DRAINAGE INFORMATION SHEET

PROJECT TITLE: *Lot L-1 Coles Industrial Subdivision* ZONE ATLAS/DRNG. FILE #: *H-16/D132*

DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: *Lot L-1 Coles Industrial Subdivision*

CITY ADDRESS: *North of Candelaria and West of Vassar*

ENGINEERING FIRM: *TIERRA WEST, LLC* CONTACT: *RONALD R. BOHANNAN*

ADDRESS: *4421 McCleod Rd. NE Suite D, 87109* PHONE: *(505) 883-7592*

OWNER: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

ARCHITECT: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: *Precision Surveys* CONTACT: *Larry Medrano*

ADDRESS: *8414-D Jefferson Street NE* PHONE: *(505)856-5700*

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

_____ DRAINAGE REPORT

_____ DRAINAGE PLAN

_____ CONCEPTUAL GRADING & DRAINAGE PLAN

X GRADING PLAN

_____ EROSION CONTROL PLAN

_____ ENGINEER'S CERTIFICATION

_____ OTHER

PRE-DESIGN MEETING:

_____ YES

X NO

_____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

_____ SKETCH PLAN APPROVAL

_____ PRELIMINARY PLAT APPROVAL

_____ S. DEV. PLAN FOR SUB'D. APPROVAL

_____ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL

_____ SECTOR PLAN APPROVAL

_____ FINAL PLAT APPROVAL

_____ FOUNDATION PERMIT APPROVAL

_____ BUILDING PERMIT APPROVAL

_____ CERTIFICATE OF OCCUPANCY APPROVAL

_____ GRADING PERMIT APPROVAL

_____ PAVING PERMIT APPROVAL

_____ S. A. D. DRAINAGE REPORT

_____ DRAINAGE REQUIREMENTS

X *OTHER - SO #19 permit*

DATE SUBMITTED: *10/18/99*

BY: *Sara Lavy*

Tierra West, LLC

October 18, 1999

Mr. John Murray
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Lot L-1 Coles Industrial Subdivision, H16/D132

Dear Mr. Murray:

This site has been approved for a grading permit and a paving permit on October 7, 1999. However, we are resubmitting the plan to get an SO #19 permit. The appropriate notes and signature block have been added to the plan.

If you have any questions regarding this matter, please do not hesitate to call me.

Sincerely,

Sara Lavy

Sara Lavy

cc: John Piper

JN: 990023
scl

990023: 9923-resubmit-so19.ltr

RECEIVED
OCT 18 1999
HYDROLOGY SECTION

4421 McLeod Rd. NE, Suite D • Albuquerque, NM 87109 • (505) 883-7592
fax (505) 883-7034 • e-mail: twdms@aol

City of Albuquerque

November 11, 1999

Ron Bohannan, PE
Tierra West LLC
4421 McLeod NE Suite D
Albuquerque, NM 87109

Re: Lot L-1 Coles Industrial Sub'd Grading and Drainage Plan
Engineer's Stamp dated 10-15-99 (H16/D1320)

Dear Mr. Bohannan,

Based upon the information provided in your submittal dated 10-18-99, the above referenced site is approved for Building Permit and SO-19 Permit. Since your submittal differed from the plan approved by Mr. Murray on 10-7-99, a brief re-review of your submittal was necessary. The approved plan required for your certification is the plan dated 10-15-99. The approval date of 7/16/99 is now void.

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.

Prior to Certification of Occupancy approval, Engineer Certification per the DPM checklist is required.

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

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, PE
Hydrology Review Engineer

C: file

City of Albuquerque

PUBLIC WORKS DEPARTMENT

December 13, 1999

INTEROFFICE CORRESPONDENCE HYDROLOGY DIVISION

TO: Desiderio Salas, Street Maintenance Division

FROM: Bradley L. Bingham PE, Hydrology Div., PWD BLB

SUBJECT: **PRIVATE DRAINAGE FACILITIES WITHIN PUBLIC RIGHT-OF-WAY DRAINAGE FILE NUMBER (H16/D132).**

Transmitted herewith is a copy of the approved drainage plan for the referenced project incorporating the SO #19 design.

This plan is being submitted to you for permitting and inspection. Please provide this section with a signed-off copy per the signature block upon construction and acceptance by your office.

As you are aware, the signed off SO#19 is required by this office for Certificate of Occupancy release; therefore your expeditious processing of this plan would be greatly appreciated and would avoid any unnecessary delay in the release of Certificate of Occupancy.

Thank you for your cooperation and if you should have any questions and/or comments, please feel free to call me at 924-3986.

Attachment

990023
Drainage

10-[illegible] 1999 REVD

City of Albuquerque

October 7, 1999

Ronald R. Bohannan, P.E.
Tierra West, LLC
4421 McLeod NE
Suite D
Albuquerque, NM 87109

RE: LOT L-1 COLES INDUSTRIAL SUBDIVISION (H16-D132). GRADING PLAN AND DRAINAGE REPORT FOR GRADING AND PAVING PERMIT APPROVALS. ENGINEER'S STAMP DATED 7/8/99 FOR REPORT AND 7/16/99 FOR PLAN.

Dear Mr. Bohannan:

Based on the information provided in your July 16, 1999 submittal, the above referenced project is approved for both Grading Permit and Paving Permit. In addition to the chronic backlog, this file had been mislaid. (Our appologies.)

The appropriate Signature Block and Standard Notes for the SO#19 Permit need to added to this approved plan prior to its insertion into the construction sets.

A separate permit is required for construction within the City right-of-way. A copy of this approval letter must be on hand when applying for the excavation permit.

Prior to Certificate of Occupancy approval, an Engineer's Certification per the DPM will be required.

The quality of the AMDS reproduction in the report is very poor and would be useless to anyone not having a copy of the AMDS Volumes.

If I can be of further assistance, please feel free to call me at 924-3984.

Sincerely,

John P. Murray, P.E.
Hydrology

RECEIVED
OCT 18 1999
HYDROLOGY SECTION

c: Pam Lujan
D. Salas, St. Maint.
WR File

DATE: 7-16-97
JOB #: 990023

PICKUP _____ DELIVER X

TO: City Hydrology

COMPANY: Plaza del Sol

ADDRESS: _____

PHONE #: _____

WHEN DOES THIS NEED TO BE DONE?

IMMEDIATELY ____ ASAP ____
TODAY ___ NEXT TIME OUT X
NO LATER THAN _____

SPECIAL INSTRUCTIONS/DIRECTIONS:

_____

_____

_____

DRAINAGE INFORMATION SHEET

PROJECT TITLE: *Lot L-1 Coles Industrial Subdivision* **ZONE ATLAS/DRNG. FILE #:** *H-16* D132

DRB #: _____ **EPC #:** _____ **WORK ORDER #:** _____

LEGAL DESCRIPTION: *Lot L-1 Coles Industrial Subdivision*

CITY ADDRESS: *North of Candelaria and West of Vassar*

ENGINEERING FIRM: *TIERRA WEST, LLC* **CONTACT:** *RONALD R. BOHANNAN*

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ARCHITECT: _____ **CONTACT:** _____

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- ___X___ GRADING PLAN
- _____ EROSION CONTROL PLAN
- _____ ENGINEER'S CERTIFICATION
- _____ OTHER

PRE-DESIGN MEETING:

- _____ YES
- ___X___ NO
- _____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- _____ SKETCH PLAN APPROVAL
- _____ PRELIMINARY PLAT APPROVAL
- _____ S. DEV. PLAN FOR SUB'D. APPROVAL
- _____ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- _____ SECTOR PLAN APPROVAL
- _____ FINAL PLAT APPROVAL
- _____ FOUNDATION PERMIT APPROVAL
- _____ BUILDING PERMIT APPROVAL
- _____ CERTIFICATE OF OCCUPANCY APPROVAL
- ___X___ GRADING PERMIT APPROVAL
- ___X___ PAVING PERMIT APPROVAL
- _____ S. A. D. DRAINAGE REPORT
- _____ DRAINAGE REQUIREMENTS
- _____ *OTHER*

RECEIVED
JUL 16 1999
HYDROLOGY SECTION

DATE SUBMITTED: *07/16/99*

BY: *Sara McCollam*

DRAINAGE REPORT

for

Lot L-1 Coles Industrial Subdivision

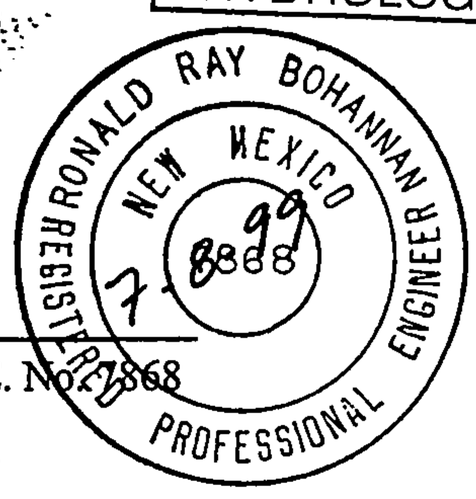
Prepared by

Tierra West, LLC
4421 McLeod Road NE, Suite D
Albuquerque, New Mexico 87109

Prepared for

John Piper
6753 Academy NE Suite C
Albuquerque, New Mexico 87109

July 1999



Ronald R. Bohannan P.E. No. 7868

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CITY OF Albuquerque

A lbuquerque G eographic I nformation S ystem

PLANNING DEPARTMENT

N

W E

S

GRAPHIC SCALE IN FEET

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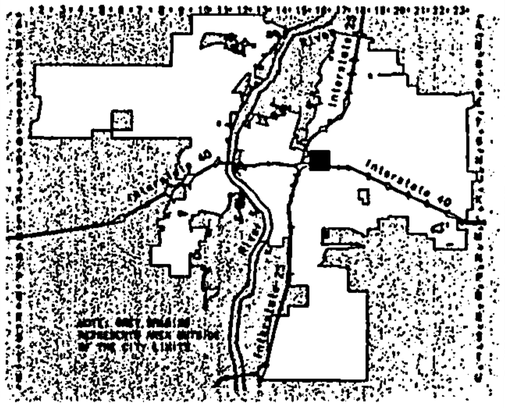

Zone Atlas Page

H-16-Z

Map Amended through
June 26, 1998

EXECUTIVE SUMMARY

Lot L-1, Coles Industrial Subdivision, located at the northwest corner of Vassar and Candelaria, is an in-fill site. We propose that this site, which is to be developed as a paved parking lot, be allowed to free discharge the developed flows to Candelaria Road. The site lies within the Albuquerque Master Drainage Study (AMDS) Study Area 1 and discharges to AP 101. We are proposing that the site sheet flow toward the entrance of the site and then to Candelaria Road at a rate of 2.276 cfs. According to the AMDS, Candelaria has the capacity to accept the developed flows from the site and surrounding basin and is currently shown as discharging at a rate of 94 cfs. We verified the downstream capacity of Candelaria and the inlet capacity in Princeton where the flows are collected. We are requesting approval for a building, grading, and paving permit. No other improvements are required for this project.

INTRODUCTION

Location and Purpose

The site, identified as Lot L-1 Coles Industrial Subdivision, is located at the northwest corner of Vassar Drive and Candelaria Road, NE and is shown on the attached Zone Atlas Map H-16, and contains approximately 0.54 acres. The purpose of this report is to provide the drainage analysis and management plan for the proposed parking lot paving on the site. The site is an in-fill site and was previously developed as a service station during the early 1970's. Since that time the building was removed and the land is partially vacant. The service station was operational during the AMDS study.

Project requirements

As an in-fill site the natural drainage is to Candelaria and then down Candelaria to Princeton. An existing storm drain picks up and conveys the flow out of the area. As such, there are no infrastructure requirements for this project. In addition, we are not asking for any platting action but will revert the parcel back to a parking lot. We are seeking a paving permit to pave the existing site.

REFERENCES

Planning History

In 1976, the site was the location of a gas station which was torn down. Currently, the site is a dirt lot.

Drainage History

The site is addressed in the AMDS prepared by Bohannan-Huston, Inc. in January 1981. The site was assumed to free discharge in the study. The site is shown in Study Area 1 and was analyzed under free discharge to Candelaria. The analysis point, AP 101, is the downstream collection point that collects the flow from the site. The AMDS analysis shows that the study area has the capacity for 99 cfs but is discharging 94 cfs.

PROJECT DESCRIPTION

Legal Description

The project's legal description is Lot L-1 Coles Industrial Subdivision. There is no platting action required and the legal description will not change as a result of this proposal.

Flood Hazard Zone

The site is located on FIRM Map 35001C0351 D as shown on the attached excerpt. The map shows that the site does not lie within any 100-year flood plains. There are no flood hazard zones in the area to be affected by the runoff from this site.

EXISTING CONDITIONS

Site Investigation and Evaluation

Currently the site is an undeveloped dirt lot. The undeveloped flow of 1.23 cfs sheet flows south toward Candelaria Road. There are no onsite drainage facilities. The existing drainage enters Candelaria and is conveyed west to Princeton Drive and then drains south to the storm sewer inlets near Claremont Avenue.

The site, which is currently undeveloped, was originally developed as a gas station that was torn down. Consequently, the site is currently discharging less flow than it did when the AMDS was completed. There are no offsite flows entering the site from the south or east as Candelaria and Vassar capture the flows from those directions. The adjacent lots are developed and no offsite runoff enters the project site.

DEVELOPED CONDITIONS & DOWNSTREAM CAPACITY

Onsite

This site is proposed to be a paved parking lot. There is one proposed basin on the site with a developed discharge rate of 2.28 cfs. The increased discharge will not affect the existing drainage patterns, and we are not proposing any change to the existing drainage patterns. The runoff will continue to free discharge to Candelaria and be conveyed to the storm drain at Claremont and Princeton. The overall drainage basin for the area originally included this site in the developed condition. The AMDS included this site in the analysis for AP 101. AP 101 is located at Candelaria and Princeton and has a 100-year flow of 94.0 cfs. At this point Candelaria has capacity for the 100-year flow of 94 cfs. Princeton has capacity for 112 cfs which is greater than the developed flows of 94.0 cfs. No drainage facilities are required either on or off-site.

BERNALILLO COUNTY
UNINCORPORATED AREAS
350001

COMANCHE

ROAD

PAN AMERICAN FI

25

DRIVE

DRIVE

STANFORD

BOULEVARD

GIRARD

Channel

CITY OF ALBUQUERQUE
350002

3

4

AZTEC

ROAD

DRIVE

BERNALILLO COUNTY
UNINCORPORATED AREAS
350001

ZONE X

DRIVE

DRIVE

BOULEVARD

COLUMBIA

PRINCETON

STANFORD

VASSAR

GIRARD

Diversion

25

ROAD

CANDELARIA

DRIVE

DRIVE

BOULEVARD

LOS
ARBOLES
AVENUE

STANFORD

CLAREMONT

AVENUE

GIRARD

North

PHOENIX

AVENUE

ZONE AO
(DEPTH 1)

WOODLAND AVENUE

VASSAR

Amafca

City of Albuquerque

October 7, 1999

Ronald R. Bohannan, P.E.
Tierra West, LLC
4421 McLeod NE
Suite D
Albuquerque, NM 87109

RE: LOT L-1 COLES INDUSTRIAL SUBDIVISION (H16-D132). GRADING PLAN AND DRAINAGE REPORT FOR GRADING AND PAVING PERMIT APPROVALS. ENGINEER'S STAMP DATED 7/8/99 FOR REPORT AND 7/16/99 FOR PLAN.

Dear Mr. Bohannan:

Based on the information provided in your July 16, 1999 submittal, the above referenced project is approved for both Grading Permit and Paving Permit. In addition to the chronic backlog, this file had been mislaid. (Our appologies.)

The appropriate Signature Block and Standard Notes for the SO#19 Permit need to added to this approved plan prior to its insertion into the construction sets.

A separate permit is required for construction within the City right-of-way. A copy of this approval letter must be on hand when applying for the excavation permit.

Prior to Certificate of Occupancy approval, an Engineer's Certification per the DPM will be required.

The quality of the AMDS reproduction in the report is very poor and would be useless to anyone not having a copy of the AMDS Volumes.

If I can be of further assistance, please feel free to call me at 924-3984.

Sincerely,

John P. Murray, P.E.
Hydrology

c: Pam Lujan
D. Salas, St. Maint.
WR File

City of Albuquerque

October 7, 1999

Ronald R. Bohannan, P.E.
Tierra West, LLC
4421 McLeod NE
Suite D
Albuquerque, NM 87109

RE: LOT L-1 COLES INDUSTRIAL SUBDIVISION (H16-D132). GRADING PLAN AND DRAINAGE REPORT FOR GRADING AND PAVING PERMIT APPROVALS. ENGINEER'S STAMP DATED 7/8/99 FOR REPORT AND 7/16/99 FOR PLAN.

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Sincerely,

John P. Murray, P.E.
Hydrology

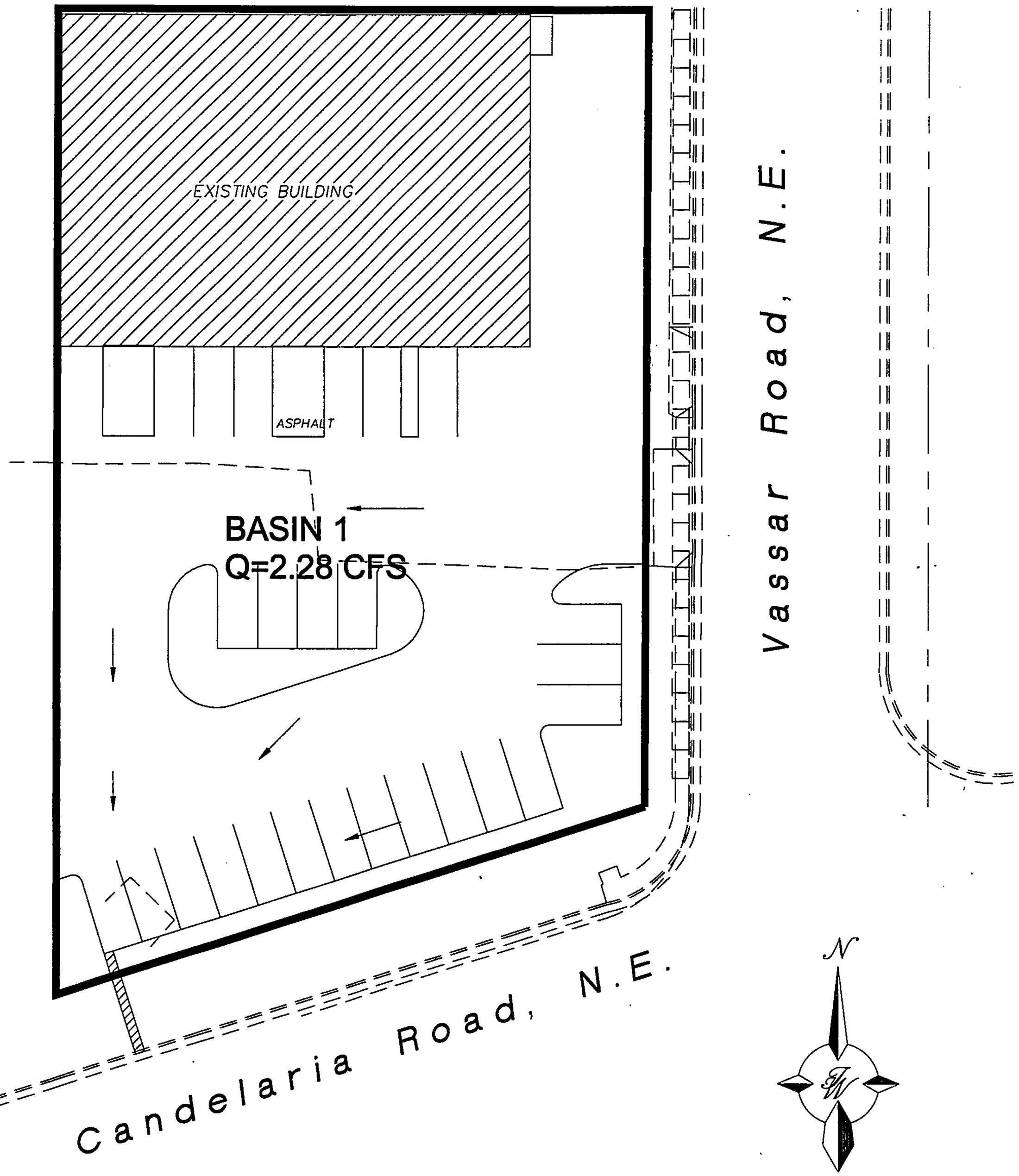
c: Pam Lujan
D. Salas, St. Maint.
WR File

CALCULATIONS

The calculations provided include the existing and proposed flows and volumes for the site. The flows and volumes were calculated using the Weighted E method. Spreadsheets are provided showing the street capacity of Candelaria and Princeton. The spreadsheets have been highlighted to show the maximum flow in the street.

CONCLUSION

Based on the AMDS, we propose to free discharge the developed flow from the site at 2.276 cfs. There are no proposed drainage improvements for the site. The developed runoff will be conveyed in Candelaria to the existing storm drain inlets on Princeton near Claremont which was analyzed under the AMDS and shown to have capacity. We verified that the downstream capacities of Candelaria and Princeton can handle the 94 cfs as identified in the AMDS study.



PROPOSED BASIN LAYOUT

Calculations

Volume and Flow Calculations

Site Information	
Zone Atlas Page:	G-16
Existing Zoning:	M-1
Acreage:	0.5399
Sq Miles:	0.0008436
Legal Description:	Lot L-1
Precipitation Zone:	2

Design Storm	Depth (in) at 100-yr Storm for Zone 2 (Table A-2)
P60	2.01
P360	2.35
P1440	2.75
P4days	3.30
P10days	3.95

Excess Precipitation (Table A-8)		
	100-Year Storm	10-Year Storm
A	0.53	0.13
B	0.78	0.28
C	1.13	0.52
D	2.12	1.34

Land Treatment Percentages				
Land Treatment (Table A-4)	Basin 1 Existing	Area (acre)	Basin 1 Proposed	Area (acre)
A	0.00%	0.0000	0.00%	0.0000
B	100.00%	0.5399	20.00%	0.1080
C	0.00%	0.0000	0.00%	0.0000
D	0.00%	0.0000	80.00%	0.4319
Total	100.00%	0.5399	100.00%	0.5399

Determine Weighted Runoff Volume

Weighted E = Ea*Aa+Eb*Ab+Ec*Ac+Ed*Ad/ Aa+Ab+Ac+Ad

Existing Runoff Volume (6-hr Storm)= 0.0650 acre-ft
2831.40 ft^3

Proposed Runoff Volume (6-hr Storm)= 0.1543 acre-ft
6722.76 ft^3

Peak Discharge (Table A-9)		
	100-Year Storm	10-Year Storm
A	1.56	0.38
B	2.28	0.95
C	3.14	1.71
D	4.70	3.14

Total Peak Flow = Qa*Aa+Qb*Ab+Qc*Ac+Qd*Ad

Existing

100-Year Flow = 1.231 cfs
10-Year Flow = 0.513 cfs

Proposed

100-Year Flow = 2.276 cfs
10-Year Flow = 1.459 cfs

Street Capacity Calculations

Candelaria Road
66' F-F with 100' ROW Street Section with 8" curb and normal crown
8" curb and normal crown
Slope= 0.0044

For water depths less than 0.125 feet

Y= Water depth
Area = 8*Y^2
P= SQRT(257*Y^2) + Y
n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.1703	0.0047	0.0001	0.0003	0.0015	0.0000	0.0095	0.0000
0.02	0.0032	0.3406	0.0094	0.0008	0.0017	0.0049	0.0000	0.0151	0.0000
0.04	0.0128	0.6812	0.0188	0.0052	0.0105	0.0154	0.0002	0.0240	0.0000
0.06	0.0288	1.0219	0.0282	0.0155	0.0309	0.0303	0.0009	0.0314	0.0001
0.08	0.0512	1.3625	0.0376	0.0333	0.0666	0.0489	0.0025	0.0381	0.0001
0.1	0.08	1.7031	0.0470	0.0604	0.1208	0.0709	0.0057	0.0442	0.0003
0.12	0.1152	2.0437	0.0564	0.0982	0.1964	0.0961	0.0111	0.0499	0.0006
0.125	0.125	2.1289	0.0587	0.1095	0.2190	0.1029	0.0129	0.0513	0.0007

For water depths greater than 0.125 ft but less than 0.667 ft

Y1= Y-0.125
A2= A1 + 2*Y1 + 25*Y1^2
P2= P1 + SQRT(2501*Y1^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.126	0.1270	2.1789	0.0583	0.1107	0.2215	0.1016	0.0129	0.0503	0.0006
0.2	0.4156	5.8797	0.0707	0.4120	0.8240	0.1401	0.0582	0.0383	0.0012
0.28	1.0356	9.8805	0.1048	1.3349	2.6698	0.2702	0.2798	0.0468	0.0045
0.34	1.7106	12.8811	0.1328	2.5818	5.1636	0.4009	0.6857	0.0540	0.0099
0.42	2.8906	16.8819	0.1712	5.1682	10.3363	0.6123	1.7699	0.0635	0.0231
0.5	4.3906	20.8827	0.2103	9.0015	18.0031	0.8621	3.7852	0.0725	0.0457
0.56	5.7256	23.8833	0.2397	12.8117	25.6233	1.0729	6.1428	0.0790	0.0706
0.62	7.2406	26.8839	0.2693	17.5090	35.0181	1.3026	9.4314	0.0853	0.1039
0.667	8.5531	29.2343	0.2926	21.8561	43.7123	1.4952	12.7889	0.0901	0.1367

For water depths greater than 0.667 ft but less than 0.745 ft

Y2= Y - 0.667
A3= A2 + Y2*27.10 + 50 * Y2^2
P3= P2 + 2 * SQRT(2501* Y2^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.667	8.5531	29.2343	0.2926	21.8561	43.7123	1.4952	12.7889	0.0901	0.1367
0.68	8.9139	30.5346	0.2919	22.7445	45.4891	1.4898	13.2795	0.0879	0.1358
0.7	9.5019	32.5350	0.2921	24.2517	48.5035	1.4908	14.1655	0.0852	0.1361
0.72	10.1299	34.5354	0.2933	25.9294	51.8587	1.5016	15.2111	0.0831	0.1382
0.745	10.9711	37.0359	0.2962	28.2682	56.5364	1.5265	16.7477	0.0812	0.1429

For water depths greater than 0.745 ft but less than 1.067 ft

Y3= Y - 0.745
A4= A3 + 33 * Y3 + 25 * Y3^2
P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.745	10.9711	37.0359	0.2962	28.2682	56.5364	1.5265	16.7477	0.0812	0.1429
0.78	13.3243	42.6870	0.3121	35.5501	71.1002	1.6656	22.1932	0.0804	0.1701
0.85	15.1023	46.1877	0.3270	41.5609	83.1218	1.7997	27.1789	0.0816	0.1986
0.82	14.3103	44.6874	0.3202	38.8379	77.6757	1.7382	24.8742	0.0810	0.1853
0.904	**16.6413**	**48.8883**	**0.3404**	**47.0406**	**94.0812**	**1.9244**	**32.0248**	**0.0831**	**0.2269**
0.97	18.7203	52.1889	0.3587	54.7982	109.5964	2.1000	39.3126	0.0855	0.2700
1.067	22.1711	57.0399	0.3887	68.4682	136.9365	2.4007	53.2265	0.0899	0.3524

Street Capacity Calculations

Princeton Drive

43' F-F Street Section with 8" curb with normal crown

Slope= 0.01

For water depths less than 0.125 feet

Y= Water depth
Area = 8*Y^2
P= SQRT(257*Y^2) + Y
n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.1703	0.0047	0.0002	0.0004	0.0023	0.0000	0.0144	0.0000
0.02	0.0032	0.3406	0.0094	0.0012	0.0025	0.0073	0.0000	0.0228	0.0000
0.04	0.0128	0.6812	0.0188	0.0079	0.0158	0.0232	0.0003	0.0362	0.0000
0.06	0.0288	1.0219	0.0282	0.0233	0.0466	0.0456	0.0013	0.0474	0.0001
0.08	0.0512	1.3625	0.0376	0.0502	0.1004	0.0737	0.0038	0.0574	0.0003
0.1	0.08	1.7031	0.0470	0.0910	0.1821	0.1069	0.0086	0.0666	0.0007
0.12	0.1152	2.0437	0.0564	0.1480	0.2961	0.1449	0.0167	0.0752	0.0013
0.125	0.125	2.1289	0.0587	0.1651	0.3301	0.1551	0.0194	0.0773	0.0015

For water depths greater than 0.125 ft but less than 0.515 ft

Y1= Y-0.125
A2= A1 + 2*Y1 + 25*Y1^2
P2= P1 + SQRT(2501*Y1^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.125	0.1250	2.1289	0.0587	0.1651	0.3301	0.1551	0.0194	0.0773	0.0015
0.15	0.1906	3.3792	0.0564	0.2451	0.4902	0.1451	0.0277	0.0586	0.0013
0.2	0.4156	5.8797	0.0707	0.6211	1.2422	0.2113	0.0878	0.0578	0.0028
0.25	0.7656	8.3802	0.0914	1.3576	2.7151	0.3240	0.2481	0.0653	0.0065
0.3	1.2406	10.8807	0.1140	2.5500	5.0999	0.4687	0.5815	0.0742	0.0135
0.35	1.8406	13.3812	0.1376	4.2873	8.5746	0.6408	1.1795	0.0832	0.0252
0.4	2.5656	15.8817	0.1615	6.6521	13.3043	0.8377	2.1493	0.0922	0.0429
0.45	3.4156	18.3822	0.1858	9.7220	19.4440	1.0578	3.6129	0.1009	0.0681
0.515	4.7075	21.6328	0.2176	14.8872	29.7743	1.3764	6.4792	0.1118	0.1149

For water depths greater than 0.515 ft but less than 0.667 ft

Y2= Y - 0.515
A3= A2 + 21.50 * Y2
P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.515	4.7075	21.6328	0.2176	14.8872	29.7743	1.3764	6.4792	0.1118	0.1149
0.54	5.2450	21.6578	0.2422	17.8130	35.6259	1.6449	8.6277	0.1266	0.1630
0.565	5.7825	21.6828	0.2667	20.9420	41.8841	1.9317	11.1699	0.1416	0.2232
0.59	6.3200	21.7078	0.2911	24.2673	48.5346	2.2358	14.1303	0.1567	0.2966
0.615	6.8575	21.7328	0.3155	27.7824	55.5647	2.5567	17.5327	0.1721	0.3845
0.64	7.3950	21.7578	0.3399	31.4816	62.9632	2.8938	21.3998	0.1875	0.4879
0.667	7.9755	21.7848	0.3661	35.6777	71.3555	3.2755	26.1235	0.2044	0.6184

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667
A4= A3 + 21.5 * Y3 + 25 * Y3^2
P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.667	7.9755	21.7848	0.3661	35.6777	71.3555	3.2755	26.1235	0.2044	0.6184
0.69	8.4832	22.9350	0.3699	38.2096	76.4191	3.3320	28.2660	0.2016	0.6411
0.72	9.1852	24.4353	0.3759	41.8190	83.6381	3.4228	31.4395	0.1990	0.6777
0.75	9.9322	25.9356	0.3830	45.7843	91.5685	3.5306	35.0668	0.1974	0.7218
0.78	10.7242	27.4359	0.3909	50.1149	100.2297	3.6532	39.1780	0.1966	0.7732
0.8172	**11.7688**	**29.2963**	**0.4017**	**56.0078**	**112.0156**	**3.8235**	**44.9985**	**0.1964**	**0.8471**
0.847	12.6555	30.7866	0.4111	61.1591	122.3181	3.9731	50.2815	0.1968	0.9144

SIDEWALK CULVERT

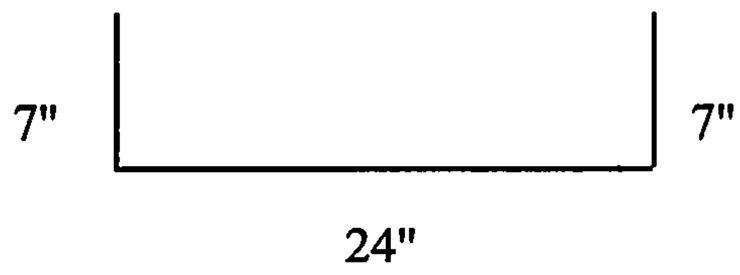
Orifice Equation:

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

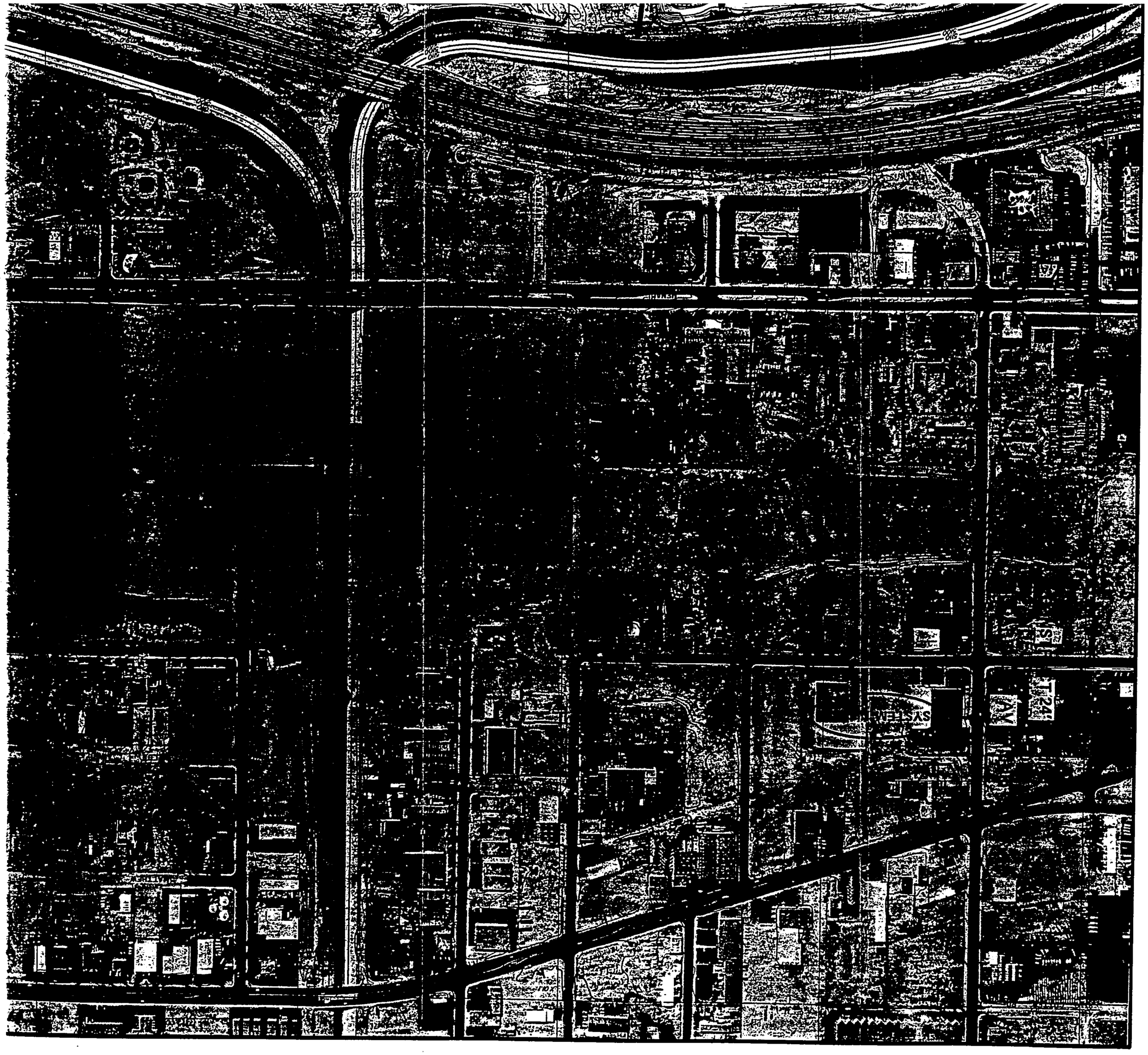
Solve for Q
C = 0.6
A = 0.5833*2 = 1.167 ft²
g = 32.2
H = Height of water measured from center of orifice

$$Q = 0.6(1.167)\sqrt{2 * 32.2 * \frac{0.5833}{2}}$$

Q=3.035 cfs
Use 1-24" sidewalk culverts
3.035 cfs > 2.28 cfs



Albuquerque Master Drainage Study Excerpt



AREA I

ALBUQUERQUE MASTER DRAINAGE STUDY
SUMMARY OF HYDROLOGIC AND HYDRAULIC ANALYSES

Location	10 - YEAR			100 - YEAR			Map	Comm
	Peak Discharge (c.f.s.) / Overland Flow	Flow Depth (ft.)	Velocity (ft./sec.)	Peak Discharge (c.f.s.) / Overland Flow	Flow Depth (ft.)	Velocity (ft./sec.)		
ALAMEDA LATERAL DRAIN 200' S. OF CLAREMONT AVE. (AP 1201)	18 / 18	.2	3.1	59 / 59	.4	4.5	H-15	
EDITH BLVD. AND CANDELARIA RD. (AP 1202)	37 / 0	.3	2.4	122 / 44	.4	3.2	H-15	
PRINCETON DR. AND CANDELARIA RD. (AP 101)	37 / 37	.4	5.8	94 / 99	.6	7.8	H-16	
UNIVERSITY BLVD. AND I-40 OVERPASS (AP 105)	97 / 97	1.0	2.2	207 / 207	1.3	2.6	H-15	
MENAUL BLVD. AND PRINCETON DR. (AP 103)	29 / 0	0	0	64 / 0	0	0	H-16	
MENAUL BLVD. AND UNIVERSITY BLVD. (AP 104)	79 / 18	.4	3.2	138 / 77	.8	5.2	H-15	
MENAUL BLVD.AND I-25 OVERPASS (AP 106)	175 /	.7	5.0	315 / 240	1.0	5.8	H-15	
MENAUL BLVD. AND BROADWAY BLVD. (AP 107)	39 / 39	.5	4.1	135 / 135	.8	5.4	H-14	
PROSPECT AVE. AND BROADWAY BLVD. (AP 109)	11 / 11	.3	2.8	47 / 47	.6	5.1	H-14	
CUTLER AVE. AND BROADWAY BLVD. (AP 110)	16 / 16	.4	3.4	28 / 28	.4	4.3	H-14	
ARVADA AVE. AND BROADWAY BLVD. (AP 111)	8 / 8	.3	2.7	46 / 46	.6	5.1	H-14	
BROADWAY BLVD. AND I-40 OVERPASS (AP 112)	25 / 25	.5	3.8	64 / 64	.6	4.7	H-14	
MCKNIGHT AVE. EXTENDED E. FROM EDITH BLVD. (AP 116)	10 / 10	.1	2.6	34 / 34	.2	4.8	H-15	
EDITH BLVD. AND INDIAN SCHOOL RD. (AP 115)	5 / 0	0	0	51 / 33	.2	3.4	H-15	