

SPECIAL ASSESSMENT DISTRICT NO. 228
CITY OF ALBUQUERQUE
DRAINAGE REPORT
JANUARY 2012

Prepared For

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I, Donald M. Duneman, P.E., do hereby certify that this report was prepared by me or under my direction and that I am a duly registered Professional Engineer under the laws of the State of New Mexico



Donald M. Duneman, P.E.
NMPE No. 17616

1-4-12

Date



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SECTION 1 – INTRODUCTION

The City of Albuquerque is planning to develop Special Assessment District Number 228 (SAD 228) to provide public infrastructure in Unit 14, 18, 19, 22, 25, 26 and 27 of Volcano Cliffs Subdivision. The purpose of this report is to develop a drainage plan for the design and construction of the storm drain infrastructure required to convey the off-site and on-site runoff generated by the improvements anticipated as a result of SAD 228.

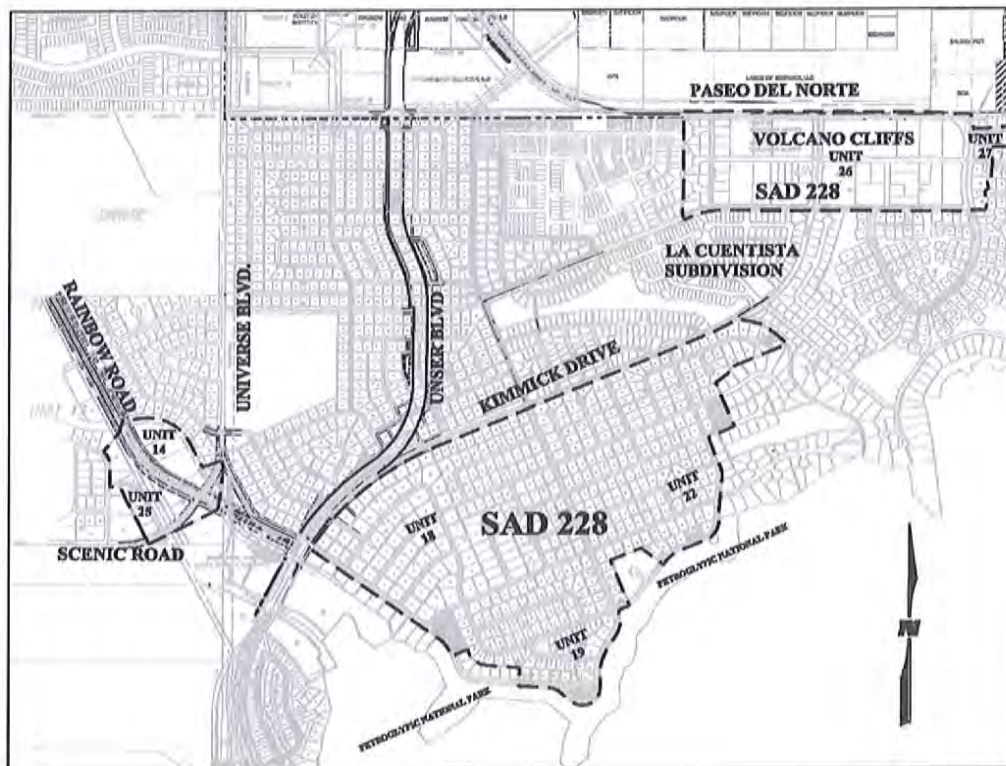
1.1 Project Description and Location

SAD 228 is comprised of proposed improvements in Unit 14, 18, 19, 22, 25, 26, and 27 of Volcano Cliffs Subdivision. See Figure 1 for Location map. The project involves the design of storm drain systems to convey developed conditions storm water runoff and to provide protection from erosion and flood damage for storm events up to the 100-year 24 hour storm event.

SAD 228 Units 18, 19 and 22 are bounded by Kimmick Street to the north, Unser Blvd to the northwest and Petroglyph National Monument to the east and south.

SAD 228 Units 26 and 27 are bounded by Paseo Del Norte Blvd to the north and Rosa Parks Road to the south. Kimmick Drive divides the project site into 2 areas. La Cuentista Subdivision is located south of Rosa Parks Road.

SAD 228 Units 14 and 25 include construction of Rainbow Blvd from Unser Blvd intersection for 2200 ft and the Universe Blvd / Scenic Rd for 500 ft south of Rainbow Blvd intersection.



LOCATION MAP
N.T.S.

Figure 1

1.2 Existing Reports

The following reports were used as a reference in this report:

“Boca Negra – Mariposa Arroyo Drainage management Plan, dated April 2005, by Resource Technology, Inc.

“Volcano Heights Drainage Compilation Report”, dated July 2011, by Wilson & Company Inc., Engineers and Architects

“La Cuentista Subdivision Drainage Report”, dated November 2003, by Wilson & Company Inc., Engineers and Architects

“La Cuentista Subdivision Drainage Report, Unit II, A Supplement to the Drainage Report for La Cuentista Subdivision dated November 2003”, dated January 2007, by Wilson & Company Inc., Engineers and Architects

“La Cuentista Subdivision Drainage Report, Unit III, A Supplement to the Drainage Report for La Cuentista Subdivision dated November 2003 & Drainage Report for La Cuentista Subdivision Drainage Report, Unit II dated January 2007”, dated April 2008, by Wilson & Company Inc., Engineers and Architects

“Unser Blvd Extension NW, Interim Conditions Drainage Report”, dated November 2010, by Wilson & Company Inc., Engineers and Architects

SECTION 2 - HYDROLOGIC ANALYSIS

2.1 Purpose

This report summarizes existing offsite and onsite hydrologic conditions; provides the design for full developed peak flows within SAD 228.

2.2 Methodology

The hydrologic and hydraulic methods and guidelines are per Section 22.2 of the City of Albuquerque DPM. The hydrology for the project has been prepared using the AHYMO_97 computer modeling software. The 100-year, 24-hour storm was used as the design storm for the detention ponds.

2.3 Design Storm Precipitation

AHYMO was used to calculate existing and proposed runoff. The rainfall values used were for the 24-hour precipitation for a 100 year storm event. Rainfall values were obtained from a precipitation frequency data server NOAA Atlas 14. See Appendix A for NOAA Atlas 14 Precipitation Frequency Data and Table 1 for Precipitation Values.

Table 1: Precipitation Values (in)			
Return Period (yrs)	24 hr Rainfall	6 hr Rainfall	1 hr Rainfall
100	2.51	2.16	1.7

2.4 Land Treatments

The land treatments used in the AHYMO Computer models are as described by Table A-4 of the COA DPM Section 22.2, and are summarized in Table 2.

Table 2: Land Treatment Classifications	
Treatment	Land Condition
A	Soil uncompacted by human activity with 0 to 10 percent slopes. Native grasses, weeds and shrubs in typical densities with minimal disturbance to grading, groundcover and infiltration capacity. Croplands. Unlined
B	Irrigated lawns, parks and golf courses with 0 to 10 percent slopes. Native grasses, weeds and shrubs, and soil uncompacted by human activity with slopes greater than 10 percent and less than 20 percent.
C	Soil compacted by human activity. Minimal vegetation. Unpaved parking, roads, trails. Most vacant lots. Gravel or rock on plastic (desert landscaping). Irrigated lawns and parks with slopes greater than 10 percent. Native grasses, weeds and shrubs, and soil uncompacted by human activity with slopes at 20 percent or greater. Native grass, weed and shrub areas with clay or clay loam soils and other soils of very low permeability as classified by SCS Hydrologic Soil Group D.
D	Impervious areas, pavement and roofs.

The following Land Treatment percentages were entered in the AHYMO Computer model based on the Volcano Heights Drainage Compilation Report:

Table 3: Treatment Type Percentage Summary				
Land Use	Treatments			
	A	B	C	D
Residential/Town Homes	0%	15%	35%	50%
Residential	0%	10%	40%	50%
Commercial	0%	10%	10%	80%
Mixed Use	0%	5%	10%	85%
Open Space	100%	0%	0%	0%
Roadway	0%	10%	0%	90%

2.5 Time to Peak Calculations

Time to Peak Calculations was performed using Upland/Lag Time methodology. The time to peak was calculated using the AHYMO COMPUTE LT TP command.

2.6 Existing Conditions

Most of project sites is undeveloped. Refer to Plate 1 in Appendix D. Paseo Del Norte Blvd is currently paved and a 72" RCP pipe exists which terminates before the intersection of Paseo Del Norte Blvd and Calle Nortena on the eastern edge of the project site in Unit 26 and 27. Unser Blvd is currently under construction. Temporary cross culverts and detention ponds on the upstream side of the boulevard is to be built with Unser Blvd project to manage runoff in the interim conditions before the full development of the area. The proposed Boca Negra Detention Facility project is expected to begin early 2012. With this project, a storm drain pipe is designed to be constructed along Atrisco drive that will serve as the outfall for a portion of the SAD. Table 4 summarizes existing conditions model data.

2.6.1 Unit 26 and 27

The watershed is approximately 45 acres. The site slopes east and southeast with slopes ranging from 1.5% to 4.0%. See Plate 1 in Appendix D for Existing Basin Boundary Plan and Table 4 for basin data.

2.6.2 Unit 18, 19 and 22

The watershed is approximately 220 acres. The existing topography slopes generally to southeast, southwest and south with slopes ranging from 1% to 3%. Most of the site drains into the Petroglyph National Monument. See Plate 1 in Appendix D for Existing Basin Boundary Plan and Table 4 for basin data.

2.6.3 Unit 14 and 25

The watershed is approximately 19 acres. Rainbow Blvd and Universe Blvd/Scenic Road intersect and divide the site into two areas. The site slopes from north to south and Boca Negra Arroyo is located west of the project area. See Plate 1 in Appendix D for Existing Basin Boundary Plan and Table 4 for basin data.

Table 4: Existing Conditions Model Data							
Basin	Area (ac)	Land treatment type (%)				Q ₁₀₀ (cfs)	V ₁₀₀₋₂₄ (ac-ft)
		A	B	C	D		
100	174.0	94	0	0	6	118.53	7.418
101	92.7	90	0	0	10	58.51	3.233
102	27.0	100	0	0	0	31.63	0.900
103	16.4	100	0	0	0	19.23	0.548
104	10.2	100	0	0	0	11.99	0.341
105	3.9	100	0	0	0	4.62	0.131
106	13.8	100	0	0	0	14.36	0.460
107	28.7	95	0	5	0	25.97	1.002
108	20.5	100	0	0	0	16.03	0.683
109	4.8	100	0	0	0	5.63	0.160
110	12.4	100	0	0	0	14.33	0.412
111	3.4	100	0	0	0	3.98	0.113
112	3.5	100	0	0	0	4.05	0.115
113	33.3	100	0	0	0	38.77	1.110

2.7 Proposed Conditions

Improvements within SAD 228 will include asphalt paving, standard curb and gutter, sidewalks and storm sewer systems. Other utility improvements will include sanitary sewer system and water line. The storm system will accept onsite and offsite runoff which will be detained on site to release the allowable flows Per Volcano Heights Drainage Compilation Report. Drainage improvements proposed in this report are in compliance with the intent of Boca Negra – Mariposa Arroyo Drainage Management Plan prepared by Resource Technology, Inc. See Plates 2 and 3 in Appendix D for Basin and Sub-Basin Boundary Plans. Table 5 below summarizes proposed conditions model data.

Table 5: Proposed Conditions Model - Basin Data							
Basin	Area (ac)	Land treatment type (%)				Q ₁₀₀ (cfs)	V ₁₀₀₋₂₄ (ac-ft)
		A	B	C	D		
UNIT 18, 19 & 22							
200	13.12	0	10	40	50	32.02	1.546
To Pond 4						32.02	1.546
201	95.3	0	10	40	50	187.54	12.300
To Pond 5						187.54	12.300
202	19.29	0	10	40	50	61.76	2.486
To La Cuentista Pond 4						61.76	2.486
203	38.83	0	10	40	50	116.11	5.014
To Pond 8						116.11	5.014
204	8.98	0	10	40	50	28.73	1.156
To Pond 7						28.73	1.156
205	41.86	0	10	40	50	114.37	5.402
To Pond 6						114.37	5.402
206	5.02	0	10	40	50	16.01	0.644
To Pond 9						16.01	0.644
207	1.85	0	10	40	50	5.96	0.240
Free Discharge						5.96	0.240

Table 5: Proposed Conditions Model - Basin Data (Cont'd)							
Basin	Area (ac)	Land treatment type (%)				Q ₁₀₀ (cfs)	V ₁₀₀₋₂₄ (ac-ft)
		A	B	C	D		
UNIT 26 & 27							
301A	10.62	0	5	10	85	38.27	1.806
301B	20.02	0	5	10	85	73.85	3.405
*To Pond 10						127.42	12.642
Tierra Buena Estates							
301C**	4.85	0	15	35	50	15.39	0.621
To curb inlets in Rosa Parks Rd						15.39	0.621
Offsite flows from Paseo Del Norte Blvd						162.69	13.765
302	17.59	0	5	10	85	64.89	2.991
To Paseo Del Norte SD						227.58	16.756
303	4.76	0	15	35	50	14.99	0.605
Free Discharge						14.99	0.605
UNIT 14 & 25							
401	8.97	0	5	10	85	33.04	1.523
To Boca Negra Arroyo						33.04	1.523
402	1.65	0	10	0	90	6.19	0.29
To Boca Negra Dam						6.19	0.29
403	2.49	0	5	10	85	8.72	0.424
404	5.03	0	5	10	85	18.53	0.903
To Temp Pond / Unser Blvd Storm System						27.25	1.327

*see AHYMO summary file for explanation.

** Submitted to the City but was never filed.

Table 6 summarizes proposed conditions model data for Sub-Basin in unit 18, 19 & 22.

Table 6: Proposed Conditions Model - Sub-Basin Data				
Basin	Area (ac)	cfs/ac	Q ₁₀₀ (cfs)	V ₁₀₀₋₂₄ (ac-ft)
Basin 200 (Discharge to Pond 4)				
200.00	13.12	2.44	32.02	1.55
Basin 201 (Discharge to Pond 5)				
201-A	7.48	1.97	14.72	0.97
201-B	6.62	1.97	13.03	0.85
201-C	5.12	1.97	10.08	0.66
201-D	2.47	1.97	4.86	0.32
201-E	1.53	1.97	3.01	0.20
201-F	8.73	1.97	17.18	1.13
201-G	8.54	1.97	16.81	1.10
201-H	8.88	1.97	17.47	1.15
201-I	6.09	1.97	11.98	0.79
201-J	8.51	1.97	16.75	1.10
201-K	3.75	1.97	7.38	0.48
201-L	11.78	1.97	23.18	1.52
201-M	5.17	1.97	10.17	0.67
201-N	5.27	1.97	10.37	0.68
201-O	3.16	1.97	6.22	0.41
201-P	2.20	1.97	4.33	0.28
Total	95.30		187.54	12.30
Basin 202 (Discharge to La Cuentista Pond)				
202-A	8.57	3.20	27.44	1.10
202-B	10.72	3.20	34.32	1.38
Total	19.29		61.76	2.486
202-C	1.33	2.62	3.50	0.235
Basin 203 (Discharge to Pond 8)				
203-A	6.51	2.99	19.47	0.84
203-B	9.99	2.99	29.87	1.29
203-C	5.24	2.99	15.67	0.68
203-D	4.18	2.99	12.50	0.54
203-E	9.89	2.99	29.57	1.28
203-F	3.02	2.99	9.03	0.390
Total	38.83		116.11	5.014

Table 6: Proposed Conditions Model - Sub-Basin Data (Cont'd)				
Basin	Area (ac)	cfs/ac	Q ₁₀₀ (cfs)	V ₁₀₀₋₂₄ (ac-ft)
Basin 204 (Discharge to Pond 7)				
204.00	8.98	3.20	28.73	1.16
Basin 205 (Discharge to Pond 6)				
205-A	10.29	2.73	28.11	1.33
205-B	10.06	2.73	27.49	1.30
205-C	5.66	2.73	15.46	0.73
205-D	3.22	2.73	8.80	0.42
205-E	5.75	2.73	15.71	0.74
205-F	6.88	2.73	18.80	0.89
Total	41.86		114.37	5.402
Basin 206A (Discharge to Pond 9)				
206-A	4.01	3.19	12.79	0.51
Basin 206B (Free Discharge)				
206-B	1.01	3.19	3.22	0.13
Total	5.02		16.01	0.644
Basin 207 (Free Discharge)				
207	1.85	3.22	5.96	0.240

2.7.1 Unit 26 and 27

The site is platted for multi – use tracts. The project area is designed to have 1 detention pond. Construction of this pond is not part of the SAD 228 improvements. See Plate 2 in Appendix D for Proposed Basin Boundary Plan, AHYMO calculations in Appendix A and Table 5 for basin data. Per Volcano Heights Drainage Compilation Report, allowable discharge values from different locations in the area were determined. See Plate 1 in Appendix E.

The area pond, future Pond 10, will be near the northwest corner of Rosa Parks Road and Kimmick Drive. A future 42” storm drain pipe will be capable of conveying offsite runoff west of SAD 228 into Pond 10. See Table 7 for Pond data and Figures 8 for future Pond 10 grading plan, located at the end of this section.

The property on the northeast corner of Kimmick- Drive and Rosa Parks Road known as Tierra Buena Estates (Basin 301C on Plate 2) was submitted to the City but never filed. Basin boundary in that area was modified to include the entire property of Tierra Buena Estates. Runoff from this site is designed to be collected in curb inlets in Rosa Parks. See Sheet 6 of 11, Tierra Buena Estates Construction Grading Plan in Appendix E. The Tierra Buena Estates project is an independent project and not part of the SAD 228 development.

Discharge outlet from Pond 10 will be connected to an existing 4 feet diameter pillbox manhole in Rosa-Parks Road per La Cuentista Subdivision Unit II Drainage Report. Per this report, a 48”

storm drain pipe will convey flows into a natural detention area in the southeast corner of Kimmick Drive and Rosa Parks Road in the interim Conditions. See sheet 10 of 37 in Appendix E. Per the report, this pond is allowed to discharge 117 cfs. Discharge from Pond 10 will be 105 cfs and 12 cfs less than was previously allowed. This reduction in allowable discharge needs to be considered when designing a permanent pond to replace the existing natural pond.

Table 7 - Pond Data, Unit 26 and 27

Pond	Q _{in} (cfs)	Q _{out} (cfs)	V ₁₀₀₋₂₄ Prv'd (ac-ft)	V ₁₀₀₋₂₄ Req'd (ac-ft)	*Top Elev (ft)	Bottom Elev (ft)	WSEL (ft)
10	112.00	105.00	0.510	0.505	5326.00	5320.00	5324.87

* Pond includes 1 ft of freeboard

Per Volcano Heights Drainage Compilation Report, sub-basins east of Unser Blvd and north of Paseo Del Norte Blvd that naturally drain south shall drain into the existing 72" storm sewer in Paseo Del Norte Blvd. Runoff from Basin 302 will be collected in two pillbox manholes and inlets located at the intersection of Paseo Del Norte Blvd and Calle Nortena. Collected flows will drain into a proposed 48" storm pipe in Paseo Del Norte Blvd which will ultimately drain into the existing 72" pipe located on the north side of Paseo Del Norte Blvd. Runoff from basin east of Calle Nortena in Unit 27 will travel in Valiente Road and sheet flow out from the east edge of SAD 228 boundary. See Plate 5 in Appendix D for reference.

2.7.2 Unit 18, 19 and 22

The site is platted for residential tracts varying from 1/3 to 1/2 acres. See Plates 2 and 3 for Proposed Basin and Sub-Basin Boundary Plan, AHYMO calculations in Appendix A and Tables 5 and 6 for basin data. 6 ponds are proposed for the area. See Plate 3 Sub-Basin Boundary Plan for pond location and Figures 2-7 at the end of this section for grading plan of each pond. Refer to Plates 6-8 for Rough Grading Plan of the area.

Pond 4 is located on the southeast corner of Unser Frontage Road and Sujeto Road. There will be a temporary detention pond on the northeast corner of Unser Blvd and Compass Drive which is being built with the Unser Blvd project. The outlet from this interim pond and Pond 4 will tie to the existing storm drain system in Unser Blvd.

Pond 5 is located on the northeast corner of the intersection of Petirrojo Road and Compass Drive. This pond will be a multi-level pond to accommodate a playground area in the upper level of the pond west of Aguilar Street. Outlet from pond 5 will connect to the Compass Drive storm drain system which ties to the existing 54" storm drain system in Unser Blvd. The storm drain is ultimately connected to the 54" pipe which is to be built with the Boca Negra Detention Facility project. Until the construction of ultimate pipe to discharge flows from the 54" pipe into the Petroglyph National Monument, the 54" pipe will terminate at a grated manhole to allow flows gradually bubble out to reduce erosion.

Pond 6 and 9 are both located south of Compass Court and Vista Del Prado Court respectively. Both ponds will have a pond riser outlet to serve as a water quality structure to block any debris from the pond. See calculations in Appendix C.

Pond 7 is located on the east end of Camino Alto and will have a water quality riser with an 18" RCP outlet pipe which drains into an offsite existing concrete channel. See Appendix B for riser calculations.

Pond 8 is located south of Papagayo Road and will have an outlet pipe which drains into a concrete flume filled with surrounding basalt rocks. There will be holes on the outer edge of the flume to gradually release flows into the escarpment into a riprap blanketed area. See flume detail on Figure 6, Pond 8 grading plan. Table 8 summarizes all pond data.

Pond	Q _{in} (cfs)	Q _{out} (cfs)	V ₁₀₀₋₂₄ Prv'd (ac-ft)	V ₁₀₀₋₂₄ Req'd (ac-ft)	*Top Elev (ft)	Bottom Elev (ft)	WSEL (ft)
4	32.02	8.60	0.837	0.748	5332.00	5326.50	5329.70
5	187.50	36.97	7.652	6.814	5322.00	5316.00	5320.58
6	114.40	41.00	2.099	2.098	5314.00	5308.00	5313.00
7	28.70	9.01	0.460	0.433	5300.00	5293.00	5298.79
8	116.10	28.28	2.559	2.398	5315.00	5308.00	5313.71
9	13.00	6.63	0.251	0.197	5320.0	5316.3	5318.96

* All City maintained ponds include 1 ft of freeboard

Runoff generated from basins east of Uracca Street and south of Kimmick Street naturally drain north into Kimmick Street. Since the existing storm drain system in Kimmick Street was not designed for these added flows, La Cuentista Subdivision hydrological model was revised to accommodate this runoff. La Cuentista Subdivision Pond 4 has the capacity to detain these flows with one foot of freeboard. La Cuentista Pond 4 is located north of Kimmick Drive on the northeast corner of project site. See revised La Cuentista AHYMO calculations in Appendix A and Table 9 for pond data.

Pond	Q _{in} (cfs)	Q _{out} (cfs)	V ₁₀₀₋₂₄ Prv'd (ac-ft)	V ₁₀₀₋₂₄ Req'd (ac-ft)	Top Elev (ft)	Bottom Elev (ft)	WSEL (ft)
Original	280.00	86.60	9.03	4.249	5306.00	5298.00	5302.38
Revised	347.00	91.40	9.03	5.703	5306.00	5298.00	5303.58

2.7.3 Unit 14 and 25

The existing drainage pattern is maintained in the proposed condition. The site is modeled for multi-use tracts. Per Volcano Heights Drainage Compilation Report, a 66" storm drain pipe in Universe Blvd / Scenic Road will convey accumulated runoff into the proposed Boca Negra Detention Facility located in the southwest corner of Rainbow Blvd and Scenic Road intersection. Sub-basins north of Scenic Road will be collected in inlets which will connect to the 66" storm pipe draining into the Dam. Any bypass flow will sheet flow in Scenic Road and drain into the Dam. The Rainbow Blvd basin north of Scenic intersection will be collected in inlets which discharge into the Boca Negra Arroyo located west of Rainbow Blvd. Runoff from the sub-basin south of Scenic Road is collected before the intersection of Rainbow and Unser Blvds and discharged into the detention pond located in the northeast corner of the intersection. Any

bypass flow will be collected in the existing curb inlets located in the southwest corner of the intersection of Rainbow and Unser Blvds. See Plate 2 for Proposed Basin Boundary Plan, AHYMO calculations in Appendix A and Table 5 for basin data.

SECTION 3 – HYDRAULIC ANALYSIS

3.1 System Description

The layout of the storm drain systems can be found on Plates 3 and 4 in Appendix D. There are a total of 7 storm drain pipe systems that include connecting inlets, manholes, and pipes.

Reinforced concrete pipe will be used for all onsite storm drain. Due to the existing rock layers, depth of the storm drain pipes were kept as shallow as possible.

3.2 Methodology

Hydraulic calculations have been performed to obtain the following capacities: street, inlet and pipe. FlowMaster by Bentley was used to calculate street capacities. Pipe capacity calculations and hydraulic modeling were performed using: FlowMaster software by Bentley and Hydraflow Storm Sewers 2005 software by Intelisolve. Inlet capacities were found using Albuquerque's DPM nomographs in chapter 22. See Appendix B and C for calculations.

3.3 Street Flow and Inlet Capacities Analysis

Street flow and inlet capacities were performed using Flow Master Software by Bentley for 50' wide right-of-way (30' flow line to flow line) typical section for local streets. The maximum at grade water surface elevation was restricted to the specific energy grade line elevation of 10". The capacities were measured at critical points. Calculations for inlets (listed in order of each storm system, upstream to downstream) and street capacities (alphabetically in order of street names) at specific points were performed which can be found in Appendix C. Table 10 summarizes maximum street capacity for various slopes.

Table 10: Street Flow Capacities	
Slope (%)	Discharge (cfs)
0.50	52
1.00	49
2.00	40
3.00	34
4.00	30
5.00	26
6.00	22
7.00	19
8.00	17

3.3.1 Unit 26 and 27

The existing paving in south half of Paseo Del Norte will be widened to accommodate increasing traffic volume. Generated runoff from south side of Paseo del Norte Blvd sheet flow and will be

collected in curb inlets on the southeast corner of Calle Nortena and Paseo Del Norte Blvd. The inlets tie into a pillbox manhole on the southwest corner of the intersection. Runoff from Basin east of Calle Nortena in Unit 27 will sheet flow to the east edge of SAD 228 boundary in Valiente Road. Placement of riprap blanket at this location will disperse and reduce velocity of the runoff to protect the area from erosion. See calculations in Appendix C and Plate 5 for reference.

3.3.2 Unit 18, 19 and 22

In addition to storm sewer systems, concrete swales, rundowns and special valley gutters are used to convey runoff. See Plate 4 for storm sewer system layout and Appendix C for calculations.

3.3.3 Unit 14 and 25

Runoff generated in Universe / Scenic will be collected in storm inlets that tie into the 66" underground storm sewer that will discharge into the proposed Boca Negra Detention Facility. Runoff generated in Rainbow Blvd is divided into 2 portions. North portion will drain into the Boca Negra Arroyo via curb inlets while the south portion will drain into a pond near the intersection with Unser Blvd. Any bypassed flow will be collected in existing curb inlets in Unser Blvd. See Plate 5 for storm sewer system layout.

3.4 Storm Drain Analysis

Storm drain system layouts can be found on Plates 3 and 4 in Appendix D. Analysis for storm drain systems were modeled using Hydra Flow Storm Sewers 2005 by Intelisolve. Analyses may be found in Appendix B.

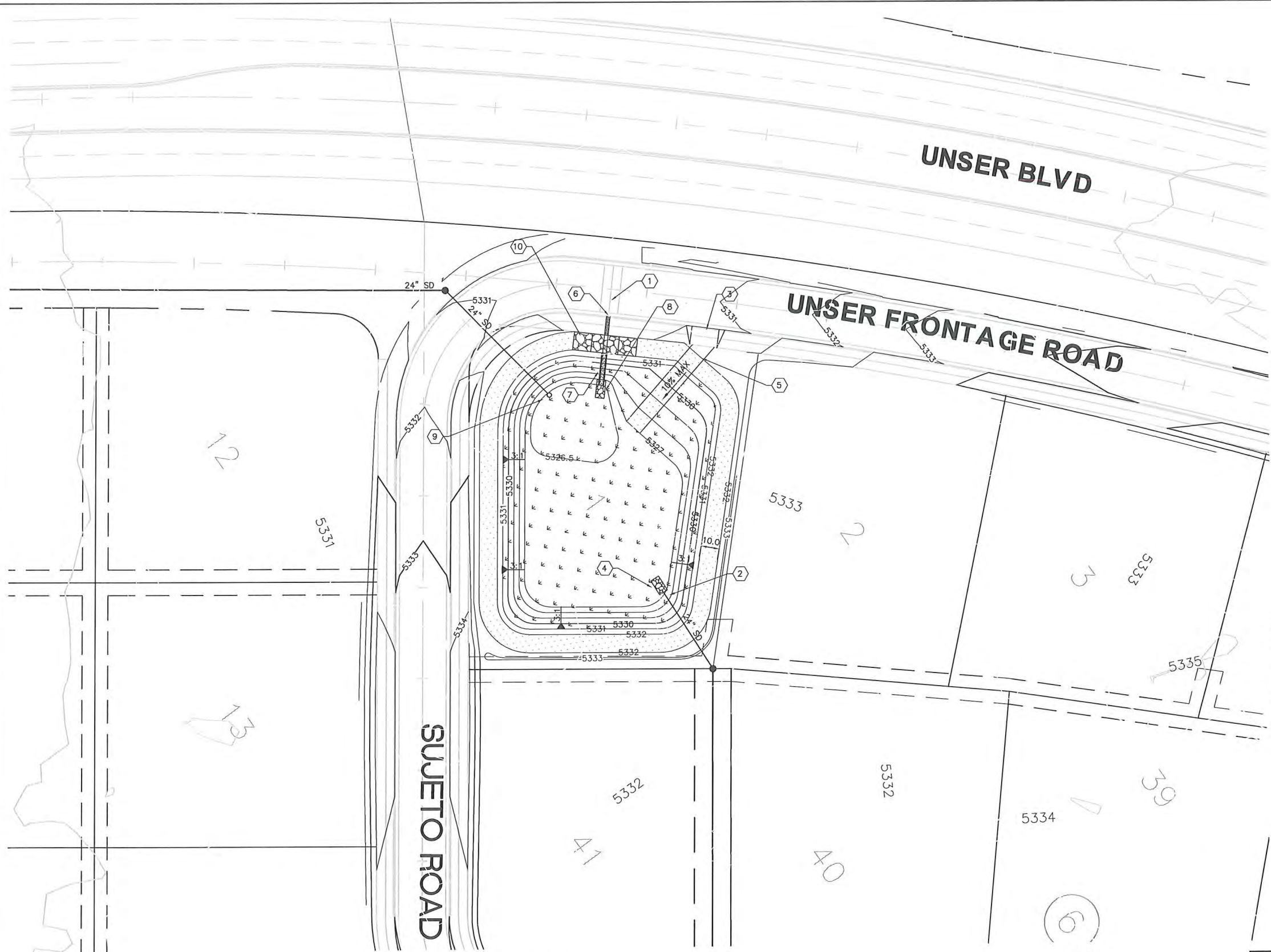
3.5 Detention Basin Analysis

Ponds were analyzed by using AHYMO_97 computer modeling. AHYMO calculates the volume needed to detain the runoff by using the rating curve input in the Route Reservoir Command. Culvert Master was used to determine the amount of discharge at different pond elevations. All ponds were designed with a minimum of one foot of freeboard.

SECTION 4 - CONCLUSION AND RECOMMENDATIONS

With the improvements of SAD 228, runoff generated will be collected and conveyed into detention ponds and allowable discharges are released into the area. Ponds are designed with a minimum of 10' wide maintenance access and maximum side slopes of 3:1.

The accumulated runoff is released in a controlled manner to reduce erosion and to ensure the discharge from the site match the existing conditions as much as possible. It is recommended that all storm structures and pond outfalls go through regular maintenance to ensure they function properly per the original design.

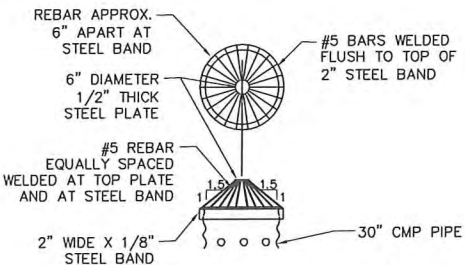


GENERAL SHEET NOTES

- 1. NO ROCK EXCAVATION ALLOWED PER V.C.S.P.

SHEET KEYNOTES

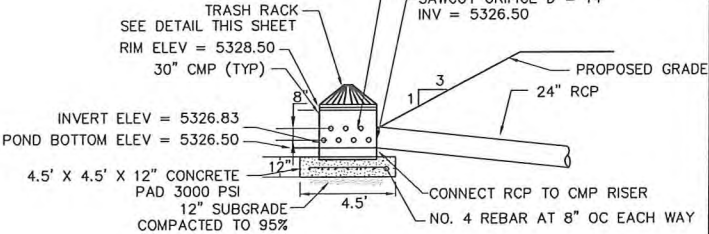
- 1. STA 15+30.3, INSTALL 10' WIDE SPECIAL CONCRETE VALLEY GUTTER PER COA STD DWG 2422.
- 2. INSTALL 50 LF 24" PIPE @ 0.94%, INV = 5327.00, 1-24" POND INLET STRUCTURE.
- 3. STA 15+84, 15' RT INSTALL 15' WIDE DRIVEPAD PER COA STD DWG 2425
- 4. INSTALL 5'W X 9'L X 18" D, 050=9" RIPRAP BLANKET WITH MIRAFI 140N FILTER FABRIC OR APPROVED EQUAL.
- 5. INSTALL 10' WIDE GRAVEL MAINTENANCE ACCESS. 6" AGGREGATE BASE COURSE, 95% MIN COMPACTION, S_w=10%.
- 6. STA 15+30.3, 15' RT, INSTALL 1-24" WIDE DOUBLE SIDEWALK CULVERT PER COA STD DWG 2236. FL = 5330.01
- 7. INSTALL 18 LF 2' WIDE, 6" DEEP CONCRETE RUNDOWN, S_w=3:1.
- 8. INSTALL 5'W X 10'L X 18" D TYPE 'L' RIPRAP BLANKET WITH MIRAFI 140N FILTER FABRIC OR APPROVED EQUAL.
- 9. INSTALL 30" RISER, 2 ROWS OF 8-4" DIA HOLES, W/14" ORIFICE PLATE. SEE DETAIL THIS SHEET.
- 10. INSTALL 10'W X 15'L EMERGENCY SPILLWAY. SEE DETAIL THIS SHEET.
- 11. INSTALL NATIVE SEED AND MULCH OVER 1' TOP SOIL, PI>10.



NOTE: ALL EXPOSED METAL SHALL BE "HOT DIP" GALVANIZED

TRASH RACK DETAIL

NTS
TWO ROWS OF 8-4" DIA HOLES EVENLY SPACED AROUND THE CIRCUMFERENCE OF 30" CMP (TYP), STAGGER HOLES BETWEEN ROWS
SAWCUT ORIFICE D = 14" INV = 5326.50



CMP RISER DETAIL

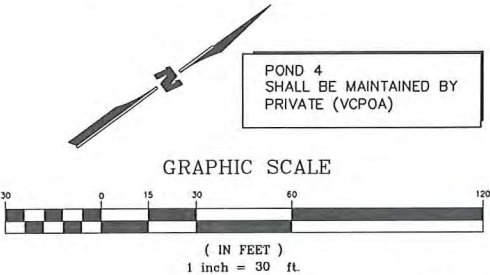
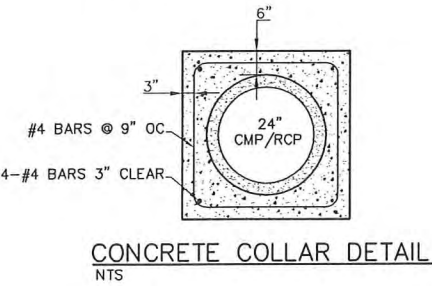
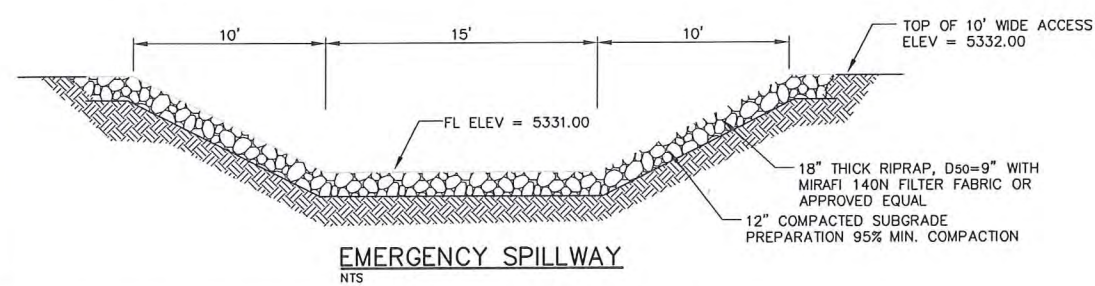
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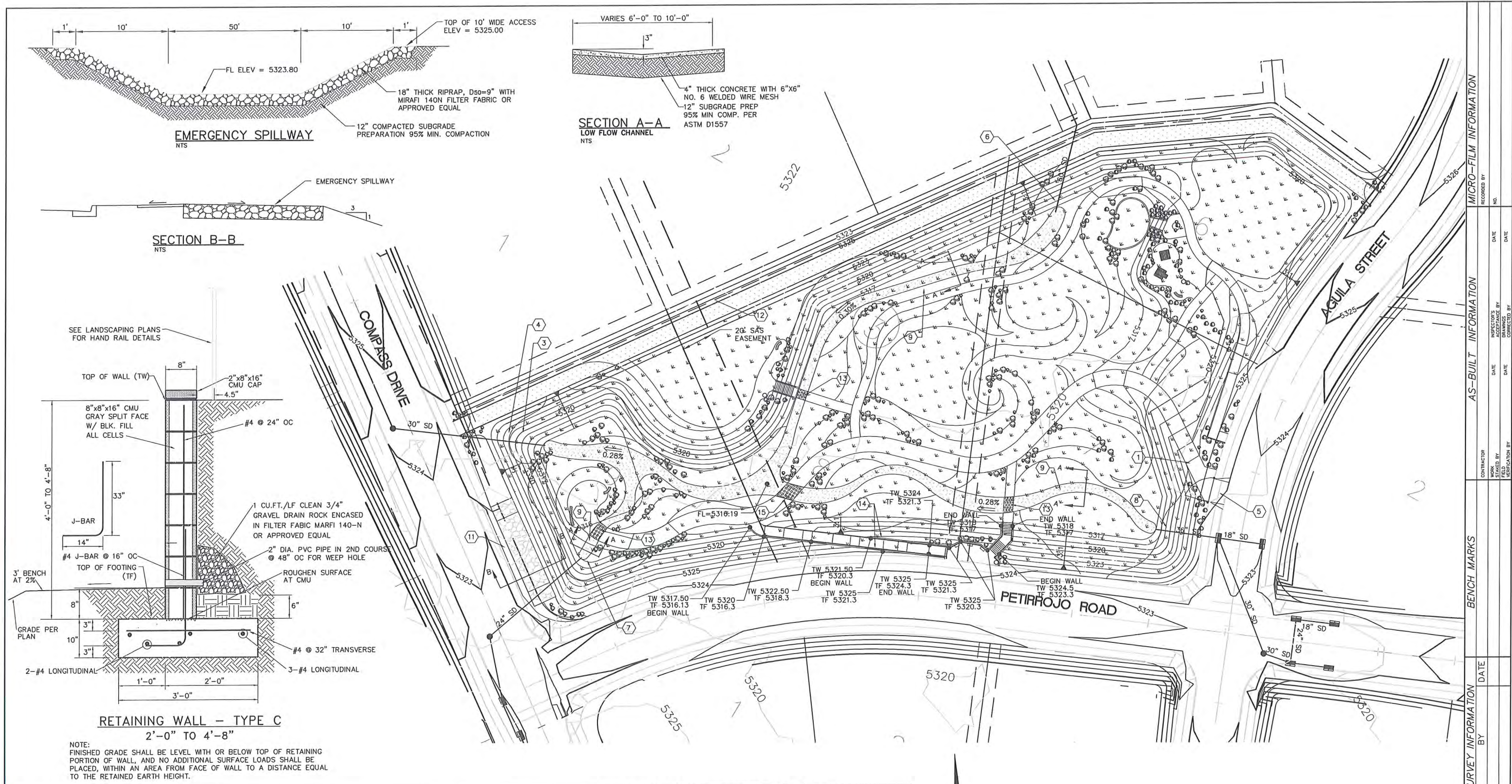
CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT
ENGINEERING DIVISION

SPECIAL ASSESSMENT DISTRICT 228-VOL. 1
POND 4 GRADING PLAN

Design Review Committee	City Engineer Approval	Mo./Day/Yr.	Mo./Day/Yr.
City Project No.	Zone Map No.	FIGURE 2	
693391	D-10, D-11		



WCEA # 0840010400
DECEMBER 2011

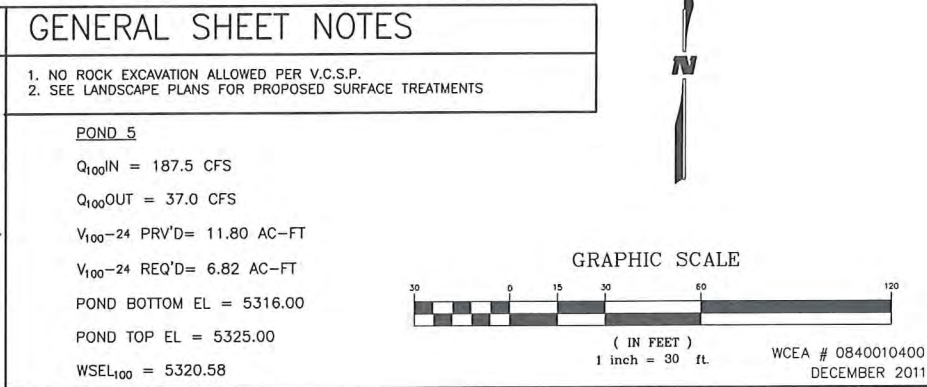


- ### KEYNOTES

 - INSTALL 10' WIDE GRAVEL MAINTENANCE ACCESS, $S_{max}=10\%$, 6" AGGREGATE BASE COURSE, 95% MIN COMPACTION. SEE SHEET 124 FOR DETAIL.
 - NOT USED.
 - FLATTEN CHANNEL BOTTOM FROM 3" TO 0".
 - INSTALL 30" POND OUTLET STRUCTURE, INV = 5315.75.
 - STA 19+17, 15' RT, INSTALL 15' WIDE DRIVEPAD PER COA STD DWG 2425.
 - INSTALL 48 LF 60" SD PIPE @ 0.35%, INV = 5317.24, 1- 60" POND INLET STRUCTURE. SEE SHEET 124 FOR DETAIL.
 - INSTALL 81.5 LF 24" PIPE @ 0.12%, INV = 5316.20, 1-24" POND INLET STRUCTURE.
 - INSTALL 34 LF 36" PIPE @ 0.50%, INV = 5317.00, 1-36" INLET STRUCTURE. SEE SHEET 124 FOR DETAIL.
 - INSTALL LOW FLOW CHANNEL. SEE DETAIL THIS SHEET.
 - NOT USED.
 - INSTALL 10'W X 50'L EMERGENCY SPILLWAY. SEE DETAIL THIS SHEET.
 - INSTALL 10' WIDE MAINTENANCE ACCESS. SEE SHEET 124 FOR DETAIL.
 - INSTALL 3-24" SIDEWALK CULVERT PER COA STD DWG 2236. SKEW ANGLE = 0' AND 13'
 - INSTALL RETAINING WALL PER DETAIL THIS SHEET.
 - INSTALL 5-24" SIDEWALK CULVERT PER COA STD DWG 2236. SKEW ANGLE = 26'
- ### GENERAL SHEET NOTES

 - NO ROCK EXCAVATION ALLOWED PER V.C.S.P.
 - SEE LANDSCAPE PLANS FOR PROPOSED SURFACE TREATMENTS

POND 5
 $Q_{100IN} = 187.5$ CFS
 $Q_{100OUT} = 37.0$ CFS
 $V_{100-24} PRVD = 11.80$ AC-FT
 $V_{100-24} REQ'D = 6.82$ AC-FT
POND BOTTOM EL = 5316.00
POND TOP EL = 5325.00
 $WSEL_{100} = 5320.58$



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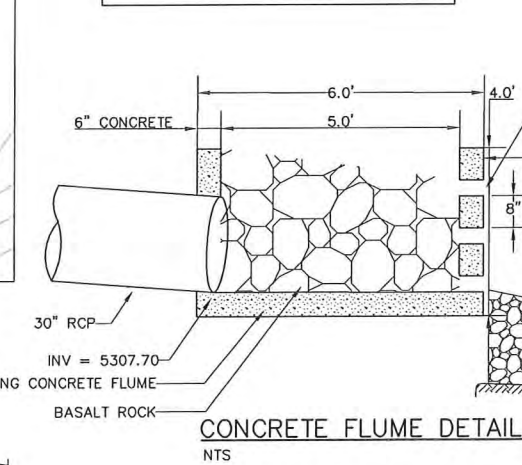
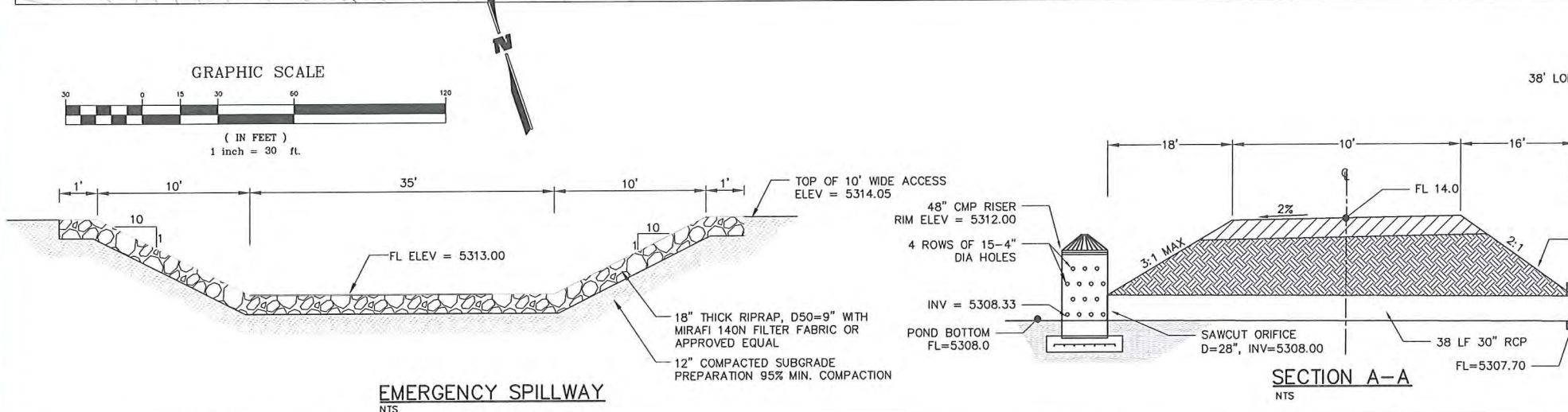
CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT
ENGINEERING DIVISION

SPECIAL ASSESSMENT DISTRICT 228-VOL. 1
POND 5 GRADING & DRAINAGE PLAN

Design Review Committee	City Engineer Approval
City Project No. 693391	Zone Map No. D-10, D-11

FIGURE 3

Last Design Update	Mo./Day/Yr.	Mo./Day/Yr.



GENERAL SHEET NOTES

1. NO ROCK EXCAVATION ALLOWED PER V.C.S.P.
2. APPROXIMATE 500 CY OF COMPACTED SOIL TO BE PLACED ON EACH FILL LOT.

MICRO-FILM INFORMATION

AS-BUILT INFORMATION

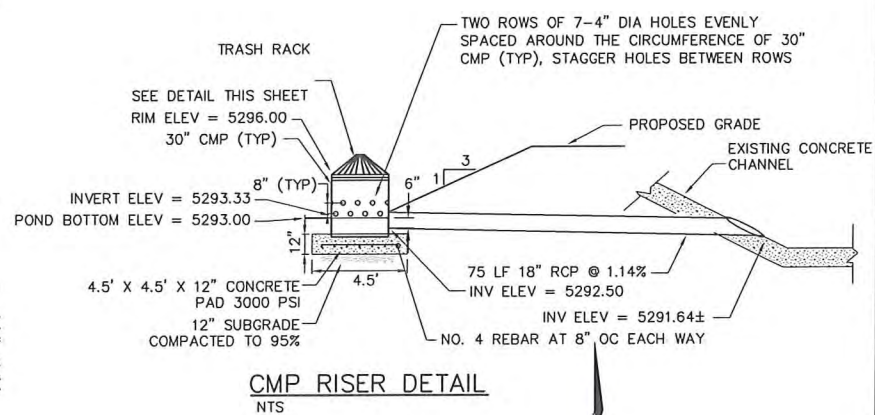
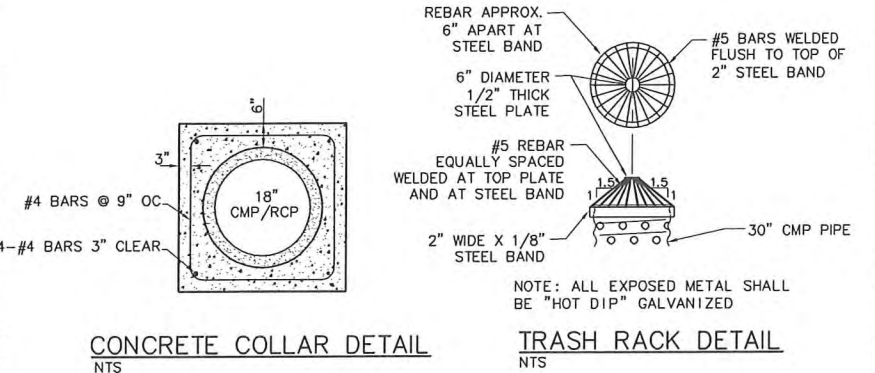
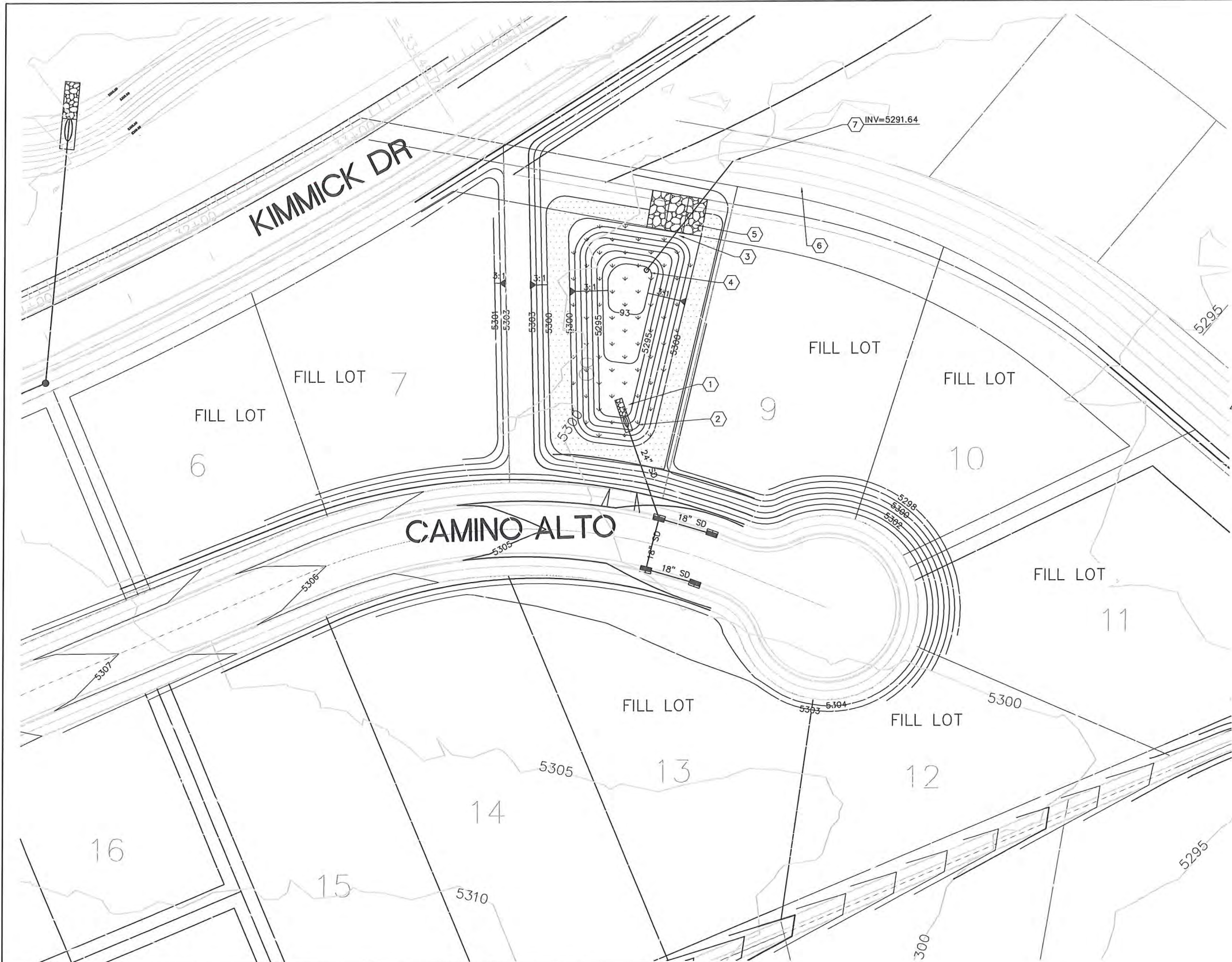
BENCH MARKS

SURVEY INFORMATION

DESIGN REVIEW COMMITTEE

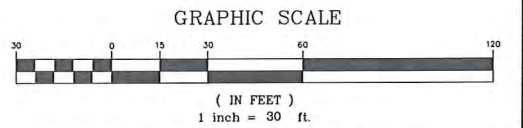
CITY ENGINEER APPROVAL

FIGURE 5



POND 7

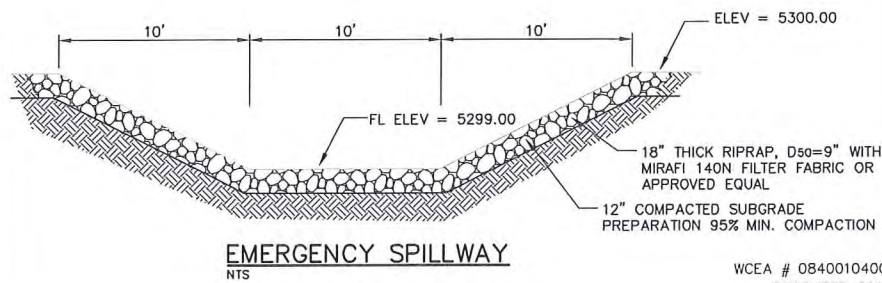
Q₁₀₀IN = 28.7 CFS
Q₁₀₀OUT = 9.01 CFS
V₁₀₀-24 PRV'D = 0.460 AC-FT
V₁₀₀-24 REQ'D = 0.433 AC-FT
POND BOTTOM EL = 5293.00
POND TOP EL = 5300.00
WSEL = 5298.79



SHEET KEYNOTES

1. INSTALL 61 LF 24" @ 2.38%, INV = 5295.00, 24" POND INLET STRUCTURE.
2. INSTALL 4'W X 10'L X 18"D, D50=6" RIPRAP BLANKET W/MIRAFI 140N FILTER FABRIC OR APPROVED EQUAL.
3. INSTALL 75 LF 18" RCP, S=1.14%. CORE DRILL INTO EXISTING CONCRETE CHANNEL TO ALLOW 18" RCP DRAIN INTO CHANNEL.
4. INSTALL 30" RISER, 2 ROWS OF 7-4" DIA STAGGERED HOLES. SEE RISER DETAIL THIS SHEET.
5. INSTALL 10'L X 10'W EMERGENCY SPILLWAY, SEE DETAIL THIS SHEET.
6. EXISTING CONCRETE CHANNEL

POND 7 SHALL BE MAINTAINED BY PRIVATE (VCPWA)



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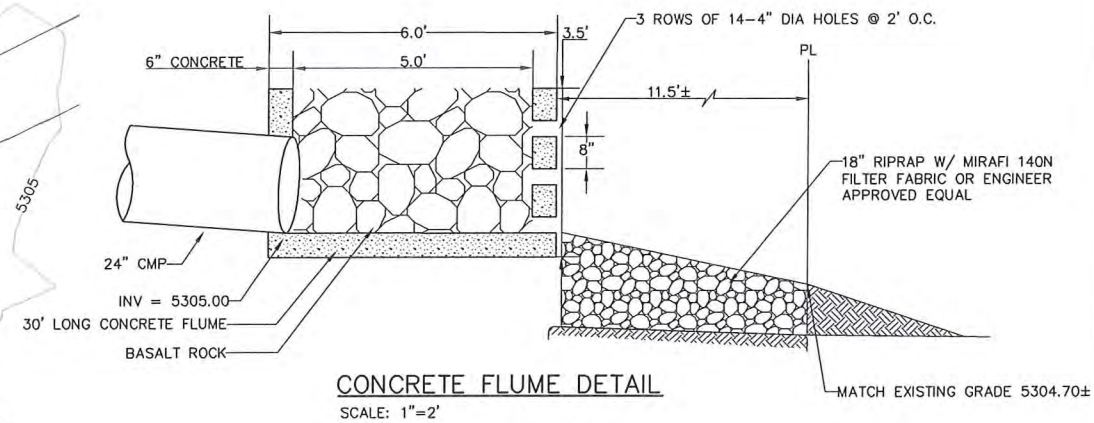
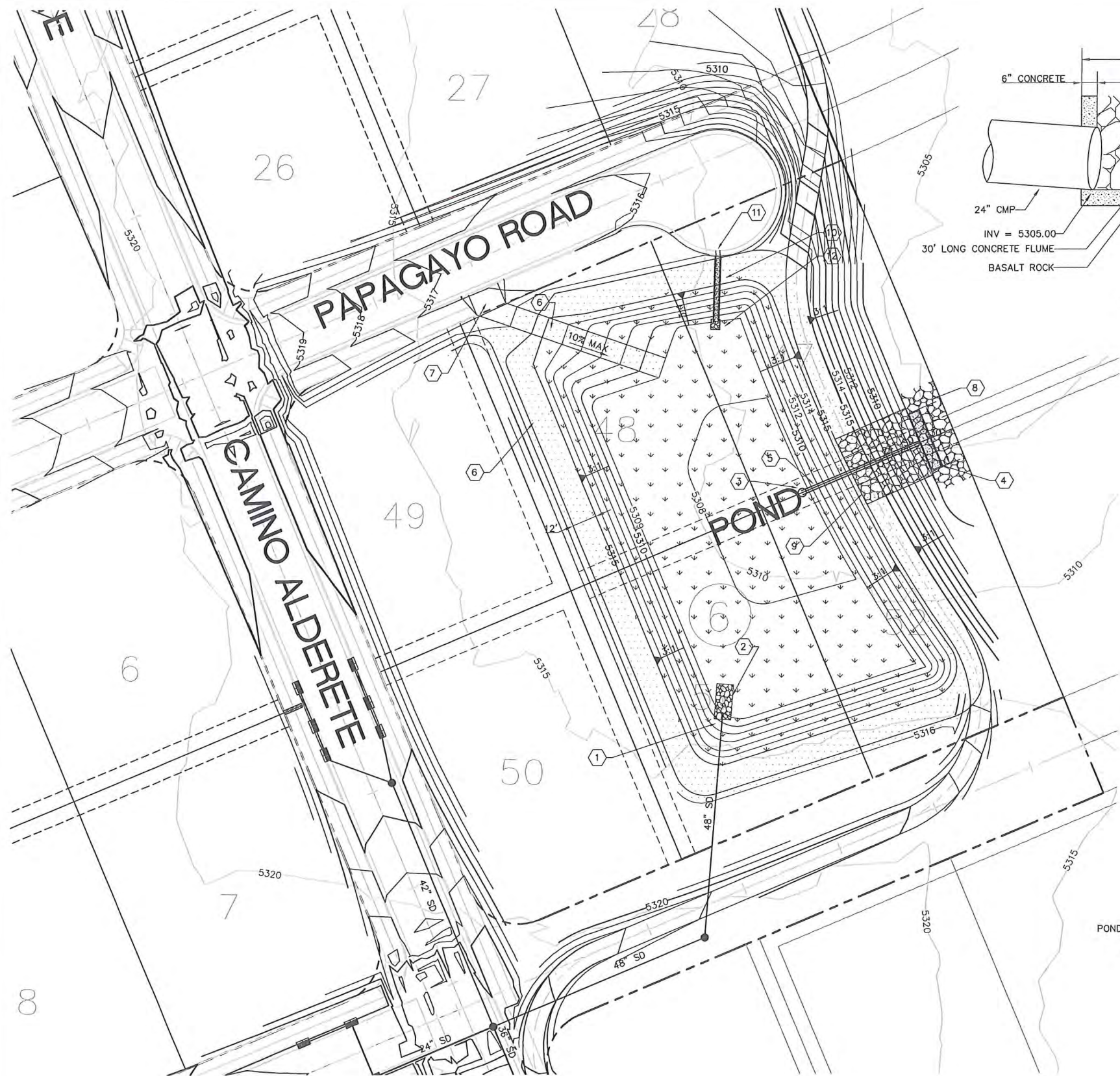
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ENGINEERING DIVISION
SPECIAL ASSESSMENT DISTRICT 228-VOL. 1
POND 7 GRADING PLAN

Design Review Committee	City Engineer Approval	Mo./Day/Yr.	Mo./Day/Yr.

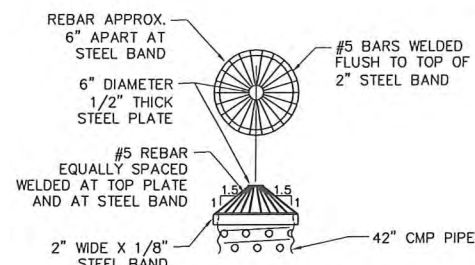
City Project No. 693391

Zone Map No. D-10, D-11

FIGURE 5

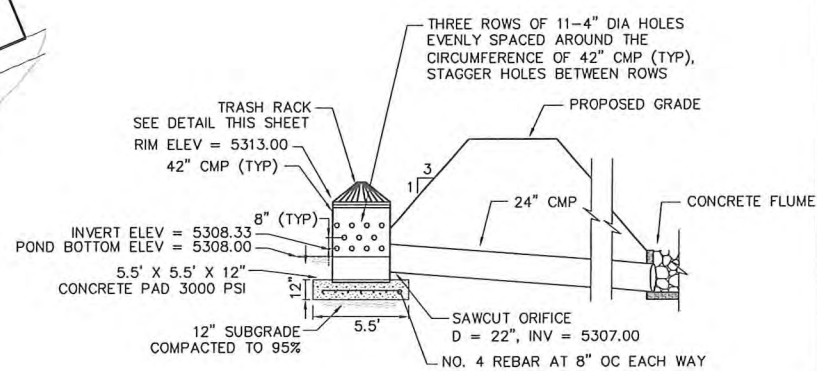


CONCRETE FLUME DETAIL
SCALE: 1"=2'

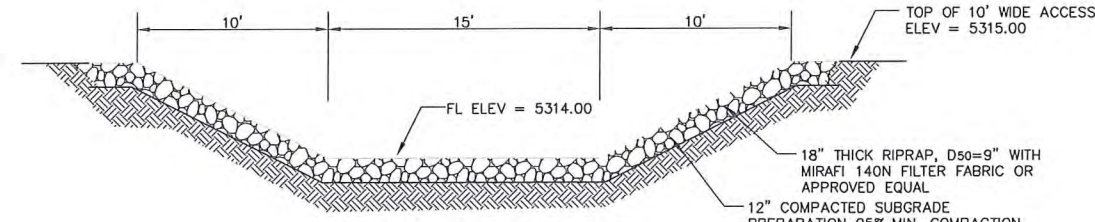


NOTE: ALL EXPOSED METAL SHALL BE "HOT DIP" GALVANIZED

TRASH RACK DETAIL
NTS



CMP RISER DETAIL
NTS



EMERGENCY SPILLWAY
NTS

POND 8 SHALL BE MAINTAINED BY COA OPEN SPACE EXCEPT FOR INLET/OUTLET STRUCTURES (ITEMS 1, 2, 3, 4, 5, 8, 9, 10, 12,) WHICH WILL BE MAINTAINED BY COA STORM DRAIN MAINTENANCE.

GENERAL SHEET NOTES

1. NO ROCK EXCAVATION ALLOWED PER V.C.S.P.

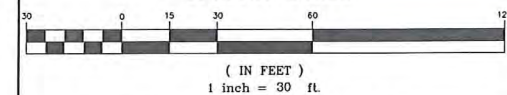
SHEET KEYNOTES

1. INSTALL 108 LF 48" PIPE @ 0.46%, INV = 5308.50, 1-48" SD POND INLET STRUCTURE.
2. INSTALL 8'W X 17'L X 18"D, D₅₀=9" RIPRAP BLANKET WITH MIRAFI 140N FILTER FABRIC OR APPROVED EQUAL.
3. INSTALL 42" RISER, 3 ROW OF 11-4" DIA STAGGERED HOLES. SEE DETAIL THIS SHEET.
4. INSTALL 30' LONG, 5' WIDE CONCRETE FLUME. SEE DETAIL THIS SHEET.
5. INSTALL 62 LF 24" CMP, S = 3.23%, INV DOWN = 5305.00
6. INSTALL 12' WIDE GRAVEL MAINTENANCE ACCESS. 6" AGGREGATE BASE COURSE, 95% MIN COMPACTION PER ASTM D 1557.
7. INSTALL 15' WIDE DRIVEPAD PER COA STD DWG 2425.
8. INSTALL 11.5'W X 50'L X 18"D, D₅₀=6" RIPRAP BLANKET WITH MIRAFI 140N FILTER FABRIC OR APPROVED EQUAL.
9. INSTALL 15'L X 10'W EMERGENCY SPILLWAY, SEE DETAIL THIS SHEET.
10. INSTALL 2' WIDE, 31' LONG CONCRETE RUNDOWN, S_Wx = 3:1.
11. STA 51+61.50, 43.7' RT, INSTALL 2' WIDE CURB CUT.
12. INSTALL 5'W X 5'L X 18"D, D₅₀=6" RIPRAP BLANKET WITH MIRAFI 140N FILTER FABRIC OR APPROVED EQUAL.

POND 8

Q₁₀₀IN = 116.1.0 CFS
Q₁₀₀OUT = 28.7 CFS
V₁₀₀ (PRV'D) = 2.548 AC-FT
V₁₀₀ (REQ'D) = 2.392 AC-FT
POND BOTTOM EL = 5308.00
POND TOP EL = 5315.00
WSEL = 5313.72

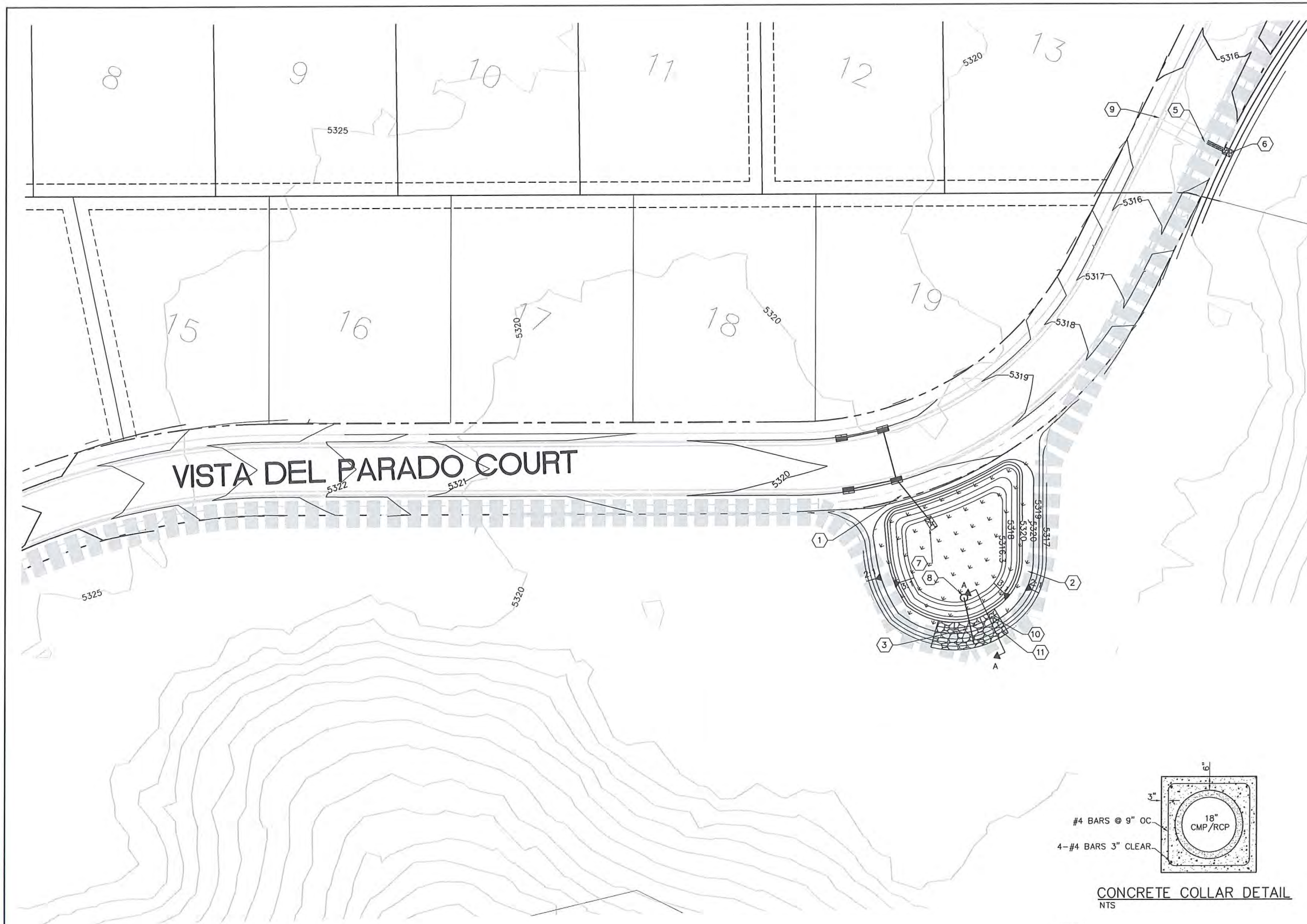
GRAPHIC SCALE



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CITY OF ALBUQUERQUE DEPARTMENT OF MUNICIPAL DEVELOPMENT ENGINEERING DIVISION			
SPECIAL ASSESSMENT DISTRICT 228-VOL. 1 POND 8 GRADING PLAN			
Design Review Committee	City Engineer Approval	Last Design Update	
		Mo./Day/Yr.	
		Mo./Day/Yr.	
		Mo./Day/Yr.	
		Mo./Day/Yr.	
		Mo./Day/Yr.	
		Mo./Day/Yr.	
City Project No.	Zone Map No.	FIGURE 6	
693391	D-10, D-11		

WCEA # 0840010400
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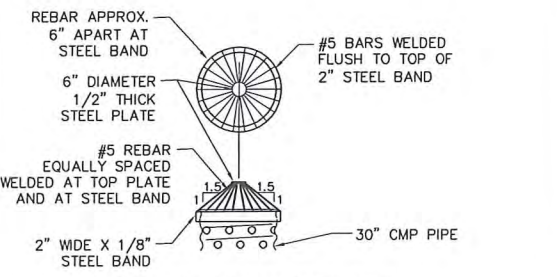


GENERAL SHEET NOTES

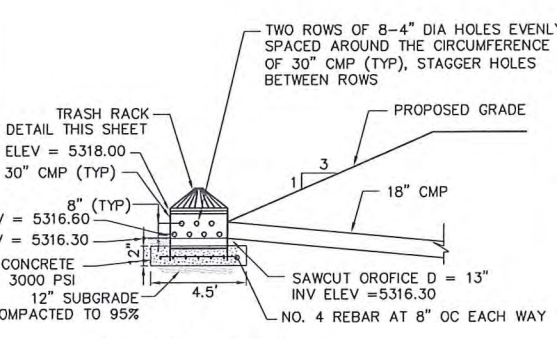
1. NO ROCK EXCAVATION ALLOWED PER V.C.S.P.

SHEET KEYNOTES

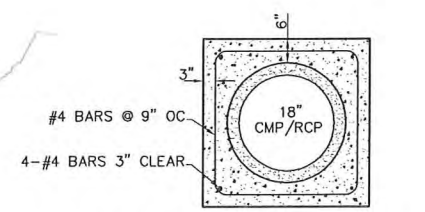
1. INSTALL 29 LF 24" RCP PIPE, S = 1.0%, INV @ =POND 5316.45
2. INSTALL 6' WIDE BERM, ELEV = 5320.00.
3. INSTALL 28 LF 18" RCP PIPE WITH 18" RCP END SECTION, S = 1.07%. INV @ POND = 5316.30
4. NOT USED.
5. STA 17+84, 15' RT INSTALL 1-DOUBLE (24" WIDE) SIDEWALK CULVERT PER COA STD DWG 2236. INV UP = 5315.39, INV DOWN = 5314.17
6. INSTALL 4'W X 5'L X 18"D, D50=6" RIPRAP BLANKET WITH MIRAFI 140N FILTER FABRIC OR APPROVED EQUAL.
7. INSTALL 4.5'W X 7'L X 12", D50=6" RIPRAP BLANKET WITH MIRAFI 140N FILTER FABRIC OR APPROVED EQUAL.
8. INSTALL 30" RISER, 2 ROW OF 8-4" DIA STAGGERED HOLES. SEE DETAIL THIS SHEET.
9. STA 17+84, INSTALL 10' WIDE SPECIAL VALLEY GUTTER PER COA STD DWG 2422. FL ELEV = 5315.54 LT, FL ELEV = 5315.39 RT
10. INSTALL 15'L X 6'W EMERGENCY SPILLWAY, SEE DETAIL THIS SHEET.
11. INSTALL 12" THICK BASALT RIPRAP, D50=6", W/ MIRAFI 140N FILTER FABRIC OR APPROVED EQUAL.



TRASH RACK DETAIL NTS

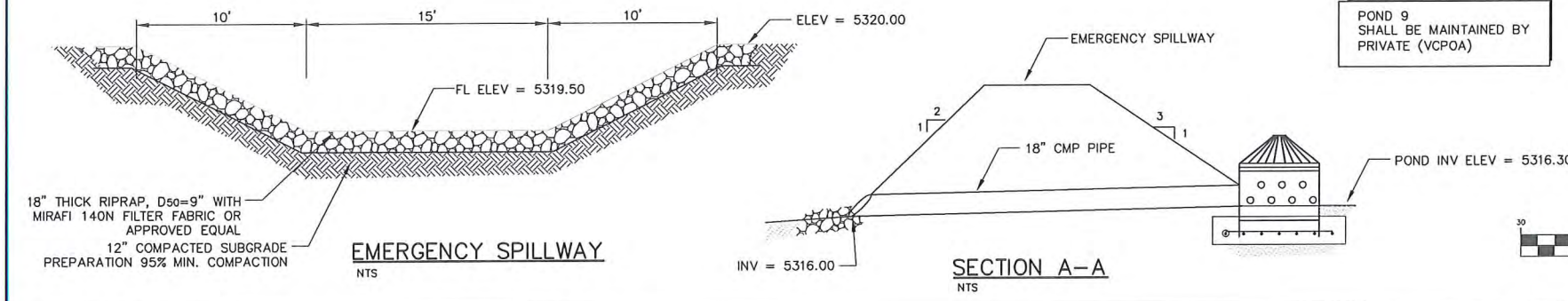
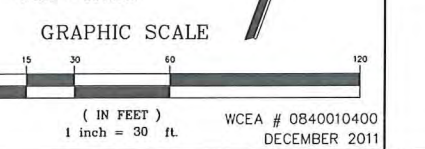


CMP RISER DETAIL NTS



CONCRETE COLLAR DETAIL NTS

POND 9
Q₁₀₀IN = 13.0 CFS
Q₁₀₀OUT = 6.6 CFS
V₁₀₀-24 PRV'D = 0.251 AC-FT
V₁₀₀-24 REQ'D = 0.197 AC-FT
POND BOTTOM EL = 5316.30
POND TOP EL = 5320.00
WSEL = 5319.00



SECTION A-A NTS

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POND 9 GRADING PLAN

Design Review Committee	City Engineer Approval	Mo./Day/Yr.	Mo./Day/Yr.
City Project No.	Zone Map No.	FIGURE 7	
693391	D-10, D-11		

APPENDIX A

NOAA Atlas 14 Precipitation Frequency Data

Hydrology

Existing Model AHYMO Analysis

Proposed Model AHYMO Analysis

La Cuentista Subdivision Unit II Revised AHYMO Analysis



NOAA Atlas 14, Volume 1, Version 5
Location name: Albuquerque, New Mexico,
US*

Coordinates: 35.1700, -106.7100

Elevation: 5318ft*

* source: Google Maps



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Paylovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchocan

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval(years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.159 (0.136-0.186)	0.206 (0.175-0.241)	0.277 (0.235-0.325)	0.335 (0.284-0.390)	0.411 (0.347-0.480)	0.472 (0.397-0.549)	0.536 (0.448-0.624)	0.605 (0.501-0.703)	0.698 (0.572-0.813)	0.773 (0.628-0.899)
10-min	0.242 (0.207-0.283)	0.313 (0.267-0.366)	0.422 (0.358-0.495)	0.509 (0.432-0.594)	0.626 (0.528-0.730)	0.718 (0.604-0.836)	0.817 (0.682-0.949)	0.921 (0.763-1.07)	1.06 (0.871-1.24)	1.18 (0.956-1.37)
15-min	0.299 (0.257-0.350)	0.388 (0.331-0.454)	0.523 (0.443-0.614)	0.631 (0.536-0.736)	0.776 (0.655-0.905)	0.890 (0.749-1.04)	1.01 (0.845-1.18)	1.14 (0.946-1.33)	1.32 (1.08-1.53)	1.46 (1.19-1.70)
30-min	0.403 (0.346-0.472)	0.523 (0.446-0.612)	0.705 (0.597-0.827)	0.850 (0.722-0.991)	1.05 (0.882-1.22)	1.20 (1.01-1.40)	1.36 (1.14-1.58)	1.54 (1.27-1.79)	1.77 (1.46-2.07)	1.96 (1.60-2.28)
60-min	0.499 (0.428-0.584)	0.647 (0.552-0.757)	0.872 (0.739-1.02)	1.05 (0.893-1.23)	1.29 (1.09-1.51)	1.48 (1.25-1.73)	1.69 (1.41-1.96)	1.90 (1.58-2.21)	2.20 (1.80-2.56)	2.43 (1.98-2.83)
2-hr	0.587 (0.505-0.683)	0.750 (0.643-0.875)	0.996 (0.851-1.16)	1.19 (1.02-1.38)	1.47 (1.25-1.69)	1.70 (1.43-1.95)	1.93 (1.61-2.22)	2.18 (1.81-2.51)	2.54 (2.08-2.91)	2.83 (2.29-3.24)
3-hr	0.623 (0.545-0.725)	0.793 (0.692-0.923)	1.04 (0.911-1.21)	1.25 (1.08-1.44)	1.52 (1.31-1.76)	1.75 (1.50-2.01)	1.99 (1.69-2.28)	2.24 (1.90-2.58)	2.60 (2.17-2.99)	2.90 (2.38-3.34)
6-hr	0.720 (0.632-0.827)	0.912 (0.804-1.05)	1.18 (1.04-1.35)	1.39 (1.22-1.60)	1.69 (1.47-1.92)	1.91 (1.66-2.18)	2.16 (1.86-2.46)	2.40 (2.06-2.74)	2.76 (2.33-3.14)	3.05 (2.56-3.48)
12-hr	0.803 (0.709-0.909)	1.02 (0.896-1.15)	1.29 (1.14-1.46)	1.51 (1.33-1.71)	1.81 (1.58-2.03)	2.04 (1.77-2.29)	2.27 (1.97-2.55)	2.52 (2.16-2.83)	2.85 (2.43-3.21)	3.13 (2.64-3.53)
24-hr	0.922 (0.813-1.05)	1.16 (1.02-1.32)	1.45 (1.29-1.65)	1.69 (1.49-1.91)	2.00 (1.76-2.27)	2.25 (1.97-2.54)	2.51 (2.19-2.83)	2.76 (2.40-3.11)	3.11 (2.68-3.50)	3.39 (2.90-3.81)
2-day	0.961 (0.856-1.08)	1.20 (1.08-1.35)	1.51 (1.35-1.69)	1.75 (1.56-1.96)	2.07 (1.84-2.32)	2.32 (2.05-2.59)	2.57 (2.27-2.88)	2.83 (2.49-3.17)	3.18 (2.78-3.57)	3.45 (3.00-3.87)
3-day	1.11 (1.01-1.23)	1.39 (1.26-1.54)	1.72 (1.55-1.90)	1.98 (1.79-2.18)	2.33 (2.10-2.57)	2.59 (2.33-2.86)	2.86 (2.56-3.16)	3.14 (2.80-3.46)	3.50 (3.11-3.87)	3.78 (3.34-4.18)
4-day	1.27 (1.16-1.39)	1.57 (1.44-1.72)	1.93 (1.76-2.11)	2.21 (2.02-2.41)	2.58 (2.35-2.82)	2.87 (2.61-3.13)	3.15 (2.86-3.44)	3.44 (3.11-3.75)	3.82 (3.44-4.16)	4.10 (3.68-4.48)
7-day	1.45 (1.33-1.58)	1.79 (1.64-1.95)	2.18 (2.00-2.37)	2.48 (2.28-2.70)	2.88 (2.64-3.12)	3.17 (2.90-3.44)	3.46 (3.16-3.75)	3.74 (3.41-4.06)	4.10 (3.74-4.46)	4.37 (3.96-4.75)
10-day	1.60 (1.47-1.74)	1.99 (1.82-2.16)	2.43 (2.23-2.63)	2.78 (2.55-3.00)	3.23 (2.97-3.49)	3.57 (3.27-3.86)	3.92 (3.58-4.23)	4.25 (3.88-4.59)	4.69 (4.26-5.07)	5.01 (4.53-5.42)
20-day	2.00 (1.83-2.18)	2.48 (2.28-2.70)	3.01 (2.77-3.27)	3.41 (3.13-3.70)	3.91 (3.59-4.25)	4.28 (3.92-4.64)	4.63 (4.24-5.01)	4.96 (4.53-5.37)	5.37 (4.90-5.82)	5.66 (5.16-6.14)
30-day	2.39 (2.19-2.58)	2.95 (2.71-3.20)	3.55 (3.27-3.84)	3.99 (3.67-4.31)	4.54 (4.17-4.89)	4.93 (4.52-5.30)	5.29 (4.85-5.70)	5.64 (5.16-6.06)	6.04 (5.52-6.50)	6.32 (5.77-6.80)
45-day	2.92 (2.69-3.15)	3.61 (3.33-3.90)	4.29 (3.96-4.63)	4.78 (4.41-5.15)	5.37 (4.96-5.78)	5.77 (5.32-6.21)	6.12 (5.66-6.58)	6.43 (5.95-6.92)	6.78 (6.27-7.28)	6.98 (6.47-7.49)
60-day	3.35 (3.09-3.62)	4.14 (3.82-4.48)	4.93 (4.56-5.32)	5.49 (5.07-5.92)	6.16 (5.70-6.64)	6.62 (6.12-7.13)	7.03 (6.51-7.58)	7.40 (6.85-7.97)	7.80 (7.23-8.41)	8.05 (7.48-8.67)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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Precipitation Frequency Data Server



Large scale terrain



Large scale map



Large scale aerial



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[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[Office of Hydrologic Development](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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EXISTING CONDITIONS

[illegible]

COMPUTE NM HYD	1.80	-	8	.04490	AHYMO.SUM 25.97	1.002	.41828	1.550	.904 PER IMP=	.00

*S BASIN 108 DISCHARGING TO PASEO DEL NORTE, AREA=20.5 AC										
*S COMPUTE BASIN "108"										
COMPUTE NM HYD	1.90	-	9	.03200	16.03	.683	.40007	1.600	.782 PER IMP=	.00

*S BASIN 109 DISCHARGING TO PETROGLYPH MONUMENT, AREA=4.8 AC										
*S COMPUTE BASIN "109"										
COMPUTE NM HYD	10.00	-	10	.00750	5.63	.160	.40007	1.500	1.172 PER IMP=	.00

*S BASIN 110 DISCHARGING TO BOCA NEGRA ARROYO, AREA=12.35 AC										
*S COMPUTE BASIN "110"										
COMPUTE NM HYD	110.00	-	**	.01930	14.33	.412	.40007	1.500	1.160 PER IMP=	.00

*S BASIN 111 DISCHARGING TO BOCA NEGRA ARROYO, AREA=3.41 AC										
*S COMPUTE BASIN "111"										
COMPUTE NM HYD	11.00	-	11	.00530	3.98	.113	.40007	1.500	1.172 PER IMP=	.00

*S BASIN 112 DISCHARGING TO UNSER BLVD, AREA=3.48 AC										
*S COMPUTE BASIN "112"										
COMPUTE NM HYD	12.00	-	12	.00540	4.05	.115	.40007	1.500	1.172 PER IMP=	.00

*S BASIN 113, DISCHARGING TO AP7, AREA=33.25 AC										
*S COMPUTE BASIN "113"										
COMPUTE NM HYD	13.00	-	13	.05200	38.77	1.110	.40007	1.500	1.165 PER IMP=	.00

*S										
*S										
*S										
FINISH										

EXIST SAD 228.WPD

* SAD 228 DRAINAGE ANALYSIS
 * WILSON & COMPANY PROJECT 08-400-104-00
 * EXISTING CONDITIONS MODEL
 * 100 YR 24 HR STORM EVENT
 * DATE: OCTOBER 2011
 * FILE: M:\RR\08-400-104-00\AE_DATA\CALCS\AHYMO\EXIST SAD 228.WPD

*S*****
 *S
 *S 100 YEAR 24 HOUR STORM - EXISTING RUNOFF ANALYSIS
 *S RAINFALL DATA FROM NOAA ATLAS 14
 *S
 *S*****

START 0.0 HOURS
 LOCATION BERNALILLO COUNTY
 RAINFALL TYPE=2 RAIN QUARTER=1.01 IN RAIN ONE=1.70 IN
 RAIN SIX=2.20 IN RAIN DAY=2.51 IN DT=0.05 HR
 *S*****

*S *****
 *S BASIN 100, AREA=173.98 AC,
 *S
 *S COMPUTE BASIN "100"
 *

COMPUTE LT TP LCODE=1 NK=3 ISLOPE=-1
 LENGTH=400 FT SLOPE=0.010 K=0.7
 LENGTH=1600 FT SLOPE=0.0150 K=2.0
 LENGTH=3760 FT SLOPE=0.0176 K=3.0
 KN=0.033 CENTROID RATIO=0.0

COMPUTE NM HYD ID=1 HYD NO=1.1 DA=0.27184 SQ MI
 PER A=94 PER B=0 PER C=0 PER D=6
 TP=0.0 MASS RAIN=-1

PRINT HYD ID=1 CODE=1

*S *****
 *S BASIN 101, AREA=92.69 AC
 *S COMPUTE BASIN "101"
 *

COMPUTE LT TP LCODE=1 NK=3 ISLOPE=-1
 LENGTH=400 FT SLOPE=0.020 K=0.7
 LENGTH=1600 FT SLOPE=0.0094 K=2.0
 LENGTH=790 FT SLOPE=0.0079 K=3.0

COMPUTE NM HYD ID=2 HYD NO=1.2 DA=0.1448 SQ MI
 PER A=99 PER B=0 PER C=0 PER D=1
 TP=0.0 MASS RAIN=-1

PRINT HYD ID=2 CODE=1

*S *****
 *S
 *S ADD SUB-BASINS "100" AND "101" DISCHARGING TO AP1++++++
 *S

ADD HYD ID=11 HYD NO=2.1 ID I=1 ID II=2
 PRINT HYD ID=11 CODE=1
 *S

*S *****
 *S BASIN 102 DISCHARGING TO AP2, AREA=27.00 AC
 *S COMPUTE BASIN "102"
 *

COMPUTE LT TP LCODE=1 NK=2 ISLOPE=-1
 LENGTH=400 FT SLOPE=0.032 K=0.7
 LENGTH=670 FT SLOPE=0.0239 K=2.0

COMPUTE NM HYD ID=3 HYD NO=1.3 DA=0.0422 SQ MI
 PER A=100 PER B=0 PER C=0 PER D=0
 TP=0.0 MASS RAIN=-1

PRINT HYD ID=3 CODE=1

*S *****
 *S BASIN 103 DISCHARGING TO AP3 , AREA=16.42 AC

*S COMPUTE BASIN "103"
 *

COMPUTE LT TP LCODE=1 NK=2 ISLOPE=-1
 LENGTH=400 FT SLOPE=0.022 K=0.7
 LENGTH=830 FT SLOPE=0.032 K=2.0

COMPUTE NM HYD ID=4 HYD NO=1.4 DA=0.02566 SQ MI
 PER A=100 PER B=0 PER C=0 PER D=0
 TP=0.0 MASS RAIN=-1

PRINT HYD ID=4 CODE=1

*S *****

*S BASIN 104 DISCHARGING TO AP4, AREA=10.24 AC

*S COMPUTE BASIN "104"
 *

COMPUTE LT TP LCODE=1 NK=2 ISLOPE=-1
 LENGTH=400 FT SLOPE=0.022 K=0.7
 LENGTH=645 FT SLOPE=0.043 K=2.0

COMPUTE NM HYD ID=5 HYD NO=1.5 DA=0.01600 SQ MI
 PER A=100 PER B=0 PER C=0 PER D=0
 TP=0.0 MASS RAIN=-1

PRINT HYD ID=5 CODE=1

*S *****

*S BASIN 105 DISCHARGING TO AP5, AREA=3.94 AC

*S COMPUTE BASIN "105"
 *

COMPUTE LT TP LCODE=1 NK=2 ISLOPE=-1
 LENGTH=400 FT SLOPE=0.015 K=0.7
 LENGTH=425 FT SLOPE=0.023 K=2.0

COMPUTE NM HYD ID=6 HYD NO=1.6 DA=0.00616 SQ MI
 PER A=100 PER B=0 PER C=0 PER D=0
 TP=0.0 MASS RAIN=-1

PRINT HYD ID=6 CODE=1

*S *****

*S BASIN 106 DISCHARGING TO AP6, AREA=13.8 AC

*S COMPUTE BASIN "106"
 *

COMPUTE LT TP LCODE=1 NK=2 ISLOPE=-1
 LENGTH=400 FT SLOPE=0.022 K=0.7
 LENGTH=1160 FT SLOPE=0.0190 K=2.0

COMPUTE NM HYD ID=7 HYD NO=1.7 DA=0.02156 SQ MI
 PER A=100 PER B=0 PER C=0 PER D=0
 TP=0.0 MASS RAIN=-1

PRINT HYD ID=7 CODE=1

*S *****

*S BASIN 107 DISCHARGING TO ROSA PARKS, AREA=28.73 AC

*S COMPUTE BASIN "107"
 *

COMPUTE LT TP LCODE=1 NK=2 ISLOPE=-1
 LENGTH=400 FT SLOPE=0.01 K=0.7
 LENGTH=1260 FT SLOPE=0.02 K=2.0

COMPUTE NM HYD ID=8 HYD NO=1.8 DA=0.0449 SQ MI
 PER A=95 PER B=0 PER C=5 PER D=0
 TP=0.0 MASS RAIN=-1

EXIST SAD 228.WPD

```

PRINT HYD      ID=8      CODE=1
*S
*S *****
*S BASIN 108 DISCHARGING TO PASEO DEL NORTE, AREA=20.5 AC
*S COMPUTE BASIN "108"
*

COMPUTE LT TP  LCODE=1 NK=2 ISLOPE=-1
                LENGTH=400 FT SLOPE=0.012 K=0.7
                LENGTH=1300 FT SLOPE=0.012 K=2.0

COMPUTE NM HYD ID=9      HYD NO=1.9      DA=0.0320 SQ MI
                PER A=100 PER B=0 PER C=0 PER D=0
                TP=0.0 MASS RAIN=-1

PRINT HYD      ID=9      CODE=1
*S
*S *****
*S BASIN 109 DISCHARGING TO PETROGLYPH MONUMENT, AREA=4.8 AC
*S COMPUTE BASIN "109"
*

COMPUTE LT TP  LCODE=1 NK=2 ISLOPE=-1
                LENGTH=400 FT SLOPE=0.012 K=0.7
                LENGTH=80 FT SLOPE=0.012 K=2.0

COMPUTE NM HYD ID=10     HYD NO=10      DA=0.0075 SQ MI
                PER A=100 PER B=0 PER C=0 PER D=0
                TP=0.0 MASS RAIN=-1

PRINT HYD      ID=10     CODE=1
*S
*S *****
*S BASIN 110 DISCHARGING TO BOCA NEGRA ARROYO, AREA=12.35 AC
*S COMPUTE BASIN "110"
*

COMPUTE LT TP  LCODE=1 NK=2 ISLOPE=-1
                LENGTH=400 FT SLOPE=0.012 K=0.7
                LENGTH=450 FT SLOPE=0.012 K=2.0

COMPUTE NM HYD ID=110    HYD NO=110     DA=0.0193 SQ MI
                PER A=100 PER B=0 PER C=0 PER D=0
                TP=0.0 MASS RAIN=-1

PRINT HYD      ID=110    CODE=1
*S
*S *****
*S BASIN 111 DISCHARGING TO BOCA NEGRA ARROYO, AREA=3.41 AC
*S COMPUTE BASIN "111"
*

COMPUTE LT TP  LCODE=1 NK=2 ISLOPE=-1
                LENGTH=400 FT SLOPE=0.012 K=0.7
                LENGTH=100 FT SLOPE=0.012 K=2.0

COMPUTE NM HYD ID=11     HYD NO=11      DA=0.0053 SQ MI
                PER A=100 PER B=0 PER C=0 PER D=0
                TP=0.0 MASS RAIN=-1

PRINT HYD      ID=11     CODE=1
*S
*S *****
*S BASIN 112 DISCHARGING TO UNSER BLVD, AREA=3.48 AC
*S COMPUTE BASIN "112"
*

COMPUTE LT TP  LCODE=1 NK=2 ISLOPE=-1
                LENGTH=400 FT SLOPE=0.012 K=0.7
                LENGTH=380 FT SLOPE=0.012 K=2.0

COMPUTE NM HYD ID=12     HYD NO=12      DA=0.0054 SQ MI
                PER A=100 PER B=0 PER C=0 PER D=0

```



```

                                EXIST SAD 228.WPD
                                TP=0.0  MASS RAIN=-1
PRINT HYD      ID=12  CODE=1
*S
*S *****
*S BASIN 113, DISCHARGING TO AP7, AREA=33.25 AC
*S COMPUTE BASIN "113"
*S
COMPUTE LT TP  LCODE=1 NK=2 ISLOPE=-1
               LENGTH=400 FT  SLOPE=0.020  K=0.7
               LENGTH=620 FT  SLOPE=0.0094  K=2.0

COMPUTE NM HYD ID=13  HYD NO=13      DA=0.0520 SQ MI
               PER A=100  PER B=0  PER C=0  PER D=0
               TP=0.0  MASS RAIN=-1

PRINT HYD      ID=13  CODE=1
*S
*S *****
*S *****
*S *****
*S
FINISH

```

PROPOSED CONDITIONS

ANYMO.SUM

[illegible]

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[illegible]

PROP SAD 228.WPD
5.638
7.652

BASIN 202, AREA=19.29 AC, DISCHARGE TO KIMMICK DRIVE STORM SYSTEM

PRINT HYD ID=3 CODE=1

PRINT HYD ID=4 CODE=1

ROUTE RESERVOIR	ID=128	HYD=POND8	INFLOW ID=4	CODE=10
	OUTFLOW (CFS)	STORAGE	(AC-FT)	ELEV (FT)
	0		0.0	5308
	3.8		0.229	5309
	13.7		0.602	5310
	19.0		1.020	5311
	23.0		1.483	5312
	26.5		1.992	5313
	29.6		2.548	5314

```

**S *****
**S BASIN 204, AREA=8.98 AC, DISCHARGE TO POND 7
**S

```

PRINT HYD ID=5 CODE=1

ROUTE	RESERVOIR	ID=127	HYD=POND7	INFLOW	ID=5	CODE=10
		OUTFLOW	(CFS)	STORAGE	(AC-FT)	ELEV (FT)
		0			0.0	5293
		2.8			0.022	5294
		4.8			0.066	5295
		6.2			0.130	5296
		7.3			0.212	5297
		8.3			0.313	5298

5299

[illegible]

PROP SAD 228.WPD

5	1	1
10	2	2
20	4	5

PRINT HYD ID=421 CODE=10

*S

*S*****

*S COMPUTE BASIN "7"*****

*S

COMPUTE LT TP LCODE=1 NK=2 ISLOPE=-1
LENGTH=400 FT SLOPE=0.020 K=0.7
LENGTH=1150 FT SLOPE=0.020 K=2.0

COMPUTE NM HYD ID=80 HYD NO=5.7 DA=0.0354 SQ MI
PER A=0 PER B=10 PER C=10 PER D=80
TP=0.0 MASS RAIN=-1

PRINT HYD ID=80 CODE=1

*S

*S ADD SUB-BASINS "POND 10" AND "7"+++++

ADD HYD ID=44 HYD NO=5.2 ID I=421 ID II=80

PRINT HYD

ID=44 CODE=1

*S

*S COMPUTE BASIN "12B"*****

*S

COMPUTE LT TP LCODE=1 NK=2 ISLOPE=-1
LENGTH=400 FT SLOPE=0.020 K=0.7
LENGTH=800 FT SLOPE=0.020 K=2.0

COMPUTE NM HYD ID=90 HYD NO=5.9 DA=0.0144 SQ MI
PER A=0 PER B=10 PER C=10 PER D=80
TP=0.0 MASS RAIN=-1

PRINT HYD ID=90 CODE=1

*S

*S

*S*****

*S

*S*****

*S

*S ADD SUB-BASINS "POND 10", "7" AND "12B"+++++

ADD HYD ID=45 HYD NO=6.0 ID I=90 ID II=44

PRINT HYD

ID=45 CODE=1

*S

*S COMPUTE BASIN "PDN3"*****

*S

COMPUTE LT TP LCODE=1 NK=3 ISLOPE=-1
LENGTH=400 FT SLOPE=0.020 K=0.7
LENGTH=500 FT SLOPE=0.020 K=2.0
LENGTH=2130 FT SLOPE=0.020 K=3.0

COMPUTE NM HYD ID=100 HYD NO=6.1 DA=0.01509 SQ MI
PER A=0 PER B=10 PER C=0 PER D=90
TP=0.0 MASS RAIN=-1

PRINT HYD ID=100 CODE=1

*S

*S*****

*S ADD SUB-BASINS "POND 10", "7", "12B" AND PDN3+++++

ADD HYD ID=48 HYD NO=6.0 ID I=100 ID II=45

PRINT HYD

ID=48 CODE=1

*S

*S*****

*S COMPUTE BASIN "PDN4" (INCLUDES PORTION OF KIMMICK)*****

*S

COMPUTE LT TP LCODE=1 NK=3 ISLOPE=-1
LENGTH=400 FT SLOPE=0.020 K=0.7
LENGTH=500 FT SLOPE=0.020 K=2.0

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```

COMPUTE NM HYD      ID=41  HYD=41.1  DA=0.0140 SQ MI
                     A=0  B=5  C=10  D=85
                     TP=0.0  MASSRAIN=-1

PRINT HYD          ID=41  CODE=5
*S
*S
**S*****
*S COMPUTE SUB-BASIN 402 - INTSN OF RAINBOW & UNIVERSE, AREA=1.65 AC
*S TO UNIVERSE SD SYSTEM
*S
COMPUTE LT TP      LCODE=1  NK=1  ISLOPE=-1
                   LENGTH=270  SLOPE=0.017  K=0.7

COMPUTE NM HYD      ID=42  HYD=42.1  DA=0.0026 SQ MI
                     A=0  B=10  C=0  D=90
                     TP=0.0  MASSRAIN=-1

PRINT HYD          ID=42  CODE=5
*S
*S
**S*****
*S COMPUTE SUB-BASIN 403 - NORTH OF UNIVERSE, AREA=2.49 AC
*S TO UNSER TEMPORARY POND, BYPASS TO UNSER BLVD SD SYSTEM
*S
COMPUTE LT TP      LCODE=1  NK=1  ISLOPE=-1
                   LENGTH=400  SLOPE=0.005  K=0.7

COMPUTE NM HYD      ID=43  HYD=43.1  DA=0.0039 SQ MI
                     A=0  B=5  C=10  D=85
                     TP=0.0  MASSRAIN=-1

PRINT HYD          ID=43  CODE=5
*S
*S
**S*****
*S COMPUTE SUB-BASIN 404 - SOUTH OF RAINBOW BLVD, AREA=5.32 AC
*S TO UNSER TEMPORARY POND, BYPASS TO UNSER BLVD SD SYSTEM
*S
COMPUTE LT TP      LCODE=1  NK=2  ISLOPE=-1
                   LENGTH=400  SLOPE=0.012  K=0.7
                   LENGTH=630  SLOPE=0.012  K=2.0

COMPUTE NM HYD      ID=44  HYD=44.1  DA=0.0083 SQ MI
                     A=0  B=5  C=10  D=85
                     TP=0.0  MASSRAIN=-1

PRINT HYD          ID=44  CODE=5
*S
*S
**S*****
*S ADD SUB-BASINS 403 AND 404

ADD HYD            ID=45  HYD NO=45.1  ID I=44 ID II=43
PRINT HYD          ID=45  CODE=1
**S**S
*S
**S*****
**S*****
**S*****
FINISH

```

REVISED LA CUENTISTA MODEL

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - AHYMO.SUM
 INPUT FILE = M:\R\0887DF~1\AE_DATA\CALCS\AHYMO\REV\AC-1.WPD - VERSION: 1997.02c
 RUN DATE (MON/DAY/YR) = 05/27/2011
 USER NO. = AHYMO-C-9803C01UNMLIB-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE =	NOTATION
START	1- COMPUTING RAINFALL										
RAINFALL	TYPE= 2										
S	2- COMPUTE TP FOR OFFSITE BASIN 301 (SET tp= MIN 0.133 HRS										
S	3- COMPUTE HYD FOR BASIN 301, (assume platted to 5 DU/ACRE, %D=50)										
	COMPUTE NM HYD 301.00 1 .08800 142.62										
S	4- Route HYDROGRAPH 301 through POND 5 (0.30/0.52ac surface/bottom, 2.20AF										
S	Historical flow Basin 301 (100% A)= 74.42CFS use 75+/- thru 34" orifice plat										
	ROUTE RESERVOIR POND.301.1 1 .08800 64.26										
S	5- Route POND 5 outflow (BASIN 301) through BASIN 302 via 36"X 1800'RCP										
S	(24'/1800'= 0.15 sfp) Add to basin 302 at pond 6, (#8)										
	ROUTE MCUNGE 301.20 2 3 .08800 5.767										
S	6- COMPUTE TP FOR BASIN 302 (LET tp= 0.133 MIN)										
S	7- COMPUTE HYD FOR BASIN 302 (assume replat to 4 DU/AC, D=42%, use 45%)										
	Historical flow (100% A)= 57.95CFS										
	COMPUTE NM HYD 302.00 1 .05800 119.01										
S	8- ADD HYDROGRAPHS 301.2 (ROUTED THROUGH 302) AND 302 - INFLOW TO POND 6										
	ADD HYD 302.10 1& 3 2 .12600 164.30										
S	9- ROUTE HYDROGRAPH 302.1 through POND 6 (0.2/0.4AC surf/bottom, 1.5AF st										
S	Historical flow- 100% A (basin 301= 74.42)+(basin 302= 57.95)= 132.37CF										
S	discharge through 48" RCP w/ 45" orifice plate										
	ROUTE RESERVOIR POND.302.2 2 1 .12600 117.19										
S	10- Route outflow from POND 6 (BASIN 301 & 302) through										
S	48"x 2300'RCP (50/2300= 2.2% sfp) through Basin 214 TO POND 8										
	ROUTE MCUNGE 302.30 1 2 .12600 10.462										
S	76- COMPUTE TP FOR BASIN 214 (Let tp= 0.133= min.)										
S	77- COMPUTE HYD FOR BASIN 214										
	COMPUTE NM HYD 214.00 1 .08600 176.58										
S	78- ADD HYDROGRAPHS 302.3 AND 214										
	ADD HYD 214.10 2& 1 3 .21200 256.75										
S	79- Route HYDROGRAPH 214.1 through POND 8 (1.7/2.2AC surf/btm, 11.3AF stor										
	ROUTE RESERVOIR POND.214.2 3 2 .21200 106.29										
S	11- COMPUTE TP FOR BASIN P-303 (Let tp= 0.133 hrs= min)										
S	12- COMPUTE HYD FOR BASIN 303 (assume replat to 4 DU/AC, D=42%, use 45%)										
	BASIN 303 Historical flow (100% A)= 75.29CFS										
	COMPUTE NM HYD 303.00 1 .06700 137.50										
S	13- ROUTE HYDROGRAPH 303 THROUGH POND 9 (0.3/0.52AC surface/bottom, 2.11AF										
S	303 Hist. flow= 75.29CFS, discharge through 36" RCP w/ 34" orifice pla										
	ROUTE RESERVOIR POND.303.1 1 2 .06700 62.82										
S	14- Route outflow from POND 9 (BASIN 303.1) through 36"x 1300'RCP										
	ROUTE MCUNGE 303.20 2 3 .06700 5.422										
S	81- COMPUTE TP FOR BASIN P-215 (Let tp= 0.133 min.)										
S	82- COMPUTE HYD FOR BASIN P-215										
	COMPUTE NM HYD 215.00 1 .05400 110.81										
S	83- ADD HYDROGRAPHS 303.2 AND 215										
	ADD HYD 215.10 1& 3 2 .12100 156.91										
S	85- Route HYDROGRAPH 215.1 through POND 10 (1.0/0.7AC surf/btm, 4.65AF sto										
	ROUTE RESERVOIR POND.215.2 2 1 .12100 14.22										
S	15- COMPUTE TP FOR OFFSITE BASIN 304 Let TP= 0.133 hrs= min.)										
S	16- Compute HYD for BASIN 304 (ex.platting 2.33+/- DU/Acre => 35% _D , use 40										
COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE =	NOTATION

BASIN 304 @ 100% A: Historical flow area= 0.05 sq mi, flow= 41.24cfs
\$
COMPUTE NM HYD - 304.00 1 .10800 217.09 8.321
\$S\$ 17- Route Hydrograph 304 through POND 7 (H=4.0', 0.40/0.25AC surf/bottom,
\$S\$ cap.). 304 historical; 100% A;area= 0.05 sq mi; Flow= 41.24cfs;
\$S\$ discharge through 28' orifice plate into 30' RCP
\$S\$ ROUTE RESERVOIR POND.304.1 1 2 .10800 41.96 8.321 ***
\$S\$ * 23- COMPUTE TP FOR BASIN P-203 (Let tp= 0.133= Min.)
\$S\$ * 24- COMPUTE HYD FOR BASIN P-203 (2.5 DU/acre, use D=45)
\$S\$ \$**\$ COMPUTE NM HYD 203.00 2 .00200 4.12 .162 ***
\$S\$ * 31- COMPUTE TP FOR BASIN P-204 (Let tp= 0.133= Min.)
\$S\$ \$**\$ COMPUTE NM HYD 204.00 1 .00800 16.43 .647
\$S\$ * 84- ADD HYDROGRAPHS 203 AND 204
\$S\$ \$**\$ ADD HYD 204.20 1& 2 5 .01000 20.55 .809
\$S\$ * 33- Route Hydrograph 204.2 through BASIN 208 IN 24'X570 LF PIPE
\$S\$ \$**\$ ROUTE MCUNGE 204.30 5 10 .01000 20.45 .809 ***
\$S\$ * 34- COMPUTE TP FOR BASIN P-205 (Let tp= 0.133= Min.)
\$S\$ * 35- COMPUTE HYD FOR BASIN P-205 (assume 4 DU/Acre=> 42%D, use 45%D)
\$S\$ \$**\$ COMPUTE NM HYD 205.00 1 .01400 28.70 1.133
\$S\$ * 36- ROUTE Hydrograph 205 THROUGH PIPE TO CONFLUENCE W/ BASIN 208
\$S\$ \$**\$ ROUTE MCUNGE 205.10 1 2 .01400 28.31 1.133 ***
\$S\$ * 45- COMPUTE TP FOR BASIN P-208 (Let tp= 0.133= Min.)
\$S\$ \$**\$ COMPUTE NM HYD 208.00 1 .01300 21.22 .725
\$S\$ * 47- ADD HYDROGRAPHS 205.1 and 208
\$S\$ \$**\$ ADD HYD 208.10 1& 2 3 .02700 49.53 1.858
\$S\$ * 48- ADD HYDROGRAPHS 204.3 AND 208.1
\$S\$ \$**\$ ADD HYD 208.20 3&10 1 .03700 69.98 2.667
\$S\$ * 51- ROUTE ADDED FLOWS AT HYDROGRAPH 208.2 through PIPE TO POND 4
\$S\$ \$**\$ ROUTE MCUNGE 208.30 1 5 .03700 68.50 2.668 ***
\$S\$ * 37- COMPUTE TP FOR BASIN P-206 (Let tp= 0.133= Min.)
\$S\$ * 38- COMPUTE HYD FOR BASIN P-206 (assume 4 DU/Acre=> 42%D, use 45%D)
\$S\$ \$**\$ COMPUTE NM HYD 206.00 1 .00700 14.36 .566 ***
\$S\$ * 59- COMPUTE TP FOR BASIN P-210 (Let tp=0.133= Min.)
\$S\$ * 60- COMPUTE HYD FOR BASIN P-210 (3.0 DU/Acre=> 35%D, use 40%D)
\$S\$ \$**\$ COMPUTE NM HYD 210.00 2 .00400 8.04 .308
\$S\$ * - ADD HYDROGRAPHS 206 AND 210
\$S\$ \$**\$ ADD HYD 210.10 1& 2 3 .01100 22.40 .875 ***
\$S\$ * 62- Compute TP for BASIN P-211 (let tp=0.133= min.)
\$S\$ * 63- COMPUTE HYD FOR BASIN P-211 (3.7 DU/acre=> 40%, use 45%)
\$S\$ \$**\$ COMPUTE NM HYD 211.00 1 .01000 20.53 .809
\$S\$ * 64- ADD HYDROGRAPHS 210.1 AND 211
\$S\$ \$**\$ ADD HYD 211.10 1& 3 2 .02100 42.93 1.684 ***
\$S\$ * 41- COMPUTE TP FOR BASIN P-207 (Let tp= 0.133= Min.)
\$S\$ * 42- COMPUTE HYD FOR BASIN P-207 (actual 3.7DU/acre, assume 4 DU/Acre=>
\$S\$ \$**\$ COMPUTE NM HYD 207.00 1 .00400 8.21 .324
\$S\$ * - ADD HYDROGRAPHS 211.1 AND 207
\$S\$ \$**\$ ADD HYD 207.10 1& 2 3 .02500 51.14 2.007 ***
\$S\$ * 52- Compute TP for BASIN P-209 (Let tp=0.133= min.)
\$S\$ * 53- Compute HYD for BASIN 209 (3.86du/acre=> 41%, use 45%D)
\$S\$ \$**\$ COMPUTE NM HYD 209.00 1 .00600 12.33 .485
\$S\$ * - ADD HYDROGRAPHS 207.1 AND 209
\$S\$ \$**\$ ADD HYD 209.10 1& 3 2 .03100 63.47 2.493 ***
\$S\$ * 66- COMPUTE TP FOR BASIN P-212 (Let TP=0.133= Min.)
\$S\$ \$**\$
1.44459 1.500 3.141 PER IMP= 40.00
1.44459 1.950 .607 AC-FI= 4.223
1.51708 1.500 3.218 PER IMP= 45.00
1.51708 1.500 3.209 PER IMP= 45.00
1.51703 1.500 3.211
1.51741 1.500 3.196 CCODE = .2
1.51708 1.500 3.203 PER IMP= 45.00
1.51746 1.500 3.160 CCODE = .2
1.04601 1.500 2.550 PER IMP= 20.00
1.29043 1.500 2.866
1.35176 1.500 2.955
1.35209 1.500 2.893 CCODE = .2
1.51708 1.500 3.205 PER IMP= 45.00
1.44459 1.500 3.141 PER IMP= 40.00
1.49067 1.500 3.182
1.51708 1.500 3.208 PER IMP= 45.00
1.50323 1.500 3.194
1.51708 1.500 3.208 PER IMP= 45.00
1.50544 1.500 3.196
1.51708 1.500 3.210 PER IMP= 45.00
1.50768 1.500 3.199

ADD HYD	212.10 2& 1 3	.03600	73.28	2.858	1.48879	1.500	3.181	
S 69 ROUTE HYDROGRAPH 212.1 down Kimmick in 48"x 175' RCP to POND 4			73.28	2.858	1.48879	1.500	3.181	CCODE = .0
ROUTE MCUNGE								
S 70- Add HYDROGRAPHS 212.2 TO 208.3 (AT POND 4)					1.41950	1.500	3.035	
ADD HYD								
S 19- COMPUTE TP FOR BASIN 201 (let TP= 0.133= Min.)			141.78	5.527				
S 20- COMPUTE HYD FOR BASIN P-201 (assume 4 DU/Acre=> 42%D, use 45%D)								
COMPUTE NM HYD								
S 21- Route HYDROGRAPH 201 through POND 1 (0.5/0.25AC surf/btm, 1.65AF stor.			71.82	2.832	1.51708	1.500	3.206	PER IMP= 45.00
S 22- Route outflow from POND 1 (BASIN 201) in 24"PIPE through BASIN 202 TO								
ROUTE RESERVOIR POND.201.1					1.51707	2.000	.593	AC-FT= 1.474
S 23- NEW POND #2 IN BASIN 202								
ROUTE MCUNGE					1.51601	2.050	.593	CCODE = .2
S 27- COMPUTE TP FOR BASIN P-202 (set tp= 0.133= Min.)					1.51708	1.500	3.206	PER IMP= 45.00
COMPUTE NM HYD								
S 28A- Add HYDROGRAPHS 201.2 and 202			112.86	4.450	1.51665	1.500	2.092	
ADD HYD								
S 29- Route HYDROGRAPH 202.1 Through POND 2 (0.77/0.5AC surf/btm, 3.50AF st			120.52	7.280	1.51665	2.550	.256	AC-FT= 3.513
S discharge 15.21cfs through 15" orifice plate into Rosa Parks System								
ROUTE RESERVOIR POND.202.2								
S 56A- Compute TP for BASIN 213 (let tp=0.133= Min.)								
S 56B- COMPUTE HYD FOR BASIN 213 (3.86du/acre=> 41%D, use 45%D)								
COMPUTE NM HYD								
S 56C- Add HYDROGRAPH 202.2 (outflow from POND 2) and 213			129.28	5.097	1.51708	1.500	3.206	PER IMP= 45.00
ADD HYD								
S 56D- Add HYDROGRAPHS 212.3 and 213.1 (INFLOW TO POND 4)			138.12	12.377	1.51682	1.500	1.410	
ADD HYD					1.48538	1.500	1.935	
S *****								
S ADD SAD 228 RUNOFF								
S *****								
S BASIN 202, AREA=19.16 AC, DISCHARGE TO KIMMICK DRIVE STORM SYSTEM								
S OFFSITE BASIN FROM SAD 228*****								
COMPUTE NM HYD								
S ADD BASIN 202 FROM SAD 228 TO INFLOW OF POND 4			66.79	2.670	1.67221	1.500	3.485	PER IMP= 50.00
ADD HYD								
S *****								
S 57- Route BASIN 213.1 and offsite basin through POND 4			346.68	20.574	1.50724	1.500	2.116	
ROUTE RESERVOIR POND.4								
FINISH			91.72	20.574	1.50724	1.900	.560	AC-FT= 5.818

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*** REVISED LA CIENTISTA SUBDIVISION

* DATE: MAY 2011

* FILE: M:\RR\08-400-104-00\AE_DATA\CALCS\AHYMO\REV La Cuentista.WPD

*** FULLY DEVELOPED CONDITIONS RUNOFF MODEL - REVISED JANUARY 2007

*** DESIGN STORM IS THE 100 YEAR - 24 HOUR STORM ***

*** COA DPM TYPE 2, 24 HOUR STORM WITH A PEAK INTENSITY AT 1.4 HOURS

*** START TIME = 0 ***

*** 1- COMPUTING RAINFALL ***

*** RAINFALL TYPE = 2 ***

RAIN QUARTER = 0.00 INCHES

RAIN ONE = 1.87

RAIN SIX = 2.20

RAIN DAY = 2.66

DT = 0.05 HOURS

*** 2- COMPUTE TP FOR OFFSITE BASIN 301 (SET tp= MIN 0.133 HRS) ***

*** COMPUTE LT TP LCODE=1 NK=3 ISLOPE=0 ***

*** LENGTH=250 FT SLOPE=0.01 K=0.7 ***

*** LENGTH=2500 FT SLOPE=0.02 K=3 ***

*** 3- COMPUTE HYD FOR BASIN 301, (assume platted to 5 DU/ACRE, %D=50)

COMPUTE NM HYD ID=1 HYDNO=301 DA=0.068 SQ MI

PERCENT A=10 B=15 C=25 D=50

TP=0.133 HOURS MASSRAIN=-1

PRINT HYD ID=1 CODE=5

*** PUNCH HYD ID=1 ***

*** 4- Route HYDROGRAPH 301 through POND 5 (0.30/0.52ac surface/bottom, 2.20AF stor req'd)

*** Historical flow Basin 301 (100% A)= 74.42CFS use 75+/- thru 34" orifice plate

ROUTE RESERVOIR ID=2 HYD=POND.301.1 INFLOWID=1 CODE=5

OUTFLOW(CFS) STORAGE(AC-FT) ELEV(FT)

0	0	0
21.82	0.154	0.5
30.86	0.316	1
37.80	0.486	1.5
43.65	0.665	2
48.80	0.853	2.5
53.46	1.049	3
57.74	1.255	3.5
61.73	1.470	4
65.47	1.694	4.5
69.02	1.928	5
72.38	2.172	5.5
75.60	2.427	6

PRINT HYD ID=2 CODE=1

*** 5- Route POND 5 outflow (BASIN 301) through BASIN 302 via 36"X 1800'RCP

*** (24'/1800'= 0.15 slp) Add to basin 302 at pond 6, (#8)

COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG5=-1 SLP=0.015

DIAM=3.0 N=0.013

ROUTE MCUNGE ID=3 HYD NO= 301.2 INFLOW ID=2

DT=0.0 L=1400 FT NS=0 SLOPE=0.015

PRINT HYD ID=3 CODE=5

*** 6- COMPUTE TP FOR BASIN 302 (LET tp= 0.133 MIN) ***

*** COMPUTE LT TP LCODE=1 NK=3 ISLOPE=0 ***

*** LENGTH=100 FT SLOPE=0.02 K=0.7 ***

*** LENGTH=1700 FT SLOPE=0.02 K=3 ***

*** 7- COMPUTE HYD FOR BASIN 302 (assume replat to 4 DU/AC, D=42%, use 45%)

*** Historical flow (100% A)= 57.95CFS

COMPUTE NM HYD ID=1 HYDNO=302 DA=0.058 SQ MI

PERCENT A=10 B=15 C=30 D=45

TP=0.133 HOURS MASSRAIN=-1

PRINT HYD ID=1 CODE=5

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 S 8- ADD HYDROGRAPHS 301.2 (ROUTED THROUGH 302) AND 302 - INFLOW TO POND 6

ADD HYD ID=2 HYD=302.1 ID=1 ID=3
 PRINT HYD ID=2 CODE=1
 *PUNCH HYD ID=2

 S 9- ROUTE HYDROGRAPH 302.1 through POND 6 (0.2/0.4AC surf/bottom, 1.5AF stor cap)
 S Historical flow- 100% A (Basin 301= 74.42)+(Basin 302= 57.95)= 132.37CFS
 S discharge through 48" RCP w/ 45" orifice plate
 ROUTE RESERVOIR ID=1 HYD=POND.302.2 INFLOWID=2 CODE=5

OUTFLOW(CFS)	STORAGE(AC-FT)	ELEV(FT)
0	0	0
38.23	0.103	0.5
54.07	0.213	1.0
66.22	0.330	1.5
76.46	0.454	2.0
85.49	0.585	2.5
93.65	0.723	3.0
101.15	0.869	3.5
108.13	1.023	4.0
114.69	1.186	4.5
120.90	1.356	5.0
126.80	1.535	5.5
132.43	1.723	6.0
132.43	1.919	6.5
132.43	2.125	7.0

PRINT HYD ID=1 CODE=1

 S 10- Route outflow from POND 6 (BASIN 301 & 302) through
 S 48"x 2300'RCP (50/2300= 2.2% slp) through Basin 214 TO POND 8

COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=-1 SLP=0.022
 DIAM=4.0 N=0.013

ROUTE MCUNGE ID=2 HYD NO= 302.3 INFLOW ID=1
 DT=0.0 L=2300 FT NS=0 SLOPE=0.022

PRINT HYD ID=2 CODE=5

 S 76- COMPUTE TP FOR BASIN 214 (Let tp= 0.133= Min.) ***

*COMPUTE LT TP LCODE=1 NK=3 ISLOPE=0
 * LENGTH=100 FT SLOPE=0.02 K=0.7
 * LENGTH=0 FT SLOPE=0.02 K=2
 * LENGTH=1250 FT SLOPE=0.02 K=3

S 77- COMPUTE HYD FOR BASIN 214
 COMPUTE NM HYD ID=1 HYDNO=214 DA=0.086 SQ MI
 PERCENT A=10 B=15 C=30 D=45
 TP=0.133 HOURS MASSRAIN=-1

PRINT HYD ID=1 CODE=5

 S 78- ADD HYDROGRAPHS 302.3 AND 214

ADD HYD ID=3 HYD=214.1 ID=2 ID=1
 PRINT HYD ID=3 CODE=1
 PUNCH HYD ID=3

 S 79- Route HYDROGRAPH 214.1 through POND 8 (1.7/2.2AC surf/btm, 11.3AF stor.cap.)
 ROUTE RESERVOIR ID=2 HYD=POND.214.2 INFLOWID=3 CODE=5

OUTFLOW(CFS)	STORAGE(AC-FT)	ELEV(FT)
0	0	0
40.82	0.859	0.5
57.73	1.738	1
70.71	2.635	1.5
81.64	3.552	2
91.28	4.489	2.5
99.99	5.445	3
108.00	6.421	3.5
115.46	7.417	4
122.47	8.434	4.5
129.09	9.472	5
135.39	10.530	5.5

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141.41	11.609	6
141.41	12.710	6.5
141.41	13.831	7

PRINT HYD ID=2 CODE=1

***** FLOW TO MARIPOSA CHANNEL *****

S 11- COMPUTE TP FOR BASIN P-303 (Let TP= 0.133 hrs= min) ***

*COMPUTE LT TP

LCODE=1	NK=2	ISLOPE=0
LENGTH=100 FT	SLOPE=0.02	K=0.7
LENGTH=0 FT	SLOPE=0.02	K=2
LENGTH=2000 FT	SLOPE=0.02	K=3

S 12- COMPUTE HYD FOR BASIN 303 (assume reflat to 4 DU/AC, D=42%, use 45%)

S BASIN 303 Historical flow (100% A)= 75.29CFS

COMPUTE NM HYD ID=1

HYDNO=303	DA=0.067	SQ MI
PERCENT A=10	B=15	C=30 D=45
TP=0.133	HOURS	MASSRAIN=-1

PRINT HYD ID=1 CODE=5

*PUNCH HYD ID=1

S 13- ROUTE HYDROGRAPH 303 THROUGH POND 9 (0.3/0.52AC surface/bottom, 2.11AF stor. cap.)

S 303 Hist. flow= 75.29CFS, discharge through 36" RCP w/ 34" orifice plate

ROUTE RESERVOIR

ID=2	HYD=POND.303.1	INFLOWID=1	CODE=5
OUTFLOW(CFS)	STORAGE(AC-FT)	ELEV(FT)	
0	0	0	
21.82	0.154	0.5	
30.86	0.316	1	
37.80	0.486	1.5	
43.65	0.665	2	
48.80	0.853	2.5	
53.46	1.049	3	
57.74	1.255	3.5	
61.73	1.470	4	
65.47	1.694	4.5	
69.02	1.928	5	
72.38	2.172	5.5	
75.60	2.427	6	
75.60	2.691	6.5	
75.60	2.966	7	

PRINT HYD ID=2 CODE=1

S 14- Route outflow from POND 9 (BASIN 303.1) through 36"x 1300'RCP

*** (50/1300=3.9% s/p) through BASIN 215 to POND 10

COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=-1 SLP=0.03

DIAM=3.0 N=0.013

ROUTE MCUNGE ID=3 HYD NO= 303.2 INFLOW ID=2

DT=0.0 L=1300 FT NS=0 SLOPE=0.039

PRINT HYD ID=3 CODE=5

S 81- COMPUTE TP FOR BASIN P-215 (Let tp= 0.133 Min.) ***

*COMPUTE LT TP

LCODE=1	NK=3	ISLOPE=0
LENGTH=100 FT	SLOPE=0.02	K=0.7
LENGTH=0 FT	SLOPE=0.02	K=2
LENGTH=1250 FT	SLOPE=0.02	K=3

S 82- COMPUTE HYD FOR BASIN P-215

COMPUTE NM HYD ID=1

HYDNO=215	DA=0.054	SQ MI
PERCENT A=10	B=15	C=30 D=45
TP=0.133	HOURS	MASSRAIN=-1

PRINT HYD ID=1 CODE=5

S 83- ADD HYDROGRAPHS 303.2 AND 215

ADD HYD ID=2 HYD=215.1 ID=1 ID=3

PRINT HYD ID=2 CODE=1

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S 85- Route HYDROGRAPH 215.1 through POND 10 (1.0/0.7AC surf/btm, 4.65AF stor.cap.)
 ROUTE RESERVOIR ID=1 HYD=POND.215.2 INFLOWID=2 CODE=5
 OUTFLOW(CFS) STORAGE(AC-FT) ELEV(FT)

0	0	0
4.39	0.5	0.5
6.21	1.3	1
8.78	2.6	2
10.75	3.9	3
12.42	5.2	4
13.88	6.5	5
15.21	7.8	6
15.21	9.1	7

PRINT HYD ID=1 CODE=1
 ***** FLOW TO PIEDRAS MARCADAS *****

S 15- COMPUTE TP FOR OFFSITE BASIN 304 Let TP= 0.133 hrs= min.)
 *COMPUTE LT TP LCODE=1 NK=3 ISLOPE=0
 * LENGTH=100 FT SLOPE=0.020 K=0.7
 * LENGTH=3500 FT SLOPE=0.020 K=3

 S 16- Compute HYD for BASIN 304 (ex.platting 2.33+/- DU/Acre => 35%D, use 40%
 S BASIN 304 @ 100% A: Historical flow area= 0.05 sq mi, flow= 41.24cfs
 COMPUTE NM HYD ID=1 HYDNO=304 DA=0.108 SQ MI
 PERCENT A=10 B=15 C=35 D=40
 TP=0.133 HOURS MASSRAIN=-1

PRINT HYD ID=1 CODE=5

 S 17- Route HYDROGRAPH 304 through POND 7 (H=4.0', 0.40/0.25AC surf/bottom, 1.14AF stor.
 S cap.). 304 historical: 100% A;area= 0.05 sq mi; flow= 41.24cfs;
 S discharge through 28" orifice plate into 30' RCP
 ROUTE RESERVOIR ID=2 HYD=POND.304.1 INFLOWID=1 CODE=5
 OUTFLOW(CFS) STORAGE(AC-FT) ELEV(FT)

0	0	0
14.80	0.381	0.5
20.93	0.775	1
25.64	1.182	1.5
29.60	1.602	2
33.10	2.035	2.5
36.26	2.482	3
39.16	2.942	3.5
41.86	3.416	4
41.90	3.904	4.5
42.00	4.407	5

PRINT HYD ID=2 CODE=1
 ***** FLOW TO MARIPOSA BASIN *****

S 23- COMPUTE TP FOR BASIN P-203 (let TP= 0.133= Min.)
 *COMPUTE LT TP LCODE=1 NK=3 ISLOPE=0
 * LENGTH=100 FT SLOPE=0.02 K=0.7
 * LENGTH=0 FT SLOPE=0.02 K=2
 * LENGTH=3500 FT SLOPE=0.02 K=3

S 24- COMPUTE HYD FOR BASIN P-203 (2.5 DU/acre, use D=45)
 COMPUTE NM HYD ID=2 HYDNO=203 DA=0.002 SQ MI
 PERCENT A=10 B=15 C=30 D=45
 TP=0.133 HOURS MASSRAIN=-1

PRINT HYD ID=2 CODE=5

S 31- COMPUTE TP FOR BASIN P-204 (let tp= 0.133= Min.)
 *COMPUTE LT TP LCODE=1 NK=3 ISLOPE=0
 * LENGTH=100 FT SLOPE=0.02 K=0.7
 * LENGTH=0 FT SLOPE=0.02 K=2
 * LENGTH=1250 FT SLOPE=0.02 K=3

*** 32- COMPUTE HYD FOR BASIN P-204 (actual 3.3DU/acre, assume 4 DU/Acre=>
 *** 42%D, use 45%D)
 COMPUTE NM HYD ID=1 HYDNO=204 DA=0.008 SQ MI
 PERCENT A=10 B=15 C=30 D=45

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TP=0.133 HOURS MASSRAIN=-1

PRINT HYD ID=1 CODE=5

S 84- ADD HYDROGRAPHS 203 AND 204

ADD HYD ID=5 HYD=204.2 ID=1 ID=2
PRINT HYD ID=5 CODE=1
*PUNCH HYD ID=5

S 33- Route HYDROGRAPH 204.2 through BASIN 208 IN 24'X570 LF PIPE

COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=-1 SLP=0.04
DIAM=2.0 N=0.013

ROUTE MCUNGE ID=10 HYD NO= 204.3 INFLOW ID=5
DT=0.0 L=570 FT NS=0 SLOPE=0.04
PRINT HYD ID=10 CODE=5

S 34- COMPUTE TP FOR BASIN P-205 (Let tp= 0.133= Min.) ***
*COMPUTE LT TP LCODE=1 NK=3 ISLOPE=0
* LENGTH=100 FT SLOPE=0.02 K=0.7
* LENGTH=0 FT SLOPE=0.02 K=2
* LENGTH=1250 FT SLOPE=0.02 K=3

S 35- COMPUTE HYD FOR BASIN P-205 (assume 4 DU/Acre=> 42%D, use 45%D)
COMPUTE NM HYD ID=1 HYDNO=205 DA=0.014 SQ MI
PERCENT A=10 B=15 C=30 D=45
TP=0.0 HOURS MASSRAIN=-1

PRINT HYD ID=1 CODE=5

S 36- ROUTE HYDROGRAPH 205 THROUGH PIPE TO CONFLUENCE W/ BASIN 208
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=-1 SLP=0.02
DIAM=4.0 N=0.013

ROUTE MCUNGE ID=2 HYD NO= 205.1 INFLOW ID=1
DT=0.0 L=800 FT NS=0 SLOPE=0.02
PRINT HYD ID=2 CODE=5

S 45- COMPUTE TP FOR BASIN P-208 (Let tp= 0.133= Min.) ***
*COMPUTE LT TP LCODE=1 NK=3 ISLOPE=0
* LENGTH=100 FT SLOPE=0.02 K=0.7
* LENGTH=0 FT SLOPE=0.02 K=2
* LENGTH=1250 FT SLOPE=0.02 K=3

*** 46- COMPUTE HYD FOR BASIN P-208 (actual 0.4DU/acre=> 10%D, use 20%D)
COMPUTE NM HYD ID=1 HYDNO=208 DA=0.013 SQ MI
PERCENT A=10 B=50 C=20 D=20
TP=0.133 HOURS MASSRAIN=-1

PRINT HYD ID=1 CODE=5
*PUNCH HYD ID=1

S 47- ADD HYDROGRAPHS 205.1 and 208

ADD HYD ID=3 HYD=208.1 ID=1 ID=2
PRINT HYD ID=3 CODE=1

S 48- ADD HYDROGRAPHS 204.3 AND 208.1

ADD HYD ID=1 HYD=208.2 ID=3 ID=10
PRINT HYD ID=1 CODE=1

*S*51- ROUTE ADDED FLOWS AT HYDROGRAPH 208.2 through PIPE TO POND 4
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=-1 SLP=0.025
DIAM=4.0 N=0.013

ROUTE MCUNGE ID=5 HYD NO= 208.3 INFLOW ID=1
DT=0.0 L=814 FT NS=0 SLOPE=0.025
PRINT HYD ID=5 CODE=5

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```

***
*S* 37- COMPUTE TP FOR BASIN P-206 (Let tp= 0.133= Min.) ***
*COMPUTE LT TP          LCODE=1 NK=3    ISLOPE=0
*                        LENGTH=100 FT    SLOPE=0.02      K=0.7
*                        LENGTH=0 FT      SLOPE=0.02      K=2
*                        LENGTH=1250 FT   SLOPE=0.02      K=3
***

*S* 38- COMPUTE HYD FOR BASIN P-206 (assume 4 DU/Acre=> 42%D, use 45%D)
COMPUTE NM HYD          ID=1          HYDNO=206 DA=0.007 SQ MI
                        PERCENT A=10 B=15 C=30 D=45
                        TP=0.0 HOURS   MASSRAIN=-1

PRINT HYD                ID=1          CODE=5

***
*S* 59- COMPUTE TP FOR BASIN P-210 (Let tp=0.133= Min.) ***
*COMPUTE LT TP          LCODE=1 NK=3    ISLOPE=0
*                        LENGTH=100 FT    SLOPE=0.02      K=0.7
*                        LENGTH=0 FT      SLOPE=0.02      K=2
*                        LENGTH=1250 FT   SLOPE=0.02      K=3
***

*S* 60- COMPUTE HYD FOR BASIN P-210 (3.0 DU/acre=> 35%D, use 40%D)
COMPUTE NM HYD          ID=2          HYDNO=210 DA=0.004 SQ MI
                        PERCENT A=10 B=15 C=35 D=40
                        TP=0.133 HOURS  MASSRAIN=-1

PRINT HYD                ID=2          CODE=5

***
*S* - ADD HYDROGRAPHS 206 AND 210

ADD HYD                  ID=3          HYD=210.1      ID=1      ID=2
PRINT HYD                ID=3          CODE=1
***
*S* 62- Compute TP for BASIN P-211 (Let tp=0.133= Min.) ***
*COMPUTE LT TP          LCODE=1 NK=3    ISLOPE=0
*                        LENGTH=100 FT    SLOPE=0.02      K=0.7
*                        LENGTH=0 FT      SLOPE=0.02      K=2
*                        LENGTH=1250 FT   SLOPE=0.02      K=3
***

*S* 63- COMPUTE HYD FOR BASIN P-211 (3.7 DU/acre=> 40%D, use 45%D)
COMPUTE NM HYD          ID=1          HYDNO=211 DA=0.010 SQ MI
                        PERCENT A=10 B=15 C=30 D=45
                        TP=0.133 HOURS  MASSRAIN=-1

PRINT HYD                ID=1          CODE=5

***
*S* 64- ADD HYDROGRAPHS 210.1 AND 211

ADD HYD                  ID=2          HYD=211.1      ID=1      ID=3
PRINT HYD                ID=2          CODE=1
***
*S* 41- COMPUTE TP FOR BASIN P-207 (Let tp= 0.133= Min.) ***
*COMPUTE LT TP          LCODE=1 NK=3    ISLOPE=0
*                        LENGTH=100 FT    SLOPE=0.02      K=0.7
*                        LENGTH=0 FT      SLOPE=0.02      K=2
*                        LENGTH=1250 FT   SLOPE=0.02      K=3
***

*S* 42- COMPUTE HYD FOR BASIN P-207 (actual 3.7DU/acre, assume 4 DU/Acre=>
* 42%D, use 45%D)
COMPUTE NM HYD          ID=1          HYDNO=207 DA=0.004 SQ MI
                        PERCENT A=10 B=15 C=30 D=45
                        TP=0.0 HOURS   MASSRAIN=-1

PRINT HYD                ID=1          CODE=5

***
*S* - ADD HYDROGRAPHS 211.1 AND 207

ADD HYD                  ID=3          HYD=207.1      ID=1      ID=2
PRINT HYD                ID=3          CODE=1
***

```



```

                                REV La Cuentista.WPD
**S* 52- Compute TP for BASIN P-209 (Let tp=0.133= Min.) ***

*COMPUTE LT TP                LCODE=1 NK=3    ISLOPE=0
*                             LENGTH=100 FT   SLOPE=0.02    K=0.7
*                             LENGTH=0 FT     SLOPE=0.02    K=2
*                             LENGTH=1250 FT  SLOPE=0.02    K=3

* * * * *

**S* 53- Compute HYD for BASIN 209 (3.86du/acre=> 41%D, use 45%D)
COMPUTE NM HYD                ID=1            HYDNO=209 DA=0.006 SQ MI
                                PERCENT A=10 B=15 C=30 D=45
                                TP=0.133 HOURS MASSRAIN=-1

PRINT HYD                     ID=1            CODE=5
*PUNCH HYD                     ID=1
* * * * *
**S* - ADD HYDROGRAPHS 207.1 AND 209

ADD HYD                        ID=2            HYD=209.1        ID=1    ID=3
PRINT HYD                      ID=2            CODE=1
* * * * *
**S* 66- COMPUTE TP FOR BASIN P-212 (Let TP=0.133= Min.) ***
* * * * *
*COMPUTE LT TP                LCODE=1 NK=3    ISLOPE=0
*                             LENGTH=100 FT   SLOPE=0.02    K=0.7
*                             LENGTH=0 FT     SLOPE=0.02    K=2
*                             LENGTH=1250 FT  SLOPE=0.02    K=3

* * * * *

**S* 67- Computing HYD for BASIN P-212 (2.5 DU/acre=> 30%D, use 35%D)
COMPUTE NM HYD                ID=1            HYDNO=212 DA=0.005 SQ MI
                                PERCENT A=10 B=15 C=40 D=35
                                TP=0.133 HOURS MASSRAIN=-1

PRINT HYD                     ID=1            CODE=5
* * * * *
**S* 68- ADD HYDROGRAPHS 209.1 AND 212

ADD HYD                        ID=3            HYD=212.1        ID=2    ID=1
PRINT HYD                      ID=3            CODE=1
*PUNCH HYD                     ID=3
* * * * *
**S* 69 ROUTE HYDROGRAPH 212.1 down Kimmick in 48"x 175' RCP to POND 4
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=-1 SLP=0.001
                                DIAM=4.0 N=0.013

ROUTE MCUNGE                  ID=2            HYD NO= 212.2 INFLOW ID=3
                                DT=0.0 L=175 FT NS=0 SLOPE=0.001
PRINT HYD                      ID=2            CODE=5
* * * * *
**S* 70- Add HYDROGRAPHS 212.2 TO 208.3 (At POND 4)

ADD HYD                        ID=6            HYD=212.3        ID=2    ID=5
PRINT HYD                      ID=6            CODE=1
*PUNCH HYD                     ID=6
* * * * *
**S* 19- COMPUTE TP FOR BASIN 201 (let TP= 0.133= Min.) ***

*COMPUTE LT TP                LCODE=1 NK=3    ISLOPE=0
*                             LENGTH=250 FT   SLOPE=0.01    K=0.7
*                             LENGTH=0 FT     SLOPE=0.02    K=2
*                             LENGTH=1250 FT  SLOPE=0.02    K=3

* * * * *

**S* 20- COMPUTE HYD FOR BASIN P-201 (assume 4 DU/Acre=> 42%D, use 45%D)
COMPUTE NM HYD                ID=1            HYDNO=201 DA=0.035 SQ MI
                                PERCENT A=10 B=15 C=30 D=45
                                TP=0.133 HOURS MASSRAIN=-1

PRINT HYD                     ID=1            CODE=5
*PUNCH HYD                     ID=1
* * * * *
**S* 21- Route HYDROGRAPH 201 through POND 1 (0.5/0.25AC surf/btm, 1.65AF stor. cap)

```

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 S discharge 15.21cfs through 15" orifice plate route to POND 2
 ROUTE RESERVOIR ID=2 HYD=POND.201.1 INFLOWID=1 CODE=5
 OUTFLOW(CFS) STORAGE(AC-FT) ELEV(FT)

0	0	0
4.39	0.129	0.5
6.21	0.265	1
7.60	0.408	1.5
8.78	0.560	2
9.82	0.719	2.5
10.75	0.887	3
11.62	1.063	3.5
12.42	1.248	4
13.17	1.441	4.5
13.88	1.644	5
14.56	1.856	5.5
15.21	2.077	6
15.21	2.308	6.5
15.21	2.549	7

PRINT HYD ID=2 CODE=1

 S 22- Route outflow from POND 1 (BASIN 201) in 24"PIPE through BASIN 202 TO
 S NEW POND #2 IN BASIN 202
 COMPUTE RATING CURVE CID=1 VS NO=1 NO SEGS=-1 SLP=0.005
 DIAM=2.0 N=0.013

ROUTE MCUNGE ID=3 HYD NO= 201.2 INFLOW ID=2
 DT=0.0 L=1000 FT NS=0 SLOPE=0.001

PRINT HYD ID=3 CODE=5

 S 27- COMPUTE TP FOR BASIN P-202 (set tp= 0.133= Min.) ***
 *COMPUTE LT TP LCODE=1 NK=3 ISLOPE=0
 * LENGTH=100 FT SLOPE=0.02 K=0.7
 * LENGTH=0 FT SLOPE=0.02 K=2
 * LENGTH=3500 FT SLOPE=0.02 K=3

 *** 28- COMPUTE HYD FOR BASIN P-202 (assume 4 DU/Acre=> 42%D, use 45%D)
 COMPUTE NM HYD ID=1 HYDNO=202 DA=0.055 SQ MI
 PERCENT A=10 B=15 C=30 D=45
 TP=0.133 HOURS MASSRAIN=-1

PRINT HYD ID=1 CODE=5
 *PUNCH HYD ID=1

 S 28A- Add HYDROGRAPHS 201.2 and 202

ADD HYD ID=2 HYD=202.1 ID=1 ID=3
 PRINT HYD ID=2 CODE=1

 S 29- Route HYDROGRAPH 202.1 Through POND 2 (0.77/0.5AC surf/btm, 3.50AF stor. cap.)
 S discharge 15.21cfs through 15" orifice plate into Rosa Parks system
 ROUTE RESERVOIR ID=3 HYD=POND.202.2 INFLOWID=2 CODE=5
 OUTFLOW(CFS) STORAGE(AC-FT) ELEV(FT)

0	0	0
4.39	0.255	0.5
6.21	0.521	1
7.60	0.797	1.5
8.78	1.084	2
9.82	1.381	2.5
10.75	1.690	3
11.62	2.011	3.5
12.42	2.343	4
13.17	2.687	4.5
13.88	3.043	5
14.56	3.411	5.5
15.21	3.792	6
15.21	4.185	6.5
15.21	4.591	7

PRINT HYD ID=3 CODE=1

 S 56A- Compute TP for BASIN 213 (Let tp=0.133= Min.) ***

```

                                REV La Cuentista.WPD
*COMPUTE LT TP                LCODE=1 NK=3    ISLOPE=0
*                            LENGTH=100 FT    SLOPE=0.02    K=0.7
*                            LENGTH=0 FT      SLOPE=0.02    K=2
*                            LENGTH=1250 FT   SLOPE=0.02    K=3

```

```

*S* 56B- COMPUTE HYD FOR BASIN 213 (3.86du/acre=> 41%D, use 45%D)
COMPUTE NM HYD                ID=1            HYDNO=213    DA=0.063 SQ MI
                                PERCENT A=10 B=15 C=30 D=45
                                TP=0.133 HOURS    MASSRAIN=-1

```

```

PRINT HYD                    ID=1    CODE=5
*PUNCH HYD                    ID=1

```

```

*S* 56C- Add HYDROGRAPH 202.2 (outflow from POND 2) and 213

```

```

ADD HYD                      ID=2    HYD=213.1    ID=1    ID=3
PRINT HYD                    ID=2    CODE=1
*PUNCH HYD                    ID=2

```

```

*S* 56D- Add HYDROGRAPHS 212.3 and 213.1 (INFLOW TO POND 4)
ADD HYD                      ID=1    HYD=213.2    ID=2    ID=6
PRINT HYD                    ID=1    CODE=1
*PUNCH HYD                    ID=1

```

```

*S
*

```

```

*S ADD SAD 228 RUNOFF
*S *****

```

```

*S BASIN 202, AREA=19.16 AC, DISCHARGE TO KIMMICK DRIVE STORM SYSYTEM
*S OFFSITE BASIN FROM SAD 228*****

```

```

COMPUTE LT TP                LCODE=1 NK=2 ISLOPE=-1
                                LENGTH=400 FT    SLOPE=0.0275    K=0.7
                                LENGTH=285 FT    SLOPE=0.0105    K=2.0

```

```

COMPUTE NM HYD                ID=3    HYD NO=2.3    DA=0.02994 SQ MI
                                PER A=0    PER B=10    PER C=40    PER D=50
                                TP=0.0    MASS RAIN=-1

```

```

PRINT HYD                    ID=3    CODE=1
*

```

```

*S SEPARATE ACTUAL FLOW TO POND FROM BYPASS FLOWS
*S (CAPTURED BY INLETS IN KIMMICK)

```

```

DIVIDE HYD                    ID=3    RATIO=-92.8    ID=5    HYD NO=5.1
                                ID=6    HYD NO=6.1

```

```

PRINT HYD                    ID=5    CODE=1
PRINT HYD                    ID=6    CODE=1

```

```

*S ADD BASIN 202 FROM SAD 228 TO INFLOW OF POND 4

```

```

ADD HYD ID=4    HYD=202.1    ID I=1    ID II=5
PRINT HYD        ID=4    CODE=1

```

```

*S *****
*S
*S* 57- Route BASIN 213.1 and offsite basin through POND 4
ROUTE RESERVOIR                ID=2 HYD=POND.4 INFLOWID=4    CODE=5
                                OUTFLOW(CFS)    STORAGE(AC-FT)    ELEV(FT)

```

0.0	0.0	5298
71.8	0.82	5299
76.5	1.73	5300
81.0	2.72	5301
85.1	3.80	5302
89.1	4.97	5303
93.0	6.23	5304
96.7	7.58	5305
100.2	9.03	5306

```

PRINT HYD                    ID=2    CODE=1

```


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FINISH

APPENDIX B

Storm Drain systems Analysis

Pond 4

Pond 5 North System

Pond 5 South System

Ponds 4 and 5 to Unser Blvd

Pond 6

Pond 7

Pond 8

Pond 9

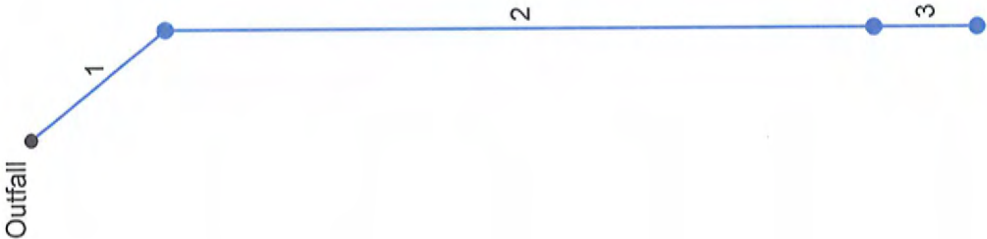
Pond 10

Agua Fria Court to Kimmick Street

Paseo Del Norte Blvd

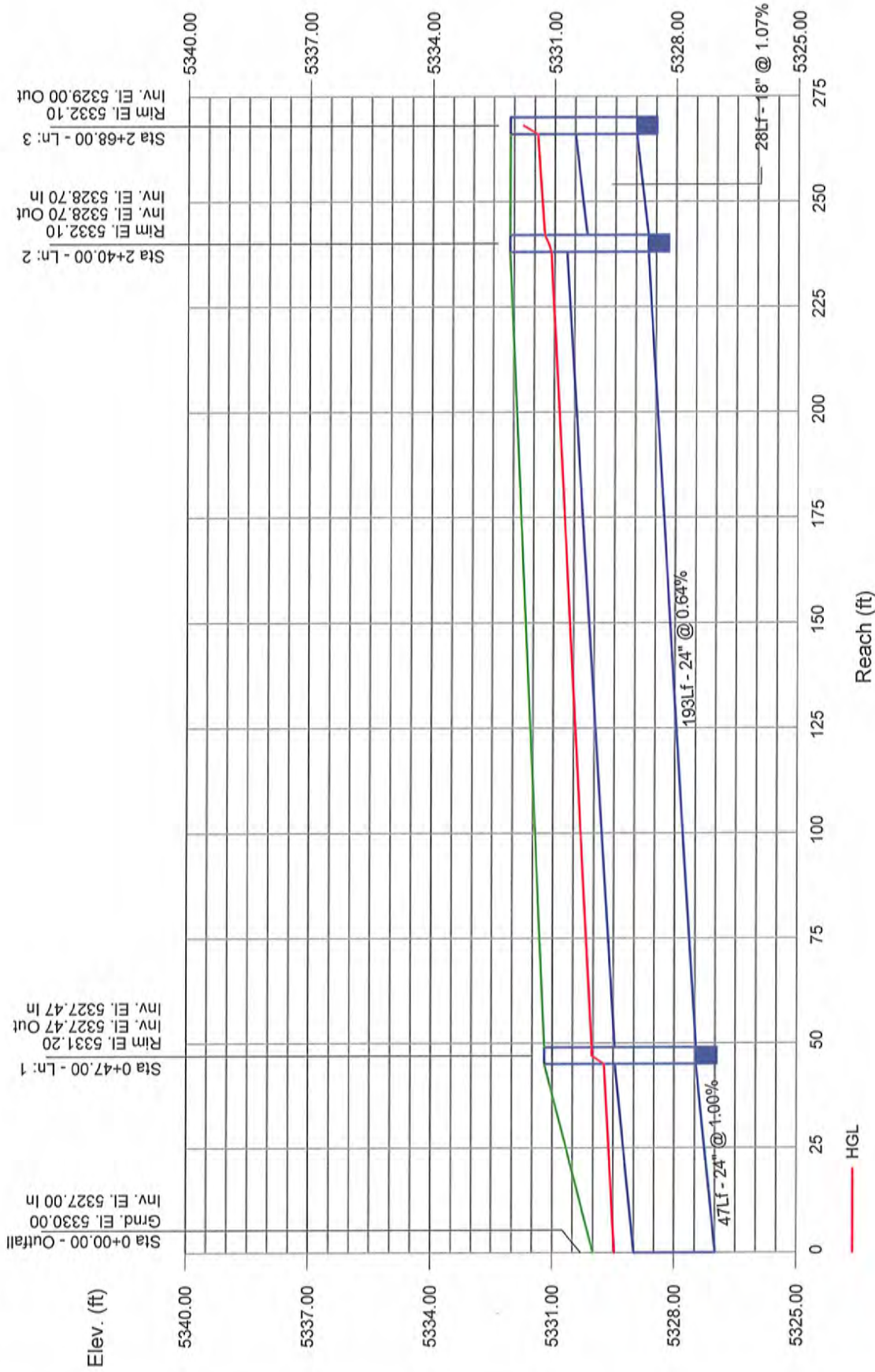
Universe - Scenic

POND 4

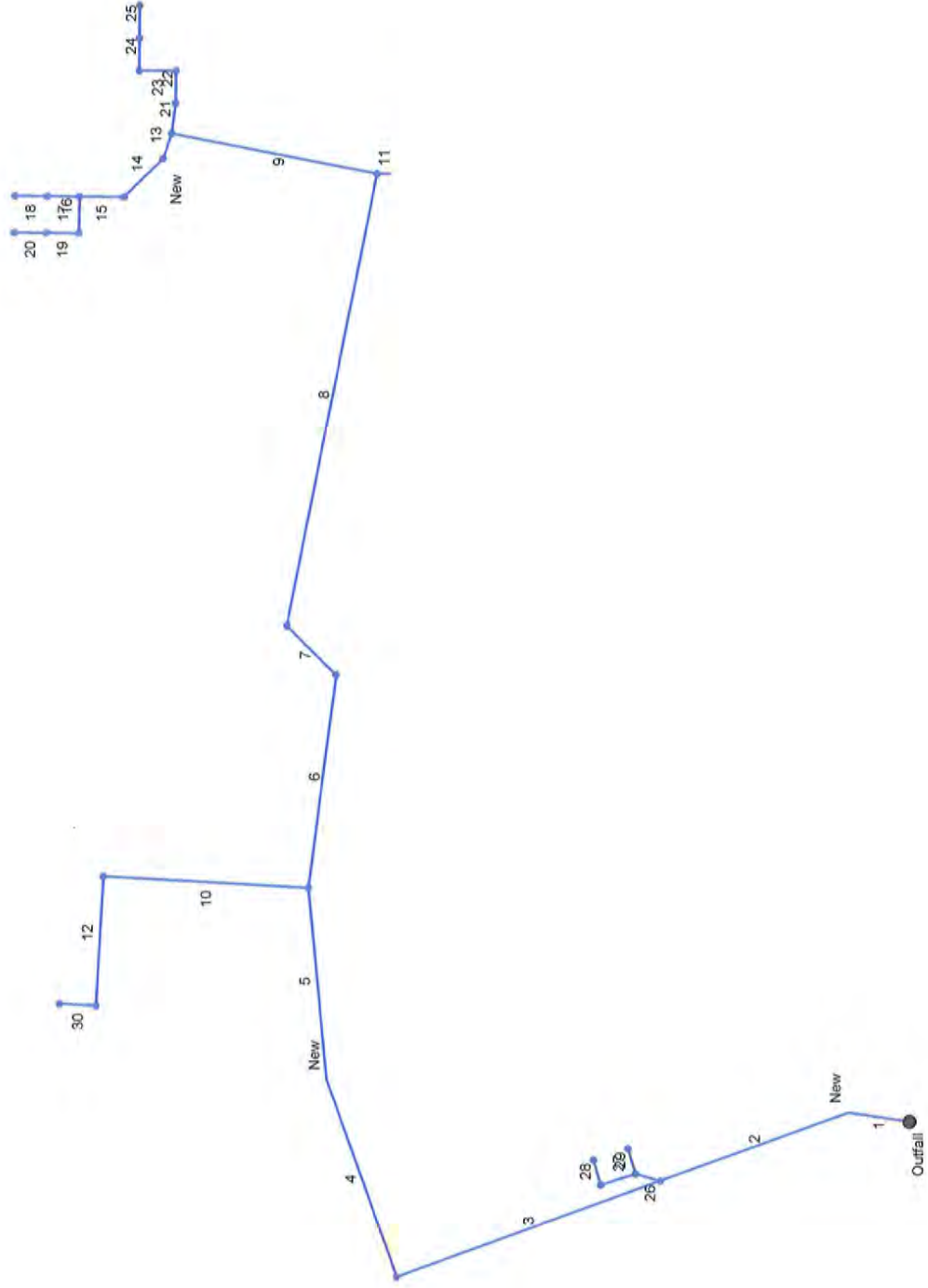


Line No.	DnStm Ln No	Line Size (in)	Flow Rate (cfs)	Line Length (ft)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	EGL Dn (ft)	EGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)	
1	Outfall	24	16.70	50	5327.00	5327.47	5330.00	5331.20	5329.68	5329.95	5330.12	5330.39	1.00	1.73	0.68	5.32	
2	1	24	16.70	193	5327.47	5328.70	5331.20	5332.10	5330.25	5331.31	5330.69	5331.74	1.73	1.40	0.15	5.32	
3	2	18	8.35	28	5328.70	5329.00	5332.10	5332.10	5331.46	5331.64	5331.81	5331.99	1.90	1.60	1.00	4.73	
POND 4																	
												Number of lines: 3			Date: 10-05-2011		
NOTES: ** Critical depth																	

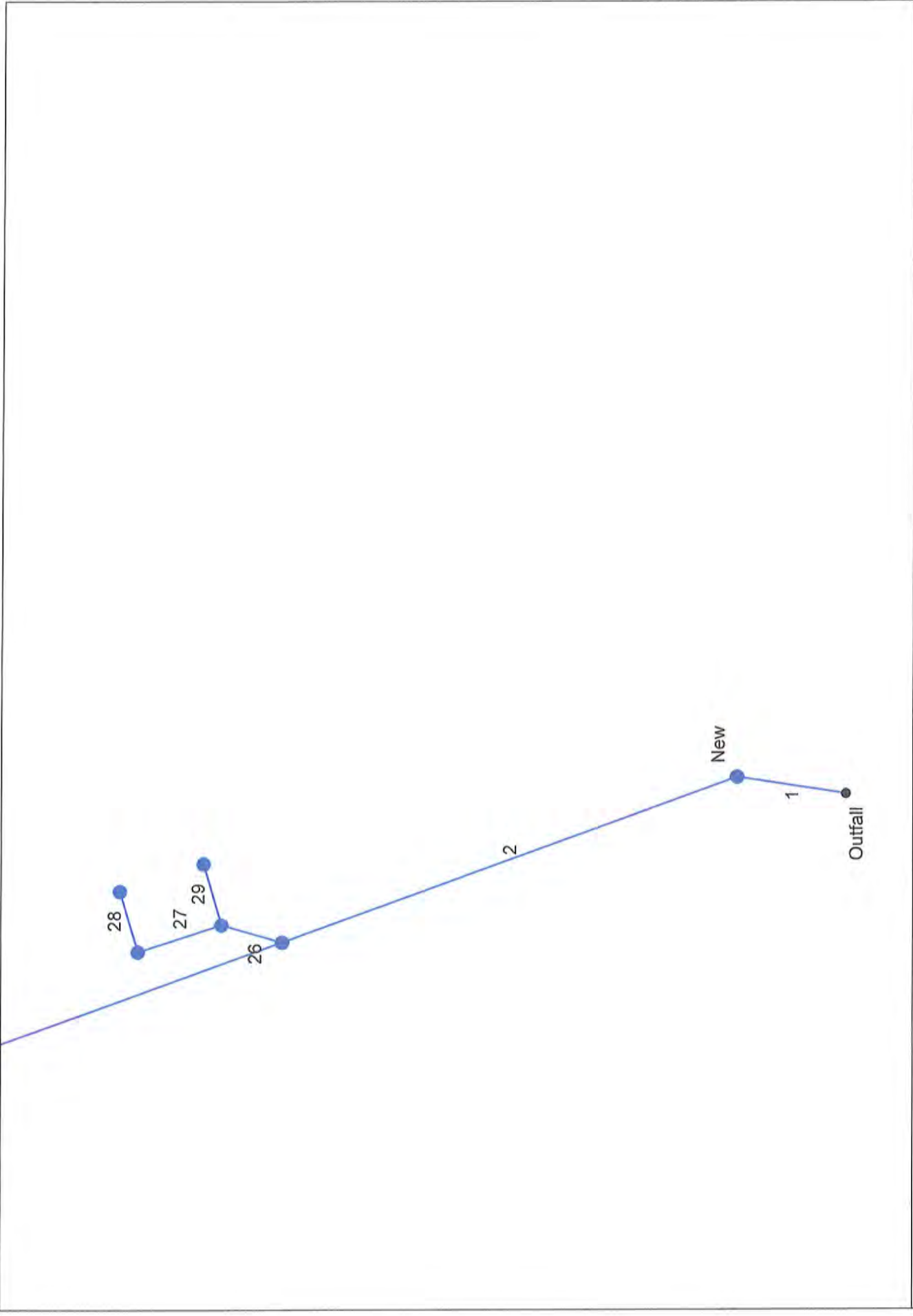
Storm Sewer Profile



Pond 5 - North System



Pond 5 - North System



Line No.	DnStm Ln No	Line Size (in)	Flow Rate (cfs)	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	EGL Dn (ft)	EGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)
1	Outfall	60	126.38	57.0	0.30	5317.24	5317.41	5322.00	5323.13	5320.48	5320.91	5321.85	5322.06	-0.24	0.72	0.23	8.99
2	1	60	126.38	154.0	0.10	5317.41	5317.57	5323.13	5324.50	5321.33	5321.82	5322.24	5322.61	0.72	1.93	0.20	7.38
3	2	48	107.38	216.0	0.20	5317.57	5318.00	5324.50	5325.20	5321.98	5323.19	5323.12	5324.32	2.93	3.20	0.27	8.55
4	3	48	107.38	161.0	0.35	5318.00	5318.56	5325.20	5326.35	5323.50	5324.40	5324.63	5325.53	3.20	3.79	0.10	8.55
5	4	48	107.38	148.0	0.35	5318.56	5319.08	5326.35	5327.50	5324.51	5325.34	5325.65	5326.47	3.79	4.42	0.54	8.55
6	5	48	81.38	147.0	0.48	5319.08	5319.79	5327.50	5328.68	5326.43	5326.90	5327.08	5327.56	4.42	4.89	0.19	6.48
7	6	48	81.38	86.0	0.71	5319.79	5320.40	5328.68	5328.98	5327.03	5327.31	5327.68	5327.96	4.89	4.58	0.20	6.48
8	7	48	81.38	329.0	0.79	5320.40	5323.00	5328.98	5330.62	5327.44	5328.49	5328.09	5329.14	4.58	3.62	0.50	6.48
9	8	48	64.38	162.0	0.62	5323.00	5324.00	5330.62	5332.52	5329.06	5329.39	5329.47	5329.80	3.62	4.52	2.00	5.12
10	5	30	26.00	158.0	0.32	5319.00	5319.50	5327.50	5328.80	5326.65	5327.28	5327.08	5327.72	6.00	6.80	0.23	5.30
11	8	24	17.00	10.0	2.00	5324.00	5324.20	5330.62	5331.00	5329.01	5329.07	5329.47	5329.53	4.62	4.80	0.00	5.41
12	10	30	26.00	99.0	0.40	5319.50	5319.90	5328.80	5327.50	5327.38	5327.78	5327.82	5328.22	6.80	5.10	0.00	5.30
13	9	30	39.38	20.4	3.63	5324.00	5324.74	5332.52	5331.75	5330.20	5330.39	5331.20	5331.39	6.02	4.51	0.22	8.02
14	13	30	34.38	41.8	0.50	5326.89	5327.10	5331.75	5332.02	5330.85	5331.14	5331.61	5331.91	2.36	2.42	0.22	7.00
15	14	30	34.38	34.0	0.59	5327.10	5327.30	5332.02	5332.51	5331.31	5331.55	5332.07	5332.31	2.42	2.71	0.22	7.00
16	15	30	17.19	28.0	0.71	5327.30	5327.50	5332.51	5332.51	5332.29	5332.34	5332.48	5332.53	2.71	2.51	0.74	3.50
17	15	24	14.45	25.0	2.80	5327.30	5328.00	5332.51	5332.95	5332.15	5332.25	5332.48	5332.58	3.21	2.95	0.94	4.60
18	17	18	8.00	25.0	2.00	5328.00	5328.50	5332.95	5333.39	5332.57	5332.72	5332.89	5333.04	3.45	3.39	0.00	4.53
19	16	24	14.45	25.0	2.00	5327.50	5328.00	5332.51	5332.95	5332.48	5332.58	5332.81	5332.91	3.01	2.95	0.94	4.60
20	19	18	8.00	25.0	2.00	5328.00	5328.50	5332.95	5333.39	5332.90	5333.05	5333.22	5333.37	3.45	3.39	0.00	4.53
21	9	24	25.00	23.2	0.47	5327.20	5327.31	5332.52	5331.97	5330.20	5330.49	5331.19	5331.47	3.32	2.66	0.00	7.96
22	21	24	20.00	25.0	1.00	5327.31	5327.56	5331.97	5332.09	5330.84	5331.04	5331.47	5331.67	2.66	2.53	0.94	6.37
23	22	24	15.00	28.2	1.10	5327.56	5327.87	5332.09	5332.09	5331.90	5332.03	5332.26	5332.38	2.53	2.22	0.00	4.78

Pond 5 - North System

Number of lines: 30

Date: 12-14-2011

NOTES: ** Critical depth

Line No.	DnStm Ln No	Line Size (in)	Flow Rate (cfs)	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	EGL Dn (ft)	EGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)
24	23	24	10.00	25.0	1.00	5327.87	5328.12	5332.09	5332.22	5332.23	5332.27	5332.38	5332.43	2.22	2.10	0.94	3.18
25	24	18	5.00	25.0	1.00	5328.12	5328.37	5332.22	5332.34	5332.46	5332.51	5332.58	5332.64	2.60	2.47	0.00	2.83
26	2	30	19.00	20.0	1.00	5317.57	5317.77	5324.50	5323.15	5322.53	5322.57	5322.76	5322.81	4.43	2.88	1.01	3.87
27	26	24	9.50	28.0	1.00	5317.77	5318.05	5323.15	5323.15	5322.90	5322.95	5323.04	5323.09	3.38	3.10	1.46	3.02
28	27	18	4.75	20.0	1.00	5318.05	5318.25	5323.15	5323.11	5323.19	5323.23	5323.30	5323.34	3.60	3.36	0.00	2.69
29	26	18	4.75	20.0	2.40	5317.77	5318.25	5323.15	5323.11	5322.93	5322.97	5323.04	5323.08	3.88	3.36	0.00	2.69
30	12	24	13.00	28.0	0.36	5319.90	5320.00	5327.50	5327.50	5327.95	5328.04	5328.22	5328.31	5.60	5.50	0.00	4.14

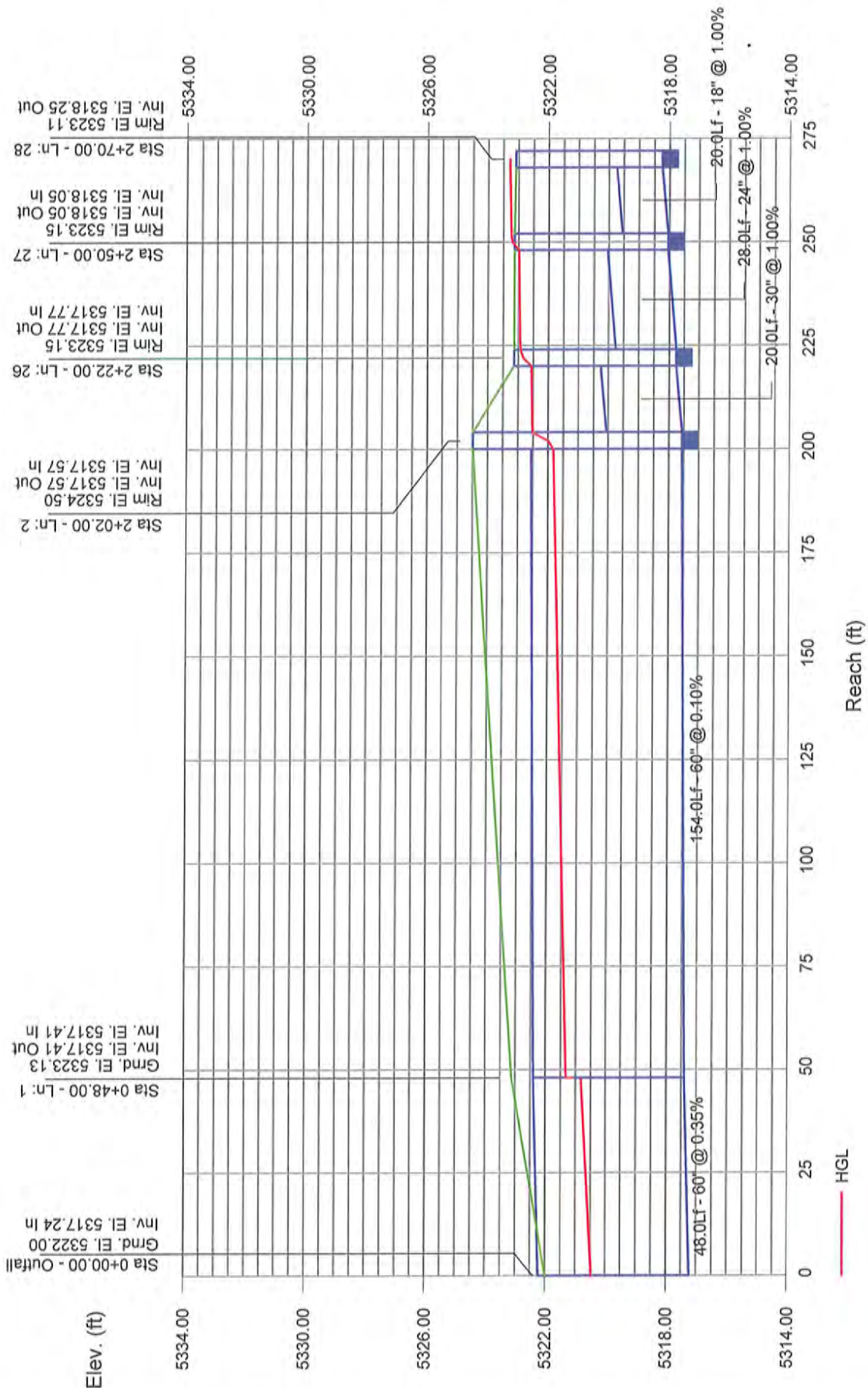
Pond 5 - North System

Number of lines: 30

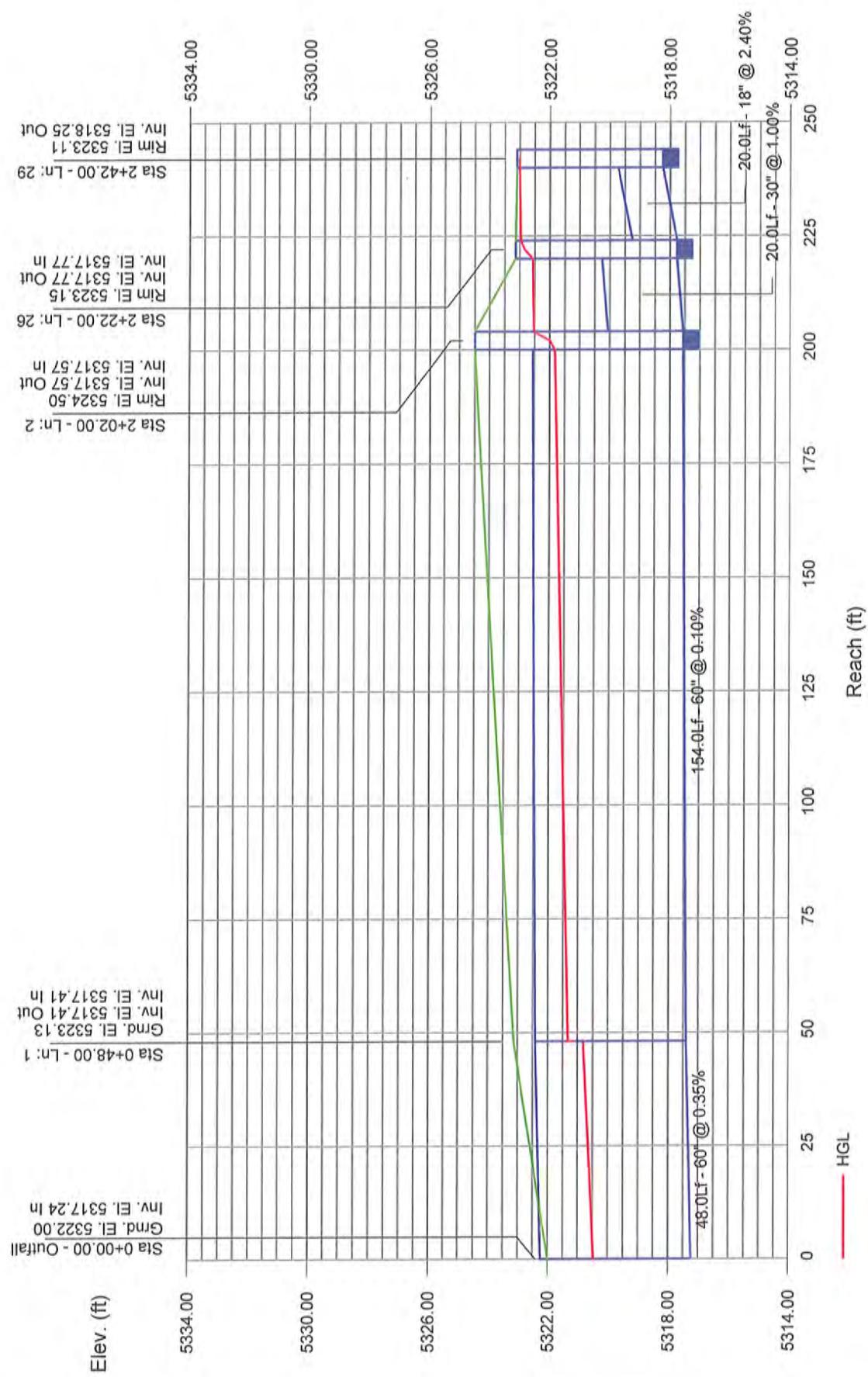
Date: 12-14-2011

NOTES: ** Critical depth

Storm Sewer Profile

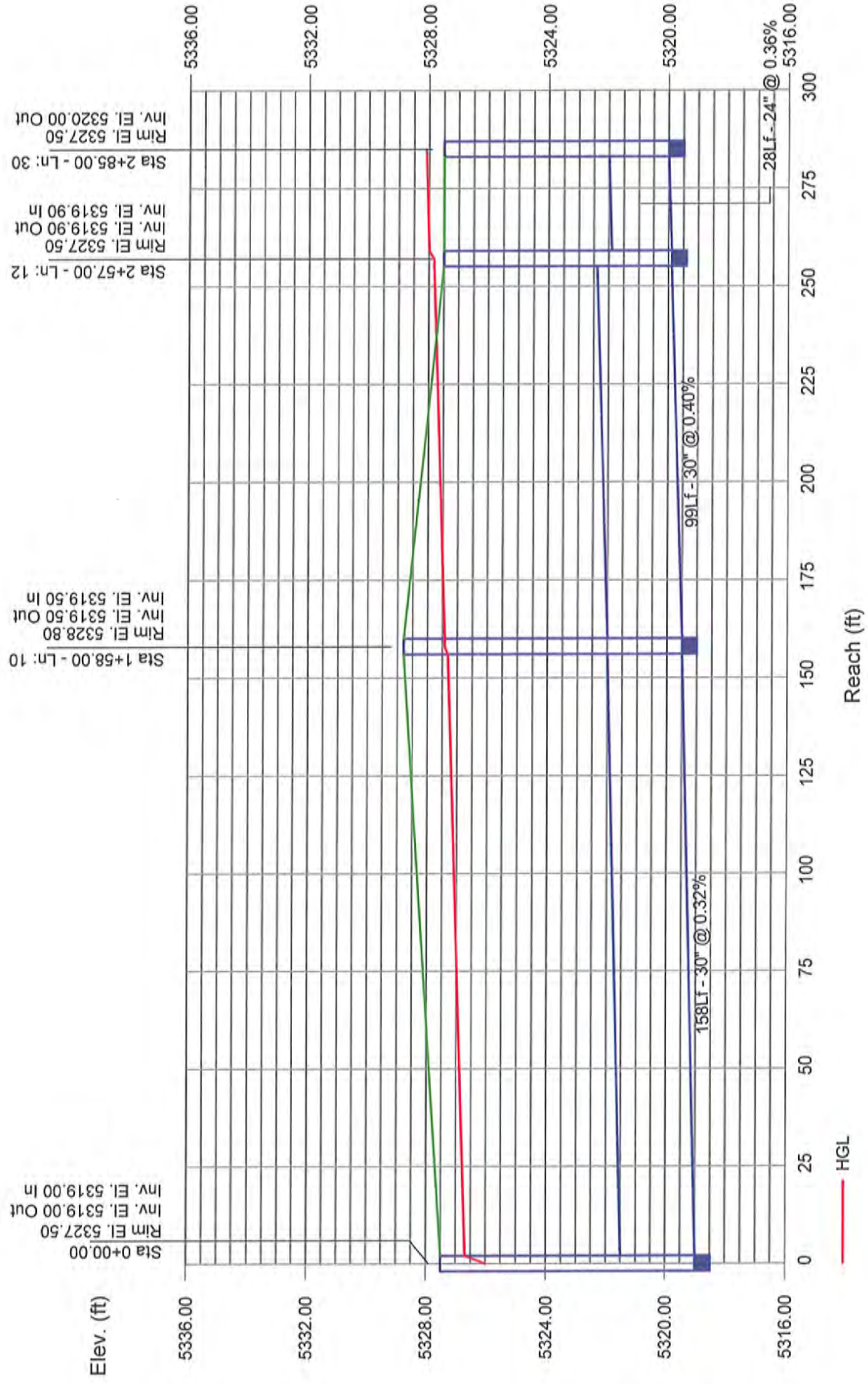


Storm Sewer Profile



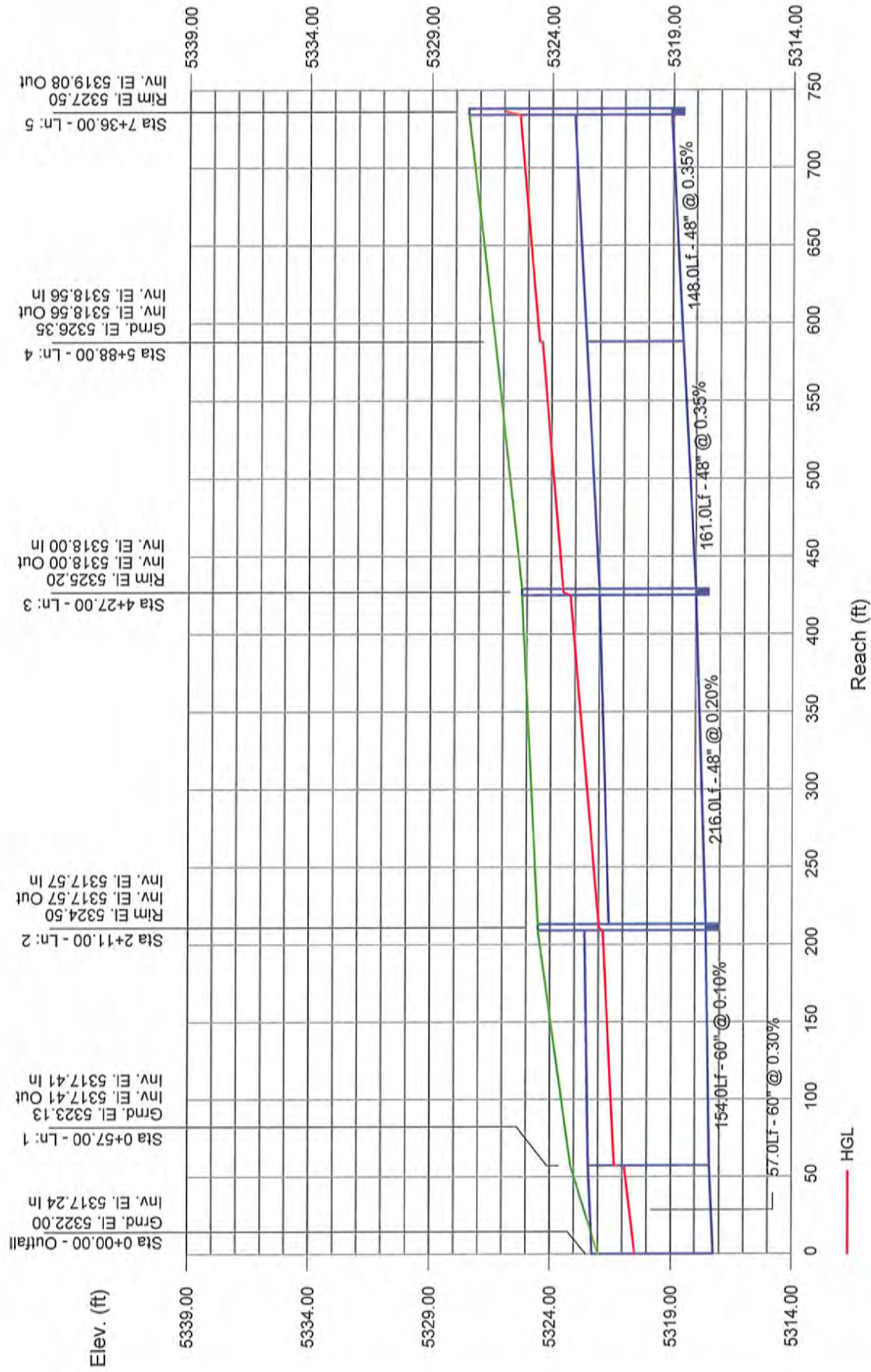
Storm Sewer Profile

Proj. file: POND 5 - North System.stm

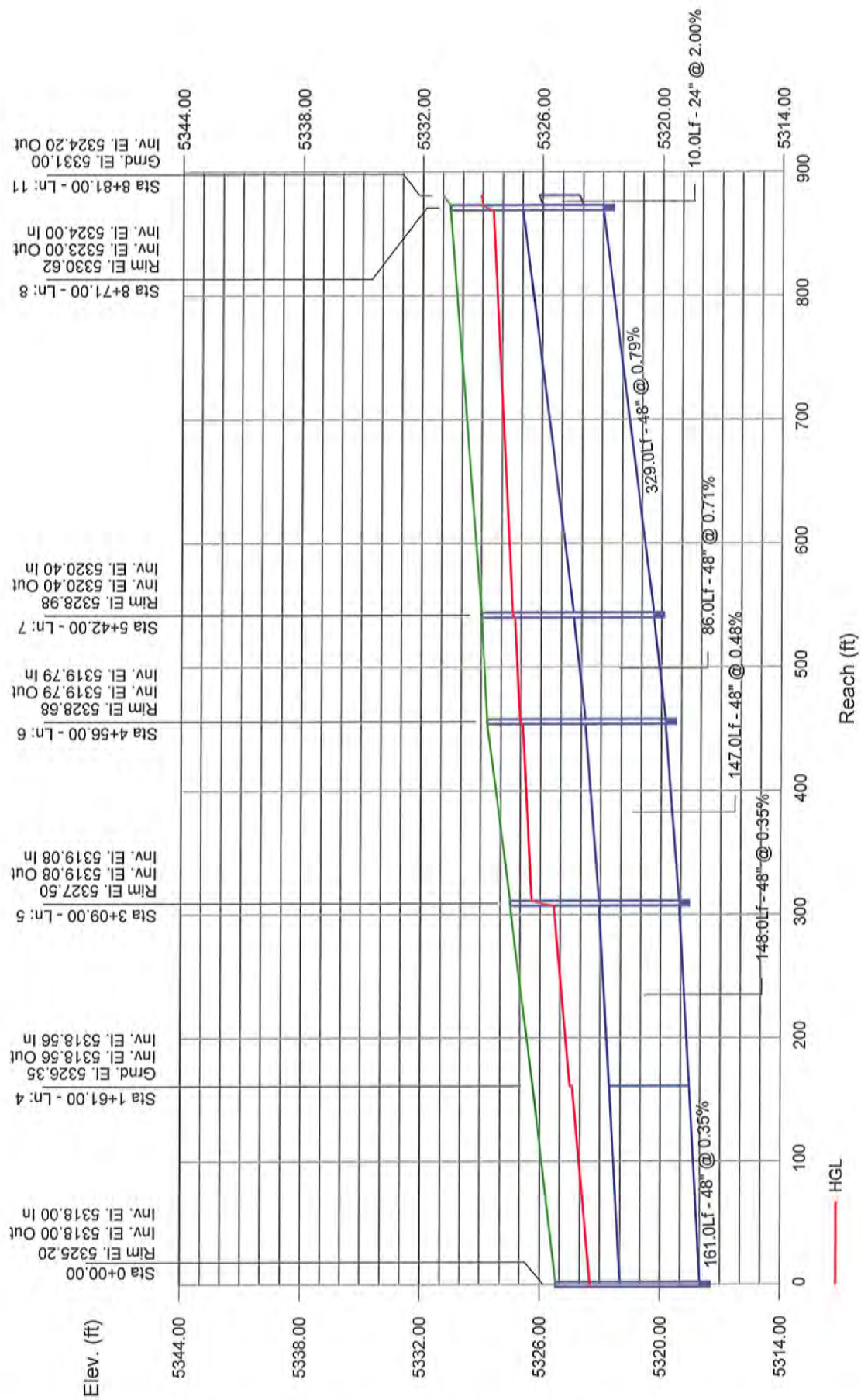


Storm Sewer Profile

Proj. file: POND 5 - North System.stm

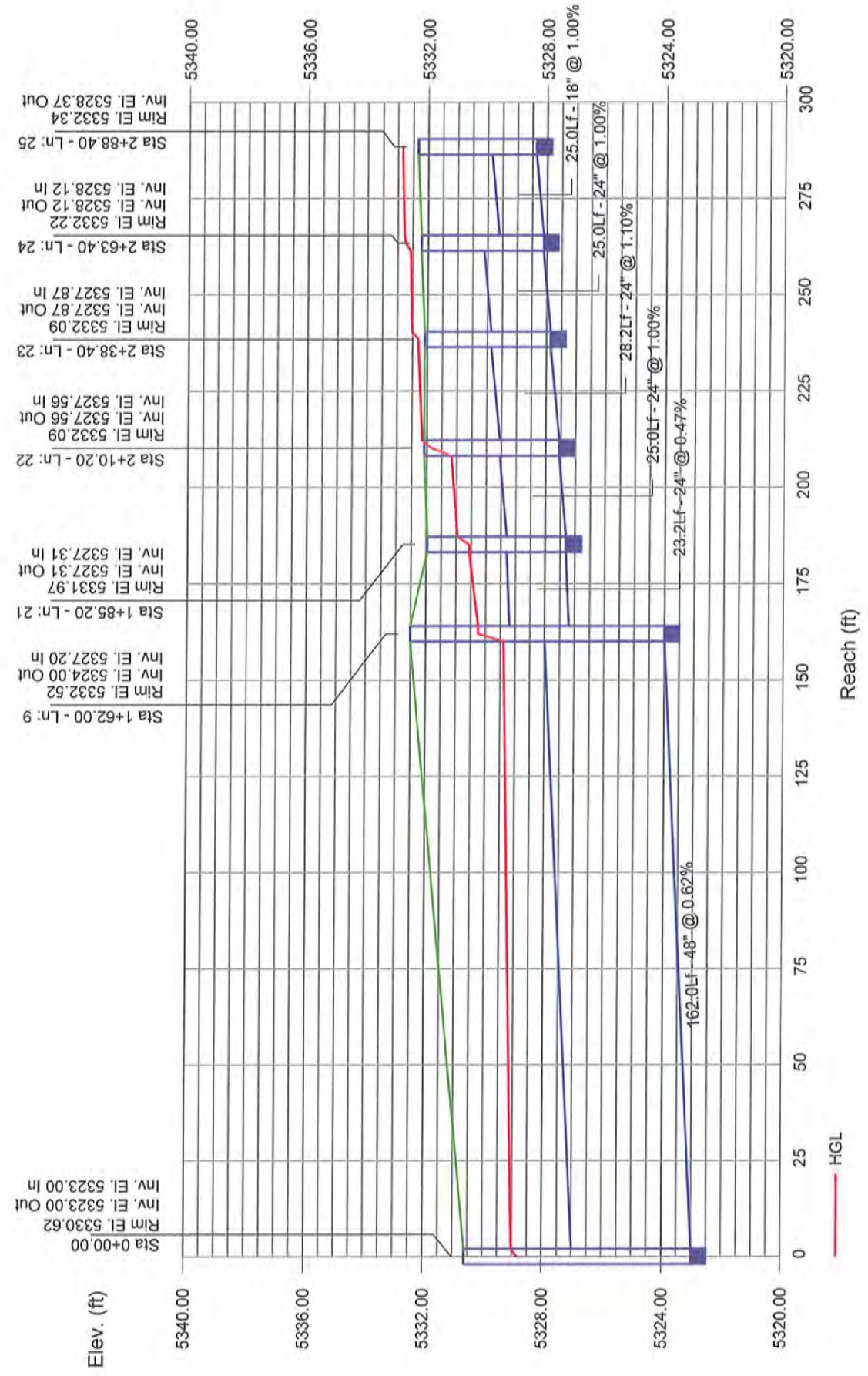


Storm Sewer Profile



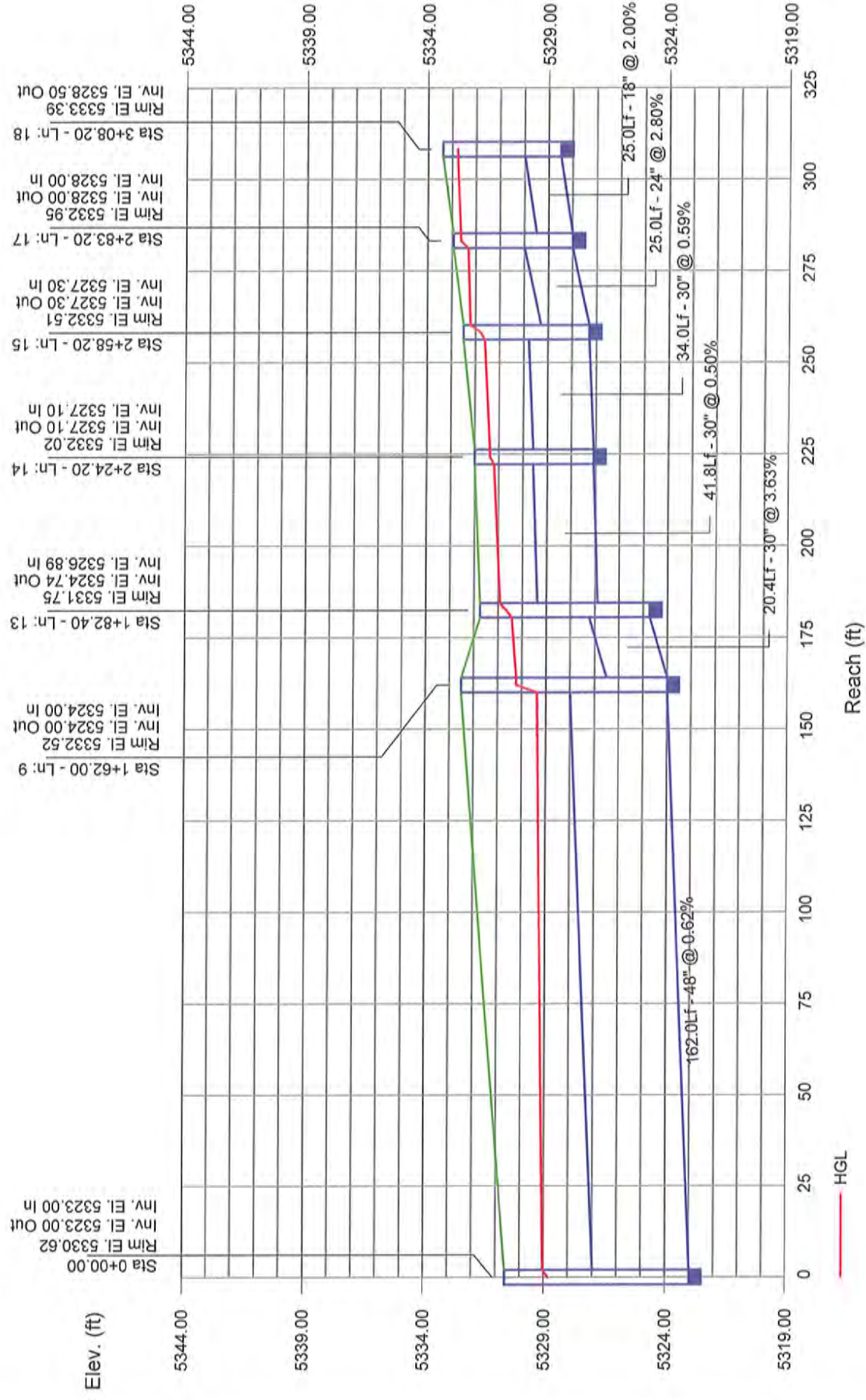
Storm Sewer Profile

Proj. file: POND 5 - North System_1.stm



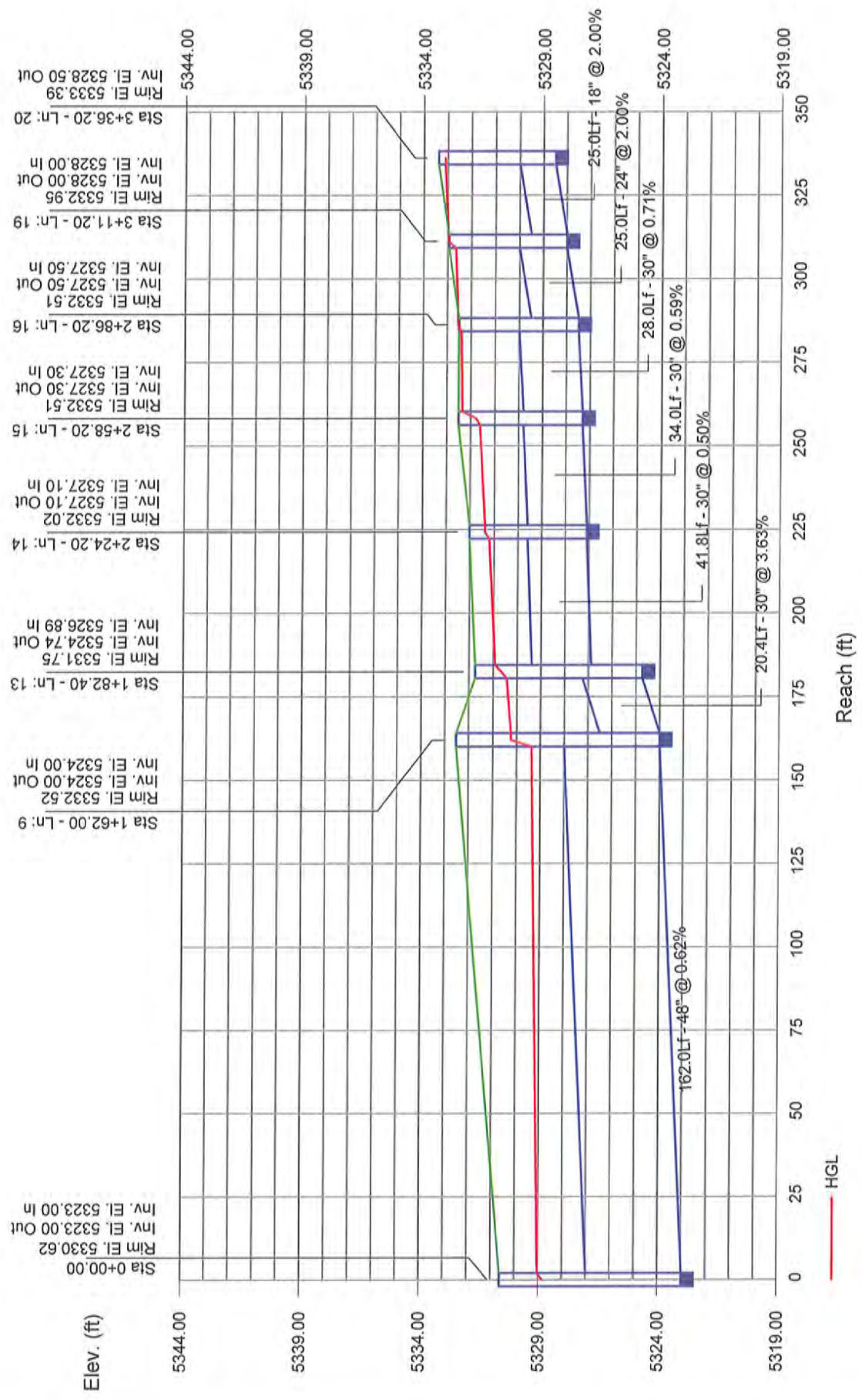
Storm Sewer Profile

Proj. file: POND 5 - North System_1.stm

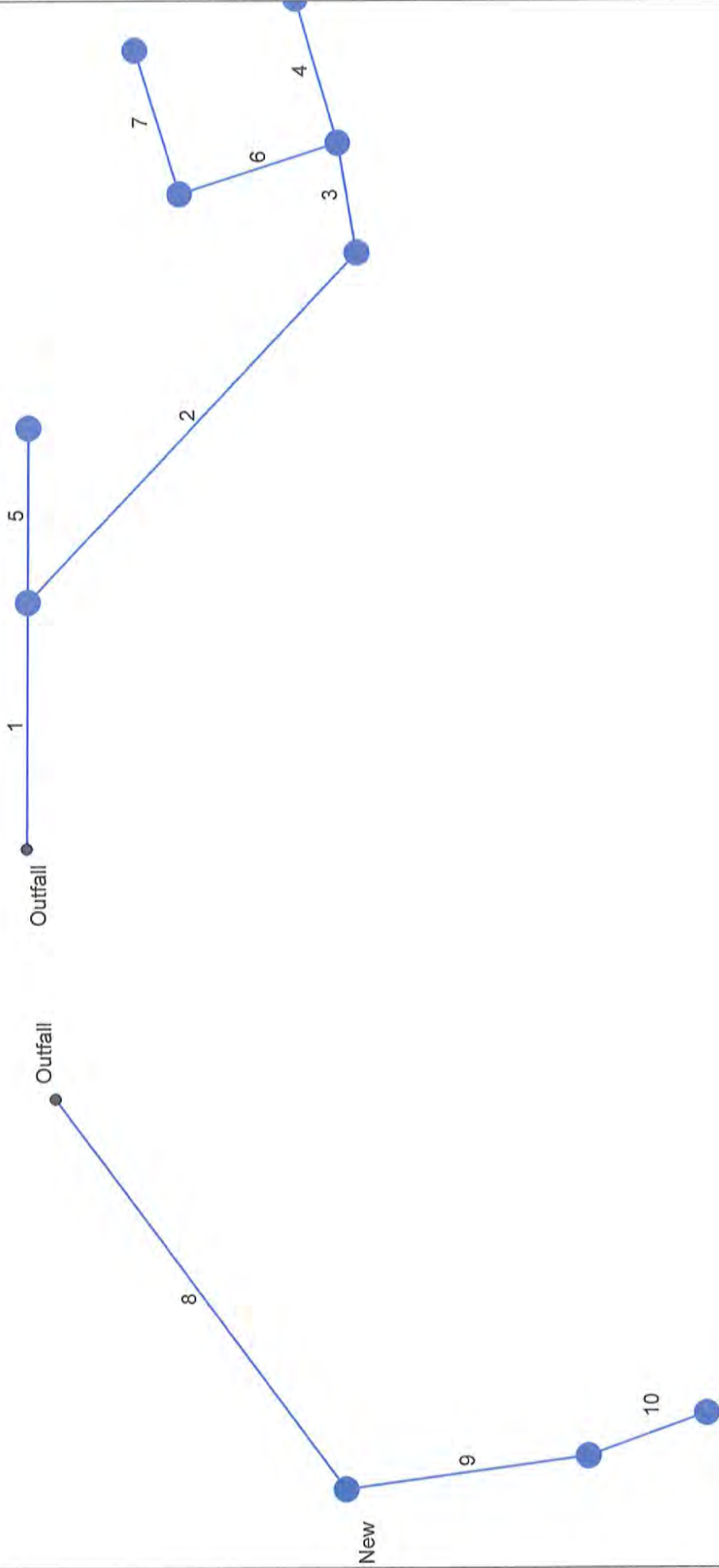


Storm Sewer Profile

Proj. file: POND 5 - North System_1.stm



POND 5 - South System



Line No.	DnStm Ln No	Line Size (in)	Flow Rate (cfs)	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	EGL Dn (ft)	EGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)
1	Outfall	36	31.00	41.0	0.41	5317.00	5317.17	5321.00	5323.26	5320.43	5320.52	5320.73	5320.82	1.00	3.09	0.73	4.39
2	1	30	22.00	80.0	0.50	5317.17	5317.57	5323.26	5322.45	5320.74	5320.97	5321.05	5321.28	3.59	2.38	0.83	4.48
3	2	30	22.00	18.5	1.68	5318.00	5318.31	5322.45	5322.26	5321.23	5321.28	5321.54	5321.59	1.95	1.45	1.00	4.48
4	3	18	5.50	25.0	0.96	5318.31	5318.55	5322.26	5322.18	5321.75	5321.82	5321.91	5321.97	2.45	2.13	1.00	3.11
5	1	18	4.50	29.0	0.52	5317.17	5317.32	5323.26	5323.26	5320.94	5320.99	5321.04	5321.09	4.59	4.44	1.00	2.55
6	3	24	11.00	28.0	1.00	5318.31	5318.59	5322.26	5322.26	5321.71	5321.78	5321.91	5321.97	1.95	1.67	1.00	3.50
7	6	18	5.50	25.0	1.00	5318.59	5318.84	5322.26	5322.18	5322.01	5322.08	5322.16	5322.23	2.17	1.84	1.00	3.11
8	Outfall	24	15.00	81.5	0.12	5316.20	5316.30	5322.70	5322.46	5320.43	5320.79	5320.79	5321.14	4.50	4.16	0.90	4.78
9	8	24	15.00	41.0	4.27	5316.30	5318.05	5322.46	5321.98	5321.11	5321.29	5321.46	5321.64	4.16	1.93	0.25	4.78
10	9	18	7.50	21.0	1.19	5318.05	5318.30	5321.98	5321.93	5321.45	5321.56	5321.73	5321.84	2.43	2.13	1.00	4.24

POND 5 - South System

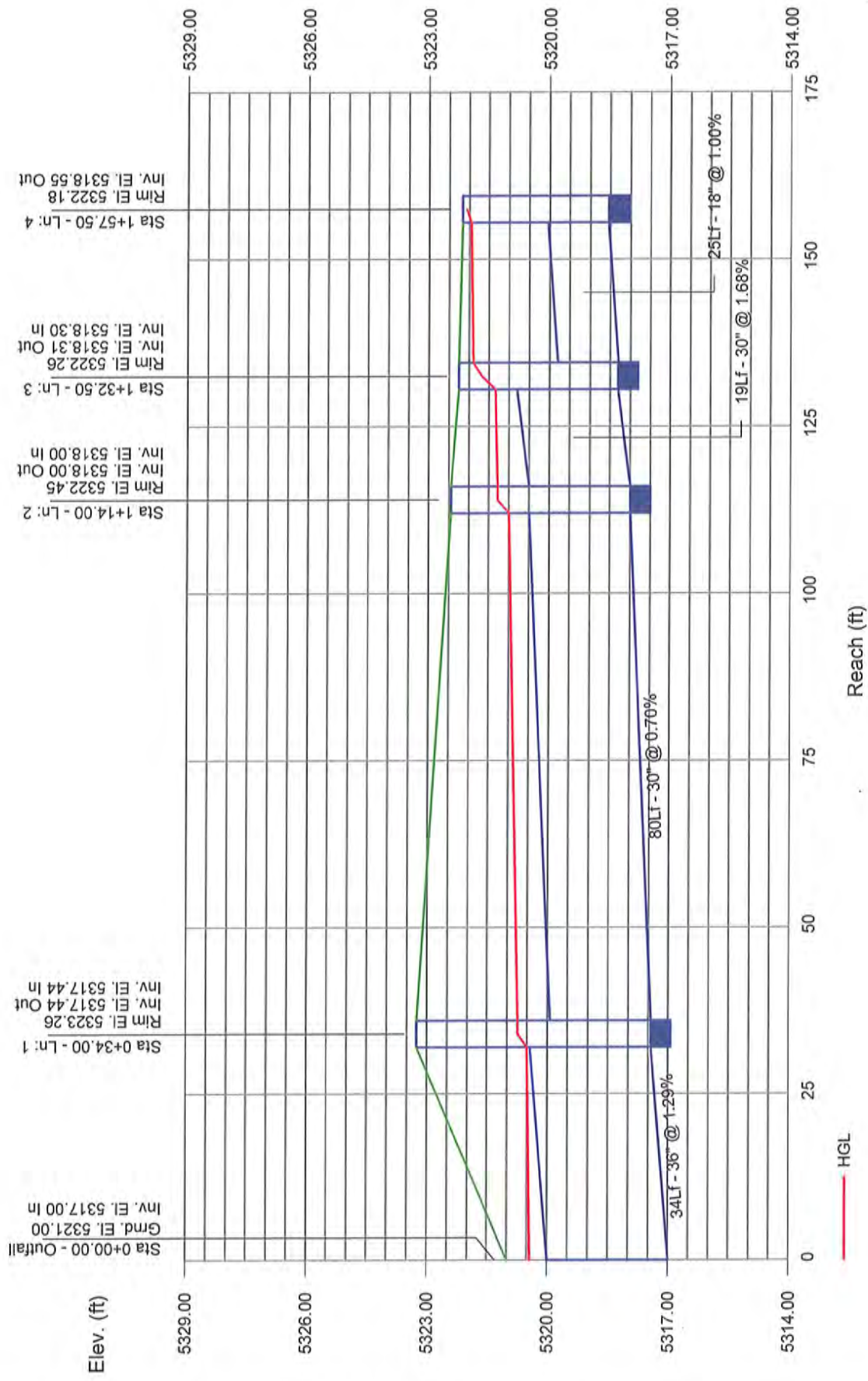
Number of lines: 10

Date: 12-15-2011

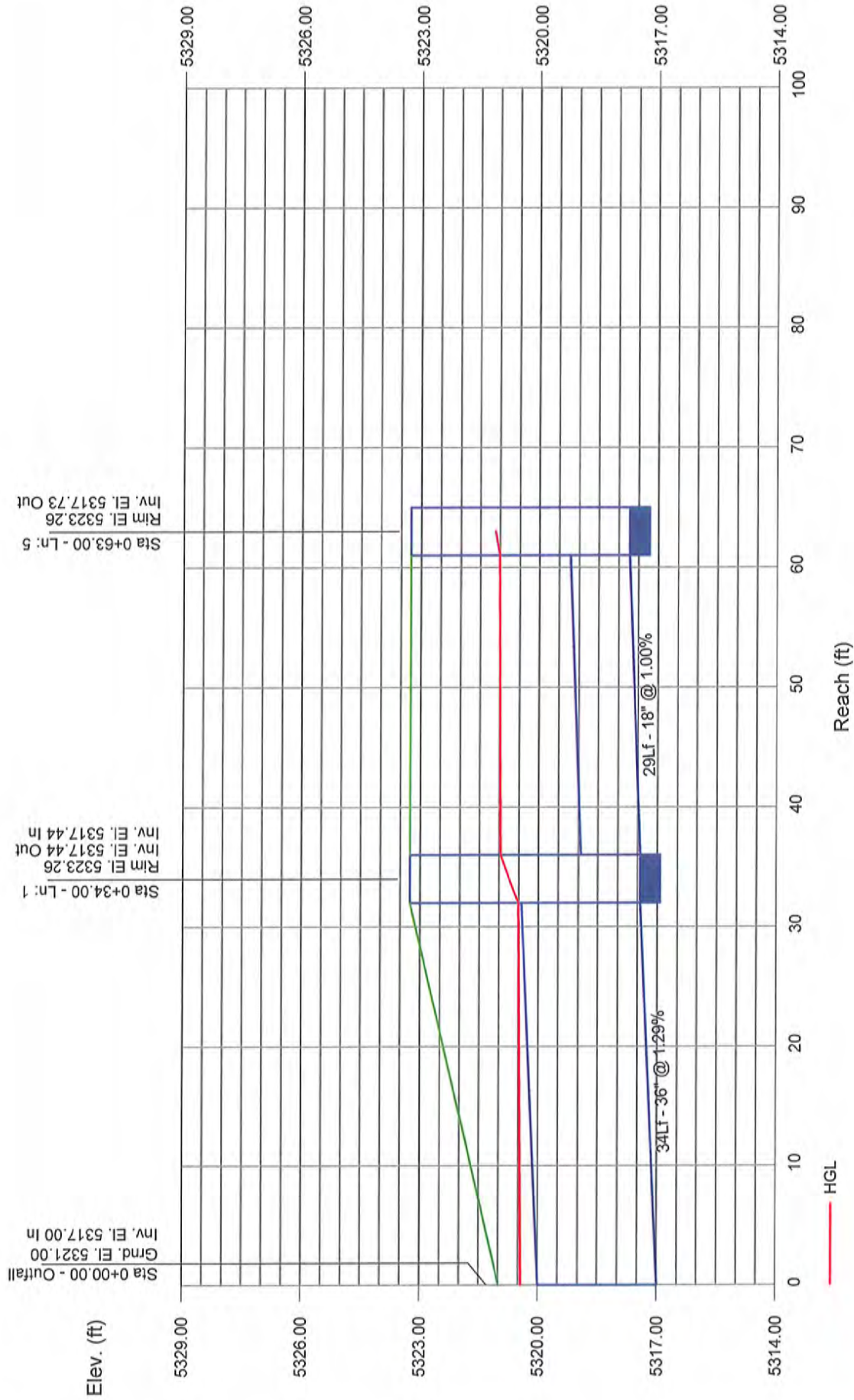
NOTES: ** Critical depth

Storm Sewer Profile

Proj. file: POND 5 - South System.stm

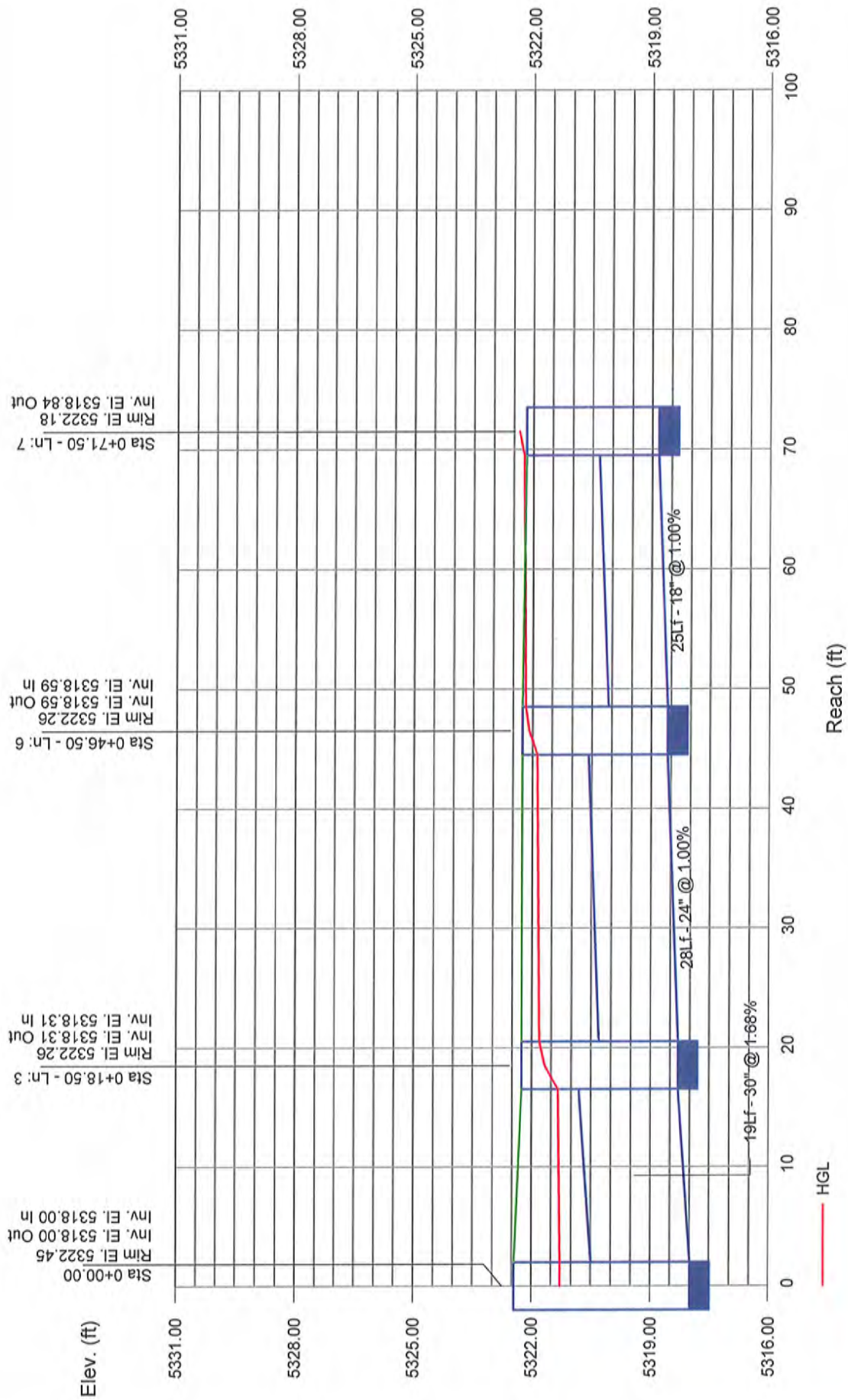


Storm Sewer Profile

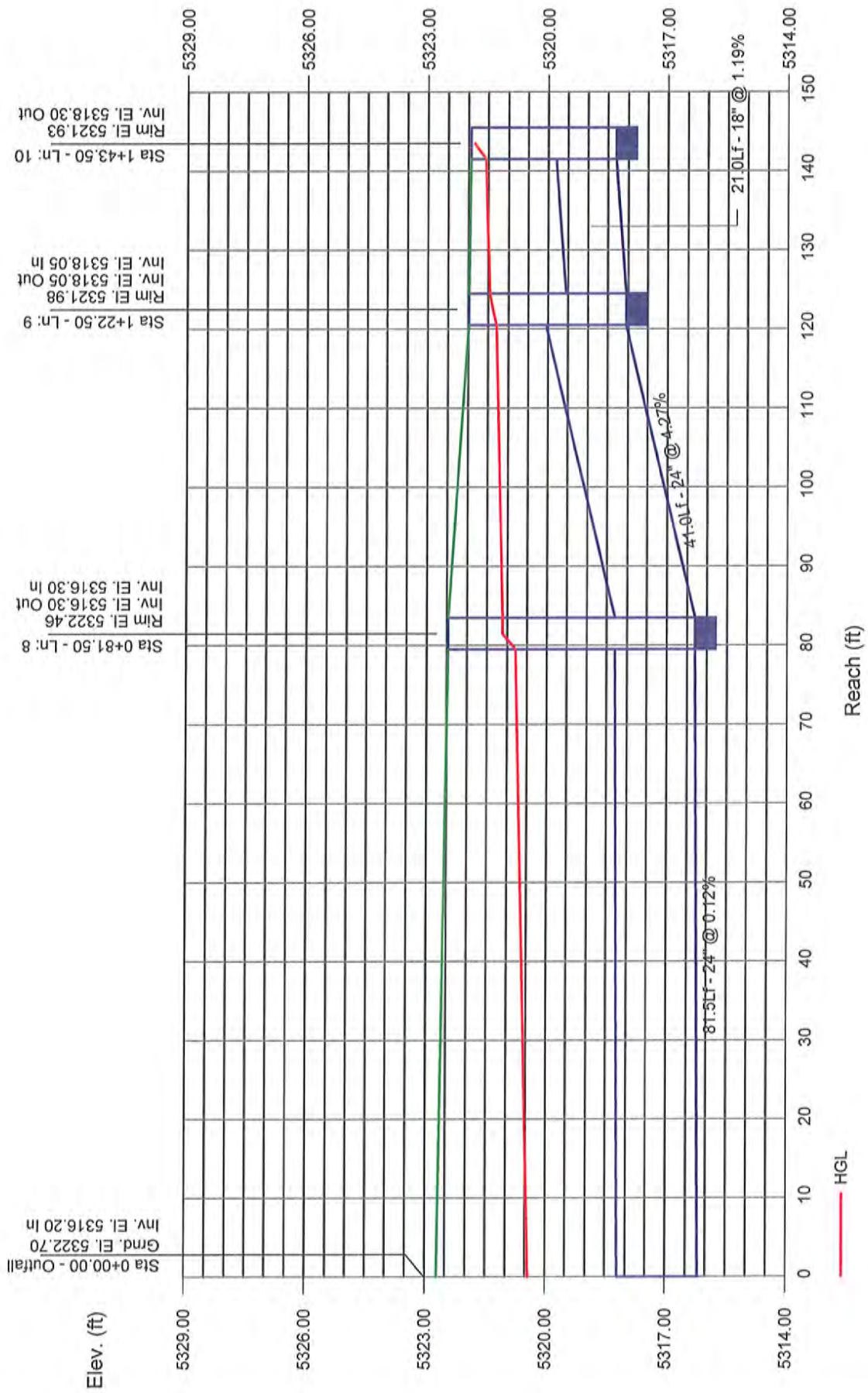


Storm Sewer Profile

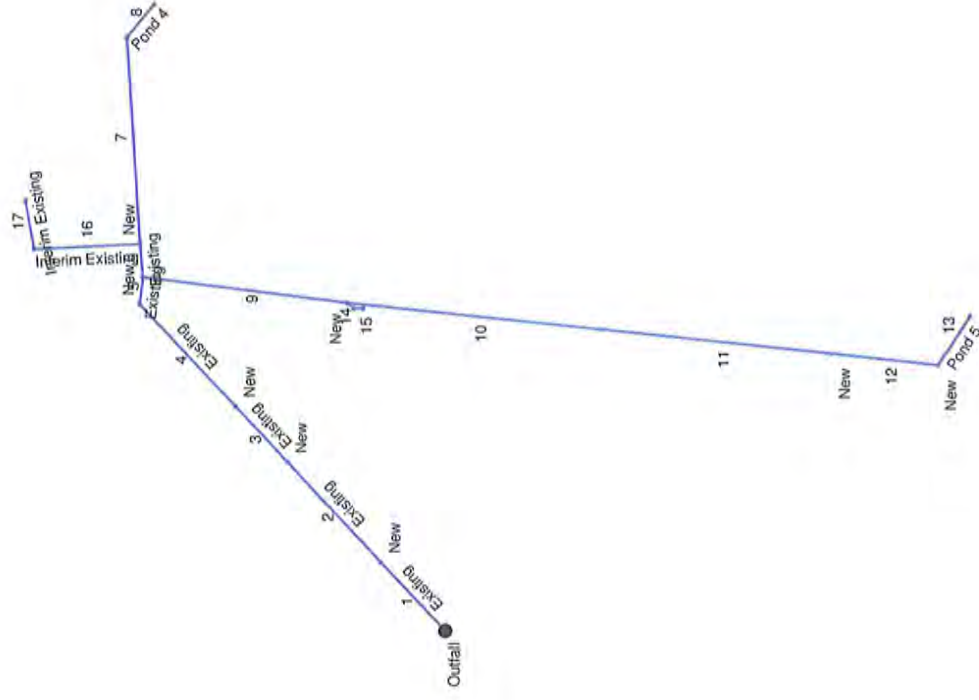
Proj. file: POND 5 - South System.stm



Storm Sewer Profile



Ponds 4 & 5 to Unser Blvd



Project File: POND5 4 and 5 to Unser SD.stm	Number of lines: 17	Date: 10-04-2011
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Hydralow Storm Sewers 2008 v12.01

Line No.	DnStm Ln No	Line Size (in)	Flow Rate (cfs)	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	EGL Dn (ft)	EGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)
1	Outfall	54	79.50	150.0	0.92	5305.00	5306.38	5326.00	5320.95	5313.06	5313.31	5313.45	5313.69	16.50	10.07	0.05	5.00
2	1	54	79.50	220.0	2.05	5306.48	5311.00	5320.95	5331.30	5313.33	5313.56	5313.71	5314.69	9.97	15.80	0.14	6.76
3	2	54	79.50	123.0	0.36	5311.36	5311.80	5331.30	5329.80	5314.30	5314.55	5315.11	5315.50	15.44	13.50	0.08	7.53
4	3	54	79.50	225.0	0.62	5311.90	5313.30	5329.80	5329.80	5315.18	5315.86	5315.82	5316.99	13.40	12.00	0.21	7.46
5	4	54	79.50	43.0	0.93	5313.40	5313.80	5329.80	5330.80	5316.60	5316.36	5317.27	5317.49	11.90	12.50	0.88	7.55
6	5	36	30.00	53.0	1.00	5313.90	5314.43	5330.80	5329.80	5317.17	5317.26	5317.45	5317.55	13.90	12.37	1.05	4.30
7	6	24	9.00	330.0	1.66	5314.53	5320.00	5329.80	5332.60	5317.73	5321.06 j	5317.86	5321.50	13.27	10.60	0.28	4.09
8	7	24	9.00	80.0	6.25	5321.50	5326.50	5332.60	5334.00	5322.56	5327.56	5323.00	5328.00	9.10	5.50	0.00	5.31
9	5	42	49.50	330.0	0.18	5313.90	5314.50	5330.80	5326.75	5317.07	5317.79	5317.53	5318.22	13.40	8.75	0.51	5.34
10	9	42	37.00	413.0	0.11	5314.50	5314.94	5326.75	5331.29	5318.21	5318.77	5318.44	5319.00	8.75	12.85	0.43	3.85
11	10	42	37.00	370.0	0.13	5314.94	5315.41	5331.29	5326.85	5318.87	5319.37	5319.10	5319.60	12.85	7.94	0.43	3.85
12	11	42	37.00	172.0	0.13	5315.41	5315.63	5326.85	5324.78	5319.47	5319.70	5319.70	5319.93	7.94	5.65	0.35	3.85
13	12	30	37.00	84.0	0.14	5315.63	5315.75	5324.78	5321.00	5319.78	5320.47	5320.67	5321.35	6.65	2.75	0.20	7.54
14	9	18	12.50	14.0	5.00	5320.50	5321.20	5326.75	5326.35	5321.84	5322.54	5322.72	5323.42	4.75	3.65	0.16	7.52
15	14	18	6.50	15.0	5.00	5321.30	5322.05	5326.35	5326.33	5323.21	5323.12	5323.42	5323.48	3.55	2.78	0.00	4.24
16	6	30	21.00	171.0	1.00	5315.46	5317.17	5329.80	5335.29	5317.57	5318.70 j	5317.92	5319.39	11.84	15.62	0.22	5.70
17	16	30	21.00	79.0	3.80	5321.80	5324.80	5335.29	5332.80	5323.33	5326.33	5324.02	5327.02	10.99	5.50	0.00	6.66

Ponds 4 & 5 to Unser Blvd

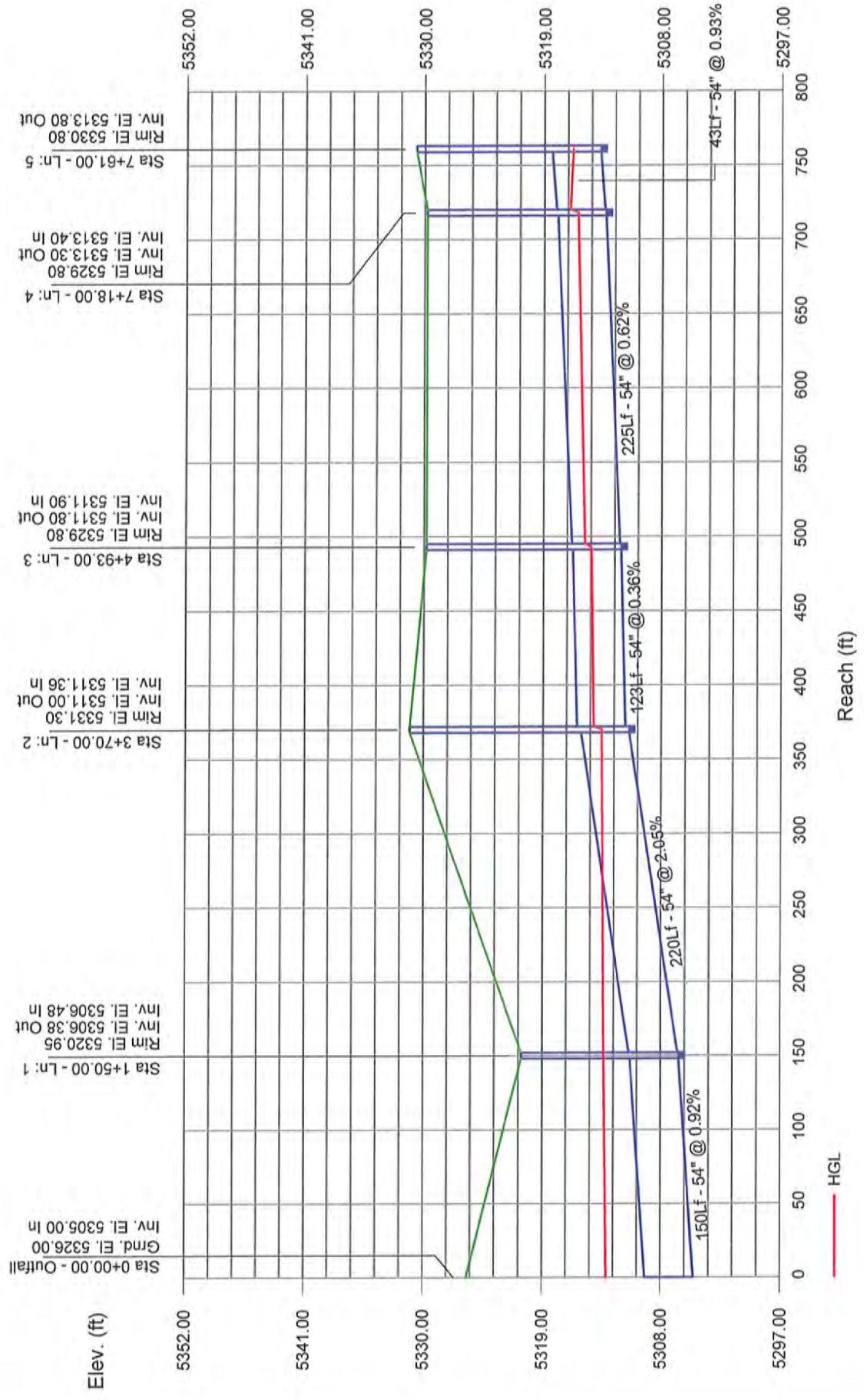
Number of lines: 17

Date: 11-28-2011

NOTES: ** Critical depth

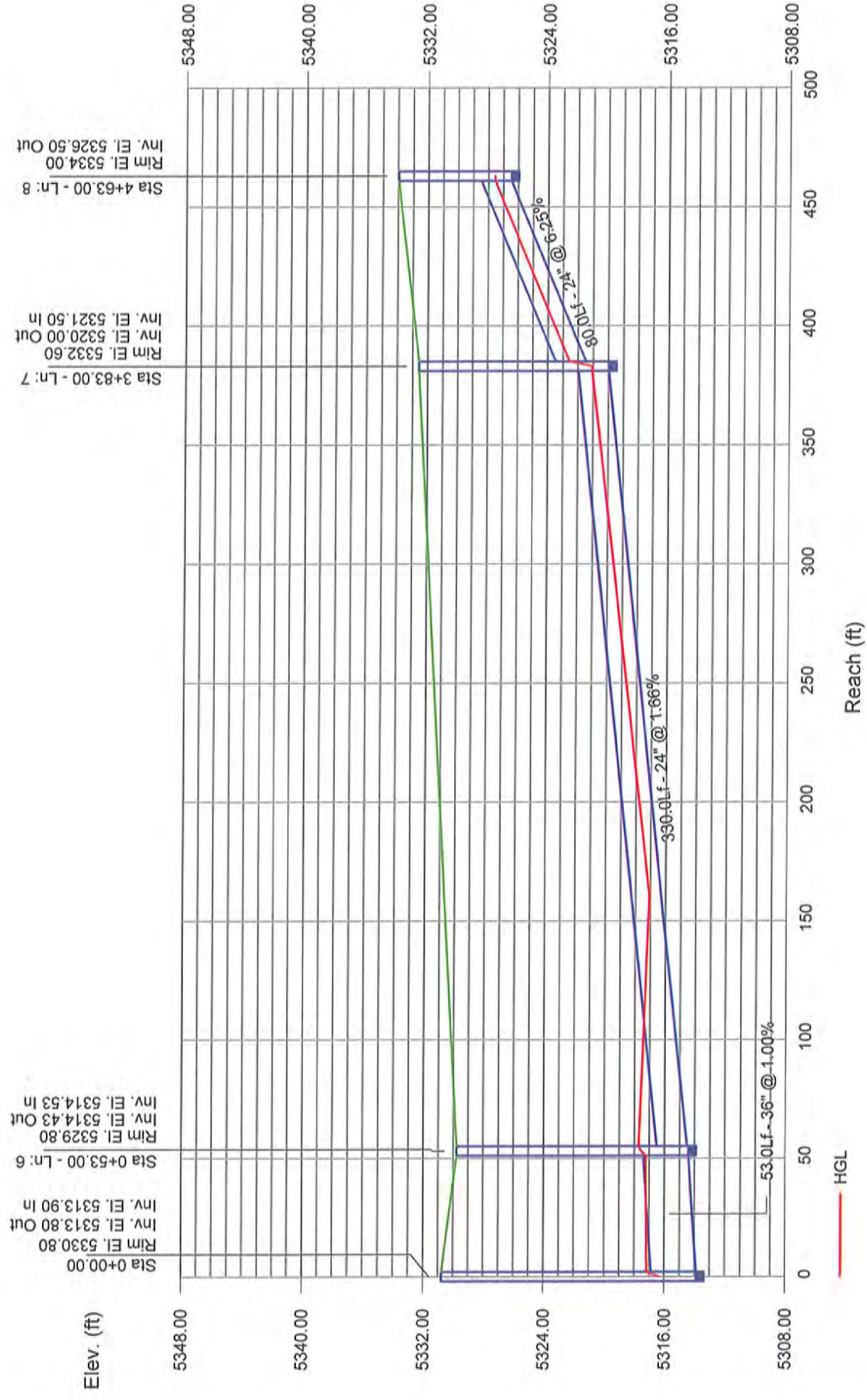
Storm Sewer Profile

Proj. file: PONDS 4 and 5 to Unser SD.stm

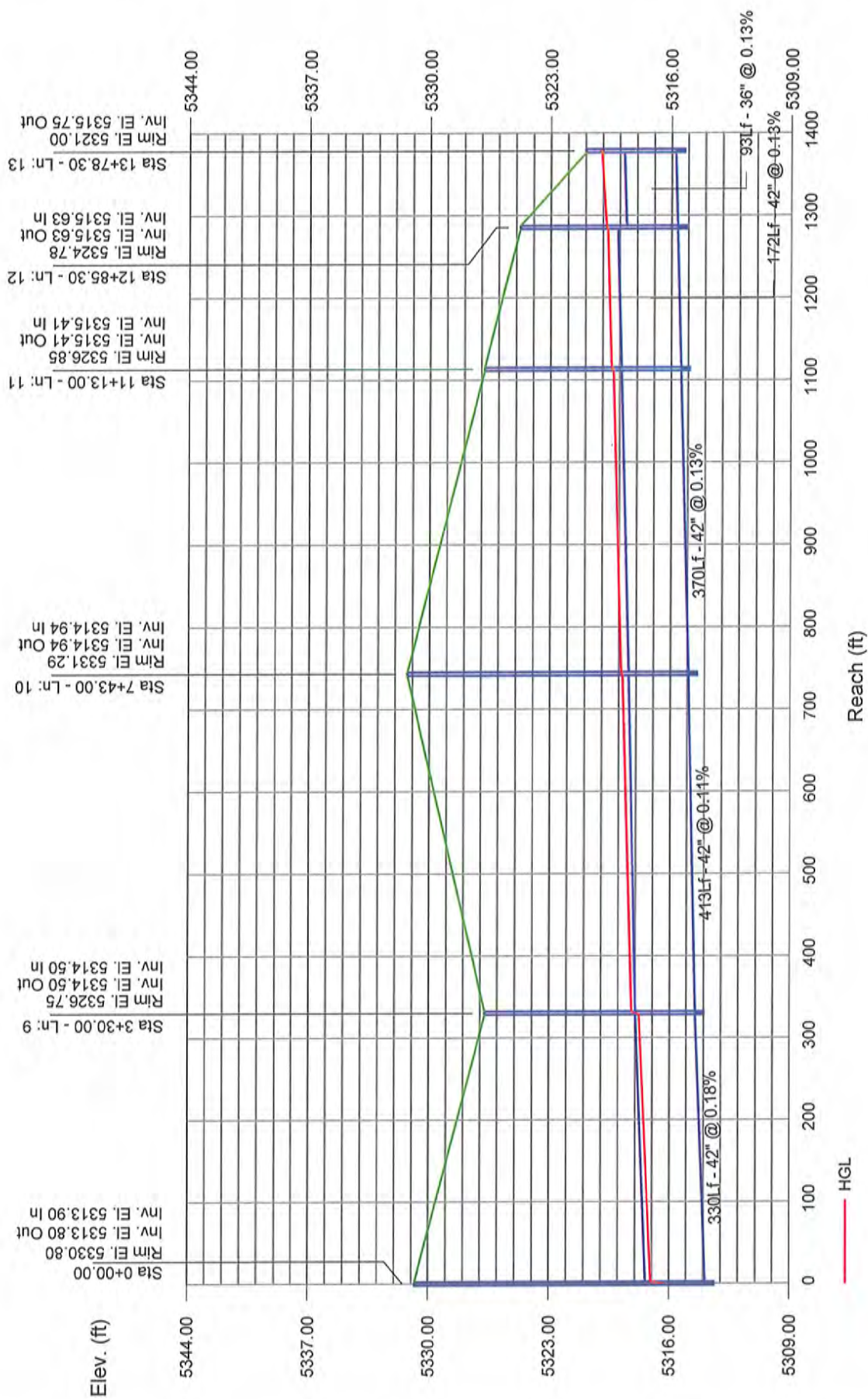


Storm Sewer Profile

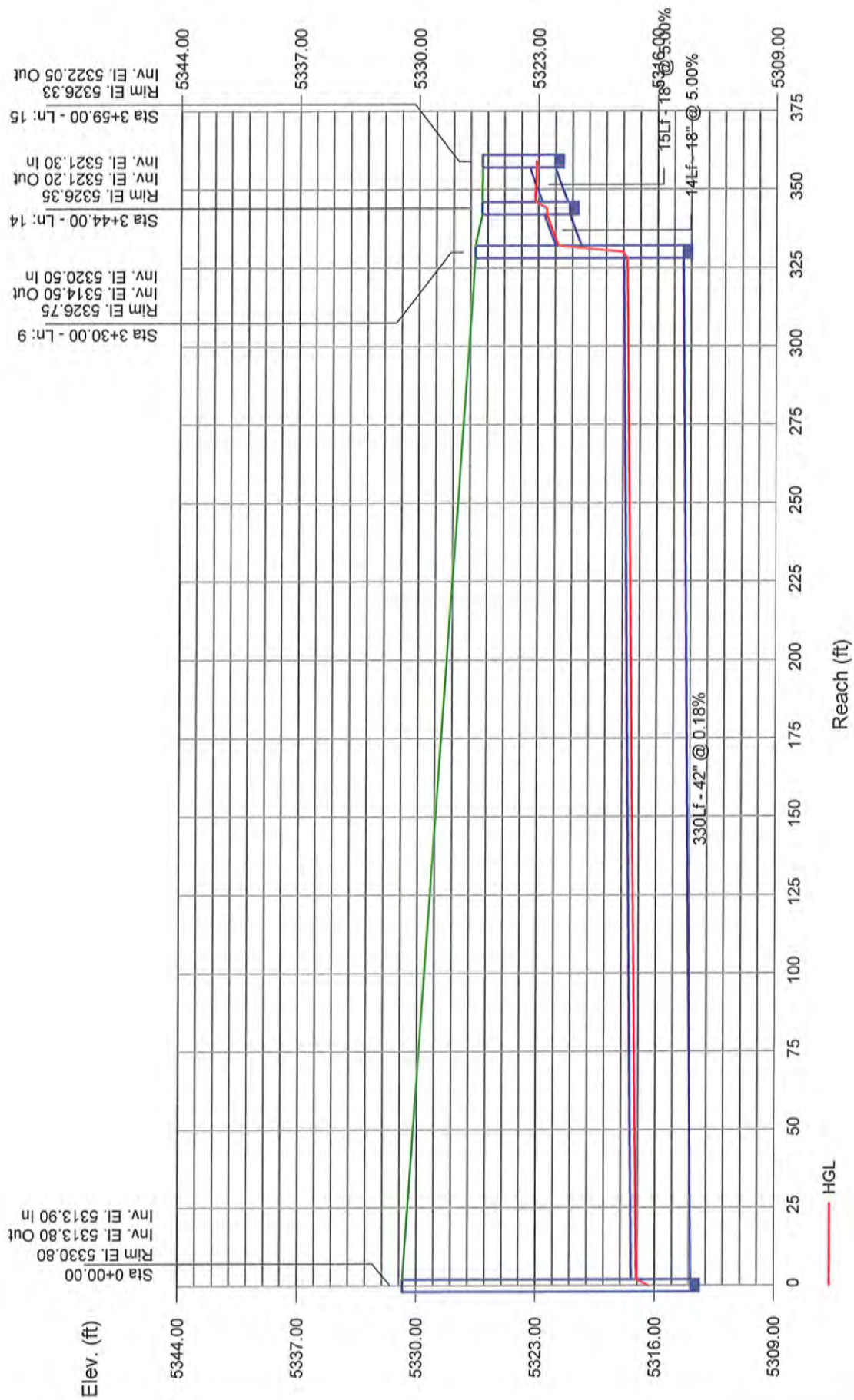
Proj. file: PONDS 4 and 5 to Unser SD.stm



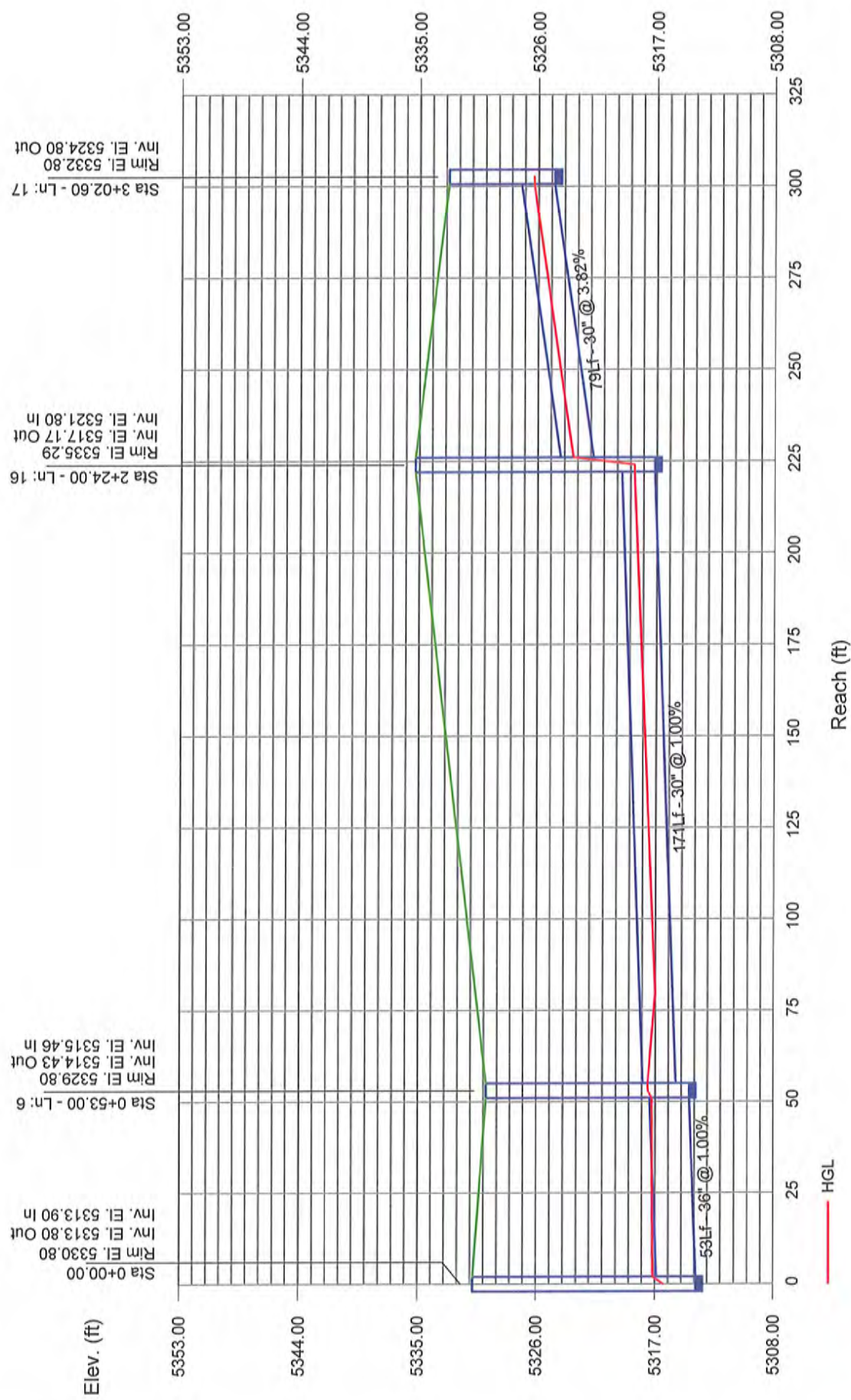
Storm Sewer Profile



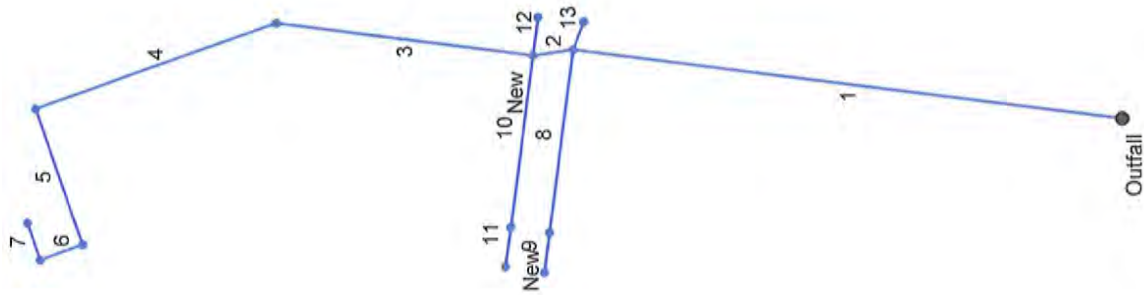
Storm Sewer Profile



Storm Sewer Profile



Pond 6



Line No.	DnStm Ln No	Line Size (in)	Flow Rate (cfs)	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	EGL Dn (ft)	EGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)
1	Outfall	48	71.00	349	0.21	5308.20	5308.95	5313.50	5315.12	5310.69	5312.51	5311.85	5313.07	1.30	2.17	1.00	7.32
2	1	36	47.15	25	0.59	5308.95	5309.10	5315.12	5315.08	5313.07	5313.20	5313.76	5313.89	3.17	2.98	0.50	6.67
3	2	24	18.00	163	0.55	5309.10	5310.00	5315.08	5316.00	5313.73	5314.76	5314.24	5315.27	3.98	4.00	0.50	5.73
4	3	24	18.00	160	3.18	5310.00	5315.08	5316.00	5321.26	5315.01	5316.58 j	5315.52	5317.37	4.00	4.18	1.00	6.42
5	4	18	13.50	90	1.00	5315.08	5315.98	5321.26	5319.88	5316.58	5318.07	5317.49	5318.98	4.68	2.40	0.52	7.64
6	5	18	9.50	28	0.99	5315.98	5316.26	5319.88	5319.88	5319.00	5319.23	5319.45	5319.68	2.40	2.12	0.52	5.38
7	6	18	4.50	25	0.98	5316.26	5316.50	5319.88	5319.99	5319.81	5319.86	5319.92	5319.96	2.12	1.99	0.00	2.55
8	1	24	18.45	115	0.91	5308.95	5310.00	5315.12	5313.81	5313.10	5313.86	5313.63	5314.40	4.17	1.81	0.15	5.87
9	8	18	6.00	25	3.12	5310.00	5310.78	5313.81	5313.78	5314.30	5314.38	5314.48	5314.56	2.31	1.50	0.00	3.40
10	2	30	18.45	108	0.46	5309.10	5309.60	5315.08	5313.81	5314.02	5314.23	5314.24	5314.45	3.48	1.71	0.15	3.76
11	10	18	6.00	25	1.60	5309.60	5310.00	5313.81	5313.78	5314.31	5314.39	5314.49	5314.57	2.71	2.28	0.00	3.40
12	2	18	5.40	24	1.69	5310.10	5310.50	5315.08	5315.23	5314.09	5314.15	5314.24	5314.30	3.48	3.23	0.00	3.06
13	1	18	5.40	19	2.94	5309.95	5310.50	5315.12	5315.23	5313.49	5313.54	5313.63	5313.68	3.67	3.23	0.00	3.06

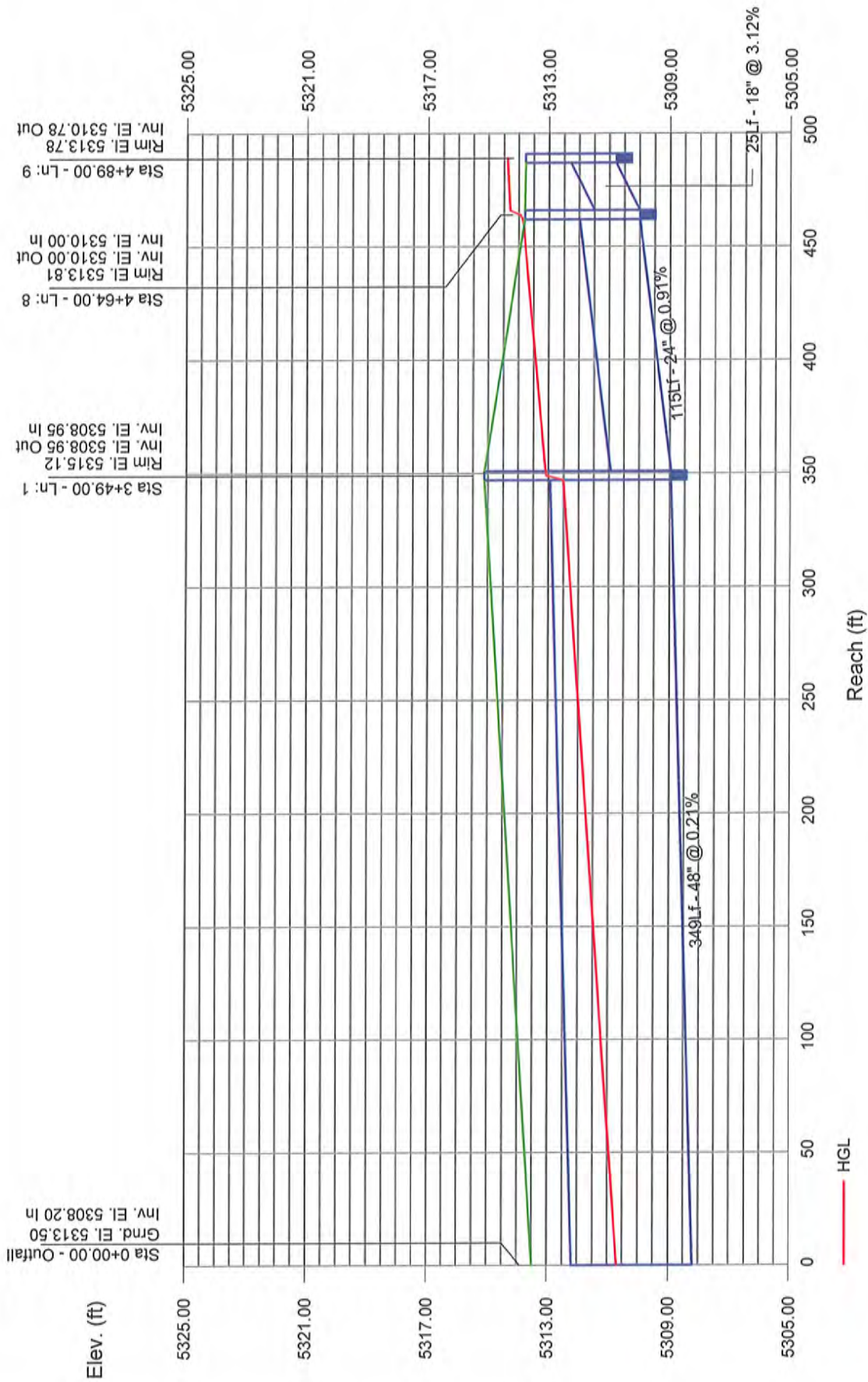
Pond 6

Number of lines: 13

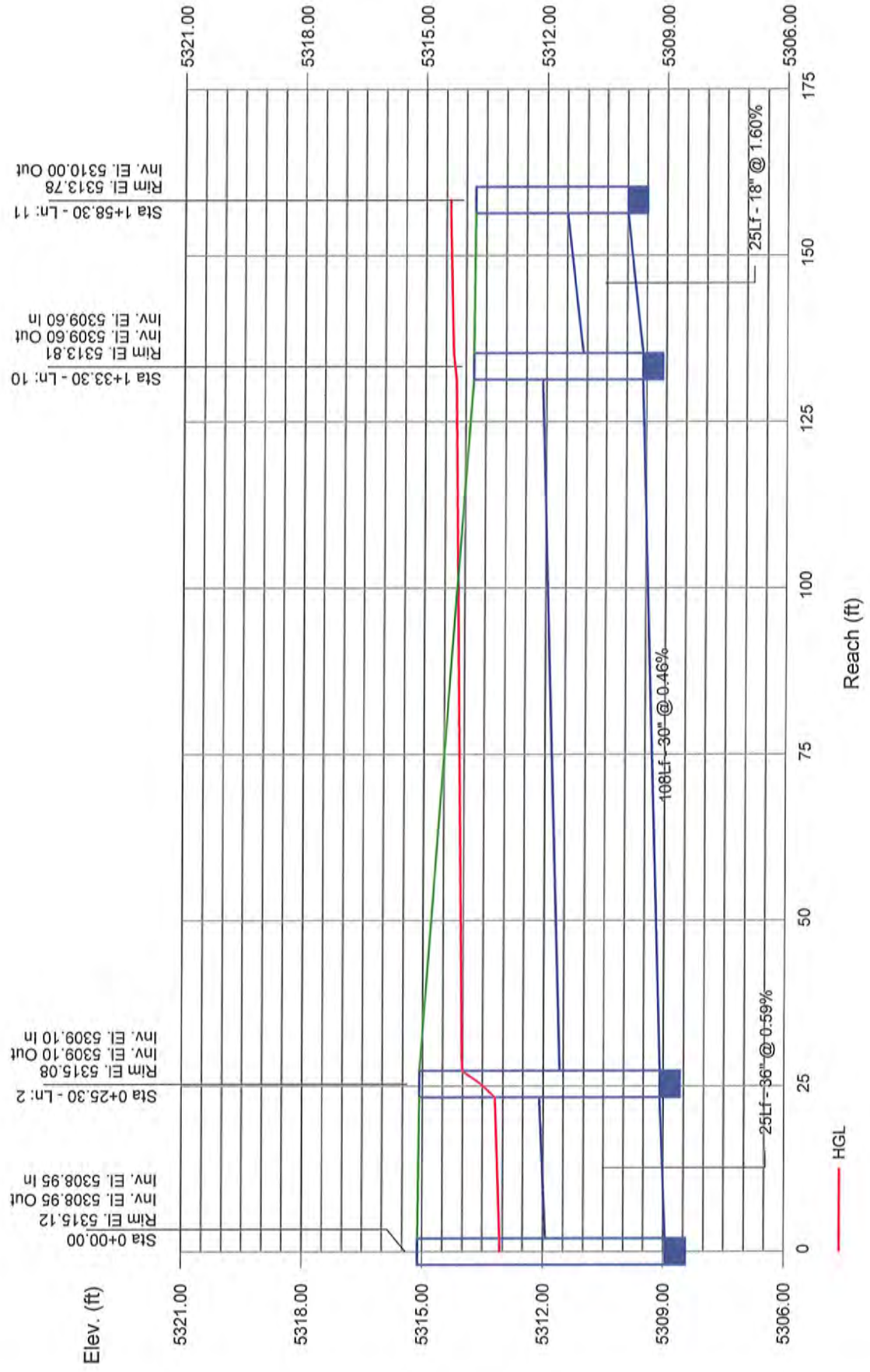
Date: 09-29-2011

NOTES: ** Critical depth

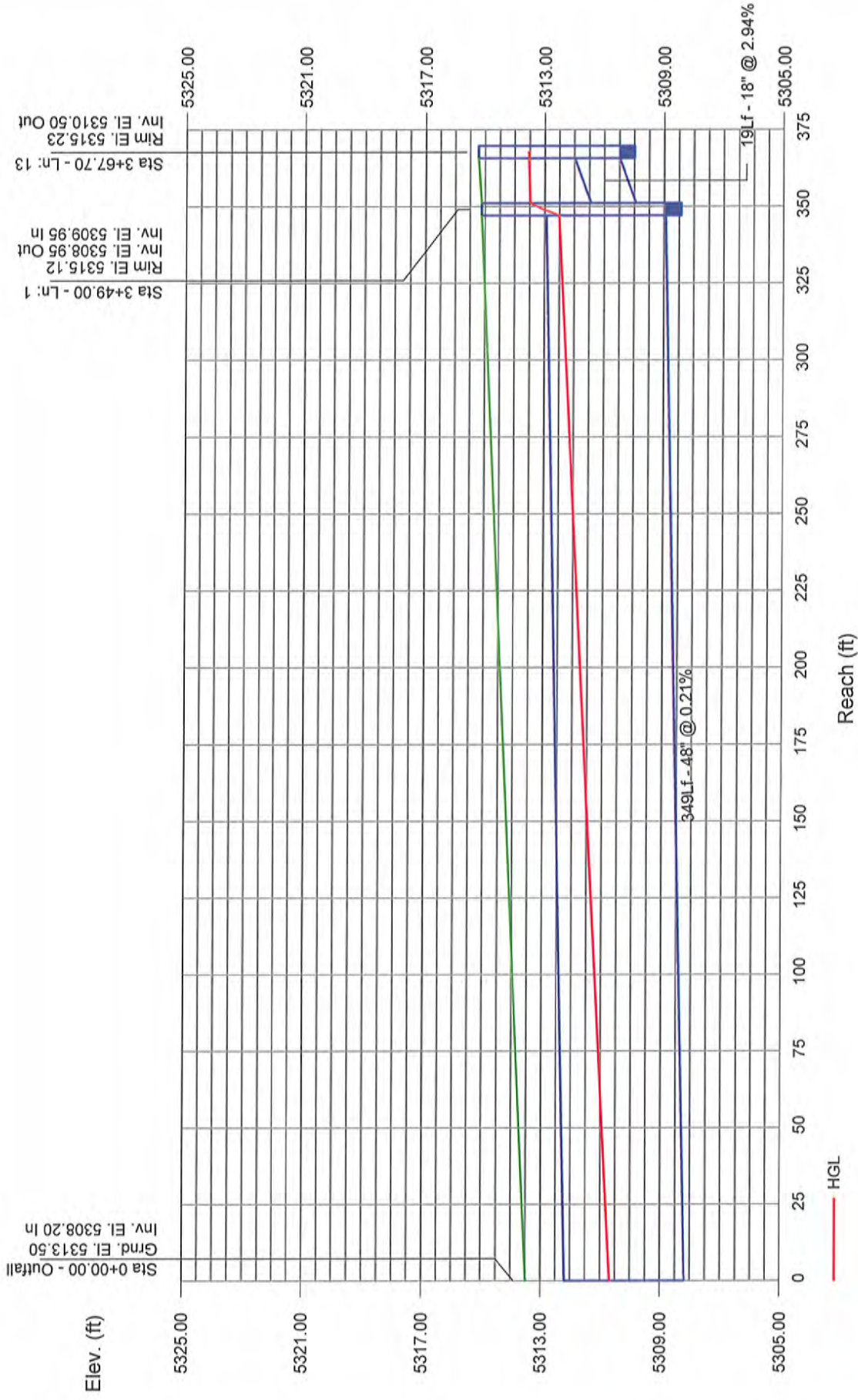
Storm Sewer Profile



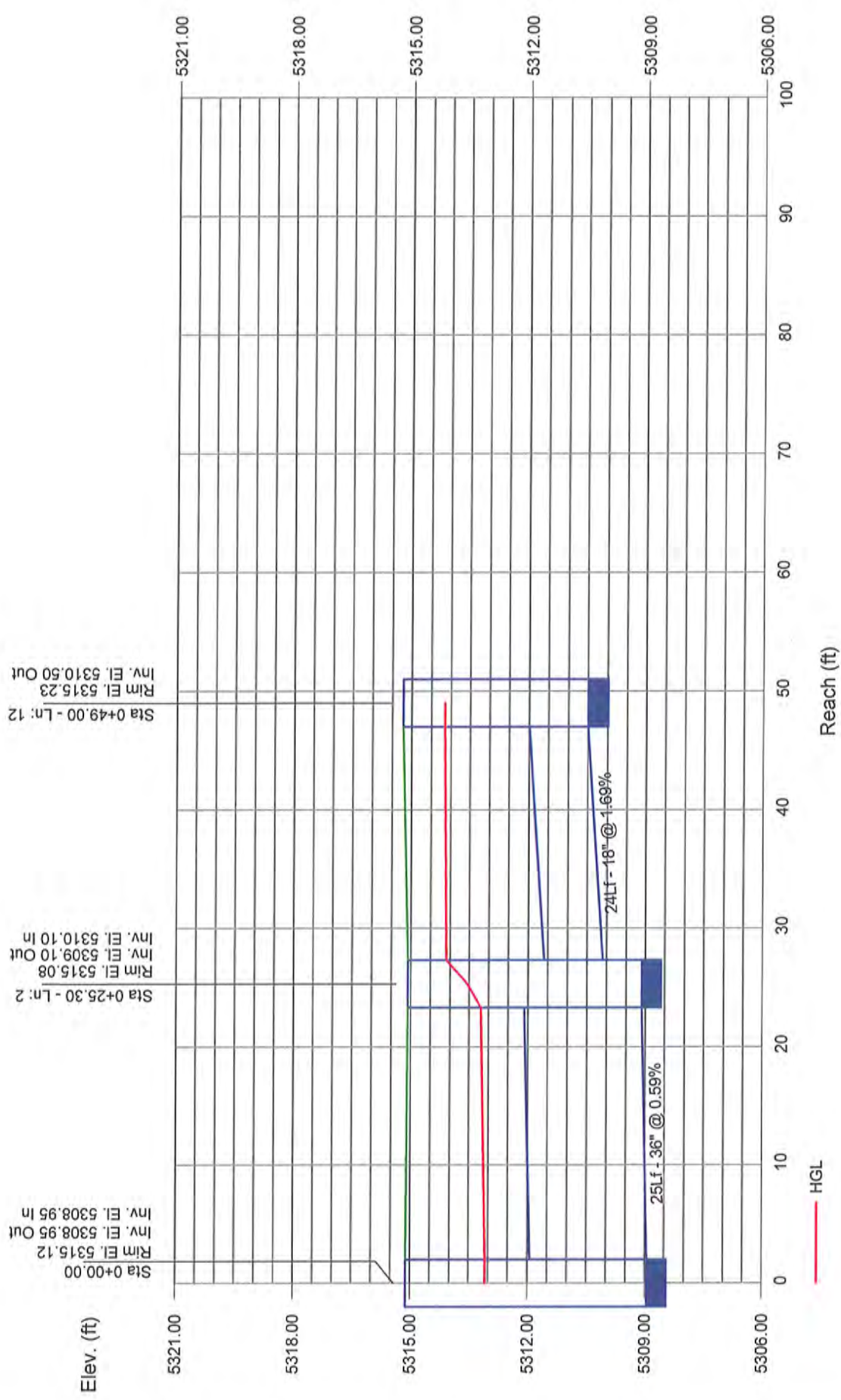
Storm Sewer Profile



Storm Sewer Profile

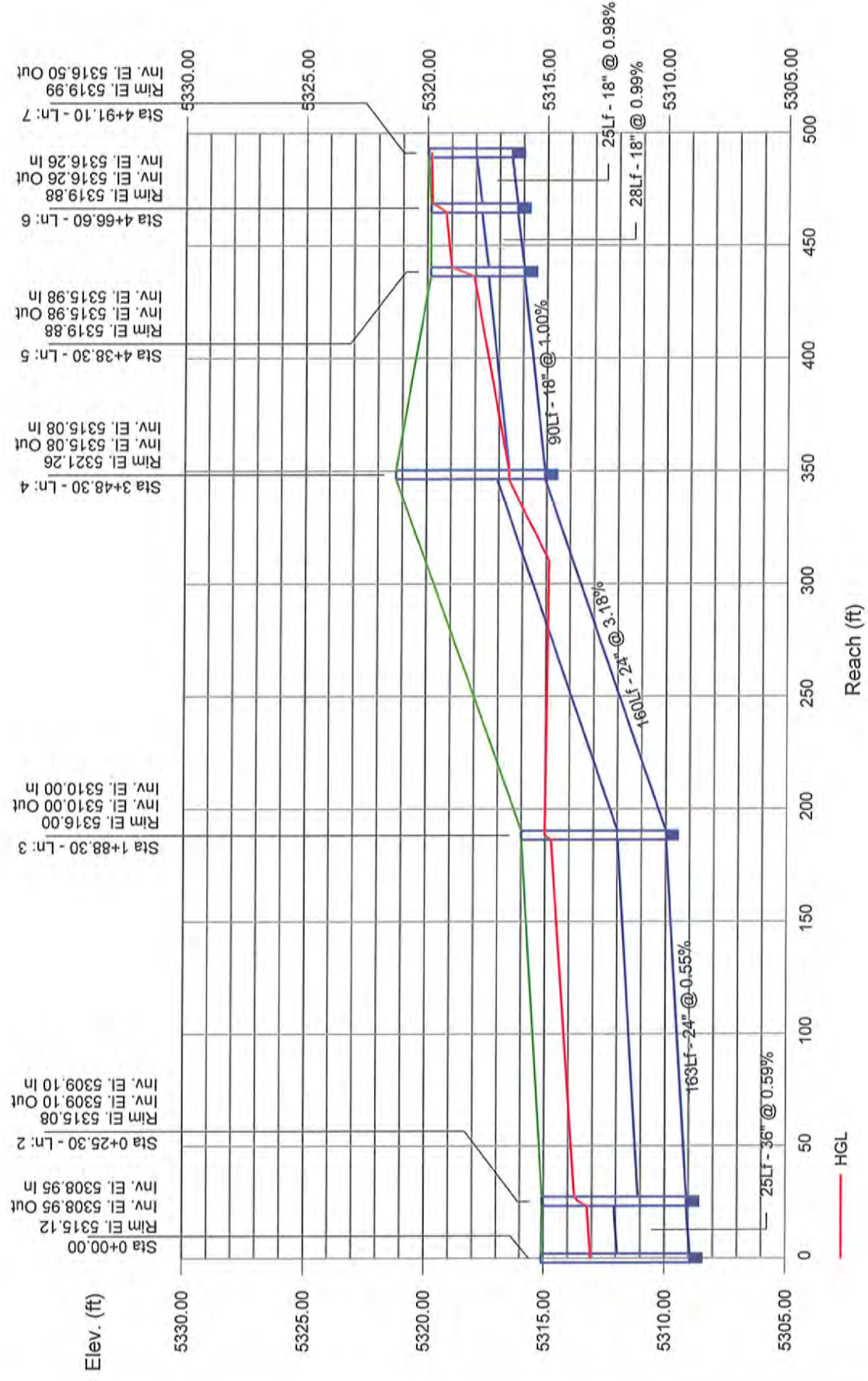


Storm Sewer Profile

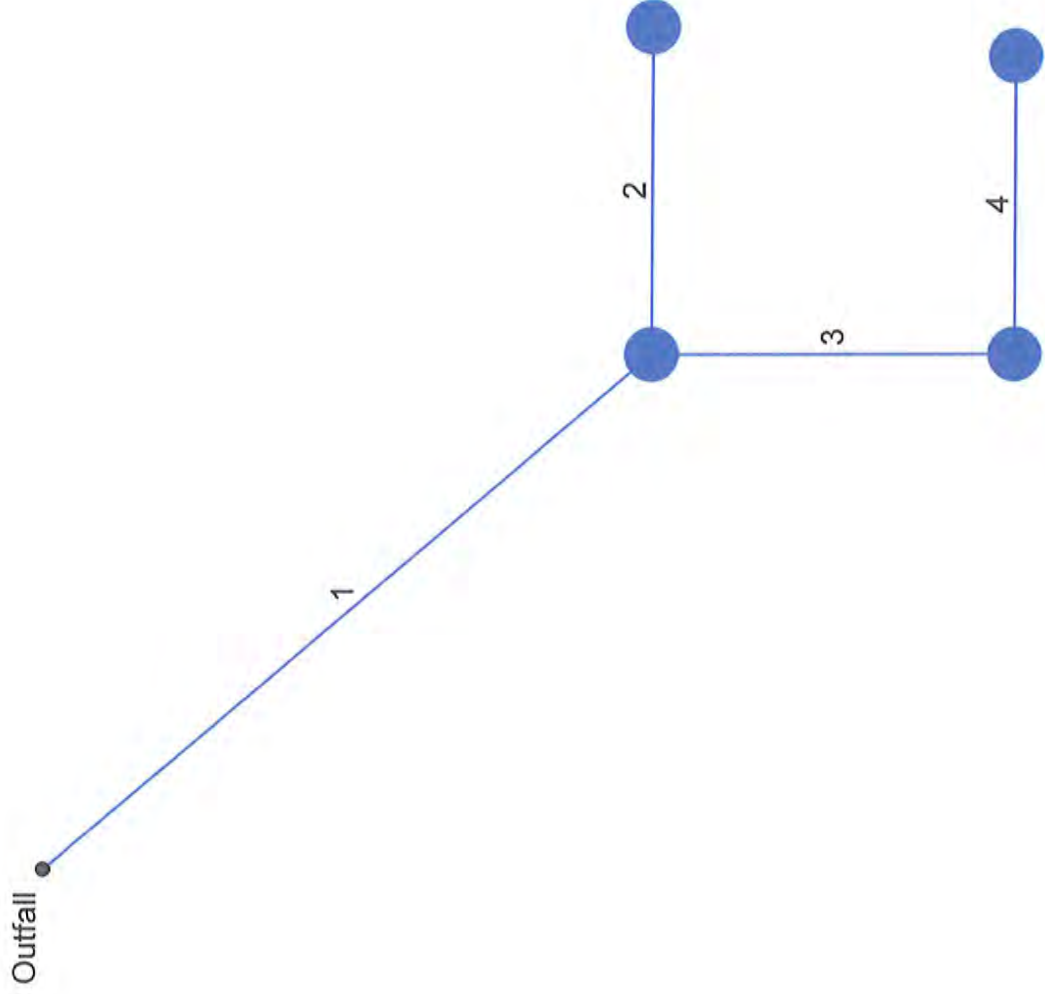


Storm Sewer Profile

Proj. file: POND 6.stm

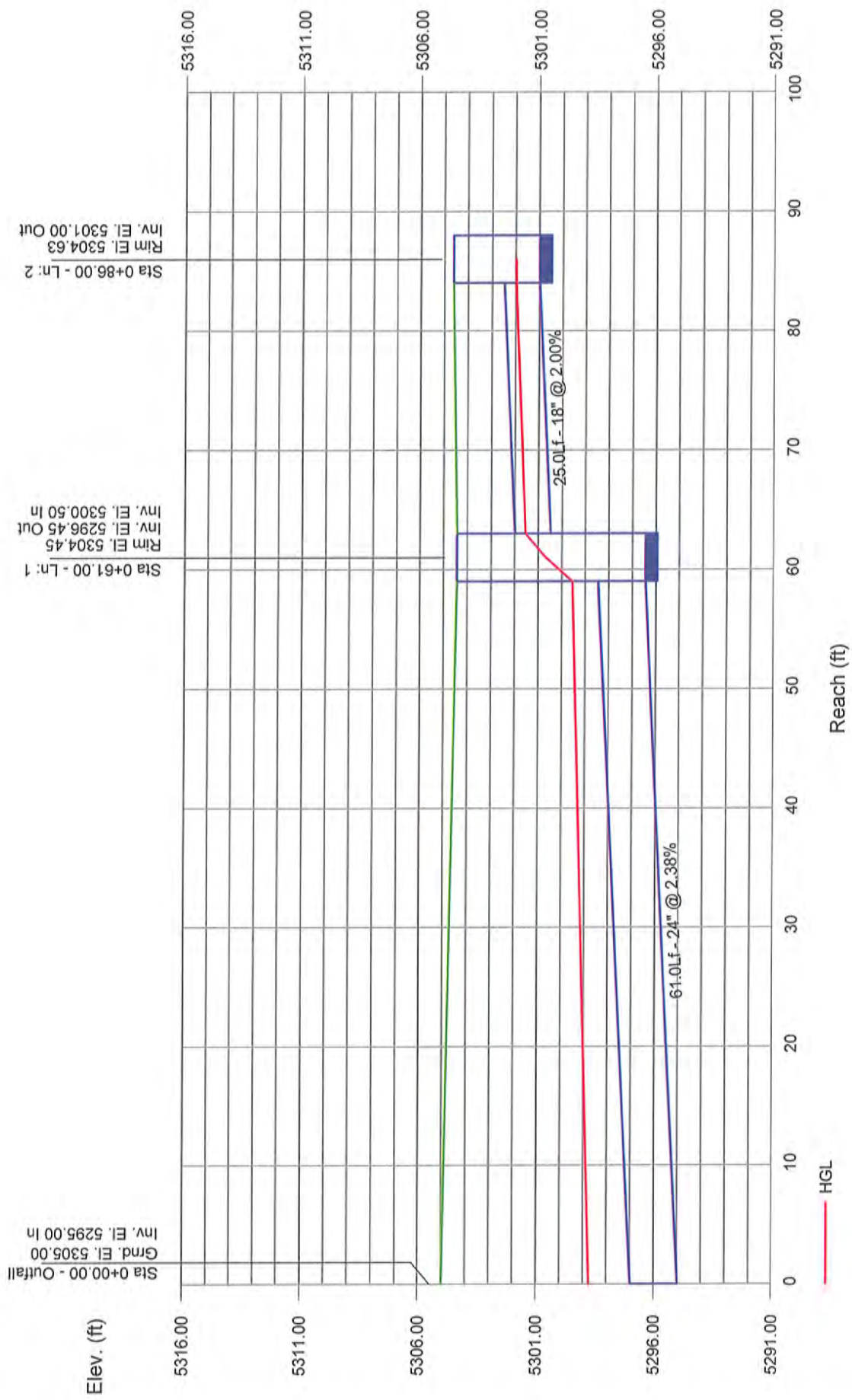


POND 7

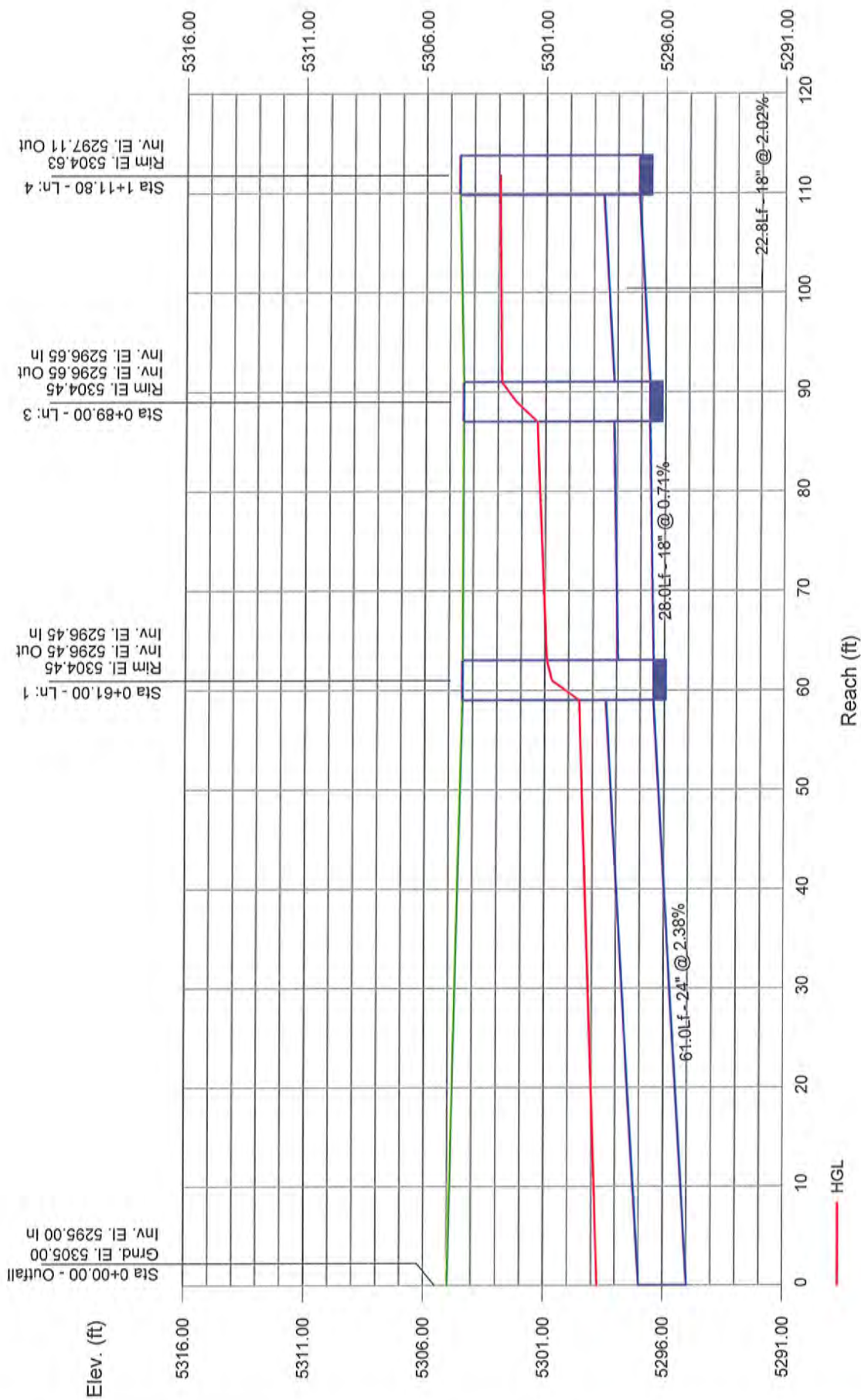


Line No.	DnStm Ln No	Line ID	Line Size (in)	Flow Rate (cfs)	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	EGL Dn (ft)	EGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)	
1	Outfall		24	28.80	61.0	2.38	5295.00	5296.45	5305.00	5304.45	5298.74	5299.73	5300.05	5301.04	8.00	6.00	1.07	9.17	
2	1		18	7.20	25.0	2.00	5300.50	5301.00	5304.45	5304.63	5302.18	5302.21	5302.44	5302.55	2.45	2.13	0.00	4.40	
3	1		18	14.40	28.0	0.71	5296.45	5296.65	5304.45	5304.45	5301.40	5301.93	5302.44	5302.96	6.50	6.30	1.04	8.15	
4	3		18	7.20	22.8	2.02	5296.65	5297.11	5304.45	5304.63	5303.78	5303.88	5304.04	5304.14	6.30	6.02	0.00	4.07	
POND 7																	Number of lines: 4		Date: 01-03-2012
NOTES: ** Critical depth																			

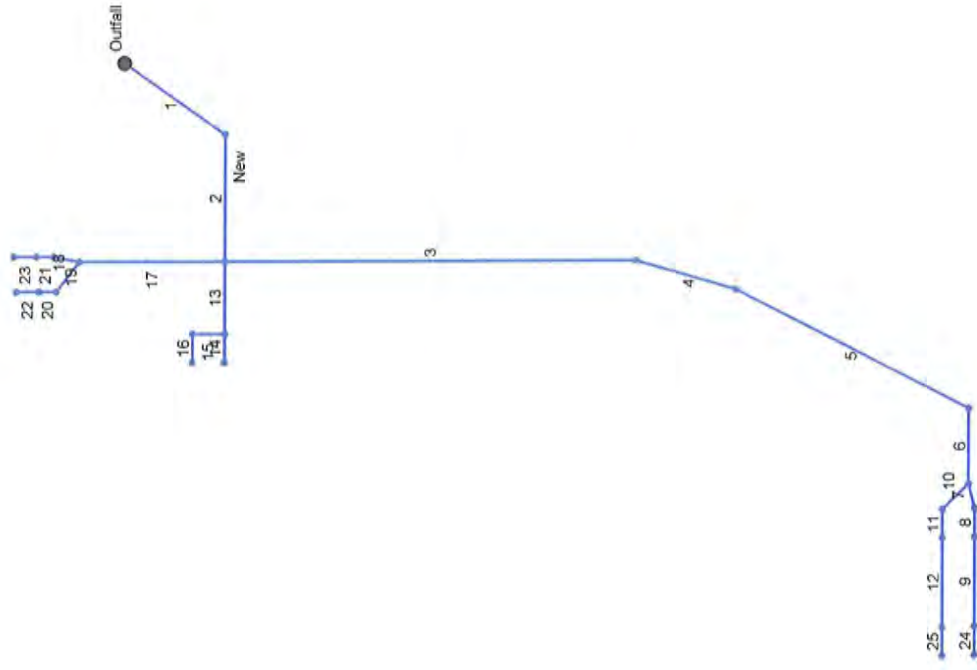
Storm Sewer Profile



Storm Sewer Profile



POND 8



Line No.	DnStm Ln No	Line Size (in)	Flow Rate (cfs)	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	EGL Dn (ft)	EGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)
1	Outfall	48	107.00	108.0	0.46	5308.50	5309.00	5314.00	5322.61	5313.35	5313.95	5314.48	5315.08	1.50	9.61	0.19	8.52
2	1	48	107.00	111.0	0.45	5310.50	5311.00	5322.61	5322.80	5314.50	5315.12	5315.63	5316.24	8.11	7.80	1.54	8.52
3	2	36	46.00	362.0	0.52	5311.00	5312.90	5322.80	5325.39	5317.32	5319.04	5317.98	5319.70	8.80	9.49	0.13	6.51
4	3	36	46.00	92.0	0.33	5312.90	5313.20	5325.39	5325.81	5319.13	5319.57	5319.79	5320.23	9.49	9.61	0.12	6.51
5	4	36	46.00	230.0	0.35	5313.20	5314.00	5325.81	5322.88	5319.65	5320.74	5320.31	5321.40	9.61	5.88	0.22	6.51
6	5	36	46.00	66.0	1.14	5314.00	5314.75	5322.88	5323.92	5320.89	5321.20	5321.55	5321.86	5.88	6.17	1.34	6.51
7	6	36	23.00	22.0	2.27	5317.00	5317.50	5323.92	5323.25	5322.58	5322.60	5322.74	5322.77	3.92	2.75	0.55	3.25
8	7	30	21.50	25.0	4.00	5317.50	5318.50	5323.25	5323.79	5322.69	5322.76	5322.99	5323.06	3.25	2.79	0.96	4.38
9	8	24	17.50	78.0	1.28	5319.50	5320.50	5323.79	5324.98	5323.05	5323.52	5323.53	5324.00	2.29	2.48	0.00	5.57
10	6	24	23.00	32.0	1.41	5314.75	5315.20	5323.92	5324.05	5322.08	5322.42	5322.92	5323.25	7.17	6.85	0.67	7.32
11	10	24	21.50	25.0	6.00	5317.00	5318.50	5324.05	5324.32	5323.08	5323.30	5323.81	5324.03	5.05	3.82	0.31	6.84
12	11	24	17.50	78.0	2.56	5318.50	5320.50	5324.32	5325.02	5323.78	5324.24	5324.26	5324.73	3.82	2.52	0.00	5.57
13	2	24	17.60	63.0	1.59	5311.00	5312.00	5322.80	5322.99	5317.49	5317.87	5317.98	5318.36	9.80	8.99	0.30	5.60
14	13	18	4.80	25.0	4.00	5317.00	5318.00	5322.99	5323.28	5318.50	5318.84 j	5318.62	5319.19	4.49	3.78	0.85	3.73
15	13	18	8.80	28.0	1.79	5312.00	5312.50	5322.99	5323.38	5318.12	5318.32	5318.51	5318.71	9.49	9.38	0.74	4.98
16	15	18	4.80	25.0	4.00	5317.00	5318.00	5323.38	5323.52	5318.88	5318.84	5318.99	5319.19	4.88	4.02	0.87	3.73
17	2	42	43.40	128.0	0.27	5311.00	5311.34	5322.80	5319.41	5317.66	5317.90	5317.98	5318.22	8.30	4.57	0.71	4.51
18	17	30	21.70	33.0	0.30	5311.34	5311.44	5319.41	5318.98	5318.14	5318.23	5318.44	5318.54	5.57	5.04	0.50	4.42
19	17	30	21.70	23.0	2.17	5312.50	5313.00	5319.41	5318.98	5318.14	5318.20	5318.44	5318.51	4.41	3.48	0.42	4.42
20	18	24	14.20	15.0	3.33	5313.00	5313.50	5318.98	5318.93	5318.38	5318.44	5318.70	5318.76	3.98	3.43	0.00	4.52
21	19	24	14.20	15.0	3.33	5313.00	5313.50	5318.98	5318.93	5318.33	5318.39	5318.65	5318.71	3.98	3.43	0.00	4.52
22	20	18	7.00	20.0	2.50	5313.50	5314.00	5318.93	5318.93	5318.52	5318.61	5318.76	5318.85	3.93	3.43	0.00	3.96
23	21	18	7.00	20.0	2.50	5313.50	5314.00	5318.93	5319.02	5318.46	5318.55	5318.71	5318.80	3.93	3.52	0.00	3.96

POND 8

Number of lines: 25

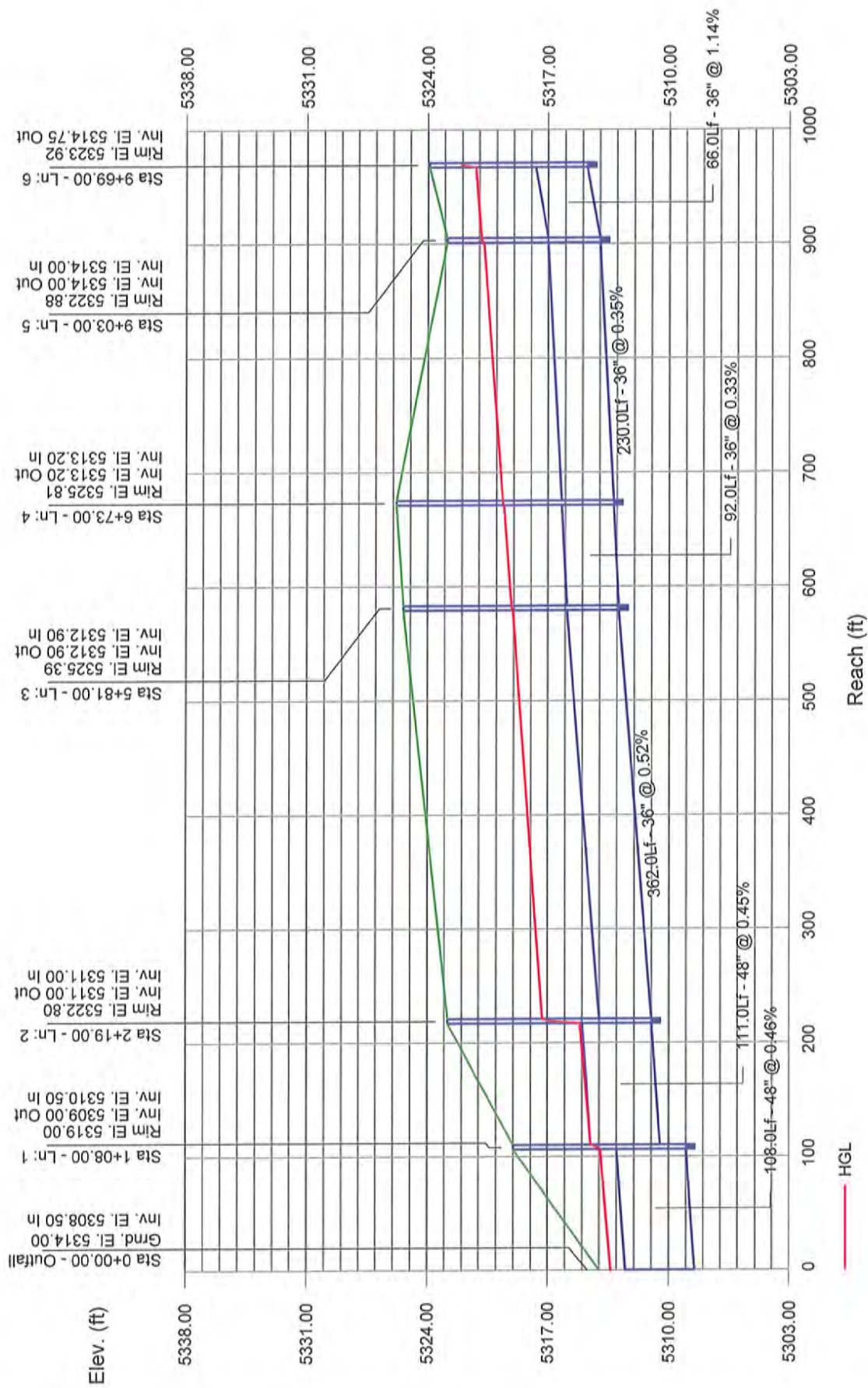
Date: 10-26-2011

NOTES: ** Critical depth

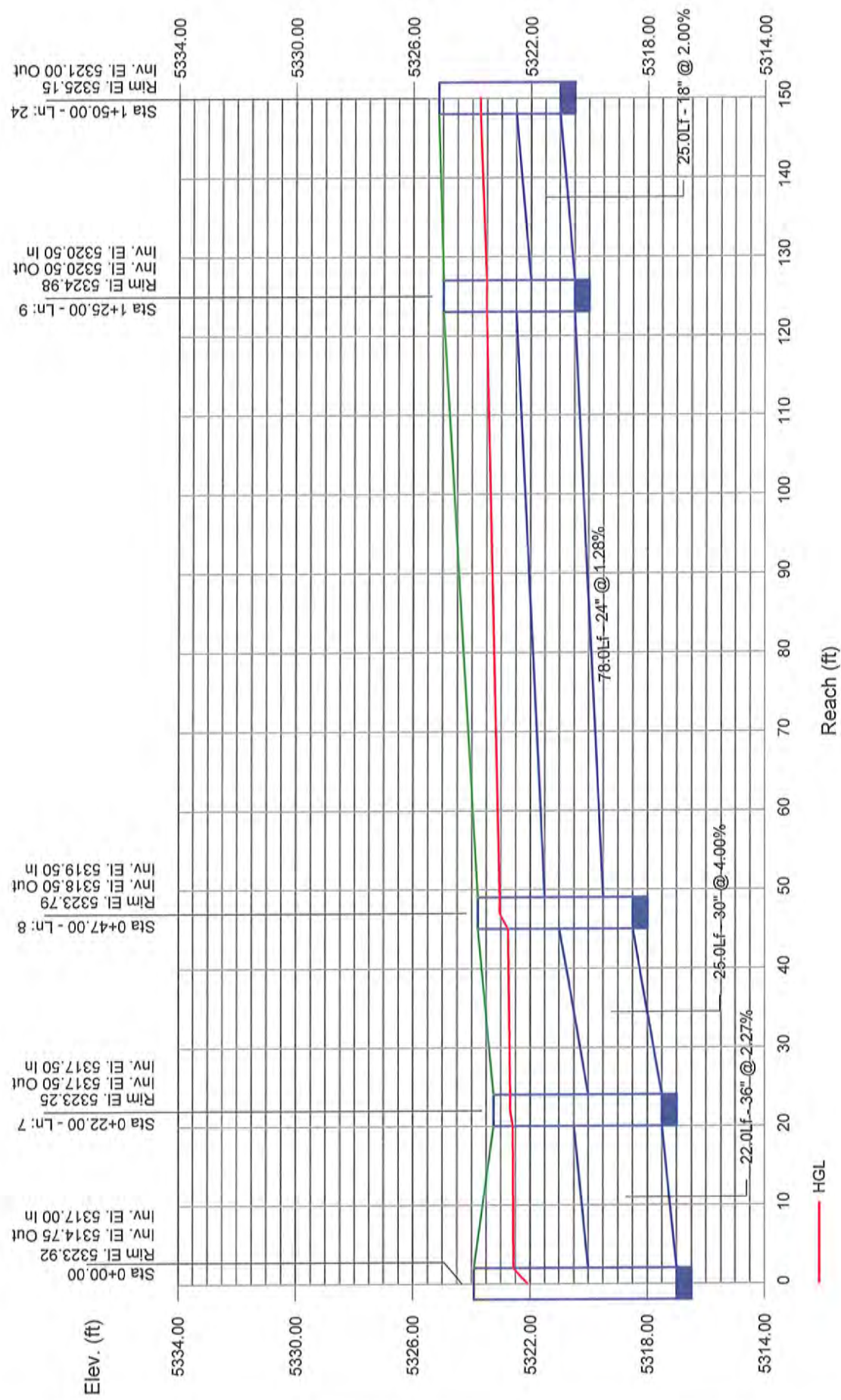
Line No.	DnStm Ln No	Line Size (in)	Flow Rate (cfs)	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	EGL Dn (ft)	EGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)	
24	9	18	10.00	25.0	2.00	5320.50	5321.00	5324.98	5325.15	5323.52	5323.74	5324.01	5324.24	2.98	2.65	0.00	5.66	
25	12	18	10.00	25.0	2.00	5320.50	5321.00	5325.02	5325.15	5324.24	5324.47	5324.74	5324.97	3.02	2.65	0.00	5.66	
POND 8																		
Number of lines: 25													Date: 10-26-2011					
NOTES: ** Critical depth																		

Storm Sewer Profile

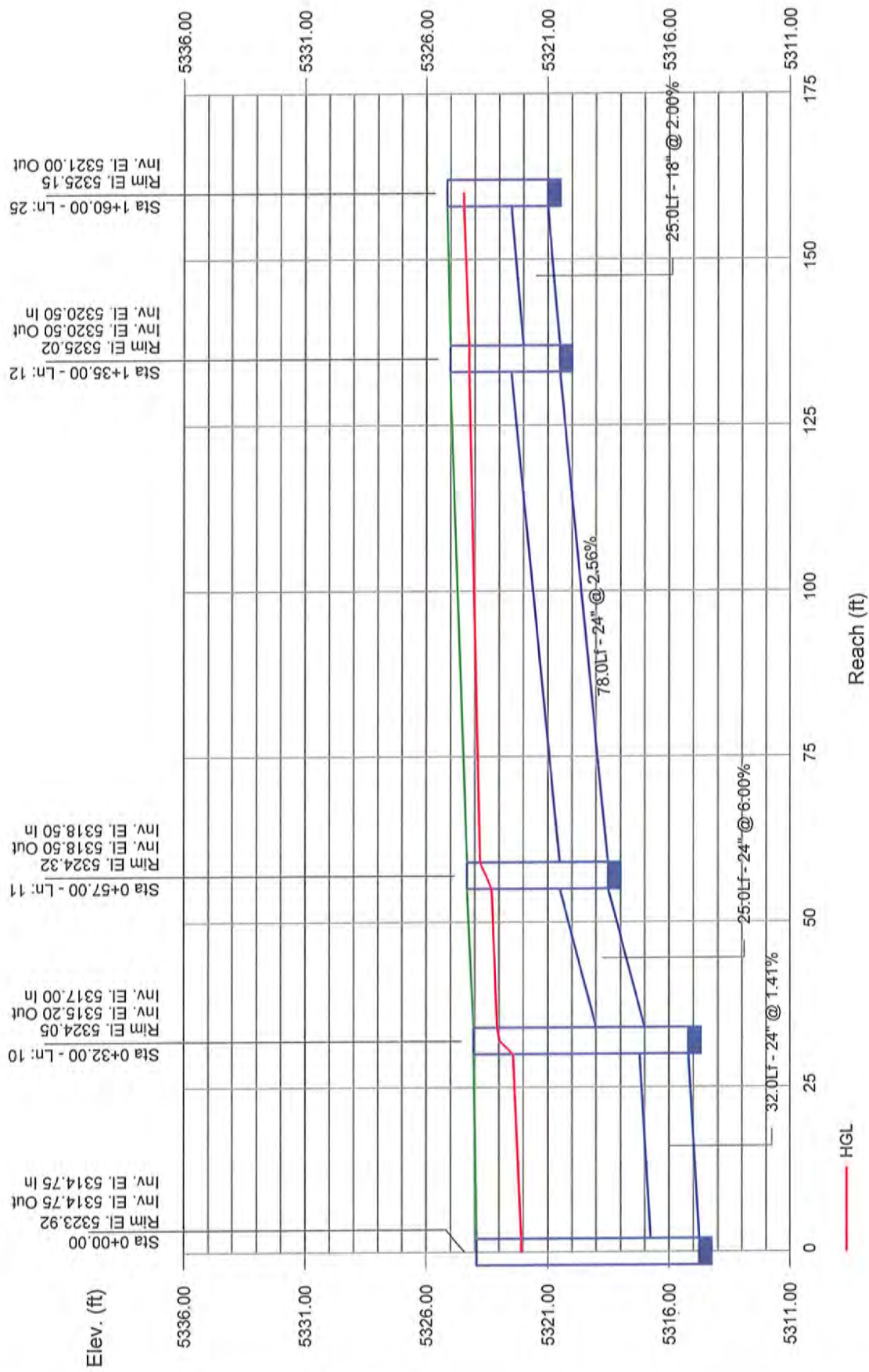
Proj. file: POND 8-REV.stm



Storm Sewer Profile

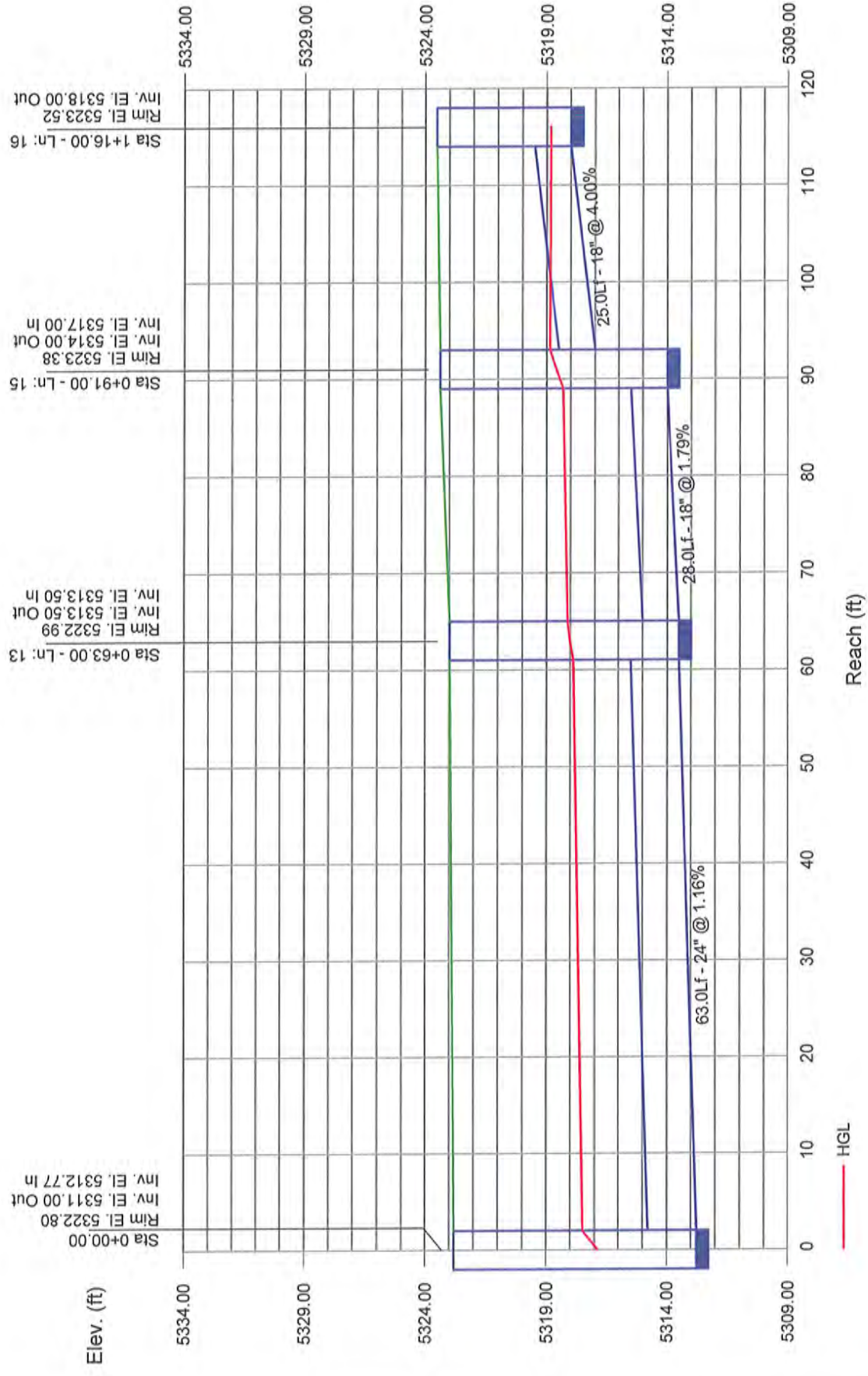


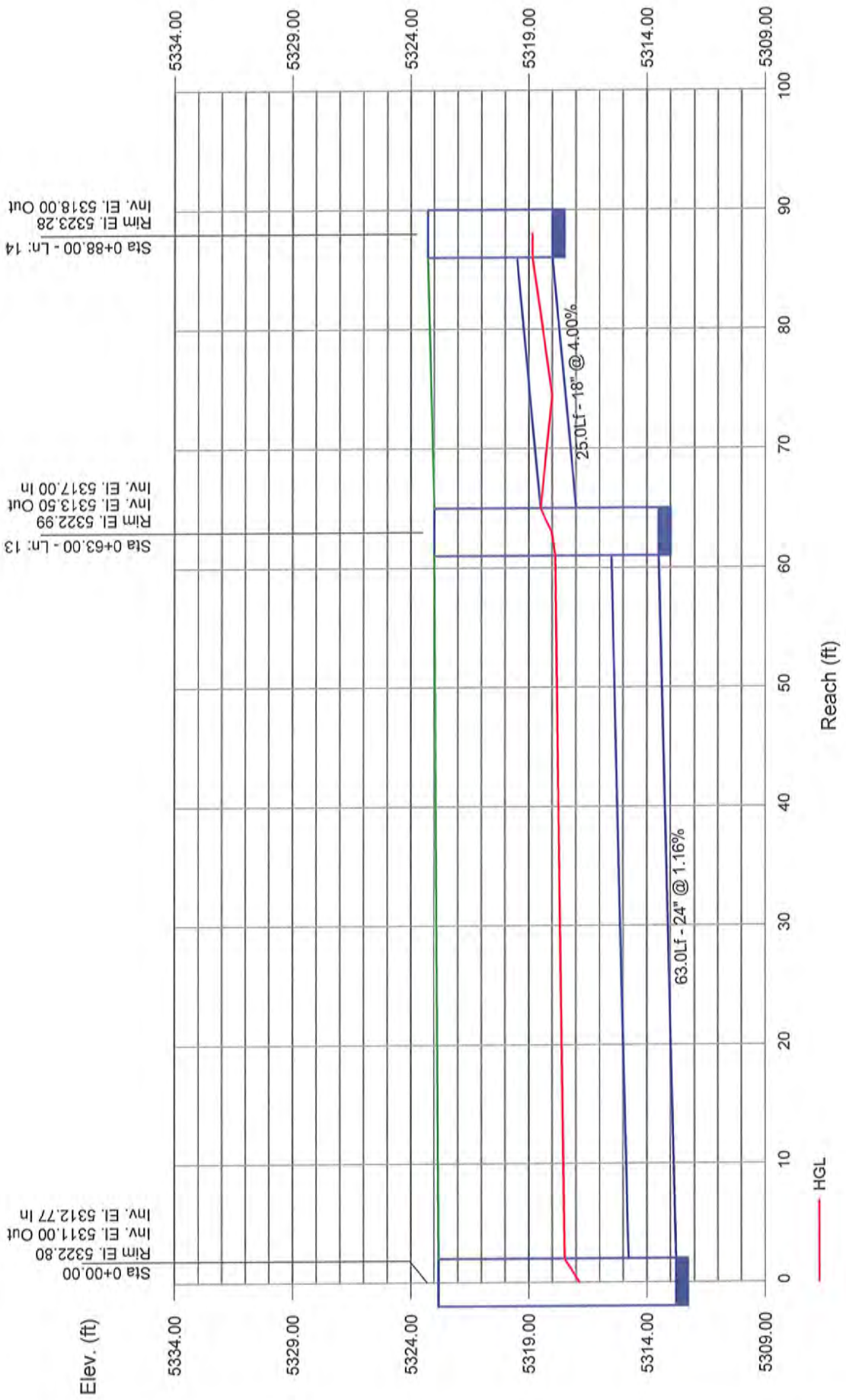
Storm Sewer Profile



Storm Sewer Profile

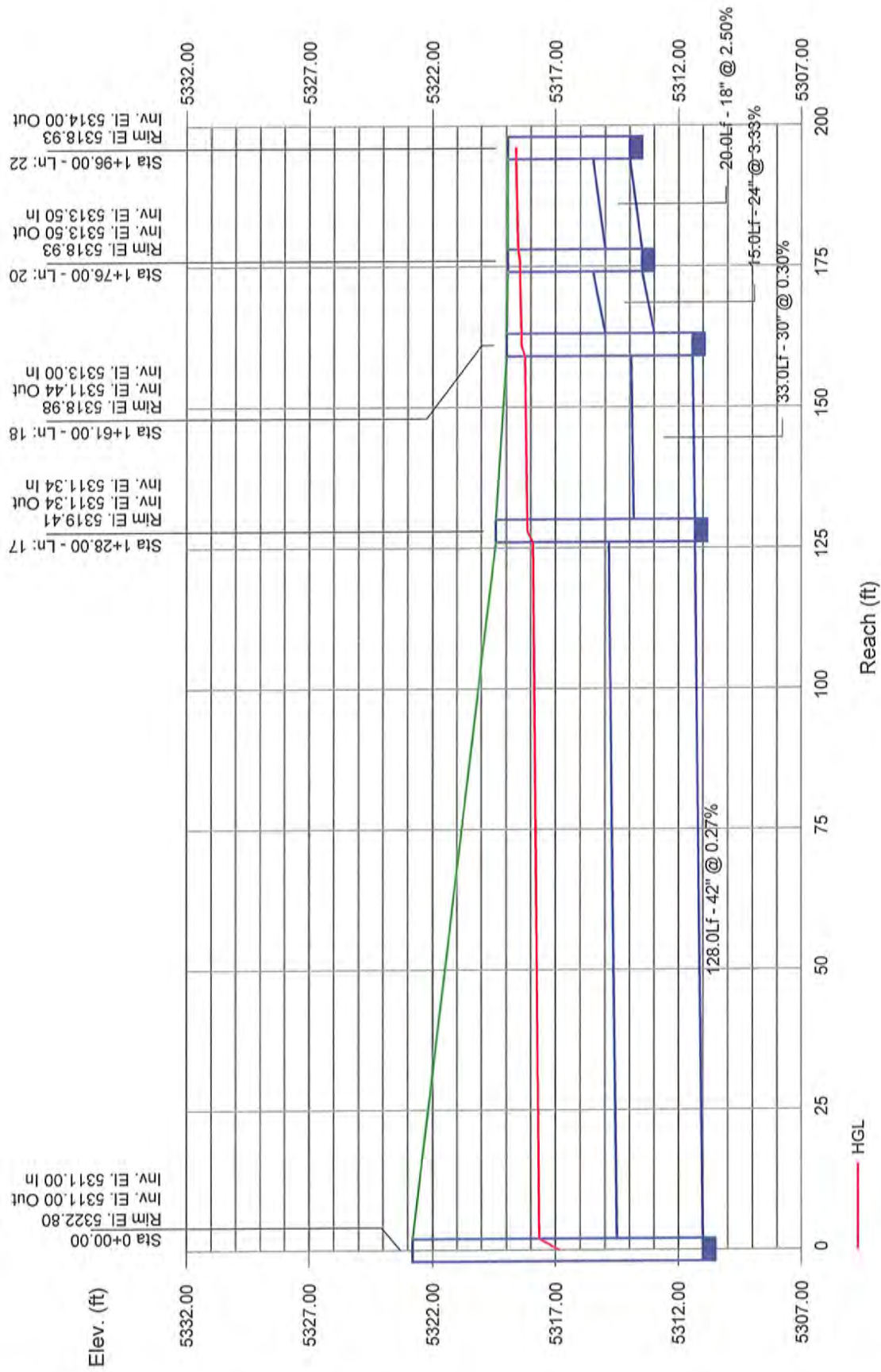
Proj. file: POND 8-REV.stm





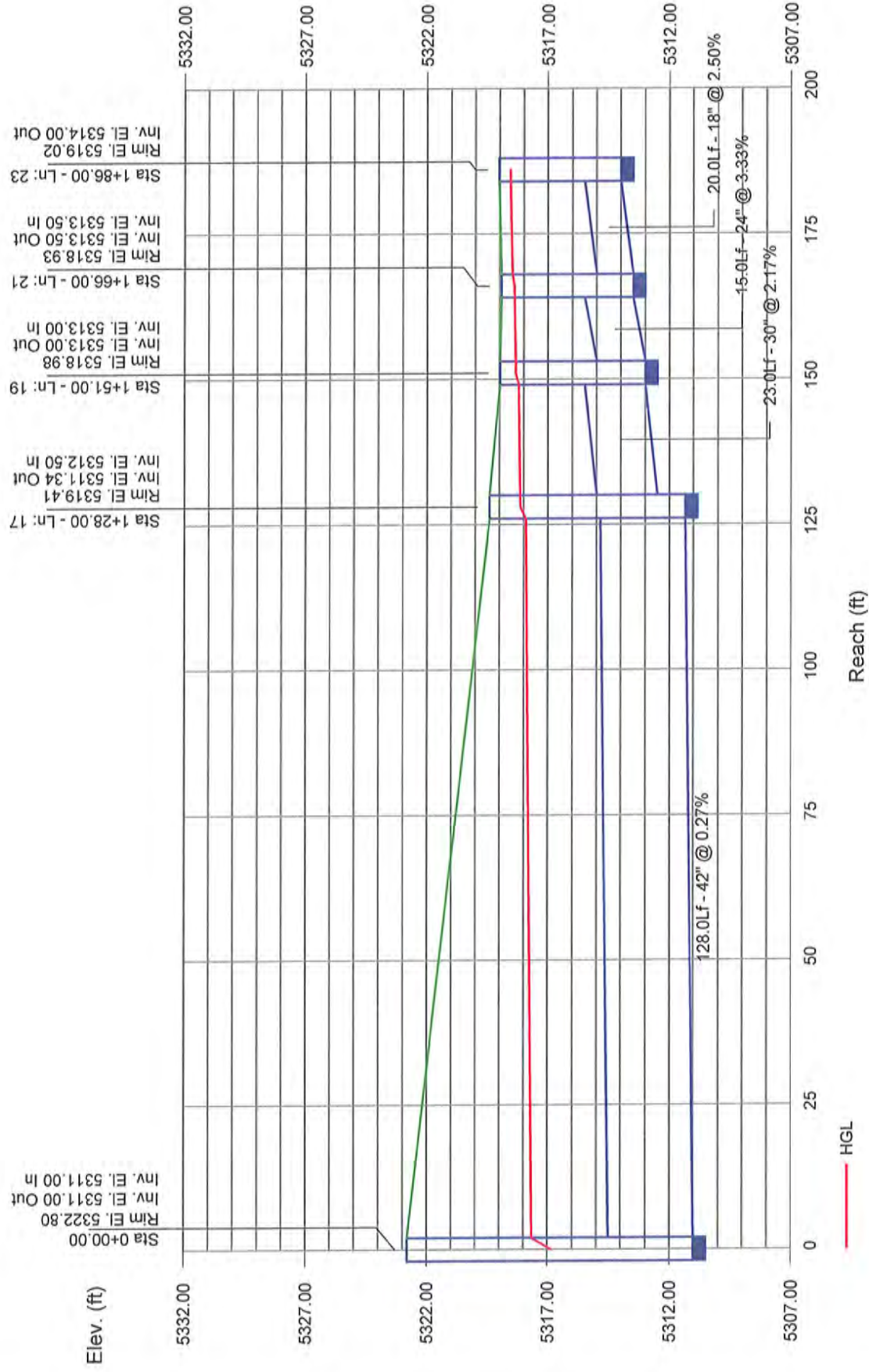
Storm Sewer Profile

Proj. file: POND 8-REV.stm

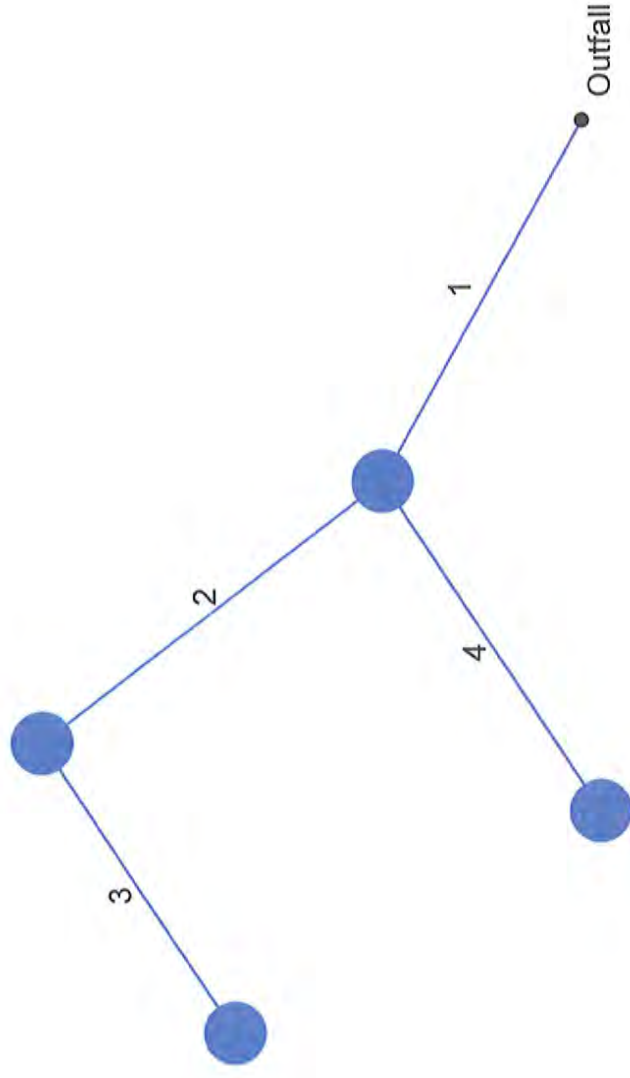


Storm Sewer Profile

Proj. file: POND 8-REV.stm

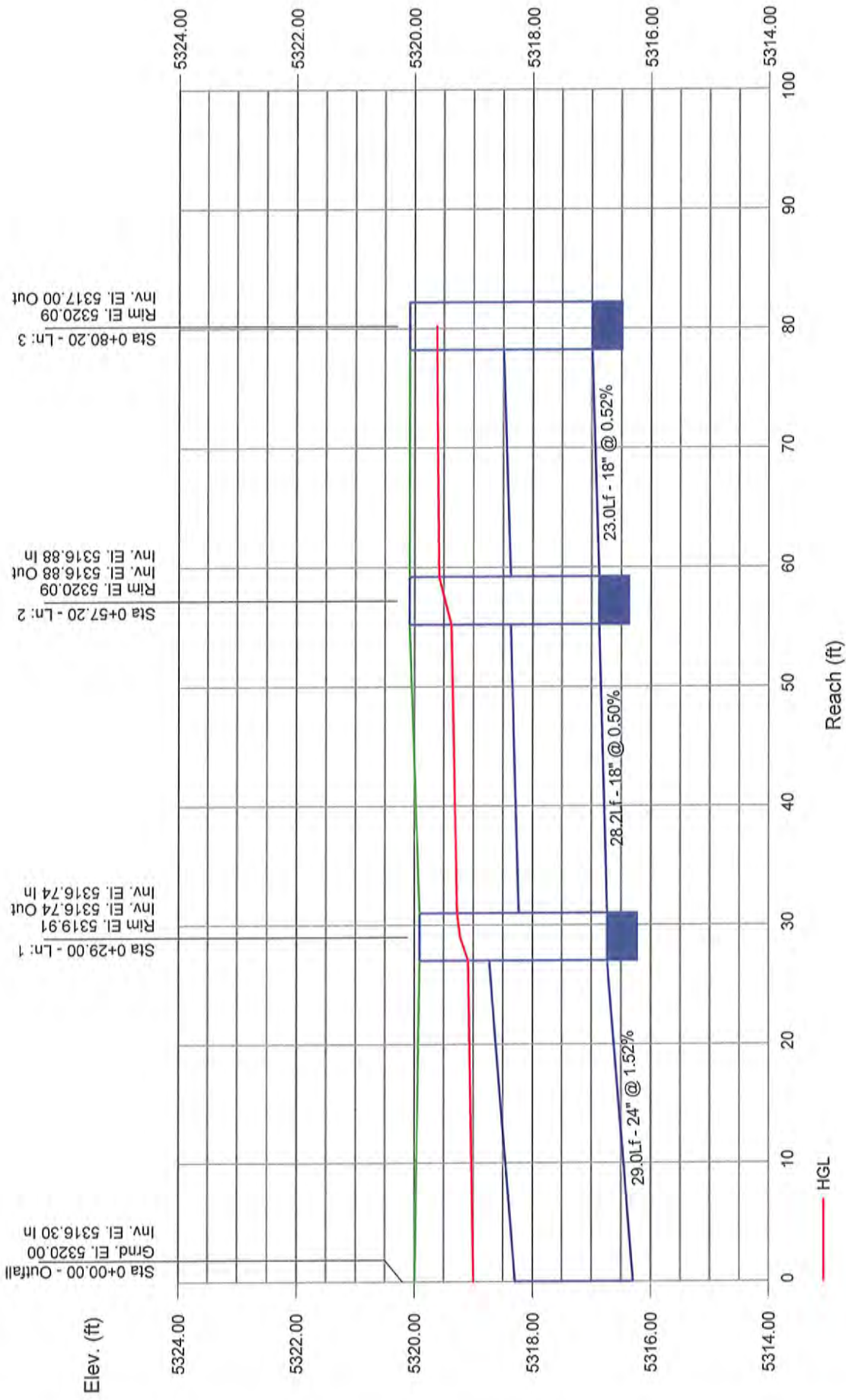


POND 9

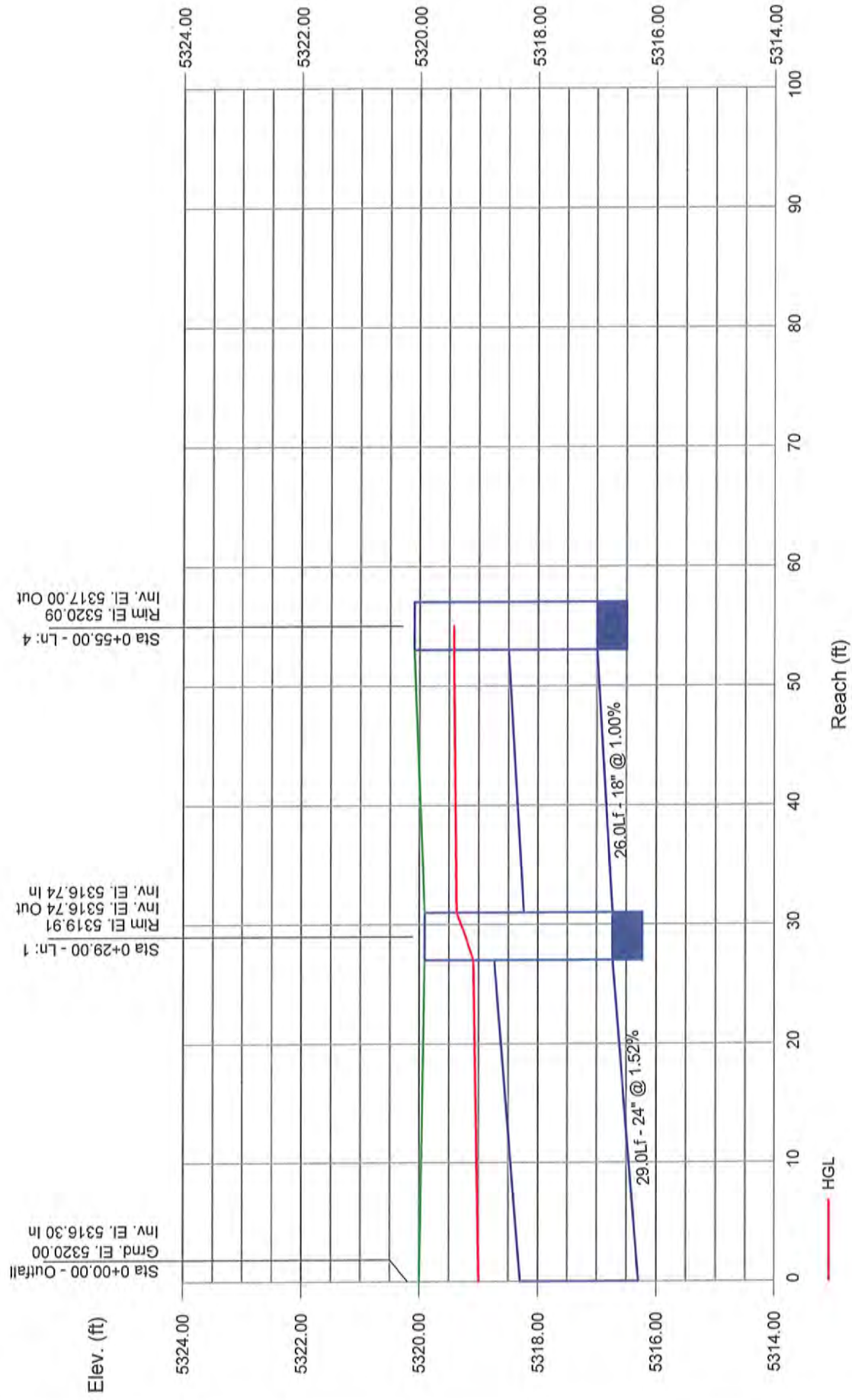


Line No.	DnStm Ln No	Line Size (in)	Flow Rate (cfs)	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	EGL Dn (ft)	EGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)	
1	Outfall	24	12.80	29.0	1.00	5316.45	5316.74	5320.00	5319.91	5319.00	5319.09	5319.26	5319.35	1.55	1.17	0.50	4.07	
2	1	18	6.40	28.2	0.50	5316.74	5316.88	5319.91	5320.09	5319.28	5319.38	5319.48	5319.59	1.67	1.71	0.50	3.62	
3	2	18	4.60	23.0	0.52	5316.88	5317.00	5320.09	5320.09	5319.58	5319.63	5319.69	5319.73	1.71	1.59	0.00	2.60	
4	1	18	4.60	26.0	1.00	5316.74	5317.00	5319.91	5320.09	5319.38	5319.42	5319.48	5319.53	1.67	1.59	0.00	2.60	
POND 9																		
Number of lines: 4													Date: 10-27-2011					
NOTES: ** Critical depth																		

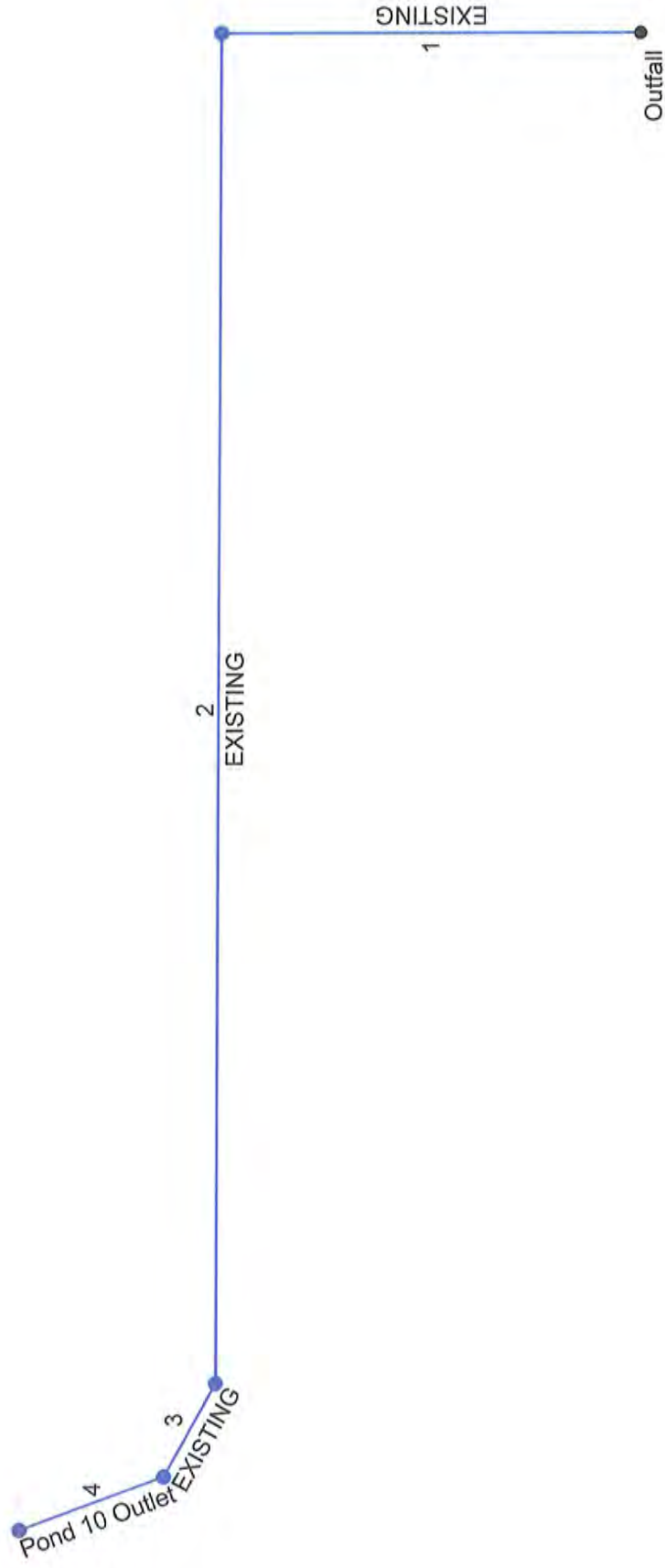
Storm Sewer Profile



Storm Sewer Profile



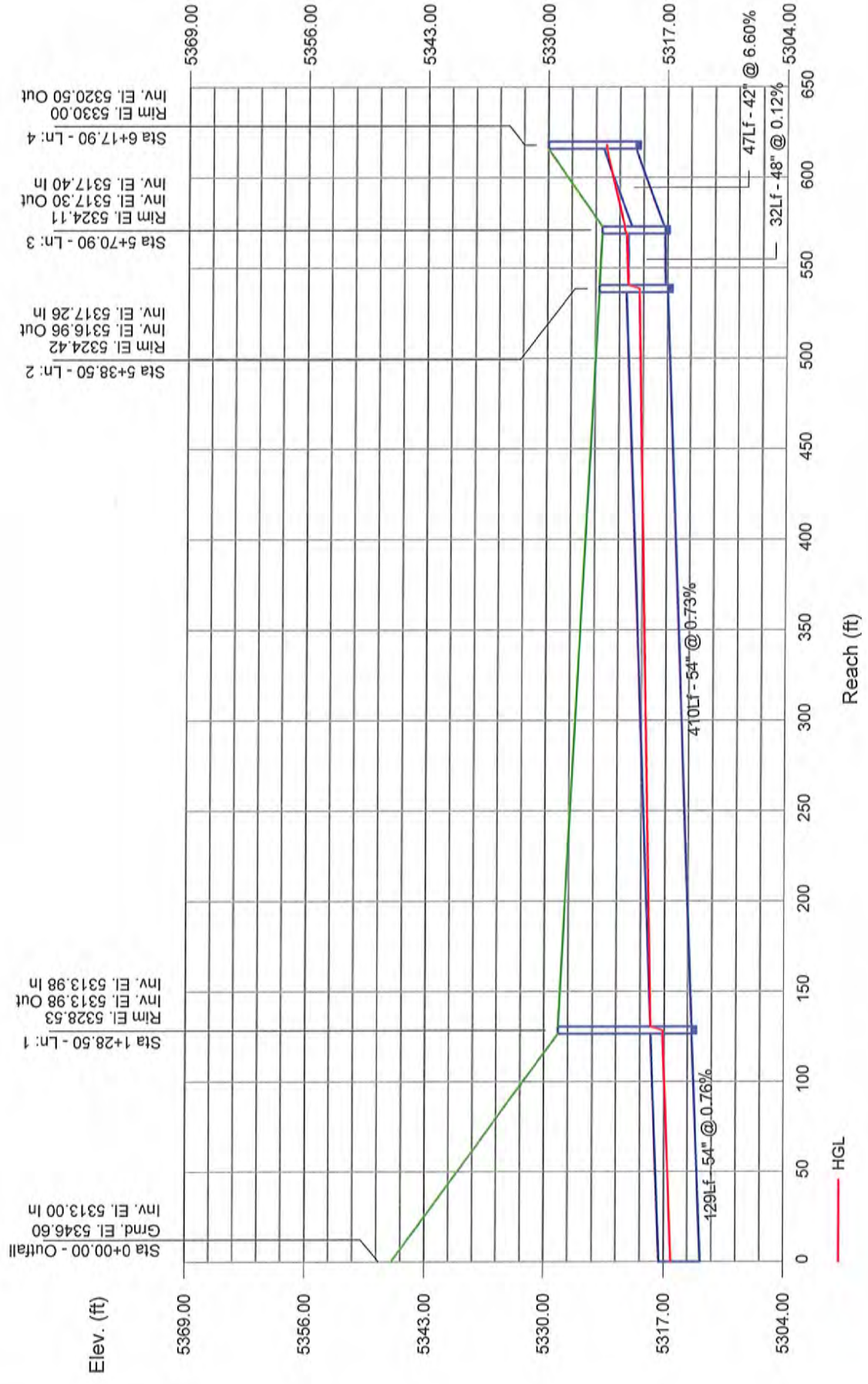
POND 10



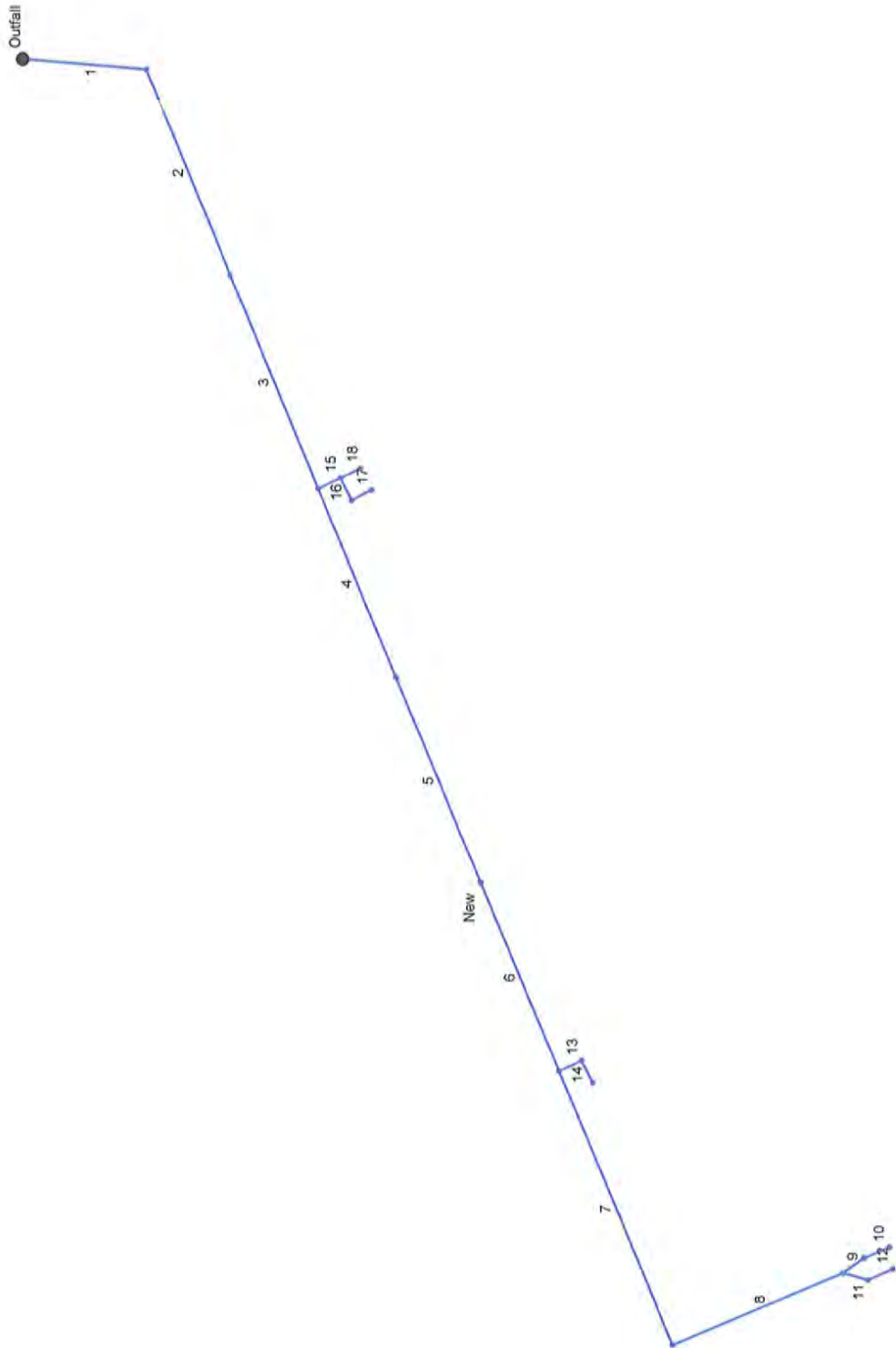
Line No.	DnStm Ln No	Line Size (in)	Flow Rate (cfs)	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	EGL Dn (ft)	EGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)	
1	Outfall	54	123.00	129	0.76	5313.00	5313.98	5346.60	5328.53	5316.18	5317.16	5317.81	5318.79	29.10	10.05	1.00	10.23	
2	1	54	113.00	410	0.73	5313.98	5316.96	5328.53	5324.42	5318.48	5320.01	5319.27	5321.52	10.05	2.96	0.15	8.48	
3	2	48	105.00	32	0.12	5317.26	5317.30	5324.42	5324.11	5321.26	5321.43	5322.35	5322.52	3.16	2.81	0.19	8.36	
4	3	42	105.00	47	6.60	5317.40	5320.50	5324.11	5330.00	5321.64	5323.63	5323.49	5325.71	3.21	6.00	1.00	11.24	
POND 10																		
													Number of lines: 4		Date: 09-29-2011			
NOTES: ** Critical depth																		

Storm Sewer Profile

Proj. file: POND 10.stm



Agua Fria CT to Kimmick ST



Line No.	DnStm Ln No	Line Size (in)	Flow Rate (cfs)	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	EGL Dn (ft)	EGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)
1	Outfall	36	55.00	140.0	0.67	5300.80	5301.74	5305.00	5307.17	5303.67	5304.41	5304.64	5305.48	1.20	2.43	0.22	8.08
2	1	36	55.00	250.0	0.90	5301.74	5304.00	5307.17	5308.91	5304.77	5306.36	5305.71	5307.68	2.43	1.91	0.15	8.49
3	2	36	55.00	260.0	0.61	5304.00	5305.58	5308.91	5316.32	5307.00	5308.77	5307.94	5309.71	1.91	7.74	0.35	7.78
4	3	36	36.00	230.0	4.16	5305.58	5315.14	5316.32	5323.96	5309.64	5317.05 j	5310.04	5317.94	7.74	5.82	0.05	6.33
5	4	36	36.00	250.0	0.85	5315.14	5317.27	5323.96	5326.14	5318.14	5319.18 j	5318.54	5320.07	5.82	5.87	0.05	6.33
6	5	30	36.00	230.0	0.63	5317.27	5318.71	5326.14	5328.09	5319.77	5321.54	5320.61	5322.38	6.37	6.88	0.29	7.33
7	6	30	27.00	335.0	2.47	5318.71	5327.00	5328.09	5334.83	5322.15	5328.74 j	5322.62	5329.59	6.88	5.33	0.25	6.46
8	7	30	27.00	207.7	0.96	5327.00	5329.00	5334.83	5334.14	5329.50	5330.74 j	5329.97	5331.59	5.33	2.64	1.64	6.46
9	8	18	13.50	29.5	1.69	5329.50	5330.00	5334.14	5334.00	5331.00	5331.40	5331.91	5332.36	3.14	2.50	0.89	7.75
10	9	18	6.50	31.4	3.18	5330.00	5331.00	5334.00	5333.72	5333.01	5333.13	5333.22	5333.34	2.50	1.22	0.00	3.68
11	8	18	13.50	29.5	1.69	5329.50	5330.00	5334.14	5334.00	5331.00	5331.40	5331.91	5332.36	3.14	2.50	0.94	7.75
12	11	18	6.50	31.4	3.18	5330.00	5331.00	5334.00	5333.72	5333.05	5333.18	5333.27	5333.39	2.50	1.22	0.00	3.68
13	6	24	9.00	28.0	3.93	5324.00	5325.10	5328.09	5328.43	5326.00	5326.16 j	5326.13	5326.60	2.09	1.33	1.19	4.09
14	13	18	4.50	28.0	0.71	5325.10	5325.30	5328.43	5328.51	5326.60	5326.64	5326.70	5326.75	1.83	1.71	0.49	2.63
15	3	24	19.00	28.0	1.79	5312.00	5312.50	5316.32	5316.82	5314.00	5314.04 j	5314.57	5314.87	2.32	2.32	0.49	6.68
16	15	18	9.50	28.0	1.79	5312.50	5313.00	5316.82	5317.76	5314.42	5314.65	5314.87	5315.10	2.82	3.26	0.00	5.38
17	16	18	6.30	25.0	2.00	5313.00	5313.50	5317.76	5316.90	5314.90	5314.99	5315.10	5315.19	3.26	1.90	0.00	3.57
18	15	18	6.30	25.0	2.00	5312.50	5313.00	5316.82	5316.90	5314.68	5314.77	5314.87	5314.96	2.82	2.40	0.00	3.57

Agua Fria CT to Kimmick ST

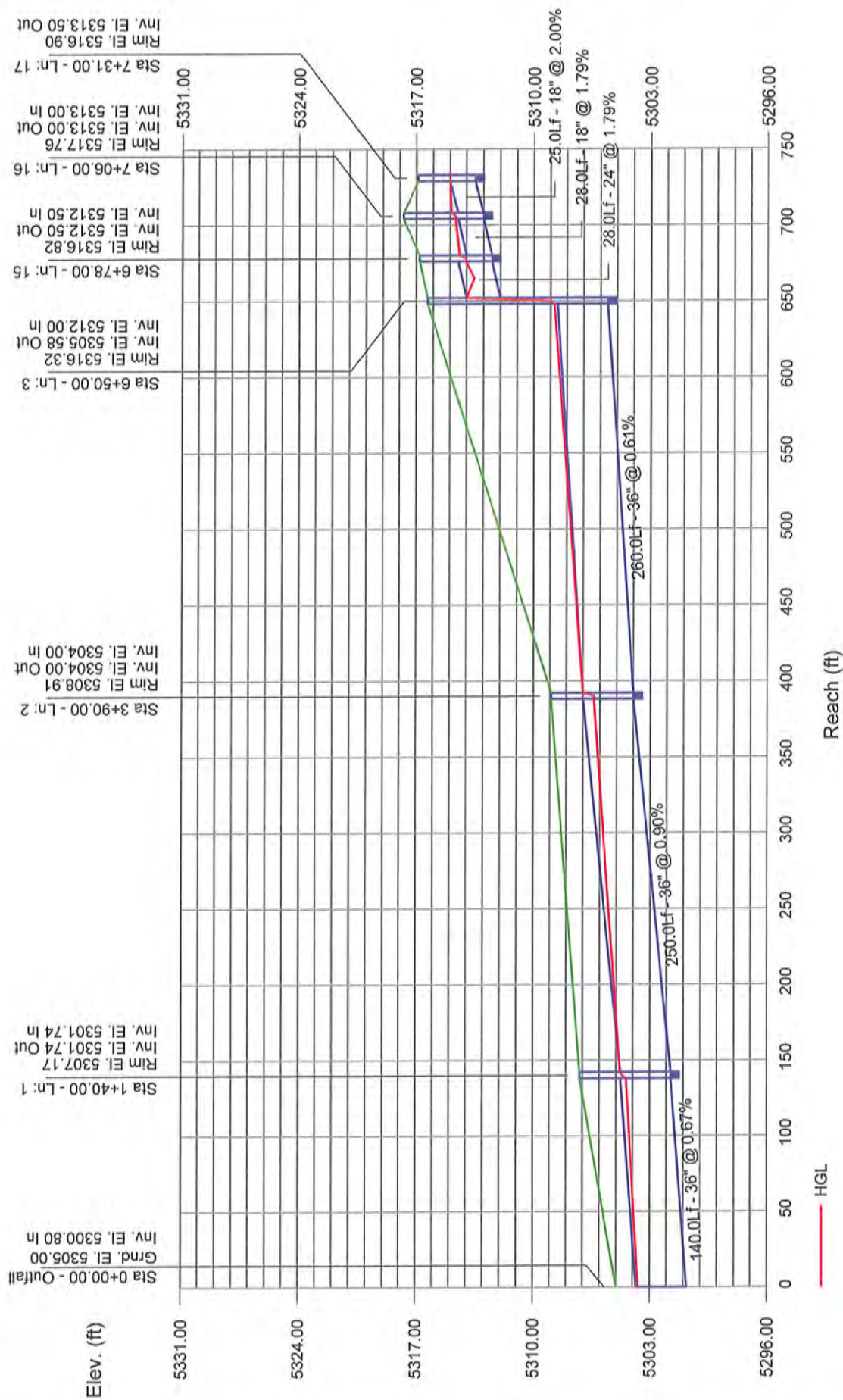
Number of lines: 18

Date: 12-14-2011

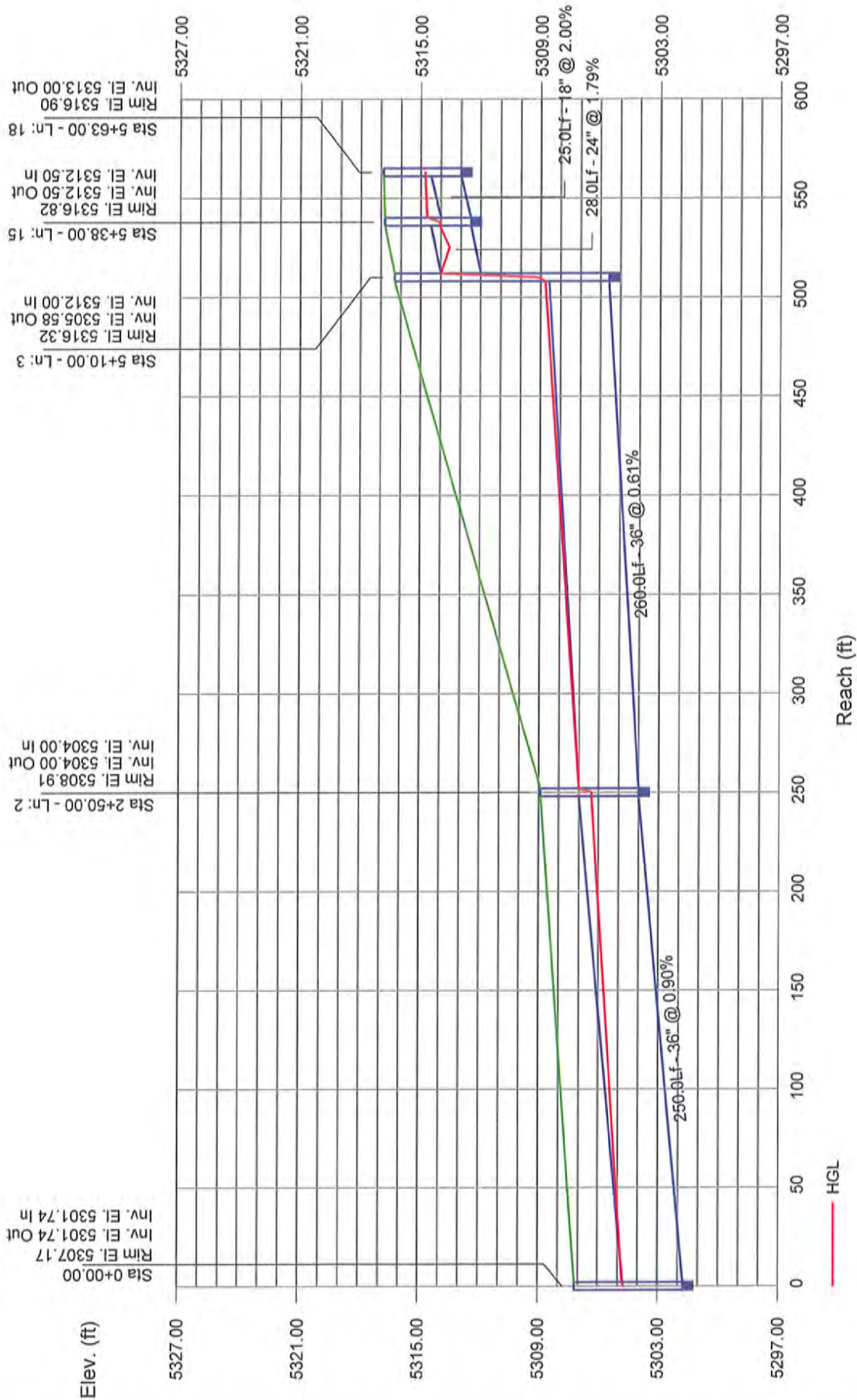
NOTES: ** Critical depth

Storm Sewer Profile

Proj. file: AGUA FRIA CT TO KIMMICK.stm



Storm Sewer Profile

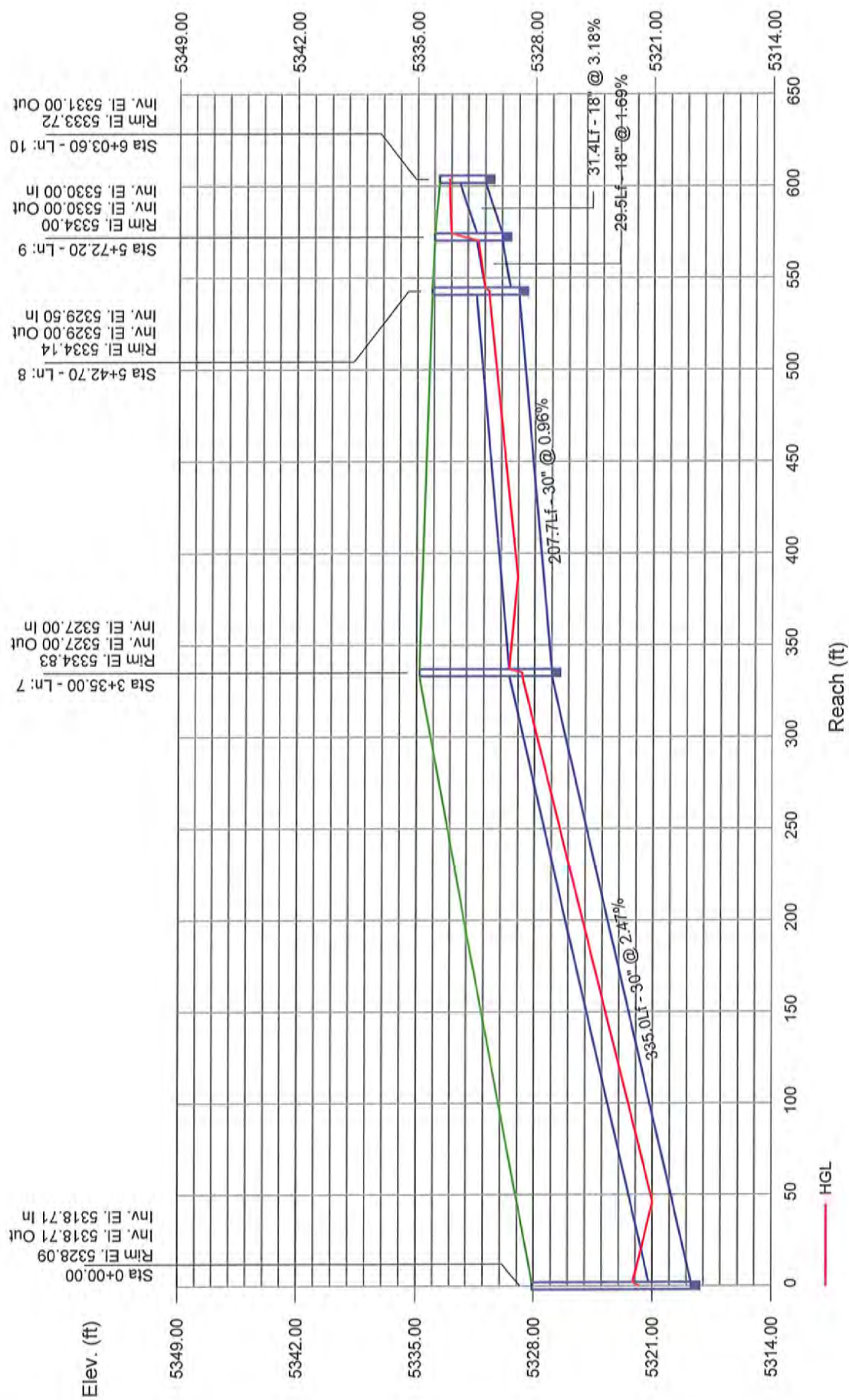


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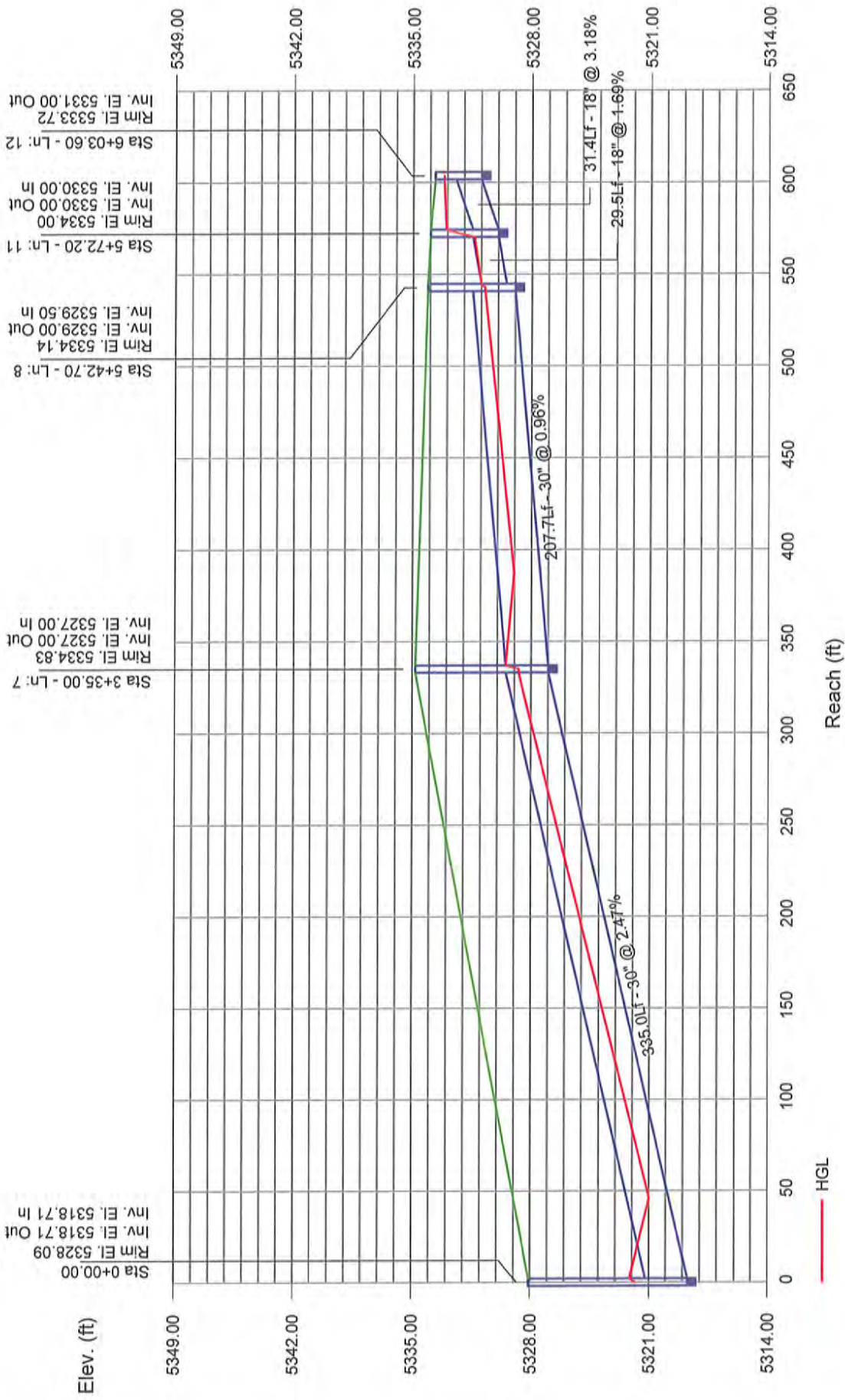


Storm Sewer Profile

Proj. file: AGUA FRIA CT TO KIMMICK.stm



Storm Sewer Profile



PASEO DEL NORTE



Line No.	DnStm Ln No	Line Size (in)	Flow Rate (cfs)	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	EGL Dn (ft)	EGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)
1	Outfall	48	215.00	18.6	5.38	5270.00	5271.00	5283.50	5283.60	5274.00	5274.89	5278.55	5279.51	9.50	8.60	0.50	17.18
2	1	48	215.00	38.3	2.61	5272.00	5273.00	5283.60	5282.20	5275.89	5276.89	5280.51	5281.51	7.60	5.20	0.15	17.25
3	2	48	209.00	207.4	7.67	5273.00	5288.90	5282.20	5299.00	5277.21	5292.77	5281.51	5297.16	5.20	6.10	0.50	16.71
4	3	48	209.00	68.8	2.91	5288.60	5290.60	5299.00	5299.20	5292.85	5294.47	5297.16	5298.86	6.40	4.60	0.50	16.71
5	4	48	200.00	79.0	4.86	5290.60	5294.44	5299.20	5304.00	5294.92	5298.29	5298.86	5302.33	4.60	5.56	0.15	16.01
6	5	48	168.00	217.3	4.86	5294.44	5305.00	5304.00	5312.00	5299.55	5308.72	5302.33	5311.68	5.56	3.00	0.15	13.58
7	6	48	168.00	400.1	2.50	5305.00	5315.00	5312.00	5321.90	5308.90	5318.72	5311.72	5321.68	3.00	2.90	0.15	13.63
8	7	30	25.00	45.0	1.11	5315.00	5315.50	5321.90	5322.00	5321.27	5321.44	5321.68	5321.85	4.40	4.00	0.00	5.09
9	7	48	143.00	350.0	2.00	5315.00	5322.00	5321.90	5329.00	5319.66	5325.55	5321.68	5327.84	2.90	3.00	0.15	11.76
10	9	48	143.00	300.0	3.67	5322.00	5333.00	5329.00	5340.23	5325.82	5336.55	5327.90	5338.84	3.00	3.23	0.15	11.85
11	10	48	143.00	250.0	2.40	5333.00	5339.00	5340.23	5347.80	5336.82	5342.55	5338.90	5344.84	3.23	4.80	0.15	11.85
12	11	48	143.00	300.0	1.10	5339.00	5342.30	5347.80	5352.80	5342.82	5345.85	5344.90	5348.14	4.80	6.50	0.15	11.85
13	12	48	143.00	260.0	1.06	5342.30	5345.05	5352.80	5352.97	5346.12	5348.60	5348.20	5350.89	6.50	3.92	0.15	11.85
14	13	18	5.00	10.0	2.00	5345.05	5345.25	5352.97	5352.77	5350.76	5350.79	5350.89	5350.91	6.42	6.02	0.00	2.83
15	13	48	138.00	232.0	1.00	5345.05	5347.38	5352.97	5354.00	5349.01	5350.88	5350.89	5353.06	3.92	2.62	0.15	11.42
16	15	48	138.00	8.0	1.00	5347.38	5347.46	5354.00	5354.00	5351.18	5351.22	5353.13	5353.19	2.62	2.54	1.00	11.22
17	4	18	9.00	64.0	1.22	5294.00	5294.78	5299.20	5300.66	5298.45	5298.92	5298.86	5299.33	3.70	4.38	0.00	5.09
18	17	18	6.00	25.0	3.12	5294.78	5295.56	5300.66	5302.12	5299.15	5299.23	5299.33	5299.41	4.38	5.06	0.00	3.40
19	5	36	32.00	13.8	3.91	5295.00	5295.54	5304.00	5303.26	5302.01	5302.04	5302.33	5302.36	6.00	4.72	0.30	4.53
20	19	36	15.00	31.5	1.46	5295.54	5296.00	5303.26	5302.69	5302.38	5302.40	5302.45	5302.47	4.72	3.69	0.15	2.12
21	19	18	10.00	23.0	2.00	5296.54	5297.00	5303.26	5304.30	5302.14	5302.34	5302.63	5302.84	5.22	5.80	0.00	5.66
22	2	18	6.00	84.5	4.38	5275.00	5278.70	5282.20	5282.70	5281.33	5281.61	5281.51	5281.79	5.70	2.50	0.00	3.40
23	22	18	3.00	50.0	0.60	5278.70	5279.00	5282.70	5283.00	5281.74	5281.78	5281.79	5281.83	2.50	2.50	0.00	1.70

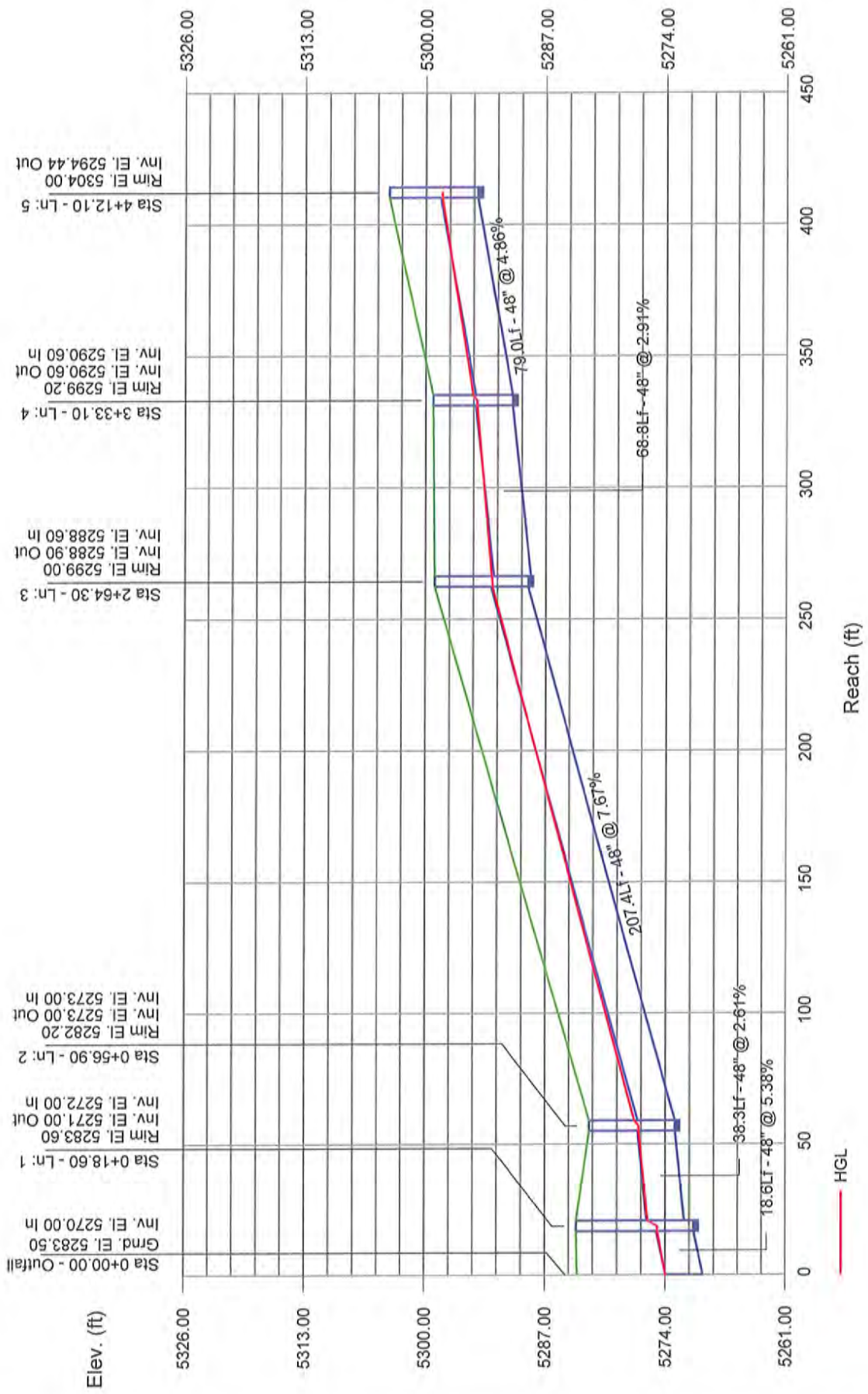
PASEO DEL NORTE

Number of lines: 23

Date: 12-15-2011

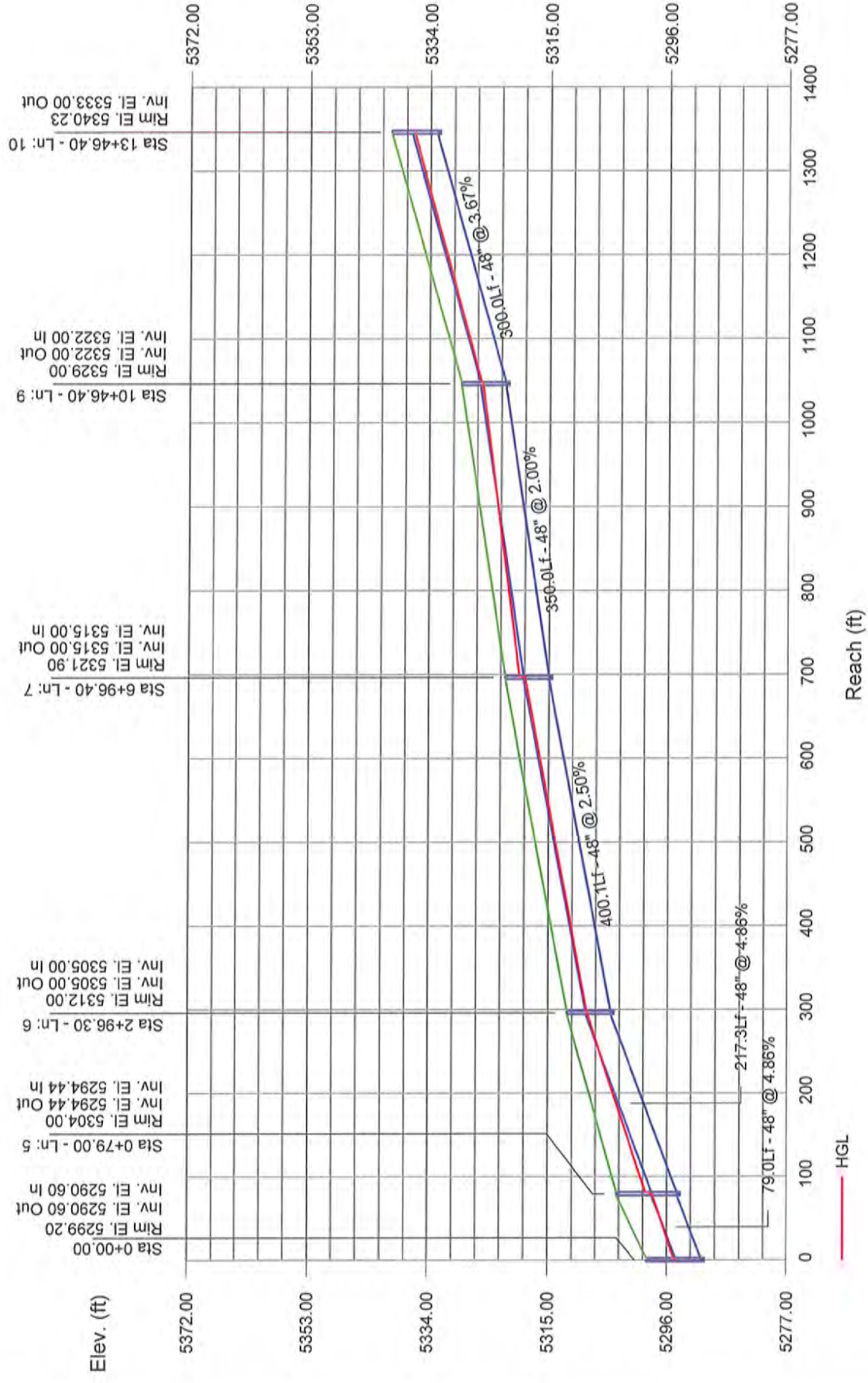
NOTES: ** Critical depth

Storm Sewer Profile



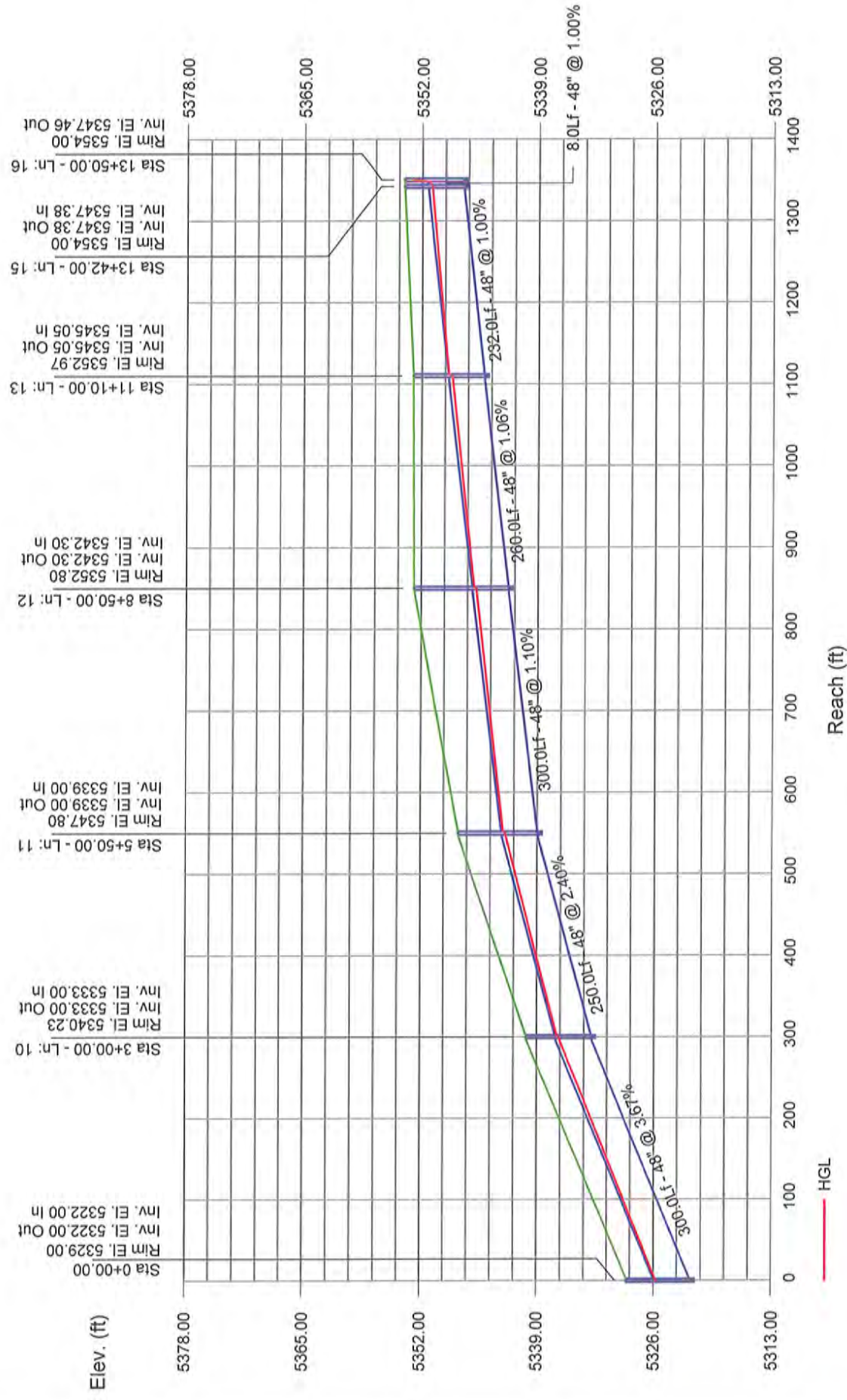
Storm Sewer Profile

Proj. file: PASEO DEL NORTE.stm

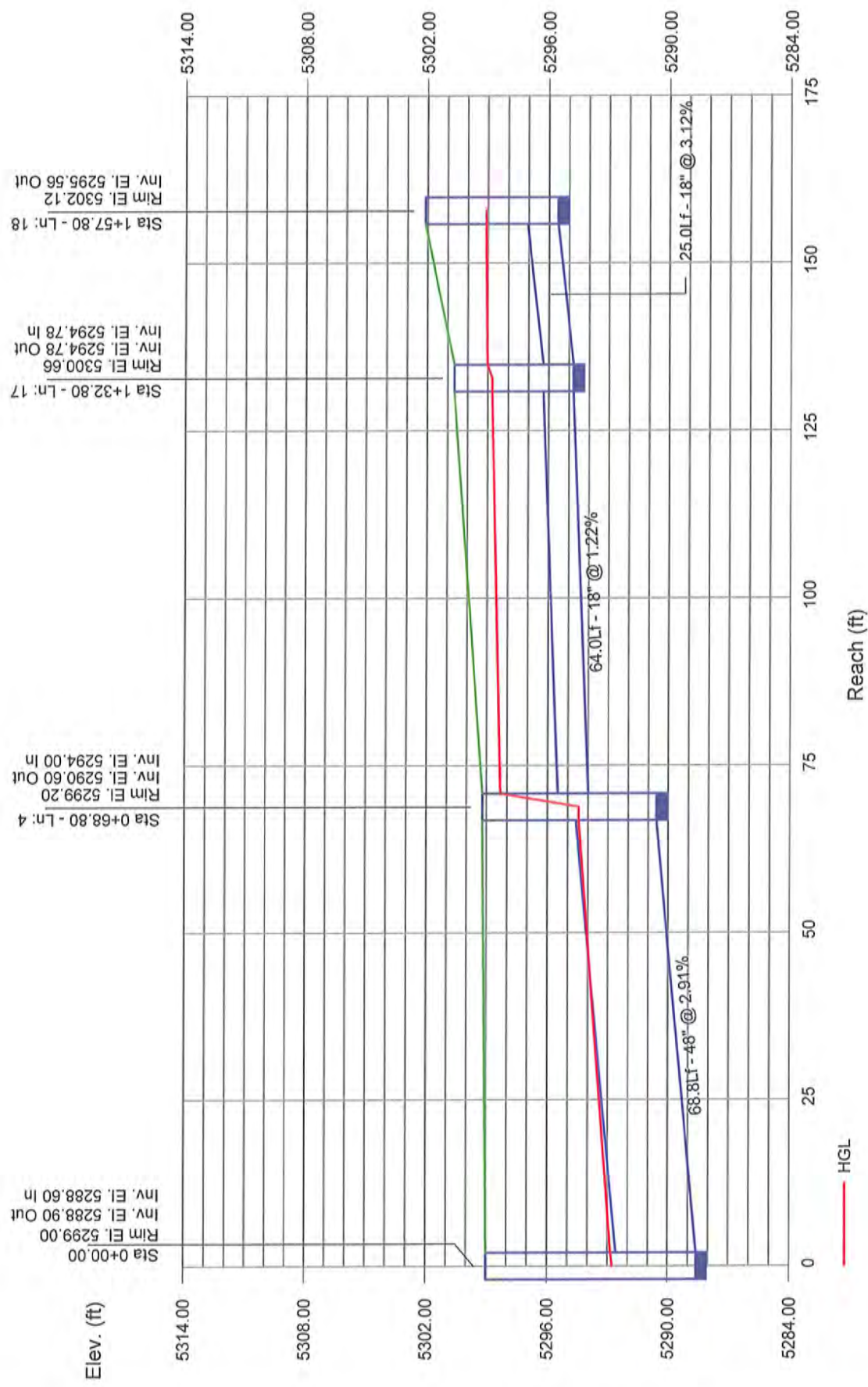


Storm Sewer Profile

Proj. file: PASEO DEL NORTE.stm

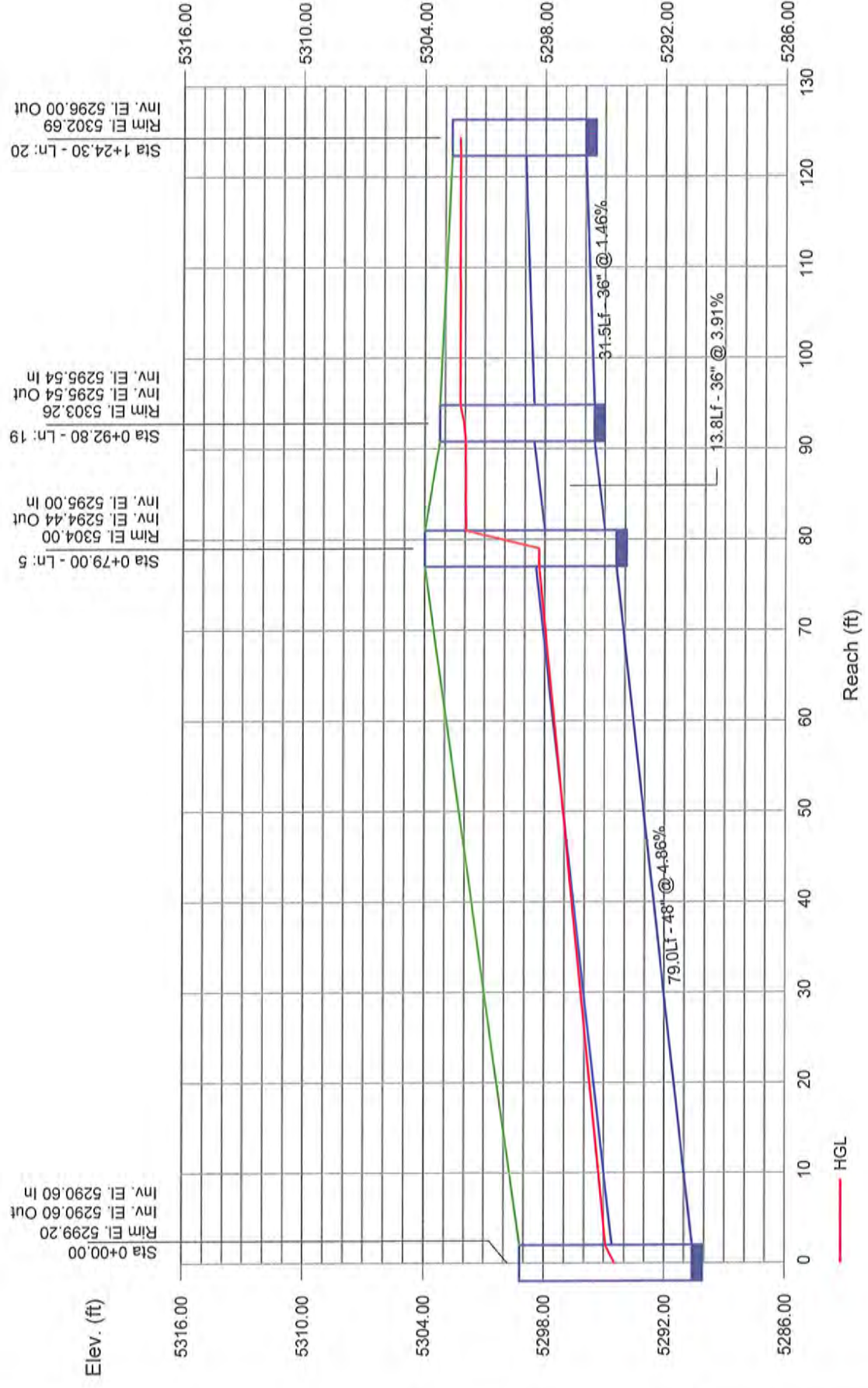


Storm Sewer Profile

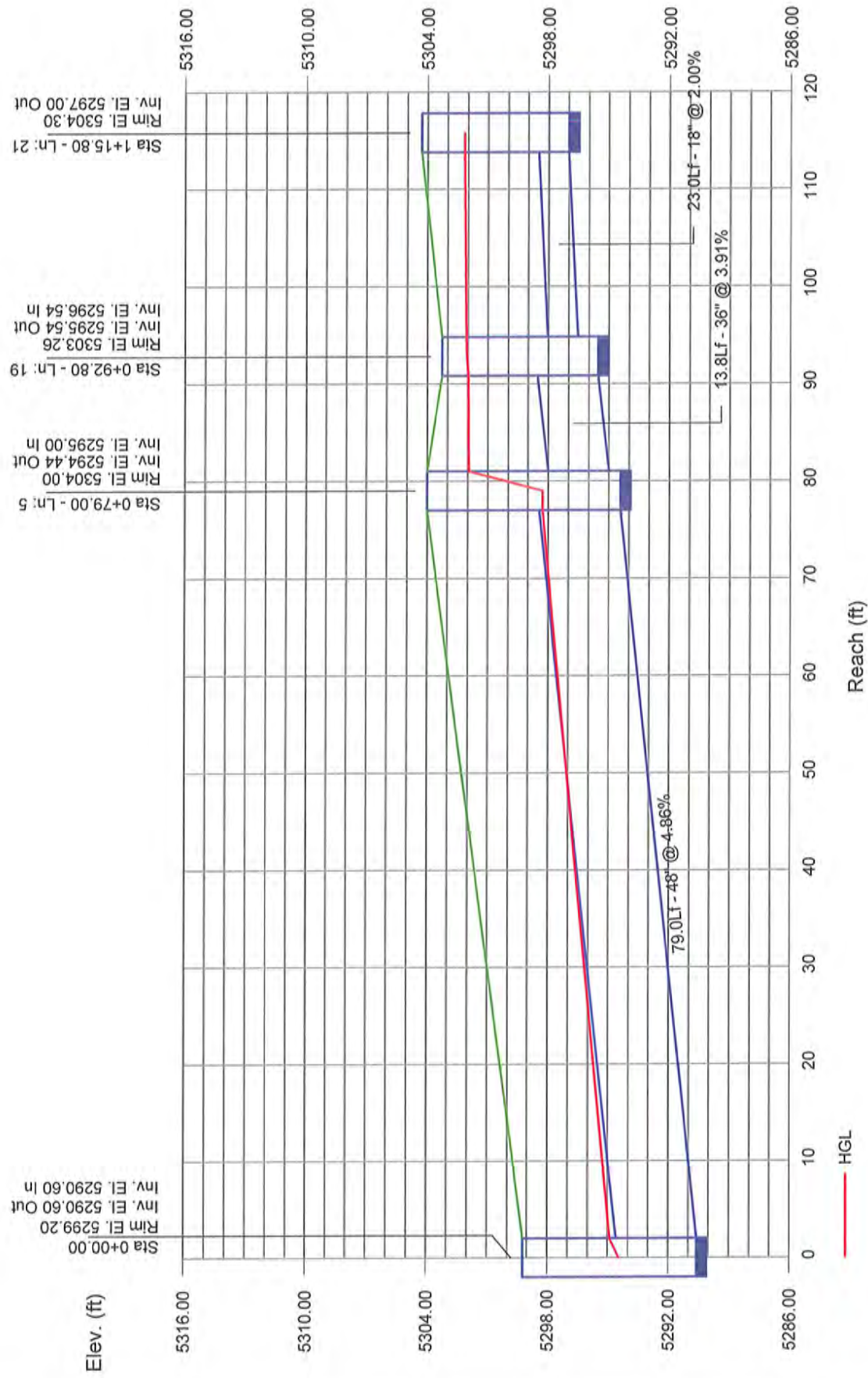


Storm Sewer Profile

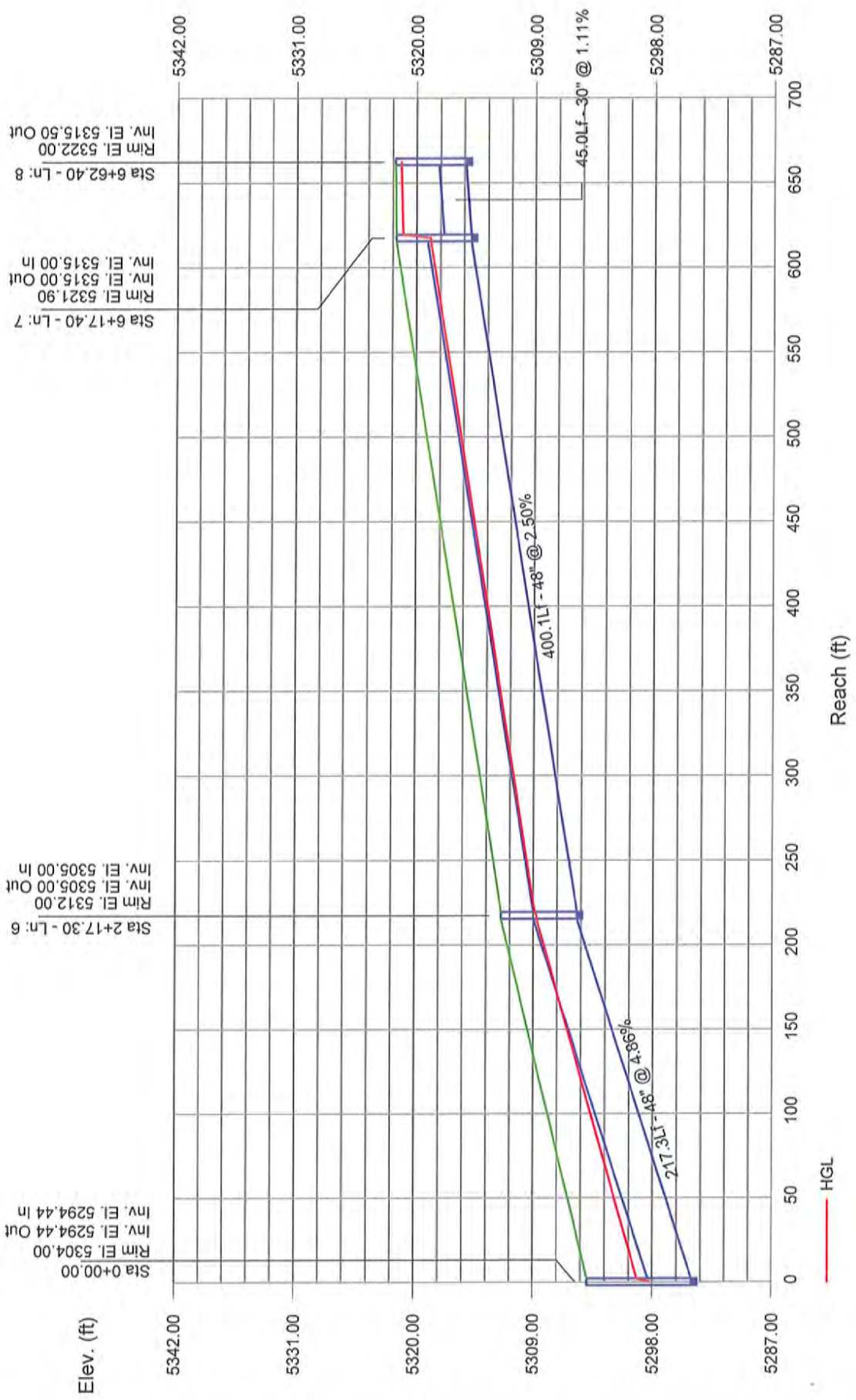
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Storm Sewer Profile

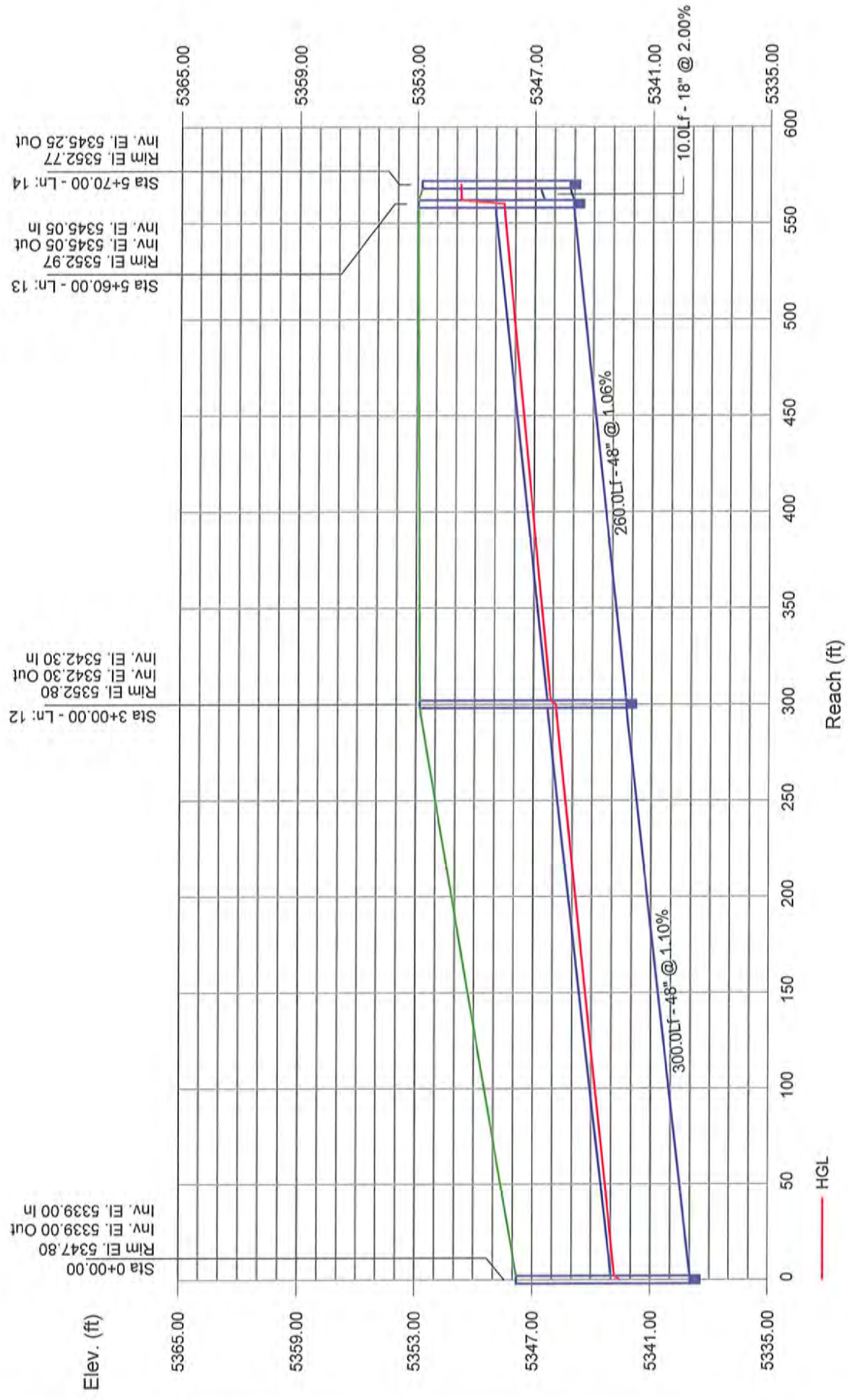


Storm Sewer Profile

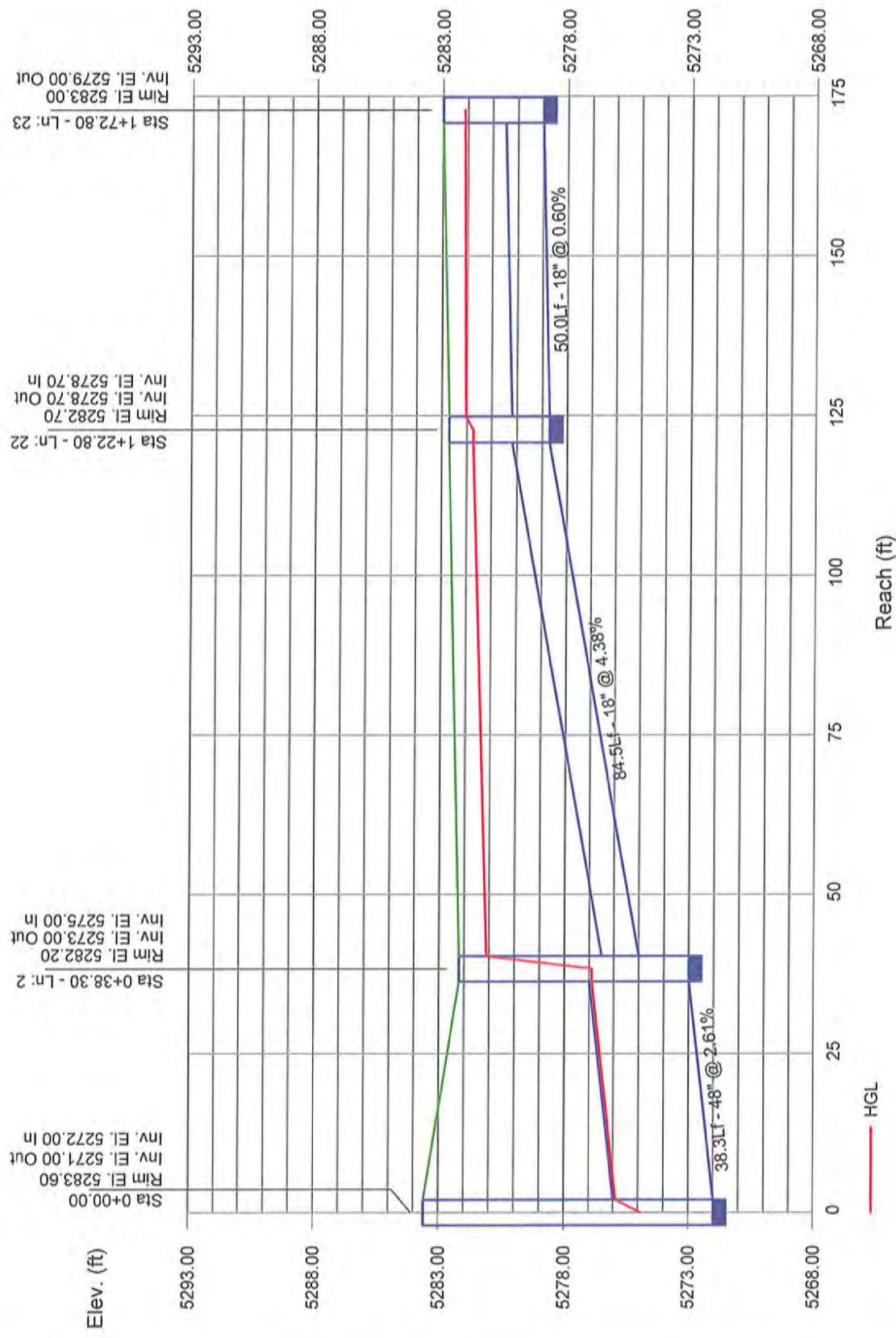


Storm Sewer Profile

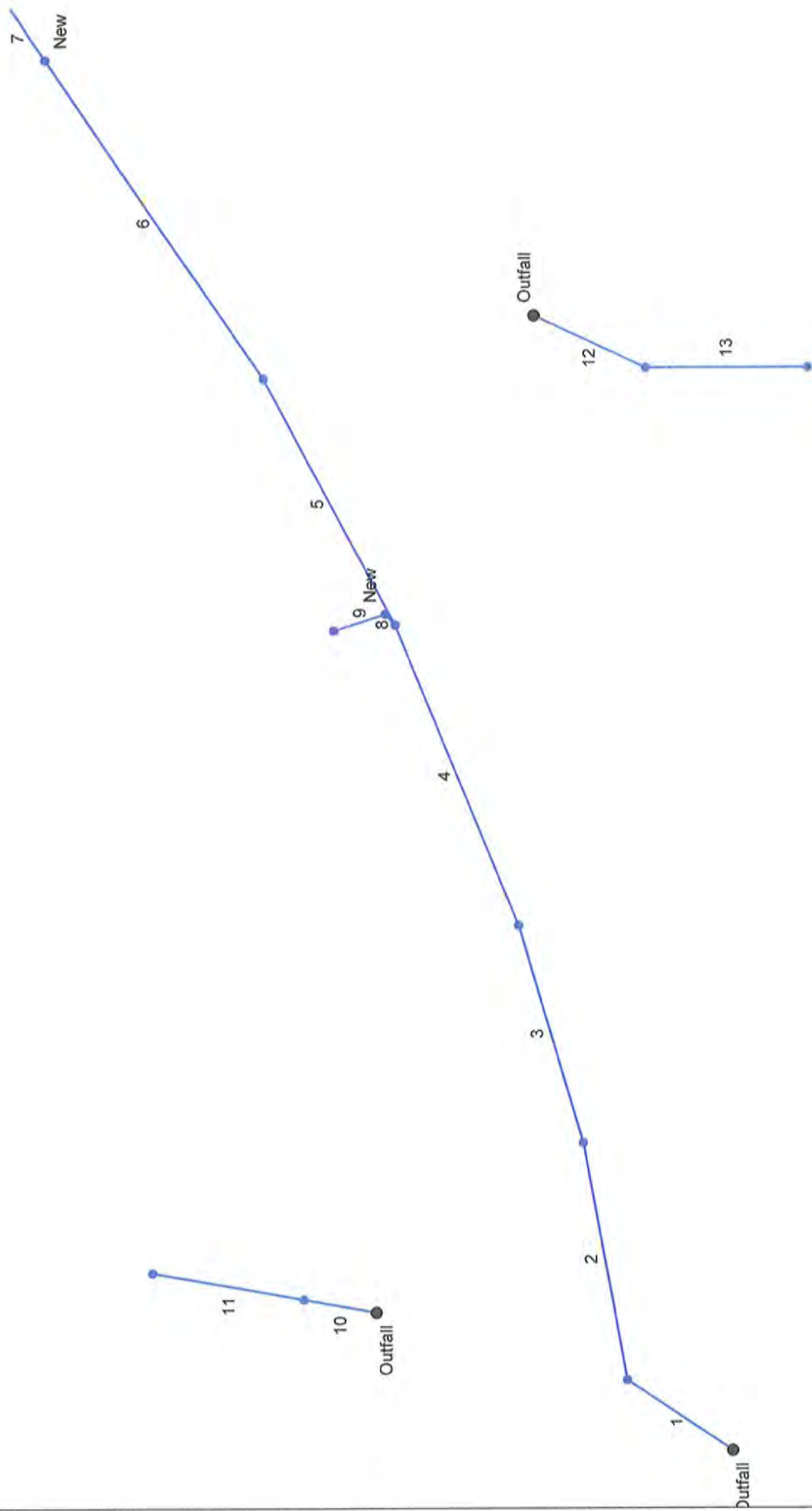
Proj. file: PASEO DEL NORTE.stm



Storm Sewer Profile



Hydraflow Storm Sewers Plan



Line No.	DnStrm Ln No	Line Size (in)	Flow Rate (cfs)	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	EGL Dn (ft)	EGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)
1	Outfall	66	248.40	70.5	1.28	5338.00	5338.90	5345.40	5345.86	5342.29	5343.19	5344.72	5345.62	1.90	1.46	0.89	12.49
2	1	66	248.40	133.0	1.73	5339.00	5341.30	5345.86	5348.27	5343.92	5345.59	5345.83	5348.02	1.36	1.47	0.15	11.79
3	2	66	248.40	125.0	1.68	5341.40	5343.50	5348.27	5351.66	5346.32	5347.79	5348.23	5350.22	1.37	2.66	0.15	11.79
4	3	66	248.40	179.0	1.71	5343.60	5346.67	5351.66	5354.41	5348.52	5350.96	5350.43	5353.39	2.56	2.24	0.15	11.79
5	4	66	239.00	154.0	0.34	5346.77	5347.30	5354.41	5356.02	5351.81	5352.58	5353.52	5354.20	2.14	3.22	0.15	10.34
6	5	66	239.00	213.0	0.61	5347.40	5348.70	5356.02	5356.52	5352.87	5353.69	5354.44	5355.42	3.12	2.32	0.50	10.31
7	6	66	239.00	34.0	0.59	5348.80	5349.00	5356.52	5356.52	5354.71	5354.88	5356.29	5356.46	2.22	2.02	0.50	10.06
8	4	24	9.40	8.0	2.50	5349.80	5350.00	5354.41	5354.14	5353.25	5353.26	5353.39	5353.40	2.61	2.14	0.15	2.99
9	8	18	4.70	30.0	1.00	5350.10	5350.40	5354.14	5354.25	5353.31	5353.37	5353.42	5353.48	2.54	2.35	0.15	2.66
10	Outfall	24	33.00	41.0	2.00	5346.51	5347.33	5351.59	5352.53	5348.41	5349.33	5350.19	5351.05	3.08	3.20	0.15	10.60
11	10	24	28.00	85.0	0.31	5347.33	5347.59	5352.53	5352.53	5350.07	5351.37	5351.30	5352.61	3.20	2.94	0.21	8.91
12	Outfall	18	12.50	68.0	3.53	5327.50	5329.90	5330.00	5338.50	5328.84	5331.24 j	5329.72	5332.12	1.00	7.10	0.21	7.51
13	12	18	4.50	90.0	2.22	5331.00	5333.00	5338.50	5338.30	5332.01	5333.81 j	5332.21	5334.14	6.00	3.80	0.21	4.08

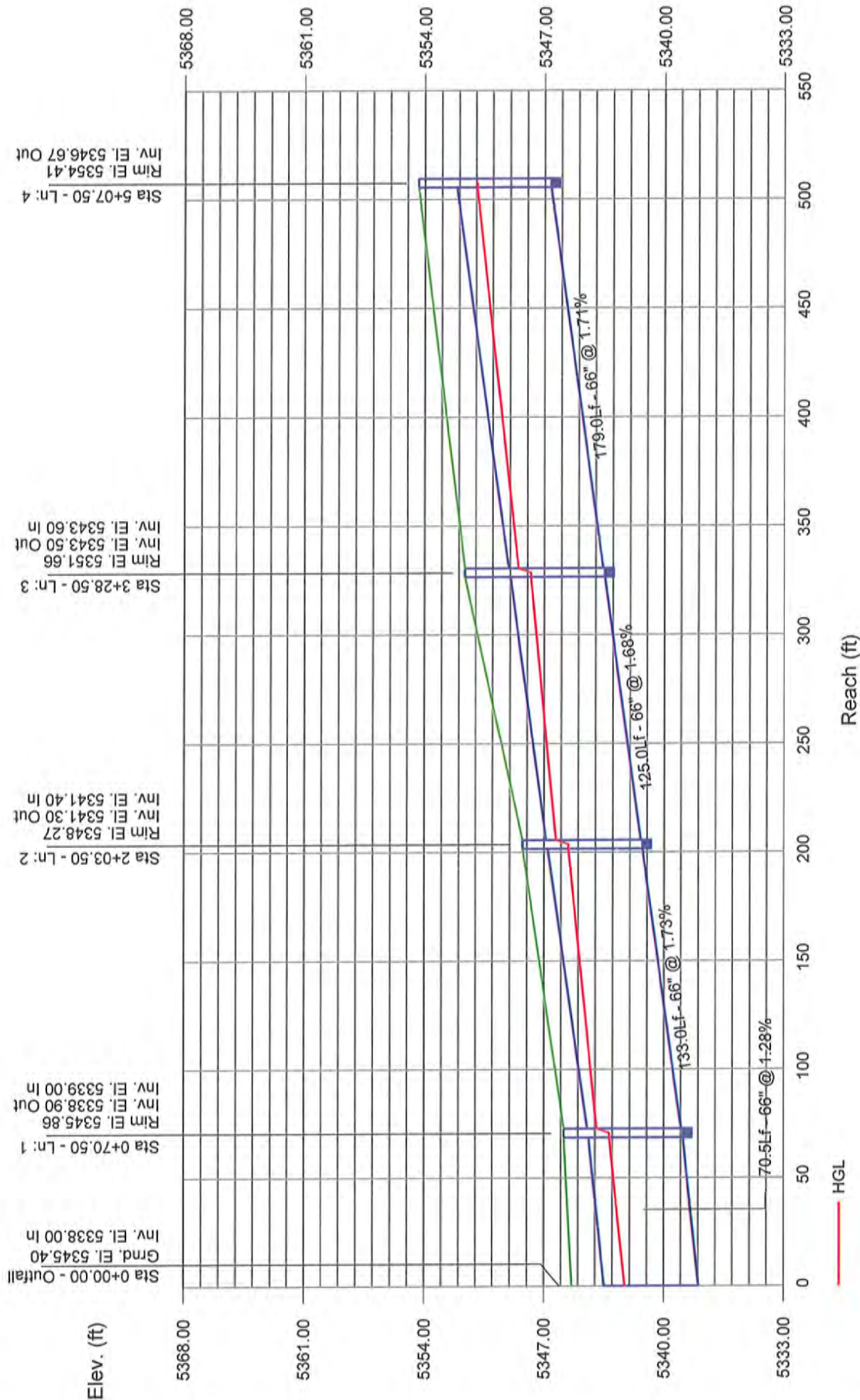
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Number of lines: 13

Date: 11-22-2011

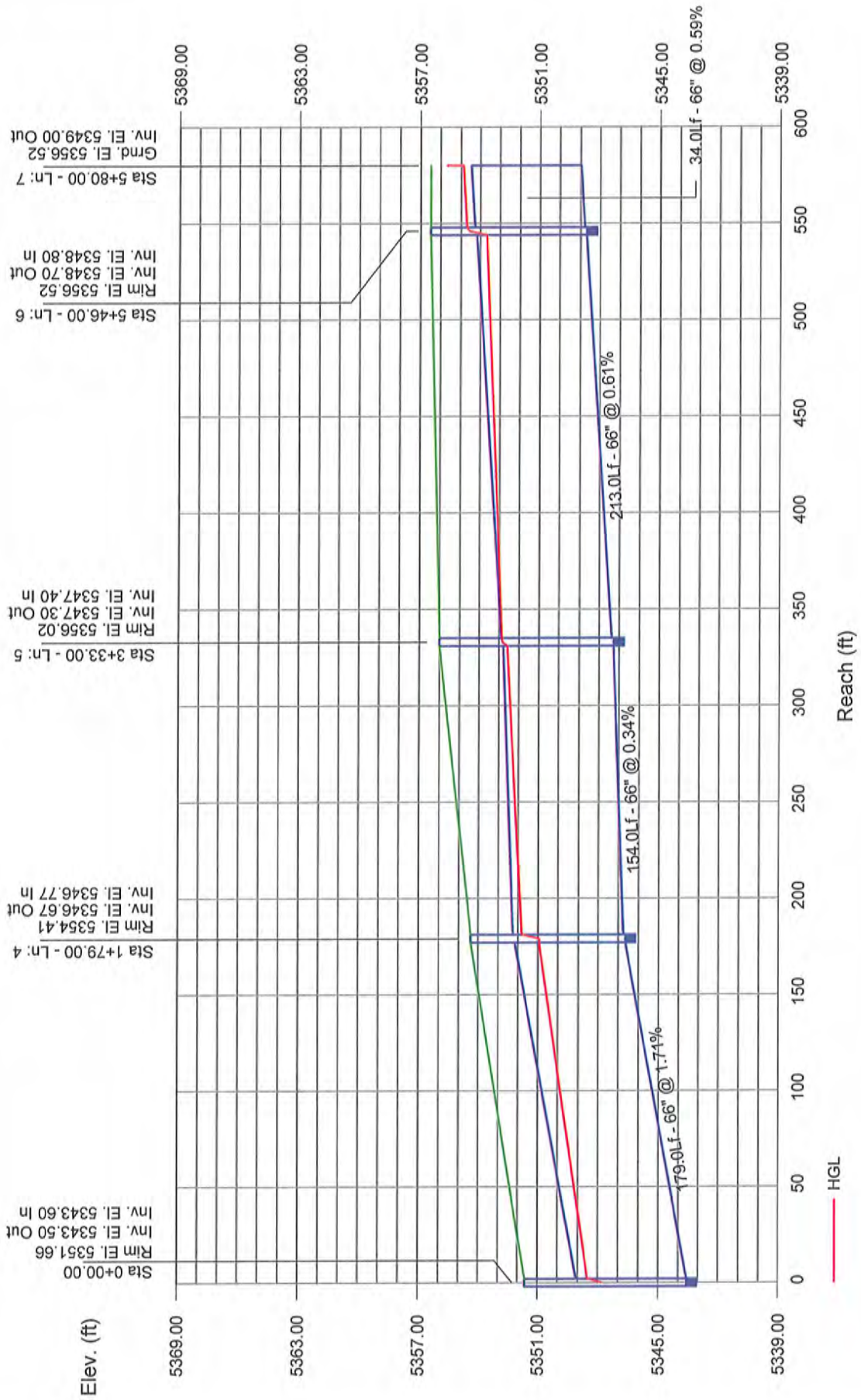
NOTES: ** Critical depth

Storm Sewer Profile



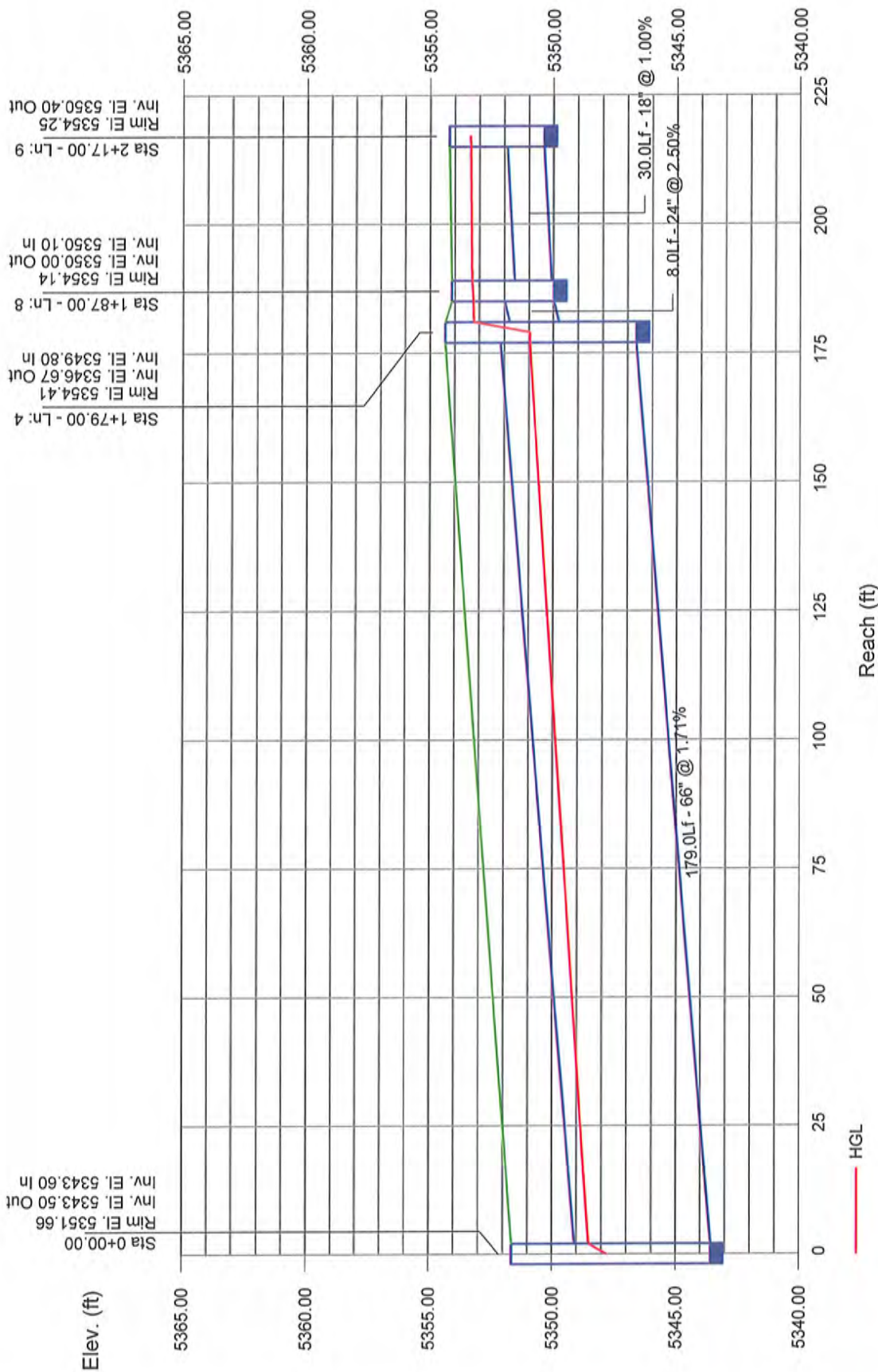
Storm Sewer Profile

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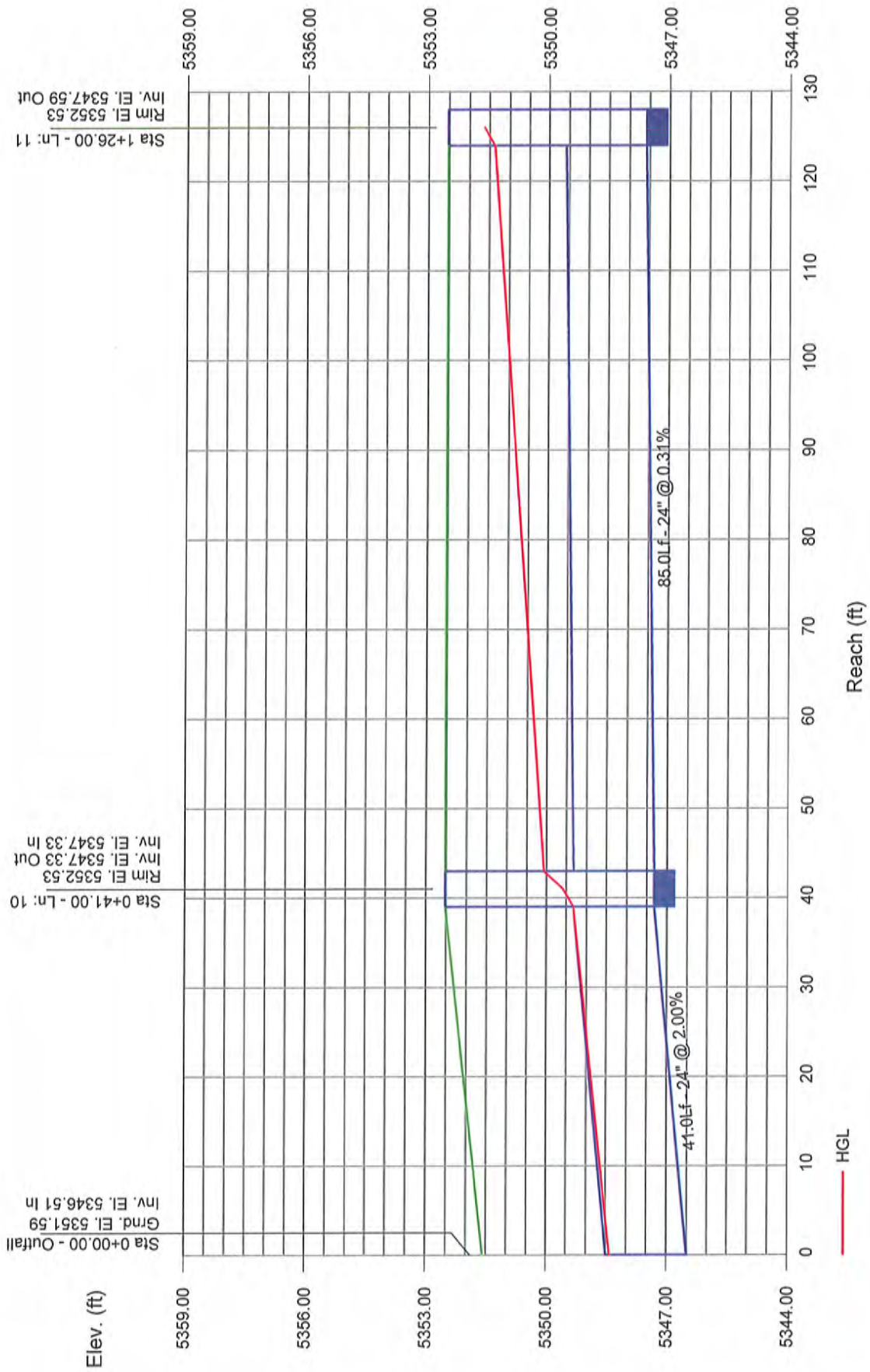


Storm Sewer Profile

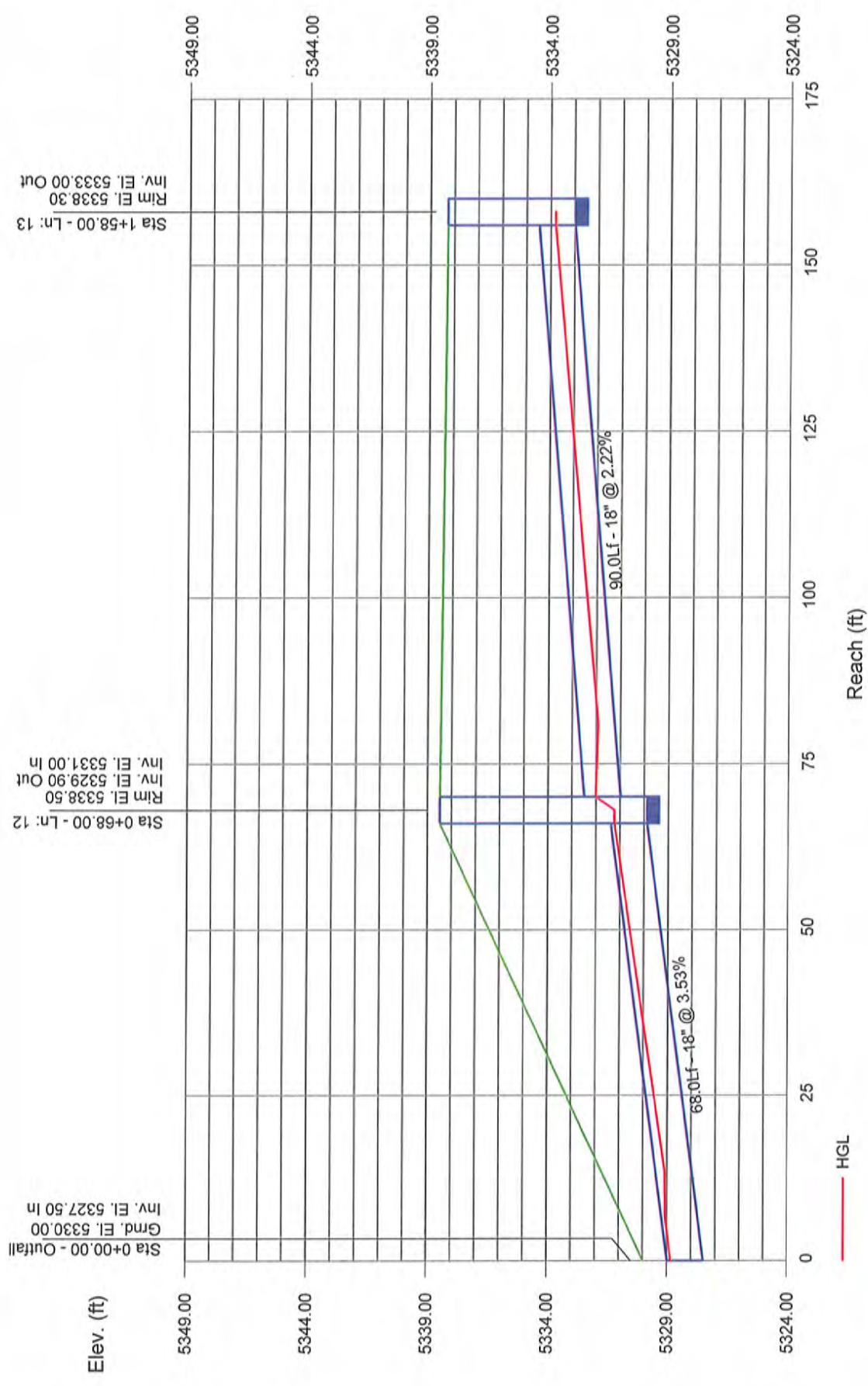
Proj. file: UNIVERSE - SCENIC.stm



Storm Sewer Profile



Storm Sewer Profile



APPENDIX C

Street Capacity Analysis
Inlet Capacity Analysis
Swale Calculations
Rundown Calculations
Pond Riser Calculations
Riprap Apron Calculations
Spillway Analysis

Project Description

Manning Formula

Normal Depth

Channel Slope

0.01130 ft/ft

Discharge

24.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Current Roughness Weighted Method

Pavlovskii's Method

Open Channel Weighting Method

Pavlovskii's Method

Closed Channel Weighting Method

Pavlovskii's Method

Normal Depth

0.37 ft

Elevation Range

0.00 to 0.87 ft

Flow Area

6.71 ft²

Wetted Perimeter

30.75 ft

Hydraulic Radius

0.22 ft

Top Width

30.00 ft

Normal Depth

0.37 ft

Critical Depth

0.42 ft

Critical Slope

0.00598 ft/ft

Velocity

3.58 ft/s

Velocity Head

0.20 ft

Worksheet for Alto Rey Ct Sta 13+35

Results

Specific Energy	0.57	ft
Froude Number	1.33	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.37	ft
Critical Depth	0.42	ft
Channel Slope	0.01130	ft/ft
Critical Slope	0.00598	ft/ft

Project Description

Manning Formula

Normal Depth

Channel Slope

0.00500 ft/ft

27.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Current Roughness Weighted Method

Pavlovskii's Method

Open Channel Weighting Method

Pavlovskii's Method

Closed Channel Weighting Method

Pavlovskii's Method

Results

Normal Depth		0.46	ft
Elevation Range	0.00 to 0.87 ft		
Flow Area		9.22	ft²
Wetted Perimeter		30.92	ft
Hydraulic Radius		0.30	ft
Top Width		30.00	ft
Normal Depth		0.46	ft
Critical Depth		0.44	ft
Critical Slope		0.00584	ft/ft
Velocity		2.93	ft/s
Velocity Head		0.13	ft

Worksheet for Agua Fria Ct Sta 13+90

Results

Specific Energy	0.59	ft
Froude Number	0.93	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.46	ft
Critical Depth	0.44	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00584	ft/ft

Project Description

Manning Formula

Normal Depth

Channel Slope

0.01130 ft/ft

Discharge

11.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Current Roughness Weighted Method

Pavlovskii's Method

Open Channel Weighting Method

Pavlovskii's Method

Closed Channel Weighting Method

Pavlovskii's Method

Results

Normal Depth

0.29 ft

Elevation Range

0.00 to 0.87 ft

Flow Area

4.12 ft²

Wetted Perimeter

29.29 ft

Hydraulic Radius

0.14 ft

Top Width

28.71 ft

Worksheet for Alto Rey Ct Sta 13+36

Results

Normal Depth	0.29	ft
Critical Depth	0.31	ft
Critical Slope	0.00705	ft/ft
Velocity	2.67	ft/s
Velocity Head	0.11	ft
Specific Energy	0.40	ft
Froude Number	1.24	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.29	ft
Critical Depth	0.31	ft
Channel Slope	0.01130	ft/ft
Critical Slope	0.00705	ft/ft

Worksheet for Aguila Sta 19+45

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01050	ft/ft
Discharge	12.00	ft³/s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.30	ft
Elevation Range	0.00 to 0.87	ft
Flow Area	4.51	ft²
Wetted Perimeter	30.61	ft
Hydraulic Radius	0.15	ft
Top Width	30.00	ft

Worksheet for Aguila Sta 19+45

Results

Normal Depth	0.30	ft
Critical Depth	0.32	ft
Critical Slope	0.00692	ft/ft
Velocity	2.66	ft/s
Velocity Head	0.11	ft
Specific Energy	0.41	ft
Froude Number	1.21	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.30	ft
Critical Depth	0.32	ft
Channel Slope	0.01050	ft/ft
Critical Slope	0.00692	ft/ft

Worksheet for Camino Aldetrete Sta 18+40

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00520 ft/ft
Discharge 43.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.55 ft
Elevation Range	0.00 to 0.87 ft
Flow Area	12.06 ft ²
Wetted Perimeter	31.11 ft
Hydraulic Radius	0.39 ft
Top Width	30.00 ft

Worksheet for Camino Aldetrete Sta 18+40

Results

Normal Depth	0.55	ft
Critical Depth	0.55	ft
Critical Slope	0.00531	ft/ft
Velocity	3.56	ft/s
Velocity Head	0.20	ft
Specific Energy	0.75	ft
Froude Number	0.99	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.55	ft
Critical Depth	0.55	ft
Channel Slope	0.00520	ft/ft
Critical Slope	0.00531	ft/ft

Worksheet for Camino Aldetrete Sta 26+50

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00590 ft/ft
Discharge 20.60 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 0.40 ft
Elevation Range 0.00 to 0.87 ft
Flow Area 7.44 ft²
Wetted Perimeter 30.80 ft
Hydraulic Radius 0.24 ft
Top Width 30.00 ft

Worksheet for Camino Aldetrete Sta 26+50

Results

Normal Depth	0.40	ft
Critical Depth	0.39	ft
Critical Slope	0.00618	ft/ft
Velocity	2.77	ft/s
Velocity Head	0.12	ft
Specific Energy	0.52	ft
Froude Number	0.98	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.40	ft
Critical Depth	0.39	ft
Channel Slope	0.00590	ft/ft
Critical Slope	0.00618	ft/ft

Worksheet for Camino Alto Sta 26+61

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 29.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness vweighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth	0.47 ft
Elevation Range	0.00 to 0.87 ft
Flow Area	9.62 ft ²
Wetted Perimeter	30.95 ft
Hydraulic Radius	0.31 ft
Top Width	30.00 ft

Worksheet for Camino Alto Sta 26+61

Results

Normal Depth	0.47	ft
Critical Depth	0.46	ft
Critical Slope	0.00575	ft/ft
Velocity	3.01	ft/s
Velocity Head	0.14	ft
Specific Energy	0.61	ft
Froude Number	0.94	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.47	ft
Critical Depth	0.46	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00575	ft/ft

Worksheet for Camino Del Oeste Sta 14+43

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 36.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness vweighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth	0.52 ft
Elevation Range	0.00 to 0.87 ft
Flow Area	10.96 ft ²
Wetted Perimeter	31.04 ft
Hydraulic Radius	0.35 ft
Top Width	30.00 ft

Worksheet for Camino Del Oeste Sta 14+43

Results

Normal Depth	0.52	ft
Critical Depth	0.51	ft
Critical Slope	0.00551	ft/ft
Velocity	3.28	ft/s
Velocity Head	0.17	ft
Specific Energy	0.68	ft
Froude Number	0.96	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.52	ft
Critical Depth	0.51	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00551	ft/ft

Worksheet for Camino Del Oeste Sta 15+75

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01050	ft/ft
Discharge	18.00	ft ³ /s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness vweighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.34	ft
Elevation Range	0.00 to 0.87	ft
Flow Area	5.76	ft ²
Wetted Perimeter	30.69	ft
Hydraulic Radius	0.19	ft
Top Width	30.00	ft

Worksheet for Camino Del Oeste Sta 15+75

Results

Normal Depth	0.34	ft
Critical Depth	0.37	ft
Critical Slope	0.00635	ft/ft
Velocity	3.12	ft/s
Velocity Head	0.15	ft
Specific Energy	0.49	ft
Froude Number	1.26	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.34	ft
Critical Depth	0.37	ft
Channel Slope	0.01050	ft/ft
Critical Slope	0.00635	ft/ft

Worksheet for Canavio PI Sta 32+63

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 23.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 0.43 ft
Elevation Range 0.00 to 0.87 ft
Flow Area 8.36 ft²
Wetted Perimeter 30.86 ft
Hydraulic Radius 0.27 ft
Top Width 30.00 ft
Normal Depth 0.43 ft
Critical Depth 0.41 ft
Critical Slope 0.00604 ft/ft
Velocity 2.75 ft/s
Velocity Head 0.12 ft

Worksheet for Canavio PI Sta 32+63

Results

Specific Energy	0.55	ft
Froude Number	0.92	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.43	ft
Critical Depth	0.41	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00604	ft/ft

Worksheet for Canoncito Dr Sta 19+50

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01160	ft/ft
Discharge	13.40	ft ³ /s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness vweighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.31	ft
Elevation Range	0.00 to 0.87	ft
Flow Area	4.68	ft ²
Wetted Perimeter	30.62	ft
Hydraulic Radius	0.15	ft
Top Width	30.00	ft

Worksheet for Canoncito Dr Sta 19+50

Results

Normal Depth	0.31	ft
Critical Depth	0.33	ft
Critical Slope	0.00676	ft/ft
Velocity	2.86	ft/s
Velocity Head	0.13	ft
Specific Energy	0.43	ft
Froude Number	1.28	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.31	ft
Critical Depth	0.33	ft
Channel Slope	0.01160	ft/ft
Critical Slope	0.00676	ft/ft

Worksheet for Compass Dr Sta 14+00

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01870	ft/ft
Discharge	5.00	ft³/s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	0.46
0+11	0.67
0+11	0.00
0+28	0.34
0+45	0.68
0+45	1.35
0+55	1.45

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.46)	(0+55, 1.45)	0.016

Options

Current Roughness vweighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.25	ft
Elevation Range	0.00 to 1.45	ft
Flow Area	1.58	ft²
Wetted Perimeter	12.85	ft
Hydraulic Radius	0.12	ft
Top Width	12.59	ft

Worksheet for Compass Dr Sta 14+00

Results

Normal Depth	0.25	ft
Critical Depth	0.30	ft
Critical Slope	0.00720	ft/ft
Velocity	3.15	ft/s
Velocity Head	0.15	ft
Specific Energy	0.41	ft
Froude Number	1.57	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.25	ft
Critical Depth	0.30	ft
Channel Slope	0.01870	ft/ft
Critical Slope	0.00720	ft/ft

Worksheet for Compass Dr Sta 25+50

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Discharge	15.00	ft ³ /s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	0.46
0+11	0.67
0+11	0.00
0+28	0.34
0+45	0.68
0+45	1.35
0+55	1.45

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.46)	(0+55, 1.45)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.49	ft
Elevation Range	0.00 to 1.45	ft
Flow Area	6.13	ft ²
Wetted Perimeter	26.94	ft
Hydraulic Radius	0.23	ft
Top Width	26.41	ft

Worksheet for Compass Dr Sta 25+50

Results

Normal Depth	0.49	ft
Critical Depth	0.47	ft
Critical Slope	0.00625	ft/ft
Velocity	2.45	ft/s
Velocity Head	0.09	ft
Specific Energy	0.59	ft
Froude Number	0.90	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.49	ft
Critical Depth	0.47	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00625	ft/ft

Worksheet for Compass Ct Sta 15+40

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00510	ft/ft
Discharge	35.00	ft ³ /s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+26	0.30
0+42	0.00
0+42	0.67
0+52	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+52, 0.87)	0.016

Options

Current Roughness weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.49	ft
Elevation Range	0.00 to 0.87	ft
Flow Area	10.99	ft ²
Wetted Perimeter	32.99	ft
Hydraulic Radius	0.33	ft
Top Width	32.00	ft

Worksheet for Compass Ct Sta 15+40

Results

Normal Depth	0.49	ft
Critical Depth	0.48	ft
Critical Slope	0.00560	ft/ft
Velocity	3.18	ft/s
Velocity Head	0.16	ft
Specific Energy	0.65	ft
Froude Number	0.96	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.49	ft
Critical Depth	0.48	ft
Channel Slope	0.00510	ft/ft
Critical Slope	0.00560	ft/ft

Worksheet for Cuervo Sta 15+05

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00810	ft/ft
Discharge	19.00	ft ³ /s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness Vweighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.36	ft
Elevation Range	0.00 to 0.87	ft
Flow Area	6.44	ft ²
Wetted Perimeter	30.74	ft
Hydraulic Radius	0.21	ft
Top Width	30.00	ft

Worksheet for Cuervo Sta 15+05

Results

Normal Depth	0.36	ft
Critical Depth	0.38	ft
Critical Slope	0.00628	ft/ft
Velocity	2.95	ft/s
Velocity Head	0.14	ft
Specific Energy	0.50	ft
Froude Number	1.12	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.36	ft
Critical Depth	0.38	ft
Channel Slope	0.00810	ft/ft
Critical Slope	0.00628	ft/ft

Worksheet for Kmmick St Sta 34+00

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00770 ft/ft
Discharge 9.50 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+27	0.34
0+44	0.00
0+44	0.67
0+56	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+56, 0.87)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 0.29 ft
Elevation Range 0.00 to 0.87 ft
Flow Area 4.27 ft²
Wetted Perimeter 29.80 ft
Hydraulic Radius 0.14 ft
Top Width 29.21 ft

Worksheet for Kmmick St Sta 34+00

Results

Normal Depth	0.29	ft
Critical Depth	0.30	ft
Critical Slope	0.00725	ft/ft
Velocity	2.23	ft/s
Velocity Head	0.08	ft
Specific Energy	0.37	ft
Froude Number	1.03	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.29	ft
Critical Depth	0.30	ft
Channel Slope	0.00770	ft/ft
Critical Slope	0.00725	ft/ft

Worksheet for Papagoya Sta 17+46

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 26.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 0.45 ft
Elevation Range 0.00 to 0.87 ft
Flow Area 9.01 ft²
Wetted Perimeter 30.91 ft
Hydraulic Radius 0.29 ft
Top Width 30.00 ft

Worksheet for Papagoya Sta 17+46

Results

Normal Depth	0.45	ft
Critical Depth	0.44	ft
Critical Slope	0.00588	ft/ft
Velocity	2.88	ft/s
Velocity Head	0.13	ft
Specific Energy	0.58	ft
Froude Number	0.93	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.45	ft
Critical Depth	0.44	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00588	ft/ft

Worksheet for Papagoya Sta 25+28

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 32.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness Vweighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth	0.49 ft
Elevation Range	0.00 to 0.87 ft
Flow Area	10.22 ft ²
Wetted Perimeter	30.99 ft
Hydraulic Radius	0.33 ft
Top Width	30.00 ft

Worksheet for Papagoya Sta 25+28

Results

Normal Depth	0.49	ft
Critical Depth	0.48	ft
Critical Slope	0.00564	ft/ft
Velocity	3.13	ft/s
Velocity Head	0.15	ft
Specific Energy	0.64	ft
Froude Number	0.95	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.49	ft
Critical Depth	0.48	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00564	ft/ft

Worksheet for Pato Sta 10+53

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.01890 ft/ft
Discharge 34.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth	0.39 ft
Elevation Range	0.00 to 0.87 ft
Flow Area	7.08 ft ²
Wetted Perimeter	30.78 ft
Hydraulic Radius	0.23 ft
Top Width	30.00 ft

Worksheet for Pato Sta 10+53

Results

Normal Depth	0.39	ft
Critical Depth	0.49	ft
Critical Slope	0.00557	ft/ft
Velocity	4.80	ft/s
Velocity Head	0.36	ft
Specific Energy	0.74	ft
Froude Number	1.74	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.39	ft
Critical Depth	0.49	ft
Channel Slope	0.01890	ft/ft
Critical Slope	0.00557	ft/ft

Worksheet for Petirrojo Sta 16+20

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00510 ft/ft
Discharge 22.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 0.42 ft
Elevation Range 0.00 to 0.87 ft
Flow Area 8.09 ft²
Wetted Perimeter 30.85 ft
Hydraulic Radius 0.26 ft
Top Width 30.00 ft

Worksheet for Petirrojo Sta 16+20

Results

Normal Depth	0.42	ft
Critical Depth	0.41	ft
Critical Slope	0.00609	ft/ft
Velocity	2.72	ft/s
Velocity Head	0.11	ft
Specific Energy	0.53	ft
Froude Number	0.92	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.42	ft
Critical Depth	0.41	ft
Channel Slope	0.00510	ft/ft
Critical Slope	0.00609	ft/ft

Worksheet for Petirrojo Sta 42+00

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00510	ft/ft
Discharge	46.00	ft ³ /s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.57	ft
Elevation Range	0.00 to 0.87	ft
Flow Area	12.65	ft ²
Wetted Perimeter	31.15	ft
Hydraulic Radius	0.41	ft
Top Width	30.00	ft

Worksheet for Petirrojo Sta 42+00

Results

Normal Depth	0.57	ft
Critical Depth	0.57	ft
Critical Slope	0.00524	ft/ft
Velocity	3.64	ft/s
Velocity Head	0.21	ft
Specific Energy	0.78	ft
Froude Number	0.99	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.57	ft
Critical Depth	0.57	ft
Channel Slope	0.00510	ft/ft
Critical Slope	0.00524	ft/ft

Worksheet for Vista Del Prado Sta 17+62.5

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.01220 ft/ft
Discharge 18.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 0.33 ft
Elevation Range 0.00 to 0.87 ft
Flow Area 5.51 ft²
Wetted Perimeter 30.67 ft
Hydraulic Radius 0.18 ft
Top Width 30.00 ft

Worksheet for Vista Del Prado Sta 17+62.5

Results

Normal Depth	0.33	ft
Critical Depth	0.37	ft
Critical Slope	0.00635	ft/ft
Velocity	3.27	ft/s
Velocity Head	0.17	ft
Specific Energy	0.50	ft
Froude Number	1.35	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.33	ft
Critical Depth	0.37	ft
Channel Slope	0.01220	ft/ft
Critical Slope	0.00635	ft/ft

Worksheet for Suejto Sta 15+83

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 17.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 0.38 ft
Elevation Range 0.00 to 0.87 ft
Flow Area 6.96 ft²
Wetted Perimeter 30.77 ft
Hydraulic Radius 0.23 ft
Top Width 30.00 ft
Normal Depth 0.38 ft
Critical Depth 0.37 ft
Critical Slope 0.00643 ft/ft
Velocity 2.44 ft/s
Velocity Head 0.09 ft

Worksheet for Suejto Sta 15+83

Results

Specific Energy	0.47	ft
Froude Number	0.89	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.38	ft
Critical Depth	0.37	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00643	ft/ft

Worksheet for Uracca St Sta 10+50

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00590 ft/ft
Discharge 14.50 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+15	0.67
0+15	0.00
0+32	0.34
0+49	0.00
0+49	0.67
0+64	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+64, 0.87)	0.016

Options

Current Roughness vweighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth	0.36 ft
Elevation Range	0.00 to 0.87 ft
Flow Area	6.32 ft ²
Wetted Perimeter	34.72 ft
Hydraulic Radius	0.18 ft
Top Width	34.00 ft

Worksheet for Uracca St Sta 10+50

Results

Normal Depth	0.36	ft
Critical Depth	0.35	ft
Critical Slope	0.00681	ft/ft
Velocity	2.29	ft/s
Velocity Head	0.08	ft
Specific Energy	0.44	ft
Froude Number	0.94	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.36	ft
Critical Depth	0.35	ft
Channel Slope	0.00590	ft/ft
Critical Slope	0.00681	ft/ft

Worksheet for Unser Blvd Sta 15+00

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00500 ft/ft
Discharge 8.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.00
0+09	0.00
0+09	-0.50
0+42	-1.49
0+42	-0.82
0+64	-1.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.00)	(0+42, -0.82)	0.016
(0+42, -0.82)	(0+64, -1.00)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 0.45 ft
Elevation Range -1.49 to 0.00 ft
Flow Area 3.36 ft²
Wetted Perimeter 15.34 ft
Hydraulic Radius 0.22 ft
Top Width 14.88 ft

Worksheet for Unser Blvd Sta 15+00

Results

Normal Depth	0.45	ft
Critical Depth	0.43	ft
Critical Slope	0.00649	ft/ft
Velocity	2.38	ft/s
Velocity Head	0.09	ft
Specific Energy	0.54	ft
Froude Number	0.88	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.45	ft
Critical Depth	0.43	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00649	ft/ft

Worksheet for Unser Blvd Sta 27+75

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01300	ft/ft
Discharge	4.00	ft ³ /s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	0.00
0+09	0.00
0+09	-0.67
0+42	0.65
0+42	1.15
0+64	1.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.00)	(0+42, 1.15)	0.016
(0+42, 1.15)	(0+64, 1.00)	0.016

Options

Current Roughness vweighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.32	ft
Elevation Range	-0.67 to 1.15	ft
Flow Area	1.30	ft ²
Wetted Perimeter	8.37	ft
Hydraulic Radius	0.16	ft
Top Width	8.03	ft

Worksheet for Unser Blvd Sta 27+75

Results

Normal Depth	0.32	ft
Critical Depth	0.37	ft
Critical Slope	0.00694	ft/ft
Velocity	3.07	ft/s
Velocity Head	0.15	ft
Specific Energy	0.47	ft
Froude Number	1.34	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.32	ft
Critical Depth	0.37	ft
Channel Slope	0.01300	ft/ft
Critical Slope	0.00694	ft/ft

Worksheet for Vista Del Prado Ct Sta 15+50

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00720	ft/ft
Discharge	13.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+10	0.67
0+10	0.00
0+25	0.30
0+40	0.00
0+40	0.67
0+50	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+50, 0.87)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.33	ft
Elevation Range	0.00 to 0.87	ft
Flow Area	5.31	ft²
Wetted Perimeter	30.66	ft
Hydraulic Radius	0.17	ft
Top Width	30.00	ft

Worksheet for Vista Del Prado Ct Sta 15+50

Results

Normal Depth	0.33	ft
Critical Depth	0.33	ft
Critical Slope	0.00680	ft/ft
Velocity	2.45	ft/s
Velocity Head	0.09	ft
Specific Energy	0.42	ft
Froude Number	1.03	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.33	ft
Critical Depth	0.33	ft
Channel Slope	0.00720	ft/ft
Critical Slope	0.00680	ft/ft

Worksheet for Calle Nortena Sta 19+00

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.04280 ft/ft
Discharge 10.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.79
0+15	0.67
0+15	0.00
0+39	-0.48
0+64	-0.96
0+64	-0.29
0+75	-0.19

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.79)	(0+75, -0.19)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth	0.28 ft
Elevation Range	-0.96 to 0.79 ft
Flow Area	1.98 ft ²
Wetted Perimeter	14.63 ft
Hydraulic Radius	0.14 ft
Top Width	14.35 ft

Worksheet for Calle Nortena Sta 19+00

Results

Normal Depth	0.28	ft
Critical Depth	0.39	ft
Critical Slope	0.00659	ft/ft
Velocity	5.06	ft/s
Velocity Head	0.40	ft
Specific Energy	0.67	ft
Froude Number	2.40	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.28	ft
Critical Depth	0.39	ft
Channel Slope	0.04280	ft/ft
Critical Slope	0.00659	ft/ft

Worksheet for Paseo Del Norte Sta 80+90

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00710 ft/ft
Discharge 15.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.00
0+36	-0.72
0+36	-0.05
0+53	0.15

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.00)	(0+53, 0.15)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.46	ft
Elevation Range	-0.72 to 0.15	ft
Flow Area	5.20	ft ²
Wetted Perimeter	23.27	ft
Hydraulic Radius	0.22	ft
Top Width	22.81	ft
Normal Depth	0.46	ft
Critical Depth	0.47	ft
Critical Slope	0.00622	ft/ft

Worksheet for Paseo Del Norte Sta 80+90

Results

Velocity	2.88	ft/s
Velocity Head	0.13	ft
Specific Energy	0.59	ft
Froude Number	1.06	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.46	ft
Critical Depth	0.47	ft
Channel Slope	0.00710	ft/ft
Critical Slope	0.00622	ft/ft

Worksheet for Paseo Del Norte Sta 101+50

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.06000 ft/ft
Discharge 32.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.00
0+36	-0.72
0+36	-0.05
0+53	0.15

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.00)	(0+53, 0.15)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth	0.41	ft
Elevation Range	-0.72 to 0.15	ft
Flow Area	4.13	ft ²
Wetted Perimeter	20.73	ft
Hydraulic Radius	0.20	ft
Top Width	20.32	ft
Normal Depth	0.41	ft
Critical Depth	0.63	ft
Critical Slope	0.00562	ft/ft

Worksheet for Paseo Del Norte Sta 101+50

Results

Velocity	7.75	ft/s
Velocity Head	0.93	ft
Specific Energy	1.34	ft
Froude Number	3.03	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.41	ft
Critical Depth	0.63	ft
Channel Slope	0.06000	ft/ft
Critical Slope	0.00562	ft/ft

Worksheet for Paseo Del Norte Sta 105+00

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.06000 ft/ft
Discharge 9.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.00
0+36	-0.72
0+36	-0.05
0+53	0.15

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.00)	(0+53, 0.15)	0.016

Options

Current Roughness vweighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.25 ft
Elevation Range	-0.72 to 0.15 ft
Flow Area	1.59 ft ²
Wetted Perimeter	12.88 ft
Hydraulic Radius	0.12 ft
Top Width	12.62 ft
Normal Depth	0.25 ft
Critical Depth	0.38 ft
Critical Slope	0.00666 ft/ft

Worksheet for Paseo Del Norte Sta 105+00

Results

Velocity	5.65	ft/s
Velocity Head	0.50	ft
Specific Energy	0.75	ft
Froude Number	2.80	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.25	ft
Critical Depth	0.38	ft
Channel Slope	0.06000	ft/ft
Critical Slope	0.00666	ft/ft

Worksheet for Rainbow Blvd Sta 31+73-East half

Results

Specific Energy	0.75	ft
Froude Number	1.19	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.56	ft
Critical Depth	0.60	ft
Channel Slope	0.00830	ft/ft
Critical Slope	0.00573	ft/ft

Worksheet for Rainbow Blvd Sta 31+73-East half

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00830 ft/ft
Discharge 28.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.00
0+09	0.00
0+09	-0.50
0+44	-1.18
0+44	-0.51
0+64	-0.31

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.00)	(0+44, -0.51)	0.016
(0+44, -0.51)	(0+64, -0.31)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 0.56 ft
Elevation Range -1.18 to 0.00 ft
Flow Area 7.88 ft²
Wetted Perimeter 28.91 ft
Hydraulic Radius 0.27 ft
Top Width 28.34 ft
Normal Depth 0.56 ft
Critical Depth 0.60 ft
Critical Slope 0.00573 ft/ft
Velocity 3.55 ft/s
Velocity Head 0.20 ft

Worksheet for Rainbow Blvd Sta 31+73 - West half

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.00830 ft/ft
Discharge 5.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.00
0+09	0.00
0+09	-0.50
0+44	-1.18
0+44	-0.51
0+64	-0.31

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.00)	(0+44, -0.51)	0.016
(0+44, -0.51)	(0+64, -0.31)	0.016

Options

Current roughness weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth	0.29 ft
Elevation Range	-1.18 to 0.00 ft
Flow Area	2.16 ft ²
Wetted Perimeter	15.14 ft
Hydraulic Radius	0.14 ft
Top Width	14.85 ft
Normal Depth	0.29 ft
Critical Depth	0.30 ft
Critical Slope	0.00721 ft/ft
Velocity	2.31 ft/s
Velocity Head	0.08 ft

Worksheet for Rainbow Blvd Sta 31+73 - West half

Results

Specific Energy	0.37	ft
Froude Number	1.07	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.29	ft
Critical Depth	0.30	ft
Channel Slope	0.00830	ft/ft
Critical Slope	0.00721	ft/ft

Worksheet for Rainbow Blvd Sta 47+57 - East half

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.02780 ft/ft
Discharge 12.93 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.00
0+09	0.00
0+09	-0.50
0+44	-1.18
0+44	-0.51
0+64	-0.31

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.00)	(0+44, -0.51)	0.016
(0+44, -0.51)	(0+64, -0.31)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth	0.33 ft
Elevation Range	-1.18 to 0.00 ft
Flow Area	2.80 ft ²
Wetted Perimeter	17.24 ft
Hydraulic Radius	0.16 ft
Top Width	16.91 ft
Normal Depth	0.33 ft
Critical Depth	0.44 ft
Critical Slope	0.00636 ft/ft
Velocity	4.61 ft/s
Velocity Head	0.33 ft

Worksheet for Rainbow Blvd Sta 47+57 - East half

Results

Specific Energy	0.66	ft
Froude Number	2.00	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.33	ft
Critical Depth	0.44	ft
Channel Slope	0.02780	ft/ft
Critical Slope	0.00636	ft/ft

Worksheet for Rainbow Blvd Sta 47+57 - West half

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.02780 ft/ft
Discharge 5.60 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.00
0+09	0.00
0+09	-0.50
0+44	-1.18
0+44	-0.51
0+64	-0.31

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.00)	(0+44, -0.51)	0.016
(0+44, -0.51)	(0+64, -0.31)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth	0.24 ft
Elevation Range	-1.18 to 0.00 ft
Flow Area	1.50 ft ²
Wetted Perimeter	12.59 ft
Hydraulic Radius	0.12 ft
Top Width	12.35 ft
Normal Depth	0.24 ft
Critical Depth	0.31 ft
Critical Slope	0.00711 ft/ft
Velocity	3.75 ft/s
Velocity Head	0.22 ft

Worksheet for Rainbow Blvd Sta 47+57 - West half

Results

Specific Energy	0.46	ft
Froude Number	1.90	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.24	ft
Critical Depth	0.31	ft
Channel Slope	0.02780	ft/ft
Critical Slope	0.00711	ft/ft

Worksheet for Scenic Rd Sta 22+50

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.01670 ft/ft
Discharge 9.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	0.87
0+12	0.67
0+12	0.00
0+29	0.30
0+44	0.00
0+44	0.67
0+58	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.87)	(0+58, 0.87)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 0.24 ft
Elevation Range 0.00 to 0.87 ft
Flow Area 3.11 ft²
Wetted Perimeter 26.22 ft
Hydraulic Radius 0.12 ft
Top Width 25.74 ft

Worksheet for Scenic Rd Sta 22+50

Results

Normal Depth	0.24	ft
Critical Depth	0.28	ft
Critical Slope	0.00735	ft/ft
Velocity	2.90	ft/s
Velocity Head	0.13	ft
Specific Energy	0.37	ft
Froude Number	1.47	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.24	ft
Critical Depth	0.28	ft
Channel Slope	0.01670	ft/ft
Critical Slope	0.00735	ft/ft

Worksheet for Compass Dr 25+50, 17' RT - Inlets in sag

Project Description

Solve For Spread

Input Data

Discharge		7.50	ft ³ /s
Gutter Width		2.00	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		1.50	in
Local Depression Width		2.50	ft
Grate Width		2.00	ft
Grate Length		6.67	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		7.40	ft
Opening Height		0.67	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option Use Both

Results

Spread	14.64	ft
Depth	0.38	ft
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Open Grate Area	6.00	ft ²
Active Grate Weir Length	8.67	ft

Worksheet for Suejto Sta 15+83, 15' LT & RT - 2 Inlets in sag

Project Description

Solve For

Spread

Input Data

Discharge		8.50	ft ³ /s
Gutter Width		2.00	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		1.50	in
Local Depression Width		2.50	ft
Grate Width		2.00	ft
Grate Length		6.67	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		7.40	ft
Opening Height		0.67	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option

Use Both

Results

Spread	15.98	ft
Depth	0.40	ft
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Open Grate Area	6.00	ft ²
Active Grate Weir Length	8.67	ft

Worksheet for Pato Sta 10+53, 15' LT & RT - Inlet on grade

Project Description

Solve For Efficiency

Input Data

Discharge	4.00	ft ³ /s
Slope	0.01900	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	86.13	%
Intercepted Flow	3.45	ft ³ /s
Bypass Flow	0.55	ft ³ /s
Spread	9.21	ft
Depth	0.27	ft
Flow Area	0.93	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	4.29	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.13	
Grate Flow Ratio	0.69	
Equivalent Cross Slope	0.06859	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.18	
Total Interception Length	22.11	ft

Messages

Messages Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pato Sta 10+78, 15' LT & RT - Inlet on grade

Project Description

Solve For Efficiency

Input Data

Discharge	8.50	ft ³ /s
Slope	0.01900	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	70.23	%
Intercepted Flow	5.97	ft ³ /s
Bypass Flow	2.53	ft ³ /s
Spread	12.65	ft
Depth	0.34	ft
Flow Area	1.69	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	5.04	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.10	
Grate Flow Ratio	0.53	
Equivalent Cross Slope	0.05671	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.12	
Total Interception Length	34.01	ft

Messages

Messages Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Pato Sta 11+03, 15' LT & RT - Inlet on grade

Project Description

Solve For

Efficiency

Input Data

Discharge	13.00	ft ³ /s
Slope	0.01900	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	61.27	%
Intercepted Flow	7.97	ft ³ /s
Bypass Flow	5.03	ft ³ /s
Spread	15.02	ft
Depth	0.39	ft
Flow Area	2.34	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	5.56	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.09	
Grate Flow Ratio	0.46	
Equivalent Cross Slope	0.05119	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.09	
Total Interception Length	43.23	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Papagayo Sta 17+46, 15' LT & RT - inlet in sag

Project Description

Solve For

Spread

Input Data

Discharge		13.00	ft ³ /s
Gutter Width		2.00	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		1.50	in
Local Depression Width		2.50	ft
Grate Width		2.00	ft
Grate Length		6.67	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		7.40	ft
Opening Height		0.67	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option

Use Both

Results

Spread	21.48	ft
Depth	0.51	ft
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Open Grate Area	6.00	ft ²
Active Grate Weir Length	8.67	ft

Worksheet for Papagayo Sta 24+53, 15' RT - Inlet on grade

Project Description

Solve For Efficiency

Input Data

Discharge	7.00	ft ³ /s
Slope	0.00500	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	70.29	%
Intercepted Flow	4.92	ft ³ /s
Bypass Flow	2.08	ft ³ /s
Spread	15.31	ft
Depth	0.39	ft
Flow Area	2.43	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	2.88	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.24	
Grate Flow Ratio	0.36	
Equivalent Cross Slope	0.05061	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.18	
Total Interception Length	22.48	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Papagayo Sta 24+78, 15' LT & RT - Inlet on grade

Project Description

Solve For

Efficiency

Input Data

Discharge	7.00	ft ³ /s
Slope	0.00500	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	75.11	%
Intercepted Flow	5.26	ft ³ /s
Bypass Flow	1.74	ft ³ /s
Spread	15.31	ft
Depth	0.39	ft
Flow Area	2.43	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	2.88	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.24	
Grate Flow Ratio	0.45	
Equivalent Cross Slope	0.05061	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.18	
Total Interception Length	22.48	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Papagayo Sta 25+03, 15' LT - Inlet on grade

Project Description

Solve For Efficiency

Input Data

Discharge	7.00	ft ³ /s
Slope	0.00500	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	70.29	%
Intercepted Flow	4.92	ft ³ /s
Bypass Flow	2.08	ft ³ /s
Spread	15.31	ft
Depth	0.39	ft
Flow Area	2.43	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	2.88	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.24	
Grate Flow Ratio	0.36	
Equivalent Cross Slope	0.05061	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.18	
Total Interception Length	22.48	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).
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Worksheet for Cuervo Sta 15+05, 15' LT & RT - 4 Inlets in sag

Project Description

Solve For Spread

Input Data

Discharge		4.75	ft ³ /s
Gutter Width		2.00	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		1.50	in
Local Depression Width		2.50	ft
Grate Width		2.00	ft
Grate Length		6.67	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		7.40	ft
Opening Height		0.67	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option Use Both

Results

Spread	10.55	ft
Depth	0.30	ft
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Open Grate Area	6.00	ft ²
Active Grate Weir Length	8.67	ft

Worksheet for Petirrojo Sta 16+06, 15' LT & RT - 4 Inlets in sag

Project Description

Solve For Spread

Input Data

Discharge		5.70	ft ³ /s
Gutter Width		2.00	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		1.50	in
Local Depression Width		2.50	ft
Grate Width		2.00	ft
Grate Length		6.67	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		7.40	ft
Opening Height		0.67	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option Use Both

Results

Spread	12.04	ft
Depth	0.33	ft
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Open Grate Area	6.00	ft ²
Active Grate Weir Length	8.67	ft

Worksheet for Aguila Sta 19+45, 15' LT & RT - Inlet on grade

Project Description

Solve For Efficiency

Input Data

Discharge	6.00	ft ³ /s
Slope	0.01100	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	77.06	%
Intercepted Flow	4.62	ft ³ /s
Bypass Flow	1.38	ft ³ /s
Spread	12.27	ft
Depth	0.33	ft
Flow Area	1.59	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	3.77	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.16	
Grate Flow Ratio	0.55	
Equivalent Cross Slope	0.05777	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.16	
Total Interception Length	24.66	ft

Messages

Messages Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Vista Del Prado Sta 17+62, 15' LT & RT - 3 Inlets in sag

Project Description

Solve For Spread

Input Data

Discharge	4.20	ft ³ /s
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft
Opening Height	0.67	ft
Curb Throat Type	Horizontal	
Throat Incline Angle	90.00	degrees

Options

Calculation Option Use Both

Results

Spread	9.64	ft
Depth	0.28	ft
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Open Grate Area	6.00	ft ²
Active Grate Weir Length	8.67	ft

Worksheet for Vista Del Prado Sta 18+52, 15' RT - Inlet on grade

Project Description

Solve For Efficiency

Input Data

Discharge	9.50	ft ³ /s
Slope	0.02430	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	68.47	%
Intercepted Flow	6.50	ft ³ /s
Bypass Flow	3.00	ft ³ /s
Spread	12.59	ft
Depth	0.34	ft
Flow Area	1.67	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	5.69	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.09	
Grate Flow Ratio	0.54	
Equivalent Cross Slope	0.05687	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.11	
Total Interception Length	38.30	ft

Messages

Messages Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Camino Del Oeste Sta 14+43, 15' LT&RT- 4 Inlets in sag

Project Description

Solve For Spread

Input Data

Discharge	8.92	ft ³ /s
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft
Opening Height	0.67	ft
Curb Throat Type	Horizontal	
Throat Incline Angle	90.00	degrees

Options

Calculation Option Use Both

Results

Spread	16.53	ft
Depth	0.42	ft
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Open Grate Area	6.00	ft ²
Active Grate Weir Length	8.67	ft

Worksheet for Camino Del Oeste Sta 15+51.3, 15' LT - Inlet on grade

Project Description

Solve For

Efficiency

Input Data

Discharge	2.70	ft ³ /s
Slope	0.00640	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	88.59	%
Intercepted Flow	2.39	ft ³ /s
Bypass Flow	0.31	ft ³ /s
Spread	9.83	ft
Depth	0.28	ft
Flow Area	1.05	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	2.57	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.28	
Grate Flow Ratio	0.55	
Equivalent Cross Slope	0.06600	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.29	
Total Interception Length	13.84	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Camino Del Oeste Sta 15+75, 15' LT&RT- Inlet on grade

Project Description

Solve For

Efficiency

Input Data

Discharge	8.00	ft ³ /s
Slope	0.00640	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	66.35	%
Intercepted Flow	5.31	ft ³ /s
Bypass Flow	2.69	ft ³ /s
Spread	15.37	ft
Depth	0.39	ft
Flow Area	2.45	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	3.27	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.20	
Grate Flow Ratio	0.36	
Equivalent Cross Slope	0.05049	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.16	
Total Interception Length	25.65	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Camino Alto Sta 26+61, 15' LT & RT - 4 Inlets in sag

Project Description

Solve For Spread

Input Data

Discharge		7.20	ft ³ /s
Gutter Width		2.00	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		1.50	in
Local Depression Width		2.50	ft
Grate Width		2.00	ft
Grate Length		6.67	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		7.40	ft
Opening Height		0.67	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option Use Both

Results

Spread	14.22	ft
Depth	0.37	ft
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Open Grate Area	6.00	ft ²
Active Grate Weir Length	8.67	ft

Worksheet for Petirrojo Sta 41+97, 15' LT & RT - Inlet on grade

Project Description

Solve For

Efficiency

Input Data

Discharge	20.00	ft ³ /s
Slope	0.00510	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	49.93	%
Intercepted Flow	9.99	ft ³ /s
Bypass Flow	10.01	ft ³ /s
Spread	22.98	ft
Depth	0.54	ft
Flow Area	5.36	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	3.73	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.17	
Grate Flow Ratio	0.24	
Equivalent Cross Slope	0.04043	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.10	
Total Interception Length	40.22	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Petirrojo Sta 42+22, 15' LT & RT - Inlet on grade

Project Description

Solve For Efficiency

Input Data

Discharge	13.00	ft ³ /s
Slope	0.00510	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	57.81	%
Intercepted Flow	7.52	ft ³ /s
Bypass Flow	5.48	ft ³ /s
Spread	19.45	ft
Depth	0.47	ft
Flow Area	3.87	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	3.36	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.19	
Grate Flow Ratio	0.29	
Equivalent Cross Slope	0.04417	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.13	
Total Interception Length	31.83	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Petirrojo Sta 43+00, 15' LT & RT - Inlet on grade

Project Description

Solve For

Efficiency

Input Data

Discharge	5.50	ft ³ /s
Slope	0.02160	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	72.82	%
Intercepted Flow	4.01	ft ³ /s
Bypass Flow	1.49	ft ³ /s
Spread	10.27	ft
Depth	0.29	ft
Flow Area	1.14	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	4.82	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.11	
Grate Flow Ratio	0.53	
Equivalent Cross Slope	0.06428	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.15	
Total Interception Length	27.30	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Petirrojo Sta 43+25, 15' LT & RT - Inlet on grade

Project Description

Solve For

Efficiency

Input Data

Discharge	1.50	ft ³ /s
Slope	0.02160	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	98.00	%
Intercepted Flow	1.47	ft ³ /s
Bypass Flow	0.03	ft ³ /s
Spread	5.57	ft
Depth	0.20	ft
Flow Area	0.40	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	3.80	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.16	
Grate Flow Ratio	0.82	
Equivalent Cross Slope	0.08854	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.31	
Total Interception Length	13.06	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Canavio PI Sta 32+38, 15' LT & RT - Inlet on grade

Project Description

Solve For Efficiency

Input Data

Discharge	7.00	ft ³ /s
Slope	0.00500	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	70.29	%
Intercepted Flow	4.92	ft ³ /s
Bypass Flow	2.08	ft ³ /s
Spread	15.31	ft
Depth	0.39	ft
Flow Area	2.43	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	2.88	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.24	
Grate Flow Ratio	0.36	
Equivalent Cross Slope	0.05061	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.18	
Total Interception Length	22.48	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Canavio PI Sta 32+63, 15' LT & RT - Inlet on grade

Project Description

Solve For

Efficiency

Input Data

Discharge	6.00	ft ³ /s
Slope	0.00500	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	73.47	%
Intercepted Flow	4.41	ft ³ /s
Bypass Flow	1.59	ft ³ /s
Spread	14.40	ft
Depth	0.37	ft
Flow Area	2.16	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	2.78	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.25	
Grate Flow Ratio	0.39	
Equivalent Cross Slope	0.05248	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.20	
Total Interception Length	20.62	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Camino Alderete Sta 18+41, 15' LT & RT - 6 Inlets in sag

Project Description

Solve For

Spread

Input Data

Discharge		7.20	ft ³ /s
Gutter Width		2.00	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		1.50	in
Local Depression Width		2.50	ft
Grate Width		2.00	ft
Grate Length		6.67	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		7.40	ft
Opening Height		0.67	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option

Use Both

Results

Spread	14.22	ft
Depth	0.37	ft
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Open Grate Area	6.00	ft ²
Active Grate Weir Length	8.67	ft

Worksheet for Vista Del Prado Ct Sta 15+35, 15' LT & RT - Inlet on

Project Description

Solve For

Efficiency

Input Data

Discharge	6.50	ft ³ /s
Slope	0.00720	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	70.23	%
Intercepted Flow	4.56	ft ³ /s
Bypass Flow	1.94	ft ³ /s
Spread	13.82	ft
Depth	0.36	ft
Flow Area	1.99	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	3.26	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.20	
Grate Flow Ratio	0.40	
Equivalent Cross Slope	0.05379	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.17	
Total Interception Length	23.44	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Vista Del Prado Ct Sta 15+60, 15' LT & RT - Inlet on

Project Description

Solve For

Efficiency

Input Data

Discharge	1.94	ft ³ /s
Slope	0.00720	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	94.03	%
Intercepted Flow	1.82	ft ³ /s
Bypass Flow	0.12	ft ³ /s
Spread	8.28	ft
Depth	0.25	ft
Flow Area	0.77	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	2.52	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.29	
Grate Flow Ratio	0.63	
Equivalent Cross Slope	0.07289	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.35	
Total Interception Length	11.76	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Agua Fria Ct 13+90, 15' LT & RT - 4 Inlets in sag

Project Description

Solve For

Spread

Input Data

Discharge		6.70	ft ³ /s
Gutter Width		2.00	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		1.50	in
Local Depression Width		2.50	ft
Grate Width		2.00	ft
Grate Length		6.67	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		7.40	ft
Opening Height		0.67	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option

Use Both

Results

Spread	13.50	ft
Depth	0.35	ft
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Open Grate Area	6.00	ft ²
Active Grate Weir Length	8.67	ft

Worksheet for Canoncito Dr Sta 19+63, 15' LT & RT - Inlet on grade

Project Description

Solve For

Efficiency

Input Data

Discharge	6.70	ft ³ /s
Slope	0.01160	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	68.39	%
Intercepted Flow	4.58	ft ³ /s
Bypass Flow	2.12	ft ³ /s
Spread	12.70	ft
Depth	0.34	ft
Flow Area	1.70	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	3.95	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.15	
Grate Flow Ratio	0.44	
Equivalent Cross Slope	0.05658	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.15	
Total Interception Length	26.57	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Camino Alderete Sta 26+25, 15' LT & RT - Inlet on grade

Project Description

Solve For Efficiency

Input Data

Discharge	10.30	ft ³ /s
Slope	0.00590	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	61.59	%
Intercepted Flow	6.34	ft ³ /s
Bypass Flow	3.96	ft ³ /s
Spread	17.26	ft
Depth	0.43	ft
Flow Area	3.06	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	3.36	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.19	
Grate Flow Ratio	0.32	
Equivalent Cross Slope	0.04722	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.14	
Total Interception Length	28.97	ft

Messages

Messages Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Camino Alderete Sta 26+50, 15' LT & RT - Inlet on grade

Project Description

Solve For

Efficiency

Input Data

Discharge	4.00	ft ³ /s
Slope	0.00590	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	81.12	%
Intercepted Flow	3.24	ft ³ /s
Bypass Flow	0.76	ft ³ /s
Spread	11.80	ft
Depth	0.32	ft
Flow Area	1.48	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	2.71	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.26	
Grate Flow Ratio	0.47	
Equivalent Cross Slope	0.05914	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.24	
Total Interception Length	17.01	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Unser Sta 15+00 - Inlet on grade

Project Description

Solve For Efficiency

Input Data

Discharge	8.00	ft ³ /s
Slope	0.00500	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.03	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	79.18	%
Intercepted Flow	6.33	ft ³ /s
Bypass Flow	1.67	ft ³ /s
Spread	12.59	ft
Depth	0.44	ft
Flow Area	2.44	ft ²
Gutter Depression	0.07	ft
Total Depression	0.19	ft
Velocity	3.28	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.27	
Grate Flow Ratio	0.49	
Equivalent Cross Slope	0.06084	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.19	
Total Interception Length	21.29	ft

Worksheet for Unser Sta 15+00 - Inlet on grade

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Unser Sta 27+75 - Inlet on grade

Project Description

Solve For Efficiency

Input Data

Discharge	4.00	ft ³ /s
Slope	0.01300	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.03	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	90.10	%
Intercepted Flow	3.60	ft ³ /s
Bypass Flow	0.40	ft ³ /s
Spread	7.86	ft
Depth	0.30	ft
Flow Area	0.99	ft ²
Gutter Depression	0.07	ft
Total Depression	0.19	ft
Velocity	4.03	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.21	
Grate Flow Ratio	0.71	
Equivalent Cross Slope	0.07597	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.22	
Total Interception Length	18.56	ft

Worksheet for Unser Sta 27+75 - Inlet on grade

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Rainbow Blvd Sta 31+73, 17' LT - 1 Inlets in sag

Project Description

Solve For

Spread

Input Data

Discharge		28.00	ft ³ /s
Gutter Width		2.00	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		1.50	in
Local Depression Width		2.50	ft
Grate Width		2.00	ft
Grate Length		6.67	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		7.40	ft
Opening Height		0.67	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option

Use Both

Results

Spread	35.90	ft
Depth	0.80	ft
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Open Grate Area	6.00	ft ²
Active Grate Weir Length	8.67	ft

Worksheet for Rainbow Blvd Sta 31+73, 17' RT - 1 Inlets in sag

Project Description

Solve For Spread

Input Data

Discharge		5.00	ft ³ /s
Gutter Width		2.00	ft
Gutter Cross Slope		0.06	ft/ft
Road Cross Slope		0.02	ft/ft
Local Depression		1.50	in
Local Depression Width		2.50	ft
Grate Width		2.00	ft
Grate Length		6.67	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%
Curb Opening Length		7.40	ft
Opening Height		0.67	ft
Curb Throat Type	Horizontal		
Throat Incline Angle		90.00	degrees

Options

Calculation Option Use Both

Results

Spread	10.95	ft
Depth	0.30	ft
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Open Grate Area	6.00	ft ²
Active Grate Weir Length	8.67	ft

Worksheet for Rainbow Blvd Sta 47+57, 44' LT - Inlet on grade

Project Description

Solve For

Efficiency

Input Data

Discharge	12.93	ft ³ /s
Slope	0.02780	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	62.36	%
Intercepted Flow	8.06	ft ³ /s
Bypass Flow	4.87	ft ³ /s
Spread	13.88	ft
Depth	0.36	ft
Flow Area	2.01	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	6.42	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.07	
Grate Flow Ratio	0.49	
Equivalent Cross Slope	0.05363	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.09	
Total Interception Length	47.02	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Rainbow Blvd Sta 47+57, 54' RT - Inlet on grade

Project Description

Solve For

Efficiency

Input Data

Discharge	5.60	ft ³ /s
Slope	0.02780	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	80.35	%
Intercepted Flow	4.50	ft ³ /s
Bypass Flow	1.10	ft ³ /s
Spread	9.81	ft
Depth	0.28	ft
Flow Area	1.05	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	5.35	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.09	
Grate Flow Ratio	0.66	
Equivalent Cross Slope	0.06608	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.14	
Total Interception Length	29.19	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Scenic Sta 22+50, 17' LT & RT - Inlet on grade

Project Description

Solve For

Efficiency

Input Data

Discharge	6.00	ft ³ /s
Slope	0.01670	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	77.48	%
Intercepted Flow	4.65	ft ³ /s
Bypass Flow	1.35	ft ³ /s
Spread	11.25	ft
Depth	0.31	ft
Flow Area	1.35	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	4.44	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.13	
Grate Flow Ratio	0.59	
Equivalent Cross Slope	0.06086	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.15	
Total Interception Length	27.09	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Calle Nortena Sta 18+72, 24' RT - Inlet on grade

Project Description

Solve For Efficiency

Input Data

Discharge	10.00	ft ³ /s
Slope	0.04280	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	3.33	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	63.41	%
Intercepted Flow	6.34	ft ³ /s
Bypass Flow	3.66	ft ³ /s
Spread	11.44	ft
Depth	0.31	ft
Flow Area	1.39	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	7.17	ft/s
Splash Over Velocity	7.39	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.01	
Grate Flow Ratio	0.48	
Equivalent Cross Slope	0.06025	ft/ft
Active Grate Length	1.67	ft
Length Factor	0.13	
Total Interception Length	44.80	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).
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Worksheet for Calle Nortena Sta 18+72, 24' RT - Inlet on grade

Project Description

Solve For Efficiency

Input Data

Discharge	10.00	ft ³ /s
Slope	0.04280	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	3.33	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	63.41	%
Intercepted Flow	6.34	ft ³ /s
Bypass Flow	3.66	ft ³ /s
Spread	11.44	ft
Depth	0.31	ft
Flow Area	1.39	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	7.17	ft/s
Splash Over Velocity	7.39	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.01	
Grate Flow Ratio	0.48	
Equivalent Cross Slope	0.06025	ft/ft
Active Grate Length	1.67	ft
Length Factor	0.13	
Total Interception Length	44.80	ft

Messages

Messages Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Calle Nortena Sta 19+05, 24' RT - Inlet on grade

Project Description

Solve For Efficiency

Input Data

Discharge	4.00	ft ³ /s
Slope	0.04280	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	82.16	%
Intercepted Flow	3.29	ft ³ /s
Bypass Flow	0.71	ft ³ /s
Spread	7.66	ft
Depth	0.24	ft
Flow Area	0.67	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	5.95	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.08	
Grate Flow Ratio	0.67	
Equivalent Cross Slope	0.07604	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.15	
Total Interception Length	26.51	ft

Messages

Messages Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for PDN Sta 101+38' RT - Inlet on grade

Project Description

Solve For

Efficiency

Input Data

Discharge	23.00	ft ³ /s
Slope	0.02520	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option

Use Both

Grate Flow Option

Exclude None

Results

Efficiency	44.16	%
Intercepted Flow	10.16	ft ³ /s
Bypass Flow	12.84	ft ³ /s
Spread	17.79	ft
Depth	0.44	ft
Flow Area	3.25	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	7.08	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.06	
Grate Flow Ratio	0.31	
Equivalent Cross Slope	0.04641	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.06	
Total Interception Length	63.41	ft

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for PDN Sta 101+69' RT - Inlet on grade

Project Description

Solve For Efficiency

Input Data

Discharge	13.00	ft ³ /s
Slope	0.02520	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.06	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	
Local Depression	1.50	in
Local Depression Width	2.50	ft
Grate Width	2.00	ft
Grate Length	6.67	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.40	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	54.58	%
Intercepted Flow	7.09	ft ³ /s
Bypass Flow	5.91	ft ³ /s
Spread	14.19	ft
Depth	0.37	ft
Flow Area	2.10	ft ²
Gutter Depression	0.09	ft
Total Depression	0.21	ft
Velocity	6.19	ft/s
Splash Over Velocity	10.50	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.07	
Grate Flow Ratio	0.39	
Equivalent Cross Slope	0.05293	ft/ft
Active Grate Length	3.34	ft
Length Factor	0.09	
Total Interception Length	46.11	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).
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Worksheet for Conc. Swale - Kimmick Rd to Pato Rd

Project Description

Friction Method	Manning Formula
Solve For	Bottom Width

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01970	ft/ft
Normal Depth	0.50	ft
Discharge	15.00	ft ³ /s

Results

Bottom Width	3.51	ft
Flow Area	1.75	ft ²
Wetted Perimeter	4.51	ft
Hydraulic Radius	0.39	ft
Top Width	3.51	ft
Critical Depth	0.83	ft
Critical Slope	0.00439	ft/ft
Velocity	8.55	ft/s
Velocity Head	1.14	ft
Specific Energy	1.64	ft
Froude Number	2.13	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.50	ft
Critical Depth	0.83	ft
Channel Slope	0.01970	ft/ft
Critical Slope	0.00439	ft/ft

Worksheet for Conc. Swale - Alto Rey Ct to Agua Fria Ct

Project Description

Friction Method	Manning Formula
Solve For	Bottom Width

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00900	ft/ft
Normal Depth	0.67	ft
Discharge	24.00	ft ³ /s

Results

Bottom Width	5.05	ft
Flow Area	3.38	ft ²
Wetted Perimeter	6.39	ft
Hydraulic Radius	0.53	ft
Top Width	5.05	ft
Critical Depth	0.89	ft
Critical Slope	0.00383	ft/ft
Velocity	7.10	ft/s
Velocity Head	0.78	ft
Specific Energy	1.45	ft
Froude Number	1.53	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.67	ft
Critical Depth	0.89	ft
Channel Slope	0.00900	ft/ft
Critical Slope	0.00383	ft/ft

Worksheet for RUNDOWN - FRONTAGE RD TO POND 4

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.10000	ft/ft
Bottom Width	2.00	ft
Discharge	8.50	ft³/s

Results

Normal Depth	0.31	ft
Flow Area	0.62	ft²
Wetted Perimeter	2.62	ft
Hydraulic Radius	0.24	ft
Top Width	2.00	ft
Critical Depth	0.83	ft
Critical Slope	0.00586	ft/ft
Velocity	13.80	ft/s
Velocity Head	2.96	ft
Specific Energy	3.27	ft
Froude Number	4.38	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.31	ft
Critical Depth	0.83	ft
Channel Slope	0.10000	ft/ft
Critical Slope	0.00586	ft/ft

Worksheet for Concrete Rundown - Compass Ct to Pond 6

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.12700	ft/ft
Bottom Width	3.50	ft
Discharge	35.00	ft³/s

Results

Normal Depth	0.47	ft
Flow Area	1.66	ft²
Wetted Perimeter	4.45	ft
Hydraulic Radius	0.37	ft
Top Width	3.50	ft
Critical Depth	1.46	ft
Critical Slope	0.00487	ft/ft
Velocity	21.09	ft/s
Velocity Head	6.91	ft
Specific Energy	7.39	ft
Froude Number	5.40	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.47	ft
Critical Depth	1.46	ft
Channel Slope	0.12700	ft/ft
Critical Slope	0.00487	ft/ft

Worksheet for Gravel rundown Pond 8

Project Description

Friction Method	Manning Formula	
Solve For	Discharge	

Input Data

Roughness Coefficient	0.050	
Channel Slope	0.15400	ft/ft
Normal Depth	0.40	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)

Results

Discharge	1.85	ft³/s
Flow Area	0.48	ft²
Wetted Perimeter	2.53	ft
Hydraulic Radius	0.19	ft
Top Width	2.40	ft
Critical Depth	0.47	ft
Critical Slope	0.06321	ft/ft
Velocity	3.85	ft/s
Velocity Head	0.23	ft
Specific Energy	0.63	ft
Froude Number	1.52	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.40	ft
Critical Depth	0.47	ft
Channel Slope	0.15400	ft/ft
Critical Slope	0.06321	ft/ft

Worksheet for Spillway - Pond 9

Project Description

Solve For Headwater Elevation

Input Data

Discharge		13.00	ft ³ /s
Crest Elevation		5319.50	ft
Tailwater Elevation		5316.00	ft
Crest Surface Type	Gravel		
Crest Breadth		6.00	ft
Crest Length		15.00	ft

Results

Headwater Elevation	5319.97	ft
Headwater Height Above Crest	0.47	ft
Tailwater Height Above Crest	-3.50	ft
Weir Coefficient	2.68	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	2.68	US
Flow Area	7.06	ft ²
Velocity	1.84	ft/s
Wetted Perimeter	15.94	ft
Top Width	15.00	ft

Cross Section for Spillway - Pond 9

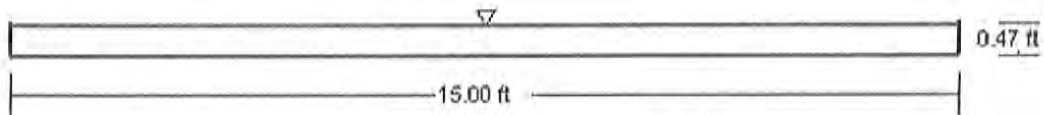
Project Description

Solve For Headwater Elevation

Input Data

Discharge		13.00	ft ³ /s
Headwater Elevation		5319.97	ft
Crest Elevation		5319.50	ft
Tailwater Elevation		5316.00	ft
Crest Surface Type	Gravel		
Crest Breadth		6.00	ft
Crest Length		15.00	ft

Cross Section Image



V: 1
H: 1

SAD 228 POND 4**30" RISER**

INVERT OF PERFORATION(S)
 DIAM OF PERFORATION(S) (in)

5326.83
 4

cfs
 Total Outflow (Needed) = 8.2
 Total Outflow (provided) = 8.5

# PERFORATIONS			1	2	4	5	8
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5327	0.09	0.00	0.03	0.05	0.10	0.13	0.20
5328	0.09	1.00	0.43	0.87	1.74	2.17	3.48
5328.5	0.09	1.50	0.53	1.06	2.13	2.66	4.26
5329	0.09	2.00	0.61	1.23	2.46	3.07	4.92
5330	0.09	3.00	0.75	1.50	3.01	3.76	6.02
5331	0.09	4.00	0.87	1.74	3.47	4.34	6.95
5332	0.09	5.00	0.97	1.94	3.88	4.86	7.77

2nd row of holes

INVERT OF PERFORATION(S)
 DIAM OF PERFORATION(S) (in)

5327.5
 4

# PERFORATIONS			1	2	4	5	8
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5328	0.09	0.33	0.25	0.50	1.00	1.25	2.01
5328.5	0.09	1.50	0.53	1.06	2.13	2.66	4.26
5329	0.09	2.00	0.61	1.23	2.46	3.07	4.92
5330	0.09	3.00	0.75	1.50	3.01	3.76	6.02
5331	0.09	4.00	0.87	1.74	3.47	4.34	6.95
5332	0.09	5.00	0.97	1.94	3.88	4.86	7.77
5333	0.09	6.00	1.06	2.13	4.26	5.32	8.51
5334	0.09	6.33	1.09	2.19	4.37	5.46	8.74

* RIM ELEVATION

SAD 228 POND 6

48" RISER

INVERT OF PERFORATION(S)
DIAM OF PERFORATION(S) (in)

5308.33
4

cfs
Total Outflow (Needed) = 40.9
Total Outflow (Provided) = 40.7

# PERFORATIONS			1	2	4	5	6	15
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5309	0.09	0.50	0.31	0.62	1.23	1.54	1.85	4.62
5310	0.09	1.50	0.53	1.06	2.13	2.66	3.19	7.99
5311	0.09	2.50	0.69	1.37	2.75	3.43	4.12	10.30
5312	0.09	3.50	0.81	1.63	3.25	4.06	4.88	12.19
5313	0.09	4.50	0.92	1.84	3.69	4.61	5.53	13.82
5314	0.09	5.50	1.02	2.04	4.07	5.09	6.11	15.28
5315	0.09	6.50	1.11	2.21	4.43	5.54	6.64	16.61

2nd row of holes

INVERT OF PERFORATION(S)
DIAM OF PERFORATION(S) (in)

5309
4

# PERFORATIONS			1	2	4	5	6	15
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5310	0.09	0.83	0.40	0.79	1.59	1.98	2.38	5.95
5311	0.09	1.83	0.59	1.18	2.35	2.94	3.53	8.82
5312	0.09	2.83	0.73	1.46	2.92	3.65	4.39	10.96
5313	0.09	3.83	0.85	1.70	3.40	4.25	5.10	12.75
5314	0.09	4.83	0.95	1.91	3.82	4.77	5.73	14.32
5315	0.09	5.83	1.05	2.10	4.19	5.24	6.29	15.73
5316	0.09	6.83	1.14	2.27	4.54	5.68	6.81	17.03
5317	0.09	7.83	1.22	2.43	4.86	6.08	7.29	18.23

SAD 228 POND 6, Cont'd

3rd row of holes

 INVERT OF PERFORATION(S)
 DIAM OF PERFORATION(S) (in)

5309.67

4

# PERFORATIONS			1	2	4	5	6	15
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5310	0.09	0.16	0.18	0.35	0.70	0.88	1.05	2.63
5311	0.09	1.16	0.47	0.94	1.87	2.34	2.81	7.02
5312	0.09	2.16	0.64	1.28	2.55	3.19	3.83	9.58
5313	0.09	3.16	0.77	1.54	3.09	3.86	4.63	11.58
5314	0.09	4.16	0.89	1.77	3.54	4.43	5.32	13.29
5315	0.09	5.16	0.99	1.97	3.95	4.93	5.92	14.80
5316	0.09	6.16	1.08	2.16	4.31	5.39	6.47	16.17

4th row of holes

 INVERT OF PERFORATION(S)
 DIAM OF PERFORATION(S) (in)

5310.34

4

# PERFORATIONS			1	2	4	5	6	15
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5311	0.09	0.49	0.30	0.61	1.22	1.52	1.83	4.57
5312	0.09	1.49	0.53	1.06	2.12	2.65	3.18	7.96
5313	0.09	2.49	0.69	1.37	2.74	3.43	4.11	10.28
5314	0.09	3.49	0.81	1.62	3.25	4.06	4.87	12.17
5315	0.09	4.49	0.92	1.84	3.68	4.60	5.52	13.81
5316	0.09	5.49	1.02	2.04	4.07	5.09	6.11	15.26
5317	0.09	6.49	1.11	2.21	4.43	5.53	6.64	16.60

* RIM ELEVATION

SAD 228 POND 7

30" RISER

INVERT OF PERFORATION(S)
DIAM OF PERFORATION(S) (in)

5293.33
4

cfs
Total Outflow (Needed) = 9.0
Total Outflow (provided) = 9.6

# PERFORATIONS			1	2	4	5	6	7
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5294	0.09	0.50	0.31	0.62	1.23	1.54	1.85	2.16
5295	0.09	1.50	0.53	1.06	2.13	2.66	3.19	3.73
5296	0.09	2.50	0.69	1.37	2.75	3.43	4.12	4.81
5297	0.09	3.50	0.81	1.63	3.25	4.06	4.88	5.69
5298	0.09	4.50	0.92	1.84	3.69	4.61	5.53	6.45
5299	0.09	5.50	1.02	2.04	4.07	5.09	6.11	7.13
5300	0.09	6.50	1.11	2.21	4.43	5.54	6.64	7.75

2nd row of holes

INVERT OF PERFORATION(S)
DIAM OF PERFORATION(S) (in)

5294
4

# PERFORATIONS			1	2	4	5	6	7
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5295	0.09	0.83	0.40	0.79	1.59	1.98	2.38	2.77
5296	0.09	2.50	0.69	1.37	2.75	3.43	4.12	4.81
5297	0.09	3.50	0.81	1.63	3.25	4.06	4.88	5.69
5298	0.09	4.50	0.92	1.84	3.69	4.61	5.53	6.45
5299	0.09	5.50	1.02	2.04	4.07	5.09	6.11	7.13
5300	0.09	6.50	1.11	2.21	4.43	5.54	6.64	7.75
5301	0.09	7.50	1.19	2.38	4.76	5.95	7.14	8.33
5302	0.09	7.83	1.22	2.43	4.86	6.08	7.29	8.51

* RIM ELEVATION

SAD 228 POND 8

42" RISER

INVERT OF PERFORATION(S)
DIAM OF PERFORATION(S) (in)

5308.33
4

cfs
Total Outflow (Needed) = 27.7
Total Outflow (Provided) = 28.0

# PERFORATIONS			1	2	4	5	6	11
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5309	0.09	0.50	0.31	0.62	1.23	1.54	1.85	3.39
5310	0.09	1.50	0.53	1.06	2.13	2.66	3.19	5.86
5311	0.09	2.50	0.69	1.37	2.75	3.43	4.12	7.56
5312	0.09	3.50	0.81	1.63	3.25	4.06	4.88	8.94
5313	0.09	4.50	0.92	1.84	3.69	4.61	5.53	10.14
5314	0.09	5.50	1.02	2.04	4.07	5.09	6.11	11.20
5315	0.09	6.50	1.11	2.21	4.43	5.54	6.64	12.18

2nd row of holes

INVERT OF PERFORATION(S)
DIAM OF PERFORATION(S) (in)

5309
4

# PERFORATIONS			1	2	4	5	6	11
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5310	0.09	0.83	0.40	0.79	1.59	1.98	2.38	4.36
5311	0.09	1.83	0.59	1.18	2.35	2.94	3.53	6.47
5312	0.09	2.83	0.73	1.46	2.92	3.65	4.39	8.04
5313	0.09	3.83	0.85	1.70	3.40	4.25	5.10	9.35
5314	0.09	4.83	0.95	1.91	3.82	4.77	5.73	10.50
5315	0.09	5.83	1.05	2.10	4.19	5.24	6.29	11.54
5316	0.09	6.83	1.14	2.27	4.54	5.68	6.81	12.49
5317	0.09	7.83	1.22	2.43	4.86	6.08	7.29	13.37

3rd row of holes

INVERT OF PERFORATION(S)
DIAM OF PERFORATION(S) (in)

5309.67
4

# PERFORATIONS			1	2	4	5	6	11
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5310	0.09	0.16	0.18	0.35	0.70	0.88	1.05	1.93
5311	0.09	1.16	0.47	0.94	1.87	2.34	2.81	5.15
5312	0.09	2.16	0.64	1.28	2.55	3.19	3.83	7.02
5313	0.09	3.16	0.77	1.54	3.09	3.86	4.63	8.49
5314	0.09	4.16	0.89	1.77	3.54	4.43	5.32	9.75
5315	0.09	5.16	0.99	1.97	3.95	4.93	5.92	10.85
5316	0.09	6.16	1.08	2.16	4.31	5.39	6.47	11.86

* 100-YR WSEL

SAD 228 POND 9**30" RISER**INVERT OF PERFORATION(S)
DIAM OF PERFORATION(S) (in)5316.6
4cfs
Total Outflow (Needed) = 6.7
Total Outflow (Provided) = 6.4

# PERFORATIONS			1	2	4	8
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5317	0.09	0.23	0.21	0.42	0.84	1.68
5318	0.09	1.23	0.48	0.96	1.93	3.86
5319	0.09	2.23	0.65	1.30	2.60	5.19
5320	0.09	3.23	0.78	1.56	3.12	6.25
5321	0.09	4.23	0.89	1.79	3.57	7.15
5322	0.09	5.23	0.99	1.99	3.97	7.95
5323	0.09	6.23	1.08	2.17	4.34	8.67

2nd row of holes

INVERT OF PERFORATION(S)
DIAM OF PERFORATION(S) (in)5317.3
4

# PERFORATIONS			1	2	4	8
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5318	0.09	0.53	0.32	0.63	1.27	2.54
5319	0.09	1.53	0.54	1.08	2.15	4.30
5320	0.09	2.53	0.69	1.38	2.76	5.53
5321	0.09	3.53	0.82	1.63	3.26	6.53
5322	0.09	4.53	0.92	1.85	3.70	7.40
5323	0.09	5.53	1.02	2.04	4.09	8.17
5324	0.09	6.53	1.11	2.22	4.44	8.88
5325	0.09	7.53	1.19	2.38	4.77	9.53

* RIM ELEVATION

HEC-14 chapter 10 - RipRap Apron Sizing

Equation 10.4 in HEC-14 $D_{50} = .2 * D (Q/g^{.5} D^{2.5})^{1/3} * (D/TW)$

Equation D.1a in HEC-14 $D_{50} = .023 * D (Q/D^{2.5}) * (D/TW)^{1.2}$

Equation D.3 in HEC-14 $D_{50} = (0.692/(S-1)) * (V^2/2g)$ where, S = riprap specific gravity

Pond 4 Inlet - Rip Rap Apron				
SUB-BASIN I.D.	Q ₁₀₀ (cfs)	V ₁₀₀ (ft/s)	Tailwater Depth (ft)	Normal (Supercritical) Depth (ft)
	16.70	7.75	1.30	1.28

S= 2.65

D= 2 ft

D'= 1.64 ft - adjusted culvert rise Per Equation 10.5 whenever the flow is supercritical

g= 32.2 ft/s²

D₅₀= 0.34 ft Per Equation 10.4, TW should be .4D < TW < 1D, .4D min

D₅₀= 0.24 ft Per Equation D.1a

D₅₀= 0.39 ft Per Equation D.3

Required D₅₀= 4.69 in

Designed D₅₀= 9 in

Apron Dimensions= 9' L x 5' W x 18" D, D50=9"

Length= 9.0

Depth= 1.50

Pond 6 Inlet - Rip Rap Apron				
SUB-BASIN I.D.	Q ₁₀₀ (cfs)	V ₁₀₀ (ft/s)	Tailwater Depth (ft)	Normal (Supercritical) Depth (ft)
	71.00	8.41	2.55	3.09

S= 2.65

D= 4.0 ft

D'= 3.55 ft - adjusted culvert rise Per Equation 10.5 whenever the flow is supercritical

g= 32.2 ft/s²

D₅₀= 0.42 ft Per Equation 10.4, TW should be .4D < TW < 1D, .4D min

D₅₀= 0.36 ft Per Equation D.1a

D₅₀= 0.46 ft Per Equation D.3

Required D₅₀= 5.53 in

Apron Dimensions= 17' L x 8' W x 12" D, D50=6"

Length= 17.0 ft

Depth= 0.92 ft

Pond 6 Outlet - Rip Rap Apron				
SUB-BASIN I.D.	Q_{100} (cfs)	V_{100} (ft/s)	Tailwater Depth (ft)	Normal (Supercritical) Depth (ft)
	40.90	9.11	2.15	2.50

$S = 2.65$
 $D = 2.5$ ft
 $D' = 2.50$ ft - adjusted culvert rise Per Equation 10.5 whenever the flow is supercritical
 $g = 32.2$ ft/s²
 $D_{50} = 0.38$ ft Per Equation 10.4, TW should be $.4D < TW < 1D$, $.4D$ min
 $D_{50} = 0.29$ ft Per Equation D.1a
 $D_{50} = 0.54$ ft Per Equation D.3
 Required $D_{50} = 6.49$ in
 Apron Dimensions = 11' L x 8' W x 18" D, D50=6"
 Length = 11.0 ft
 Depth = 1.08 ft

Pond 7 Inlet - Rip Rap Apron				
SUB-BASIN I.D.	Q_{100} (cfs)	V_{100} (ft/s)	Tailwater Depth (ft)	Normal (Supercritical) Depth (ft)
	26.00	9.63	1.60	1.60

$S = 2.65$
 $D = 2$ ft
 $D' = 1.80$ ft - adjusted culvert rise Per Equation 10.5 whenever the flow is supercritical
 $g = 32.2$ ft/s²
 $D_{50} = 0.43$ ft Per Equation 10.4, TW should be $.4D < TW < 1D$, $.4D$ min
 $D_{50} = 0.29$ ft Per Equation D.1a
 $D_{50} = 0.60$ ft Per Equation D.3
 Required $D_{50} = 7.25$ in
 Apron Dimensions = 10' L x 4' W x 18" D, D50=6"
 Length = 9.0
 Depth = 1.21

Pond 8 Inlet - Rip Rap Apron				
SUB-BASIN I.D.	Q ₁₀₀ (cfs)	V ₁₀₀ (ft/s)	Tailwater Depth (ft)	Normal (Supercritical) Depth (ft)
	108.00	10.53	3.04	3.04

S= 2.65
 D= 4 ft
 D'= 3.52 ft - adjusted culvert rise Per Equation 10.5 whenever the flow is supercritical
 g= 32.2 ft/s²
 D₅₀= 0.62 ft Per Equation 10.4, TW should be .4D < TW < 1D, .4D min
 D₅₀= 0.45 ft Per Equation D.1a
 D₅₀= 0.72 ft Per Equation D.3
 Required D₅₀= 8.67 in
 Designed D₅₀= 9 in
 Apron Dimensions 17' L x 8' W x 18" D, D50=9"
 Length= 17.0
 Depth= 1.50

Pond 9 Inlet - Rip Rap Apron				
SUB-BASIN I.D.	Q ₁₀₀ (cfs)	V ₁₀₀ (ft/s)	Tailwater Depth (ft)	Normal (Supercritical) Depth (ft)
	13.00	7.35	1.27	1.20

S= 2.65
 D= 1.5 ft
 D'= 1.35 ft - adjusted culvert rise Per Equation 10.5 whenever the flow is supercritical
 g= 32.2 ft/s²
 D₅₀= 0.32 ft Per Equation 10.4, TW should be .4D < TW < 1D, .4D min
 D₅₀= 0.21 ft Per Equation D.1a
 D₅₀= 0.35 ft Per Equation D.3
 Required D₅₀= 4.22 in
 Apron Dimensions 7' L x 4.5' W x 12" D, D50=6"
 Length= 7.0 ft
 Depth= 0.70 in

Pond 9 Outlet - Rip Rap Apron				
SUB-BASIN I.D.	Q_{100} (cfs)	V_{100} (ft/s)	Tailwater Depth (ft)	Normal (Supercritical) Depth (ft)
	7.00	5.52	1.04	1.05

$S = 2.65$
 $D = 1.5$ ft
 $D' = 1.28$ ft - adjusted culvert rise Per Equation 10.5 whenever the flow is supercritical
 $g = 32.2$ ft/s²
 $D_{50} = 0.18$ ft Per Equation 10.4, TW should be $.4D < TW < 1D$, .4D min
 $D_{50} = 0.14$ ft Per Equation D.1a
 $D_{50} = 0.20$ ft Per Equation D.3
 Required $D_{50} = 2.38$ in
 Apron Dimensions 7' L x 4.5' W x 12" D, $D_{50} = 6"$
 Length = 7.0 ft
 Depth = 0.40 in

La Cuentista pond Inlet - Rip Rap Apron				
SUB-BASIN I.D.	Q_{100} (cfs)	V_{100} (ft/s)	Tailwater Depth (ft)	Normal (Supercritical) Depth (ft)
	56.60	8.13	2.87	2.57

$S = 2.65$
 $D = 3$ ft
 $D' = 2.79$ ft - adjusted culvert rise Per Equation 10.5 whenever the flow is supercritical
 $g = 32.2$ ft/s²
 $D_{50} = 0.38$ ft Per Equation 10.4, TW should be $.4D < TW < 1D$, .4D min
 $D_{50} = 0.27$ ft Per Equation D.1a
 $D_{50} = 0.43$ ft Per Equation D.3
 Required $D_{50} = 5.17$ in
 Designed $D_{50} = 9$ in
 Apron Dimensions 13' L x 6' W x 18" D, $D_{50} = 9"$
 Length = 13.0
 Depth = 1.50

Worksheet for Valiente Rd Riprap Blanket

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.040	
Channel Slope	0.07050	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	8.00	ft ³ /s

Results

Normal Depth	0.74	ft
Flow Area	1.63	ft ²
Wetted Perimeter	4.67	ft
Hydraulic Radius	0.35	ft
Top Width	4.43	ft
Critical Depth	0.85	ft
Critical Slope	0.03327	ft/ft
Velocity	4.90	ft/s
Velocity Head	0.37	ft
Specific Energy	1.11	ft
Froude Number	1.42	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.74	ft
Critical Depth	0.85	ft
Channel Slope	0.07050	ft/ft
Critical Slope	0.03327	ft/ft

Worksheet for Spillway - Pond 4

Project Description

Solve For Headwater Elevation

Input Data

Discharge		32.00	ft ³ /s
Crest Elevation		5331.00	ft
Tailwater Elevation		5329.80	ft
Crest Surface Type	Gravel		
Crest Breadth		10.00	ft
Crest Length		15.00	ft

Results

Headwater Elevation	5331.84	ft
Headwater Height Above Crest	0.84	ft
Tailwater Height Above Crest	-1.20	ft
Weir Coefficient	2.79	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	2.79	US
Flow Area	12.54	ft ²
Velocity	2.55	ft/s
Wetted Perimeter	16.67	ft
Top Width	15.00	ft

Cross Section for Spillway - Pond 4

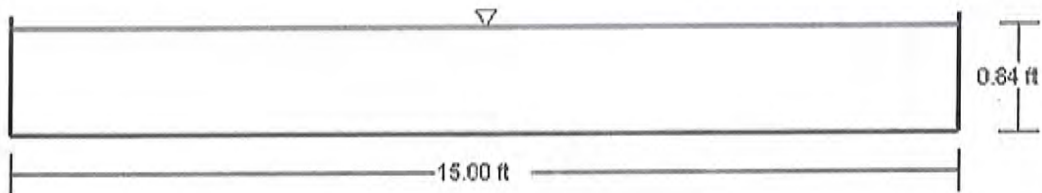
Project Description

Solve For Headwater Elevation

Input Data

Discharge		32.00	ft ³ /s
Headwater Elevation		5331.84	ft
Crest Elevation		5331.00	ft
Tailwater Elevation		5329.80	ft
Crest Surface Type	Gravel		
Crest Breadth		10.00	ft
Crest Length		15.00	ft

Cross Section Image



V: 2
H: 1

Worksheet for Spillway - Pond 5

Project Description

Solve For Headwater Elevation

Input Data

Discharge		187.50	ft³/s
Crest Elevation		5323.80	ft
Tailwater Elevation		5320.60	ft
Crest Surface Type	Gravel		
Crest Breadth		10.00	ft
Crest Length		50.00	ft

Results

Headwater Elevation	5325.00	ft
Headwater Height Above Crest	1.20	ft
Tailwater Height Above Crest	-3.20	ft
Weir Coefficient	2.87	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	2.87	US
Flow Area	59.78	ft²
Velocity	3.14	ft/s
Wetted Perimeter	52.39	ft
Top Width	50.00	ft

Cross Section for Spillway - Pond 5

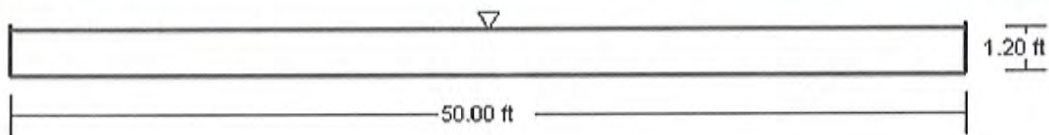
Project Description

Solve For Headwater Elevation

Input Data

Discharge		187.50	ft ³ /s
Headwater Elevation		5325.00	ft
Crest Elevation		5323.80	ft
Tailwater Elevation		5320.60	ft
Crest Surface Type	Gravel		
Crest Breadth		10.00	ft
Crest Length		50.00	ft

Cross Section Image



V: 2
H: 1

Worksheet for Spillway - Pond 6

Project Description

Solve For Headwater Elevation

Input Data

Discharge		114.00	ft ³ /s
Crest Elevation		5313.00	ft
Tailwater Elevation		5309.00	ft
Crest Surface Type	Gravel		
Crest Breadth		10.00	ft
Crest Length		35.00	ft

Results

Headwater Elevation	5314.09	ft
Headwater Height Above Crest	1.09	ft
Tailwater Height Above Crest	-4.00	ft
Weir Coefficient	2.85	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	2.85	US
Flow Area	38.28	ft ²
Velocity	2.98	ft/s
Wetted Perimeter	37.19	ft
Top Width	35.00	ft

Cross Section for Spillway - Pond 6

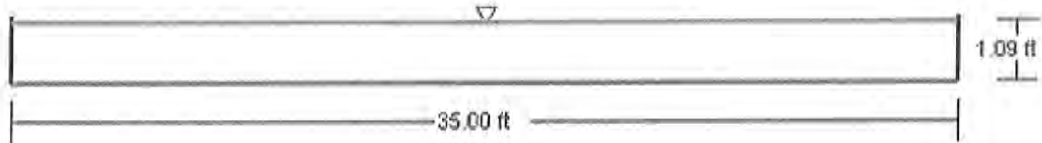
Project Description

Solve For Headwater Elevation

Input Data

Discharge		114.00	ft ³ /s
Headwater Elevation		5314.09	ft
Crest Elevation		5313.00	ft
Tailwater Elevation		5309.00	ft
Crest Surface Type	Gravel		
Crest Breadth		10.00	ft
Crest Length		35.00	ft

Cross Section Image



V: 2 
H: 1

Worksheet for Spillway - Pond 7

Project Description

Solve For Headwater Elevation

Input Data

Discharge		26.00	ft ³ /s
Crest Elevation		5299.00	ft
Tailwater Elevation		5291.60	ft
Crest Surface Type	Gravel		
Crest Breadth		10.00	ft
Crest Length		10.00	ft

Results

Headwater Elevation	5299.95	ft
Headwater Height Above Crest	0.95	ft
Tailwater Height Above Crest	-7.40	ft
Weir Coefficient	2.82	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	2.82	US
Flow Area	9.48	ft ²
Velocity	2.74	ft/s
Wetted Perimeter	11.90	ft
Top Width	10.00	ft

Cross Section for Spillway - Pond 7

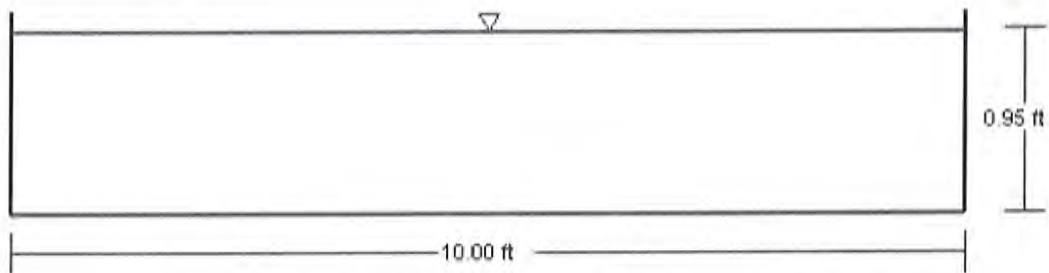
Project Description

Solve For Headwater Elevation

Input Data

Discharge	26.00	ft ³ /s
Headwater Elevation	5299.95	ft
Crest Elevation	5299.00	ft
Tailwater Elevation	5291.60	ft
Crest Surface Type	Gravel	
Crest Breadth	10.00	ft
Crest Length	10.00	ft

Cross Section Image



V: 2
H: 1

Worksheet for Spillway - Pond 8

Project Description

Solve For Headwater Elevation

Input Data

Discharge		18.25	ft ³ /s
Crest Elevation		5314.00	ft
Tailwater Elevation		5307.00	ft
Crest Surface Type	Gravel		
Crest Breadth		10.00	ft
Crest Length		15.00	ft

Results

Headwater Elevation	5314.58	ft
Headwater Height Above Crest	0.58	ft
Tailwater Height Above Crest	-7.00	ft
Weir Coefficient	2.72	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	2.72	US
Flow Area	8.77	ft ²
Velocity	2.08	ft/s
Wetted Perimeter	16.17	ft
Top Width	15.00	ft

Cross Section for Spillway - Pond 8

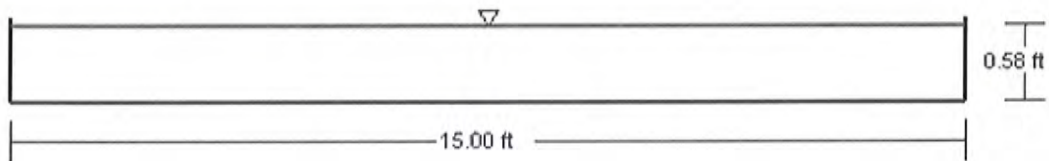
Project Description

Solve For Headwater Elevation

Input Data

Discharge		18.25	ft ³ /s
Headwater Elevation		5314.58	ft
Crest Elevation		5314.00	ft
Tailwater Elevation		5307.00	ft
Crest Surface Type	Gravel		
Crest Breadth		10.00	ft
Crest Length		15.00	ft

Cross Section Image



V: 2
H: 1

Worksheet for Spillway - Pond 9

Project Description

Solve For Headwater Elevation

Input Data

Discharge		13.00	ft ³ /s
Crest Elevation		5319.50	ft
Tailwater Elevation		5316.00	ft
Crest Surface Type	Gravel		
Crest Breadth		6.00	ft
Crest Length		15.00	ft

Results

Headwater Elevation	5319.97	ft
Headwater Height Above Crest	0.47	ft
Tailwater Height Above Crest	-3.50	ft
Weir Coefficient	2.68	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	2.68	US
Flow Area	7.06	ft ²
Velocity	1.84	ft/s
Wetted Perimeter	15.94	ft
Top Width	15.00	ft

Cross Section for Spillway - Pond 9

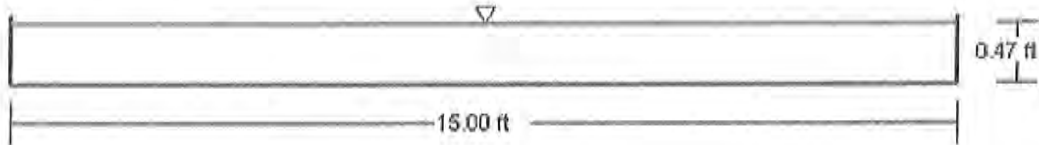
Project Description

Solve For Headwater Elevation

Input Data

Discharge		13.00	ft ³ /s
Headwater Elevation		5319.97	ft
Crest Elevation		5319.50	ft
Tailwater Elevation		5316.00	ft
Crest Surface Type	Gravel		
Crest Breadth		6.00	ft
Crest Length		15.00	ft

Cross Section Image



V: 2
H: 1

APPENDIX D

Plate 1 - Existing Basin Boundary Plan

Plate 2 - Proposed Basin Boundary Plan

Plate 3 - Proposed Sub-Basin Boundary Plan, Unit 18, 19 and 22

Plate 4 - Overall Storm Drain Plan, Unit 18, 19 and 22

Plate 5 - Overall Storm Drain Plan, Unit 14, 15, 22 and 25

APPENDIX E

References

Plate 1 – Volcano Heights Drainage Compilation Plan

Plate 2 – La Cuentista Subdivision Proposed Conditions,
Drainage Basin Map

Sheet 10 of 37 – La Cuentista Subdivision – Unit II,
Construction Grading Plan

Sheet 6 of 11 – Tierra Buena Estates, Construction Grading Plan

