Hydrologic & Hydraulic Drainage
and
Post-Construction Stormwater Quality
Report

FOR

Artic Storage
City of Oxnard, California

Prepared for:

Sakioka Farms Rive Ave, TIC
Craig Kaihara
Tel: 805.278.1703

Prepared by:

DELANE ENGINEERING

2812 Santa Monica Blvd, Suite 206
Santa Monica, CA 90404

Contact Person:
Scott Uhles P.E., LEED AP

JN 10-10268

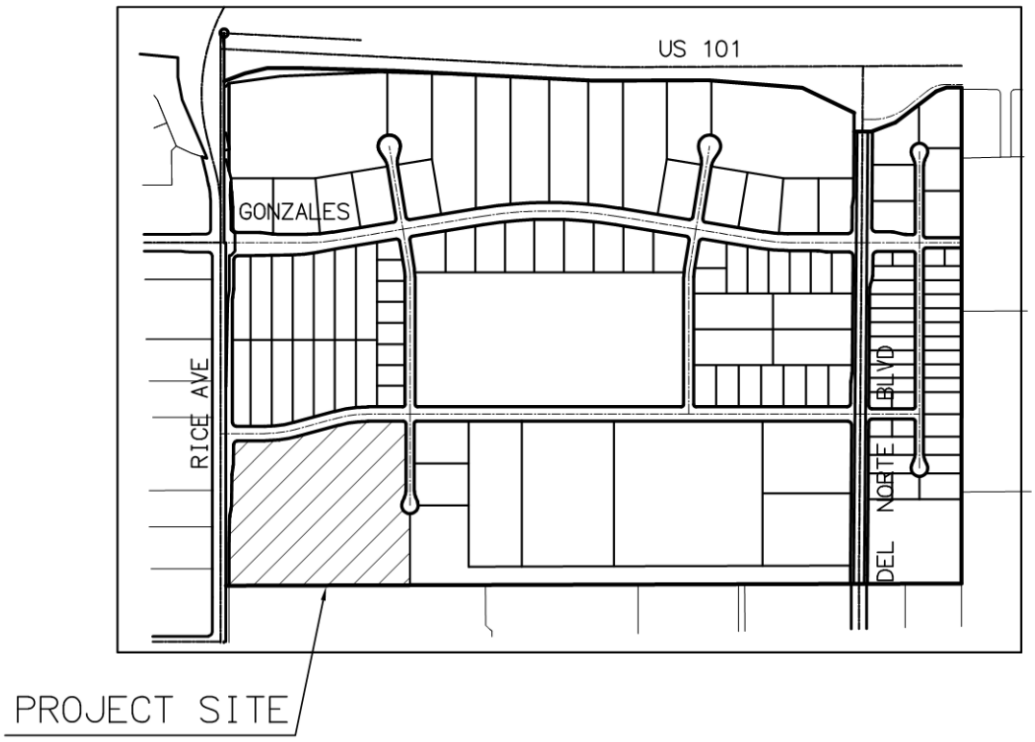
April 2020

*This is the Drainage report that was submitted with the Construction Documents. City staff requested that we use this final report since it is available.

TABLE OF CONTENTS

INTRODUCTION

The project site is in North Oxnard, on an approximately 32 acre lot at the southwest corner of the proposed 430 acre Sakioka Farms project to be developed for light and industrial business research park uses and is part of Adopted Specific Plan (PZ 02-640-01). Anticipated future developments within the surrounding area will comprise of projects built for Light Industrial (M-1) and Business Research (BRP).



LOCATION PLAN
NTS

LEGAL DESCRIPTION

The project site is situated in the city of Oxnard, County of Ventura, State of California, and is described as follows:

Lot 1 thru 5 of Tract 5996
APN(S): 216-0-030-145, 216-0-030-155, 216-0-030-75 and 216-0-030

REFERENCES

- “Ventura County Watershed Protection District Hydrology Manual dated 1991.
- Master Plan of Drainage, City of Oxnard, August 2004.
- City of Oxnard and County of Ventura agreement for Sturgis Road Drain Peak flow and storage requirements.
- Final Report of Proposed Improvements and Assessment Spread for the Northeast Industrial Assessment District (NIAD) dated August 1985.
- Sakioka Farms Business Park Specific Plan, Langdon Wilson Architecture Planning Interiors, January 2007.
- Ventura County Watershed Protection District Design Manual dated 1968.
- Technical Guidance Manual for Stormwater Quality Control Measures, VCWPD, 2002.
- Ventura Countywide Storm Water Quality Urban Impact Mitigation Management Plan (SQUIMP) dated July 2000.
- City of Oxnard Standard Plans, Standard Plan Plates 54-62.
- Sakioka Tract No. 5996 Drainage Basis of Design Report, DRAFT April 2020

OBJECTIVES

The objective of this report is to present hydrologic analysis of proposed drainage improvements to meet City of Oxnard drainage design goals consistent with the City of Oxnard Master Plan of Drainage as well as meet Ventura Countywide Stormwater Quality Management Programs requirements.

The City of Oxnard and the Northeast Industrial Assessment District Report (NIAD) of 1985 requires the proposed development to minimize and mitigate potential negative impacts to the existing downstream offsite drainage facilities by requiring all developments within the Rice Road Drain watershed to construct detention facilities to limit peak discharges to no more than one (1) cfs per acre for events up to and including the 100-year storm. The overall Sakioka Farms development plan includes reservoirs to attenuate runoff attributed to developed right-of-way and common open space but requires flow rate mitigation to be individually implemented on each lot.

The City of Oxnard requires all new development within the city to incorporate stormwater quality control measures into the proposed improvement plans as part of the County Storm Water Quality Urban Impact Mitigation Management Plan (SQUIMP), NPDES Permit No. CAS004002, Order 2010-0108 for projects deemed complete prior to October 11, 2011. The Sakioka Specific Plan is “Grandfathered” under the old permit.

PROCEDURE

This report has been prepared in accordance with the requirements of the City of Oxnard and Ventura County regulations.

The report shall provide analysis showing how the project meets the following list of design requirements:

a. As stated in the “Agreement for Storm Water Retention Within Rice Road Drain Watershed" drainage from the development must provide detention facilities to allow the release of only 1 cfs/acre during a 100-year storm event.
b. Design inlets, conveyances and conduits for a 10-year storm event.
c. Stormwater Control BMPs shall be designed per the Ventura County Technical Guidance Manual for Stormwater Quality Control Measures, 2002.
d. Structures shall be protected from a 100-year flood event.

HYDROLOGY

Existing Conditions

The project site is currently a flat agricultural field with several existing farm structures. There are no existing developments and the entire site is vacant, except for a few farming related structures.

The site drains generally from northwest to the southeast at slopes of approximately 0.3%. Runoff from the southwest corner leaves the site as surface flow onto the adjacent property to the south. The majority of runoff from the site is collected by an unlined earthen channel that begins along the southern boundary of the site and continues east for approximately 4000' to an existing concrete-lined channel which serves as the discharge point for the greater Sakioka Farms development.

Pre-Development peak Q's were determined in Sakioka Tract No. 5996 Drainage Basis of Design Report. A summary of the existing unit runoff rates determined for the project site is provided in Table 1:1

Table 1:1 Pre-Development Condition

Q_{10} (cfs/ac)	Q_{50} (cfs/ac)	Q_{100} (cfs/ac)
0.44	0.72	0.86

Developed Conditions

As in the existing condition, the developed site will drain in a general southeast direction, although gutters, inlets, and storm drain piping will be used to convey runoff around the proposed building to a storm water treatment device and flow-through detention basin at the low point of the site in southeast corner.

Developed condition peak Q's for the project site are determined by Sakioka Tract No. 5996 Drainage Basis of Design Report. A summary of unit runoff rates is provided in Table 1:2

Table 1:2 Developed Condition

Q_{10} (cfs/ac)	Q_{50} (cfs/ac)	Q_{100} (cfs/ac)
1.22	2.12	2.47

DETENTION/RETENTION

In order to limit flow leaving the site to 1 cfs/acre a detention basin is proposed at the southeast corner. To size the basin, a hydrograph of the 100-yr storm event was created and imported into Hydraflow Hydragraphs, by Autodesk Inc. A peak flow rate of 3.34 cfs/acre was chosen as the basis of for the detention basin sizing to be conservative until the master drainage is approved. The hydrograph was routed through the proposed detention facility, the results of which are summarizes in *Table 1.3*. An emergency spillway in accordance with the Ventura Stormwater Technical Guidance Manual is proposed along the east side of the basin. The Hydrograph, Pond report, and emergency spillway design for the basin are provided in **Appendix A**.

Table 1.3: Detention Design Summary	
Total Project Sub-Areas	A
Drainage Area (Acres)	31.87
100-year Peak Flow (cfs)	106.38
Detention Volume (cu.ft)	58,432
100-year design outflow from site (cfs)	30.42
Allowable Outflow 1cfs/ca	31.87

COMPUTATIONS

Hydraulic Analysis

Drainage within the site is conveyed by curb & gutters, pipes or drainage swales and into the detention basin. Hydraulic capacity analysis for the inlets and storm drain pipes were accomplished using Hydraflow Express Extension by Autodesk Inc., which uses manning's equations to calculate depth of flow given design flow rates.

Capacity analysis of each inlet was conducted to confirm that each would intercept and capture the tributary 10-year peak flow for on-grade inlets and 50-year peak flow for inlets in a sump, a summary of which is shown in *Table 1.4*. Storm drain piping is sized to capture the 10-year peak flow. A map of the sub-basin delineations used for pipe and inlet sizing is provided in **Appendix B** along with pipe and inlet capacity calculations.

Table 1.4: Inlet Sizing Summary			
Sub-Area	Q10(cfs)	Q50(cfs)	Notes
A1	13.01	17.48	2'X3' Curb/Grated Inlet
A2	13.03	17.51	(4) 24x24 H-20 Rated Grated Inlets
A3	4.98	6.69	Roof drains Connect to SD main
A4	6.04	8.12	Roof drains Connect to SD main
A5	5.73	7.71	2'X3' Curb/Grated Inlet
A6	4.36	5.86	Roof drains Connect to SD main
A7	4.80	6.46	2'X3' Curb/Grated Inlet
A8	4.28	5.76	Roof drains Connect to SD main
A9	3.30	4.42	2'X3' Curb/Grated Inlet
A10	1.55	2.10	Roof drains Connect to SD main
A11	5.32	7.16	Roof drains Connect to SD main
A12	4.91	6.60	Nyloplast 2'X3' curb opening/Grated Inlet

100-Year Overflow

Emergency Overflow paths shall be provided along the south property line. Overflow path shall be sized for the full Q100 design flow.

The FIRM Map (National Flood Insurance Program's Flood Insurance Rate Map) for this area shows the area north of HWY 101 to be within Flood
Zone AO per Firm Panel 060417 0010C, with a maximum flooding depth of 2'. However, the Sakioka Farms project lies within the limits of Flood Zone C and Flood Zone B.

STORMWATER QUALITY

Best Management Practice (BMP) devices for this project have been designed per the Ventura County Technical Guidance Manual (TGM), July 2002. The Stormwater Quality Design Flow (SQDF) is defined as 10% of the 50 year storm event, and the Stormwater Quality Design Volume (SQDV) is defined as the volume necessary to capture and treat 80 percent or more of the average annual runoff volume from the site at the design drawdown period.

The overall design concept was established to allow water to be treated through treatment train methods. The "treatment train" allows for improved levels of pollutant removals by providing more than one method of removing pollutants and providing them in successive order. Providing more than one treatment method to treat runoff ensures that pollutants are captured with a higher success rate. The treatment train process begins with routine maintenance on the grounds. Each Parcel or Tract within the Specific Plan shall detain in onsite detention basins before allowing runoff to enter the backbone storm drain system or directly into the Regional Basin. Discharge into the Regional Detention Basin shall be filtered through a Grassy Swale Filter before leaving the site via the existing lined channel at the southeast corner of the Specific Plan.

The multiple opportunities to collect trash and debris and reduce peak flow levels of each successive treatment measure ensures that the first flush from a storm is treated to the facilities optimal capability. Additionally, the BMPs have been in an easily accessible location for ease of maintenance and inspection. This ensures that the unit can be maintained routinely and inspected often. Design worksheets and calculations provided by the manufacturer of the systems used have been included as part of this report in **Appendix C**.

Groundwater and Infiltration

Terracon performed infiltration testing for the site, the results of which are summarized in a Draft report dated May 11, 2018, and provided in **Appendix D**. The findings establish that Groundwater to be between 3 and 11 feet below the ground surface. Historic high groundwater based on the Seismic Hazard Evaluation Report of the Oxnard Quadrangle, by the State of California, Division of Mines and Geology finds it to be shallower than 10 feet below existing grade.

Seasonal High Ground Water is established at Elevation 51.

Results

The project proposes to meet the NPDES requirements consistent with the 2002 Technical Guidance Manual with the use of a CDS Unit at the downstream end of the site storm drain piping, prior to discharge into the detention basin.

Table 1.5: Summary of Results

Total Project Site Area	31.87 Acres
Q50	95.87 cfs
SQDF (10% Q50)	9.6 cfs
Hydrodynamic Separator	CDS Unit Model 5653-D

CONCLUSIONS/RECOMENDATIONS

The proposed design and analysis presented shows that the project will meet the City of Oxnard drainage requirements as well as the Ventura County NPDES standards as a Grandfathered project meeting the requirements of the Technical Guidance 2002 Manual.

APPENDICES

APPENDIX A - Detention Basin Analysis

Hydrograph Report

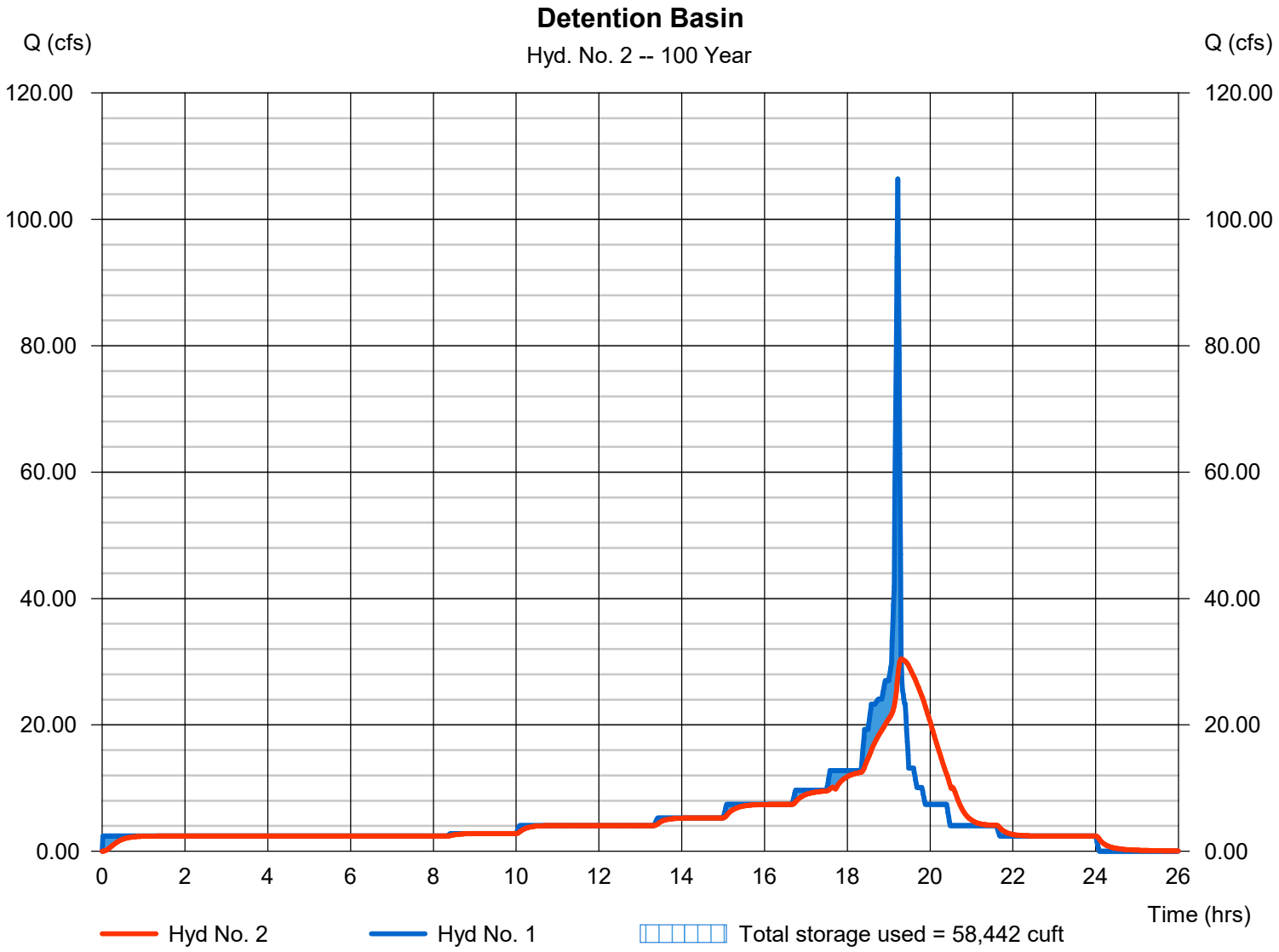
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v2018.3 Wednesday, 04 / 8 / 2020

Hyd. No. 2

Detention Basin

Hydrograph type	= Reservoir	Peak discharge	= 30.42 cfs
Storm frequency	= 100 yrs	Time to peak	= 19.30 hrs
Time interval	= 1 min	Hyd. volume	= 477,117 cuft
Inflow hyd. No.	= 1 - Imported from VCRat	Max. Elevation	= 62.18 ft
Reservoir name	= Detention Basin	Max. Storage	= 58,442 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Detention Basin

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 55.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	55.00	4,100	0	0
1.00	56.00	5,100	4,590	4,590
2.00	57.00	6,200	5,640	10,231
3.00	58.00	7,300	6,742	16,973
4.00	59.00	8,500	7,892	24,864
5.00	60.00	9,700	9,092	33,957
6.00	61.00	11,100	10,391	44,348
7.00	62.00	12,500	11,792	56,140
8.00	63.00	14,000	13,242	69,381
9.00	64.00	15,500	14,742	84,124
10.00	65.00	17,100	16,292	100,415

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	0.00	0.00
Span (in)	= 24.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 55.00	0.00	0.00	0.00
Length (ft)	= 200.00	0.00	0.00	0.00
Slope (%)	= 0.30	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	Inactive	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	55.00	0.00	---	---	---	---	---	---	---	---	---	0.000
0.10	459	55.10	0.06 oc	---	---	---	---	---	---	---	---	---	0.060
0.20	918	55.20	0.25 oc	---	---	---	---	---	---	---	---	---	0.249
0.30	1,377	55.30	0.55 ic	---	---	---	---	---	---	---	---	---	0.553
0.40	1,836	55.40	0.97 ic	---	---	---	---	---	---	---	---	---	0.966
0.50	2,295	55.50	1.48 ic	---	---	---	---	---	---	---	---	---	1.481
0.60	2,754	55.60	2.09 oc	---	---	---	---	---	---	---	---	---	2.094
0.70	3,213	55.70	2.74 oc	---	---	---	---	---	---	---	---	---	2.744
0.80	3,672	55.80	3.43 oc	---	---	---	---	---	---	---	---	---	3.431
0.90	4,131	55.90	4.17 oc	---	---	---	---	---	---	---	---	---	4.165
1.00	4,590	56.00	4.92 oc	---	---	---	---	---	---	---	---	---	4.916
1.10	5,155	56.10	5.66 oc	---	---	---	---	---	---	---	---	---	5.662
1.20	5,719	56.20	6.42 oc	---	---	---	---	---	---	---	---	---	6.419
1.30	6,283	56.30	7.14 oc	---	---	---	---	---	---	---	---	---	7.142
1.40	6,847	56.40	7.84 oc	---	---	---	---	---	---	---	---	---	7.843
1.50	7,411	56.50	8.50 oc	---	---	---	---	---	---	---	---	---	8.502
1.60	7,975	56.60	9.09 oc	---	---	---	---	---	---	---	---	---	9.088
1.70	8,539	56.70	9.59 oc	---	---	---	---	---	---	---	---	---	9.588
1.80	9,103	56.80	9.97 oc	---	---	---	---	---	---	---	---	---	9.968
1.90	9,667	56.90	10.16 oc	---	---	---	---	---	---	---	---	---	10.16
2.00	10,231	57.00	9.81 oc	---	---	---	---	---	---	---	---	---	9.806
2.10	10,905	57.10	10.59 oc	---	---	---	---	---	---	---	---	---	10.59
2.20	11,579	57.20	11.32 oc	---	---	---	---	---	---	---	---	---	11.32
2.30	12,254	57.30	12.01 oc	---	---	---	---	---	---	---	---	---	12.01
2.40	12,928	57.40	12.66 oc	---	---	---	---	---	---	---	---	---	12.66
2.50	13,602	57.50	13.28 oc	---	---	---	---	---	---	---	---	---	13.28
2.60	14,276	57.60	13.87 oc	---	---	---	---	---	---	---	---	---	13.87
2.70	14,950	57.70	14.43 oc	---	---	---	---	---	---	---	---	---	14.43
2.80	15,624	57.80	14.98 oc	---	---	---	---	---	---	---	---	---	14.98
2.90	16,299	57.90	15.51 oc	---	---	---	---	---	---	---	---	---	15.51
3.00	16,973	58.00	16.01 oc	---	---	---	---	---	---	---	---	---	16.01
3.10	17,762	58.10	16.51 oc	---	---	---	---	---	---	---	---	---	16.51

Continues on next page...

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Apr 13 2020

EMERGENCY SPILLWAY

Trapezoidal

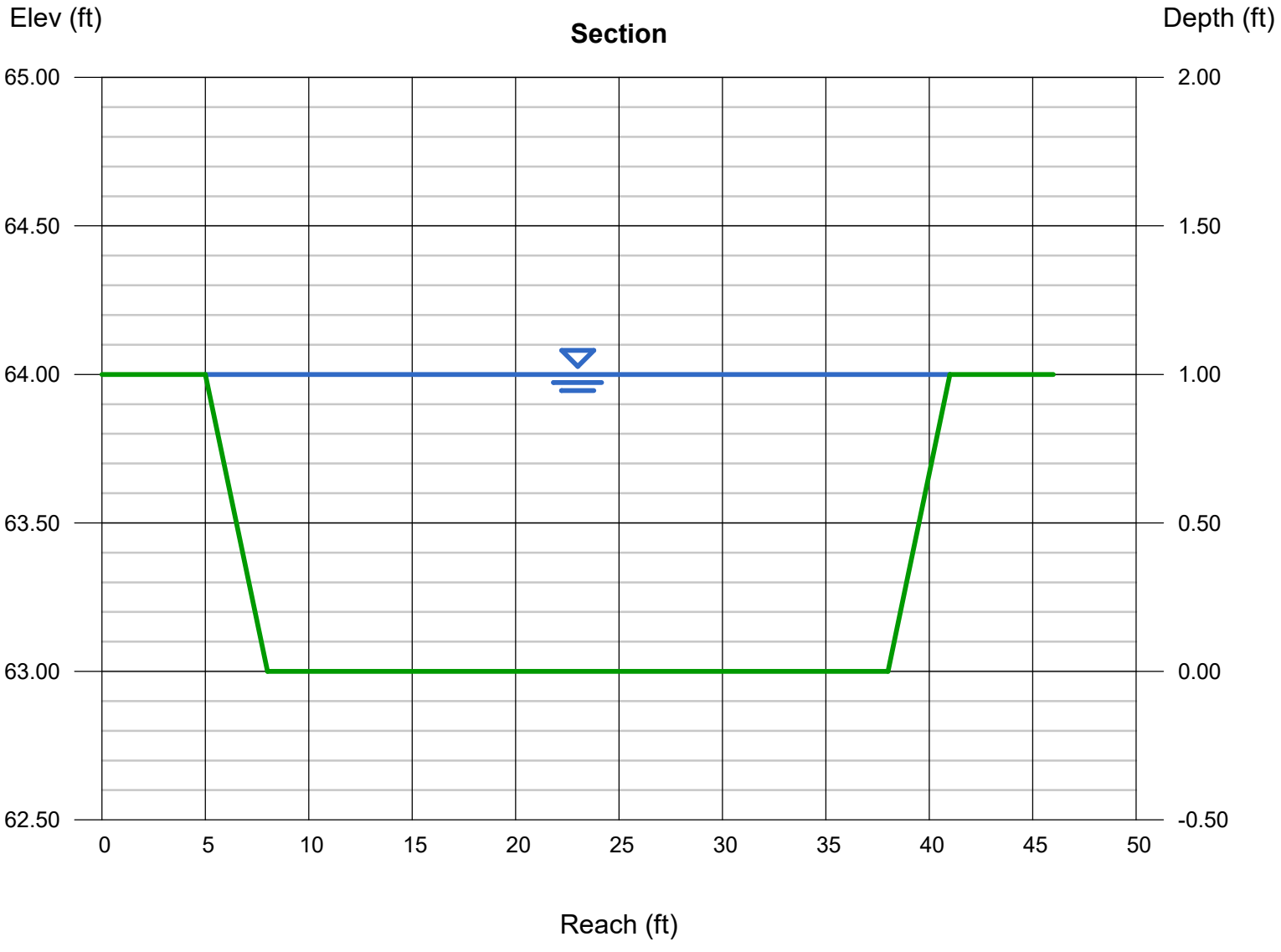
Bottom Width (ft)	= 30.00
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 63.00
Slope (%)	= 2.00
N-Value	= 0.025

Calculations

Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 1.00
Q (cfs)	= 260.20
Area (sqft)	= 33.00
Velocity (ft/s)	= 7.88
Wetted Perim (ft)	= 36.32
Crit Depth, Yc (ft)	= 1.00
Top Width (ft)	= 36.00
EGL (ft)	= 1.97



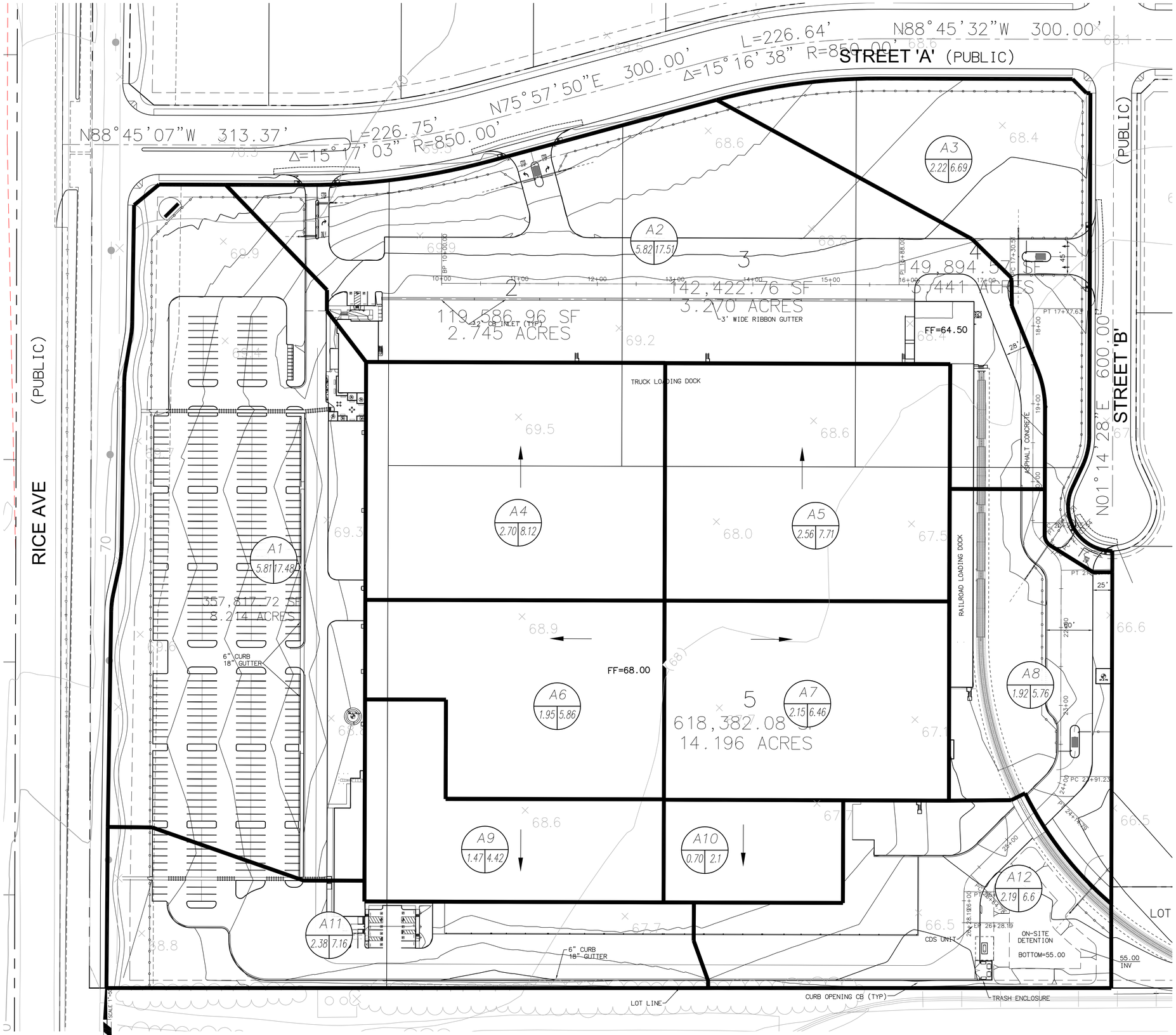
Detention Basin

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
3.20	18,551	58.20	16.99 oc	---	---	---	---	---	---	---	---	---	16.99
3.30	19,340	58.30	17.45 oc	---	---	---	---	---	---	---	---	---	17.45
3.40	20,129	58.40	17.90 oc	---	---	---	---	---	---	---	---	---	17.90
3.50	20,919	58.50	18.35 oc	---	---	---	---	---	---	---	---	---	18.35
3.60	21,708	58.60	18.78 oc	---	---	---	---	---	---	---	---	---	18.78
3.70	22,497	58.70	19.20 oc	---	---	---	---	---	---	---	---	---	19.20
3.80	23,286	58.80	19.61 oc	---	---	---	---	---	---	---	---	---	19.61
3.90	24,075	58.90	20.02 oc	---	---	---	---	---	---	---	---	---	20.02
4.00	24,864	59.00	20.41 oc	---	---	---	---	---	---	---	---	---	20.41
4.10	25,774	59.10	20.80 oc	---	---	---	---	---	---	---	---	---	20.80
4.20	26,683	59.20	21.18 oc	---	---	---	---	---	---	---	---	---	21.18
4.30	27,592	59.30	21.56 oc	---	---	---	---	---	---	---	---	---	21.56
4.40	28,501	59.40	21.93 oc	---	---	---	---	---	---	---	---	---	21.93
4.50	29,411	59.50	22.29 oc	---	---	---	---	---	---	---	---	---	22.29
4.60	30,320	59.60	22.65 oc	---	---	---	---	---	---	---	---	---	22.65
4.70	31,229	59.70	23.00 oc	---	---	---	---	---	---	---	---	---	23.00
4.80	32,138	59.80	23.34 oc	---	---	---	---	---	---	---	---	---	23.34
4.90	33,048	59.90	23.68 oc	---	---	---	---	---	---	---	---	---	23.68
5.00	33,957	60.00	24.02 oc	---	---	---	---	---	---	---	---	---	24.02
5.10	34,996	60.10	24.35 oc	---	---	---	---	---	---	---	---	---	24.35
5.20	36,035	60.20	24.68 oc	---	---	---	---	---	---	---	---	---	24.68
5.30	37,074	60.30	25.00 oc	---	---	---	---	---	---	---	---	---	25.00
5.40	38,113	60.40	25.32 oc	---	---	---	---	---	---	---	---	---	25.32
5.50	39,152	60.50	25.63 oc	---	---	---	---	---	---	---	---	---	25.63
5.60	40,192	60.60	25.95 oc	---	---	---	---	---	---	---	---	---	25.95
5.70	41,231	60.70	26.25 oc	---	---	---	---	---	---	---	---	---	26.25
5.80	42,270	60.80	26.56 oc	---	---	---	---	---	---	---	---	---	26.56
5.90	43,309	60.90	26.86 oc	---	---	---	---	---	---	---	---	---	26.86
6.00	44,348	61.00	27.15 oc	---	---	---	---	---	---	---	---	---	27.15
6.10	45,527	61.10	27.45 oc	---	---	---	---	---	---	---	---	---	27.45
6.20	46,706	61.20	27.74 oc	---	---	---	---	---	---	---	---	---	27.74
6.30	47,886	61.30	28.02 oc	---	---	---	---	---	---	---	---	---	28.02
6.40	49,065	61.40	28.31 oc	---	---	---	---	---	---	---	---	---	28.31
6.50	50,244	61.50	28.59 oc	---	---	---	---	---	---	---	---	---	28.59
6.60	51,423	61.60	28.87 oc	---	---	---	---	---	---	---	---	---	28.87
6.70	52,602	61.70	29.15 oc	---	---	---	---	---	---	---	---	---	29.15
6.80	53,781	61.80	29.42 oc	---	---	---	---	---	---	---	---	---	29.42
6.90	54,961	61.90	29.69 oc	---	---	---	---	---	---	---	---	---	29.69
7.00	56,140	62.00	29.96 oc	---	---	---	---	---	---	---	---	---	29.96
7.10	57,464	62.10	30.23 oc	---	---	---	---	---	---	---	---	---	30.23
7.20	58,788	62.20	30.49 oc	---	---	---	---	---	---	---	---	---	30.49
7.30	60,112	62.30	30.75 oc	---	---	---	---	---	---	---	---	---	30.75
7.40	61,437	62.40	31.01 oc	---	---	---	---	---	---	---	---	---	31.01
7.50	62,761	62.50	31.27 oc	---	---	---	---	---	---	---	---	---	31.27
7.60	64,085	62.60	31.52 oc	---	---	---	---	---	---	---	---	---	31.52
7.70	65,409	62.70	31.78 oc	---	---	---	---	---	---	---	---	---	31.78
7.80	66,733	62.80	32.03 oc	---	---	---	---	---	---	---	---	---	32.03
7.90	68,057	62.90	32.28 oc	---	---	---	---	---	---	---	---	---	32.28
8.00	69,381	63.00	32.52 oc	---	---	---	---	---	---	---	---	---	32.52
8.10	70,856	63.10	32.77 oc	---	---	---	---	---	---	---	---	---	32.77
8.20	72,330	63.20	33.01 oc	---	---	---	---	---	---	---	---	---	33.01
8.30	73,804	63.30	33.26 oc	---	---	---	---	---	---	---	---	---	33.26
8.40	75,278	63.40	33.50 oc	---	---	---	---	---	---	---	---	---	33.50
8.50	76,753	63.50	33.73 oc	---	---	---	---	---	---	---	---	---	33.73
8.60	78,227	63.60	33.97 oc	---	---	---	---	---	---	---	---	---	33.97
8.70	79,701	63.70	34.21 oc	---	---	---	---	---	---	---	---	---	34.21
8.80	81,175	63.80	34.44 oc	---	---	---	---	---	---	---	---	---	34.44
8.90	82,649	63.90	34.67 oc	---	---	---	---	---	---	---	---	---	34.67
9.00	84,124	64.00	34.90 oc	---	---	---	---	---	---	---	---	---	34.90
9.10	85,753	64.10	35.13 oc	---	---	---	---	---	---	---	---	---	35.13
9.20	87,382	64.20	35.36 oc	---	---	---	---	---	---	---	---	---	35.36
9.30	89,011	64.30	35.58 oc	---	---	---	---	---	---	---	---	---	35.58
9.40	90,640	64.40	35.81 oc	---	---	---	---	---	---	---	---	---	35.81
9.50	92,270	64.50	36.03 oc	---	---	---	---	---	---	---	---	---	36.03
9.60	93,899	64.60	36.25 oc	---	---	---	---	---	---	---	---	---	36.25
9.70	95,528	64.70	36.47 oc	---	---	---	---	---	---	---	---	---	36.47
9.80	97,157	64.80	36.69 oc	---	---	---	---	---	---	---	---	---	36.69
9.90	98,786	64.90	36.91 oc	---	---	---	---	---	---	---	---	---	36.91
10.00	100,415	65.00	37.13 oc	---	---	---	---	---	---	---	---	---	37.13

...End

APPENDIX B - Pipe/Inlet Sizing



LEGEND

- EXISTING WATERSHED BOUNDARY
- FLOW DIRECTION
- EXISTING CONTOUR — 12
- CONCENTRATION POINT — (0)
- X.J / 0.53 | 0.86 — DRAINAGE AREA DESIGNATION
- Q50 (CFS)
- AREA (AC)

NOTE:

1. ROUGH GRADE PHASE 1 CONTOURS SHOWN AS BACKGROUND TOPOGRAPHY WITH TRACT LIMITS

DELANE ENGINEERING
2812 SANTA MONICA BLVD. SUITE 206
SANTA MONICA, CA 90404
PHONE: 310.546.5711-WWW.DELANEENGINEERING.COM

REGISTERED PROFESSIONAL ENGINEER — COLBY DELANE — No C 72391 — CIVIL — STATE OF CALIFORNIA

ARCTIC COLD STORAGE

HYDROLOGY MAP - DEVELOPED CONDITION

OXNARD, CALIFORNIA

DATE	REMARKS

PE / PM:	DP/SU
DRAWN BY:	TN
JOB NO.:	01-10268

PLOT DATE: 4/8/20 7:53 PM FILE NAME: C:\USERS\BRIANWESE\CLOUDSTATION\DELANESM\PROJECTA\01\10268\WORK\REPORTS\FINAL DRAINAGE REPORT\HYDROLOGY EXHIBITS\268-HYD-DEVELOPED.DWG
SAVE DATE: 4/8/20 BRIANWESE

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Apr 9 2020

18in Pipe Capacity

Circular

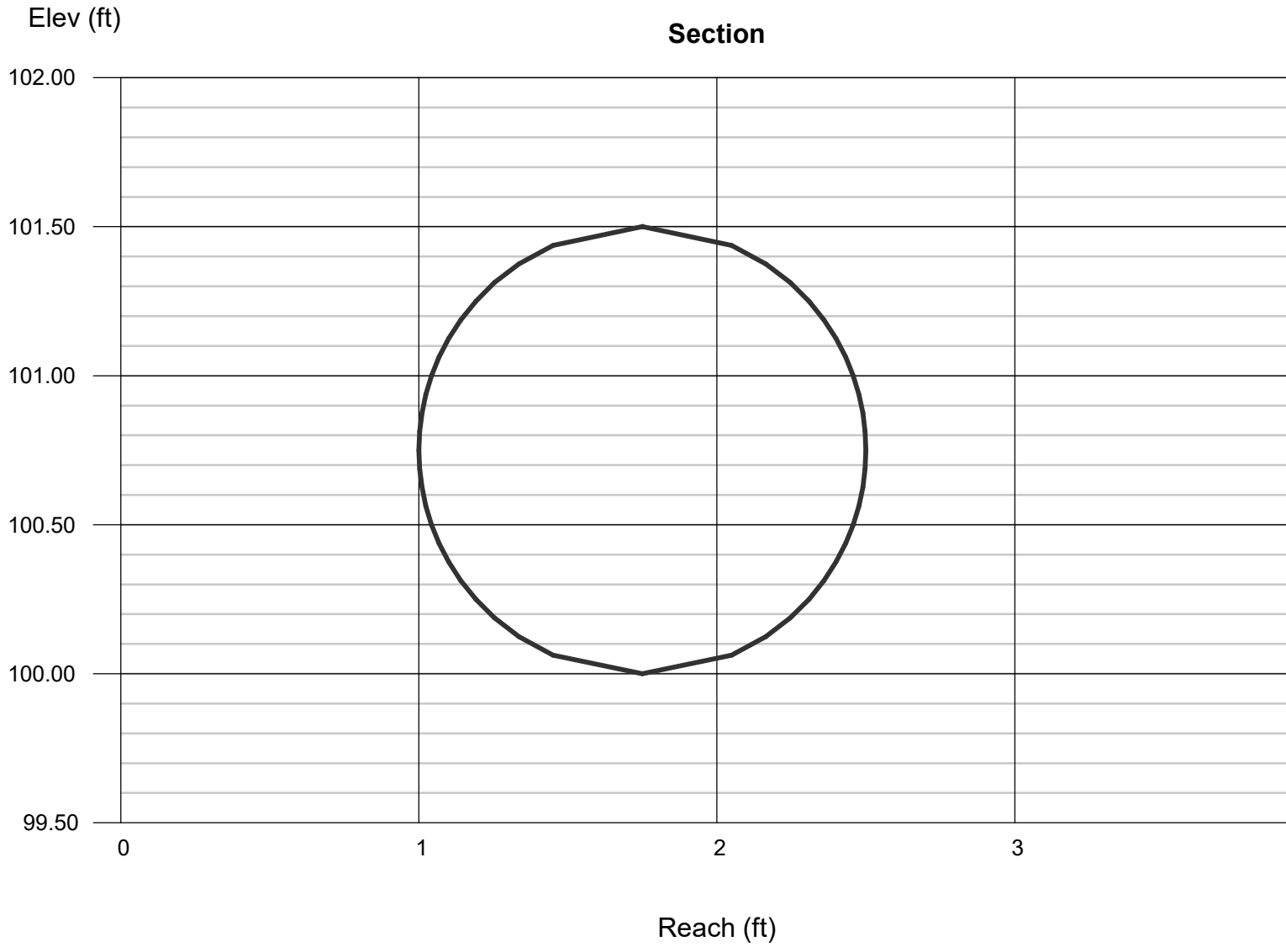
Diameter (ft)	= 1.50
Invert Elev (ft)	= 100.00
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 1.50
Q (cfs)	= 10.50
Area (sqft)	= 1.77
Velocity (ft/s)	= 5.94
Wetted Perim (ft)	= 4.71
Crit Depth, Yc (ft)	= 1.25
Top Width (ft)	= 0.00
EGL (ft)	= 2.05



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Apr 8 2020

24in Pipe Capacity

Circular

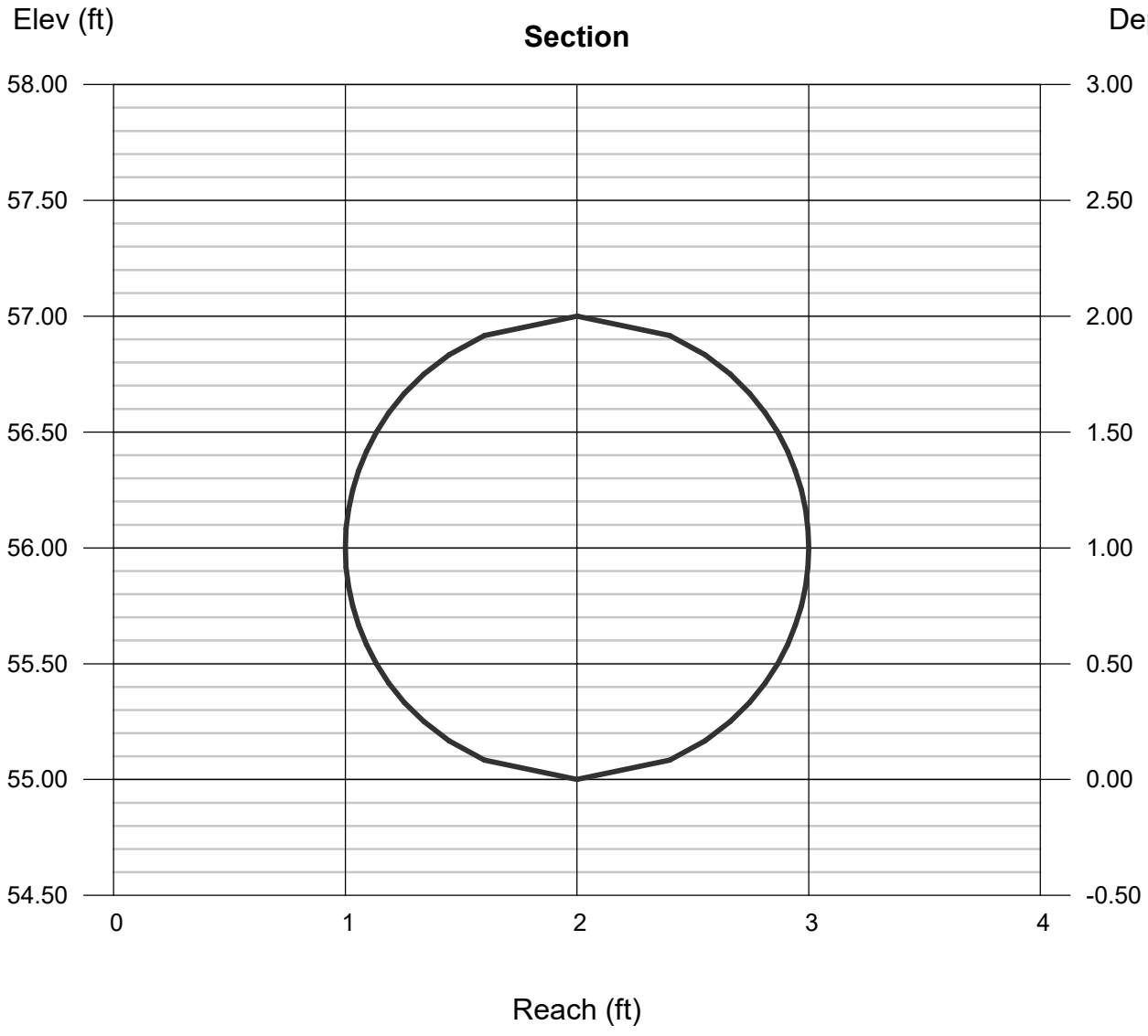
Diameter (ft)	= 2.00
Invert Elev (ft)	= 55.00
Slope (%)	= 0.40
N-Value	= 0.013

Calculations

Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 2.00
Q (cfs)	= 14.30
Area (sqft)	= 3.14
Velocity (ft/s)	= 4.55
Wetted Perim (ft)	= 6.28
Crit Depth, Yc (ft)	= 1.37
Top Width (ft)	= 0.00
EGL (ft)	= 2.32



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Apr 8 2020

36in Pipe Capacity

Circular

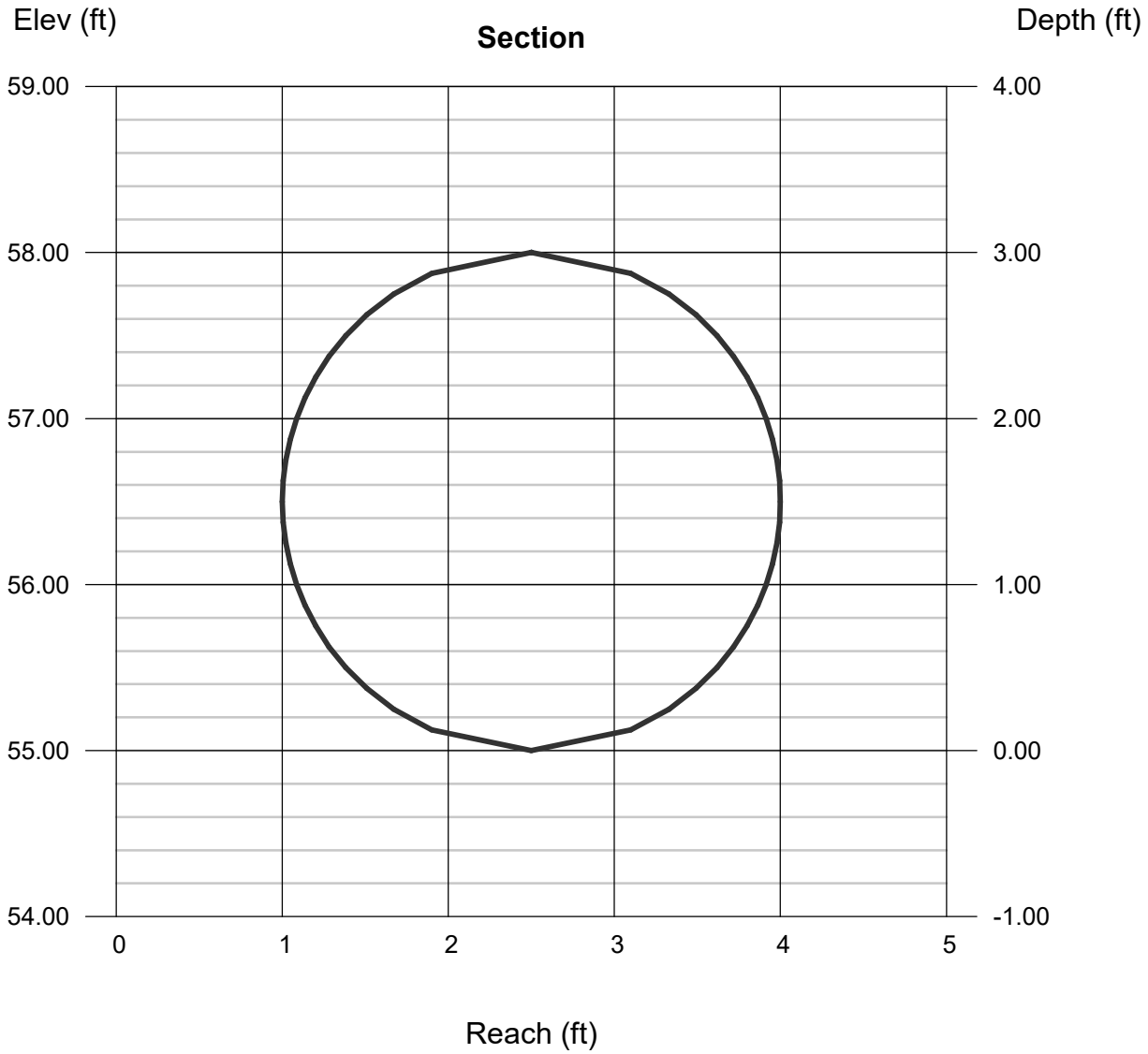
Diameter (ft)	= 3.00
Invert Elev (ft)	= 55.00
Slope (%)	= 0.30
N-Value	= 0.013

Calculations

Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 3.00
Q (cfs)	= 36.53
Area (sqft)	= 7.07
Velocity (ft/s)	= 5.17
Wetted Perim (ft)	= 9.42
Crit Depth, Yc (ft)	= 1.97
Top Width (ft)	= 0.00
EGL (ft)	= 3.42



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Apr 8 2020

48in Pipe Capacity

Circular

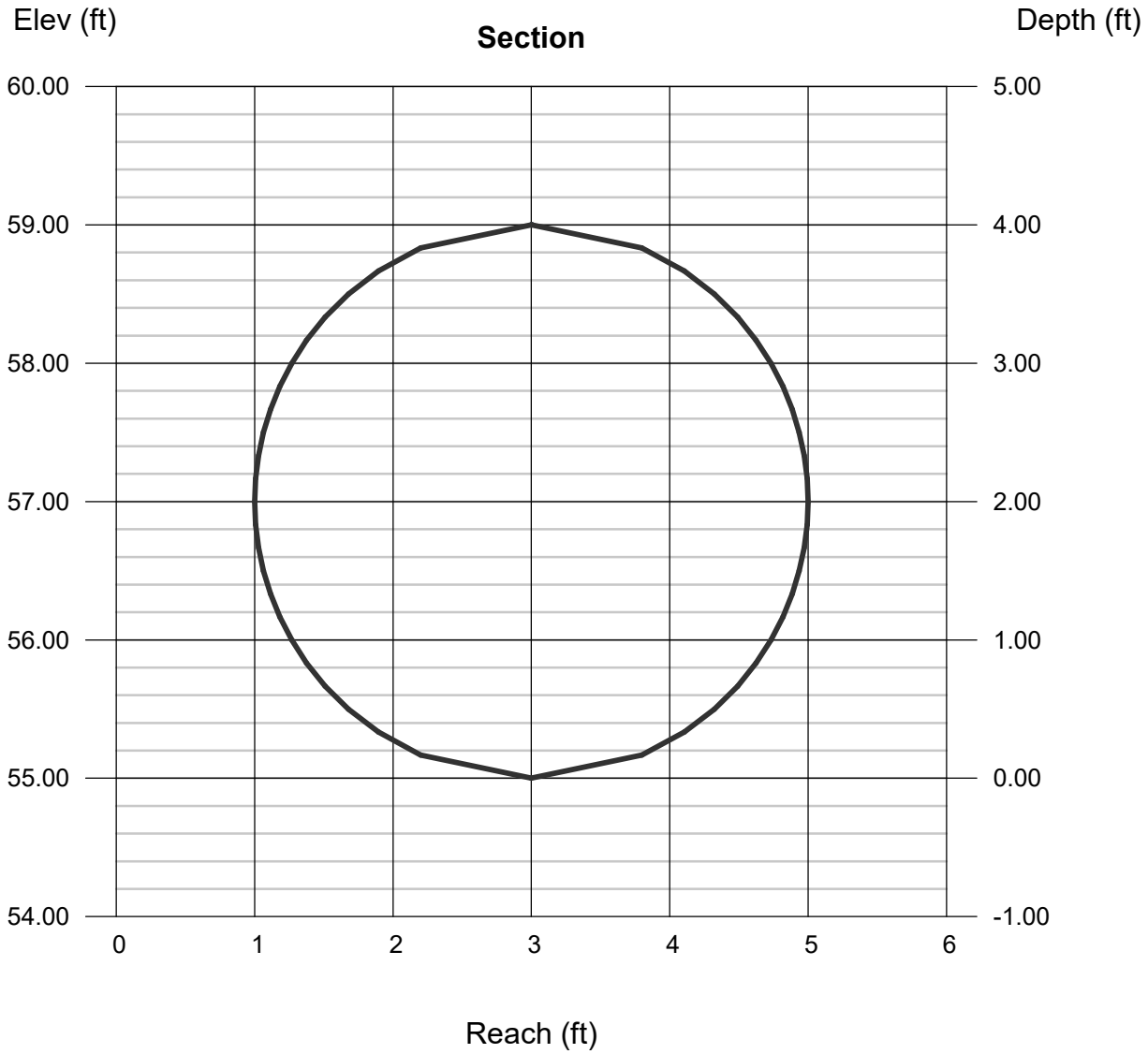
Diameter (ft)	= 4.00
Invert Elev (ft)	= 55.00
Slope (%)	= 0.30
N-Value	= 0.013

Calculations

Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 4.00
Q (cfs)	= 78.68
Area (sqft)	= 12.57
Velocity (ft/s)	= 6.26
Wetted Perim (ft)	= 12.57
Crit Depth, Yc (ft)	= 2.69
Top Width (ft)	= 0.00
EGL (ft)	= 4.61



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Apr 13 2020

48in OUTLET PIPE

Circular

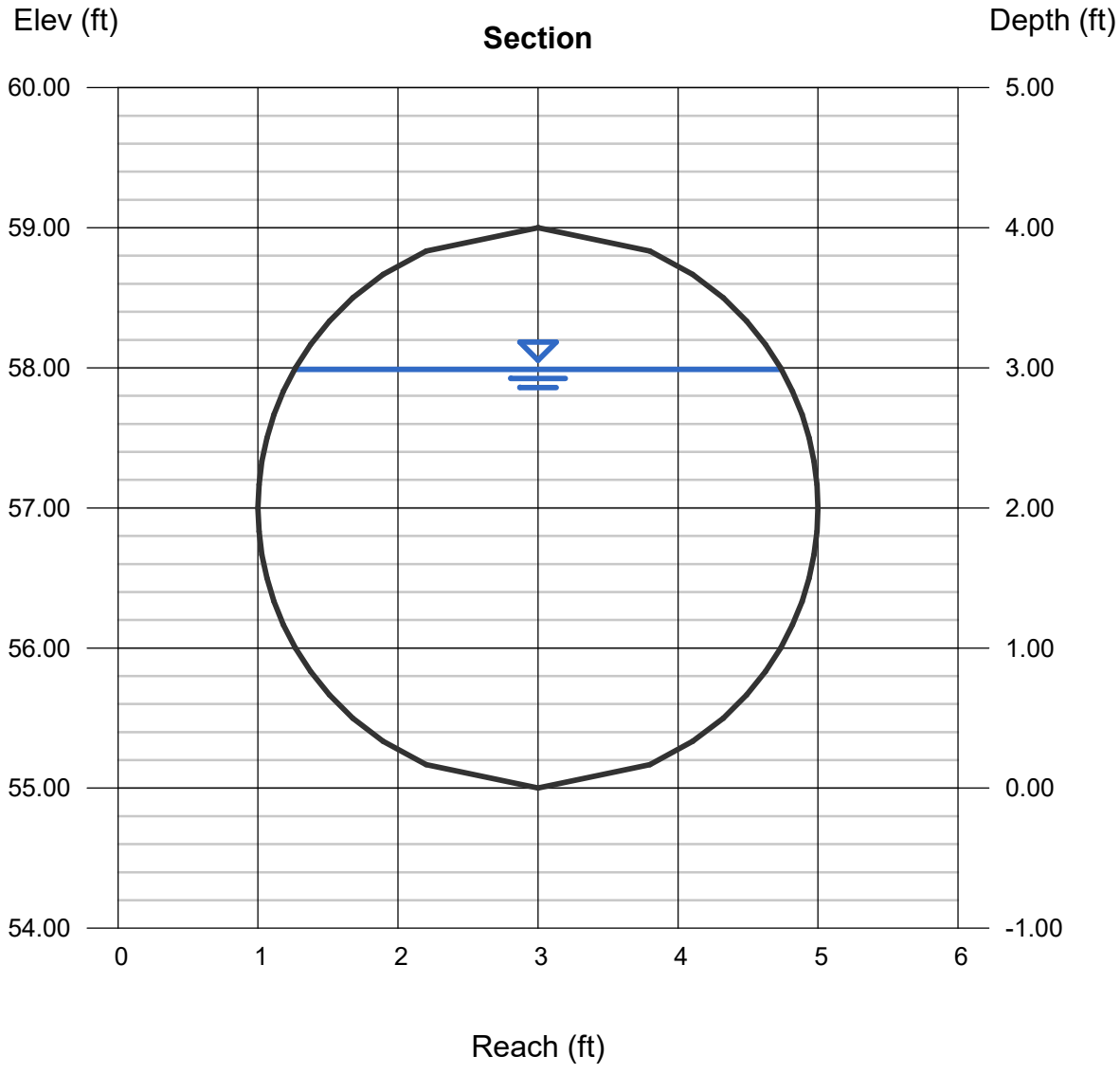
Diameter (ft)	= 4.00
Invert Elev (ft)	= 55.00
Slope (%)	= 0.30
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 71.31

Highlighted

Depth (ft)	= 2.99
Q (cfs)	= 71.31
Area (sqft)	= 10.08
Velocity (ft/s)	= 7.07
Wetted Perim (ft)	= 8.36
Crit Depth, Yc (ft)	= 2.56
Top Width (ft)	= 3.47
EGL (ft)	= 3.77



Inlet Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Sunday, Nov 17 2019

CB A1

Combination Inlet

Location	= Sag
Curb Length (ft)	= 3.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= 1.00
Grate Width (ft)	= 2.00
Grate Length (ft)	= 3.00

Gutter

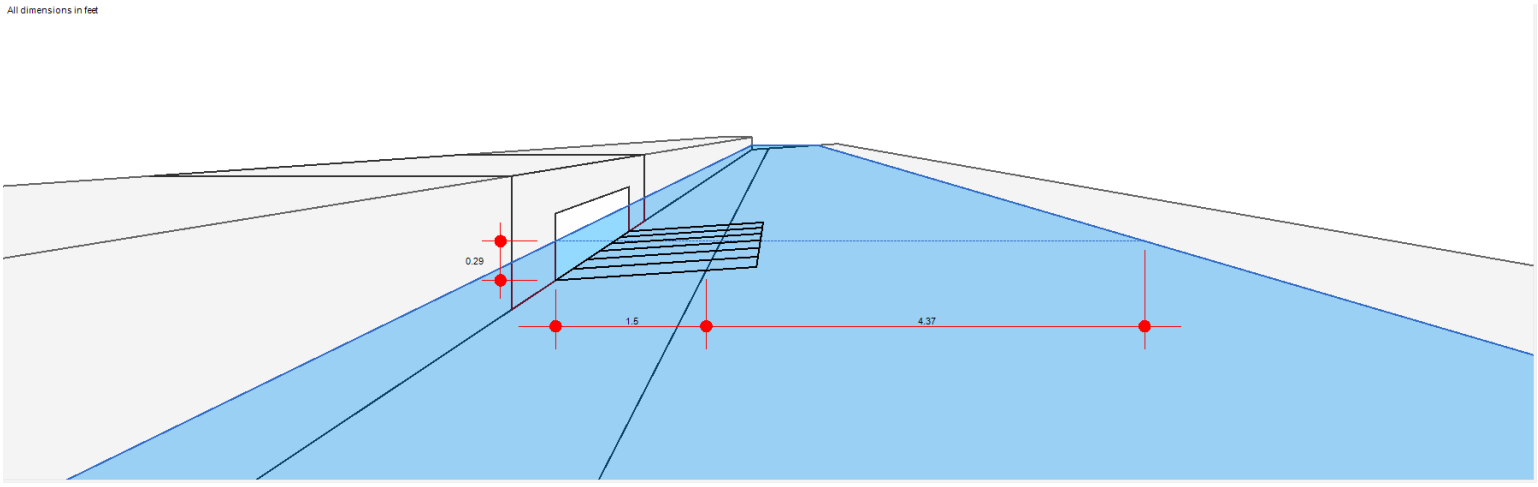
Slope, Sw (ft/ft)	= 0.050
Slope, Sx (ft/ft)	= 0.050
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 3.64

Highlighted

Q Total (cfs)	= 3.64
Q Capt (cfs)	= 3.64
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 3.52
Efficiency (%)	= 100
Gutter Spread (ft)	= 5.87
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Sunday, Nov 17 2019

CB A2/4

Drop Grate Inlet

Location	= Sag
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= 1.00
Grate Width (ft)	= 2.00
Grate Length (ft)	= 3.00

Gutter

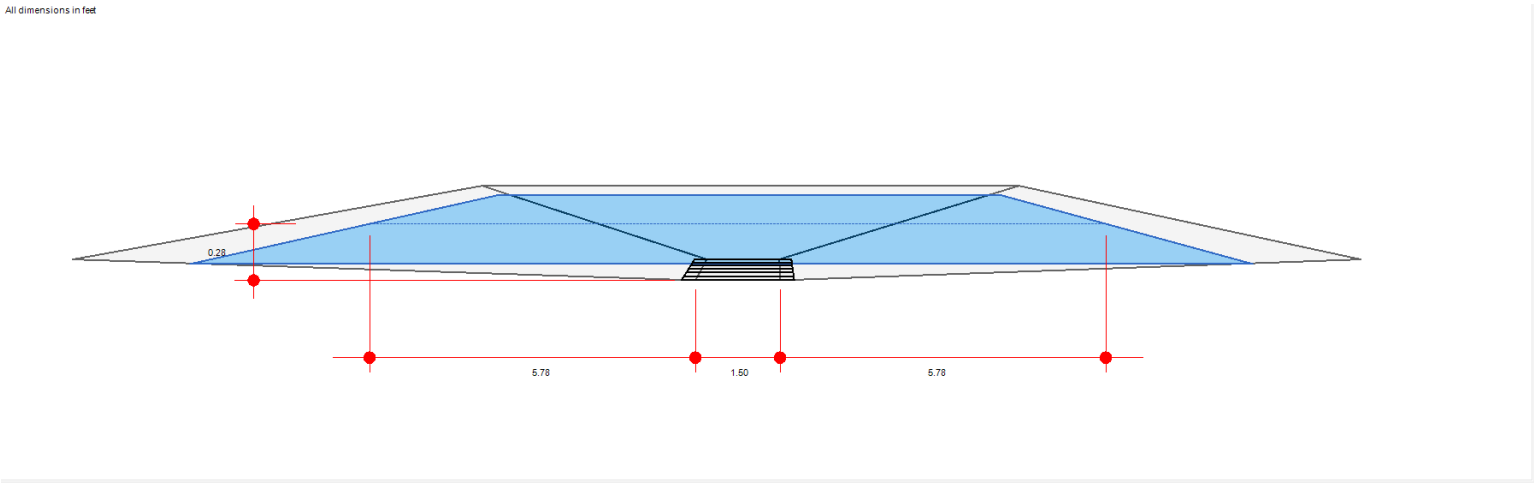
Slope, Sw (ft/ft)	= 0.050
Slope, Sx (ft/ft)	= 0.050
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 2.83

Highlighted

Q Total (cfs)	= 2.83
Q Capt (cfs)	= 2.83
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 3.32
Efficiency (%)	= 100
Gutter Spread (ft)	= 13.06
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Sunday, Nov 17 2019

CB A5

Combination Inlet

Location	= Sag
Curb Length (ft)	= 3.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= 1.00
Grate Width (ft)	= 2.00
Grate Length (ft)	= 3.00

Gutter

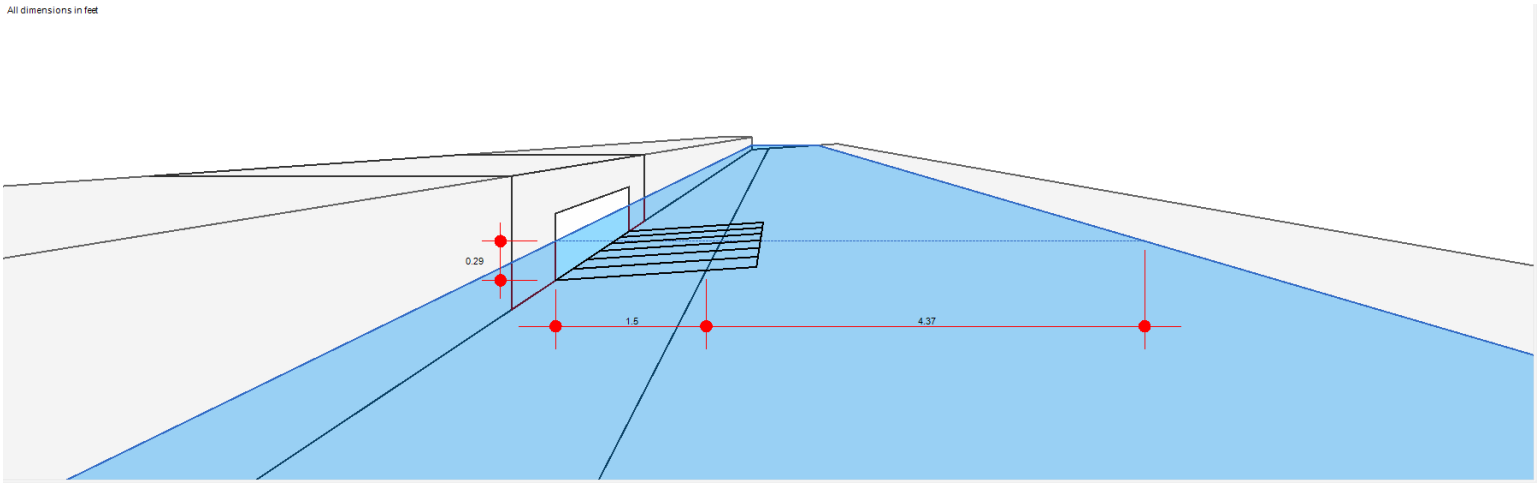
Slope, Sw (ft/ft)	= 0.050
Slope, Sx (ft/ft)	= 0.050
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 2.83

Highlighted

Q Total (cfs)	= 2.83
Q Capt (cfs)	= 2.83
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 3.52
Efficiency (%)	= 100
Gutter Spread (ft)	= 5.87
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

CB A7

Combination Inlet

Location	= Sag
Curb Length (ft)	= 3.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= 1.00
Grate Width (ft)	= 2.00
Grate Length (ft)	= 3.00

Gutter

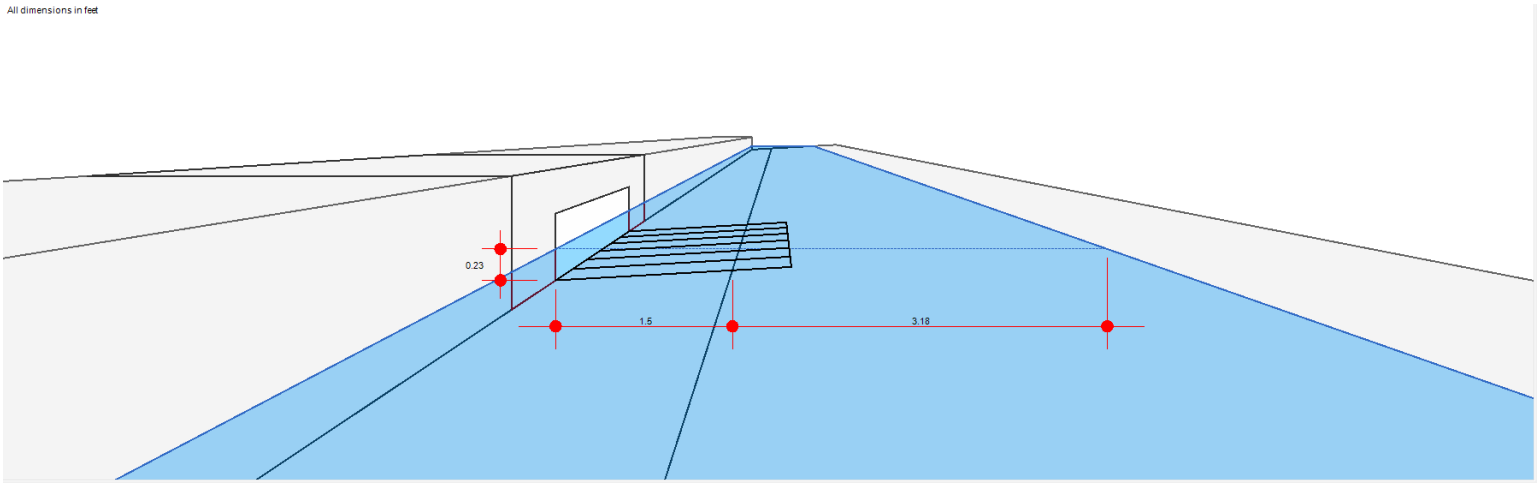
Slope, Sw (ft/ft)	= 0.050
Slope, Sx (ft/ft)	= 0.050
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 1.83

Highlighted

Q Total (cfs)	= 1.83
Q Capt (cfs)	= 1.83
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 2.81
Efficiency (%)	= 100
Gutter Spread (ft)	= 4.68
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Sunday, Nov 17 2019

CB A9

Combination Inlet

Location	= Sag
Curb Length (ft)	= 3.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= 1.00
Grate Width (ft)	= 2.00
Grate Length (ft)	= 3.00

Gutter

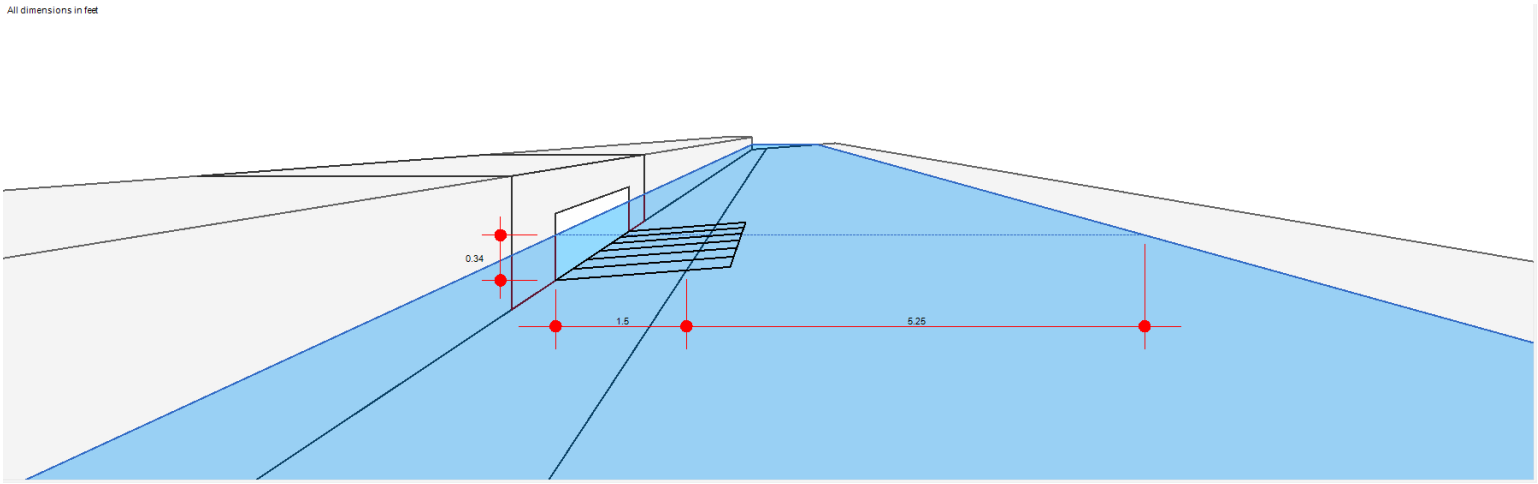
Slope, Sw (ft/ft)	= 0.050
Slope, Sx (ft/ft)	= 0.050
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 4.71

Highlighted

Q Total (cfs)	= 4.71
Q Capt (cfs)	= 4.71
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 4.05
Efficiency (%)	= 100
Gutter Spread (ft)	= 6.75
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

CB A12

Combination Inlet

Location	= Sag
Curb Length (ft)	= 3.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= 1.00
Grate Width (ft)	= 2.00
Grate Length (ft)	= 3.00

Gutter

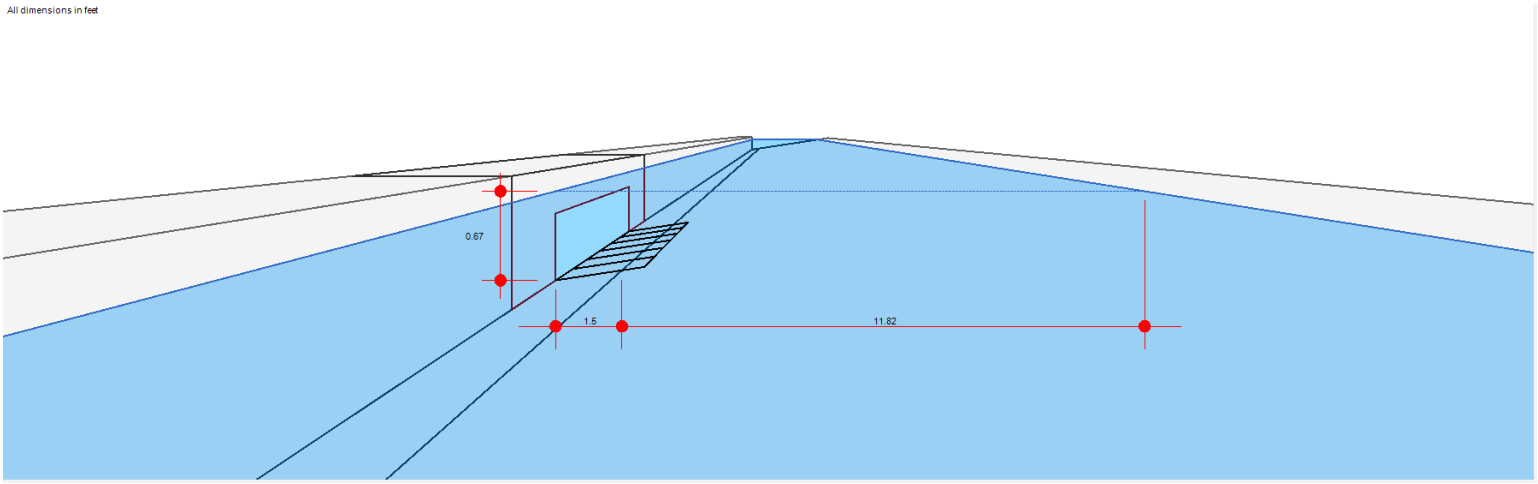
Slope, Sw (ft/ft)	= 0.050
Slope, Sx (ft/ft)	= 0.050
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 9.15

Highlighted

Q Total (cfs)	= 9.15
Q Capt (cfs)	= 9.15
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 7.99
Efficiency (%)	= 100
Gutter Spread (ft)	= 13.32
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



APPENDIX C – Stormwater Quality Calculations

SECTION [_____]

STORM WATER TREATMENT DEVICE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope

The Contractor shall furnish all labor, equipment and materials necessary to install the storm water treatment device(s) (SWTD) and appurtenances specified in the Drawings and these specifications.

B. Related Sections

Section 02240: Dewatering
Section 02260: Excavation Support and Protection
Section 02315: Excavation and Fill
Section 02340: Soil Stabilization

1.2 QUALITY ASSURANCES

A. Inspection

All components shall be subject to inspection by the engineer at the place of manufacture and/or installation. All components are subject to being rejected or identified for repair if the quality of materials and manufacturing do not comply with the requirements of this specification. Components which have been identified as defective may be subject for repair where final acceptance of the component is contingent on the discretion of the Engineer.

B. Warranty

The manufacturer shall guarantee the SWTD components against all manufacturer originated defects in materials or workmanship for a period of twelve (12) months from the date the components are delivered to the owner for installation. The manufacturer shall upon its determination repair, correct or replace any manufacturer originated defects advised in writing to the manufacturer within the referenced warranty period. The use of SWTD components shall be limited to the application for which it was specifically designed.

C. Manufacturer's Performance Certificate

The SWTD manufacturer shall submit to the Engineer of Record a "Manufacturer's Performance Certification" certifying that each SWTD is capable of achieving the specified removal efficiencies listed in these specifications. The certification shall be supported by independent third-party research

1.3 SUBMITTALS

A. Shop Drawings

The contractor shall prepare and submit shop drawings in accordance with Section **[_____]** of the contract documents. The shop drawings shall detail horizontal and vertical dimensioning as well as joint type and locations.

1.4 PRODUCT SUBMITTALS

No product substitutions shall be accepted unless submitted 10 days prior to project bid date, or as directed by the engineer of record. Submissions for substitutions require review and approval by the Engineer of Record, for hydraulic performance, impact to project designs, equivalent treatment performance, and any required project plan and report (hydrology/hydraulic, water quality, stormwater pollution) modifications that would be required by the approving jurisdictions/agencies. Contractor to coordinate with the Engineer of Record any applicable modifications to the project estimates of cost, bonding amount determinations, plan check fees for changes to approved documents, and/or any other regulatory requirements resulting from product substitutions.

PART 2.0 – PRODUCTS

2.1 MATERIALS AND DESIGN

A. Housing unit of stormwater treatment device shall be constructed of pre-cast or cast-in-place concrete, no exceptions. Precast concrete components shall conform to applicable sections of ASTM C 478, ASTM C 857 and ASTM C 858 and the following:
   1. Concrete shall achieve a minimum 28-day compressive strength of 4,000 pounds per square-inch (psi);
   2. Unless otherwise noted, the precast concrete sections shall be designed to withstand lateral earth and AASHTO H-20 traffic loads;
   3. Cement shall be Type III Portland Cement conforming to ASTM C 150;
   4. Aggregates shall conform to ASTM C 33;
   5. Reinforcing steel shall be deformed billet-steel bars, welded steel wire or deformed welded steel wire conforming to ASTM A 615, A 185, or A 497.
   6. Joints shall be sealed with preformed joint sealing compound conforming to ASTM C 990.
   7. Shipping of components shall not be initiated until a minimum compressive strength of 4,000 psi is attained or five (5) calendar days after fabrication has expired, whichever occurs first.

B. Internal Components and appurtenances shall conform to the following:
   1. Screen and support structure shall be manufactured of Type 316 and 316L stainless steel conforming to ASTM F 1267-01;
   2. Hardware shall be manufactured of Type 316 stainless steel conforming to ASTM A 320;

3. Fiberglass components shall conform to the National Bureau of Standards PS-15 and coated with an isophalic polyester gelcoat and
4. Access system(s) conform to the following:
    a. Manhole castings shall be designed to withstand AASHTO H-20 loadings and manufactured of cast-iron conforming to ASTM A 48 Class 30.

2.2 PERFORMANCE

A. REMOVAL EFFICIENCIES

1. The SWTD shall be sized to either achieve an 80 percent average annual reduction in the total suspended solid load or treat a flow rate designated by the jurisdiction in which the project is located.

2. The SWTD shall be capable of capturing and retaining 100 percent of pollutants greater than or equal to 2.4 millimeters (mm) regardless of the pollutant's specific gravity (i.e.: floatable and neutrally buoyant materials) for flows up to the device's rated-treatment capacity. The SWTD shall be designed to retain all previously captured pollutants addressed by this subsection under all flow conditions. The CDS unit shall be fitted with a 2400 micron or stainless steel screen.

3. The SWTD shall be capable of capturing and retaining total petroleum hydrocarbons. The SWTD shall be capable of achieving a removal efficiency of 92 and 78 percent when the device is operating at 25 and 50 percent of its rated-treatment capacity (125 micron flow rates listed in table 1.). These removal efficiencies shall be based on independent third-party research for influent oil concentrations representative of storm water runoff (20 ± 5 mg/L). The SWTD shall be greater than 99 percent effective in controlling dry-weather accidental oil spills.

B. HYDRAULIC CAPACITY

1. The SWTD shall provide verified treatment performance up to and including the rated treatment capacity of the selected unit listed in Table 1. The treatment performance shall be verified through a nationally or regionally accredited testing protocol.

2. The SWTD shall convey the flow from the peak storm event of the drainage network, in accordance with required hydraulic upstream conditions as defined by the Engineer. If a substitute SWTD is proposed, supporting documentation shall be submitted that demonstrates equal or better upstream hydraulic conditions compared to that specified herein. This documentation shall be signed and sealed by a Professional Engineer registered in the State of the work. All costs associated with preparing and certifying this documentation shall be born solely by the Contractor.

C. STORAGE CAPACITY

1. The SWTD shall be designed with a sump chamber for the storage of captured sediments and other negatively buoyant pollutants in between maintenance cycles. The minimum storage capacity provided by the sump chamber shall be in accordance with the volume listed in Table 1. The boundaries of the sump chamber shall be limited to that which do not degrade the SWTD's treatment efficiency as captured pollutants accumulate. The sump chamber shall be separate from the treatment processing portion(s) of the SWTD to minimize the probability of fine particle re-suspension. In order to not restrict the Owner's ability to maintain the SWTD, the minimum dimension providing access from the ground surface to the sump chamber shall be 20 inches in diameter.
2. The SWTD shall be designed to capture and retain Total Petroleum Hydrocarbons generated by wet-weather flow and dry-weather gross spills and have a capacity listed in Table 1 of the required unit.

2.3 MANUFACTURER

The manufacturer of the SWTD shall be one that is regularly engaged in the engineering design and production of systems deployed for the treatment of storm water runoff for at least five (5) years and which have a history of successful production, acceptable to the Engineer. In accordance with the Drawings, the SWTD(s) shall be a CDS® device manufactured by:

CONTECH Engineered Solutions, LLC
9025 Centre Pointe Drive, Suite 400
West Chester, OH 45069
(800) 338-1122
www.ContechES.com

PART 3 – EXECUTION

3.1 HANDLING AND STORAGE

1. The contractor shall exercise care in the storage and handling of the SWTD components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted and unloading has commenced shall be borne by the contractor.

3.2 INSTALLATION

1. The SWTD shall be installed in accordance with the manufacturer's recommendations and related sections of the contract documents. The manufacturer shall provide the contractor installation instructions and offer on-site guidance during the important stages of the installation as identified by the manufacturer at no additional expense. A minimum of 72 hours notice shall be provided to the manufacturer prior to their performance of the services included under this subsection.

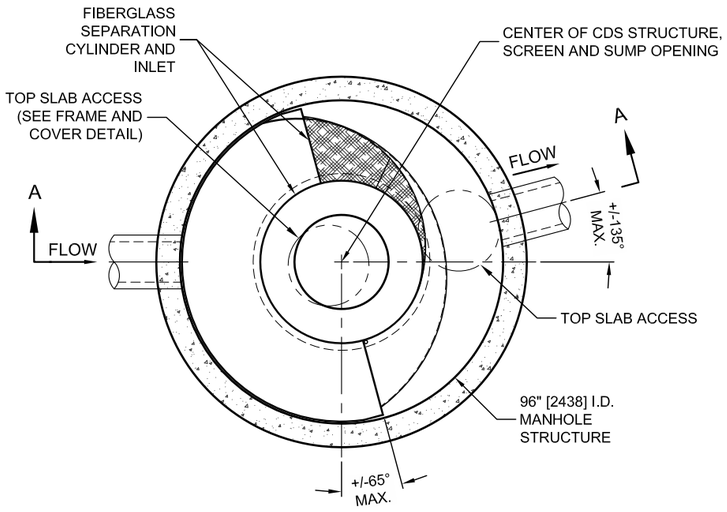
2. The contractor shall fill all voids associated with lifting provisions provided by the manufacturer. These voids shall be filled with non-shrinking grout providing a finished surface consistent with adjacent surfaces. The contractor shall trim all protruding lifting provisions flush with the adjacent concrete surface in a manner, which leaves no sharp points or edges.

3. The contractor shall removal all loose material and pooling water from the SWTD prior to the transfer of operational responsibility to the Owner.

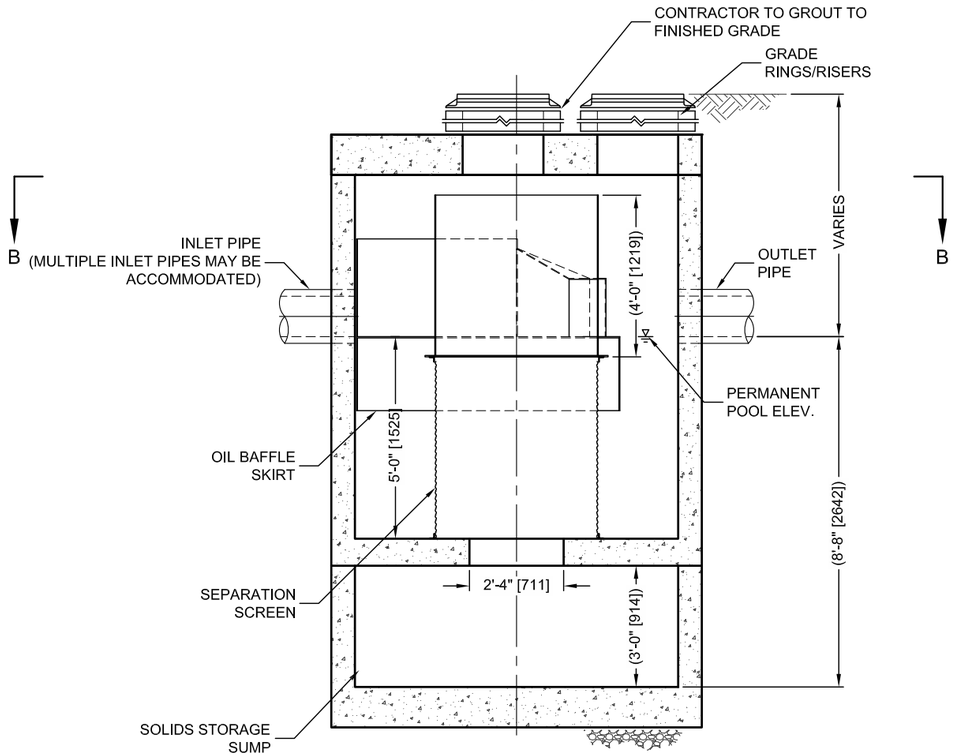
TABLE 1
Storm Water Treatment Device
Hydraulic and Storage Capacities

CDS Model	Treatment Capacity (cfs)/(L/s)	Minimum Sump Storage Capacity (yd^3)/(m^3)	Minimum Oil Storage Capacity (gal)/(L)
CDS2015-G	0.7 (19.8)	0.5 (0.4)	70 (265)
CDS2015-4	0.7 (19.8)	0.5 (1.4)	70 (265)
CDS2015	0.7(19.8)	1.3 (1.0)	92 (348)
CDS2020	1.1 (31.2)	1.3 (1.0)	131 (496)
CDS2025	1.6 (45.3)	1.3 (1.0)	143 (541)
CDS3020	2.0 (56.6)	2.1 (1.6)	146 (552)
CDS3030	3.0 (85.0)	2.1 (1.6)	205 (776)
CDS3035	3.8 (106.2)	2.1 (1.6)	234 (885)
CDS4030	4.5 (127.4)	5.6 (4.3)	407 (1540)
CDS4040	6.0 (169.9)	5.6 (4.3)	492 (1862)
CDS4045	7.5 (212.4)	5.6 (4.3)	534 (2012)
CDS2020-D	1.1 (31.2)	1.3 (1.0)	131 (495)
CDS3020-D	2.0 (56.6)	2.1 (1.6)	146 (552)
CDS3030-D	3.0 (85.0)	2.1 (1.6)	205 (776)
CDS3035-D	3.8 (106.2)	2.1 (1.6)	234 (885)
CDS4030-D	4.5 (127.4)	4.3 (3.3)	328 (1241)
CDS4040-D	6.0 (169.9)	4.3 (3.3)	396 (1499)
CDS4045-D	7.5 (212.4)	4.3 (3.3)	430 (1627)
CDS5640-D	9.0 (254.9)	5.6 (4.3)	490 (1854)
CDS5653-D	14.0 (396.5)	5.6 (4.3)	599 (2267)
CDS5668-D	19.0 (538.1)	5.6 (4.3)	733 (2774)
CDS5678-D	25.0 (708.0)	5.6 (4.3)	814 (3081)
CDS3030-DV	3.0 (85.0)	2.1 (1.6)	205 (776)
CDS5042-DV	9.0 (254.9)	1.9 (1.5)	294 (1112)
CDS5050-DV	11.0 (311.5)	1.9 (1.5)	367 (1389)
CDS7070-DV	26.0 (736.3)	3.3 (2.5)	914 (3459)
CDS10060-DV	30.0 (849.6)	5.0 (3.8)	792 (2997)
CDS10080-DV	50.0 (1416.0)	5.0 (3.8)	1057 (4000)
CDS100100-DV	64.0 (1812.5)	5.0 (3.8)	1320 (4996)

END OF SECTION



PLAN VIEW B-B
N.T.S.



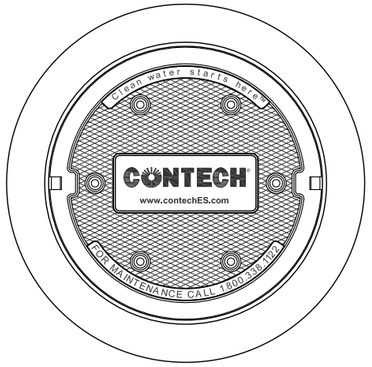
ELEVATION A-A
N.T.S.

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS4045-8-C DESIGN NOTES

THE STANDARD CDS4045-8-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS4045-8-C
INLINE CDS
STANDARD DETAIL