CITY OF ALBUQUERQUE

August 19, 2016

Ron Bohannan, P.E.
Tierra West, LLC
5571 Midway Park Place NE
Albuquerque, New Mexico 87109

Re: Freddy's
131 Coors Blvd NW
Requested for ~~60 Day~~ Permanent C. O. - Accepted
Engineers Stamp Date 7/7/15 (K10D001B)

Dear Mr. Bohannan,

Based on the Certification received 8/16/2016, the site is acceptable for release of Certificate of Occupancy by Hydrology.

- The Emergency Spillway appears to flow back into the pond. Per the drawings the flow was towards the NE corner of the spillway. Should the ponds every completely fill up the water may back flow into the site.

If you have any questions, you can contact me at 924-3999 or Totten Elliott at 924-3982.

Sincerely,

Abiel Carrillo, P.E.,
Principal Engineer, Planning Department
Development and Review Services

TE/AC
C: email   Cordova, Camille C.; Miranda, Rachel; Sandoval, Darlene M.; Blocker, Lois

City of Albuquerque

Planning Department
Development & Building Services Division
RAINAGE AND TRANSPORTATION INFORMATION SHEET
(REV 02/2013)

Project Title: Freddy's | City Drainage #: _____

DRB#: 1004095 | EPC#: _____ | Work Order#: _____

Legal Description: TR D-1 Plat of Hubbell Plaza

City Address: 111 Coors Blvd. NW Albuquerque, NM 87121

Engineering Firm: Tierra West, LLC | Contact: Ronald R. Bohannan

Address: 5571 Midway Park Place NE Albuquerque, NM 87109

Phone#: 505-858-3100 | Fax#: 505-858-1118 | E-mail: rrb@tierrawestllc.com

Owner: Oak Realty Partners, Inc. | Contact: Michael Bushell

Address: 5975 S Quebec Street, Suite 141 Greenwood Village, CO 80111

Phone#: 303-318-0100 | 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)
- [X] 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
- [X] CERTIFICATE OF OCCUPANCY (PERM)
- ___ CERTIFICATE OF OCCUPANCY (TCL TEMP)
- ___ FOUNDATION PERMIT APPROVAL
- ___ BUILDING PERMIT APPROVAL
- ___ GRADING PERMIT APPROVAL   ___ SO-19 APPROVAL
- ___ PAVING PERMIT APPROVAL   ___ ESC PERMIT APPROVAL
- ___ WORK ORDER APPROVAL   ___ ESC CERT. ACCEPTANCE
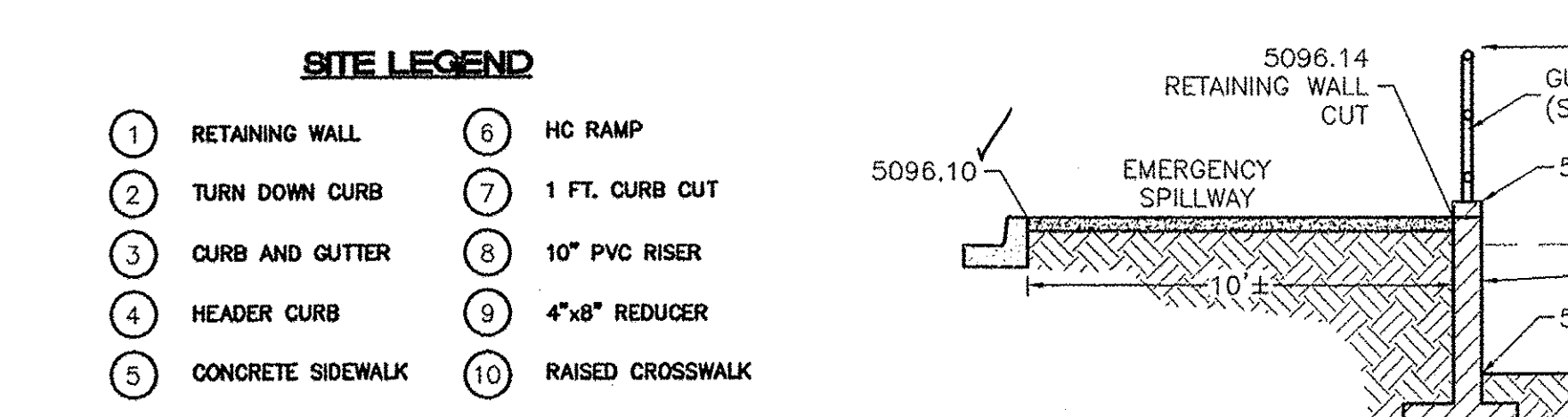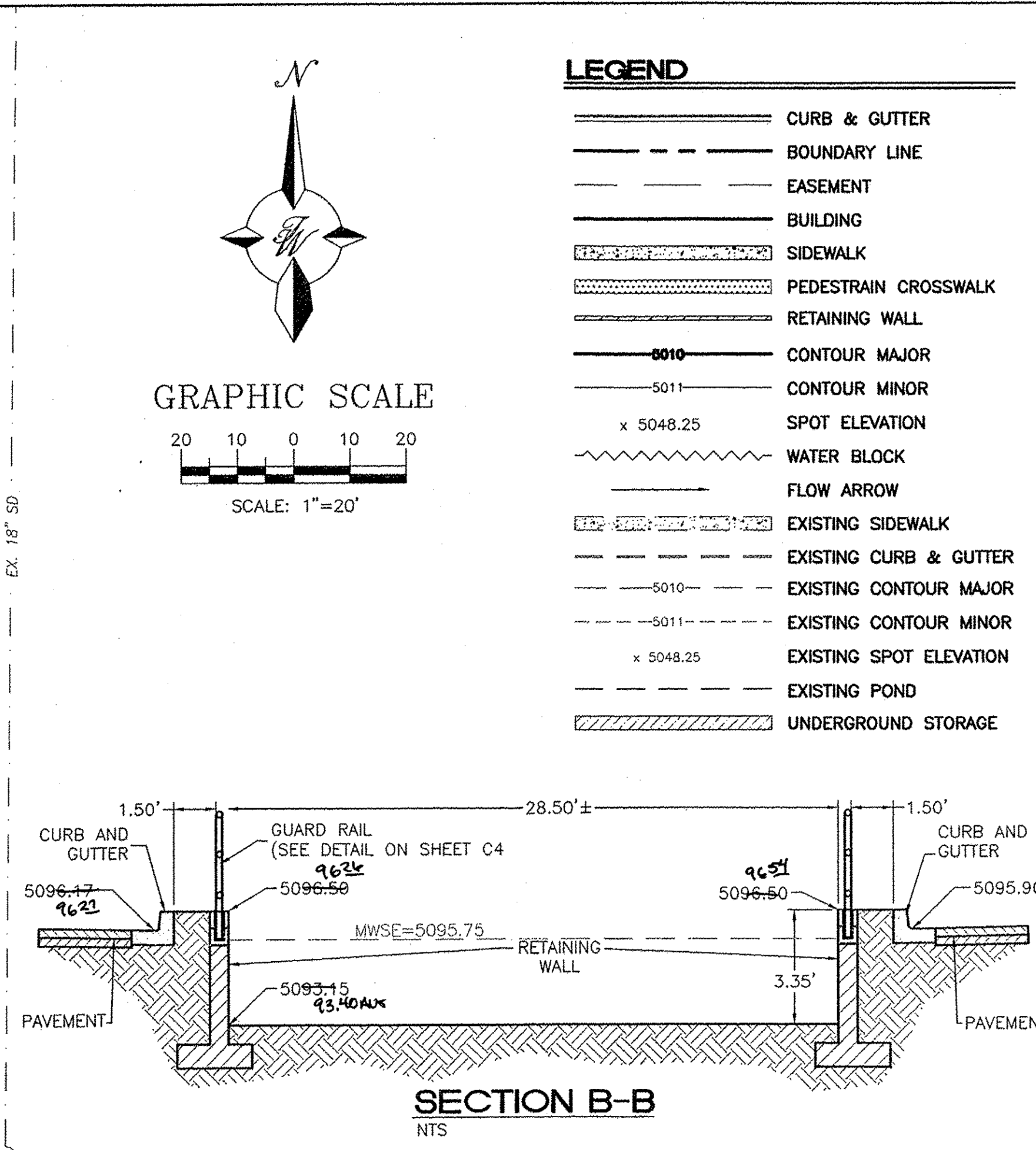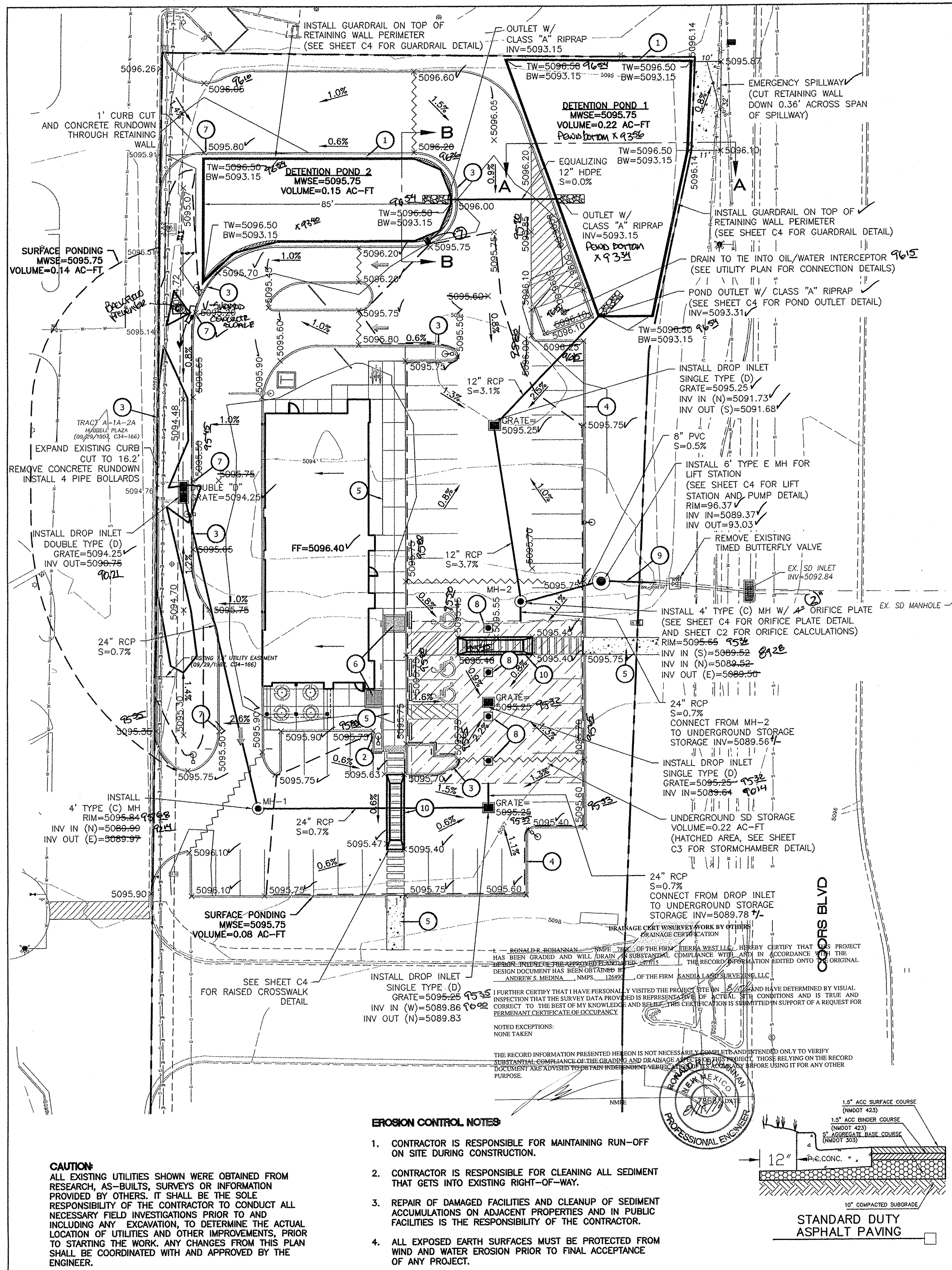- ___ GRADING CERTIFICATION   ___ OTHER (SPECIFY)

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

DATE SUBMITTED: 8/15/16 | By: BF for RRB

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 followin

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

LEGEND

————	CURB & GUTTER
————	BOUNDARY LINE
————	EASEMENT
————	BUILDING
▨▨▨	SIDEWALK
▨▨▨	PEDESTRAIN CROSSWALK
▨▨▨	RETAINING WALL
—5010—	CONTOUR MAJOR
—5011—	CONTOUR MINOR
x 5048.25	SPOT ELEVATION
∿∿∿	WATER BLOCK
→	FLOW ARROW
— — —	EXISTING SIDEWALK
— — —	EXISTING CURB & GUTTER
—5010—	EXISTING CONTOUR MAJOR
—5011—	EXISTING CONTOUR MINOR
x 5048.25	EXISTING SPOT ELEVATION
▨▨	EXISTING POND
▨▨▨	UNDERGROUND STORAGE

GRAPHIC SCALE

20 10 0 10 20

SCALE: 1"=20'

ZONE AH (EL 5083)
ZONE AH (EL 5097)
SITE

SECTION B-B
NTS

1.50' 28.50'± 1.50'
CURB AND GUTTER — GUARD RAIL (SEE DETAIL ON SHEET C4) — CURB AND GUTTER
MWSE=5095.75
RETAINING WALL
5093.15
3.35'
PAVEMENT

SECTION A-A
NTS

VARIES 1.50'
5096.14 RETAINING WALL CUT
GUARD RAIL (SEE DETAIL ON SHEET C4)
CURB AND GUTTER
5096.10
EMERGENCY SPILLWAY
MWSE=5095.75
RETAINING WALL
5093.15
3.35'
PAVEMENT 5096.20

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	10	RAISED CROSSWALK

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 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 east 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 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 calulations, 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
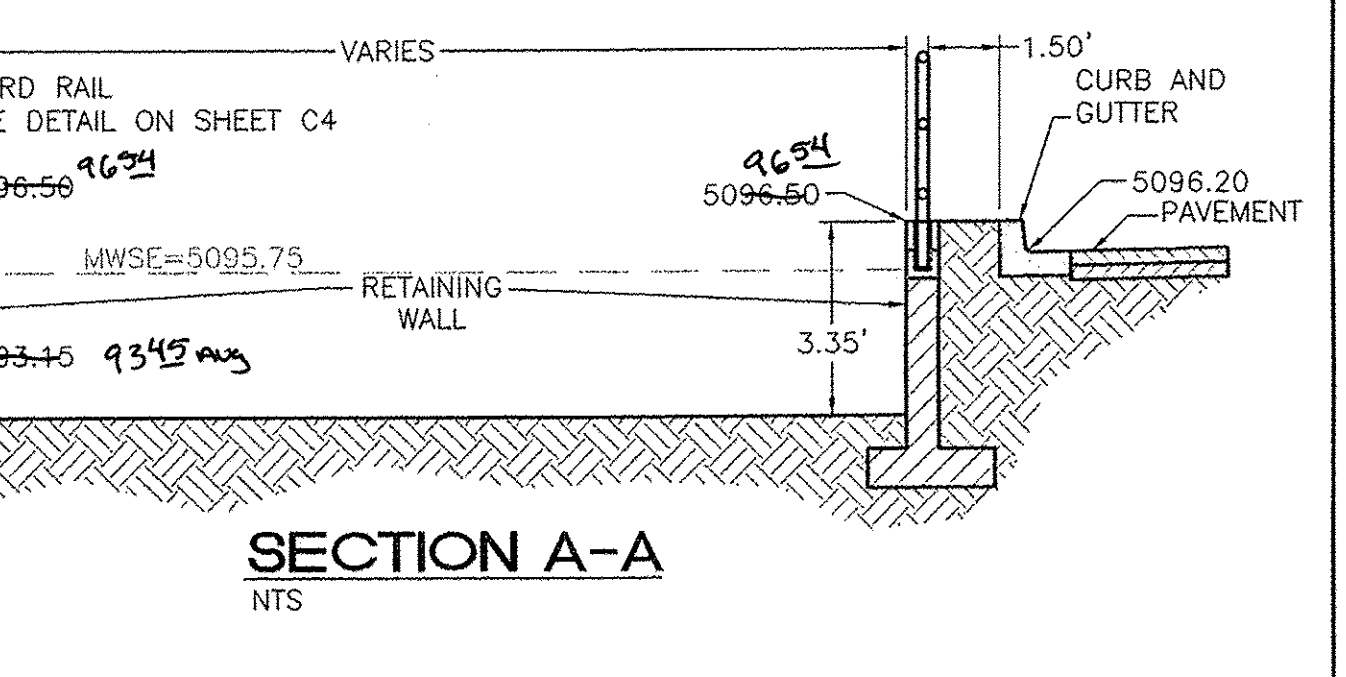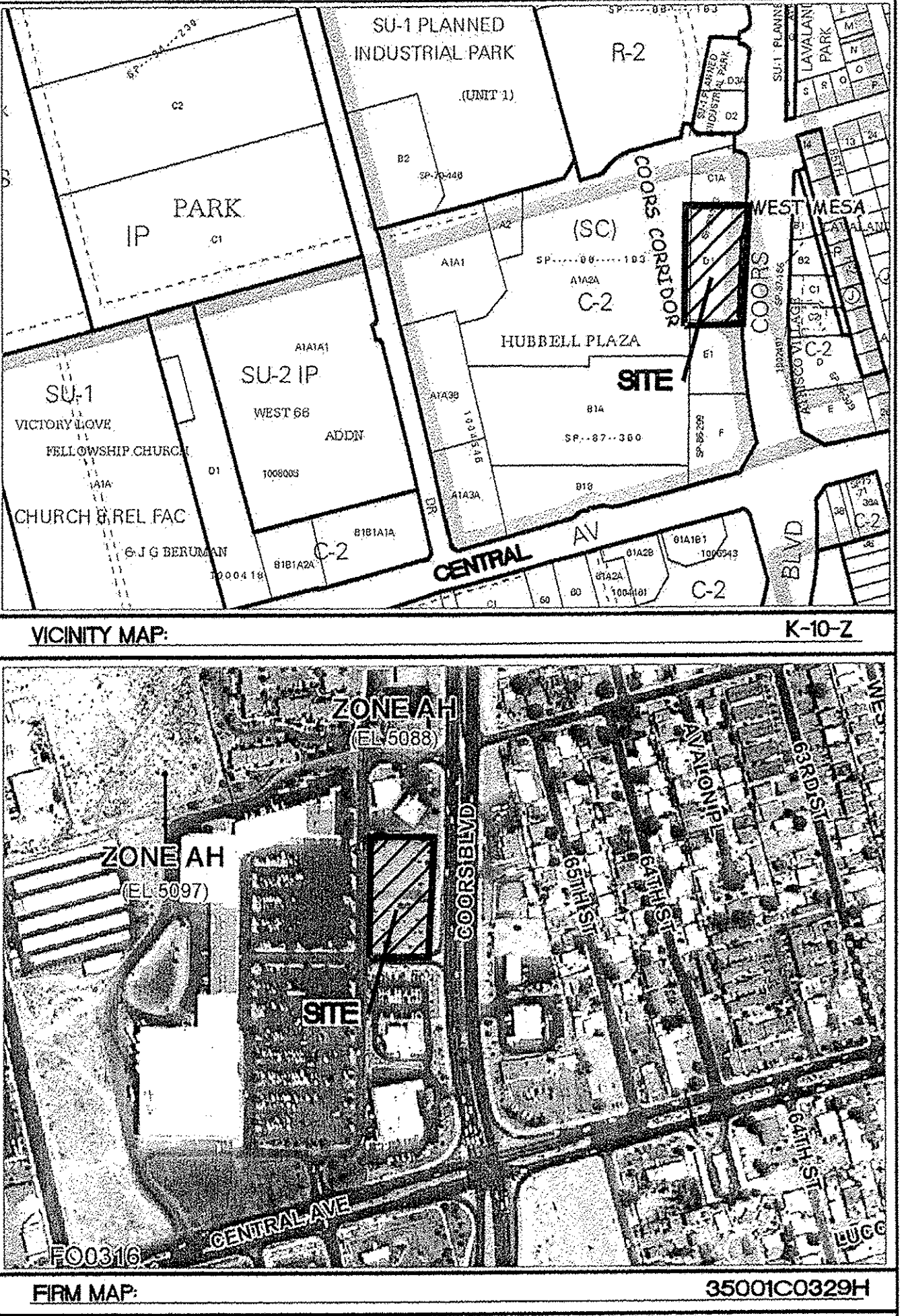
NOTICE TO CONTRACTORS

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 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		

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.
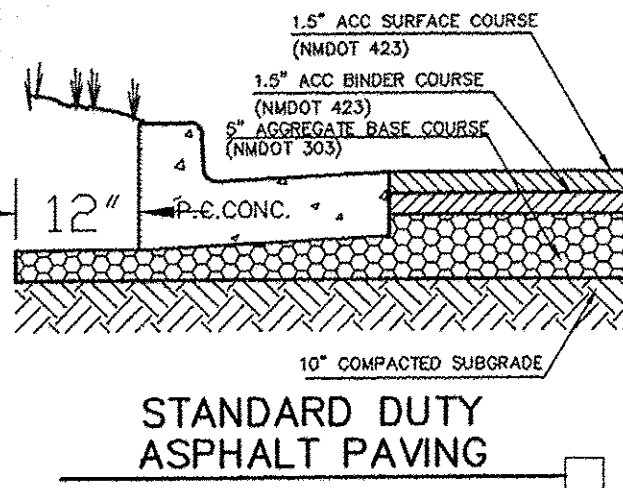
CAUTION:

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.

STANDARD DUTY ASPHALT PAVING

1.5" ACC SURFACE COURSE (NMDOT 423)
1.5" ACC BINDER COURSE (NMDOT 423)
6" AGGREGATE BASE COURSE (NMDOT 303)
12"
P.C. CONC.
10" COMPACTED SUBGRADE

Title Block

FREDDY'S AT COORS AND CENTRAL
GRADING AND DRAINAGE PLAN

ENGINEER'S SEAL

RONALD R. BOHANNAN, P.E. #7868

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

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DATE: 7/07/15
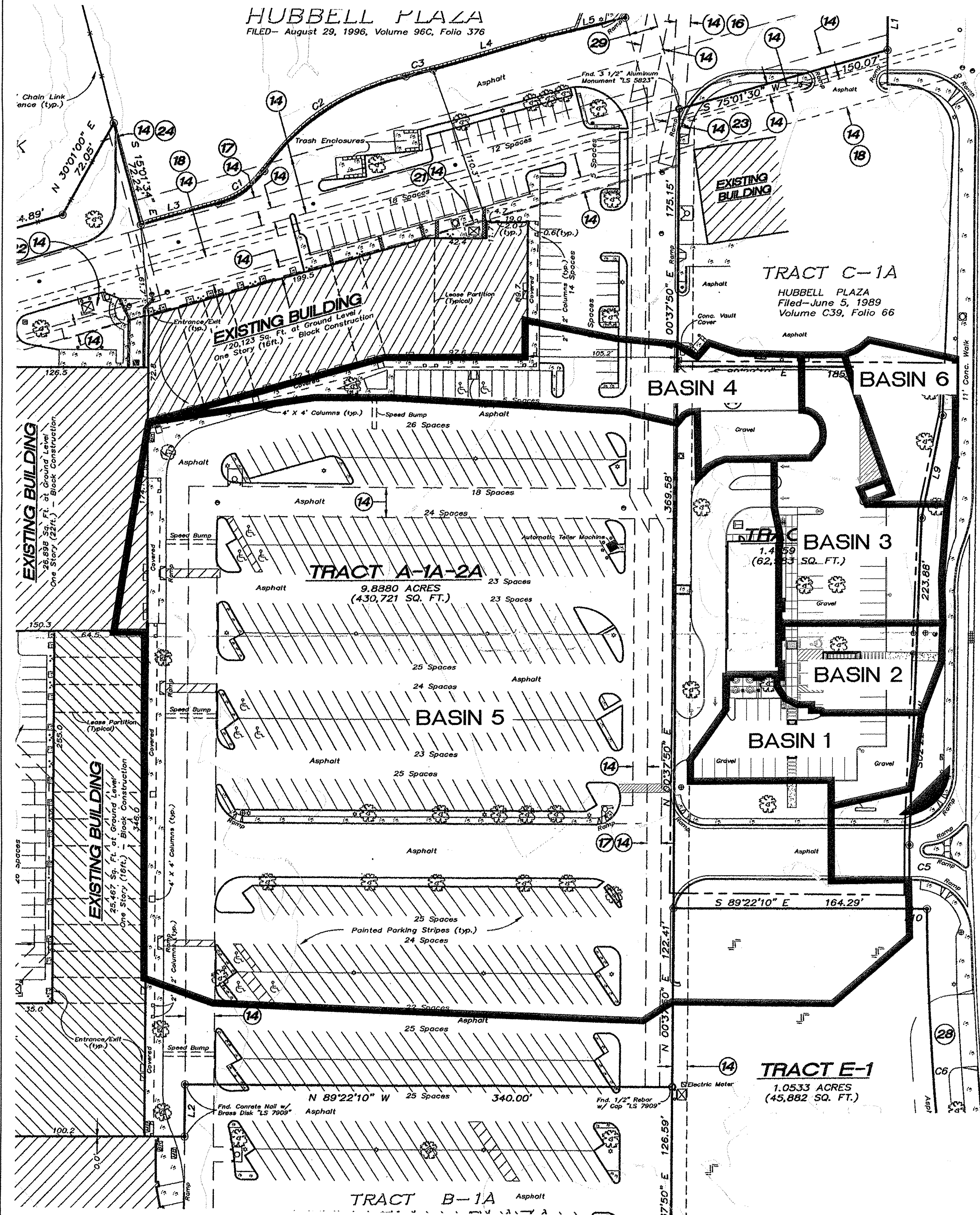2015036-GRE
SHEET #: C1
JOB #: 2015036

Plan annotations

INSTALL GUARDRAIL ON TOP OF RETAINING WALL PERIMETER (SEE SHEET C4 FOR GUARDRAIL DETAIL)

OUTLET W/ CLASS "A" RIPRAP INV=5093.15

EMERGENCY SPILLWAY (CUT RETAINING WALL DOWN 0.36' ACROSS SPAN OF SPILLWAY)

DETENTION POND 1
MWSE=5095.75
VOLUME=0.22 AC-FT
Pond Bottom x 93%

DETENTION POND 2
MWSE=5095.75
VOLUME=0.15 AC-FT

TW=5096.50
BW=5093.15

EQUALIZING 12" HDPE S=0.0%

OUTLET W/ CLASS "A" RIPRAP INV=5093.15
Pond Bottom X 9394

INSTALL GUARDRAIL ON TOP OF RETAINING WALL PERIMETER (SEE SHEET C4 FOR GUARDRAIL DETAIL)

DRAIN TO TIE INTO OIL/WATER INTERCEPTOR (SEE UTILITY PLAN FOR CONNECTION DETAILS)

POND OUTLET W/ CLASS "A" RIPRAP (SEE SHEET C4 FOR POND OUTLET DETAIL) INV=5093.31

TW=5096.50
BW=5093.15

SURFACE PONDING
MWSE=5095.75
VOLUME=0.14 AC-FT

1' CURB CUT AND CONCRETE RUNDOWN THROUGH RETAINING WALL

FF=5096.40

INSTALL DROP INLET SINGLE TYPE (D)
GRATE=5095.25
INV IN (N)=5091.73
INV OUT (S)=5091.68

8" PVC S=0.5%

INSTALL 6' TYPE E MH FOR LIFT STATION (SEE SHEET C4 FOR LIFT STATION AND PUMP DETAIL)
RIM=96.37
INV IN=5089.37
INV OUT=93.03

REMOVE EXISTING TIMED BUTTERFLY VALVE

EX. SD INLET INV=5092.84

12" RCP S=3.1%
12" RCP S=3.7%

GRATE=5095.25

TRACT A-1A-2A HUBBELL PLAZA (08/25/1993, C34-166)
EXPAND EXISTING CURB CUT TO 16.2'
REMOVE CONCRETE RUNDOWN INSTALL 4 PIPE BOLLARDS

INSTALL DROP INLET DOUBLE TYPE (D)
GRATE=5094.25
INV OUT=5090.75

DOUBLE "D" GRATE=5094.25

INSTALL 4' TYPE (C) MH W/ 4" ORIFICE PLATE (SEE SHEET C4 FOR ORIFICE PLATE DETAIL AND SHEET C2 FOR ORIFICE CALCULATIONS)
RIM=5095.65
INV IN (S)=5089.52
INV IN (N)=5089.52
INV OUT (E)=5089.50

MH-2

24" RCP S=0.7%

24" RCP S=0.7% CONNECT FROM MH-2 TO UNDERGROUND STORAGE INV=5089.56

INSTALL DROP INLET SINGLE TYPE (D)
GRATE=5095.25
INV IN=5089.64

UNDERGROUND SD STORAGE
VOLUME=0.22 AC-FT
(HATCHED AREA, SEE SHEET C3 FOR STORMCHAMBER DETAIL)

24" RCP S=0.7% CONNECT FROM DROP INLET TO UNDERGROUND STORAGE STORAGE INV=5089.78

MH-1
INSTALL 4' TYPE (C) MH
RIM=5095.84
INV IN (N)=5089.90
INV OUT (E)=5089.97

SURFACE PONDING
MWSE=5095.75
VOLUME=0.08 AC-FT

INSTALL DROP INLET SINGLE TYPE (D)
GRATE=5095.25
INV IN (W)=5089.86
INV OUT (N)=5089.83

COORS BLVD

SEE SHEET C4 FOR RAISED CROSSWALK DETAIL

EX. 18" SD

EX. SD MANHOLE

Drainage Certification

RONALD R. BOHANNAN ... OF THE FIRM TIERRA WEST LLC... HEREBY CERTIFY THAT THIS PROJECT HAS BEEN GRADED AND WILL DRAIN IN SUBSTANTIAL COMPLIANCE WITH, AND IN ACCORDANCE WITH THE DESIGN INTENT OF, THE APPROVED PLANS AND... THE RECORD INFORMATION EDITED ONTO THE ORIGINAL DESIGN DOCUMENT HAS BEEN OBTAINED BY... ANDREW S. MEDINA ... NMPS... 12649... OF THE FIRM SANDIA LAND SURVEYING, LLC...

I FURTHER CERTIFY THAT I HAVE PERSONALLY VISITED THE PROJECT SITE ON... AND HAVE DETERMINED BY VISUAL INSPECTION THAT THE SURVEY DATA PROVIDED IS REPRESENTATIVE OF ACTUAL SITE CONDITIONS AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. THIS CERTIFICATION IS SUBMITTED IN SUPPORT OF A REQUEST FOR PERMANENT CERTIFICATE OF OCCUPANCY.

NOTED EXCEPTIONS: NONE TAKEN

THE RECORD INFORMATION PRESENTED HEREON IS NOT NECESSARILY COMPLETE AND INTENDED ONLY TO VERIFY SUBSTANTIAL COMPLIANCE OF THE GRADING AND DRAINAGE FOR THIS PROJECT. THOSE RELYING ON THE RECORD DOCUMENT ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION OF ITS ACCURACY BEFORE USING IT FOR ANY OTHER PURPOSE.

DRAINAGE CERT W/SURVEY WORK BY OTHERS
DRAINAGE CERTIFICATION

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 %	(acres)	Treatment B %	(acres)	Treatment C %	(acres)	Treatment D %	(acres)	Weighted E	Volume (ac-ft)	Flow cfs	Weighted E	Volume (ac-ft)	Flow cfs
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 %	(acres)	Treatment B %	(acres)	Treatment C %	(acres)	Treatment D %	(acres)	Weighted E	Volume (ac-ft)	Flow cfs	Weighted E	Volume (ac-ft)	Flow cfs
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

CAPACITY OF SINGLE D GRATES

L = 40" - 2(2"ends) - 7(½" middle bars)
= 32 ½"
= 2.7083'

W = 25" - 13(½" middle bars)
= 18.5"
= 1.54'

Area = 2.7083' x 1.54'
= 18 ft^2

Effective Area = 4.18- 4.18 (0.5 clogging factor)
= 2.09 ft^2 at the grate

Orifice Equation:
$Q = CA \sqrt{2gH}$
$Q = 0.6 \times 2.09 \sqrt{2 \times 32.2 \times 0.5}$
$Q = 7.12$ cfs

CAPACITY OF DOUBLE D GRATE

L = 80" - 2(2"ends) - 14(½" middle bars) - 6" (center piece)
= 63"
= 5.25'

W = 25" - 13(½" middle bars)
= 18.5"
= 1.54'

Area = 5.25' x 1.54'
= 8.09 ft^2

Effective Area = 8.09- 8.09 (0.5 clogging factor)
= 4.04 ft^2 at the grate

Orifice Equation:
$Q = CA \sqrt{2gH}$
$Q = 0.6 \times 4.04 \sqrt{2 \times 32.2 \times 1.0}$
$Q = 19.45$ cfs

MAXIMUM CAPACITY OF EQUALIZING 12" HDPE

Orifice Equation: $Q = CA \sqrt{2gH}$
C = 0.6
A = Orifice Area (0.785 ft^2)
G = 32.2 ft^2/s
H = Depth of water above center of orifice (2.1 ft)
Q = Flow (cfs)
$Q = 0.6 \times 0.785 \sqrt{2 \times 32.2 \times 2.1}$
Maximum Q = 5.48 cfs

MAXIMUM CAPACITY OF 24" RCP @ 0.7%

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

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

MAXIMUM CAPACITY OF 12" RCP @ 3.1%

Manning Equation:
$Q = (1.49/n)AR^{(\frac{2}{3})} \cdot \sqrt{S}$
Q = Discharge
n = Manning's roughness coefficient (0.013)
A = Pipe area (0.785 ft2)
R = Hydraulic Radius (0.29 ft)
S = Pipe slope (0.031 ft/ft)

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

MAXIMUM CAPACITY OF 12" RCP @ 3.7%

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

$Q = (1.49/0.013) \times 0.785 \times (0.29)^{2/3} \times \sqrt{(0.037)}$
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)

$16.77 = 2.95 \times L \times (0.5)^{3/2}$
$16.77 = 1.04 \times L$
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)

$0.85 = 2.95 \times L \times (0.5)^{3/2}$
$0.85 = 1.04 \times L$
L = 0.82 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 = discharge (1.22 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)

$1.22 = 2.95 \times L \times (0.98)^{3/2}$
$1.22 = 2.86 \times L$
L = 0.43 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 ft^2

Total volume = 33156.97 * 0.02833 = 939.34 ft^3

Retain first flush in north detention pond:
Pond Area = 6179 ft^2
Depth to retain = 939.34/6179 = 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

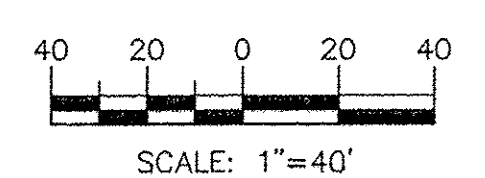Total storage of volume of Stormchamber system = 0.11 + 0.11 = 0.22 ac-ft

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)

$Q = CA\sqrt{2gH}$
$1.08 = 0.6 \times A \times \sqrt{2 \times 32.2 \times 6.25}$
$1.08 = 12.037$ A
A = 0.0897 ft^2

$A = \pi \times r^2$
$0.0897 = \pi \times r^2$
$0.02855 = r^2$
r = 0.169 ft
r = 2"
Use 4" dia. orifice plate

GRAPHIC SCALE

40 20 0 20 40

SCALE: 1"=40'

ENGINEER'S SEAL

RONALD R. BOHANNAN
NEW MEXICO
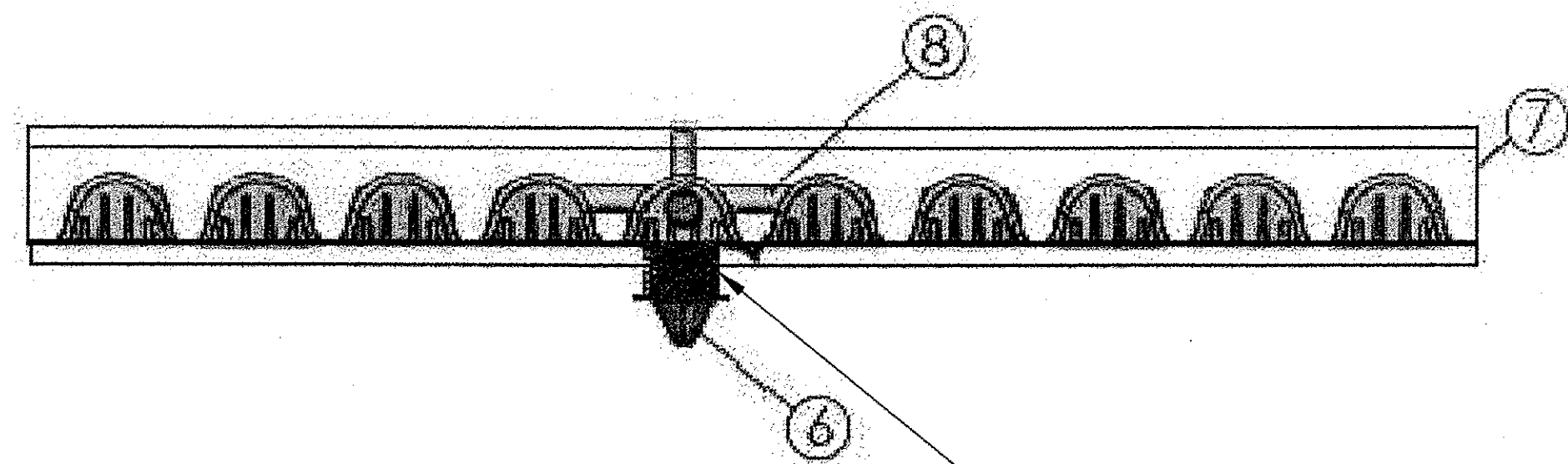PROFESSIONAL ENGINEER

RONALD R. BOHANNAN
P.E. #7868

FREDDY'S AT COORS AND CENTRAL
BASIN MAP AND CALCULATIONS

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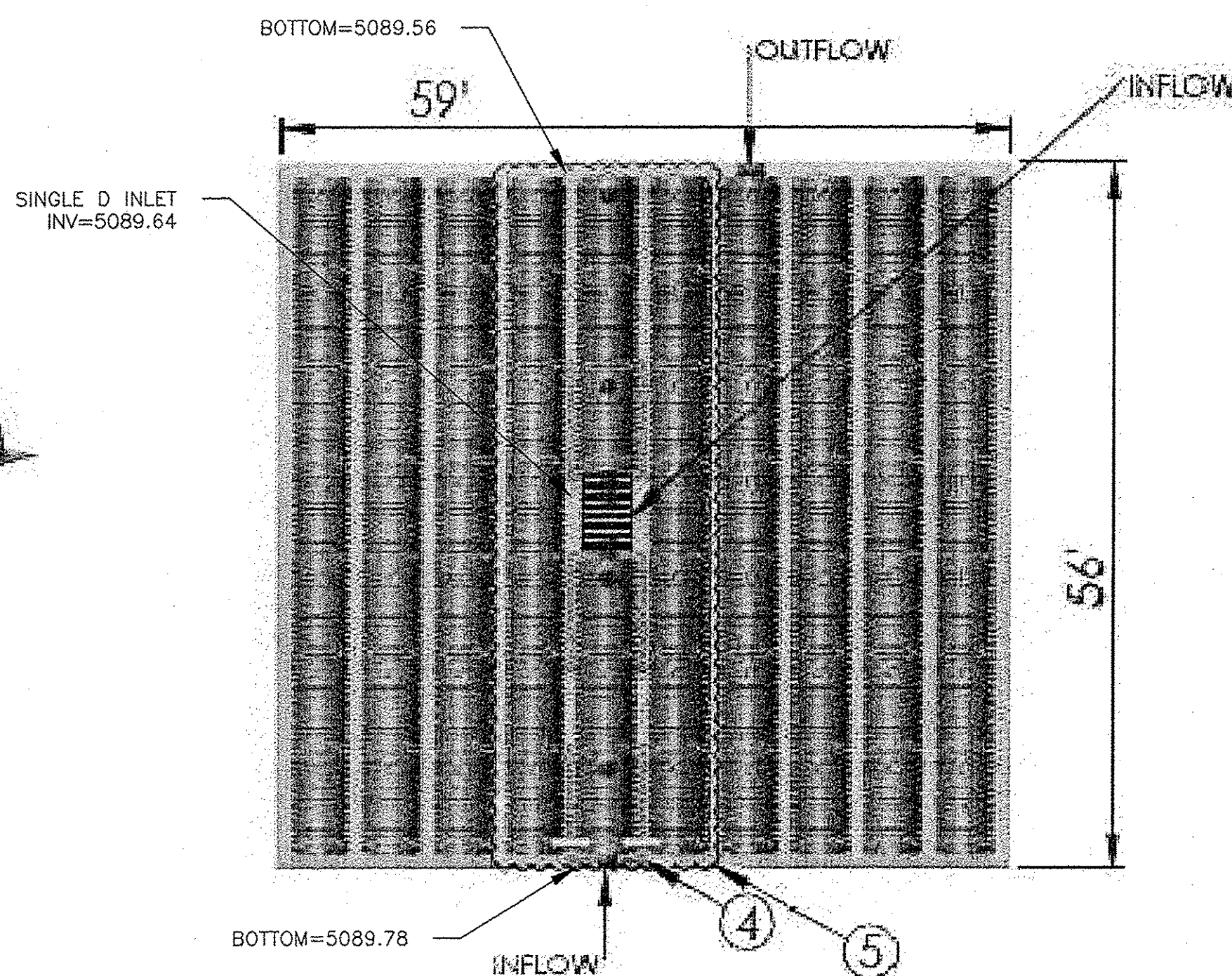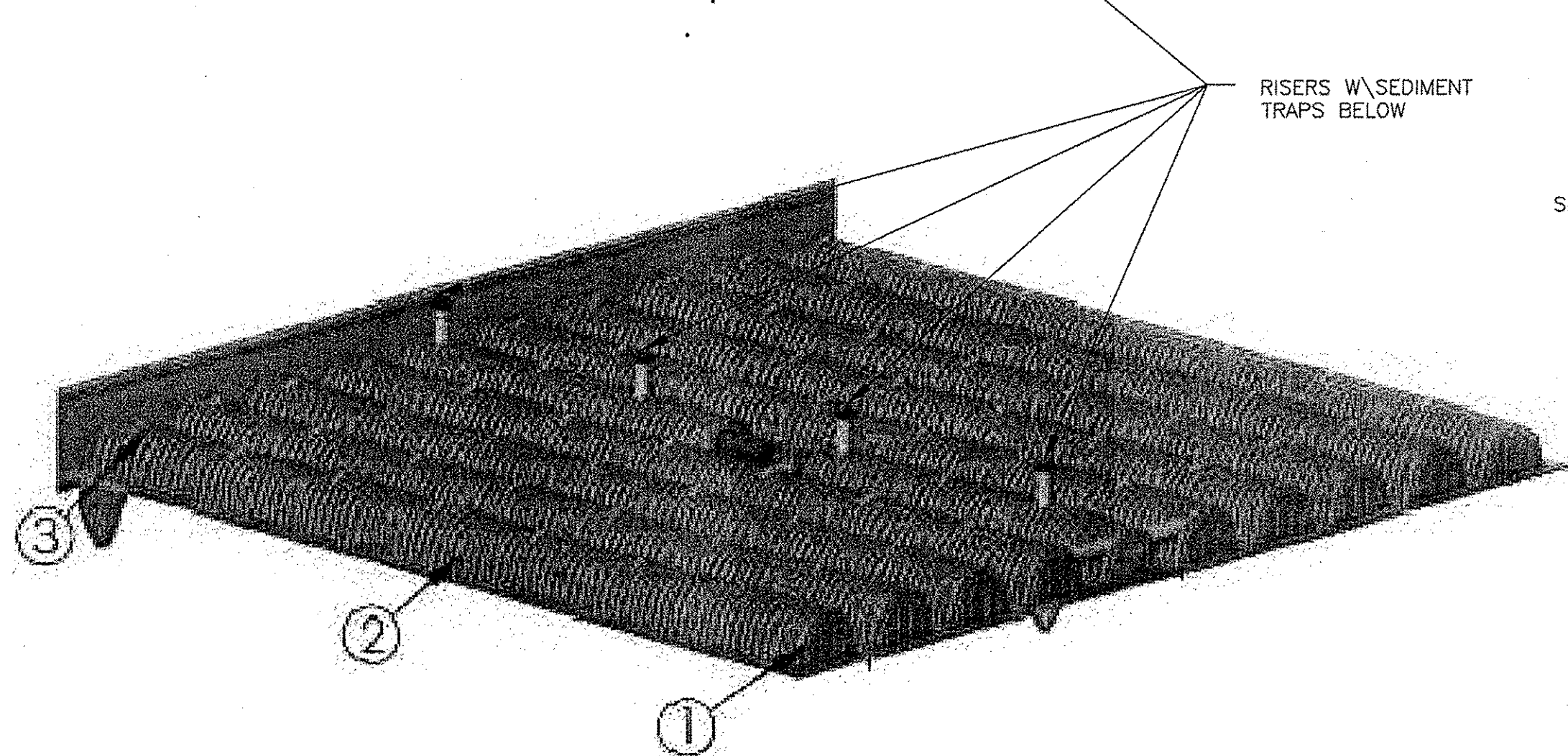ALBUQUERQUE, NM 87109
(505) 858-3100
www.tierrawestllc.com

DRAWN BY: BJF
DATE: 07/07/15
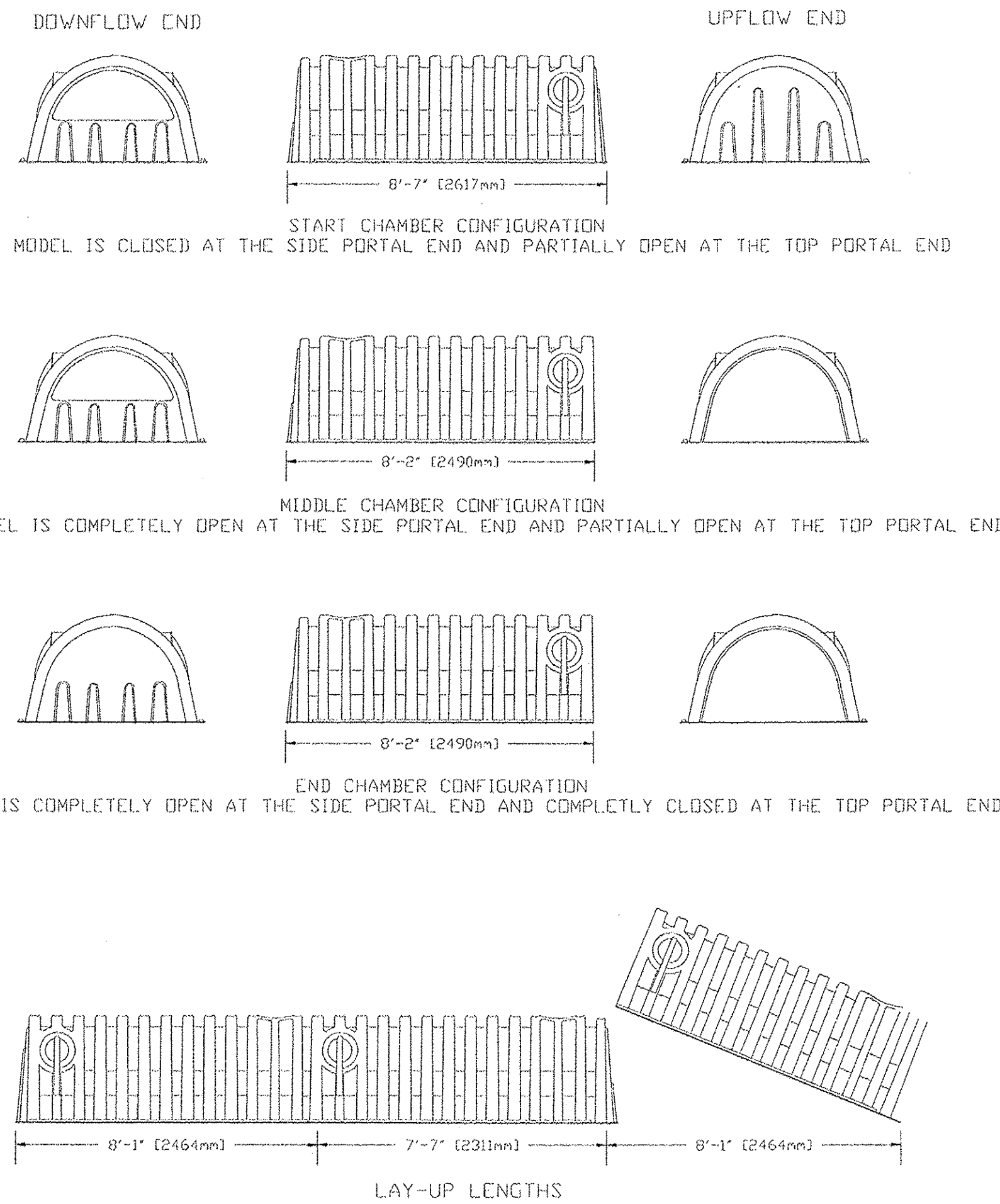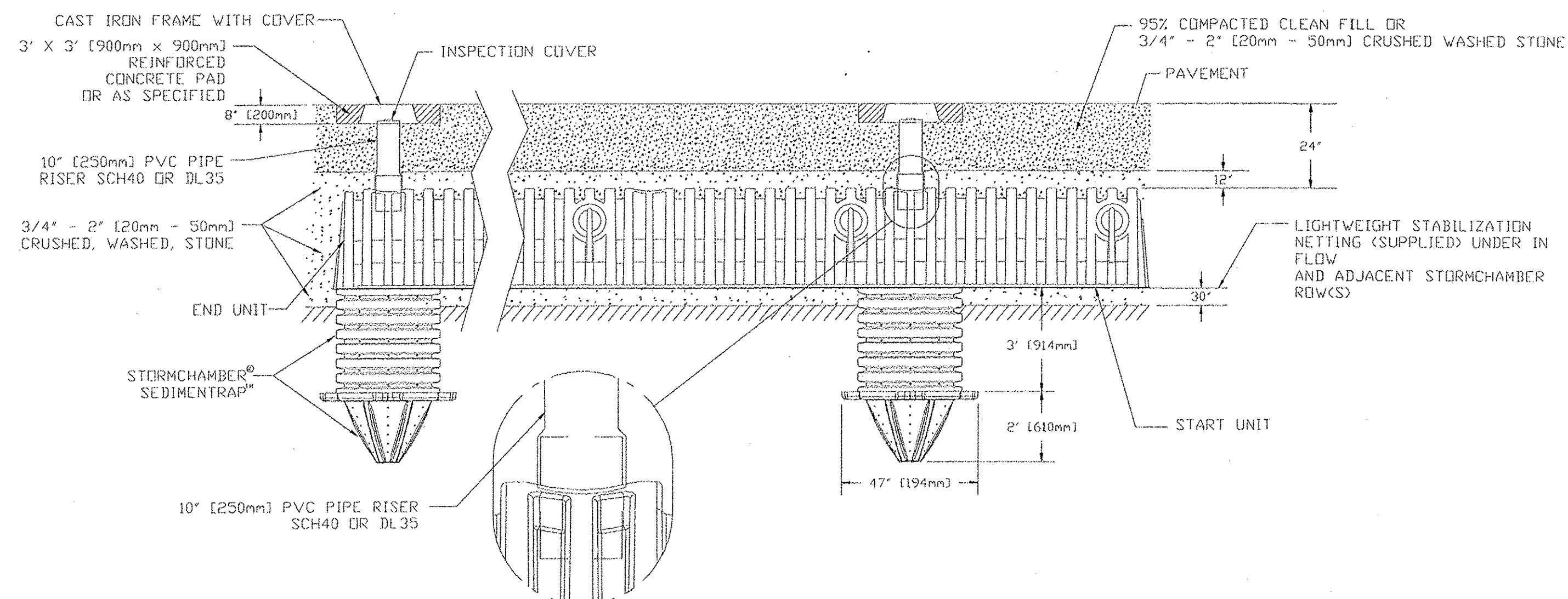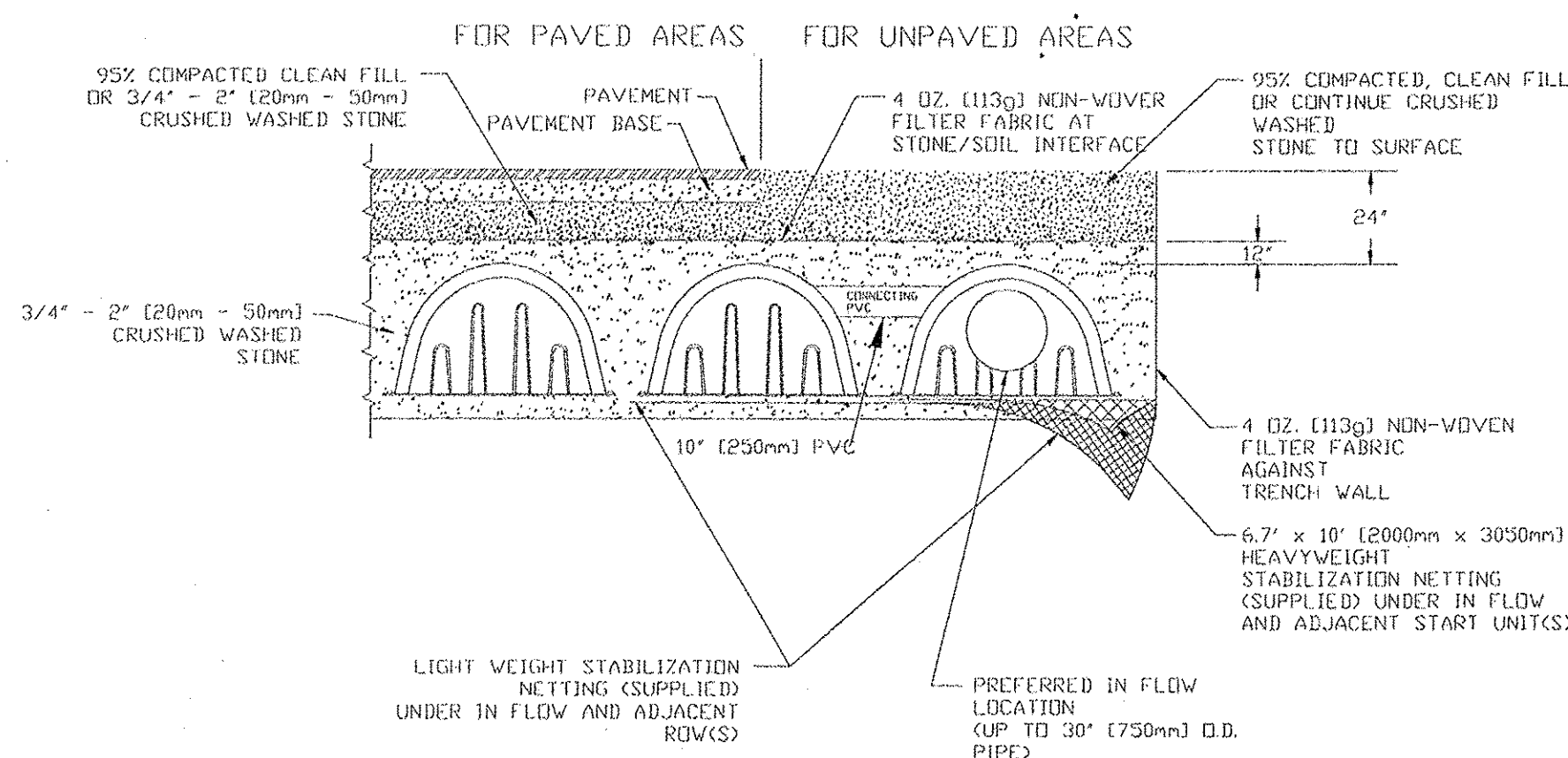2015036-GRB-DETAILS

SHEET #: C2

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.	

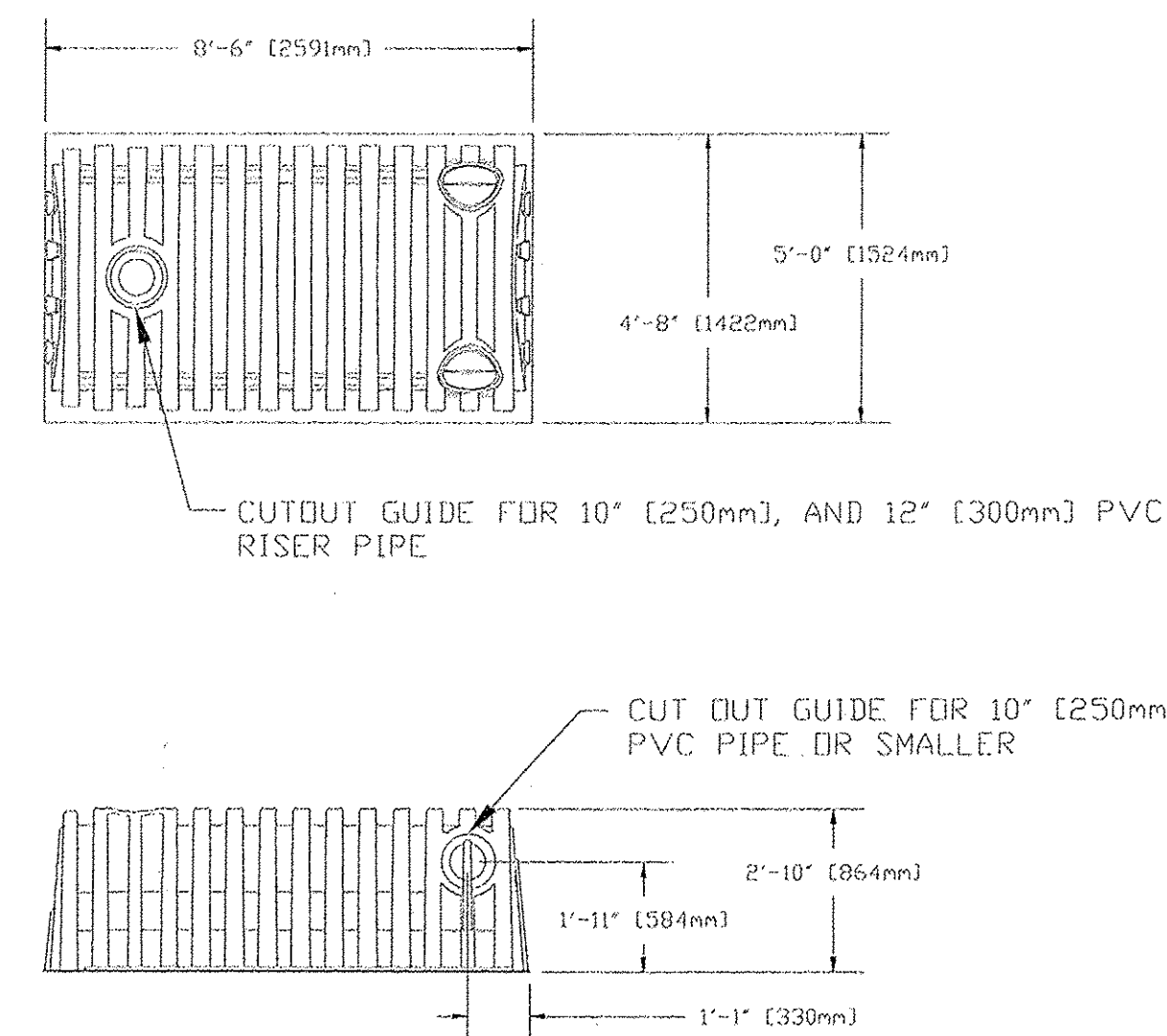**TOTAL # OF CHAMBERS (START, MIDDLE, AND END UNITS) = 69**

DOWNFLOW END

UPFLOW END

8'-7" (2617mm)

START CHAMBER CONFIGURATION
START MODEL IS CLOSED AT THE SIDE PORTAL END AND PARTIALLY OPEN AT THE TOP PORTAL END

8'-2" (2490mm)

MIDDLE CHAMBER CONFIGURATION
MIDDLE MODEL IS COMPLETELY OPEN AT THE SIDE PORTAL END AND PARTIALLY OPEN AT THE TOP PORTAL END

8'-2" (2490mm)

END CHAMBER CONFIGURATION
END MODEL IS COMPLETELY OPEN AT THE SIDE PORTAL END AND COMPLETLY CLOSED AT THE TOP PORTAL END

8'-1" (2464mm) 7'-7" (2311mm) 8'-1" (2464mm)

LAY-UP LENGTHS

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.

RISERS W\SEDIMENT TRAPS BELOW

BOTTOM=5089.56

OUTFLOW

INFLOW

59'

56'

SINGLE D INLET INV=5089.64

BOTTOM=5089.78

INFLOW

STORMCHAMBER® WITH SEDIMENTRAP™

8'-6" (2591mm)

5'-0" (1524mm)

4'-8" (1422mm)

CUTOUT GUIDE FOR 10" [250mm], AND 12" [300mm] PVC RISER PIPE

CUT OUT GUIDE FOR 10" [250mm] PVC PIPE OR SMALLER

2'-10" (864mm)

1'-11" (584mm)

1'-1" (330mm)

STORMCHAMBER® TYPICAL CROSS-SECTION INSTALLATION

FOR PAVED AREAS   FOR UNPAVED AREAS

95% COMPACTED CLEAN FILL OR 3/4" - 2" [20mm - 50mm] CRUSHED WASHED STONE

PAVEMENT
PAVEMENT BASE

4 OZ. [113g] NON-WOVEN FILTER FABRIC AT STONE/SOIL INTERFACE

95% COMPACTED, CLEAN FILL OR CONTINUE CRUSHED WASHED STONE TO SURFACE

CONNECTING

24"

12"

3/4" - 2" [20mm - 50mm] CRUSHED WASHED STONE

10" [250mm] PVC

4 OZ. [113g] NON-WOVEN FILTER FABRIC AGAINST TRENCH WALL

6.7' x 10' [2000mm x 3050mm] HEAVYWEIGHT STABILIZATION NETTING (SUPPLIED) UNDER IN FLOW AND ADJACENT START UNIT(S)

LIGHT WEIGHT STABILIZATION NETTING (SUPPLIED) UNDER IN FLOW AND ADJACENT ROW(S)

PREFERRED IN FLOW LOCATION (UP TO 30" [750mm] O.D. PIPE)

CAST IRON FRAME WITH COVER
3' X 3' (900mm x 900mm) REINFORCED CONCRETE PAD OR AS SPECIFIED

INSPECTION COVER

95% COMPACTED CLEAN FILL OR 3/4" - 2" [20mm - 50mm] CRUSHED WASHED STONE

PAVEMENT

10" [250mm] PVC PIPE RISER SCH40 OR DL35

8" [200mm]

3/4" - 2" [20mm - 50mm] CRUSHED, WASHED, STONE

END UNIT

STORMCHAMBER® SEDIMENTRAP™

10" [250mm] PVC PIPE RISER SCH40 OR DL35

24"

12"

LIGHTWEIGHT STABILIZATION NETTING (SUPPLIED) UNDER IN FLOW AND ADJACENT STORMCHAMBER ROW(S)

30"

3' (914mm)

2' [610mm]

START UNIT

4.7" [194mm]

"FOR INFORMATION ONLY"

H (ft)   (m)

160 50
140 40
120
100 30
80
60   20
40
20   10
0   0

0   5   10   15   20   25   30   35   Q (l/s)

0   100   200   300   400   500   (gpm)

P₁ (HP) (kW)

8   6
7   5
6
5   4
4   3
3
2   2
1   1
0   0

0   5   10   15   20   25   30   35   Q (l/s)

0   100   200   300   400   500   (gpm)

ISO 9906/A

60 Hz	N	H
Discharge connection	4"	3"
Rated power P₁ [kW/HP]	4.4 / 6.0	4.4 / 6.0
Max. power consumption P₁ [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 / 30¼	768 / 30¼
Diameter [mm/inch]	286 / 11¼	286 / 11¼
Weight [kg/lbs]	50 / 110	50 / 110

Other voltages on request
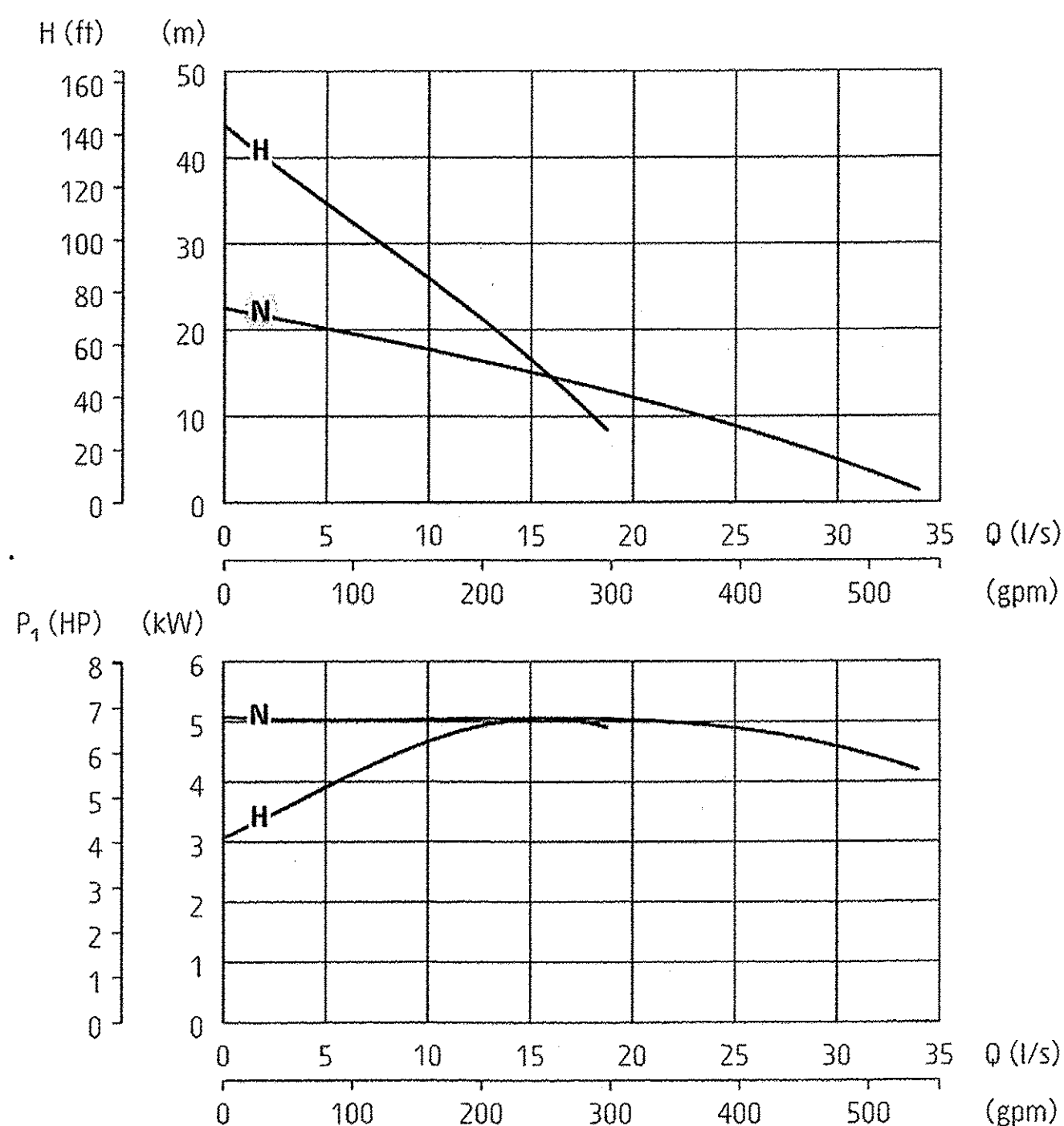
Pump types
N: normal pressure
H: high pressure

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 mechnical 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
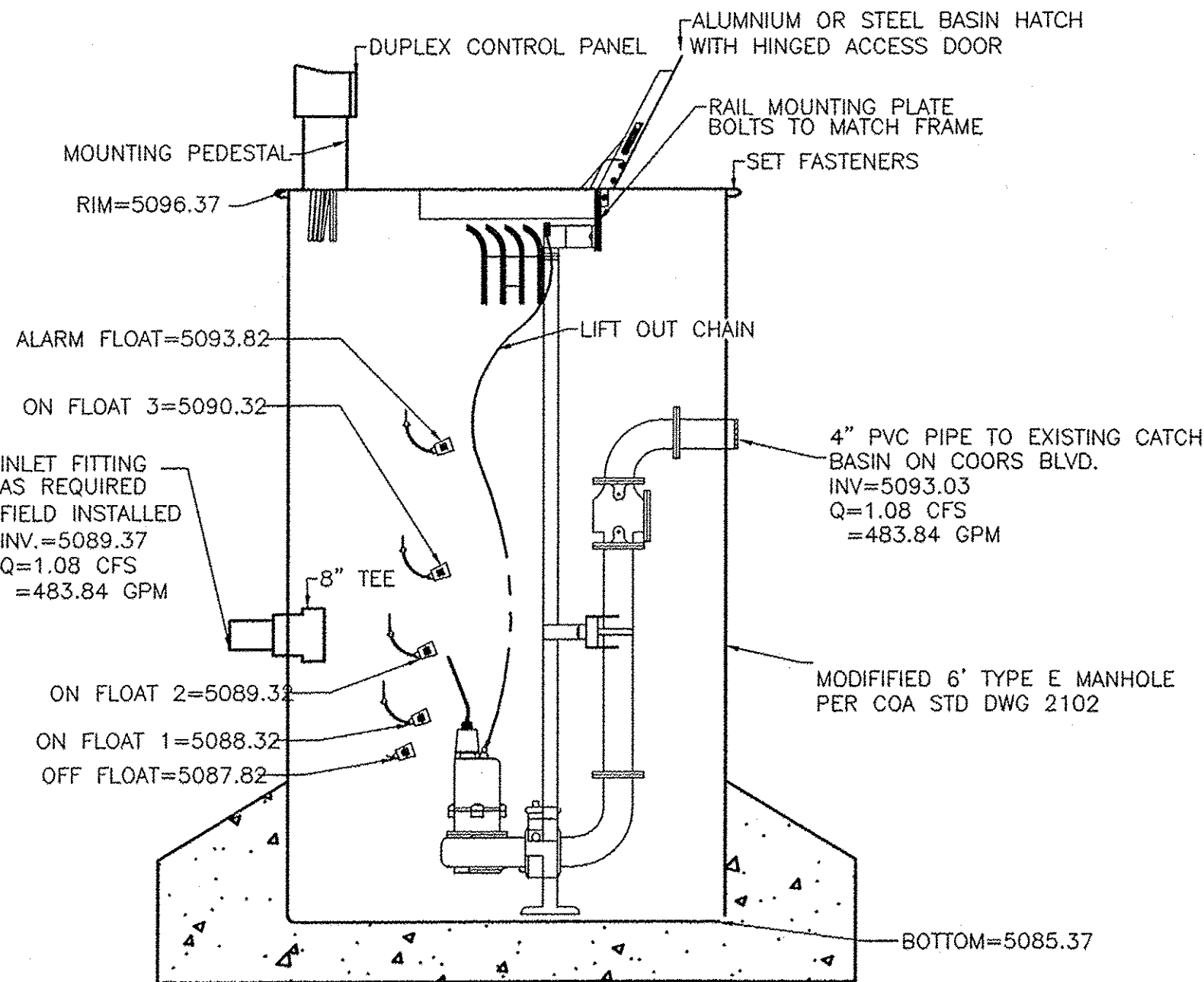Level regulator
Zinc anodes
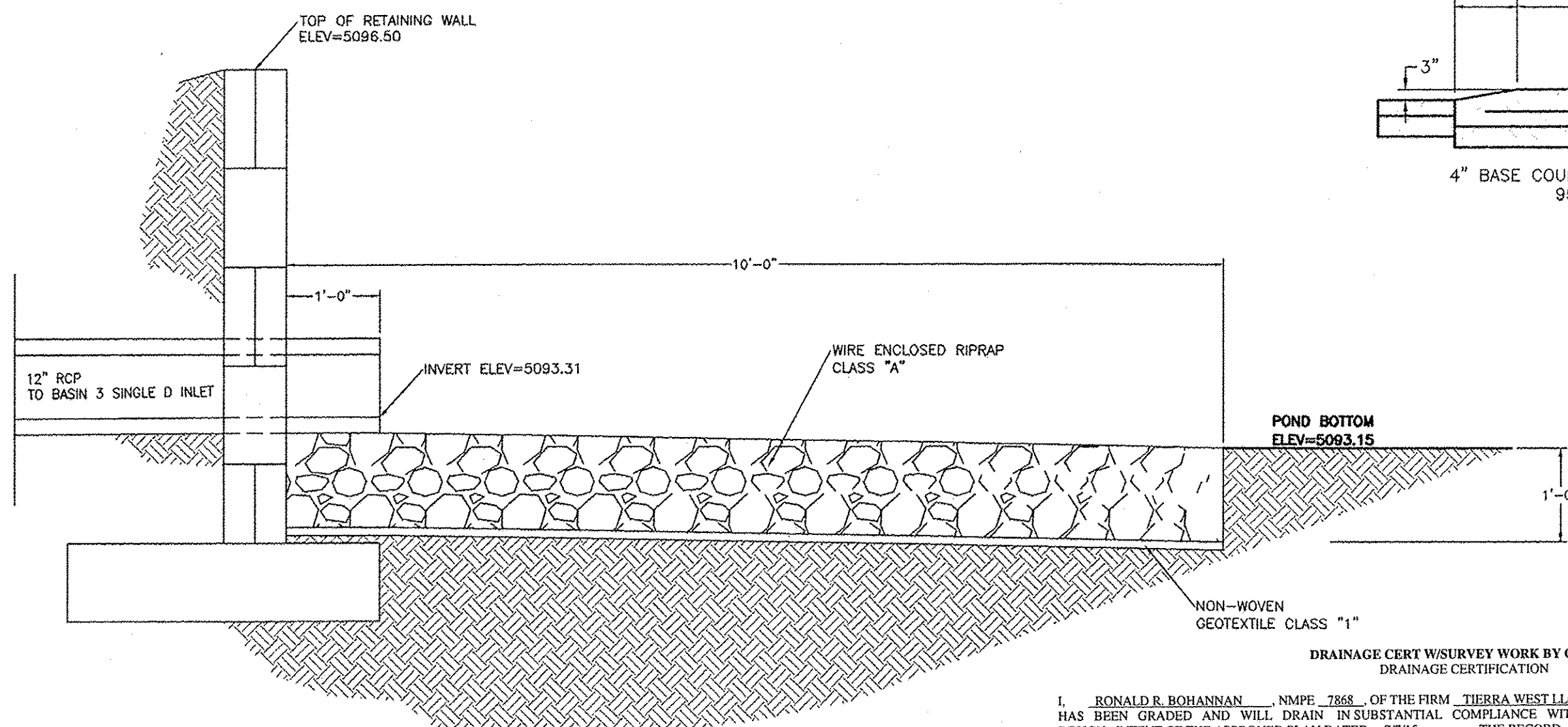Tandem connection
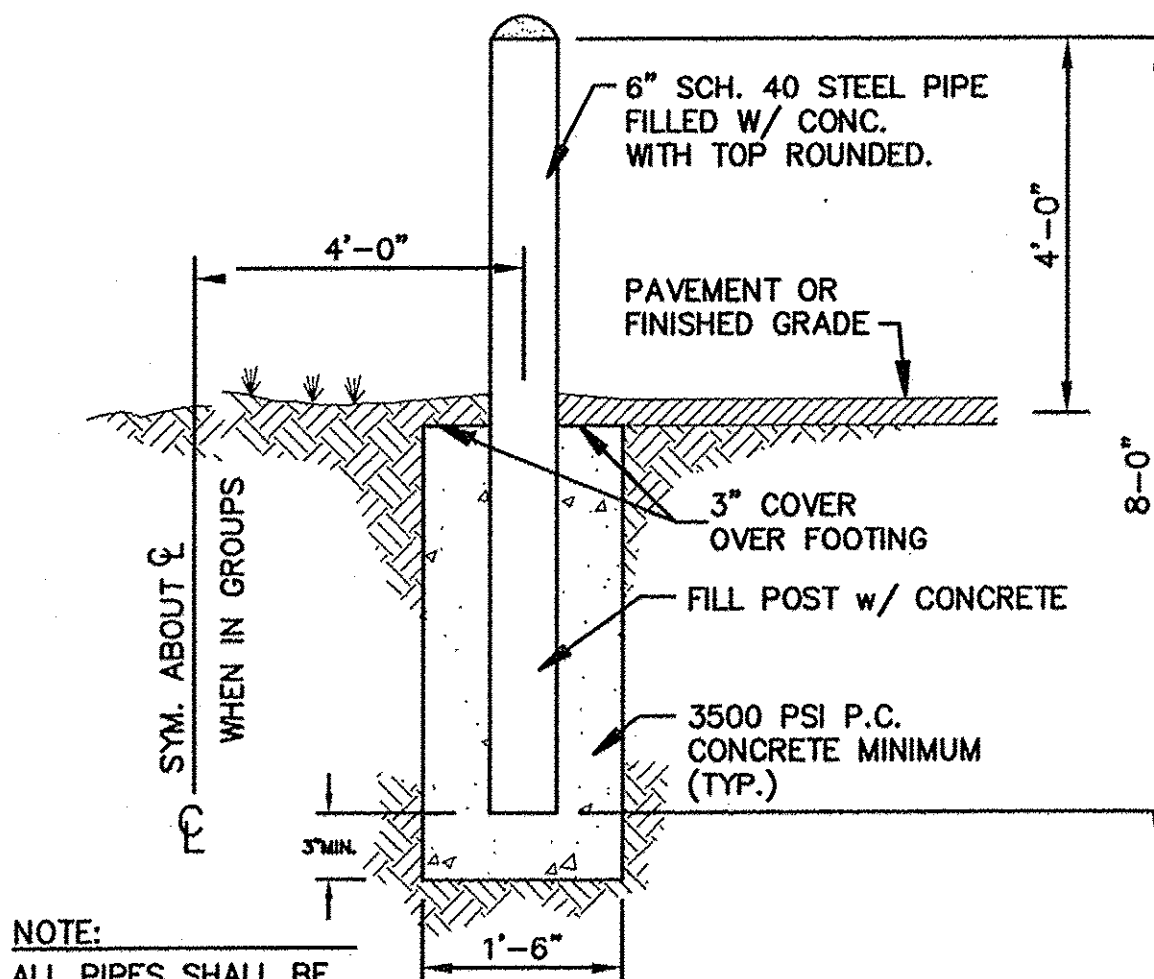Low suction collar
Pump raft

GRINDEX PUMP DETAIL
NTS
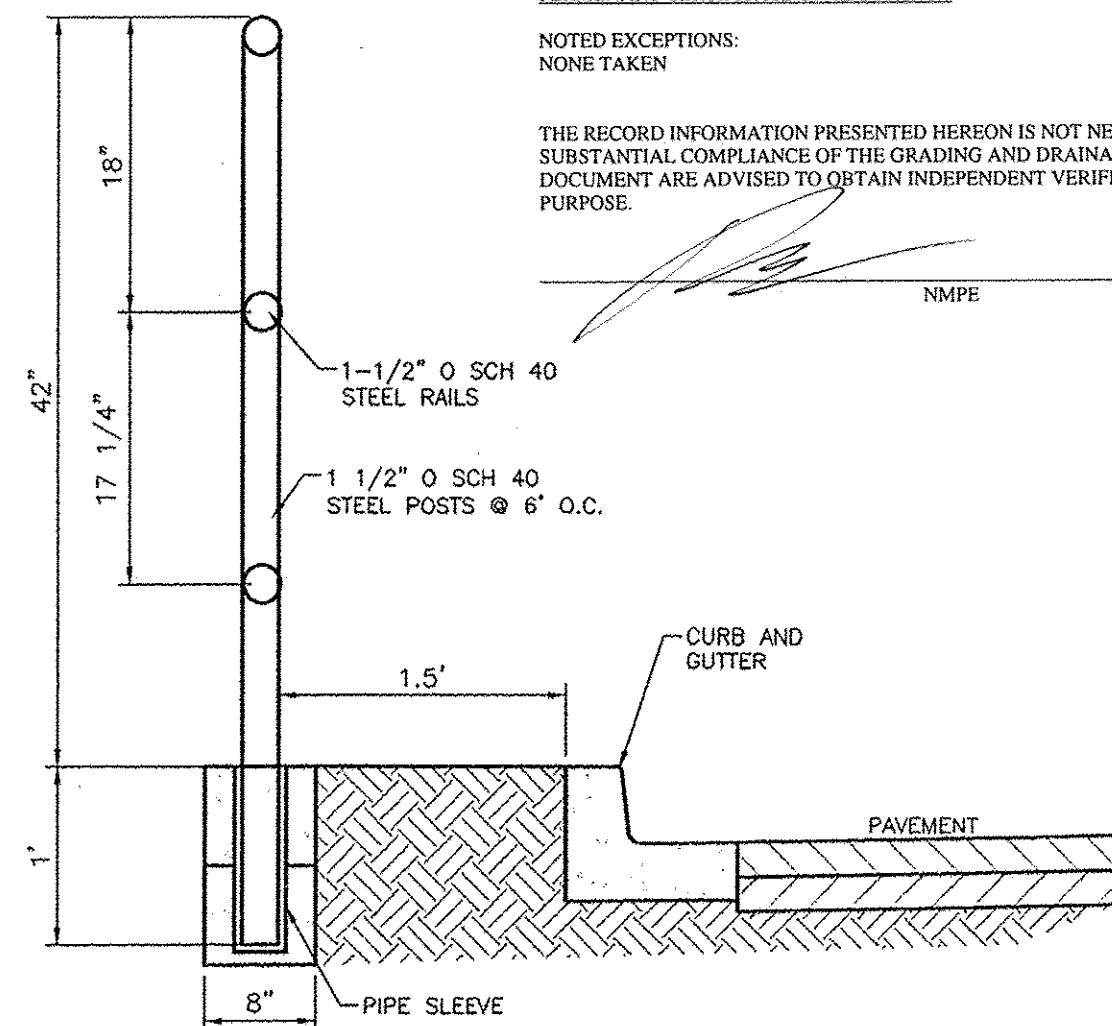

LIFT STATION DETAIL
NTS

DUPLEX CONTROL PANEL
ALUMINUM OR STEEL BASIN HATCH WITH HINGED ACCESS DOOR
MOUNTING PEDESTAL
RAIL MOUNTING PLATE BOLTS TO MATCH FRAME
SET FASTENERS
RIM=5096.37
LIFT OUT CHAIN
ALARM FLOAT=5093.82
ON FLOAT 3=5090.32
4" PVC PIPE TO EXISTING CATCH BASIN ON COORS BLVD.
INV=5093.03
Q=1.08 CFS
=483.84 GPM
INLET FITTING AS REQUIRED FIELD INSTALLED
INV.=5089.37
Q=1.08 CFS
=483.84 GPM
8" TEE
ON FLOAT 2=5089.32
ON FLOAT 1=5088.32
OFF FLOAT=5087.82
MODIFIED 6' TYPE E MANHOLE PER COA STD DWG 2102
BOTTOM=5085.37

POND OUTLET DETAIL
NTS

TOP OF RETAINING WALL ELEV=5096.50
12" RCP TO BASIN 3 SINGLE D INLET
INVERT ELEV=5093.31
WIRE ENCLOSED RIPRAP CLASS "A"
10'-0"
1'-0"
POND BOTTOM ELEV=5093.15
NON-WOVEN GEOTEXTILE CLASS "1"

PIPE BOLLARD DETAIL
NTS

6" SCH. 40 STEEL PIPE FILLED W/ CONC. WITH TOP ROUNDED.
4'-0"
4'-0"
8'-0"
PAVEMENT OR FINISHED GRADE
3" COVER OVER FOOTING
FILL POST W/ CONCRETE
3500 PSI P.C. CONCRETE MINIMUM (TYP.)
SYM. ABOUT ℄ WHEN IN GROUPS
1'-6"

NOTE:
ALL PIPES SHALL BE PAINTED TRAFFIC YELLOW

GUARD RAIL DETAIL
NTS

18"
42"
17 1/4"
1-1/2" Ø SCH 40 STEEL RAILS
1 1/2" Ø SCH 40 STEEL POSTS @ 6' O.C.
1.5'
1'
8"
PIPE SLEEVE
CURB AND GUTTER
PAVEMENT

CROSSWALK PLAN VIEW

6'
3.125"
VARIES
3.125"
12:1 MAX.
12:1 MAX.
SCORED CONC. EVERY 2' BOTH DIRECTIONS
5" PCC

RAISED CROSSWALK
NTS

6'
1' 4' 1'
3"
EXPOSED AGGREGATE OR COLOR PER OWNER SPECIFICATIONS
MATCH PAVEMENT
4" BASE COURSE COMPACTED 95% ASTM D1557
5" PCC (4000 PSI)
6"x6"x6G WELDED WIRE MESH

TYP. ORIFICE PLATE DETAIL
NTS

.25"
3/8"x6" ANCHOR BOLTS
SEE ORIFICE PLATE DETAIL
8" PVC
11"
4"
8"
MANHOLE WALL
1.5"
8"
1.5" 8" 1.5"

DRAINAGE CERT W/SURVEY WORK BY OTHERS
DRAINAGE CERTIFICATION
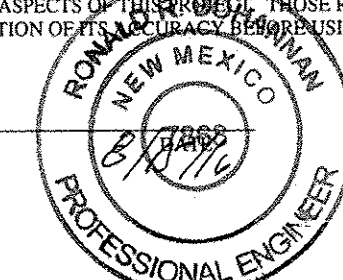
I, RONALD R. BOHANNAN, NMPE 7868, OF THE FIRM TIERRA WEST LLC, HEREBY CERTIFY THAT THIS PROJECT HAS BEEN GRADED AND WILL DRAIN IN SUBSTANTIAL COMPLIANCE WITH AND IN ACCORDANCE WITH THE DESIGN INTENT OF THE APPROVED PLAN DATED 7/7/15. THE RECORD INFORMATION EDITED ONTO THE ORIGINAL DESIGN DOCUMENT HAS BEEN OBTAINED BY ANDREW S. MEDINA, NMPS 126490, OF THE FIRM SANDIA LAND SURVEYING, LLC

I FURTHER CERTIFY THAT I HAVE PERSONALLY VISITED THE PROJECT SITE ON 8/17/16 AND HAVE DETERMINED BY VISUAL INSPECTION THAT THE SURVEY DATA PROVIDED IS REPRESENTATIVE OF ACTUAL SITE CONDITIONS AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. THIS CERTIFICATION IS SUBMITTED IN SUPPORT OF A REQUEST FOR A PERMENANT CERTIFICATE OF OCCUPANCY. HAVE INSTALLED @ THE OUTFLOW OF MANHOLE 2

NOTED EXCEPTIONS:
NONE TAKEN

THE RECORD INFORMATION PRESENTED HEREON IS NOT NECESSARILY COMPLETE AND INTENDED ONLY TO VERIFY SUBSTANTIAL COMPLIANCE OF THE GRADING AND DRAINAGE ASPECTS OF THE PROJECT. THOSE RELYING ON THE RECORD DOCUMENT ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION OF ITS ACCURACY BEFORE USING IT FOR ANY OTHER PURPOSE.

NMPE