

# CITY OF ALBUQUERQUE



August 6, 2015

Ronald R. Bohannon, P.E.  
Tierra West, LLC  
5571 Midway Park Pl NE  
Albuquerque, NM 87109

**Re: Freddy's, Tract D-1 Plat Of Hubbell Plaza  
Grading and Drainage Plan  
Engineer's Stamp Date 7-7-2015 (K10-D001B)**

Dear Mr. Bohannon,

Based upon the information provided in your submittal July 27, 2015, the above referenced plan is approved for Building Permit.

This project requires a National Pollutant Discharge Elimination System (NPDES) permit for storm water discharge for disturbing one acre or more and a Topsoil Disturbance Permit for disturbing  $\frac{3}{4}$  of an acre or more. Since more than one acre will be disturbed an Erosion and Sediment Control plan will also have to be approved prior to building permit approval.

Prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

If you have any questions, you can contact me at 924-3999.

Sincerely,

Shahab Biazar, P.E.  
City Engineer, Planning Dept.  
Development Review Services

C: e-mail

## **Biazar, Shahab**

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**From:** Vinny Perea <vperea@tierrawestllc.com>  
**Sent:** Thursday, August 06, 2015 8:20 AM  
**To:** Biazar, Shahab  
**Subject:** Freddy's Drainage

Good morning Shahab,

Per our phone conversation this morning regarding the status of the Proposed Freddy's on Coors and Central, we are looking into determining if the existing timed valve is functioning properly for the existing drainage pond on the site.

Curtis Cherne noticed out at the site that the pond did not look to be discharging the storm water as it should be. The pond does get released by a valve that is supposed to open up 2 hours after the storm begins so it could be that this valve is not working properly or that it just didn't open up yet. We have scheduled for an electrician to check if the valve is not working properly and will let you know what their feedback is as soon as we get that information. Please also note that we will be removing the timed valve when the storm drain improvements are constructed. Let me know if you have any questions or would like any additional information.

Thanks,

**Vinny Perea**

Engineer Intern, EIT

**Tierra West, LLC**

5571 Midway Park Pl. NE

Albuquerque, NM 87109

Office: (505) 858-3100

Fax: (505) 858-1118

1-800-245-3102

[www.tierrawestllc.com](http://www.tierrawestllc.com)

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# City of Albuquerque

Planning Department

Development & Building Services Division

## RAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV 02/2013)

Project Title: \_\_\_\_\_ City Drainage #: \_\_\_\_\_

DRB#: \_\_\_\_\_ EPC#: \_\_\_\_\_ Work Order#: \_\_\_\_\_

Legal Description: \_\_\_\_\_

City Address: \_\_\_\_\_

**Engineering Firm:** \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

**Owner:** \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

**Architect:** \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

**Surveyor:** \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

**Contractor:** \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

### TYPE OF SUBMITTAL:

- ☐ DRAINAGE REPORT
- ☐ DRAINAGE PLAN 1st SUBMITTAL
- ☒ DRAINAGE PLAN RESUBMITTAL
- ☐ CONCEPTUAL G & D PLAN
- ☒ GRADING PLAN
- ☐ EROSION & SEDIMENT CONTROL PLAN (ESC)
- ☐ ENGINEER'S CERT (HYDROLOGY)
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ ENGINEER'S CERT (TCL)
- ☐ ENGINEER'S CERT (DRB SITE PLAN)
- ☐ ENGINEER'S CERT (ESC)
- ☐ SO-19
- ☐ OTHER (SPECIFY) \_\_\_\_\_

### CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

- ☐ SIA/FINANCIAL GUARANTEE RELEASE
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ S. DEV. PLAN FOR SUB'D APPROVAL
- ☐ S. DEV. FOR BLDG. PERMIT APPROVAL
- ☐ SECTOR PLAN APPROVAL
- ☐ FINAL PLAT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY (PERM)
- ☐ CERTIFICATE OF OCCUPANCY (TCL TEMP)
- ☐ FOUNDATION PERMIT APPROVAL
- ☒ BUILDING PERMIT APPROVAL
- ☐ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☐ GRADING CERTIFICATION
- ☐ SO-19 APPROVAL
- ☐ ESC PERMIT APPROVAL
- ☐ ESC CERT. ACCEPTANCE
- ☐ OTHER (SPECIFY) \_\_\_\_\_

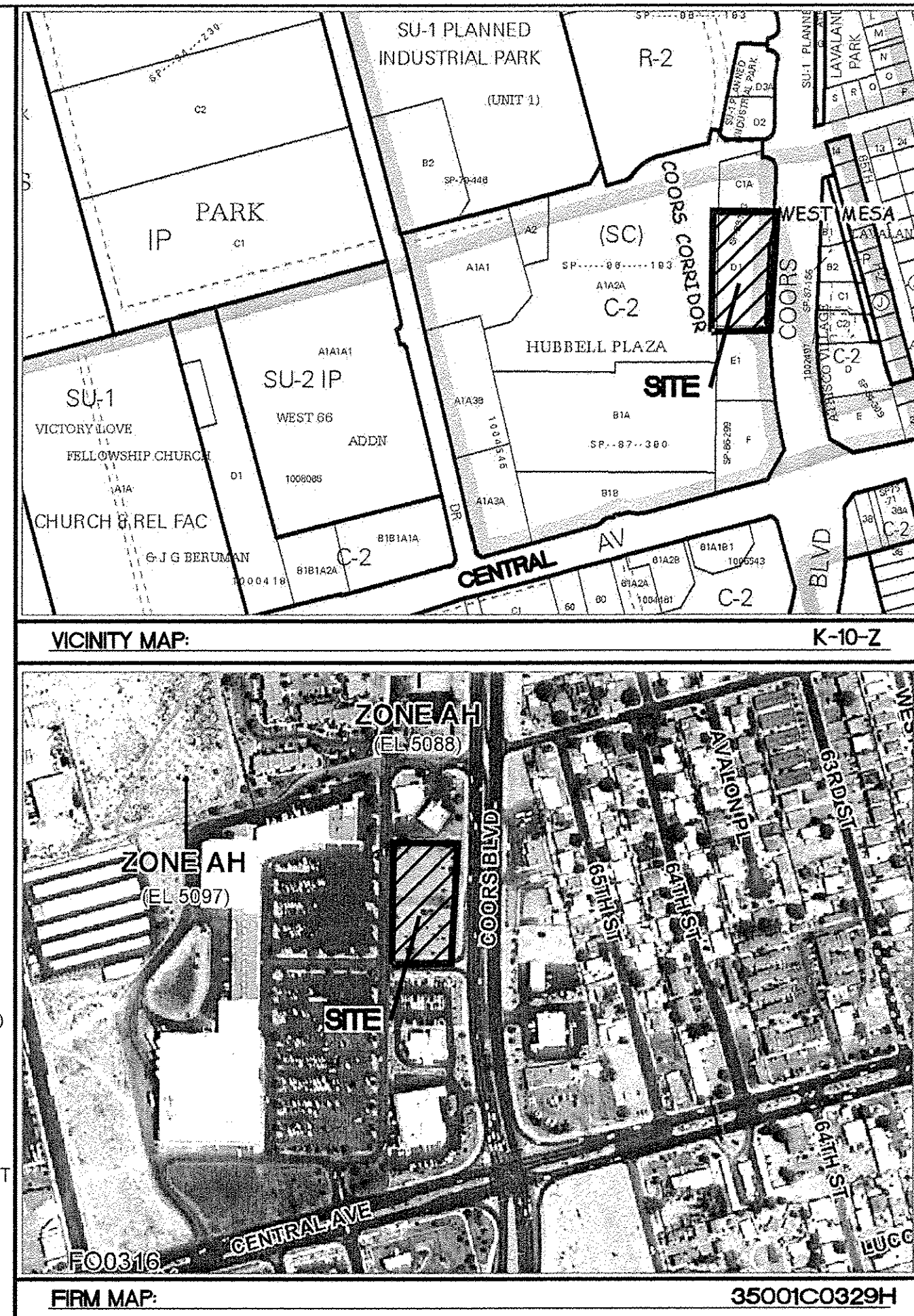
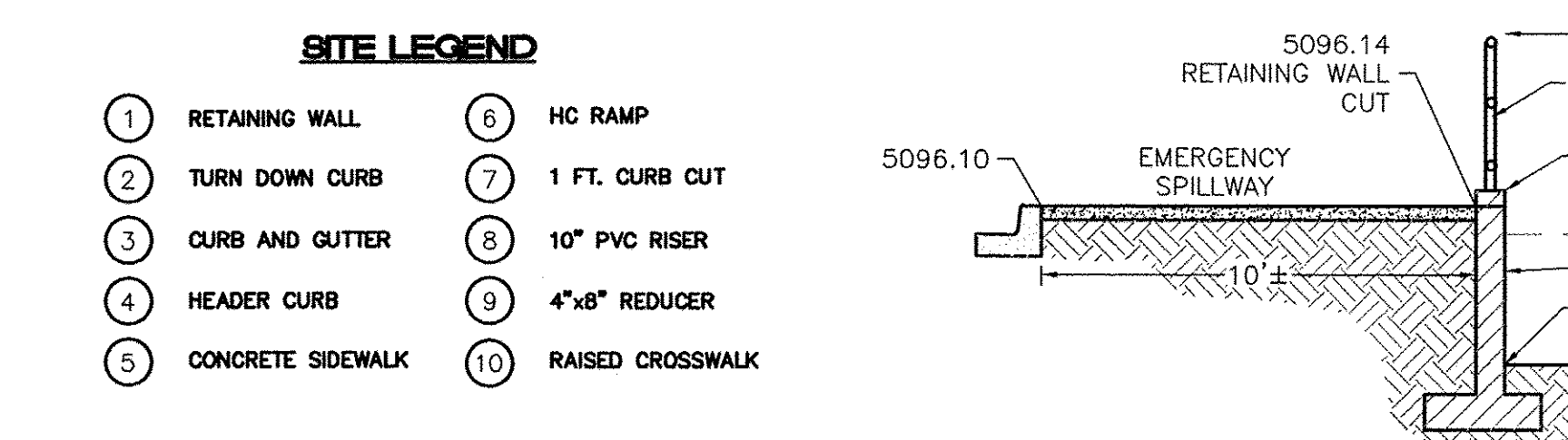
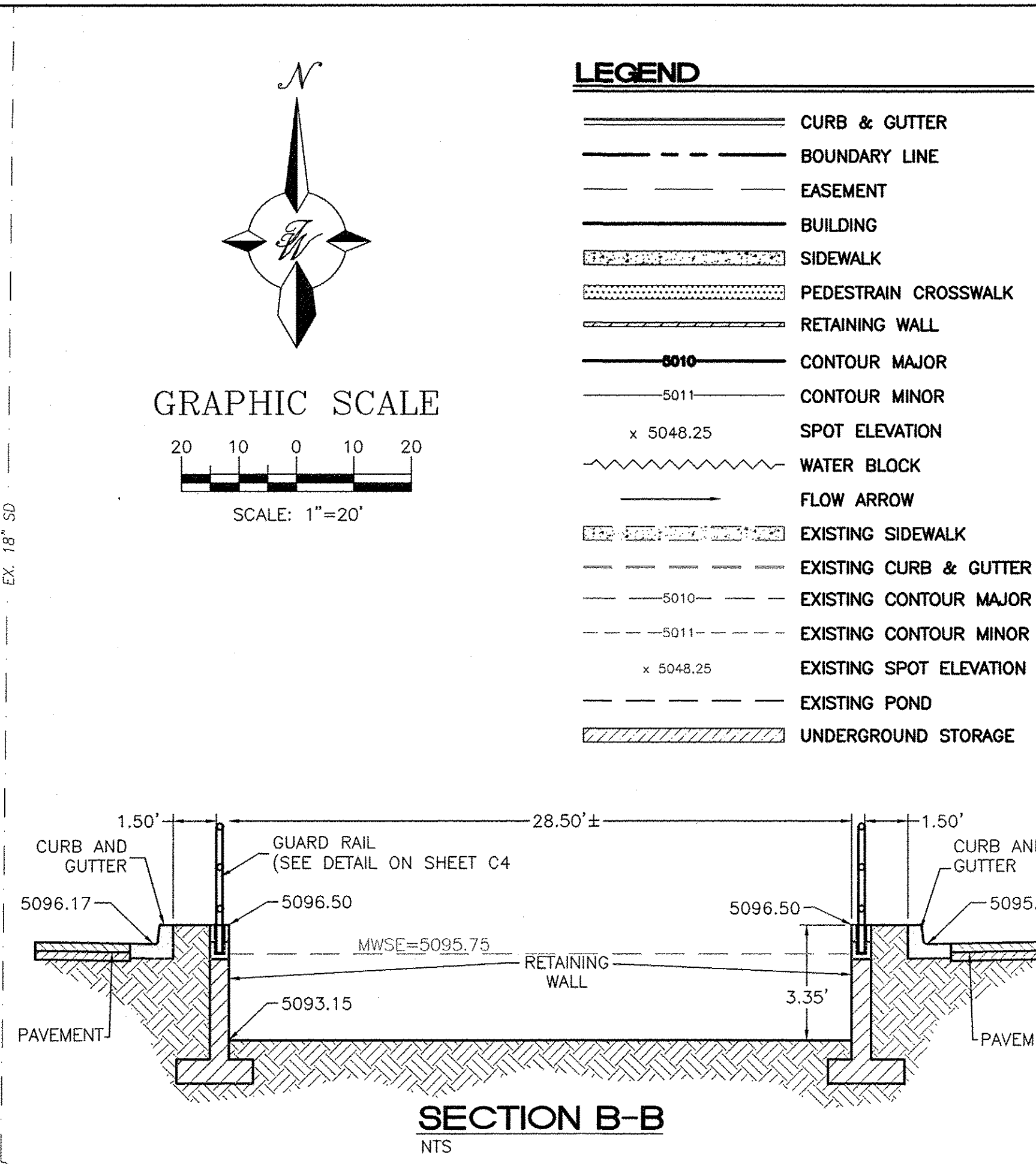
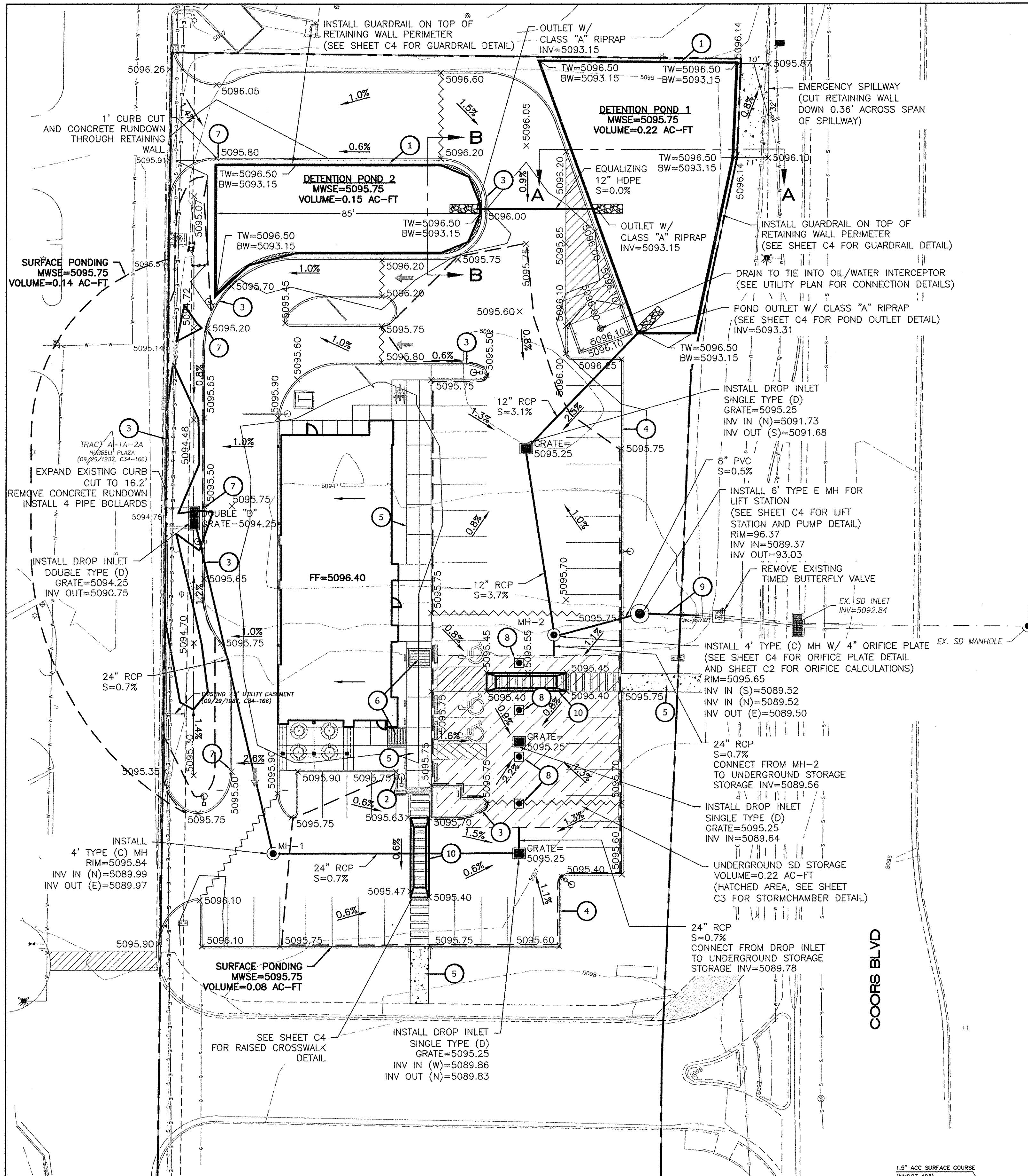
WAS A PRE-DESIGN CONFERENCE ATTENDED: \_\_\_\_\_ Yes \_\_\_\_\_ No \_\_\_\_\_ Copy Provided

DATE SUBMITTED: \_\_\_\_\_ By: \_\_\_\_\_

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location, and scope to the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres
3. **Drainage Report:** Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more
4. **Erosion and Sediment Control Plan:** Required for any new development and redevelopment site with 1-acre or more of land disturbing area, including project less than 1-acre than are part of a larger common plan of development





**Introduction**  
The purpose of this submittal is to provide a drainage management plan for the proposed Freddy's restaurant located near the intersection of Coors Blvd. and Central Ave. in Albuquerque, New Mexico. The site contains approximately 1.45 acres and is located within the Hubbell Plaza Shopping Center. The site lies outside of any flood plains (FIRM Map 35001C0329H).

**Existing Conditions**  
The site is part of an approved drainage plan titled "Coors & Central Shopping Center" (K10-D018). The location is tract D-1 within the Hubbell Plaza Shopping Center and is currently a detention pond for 5.4 acres of the shopping center. The site collects all flows from the 5.4 acres via surface flow through a concrete channel located on the west side of the site. The pond holds all flows for a minimum of 2 hours before being discharged through an 8-inch connecting pipe on the east side of the site. A delay timer is used to discharge the pond through the 8-inch pipe towards the back of a catch basin located on Coors Blvd. and into the street storm drain system. Per the approved drainage plan calculations, the pond is designed to hold 30,068 cubic feet of runoff and discharge to the Coors storm drain system at a rate of 1.08 cfs. Flows from the tract directly north are not directed towards the existing pond onsite, these flows are directed north and away from the subject site and have no impact on the drainage.

**Proposed Conditions**  
The subject site will continue to collect all flows from the offsite area of the shopping center and detain in a subsurface system. Two detention ponds (Detention Pond 1 and Detention Pond 2) will act as a singular detention pond system with a 12-inch equalizing pipe connecting the two together. The offsite flows will drain via surface flow through the north driveway aisle and through a curb cut on the west side of the site where the existing concrete channel lies. The offsite flows through the 16 ft curb cut will be collected into a Double D drop inlet that is located in a bio swale on the western side of the site. The offsite flows through the north driveway will be collected in Detention Pond 2. All flows from the west side of the building and directly north of the building will be directed towards the bio swale and into the Double D drop inlet. All other flows from the site will be directed to three Single D drop inlets in the parking lot. The Double D inlet will interconnect via storm drain with the southern Single D inlet and underground storage system. The two detention ponds will interconnect via storm drain with the northernmost Single D inlet and the underground storage system.

As runoff volume increases and fills up the underground storage system completely, the interconnecting storm drains, drop inlets and two detention ponds will act as an equalizing system and allow runoff to be stored in both the detention ponds and on the surface of the parking lot and bio swale. During the 100-year 6-hour storm, the maximum water surface elevation for the detention system is 5095.75. This water surface elevation allows 6 inches of ponding depth in the parking lot and 18 inches of ponding in the bio swale and is below the elevation of the finished floor of the building (5096.40). A 4" cut in the retaining wall of the NE corner of Detention Pond 1 will act as an emergency overflow to Coors Blvd., assuring that the MWSE will never reach the finished floor elevation. The detention system will outflow through a 4" orifice plate located in MH-2 and will be sent to a Grindex pump system to outfall towards the existing catch basin on Coors.

When the maximum water surface elevation is reached; the volume of the detention ponds is 0.37 ac-ft, volume of underground storage is 0.22 ac-ft, and the volume of surface ponding is 0.22 ac-ft. This gives a total storage volume of 0.81 ac-ft equivalent to the required 0.81 ac-ft of storage required for developed runoff. The orifice plate at MH-2 will control the outflow to the required discharge of 1.08 cfs. The detention ponds and underground storage system will capture sediment within the bottom of each respective area; the detention ponds' outlet will be raised 0.16 ft above the pond bottom to retain the first flush volume of the site.

See sheet C2 for DPM calculations, Grate capacity, Pipe capacity, Orifice Calcs, and Basin Map  
See sheet C3 for Undergound StormChamber configuration and details  
See sheet C4 for Pump Details and Site Details

**NOTICE TO CONTRACTORS**

- AN EXCAVATION/CONSTRUCTION PERMIT WILL BE REQUIRED BEFORE BEGINNING ANY WORK WITHIN CITY RIGHT-OF-WAY.
- 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.
- TWO WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT LINE LOCATING SERVICE, 765-1234, FOR LOCATION OF EXISTING UTILITIES.
- PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL CONNECTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.
- BACKFILL COMPACTION SHALL BE ACCORDING TO TRAFFIC/STREET USE.
- 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		

ENGINEER'S SEAL  
RONALD R. BOHANNAN  
NEW MEXICO  
PROFESSIONAL ENGINEER  
#7868

**FREDDY'S AT COORS AND CENTRAL**

**GRADING AND DRAINAGE PLAN**

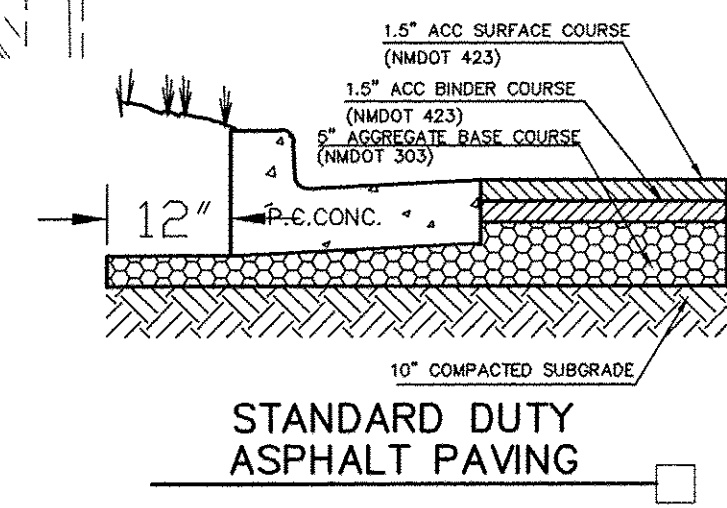
**TIERRA WEST, LLC**  
5571 MIDWAY PARK PLACE NE  
ALBUQUERQUE, NM 87109  
(505) 858-3100  
www.tierrawestllc.com

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SHEET #  
**C1**

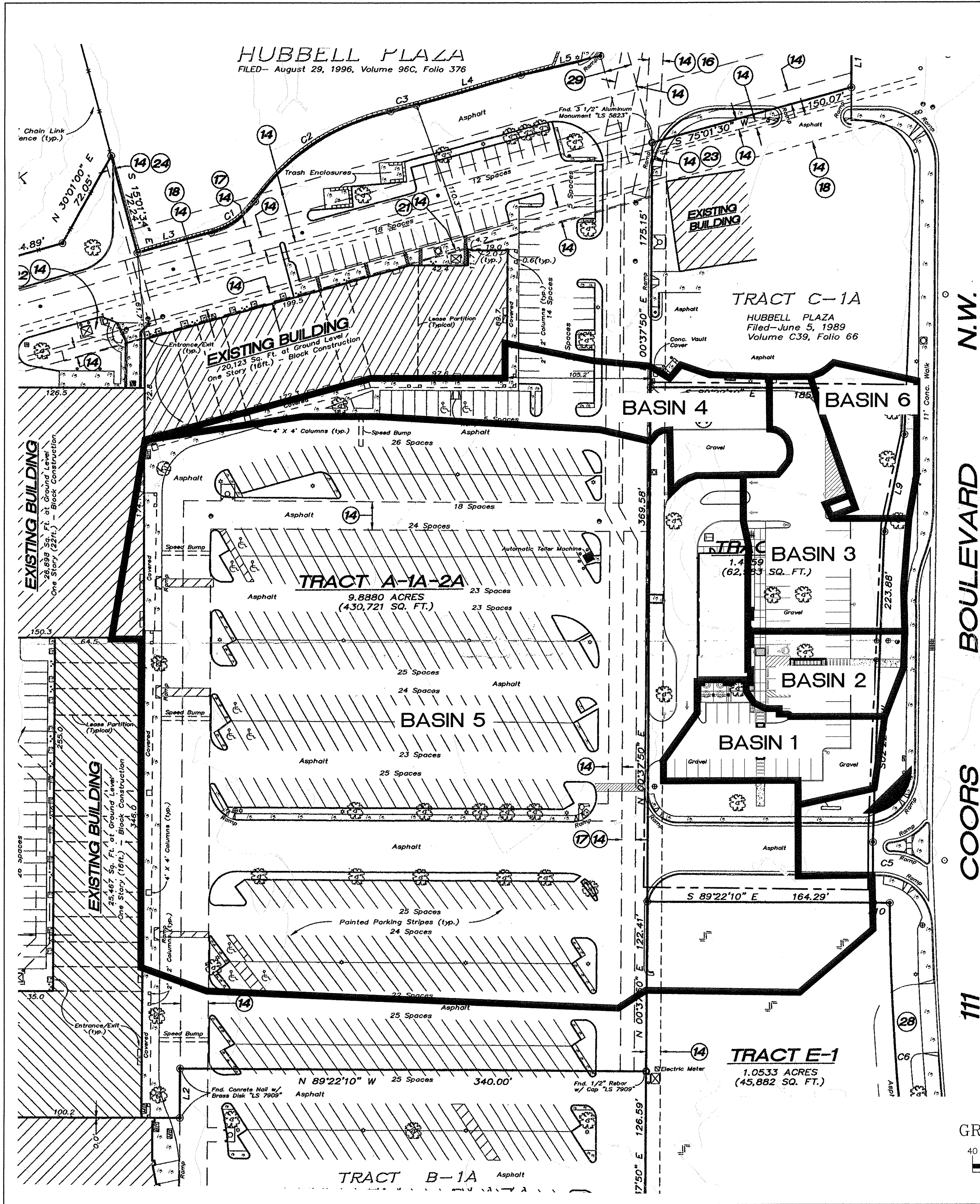
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- EROSION CONTROL NOTES**
- CONTRACTOR IS RESPONSIBLE FOR MAINTAINING RUN-OFF ON SITE DURING CONSTRUCTION.
  - CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL SEDIMENT THAT GETS INTO EXISTING RIGHT-OF-WAY.
  - REPAIR OF DAMAGED FACILITIES AND CLEANUP OF SEDIMENT ACCUMULATIONS ON ADJACENT PROPERTIES AND IN PUBLIC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
  - ALL EXPOSED EARTH SURFACES MUST BE PROTECTED FROM WIND AND WATER EROSION PRIOR TO FINAL 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.





DPM Weighted E Method (Zone 1)

Existing Conditions																	
Basin Descriptions												100-Year, 6-Hr			10-Year, 6-Hr		
Basin ID	Area (sf)	Area (acres)	Area (sq miles)	Treatment A		Treatment B		Treatment C		Treatment D		Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
				%	(acres)	%	(acres)	%	(acres)	%	(acres)						
1	235,224.00	5.400	0.00844	0%	0.000	30%	1.620	0%	0.000	70%	3.780	1.580	0.711	19.81	0.934	0.420	12.16
Total	235,224.00	5.400	0.00844										0.711	19.81		0.420	12.16

Proposed Conditions														100-Year, 6-Hr			10-Year, 6-Hr		
Basin ID	Area (sf)	Area (acres)	Area (sq miles)	Basin Descriptions				Treatment				Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs		
				Treatment A %	Treatment B %	Treatment C %	Treatment D %	Treatment A %	Treatment B %	Treatment C %	Treatment D %								
1	8,908.63	0.205	0.00032	0%	0.000	20%	0.041	0%	0.000	80%	0.164	1.710	0.029	0.80	1.036	0.018	0.50		
2	6,297.83	0.145	0.00023	0%	0.000	15%	0.022	0%	0.000	85%	0.123	1.775	0.021	0.58	1.087	0.013	0.37		
3	14,479.94	0.332	0.00052	0%	0.000	15%	0.050	0%	0.000	85%	0.283	1.775	0.049	1.34	1.087	0.030	0.85		
4	17,152.37	0.394	0.00062	0%	0.000	40%	0.158	0%	0.000	60%	0.236	1.450	0.048	1.35	0.832	0.027	0.80		
5	181,825.49	4.174	0.00652	0%	0.000	10%	0.417	0%	0.000	90%	3.757	1.840	0.640	17.26	1.138	0.396	11.17		
6	6,559.74	0.151	0.00024	0%	0.000	0%	0.000	0%	0.000	100%	0.151	1.970	0.025	0.66	1.240	0.016	0.44		
Total	235,224.00	5.400	0.00844									0.812	21.99			0.500	0.00		

Grate Capacity (Based On Orifice Equation)				
Basin ID	Q Required (CFS)	Grate Type	Q Allow (CFS)	Result
1	0.8	Single D	7.12	Capacity OK
2	0.58	Single D	7.12	Capacity OK
3	1.34	Single D	7.12	Capacity OK
5	17.26	Double D	19.45	Capacity OK

Pipe Capacity (Based on Manning's Equation)				
Invert ID	Q Required (CFS)	Pipe Size	Q Allow (CFS)	Result
Basin 5 Double D Grate	17.26	24" RCP @ 0.7%	20.94	Capacity OK
MH-1	17.26	24" RCP @ 0.7%	20.94	Capacity OK
Basin 1 Single D Grate	18.06	24" RCP @ 0.7%	20.94	Capacity OK
Basin 2 Underground Storage Outlet	18.64	24" RCP @ 0.7%	20.94	Capacity OK
Equalizing Pipe	1.35	12" HDPE @ 0%	5.48	Capacity OK
Basin 6 Pond Inlet	2.01	12" RCP @ 3.1%	6.93	Capacity OK
Basin 3 Single D Grate	4.7	12" RCP @ 3.7%	7.58	Capacity OK

MAXIMUM CAPACITY OF EQUALIZING 12" HDPE

Orifice Equation:  $Q = CA \sqrt{2gh}$

$C = 0.6$   
 $A = \text{Orifice Area (0.785 ft}^2\text{)}$   
 $G = 32.2 \text{ ft/s}^2$   
 $H = \text{Depth of water above center of orifice (2.1 ft)}$

$Q = \text{Flow (cfs)}$   
 $Q = 0.6 * 0.785 * \sqrt{2 * 32.2 * 2.1}$   
Maximum Q = 5.48 cfs

CAPACITY OF SINGLE D GRATES

$L = 40" - 2(2" \text{ ends}) - 7(1/2" \text{ middle bars}) = 32 1/2" = 2.7083'$

$W = 25" - 13(1/2" \text{ middle bars}) = 18.5" = 1.54'$

Area =  $2.7083' \times 1.54' = 18 \text{ ft}^2$

Effective Area =  $4.18 - 4.18 (0.5 \text{ clogging factor}) = 2.09 \text{ ft}^2 \text{ at the grate}$

Orifice Equation:  
 $Q = CA \sqrt{2gh}$   
 $Q = 0.6 * 2.09 * \sqrt{2 * 32.2 * 0.5}$   
 $Q = 7.12 \text{ cfs}$

CAPACITY OF DOUBLE D GRATE

$L = 80" - 2(2" \text{ ends}) - 14(1/2" \text{ middle bars}) - 6" \text{ (center piece)} = 63" = 5.25'$

$W = 25" - 13(1/2" \text{ middle bars}) = 18.5" = 1.54'$

Area =  $5.25' \times 1.54' = 8.09 \text{ ft}^2$

Effective Area =  $8.09 - 8.09 (0.5 \text{ clogging factor}) = 4.04 \text{ ft}^2 \text{ at the grate}$

Orifice Equation:  
 $Q = CA \sqrt{2gh}$   
 $Q = 0.6 * 4.04 * \sqrt{2 * 32.2 * 1.0}$   
 $Q = 19.45 \text{ cfs}$

MAXIMUM CAPACITY OF 24" RCP @ 0.7%

Manning Equation:  
 $Q = (1.49/n)AR^{2/3} \sqrt{S}$

$Q = \text{Discharge}$   
 $n = \text{Manning's roughness coefficient (0.013)}$   
 $A = \text{Pipe area (3.14 ft}^2\text{)}$   
 $R = \text{Hydraulic Radius (0.58 ft)}$   
 $S = \text{Pipe slope (0.007 ft/ft)}$

$Q = (1.49/0.013) * 3.14 * (0.58)^{2/3} \sqrt{0.007}$   
Maximum Q = 20.94 cfs

MAXIMUM CAPACITY OF 12" RCP @ 3.1%

Manning Equation:  
 $Q = (1.49/n)AR^{2/3} \sqrt{S}$

$Q = \text{Discharge}$   
 $n = \text{Manning's roughness coefficient (0.013)}$   
 $A = \text{Pipe area (0.785 ft}^2\text{)}$   
 $R = \text{Hydraulic Radius (0.29 ft)}$   
 $S = \text{Pipe slope (0.031 ft/ft)}$

$Q = (1.49/0.013) * 0.785 * (0.29)^{2/3} \sqrt{0.031}$   
Maximum Q = 6.93 cfs

MAXIMUM CAPACITY OF 12" RCP @ 3.7%

Manning Equation:  
 $Q = (1.49/n)AR^{2/3} \sqrt{S}$

$Q = \text{Discharge}$   
 $n = \text{Manning's roughness coefficient (0.013)}$   
 $A = \text{Pipe area (0.785 ft}^2\text{)}$   
 $R = \text{Hydraulic Radius (0.29 ft)}$   
 $S = \text{Pipe slope (0.037 ft/ft)}$

$Q = (1.49/0.013) * 0.785 * (0.29)^{2/3} \sqrt{0.037}$   
Maximum Q = 7.58 cfs

CURB CUT CAPACITY CALCULATIONS  
OFFSITE FLOWS FROM SHOPPING CENTER TO DOUBLE D INLET

Use weir equation:  
 $Q = CL(H)^{3/2}$

$Q = \text{discharge (16.77 cfs for offsite flows of Basin 5)}$   
 $C = \text{coefficient of discharge (2.95)}$   
 $L = \text{Length of curb cut}$   
 $H = \text{Height of curb cut (0.5 ft)}$

$16.77 = 2.95 * L * (0.5)^{3/2}$   
 $16.77 = 1.04 * L$   
 $L = 16.13 \text{ ft, minimum curb cut length}$

CURB CUT CAPACITY CALCULATIONS  
ONSITE FLOWS FROM WEST SIDE OF SITE TO DOUBLE D INLET

Use weir equation:  
 $Q = CL(H)^{3/2}$

$Q = \text{discharge (0.85 cfs for on-site flows of Basin 5)}$   
 $C = \text{coefficient of discharge (2.95)}$   
 $L = \text{Length of curb cut}$   
 $H = \text{Height of curb cut (0.5 ft)}$

$0.85 = 2.95 * L * (0.5)^{3/2}$   
 $0.85 = 1.04 * L$   
 $L = 0.82 \text{ ft, minimum curb cut length}$

CURB CUT CAPACITY CALCULATIONS  
ONSITE/OFFSITE FLOWS TO CURB CUT ENTERING DETENTION POND 2

Use weir equation:  
 $Q = CL(H)^{3/2}$

$Q = \text{discharge (1.22 cfs for flows from Basin 4, not including pond area)}$   
 $C = \text{coefficient of discharge (2.95)}$   
 $L = \text{Length of curb cut}$   
 $H = \text{Height of curb cut (0.98 ft)}$

$1.22 = 2.95 * L * (0.98)^{3/2}$   
 $1.22 = 2.86 * L$   
 $L = 0.43 \text{ ft, minimum curb cut length}$

FIRST FLUSH VOLUME RETENTION

Depth to be retained = 0.44" per city ordinance

Initial abstractions = 0.1"

Total depth =  $0.44" - 0.1" = 0.34" = 0.02833 \text{ ft}$

Total impervious area = 33156.97 ft<sup>2</sup>

Total volume =  $33156.97 * 0.02833 = 939.34 \text{ ft}^3$

Retain first flush in north detention pond:  
Pond Area = 6179 ft<sup>2</sup>

Depth to retain =  $939.34/6179 = 0.16 \text{ ft}$

STORMCHAMBER VOLUME CALCULATION

Total storage volume required = 0.22 ac-ft

Total # of chambers = 69

Volume per chamber = 0.00172 ac-ft

Volume inside chambers =  $0.00172 * 69 = 0.11 \text{ ac-ft}$

Area of chambers and surrounding stone = 0.076 ac

Volume of chambers and surrounding stone =  $0.076 * 6.33 = 0.48 \text{ ac-ft}$

Volume of only surrounding stone =  $0.48 - 0.11 = 0.37 \text{ ac-ft}$

Volume of 30% voids in stone =  $0.37 * 0.3 = 0.11 \text{ ac-ft}$

Total storage of volume of Stormchamber system =  $0.11 + 0.11 = 0.22 \text{ ac-ft}$

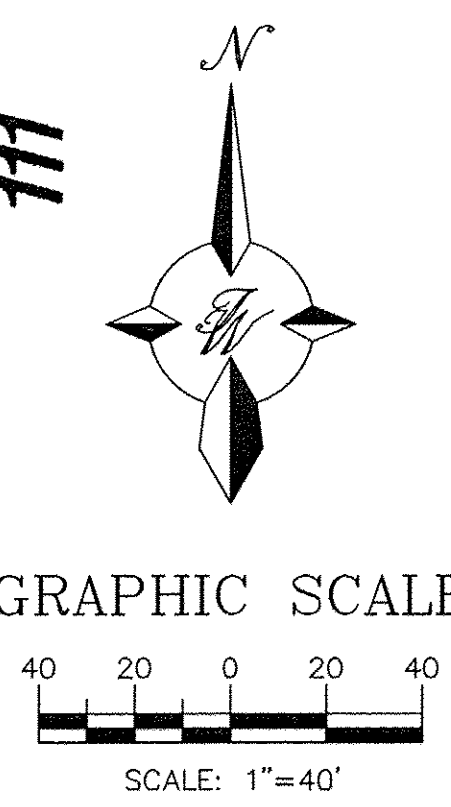
ORIFICE PLATE IN MANHOLE 2 CALCULATIONS

Orifice Equation:  $Q = CA \sqrt{2gh}$

$C = 0.6$   
 $A = \text{Orifice Area (ft}^2\text{)}$   
 $g = 32.2$   
 $H = \text{Depth of water above center of orifice (ft)}$   
 $Q = \text{Flow (cfs)}$

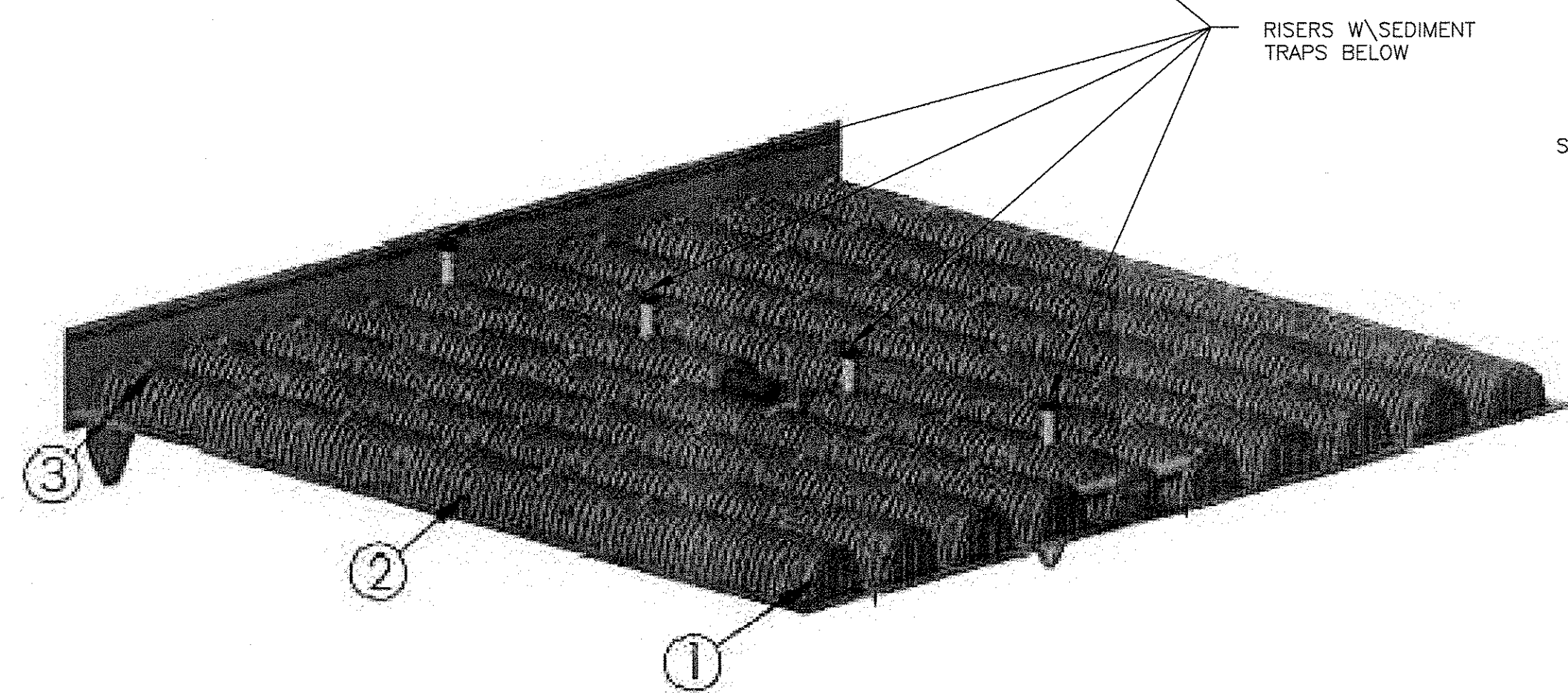
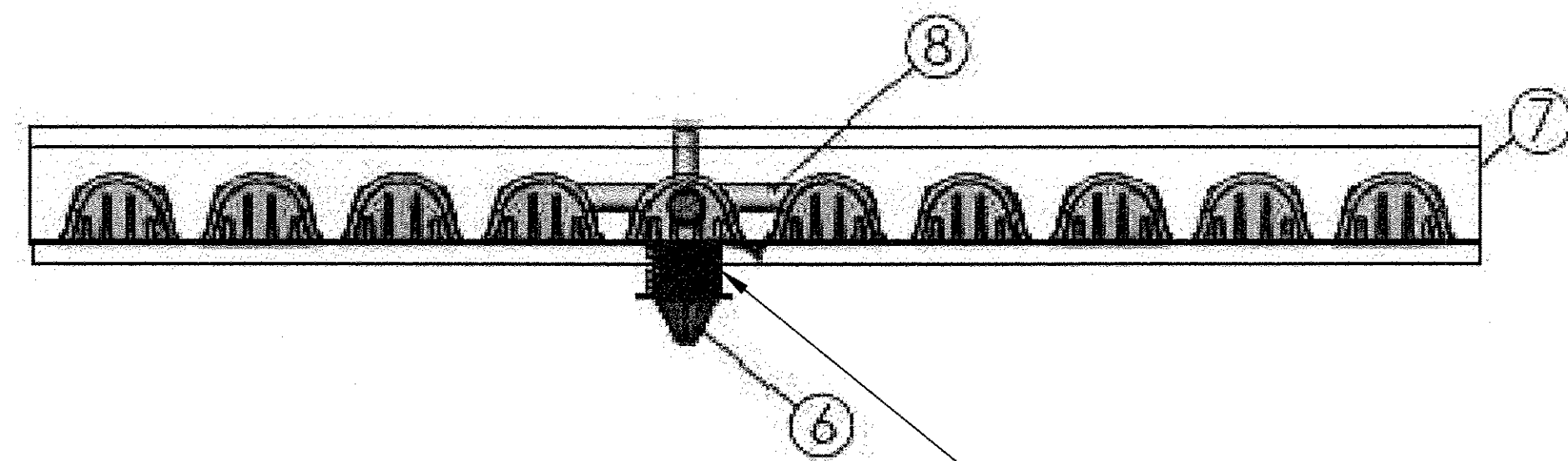
$Q = CA \sqrt{2gh}$   
 $1.08 = 0.6 * A * \sqrt{2 * 32.2 * 6.25}$   
 $1.08 = 12.037 A$   
 $A = 0.0897 \text{ ft}^2$

$A = \pi * r^2$   
 $0.0897 = \pi * r^2$   
 $0.02855 = r^2$   
 $r = 0.169 \text{ ft}$   
 $r = 2"$   
Use 4" dia. orifice plate



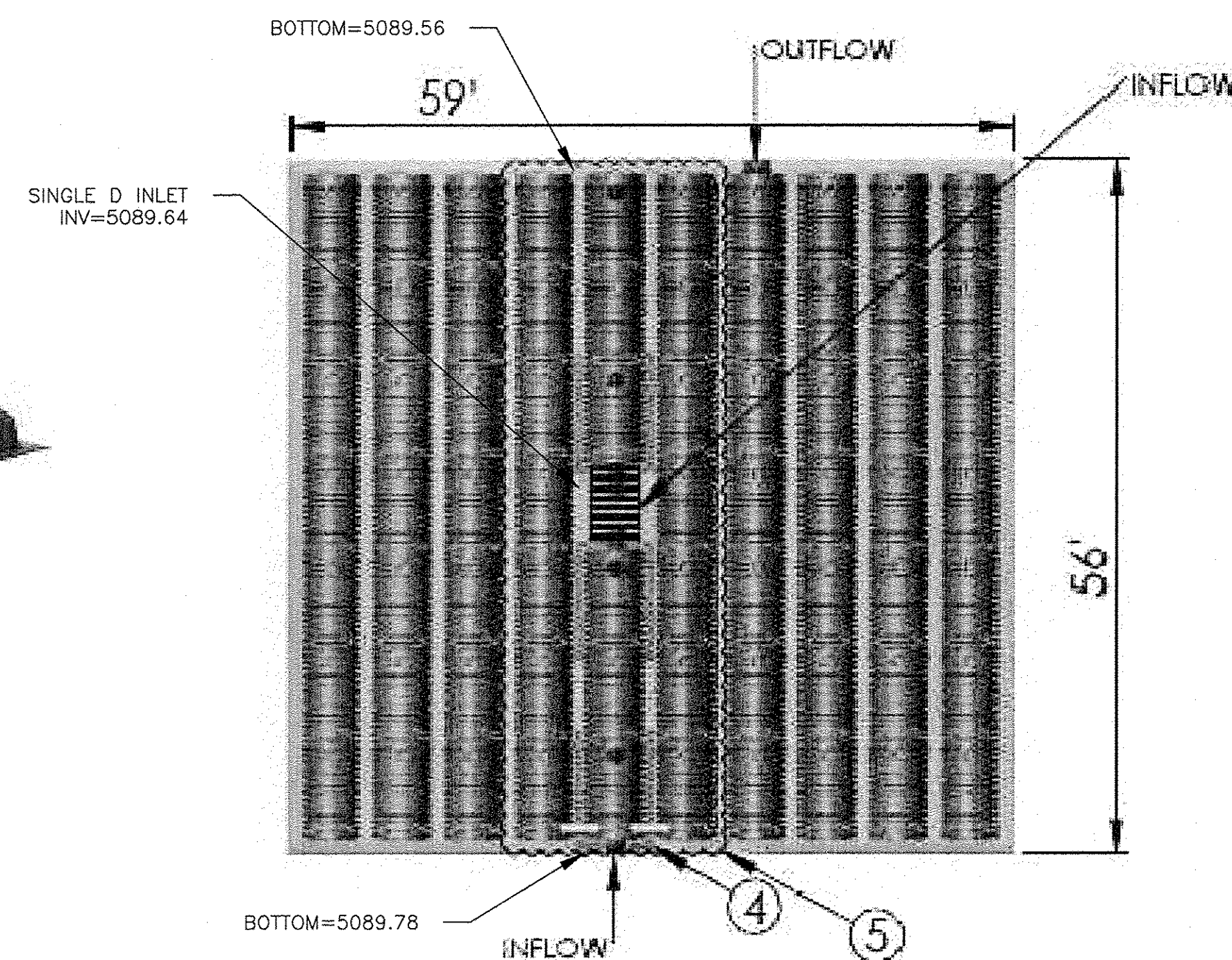
ENGINEER'S SEAL	<b>FREDDY'S AT COORS AND CENTRAL</b>	DRAWN BY BJF
	<b>BASIN MAP AND CALCULATIONS</b>	DATE 07/07/15
	<b>TIERRA WEST, LLC</b> 5571 MIDWAY PARK PLACE NE ALBUQUERQUE, NM 87109 (505) 858-3100 www.tierrowestllc.com	2015036-GRB-DETAILS
RONALD R. BOHANNAN P.E. #7868		SHEET # <b>C2</b>
		JOB # 2015036





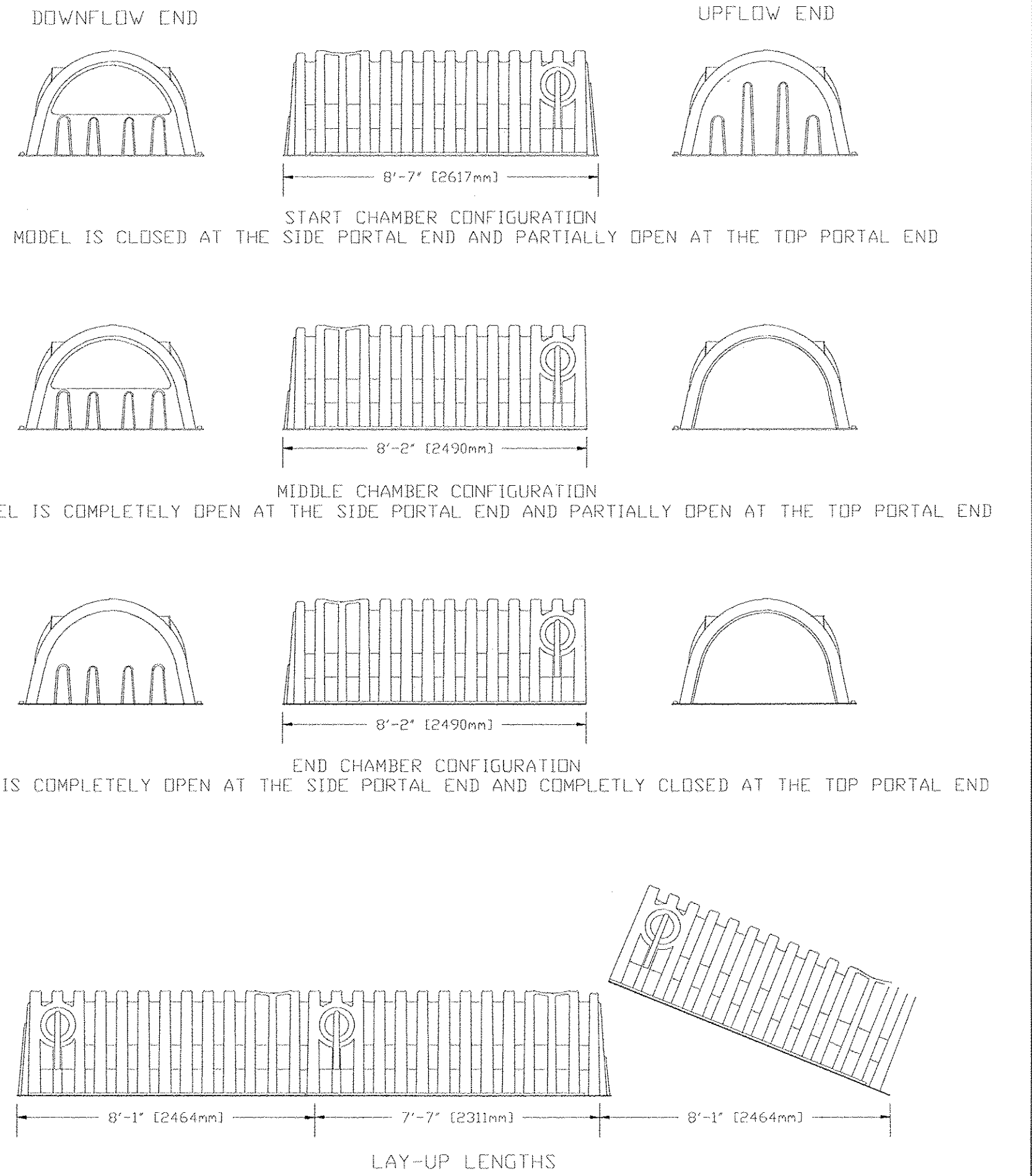
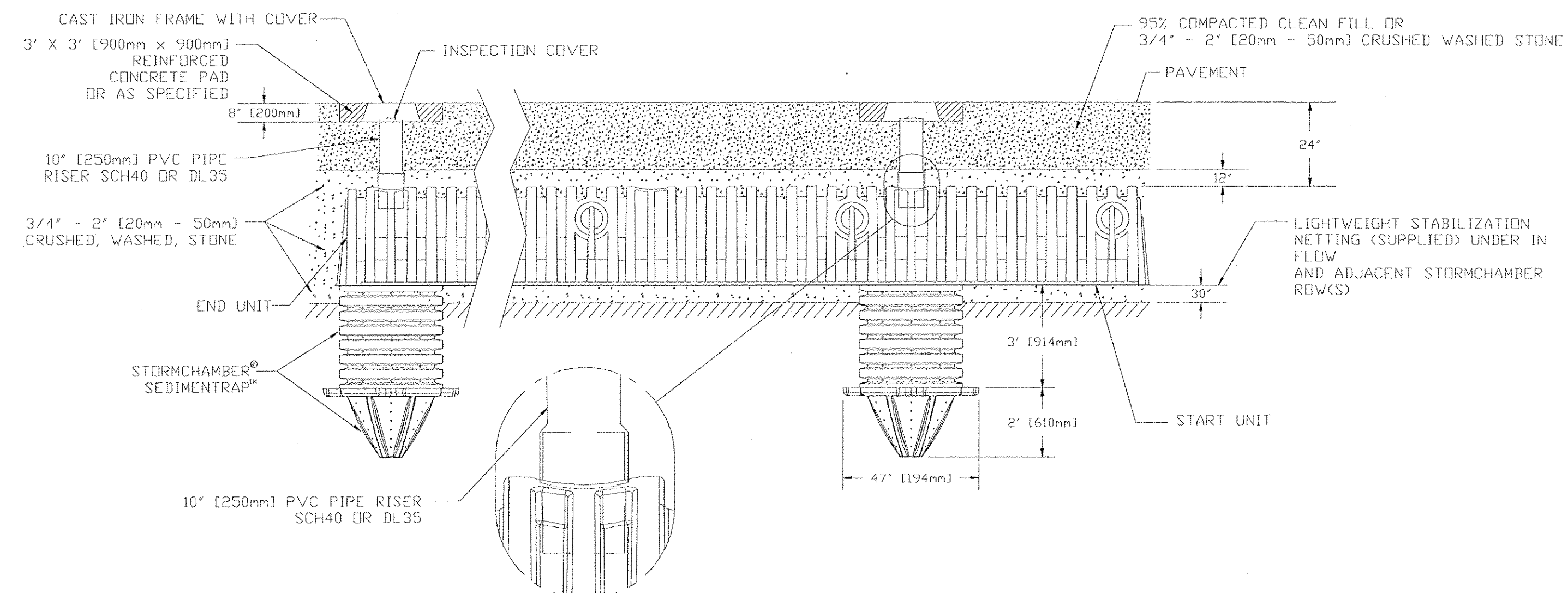
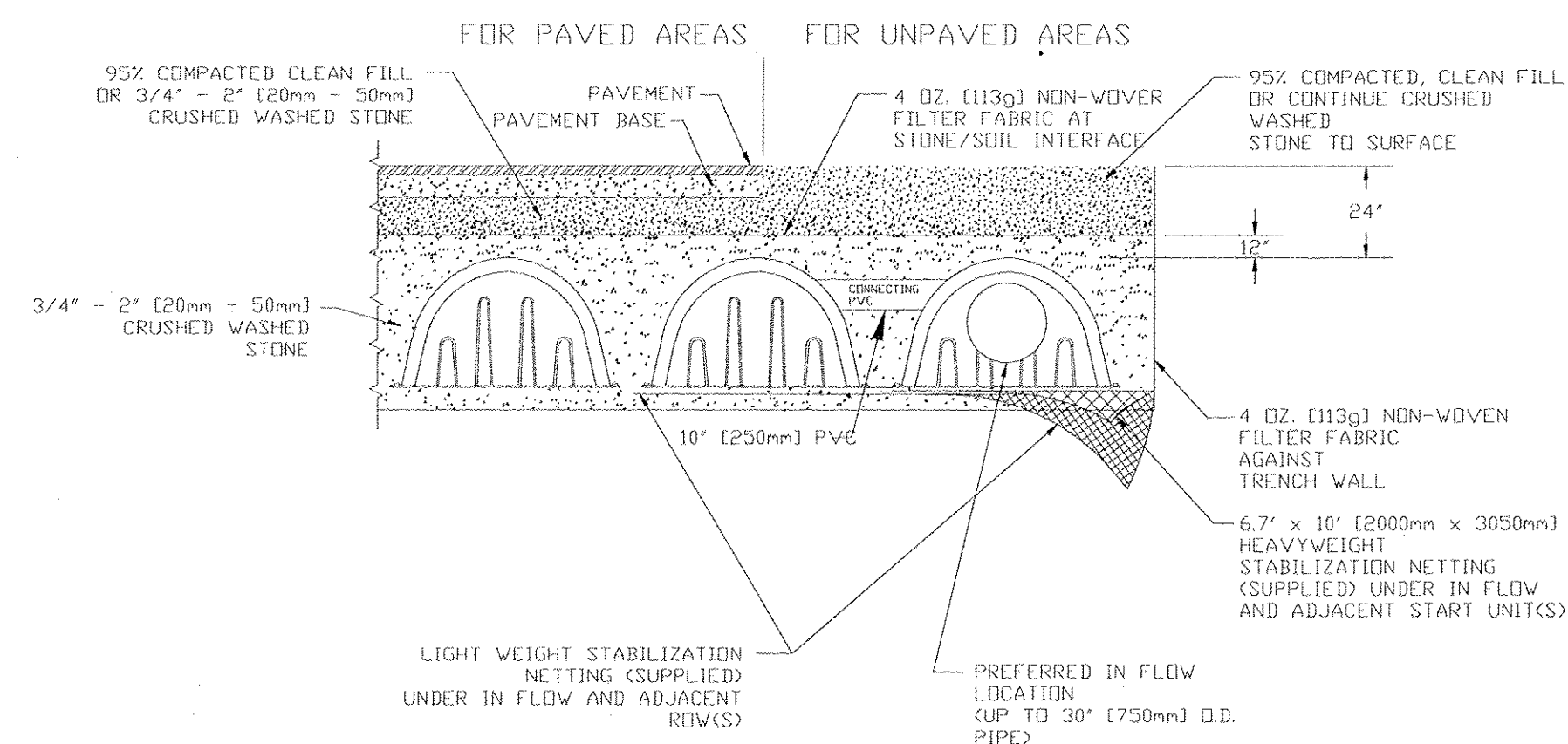
ITEM NO.	STORMCHAMBER PROPOSED LAYOUT DESCRIPTION	QTY
1	START UNITS	11
2	MIDDLE UNITS	47
3	END UNITS	11
4	7'X10' HEAVY DUTY NETTING (SUPPLIED)	3
5	LIGHTWEIGHTS STABILIZATION NETTING (INFLOW AND ADJACENT ROWS) (SUPPLIED)	1
6	10" PVC INSPECTION / CLEAN OUT RISER - (SUPPLIED BY OTHERS) W / FRAME AND LID AND SEDIMENTRAP (SUPPLIED)	4
7	4oz NON WOVEN STORMCHAMBER GEOTEXTILE FILTER FABRIC (SUPPLIED)	2
8	ROW CONNECTING 10" PVC (SUPPLIED BY OTHERS)	2
INSTALLED WITH 12" COVER STONE, 30" BASE STONE, 30% STONE VOID. INSTALLED SYSTEM VOLUME (PERIMETER STONE INCLUDED) = 9583 CF.		

TOTAL # OF CHAMBERS (START, MIDDLE, AND END UNITS) = 69

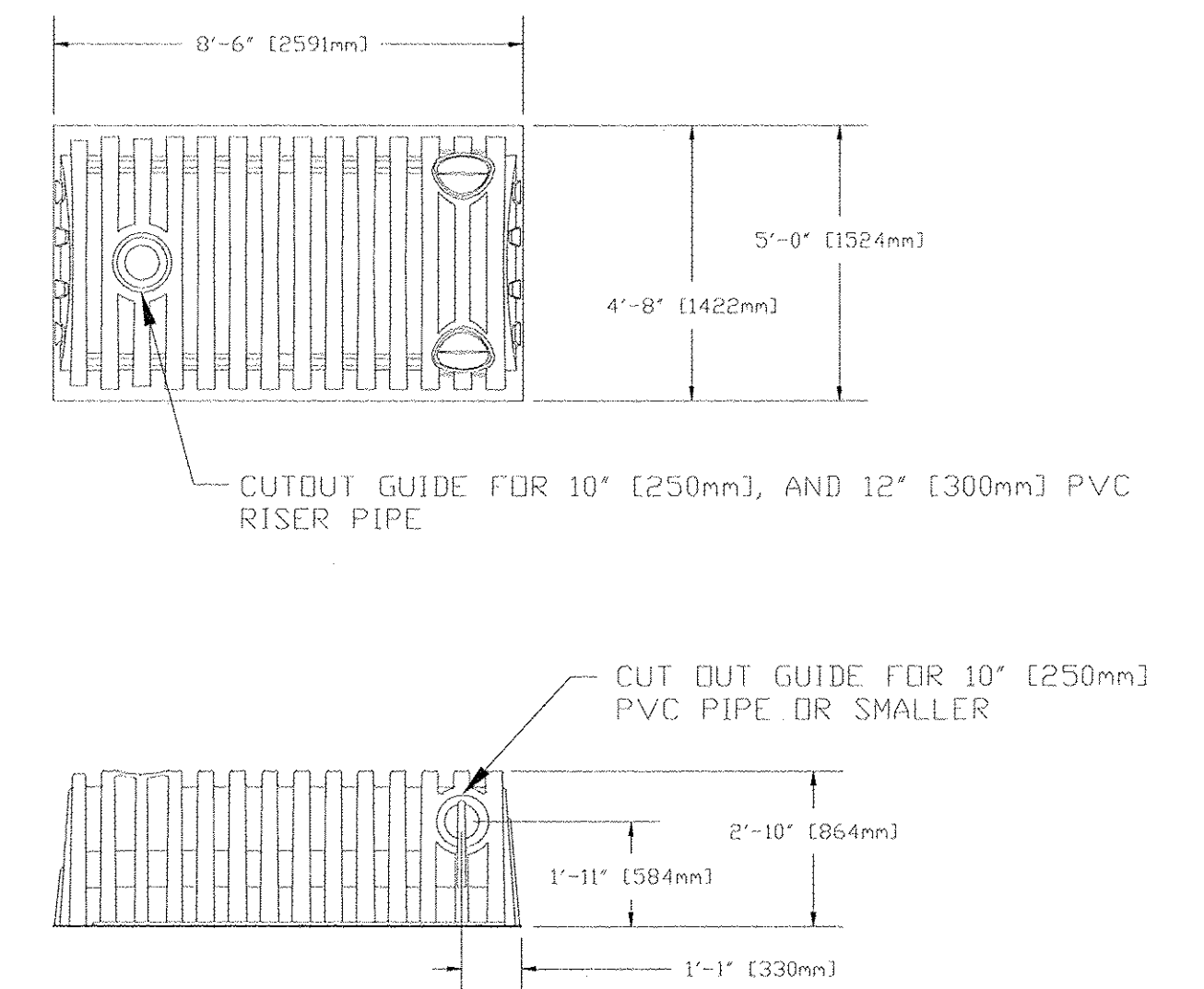


### STORMCHAMBER® WITH SEDIMENTRAP™

#### STORMCHAMBER® TYPICAL CROSS-SECTION INSTALLATION



NOTE: 1. Start chambers (closed at the side portal end) are placed at the inflow end of the rows.  
2. Begin placements with Start chambers and end rows with End chambers.  
3. Place first rib of next chamber in the row over last rib of previous chamber.



	ENGINEER'S SEAL	<b>FREDDY'S AT COORS AND CENTRAL</b>	DRAWN BY BJF
		<b>STORMCHAMBER STORAGE SYSTEM</b>	DATE 07/07/15
		<b>TIERRA WEST, LLC</b> 5571 MIDWAY PARK PLACE NE ALBUQUERQUE, NM 87109 (505) 858-3100 www.tierrawestllc.com	2015036-GRB-DETAILS
			SHEET # <b>C3</b> JOB # 2015036

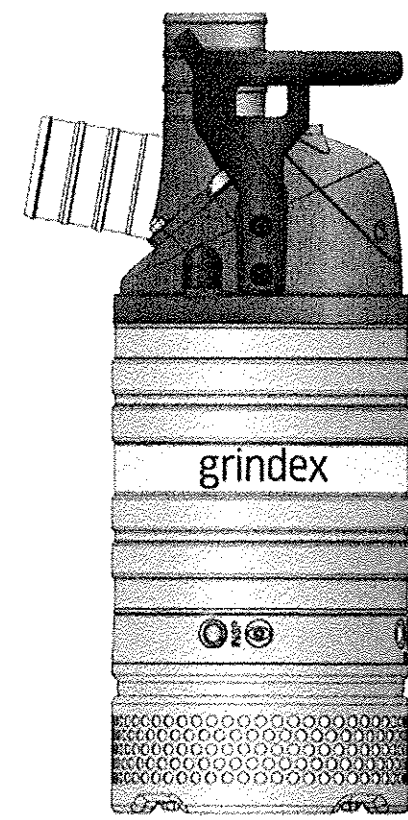


No: PD603181-INT | Revision 0 2014.02 | 60 Hz

8103.181

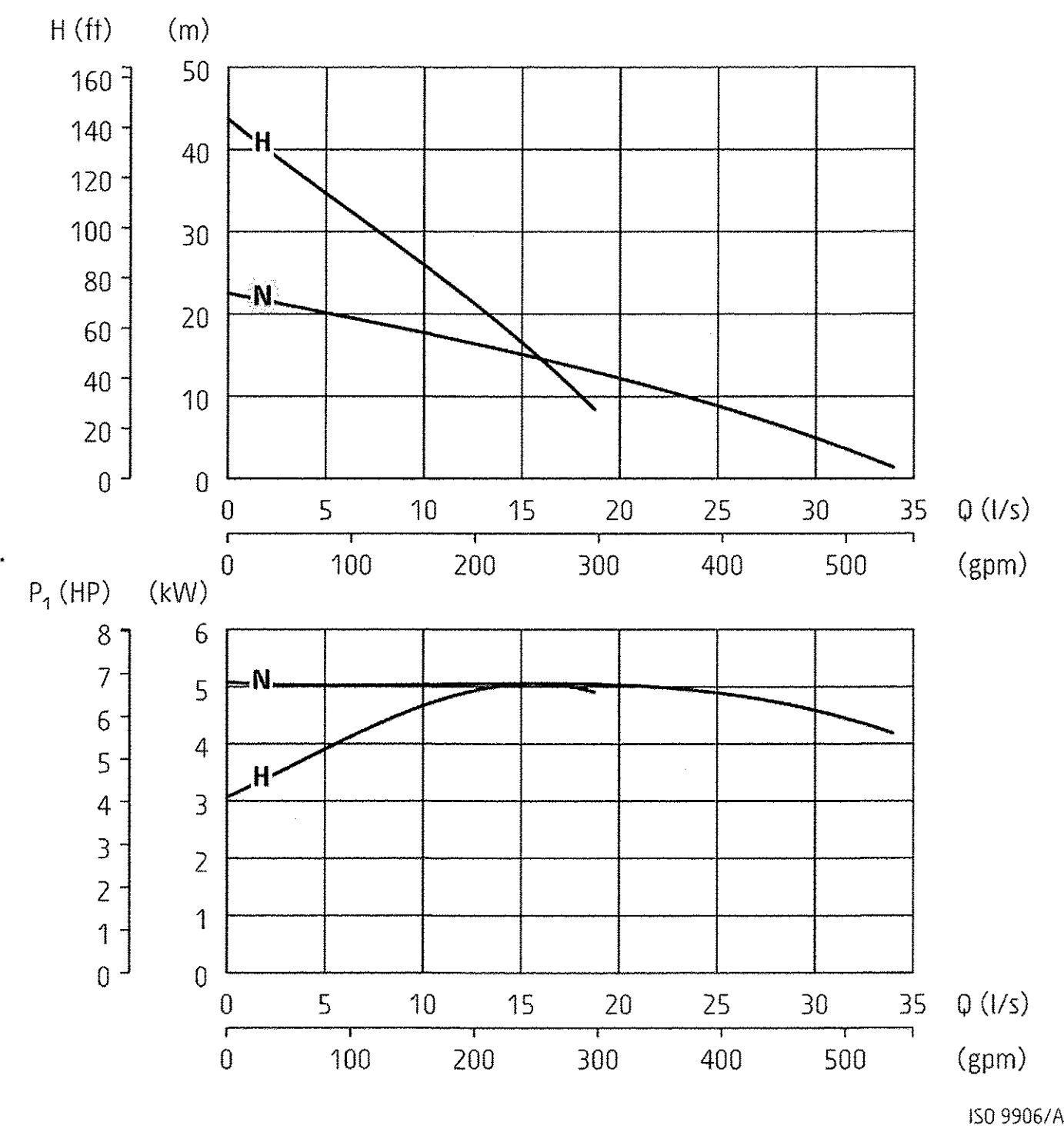
## Minor

Electrical submersible drainage pump



60 Hz	N	H
Discharge connection	4"	3"
Rated power $P_2$ [kW/HP]	4.4 / 6.0	4.4 / 6.0
Max. power consumption $P_1$ [kW]	5.2	5.2
Shaft speed [r.p.m.]	3480	3480
Rated current at 230V	15 A	15 A
Rated current at 460V	7.1 A	7.1 A
Rated current at 575V	5.5 A	5.5 A
Solids passage [mm/inch]	10 / 0.39	10 / 0.39
Height [mm/inch]	768 / 30 1/4	768 / 30 1/4
Diameter [mm/inch]	286 / 11 1/4	286 / 11 1/4
Weight [kg/lbs]	50 / 110	50 / 110

Other voltages on request



### Pump types

N: normal pressure  
H: high pressure

### Classification

Electrical submersible drainage pump  
Protection class: IP 68

### Electrical motor

Squirrel cage induction motor, insulation class: H (IEC 85)

### Motor protection

Phase sequence control, phase failure guard, temperature guard with thermal contacts in the stator opening temperature 140°C (284°F) (= SMART system), air valve

### Cable - SubCab

4G2,5mm<sup>2</sup>, length 20 m or 14AWG/4, length 53 ft

### Limitations

Max. submersion depth: 20 m (66 ft)  
Max. liquid temperature: 40 °C (104 °F)  
Allowed pH range: 5 - 8  
Maximum liquid density: 1100 kg/m<sup>3</sup> (68 lbs/ft<sup>3</sup>)

### Shaft seals

Cartridge seal: pre-assembled double mechanical seal running in an oil compartment  
Material lower seal: *silicon carbide - silicon carbide*  
Material upper seal: *tungsten carbide - aluminium oxide*

### Bearings

Ball bearings with C3 clearance

### Discharge connection

3-4" hose, ISO-G or NPT

### Materials

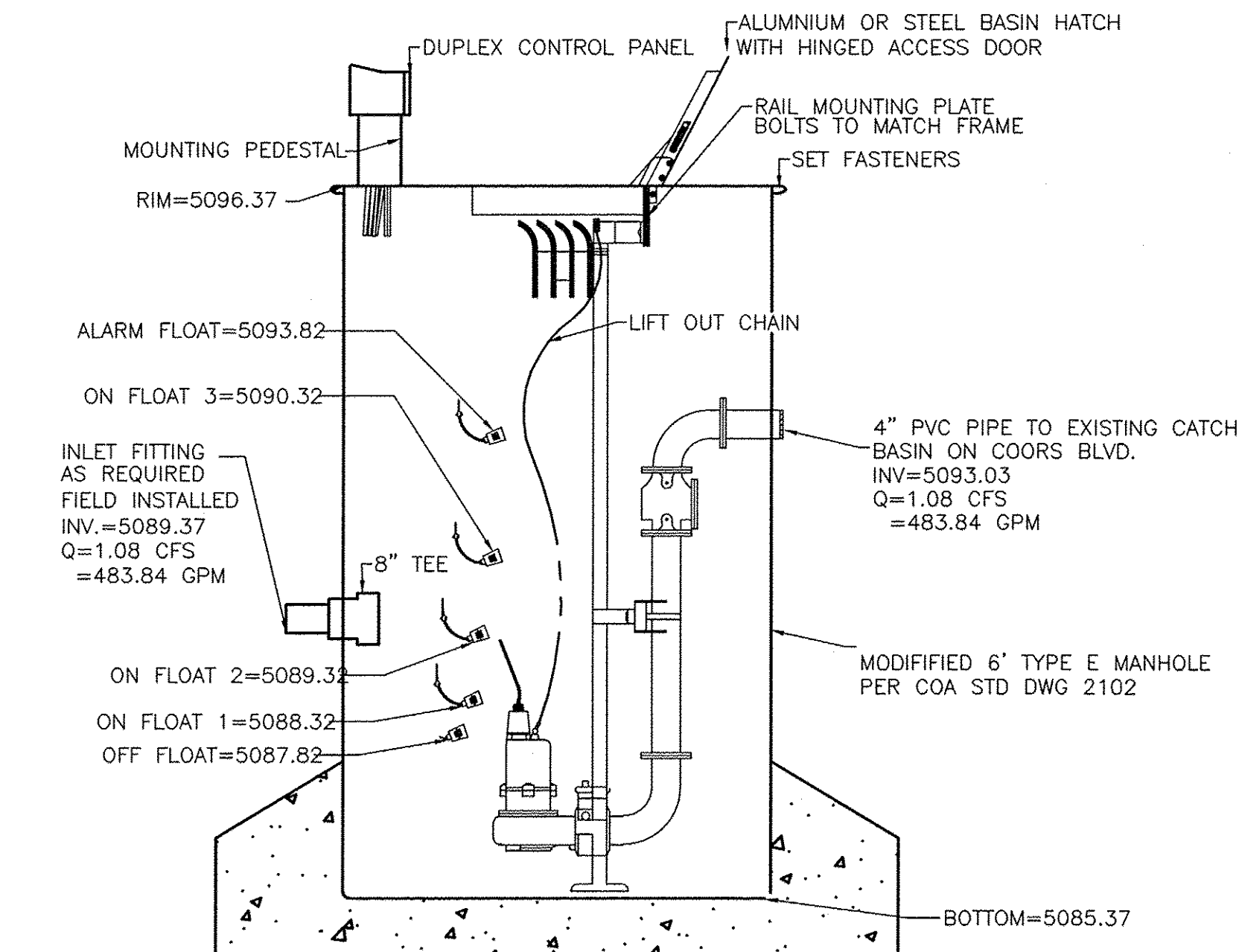
Casted parts: *Aluminium*  
Outer casing: *Stainless steel*  
Motor shaft: *Stainless steel*  
Impeller and suction cover: *Hard-Iron™*  
Diffusers: *Nitrile rubber*  
Screws and nuts: *Stainless steel*  
O-rings: *Nitrile rubber*

### Accessories

Level regulator  
Zinc anodes  
Tandem connection  
Low suction collar  
Pump raft

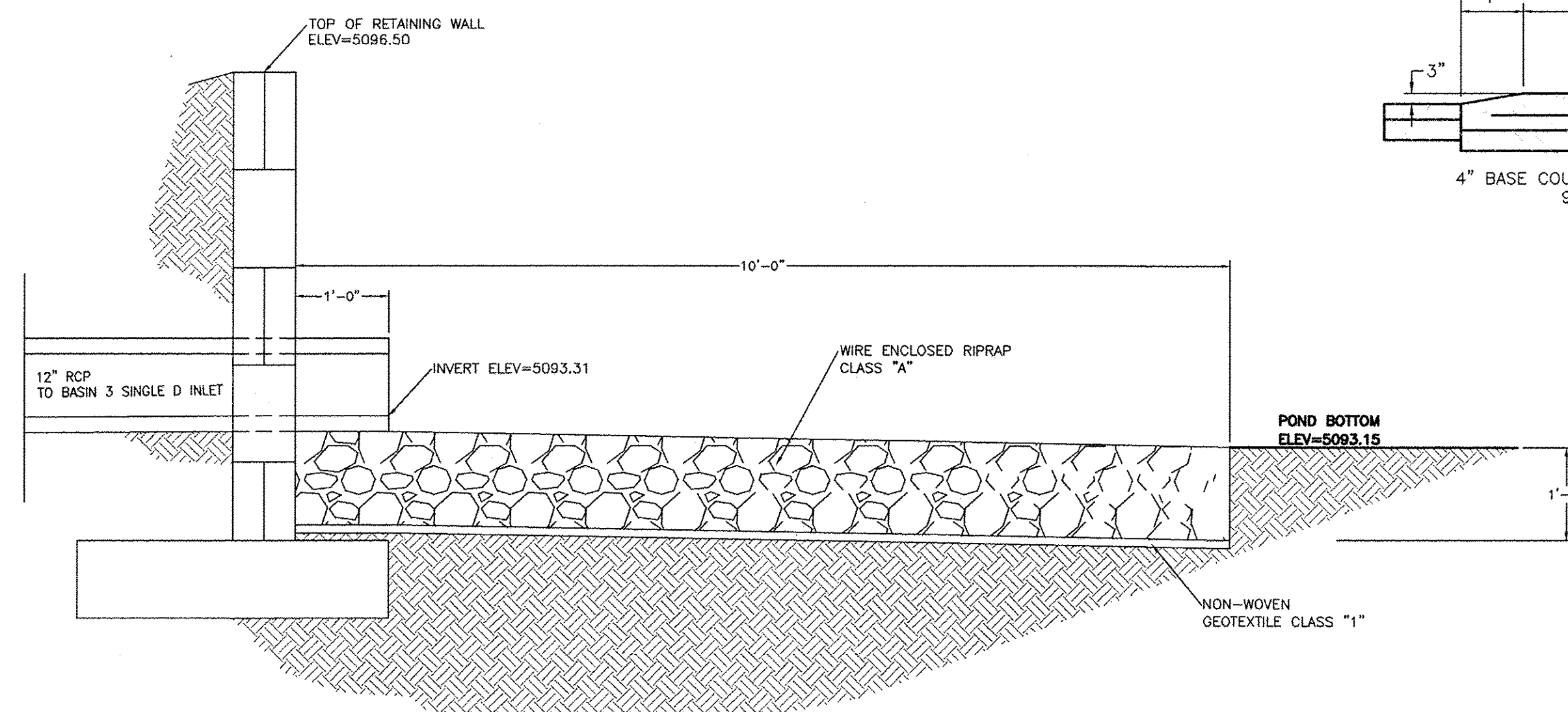
## GRINDEX PUMP DETAIL

NTS



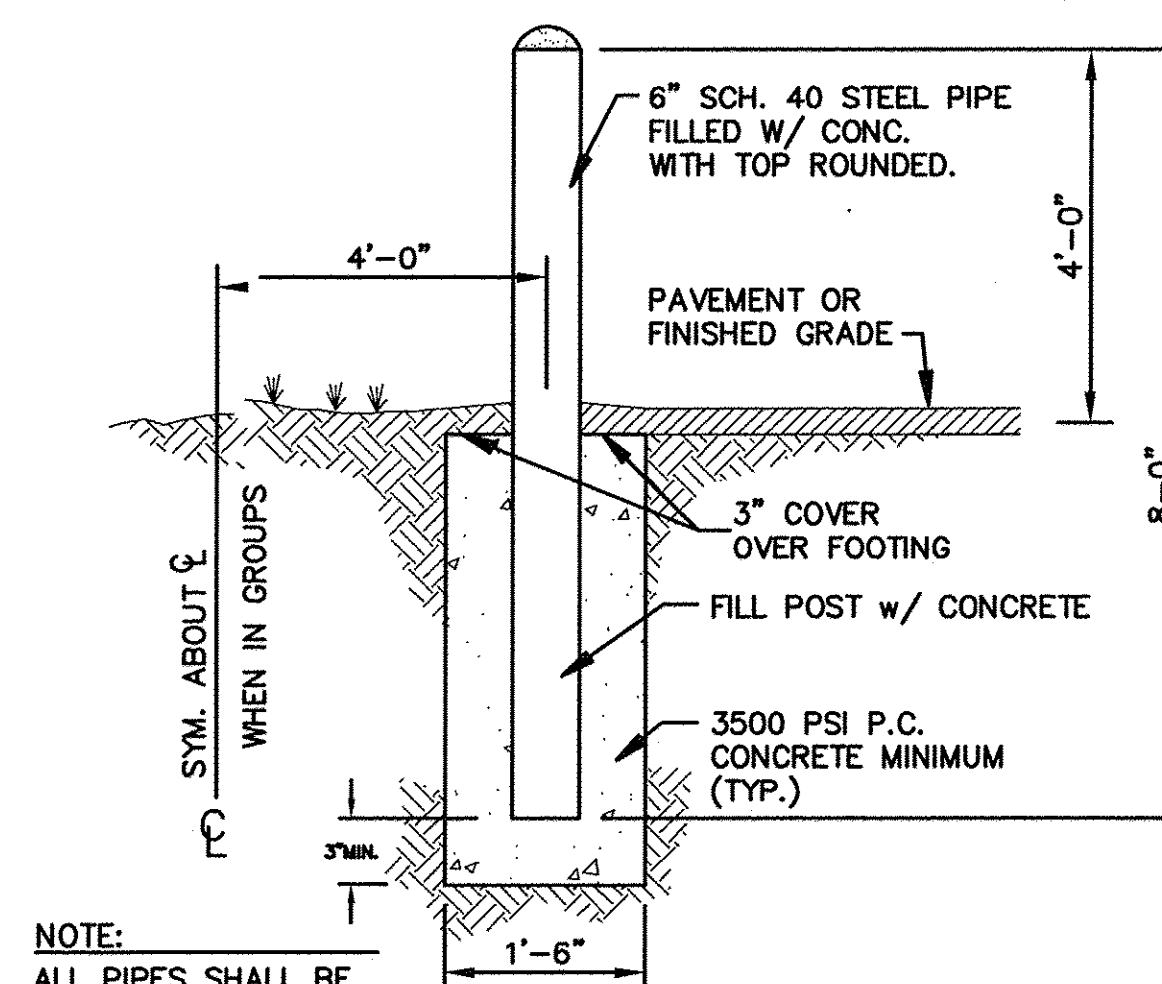
### LIFT STATION DETAIL

NTS



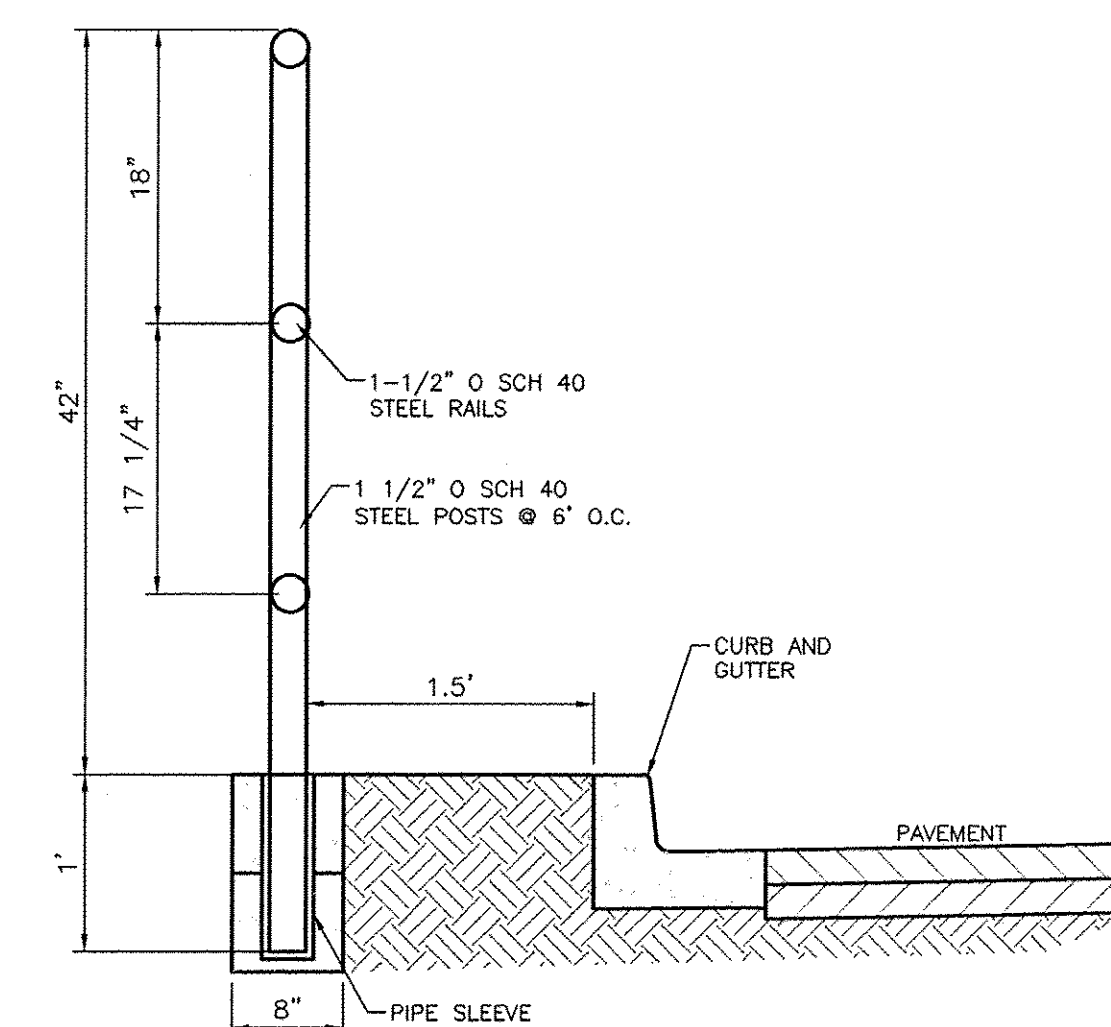
### POND OUTLET DETAIL

NTS



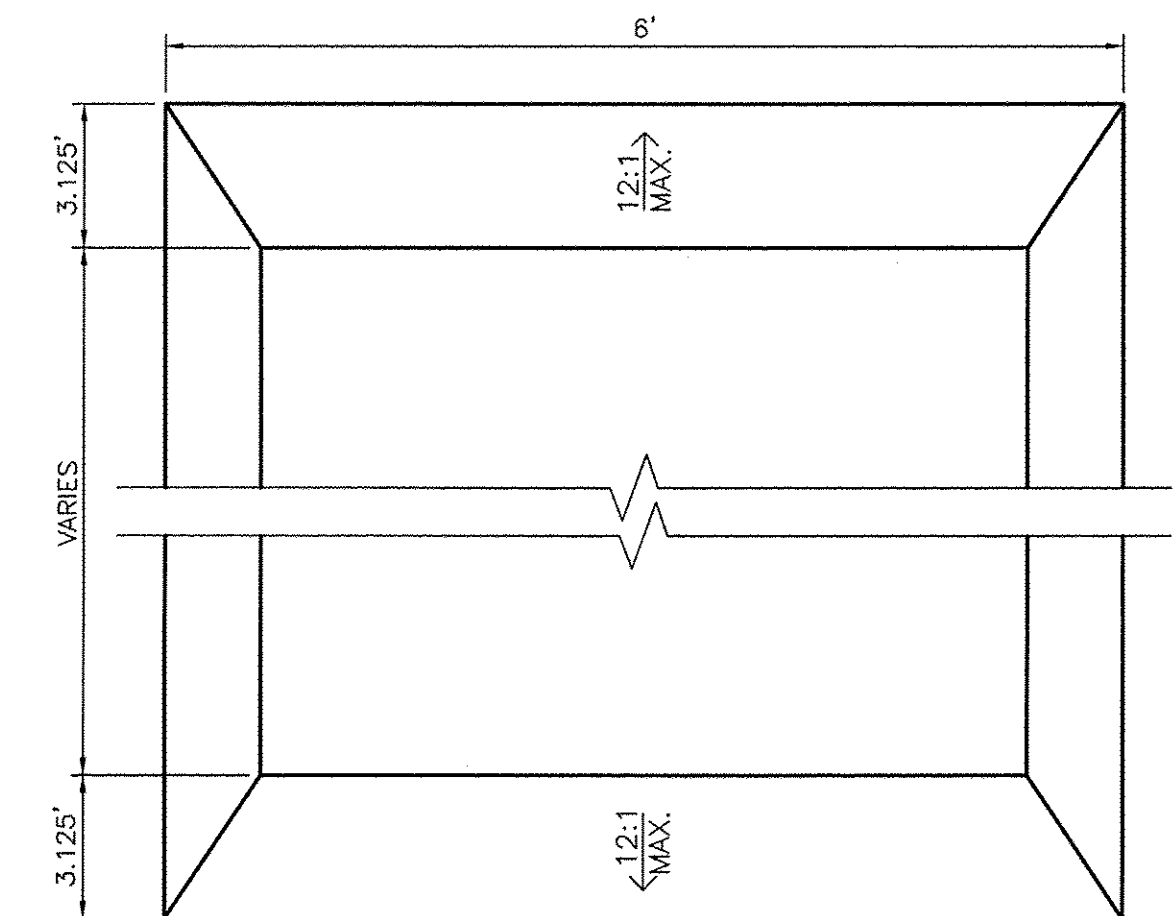
### PIPE BOLLARD DETAIL

NTS

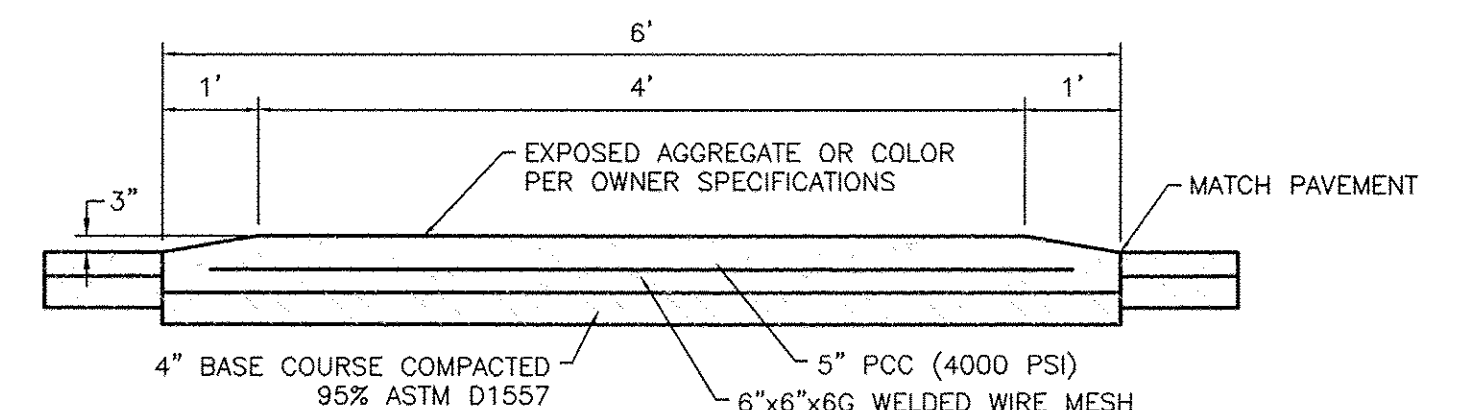


### GUARD RAIL DETAIL

NTS

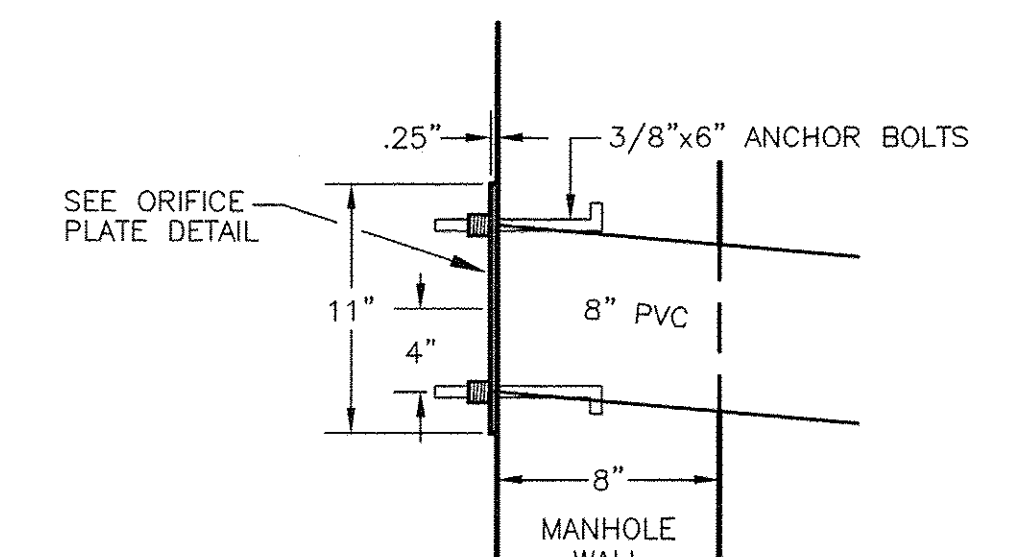


### CROSSWALK PLAN VIEW

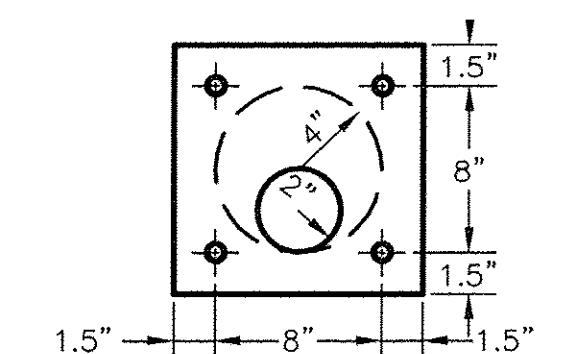


### RAISED CROSSWALK

NTS



TO BE INSTALLED @ THE OUTFLOW OF MANHOLE 2



### TYP. ORIFICE PLATE DETAIL

NTS

	<b>FREDDY'S AT COORS AND CENTRAL</b>		DRAWN BY
	<b>PUMP AND DETAIL SHEET</b>		BJF
			DATE
			7/07/15
		2015036-GRB-DETAILS	
			SHEET #
			<b>C4</b>
			JOB #
			2015036