Runoff Calculations:

The following calculations are based on Zone 2 from Table A-9 found in the Albuquerque Development Process Manual, Section 22.2 page 16.

100 YEAR PEAK DISCHARGE – TABLE A-9				
ZONE	A	B	C	D
1	1.290	2.030	2.870	4.370
2	1.560	2.280	3.140	4.700
3	1.870	2.600	3.450	5.020
4	2.200	2.920	3.730	5.250

Subbasin 1:

Treatment Type Areas for Subbasin 1:

$Area_{A1}=0 \quad Area_{B1}=0 \quad Area_{C1}=0.1714 \quad Area_{D1}=0.3282 \quad Ac$

$Q_{s1}=1.560 \cdot Area_{A1}+2.280 \cdot Area_{B1}+3.140 \cdot Area_{C1}+4.700 \cdot Area_{D1}=2.081 \quad cfs$

Subbasin 2:

Treatment Type Areas for Subbasin 2:

$Area_{A2}=0 \quad Area_{B2}=0 \quad Area_{C2}=0.1098 \quad Area_{D2}=1.0297 \quad Ac$

$Q_{s2}=1.560 \cdot Area_{A2}+2.280 \cdot Area_{B2}+3.140 \cdot Area_{C2}+4.700 \cdot Area_{D2}=5.184 \quad cfs$

Subbasin 3:

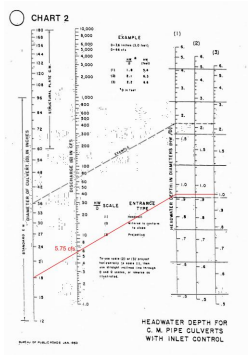
Treatment Type Areas for Subbasin 3:

$Area_{A3}=0 \quad Area_{B3}=0 \quad Area_{C3}=0.3508 \quad Area_{D3}=0.9815 \quad Ac$

$Q_{s3}=1.560 \cdot Area_{A3}+2.280 \cdot Area_{B3}+3.140 \cdot Area_{C3}+4.700 \cdot Area_{D3}=5.715 \quad cfs$

Total:

$Q_{tot}=Q_{s1}+Q_{s2}+Q_{s3}=12.98 \quad cfs$



Manning Formula:

Triangular Channel

Input	
Flow	0.3 cfs
Slope	0.0065 ft/ft
Manning's n	0.035
Base Width	0 ft
Right Side Slope	3:1
Left Side Slope	3:1

Output	
Depth	0.320 ft
Flow Area	0.308 sf
Velocity	0.976 fps
Velocity Head	0.0148 ft
Top Width	1.92 ft
Froude Number	0.429
Critical Depth	0.238 ft
Critical Slope	0.0395 ft/ft

Manning Formula:

Circular Channel

Input	
Flow	5.75 cfs
Slope	0.075 ft/ft
Manning's n	0.024
Diameter	18 in

Output	
Depth	0.631 ft
Flow Area	0.705 sf
Velocity	8.15 fps
Velocity Head	1.03 ft
Top Width	1.48 ft
Froude Number	1.45
Critical Depth	0.825 ft
Critical Slope	0.0209 ft/ft

Water Quality First Flush Volumes Required

Pond 1:

$FVol_1=Area_{B1} \cdot 43560 \cdot \frac{0.34}{12}=405.064 \quad cu.\,ft.$

Pond 2:

$FVol_2=Area_{B2} \cdot 43560 \cdot \frac{0.34}{12}=1270.856 \quad cu.\,ft.$

Pond 3:

$FVol_3=Area_{B3} \cdot 43560 \cdot \frac{0.34}{12}=1211.367 \quad cu.\,ft.$

Total Pond Volume:

$FVol=FVol_1+FVol_2+FVol_3=2887.287 \quad cu.\,ft.$

Pond 1

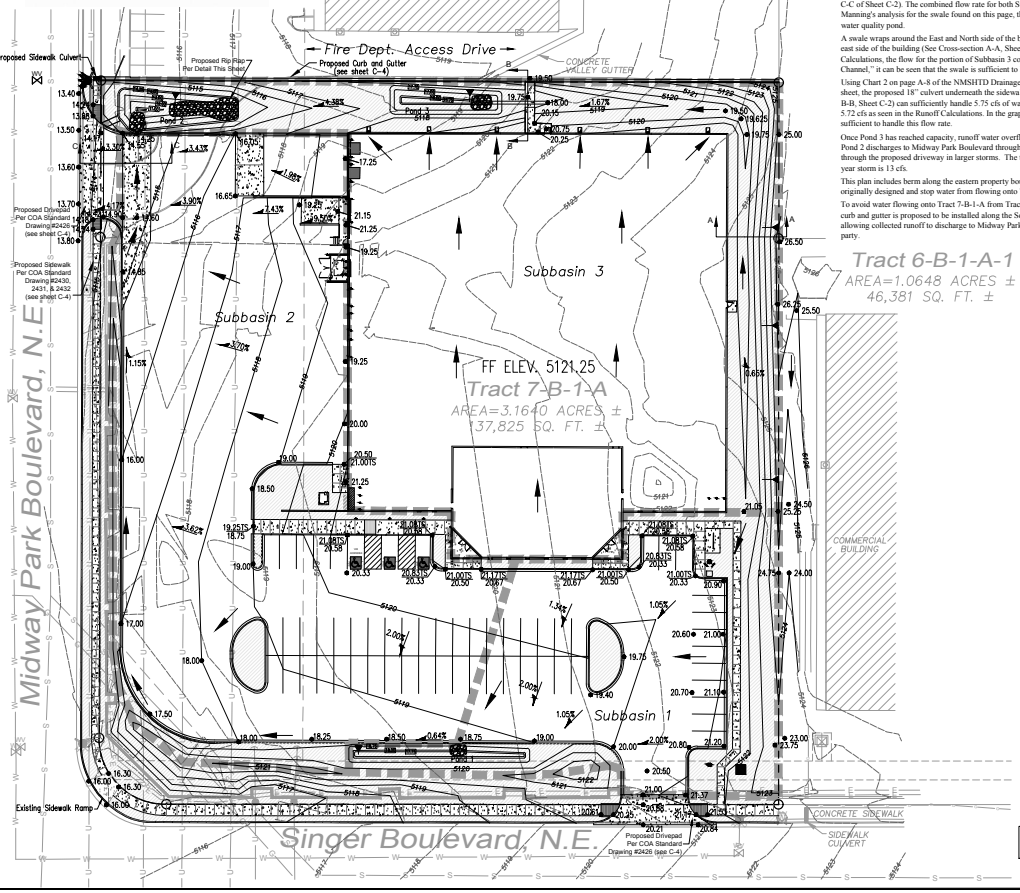
Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)	Cum. (Ac-ft)
5117.75	214.2098	0	0	0
5118.25	499.3876	178.39935	178.39935	0.004
5118.75	802.1949	325.395625	503.794975	0.012

Pond 2

Elev.	Area (Cu. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)	Cum. (Ac-ft)
5110.75	5.7036	0	0	0
5111.25	53.4338	14.28435	14.28435	0.000
5111.75	159.4263	53.215025	67.499375	0.002
5112.25	318.6876	119.528475	187.02785	0.004
5112.75	499.8758	204.640085	391.6687	0.009
5113.25	697.9785	299.463575	691.132275	0.016
5113.75	912.7591	402.6844	1093.816675	0.025
5114.25	1144.2227	514.24545	1608.062125	0.037

Pond 3

Elev.	Area (Cu. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)	Cum. (Ac-ft)
5116.75	80.9655	0	0	0
5117.25	236.9095	79.46875	79.46875	0.002
5117.75	410.4333	161.8357	241.30445	0.006
5118.25	601.541	252.993575	494.298025	0.011
5118.75	810.2327	352.943425	847.24145	0.019



Purvis Industries Warehouse Drainage

Background

Tract 7-B-1-A is allowed free discharge per the Drainage report for Singer Business Park (1985). This site has already been developed in accordance with these conditions. Currently, the site plan does not include any water quality features. As a part of this project, water quality ponding will be provided for Tract 7-B-1-A. Tract 7-B-1-A is created from Tract 7-B-1, which is the current playground for the existing Montessori School and a small portion of Tract 8-B, which is the existing property to the North.

Existing Conditions

The site is approximately 3 acres and slopes primarily from east to west at 3% and slightly from south to north. Currently, this site receives additional water from the site to the East. However, the original Drainage and Grading Plan for that site, mentioned above, shows a swale to divert all flow from the eastern site to Singer Boulevard. For Tract 7-B-1, all runoff currently flows to the West until reaching that portion of the site adjacent Midway Park Blvd NE, with flows discharging to Midway through the existing drive opening at the northwest corner of the site.

Methodology

Hydrology calculations for the site are performed in accordance with the Albuquerque DPM Section 22.2 using the Rational Method to calculate the peak flow rates to insure that flow paths, such as swales and gutters, 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 of each individual subbasin by the first flush runoff value of 0.34". The water quality calculations as well as the pond rating curves can be found on the left side of this sheet.

Proposed Conditions

The site is analyzed as three separate subbasins. Subbasin 1 consists of the Southeastern portion of the site including most of the parking area. Subbasin 2 consists of the Western portion of the property including part of the parking lot as well as the truck yard. Subbasin 3 consists of the Northeastern portion of the site including the building. The measured areas of Treatment Types are shown at the left side of this sheet along with the calculations to determine flow rates for each of the subbasins.

The grading on the south side of the building is designed to form a swale within the parking lot in order to convey this runoff to the curb and gutter on the Southern side of the site until it reaches Pond 1. Once Pond 1 has filled, water will bypass the entrance of the pond and continue to flow along the curb and gutter. The water then drains to the curb with gutter along the West side of the property and then along this curb from South to North, with Subbasin 2 flowing to this curbline as well. The runoff water flows across a concrete swale on the Northwest portion of the subbasin and into Pond 2. The swale has a consistent depth of 0.3'(see Cross Section C-C of Sheet C-2). The combined flow rate for both Subbasins 1 and 2 is 7.27 cfs. As can be seen in the Manning's analysis for the swale found on this page, the swale has capacity for the water flowing into the water quality pond.

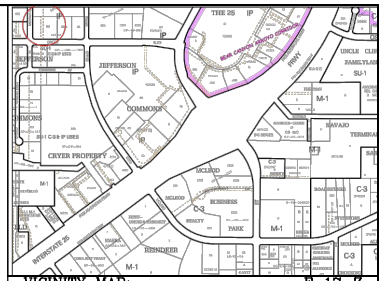
A swale wraps around the East and North side of the building and drains runoff into Pond 3. The swale on the east side of the building (See Cross-section A-A, Sheet C-2), is a relatively small swale. Based on the Runoff Calculations, the flow for the portion of Subbasin 3 coming to this point is 0.3 cfs. In the graph "Triangular Channel," it can be seen that the swale is sufficient to handle this flow rate.

Using Chart 2 on page A-8 of the NMSHTD Drainage Manual, Volume II, which is shown at the top of this sheet, the proposed 18" culvert underneath the sidewalk on the north side of the building (See Cross-section B-B, Sheet C-2) can sufficiently handle 5.75 cfs of water flow. The 100-year flow within this entire subbasin is 5.72 cfs as seen in the Runoff Calculations. In the graph "Circular Channel," it can be seen that the culvert is sufficient to handle this flow rate.

Once Pond 3 has reached capacity, runoff water overflows into a swale leading to Pond 2. The overflow from Pond 2 discharges to Midway Park Boulevard through a 3' x 0.5' concrete weir in smaller storms and also through the proposed driveway in larger storms. The total discharge rate to Midway Park Boulevard in a 100 year storm is 13 cfs.

This plan includes berm along the eastern property boundary that will allow Tract 6-B-1-A-1 to drain as it was originally designed and stop water from flowing onto Tract 7-B-1-A. Both tracts are owned by the same party.

To avoid water flowing onto Tract 7-B-1-A from Tract 8-B-1 due to the property line adjustment, a proposed curb and gutter is proposed to be installed along the Southern side of Tract 8-B-1, with a sidewalk culvert allowing collected runoff to discharge to Midway Park Boulevard. Both of these tracts are owned by the same party.



Legend

- UTILITY POLE
- GUY WIRE
- TRANSFORMER
- ELECTRIC BOX
- WATER METER
- ROOF DRAIN
- WATER VALVE
- FIRE HYDRANT
- IRRIGATION CONTROL VALVE
- SIDEWALK CULVERT
- EDGE OF ASPHALT
- BLUESTAKE ELECTRIC LINE
- BLUESTAKE GAS LINE
- OVERHEAD UTILITY LINE
- BLUESTAKE WATER LINE
- SUBBASIN BOUNDARY
- PROPERTY LINE
- PROPOSED POND ELEVATIONS
- 5123 EXISTING CONTOURS
- 5123 PROPOSED CONTOURS
- LANDSCAPING HATCH

N

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

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FLOYD DEVELOPMENT SERVICES, LLC
DEVELOPMENT, ENGINEERING, & WATERSHED CONSULTING
918 PINEHURST RD SE, SUITE 101
RIO RANCHO, NM 87124
HUGH@DEVELOPNM.COM
505-366-4187

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SHEET: C-1
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