



January 17, 2017

Richard J. Berry, Mayor

Joel Hernandez, P.E.
Tierra West, LLC
5571 Midway Park Place, NE
Albuquerque, NM, 87109

**RE: U-Haul at West Bluff
Atrisco Drive NW
Grading Plan and Drainage Report
Engineer's Stamp Date 12-5-2016 (File: H11D059)**

Dear Mr. Hernandez:

Based upon the information provided in your submittal received 12-9-2016, the Grading Plan and Drainage Report are not approved for Building Permit. The following comments need to be addressed for approval of the referenced project:

1. The North detention pond appears to be bounded by a CMU retaining wall as high as 8 feet in some places. This will need to be enclosed with a fence at least 42 inches high.
2. Call out Class IV RCP for the north detention pond outfall pipe under the retaining wall.
3. Additional detail is required for the two curb cuts and their associated water blocks to ensure ADA compliance for pedestrian traffic along Atrisco. Provide section views at these locations, including flow line elevation, slope, and waterblock elevations.
4. Project Benchmark and Vertical Datum is missing from the sheets. The Drainage Management Plan addresses the NGVD29 to NAVD88 shift, but sheets need this information as well.
5. A portion of the sidewalk is within the parcel property, if there is no existing sidewalk easement, one will need to be provided.
6. Verify that the two drop inlets are capable of handling twice the 100-yr flow at the sump on Atrisco. It appears this location has a single-C and double-C on each side of the road. If these inlets are insufficient, additional inlets will be needed on the new lateral from the north pond to prevent flows from spilling over into the north pond.

PO Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

Please prepare and submit an Erosion and Sediment Control Plan to the storm water quality section for review. Work within the City Right-of-Way will require a city work order. If you have any questions, please contact me at 924-3695 or dpeterson@cabq.gov.

Sincerely,

A handwritten signature in black ink, appearing to read 'D. Peterson', written over a horizontal line.

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

DRAINAGE MANAGEMENT PLAN

For

West Bluff Business Center

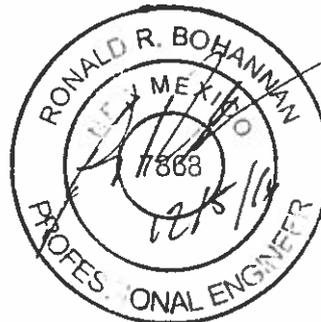
**SWC Miami Street and Atrisco Drive, NW
Albuquerque, New Mexico**

Prepared by:

Tierra West, LLC
5571 Midway Park Place NE
Albuquerque, New Mexico 87109

December, 2016

I certify that this report was prepared under my supervision, and I am a registered Professional Engineer in the State of New Mexico in good standing.



Ronald R. Bohannon, PE
NO. 7868

TW Job No. 2016061

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Map Pockets

Grading and Drainage Plan Map Pocket

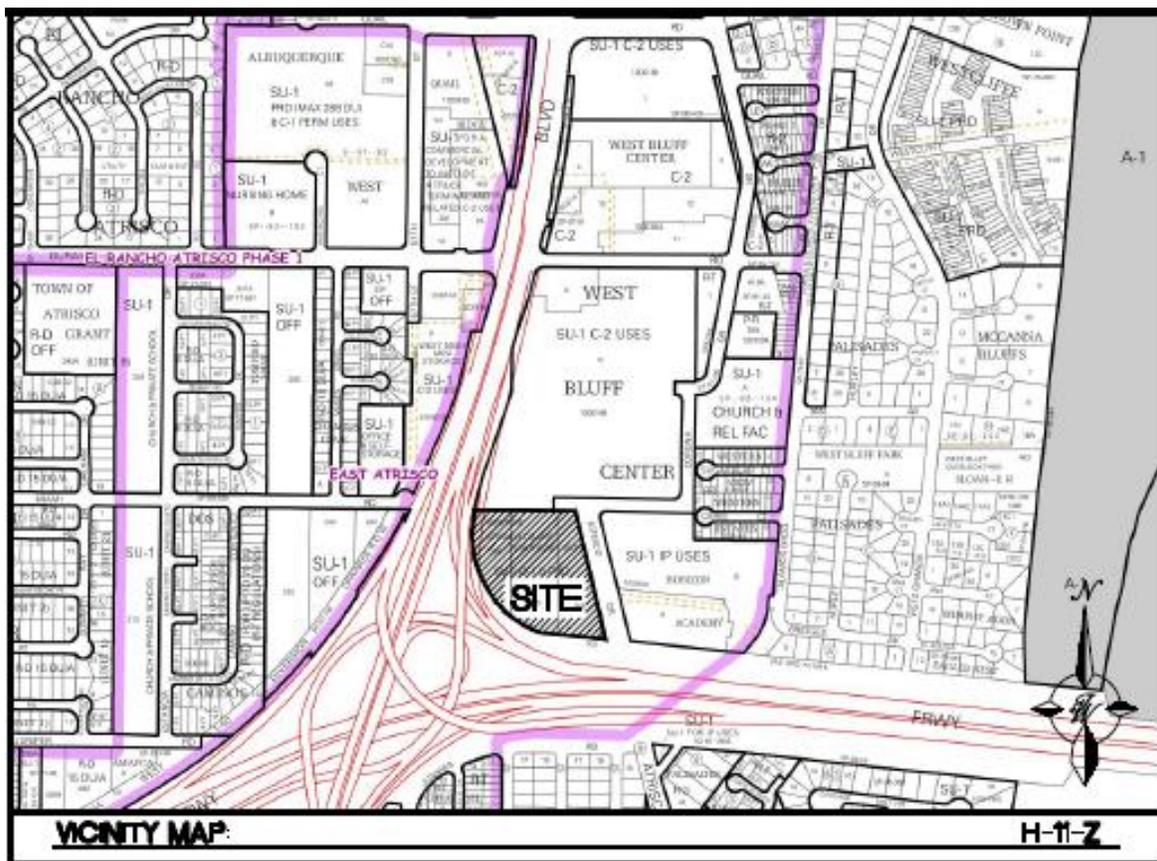
Introduction:

The purpose of this drainage report is to present a drainage solution for the proposed storage facility development consisting of four buildings and associated parking facility. This report accompanies the request for approval of the Grading and Drainage Plan for Site Development Plan for Building Permit.

This site in its entirety was previously analyzed by the Drainage Report for SAD 219 (see Appendix C) and falls within Drainage Basin H11-3 which was designated to discharge all developed flows from the site to the existing 14' x 14' CBC with a storm drain connection. This report will demonstrate the storm drain system in Atrisco Drive has sufficient capacity to accommodate the developed flows as indicated on the proposed grading and drainage plan.

Project Location Map:

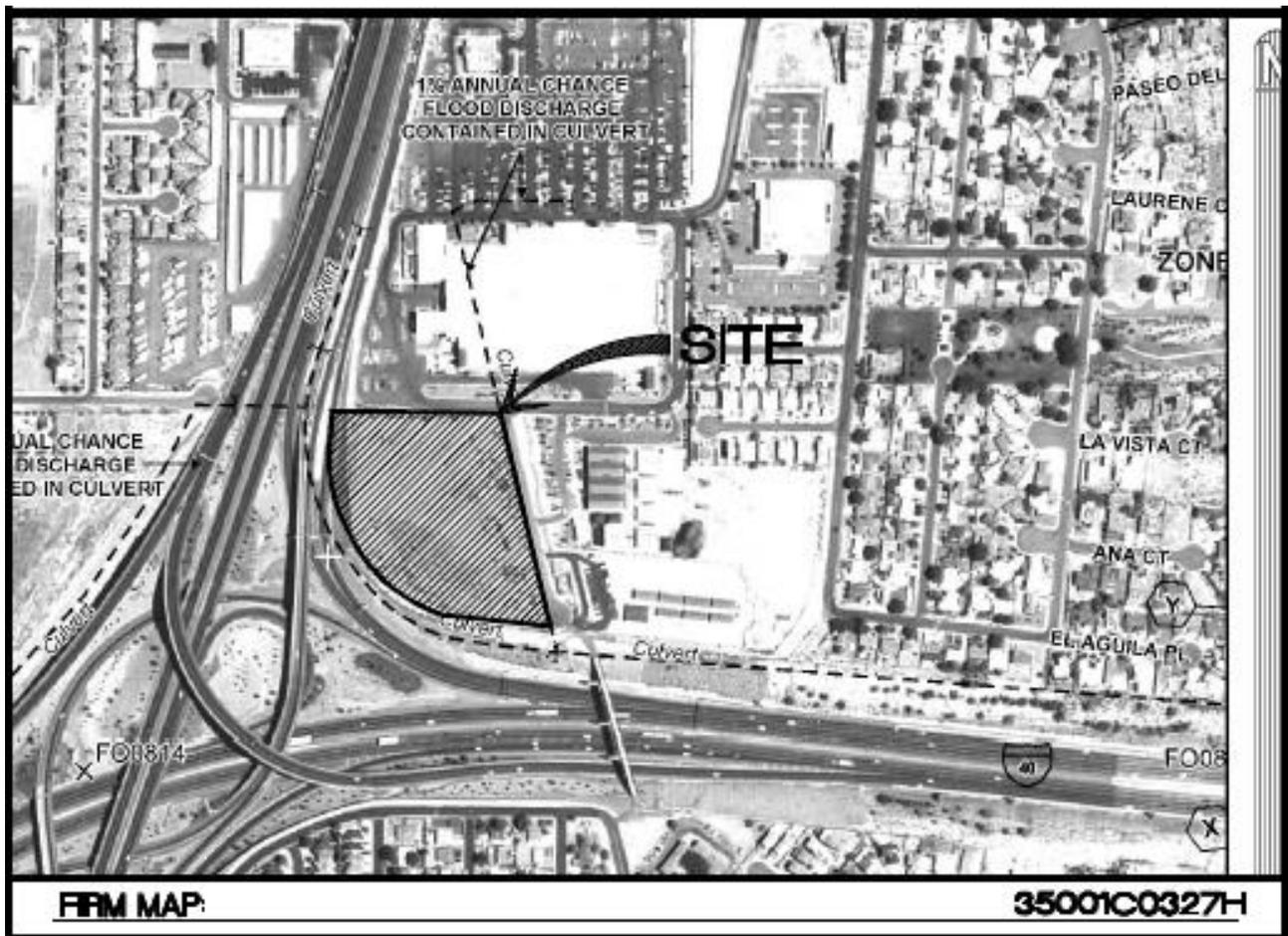
The 5.18-acre site is comprised of an undeveloped parcel (recently consolidated from four lots) located at the southwest corner of Miami Street and Atrisco Drive, NW.



Pre-Developed Conditions:

The site is bound on the north by the Miami Street public roadway improvements and an existing retail facility, on the east by Atrisco Drive, on the south by Interstate 40, and on the west by the off-ramp from I-40 to Coors Boulevard. Site terrain is gently sloping and generally drains by sheet flow from northeast to southwest onto the I-40 off-ramp. There is an existing 54-inch storm drain within Atrisco Drive (Atrisco Drain) and a 14'X14' concrete box culvert (CBC) with the public right-of-way along the westerly property boundary. The 54-inch Atrisco Drain connects to the 14'X14' CBC just south of the Atrisco Drive southerly terminus, where it continues toward the east to discharge into the Rio Grande.

Existing conditions, analyzed as a single basin with a runoff rate of 15.27 cfs, generally sheet flow from northeast to southwest discharging onto the Coors Boulevard off-ramp from I-40. No offsite runoff enters the site. The site is located outside any mapped 100-year floodplain, as indicated on FEMA FIRM Map 35001C0327H.



Post-Developed Conditions:

The proposed grading scheme directs storm runoff toward the east by means of surface sheet flow to the extent possible into two water quality retention ponds which then discharge into the existing storm drain system in Atrisco Drive (Atrisco Drain). An onsite private storm drain system will also be employed to capture drainage from areas where sheet flow is impractical. A slope area (Basin C) along the westerly property boundary will flow onto the adjacent slope toward the west, although the flows expected are miniscule (0.27 cfs) especially when compared to the historic flow of 15.27 cfs which were historically conveyed to this area. The onsite storm drain system capacity calculations were performed using FlowMaster and are included in Appendix B. Storm drain lateral connections into the Atrisco Drain will require construction of a new storm drain manhole for the north basin, and connection into an existing manhole in Atrisco Drive for the south basin.

A downstream capacity analysis of the Atrisco Drain was performed by modeling the existing system using StormCAD to assess the system capacity. As a conservative measure, the attenuation effect of the retention ponds was unaccounted for in the analysis. The model was developed using as-built drawing information (included in Appendix C) for the existing system and includes the proposed lateral storm drain connections from the retention ponds. As a matter of clarity, all elevations in the StormCAD model reflect the NGVD 29 Datum, including those of the proposed storm drain lateral connections. Adjusting for the difference between NGVD 29/NAVD88 Datum (approximately 2.80'), the HGL at 100-year peak flows is expected to be 5087.74' at the north lateral, and 5091.24' at the south lateral, both of which are below the retention pond bottom elevations of 5091.00' and 5092.50', respectively. The results indicate the Atrisco Drain has sufficient capacity to accommodate the developed flows from the site without detention ponds.

Water Quality Management

Low Impact Development strategies are implemented in the grading and drainage design by incorporating gravel-lined swales, retention ponds, and CMP risers outfitted with trash racks prior to releasing flows from developed impervious areas. The majority of the surface drainage is conveyed to the retention ponds through gravel-lined swales which act to capture sediment and other debris before reaching the retention ponds. Retention volume is achieved within the ponds and controlled by the crest elevation of the corresponding CMP risers which are sized to convey the 100-year storm at the maximum water surface elevations indicated on the grading and drainage plan. Calculations for required retention volumes, pond volumes, and CMP riser headwater elevations are included in Appendix A.

Conclusion:

This Drainage Management Plan provides for grading and drainage elements which are capable of safely conveying the 100-year, 6-hour storm and which meet the DPM requirements. With this submittal we request Drainage Report and Grading Plan approvals for the Site Development Plan for Building Permit application.

APPENDIX A

**On-Site Hydrology and Hydraulics
Excerpt for Reference**

U-HAUL AT WEST BLUFF

Existing Conditions Basin Data Table

This table is based on the DPM Section 22.2, Zone: 1

BASIN	Area (SQ. FT)	Area (AC.)	Land Treatment Percentages				Q(100) (cfs/ac.)	Q(100) (CFS)	V(100) (inches)	V(100) (CF)
			A	B	C	D				
EXISTING CONDITIONS										
EX	231788	5.32	0.0%	0.0%	100.0%	0.0%	2.87	15.27	0.99	19123
TOTAL		5.32						15.27	0.99	19123

Proposed Conditions Basin Data Tables

BASIN	Area (SQ. FT)	Area (AC.)	Land Treatment Percentages				Q(100) (cfs/ac.)	Q(100) (CFS)	V(100) (inches)	V(100) (CF)
			A	B	C	D				
PROPOSED CONDITIONS										
A1	12557	0.29	0.0%	0.0%	0.0%	100.0%	4.37	1.26	1.97	2061
A2	8128	0.19	0.0%	0.0%	2.0%	98.0%	4.34	0.81	1.95	1321
A3	3457	0.08	0.0%	0.0%	13.0%	87.0%	4.18	0.33	1.84	531
A4	530	0.01	0.0%	0.0%	0.0%	100.0%	4.37	0.05	1.97	87
A5	60973	1.40	0.0%	0.0%	28.0%	72.0%	3.95	5.53	1.70	8615
TOTAL		1.97						7.98	1.97	12616

BASIN	Area (SQ. FT)	Area (AC.)	Land Treatment Percentages				Q(100) (cfs/ac.)	Q(100) (CFS)	V(100) (inches)	V(100) (CF)
			A	B	C	D				
PROPOSED CONDITIONS										
B1	14177	0.33	0.0%	0.0%	4.0%	96.0%	4.31	1.40	1.93	2281
B2	13057	0.30	0.0%	0.0%	0.0%	100.0%	4.37	1.31	1.97	2144
B3	10227	0.23	0.0%	0.0%	0.0%	100.0%	4.37	1.03	1.97	1679
B4	69786	1.60	0.0%	0.0%	0.0%	100.0%	4.37	7.00	1.97	11457
B5	34751	0.80	0.0%	0.0%	76.0%	24.0%	3.23	2.58	1.23	3548
TOTAL		3.26						13.32	1.93	21108

BASIN	Area (SQ. FT)	Area (AC.)	Land Treatment Percentages				Q(100) (cfs/ac.)	Q(100) (CFS)	V(100) (inches)	V(100) (CF)
			A	B	C	D				
PROPOSED CONDITIONS										
C	4145	0.10	0.0%	0.0%	100.0%	0.0%	2.87	0.27	0.99	342
TOTAL		0.10						0.27	0.99	342

(60' ROW TYPICAL)

EXISTING 10' PUBLIC TRAIL EASEMENT
(10/02/2000, 2000C-256)

Coors Boulevard, N.W.
RIGHT OF WAY TRACT 5-1 NMP TPU-040-3(89)155

ACCESS CONTROL, RIGHT OF WAY LINE

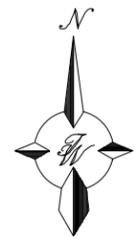
Atrisco Drive, N.W.
(100' ROW)

EXISTING 50' WIDE GAS COMPANY EASEMENT
(09/20/1930, VOL. 112-FOL 531)

EXISTING STORM SEWER EASEMENT
(BK. MS. 750-1, PG. 825)

ACCESS CONTROL, RIGHT OF WAY LINE
Interstate I-40
NMP TPU-040-3(89) 155
(450' ROW TYPICAL)

Basin EX
5.33
ac
15.27 cfs



NTS

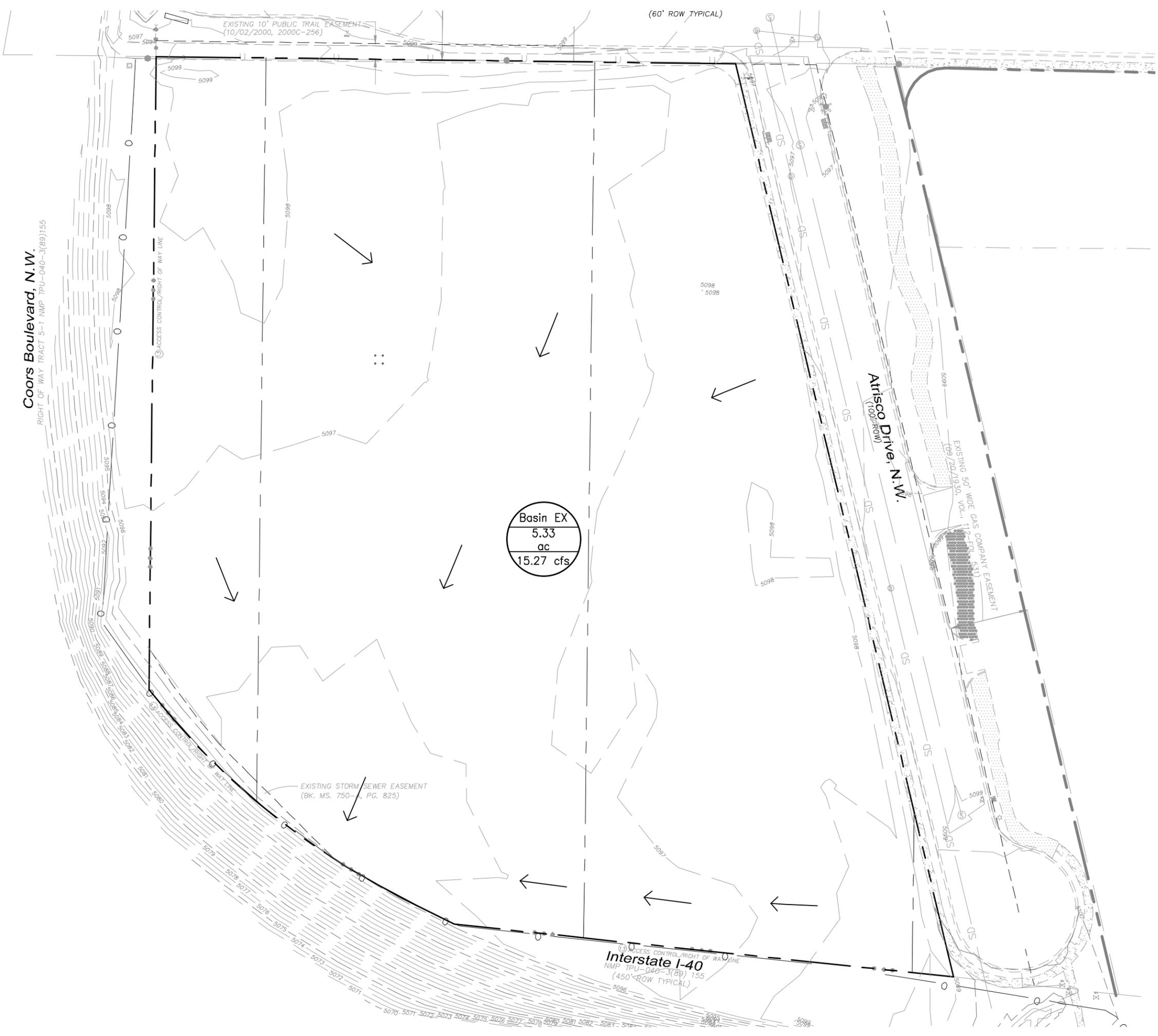
LEGEND

--- DRAINAGE BASIN
→ FLOW DIRECTION

Basin ID
Basin Area
Q100 (cfs)

Analysis Point
Q100

**PRE-DEVELOPMENT
DRAINAGE BASINS**



(60' ROW TYPICAL)

EXISTING 10' PUBLIC TRAIL EASEMENT
(T07/02/2000, 2008C-256)-G

Coors Boulevard, N.W.
RIGHT OF WAY TRACT 5-1 NMP TPU-040-3(89)155

Atiseo Drive, N.W.
(100' ROW)

EXISTING STORM SEWER EASEMENT
(BK) MS. 750-A, PG. 825

ACCESS CONTROL RIGHT OF WAY LINE
Interstate I-40
NMP TPU-040-3(89) 155
(450' ROW TYPICAL)

LOCKED GATE
FOR OPENING
FOOT TRAIL



NTS

LEGEND

--- DRAINAGE BASIN
→ FLOW DIRECTION

Basin ID
Basin Area
Q₁₀₀(cfs)

Analysis Point
Q₁₀₀

Basin C
0.10 ac
0.27 cfs

Basin B4
1.60 ac
7.00 cfs

Basin B5
0.80 ac
2.58 cfs

Basin B3
0.23 ac
1.03 cfs

Basin B2
0.30 ac
1.31 cfs

Basin B1
0.33 ac
1.40 cfs

Basin A2
0.19 ac
0.81 cfs

Basin A1
0.29 ac
1.26 cfs

Basin A3
0.08 ac
0.33 cfs

Basin A4
0.01 ac
0.05 cfs

Basin A5
1.40 ac
5.53 cfs

AP #100
7.98 cfs

AP #101
2.45 cfs

AP #202
2.71 cfs

AP #201
3.74 cfs

AP #200
13.32 cfs

**POST-DEVELOPMENT
DRAINAGE BASINS**

FIRST FLUSH RETENTION VOLUME CALCULATIONS

NORTH POND (A) RETENTION VOLUME CALCULATIONS

ELEVATION (ft)	AREA (sf)	VOLUME (cf)	CUMULATIVE VOLUME (cf)
5091	707	0	0
5092	757	732	732
5093	809	783	1515
5094*	853	831	2346

VOLUME PROVIDED: 2346

VOLUME REQUIRED:

IMPERVIOUS AREA (Ai): 67,236 sf

VOLUME REQ'd= $A_i(0.44-0.1)/12=$ **1,905**

OK

*CMP RISER ELEVATION

SOUTH POND (B) RETENTION VOLUME CALCULATIONS

ELEVATION (ft)	AREA (sf)	VOLUME (cf)	CUMULATIVE VOLUME (cf)
5092.5	2447	0	0
5093.5	4155	3301	3301
5094*	5171	2331.5	5633

VOLUME PROVIDED: 5633

VOLUME REQUIRED:

IMPERVIOUS AREA (Ai): 120,893 sf

VOLUME REQ'd= $A_i(0.44-0.1)/12=$ **3,425**

OK

*CMP RISER ELEVATION

Water Quality CMP Riser-Orifice Calculations

ONSITE POND A (NORTH POIND) HEADWATER CALCULATION

Orifice Equation (Solved for H)

$$H = \frac{\left(\frac{Q}{C_d A_o} \right)^2}{2g}$$

C =	0.6
Diameter (in)	18
Area (ft^2)=	1.767
g =	32.2
Q (CFS)=	7.98 (FROM AP #100)
H (Ft) =	0.88

CALCULATE MAXIMUM WATER SURFACE ELEVATION (WSE)

WSE= [RISER ELEVATION]+ [HEADWATER]

Riser Elavation: 5094.0

MAX WSE= 5094.9

ONSITE POND B (SOUT POIND) HEADWATER CALCULATION

Orifice Equation (Solved for H)

$$H = \frac{\left(\frac{Q}{C_d A_o} \right)^2}{2g}$$

C =	0.6
Diameter (in)	30
Area (ft^2)=	4.909
g =	32.2
Q (CFS)=	13.32 (FROM AP #200)
H (Ft) =	0.32

CALCULATE MAXIMUM WATER SURFACE ELEVATION (WSE)

WSE= [RISER ELEVATION]+ [HEADWATER]

Riser Elavation: 5094.0

MAX WSE= 5094.3

Worksheet for Circular Pipe - A Outlet

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Diameter	12	in
Discharge	2.45	ft ³ /s

Results

Normal Depth	0.52	ft
Flow Area	0.41	ft ²
Wetted Perimeter	1.60	ft
Hydraulic Radius	0.26	ft
Top Width	1.00	ft
Critical Depth	0.67	ft
Percent Full	51.7	%
Critical Slope	0.00448	ft/ft
Velocity	5.98	ft/s
Velocity Head	0.56	ft
Specific Energy	1.07	ft
Froude Number	1.65	
Maximum Discharge	4.98	ft ³ /s
Discharge Full	4.63	ft ³ /s
Slope Full	0.00280	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	51.70	%
Downstream Velocity	Infinity	ft/s

Worksheet for Circular Pipe - B Outlet

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Diameter	12	in
Discharge	3.74	ft ³ /s

Results

Normal Depth	0.68	ft
Flow Area	0.57	ft ²
Wetted Perimeter	1.94	ft
Hydraulic Radius	0.29	ft
Top Width	0.93	ft
Critical Depth	0.82	ft
Percent Full	68.1	%
Critical Slope	0.00647	ft/ft
Velocity	6.56	ft/s
Velocity Head	0.67	ft
Specific Energy	1.35	ft
Froude Number	1.48	
Maximum Discharge	4.98	ft ³ /s
Discharge Full	4.63	ft ³ /s
Slope Full	0.00652	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	68.11	%
Downstream Velocity	Infinity	ft/s

Worksheet for Circular Pipe - PB2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.00500	ft/ft
Diameter	12	in
Discharge	2.71	ft ³ /s

Results

Normal Depth	0.69	ft
Flow Area	0.58	ft ²
Wetted Perimeter	1.97	ft
Hydraulic Radius	0.30	ft
Top Width	0.92	ft
Critical Depth	0.71	ft
Percent Full	69.4	%
Critical Slope	0.00478	ft/ft
Velocity	4.66	ft/s
Velocity Head	0.34	ft
Specific Energy	1.03	ft
Froude Number	1.03	
Maximum Discharge	3.52	ft ³ /s
Discharge Full	3.27	ft ³ /s
Slope Full	0.00342	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	69.40	%
Downstream Velocity	Infinity	ft/s

Worksheet for Triangular Channel - A5

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.041	
Channel Slope	0.01000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	5.53	ft ³ /s

Results

Normal Depth	0.94	ft
Flow Area	2.62	ft ²
Wetted Perimeter	5.91	ft
Hydraulic Radius	0.44	ft
Top Width	5.61	ft
Critical Depth	0.73	ft
Critical Slope	0.03672	ft/ft
Velocity	2.11	ft/s
Velocity Head	0.07	ft
Specific Energy	1.00	ft
Froude Number	0.54	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.94	ft
Critical Depth	0.73	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.03672	ft/ft

Worksheet for Triangular Channel - B4

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.041	
Channel Slope	0.01000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	7.00	ft ³ /s

Results

Normal Depth	1.02	ft
Flow Area	3.13	ft ²
Wetted Perimeter	6.46	ft
Hydraulic Radius	0.48	ft
Top Width	6.13	ft
Critical Depth	0.81	ft
Critical Slope	0.03559	ft/ft
Velocity	2.24	ft/s
Velocity Head	0.08	ft
Specific Energy	1.10	ft
Froude Number	0.55	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

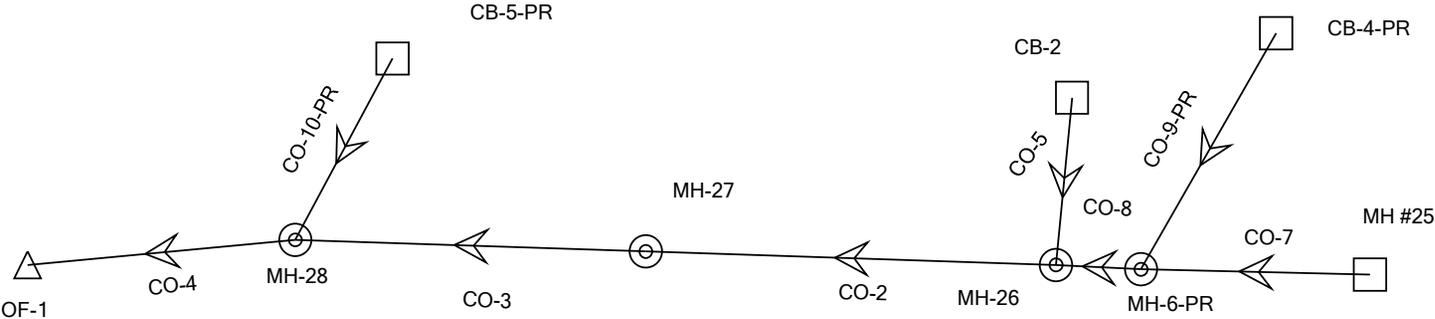
GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.02	ft
Critical Depth	0.81	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.03559	ft/ft

APPENDIX B

Off-Site Hydraulics Capacity Analysis Atrisco Drain

Scenario: Base



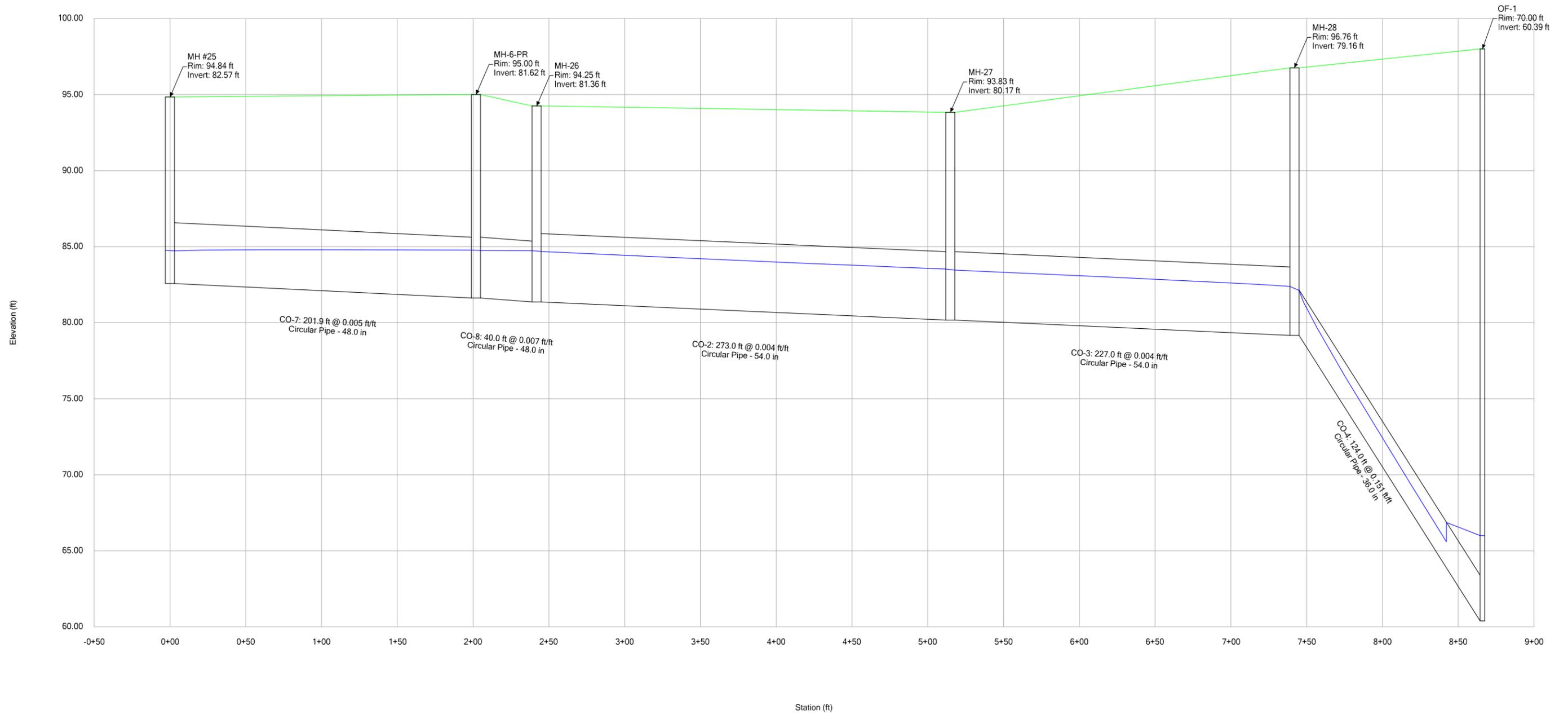
Scenario: Base
Current Time Step: 0.000Hr
Conduit FlexTable: Combined Pipe/Node Report

Label	Start Node	Stop Node	Length (Unified) (ft)	Capacity (Full Flow) (ft ³ /s)	Flow (Link) (ft ³ /s)	Velocity (Average) (ft/s)	Slope (ft/ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Invert (Downstream) (ft)	Invert (Upstream) (ft)
CO-10-PR	CB-5-PR	MH-28	50.0	10.50	13.32	7.54	0.010	88.44	87.56	86.20	86.70
CO-9-PR	CB-4-PR	MH-6-PR	30.0	10.50	7.98	4.52	0.010	84.94	84.77	82.90	83.20
CO-5	CB-2	MH-26	31.0	112.45	60.00	36.38	0.247	91.65	84.74	82.00	89.66
CO-8	MH-6-PR	MH-26	40.0	115.80	55.98	9.14	0.007	84.75	84.74	81.36	81.62
CO-7	MH #25	MH-6-PR	201.9	98.52	48.00	7.79	0.005	84.73	84.77	81.62	82.57
CO-4	MH-28	OF-1	124.0	259.49	129.30	36.68	0.151	82.12	66.00	60.39	79.16
CO-3	MH-27	MH-28	227.0	131.16	115.98	9.31	0.004	83.46	82.38	79.16	80.17
CO-2	MH-26	MH-27	273.0	129.83	115.98	9.23	0.004	84.68	83.53	80.17	81.36

Z:\2016\2016061 U-Haul West Bluff\Working Documents\2016061 Atrisco Storm proposed.stc

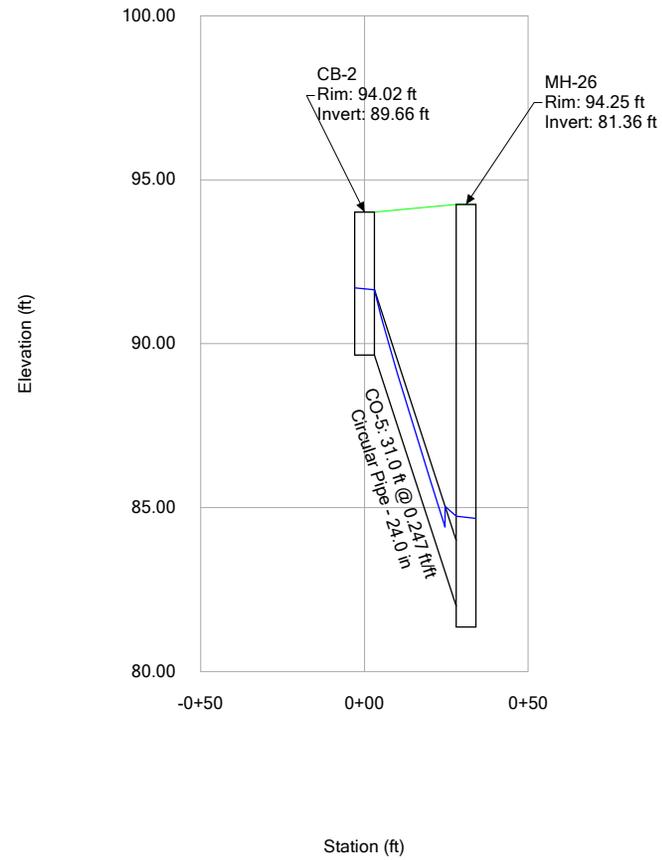
Profile Report

Engineering Profile - Profile - 1-Atrisco Trunk (2016061 Atrisco Storm proposed.stc)



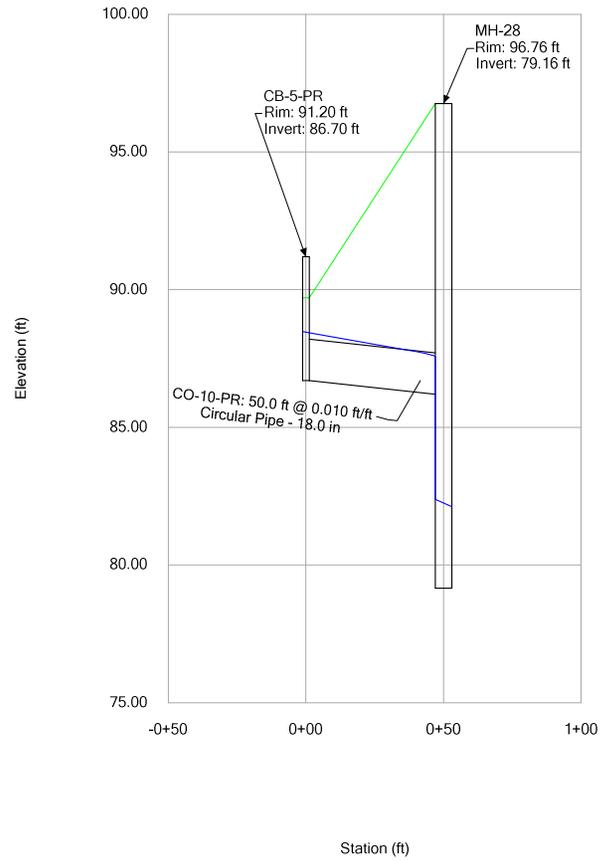
Profile Report

Engineering Profile - Profile - 2-Lateral @ MH#26 (2016061 Atrisco Storm proposed.stc)



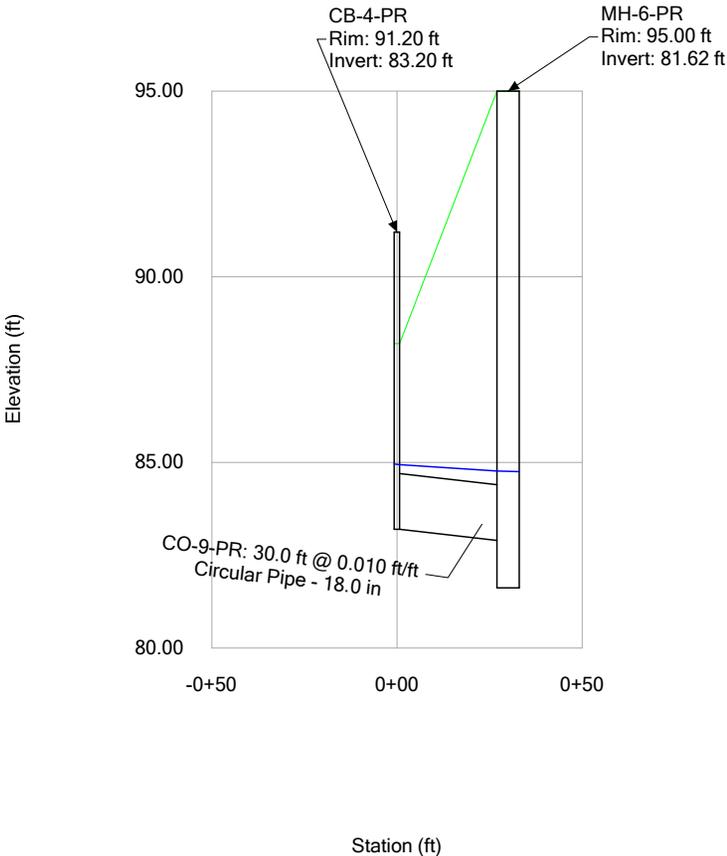
Profile Report

Engineering Profile - Profile - 3- New South Lateral (2016061 Atrisco Storm proposed.stc)



Profile Report

Engineering Profile - Profile - 4-New North Lateral (2016061 Atrisco Storm proposed.stc)



APPENDIX C

**Drainage Report for SAD 219
Excerpt for Reference**

III. CORONA AREA / I-40 AREA

Proposed street improvements for SAD 219 in the Corona Area consist of the following: (1) Atrisco Drive from I-40 to Corona, and (2) Corona from Atrisco Drive to Ouray Road.

A. Hydrology

Hydrologic analysis criteria used for this area of study are listed as follows:

1. City of Albuquerque Development Process Manual (DPM)
2. Albuquerque Master Drainage Study
3. West Bluff Drainage Study

The prevalent hydrologic soil classification for this area of SAD 219 is Class B. The current zoning is predominantly SU-1 for C-2. Therefore, a C Factor of 0.90 was used. Based on this criteria, the Rational formula was used to calculate runoff for the three drainage basins defined on Sheet 2 of 9 located in the map pockets at the end of this report. Also shown on that sheet are the discharge rates for the 100 year storm for each of the drainage basins.

B. Hydraulics

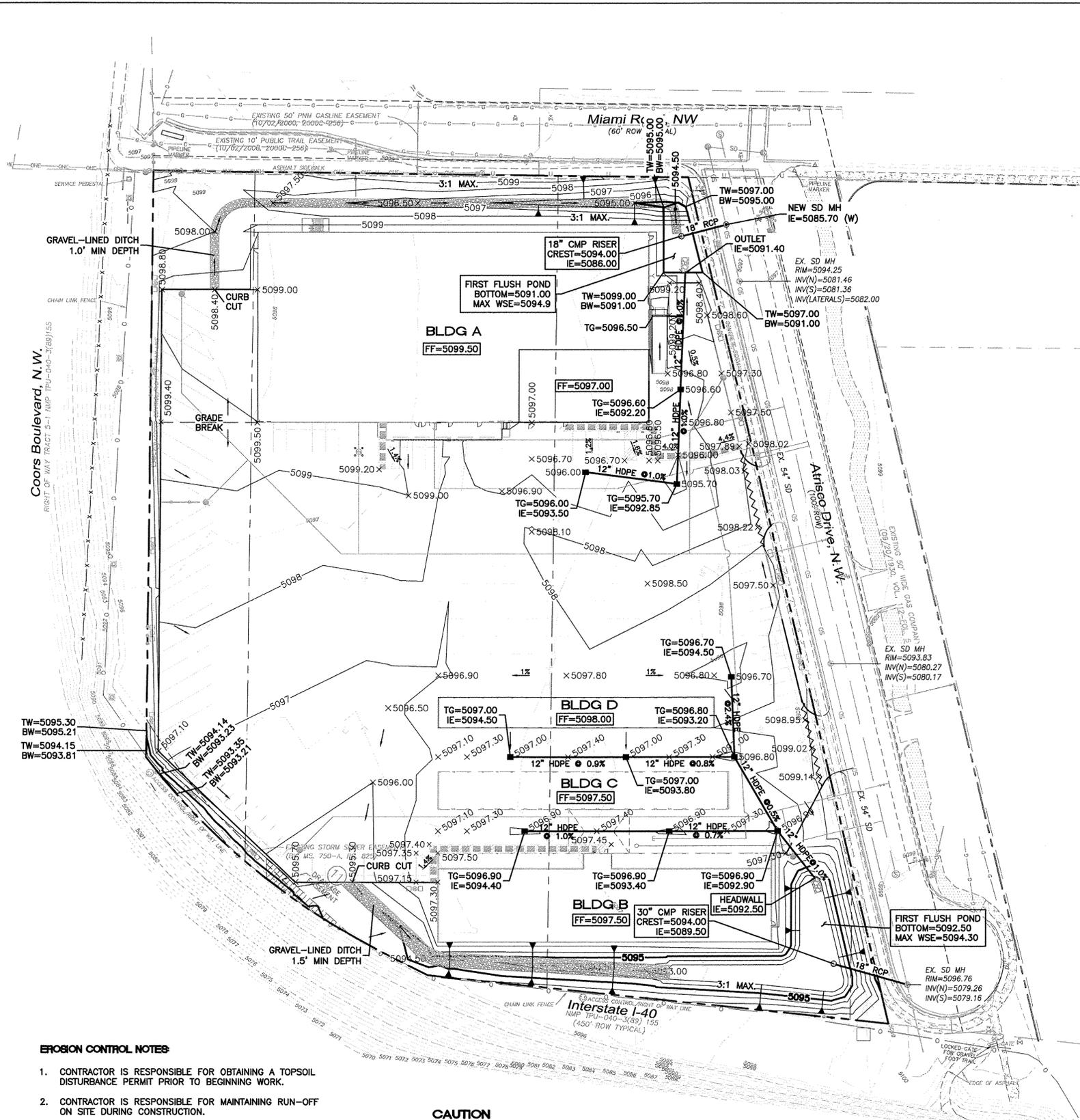
The area is relatively flat, and it is anticipated that the proposed street grades will be approximately 0.50%. Therefore, the capacity of the streets will be approximately 52 cfs. There are four drainage basins defined as shown on Drainage Map H-11 (Sheet 2 of 9) in the map pockets of this report. It is proposed to discharge the 48 cfs runoff from Area H-11-1b into the West Bluffs System via a 36" and 42" RCP pipe running down Corona and Atrisco. Drainage Area H11-2 (82 cfs) will be carried via a combination of street and channel surface flow to Atrisco, and then conveyed to the West Bluffs System via drop inlets and a 42" RCP pipe on Atrisco. Flows generated on the north cul-de-sac of Atrisco (Area H11-1a) will be picked up by a proposed drop inlet in the end of the cul-de-sac, and carried to the West Bluffs drainage pipe along Coors Boulevard by way of an existing 60" storm drain, or can be routed to the existing drop inlet on the south side of Ouray \pm 600 feet east of Coors Boulevard.

Drainage basin H11-3 will generate peak flows of 38 cfs during the 100 year rainfall event. It is proposed that these flows be carried on site to the west, and collected at the central point at which time they will be directly discharged into the West Bluff storm sewer system. The point of discharge for this drainage basin will be the 14' x 14' CBC section with a 2,349 cfs capacity. Time of concentration for this drainage basin in SAD 219 is 0.12 hours (7 minutes). As each tract in Area H11-3 is developed, the drainage system should be constructed which will convey the developed flows into the adjacent West Bluffs system. The collection system for Area H11-3 is not proposed to be part of SAD 219. Additionally, stormwater runoff from Drainage Area H11-3 should not be permitted to drain onto Atrisco Drive.

SAD 219 DRAINAGE SUMMARY SHEET

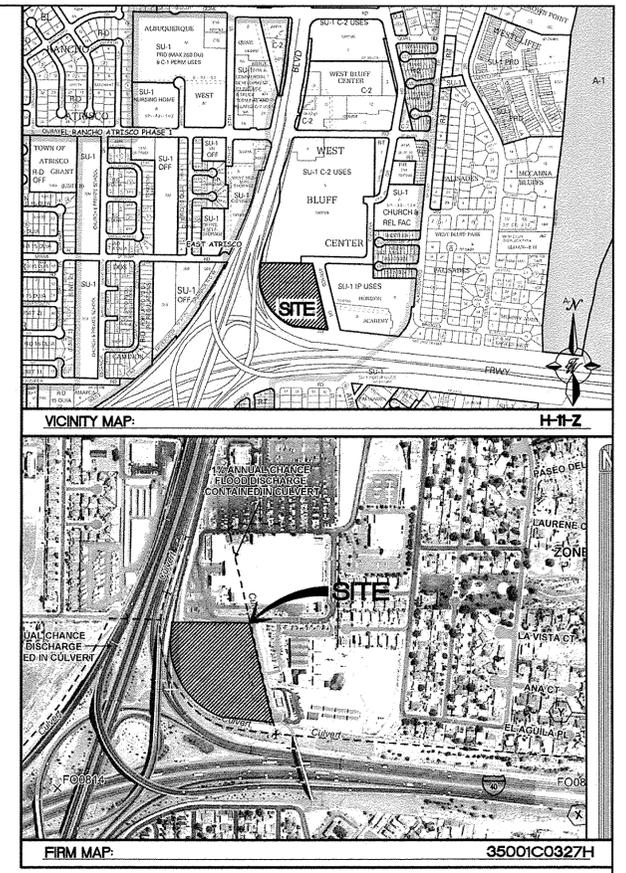
ATRISCO / CORONA AREA

<u>Area Designation</u>	<u>Area (Acres)</u>	<u>Rainfall Intensity (i)</u>	<u>C Factor</u>	<u>100 year Runoff Rate</u>
<u>West Bluffs Channel Outfall</u>				
H11-1a	5.10	4.65	0.90	21.30
H11-1b	11.50	4.65	0.90	48.10
H11-2	19.51	4.65	0.90	81.65
H11-3	9.09	4.65	0.90	38.04



LEGEND

	CURB & GUTTER
	BOUNDARY LINE
	EASEMENT
	CENTERLINE
	RIGHT-OF-WAY
	BUILDING
	SIDEWALK
	RETAINING WALL
	CONTOUR MAJOR
	CONTOUR MINOR
	SPOT ELEVATION
	FLOW ARROW
	EXISTING CURB & GUTTER
	EXISTING BOUNDARY LINE
	EXISTING CONTOUR MAJOR
	EXISTING CONTOUR MINOR
	EXISTING SPOT ELEVATION
	ACCESSIBLE ROUTE
	WATERBLOCK



- NOTICE TO CONTRACTORS**
1. AN EXCAVATION/CONSTRUCTION PERMIT WILL BE REQUIRED BEFORE BEGINNING ANY WORK WITHIN CITY RIGHT-OF-WAY.
 2. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED, EXCEPT AS OTHERWISE STATED OR PROVIDED HERON, SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF ALBUQUERQUE INTERIM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1985.
 3. TWO WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT LINE LOCATING SERVICE, 765-1234, FOR LOCATION OF EXISTING UTILITIES.
 4. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL CONSTRUCTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.
 5. BACKFILL COMPACTION SHALL BE ACCORDING TO TRAFFIC/STREET USE.
 6. MAINTENANCE OF THESE FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER OF THE PROPERTY SERVED.
 7. WORK ON ARTERIAL STREETS SHALL BE PERFORMED ON A 24-HOUR BASIS.

APPROVAL	NAME	DATE
INSPECTOR		

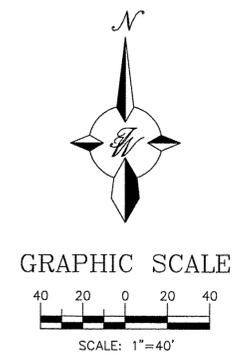
- EROSION CONTROL NOTES**
1. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A TOPSOIL DISTURBANCE PERMIT PRIOR TO BEGINNING WORK.
 2. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING RUN-OFF ON SITE DURING CONSTRUCTION.
 3. CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL SEDIMENT THAT GETS INTO EXISTING RIGHT-OF-WAY.
 4. REPAIR OF DAMAGED FACILITIES AND CLEANUP OF SEDIMENT ACCUMULATIONS ON ADJACENT PROPERTIES AND IN PUBLIC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
 5. ALL EXPOSED EARTH SURFACES MUST BE PROTECTED FROM WIND AND WATER EROSION PRIOR TO FINAL (CITY) ACCEPTANCE OF ANY PROJECT.

CAUTION

ALL EXISTING UTILITIES SHOWN WERE OBTAINED FROM RESEARCH, AS-BUILTS, SURVEYS OR INFORMATION PROVIDED BY OTHERS. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO CONDUCT ALL NECESSARY FIELD INVESTIGATIONS PRIOR TO AND INCLUDING ANY EXCAVATION, TO DETERMINE THE ACTUAL LOCATION OF UTILITIES AND OTHER IMPROVEMENTS, PRIOR TO STARTING THE WORK. ANY CHANGES FROM THIS PLAN SHALL BE COORDINATED WITH AND APPROVED BY THE ENGINEER.

NOTE:

ALL EXISTING STORM DRAIN RIM & INVERT INFORMATION ALONG ATRISCO DR NW FROM CITY PROJECT NO. 3558.



	WEST BLUFF BUSINESS CENTER	DRAWN BY DY
	GRADING AND DRAINAGE PLAN	DATE 11/28/16
	TERRA WEST, LLC 5571 MIDWAY PARK PLACE NE ALBUQUERQUE, NM 87109 (505) 858-3100 www.tierrawestllc.com	2016061-GRB
		SHEET # GR-1
		JOB # 2016061

EROSION CONTROL NOTES

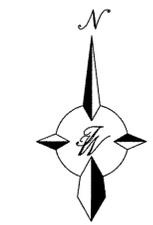
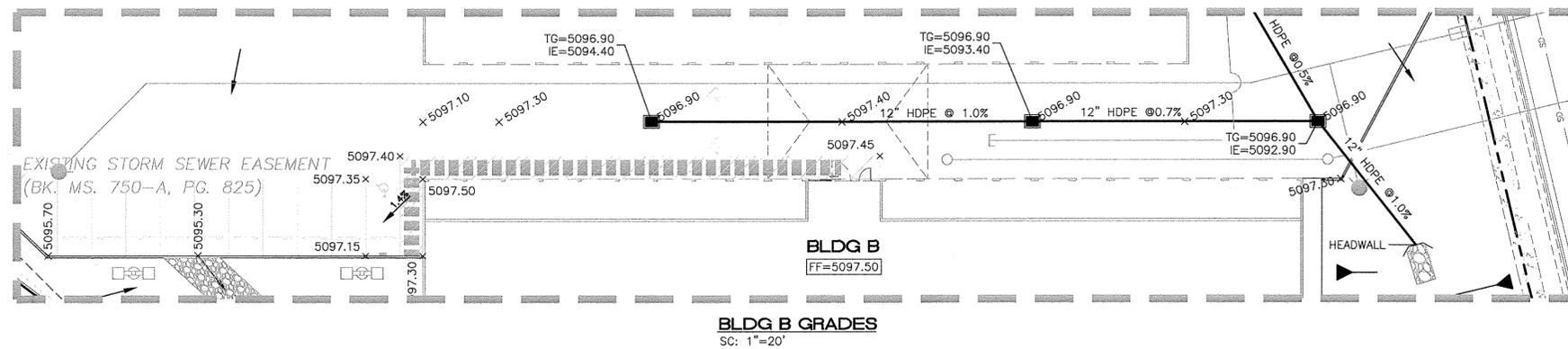
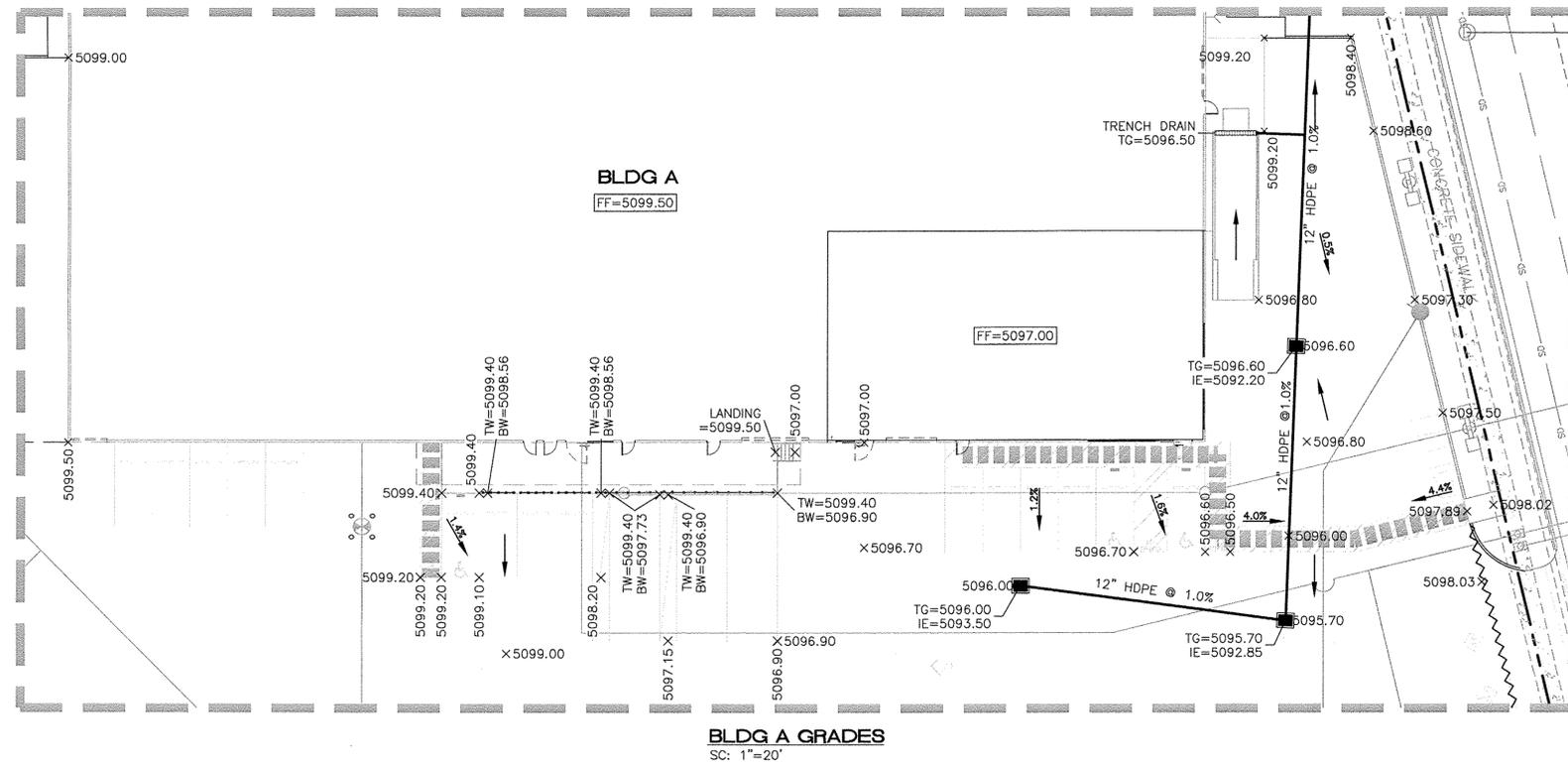
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CAUTION

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LEGEND

- ==== CURB & GUTTER
- - - - BOUNDARY LINE
- - - - EASEMENT
- - - - CENTERLINE
- ▭ BUILDING
- ▨ SIDEWALK
- x 5048.25 SPOT ELEVATION
- FLOW ARROW
- - - - EXISTING CURB & GUTTER
- - - - EXISTING BOUNDARY LINE
- ▨ ACCESSIBLE ROUTE
- ~~~~~ WATERBLOCK



GRAPHIC SCALE



	WEST BLUFF BUSINESS CENTER GRADING AND DRAINAGE PLAN	DRAWN BY DY
	DATE 11/28/16	2016061-GRB
TIERRA WEST, LLC 5571 MIDWAY PARK PLACE NE ALBUQUERQUE, NM 87109 (505) 858-3100 www.tierrowestllc.com	SHEET # GR-2	JOB # 2016061

Bill of Materials

C.M. Riser _____ Diam., _____ Lin. Ft., Metal thickness = _____" (_____ Gage)

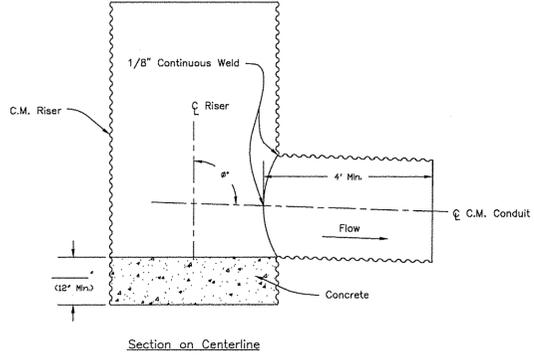
C.M. Conduit _____ Diam., _____ Lin. Ft., Metal thickness = _____" (_____ Gage)

∅ Angle = _____ Degrees

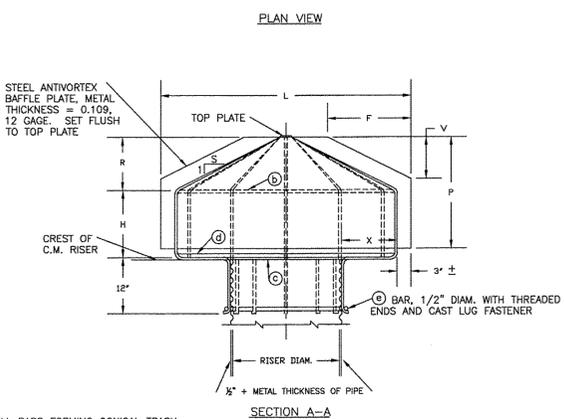
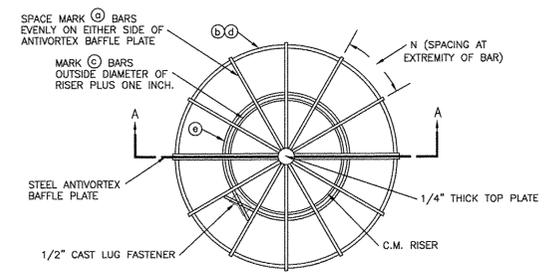
Volume of Concrete = _____ Cu. Yds.

Concrete Table

Riser Diameter (Inches)	Volume of Concrete (Cu. Yds./Inch)
18	.0055
21	.0074
24	.0097
30	.0152
36	.0218



- Notes:
1. The maximum diameter of the C.M. riser shall be 36".
 2. The maximum height of the C.M. riser measured from the top of the riser to the invert of the C.M. conduit shall be 13 feet.



ALL BARS FORMING CONICAL TRASH RACK ARE MARK (C) BARS, UNLESS OTHERWISE NOTED.

- NOTES:
1. WELD 4 MARK (C) BARS TO BAFFLE PLATE AND TO TOP PLATE. WELD MARK (C) AND MARK (D) BARS TO 4 MARK (C) BARS. WELD MARK (D) BAR TO MARK (C) BARS. WELD REMAINING MARK (C) BARS TO MARK (D), MARK (C), AND MARK (D) BARS AND TOP PLATE.
 2. THE TRASH RACK AND ANTIVORTEX BAFFLE PLATE, MAY BE FABRICATED AS A UNIT, OR TRASH RACK MAY BE FABRICATED IN IDENTICAL HALVES AND ATTACHED TO BAFFLE PLATE WITH 1/2" DIAM. U BOLTS SPACED APPROXIMATELY 12 INCHES CENTER TO CENTER ALONG THE VERTICAL AND INCLINED SECTIONS OF THE MARK (C) BARS NEXT TO THE PLATE.
 3. ALL BARS ARE SMOOTH ROUND BARS.
 4. COAT WITH A RUST INHIBITIVE PAINT.

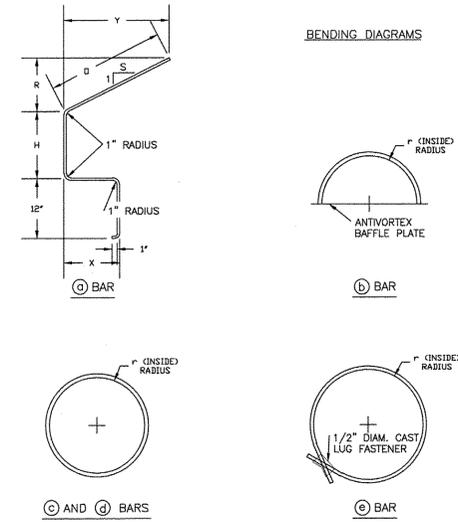


TABLE OF DIMENSIONS AND QUANTITIES

① BARS 5/8" DIAMETER										ANTIVORTEX BAFFLE PLATE				
H	R	X	Y	S	O	TOTAL LENGTH	NO. REQ'D	N	L	P	F	V		
INCHES	INCHES	INCHES	INCHES	INCHES	INCHES	INCHES		INCHES	INCHES	INCHES	INCHES	INCHES		
18" DIAMETER CORRUGATED METAL RISER														
9	14-1/8	6	14-1/8	1	20	4"	10	11-7/16	3'	21	8	8		
21" DIAMETER CORRUGATED METAL RISER														
12	9-1/4	9	18-1/2	2	20-5/8	4' 6-5/8"	12	12-3/8	4'	18	12	6		
24" DIAMETER CORRUGATED METAL RISER														
15	11-3/8	12	22-3/4	2	25-3/8	5' 5-3/8"	12	14-13/16	4'-6"	24	18	9		
30" DIAMETER CORRUGATED METAL RISER														
18	9-1/2	15	28-1/2	3	30	6' 4"	14	15-13/16	6'	24	21	7		
36" DIAMETER CORRUGATED METAL RISER														
21	12-1/2	21	37-5/8	3	39-1/2	7'10-1/2"	16	17-5/16	7'-6"	30	30	10		

TABLE OF DIMENSIONS AND QUANTITIES

② BARS 5/8" DIAMETER		③ BARS 5/8" DIAMETER		④ BARS 5/8" DIAMETER		⑤ BARS 5/8" DIAMETER		TOP PLATE				
NO.	r	LENGTH	NO.	r	LENGTH	NO.	r	LENGTH	DIAM.			
REQ'D	INCHES	INCHES	REQ'D	INCHES	INCHES	REQ'D	INCHES	INCHES	INCHES			
18" DIAMETER CORRUGATED METAL RISER												
2	14-5/16	46	1	10	62-10	1	14-5/16	92	1	10-1/4	73	3
21" DIAMETER CORRUGATED METAL RISER												
2	18-13/16	60	1	11-1/2	72-1/4	1	18-13/16	120	1	11-3/4	82-1/2	3-1/2
24" DIAMETER CORRUGATED METAL RISER												
2	23-5/16	74	1	13	81-8	1	23-5/16	148	1	13-1/4	91-1/2	3-1/2
30" DIAMETER CORRUGATED METAL RISER												
2	29-5/16	93	1	16	100-1/2	1	29-5/16	186	1	16-1/4	111	4
36" DIAMETER CORRUGATED METAL RISER												
2	38-3/8	121-1/2	1	19	119-5	1	38-3/8	243	1	19-1/4	129	4

USDA United States Department of Agriculture
Natural Resources Conservation Service

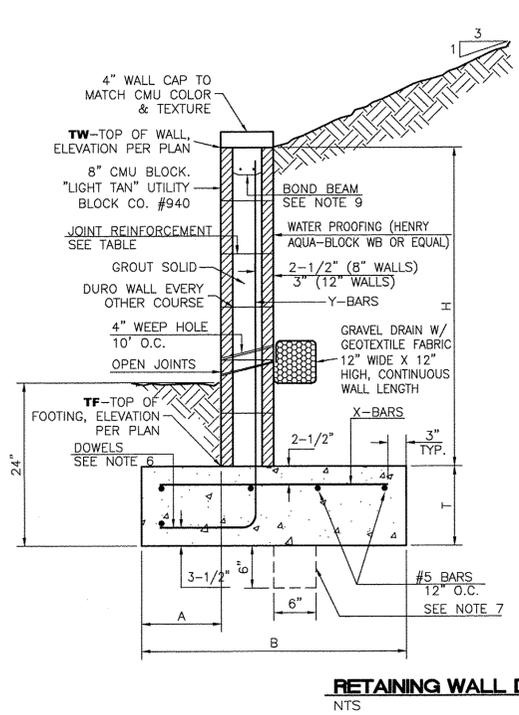
C.M. RISER DETAILS (ROUND CONCRETE BASE)

Designed: ### Date: ###
 Drawn: ### Date: 07/14
 Checked: ###
 Approved: ###
 SheetXX of ###

USDA United States Department of Agriculture
Natural Resources Conservation Service

CONICAL TRASH RACK AND BAFFLE PLATE FOR 18" TO 36" DIAM. C.M. RISERS

Designed: ### Date: ###
 Drawn: ### Date: 07/14
 Checked: ###
 Approved: ###
 SheetXX of ###



8 INCH REINFORCED CONCRETE MASONRY WALL

H	A	B	T	Y-BARS	X-BARS
ft.-in.	in.	ft.-in.	in.		
2'-0"	8"	2'-0"	9"	#4 @32" O.C.	#4 @24" O.C.
2'-8"	8"	2'-0"	9"	#4 @32" O.C.	#4 @24" O.C.
3'-4"	8"	2'-4"	9"	#4 @32" O.C.	#4 @24" O.C.
4'-0"	10"	2'-8"	9"	#4 @32" O.C.	#4 @24" O.C.
4'-8"	12"	3'-4"	10"	#5 @32" O.C.	#4 @18" O.C.
5'-4"	14"	3'-10"	10"	#6 @16" O.C.	#4 @18" O.C.
6'-0"	16"	4'-8"	12"	#6 @8" O.C.	#4 @12" O.C.

12 INCH REINFORCED CONCRETE MASONRY WALL

H	A	B	T	Y-BARS	X-BARS
ft.-in.	in.	ft.-in.	in.		
5'-4"	14"	3'-8"	10"	#6 @18" O.C.	#4 @24" O.C.
6'-0"	15"	4'-2"	12"	#4 @16" O.C.	#4 @18" O.C.
6'-8"	16"	4'-6"	12"	#6 @24" O.C.	#5 @18" O.C.
7'-4"	18"	4'-10"	12"	#6 @16" O.C.	#5 @18" O.C.
8'-0"	20"	5'-4"	12"	#7 @18" O.C.	#6 @12" O.C.
8'-8"	20"	5'-8"	12"	#7 @16" O.C.	#6 @12" O.C.

- GENERAL NOTES:
1. ALL CONCRETE IS TO BE 4000 PSI @ 28 DAYS.
 2. MINIMUM COMPACTION UNDER FOOTINGS IS TO BE 95% PER ASTM. D 1557 FOR A DEPTH OF 12" MOISTURE CONTENT IS TO BE ± 2.0%.
 3. BACK FILL AGAINST WALLS IS TO BE HAND-PLACED AND COMPACTED.
 4. ALL BARS ARE TO BE GRADE 60, ASTM 615.
 5. TRUSS TYPE DUR-O-WALL EVERY OTHER COURSE.
 6. DOWELS SHALL BE AT LEAST EQUAL IN SIZE AND SPACING TO V-BARS, SHALL PROJECT A MINIMUM OF 30 BAR DIA. INTO THE FILLED BLOCK CORES, AND SHALL EXTEND TO THE TOE OF THE FOOTING.
 7. PROVIDE KEY FOR 8" AND 12" WALLS WHERE H EXCEEDS 6'-0"
 8. USE EITHER EXPANSION JOINTS ON 20' CENTERS OR PILASTERS EVERY 16'.
 9. BOND BEAM, 1-#4 BARS FOR WALLS UNDER 3'-4", 2-#4 BARS FOR WALLS UNDER 5'-4", 2-#5 BARS FOR WALLS OVER 5'-4".

	WEST BLUFF BUSINESS CENTER GRADING AND DRAINAGE DETAILS	DRAWN BY DY DATE 11/28/16
		SHEET # GR-3
RONALD R. BOHANNAN P.E. #7868	5571 MIDWAY PARK PLACE NE ALBUQUERQUE, NM 87109 (505) 858-3100 www.tierrowestllc.com	2016061-GRB JOB # 2016061