

CITY OF ALBUQUERQUE



Richard J. Berry, Mayor

May 26, 2017

Rick Beltramo, P.E.
Respec
5971 Jefferson St. NE
Albuquerque, NM, 87109

**RE: Paseo Marketplace
Conceptual Grading Plan
Stamp Date: 5/25/17
Hydrology File: D18D056**

Dear Mr. Beltramo:

PO Box 1293

Based upon the information provided in your re-submittal received 5/25/17, the Conceptual Grading Plan is approved for Site Plan for Subdivision and Site Plan for Building Permit.

Albuquerque

If you have any questions, please contact me at 924-3995 or rbrissette@cabq.gov.

New Mexico 87103

Sincerely,

Renee C. Brissette

www.cabq.gov

Reneé C. Brissette, P.E.
Senior Engineer, Hydrology
Planning Department

Hydrology Calculations

The following calculations are based on Albuquerque's Development Process Manual, Section 22.2

Runoff Rate:

Treatment Type Areas

Subbasin	Area _a (ac)	Area _b (ac)	Area _c (ac)	Area _d (ac)	Total (ac)
Offsite Subbasin	1.98	0.00	1.32	0.00	3.30
Proposed Subbasin 1	0.00	0.04	0.04	0.14	0.21
Proposed Subbasin 2	0.00	0.06	0.06	0.41	0.53
Proposed Subbasin 3	0.00	0.06	0.06	2.24	2.36
Proposed Subbasin 4	0.00	0.02	0.02	0.17	0.23
Proposed Subbasin 5	0.00	0.00	0.00	0.14	0.14
Proposed Subbasin 6	0.00	0.14	0.14	2.44	2.71

Peak Discharge values based on Zone 3 from Table A-9

$$Q_a = 1.87 \text{ cfs/ac}$$

$$Q_b = 2.60 \text{ cfs/ac}$$

$$Q_c = 3.45 \text{ cfs/ac}$$

$$Q_d = 5.02 \text{ cfs/ac}$$

Peak Discharge calculation for a 100-yr, 24-hr storm event from equation A-10

Subbasin	Discharge (cfs)
Offsite Subbasin	8.3
Proposed Subbasin 1	0.9
Proposed Subbasin 2	2.4
Proposed Subbasin 3	11.6
Proposed Subbasin 4	1.0
Proposed Subbasin 5	0.7
Proposed Subbasin 6	13.1

Water Quality:

Required Water Quality volume for first flush of 0.34"

Subbasin	Volume (cu. ft.)
Proposed Subbasin 1	173
Proposed Subbasin 2	510
Proposed Subbasin 3	2767
Proposed Subbasin 4	210
Proposed Subbasin 5	173
Proposed Subbasin 6	3010
Total Required	6843

18" HDPE Pipe Capacity

Circular Channel

Input

Flow: 15 cfs
Slope: 0.015 ft/ft
Manning's n: 0.011
Diameter: 18 in

Output

Depth: 1.212 ft
Flow Area: 1.53 sf
Velocity: 9.81 fps
Velocity Head: 1.49 ft
Top Width: 1.18 ft
Froude Number: 1.52
Critical Depth: 1.406 ft
Critical Slope: 0.0126 ft/ft

30" HDPE Pipe Capacity

Circular Channel

Input

Flow: 38.1 cfs
Slope: 0.01 ft/ft
Manning's n: 0.011
Diameter: 30 in

Output

Depth: 1.670 ft
Flow Area: 3.48 sf
Velocity: 10.9 fps
Velocity Head: 1.86 ft
Top Width: 2.35 ft
Froude Number: 1.58
Critical Depth: 2.086 ft
Critical Slope: 0.00599 ft/ft

1' Sidewalk Culvert Capacity

Rectangular Channel

Input

Depth: 0.5 ft
Slope: 0.01 ft/ft
Manning's n: 0.013
Base Width: 1 ft
Right Side Slope: 0:1
Left Side Slope: 0:1

Output

Flow: 2.27 cfs
Flow Area: 0.500 sf
Velocity: 4.54 fps
Velocity Head: 0.320 ft
Top Width: 1.00 ft
Froude Number: 1.13
Critical Depth: 0.543 ft
Critical Slope: 0.00804 ft/ft

Water Quality Pond Rating Curves

WQ Pond 1	Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5253.8	353	0	0	
5254.3	482	209	0	

WQ Pond 4	Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5243.2	139	0	0	
5244	273	165	0	
5244.2	313	59	223	

WQ Pond 5.2	Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5256.39	89	0	0	
5256.89	242	83	83	

WQ Pond 2	Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5242.75	575	0	0	
5243	648	153	153	
5243.5	806	364	516	

WQ Pond 5.1	Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5254.34	32	0	0	
5255	136	56	56	
5255.34	205	58	114	

24" HDPE Pipe Capacity

Circular Channel

Input

Flow: 23.1 cfs
Slope: 0.01 ft/ft
Manning's n: 0.011
Diameter: 24 in

Output

Depth: 1.435 ft
Flow Area: 2.41 sf
Velocity: 9.58 fps
Velocity Head: 1.43 ft
Top Width: 1.80 ft
Froude Number: 1.46
Critical Depth: 1.709 ft
Critical Slope: 0.00698 ft/ft

4" SDR 35 Pipe Capacity

Circular Channel

Input

Flow: 0.13 cfs
Slope: 0.005 ft/ft
Manning's n: 0.012
Diameter: 4 in

Output

Depth: 0.245 ft
Flow Area: 0.0688 sf
Velocity: 1.89 fps
Velocity Head: 0.0554 ft
Top Width: 0.294 ft
Froude Number: 0.688
Critical Depth: 0.203 ft
Critical Slope: 0.00847 ft/ft

Weir Calculation for 2' Curb Cut

Weir:

Head Water Depth (h): 0.5 ft
Discharge Coeff. (C_w): 3.367
Length (L): 2 ft
Flow (Q) = C_w · L · h^{1.5} = 2.4 cfs
Flow (Q) = 2.4 cfs

Weir Calculation for 1.5' Curb Cut

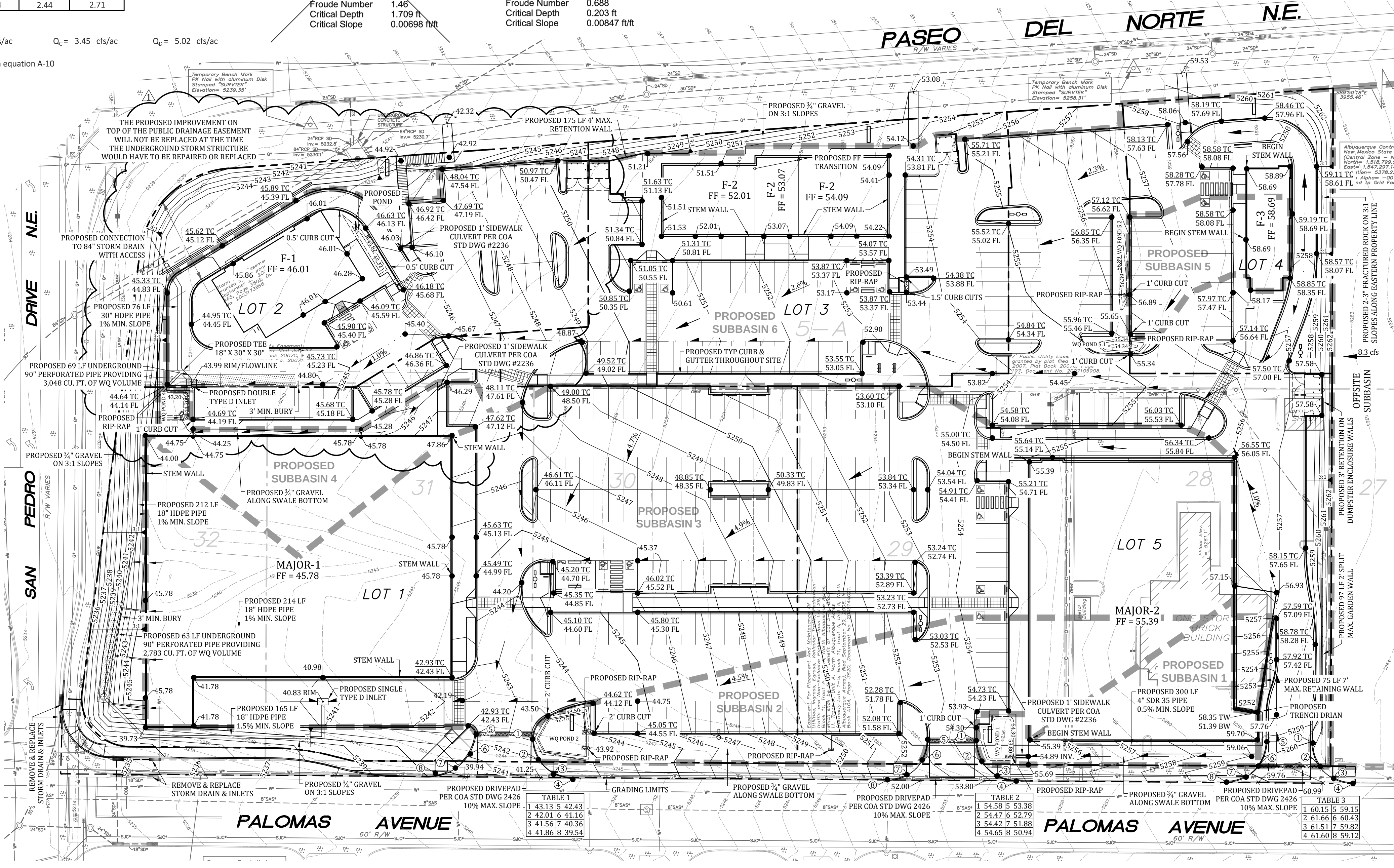
Weir:

Head Water Depth (h): 0.5 ft
Discharge Coeff. (C_w): 3.367
Length (L): 1.5 ft
Flow (Q) = C_w · L · h^{1.5} = 1.8 cfs
Flow (Q) = 1.8 cfs

Weir Calculation for 2' Curb Cut

Weir:

Head Water Depth (h): 0.5 ft
Discharge Coeff. (C_w): 3.367
Length (L): 1 ft
Flow (Q) = C_w · L · h^{1.5} = 1.2 cfs
Flow (Q) = 1.2 cfs



Background

Lots 1 thru 5 account for approximately 6.7 acres in Block 11, Tract A, Unit A, of North Albuquerque Acres in Bernalillo County, New Mexico. This property is located at the southeast corner of the intersection of Paseo Del Norte and San Pedro Drive. The site is mostly undeveloped with an existing one-story brick building located at the southeast corner of the property. The site receives offsite flows from the undeveloped properties located to the east. The historic flow rate from these properties is accounted for in the runoff calculations. There is no floodplain on the site. This property has an approved drainage report completed by Floyd Development Services (FDS) in December, 2015 (D180056) and should be referenced for general background information. Per this report, the site is allowed free discharge into the existing 84" storm drain crossing the northwest portion of the property.

Methodology

Hydrologic calculations for the site are performed in accordance with the Albuquerque Development Process Manual (DPM) Section 22.2 using the Rational Method to calculate peak flow rates in order to ensure all flow paths are sufficient to carry flows to the water quality ponds located on-site. The water quality ponding volume required was calculated by multiplying the impervious area by the first flush runoff value of 0.34". All hydrologic and hydraulic calculations can be found on this sheet.

Existing Conditions

The existing property slopes from east to west at approximately 3%. Therefore, the site has historically drained west into San Pedro Drive with a smaller portion draining to Palomas Avenue. Runoff entering San Pedro Drive either enters a 24" storm drain through an inlet located on the eastern curb near the intersection with Palomas Avenue or through a slot drain located in the median, which discharges directly into the 84" storm drain. Water entering Palomas Avenue flows west along the northern curb and eventually arrives at two inlets near the intersection with San Pedro Drive. This 24" storm drain converges with a 30" storm drain that discharges to an 8'x10' concrete box channel near the southwest corner of the intersection of Palomas Avenue and San Pedro Drive. This channel is also where the 84" storm drain discharges.

Proposed Conditions

It is proposed that the site, in general, drains from east to west as it has done historically. The property has been split into six subbasins. See the Hydrology Calculations in the top left corner of this sheet for peak flow rates and required water quality volumes.

Subbasin 1 is 0.21 acres and generates 0.9 cfs. Runoff generated by this subbasin is collected in a swale running west along the southern property line. The water enters a 1' sidewalk culvert that discharges into WQ Pond 1. The Manning's calculation for the sidewalk culvert is shown on the left side of this sheet. The required water quality pond volume for this subbasin is 173 cubic feet. WQ Pond 1 provides a total of 209 cubic feet. See the Water Quality Pond Rating Curves in the bottom left corner of this sheet. Once runoff is routed through the pond, it discharges through a 1' curb cut into the parking lot west of building Major-2. A weir calculation for a 1' curb cut is included at the top of this sheet.

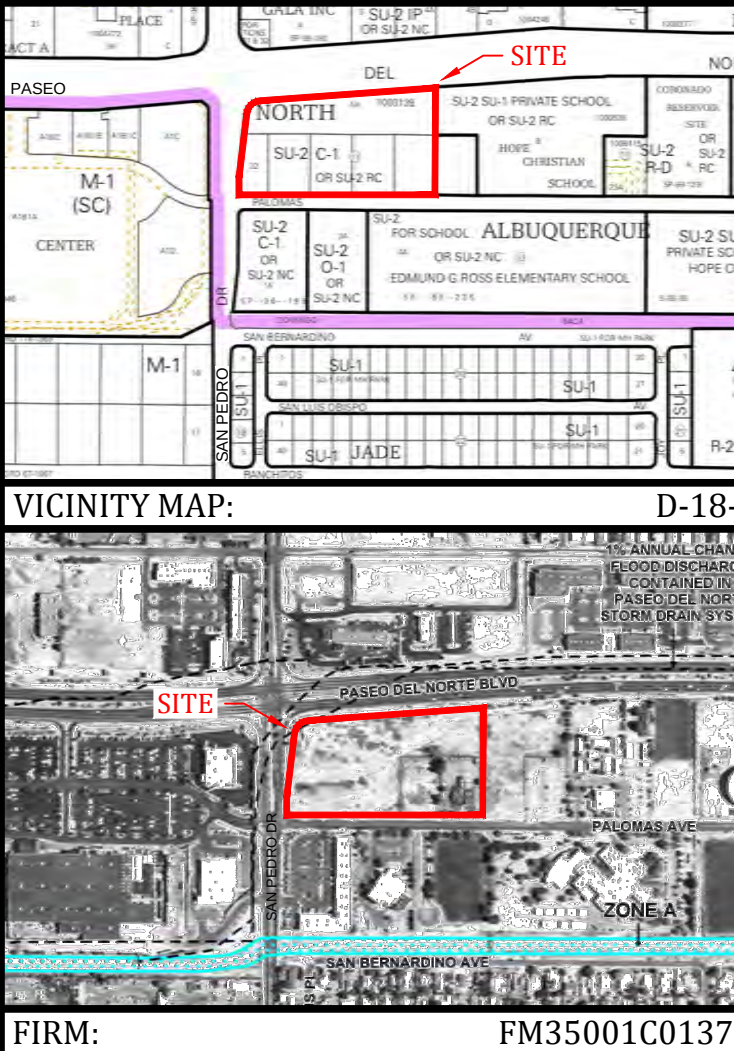
Subbasin 2 is 0.53 acres and generates 2.4 cfs. The truck ramp located east of building Major-2 is included in this subbasin. See the truck ramp calculations at the bottom of this sheet. Runoff from the truck ramp enters a 4" SDR 35 pipe and discharges into a swale located along the southern property line. The orifice and Manning's calculations for this pipe are included on this sheet. This basin is collected in WQ Pond 2 through a 2' curb opening. A weir calculation for a 2' curb cut is included at the top of this sheet. The required water quality pond volume for Subbasin 2 is 510 cubic feet. WQ Pond 2 provides a total of 516 cubic feet. Once full, runoff discharges through a 2' curb cut into the parking lot.

Subbasin 3 is 2.36 acres and generates 11.6 cfs. This basin also receives flows from Subbasins 1 and 2. Therefore, the peak flow rate for Subbasin 3 is 15.0 cfs. In general, water flows southwest across this basin and is collected by a single type D inlet. The orifice and weir calculation for a single type D inlet is included at the bottom of this sheet. From there water flows through a 18" HDPE pipe and discharges to an underground 90" perforated pipe located west of building Major-1. The Manning's calculation for the 18" HDPE pipe is shown on the left side of this sheet. The required water quality pond volume for Subbasin 3 is 2,767 cubic feet and the underground pipe provides 2,783 cubic feet. Once the underground storage is full, water flows through a 18" HDPE pipe, which connects with a 30" HDPE pipe that discharges into the 84" storm drain. The 30" HDPE pipe carries runoff for all subbasins both onsite and offsite, all of which generate a total peak discharge of 38.1 cfs. The Manning's calculation is included on the left side of this sheet.

Subbasin 4 is 0.23 acres and generates 1.0 cfs. Runoff is collected in a swale on the north side of building Major-1 and discharges into WQ Pond 4. The required water quality volume for this basin is 210 cubic feet, and WQ Pond 4 provides 223 cubic feet. From there, water discharges through a 1' curb cut into the parking lot.

Subbasin 5 is 0.14 acres and generates 0.7 cfs. Runoff is collected in WQ Pond 5.1 and WQ Pond 5.2 through two 1' curb cuts. The required water quality volume for subbasin 5 is 173 cubic feet. The combined volume for both ponds is 197 cubic feet. Both ponds discharge through a 1' curb opening into the parking lot.

Subbasin 6 is 2.36 acres and generates 13.1 cfs. This basin also receives the offsite flows from the east, which is 8.3 cfs, as well as Subbasins 4 and 5. Therefore, the peak flow rate for Subbasin 6 is 23.1 cfs. Runoff generated both onsite and offsite flows west in the northern portion of the property until eventually reaching the double type D inlet located in the parking lot in the northwest corner of the site. The orifice and weir calculation for a double type D inlet is included at the bottom of this sheet. Storm water is then collected in an underground 90" perforated pipe. The required water quality volume for this subbasin is 3,010 cubic feet and the underground pipe provides 3,048 cubic feet. After the pipe fills, excess water discharges through a 30" HDPE pipe and flows into the 84" storm drain. This is the same 30" HDPE pipe that the 18" HDPE pipe carrying runoff from Subbasins 1 thru 3 discharges into. The total water quality volume provided for the site is 6,974 cubic feet vs. 6,843 cubic feet required.



REVISION

DESIGNED: RLE
DRAWN: JWS
CHECKED: HWF
DATE: 5-25-17

CHANGES TO BLDG F-1

5-25-17

STAMP

HIGH W. FLOYD
NEW MEXICO
18633
LICENSED PROFESSIONAL ENGINEER

EXISTING LEGAL DESCRIPTION:

LOTS 5A, 27 THRU 31 AND THE
REMAINING PORTION OF LOT 32,
BLOCK 11, TRACT A, UNIT A, NORTH
ALBUQUERQUE ACRES

PASEO MARKETPLACE

CONCEPTUAL GRADING & DRAINAGE PLAN

GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

SHEET NUMBER:

C-1