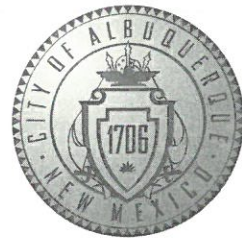


CITY OF ALBUQUERQUE



Richard J. Berry, Mayor

May 1, 2017

Donald Duneman
Wilson & Company
4900 Lang Ave, NE
Albuquerque, NM 8709

RE: **APS Montgomery Complex**
3315 Louisiana Blvd NE
Drainage Report and Grading Plan
Engineer's Stamp Date: 4/25/17
Hydrology File: G18D048

Dear Mr. Duneman:

PO Box 1293

Based on the information provided in your submittal received 4/26/17, and updated information received on 5/1/17, the Drainage Report and Grading Plan are approved for Grading and Building Permit.

Albuquerque

Please notify Rudy Rael, CFM (rrael@cabq.gov) prior to beginning work in the floodplain. If you have any questions, please contact me at 924-3695 or dpeterson@cabq.gov.

New Mexico 87103

Sincerely,

www.cabq.gov

Dana Peterson, P.E.
Senior Engineer, Planning Dept.
Development Review Services



City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 09/2015)

Project Title: APS Professional Development Center - Montgomery Complex **Building Permit #:** BP-2017-01271 **City Drainage #:** G18D048
DRB#: _____ **EPC#:** _____ **Work Order#:** 772071
Legal Description: Lands of the Board of Education of the Albuquerque Municipal School District No. 12 (Montgomery Elementary School) within Section 1, Township 10N, Range 3E
City Address: 3315 Louisiana Blvd, NE Albuquerque, NM 87110

Engineering Firm: Wilson & Company Engineers and Architects, Inc. **Contact:** Donald Duneman
Address: 4900 Lang Ave, NE Albuquerque, NM 87109
Phone#: 505-948-5125 **Fax#:** _____ **E-mail:** donald.duneman@wilsonco.com

Owner: Albuquerque Public Schools **Contact:** David Ritchey
Address: 915 Oak Street, SE, Albuquerque, NM 87106
Phone#: 505-977-5829 **Fax#:** _____ **E-mail:** ritchey_d@aps.edu

Architect: Studio Collaboration, LLC **Contact:** Sam Sterling
Address: 924 2nd St. NW, Albuquerque, NM 87102
Phone#: 505-232-2520 **Fax#:** _____ **E-mail:** sam@studiocollaboration.com

Other Contact: _____ **Contact:** _____
Address: _____
Phone#: _____ **Fax#:** _____ **E-mail:** _____

Check all that Apply:

DEPARTMENT:

☒ HYDROLOGY/ DRAINAGE
☐ TRAFFIC/ TRANSPORTATION
☐ MS4/ EROSION & SEDIMENT CONTROL

TYPE OF SUBMITTAL:

☐ ENGINEER/ ARCHITECT CERTIFICATION
☐ CONCEPTUAL G & D PLAN
☒ GRADING PLAN
☐ DRAINAGE MASTER PLAN
☒ DRAINAGE REPORT
☐ CLOMR/LOMR
☐ TRAFFIC CIRCULATION LAYOUT (TCL)
☐ TRAFFIC IMPACT STUDY (TIS)
☐ EROSION & SEDIMENT CONTROL PLAN (ESC)
☐ OTHER (SPECIFY) _____

CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

☒ BUILDING PERMIT APPROVAL
☐ CERTIFICATE OF OCCUPANCY
☐ PRELIMINARY PLAT APPROVAL
☐ SITE PLAN FOR SUB'D APPROVAL
☐ SITE PLAN FOR BLDG. PERMIT APPROVAL
☐ FINAL PLAT 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
☐ PRE-DESIGN MEETING
☐ OTHER (SPECIFY) _____

IS THIS A RESUBMITTAL?: ☒ Yes ☐ No

DATE SUBMITTED: April 26, 2017 **By:** Donald Duneman

COA STAFF: _____ ELECTRONIC SUBMITTAL RECEIVED: _____



Alaska
Arizona
California
Colorado
Kansas
Louisiana
Minnesota
Missouri
Nebraska

April 26, 2017

Mr. Dana Peterson, P.E.
Senior Engineer - Hydrology
Planning Department
600 2nd Street, NW
Albuquerque, NM 87102

RE: APS Montgomery Complex; G18D048

Dear Mr. Peterson,
Wilson & Company has reviewed the comments provided in an email dated April 25, 2017 on the APS Montgomery Complex Project. **Below are the responses to the comments:**

1. Provide finished floor elevation for the PDC building. Assuming the PDC building footprint is outside the Zone AO on Comanche, state so in the report (section 1.3). **Note added to Overall Grading & Drainage Plan and report.**
2. Pond 7. Provide inlet protection on the outfall to prevent accidental entry. Also include a water quality feature to prevent sediment from washing into South Hahn. **Riser added. See Detail sheet C502**
3. Pond 4. Provide inlet protection on the outfall end section to prevent accidental entry. **Trash rack added. See Detail sheet C502**
4. It is unclear how the storm water quality volume is being retained. The report references use of each ponds' dead storage, however the outlet culverts are all within 0.2 ft of pond bottom. Provide dead storage volumes and account for allowable error in construction finished grades (likely +/- 0.2 feet). **Bottom of pond elevation modified to 0.4 ft below outfall invert. First Flush volume of each pond noted on plan and Pond Summary Table.**
5. This work will require a Floodplain Permit to be submitted prior to Grading Permit approval (Rudy Rael, CFM, rrael@cabq.gov). **See attached Permit.**
6. This work will require an updated Erosion and Sediment Control Plan to be submitted before Grading Permit approval (Curtis Cherne, PE, ccherne@cabq.gov). **ESC Plan submitted.**
7. The penetration into South Hahn may be performed under S0-19 or mini- work order. State how the work will be performed on the Grading Plan. If using S0-19, include standard S0-19 notes. Prior to beginning work, notify Jason Rodriguez with Municipal Development to coordinate an inspection schedule (jtrodriguez@cabq.gov). **Penetration will be performed under work order 772071. Note added on Overall Grading & Drainage Plan.**



Please feel free to contact me at 505-238-0152 or via email, should you have any further questions or comments on these responses, APS Montgomery Complex Project. Thank you for your time.

WILSON & COMPANY

A handwritten signature in black ink, appearing to read "Don Duneman", with a long, sweeping horizontal line extending to the right.

Donald Duneman, P.E.

Project Manager

Donald.duneman@wilsonco.com

Floodplain Development Permit Form
Planning Dept., City of Albuquerque

Section 1: General Provisions (Applicant to read and sign)

1. No work of any kind may start until a permit is issued.
2. Applicant is hereby informed that other permits may be required to fulfill local, state, and federal regulatory requirements.
3. Applicant hereby gives consent to the Floodplain Administrator and his/her representative to make reasonable inspections required to verify compliance.
4. Applicant must provide a Critical Habitat for Threatened & Endangered Species report if working on or near an endangered species area.
5. The applicant certifies that all statements herein and in attachments to this application are, to the best of my knowledge, true and accurate.

Applicant Signature Eugenio Valdez Date 8/30/16

Applicant Printed Name Eugenio Valdez Phone #: 505-948-5127

Section 2: Proposed Development in Special Flood Hazard Area (to be completed by Applicant)

Brief Project Description Concrete flatwork and vegetated landscape to be built within the floodplain boundary. On site will be a building and parking garage structure.

Applicant is (check one): Owner ☐ Builder ☐ Engineer/Architect ☒

Project address/Legal Disc/Location: 3315 Louisiana Blvd. NE/
027 027 Montgomery Elem School/ Louisiana & Comanche int.

Description of Work in Special Flood Hazard Area (SFHA):

A. Development Activities

Clearing ☒ Fill ☒ Drilling ☐ Excavation ☒

Watercourse Alteration ☐ (Including Dredging and Channel Modifications)

Drainage Improvements ☒ Road, Street or Bridge Construction ☒

Water or Sewer Line Installation ☐ Paving ☒ Walls, Fences ☐

Storage of Materials/Equipment for more than a year. ☐ Materials Volume (cu. Ft.)

Other (Please Specify)

B. Building Development and Building Type

New Building ☒ Residential (1-4 Family) _____ Residential (More than 4 Family) _____

Commercial ☒ Addition _____ Alteration _____ Demolition _____

Manufactured Home _____

If an addition or alteration:

Estimated Cost of structure before addition/alteration. _____

Estimated Cost of Project \$ _____ Percent of value (new/existing) _____

Is there a Grading & Drainage Plan associated with this work? Yes ☒ No _____

Drainage file Number: G18D048

Section 3: Floodplain Determination (Completed by the Floodplain Administrator)

The proposed development is located in a SFHA Zone (circle one): A AE AH AO

And is located on FIRM Panel: 3500/C0352H

And is located in a Floodway: _____ Yes ☒ No

BFE if Applicable: Depth 1'

Drainage File Number: G18D048

Floodplain Permit Number: G18FD48

Building Permit / Work Order #: _____

Site specific Instructions: ALL work is to complete
with the approved Grading and Drainage
Plan. Notify Rudy when CO is granted

Signed: [Signature] Date: 8/31/16

Printed Name: Rudy E. Rael

If proposed development is a building complete section 4.

**ALBUQUERQUE PUBLIC SCHOOLS
MONTGOMERY COMPLEX
DRAINAGE REPORT**

By:



**4900 Lang Ave NE
Albuquerque, NM 87109**

**ALBUQUERQUE PUBLIC SCHOOLS
MONTGOMERY COMPLEX
DRAINAGE REPORT**

APRIL 2017

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



Donald M. Duneman, P.E.
State of New Mexico P.E. No. 17616

04/26/17
Date



Albuquerque Public Schools – Montgomery Complex Drainage Report

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Albuquerque Public Schools – Montgomery Complex Drainage Report

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Appendix

Appendix A	Referenced Material
Appendix B	Hydrologic Analysis
Appendix C	Hydraulic Analysis

Miscellaneous Details (Back Pocket)
Overall Grading & Drainage Plan (Back Pocket)

1 Introduction

The Albuquerque Public Schools (APS) Montgomery Complex is located at 3315 Louisiana Blvd NE, Albuquerque, NM 87110. The 10.3 acre site is a multi-use educational facility used by APS. The proposed facility will be composed of a professional development center and associated parking lot.

The proposed site calls for a linear park buffer on the west side of the campus between the proposed buildings and surrounding streets (Mossman Place NE and Comanche Road NE).

1.1 Purpose

The purpose of this report is to evaluate existing and proposed on-site drainage conditions and provide recommendations for on-site storm drain facilities that accommodate the development. The proposed site plan is illustrated in Figure 4, page 10. The majority of the site will discharge into the South Hahn Arroyo, while a small basin will drain to Comanche Road.

This Drainage Report serves as the basis for the grading and drainage design of the Montgomery Complex Facility. This report supersedes the “Albuquerque Public Schools Montgomery Complex Drainage Master Plan”, dated August 2016 prepared by Wilson & Company (DMP). The DMP presented a two level parking structure located in the middle of the site, with a future early childhood development center proposed on the south side of the site. Since the DMP was completed, the parking structure and early childhood development center have been eliminated from the plans for the site and replaced with an at grade parking lot.

1.2 Existing Reports and Plans

The following reports and plans were employed in the hydrologic and hydraulic analyses.

- “South Hahn Arroyo Channel Design Phase 1” Design Analysis Report, dated December 2010, by Smith Engineering Company. (Report received/copied from AMAFCA files)
- “Candelaria – Hahn Drainage Analysis – Report and Conceptual Storm Drain Design,” dated May, 2004, by Smith Engineering Company. Drainage File Number 279.
- “Drainage Report for Comanche Park, Phase 1,” dated December, 2003, by Smith Engineering Company. Drainage File Number 511.

Albuquerque Public Schools – Montgomery Complex Drainage Report

The above reports and plans provide information regarding existing offsite drainage patterns and tributary flows to the South Hahn Arroyo Channel, which is located adjacent to the project site.

1.3 Site Location

The APS Montgomery Complex is located on approximately 10.3 acres of land northeast of downtown Albuquerque (see Figure 1, Vicinity Map). The site is bounded on the north by Comanche Road NE, Mossman Place NE to the west, and Louisiana Boulevard NE to the east, and South Hahn Arroyo Channel to the south.

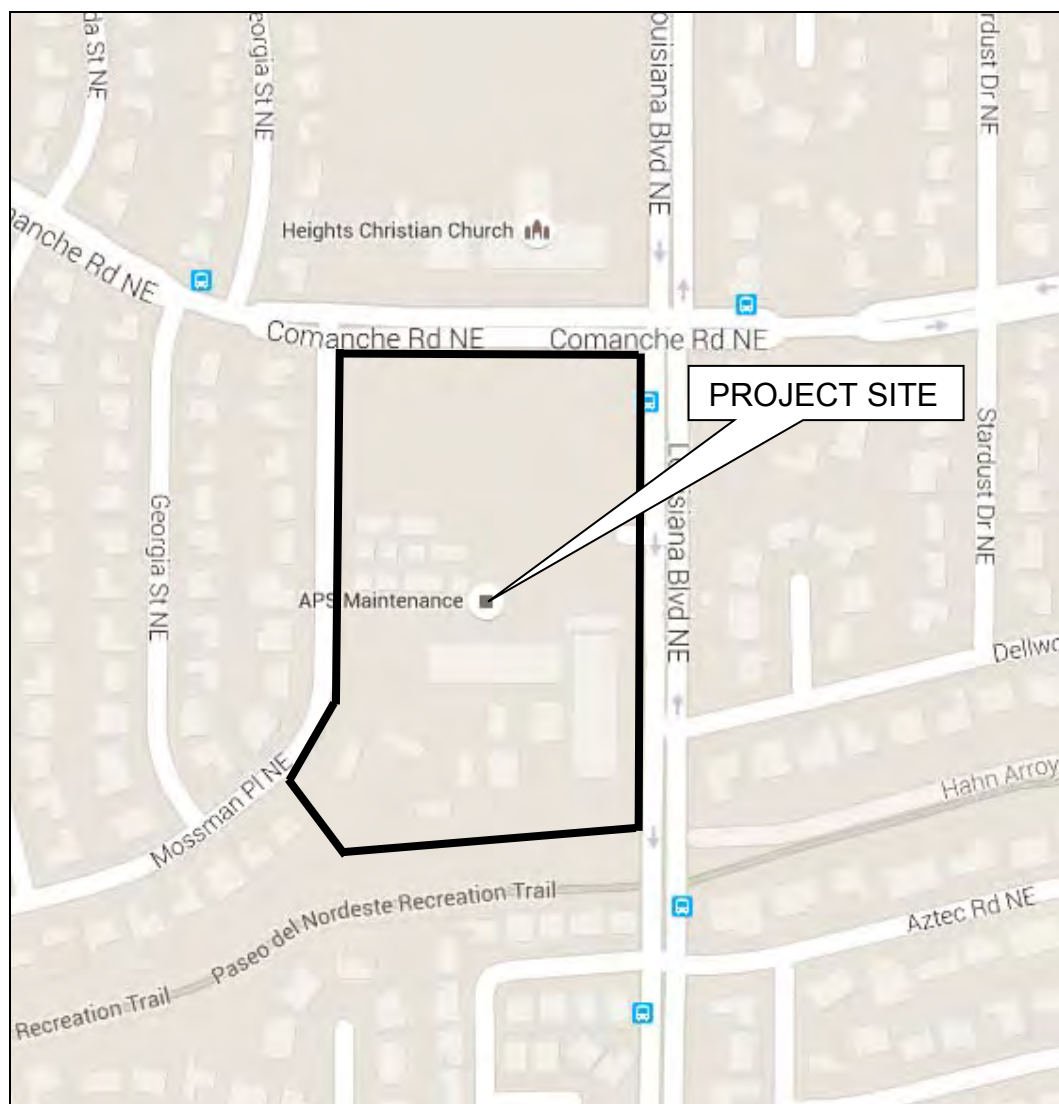


Figure 1: Vicinity Map

Comanche Rd NE serves as a conveyance channel and is within a Federal Emergency Management Agency (FEMA) designated flood hazard zone, Zone AO, with flood

Albuquerque Public Schools – Montgomery Complex Drainage Report

depths of 1 foot. A portion of the north side of the property on Comanche Road lies within the FEMA Zone AO. The proposed building with finished floor elevation of 5306.50 is outside of the Zone AO. The FEMA Flood Insurance Rate Map (FIRM) Number 35001C0352H also shows the presence of a Zone A floodplain located within the South Hahn Arroyo Channel, which is adjacent to the south side of the project. The majority of the site is outside the FEMA designated flood hazard zone. A copy of the FIRM map is included within Appendix A of this report.

2 Hydrology

The APS Montgomery Complex is located within the watershed boundary lines of the South Hahn Arroyo, which ultimately discharge into the Rio Grande. This area lies within Precipitation Zone 3 as defined in Section 22.2 of the City of Albuquerque (COA) Development Process Manual (DPM), July 1997. Basin peak flows and volumes for the study area were computed using Arid Lands Hydrological Model (AHYMO-S4).

2.1 Methodology

The AHYMO-S4 Computer Program follows the procedures outlined in Chapter 22 of the COA DPM. The program's input parameters were created by the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) in conjunction with the City of Albuquerque. The storm events analyzed were the 100-year 6-hour and 24-hour events.

2.2 Design Storm Precipitation

Two design storm events were considered for the analysis of the existing and proposed drainage systems. The 100-year, 6-hour event storm was utilized in calculating peak discharge, and the 100-year, 24-hour event storm was utilized in determining volumetric runoff. Zone 3 precipitation depths per Section 22.2 of DPM are as follows: $P_{60}=2.14''$, $P_{360}=2.60''$, and $P_{1440}=3.10''$ for the 100-year Average Recurrence Interval (ARI) respectively.

2.3 Land Treatments

Four land treatments are defined by the DPM. Table A-4 of Section 22.2 of the DPM describes land conditions for each treatment. The following sections describe how the percentages of land treatments were determined for use in the current analysis.

2.3.1 Existing Land Treatment

Existing off-site and on-site land treatments were delineated using aerial photography, existing topography and site visits.

2.3.2 Proposed Land Treatment

The proposed site is comprised of various buildings and a parking facility. The Fully Developed Site Plan (see Figure 4, page 9) illustrates the proposed location and approximate sizes of future buildings, a parking facility, and landscape areas. Land use assumptions for the areas designated as landscape have been divided into two categories, described below.

Albuquerque Public Schools – Montgomery Complex Drainage Report

- Where existing flat surfaces (landscape and grass) are located, 100% B was assumed.
- Where existing concrete sidewalks and buildings are located, 100% 'D' was assumed.
- Where existing bituminous surfaces are located, the land treatment was assumed to be 100% 'D' due to heavy compaction from vehicle and pedestrian use.
- Where proposed steep hillsides have been shown to receive landscape, land use treatments are considered to be treatment 'C'. The use of this treatment anticipates that the steep sloped areas will likely receive desert landscape or gravel.
- Where proposed landscaping correlates with relatively flat slopes, such as those in landscaped medians and large areas adjacent to buildings, a land use ratio of 50% 'B' and 50% 'C' was used to account for the probability of a combination of irrigated areas and desert landscaping mixed with some areas compacted by human activity.
- The proposed asphalt parking lot, as well as development center building, were assumed to be 100% 'D'.
- The base course parking area located on the south side of the property was assumed to be 100% 'C'.

2.4 Time of Concentration

In accordance with Chapter 22 of the DPM, equation B-9, the time to peak (t_p) is equal to 2/3 of the time of concentration (t_c). The time of concentration for the existing and proposed sub-basins utilized in the on-site hydrologic analysis have been estimated to be 12 minutes or less. Thus, in accordance with the DPM, the minimum time to peak values of 0.1333 hours is utilized in the AHYMO-S4 model.

2.5 Peak Discharge Rates

Peak discharge rates for the existing and proposed conditions were calculated using the AHYMO-S4 computer program as outlined in Chapter 22 of the DMP. Soils report data obtained from the NRCS Web Soil Survey indicate that the primary soils on-site are classified as Hydraulic Soil Group B. These soils are typically well drained and have low runoff potential. Peak discharge rates for the existing and proposed conditions are presented in Tables 1 and 3 of Section 4 in this report.

3 Hydrologic and Hydraulic Analysis

3.1 Existing Site Description

The site is currently vacant and was cleared of all pre-existing facilities in late 2016 after the DMP was completed. For the purposes of this analysis, the pre-existing conditions were modeled in order to determine the allowable discharge from the site. As illustrated in Figure 2, Existing Site Map, with the exception of field and landscaped areas, the pre-existing site was fairly developed. The existing campus was characterized by buildings, sidewalks, and bituminous surfaces and landscaping.



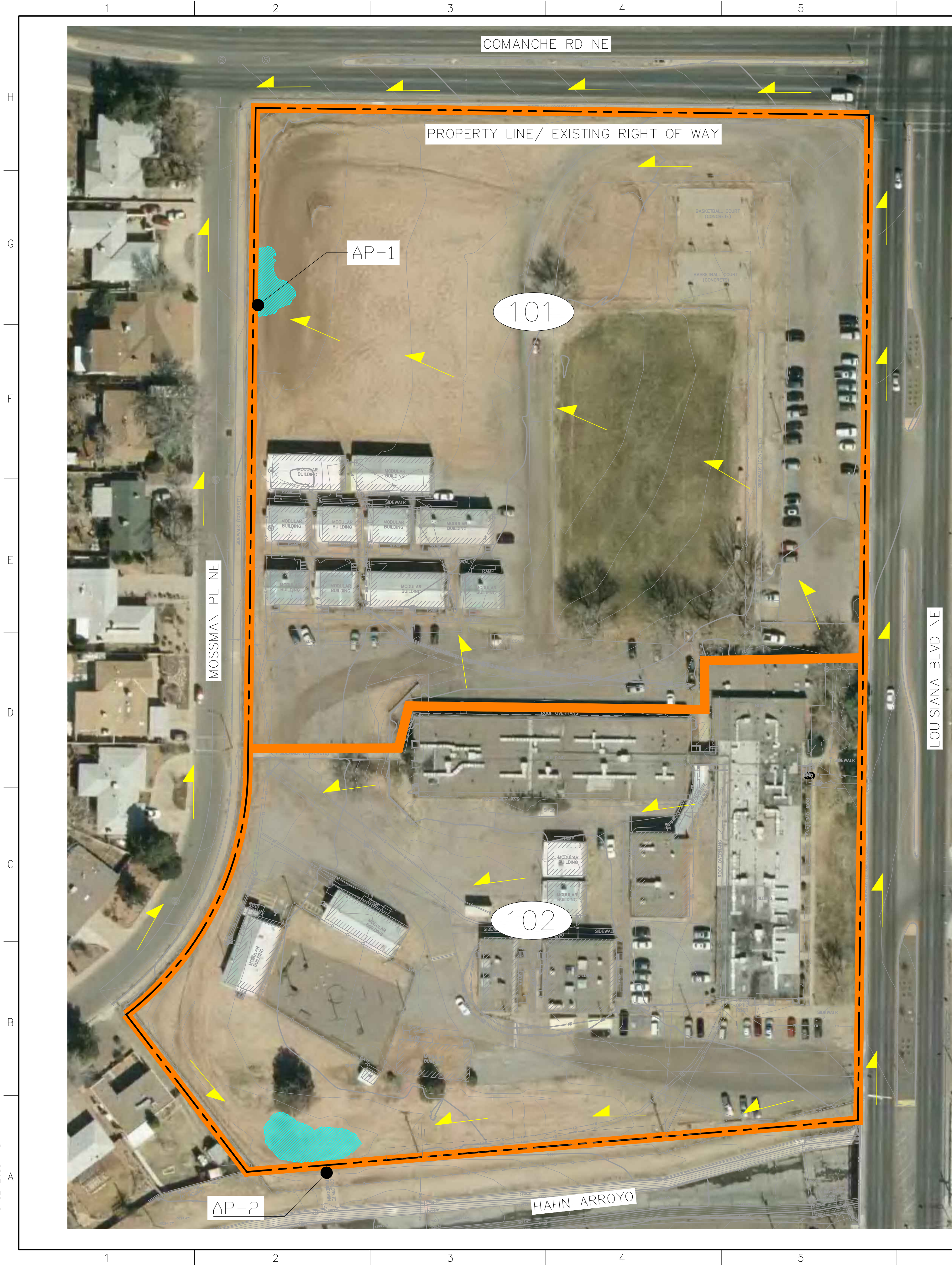
Figure 2: Existing Site Map

3.2 Existing Conditions Analysis

The existing conditions hydrology map (Figure 3, Page 6) shows the various parameters utilized to analyze the site, as well as peak rates and volumetric runoff. The general topography of the site drains to two low points, one located at the northwest corner and one at southwest corner of the project site. The area draining to the northwest “low point” ultimately spills over the sidewalk and discharges onto the Mossman Place NE and Comanche Rd. NE Intersection. The area draining to the southwest corner of the site ultimately discharges into a concrete rundown and into a 12-inch storm drain pipe, which outfalls into the South Hahn Arroyo Channel.

In reviewing the South Hahn Arroyo Channel Design Phase 1, by Smith Engineering Company, Inc., it was determined that the site is located in Main South Hahn Arroyo, also named the South Hahn Arroyo, Watershed Boundary. This segment of the Hahn Arroyo is owned and maintained by the City of Albuquerque. The north boundary of the site is currently at an elevation in which flows from Comanche Rd. could potentially encroach upon the site as shown on the FEMA FIRM. This report assumes no offsite flows enter the site.

8/12/2016 4:37 PM



LEGEND

- EXISTING MAJOR CONTOUR (5')
- EXISTING MINOR CONTOUR (1')
- EXISTING ON-SITE DETENTION
- BASIN BOUNDARY
- RIGHT-OF-WAY
- FLOW ARROW
- BASIN IDENTIFIER
- ANALYSIS POINT

EXISTING DESIGN POINT PEAK
DISCHARGE AND VOLUMETRIC
RUNOFF SUMMARY

Existing Basin Peak Discharge and Volumetric Runoff							
Basin	Area (Ac)	Land Treatment Percentage (%)				Q ₁₀₀ (cfs)	V ₁₀₀ (ac-ft)
		A	B	C	D		
101	5.77	0	15	47	38	24.2	0.90
102	4.57	0	5	46	49	20.2	0.79

WILSON & COMPANY

4900 LANG AVE. NE
ALBUQUERQUE, NM 87109
PHONE: 505-348-4000
FAX: 505-348-4155 SECOND FLOOR
www.wilsonco.com

ALBUQUERQUE
PUBLIC SCHOOLS

SEAL

PROJECT NAME
**ALBUQUERQUE PUBLIC
SCHOOLS MONTGOMERY
COMPLEX DMP**

REV.	DATE	DESCRIPTION	BY

PROJECT NO: 1460006901
DESIGNED BY: EEV
DRAWN BY: EEV
CHECKED BY: EEV
DATE: AUG 2016

SHEET TITLE
**EXISTING
BASIN MAP
FIGURE 3**

SHEET NO:
PAGE 6

3.3 Existing Conditions Hydrologic Analysis Summaries

Table 1: Existing Basin Peak Discharge and Volumetric Runoff

Basin	Area (Ac)	Land Treatment Percentage (%)				Q ₁₀₀ (cfs)	V ₁₀₀ (ac-ft)
		A	B	C	D		
101	5.77	0	15	47	38	24.2	0.90
102	4.57	0	5	46	49	20.2	0.79

3.4 Proposed Site Description

The proposed site will consist of the following features: a professional development center, a parking lot, and a linear park on the west side of campus. The site will also include a proposed detention system at the southwest corner that will hold all runoff for the site in a 100-year event and gradually release to the South Hahn Arroyo Channel. The Fully Developed Site Plan Map can be found on page 9, Figure 4.

3.5 Proposed Drainage Improvements

Proposed drainage improvements are as follows:

- Storm Drain Culverts
- Swales
- South Hahn Arroyo Channel Penetration
- Open Ponds

3.6 Water Quality Treatment

The City of Albuquerque City Ordinance defines that all new development projects shall manage the runoff from precipitation which occurs during 90th percentile storm events. The 90th percentile storm event is defined as 0.44 inches, and also referred to as the “first-flush” event. The first-flush water quality volumetric runoff was calculated utilizing per equation below:

$$\text{First-Flush Volumetric Runoff} = [(P_{90\text{th}}) - (I_a)] * A_D$$

Where:

P_{90th} = 90th Percentile Precipitation = 0.44 inches

I_a = Initial Abstraction = 0.1 inches

A_D = Area of Land Treatment ‘D’ (Acres)

Therefore, per equation above:

$$\text{First-Flush Volumetric Runoff} = (0.34\text{-inches}) * (1 \text{ ft}/12\text{-inches}) * (5.1 \text{ AC}) = \underline{0.14 \text{ AC-FT}}$$

The 0.14 AC-FT is the total volume of runoff needing to be treated prior to flow leaving the site. The first flush volume will be provided with dead storage retention areas within each of the proposed ponds.

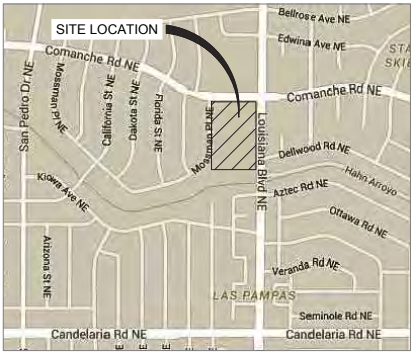
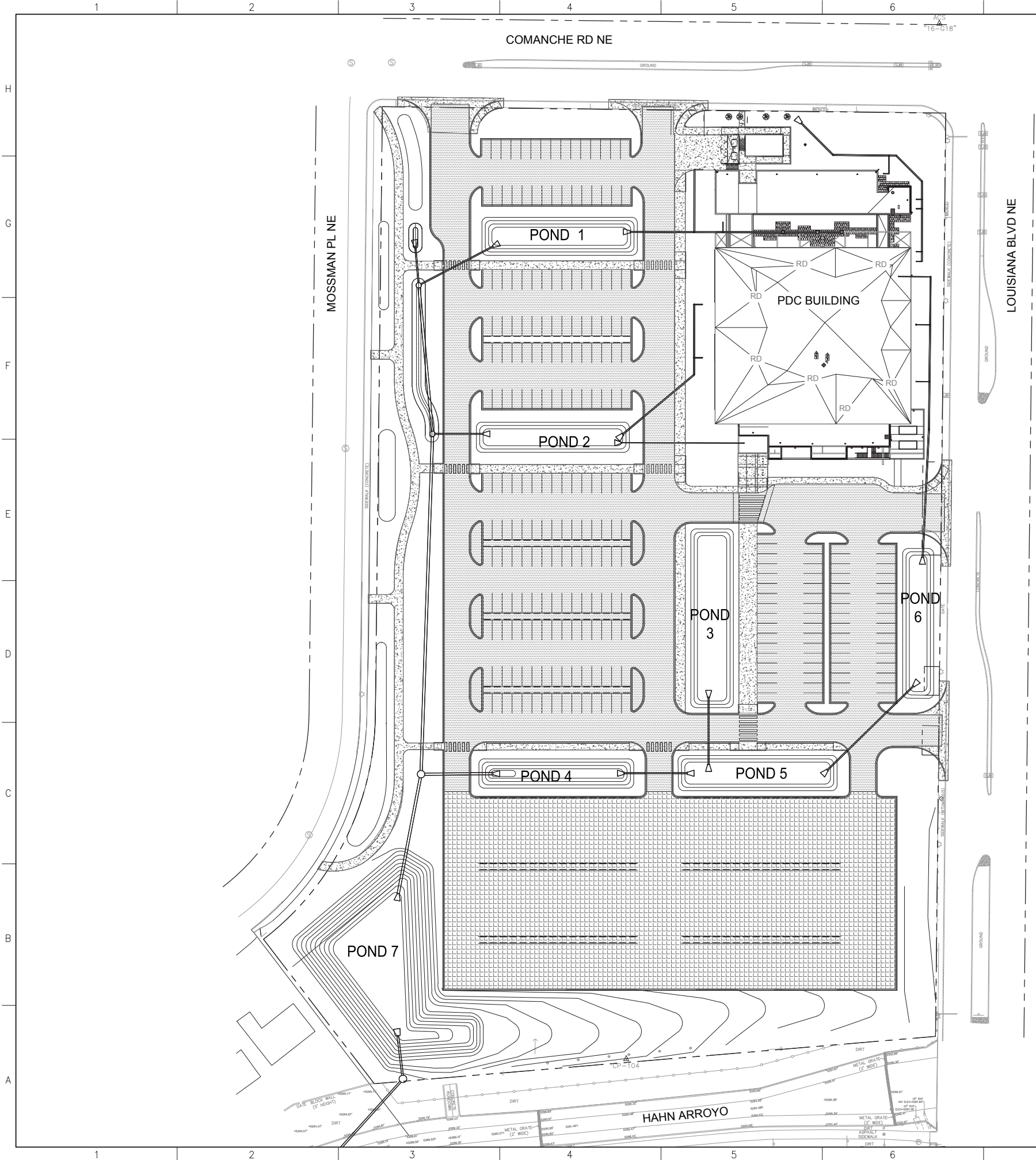
The majority of storm water flows are routed through open detention ponds to attenuate peak flows and allow fines to settle. Flows will ultimately drain into a detention pond located at the southwest corner of the site (Pond 7) prior to discharging into The South Hahn Arroyo Channel. Prior to entering Pond 7 the runoff will pass through a structural treatment (water quality manhole), which will allow for secondary treatment (floatables and solids) and removal of pollutants from urban runoff.

3.7 Proposed Conditions Analysis

The proposed conditions basin map (Figure 5, Page 10) shows the various parameters utilized to analyze the site, as well as peak discharge rates and volumetric runoff. The suggested grading of the site drains runoff generally west towards the landscape where it is collected and conveyed via an underground storm drain and detained onsite with a controlled peak discharge rate into The South Hahn Arroyo Channel.

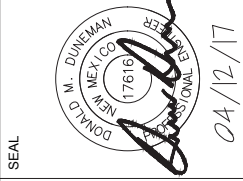
A flap gate will be installed in the 6-foot diameter manhole located on the storm drain that discharges into the South Hahn Arroyo. The flap gate will prevent water from entering the storm drain system when the South Hahn Arroyo is flowing. The storm drain design is based on the South Hahn Arroyo flowing full. See Section 3.8.

4/14/2017 11:15 AM



VICINITY MAP
ZONE ATLAS MAP NO G-18

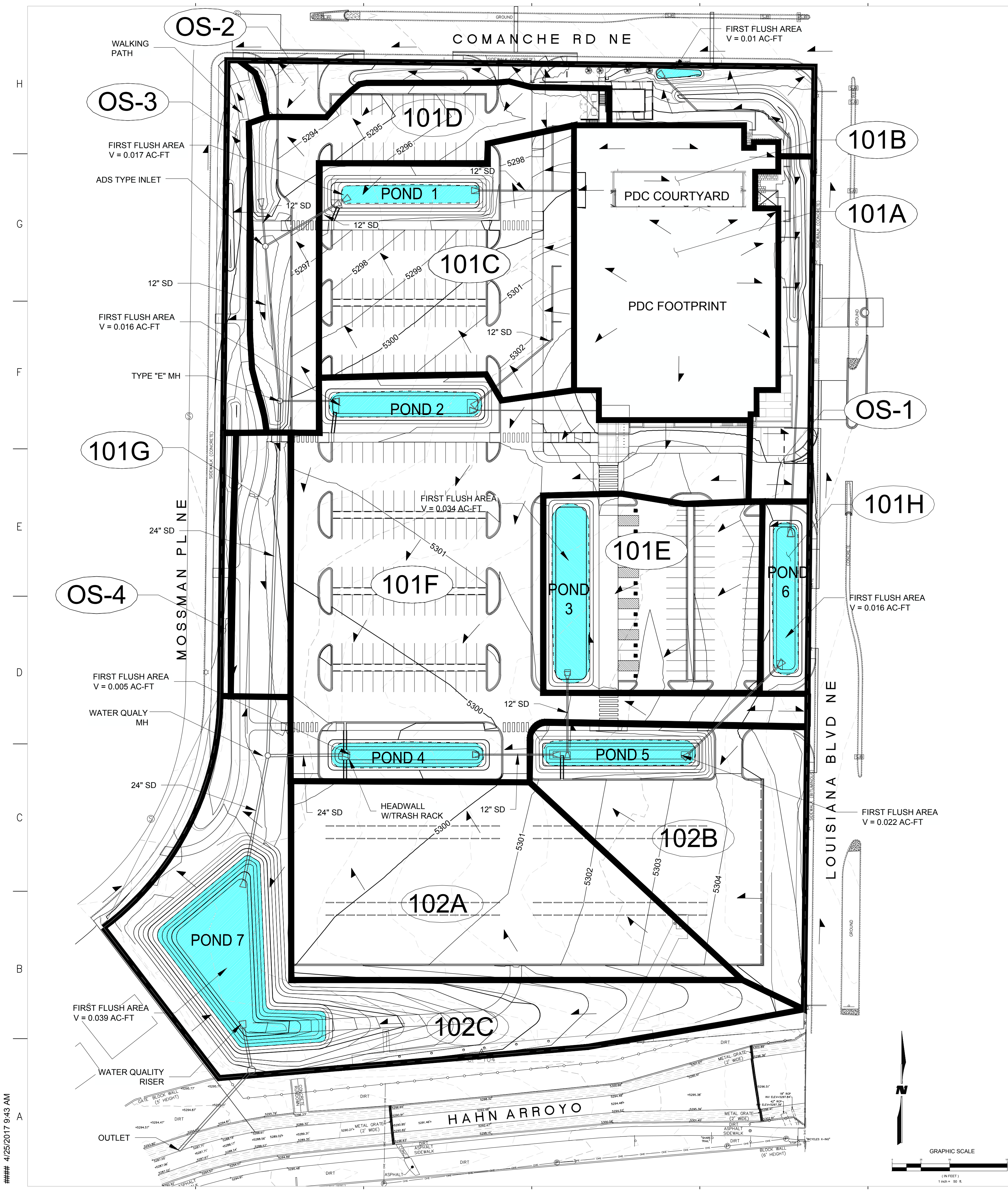
WILSON & COMPANY
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FAX: 505-348-4155 SECOND FLOOR
www.wilsonco.com



PROJECT NAME
**ALBUQUERQUE PUBLIC
SCHOOLS MONTGOMERY
COMPLEX DMP**

REV.	DATE	DESCRIPTION	BY

PROJECT NO: 1460006901
DESIGNED BY: EEV
DRAWN BY: EEV
CHECKED BY: EEV
DATE: AUG 2016
SHEET TITLE
**FULLY DEVELOPED
SITE PLAN
FIGURE 4**
SHEET NO:
PAGE 9



LEGEND

BASIN BOUNDARY ———

PROPOSED STORM DRAIN ———

BASIN IDENTIFIER 101

ROW - - - - -

FLOW ARROWS →

PONDING / FIRST FLUSH AREAS

PROPOSED DESIGN POINT PEAK DISCHARGE AND VOLUMETRIC RUNOFF SUMMARY

Basin	Area (Ac)	Land Treatment Percentage (%)				Q _{100yr-6hr} (cfs)	V _{100yr-24 hr} (ac-ft)
		A	B	C	D		
101A	0.905	0	0	0	100	4.7	0.21
101B	0.083	0	0	0	100	0.44	0.02
101C	1.008	0	15	0	85	5.47	0.24
101D	0.682	0	0	47	53	3.09	0.12
101E	0.733	0	15	0	85	2.91	0.11
101F	2.164	0	15	0	85	10.55	0.47
101G	0.263	0	0	70	30	1.12	0.04
101H	0.155	0	0	70	30	0.66	0.02
102A	1.182	0	0	100	0	4.41	0.13
102B	0.870	0	30	60	10	3.19	0.1
102C	1.333	0	0	97	3	5.03	0.15
OS-1	0.268	0	0	70	30	1.13	0.04
OS-2	0.421	0	0	82	18	1.7	0.57
OS-3	0.180	0	0	70	30	0.77	0.03
OS-4	0.050	0	0	90	10	0.21	0.01

POND TABLES

POND	PEAK FLOW (CFS)		VOLUME (AC-FT)			ELEVATION (FT)		
	IN	OUT	PRVD	REQ'D	FIRST FLUSH (PRVD)	TOP	BOTTOM	WSEL
1	7.52	3.35	0.230	0.143	0.017	5297.0	5294.0	5296.1
2	1.69	0.13	0.129	0.056	0.016	5300.0	5298.0	5299.0
3	2.87	0.01	0.232	0.096	0.034	5302.0	5300.0	5300.9
4	14.76	13.22	0.163	0.095	0.005	5300.0	5296.5	5299.1
5	3.15	0.44	0.163	0.081	0.022	5300.0	5298.0	5299.1
6	1.25	0.01	0.130	0.042	0.016	5305.0	5303.0	5303.8
7	23.69	19.12	1.533	0.205	0.039	5298.0	5299.0	5292.7

WILSON & COMPANY
4900 LANG AVE. NE
ALBUQUERQUE, NM 87109
PHONE: 505-348-4000
FAX: 505-348-4155
www.wilsonco.com

APS
ALBUQUERQUE PUBLIC SCHOOLS

SEAL
DONALD M. DUNHAM
NEW MEXICO
17616
Professional Engineer
04/12/17

PROJECT NAME
ALBUQUERQUE PUBLIC SCHOOLS MONTGOMERY COMPLEX DMP

REV.	DATE	DESCRIPTION	BY

PROJECT NO: 1460006901
DESIGNED BY: EEV
DRAWN BY: EEV
CHECKED BY: EEV
DATE: AUG 2016

SHEET TITLE
PROPOSED CONDITIONS BASIN MAP
FIGURE 5

SHEET NO:
PAGE 10

Albuquerque Public Schools – Montgomery Complex Drainage Report

Table 2: Proposed Basin Peak Discharge and Volumetric Runoff

Basin	Area (Ac)	Land Treatment Percentage (%)				Q _{100yr-6hr} (cfs)	V _{100yr-24 hr} (ac-ft)
		A	B	C	D		
101A	0.905	0	0	0	100	4.70	0.21
101B	0.083	0	0	0	100	0.44	0.02
101C	1.008	0	15	0	85	5.47	0.24
101D	0.682	0	0	47	53	3.09	0.12
101E	0.733	0	15	0	85	2.91	0.11
101F	2.164	0	15	0	85	10.55	0.47
101G	0.263	0	0	70	30	1.12	0.04
101H	0.155	0	0	70	30	0.66	0.02
102A	1.182	0	0	100	0	4.41	0.13
102B	0.870	0	30	60	10	3.19	0.10
102C	1.333	0	0	97	3	5.03	0.15
OS-1	0.268	0	0	70	30	1.13	0.04
OS-2	0.421	0	0	82	18	1.70	0.57
OS-3	0.180	0	0	70	30	0.77	0.03
OS-4	0.050	0	0	90	10	0.21	0.01

3.8 South Hahn Arroyo Channel

The Hahn Arroyo Channel Design Phase 1 by Smith Engineering was utilized to determine the approximate 100-year Water Surface Elevation (WSEL) at the point of discharge during the peak flow in the Channel. The max channel depth is ~ 3.3 feet. (Hahn Arroyo Channel Design Phase 1, Smith Engineering, 2010). Based on the max channel depth, the starting HGL for the proposed storm drain system is listed in Table 4 below:

Table 3: Proposed Storm Drain System Outflow

100-year WSEL in Channel (ft)	Outflow from Proposed Storm Drain System (cfs)
5291.06	19.1

3.9 Proposed Storm Drain System

The proposed storm drain system (see Appendix C) will take peak flow runoff from the site and ultimately outflow to South Hahn Arroyo Channel. The proposed storm drain system consists of a series of storm drain, ponds and culverts which convey flow to Pond 7 before discharging to the Hahn Arroyo. See Figure 5 – Proposed Conditions Basin Map.

Albuquerque Public Schools – Montgomery Complex Drainage Report

Roof drainage from the west side of the Professional Development Center (PDC) building is conveyed via storm drain and discharges to Ponds 1 and 2. Pond 1 collects runoff from Basin 101B, 101C and a portion of 101A (roof drainage) and discharges to a swale along the west side of the property. The swale also collects runoff from Basin 101D which sheet flows and drains to the swale via a 2' curb opening. Pond 2 collects runoff from a portion of Basin 101A (roof drainage) and discharges to a storm drain system which conveys flows along the west side of the property to Pond 7. This storm drain system also collects runoff from Pond 1 and Basin 101D with an inlet to capture flows from the swale. The storm drain system continues south and collects runoff from Pond 4 before ultimately draining to Pond 7. The total flow from the site to the Hahn Arroyo will not exceed the outflow of 19.1 cfs per Table 4.

Pond 4 collects runoff from Basins 102A, 102B, 101F, 101E, 101H and a portion of Basin 101A (roof drainage). Roof drainage from a portion of Basin 101A is collected by storm drain and conveyed to Pond 6. Pond 6 also collects runoff from Basin 101H and discharges to Pond 5 via a storm drain culvert. Pond 5 collects runoff from Basin 102B and from Pond 3. Pond 3 collects runoff from Basin 101E. Pond 5 then discharges to Pond 4, which discharges to the main storm drain located along the west side of the property and conveys runoff to Pond 7.

There are 4 small drainage basins that drain directly to the adjacent roadways. Basin OS-1, with a 100-year discharge rate of 1.12 cfs drains directly to Louisiana Blvd. Basin OS-2 discharges 1.68 cfs directly to Comanche Rd. Basins OS-3 and OS-4 drain to Mossman Place with a total 100-year discharge rate of 0.97 cfs. A small portion of Basin 101A is captured by a storm drain and conveyed to a first flush pond located at the northeast corner of the property, with a discharge rate of 1.40 cfs. The total flow draining to surrounding roadways is much less than the pre-existing conditions discharge rate of 24.2 cfs.

Culverts throughout the site were sized using CulvertMaster by Bentley. Table 5 shows the Culvert Hydraulic Summary. See Figure 5 – Proposed Conditions Basin Map for the location of all culverts.

Inlet capacities were calculated with FlowMaster. FlowMaster uses the weir equation and the orifice equation to calculate the capacity of inlets. Intercepted flow is calculated at any depth using the lesser of computed intercepted flows using the weir or orifice equation. Inlets are capable of conveying calculated flows with no more than 6" of head. Table 6 shows the Inlet Peak Flows and Inlet Capacities.

Albuquerque Public Schools – Montgomery Complex Drainage Report

Table 4: CulvertMaster Hydraulic Summary

Culvert ID	Downstream	Line Length	Line Size	Line Slope	Flow Rate	Velocity
		(ft)	(in)	(%)	(cfs)	(ft/s)
Pond 1 Outlet	West Swale	75.8	12	3.30	4.72	6.00
Pond 2 Outlet	Main Storm Drain	45.8	12	15.66	3.88	4.94
Pond 3 Outlet	Pond 5	61	12	3.28	3.57	4.55
Pond 4 Outlet	Main Storm Drain	65	24	1.06	21.79	6.94
Pond 5 Outlet	Pond 4	57	12	1.75	3.65	4.64
Pond 6 Outlet	Pond 5	109	12	4.59	2.93	3.74
Pond 7 Outlet	Hahn Arroyo	130	24	0.78	19.12	6.09

Table 5: Inlet Peak Flows and Inlet Capacities

		Intercepted Peak Flow Rate Required	Intercepted Peak Flow Rate Provided
Inlet	Type	Qp _{100-6hr} (cfs)	Qp (cfs)
A-1	Nyloplast 12" Pedestrian	0.1	1.06*
A-2	Nyloplast 12" Pedestrian	0.1	1.06*
A-3	Nyloplast 12" Pedestrian	0.1	1.06*
A-4	Nyloplast 12" Pedestrian	1.03	1.06*

* Based on 3-inch depth over grate

3.10 Detention System

The AHYMO-S4 Computer Program (Appendix D) was utilized to route the proposed flows through the detention pond system which releases flow to the Hahn Arroyo. The detention pond results are located in Table 7 below.

Table 6: Detention Pond Summary Table

POND	PEAK FLOW (CFS)		VOLUME (AC-FT)			ELEVATION (FT)		
	IN	OUT	PRV'D	REQ'D	FIRST FLUSH (PRV'D)	TOP	BOTTOM	WSEL
1	7.52	3.35	0.230	0.143	0.017	5297.0	5294.0	5296.1
2	1.69	0.13	0.129	0.056	0.016	5300.0	5298.0	5299.0
3	2.87	0.01	0.232	0.096	0.034	5302.0	5300.0	5300.9
4	14.76	13.22	0.163	0.095	0.005	5300.0	5296.5	5299.1
5	3.15	0.44	0.163	0.081	0.022	5300.0	5298.0	5299.1
6	1.25	0.01	0.130	0.042	0.016	5305.0	5303.0	5303.8
7	23.69	19.12	1.533	0.205	0.039	5298.0	5289.0	5292.7

4 Summary and Conclusions

The primary components of the Drainage Report include the following:

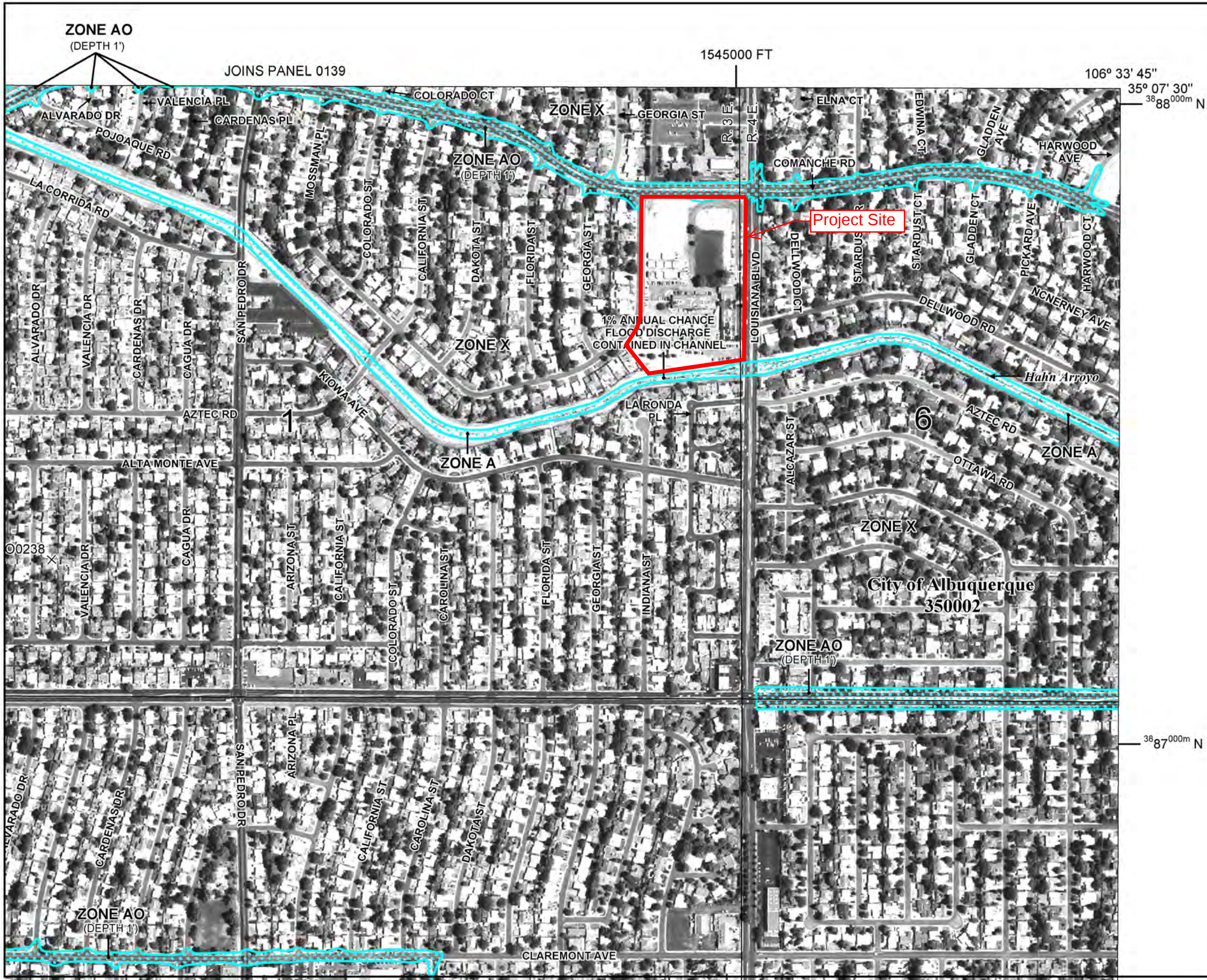
- Increased collection and diversion of runoff to the South Hahn Arroyo at a controlled maximum rate of 19.1 cfs.
- Proposed storm drain facilities are modeled to convey the 100-year, 6-hour storm event.
- The detention system is sized to detain a 100-year, 24-hour volumetric runoff event.
- 7 water quality enhancement/detention ponds
- Drainage swales to facilitate drainage around structures
- Minimize the amount of runoff draining to adjacent roadways
- Prevention of floatables and sediment transport into South Hahn Arroyo by installing a water quality riser

The proposed peak discharge into the South Hahn Arroyo of 19.1 cfs is less than the existing peak discharge of 20.2 cfs. Proposed ponds have been incorporated in the plan including first flush retention to provide treatment of storm water generated throughout the site.

Appendices

Appendix A – Referenced Material

FEMA FIRM MAP



MAP SCALE 1" = 500'

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0352H

FIRM
FLOOD INSURANCE RATE MAP
BERNALILLO COUNTY,
NEW MEXICO
AND INCORPORATED AREAS

PANEL 352 OF 825
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBUQUERQUE, CITY OF	350002	0352	H

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
35001C0352H

MAP REVISED
AUGUST 16, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

NOAA POINT PRECIPITATION FREQUENCY ESTIMATES



NOAA Atlas 14, Volume 1, Version 5
Location name: Albuquerque, New Mexico, US*
Latitude: 35.1223°, Longitude: -106.5699°
Elevation: 5299 ft*
* source: Google Maps



POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aeriels](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.176 (0.149-0.209)	0.228 (0.191-0.271)	0.307 (0.256-0.364)	0.367 (0.306-0.435)	0.449 (0.373-0.532)	0.515 (0.426-0.609)	0.583 (0.479-0.689)	0.654 (0.535-0.774)	0.751 (0.609-0.890)	0.830 (0.669-0.981)
10-min	0.268 (0.226-0.318)	0.347 (0.290-0.412)	0.466 (0.390-0.554)	0.558 (0.466-0.662)	0.684 (0.568-0.810)	0.783 (0.649-0.927)	0.887 (0.728-1.05)	0.996 (0.815-1.18)	1.14 (0.926-1.35)	1.26 (1.02-1.49)
15-min	0.332 (0.280-0.395)	0.429 (0.360-0.510)	0.578 (0.484-0.686)	0.692 (0.577-0.820)	0.848 (0.704-1.00)	0.970 (0.804-1.15)	1.10 (0.903-1.30)	1.24 (1.01-1.46)	1.42 (1.15-1.68)	1.57 (1.26-1.85)
30-min	0.447 (0.377-0.532)	0.578 (0.485-0.687)	0.778 (0.651-0.924)	0.932 (0.777-1.11)	1.14 (0.948-1.35)	1.31 (1.08-1.55)	1.48 (1.22-1.75)	1.66 (1.36-1.97)	1.91 (1.55-2.26)	2.11 (1.70-2.49)
60-min	0.553 (0.467-0.658)	0.716 (0.600-0.851)	0.963 (0.806-1.14)	1.15 (0.962-1.37)	1.41 (1.17-1.67)	1.62 (1.34-1.92)	1.83 (1.51-2.17)	2.06 (1.68-2.43)	2.36 (1.91-2.80)	2.61 (2.10-3.08)
2-hr	0.656 (0.542-0.803)	0.842 (0.698-1.03)	1.12 (0.921-1.36)	1.33 (1.10-1.62)	1.64 (1.34-1.99)	1.89 (1.53-2.28)	2.14 (1.73-2.60)	2.42 (1.94-2.91)	2.80 (2.22-3.38)	3.11 (2.45-3.76)
3-hr	0.700 (0.584-0.851)	0.891 (0.740-1.08)	1.17 (0.971-1.42)	1.39 (1.15-1.68)	1.70 (1.40-2.05)	1.95 (1.59-2.34)	2.21 (1.80-2.66)	2.49 (2.01-3.00)	2.88 (2.30-3.46)	3.20 (2.54-3.85)
6-hr	0.817 (0.685-0.988)	1.03 (0.865-1.25)	1.33 (1.12-1.60)	1.57 (1.31-1.88)	1.89 (1.57-2.27)	2.14 (1.77-2.57)	2.42 (1.99-2.89)	2.69 (2.20-3.22)	3.08 (2.50-3.68)	3.39 (2.73-4.05)
12-hr	0.901 (0.764-1.06)	1.14 (0.963-1.34)	1.45 (1.22-1.70)	1.69 (1.42-1.98)	2.02 (1.69-2.36)	2.27 (1.90-2.66)	2.54 (2.11-2.96)	2.81 (2.32-3.28)	3.18 (2.61-3.72)	3.49 (2.83-4.08)
24-hr	1.03 (0.885-1.20)	1.29 (1.11-1.50)	1.62 (1.39-1.88)	1.88 (1.62-2.19)	2.24 (1.92-2.61)	2.52 (2.14-2.92)	2.81 (2.38-3.25)	3.11 (2.62-3.59)	3.50 (2.93-4.05)	3.82 (3.18-4.43)
2-day	1.07 (0.925-1.24)	1.35 (1.17-1.56)	1.70 (1.47-1.97)	1.98 (1.70-2.29)	2.36 (2.01-2.73)	2.65 (2.25-3.06)	2.95 (2.50-3.41)	3.26 (2.75-3.78)	3.68 (3.08-4.28)	4.01 (3.35-4.67)
3-day	1.18 (1.05-1.33)	1.47 (1.31-1.66)	1.83 (1.63-2.06)	2.12 (1.87-2.37)	2.50 (2.20-2.81)	2.79 (2.45-3.14)	3.09 (2.71-3.47)	3.39 (2.96-3.82)	3.80 (3.30-4.29)	4.12 (3.56-4.70)
4-day	1.29 (1.17-1.41)	1.60 (1.46-1.75)	1.96 (1.78-2.15)	2.25 (2.05-2.46)	2.64 (2.39-2.88)	2.93 (2.66-3.21)	3.23 (2.91-3.53)	3.53 (3.17-3.86)	3.92 (3.52-4.31)	4.22 (3.77-4.72)
7-day	1.47 (1.34-1.60)	1.82 (1.67-1.99)	2.22 (2.03-2.42)	2.53 (2.31-2.76)	2.94 (2.68-3.20)	3.25 (2.96-3.53)	3.56 (3.23-3.86)	3.85 (3.49-4.19)	4.24 (3.83-4.61)	4.52 (4.08-4.93)
10-day	1.63 (1.50-1.77)	2.02 (1.85-2.20)	2.48 (2.27-2.69)	2.83 (2.60-3.07)	3.31 (3.03-3.58)	3.66 (3.35-3.96)	4.02 (3.66-4.35)	4.37 (3.97-4.74)	4.83 (4.37-5.24)	5.17 (4.66-5.62)
20-day	2.05 (1.87-2.24)	2.55 (2.33-2.78)	3.09 (2.83-3.37)	3.51 (3.21-3.82)	4.04 (3.69-4.39)	4.42 (4.03-4.80)	4.79 (4.36-5.20)	5.14 (4.67-5.58)	5.58 (5.06-6.07)	5.90 (5.33-6.42)
30-day	2.46 (2.25-2.67)	3.05 (2.80-3.31)	3.68 (3.37-3.99)	4.14 (3.79-4.48)	4.72 (4.32-5.10)	5.14 (4.69-5.55)	5.53 (5.04-5.97)	5.90 (5.37-6.37)	6.34 (5.76-6.86)	6.66 (6.04-7.21)
45-day	3.02 (2.77-3.27)	3.74 (3.44-4.05)	4.46 (4.10-4.83)	4.97 (4.57-5.38)	5.60 (5.14-6.06)	6.03 (5.54-6.53)	6.42 (5.90-6.95)	6.77 (6.21-7.33)	7.17 (6.58-7.77)	7.42 (6.82-8.04)
60-day	3.47 (3.20-3.77)	4.30 (3.96-4.66)	5.13 (4.73-5.56)	5.72 (5.27-6.20)	6.44 (5.93-6.97)	6.93 (6.38-7.50)	7.38 (6.80-8.00)	7.78 (7.17-8.45)	8.25 (7.60-8.96)	8.55 (7.88-9.28)

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

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PF graphical

Appendix B – Hydrologic Analyses

**EXISTING CONDITIONS
100 YEAR-6 HOUR
HYDROLOGY MODEL**

* ALBUQUERQUE PUBLIC SCHOOLS
* MASTER DRAINAGE PLAN
* EXISTING CONDITIONS MODEL
* 100 YR 6 HR STORM EVENT

START
RAINFALL TYPE=1 RAIN QUARTER=0.0 IN RAIN ONE=2.14 IN
 RAIN SIX=2.60 IN RAIN DAY=3.10 IN DT=0.01 HRS
COMPUTE NM HYD ID=1 HYD NO=101 DA= 0.00903 SQ MI
 A=0 AC B=0.87 AC C=2.72 AC D=2.18 AC
 TP=0.1333 HR MASS RAIN=-1
PRINT HYD ID=1 CODE=1
PLOT HYD ID=1
COMPUTE NM HYD ID=2 HYD NO=102 DA= 0.00714 SQ MI
 A=0 AC B=0.24 AC C=2.09 AC D=2.24 AC
 TP=0.1333 HR MASS RAIN=-1
PRINT HYD ID=2 CODE=1
PLOT HYD ID=2
FINISH

INPUT FILE = ainage Report\Hydrologic_Analysis\Existing Condition\AHYMO\6 hr\EX100YR6.DAT USER NO.= AHYMO_Temp_User:20122010

HYDROGRAPH IDENTIFICATION		FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1
										NOTATION
START										TIME= 0.00
RAINFALL TYPE= 1 NOAA 14										RAIN6= 2.600
COMPUTE NM HYD	101.00	-	1	0.00903	24.19	0.809	1.67933	1.530	4.186	PER IMP= 37.78
COMPUTE NM HYD	102.00	-	2	0.00714	20.23	0.693	1.82056	1.530	4.427	PER IMP= 49.02
FINISH										

**PROPOSED CONDITIONS
100 YEAR-6 HOUR
HYDROLOGY MODEL**

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1	NOTATION
*S*****											
*S											
*S	100 YEAR 24 HOUR STORM - PROPOSED RUNOFF ANALYSIS										
*S	RAINFALL DATA FROM DPM Chapter 22 - ZONE 3										
*S											
*S*****											
START											TIME= 0.00
RAINFALL TYPE= 1 NOAA 14											RAIN6= 2.600
COMPUTE NM HYD	101A	-	1	0.00141	4.70	0.177	2.34898	1.518	5.206		PER IMP= 100.00
DIVIDE HYD	101A-W	1	20	0.00103	3.43	0.129	2.34877	1.518	5.206		
	101A-Rem	and	21	0.00038	1.27	0.048	2.34877	1.518	5.206		
DIVIDE HYD	101A-E	21	30	0.00018	0.61	0.023	2.34817	1.518	5.206		
	101A-COM	and	31	0.00020	0.66	0.025	2.34817	1.518	5.206		
DIVIDE HYD	11.20	20	11	0.00051	1.71	0.064	2.34868	1.518	5.206		
	10.10	and	10	0.00051	1.71	0.064	2.34868	1.518	5.206		
*S POND 2											
ROUTE RESERVOIR	POND2	11	20	0.00051	0.13	0.057	2.06249	2.178	0.406	AC-FT= 0.056	
COMPUTE NM HYD	101B	-	2	0.00013	0.44	0.016	2.34898	1.518	5.308	PER IMP= 100.00	
COMPUTE NM HYD	101C	-	3	0.00175	5.47	0.201	2.15800	1.518	4.883	PER IMP= 85.00	
ADD HYD	4.00	10& 2	4	0.00064	2.16	0.081	2.34826	1.518	5.227		
ADD HYD	5.POND1	4& 3	5	0.00239	7.63	0.282	2.20911	1.518	4.976		
*S POND 1											
ROUTE RESERVOIR	POND1	5	10	0.00239	3.35	0.274	2.14362	1.716	2.185	AC-FT= 0.143	
COMPUTE NM HYD	101H	-	15	0.00024	0.66	0.021	1.64544	1.518	4.300	PER IMP= 30.00	
ADD HYD	101H.1	30&15	16	0.00042	1.27	0.044	1.94864	1.518	4.691		
*S POND 6											
ROUTE RESERVOIR	POND6	16	11	0.00042	0.01	0.038	1.67357	2.838	0.028	AC-FT= 0.042	
COMPUTE NM HYD	101E	-	12	0.00115	2.91	0.099	1.61688	1.518	3.954	PER IMP= 42.50	
*S POND 3											
ROUTE RESERVOIR	101E.1	12	21	0.00115	0.01	0.064	1.04829	3.201	0.013	AC-FT= 0.096	
ADD HYD	36.00	21&11	30	0.00157	0.02	0.102	1.21636	3.036	0.017		
COMPUTE NM HYD	102B	-	13	0.00136	3.19	0.098	1.35464	1.518	3.664	PER IMP= 10.00	
ADD HYD	102B.1	30&13	31	0.00293	3.20	0.200	1.28043	1.518	1.703		
*S POND 5											
ROUTE RESERVOIR	POND5	31	22	0.00293	0.45	0.145	0.92863	1.914	0.238	AC-FT= 0.081	
COMPUTE NM HYD	102A	-	14	0.00185	4.41	0.132	1.34392	1.518	3.731	PER IMP= 0.00	
ADD HYD	23.00	22&14	23	0.00478	4.42	0.278	1.08909	1.518	1.443		
COMPUTE NM HYD	101F	-	15	0.00338	10.55	0.389	2.15799	1.518	4.875	PER IMP= 85.00	
ADD HYD	24.00	23&15	24	0.00816	14.96	0.667	1.53191	1.518	2.865		
*S POND 4											
ROUTE RESERVOIR	POND4	24	25	0.00816	13.31	0.662	1.52069	1.584	2.548	AC-FT= 0.096	
COMPUTE NM HYD	101D	-	2	0.00107	3.09	0.107	1.87660	1.518	4.535	PER IMP= 53.00	
ADD HYD	101D.1	10& 2	41	0.00346	5.65	0.380	2.06129	1.584	2.550		
ADD HYD	101D.11	41&20	42	0.00398	5.65	0.437	2.06144	1.584	2.223		
COMPUTE NM HYD	101G	-	43	0.00041	1.12	0.036	1.64544	1.518	4.248	PER IMP= 30.00	
ADD HYD	101G.1	43&42	44	0.00439	6.63	0.473	2.02242	1.584	2.361		
ADD HYD	101G.11	44&25	45	0.01255	19.94	1.135	1.69609	1.584	2.483		
COMPUTE NM HYD	102C	-	26	0.00208	5.03	0.152	1.37407	1.518	3.781	PER IMP= 3.00	
ADD HYD	102C.1	45&26	46	0.01463	24.64	1.287	1.65029	1.551	2.632		
*S POND 7											

COMMAND	IDENTIFICATION	NO.	NO.	(SQ MI)	AHYMO.SUM (CFS)	(AC-FT)	(INCHES)	(HOURS)	ACRE	NOTATION
ROUTE RESERVOIR	13.00	46	13	0.01463	19.80	1.226	1.57195	1.683	2.115	AC-FT= 0.215
COMPUTE NM HYD	OS-1	-	40	0.00042	1.13	0.037	1.64544	1.518	4.238	PER IMP= 30.00
COMPUTE NM HYD	OS-2	-	41	0.00066	1.70	0.054	1.52483	1.518	4.036	PER IMP= 18.00
COMPUTE NM HYD	OS-3	-	42	0.00028	0.77	0.025	1.64544	1.518	4.277	PER IMP= 30.00
COMPUTE NM HYD	OS-4	-	43	0.00008	0.21	0.006	1.44442	1.518	4.141	PER IMP= 10.00
FINISH										

PROP 100-6.DAT

* ALBUQUERQUE PUBLIC SCHOOLS
 * MONTGOMERY COMPLEX DRAINAGE MASTER PLAN
 * PROPOSED CONDITIONS MODEL
 * 100 YR 6 HR STORM EVENT
 * DATE: APRIL 2017

*S*****
 *S
 *S 100 YEAR 24 HOUR STORM - PROPOSED RUNOFF ANALYSIS
 *S RAINFALL DATA FROM DPM Chapter 22 - ZONE 3
 *S*****

START 0.0 HOURS
 RAINFALL TYPE=1 RAIN QUARTER=0.0 IN RAIN ONE=2.14 IN
 RAIN SIX=2.60 IN RAIN DAY=3.10 IN DT=0.033 HRS

*

 * COMPUTE HYD FOR BASIN 101A

 *

COMPUTE NM HYD ID=1 HYD NO=101A DA= 0.00141 SQ MI
 PER A=0 PER B=0 PER C=0 PER D=100
 TP=0.1333 HR MASS RAIN=-1

PRINT HYD ID=1 CODE=1

*

 * DIVIDE HYD FOR BASIN 101A 73% TO WEST 13% TO EAST SD & 14% to Comanche

 *

DIVIDE HYD ID=1 PER=-0.73 ID=20 HYD NO=101A-W
 ID=21 HYD NO=101A-Rem

DIVIDE HYD ID=21 PER=-0.48 ID=30 HYD NO=101A-E
 ID=31 HYD NO=101A-COM

PRINT HYD ID=20 CODE=1
 PRINT HYD ID=30 CODE=1
 PRINT HYD ID=31 CODE=1

*

 * DIVIDE HYD FOR BASIN 101A WEST BETWEEN PONDS 1 AND 2

 *

DIVIDE HYD ID=20 PER=-0.50 ID=11 HYD NO=11.2
 ID=10 HYD NO=10.1

PRINT HYD ID=10 CODE=1
 PRINT HYD ID=11 CODE=1

*

 *S POND 2
 *

****Route 101A-E THROUGH POND 2

ROUTE RESERVOIR	ID=20 HYD NO=POND2	INFLOW ID=11	CODE=5	
	OUTFLOW (CFS)	STORAGE (AC FT)		ELEV (FT)
	0.0	0.000		5298.0
	0.01	0.054		5299.0
	3.83	0.129		5300.0

PRINT HYD ID=20 CODE=5

*

 * COMPUTE HYD FOR BASIN 101B

 *

COMPUTE NM HYD ID=2 HYD NO=101B DA= 0.00013 SQ MI
 PER A=0 PER B=0 PER C=0 PER D=100
 TP=0.1333 HR MASS RAIN=-1

PRINT HYD ID=2 CODE=1

PROP 100-6.DAT

```

*
*****
*
*   COMPUTE HYD FOR BASIN 101C
*****
*

COMPUTE NM HYD      ID=3  HYD NO=101C  DA= 0.00175 SQ MI
                    PER A=0 PER B=15 PER C=0 PER D=85
                    TP=0.1333 HR MASS RAIN=-1

PRINT HYD           ID=3  CODE=1
*****
**** ADD HYD HALF 101A-W TO 101B TO GET 101B.1
ADD HYD             ID=4  HYD NO=4   INFLOW IDS= 10 AND 2
PRINT HYD           ID=4  CODE=5

**** ADD HYD 101B.1 TO 101C TO GET 101C.1
ADD HYD             ID=5  HYD NO=5.POND1 INFLOW IDS= 4 AND 3
PRINT HYD           ID=5  CODE=5
*
*****
*S POND 1
*
****Route 101C.1 THROUGH POND 1
*
ROUTE RESERVOIR     ID=10  HYD NO=POND1 INFLOW ID=5  CODE=5
                    OUTFLOW (CFS)      STORAGE (AC FT)      ELEV (FT)
                    0.0              0.000              5294.0
                    0.01             0.055              5295.0
                    3.19             0.131              5296.0
                    4.52             0.230              5297.0

PRINT HYD           ID=10  CODE=5

*
*****
*
*   COMPUTE HYD FOR BASIN 101H
*****
*

COMPUTE NM HYD      ID=15  HYD NO=101H  DA= 0.00024 SQ MI
                    PER A=0 PER B=0 PER C=70 PER D=30
                    TP=0.1333 HR MASS RAIN=-1

PRINT HYD           ID=15  CODE=1

*
*ADD ROOF DRAIN FROM EAST HALF TO BASIN 101H

ADD HYD             ID=16  HYD NO=101H.1 INFLOW IDS= 30 AND 15
PRINT HYD           ID=16  CODE=5
*
*****
*S POND 6
*
****Route THROUGH POND 6
*
ROUTE RESERVOIR     ID=11  HYD NO=POND6 INFLOW ID=16  CODE=5
                    OUTFLOW (CFS)      STORAGE (AC FT)      ELEV (FT)
                    0.00              0.000              5303
                    0.01             0.055              5304
                    2.93             0.130              5305

PRINT HYD           ID=11  CODE=5
*
*****
*
*   COMPUTE HYD FOR BASIN 101E
*****
*

COMPUTE NM HYD      ID=12  HYD NO=101E  DA= 0.00115 SQ MI
                    PER A=0 PER B=115 PER C=0 PER D=85
                    TP=0.1333 HR MASS RAIN=-1

PRINT HYD           ID=12  CODE=1

*
*****
*S POND 3

```

```

*
*ROUTE BASIN 101E THROUGH POND 3
ROUTE RESERVOIR      ID=21  HYD NO=101E.1  INFLOW ID=12  CODE=5
                     OUTFLOW (CFS)          STORAGE (AC FT)          ELEV (FT)
                     0.00                    0.000                    5300
                     0.01                    0.103                    5301
                     3.57                    0.232                    5302

PRINT HYD            ID=21   CODE=5
*

*ADD OUTFLOW FROM PONDS 3 AND 6
ADD HYD              ID=30  HYD NO=36  INFLOW IDS= 21 AND 11
PRINT HYD            ID=30   CODE=5
*
*****
*      COMPUTE HYD FOR BASIN 102B
*****
*
COMPUTE NM HYD       ID=13  HYD NO=102B  DA= 0.00136 SQ MI
                     PER A=0 PER B=30 PER C=60 PER D=10
                     TP=0.1333 HR MASS RAIN=-1

PRINT HYD            ID=13   CODE=1
*
*****
*ADD ADD OUTFLOW FROM PONDS 3 AND 6 TO BASIN 102B
ADD HYD              ID=31  HYD NO=102B.1  INFLOW IDS= 30 AND 13
PRINT HYD            ID=31   CODE=5
*
*****
*S POND 5
*
*ROUTE THROUGH POND 5
ROUTE RESERVOIR      ID=22  HYD NO=POND5  INFLOW ID=31  CODE=5
                     OUTFLOW (CFS)          STORAGE (AC FT)          ELEV (FT)
                     0.00                    0.000                    5298
                     0.01                    0.070                    5299
                     3.65                    0.163                    5300

PRINT HYD            ID=22   CODE=5
*
*****
*      COMPUTE HYD FOR BASIN 102A
*****
*
COMPUTE NM HYD       ID=14  HYD NO=102A  DA= 0.001847 SQ MI
                     PER A=0 PER B=0 PER C=100 PER D=0
                     TP=0.1333 HR MASS RAIN=-1

PRINT HYD            ID=14   CODE=1
*
*****
*ADD ADD OUTFLOW FROM POND 5 AND BASIN 102A
ADD HYD              ID=23  HYD NO=23  INFLOW IDS= 22 AND 14
PRINT HYD            ID=23   CODE=5
*
*****
*      COMPUTE HYD FOR BASIN 101F
*****
*
COMPUTE NM HYD       ID=15  HYD NO=101F  DA= 0.003381 SQ MI
                     PER A=0 PER B=15 PER C=0 PER D=85
                     TP=0.1333 HR MASS RAIN=-1

PRINT HYD            ID=15   CODE=1
*
*****
*ADD ADD OUTFLOW FROM POND 5 AND BASIN 102A

```

```

PROP 100-6.DAT
ADD HYD          ID=24 HYD NO=24  INFLOW IDS= 23 AND 15
PRINT HYD        ID=24  CODE=5
*
*****
*S POND 4
*
*ROUTE THROUGH POND 4

ROUTE RESERVOIR   ID=25  HYD NO=POND4  INFLOW ID=24  CODE=5
                  OUTFLOW (CFS)          STORAGE (AC FT)          ELEV (FT)
                  0.0                    0.0000                    5296.5
                  0.01                    0.0057                    5297
                  0.02                    0.0381                    5298
                  12.6                    0.0901                    5299
                  21.8                    0.1634                    5300

PRINT HYD        ID=25  CODE=5
*
*****
*      COMPUTE HYD FOR BASIN 101D
*****
*
COMPUTE NM HYD    ID=2  HYD NO=101D  DA= 0.001066 SQ MI
                  PER A=0 PER B=0 PER C=47 PER D=53
                  TP=0.1333 HR MASS RAIN=-1

PRINT HYD        ID=2  CODE=1
*
*****
* ADD BASIN 101D TO OUTFLOW FROM POND 1

ADD HYD          ID=41 HYD NO=101D.1  INFLOW IDS= 10 AND 2
PRINT HYD        ID=41  CODE=5
*
*****
* ADD BASIN 101D TO OUTFLOW FROM POND 2

ADD HYD          ID=42 HYD NO=101D.11  INFLOW IDS= 41 AND 20
PRINT HYD        ID=42  CODE=5
*
*****
*      COMPUTE HYD FOR BASIN 101G
*****
*
COMPUTE NM HYD    ID=43  HYD NO=101G  DA= 0.000411 SQ MI
                  PER A=0 PER B=0 PER C=70 PER D=30
                  TP=0.1333 HR MASS RAIN=-1

PRINT HYD        ID=43  CODE=1
*
*****
* ADD BASIN 101G TO 101D.11

ADD HYD          ID=44 HYD NO=101G.1  INFLOW IDS= 43 AND 42
PRINT HYD        ID=44  CODE=5
*
*****
* ADD BASIN 101G.1 TO OUTFLOW FROM POND 4

ADD HYD          ID=45 HYD NO=101G.11  INFLOW IDS= 44 AND 25
PRINT HYD        ID=45  CODE=5
*
*****
*      COMPUTE HYD FOR BASIN 102C
*****
*
COMPUTE NM HYD    ID=26  HYD NO=102C  DA= 0.00208 SQ MI
                  PER A=0 PER B=0 PER C=97 PER D=3
                  TP=0.1333 HR MASS RAIN=-1

PRINT HYD        ID=26  CODE=1
*

```

```

*****
                                PROP 100-6.DAT
*****

**** ADD HYD 102C TO 101D.11
ADD HYD          ID=46 HYD NO=102C.1  INFLOW IDS= 45 AND 26
PRINT HYD        ID=46   CODE=5
*

*****
*S POND 7
*
****Route 101.D3 THROUGH 18" outlet IN POND 7
*
ROUTE RESERVOIR   ID=13  HYD NO=13 INFLOW ID=46  CODE=5
                  OUTFLOW (CFS)      STORAGE (AC FT)      ELEV (FT)
                  0.00              0.000              5289.00
                  0.01              0.028              5290.00
                  0.02              0.076              5291.00
                  14.6              0.143              5292.00
                  20.9              0.230              5293.00
                  25.8              0.341              5294.00
                  29.8              0.476              5295.00
                  33.4              0.717              5296.00
                  36.6              1.097              5297.00
                  39.6              1.533              5298.00

PRINT HYD          ID=13   CODE=5
*
*****
*      COMPUTE HYD FOR BASIN OS-1
*****
*
COMPUTE NM HYD      ID=40  HYD NO=OS-1  DA= 0.000418 SQ MI
                    PER A=0 PER B=0 PER C=70 PER D=30
                    TP=0.1333 HR MASS RAIN=-1

PRINT HYD           ID=40   CODE=1
*
*****
*      COMPUTE HYD FOR BASIN OS-2
*****
*
COMPUTE NM HYD      ID=41  HYD NO=OS-2  DA= 0.000658 SQ MI
                    PER A=0 PER B=0 PER C=82 PER D=18
                    TP=0.1333 HR MASS RAIN=-1

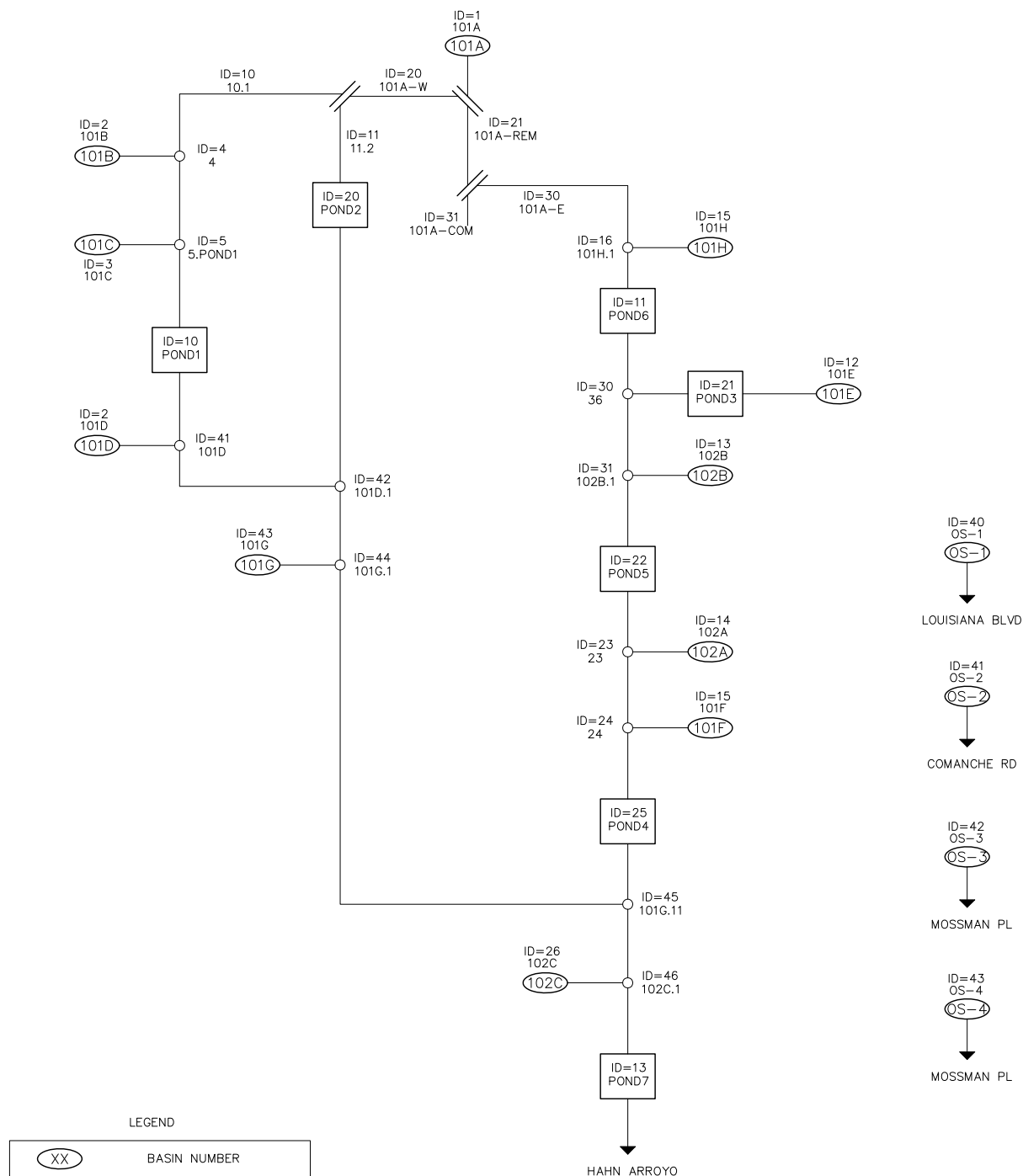
PRINT HYD           ID=41   CODE=1
*
*****
*      COMPUTE HYD FOR BASIN OS-3
*****
*
COMPUTE NM HYD      ID=42  HYD NO=OS-3  DA= 0.000281 SQ MI
                    PER A=0 PER B=0 PER C=70 PER D=30
                    TP=0.1333 HR MASS RAIN=-1

PRINT HYD           ID=42   CODE=1
*
*****
*      COMPUTE HYD FOR BASIN OS-4
*****
*
COMPUTE NM HYD      ID=43  HYD NO=OS-4  DA= 0.00008 SQ MI
                    PER A=0 PER B=0 PER C=90 PER D=10
                    TP=0.1333 HR MASS RAIN=-1

PRINT HYD           ID=43   CODE=1
FINISH

```

**PROPOSED CONDITIONS
100 YEAR-24 HOUR
HYDROLOGY MODEL**



AHYMO PROGRAM SUMMARY TABLE (AHYMO-S4)
 INPUT FILE = SD\14-600-070-01\2_Disciplines\Drainage\Calculations\AHYMO\PROP 100-24.DAT

AHYMO.SUM
 - Ver. S4.01a, Rel: 01a
 RUN DATE (MON/DAY/YR) =04/19/2017
 USER NO.= AHYMO_Temp_User:20122010

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
*S*****										
*S										
*S	100 YEAR 24 HOUR STORM - PROPOSED RUNOFF ANALYSIS									
*S	RAINFALL DATA FROM DPM Chapter 22 - ZONE 3									
*S*****										
START										TIME= 0.00
RAINFALL TYPE= 2 NOAA 14										RAIN24= 3.100
COMPUTE NM HYD	101A	-	1	0.00141	4.64	0.214	2.84981	1.500	5.137	PER IMP= 100.00
DIVIDE HYD	101A-W	1	20	0.00103	3.38	0.156	2.84959	1.500	5.137	
	101A-Rem	and	21	0.00038	1.25	0.058	2.84959	1.500	5.137	
DIVIDE HYD	101A-E	21	30	0.00018	0.60	0.028	2.84904	1.500	5.137	
	101A-COM	and	31	0.00020	0.65	0.030	2.84904	1.500	5.137	
DIVIDE HYD	11.20	20	11	0.00051	1.69	0.078	2.84953	1.500	5.137	
	10.10	and	10	0.00051	1.69	0.078	2.84953	1.500	5.137	
*S POND 2										
ROUTE RESERVOIR	POND2	11	20	0.00051	0.13	0.075	2.71935	2.150	0.406	AC-FT= 0.056
COMPUTE NM HYD	101B	-	2	0.00013	0.44	0.020	2.84981	1.500	5.229	PER IMP= 100.00
COMPUTE NM HYD	101C	-	3	0.00175	5.40	0.241	2.58387	1.500	4.818	PER IMP= 85.00
ADD HYD	4.00	10& 2	4	0.00064	2.13	0.098	2.84909	1.500	5.156	
ADD HYD	5.POND1	4& 3	5	0.00239	7.52	0.339	2.65513	1.500	4.909	
*S POND 1										
ROUTE RESERVOIR	POND1	5	10	0.00239	3.35	0.335	2.62431	1.700	2.183	AC-FT= 0.143
COMPUTE NM HYD	101H	-	15	0.00024	0.65	0.023	1.79580	1.500	4.233	PER IMP= 30.00
ADD HYD	101H.1	30&15	16	0.00042	1.25	0.051	2.24761	1.500	4.624	
*S POND 6										
ROUTE RESERVOIR	POND6	16	11	0.00042	0.01	0.048	2.13020	2.850	0.028	AC-FT= 0.042
COMPUTE NM HYD	101E	-	12	0.00115	2.87	0.112	1.83038	1.500	3.900	PER IMP= 42.50
*S POND 3										
ROUTE RESERVOIR	101E.1	12	21	0.00115	0.01	0.089	1.45262	12.800	0.013	AC-FT= 0.096
ADD HYD	36.00	21&11	30	0.00157	0.02	0.134	1.60075	3.050	0.017	
COMPUTE NM HYD	102B	-	13	0.00136	3.14	0.102	1.40354	1.500	3.612	PER IMP= 10.00
ADD HYD	102B.1	30&13	31	0.00293	3.15	0.236	1.50924	1.500	1.678	
*S POND 5										
ROUTE RESERVOIR	POND5	31	22	0.00293	0.44	0.198	1.26319	1.900	0.236	AC-FT= 0.081
COMPUTE NM HYD	102A	-	14	0.00185	4.35	0.132	1.34408	1.500	3.678	PER IMP= 0.00
ADD HYD	23.00	22&14	23	0.00478	4.35	0.330	1.29443	1.500	1.423	
COMPUTE NM HYD	101F	-	15	0.00338	10.41	0.466	2.58387	1.500	4.809	PER IMP= 85.00
ADD HYD	24.00	23&15	24	0.00816	14.76	0.796	1.82861	1.500	2.826	
*S POND 4										
ROUTE RESERVOIR	POND4	24	25	0.00816	13.22	0.793	1.82105	1.550	2.531	AC-FT= 0.095
COMPUTE NM HYD	101D	-	2	0.00107	3.05	0.122	2.14211	1.500	4.470	PER IMP= 53.00
ADD HYD	101D.1	10& 2	41	0.00346	5.62	0.455	2.46722	1.600	2.536	
ADD HYD	101D.11	41&20	42	0.00398	5.62	0.528	2.49120	1.600	2.210	
COMPUTE NM HYD	101G	-	43	0.00041	1.10	0.039	1.79580	1.500	4.178	PER IMP= 30.00
ADD HYD	101G.1	43&42	44	0.00439	6.60	0.568	2.42600	1.550	2.352	
ADD HYD	101G.11	44&25	45	0.01255	19.82	1.360	2.03253	1.550	2.469	
COMPUTE NM HYD	102C	-	26	0.00208	4.96	0.154	1.38925	1.500	3.726	PER IMP= 3.00
ADD HYD	102C.1	45&26	46	0.01463	24.67	1.514	1.94056	1.550	2.635	
*S POND 7										

PAGE = 2

COMMAND	IDENTIFICATION	NO.	NO.	(SQ MI)	AHYMO.SUM (CFS)	(AC-FT)	(INCHES)	(HOURS)	ACRE	NOTATION
ROUTE RESERVOIR	13.00	46	13	0.01463	19.72	1.479	1.89542	1.650	2.107	AC-FT= 0.214
COMPUTE NM HYD	OS-1	-	40	0.00042	1.12	0.040	1.79580	1.500	4.178	PER IMP= 30.00
COMPUTE NM HYD	OS-2	-	41	0.00066	1.68	0.057	1.61511	1.500	3.980	PER IMP= 18.00
COMPUTE NM HYD	OS-3	-	42	0.00028	0.76	0.027	1.79580	1.500	4.211	PER IMP= 30.00
COMPUTE NM HYD	OS-4	-	43	0.00008	0.21	0.006	1.49465	1.500	4.084	PER IMP= 10.00
FINISH										

PROP 100-24.DAT

* ALBUQUERQUE PUBLIC SCHOOLS
 * MONTGOMERY COMPLEX DRAINAGE MASTER PLAN
 * PROPOSED CONDITIONS MODEL
 * 100 YR 24 HR STORM EVENT
 * DATE: APRIL 2017

*S*****
 *S
 *S 100 YEAR 24 HOUR STORM - PROPOSED RUNOFF ANALYSIS
 *S RAINFALL DATA FROM DPM Chapter 22 - ZONE 3
 *S
 *S*****

START 0.0 HOURS
 RAINFALL TYPE=2 RAIN QUARTER=0.0 IN RAIN ONE=2.14 IN
 RAIN SIX=2.60 IN RAIN DAY=3.10 IN DT=0.05 HRS

*

 * COMPUTE HYD FOR BASIN 101A

 *

COMPUTE NM HYD ID=1 HYD NO=101A DA= 0.00141 SQ MI
 PER A=0 PER B=0 PER C=0 PER D=100
 TP=0.1333 HR MASS RAIN=-1

PRINT HYD ID=1 CODE=1

*

 * DIVIDE HYD FOR BASIN 101A 73% TO WEST 13% TO EAST SD & 14% to Comanche

 *

DIVIDE HYD ID=1 PER=-0.73 ID=20 HYD NO=101A-W
 ID=21 HYD NO=101A-Rem

DIVIDE HYD ID=21 PER=-0.48 ID=30 HYD NO=101A-E
 ID=31 HYD NO=101A-COM

PRINT HYD ID=20 CODE=1
 PRINT HYD ID=30 CODE=1
 PRINT HYD ID=31 CODE=1

*

 * DIVIDE HYD FOR BASIN 101A WEST BETWEEN PONDS 1 AND 2

 *

DIVIDE HYD ID=20 PER=-0.50 ID=11 HYD NO=11.2
 ID=10 HYD NO=10.1

PRINT HYD ID=10 CODE=1
 PRINT HYD ID=11 CODE=1

*

 *S POND 2
 *

****Route 101A-E THROUGH POND 2

ROUTE RESERVOIR	ID=20 HYD NO=POND2	INFLOW ID=11	CODE=5	
	OUTFLOW (CFS)	STORAGE (AC FT)		ELEV (FT)
	0.0	0.000		5298.0
	0.01	0.054		5299.0
	3.83	0.129		5300.0

PRINT HYD ID=20 CODE=5

*

 * COMPUTE HYD FOR BASIN 101B

 *

COMPUTE NM HYD ID=2 HYD NO=101B DA= 0.00013 SQ MI
 PER A=0 PER B=0 PER C=0 PER D=100
 TP=0.1333 HR MASS RAIN=-1

```

PROP 100-24.DAT

PRINT HYD          ID=2  CODE=1

*
*****
*
  COMPUTE HYD FOR BASIN 101C
*****
*

COMPUTE NM HYD      ID=3  HYD NO=101C  DA= 0.00175 SQ MI
                    PER A=0 PER B=15 PER C=0 PER D=85
                    TP=0.1333 HR MASS RAIN=-1

PRINT HYD          ID=3  CODE=1
*****
**** ADD HYD HALF 101A-W TO 101B TO GET 101B.1
ADD HYD             ID=4  HYD NO=4  INFLOW IDS= 10 AND 2
PRINT HYD          ID=4  CODE=5

**** ADD HYD 101B.1 TO 101C TO GET 101C.1
ADD HYD             ID=5  HYD NO=5.POND1  INFLOW IDS= 4 AND 3
PRINT HYD          ID=5  CODE=5
*
*****
*S POND 1
*
****Route 101C.1 THROUGH POND 1
*
ROUTE RESERVOIR      ID=10  HYD NO=POND1  INFLOW ID=5  CODE=5
                    OUTFLOW (CFS)      STORAGE (AC FT)      ELEV (FT)
                    0.0                0.000                5294.0
                    0.01               0.055                5295.0
                    3.19               0.131                5296.0
                    4.52               0.230                5297.0

PRINT HYD          ID=10  CODE=5
*
*****
*
  COMPUTE HYD FOR BASIN 101H
*****
*

COMPUTE NM HYD      ID=15  HYD NO=101H  DA= 0.00024 SQ MI
                    PER A=0 PER B=0 PER C=70 PER D=30
                    TP=0.1333 HR MASS RAIN=-1

PRINT HYD          ID=15  CODE=1

*
*ADD ROOF DRAIN FROM EAST HALF TO BASIN 101H

ADD HYD             ID=16  HYD NO=101H.1  INFLOW IDS= 30 AND 15
PRINT HYD          ID=16  CODE=5
*
*****
*S POND 6
*
****Route THROUGH POND 6
*
ROUTE RESERVOIR      ID=11  HYD NO=POND6  INFLOW ID=16  CODE=5
                    OUTFLOW (CFS)      STORAGE (AC FT)      ELEV (FT)
                    0.00               0.000                5303
                    0.01               0.055                5304
                    2.93               0.130                5305

PRINT HYD          ID=11  CODE=5
*
*****
*
  COMPUTE HYD FOR BASIN 101E
*****
*

COMPUTE NM HYD      ID=12  HYD NO=101E  DA= 0.00115 SQ MI
                    PER A=0 PER B=115 PER C=0 PER D=85
                    TP=0.1333 HR MASS RAIN=-1

PRINT HYD          ID=12  CODE=1

*
*****
*S POND 3

```

*

*ROUTE BASIN 101E THROUGH POND 3

ROUTE RESERVOIR	ID=21 HYD NO=101E.1	INFLOW ID=12	CODE=5	
	OUTFLOW (CFS)	STORAGE (AC FT)		ELEV (FT)
	0.00	0.000		5300
	0.01	0.103		5301
	3.57	0.232		5302

PRINT HYD ID=21 CODE=5

*

*ADD OUTFLOW FROM PONDS 3 AND 6

ADD HYD ID=30 HYD NO=36 INFLOW IDS= 21 AND 11

PRINT HYD ID=30 CODE=5

*

* COMPUTE HYD FOR BASIN 102B

*

COMPUTE NM HYD ID=13 HYD NO=102B DA= 0.00136 SQ MI
PER A=0 PER B=30 PER C=60 PER D=10
TP=0.1333 HR MASS RAIN=-1

PRINT HYD ID=13 CODE=1

*

*ADD ADD OUTFLOW FROM PONDS 3 AND 6 TO BASIN 102B

ADD HYD ID=31 HYD NO=102B.1 INFLOW IDS= 30 AND 13

PRINT HYD ID=31 CODE=5

*

*S POND 5

*

*ROUTE THROUGH POND 5

ROUTE RESERVOIR	ID=22 HYD NO=POND5	INFLOW ID=31	CODE=5	
	OUTFLOW (CFS)	STORAGE (AC FT)		ELEV (FT)
	0.00	0.000		5298
	0.01	0.070		5299
	3.65	0.163		5300

PRINT HYD ID=22 CODE=5

*

* COMPUTE HYD FOR BASIN 102A

*

COMPUTE NM HYD ID=14 HYD NO=102A DA= 0.001847 SQ MI
PER A=0 PER B=0 PER C=100 PER D=0
TP=0.1333 HR MASS RAIN=-1

PRINT HYD ID=14 CODE=1

*

*ADD ADD OUTFLOW FROM POND 5 AND BASIN 102A

ADD HYD ID=23 HYD NO=23 INFLOW IDS= 22 AND 14

PRINT HYD ID=23 CODE=5

*

* COMPUTE HYD FOR BASIN 101F

*

COMPUTE NM HYD ID=15 HYD NO=101F DA= 0.003381 SQ MI
PER A=0 PER B=15 PER C=0 PER D=85
TP=0.1333 HR MASS RAIN=-1

PRINT HYD ID=15 CODE=1

*

*ADD ADD OUTFLOW FROM POND 5 AND BASIN 102A

```

PROP 100-24.DAT
ADD HYD          ID=24 HYD NO=24  INFLOW IDS= 23 AND 15
PRINT HYD        ID=24  CODE=5
*
*****
*S POND 4
*
*ROUTE THROUGH POND 4

ROUTE RESERVOIR  ID=25  HYD NO=POND4  INFLOW ID=24  CODE=5
                  OUTFLOW (CFS)          STORAGE (AC FT)          ELEV (FT)
                  0.0                    0.0000                    5296.5
                  0.01                    0.0057                    5297
                  0.02                    0.0381                    5298
                  12.6                    0.0901                    5299
                  21.8                    0.1634                    5300

PRINT HYD        ID=25  CODE=5
*
*****
*      COMPUTE HYD FOR BASIN 101D
*****
*

COMPUTE NM HYD   ID=2  HYD NO=101D  DA= 0.001066 SQ MI
                  PER A=0 PER B=0 PER C=47 PER D=53
                  TP=0.1333 HR MASS RAIN=-1

PRINT HYD        ID=2  CODE=1
*
*****
* ADD BASIN 101D TO OUTFLOW FROM POND 1

ADD HYD          ID=41 HYD NO=101D.1  INFLOW IDS= 10 AND 2
PRINT HYD        ID=41  CODE=5
*
*****
* ADD BASIN 101D TO OUTFLOW FROM POND 2

ADD HYD          ID=42 HYD NO=101D.11  INFLOW IDS= 41 AND 20
PRINT HYD        ID=42  CODE=5
*
*****
*      COMPUTE HYD FOR BASIN 101G
*****
*

COMPUTE NM HYD   ID=43  HYD NO=101G  DA= 0.000411 SQ MI
                  PER A=0 PER B=0 PER C=70 PER D=30
                  TP=0.1333 HR MASS RAIN=-1

PRINT HYD        ID=43  CODE=1
*
*****
* ADD BASIN 101G TO 101D.11

ADD HYD          ID=44 HYD NO=101G.1  INFLOW IDS= 43 AND 42
PRINT HYD        ID=44  CODE=5
*
*****
* ADD BASIN 101G.1 TO OUTFLOW FROM POND 4

ADD HYD          ID=45 HYD NO=101G.11  INFLOW IDS= 44 AND 25
PRINT HYD        ID=45  CODE=5
*
*****
*      COMPUTE HYD FOR BASIN 102C
*****
*

COMPUTE NM HYD   ID=26  HYD NO=102C  DA= 0.00208 SQ MI
                  PER A=0 PER B=0 PER C=97 PER D=3
                  TP=0.1333 HR MASS RAIN=-1

PRINT HYD        ID=26  CODE=1
*

```

```

*****
PROP 100-24.DAT
*****

**** ADD HYD 102C TO 101D.11
ADD HYD          ID=46 HYD NO=102C.1  INFLOW IDS= 45 AND 26
PRINT HYD        ID=46   CODE=5
*

*****
*S POND 7
*
****Route 101.D3 THROUGH 18" outlet IN POND 7
*
ROUTE RESERVOIR   ID=13  HYD NO=13 INFLOW ID=46  CODE=5
                  OUTFLOW (CFS)      STORAGE (AC FT)      ELEV (FT)
                  0.00              0.000              5289.00
                  0.01              0.028              5290.00
                  0.02              0.076              5291.00
                  14.6              0.143              5292.00
                  20.9              0.230              5293.00
                  25.8              0.341              5294.00
                  29.8              0.476              5295.00
                  33.4              0.717              5296.00
                  36.6              1.097              5297.00
                  39.6              1.533              5298.00

PRINT HYD        ID=13   CODE=5
*
*****
*      COMPUTE HYD FOR BASIN OS-1
*****
*
COMPUTE NM HYD    ID=40  HYD NO=OS-1  DA= 0.000418 SQ MI
                  PER A=0 PER B=0 PER C=70 PER D=30
                  TP=0.1333 HR MASS RAIN=-1

PRINT HYD        ID=40   CODE=1
*
*****
*      COMPUTE HYD FOR BASIN OS-2
*****
*
COMPUTE NM HYD    ID=41  HYD NO=OS-2  DA= 0.000658 SQ MI
                  PER A=0 PER B=0 PER C=82 PER D=18
                  TP=0.1333 HR MASS RAIN=-1

PRINT HYD        ID=41   CODE=1
*
*****
*      COMPUTE HYD FOR BASIN OS-3
*****
*
COMPUTE NM HYD    ID=42  HYD NO=OS-3  DA= 0.000281 SQ MI
                  PER A=0 PER B=0 PER C=70 PER D=30
                  TP=0.1333 HR MASS RAIN=-1

PRINT HYD        ID=42   CODE=1
*
*****
*      COMPUTE HYD FOR BASIN OS-4
*****
*
COMPUTE NM HYD    ID=43  HYD NO=OS-4  DA= 0.00008 SQ MI
                  PER A=0 PER B=0 PER C=90 PER D=10
                  TP=0.1333 HR MASS RAIN=-1

PRINT HYD        ID=43   CODE=1
FINISH

```

Appendix C – Hydraulic Analyses

INLET CAPACITIES

Rating Curve for Type D Single Inlet

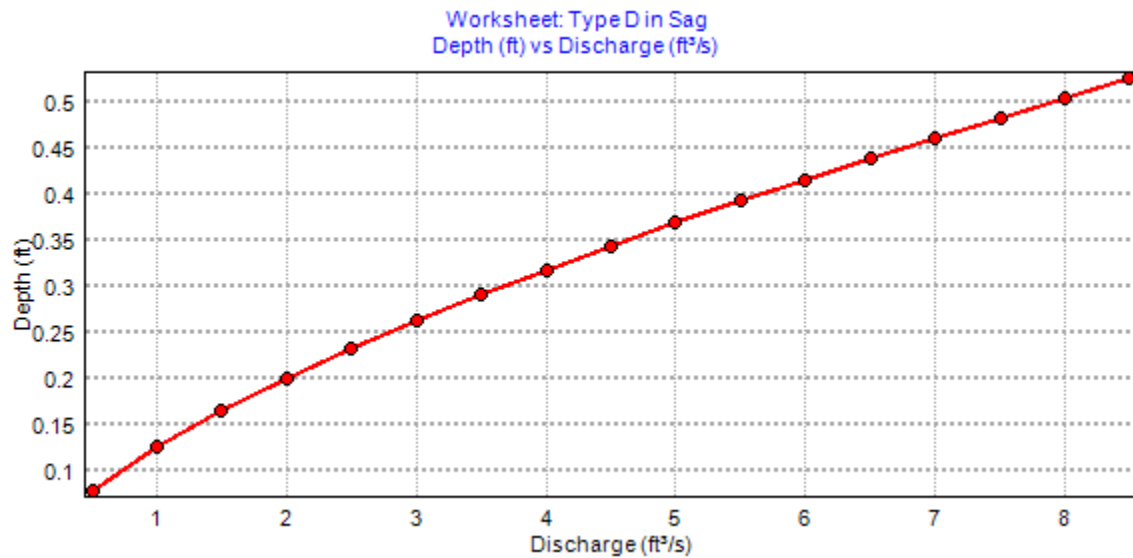
Project Description

Solve For Spread

Input Data

Discharge	8.00	ft ³ /s
Left Side Slope	50.00	ft/ft (H:V)
Right Side Slope	50.00	ft/ft (H:V)
Bottom Width	3.20	ft
Grate Width	3.20	ft
Grate Length	2.13	ft
Local Depression	0.00	in
Local Depression Width	0.00	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%

Rating Curve Plot



Rating Curve for 12" Nyloplast Inlet

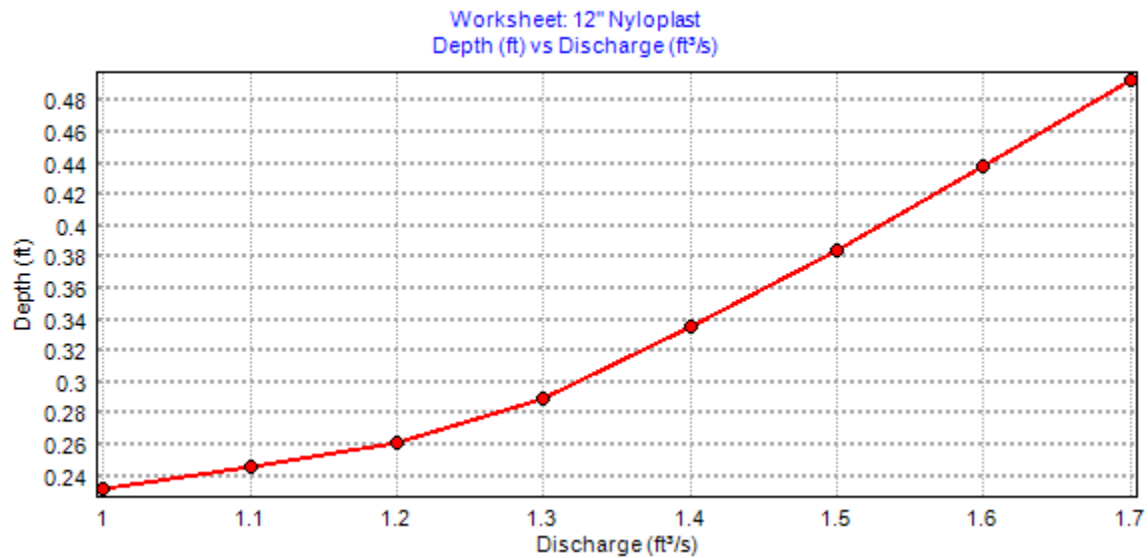
Project Description

Solve For Spread

Input Data

Discharge	1.70	ft ³ /s
Left Side Slope	50.00	ft/ft (H:V)
Right Side Slope	50.00	ft/ft (H:V)
Bottom Width	1.00	ft
Grate Width	1.00	ft
Grate Length	1.00	ft
Local Depression	0.00	in
Local Depression Width	0.00	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%

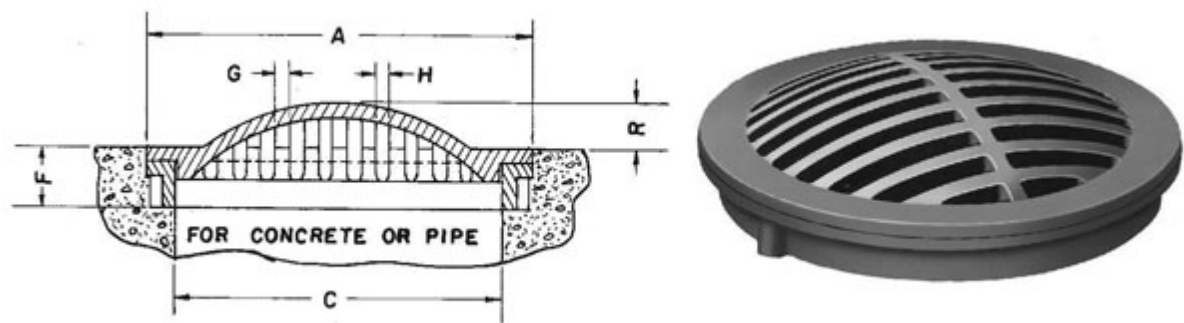
Rating Curve Plot



R-4360 Series

Beehive Grate, Frame

Light Duty



Various kinds and types of pipe are made under many specifications and dimensions may vary. Check the grate size as shown on the drawing to be sure it will fit the pipe you are using.

Catalog Number		Grate Type		Sq. Feet Open	Weir Perimeter Lineal Feet	
R-4360-A		Beehive		0.6	4.3	
R-4360-B		Beehive		0.8	4.7	
R-4360-C		Beehive		1.4	4.5	
R-4360-D		Beehive		0.7	6.3	
Catalog Number	A	C	F	G	H	R
R-4360-A	18-1/4	16-1/4	2-3/4	1	1/2	1-5/8

Catalog Number	A	C	F	G	H	R
R-4360-B	22	18	2-3/4	1	1/2	1-5/8
R-4360-C	23-1/4	17	3-1/2	2	1-1/2	1-3/4
R-4360-D	28-1/2	24	3-5/8	1	1	3

Instructions:

1. Select a catalog number (will automatically fill in Open Area and Perimeter) or enter your own values
2. Enter head value
3. Click "calculate"

The results will determine automatically if your situation falls into a Weir, Transitional or Orifice flow. Additionally, Neenah grates which fall within the parameters chosen will appear below the calculator.

Catalog Number and Grate Type:

R-4360-C: Beehive

Feet perimeter (P):

4.5

Head in feet (h):

.4

Free open area in sq. ft. (A):

1.4

Calculate

Weir capacity in cfs:

Transitional flow in cfs:

3.2

Orifice capacity in cfs:

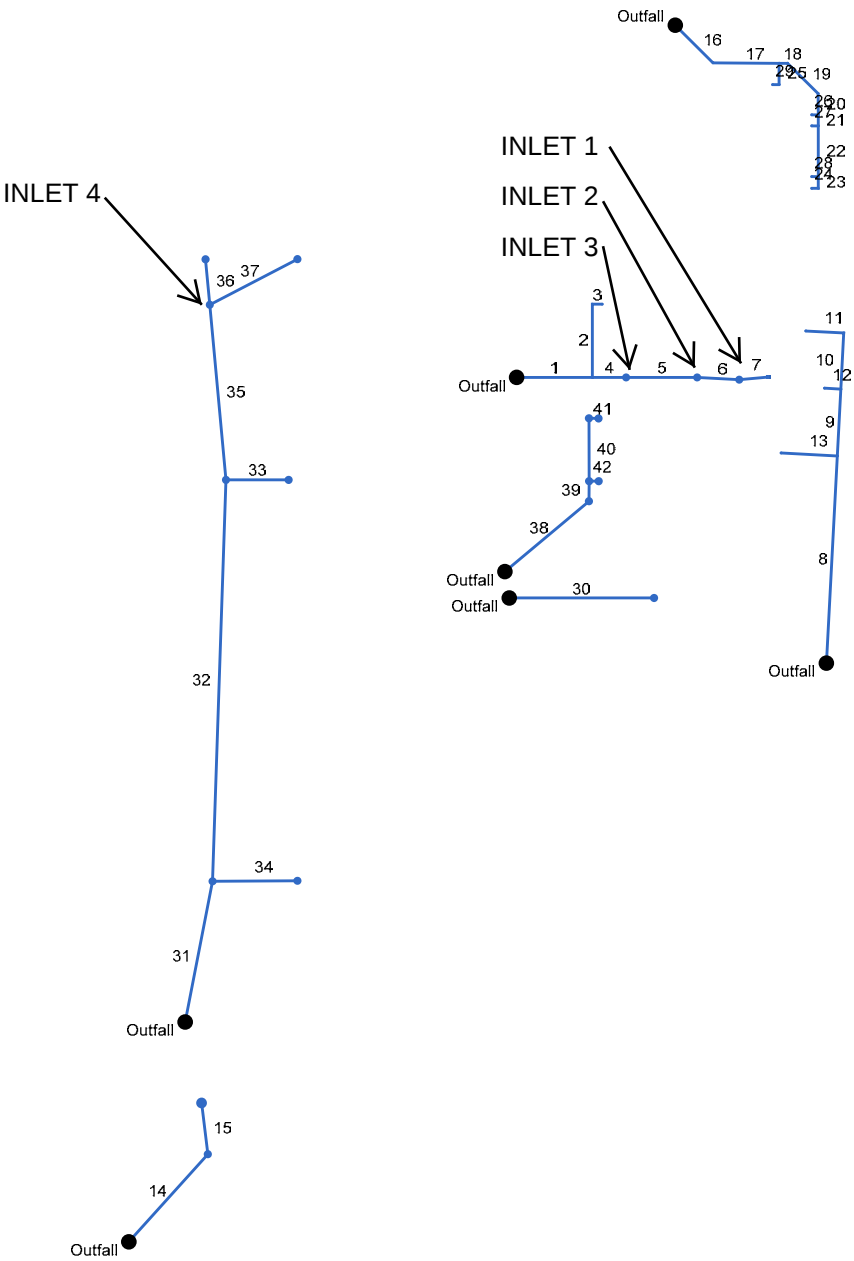
Based on transitional flow, the following grates match the criteria you entered.

Catalog Number	Grate Type
R-3165	A
R-4360-C	Beehive

For additional information regarding Neenah Inlet Grate Capacities, please contact Ryan Bonell P.E., at (920) 729.3463 or email at ryan.bonell@neenahenterprises.com, or Joe Falle P.E., at (920)729.3653 or email at joseph.falle@neenahenterprises.com.

HYDRAFLOW CALCULATIONS

Montgomery Complex



Line No.	Line ID	Line Size (in)	Line Length (ft)	Line Slope (%)	Flow Rate (cfs)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)	
1	A	12	58.0	2.00	1.75	5295.00	5296.16	5297.00	5301.05	5296.10	5296.72 j	1.00	3.89	1.00 z	3.04	
2	A	12	56.3	2.01	0.29	5296.16	5297.29	5301.05	5302.00	5296.72	5297.51 j	3.89	3.71	1.00 z	1.44	
3	A	12	7.5	0.40	0.29	5297.29	5297.32	5302.00	5302.00	5297.52	5297.55	3.71	3.68	1.00	2.08	
4	A	12	25.9	2.01	1.46	5296.16	5296.68	5301.05	5304.00	5296.72	5297.19 j	3.89	6.32	0.15 z	3.41	
5	A	12	54.4	8.33	1.46	5296.68	5301.21	5304.00	5304.00	5297.19	5301.72	6.32	1.79	0.50 z	3.61	
6	A	12	32.2	0.50	0.88	5301.21	5301.37	5304.00	5304.00	5301.72	5301.76 j	1.79	1.63	0.50 z	2.63	
7	A	12	22.0	0.50	0.44	5301.37	5301.48	5304.00	5304.17	5301.76	5301.75 j	1.63	1.69	1.00 z	2.03	
8	B	12	159.2	0.39	0.64	5303.00	5303.62	5304.80	5305.86	5303.80	5303.99	0.80	1.24	1.00	1.67	
9	B	12	51.4	0.41	0.46	5303.62	5303.83	5305.86	5306.32	5304.08	5304.14	1.24	1.49	1.00	1.78	
10	B	12	43.1	0.39	0.12	5303.83	5304.00	5306.32	5306.00	5304.22	5304.22	1.49	1.00	1.00	0.67	
11	B	4	29.1	1.48	0.12	5304.00	5304.43	5306.00	5306.00	5304.24	5304.62 j	1.67	1.24	1.00 z	2.04	
12	B	4	12.5	2.00	0.34	5303.83	5304.08	5306.32	5306.00	5304.22	5304.56	2.16	1.59	1.00	3.90	
13	B	4	43.1	0.70	0.18	5303.62	5303.92	5305.86	5306.00	5304.08	5304.41	1.91	1.75	1.00	2.06	
14	OUT	24	90.5	0.81	19.12	5287.48	5288.21	5289.10	5296.16	5291.06	5291.71	-0.38	5.95	0.79	6.09	
15		24	39.5	0.73	19.12	5288.21	5288.50	5296.16	5298.09	5292.16	5292.45	5.95	7.59	1.00	6.09	
16	D	12	40.8	2.40	1.40	5299.51	5300.49	5301.00	5304.90	5300.40	5300.99 j	0.49	3.41	0.75 z	2.73	
17	D	12	50.6	2.39	1.40	5300.49	5301.70	5304.90	5305.00	5300.99	5302.20	3.41	2.30	1.00 z	3.56	
18	D	12	6.6	2.42	1.01	5301.70	5301.86	5305.00	5304.95	5302.20	5302.28 j	2.30	2.09	0.74 z	2.89	
19	D	12	32.9	2.40	1.01	5301.86	5302.65	5304.95	5307.00	5302.28	5303.07	2.09	3.35	0.75 z	3.21	
20	D	12	16.3	2.45	1.01	5302.65	5303.05	5307.00	5307.30	5303.07	5303.47	3.35	3.25	1.00 z	3.21	
21	D	12	8.5	2.36	0.30	5303.05	5303.25	5307.30	5307.35	5303.47	5303.48 j	3.25	3.10	1.00 z	1.61	
22	D	12	38.9	1.00	0.26	5303.25	5303.64	5307.35	5305.80	5303.48	5303.85 j	3.10	1.16	1.00 z	2.07	
23	D	12	8.9	1.01	0.05	5303.64	5303.73	5305.80	5305.85	5303.85	5303.82	1.16	1.12	1.00 z	0.91	

Montgomery Complex

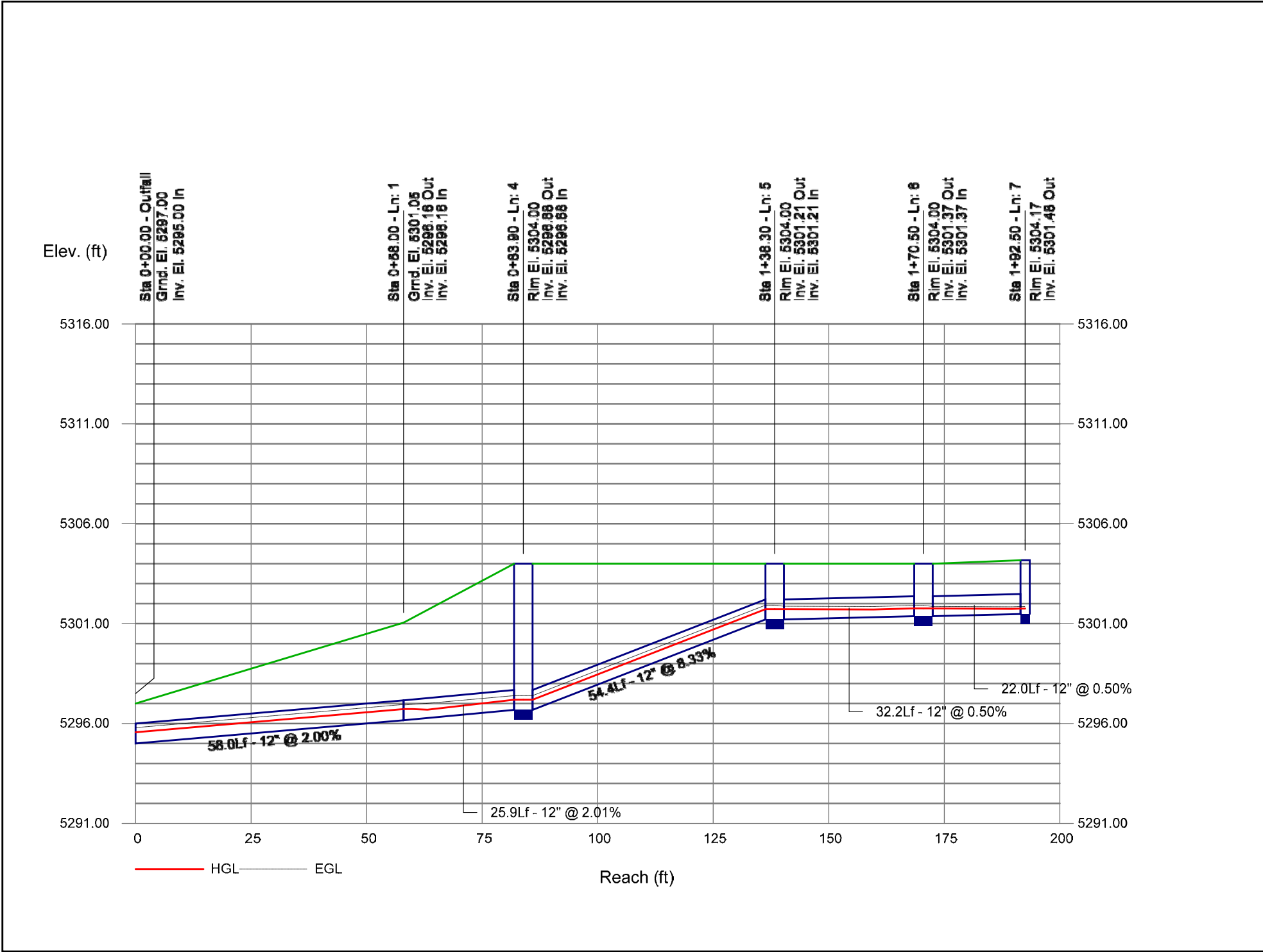
Number of lines: 42

Date: 4/14/2017

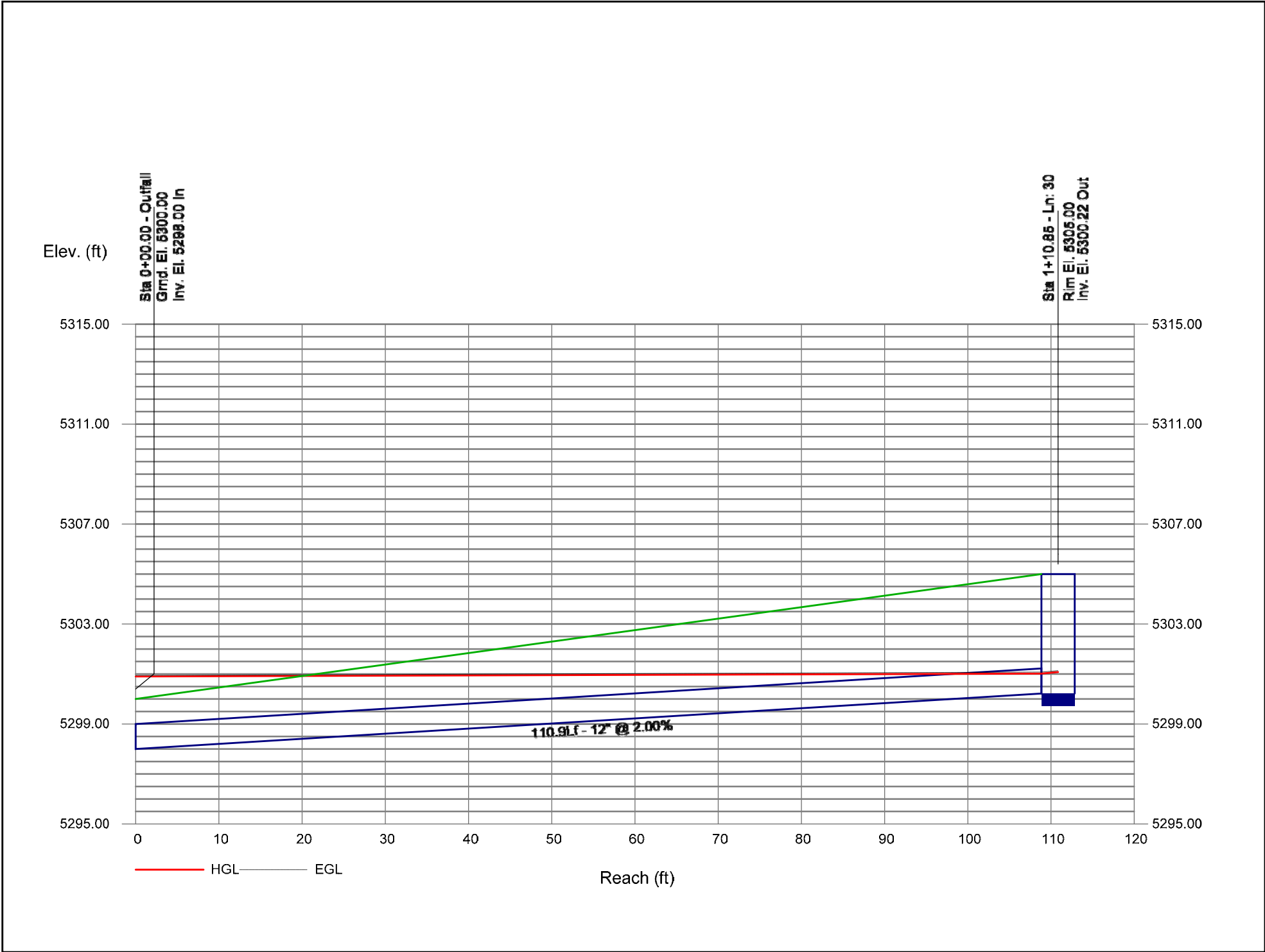
NOTES: ** Critical depth

Line No.	Line ID	Line Size (in)	Line Length (ft)	Line Slope (%)	Flow Rate (cfs)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	Cover Dn (ft)	Cover Up (ft)	J-Loss Coeff	Vel Ave (ft/s)		
24	D	4	5.0	5.40	0.05	5303.73	5304.00	5305.85	5306.00	5303.82	5304.12	1.79	1.67	1.00 z	2.15		
25	D	4	16.4	5.00	0.39	5301.70	5302.52	5305.00	5306.42	5302.20	5302.84 j	2.97	3.57	1.00 z	4.50		
26	D	4	5.0	5.00	0.71	5303.05	5303.30	5307.30	5306.00	5303.47	5304.07	3.92	2.37	1.00	8.14		
27	D	4	5.0	5.00	0.04	5303.25	5303.50	5307.35	5306.05	5303.48	5303.61 j	3.77	2.22	1.00 z	1.12		
28	D	4	5.0	5.00	0.21	5303.64	5303.89	5305.80	5306.00	5303.85	5304.15	1.83	1.78	1.00 z	3.27		
29	D	4	5.0	5.00	0.39	5302.52	5302.77	5306.42	5306.50	5302.84	5303.09	3.57	3.40	1.00 z	4.54		
30	A	12	110.9	2.00	1.32	5298.00	5300.22	5300.00	5305.00	5298.49	5300.71 j	1.00	3.78	1.00 z	3.47		
31		24	110.0	0.50	19.75	5288.74	5289.29	5293.00	5298.30	5292.76	5293.48	2.26	7.01	0.98	6.29		
32		24	308.2	0.50	6.53	5289.29	5290.83	5298.30	5298.60	5294.08	5294.30	7.01	5.77	1.00	2.08		
33		12	48.0	14.94	0.13	5290.83	5298.00	5298.60	5300.00	5294.36	5298.15 j	6.77	1.00	1.00 z	0.99		
34		24	65.0	11.09	13.22	5289.29	5296.50	5298.30	5300.00	5294.08	5297.81 j	7.01	1.50	1.00 z	5.14		
35		12	134.9	0.50	6.40	5290.83	5291.50	5298.60	5304.00	5294.36	5298.08	6.77	11.50	0.94	8.15		
36		12	35.0	1.43	3.05	5291.50	5292.00	5304.00	5304.00	5299.05	5299.27	11.50	11.00	1.00	3.88		
37		12	75.7	3.30	3.35	5291.50	5294.00	5304.00	5304.00	5299.05	5299.62	11.50	9.00	1.00	4.27		
38		12	84.0	0.49	1.03	5298.00	5298.41	5300.00	5302.00	5298.43	5298.84	1.00	2.59	0.80	3.20		
39		12	15.4	0.52	1.03	5298.41	5298.49	5302.00	5303.60	5298.97	5298.92	2.59	4.11	1.00 z	2.76		
40		12	48.3	2.59	0.49	5298.49	5299.74	5303.60	5302.50	5298.92	5300.03 j	4.11	1.76	1.00 z	2.06		
41		6	7.4	0.54	0.49	5299.74	5299.78	5302.50	5303.60	5300.24	5300.28	2.26	3.32	1.00	2.50		
42		6	7.4	0.54	0.54	5298.49	5298.53	5303.60	5304.00	5298.99	5299.03	4.61	4.97	1.00	2.75		
Montgomery Complex													Number of lines: 42			Date: 4/14/2017	
NOTES: ** Critical depth																	

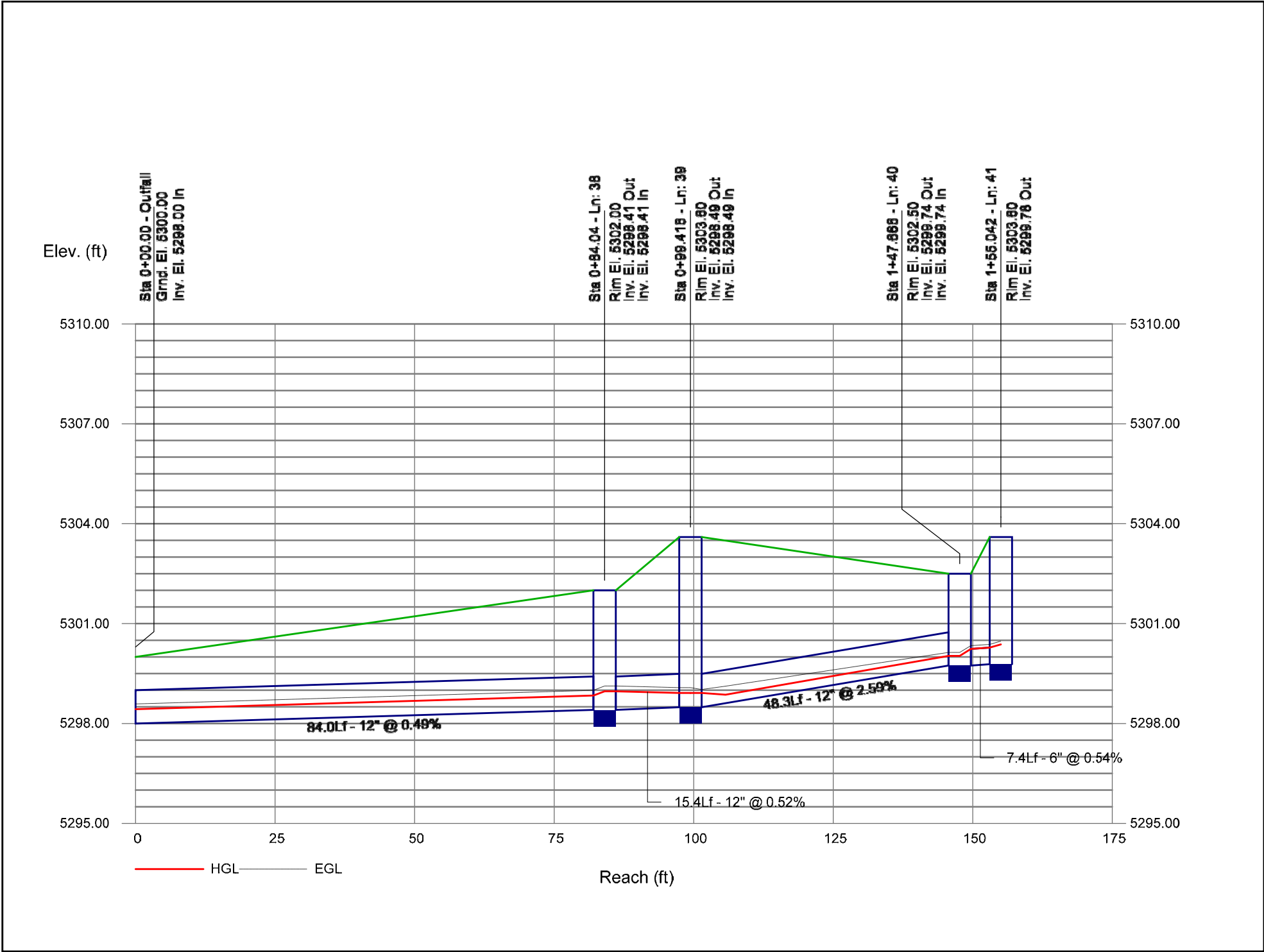
Storm Sewer Profile



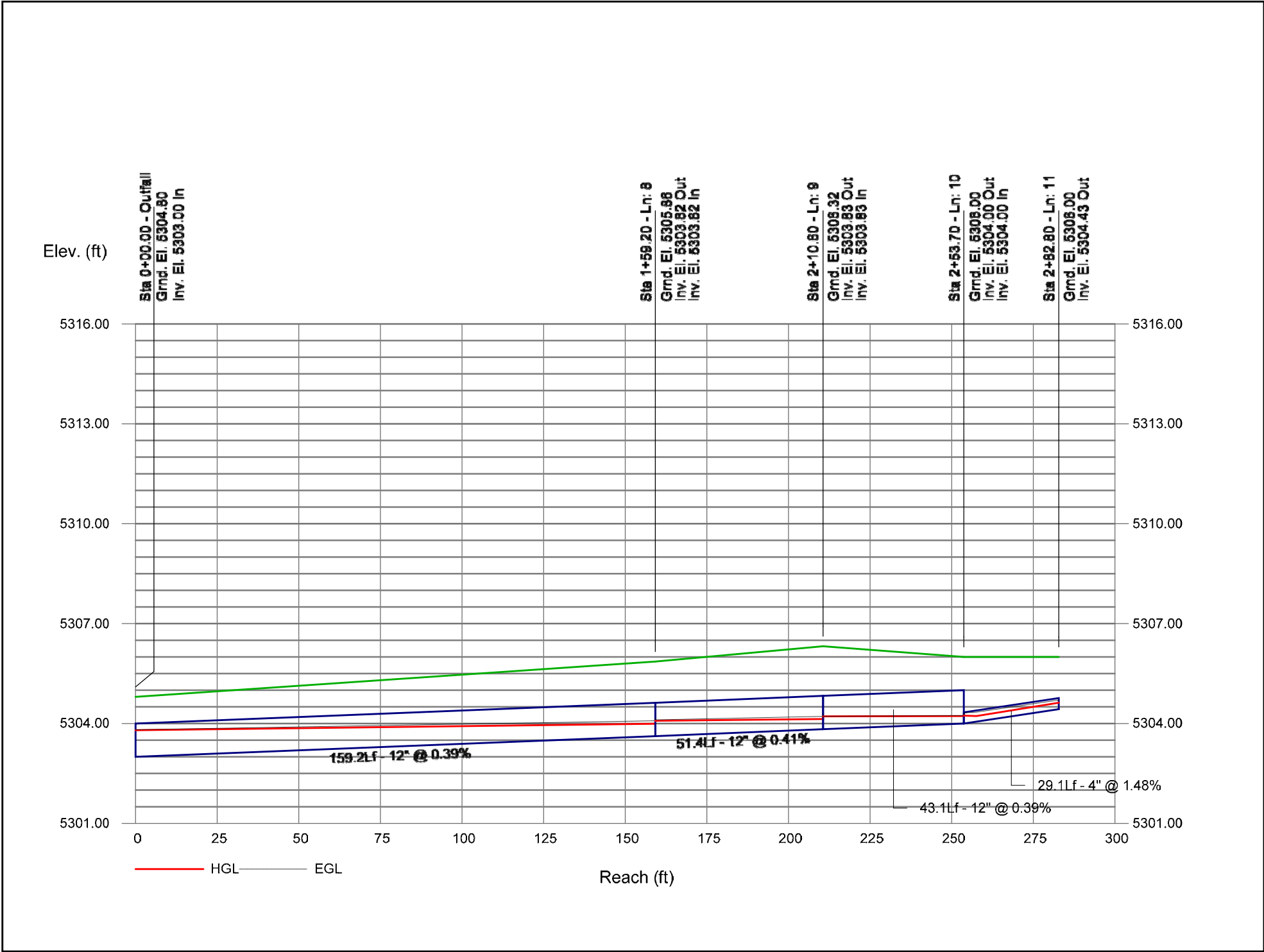
Storm Sewer Profile



Storm Sewer Profile

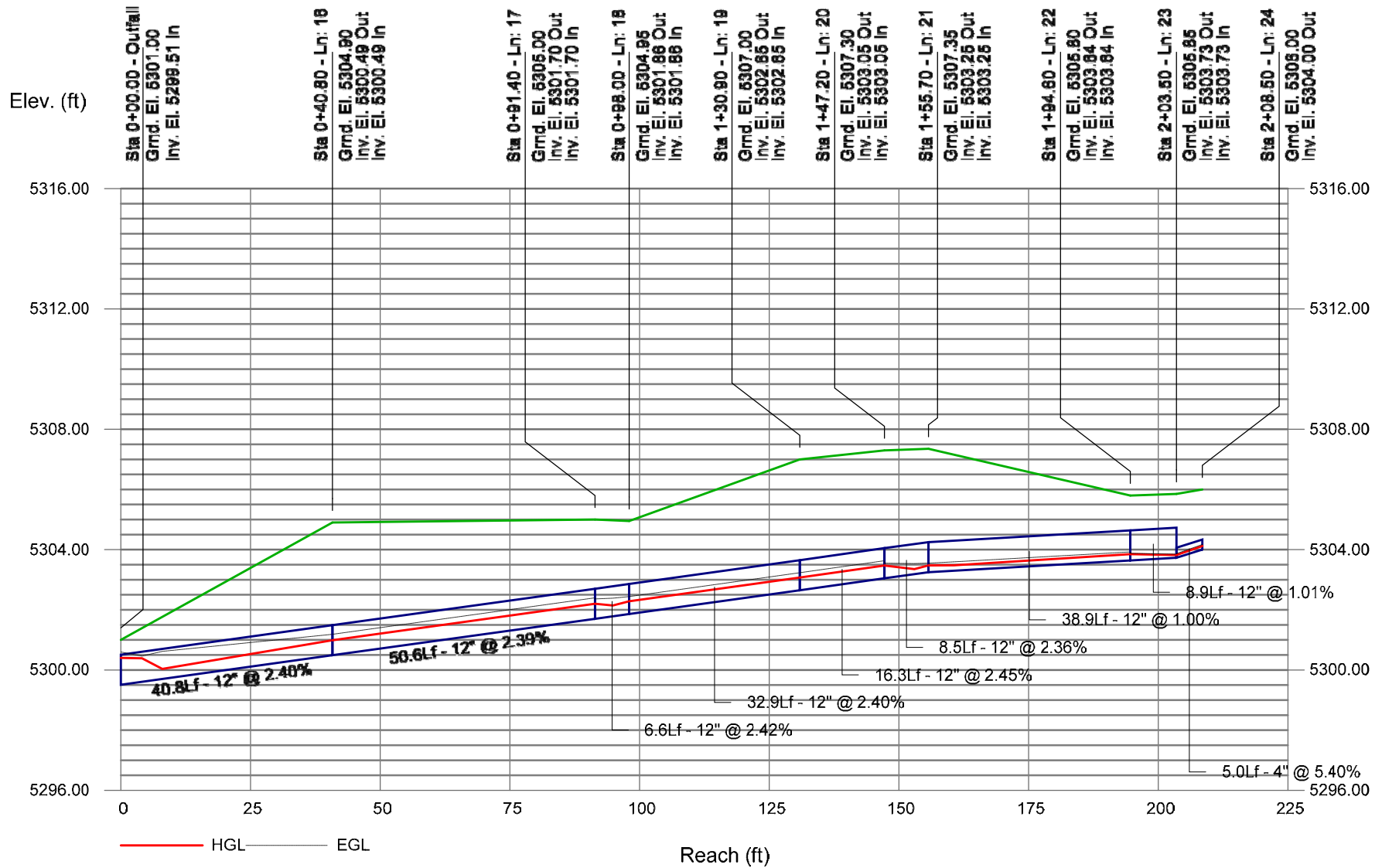


Storm Sewer Profile



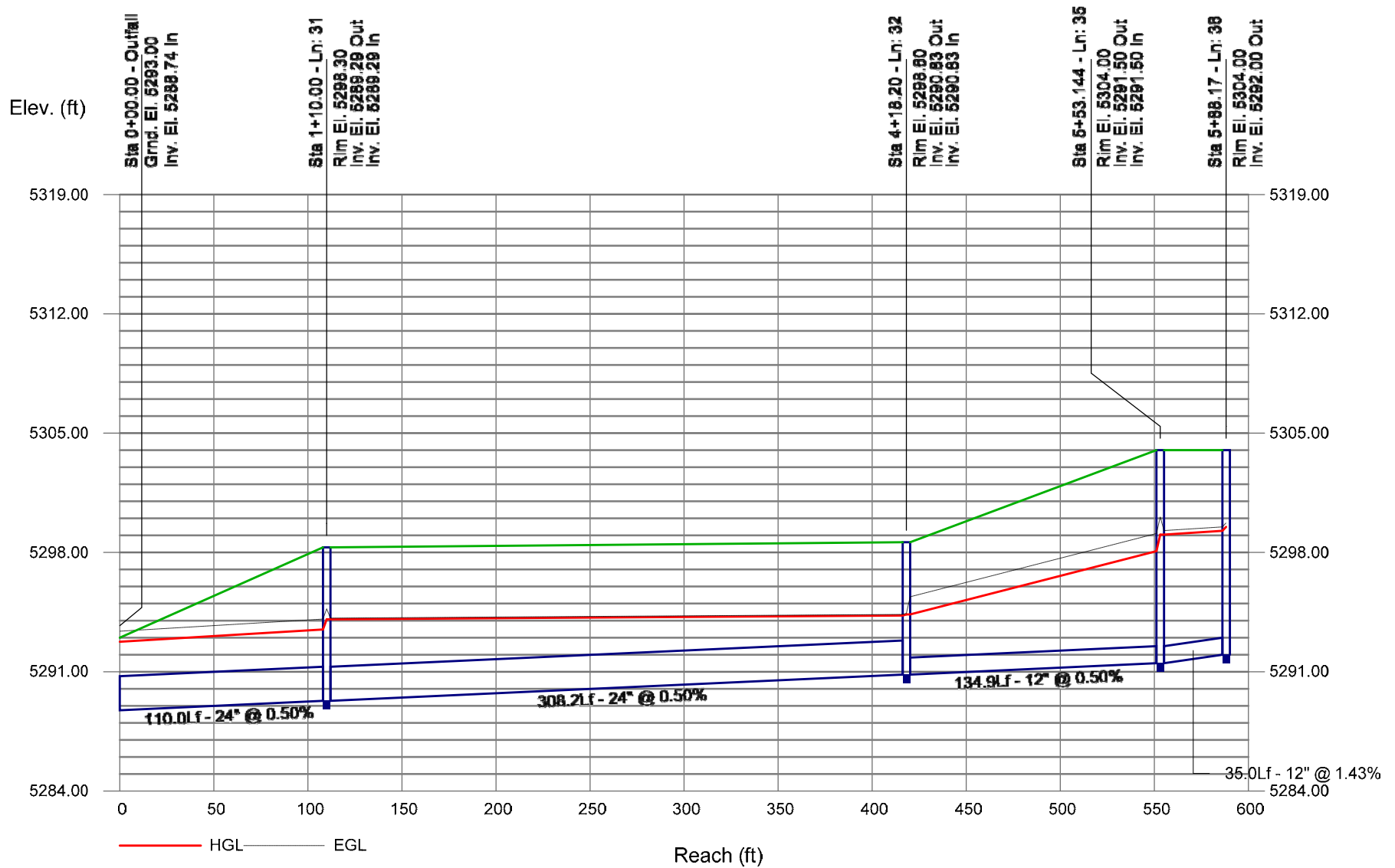
Storm Sewer Profile

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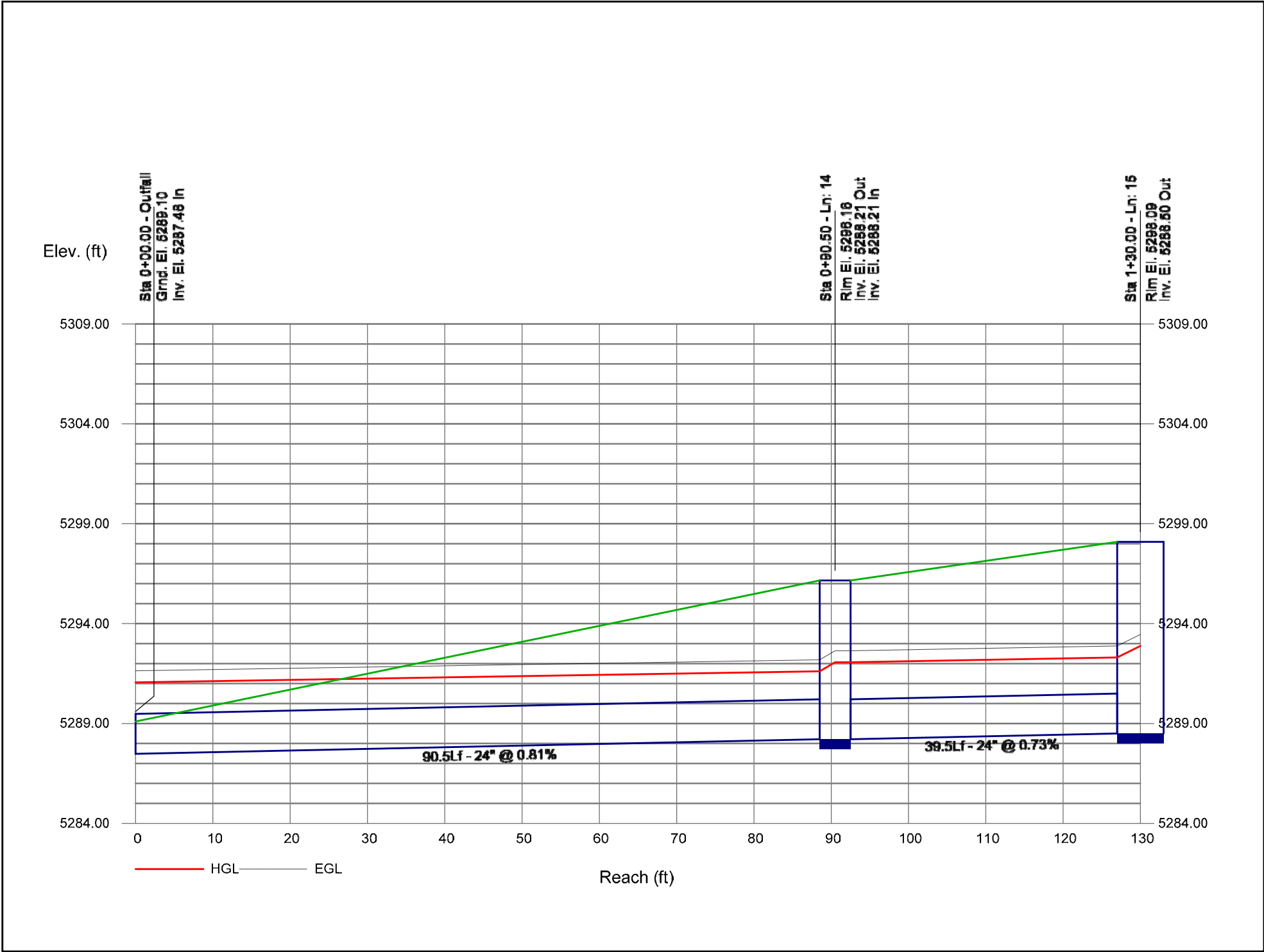


Storm Sewer Profile

Proj. file: Montgomery Complex.stm



Storm Sewer Profile



CULVERTMASTER CALCULATIONS

Culvert Calculator Report

Pond 1 Outlet

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	5,297.00 ft	Headwater Depth/Height	3.00
Computed Headwater Elev.	5,297.00 ft	Discharge	4.52 cfs
Inlet Control HW Elev.	5,295.62 ft	Tailwater Elevation	5,295.00 ft
Outlet Control HW Elev.	5,297.00 ft	Control Type	Outlet Control
Grades			
Upstream Invert	5,294.00 ft	Downstream Invert	5,291.29 ft
Length	86.00 ft	Constructed Slope	0.031512 ft/ft
Hydraulic Profile			
Profile	Pressure Profile	Depth, Downstream	3.71 ft
Slope Type	N/A	Normal Depth	0.62 ft
Flow Regime	N/A	Critical Depth	0.89 ft
Velocity Downstream	5.75 ft/s	Critical Slope	0.014331 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	1.00 ft
Section Size	12 inch	Rise	1.00 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	5,297.00 ft	Upstream Velocity Head	0.51 ft
Ke	0.20	Entrance Loss	0.10 ft
Inlet Control Properties			
Inlet Control HW Elev.	5,295.62 ft	Flow Control	Submerged
Inlet Type	Beveled ring, 33.7° bevels	Area Full	0.8 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Calculator Report

Pond 2 Outlet

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	5,300.00 ft	Headwater Depth/Height	2.00
Computed Headwater Elev.	5,300.00 ft	Discharge	3.88 cfs
Inlet Control HW Elev.	5,299.35 ft	Tailwater Elevation	5,299.00 ft
Outlet Control HW Elev.	5,300.00 ft	Control Type	Outlet Control
Grades			
Upstream Invert	5,298.00 ft	Downstream Invert	5,290.83 ft
Length	45.80 ft	Constructed Slope	0.156550 ft/ft
Hydraulic Profile			
Profile	Pressure Profile	Depth, Downstream	8.17 ft
Slope Type	N/A	Normal Depth	0.36 ft
Flow Regime	N/A	Critical Depth	0.84 ft
Velocity Downstream	4.94 ft/s	Critical Slope	0.011459 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	1.00 ft
Section Size	12 inch	Rise	1.00 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	5,300.00 ft	Upstream Velocity Head	0.38 ft
Ke	0.20	Entrance Loss	0.08 ft
Inlet Control Properties			
Inlet Control HW Elev.	5,299.35 ft	Flow Control	Submerged
Inlet Type	Beveled ring, 33.7° bevels	Area Full	0.8 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Calculator Report

Pond 3 Outlet

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	5,302.00 ft	Headwater Depth/Height	2.00
Computed Headwater Elev.	5,302.00 ft	Discharge	3.57 cfs
Inlet Control HW Elev.	5,301.32 ft	Tailwater Elevation	5,301.00 ft
Outlet Control HW Elev.	5,302.00 ft	Control Type	Outlet Control
Grades			
Upstream Invert	5,300.00 ft	Downstream Invert	5,298.00 ft
Length	61.00 ft	Constructed Slope	0.032787 ft/ft
Hydraulic Profile			
Profile	Pressure Profile	Depth, Downstream	3.00 ft
Slope Type	N/A	Normal Depth	0.53 ft
Flow Regime	N/A	Critical Depth	0.81 ft
Velocity Downstream	4.55 ft/s	Critical Slope	0.010354 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	1.00 ft
Section Size	12 inch	Rise	1.00 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	5,302.00 ft	Upstream Velocity Head	0.32 ft
Ke	0.20	Entrance Loss	0.06 ft
Inlet Control Properties			
Inlet Control HW Elev.	5,301.32 ft	Flow Control	N/A
Inlet Type	Beveled ring, 33.7° bevels	Area Full	0.8 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Calculator Report

Pond 4 Outlet

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	5,300.00 ft	Headwater Depth/Height	1.75
Computed Headwater Elev.	5,300.00 ft	Discharge	21.79 cfs
Inlet Control HW Elev.	5,299.22 ft	Tailwater Elevation	5,298.50 ft
Outlet Control HW Elev.	5,300.00 ft	Control Type	Outlet Control
Grades			
Upstream Invert	5,296.50 ft	Downstream Invert	5,289.60 ft
Length	65.00 ft	Constructed Slope	0.106154 ft/ft
Hydraulic Profile			
Profile	Pressure Profile	Depth, Downstream	8.90 ft
Slope Type	N/A	Normal Depth	0.75 ft
Flow Regime	N/A	Critical Depth	1.67 ft
Velocity Downstream	6.94 ft/s	Critical Slope	0.008999 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	5,300.00 ft	Upstream Velocity Head	0.75 ft
Ke	0.20	Entrance Loss	0.15 ft
Inlet Control Properties			
Inlet Control HW Elev.	5,299.22 ft	Flow Control	N/A
Inlet Type	Beveled ring, 33.7° bevels	Area Full	3.1 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Calculator Report

Pond 5 Outlet

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	5,300.00 ft	Headwater Depth/Height	2.00
Computed Headwater Elev.	5,300.00 ft	Discharge	3.65 cfs
Inlet Control HW Elev.	5,299.35 ft	Tailwater Elevation	5,299.00 ft
Outlet Control HW Elev.	5,300.00 ft	Control Type	Outlet Control
Grades			
Upstream Invert	5,298.00 ft	Downstream Invert	5,297.00 ft
Length	57.00 ft	Constructed Slope	0.017544 ft/ft
Hydraulic Profile			
Profile	Pressure Profile	Depth, Downstream	2.00 ft
Slope Type	N/A	Normal Depth	0.66 ft
Flow Regime	N/A	Critical Depth	0.81 ft
Velocity Downstream	4.64 ft/s	Critical Slope	0.010603 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	1.00 ft
Section Size	12 inch	Rise	1.00 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	5,300.00 ft	Upstream Velocity Head	0.34 ft
Ke	0.20	Entrance Loss	0.07 ft
Inlet Control Properties			
Inlet Control HW Elev.	5,299.35 ft	Flow Control	Submerged
Inlet Type	Beveled ring, 33.7° bevels	Area Full	0.8 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Calculator Report

Pond 6 Outlet

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	5,305.00 ft	Headwater Depth/Height	2.00
Computed Headwater Elev.	5,305.00 ft	Discharge	2.93 cfs
Inlet Control HW Elev.	5,304.12 ft	Tailwater Elevation	5,304.00 ft
Outlet Control HW Elev.	5,305.00 ft	Control Type	Outlet Control
Grades			
Upstream Invert	5,303.00 ft	Downstream Invert	5,298.00 ft
Length	109.00 ft	Constructed Slope	0.045872 ft/ft
Hydraulic Profile			
Profile	Pressure Profile	Depth, Downstream	6.00 ft
Slope Type	N/A	Normal Depth	0.43 ft
Flow Regime	N/A	Critical Depth	0.73 ft
Velocity Downstream	3.74 ft/s	Critical Slope	0.008569 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	1.00 ft
Section Size	12 inch	Rise	1.00 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	5,305.00 ft	Upstream Velocity Head	0.22 ft
Ke	0.20	Entrance Loss	0.04 ft
Inlet Control Properties			
Inlet Control HW Elev.	5,304.12 ft	Flow Control	N/A
Inlet Type	Beveled ring, 33.7° bevels	Area Full	0.8 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Culvert Calculator Report

Pond 7 Outlet

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	5,298.00 ft	Headwater Depth/Height	2.09
Computed Headwater Elev.	5,292.68 ft	Discharge	19.12 cfs
Inlet Control HW Elev.	5,291.06 ft	Tailwater Elevation	5,291.06 ft
Outlet Control HW Elev.	5,292.68 ft	Control Type	Outlet Control
Grades			
Upstream Invert	5,288.50 ft	Downstream Invert	5,287.48 ft
Length	130.00 ft	Constructed Slope	0.007846 ft/ft
Hydraulic Profile			
Profile	Pressure Profile	Depth, Downstream	3.58 ft
Slope Type	N/A	Normal Depth	1.56 ft
Flow Regime	N/A	Critical Depth	1.57 ft
Velocity Downstream	6.09 ft/s	Critical Slope	0.007737 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	5,292.68 ft	Upstream Velocity Head	0.58 ft
Ke	0.20	Entrance Loss	0.12 ft
Inlet Control Properties			
Inlet Control HW Elev.	5,291.06 ft	Flow Control	Submerged
Inlet Type	Beveled ring, 33.7° bevels	Area Full	3.1 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

POND RISER CALCULATIONS

POND 7 Outlet**48" RISER**

cfs

INVERT OF PERFORATION(S) 5288.6
 DIAM OF PERFORATION(S) (in) 4

Total Outflow (Needed) = 19.1
 Total Outflow (Provided) = 19.3

# PERFORATIONS			1	2	4	8
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5289	0.09	0.23	0.21	0.42	0.84	1.68
5290	0.09	1.23	0.48	0.96	1.93	3.86
5291	0.09	2.23	0.65	1.30	2.60	5.19
5292	0.09	3.23	0.78	1.56	3.12	6.25
5293	0.09	4.23	0.89	1.79	3.57	7.15
5294	0.09	5.23	0.99	1.99	3.97	7.95
5295	0.09	6.23	1.08	2.17	4.34	8.67

2nd row of holes

INVERT OF PERFORATION(S) 5289.37
 DIAM OF PERFORATION(S) (in) 4

# PERFORATIONS			1	2	4	8
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5290	0.09	0.46	0.30	0.59	1.18	2.36
5291	0.09	1.46	0.53	1.05	2.10	4.20
5292	0.09	2.46	0.68	1.36	2.73	5.45
5293	0.09	3.46	0.81	1.62	3.23	6.46
5294	0.09	4.46	0.92	1.83	3.67	7.34
5295	0.09	5.46	1.01	2.03	4.06	8.12

3rd row of holes

INVERT OF PERFORATION(S) 5290.14
 DIAM OF PERFORATION(S) (in) 4

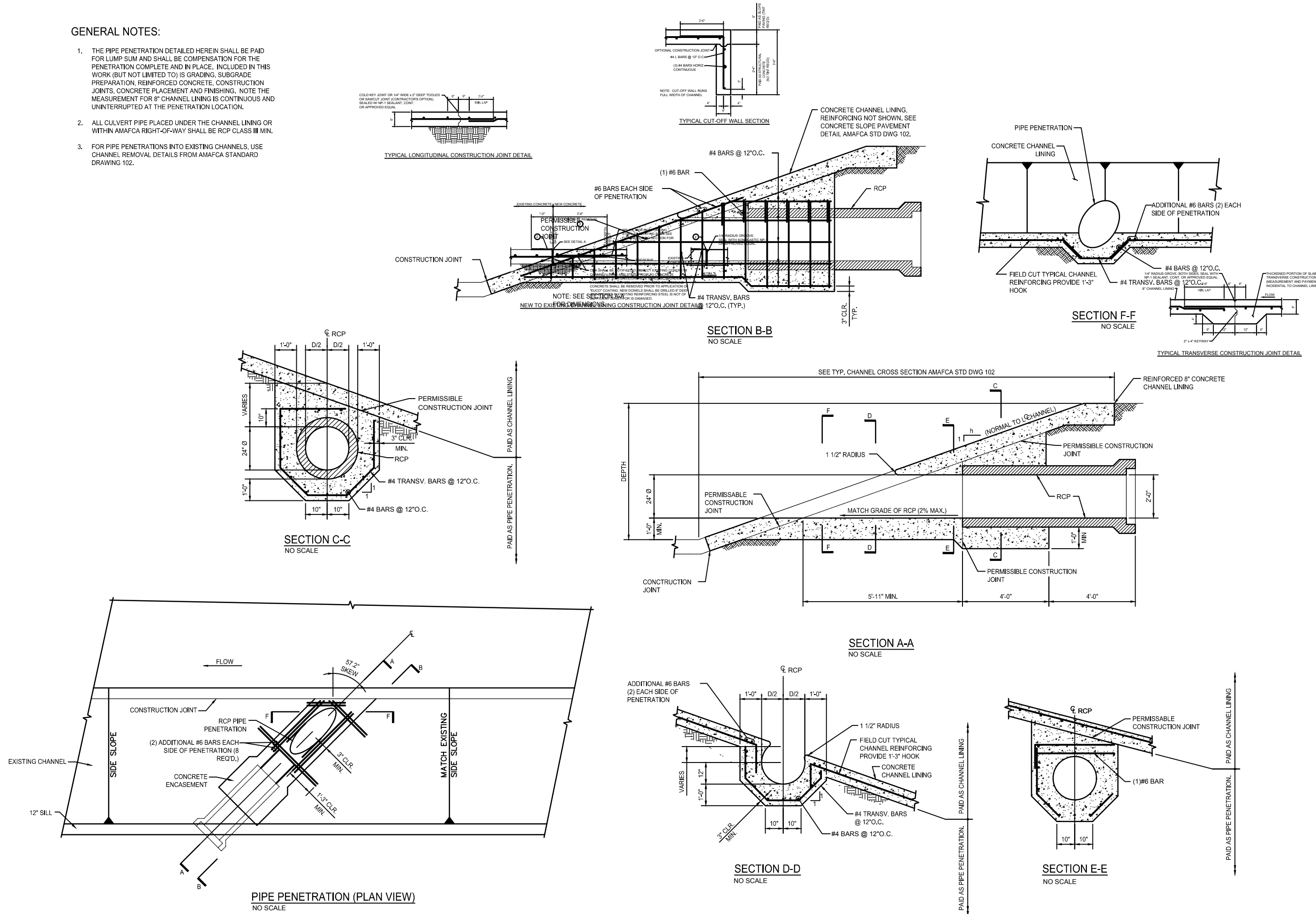
# PERFORATIONS			1	2	4	8
ELEVATION	A (sf)	h (ft)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
5291	0.09	0.69	0.36	0.72	1.45	2.89
5292	0.09	1.69	0.57	1.13	2.26	4.52
5293	0.09	2.69	0.71	1.43	2.85	5.70
5294	0.09	3.69	0.83	1.67	3.34	6.68
5295	0.09	4.69	0.94	1.88	3.76	7.53

* RIM ELEVATION

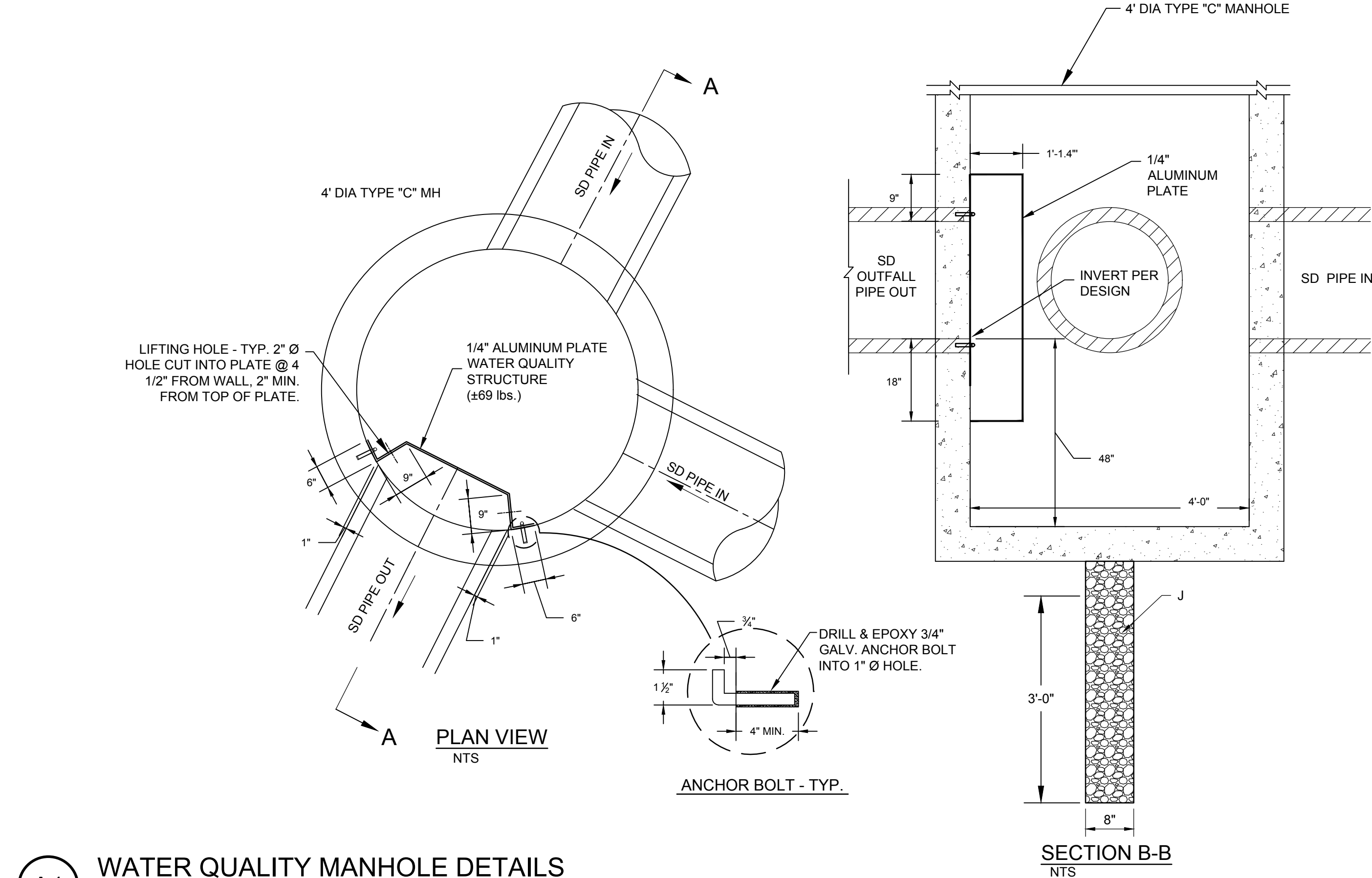
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GENERAL NOTES:

- THE PIPE PENETRATION DETAIL HEREIN SHALL BE PAID FOR LUMP SUM AND SHALL BE COMPENSATION FOR THE PENETRATION COMPLETE AND IN PLACE, INCLUDING THE PREPARATION, REPAIR, CONSTRUCTION, JOINTS, CONCRETE PLACEMENT AND FINISHING. NOTE THE MEASUREMENT FOR CHANNEL LININGS CONTIGUOUS AND UNINTERRUPTED AT THE PENETRATION LOCATION.
- ALL CULVERT PIPE PLACED UNDER THE CHANNEL LINING OR WITHIN AMMFCA REDUCING PIPES SHALL BE RCP CLASS B MIN.
- FOR PIPE PENETRATIONS INTO EXISTING CHANNELS, USE CHANNEL REMOVAL DETAILS FROM AMMFCA STANDARD DRAWING 102.



B1 PIPE PENETRATION DETAIL DETAIL
SCALE: NTS



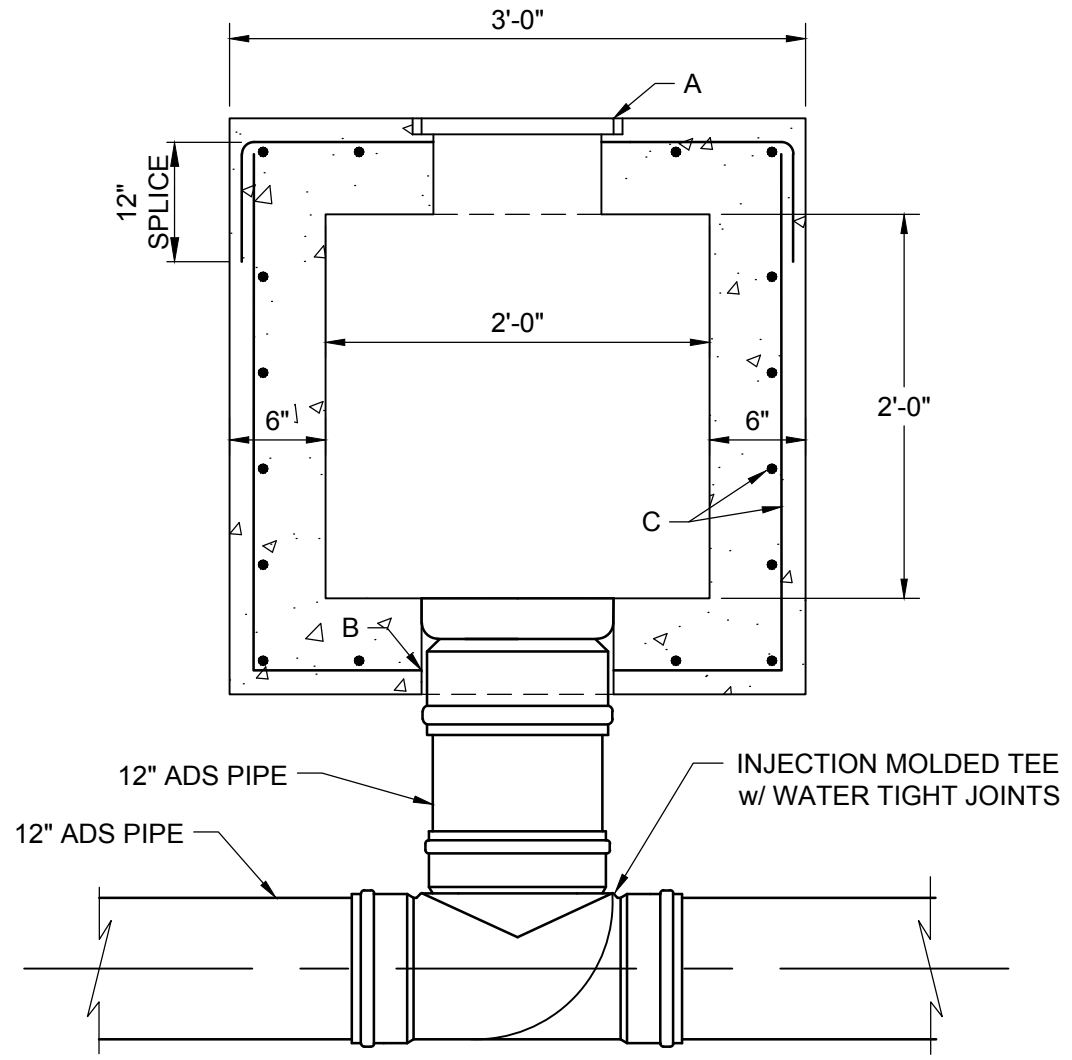
A1 WATER QUALITY MANHOLE DETAILS
SCALE: NTS

NOTES FOR CHANNEL CONSTRUCTION

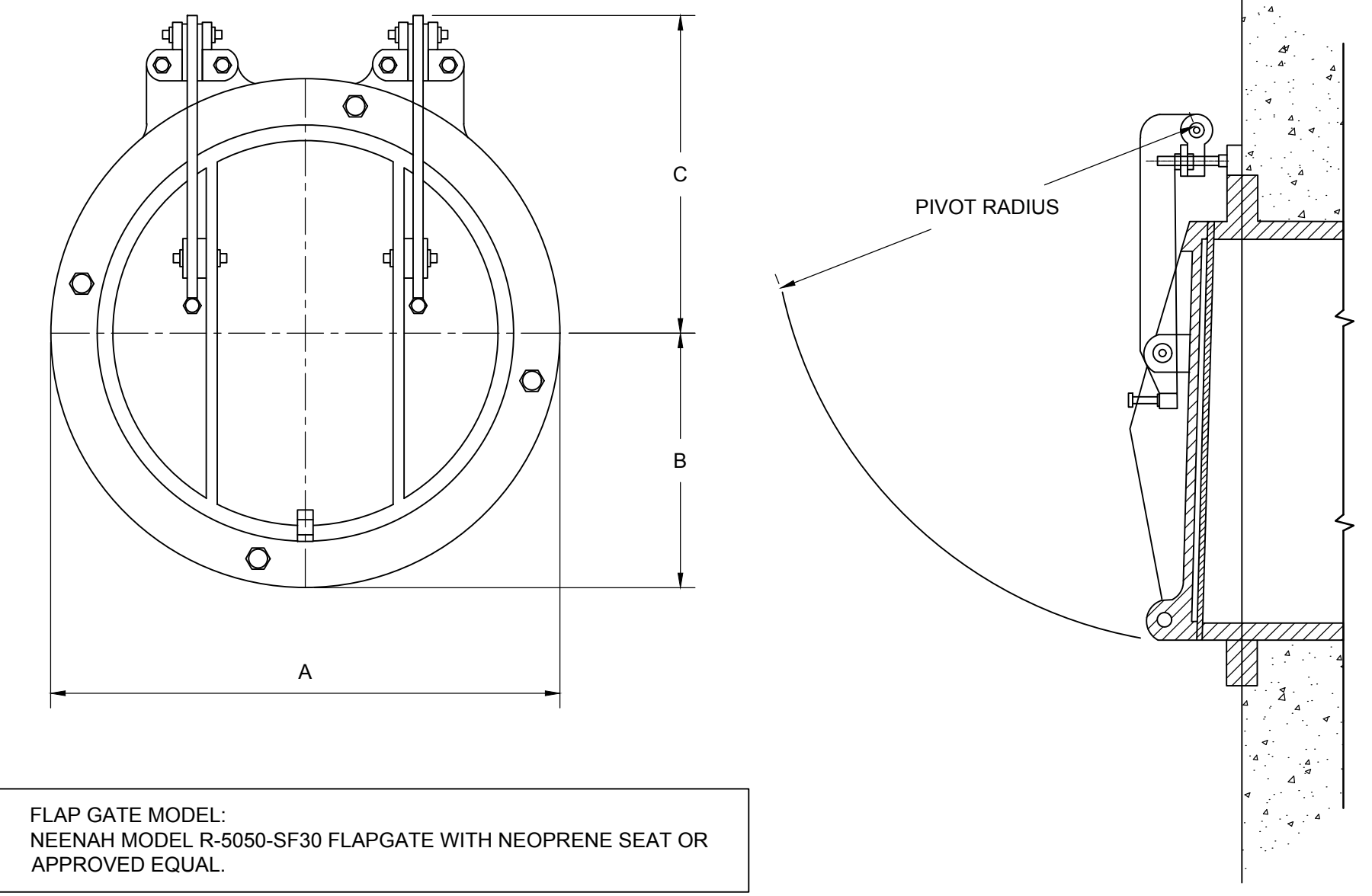
- CAST-IN-PLACE CONCRETE. CONCRETE SHALL BE IN ACCORDANCE WITH PROJECT SPECIFICATIONS. IT SHALL BE MINIMUM 34" CHAMFER ON ALL EXPOSED FORMED EDGES UNLESS NOTED OTHERWISE.
- REINFORCING STEEL. STEEL REINFORCEMENT AND PLACEMENT SHALL BE IN ACCORDANCE WITH PROJECT SPECIFICATIONS AND SHALL CONFORM TO ASTM A618, GRADE 60. ALL LAP SPLICES SHALL BE CLASS "B" UNLESS NOTED OTHERWISE. REINFORCING STEEL SHALL BE INCIDENTAL TO THE CONCRETE ED ITEMS.
- ALL EXPOSED CHANNEL SURFACES SHALL BE GIVEN A CLASS 3 FLOAT & TIME FINISH. TIME SHALL BE TRANSVERSE TO FLOW.
- ALL EXPOSED CONCRETE SHALL BE TINTED WITH SAN DIEGO BUFF (DAVIS COLOR 807) AT THE REDUCED DOSEAGE OF 1/8 PER BAG OF CEMENT, OR APPROVED EQUAL. TINT SHALL BE INCIDENTAL TO THE COST OF THE RESPECTIVE CONCRETE.
- NEW TO EXISTING CHANNEL CONSTRUCTION. EUCO AND LITHIUM NITRATE TREATMENT IS REQUIRED FOR ANY EXISTING CONCRETE CHANNELS. SEE DETAILS FOR INSTALLATION REQUIREMENTS, THIS SHEET.
- MINIMUM REBAR LAP LENGTH (CLASS B LAPS):
#5 = 22"
#7 = 43"
#8 = 54"
- THE EARTH SIDE OF SILL WALLS SHALL BE WATERPROOFED AT IRRIGATED AREAS AND DAM PROOFED AT ALL OTHER AREAS. WATERPROOFING SHALL BE CONNAP BARRIER CS-212 AS MANUFACTURED BY CONCRETE SEALANTS, INC. (MEMBRANE THICKNESS 1.100 INCHES MINIMUM) OR ENGINEER APPROVED EQUAL. DAM PROOFING SHALL BE HYDROIDE 700B OR ENGINEER APPROVED EQUAL.
- ALL EXPOSED SURFACES OF THE CHANNEL SILL WALLS SHALL RECEIVE A "THOROCOAT" CLASS 4 FINISH. THE COLOR SHALL BE SIMILAR TO THE TINTED CHANNEL LINING AND SHALL BE APPROVED BY AMMFCA. "THOROCOAT" SHALL BE APPLIED TO THE BACK OF WALLS 6 INCHES BELOW GRADE.

KEYED NOTES

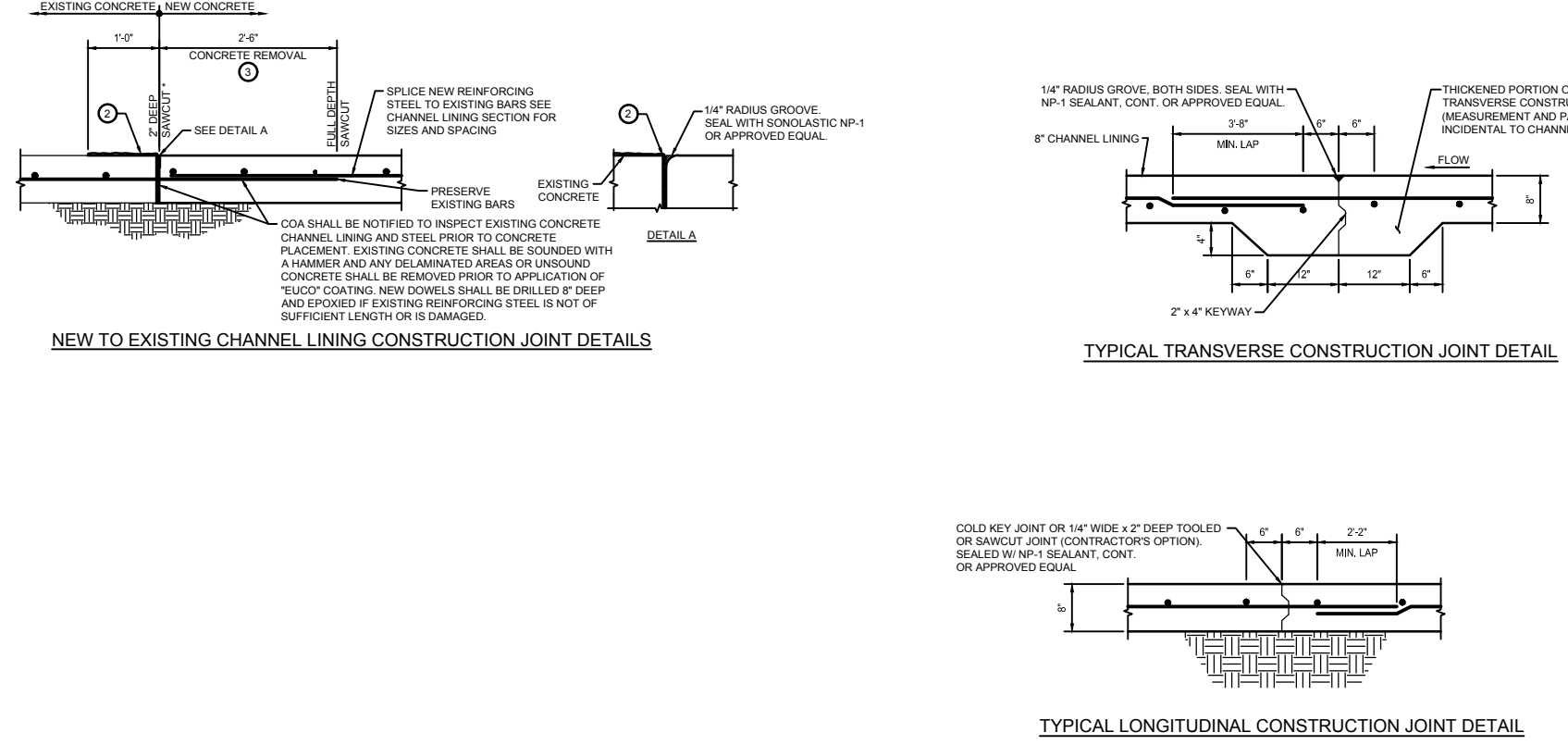
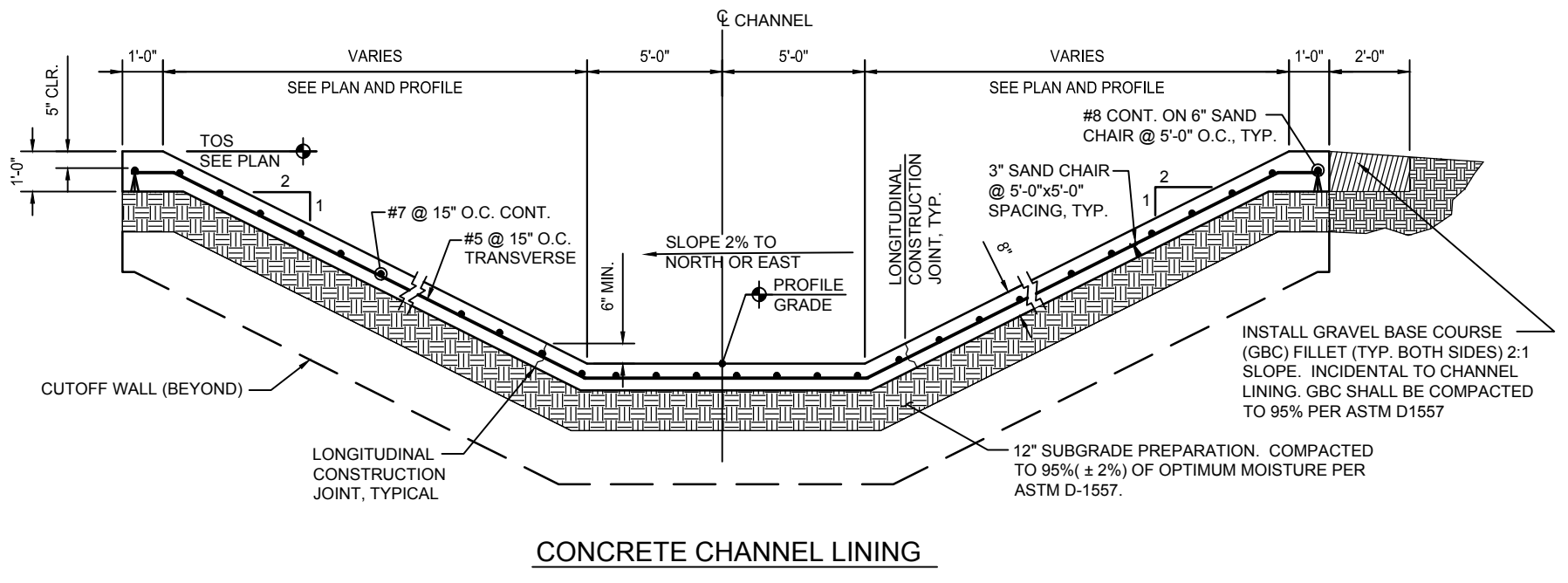
- NATIVE RE-VEGETATION. SEE CITY OF ALBUQUERQUE, SPECIFICATION SECTION 1012. GRAVEL MULCH IS REQUIRED FOR SLOPES GREATER THAN 3:1V.
- EUCO ARC LITHIUM NITRATE COATING OR APPROVED EQUAL APPLIED TO VERTICAL SURFACE AND 12" OF TOP SURFACE OF EXISTING CONCRETE TO REMAIN.
- REMOVAL OF CONCRETE ADJACENT TO THE 2" SAWCUT WILL BE WITH A 3/8 IN. MAX. PREMATCH CHAMFER. IN THE EVENT OF DAMAGE TO THE CONCRETE TO REMAIN, THE CONTRACTOR SHALL REPAIR THE 2" JOINT AND REMOVE AND REPLACE THAT CONCRETE AT NO COST TO CITY OF ALBUQUERQUE.



B2 ADS INLET DETAIL
SCALE: NTS



A2 FLAP GATE DETAIL
SCALE: NTS



GENERAL NOTES:

- OUTLET PIPE SIZE, PER DESIGN REQUIREMENT.

CONSTRUCTION NOTES:

- FRAME & GRATE, NEENAH #R4411-1-Q OR BEEHIVE #R4360-D; SEE GRADING PLAN
- CUT HORIZONTAL BAR EW AT PIPE OPENING.
- NO 4 BARS AT 6" OC EW
- INVERT PER DESIGN

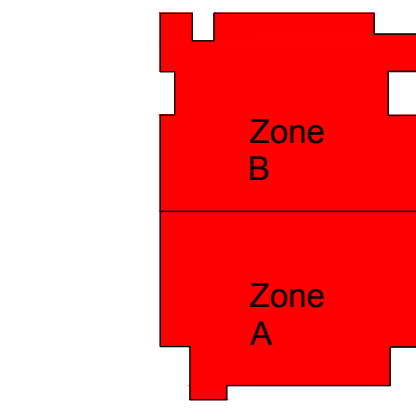
ARCHITECT

studio collaboration llc
124 2nd St NW Suite C, Albuquerque, NM 87102 505.232.2520
125 Jefferson St NE Albuquerque, NM 87108 505.255.4033

CONSULTANT

WILSON & COMPANY
4900 LANG AVE. NE
ALBUQUERQUE, NM 87109
PHONE: 505-348-4000
FAX: 505-348-4055 FIRST FLOOR
FAX: 505-348-4155 SECOND FLOOR
www.wilsonco.com

KEY PLAN



ALBUQUERQUE PUBLIC SCHOOLS
PROFESSIONAL DEVELOPMENT CENTER
3315 LOUISIANA BOULEVARD
Albuquerque, NM 87110

No.	Description	Date
1	Addendum #1	01/11/2017
2	Addendum #2	01/20/2017
3	Addendum #3	02/03/2017
4	Addendum #4	02/10/2017
5	ASI 1	04/14/2017

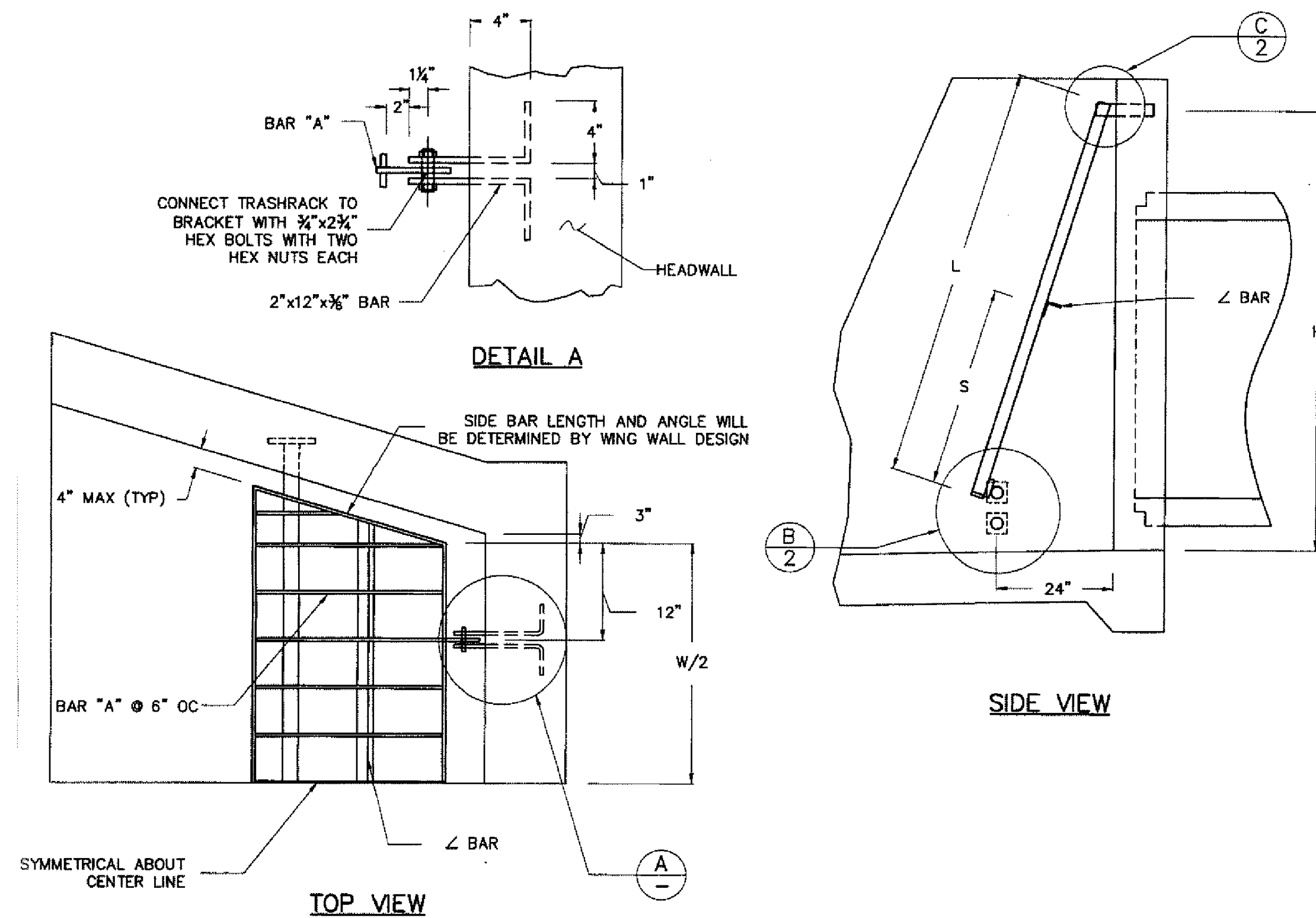
REV:

PHASE: 100% Construction Documents

DATE: December 1, 2016
DRAWN BY: JEM
CHECKED BY: DMD

C501

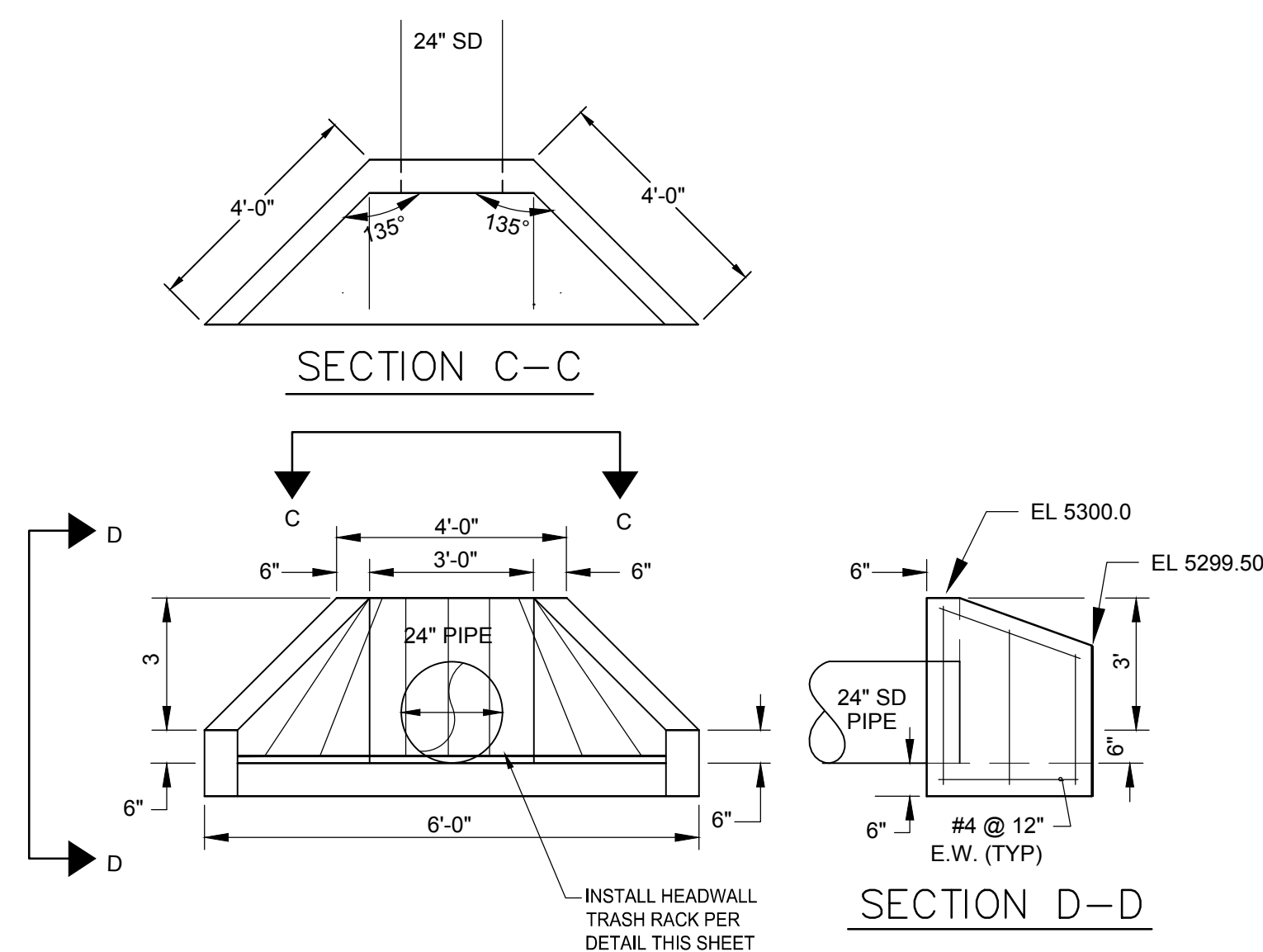
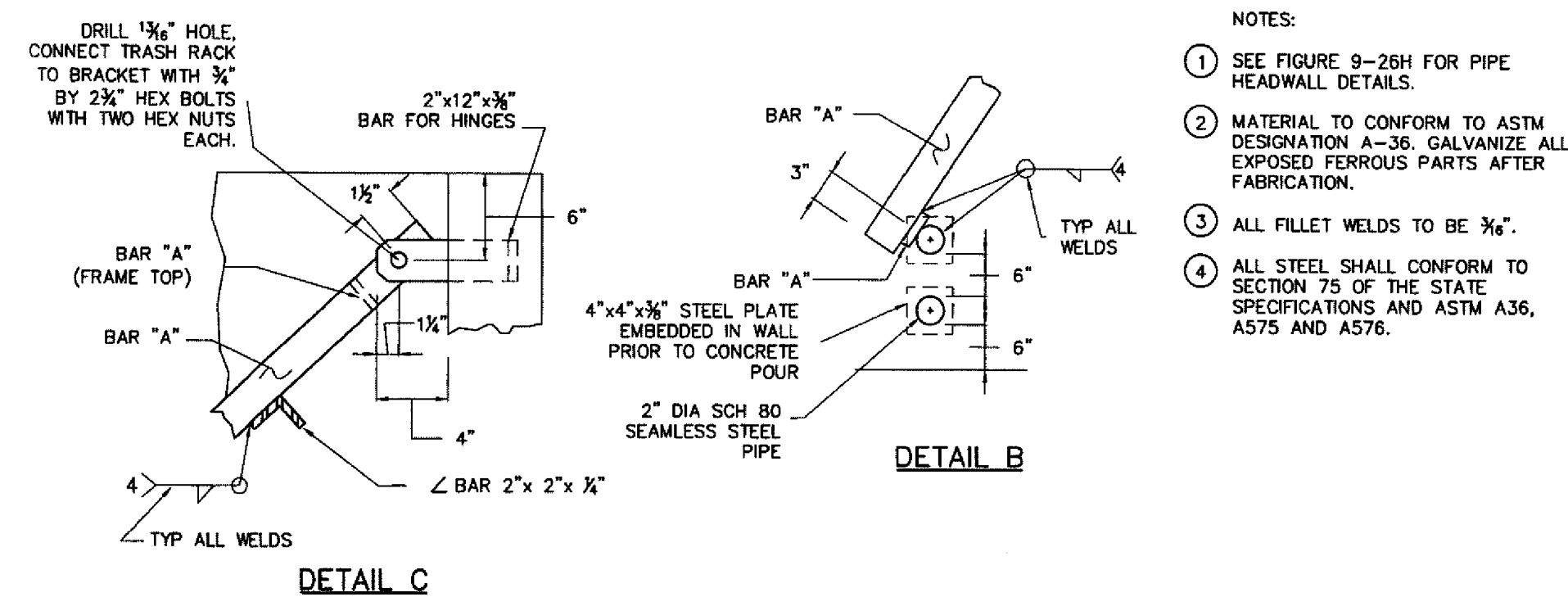
MISCELLANEOUS DETAILS



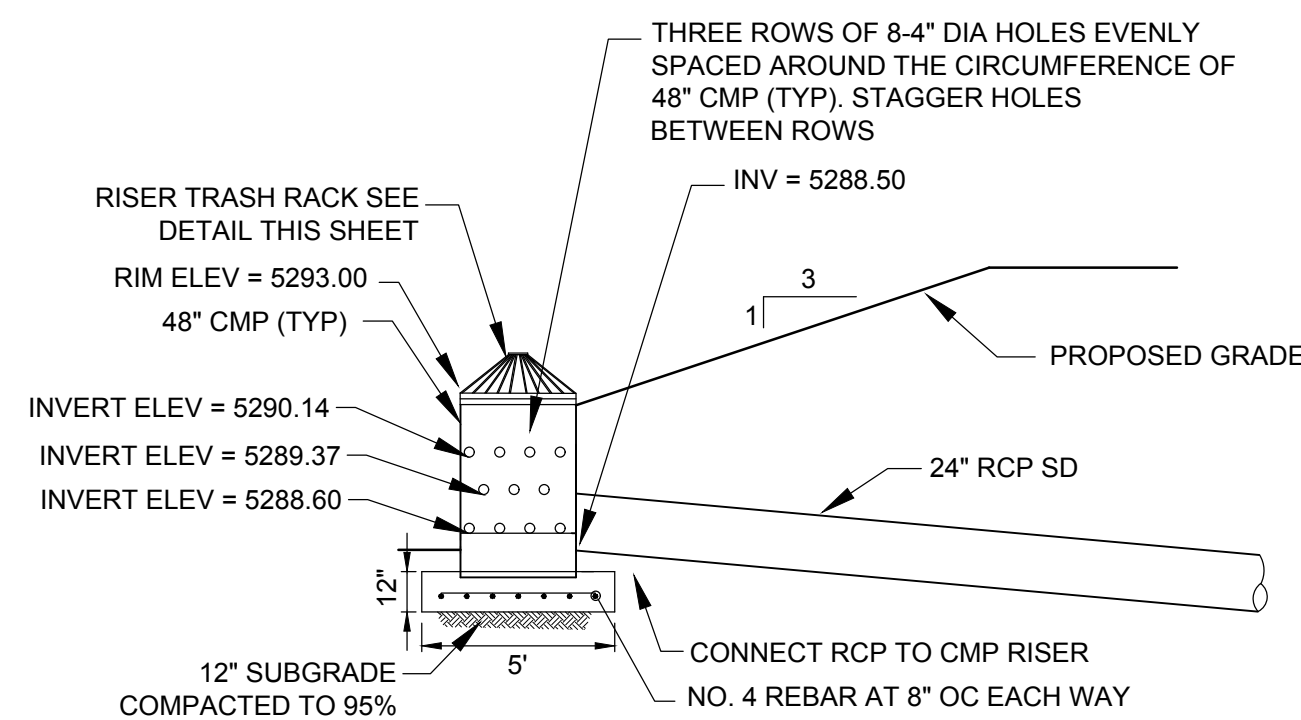
HEADWALL TRASH RACK DETAIL

PIPE DIA (IN)	PIPE OD (IN)	QUANTITY* BAR "A"	BAR "A" SIZE (IN)	H (IN)	W (IN)	L (IN)	S (IN)
24	30	11	3/8x2 1/2	56	48	40	18
37	33.5	11	3/8x2 1/2	40	48	42	19
30	37.5	11	3/8x2 1/2	53	48	46	21
33	40.5	11	3/8x2 1/2	57	48	52	24
36	44	13	3/8x2 1/2	60	60	52	24

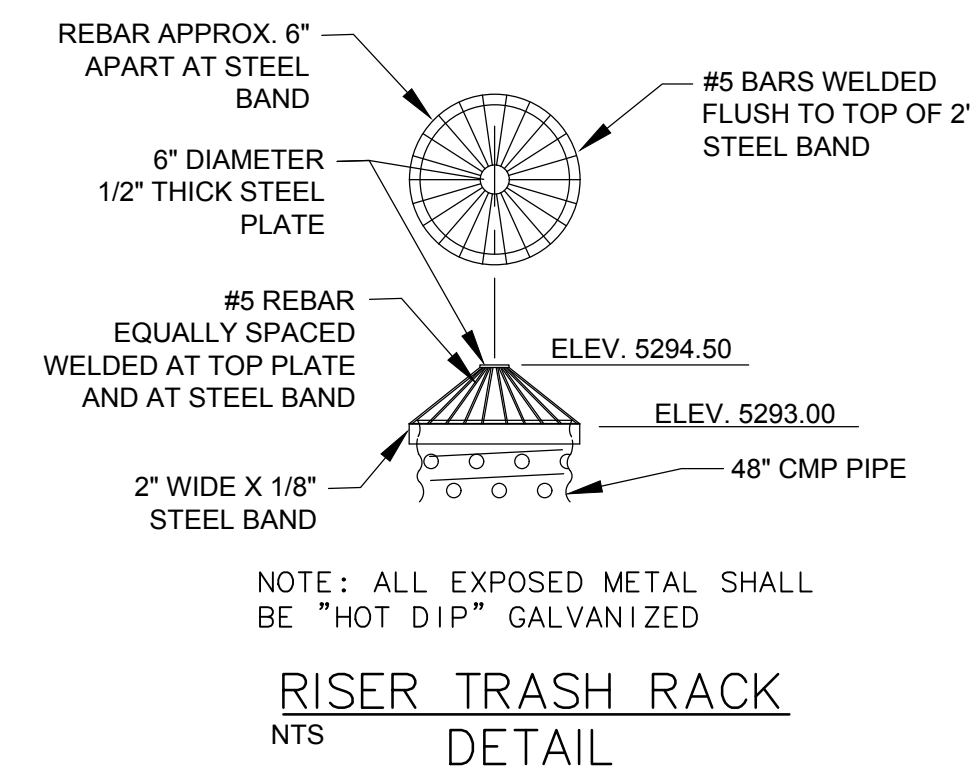
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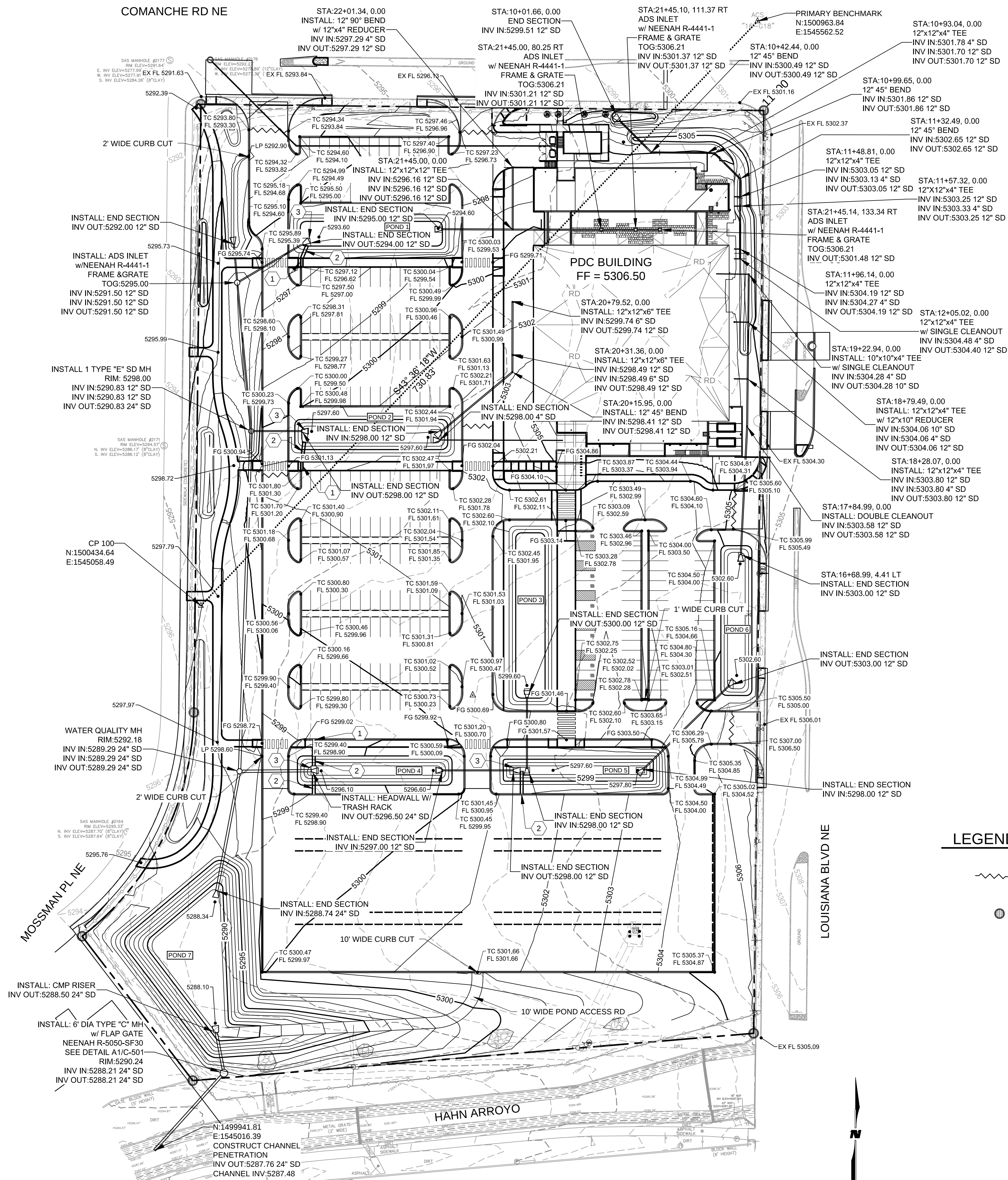


A1 HEADWALL DETAIL
SCALE: NTS



A6 **CMP RISER DETAIL**
SCALE: NTS





OVERALL GRADING & DRAINAGE PLAN

SCALE: 1" = 50'

GENERAL SHEET NOTES

- ALL ADS TEES AND BENDS SHALL HAVE CAST-IN-PLACE THRUST BLOCK. SEE DETAIL C5/C504.
- SEE SHEET C505 FOR MANHOLE DETAILS.
- STORM DRAIN SHALL BE ADS PIPE OR APPROVED EQUAL UNLESS OTHERWISE NOTED.
- GRADES SHOWN ARE TO FINISHED GRADE ELEVATIONS. LANDSCAPE SURFACING TREATMENT IS 4 INCHES THICK TO SUBGRADE (TYP), EXCEPT FOR AREAS WITH PAVERS AND THE DRAINAGE SWALE SIDE SLOPES WHICH ARE 8 INCHES THICK TO SUBGRADE. CONTRACTOR SHALL COORDINATE WITH LANDSCAPE ARCHITECT.
- SEE SHEET C502 FOR ADS INLET DETAIL.
- SEE SHEET C502 FOR DROP INLET DETAIL.
- SEE SHEET C504 FOR WATER QUALITY MH DETAIL.
- SEE SHEET C505 FOR TYPE "C" AND "E" MH DETAILS.
- SEE SHEET C505 FOR TYPE "D" INLET DETAIL.
- TIE-IN TO HAHN ARROYO AND ALL WORK WITHIN PUBLIC RIGHT-OF-WAY SHALL BE CONSTRUCTED PER CITY WORK ORDER PLANS.
- PIPE PENETRATION WORK INTO SOUTH HAHN ARROYO WILL BE PERFORMED UNDER CITY WORK ORDER 772071.

KEYNOTES

- CONSTRUCT 24" WIDE SIDEWALK CULVERT.
- CONSTRUCT 24" WIDE CONCRETE RUNDOWN.
- CONSTRUCT 5x5' MIN RIPRAP.

LEGEND

- GRADE BREAK
- FOUND PROPERTY CORNER

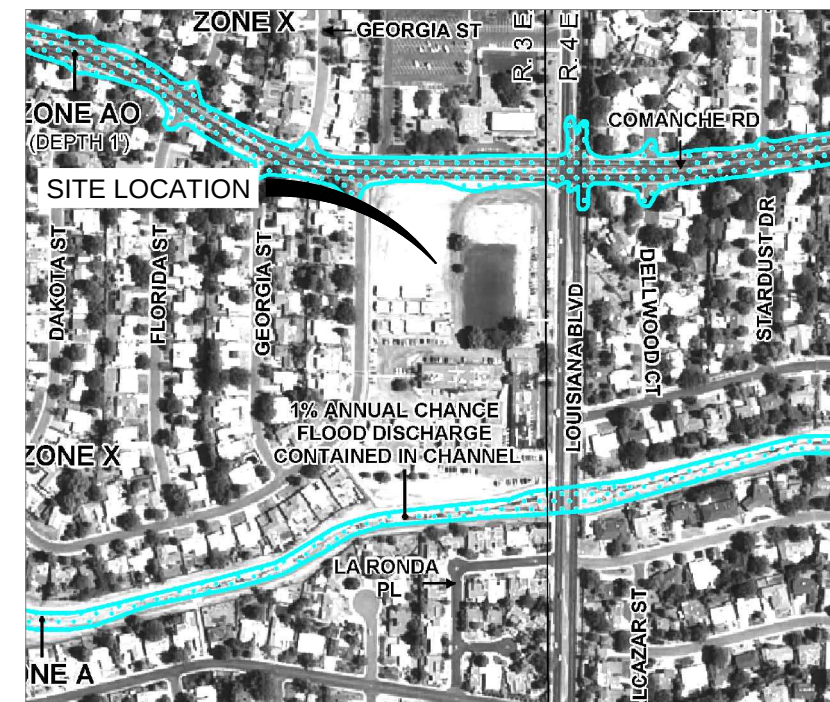
PRIMARY BENCHMARK

- FIELD SURVEY PERFORMED ON JANUARY 2009.
 - HORIZONTAL DATUM: COORDINATES ARE MODIFIED GROUND COORDINATES BASED ON NAD83, NEW MEXICO CENTRAL ZONE.
 - VERTICAL DATUM: NAVD 88
- A CITY OF ALBUQUERQUE 1-3/4" ALUMINUM DISK, STAMPED "ACS BM, 16-618", EPOXYED ON TOP OF THE CONCRETE CURB BASE OF TRAFFIC LIGHT STANCHION, NW QUADRANT OF LOUISIANA BLVD. & COMANCHE RD. NE, ON THE SOUTHWESTERLY CORNER OF SAID CONCRETE BASE.
- X=1,545,562.524' ELEV=5302.355' (NAVD 1988)
Y=1,500,963.838' CGGF:1.0003371873

POND	PEAK FLOW (CFS)		VOLUME (AC-FT)			ELEVATION (FT)		
	IN	OUT	PRVD	REQ'D	FIRST FLUSH (PRVD)	TOP	BOTTOM	WSEL
1	7.52	3.35	0.230	0.143	0.017	5297.0	5294.0	5296.1
2	1.69	0.13	0.129	0.056	0.016	5300.0	5298.0	5299.0
3	2.87	0.01	0.232	0.096	0.034	5302.0	5300.0	5300.9
4	14.76	13.22	0.163	0.095	0.005	5300.0	5296.5	5299.1
5	3.15	0.44	0.163	0.081	0.022	5300.0	5298.0	5299.1
6	1.25	0.01	0.130	0.042	0.016	5305.0	5303.0	5303.8
7	23.69	19.12	1.533	0.205	0.039	5298.0	5289.0	5292.7



LOCATION
ZONE ATLAS MAP NO G-18



FLOOD INSURANCE RATE MAP
REFERENCE: FLOOD INSURANCE STUDY
PANEL 352 #35001C0352H



SOILS MAP
REFERENCE: HTTP://WEBISOILSURVEY.NRCS.USDA.GOV

ARCHITECT

studio collaboration llc
5201 2nd St NW Suite C, Albuquerque, NM 87102 505.232.2620
125 Jefferson St NE Albuquerque, NM 87108 505.255.4033

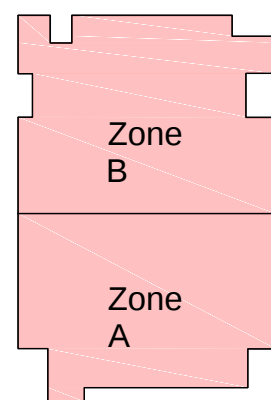
CONSULTANT

WILSON & COMPANY

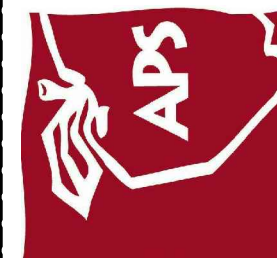
4900 LANG AVE. NE
ALBUQUERQUE, NM 87109
PHONE: 505-348-4000
FAX: 505-348-4055 FIRST FLOOR
FAX: 505-348-4155 SECOND FLOOR
www.wilsonco.com



KEY PLAN



ALBUQUERQUE PUBLIC SCHOOLS
PROFESSIONAL DEVELOPMENT CENTER
3315 LOUISIANA BOULEVARD
Albuquerque, NM 87110



No.	Description	Date
1	Addendum #1	01/11/2017
2	Addendum #2	01/20/2017
3	Addendum #3	02/03/2017
4	Addendum #4	02/10/2017
5	ASI 1	04/14/2017

REV:

PHASE: 100% Construction Documents

DATE: December 1, 2016

DRAWN BY: JEM

CHECKED BY: DMD

C102R

OVERALL GRADING & DRAINAGE PLAN