

# CITY OF ALBUQUERQUE



Richard J. Berry, Mayor

May 5, 2017

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

**RE: Paseo Marketplace  
Conceptual Grading Plan  
Revision Stamp Date: 5/3/17  
Hydrology File: D18D056**

Dear Mr. Beltramo:

Based upon the information provided in your re-submittal received 5/4/2017, the Conceptual Grading Plan **is not** approved for Building Permit, Site Plan for Subdivision, Site Plan for Building Permit, Grading Permit, and SO-19. The following comments need to be addressed for approval of the above referenced project:

1. Under the Proposed Conditions – Subbasin 6, it states that the runoff will eventually reach the double Type A inlet. Since the inlets are not double Type A but double Type C as shown on the revised plans, please update.
2. Under the Proposed Conditions – Subbasin 6, the WQ volume required should be 3,132 CF as noted in the first flush volume calculations. Please update.
3. Included on the plans is The Oriffice & Weir Calculation for a double Type A inlet. Since the inlets are not double Type A but double Type C as shown on the revised plans, please update the Oriffice & Weir Calculations for a double Type C inlet.
4. Next to Building F-1, there is a proposed pond. Please provide the volume of this pond. Is this pond needed? I do not see this pond in the Proposed Conditions – Subbasin 6 paragraph. Please update if pond is needed.
5. It appears that only the note for the newly proposed Type C inlet is shown on the plan. Please show the newly proposed double Type C inlet. Also please label the rim and flowline elevations for the double Type C inlet.

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6. The shown boundary of the Proposed Subbasin 4 was not updated with the revisions to Building F-1 and surrounding pavement. Please update boundary which will also effect Subasin 3 and 6 areas and supporting calculations. The calculations for all three Subbasins should be revised.
7. The proposed swale in Subbasin 4 does not match the revised proposed contours. Please update the swale or contours to reflect the proposed swale. Please also show the drainage arrows.
8. The one inch curb cut near WQ pond 4 did not get relocated in the revisions. The newly proposed Subbasin 6 drainage flow line to the double Type C inlets is very close to the one inch curb cut and drainage from Subbasin 6 will outfall through this to WQ pond 4. Please either relocate the one inch curb cut if it is still needed or remove it if it is no longer needed.
9. It appears that WQ pond 4 size and shape have changed with the revisions, however the water quality pond rating curve for the pond did not change. Please revise the calculations so that the required volume for Subbasin 4 is being handled in the revised WQ pond 4. If needed, than adjust WQ pond 4 so that it will hold the required volume.

PO Box 1293

Albuquerque

NM 87103

[www.cabq.gov](http://www.cabq.gov)

If you have any questions, please contact me at 924-3995 or [rbrissette@cabq.gov](mailto:rbrissette@cabq.gov).

Sincerely,

*Renee C. Brissette*

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 <sub>a</sub> (ac) | Area <sub>b</sub> (ac) | Area <sub>c</sub> (ac) | Area <sub>d</sub> (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                   | 0.40                   | 0.51       |
| Proposed Subbasin 3 | 0.00                   | 0.06                   | 0.06                   | 2.25                   | 2.37       |
| Proposed Subbasin 4 | 0.00                   | 0.03                   | 0.03                   | 0.16                   | 0.23       |
| Proposed Subbasin 5 | 0.00                   | 0.00                   | 0.00                   | 0.14                   | 0.14       |
| Proposed Subbasin 6 | 0.00                   | 0.14                   | 0.14                   | 2.54                   | 2.82       |

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

$$Q_{a1} = 1.87 \text{ cfs/ac}$$

$$Q_{a2} = 2.60 \text{ cfs/ac}$$

$$Q_{a3} = 3.45 \text{ cfs/ac}$$

$$Q_{a4} = 5.02 \text{ cfs/ac}$$

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 | 2.3             |
| Proposed Subbasin 3 | 11.7            |
| Proposed Subbasin 4 | 1.0             |
| Proposed Subbasin 5 | 0.7             |
| Proposed Subbasin 6 | 13.6            |

### Water Quality:

Required Water Quality volume for first flush of 0.34"

| Subbasin            | Volume (cu. ft.) |
|---------------------|------------------|
| Proposed Subbasin 1 | 173              |
| Proposed Subbasin 2 | 491              |
| Proposed Subbasin 3 | 2779             |
| Proposed Subbasin 4 | 202              |
| Proposed Subbasin 5 | 173              |
| Proposed Subbasin 6 | 3132             |
| Total Required      | 6949             |

### 18" HDPE Pipe Capacity

#### Circular Channel

**Input**

Flow: 11.7 cfs  
Slope: 0.01 ft/ft  
Manning's n: 0.012  
Diameter: 18 in

**Output**

Depth: 1.271 ft  
Flow Area: 1.60 sf  
Velocity: 7.33 fps  
Velocity Head: 0.834 ft  
Top Width: 1.08 ft  
Froude Number: 1.06  
Critical Depth: 1.302 ft  
Critical Slope: 0.00967 ft/ft

### 18" RCP Pipe Capacity

#### Circular Channel

**Input**

Flow: 11.7 cfs  
Slope: 0.015 ft/ft  
Manning's n: 0.013  
Diameter: 18 in

**Output**

Depth: 1.122 ft  
Flow Area: 1.42 sf  
Velocity: 8.25 fps  
Velocity Head: 1.06 ft  
Top Width: 1.30 ft  
Froude Number: 1.39  
Critical Depth: 1.302 ft  
Critical Slope: 0.0114 ft/ft

### 1' Sidewalk Culvert Capacity

#### Rectangular Channel

**Input**

Flow: 0.9 cfs  
Slope: 0.02 ft/ft  
Manning's n: 0.013  
Base Width: 1 ft  
Right Side Slope: 0.1  
Left Side Slope: 0.1

**Output**

Depth: 0.203 ft  
Flow Area: 0.203 sf  
Velocity: 4.44 fps  
Velocity Head: 0.307 ft  
Top Width: 1.00 ft  
Froude Number: 1.74  
Critical Depth: 0.293 ft  
Critical Slope: 0.00686 ft/ft

### Water Quality Pond Rating Curves

| WQ Pond 1 | Elev. | Area (Sq. Ft.) | Vol (Cu. Ft.) | Cum. (Cu. Ft.) |
|-----------|-------|----------------|---------------|----------------|
| 5254      | 361   | 0              | 0             |                |
| 5254.5    | 483   | 211            | 211           |                |

| WQ Pond 4 | Elev. | Area (Sq. Ft.) | Vol (Cu. Ft.) | Cum. (Cu. Ft.) |
|-----------|-------|----------------|---------------|----------------|
| 5244.16   | 177   | 0              | 0             |                |
| 5245      | 326   | 211            | 211           |                |
| 5245.16   | 358   | 55             | 266           |                |

| 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.) |
|-----------|-------|----------------|---------------|----------------|
| 5241.63   | 168   | 0              | 0             |                |
| 5242      | 243   | 76             | 76            |                |
| 5243      | 496   | 369            | 445           |                |
| 5243.13   | 534   | 67             | 512           |                |

| 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: 23.6 cfs  
Slope: 0.01 ft/ft  
Manning's n: 0.012  
Diameter: 24 in

**Output**

Depth: 1.576 ft  
Flow Area: 2.66 sf  
Velocity: 8.88 fps  
Velocity Head: 1.23 ft  
Top Width: 1.63 ft  
Froude Number: 1.23  
Critical Depth: 1.724 ft  
Critical Slope: 0.00856 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<sub>w</sub>): 3.367  
Length (L): 2 ft  
Flow (Q) = C<sub>w</sub> · L · h<sup>1.5</sup> (1.5)  
Flow (Q) = 2.4 cfs

### Weir Calculation for 1.5' Curb Cut

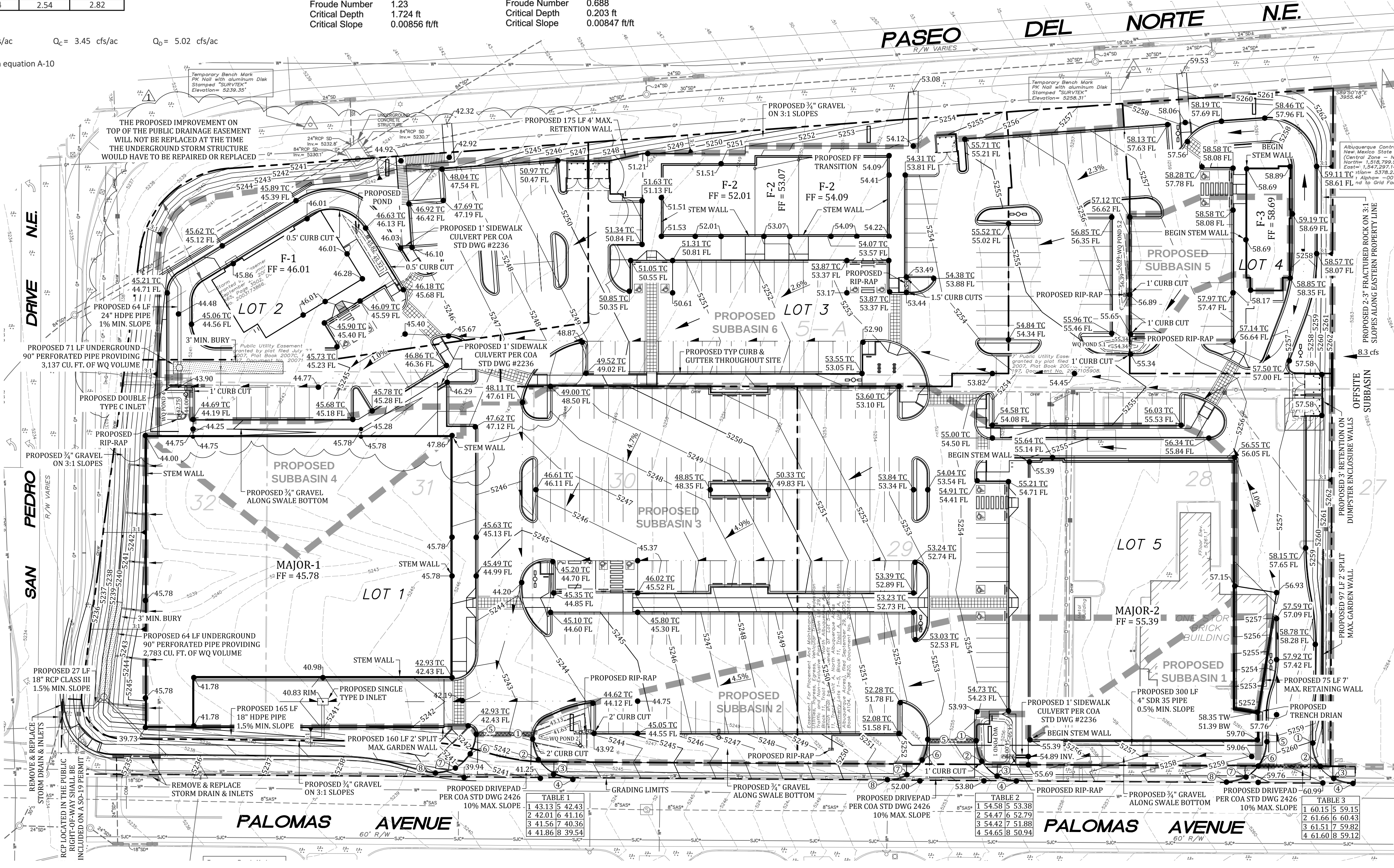
**Weir:**

Head Water Depth (h): 0.5 ft  
Discharge Coeff. (C<sub>w</sub>): 3.367  
Length (L): 1.5 ft  
Flow (Q) = C<sub>w</sub> · L · h<sup>1.5</sup> (1.5)  
Flow (Q) = 1.8 cfs

### Weir Calculation for 1' Curb Cut

**Weir:**

Head Water Depth (h): 0.5 ft  
Discharge Coeff. (C<sub>w</sub>): 3.367  
Length (L): 1 ft  
Flow (Q) = C<sub>w</sub> · L · h<sup>1.5</sup> (1.5)  
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 (D18B056) 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

Hydrology 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 8x10' 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 Subbasin 1 is 173 cubic feet. WQ Pond 1 provides a total of 211 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 driveway and enters Palomas Avenue. 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 512 cubic feet. Once full, runoff discharges through a 2' curb cut into the driveway and enters Palomas Avenue. Per the 2015 FDS report, the inlets on the northern curb of Palomas Avenue at the northeast corner of the intersection with San Pedro Drive historically receives 9.4 cfs. The combined flow rate from Subbasins 1 & 2 is 3.2 cfs, which is less than historic.

Subbasin 3 is 2.37 acres and generates 11.7 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 2,779 cubic feet and the underground pipe provides 2,783 cubic feet. Once the underground storage is full, water flows through a 18" reinforced concrete pipe (RCP) and discharges into the back of the inlet located on the eastern curb of San Pedro Drive near the northeast corner of the intersection with Palomas Avenue. The Manning's calculation for the 18" RCP is provided on the left side of this sheet. Per the 2015 FDS report, this inlet historically receives 13.2 cfs, which is greater than the proposed 11.7 cfs.

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 202 cubic feet, and WQ Pond 4 provides 266 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 2.80 acres and generates 13.5 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 23.5 cfs. Runoff generated both onsite and offsite flows west in the northern portion of the property until eventually reaching the double type A inlet located in the parking lot in the northwest corner of the site. The orifice and weir calculation for a double type A 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 3,110 cubic feet and the underground storage provides 3,137 cubic feet. After the pipe fills, excess water discharges through a 24" HDPE pipe and into the 84" storm drain. The Manning's calculation for the 24" pipe is shown at the top of this sheet. The total water quality volume provided for the site is 7,106 cubic feet vs. 6,949 cubic feet required.

**REVISION**

| NO. | DESCRIPTION         | DATE   |
|-----|---------------------|--------|
| 1   | CHANGES TO BLDG F-1 | 5-3-17 |

**DESIGNED** RLB  
**DRAWN** JWS  
**CHECKED** HWF  
**DATE** 5-3-17

**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**

**GRADING & DRAINAGE PLAN**

**GRAPHIC SCALE**

( IN FEET )

1 inch = 40 ft.

**SHEET NUMBER:**

**C-1**