

Hydrology Calculations

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

NAA Scenario Runoff Rate:

Treatment Type Areas
 Area_A = 0 ac Area_B = 0.3233 ac Area_C = 0.1940 ac Area_D = 0.7759 ac

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

Q_A = 1.87 cfs/ac Q_B = 2.60 cfs/ac Q_C = 3.45 cfs/ac Q_D = 5.02 cfs/ac

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

Q_p = Q_A • Area_A + Q_B • Area_B + Q_C • Area_C + Q_D • Area_D = 5.4 cfs

Proposed Conditions Runoff Rate:

Treatment Type Areas
 Area_A = 0 ac Area_B = 0.0706 ac Area_C = 0.0706 ac Area_D = 0.9955 ac

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

Q_A = 1.87 cfs/ac Q_B = 2.60 cfs/ac Q_C = 3.45 cfs/ac Q_D = 5.02 cfs/ac

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

Q_p = Q_A • Area_A + Q_B • Area_B + Q_C • Area_C + Q_D • Area_D = 5.4 cfs

Water Quality:

V_{WQ} = Area_D • 0.34" = 1229 ft³

Water Quality Pond A

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5306.0	34	0	0
5307.0	148	91	91
5307.5	226	93	184

Water Quality Pond C

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5306.0	18	0	0
5307.0	125	71	71
5307.5	204	82	153

Water Quality Pond B

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5305.5	35	0	0
5306.0	86	30	30
5307.0	243	164	194
5307.5	345	147	341

Water Quality Pond D

Elev.	Area (Sq. Ft.)	Vol (Cu. Ft.)	Cum. (Cu. Ft.)
5310.00	19	0	0
5311.0	108	63	63
5312.0	267	188	251
5312.85	461	310	560

Total Water Quality Volume = 1239 ft³

SIDEWALK CULVERT

Rectangular Channel Input

Flow	5.4 cfs
Slope	0.0238 ft/ft
Manning's n	0.013
Base Width	1.5 ft
Right Side Slope	0.1
Left Side Slope	0.1

Output

Depth	0.468 ft
Flow Area	0.702 sf
Velocity	7.69 fps
Velocity Head	0.920 ft
Top Width	1.50 ft
Froude Number	1.98
Critical Depth	0.739 ft
Critical Slope	0.00680 ft/ft

12" ADS PIPE

Circular Channel Input

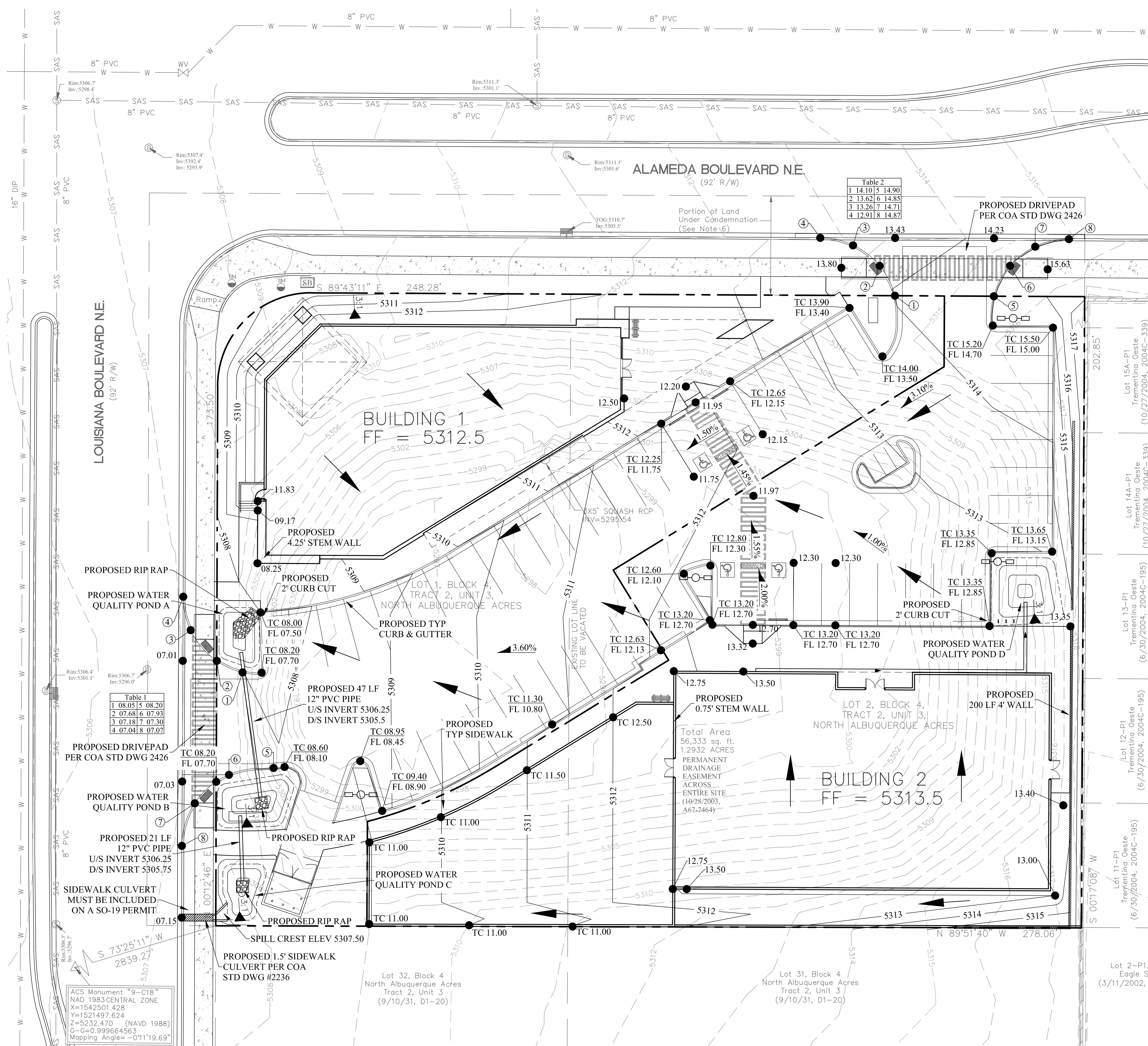
Flow	5.4 cfs
Slope	0.015 ft/ft
Manning's n	0.011
Diameter	12 in

Output

Depth	0.870 ft
Flow Area	0.726 sf
Velocity	7.44 fps
Velocity Head	0.861 ft
Top Width	0.672 ft
Froude Number	1.26
Critical Depth	0.935 ft
Critical Slope	0.0142 ft/ft

LEGEND

- SANITARY SEWER MANHOLE
- WATER VALVE
- STORM DRAIN MANHOLE
- TRAFFIC MAST
- SIGNAL BOX
- INLET GRATE
- EXISTING CONTOURS
- PROPOSED CONTOURS
- PROPOSED SPOT ELEVATIONS



REVISION

NO.	DATE	DESCRIPTION

RESPEC
 WATER & NATURAL RESOURCES
 6808 ACADEMY PARKWAY
 ALBUQUERQUE, NM 87109
 PHONE: 505.253.9810

VICINITY MAP: C-19-Z

FIRM MAP: FM35001C0137H

STAMP:
 HIGH W. FLOYD
 NEW MEXICO
 16633
 1-14-16
 LICENSED PROFESSIONAL ENGINEER

Background
 Lots 1 & 2 account for approximately 1.3 acres in Block 4, Tract 2, Unit 3 of North Albuquerque Acres in Bernalillo County, New Mexico. These lots are located on the southeast corner of the intersection of Alameda Boulevard and Louisiana Boulevard. The site has been previously developed to serve as a drainage pond to relieve Alameda Boulevard of excess runoff. Due to recent roadway and storm drain improvements along Alameda Boulevard, the existing pond can be eliminated per the Drainage report for the Alameda Widening Project (TEC, January 2012). Storm water from the site is restricted by the North Albuquerque Acres Drainage Plan to 5.4 cfs.

Methodology
 Hydrology calculations for the properties are performed in accordance with the Albuquerque DPM Section 22.2 using the Rational Method to calculate peak flow rates to insure all flow paths are sufficient to carry flows to the water quality ponding located on-site. The water quality ponding volume required was calculated by multiplying the impervious area onsite by the first flush runoff value of 0.34". The hydrology and hydraulic calculations can be found on this sheet.

Existing Conditions
 The existing site is a detention pond with 3:1 (H:V) slopes, a bottom elevation of 5297, and maximum spill crest elevation of 5307. There is a 3x5' square reinforced concrete pipe with an invert of 5295.54 located at the bottom of the pond. Lots 1 & 2 do not appear to be receiving additional surface runoff from adjacent lands.

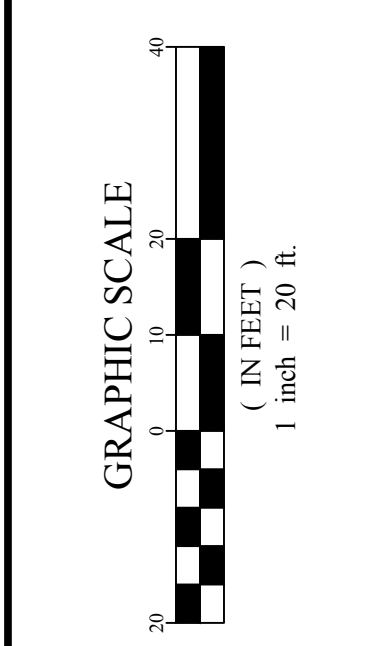
Proposed Conditions
 The Alameda storm drain system has been constructed to convey the runoff previously held by the existing detention pond west to the San Pedro storm drain. Therefore, the existing detention pond is no longer needed per the report referenced above.

Hydrology
 The Hydrology Report for North Albuquerque Acres by Resource Technology, Inc. in November 1998 is used to determine the allowable discharge from the site. The subject property is located in subbasin 117.4 per this report. Table B-3 on page Appendix - 19 assigns future conditions land treatment types as 0% A, 25% B, 15% C, and 60% D for this subbasin. The allowable discharge using the Rational Method and the assigned treatment types above is 5.4 cfs. The calculation is shown on the left side of this sheet.

Drainage
 It is proposed that the site, in general, drains from east to west toward Louisiana Boulevard. The small amount of runoff from the area south of Building 2 and the play area west of Building 2 are contained within the play area, which has a permeable surface and is recessed approximately 1'. Accordingly, this area is removed from the subbasin area for the 100 year storm water runoff. Under proposed conditions, the remainder of the site generates 5.4 cfs. See Hydrology Calculations on the left side of this sheet. Therefore, no detention ponding is required to reduce the flow rate. Runoff from the entire site enters into Pond A through a 2' curb cut located at the southwest corner of Building 1. Water then enters a 12" pipe transferring runoff from Pond A to Pond B. There is another 12" pipe that connects Pond B to Pond C. Manning's calculations for both pipes can be found on the left side of this sheet. Once a maximum water surface elevation of 5307.5 is reached, runoff begins to spill into a sidewalk culvert located at the southwest corner of the site. From there water enters the storm drain system through a grate located in the median in Louisiana Boulevard.

Water Quality
 Before Building 2 drains across the site, runoff is routed through Pond D. Once the pond has filled to a maximum water surface elevation of 5312.85, the pond discharges through a 2' curb cut into the parking lot. Pond rating curves for all ponds can be seen on the left side of this sheet. The total provided water quality pond volume for the site is 1239 cubic feet. The required volume is 1229 cubic feet. See the calculation on the left side of this sheet.

**ALAMEDA & LOUISIANA
 COMMERCIAL DEVELOPMENT
 GRADING & DRAINAGE PLAN**



ISSUED FOR DRB SITE PLAN

SHEET NUMBER:
C-1