

**DRAINAGE REPORT
FOR
MESA DEL SOL DRAINAGE AREA 8
ALBUQUERQUE, NM**

JUNE 24, 2024

City of Albuquerque Planning Department Development Review Services HYDROLOGY SECTION PRELIMINARY APPROVED DATE: <u>7/18/2024</u> BY: <u>Hegre Chan</u> HydroTrans # <u>R16D097DA8</u> THESE PLANS AND/OR REPORT ARE CONCEPTUAL ONLY. MORE INFORMATION MAY BE NEEDED IN THEM AND SUBMITTED TO HYDROLOGY FOR BUILDING PERMIT APPROVAL.	
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I. INTRODUCTION

This report establishes a Drainage Management Plan for Mesa Del Sol Drainage Area 8 (DA-8), as defined by the *Mesa Del Sol Innovation Park III – Overall Drainage Management Plan* (COA Hydrology File R16D097D). Included in this area is a majority of the City Center area of Mesa del Sol, University Boulevard south of the Aperture Center down to the Level B Boundary, and the future tracts immediately west University Boulevard.

The purpose of this report is to provide site-specific drainage analysis for existing, interim, and ultimate roadway and contributing basin conditions for development within the area referred to as Mesa Del Sol DA-8. This plan is prepared and submitted to support design and grading of the roadways, as well as the regional retention ponding areas that accommodate the discharge from the trunk public storm drains within the public Right-of-Way(s).

II. METHODOLOGY AND REFERENCES

All analysis was completed to reflect fully developed conditions for onsite and offsite contributory areas as well as the interim condition, with only the roadways fully developed. Runoff from the contributing basins was computed for the 100-year, 24-hour storm in accordance with the City of Albuquerque Development Process Manual (DPM), Chapter 6, dated June 15, 2020. Given that previous drainage analyses and master planning efforts have identified the “mesa top” area of Mesa del Sol as a closed basin that does not drain to the Rio Grande, much of the drainage management strategy relies on retention ponding schemes. These retention ponds are required to accommodate the 100-year, 10-day storm as defined by the City DPM (see **Table 1** and **Table 2**). All other drainage management infrastructure—including streets, inlets, and storm drains—were all analyzed and sized to accommodate the 100-year, 24-hour storm.

This drainage report for Drainage Area 8 and the assumptions associated with the surrounding areas is consistent with previously approved drainage reports for Mesa Del Sol. Specifically, the following approved Drainage Management Plan will be referenced throughout this report (**EXHIBIT A**), as this document established the high-level drainage management strategy for this area when it was prepared in support of a large bulk land plat for portions of the project area: *Innovation Park III – Overall Drainage Management Plan* (COA Hydrology File R16D097D). This document will herein be referred to as the “Overall DMP”.

TABLE 1– POND ANALYSIS – INTERIM CONDITIONS

Retention Pond ID	Req'd Volume (V100, 10day) (acre-feet)	Provided Volume (acre-feet)*	Pond Bottom (ft)*
Pond 1	3.6	17.8	5269.00
Pond 2	0.5	11.8	5268.00
Pond 3	2.4	27.0	5264.00
Pond 4	2.2	18.5	5264.00
TOTAL	8.7	75.1	

TABLE 2 – POND ANALYSIS – ULTIMATE CONDITIONS

Pond Analysis - Ultimate Conditions				
Retention Pond ID	Req'd Volume (V100, 10day) (acre-feet)	Provided Volume (acre-feet)*	Pond Bottom (ft)*	WSEL 100yr, 10d (ft)*
Pond 1	32.1	17.8	5269.00	-
Pond 2	0.7	11.8	5268.00	-
Pond 3	6.0	27.0	5264.00	-
Pond 4	2.2	18.5	5264.00	-
TOTAL	41.0	75.1**		5274.29

*Pond design is subject to change.

**Ponds 1 through 4 will be connected via equalization pipes to collectively provide the required volumes.

III. SITE LOCATION AND CHARACTERISTICS

This project is located within the Mesa del Sol South Master Planned Area, in south Albuquerque. Drainage Area 8 (DA-8) encompasses a portion of the Mesa del Sol City Center—a focal point at the intersections of two major master-planned roadways: Mesa del Sol Boulevard and University Boulevard. DA-8 includes the southern extension of University Boulevard from its current southern extent at Stryker Road, south to the current Mesa del Sol Level B boundary. DA-8 includes the roadway itself, regional retention ponding and park areas to the east of University Boulevard, and several large tracts to the west of University Boulevard. DA-8 encompasses approximately 193 acres.

East of the DA-8 regional ponds, a “special industrial use area” has been identified and is in the process of being platted. This area is identified as Drainage Area 9 (DA-9) in the *Overall DMP* will feature individual tracts that are responsible for retaining the drainage from each respective tract on-site and will not drain to the regional pond facility along University.

Similarly, the tracts north of the special industrial use area, currently owned by University of New Mexico (UNM), will be required to retain drainage on-site. In the northeast limits of City Center, three of the tracts are part of Drainage Area 3B (DA-3B) and do not drain to the DA-8 storm drain and pond system. Instead, those area will be incorporated into the storm drain system currently discharging to Pond OS-7 (located within the eastern Mesa del Sol Couplet), which will eventually be relocated further to the northeast. West of DA-8, an additional Drainage Area 10 (DA-10) has been identified. This area will be located west of a future southern extension of Dekooning Avenue and drain to a separate retention ponding system west of DA-8.

IV. EXISTING CONDITIONS

The overall project area primarily consists of undeveloped lands with sparse desert vegetation (grasses and small shrubs) on gentle slopes. Areas east and west of University generally slope towards the future roadway alignment and eventually concentrate drainage within the existing playas, which are discussed in more detail within the Mesa del Sol Level B Master Plan. Slopes are considered moderate, ranging from 0.5% to 2%. Based on the survey, existing dominant soil types are type A with up to 10% slopes, minimal disturbance and compaction, and a higher level of infiltration with a 100 year 24 hour initial abstraction of 0.65 inches. For additional information and an overview of the project area drainage patterns, refer to the Overall DMP and the Mesa del Sol Level B Master Plan – **EXHIBIT A**.

In the interim, temporary ponds have been graded as a temporary solution in the undeveloped tracts in City Center and west of University Boulevard. Assuming these undeveloped basins all have a 100% type B land treatment, these ponds have been sized to protect future roadways from offsite flows. A summary of these basins can be found in **Table 3**.

TABLE 3 – INTERIM BASIN TABLE

Interim Basin Data Table								
This table is based on page 6-10 of the DMP, Zone: 2								
Pond 1 Basins								
Basin ID	Area (ac)	Land Treatment Percentages				Q(100yr) (cfs)	V(100yr- 24hr) (ac- ft)*	V(provided) (ac-ft)
		A	B	C	D			
Pond 1 Basins								
8-1C	5.45	0%	100%	0%	0%	12.85	0.36	0.40
8-1F	6.39	0%	100%	0%	0%	15.08	0.43	0.47
8-1H	3.67	0%	100%	0%	0%	8.67	0.24	0.27
8-1J	9.36	0%	100%	0%	0%	22.10	0.62	0.66
8-1L	5.38	0%	100%	0%	0%	12.70	0.36	0.41
8-1N	3.33	0%	100%	0%	0%	7.86	0.22	0.27
8-1Q	9.86	0%	100%	0%	0%	23.27	0.66	0.75
8-1S	24.95	0%	100%	0%	0%	58.87	1.66	1.87
8-1T	16.04	0%	100%	0%	0%	37.85	1.07	1.15
8-1W	32.63	0%	100%	0%	0%	77.00	2.18	2.32
Pond 1 Basins Subtotal	117					276	7.80	8.59
Pond 3 Basins								
8-3A	17.86	0%	100%	0%	0%	42.16	1.19	1.25
TOTAL	135					318	8.99	9.83

*Volume is calculated based off City of Albuquerque DPM Section 6.2.8

V. DEVELOPED CONDITIONS

While development is eventually anticipated throughout the DA-8 project area, this particular report can only assume development densities for the adjacent tracts. This report is prepared in support of the public infrastructure to serve a number of these adjacent tracts, as well as those located in other Drainage Areas. Specifically, Mesa del Sol has begun the design of East and West University Boulevard within the City Center project area as part of a City of Albuquerque Public Work Order (PWO Package C) CPN 393572, as well as University Boulevard south to the Level B Boundary (PWO Package D), CPN 393573.

PWO Package C (CPN 393572) includes full roadway sections of East University Boulevard (from Stryker Road to the Southern Couplet), West University Boulevard (from North Mesa del Sol Boulevard to the Southern Couplet), storm drain improvements within East and West University Blvd roadways, and a portion of the regional pond system east of University Boulevard.

PWO Package D (CPN 393573) includes the east half-roadway section of University Blvd from the South Couplet to the southern limits of the Mesa del Sol Level B Boundary, storm drain improvements within University Boulevard, and regional retention ponding east of University Boulevard.

Upon completion of PWO C and PWO D, the storm drain and pond infrastructure will be able to accommodate full build-out of the remaining tracts within DA-8, although the development of these tracts and their adjacent public right-of-way will require appropriate drainage infrastructure to connect to these trunk systems.

The developed conditions basins identified in Overall DMP for DA-8 have been divided into sub-basins for detailed analysis purposes (see **EXHIBIT B** for Proposed Basin Map). These sub-basins contain flows (**APPENDIX A**) that will drain into the roadways and proposed ponds. See **Table 4** for a summary of these calculations. All roadways in the drainage area (East and West University Blvd, North and South Mesa del Sol Blvd, Cather Crossing, Fellini, and University Blvd) have been divided into basins that have been determined by design profiles and the typical roadway sections (see **APPENDIX B**). The roadways will be constructed with standard 8" curb and gutter and will convey all storm runoff from these fully developed roadway basins. Flows directed to low points in the roadways will be collected by inlets in sump condition on both sides of the street and conveyed through public storm drain to the regional retention ponds. All inlets (see **APPENDIX C**) have been sized to allow for ultimate developed conditions of the roadway basins and all storm drain pipes (see **EXHIBIT D**) have been sized to allow for ultimate developed conditions of all basins. Summaries of inlet and storm drain calculations can be found in **Table 5** and **Table 6** below.

TABLE 4 – PROPOSED BASIN DATE TABLE

This table is based on page 6-10 of the DMP, Zone: 2							
Pond 1 Basins							
Basin ID	Area (ac)	Land Treatment %				Q(100yr) (cfs)	V(100yr-10day) (ac-ft)*
		A	B	C	D		
8-5A	1.27	0%	0%	10%	90%	5.33	0.36
8-1A	1.13	0%	0%	10%	90%	4.78	0.32
8-1B	1.25	0%	0%	10%	90%	5.25	0.35
8-1C	5.45	0%	5%	5%	90%	22.74	1.54
8-1D	0.72	0%	0%	10%	90%	3.02	0.20
8-1E	3.06	0%	0%	10%	90%	12.89	0.87
8-1F	6.39	0%	5%	5%	90%	26.69	1.80
8-1G	1.25	0%	0%	10%	90%	5.25	0.35
8-1H	3.67	0%	5%	5%	90%	15.34	1.04
8-1I	0.72	0%	0%	10%	90%	3.02	0.20
8-1J	9.36	0%	5%	5%	90%	39.10	2.64
8-1K	1.28	0%	0%	10%	90%	5.38	0.36
8-1L	5.38	0%	5%	5%	90%	22.47	1.52
8-1M	0.73	0%	0%	10%	90%	3.09	0.21
8-1N	3.33	0%	5%	5%	90%	13.92	0.94
8-1O	3.15	0%	0%	10%	90%	13.27	0.89
8-1P	1.20	0%	0%	10%	90%	5.05	0.34
8-1Q	9.86	0%	5%	5%	90%	41.18	2.78
8-1R	1.35	0%	0%	10%	90%	5.67	0.38
8-1S	24.95	0%	23%	23%	55%	89.91	5.04
8-1T	16.04	0%	50%	50%	0%	43.38	1.22
8-1U	3.23	0%	0%	10%	90%	13.59	0.91
8-1V	7.29	0%	50%	50%	0%	19.73	0.56
8-1W	32.63	0%	23%	23%	55%	117.59	6.59
8-1X	3.49	0%	0%	10%	90%	14.70	0.99
Pond 1 Basins Subtotal	146.90					547.03	32.05
Pond 2 Basins							
Basin ID	Area (ac)	Land Treatment %				Q(100yr-6hr) (cfs)	V(100yr-10day) (ac-ft)*
		A	B	C	D		
8-2A	1.63	0%	0%	10%	90%	6.86	0.46
8-2B	3.67	0%	50%	50%	0%	9.92	0.28
Pond 2 Basins Subtotal	5.30					16.78	0.74
Pond 3 Basins							
8-3A	17.86	0%	23%	23%	55%	64.39	3.61
8-3B	3.78	0%	0%	10%	90%	15.92	1.07
8-3C	6.78	0%	23%	23%	55%	24.42	1.37
Pond 3 Basins Subtotal	28.42					104.73	6.05
Pond 4 Basins							
8-4A	3.00	0%	0%	10%	90%	12.62	0.85
8-4B	6.52	0%	23%	23%	55%	23.50	1.32
Pond 4 Basins Subtotal	9.52					36.12	2.17
TOTAL	191.40					709.99	41.37

*Volume is calculated based off City of Albuquerque DPM Section 6.2.8

TABLE 5 – STORM DRAIN PIPE TABLE

Storm Drain Pipe Table			
Pipe No.	Contributing Inlets and Basins	Size in	Actual Flow (cfs)
SD1	AP-1	18	5.33
SD2	AP-2	18	4.78
SD3	AP-3	18	5.25
SD4	AP-4	30	25.76
SD5	SD2 + SD3 + SD4	30	35.78
SD6	AP-6	30	31.94
SD7	AP-7	24	18.36
SD7-1	SD5 + SD6 + SD7	48	86.08
SD8	IN-8A + IN-8B	24	3.80
SD8-1	SD7-1 + SD8	48	89.88
SD9	AP-9	36	44.49
SD10	AP-10	30	25.57
SD10-1	SD8-1 + SD9 + SD10	60	159.94
SD11	IN-11A + IN-11B + Basin 8-1N	24	21.07
SD11-1	SD10-1 + SD11	66	181.01
SD12	IN-12A + IN-12B	24	5.00
SD14	AP-14	36	51.90
SD14-1	SD12 + SD14	42	56.90
SD15	IN-15A + IN-15B	24	9.27
SD15-1	SD14-1 + SD15	48	66.17
SD15-2	SD11-1 + SD15-1	72	247.18
SD16	IN-16A + IN-16B + Basin 8-1T**	42	56.97
SD16-1	SD15-2 + SD16	72	304.15
SD16-2	Basin 8-1S	48	89.91
SD16-3	SD16-1 + SD16-2	72	394.07
SD17	IN-17A + IN-17B + 60% of Basin 8-1W**	36	85.26
SD18	IN-18A + IN-18B + 40% of Basin 8-1W**	30	53.90
SD19	IN-19A + IN-19B + Basins 8-3A**	36	80.31
SD20	IN-20A + IN-20B**	24	12.62

TABLE 6 – INLET TABLE

Inlet Table		
Inlet No.	Inlet Type*	Actual Flow (cfs)
IN-8A	1-SGL COA TYPE A	3.87
IN-8B	1-SGL COA TYPE A	3.87
IN-11A	1-SGL COA TYPE A*	3.58
IN-11B	1-SGL COA TYPE A*	3.58
IN-12A	1-SGL COA TYPE A	3.98
IN-12B	1-SGL COA TYPE A	3.98
IN-15A	1-SGL COA TYPE A*	4.64
IN-15B	1-SGL COA TYPE A*	4.64
IN-16A	1-SGL COA TYPE A*	6.80
IN-16B	1-SGL COA TYPE A*	6.80
IN-17A	1-SGL COA TYPE A*	7.35
IN-17B	1-SGL COA TYPE A*	7.35
IN-18A	1-SGL COA TYPE A*	3.43
IN-18B	1-SGL COA TYPE A*	3.43
IN-19A	1-SGL COA TYPE A*	7.96
IN-19B	1-SGL COA TYPE A*	7.96
IN-20A	1-SGL COA TYPE A*	6.31
IN-20B	1-SGL COA TYPE A*	6.31

*Inlet in sump condition. All Type A inlets in sump condition shall be double-winged.

VI. GRADING PLAN

The grading plans for East and West University Boulevard, University Boulevard, and the interim ponds for the undeveloped tracts' fully developed conditions are included in 'EXHIBIT E– Grading Plan' of this report. This grading is based on the 60% design for PWO packages C and D. Pond grading will be optimized and reduced in the future but will meet required volumes.

The trunk storm drain system will be within West University, where it will include stubs for future storm drain within the intersection roadways (North Mesa del Sol, South Mesa del Sol, Cather Crossing). These cross streets are assumed to accept flows from fully developed conditions from the adjacent tracts, which the storm drain has been sized to accommodate. The storm drain will slope south, where it will combine with a similar trunk system in East University and inlets along the roadway, before discharging directly into Pond 8-1, southeast of the southern University couplet.

South of the couplet on University Boulevard, curb inlets at low points and at intersections with future roadways will collect roadway flow on both sides of the road and drain east into Ponds 8-1, 8-2, and 8-3. At these future intersections, storm drain stubs will be extended to the east to accommodate future storm drainage infrastructure within those streets and to serve the tracts east of University Boulevard. Culverts that serve as equalization pipes between the various ponds along University Boulevard will be constructed to connect ponds so that they can collectively meet the required runoff volume from the developed basins.

VII. CALCULATIONS

All the calculations to support the narrative are included in the appendices and were computed in accordance with the COA DPM, Chapter 6. The COA DPM rational method utilizes land treatment designations and imperviousness to represent surface losses. This site is located in precipitation zone 2. Land treatments are based on fully developed conditions. All roadway basins are based on the roadway sections with 90% D and 10% C. The smaller basins located in the City Center (Basins 8-1C, 8-1F, 8-1H, 8-1J, 8-1L, and 8-1N) are assumed to have 90% D, 5% C, and 5% B. The larger basins east of the ponds are assumed to have 50% type D with the remaining split between type B and C. Refer to **Table 4** for a hydrologic summary of these basins.

Primarily, Rational Method (per the COA DPM) was used to calculate basin runoff for the contributing basins, Manning's equation for open channel flow was used to analyze the roadway capacities, while HEC-22 methodology was used to analyze inlet and storm drain capacities. Inlets have been sized with a 50% clogging factor (**APPENDIX C**). Modeling results from Stormwater Studio have been included in **APPENDIX D**. The design storm used in the analysis of roadway and storm drainage infrastructure is the 100-year, 24-hour storm event. As all ponds are full retention, they were analyzed following the requirements and procedures in the City of Albuquerque Development Process Manual (COA DPM) Part 6-2(A), using the 100-year, 10-day storm event (**APPENDIX E**).

VIII. CONCLUSION

This drainage report follows the previously approved drainage master plans, drainage reports, and chapter 6 of the COA DPM. The proposed storm drain infrastructure and drainage management schemes allow for the safe management of storm runoff and preservation of the natural terrain in permanent conditions. Attached analysis demonstrates that the proposed drainage infrastructure has been sized accordingly and the 100-year 10-day runoff is effectively managed.

APPENDICES

APPENDIX A: BASIN ANALYSIS AND SUMMARY OF LAND TREATMENTS

APPENDIX B: ROADWAY HYDAULICS

APPENDIX C: INLET CAPACITY ANALYSIS

APPENDIX D: STORM DRAIN PIPE ANALYSIS

APPENDIX E: POND ANALYSIS

APPENDIX A

BASIN ANALYSIS AND SUMMARY OF LAND TREATMENTS

Proposed Basin Data Table									
This table is based on page 6-10 of the DMP, Zone: 2									
Pond 1 Basins									
Basin ID	Area (sq ft)	Area (ac)	Land Treatment Percentages				Q _(100yr) (cfs/ac)	Q _(100yr) (cfs)	V _(100yr-10day) (ac-ft)*
			A	B	C	D			
8-5A	55108	1.27	0%	0%	10%	90%	4.21	5.33	0.36
Pond 1 Basins									
8-1A	49418	1.13	0%	0%	10%	90%	4.21	4.78	0.32
8-1B	54288	1.25	0%	0%	10%	90%	4.21	5.25	0.35
8-1C	237200	5.45	0%	5%	5%	90%	4.18	22.74	1.54
8-1D	31200	0.72	0%	0%	10%	90%	4.21	3.02	0.20
8-1E	133303	3.06	0%	0%	10%	90%	4.21	12.89	0.87
8-1F	278400	6.39	0%	5%	5%	90%	4.18	26.69	1.80
8-1G	54287	1.25	0%	0%	10%	90%	4.21	5.25	0.35
8-1H	160000	3.67	0%	5%	5%	90%	4.18	15.34	1.04
8-1I	31200	0.72	0%	0%	10%	90%	4.21	3.02	0.20
8-1J	407857	9.36	0%	5%	5%	90%	4.18	39.10	2.64
8-1K	55680	1.28	0%	0%	10%	90%	4.21	5.38	0.36
8-1L	234400	5.38	0%	5%	5%	90%	4.18	22.47	1.52
8-1M	32000	0.73	0%	0%	10%	90%	4.21	3.09	0.21
8-1N	145157	3.33	0%	5%	5%	90%	4.18	13.92	0.94
8-1O	137305	3.15	0%	0%	10%	90%	4.21	13.27	0.89
8-1P	52227	1.20	0%	0%	10%	90%	4.21	5.05	0.34
8-1Q	429538	9.86	0%	5%	5%	90%	4.18	41.18	2.78
8-1R	58641	1.35	0%	0%	10%	90%	4.21	5.67	0.38
8-1S	1086683	24.95	0%	23%	23%	55%	3.60	89.91	5.04
8-1T	698556	16.04	0%	50%	50%	0%	2.71	43.38	1.22
8-1U	140586	3.23	0%	0%	10%	90%	4.21	13.59	0.91
8-1V	317767	7.29	0%	50%	50%	0%	2.71	19.73	0.56
8-1W	1421187	32.63	0%	23%	23%	55%	3.60	117.59	6.59
8-1X	152106	3.49	0%	0%	10%	90%	4.21	14.70	0.99
Pond 1 Basins Subtotal	6,398,985	146.90						547.03	32.05
Pond 2 Basins									
Basin ID	Area (sq ft)	Area (ac)	Land Treatment Percentages				Q _(100yr) (cfs/ac)	Q _(100yr-6hr) (cfs)	V _(100yr-10day) (ac-ft)*
			A	B	C	D			
8-2A	70976	1.63	0%	0%	10%	90%	4.21	6.86	0.46
8-2B	159702	3.67	0%	50%	50%	0%	2.71	9.92	0.28
Pond 2 Basins Subtotal	230,678	5.30						16.78	0.74
Pond 3 Basins									
8-3A	778197	17.86	0%	23%	23%	55%	3.60	64.39	3.61
8-3B	164657	3.78	0%	0%	10%	90%	4.21	15.92	1.07
8-3C	295189	6.78	0%	23%	23%	55%	3.60	24.42	1.37
Pond 3 Basins Subtotal	1,238,042	28.42						104.73	6.05
Pond 4 Basins									
8-4A	130586	3.00	0%	0%	10%	90%	4.21	12.62	0.85
8-4B	283977	6.52	0%	23%	23%	55%	3.60	23.50	1.32
Pond 4 Basins Subtotal	414,563	9.52						36.12	2.17
TOTAL	8,337,377	191						710	41

*Volume is calculated based off City of Albuquerque DPM Section 6.2.8

APPENDIX B
ROADWAY HYDRAULICS

AP-2
AP-3
AP-9

78' ROW 2% Cross Slope Road 0.5%

MANNING'S N = 0.017

SLOPE = 0.005

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.0	4.0	17.4	0.1	7.0	62.0	0.0
2.0	15.4	0.7	5.0	42.0	0.6	8.0	62.6	0.7
3.0	16.0	0.0	6.0	60.6	0.1	9.0	78.0	1.0

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.010	0.010	0.001	0.000	0.240	0.176	0.230	0.230	0.010	0.438
0.020	0.020	0.005	0.001	0.480	0.279	0.460	0.460	0.021	0.492
0.030	0.030	0.010	0.004	0.719	0.366	0.691	0.691	0.032	0.527
0.040	0.040	0.018	0.008	0.959	0.443	0.921	0.921	0.043	0.552
0.050	0.050	0.029	0.015	1.199	0.514	1.151	1.151	0.054	0.573
0.060	0.060	0.041	0.024	1.439	0.581	1.381	1.381	0.065	0.591
0.070	0.070	0.056	0.036	1.679	0.644	1.611	1.611	0.076	0.606
0.080	0.080	0.074	0.052	1.919	0.703	1.842	1.842	0.088	0.620
0.090	0.090	0.093	0.071	2.158	0.761	2.072	2.072	0.099	0.632
0.100	0.100	0.115	0.094	2.398	0.816	2.302	2.302	0.110	0.644
0.110	0.110	0.139	0.121	2.638	0.870	2.532	2.532	0.122	0.654
0.120	0.120	0.166	0.153	2.878	0.922	2.762	2.762	0.133	0.663
0.130	0.130	0.195	0.189	3.118	0.972	2.993	2.993	0.145	0.672
0.140	0.140	0.229	0.208	4.066	0.909	3.931	3.931	0.153	0.663
0.150	0.150	0.273	0.243	5.013	0.888	4.870	4.870	0.162	0.661
0.160	0.160	0.327	0.291	5.961	0.892	5.809	5.809	0.172	0.663
0.170	0.170	0.389	0.354	6.909	0.908	6.748	6.748	0.183	0.667
0.180	0.180	0.462	0.431	7.857	0.934	7.687	7.687	0.194	0.672
0.190	0.190	0.543	0.524	8.805	0.965	8.626	8.626	0.204	0.678
0.200	0.200	0.634	0.634	9.752	0.999	9.565	9.565	0.216	0.684
0.210	0.210	0.734	0.761	10.700	1.036	10.503	10.503	0.227	0.691
0.220	0.220	0.844	0.907	11.648	1.074	11.442	11.442	0.238	0.697
0.230	0.230	0.963	1.073	12.596	1.114	12.381	12.381	0.249	0.704
0.240	0.240	1.092	1.259	13.543	1.153	13.320	13.320	0.261	0.710
0.250	0.250	1.230	1.468	14.491	1.194	14.259	14.259	0.272	0.717
0.260	0.260	1.377	1.699	15.439	1.234	15.198	15.198	0.284	0.723
0.270	0.270	1.534	1.954	16.387	1.274	16.137	16.137	0.295	0.729
0.280	0.280	1.700	2.234	17.335	1.314	17.076	17.076	0.307	0.734
0.290	0.290	1.875	2.539	18.282	1.354	18.014	18.014	0.319	0.740
0.300	0.300	2.060	2.872	19.230	1.394	18.953	18.953	0.330	0.746
0.310	0.310	2.254	3.232	20.178	1.434	19.892	19.892	0.342	0.751
0.320	0.320	2.458	3.620	21.126	1.473	20.831	20.831	0.354	0.756
0.330	0.330	2.671	4.038	22.074	1.512	21.770	21.770	0.366	0.761

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.340	0.340	2.893	4.487	23.021	1.551	22.709	22.709	0.377	0.766
0.350	0.350	3.125	4.966	23.969	1.589	23.648	23.648	0.389	0.771
0.360	0.360	3.366	5.478	24.917	1.627	24.587	24.587	0.401	0.775
0.370	0.370	3.617	6.022	25.865	1.665	25.525	25.525	0.413	0.780
0.380	0.380	3.877	6.601	26.812	1.703	26.464	26.464	0.425	0.784
0.390	0.390	4.146	7.214	27.760	1.740	27.403	27.403	0.437	0.789
0.400	0.400	4.425	7.862	28.708	1.777	28.342	28.342	0.449	0.793
0.410	0.410	4.713	8.546	29.656	1.813	29.281	29.281	0.461	0.797
0.420	0.420	5.010	9.268	30.604	1.850	30.220	30.220	0.473	0.801
0.430	0.430	5.317	10.027	31.551	1.886	31.159	31.159	0.485	0.805
0.440	0.440	5.633	10.825	32.499	1.922	32.097	32.097	0.497	0.809
0.450	0.450	5.959	11.662	33.447	1.957	33.036	33.036	0.510	0.812
0.460	0.460	6.294	12.540	34.395	1.992	33.975	33.975	0.522	0.816
0.470	0.470	6.639	13.458	35.343	2.027	34.914	34.914	0.534	0.820
0.480	0.480	6.992	14.418	36.290	2.062	35.853	35.853	0.546	0.823
0.490	0.490	7.356	15.421	37.238	2.096	36.792	36.792	0.558	0.827
0.500	0.500	7.728	16.466	38.186	2.131	37.731	37.731	0.571	0.830
0.510	0.510	8.110	17.556	39.134	2.165	38.670	38.670	0.583	0.833
0.520	0.520	8.502	18.690	40.081	2.198	39.608	39.608	0.595	0.837
0.530	0.530	8.902	19.869	41.029	2.232	40.547	40.547	0.607	0.840
0.540	0.540	9.313	21.095	41.977	2.265	41.486	41.486	0.620	0.843
0.550	0.550	9.732	22.367	42.925	2.298	42.425	42.425	0.632	0.846
0.560	0.560	10.161	23.686	43.873	2.331	43.364	43.364	0.645	0.849
0.570	0.570	10.599	25.054	44.820	2.364	44.303	44.303	0.657	0.852
0.580	0.580	11.047	26.471	45.768	2.396	45.242	45.242	0.669	0.855
0.590	0.590	11.504	27.937	46.716	2.428	46.181	46.181	0.682	0.858
0.600	0.600	11.971	29.453	47.664	2.460	47.119	47.119	0.694	0.861
0.610	0.610	12.442	31.399	47.691	2.524	47.138	47.138	0.709	0.866
0.620	0.620	12.914	33.395	47.718	2.586	47.157	47.157	0.724	0.871
0.630	0.630	13.385	35.438	47.746	2.648	47.175	47.175	0.739	0.876
0.640	0.640	13.857	37.531	47.773	2.708	47.194	47.194	0.754	0.881
0.650	0.650	14.329	39.670	47.801	2.769	47.213	47.213	0.769	0.886
0.660	0.660	14.801	41.857	47.828	2.828	47.231	47.231	0.784	0.891
0.670	0.670	15.274	44.090	47.855	2.887	47.250	47.250	0.800	0.895
0.680	0.680	15.752	45.740	48.916	2.904	48.310	48.310	0.811	0.897
0.690	0.690	16.240	47.445	49.976	2.921	49.371	49.371	0.823	0.898
0.700	0.700	16.739	49.205	51.037	2.940	50.431	50.431	0.834	0.900
0.710	0.710	17.249	51.023	52.097	2.958	51.491	51.491	0.846	0.901
0.720	0.720	17.769	52.898	53.158	2.977	52.552	52.552	0.858	0.903
0.730	0.730	18.300	54.831	54.218	2.996	53.612	53.612	0.870	0.904
0.740	0.740	18.841	56.823	55.279	3.016	54.672	54.672	0.881	0.906

Q(max) =
44.09 CFS
D = 0.67
E = 0.80<0.96

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.750	0.750	19.393	58.874	56.339	3.036	55.733	55.733	0.893	0.907
0.760	0.760	19.956	60.985	57.400	3.056	56.793	56.793	0.905	0.909
0.770	0.770	20.529	63.157	58.461	3.077	57.853	57.853	0.917	0.911
0.780	0.780	21.113	65.391	59.521	3.097	58.914	58.914	0.929	0.912
0.790	0.790	21.707	67.686	60.582	3.118	59.974	59.974	0.941	0.914
0.800	0.800	22.312	70.045	61.642	3.139	61.034	61.034	0.953	0.915
0.810	0.810	22.928	72.467	62.703	3.161	62.095	62.095	0.965	0.917
0.820	0.820	23.554	74.953	63.763	3.182	63.155	63.155	0.978	0.919
0.830	0.830	24.191	77.504	64.824	3.204	64.216	64.216	0.990	0.920
0.840	0.840	24.838	80.120	65.884	3.226	65.276	65.276	1.002	0.922
0.850	0.850	25.497	82.803	66.945	3.248	66.336	66.336	1.014	0.924
0.860	0.860	26.165	85.552	68.005	3.270	67.397	67.397	1.026	0.925
0.870	0.870	26.844	88.370	69.066	3.292	68.457	68.457	1.039	0.927
0.880	0.880	27.534	91.255	70.126	3.314	69.517	69.517	1.051	0.928
0.890	0.890	28.235	94.210	71.187	3.337	70.578	70.578	1.063	0.930
0.900	0.900	28.946	97.234	72.247	3.359	71.638	71.638	1.076	0.932
0.910	0.910	29.668	100.328	73.308	3.382	72.698	72.698	1.088	0.933
0.920	0.920	30.400	103.494	74.369	3.404	73.759	73.759	1.100	0.935
0.930	0.930	31.143	106.731	75.429	3.427	74.819	74.819	1.113	0.937
0.940	0.940	31.896	110.040	76.490	3.450	75.879	75.879	1.125	0.938
0.950	0.950	32.660	113.423	77.550	3.473	76.940	76.940	1.138	0.940

AP-4
AP-5
AP-6
AP-7
AP-12
AP-15

78' ROW 2% Cross Slope Road 0.6%

MANNING'S N = 0.017

SLOPE = 0.006

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.0	4.0	17.4	0.1	7.0	62.0	0.0
2.0	15.4	0.7	5.0	42.0	0.6	8.0	62.6	0.7
3.0	16.0	0.0	6.0	60.6	0.1	9.0	78.0	1.0

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.010	0.010	0.001	0.000	0.240	0.193	0.230	0.230	0.011	0.480
0.020	0.020	0.005	0.001	0.480	0.306	0.460	0.460	0.021	0.539
0.030	0.030	0.010	0.004	0.719	0.401	0.691	0.691	0.032	0.577
0.040	0.040	0.018	0.009	0.959	0.485	0.921	0.921	0.044	0.605
0.050	0.050	0.029	0.016	1.199	0.563	1.151	1.151	0.055	0.628
0.060	0.060	0.041	0.026	1.439	0.636	1.381	1.381	0.066	0.647
0.070	0.070	0.056	0.040	1.679	0.705	1.611	1.611	0.078	0.664
0.080	0.080	0.074	0.057	1.919	0.771	1.842	1.842	0.089	0.679
0.090	0.090	0.093	0.078	2.158	0.834	2.072	2.072	0.101	0.693
0.100	0.100	0.115	0.103	2.398	0.894	2.302	2.302	0.112	0.705
0.110	0.110	0.139	0.133	2.638	0.953	2.532	2.532	0.124	0.716
0.120	0.120	0.166	0.167	2.878	1.010	2.762	2.762	0.136	0.727
0.130	0.130	0.195	0.207	3.118	1.065	2.993	2.993	0.148	0.736
0.140	0.140	0.229	0.228	4.066	0.995	3.931	3.931	0.155	0.727
0.150	0.150	0.273	0.266	5.013	0.973	4.870	4.870	0.165	0.724
0.160	0.160	0.327	0.319	5.961	0.977	5.809	5.809	0.175	0.726
0.170	0.170	0.389	0.387	6.909	0.995	6.748	6.748	0.185	0.730
0.180	0.180	0.462	0.472	7.857	1.023	7.687	7.687	0.196	0.736
0.190	0.190	0.543	0.574	8.805	1.057	8.626	8.626	0.207	0.743
0.200	0.200	0.634	0.694	9.752	1.095	9.565	9.565	0.219	0.750
0.210	0.210	0.734	0.833	10.700	1.135	10.503	10.503	0.230	0.757
0.220	0.220	0.844	0.993	11.648	1.177	11.442	11.442	0.242	0.764
0.230	0.230	0.963	1.175	12.596	1.220	12.381	12.381	0.253	0.771
0.240	0.240	1.092	1.379	13.543	1.263	13.320	13.320	0.265	0.778
0.250	0.250	1.230	1.608	14.491	1.307	14.259	14.259	0.277	0.785
0.260	0.260	1.377	1.861	15.439	1.352	15.198	15.198	0.288	0.792
0.270	0.270	1.534	2.140	16.387	1.396	16.137	16.137	0.300	0.798
0.280	0.280	1.700	2.447	17.335	1.440	17.076	17.076	0.312	0.805
0.290	0.290	1.875	2.782	18.282	1.484	18.014	18.014	0.324	0.811
0.300	0.300	2.060	3.146	19.230	1.527	18.953	18.953	0.336	0.817
0.310	0.310	2.254	3.540	20.178	1.571	19.892	19.892	0.348	0.823
0.320	0.320	2.458	3.966	21.126	1.614	20.831	20.831	0.360	0.828
0.330	0.330	2.671	4.424	22.074	1.656	21.770	21.770	0.373	0.834

Inlet 12
Q = 3.98 CFS
D = 0.36<0.67
E = 0.66<0.96

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.340	0.340	2.893	4.915	23.021	1.699	22.709	22.709	0.385	0.839
0.350	0.350	3.125	5.440	23.969	1.741	23.648	23.648	0.397	0.844
0.360	0.360	3.366	6.001	24.917	1.783	24.587	24.587	0.409	0.849
0.370	0.370	3.617	6.597	25.865	1.824	25.525	25.525	0.422	0.854
0.380	0.380	3.877	7.231	26.812	1.865	26.464	26.464	0.434	0.859
0.390	0.390	4.146	7.902	27.760	1.906	27.403	27.403	0.447	0.864
0.400	0.400	4.425	8.612	28.708	1.946	28.342	28.342	0.459	0.868
0.410	0.410	4.713	9.362	29.656	1.987	29.281	29.281	0.471	0.873
0.420	0.420	5.010	10.152	30.604	2.026	30.220	30.220	0.484	0.877
0.430	0.430	5.317	10.984	31.551	2.066	31.159	31.159	0.496	0.882
0.440	0.440	5.633	11.858	32.499	2.105	32.097	32.097	0.509	0.886
0.450	0.450	5.959	12.776	33.447	2.144	33.036	33.036	0.521	0.890
0.460	0.460	6.294	13.737	34.395	2.182	33.975	33.975	0.534	0.894
0.470	0.470	6.639	14.743	35.343	2.221	34.914	34.914	0.547	0.898
0.480	0.480	6.992	15.794	36.290	2.259	35.853	35.853	0.559	0.902
0.490	0.490	7.356	16.893	37.238	2.297	36.792	36.792	0.572	0.905
0.500	0.500	7.728	18.038	38.186	2.334	37.731	37.731	0.585	0.909
0.510	0.510	8.110	19.231	39.134	2.371	38.670	38.670	0.597	0.913
0.520	0.520	8.502	20.474	40.081	2.408	39.608	39.608	0.610	0.916
0.530	0.530	8.902	21.765	41.029	2.445	40.547	40.547	0.623	0.920
0.540	0.540	9.313	23.108	41.977	2.481	41.486	41.486	0.636	0.923
0.550	0.550	9.732	24.501	42.925	2.518	42.425	42.425	0.649	0.927
0.560	0.560	10.161	25.947	43.873	2.554	43.364	43.364	0.661	0.930
0.570	0.570	10.599	27.445	44.820	2.589	44.303	44.303	0.674	0.933
0.580	0.580	11.047	28.997	45.768	2.625	45.242	45.242	0.687	0.936
0.590	0.590	11.504	30.603	46.716	2.660	46.181	46.181	0.700	0.940
0.600	0.600	11.971	32.265	47.664	2.695	47.119	47.119	0.713	0.943
0.610	0.610	12.442	34.396	47.691	2.765	47.138	47.138	0.729	0.949
0.620	0.620	12.914	36.582	47.718	2.833	47.157	47.157	0.745	0.954
0.630	0.630	13.385	38.821	47.746	2.900	47.175	47.175	0.761	0.960
0.640	0.640	13.857	41.113	47.773	2.967	47.194	47.194	0.777	0.965
0.650	0.650	14.329	43.457	47.801	3.033	47.213	47.213	0.793	0.971
0.660	0.660	14.801	45.852	47.828	3.098	47.231	47.231	0.809	0.976
0.670	0.670	15.274	48.299	47.855	3.162	47.250	47.250	0.826	0.981
0.680	0.680	15.752	50.105	48.916	3.181	48.310	48.310	0.837	0.982
0.690	0.690	16.240	51.973	49.976	3.200	49.371	49.371	0.849	0.984
0.700	0.700	16.739	53.902	51.037	3.220	50.431	50.431	0.861	0.985
0.710	0.710	17.249	55.893	52.097	3.240	51.491	51.491	0.873	0.987
0.720	0.720	17.769	57.947	53.158	3.261	52.552	52.552	0.885	0.989
0.730	0.730	18.300	60.064	54.218	3.282	53.612	53.612	0.898	0.990
0.740	0.740	18.841	62.246	55.279	3.304	54.672	54.672	0.910	0.992

Q(max) =
48.30 CFS
D = 0.67
E = 0.83<0.96

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.750	0.750	19.393	64.493	56.339	3.326	55.733	55.733	0.922	0.994
0.760	0.760	19.956	66.806	57.400	3.348	56.793	56.793	0.934	0.996
0.770	0.770	20.529	69.185	58.461	3.370	57.853	57.853	0.947	0.997
0.780	0.780	21.113	71.632	59.521	3.393	58.914	58.914	0.959	0.999
0.790	0.790	21.707	74.147	60.582	3.416	59.974	59.974	0.971	1.001
0.800	0.800	22.312	76.730	61.642	3.439	61.034	61.034	0.984	1.003
0.810	0.810	22.928	79.383	62.703	3.462	62.095	62.095	0.996	1.005
0.820	0.820	23.554	82.106	63.763	3.486	63.155	63.155	1.009	1.006
0.830	0.830	24.191	84.901	64.824	3.510	64.216	64.216	1.022	1.008
0.840	0.840	24.838	87.767	65.884	3.534	65.276	65.276	1.034	1.010
0.850	0.850	25.497	90.706	66.945	3.558	66.336	66.336	1.047	1.012
0.860	0.860	26.165	93.718	68.005	3.582	67.397	67.397	1.060	1.013
0.870	0.870	26.844	96.804	69.066	3.606	68.457	68.457	1.072	1.015
0.880	0.880	27.534	99.965	70.126	3.631	69.517	69.517	1.085	1.017
0.890	0.890	28.235	103.202	71.187	3.655	70.578	70.578	1.098	1.019
0.900	0.900	28.946	106.514	72.247	3.680	71.638	71.638	1.111	1.021
0.910	0.910	29.668	109.904	73.308	3.705	72.698	72.698	1.123	1.022
0.920	0.920	30.400	113.372	74.369	3.729	73.759	73.759	1.136	1.024
0.930	0.930	31.143	116.918	75.429	3.754	74.819	74.819	1.149	1.026
0.940	0.940	31.896	120.543	76.490	3.779	75.879	75.879	1.162	1.028
0.950	0.950	32.660	124.248	77.550	3.804	76.940	76.940	1.175	1.029

AP-11

78' ROW 2% Cross Slope Road 0.7%

MANNING'S N = 0.017

SLOPE = 0.007

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.0	4.0	17.4	0.1	7.0	62.0	0.0
2.0	15.4	0.7	5.0	42.0	0.6	8.0	62.6	0.7
3.0	16.0	0.0	6.0	60.6	0.1	9.0	78.0	1.0

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.010	0.010	0.001	0.000	0.240	0.208	0.230	0.230	0.011	0.519
0.020	0.020	0.005	0.002	0.480	0.330	0.460	0.460	0.022	0.582
0.030	0.030	0.010	0.004	0.719	0.433	0.691	0.691	0.033	0.623
0.040	0.040	0.018	0.010	0.959	0.524	0.921	0.921	0.044	0.654
0.050	0.050	0.029	0.018	1.199	0.608	1.151	1.151	0.056	0.678
0.060	0.060	0.041	0.028	1.439	0.687	1.381	1.381	0.067	0.699
0.070	0.070	0.056	0.043	1.679	0.761	1.611	1.611	0.079	0.718
0.080	0.080	0.074	0.061	1.919	0.832	1.842	1.842	0.091	0.734
0.090	0.090	0.093	0.084	2.158	0.900	2.072	2.072	0.103	0.748
0.100	0.100	0.115	0.111	2.398	0.966	2.302	2.302	0.115	0.761
0.110	0.110	0.139	0.143	2.638	1.029	2.532	2.532	0.126	0.774
0.120	0.120	0.166	0.181	2.878	1.091	2.762	2.762	0.139	0.785
0.130	0.130	0.195	0.224	3.118	1.150	2.993	2.993	0.151	0.796
0.140	0.140	0.229	0.246	4.066	1.075	3.931	3.931	0.158	0.785
0.150	0.150	0.273	0.287	5.013	1.051	4.870	4.870	0.167	0.782
0.160	0.160	0.327	0.344	5.961	1.055	5.809	5.809	0.177	0.784
0.170	0.170	0.389	0.419	6.909	1.075	6.748	6.748	0.188	0.789
0.180	0.180	0.462	0.510	7.857	1.105	7.687	7.687	0.199	0.795
0.190	0.190	0.543	0.620	8.805	1.142	8.626	8.626	0.210	0.802
0.200	0.200	0.634	0.750	9.752	1.182	9.565	9.565	0.222	0.810
0.210	0.210	0.734	0.900	10.700	1.226	10.503	10.503	0.233	0.817
0.220	0.220	0.844	1.073	11.648	1.271	11.442	11.442	0.245	0.825
0.230	0.230	0.963	1.269	12.596	1.318	12.381	12.381	0.257	0.833
0.240	0.240	1.092	1.490	13.543	1.365	13.320	13.320	0.269	0.840
0.250	0.250	1.230	1.736	14.491	1.412	14.259	14.259	0.281	0.848
0.260	0.260	1.377	2.010	15.439	1.460	15.198	15.198	0.293	0.855
0.270	0.270	1.534	2.312	16.387	1.507	16.137	16.137	0.305	0.862
0.280	0.280	1.700	2.643	17.335	1.555	17.076	17.076	0.318	0.869
0.290	0.290	1.875	3.005	18.282	1.602	18.014	18.014	0.330	0.876
0.300	0.300	2.060	3.398	19.230	1.650	18.953	18.953	0.342	0.882
0.310	0.310	2.254	3.824	20.178	1.696	19.892	19.892	0.355	0.888
0.320	0.320	2.458	4.284	21.126	1.743	20.831	20.831	0.367	0.895
0.330	0.330	2.671	4.778	22.074	1.789	21.770	21.770	0.380	0.901

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.340	0.340	2.893	5.309	23.021	1.835	22.709	22.709	0.392	0.906
0.350	0.350	3.125	5.876	23.969	1.880	23.648	23.648	0.405	0.912
0.360	0.360	3.366	6.481	24.917	1.925	24.587	24.587	0.418	0.917
0.370	0.370	3.617	7.126	25.865	1.970	25.525	25.525	0.430	0.923
0.380	0.380	3.877	7.810	26.812	2.015	26.464	26.464	0.443	0.928
0.390	0.390	4.146	8.535	27.760	2.059	27.403	27.403	0.456	0.933
0.400	0.400	4.425	9.302	28.708	2.102	28.342	28.342	0.469	0.938
0.410	0.410	4.713	10.112	29.656	2.146	29.281	29.281	0.482	0.943
0.420	0.420	5.010	10.966	30.604	2.189	30.220	30.220	0.495	0.948
0.430	0.430	5.317	11.864	31.551	2.231	31.159	31.159	0.507	0.952
0.440	0.440	5.633	12.808	32.499	2.274	32.097	32.097	0.520	0.957
0.450	0.450	5.959	13.799	33.447	2.316	33.036	33.036	0.533	0.961
0.460	0.460	6.294	14.837	34.395	2.357	33.975	33.975	0.546	0.966
0.470	0.470	6.639	15.924	35.343	2.399	34.914	34.914	0.559	0.970
0.480	0.480	6.992	17.060	36.290	2.440	35.853	35.853	0.573	0.974
0.490	0.490	7.356	18.246	37.238	2.481	36.792	36.792	0.586	0.978
0.500	0.500	7.728	19.483	38.186	2.521	37.731	37.731	0.599	0.982
0.510	0.510	8.110	20.772	39.134	2.561	38.670	38.670	0.612	0.986
0.520	0.520	8.502	22.114	40.081	2.601	39.608	39.608	0.625	0.990
0.530	0.530	8.902	23.509	41.029	2.641	40.547	40.547	0.638	0.994
0.540	0.540	9.313	24.959	41.977	2.680	41.486	41.486	0.652	0.997
0.550	0.550	9.732	26.465	42.925	2.719	42.425	42.425	0.665	1.001
0.560	0.560	10.161	28.026	43.873	2.758	43.364	43.364	0.678	1.005
0.570	0.570	10.599	29.644	44.820	2.797	44.303	44.303	0.692	1.008
0.580	0.580	11.047	31.321	45.768	2.835	45.242	45.242	0.705	1.012
0.590	0.590	11.504	33.055	46.716	2.873	46.181	46.181	0.718	1.015
0.600	0.600	11.971	34.850	47.664	2.911	47.119	47.119	0.732	1.018
0.610	0.610	12.442	37.152	47.691	2.986	47.138	47.138	0.749	1.025
0.620	0.620	12.914	39.513	47.718	3.060	47.157	47.157	0.766	1.031
0.630	0.630	13.385	41.931	47.746	3.133	47.175	47.175	0.783	1.037
0.640	0.640	13.857	44.407	47.773	3.205	47.194	47.194	0.800	1.043
0.650	0.650	14.329	46.939	47.801	3.276	47.213	47.213	0.817	1.048
0.660	0.660	14.801	49.526	47.828	3.346	47.231	47.231	0.834	1.054
0.670	0.670	15.274	52.169	47.855	3.416	47.250	47.250	0.851	1.059
0.680	0.680	15.752	54.120	48.916	3.436	48.310	48.310	0.864	1.061
0.690	0.690	16.240	56.137	49.976	3.457	49.371	49.371	0.876	1.063
0.700	0.700	16.739	58.221	51.037	3.478	50.431	50.431	0.888	1.064
0.710	0.710	17.249	60.371	52.097	3.500	51.491	51.491	0.901	1.066
0.720	0.720	17.769	62.590	53.158	3.522	52.552	52.552	0.913	1.068
0.730	0.730	18.300	64.877	54.218	3.545	53.612	53.612	0.925	1.070
0.740	0.740	18.841	67.234	55.279	3.568	54.672	54.672	0.938	1.072

Q(max) =
52.17 CFS
D = 0.67
E = 0.85<0.96

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.750	0.750	19.393	69.661	56.339	3.592	55.733	55.733	0.951	1.074
0.760	0.760	19.956	72.159	57.400	3.616	56.793	56.793	0.963	1.075
0.770	0.770	20.529	74.729	58.461	3.640	57.853	57.853	0.976	1.077
0.780	0.780	21.113	77.371	59.521	3.665	58.914	58.914	0.989	1.079
0.790	0.790	21.707	80.087	60.582	3.689	59.974	59.974	1.002	1.081
0.800	0.800	22.312	82.878	61.642	3.714	61.034	61.034	1.015	1.083
0.810	0.810	22.928	85.744	62.703	3.740	62.095	62.095	1.028	1.085
0.820	0.820	23.554	88.685	63.763	3.765	63.155	63.155	1.041	1.087
0.830	0.830	24.191	91.703	64.824	3.791	64.216	64.216	1.054	1.089
0.840	0.840	24.838	94.799	65.884	3.817	65.276	65.276	1.067	1.091
0.850	0.850	25.497	97.974	66.945	3.843	66.336	66.336	1.080	1.093
0.860	0.860	26.165	101.227	68.005	3.869	67.397	67.397	1.093	1.095
0.870	0.870	26.844	104.560	69.066	3.895	68.457	68.457	1.106	1.097
0.880	0.880	27.534	107.975	70.126	3.921	69.517	69.517	1.119	1.099
0.890	0.890	28.235	111.470	71.187	3.948	70.578	70.578	1.132	1.100
0.900	0.900	28.946	115.049	72.247	3.975	71.638	71.638	1.146	1.102
0.910	0.910	29.668	118.710	73.308	4.001	72.698	72.698	1.159	1.104
0.920	0.920	30.400	122.455	74.369	4.028	73.759	73.759	1.172	1.106
0.930	0.930	31.143	126.286	75.429	4.055	74.819	74.819	1.186	1.108
0.940	0.940	31.896	130.201	76.490	4.082	75.879	75.879	1.199	1.110
0.950	0.950	32.660	134.204	77.550	4.109	76.940	76.940	1.213	1.112

AP-1
AP-8

78' ROW 2% Cross Slope Road 1.2%

MANNING'S N = 0.017

SLOPE = 0.012

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.0	4.0	17.4	0.1	7.0	62.0	0.0
2.0	15.4	0.7	5.0	42.0	0.6	8.0	62.6	0.7
3.0	16.0	0.0	6.0	60.6	0.1	9.0	78.0	1.0

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.010	0.010	0.001	0.000	0.240	0.272	0.230	0.230	0.011	0.679
0.020	0.020	0.005	0.002	0.480	0.432	0.460	0.460	0.023	0.762
0.030	0.030	0.010	0.006	0.719	0.567	0.691	0.691	0.035	0.816
0.040	0.040	0.018	0.013	0.959	0.686	0.921	0.921	0.047	0.856
0.050	0.050	0.029	0.023	1.199	0.797	1.151	1.151	0.060	0.888
0.060	0.060	0.041	0.037	1.439	0.900	1.381	1.381	0.073	0.916
0.070	0.070	0.056	0.056	1.679	0.997	1.611	1.611	0.085	0.939
0.080	0.080	0.074	0.080	1.919	1.090	1.842	1.842	0.098	0.961
0.090	0.090	0.093	0.110	2.158	1.179	2.072	2.072	0.112	0.980
0.100	0.100	0.115	0.146	2.398	1.265	2.302	2.302	0.125	0.997
0.110	0.110	0.139	0.188	2.638	1.347	2.532	2.532	0.138	1.013
0.120	0.120	0.166	0.237	2.878	1.428	2.762	2.762	0.152	1.028
0.130	0.130	0.195	0.293	3.118	1.506	2.993	2.993	0.165	1.042
0.140	0.140	0.229	0.323	4.066	1.408	3.931	3.931	0.171	1.028
0.150	0.150	0.273	0.376	5.013	1.376	4.870	4.870	0.179	1.024
0.160	0.160	0.327	0.451	5.961	1.381	5.809	5.809	0.190	1.027
0.170	0.170	0.389	0.548	6.909	1.407	6.748	6.748	0.201	1.033
0.180	0.180	0.462	0.668	7.857	1.447	7.687	7.687	0.213	1.041
0.190	0.190	0.543	0.812	8.805	1.495	8.626	8.626	0.225	1.050
0.200	0.200	0.634	0.982	9.752	1.548	9.565	9.565	0.237	1.060
0.210	0.210	0.734	1.179	10.700	1.605	10.503	10.503	0.250	1.070
0.220	0.220	0.844	1.405	11.648	1.664	11.442	11.442	0.263	1.080
0.230	0.230	0.963	1.662	12.596	1.725	12.381	12.381	0.276	1.090
0.240	0.240	1.092	1.951	13.543	1.787	13.320	13.320	0.290	1.100
0.250	0.250	1.230	2.274	14.491	1.849	14.259	14.259	0.303	1.110
0.260	0.260	1.377	2.632	15.439	1.911	15.198	15.198	0.317	1.120
0.270	0.270	1.534	3.027	16.387	1.974	16.137	16.137	0.331	1.129
0.280	0.280	1.700	3.461	17.335	2.036	17.076	17.076	0.344	1.138
0.290	0.290	1.875	3.934	18.282	2.098	18.014	18.014	0.358	1.146
0.300	0.300	2.060	4.449	19.230	2.160	18.953	18.953	0.373	1.155
0.310	0.310	2.254	5.007	20.178	2.221	19.892	19.892	0.387	1.163
0.320	0.320	2.458	5.609	21.126	2.282	20.831	20.831	0.401	1.171
0.330	0.330	2.671	6.256	22.074	2.342	21.770	21.770	0.415	1.179

Inlet 8
Q = 3.87 CFS
D = 0.28<0.67
E = 0.66<0.96

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.340	0.340	2.893	6.951	23.021	2.402	22.709	22.709	0.430	1.187
0.350	0.350	3.125	7.694	23.969	2.462	23.648	23.648	0.444	1.194
0.360	0.360	3.366	8.486	24.917	2.521	24.587	24.587	0.459	1.201
0.370	0.370	3.617	9.330	25.865	2.580	25.525	25.525	0.474	1.208
0.380	0.380	3.877	10.226	26.812	2.638	26.464	26.464	0.488	1.215
0.390	0.390	4.146	11.175	27.760	2.695	27.403	27.403	0.503	1.222
0.400	0.400	4.425	12.179	28.708	2.753	28.342	28.342	0.518	1.228
0.410	0.410	4.713	13.240	29.656	2.809	29.281	29.281	0.533	1.235
0.420	0.420	5.010	14.358	30.604	2.866	30.220	30.220	0.548	1.241
0.430	0.430	5.317	15.534	31.551	2.921	31.159	31.159	0.563	1.247
0.440	0.440	5.633	16.770	32.499	2.977	32.097	32.097	0.578	1.253
0.450	0.450	5.959	18.067	33.447	3.032	33.036	33.036	0.593	1.259
0.460	0.460	6.294	19.427	34.395	3.086	33.975	33.975	0.608	1.264
0.470	0.470	6.639	20.849	35.343	3.141	34.914	34.914	0.623	1.270
0.480	0.480	6.992	22.337	36.290	3.194	35.853	35.853	0.639	1.275
0.490	0.490	7.356	23.890	37.238	3.248	36.792	36.792	0.654	1.281
0.500	0.500	7.728	25.509	38.186	3.301	37.731	37.731	0.669	1.286
0.510	0.510	8.110	27.197	39.134	3.353	38.670	38.670	0.685	1.291
0.520	0.520	8.502	28.954	40.081	3.406	39.608	39.608	0.700	1.296
0.530	0.530	8.902	30.781	41.029	3.458	40.547	40.547	0.716	1.301
0.540	0.540	9.313	32.679	41.977	3.509	41.486	41.486	0.732	1.306
0.550	0.550	9.732	34.650	42.925	3.560	42.425	42.425	0.747	1.311
0.560	0.560	10.161	36.695	43.873	3.611	43.364	43.364	0.763	1.315
0.570	0.570	10.599	38.814	44.820	3.662	44.303	44.303	0.779	1.320
0.580	0.580	11.047	41.008	45.768	3.712	45.242	45.242	0.794	1.324
0.590	0.590	11.504	43.280	46.716	3.762	46.181	46.181	0.810	1.329
0.600	0.600	11.971	45.629	47.664	3.812	47.119	47.119	0.826	1.333
0.610	0.610	12.442	48.644	47.691	3.910	47.138	47.138	0.848	1.342
0.620	0.620	12.914	51.735	47.718	4.006	47.157	47.157	0.870	1.350
0.630	0.630	13.385	54.901	47.746	4.102	47.175	47.175	0.892	1.358
0.640	0.640	13.857	58.142	47.773	4.196	47.194	47.194	0.914	1.365
0.650	0.650	14.329	61.457	47.801	4.289	47.213	47.213	0.936	1.373
0.660	0.660	14.801	64.845	47.828	4.381	47.231	47.231	0.959	1.380
0.670	0.670	15.274	68.305	47.855	4.472	47.250	47.250	0.981	1.387
0.680	0.680	15.752	70.860	48.916	4.499	48.310	48.310	0.995	1.389
0.690	0.690	16.240	73.501	49.976	4.526	49.371	49.371	1.009	1.391
0.700	0.700	16.739	76.229	51.037	4.554	50.431	50.431	1.023	1.394
0.710	0.710	17.249	79.045	52.097	4.583	51.491	51.491	1.037	1.396
0.720	0.720	17.769	81.949	53.158	4.612	52.552	52.552	1.051	1.398
0.730	0.730	18.300	84.944	54.218	4.642	53.612	53.612	1.065	1.401
0.740	0.740	18.841	88.030	55.279	4.672	54.672	54.672	1.080	1.403

Q(max) =
64.85 CFS
D = 0.66<0.67
E = 0.96

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.750	0.750	19.393	91.207	56.339	4.703	55.733	55.733	1.094	1.406
0.760	0.760	19.956	94.478	57.400	4.734	56.793	56.793	1.109	1.408
0.770	0.770	20.529	97.843	58.461	4.766	57.853	57.853	1.123	1.411
0.780	0.780	21.113	101.303	59.521	4.798	58.914	58.914	1.138	1.413
0.790	0.790	21.707	104.859	60.582	4.831	59.974	59.974	1.153	1.416
0.800	0.800	22.312	108.513	61.642	4.863	61.034	61.034	1.168	1.418
0.810	0.810	22.928	112.265	62.703	4.896	62.095	62.095	1.183	1.421
0.820	0.820	23.554	116.116	63.763	4.930	63.155	63.155	1.198	1.423
0.830	0.830	24.191	120.068	64.824	4.963	64.216	64.216	1.213	1.426
0.840	0.840	24.838	124.121	65.884	4.997	65.276	65.276	1.228	1.428
0.850	0.850	25.497	128.277	66.945	5.031	66.336	66.336	1.244	1.431
0.860	0.860	26.165	132.537	68.005	5.065	67.397	67.397	1.259	1.433
0.870	0.870	26.844	136.902	69.066	5.100	68.457	68.457	1.275	1.436
0.880	0.880	27.534	141.372	70.126	5.134	69.517	69.517	1.290	1.438
0.890	0.890	28.235	145.949	71.187	5.169	70.578	70.578	1.306	1.441
0.900	0.900	28.946	150.634	72.247	5.204	71.638	71.638	1.321	1.443
0.910	0.910	29.668	155.428	73.308	5.239	72.698	72.698	1.337	1.446
0.920	0.920	30.400	160.332	74.369	5.274	73.759	73.759	1.353	1.448
0.930	0.930	31.143	165.347	75.429	5.309	74.819	74.819	1.368	1.451
0.940	0.940	31.896	170.474	76.490	5.345	75.879	75.879	1.384	1.453
0.950	0.950	32.660	175.714	77.550	5.380	76.940	76.940	1.400	1.456

78' ROW 2% Cross Slope Road 1.5%

MANNING'S N = 0.017

SLOPE = 0.015

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.0	4.0	17.4	0.1	7.0	62.0	0.0
2.0	15.4	0.7	5.0	42.0	0.6	8.0	62.6	0.7
3.0	16.0	0.0	6.0	60.6	0.1	9.0	78.0	1.0

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.010	0.010	0.001	0.000	0.240	0.305	0.230	0.230	0.011	0.759
0.020	0.020	0.005	0.002	0.480	0.484	0.460	0.460	0.024	0.852
0.030	0.030	0.010	0.007	0.719	0.634	0.691	0.691	0.036	0.912
0.040	0.040	0.018	0.014	0.959	0.768	0.921	0.921	0.049	0.957
0.050	0.050	0.029	0.026	1.199	0.891	1.151	1.151	0.062	0.993
0.060	0.060	0.041	0.042	1.439	1.006	1.381	1.381	0.076	1.024
0.070	0.070	0.056	0.063	1.679	1.115	1.611	1.611	0.089	1.050
0.080	0.080	0.074	0.090	1.919	1.218	1.842	1.842	0.103	1.074
0.090	0.090	0.093	0.123	2.158	1.318	2.072	2.072	0.117	1.095
0.100	0.100	0.115	0.163	2.398	1.414	2.302	2.302	0.131	1.115
0.110	0.110	0.139	0.210	2.638	1.507	2.532	2.532	0.145	1.133
0.120	0.120	0.166	0.265	2.878	1.597	2.762	2.762	0.160	1.149
0.130	0.130	0.195	0.328	3.118	1.684	2.993	2.993	0.174	1.165
0.140	0.140	0.229	0.361	4.066	1.574	3.931	3.931	0.179	1.149
0.150	0.150	0.273	0.420	5.013	1.539	4.870	4.870	0.187	1.145
0.160	0.160	0.327	0.504	5.961	1.544	5.809	5.809	0.197	1.148
0.170	0.170	0.389	0.613	6.909	1.574	6.748	6.748	0.209	1.155
0.180	0.180	0.462	0.747	7.857	1.618	7.687	7.687	0.221	1.164
0.190	0.190	0.543	0.908	8.805	1.671	8.626	8.626	0.233	1.174
0.200	0.200	0.634	1.097	9.752	1.731	9.565	9.565	0.247	1.185
0.210	0.210	0.734	1.318	10.700	1.795	10.503	10.503	0.260	1.197
0.220	0.220	0.844	1.571	11.648	1.861	11.442	11.442	0.274	1.208
0.230	0.230	0.963	1.858	12.596	1.929	12.381	12.381	0.288	1.219
0.240	0.240	1.092	2.181	13.543	1.998	13.320	13.320	0.302	1.230
0.250	0.250	1.230	2.542	14.491	2.067	14.259	14.259	0.316	1.241
0.260	0.260	1.377	2.942	15.439	2.137	15.198	15.198	0.331	1.252
0.270	0.270	1.534	3.384	16.387	2.207	16.137	16.137	0.346	1.262
0.280	0.280	1.700	3.869	17.335	2.276	17.076	17.076	0.361	1.272
0.290	0.290	1.875	4.398	18.282	2.346	18.014	18.014	0.376	1.282
0.300	0.300	2.060	4.974	19.230	2.415	18.953	18.953	0.391	1.291
0.310	0.310	2.254	5.598	20.178	2.483	19.892	19.892	0.406	1.301
0.320	0.320	2.458	6.271	21.126	2.551	20.831	20.831	0.421	1.309
0.330	0.330	2.671	6.995	22.074	2.619	21.770	21.770	0.437	1.318

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.340	0.340	2.893	7.771	23.021	2.686	22.709	22.709	0.452	1.327
0.350	0.350	3.125	8.602	23.969	2.753	23.648	23.648	0.468	1.335
0.360	0.360	3.366	9.488	24.917	2.819	24.587	24.587	0.484	1.343
0.370	0.370	3.617	10.431	25.865	2.884	25.525	25.525	0.499	1.351
0.380	0.380	3.877	11.433	26.812	2.949	26.464	26.464	0.515	1.358
0.390	0.390	4.146	12.494	27.760	3.014	27.403	27.403	0.531	1.366
0.400	0.400	4.425	13.617	28.708	3.078	28.342	28.342	0.547	1.373
0.410	0.410	4.713	14.803	29.656	3.141	29.281	29.281	0.563	1.380
0.420	0.420	5.010	16.052	30.604	3.204	30.220	30.220	0.580	1.387
0.430	0.430	5.317	17.368	31.551	3.266	31.159	31.159	0.596	1.394
0.440	0.440	5.633	18.750	32.499	3.328	32.097	32.097	0.612	1.401
0.450	0.450	5.959	20.200	33.447	3.390	33.036	33.036	0.629	1.407
0.460	0.460	6.294	21.720	34.395	3.451	33.975	33.975	0.645	1.413
0.470	0.470	6.639	23.310	35.343	3.511	34.914	34.914	0.662	1.420
0.480	0.480	6.992	24.973	36.290	3.571	35.853	35.853	0.678	1.426
0.490	0.490	7.356	26.709	37.238	3.631	36.792	36.792	0.695	1.432
0.500	0.500	7.728	28.520	38.186	3.690	37.731	37.731	0.712	1.438
0.510	0.510	8.110	30.407	39.134	3.749	38.670	38.670	0.729	1.443
0.520	0.520	8.502	32.372	40.081	3.808	39.608	39.608	0.746	1.449
0.530	0.530	8.902	34.414	41.029	3.866	40.547	40.547	0.762	1.454
0.540	0.540	9.313	36.537	41.977	3.923	41.486	41.486	0.779	1.460
0.550	0.550	9.732	38.740	42.925	3.981	42.425	42.425	0.796	1.465
0.560	0.560	10.161	41.026	43.873	4.038	43.364	43.364	0.814	1.470
0.570	0.570	10.599	43.395	44.820	4.094	44.303	44.303	0.831	1.476
0.580	0.580	11.047	45.849	45.768	4.150	45.242	45.242	0.848	1.481
0.590	0.590	11.504	48.388	46.716	4.206	46.181	46.181	0.865	1.486
0.600	0.600	11.971	51.015	47.664	4.262	47.119	47.119	0.882	1.491
0.610	0.610	12.442	54.385	47.691	4.371	47.138	47.138	0.907	1.500
0.620	0.620	12.914	57.841	47.718	4.479	47.157	47.157	0.932	1.509
0.630	0.630	13.385	61.381	47.746	4.586	47.175	47.175	0.957	1.518
0.640	0.640	13.857	65.005	47.773	4.691	47.194	47.194	0.982	1.526
0.650	0.650	14.329	68.711	47.801	4.795	47.213	47.213	1.008	1.535
0.660	0.660	14.801	72.499	47.828	4.898	47.231	47.231	1.033	1.543
0.670	0.670	15.274	76.367	47.855	5.000	47.250	47.250	1.059	1.550
0.680	0.680	15.752	79.224	48.916	5.030	48.310	48.310	1.073	1.553
0.690	0.690	16.240	82.177	49.976	5.060	49.371	49.371	1.088	1.555
0.700	0.700	16.739	85.226	51.037	5.091	50.431	50.431	1.103	1.558
0.710	0.710	17.249	88.375	52.097	5.124	51.491	51.491	1.118	1.561
0.720	0.720	17.769	91.622	53.158	5.156	52.552	52.552	1.134	1.563
0.730	0.730	18.300	94.970	54.218	5.190	53.612	53.612	1.149	1.566
0.740	0.740	18.841	98.420	55.279	5.224	54.672	54.672	1.164	1.569

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.750	0.750	19.393	101.973	56.339	5.258	55.733	55.733	1.180	1.572
0.760	0.760	19.956	105.630	57.400	5.293	56.793	56.793	1.196	1.574
0.770	0.770	20.529	109.392	58.461	5.329	57.853	57.853	1.212	1.577
0.780	0.780	21.113	113.260	59.521	5.365	58.914	58.914	1.228	1.580
0.790	0.790	21.707	117.236	60.582	5.401	59.974	59.974	1.244	1.583
0.800	0.800	22.312	121.321	61.642	5.437	61.034	61.034	1.260	1.585
0.810	0.810	22.928	125.516	62.703	5.474	62.095	62.095	1.276	1.588
0.820	0.820	23.554	129.822	63.763	5.512	63.155	63.155	1.293	1.591
0.830	0.830	24.191	134.240	64.824	5.549	64.216	64.216	1.309	1.594
0.840	0.840	24.838	138.772	65.884	5.587	65.276	65.276	1.326	1.597
0.850	0.850	25.497	143.419	66.945	5.625	66.336	66.336	1.342	1.600
0.860	0.860	26.165	148.181	68.005	5.663	67.397	67.397	1.359	1.602
0.870	0.870	26.844	153.061	69.066	5.702	68.457	68.457	1.376	1.605
0.880	0.880	27.534	158.059	70.126	5.740	69.517	69.517	1.393	1.608
0.890	0.890	28.235	163.176	71.187	5.779	70.578	70.578	1.410	1.611
0.900	0.900	28.946	168.414	72.247	5.818	71.638	71.638	1.427	1.614
0.910	0.910	29.668	173.774	73.308	5.857	72.698	72.698	1.444	1.616
0.920	0.920	30.400	179.256	74.369	5.897	73.759	73.759	1.461	1.619
0.930	0.930	31.143	184.863	75.429	5.936	74.819	74.819	1.478	1.622
0.940	0.940	31.896	190.595	76.490	5.975	75.879	75.879	1.495	1.625
0.950	0.950	32.660	196.454	77.550	6.015	76.940	76.940	1.513	1.628

78' ROW 2% Cross Slope Road 1.7%

MANNING'S N = 0.017

SLOPE = 0.017

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.0	4.0	17.4	0.1	7.0	62.0	0.0
2.0	15.4	0.7	5.0	42.0	0.6	8.0	62.6	0.7
3.0	16.0	0.0	6.0	60.6	0.1	9.0	78.0	1.0

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.010	0.010	0.001	0.000	0.240	0.324	0.230	0.230	0.012	0.808
0.020	0.020	0.005	0.002	0.480	0.515	0.460	0.460	0.024	0.907
0.030	0.030	0.010	0.007	0.719	0.674	0.691	0.691	0.037	0.971
0.040	0.040	0.018	0.015	0.959	0.817	0.921	0.921	0.050	1.019
0.050	0.050	0.029	0.027	1.199	0.948	1.151	1.151	0.064	1.057
0.060	0.060	0.041	0.044	1.439	1.071	1.381	1.381	0.078	1.090
0.070	0.070	0.056	0.067	1.679	1.187	1.611	1.611	0.092	1.118
0.080	0.080	0.074	0.096	1.919	1.297	1.842	1.842	0.106	1.143
0.090	0.090	0.093	0.131	2.158	1.403	2.072	2.072	0.121	1.166
0.100	0.100	0.115	0.173	2.398	1.505	2.302	2.302	0.135	1.187
0.110	0.110	0.139	0.223	2.638	1.604	2.532	2.532	0.150	1.206
0.120	0.120	0.166	0.282	2.878	1.700	2.762	2.762	0.165	1.223
0.130	0.130	0.195	0.349	3.118	1.793	2.993	2.993	0.180	1.240
0.140	0.140	0.229	0.384	4.066	1.675	3.931	3.931	0.184	1.223
0.150	0.150	0.273	0.447	5.013	1.638	4.870	4.870	0.192	1.219
0.160	0.160	0.327	0.537	5.961	1.644	5.809	5.809	0.202	1.222
0.170	0.170	0.389	0.652	6.909	1.675	6.748	6.748	0.214	1.230
0.180	0.180	0.462	0.795	7.857	1.722	7.687	7.687	0.226	1.239
0.190	0.190	0.543	0.966	8.805	1.779	8.626	8.626	0.239	1.250
0.200	0.200	0.634	1.168	9.752	1.843	9.565	9.565	0.253	1.262
0.210	0.210	0.734	1.403	10.700	1.910	10.503	10.503	0.267	1.274
0.220	0.220	0.844	1.672	11.648	1.981	11.442	11.442	0.281	1.286
0.230	0.230	0.963	1.978	12.596	2.053	12.381	12.381	0.296	1.298
0.240	0.240	1.092	2.322	13.543	2.127	13.320	13.320	0.310	1.310
0.250	0.250	1.230	2.706	14.491	2.201	14.259	14.259	0.325	1.321
0.260	0.260	1.377	3.132	15.439	2.275	15.198	15.198	0.341	1.333
0.270	0.270	1.534	3.603	16.387	2.349	16.137	16.137	0.356	1.343
0.280	0.280	1.700	4.119	17.335	2.423	17.076	17.076	0.371	1.354
0.290	0.290	1.875	4.682	18.282	2.497	18.014	18.014	0.387	1.365
0.300	0.300	2.060	5.295	19.230	2.571	18.953	18.953	0.403	1.375
0.310	0.310	2.254	5.959	20.178	2.644	19.892	19.892	0.419	1.385
0.320	0.320	2.458	6.676	21.126	2.716	20.831	20.831	0.435	1.394
0.330	0.330	2.671	7.446	22.074	2.788	21.770	21.770	0.451	1.403

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.340	0.340	2.893	8.273	23.021	2.859	22.709	22.709	0.467	1.412
0.350	0.350	3.125	9.157	23.969	2.930	23.648	23.648	0.484	1.421
0.360	0.360	3.366	10.101	24.917	3.001	24.587	24.587	0.500	1.430
0.370	0.370	3.617	11.105	25.865	3.070	25.525	25.525	0.517	1.438
0.380	0.380	3.877	12.171	26.812	3.140	26.464	26.464	0.533	1.446
0.390	0.390	4.146	13.301	27.760	3.208	27.403	27.403	0.550	1.454
0.400	0.400	4.425	14.496	28.708	3.276	28.342	28.342	0.567	1.462
0.410	0.410	4.713	15.759	29.656	3.344	29.281	29.281	0.584	1.469
0.420	0.420	5.010	17.089	30.604	3.411	30.220	30.220	0.601	1.477
0.430	0.430	5.317	18.489	31.551	3.477	31.159	31.159	0.618	1.484
0.440	0.440	5.633	19.961	32.499	3.543	32.097	32.097	0.635	1.491
0.450	0.450	5.959	21.504	33.447	3.609	33.036	33.036	0.653	1.498
0.460	0.460	6.294	23.122	34.395	3.674	33.975	33.975	0.670	1.505
0.470	0.470	6.639	24.816	35.343	3.738	34.914	34.914	0.687	1.511
0.480	0.480	6.992	26.586	36.290	3.802	35.853	35.853	0.705	1.518
0.490	0.490	7.356	28.434	37.238	3.866	36.792	36.792	0.722	1.524
0.500	0.500	7.728	30.362	38.186	3.929	37.731	37.731	0.740	1.530
0.510	0.510	8.110	32.371	39.134	3.991	38.670	38.670	0.758	1.536
0.520	0.520	8.502	34.462	40.081	4.054	39.608	39.608	0.776	1.542
0.530	0.530	8.902	36.637	41.029	4.115	40.547	40.547	0.793	1.548
0.540	0.540	9.313	38.896	41.977	4.177	41.486	41.486	0.811	1.554
0.550	0.550	9.732	41.242	42.925	4.238	42.425	42.425	0.829	1.560
0.560	0.560	10.161	43.675	43.873	4.298	43.364	43.364	0.847	1.565
0.570	0.570	10.599	46.198	44.820	4.358	44.303	44.303	0.865	1.571
0.580	0.580	11.047	48.810	45.768	4.418	45.242	45.242	0.884	1.576
0.590	0.590	11.504	51.513	46.716	4.478	46.181	46.181	0.902	1.582
0.600	0.600	11.971	54.309	47.664	4.537	47.119	47.119	0.920	1.587
0.610	0.610	12.442	57.897	47.691	4.653	47.138	47.138	0.947	1.597
0.620	0.620	12.914	61.576	47.718	4.768	47.157	47.157	0.974	1.606
0.630	0.630	13.385	65.345	47.746	4.882	47.175	47.175	1.001	1.616
0.640	0.640	13.857	69.203	47.773	4.994	47.194	47.194	1.028	1.625
0.650	0.650	14.329	73.148	47.801	5.105	47.213	47.213	1.055	1.634
0.660	0.660	14.801	77.181	47.828	5.214	47.231	47.231	1.083	1.642
0.670	0.670	15.274	81.299	47.855	5.323	47.250	47.250	1.111	1.650
0.680	0.680	15.752	84.340	48.916	5.354	48.310	48.310	1.126	1.653
0.690	0.690	16.240	87.484	49.976	5.387	49.371	49.371	1.141	1.656
0.700	0.700	16.739	90.730	51.037	5.420	50.431	50.431	1.157	1.659
0.710	0.710	17.249	94.082	52.097	5.454	51.491	51.491	1.173	1.661
0.720	0.720	17.769	97.539	53.158	5.489	52.552	52.552	1.189	1.664
0.730	0.730	18.300	101.104	54.218	5.525	53.612	53.612	1.205	1.667
0.740	0.740	18.841	104.776	55.279	5.561	54.672	54.672	1.221	1.670

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.750	0.750	19.393	108.558	56.339	5.598	55.733	55.733	1.237	1.673
0.760	0.760	19.956	112.451	57.400	5.635	56.793	56.793	1.254	1.676
0.770	0.770	20.529	116.456	58.461	5.673	57.853	57.853	1.271	1.679
0.780	0.780	21.113	120.575	59.521	5.711	58.914	58.914	1.287	1.682
0.790	0.790	21.707	124.807	60.582	5.750	59.974	59.974	1.304	1.685
0.800	0.800	22.312	129.156	61.642	5.789	61.034	61.034	1.321	1.688
0.810	0.810	22.928	133.622	62.703	5.828	62.095	62.095	1.338	1.691
0.820	0.820	23.554	138.206	63.763	5.868	63.155	63.155	1.356	1.694
0.830	0.830	24.191	142.909	64.824	5.908	64.216	64.216	1.373	1.697
0.840	0.840	24.838	147.734	65.884	5.948	65.276	65.276	1.390	1.700
0.850	0.850	25.497	152.681	66.945	5.988	66.336	66.336	1.408	1.703
0.860	0.860	26.165	157.751	68.005	6.029	67.397	67.397	1.425	1.706
0.870	0.870	26.844	162.946	69.066	6.070	68.457	68.457	1.443	1.709
0.880	0.880	27.534	168.266	70.126	6.111	69.517	69.517	1.461	1.712
0.890	0.890	28.235	173.714	71.187	6.152	70.578	70.578	1.479	1.715
0.900	0.900	28.946	179.290	72.247	6.194	71.638	71.638	1.497	1.718
0.910	0.910	29.668	184.996	73.308	6.236	72.698	72.698	1.515	1.721
0.920	0.920	30.400	190.833	74.369	6.277	73.759	73.759	1.533	1.724
0.930	0.930	31.143	196.802	75.429	6.319	74.819	74.819	1.551	1.727
0.940	0.940	31.896	202.904	76.490	6.361	75.879	75.879	1.569	1.730
0.950	0.950	32.660	209.141	77.550	6.404	76.940	76.940	1.588	1.733

AP-10
AP-14

80' ROW 2% Cross Slope Road 0.5%

MANNING'S N = 0.017

SLOPE = 0.005

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.0	4.0	17.4	0.1	7.0	64.0	0.0
2.0	15.4	0.7	5.0	40.0	0.6	8.0	64.6	0.7
3.0	16.0	0.0	6.0	62.6	0.1	9.0	80.0	1.0

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.010	0.010	0.001	0.000	0.240	0.176	0.230	0.230	0.010	0.438
0.020	0.020	0.005	0.001	0.480	0.279	0.460	0.460	0.021	0.492
0.030	0.030	0.010	0.004	0.719	0.366	0.691	0.691	0.032	0.527
0.040	0.040	0.018	0.008	0.959	0.443	0.921	0.921	0.043	0.552
0.050	0.050	0.029	0.015	1.199	0.514	1.151	1.151	0.054	0.573
0.060	0.060	0.041	0.024	1.439	0.581	1.381	1.381	0.065	0.591
0.070	0.070	0.056	0.036	1.679	0.644	1.611	1.611	0.076	0.606
0.080	0.080	0.074	0.052	1.919	0.703	1.842	1.842	0.088	0.620
0.090	0.090	0.093	0.071	2.158	0.761	2.072	2.072	0.099	0.632
0.100	0.100	0.115	0.094	2.398	0.816	2.302	2.302	0.110	0.644
0.110	0.110	0.139	0.121	2.638	0.870	2.532	2.532	0.122	0.654
0.120	0.120	0.166	0.153	2.878	0.922	2.762	2.762	0.133	0.663
0.130	0.130	0.195	0.189	3.118	0.972	2.993	2.993	0.145	0.672
0.140	0.140	0.230	0.205	4.198	0.891	4.064	4.064	0.152	0.661
0.150	0.150	0.276	0.238	5.278	0.864	5.135	5.135	0.162	0.657
0.160	0.160	0.332	0.287	6.357	0.864	6.205	6.205	0.172	0.658
0.170	0.170	0.400	0.352	7.437	0.881	7.276	7.276	0.182	0.662
0.180	0.180	0.478	0.433	8.517	0.906	8.347	8.347	0.193	0.668
0.190	0.190	0.567	0.531	9.597	0.937	9.418	9.418	0.204	0.674
0.200	0.200	0.666	0.648	10.677	0.973	10.489	10.489	0.215	0.680
0.210	0.210	0.777	0.784	11.757	1.010	11.560	11.560	0.226	0.687
0.220	0.220	0.898	0.942	12.837	1.049	12.631	12.631	0.237	0.694
0.230	0.230	1.029	1.121	13.916	1.089	13.702	13.702	0.248	0.701
0.240	0.240	1.172	1.323	14.996	1.130	14.773	14.773	0.260	0.707
0.250	0.250	1.325	1.551	16.076	1.170	15.844	15.844	0.271	0.714
0.260	0.260	1.489	1.803	17.156	1.211	16.915	16.915	0.283	0.720
0.270	0.270	1.663	2.083	18.236	1.252	17.986	17.986	0.294	0.726
0.280	0.280	1.848	2.390	19.316	1.293	19.057	19.057	0.306	0.732
0.290	0.290	2.044	2.726	20.396	1.334	20.128	20.128	0.318	0.738
0.300	0.300	2.251	3.093	21.476	1.374	21.199	21.199	0.329	0.743
0.310	0.310	2.468	3.490	22.555	1.414	22.270	22.270	0.341	0.749
0.320	0.320	2.696	3.920	23.635	1.454	23.341	23.341	0.353	0.754
0.330	0.330	2.935	4.383	24.715	1.493	24.412	24.412	0.365	0.759

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.340	0.340	3.184	4.880	25.795	1.532	25.483	25.483	0.377	0.764
0.350	0.350	3.445	5.413	26.875	1.571	26.554	26.554	0.388	0.769
0.360	0.360	3.716	5.981	27.955	1.610	27.625	27.625	0.400	0.774
0.370	0.370	3.997	6.587	29.035	1.648	28.696	28.696	0.412	0.778
0.380	0.380	4.289	7.231	30.114	1.686	29.767	29.767	0.424	0.783
0.390	0.390	4.592	7.914	31.194	1.723	30.838	30.838	0.436	0.787
0.400	0.400	4.906	8.638	32.274	1.761	31.909	31.909	0.448	0.792
0.410	0.410	5.231	9.402	33.354	1.797	32.980	32.980	0.460	0.796
0.420	0.420	5.566	10.208	34.434	1.834	34.051	34.051	0.472	0.800
0.430	0.430	5.912	11.057	35.514	1.870	35.122	35.122	0.484	0.804
0.440	0.440	6.268	11.950	36.594	1.906	36.193	36.193	0.497	0.808
0.450	0.450	6.636	12.887	37.674	1.942	37.264	37.264	0.509	0.811
0.460	0.460	7.014	13.870	38.753	1.978	38.335	38.335	0.521	0.815
0.470	0.470	7.402	14.899	39.833	2.013	39.406	39.406	0.533	0.819
0.480	0.480	7.802	15.976	40.913	2.048	40.477	40.477	0.545	0.822
0.490	0.490	8.212	17.100	41.993	2.082	41.548	41.548	0.557	0.826
0.500	0.500	8.633	18.274	43.073	2.117	42.619	42.619	0.570	0.829
0.510	0.510	9.064	19.497	44.153	2.151	43.690	43.690	0.582	0.833
0.520	0.520	9.506	20.771	45.233	2.185	44.761	44.761	0.594	0.836
0.530	0.530	9.959	22.096	46.312	2.219	45.832	45.832	0.607	0.839
0.540	0.540	10.423	23.473	47.392	2.252	46.903	46.903	0.619	0.842
0.550	0.550	10.897	24.904	48.472	2.285	47.974	47.974	0.631	0.845
0.560	0.560	11.383	26.388	49.552	2.318	49.045	49.045	0.644	0.848
0.570	0.570	11.873	28.300	49.579	2.384	49.063	49.063	0.658	0.854
0.580	0.580	12.364	30.265	49.607	2.448	49.082	49.082	0.673	0.860
0.590	0.590	12.855	32.283	49.634	2.511	49.101	49.101	0.688	0.865
0.600	0.600	13.346	34.352	49.662	2.574	49.119	49.119	0.703	0.871
0.610	0.610	13.837	36.472	49.689	2.636	49.138	49.138	0.718	0.876
0.620	0.620	14.329	38.642	49.716	2.697	49.157	49.157	0.733	0.881
0.630	0.630	14.820	40.862	49.744	2.757	49.175	49.175	0.748	0.885
0.640	0.640	15.312	43.132	49.771	2.817	49.194	49.194	0.763	0.890
0.650	0.650	15.804	45.450	49.798	2.876	49.213	49.213	0.779	0.895
0.660	0.660	16.296	47.816	49.826	2.934	49.231	49.231	0.794	0.899
0.670	0.670	16.789	50.229	49.853	2.992	49.250	49.250	0.809	0.903
0.680	0.680	17.287	52.001	50.913	3.008	50.310	50.310	0.821	0.905
0.690	0.690	17.795	53.830	51.974	3.025	51.371	51.371	0.832	0.906
0.700	0.700	18.314	55.717	53.035	3.042	52.431	52.431	0.844	0.908
0.710	0.710	18.844	57.662	54.095	3.060	53.491	53.491	0.856	0.909
0.720	0.720	19.384	59.666	55.156	3.078	54.552	54.552	0.867	0.910
0.730	0.730	19.935	61.730	56.216	3.097	55.612	55.612	0.879	0.912
0.740	0.740	20.496	63.854	57.277	3.115	56.672	56.672	0.891	0.913

Q(max) =
50.23 CFS
D = 0.67
E = 0.81<0.96

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.750	0.750	21.068	66.039	58.337	3.135	57.733	57.733	0.903	0.915
0.760	0.760	21.651	68.285	59.398	3.154	58.793	58.793	0.915	0.916
0.770	0.770	22.244	70.594	60.458	3.174	59.853	59.853	0.927	0.918
0.780	0.780	22.848	72.966	61.519	3.194	60.914	60.914	0.939	0.919
0.790	0.790	23.462	75.402	62.579	3.214	61.974	61.974	0.951	0.921
0.800	0.800	24.087	77.902	63.640	3.234	63.034	63.034	0.963	0.922
0.810	0.810	24.723	80.467	64.700	3.255	64.095	64.095	0.975	0.924
0.820	0.820	25.369	83.097	65.761	3.276	65.155	65.155	0.987	0.925
0.830	0.830	26.026	85.794	66.821	3.296	66.216	66.216	0.999	0.927
0.840	0.840	26.693	88.558	67.882	3.318	67.276	67.276	1.011	0.929
0.850	0.850	27.372	91.389	68.943	3.339	68.336	68.336	1.023	0.930
0.860	0.860	28.060	94.289	70.003	3.360	69.397	69.397	1.036	0.932
0.870	0.870	28.759	97.258	71.064	3.382	70.457	70.457	1.048	0.933
0.880	0.880	29.469	100.296	72.124	3.403	71.517	71.517	1.060	0.935
0.890	0.890	30.190	103.405	73.185	3.425	72.578	72.578	1.072	0.936
0.900	0.900	30.921	106.585	74.245	3.447	73.638	73.638	1.085	0.938
0.910	0.910	31.663	109.836	75.306	3.469	74.698	74.698	1.097	0.939
0.920	0.920	32.415	113.160	76.366	3.491	75.759	75.759	1.110	0.941
0.930	0.930	33.178	116.557	77.427	3.513	76.819	76.819	1.122	0.942
0.940	0.940	33.951	120.027	78.487	3.535	77.879	77.879	1.134	0.944
0.950	0.950	34.735	123.572	79.548	3.558	78.940	78.940	1.147	0.945

AP-13

80' ROW 2% Cross Slope Road 0.6%

MANNING'S N = 0.017

SLOPE = 0.006

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.0	4.0	17.4	0.1	7.0	64.0	0.0
2.0	15.4	0.7	5.0	40.0	0.6	8.0	64.6	0.7
3.0	16.0	0.0	6.0	62.6	0.1	9.0	80.0	1.0

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.010	0.010	0.001	0.000	0.240	0.193	0.230	0.230	0.011	0.480
0.020	0.020	0.005	0.001	0.480	0.306	0.460	0.460	0.021	0.539
0.030	0.030	0.010	0.004	0.719	0.401	0.691	0.691	0.032	0.577
0.040	0.040	0.018	0.009	0.959	0.485	0.921	0.921	0.044	0.605
0.050	0.050	0.029	0.016	1.199	0.563	1.151	1.151	0.055	0.628
0.060	0.060	0.041	0.026	1.439	0.636	1.381	1.381	0.066	0.647
0.070	0.070	0.056	0.040	1.679	0.705	1.611	1.611	0.078	0.664
0.080	0.080	0.074	0.057	1.919	0.771	1.842	1.842	0.089	0.679
0.090	0.090	0.093	0.078	2.158	0.834	2.072	2.072	0.101	0.693
0.100	0.100	0.115	0.103	2.398	0.894	2.302	2.302	0.112	0.705
0.110	0.110	0.139	0.133	2.638	0.953	2.532	2.532	0.124	0.716
0.120	0.120	0.166	0.167	2.878	1.010	2.762	2.762	0.136	0.727
0.130	0.130	0.195	0.207	3.118	1.065	2.993	2.993	0.148	0.736
0.140	0.140	0.230	0.224	4.198	0.976	4.064	4.064	0.155	0.724
0.150	0.150	0.276	0.261	5.278	0.946	5.135	5.135	0.164	0.720
0.160	0.160	0.332	0.315	6.357	0.947	6.205	6.205	0.174	0.721
0.170	0.170	0.400	0.386	7.437	0.965	7.276	7.276	0.184	0.725
0.180	0.180	0.478	0.474	8.517	0.993	8.347	8.347	0.195	0.731
0.190	0.190	0.567	0.582	9.597	1.027	9.418	9.418	0.206	0.738
0.200	0.200	0.666	0.710	10.677	1.065	10.489	10.489	0.218	0.745
0.210	0.210	0.777	0.859	11.757	1.106	11.560	11.560	0.229	0.753
0.220	0.220	0.898	1.032	12.837	1.149	12.631	12.631	0.241	0.760
0.230	0.230	1.029	1.228	13.916	1.193	13.702	13.702	0.252	0.767
0.240	0.240	1.172	1.450	14.996	1.237	14.773	14.773	0.264	0.775
0.250	0.250	1.325	1.699	16.076	1.282	15.844	15.844	0.276	0.782
0.260	0.260	1.489	1.975	17.156	1.327	16.915	16.915	0.287	0.789
0.270	0.270	1.663	2.281	18.236	1.372	17.986	17.986	0.299	0.795
0.280	0.280	1.848	2.618	19.316	1.416	19.057	19.057	0.311	0.802
0.290	0.290	2.044	2.986	20.396	1.461	20.128	20.128	0.323	0.808
0.300	0.300	2.251	3.388	21.476	1.505	21.199	21.199	0.335	0.814
0.310	0.310	2.468	3.823	22.555	1.549	22.270	22.270	0.347	0.820
0.320	0.320	2.696	4.294	23.635	1.593	23.341	23.341	0.359	0.826
0.330	0.330	2.935	4.801	24.715	1.636	24.412	24.412	0.372	0.832

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.340	0.340	3.184	5.346	25.795	1.679	25.483	25.483	0.384	0.837
0.350	0.350	3.445	5.929	26.875	1.721	26.554	26.554	0.396	0.843
0.360	0.360	3.716	6.552	27.955	1.763	27.625	27.625	0.408	0.848
0.370	0.370	3.997	7.216	29.035	1.805	28.696	28.696	0.421	0.853
0.380	0.380	4.289	7.921	30.114	1.847	29.767	29.767	0.433	0.858
0.390	0.390	4.592	8.670	31.194	1.888	30.838	30.838	0.445	0.862
0.400	0.400	4.906	9.462	32.274	1.929	31.909	31.909	0.458	0.867
0.410	0.410	5.231	10.299	33.354	1.969	32.980	32.980	0.470	0.872
0.420	0.420	5.566	11.182	34.434	2.009	34.051	34.051	0.483	0.876
0.430	0.430	5.912	12.113	35.514	2.049	35.122	35.122	0.495	0.880
0.440	0.440	6.268	13.090	36.594	2.088	36.193	36.193	0.508	0.885
0.450	0.450	6.636	14.117	37.674	2.128	37.264	37.264	0.520	0.889
0.460	0.460	7.014	15.194	38.753	2.166	38.335	38.335	0.533	0.893
0.470	0.470	7.402	16.321	39.833	2.205	39.406	39.406	0.546	0.897
0.480	0.480	7.802	17.500	40.913	2.243	40.477	40.477	0.558	0.901
0.490	0.490	8.212	18.732	41.993	2.281	41.548	41.548	0.571	0.905
0.500	0.500	8.633	20.018	43.073	2.319	42.619	42.619	0.584	0.908
0.510	0.510	9.064	21.358	44.153	2.356	43.690	43.690	0.596	0.912
0.520	0.520	9.506	22.753	45.233	2.393	44.761	44.761	0.609	0.916
0.530	0.530	9.959	24.205	46.312	2.430	45.832	45.832	0.622	0.919
0.540	0.540	10.423	25.714	47.392	2.467	46.903	46.903	0.635	0.923
0.550	0.550	10.897	27.281	48.472	2.503	47.974	47.974	0.647	0.926
0.560	0.560	11.383	28.907	49.552	2.540	49.045	49.045	0.660	0.929
0.570	0.570	11.873	31.002	49.579	2.611	49.063	49.063	0.676	0.936
0.580	0.580	12.364	33.154	49.607	2.682	49.082	49.082	0.692	0.942
0.590	0.590	12.855	35.364	49.634	2.751	49.101	49.101	0.708	0.948
0.600	0.600	13.346	37.631	49.662	2.820	49.119	49.119	0.724	0.954
0.610	0.610	13.837	39.953	49.689	2.887	49.138	49.138	0.740	0.959
0.620	0.620	14.329	42.330	49.716	2.954	49.157	49.157	0.756	0.965
0.630	0.630	14.820	44.762	49.744	3.020	49.175	49.175	0.772	0.970
0.640	0.640	15.312	47.248	49.771	3.086	49.194	49.194	0.788	0.975
0.650	0.650	15.804	49.787	49.798	3.150	49.213	49.213	0.804	0.980
0.660	0.660	16.296	52.379	49.826	3.214	49.231	49.231	0.821	0.985
0.670	0.670	16.789	55.024	49.853	3.277	49.250	49.250	0.837	0.990
0.680	0.680	17.287	56.964	50.913	3.295	50.310	50.310	0.849	0.991
0.690	0.690	17.795	58.968	51.974	3.314	51.371	51.371	0.861	0.993
0.700	0.700	18.314	61.035	53.035	3.333	52.431	52.431	0.873	0.994
0.710	0.710	18.844	63.165	54.095	3.352	53.491	53.491	0.885	0.996
0.720	0.720	19.384	65.361	55.156	3.372	54.552	54.552	0.897	0.997
0.730	0.730	19.935	67.621	56.216	3.392	55.612	55.612	0.909	0.999
0.740	0.740	20.496	69.948	57.277	3.413	56.672	56.672	0.921	1.000

Q(max) =
55.02 CFS
D = 0.67
E = 0.84<0.96

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.750	0.750	21.068	72.342	58.337	3.434	57.733	57.733	0.933	1.002
0.760	0.760	21.651	74.803	59.398	3.455	58.793	58.793	0.946	1.004
0.770	0.770	22.244	77.332	60.458	3.477	59.853	59.853	0.958	1.005
0.780	0.780	22.848	79.931	61.519	3.498	60.914	60.914	0.970	1.007
0.790	0.790	23.462	82.599	62.579	3.520	61.974	61.974	0.983	1.009
0.800	0.800	24.087	85.337	63.640	3.543	63.034	63.034	0.995	1.010
0.810	0.810	24.723	88.147	64.700	3.565	64.095	64.095	1.008	1.012
0.820	0.820	25.369	91.028	65.761	3.588	65.155	65.155	1.020	1.014
0.830	0.830	26.026	93.982	66.821	3.611	66.216	66.216	1.033	1.015
0.840	0.840	26.693	97.010	67.882	3.634	67.276	67.276	1.045	1.017
0.850	0.850	27.372	100.112	68.943	3.658	68.336	68.336	1.058	1.019
0.860	0.860	28.060	103.288	70.003	3.681	69.397	69.397	1.071	1.021
0.870	0.870	28.759	106.540	71.064	3.705	70.457	70.457	1.083	1.022
0.880	0.880	29.469	109.869	72.124	3.728	71.517	71.517	1.096	1.024
0.890	0.890	30.190	113.274	73.185	3.752	72.578	72.578	1.109	1.026
0.900	0.900	30.921	116.758	74.245	3.776	73.638	73.638	1.122	1.027
0.910	0.910	31.663	120.320	75.306	3.800	74.698	74.698	1.135	1.029
0.920	0.920	32.415	123.961	76.366	3.824	75.759	75.759	1.147	1.031
0.930	0.930	33.178	127.682	77.427	3.848	76.819	76.819	1.160	1.032
0.940	0.940	33.951	131.483	78.487	3.873	77.879	77.879	1.173	1.034
0.950	0.950	34.735	135.367	79.548	3.897	78.940	78.940	1.186	1.036

AP-16
AP-17
AP-18
AP-19
AP-20

152' ROW 2% Cross Slope Road 0.6%

MANNING'S N = 0.017

SLOPE = 0.006

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	1.0	6.0	54.0	0.6	11.0	136.6	0.1
2.0	17.4	0.7	7.0	54.5	1.3	12.0	138.0	0.0
3.0	18.0	0.0	8.0	101.5	1.3	13.0	138.6	0.7
4.0	19.4	0.1	9.0	102.0	0.6	14.0	152.0	0.9
5.0	51.9	0.5	10.0	104.1	0.5			

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.010	0.010	0.001	0.000	0.240	0.193	47.150	0.230	0.011	0.480
0.020	0.020	0.005	0.001	0.480	0.306	47.380	0.460	0.021	0.539
0.030	0.030	0.010	0.004	0.719	0.401	47.611	0.691	0.032	0.577
0.040	0.040	0.018	0.009	0.959	0.485	47.841	0.921	0.044	0.605
0.050	0.050	0.029	0.016	1.199	0.563	48.071	1.151	0.055	0.628
0.060	0.060	0.041	0.026	1.439	0.636	48.301	1.381	0.066	0.647
0.070	0.070	0.056	0.040	1.679	0.705	48.531	1.611	0.078	0.664
0.080	0.080	0.074	0.057	1.919	0.771	48.762	1.842	0.089	0.679
0.090	0.090	0.093	0.078	2.158	0.834	48.992	2.072	0.101	0.693
0.100	0.100	0.115	0.103	2.398	0.894	49.222	2.302	0.112	0.705
0.110	0.110	0.139	0.133	2.638	0.953	49.452	2.532	0.124	0.716
0.120	0.120	0.166	0.167	2.878	1.010	49.682	2.762	0.136	0.727
0.130	0.130	0.195	0.207	3.118	1.065	49.913	2.993	0.148	0.736
0.140	0.140	0.232	0.211	4.733	0.908	51.519	4.599	0.153	0.712
0.150	0.150	0.286	0.246	6.348	0.858	53.125	6.205	0.161	0.704
0.160	0.160	0.357	0.304	7.963	0.854	54.731	7.811	0.171	0.705
0.170	0.170	0.443	0.386	9.578	0.872	56.337	9.417	0.182	0.709
0.180	0.180	0.545	0.492	11.193	0.903	57.944	11.024	0.193	0.716
0.190	0.190	0.663	0.624	12.808	0.941	59.550	12.630	0.204	0.724
0.200	0.200	0.798	0.784	14.423	0.983	61.156	14.236	0.215	0.732
0.210	0.210	0.948	0.974	16.038	1.027	62.762	15.842	0.226	0.740
0.220	0.220	1.114	1.196	17.653	1.073	64.368	17.448	0.238	0.749
0.230	0.230	1.297	1.453	19.268	1.120	65.975	19.055	0.250	0.757
0.240	0.240	1.495	1.746	20.883	1.168	67.581	20.661	0.261	0.765
0.250	0.250	1.710	2.078	22.498	1.215	69.187	22.267	0.273	0.773
0.260	0.260	1.941	2.450	24.113	1.262	70.793	23.873	0.285	0.780
0.270	0.270	2.188	2.864	25.728	1.309	72.400	25.480	0.297	0.788
0.280	0.280	2.450	3.323	27.343	1.356	74.006	27.086	0.309	0.795
0.290	0.290	2.729	3.827	28.958	1.402	75.612	28.692	0.321	0.802
0.300	0.300	3.024	4.380	30.573	1.448	77.218	30.298	0.333	0.808
0.310	0.310	3.335	4.982	32.189	1.494	78.824	31.904	0.345	0.814
0.320	0.320	3.662	5.635	33.804	1.539	80.431	33.511	0.357	0.821

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.330	0.330	4.005	6.342	35.419	1.583	82.037	35.117	0.369	0.827
0.340	0.340	4.365	7.104	37.034	1.628	83.643	36.723	0.381	0.832
0.350	0.350	4.740	7.922	38.649	1.671	85.249	38.329	0.393	0.838
0.360	0.360	5.131	8.798	40.264	1.715	86.856	39.936	0.406	0.843
0.370	0.370	5.539	9.735	41.879	1.758	88.462	41.542	0.418	0.849
0.380	0.380	5.962	10.732	43.494	1.800	90.068	43.148	0.430	0.854
0.390	0.390	6.402	11.793	45.109	1.842	91.674	44.754	0.443	0.859
0.400	0.400	6.857	12.918	46.724	1.884	93.280	46.360	0.455	0.864
0.410	0.410	7.329	14.109	48.339	1.925	94.887	47.967	0.468	0.868
0.420	0.420	7.816	15.368	49.954	1.966	96.493	49.573	0.480	0.873
0.430	0.430	8.320	16.696	51.569	2.007	98.099	51.179	0.493	0.877
0.440	0.440	8.840	18.095	53.184	2.047	99.705	52.785	0.505	0.882
0.450	0.450	9.376	19.565	54.799	2.087	101.312	54.392	0.518	0.886
0.460	0.460	9.928	21.110	56.414	2.126	102.918	55.998	0.530	0.890
0.470	0.470	10.496	22.729	58.029	2.166	104.524	57.604	0.543	0.894
0.480	0.480	11.080	24.425	59.644	2.204	106.130	59.210	0.556	0.898
0.490	0.490	11.680	26.199	61.259	2.243	107.736	60.816	0.568	0.902
0.500	0.500	12.296	28.051	62.874	2.281	109.343	62.423	0.581	0.906
0.510	0.510	12.929	29.985	64.489	2.319	110.949	64.029	0.594	0.910
0.520	0.520	13.577	32.001	66.104	2.357	112.555	65.635	0.606	0.914
0.530	0.530	14.241	34.100	67.719	2.394	114.161	67.241	0.619	0.917
0.540	0.540	14.922	36.284	69.334	2.432	115.767	68.847	0.632	0.921
0.550	0.550	15.614	38.862	70.055	2.489	116.479	69.559	0.646	0.926
0.560	0.560	16.313	41.521	70.776	2.545	117.191	70.271	0.661	0.931
0.570	0.570	17.019	44.261	71.497	2.601	117.903	70.983	0.675	0.936
0.580	0.580	17.733	47.080	72.218	2.655	118.615	71.695	0.690	0.941
0.590	0.590	18.453	49.979	72.939	2.708	119.327	72.407	0.704	0.946
0.600	0.600	19.181	52.958	73.660	2.761	120.039	73.119	0.719	0.950
0.610	0.610	19.912	56.339	73.713	2.829	120.074	73.154	0.735	0.956
0.620	0.620	20.644	59.803	73.766	2.897	120.108	73.188	0.751	0.962
0.630	0.630	21.376	63.349	73.818	2.964	120.142	73.222	0.767	0.967
0.640	0.640	22.108	66.976	73.871	3.029	120.177	73.257	0.783	0.972
0.650	0.650	22.841	70.683	73.924	3.095	120.211	73.291	0.799	0.977
0.660	0.660	23.574	74.469	73.977	3.159	120.245	73.325	0.815	0.982
0.670	0.670	24.307	78.333	74.029	3.223	120.280	73.360	0.832	0.987
0.680	0.680	25.046	81.584	75.061	3.257	121.302	74.382	0.845	0.990
0.690	0.690	25.795	84.914	76.093	3.292	122.324	75.404	0.859	0.992
0.700	0.700	26.554	88.322	77.125	3.326	123.346	76.426	0.872	0.995
0.710	0.710	27.324	91.811	78.157	3.360	124.368	77.448	0.886	0.997
0.720	0.720	28.103	95.381	79.189	3.394	125.390	78.470	0.899	1.000
0.730	0.730	28.893	99.032	80.221	3.428	126.412	79.492	0.913	1.002

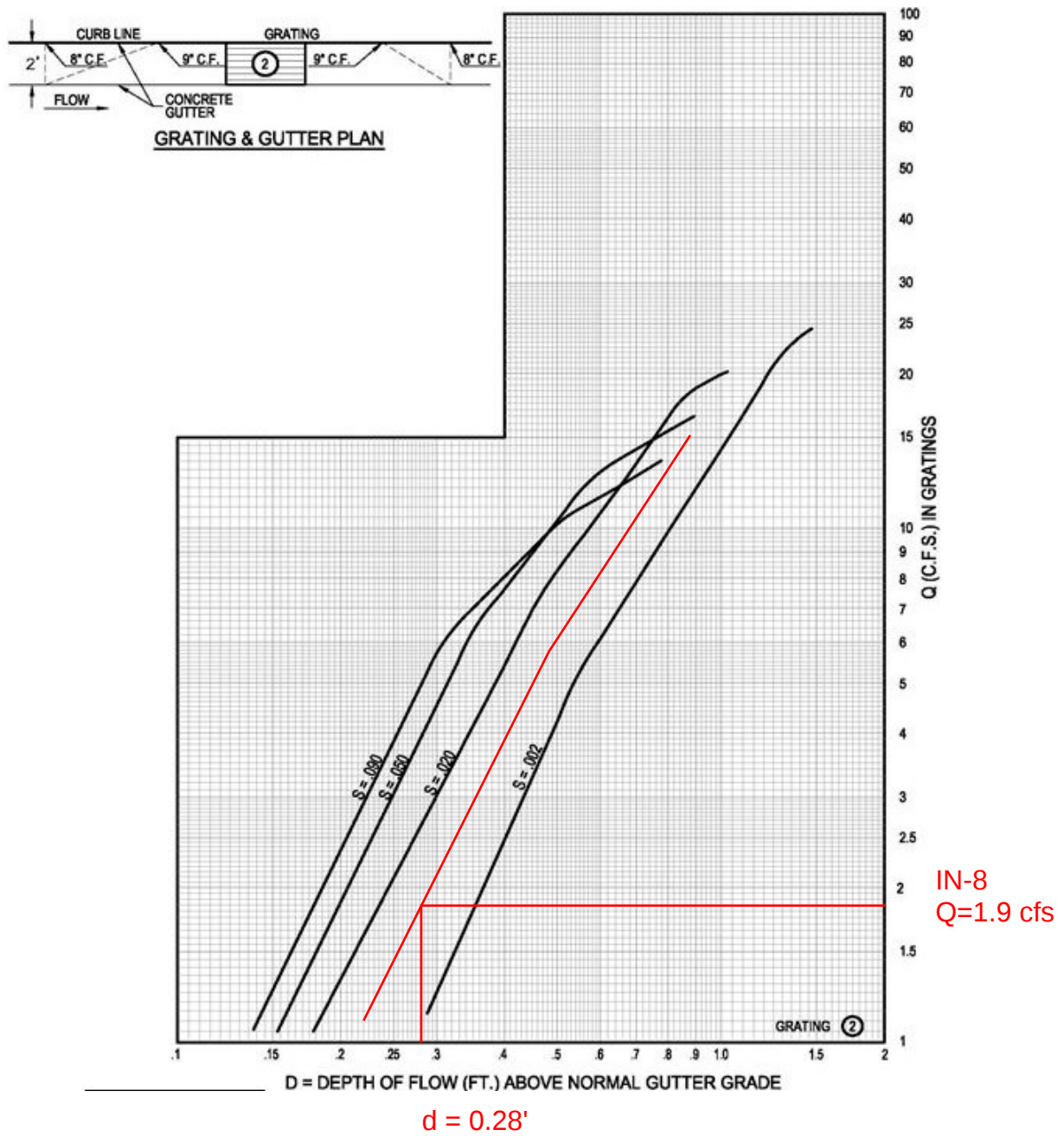
Q(max) =
44.09 CFS
D = 0.67
E = 0.83<0.94

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOPWID WATER	TOTAL ENERGY (FT)	FROUDE NO.
0.740	0.740	29.693	102.765	81.253	3.461	127.434	80.514	0.926	1.005
0.750	0.750	30.503	106.580	82.285	3.494	128.456	81.536	0.940	1.007
0.760	0.760	31.324	110.479	83.317	3.527	129.478	82.558	0.953	1.009
0.770	0.770	32.154	114.462	84.349	3.560	130.500	83.580	0.967	1.012
0.780	0.780	32.995	118.529	85.381	3.592	131.522	84.602	0.981	1.014
0.790	0.790	33.846	122.682	86.413	3.625	132.544	85.624	0.994	1.016
0.800	0.800	34.708	126.921	87.445	3.657	133.566	86.646	1.008	1.019
0.810	0.810	35.579	131.247	88.477	3.689	134.588	87.668	1.022	1.021
0.820	0.820	36.461	135.660	89.509	3.721	135.610	88.690	1.035	1.023
0.830	0.830	37.353	140.162	90.541	3.752	136.632	89.712	1.049	1.025
0.840	0.840	38.255	144.751	91.573	3.784	137.654	90.734	1.063	1.027
0.850	0.850	39.168	149.431	92.605	3.815	138.676	91.756	1.076	1.029
0.860	0.860	40.091	154.200	93.637	3.846	139.698	92.778	1.090	1.032
0.870	0.870	41.023	159.060	94.669	3.877	140.720	93.800	1.104	1.034
0.880	0.880	41.967	164.012	95.701	3.908	141.742	94.822	1.118	1.036
0.890	0.890	42.920	169.055	96.733	3.939	142.764	95.844	1.131	1.038
0.900	0.900	43.883	174.191	97.764	3.969	143.786	96.866	1.145	1.040
0.910	0.910	44.857	179.420	98.796	4.000	144.808	97.888	1.159	1.042
0.920	0.920	45.841	184.743	99.828	4.030	145.830	98.910	1.173	1.044
0.930	0.930	46.835	190.161	100.860	4.060	146.852	99.932	1.186	1.046

APPENDIX C

INLET CAPACITY ANALYSIS

FIGURE 6.9.9 Grate Capacities for Types "A," "C," and "D"



Single A inlet, in sump condition:

Open Area (for orifice calc in sq. ft.): 3.9314236
 Length of Weir (feet): 5.3541667
 Orifice Coefficient 0.6
 Weir Coefficient 3

Head (ft)	Head (in)	1 Wing	Grate		Control Q	
		Weir Q (cfs)	Weir Q (cfs)	Orifice Q (cfs)	Sgl Wing (cfs)	Dbl Wing (cfs)
0.05	0.6	0.13	0.18	4.23	0.31	0.45
0.10	1.2	0.38	0.51	5.99	0.89	1.27
0.15	1.8	0.70	0.93	7.33	1.63	2.33
0.20	2.4	1.07	1.44	8.47	2.51	3.58
0.25	3	1.50	2.01	9.46	3.51	5.01
0.30	3.6	1.97	2.64	10.37	4.61	6.58
0.35	4.2	2.48	3.33	11.20	5.81	8.30
0.40	4.8	3.04	4.06	11.97	7.10	10.14
0.45	5.4	3.62	4.85	12.70	8.47	12.09
0.50	6	4.24	5.68	13.39	9.92	14.16
0.55	6.6	4.89	6.55	14.04	11.45	16.34
0.60	7.2	5.58	7.47	14.66	13.04	18.62
0.65	7.8	6.29	8.42	15.26	14.71	20.99
0.67	8.0	6.54	8.75	15.46	15.29	21.82
0.70	8.4	7.03	9.41	15.84	16.44	23.46
0.75	9	7.79	10.43	16.39	18.23	26.02
0.80	9.6	8.59	11.49	16.93	20.08	28.67
0.85	10.2	9.40	12.59	17.45	21.99	31.40
0.90	10.8	10.25	13.71	17.96	23.96	34.21
0.95	11.4	11.11	14.87	18.45	25.98	37.10
1.00	12	12.00	16.06	18.93	28.06	40.06
1.05	12.6	12.91	17.28	19.40	30.19	43.10
1.10	13.2	13.84	18.53	19.85	32.38	46.22
1.15	13.8	14.80	19.81	20.30	34.61	49.41
1.20	14.4	15.77	21.11	20.74	52.29	52.29
1.25	15	16.77	22.45	21.16	54.71	54.71

IN-11A &
 IN-11B
 $Q = 0.5 * 21.82$
 $= 10.921 \text{ cfs}$



Single A inlet, in sump condition:

Open Area (for orifice calc in sq. ft.): 3.9314236
 Length of Weir (feet): 5.3541667
 Orifice Coefficient 0.6
 Weir Coefficient 3

Head (ft)	Head (in)	1 Wing	Grate		Control Q	
		Weir Q (cfs)	Weir Q (cfs)	Orifice Q (cfs)	Sgl Wing (cfs)	Dbl Wing (cfs)
0.05	0.6	0.13	0.18	4.23	0.31	0.45
0.10	1.2	0.38	0.51	5.99	0.89	1.27
0.15	1.8	0.70	0.93	7.33	1.63	2.33
0.20	2.4	1.07	1.44	8.47	2.51	3.58
0.25	3	1.50	2.01	9.46	3.51	5.01
0.30	3.6	1.97	2.64	10.37	4.61	6.58
0.35	4.2	2.48	3.33	11.20	5.81	8.30
0.40	4.8	3.04	4.06	11.97	7.10	10.14
0.45	5.4	3.62	4.85	12.70	8.47	12.09
0.50	6	4.24	5.68	13.39	9.92	14.16
0.55	6.6	4.89	6.55	14.04	11.45	16.34
0.60	7.2	5.58	7.47	14.66	13.04	18.62
0.65	7.8	6.29	8.42	15.26	14.71	20.99
0.67	8.0	6.54	8.75	15.46	15.29	21.82
0.70	8.4	7.03	9.41	15.84	16.44	23.46
0.75	9	7.79	10.43	16.39	18.23	26.02
0.80	9.6	8.59	11.49	16.93	20.08	28.67
0.85	10.2	9.40	12.59	17.45	21.99	31.40
0.90	10.8	10.25	13.71	17.96	23.96	34.21
0.95	11.4	11.11	14.87	18.45	25.98	37.10
1.00	12	12.00	16.06	18.93	28.06	40.06
1.05	12.6	12.91	17.28	19.40	30.19	43.10
1.10	13.2	13.84	18.53	19.85	32.38	46.22
1.15	13.8	14.80	19.81	20.30	34.61	49.41
1.20	14.4	15.77	21.11	20.74	52.29	52.29
1.25	15	16.77	22.45	21.16	54.71	54.71

IN-15A &
 IN-15B
 $Q = 0.5 \times 21.82$
 $= 10.921 \text{ cfs}$

Single A inlet, in sump condition:

Open Area (for orifice calc in sq. ft.): 3.9314236
 Length of Weir (feet): 5.3541667
 Orifice Coefficient 0.6
 Weir Coefficient 3

Head (ft)	Head (in)	1 Wing	Grate		Control Q	
		Weir Q (cfs)	Weir Q (cfs)	Orifice Q (cfs)	Sgl Wing (cfs)	Dbl Wing (cfs)
0.05	0.6	0.13	0.18	4.23	0.31	0.45
0.10	1.2	0.38	0.51	5.99	0.89	1.27
0.15	1.8	0.70	0.93	7.33	1.63	2.33
0.20	2.4	1.07	1.44	8.47	2.51	3.58
0.25	3	1.50	2.01	9.46	3.51	5.01
0.30	3.6	1.97	2.64	10.37	4.61	6.58
0.35	4.2	2.48	3.33	11.20	5.81	8.30
0.40	4.8	3.04	4.06	11.97	7.10	10.14
0.45	5.4	3.62	4.85	12.70	8.47	12.09
0.50	6	4.24	5.68	13.39	9.92	14.16
0.55	6.6	4.89	6.55	14.04	11.45	16.34
0.60	7.2	5.58	7.47	14.66	13.04	18.62
0.65	7.8	6.29	8.42	15.26	14.71	20.99
0.67	8.0	6.54	8.75	15.46	15.29	21.82
0.70	8.4	7.03	9.41	15.84	16.44	23.46
0.75	9	7.79	10.43	16.39	18.23	26.02
0.80	9.6	8.59	11.49	16.93	20.08	28.67
0.85	10.2	9.40	12.59	17.45	21.99	31.40
0.90	10.8	10.25	13.71	17.96	23.96	34.21
0.95	11.4	11.11	14.87	18.45	25.98	37.10
1.00	12	12.00	16.06	18.93	28.06	40.06
1.05	12.6	12.91	17.28	19.40	30.19	43.10
1.10	13.2	13.84	18.53	19.85	32.38	46.22
1.15	13.8	14.80	19.81	20.30	34.61	49.41
1.20	14.4	15.77	21.11	20.74	52.29	52.29
1.25	15	16.77	22.45	21.16	54.71	54.71

IN-16A &
 IN-16B
 $Q = 0.5 * 21.82$
 $= 10.921 \text{ cfs}$

Single A inlet, in sump condition:

Open Area (for orifice calc in sq. ft.): 3.9314236
 Length of Weir (feet): 5.3541667
 Orifice Coefficient 0.6
 Weir Coefficient 3

Head (ft)	Head (in)	1 Wing	Grate		Control Q	
		Weir Q (cfs)	Weir Q (cfs)	Orifice Q (cfs)	Sgl Wing (cfs)	Dbl Wing (cfs)
0.05	0.6	0.13	0.18	4.23	0.31	0.45
0.10	1.2	0.38	0.51	5.99	0.89	1.27
0.15	1.8	0.70	0.93	7.33	1.63	2.33
0.20	2.4	1.07	1.44	8.47	2.51	3.58
0.25	3	1.50	2.01	9.46	3.51	5.01
0.30	3.6	1.97	2.64	10.37	4.61	6.58
0.35	4.2	2.48	3.33	11.20	5.81	8.30
0.40	4.8	3.04	4.06	11.97	7.10	10.14
0.45	5.4	3.62	4.85	12.70	8.47	12.09
0.50	6	4.24	5.68	13.39	9.92	14.16
0.55	6.6	4.89	6.55	14.04	11.45	16.34
0.60	7.2	5.58	7.47	14.66	13.04	18.62
0.65	7.8	6.29	8.42	15.26	14.71	20.99
0.67	8.0	6.54	8.75	15.46	15.29	21.82
0.70	8.4	7.03	9.41	15.84	16.44	23.46
0.75	9	7.79	10.43	16.39	18.23	26.02
0.80	9.6	8.59	11.49	16.93	20.08	28.67
0.85	10.2	9.40	12.59	17.45	21.99	31.40
0.90	10.8	10.25	13.71	17.96	23.96	34.21
0.95	11.4	11.11	14.87	18.45	25.98	37.10
1.00	12	12.00	16.06	18.93	28.06	40.06
1.05	12.6	12.91	17.28	19.40	30.19	43.10
1.10	13.2	13.84	18.53	19.85	32.38	46.22
1.15	13.8	14.80	19.81	20.30	34.61	49.41
1.20	14.4	15.77	21.11	20.74	52.29	52.29
1.25	15	16.77	22.45	21.16	54.71	54.71

IN-17A &
 IN-17B
 $Q = 0.5 * 21.82$
 $= 10.921 \text{ cfs}$

Single A inlet, in sump condition:

Open Area (for orifice calc in sq. ft.): 3.9314236
 Length of Weir (feet): 5.3541667
 Orifice Coefficient 0.6
 Weir Coefficient 3

Head (ft)	Head (in)	1 Wing	Grate		Control Q	
		Weir Q (cfs)	Weir Q (cfs)	Orifice Q (cfs)	Sgl Wing (cfs)	Dbl Wing (cfs)
0.05	0.6	0.13	0.18	4.23	0.31	0.45
0.10	1.2	0.38	0.51	5.99	0.89	1.27
0.15	1.8	0.70	0.93	7.33	1.63	2.33
0.20	2.4	1.07	1.44	8.47	2.51	3.58
0.25	3	1.50	2.01	9.46	3.51	5.01
0.30	3.6	1.97	2.64	10.37	4.61	6.58
0.35	4.2	2.48	3.33	11.20	5.81	8.30
0.40	4.8	3.04	4.06	11.97	7.10	10.14
0.45	5.4	3.62	4.85	12.70	8.47	12.09
0.50	6	4.24	5.68	13.39	9.92	14.16
0.55	6.6	4.89	6.55	14.04	11.45	16.34
0.60	7.2	5.58	7.47	14.66	13.04	18.62
0.65	7.8	6.29	8.42	15.26	14.71	20.99
0.67	8.0	6.54	8.75	15.46	15.29	21.82
0.70	8.4	7.03	9.41	15.84	16.44	23.46
0.75	9	7.79	10.43	16.39	18.23	26.02
0.80	9.6	8.59	11.49	16.93	20.08	28.67
0.85	10.2	9.40	12.59	17.45	21.99	31.40
0.90	10.8	10.25	13.71	17.96	23.96	34.21
0.95	11.4	11.11	14.87	18.45	25.98	37.10
1.00	12	12.00	16.06	18.93	28.06	40.06
1.05	12.6	12.91	17.28	19.40	30.19	43.10
1.10	13.2	13.84	18.53	19.85	32.38	46.22
1.15	13.8	14.80	19.81	20.30	34.61	49.41
1.20	14.4	15.77	21.11	20.74	52.29	52.29
1.25	15	16.77	22.45	21.16	54.71	54.71

IN-18A &
 IN-18B
 $Q = 0.5 \times 21.82$
 $= 10.921 \text{ cfs}$

Single A inlet, in sump condition:

Open Area (for orifice calc in sq. ft.): 3.9314236
 Length of Weir (feet): 5.3541667
 Orifice Coefficient 0.6
 Weir Coefficient 3

Head (ft)	Head (in)	1 Wing	Grate		Control Q	
		Weir Q (cfs)	Weir Q (cfs)	Orifice Q (cfs)	Sgl Wing (cfs)	Dbl Wing (cfs)
0.05	0.6	0.13	0.18	4.23	0.31	0.45
0.10	1.2	0.38	0.51	5.99	0.89	1.27
0.15	1.8	0.70	0.93	7.33	1.63	2.33
0.20	2.4	1.07	1.44	8.47	2.51	3.58
0.25	3	1.50	2.01	9.46	3.51	5.01
0.30	3.6	1.97	2.64	10.37	4.61	6.58
0.35	4.2	2.48	3.33	11.20	5.81	8.30
0.40	4.8	3.04	4.06	11.97	7.10	10.14
0.45	5.4	3.62	4.85	12.70	8.47	12.09
0.50	6	4.24	5.68	13.39	9.92	14.16
0.55	6.6	4.89	6.55	14.04	11.45	16.34
0.60	7.2	5.58	7.47	14.66	13.04	18.62
0.65	7.8	6.29	8.42	15.26	14.71	20.99
0.67	8.0	6.54	8.75	15.46	15.29	21.82
0.70	8.4	7.03	9.41	15.84	16.44	23.46
0.75	9	7.79	10.43	16.39	18.23	26.02
0.80	9.6	8.59	11.49	16.93	20.08	28.67
0.85	10.2	9.40	12.59	17.45	21.99	31.40
0.90	10.8	10.25	13.71	17.96	23.96	34.21
0.95	11.4	11.11	14.87	18.45	25.98	37.10
1.00	12	12.00	16.06	18.93	28.06	40.06
1.05	12.6	12.91	17.28	19.40	30.19	43.10
1.10	13.2	13.84	18.53	19.85	32.38	46.22
1.15	13.8	14.80	19.81	20.30	34.61	49.41
1.20	14.4	15.77	21.11	20.74	52.29	52.29
1.25	15	16.77	22.45	21.16	54.71	54.71

IN-19A &
 IN-19B
 $Q = 0.5 * 21.82$
 $= 10.921 \text{ cfs}$

Single A inlet, in sump condition:

Open Area (for orifice calc in sq. ft.): 3.9314236
 Length of Weir (feet): 5.3541667
 Orifice Coefficient 0.6
 Weir Coefficient 3

Head (ft)	Head (in)	1 Wing	Grate		Control Q	
		Weir Q (cfs)	Weir Q (cfs)	Orifice Q (cfs)	Sgl Wing (cfs)	Dbl Wing (cfs)
0.05	0.6	0.13	0.18	4.23	0.31	0.45
0.10	1.2	0.38	0.51	5.99	0.89	1.27
0.15	1.8	0.70	0.93	7.33	1.63	2.33
0.20	2.4	1.07	1.44	8.47	2.51	3.58
0.25	3	1.50	2.01	9.46	3.51	5.01
0.30	3.6	1.97	2.64	10.37	4.61	6.58
0.35	4.2	2.48	3.33	11.20	5.81	8.30
0.40	4.8	3.04	4.06	11.97	7.10	10.14
0.45	5.4	3.62	4.85	12.70	8.47	12.09
0.50	6	4.24	5.68	13.39	9.92	14.16
0.55	6.6	4.89	6.55	14.04	11.45	16.34
0.60	7.2	5.58	7.47	14.66	13.04	18.62
0.65	7.8	6.29	8.42	15.26	14.71	20.99
0.67	8.0	6.54	8.75	15.46	15.29	21.82
0.70	8.4	7.03	9.41	15.84	16.44	23.46
0.75	9	7.79	10.43	16.39	18.23	26.02
0.80	9.6	8.59	11.49	16.93	20.08	28.67
0.85	10.2	9.40	12.59	17.45	21.99	31.40
0.90	10.8	10.25	13.71	17.96	23.96	34.21
0.95	11.4	11.11	14.87	18.45	25.98	37.10
1.00	12	12.00	16.06	18.93	28.06	40.06
1.05	12.6	12.91	17.28	19.40	30.19	43.10
1.10	13.2	13.84	18.53	19.85	32.38	46.22
1.15	13.8	14.80	19.81	20.30	34.61	49.41
1.20	14.4	15.77	21.11	20.74	52.29	52.29
1.25	15	16.77	22.45	21.16	54.71	54.71

IN-20A &
 IN-20B
 $Q = 0.5 * 21.82$
 $= 10.921 \text{ cfs}$

APPENDIX D
STORM DRAIN PIPE ANALYSIS

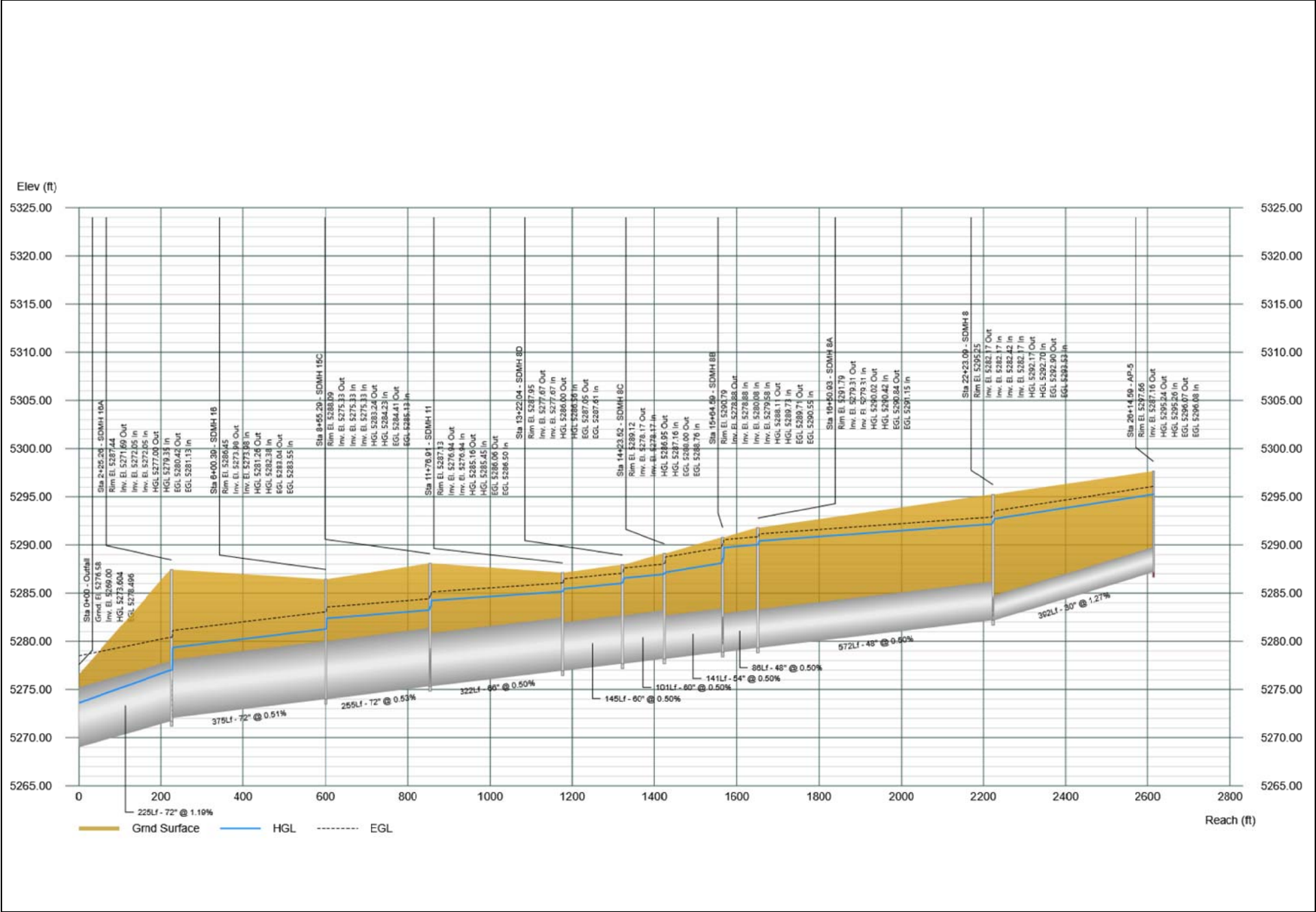
Profile View

Stormwater Studio 2022 v 3.0.0.29

West University/University

Project Name: SD

06-12-2024



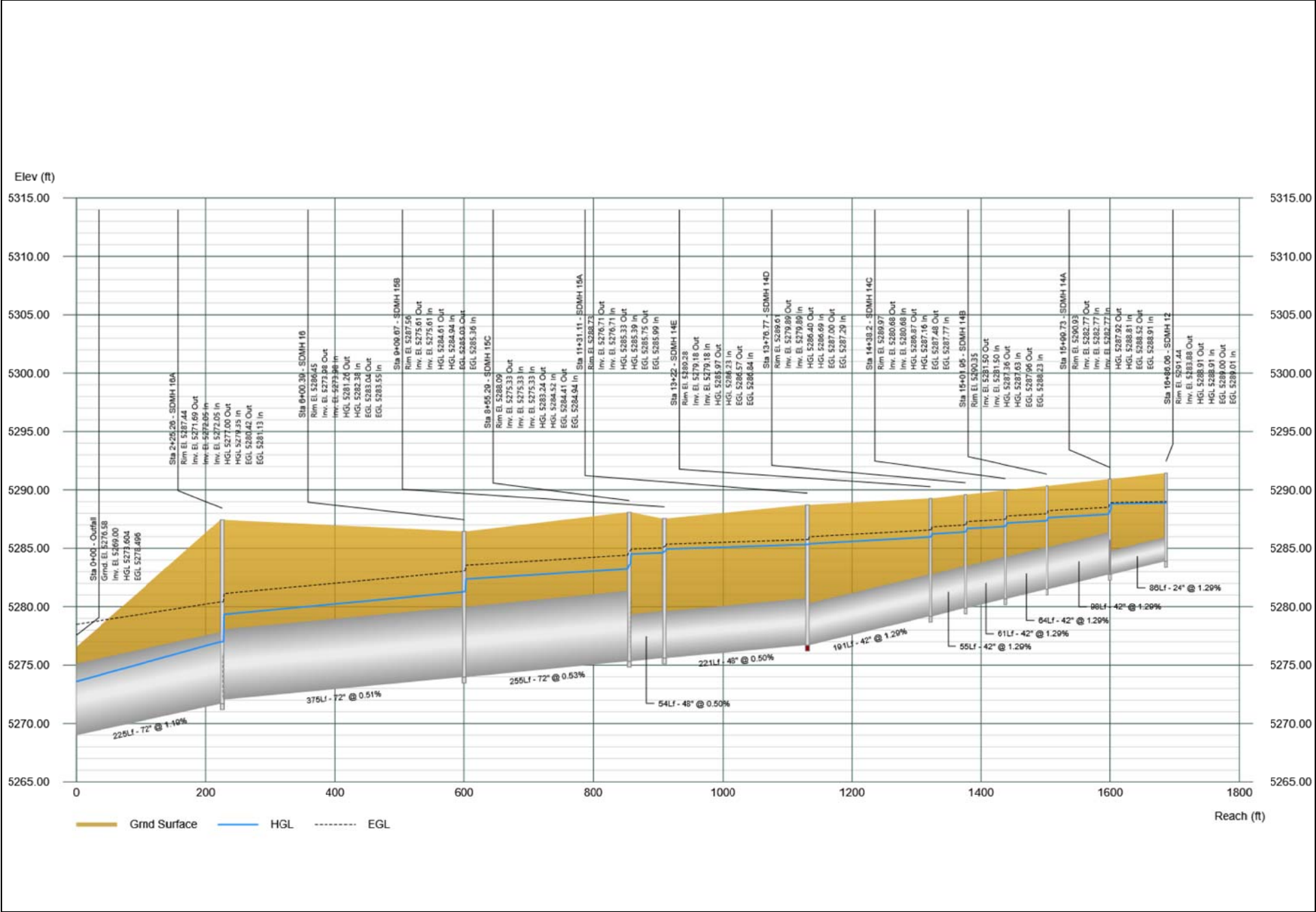
Profile View

East University

Project Name: SD

Stormwater Studio 2022 v 3.0.0.29

06-12-2024



APPENDIX E
POND ANALYSIS

Pond Analysis - Interim Conditions					
Retention Pond ID	Contributing Basins	Req'd Volume (V100, 10day) (acre-feet)	Provided Volume (acre-feet)*	Pond Bottom (ft)*	WSEL 100yr, 10d (ft)*
Pond 1	8-1A, 8-1E, 8-1U, 8-1V, 8-1X	3.6	17.8	5269.00	-
Pond 2	8-2A	0.5	11.8	5268.00	-
Pond 3	8-3B, 8-3C	2.4	27.0	5264.00	-
Pond 4	8-4A, 8-4B	2.2	18.5	5264.00	-
TOTAL		8.7	75.1		5267.52

*Pond design is subject to change.

Pond Analysis - Ultimate Conditions					
Retention Pond ID	Contributing Basins	Req'd Volume (V100, 10day) (acre-feet)	Provided Volume (acre-feet)* **	Pond Bottom (ft)*	WSEL 100yr, 10d (ft)*
Pond 1	8-1 basins	32.1	17.8	5269.00	-
Pond 2	8-2 basins	0.7	11.8	5268.00	-
Pond 3	8-3 basins	6.0	27.0	5264.00	-
Pond 4	8-4 basins	2.2	18.5	5264.00	-
TOTAL		41.0	75.1		5274.29

*Pond design is subject to change.

**Ponds 1 through 4 will be connected via equalization pipes to collectively provide the required volumes.

EXHIBITS

EXHIBIT A: OVERALL DMP

EXHIBIT B: PROPOSED BASIN MAP

EXHIBIT C: INLETS

EXHIBIT D: STORM DRAIN

EXHIBIT E: GRADING PLAN

EXHIBIT A
OVERALL DMP

CITY OF ALBUQUERQUE

Planning Department
Alan Varela, Director



Mayor Timothy M. Keller

March 11, 2024

Olin M. Brown, P.E., Vice President Community Development and Planning
Bohannon Huston, Inc.
7500 Jefferson St NE
Albuquerque, NM 87109

**RE: Mesa del Sol Innovation Park III - Overall Drainage Management Plan
Drainage Management Plan Submittal for Bulk Land Plat
Drainage Management Plan Engineer's Stamp Date: 2/27/2024
Hydrology File: R16D097D**

Dear Mr. Brown,

Based upon the information provided in your submittal received 3/4/2024, the Drainage Management Plan is preliminary approved for Bulk Land Plat action by the DHO.

PO Box 1293

For future grading & drainage plan submittals, the land treatment percentage values for DA 9 needs to be verified. It looks like they should be 0%, 10%, 10% & 80% for land treatment A, B, C & D respectively based on 9-A through 9-E land treatment percentages. Please also check the land treatment numbers for DA8 & DA10.

Albuquerque

DA 9	498.50	0.0%	5.0%	5.0%	90.0%
------	--------	------	------	------	-------

NM 87103

If you have any questions, please contact me at 505-924-3695 or tchen@cabq.gov.

Sincerely,

www.cabq.gov

Tiequan Chen, P.E.
Principal Engineer, Hydrology
Planning Department, Development Review Services



City of Albuquerque

Planning Department
Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (DTIS)

Project Title: Mesa del Sol Innovation Park III - Overall Drainage Management Plan Hydrology File # _____

Legal Description: Tract 18 Artiste (soon to be Mesa del Sol Innovation Park III)

City Address, UPC, OR Parcel: 99999 University Blvd

Applicant/Agent: Bohannon Huston Inc. Contact: Mike Balaskovits

Address: 7500 Jefferson St. NE, Albuquerque, NM 87109 Phone: 505-798-7891

Email: mbalaskovits@bhinc.com

Applicant/Owner: MDS Investment LLC Contact: Tom Schmidt

Address: 5700 University Blvd. Albuquerque, NM 87106 Phone: 505-238-0700

Email: tom@sc3development.com

(Please note that a DFT SITE is one that needs Site Plan Approval & ADMIN SITE is one that does not need it.)

TYPE OF DEVELOPMENT: ☒ PLAT (#of lots) ¹⁴ ☐ RESIDENCE
☐ DFT SITE ☐ ADMIN SITE

RE-SUBMITTAL: ☐ YES ☒ NO

DEPARTMENT: ☐ TRANSPORTATION ☒ HYDROLOGY/DRAINAGE

Check all that apply under Both the Type of Submittal and the Type of Approval Sought:

TYPE OF SUBMITTAL:

- ☐ ENGINEER/ARCHITECT CERTIFICATION
- ☐ PAD CERTIFICATION
- ☐ CONCEPTUAL G&D PLAN
- ☐ GRADING & DRAINAGE PLAN
- ☐ DRAINAGE REPORT
- ☒ DRAINAGE MASTER PLAN
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL) ADMINISTRATIVE
- ☐ TRAFFIC CIRCULATION LAYOUT FOR DFT APPROVAL
- ☐ TRAFFIC IMPACT STUDY (TIS)
- ☐ STREET LIGHT LAYOUT
- ☐ OTHER (SPECIFY) _____

TYPE OF APPROVAL SOUGHT:

- ☐ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY
- ☐ CONCEPTUAL TCL DFT APPROVAL
- ☐ PRELIMINARY PLAT APPROVAL
- ☒ FINAL PLAT APPROVAL
- ☐ SITE PLAN FOR BLDG PERMIT DFT APPROVAL
- ☐ SIA/RELEASE OF FINANCIAL GUARANTEE
- ☐ FOUNDATION PERMIT APPROVAL
- ☐ GRADING PERMIT APPROVAL
- ☐ SO-19 APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ GRADING PAD CERTIFICATION
- ☐ WORK ORDER APPROVAL
- ☐ CLOMR/LOMR
- ☐ OTHER (SPECIFY) _____

DATE SUBMITTED: 02-27-2024

EXHIBIT B
PROPOSED BASIN MAP



Pond Analysis - Interim Conditions					
Retention Pond ID	Contributing Basins	Req'd Volume (V100, 10day) (acre-feet)	Provided Volume (acre-feet)*	Pond Bottom (ft)*	WSEL 100yr, 10d (ft)*
Pond 1	8-1E, 8-1U, 8-1V	3.6	17.8	5269.00	-
Pond 2	8-2A	0.5	11.8	5268.00	-
Pond 3	8-3B, 8-3C	2.4	27.0	5264.00	-
Pond 4	8-4A, 8-4B	2.2	18.5	5264.00	-
TOTAL		8.7	75.1		5267.52

*Pond design is subject to change.

Pond Analysis - Ultimate Conditions					
Retention Pond ID	Contributing Basins	Req'd Volume (V100, 10day) (acre-feet)	Provided Volume (acre-feet)* **	Pond Bottom (ft)*	WSEL 100yr, 10d (ft)*
Pond 1	8-1 basins	32.1	17.8	5269.00	-
Pond 2	8-2 basins	0.7	11.8	5268.00	-
Pond 3	8-3 basins	6.0	27.0	5264.00	-
Pond 4	8-4 basins	2.2	18.5	5264.00	-
TOTAL		41.0	75.1		5274.29

*Pond design is subject to change.

**Ponds 1 through 4 will be connected via equalization pipes to collectively provide the required volumes.

UNM LANDS

(CONTRIBUTING AREA WILL FEATURE 100% RETENTION ON RESPECTIVE TRACTS. DETAILED ANALYSIS NOT INCLUDED.)

Mesa Del Sol Drainage Area 8 Proposed Basin Data Table									
This table is based on page 6-10 of the DMP, Zone: 2									
Pond 1 Basins									
Basin ID	Area (sq ft)	Area (ac)	Land Treatment Percentages				Q _{100yr} (cfs/ac)	Q _{100yr} (cfs)	V _{100yr-10day} (ac-ft)*
			A	B	C	D			
8-5A	55108	1.27	0%	0%	10%	90%	4.21	5.33	0.36
Pond 1 Basins									
8-1A	49418	1.13	0%	0%	10%	90%	4.21	4.78	0.32
8-1B	54288	1.25	0%	0%	10%	90%	4.21	5.25	0.35
8-1C	237200	5.45	0%	5%	5%	90%	4.18	22.74	1.54
8-1D	31200	0.72	0%	0%	10%	90%	4.21	3.02	0.20
8-1E	133303	3.06	0%	0%	10%	90%	4.21	12.89	0.87
8-1F	278400	6.39	0%	5%	5%	90%	4.18	26.69	1.80
8-1G	54287	1.25	0%	5%	10%	90%	4.21	5.25	0.35
8-1H	160000	3.67	0%	5%	5%	90%	4.18	15.34	1.04
8-1I	31200	0.72	0%	0%	10%	90%	4.21	3.02	0.20
8-1J	407857	9.36	0%	5%	5%	90%	4.18	39.10	2.64
8-1K	55680	1.28	0%	0%	10%	90%	4.21	5.38	0.36
8-1L	234400	5.38	0%	5%	5%	90%	4.18	22.47	1.52
8-1M	32000	0.73	0%	0%	10%	90%	4.21	3.09	0.21
8-1N	145157	3.33	0%	5%	5%	90%	4.18	13.92	0.94
8-1O	137305	3.15	0%	0%	10%	90%	4.21	13.27	0.89
8-1P	52227	1.20	0%	0%	10%	90%	4.21	5.05	0.34
8-1Q	429538	9.86	0%	5%	5%	90%	4.18	41.18	2.78
8-1R	58641	1.35	0%	0%	10%	90%	4.21	5.67	0.38
8-1S	1086583	24.95	0%	23%	23%	55%	3.60	89.91	5.04
8-1T	698566	16.04	0%	50%	50%	0%	2.71	43.38	1.22
8-1U	140586	3.23	0%	0%	10%	90%	4.21	13.59	0.91
8-1V	317767	7.29	0%	50%	50%	0%	2.71	19.73	0.56
8-1W	1421187	32.63	0%	23%	23%	55%	3.60	117.59	6.59
8-1X	152106	3.49	0%	0%	10%	90%	4.21	14.70	0.99
Pond 1 Basins Subtotal		6,398,985	146.90					547.03	32.05
Pond 2 Basins									
Basin ID	Area (sq ft)	Area (ac)	Land Treatment Percentages				Q _{100yr} (cfs/ac)	Q _{100yr-6hr} (cfs)	V _{100yr-10day} (ac-ft)*
			A	B	C	D			
8-2A	70976	1.63	0%	0%	10%	90%	4.21	6.86	0.46
8-2B	159702	3.67	0%	50%	50%	0%	2.71	9.92	0.28
Pond 2 Basins Subtotal		230,678	5.30					16.78	0.74
Pond 3 Basins									
8-3A	778197	17.86	0%	23%	23%	55%	3.60	64.39	3.61
8-3B	164657	3.78	0%	0%	10%	90%	4.21	15.92	1.07
8-3C	295189	6.78	0%	23%	23%	55%	3.60	24.42	1.37
Pond 3 Basins Subtotal		1,238,042	28.42					104.73	6.05
Pond 4 Basins									
8-4A	130586	3.00	0%	0%	10%	90%	4.21	12.62	0.85
8-4B	283977	6.52	0%	23%	23%	55%	3.60	23.50	1.32
Pond 4 Basins Subtotal		414,563	9.52					36.12	2.17
TOTAL		8,337,377	191					710	41

*Volume is calculated based off City of Albuquerque DPM Section 6.2.8

DRAINAGE AREA 9

(CONTRIBUTING AREA WILL FEATURE 100% RETENTION ON RESPECTIVE TRACTS. DETAILED ANALYSIS NOT INCLUDED.)

DRAINAGE AREA 8
EXHIBIT B - PROPOSED BASIN MAP
MESA DEL SOL

DRAWN BY: HG

CHECKED BY: OB

DATE: 06/24/2024

BHI PROJECT NO: 20240195

SHEET NO: -

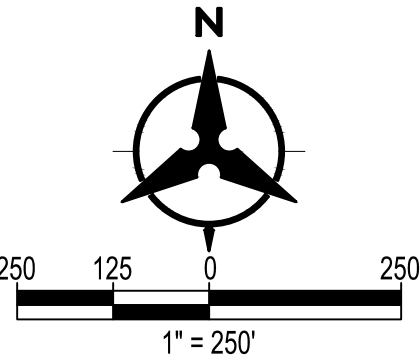
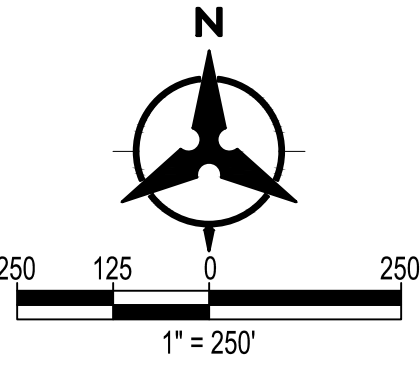


EXHIBIT C
INLETS



Inlet Table							
Inlet No.	Inlet Type*	Contributing Basins	Actual Flow (cfs)	Avail Head (ft)	Capacity (cfs)	Intercepted Flow (cfs)	Bypass Flow (cfs)
IN-8A	1-SGL COA TYPE A	60% of Basin 8-1E	3.87	0.67	1.90	1.90	1.97
IN-8B	1-SGL COA TYPE A		3.87	0.67	1.90	1.90	1.97
IN-11A	1-SGL COA TYPE A*		3.58	0.67	10.91	-	-
IN-11B	1-SGL COA TYPE A*	40% of Basin 8-1E + Inlet 8 bypass + Inlet 9 bypass	3.58	0.67	10.91	-	-
IN-12A	1-SGL COA TYPE A	60% of Basin 8-1O	3.98	0.67	2.50	2.50	1.48
IN-12B	1-SGL COA TYPE A		3.98	0.67	2.50	2.50	1.48
IN-15A	1-SGL COA TYPE A*	40% of Basin 8-1O + Inlet 12 bypass + Inlet 13 bypass	4.64	0.67	10.91	-	-
IN-15B	1-SGL COA TYPE A*		4.64	0.67	10.91	-	-
IN-16A	1-SGL COA TYPE A*	Basin 8-1U	6.80	0.67	10.91	-	-
IN-16B	1-SGL COA TYPE A*		6.80	0.67	10.91	-	-
IN-17A	1-SGL COA TYPE A*	Basin 8-1X	7.35	0.67	10.91	-	-
IN-17B	1-SGL COA TYPE A*		7.35	0.67	10.91	-	-
IN-18A	1-SGL COA TYPE A*	Basin 8-2A	3.43	0.67	10.91	-	-
IN-18B	1-SGL COA TYPE A*		3.43	0.67	10.91	-	-
IN-19A	1-SGL COA TYPE A*	Basin 8-3B	7.96	0.67	10.91	-	-
IN-19B	1-SGL COA TYPE A*		7.96	0.67	10.91	-	-
IN-20A	1-SGL COA TYPE A*	Basin 8-4A	6.31	0.67	10.91	-	-
IN-20B	1-SGL COA TYPE A*		6.31	0.67	10.91	-	-

*Inlet in sump condition. All Type A inlets in sump condition shall be double-winged.



DRAINAGE AREA 8

EXHIBIT C - INLETS

MESA DEL SOL

DRAWN BY: HG

CHECKED BY: OB

DATE: 06/14/2024

BHI PROJECT NO: 20240195

SHEET NO: ----

EXHIBIT D

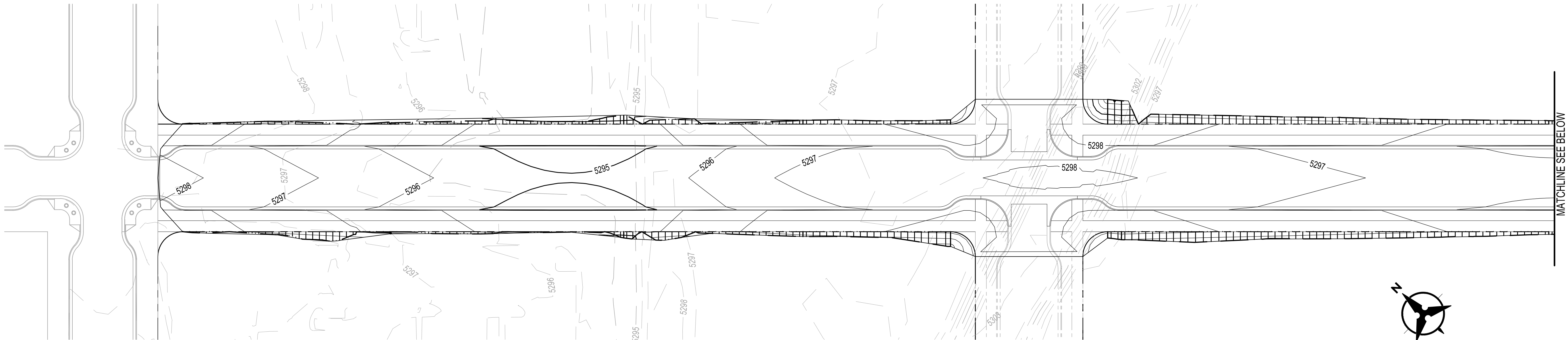
STORM DRAIN



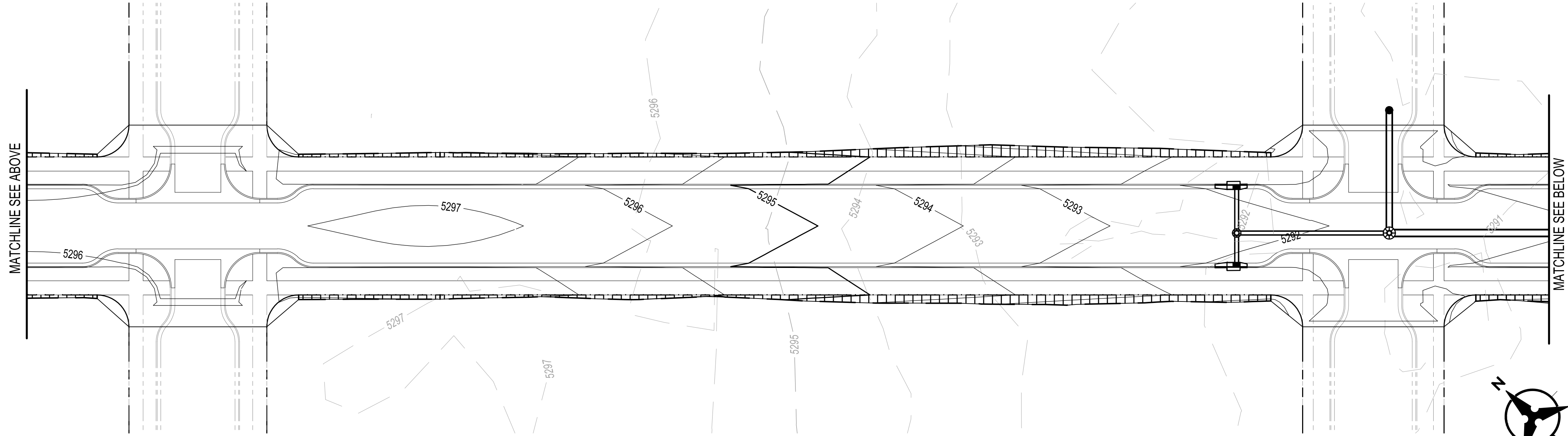
Analysis Points Table		
AP	Contributing Basins	Q (cfs)
AP-1	Basin 8-5A	5.33
AP-2	Basin 8-1A	4.78
AP-3	Basin 8-1B	5.25
AP-4	Basins 8-1C + 8-1D	25.76
AP-5	20% of Basin 8-1E	2.58
AP-6	Basins 8-1F + 8-1G	31.94
AP-7	Basins 8-1H + 8-1I	18.36
AP-8	40% of Basin 8-1E + AP-5	7.73
AP-9	Basins 8-1J + 8-1K	44.49
AP-10	Basins 8-1L + 8-1M	25.57
AP-11	Basin 8-1N + 40% of Basin 8-1E + AP-8 + AP-9	71.29
AP-12	60% of Basin 8-1O	7.96
AP-13	Basin 8-1P	5.05
AP-14	Basins 8-1Q + 8-1R + AP-13	51.90
AP-15	40% of Basin 8-1O + AP-12 + AP-14	65.17
AP-16	Basins 8-1T + 8-1U	56.97
AP-16-1	Basin 8-1S	89.91
AP-17	60% of Basin 8-1W + Basin 8-1X	85.26
AP-18	40% of Basin 8-1W + Basin 8-2A	53.90
AP-19	Basins 8-3A + 8-3B	80.31
AP-20	Basin 8-4A	12.62

Storm Drain Pipe Table				
Pipe No.	Contributing Inlets and Basins	Size in	Slope	Actual Flow (cfs)
SD1	AP-1	18	1.00%	5.33
SD2	AP-2	18	0.50%	4.78
SD3	AP-3	18	0.50%	5.25
SD4	AP-4	30	0.50%	25.76
SD5	SD2 + SD3 + SD4	30	1.27%	35.78
SD6	AP-6	30	1.00%	31.94
SD7	AP-7	24	1.00%	18.36
SD7-1	SD5 + SD6 + SD7	48	0.50%	86.08
SD8	IN-8A + IN-8B	24	1.00%	3.80
SD8-1	SD7-1 + SD8	48	0.50%	89.88
SD9	AP-9	36	1.00%	44.49
SD10	AP-10	30	1.00%	25.57
SD10-1	SD8-1 + SD9 + SD10	60	0.50%	159.94
SD11	IN-11A + IN-11B + Basin 8-1N	24	1.00%	21.07
SD11-1	SD10-1 + SD11	66	0.50%	181.01
SD12	IN-12A + IN-12B	24	1.00%	5.00
SD14	AP-14	36	1.00%	51.90
SD14-1	SD12 + SD14	42	1.29%	56.90
SD15	IN-15A + IN-15B	24	0.50%	9.27
SD15-1	SD14-1 + SD15	48	0.50%	66.17
SD15-2	SD11-1 + SD15-1	72	0.50%	247.18
SD16	IN-16A + IN-16B + Basin 8-1T**	42	0.50%	56.97
SD16-1	SD15-2 + SD16	72	0.50%	304.15
SD16-2	Basin 8-1S	48	0.50%	89.91
SD16-3	SD16-1 + SD16-2	72	1.19%	394.07
SD17	IN-17A + IN-17B + 60% of Basin 8-1W**	36	1.17%	85.26
SD18	IN-18A + IN-18B + 40% of Basin 8-1W**	30	2.50%	53.90
SD19	IN-19A + IN-19B + Basins 8-3A**	36	2.00%	80.31
SD20	IN-20A + IN-20B**	24	2.00%	12.62

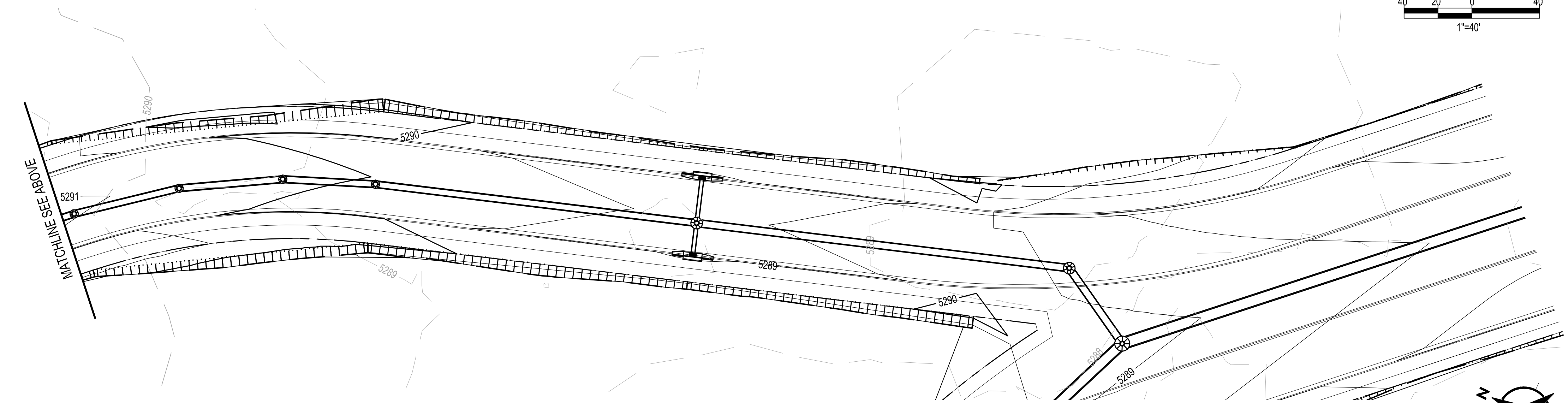
EXHIBIT E
GRADING PLAN



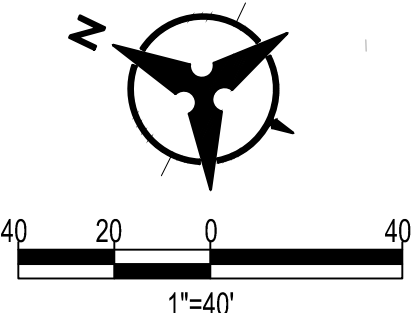
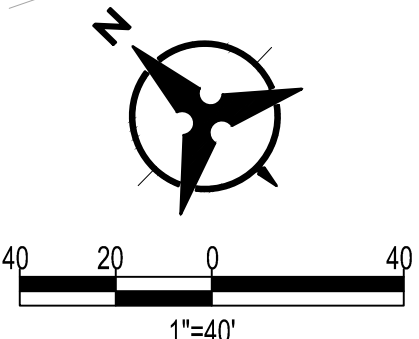
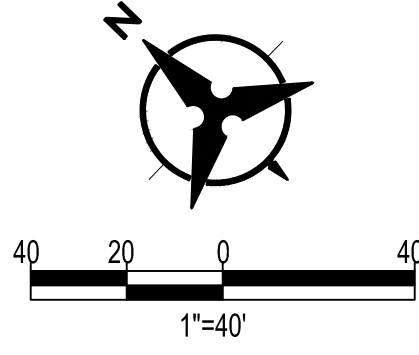
EAST UNIVERSITY BLVD.



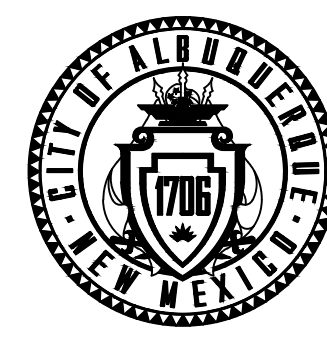
EAST UNIVERSITY BLVD.



EAST UNIVERSITY BLVD.



FOR INFORMATION ONLY



CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT
ENGINEERING DIVISION

MDS INFRASTRUCTURE IMPROVEMENTS
PWO PACKAGE C
GRADING PLAN

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	ZONE MAP NO. R-16-Z, S-16-Z, S-17-Z
		CITY PROJECT NO. CPN 393572
		SHEET NO. 4B OF 16

??% FOR REVIEW ONLY

June 13, 2024

NO.	DATE	DESCRIPTION	BY
		AS-BUILT INFORMATION	
		WORK STAKED BY:	
		INSPECTOR'S ACCEPTANCE BY:	
		FIELD VERIFICATION BY:	
		DRAWINGS CORRECTED BY:	

DESIGNED BY:	OB
DRAWN BY:	AR
CHECKED BY:	OB
DATE	6/12/2024

CONSULTANTS
BENCH MARKS
SEAL