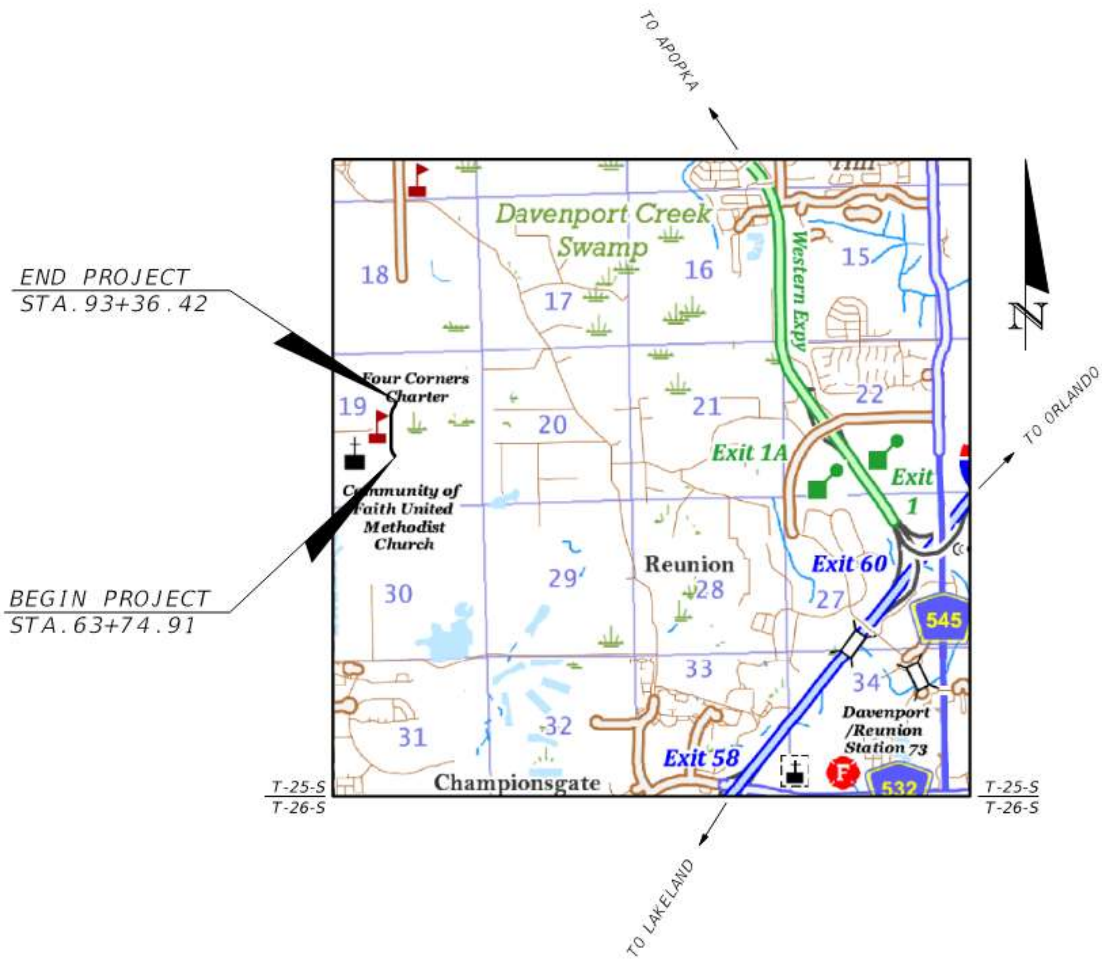
STORMWATER REPORT
FOR
WESTSIDE BOULEVARD EXTENSION
STA 66+00 – STA 96+00

60% DRAINAGE DESIGN REPORT
OSCEOLA COUNTY, FLORIDA



JUNE 6, 2022
HAMILTON PROJECT NO. 53509.0017

Signature Sheet for:

STORMWATER REPORT

FOR

WESTSIDE BOULEVARD EXTENSION

OSCEOLA COUNTY, FLORIDA

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1.0 Introduction

The purpose of this report is to present the engineering details and calculations for the site stormwater management system for a roadway project located in northwestern Osceola County, Florida. This report is in support of a request to construct a stormwater treatment system to serve a portion of a new 4-lane divided urban road called Westside Boulevard.

The project will have one wet pond (Pond 1) to serve the portion of the Westside Boulevard road extension. All treatment volume shall be provided by the one detention wet pond.

1.1 Location

This site is located in a portion of Section 19, Township 25 South, Range 27 East in Osceola County, Florida. The proposed improvements begin at the end of the southeast development called Tract X owned by Lennar LLC and the end of the southwest development called Eden Gardens owned by EGR LLC and ends at the beginning of the Northwest residential development called Soleil at Westside owned by Mattamy Homes. The south and north developments that our proposed road is tying into are currently being designed and modified therefore coordination with the property owners is still ongoing. The location map is included in Appendix A. The project's horizontal datum is the Florida State Plane East zone (NAD 1983) and the vertical datum is NAVD88.

2.0 Pre-Development Overview

A pre-development analysis was performed to verify offsite impacts to the property, drainage patterns, and existing runoff rates to the adjacent properties. Most of the project is within a TOHO Water Authority parcel and is within the Reedy Creek Drainage Basin. The existing drainage pattern consists of runoff draining towards the East to adjacent wetlands (Wetland 1) that will ultimately outfall into Davenport Creek (WBID 3170K) which is an impaired water body (fecal coliform). A field review was conducted by HNTB on January 26th, 2021. Based on what was observed in the field and other information included in previously permitted projects in the area, it was determined that the existing land uses are primarily wetlands and open space.

2.1 Pre-Development Analysis Goals

The pre-development analysis for the project was performed to determine existing offsite peak runoff discharge rates (cfs).

2.2 Existing Conditions

2.2.1 Soils

The project location has been delineated on the soils map provided in a soils maps provided in a geotechnical study performed by Geotechnical and Environmental Consultants, Inc. dated February 26, 2021. The soils within this project area consist of Basinger fine sand (depressional, 0 to 1 % slopes), Candler sand (0 to 12 % slopes), and Smyrna fine sand (0 to 2 % slopes). Soil types are A and A/D. The Type A soil area shall be evaluated as Type A soils in both the existing and proposed conditions. The soil areas classified as Type A/D will be evaluated as Type A soil in the existing and developed condition. Soils within Group A have a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well-drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

2.2.2 Control Elevations

Royal Consulting Services is providing Osceola County and Toho Water Authority with plans for Rapid Infiltration Basin's (RIBs) to help treat and disperse municipal wastewater in the area. The RIBs system is planned to be in place prior to the construction of Westside Boulevard and the plans show Westside Boulevard within the influence of this development. Royal Consulting provided an exhibit that shows groundwater levels in the wet season higher than what is observed in the geotechnical report. The water table in the model varies and gets lower with increased distance from the RIBs. The water table shown in Royal Consulting Services' model is used as the estimated seasonal high water table with a value of 118.00 ft NGVD29 or 117.25 NAVD88 used for the pond design. These elevations were converted from NGVD29 to NAVD88 using a conversion factor, acquired from NOAA's online Vertical Datum Transformation tool, of NAVD88 = NGVD29 - 0.86, provided in Appendix B. The exhibit, extracted from Royal Consulting's model, can be found in Appendix B.

2.2.3 Wetlands

The proposed Westside Boulevard roadway extension is adjacent to offsite wetlands to the east (Wetland 1), that will be impacted. The total primary wetland impact is 0.13 acres and total secondary wetland impact is 0.25 acres.

2.2.4 Flood Plain Area

The following Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (Map Number 12097C0020G) for Osceola County, Florida was used to identify potential floodplains associated with the project. The FEMA Map used for the floodplain analysis is shown in Appendix A.

As shown in the FEMA map, there are locations that our proposed development impacts Zone A floodplain locations. Since there is no existing permitted information on what the existing floodplain elevation is and FEMA does not provide Zone A floodplain elevations, a vertices method was used to estimate the floodplain elevation. This method overlaps the floodplain shape with the surveyed contours along the project. Where the proposed project impacts the floodplain, multiple points were plotted to estimate the floodplain elevation using surveyed elevations. After calculations were completed, the estimated floodplain elevation is 117.15 ft (NAVD88).

The RIBs exhibit provided by Royal Consulting, found in Appendix B, shows the wetlands having a wet seasonal high water table (SHWT) of approximately 117.85 ft (NAVD88). Since the SHWT elevation of 117.85 ft at the wetlands is higher than the calculated floodplain elevation of 117.15 ft, there are no anticipated floodplain impacts.

2.2.5 Drainage Basins, Flow Patterns and Cross Drains

It was determined that the project site has seven (7) distinct pre-development drainage basins. A pre-development drainage basin map showing the basins and discharge points is shown in Appendix B. Pre-development drainage basins 1, 2, and 3 are located within post-development basin project limits and were utilized to calculate the pre-development discharge rate for Pond 1's control structure to Wetland 1. Pre-development basins CD-1, CD-2, CD-3, and CD-4 are offsite existing drainage patterns that will require proposed cross drains. In the existing condition, the ground sheet flows naturally to the east towards the existing Wetland 1. When Westside Boulevard is constructed, cross drains in junction with roadside ditches will be used to convey runoff from the west towards the east into Wetland 1. The roadside ditches were added to the west side of Westside Boulevard to avoid runoff encroaching past the right of way during large storm events. Further design of the proposed cross drains can be found in the Post Development Conditions section of this report.

The proposed pond (Pond 1) is located in the southwest section of the Westside Boulevard extension (around station 73+00 – 75+00) and will discharge in one location to Wetland 1, a historical runoff point (Pre-Basin 1-3). Since basins CD-1 to CD-4 existing runoff will not be conveyed into Pond 1, only pre-development basins 1-3 were analyzed to determine the existing offsite discharge rates. A full-size copy of this map is included in the pre-condition analysis located in Appendix B.

2.2.6 Curve Number Calculations

All existing ground curve numbers have been determined using SFWMD's Soil Profile Storage Table.

PRE-BASIN 1

	Land Use / Soil Storage	Area, ac.	% Area	CN No.	Comp. CN
----	Open Water/Wetland	0.68	12.4%	98	12.2
A	Flatwoods, Depth to WT: 2 & Uncompacted (Boring: AB-2-AB-5 & AB-7)	3.69	67.5%	80	54.0
A	Flatwoods, Depth to WT: 4 & Uncompacted (Boring: PB-1 & PB-2)	1.10	20.1%	53	10.7
		5.47	**100%**		**76.8**

PRE-BASIN 2

	Land Use / Soil Storage	Area, ac.	% Area	CN No.	Comp. CN
----	Open Water	0.01	0.3%	98	0.3
A	Flatwoods, Depth to WT: 4 & Uncompacted (Boring: AB-8 - AB-13)	2.94	99.7%	53	52.8
		2.95	**100.0%**		**53.2**

PRE-BASIN 3

	Land Use / Soil Storage	Area, ac.	% Area	CN No.	Comp. CN
A	Flatwoods, Depth to WT: 4 & Uncompacted (Boring: AB-14)	1.29	100.0%	53	53.0
		1.29	100.0%		53.0

2.2.7 Time of Concentration

For overland flow less than 300 feet, Manning's kinematic solution (Overtop & Meadows 1976) was used to calculate the time of concentration. The project site's ground cover is short grass condition corresponding to a roughness coefficient of 0.15.

$$t_O = \frac{0.007(nL_O)^{0.8}}{(P_2)^{0.5}(s_O)^{0.4}}$$

where t_O = overland flow travel time, hours
n = Manning's roughness coefficient;
L_O = flow length, feet
P_2 = 2-year 24-hour rainfall depth, inches;
s_O = overland flow slope, feet/foot.

After a maximum of 300 feet, sheet flow usually becomes a shallow concentrated flow. The following equation was used to calculate the time of concentration of shallow concentrated flow.

$$T_t = \frac{L}{3600V}$$

Where T_t = travel time (hr)
L = flow length (ft)
V = average velocity (ft/s)

PRE-BASIN 1

Section 1:			Section 2:			Section 3:		
Watercourse:	Short Grass							
Slope (s):	0.0265	ft/ft	Surface Description:	Unpaved		Surface Description:	Unpaved	
Length (L):	100	ft	Watercourse Slope (s):	0.0105	ft/ft	Watercourse Slope (s):	0.0102	ft/ft
Runoff (P): *	5	in	Flow Length (L):	156	ft	Flow Length (L):	120	ft
Mannings (n): **	0.15		Avg. Velocity	1.65	ft/s	Avg. Velocity	1.63	ft/s
			V = 16.1345 x S^0.5			V = 16.1345 x S^0.5		
Time of Conc =	$\frac{.007(Ln)^{.8}}{P^{.5}s^{.4}}$		Time of Conc =	$\frac{L}{3600V}$		Time of Conc =	$\frac{L}{3600V}$	
Time of Conc =	0.12	hrs						
Time of Conc =	7.00	mins	Time of Conc =	0.03	hrs	Time of Conc =	0.02	hrs
			Time of Conc =	1.57	mins	Time of Conc =	1.23	mins

Total Time of Concentration =	9.80	mins

PRE-BASIN 2

Section 1:			Section 2:			Section 3:		
Watercourse:	Short Grass							
Slope (s):	0.0363	ft/ft	Surface Description:	Unpaved		Surface Description:	Unpaved	
Length (L):	100	ft	Watercourse Slope (s):	0.0481	ft/ft	Watercourse Slope (s):	0.0061	ft/ft
Runoff (P): *	5	in	Flow Length (L):	123	ft	Flow Length (L):	165	ft
Mannings (n): **	0.15		Avg. Velocity	3.54	ft/s	Avg. Velocity	1.26	ft/s
			V = 16.1345 x S^0.5			V = 16.1345 x S^0.5		
Time of Conc =	$\frac{.007(Ln)^{.8}}{P^{.5}s^{.4}}$		Time of Conc =	$\frac{L}{3600V}$		Time of Conc =	$\frac{L}{3600V}$	
Time of Conc =	0.10	hrs						
Time of Conc =	6.18	mins	Time of Conc =	0.01	hrs	Time of Conc =	0.04	hrs
			Time of Conc =	0.58	mins	Time of Conc =	2.18	mins

Total Time of Concentration =	8.93	mins

PRE BASIN 3

Section 1:			Section 2:		
Watercourse:	Short Grass				
Slope (s):	0.0257	ft/ft	Surface Description:	Unpaved	
Length (L):	100	ft	Watercourse Slope (s):	0.0556	ft/ft
Runoff (P): *	5	in	Flow Length (L):	208	ft
Mannings (n): **	0.15		Avg. Velocity	3.81	ft/s
			V = 16.1345 x S^0.5		
Time of Conc =	$\frac{.007(Ln)^{.8}}{P^{.5}s^{.4}}$		Time of Conc =	$\frac{L}{3600V}$	
Time of Conc =	0.12	hrs			
Time of Conc =	7.09	mins	Time of Conc =	0.02	hrs
			Time of Conc =	0.91	mins

Total Time of Concentration =	7.11	mins

2.2.8 Peak Runoff Rate Determination

To determine the offsite runoff, ICPR version 3, was used to create hydrographs for the existing basin of interest. The maximum runoff rates derived from the hydrograph will be used as the maximum allowable runoff in the post condition pond design.

2.2.9 Existing Conditions Summary

After performing an in-depth pre-condition analysis on the subject property, it was determined that the existing peak runoff from the basins of interest for the 10-year, 72-hour storm are as follows:

Pre-Basin 1: 15.83 cfs
Pre-Basin 2: 5.25 cfs
Pre-Basin 3: 1.65 cfs

The normal water elevation used in analysis for Pond 1 will be 117.25 (NAVD88, feet). See attached Geotechnical and Environmental Consultants, Inc. geotechnical report (dated February 26) and Royal Consulting Services' RIBs exhibit.

3.0 PROPOSED DEVELOPMENT

3.1 Permits Required

All necessary construction permits will be obtained before any construction activity occurring within the project limits. Permits that may be required include, but are not limited to the following:

- Osceola County SDP approval
- SFWMD Environmental Resource Permit
- FDEP Water and Sewer Permit

3.2 Post-Development Design Criteria

The objectives for this project are to provide water quality treatment of the stormwater runoff and to attenuate the peak discharge of the design storm. The pond onsite will be a wet detention pond with offsite discharge via a control structure.

The following design criteria were used for this project:

1. Wet detention (Pond 1): pond shall provide treatment volume for the first 1" of the total basin area or 2.5" of percent impervious, whichever is greater. Discharge shall be limited to existing offsite discharge rates. Pond shall recover entire volume within 14 days via natural percolation and/or bleeder device. If the pond cannot recover in the allotted time, an additional 100-year/24-hour storm event shall be detained.
2. The minimum roadway elevations shall be above the 10-year/24-hour design storm.
3. Cross drains shall convey runoff from the 50-year/24-hour design storm.

3.3 Design Storms and Rainfall Amounts

The following design storms and corresponding rainfall depths were used in the pre-development and post-development analysis. (Source: SFWMD ERP Environmental Resource Permit, A.H. II, May 2016; Osceola County Land Development Code, June 2022 & Florida Department of Transportation (FDOT) Drainage Manual, January 2021).

Frequency/Duration	Total Rainfall	Rainfall Distribution
10-year/24-hour	P = 6"	FL Modified
10-year/72-hour	P = 7.8"	SFWMD 72 hour
50-year/24-hour	P = 9.3"	FL Modified
100-year/72-hour	P = 12"	SFWMD 72 hour

3.4 Post Development Conditions

3.4.1 Project Areas

The Westside Boulevard project consists of one (1) post development drainage basins and four (4) cross drain post development basins. Basin 1 collects the stormwater runoff from only Westside Boulevard. The post development drainage Basin 1 is 9.71 acres. The post development drainage basin 1 areas are listed below. Post development cross drain basins areas will not be included in this report since there is no impervious area therefore no required water quality.

BASIN 1			
Total Area:	9.71	ac	100%
Building Area:	0.00	ac	0%
Asphalt Area:	3.30	ac	34%
Sidewalk/Driveways Area:	1.47	ac	15%
Wet Detention Area:	0.56	ac	6%
Wetland Preservation Area:	0.00	ac	0%
Green/Open Area:	4.38	ac	45%
Pervious Area:	4.38	ac	45%
Impervious Area:	4.77	ac	49%

A full-size post condition drainage map is located in Appendix C.

3.4.2 Curve Number Calculations

All proposed curve numbers have been determined using SFWMD's Soil Profile Storage Table.

BASIN 1 (Pond 1)

	Land Use	Area, ac.	% Area	CN No.	Comp. CN
Impervious Area:					
----	Building Area	0.00	0.0%	98	0.00
----	Asphalt	3.30	34.0%	98	33.31
----	Sidewalks/Driveways	1.47	15.1%	98	14.84
----	Wetland	0.00	0.0%	95	0.00
----	***Pond:***	0.56	5.8%	95	5.48
Pervious Area:					
A	Flatwoods, Depth to WT=4.0, Compacted	4.38	45.1%	60	27.06
		9.71	100%		**80.69**

3.4.3 Time of Concentration Calculations

The time of concentration for the post development drainage basins was determined to be 19.64 mins.

POST BASIN 1

Section 1:			Section 2:		
Watercourse:	Smooth Surface		Surface Description:	Concrete Pipe	
Slope (s):	0.0200	ft/ft	Watercourse Slope (s):	0.0020	ft/ft
Length (L):	102	ft	Flow Length (L):	2239	ft
Runoff (P): *	5	in	Avg. Velocity	2.00	ft/s
Mannings (n): **	0.011				
Time of Conc =	$\frac{.007(Ln)^{.8}}{P^{.5}s^{.4}}$		Time of Conc =	$\frac{L}{3600V}$	
Time of Conc =	0.02	hrs	Time of Conc =	0.31	hrs
Time of Conc =	0.98	mins	Time of Conc =	18.66	mins

Total Time of Concentration = 19.64 mins

3.4.4 Control Elevation and Soil Conditions

The normal wet seasonal water elevations used for Pond 1 was determined to be 117.25 NAVD88 based on the water table shown in Royal Consulting Services' model for the RIBs, as previously mentioned.

3.4.5 Proposed Pond Stage/Storage

Pond 1

ELEV	DEPTH ft	AREA ft	AREA ac	VOL. cf	VOL. ac-ft
117.25	0.00	22603	0.52	0	0.00
118.00	0.75	25495	0.59	18398	0.42
119.00	1.75	29350	0.67	46302	1.06
120.00	2.75	33205	0.76	78062	1.79
121.00	3.75	37061	0.85	113677	2.61
122.00	4.75	40916	0.94	153147	3.52
122.50	5.25	42844	0.98	174329	4.00

PAV Provided

3.4.6 Water Quality Required

The water quality volumes were determined using the SFWMD rules and regulations (Volume IV Permit Information Manual). The pollution abatement volume required will be greater of the first 1" of runoff from the entire site or 2.5" over the percent impervious from the entire site as calculated in Appendix C. The required pollution treatment volume will be fully satisfied by wet detention Pond 1.

This site is located in the Lake Okeechobee basin as shown in the following figure. To satisfy current TMDL requirements, an additional 50% of pollution abatement volume has been provided as shown below. The additional 50% of pollution abatement volume can be seen in the required water quality calculations located in Appendix C.

Figure 1: Lake Okeechobee Basin Map

Basin 1 PAV Required (Appendix C): **1.49** ac-ft Total PAV Provided: **1.79** ac-ft

The water quality volumes provided correspond with the weir elevations for each pond:

Pond 1: **1.79** ac-ft @ 120.00' (NAVD88)
(Pond Bottom 105.00', weir crest elevation at 120.00', bleeder invert elevation at 117.25')

3.4.7 Wet Detention Area Dimension Criteria

Total Wet Detention Area @ NWL = 0.52 ac = 22,603 SF (Minimum 0.5 acre)
Approximate Length of Pond 1 (Irregular Shape) @ NWL = 205 ft
Average Width of Pond 1 @ NWL = 22,603 SF/ 205 ft = **110 ft**

Therefore, the wet detention pond meets the required dimensional criteria as outlined in Section 5.4.2., Vol. II.

3.4.8 Offsite Discharge

The proposed discharge point is to the offsite wetland 1, a historical runoff area. The runoff shall be discharged via a drop structure and spreader swale. The spreader swale will limit the velocity of the water leaving the site and reduce the height of the runoff to a shallow film.

3.4.9 Tailwater

For Pond 1, the tailwater condition is set at an elevation of 116.15' NAVD88. The tailwater conditions were determined by on the water table shown in Royal Consulting Services' model for the RIBs, as previously mentioned.

3.4.10 Pond Recovery

Pond recovery analyses were run using ICPR version 3.1 software. A separate recovery analysis was performed for the pond to demonstrate recovery of the water quality treatment volume. This was performed by running the routing time out an additional 336 hours (14 days) past the design storm event. Pond 1 is a wet detention pond that has a 3" circular bleed down device to assist with the recovery of the water quality treatment volume in Control Structure CS-1. The 3" circular bleed down orifice is set at the normal water elevation of 117.25' NAVD88. Circular Bleeder calculations can be found in Appendix C. No percolation was utilized. The pond recovery flat lines at approximately 0.21 feet above the normal water level at hour 300 of the 10-year/72-hour storm event.

3.4.11 Cross Drains

There are four (4) proposed cross drains, CD-1, CD-2, CD-3, and CD-4, within the project limits that will be needed to maintain offsite existing drainage patterns. The cross drain sizes were sized based on the 50-year – 24-hour design storm per Osceola County LDC Section 4.5.1.F. To determine the total offsite runoff to each cross drain, ICPR version 3, was used to create hydrographs for the existing basin of interest. The maximum runoff rates derived from the hydrograph for the 50-year – 24-hour storm will be used to size the cross drain. All existing offsite drainage area for the cross drains is assumed to have a curve number of 53, for Flatwoods, Depth to the water table of 4ft, and uncompacted soil. Time of concentration for the offsite cross drain areas are calculated below:

CD-1

Section 1:			Section 2:			Section 3:		
Watercourse:	Short Grass		Surface Description:	Unpaved		Cross Sectional Flow Area:	4	ft^2
Slope (s):	0.0362	ft/ft	Watercourse Slope (s):	0.0231	ft/ft	Wetted Perimeter, Pw	8.25	ft
Length (L):	100	ft	Flow Length (L):	294	ft	Hydraulic Radius, r=a/Pw	0.48	ft
Runoff (P): *	5	in	Avg. Velocity	2.45	ft/s	Channel Slope, S	0.0038	ft/ft
Mannings (n): **	0.15		V = 16.1345 x S^0.5			Manning's (n):**	0.08	
						V=1.49(r^2/3)(s^1/2) / n	0.70	ft/s
Time of Conc =	$\frac{.007(Ln)^{.8}}{P^{.5}s^{.4}}$		Time of Conc =	$\frac{L}{3600V}$		Flow Length, L	280	ft
Time of Conc =	0.10	hrs	Time of Conc =	0.03	hrs	Time of Conc =	0.11	hrs
Time of Conc =	6.18	mins	Time of Conc =	2.00	mins	Time of Conc =	6.63	mins

Total Time of Conc.= 14.81 mins

CD-2

Section 1:			Section 2:			Section 3:		
Watercourse:	Short Grass		Surface Description:	Unpaved		Cross Sectional Flow Area:	4	ft^2
Slope (s):	0.0312	ft/ft	Watercourse Slope (s):	0.0346	ft/ft	Wetted Perimeter, Pw	8.25	ft
Length (L):	100	ft	Flow Length (L):	1381	ft	Hydraulic Radius, r=a/Pw	0.48	ft
Runoff (P): *	5	in	Avg. Velocity	3.00	ft/s	Channel Slope, S	0.0094	ft/ft
Mannings (n): **	0.15		V = 16.1345 x S^0.5			Manning's (n):**	0.08	
						V=1.49(r^2/3)(s^1/2) / n	1.12	ft/s
Time of Conc =	$\frac{.007(Ln)^{.8}}{P^{.5}s^{.4}}$		Time of Conc =	$\frac{L}{3600V}$		Flow Length, L	298	ft
Time of Conc =	0.11	hrs	Time of Conc =	0.13	hrs	Time of Conc =	0.07	hrs
Time of Conc =	6.56	mins	Time of Conc =	7.66	mins	Time of Conc =	4.45	mins

Total Time of Conc. = 18.67 mins

CD-3

Section 1:			Section 2:			Section 3:		
Watercourse:	Short Grass		Surface Description:	Unpaved		Cross Sectional Flow Area:	4	ft^2
Slope (s):	0.0263	ft/ft	Watercourse Slope (s):	0.0328	ft/ft	Wetted Perimeter, Pw	8.25	ft
Length (L):	100	ft	Flow Length (L):	535	ft	Hydraulic Radius, r=a/Pw	0.48	ft
Runoff (P): *	5	in	Avg. Velocity	2.92	ft/s	Channel Slope, S	0.0051	ft/ft
Mannings (n): **	0.15		V = 16.1345 x S^0.5			Manning's (n):**	0.08	
						$V=\frac{1.49(r^{2/3})(s^{1/2})}{n}$	0.82	ft/s
Time of Conc =	$\frac{.007(Ln)^{.8}}{P^{.5}s^{.4}}$		Time of Conc =	$\frac{L}{3600V}$		Flow Length, L	500	ft
Time of Conc =	0.12	hrs	Time of Conc =	0.05	hrs	Time of Conc =	0.17	hrs
Time of Conc =	7.03	mins	Time of Conc =	3.05	mins	Time of Conc =	10.15	mins

Total Time of Conc. = 20.23 mins

CD-4

Section 1:			Section 2:			Section 3:		
Watercourse:	Short Grass		Surface Description:	Unpaved		Cross Sectional Flow Area:	4	ft^2
Slope (s):	0.0331	ft/ft	Watercourse Slope (s):	0.0378	ft/ft	Wetted Perimeter, Pw	8.25	ft
Length (L):	100	ft	Flow Length (L):	920	ft	Hydraulic Radius, r=a/Pw	0.48	ft
Runoff (P): *	5	in	Avg. Velocity	3.14	ft/s	Channel Slope, S	0.0134	ft/ft
Mannings (n): **	0.15		V = 16.1345 x S^0.5			Manning's (n):**	0.08	
						$V=\frac{1.49(r^{2/3})(s^{1/2})}{n}$	1.33	ft/s
Time of Conc =	$\frac{.007(Ln)^{.8}}{P^{.5}s^{.4}}$		Time of Conc =	$\frac{L}{3600V}$		Flow Length, L	44	ft
Time of Conc =	0.11	hrs	Time of Conc =	0.08	hrs	Time of Conc =	0.01	hrs
Time of Conc =	6.41	mins	Time of Conc =	4.89	mins	Time of Conc =	0.55	mins

Total Time of Conc. = 11.85 mins

The proposed cross drains and their respective locations and sizes are summarized in the Table below.

Cross Drain ID	Station	Size (Inches)
CD-1	72+50	36”
CD-2	75+87	36”
CD-3	84+00	24”
CD-4	86+75	36”

Drainage maps, illustrating the proposed cross drains, are included in Appendix C.

3.4.12 Nutrient Loading Analysis

Nutrient Loading Analysis for Pond 1 is to be calculated during the 90% set and submitted under a separate cover. Pond 1 was designed with a treatment volume of more than 150% the required volume, as required by the TMDL requirements for the Lake Okeechobee Basin.

3.4.13 Skimmer and Spreader Swale Calculations

The skimmer will be evaluated to determine that the opening is sufficient to not impede the flow of water entering the weir. Also, the spreader swale will be designed to limit velocity and depth of potential overflow leaving the site to ensure that there are no negative impacts to the adjacent wetlands. The skimmer calculations and spreader swale calculations are included in Appendix E.

4.0 SUMMARY OF RESULTS

Detention Pond	Pond 1
Pond Treatment Volume Required (ac-ft)	1.49
Pond Treatment Volume Provided (ac-ft)	1.79 @ 120.00’
Peak Stage of 10-yr/24-hr Storm Event (ft)	120.20
Minimum Pavement Elevations Proposed (ft)	124.11
Peak Stage of 10-yr/72-hr Storm Event (ft)	120.62
Top of Pond Berm (ft)	122.50
Max Stage of 100-yr/72-hr Storm Event (ft)	121.14
Minimum Final Floor Elevations Proposed (ft)	N/A
Total Peak Discharge Rate Allowed (10-yr/72-hr, cfs)	22.73
Total Peak Discharge Rate Provided (10-yr/72-hr, cfs)	13.06
Drawdown Elevation Required after 336 hrs of 10-yr/72-hr (ft)	117.25
Drawdown Elevation After 10-yr/72-hr (ft)	117.46

In conclusion, the site improvements proposed on this project meet the applicable stormwater management criteria per SFWMD and Osceola County.

5.0 CONSTRUCTION TECHNIQUES

The contractor shall utilize best management practices during construction to prevent erosion, turbidity and sedimentation in off-site wetlands and water bodies. Mass grading will be an interim construction phase where runoff will be graded to flow directly to the ponds or to on-site low spots for future storm drain inlets (that will be connected to ponds when constructed). Any discharges that are not connected to the pond during the interim mass grading phase will be controlled using best management practices (BMPs) prior to discharge in accordance with the Stormwater Pollution Prevention Plan developed by the contractor for compliance with NPDES stormwater permitting. The contractor shall also provide a silt fence around the site in accordance with South Florida Water Management District standards and specifications and as shown on the erosion control plans. A double-row silt fence will be installed along all wetland boundaries. After construction is complete, all disturbed areas shall be neatly graded, seeded and mulched or sodded as noted. Areas within the County R/W shall be sodded.

6.0 SYSTEM CONSTRUCTION AND MAINTENANCE

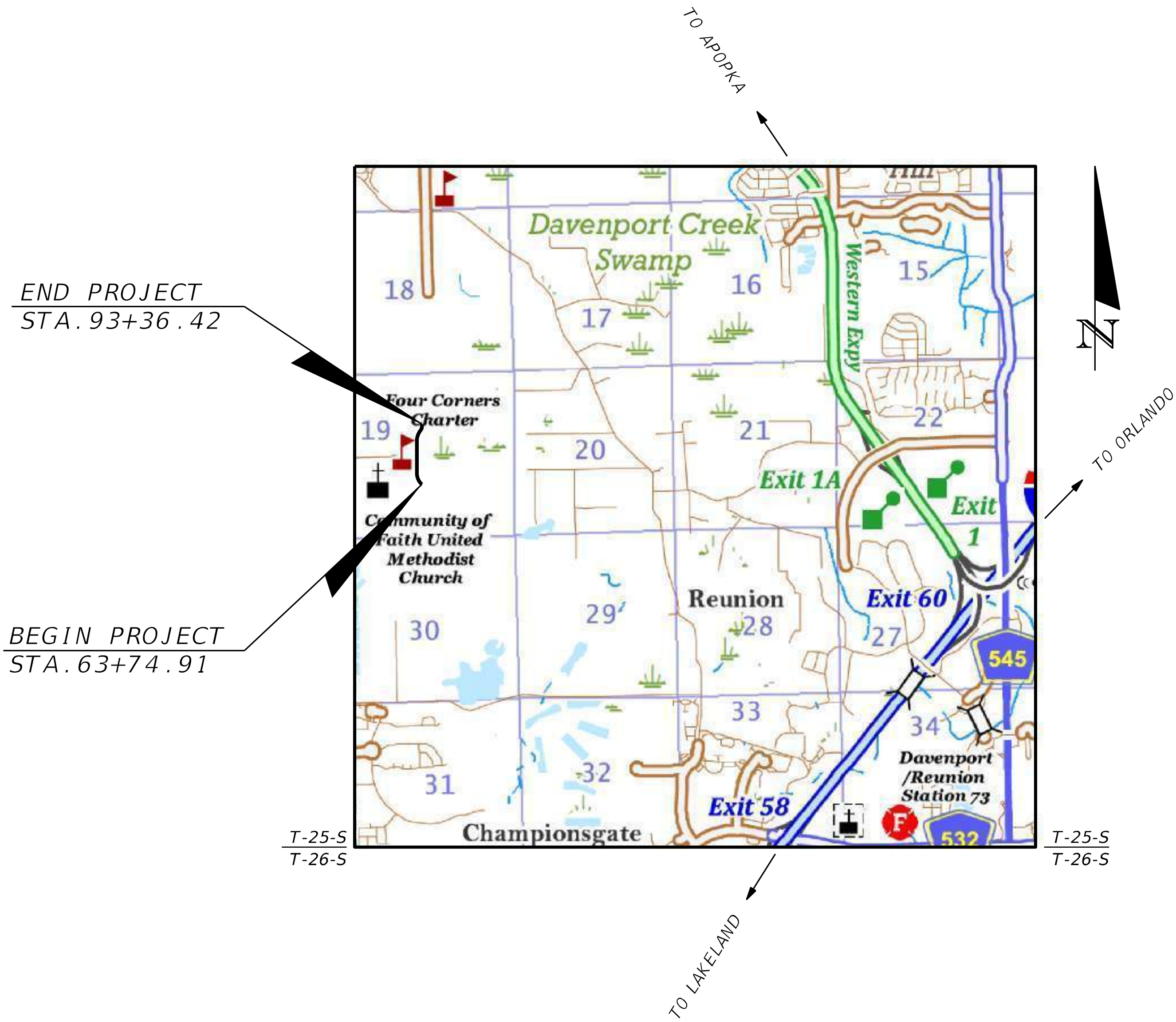
The project site will be mass graded with the stormwater pond modifications/additions constructed at that time. Tract X Property is located within the overall limits of the area to be maintained by the Stoneybrook South at Championsgate Community Development District (CDD). The CDD will be responsible for the operation and maintenance of all ponds located within the Tract X Property. The CDD is a local unit of special purpose government created under Florida law, and will be responsible for the maintenance of certain improvements, infrastructure and facilities within their respective Districts. The Stoneybrook South at ChampionsGate CDD was established by Osceola County Ordinance 2016-70.

Appendix A

Exhibits

1. **Location Map**
2. **Legal Description**
3. **Soils Map & Description**
4. **FIRM Flood Map**

LOCATION MAP
WESTSIDE BLVD EXTENSION



AUGUST 2021
OSCEOLA COUNTY, FLORIDA

Westside Boulevard Extension
Osceola County, Florida

Description:

The easterly 540 feet of Parcel 19-25-27-0000-0030-0000, said parcel being more particularly described as:

S3/4 OF E1/2 OF NE1/4 OF SW1/4 LESS FOUR CORNERS SCHOOL PB 12 PG 92-93 & LESS COM AT SE COR OF LOT 3 BLK C, FLA FRUIT & TRUCK LAND CO PB B PG 68, S89-42-12W 144.36 FT TO POB; CONT S89-42-12W 356.91 FT, N00-01-30E 365.01 FT, N89-42-12E 274.96 FT, S00-18-06E 98.99 FT TO POC, CONC E, RAD 349.41 FT, CENT ANG 23 DEG, (CH BEARING S11-47-33E 139.22 FT), SLY ALONG CURVE 140.15 FT, S21-19-09E 101.77 FT TO POC, CONC NE, RAD 328.78 FT, CENT ANG 07 DEG, (CH BEARING S24-37-44E 37.96 FT), SELY ALONG CURVE 37.99 FT TO POB & LESS BEG AT SW COR OF LOT 5 BLK C, FLA FRUIT & TRUCK LAND CO PB B PG 68, N00-01-30E 365.01 FT, N89-42-12E 477.38 FT, S00-01-30W 365.01 FT, S89-42-12W 477.38 FT TO POB.

Together with the easterly 300 feet of Parcel 19-25-27-3160-000C-0040, said parcel being more particularly described as:

FLA FRUIT & TRUCK LAND CO SUB BLK C N 1/2 OF LOT 4 & N 1/4 OF LOTS 5 & 6 LESS THAT PORTION OF FOLLOWING LYING IN LOTS 4, 5 & 6: BEG NW COR LOT 6 BLK C FLA FRUIT & TRUCKLAND CO, S 609.75 FT, N 89 DEG E 338.07 FT, N 125.05 FT, N 53 DEG E 205.12 FT, N 30 DEG E 134.36 FT, N 50 DEG E 44.83 FT, E 30.80 FT TO POC CONCAVE NWLY WITH RADIUS OF 283.75 FT, CENT ANG 34 DEG 27 MIN 37 SEC FOR 170.66 FT, S 55 DEG E 74.39 FT, N 27 DEG E 298.35 FT, N 600 FT, S 89 DEG 350 FT TO POC CONCAVE SELY WITH RADIUS OF 1,298.93 FT, CENT ANG 38 DEG 15 MIN 55 SEC FOR 867.50 FT, S 100 FT TO POB LESS FOUR CORNERS SCHOOL PB 12 PG 92-93.

Together with the easterly 300 feet of Parcel 19-25-27-3160-000B-0010, said parcel being more particularly described as:

FLA FRUIT & TRUCK LAND CO SUB BLK B LOT 1 & 12 & S1/2 LOTS 13 TO 16 LESS W 25 FT LOT 12 FOR RD R/W LESS THAT PORTION OF FOLLOWING LYING IN LOTS 1-12 BLK B: BEG NW COR LOT 6 BLK C FLA FRUIT & TRUCKLAND CO, S 609.75 FT, N 89 DEG E 338.07 FT, N 125.05 FT, N 53 DEG E 205.12 FT, N 30 DEG E 134.36 FT, N 50 DEG E 44.83 FT, E 30.80 FT TO POC CONCAVE NWLY WITH RADIUS OF 283.75 FT, CENT ANG 34 DEG 27 MIN 37 SEC FOR 170.66 FT, S 55 DEG E 74.39 FT, N 27 DEG E 298.35 FT, N 600 FT, S 89 DEG W 350 FT TO POC CONCAVE SELY, RADIUS 1298.93 FT, CENT ANG 38 DEG 15 MIN 55 SEC FOR 867.50 FT, S 100 FT TO POB.

Together with the easterly 250 feet of Parcel 19-25-27-3160-000B-0020, said parcel being more particularly described as:

FLA FRUIT & TRUCK LAND CO SUB BLK B LOTS 2, 11, N 1/2 LOTS 13 & 14, 15 & 16 LESS W 25 FT LOT 11 FOR RD R/W.

Together with the easterly 150 feet of Parcel 19-25-27-3160-000B-0030, said parcel being more particularly described as:

FLA FRUIT & TRUCK LAND CO SUB BLK B LOTS 3 TO 6.

Final right-of-way description to be determined upon completion of the roadway design and preparation of a right-of-way map.

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Osceola County, Florida

August 7, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

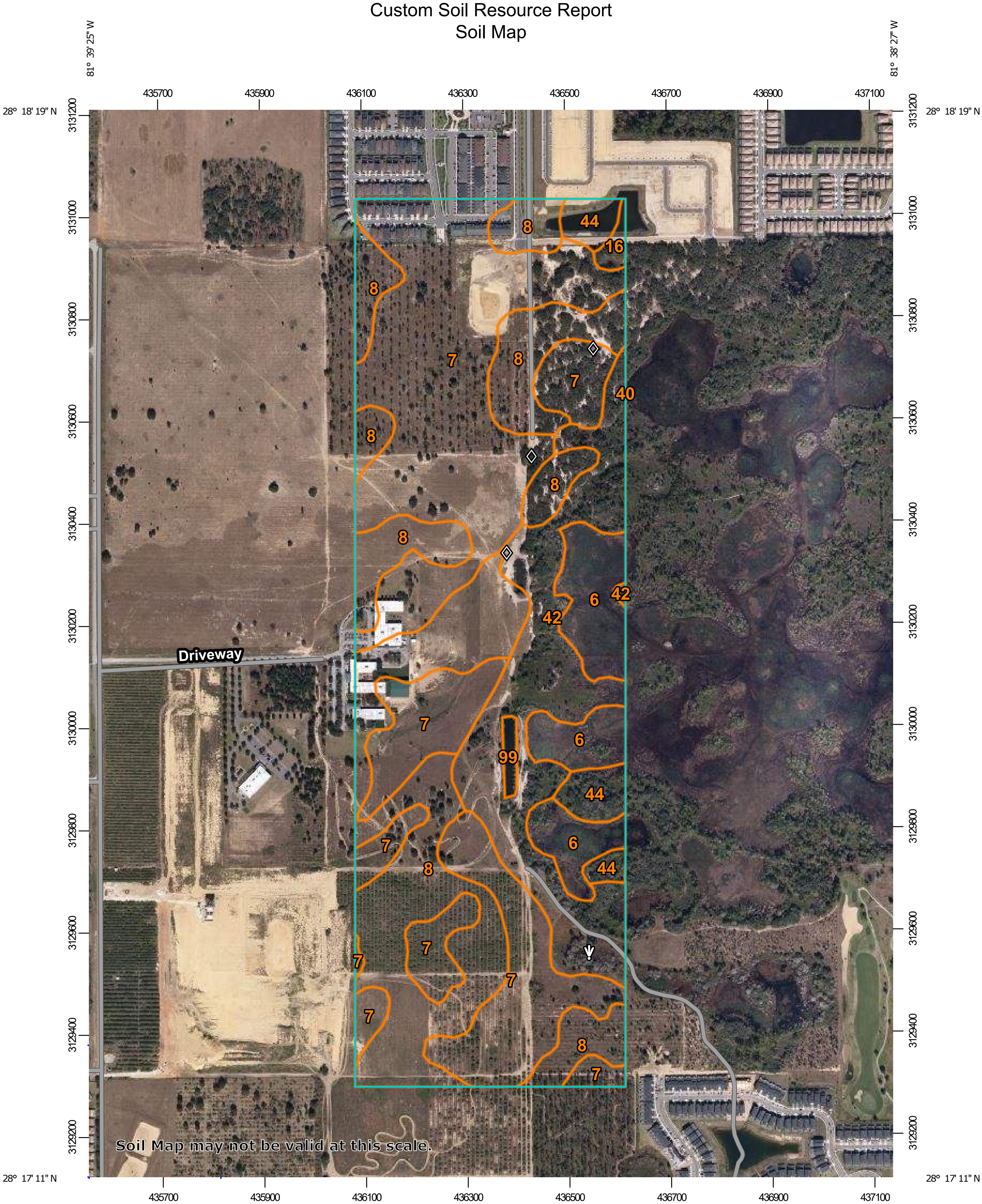
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:10,200 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 150, 300, 600, 900

Feet: 0, 450, 900, 1800, 2700

N

Map projection: Web Mercator   Corner coordinates: WGS84   Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Osceola County, Florida
Survey Area Data: Version 18, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 28, 2020—Feb 4, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6	Basinger fine sand, depressional, 0 to 1 percent slopes	18.0	7.9%
7	Candler sand, 0 to 5 percent slopes	98.2	42.8%
8	Candler sand, 5 to 12 percent slopes	68.6	29.9%
16	Immokalee fine sand, 0 to 2 percent slopes	1.1	0.5%
40	Samsula muck, frequently ponded, 0 to 1 percent slopes	0.0	0.0%
42	Smyrna fine sand, 0 to 2 percent slopes	35.8	15.6%
44	Tavares fine sand, 0 to 5 percent slopes	6.5	2.9%
99	Water	1.0	0.4%
Totals for Area of Interest		**229.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Osceola County, Florida

6—Basinger fine sand, depressional, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2v16t
Elevation: 0 to 150 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 287 to 317 days
Farmland classification: Not prime farmland

Map Unit Composition

Basinger, depressional, and similar soils: 92 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Basinger, Depressional

Setting

Landform: Depressions on marine terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 3 inches: fine sand
E - 3 to 8 inches: fine sand
E/Bh - 8 to 24 inches: fine sand
C - 24 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 50.02 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)

Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)
Hydric soil rating: Yes

Minor Components

Smyrna

Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R155XY003FL - South Florida Flatwoods
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Immokalee, hydric

Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R154XY003FL - South Florida Flatwoods
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Hydric soil rating: Yes

Floridana, hydric

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G154XB245FL)
Hydric soil rating: Yes

7—Candler sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2t3z1
Elevation: 10 to 260 feet
Mean annual precipitation: 47 to 56 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 280 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Candler and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Candler

Setting

Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, interfluve, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits and/or sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: sand
E - 6 to 63 inches: sand
E and Bt - 63 to 80 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on ridges and dunes of xeric uplands (G155XB111FL), Sandy soils on ridges and dunes of xeric uplands (G154XB111FL)
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL), Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL), Sandy soils on ridges and dunes of xeric uplands (G154XB111FL)
Hydric soil rating: No

Minor Components

Millhopper

Percent of map unit: 5 percent
Landform: Ridges on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)
Hydric soil rating: No

Tavares

Percent of map unit: 5 percent
Landform: Ridges on marine terraces
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex, concave
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)
Hydric soil rating: No

8—Candler sand, 5 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2w0q4
Elevation: 30 to 160 feet
Mean annual precipitation: 44 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 290 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Candler and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Candler

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve, side slope, tread
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Eolian deposits and/or sandy and loamy marine deposits

Typical profile

A - 0 to 5 inches: sand
E - 5 to 67 inches: sand
E and Bt - 67 to 80 inches: sand

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on strongly sloping to steep side slopes of xeric uplands (G154XB113FL)
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL), Sand Pine Scrub (R154XY001FL), Sandy soils on strongly sloping to steep side slopes of xeric uplands (G154XB113FL)
Hydric soil rating: No

Minor Components

Apopka

Percent of map unit: 6 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Other vegetative classification: Sandy soils on strongly sloping to steep side slopes of xeric uplands (G154XB113FL)
Hydric soil rating: No

Kendrick

Percent of map unit: 5 percent
Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL), Sandy over loamy soils on knolls and ridges of mesic uplands (G154XB211FL)
Hydric soil rating: No

Adamsville

Percent of map unit: 3 percent
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)
Hydric soil rating: No

Pompano

Percent of map unit: 1 percent
Landform: Flats on marine terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, talf

Down-slope shape: Linear
Across-slope shape: Linear, convex
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Hydric soil rating: Yes

16—Immokalee fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2s3lk
Elevation: 0 to 130 feet
Mean annual precipitation: 44 to 56 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Immokalee and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Immokalee

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 35 inches: fine sand
Bh - 35 to 54 inches: fine sand
BC - 54 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Minor Components

Basinger

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Pomello

Percent of map unit: 2 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: R155XY001FL - Sand Pine Scrub
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Wabasso

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Margate

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Yes

Placid

Percent of map unit: 1 percent

Landform: Depressions on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

40—Samsula muck, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2tzw9
Elevation: 0 to 250 feet
Mean annual precipitation: 44 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 335 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Samsula and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Samsula

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over sandy marine deposits

Typical profile

Oa1 - 0 to 24 inches: muck
Oa2 - 24 to 32 inches: muck
Cg1 - 32 to 35 inches: sand
Cg2 - 35 to 44 inches: sand
Cg3 - 44 to 80 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Very high (about 13.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Minor Components

Basinger

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Myakka

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Kaliga

Percent of map unit: 3 percent
Landform: Depressions on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Floridana

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Sanibel

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Anclote

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, convex
Across-slope shape: Concave, linear
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

42—Smyrna fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2svzh
Elevation: 0 to 130 feet
Mean annual precipitation: 38 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 300 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Smyrna and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Smyrna

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 13 inches: fine sand
Bh - 13 to 18 inches: fine sand
C/Bw - 18 to 49 inches: fine sand
C - 49 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Minor Components

Eaugallie

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Basinger

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Immokalee

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Placid

Percent of map unit: 2 percent
Landform: Depressions on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Pomello

Percent of map unit: 2 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

44—Tavares fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2sw00
Elevation: 0 to 130 feet
Mean annual precipitation: 42 to 63 inches
Mean annual air temperature: 66 to 77 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Tavares and similar soils: 83 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tavares

Setting

Landform: Flats on marine terraces, hills on marine terraces, ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, side slope, tread, rise
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Eolian or sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand

C - 6 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Minor Components

Cassia

Percent of map unit: 5 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Pomello

Percent of map unit: 4 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear
Ecological site: R155XY001FL - Sand Pine Scrub
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Apopka

Percent of map unit: 3 percent
Landform: Hills on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Convex

Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Hydric soil rating: No

Astatula

Percent of map unit: 3 percent
Landform: Hills on marine terraces, ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Hydric soil rating: No

Adamsville

Percent of map unit: 2 percent
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Upland Hardwood Hammock (R155XY008FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

99—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

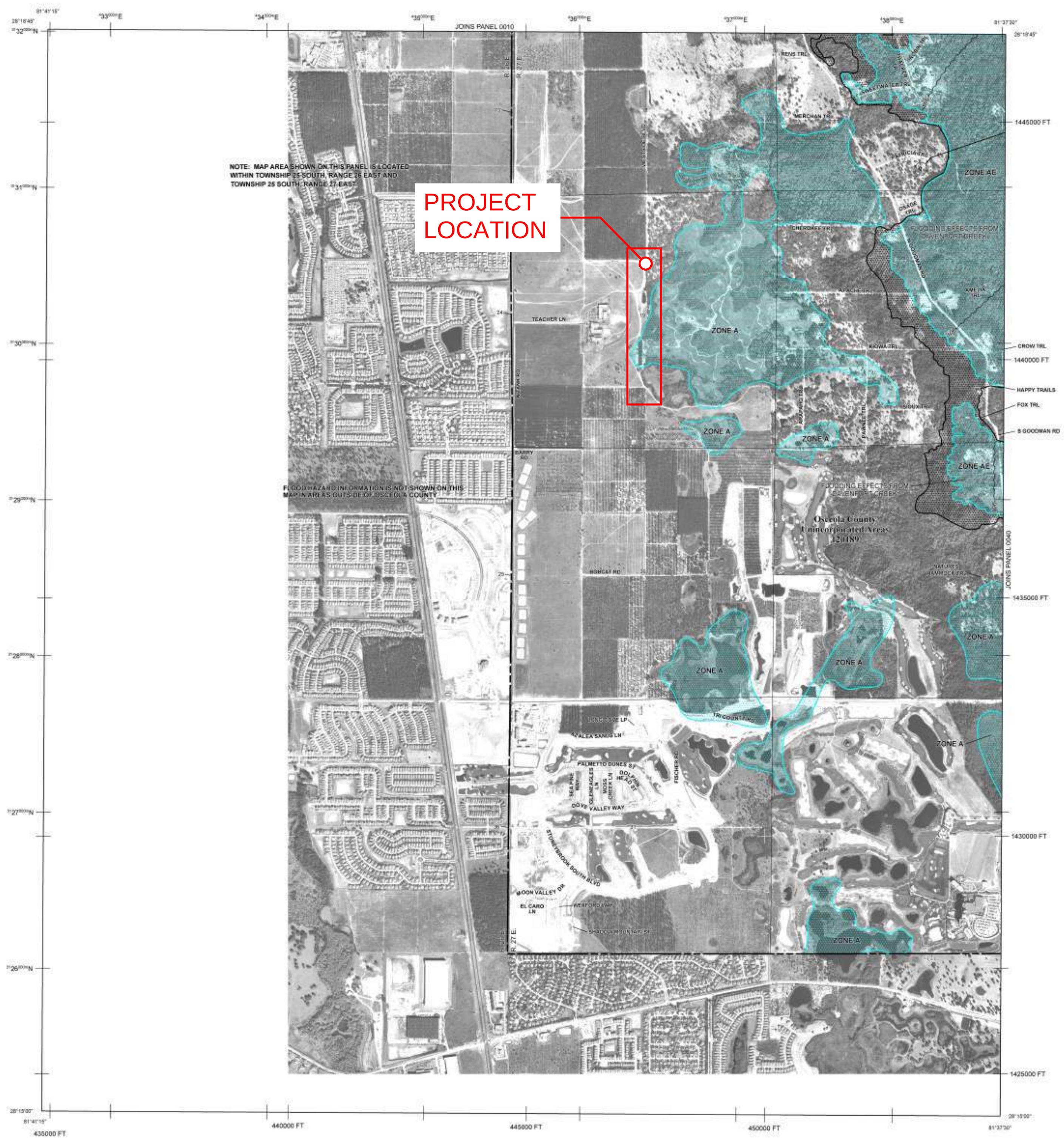
United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

NOTES TO USERS



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

OTHER AREAS

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

MAP REPOSITORIES

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP MAY 7, 2001

MAP SCALE 1" = 1000'

PANEL 0020G

NATIONAL FLOOD INSURANCE PROGRAM

NFIP

FIRM

FLOOD INSURANCE RATE MAP

OSCEOLA COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 20 OF 900

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

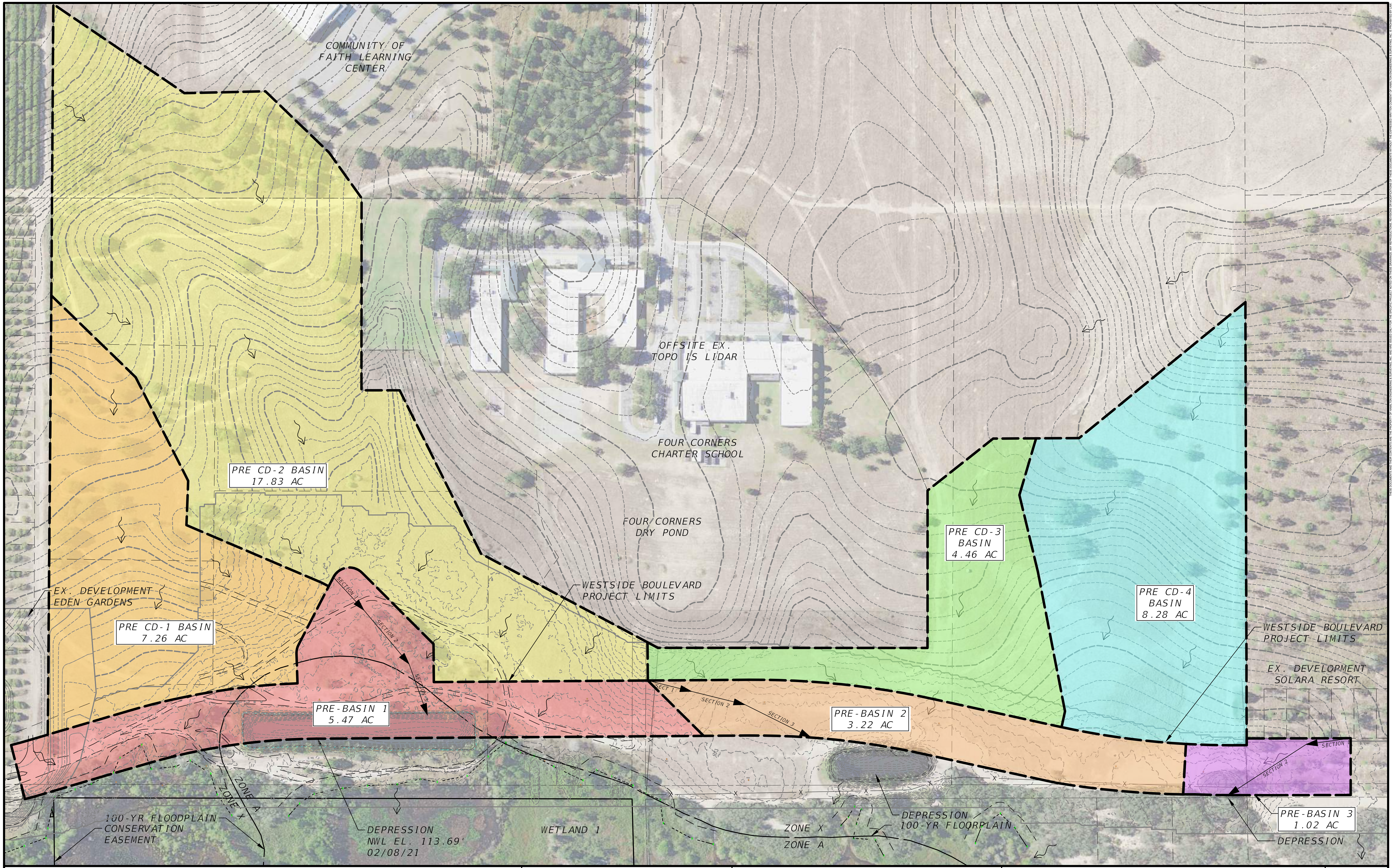
MAP NUMBER 12097C0020G

MAP REVISED JUNE 18, 2013

Federal Emergency Management Agency

Appendix B

Pre Development Analysis



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

DAVID A. REID, P.E.
P.E. LICENSE NUMBER 38794
HAMILTON ENGINEERING & SURVEYING, LLC
775 WARNER LANE
ORLANDO, FL 32803
(407) 362 - 5929 EXT 405

OSCEOLA COUNTY

OSCEOLA COUNTY
TRANSPORTATION AND TRANSIT
DEPARTMENT

PRE-DEVELOPMENT DRAINAGE MAP

SHEET NO.

EricA Jun 02, 2022 - 9:57:54am

L:\53509 Lennar Homes, LLC\0017 Westside Blvd Ext\ENGR\02 Master\Design\Calcs\Stormwater\PRE-DEVEL-MAP.dwg (11x17)

```
==========================================================================================
==== Basins ==============================================================================
==========================================================================================

         Name: basin 1                  Node: basin 1                Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                   Peaking Factor: 256.0
          Rainfall File: Sfwmd72             Storm Duration(hrs): 72.00
    Rainfall Amount(in): 7.800                 Time of Conc(min): 10.00
               Area(ac): 5.470                   Time Shift(hrs): 0.00
           Curve Number: 76.80             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


==========================================================================================
==== Nodes ===============================================================================
==========================================================================================

      Name:                     Base Flow(cfs): 0.000         Init Stage(ft): 0.000
     Group: BASE                                              Warn Stage(ft): 0.000
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------

==========================================================================================
==== Drop Structures =====================================================================
==========================================================================================

         Name:                    From Node:                   Length(ft): 0.00
        Group: BASE                 To Node:                        Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
     Geometry: Circular      Circular                 Solution Algorithm: Most Restrictive
     Span(in): 0.00          0.00                                   Flow: Both
     Rise(in): 0.00          0.00                     Entrance Loss Coef: 0.000
   Invert(ft): 0.000         0.000                        Exit Loss Coef: 1.000
  Manning's N: 0.000000      0.000000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                         Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



==========================================================================================
==== Weirs ===============================================================================
==========================================================================================

         Name:                    From Node:
        Group: BASE                 To Node:
         Flow: Both                   Count: 1
         Type: Horizontal          Geometry: Circular

                   Span(in): 0.00
                   Rise(in): 0.00
                 Invert(ft): 0.000
       Control Elevation(ft): 0.000
                                               TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


==========================================================================================
==== Hydrology Simulations ===============================================================
==========================================================================================

         Name: 10-72
     Filename: L:\53509 Lennar Homes, LLC\0017 Westside Blvd Ext\ENGR\02 Master\Design\Calcs\Stormwater\ICPR3\ICPR3 Storms\10YR-

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Sfwmd72
    Rainfall Amount(in): 7.80

Time(hrs)       Print Inc(min)
--------------- ---------------
```

```
72.000          60.00

==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

         Name:                     Hydrology Sim:
     Filename:

      Execute: No          Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 0.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

```
          Basin Name: basin 1
          Group Name: BASE
          Simulation: 10-72
           Node Name: basin 1
          Basin Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256
       Peaking Fator: 256.0
 Spec Time Inc (min): 1.33
 Comp Time Inc (min): 1.33
       Rainfall File: Sfwmd72
Rainfall Amount (in): 7.800
Storm Duration (hrs): 72.00
              Status: Onsite
  Time of Conc (min): 10.00
    Time Shift (hrs): 0.00
           Area (ac): 5.470
Vol of Unit Hyd (in): 1.000
        Curve Number: 76.800
            DCIA (%): 0.000

      Time Max (hrs): 60.02
      Flow Max (cfs): 15.829
  Runoff Volume (in): 5.066
 Runoff Volume (ft3): 100598.989
```

```
=========================================================================================
==== Basins =============================================================================
=========================================================================================

         Name: basin 2                  Node: basin 1               Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                  Peaking Factor: 256.0
          Rainfall File: Sfwmd72           Storm Duration(hrs): 72.00
    Rainfall Amount(in): 7.800               Time of Conc(min): 10.00
               Area(ac): 3.220                 Time Shift(hrs): 0.00
           Curve Number: 53.20            Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



=========================================================================================
==== Nodes ==============================================================================
=========================================================================================

      Name:                     Base Flow(cfs): 0.000         Init Stage(ft): 0.000
     Group: BASE                                              Warn Stage(ft): 0.000
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------

=========================================================================================
==== Drop Structures ====================================================================
=========================================================================================

         Name:                     From Node:                   Length(ft): 0.00
        Group: BASE                  To Node:                        Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
     Geometry: Circular       Circular                Solution Algorithm: Most Restrictive
     Span(in): 0.00           0.00                                  Flow: Both
     Rise(in): 0.00           0.00                    Entrance Loss Coef: 0.000
   Invert(ft): 0.000          0.000                       Exit Loss Coef: 1.000
  Manning's N: 0.000000       0.000000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                       Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall




=========================================================================================
==== Weirs ==============================================================================
=========================================================================================

         Name:                     From Node:
        Group: BASE                  To Node:
         Flow: Both                    Count: 1
         Type: Horizontal           Geometry: Circular

                    Span(in): 0.00
                    Rise(in): 0.00
                  Invert(ft): 0.000
       Control Elevation(ft): 0.000
                                          TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



=========================================================================================
==== Hydrology Simulations ==============================================================
=========================================================================================

         Name: 10-72
     Filename: L:\53509 Lennar Homes, LLC\0017 Westside Blvd Ext\ENGR\02 Master\Design\Calcs\Stormwater\ICPR3\ICPR3 Storms\10YR-

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Sfwmd72
    Rainfall Amount(in): 7.80

Time(hrs)       Print Inc(min)
--------------- ---------------
```

```
72.000          60.00

==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

         Name:                     Hydrology Sim:
     Filename:

      Execute: No          Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 0.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

```
           Basin Name: basin 2
           Group Name: BASE
           Simulation: 10-72
            Node Name: basin 1
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256
        Peaking Fator: 256.0
  Spec Time Inc (min): 1.33
  Comp Time Inc (min): 1.33
        Rainfall File: Sfwmd72
 Rainfall Amount (in): 7.800
 Storm Duration (hrs): 72.00
               Status: Onsite
   Time of Conc (min): 10.00
     Time Shift (hrs): 0.00
            Area (ac): 3.220
 Vol of Unit Hyd (in): 1.000
         Curve Number: 53.200
             DCIA (%): 0.000

       Time Max (hrs): 60.02
       Flow Max (cfs): 5.247
   Runoff Volume (in): 2.458
  Runoff Volume (ft3): 28734.363
```

```
==========================================================================================
==== Basins ==============================================================================
==========================================================================================

         Name: basin 3                  Node: basin 1                Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                   Peaking Factor: 256.0
          Rainfall File: Sfwmd72             Storm Duration(hrs): 72.00
    Rainfall Amount(in): 7.800                 Time of Conc(min): 10.00
               Area(ac): 1.020                   Time Shift(hrs): 0.00
           Curve Number: 53.00            Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


==========================================================================================
==== Nodes ===============================================================================
==========================================================================================

      Name:                     Base Flow(cfs): 0.000          Init Stage(ft): 0.000
     Group: BASE                                               Warn Stage(ft): 0.000
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------

==========================================================================================
==== Drop Structures =====================================================================
==========================================================================================

         Name:                     From Node:                   Length(ft): 0.00
        Group: BASE                  To Node:                        Count: 1

               UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
     Geometry: Circular       Circular                  Solution Algorithm: Most Restrictive
     Span(in): 0.00           0.00                                    Flow: Both
     Rise(in): 0.00           0.00                      Entrance Loss Coef: 0.000
   Invert(ft): 0.000          0.000                         Exit Loss Coef: 1.000
  Manning's N: 0.000000       0.000000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



==========================================================================================
==== Weirs ===============================================================================
==========================================================================================

         Name:                     From Node:
        Group: BASE                  To Node:
         Flow: Both                    Count: 1
         Type: Horizontal           Geometry: Circular

                    Span(in): 0.00
                    Rise(in): 0.00
                  Invert(ft): 0.000
       Control Elevation(ft): 0.000
                                                TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



==========================================================================================
==== Hydrology Simulations ===============================================================
==========================================================================================

         Name: 10-72
     Filename: L:\53509 Lennar Homes, LLC\0017 Westside Blvd Ext\ENGR\02 Master\Design\Calcs\Stormwater\ICPR3\ICPR3 Storms\10YR-

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Sfwmd72
    Rainfall Amount(in): 7.80

Time(hrs)       Print Inc(min)
--------------- ---------------
```

```
72.000          60.00

==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

         Name:                     Hydrology Sim:
     Filename:

      Execute: No          Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 0.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:

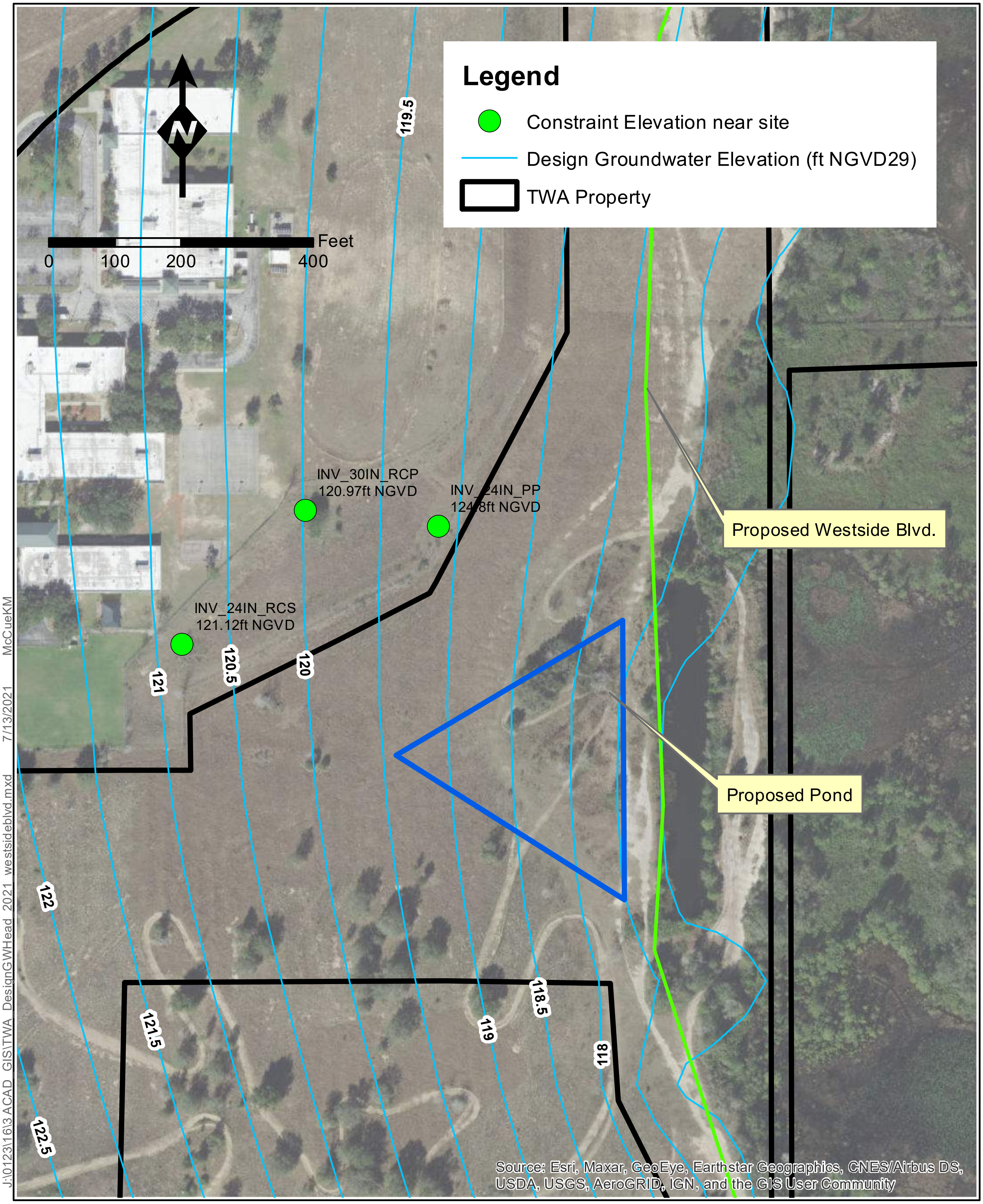

Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

```
           Basin Name: basin 3
           Group Name: BASE
           Simulation: 10-72
            Node Name: basin 1
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256
        Peaking Fator: 256.0
  Spec Time Inc (min): 1.33
  Comp Time Inc (min): 1.33
        Rainfall File: Sfwmd72
 Rainfall Amount (in): 7.800
 Storm Duration (hrs): 72.00
               Status: Onsite
   Time of Conc (min): 10.00
     Time Shift (hrs): 0.00
            Area (ac): 1.020
 Vol of Unit Hyd (in): 1.000
         Curve Number: 53.000
             DCIA (%): 0.000

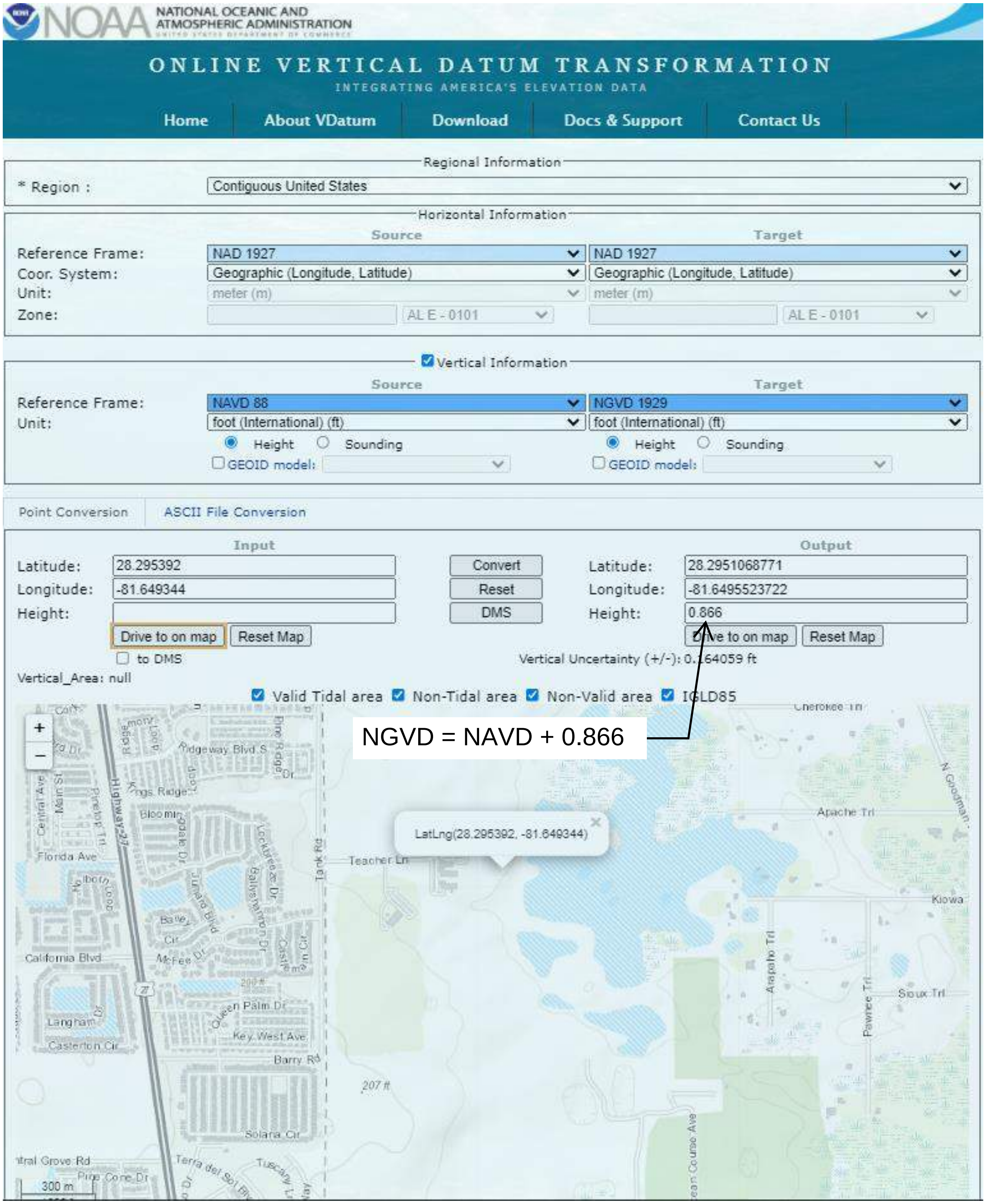
       Time Max (hrs): 60.02
       Flow Max (cfs): 1.650
   Runoff Volume (in): 2.437
  Runoff Volume (ft3): 9024.970
```



J:\0123\16\3 ACAD GIS\TWA DesignGWHead 2021 westsideblvd.mxd 7/13/2021 McCueKM

ROYAL CONSULTING SERVICES, INC.

Figure 1
Model Predicted Groundwater Elevation at the End of the Wet Season


NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
ONLINE VERTICAL DATUM TRANSFORMATION
INTEGRATING AMERICA'S ELEVATION DATA
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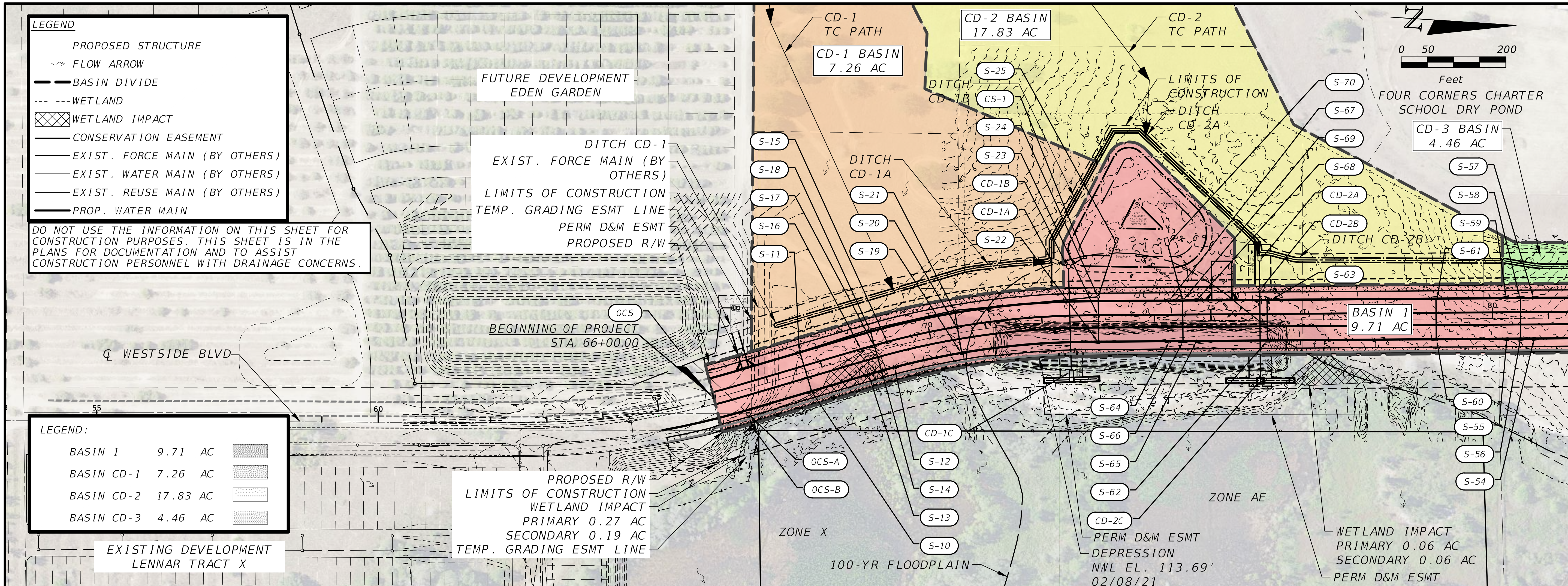
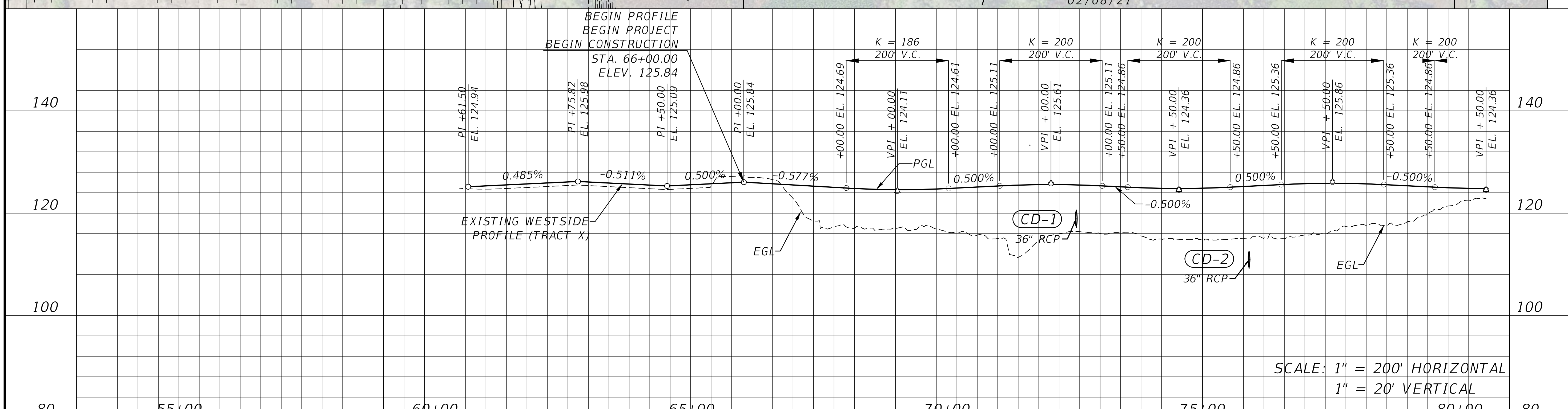
Docs & Support
Contact Us
Regional Information
* Region :
Contiguous United States
Horizontal Information
Source
Target
Reference Frame:
NAD 1927
NAD 1927
Coor. System:
Geographic (Longitude, Latitude)
Geographic (Longitude, Latitude)
Unit:
meter (m)
meter (m)
Zone:
AL E - 0101
AL E - 0101
Vertical Information
Source
Target
Reference Frame:
NAVD 88
NGVD 1929
Unit:
foot (International) (ft)
foot (International) (ft)
Height
Sounding
Height
Sounding
GEOID model:
GEOID model:
Point Conversion
ASCII File Conversion
Input
Output
Latitude:
28.295392
Convert
Latitude:
28.2951068771
Longitude:
-81.649344
Reset
Longitude:
-81.6495523722
Height:
DMS
Height:
0.866
Drive to on map
Reset Map
Drive to on map
Reset Map
to DMS
Vertical Uncertainty (+/-): 0.164059 ft
Vertical_Area: null
Valid Tidal area
Non-Tidal area
Non-Valid area
IGLD85
NGVD = NAVD + 0.866
LatLng(28.295392, -81.649344)
300 m

Appendix C

Post Development Analysis





REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

DAVID A. REID, P.E.
P.E. LICENSE NUMBER 38794
HAMILTON ENGINEERING & SURVEYING, LLC
775 WARNER LANE
ORLANDO, FL 32803
(407) 362 - 5929 EXT 405

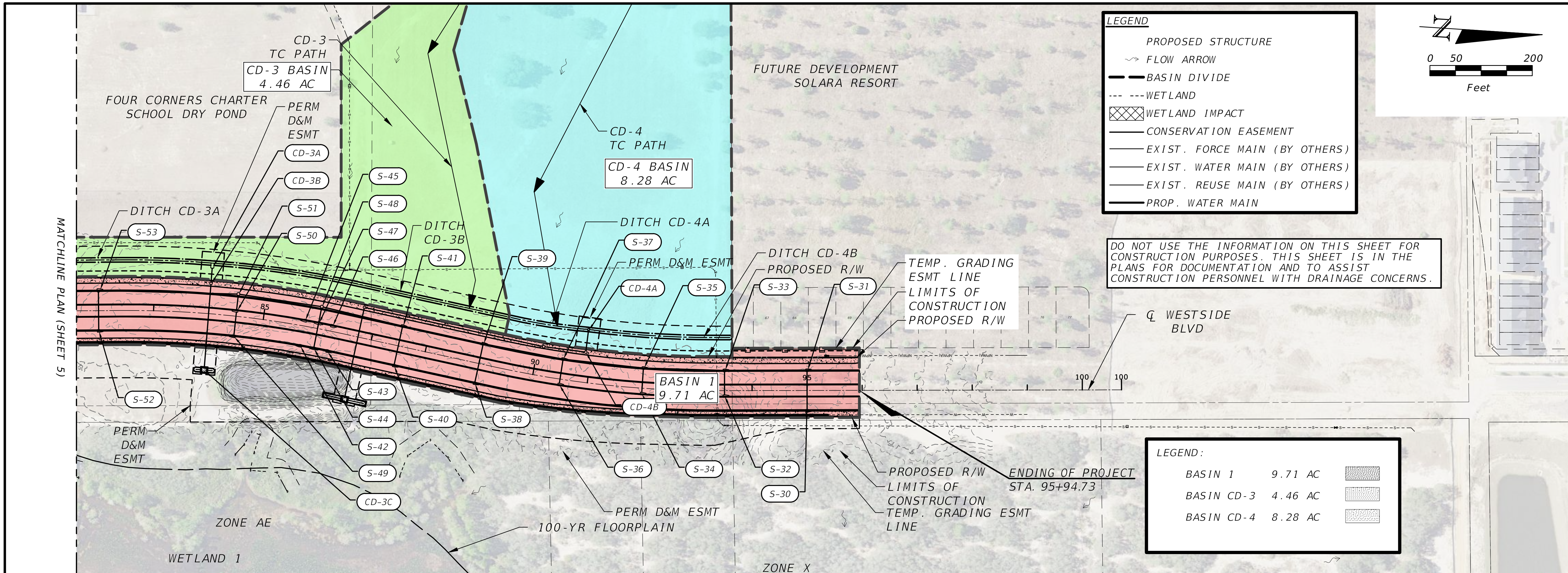
OSCEOLA COUNTY
OSCEOLA COUNTY TRANSPORTATION AND TRANSIT DEPARTMENT

DRAINAGE MAP

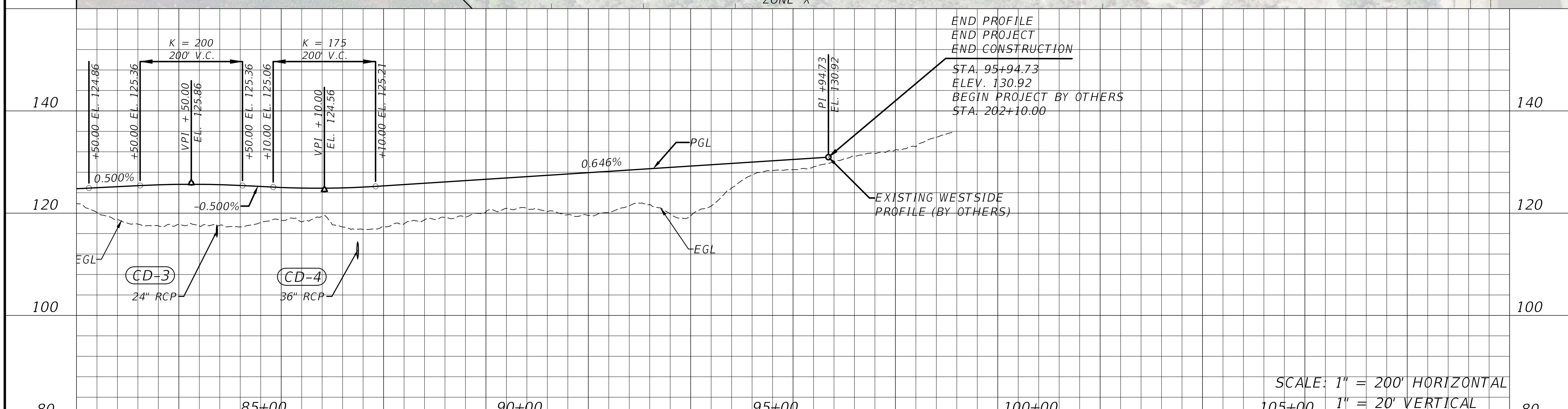
SHEET NO. 5

EricA Jun 02, 2022 - 1:37:46pm

L:\53509 Lennar Homes, LLC\0017 Westside Blvd Ext\ENGR\02 Master\1 DWGs\60% SET\5 DRAINAGE MAP.dwg (5 DRAINAGE MAP)



DO NOT USE THE INFORMATION ON THIS SHEET FOR CONSTRUCTION PURPOSES. THIS SHEET IS IN THE PLANS FOR DOCUMENTATION AND TO ASSIST CONSTRUCTION PERSONNEL WITH DRAINAGE CONCERNS.



SCALE: 1" = 200' HORIZONTAL
1" = 20' VERTICAL

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

DAVID A. REID, P.E.
P.E. LICENSE NUMBER 38794
HAMILTON ENGINEERING & SURVEYING, LLC
775 WARNER LANE
ORLANDO, FL 32803
(407) 362 - 5929 EXT 405

OSCEOLA COUNTY
TRANSPORTATION AND TRANSIT
DEPARTMENT

DRAINAGE MAP

SHEET NO. 6

EricA Jun 02, 2022 - 2:19:14pm

L:\53509 Lennar Homes, LLC\0017 Westside Blvd Ext\ENGR\02 Master\1 DWGs\60% SET\6 DRAINAGE MAP.dwg (6 DRAINAGE MAP)

Project No.: 53509.0017
Project Name: Westside Boulevard Extension - Osceola County 66+00
Calculations by: EA

SFWMD - WATER QUALITY CRITERIA

WET DETENTION "POND 1"

CONTRIBUTING BASINS: BASIN 1

Basin Area =	9.71	acres	100%
Pervious Area =	4.38	acres	45%
Wet Detention Area =	0.56	acres	6%
Building Area =	0	acres	0%
Impervious Area =	4.77	acres	49%

(excluding pond & building area)

1. Compute the first 1-inch of runoff from the developed project

= 1 inch x 9.71 acres x (1ft/12in)

= **0.81** **ac-ft** for the first inch of runoff

2. Compute 2.5-inches times the percentage of imperviousness:

a. Site area for water quality pervious/impervious calculations only:

= Total project - (Wet Detention Area + Building Area)

= 9.71 - 0.56 acres + 0 acres

= **9.15** **acres** of site area for water quality pervious/impervious

b. Impervious area for water quality pervious/impervious calculations only:

= (Site Area for water quality pervious/impervious) - pervious area

= 9.15 acres - 4.38 acres

= **4.77** **acres**

c. Percentage of impervious for water quality:

= (Impervious area for water quality/Site area for water quality) x 100 %

=(4.77 / 9.15)x 100%

= **52%**

d. For 2.5 inches times the percentage impervious:

= 2.5 inches x 0.52

= **1.30** **inches** to be treated

e. Compute the volume required for water quality WET detention:

= 1.30 inches x (9.71 acres - 0.56 acres) x (1ft/12in)

= **0.99** **acre-ft** required for WET detention

3. Additional 50% water quality to prevent further degradation to the receiving water body:

= Max. required water quality volume x 1.5

= **0.99** x 1.50

= **1.49** acre-ft required for WET detention storage

= **64932** CF required for WET detention storage

```
==========================================================================================
==== Basins ==============================================================================
==========================================================================================

        Name: basin1                  Node: pond1                 Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh256                   Peaking Factor: 256.0
         Rainfall File: Sfwmd72            Storm Duration(hrs): 72.00
    Rainfall Amount(in): 7.800               Time of Conc(min): 19.64
              Area(ac): 9.710                  Time Shift(hrs): 0.00
          Curve Number: 80.69              Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00


==========================================================================================
==== Nodes ===============================================================================
==========================================================================================

      Name: offsite1           Base Flow(cfs): 0.000          Init Stage(ft): 116.150
     Group: BASE                                              Warn Stage(ft): 116.150
      Type: Time/Stage


      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00         116.150
          60.00         116.150
          72.00         116.150

------------------------------------------------------------------------------------------
      Name: pond1              Base Flow(cfs): 0.000          Init Stage(ft): 117.250
     Group: BASE                                              Warn Stage(ft): 122.600
      Type: Stage/Volume


      Stage(ft)      Volume(af)
--------------- ---------------
        117.250          0.0000
        118.000          0.4200
        119.000          1.0600
        120.000          1.7900
        121.000          2.6100
        122.000          3.5200
        122.500          4.0000

==========================================================================================
==== Operating Tables ====================================================================
==========================================================================================

      Name:                     Group: BASE
      Type: Bottom Clip
  Function: Time vs. Depth of Clip


      Time(hrs)  Clip Depth(in)
--------------- ---------------

==========================================================================================
==== Pipes ===============================================================================
==========================================================================================

        Name:                    From Node:                   Length(ft): 0.00
       Group: BASE                 To Node:                        Count: 1
                                                       Friction Equation: Automatic
             UPSTREAM       DOWNSTREAM                Solution Algorithm: Most Restrictive
     Geometry: Circular      Circular                                Flow: Both
     Span(in): 0.00          0.00                     Entrance Loss Coef: 0.00
     Rise(in): 0.00          0.00                         Exit Loss Coef: 1.00
   Invert(ft): 0.000         0.000                        Bend Loss Coef: 0.00
  Manning's N: 0.000000      0.000000                  Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                      Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                     Stabilizer Option: None
```

```
Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


==========================================================================================
==== Drop Structures =====================================================================
==========================================================================================

         Name: CS-1               From Node: pond1             Length(ft): 228.00
        Group: BASE                 To Node: offsite1               Count: 1

               UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
     Geometry: Circular       Circular                  Solution Algorithm: Most Restrictive
     Span(in): 36.00          36.00                                   Flow: Both
     Rise(in): 36.00          36.00                     Entrance Loss Coef: 0.000
   Invert(ft): 117.450        117.000                       Exit Loss Coef: 1.000
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                         Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


*** Weir 1 of 3 for Drop Structure CS-1 ***
                                                                                  TABLE
                  Count: 1                     Bottom Clip(in): 0.000
                   Type: Vertical: Mavis          Top Clip(in): 0.000
                   Flow: Both                    Weir Disc Coef: 3.200
               Geometry: Circular              Orifice Disc Coef: 0.600

               Span(in): 3.00                        Invert(ft): 117.250
               Rise(in): 3.00                  Control Elev(ft): 117.250

*** Weir 2 of 3 for Drop Structure CS-1 ***
                                                                                  TABLE
                  Count: 1                     Bottom Clip(in): 0.000
                   Type: Vertical: Mavis          Top Clip(in): 0.000
                   Flow: Both                    Weir Disc Coef: 3.200
               Geometry: Rectangular           Orifice Disc Coef: 0.600

               Span(in): 48.00                       Invert(ft): 120.000
               Rise(in): 99999.00              Control Elev(ft): 117.250

*** Weir 3 of 3 for Drop Structure CS-1 ***
                                                                                  TABLE
                  Count: 1                     Bottom Clip(in): 0.000
                   Type: Vertical: Mavis          Top Clip(in): 0.000
                   Flow: Both                    Weir Disc Coef: 3.200
               Geometry: Rectangular           Orifice Disc Coef: 0.600

               Span(in): 168.00                      Invert(ft): 122.000
               Rise(in): 999999.00             Control Elev(ft): 117.250


==========================================================================================
==== Weirs ===============================================================================
==========================================================================================

         Name:                    From Node:
        Group: BASE                 To Node:
         Flow: Both                   Count: 1
         Type: Horizontal          Geometry: Circular

                    Span(in): 0.00
                    Rise(in): 0.00
                  Invert(ft): 0.000
```

```
       Control Elevation(ft): 0.000
                                           TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



==========================================================================================
==== Percolation Links ===================================================================
==========================================================================================

         Name:                     From Node:                          Flow: Both
        Group: BASE                  To Node:                         Count: 1

         Surface Area Option: Use 1st Point in Stage/Area Table
   Vertical Flow Termination: Horizontal Flow Algorithm
       Aquifer Base Elev(ft): 0.000                         Perimeter 1(ft): 0.000
        Water Table Elev(ft): 0.000                         Perimeter 2(ft): 0.000
 *****************************0.000                         Perimeter 3(ft): 0.000
  Horiz Conductivity(ft/day): 0.000                     Distance 1 to 2(ft): 0.000
   Vert Conductivity(ft/day): 0.000                     Distance 2 to 3(ft): 0.000
     Effective Porosity(dec): 0.000                        Num Cells 1 to 2: 0
            Suction Head(in): 0.000                        Num Cells 2 to 3: 0
         Layer Thickness(ft): 0.000



==========================================================================================
==== Hydrology Simulations ===============================================================
==========================================================================================

         Name: 100YR-72HR
     Filename: L:\53509 Lennar Homes, LLC\0017 Westside Blvd Ext\ENGR\02 Master\Design\Calcs\Stormwater\ICPR3\ICPR3 Storms\SF100-72.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Sfwmd72
    Rainfall Amount(in): 12.00

Time(hrs)       Print Inc(min)
--------------- ---------------
72.000          60.00

----------------------------------------------------------------------------------------------------
         Name: 10YR-24HR
     Filename: L:\53509 Lennar Homes, LLC\0017 Westside Blvd Ext\ENGR\02 Master\Design\Calcs\Stormwater\ICPR3\ICPR3 Storms\10YR-24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 6.00

Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.00

----------------------------------------------------------------------------------------------------
         Name: 10YR-72HR
     Filename: L:\53509 Lennar Homes, LLC\0017 Westside Blvd Ext\ENGR\02 Master\Design\Calcs\Stormwater\ICPR3\ICPR3 Storms\SF10-72.R32

      Override Defaults: Yes
    Storm Duration(hrs): 72.00
          Rainfall File: Sfwmd72
    Rainfall Amount(in): 7.80

Time(hrs)       Print Inc(min)
--------------- ---------------
72.000          60.00

==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

         Name: 100Y-72HR           Hydrology Sim: 100YR-72HR
     Filename: L:\53509 Lennar Homes, LLC\0017 Westside Blvd Ext\ENGR\02 Master\Design\Calcs\Stormwater\ICPR3\ICPR3 Storms\SF100-72.I32
```

```
      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 72.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
72.000          15.000

Group           Run
--------------- -----
BASE            Yes

----------------------------------------------------------------------------------------------------
         Name: 10YR-24HR          Hydrology Sim: 10YR-24HR
     Filename: L:\53509 Lennar Homes, LLC\0017 Westside Blvd Ext\ENGR\02 Master\Design\Calcs\Stormwater\ICPR3\ICPR3 Storms\10Y-24H.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          15.000

Group           Run
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BASE            Yes

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         Name: 10YR-72HR          Hydrology Sim: 10YR-72HR
     Filename: L:\53509 Lennar Homes, LLC\0017 Westside Blvd Ext\ENGR\02 Master\Design\Calcs\Stormwater\ICPR3\ICPR3 Storms\SF10-72.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 408.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
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360.000         720.000

Group           Run
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BASE            Yes
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Simulation	Node	Group	Time hrs	Stage ft	Warning Stage ft	Surface Area ft2	Total Inflow cfs	Total Outflow cfs	Total Vol In af	Total Vol Out af	
10YR-72HR	pond1	BASE	0.00	117.25	122.60	22651	0.00	0.00	0.0	0.0	
10YR-72HR	pond1	BASE	12.02	117.25	122.60	22651	0.00	0.00	0.0	0.0	
10YR-72HR	pond1	BASE	24.02	117.32	122.60	22958	0.08	0.00	0.0	0.0	
10YR-72HR	pond1	BASE	36.02	117.62	122.60	24388	0.24	0.06	0.2	0.0	
10YR-72HR	pond1	BASE	48.02	117.94	122.60	25846	0.32	0.13	0.5	0.1	
10YR-72HR	pond1	BASE	60.00	120.27	122.60	34826	21.59	2.17	11.3	1.3	
10YR-72HR	pond1	BASE	72.00	120.08	122.60	34089	0.00	0.67	22.0	2.7	RECOVERY START
10YR-72HR	pond1	BASE	84.00	119.62	122.60	32250	0.00	0.33	22.0	3.2	
10YR-72HR	pond1	BASE	96.00	119.19	122.60	30582	0.00	0.29	22.0	3.5	
10YR-72HR	pond1	BASE	108.00	118.80	122.60	29085	0.00	0.25	22.0	3.7	
10YR-72HR	pond1	BASE	120.00	118.45	122.60	27785	0.00	0.21	22.0	4.0	
10YR-72HR	pond1	BASE	132.00	118.14	122.60	26668	0.00	0.17	22.0	4.2	
10YR-72HR	pond1	BASE	144.00	117.90	122.60	25666	0.00	0.13	22.0	4.3	
10YR-72HR	pond1	BASE	156.00	117.72	122.60	24819	0.00	0.09	22.0	4.4	
10YR-72HR	pond1	BASE	168.00	117.60	122.60	24270	0.00	0.05	22.0	4.5	
10YR-72HR	pond1	BASE	180.00	117.53	122.60	23973	0.00	0.02	22.0	4.5	
10YR-72HR	pond1	BASE	192.00	117.51	122.60	23840	0.00	0.01	22.0	4.5	
10YR-72HR	pond1	BASE	204.00	117.49	122.60	23787	0.00	0.01	22.0	4.5	
10YR-72HR	pond1	BASE	216.00	117.49	122.60	23748	0.00	0.00	22.0	4.5	
10YR-72HR	pond1	BASE	228.00	117.48	122.60	23720	0.00	0.00	22.0	4.5	
10YR-72HR	pond1	BASE	240.00	117.48	122.60	23700	0.00	0.00	22.0	4.5	
10YR-72HR	pond1	BASE	252.00	117.47	122.60	23684	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	264.00	117.47	122.60	23671	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	276.00	117.47	122.60	23660	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	288.00	117.47	122.60	23652	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	300.00	117.46	122.60	23645	0.00	0.00	22.0	4.6	RECOVERY END
10YR-72HR	pond1	BASE	312.00	117.46	122.60	23638	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	324.00	117.46	122.60	23633	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	336.00	117.46	122.60	23629	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	348.00	117.46	122.60	23625	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	360.00	117.46	122.60	23621	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	372.00	117.46	122.60	23619	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	372.25	117.46	122.60	23619	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	372.50	117.46	122.60	23619	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	372.75	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	373.00	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	373.25	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	373.50	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	373.75	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	374.00	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	374.25	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	374.50	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	374.75	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	375.00	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	375.25	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	375.50	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	375.75	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	376.00	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	376.25	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	376.50	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	376.75	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	377.00	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	377.25	117.46	122.60	23618	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	377.50	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	377.75	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	378.00	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	378.25	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	378.50	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	378.75	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	379.00	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	379.25	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	379.50	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	379.75	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	380.00	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	380.25	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	380.50	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	380.75	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	381.00	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	381.25	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	381.50	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	381.75	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	382.00	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	382.25	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	382.50	117.46	122.60	23617	0.00	0.00	22.0	4.6	
10YR-72HR	pond1	BASE	382.75	117.46	122.60	23617	0.00	0.00	22.0	4.6	

Simulation	Node	Group	Time hrs	Stage ft	Warning Stage ft	Surface Area ft2	Total Inflow cfs	Total Outflow cfs	Total Vol In af	Total Vol Out af
10YR-72HR	pond1	BASE	383.00	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	383.25	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	383.50	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	383.75	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	384.00	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	384.25	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	384.50	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	384.75	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	385.00	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	385.25	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	385.50	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	385.75	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	386.00	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	386.25	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	386.50	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	386.75	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	387.00	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	387.25	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	387.50	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	387.75	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	388.00	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	388.25	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	388.50	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	388.75	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	389.00	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	389.25	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	389.50	117.46	122.60	23616	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	389.75	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	390.00	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	390.25	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	390.50	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	390.75	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	391.00	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	391.25	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	391.50	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	391.75	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	392.00	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	392.25	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	392.50	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	392.75	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	393.00	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	393.25	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	393.50	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	393.75	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	394.00	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	394.25	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	394.50	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	394.75	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	395.00	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	395.25	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	395.50	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	395.75	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	396.00	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	396.25	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	396.50	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	396.75	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	397.00	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	397.25	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	397.50	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	397.75	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	398.00	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	398.25	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	398.50	117.46	122.60	23615	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	398.75	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	399.00	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	399.25	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	399.50	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	399.75	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	400.00	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	400.25	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	400.50	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	400.75	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	401.00	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	401.25	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	401.50	117.46	122.60	23614	0.00	0.00	22.0	4.6

Simulation	Node	Group	Time hrs	Stage ft	Warning Stage ft	Surface Area ft2	Total Inflow cfs	Total Outflow cfs	Total Vol In af	Total Vol Out af
10YR-72HR	pond1	BASE	401.75	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	402.00	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	402.25	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	402.50	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	402.75	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	403.00	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	403.25	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	403.50	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	403.75	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	404.00	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	404.25	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	404.50	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	404.75	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	405.00	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	405.25	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	405.50	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	405.75	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	406.00	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	406.25	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	406.50	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	406.75	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	407.00	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	407.25	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	407.50	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	407.75	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	408.00	117.46	122.60	23614	0.00	0.00	22.0	4.6
10YR-72HR	pond1	BASE	408.01	117.46	122.60	23614	0.00	0.00	22.0	4.6

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
pond1	BASE	100Y-72HR	60.33	121.14	122.60	0.0050	38110	60.00	35.65	60.33	28.19
pond1	BASE	10YR-24HR	13.91	120.20	122.60	0.0050	34551	12.17	19.38	13.91	2.92
pond1	BASE	10YR-72HR	60.63	120.62	122.60	0.0050	36197	60.00	21.60	60.63	13.06

```
==========================================================================================
==== Basins ==============================================================================
==========================================================================================

        Name: CD1                    Node: CD1                   Status: Onsite
       Group: BASE                   Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh484                Peaking Factor: 484.0
         Rainfall File: Fdot-24           Storm Duration(hrs): 24.00
    Rainfall Amount(in): 9.300               Time of Conc(min): 14.81
              Area(ac): 7.260                  Time Shift(hrs): 0.00
          Curve Number: 53.00          Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00


==========================================================================================
==== Nodes ===============================================================================
==========================================================================================

     Name:                  Base Flow(cfs): 0.000         Init Stage(ft): 0.000
    Group: BASE                                           Warn Stage(ft): 0.000
     Type: Stage/Area



     Stage(ft)        Area(ac)
--------------- ---------------

==========================================================================================
==== Drop Structures =====================================================================
==========================================================================================

        Name:                    From Node:                   Length(ft): 0.00
       Group: BASE                 To Node:                        Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
    Geometry: Circular       Circular                Solution Algorithm: Most Restrictive
    Span(in): 0.00           0.00                                  Flow: Both
    Rise(in): 0.00           0.00                    Entrance Loss Coef: 0.000
  Invert(ft): 0.000          0.000                       Exit Loss Coef: 1.000
 Manning's N: 0.000000       0.000000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dc
Bot Clip(in): 0.000          0.000                       Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



==========================================================================================
==== Weirs ===============================================================================
==========================================================================================

        Name:                    From Node:
       Group: BASE                 To Node:
        Flow: Both                   Count: 1
        Type: Horizontal          Geometry: Circular

                   Span(in): 0.00
                   Rise(in): 0.00
                 Invert(ft): 0.000
      Control Elevation(ft): 0.000
                                          TABLE
            Bottom Clip(in): 0.000
               Top Clip(in): 0.000
        Weir Discharge Coef: 3.200
     Orifice Discharge Coef: 0.600


==========================================================================================
==== Hydrology Simulations ===============================================================
==========================================================================================

        Name: 50-24
    Filename: L:\ICPR\icpr\50Y-24H.R32

     Override Defaults: Yes
    Storm Duration(hrs): 24.00
         Rainfall File: Fdot-24
    Rainfall Amount(in): 9.30

Time(hrs)       Print Inc(min)
--------------- ---------------
```

24.000 5.00

```
================================================================================================
==== Routing Simulations =======================================================================
================================================================================================

         Name:                     Hydrology Sim:
     Filename:

      Execute: No          Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 0.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:
```

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

```
           Basin Name: CD1
           Group Name: BASE
           Simulation: 50-24
            Node Name: CD1
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh484
        Peaking Fator: 484.0
  Spec Time Inc (min): 1.97
  Comp Time Inc (min): 1.97
        Rainfall File: Fdot-24
 Rainfall Amount (in): 9.300
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 14.81
     Time Shift (hrs): 0.00
            Area (ac): 7.260
 Vol of Unit Hyd (in): 1.001
         Curve Number: 53.000
             DCIA (%): 0.000

       Time Max (hrs): 12.01
       Flow Max (cfs): 3.044
   Runoff Volume (in): 3.450
  Runoff Volume (ft3): 90924.066
```

```
==========================================================================================
==== Basins ==============================================================================
==========================================================================================

         Name: CD2                     Node: CD2                    Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh484                 Peaking Factor: 484.0
          Rainfall File: Fdot-24            Storm Duration(hrs): 24.00
    Rainfall Amount(in): 9.300                Time of Conc(min): 18.67
               Area(ac): 17.380                 Time Shift(hrs): 0.00
           Curve Number: 53.00           Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



==========================================================================================
==== Nodes ===============================================================================
==========================================================================================

      Name:                     Base Flow(cfs): 0.000         Init Stage(ft): 0.000
     Group: BASE                                              Warn Stage(ft): 0.000
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------

==========================================================================================
==== Drop Structures =====================================================================
==========================================================================================

         Name:                     From Node:                   Length(ft): 0.00
        Group: BASE                  To Node:                        Count: 1

               UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
     Geometry: Circular       Circular                  Solution Algorithm: Most Restrictive
     Span(in): 0.00           0.00                                    Flow: Both
     Rise(in): 0.00           0.00                      Entrance Loss Coef: 0.000
   Invert(ft): 0.000          0.000                         Exit Loss Coef: 1.000
  Manning's N: 0.000000       0.000000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



==========================================================================================
==== Weirs ===============================================================================
==========================================================================================

         Name:                     From Node:
        Group: BASE                  To Node:
         Flow: Both                    Count: 1
         Type: Horizontal           Geometry: Circular

                    Span(in): 0.00
                    Rise(in): 0.00
                  Invert(ft): 0.000
       Control Elevation(ft): 0.000
                                                      TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



==========================================================================================
==== Hydrology Simulations ===============================================================
==========================================================================================

         Name: 50-24
     Filename: L:\53509 Lennar Homes, LLC\0017 Westside Blvd Ext\ENGR\02 Master\Design\Calcs\Stormwater\ICPR3\ICPR3 Storms\50Y-2

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Fdot-24
    Rainfall Amount(in): 9.30

Time(hrs)       Print Inc(min)
--------------- ---------------
```

```
24.000          60.00

===========================================================================================
==== Routing Simulations ==================================================================
===========================================================================================

         Name:                     Hydrology Sim:
     Filename:

      Execute: No          Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 0.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

```
           Basin Name: CD2
           Group Name: BASE
           Simulation: 50-24
            Node Name: CD2
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh484
        Peaking Fator: 484.0
  Spec Time Inc (min): 2.49
  Comp Time Inc (min): 2.49
        Rainfall File: Fdot-24
 Rainfall Amount (in): 9.300
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 18.67
     Time Shift (hrs): 0.00
            Area (ac): 17.380
 Vol of Unit Hyd (in): 1.001
         Curve Number: 53.000
             DCIA (%): 0.000

       Time Max (hrs): 12.03
       Flow Max (cfs): 7.229
   Runoff Volume (in): 3.449
  Runoff Volume (ft3): 217618.572
```

```
==========================================================================================
==== Basins ==============================================================================
==========================================================================================

         Name: CD3                     Node: CD3                    Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh484                   Peaking Factor: 484.0
          Rainfall File: Fdot-24             Storm Duration(hrs): 24.00
    Rainfall Amount(in): 9.300                 Time of Conc(min): 20.22
               Area(ac): 4.460                   Time Shift(hrs): 0.00
           Curve Number: 53.00             Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00



==========================================================================================
==== Nodes ===============================================================================
==========================================================================================

      Name:                     Base Flow(cfs): 0.000         Init Stage(ft): 0.000
     Group: BASE                                              Warn Stage(ft): 0.000
      Type: Stage/Area



      Stage(ft)        Area(ac)
--------------- ---------------

==========================================================================================
==== Drop Structures =====================================================================
==========================================================================================

         Name:                     From Node:                   Length(ft): 0.00
        Group: BASE                  To Node:                        Count: 1

              UPSTREAM       DOWNSTREAM                 Friction Equation: Automatic
     Geometry: Circular      Circular                  Solution Algorithm: Most Restrictive
     Span(in): 0.00          0.00                                    Flow: Both
     Rise(in): 0.00          0.00                      Entrance Loss Coef: 0.000
   Invert(ft): 0.000         0.000                         Exit Loss Coef: 1.000
  Manning's N: 0.000000      0.000000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                        Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                          Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



==========================================================================================
==== Weirs ===============================================================================
==========================================================================================

         Name:                     From Node:
        Group: BASE                  To Node:
         Flow: Both                    Count: 1
         Type: Horizontal           Geometry: Circular

                    Span(in): 0.00
                    Rise(in): 0.00
                  Invert(ft): 0.000
       Control Elevation(ft): 0.000
                                           TABLE
             Bottom Clip(in): 0.000
                Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



==========================================================================================
==== Hydrology Simulations ===============================================================
==========================================================================================

         Name: 50-24
     Filename: L:\53509 Lennar Homes, LLC\0017 Westside Blvd Ext\ENGR\02 Master\Design\Calcs\Stormwater\ICPR3\ICPR3 Storms\10YR-

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Fdot-24
    Rainfall Amount(in): 9.30

Time(hrs)       Print Inc(min)
--------------- ---------------
```

24.000	60.00

```
==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

         Name:                     Hydrology Sim:
     Filename:

      Execute: No          Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 0.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:
```

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

```
           Basin Name: CD3
           Group Name: BASE
           Simulation: 50-24
            Node Name: CD3
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh484
        Peaking Fator: 484.0
  Spec Time Inc (min): 2.70
  Comp Time Inc (min): 2.70
        Rainfall File: Fdot-24
 Rainfall Amount (in): 9.300
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 20.22
     Time Shift (hrs): 0.00
            Area (ac): 4.460
 Vol of Unit Hyd (in): 1.001
         Curve Number: 53.000
             DCIA (%): 0.000

       Time Max (hrs): 12.04
       Flow Max (cfs): 1.850
   Runoff Volume (in): 3.450
  Runoff Volume (ft3): 55859.271
```

```
====================================================================================
==== Basins ========================================================================
====================================================================================

         Name: CD4                      Node: CD4                    Status: Onsite
        Group: BASE                     Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh484                  Peaking Factor: 484.0
          Rainfall File: Fdot-24            Storm Duration(hrs): 24.00
    Rainfall Amount(in): 9.300                Time of Conc(min): 11.84
               Area(ac): 8.280                  Time Shift(hrs): 0.00
           Curve Number: 53.00           Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00


====================================================================================
==== Nodes =========================================================================
====================================================================================

      Name:                     Base Flow(cfs): 0.000         Init Stage(ft): 0.000
     Group: BASE                                              Warn Stage(ft): 0.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------

====================================================================================
==== Drop Structures ===============================================================
====================================================================================

         Name:                    From Node:                   Length(ft): 0.00
        Group: BASE                 To Node:                        Count: 1

              UPSTREAM       DOWNSTREAM                Friction Equation: Automatic
     Geometry: Circular      Circular                 Solution Algorithm: Most Restrictive
     Span(in): 0.00          0.00                                   Flow: Both
     Rise(in): 0.00          0.00                     Entrance Loss Coef: 0.000
   Invert(ft): 0.000         0.000                        Exit Loss Coef: 1.000
  Manning's N: 0.000000      0.000000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                         Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



====================================================================================
==== Weirs =========================================================================
====================================================================================

         Name:                    From Node:
        Group: BASE                 To Node:
         Flow: Both                   Count: 1
         Type: Horizontal          Geometry: Circular

                  Span(in): 0.00
                  Rise(in): 0.00
                Invert(ft): 0.000
       Control Elevation(ft): 0.000
                                          TABLE
            Bottom Clip(in): 0.000
               Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600


====================================================================================
==== Hydrology Simulations =========================================================
====================================================================================

         Name: 50-24
     Filename: L:\ICPR\icpr\50Y-24H.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Fdot-24
    Rainfall Amount(in): 9.30

Time(hrs)       Print Inc(min)
--------------- ---------------
```

```
24.000          60.00

===========================================================================================
==== Routing Simulations ==================================================================
===========================================================================================

         Name:                     Hydrology Sim:
     Filename:

      Execute: No          Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 0.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

```
           Basin Name: CD4
           Group Name: BASE
           Simulation: 50-24
            Node Name: CD4
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh484
        Peaking Fator: 484.0
  Spec Time Inc (min): 1.58
  Comp Time Inc (min): 1.58
        Rainfall File: Fdot-24
 Rainfall Amount (in): 9.300
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 11.84
     Time Shift (hrs): 0.00
            Area (ac): 8.280
 Vol of Unit Hyd (in): 1.001
         Curve Number: 53.000
             DCIA (%): 0.000

       Time Max (hrs): 12.02
       Flow Max (cfs): 3.497
   Runoff Volume (in): 3.450
  Runoff Volume (ft3): 103705.493
```

Project No.: 53509.0017

Project Name: Westside Boulevard Extension - Osceola County

Calculations by: EA

WET POND RECOVERY ANALYSIS

WET DETENTION "POND 1"

CONTRIBUTING BASINS: BASIN 1

Size the control structure detention discharge weir:

1. Volume to be discharged in the first 24 hours is 0.5 inch of the required detention:

= 0.5 inches x (Total Site - Lakes)

= 0.5 inches x (9.71 acres - 0.56 acres) x (1 foot /12 inches)

= **0.38** **ac-ft**

2. Design head

= Weir Crest Elevation - Control Elevation

= 120.5 feet (NGVD 29) - 118 feet (NGVD29)

= **2.50** **feet (NGVD 29)**

3. Average Discharge Rate

The average flow rate (Q) required to drawdown one-half treatment volume is as follows:

Q = TV/ (2 x t x CF)

Where:

Treatment Volume, TV =	76457	ft^3
Recovery time, t =	24	hours
Converstion Factor, CF=	3600	sec/hour
Q =	**0.44**	**cfs**

4. Orifice Area

Rate of Discharge, Q (cfs) = C x A x Sqrt(2 x g x h)

A = Q / C x sqrt (2 x g x h)

Where:

Average flow rate, Q =	0.44	cfs
Orifice coeffient (assumed) =	0.6	
Average depth, h =	2.50	ft
Grav. Constant, g (ft/sec^2) =	32.2	
Orifice Area, A =	**0.06**	**ft^2**

5. Orifice Diameter (unadjusted)

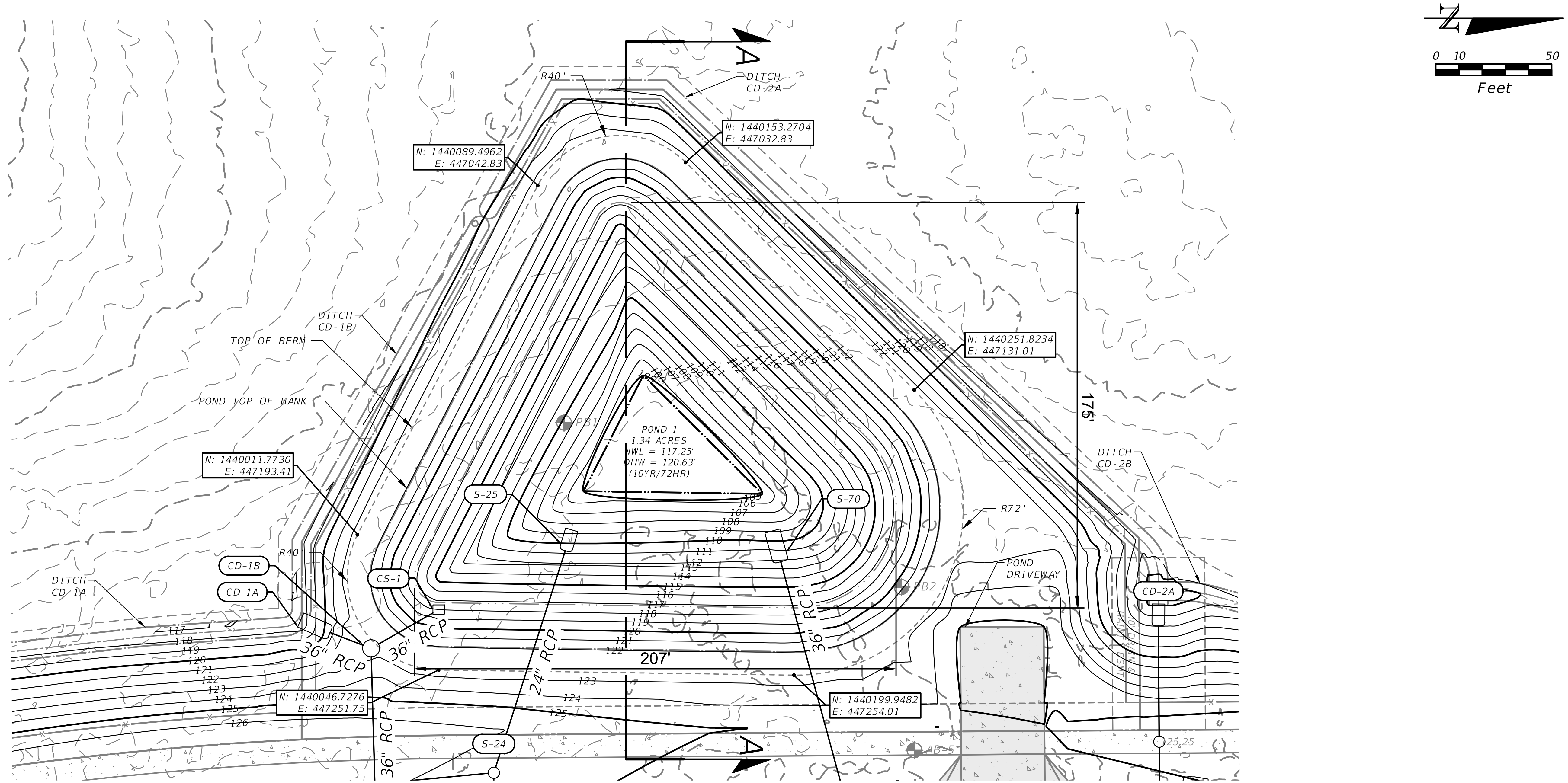
D = sqrt(4 x A / pi)

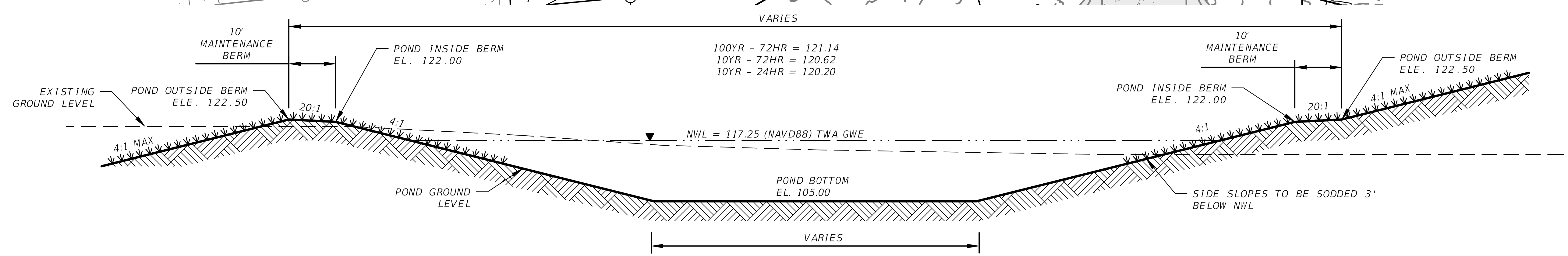
Orifice Diameter, D =	0.27	ft^2
	3.26	inches
Use:	**3.0**	**inches**

(Min. required per Applicant's Handbook Vol. II. IV, 5.2 (a)) 3 inches)

Appendix D

Pond, Overflow Structure, and Spreader Swale Details





CROSS SECTION A-A
N.T.S.

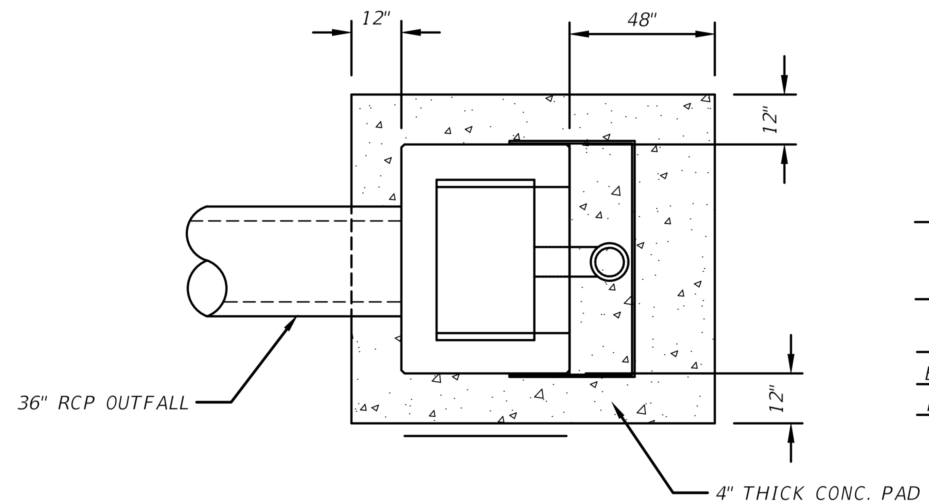
REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

DAVID A. REID, P.E.
P.E. LICENSE NUMBER 38794
HAMILTON ENGINEERING & SURVEYING, LLC
431 E. HORATIO AVE., SUITE 260
ORLANDO, FL 32751
(407) 362 - 5929 EXT 405

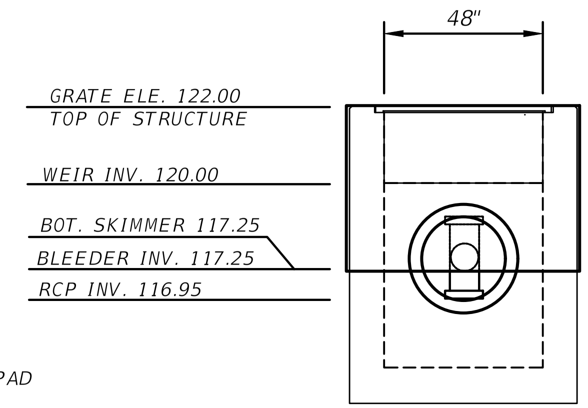
OSCEOLA COUNTY
TRANSPORTATION AND TRANSIT DEPARTMENT

POND DETAIL (1)

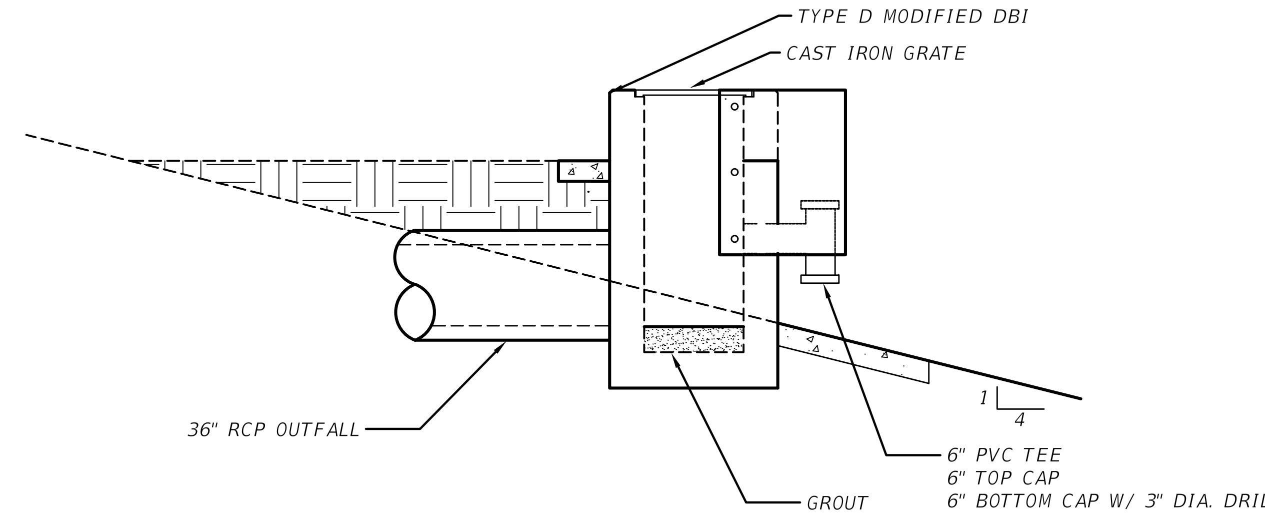
SHEET NO. 74



PLAN VIEW

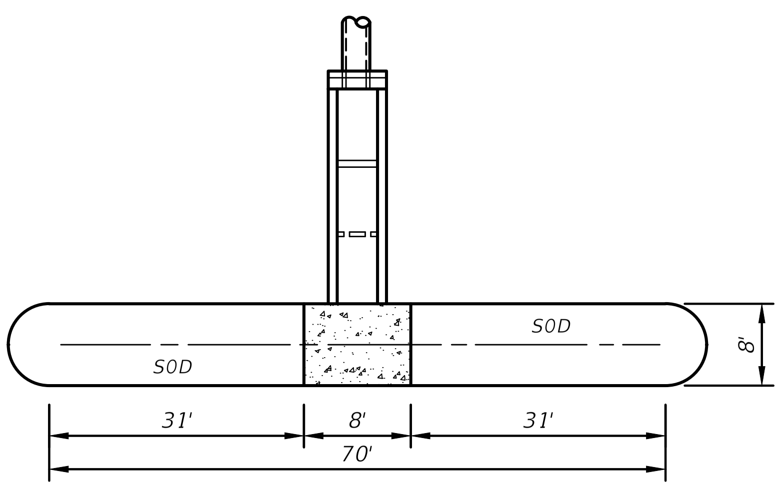


FRONT VIEW

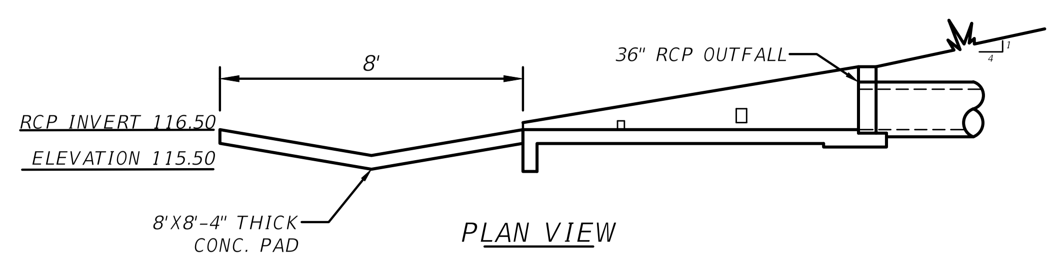


SIDE VIEW

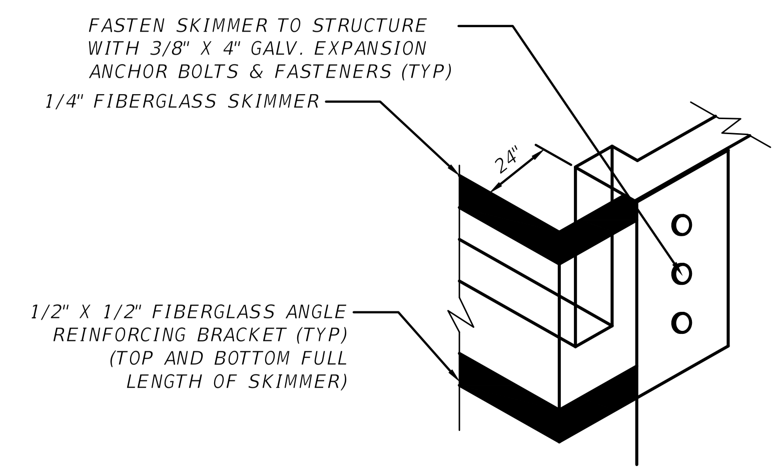
CONTROL STRUCTURE CS-1 FDOT TYPE D MODIFIED DBI
N.T.S.



SIDE VIEW
CD-1C U-ENDWALL W/SPREADER SWALE
N.T.S.



PLAN VIEW
CD-1C U-ENDWALL W/SPREADER SWALE
N.T.S.



SKIMMER DETAIL
N.T.S.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

DAVID A. REID, P.E.
P.E. LICENSE NUMBER 38794
HAMILTON ENGINEERING & SURVEYING, LLC
431 E. HORATIO AVE., SUITE 260
ORLANDO, FL 32751
(407) 362 - 5929 EXT 405

OSCEOLA COUNTY
OSCEOLA COUNTY TRANSPORTATION AND TRANSIT DEPARTMENT

POND DETAILS (2)

SHEET NO. 75

EricA Jun 02, 2022 - 3:46:01pm

L:\53509 Lennar Homes, LLC\0017 Westside Blvd Ext\ENGR\02 Master\1 DWGs\60% SET\75 POND DETAILS (2).dwg (75 POND DETAILS (2))

Appendix E

Spreader Swale and Skimmer Opening Calculations

Spreader Swale Calculations

Job Number:
Project Name: Westside Boulevard Extension
Pond 1 & CD-1

Spreader Calculations are based on the following Equation:

Continuity Equation Q = VA

Q = Weir Discharge rate (cfs)
C = Runoff Coefficient (3.2)
H = Height of Water (ft)
L = Length of Spreader Swale Required (ft)
V = Velocity over spreader Swale (fps)

Q	=	16.1	cfs	(from ICPR routing data)
C	=	3.2		(weir coefficient)
V	=	2	fps	(maximum allowed)
H	=	0.1	ft	(maximum allowed)
Q	=	VA	cfs	
A	=	Q / V	sf	
A	=	8.05	sf	
A	=	LH	sf	(area = length x height)
L	=	A / H	ft	
L	=	81	ft @ 2 fps	minimum required

To consist of 8' concrete section and 41' of sodded swale on each side (90' total)

Actual discharge over spreader swale:

H	=	A/L	ft
A	=	0.089	sf
Q	=	VA	cfs
Q	**=**	**0.179**	**cfs**

Spreader Swale Calculations

Job Number:
Project Name: Westside Boulevard Extension
CD-2

Spreader Calculations are based on the following Equation:

Continuity Equation $Q = VA$

Q = Weir Discharge rate (cfs)
C = Runoff Coefficient (3.2)
H = Height of Water (ft)
L = Length of Spreader Swale Required (ft)
V = Velocity over spreader Swale (fps)

Q	=	7.23	cfs	(from ICPR routing data)
C	=	3.2		(weir coefficient)
V	=	2	fps	(maximum allowed)
H	=	0.1	ft	(maximum allowed)
Q	=	VA	cfs	
A	=	Q / V	sf	
A	=	3.615	sf	
A	=	LH	sf	(area = length x height)
L	=	A / H	ft	
L	=	36	ft @ 2 fps	minimum required

To consist of 12' concrete section/Type E DBI and 50' of sodded swale on both sides (112' total)

Actual discharge over spreader swale:

H	=	A/L	ft
A	=	0.032	sf
Q	=	VA	cfs
Q	**=**	**0.065**	**cfs**

Spreader Swale Calculations

Job Number:
Project Name: Westside Boulevard Extension
CD-3

Spreader Calculations are based on the following Equation:

Continuity Equation $Q = VA$

Q = Weir Discharge rate (cfs)
C = Runoff Coefficient (3.2)
H = Height of Water (ft)
L = Length of Spreader Swale Required (ft)
V = Velocity over spreader Swale (fps)

Q	=	1.85	cfs	(from ICPR routing data)
C	=	3.2		(weir coefficient)
V	=	2	fps	(maximum allowed)
H	=	0.1	ft	(maximum allowed)
Q	=	VA	cfs	
A	=	Q / V	sf	
A	=	0.925	sf	
A	=	LH	sf	(area = length x height)
L	=	A / H	ft	
L	=	9	ft @ 2 fps	minimum required

To consist of 12' concrete section/Type E DBI and 8.5' of sodded swale on both sides (29' total)

Actual discharge over spreader swale:

H	=	A/L	ft
A	=	0.032	sf
Q	=	VA	cfs
Q	**=**	**0.064**	**cfs**

Spreader Swale Calculations

Job Number:
Project Name: Westside Boulevard Extension
CD-4

Spreader Calculations are based on the following Equation:

Continuity Equation $Q = VA$

Q = Weir Discharge rate (cfs)
C = Runoff Coefficient (3.2)
H = Height of Water (ft)
L = Length of Spreader Swale Required (ft)
V = Velocity over spreader Swale (fps)

Q	=	3.5	cfs	(from ICPR routing data)
C	=	3.2		(weir coefficient)
V	=	2	fps	(maximum allowed)
H	=	0.1	ft	(maximum allowed)
Q	=	VA	cfs	
A	=	Q / V	sf	
A	=	1.75	sf	
A	=	LH	sf	(area = length x height)
L	=	A / H	ft	
L	=	18	ft @ 2 fps	minimum required

To consist of 12' concrete section/Type E DBI and 29' of sodded swale on both sides (70' total)

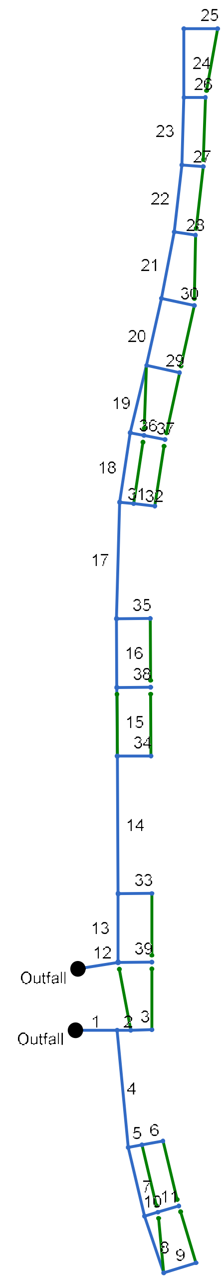
Actual discharge over spreader swale:

H	=	A/L	ft
A	=	0.025	sf
Q	=	VA	cfs
Q	**=**	**0.05**	**cfs**

Appendix F

Hydraflow Input, Results & Profiles

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: STORM0102.stm	Number of lines: 39	Date: 6/2/2022

Line	To Line	Type of Struct.	N Value	Line Len	Incr. Area	Sub Total Area	C1 = C2 = C3 =	Sub Total CxA	Time of Conc.	Line Flow Time	Rnfall Inten. (I)	Total CxA	Add. Q Total Runoff	Inlet Elev.	HGL Crown Invert	HGL Crown Invert	HGL Crown Invert	Line Size	HGL Pipe	Actual Design	Actual Design	Line ID
				(ft)	(ac)	(ac)			(min)	(min)	(in/ hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/ s)	(cfs)	
39	12	Curb	0.012	73.410	0.00	0.00	0.20	0.00	10.00	1.11	7.21	0.27	0.00	124.50	121.20	121.17	0.03	18	0.04	1.65	1.95	66-69
					0.00	0.00	0.50	0.00					1.95		121.80	121.65			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.30	120.15	0.15					
38	15	Curb	0.012	73.410	0.00	0.00	0.20	0.00	10.00	1.11	7.21	0.27	0.00	124.53	122.52	122.50	0.02	18	0.03	1.10	1.95	56-59
					0.00	0.00	0.50	0.00					1.95		121.90	121.75			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.40	120.25	0.15					
37	36	Curb	0.012	46.660	0.00	0.00	0.20	0.00	10.00	0.70	7.21	0.27	0.00	124.70	123.65	123.64	0.01	18	0.03	1.10	1.95	44-45
					0.00	0.00	0.50	0.00					1.95		122.00	121.91			0.19	0.00	0.00	
					0.00	0.00	0.90	0.00							120.50	120.41	0.09					
36	18	Curb	0.012	30.375	0.00	0.00	0.20	0.00	10.70	0.23	7.11	0.55	0.00	125.32	123.60	123.57	0.04	18	0.12	2.20	3.90	47-48
					0.00	0.00	0.50	0.00					3.90		121.91	121.85			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.41	120.35	0.06					
35	16	Curb	0.012	73.410	0.00	0.00	0.20	0.00	10.00	2.27	7.21	0.13	0.00	125.03	122.95	122.94	0.01	18	0.01	0.54	0.95	52-53
					0.00	0.00	0.50	0.00					0.95		122.40	122.25			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.90	120.75	0.15					
34	14	Curb	0.012	73.410	0.00	0.00	0.20	0.00	10.00	2.16	7.21	0.14	0.00	125.03	121.90	121.90	0.00	18	0.01	0.74	1.00	60-61
					0.00	0.00	0.50	0.00					1.00		122.40	122.25			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.90	120.75	0.15					
33	13	Curb	0.012	73.410	0.00	0.00	0.20	0.00	10.00	2.16	7.21	0.14	0.00	125.03	121.51	121.49	0.02	18	0.03	1.31	1.00	62-63
					0.00	0.00	0.50	0.00					1.00		122.40	122.25			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.90	120.75	0.15					
32	31	Curb	0.012	46.662	0.00	0.00	0.20	0.00	10.00	0.70	7.21	0.27	0.00	125.20	123.45	123.44	0.01	18	0.03	1.10	1.95	49-50
					0.00	0.00	0.50	0.00					1.95		122.50	122.41			0.19	0.00	0.00	
					0.00	0.00	0.90	0.00							121.00	120.91	0.09					
31	17	Curb	0.012	30.366	0.00	0.00	0.20	0.00	10.70	0.23	7.11	0.55	0.00	125.75	123.40	123.36	0.04	18	0.12	2.20	3.90	47-48
					0.00	0.00	0.50	0.00					3.90		122.41	122.35			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.91	120.85	0.06					

Line	To Line	Type of Struct.	N Value	Line Len	Incr. Area	Sub Total Area	C1 = C2 = C3 =	Sub Total CxA	Time of Conc.	Line Flow Time	Rnfall Inten. (I)	Total CxA	Add. Q Total Runoff	Inlet Elev.	HGL Crown Invert	HGL Crown Invert	HGL Crown Invert	Line Size	HGL Pipe	Actual Design	Actual Design	Line ID
				(ft)	(ac)	(ac)			(min)	(min)	(in/ hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/ s)	(cfs)	
30	20	Curb	0.012	73.410	0.00	0.00	0.20	0.00	10.00	1.96	7.21	0.15	0.00	126.75	124.22	124.22	0.01	18	0.01	0.63	1.11	38-39
					0.00	0.00	0.50	0.00					1.11		123.84	123.70			0.19	0.00	0.00	
					0.00	0.00	0.90	0.00							122.34	122.20	0.14					
29	19	Curb	0.012	73.410	0.00	0.00	0.20	0.00	10.00	2.07	7.21	0.14	0.00	126.83	123.96	123.95	0.00	18	0.01	0.63	1.05	40-41
					0.00	0.00	0.50	0.00					1.05		124.20	124.05			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							122.70	122.55	0.15					
28	21	Curb	0.012	46.659	0.00	0.00	0.20	0.00	10.00	1.39	7.21	0.14	0.00	127.70	124.38	124.38	0.00	18	0.01	0.59	0.99	36-37
					0.00	0.00	0.50	0.00					0.99		124.59	124.50			0.19	0.00	0.00	
					0.00	0.00	0.90	0.00							123.09	123.00	0.09					
27	22	Curb	0.012	46.667	0.00	0.00	0.20	0.00	10.00	1.47	7.21	0.13	0.00	128.60	124.73	124.72	0.01	18	0.02	1.20	0.93	34-35
					0.00	0.00	0.50	0.00					0.93		125.59	125.50			0.19	0.00	0.00	
					0.00	0.00	0.90	0.00							124.09	124.00	0.09					
26	23	Curb	0.012	46.660	0.00	0.00	0.20	0.00	10.00	1.57	7.21	0.12	0.00	129.50	125.30	125.28	0.03	18	0.06	1.56	0.88	32-33
					0.00	0.00	0.50	0.00					0.88		126.30	126.21			0.19	0.00	0.00	
					0.00	0.00	0.90	0.00							124.80	124.71	0.09					
25	24	Curb	0.012	73.410	0.00	0.00	0.20	0.00	10.00	3.59	7.21	0.08	0.00	129.93	126.15	126.00	0.15	18	0.20	1.95	0.60	30-31
					0.00	0.00	0.50	0.00					0.60		127.30	127.15			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							125.80	125.65	0.15					
24	23	Curb	0.012	150.000	0.00	0.00	0.20	0.00	13.59	3.51	6.72	0.18	0.00	129.93	125.53	125.28	0.26	18	0.17	2.27	1.18	31-33
					0.00	0.00	0.50	0.00					1.18		126.55	126.25			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							125.05	124.75	0.30					
23	22	Curb	0.012	147.346	0.00	0.00	0.20	0.00	17.09	1.41	6.28	0.44	0.00	129.48	125.08	124.79	0.29	18	0.20	2.91	2.74	33-35
					0.00	0.00	0.50	0.00					2.74		125.79	125.50			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							124.29	124.00	0.29					
22	21	Curb	0.012	146.962	0.00	0.00	0.20	0.00	18.51	0.90	6.12	0.70	0.00	128.19	124.55	124.38	0.17	18	0.12	2.60	4.27	35-37
					0.00	0.00	0.50	0.00					4.27		124.79	124.50			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							123.29	123.00	0.29					

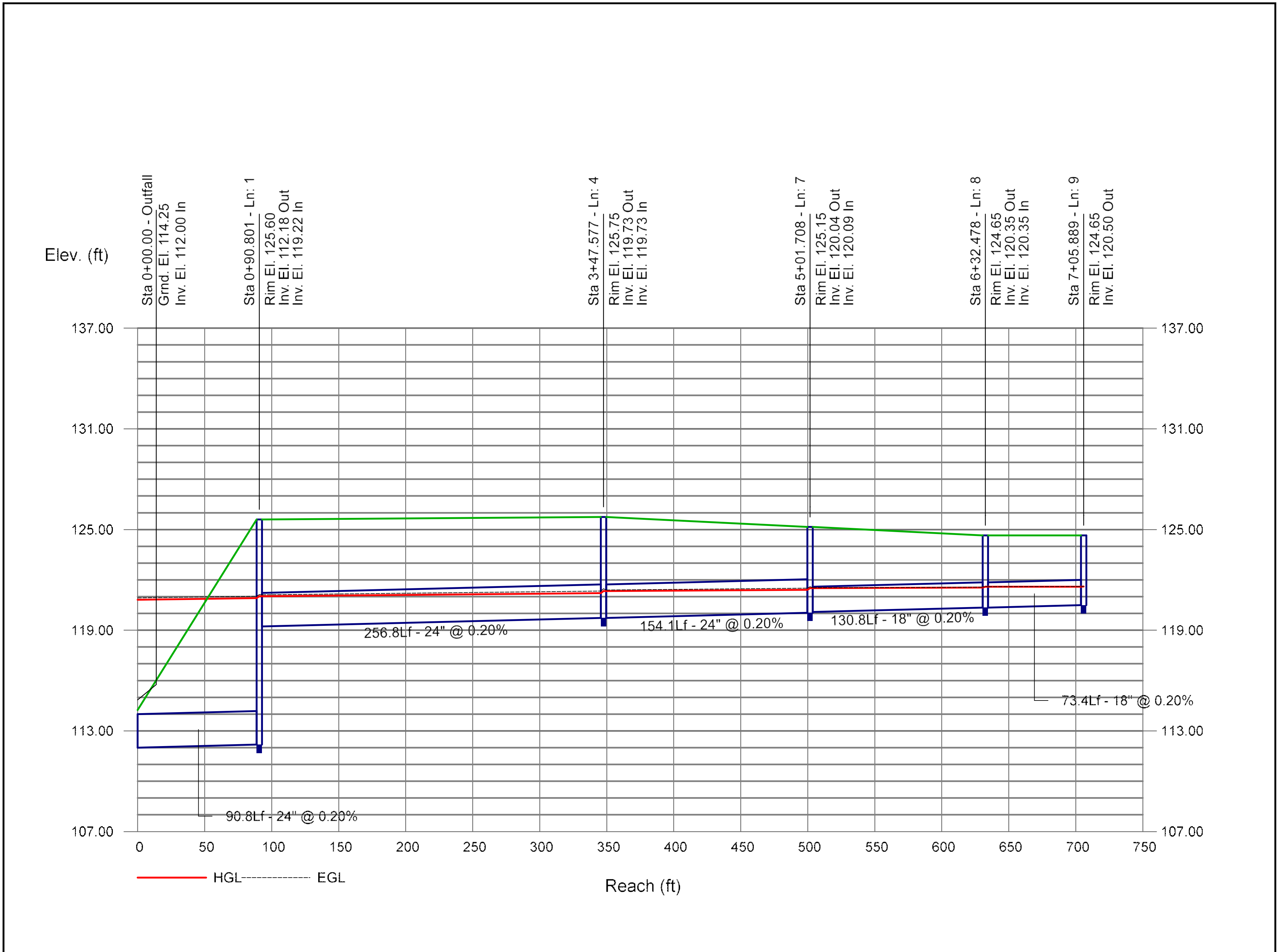
Line	To Line	Type of Struct.	N Value	Line Len	Incr. Area	Sub Total Area	C1 = C2 = C3 =	Sub Total CxA	Time of Conc.	Line Flow Time	Rnfall Inten. (I)	Total CxA	Add. Q Total Runoff	Inlet Elev.	HGL Crown Invert	HGL Crown Invert	HGL Crown Invert	Line Size	HGL Pipe	Actual Design	Actual Design	Line ID
				(ft)	(ac)	(ac)			(min)	(min)	(in/ hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/ s)	(cfs)	
21	20	Curb	0.012	147.606	0.00	0.00	0.20	0.00	19.40	1.17	6.02	0.97	0.00	127.23	124.30	124.22	0.08	24	0.06	1.85	5.82	37-39
					0.00	0.00	0.50	0.00					5.82		124.00	123.70			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							122.00	121.70	0.30					
20	19	Curb	0.012	150.000	0.00	0.00	0.20	0.00	20.58	0.94	5.89	1.25	0.00	126.67	124.09	123.95	0.14	24	0.09	2.35	7.37	39-41
					0.00	0.00	0.50	0.00					7.37		123.10	122.80			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							121.10	120.80	0.30					
19	18	Curb	0.012	151.006	0.00	0.00	0.20	0.00	21.51	0.78	5.79	1.54	0.00	126.68	123.76	123.57	0.20	24	0.13	2.83	8.89	41-48
					0.00	0.00	0.50	0.00					8.89		122.80	122.50			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.80	120.50	0.30					
18	17	MH	0.012	153.320	0.00	0.00	0.20	0.00	22.29	0.93	5.71	2.08	0.00	125.70	123.47	123.36	0.11	30	0.07	2.42	11.90	48-51
					0.00	0.00	0.50	0.00					11.90		122.85	122.54			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.35	120.04	0.31					
17	16	MH	0.012	254.312	0.00	0.00	0.20	0.00	23.22	1.24	5.62	2.63	0.00	126.25	123.22	122.94	0.28	30	0.11	3.01	14.78	50-53
					0.00	0.00	0.50	0.00					14.78		122.54	122.03			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.04	119.53	0.51					
16	15	Curb	0.012	150.000	0.00	0.00	0.20	0.00	24.46	0.68	5.50	2.90	0.00	125.45	122.70	122.50	0.19	30	0.13	3.25	15.95	53-59
					0.00	0.00	0.50	0.00					15.95		122.03	121.73			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							119.53	119.23	0.30					
15	14	Curb	0.012	150.000	0.00	0.00	0.20	0.00	25.14	0.58	5.43	3.44	0.00	124.50	122.16	121.90	0.27	30	0.18	3.81	18.70	59-61
					0.00	0.00	0.50	0.00					18.70		121.73	121.43			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							119.23	118.93	0.30					
14	13	Curb	0.012	300.000	0.00	0.00	0.20	0.00	25.72	1.58	5.38	3.72	0.00	125.00	121.70	121.49	0.21	36	0.07	2.88	20.00	61-63
					0.00	0.00	0.50	0.00					20.00		121.93	121.33			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							118.93	118.33	0.60					
13	12	Curb	0.012	150.003	0.00	0.00	0.20	0.00	27.30	0.76	5.23	4.00	0.00	125.00	121.29	121.17	0.12	36	0.08	2.96	20.92	63-69
					0.00	0.00	0.50	0.00					20.92		121.33	121.03			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							118.33	118.03	0.30					
12	Outfa	Curb	0.012	88.580	0.00	0.00	0.20	0.00	28.05	0.40	5.17	4.54	0.00	124.50	120.91	120.82	0.09	36	0.11	3.32	23.45	69-70
					0.00	0.00	0.50	0.00					23.45		115.18	115.00			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							112.18	112.00	0.18					
11	10	Curb	0.012	47.537	0.00	0.00	0.20	0.00	10.00	0.77	7.21	0.25	0.00	124.33	121.57	121.56	0.01	18	0.02	1.05	1.81	12-13
					0.00	0.00	0.50	0.00					1.81		121.70	121.60			0.21	0.00	0.00	

Line	To Line	Type of Struct.	N Value	Line Len	Incr. Area	Sub Total Area	C1 = C2 = C3 =	Sub Total CxA	Time of Conc.	Line Flow Time	Rnfall Inten. (I)	Total CxA	Add. Q Total Runoff	Inlet Elev.	HGL Crown Invert	HGL Crown Invert	HGL Crown Invert	Line Size	HGL Pipe	Actual Design	Actual Design	Line ID
				(ft)	(ac)	(ac)			(min)	(min)	(in/ hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/ s)	(cfs)	
					0.00	0.00	0.90	0.00							120.20	120.10	0.10					
10	7	Curb	0.012	30.373	0.00	0.00	0.20	0.00	10.77	0.25	7.10	0.51	0.00	124.75	121.53	121.50	0.02	18	0.08	2.07	3.61	13-14
					0.00	0.00	0.50	0.00					3.61		121.60	121.54			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.10	120.04	0.06					
9	8	Curb	0.012	73.411	0.00	0.00	0.20	0.00	10.00	1.89	7.21	0.16	0.00	124.65	121.59	121.59	0.00	18	0.01	0.78	1.14	10-11
					0.00	0.00	0.50	0.00					1.14		122.00	121.85			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.50	120.35	0.15					
8	7	Curb	0.012	130.770	0.00	0.00	0.20	0.00	11.89	1.74	6.95	0.31	0.00	124.65	121.54	121.50	0.04	18	0.03	1.34	2.15	11-14
					0.00	0.00	0.50	0.00					2.15		121.85	121.59			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.35	120.09	0.26					
7	4	MH	0.012	154.131	0.00	0.00	0.20	0.00	13.63	1.40	6.71	0.82	0.00	125.15	121.41	121.34	0.07	24	0.05	2.21	5.49	14-17
					0.00	0.00	0.50	0.00					5.49		122.04	121.73			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.04	119.73	0.31					
6	5	Curb	0.012	46.653	0.00	0.00	0.20	0.00	10.00	1.44	7.21	0.13	0.00	124.72	121.37	121.37	0.00	18	0.01	0.85	0.95	15-16
					0.00	0.00	0.50	0.00					0.95		122.00	121.91			0.19	0.00	0.00	
					0.00	0.00	0.90	0.00							120.50	120.41	0.09					
5	4	Curb	0.012	30.387	0.00	0.00	0.20	0.00	11.44	0.46	7.01	0.27	0.00	125.27	121.35	121.34	0.01	18	0.03	1.59	1.90	16-17
					0.00	0.00	0.50	0.00					1.90		121.91	121.85			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.41	120.35	0.06					
4	1	MH	0.012	256.776	0.00	0.00	0.20	0.00	15.03	1.78	6.54	1.09	0.00	125.75	121.21	121.02	0.19	24	0.07	2.62	7.12	17-20
					0.00	0.00	0.50	0.00					7.12		121.73	121.22			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							119.73	119.22	0.51					
3	2	Curb	0.012	45.785	0.00	0.00	0.20	0.00	10.00	2.02	7.21	0.09	0.00	124.97	121.18	121.17	0.01	18	0.03	1.24	0.67	18-19
					0.00	0.00	0.50	0.00					0.67		122.20	122.11			0.20	0.00	0.00	
					0.00	0.00	0.90	0.00							120.70	120.61	0.09					
2	1	Curb	0.012	29.697	0.00	0.00	0.20	0.00	12.02	0.66	6.93	0.18	0.00	125.50	121.12	121.06	0.06	18	0.20	2.41	1.28	19-20
					0.00	0.00	0.50	0.00					1.28		122.11	122.05			0.20	2.89	5.11	
					0.00	0.00	0.90	0.00							120.61	120.55	0.06					
1	)utfa	MH	0.012	90.801	0.00	0.00	0.20	0.00	16.81	0.55	6.32	1.27	0.00	125.60	120.92	120.82	0.10	24	0.11	2.56	8.05	20-21
					0.00	0.00	0.50	0.00					8.05		114.18	114.00			0.20	3.47	10.91	

Line	To Line	Type of Struct.	N Value	Line Len	Incr. Area	Sub Total Area	C1 = C2 = C3 =	Sub Total CxA	Time of Conc.	Line Flow Time	Rnfall Inten. (I)	Total CxA	Add. Q Total Runoff	Inlet Elev.	HGL Crown Invert	HGL Crown Invert	HGL Crown Invert	Line Size	HGL Pipe	Actual Design	Actual Design	Line ID
				(ft)	(ac)	(ac)			(min)	(min)	(in/ hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/ s)	(cfs)	
					0.00	0.00	0.90	0.00							112.18	112.00	0.18					

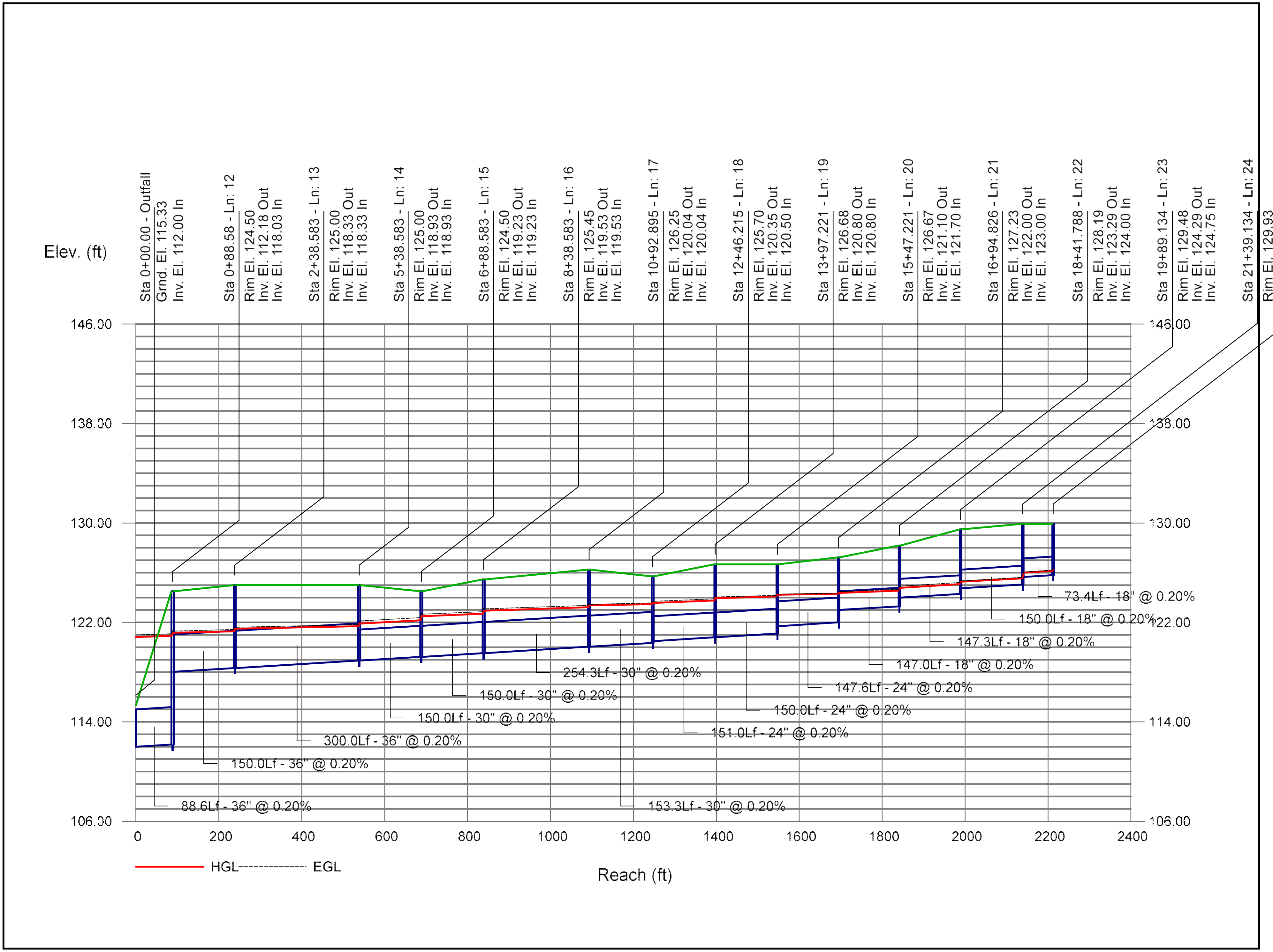
Storm Sewer Profile

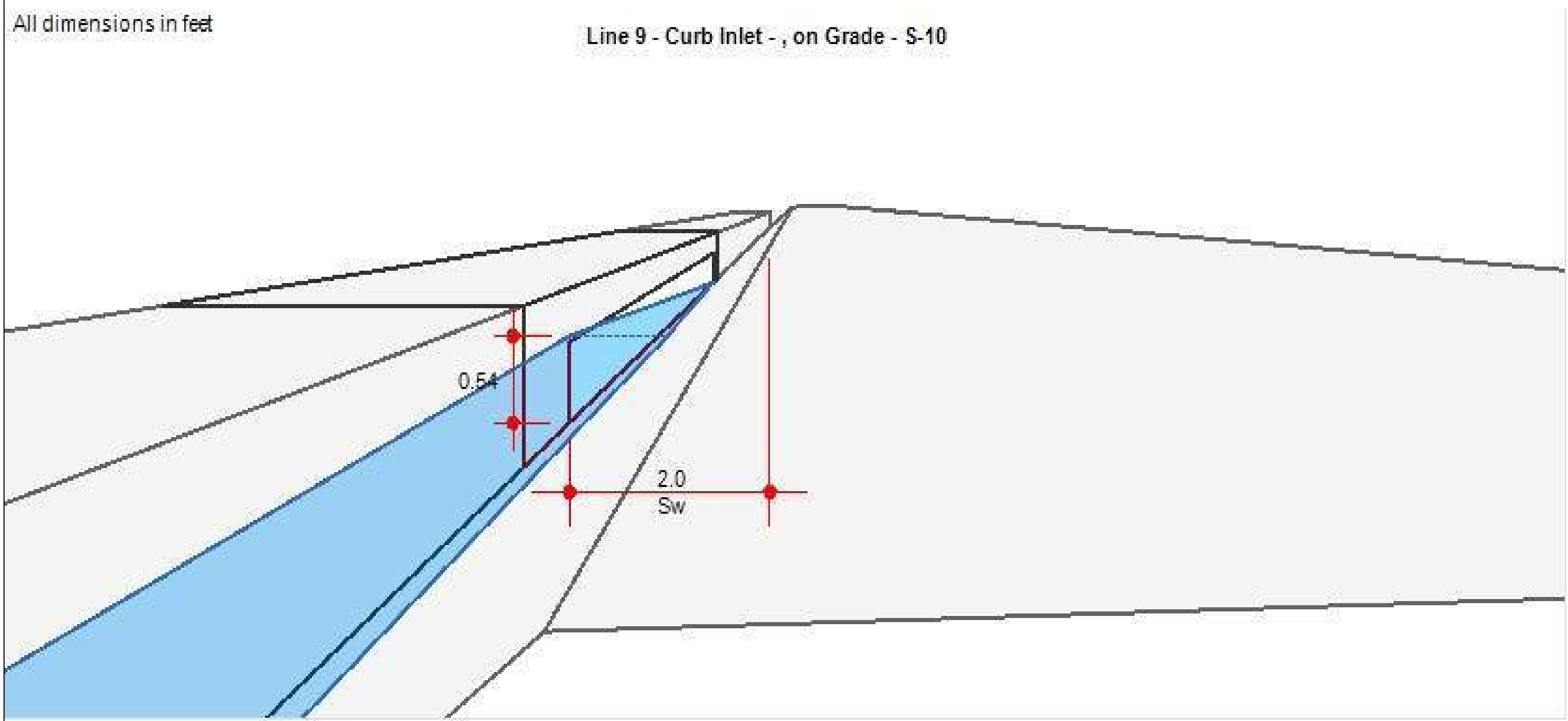
Proj. file: STORM0102.stm



Storm Sewer Profile

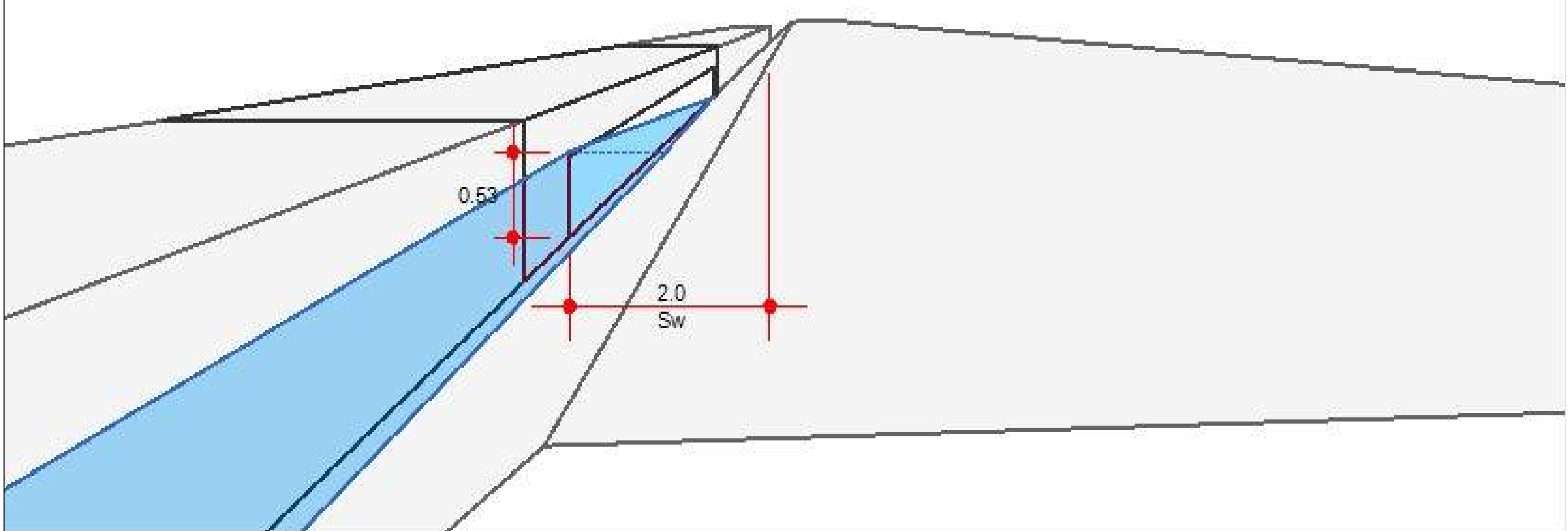
Proj. file: STORM0102.stm

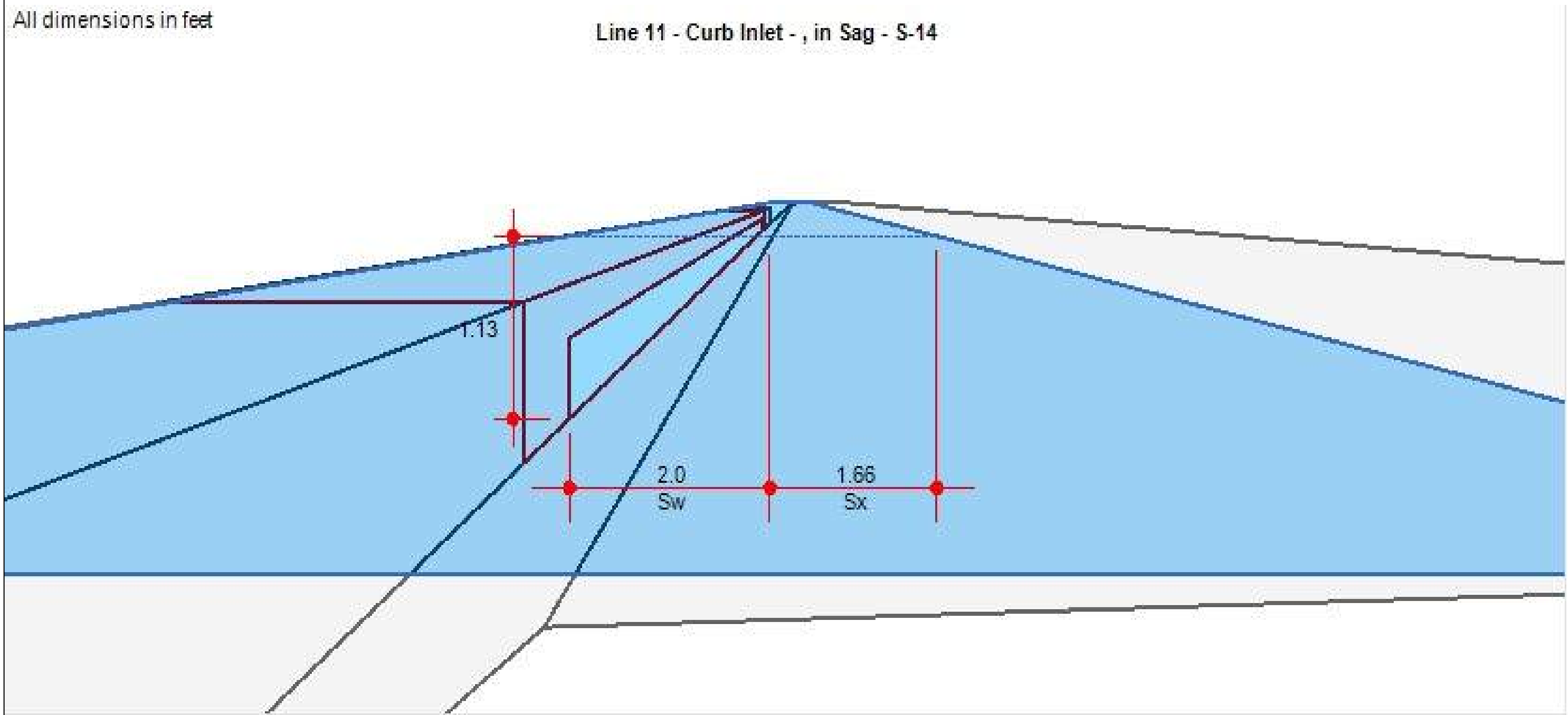


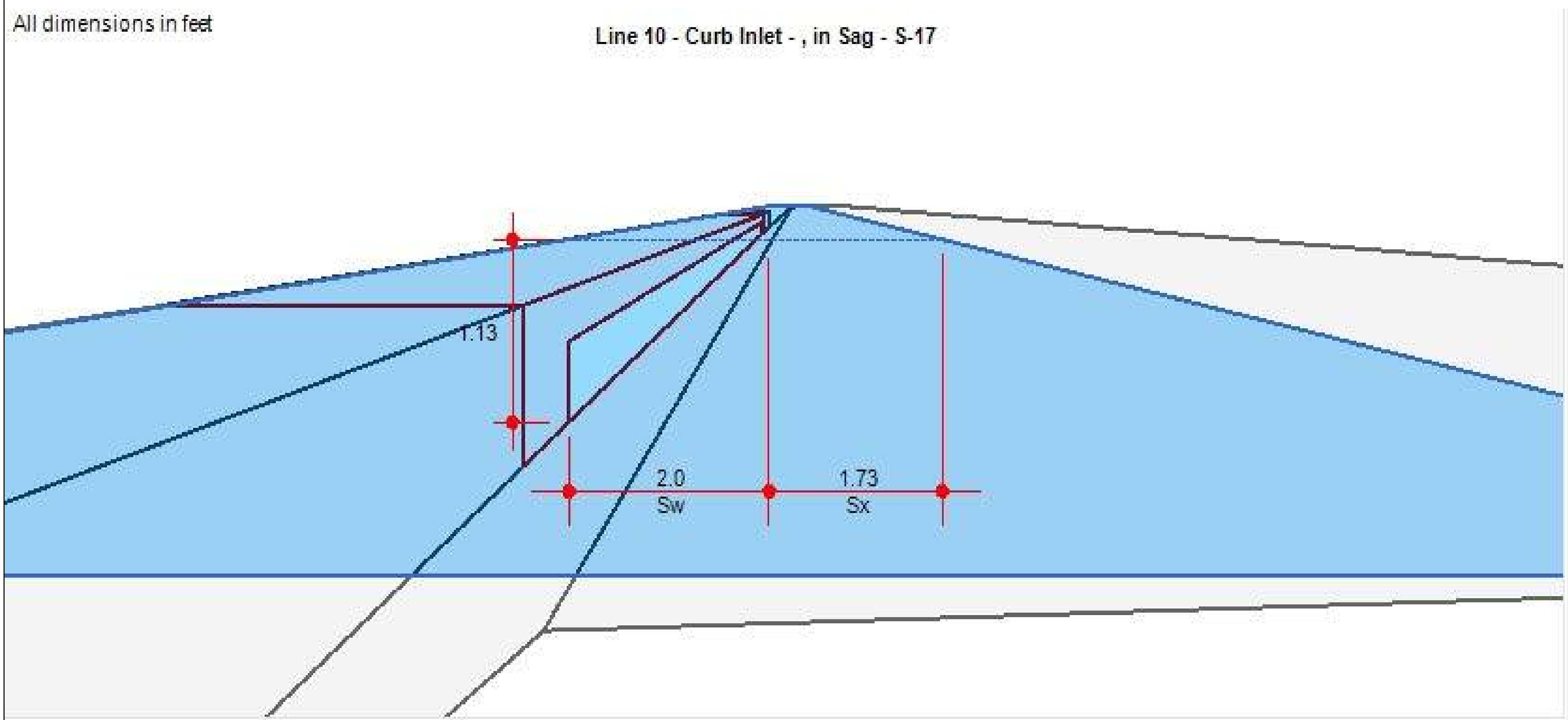

All dimensions in feet
Line 9 - Curb Inlet - , on Grade - S-10
0.54
2.0
Sw

All dimensions in feet

Line 8 - Curb Inlet - , on Grade - S-11

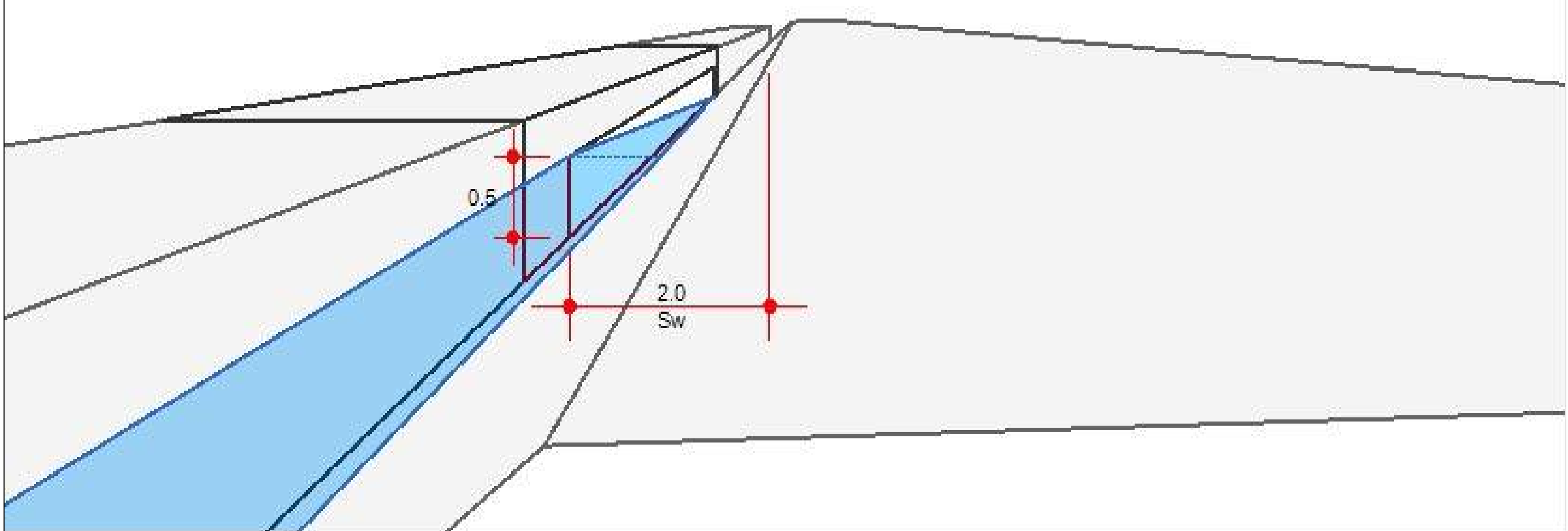


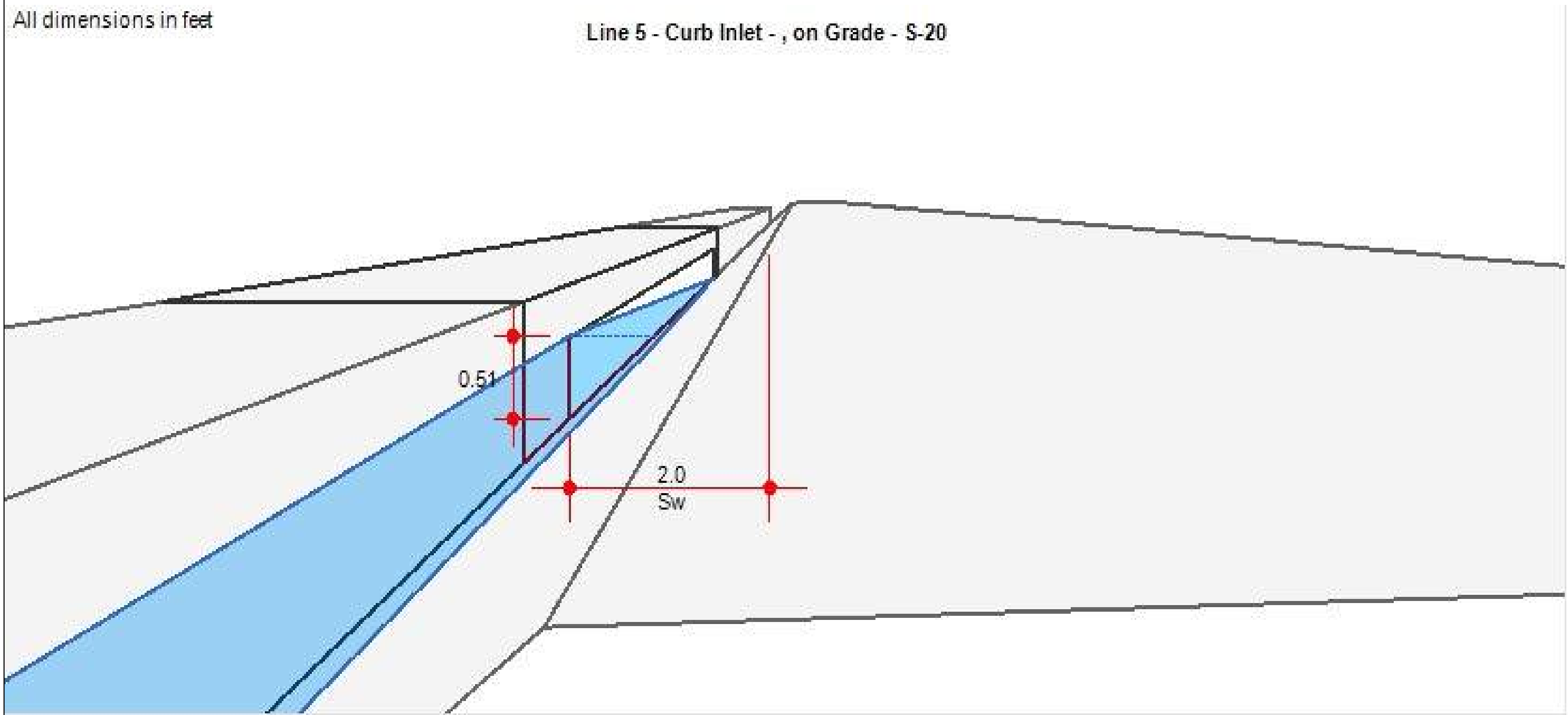

All dimensions in feet
Line 11 - Curb Inlet - , in Sag - S-14
1.13
2.0
Sw
1.66
Sx

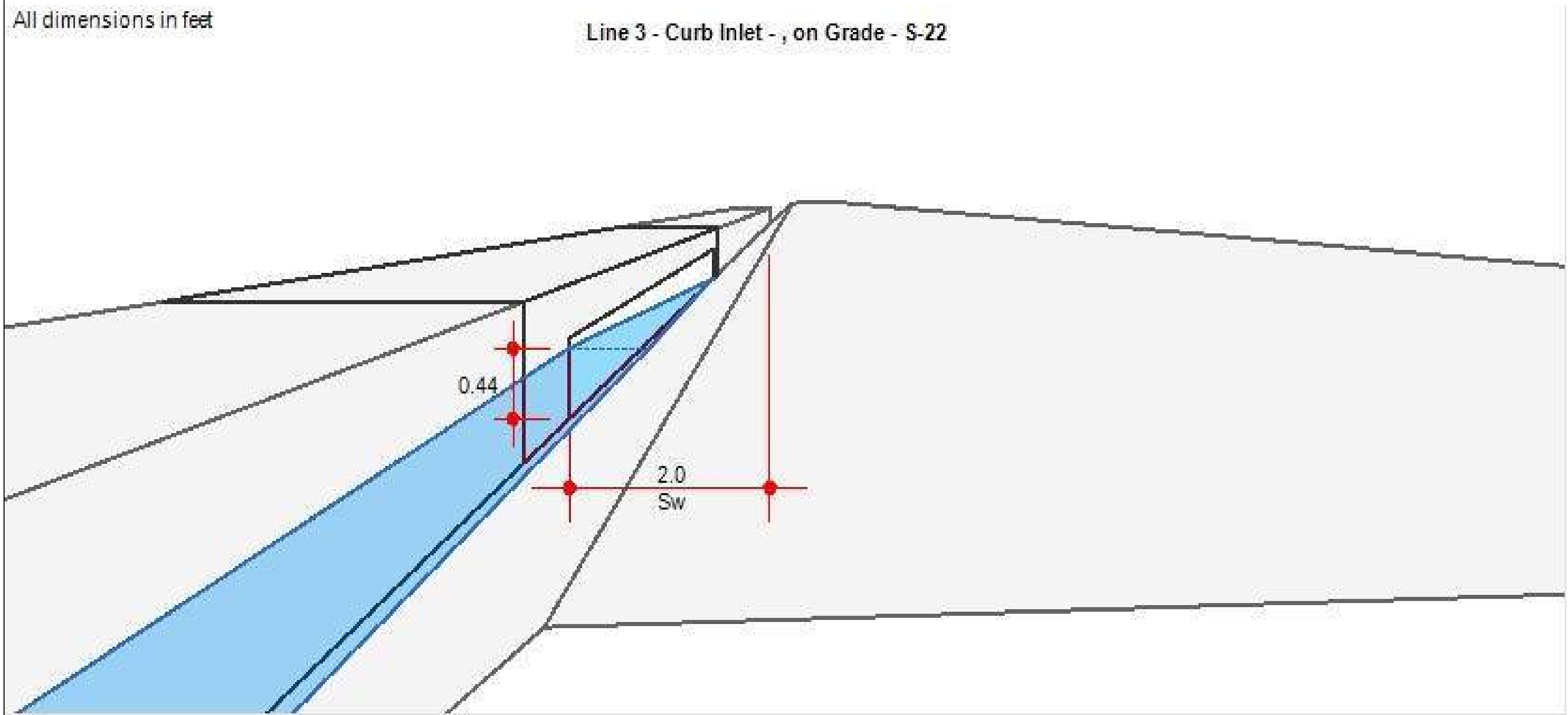

All dimensions in feet
Line 10 - Curb Inlet - , in Sag - S-17
1.13
2.0
Sw
1.73
Sx

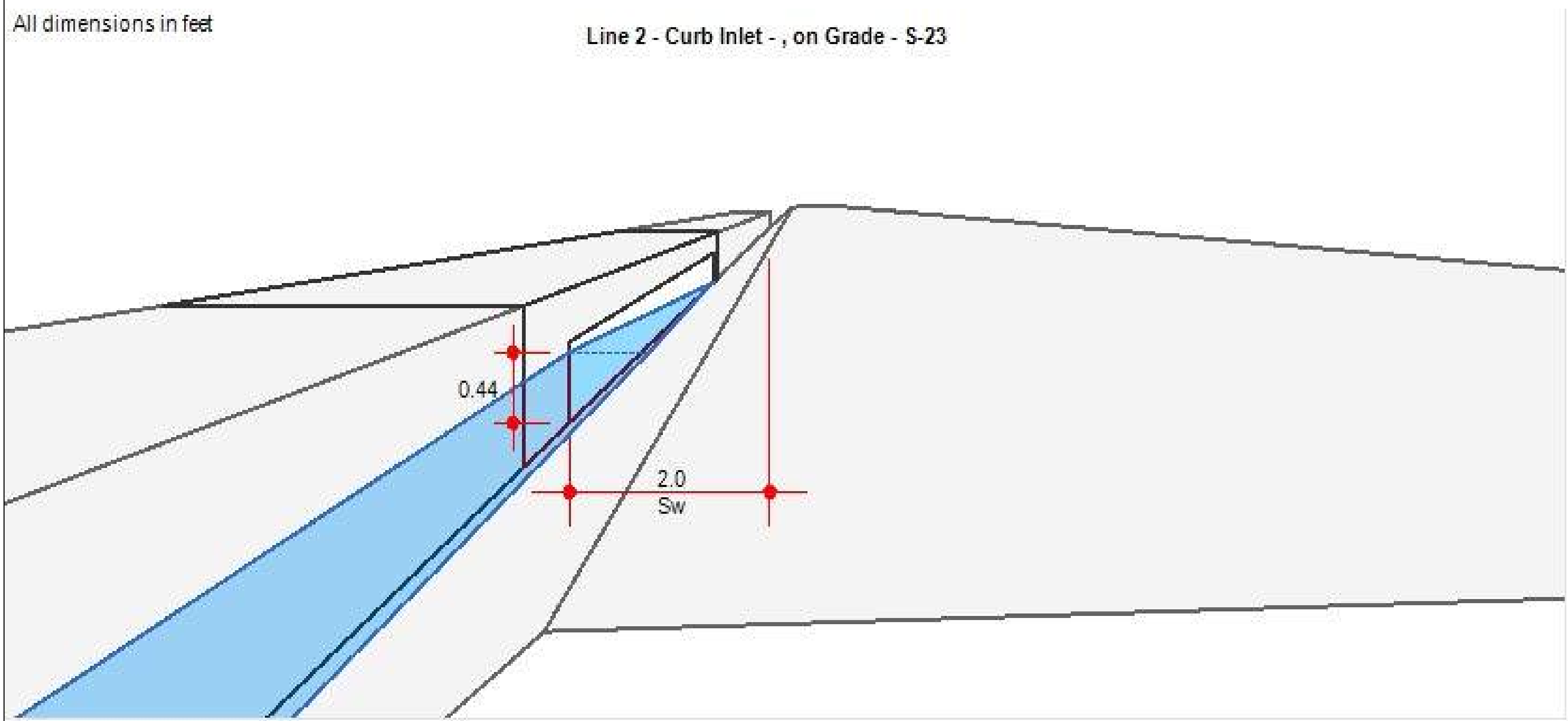
All dimensions in feet

Line 6 - Curb Inlet - , on Grade - S-19

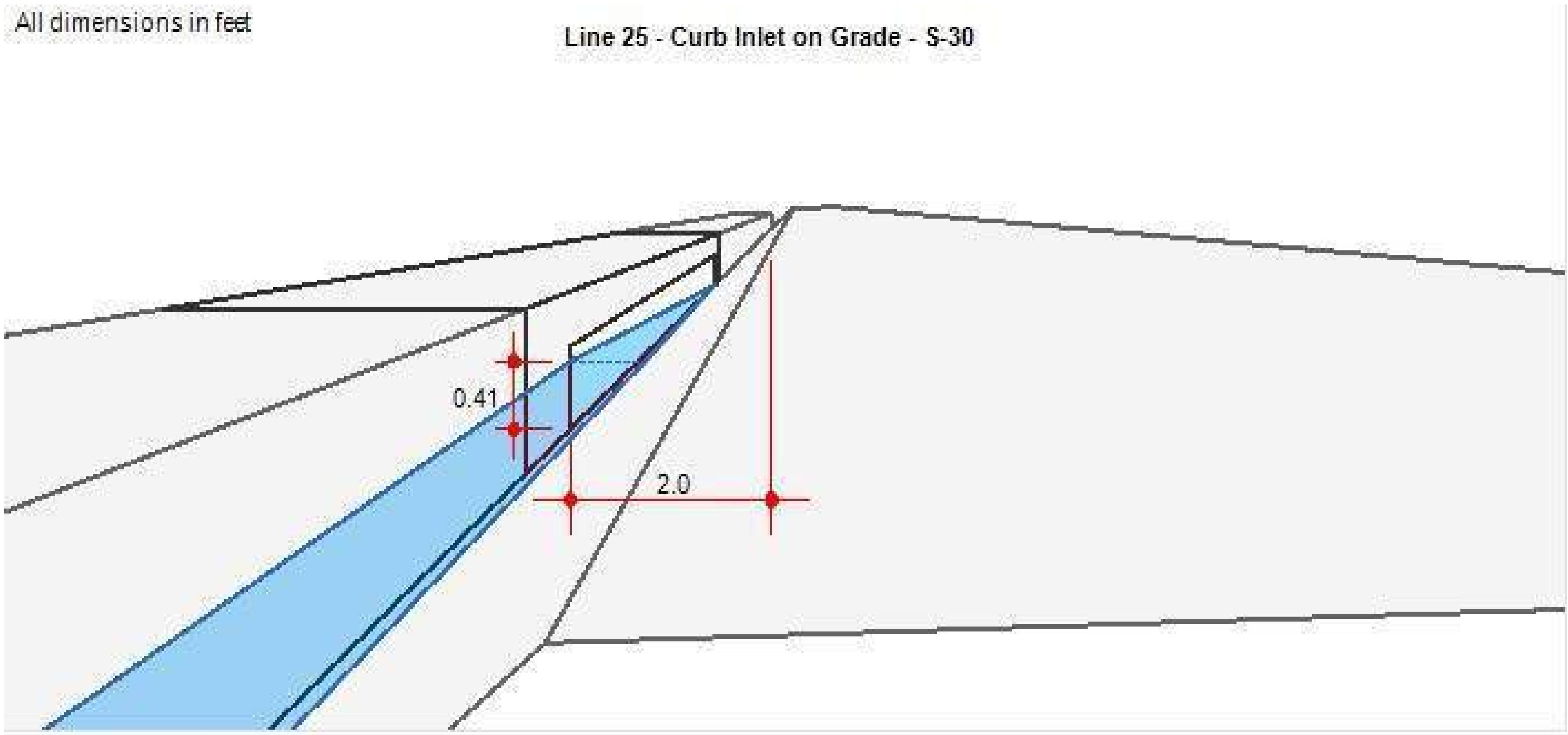



All dimensions in feet
Line 5 - Curb Inlet - , on Grade - S-20
0.51
2.0
Sw


All dimensions in feet
Line 3 - Curb Inlet - , on Grade - S-22
0.44
2.0
Sw


All dimensions in feet
Line 2 - Curb Inlet - , on Grade - S-23
0.44
2.0
Sw

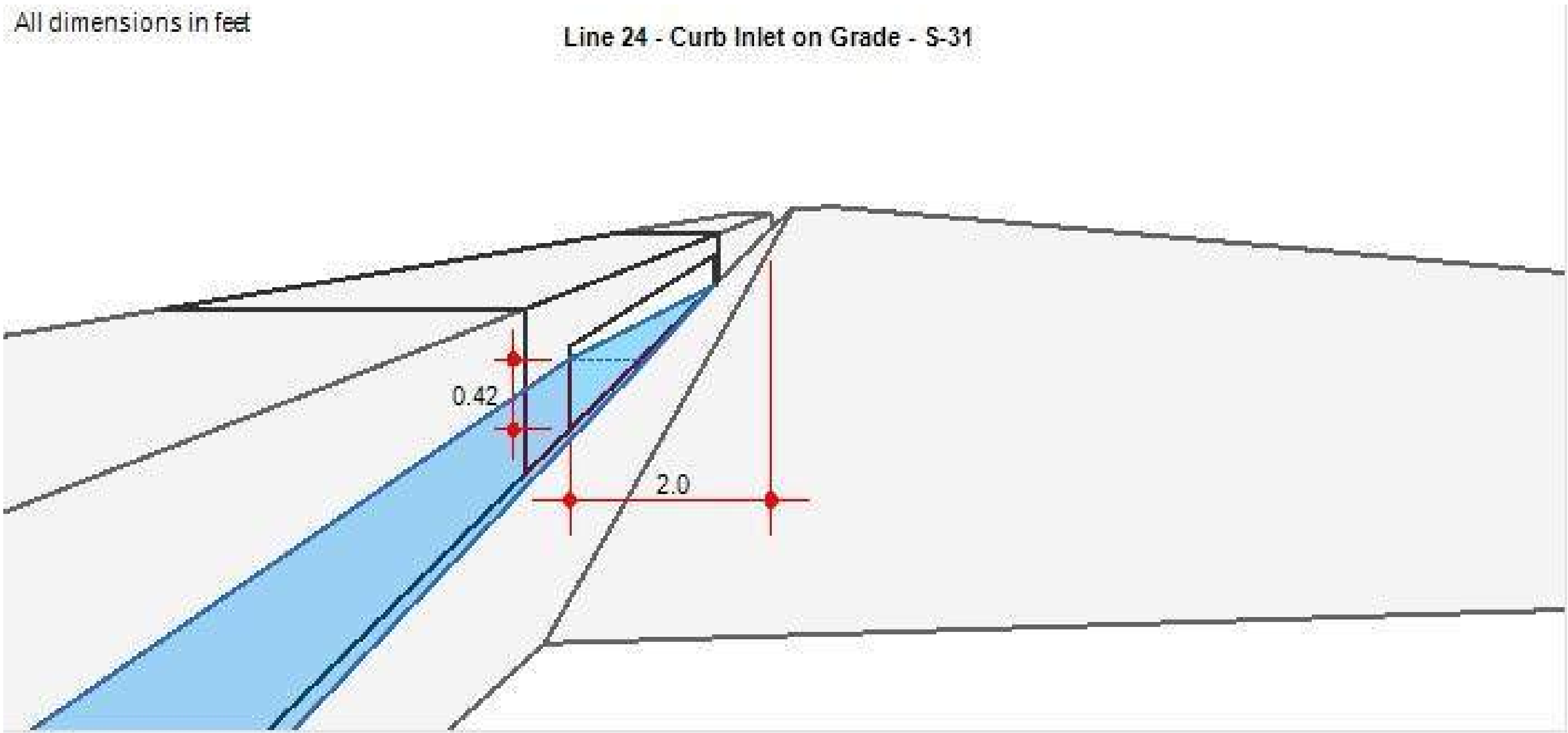
Inlet Section (Line 25 - Curb Inlet) - S-30



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
25	0.60	0.00	0.60	0.00	10.50	0.0	6.0	2.00	0.006	0.550	0.020	0.41	0.74	0.00	0.00	26

Project File: | No. Lines: 39 | Run Date: 4/8/2022

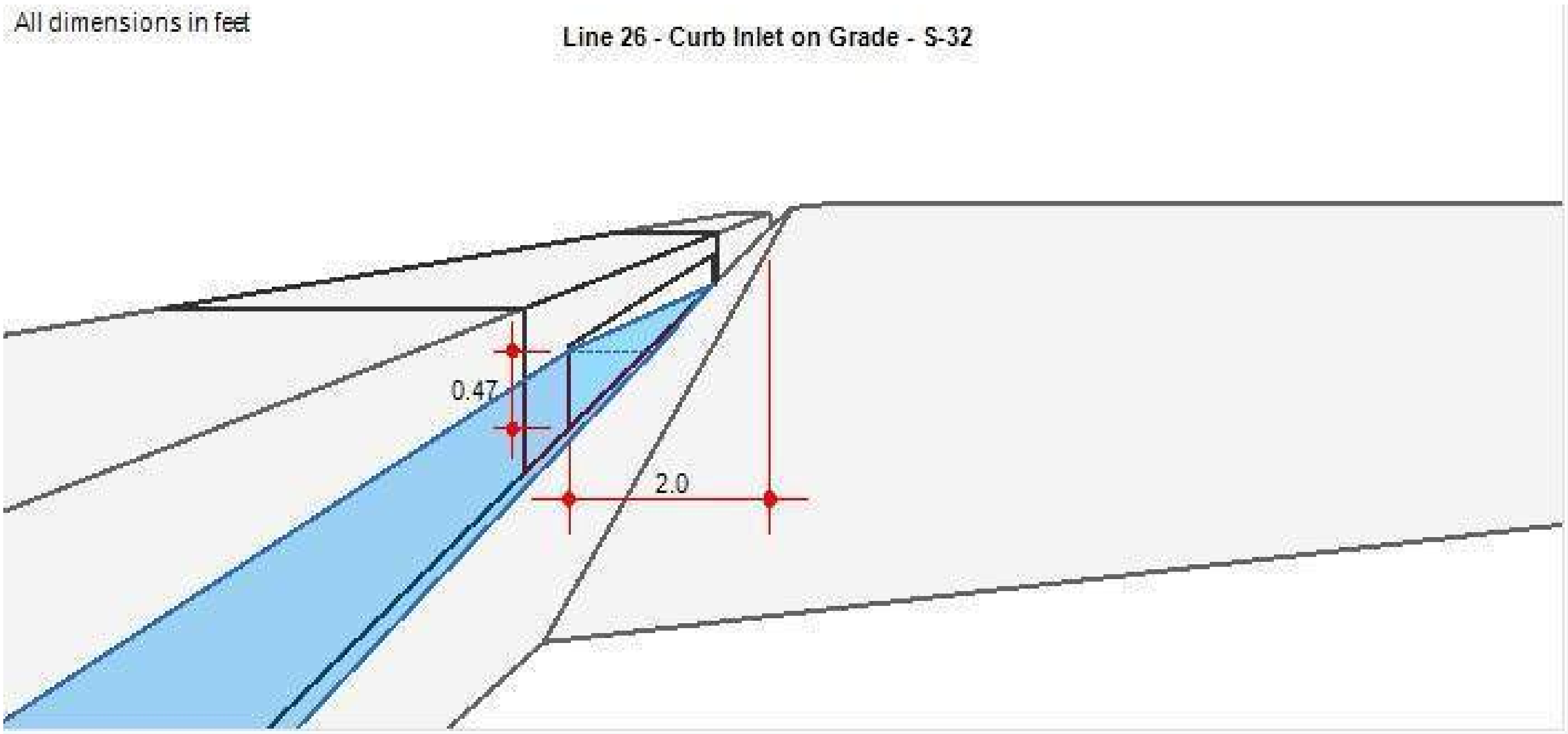
Inlet Section (Line 24 - Curb Inlet) - S-31



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
24	0.67	0.00	0.67	0.00	10.50	0.0	6.0	2.00	0.006	0.550	0.020	0.42	0.77	0.00	0.00	23

Project File: | No. Lines: 39 | Run Date: 4/8/2022

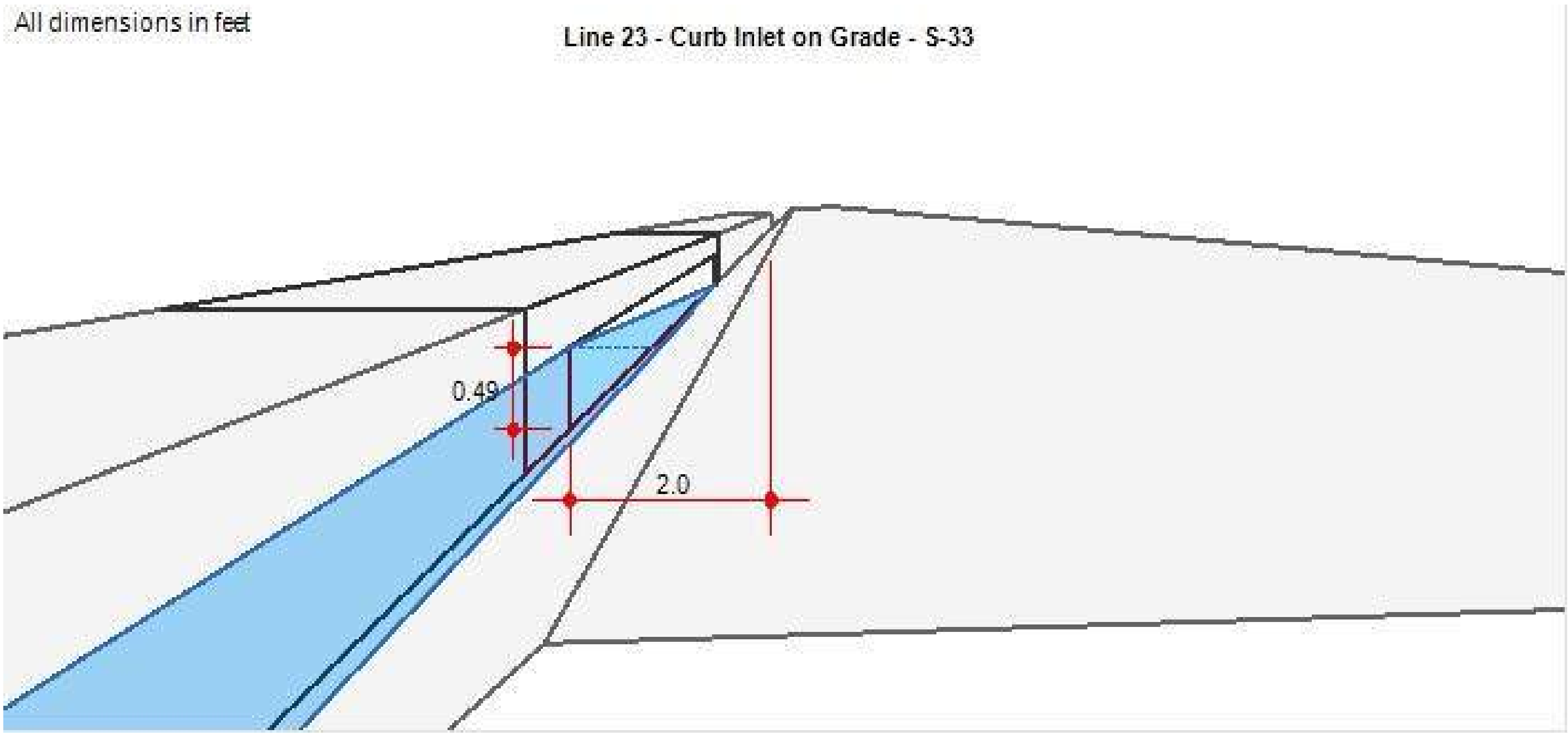
Inlet Section (Line 26 - Curb Inlet) - S-32



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
26	0.88	0.00	0.88	0.00	10.50	0.0	6.0	2.00	0.006	0.550	0.070	0.47	0.85	0.00	0.00	27

Project File: | No. Lines: 39 | Run Date: 4/8/2022

Inlet Section (Line 23 - Curb Inlet) - S-33



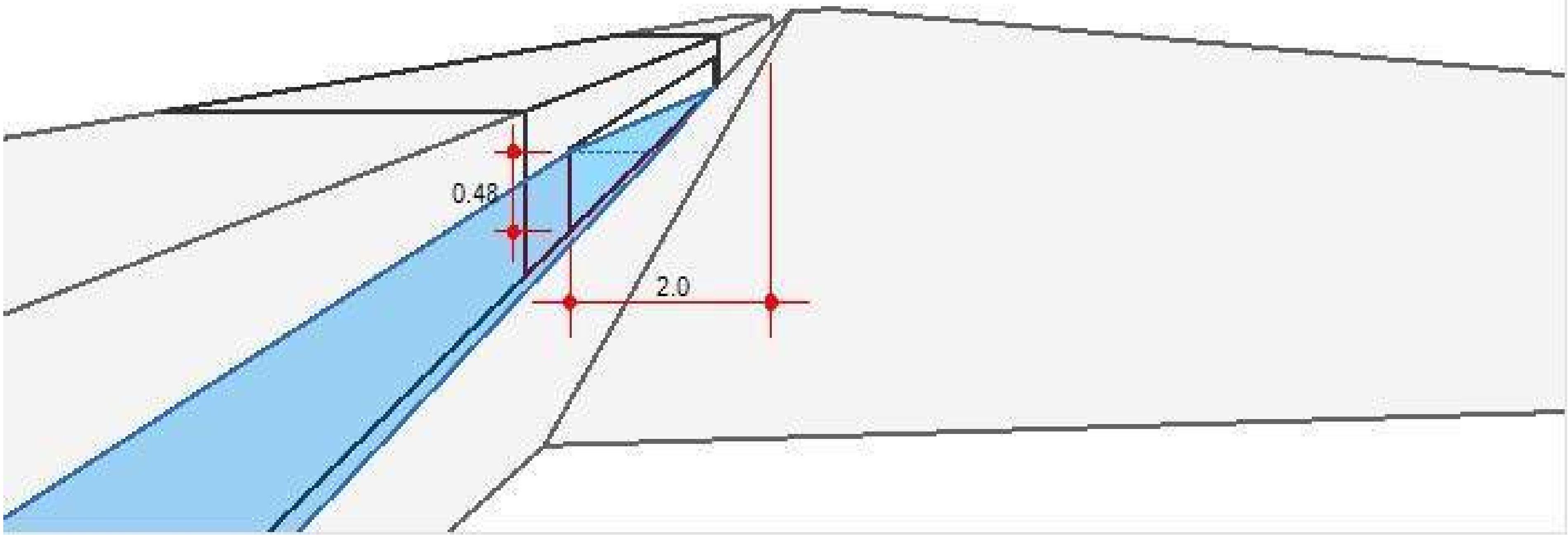
Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
23	1.00	0.00	1.00	0.00	10.50	0.0	6.0	2.00	0.006	0.550	0.020	0.49	0.90	0.00	0.00	22

Project File: No. Lines: 39 Run Date: 4/8/2022

Inlet Section (Line 27 - Curb Inlet) - S-34

All dimensions in feet

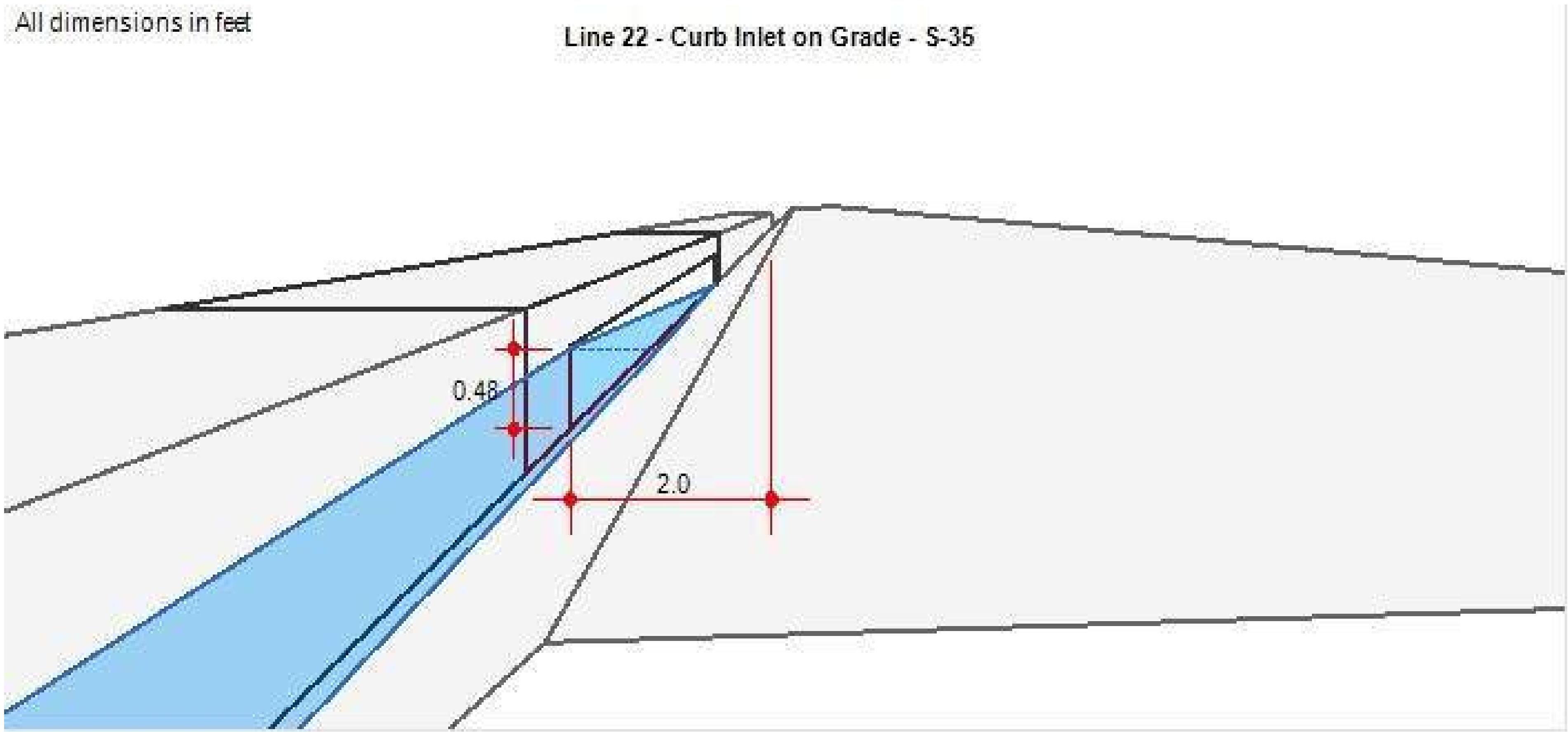
Line 27 - Curb Inlet on Grade - S-34



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
27	0.93	0.00	0.93	0.00	10.50	0.0	6.0	2.00	0.006	0.550	0.020	0.48	0.87	0.00	0.00	28

Project File: No. Lines: 39 Run Date: 4/8/2022

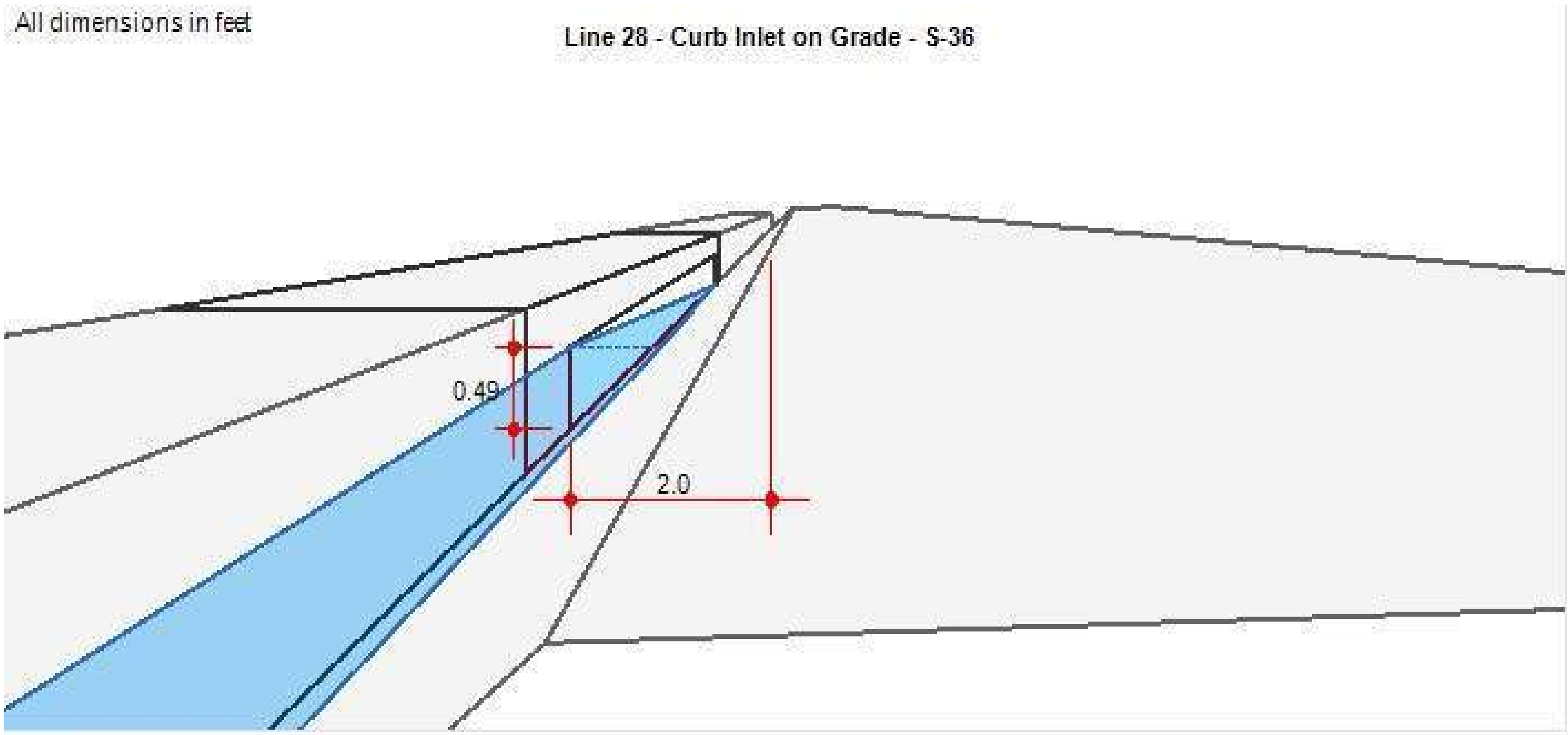
Inlet Section (Line 22 - Curb Inlet) - S-35



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
22	0.95	0.00	0.95	0.00	10.50	0.0	6.0	2.00	0.006	0.550	0.020	0.48	0.88	0.00	0.00	21

Project File: No. Lines: 39 Run Date: 4/8/2022

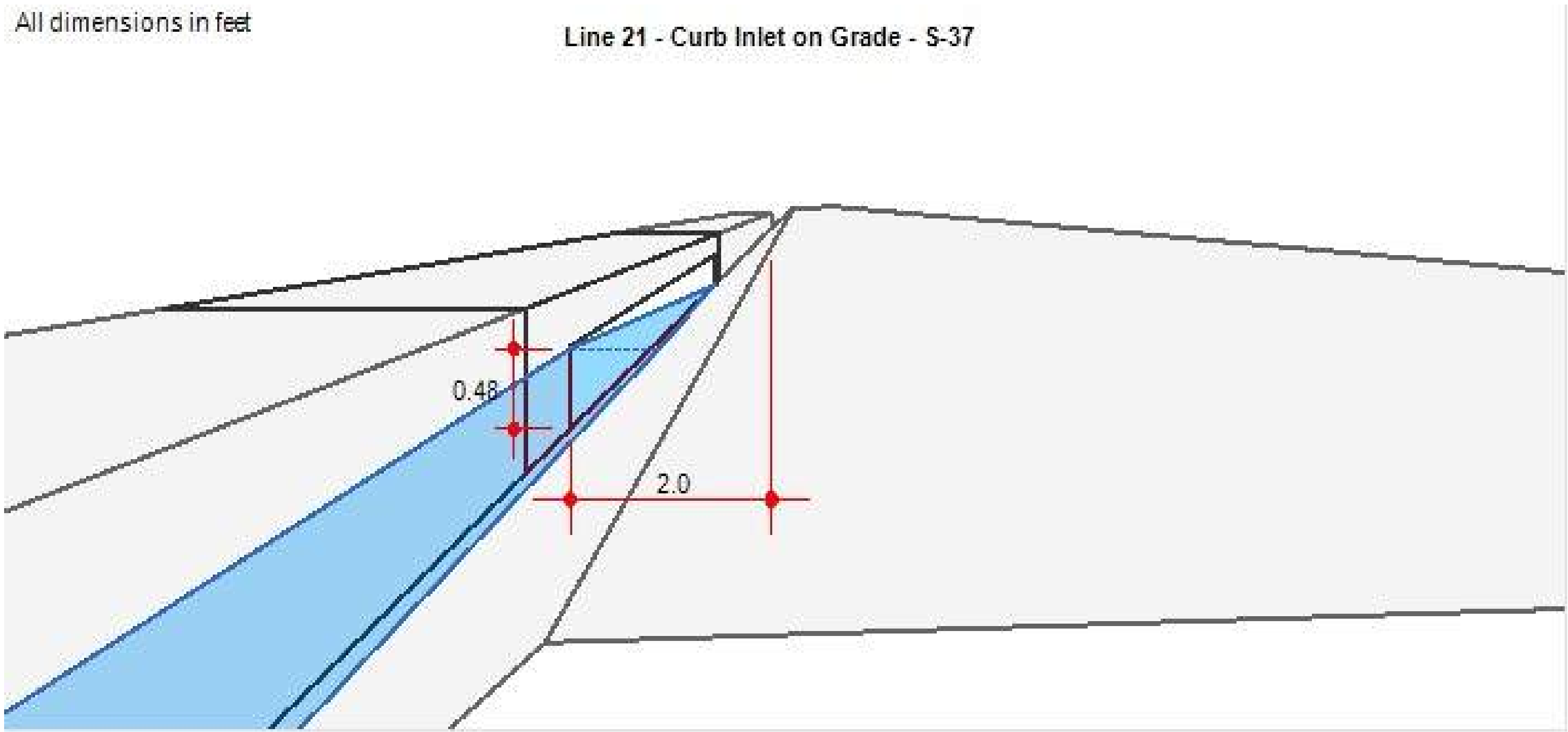
Inlet Section (Line 28 - Curb Inlet) - S-36



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
28	0.99	0.00	0.99	0.00	10.50	0.0	6.0	2.00	0.006	0.550	0.020	0.49	0.89	0.00	0.00	30

Project File: | No. Lines: 39 | Run Date: 4/8/2022

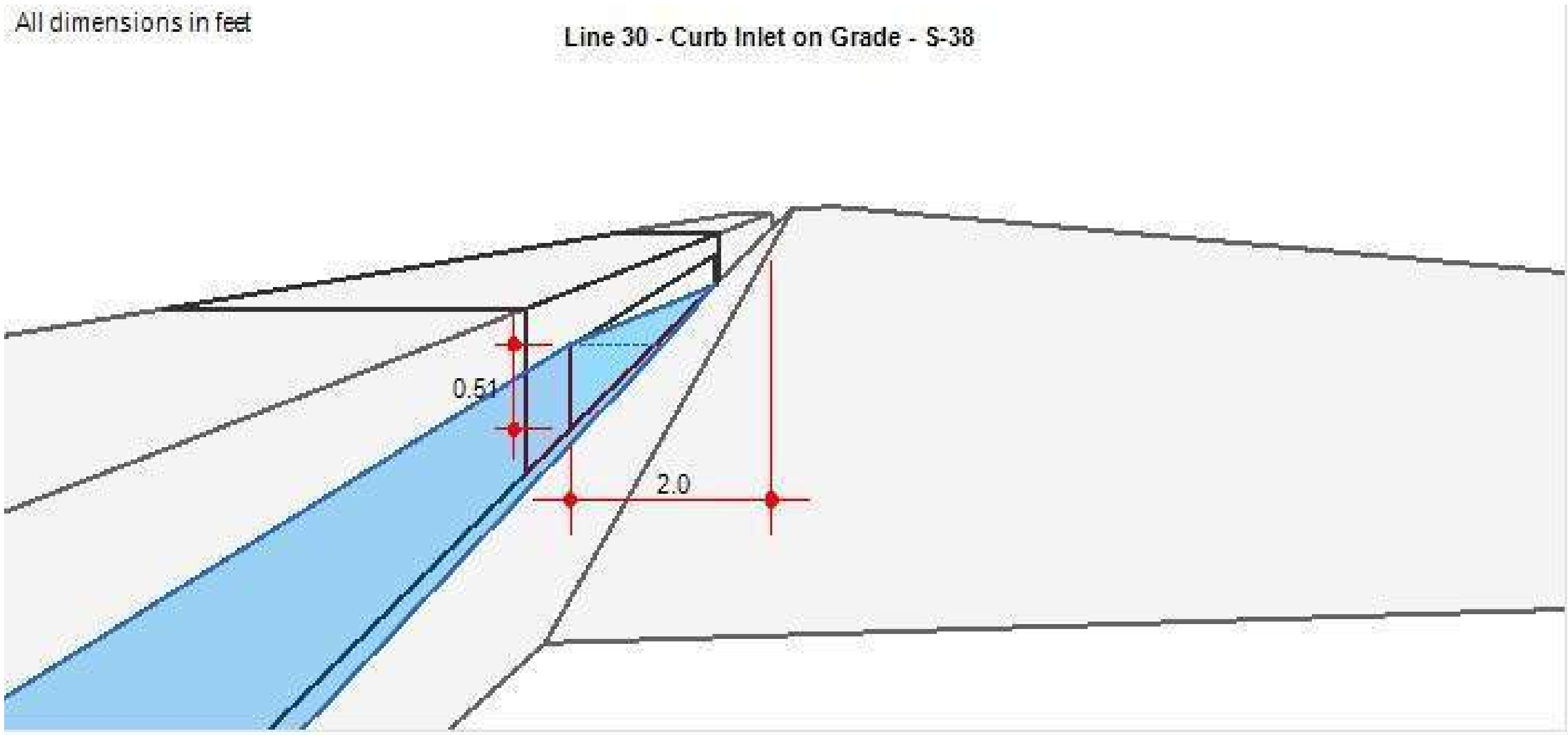
Inlet Section (Line 21 - Curb Inlet) - S-37



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
21	0.95	0.00	0.95	0.00	10.50	0.0	6.0	2.00	0.006	0.550	0.020	0.48	0.88	0.00	0.00	20

Project File: | No. Lines: 39 | Run Date: 4/8/2022

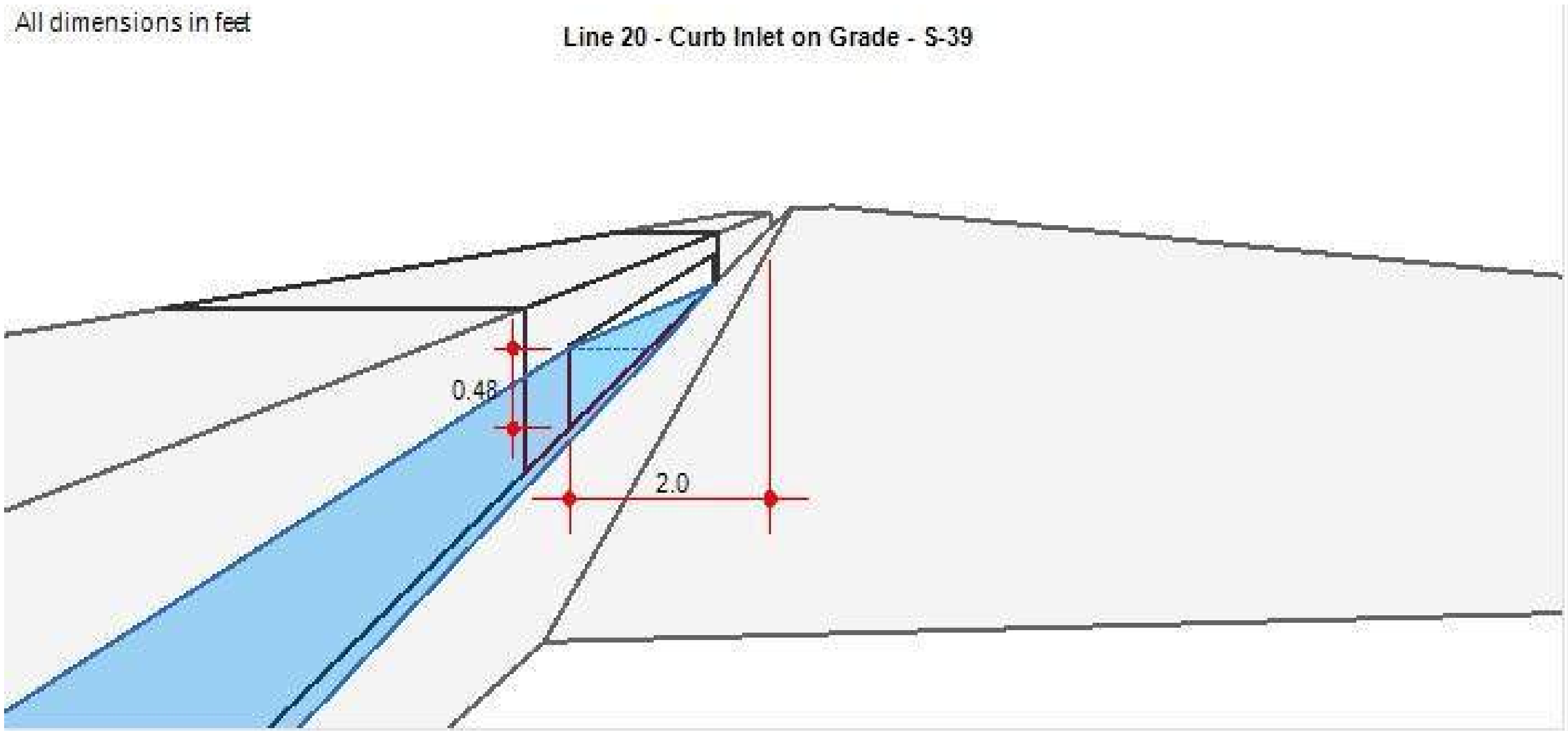
Inlet Section (Line 30 - Curb Inlet) - S-38



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
30	1.11	0.00	1.11	0.00	10.50	0.0	6.0	2.00	0.006	0.550	0.020	0.51	0.93	0.00	0.00	29

Project File: No. Lines: 39 Run Date: 4/8/2022

Inlet Section (Line 20 - Curb Inlet) - S-39



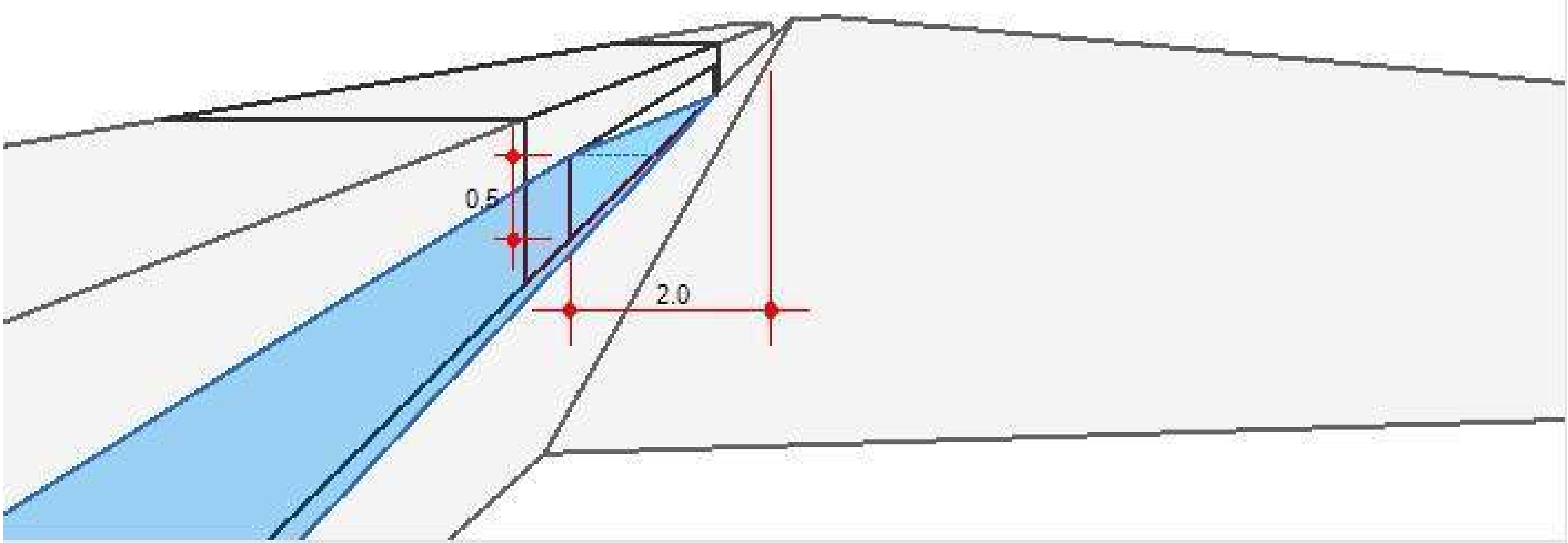
Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
20	0.95	0.00	0.95	0.00	10.50	0.0	6.0	2.00	0.006	0.550	0.017	0.48	0.88	0.00	0.00	19

Project File: | No. Lines: 39 | Run Date: 4/8/2022

Inlet Section (Line 29 - Curb Inlet) - S-40

All dimensions in feet

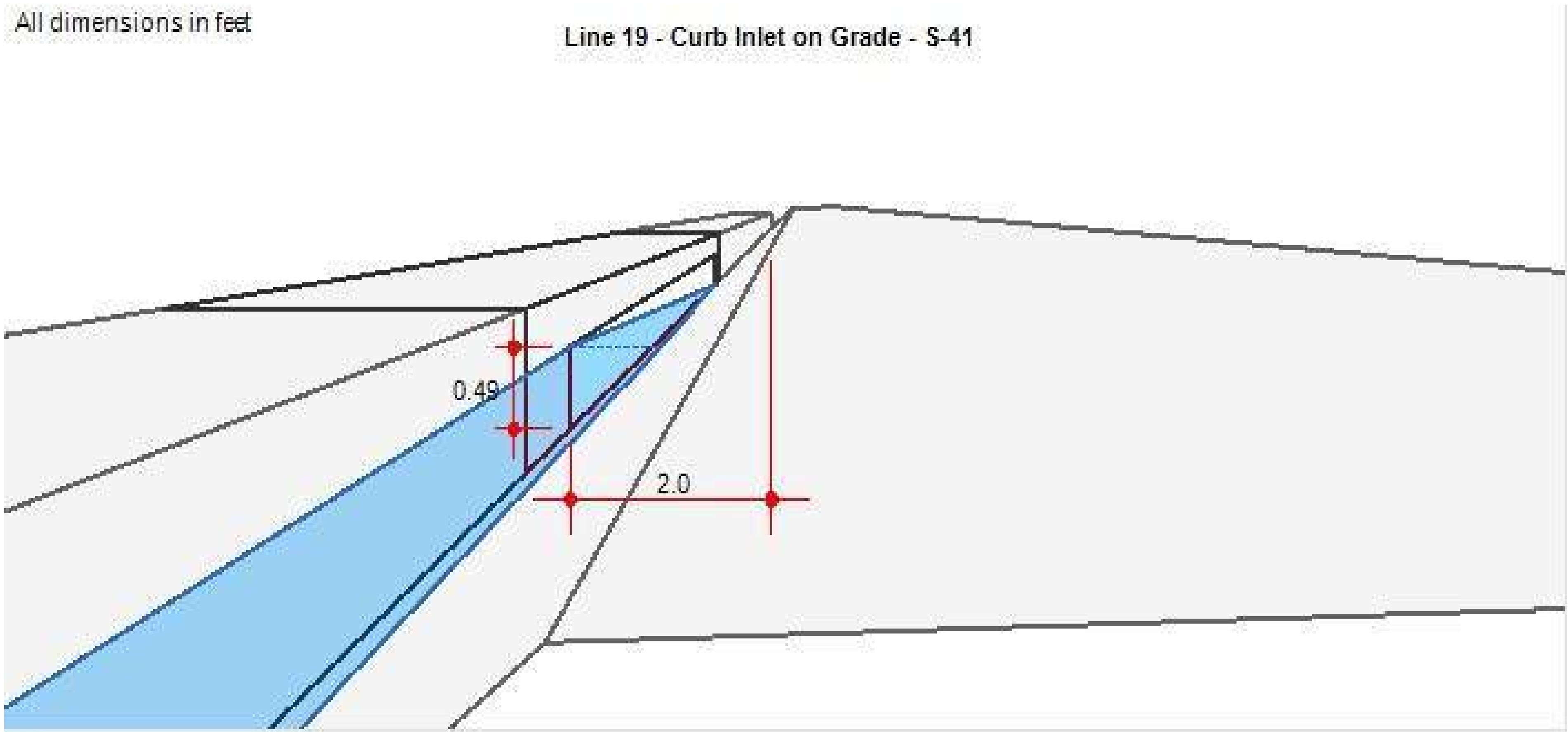
Line 29 - Curb Inlet on Grade - S-40



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
29	1.05	0.00	1.05	0.00	10.50	0.0	6.0	2.00	0.006	0.550	0.020	0.50	0.91	0.00	0.00	37

Project File:	No. Lines: 39	Run Date: 4/8/2022

Inlet Section (Line 19 - Curb Inlet) - S-41

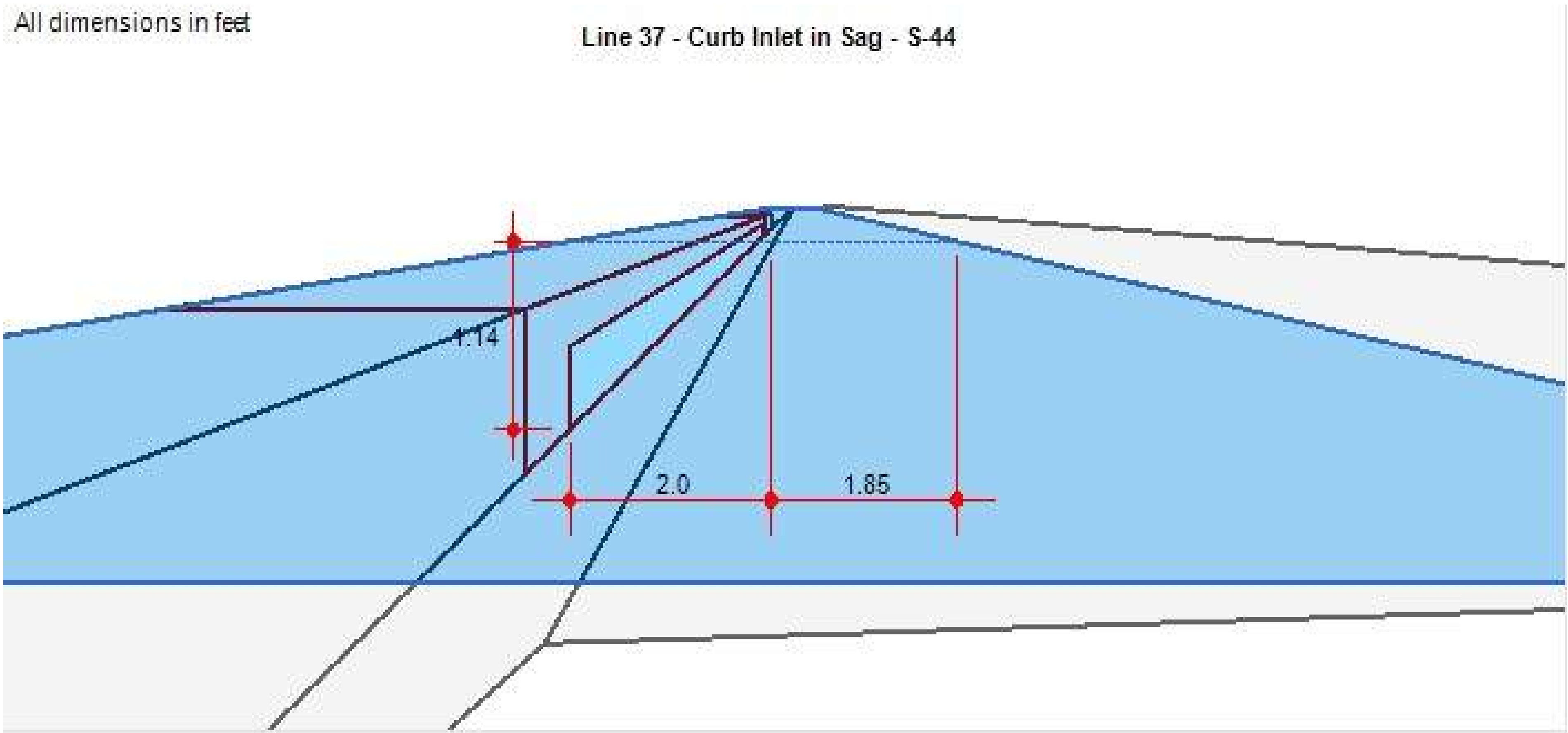


Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
19	1.00	0.00	1.00	0.00	10.50	0.0	6.0	2.00	0.006	0.550	0.020	0.49	0.90	0.00	0.00	36

Project File:	No. Lines: 39	Run Date: 4/8/2022

Inlet Section (Line 37 - Curb Inlet) - S-44

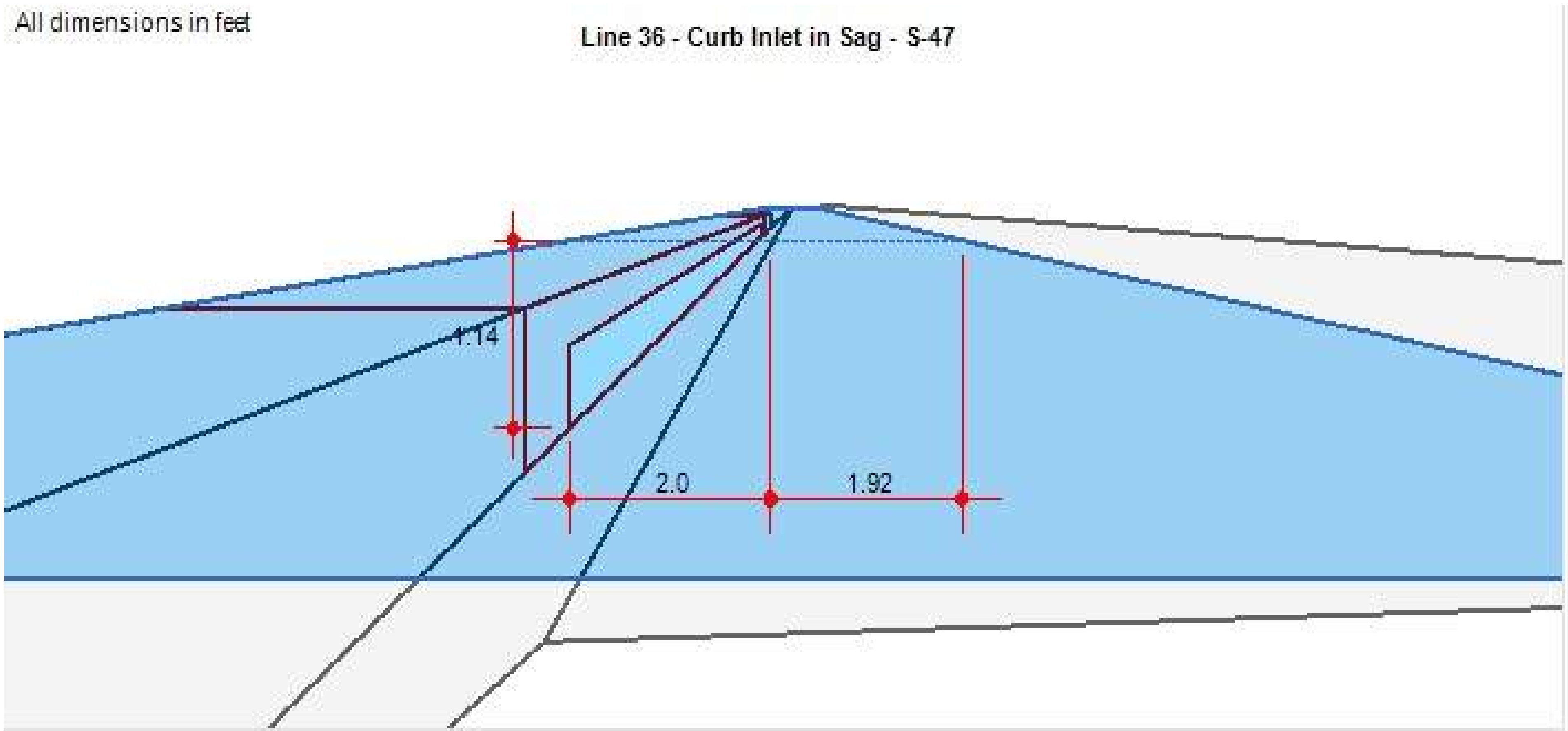
All dimensions in feet



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
37	1.95	0.00	1.95	0.00	36.00	0.0	6.0	2.00	Sag	0.550	0.020	1.14	3.85	n/a	n/a	Sag

Project File: No. Lines: 39 Run Date: 4/8/2022

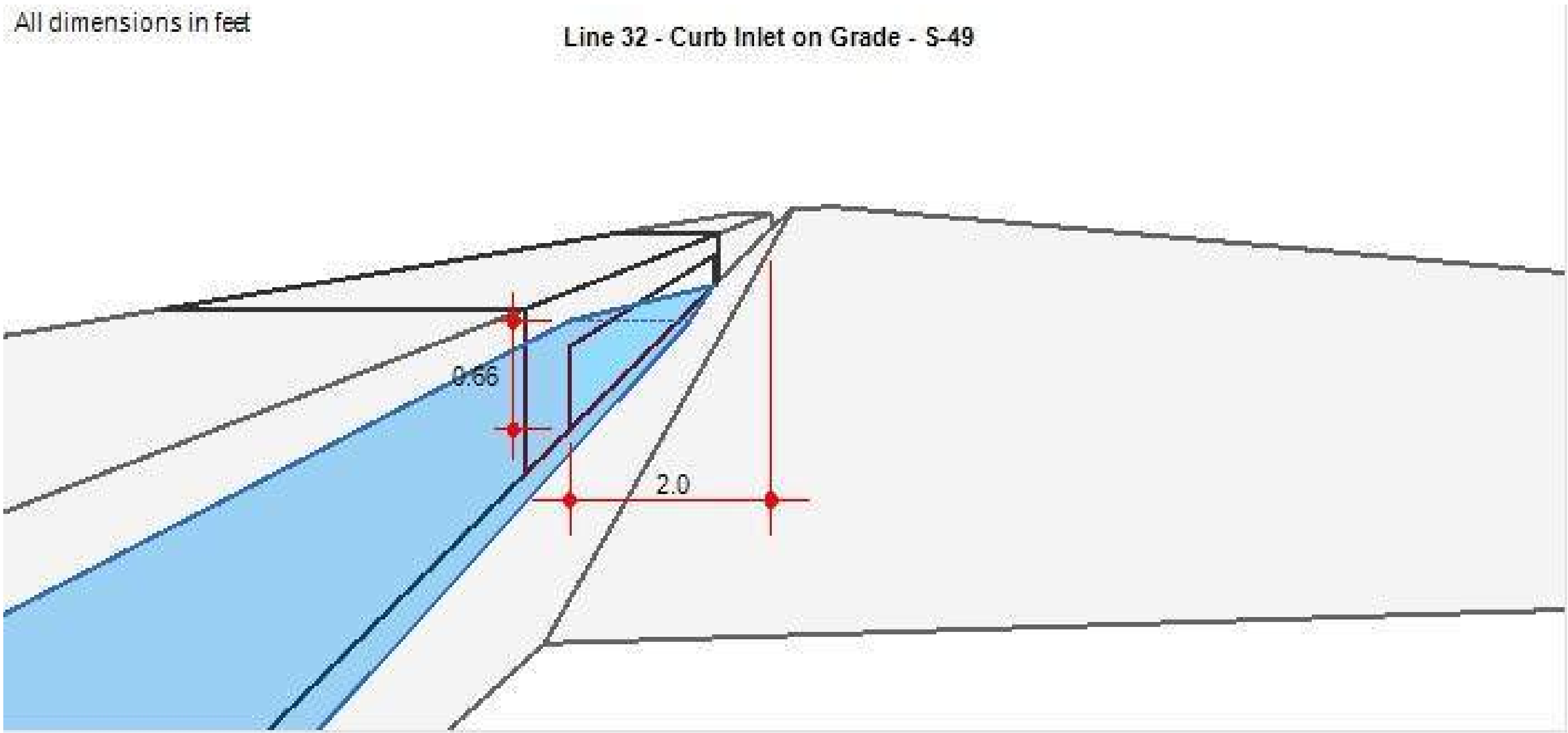
Inlet Section (Line 36 - Curb Inlet) - S-47



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
36	2.00	0.00	2.00	0.00	36.00	0.0	6.0	2.00	Sag	0.550	0.020	1.14	3.92	n/a	n/a	Sag

Project File: No. Lines: 39 Run Date: 4/8/2022

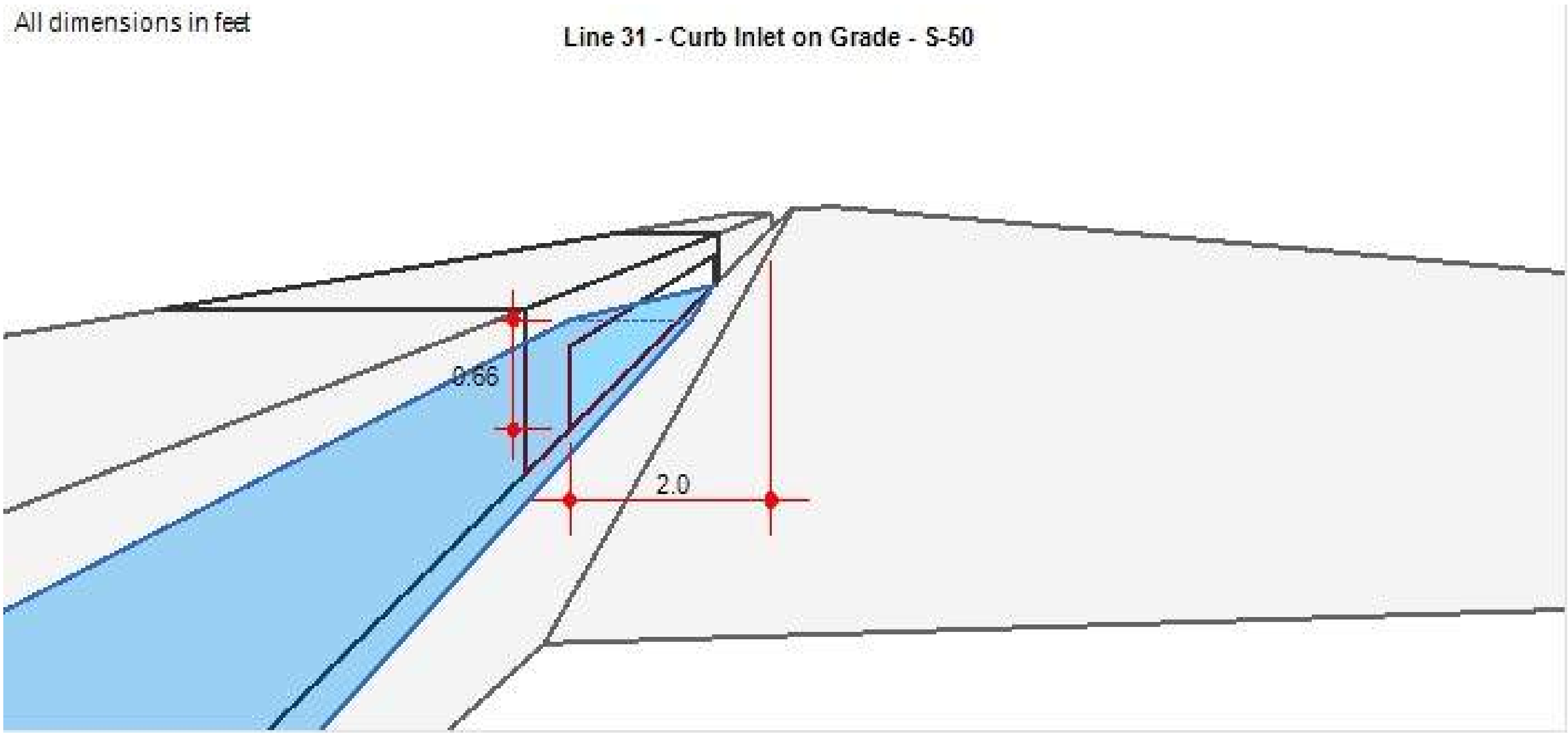
Inlet Section (Line 32 - Curb Inlet) - S-49



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
32	1.95	0.00	1.95	0.00	10.50	0.0	6.0	2.00	0.005	0.550	0.020	0.66	1.19	0.00	0.00	37

Project File: No. Lines: 39 Run Date: 4/8/2022

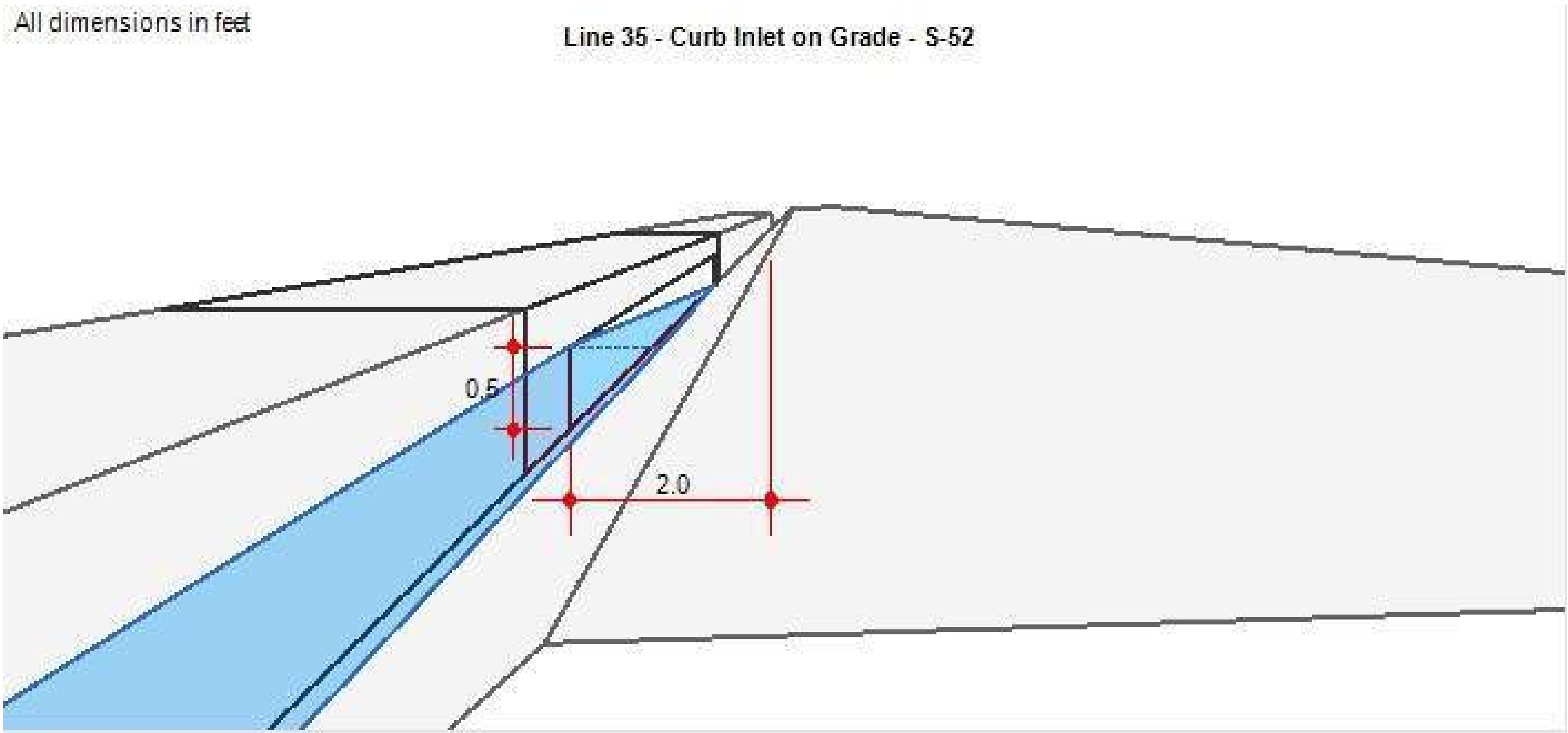
Inlet Section (Line 31 - Curb Inlet) - S-50



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
31	2.00	0.00	2.00	0.00	10.50	0.0	6.0	2.00	0.005	0.550	0.020	0.66	1.20	0.00	0.00	36

Project File: No. Lines: 39 Run Date: 4/8/2022

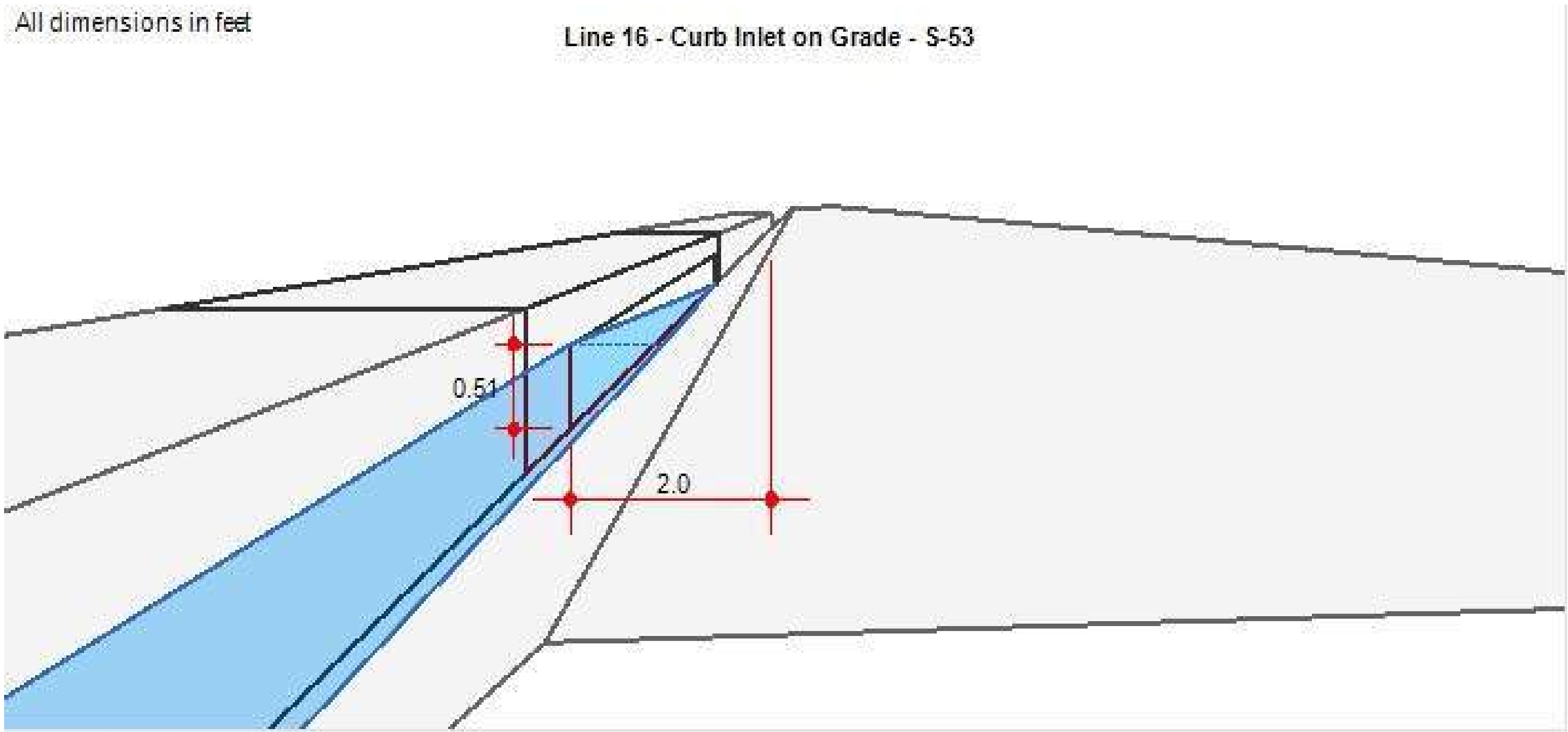
Inlet Section (Line 35 - Curb Inlet) - S-52



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
35	0.95	0.00	0.95	0.00	10.50	0.0	6.0	2.00	0.005	0.550	0.020	0.50	0.91	0.00	0.00	38

Project File: No. Lines: 39 Run Date: 4/8/2022

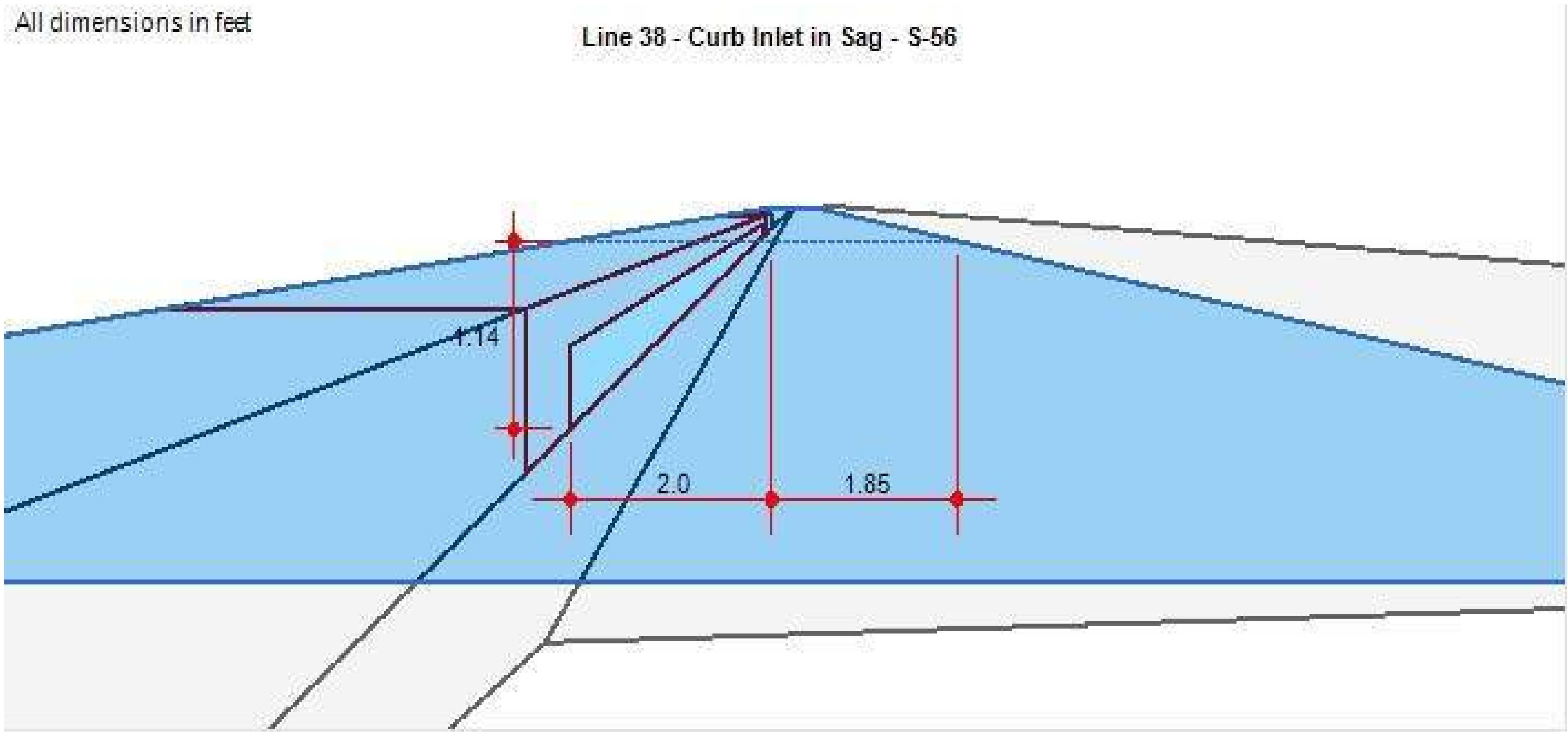
Inlet Section (Line 16 - Curb Inlet) - S-53



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
16	1.00	0.00	1.00	0.00	10.50	0.0	6.0	2.00	0.005	0.550	0.020	0.51	0.93	0.00	0.00	15

Project File:	No. Lines: 39	Run Date: 4/8/2022

Inlet Section (Line 38 - Curb Inlet) - S-56

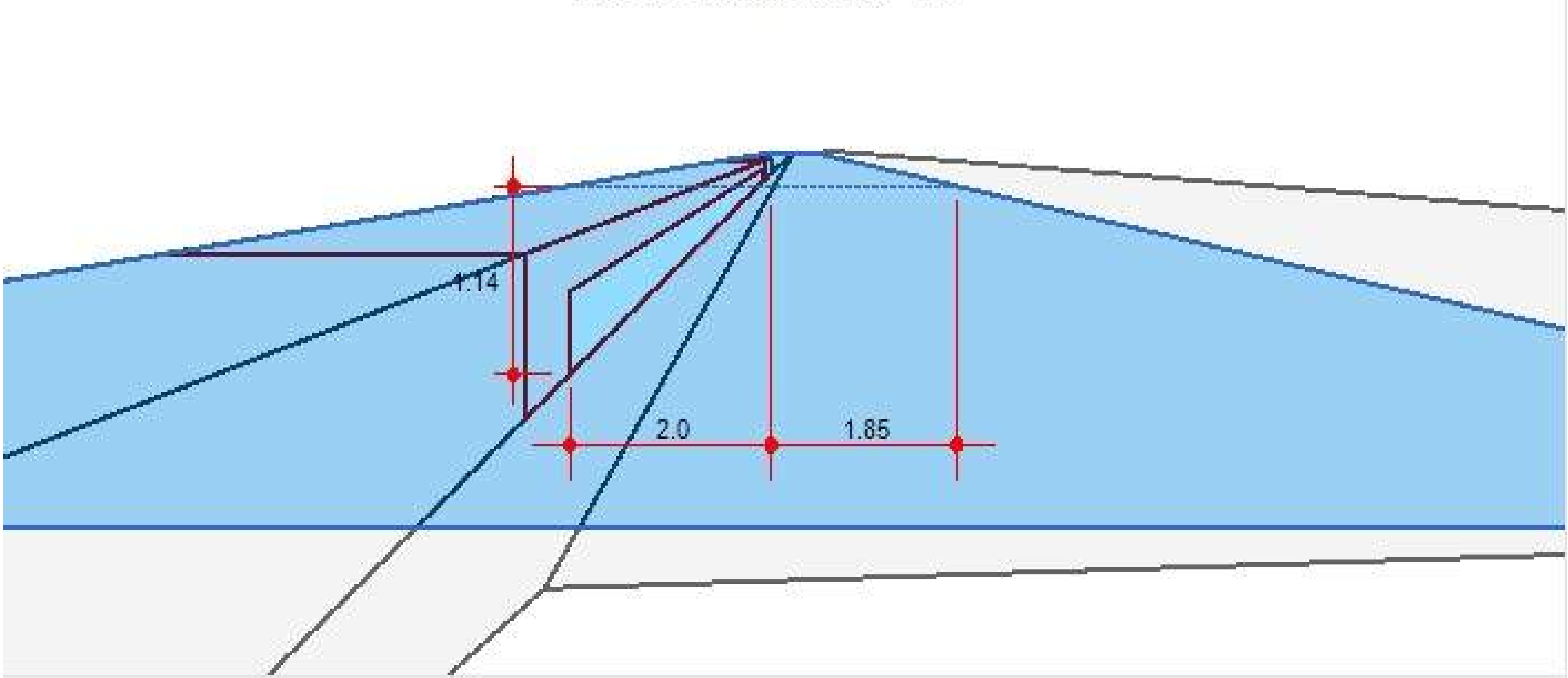


Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
38	1.95	0.00	1.95	0.00	36.00	0.0	6.0	2.00	Sag	0.550	0.020	1.14	3.85	n/a	n/a	Sag

Project File: | No. Lines: 39 | Run Date: 4/8/2022

Inlet Section (Line 15 - Curb Inlet) - S-59

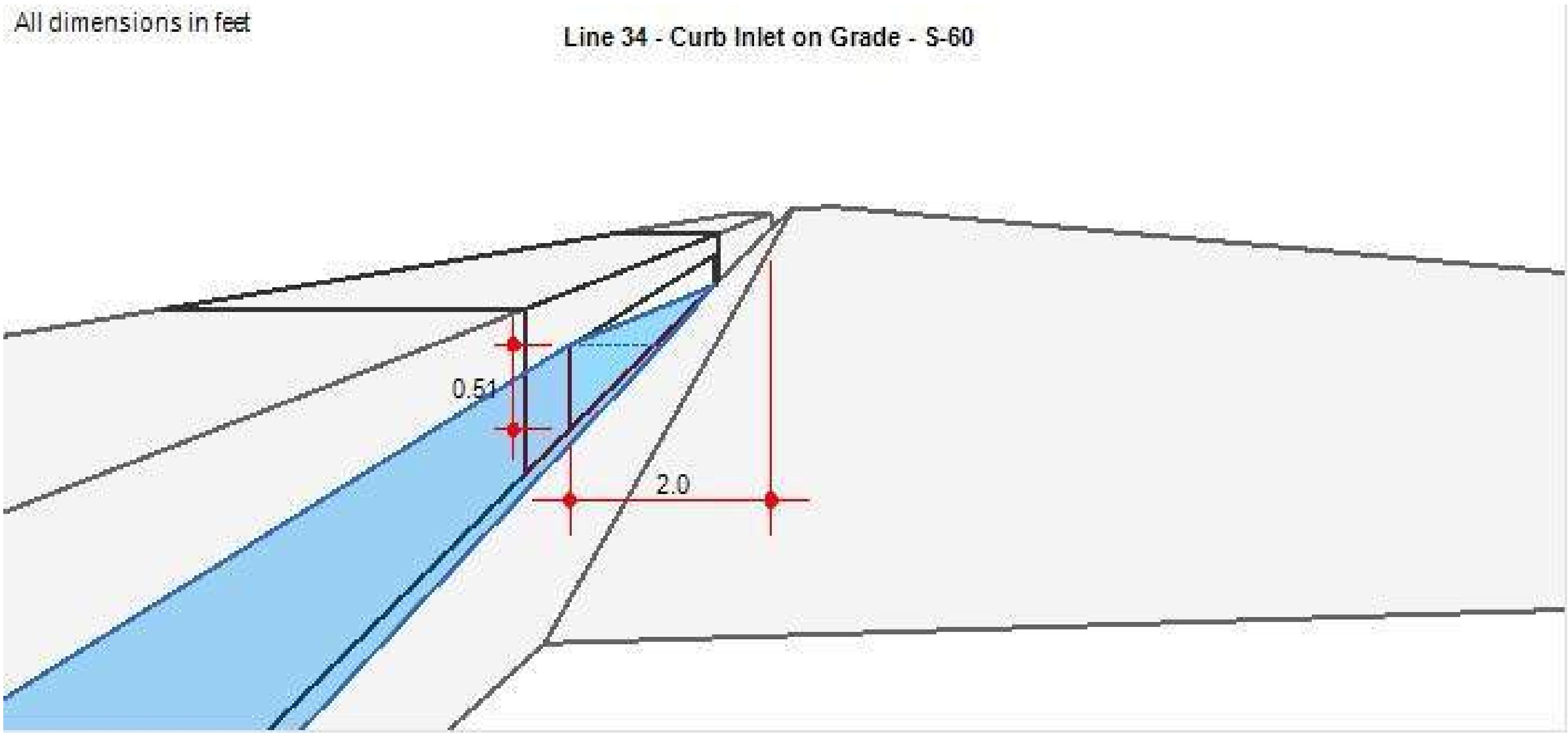
All dimensions in feet



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
15	1.95	0.00	1.95	0.00	36.00	0.0	6.0	2.00	Sag	0.550	0.020	1.14	3.85	n/a	n/a	Sag

Project File: No. Lines: 39 Run Date: 4/8/2022

Inlet Section (Line 34 - Curb Inlet) - S-60



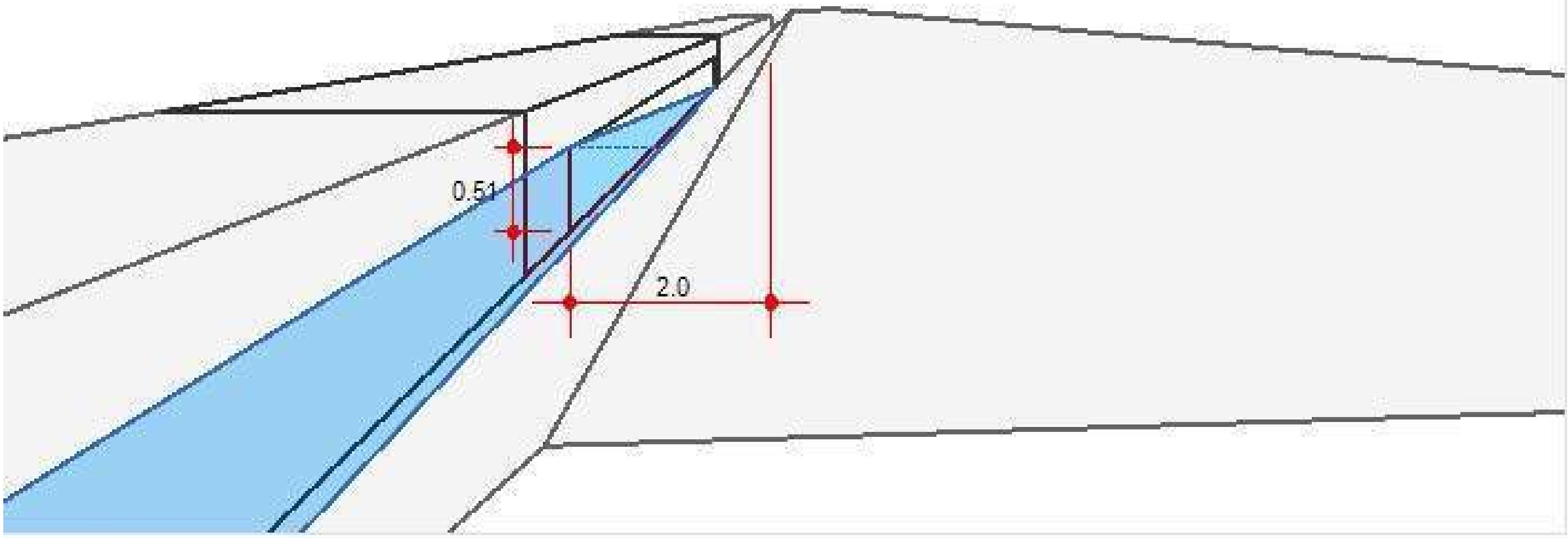
Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
34	1.00	0.00	1.00	0.00	10.50	0.0	6.0	2.00	0.005	0.550	0.020	0.51	0.93	0.00	0.00	38

Project File: No. Lines: 39 Run Date: 4/8/2022

Inlet Section (Line 14 - Curb Inlet) - S-61

All dimensions in feet

Line 14 - Curb Inlet on Grade - S-61



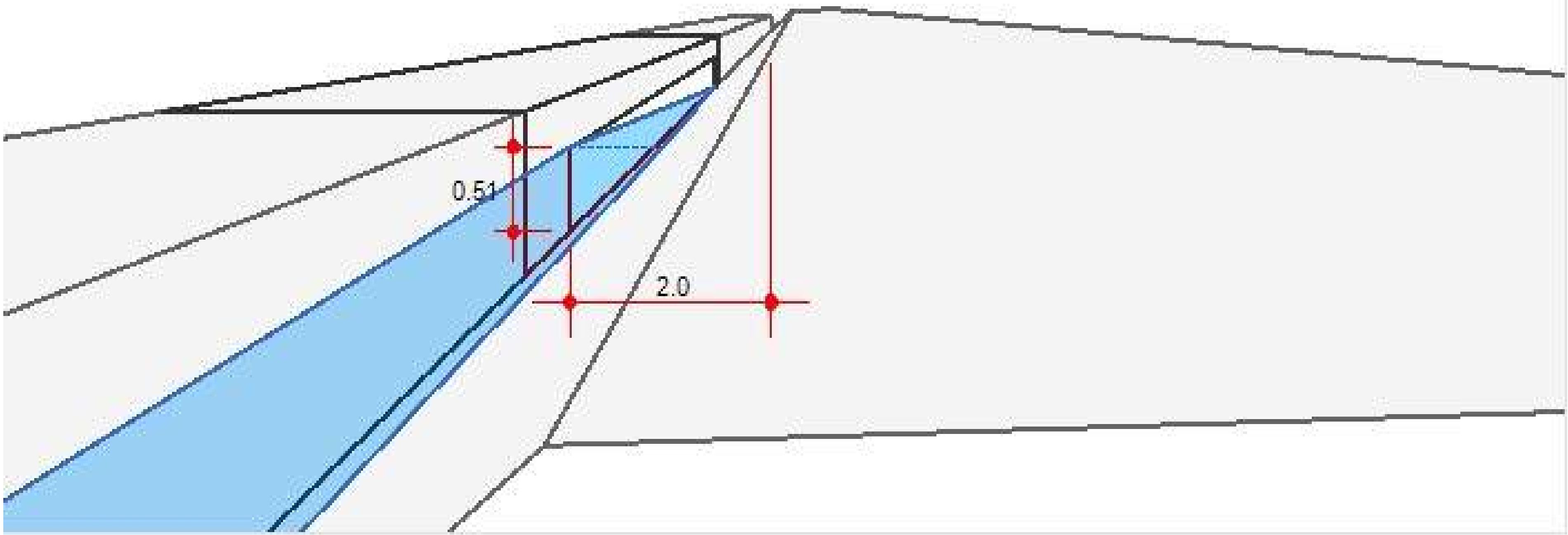
Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
14	1.00	0.00	1.00	0.00	10.50	0.0	6.0	2.00	0.005	0.550	0.020	0.51	0.93	0.00	0.00	15

Project File: No. Lines: 39 Run Date: 4/8/2022

Inlet Section (Line 33 - Curb Inlet) - S-62

All dimensions in feet

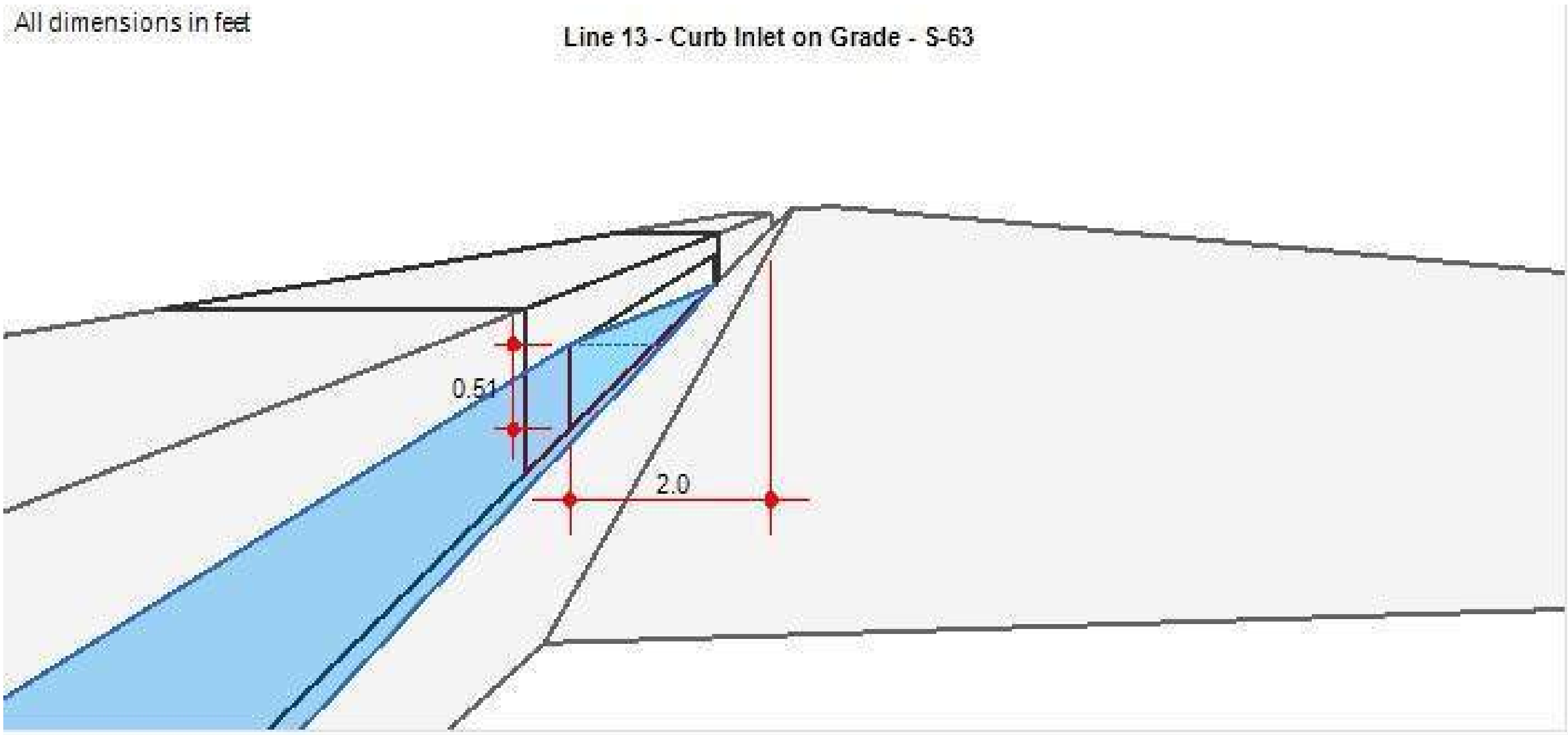
Line 33 - Curb Inlet on Grade - S-62



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
33	1.00	0.00	1.00	0.00	10.50	0.0	6.0	2.00	0.005	0.550	0.020	0.51	0.93	0.00	0.00	39

Project File: No. Lines: 39 Run Date: 4/8/2022

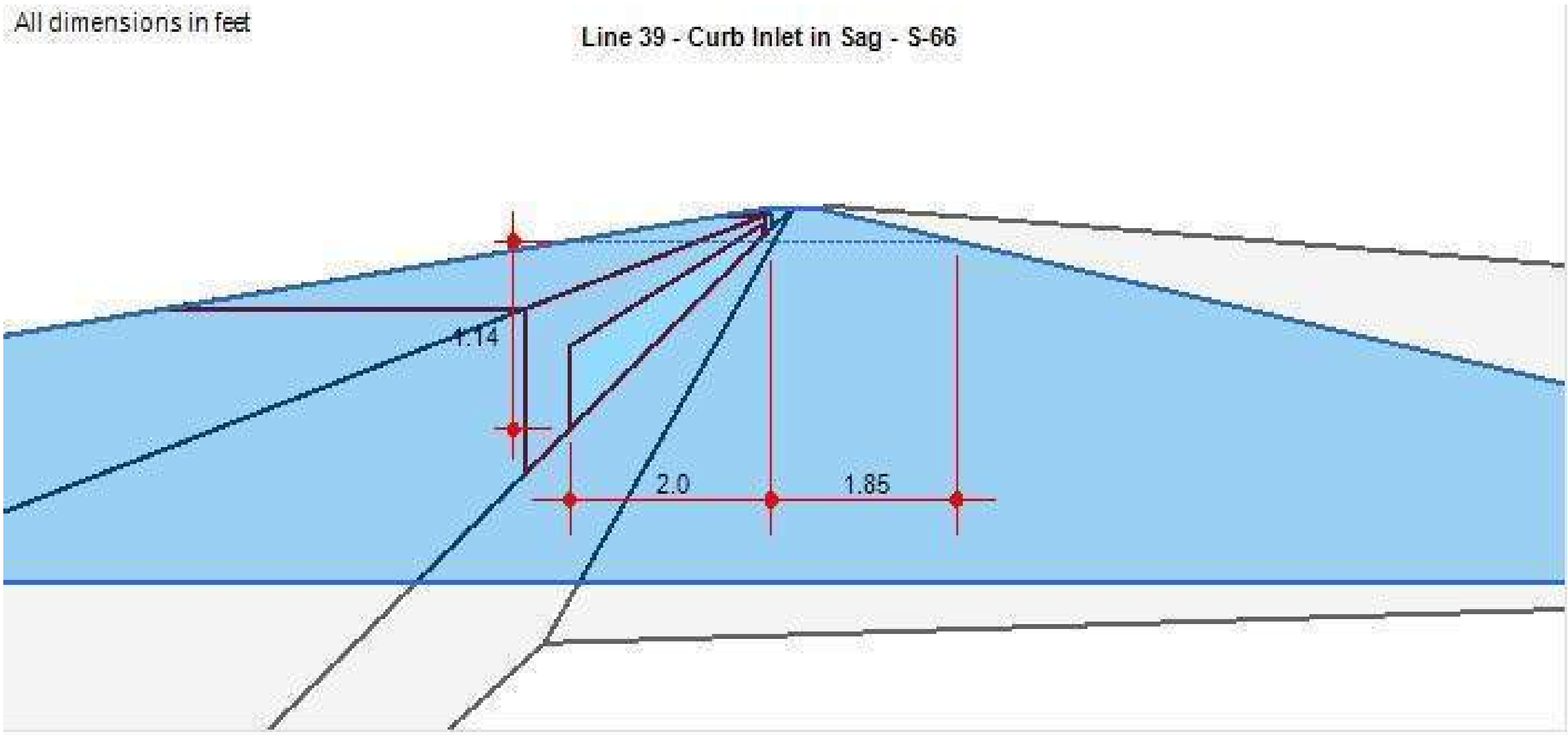
Inlet Section (Line 13 - Curb Inlet) - S-63



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
13	1.00	0.00	1.00	0.00	10.50	0.0	6.0	2.00	0.005	0.550	0.020	0.51	0.93	0.00	0.00	12

Project File:	No. Lines: 39	Run Date: 4/8/2022

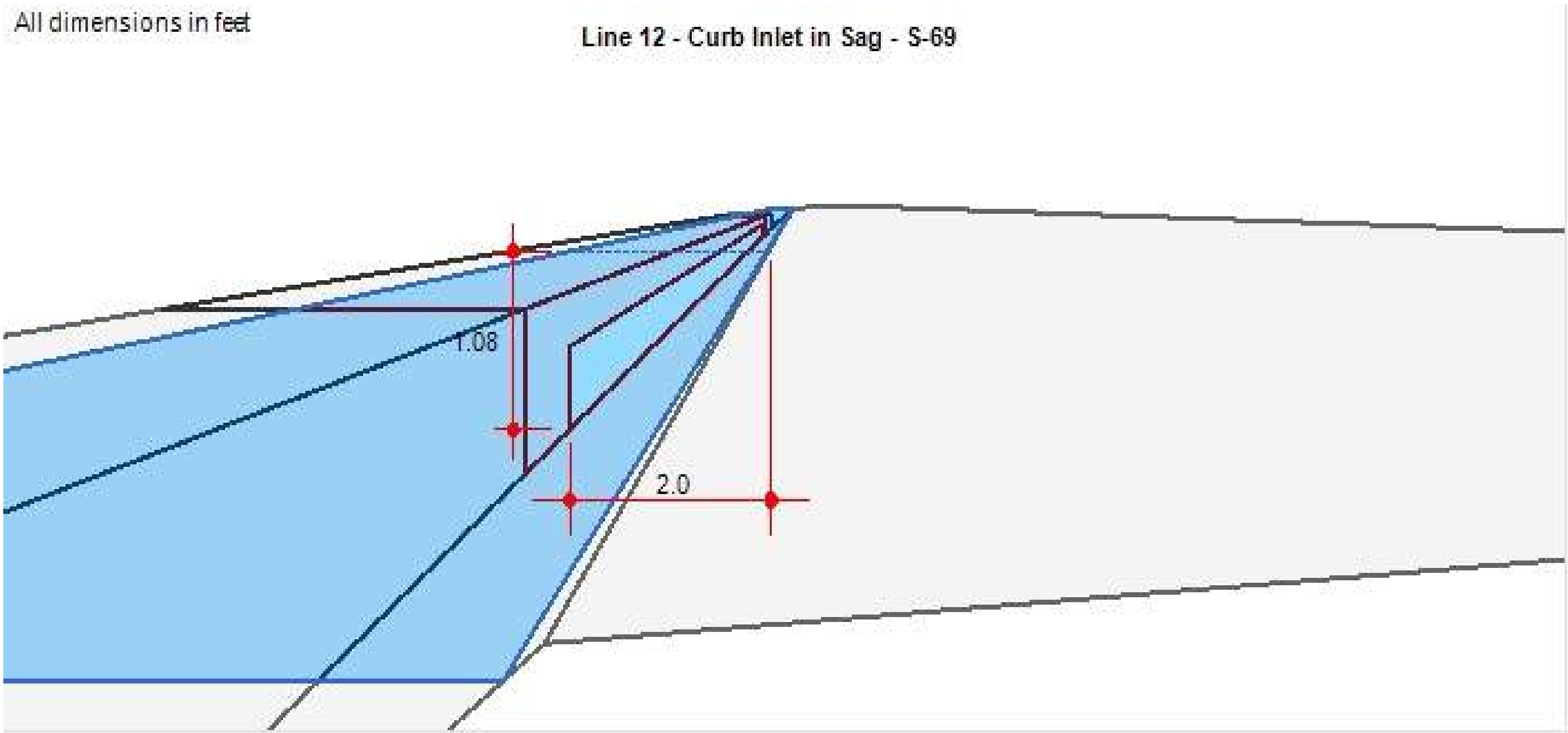
Inlet Section (Line 39 - Curb Inlet) - S-66



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
39	1.95	0.00	1.95	0.00	36.00	0.0	6.0	2.00	Sag	0.550	0.020	1.14	3.85	n/a	n/a	Sag

Project File: | No. Lines: 39 | Run Date: 4/8/2022

Inlet Section (Line 12 - Curb Inlet) - S-69



Line #	Q				Inlet			Gutter				Depth		Spread		Byp
	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Length (ft)	Depr (in)	Throat (in)	Width (ft)	Slope (ft/ft)	Sw (ft/ft)	Sx (ft/ft)	Gutter (ft)	Inlet (ft)	Gutter (ft)	Inlet (ft)	Line (ft)
12	1.95	0.00	1.95	0.00	36.00	0.0	6.0	2.00	Sag	0.550	0.050	1.08	1.96	n/a	n/a	Sag

Project File: | No. Lines: 39 | Run Date: 4/8/2022