

Cherne, Curtis

From: Cherne, Curtis
Sent: Thursday, July 25, 2013 9:50 AM
To: 'Mark Goodwin'
Cc: Wolfe, Bryan K.
Subject: erosion at desert sage Unit 3 pond
Attachments: DSCF3026.pdf; DSCF3025.pdf; DSCF3032.pdf

Mark,
Good morning.

The resident at 8212 Reilly Ct SW called our office concerned that his wall may fall down due to the erosion at and upstream of the pond located at the northwest corner of Sage Road and 82nd st.
Please see attached photos.

The drainage report, Mark Goodwin and Associates stamp date 4-7-03, mentioned an offsite flow of 7.20 cfs from the area west of this subdivision flowing in a southeasterly direction. I am wondering why erosion protection was not provided where this flow enters the pond?

Thank you for your consideration in this matter.

Curtis Cherne, P.E.,CFM
Hydrology
COA/ Planning Dept.
924-3986

7/25/2013





AGREEMENT AND COVENANT

This Agreement and Covenant, between the City of Albuquerque, New Mexico ("City") and Mor Land, LLC., ("User") is made in Albuquerque, New Mexico and is entered into as of the date of recording this Agreement with the Bernalillo County Clerk.

1. Recital. The User is the owner of certain real property ("User's Property") located at NW Corner of Sage Rd. SW and 82nd St. SW, in Albuquerque, New Mexico, and more particularly described as: (give legal description and filing information)

EXISTING: Tract 463, Town of Atrisco Grant, Unit 7 (12-5-44, D-118)
PROPOSED: TRACT A, DESERT SAGE 3 SUBDIVISION

All being records of Bernalillo County, NM

The City is the owner of certain real property, easement or public right-of-way ("City's Property") in the vicinity of, contiguous to, abutting or within User's Property, and more particularly described as:

Tract A of the proposed Desert Sage 3 Subdivision filed for record November 6, 2003 in Book 2003C at Page 331 In Doc # 2003203359 Bernalillo County, New Mexico.

The User wishes to construct upon, improve or repair and to maintain the following "Improvement" on the City's Property (or already has done so):

Temporary Retention Pond. A sketch of the proposed or existing improvement is attached as Exhibit A and made a part of the Agreement.

A sketch of the proposed or existing Improvement is attached as Exhibit A and made a part of this Agreement.

The City agrees to permit the Improvement to exist on the City's Property provided the User complies with the terms of this Agreement.

2. City Use of City's Property and City Liability. The City has the right to enter upon the City's Property at any time and perform whatever inspection, installation, maintenance, repair, modification or removal ("Work") it deems appropriate without liability to the User. If the Work affects the Improvement the City will not be financially or otherwise responsible for rebuilding or repairing the Improvement. The User promptly will repair the Improvement to the City's satisfaction. The cost of repairing the Improvement will be paid by User.

3. User's Responsibility for Improvement. The User will be solely responsible for constructing, maintaining, repairing and, if required, removing the Improvement, all in accordance with standards required by the City as per the approved Grading and Drainage



Plan L10/D24 on file at the City Engineer's office. The User will be solely responsible for paying all related costs. The User will not permit the Improvement to constitute a hazard to the health or safety of the general public or to interfere with the City's use of the City's Property. The User will conform with all applicable laws, ordinances and regulations.

4. Use of the Improvement. If the City's Property is a public right-of-way, it shall be open to the use of the general public at all times, subject to reasonable curtailment during periods of construction, maintenance or repair.

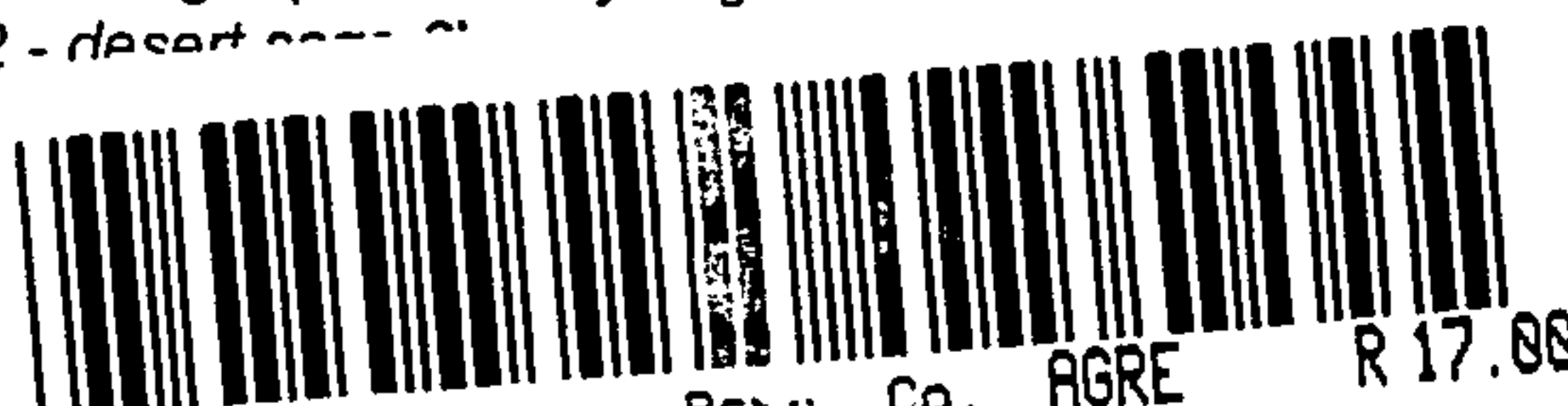
5. Demand for Repair, Modification or Removal. The City may send written notice ("Notice") to the User requiring the User to repair, modify or remove the Improvement within 30 days ("Deadline") and the User will comply promptly with the requirements of the Notice. If removal is demanded, the City also may require the User to return the City's Property to its original condition by the Deadline. The User will perform all required work by the Deadline, at User's sole expense.

6. Failure to Perform by User and Emergency Work by City. If the User fails to comply with the terms of the Notice by the Deadline stated, or, if the City determines that an emergency condition exists, the City may perform the work itself. The City then may assess the User for the cost of the work and for any other expenses or damages which result from User's failure to perform. The User agrees promptly to pay the City the amount assessed. If the User fails to pay the city within thirty (30) days after the City gives the User written notice of the amount due, the City may impose a lien against User's Property for the total resulting amount.

7. Cancellation of Agreement and Release of Covenant. This Agreement may be canceled, and User's covenants released by the City at will by the City's mailing to the User notice of the City's intention to record a Cancellation and Release with the Bernalillo County Clerk. The Cancellation and Release will be effective thirty (30) days after the date of mailing the notice to the User unless a later date is stated in the notice or the Cancellation and Release. After the effective date, the City will record the Cancellation and Release with the Bernalillo County Clerk.

8. Condemnation. If any part of the User's Property is ever condemned by the City, the User will forego all claims to compensation for any portion of User's structure which encroaches on City Property and for severance damage to the remaining portion of User's structure on User's Property.

9. Assessment. Nothing in this Agreement shall be construed to relieve the User, his heirs, assigns and successors from an assessment against User's Property for improvements to the City Property under a duly authorized and approved Special Assessment District. The parties specifically agree that the value of the Improvement will not reduce the amount assessed by the City.



10. Notice. For purposes of giving formal written notice to the User, User's address is:

8200 Reilly Ct SW

Mor Land, LLC

2820 Broadbent Parkway, NE

Suite E

Albuquerque, NM 87107

Gm Land & Development

8601 Washington NE

Suite E

RR

Notice may be given to the User either in person or by mailing the notice by regular U.S. mail, postage paid. Notice will be considered to have been received by the User within 3 days after the notice is mailed if there is no actual evidence of receipt. The User may change User's address by giving written notice of the change by certified mail, return receipt requested, to the City Engineer at P.O. Box 1293, Albuquerque, New Mexico 87103.

11. Indemnification. The User agrees to defend, indemnify and hold harmless the City, its officials, agents and employees from and against any and all claims, actions, suits or proceedings of any kind brought against said parties as a result of user's use of the City's Property. To the extent, if at all, Section 56-7-1 NMSA 1978 is applicable to this Agreement, this Agreement to indemnify will not extend to liability, claims, damages, losses or expense, including attorney's fees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications by the indemnitee, or the agents or employees of the indemnitee; or (2) the giving of or failure to give directions or instructions is the primary cause of bodily injury to persons or damage to property.

12. Term. This Agreement shall continue until revoked by the City pursuant to Section 7 above.

13. Binding on User's Property. The covenants and obligations of the User set forth herein shall be binding on User, his heirs, assigns and successors and on User's Property and constitute covenants running with User's Property until release by the City.

14. Entire Agreement. This Agreement contains the entire agreement of the parties and supersedes any and all other agreements or understandings, oral or written, whether previous to the execution hereof or contemporaneous herewith.

15. Changes of Agreement. Changes to this Agreement are not binding unless made in writing, signed by both parties.

16. Construction and Severability. If any part of this Agreement is held to be invalid or unenforceable, the remainder is reasonably capable of completion.



17. Captions. The captions to the sections or paragraphs of this Agreement are not part of this Agreement and will not affect the meaning or construction of any of its provisions.

CITY OF ALBUQUERQUE:

By: [Signature]
Chief Administrative Officer
Dated: 7-15-03

APPROVED:
[Signature] 7/15/03
Director, Public Works Dept.

USER:

By: [Signature]
Title: MANAGING PARTNER
Dated: 6-11-03

Reviewed by:
[Signature] 7/15/03
City Engineer
[Signature] 7/14/03

CITY'S ACKNOWLEDGMENT

STATE OF NEW MEXICO)
) SS
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on July 15, 2003, by Fred J. Aguirre Chief Administrative Officer for the City of Albuquerque, a New Mexico municipal corporation, on behalf of the corporation.

My Commission Expires:
11-15-2003

[Signature]
Notary Public

USER'S ACKNOWLEDGMENT

STATE OF New Mexico)
) SS
COUNTY OF Bernalillo)

This instrument was acknowledged before me on June 11, 2003, by Mel Ottley, Managing Member, on behalf of Mor Land, LLC.

My Commission Expires:
12/14/05

[Signature]
Notary Public
[Signature]

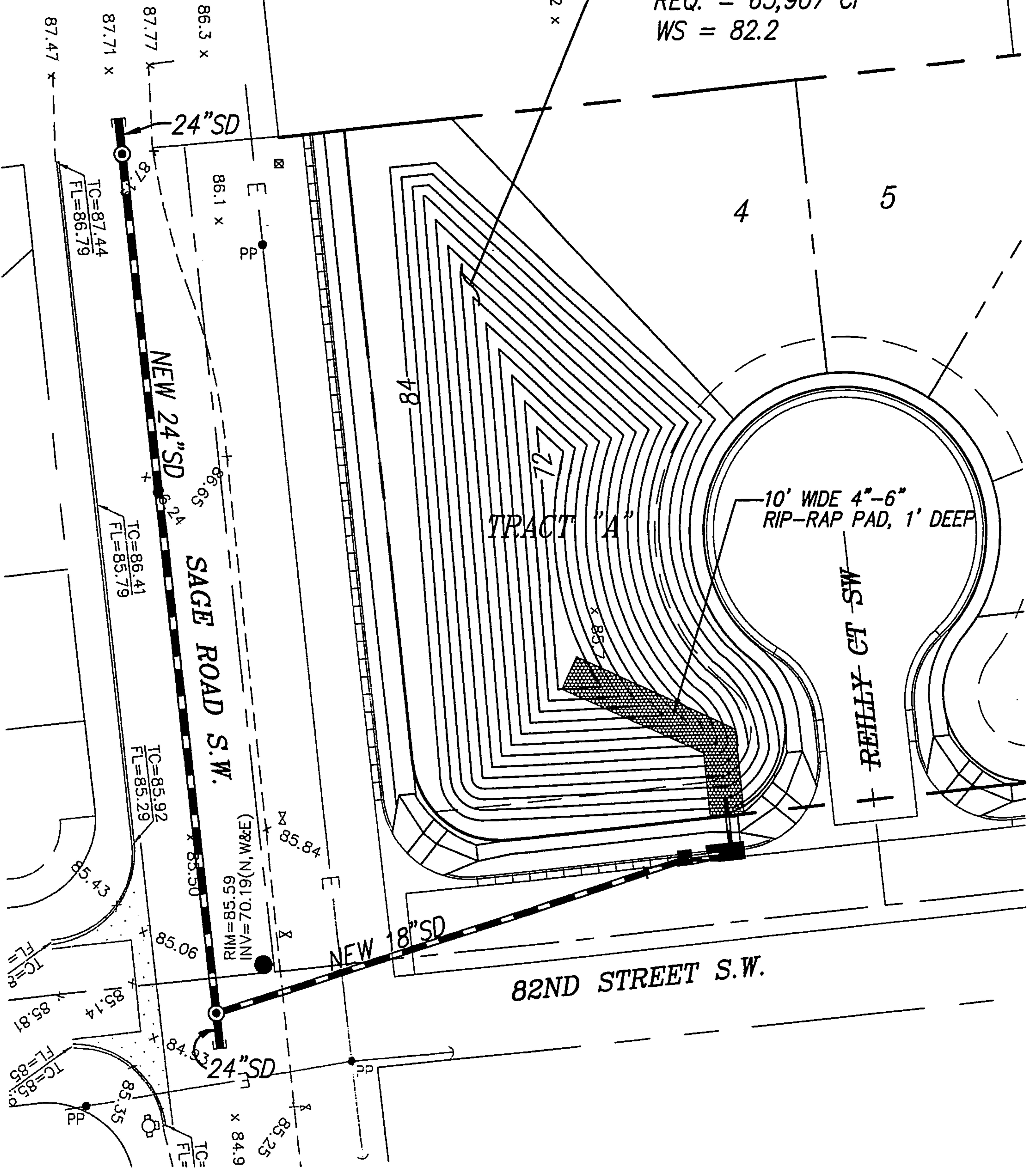


9/15/2004
OFFICIAL SEAL
SUSAN RASINSKI
NOTARY PUBLIC-STATE OF NEW MEXICO

My commission expires: 9-3-04



TEMPORARY RETENTION POND
 AVAIL = 61,236 CF
 REQ. = 65,907 CF
 WS = 82.2



Mary Herrera Bern. Co. ASRE R 17.00

2003205429
 5988461
 Page: 5 of 5
 11/12/2003 12:35P
 Bk-A68 Pg-4995

SCALE: 1" = 40'

A02jobs\A2102ds3\EXHIBITS\Exhibit-A.dwg\07-08-03\DER

DESERT SAGE SUBDIVISION UNIT 3
 EXHIBIT "A" - AGREEMENT & COVENANT

dmg MARK GOODWIN & ASSOCIATES, P.A.
 CONSULTING ENGINEERS
 P.O. BOX 90606
 ALBUQUERQUE, NEW MEXICO 87199
 (505)828-2200, FAX (505)797-9539



April 16, 2003

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Amy Driscoll, PE
Mark Goodwin & Associates
P.O. Box 90606,
Albuquerque, NM 87199

Re: Desert Sage Unit 3 Subdivision Drainage Report
Engineer's Stamp dated 4-7-03, (L10/D24)

Dear Ms. Driscoll,

Based upon the information provided in your submittal dated 4-7-03, the above referenced report is approved for Preliminary Plat action by the DRB. Once that board has approved the grading plan, please submit a mylar copy for my signature.

This project requires a National Pollutant Discharge Elimination System (NPDES) permit. Refer to the attachment that is provided with this letter for details. If you have any questions please feel free to call the Public Works Hydrology section at 768-3654 (Charles Caruso) or 768-3645 (Brian Wolfe).

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

Sincerely,

Bradley L. Bingham, PE
Sr. Engineer, Planning Dept.
Development and Building Services

C: Chuck Caruso, CoA
file

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/11/2002)

L-10/D24

PROJECT TITLE: Desert Sage, Unit 3ZONE MAP/DRB FILE#: L-10DRB#: 102243EPC# 02EPC-01460

WORK ORDER#: _____

LEGAL DESCRIPTION: Tracts 463, Town of Atrisco Grant, Unit 7

CITY ADDRESS: _____

ENGINEERING FIRM: Mark Goodwin & Associates, PACONTACT: Amy L. Driscoll, PEADDRESS: P.O. Box 90606PHONE: 828-2200CITY, STATE: Albuquerque, NMZIP CODE: 87119OWNER: TS McNaney & AssociatesCONTACT: Tim McNaneyADDRESS: 400 Gold SW, Suite 700PHONE: 338-0200CITY, STATE: Albuquerque, NMZIP CODE: 87102ARCHITECT: N/A

CONTACT: _____

ADDRESS: _____

PHONE: _____

CITY, STATE: _____

ZIP CODE: _____

SURVEYOR: Aldrich Land SurveyCONTACT: Tim AldrichADDRESS: P.O. Box 30701PHONE: 884-1990CITY, STATE: Albuquerque, NMZIP CODE: 87190-0701CONTRACTOR: N/A

CONTACT: _____

ADDRESS: _____

PHONE: _____

CITY, STATE: _____

ZIP CODE: _____

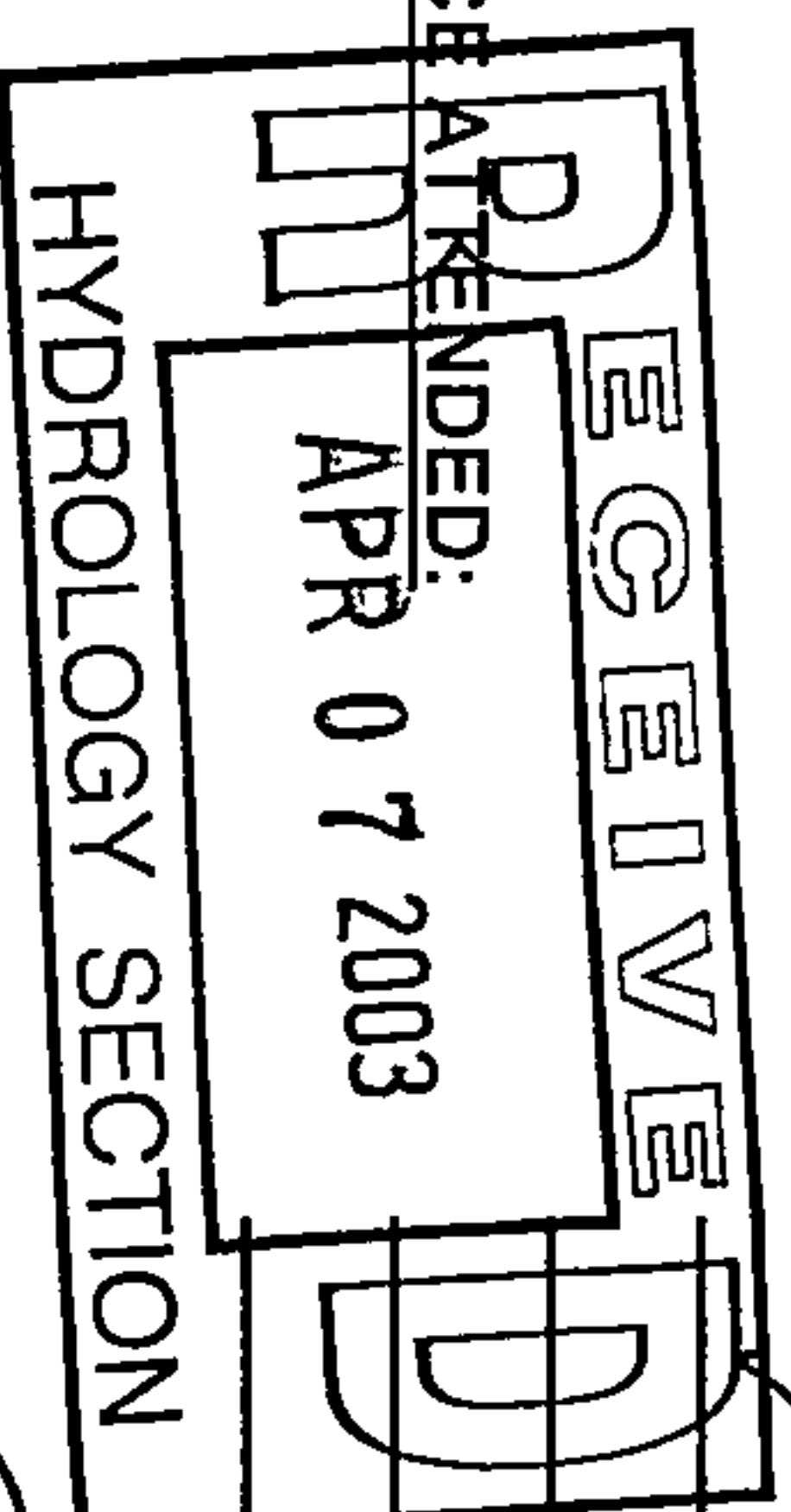
TYPE OF SUBMITTAL:

☒ DRAINAGE REPORT☒ DRAINAGE PLAN☒ CONCEPTUAL GRADING & DRAINAGE PLAN☒ GRADING PLAN_____
EROSION CONTROL PLAN_____
ENGINEER'S CERTIFICATION (HYDROLOGY)_____
CLOMRL/OMR_____
TRAFFIC CIRCULATION LAYOUT (TCL)_____
ENGINEER'S CERTIFICATION (TCL)_____
ENGINEER'S CERTIFICATION (DRB APPR. SITE PLAN)_____
OTHER

CHECK TYPE OF APPROVAL SOUGHT:

SIA / FINANCIAL GUARANTY RELEASE_____
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 (PERM)_____
CERTIFICATE OF OCCUPANCY (TEMP)_____
GRADING PERMIT APPROVAL_____
PAVING PERMIT APPROVAL_____
WORK ORDER APPROVAL_____
OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

☒ YES☒ NO_____
COPY PROVIDEDDATE SUBMITTED: 4/7/03 BY: __________
Amy L. Driscoll, PE

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of to the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5).
2. **Drainage Plans:** Required for building permits, grading permits and site plans less than five (5).
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.



D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmng@swcp.com

April 7, 2003

Mr. Brad Bingham, PE
City of Albuquerque
600 2nd Street SW
Albuquerque, NM 87103

Re: **Desert Sage, Unit 3 (L10/D24)**

Dear Mr. Bingham:

This letter is in response to your February 27, 2003 comments.

1. Basin 500 now has a land treatment table that adds up to 100%.
2. The driveway impervious area has been adjusted. The time-to-peak is now 0.133. Please see the revised AHYMO run and G&D Report Summary.
3. Per the Tower/Sage Drainage Master Plan, Basin S6-D comprises of our site and properties to the west of our site. There is not enough capacity in Sage Road to contain developed flows from the properties to the west. Our project prohibits them from being able to have a place to discharge so we are providing an 24 inch pipe for the properties to the west. This is how we are dealing with the worst case scenario. The 24 inch pipe is sized for the developed flows.
4. The existing curb and paving in San Ygnacio is already shown. The paving goes to the center of San Ignacio. The existing 36 inch storm drain is now shown on the G&D Plan. Directly north of our subdivision there are no other existing utilities in San Ygnacio.
Per the Tower/Sage Drainage Master Plan, the total flow at the corner of 82nd and San Ygnacio is 25 cfs. The water surface elevation in San Ygnacio is 0.50 feet for 25 cfs. No inlet is needed at 82nd and Sage. It is so low because the flow west of Basin S6-D is being discharged into the Tower Pond. Please see the enclosed calculations.
A transition road on the east has been added as shown on the G&D Plan. There is nothing to transition to on the west side of San Ygnacio.
5. The pond volume and water surface elevation have been added to the plan.

Please contact me if I can be of further assistance.

Sincerely,

MARK GOODWIN & ASSOCIATES, P.A.

Amy L. Driscoll, PE
Project Engineer



DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV.1/11/2002)

PROJECT TITLE: <u>Desert Sage, Unit 3</u>		ZONE MAP/DRB.FILE#: <u>L-10 / D24</u>
DRB#: <u>102243</u>	EPC# <u>02EPC-01460</u>	WORK ORDER#: <u>670482</u>
LEGAL DESCRIPTION: <u>Desert Sage Unit 3</u>		
CITY ADDRESS: _____		
ENGINEERING FIRM: <u>Mark Goodwin & Associates, PA</u>		CONTACT: <u>Amy L. D. Niese, PE</u>
ADDRESS: <u>P.O. Box 90606</u>		PHONE: <u>828-2200</u>
CITY, STATE: <u>Albuquerque, NM</u>		ZIP CODE: <u>87119</u>
OWNER: <u>Mor Land, LLC</u>		CONTACT: <u>Mel Ottley</u>
ADDRESS: <u>2820 Broadbent Parkway, NE</u>		PHONE: <u>889-0315</u>
CITY, STATE: <u>Albuquerque, NM</u>		ZIP CODE: <u>87107</u>
ARCHITECT: <u>N/A</u>		CONTACT: _____
ADDRESS: _____		PHONE: _____
CITY, STATE: _____		ZIP CODE: _____
SURVEYOR: _____		CONTACT: _____
ADDRESS: _____		PHONE: _____
CITY, STATE: _____		ZIP CODE: _____
CONTRACTOR: <u>N/A</u>		CONTACT: _____
ADDRESS: _____		PHONE: _____
CITY, STATE: _____		ZIP CODE: _____

TYPE OF SUBMITTAL:

- ☐ DRAINAGE REPORT
- ☐ DRAINAGE PLAN
- ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
- ☐ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☒ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ ENGINEER'S CERTIFICATION (TCL)
- ☐ ENGINEER'S CERTIFICATION (DRB APPR. SITE PLAN)
- ☐ OTHER

WAS A PRE-DESIGN CONFERENCE ATTENDED:

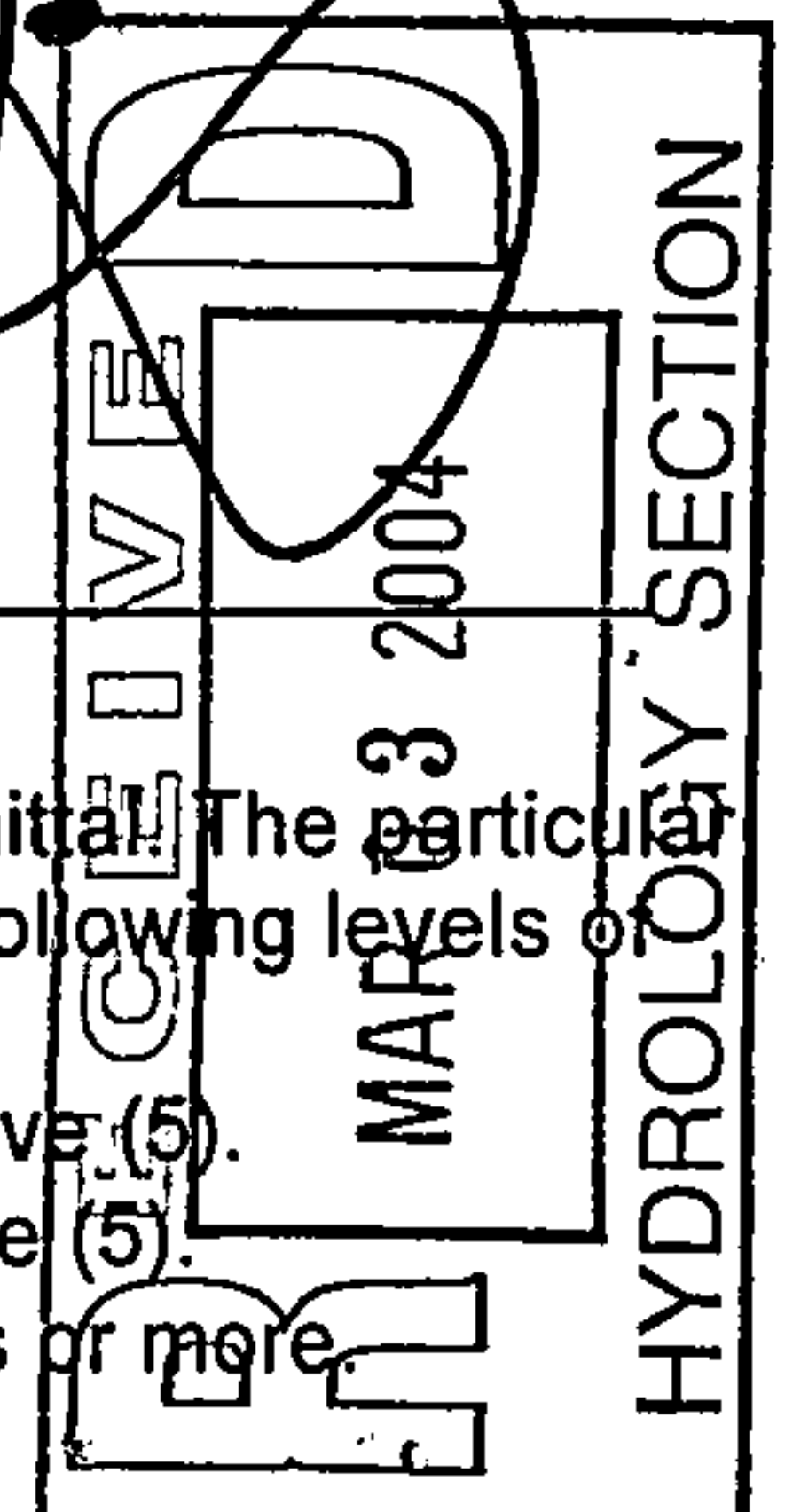
- ☐ YES
- ☒ NO
- ☐ COPY PROVIDED

DATE SUBMITTED: 3/3/04

CHECK TYPE OF APPROVAL SOUGHT:

- ☒ SIA / FINANCIAL GUARANTY RELEASE
- ☐ 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 (PERM)
- ☐ CERTIFICATE OF OCCUPANCY (TEMP)
- ☐ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☒ OTHER (SPECIFY) Hydrology Cert

BY: Amy L. D. Niese, PE



Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5).
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3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

D. Mark Goodwin and Associates, P.A.
Consulting Engineers

P.O. Box 90606 ♦ Albuquerque, NM 87199
(505) 828-2200 ♦ (505) 797-9539 fax
e-mail: dmng@swcp.com

LETTER OF TRANSMITTAL

To: Brad Bingham

Date: March 3, 2004

Hydrology

City of Albuquerque

Re: Desert Sage 3

L10/D24

We are sending:

No. Copies	Date	Item Description
1		Grading Certification

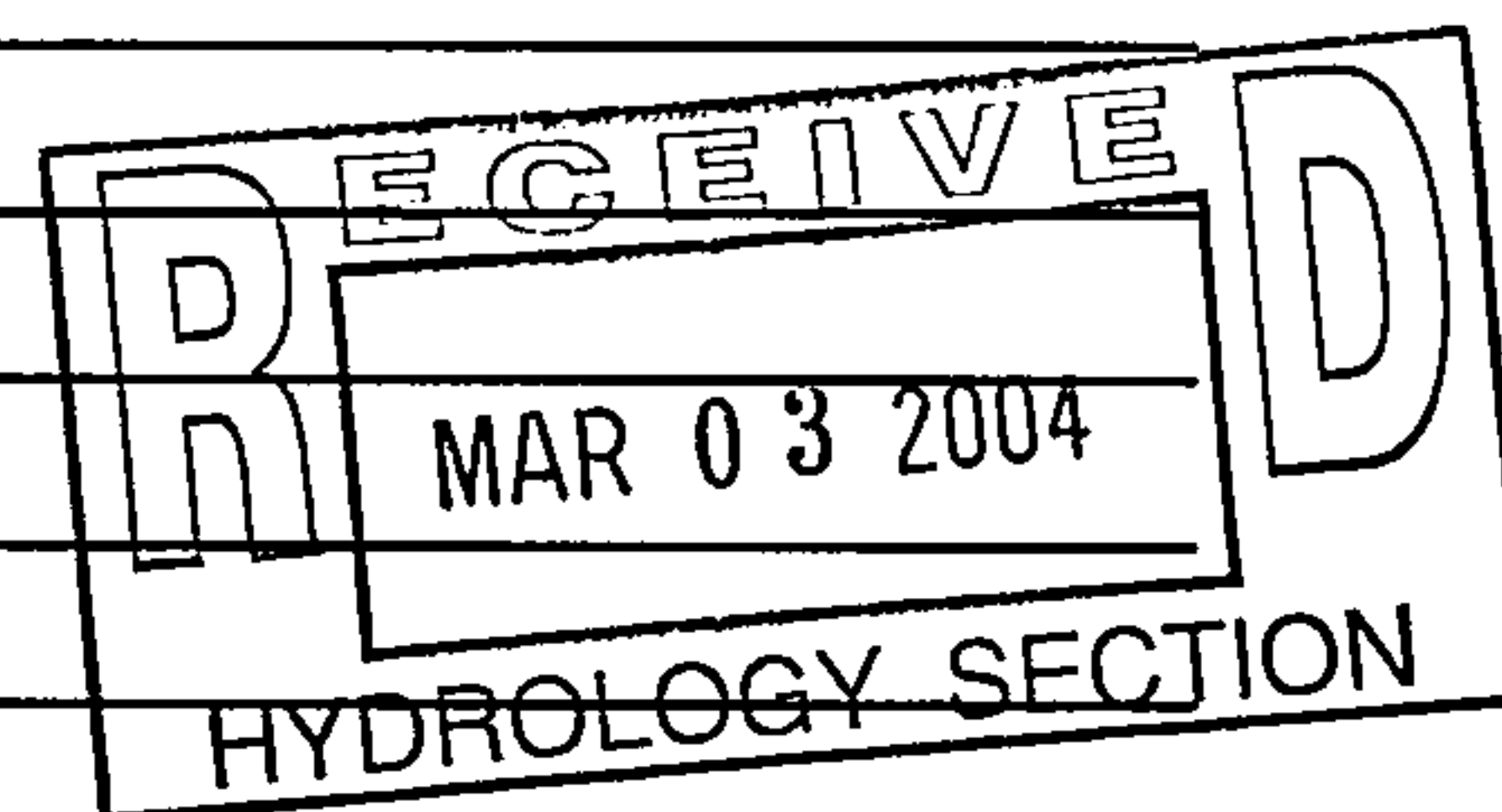
☒ For your approval

☐ For your information

☐ As you requested

☐ For your comments

NOTES:



SIGNED:

A handwritten signature in black ink, appearing to read "Amy L. D. Niese".

Amy L. D. Niese, PE



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 5, 2004

Amy Niese, P.E.
Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199

Re: Desert Sage Unit 3, SIA/Financial Guarantee Release
Engineer's Stamp dated 4-07-03 (L10/D24)
Certification dated 3-03-04

Dear Ms. Niese,

Based upon the information provided in your submittal received 3-03-04, the above referenced certification is approved for release of SIA and Financial Guarantee.

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: Arlene Portillo, COA# 670482
file

MARK GOODWIN

& ASSOCIATES
CONSULTING ENGINEERS

dmg

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV.1/11/2002)

File

PROJECT TITLE: Desert Sage, Unit 3

ZONE MAP/DRB.FILE#: L-10 / D24

DRB#: 102243

EPC# 02EPC-01460

WORK ORDER#: _____

LEGAL DESCRIPTION: Tracts 463, Town of Atrisco Grant, Unit 7

CITY ADDRESS: _____

ENGINEERING FIRM: Mark Goodwin & Associates, PA

ADDRESS: P.O. Box 90606

CITY, STATE: Albuquerque, NM

CONTACT: Amy L. Driscoll, PE

PHONE: 828-2200

ZIP CODE: 87119

OWNER: TS McNaney & Associates

ADDRESS: 400 Gold SW, Suite 700

CITY, STATE: Albuquerque, NM

CONTACT: Tim McNaney

PHONE: 338-0200

ZIP CODE: 87102

ARCHITECT: N/A

ADDRESS: _____

CITY, STATE: _____

CONTACT: _____

PHONE: _____

ZIP CODE: _____

SURVEYOR: Aldrich Land Survey

ADDRESS: P.O. Box 30701

CITY, STATE: Albuquerque, NM

CONTACT: Tim Aldrich

PHONE: 884-1990

ZIP CODE: 87190-0701

CONTRACTOR: N/A

ADDRESS: _____

CITY, STATE: _____

CONTACT: _____

PHONE: _____

ZIP CODE: _____

TYPE OF SUBMITTAL:

- ☐ DRAINAGE REPORT
- ☒ DRAINAGE PLAN
- ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
- ☒ GRADING PLAN
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- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ ENGINEER'S CERTIFICATION (TCL)
- ☐ ENGINEER'S CERTIFICATION (DRB APPR. SITE PLAN)
- ☐ OTHER

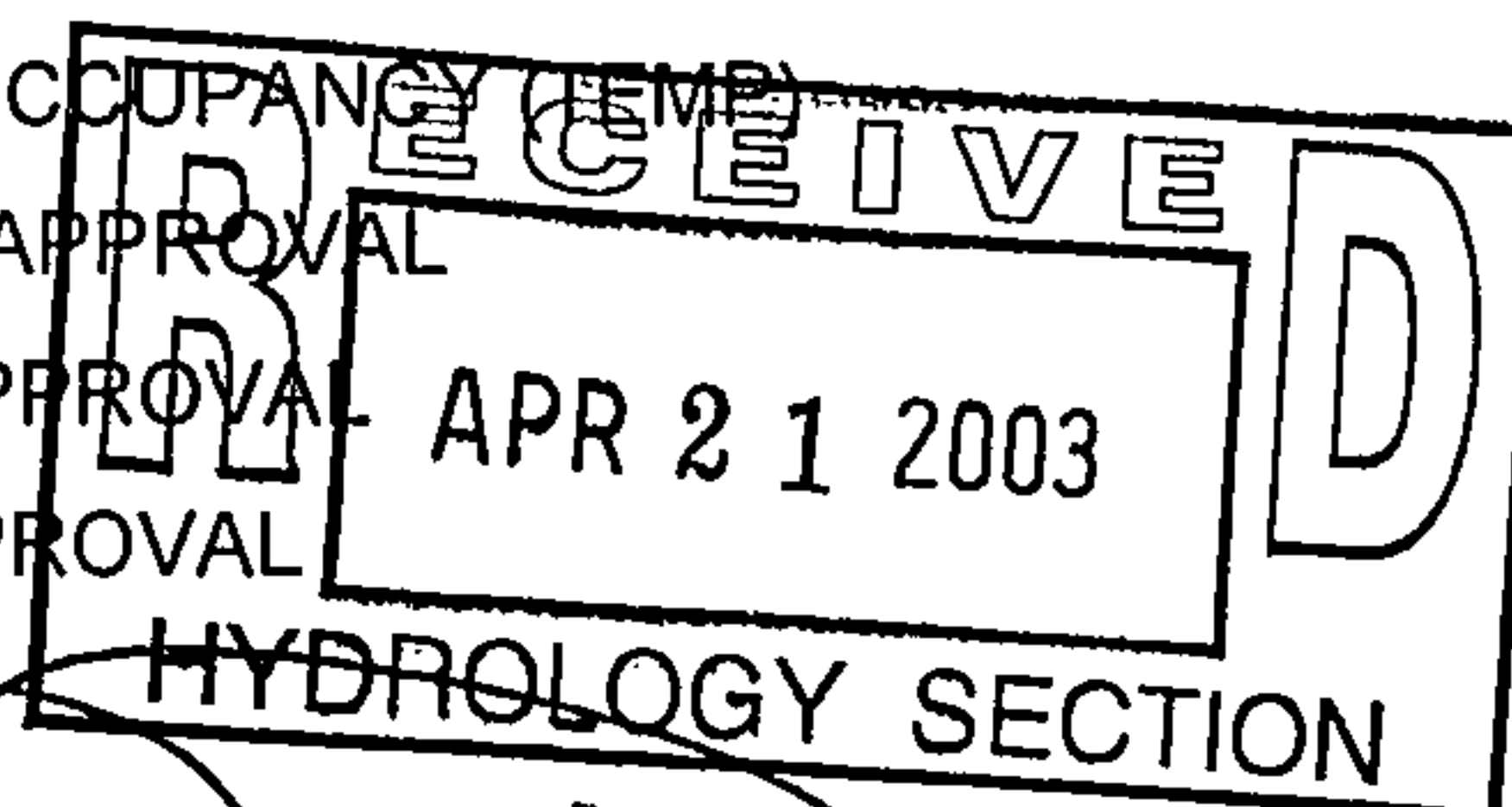
WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☐ YES
- ☒ NO
- ☐ COPY PROVIDED

DATE SUBMITTED: 4/21/03

CHECK TYPE OF APPROVAL SOUGHT:

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- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☐ OTHER (SPECIFY) _____



BY: _____

Amy L. Driscoll, PE

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3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

DRAINAGE REPORT

for

Desert Sage, Unit 3 Subdivision

Prepared By

*Amy L. Driscoll, PE
Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199*



April 2003

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- I. *Introduction*
- II. *Existing Conditions*
- III. *Proposed Drainage Plan*
- IV. *Summary*

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- *Desert Sage, Unit 3 Grading and Drainage Plan*
- *FIRM Map*
- *Basin Map*
- *AHYMO Run*
 - *Summary Output - 100 year*
 - *Input Data - 100 year*
 - *Output Data - 100 year*
- *Excerpt from the Sage Road Capacity Calculations*
- *Excerpt from the Tower/Sage Drainage Master Plan*
- *Desert Sage, Unit 3 Calculations*

INTRODUCTION

This report is being submitted for Grading and Drainage approval.

Please see the enclosed Zone Atlas Map, L-10. The proposed Desert Sage, Unit 3 Subdivision at the northwest corner of 82nd Street and Sage Road. The project covers 5.0 acres and will be developed into 29 single family residential homes.

EXISTING CONDITIONS

Tract 463, Unit 7 of the Town of Atrisco Grant was previously in the County but is now annexed into the City of Albuquerque (02EPC-01460). All of the Zoning is now RD/9 DU/ AC.

Currently the site is vacant and covered in native vegetation. Please see the enclosed Desert Sage, Unit 3 Grading and Drainage Plan. Part of the site is within the 100 year flood plain which is shown on the Grading and Drainage Plan and in the Appendix. The flood plain is identified as Zone AE which is at elevation 5085. A submittal to FEMA will be done to remove the site from the 100 year flood plain.

There is no flow coming onto the site from the north, east, or south. The area to the west is currently draining 7.20 cfs in a southeasterly direction. Eagle Pointe Subdivision and Desert Sage Subdivision drain to the south. Please see the enclosed Basin Map.

PROPOSED DRAINAGE PLAN

Per the Sage Road Capacity Calculations by Mark Goodwin and Associates, no flow in Sage Road is to go east past 86th Street for the future condition. Per the Tower/Sage Drainage Master Plan by Andrews, Asbury, and Robert, a 30 inch storm pipe will start at 82nd Street and Sage Road and go east to discharge in the Amole Del Norte Channel.

All of the area south of Sage between 86th Street and 82nd Street is to drain south. Eagle Pointe Subdivision and Desert Sage Subdivision are presently draining south. Per the Arenal/Unser Pond Report by Mark Goodwin and Associates, the tracts between these subdivisions are to drain to the south under future conditions.

La Mesilla Subdivision at the northeast corner of 86th and Sage Road drains to the north. The Desert Sage, Unit 3 site will drain to new inlets in 82nd Street. The area between these two sites will drain 29.53 cfs to an 18 inch pipe in Sage Road.

The only surface flow in Sage Road up to 82nd Street is what rain falls on Sage Road. That amount of flow will be 4.92 cfs. The other half of 82nd Street (3.09 cfs) will surface drain to Sage Road. The total surface flow in Sage Road after 82nd Street will be 8.01 (4.92 + 3.09) cfs. The capacity of half of Sage Road is 8.30 cfs. As a result, no inlets will be needed in Sage from 86th Street to 82nd Street.

The developed flow for this site will be 15.18 cfs. The developed flow for the properties to the west will be 29.5 cfs. The developed flow for 82nd will be 6.2 cfs. The surface flow in Sage will be 4.92 cfs. All of these add up to 55.8 cfs. Per the Tower/Sage Drainage Master Plan, all of these areas combined (Basin S6-D) are allowed to discharge up to 55 cfs. The 0.8 additional cfs is insignificant.

Half of 82nd Street will be 3.09 cfs. This site will be 15.18 cfs. These flows (18.26 cfs) will drain to new inlets in 82nd Street. The inlets are in a sump condition so they are sized for twice the 100 year storm. A Single A Inlet and a Double C Inlet can accept 14.95 cfs and 23.86 cfs, respectively, for a total of 38.81 cfs. In the future, the 18.26 cfs will drain to an 18 inch pipe in 82nd Street which discharges to a manhole in Sage Road.

The pipe flow coming from 82nd Street and our site will be 18.26 cfs. The pipe flow coming from the west will be 29.53 cfs. The surface flow in Sage (ultimate) will be 8.01 cfs. At this point, the total flow in the manhole will be 47.79 cfs (18.26 + 29.53) which will drain to a 24 inch storm line in Sage Road. This will connect to the 30 inch storm pipe proposed in the Tower/Sage Drainage Master Plan.

The water surface elevation in 82nd street for 18.26 cfs will be 0.47 which will be below the top of the curb at 0.67. The water surface elevation in each cul-de-sac will be at 0.14 which will be below the top of curb at 0.33.

In the interim, the inlets and the 18 inch pipe in 82nd Street and the 18 inch pipe in Sage Road will be constructed with this project. However, they will be plugged because there are no pipes to connect them until the future conditions. In the meantime, flow will be directed to a retention pond. The pond will be removed once these other storm drains are connected.

The volume required for the retention pond is twice the 100 year storm which will be a total of 61,236 cf. The retention pond actually has capacity for 65,907 cf. The water surface in the retention pond will be elevation 82.2.

Per the Tower/Sage Drainage Master Plan, the flow at the intersection of 82nd and San Ygnacio Road will be 25 cfs. The water surface elevation at that flow will be 0.50 ft. There will be no need for inlets in San Ygnacio Road.

SUMMARY

The existing vacant lot will become a 29 lot subdivision. There is a 100 year flood plain which will need to be removed by a submittal to FEMA.

The site will drain to inlets in 82nd Street. In the interim, the inlets will drain to a retention pond. An 18 inch pipe will be constructed in 82nd Street. An 18 inch and 24 pipe will be constructed in Sage Road to accept drainage from the site to the west and from the pipe in 82nd Street. No inlets are needed in Sage Road or San Ygnacio up to 82nd Street. The retention pond will be removed once these pipes are connected to the proposed 30 inch storm pipe in Sage Road east of 82nd Street.

ZONE ATLAS MAP

10-10-10

DESERT SAGE, UNIT 3
GRADING AND DRAINAGE PLAN

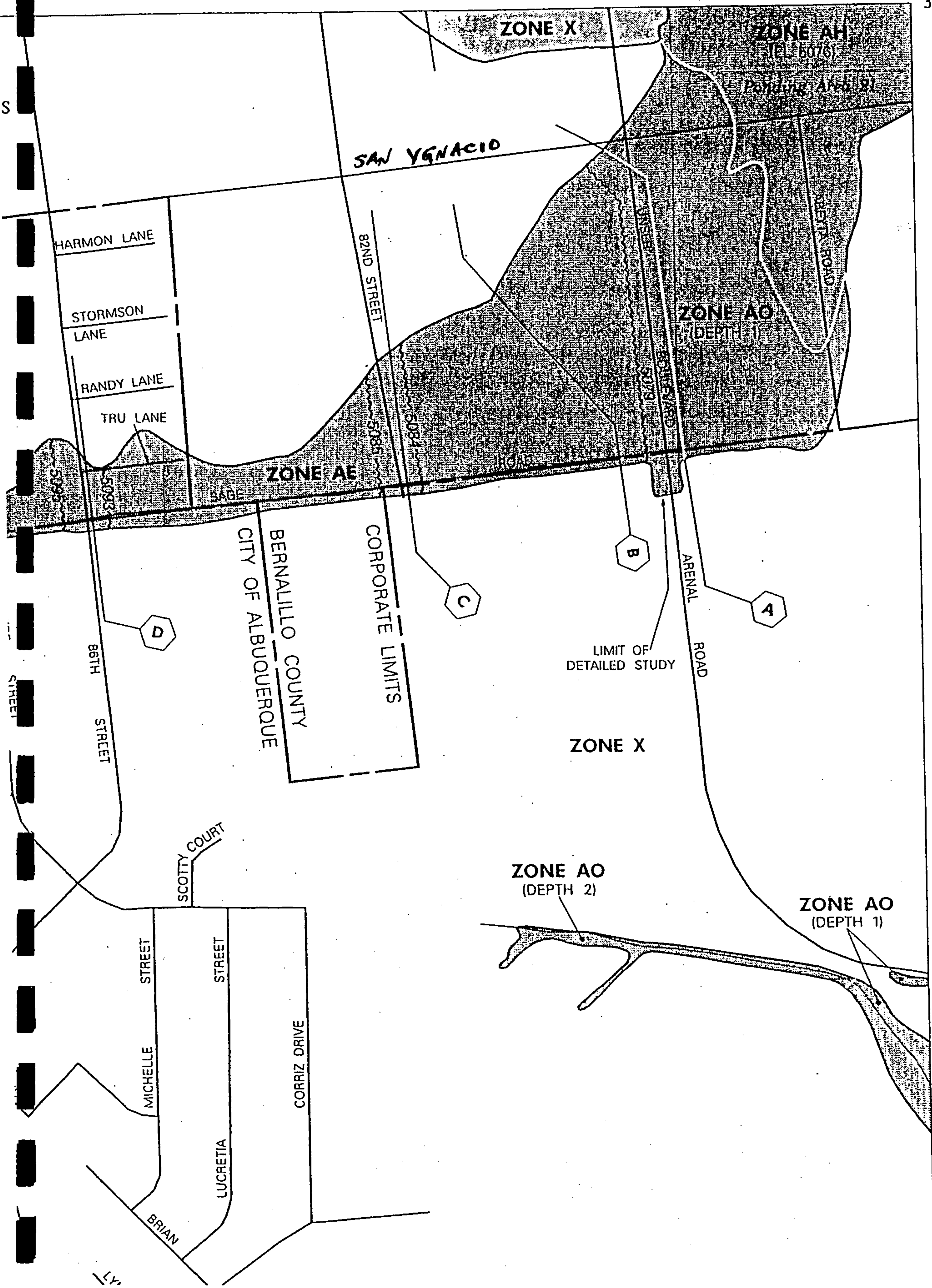
FIRM MAP

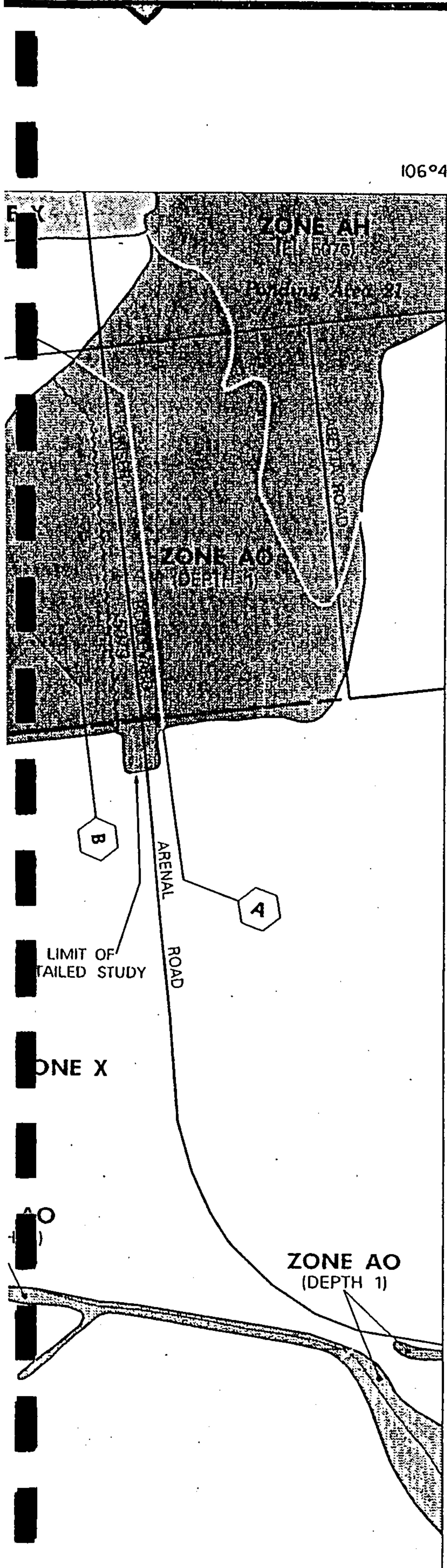
E

F

106°43'07"

35°03'45"





LEGEND



SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

- ZONE A** No base flood elevations determined.
- ZONE AE** Base flood elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE A99** To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.
- ZONE V** Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- ZONE VE** Coastal flood with velocity hazard (wave action); base flood elevations determined.



FLOODWAY AREAS IN ZONE AE



OTHER FLOOD AREAS

- ZONE X** Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.



OTHER AREAS

- ZONE X** Areas determined to be outside 500-year floodplain.
- ZONE D** Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS



Identified
1983



Identified
1990



Otherwise
Protected Areas

Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.



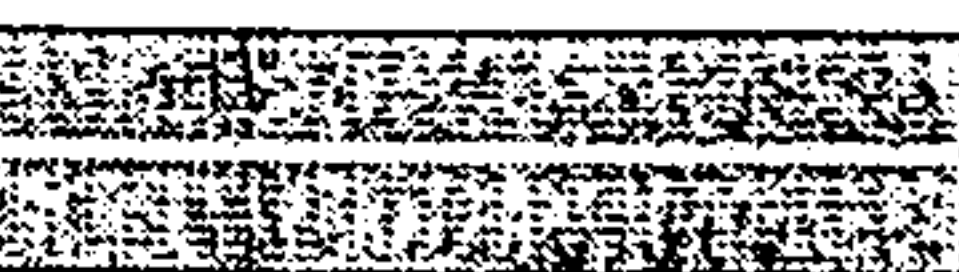
Flood Boundary



Floodway Boundary



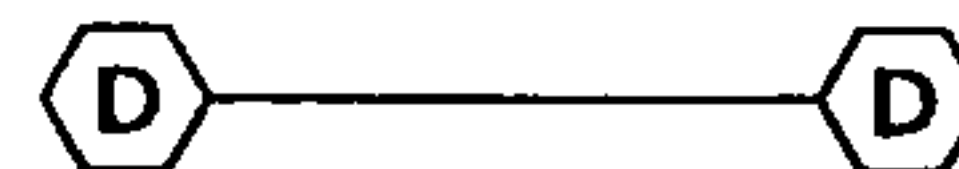
Zone D Boundary



Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.



Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.



Cross Section Line

(EL 987)

Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.

RM7 X

Elevation Reference Mark

• M2

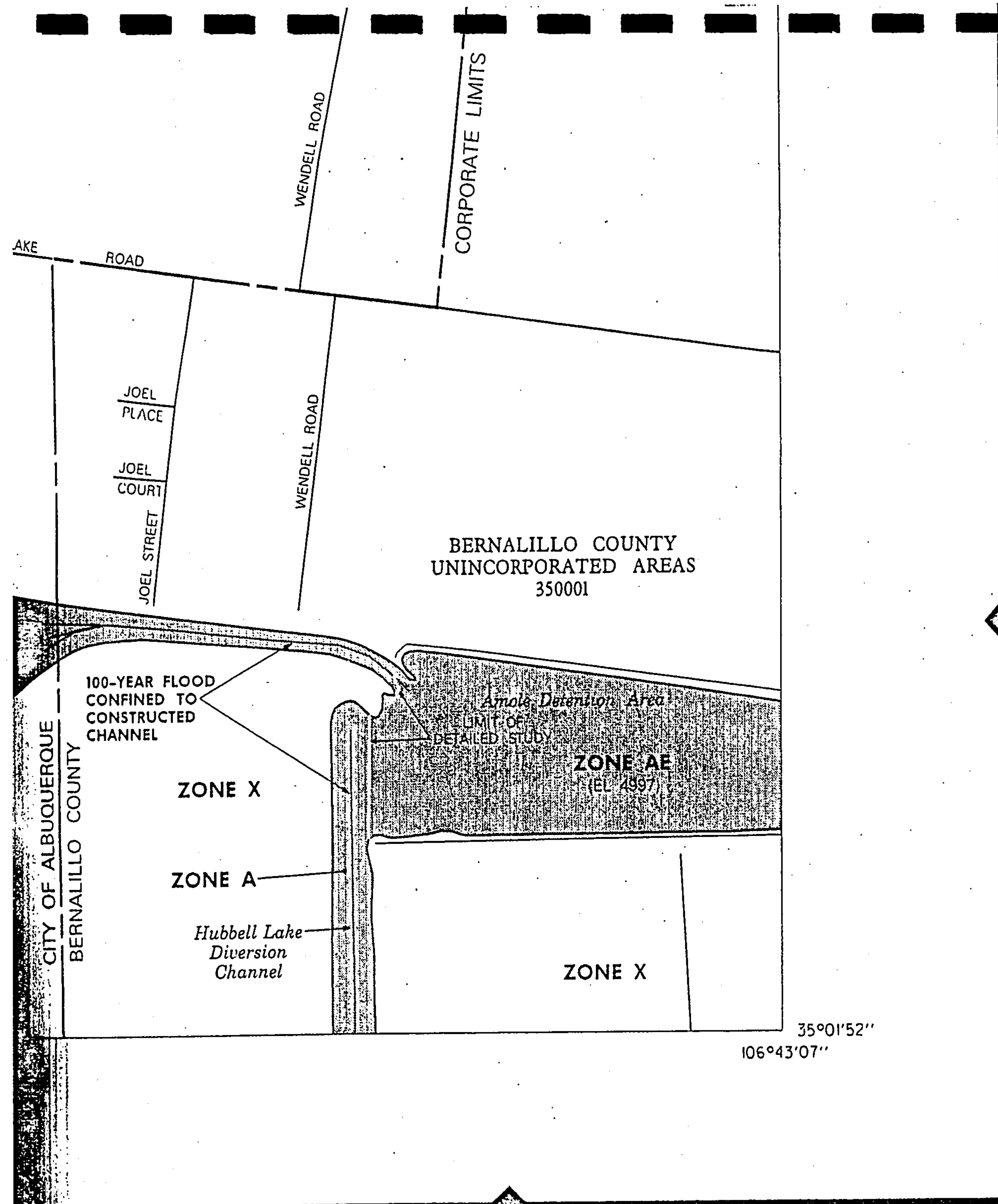
River Mile

97°07'30", 32°22'30"

Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from



NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

BERNALILLO COUNTY,
NEW MEXICO AND
INCORPORATED AREAS

PANEL 336 OF 825

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:
COMMUNITY

NUMBER	PANEL	SUFFIX
--------	-------	--------

ALBUQUERQUE, CITY OF	350002	0336	D
BERNALILLO COUNTY, UNINCORPORATED AREAS	350001	0336	D

MAP NUMBER
35001C0336 D

EFFECTIVE DATE:
SEPTEMBER 20, 1996



Federal Emergency Management Agency

BASIN MAP

AHYMO RUN

- VERSION: 1997.02d

RUN DATE (MON/DAY/YR) =03/26/2003
USER NO.= AHYMO-I-9702dGoodwinM-AH

HYDROGRAPH IDENTIFICATION		FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1
										NOTATION
START										
RAINFALL TYPE= 2										TIME= .00
COMPUTE NM HYD	200.00	-	2	A .00780	6.68	.188	.45191	1.533	1.337	RAIN24= 2.670
COMPUTE NM HYD	300.00	-	3	C .01530	14.84	.438	.53714	1.533	1.515	PER IMP= .00
COMPUTE NM HYD	400.00	-	4	A .00780	15.18	.570	1.36940	1.500	3.041	PER IMP= 3.00
COMPUTE NM HYD	500.00	-	5	B .00230	6.17	.266	2.17199	1.500	4.189	PER IMP= 41.00
COMPUTE NM HYD	600.00	-	6	SAGE .00189	4.92	.211	2.08839	1.500	4.069	PER IMP= 89.00
COMPUTE NM HYD	700.00	-	7	C .01530	29.53	1.104	1.35267	1.500	3.016	PER IMP= 84.00
FINISH										

```

START          TIME=0.0
*****
***** DESERT SAGE, UNIT 3
***** FILE: C:\PROGRAMFILES\DS3.DAT MARCH 2003 BY:AMY
*****
***** 100-YEAR 24-HOUR STORM EVENT
*****
RAINFALL       TYPE=2 RAIN QUARTER=0.0 IN
               RAIN ONE=1.90 IN RAIN SIX=2.21 IN
               RAIN DAY=2.67 IN DT=0.033333 HR
*****
***** EXISTING CONDITIONS
*****
***** BASIN A - ON-SITE - ENTIRE SUBDIVISION
*****
COMPUTE NM HYD   ID=2 HYD NO=200.00 AREA=0.0078 SQ MI
                 PER A=100.00 PER B=0.00 PER C=0.00 PER D=0.00
                 TP=0.133 HR MASS RAINFALL=-1
PRINT HYD       ID=2 CODE=1
*****
***** BASIN C - OFF-SITE FROM WEST
*****
COMPUTE NM HYD   ID=3 HYD NO=300.00 AREA=0.0153 SQ MI
                 PER A=90.00 PER B=0.00 PER C=7.00 PER D=3.00
                 TP=0.133 HR MASS RAINFALL=-1
PRINT HYD       ID=3 CODE=1
*****
***** DEVELOPED CONDITIONS
*****
***** BASIN A - ON-SITE
*****
COMPUTE NM HYD   ID=4 HYD NO=400.00 AREA=0.0078 SQ MI
                 PER A=0.00 PER B=59.00 PER C=0.00 PER D=41.00
                 TP=0.133 HR MASS RAINFALL=-1
PRINT HYD       ID=4 CODE=1
*****
***** BASIN B - 82ND ST
*****
COMPUTE NM HYD   ID=5 HYD NO=500.00 AREA=0.0023 SQ MI
                 PER A=0.00 PER B=11.00 PER C=0.00 PER D=89.00
                 TP=0.133 HR MASS RAINFALL=-1
PRINT HYD       ID=5 CODE=1
*****
***** SAGE ROAD SURFACE FLOW
*****
COMPUTE NM HYD   ID=6 HYD NO=600.00 AREA=0.00189 SQ MI
                 PER A=00.00 PER B=16.00 PER C=0.00 PER D=84.00
                 TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD       ID=6 CODE=1
*****
***** BASIN C - OFF-SITE FROM WEST
*****
COMPUTE NM HYD   ID=7 HYD NO=700.00 AREA=0.0153 SQ MI
                 PER A=0.00 PER B=60.00 PER C=0.00 PER D=40.00
                 TP=0.133 HR MASS RAINFALL=-1
PRINT HYD       ID=7 CODE=1
FINISH

```

AHYMO PROGRAM (AHYMO_97) -
RUN DATE (MON/DAY/YR) = 03/26/2003
START TIME (HR:MIN:SEC) = 16:39:55
INPUT FILE = DS3.DAT

- Version: 1997.02d

USER NO. = AHYMO-I-9702dGoodwinM-AH

START TIME=0.0
***** DESERT SAGE, UNIT 3
***** FILE: C:\PROGRAMFILES\DS3.DAT MARCH 2003 BY:AMY

***** 100-YEAR 24-HOUR STORM EVENT

RAINFALL TYPE=2 RAIN QUARTER=0.0 IN
RAIN ONE=1.90 IN RAIN SIX=2.21 IN
RAIN DAY=2.67 IN DT=0.033333 HR

COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.

DT =	.033333 HOURS	END TIME =	19.966470 HOURS
.0000	.0014	.0029	.0043
.0106	.0123	.0140	.0157
.0232	.0252	.0272	.0294
.0387	.0412	.0439	.0466
.0590	.0625	.0663	.0715
.1249	.1694	.2331	.3202
.9839	1.1890	1.2748	1.3472
1.5745	1.6213	1.6652	1.7065
1.8502	1.8816	1.9113	1.9395
1.9832	1.9883	1.9932	1.9978
2.0147	2.0185	2.0223	2.0259
2.0393	2.0425	2.0455	2.0485
2.0599	2.0625	2.0652	2.0678
2.0776	2.0800	2.0823	2.0845
2.0933	2.0954	2.0975	2.0995
2.1074	2.1093	2.1112	2.1131
2.1203	2.1221	2.1238	2.1255
2.1322	2.1338	2.1354	2.1370
2.1432	2.1447	2.1462	2.1477
2.1535	2.1549	2.1564	2.1577
2.1632	2.1646	2.1659	2.1672
2.1724	2.1736	2.1749	2.1762
2.1811	2.1823	2.1835	2.1847
2.1893	2.1905	2.1916	2.1928
2.1972	2.1983	2.1994	2.2005
2.2048	2.2058	2.2069	2.2079
2.2126	2.2139	2.2152	2.2165
2.2217	2.2229	2.2242	2.2255
2.2306	2.2318	2.2331	2.2343
2.2393	2.2405	2.2418	2.2430
2.2479	2.2491	2.2504	2.2516
2.2564	2.2576	2.2588	2.2600
2.2648	2.2660	2.2671	2.2683
2.2730	2.2742	2.2753	2.2765
2.2811	2.2823	2.2834	2.2846
2.2891	2.2903	2.2914	2.2925
2.2970	2.2981	2.2992	2.3003
2.3048	2.3059	2.3070	2.3081
2.3124	2.3135	2.3146	2.3157
2.3200	2.3211	2.3222	2.3232
2.3275	2.3285	2.3296	2.3306
2.3348	2.3359	2.3369	2.3380
2.3421	2.3431	2.3442	2.3452
2.3493	2.3503	2.3513	2.3523
2.3564	2.3574	2.3584	2.3594
2.3634	2.3644	2.3654	2.3664
2.3703	2.3713	2.3723	2.3733
2.3771	2.3781	2.3791	2.3801
2.3839	2.3849	2.3858	2.3868
2.3906	2.3915	2.3925	2.3934
2.3972	2.3981	2.3991	2.4000
2.4037	2.4046	2.4056	2.4065
2.4102	2.4111	2.4120	2.4129
2.4165	2.4174	2.4183	2.4192
2.4228	2.4237	2.4246	2.4255
2.4291	2.4300	2.4309	2.4317
2.4353	2.4361	2.4370	2.4379
2.4414	2.4422	2.4431	2.4440
2.4474	2.4483	2.4491	2.4500
2.4534	2.4543	2.4551	2.4560
2.4593	2.4602	2.4610	2.4619
2.4652	2.4660	2.4669	2.4677
2.4710	2.4718	2.4727	2.4735
2.4768	2.4776	2.4784	2.4792
2.4825	2.4833	2.4841	2.4849
2.4881	2.4889	2.4897	2.4905
2.4937	2.4945	2.4953	2.4961
2.4992	2.5000	2.5008	2.5016
2.5047	2.5055	2.5063	2.5070
2.5101	2.5109	2.5117	2.5124
2.5155	2.5163	2.5170	2.5178
2.5209	2.5216	2.5224	2.5231
2.5261	2.5269	2.5276	2.5284
2.5314	2.5321	2.5329	2.5336
2.5366	2.5373	2.5381	2.5388
2.5417	2.5425	2.5432	2.5439
2.5468	2.5476	2.5483	2.5490
2.5519	2.5526	2.5533	2.5541
2.5569	2.5576	2.5584	2.5591
2.5619	2.5626	2.5633	2.5640
2.5668	2.5675	2.5682	2.5689
2.5717	2.5724	2.5731	2.5738
2.5766	2.5773	2.5780	2.5787

2.5814 2.5821 2.5828 2.5835 2.5842 2.5848 2.5855
2.5862 2.5869 2.5876 2.5882 2.5889 2.5896 2.5903
2.5909 2.5916 2.5923 2.5930 2.5936

***** EXISTING CONDITIONS

***** BASIN A - ON-SITE - ENTIRE SUBDIVISION

COMPUTE NM HYD ID=2 HYD NO=200.00 AREA=0.0078 SQ MI
PER A=100.00 PER B=0.00 PER C=0.00 PER D=0.00
TP=0.133 HR MASS RAINFALL=-1

K = .162561HR TP = .133000HR K/TP RATIO = 1.222262 SHAPE CONSTANT, N = 2.911962
UNIT PEAK = 16.102 CFS UNIT VOLUME = .9988 B = 274.56 P60 = 1.9000
AREA = .007800 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 200.00

RUNOFF VOLUME = .45191 INCHES = .1880 ACRE-FEET
PEAK DISCHARGE RATE = 6.68 CFS AT 1.533 HOURS BASIN AREA = .0078 SQ. MI.

***** BASIN C - OFF-SITE FROM WEST

COMPUTE NM HYD ID=3 HYD NO=300.00 AREA=0.0153 SQ MI
PER A=90.00 PER B=0.00 PER C=7.00 PER D=3.00
TP=0.133 HR MASS RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.8162 CFS UNIT VOLUME = .9934 B = 526.28 P60 = 1.9000
AREA = .000459 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .158477HR TP = .133000HR K/TP RATIO = 1.191554 SHAPE CONSTANT, N = 2.980491
UNIT PEAK = 31.270 CFS UNIT VOLUME = .9993 B = 280.23 P60 = 1.9000
AREA = .014841 SQ MI IA = .62835 INCHES INF = 1.60938 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=3 CODE=1

HYDROGRAPH FROM AREA 300.00

RUNOFF VOLUME = .53714 INCHES = .4383 ACRE-FEET
PEAK DISCHARGE RATE = 14.84 CFS AT 1.533 HOURS BASIN AREA = .0153 SQ. MI.

***** DEVELOPED CONDITIONS

***** BASIN A - ON-SITE

COMPUTE NM HYD ID=4 HYD NO=400.00 AREA=0.0078 SQ MI
PER A=0.00 PER B=59.00 PER C=0.00 PER D=41.00
TP=0.133 HR MASS RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 12.654 CFS UNIT VOLUME = .9985 B = 526.28 P60 = 1.9000
AREA = .003198 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .130466HR TP = .133000HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599935
UNIT PEAK = 11.334 CFS UNIT VOLUME = .9991 B = 327.55 P60 = 1.9000
AREA = .004602 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=4 CODE=1

HYDROGRAPH FROM AREA 400.00

RUNOFF VOLUME = 1.36940 INCHES = .5697 ACRE-FEET
PEAK DISCHARGE RATE = 15.18 CFS AT 1.500 HOURS BASIN AREA = .0078 SQ. MI.

***** BASIN B - 82ND ST

COMPUTE NM HYD ID=5 HYD NO=500.00 AREA=0.0023 SQ MI
PER A=0.00 PER B=11.00 PER C=0.00 PER D=89.00
TP=0.133 HR MASS RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 8.0999 CFS UNIT VOLUME = .9981 B = 526.28 P60 = 1.9000
AREA = .002047 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .130466HR TP = .133000HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599935
UNIT PEAK = .62309 CFS UNIT VOLUME = .9790 B = 327.55 P60 = 1.9000

AREA = .000253 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=5 CODE=1

OUTFLOW HYDROGRAPH RESERVOIR 500.00

RUNOFF VOLUME = 2.17199 INCHES = .2664 ACRE-FEET
PEAK DISCHARGE RATE = 6.17 CFS AT 1.500 HOURS BASIN AREA = .0023 SQ. MI.

***** SAGE ROAD SURFACE FLOW

COMPUTE NM HYD ID=6 HYD NO=600.00 AREA=0.00189 SQ MI
PER A=0.00 PER B=16.00 PER C=0.00 PER D=84.00
TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 6.2679 CFS UNIT VOLUME = .9976 B = 526.28 P60 = 1.9000
AREA = .001588 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .130761HR TP = .133300HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599930
UNIT PEAK = .74307 CFS UNIT VOLUME = .9822 B = 327.55 P60 = 1.9000
AREA = .000302 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=6 CODE=1

HYDROGRAPH FROM AREA 600.00

RUNOFF VOLUME = 2.08839 INCHES = .2105 ACRE-FEET
PEAK DISCHARGE RATE = 4.92 CFS AT 1.500 HOURS BASIN AREA = .0019 SQ. MI.

***** BASIN C - OFF-SITE FROM WEST

COMPUTE NM HYD ID=7 HYD NO=700.00 AREA=0.0153 SQ MI
PER A=0.00 PER B=60.00 PER C=0.00 PER D=40.00
TP=0.133 HR MASS RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 24.217 CFS UNIT VOLUME = .9990 B = 526.28 P60 = 1.9000
AREA = .006120 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .130466HR TP = .133000HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599935
UNIT PEAK = 22.608 CFS UNIT VOLUME = .9997 B = 327.55 P60 = 1.9000
AREA = .009180 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=7 CODE=1

HYDROGRAPH FROM AREA 700.00

RUNOFF VOLUME = 1.35267 INCHES = 1.1038 ACRE-FEET
PEAK DISCHARGE RATE = 29.53 CFS AT 1.500 HOURS BASIN AREA = .0153 SQ. MI.

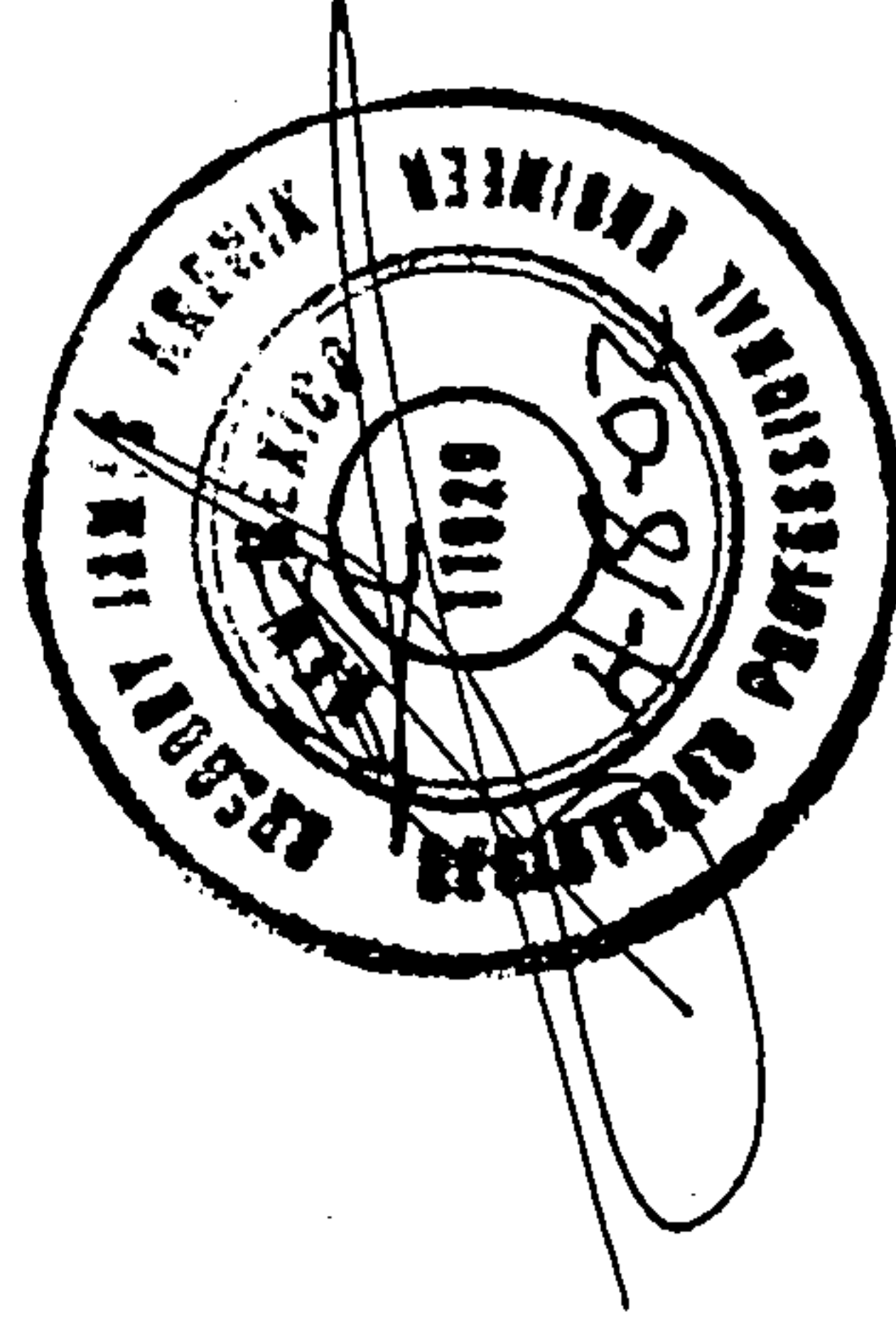
FINISH

NORMAL PROGRAM FINISH

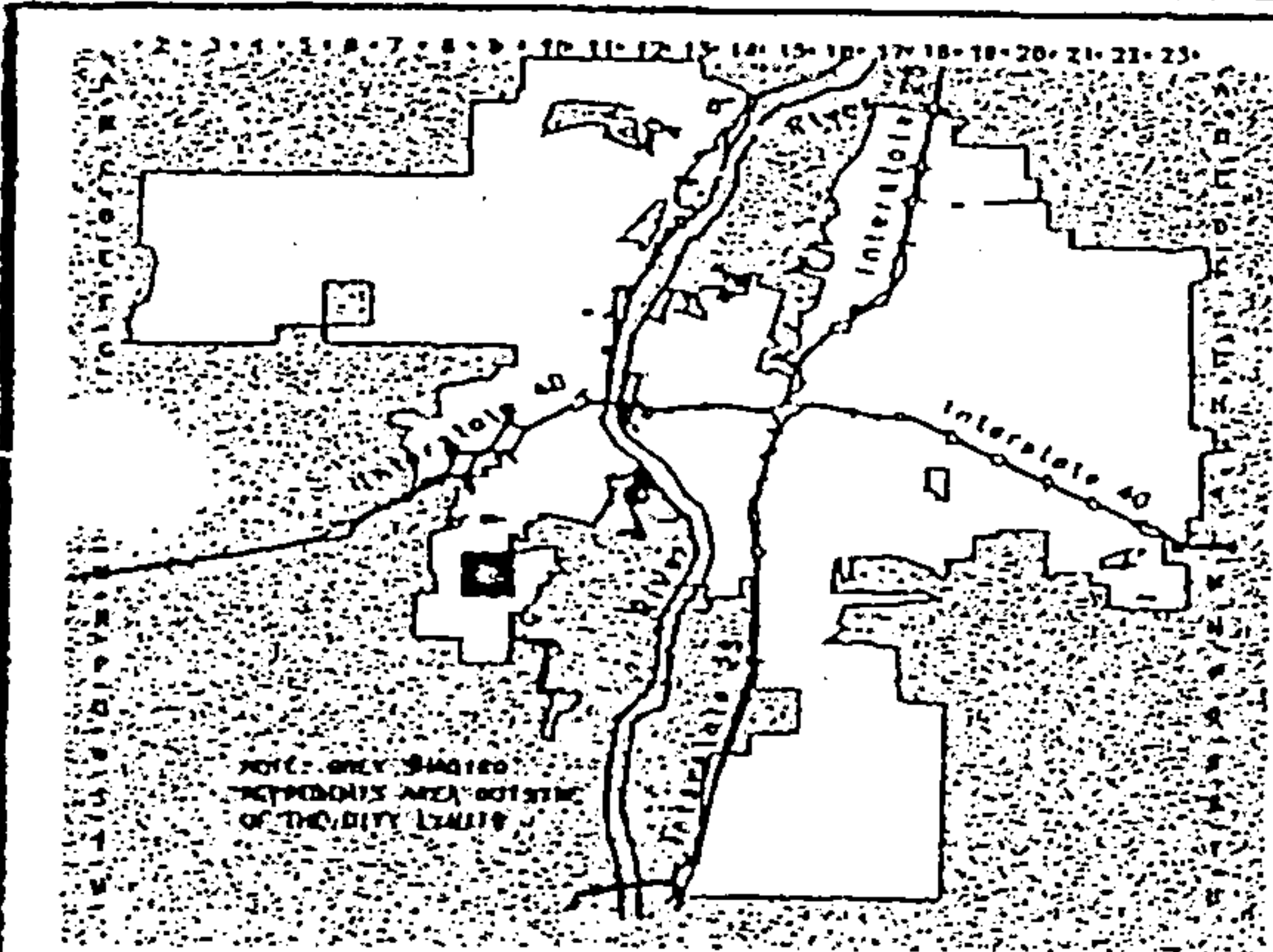
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EXCERPT FROM
SAGE ROAD CAPACITY CALCULATIONS

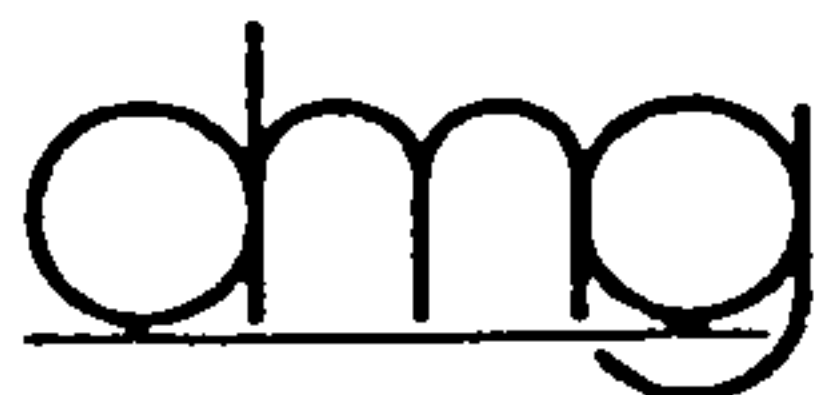
SAGE ROAD SW
CAPACITY CALCULATIONS



D. MARK GOODWIN & ASSOCIATES



Map Amended through July 18, 2001



D. Mark Goodwin & Associates, P.A.
Consulting Engineers

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PROJECT SAGE POINTE SUBD.
SUBJECT SAGE ROAD CAPACITY.
BY GJK DATE 4-18-02
CHECKED _____ DATE _____
SHEET 1 OF _____

THIS REPORT OR VERIFICATION OF SAGE ROAD CAPACITY WAS REQUESTED BECAUSE OF THE "LA MESILLA SUBDIVISION" REPORT (L9-D5) PREPARED BY BOHANNAN HUSTON, INC 2-19-02.

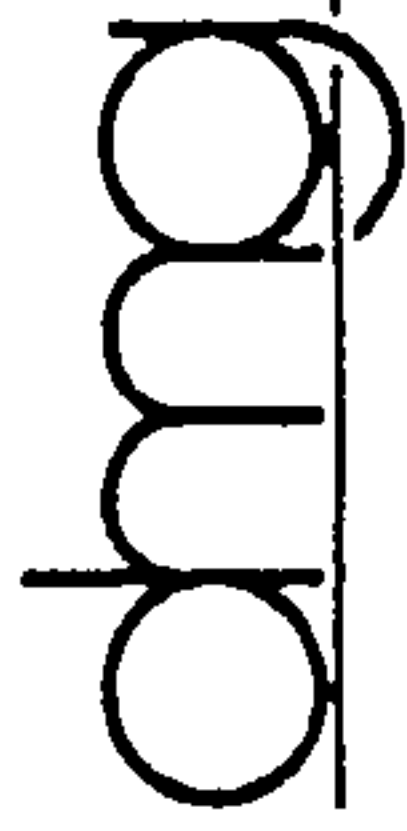
- THE LMS REPORT STATES THAT 216 CFS IS IN SAGE ROAD JUST WEST OF 86TH STREET. AND THAT 145 CFS CONTINUES EAST THUS EXCEEDING THE CAPACITY OF SAGE ROAD.
- THIS REPORT WILL SHOW THAT SAGE ROAD HAS CAPACITY USING THE SAME INFORMATION.
- THE LMS REPORT REFERENCES THE SAD 222 DRAINAGE ANALYSIS.
- THE EXPLANATION FOR THE DIFFERENCE IN FLOW IN SAGE ROAD IS THEY ADDED RETAINED FLOWS FROM TR X AND S3-D.

REFER TO SCENARIO "A" SHEET 4 AND DRAINAGE MAP

AREA DRAINING TO RETENTION POND	FLOW (CFS)
WESTVIEW TOWNHOMES ADDN.	58.2
TR. X	2.7
S3-D1	43.88 *
LOT 16	0.5
LOT 26	0.5
LOT 27	0.5
S4-D	58.4
TOTAL	164.68

AREA DRAINING TO SAGE ROAD OR 90 TH ST	FLOW (CFS)
TR A	14.2
S2-D	35.0
S3-D2	16.03 *
S3-D3	10.68 *
S3-D4	5.34 *
S3-D5	38.53 *

* SUM OF S3-D = 114.46 CFS $\approx$ 114.47 PER REPORT



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PROJECT SAGE POINTE SUBD.
SUBJECT SAGE ROAD CAPACITY
BY GJK DATE 4-18-02
CHECKED _____ DATE _____
SHEET 2 OF _____

TR 49	
TR 39	
TR 29	
TR 19	
<u>TOTAL</u>	

3.3
3.3
6.5
3.3
<u>136.18</u>

THE 136.18 CFS IS THE FLOW IN SAGE ROAD WEST OF 86TH ST.

AREA DRAINING TO 86TH ST

TR 1	
TR 2	
TR 3	
TR 4	
<u>TOTAL</u>	

FLOW (CFS)
3.3
3.3
3.3
6.5
<u>16.40</u>

THE 16.4 CFS IS THE FLOW IN 86TH ENTERING SAGE ROAD FROM THE NORTH.

- TOTAL FLOW = $144.68 + 136.18 + 16.40$
= 317.26 CFS $\approx$ 317.0 CFS FROM SCENARIO "A"

- PER THE REPORT 93.0 CFS TURNS SOUTH ON 86TH ST.

- FLOW IN SAGE ROAD JUST EAST OF 86TH

$$= 136.18 - 93.00 + 16.40$$

= 59.58 CFS THIS IS MUCH LESS THAN THE 145 CFS PER THE REPORT.

- FIND CAPACITY OF SAGE ROAD

$$d = 0.67$$

$$WP = 29.92$$

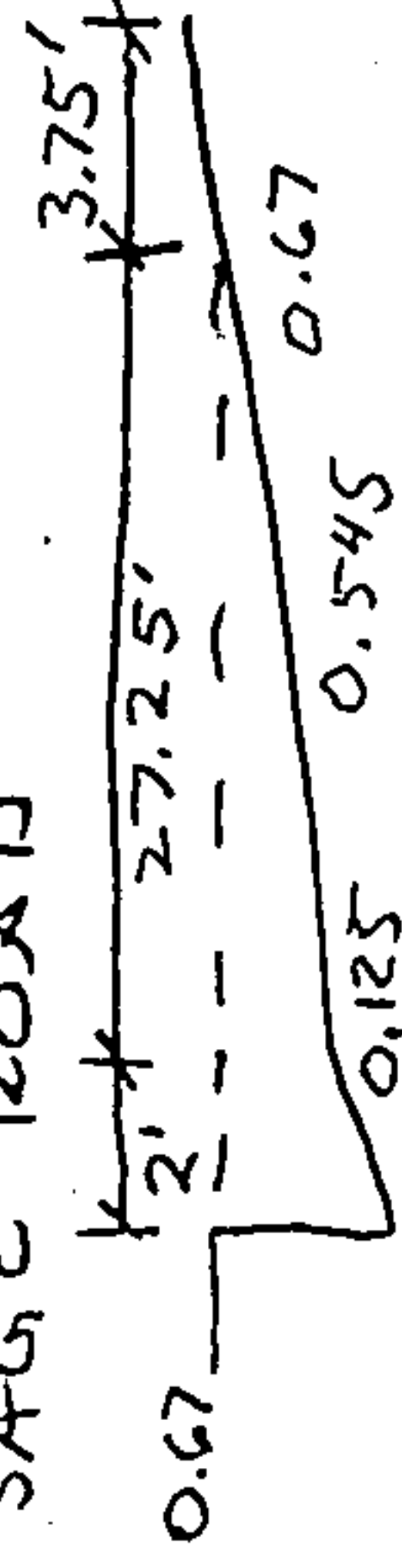
$$A = 8.64$$

$$V_{1/2} = 3.44 \text{ F/S}$$

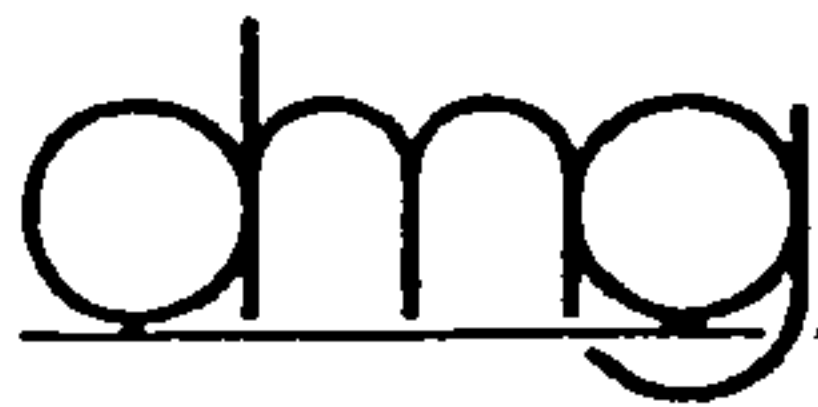
$$Q_{1/2} = 29.73 \text{ CFS} \approx 59.58 / 2 = 29.79 \text{ CFS} \quad \text{OK}$$

$$d + V^2 / 2g = 0.85 < 0.87 \quad \text{OK}$$

SAGE ROAD WORKS AT THIS POINT WITH FULL SECTION



$$S = 0.812\%$$
$$n = 0.017$$



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PROJECT SAGE POINTE SUBD.
SUBJECT SAGE ROAD CAPACITY
BY GTK DATE 4-18-02
CHECKED _____ DATE _____
SHEET 3 OF _____

- THE BUILD OUT CALLS FOR A STORMMAIN IN SAGE ROAD TURNING NORTH ON 86TH ST AND CONNECTING TO THE STORMMAIN IN SAN YGNACIO.

ONCE THIS IS IN PLACE THE FLOW IN SAGE ROAD EAST OF 86TH ST IS ZERO BECAUSE OF INLETS REMOVING THE FLOW. A SUMP INLET WILL BE AT THE NW CORNER OF THE INTERSECTION.

THE STORMMAIN EAST IN SAGE ROAD IS TO HAVE ITS FIRST INLET AT 82ND STREET. THIS CONTINUES EAST WHERE IT WILL CONNECT WITH FUTURE UNSER BLVD FLOWS AND CONTINUE EAST AND TIE INTO THE EXISTING STORMMAIN IN FRONT OF THE ROLLING HILLS SUBDIVISION JUST WEST OF THE AMOLE.

- PER THE REPORT THE EXISTING 145 CFS FROM THAT REPORT IS CONTAINED IN THE EXISTING ROW. (PAGES 5+6) FLOWS DO NOT CROSS EITHER ROW LINE, THEY DO NOT ENTER PROPERTY TO THE NORTH OR SOUTH.

SINCE THIS REPORT REDUCES THE FLOW IN SAGE ROAD THE SAME CONDITIONS EXIST. THE FLOW STAYS WITHIN THE ROW AND DOES NOT ENTER PRIVATE PROPERTY.



EXCERPT FROM
TOWER/SAGE DRAINAGE MASTER PLAN

CITY OF ALBUQUERQUE
NEW MEXICO

AMOLE DEL NORTE
STORM DRAINAGE FACILITIES

TOWER/SAGE
DRAINAGE MASTER PLAN

APRIL 1995

REVISED OCTOBER 1997

Prepared By

ANDREWS, ASBURY & ROBERT, INC.
149 Jackson Street, N.E.
Albuquerque, New Mexico 87108

TABLE 2
TOWER/SAGE DRAINAGE MASTER PLAN
AHYMO BASIN PARAMETER WORKSHEET
PEAK BASIN FLOWS AND VOLUMES

(ALL FLOWS & VOLUMES INCLUDE A 5% BULKING FACTOR)

														10 YEAR		100 YEAR	
BASIN	AREA		LENGTH (ft.)	ELEV. DIFF. (ft.)	SLOPE (%)	K	VEL (fps)	T(c) (hr.)	T(p) (hr.)	LAND TREATMENT				PEAK FLOW (6hr.) (cfs)	RUNOFF VOLUME (24hr.) (ac.ft.)	PEAK FLOW (6hr.) (cfs)	RUNOFF VOLUME (24hr.) (ac.ft.)
	(ac.)	(sq.mi.)								(%)							
										A	B	C	D				
S5-D	15.2	0.0238	400 1000	6.0 4.0	1.50 0.40	3.0 3.0	3.67 1.90	0.03 <u>0.15</u> 0.18	0.02 <u>0.10</u> 0.12								
		TOTAL =									41		59	33	1.3	56	2.3
S6-D	24.2	0.0378	400 400 200 1100	1.0 1.0 2.0 5.0	0.25 0.25 1.00 0.45	1.0 3.0 3.0 3.0	0.50 1.50 3.00 2.02	0.22 0.07 0.02 <u>0.15</u> 0.47	0.15 0.05 0.01 <u>0.10</u> 0.31								
		TOTAL =									40		60	32	2.2	55	3.7
S7-D	36.5	0.0570	400 950 650	2.0 1.0 3.0	0.50 0.11 0.46	1.0 2.0 2.0	0.71 0.65 1.36	0.16 0.41 <u>0.13</u> 0.70	0.10 0.27 <u>0.09</u> 0.46								
		TOTAL =									29		71	43	3.7	70	6.2
S8-D	43.7	0.0683	400 1000 1100	2.0 1.0 6.0	0.50 0.10 0.55	1.0 3.0 3.0	0.71 0.95 2.22	0.16 0.29 <u>0.14</u> 0.59	0.10 0.20 <u>0.09</u> 0.39								
		TOTAL =									37		63	52	4.1	87	6.8
S9-D	47.9	0.0748	300 950 1150	10.0 9.0 33.0	3.33 0.95 2.87	1.0 3.0 3.0	1.83 2.92 5.08	0.05 0.09 <u>0.06</u> 0.20	0.03 0.06 <u>0.04</u> 0.13								
		TOTAL =									50		50	94	3.7	166	6.5

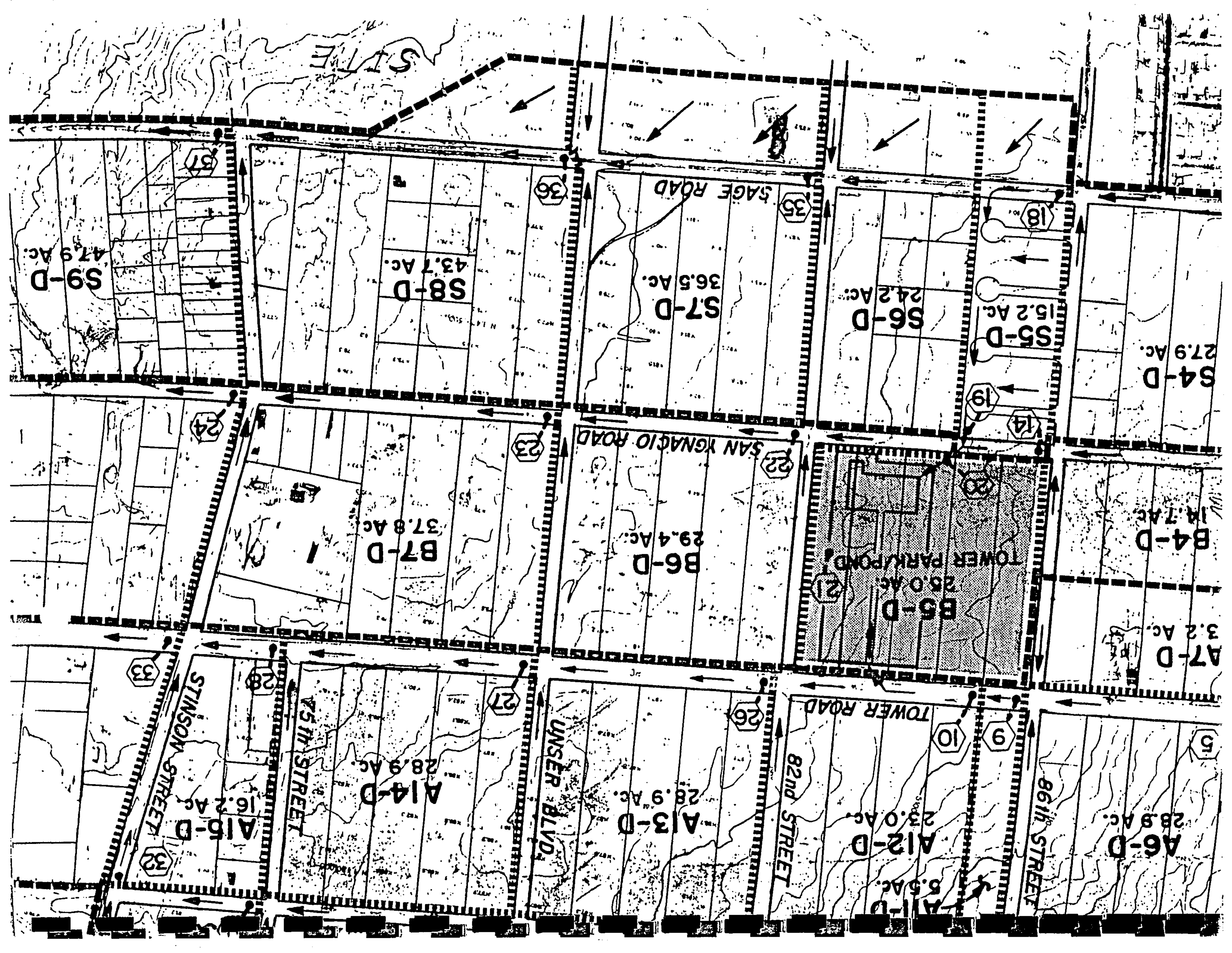
SEE MAP NO. 2 FOR BASIN IDENTIFICATION

TABLE 3
TOWER/SAGE DRAINAGE MASTER PLAN
SUMMARY OF PEAK DISCHARGES
AND PEAK VOLUMES

(ALL FLOWS INCLUDE A 5% BULKING FACTOR)

ANALYSIS POINT	Q(10) (6hr.) (cfs)	V(10) (24hr.) (ac.ft.)	Q(100) (6hr.) (cfs)	V(100) (24hr.) (ac.ft.)
1	70	3.2	112	5.2
2	126	5.7	204	9.4
3	179	8.3	292	13.7
4	244	11.4	397	18.8
5	298	14.0	490	23.2
6	73	3.7	119	6.1
7	78	4.2	132	7.0
8	86	4.7	147	7.9
9	445	22.0	748	36.8
10	457	22.6	766	37.8
11	35	1.5	58	2.4
12	77	3.5	132	5.8
13	118	5.6	211	9.6
14	142	6.8	252	11.6
15	46	1.9	77	3.2
16	65	2.7	109	4.6
17	132	5.5	228	9.6
18	185	8.0	318	13.8
19	33	1.3	56	2.3
20	345	16.5	599	27.7
21	820	39.3	1414	67.2
22	23	39.3	25	67.2
23	59	42.1	90	71.9
24	111	45.8	178	78.1
25	151	50.2	250	85.9
26	56	2.5	91	4.1
27	104	5.2	170	8.7
28	127	8.2	207	13.5
29	14	0.5	24	0.9
30	22	1.1	39	1.9
31	24	1.7	46	3.0
32	30	2.1	57	3.7
33	180	11.7	303	19.6
34	217	14.9	368	25.2
35	32	2.2	55	3.7
36	71	5.9	118	9.8
37	120	9.9	201	16.7
38	149	13.7	251	23.2
39	58	2.4	96	4.0
40	83	3.6	138	5.9
41	124	5.4	199	8.9
42	48	2.1	77	3.4
43	171	7.5	276	12.3
44	175	8.0	283	13.2
45	36	1.5	55	2.5

NOTE: SEE MAP NO. 2 FOR LOCATION OF ANALYSIS POINTS



CALCULATIONS FOR
DESERT SAGE, UNIT 3



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PROJECT DESERT SAGE UNIT 3
SUBJECT _____
BY AMY DATE 1/14/03
CHECKED _____ DATE 3/26/03
SHEET 1 OF 1

DETERMINE FLOWS

BASIN A
 $A = 5.005/AC = 218,022 SF = 0.0078 SP MI$ SIZE OF SITE

IMPERVIOUS AREA

$PAD = 33 \times 47 = 1551 SF$

$1551 \times 32 = 49,632 SF$

ROAD (ROW: 46 FT THROAT, 45' RAD)

PAVEMENT: $28 + 5.25 = 33.25$ NOT ACCURATE w/ CURB RETURNS

→ w/ CURB RETURN AVG = 60 FT x 37 FOR THROAT
= 1850

$1850 \times 4 = 7400 SF$

$\left(\frac{\pi D^2}{4}\right) 4 = \pi 90^2 = 25,447 SF$

SAGE IS MINOR ARTERIAL = 86 FT ROW AND 66 ROAD w/ MEDIAN

WE ARE ADDING 6' BIKE LANE FOR 92'

$\frac{66 - 4 + 6}{2} = 35$ FOR CURB HALF, 5' PAST CURRENT ROW

$11.5 \times 204 = 1020$

TOTAL PAVE = $7400 + 25,447 + 1020 = 33,867$

TOTAL PAVE + RD = $49,632 + 4800 + 33,867 = 88,299 SF$

$\%D = \frac{88,299}{218,022} = 41\%$

$\%B = 59\%$

PER ATHMO EXIST. = 6.68 CFS
ON-SITE DEV = 15.18 CFS

$V = 0.5697 AC-FT = 24,816 CF$

BASIN C

OFF-SITE FLOWS ARE COMING TOWARDS SUBDIVISION FROM WEST
HOWEVER, OUR WALL WILL DRIVE IT SOUTH TO SAGE

THIS OFF-SITE AREA = $10671 \times 400 = 426,800 SF = 0.0153 SP MI = 9.8 A$

IMPERV. = $160 \times 80 = 12,800 SF$

DEVELOPED
UNDEVELOPED

$\%D = 40\%$

$\%D = 3\%$

$\%B = 60\%$

$\%C = 7\%$

$\%A = 90\%$ USE $t_p = 0.133$

PER ATHMO $Q = 14.84 CFS (UND)$ AND $Q = 29.53 CFS (DEV)$

BASIN B

- 82nd ST (ENTIRE ST)

60' ROW → $40 + 5.25 + 2(4) = 53.25$

$A_p = 1067 \times 53.25 = 56,818$

$A_t = 1067 \times 60 = 64,020 = 1.48 AC = 0.0023 SP MI$

→ 89% D + 11% B USE $t_p = 0.133$

PER ATHMO $Q = 6.17 CFS$ $V = 2664 AC-FT = 11,604 CF$



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PROJECT DESERT SAGE UNIT 3
SUBJECT _____
BY Amy DATE 4/1/03
CHECKED _____ DATE _____
SHEET 24 OF _____

SUMMARY OF FLOWS

OUR SITE DEV = 15.2 CFS
82nd ST DEV = 6.2 CFS
PROP TO WEST DEV = 89.5 CFS
SURFACE FLOW IN SAGE = 4.9 CFS
55.8 CFS

TOWER/SAGE PLAN ALLOWS 55 CFS AT 82nd + SAGE
ADDITIONAL 0.8 CFS IS INSIGNIFICANT



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PROJECT DESERT SAGE, UNIT 3
SUBJECT _____
BY Amv DATE 1/23/03
CHECKED _____ DATE 4/2/03
SHEET 3 OF _____

SIZE RETENTION POND

1/2 BASIN B (80' x 50' ST)

$$Q = \frac{6.17}{2} = 3.09 \text{ cfs} \quad V = 11,604 \text{ CF} = 580 \text{ a} \quad C =$$

BASIN A (SITE)

$$Q = 15.18 \text{ cfs} \quad V = 24,867 \text{ CF}$$
$$Q = 18.27 \text{ cfs} \quad V = 30,618 \text{ CF}$$

$$V_{\text{NEEDED}} = 2 \times 30,618$$

$$= 61,236 \text{ CF} = 1.40 \text{ AC-FT}$$

USE LOTS 1, 2, 3 - V AVAILABLE

$$\begin{array}{rcl} 84 & 10,558 & & V(\text{CF}) \\ 74 & 360 & & \\ & & > 54,590 \end{array}$$

THUNDER VERSION - LOTS 1, 2, 3

$$\begin{array}{rcl} 83 & 65,907 & & \\ 72 & 356 & & \\ & & > 65,907 \text{ CF} > 61,236 \text{ CF} \quad \checkmark \end{array}$$
$$WSE = 82.2 \text{ ELEV}$$

SIZE SW CULVERT

NOT USED

$$Q = 18.27 \text{ cfs} \quad H = .67$$

$$L = \frac{Q}{2.95 H^{3/2}} = \frac{18.27}{2.95 (.67)^{1.5}} = \boxed{11.29} \text{ FT}$$

DETERMINE ST CAPACITY

$$\text{AREA PER ST} = 262 \times 61 = 15,982 \text{ SF} = 0.37 \text{ AC} \quad \leftarrow \text{EACH CUL-DESAC}$$

$$\text{FOR BASIN A} \quad \frac{15.18}{5,005 \text{ AC}} = 3.03 \frac{\text{CFS}}{\text{AC}}$$

$$0.37 \text{ AC} \times 3.03 \frac{\text{CFS}}{\text{AC}} = 1.121 \text{ CFS}$$

ST IS 28' FF

$$\text{PER HEC BAS MAX WSE} = 0.14$$

1/2 80' x 50' ST

$$\text{TRANS CONNG IN} = \frac{6.17}{2} + 15.18 = 21.35 \text{ cfs} \quad \text{ST IS 40' FF}$$
$$WSE = 0.47$$

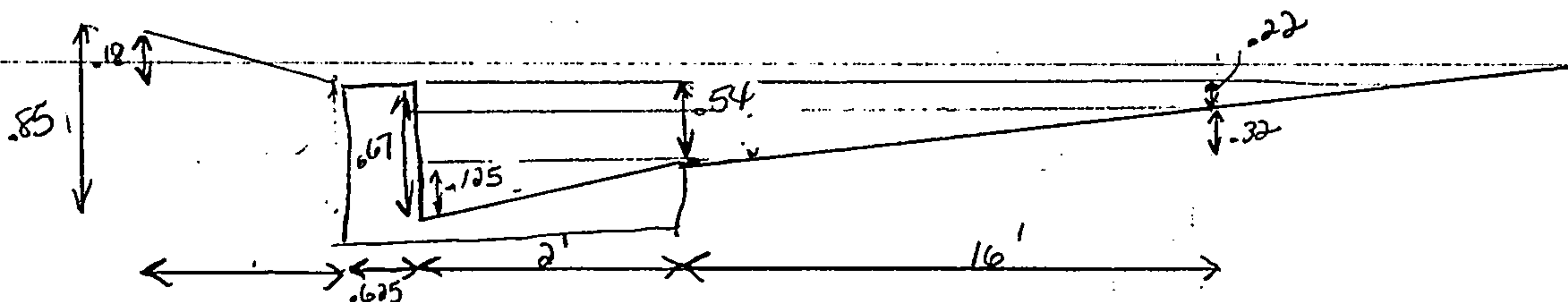
STREET CAPACITY OF SAGE

SAGE IS 86' ROW + AN ARTERIAL

ARTERIAL MUST HAVE 1 LANE OPEN FOR 10 VR STORM

SAGE ALSO HAS BIKE LANE

∴ SIZE ROAD FOR $12 + 6 = 18$ FT OPEN FROM FACE OF CURB FOR 10 YR STORM



X D = .67

$$A_{V2} = \frac{.125(2)}{2} + .54(2) + \frac{16(.32)}{2} + .22(16) = 7.29$$

$$wP_k = .67 + 2 + 16 = 18.67$$

$$R = \frac{7.29}{18.67} = 0.390$$

$$V = \frac{1.49 (0.39)^{2/3} \sqrt{0.008}}{1.49} = 4.19 \text{ FPS}$$

$$Q = vA = 4.19(7.29) = 30.53$$

$$d + \frac{v^2}{2g} = .67 + \frac{4.19^2}{2(32.2)} = .94$$

$$D = .32$$

$$A_{\frac{1}{2}} = \frac{.125(2)}{2} + \frac{.32(2)}{2} + \frac{16(-.22)}{2} = 3.32$$

$$WP_{\frac{1}{2}} = .32 + .125 + 2 + 16 = 18.45$$

$$R = \frac{3.32}{18.45} = 0.180$$

$$v = \frac{1.49 (180)^{2/3} \sqrt{.008}}{.017} = 2.50$$

$$Q = \sqrt{A} = 2.5(3.52) = 8.30 \leftarrow \frac{1}{2} \text{ ST}$$

$$d + \frac{v^2}{2g} = 0.32 + \frac{2.50^2}{64.4} = 0.42 < 0.85 \checkmark$$

$$4.92 + 3.09 = 8.01 < 8.30 \checkmark$$



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PROJECT DESALT SAGE, UNIT 3
SUBJECT _____
BY AMY DATE 1/23/03
CHECKED _____ DATE 4/2/03
SHEET 7 OF _____

STORM PIPE IN SAGE BEFORE 82nd

PER TOWER / SAGE MASTER DRAINAGE PLAN, 30" PIPE
TO COME UP TO 82nd + SAGE

WE HAD TO ADD STORM DRAIN BEH TRACT WEST OF
OUR SITE NEEDS TO DISCHARGE.

BUT SAGE SURFACE CAN ONLY HOLD $8.30 \times 2 = 16.60$ CFS
FLOW FROM BASIN C = 29.53 CFS

MAX 18 IN CAN HOLD

$$Q = 0.6 A \sqrt{2gh} = 0.6 \left(\frac{\pi 1.5^2}{4} \right) \sqrt{2(32.2)(8)} \quad h = 8 \text{ ASSUMED}$$
$$= 124.06 \text{ CFS}$$

STORM PIPE = 24.0 CFS

$$\text{SURFACE} = \underset{\text{(SUB)}}{5.53} + \underset{\text{(RAIN ON SAGE)}}{4.92} + \underset{\text{(82nd ST)}}{3.09} = 13.54 > 8.30 \quad \text{CAN ONLY HOLD 16.60 CFS}$$

→ GO TO 24" PIPE HOLDING 29.53 CFS
ADJUSTED SURFACE = $4.92 + 3.09 = 8.01 < 8.30$ ✓

STORM PIPE IN 82nd ST

BASIN A (SITE)	15.18 CFS
1/2 BASIN B (WEST)	3.08 CFS
	<u>18.26</u>

1/2 BASIN B (EAST)	3.08
	<u>21.34 CFS</u>

ASSUME $h = 8$

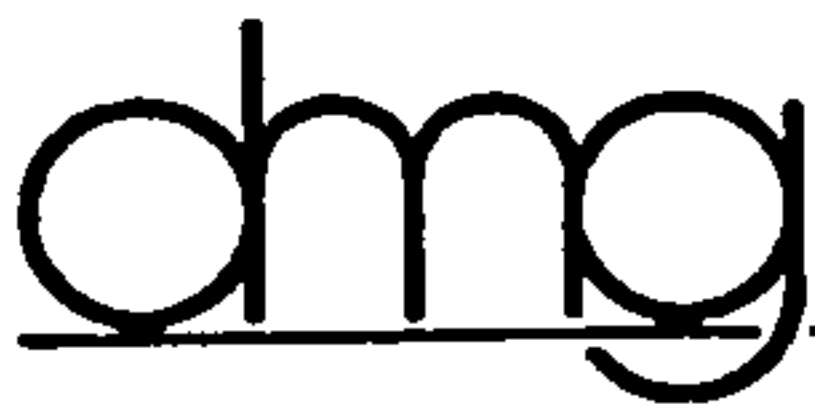
$$D = \sqrt{\frac{4(21.34)}{0.6\pi(2(32.2)(8))}} = 1.4 \text{ FT} = 16.9 \text{ IN} \rightarrow \text{USE 18 IN}$$

STORM PIPE IN SAGE AFTER OUR SITE FLOWS ADDED

$$18.26 + 29.53 = 47.79 \text{ CFS}$$

ASSUME $h = 10 \text{ FT}$

$$D = \sqrt{\frac{4(47.79)}{0.6\pi(2(32.2)(10))}} = 2.00 \text{ FT} = 23.99 \text{ IN} \rightarrow \text{USE 24" IN}$$



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PROJECT DESERT OASE, UNIT 3

SUBJECT _____

BY AMY DATE 1/23/03

CHECKED _____ DATE 4/6/03

SHEET 8 OF _____

SIZE INLET IN 82nd ST

WEST SIDE: SUMP CONDITION SD $Q = 2 \times 18.26 = 36.52$ CFS

~~SINGLE~~ A + C

SIDE = 2' AVG DEPTH = .719

FRONT = 6.5' WITH .896 AT GUTTER

$Q_{SIDE} = 3(2 \times 2)(.719)^{3/2} = 7.32$

$Q_{FRONT} = 3(3)(.896)^{3/2} = 17.63$

14.95 CFS

DOUBLE C

SIDE = 2' AVG DEPTH = .719

FRONT = 6.5' WIDTH = 0.896 AT GUTTER

$Q_{SIDE} = 3(2 \times 2)(.719)^{3/2} = 7.32$

$Q_{FRONT} = 3(6.5)(.896)^{3/2} = 16.54$

23.86

USE SINGLE A + DOUBLE C = $14.95 + 23.86 = 38.81 > 36.52$ ✓

FLOW IN SAGE FROM 86th TO 82nd

86' ROW

$\frac{6 + (32 - 3)}{43} = 84\% D$ FOR EACH HALF

48 FT X 1100 FT = 52,800 SF = 1.21 AC = 0.00189 SQ MI

FROM ATRIMO $Q = 4.92$ CFS

$\frac{4.92 \text{ CFS}}{1100 \text{ FT}} = 0.00447 \frac{\text{CFS}}{\text{FT}}$ OF SAGE

SINCE $\frac{1}{2}$ SAGE CAN HOLD 8.30 CFS NO INLETS
ARE NEEDED UP TO 82nd ST.

FLOW IN SAN YGNACIO

TOWER SAGE PLAN SAGE 2.5 CFS AT 82nd + SAN YGNACIO

SAN YGNACIO WS = 0.50

NO INLETS NEEDED

HEC-RAS Plan: Plan 01 River: street Reach: street

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Ch.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chm (ft/s)	Flow Area (sq ft)	Top Width (ft)	Friction f Ct
Street	300	21.40	0.00	0.47	0.47	0.58	0.007532	2.59	8.25	40.88	1.02
Street	500	21.40	0.00	0.47	0.47	0.60	0.006965	2.89	7.40	28.88	1.01

1/2 82nd ST

S=0.6%

40' FF ST Ctg

HEC-RAS Plan: Plan 01 River: street Reach: street

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Ch W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/m)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Ch
street	900	25.00	0.00	0.50	0.50	0.61	0.006962	2.69	9.28	40.93	1.00
street	500	25.00	0.00	0.50	0.50	0.65	0.006806	3.07	8.15	28.93	1.02

SAN YGNACIO WEST OF 82nd
 $S = 0.0047$
 40' FF ST Ctg

HEC-RAS Plan: Plan 01 River: street Reach: a

Reaches	River Sta	Q Total (cfs)	Min Ch E (ft)	W.S. Elev (ft)	CRWS Elev (ft)	EC Elev (ft)	EC Slope	Vel Channel (m/s)	Flow Area (sq ft)	Top Width (ft)	Flow Depth (ft)
1	900	1.12	0.00	0.14	0.14	0.17	0.011230	1.45	0.77	12.32	1.02
2	500	1.12	0.00	0.14	0.14	0.17	0.010923	1.44	0.78	12.39	1.01

28' FF MGS

S = 1.123%

CUL DE SAC

HEC-RAS Plan: Plan 01 River street Reach: a

Reach	River Sta	G Total (cfs)	Min Ch E (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Cmf (ft/s)	Flow Area (sq ft)	Top Width (ft)	Friction Coef
1	900	1.12	0.00	0.14	0.14	0.17	0.010923	1.44	0.78	12.39	1.01
2	500	1.12	0.00	0.14	0.14	0.17	0.010923	1.44	0.78	12.39	1.01

28' FF MCG
 $\delta = .765\%$
CEC DE SAC