

From: [Wolfenbarger, Jeanne](#)
To: ["Vinny Perea"](#)
Subject: Freddy's (Formerly Whataburger)
Date: Monday, June 01, 2015 4:37:00 PM

Vinny,

As discussed, prior to approval, we will need:

- A. An agreement from adjacent property owner to the west acknowledging the increase in 100-year water surface elevation to what is shown on the plan at a distance of "X" above existing ground.
- B. Put back the spot elevations that you had on the conceptual plan showing the relationship between top of water surface elevation and top of existing ground. Ensure that the added water surface depth does not adversely affect the property to the north or south and that drainage is still being directed toward the double "D" inlet.
- C. Add a grease trap connection for the dumpster with a couple of added spot elevation showing drainage to the grease trap.

Thanks!

Jeanne



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

CITY OF ALBUQUERQUE



March 6, 2015

Ronald Bohannon, PE
Tierra West, LLC
5571 Midway Park Place NE
Albuquerque, NM 87109

RE: **Whataburger
Grading Plan
Engineer's Stamp Date 2-18-2015 (File: K10-D001B)**

Dear Mr. Bohannon:

Based upon the information provided in your submittal received 2-20-15, the above referenced Grading Plan cannot be approved for Building Permit until the following comments are addressed:

PO Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

- 1) The volume of on-site storage detention is shown to be based on the 100-year 6-hour storm event. Provide a hydrograph which shows that 90% of the storage volume will be discharged from the site within 6 hours, as per the Drainage Ordinance.
- 2) On the plan view for the "Grading and Drainage Plan", label all of the different detention volumes that correspond to the "Proposed Conditions" discussion which include the 0.43 ac-ft detention pond, the 0.16 ac-ft surface pond, and the underground storage of 0.22 ac-ft. Show the underground storage system area on the plan view for the "Grading and Drainage Plan", and label the connections from the new 24-inch storm drain to this underground storage system.
- 3) There is a Section A-A on the "Grading and Drainage Plan" which shows pond elevations within the detention pond in the north area of the site. Provide more spot elevations within this area at the corners of the pond to ensure that there will be enough volume provided for the detention pond.
- 4) Eliminate the existing timed butterfly valve as discussed. If there are issues with the valve not operating properly, it will pose a risk to the site. The pipe discharging from the site to Coors Boulevard is at the upstream end of the existing storm drainage system, and it is discharging to a fairly steep 18-inch pipe in Coors Boulevard to convey the required 1.08 cfs. Therefore, due to the amount of existing

pipe capacity to handle such a small amount of flow, there is no concern regarding elimination of the timed valve.

- 5) How is storm drainage getting to the Double-D inlet on the west side of the site? Provide capacity calculations for the 5.6-foot wide curb cut that is accepting the off-site flow from the west and adjust as necessary.
- 6) Provide capacity calculations for all of the curb cuts shown on the plan.
- 7) A summary table is provided for grate capacities and pipe capacities on the "Basin Map and Calculations" sheet. Please provide the calculations for these capacities.
- 8) It is not clear if the subject site is accepting off-site flows from the site or how the site to the north will be impacted. Include discussion of off-site flows from the site to the north to ensure that grading of the Whataburger site does not adversely impact this site.
- 9) The number of chambers shown on the "Basin Map and Calculations" sheet is 75. This needs to be called out on the plan view detail on the "Stormchamber Storage System" sheet to make sure the right number of stormchambers will be installed. Also, please provide a legible table showing the layout dimensions for the stormchambers.

If you have any questions, you can contact me at 924-3924.

Sincerely,

A handwritten signature in blue ink, appearing to read "Jeanne Wolfenbarger".

Jeanne Wolfenbarger, P.E.
Senior Engineer, Planning Dept.
Development Review Services

Orig: Drainage file
c.pdf Addressee via Email

May 18, 2015

Ms. Jeanne Wolfenbarger, P.E.
Senior Engineer, Planning Dept.
City of Albuquerque
PO Box 1293
Albuquerque, NM 87103

**RE: FREDDY'S (PREVIOUSLY WHATABURGER), 111 COORS BLVD. NW
GRADING AND DRAINAGE PLAN
ENGINEER'S STAMP DATE 2-18-2015 (K10-D001B)**

Dear Ms. Wolfenbarger:

Per your correspondence dated March 6, 2015, please find the following responses addressing the comments listed below:

1. The volume of on-site storage detention is shown to be based on the 100-year 6-hour storm event. Provide a hydrograph which shows that 90% of the storage volume will be discharged from the site within 6 hours, as per Drainage Ordinance.
Response: An AHYMO hydrograph was provided to your office with the COA at an earlier date showing the amount of time to discharge the runoff from the site. A letter from you, dated 3/24/2015, shows approval for action by EPC, this letter is approval for addressing the hydrograph request.
2. On the plan view for the "Grading and Drainage Plan", label all of the different detention volumes that correspond to the "Proposed Conditions" discussion which include the 0.43 ac-ft. detention pond, the 0.16 ac-ft surface pond, and underground storage of 0.22 ac-ft. Show the underground storage system area on the plan view for the "Grading and Drainage Plan", and label the connections from the new 24-inch storm drain two this underground storage system.
Response: The detention volumes for surface ponding and the detention pond have changed slightly and were accounted for in the narrative discussion and calculations, still equating to the total 0.81 ac-ft of total storage. Detention volumes were added to each label calling out the maximum water surface elevations for the surface and detention ponding areas. The two surface ponding areas show ponding areas show 0.08 ac-ft and 0.15 ac-ft volumes for each, equating to the total 0.23 ac-ft for surface ponding. The north detention pond shows the volume to be 0.36 ac-ft. The underground storage system was hatched and called out on the "Grading and Drainage Plan" Sheet, the detention volume was added to this label as well (0.22 ac-ft). The two 24-inch storm drains that connect to the underground storage were labeled and show the invert elevations of where each connects.

3. There is a Section A-A on the "Grading and Drainage Plan" which shows pond elevations within the detention pond in the north area of the site. Provide more spot elevations within this area at the corners of the pond to ensure that there will be enough volume provided for the detention pond.

Response: Top of Wall and Bottom of Wall spot elevations are called out at the corners of the north area detention pond on the "Grading and Drainage Plan" sheet.

4. Eliminate the existing timed butterfly valve as discussed. If there are issues with the valve not operating properly, it will pose a risk to the site. The pipe discharging from the site to Coors Boulevard is at the upstream end of the existing storm drainage system, and it is discharging to a fairly steep 18-inch pipe in Coors Boulevard to convey the required 1.08 cfs. Therefore, due to the amount of existing pipe capacity to handle such a small amount of flow, there is no concern regarding elimination of the timed valve.

Response: The relocation of the existing timed butterfly valve was removed from the plan set on the "Grading and Drainage Plan" sheet, showing the valve to be removed completely from the site.

5. How is storm drainage getting to the Double-D inlet on the west side of the site? Provide capacity calculations for the 5.6-foot wide curb cut that is accepting the offsite flow from the west and adjust as necessary.

Response: Storm drainage on the west side of the building/site is directed towards the landscaped area, away from the building. This drainage is directed towards the Double D inlet through a series of 1 foot curb cuts along the east curb of this landscaped area, the locations of the cuts are marked on the "Grading and Drainage Plan" sheet as keyed note 7. Capacity calculations for the curb cut accepting offsite flows from the west were added to the "Basin Map and Calculations" sheet. For the given offsite flows, the curb cut width needs to be 16.2 feet wide. The grading plan was modified for this change and concrete bollards were added within the curb cut to prevent vehicles from entering.

6. Provide capacity calculations for all of the curb cuts shown on the plan.

Response: All curb cut calculations were added to the "Basin Map and Calculations" sheet. These calculations are for 3 different curb cut areas: the length of cut accepting the offsite flows, the length of cut accepting flows from west side of site, and the cut accepting flows from Basin 4 into the detention pond.

The length of cut needed for the entire flows on the west side of site is 0.49 ft. The slope of the curb where this drainage would cross is relatively flat; therefore the series of 1-ft curb cuts are added to ensure that all drainage from this area can reach the double D inlet.

7. A summary table is provided for grate capacities and pipe capacities on the "Basin Map and Calculations" sheet. Please provide the calculations for these capacities.

Response: The calculations for the grate capacities and pipe capacities were added to the "Basin Map and Calculations" sheet.

8. It is not clear if the subject site is accepting off-site flows from the site or how the site to the north will be impacted. Include discussion of off-site flows from the site or how the site to the north will be impacted. Include discussion of off-site flows from the site to the north to ensure that grading of the Whataburger site does not adversely impact this site.

Response: Flows from the site to the north are not affected by the development of our site. The curb along the southern end of the north site acts as a basin boundary between Basin 4 (onsite) and the northern tract basin (offsite). Flows south of this curb will be directed towards the onsite detention pond and is included in the drainage volume calculations. Flows north of this curb are directed west towards the shopping center access road and then flow north away from our site. Discussion of this was added to the "Existing Conditions" of the narrative on the "Grading and Drainage Plan" sheet.

9. The number of chambers shown on the "Basin Map and Calculations" sheet is 75. This needs to be called out on the plan view detail on the "Stormchamber Storage System" sheet to make sure right number of stormchambers will be installed. Also, please provide a legible table showing the dimensions for the stormchambers.

Response: The number of chambers was reduced from 75 to 69. This was modified in the Stormchamber volume calculations and is called out on the plan view detail on the "Stormchamber Storage System" sheet. The table showing the material quantities and the cross sections of the chambers was modified to be more legible.

If you have any questions or need additional information regarding this matter, please do not hesitate to contact me.

Sincerely,



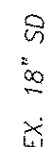
Ronald R. Bohannon, P.E.

JN: 2015036

Letter.docx

RRB/vp/cwg

Z:\2015\2015036 Freddy's at Coors and Central\Working Documents\2015036 15-05-12 Freddy's Coors and Central Draft

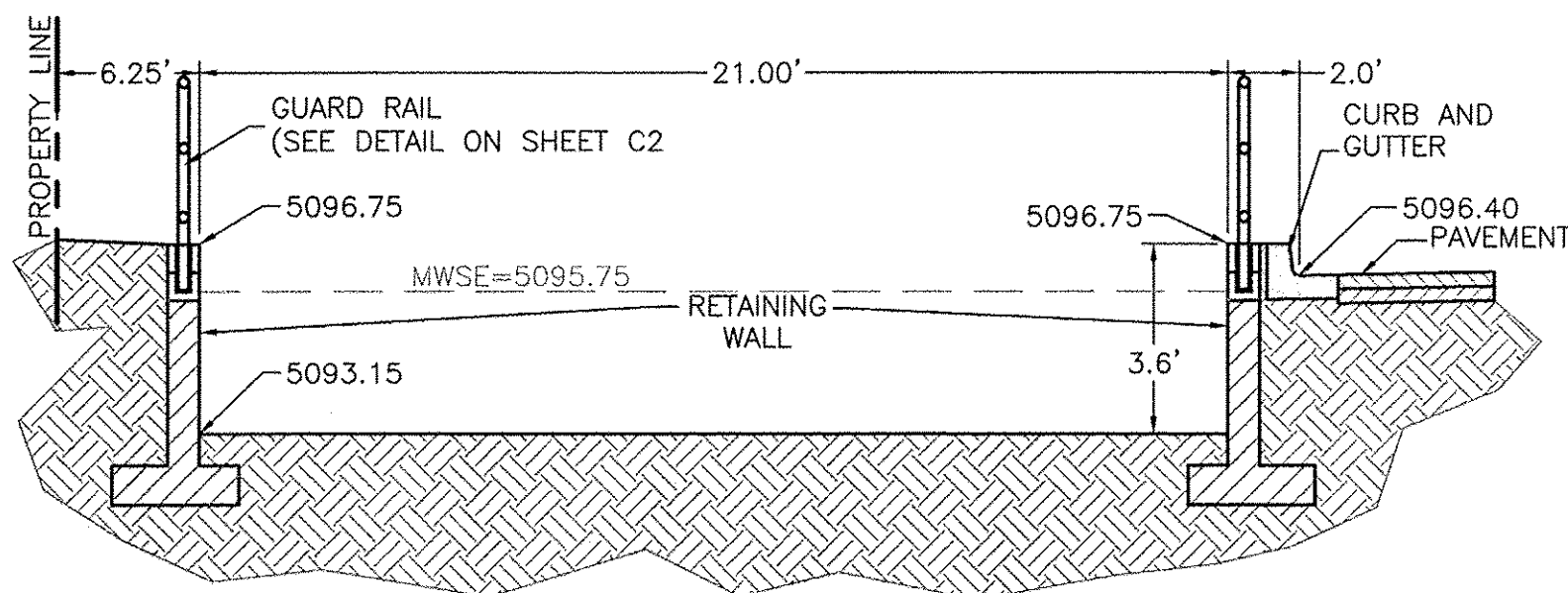


20 10 0 10 2

SCALE: 1"=20'

SITE LEGEND

- | | | | |
|-----|-------------------|-----|----------------|
| (1) | RETAINING WALL | (6) | HC RAMP |
| (2) | TURN DOWN CURB | (7) | 1 FT. CURB CUT |
| (3) | CURB AND GUTTER | (8) | 10" PVC RISER |
| (4) | HEADER CURB | (9) | 4"x8" REDUCER |
| (5) | CONCRETE SIDEWALK | | |



SECTION A-A

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 1.15 acres and 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

















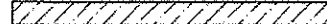


The subject site will continue to collect all flows from the offsite area of the shopping center and detain in a subsurface system. The offsite flows will drain via surface flow through both driveway aisles and through a curb cut on the west side of the site where the existing concrete channel lies. The offsite flows through the south driveway and curb cut will be collected into a Double D Drop Inlet that is located in a bio swale on the western side of site. The offsite flows through the north driveway will be collected in the detention pond on the north side of the site. 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. Flows from the north driveway aisle will be directed towards the detention pond. 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 an underground storage system. The detention pond will interconnect via storm drain with the northernmost Single D inlet and the underground storage system.

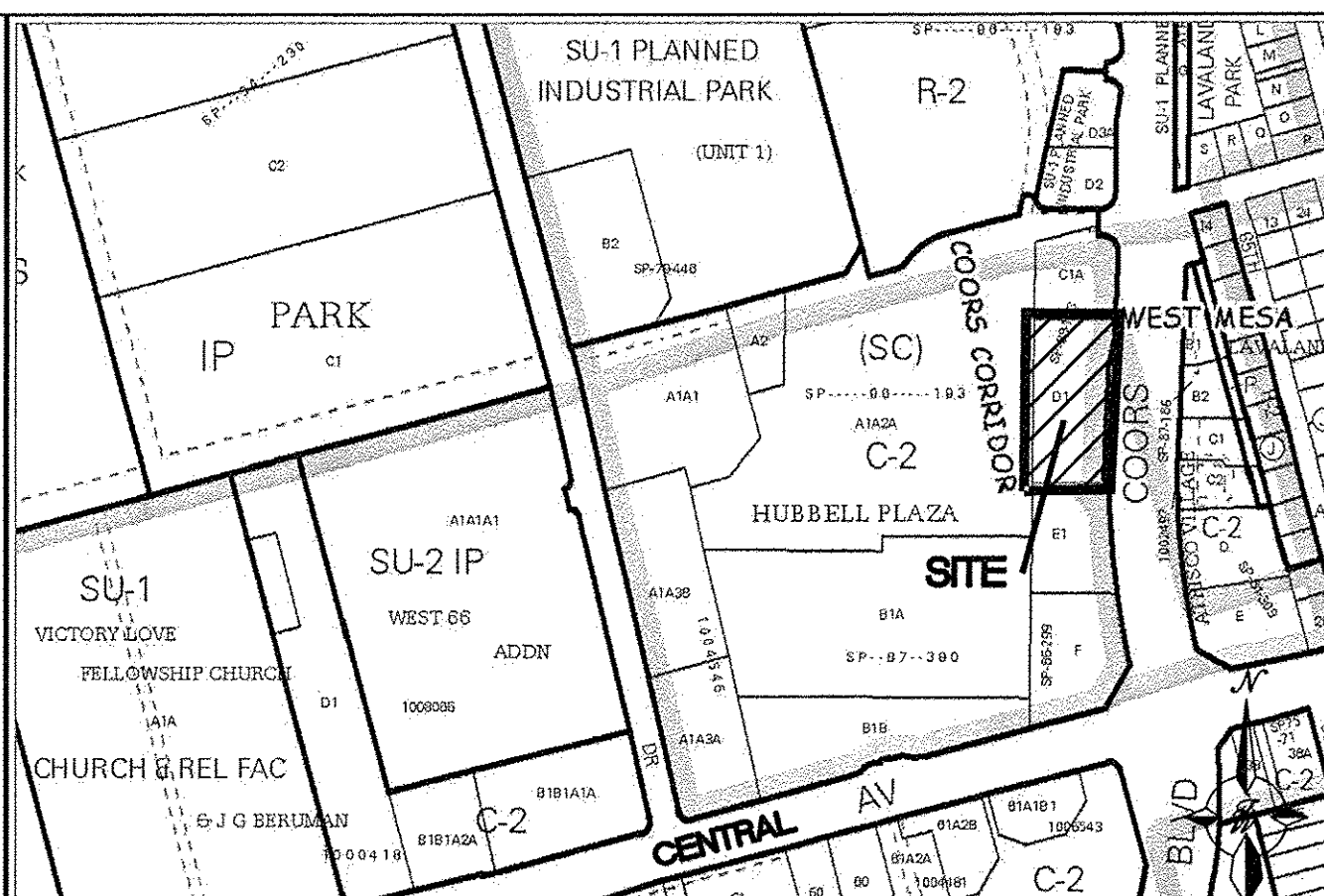
As runoff volume increases and fills up the underground storage system completely, the interconnecting storm drains, drop inlets and detention pond will act as an equalizing system and allow runoff to be stored in both the detention pond and on the surface of the parking lot and bio swale. During the 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). Emergency overflow of the water surface elevation would send flows over the southeast part of the parking lot and onto Coors Blvd. The detention system will overflow through a 4" orifice plate located at 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 pond is 0.36 ac-ft, volume of underground storage, is 0.22 ac-ft, and the volume of surface ponding is 0.23 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 pond and underground storage system will capture sediment within the bottom of each respective area, the detention pond outlet will be raised 0.16ft 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 Underground StormChamber configuration and details
See sheet C4 for Pump Details and Site Details



- | | |
|---|-------------------------|
|  | CURB & GUTTER |
|  | BOUNDARY LINE |
|  | EASEMENT |
|  | BUILDING |
|  | SIDEWALK |
|  | PEDESTRAIN CROSSWALK |
|  | RETAINING WALL |
|  | CONTOUR MAJOR |
|  | CONTOUR MINOR |
|  | SPOT ELEVATION |
|  | WATER BLOCK |
|  | FLOW ARROW |
|  | EXISTING SIDEWALK |
|  | EXISTING CURB & GUTTER |
|  | EXISTING CONTOUR MAJOR |
|  | EXISTING CONTOUR MINOR |
|  | EXISTING SPOT ELEVATION |
|  | EXISTING POND |
|  | UNDERGROUND STORAGE |



VICINITY MAP:

K-10-Z



FIRM MAP:

35001C0329H

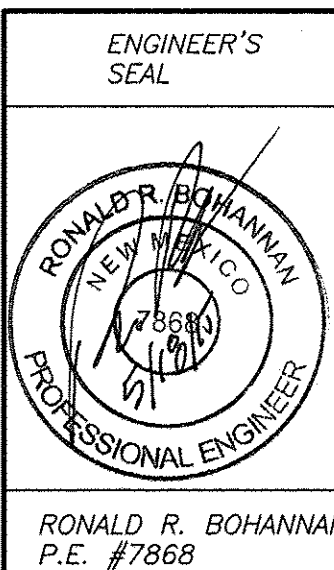
EROSION CONTROL NOTES:

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

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 INTERIOR 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 CONNECTIONS. 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		



**FREDDY'S AT
COORS AND CENTRAL
GRADING AND
DRAINAGE PLAN**

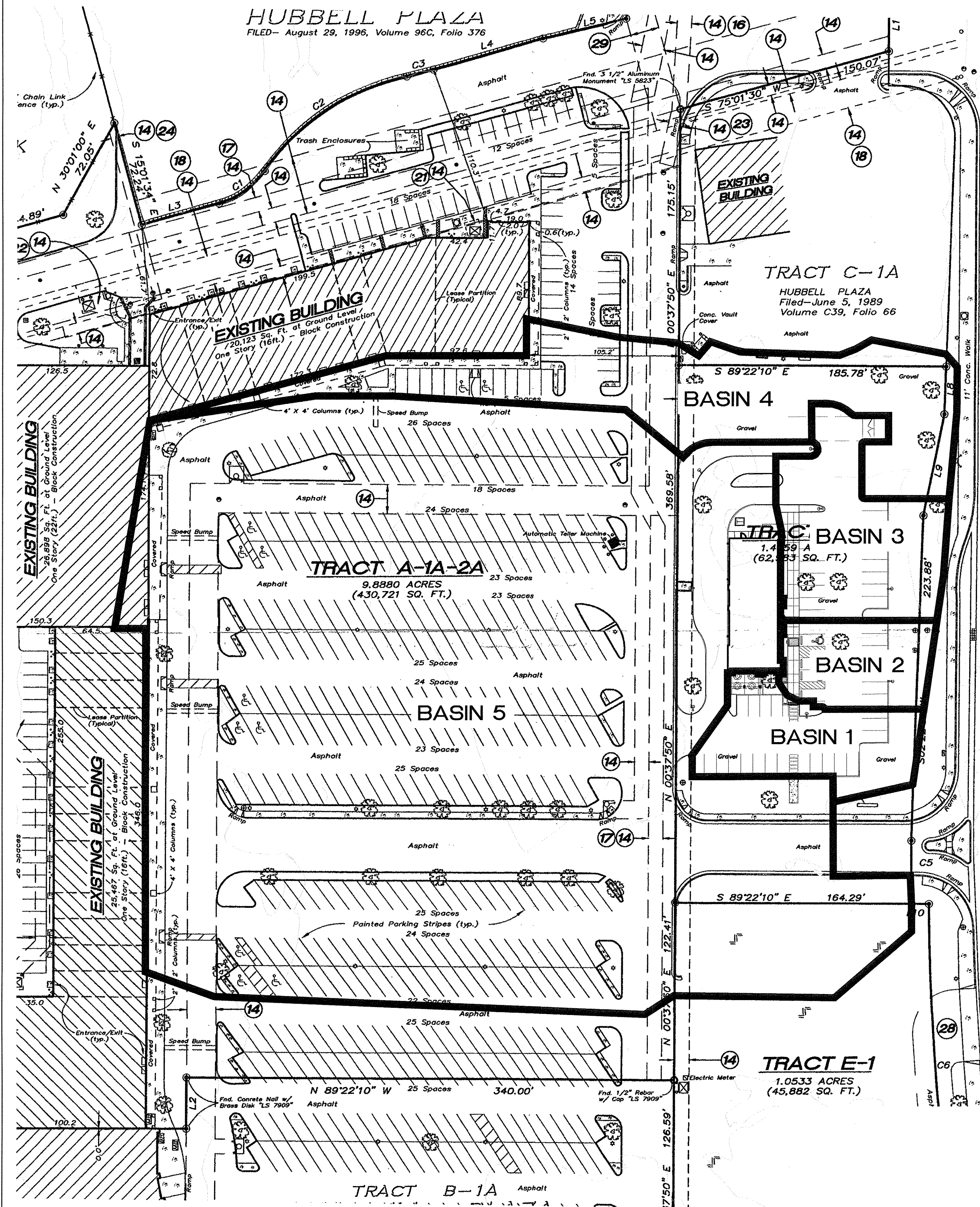
TIERRA WEST, LLC
5571 MIDWAY PARK PLACE NE
ALBUQUERQUE, NM 87109
(505) 858-3100
www.tierrawestllc.com

DRAWN BY
DY
DATE
05/11/15

SHEET #

C1

JOB #
2015036



DPM Weighted E Method

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

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	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	13,033.50	0.299	0.00047	0%	0.000	15%	0.045	0%	0.000	85%	0.254	1.775	0.044	1.20	1.087	0.027	0.77
4	24,898.85	0.572	0.00089	0%	0.000	40%	0.229	0%	0.000	60%	0.343	1.450	0.069	1.96	0.832	0.040	1.16
5	182,085.40	4.180	0.00653	0%	0.000	10%	0.418	0%	0.000	90%	3.762	1.840	0.641	17.29	1.138	0.396	11.19
Total	235,224.21	5.400	0.00844										0.805	21.83		0.494	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	1.2	Single D	7.12	Capacity OK
5	17.29	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	17.29	24" RCP @ 0.7%	20.94	Capacity OK
MH-1	17.29	24" RCP @ 0.7%	20.94	Capacity OK
Basin 1 Single D Grate	18.09	24" RCP @ 0.7%	20.94	Capacity OK
Basin 2 Underground Storage Outlet	18.67	24" RCP @ 0.7%	20.94	Capacity OK
Basin 4 Pond Inlet	1.96	12" RCP @ 4.1%	7.98	Capacity OK
Basin 3 Single D Grate	3.16	12" RCP @ 3.7%	7.58	Capacity OK

CAPACITY OF SINGLE D GRATES

L = 40" - 2(2"ends) - 70(1/2" middle bars) = 32 1/2" = 2.7083'

W = 25" - 13(1/2" middle bars) = 18.5" = 1.54'

Area = 2.7083' x 1.54' = 18 ft²

Effective Area = 4.18 - 4.18 (0.5 clogging factor) = 2.09 ft² at the grate

Orifice Equation:
Q = CA sqrt(2gh)
Q = 0.6 * 2.09 * sqrt(2 * 32.2 * 0.5)
Q = 7.12 cfs

CAPACITY OF DOUBLE D GRATE

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

W = 25" - 13(1/2" middle bars) = 18.5" = 1.54'

Area = 5.25' x 1.54' = 8.09 ft²

Effective Area = 8.09 - 8.09 (0.5 clogging factor) = 4.04 ft² at the grate

Orifice Equation:
Q = CA sqrt(2gh)
Q = 0.6 * 4.04 * sqrt(2 * 32.2 * 1.0)
Q = 19.45 cfs

MAXIMUM CAPACITY OF 24" RCP @ 0.7%

Manning Equation:
Q = (1.49/n)AR^{2/3} * sqrt(S)
Q = Discharge
n = Manning's roughness coefficient (0.013)
A = Pipe area (3.14 ft²)
R = Hydraulic Radius (0.58 ft)
S = 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 @ 4.1%

Manning Equation:
Q = (1.49/n)AR^{2/3} * sqrt(S)
Q = Discharge
n = Manning's roughness coefficient (0.013)
A = Pipe area (0.785 ft²)
R = Hydraulic Radius (0.29 ft)
S = Pipe slope (0.041 ft/ft)

Q = (1.49/0.013) * 0.785 * (0.29)^{2/3} * sqrt(0.041)
Maximum Q = 7.98 cfs

MAXIMUM CAPACITY OF 12" RCP @ 3.7%

Manning Equation:
Q = (1.49/n)AR^{2/3} * sqrt(S)
Q = Discharge
n = Manning's roughness coefficient (0.013)
A = Pipe area (0.785 ft²)
R = Hydraulic Radius (0.29 ft)
S = 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 = discharge (16.77 cfs for offsite flows of Basin 5)
C = coefficient of discharge (2.95)
L = Length of curb cut
H = Height of curb cut (0.5 ft)

16.77 = 2.95 * L * (0.5)^{3/2}
16.77 = 1.04 * L
L = 16.13 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 = discharge (0.85 cfs for onsite flows of Basin 5)
C = coefficient of discharge (2.95)
L = Length of curb cut
H = Height of curb cut (0.5 ft)

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

CURB CUT CAPACITY CALCULATIONS

ONSITE/OFFSITE FLOWS TO CURB CUT ENTERING NORTH DETENTION POND

Use weir equation:
Q = CL(H)^{3/2}
Q = discharge (1.40 cfs for flows from Basin 4, not including pond area)
C = coefficient of discharge (2.95)
L = Length of curb cut
H = Height of curb cut (0.98 ft)

1.40 = 2.95 * L * (0.98)^{3/2}
1.40 = 2.86 * L
L = 0.49 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 ft
Total impervious area = 33156.97 ft²

Total volume = 33156.97 * 0.02833 = 939.34 ft³

Retain first flush in north detention pond:
Pond Area = 6152 ft²
Depth to retain = 939.34/6152 = 0.16 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 ac-ft

Area of chambers and surrounding stone = 0.076 ac
Volume of chambers and surrounding stone = 0.076 * 6.33 = 0.48 ac-ft
Volume of only surrounding stone = 0.48 - 0.11 = 0.37 ac-ft
Volume of 30% voids in stone = 0.37 * 0.3 = 0.11 ac-ft


Total storage of volume of Stormchamber system = 0.11 + 0.11 = 0.22 ac-ft

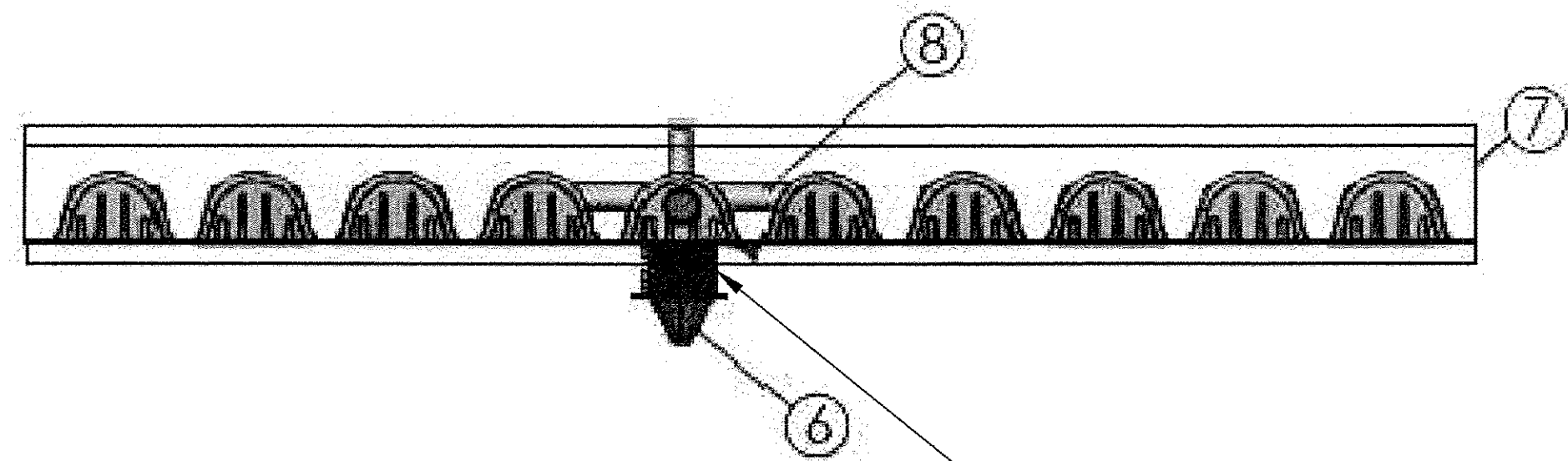
ORIFICE PLATE IN MANHOLE 2 CALCULATIONS

Orifice Equation: Q = CA sqrt(2gh)
C = 0.6
A = Orifice Area (ft²)
g = 32.2
H = Depth of water above center of orifice (ft)
Q = 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 ft²

A = pi * r²
0.0897 = pi * r²
0.02855 = r²
r = 0.169 ft
r = 2"
Use 4" dia. orifice plate

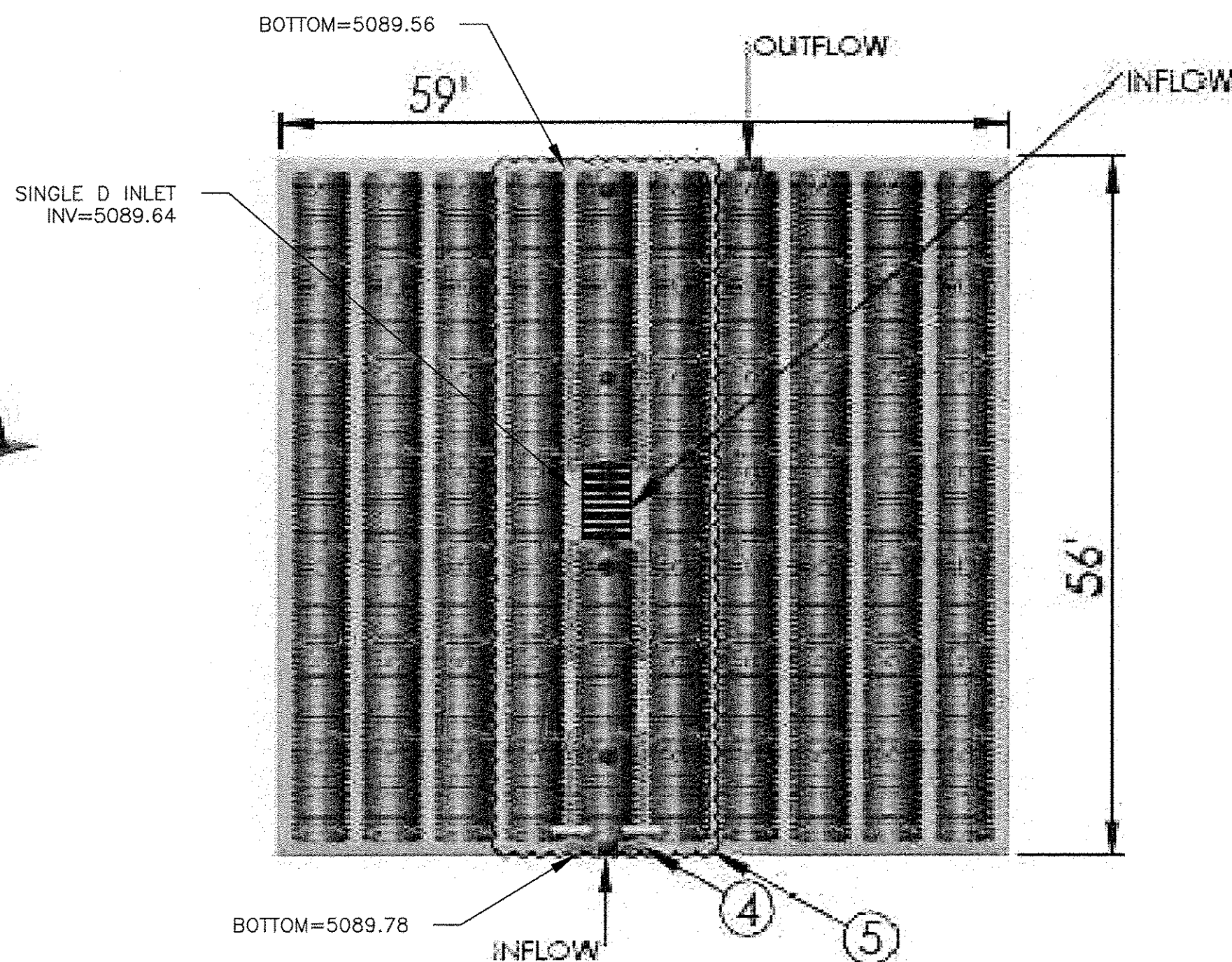
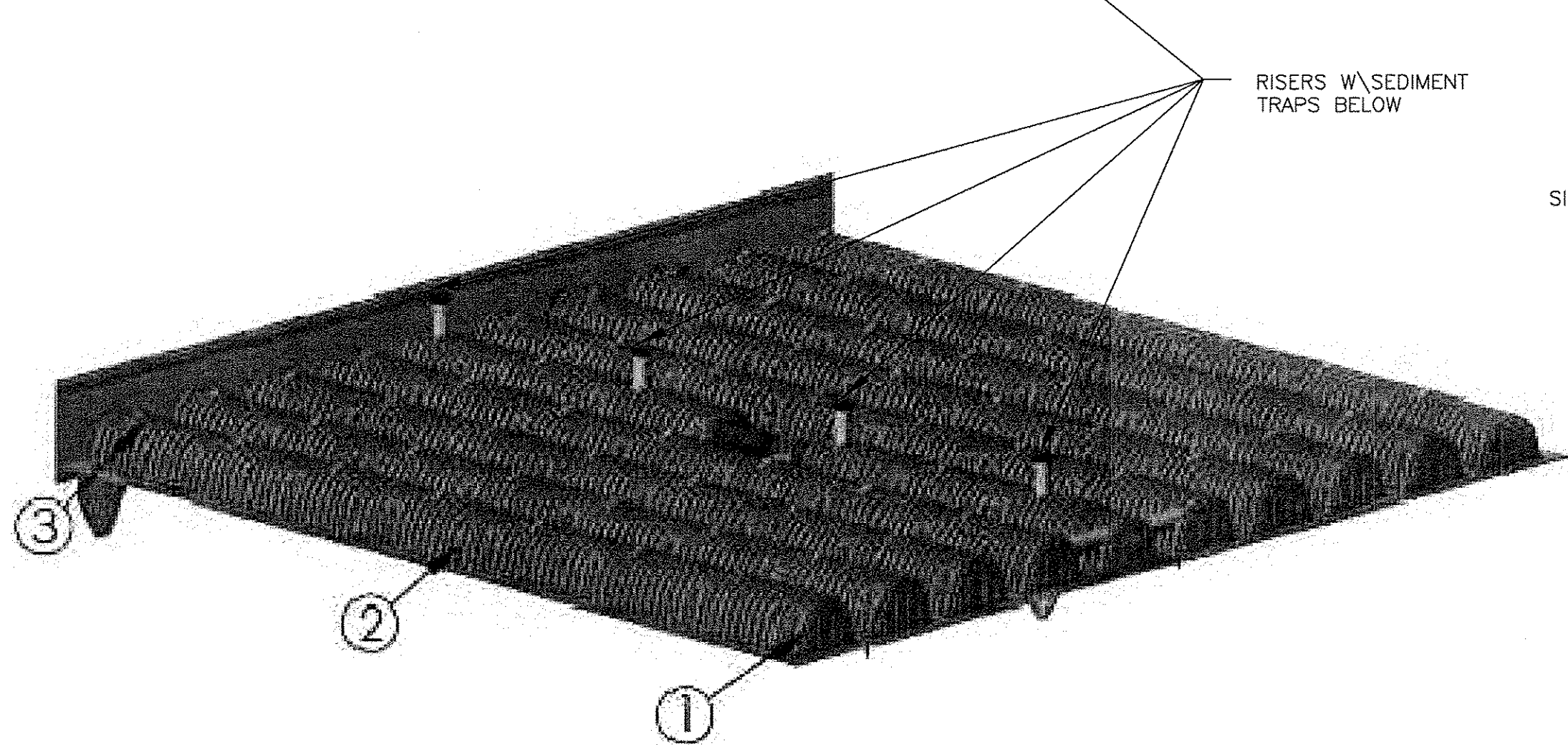
ENGINEER'S SEAL		FREDDY'S AT COORS AND CENTRAL BASIN MAP AND CALCULATIONS	DRAWN BY BJF	
			DATE 05/11/15	2015036-GRB-DETAILS
			SHEET # C2	
	RONALD R. BOHANNAN P.E. #7868		JOB # 2015036	



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

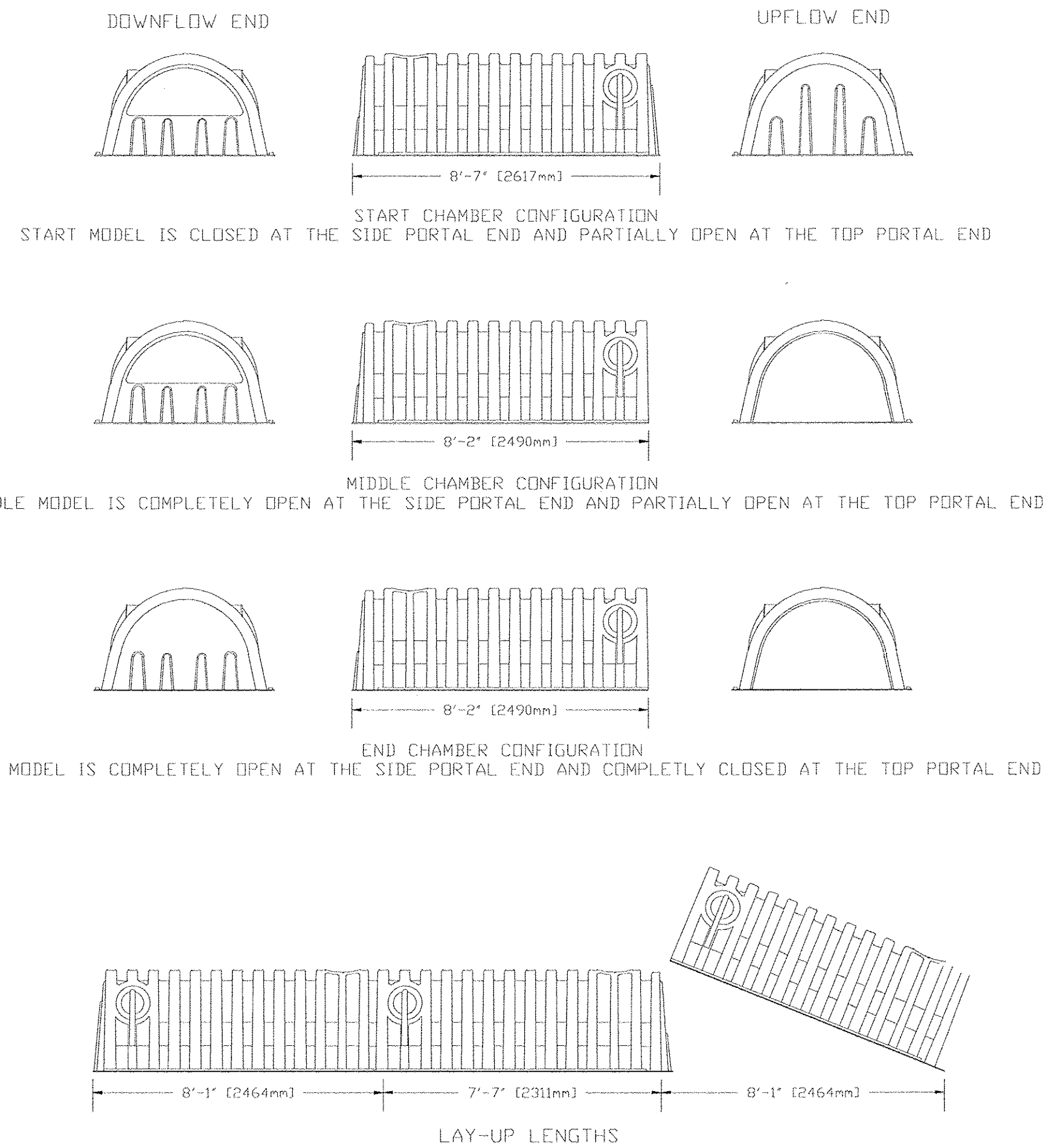
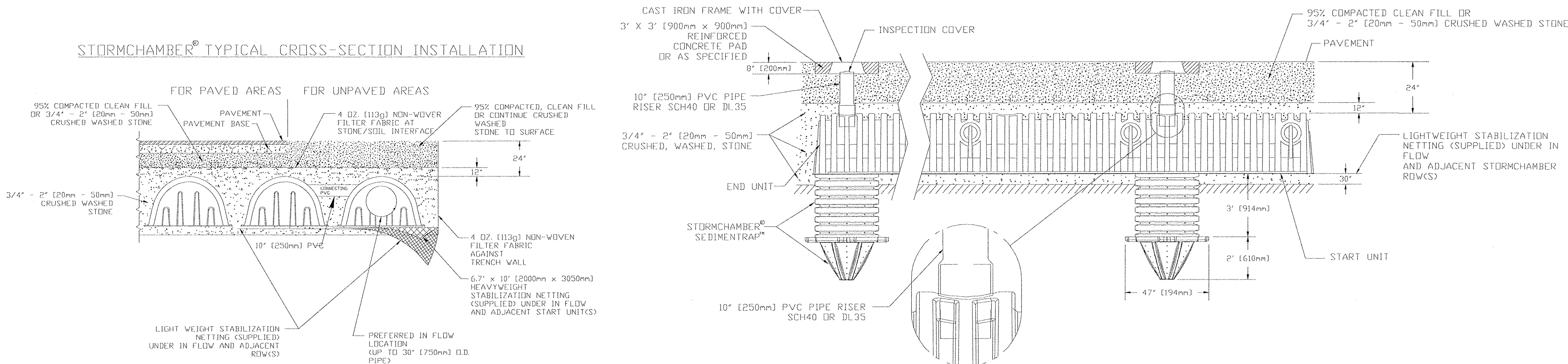
INSTALLED WITH 12" COVER STONE, 30" BASE STONE, 30% STONE VOID. INSTALLED SYSTEM VOLUME (PERIMETER STONE INCLUDED) = 9583 CF.

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

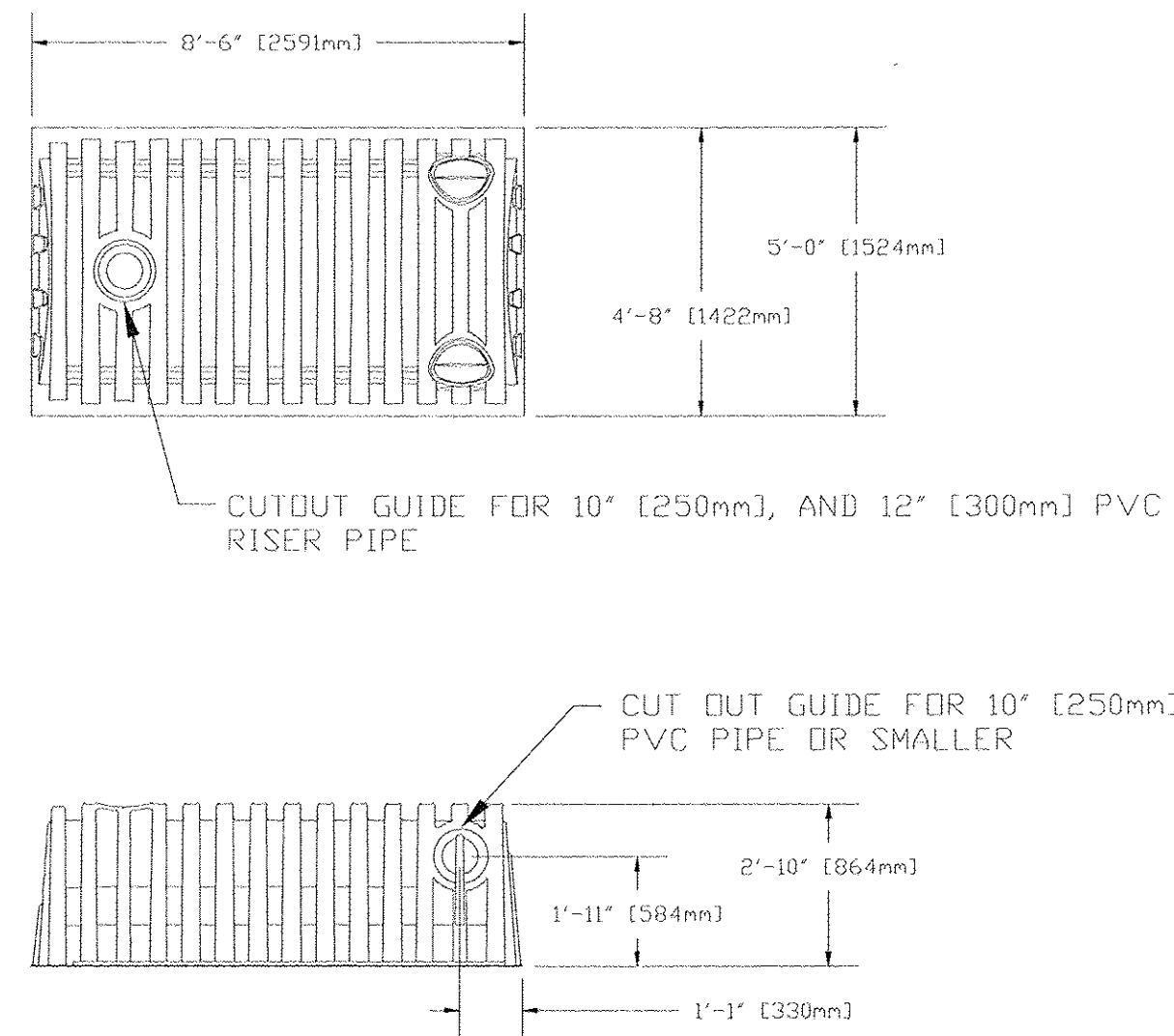


STORMCHAMBER® WITH SEDIMENTRAP™

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.



 RONALD R. BOHANNAN P.E. #7868	ENGINEER'S SEAL	FREDDY'S AT COORS AND CENTRAL	DRAWN BY BJF
		STORMCHAMBER STORAGE SYSTEM	DATE 05/11/15
		TIERRA WEST, LLC 5571 MIDWAY PARK PLACE NE ALBUQUERQUE, NM 87109 (505) 858-3100 www.tierrawestllc.com	2015036-GRB-DETAILS
			SHEET # C3 JOB # 2015036

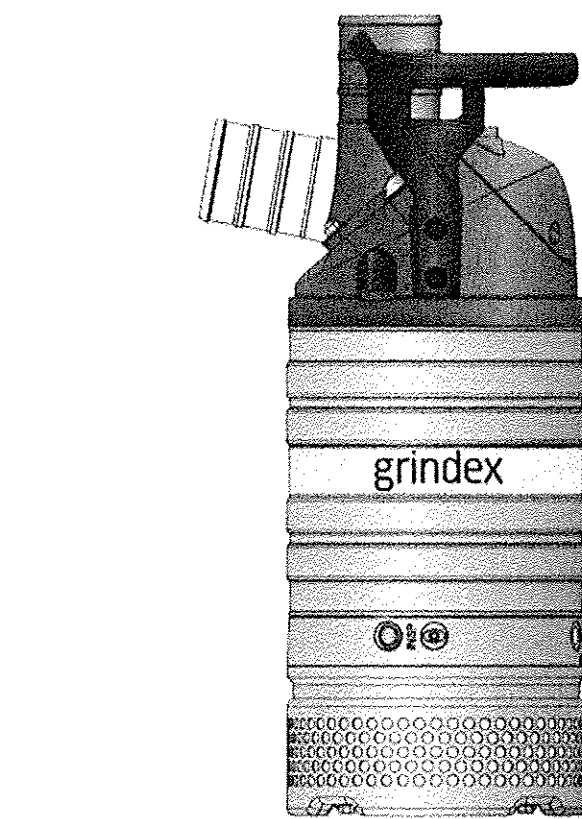
No: PD603181-INT | Revision 0 2014.02 | 60 Hz

8103.181

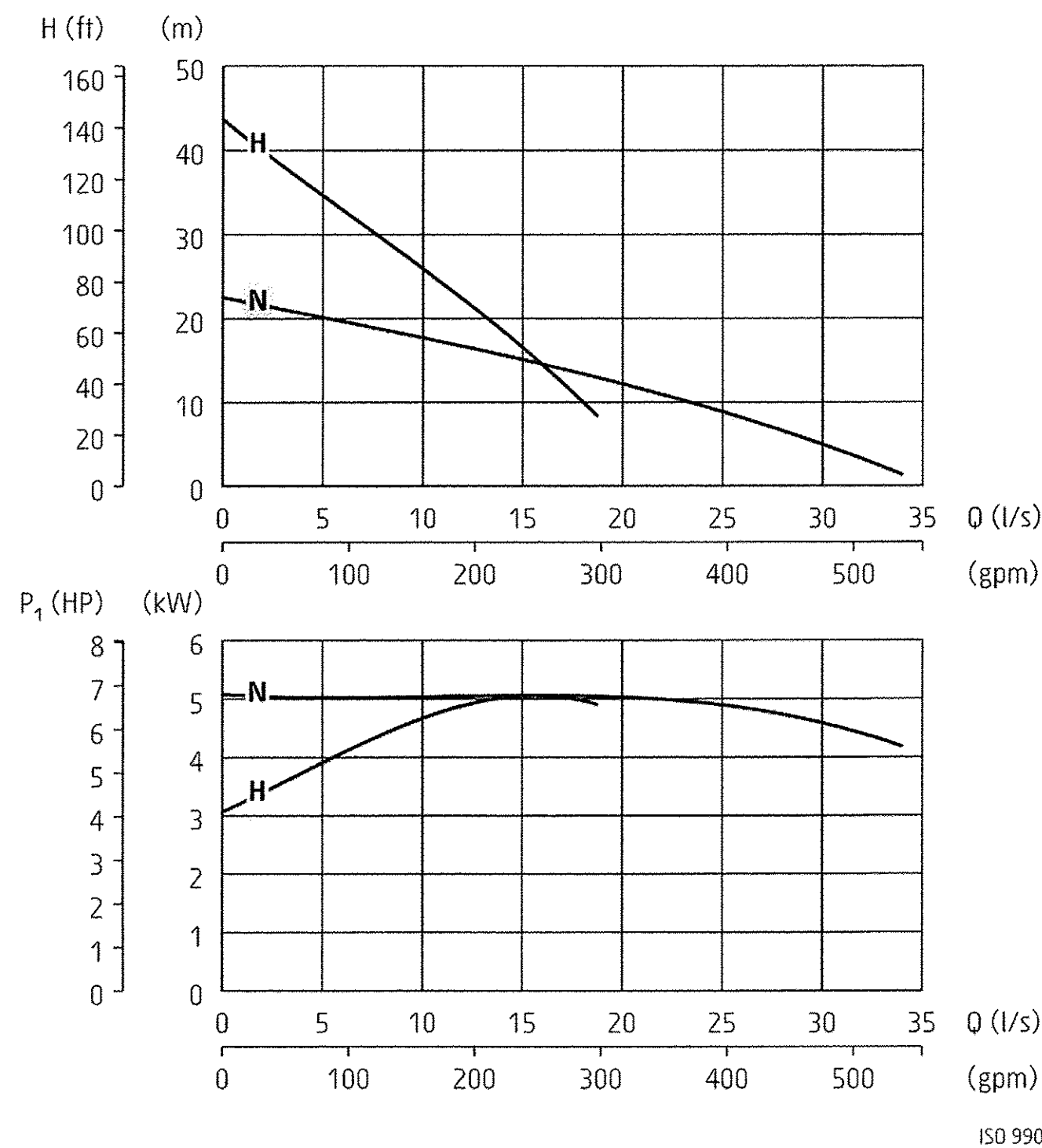
grindex

Minor

Electrical submersible drainage pump



60 Hz	N	H
Discharge connection	4"	3"
Rated power P _r [kW/HP]	4.4 / 6.0	4.4 / 6.0
Max. power consumption P _i [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

4G2,5mm², 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/m³ (68 lbs/ft³)

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

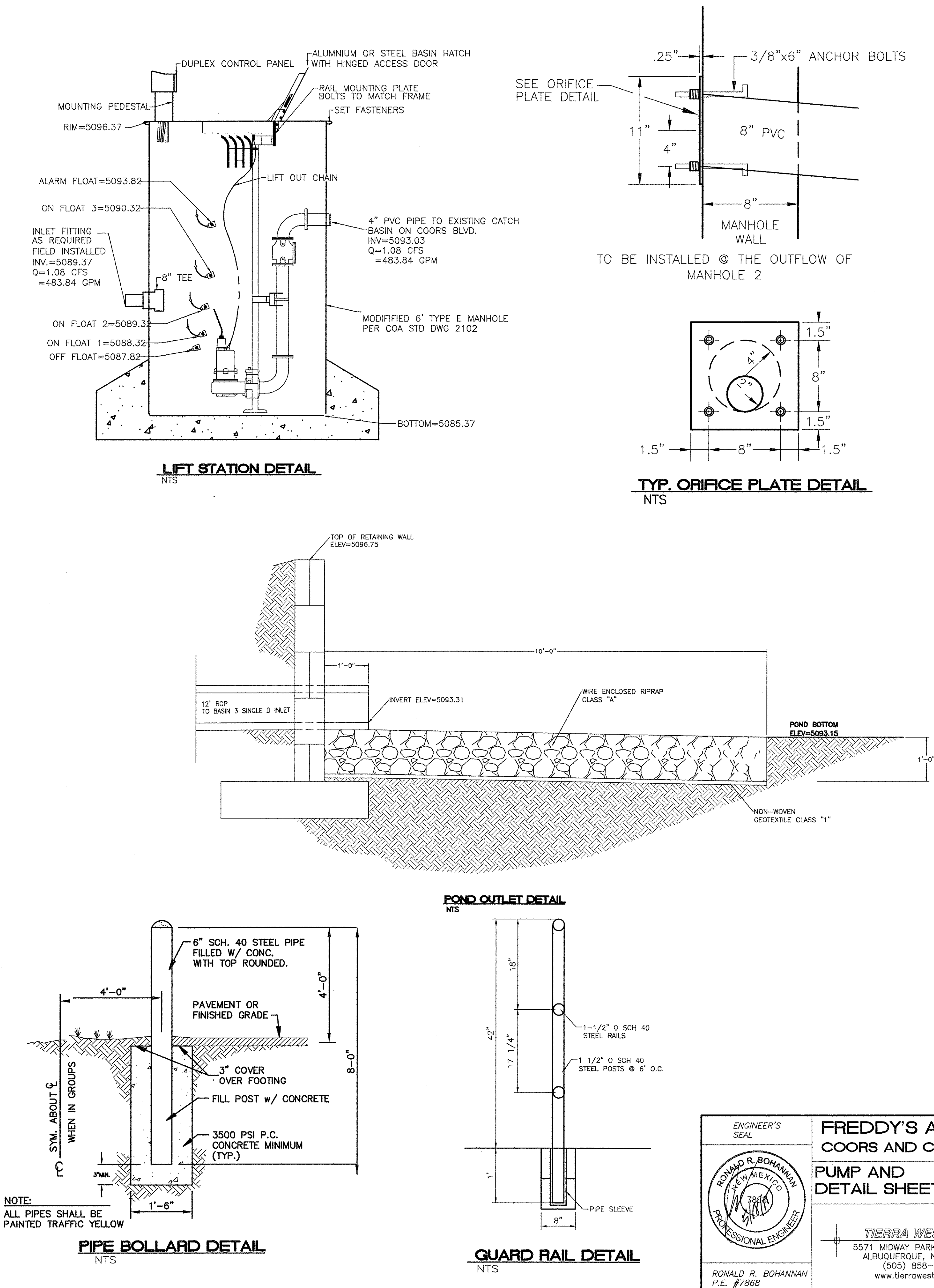
Casted parts: *Aluminium*
Outer casing: *Stainless steel*
Motor shaft: *Stainless steel*
Impeller and suction cover: *Hard-Iron™*
Diffusers: *Nitrile rubber*
Screws and nuts: *Stainless steel*
O-rings: *Nitrile rubber*

Accessories

Level regulator
Zinc anodes
Tandem connection
Low suction collar
Pump raft

GRINDEX PUMP DETAIL

NTS



<div>ENGINEER'S SEAL</div> <div></div> <div>RONALD R. BOHANNAN P.E. #7868</div>	FREDDY'S AT COORS AND CENTRAL	DRAWN BY BJF
		DATE 05/11/15
	PUMP AND DETAIL SHEET	2015036-GRB-DETAILS
	<div></div> <div>TERRA WEST, LLC 5571 MIDWAY PARK PLACE NE ALBUQUERQUE, NM 87109 (505) 858-3100 www.tierrowestllc.com</div>	SHEET # C4 JOB # 2015036