CITY OF ALBUQUERQUE

Planning Department
Brennon Williams, Director

Mayor Timothy M. Keller

December 13, 2019

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

RE: **Maverick at University & Menaul**
1901 Menaul NE
Grading Plan Stamp Date: 12/11/19 & 12/12/19
Drainage Report Stamp Date: 12/11/19
Hydrology File: H15D068

Dear Mr. Bohannan,

Based on the submittal received on 12/13/19, this project cannot be approved for Building Permit until the following are corrected:

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

Prior to Building Permit:

1. Provide a Revocable Permit and Slope Easement (measured at a 3:1 slope from top of wall to bottom of wall) for the retaining wall encroaching on University. Final recorded documents can be provided at CO, but they need to be initiated now. Turn in the documents to DRC on the 4th Floor for routing and then provide a copy along with a DTIS sheet when resubmitting for building permit approval. There is no resubmittal fee for this action; please include a copy of this letter when resubmitting to receive the reduced fee.

2. As a reminder, if the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required to be submitted to the Stormwater Quality Engineer (Curtis Cherne, PE, ccherne@cabq.gov, 924-3420) 14 days prior to any earth disturbance.

Prior to Certificate of Occupancy (For Information):

3. Engineer's Certification, per the DPM Chapter 22.7: *Engineer's Certification Checklist For Non-Subdivision* is required.

4. City acceptance and close-out of the public Work Order will be required, unless a financial guarantee has been posted.

5. A Bernalillo County Recorded Drainage Covenant (No Public Easement) is required for the storm water ponds. The original notarized form, exhibit A (legible on 8.5x11 paper), and recording fee ($25, payable to Bernalillo County) must be turned into DRC (4th, Plaza del Sol)

for routing. Please contact Charlotte LaBadie (clabadie@cabq.gov, 924-3996) regarding the routing and recording process for covenants. The routing and recording process for covenants can take a month or longer; Hydrology recommends beginning this process as soon as possible as to not delay approval for certificate of occupancy.

If you have any questions, please contact me at 924-3695 or dpeterson@cabq.gov.

Sincerely,

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

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 6/2018)

Project Title: Maverik University & Menaul Building Permit #: _____ Hydrology File #: _____

DRB#: _____ EPC#: _____ Work Order#: _____

Legal Description: TR OF LD IN SEC 9 T10N R3E IN THE S/2 SW/4 SE/4 NE/4 EXCTHE SE'LY PORT OUT TO R/W AT THE NW CORNER OF MENAUL &UNIVERSITY & EXC A W'LY PORT OUT TO R/W AT MENAUL & I-25

City Address: 1901 Menaul Blvd NE, Albuquerque, NM 87107

Applicant: Tierra West, LLC Contact: Vinny Perea

Address: 5571 Midway Park Place NE, Albuquerque, NM 87109

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

Other Contact: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

TYPE OF DEVELOPMENT: ____ PLAT (# of lots) ____ RESIDENCE ____ DRB SITE ✓ ADMIN SITE

IS THIS A RESUBMITTAL? ____ Yes ✓ No

DEPARTMENT ____ TRANSPORTATION ✓ HYDROLOGY/DRAINAGE

Check all that Apply:

TYPE OF SUBMITTAL:

____ ENGINEER/ARCHITECT CERTIFICATION
____ PAD CERTIFICATION
____ CONCEPTUAL G & D PLAN
✓ GRADING PLAN
✓ DRAINAGE REPORT
____ DRAINAGE MASTER PLAN
____ FLOODPLAIN DEVELOPMENT PERMIT APPLIC
____ ELEVATION CERTIFICATE
____ CLOMR/LOMR
____ TRAFFIC CIRCULATION LAYOUT (TCL)
____ TRAFFIC IMPACT STUDY (TIS)
____ STREET LIGHT LAYOUT
____ OTHER (SPECIFY) _____
____ PRE-DESIGN MEETING?

TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

✓ BUILDING PERMIT APPROVAL
____ CERTIFICATE OF OCCUPANCY

____ PRELIMINARY PLAT APPROVAL
____ SITE PLAN FOR SUB'D APPROVAL
✓ SITE PLAN FOR BLDG. PERMIT APPROVAL
____ FINAL PLAT APPROVAL

____ SIA/ RELEASE OF FINANCIAL GUARANTEE
____ FOUNDATION PERMIT APPROVAL
✓ GRADING PERMIT APPROVAL
____ SO-19 APPROVAL
____ PAVING PERMIT APPROVAL
____ GRADING/ PAD CERTIFICATION
____ WORK ORDER APPROVAL
____ CLOMR/LOMR
____ FLOODPLAIN DEVELOPMENT PERMIT
____ OTHER (SPECIFY) _____

DATE SUBMITTED: 12/11/2019 By: Vinny Perea 505-858-3100

COA STAFF: ELECTRONIC SUBMITTAL RECEIVED: _____

FEE PAID: _____

DRAINAGE REPORT

For

Maverik Gas Station
University Blvd/Menaul Blvd

Prepared by:

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

December 11, 2019

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

12/11/19

Ronald R. Bohannan
PE # 7868

Job No. 2018062

TABLE OF CONTENTS

Appendices

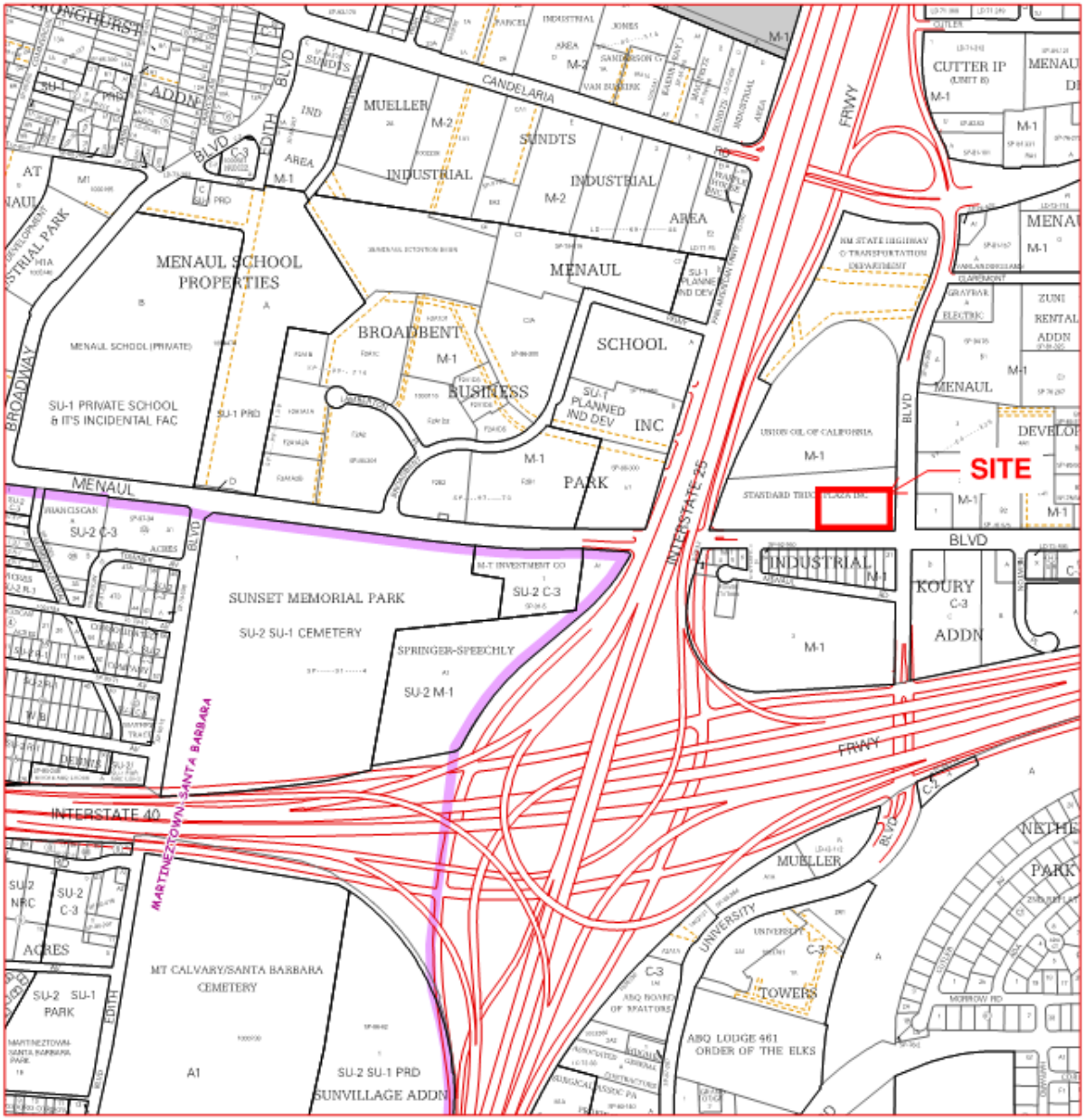
Purpose

The purpose of this report is to develop a Drainage Management Plan for developing a new Maverik convenience store and gas station on currently-developed 2.45-acre parcel of land. The land is currently going through being platted. The current legal description is “Tract of Land in Section 9 Township 10N Range 3E in the S/2 SW/4 SE/4 NE/4 excluding the southeasterly portion out to R/W at the NW of Menaul & university & excluding a westerly portion out to R/W at Menaul & I-25”. The legal description for the Maverik site once the plat is finalized and recorded will be “Tract B-1 Truck Stop Plaza”.

Location

This Maverik site (referred to in this report as “The Site”) is located at the northeast corner of the University Blvd/Menaul Blvd intersection. The property as it stands today fronts the north side of Menaul Blvd and spans from University Blvd to the I-25 northbound frontage road. The property currently stores large truck trailers and has two commercial buildings in the southeast quadrant of the property. As mentioned, the property is currently going through a platting action to subdivide out the southeast quadrant of the property where the existing buildings are located. These buildings and site will be demolished and become the site for the Maverik development. The Maverik site is bounded by Menaul Blvd. to the south, University Blvd. to the east, and the remaining balance of the subdivided property to the north and west. The Maverik site will consist of 1 convenience store building, a heavy-vehicle fueling station, and a light-vehicle fueling station.

Exhibit A – Vicinity Map



For more current information and more details visit: http://www.cabq.gov/gis

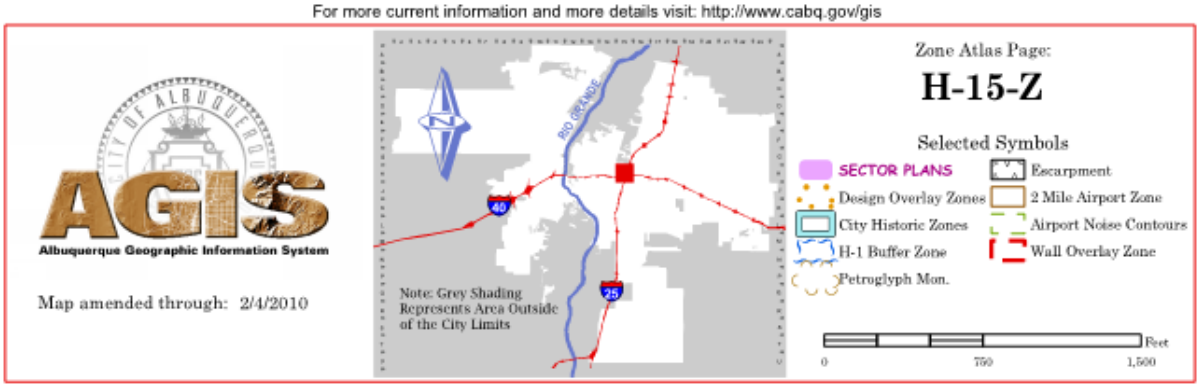
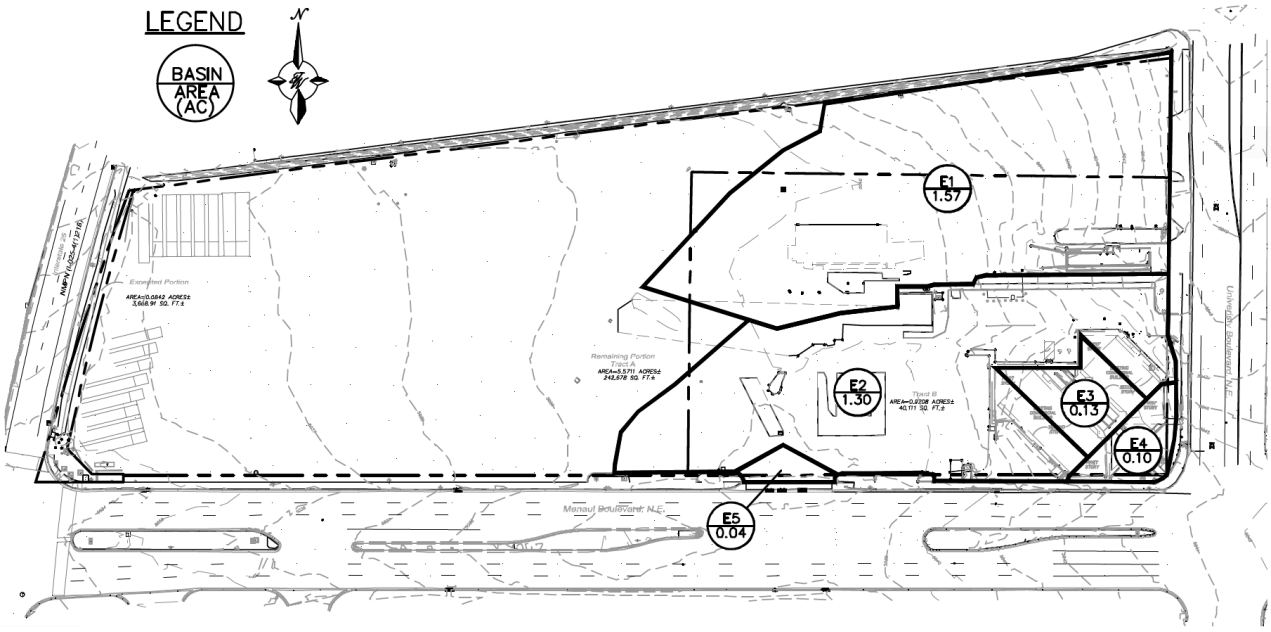


Exhibit B – Site Aerial Image

Exhibit C – Existing Basin Map



Existing Conditions

The site is currently developed with a building, parking lot, and old remnants of a Fina gas station that has been demolished. These old remnants include a heavy truck scale and concrete pads from old fuel canopies and the demolished gas station building. The site is 97% impervious with asphalt, concrete, and building surfaces. Drainage of the site predominantly flows from east to west with three primary basins, E1, E2, and E3. There are two smaller drainage basins that send runoff to the Menaul Blvd right-of-way, basins E4 and E5.

Basin E1 consists of the northern half of the site, plus the remaining portion of the subdivided property directly north of the site. Runoff from this basin flows from east to west and is directed towards a sumped drainage inlet within the basin. The inlet has been completely filled up and clogged with sediment and debris, resulting in drainage not being able to drain through the inlet. Runoff in larger storm events will pond within the basin but then overtop towards the west and towards Menaul Blvd.

Basin E2 consists of the southern half of the site, excluding the two existing buildings and southeast corner of the site. Runoff from this basin flows from east to west and, like Basin E1, is directed towards a sumped drainage inlet within the basin. This inlet is currently clogged as well, and runoff will pond within the basin before overtopping to the west and towards Menaul Blvd.

Basin E3 consists of the two buildings in the southeast corner of the site and the courtyard space between the buildings. Within the courtyard is a drainage inlet that the building drainage is directed towards, which connects to the storm drain under Menaul Blvd.

Basins E4 and E5 consist of small portions of onsite that are near the Menaul Blvd and University Blvd right-of-way that sheet flow towards the right-of way. The surface flows eventually make their way towards drainage inlets and storm drain within Menaul Blvd.

The total 100-year peak flow of these existing basins is 14.61 cfs, hydrology calculations and an enlarged drainage basin map can be found in Appendix A.

Flood Plain

The site is located on FIRM Maps 35001C0332G and 35001C0351H. The maps indicate that the site does not lie within any flood hazard areas; however, Menaul Blvd lies within a Zone AO flood hazard area.

Exhibit D – FIRM Map

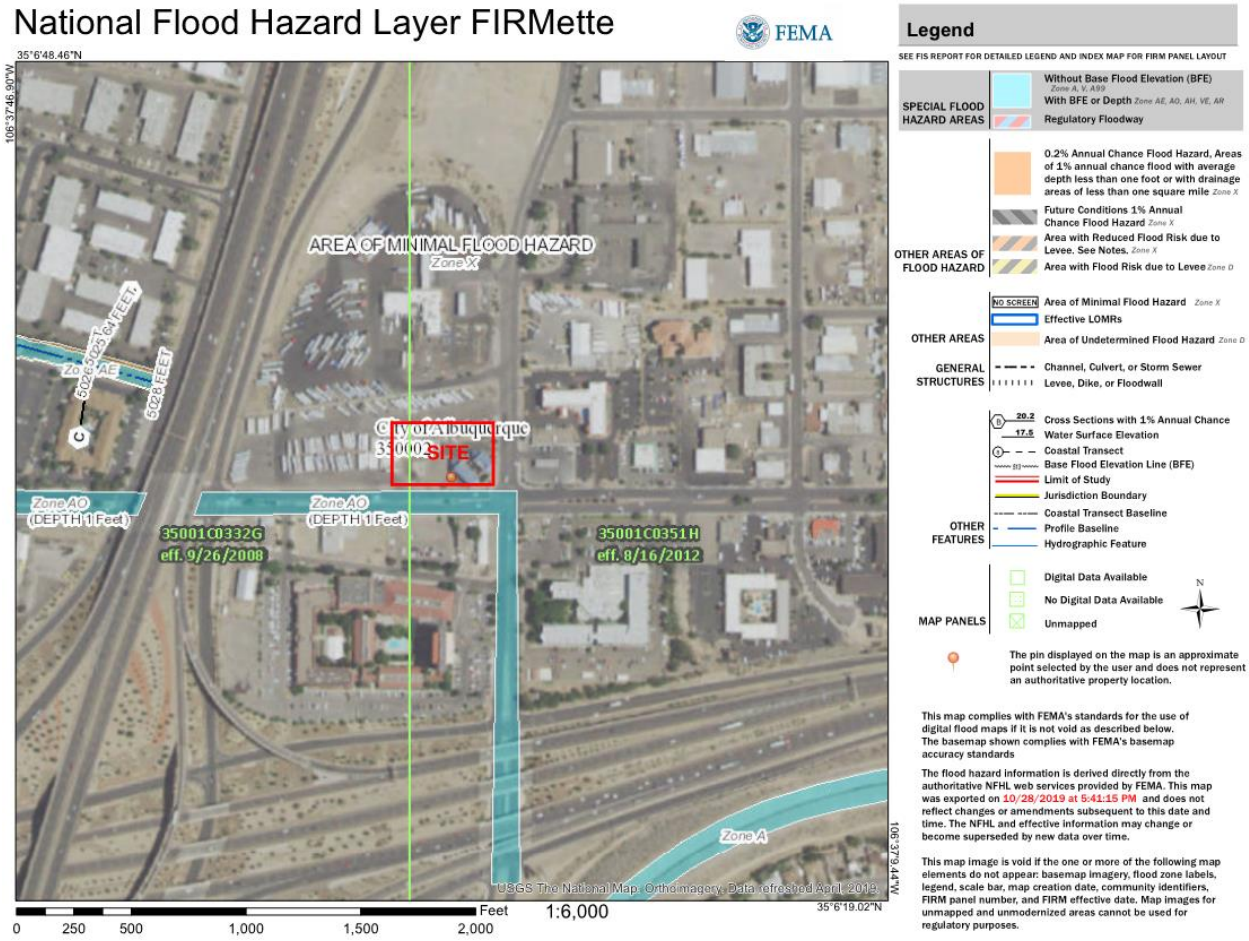
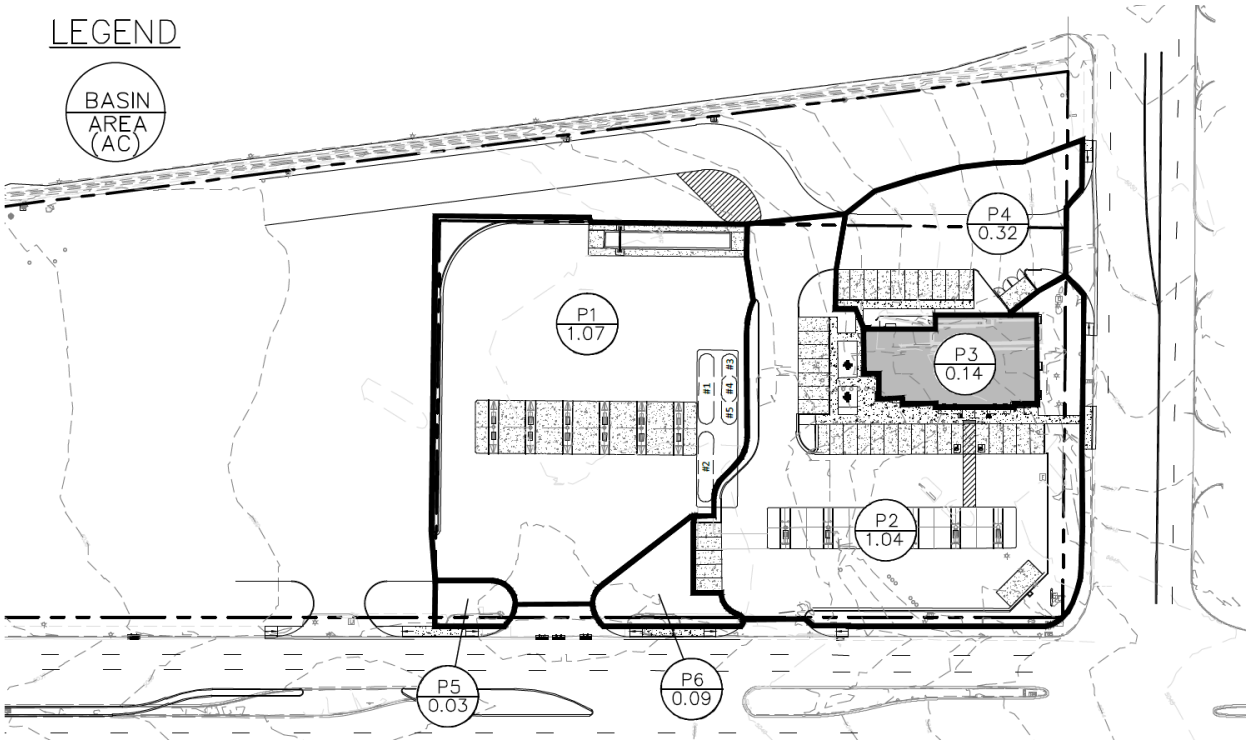


Exhibit E – Proposed Basin Map



Proposed Conditions

All improvements will be built out in their entirety. The grading and drainage design is configured to accommodate the proposed building, fuel canopies, and associated improvements plus a small portion of the property directly north of the site.

Basin P1 consists of the western half of the site, which is the heavy-vehicle fueling area. Runoff from this basin will be directed from north to south via surface flow for all the paving areas around the canopy. The surface flows will enter a new water quality inlet at the southwest corner of the basin; this inlet will then discharge into a water quality pond within basin P5. The truck scale, located at the northeast corner of this basin, and the fueling canopy will drain via subsurface pvc conduit drains that will connect to the water quality inlet.

Basin P2 consists primarily of the light-vehicle fueling area and the adjacent landscape buffers along Menaul Blvd and University Blvd. Runoff from this basin is directed from northeast to southwest via surface flow towards a water quality inlet located in the in parking stalls at the southwest corner of this basin. The inlet will then discharge into a water quality pond within basin P6. The fueling canopy will drain via subsurface pvc conduit drains that will connect to the water quality inlet.

Basin P3 consists entirely of the convenience store building. This basin will drain via roof drains. The roof drains will continue in subsurface pvc conduit drains that will connect to the fueling canopy pvc drains in Basin P2.

P4 consists of the drive aisle, parking, and dumpster pad area directly north of the convenience store building. Runoff from this basin is directed from east to west via surface flows and outfalls through a sidewalk culvert located the southwest corner of the parking spaces within the basin. The sidewalk culvert outfall directs the basin flows into basin two and eventually into the water quality pond in basin P6.

Basins P5 and P6 consists of strictly the landscape areas and water quality ponds that collect all the drainage from the site. Water Quality Pond 2 in Basin P6 connects to Water Quality Pond 1 in Basin P5 via an 18” HDPE pipe so that they act as one singular pond for water quality retention.

The water quality ponds will retain the city-required “first flush” volume to a certain elevation and will then free discharge into a new raised drop inlet in Water Quality Pond 1. This inlet will connect to a new 18” HDPE storm drain that is directed west through the western balance of the property to a new manhole near the Menaul/I-25 Frontage Rd intersection. That manhole will then have a 24” RCP pipe that connects to the Menaul Blvd public storm drain. The reason for the upsizing of pipe between the manhole and the public storm drain connection is so that when future development happens on the remaining balance of the property, that development can tie into the manhole the manhole for their drainage discharge (this 24” sizing assumes 85% Impervious and 15% impervious for the remaining balance of the property).

The 100-year, 6-hour total peak discharge from the Maverik site to the Menaul public storm drain system is 11.82 cfs. This is lower than the historical 100-year discharge of the site, which is 14.61 cfs, due to decreasing the impervious area of the site. Hydrology calculation and an enlarged proposed basin map can be found in Appendix A.

Water Quality Management

The management of water quality for this site intends to capture the “first flush” volume and retain onsite prior to any discharge off of the site. This volume was calculated per the COA drainage ordinance for redevelopment projects as 0.28” over the total impervious areas of the site, giving a total of 2,332 cubic feet of runoff to retain. The water quality will be retained in the two drainage ponds in the SW quadrant of the site. The ponds will have an outfall invert elevation that is 2.1 feet higher than the bottom of the ponds. The volume that is retained below this invert elevation is 2,450 cubic feet, which exceeds the required first flush retention volume. The water quality volume required calculations can be found on the proposed hydrology table in Appendix A. The provided volume calculations of the ponds can be found in Appendix C. The two proposed onsite drop inlets that are upstream of the water quality ponds will have recessed open bottoms with bio-snouts to help mitigate the migration of oils, gasoline, and pollutants even further prior to entering the ponds.

Calculations

The Weighted E Method from the “City of Albuquerque Development Process Manual Volume I – Design Criteria, 2006 Revision” was used to calculate the runoff and volume for the site, the hydrology tables can be found in Appendix A. Drainage capacities for the concrete flume, curb cut, landscape swale and storm/roof drains were determined through Bentley FlowMaster and results can be found in Appendix B. Drop inlet capacity calculations can be found in Appendix B as well. Actual water quality pond volume calculations can be found in Appendix C.

Summary

The entire site will be demolished, re-graded and all of the surface improvements will be built out in their entirety. The enclosed grading plan shows the grades for the entire project.

The proposed redevelopment consists of a new convenience store/gas station with a heavy-vehicle fueling canopy and light-vehicle fueling canopy. There are a total of 6 onsite basins which will convey flow towards the two water quality ponds in the SW quadrant of the site prior to discharging into the Menaul public storm drain system. The 100-year peak discharge of the proposed site is 11.82 cfs which is less than the historical flow rate of 14.61 cfs.

APPENDIX A

EXISTING/PROPOSED HYDROLOGY TABLE

AND DRAINAGE BASIN MAPS

DPM Weighted E Method

Precipitation Zone 2
NW Corner of Menaul & University
Maverik Truck Stop
TWLLC **Date** 11/19/2019

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 (in)	Volume (ac-ft)	Flow cfs	Weighted E (in)	Volume (ac-ft)	Flow cfs
				%	(acres)	%	(acres)	%	(acres)	%	(acres)						
E1	68,460.61	1.572	0.00246	0%	0.000	0%	0.000	2%	0.031	98%	1.540	2.100	0.275	7.34	1.324	0.173	4.89
E2	56,649.04	1.300	0.00203	0%	0.000	0%	0.000	2%	0.026	98%	1.274	2.100	0.228	6.07	1.324	0.143	4.05
E3	5,743.97	0.132	0.00021	0%	0.000	0%	0.000	5%	0.007	95%	0.125	2.071	0.023	0.61	1.299	0.014	0.40
E4	4392.21	0.101	0.00016	0%	0.000	0%	0.000	45%	0.045	55%	0.055	1.675	0.014	0.40	0.971	0.008	0.25
E5	1696.45	0.039	0.00006	0%	0.000	0%	0.000	0%	0.000	100%	0.039	2.120	0.007	0.18	1.340	0.004	0.12
Total	**136,942.28**	**3.144**	**0.00491**		**0.000**		**0.000**		**0.109**		**3.034**		**0.546**	**14.61**		**0.344**	**9.71**

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 (in)	Volume (ac-ft)	Flow cfs	Weighted E (in)	Volume (ac-ft)	Flow cfs
				%	(acres)	%	(acres)	%	(acres)	%	(acres)						
P1	46,499.93	1.067	0.00167	0%	0.000	1%	0.011	0%	0.000	99%	1.057	2.107	0.187	4.99	1.329	0.118	3.33
P2	45,363.28	1.041	0.00163	0%	0.000	21%	0.219	0%	0.000	79%	0.823	1.839	0.160	4.37	1.117	0.097	2.79
P3	6,100.08	0.140	0.00022	0%	0.000	0%	0.000	0%	0.000	100%	0.140	2.120	0.025	0.66	1.340	0.016	0.44
P4	14119.56	0.324	0.00051	0%	0.000	5%	0.016	0%	0.000	95%	0.308	2.053	0.055	1.48	1.287	0.035	0.98
P5	1,495.39	0.034	0.00005	0%	0.000	50%	0.017	50%	0.017	0%	0.000	0.955	0.003	0.09	0.400	0.001	0.05
P6	3697.45	0.085	0.00013	0%	0.000	55%	0.047	45%	0.038	0%	0.000	0.938	0.007	0.23	0.388	0.003	0.11
Total	**117,275.69**	**2.692**	**0.00421**		**0.000**		**0.309**		**0.055**		**2.327**		**0.437**	**11.82**		**0.270**	**7.70**

Equations:

Weighted E = Ea*Aa + Eb*Ab + Ec*Ac + Ed*Ad / (Total Area)

Volume = Weighted D * Total Area

Flow = Qa*Aa + Qb*Ab + Qc*Ac + Qd*Ad

Excess Precipitation, E (in.)		
Zone 2	100-Year	10-Year
Ea	0.53	0.13
Eb	0.78	0.28
Ec	1.13	0.52
Ed	2.12	1.34

Peak Discharge (cfs/acre)		
Zone 2	100-Year	10-Year
Qa	1.56	0.38
Qb	2.28	0.95
Qc	3.14	1.71
Qd	4.70	3.14

Water Quality Volume (Onsite)

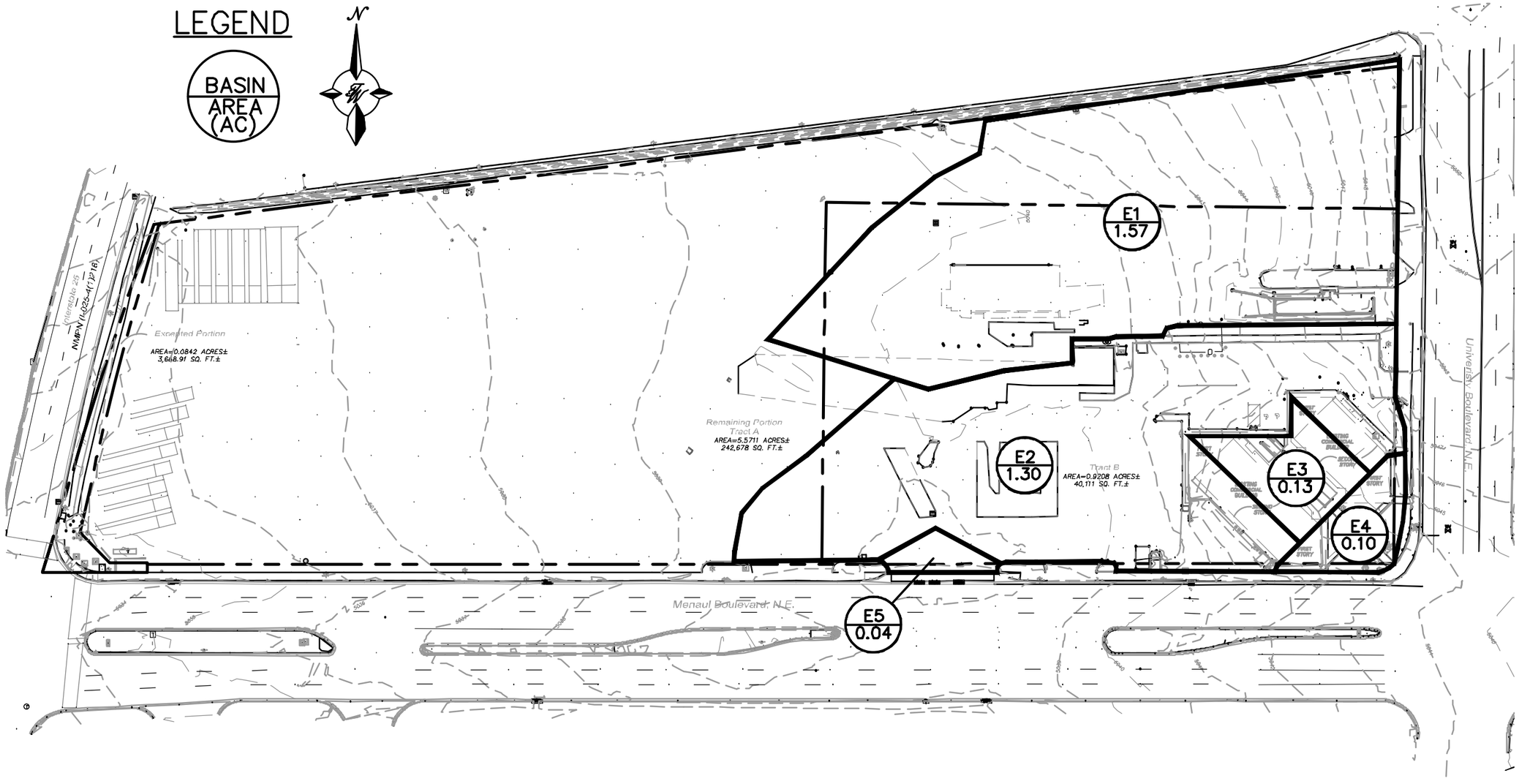
Total Impervious Area = 2.327 Acres = 101,364.12 SF

Retainage depth = 0.28" = 0.023' (redevelopment)

Retention Volume = 0.023*101,364.12 = **2,332 CF = 0.05 Ac-Ft**

LEGEND

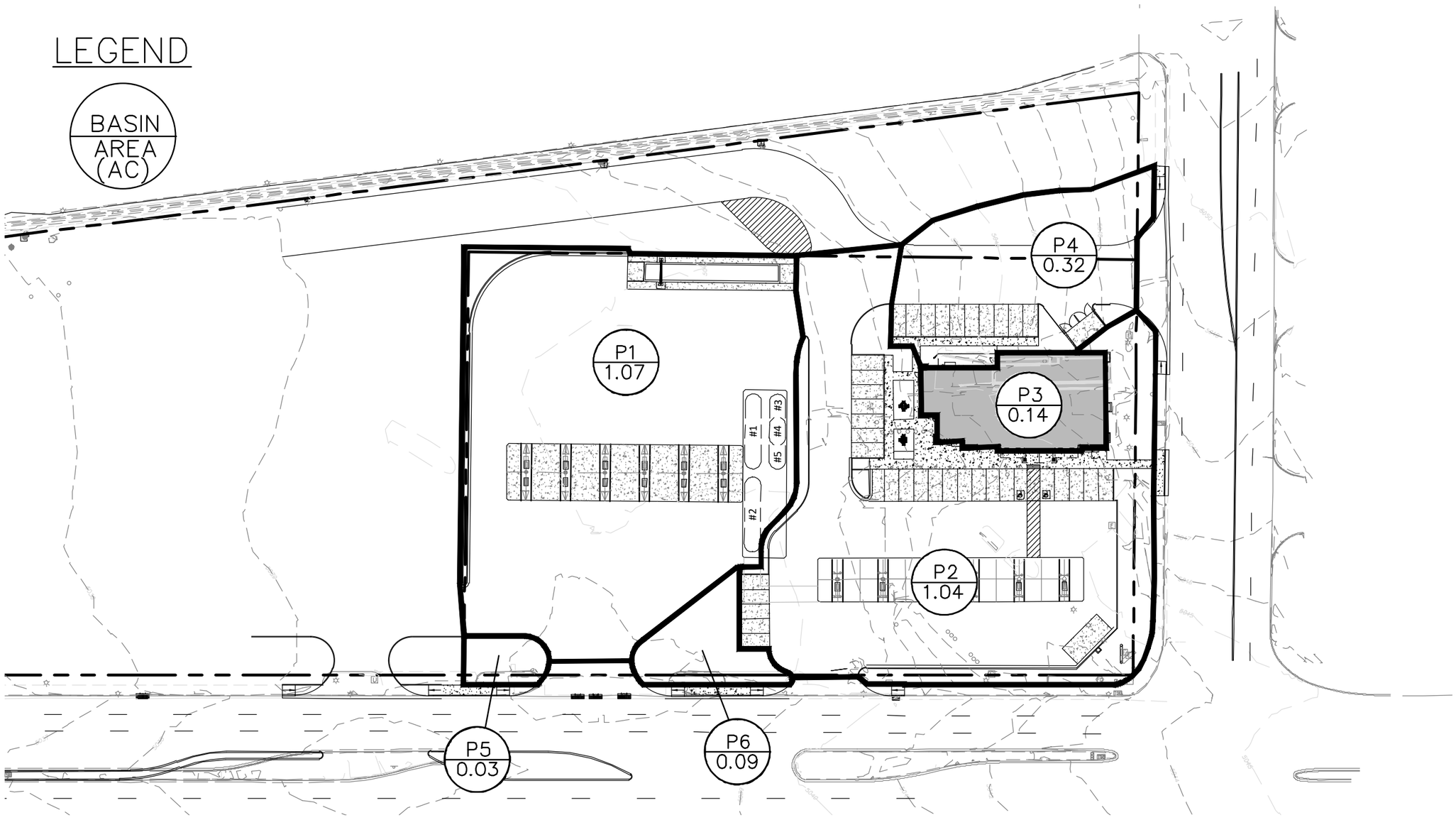
BASIN
AREA
(AC)



EXISTING BASIN MAP

LEGEND

BASIN
AREA
(AC)



PROPOSED BASIN MAP

APPENDIX B

CALCULATIONS FOR FLUME, CURB CUT, INLETS, LANDSCAPE SWALE, AND STORM/ROOF DRAINS

Worksheet for 2'-Wide Concrete Flume - Basin P4

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.03200	ft/ft
Bottom Width	2.00	ft
Discharge	1.48	ft^3/s ← 100yr-6hr Flow for Basin P4

Results

Normal Depth	0.14	ft ← Less than 0.5' Flume Height, therefore OK
Flow Area	0.29	ft^2
Wetted Perimeter	2.29	ft
Hydraulic Radius	0.13	ft
Top Width	2.00	ft
Critical Depth	0.26	ft
Critical Slope	0.00525	ft/ft
Velocity	5.14	ft/s
Velocity Head	0.41	ft
Specific Energy	0.55	ft
Froude Number	2.39	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.14	ft
Critical Depth	0.26	ft
Channel Slope	0.03200	ft/ft
Critical Slope	0.00525	ft/ft

Worksheet for Basin P2 Landscape Swale

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.069	
Channel Slope	0.01100	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	0.21	ft^3/s ← 100yr-6hr Flow for Landscape Swale Area

Results

Normal Depth	0.33	ft
Flow Area	0.32	ft^2
Wetted Perimeter	2.07	ft
Hydraulic Radius	0.16	ft
Top Width	1.96	ft
Critical Depth	0.20	ft
Critical Slope	0.16087	ft/ft
Velocity	0.65	ft/s
Velocity Head	0.01	ft
Specific Energy	0.33	ft
Froude Number	0.28	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.33	ft
Critical Depth	0.20	ft
Channel Slope	0.01100	ft/ft
Critical Slope	0.16087	ft/ft

Worksheet for 2'-Wide Curb Cut for Landscape Swale - Basin P2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Bottom Width	2.00	ft
Discharge	0.21	ft^3/s ← 100yr-6hr Flow for Landscape Swale Area

Results

Normal Depth	0.06	ft ← Less than 0.5' Curb Cut Height, Therefore OK
Flow Area	0.12	ft^2
Wetted Perimeter	2.12	ft
Hydraulic Radius	0.06	ft
Top Width	2.00	ft
Critical Depth	0.07	ft
Critical Slope	0.00654	ft/ft
Velocity	1.71	ft/s
Velocity Head	0.05	ft
Specific Energy	0.11	ft
Froude Number	1.22	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.06	ft
Critical Depth	0.07	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00654	ft/ft

Worksheet for 6" PVC Roof Drain - Convenience Store

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010		
Channel Slope	0.00900	ft/ft	
Diameter	0.50	ft	
Discharge	0.66	ft³/s	← 100yr-6hr Flow for Basin P3

Results

Normal Depth	0.39	ft
Flow Area	0.16	ft²
Wetted Perimeter	1.08	ft
Hydraulic Radius	0.15	ft
Top Width	0.41	ft
Critical Depth	0.41	ft
Percent Full	78.1	%
Critical Slope	0.00813	ft/ft
Velocity	4.01	ft/s
Velocity Head	0.25	ft
Specific Energy	0.64	ft
Froude Number	1.12	
Maximum Discharge	0.74	ft³/s ← Greater than 100yr Flow for Basin P3, Therefore OK
Discharge Full	0.69	ft³/s
Slope Full	0.00819	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	78.08	%
Downstream Velocity	Infinity	ft/s

Worksheet for 4" PVC Roof Drain - Light Fueling Canopy Column

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.00900	ft/ft
Diameter	0.33	ft
Discharge	0.08	ft³/s ← 100yr-6hr Flow for Attributed Fueling Canopy Area

Results

Normal Depth	0.13	ft
Flow Area	0.03	ft²
Wetted Perimeter	0.46	ft
Hydraulic Radius	0.07	ft
Top Width	0.33	ft
Critical Depth	0.16	ft
Percent Full	40.2	%
Critical Slope	0.00510	ft/ft
Velocity	2.44	ft/s
Velocity Head	0.09	ft
Specific Energy	0.23	ft
Froude Number	1.36	
Maximum Discharge	0.25	ft³/s ← Greater than 100yr Attributed Flow, Therefore OK
Discharge Full	0.23	ft³/s
Slope Full	0.00105	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	40.22	%
Downstream Velocity	Infinity	ft/s

Worksheet for 8" PVC Roof Drain - Light Fueling Canopy & C-Store

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Diameter	0.67	ft
Discharge	1.12	ft³/s ← 100yr-6hr Flow for Convenience Store & Fueling Canopy

Results

Normal Depth	0.41	ft
Flow Area	0.23	ft²
Wetted Perimeter	1.21	ft
Hydraulic Radius	0.19	ft
Top Width	0.65	ft
Critical Depth	0.50	ft
Percent Full	61.9	%
Critical Slope	0.00598	ft/ft
Velocity	4.89	ft/s
Velocity Head	0.37	ft
Specific Energy	0.79	ft
Froude Number	1.45	
Maximum Discharge	1.71	ft³/s ← Greater than 100yr Flow for C-Store & Fueling Canopy, Therefore OK
Discharge Full	1.59	ft³/s
Slope Full	0.00495	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	61.87	%
Downstream Velocity	Infinity	ft/s

Worksheet for 4" PVC Drain - Truck Scale

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01200	ft/ft
Diameter	0.33	ft
Discharge	0.11	ft³/s ← 100yr-6hr Flow for Attributed Truck Scale Area

Results

Normal Depth	0.15	ft
Flow Area	0.04	ft²
Wetted Perimeter	0.49	ft
Hydraulic Radius	0.08	ft
Top Width	0.33	ft
Critical Depth	0.19	ft
Percent Full	44.4	%
Critical Slope	0.00554	ft/ft
Velocity	2.95	ft/s
Velocity Head	0.13	ft
Specific Energy	0.28	ft
Froude Number	1.55	
Maximum Discharge	0.29	ft³/s ← Greater than 100yr Attributed Flow, Therefore OK
Discharge Full	0.27	ft³/s
Slope Full	0.00199	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	44.39	%
Downstream Velocity	Infinity	ft/s

Worksheet for 4" PVC Roof Drain - Heavy Fueling Canopy

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Diameter	0.33	ft
Discharge	0.09	ft³/s ← 100yr-6hr Flow for Attributed Fueling Canopy Area

Results

Normal Depth	0.14	ft
Flow Area	0.03	ft²
Wetted Perimeter	0.47	ft
Hydraulic Radius	0.07	ft
Top Width	0.33	ft
Critical Depth	0.17	ft
Percent Full	41.8	%
Critical Slope	0.00525	ft/ft
Velocity	2.61	ft/s
Velocity Head	0.11	ft
Specific Energy	0.25	ft
Froude Number	1.42	
Maximum Discharge	0.27	ft³/s ← Greater than 100yr Attributed Flow, Therefore OK
Discharge Full	0.25	ft³/s
Slope Full	0.00133	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	41.77	%
Downstream Velocity	Infinity	ft/s

Worksheet for 6" PVC Roof Drain - Heavy Fueling Canopy & Truck Scale

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01200	ft/ft
Diameter	0.50	ft
Discharge	0.66	ft³/s ← 100yr-6hr Flow for Truck Scale and Heavy Fueling Canopy

Results

Normal Depth	0.35	ft
Flow Area	0.15	ft²
Wetted Perimeter	0.98	ft
Hydraulic Radius	0.15	ft
Top Width	0.46	ft
Critical Depth	0.41	ft
Percent Full	69.3	%
Critical Slope	0.00813	ft/ft
Velocity	4.54	ft/s
Velocity Head	0.32	ft
Specific Energy	0.67	ft
Froude Number	1.43	
Maximum Discharge	0.86	ft³/s ← Greater than 100yr Flow for Truck Scale and Fueling Canopy, Therefore OK
Discharge Full	0.80	ft³/s
Slope Full	0.00819	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	69.31	%
Downstream Velocity	Infinity	ft/s

Worksheet for 18" HDPE SD - Outfall from Pond 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010		
Channel Slope	0.01150	ft/ft	
Diameter	1.50	ft	
Discharge	11.82	ft³/s	← 100yr-6hr Flow for Basins P1-P6

Results

Normal Depth	1.02	ft
Flow Area	1.28	ft²
Wetted Perimeter	2.91	ft
Hydraulic Radius	0.44	ft
Top Width	1.40	ft
Critical Depth	1.31	ft
Percent Full	68.1	%
Critical Slope	0.00682	ft/ft
Velocity	9.22	ft/s
Velocity Head	1.32	ft
Specific Energy	2.34	ft
Froude Number	1.70	
Maximum Discharge	15.75	ft³/s ← Greater than 100yr Flow for Basins P1-P6, Therefore OK
Discharge Full	14.64	ft³/s
Slope Full	0.00749	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

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

Worksheet for 24" RCP SD - Connection to Menaul SD

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.02360	ft/ft
Diameter	2.00	ft
Discharge	29.50	ft³/s

100yr-6hr Flow for Basins P1-P6 plus Remaining Balance of Property (Assumes 85% Land Treatment "D" and 15% "C")

Results

Normal Depth	1.41	ft
Flow Area	2.38	ft²
Wetted Perimeter	4.00	ft
Hydraulic Radius	0.59	ft
Top Width	1.82	ft
Critical Depth	1.85	ft
Percent Full	70.7	%
Critical Slope	0.01472	ft/ft
Velocity	12.42	ft/s
Velocity Head	2.40	ft
Specific Energy	3.81	ft
Froude Number	1.92	
Maximum Discharge	37.38	ft³/s
Discharge Full	34.75	ft³/s
Slope Full	0.01701	ft/ft
Flow Type	SuperCritical	

Greater than 100yr Flow of Entire Property at Full Development, Therefore OK

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	70.74	%
Downstream Velocity	Infinity	ft/s

Capacity of a Single ‘D’ Storm Drop Inlet

Capacity of the grate:

L = 40” - 2(2"$_{ends}$) - 7(½” $_{middle\ bars}$)
= 32 1/2"
= 2.7083’

W = 25" - 13(½” $_{middle\ bars}$)
= 18.5"
= 1.54'

Area = 2.7083' x 1.54'
= 4.18 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*2.09*sqrt(2*32.2*0.67)
Q = 8.24 cfs

Capacity Greater than:
100yr Flow of Basin P2+P4 (5.85 cfs)
100yr Flow of Basin P1 (4.99 cfs)
Therefore OK

Capacity of a Double 'D' Storm Drop Inlet

Capacity of the 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*4.04*sqrt(2*32.2*0.67)
Q = 15.93 cfs

Capacity Greater than 100yr Flow of Basins P1 through P6 (11.82 cfs), Therefore OK

APPENDIX C

ONSITE POND VOLUME CALCULATIONS

TIERRA WEST, LLC

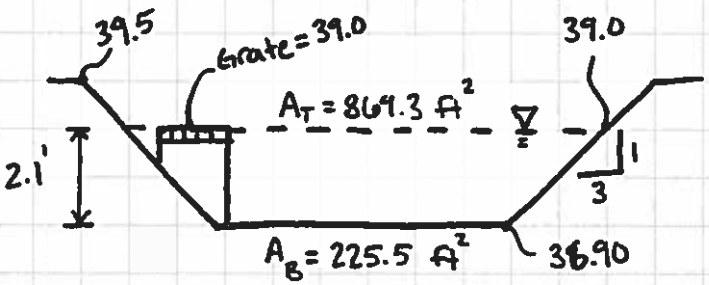
Project Maverik University / Menaul Date

Project No. 2018062

Meeting Purpose Sheet No of

Attendees

WQ Pond 1



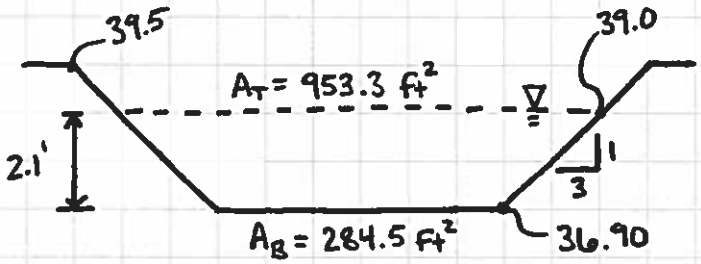
End Area Method:

$$V = \frac{A_T + A_B}{2} \times h$$

$$V = \frac{869.3 + 225.5}{2} \times 2.1$$

$$V = 1149.5\ ft^3$$

WQ Pond 2



End Area Method:

$$V = \frac{A_T + A_B}{2} \times h$$

$$V = \frac{953.3 + 284.5}{2} \times 2.1$$

$$V = 1299.7\ ft^3$$

Total WQ Volume = 1149.5 + 1299.7

= 2449.2 ft^3 > WQ Volume Required (2332 ft^3)

Therefore ⇒ OK

5571 Midway Park Place NE • Albuquerque, NM 87109 • (505) 858-3100 • (505) 858-1118 Fax • 1-800-245-3102 • twllc@tierrawestllc.com

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2. TWO WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT LINE LOCATING SERVICE, 765-1234, FOR LOCATION OF EXISTING UTILITIES.
3. 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.
4. BACKFILL COMPACTION SHALL BE ACCORDING TO TRAFFIC/STREET USE.
5. 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.

EROSION CONTROL NOTES:

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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 (CITY) ACCEPTANCE OF ANY PROJECT.

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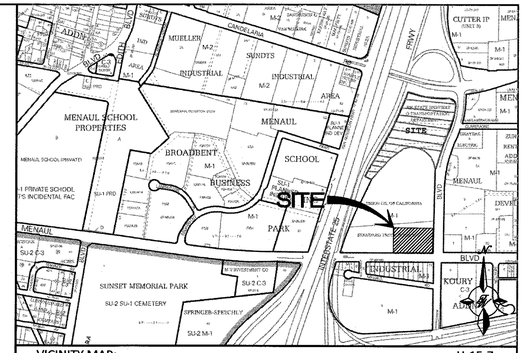
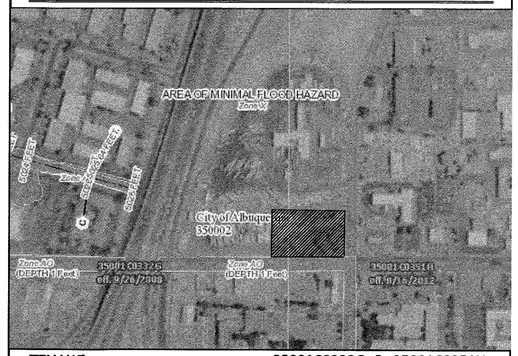
LEGEND

- CURB & GUTTER
- BOUNDARY LINE
- EASEMENT
- RIGHT-OF-WAY
- BUILDING
- SIDEWALK
- 5010 CONTOUR MAJOR
- 5011 CONTOUR MINOR
- x 5048.25 SPOT ELEVATION
- FLOW ARROW
- EXISTING CURB & GUTTER
- EXISTING BOUNDARY LINE
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- x 5048.25 EXISTING SPOT ELEVATION
- DROP INLET
- CONCRETE FLUME



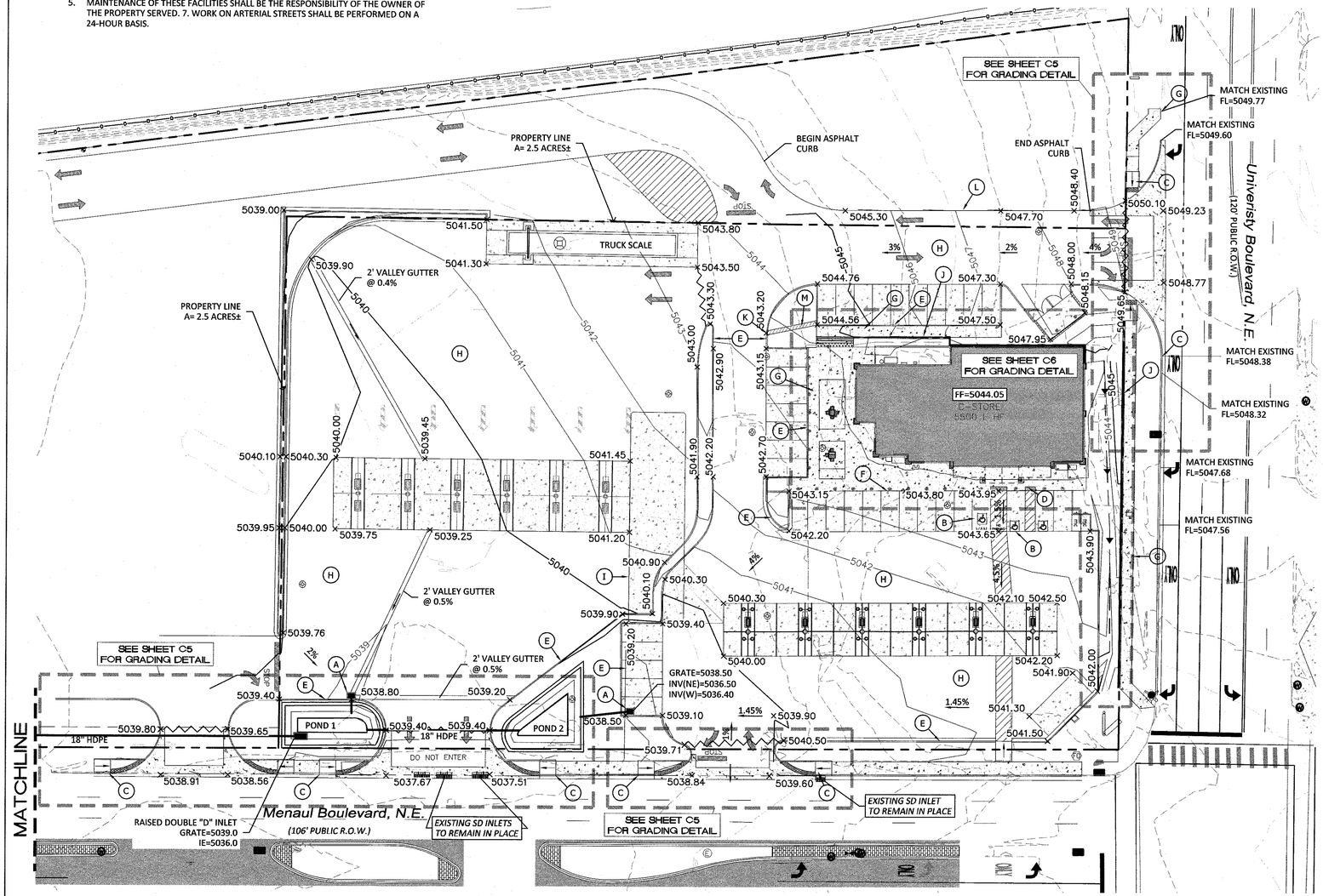
VICINITY MAP: H-15-Z

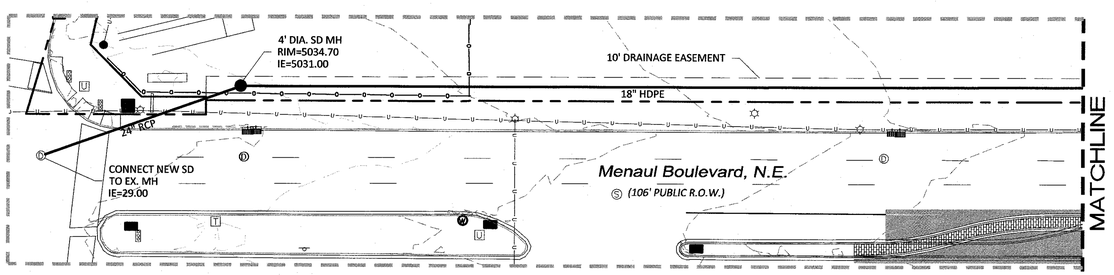


FIRM MAP: 35001C0332G & 35001C0351H

KEYED NOTE:

- (A) SINGLE "D" WATER QUALITY INLET W/ BIOSNOUT (SEE DETAIL SHT. C11)
- (B) ACCESSIBLE PARKING PER ADA STANDARDS WITH SIGN (SEE DETAIL SHT. C9)
- (C) UNIDIRECTIONAL ACCESSIBLE RAMP (SEE DETAIL SHT. C10)
- (D) TRUNCATED DOMES (SEE DETAIL SHT. C10)
- (E) ON-SITE CURB & GUTTER (SEE DETAIL SHT. C10)
- (F) ZERO CURB
- (G) CONCRETE SIDEWALK (SEE DETAIL SHT. C9)
- (H) ASPHALT PAVING (SEE GEOTECH REPORT)
- (I) CONCRETE SLAB W/ CHAMFERED CORNERS
- (J) RETAINING WALL WITH RAILING (SEE DETAIL SHT. C11)
- (K) 2' CURB CUT
- (L) ASPHALT CURB
- (M) 2' WIDE CONCRETE FLUME (SEE DETAIL SHT. C11)





SPOT ELEVATION NOTE:

ALL SPOT ELEVATIONS ARE FLOWLINE UNLESS OTHWISE NOTED.

GRAPHIC SCALE

30 15 0 15 30

SCALE: 1"=30'

MAVERIK

TEXAS BUSINESS NO. F-11773

ENGINEER'S SEAL

RONALD R. BOHANNAN NEW MEXICO 7868 REGISTERED PROFESSIONAL ENGINEER

RONALD R. BOHANNAN P.E. #7868

MAVERIK
UNIVERSITY & MENAUL

GRADING AND DRAINAGE PLAN

DRAWN BY DY

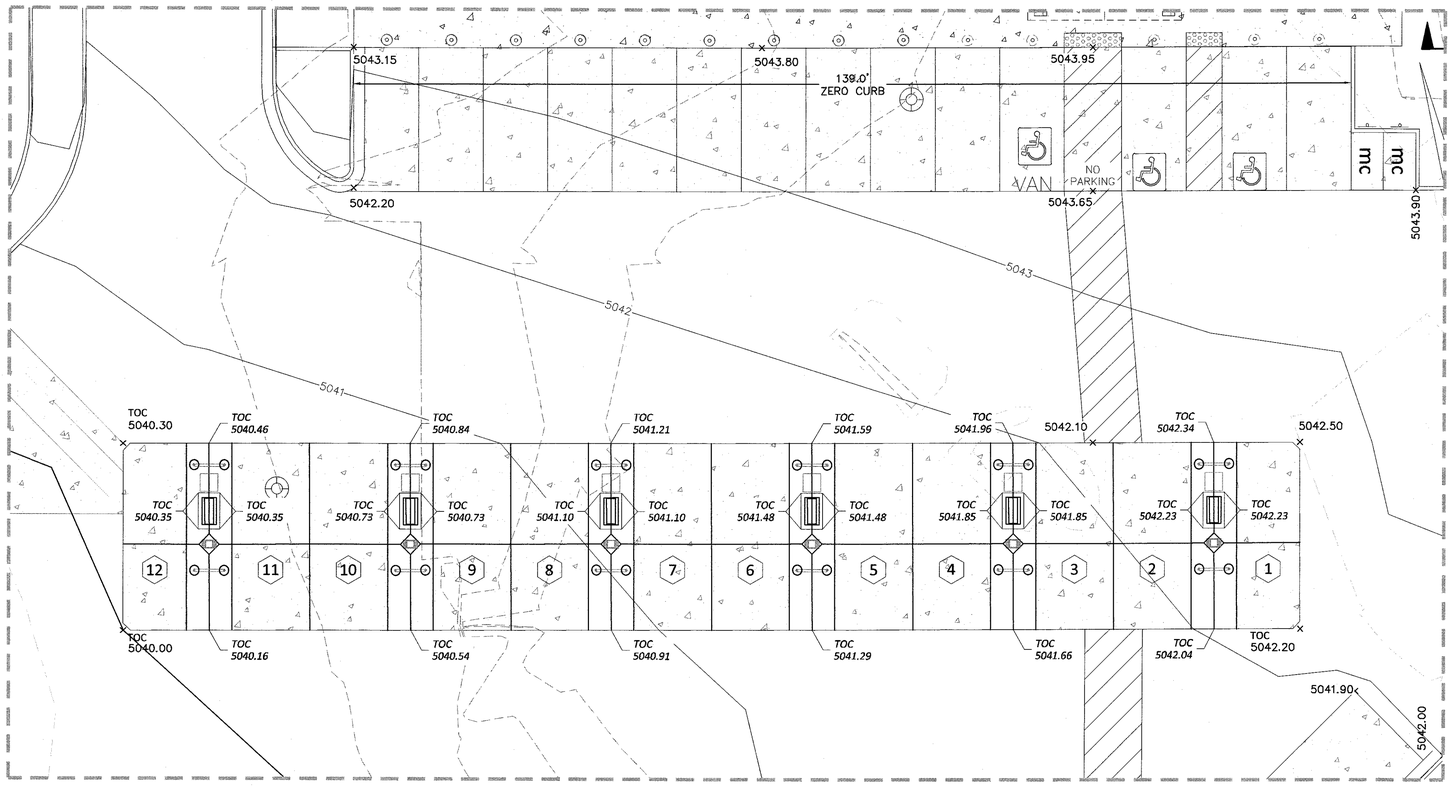
DATE 9/3/2019

2018062-C2-GRB

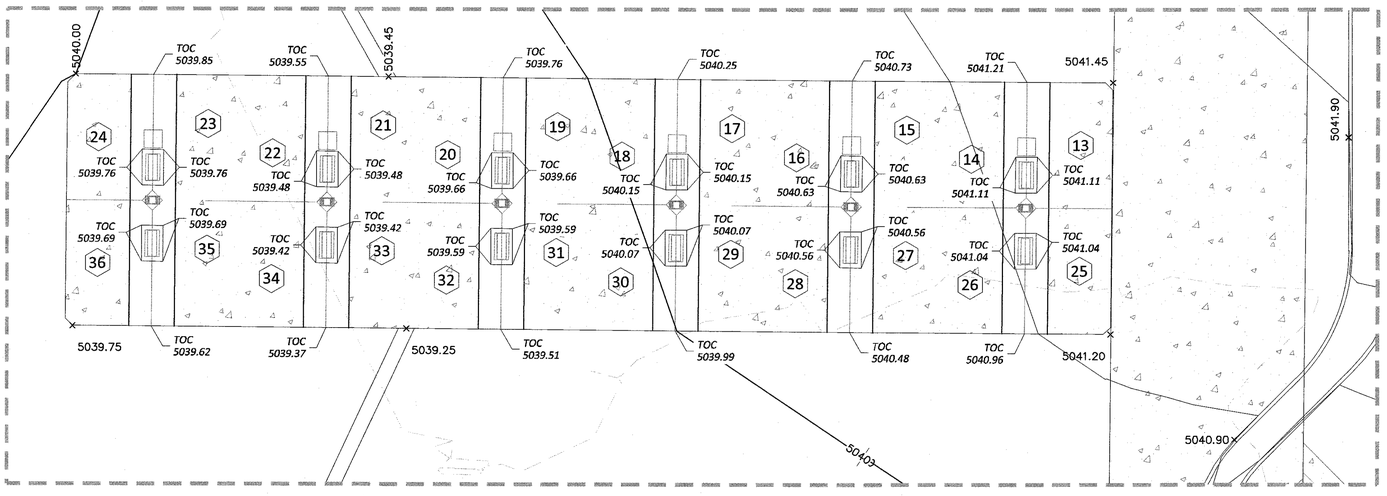
SHEET # C2

JOB # 2018062

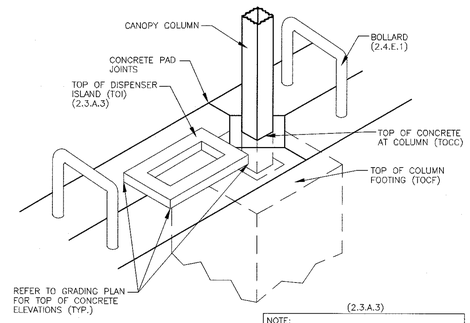
TIERRA WEST, LLC
5571 MIDWAY PARK PLACE NE
ALBUQUERQUE, NM 87109
(505) 858-3100
www.tierrawestllc.com



PEDESTRIAN VEHICLE FUELING AREA



HEAVY TRUCK FUELING AREA



NOTE: TOP OF CONCRETE TO TOP OF SPOT & SPREAD FOOTING SEPARATION IS 36".

(2.3.A.3)

NOTE:
6" RAISED VERTICAL CONCRETE ISLAND WITH TOOLED EDGES AND CORNERS TO BE POURED FIRST 5'-0" x 3'-0" CONCRETE ISLAND (NO METAL FORM – VERIFY SIZE WITH DISPENSER MANUF.)

AFTER THE 5'-0" – 3'-0" FUEL ISLAND HAS BEEN POURED, SLOPE CONCRETE AWAY FROM ISLAND IN ALL (4) DIRECTIONS.

ALL DISPENSERS TO BE EQUIPPED WITH AN EXTINGUISHER.

NOTE: TOC=TOP OF CONCRETE FUEL DISPENSER ELEVATIONS

FUEL DISPENSER	TOP OF ISLAND	T.O.C. @ COLUMN	TOP OF COL. FTP
1-2	5042.73	5042.19	5039.19
3-4	5042.35	5041.81	5038.81
5-6	5041.98	5041.44	5038.44
7-8	5041.60	5041.06	5038.06
9-10	5041.23	5040.69	5037.69
11-12	5040.85	5040.31	5037.31
13-14	5041.61	5041.08	5038.08
15-16	5041.13	5040.60	5037.60
17-8	5040.65	5040.12	5037.12
19-20	5040.16	5039.63	5036.63
21-22	5039.98	5039.46	5036.46
23-24	5040.26	5039.73	5036.73
25-26	5041.54	5041.08	5038.08
27-28	5041.06	5040.60	5037.60
29-30	5040.57	5040.12	5037.12
31-32	5040.09	5039.63	5036.63
33-34	5039.92	5039.46	5036.46
35-36	5040.19	5039.73	5036.73

GRAPHIC SCALE

10 5 0 5 10

SCALE: 1"=10'

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GRADING DETAILS – FUEL CANOPIES

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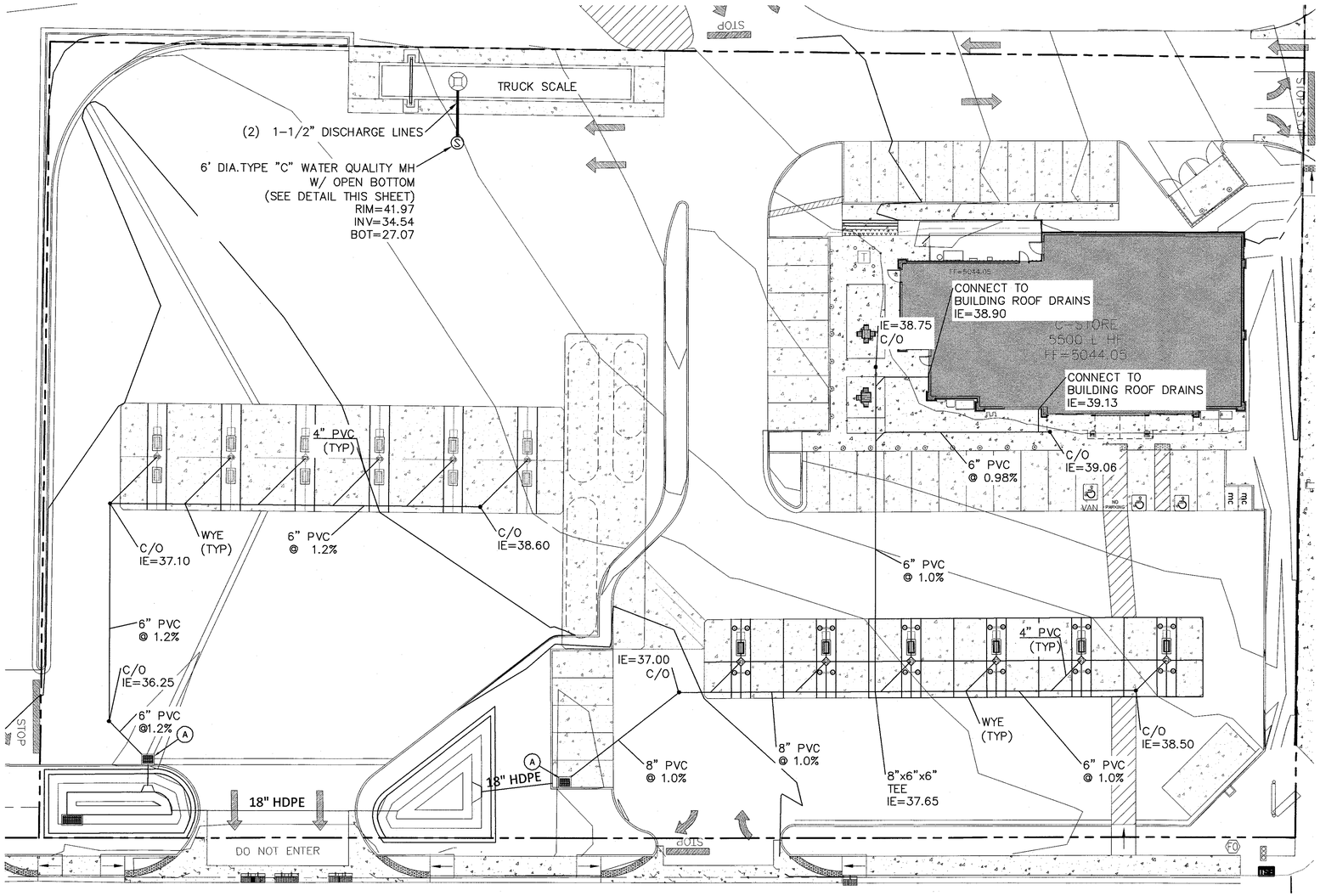
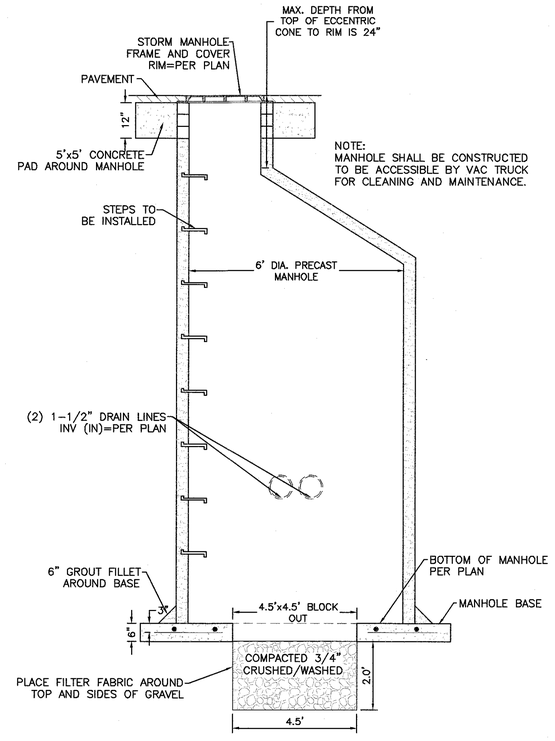
SHEET #
C3

JOB #
2018062





WATER QUALITY MANHOLE
NTS

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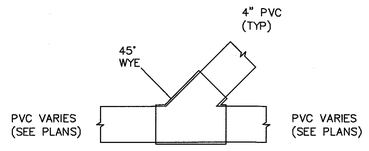

WYE TYPICAL
NOT TO SCALE

KEYED NOTE:

(A) WATER QUALITY INLET W/ BIOSNOUT - SEE DETAIL SHEET C11

GRAPHIC SCALE
20 10 0 10 20
SCALE: 1"=20'

LEGEND

- CURB & GUTTER
- BOUNDARY LINE
- EASEMENT
- RIGHT-OF-WAY
- BUILDING
- SIDEWALK
- 5010 CONTOUR MAJOR
- 5011 CONTOUR MINOR
- × 5048.25 SPOT ELEVATION
- FLOW ARROW
- EXISTING CURB & GUTTER
- EXISTING BOUNDARY LINE
- EXISTING CONTOUR MAJOR
- 5011 EXISTING CONTOUR MINOR
- × 5048.25 EXISTING SPOT ELEVATION
- ⊠ 12"x12" CATCH BASIN (NDS OR EQUAL)
- DROP INLET
- CURB INLET

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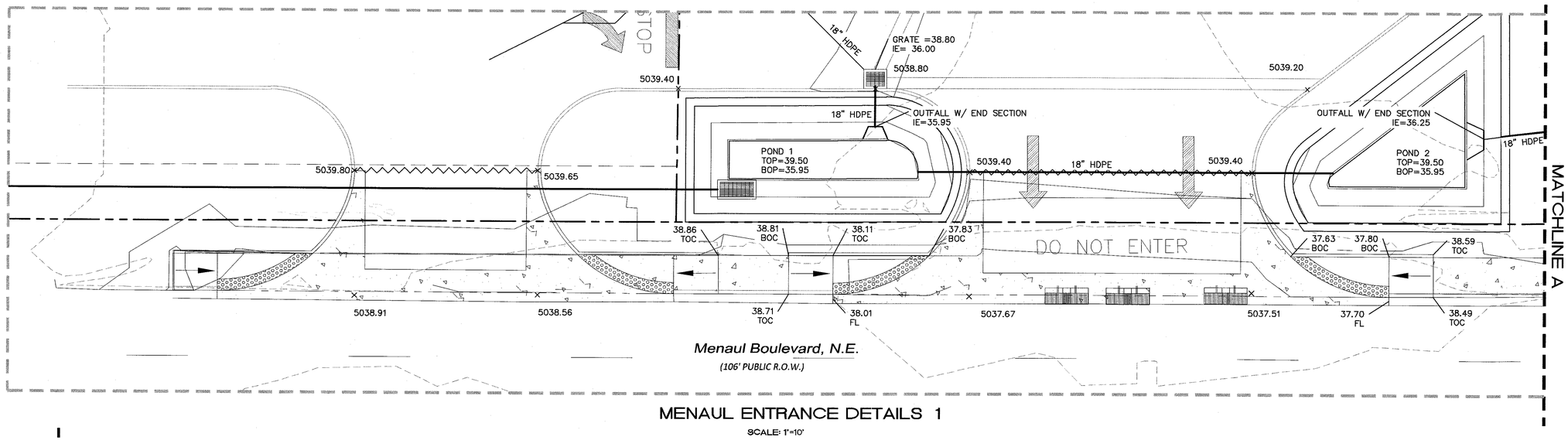
ROOF STORM DRAINAGE PLAN

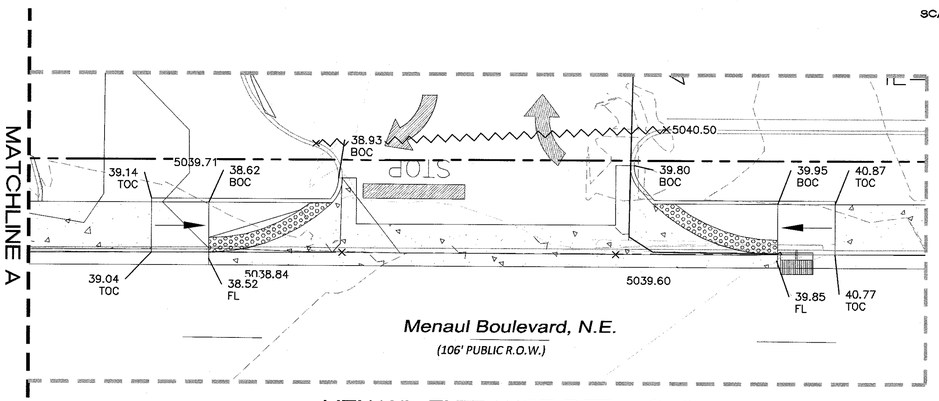
TIERRA WEST, LLC
5571 MIDWAY PARK PLACE NE
ALBUQUERQUE, NM 87109
(505) 858-3100
www.tierrawestllc.com

DRAWN BY	BJF
DATE	9/3/2019
	2018062-C2-GRB
SHEET #	C4
JOB #	2018062



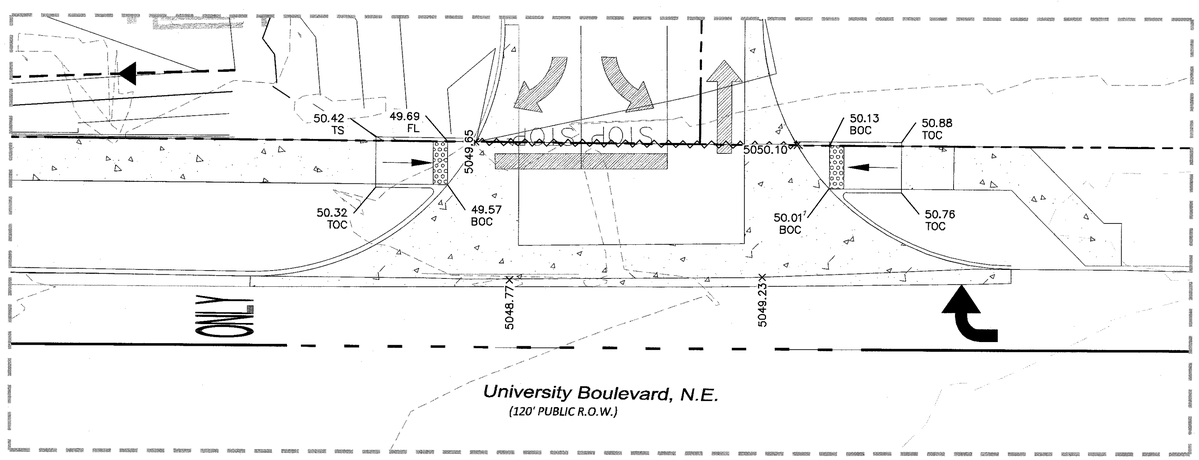
MENAUL ENTRANCE DETAILS 1

SCALE: 1"=10'



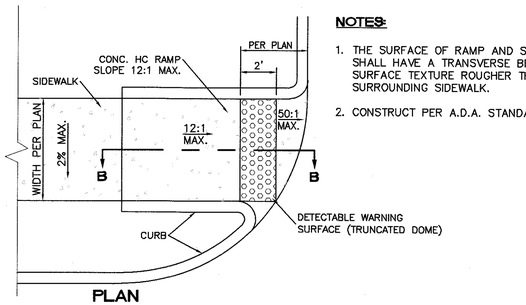
MENAUL ENTRANCE DETAILS 2

SCALE: 1"=10'

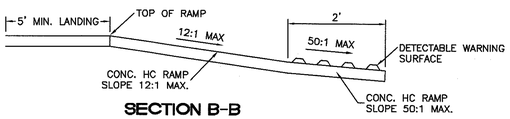


UNIVERSITY ENTRANCE DETAILS 3

SCALE: 1"=10'



PLAN



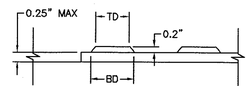
SECTION B-B

UNIDIRECTIONAL HC RAMP

NOT TO SCALE

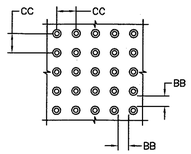
NOTES:

1. THE SURFACE OF RAMP AND SIDES SHALL HAVE A TRANSVERSE BROOMED SURFACE TEXTURE ROUGHER THAN THE SURROUNDING SIDEWALK.
2. CONSTRUCT PER A.D.A. STANDARDS.



DOME SECTION

BD – BASE DIAMETER 0.9" MIN
TD – TOP DIAMETER 50% OF BD MIN TO 65% OF BD MAX



DOME SPACING

CC – CENTER TO CENTER SPACING 2.35"
BB – BASE TO BASE SPACING 1.48" MIN

GRAPHIC SCALE

10 5 0 5 10

SCALE: 1"=10'

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.

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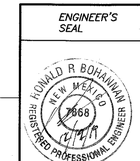
TEXAS BUSINESS NO. F-11773

ENGINEER'S SEAL



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P.E. #7868

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ENTRANCE/POND DETAILS

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5571 MIDWAY PARK PLACE NE
ALBUQUERQUE, NM 87109
(505) 858-3100
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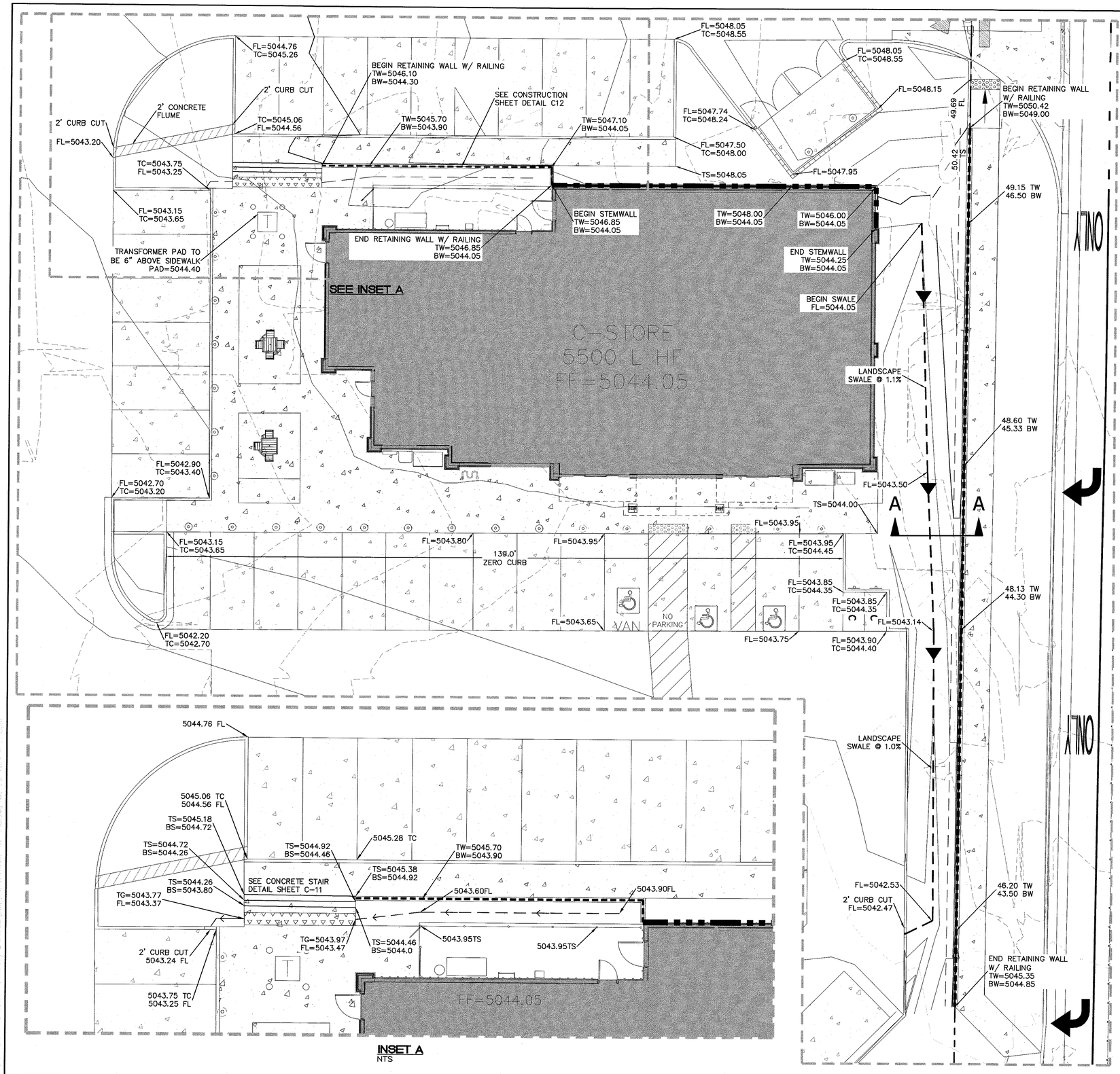
DRAWN BY: BJF
DATE: 9/3/2019
2018062-C2-GRB
SHEET # C5
JOB # 2018062



INSET A
NTS

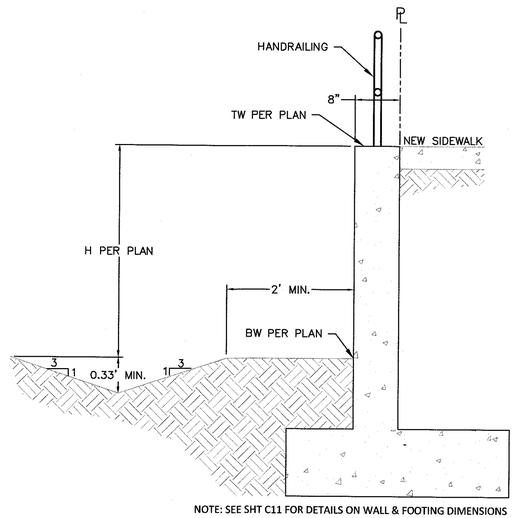
GRAPHIC SCALE
10 5 0 5 10
SCALE: 1"=10'

LEGEND

- RETAINING WALL
- EXTENDED STEM WALL
- EXISTING CURB & GUTTER
- EXISTING BOUNDARY LINE
- 5010 EXISTING CONTOUR MAJOR
- 5011 EXISTING CONTOUR MINOR
- x 5048.25 EXISTING SPOT ELEVATION
- CURB & GUTTER
- BOUNDARY LINE
- EASEMENT
- RIGHT-OF-WAY
- BUILDING
- SIDEWALK
- 5010 CONTOUR MAJOR
- 5011 CONTOUR MINOR
- x 5048.25 SPOT ELEVATION
- FLOW ARROW
- LANDSCAPE SWALE
- FLUME
- SIDEWALK CULVERT

SPOT ELEVATION LEGEND

FL=FLOWLINE
TC=TOP OF CURB
TS=TOP OF SIDEWALK/STEP
BS=BOTTOM OF STEP
BW=BOTTOM OF WALL
TW=TOP OF WALL
TG=TOP OF GRATE



NOTE: SEE SHT C11 FOR DETAILS ON WALL & FOOTING DIMENSIONS

SECTION A-A
NTS

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TEXAS BUSINESS NO. F-11773

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RONALD R. BOHANNAN
P.E. #9868

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BUILDING ELEVATION DETAILS

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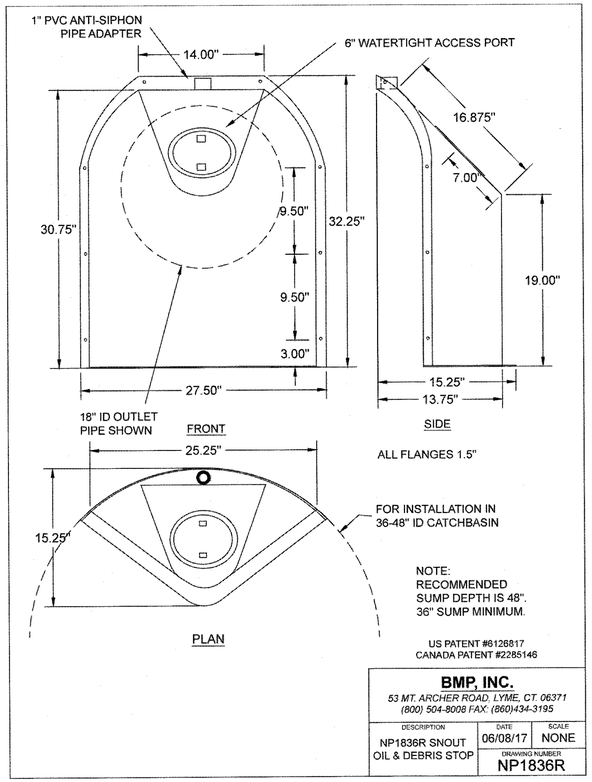
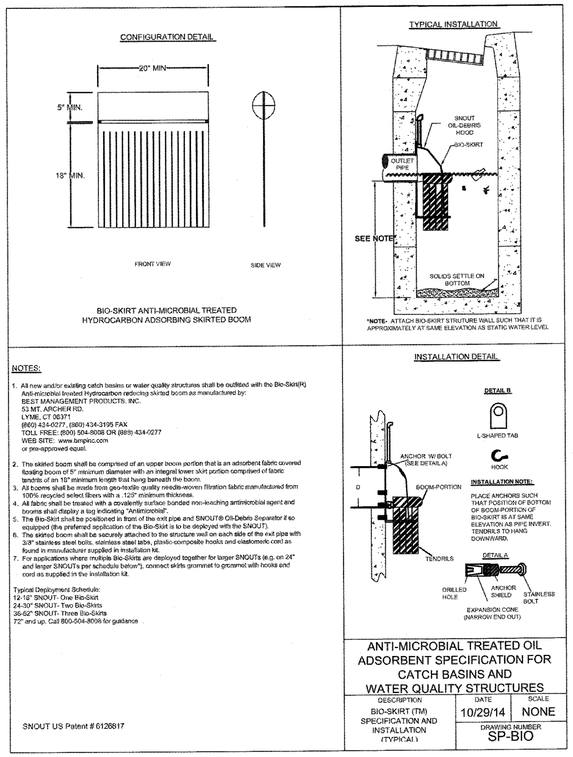
5571 MIDWAY PARK PLACE NE
ALBUQUERQUE, NM 87109
(505) 858-3100
www.tierrawestllc.com

DRAWN BY	FB
DATE	9/13/2019
	2018062-C2-GRB
SHEET #	C6
JOB #	2018062



BMP, INC.
53 MT. ARCHER ROAD, LYME, CT 06371
(800) 504-8008 FAX: (860)434-3195

DESCRIPTION	DATE	SCALE
NP1836R SNOUT OIL & DEBRIS STOP	06/08/17	NONE
	DRAWING NUMBER	NP1836R



NOTES:

1. All new and/or existing catch basins or water quality structures shall be outfitted with the Bio-Skirt(R) Anti-microbial treated Hydrocarbon reducing skirted boom as manufactured by: BEST MANAGEMENT PRODUCTS, INC. 53 MT. ARCHER RD. LYME, CT 06371 (860) 434-0277, (860) 434-3195 FAX TOLL FREE: (800) 504-8008 OR (888) 434-0277 WEB SITE: www.bmpinc.com or pre-approved equal.
2. The skirted boom shall be comprised of an upper boom portion that is an adsorbent fabric covered floating boom of 5" minimum diameter with an integral lower skirt portion comprised of fabric tendrils of an 18" minimum length that hang beneath the boom.
3. All booms shall be made from geo-textile quality needle-woven filtration fabric manufactured from 100% recycled select fibers with a .123" minimum thickness.
4. All fabric shall be treated with a covalently surface bonded non-leaching antimicrobial agent and booms shall display a tag indicating "Antimicrobial".
5. The Bio-Skirt shall be positioned in front of the exit pipe and SNOUT® Oil-Debris Separator if so equipped (the preferred application of the Bio-Skirt is to be deployed with the SNOUT).
6. The skirted boom shall be securely attached to the structure wall on each side of the exit pipe with 3/8" stainless steel bolts, stainless steel tabs, plastic-composite hooks and elastomeric cord as found in manufacturer supplied in installation kit.
7. For applications where multiple Bio-Skirts are deployed together for larger SNOUTs (e.g. on 24" and larger SNOUTs per schedule below"), connect skirts grommet to grommet with hooks and cord as supplied in the installation kit.

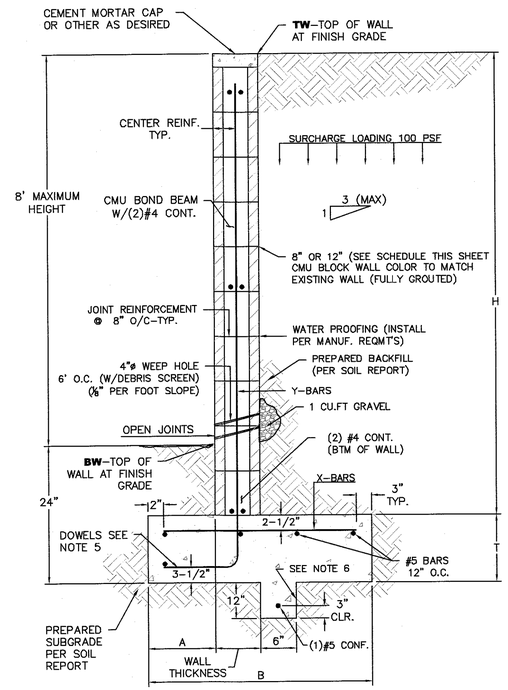
Typical Deployment Schedule:
12-18" SNOUT- One Bio-Skirt
24-30" SNOUT- Two Bio-Skirts
36-52" SNOUT- Three Bio-Skirts
72" and up. Call 800-504-8008 for guidance

SNOUT US Patent # 6126817

ANTI-MICROBIAL TREATED OIL ADSORBENT SPECIFICATION FOR CATCH BASINS AND WATER QUALITY STRUCTURES

DESCRIPTION	DATE	SCALE
BIO-SKIRT (TM) SPECIFICATION AND INSTALLATION (TYPICAL)	10/29/14	NONE
	DRAWING NUMBER	SP-BIO

WATER QUALITY INLET AND BIOSNOUT DETAIL
SCALE: NONE



RETAINING WALL DETAIL
NTS

- $f'm$ = 1500 PSI
- SOIL ALLOWABLE 2000 PSF (VERIFY W/SOILS REPORT)
- ACTIVE SOIL PRESSURE – 35 PSF/FT (VERIFY W/SOILS REPORT)
- PASSIVE SOIL PRESSURE – 250 PSF/FT (VERIFY W/SOILS REPORT)
- SOIL FRICTION FACTOR – 0.4 (VERIFY W/SOILS REPORT)

8 INCH REINFORCED CONCRETE MASONRY WALL

H	A	B	T	Y–BARS	X–BARS
ft.–in.	in.	ft.–in.	in.		
2'–0"	10"	2'–4"	10"	#4 @24" O.C.	#4 @24" O.C.
2'–8"	10"	2'–4"	10"	#4 @24" O.C.	#4 @24" O.C.
3'–4"	10"	2'–4"	10"	#4 @24" O.C.	#4 @24" O.C.
4'–0"	12"	2'–8"	10"	#4 @16" O.C.	#4 @24" O.C.
4'–8"	16"	3'–4"	12"	#5 @16" O.C.	#4 @18" O.C.
5'–4"	19"	3'–10"	12"	#5 @ 8" O.C.	#5 @24" O.C.
6'–0"	20"	4'–8"	12"	#6 @ 8" O.C.	#5 @24" O.C.

Y– BARS EDGE (2 ½") FROM RETAINING FACE

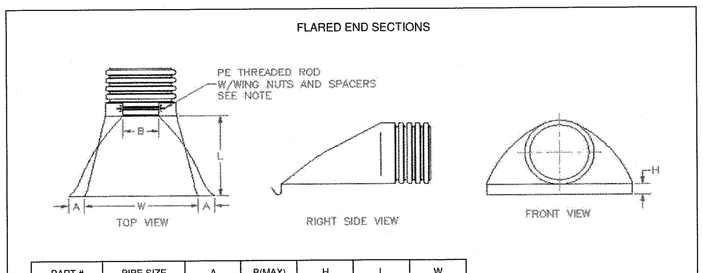
12 INCH REINFORCED CONCRETE MASONRY WALL

H	A	B	T	Y–BARS	X–BARS
ft.–in.	in.	ft.–in.	in.		
5'–4"	16"	3'–8"	12"	#5 @16" O.C.	#5 @24" O.C.
6'–0"	19"	4'–2"	12"	#5 @ 8" O.C.	#5 @24" O.C.
6'–8"	21"	4'–6"	12"	#5 @ 8" O.C.	#5 @16" O.C.
7'–4"	23"	4'–10"	12"	#6 @ 8" O.C.	#6 @18" O.C.
8'–0"	26"	5'–4"	12"	#6 @ 8" O.C.	#6 @18" O.C.
8'–8"	28"	5'–8"	12"	#6 @ 8" O.C.	#6 @12" O.C.

Y– BARS EDGE (3") FROM RETAINING FACE

GENERAL NOTES:

1. ALL CONCRETE IS TO BE 4000 PSI @ 28 DAYS.
2. MINIMUM COMPACTION UNDER FOOTINGS IS TO BE 95% PER ASTM. D 1557 FOR A DEPTH OF 12" MOISTURE CONTENT IS TO BE ± 2.0%.
3. BACK FILL AGAINST WALLS IS TO BE HAND–PLACED AND COMPACTED.
4. ALL BARS ARE TO BE GRADE 60, ASTM 615.
5. DOWELS SHALL BE EQUAL IN SIZE AND SPACING TO Y–BARS, SHALL PROJECT A MINIMUM OF #4–24", #5–30", #6–36" INTO THE FILLED BLOCK CORES, AND SHALL EXTEND TO THE TOE OF THE FOOTING.
6. PROVIDE KEY FOR 8" AND 12" WALLS WHERE H EXCEEDS 6'
7. USE EITHER EXPANSION JOINTS ON 20' CENTERS OR PILASTERS EVERY 16'.



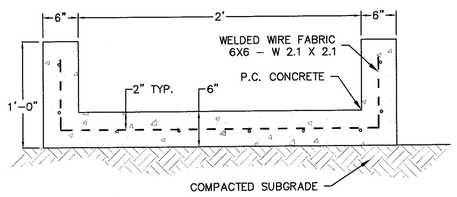
PART #	PIPE SIZE	A	B(MAX)	H	L	W
1015NP	10 in (250 mm)	3.8 in (95 mm)	10.0 in (254 mm)	6.5 in (165 mm)	28.0 in (711 mm)	34.5 in (876 mm)
1215NP	12 & 15 (300 & 375mm)	6.5 in (165 mm)	10.0 in (254 mm)	6.5 in (165 mm)	25.0 in (635 mm)	29.0 in (737 mm)
1810NP	18 in (450 mm)	7.5 in (191 mm)	15.0 in (381 mm)	6.5 in (165 mm)	32.0 in (813 mm)	35.0 in (889 mm)
2410NP	24 in (600 mm)	7.5 in (191 mm)	18.0 in (457 mm)	6.5 in (165 mm)	36.0 in (914 mm)	45.0 in (1143 mm)
3015NP	30 in (750 mm)	7.5 in (191 mm)	12.0 in (305 mm)	8.6 in (218 mm)	58.0 in (1473 mm)	63.0 in (1600 mm)
3615NP	36 in (900 mm)	7.5 in (191 mm)	25.0 in (635 mm)	8.6 in (218 mm)	58.0 in (1473 mm)	63.0 in (1600 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL

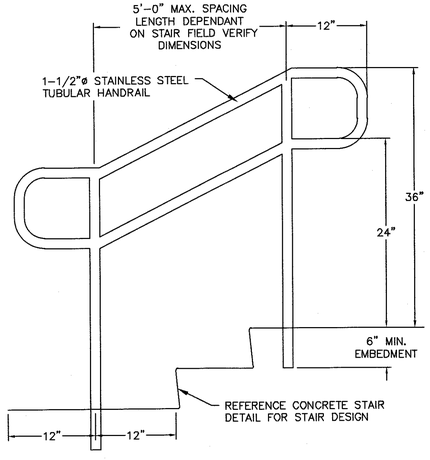
ADS ADVANCED DRAINAGE SYSTEMS, INC.

DRAWING #:	6070
DRAWN BY:	JCB 01.17.07
APPROVED BY:	JCB 06.28.07
REVISIONS:	TJR 6/7/2018

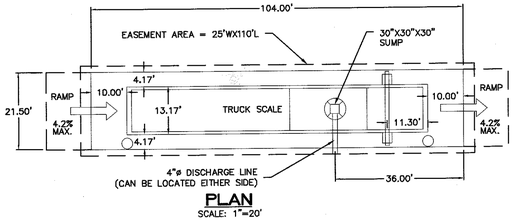
HDPE END SECTION DETAIL
NTS



CONCRETE FLUME DETAIL
NTS

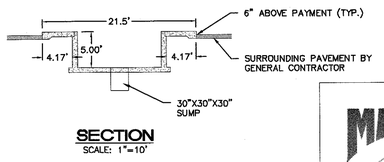


HANDRAIL DETAIL
NTS

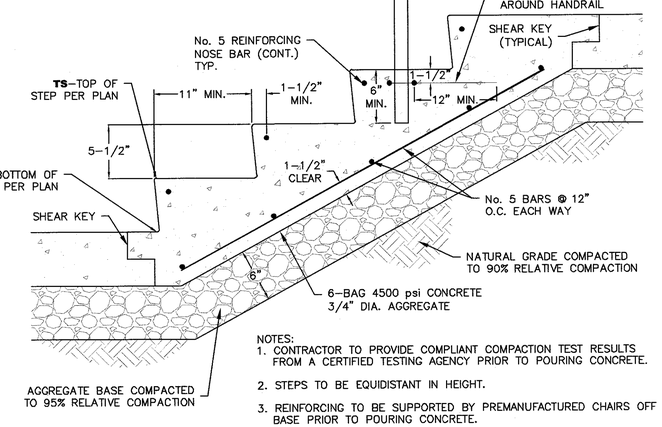


PLAN
SCALE: 1"=20'

TRUCK SCALE (CAT)
SCALE: NONE



SECTION
SCALE: 1"=10'



NOTES:
1. CONTRACTOR TO PROVIDE COMPLIANT COMPACTION TEST RESULTS FROM A CERTIFIED TESTING AGENCY PRIOR TO POURING CONCRETE.
2. STEPS TO BE EQUIDISTANT IN HEIGHT.
3. REINFORCING TO BE SUPPORTED BY PREMANUFACTURED CHAIRS OFF BASE PRIOR TO POURING CONCRETE.

CONCRETE STAIR DETAIL
NTS

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RONALD R BOHANNAN NEW MEXICO 7868 REGISTERED PROFESSIONAL ENGINEER

RONALD R. BOHANNAN P.E. #7868

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CONSTRUCTION DETAIL 4

TIERRA WEST, LLC
5571 MIDWAY PARK PLACE NE
ALBUQUERQUE, NM 87109
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www.tierrawestllc.com

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DATE	9/3/2019
	2018062–C8–DETAILS
SHEET #	C11
JOB #	2018062