

CITY OF ALBUQUERQUE



Richard J. Berry, Mayor

May 3, 2017

Dennis Lorenz, P.E.
Lorenz Design & Consulting
2501 Rio Grande NW, Suite A
Albuquerque, NM 87104

RE: Eagle Ranch MVD – Retail Drainage Report
Eagle Ranch Rd
Engineer's Stamp Date: 4/24/17
Hydrology File: B13D002C

Dear Mr. Lorenz:

PO Box 1293

Based on the information provided in your submittal received on 4/28/17, the Drainage Report is approved for Site Plan for Building Permit. However, prior to Building Permit approval the following must be addressed:

Albuquerque

1. This project will require an approved Site Plan from DRB prior to Building Permit approval.

NM 87103

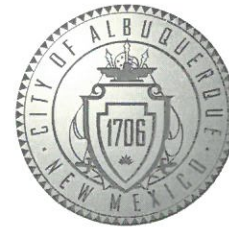
2. This Project will require an Erosion and Sediment Control Plan submitted to the storm water quality engineer (Curtis Cherne, PE, ccherne@cabq.gov) before Building Permit approval.

www.cabq.gov

3. Detail how the connection to the storm drain stub off Eagle Ranch will be made:
- The storm drain connection cannot be made as part of the Water Utility Work Order as the City does not review Water Utility work orders.
 - The storm drain, water, and sewer connections can all be made as a City work order or mini-work order and both Water Utility and the City will review.
 - The water and sewer can remain with the Water Utility work order and the storm drain can be done by mini-work order or SO-19 permit. If SO-19 is desired, the sheets will need to include the standard SO-19 language.

Whichever route is taken, the grading and drainage sheets will need to be amended to detail how the storm drain connection is being made.

CITY OF ALBUQUERQUE



Richard J. Berry, Mayor

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 09/2015)

Project Title: _____ **Building Permit #:** _____ **City Drainage #:** _____
DRB#: _____ **EPC#:** _____ **Work Order#:** _____
Legal Description: _____
City Address: _____

Engineering Firm: _____ **Contact:** _____
Address: _____
Phone#: _____ **Fax#:** _____ **E-mail:** _____

Owner: _____ **Contact:** _____
Address: _____
Phone#: _____ **Fax#:** _____ **E-mail:** _____

Architect: _____ **Contact:** _____
Address: _____
Phone#: _____ **Fax#:** _____ **E-mail:** _____

Other Contact: _____ **Contact:** _____
Address: _____
Phone#: _____ **Fax#:** _____ **E-mail:** _____

Check all that Apply:

DEPARTMENT:

☐ HYDROLOGY/ DRAINAGE
☐ TRAFFIC/ TRANSPORTATION
☐ MS4/ EROSION & SEDIMENT CONTROL

TYPE OF SUBMITTAL:

☐ ENGINEER/ ARCHITECT CERTIFICATION

☐ CONCEPTUAL G & D PLAN
☐ GRADING PLAN
☐ DRAINAGE MASTER PLAN
☐ DRAINAGE REPORT
☐ CLOMR/LOMR

☐ TRAFFIC CIRCULATION LAYOUT (TCL)
☐ TRAFFIC IMPACT STUDY (TIS)
☐ EROSION & SEDIMENT CONTROL PLAN (ESC)

☐ OTHER (SPECIFY) _____

CHECK 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

☐ PRE-DESIGN MEETING
☐ OTHER (SPECIFY) _____

IS THIS A RESUBMITTAL?: ☐ Yes ☐ No

DATE SUBMITTED: _____ **By:** _____

COA STAFF: _____ ELECTRONIC SUBMITTAL RECEIVED: _____



April 24, 2017

Dana Peterson, PE
Senior Engineer - Hydrology Section
Development and Building Services
City of Albuquerque
Plaza Del Sol
Albuquerque, New Mexico 87102

SUBJECT: DRAINAGE REPORT EAGLE RANCH NM MVD – RETAIL (B13/D002C)

Dear Dana:

Submitted herewith is one copy of the revised **Drainage Report for Eagle Ranch NM MVD – Retail**. The report has been revised to address the comments listed in your March 15, 2017 letter. Specifically, your comments are addressed as follows:

1. The first flush calculations have been revised as recommended. Figure 3 is provided to illustrate the landscaped areas that are considered flat enough to provide at least 3-inches of storage. Curb blockouts are provided, where practical, to allow runoff from the parking lots. Landscaped areas near the buildings are also depressed to allow storage for roof drainage. The first flush detention ponds will be constructed with the top of inlet grate set 12-inches above the pond bottom to allow for additional storage. As shown by the calculations, the water quality requirements will be satisfied without the additional storage provided by the detention ponds.
2. The Drainage Report has been revised to provide a discussion regarding downstream capacity. The drainage reports supporting the public storm drainage systems are not available, however, there exists sufficient documentation to support approval of free discharge for this development. This property was granted free discharge for a previous development proposal that was not built. Other downstream developments were also granted free discharge. I've provided documentation in the **Exhibits** section that supports free discharge for this development.
3. Figures 1 and 2 are properly labeled.
4. An Erosion and Sedimentation Control Plan will be provided by another firm. We understand this will be a conditional building permit approval.
5. The retailing walls will not be topped with garden walls. Safety rails or barriers will

be provided on the large walls per code. Due to the complexity of the retaining walls on this project the developer has retained a design build company to ensure proper design and construction of all retaining walls.

Thank you for your assistance with this project. If you have any questions regarding this matter, please call me.

Sincerely,

LORENZ DESIGN & CONSULTING, LLC



Dennis A. Lorenz, PE

P\17-003\dp04242017

DRAINAGE REPORT FOR EAGLE RANCH NM MVD - RETAIL

Albuquerque, New Mexico

Prepared For:

Allen Sigmon Real Estate Group
9201 Montgomery Boulevard NE
Albuquerque, New Mexico 87111

Prepared by:



February 2017



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PURPOSE AND SCOPE

This project involves the development of the subject property for New Mexico MVD, and Eagle Ranch Retail Center. The project proposes site improvements to support the development, including access, grading, drainage and utility improvements.

The purpose of this report is to outline the criteria for development of the site and demonstrate that this project will not negatively impact the project site, or upstream and downstream properties. This report is prepared and submitted in support of a pending building permit application.

The scope of this report is to provide analysis of the existing and improved conditions utilizing storm drainage modeling tools, thereby demonstrating the before and after behavior of the project site during rainfall events. It will be demonstrated that this project will be developed in accordance with the City of Albuquerque, Development Process Manual, Volume 2, and the City of Albuquerque Drainage Ordinance.

EXISTING CONDITIONS

The 6.77-acre project site is presently undeveloped. The site is bounded north by developed residential property, on the west by Irving Boulevard NW, on the south by developed institutional property and undeveloped property, and on the east by Eagle Ranch Road NW. Site topography is very rugged and steep. Excess runoff generally drains from west to east, discharging to Eagle Ranch Road. All undeveloped excess runoff is intercepted by the Eagle Ranch Storm Drainage System that drains to the Calabacillas Arroyo, approximately one-quarter mile northeast from the site.

No offsite flows enter the property. As shown by FIRM Panel 35001C0108G, this property is not located within a mapped 100 year floodplain.

PROPOSED CONDITIONS

As shown by the Grading and Drainage Plan (see back pocket), the property is to be developed to support the proposed New Mexico MVD, and Eagle Ranch Retail Center. This is a phased project. The New Mexico MVD, and Eagle Ranch Retail Center will be developed as Phase 1. Phase 2 (3.60 acres) will be developed in the future. Site plans for Phase 2 will be presented to EPC and DRB for approval. A Phase 2 Grading and Drainage Plan will be submitted to support the planning and building permit process.

All Phase 1 drainage flows will be managed by grading and drainage improvements recommended by this plan. All excess runoff will be routed through landscaping improvements and 3 first flush detention ponds prior to discharge to a proposed private storm drain system. The private storm drain system will connect to an existing 36"

stubout that drains to an 84" storm drain located within Eagle Ranch Rd NW. The 84" storm drain flows to the Calabacillas Arroyo. This storm drain, along with a parallel 60" storm drain allows all properties in the area to free discharge to the public system. Cottonwood Pointe, a previous development that did not materialize on this site, was granted free discharge. Other downstream developments, Aspen Ranch Apartments, Kia Auto Dealership, and Venture Commerce Center, were all granted free discharge by benefit of the public storm drainage system. Documentation for all of these Drainage Plans is provided in the Appendix.

As shown by the Grading & Drainage Plan – Overall Site and Drainage Plan, the developed site is divided into 5 drainage basins. Each drainage basin is described below:

Basin A represents Phase 2. Undeveloped Basin "A" runoff drains to a temporary erosion control pond located south of the NM-MVD site. Future Phase 2 flows will drain to the private storm drain system.

Basin B is the NM-MVD site. All flows drain through landscaping improvements to First Flush Pond "B", which connects to the private storm drain system.

Basin C is the Eagle Ranch Retail site. All flows drain through landscaping improvements to First Flush Pond "C", which connects to the private storm drain system.

Basin D is a portion of the site access road. All flows drain to the private storm drain system.

Basin E is the existing portion of the site access road. All flows drain to the private storm drain system.

90th Percentile Storm

In accordance with the City of Albuquerque Drainage Ordinance, effective May 12, 2014, all new development projects are required to manage the runoff which occurs during the 90th percentile storm event. In order to comply with this criteria, where practical, all "first flush" surface drainage shall be routed through landscaped areas before release into downstream drainage facilities.

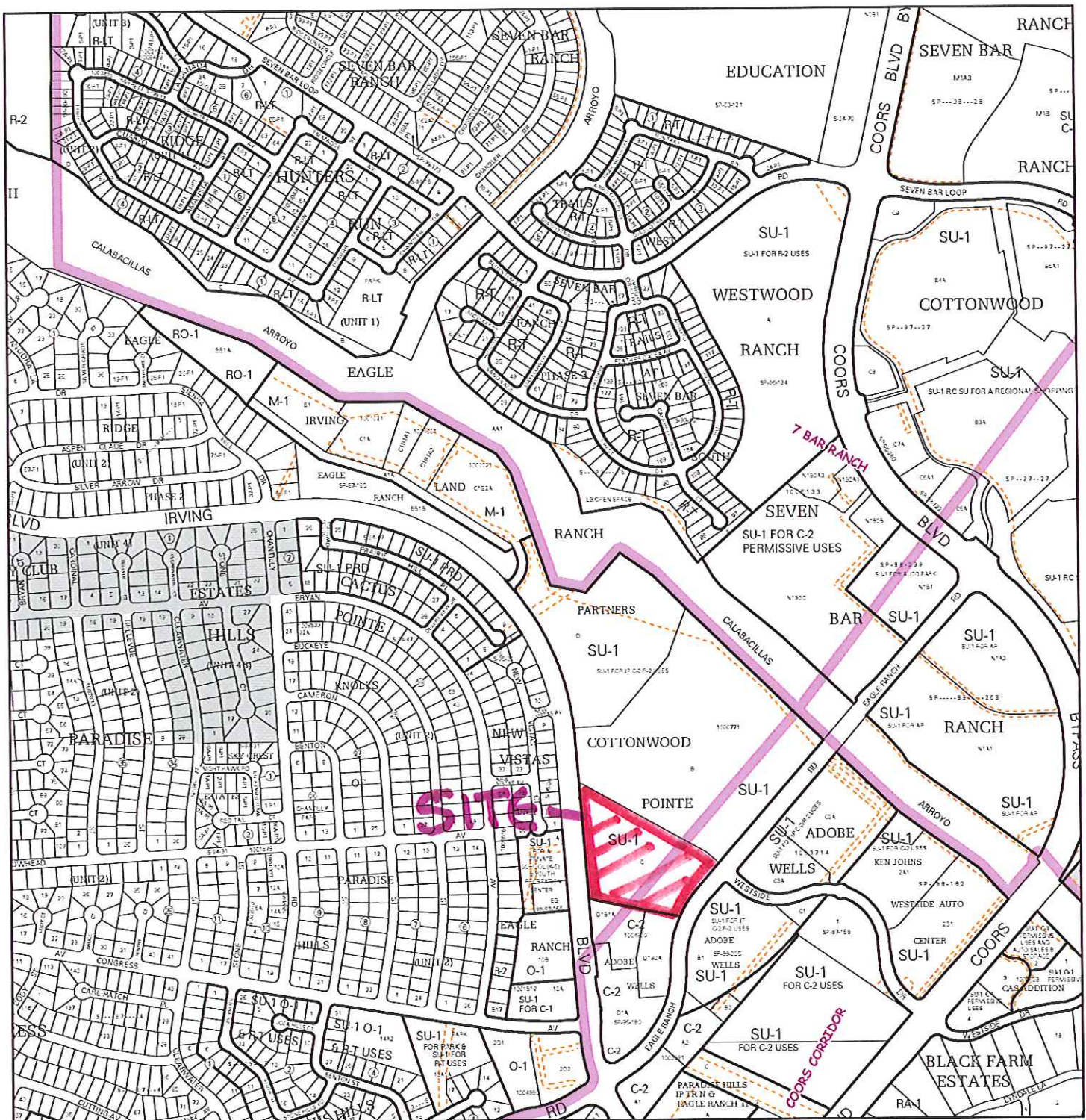
As shown by the calculations, the site easily satisfies the first flush requirement.

CALCULATIONS

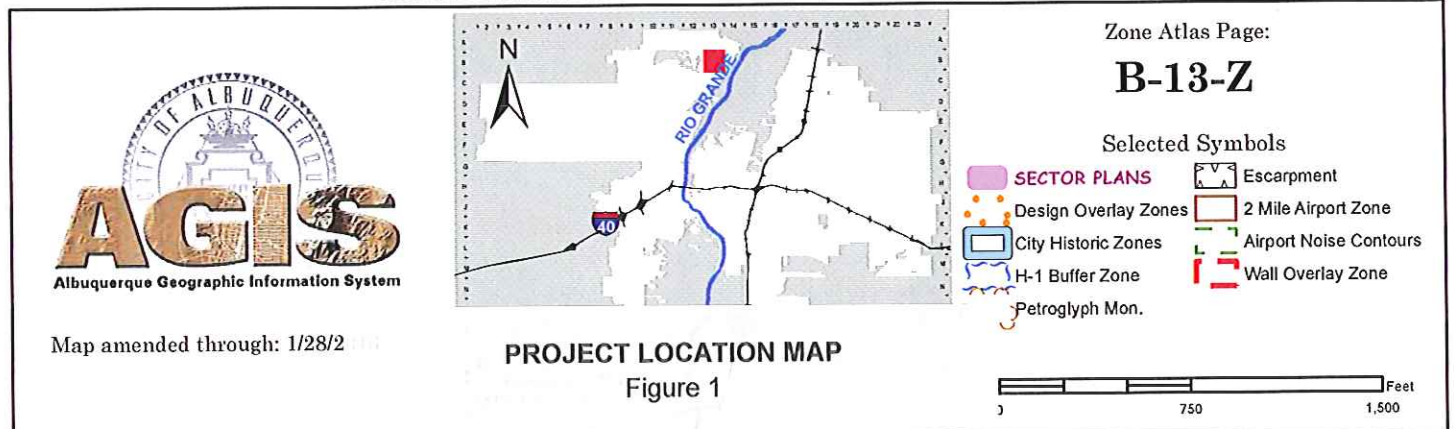
Hydrology

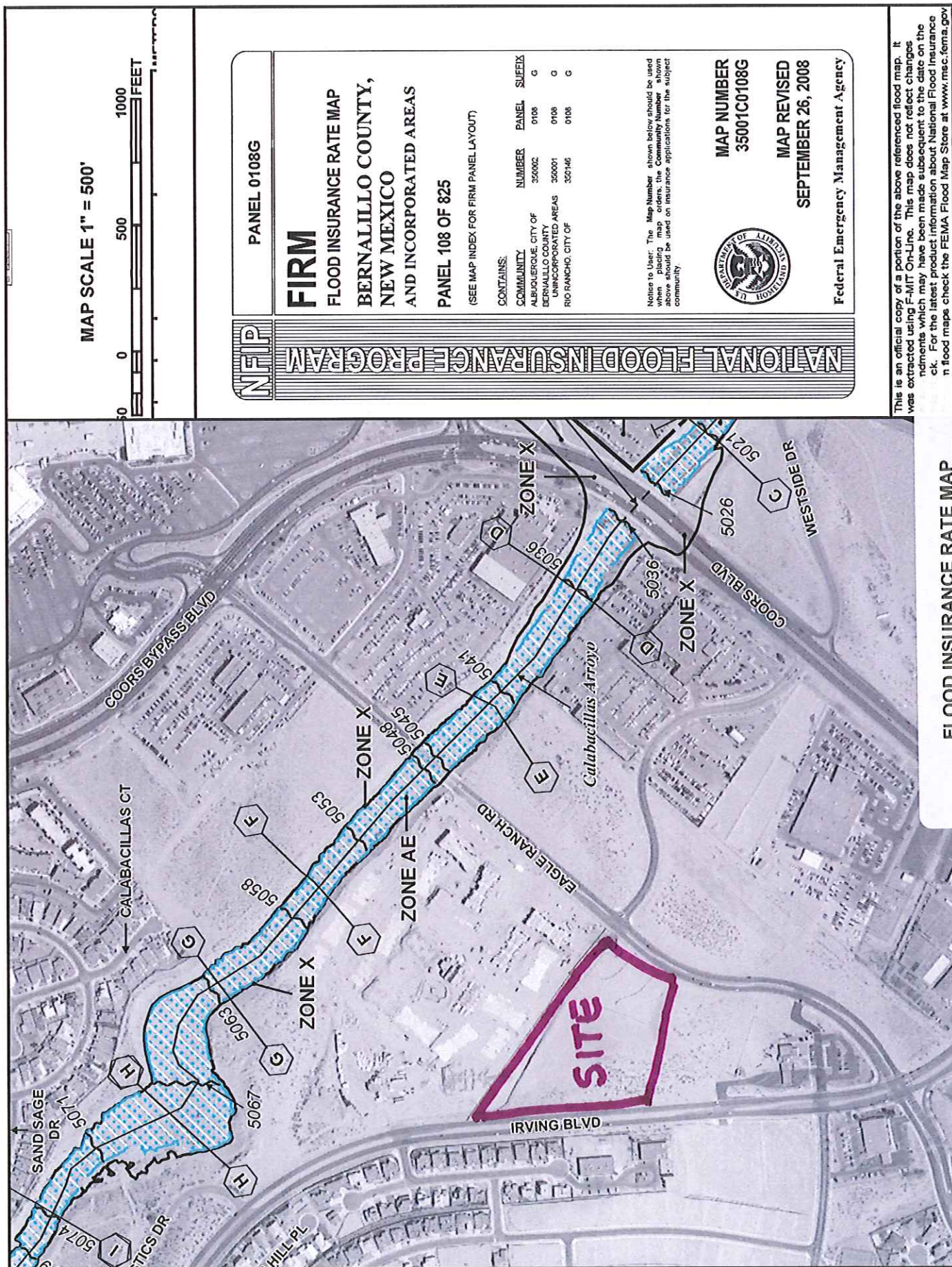
The calculations contained herein define the 100-year/6-hour rainfall event falling within the project site and contributing off-site areas under existing and developed conditions. The hydrology is per the City of Albuquerque, Development Process Manual, Chapter 22, Volume 2, 1997 Revision. The AHYMO 97 model is used to determine peak runoff. The calculations are presented to demonstrate the capacity and function of all proposed storm drainage improvements.

MAPS



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





FLOOD INSURANCE RATE MAP

Figure 2

CALCULATIONS

FIRST FLUSH CRITERIA

FIRST FLUSH POND DESIGN

FIRST FLUSH CRITERIA

By ordinance the site is required to retain the 90th percentile rainfall depth. In order to comply with this criterion, where practical, all surface areas will be routed through landscaped areas before release to downstream public drainage facilities. The proposed plan will rout runoff through 2 proposed first flush detention ponds and a third first flush retention pond. Storage in excess of the 90th percentile rainfall will be provided as illustrated below.

90 th percentile depth	0.44"
Less initial abstraction	0.10"

Total retained depth	0.34"

The first flush requirement will be based on Phase I development. Phase 2 will provide its own first flush storage at the time of development.

Phase I Area Type D = 2.43 ac.

Storage requirement = $Ad(0.34") = 2.43 \text{ ac}(43,560 \text{ sf/ac})(0.34"/12"/\text{ft}) = 2,999 \text{ cf}$

First Flush storage provided:

Total Phase I landscape area = 0.74 ac.

Landscape area too steep to accept first flush flow = 0.40 ac

Total landscape area available for first flush use = 0.34 ac (See Figure 3)

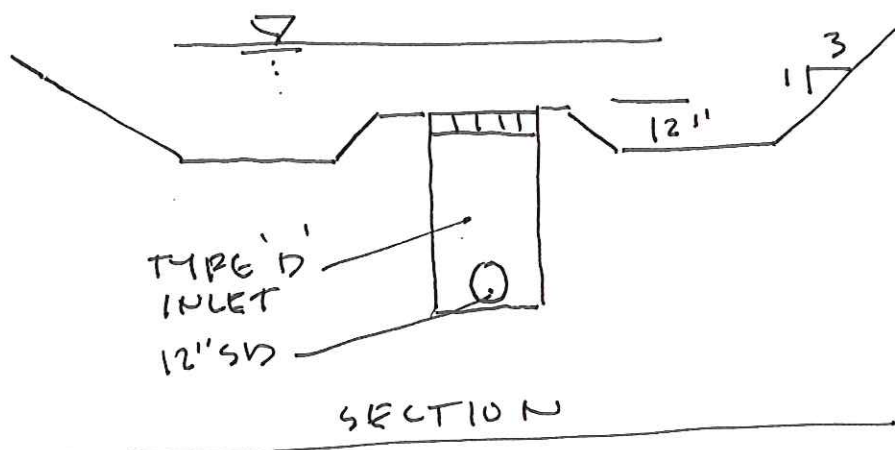
All landscape areas shall be graded 3" below adjacent paved surfaces

Total first flush volume = $0.33 \text{ ac}(43,560 \text{ sf/ac})(0.25') = 3,703 \text{ cf}$

This volume does not include storage provided in the proposed first flush detention ponds or the temporary erosion control pond.



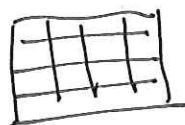
TYPE 'D' INLET @ FIRST FWSH POND S



POND #1 Q = 4.7 CFS
POND #2 Q = 6.0 CFS

DETERMINE SUBMERGED INLET CAPACITY
FOR ANY POND ROUTING TABLE:

① INLET GRATE



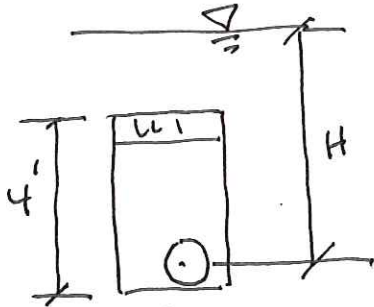
OPEN AREA = 4.31 SF

$$Q = CA\sqrt{2gh}$$

$C = 0.6$

H	Q
0	0
1'	20.8
2'	29.4

② CHECK 12" SD INLET CONTROL



$$A_{12" \text{ PIPE}} = 0.79 \text{ SF}$$

$$C = 0.6$$

$$Q = CA\sqrt{2gh}$$

H	Q
0	0
3.5	7.11
4.5	8.07
5.5	8.92

③ CHECK 12" SD PIPE FLOW
BY MANNING'S

PODS	PIPE S	Q CFS
B	33.0	20.0
C	48.0	24.1

LIMITING VARIABLE IS INLET CONTROL

POND ROUTING TABLES FOR ANYMO.

I. FIRST FLUSH POND 'B'		
ELEVATION	QOUT	STORAGE
ft	cfs	af
84.0	0	0
85.0	8.07	0.00893
86.0	8.92	0.02397
I. FIRST FLUSH POND 'C'		
ELEVATION	QOUT	STORAGE
ft	cfs	af
67.5	0	0
68.0	8.07	0.00181
69.0	8.92	0.00955

BASIN 'A' TEMPORARY EROSION CONTROL POND DESIGN

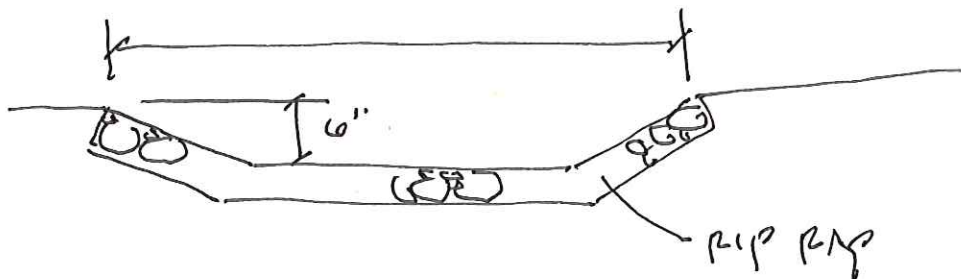
TEMP EC PANS - UNDER PAVEMENT 'A'

PER AWWWD: $Q_{100} = 9.4 \text{ CFS}$
 $V_{100} = 0.262 \text{ AF}$
 $= 11,412 \text{ CF}$

$\Rightarrow 11,500 \text{ CF PROVIDED}$

EMERGENCY SPILLWAY

$Q_{100} = 9.4 \text{ CFS}$



$Q = C L H^{3/2}$

$C = 2.5$
 $H = 0.5'$

$L = Q / C H^{3/2} = 10.6'$ USE 12'

STORM DRAINAGE SYSTEM

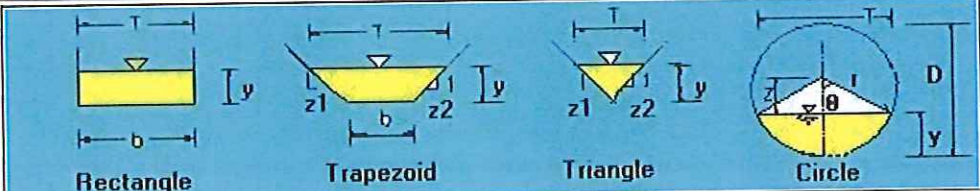
EAGLE RANCH NM MVD - RETAIL
STORM DRAIN SYSTEM INVENTORY

ANALYSIS POINT	Q100 cfs	DRAINAGE STRUCTURE	STREET DEPTH ft	PIPE SLOPE %	CAPACITY cfs	COMMENTS
1	8.3	TYPE C INLET	0.24	-	3.5	
2	8.3	TYPE C INLET	0.24	-	3.5	
3	3.5	12" SD	-	7.2	9.2	
4	3.5	12" SD	-	7.2	9.2	
5	5.5	TYPE C INLET	0.20	-	2.0	
6	5.5	TYPE C INLET	0.20	-	2.0	TOTAL 6.7 CFS SURFACE FLOW TO EAGLE RANCH
7	5.5	12" SD	-	11.1	11.5	
8	5.5	12" SD	-	35.4	20.7	
9	11.0	4' DIA SD MH	-	-	-	
10	11.0	18" SD	-	2.0	14.5	
11	4.7	TYPE D INLET	-	-	20.8	AT H=1.0'
12	4.7	12" SD	-	33.0	20.0	
13	15.7	4' DIA SD MH	-	-	-	
14	15.7	24" SD	-	6.8	58.0	
15	6.0	TYPE D INLET	-	-	20.8	AT H=1.0'
16	6.0	12" SD	-	48.0	24.1	
17	21.8	24" SD	-	6.8	58.0	
18	21.8	EXISTING 36" SD	-	** 2.0	31.3	** ASSUMED SLOPE

The open channel flow calculator			
Select Channel Type: Triangle ▼	Rectangle Trapezoid Triangle Circle		
Velocity(V)&Discharge(Q) ▼	Select unit system: Feet(ft) ▼		
Channel slope: .072 ft/ft	Water depth(y): .24 ft	Bottom W(b): 0 ft	
Flow velocity 5.6749 ft/s	LeftSlope (Z1): 50 to 1 (H:V)	RightSlope (Z2): 1 to 1 (H:V)	
Flow discharge 8.3353 ft^3/s	Input n value .017 or select n		
Calculate!	Status: Calculation finished		Reset
Wetted perimeter 12.34 ft	Flow area 1.47 ft^2	Top width(T) 12.24 ft	
Specific energy 0.74 ft	Froude number 2.89		Flow status Supercritical flow
Critical depth 0.37 ft	Critical slope 0.0074 ft/ft		Velocity head 0.5 ft

Copyright 2000 Dr. Xing Fang, Department of Civil Engineering, Lamar University.

1/2 STREET FLOW AT AP 1+2

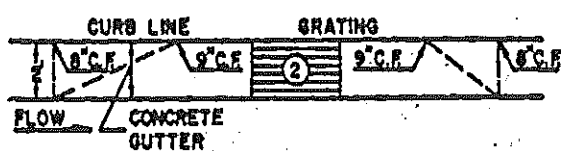
The open channel flow calculator			
Select Channel Type: Triangle ▼	 Rectangle Trapezoid Triangle Circle		
Velocity(V)&Discharge(Q) ▼	Select unit system: Feet(ft) ▼		
Channel slope: .072 ft/ft	Water depth(y): .195 ft	Bottom W(b) 0 ft	
Flow velocity 4.9413 ft/s	LeftSlope (Z1): 50 to 1 (H:V)	RightSlope (Z2): 1 to 1 (H:V)	
Flow discharge 4.7913 ft^3/s	Input n value .017 or select n		
Calculate!	Status: Calculation finished		Reset
Wetted perimeter 10.03 ft	Flow area 0.97 ft^2	Top width(T) 9.95 ft	
Specific energy 0.57 ft	Froude number 2.79		Flow status Supercritical flow
Critical depth 0.29 ft	Critical slope 0.008 ft/ft		Velocity head 0.38 ft

Copyright 2000 Dr. Xing Fang, Department of Civil Engineering, Lamar University.

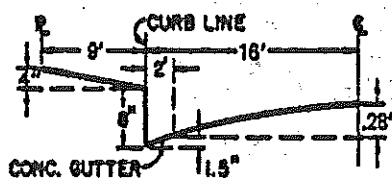
1/2 STREET FLOW AT AP 5+6

Chapter 22 - Drainage, Flood Control and Erosion Control

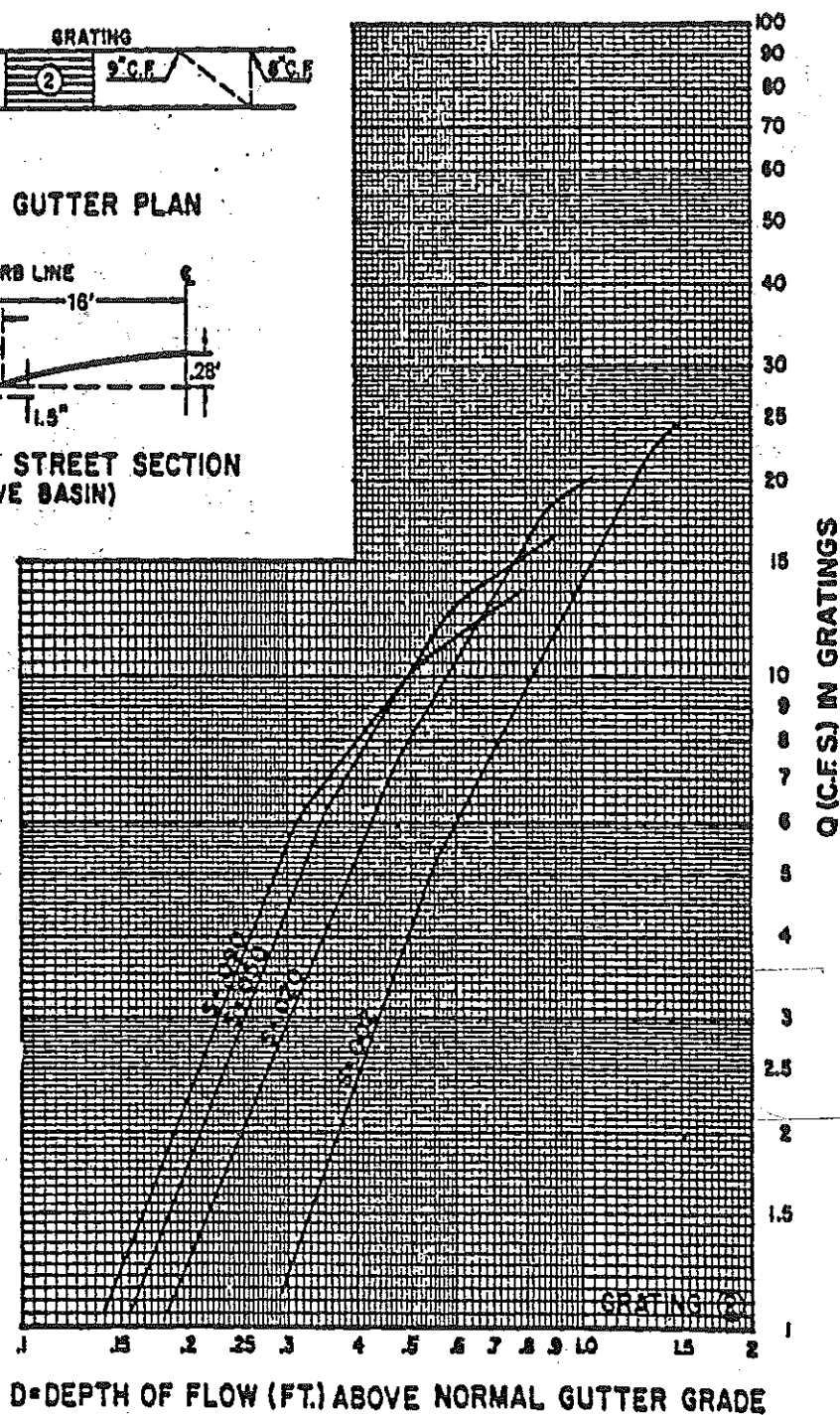
GRATING CAPACITIES FOR TYPE 'A' , 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



PROJECT HYDROLOGY

**EAGLE RANCH NM MVD - RETAIL
HYDROLOGY SUMMARY**

BASIN	AREA acres	AREA sq. mi.	LAND TREATMENT AREAS (Percent)				Q 100 cfs	VOL 100 ac-ft
			A	B	C	D		
EXISTING CONDITION								
SITE	6.77	0.01058	0	82	15	3	18.0	0.512
PROPOSED CONDITION								
SITE	6.77	0.01058	0	51	14	35	22.3	0.712
A	3.60	0.00563	0	85	15	0	9.4	0.262
B	1.16	0.00181	0	15	15	70	4.7	0.163
C	1.46	0.00228	0	11	11	78	6.0	0.211
D	0.27	0.00042	0	0	20	80	1.2	0.040
E	0.26	0.00041	0	3	3	94	1.2	0.041
FUTURE DEVELOPED CONDITION								
SITE	6.77	0.01058	0	8	12	80	28.3	0.993
A	3.60	0.00563	0	5	10	85	15.4	0.543
B	1.16	0.00181	0	15	15	70	4.7	0.163
C	1.46	0.00228	0	11	11	78	6.0	0.211
D	0.27	0.00042	0	0	20	80	1.2	0.040
E	0.26	0.00041	0	3	3	94	1.2	0.041

AHYMO OUTPUT FILES

Eagle.Ranch.txt

```

*****
*                               EAGLE VISTA - NM MVD-RETAIL
*                               PROJECT HYDROLOGY
*****
START      TIME=0.0  PUNCH CODE=0
LOCATION     ALBUQUERQUE
RAINFALL   TYPE=1  RAIN QUARTER=0.0  RAIN ONE=1.87
           RAIN SIX=2.20  RAIN DAY=2.66  DT=0.03333 HRS
*****
*****
* EXISTING CONDITIONS *
*****
* SITE - 6.77 ACRES
COMPUTE NM HYD      ID=1  HYD NO=EX-SITE  DA=0.010578 SQ MI
                   PER A=0 PER B=82 PER C=15  PER D=3
                   TP=0.1333 HR  MASS RAIN=-1
PRINT HYD           ID=1  CODE=20
*****
* DEVELOPED CONDITIONS *
*****
* SITE - 6.77 ACRES
COMPUTE NM HYD      ID=2  HYD NO=DEV-SITE  DA=0.010578 SQ MI
                   PER A=0 PER B=51 PER C=14  PER D=35
                   TP=0.1333 HR  MASS RAIN=-1
PRINT HYD           ID=2  CODE=20
* EXISTING BASIN A - 3.60 ACRES
COMPUTE NM HYD      ID=3  HYD NO=EXIST-A  DA=0.005625 SQ MI
                   PER A=0 PER B=85 PER C=15 PER D=0
                   TP=0.1333 HR  MASS RAIN=-1
PRINT HYD           ID=3  CODE=20
* BASIN B - 1.18 ACRES
COMPUTE NM HYD      ID=4  HYD NO=DEV-B  DA=0.001844 SQ MI
                   PER A=0 PER B=15 PER C=15 PER D=70
                   TP=0.1333 HR  MASS RAIN=-1
PRINT HYD           ID=4  CODE=20
* BASIN C - 1.46 ACRES
COMPUTE NM HYD      ID=5  HYD NO=DEV-C  DA=0.002281 SQ MI
                   PER A=0 PER B=11 PER C=11 PER D=78
                   TP=0.1333 HR  MASS RAIN=-1
PRINT HYD           ID=5  CODE=20
* BASIN D - 0.27 ACRES
COMPUTE NM HYD      ID=6  HYD NO=DEV-D  DA=0.000422 SQ MI
                   PER A=0 PER B=0 PER C=20 PER D=80
                   TP=0.1333 HR  MASS RAIN=-1
PRINT HYD           ID=6  CODE=20
* BASIN E - 0.26 ACRES
COMPUTE NM HYD      ID=7  HYD NO=DEV-E  DA=0.000406 SQ MI
                   PER A=0 PER B=3 PER C=3 PER D=94
                   TP=0.1333 HR  MASS RAIN=-1
PRINT HYD           ID=7  CODE=20
* FUTURE BASIN A - 3.60 ACRES
COMPUTE NM HYD      ID=8  HYD NO=FUTURE-A  DA=0.005625 SQ MI
                   PER A=0 PER B=5 PER C=10 PER D=85
                   TP=0.1333 HR  MASS RAIN=-1
PRINT HYD           ID=8  CODE=20
* FUTURE SITE - 6.77 ACRES
COMPUTE NM HYD      ID=9  HYD NO=FUTURE-SITE  DA=0.010578 SQ MI
                   PER A=0 PER B=8 PER C=12  PER D=80
                   TP=0.1333 HR  MASS RAIN=-1
PRINT HYD           ID=9  CODE=20
*****
* ROUTE DEVELOPED BASIN B THROUGH DETENTION POND B
* THRU 12 INCH SD TO STORM MANHOLE
*****

```

Eagle.Ranch.txt

```

*****
ROUTE RESERVOIR      ID=10 HYD NO=POND.B.OUT  INFLOW ID=4  CODE=10
                     OUT (CFS)  STORAGE (AC-FT)  ELEV (FT)
                     0.0        0              84.00
                     8.07        0.00893        85.00
                     8.92        0.02397        86.00
PRINT HYD            ID=10 CODE=20
*****
* ROUTE DEVELOPED BASIN C THROUGH DETENTION POND B      *
* THRU 12 INCH SD TO 24" SD                            *
*****

ROUTE RESERVOIR      ID=11 HYD NO=POND.C.OUT  INFLOW ID=5  CODE=10
                     OUT (CFS)  STORAGE (AC-FT)  ELEV (FT)
                     0.0        0              67.50
                     8.07        0.00181        68.00
                     8.92        0.00955        69.00
PRINT HYD            ID=11 CODE=20
ADD HYD              ID=12  HYD NO=SD INLETS  ID I=8  ID II=6
PRINT HYD            ID=12  CODE=20
FINISH

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AHYMO PROGRAM (AHYMO-S4)                                - Version: S4.01a -- Rel: 01a
RUN DATE (MON/DAY/YR) = 02/22/2017                     USER NO.= Lorenz-NWSingleA33825816
START TIME (HR:MIN:SEC) = 15:26:25                      INPUT FILE = C:\Users\dennis\Desktop\Ahymo Files\Eagle.Ranch.txt
*****
EAGLE VISTA - NM MVD-RETAIL
PROJECT HYDROLOGY
*****
TIME=0.0 PUNCH CODE=0
ALBUQUERQUE
City of Albuquerque soil infiltration values (LAND FACTORS) used for computations.
Land Treatment   Initial Abstr.(in)    Unif. Infil.(in/hour)
A               0.65                1.67
B               0.50                1.25
C               0.35                0.83
D               0.10                0.04
*****
RAINFALL
TYPE=1 RAIN QUARTER=0.0 RAIN ONE=1.87
RAIN SIX=2.20 RAIN DAY=2.66 DT=0.03333 HRS
*****
6-HOUR RAINFALL DIST. - BASED ON NOAA ATLAS 14 FOR CONVECTIVE AREAS (NM & AZ) - D1
DT = 0.033330 HOURS      END TIME = 5.999400 HOURS
0.0000 0.0015 0.0029 0.0045 0.0061 0.0077 0.0096
0.0114 0.0133 0.0154 0.0175 0.0219 0.0264 0.0311
0.0361 0.0412 0.0466 0.0521 0.0577 0.0635 0.0693
0.0753 0.0814 0.0878 0.0946 0.1014 0.1091 0.1168
0.1296 0.1477 0.1657 0.1898 0.2140 0.2429 0.2767
0.3105 0.3612 0.4120 0.4810 0.5886 0.6562 0.8890
1.1224 1.3042 1.4336 1.5629 1.6282 1.6932 1.7463
1.7873 1.8282 1.8567 1.8850 1.9097 1.9304 1.9512
1.9670 1.9827 1.9942 2.0015 2.0087 2.0151 2.0215
2.0273 2.0326 2.0378 2.0426 2.0474 2.0521 2.0568
2.0614 2.0636 2.0659 2.0681 2.0702 2.0724 2.0744
2.0764 2.0784 2.0803 2.0823 2.0842 2.0860 2.0879
2.0896 2.0914 2.0931 2.0948 2.0965 2.0982 2.0999
2.1015 2.1030 2.1046 2.1062 2.1077 2.1092 2.1107
2.1122 2.1136 2.1150 2.1164 2.1178 2.1192 2.1206
2.1220 2.1233 2.1246 2.1260 2.1273 2.1286 2.1299
2.1312 2.1324 2.1337 2.1349 2.1362 2.1374 2.1386
2.1398 2.1410 2.1422 2.1434 2.1446 2.1457 2.1469
2.1480 2.1492 2.1503 2.1514 2.1525 2.1536 2.1547
2.1558 2.1569 2.1580 2.1591 2.1601 2.1612 2.1622
2.1633 2.1643 2.1653 2.1663 2.1673 2.1684 2.1693
2.1703 2.1713 2.1723 2.1733 2.1742 2.1752 2.1762
2.1771 2.1781 2.1790 2.1799 2.1809 2.1818 2.1827
2.1836 2.1845 2.1854 2.1863 2.1872 2.1881 2.1890
2.1898 2.1907 2.1916 2.1924 2.1933 2.1941 2.1950
2.1958 2.1967 2.1975 2.1983 2.1992 2.2000

```

* EXISTING CONDITIONS *

* SITE - 6.77 ACRES

COMPUTE NM HYD ID=1 HYD NO=EX-SITE DA=0.010578 SQ MI
PER A=0 PER B=82 PER C=15 PER D=3
TP=0.1333 HR MASS RAIN=-1

K = 0.072649HR TP = 0.133300HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 1.2529 CFS UNIT VOLUME = 0.9897 B = 526.28 P60 = 1.8700
AREA = 0.00317 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

K = 0.127107HR TP = 0.133300HR K/TP RATIO = 0.953538 SHAPE CONSTANT, N = 3.706151
UNIT PEAK = 25.793 CFS UNIT VOLUME = 0.9996 B = 335.08 P60 = 1.8700
AREA = 0.010261 SQ MI IA = 0.47680 INCHES INF = 1.18505 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

PRINT HYD ID=1 CODE=20

HYDROGRAPH FROM AREA EX-SITE

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.333	1.3	4.000	0.0
0.667	0.0	2.000	1.6	4.666	0.0

RUNOFF VOLUME = 0.90738 INCHES = 0.5119 ACRE-FEET
PEAK DISCHARGE RATE = 18.03 CFS AT 1.533 HOURS BASIN AREA = 0.0106 SQ. MI.

* DEVELOPED CONDITIONS *

* SITE - 6.77 ACRES

COMPUTE NM HYD ID=2 HYD NO=DEV-SITE DA=0.010578 SQ MI
PER A=0 PER B=51 PER C=14 PER D=35
TP=0.1333 HR MASS RAIN=-1

K = 0.072649HR TP = 0.133300HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 14.617 CFS UNIT VOLUME = 0.9985 B = 526.28 P60 = 1.8700
AREA = 0.003702 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

K = 0.125580HR TP = 0.133300HR K/TP RATIO = 0.942088 SHAPE CONSTANT, N = 3.752895

UNIT PEAK = 17.452 CFS UNIT VOLUME = 0.9994 B = 338.35 P60 = 1.8700
 AREA = 0.006876 SQ MI IA = 0.46769 INCHES INF = 1.15954 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

PRINT HYD ID=2 CODE=20

HYDROGRAPH FROM AREA DEV-SITE

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	2.000	2.6	4.000	0.0	5.999	0.1
0.667	0.0	2.666	0.3	4.666	0.0	6.666	0.0
1.333	3.9	3.333	0.1	5.333	0.0		

RUNOFF VOLUME = 1.26184 INCHES = 0.7119 ACRE-FEET
 PEAK DISCHARGE RATE = 22.30 CFS AT 1.533 HOURS BASIN AREA = 0.0106 SQ. MI.

* EXISTING BASIN A - 3.60 ACRES

COMPUTE NM HYD ID=3 HYD NO=EXIST-A DA=0.005625 SQ MI
 PER A=0 PER B=85 PER C=15 PER D=0
 TP=0.1333 HR MASS RAIN=-1

K = 0.127223HR TP = 0.133300HR K/TP RATIO = 0.954412 SHAPE CONSTANT, N = 3.702639
 UNIT PEAK = 14.129 CFS UNIT VOLUME = 0.9993 B = 334.84 P60 = 1.8700
 AREA = 0.005625 SQ MI IA = 0.47750 INCHES INF = 1.18700 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

PRINT HYD ID=3 CODE=20

HYDROGRAPH FROM AREA EXIST-A

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.333	0.5	2.666	0.1		
0.667	0.0	2.000	0.8	3.333	0.0		

RUNOFF VOLUME = 0.87394 INCHES = 0.2622 ACRE-FEET
 PEAK DISCHARGE RATE = 9.37 CFS AT 1.533 HOURS BASIN AREA = 0.0056 SQ. MI.

* BASIN B - 1.18 ACRES

COMPUTE NM HYD ID=4 HYD NO=DEV-B DA=0.001844 SQ MI
 PER A=0 PER B=15 PER C=15 PER D=70
 TP=0.1333 HR MASS RAIN=-1

K = 0.072649HR TP = 0.133300HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
 UNIT PEAK = 5.0961 CFS UNIT VOLUME = 0.9973 B = 526.28 P60 = 1.8700

AREA = 0.001291 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

K = 0.118429HR TP = 0.133300HR K/TP RATIO = 0.888442 SHAPE CONSTANT, N = 3.992344
UNIT PEAK = 1.4719 CFS UNIT VOLUME = 0.9915 B = 354.66 P60 = 1.8700
AREA = 0.000553 SQ MI IA = 0.42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

PRINT HYD ID=4 CODE=20

HYDROGRAPH FROM AREA DEV-B

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.333	1.2	2.666	0.0
0.667	0.0	2.000	0.6	3.333	0.0
				4.666	0.0
				5.333	0.0
				5.999	0.0

RUNOFF VOLUME = 1.65835 INCHES = 0.1628 ACRE-FEET
PEAK DISCHARGE RATE = 4.73 CFS AT 1.533 HOURS BASIN AREA = 0.0018 SQ. MI.

* BASIN C - 1.46 ACRES

COMPUTE NM HYD ID=5 HYD NO=DEV-C DA=0.002281 SQ MI
PER A=0 PER B=11 PER C=11 PER D=78
TP=0.1333 HR MASS RAIN=-1

K = 0.072649HR TP = 0.133300HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 7.0243 CFS UNIT VOLUME = 0.9978 B = 526.28 P60 = 1.8700
AREA = 0.001779 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

K = 0.118429HR TP = 0.133300HR K/TP RATIO = 0.888442 SHAPE CONSTANT, N = 3.992344
UNIT PEAK = 1.3352 CFS UNIT VOLUME = 0.9906 B = 354.66 P60 = 1.8700
AREA = 0.000502 SQ MI IA = 0.42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

PRINT HYD ID=5 CODE=20

HYDROGRAPH FROM AREA DEV-C

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.333	1.6	2.666	0.1
0.667	0.0	2.000	0.8	3.333	0.0
				4.666	0.0
				5.333	0.0
				5.999	0.0

RUNOFF VOLUME = 1.73492 INCHES = 0.2111 ACRE-FEET
PEAK DISCHARGE RATE = 6.04 CFS AT 1.533 HOURS BASIN AREA = 0.0023 SQ. MI.

* BASIN D - 0.27 ACRES

COMPUTE NM HYD

ID=6 HYD NO=DEV-D DA=0.000422 SQ MI
PER A=0 PER B=0 PER C=20 PER D=80
TP=0.1333 HR MASS RAIN=-1

K = 0.072649HR TP = 0.133300HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 1.3329 CFS UNIT VOLUME = 0.9911 B = 526.28 P60 = 1.8700
AREA = 0.000338 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

K = 0.105867HR TP = 0.133300HR K/TP RATIO = 0.794199 SHAPE CONSTANT, N = 4.514592
UNIT PEAK = 0.24575 CFS UNIT VOLUME = 0.9486 B = 388.14 P60 = 1.8700
AREA = 0.000084 SQ MI IA = 0.35000 INCHES INF = 0.83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

PRINT HYD ID=6 CODE=20

HYDROGRAPH FROM AREA DEV-D

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.333	0.3	4.000	0.0
0.667	0.0	2.000	0.2	3.333	0.0
				4.666	0.0
RUNOFF VOLUME = 1.78024 INCHES = 0.0401 ACRE-FEET					
PEAK DISCHARGE RATE = 1.16 CFS AT 1.533 HOURS BASIN AREA = 0.0004 SQ. MI.					

* BASIN E - 0.26 ACRES

COMPUTE NM HYD

ID=7 HYD NO=DEV-E DA=0.000406 SQ MI
PER A=0 PER B=3 PER C=3 PER D=94
TP=0.1333 HR MASS RAIN=-1

K = 0.072649HR TP = 0.133300HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 1.5067 CFS UNIT VOLUME = 0.9922 B = 526.28 P60 = 1.8700
AREA = 0.000382 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

K = 0.118429HR TP = 0.133300HR K/TP RATIO = 0.888442 SHAPE CONSTANT, N = 3.992344
UNIT PEAK = 0.64813E-01CFS UNIT VOLUME = 0.8761 B = 354.66 P60 = 1.8700
AREA = 0.000024 SQ MI IA = 0.42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

PRINT HYD ID=7 CODE=20

HYDROGRAPH FROM AREA DEV-E

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.333	0.3	2.666	0.0	4.000	0.0
0.667	0.0	2.000	0.2	3.333	0.0	4.666	0.0

RUNOFF VOLUME = 1.89406 INCHES = 0.0410 ACRE-FEET
 PEAK DISCHARGE RATE = 1.16 CFS AT 1.500 HOURS BASIN AREA = 0.0004 SQ. MI.

* FUTURE BASIN A - 3.60 ACRES
 COMPUTE NM HYD ID=8 HYD NO=FUTURE-A DA=0.005625 SQ MI
 PER A=0 PER B=5 PER C=10 PER D=85
 TP=0.1333 HR MASS RAIN=-1

K = 0.072649HR TP = 0.133300HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
 UNIT PEAK = 18.877 CFS UNIT VOLUME = 0.9988 B = 526.28 P60 = 1.8700
 AREA = 0.004781 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

K = 0.114242HR TP = 0.133300HR K/TP RATIO = 0.857028 SHAPE CONSTANT, N = 4.150443
 UNIT PEAK = 2.3108 CFS UNIT VOLUME = 0.9944 B = 365.08 P60 = 1.8700
 AREA = 0.000844 SQ MI IA = 0.40000 INCHES INF = 0.97000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

PRINT HYD ID=8 CODE=20

HYDROGRAPH FROM AREA FUTURE-A

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	2.000	2.2	4.000	0.0	5.999	0.1
0.667	0.0	2.666	0.2	4.666	0.0	6.666	0.0
1.333	4.3	3.333	0.0	5.333	0.1		

RUNOFF VOLUME = 1.81072 INCHES = 0.5432 ACRE-FEET
 PEAK DISCHARGE RATE = 15.37 CFS AT 1.500 HOURS BASIN AREA = 0.0056 SQ. MI.

* FUTURE SITE - 6.77 ACRES
 COMPUTE NM HYD ID=9 HYD NO=FUTURE-SITE DA=0.010578 SQ MI
 PER A=0 PER B=8 PER C=12 PER D=80
 TP=0.1333 HR MASS RAIN=-1

K = 0.072649HR TP = 0.133300HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428

UNIT PEAK = 33.410 CFS UNIT VOLUME = 0.9990 B = 526.28 P60 = 1.8700
AREA = 0.008462 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

K = 0.115917HR TP = 0.133300HR K/TP RATIO = 0.869594 SHAPE CONSTANT, N = 4.085527
UNIT PEAK = 5.7268 CFS UNIT VOLUME = 0.9980 B = 360.83 P60 = 1.8700
AREA = 0.002116 SQ MI IA = 0.41000 INCHES INF = 0.99800 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033330

PRINT HYD ID=9 CODE=20

HYDROGRAPH FROM AREA FUTURE-SITE

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	2.000	4.0	4.000	0.0	5.999	0.1
0.667	0.0	2.666	0.3	4.666	0.1	6.666	0.0
1.333	7.7	3.333	0.1	5.333	0.1		

RUNOFF VOLUME = 1.75988 INCHES = 0.9929 ACRE-FEET
PEAK DISCHARGE RATE = 28.29 CFS AT 1.533 HOURS BASIN AREA = 0.0106 SQ. MI.

* ROUTE DEVELOPED BASIN B THROUGH DETENTION POND B *
* THRU 12 INCH SD TO STORM MANHOLE *

ROUTE RESERVOIR ID=10 HYD NO=POND.B.OUT INFLOW ID=4 CODE=10
OUT (CFS) STORAGE (AC-FT) ELEV (FT)
0.0 0 84.00
8.07 0.00893 85.00
8.92 0.02397 86.00

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
0.00	0.00	84.00	0.000	0.00
0.33	0.00	84.00	0.000	0.00
0.67	0.00	84.00	0.000	0.00
1.00	0.14	84.01	0.000	0.12
1.33	1.21	84.14	0.001	1.10
1.67	2.69	84.36	0.003	2.91
2.00	0.65	84.08	0.001	0.68
2.33	0.19	84.02	0.000	0.20
2.67	0.05	84.01	0.000	0.05
3.00	0.01	84.00	0.000	0.01

3.33	0.01	84.00	0.000	0.01
3.67	0.01	84.00	0.000	0.01
4.00	0.01	84.00	0.000	0.01
4.33	0.01	84.00	0.000	0.01
4.67	0.01	84.00	0.000	0.01
5.00	0.01	84.00	0.000	0.01
5.33	0.01	84.00	0.000	0.01
5.67	0.02	84.00	0.000	0.02
6.00	0.02	84.00	0.000	0.02
6.33	0.00	84.00	0.000	0.00

PEAK DISCHARGE = 4.747 CFS - PEAK OCCURS AT HOUR 1.53
 MAXIMUM WATER SURFACE ELEVATION = 84.588
 MAXIMUM STORAGE = 0.0053 AC-FT INCREMENTAL TIME= 0.033330HRS

PRINT HYD ID=10 CODE=20

HYDROGRAPH FROM AREA POND.B.OUT

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.333	1.1	2.666	0.1
0.667	0.0	2.000	0.7	3.333	0.0

RUNOFF VOLUME = 1.65518 INCHES = 0.1628 ACRE-FEET
 PEAK DISCHARGE RATE = 4.75 CFS AT 1.533 HOURS BASIN AREA = 0.0018 SQ. MI.

 * ROUTE DEVELOPED BASIN C THROUGH DETENTION POND B *
 * THRU 12 INCH SD TO 24" SD *

ROUTE RESERVOIR ID=11 HYD NO=POND.C.OUT INFLOW ID=5 CODE=10

OUT (CFS)	STORAGE (AC-FT)	ELEV (FT)
0.0	0	67.50
8.07	0.00181	68.00
8.92	0.00955	69.00

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
0.00	0.00	67.50	0.000	0.00
0.33	0.00	67.50	0.000	0.00
0.67	0.00	67.50	0.000	0.00
1.00	0.19	67.51	0.000	0.18
1.33	1.62	67.60	0.000	1.59
1.67	3.43	67.72	0.001	3.49
2.00	0.85	67.55	0.000	0.86

2.33	0.25	67.52	0.000	0.25
2.67	0.06	67.50	0.000	0.06
3.00	0.02	67.50	0.000	0.02
3.33	0.01	67.50	0.000	0.01
3.67	0.01	67.50	0.000	0.01
4.00	0.01	67.50	0.000	0.01
4.33	0.01	67.50	0.000	0.01
4.67	0.01	67.50	0.000	0.01
5.00	0.02	67.50	0.000	0.02
5.33	0.02	67.50	0.000	0.02
5.67	0.02	67.50	0.000	0.02
6.00	0.03	67.50	0.000	0.03
6.33	0.00	67.50	0.000	0.00

PEAK DISCHARGE = 6.063 CFS - PEAK OCCURS AT HOUR 1.53
 MAXIMUM WATER SURFACE ELEVATION = 67.876
 MAXIMUM STORAGE = 0.0014 AC-FT INCREMENTAL TIME= 0.033330HRS

PRINT HYD ID=11 CODE=20

HYDROGRAPH FROM AREA POND.C.OUT

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.333	1.6	2.666	0.1
0.667	0.0	2.000	0.9	3.333	0.0

RUNOFF VOLUME = 1.73478 INCHES = 0.2110 ACRE-FEET
 PEAK DISCHARGE RATE = 6.06 CFS AT 1.533 HOURS BASIN AREA = 0.0023 SQ. MI.

ADD HYD ID=12 HYD NO=SD INLETS ID I=8 ID II=6
 PRINT HYD ID=12 CODE=20

HYDROGRAPH FROM AREA SD

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	2.000	2.4	4.000	0.0
0.667	0.0	2.666	0.2	4.666	0.0
1.333	4.6	3.333	0.0	5.333	0.1

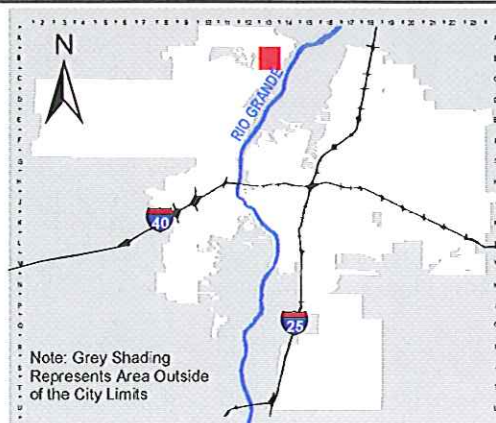
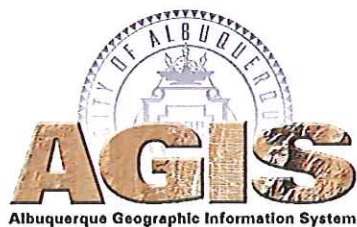
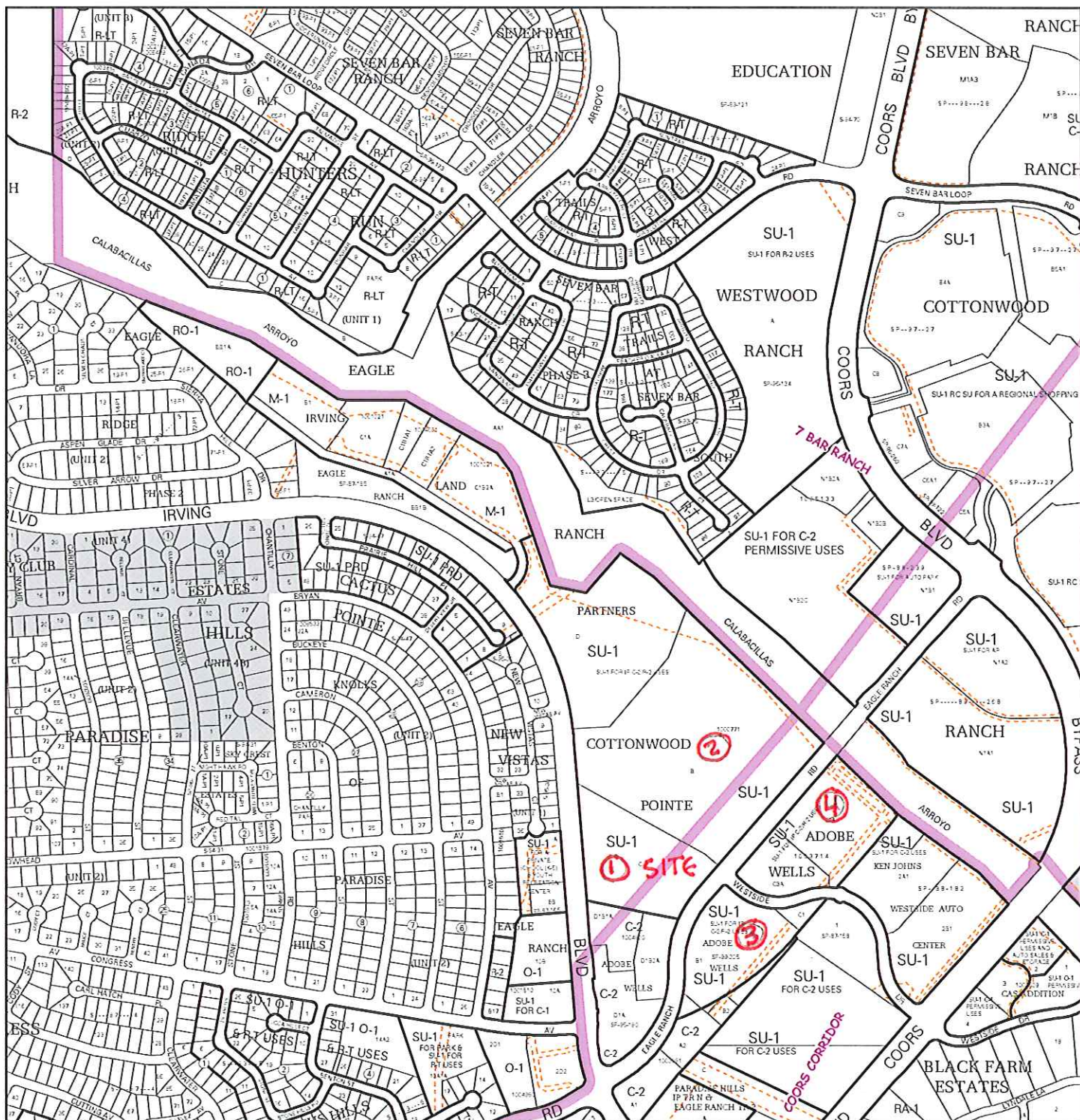
RUNOFF VOLUME = 1.80851 INCHES = 0.5833 ACRE-FEET
 PEAK DISCHARGE RATE = 16.53 CFS AT 1.500 HOURS BASIN AREA = 0.0060 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 15:26:25

EXHIBITS

DOWNSTREAM CAPACITY EXHIBITS

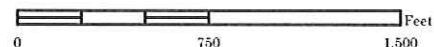


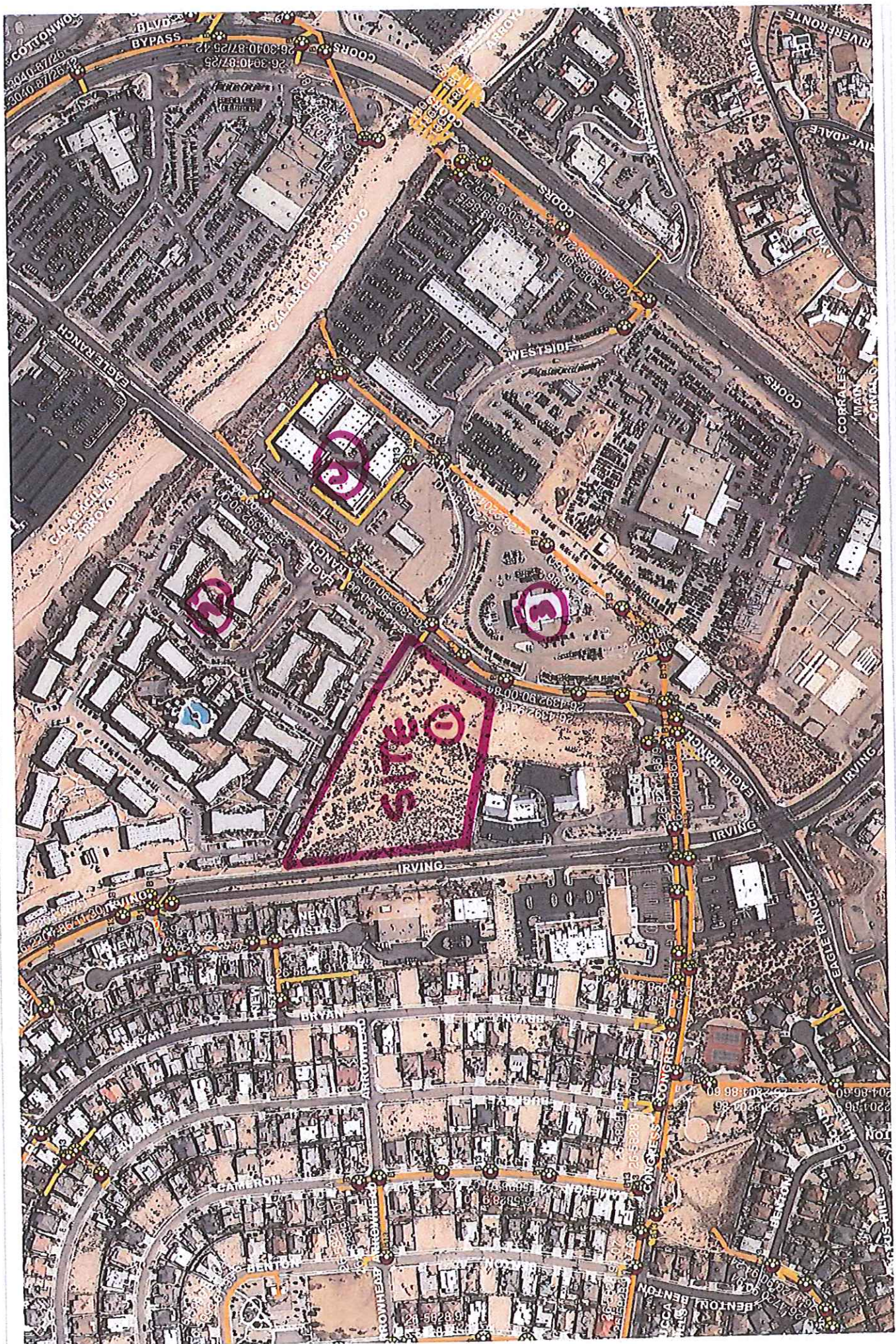
Zone Atlas Page:

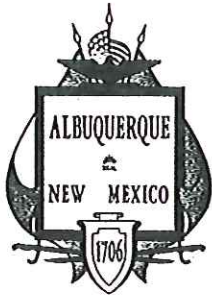
B-13-Z

Selected Symbols

- SECTOR PLANS**
- Design Overlay Zones
- City Historic Zones
- H-1 Buffer Zone
- Petroglyph Mon.
- Escarpment
- 2 Mile Airport Zone
- Airport Noise Contours
- Wall Overlay Zone







City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

October 25, 2001

Daniel S. Aguirre, P.E.
Wilson & Company
4900 Lang Ave. NE
Albuquerque, NM 87109

Attn: John A. Tellez, E.I.

Re: Cottonwood Pointe (B-13/D002C) Rough Grading & Drainage Plan, Engineer's stamp dated 10-23-01

Dear Mr. Aguirre,

Based on the information provided in your submittal dated Oct. 24, 2001, the above-referenced project is approved for Rough Grading.

If you have any questions, please call me at 924-3988.

Sincerely,

Nancy Musinski, P.E.
Hydrology/Utility Development
City of Albuquerque Public Works

xc: File

CITY OF ALBUQUERQUE



2

December 27, 2011

Scott M. McGee, P.E.
9700 Tanoan Dr NE
Albuquerque, NM 87111

**Re: Aspen Ranch Apartments Ph 2 Grading and Drainage Plan
Engineer's Stamp dated 11-22-11 (B13/D002B)**

Dear Mr. McGee,

Based upon the information provided in your submittal received 11-23-11, the above referenced plan is approved for Building Permit. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

Prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

PO Box 1293

If you have any questions, you can contact me at 924-3986.

Albuquerque

NM 87103

www.cabq.gov

Sincerely,

Curtis A. Cherne, P.E.
Principal Engineer, Planning Dept.
Development and Building Services

C: e-mail



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

3

April 6, 2004

Ronald Bohannon, P.E.
Tierra West, LLC
8509 Jefferson NE
Albuquerque, NM 87113

**Re: KIA Auto Dealership, SE corner of Eagle Ranch Rd. and Westside Blvd.,
Grading and Drainage Report
Engineer's Stamp dated 1-29-04 (B13/D2D)**

Dear Mr. Bohannon,

Based upon the information provided in your submittal received 1-30-04, the above referenced plan is approved for Building Permit. **However, please note that a work order will be required for the proposed inlets.** Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology. Prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

This project requires a National Pollutant Discharge Elimination System (NPDES) permit. If you have any questions regarding this permit please feel free to call the DMD Storm Drainage Design section at 768-3654 (Charles Caruso) or 768-3645 (Bryan Wolfe).

If you have any questions, you can contact me at 924-3981.

Sincerely,

Kristal D. Metro
Engineering Associate, Planning Dept.
Development and Building Services

C: Charles Caruso, DMD Storm Drainage Design
File

DRAINAGE REPORT

For

**West Side Kia Dealership
Adobe Wells Subdivision**

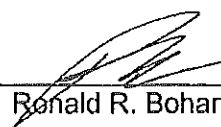
Prepared by

Tierra West, LLC
8509 Jefferson NE
Albuquerque, New Mexico 87113

Prepared for

Skye Inc.
3515 Seabreeze Lane
Corona Del Mar, Ca 92625

March 15, 2004


Ronald R. Bohannon P.E. No. 7868

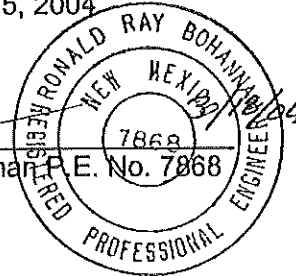


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Existing Drainage Conditions	2
FIRM Map and Soil Conditions	3
On-Site Drainage Management Plan	3
FEMA Map 350002	4
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Criteria	6
Summary	6
Drainage Summary Table.....	7
GRADING AND DRAINAGE PLAN.	MAP POCKET

LOCATION:

The 6-acre site is located in the southeast corner of the intersection of Eagle Ranch Road NW and Westside Drive, just west of Coors Boulevard. The site is bordered on the south by the undeveloped property and by existing car lots to the east. The purpose of this report is to provide the drainage analysis and management plan for the commercial site to include the proposed Kia dealership for site plan for subdivision and site plan for building permit in the central portion of the site.

DRAINAGE BASINS DESIGNATIONS:

For the purpose of this report, the existing and developed drainage basins were designated as follows.

Existing Undeveloped Basins:

Basin A-B	Entire site consisting of Tract B1.
-----------	-------------------------------------

Developed Conditions:

Basins A-B	Developed parcels with on-site connections to existing underground storm drain
------------	--

EXISTING DRAINAGE CONDITIONS:

The site is currently undeveloped with the exception of a previously constructed storm drain and waterline that transverse the site from south to north along the east property line. This primarily undeveloped site accepts no upland flows. All upland flows were intercepted by the construction of the storm drain located in Eagle Ranch Road. Upland flows from the north are intercepted by Westside Boulevard and conveyed to an existing storm sewer at its intersection with Coors Boulevard. The onsite runoff primarily drains from west to east to existing drop inlets that connect to an existing 60" storm drain that eventually outfalls to the Calabacillas Arroyo.

During the construction of the Eagle Ranch Road, the flows that previously entered the 60" storm drain were rerouted to the new storm sewer constructed in the new roadway. The 60" storm drain located within the proposed Kia site was connected to the new storm sewer and is intended to act as an overflow only. The calculated undeveloped runoff from this site for a 100-year, 6-hour storm event under existing conditions is 7.77 cfs.

FIRM MAP AND SOIL CONDITIONS:

The site is located on FIRM Map 35001C0108 D, Panel Number 108, as shown on the attached excerpts. The map shows that the site does not lie within a 100-year flood plain.

The site contains a soil type designated as Bluepoint Series by the Soil Conservation Service Soil Survey of Bernalillo County. The Bluepoint series consists of deep, somewhat excessively drained soils formed in sandy alluvium and eolian sediments on alluvial fans and terraces. Slopes range from one to fifteen percent. Permeability is rapid. Runoff is slow and the hazard of blowing is severe.

ONSITE DRAINAGE MANAGEMENT PLAN:

The on-site developed basins A and B are shown on exhibit B. The basins will surface flow to individual drop inlets that are connected to an existing on site underground storm drain system. The project is planned to be constructed in two phases and although the drop inlets are in the Phase II area, they will be constructed with Phase I. Water quality inlets will be used for this site as shown on the grading and drainage plans. The storm drain system conveys the flows north to the Calabacillas Arroyo. The total peak discharge from the site for a 100-year, 6-hour storm is 24.5 cfs. The flows upland of the existing section of storm drain that traverses the proposed Kia site were previously rerouted into the new storm drain constructed in Eagle Ranch Road. The existing 60" storm drain was

not abandoned and is intended to act as an overflow for the new Eagle Ranch Road storm sewer. There is ample capacity in the older storm sewer to convey the flows from the proposed Kia development to the Calabacillas Arroyo.

Due to the relatively minor grade differences between this site and the existing adjacent property to the east, a retaining wall is required along a portion of the east property line. The retaining wall will be constructed as part of Phase II of this site. In the interim, an earthen berm will be constructed in Phase I to prevent cross lot drainage by directing the flows from the site to the proposed drop inlets that will also be constructed in Phase II. Runoff in excess of the 100-year, 6-hour design storm will overflow to the east in the vicinity of the proposed retaining wall.

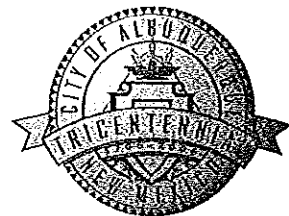
CRITERIA:

The site was analyzed using the procedures outlined in the Development Process Manual Volume 2, Chapter 22. The Weighted-E method was used in estimating volumes and flow rates of runoff from on-site basins. The existing and developed conditions for on site basins were analyzed for a 100-year, 6-hour rainfall event.

SUMMARY:

The proposed development will surface flow to individual drop inlets that are connected to an existing on site underground storm drain system. The storm drain system conveys the flows north to the Calabacillas Arroyo. The total peak discharge from the site for a 100-year, 6-hour storm is 24.5 cfs. Eagle Ranch Road and West Side Boulevard intercept all upland flows. No upland flows enter the site.

CITY OF ALBUQUERQUE



March 16, 2007

Ronald Ray Bohannon, P.E.
Tierra West, LLC
5571 Midway Park Place NE
Albuquerque, NM 87109

Re: Venture Commerce Center Grading and Drainage Plan
Engineer's Stamp dated 3-15-07 (B13/D2E)

Dear Mr. Bohannon,

Based upon the information provided in your submittal received 3-2-07, the above referenced plan is approved for Building Permit and SO19 Permit. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

P.O. Box 1293

A separate permit is required for construction within City R/W. A copy of this approval letter must be on hand when applying for the excavation permit.

Albuquerque

This project requires a National Pollutant Discharge Elimination System (NPDES) permit.

New Mexico 87103

Also, prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

If you have any questions, you can contact me at 924-3695.

www.cabq.gov

Sincerely,

Curtis A. Cherne, E.I.
Engineering Associate, Planning Dept.
Development and Building Services

[3/11/07
MYLAR]

file
Sertil Kanbar, DMD
Antoinette Baldonado, Excavation and Barricading
Dwayne Schmitz, Street/Storm Drain Maintenance

DRAINAGE REPORT

for

**Venture Commerce Center
Northeast Corner of Eagle Ranch/Westside Drive
Albuquerque, New Mexico**

Prepared by

Tierra West, LLC
8509 Jefferson NE
Albuquerque, New Mexico 87113

Prepared for

Venture Corporation
125 Sir Francis Drake Blvd. - Third Floor
Larkspur, CA 94939

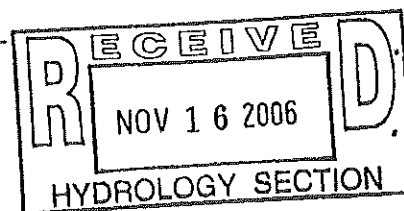
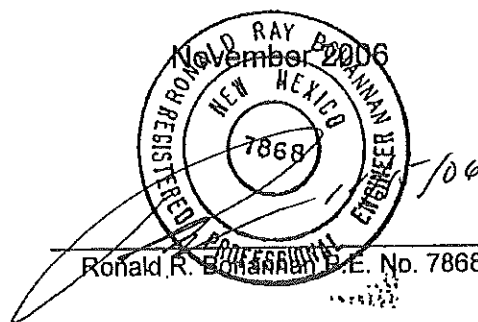


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Developed Basin Layout	5
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Storm Sewer Calculations.....	8

Location

The site is located at the northeast corner of Westside Drive and Eagle Ranch Road. The site contains approximately 7.5 acres and is currently undeveloped (see attached Zone Atlas Map B-13). The property will be subdivided into two lots, with only the northerly 5 acres being developed at this time. The purpose of this report is to provide the drainage analysis and management plan for the project.

Existing Drainage Conditions

The site is currently undeveloped. No offsite runoff enters the site. The Calabacillas Arroyo is located to the north of the site and cuts off flows from that direction. Eagle Ranch Road and Westside Drive are located west and south of the site and prevent any offsite drainage from entering the site from those directions. The property to the east is developed as a car dealership and no water leaves the site.

FIRM Map

The site is located on FIRM Map 35001C0108E as shown on the attached excerpt. The map shows that the site does not lie within any 100-year flood plains. The Calabacillas Arroyo is located north of the site. The project is far enough to the west from the Arroyo to be outside the floodplain and prudent line limits.

Due to recent erosion problems in the Calabacillas Arroyo, AMAFCA is working with their consultant for a design for slope stabilization. This project will either enter into a funding agreement with AMAFCA for a portion of the cost of the proposed improvements, or construct improvements adjacent to the site. At this time, AMAFCA's design is not complete, and no decisions can be made.

On-Site Drainage Management Plan

The proposed drainage management plan is to collect the developed flows into two new on-site storm drain systems that outfall to the existing 60" storm drain on the east side of the site. The site is divided into eight (8) basins. Basins 1, 4, and 8 will drain to a new storm drain on the south side of the site. Basin 8 consists of the currently undeveloped tract to the south and has a developed flow of 8.56 cfs. This basin currently drains northeast towards the new project and an interim detention pond will capture the undeveloped flows until the basin is developed. A new 18" storm drain stub and catch basin will capture the undeveloped flows and convey them to the new south storm drain system. The 18" storm drain has capacity for the developed flow of 8.56 cfs from this site. The new southern storm drain system will drain a total of 17.16 cfs to the existing 60" storm drain. A new storm drain was constructed in Eagle Ranch Road as part of an SAD and the existing 60" is intended to act as an overflow for the new Eagle Ranch storm sewer. There is ample capacity in the older storm drain to convey the flows from this site and the flows from the upstream Kia Dealership.

Basins 2, 3, 5, and 6 will drain a total flow of 10.29 to the second new storm drain system located on the north side of the site. This new storm drain also outfalls to the existing 60" storm drain on the east side of the property. Basin 7 consists of the landscape area located north of the parking lot adjacent to the Calabacillas Arroyo. This basin has an undeveloped flow of 1.06 cfs and will continue the current drainage pattern of sheet flowing into the Calabacillas Arroyo. Water quality inlets are located at the end of both new storm drains before any flows from the site enter the existing 60" storm drain.

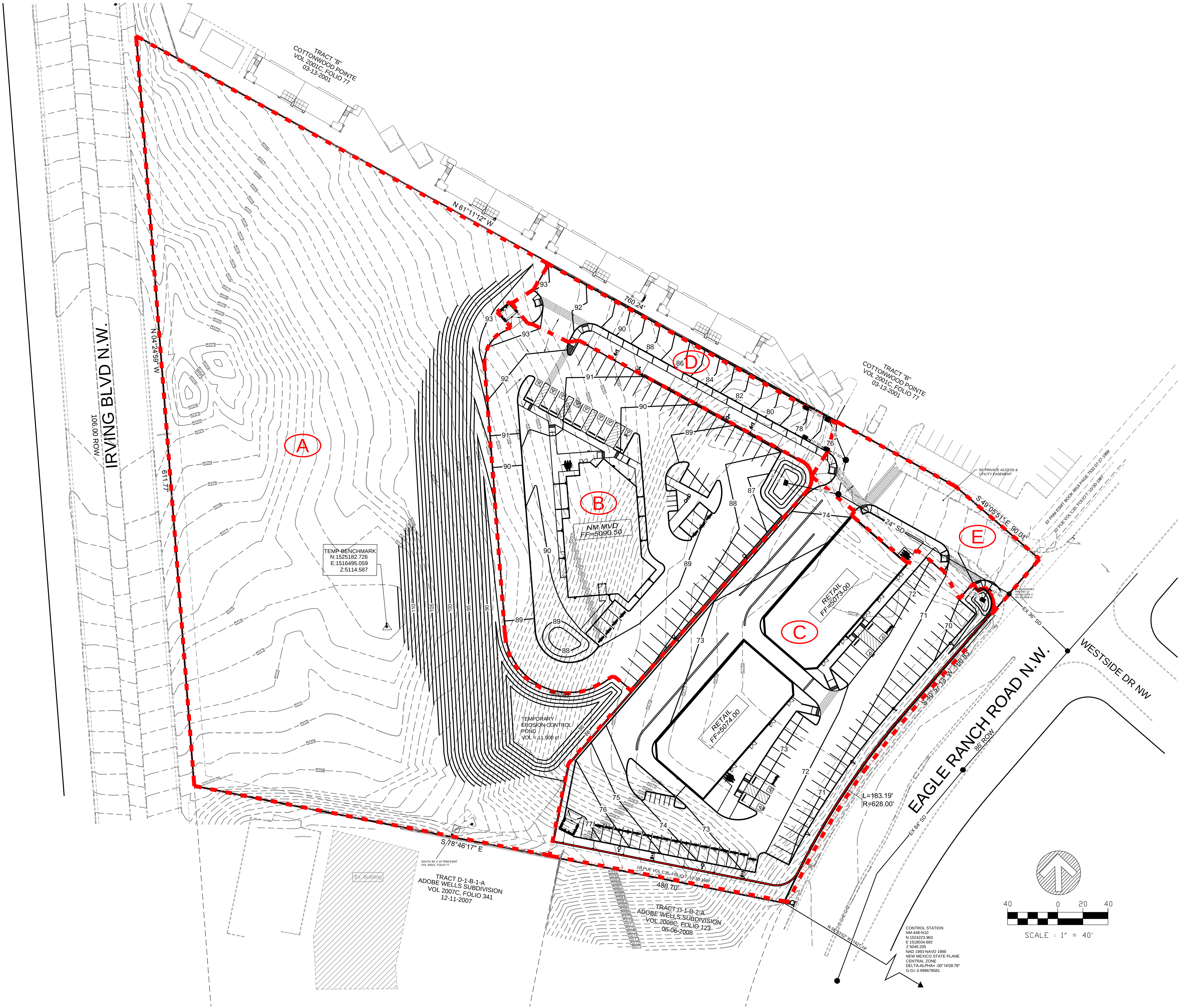
In the case of an emergency or storm greater than the 100-year event, the site will overflow out the entrances or to the Calabacillas Arroyo before any water enters the buildings.

Calculations

The Weighted E method from the "City of Albuquerque Development Process Manual Volume 11 – Design Criteria, 1997 Revision" was used to calculate the runoff and volume for the site.

Summary

The site generates a total developed flow of 28.51 cfs. Two new on-site storm drain systems will drain 27.45 cfs to the existing 60" storm drain located on the east side of the site. Basin 7 will continue the current drainage pattern and discharge 1.06 cfs directly to the Calabacillas Arroyo. Basin 8 is undeveloped at this time, but the new storm drain system has been designed to accept the future developed flow of 8.56 cfs.



LEGEND		
ITEM	EXISTING	PROPOSED
PROPERTY LINE		
SPOT ELEVATION	× 75.5	01.5
CONTOUR W/ ELEVATION	5800	5800
BLOCK WALL		
RETAINING WALL		
STORM DRAIN	84" SD	24" SD
DIRECTION OF FLOW		
DRAINAGE SWALE		
RIDGE LINE		3:1
SLOPE GRADING		
CONCRETE CURB		
DRAINAGE BASIN ID		A
DRAINAGE BASIN BOUNDARY		

PROJECT DATA

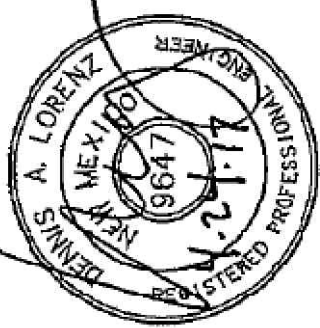
PROPERTY ADDRESS:
EAGLE RANCH ROAD NW
ALBUQUERQUE, NEW MEXICO
LEGAL DESCRIPTION:
TRACT C,
COTTONWOOD POINTE
ALBUQUERQUE, NEW MEXICO
SURVEY:
ALL PROJECT SURVEYING BY
CONSTRUCTION SURVEY
TECHNOLOGIES, INC.

IN ACCORDANCE WITH THE CITY OF ALBUQUERQUE DRAINAGE ORDINANCE, EFFECTIVE MAY 12, 2014, ALL NEW DEVELOPMENT PROJECTS ARE REQUIRED TO MANAGE THE RUNOFF WHICH OCCURS DURING THE 90TH PERCENTILE STORM EVENT. IN ORDER TO COMPLY WITH THIS CRITERIA, WHERE PRACTICAL, ALL SURFACE DRAINAGE SHALL BE ROUTED THROUGH LANDSCAPED AREAS BEFORE RELEASE INTO DOWNSTREAM DRAINAGE FACILITIES. THIS PLAN RECOMMENDS ALL LANDSCAPED AREAS BE DEPRESSED A MINIMUM OF 3-INCHES BELOW THE ADJACENT PAVED SURFACE TO RETAIN THE FIRST FLUSH RUNOFF.



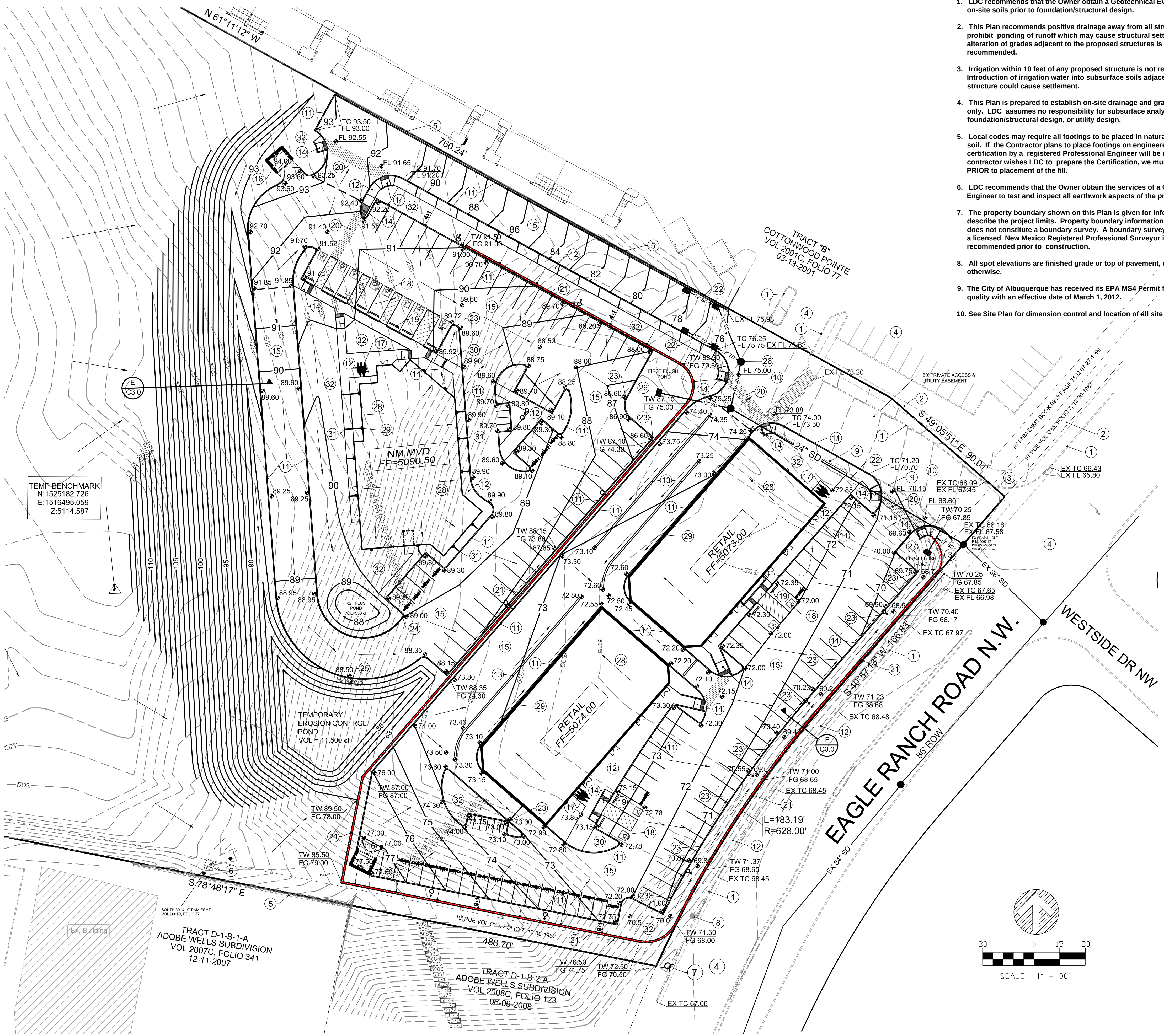
EAGLE RANCH NM MVD - RETAIL
Albuquerque, New Mexico
GRADING & DRAINAGE PLAN
Overall Site & Drainage Basins

REVISION DATE



DATE
02-20-2017

SHEET NUMBER
C-1.0



DRAINAGE PLAN NOTES

1. LDC recommends that the Owner obtain a Geotechnical Evaluation of the on-site soils prior to foundation/structural design.
2. This Plan recommends positive drainage away from all structures to prohibit ponding of runoff which may cause structural settlement. Future alteration of grades adjacent to the proposed structures is not recommended.
3. Irrigation within 10 feet of any proposed structure is not recommended. Introduction of irrigation water into subsurface soils adjacent to the structure could cause settlement.
4. This Plan is prepared to establish on-site drainage and grading criteria only. LDC assumes no responsibility for subsurface analysis, foundation/structural design, or utility design.
5. Local codes may require all footings to be placed in natural undisturbed soil. If the Contractor plans to place footings on engineered fill, a certification by a registered Professional Engineer will be required. If the contractor wishes LDC to prepare the Certification, we must be notified PRIOR to placement of the fill.
6. LDC recommends that the Owner obtain the services of a Geotechnical Engineer to test and inspect all earthwork aspects of the project.
7. The property boundary shown on this Plan is given for information only to describe the project limits. Property boundary information shown hereon does not constitute a boundary survey. A boundary survey performed by a licensed New Mexico Registered Professional Surveyor is recommended prior to construction.
8. All spot elevations are finished grade or top of pavement, unless noted otherwise.
9. The City of Albuquerque has received its EPA MS4 Permit for stormwater quality with an effective date of March 1, 2012.
10. See Site Plan for dimension control and location of all site improvements.

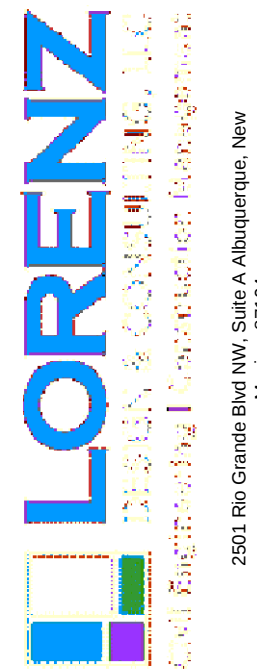
LEGEND

ITEM	EXISTING	PROPOSED
PROPERTY LINE	—	—
SPOT ELEVATION	× 75.5	01.5 ●
CONTOUR W/ ELEVATION	— 5800 —	— 5800 —
DIRECTION OF FLOW	—	—
RIDGE LINE	—	—
SLOPE GRADING	—	3:1
TOP CURB/FLOWLINE	EX TC 75.75 EX FL 75.25	TC 75.75 FL 75.25
TOP WALL/FINISH GRADE	EX TW 75.75 EX FG 75.25	TW 75.75 FG 75.25
CONCRETE CURB	—	—
BLOCK WALL	—	—
RETAINING WALL	—	—
STORM DRAIN	84" SD	24" SD
UTILITY POLE	PP	—
WATER METER	WM	—
ELECTRIC TRANSFORMER	XFMR	—
FIRE HYDRANT	—	—

KEYED NOTES

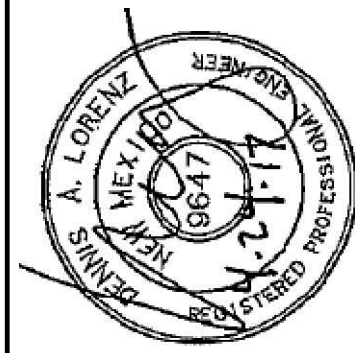
1. EXISTING CONCRETE CURB.
2. EXISTING CONCRETE SIDEWALK.
3. EXISTING HANDICAP RAMP.
4. EXISTING ASPHALT PAVEMENT.
5. EXISTING BLOCK WALL.
6. EXISTING ELECTRIC TRANSFORMER.
7. EXISTING FIRE HYDRANT.
8. EXISTING WATER METER.
9. REM & DISPOSE EXISTING CONCRETE CURB & GUTTER AND SIDEWALK TO LIMITS SHOWN.
10. REM & DISPOSE ASPHALT PAVEMENT TO LIMITS SHOWN FOR UNDERGROUND UTILITY CONSTRUCTION. SEE UTILITY PLAN.
11. CONSTRUCT 6" CONCRETE CURB & GUTTER. SEE SHEET C-3.0.
12. CONSTRUCT SIDEWALK. SEE SITE PLAN.
13. CONSTRUCT MOUNTABLE CURB AT DRIVE THRU LANES. SEE SHEET AS-1.2.
14. CONSTRUCT HANDICAP RAMP. SEE SHEET AS-1.2.
15. CONSTRUCT ASPHALT PAVEMENT. SEE SHEET C-3.0.
16. CONSTRUCT REFUSE ENCLOSURE. SEE SHEET AS-1.2.
17. INSTALL BICYCLE RACK. SEE SHEET AS-1.2.
18. INSTALL HANDICAPPED PARKING STRIPING AND SIGNAGE. SEE SHEET AS-1.2.
19. INSTALL CONCRETE TIRE STOPS.
20. INSTALL PEDESTRIAN CROSSWALK STRIPING. SEE SHEET AS-1.2.
21. CONSTRUCT RETAINING WALL. DESIGN BY OTHERS.
22. CONSTRUCT STORM DRAIN SYSTEM. SEE DETAIL J/C-3.0.
23. PROVIDE 12-INCH CURB BLOCKOUT FOR DRAINAGE.
24. PROVIDE 24-INCH CURB BLOCKOUT FOR FIRST FLUSH POND OVERFLOW.
25. CONSTRUCT OVERFLOW SPILLWAY AT TEMPORARY EROSION CONTROL POND. SEE SHEET C-3.0.
26. CONSTRUCT FIRST FLUSH POND-B. SEE DETAIL K/C-3.0.
27. CONSTRUCT FIRST FLUSH POND-C. SEE DETAIL L/C-3.0.
28. DIRECTION OF ROOF DRAINAGE.
29. DOWNSPOUT LOCATION. SEE SHEET A-5.0 FOR ROOF PLAN.
30. CONSTRUCT 12" SIDEWALK CULVERT PER COA STD DRAWING 2236.
31. CONNECT 4-INCH SD TO ROOF DOWNSPOUT. CONSTRUCT 4-INCH CURB PENETRATION PER COA STD DRAWING 2235, OR DAYLIGHT TO GRAVEL SWALE.
32. LANDSCAPING.

IN ACCORDANCE WITH THE CITY OF ALBUQUERQUE DRAINAGE ORDINANCE, EFFECTIVE MAY 12, 2014, ALL NEW DEVELOPMENT PROJECTS ARE REQUIRED TO MANAGE THE RUNOFF WHICH OCCURS DURING THE 90TH PERCENTILE STORM EVENT. IN ORDER TO COMPLY WITH THIS CRITERIA, WHERE PRACTICAL, ALL SURFACE DRAINAGE SHALL BE ROUTED THROUGH LANDSCAPED AREAS BEFORE RELEASE INTO DOWNSTREAM DRAINAGE FACILITIES. THIS PLAN RECOMMENDS ALL LANDSCAPED AREAS BE DEPRESSED A MINIMUM OF 3-INCHES BELOW THE ADJACENT PAVED SURFACE TO RETAIN THE FIRST FLUSH RUNOFF.



EAGLE RANCH NM MVD - RETAIL
Albuquerque, New Mexico
GRADING & DRAINAGE PLAN
Phase 1 Plan

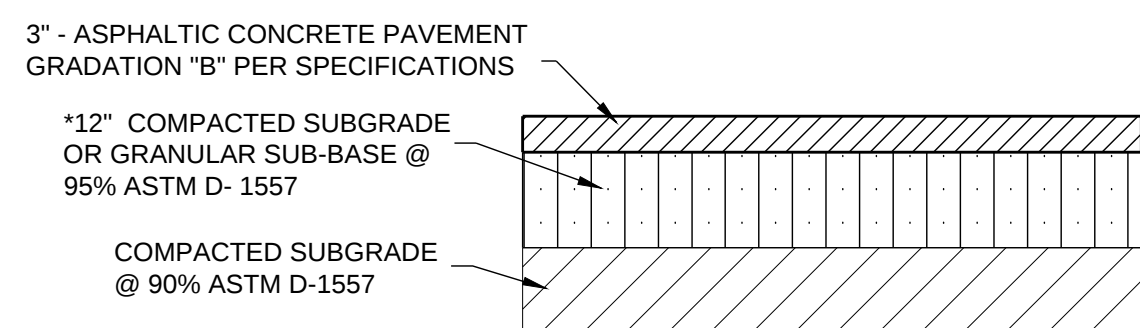
REVISION DATE



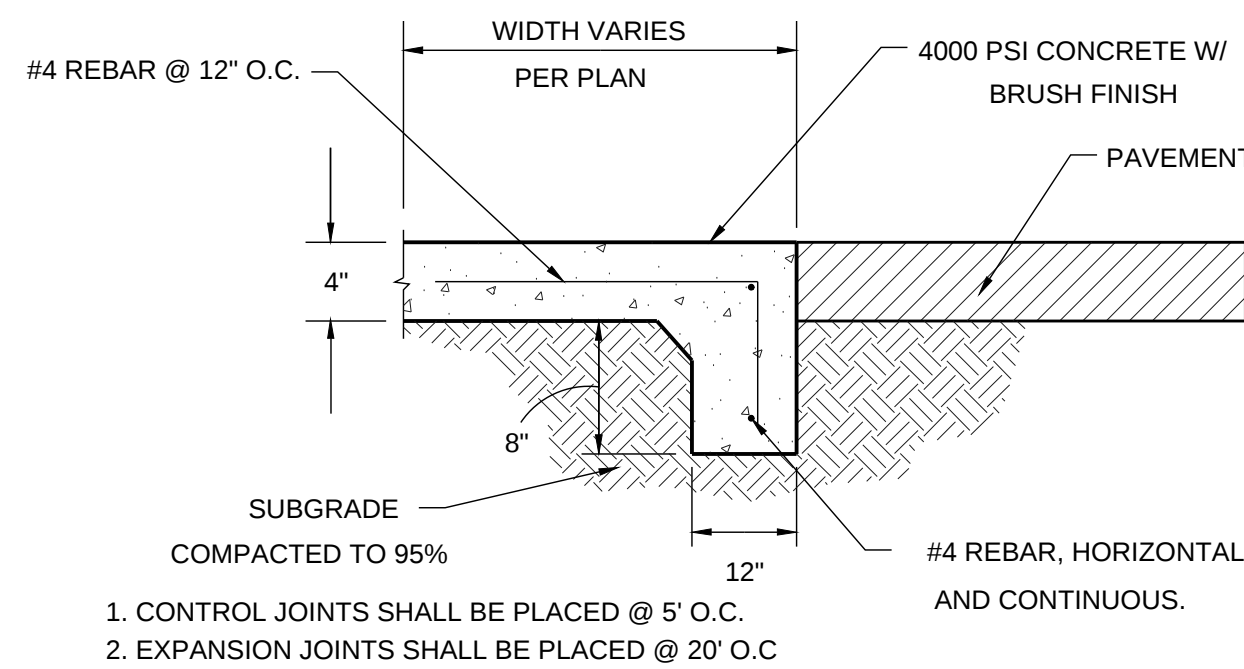
DATE
02-20-2017

SHEET NUMBER

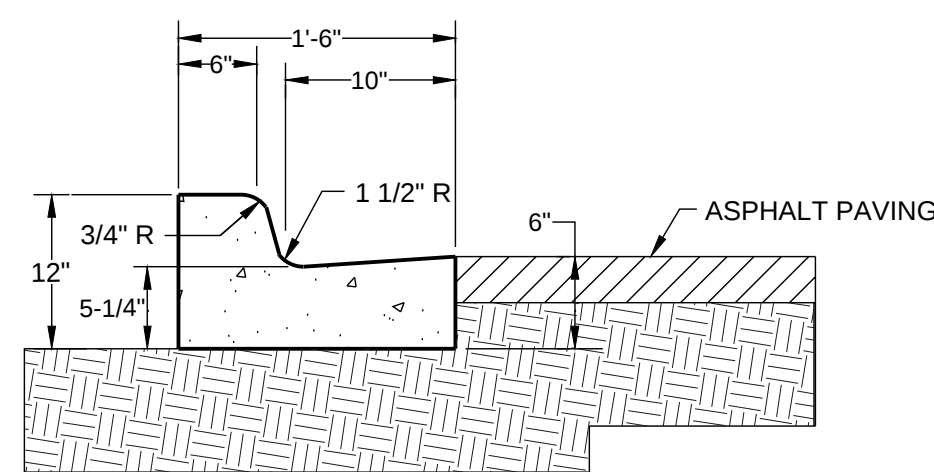
C-2.0



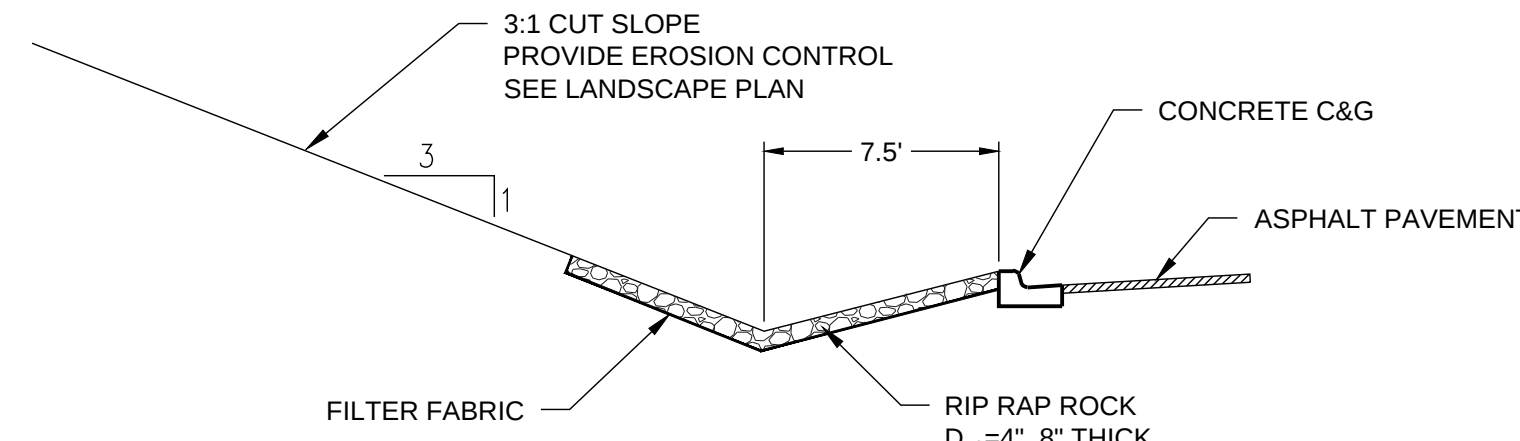
ASPHALT PAVEMENT SECTION
AUTO/PICKUP TRUCK
NTS
A
C-3.0



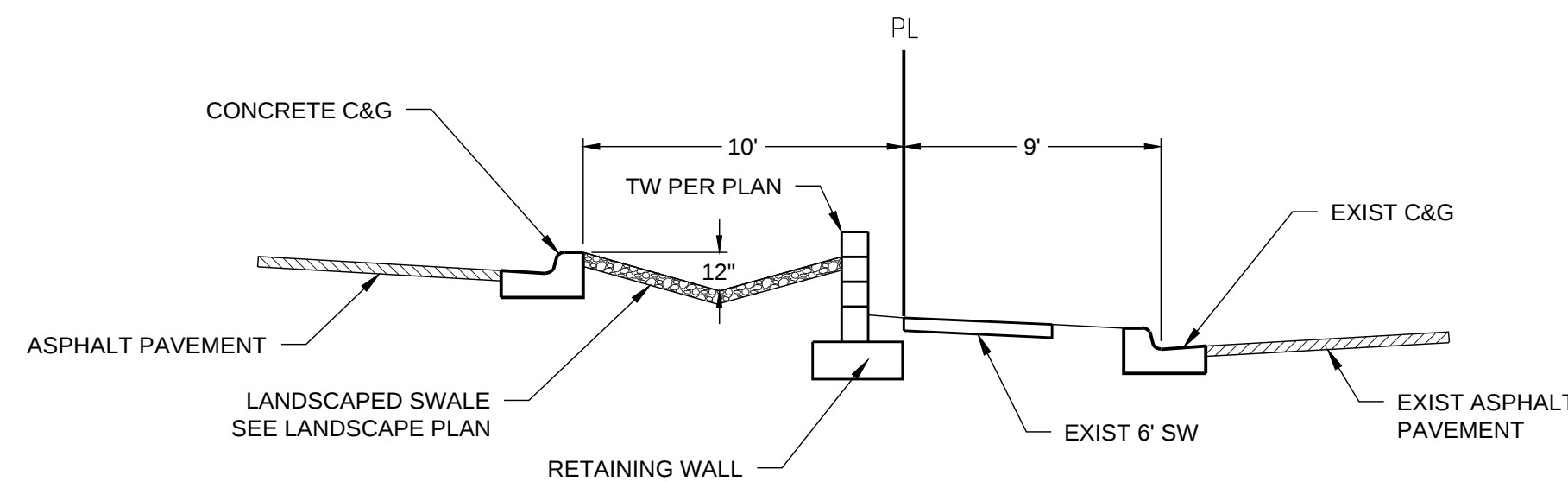
TURN DOWN SIDEWALK AT ACCESSIBLE ZONES
NTS
B
C-3.0



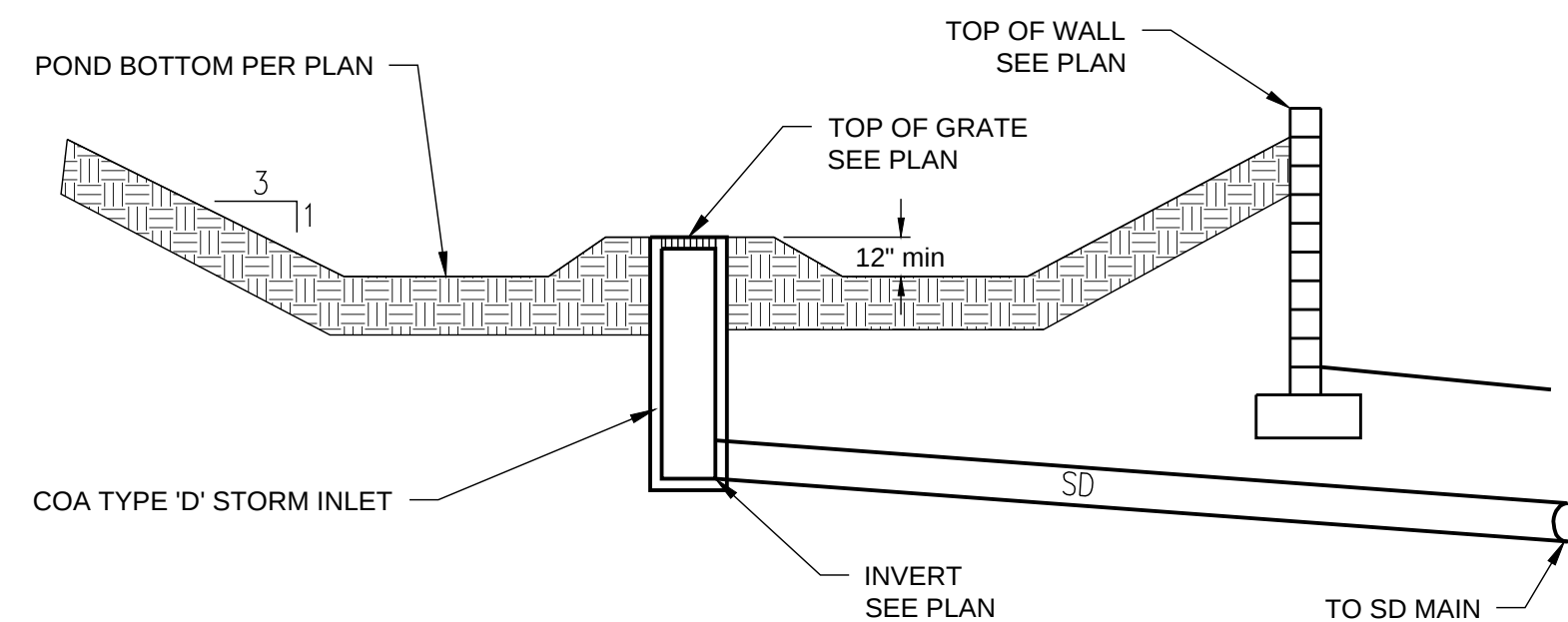
CONCRETE CURB AND GUTTER
NTS
C
C-3.0



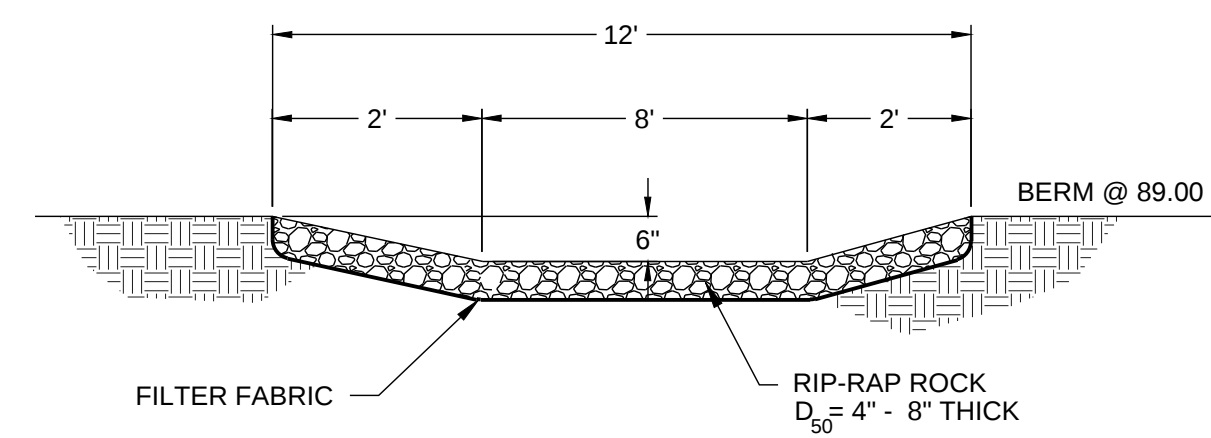
CUT SLOPE/SWALE SECTION
NTS
E
C-3.0



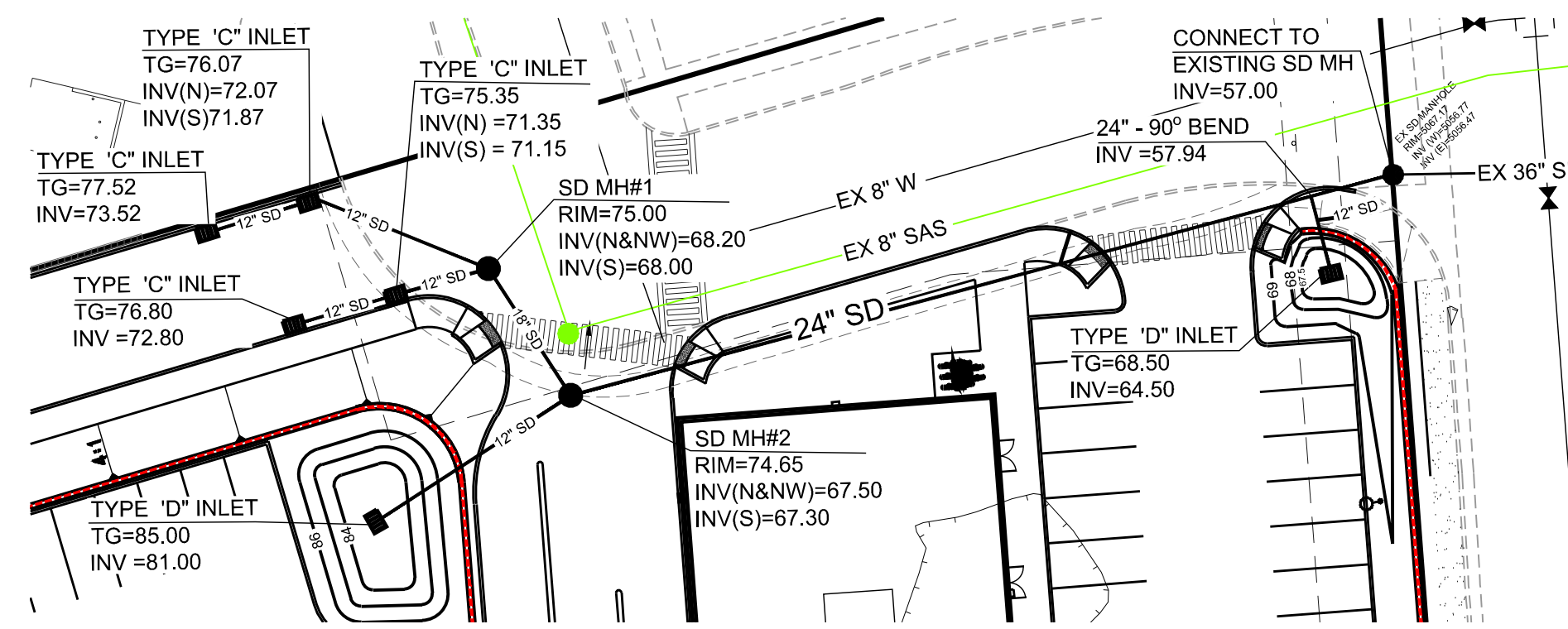
LANDSCAPED SWALE SECTION
NTS
F
C-3.0



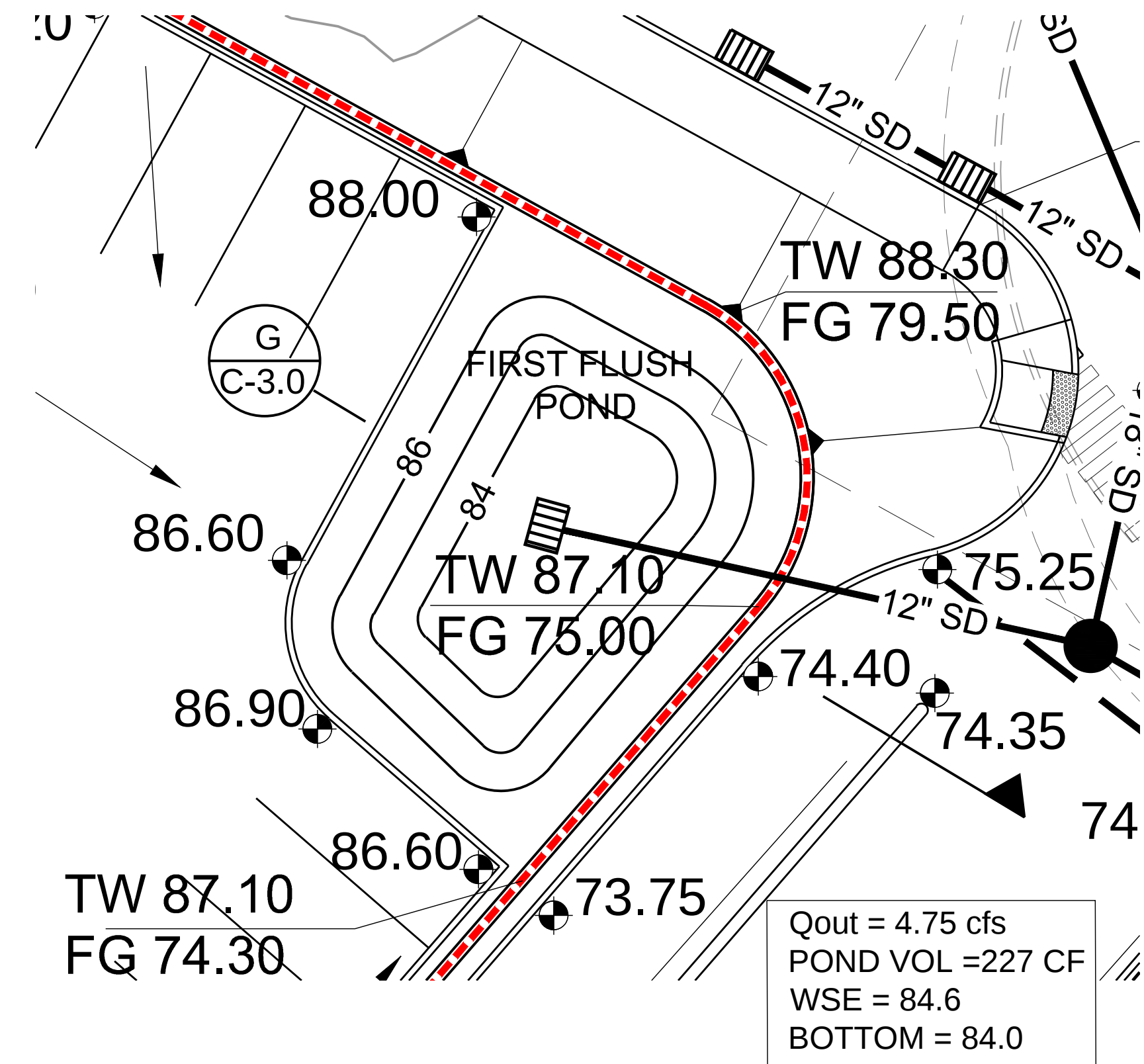
TYPICAL POND SECTION
NTS
G
C-3.0



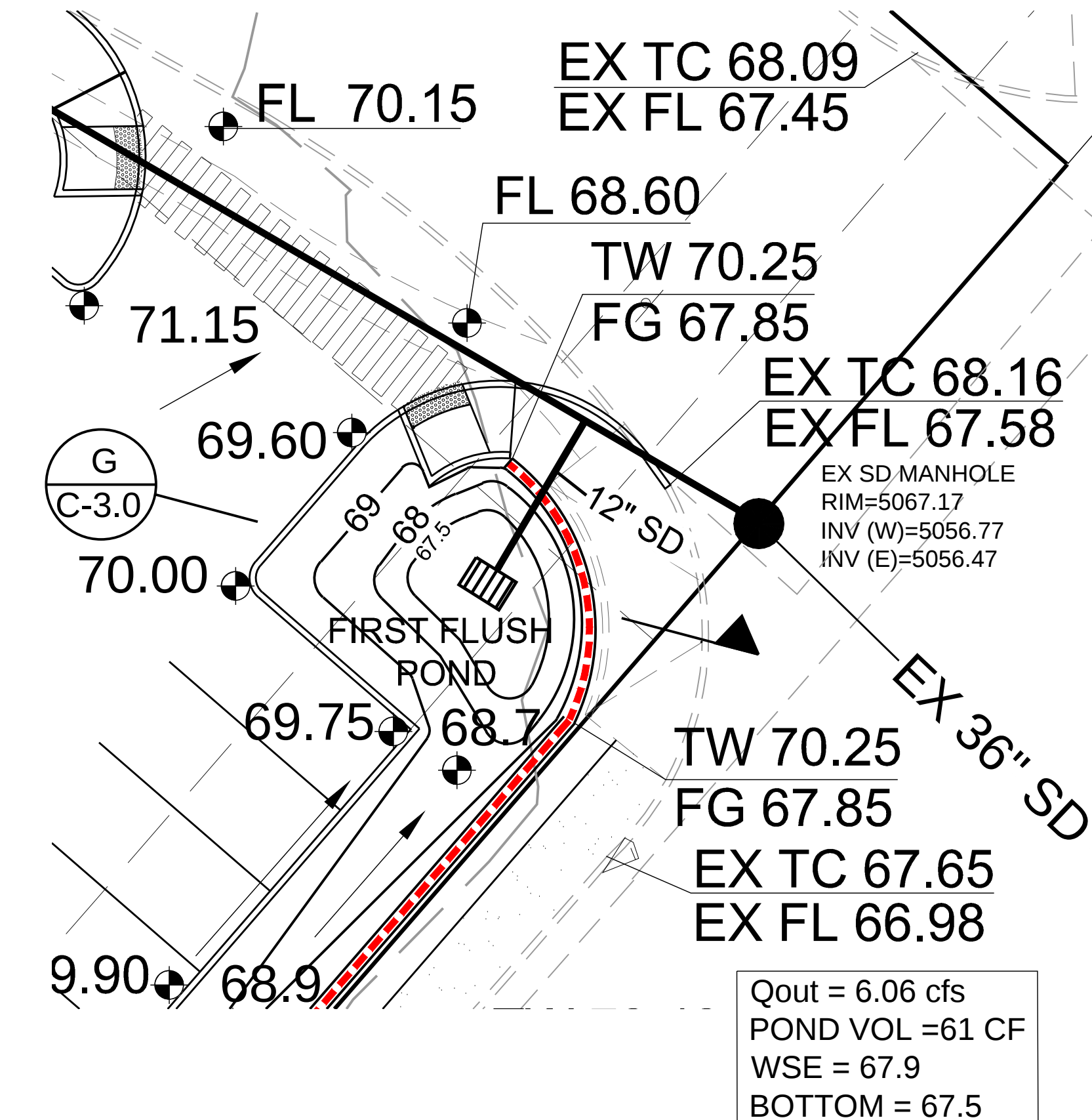
OVERFLOW SPILLWAY
NTS
H
C-3.0



STORM DRAIN PLAN
1" = 30'
J
C-3.0



FIRST FLUSH POND "B" DETAIL
1" = 10'
K
C-3.0



FIRST FLUSH POND "C" DETAIL
1" = 10'
L
C-3.0