CITY OF
Albuquerque

Martin J. Chávez, Mayor

November 14,1997

Joe Kelley
Chavez-Grieves Engineering
5639 Jefferson St. NE
Albuquerque, New Mexico 87109

RE: REVISED ENGINEER CERTIFICATION FOR HUD HOUSING PROJECT (JIO-D2L)
CERTIFICATION STATEMENT DATED 11/5/97

Dear Mr. Kelley:

Based on the information provided on your November 6,1997 resubmittal, Engineer Certification for the above referenced site is acceptable.

In view that the liner was designed and installed after the ponds where constructed ,and if for some unforseen reason the liner does not function as designed. The responsibility or liability will not be on the City of Albuquerque for acceptance of the Certification.

If I can be of further assistance, please feel free to contact me at 924-3986.

C: Andrew Garcia
John Wilger, Wilger Enterprises
File

Sincerely

Bernie J. Montoya CE
Associate Engineer

DRAINAGE INFORMATION

J-10/D21

PROJECT TITLE: HUD HOUSING ZONE ATLAS/DRNG. FILE #: ~~J-10/D17~~

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

LEGAL DESCRIPTION: A Portion of lot 2-B, tract n, unit 2, Atrisco Business Park

CITY ADDRESS: Los Volcanes Rd. NW

ENGINEERING FIRM: Chavez-Grieves CONTACT: Joe Kelley

ADDRESS: 5639 Jefferson NE PHONE: 344-4080

OWNER: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

ARCHITECT: Garrett Smith Ltd CONTACT: Jon Anderson

ADDRESS: _____ PHONE: 766-6968

SURVEYOR: Frostbauer Surveying CONTACT: Ron Forstbauer L.S.

ADDRESS: _____ PHONE: 268-2112

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

____ DRAINAGE REPORT

____ DRAINAGE PLAN

____ CONCEPTUAL GRADING & DRAINAGE PLAN

____ GRADING PLAN

____ EROSION CONTROL PLAN

__X__ ENGINEER'S CERTIFICATION

____ OTHER

PRE-DESIGN MEETING:

____ YES

__X__ NO

____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

____ PRELIMINARY PLAT APPROVAL

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

____ S. DEV. PLAN FOR BLDG. PRMT. APPROVAL

____ SECTOR PLAN APPROVAL

____ FINAL PLAT APPROVAL

____ FOUNDATION PERMIT APPROVAL

____ BUILDING PERMIT APPROVAL

__X__ CERTIFICATE OF OCCUPANCY APPROVAL

____ GRADING PERMIT APPROVAL

____ PAVING PERMIT APPROVAL

____ S.A.D. DRAINAGE REPORT

____ DRAINAGE REQUIREMENTS

____ OTHER

DATE SUBMITTED: Nov. 5, 1997

BY: Joe Kelley

RECEIVED
NOV 06 1997
HYDROLOGY SECTION

CHAVEZ · GRIEVES
CONSULTING ENGINEERS, INC.
THE ENGINEERING FIRM OF CHOICE

5639 JEFFERSON STREET NE · ALBUQUERQUE, NEW MEXICO 87109 · PHONE (505) 344-4080 · FAX (505) 343-8759

LETTER OF TRANSMITTAL

TO: C.O.A Hydrology DATE: 11-5-97

JOB #

RE: Los Volcanes Hsg

ATTN: Mr. Bernie Montoya

WE ARE SENDING YOU X ATTACHED ___ UNDER SEPARATE COVER, THE FOLLOWING ITEMS:

___SHOP DRAWINGS	___PLANS	___SPECIFICATIONS	___DISKETTE
___CHANGE ORDER	X PRINTS	___CALCULATIONS	___PROPOSAL INFO
___COPY OF LETTER	___SAMPLES	___REPORT	___ _____

COPIES	DATE	NO.	DESCRIPTION
1			Drainage Info.
1			As-built drawg.

THESE ARE TRANSMITTED AS CHECKED BELOW:

X FOR YOUR USE	X FOR REVIEW & COMMENT
___AS REQUESTED	___RETURNED AFTER LOAN TO US
___PLEASE CORRECT AND RESUBMIT	___SUBMIT___COPIES FOR DISTRIBUTION
___RESUBMITTAL IS NOT REQUIRED	___RETURN___CORRECTED PRINTS
CORRECTIONS, IF ANY, ARE NOTED	___BIDS/PROPOSALS DUE _____ 199_

REMARKS: Any questions please call.

RECEIVED
NOV 06 1997
HYDROLOGY SECTION

COPIES TO: Job File SIGNED: Bernie Cobau

IF ENCLOSURES ARE NOT AS NOTED, KINDLY NOTIFY US AT ONCE. *REV.9/95*

Wilger Enterprises, Inc.

June 20, 1996

Mr. Bernie Montoya
Development Review Engineer
Public Works Dept.
Hydrology Division
400 Marquette NW
Albuquerque, NM 87103

SUBJECT: 6800 LOS VOLCANOS. NW

Dear Mr. Montoya: JW

This is to inform you of our intent to install Permanent pond liners at the above referenced address within a time frame not to exceed two months from today's date.

With this in mind, I would ask that you grant the project a temporary certificate of occupancy as soon as possible.

Respectfully,

John Wilger

JW/kjt

cc: Garrett Smith
Tasso Chronis

30 day temp. 6/23/97

425 Edmon, NE • Albuquerque, New Mexico 87107 • (505) 345-2854 • FAX (505) 345-3202

GEO-TEST

MEMORANDUM

TO: Joe Kelley

FROM: C. Miller

DATE: 6/12/97

SUBJECT: Los Volcanes

cc:

Based on the information which you have provided to me, the earthwork performed for the project was not performed in accordance with our Geotechnical Investigation Report, File No. 1-51106, dated December 29, 1995. The Earthwork Specification in that report called for deep wetting and vibratory compaction treatment prior to foundation construction. Based on our conversations and documentation provided by you and Wilger Enterprises, this treatment was not performed. Geo-Test was not involved in the project after submitting our report, and we have not reviewed project documents.

If this is indeed correct, drainage issues become more vital. Ponding areas should be lined as indicated on the Grading Plan as soon as possible. In the mean time, temporary partial lining of the ponds with polyethylene or plastic liner material covered with decorative aggregate is acceptable so long as infiltration is precluded within 20 feet of any structure foundation. The ponds should be graded as much as possible to eliminate standing water and enhance the pumping of the water to the street, i.e., install the pump in a sump that drains the ponds.

Positive drainage adjacent to foundations is important, as outlined in our report. It should be verified that positive drainage away from foundations exists on the site and that existing or future sidewalks and landscaping do not inhibit positive drainage of roof runoff or natural precipitation.

We feel these are reasonable measures, however, since our original recommendations were apparently not followed, Geo-Test, Inc. will not accept responsibility or liability for future foundation performance, if this is indeed, the case.

GEO-TEST, INC.
3204 RICHARDS LANE
SANTA FE,
NEW MEXICO
87505
(505) 471-1101
FAX (505) 471-2245

8904 WASHINGTON, NE
ALBUQUERQUE,
NEW MEXICO
87113
(505) 857-0933
FAX (505) 857 0803

P O BOX 2487
LAS CRUCES,
N MEXICO
88
(505) 526-6260
FAX (505) 523-1660

CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.

5639 Jefferson Street NE, Albuquerque, New Mexico 87109 *Phone (505) 344-4080 - Fax (505) 343-8759*

TRANSMITTAL LETTER

TO: Mr. Charlie Miller, Geo-Test
8904 Washington NE

COPY TO: Mr. Ron Jacob, Garrett Smitth Ltd.
FAX NO.: 243-4508

COPY TO: Mr. Don Guarienti, Wilger Enterprises
FAX NO.: 345-3202

COPY TO: Mr. Bernie Montoya, City Hydrology
FAX NO: 924-3864

FROM: Joe Kelley

DATE: May 21, 1997

PROJECT NAME: Los Volcanes
PROJECT NO.: S60-100-5196

ITEMS TRANSMITTED:

1 Grading Plan

COMMENTS:

This project has been built in accordance with the attached grading plan, with the exception of the liner indicated in the ponds. HUD Housing doesn't have the money to install the liner at this time ($40,000), and the City had stated that they would not issue a Certificate of Occupancy until one is installed. So the Owner is stuck in a tough predicament.

The C.O. is needed this week, so City Hydrology (Bernie Montoya), the Architect (Garrett Smith), the Contractor (Wilger Enterprises), and Chavez-Grieves met today to attempt to resolve this. The City has agreed that they can live with rocks on plastic within 15' of the buildings adjacent to the ponding areas, as long as a sump pump is built into the northeast pond. The pump would automatically be activated at 2" or more of depth, and would pump the water up into the street. It was discussed at the meeting that this would be a viable solution because the water would have little effect if it was never allowed to stand more than 2" in depth. From the Contractor's observations on-site, the last 2" soaks in very quickly, and doesn't have much chance to evaporate. The Contractor has stated that he may be able to come up with some extra money as long as the solution is inexpensive.

It was also discussed that this solution to the problem might be fine as a permanent solution, or it may be that even this is not necessary--ponding is of no concern. If that is true, then the City would agree to whatever the geotechnical engineer identified as the permanent solution.

What do you recommend that is least expensive? What is the minimal amount of protection that will work?

They would like the C.O. this week, so we anxiously await your response.

Cy: Vic Chavez

****
*** RX REPORT ***
****

RECEPTION OK

TX/RX NO	5402
CONNECTION TEL	505 343 8759
SUBADDRESS	
CONNECTION ID	PRM
ST. TIME	05/21 15:09
USAGE T	00'37
PGS.	1
RESULT	OK

DRAINAGE INFORMATION

PROJECT TITLE: Los Volcanes HUD Housing ZONE ATLAS/DRNG. FILE #: J-10-Z/ZL

DRB#: 96-347 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: Lot 2-B, Tract N, Unit 2, Atrisco Business Park

CITY ADDRESS: Los Volcanes Road, SW

ENGINEERING FIRM: Chavez-Grieves CONTACT: Joe Kelley, P.E.

ADDRESS: 5639 Jefferson NE PHONE: 344-4080

OWNER: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

ARCHITECT: Garrett Smith Ltd CONTACT: Garrett Smith

ADDRESS: _____ PHONE: 766-6968

SURVEYOR: Forstbauer Surveying CONTACT: Ron Forstbauer, L.S.

ADDRESS: _____ PHONE: 268-2112

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT

___ DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAINAGE PLAN

___ GRADING PLAN

___ EROSION CONTROL PLAN

_X_ ENGINEER'S CERTIFICATION

___ OTHER

PRE-DESIGN MEETING:

___ YES

_X_ NO

___ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL

___ PRELIMINARY PLAT APPROVAL

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

___ S. DEV. PLAN FOR BLDG. PRMT. APPROVAL

___ SECTOR PLAN APPROVAL

___ FINAL PLAT APPROVAL

___ FOUNDATION PERMIT APPROVAL

___ BUILDING PERMIT APPROVAL

_X_ CERTIFICATE OF OCCUPANCY APPROVAL

___ GRADING PERMIT APPROVAL

___ PAVING PERMIT APPROVAL

___ S.A.D. DRAINAGE REPORT

___ DRAINAGE REQUIREMENTS

___ OTHER _____ (SPECIFY)

DATE SUBMITTED: June 9, 1997

BY: Joe P. Kelley, P.E.

Printed June 16, 1997 (8:30am)

CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.

5639 Jefferson Street NE, Albuquerque, New Mexico 87109 *Phone (505) 344-4080 - Fax (505) 343-8759*

FAX TRANSMITTAL LETTER

TO: Mr. Bernie Montoya, City Hydrology
FAX NO: 924-3864

TO: Mr. John Wilger
FAX NO: 345-3202

TO: Mr. Garrett Smith
FAX NO: 243-4508

FROM: Joe Kelley

DATE: June 16, 1997

PROJECT NAME: Los Volcanes
PROJECT NO.: S60-100-5196

NO. PAGES: 2

COMMENTS:

Attached is a copy of the geotechnical engineer's assessment of the detention ponds' effect on this project. He has agreed to the temporary pump and partial lining as previously discussed with the City, with the provision that the lining be increased to 20' from the buildings, not 15'.

These measures should be sufficient for a certificate of occupancy, and meet the requirements we had previously agreed upon.

We submitted the engineer's certification for the certificate of occupancy on June 9, and would appreciate it if the City could at least issue a temporary C.O., as there are residents who have sold homes and are needing to move in.

Please call if you have any questions, as we want to help in any way we can to get these people into their homes.

Cy: Vic Chavez

CITY OF
Albuquerque
Public Works Department

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

April ,1997

Joe Kelley, PE
Chavez-Grieves
5639 Jefferson NE
Albuquerque, New Mexico 87109

RE : REVISED DRAINAGE PLAN FOR LOS VOLCANES HUD HOUSING (J10-D2L)
REVISION DATED 3/14/97

Dear Mr. Kelley:

Based on the information provided on your March 18,1997 resubmittal, listed are some concerns that will need to be addressed prior to final approval:

1. No ponding is allowed within 15' from planned or existing structures unless a soils report is provided allowing the closeness of the pond. Also, no closer than 15' from the property line minus the required setback on the adjacent property. For ponds 18" deep or less, water may be impounded adjacent to street R/W but not closer than 10' from pavement. For pond deeper than 18", water shall not pond closer than 15' to the street pavement or curb and gutter.

2. Please install an overflow system on the Northwest ponding area.

If I can be of further assistance, please feel free to contact me at 924-3986.

C: Andrew Garcia
File

Sincerely

Bernie J. Montoya CE
Engineering Associate

THE ENGINEERING FIRM OF CHOICE

CHAVEZ · GRIEVES
CONSULTING ENGINEERS, INC.

5639 JEFFERSON STREET NE · ALBUQUERQUE, NEW MEXICO 87109 · PHONE (505) 344·4080 · FAX (505) 343·8759

June 9, 1997

Mr. Bernie Montoya, C.E.
City of Albuquerque Hydrology Department
Plaza del Sol Building
P.O. Box 1293
Albuquerque, NM 87103

RE: DRAINAGE PLAN FOR LOS VOLCANES HUD HOUSING (J10/D26)
C-G PROJECT NO. S60-100-5196

Dear Mr. Montoya:

The attached plan is being submitted for certificate of occupancy approval. Per our meeting of May 21, 1997 we are providing a temporary/long term drainage measure for certificate of occupancy approval. The Contractor is landscaping within 15' of all buildings with landscaping rock on plastic, and is providing a sump pump in the northeast pond that will automatically pump storm runoff into Los Volcanes Road whenever the pond begins to fill with water.

We have been corresponding with the geotechnical engineer to determine what will be acceptable for a permanent solution, but have not yet been able to reach agreement. If it is found that the pump is not necessary, we will apprise you prior to its removal.

Please call should there be any questions.

Sincerely,

CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.

Joe Kelley

Joe P. Kelley, P.E.
Senior Engineer

Cy: Garrett Smith
John Wilger
Vic Chavez

G:\S60\100\DOCUMENT\MONTOYA.WPD

CITY OF
Albuquerque
Public Works Department

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

April 18,1997

Joe Kelley
Chavez-Grieves Consulting Engineers
5639 Jefferson St. NE
Albuquerque, New Mexico 87109

RE: REVISED DRAINAGE PLAN FOR LOS VOLCANES HUD HOUSING (J10-D2L)
REVISION DATED 4/8/97

Dear Mr. Kelley:

Based on the information provided on your April 10,1997 resubmittal, the above referenced site is approved for Building Permit.

Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

Also, prior to Certificate of Occupancy release, the following must be addressed:

1. Engineer Certification per the DPM checklist will be required. The SO19 will be required at the time of connection.

2. Also, when the outfall becomes available it will be the responsibility of HUD to make the connection and provide our department a revised plan identifying which ponds will be deleted and how the drainage within the site will function.

If I can be of further assistance, please feel free to contact me at 924-3986.

C: Andrew Garcia
File

Sincerely

Bernie J. Montoya CE
Engineering Associate

CITY OF
Albuquerque
Public Works Department

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

April 18,1997

Joe Kelley
Chavez-Grieves Consulting Engineers
5639 Jefferson St. NE
Albuquerque, New Mexico 87109

RE: REVISED DRAINAGE PLAN FOR LOS VOLCANES HUD HOUSING (J10-D2L)
REVISION DATED 4/8/97

Dear Mr. Kelley:

Based on the information provided on your April 10,1997 resubmittal, the above referenced site is approved for Building Permit.

Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

Also, prior to Certificate of Occupancy release, the following must be addressed:

1. Engineer Certification per the DPM checklist will be required. The SO19 will be required at the time of connection.

2. Also, when the outfall becomes available it will be the responsibility of HUD to make the connection and provide our department a revised plan identifying which ponds will be deleted and how the drainage within the site will function.

If I can be of further assistance, please feel free to contact me at 924-3986.

C: Andrew Garcia
File

Sincerely

Bernie J. Montoya CE
Engineering Associate

DRAINAGE INFORMATION

PROJECT TITLE: Los Volcanes HUD Housing ZONE ATLAS/DRNG. FILE #: J-10-Z / D2L

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

LEGAL DESCRIPTION: Lot 2-B, Tract N, Unit 2, Atrisco Business Park

CITY ADDRESS: Los Volcanes Road, SW

ENGINEERING FIRM: Chavez-Grieves CONTACT: Joe Kelley, P.E.

ADDRESS: 5639 Jefferson NE PHONE: 344-4080

OWNER: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

ARCHITECT: Garrett Smith Ltd CONTACT: Fritz Wiebelhaus

ADDRESS: _____ PHONE: 766-6968

SURVEYOR: Forstbauer Surveying CONTACT: Ron Forstbauer, L.S.

ADDRESS: _____ PHONE: 268-2112

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT

_X_ DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAINAGE PLAN

_X_ GRADING PLAN

___ EROSION CONTROL PLAN

___ ENGINEER'S CERTIFICATION

___ OTHER

PRE-DESIGN MEETING:

___ YES

_X_ NO

___ COPY PROVIDED

DATE SUBMITTED: 4-9-97

BY: Joe P. Kelley, P.E.

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL

___ PRELIMINARY PLAT APPROVAL

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

___ S. DEV. PLAN FOR BLDG. PRMT. APPROVAL

___ SECTOR PLAN APPROVAL

___ FINAL PLAT APPROVAL

___ FOUNDATION PERMIT APPROVAL

_X_ BUILDING PERMIT APPROVAL

___ CERTIFICATE OF OCCUPANCY APPROVAL

___ GRADING PERMIT APPROVAL

___ PAVING PERMIT APPROVAL

___ S.A.D. DRAINAGE REPORT

___ DRAINAGE REQUIREMENTS

___ OTHER _____ (SPECIFY)

THE ENGINEERING FIRM OF CHOICE

CHAVEZ · GRIEVES
CONSULTING ENGINEERS, INC.

5639 JEFFERSON STREET NE · ALBUQUERQUE, NEW MEXICO 87109 · PHONE (505) 344·4080 · FAX (505) 343·8759

April 9, 1997

Mr. Bernie Montoya, C.E.
City of Albuquerque Hydrology Department
P.O. Box 1293
Albuquerque, NM 87103

RE: DRAINAGE PLAN FOR LOS VOLCANES HUD HOUSING (J10/D26)
C-G PROJECT NO. S60-100-5196

Dear Mr. Montoya:

Transmitted herewith for final grading approval is the grading and drainage plan that we have revised In accordance with your comments dated April 1997. Your comments were addressed as follows:

1. The pond shapes were not revised, although they are closer to the buildings than would normally have been allowed. However, to protect the buildings, a bentonite clay liner has been specified to be placed underneath the ponds. This layer will keep water from invading the potentially collapsible soils below.

2. As I mentioned to you on the phone, the overflow from the northwest pond will be back to the southwest through a paved driveway area, into main pond, and then on out to the northeast pond where this an emergency overflow. You agreed on the phone that the overflow at this location would be sufficient to serve the entire site.

Please call if you have any questions prior to approval.

Sincerely,

CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.

Joe P. Kelley, P.E.
Senior Engineer

JPK:dls

Cy: Garrett Smith, Architects

RECEIVED
APR 10 1997
HYDROLOGY SECTION
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CITY OF
Albuquerque

Public Works Department

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

February 27, 1997

Joe Kelley, P.E.
Chavez-Grieves
5639 Jefferson NE
Albuquerque, NM 87109

RE: LOS VOLCANES HUD HOUSING (J10-D2L). GRADING AND DRAINAGE PLAN FOR BUILDING PERMIT APPROVAL. ENGINEER'S STAMP NOT DATED PROPERLY (2/20/9).

Dear Mr. Kelley:

Based on the information provided on your February 21, 1997 submittal, City Hydrology has the following comments:

1. The letter dated June 12, 1996 is no longer relevant. It has been brought to my attention that this design has some issues that need to be addressed.

2. Provide a copy of the infrastructure list. Retention is allowed on a temporary basis only. Since SAD 512 is not even in the design phase retaining on this site would not be considered temporary. You would therefore be responsible for a storm drain system.

3. I still do not agree with your response that the ponds will eventually act as a detention system. Again, with each pond bottom and pipe invert at the same elevation, it is not possible for the 100-year storm event to escape the site. Retention is not allowed on a permanent basis.

4. If your intention is to keep the pond bottoms at the same elevation, than you will be required to provide direct connections from each pond to the Los Volcanes Road storm drain.

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

Sincerely,

Lisa Ann Manwill, P.E.
Engineering Assoc./Hyd.

c: Andrew Garcia
File

CHAVEZ · GRIEVES
CONSULTING ENGINEERS, INC.

5639 JEFFERSON STREET NE · ALBUQUERQUE, NEW MEXICO 87109 · PHONE (505) 344·4080 · FAX (505) 343 8759

GRADING AND DRAINAGE PLAN

FOR

LOS VOLCANES HUD HOUSING

ALBUQUERQUE, NEW MEXICO

MARCH 1997

CHAVEZ · GRIEVES
CONSULTING ENGINEERS, INC.

5639 JEFFERSON STREET NE · ALBUQUERQUE, NEW MEXICO 87109 · PHONE (505) 344·4080 · FAX (505) 343·8759

GRADING AND DRAINAGE PLAN

FOR

LOS VOLCANES HUD HOUSING

ALBUQUERQUE, NEW MEXICO

Joe Kelley
3/14/97

MARCH 1997

LOCATION

This site is located on Albuquerque's west side, on the south side of Los Volcanes Road, about 1/4 mile west of Coors Blvd.

LEGAL DESCRIPTION

A portion of Lot 2-B, Tract N, Unit 2, Atrisco Business Park as shown on plat of Lots 2-A and 2-B, Tract N, Unit 2, Atrisco Business Park, filed 6-30-1995, 95C-242.

FLOOD HAZARD ZONES

As shown by Panel 3500020027 of the National Flood Insurance Rate Maps for the City of Albuquerque, dated October 14, 1983, the site is not in a designated flood hazard zone. However, as shown on the grading plan, there is a flood hazard Zone A4 (EL 5101) adjacent to the site. Zone A4 designates "areas of 100-year flood; base flood elevations and flood hazard factors determined." Due to the close proximity of this flood zone to the subject site, this site will not be permitted to discharge developed runoff freely downstream.

EXISTING SITE CONDITIONS AND DRAINAGE PATTERN

The site is in a developing area that has no storm drainage systems. It is partially vegetated by desert brush and shrubs, with ground slopes between 2 and 10%. A low-lying pocket exists at the northwest corner of the site, resulting in some on-site ponding at this time. As shown on the grading plan, undeveloped off-site runoff from the west discharges onto this site, with most of it discharging to the low-lying pocket. Along the south, east, and north property lines, runoff discharges off-site.

RELATED REPORTS

According to the West Bluff Drainage Plan, a future storm drain system is slated for construction in Los Volcanes Road. This storm drain is identified as System 512 in Appendix D. This future system has not been designed; however, it is anticipated that it will have the capacity to discharge a portion of the developed runoff from the subject site. As shown in the West Bluff Drainage Plan, two future storm drain connections have been identified adjacent to the subject site. These are indicated on the grading plan, with their future elevations.

The Atrisco Business Park Master Drainage Plan by Easterling and Associates identified

the off-site flow from the west that discharges onto the subject site as Basin 200.6. According to that plan, this off-site flow will eventually be redirected to the west into Airport Road.

PROPOSED SITE CONDITIONS AND DRAINAGE PATTERN

The proposed site will consist of 24 duplex apartment units for the elderly. It will consist of a majority of impervious areas (roofs and parking), but a good portion will be landscaped. Because it is for the elderly, the site has been graded to provide good walking accessibility around the entire site, although only certain portions are actually handicap accessible.

The proposed drainage pattern is total site retention, which is consistent with the developed pattern selected for the properties north and east of the subject site. This pattern was selected for these properties because they contribute to a downstream flood hazard zone. By retaining all runoff on-site, these properties make no contribution to potential downstream flooding. However, total site retention is not generally desired as a long-term drainage solution in the City of Albuquerque. In this particular case, total site retention will be done on an interim basis until such time as the storm drain in Los Volcanes Road is constructed. At that time, the 6" drain pipe at the northeast corner of the site will be connected to the storm drain system, and the retention pond system will be converted to a detention pond system.

As shown on the grading plan, 7 retention ponds have been provided. These ponds will be interconnected such that the water surface in the ponds rises and falls together. The 100-year, 10-day volume required for the ponds is computed on page A-3 as 28,750 cubic feet. The system has been designed to provide this volume at a depth of 18". When the pond system exceeds this depth, it will overflow into the public right-of-way at the northeast corner of the site.

The ponds will be landscaped, and will harvest runoff for natural irrigation. The side slopes of the ponds have been designed at 4:1maximum in order to allow for mowing, and to make them more easily accessible. The 4:1slope will be traversable by most seniors.

The site has been designed so that asphalt surfaces are generally sloped at 2%, minimum. There are some cases where asphalt slopes are as low as 1%. This was generally avoided to reduce ponding in paved areas, which would deteriorate the asphalt at a faster rate. Where slopes adjacent to curbs are less than 1.5%, a gutter has been provided with the curb so that any ponding of runoff will occur on concrete surfaces, where it will tend to do less damage.

The site will continue to accept off-site runoff from the west. As calculated on page A-3,

the pond system has been sized to accommodate this runoff in the interim period until it is redirected to the west by future development. Off-site discharge to the properties on the south and east has been virtually eliminated.

A sloped 10" pipe will be installed from the center pond to the northeast pond for timely stormwater conveyance. Under future conditions, the center pond can be filled to the pipe invert elevation if desired. In the AHYMO run on pages A-4 through A-12, this pond was modeled to be filled to the pipe invert elevation.

FUTURE CONDITIONS

A storm drain will be constructed in Los Volcanes Road in the future. At that time, the pond system will be connected to the storm drain and will act as a detention ponding system. The only ponds that will remain in place at that time are the center pond, and the ponds on the northwest and the northeast corner of the site; the remaining ponds can be filled with dirt or abandoned in place, as long as the runoff from those areas is directed to the main ponds via underground or overland flow. At that time, an 8" storm drain connection will be made from each of the corner ponds to future inlets on Los Volcanes Road. As shown by the AHYMO run on pages A-4 through A-12, the ponds will drain the 100-year storm within 24 hours. The 100-year runoff discharged from the site will be 2.82 cfs which is lower than the existing on-site 100-year runoff of 6.37 cfs (page A-12). Pipe capacity calculations may be found on page A-13.

HYDROLOGY/HYDRAULICS

The runoff calculations and design have been done in accordance with Section 22.2 of the Development Process Manual of the City of Albuquerque, January 1993. The 100-year, 10-day storm was used to determine the required ponding volume. This volume was computed from the output data provided by the AHYMO run, coupled with equations A-9 and C-9 of Section 22.2.

APPENDIX A

DRAINAGE COMPUTATIONS

Printed October 17, 1996 (6:14am)

CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.

5639 Jefferson Street NE, Albuquerque, New Mexico 87109 *Phone (505) 344-4080 - Fax (505) 343-8759*

RUNOFF CALCULATIONS - SIMPLIFIED PROCEDURE

By: Joe Kelley Date: October 16, 1996
Project: Los Volcanes HUD Housing Zone Atlas: J-10

This procedure is in accordance with the City of Albuquerque Development Process Manual, Volume 2, Section 22.2, "Hydrology", peak discharge rate for small watersheds less than forty acres in size.

Precipitation Zone from Figure A-1: 1
Land treatment descriptions are in Table A-4.

1. RUNOFF RATE COMPUTATION

Use Equation a-10: $Q_P = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$

Values of Q_{pi} are from Table A-9, and are in CFS/acre. Area values are in acres.

BASIN	Q_{PA}	A_A	Q_{PB}	A_B	Q_{PC}	A_C	Q_{PD}	A_D	Q_P
EXISTING BASIN RATE OF RUNOFF (CFS)									
On-Site	1.29	0	2.03	3.14	2.87	0	4.37	0	6.37
Off-Site	1.29	0	2.03	1.38	2.87	0	4.37	0	2.80
DEVELOPED BASIN RATE OF RUNOFF (CFS)									
On-Site	1.29	0	2.03	1.31	2.87	0	4.37	1.83	10.66

2. RUNOFF VOLUME COMPUTATION

Use Equation a-5 to compute weighted excess precipitation:

Weighted E = "E" = $(E_A A_A + E_B A_B + E_C A_C + E_D A_D)/(A_A + A_B + A_C + A_D)$

$(A_A + A_B + A_C + A_D) = \sum A_i$

Use Equation a-6 to compute the volume:

V_{360} = "E" x $(A_A + A_B + A_C + A_D)$ x 3630 feet^3/acre·inch

Values of E_i are from Table A-8, and are in inches. Area values are in acres.

BASIN	E_A	A_A	E_B	A_B	E_C	A_C	E_D	A_D	$\sum A_i$	"E"	V_{360}
EXISTING BASIN VOLUME OF RUNOFF (CUBIC FEET)											
On-Site	0.44	0	0.67	3.14	0.99	0	1.97	0	3.14	0.67	7637
Off-Site	0.44	0	0.67	1.38	0.99	0	1.97	0	1.38	0.67	3356
DEVELOPED BASIN VOLUME OF RUNOFF (CUBIC FEET)											
On-Site	0.44	0	0.67	1.31	0.99	0	1.97	1.83	3.14	1.43	16273

CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.

5639 Jefferson Street NE, Albuquerque, New Mexico 87109 *Phone (505) 344-4080 - Fax (505) 343-8759*

RETENTION POND VOLUME CALCULATIONS

By: Joe Kelley Date: October 16, 1996

Project: Los Volcanes HUD Housing Zone Atlas: J-10

This procedure is in accordance with the City of Albuquerque Development Process Manual, Volume 2, Section 22.2, "Hydrology", Equations c-7 and a-9.

BASIN	Q_{360} (CFS)	V_{360} (AC-FT)	A_D (AC)	$V_{10\text{-DAY}}$ (AC-FT)	$V_{10\text{-DAY}}$ (CU-FT)
On-Site	10.66	0.374	1.83	0.58	25,264.80
Off-Site	2.8	0.077	0	0.08	3,484.80

LOS VOLCANES HUD HOUSING AHYMO OUTPUT

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 03/14/1997
         START TIME (HR:MIN:SEC) = 12:22:26     USER NO.= CHVZ_GNM.I01
         INPUT FILE = G:\S60\100\AHYMO.IN

*S**
*************************************************************************
*S*************    CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.    *S*************
*S*************                  LOS VOLCANES                   *************
*S*************************************************************************
*S*  FILENAME:  G:\S60\100\AHYMO.IN/OUT
*S*************************************************************************
*S******* 100 YEAR, 24 HOUR STORM (Section 22.2 Hydrology)
START                0.00
RAINFALL             TYPE=2 RAIN QUARTER=0.0 RAIN ONE=1.87
                     RAIN SIX=2.20  RAIN DAY=2.66 DT=0.0333


                COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                DT =    .033300 HOURS       END TIME =    19.946700 HOURS
                   .0000   .0016   .0033   .0050   .0067   .0085   .0103
                   .0121   .0140   .0160   .0180   .0200   .0221   .0243
                   .0265   .0288   .0312   .0336   .0361   .0387   .0414
                   .0442   .0471   .0501   .0533   .0566   .0600   .0636
                   .0674   .0714   .0757   .0808   .0863   .0922   .1044
                   .1323   .1754   .2374   .3221   .4335   .5756   .7527
                   .9690  1.1767  1.2619  1.3336  1.3972  1.4551  1.5084
                  1.5579  1.6041  1.6474  1.6881  1.7266  1.7629  1.7973
                  1.8298  1.8607  1.8900  1.9178  1.9442  1.9515  1.9573
                  1.9627  1.9680  1.9729  1.9777  1.9823  1.9867  1.9909
                  1.9950  1.9990  2.0029  2.0066  2.0102  2.0137  2.0172
                  2.0205  2.0238  2.0269  2.0300  2.0331  2.0360  2.0389
                  2.0418  2.0446  2.0473  2.0500  2.0526  2.0552  2.0578
                  2.0603  2.0627  2.0651  2.0675  2.0698  2.0721  2.0744
                  2.0766  2.0788  2.0810  2.0832  2.0853  2.0873  2.0894
                  2.0914  2.0934  2.0954  2.0974  2.0993  2.1012  2.1031
                  2.1050  2.1068  2.1086  2.1104  2.1122  2.1140  2.1157
                  2.1174  2.1191  2.1208  2.1225  2.1242  2.1258  2.1274
                  2.1290  2.1306  2.1322  2.1338  2.1353  2.1369  2.1384
                  2.1399  2.1414  2.1429  2.1444  2.1459  2.1473  2.1487
                  2.1502  2.1516  2.1530  2.1544  2.1558  2.1571  2.1585
                  2.1599  2.1612  2.1625  2.1639  2.1652  2.1665  2.1678
                  2.1691  2.1703  2.1716  2.1729  2.1741  2.1754  2.1766
                  2.1778  2.1791  2.1803  2.1815  2.1827  2.1839  2.1850
                  2.1862  2.1874  2.1886  2.1897  2.1909  2.1920  2.1931
                  2.1943  2.1954  2.1965  2.1976  2.1987  2.1998  2.2011
                  2.2024  2.2037  2.2050  2.2063  2.2076  2.2088  2.2101
                  2.2114  2.2127  2.2140  2.2152  2.2165  2.2178  2.2190
                  2.2203  2.2216  2.2228  2.2241  2.2253  2.2266  2.2278
                  2.2291  2.2303  2.2315  2.2328  2.2340  2.2352  2.2364
                  2.2377  2.2389  2.2401  2.2413  2.2425  2.2437  2.2449
                  2.2461  2.2473  2.2485  2.2497  2.2509  2.2521  2.2533
                  2.2545  2.2557  2.2569  2.2580  2.2592  2.2604  2.2616
                  2.2627  2.2639  2.2651  2.2662  2.2674  2.2685  2.2697
                  2.2708  2.2720  2.2731  2.2743  2.2754  2.2766  2.2777
                  2.2788  2.2800  2.2811  2.2822  2.2833  2.2845  2.2856
                  2.2867  2.2878  2.2889  2.2900  2.2912  2.2923  2.2934
                  2.2945  2.2956  2.2967  2.2978  2.2989  2.3000  2.3011
                  2.3021  2.3032  2.3043  2.3054  2.3065  2.3076  2.3086
                  2.3097  2.3108  2.3118  2.3129  2.3140  2.3150  2.3161
                  2.3172  2.3182  2.3193  2.3203  2.3214  2.3224  2.3235
                  2.3245  2.3256  2.3266  2.3277  2.3287  2.3297  2.3308
                  2.3318  2.3328  2.3339  2.3349  2.3359  2.3369  2.3379
```

LOS VOLCANES HUD HOUSING AHYMO OUTPUT

2.3390	2.3400	2.3410	2.3420	2.3430	2.3440	2.3450
2.3461	2.3471	2.3481	2.3491	2.3501	2.3511	2.3521
2.3531	2.3540	2.3550	2.3560	2.3570	2.3580	2.3590
2.3600	2.3610	2.3619	2.3629	2.3639	2.3649	2.3658
2.3668	2.3678	2.3687	2.3697	2.3707	2.3716	2.3726
2.3736	2.3745	2.3755	2.3764	2.3774	2.3783	2.3793
2.3802	2.3812	2.3821	2.3831	2.3840	2.3849	2.3859
2.3868	2.3878	2.3887	2.3896	2.3906	2.3915	2.3924
2.3933	2.3943	2.3952	2.3961	2.3970	2.3980	2.3989
2.3998	2.4007	2.4016	2.4025	2.4034	2.4044	2.4053
2.4062	2.4071	2.4080	2.4089	2.4098	2.4107	2.4116
2.4125	2.4134	2.4143	2.4152	2.4161	2.4169	2.4178
2.4187	2.4196	2.4205	2.4214	2.4223	2.4231	2.4240
2.4249	2.4258	2.4266	2.4275	2.4284	2.4293	2.4301
2.4310	2.4319	2.4327	2.4336	2.4345	2.4353	2.4362
2.4371	2.4379	2.4388	2.4396	2.4405	2.4413	2.4422
2.4430	2.4439	2.4447	2.4456	2.4464	2.4473	2.4481
2.4490	2.4498	2.4506	2.4515	2.4523	2.4532	2.4540
2.4548	2.4557	2.4565	2.4573	2.4581	2.4590	2.4598
2.4606	2.4615	2.4623	2.4631	2.4639	2.4647	2.4656
2.4664	2.4672	2.4680	2.4688	2.4696	2.4704	2.4713
2.4721	2.4729	2.4737	2.4745	2.4753	2.4761	2.4769
2.4777	2.4785	2.4793	2.4801	2.4809	2.4817	2.4825
2.4833	2.4841	2.4849	2.4857	2.4865	2.4873	2.4880
2.4888	2.4896	2.4904	2.4912	2.4920	2.4927	2.4935
2.4943	2.4951	2.4959	2.4966	2.4974	2.4982	2.4990
2.4997	2.5005	2.5013	2.5021	2.5028	2.5036	2.5044
2.5051	2.5059	2.5067	2.5074	2.5082	2.5089	2.5097
2.5105	2.5112	2.5120	2.5127	2.5135	2.5142	2.5150
2.5157	2.5165	2.5172	2.5180	2.5187	2.5195	2.5202
2.5210	2.5217	2.5225	2.5232	2.5240	2.5247	2.5254
2.5262	2.5269	2.5277	2.5284	2.5291	2.5299	2.5306
2.5313	2.5321	2.5328	2.5335	2.5342	2.5350	2.5357
2.5364	2.5372	2.5379	2.5386	2.5393	2.5401	2.5408
2.5415	2.5422	2.5429	2.5437	2.5444	2.5451	2.5458
2.5465	2.5472	2.5479	2.5487	2.5494	2.5501	2.5508
2.5515	2.5522	2.5529	2.5536	2.5543	2.5550	2.5557
2.5564	2.5571	2.5578	2.5585	2.5592	2.5599	2.5606
2.5613	2.5620	2.5627	2.5634	2.5641	2.5648	2.5655
2.5662	2.5669	2.5676	2.5683	2.5689	2.5696	2.5703
2.5710	2.5717	2.5724	2.5731	2.5737	2.5744	2.5751
2.5758	2.5765	2.5771	2.5778	2.5785	2.5792	2.5799
2.5805	2.5812	2.5819	2.5826	2.5832		

```
*S COMPUTE RUNOFF FROM OFF-SITE BASIN
COMPUTE NM HYD       ID=8 HYD=OFF_SITE DA=0.00216 SQ MI
                     %A=0 %B=100 %C=0 %D=0
                     TP=0.1333 RAINFALL=-1

    K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
    UNIT PEAK =   5.3001    CFS   UNIT VOLUME =    .9977       B =   327.09      P60 = 1.8700
    AREA =      .002160 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD            ID=8 CODE=1

                                        HYDROGRAPH FROM AREA OFF_SITE

    RUNOFF VOLUME =      .66738 INCHES     =        .0769 ACRE-FEET
    PEAK DISCHARGE RATE =       2.82 CFS  AT   1.532 HOURS   BASIN AREA =   .0022 SQ. MI.
```

LOS VOLCANES HUD HOUSING AHYMO OUTPUT

```
*S COMPUTE RUNOFF FROM ON-SITE BASIN A
COMPUTE NM HYD       ID=1 HYD=A DA=0.00061 SQ MI
                     %A=0 %B=42 %C=0 %D=58
                     TP=0.1333 RAINFALL=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   1.3968    CFS   UNIT VOLUME =    .9910       B =   526.28      P60 = 1.8700
    AREA =      .000354 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

    K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
    UNIT PEAK =   .62866    CFS   UNIT VOLUME =    .9787       B =   327.09      P60 = 1.8700
    AREA =      .000256 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD            ID=1 CODE=1

                                        HYDROGRAPH FROM AREA A


    RUNOFF VOLUME =     1.64045 INCHES     =        .0534 ACRE-FEET
    PEAK DISCHARGE RATE =       1.34 CFS  AT   1.499 HOURS   BASIN AREA =   .0006 SQ. MI.


*
*S COMPUTE RUNOFF FROM ON-SITE BASIN B
COMPUTE NM HYD       ID=2 HYD=E DA=0.00067 SQ MI
                     %A=0 %B=42 %C=0 %D=58
                     TP=0.1333  RAINFALL=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   1.5342    CFS   UNIT VOLUME =    .9922       B =   526.28      P60 = 1.8700
    AREA =      .000389 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

    K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
    UNIT PEAK =   .69049    CFS   UNIT VOLUME =    .9804       B =   327.09      P60 = 1.8700
    AREA =      .000281 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD            ID=2 CODE=1

                                        HYDROGRAPH FROM AREA E


    RUNOFF VOLUME =     1.64044 INCHES     =        .0586 ACRE-FEET
    PEAK DISCHARGE RATE =       1.47 CFS  AT   1.499 HOURS   BASIN AREA =   .0007 SQ. MI.


*
*S  ADD BASINS B,OFF-SITE
ADD HYD              ID=2  HYD NO=BASINS_ABCDEF ID I=2 ID II=8
PRINT HYD            ID=2 CODE=1

                                        HYDROGRAPH FROM AREA BASINS_ABCDEF


    RUNOFF VOLUME =      .89772 INCHES     =        .1355 ACRE-FEET
    PEAK DISCHARGE RATE =       4.26 CFS  AT   1.499 HOURS   BASIN AREA =   .0028 SQ. MI.
```

LOS VOLCANES HUD HOUSING AHYMO OUTPUT

```
*
*S ROUTE BASIN B, OFF-SITE THROUGH THE DETENTION POND
ROUTE RESERVOIR     ID=3  HYD NO=BASIN_B_ROUTE INFLOW ID=2 CODE=10
                    OUTFLOW(CFS)   STORAGE(AC-FT)  ELEVATION(FT)
                    0               0               0
                    2.100           0.102           1.5

  * * * * * * * * * * * * * * * * * *
```

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	.00	.000	.00
.33	.00	.00	.000	.00
.67	.00	.00	.000	.00
1.00	.00	.00	.000	.00
1.33	.39	.02	.002	.03
1.67	2.35	.93	.063	1.30
2.00	.56	.86	.058	1.20
2.33	.17	.58	.040	.82
2.66	.07	.36	.025	.51
3.00	.03	.22	.015	.31
3.33	.02	.13	.009	.18
3.66	.01	.08	.005	.11
4.00	.01	.05	.003	.06
4.33	.01	.03	.002	.04
4.66	.01	.02	.001	.02
5.00	.01	.01	.001	.02
5.33	.01	.01	.001	.01
5.66	.01	.01	.000	.01
5.99	.01	.01	.000	.01
6.33	.01	.01	.000	.01
6.66	.01	.01	.000	.01
6.99	.01	.01	.000	.01
7.33	.01	.01	.000	.01
7.66	.01	.01	.000	.01
7.99	.01	.01	.000	.01
8.33	.01	.01	.000	.01
8.66	.01	.01	.000	.01
8.99	.01	.01	.000	.01
9.32	.01	.01	.000	.01
9.66	.01	.01	.000	.01
9.99	.01	.01	.000	.01
10.32	.01	.01	.000	.01
10.66	.01	.01	.000	.01
10.99	.01	.01	.000	.01
11.32	.01	.01	.000	.01
11.66	.01	.01	.000	.01
11.99	.01	.01	.000	.01
12.32	.01	.01	.000	.01
12.65	.01	.00	.000	.01
12.99	.01	.00	.000	.01
13.32	.01	.00	.000	.01
13.65	.01	.00	.000	.01
13.99	.01	.00	.000	.01
14.32	.01	.00	.000	.01
14.65	.01	.00	.000	.01
14.99	.01	.00	.000	.01
15.32	.01	.00	.000	.01
15.65	.01	.00	.000	.01
15.98	.01	.00	.000	.01
16.32	.01	.00	.000	.01

```
16.65        .01        .00        .000        .01
16.98        .01        .00        .000        .01
17.32        .01        .00        .000        .01
17.65        .01        .00        .000        .01
17.98        .01        .00        .000        .01
18.32        .01        .00        .000        .01

TIME         INFLOW     ELEV       VOLUME      OUTFLOW
(HRS)        (CFS)      (FEET)     (AC-FT)     (CFS)

18.65        .01        .00        .000        .01
18.98        .01        .00        .000        .01
19.31        .01        .00        .000        .01
19.65        .01        .00        .000        .01
 PEAK DISCHARGE =          1.382 CFS - PEAK OCCURS AT HOUR    1.76
 MAXIMUM WATER SURFACE ELEVATION =           .987
 MAXIMUM STORAGE =           .0671 AC-FT      INCREMENTAL TIME=     .033300HRS

PRINT HYD            ID=3 CODE=1

                                        HYDROGRAPH FROM AREA BASIN_B_ROUTE


    RUNOFF VOLUME =       .89605 INCHES      =         .1352 ACRE-FEET
    PEAK DISCHARGE RATE =        1.38 CFS  AT    1.765 HOURS    BASIN AREA =    .0028 SQ. MI.



*
*S COMPUTE RUNOFF FROM ON-SITE BASIN C
COMPUTE NM HYD       ID=4 HYD=C DA=0.00328 SQ MI
                     %A=0 %B=42 %C=0 %D=58
                     TP=0.1333  RAINFALL=-1

      K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
      UNIT PEAK =    7.5108     CFS    UNIT VOLUME =     .9978        B =    526.28       P60 = 1.8700
      AREA =       .001902 SQ MI     IA =     .10000 INCHES     INF =     .04000 INCHES PER HOUR
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033300


      K =    .130992HR     TP =    .133300HR     K/TP RATIO =    .982685      SHAPE CONSTANT, N =  3.593448
      UNIT PEAK =    3.3803     CFS    UNIT VOLUME =     .9964        B =    327.09       P60 = 1.8700
      AREA =       .001378 SQ MI     IA =     .50000 INCHES     INF =    1.25000 INCHES PER HOUR
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033300

PRINT HYD            ID=4 CODE=1

                                        HYDROGRAPH FROM AREA C


    RUNOFF VOLUME =      1.64039 INCHES      =         .2870 ACRE-FEET
    PEAK DISCHARGE RATE =        7.11 CFS  AT    1.499 HOURS    BASIN AREA =    .0033 SQ. MI.


*
*S  ADD BASINS A,C
ADD HYD              ID=5  HYD NO=BASINS_AC ID I=1 ID II=4
PRINT HYD            ID=5 CODE=1

                                        HYDROGRAPH FROM AREA BASINS_AC


    RUNOFF VOLUME =      1.64040 INCHES      =         .3403 ACRE-FEET
```

LOS VOLCANES HUD HOUSING AHYMO OUTPUT

PEAK DISCHARGE RATE = 8.45 CFS AT 1.499 HOURS BASIN AREA = .0039 SQ. MI.

```
*
*S ROUTE BASINS THROUGH THE DETENTION POND
ROUTE RESERVOIR     ID=6  HYD NO=BASIN_ROUTE INFLOW ID=5 CODE=10
                    OUTFLOW(CFS)   STORAGE(AC-FT)  ELEVATION(FT)
                    0               0               0
                    2.235           0.1735          1.0

  * * * * * * * * * * * * * * * * * *
```

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	.00	.000	.00
.33	.00	.00	.000	.00
.67	.00	.00	.000	.00
1.00	.00	.00	.000	.00
1.33	1.97	.05	.009	.12
1.67	4.41	.83	.145	1.87
2.00	1.77	.94	.163	2.10
2.33	.40	.78	.136	1.75
2.66	.16	.58	.101	1.30
3.00	.08	.42	.073	.95
3.33	.05	.31	.053	.68
3.66	.04	.22	.038	.49
4.00	.04	.16	.028	.36
4.33	.04	.12	.020	.26
4.66	.04	.09	.015	.19
5.00	.04	.07	.011	.15
5.33	.04	.05	.009	.11
5.66	.04	.04	.007	.09
5.99	.05	.04	.006	.08
6.33	.05	.03	.005	.07
6.66	.06	.03	.005	.07
6.99	.05	.03	.005	.06
7.33	.05	.03	.005	.06
7.66	.05	.03	.004	.06
7.99	.05	.02	.004	.06
8.33	.05	.02	.004	.05
8.66	.05	.02	.004	.05
8.99	.05	.02	.004	.05
9.32	.05	.02	.004	.05
9.66	.05	.02	.004	.05
9.99	.04	.02	.004	.05
10.32	.04	.02	.004	.05
10.66	.04	.02	.004	.05
10.99	.04	.02	.004	.05
11.32	.04	.02	.003	.04
11.66	.04	.02	.003	.04
11.99	.04	.02	.003	.04
12.32	.04	.02	.003	.04
12.65	.04	.02	.003	.04
12.99	.04	.02	.003	.04
13.32	.04	.02	.003	.04
13.65	.04	.02	.003	.04
13.99	.04	.02	.003	.04
14.32	.04	.02	.003	.04
14.65	.04	.02	.003	.04
14.99	.04	.02	.003	.04
15.32	.04	.02	.003	.04
15.65	.03	.02	.003	.04

```
15.98          .03          .02          .003          .04
16.32          .03          .02          .003          .04
16.65          .03          .02          .003          .03
16.98          .03          .02          .003          .03
17.32          .03          .02          .003          .03
17.65          .03          .01          .003          .03
17.98          .03          .01          .003          .03
18.32          .03          .01          .003          .03

TIME           INFLOW       ELEV         VOLUME        OUTFLOW
(HRS)          (CFS)        (FEET)       (AC-FT)       (CFS)

   18.65          .03          .01          .002          .03
   18.98          .03          .01          .002          .03
   19.31          .03          .01          .002          .03
   19.65          .03          .01          .002          .03
 PEAK DISCHARGE =          2.113 CFS - PEAK OCCURS AT HOUR     1.90
 MAXIMUM WATER SURFACE ELEVATION =           .945
 MAXIMUM STORAGE =           .1640 AC-FT      INCREMENTAL TIME=     .033300HRS

PRINT HYD            ID=6 CODE=1

                                        HYDROGRAPH FROM AREA BASIN_ROUTE


    RUNOFF VOLUME =      1.62898 INCHES     =          .3380 ACRE-FEET
    PEAK DISCHARGE RATE =        2.11 CFS  AT    1.898 HOURS   BASIN AREA =    .0039 SQ. MI.



*
*S COMPUTE RUNOFF FROM ON-SITE BASIN D
COMPUTE NM HYD       ID=1 HYD=G DA=0.00035 SQ MI
                     %A=0 %B=42 %C=0 %D=58
                     TP=0.1333  RAINFALL=-1

    K =    .072649HR     TP =    .133300HR     K/TP RATIO =    .545000      SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =    .80145     CFS   UNIT VOLUME =     .9840        B =   526.28       P60 = 1.8700
    AREA =       .000203 SQ MI     IA =     .10000 INCHES     INF =     .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033300


    K =    .130992HR     TP =    .133300HR     K/TP RATIO =    .982685      SHAPE CONSTANT, N =  3.593448
    UNIT PEAK =    .36070     CFS   UNIT VOLUME =     .9612        B =   327.09       P60 = 1.8700
    AREA =       .000147 SQ MI     IA =     .50000 INCHES     INF =    1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033300

PRINT HYD            ID=1 CODE=1

                                        HYDROGRAPH FROM AREA G


    RUNOFF VOLUME =      1.64051 INCHES     =          .0306 ACRE-FEET
    PEAK DISCHARGE RATE =         .77 CFS  AT    1.499 HOURS   BASIN AREA =    .0004 SQ. MI.



*
*S  ADD BASIN D
ADD HYD              ID=6  HYD NO=BASIN_ACD ID I=1 ID II=6
PRINT HYD            ID=6 CODE=1

                                        HYDROGRAPH FROM AREA BASIN_ACD
```

LOS VOLCANES HUD HOUSING AHYMO OUTPUT

RUNOFF VOLUME = 1.62993 INCHES = .3686 ACRE-FEET
PEAK DISCHARGE RATE = 2.33 CFS AT 1.798 HOURS BASIN AREA = .0042 SQ. MI.

```
*
*S ROUTE BASINS THROUGH THE DETENTION POND
ROUTE RESERVOIR     ID=7  HYD NO=BASIN_ROUTE INFLOW ID=6 CODE=10
                    OUTFLOW(CFS)   STORAGE(AC-FT)  ELEVATION(FT)
                    0               0               0
                    2.10            0.0793          1.5
```

* * * * * * * * * * * * * * * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	.00	.000	.00
.33	.00	.00	.000	.00
.67	.00	.00	.000	.00
1.00	.00	.00	.000	.00
1.33	.30	.02	.001	.03
1.67	2.27	.62	.033	.87
2.00	2.26	1.15	.061	1.61
2.33	1.78	1.30	.069	1.82
2.66	1.31	1.18	.063	1.66
3.00	.95	.98	.052	1.37
3.33	.69	.77	.040	1.07
3.66	.50	.58	.031	.81
4.00	.36	.43	.023	.61
4.33	.26	.32	.017	.45
4.66	.20	.24	.013	.33
5.00	.15	.18	.009	.25
5.33	.12	.13	.007	.19
5.66	.10	.10	.005	.15
5.99	.08	.08	.004	.12
6.33	.08	.07	.004	.10
6.66	.07	.06	.003	.08
6.99	.07	.05	.003	.08
7.33	.06	.05	.003	.07
7.66	.06	.05	.003	.07
7.99	.06	.05	.002	.06
8.33	.06	.04	.002	.06
8.66	.06	.04	.002	.06
8.99	.06	.04	.002	.06
9.32	.05	.04	.002	.06
9.66	.05	.04	.002	.05
9.99	.05	.04	.002	.05
10.32	.05	.04	.002	.05
10.66	.05	.04	.002	.05
10.99	.05	.04	.002	.05
11.32	.05	.04	.002	.05
11.66	.05	.03	.002	.05
11.99	.05	.03	.002	.05
12.32	.05	.03	.002	.05
12.65	.04	.03	.002	.05
12.99	.04	.03	.002	.05
13.32	.04	.03	.002	.04
13.65	.04	.03	.002	.04
13.99	.04	.03	.002	.04
14.32	.04	.03	.002	.04
14.65	.04	.03	.002	.04
14.99	.04	.03	.002	.04
15.32	.04	.03	.002	.04

```
15.65          .04          .03          .002          .04
15.98          .04          .03          .001          .04
16.32          .04          .03          .001          .04
16.65          .04          .03          .001          .04
16.98          .04          .03          .001          .04
17.32          .04          .03          .001          .04
17.65          .04          .03          .001          .04
17.98          .04          .03          .001          .04
18.32          .04          .03          .001          .04

TIME           INFLOW       ELEV         VOLUME        OUTFLOW
(HRS)          (CFS)        (FEET)       (AC-FT)       (CFS)

   18.65          .03          .03          .001          .04
   18.98          .03          .02          .001          .03
   19.31          .03          .02          .001          .03
   19.65          .03          .02          .001          .03
 PEAK DISCHARGE =          1.818 CFS - PEAK OCCURS AT HOUR     2.30
 MAXIMUM WATER SURFACE ELEVATION =          1.299
 MAXIMUM STORAGE =           .0687 AC-FT       INCREMENTAL TIME=      .033300HRS

PRINT HYD            ID=7 CODE=1

                                          HYDROGRAPH FROM AREA BASIN_ROUTE


    RUNOFF VOLUME =      1.62430 INCHES      =          .3673 ACRE-FEET
    PEAK DISCHARGE RATE =         1.82 CFS  AT    2.298 HOURS    BASIN AREA =    .0042 SQ. MI.

*
*S  ADD TOTAL FLOWS EXITING OFF-SITE
ADD HYD              ID=1  HYD NO=BASIN_TOTAL ID I=3 ID II=7
PRINT HYD            ID=1 CODE=1

                                          HYDROGRAPH FROM AREA BASIN_TOTAL


    RUNOFF VOLUME =      1.33279 INCHES      =          .5025 ACRE-FEET
    PEAK DISCHARGE RATE =         2.82 CFS  AT    2.065 HOURS    BASIN AREA =    .0071 SQ. MI.


FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 12:22:28
```

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CONSULTING ENGINEERS, INC.
5639 JEFFERSON STREET N.E. • ALBUQUERQUE, NEW MEXICO 87109
PHONE (505) 344-4080 • FAX (505) 343-8759

SHEET NO. A-13 OF
JOB
SUBJECT
CLIENT JOB NO.
BY DATE
CHECKED BY DATE

PIPE CAPACITIES

$$Q = C_d A \sqrt{2gh}$$

$C_d = 0.67$

8" Pipe

$A = 0.352\ ft^2$

$h = 1.17'$

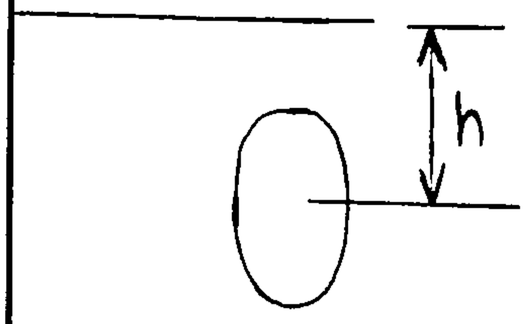
$Q = 2.1$ CFS

10" Pipe

$A = 0.545\ ft^2$

$h = 0.583'$

$Q = 2.24$ CFS



NOTE TO FILE

On Wednesday, March 5, 1997 I spoke with Joe Kelley of Chavez-Grieves. Our conversation was in reference to my letter dated February 27, 1997. I explained to him the following:

1. Comment #1 in my letter dated 2-27-97 means; because the previous design (by JMA) was not the same as his, JMA's approval letter is no longer relevant to this project. Mr. Kelley substantially changed the hydrology. Instead of using temporary retention, he is using permanent retention ponding, which is not allowed.

2. Mr. Kelley wants to resolve this so that he can get an approval, however, he doesn't want to change his design. I gave him (2) two options:

    a. Go back to the original, approved design that JMA did.

    b. Connect each pond to the future storm drain system in Los Volcanes.

    Mr. Kelley disagrees with me that the pipes connecting each pond must slope in order to allow for future discharge. Also, I had to explain that he can not take credit for infiltration.

3. I explained to him that SAD 512 was not even in the design phase - it could take years for anything to happen. He is not allowed to wait for the City to put a storm drain system in. Part of this is his clients responsibility.

Lisa Ann Manwill

LAM

March 6, 1997 ~ spoke w/ Architect, Fritz Wiebelhaus w/ Garret Smith Ltd. to make sure he understands the issues.

March 6, 1997 ~ left a message (returned call) to Joe Kelley. He wanted to know what to do to get approval ~ if he just sloped the pipes, would I approve. I left message on voice mail stating that he would have to slope pipe & fall of lower pond bottom. Pond Bottom & pipe invert must be the same. Also, his =>

ponds, in some areas, are closer than 10-feet from foundation. I expressed this concern in my message too.

LAK.

DRAINAGE INFORMATION

PROJECT TITLE: Los Volcanes HUD Housing ZONE ATLAS/DRNG. FILE #: J-10-Z

DRB#: 96-347 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: Lot 2-B, Tract N, Unit 2, Atrisco Business Park

CITY ADDRESS: Los Volcanes Road, SW

ENGINEERING FIRM: Chavez-Grieves CONTACT: Joe Kelley, P.E.

ADDRESS: 5639 Jefferson NE PHONE: 344-4080

OWNER: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

ARCHITECT: Garrett Smith Ltd CONTACT: Fritz Wiebelhaus

ADDRESS: _____ PHONE: 766-6968

SURVEYOR: Forstbauer Surveying CONTACT: Ron Forstbauer, L.S.

ADDRESS: _____ PHONE: 268-2112

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

____ DRAINAGE REPORT

_X_ DRAINAGE PLAN

____ CONCEPTUAL GRADING & DRAINAGE PLAN

_X_ GRADING PLAN

_X_ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

____ OTHER

PRE-DESIGN MEETING:

____ YES

_X_ NO

____ COPY PROVIDED

DATE SUBMITTED: Mar.17, 1997

BY: Joe P. Kelley, P.E.

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

____ PRELIMINARY PLAT APPROVAL

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

____ S. DEV. PLAN FOR BLDG. PRMT. APPROVAL

____ SECTOR PLAN APPROVAL

____ FINAL PLAT APPROVAL

____ FOUNDATION PERMIT APPROVAL

_X_ BUILDING PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

____ GRADING PERMIT APPROVAL

____ PAVING PERMIT APPROVAL

____ S.A.D. DRAINAGE REPORT

____ DRAINAGE REQUIREMENTS

____ OTHER _____ (SPECIFY)

CITY OF
Albuquerque
January 13, 1997

Martin J. Chávez, Mayor

Joe Kelley, P.E.
Chavez-Grieves
5639 Jefferson NE
Albuquerque, NM 87109

RE: LOS VOLCANES HUD HOUSING (J10-D2L). GRADING AND DRAINAGE PLAN FOR BUILDING PERMIT APPROVAL. ENGINEER'S STAMP DATED 12-30-96.

Dear Mr. Kelley:

Based on the information provided on your December 30, 1996 submittal, City Hydrology has the following comments:

1. Please provide a DRB number on the Drainage Information Sheet.

2. Retention is allowed on a temporary basis only. Since SAD 512 is not even in the design phase retaining on this site would not be considered temporary. You would therefore be responsible for a storm drain system.

3. I do not agree with your response that the ponds will eventually act as a detention system. With each pond bottom and pipe invert at the same elevation, it is not possible for the 100-year storm event to escape the site in a timely manner (24 hours). Retention is not allowed on a permanent basis. No developed flows (roof, street, etc.) can be used for water harvesting purposes.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

CITY OF
Albuquerque

November 18, 1996

Martin J. Chávez, Mayor

Joe Kelley, P.E.
Chavez-Grieves
5639 Jefferson NE
Albuquerque, NM 87109

RE: LOS VOLCANES HUD HOUSING (J10-D2L). DRAINAGE REPORT FOR BUILDING PERMIT. ENGINEER'S STAMP DATED 10-30-96.

Dear Mr. Kelley:

Based on the information provided on your November 13, 1996 submittal, City Hydrology has the following comments:

1. Please provide an infrastructure list with your next submittal.

2. How much will this site be allowed to discharge in the future? Please provide appropriate calculations for outlet pipe size.

3. When SAD 512 is constructed, how will this site detain water if all connecting ponds have the same elevations?

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

DRAINAGE INFORMATION

PROJECT TITLE: Los Volcanes HUD Housing ZONE ATLAS/DRNG. FILE #: J-10-Z /402 L

DP3#: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: Lot 2-B, Tract N, Unit 2, Atrisco Business Park

CITY ADDRESS: Los Volcanes Road, SW

ENGINEERING FIRM: Chavez-Grieves CONTACT: Joe Kelley, P.E.

ADDRESS: 5639 Jefferson NE PHONE: 344-4080

OWNER: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

ARCHITECT: Garrett Smith Ltd CONTACT: Fritz Wiebelhaus

ADDRESS: _____ PHONE: 766-6968

SURVEYOR: Forstbauer Surveying CONTACT: Ron Forstbauer, L.S.

ADDRESS: _____ PHONE: 268-2112

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT

_X_ DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAINAGE PLAN

_X_ GRADING PLAN

___ EROSION CONTROL PLAN

___ ENGINEER'S CERTIFICATION

___ OTHER

PRE-DESIGN MEETING:

___ YES

_X_ NO

___ COPY PROVIDED

DATE SUBMITTED: _____

BY: Joe P. Kelley, P.E.

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL

___ PRELIMINARY PLAT APPROVAL

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

___ S. DEV. PLAN FOR BLDG. PRMT. APPROVAL

___ SECTOR PLAN APPROVAL

___ FINAL PLAT APPROVAL

___ FOUNDATION PERMIT APPROVAL

_X_ BUILDING PERMIT APPROVAL

___ CERTIFICATE OF OCCUPANCY APPROVAL

___ GRADING PERMIT APPROVAL

___ PAVING PERMIT APPROVAL

___ S.A.D. DRAINAGE REPORT

___ DRAINAGE REQUIREMENTS

___ OTHER _____ (SPECIFY)

RECEIVED
DEC 30

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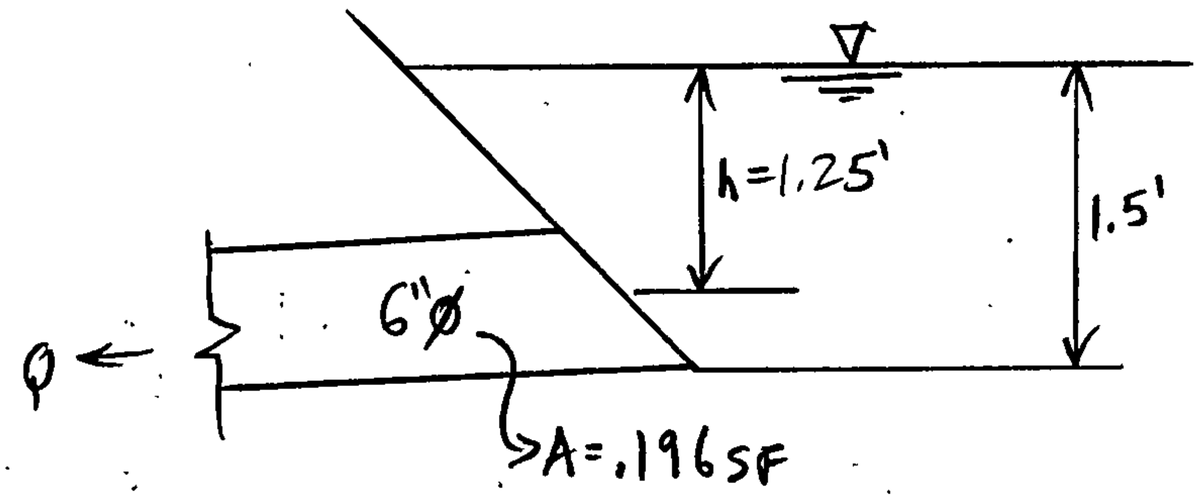
CONSULTING ENGINEERS, INC.
5639 JEFFERSON STREET N.E. • ALBUQUERQUE, NEW MEXICO 87109
PHONE (505) 344-4080 • FAX (505) 343-8759

SHEET NO. _____ OF _____
JOB Los Volcanes HUP Housing
SUBJECT _____
CLIENT _____
JOB NO. _____
BY JK DATE 12/23/96

CAPACITY OF FUTURE DISCHARGE PIPE:



CONTROLLED BY THE ORIFICE EQUATION:

$$Q = .6A\sqrt{2gh}$$
$$= .6(.196)\sqrt{2(32.2)1.25}$$
$$= 1.06 \text{ CFS}$$

THE ENGINEERING FIRM OF CHOICE

CHAVEZ · GRIEVES
CONSULTING ENGINEERS, INC.

5639 JEFFERSON STREET NE · ALBUQUERQUE, NEW MEXICO 87109 · PHONE (505) 344·4080 · FAX (505) 343·8759

December 23, 1996

Ms. Lisa Manwill
City of Albuquerque Hydrology
P.O. Box 1293
Albuquerque, NM 87103

RE: LOS VOLCANES HUD HOUSING (J10-D2L)
C-G PROJECT NUMBER: S60-100-5196

Dear Ms. Manwill:

Transmitted herewith for building permit approval is the attached grading plan which has been revised in accordance with your comments of November 18, 1996. Your comments have been addressed as follows:

1. There is no infrastructure list for this project. As it went through the DRB, it was determined that there is no additional infrastructure required in order to construct this project. Therefore, no infrastructure list was provided.

2. The future acceptable discharge from this site has not yet been determined. Per the West Bluff master drainage plan, SAD 512 has not yet been designed, and therefore the allowable discharge to that system is not known. The 6" pipe that was provided for the future discharge would allow for a 1.06cfs discharge to the storm system in the future. By inspection it is observed that this discharge is less than historical undeveloped discharge; the future storm drain system should be designed to discharge at least this amount from the site. Because this site has been designed for total retention on an interim basis, and because it will not be regraded in the future at the time the storm drain is built, the discharge to the future storm drain could be restricted to less than 1.06cfs if necessary. The decreased discharge would not affect this site because this site has an onsite storage capacity to retain whatever amount of runoff is necessary.

3. When SAD 512 is constructed, and the site is connected to the new storm drain, the retention ponds will then behave in a detention manner. Because all the pond bottoms

DEC 30

G:\S60\100\DOCUMENT\MANWELL.WPD

Want discharge at all!

are the same elevation, water will not discharge from the site quickly. However, the storm run-off that does not soak into the ground will eventually discharge off-site via the new storm drain system. The fact that it will discharge off-site slowly will not be a detriment to the on site system. In fact, it is viewed as an asset to this site, as storm runoff from most events will be minimal, and the storm water will effectively be harvested for on-site irrigation.

Should you have any questions prior to your approval, please give me a call.

Sincerely,

CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.

Joe P. Kelley, P.E.
Senior Engineer

JPK/lr

CY: Fritz Wiebelhaus, Garrett Smith Architects

G\S60\100\DOCUMENT\MANWELL.WPD

CHAVEZ · GRIEVES
CONSULTING ENGINEERS, INC.

5639 JEFFERSON STREET NE · ALBUQUERQUE, NEW MEXICO 87109 · PHONE (505) 344-4080 · FAX (505) 343 8759

GRADING AND DRAINAGE PLAN

FOR

LOS VOLCANES HUD HOUSING

ALBUQUERQUE, NEW MEXICO

OCTOBER 1996

CHAVEZ · GRIEVES
CONSULTING ENGINEERS, INC.

5639 JEFFERSON STREET NE · ALBUQUERQUE, NEW MEXICO 87109 · PHONE (505) 344-4080 · FAX (505) 343-8759

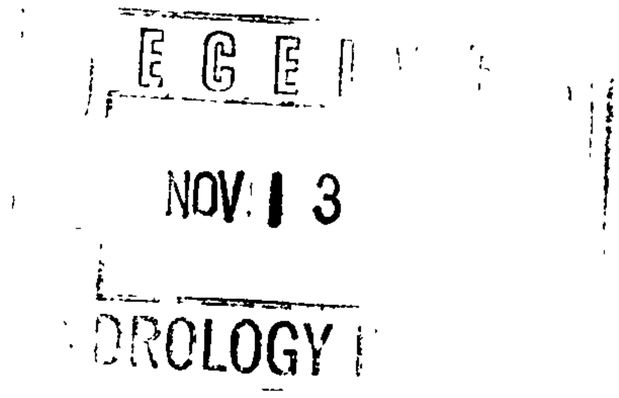
GRADING AND DRAINAGE PLAN

FOR

LOS VOLCANES HUD HOUSING

ALBUQUERQUE, NEW MEXICO

OCTOBER 1996



LOCATION

This site is located on Albuquerque's west side, on the south side of Los Volcanes Road, about 1/4 mile west of Coors Blvd.

LEGAL DESCRIPTION

A portion of Lot 2-B, Tract N, Unit 2, Atrisco Business Park as shown on plat of Lots 2-A and 2-B, Tract N, Unit 2, Atrisco Business Park, filed 6-30-1995, 95C-242.

FLOOD HAZARD ZONES

As shown by Panel 3500020027 of the National Flood Insurance Rate Maps for the City of Albuquerque, dated October 14, 1983, the site is not in a designated flood hazard zone. However, as shown on the grading plan, there is a flood hazard Zone A4 (EL 5101) adjacent to the site. Zone A4 designates "areas of 100-year flood; base flood elevations and flood hazard factors determined." Due to the close proximity of this flood zone to the subject site, this site will not be permitted to discharge developed runoff freely downstream.

EXISTING SITE CONDITIONS AND DRAINAGE PATTERN

The site is in a developing area that has no storm drainage systems. It is partially vegetated by desert brush and shrubs, with ground slopes between 2 and 10%. A low-lying pocket exists at the northwest corner of the site, resulting in some on-site ponding at this time. As shown on the grading plan, undeveloped off-site runoff from the west discharges onto this site, with most of it discharging to the low-lying pocket. Along the south, east, and north property lines, runoff discharges off-site.

RELATED REPORTS

According to the West Bluff Drainage Plan, a future storm drain system is slated for construction in Los Volcanes Road. This storm drain is identified as System 512 in Appendix D. This future system has not been designed; however, it is anticipated that it will have the capacity to discharge a portion of the developed runoff from the subject site. As shown in the West Bluff Drainage Plan, two future storm drain connections have been identified adjacent to the subject site. These are indicated on the grading plan, with their future elevations.

The Atrisco Business Park Master Drainage Plan by Easterling and Associates identified

the off-site flow from the west that discharges onto the subject site as Basin 200.6. According to that plan, this off-site flow will eventually be redirected to the west into Airport Road.

PROPOSED SITE CONDITIONS AND DRAINAGE PATTERN

The proposed site will consist of 24 duplex apartment units for the elderly. It will consist of a majority of impervious areas (roofs and parking), but a good portion will be landscaped. Because it is for the elderly, the site has been graded to provide good walking accessibility around the entire site, although only certain portions are actually handicap accessible.

The proposed drainage pattern is total site retention, which is consistent with the developed pattern selected for the properties north and east of the subject site. This pattern was selected for these properties because they contribute to a downstream flood hazard zone. By retaining all runoff on-site, these properties make no contribution to potential downstream flooding. However, total site retention is not generally desired as a long-term drainage solution in the City of Albuquerque. In this particular case, total site retention will be done on an interim basis until such time as the storm drain in Los Volcanes Road is constructed. At that time, the 6" drain pipe at the northeast corner of the site will be connected to the storm drain system, and the retention pond system will be converted to a detention pond system.

As shown on the grading plan, 7 retention ponds have been provided. These ponds will be interconnected such that the water surface in the ponds rises and falls together. The 100-year, 10-day volume required for the ponds is computed on page A-3 as 28,750 cubic feet. The system has been designed to provide this volume at a depth of 18". When the pond system exceeds this depth, it will overflow into the public right-of-way at the northeast corner of the site.

The ponds will be landscaped, and will harvest runoff for natural irrigation. The side slopes of the ponds have been designed at 4:1maximum in order to allow for mowing, and to make them more easily accessible. The 4:1slope will be traversable by most seniors.

The site has been designed so that asphalt surfaces are generally sloped at 2%, minimum. There are some cases where asphalt slopes are as low as 1%. This was generally avoided to reduce ponding in paved areas, which would deteriorate the asphalt at a faster rate. Where slopes adjacent to curbs are less than 1.5%, a gutter has been provided with the curb so that any ponding of runoff will occur on concrete surfaces, where it will tend to do less damage.

The site will continue to accept off-site runoff from the west. As calculated on page A-3,

the pond system has been sized to accommodate this runoff in the interim period until it is redirected to the west by future development. Off-site discharge to the properties on the south and east has been virtually eliminated.

HYDROLOGY/HYDRAULICS

The runoff calculations and design have been done in accordance with Section 22.2 of the Development Process Manual of the City of Albuquerque, January 1993. The 100-year, 10-day storm was used to determine the required ponding volume. This volume was computed from the output data provided by the AHYMO run, coupled with equations A-9 and C-9 of Section 22.2.

APPENDIX A

DRAINAGE COMPUTATIONS

Printed October 17, 1996 (6:14am)

CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.

5639 Jefferson Street NE, Albuquerque, New Mexico 87109 *Phone (505) 344-4080 - Fax (505) 343-8759*

RUNOFF CALCULATIONS - SIMPLIFIED PROCEDURE

By: Joe Kelley Date: October 16, 1996

Project: Los Volcanes HUD Housing Zone Atlas: J-10

This procedure is in accordance with the City of Albuquerque Development Process Manual, Volume 2, Section 22.2, "Hydrology", peak discharge rate for small watersheds less than forty acres in size.

Precipitation Zone from Figure A-1: 1
Land treatment descriptions are in Table A-4.

Bond for future.

① How much will this site be allowed to discharge?

② All currents < .4 → how will they ever detain?

1. RUNOFF RATE COMPUTATION

Use Equation a-10: $Q_P = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$

Values of Q_{pi} are from Table A-9, and are in CFS/acre. Area values are in acres.

BASIN	Q_{PA}	A_A	Q_{PB}	A_B	Q_{PC}	A_C	Q_{PD}	A_D	Q_P
EXISTING BASIN RATE OF RUNOFF (CFS)									
On-Site	1.29	0	2.03	3.14	2.87	0	4.37	0	6.37
Off-Site	1.29	0	2.03	1.38	2.87	0	4.37	0	2.80
DEVELOPED BASIN RATE OF RUNOFF (CFS)									
On-Site	1.29	0	2.03	1.31	2.87	0	4.37	1.83	10.66

2. RUNOFF VOLUME COMPUTATION

Use Equation a-5 to compute weighted excess precipitation:

Weighted E = "E" = $(E_A A_A + E_B A_B + E_C A_C + E_D A_D)/(A_A + A_B + A_C + A_D)$

$(A_A + A_B + A_C + A_D) = \sum A_i$

Use Equation a-6 to compute the volume:

V_{360} = "E" x $(A_A + A_B + A_C + A_D)$ x 3630 feet^3/acre·inch

Values of E_i are from Table A-8, and are in inches. Area values are in acres.

BASIN	E_A	A_A	E_B	A_B	E_C	A_C	E_D	A_D	$\sum A_i$	"E"	V_{360}
EXISTING BASIN VOLUME OF RUNOFF (CUBIC FEET)											
On-Site	0.44	0	0.67	3.14	0.99	0	1.97	0	3.14	0.67	7637
Off-Site	0.44	0	0.67	1.38	0.99	0	1.97	0	1.38	0.67	3356
DEVELOPED BASIN VOLUME OF RUNOFF (CUBIC FEET)											
On-Site	0.44	0	0.67	1.31	0.99	0	1.97	1.83	3.14	1.43	16273

CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.

5639 Jefferson Street NE, Albuquerque, New Mexico 87109 *Phone (505) 344-4080 - Fax (505) 343-8759*

RETENTION POND VOLUME CALCULATIONS

By: Joe Kelley Date: October 16, 1996

Project: Los Volcanes HUD Housing Zone Atlas: J-10

This procedure is in accordance with the City of Albuquerque Development Process Manual, Volume 2, Section 22.2, "Hydrology", Equations c-7 and a-9.

BASIN	Q_{360} (CFS)	V_{360} (AC-FT)	A_D (AC)	$V_{10\text{-DAY}}$ (AC-FT)	$V_{10\text{-DAY}}$ (CU-FT)
On-Site	10.66	0.374	1.83	0.58	25,264.80
Off-Site	2.8	0.077	0	0.08	3,484.80

THE ENGINEERING FIRM OF CHOICE

CHAVEZ · GRIEVES
CONSULTING ENGINEERS, INC.

5639 JEFFERSON STREET NE · ALBUQUERQUE, NEW MEXICO 87109 · PHONE (505) 344·4080 · FAX (505) 343·8759

November 12, 1996

City of Albuquerque
Hydrology Division
City/County Building Room 301
Albuquerque, NM 87103

RE: LOS VOLCANES HUD HOUSING
C-G PROJECT NUMBER: S60-100-0096

Dear Sir or Madam:

A grading and drainage plan prepared by Jeff Mortensen and Associates has been approved for this site. We were subsequently commissioned by the Architect to revise JMA's grading plan in order to remove the retaining walls and deep ponds. We have revised this plan in accordance with that directive.

We have recomputed the hydrology for this site independent of the prior submittal. The results we obtained are consistent with the prior plan, as they should be. The pattern of runoff has not changed with this present design. As stated before, the only major change is the reconfiguration of ponds to reduce their depth and increase their usability.

Should you have any questions or comments prior to approval please feel free to call.

Sincerely,

CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.

Joe Kelley

Joe P. Kelley, P.E.
Senior Engineer

JPK/lr

CY: Vic Chavez
Fritz Wiebelhaus, Garret Smith LTD.

RECEIVED
NOV 13
HYDROLOGY DIVIS

DRAINAGE INFORMATION

PROJECT TITLE: Los Volcanes HUD Housing ZONE ATLAS/DRNG. FILE #: J-10-Z / 122

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

LEGAL DESCRIPTION: Lot 2-B, Tract N, Unit 2, Atrisco Business Park

CITY ADDRESS: Los Volcanes Road, SW

ENGINEERING FIRM: Chavez-Grieves CONTACT: Joe Kelley, P.E.

ADDRESS: 5639 Jefferson NE PHONE: 344-4080

OWNER: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

ARCHITECT: Garrett Smith Ltd CONTACT: Fritz Wiebelhaus

ADDRESS: _____ PHONE: 766-6968

SURVEYOR: Forstbauer Surveying CONTACT: Ron Forstbauer, L.S.

ADDRESS: _____ PHONE: 268-2112

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

_X_ DRAINAGE REPORT

_X_ DRAINAGE PLAN

____ CONCEPTUAL GRADING & DRAINAGE PLAN

_X_ GRADING PLAN

_X_ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

____ OTHER

PRE-DESIGN MEETING:

____ YES

_X_ NO

____ COPY PROVIDED

DATE SUBMITTED: Nov. 12, 1996

BY: Joe P. Kelley, P.E.

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

____ PRELIMINARY PLAT APPROVAL

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

____ S. DEV. PLAN FOR BLDG. PRMT. APPROVAL

____ SECTOR PLAN APPROVAL

____ FINAL PLAT APPROVAL

____ FOUNDATION PERMIT APPROVAL

_X_ BUILDING PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

____ GRADING PERMIT APPROVAL

____ PAVING PERMIT APPROVAL

____ S.A.D. DRAINAGE REPORT

____ DRAINAGE REQUIREMENTS

____ OTHER _____ (SPECIFY)

DRAINAGE INFORMATION SHEET

960112

PROJECT TITLE: HUD HOUSING ZONE ATLAS/DRNG. FILE #: J10/D17

DRB #: 96-119 EPC #: _____ WORK ORDER #: 5399.90

LEGAL DESCRIPTION: A PORTION OF LOT 2-B, TRACT N, UNIT 2, ATRISCO BUSINESS PARK

CITY ADDRESS: LOS VOLCANES RD NW

ENGINEERING FIRM: JMA CONTACT: GRAEME MEANS

ADDRESS: 6010-B MIDWAY PARK BLVD NE PHONE: 345-4250

OWNER: AHEPA 501 INC. CONTACT: TODD CHROMIS ARCHITECT

ADDRESS: 5925 Central NW 87121 PHONE: _____

ARCHITECT: GARRETT SMITH LTD CONTACT: GORDON CRABTREE

ADDRESS: 514 CENTRAL SW PHONE: 766-6968

SURVEYOR: RONALD A. FORSTRAUER CONTACT: RON FORSTRAUER

ADDRESS: 1110 ALVARADO NE SUITE C PHONE: 268-2112

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT
X 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 PLAT APPROVAL
___ PRELIMINARY PLAT APPROVAL
___ S. DEV. PLAN FOR SUB'D. APPROVAL
___ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
___ SECTOR PLAN APPROVAL
X FINAL PLAT APPROVAL
___ FOUNDATION PERMIT APPROVAL
X BUILDING PERMIT APPROVAL
___ CERTIFICATE OF OCCUPANCY APPROVAL
___ GRADING PERMIT APPROVAL
___ PAVING PERMIT APPROVAL
___ S.A.D. DRAINAGE REPORT
___ DRAINAGE REQUIREMENTS
X OTHER SO #19 (SPECIFY)

RECEIVED
MAY - 8 1996
HYDROLOGY SECTION

DATE SUBMITTED: 05/08/96

BY: J. GRAEME MEANS

DRAINAGE INFORMATION SHEET

960112

PROJECT TITLE: HUD HOUSING ZONE ATLAS/DRNG. FILE #: J-10/W19

DRB #: 96-119 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: A PORTION OF LOT 2-B, TRACT N, UNIT 2, ATRISCO BUSINESS PARK

CITY ADDRESS: LOS VOLCANES RD NW

ENGINEERING FIRM: JMA CONTACT: J. GRAEME MEANS

ADDRESS: 6010-B MIDWAY PARK BLVD NE PHONE: 345-4250

OWNER: AHEPA 501 INC. CONTACT: ARCHITECT

ADDRESS: _____ PHONE: _____

ARCHITECT: GARRETT SMITH CONTACT: GORDON CRABTREE

ADDRESS: 514 CENTRAL S.W. PHONE: 766-6968

SURVEYOR: RONALD A. FORSTBAUER CONTACT: RON FORSTBAUER

ADDRESS: 1110 ALVARADO NE SUITE C PHONE: 268-2112

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT
X 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 PLAT 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
X BUILDING PERMIT APPROVAL
___ CERTIFICATE OF OCCUPANCY APPROVAL
___ GRADING PERMIT APPROVAL
___ PAVING PERMIT APPROVAL
___ S.A.D: DRAINAGE REPORT
___ DRAINAGE REQUIREMENTS
___ OTHER (SPECIFY)

RECEIVED
MAR 13 1996
HYDROLOGY DIVISION

DATE SUBMITTED: 03-13-96

BY: J. GRAEME MEANS

See
T10/D2L
for more info

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 26, 1996

your response to
make proper correction to
SAD once its available
SP drawing
+ permit

Graeme Means
Jeff Mortensen & Assoc.
6010-B Midway Park Blvd. NE
Albuquerque, NM 87109

RE: HUD HOUSING (J10-D17) DRAINAGE AND GRADING PLAN FOR BUILDING PERMIT APPROVAL. ENGINEER'S STAMP DATED MARCH 12, 1996.

Dear Mr. Means:

Based on the information provided on your March 13, 1996 submittal, please address the following comments:

1. According to the West Bluff Drainage Master Plan, an 84 inch storm drain is to be placed along Los Volcanes Road adjacent to your site. The owners will be required to bond the portion of pipe along their property line.

2. Please give information on exactly where and how you plan on releasing the offsite flow. What point does the offsite flow leave the site historically?

3. Please design and discuss emergency spillways for the ponds.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

CITY OF
Albuquerque

June 12, 1996

Martin J. Chávez, Mayor

Graeme Means
Jeff Mortensen & Assoc.
6010-B Midway Park Blvd. NE
Albuquerque, NM 87109

RE: HUD HOUSING (J10-D17) DRAINAGE AND GRADING PLAN FOR FINAL PLAT, BUILDING PERMIT, AND SO #19 PERMIT APPROVALS. ENGINEER'S STAMP DATED MAY 7, 1996.

Dear Mr. Means:

Based on the information provided on your May 8, 1996 submittal, the above referenced project is approved for Final Plat, Building Permit, and SO #19 Permit.

The developer of this property will be responsible for the following:

1. Making the proper connection to the Los Volcanes Storm Drain, once it is available.

2. Participating in the Special Assesment District for the Los Volcanes Storm Drain.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Tasso Chronis - AHEPA 501, Inc.
Gordon Crabtree - Garrett Smith, Ltd.
Arlene Portillo - COA
Andrew Garcia - COA
File

CHAVEZ · GRIEVES
CONSULTING ENGINEERS, INC.

5639 JEFFERSON STREET NE · ALBUQUERQUE, NEW MEXICO 87109 · PHONE (505) 344·4080 · FAX (505) 343 8759

March 17, 1997

Infrastruce List?

Ms. Lisa Manwill, P.E.
City Hydrology
P.O. Box 1293
Albuquerque, NM 87103

RE: LOS VOLCANES HUD HOUSING (J10/D2L)
C-G PROJECT NUMBER: S60-100-5196

Dear Ms. Manwill:

This grading and drainage plan is hereby submitted for final approval. The plan has been revised in accordance with the discussion on March 12, 1997, between yourself, Fred Aguire, and Vic Chavez. The outcome of the meeting was that retention ponding as was originally approved will continue to be allowed on this site on an interim basis until a public storm drain is built in Los Volcanes Road. At that time, two connections will be made to the public storm drain, including one at the northeast pond, and one at the northwest pond. A 10" pipe has been added to the plan, discharging from the central pond to the northeast pond. This pipe will be installed at a slope that will provide for positive discharge of runoff from the central pond to the northeast pond, and the central pond can be filled at that time, up to the invert elevation of this 10" pipe if so desired. The runoff calculations that have been performed for this detention ponding system do not require anymore storage than that provided by the northeast, northwest and central ponds. The remaining on-site ponds can be filled at that time if so desired. If they are filled, the runoff will need to be redirected via underground or above ground storm conveyance to the central pond system.

As is shown by the calculations in the report, this detention pond system will discharge runoff from the site at a rate much less than the historical flow rate. In the meantime, the ponds have been sized to retain the 100 year, 10-day storm runoff in accordance with City requirements.

If you should have any questions prior to your approval, please feel free to call me or Jeanne Wolfenbarger.

Sincerely,

CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.

Joe Kelley by l.r.

Joe P. Kelley, P.E.
Senior Engineer

JPK/lr

cc: Vic Chavez
Fritz Wiebelhaus, Garret Smith Architects

RECEIVED
MAR 18 1997
HYDROLOGY SECTION

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See
J10/017
for more info.

DRAINAGE INFORMATION

PROJECT TITLE: Los Volcanes HUD Housing ZONE ATLAS/DRNG. FILE #: J-10-Z

DRB#: 96-347 EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: Lot 2-B, Tract N, Unit 2, Atrisco Business Park

CITY ADDRESS: Los Volcanes Road, SW

ENGINEERING FIRM: Chavez-Grieves CONTACT: Joe Kelley, P.E.

ADDRESS: 5639 Jefferson NE PHONE: 344-4080

OWNER: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

ARCHITECT: Garrett Smith Ltd CONTACT: Fritz Wiebelhaus

ADDRESS: _____ PHONE: 766-6968

SURVEYOR: Forstbauer Surveying CONTACT: Ron Forstbauer, L.S.

ADDRESS: _____ PHONE: 268-2112

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

____ DRAINAGE REPORT

_X_ DRAINAGE PLAN

____ CONCEPTUAL GRADING & DRAINAGE PLAN

_X_ GRADING PLAN

_X_ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

____ OTHER

PRE-DESIGN MEETING:

____ YES

_X_ NO

____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

____ PRELIMINARY PLAT APPROVAL

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

____ S. DEV. PLAN FOR BLDG. PRMT. APPROVAL

____ SECTOR PLAN APPROVAL

____ FINAL PLAT APPROVAL

____ FOUNDATION PERMIT APPROVAL

_X_ BUILDING PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

____ GRADING PERMIT APPROVAL

____ PAVING PERMIT APPROVAL

____ S.A.D. DRAINAGE REPORT

____ DRAINAGE REQUIREMENTS

____ OTHER _____ (SPECIFY)

DATE SUBMITTED: Feb. 21, 1997

BY: Joe P. Kelley, P.E.

RECEIVED
FEB 21 1997
HYDROLOGY SECTION

THE ENGINEERING FIRM OF CHOICE

CHAVEZ · GRIEVES
CONSULTING ENGINEERS, INC.

5639 JEFFERSON STREET NE · ALBUQUERQUE, NEW MEXICO 87109 · PHONE (505) 344·4080 · FAX (505) 343·8759

February 21, 1997

Ms. Lisa Manwill
City of Albuquerque Hydrology
P.O. Box 1293
Albuquerque, NM 87103

RE: LOS VOLCANES HUD HOUSING (J10-D2L)
C-G PROJECT NUMBER: S60-100-5196

Dear Ms. Manwill:

Transmitted herewith for building permit approval is the attached grading plan which has been revised in accordance with your comments of January 13, 1997. Your comments have been addressed as follows:

1. The DRB number is provided on the attached Drainage Information Sheet.

2. Per a letter you had written on June 12, 1996, the conceptual grading plan was approved. This plan shows temporary retention ponding. You had mentioned that the developer is responsible for making the connection to the Los Volcanes storm drain once it is constructed under SAD 512. Refer to the attached letters.

3. The ponds will eventually act as a detention pond system once the storm drain connection is installed. Refer to the attached AHYMO calculations which show that the pond system drains in 19.66 hours. The proposed pipe to the street as well as the pipe discharging to the pond on the far northeast corner of the site were upsized from 6" to 8" pipes to provide this discharge.

Should you have any questions prior to your approval, please give me a call.

Sincerely,

CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.

Joe P. Kelley, P.E.
Senior Engineer

JPK/lr

CY: Fritz Wiebelhaus, Garrett Smith Architects

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CITY OF
Albuquerque

June 12, 1996

Martin J. Chávez, Mayor

Graeme Means
Jeff Mortensen & Assoc.
6010-B Midway Park Blvd. NE
Albuquerque, NM 87109

RE: HUD HOUSING (J10-D17) DRAINAGE AND GRADING PLAN FOR FINAL PLAT, BUILDING PERMIT, AND SO #19 PERMIT APPROVALS. ENGINEER'S STAMP DATED MAY 7, 1996.

Dear Mr. Means:

Based on the information provided on your May 8, 1996 submittal, the above referenced project is approved for Final Plat, Building Permit, and SO #19 Permit.

The developer of this property will be responsible for the following:

1. Making the proper connection to the Los Volcanes Storm Drain, once it is available.

2. Participating in the Special Assesment District for the Los Volcanes Storm Drain.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Tasso Chronis - AHEPA 501, Inc.
Gordon Crabtree - Garrett Smith, Ltd.
Arlene Portillo - COA
Andrew Garcia - COA
File

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 26, 1996

Graeme Means
Jeff Mortensen & Assoc.
6010-B Midway Park Blvd. NE
Albuquerque, NM 87109

RE: HUD HOUSING (J10-D17) DRAINAGE AND GRADING PLAN FOR BUILDING PERMIT APPROVAL. ENGINEER'S STAMP DATED MARCH 12, 1996.

Dear Mr. Means:

Based on the information provided on your March 13, 1996 submittal, please address the following comments:

1. According to the West Bluff Drainage Master Plan, an 84 inch storm drain is to be placed along Los Volcanes Road adjacent to your site. The owners will be required to bond the portion of pipe along their property line.

2. Please give information on exactly where and how you plan on releasing the offsite flow. What point does the offsite flow leave the site historically?

3. Please design and discuss emergency spillways for the ponds.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 02/20/1997
         START TIME (HR:MIN:SEC) = 08:59:52     USER NO.= CHVZ_GNM.I01
         INPUT FILE = G:\S60\100\AHYMO2.IN

*S*****************************************************************************
*S*************    CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.    *S*************
*S*************                  LOS VOLCANES                   *************
*S*****************************************************************************
*S*  FILENAME:  G:\S60\100\AHYMO.IN/OUT
*S*****************************************************************************
*S******* 100 YEAR, 24 HOUR STORM (Section 22.2 Hydrology)
START               0.00
RAINFALL            TYPE=2 RAIN QUARTER=0.0 RAIN ONE=1.87
                    RAIN SIX=2.20  RAIN DAY=2.66 DT=0.03333


                COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                DT =    .033330 HOURS       END TIME =    19.964670 HOURS
                   .0000   .0016   .0033   .0050   .0067   .0085   .0103
                   .0122   .0141   .0160   .0180   .0201   .0222   .0243
                   .0266   .0289   .0312   .0337   .0362   .0388   .0415
                   .0443   .0472   .0502   .0534   .0567   .0601   .0637
                   .0675   .0715   .0758   .0809   .0865   .0924   .1050
                   .1334   .1771   .2398   .3254   .4379   .5814   .7600
                   .9780  1.1804  1.2649  1.3363  1.3997  1.4575  1.5106
                  1.5600  1.6061  1.6493  1.6900  1.7284  1.7646  1.7989
                  1.8314  1.8623  1.8915  1.9193  1.9456  1.9518  1.9576
                  1.9630  1.9682  1.9732  1.9780  1.9825  1.9869  1.9912
                  1.9953  1.9993  2.0031  2.0068  2.0104  2.0140  2.0174
                  2.0207  2.0240  2.0272  2.0303  2.0333  2.0363  2.0392
                  2.0420  2.0448  2.0475  2.0502  2.0528  2.0554  2.0580
                  2.0605  2.0629  2.0653  2.0677  2.0700  2.0723  2.0746
                  2.0768  2.0790  2.0812  2.0833  2.0855  2.0875  2.0896
                  2.0916  2.0936  2.0956  2.0976  2.0995  2.1014  2.1033
                  2.1051  2.1070  2.1088  2.1106  2.1124  2.1141  2.1159
                  2.1176  2.1193  2.1210  2.1227  2.1244  2.1260  2.1276
                  2.1292  2.1308  2.1324  2.1340  2.1355  2.1371  2.1386
                  2.1401  2.1416  2.1431  2.1446  2.1460  2.1475  2.1489
                  2.1504  2.1518  2.1532  2.1546  2.1560  2.1573  2.1587
                  2.1600  2.1614  2.1627  2.1640  2.1654  2.1667  2.1680
                  2.1692  2.1705  2.1718  2.1731  2.1743  2.1756  2.1768
                  2.1780  2.1792  2.1804  2.1817  2.1829  2.1840  2.1852
                  2.1864  2.1876  2.1887  2.1899  2.1910  2.1922  2.1933
                  2.1944  2.1956  2.1967  2.1978  2.1989  2.2000  2.2013
                  2.2026  2.2039  2.2052  2.2065  2.2078  2.2091  2.2103
                  2.2116  2.2129  2.2142  2.2155  2.2167  2.2180  2.2193
                  2.2205  2.2218  2.2230  2.2243  2.2255  2.2268  2.2280
                  2.2293  2.2305  2.2318  2.2330  2.2342  2.2354  2.2367
                  2.2379  2.2391  2.2403  2.2415  2.2428  2.2440  2.2452
                  2.2464  2.2476  2.2488  2.2500  2.2512  2.2524  2.2536
                  2.2547  2.2559  2.2571  2.2583  2.2595  2.2606  2.2618
                  2.2630  2.2641  2.2653  2.2665  2.2676  2.2688  2.2699
                  2.2711  2.2722  2.2734  2.2745  2.2757  2.2768  2.2779
                  2.2791  2.2802  2.2813  2.2825  2.2836  2.2847  2.2858
                  2.2870  2.2881  2.2892  2.2903  2.2914  2.2925  2.2936
                  2.2947  2.2958  2.2969  2.2980  2.2991  2.3002  2.3013
                  2.3024  2.3035  2.3046  2.3057  2.3067  2.3078  2.3089
                  2.3100  2.3110  2.3121  2.3132  2.3142  2.3153  2.3164
                  2.3174  2.3185  2.3195  2.3206  2.3216  2.3227  2.3237
                  2.3248  2.3258  2.3269  2.3279  2.3290  2.3300  2.3310
                  2.3321  2.3331  2.3341  2.3352  2.3362  2.3372  2.3382
                  2.3392  2.3403  2.3413  2.3423  2.3433  2.3443  2.3453
                  2.3463  2.3473  2.3483  2.3493  2.3503  2.3513  2.3523
```

2.3533 2.3543 2.3553 2.3563 2.3573 2.3583 2.3593
2.3603 2.3612 2.3622 2.3632 2,3642 2.3651 2.3661
2.3671 2.3681 2.3690 2.3700 2.3710 2.3719 2.3729
2.3738 2.3748 2.3758 2.3767 2.3777 2.3786 2.3796
2.3805 2.3815 2.3824 2.3834 2.3843 2.3852 2.3862
2.3871 2.3881 2.3890 2.3899 2.3909 2.3918 2.3927
2.3936 2.3946 2.3955 2.3964 2.3973 2.3983 2.3992
2.4001 2.4010 2.4019 2.4028 2.4038 2.4047 2.4056
2.4065 2.4074 2.4083 2.4092 2.4101 2.4110 2.4119
2.4128 2.4137 2.4146 2.4155 2.4164 2.4173 2.4181
2.4190 2.4199 2.4208 2.4217 2.4226 2.4234 2.4243
2.4252 2.4261 2.4270 2.4278 2.4287 2.4296 2.4304
2.4313 2.4322 2.4331 2.4339 2.4348 2.4356 2.4365
2.4374 2.4382 2.4391 2.4399 2.4408 2.4416 2.4425
2.4434 2.4442 2.4450 2.4459 2.4467 2.4476 2.4484
2.4493 2.4501 2.4510 2.4518 2.4526 2.4535 2.4543
2.4551 2.4560 2.4568 2.4576 2.4585 2.4593 2.4601
2.4609 2.4618 2.4626 2.4634 2.4642 2.4651 2.4659
2.4667 2.4675 2.4683 2.4691 2.4700 2.4708 2.4716
2.4724 2.4732 2.4740 2.4748 2.4756 2.4764 2.4772
2.4780 2.4788 2.4796 2.4804 2.4812 2.4820 2.4828
2.4836 2.4844 2.4852 2.4860 2.4868 2.4876 2.4884
2.4892 2.4899 2.4907 2.4915 2.4923 2.4931 2.4939
2.4946 2.4954 2.4962 2.4970 2.4978 2.4985 2.4993
2.5001 2.5008 2.5016 2.5024 2.5032 2.5039 2.5047
2.5055 2.5062 2.5070 2.5078 2.5085 2.5093 2.5100
2.5108 2.5116 2.5123 2.5131 2.5138 2.5146 2.5153
2.5161 2.5168 2.5176 2.5183 2.5191 2.5198 2.5206
2.5213 2.5221 2.5228 2.5236 2.5243 2.5250 2.5258
2.5265 2.5273 2.5280 2.5287 2.5295 2.5302 2.5309
2.5317 2.5324 2.5331 2.5339 2.5346 2.5353 2.5361
2.5368 2.5375 2.5382 2.5390 2.5397 2.5404 2.5411
2.5418 2.5426 2.5433 2.5440 2.5447 2.5454 2.5462
2.5469 2.5476 2.5483 2.5490 2.5497 2.5504 2.5511
2.5518 2.5526 2.5533 2.5540 2.5547 2.5554 2.5561
2.5568 2.5575 2.5582 2.5589 2.5596 2.5603 2.5610
2.5617 2.5624 2.5631 2.5638 2.5645 2.5652 2.5659
2.5665 2.5672 2.5679 2.5686 2.5693 2.5700 2.5707
2.5714 2.5721 2.5727 2.5734 2.5741 2.5748 2.5755
2.5761 2.5768 2.5775 2.5782 2.5789 2.5795 2.5802
2.5809 2.5816 2.5822 2.5829 2.5836

```
*S COMPUTE RUNOFF FROM ON-SITE BASIN
COMPUTE NM HYD      ID=1 HYD=ON_SITE DA=0.00491 SQ MI
                    %A=0 %B=42 %C=0 %D=58
                    TP=0.1333 RAINFALL=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   11.243    CFS   UNIT VOLUME =    .9984       B =   526.28      P60 = 1.8700
    AREA =      .002848 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
    UNIT PEAK =   5.0602    CFS   UNIT VOLUME =    .9975       B =   327.09      P60 = 1.8700
    AREA =      .002062 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=1 CODE=1

                                    HYDROGRAPH FROM AREA ON_SITE


    RUNOFF VOLUME =     1.64049 INCHES     =        .4296 ACRE-FEET
    PEAK DISCHARGE RATE =      10.64 CFS  AT   1.500 HOURS   BASIN AREA =   .0049 SQ. MI.
```

```
*S COMPUTE RUNOFF FROM OFF-SITE BASIN
COMPUTE NM HYD       ID=2 HYD=OFF_SITE DA=0.00216 SQ MI
                     %A=0 %B=100 %C=0 %D=0
                     TP=0.1333 RAINFALL=-1

    K =   .130992HR    TP =   .133300HR   K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
    UNIT PEAK =   5.3001    CFS   UNIT VOLUME =    .9977       B =   327.09      P60 = 1.8700
    AREA =      .002160 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=2 CODE=1

                                        HYDROGRAPH FROM AREA OFF_SITE


    RUNOFF VOLUME =      .66738 INCHES     =        .0769 ACRE-FEET
    PEAK DISCHARGE RATE =       2.81 CFS  AT   1.533 HOURS   BASIN AREA =   .0022 SQ. MI.



*S  ADD ON_SITE AND OFF-SITE BASIN
ADD HYD              ID=1  HYD NO=BASIN_A,B ID I=1 ID II=2
PRINT HYD            ID=1 CODE=1

                                        HYDROGRAPH FROM AREA BASIN_A,B


    RUNOFF VOLUME =     1.34317 INCHES     =        .5065 ACRE-FEET
    PEAK DISCHARGE RATE =      13.44 CFS  AT   1.500 HOURS   BASIN AREA =   .0071 SQ. MI.



*S ROUTE ON-SITE AND OFF-SITE BASIN THROUGH THE DETENTION POND
ROUTE RESERVOIR      ID=2  HYD NO=BASIN_ROUTE INFLOW ID=1 CODE=10
                     OUTFLOW(CFS)   STORAGE(AC-FT)  ELEVATION(FT)
                     0               0              0
                     2.30            0.66           1.5

  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

    TIME       INFLOW     ELEV       VOLUME     OUTFLOW
    (HRS)      (CFS)      (FEET)     (AC-FT)    (CFS)

      .00         .00        .00        .000        .00
      .33         .00        .00        .000        .00
      .67         .00        .00        .000        .00
     1.00         .00        .00        .000        .00
     1.33        2.57        .03        .012        .04
     1.67        7.08        .58        .256        .89
     2.00        2.47        .77        .338       1.18
     2.33         .62        .78        .343       1.20
     2.67         .26        .73        .322       1.12
     3.00         .13        .68        .298       1.04
     3.33         .08        .62        .273        .95
     3.67         .05        .57        .249        .87
     4.00         .05        .52        .228        .79
     4.33         .05        .47        .208        .73
     4.67         .05        .43        .190        .66
     5.00         .05        .40        .174        .61
     5.33         .05        .36        .159        .56
```

5.67	.05	.33	.146	.51
6.00	.06	.31	.134	.47
6.33	.07	.28	.124	.43
6.67	.07	.26	.114	.40
7.00	.07	.24	.106	.37
7.33	.07	.22	.098	.34
7.67	.07	.21	.090	.32
8.00	.06	.19	.084	.29
8.33	.06	.18	.078	.27
8.67	.06	.16	.072	.25
9.00	.06	.15	.067	.23
9.33	.06	.14	.063	.22
9.67	.06	.13	.059	.20
10.00	.06	.12	.055	.19
10.33	.06	.12	.051	.18
10.67	.06	.11	.048	.17
11.00	.05	.10	.045	.16
11.33	.05	.10	.042	.15
11.67	.05	.09	.040	.14
12.00	.05	.09	.037	.13
12.33	.05	.08	.035	.12
12.67	.05	.08	.033	.12
13.00	.05	.07	.032	.11
13.33	.05	.07	.030	.10
13.67	.05	.06	.029	.10
14.00	.05	.06	.027	.09
14.33	.05	.06	.026	.09
14.67	.05	.06	.025	.09
15.00	.04	.05	.024	.08
15.33	.04	.05	.023	.08
15.67	.04	.05	.022	.08
16.00	.04	.05	.021	.07
16.33	.04	.05	.020	.07
16.67	.04	.04	.019	.07
17.00	.04	.04	.019	.07
17.33	.04	.04	.018	.06
17.66	.04	.04	.017	.06
18.00	.04	.04	.017	.06
18.33	.04	.04	.016	.06

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
18.66	.04	.04	.016	.06
19.00	.04	.04	.016	.05
19.33	.04	.03	.015	.05
19.66	.04	.03	.015	.05

PEAK DISCHARGE = 1.213 CFS - PEAK OCCURS AT HOUR 2.17
MAXIMUM WATER SURFACE ELEVATION = .791
MAXIMUM STORAGE = .3481 AC-FT INCREMENTAL TIME= .033330HRS

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA BASIN_ROUTE

RUNOFF VOLUME = 1.30509 INCHES = .4921 ACRE-FEET
PEAK DISCHARGE RATE = 1.21 CFS AT 2.166 HOURS BASIN AREA = .0071 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 08:59:54

CHAVEZ · GRIEVES
CONSULTING ENGINEERS, INC.

5639 JEFFERSON STREET NE · ALBUQUERQUE, NEW MEXICO 87109 · PHONE (505) 344-4080 · FAX (505) 343 8759

GRADING AND DRAINAGE PLAN

FOR

LOS VOLCANES HUD HOUSING

ALBUQUERQUE, NEW MEXICO

MARCH 1997

CHAVEZ · GRIEVES
CONSULTING ENGINEERS, INC.

5639 JEFFERSON STREET NE · ALBUQUERQUE, NEW MEXICO 87109 · PHONE (505) 344·4080 · FAX (505) 343·8759

GRADING AND DRAINAGE PLAN

FOR

LOS VOLCANES HUD HOUSING

ALBUQUERQUE, NEW MEXICO

Joe Kelley
3/14/97

MARCH 1997

LOCATION

This site is located on Albuquerque's west side, on the south side of Los Volcanes Road, about 1/4 mile west of Coors Blvd.

LEGAL DESCRIPTION

A portion of Lot 2-B, Tract N, Unit 2, Atrisco Business Park as shown on plat of Lots 2-A and 2-B, Tract N, Unit 2, Atrisco Business Park, filed 6-30-1995, 95C-242.

FLOOD HAZARD ZONES

As shown by Panel 3500020027 of the National Flood Insurance Rate Maps for the City of Albuquerque, dated October 14, 1983, the site is not in a designated flood hazard zone. However, as shown on the grading plan, there is a flood hazard Zone A4 (EL 5101) adjacent to the site. Zone A4 designates "areas of 100-year flood; base flood elevations and flood hazard factors determined." Due to the close proximity of this flood zone to the subject site, this site will not be permitted to discharge developed runoff freely downstream.

EXISTING SITE CONDITIONS AND DRAINAGE PATTERN

The site is in a developing area that has no storm drainage systems. It is partially vegetated by desert brush and shrubs, with ground slopes between 2 and 10%. A low-lying pocket exists at the northwest corner of the site, resulting in some on-site ponding at this time. As shown on the grading plan, undeveloped off-site runoff from the west discharges onto this site, with most of it discharging to the low-lying pocket. Along the south, east, and north property lines, runoff discharges off-site.

RELATED REPORTS

According to the West Bluff Drainage Plan, a future storm drain system is slated for construction in Los Volcanes Road. This storm drain is identified as System 512 in Appendix D. This future system has not been designed; however, it is anticipated that it will have the capacity to discharge a portion of the developed runoff from the subject site. As shown in the West Bluff Drainage Plan, two future storm drain connections have been identified adjacent to the subject site. These are indicated on the grading plan, with their future elevations.

The Atrisco Business Park Master Drainage Plan by Easterling and Associates identified

the off-site flow from the west that discharges onto the subject site as Basin 200.6. According to that plan, this off-site flow will eventually be redirected to the west into Airport Road.

PROPOSED SITE CONDITIONS AND DRAINAGE PATTERN

The proposed site will consist of 24 duplex apartment units for the elderly. It will consist of a majority of impervious areas (roofs and parking), but a good portion will be landscaped. Because it is for the elderly, the site has been graded to provide good walking accessibility around the entire site, although only certain portions are actually handicap accessible.

The proposed drainage pattern is total site retention, which is consistent with the developed pattern selected for the properties north and east of the subject site. This pattern was selected for these properties because they contribute to a downstream flood hazard zone. By retaining all runoff on-site, these properties make no contribution to potential downstream flooding. However, total site retention is not generally desired as a long-term drainage solution in the City of Albuquerque. In this particular case, total site retention will be done on an interim basis until such time as the storm drain in Los Volcanes Road is constructed. At that time, the 6" drain pipe at the northeast corner of the site will be connected to the storm drain system, and the retention pond system will be converted to a detention pond system.

As shown on the grading plan, 7 retention ponds have been provided. These ponds will be interconnected such that the water surface in the ponds rises and falls together. The 100-year, 10-day volume required for the ponds is computed on page A-3 as 28,750 cubic feet. The system has been designed to provide this volume at a depth of 18". When the pond system exceeds this depth, it will overflow into the public right-of-way at the northeast corner of the site.

The ponds will be landscaped, and will harvest runoff for natural irrigation. The side slopes of the ponds have been designed at 4:1maximum in order to allow for mowing, and to make them more easily accessible. The 4:1slope will be traversable by most seniors.

The site has been designed so that asphalt surfaces are generally sloped at 2%, minimum. There are some cases where asphalt slopes are as low as 1%. This was generally avoided to reduce ponding in paved areas, which would deteriorate the asphalt at a faster rate. Where slopes adjacent to curbs are less than 1.5%, a gutter has been provided with the curb so that any ponding of runoff will occur on concrete surfaces, where it will tend to do less damage.

The site will continue to accept off-site runoff from the west. As calculated on page A-3,

the pond system has been sized to accommodate this runoff in the interim period until it is redirected to the west by future development. Off-site discharge to the properties on the south and east has been virtually eliminated.

A sloped 10" pipe will be installed from the center pond to the northeast pond for timely stormwater conveyance. Under future conditions, the center pond can be filled to the pipe invert elevation if desired. In the AHYMO run on pages A-4 through A-12, this pond was modeled to be filled to the pipe invert elevation.

FUTURE CONDITIONS

A storm drain will be constructed in Los Volcanes Road in the future. At that time, the pond system will be connected to the storm drain and will act as a detention ponding system. The only ponds that will remain in place at that time are the center pond, and the ponds on the northwest and the northeast corner of the site; the remaining ponds can be filled with dirt or abandoned in place, as long as the runoff from those areas is directed to the main ponds via underground or overland flow. At that time, an 8" storm drain connection will be made from each of the corner ponds to future inlets on Los Volcanes Road. As shown by the AHYMO run on pages A-4 through A-12, the ponds will drain the 100-year storm within 24 hours. The 100-year runoff discharged from the site will be 2.82 cfs which is lower than the existing on-site 100-year runoff of 6.37 cfs (page A-12). Pipe capacity calculations may be found on page A-13.

HYDROLOGY/HYDRAULICS

The runoff calculations and design have been done in accordance with Section 22.2 of the Development Process Manual of the City of Albuquerque, January 1993. The 100-year, 10-day storm was used to determine the required ponding volume. This volume was computed from the output data provided by the AHYMO run, coupled with equations A-9 and C-9 of Section 22.2.

APPENDIX A

DRAINAGE COMPUTATIONS

Printed October 17, 1996 (6:14am)

CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.

5639 Jefferson Street NE, Albuquerque, New Mexico 87109 *Phone (505) 344-4080 - Fax (505) 343-8759*

RUNOFF CALCULATIONS - SIMPLIFIED PROCEDURE

By: Joe Kelley Date: October 16, 1996

Project: Los Volcanes HUD Housing Zone Atlas: J-10

This procedure is in accordance with the City of Albuquerque Development Process Manual, Volume 2, Section 22.2, "Hydrology", peak discharge rate for small watersheds less than forty acres in size.

Precipitation Zone from Figure A-1: 1
Land treatment descriptions are in Table A-4.

1. RUNOFF RATE COMPUTATION

Use Equation a-10: $Q_P = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$

Values of Q_{pi} are from Table A-9, and are in CFS/acre. Area values are in acres.

BASIN	Q_{PA}	A_A	Q_{PB}	A_B	Q_{PC}	A_C	Q_{PD}	A_D	Q_P
EXISTING BASIN RATE OF RUNOFF (CFS)									
On-Site	1.29	0	2.03	3.14	2.87	0	4.37	0	6.37
Off-Site	1.29	0	2.03	1.38	2.87	0	4.37	0	2.80
DEVELOPED BASIN RATE OF RUNOFF (CFS)									
On-Site	1.29	0	2.03	1.31	2.87	0	4.37	1.83	10.66

2. RUNOFF VOLUME COMPUTATION

Use Equation a-5 to compute weighted excess precipitation:

Weighted E = "E" = $(E_A A_A + E_B A_B + E_C A_C + E_D A_D)/(A_A + A_B + A_C + A_D)$

$(A_A + A_B + A_C + A_D) = \sum A_i$

Use Equation a-6 to compute the volume:

V_{360} = "E" x $(A_A + A_B + A_C + A_D)$ x 3630 feet^3/acre·inch

Values of E_i are from Table A-8, and are in inches. Area values are in acres.

BASIN	E_A	A_A	E_B	A_B	E_C	A_C	E_D	A_D	$\sum A_i$	"E"	V_{360}
EXISTING BASIN VOLUME OF RUNOFF (CUBIC FEET)											
On-Site	0.44	0	0.67	3.14	0.99	0	1.97	0	3.14	0.67	7637
Off-Site	0.44	0	0.67	1.38	0.99	0	1.97	0	1.38	0.67	3356
DEVELOPED BASIN VOLUME OF RUNOFF (CUBIC FEET)											
On-Site	0.44	0	0.67	1.31	0.99	0	1.97	1.83	3.14	1.43	16273

CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.

5639 Jefferson Street NE, Albuquerque, New Mexico 87109 *Phone (505) 344-4080 - Fax (505) 343-8759*

RETENTION POND VOLUME CALCULATIONS

By: Joe Kelley Date: October 16, 1996

Project: Los Volcanes HUD Housing Zone Atlas: J-10

This procedure is in accordance with the City of Albuquerque Development Process Manual, Volume 2, Section 22.2, "Hydrology", Equations c-7 and a-9.

BASIN	Q_{360} (CFS)	V_{360} (AC-FT)	A_D (AC)	$V_{10\text{-DAY}}$ (AC-FT)	$V_{10\text{-DAY}}$ (CU-FT)
On-Site	10.66	0.374	1.83	0.58	25,264.80
Off-Site	2.8	0.077	0	0.08	3,484.80

LOS VOLCANES HUD HOUSING AHYMO OUTPUT

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 03/14/1997
         START TIME (HR:MIN:SEC) = 12:22:26     USER NO.= CHVZ_GNM.I01
         INPUT FILE = G:\S60\100\AHYMO.IN

*S**
*****************************************************************************
*S*************    CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.    *S*************
*S*************                  LOS VOLCANES                   *************
*S*****************************************************************************
*S*  FILENAME:  G:\S60\100\AHYMO.IN/OUT
*S*****************************************************************************
*S******* 100 YEAR, 24 HOUR STORM (Section 22.2 Hydrology)
START                0.00
RAINFALL             TYPE=2 RAIN QUARTER=0.0 RAIN ONE=1.87
                     RAIN SIX=2.20  RAIN DAY=2.66 DT=0.0333


                  COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                  DT =     .033300 HOURS       END TIME =    19.946700 HOURS
                     .0000   .0016   .0033   .0050   .0067   .0085   .0103
                     .0121   .0140   .0160   .0180   .0200   .0221   .0243
                     .0265   .0288   .0312   .0336   .0361   .0387   .0414
                     .0442   .0471   .0501   .0533   .0566   .0600   .0636
                     .0674   .0714   .0757   .0808   .0863   .0922   .1044
                     .1323   .1754   .2374   .3221   .4335   .5756   .7527
                     .9690  1.1767  1.2619  1.3336  1.3972  1.4551  1.5084
                    1.5579  1.6041  1.6474  1.6881  1.7266  1.7629  1.7973
                    1.8298  1.8607  1.8900  1.9178  1.9442  1.9515  1.9573
                    1.9627  1.9680  1.9729  1.9777  1.9823  1.9867  1.9909
                    1.9950  1.9990  2.0029  2.0066  2.0102  2.0137  2.0172
                    2.0205  2.0238  2.0269  2.0300  2.0331  2.0360  2.0389
                    2.0418  2.0446  2.0473  2.0500  2.0526  2.0552  2.0578
                    2.0603  2.0627  2.0651  2.0675  2.0698  2.0721  2.0744
                    2.0766  2.0788  2.0810  2.0832  2.0853  2.0873  2.0894
                    2.0914  2.0934  2.0954  2.0974  2.0993  2.1012  2.1031
                    2.1050  2.1068  2.1086  2.1104  2.1122  2.1140  2.1157
                    2.1174  2.1191  2.1208  2.1225  2.1242  2.1258  2.1274
                    2.1290  2.1306  2.1322  2.1338  2.1353  2.1369  2.1384
                    2.1399  2.1414  2.1429  2.1444  2.1459  2.1473  2.1487
                    2.1502  2.1516  2.1530  2.1544  2.1558  2.1571  2.1585
                    2.1599  2.1612  2.1625  2.1639  2.1652  2.1665  2.1678
                    2.1691  2.1703  2.1716  2.1729  2.1741  2.1754  2.1766
                    2.1778  2.1791  2.1803  2.1815  2.1827  2.1839  2.1850
                    2.1862  2.1874  2.1886  2.1897  2.1909  2.1920  2.1931
                    2.1943  2.1954  2.1965  2.1976  2.1987  2.1998  2.2011
                    2.2024  2.2037  2.2050  2.2063  2.2076  2.2088  2.2101
                    2.2114  2.2127  2.2140  2.2152  2.2165  2.2178  2.2190
                    2.2203  2.2216  2.2228  2.2241  2.2253  2.2266  2.2278
                    2.2291  2.2303  2.2315  2.2328  2.2340  2.2352  2.2364
                    2.2377  2.2389  2.2401  2.2413  2.2425  2.2437  2.2449
                    2.2461  2.2473  2.2485  2.2497  2.2509  2.2521  2.2533
                    2.2545  2.2557  2.2569  2.2580  2.2592  2.2604  2.2616
                    2.2627  2.2639  2.2651  2.2662  2.2674  2.2685  2.2697
                    2.2708  2.2720  2.2731  2.2743  2.2754  2.2766  2.2777
                    2.2788  2.2800  2.2811  2.2822  2.2833  2.2845  2.2856
                    2.2867  2.2878  2.2889  2.2900  2.2912  2.2923  2.2934
                    2.2945  2.2956  2.2967  2.2978  2.2989  2.3000  2.3011
                    2.3021  2.3032  2.3043  2.3054  2.3065  2.3076  2.3086
                    2.3097  2.3108  2.3118  2.3129  2.3140  2.3150  2.3161
                    2.3172  2.3182  2.3193  2.3203  2.3214  2.3224  2.3235
                    2.3245  2.3256  2.3266  2.3277  2.3287  2.3297  2.3308
                    2.3318  2.3328  2.3339  2.3349  2.3359  2.3369  2.3379
```

LOS VOLCANES HUD HOUSING AHYMO OUTPUT

2.3390	2.3400	2.3410	2.3420	2.3430	2.3440	2.3450
2.3461	2.3471	2.3481	2.3491	2.3501	2.3511	2.3521
2.3531	2.3540	2.3550	2.3560	2.3570	2.3580	2.3590
2.3600	2.3610	2.3619	2.3629	2.3639	2.3649	2.3658
2.3668	2.3678	2.3687	2.3697	2.3707	2.3716	2.3726
2.3736	2.3745	2.3755	2.3764	2.3774	2.3783	2.3793
2.3802	2.3812	2.3821	2.3831	2.3840	2.3849	2.3859
2.3868	2.3878	2.3887	2.3896	2.3906	2.3915	2.3924
2.3933	2.3943	2.3952	2.3961	2.3970	2.3980	2.3989
2.3998	2.4007	2.4016	2.4025	2.4034	2.4044	2.4053
2.4062	2.4071	2.4080	2.4089	2.4098	2.4107	2.4116
2.4125	2.4134	2.4143	2.4152	2.4161	2.4169	2.4178
2.4187	2.4196	2.4205	2.4214	2.4223	2.4231	2.4240
2.4249	2.4258	2.4266	2.4275	2.4284	2.4293	2.4301
2.4310	2.4319	2.4327	2.4336	2.4345	2.4353	2.4362
2.4371	2.4379	2.4388	2.4396	2.4405	2.4413	2.4422
2.4430	2.4439	2.4447	2.4456	2.4464	2.4473	2.4481
2.4490	2.4498	2.4506	2.4515	2.4523	2.4532	2.4540
2.4548	2.4557	2.4565	2.4573	2.4581	2.4590	2.4598
2.4606	2.4615	2.4623	2.4631	2.4639	2.4647	2.4656
2.4664	2.4672	2.4680	2.4688	2.4696	2.4704	2.4713
2.4721	2.4729	2.4737	2.4745	2.4753	2.4761	2.4769
2.4777	2.4785	2.4793	2.4801	2.4809	2.4817	2.4825
2.4833	2.4841	2.4849	2.4857	2.4865	2.4873	2.4880
2.4888	2.4896	2.4904	2.4912	2.4920	2.4927	2.4935
2.4943	2.4951	2.4959	2.4966	2.4974	2.4982	2.4990
2.4997	2.5005	2.5013	2.5021	2.5028	2.5036	2.5044
2.5051	2.5059	2.5067	2.5074	2.5082	2.5089	2.5097
2.5105	2.5112	2.5120	2.5127	2.5135	2.5142	2.5150
2.5157	2.5165	2.5172	2.5180	2.5187	2.5195	2.5202
2.5210	2.5217	2.5225	2.5232	2.5240	2.5247	2.5254
2.5262	2.5269	2.5277	2.5284	2.5291	2.5299	2.5306
2.5313	2.5321	2.5328	2.5335	2.5342	2.5350	2.5357
2.5364	2.5372	2.5379	2.5386	2.5393	2.5401	2.5408
2.5415	2.5422	2.5429	2.5437	2.5444	2.5451	2.5458
2.5465	2.5472	2.5479	2.5487	2.5494	2.5501	2.5508
2.5515	2.5522	2.5529	2.5536	2.5543	2.5550	2.5557
2.5564	2.5571	2.5578	2.5585	2.5592	2.5599	2.5606
2.5613	2.5620	2.5627	2.5634	2.5641	2.5648	2.5655
2.5662	2.5669	2.5676	2.5683	2.5689	2.5696	2.5703
2.5710	2.5717	2.5724	2.5731	2.5737	2.5744	2.5751
2.5758	2.5765	2.5771	2.5778	2.5785	2.5792	2.5799
2.5805	2.5812	2.5819	2.5826	2.5832		

```
*S COMPUTE RUNOFF FROM OFF-SITE BASIN
COMPUTE NM HYD       ID=8 HYD=OFF_SITE DA=0.00216 SQ MI
                     %A=0 %B=100 %C=0 %D=0
                     TP=0.1333 RAINFALL=-1

    K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
    UNIT PEAK =   5.3001    CFS   UNIT VOLUME =    .9977       B =   327.09      P60 = 1.8700
    AREA =      .002160 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD            ID=8 CODE=1

                                        HYDROGRAPH FROM AREA OFF_SITE

    RUNOFF VOLUME =      .66738 INCHES     =        .0769 ACRE-FEET
    PEAK DISCHARGE RATE =       2.82 CFS  AT   1.532 HOURS   BASIN AREA =   .0022 SQ. MI.
```

LOS VOLCANES HUD HOUSING AHYMO OUTPUT

```
*S COMPUTE RUNOFF FROM ON-SITE BASIN A
COMPUTE NM HYD       ID=1 HYD=A DA=0.00061 SQ MI
                     %A=0 %B=42 %C=0 %D=58
                     TP=0.1333 RAINFALL=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   1.3968    CFS   UNIT VOLUME =    .9910       B =   526.28      P60 = 1.8700
    AREA =      .000354 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

    K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
    UNIT PEAK =   .62866    CFS   UNIT VOLUME =    .9787       B =   327.09      P60 = 1.8700
    AREA =      .000256 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD            ID=1 CODE=1

                                        HYDROGRAPH FROM AREA A


    RUNOFF VOLUME =     1.64045 INCHES     =        .0534 ACRE-FEET
    PEAK DISCHARGE RATE =       1.34 CFS  AT   1.499 HOURS   BASIN AREA =   .0006 SQ. MI.


*
*S COMPUTE RUNOFF FROM ON-SITE BASIN B
COMPUTE NM HYD       ID=2 HYD=E DA=0.00067 SQ MI
                     %A=0 %B=42 %C=0 %D=58
                     TP=0.1333  RAINFALL=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   1.5342    CFS   UNIT VOLUME =    .9922       B =   526.28      P60 = 1.8700
    AREA =      .000389 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300


    K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
    UNIT PEAK =   .69049    CFS   UNIT VOLUME =    .9804    -   B =   327.09      P60 = 1.8700
    AREA =      .000281 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD            ID=2 CODE=1

                                        HYDROGRAPH FROM AREA E


    RUNOFF VOLUME =     1.64044 INCHES     =        .0586 ACRE-FEET
    PEAK DISCHARGE RATE =       1.47 CFS  AT   1.499 HOURS   BASIN AREA =   .0007 SQ. MI.


*
*S  ADD BASINS B,OFF-SITE
ADD HYD              ID=2  HYD NO=BASINS_ABCDEF ID I=2 ID II=8
PRINT HYD            ID=2 CODE=1

                                        HYDROGRAPH FROM AREA BASINS_ABCDEF


    RUNOFF VOLUME =      .89772 INCHES     =        .1355 ACRE-FEET
    PEAK DISCHARGE RATE =       4.26 CFS  AT   1.499 HOURS   BASIN AREA =   .0028 SQ. MI.
```

LOS VOLCANES HUD HOUSING AHYMO OUTPUT

```
*
*S ROUTE BASIN B, OFF-SITE THROUGH THE DETENTION POND
ROUTE RESERVOIR     ID=3  HYD NO=BASIN_B_ROUTE INFLOW ID=2 CODE=10
                    OUTFLOW(CFS)   STORAGE(AC-FT)  ELEVATION(FT)
                    0               0               0
                    2.100           0.102           1.5

  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
```

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	.00	.000	.00
.33	.00	.00	.000	.00
.67	.00	.00	.000	.00
1.00	.00	.00	.000	.00
1.33	.39	.02	.002	.03
1.67	2.35	.93	.063	1.30
2.00	.56	.86	.058	1.20
2.33	.17	.58	.040	.82
2.66	.07	.36	.025	.51
3.00	.03	.22	.015	.31
3.33	.02	.13	.009	.18
3.66	.01	.08	.005	.11
4.00	.01	.05	.003	.06
4.33	.01	.03	.002	.04
4.66	.01	.02	.001	.02
5.00	.01	.01	.001	.02
5.33	.01	.01	.001	.01
5.66	.01	.01	.000	.01
5.99	.01	.01	.000	.01
6.33	.01	.01	.000	.01
6.66	.01	.01	.000	.01
6.99	.01	.01	.000	.01
7.33	.01	.01	.000	.01
7.66	.01	.01	.000	.01
7.99	.01	.01	.000	.01
8.33	.01	.01	.000	.01
8.66	.01	.01	.000	.01
8.99	.01	.01	.000	.01
9.32	.01	.01	.000	.01
9.66	.01	.01	.000	.01
9.99	.01	.01	.000	.01
10.32	.01	.01	.000	.01
10.66	.01	.01	.000	.01
10.99	.01	.01	.000	.01
11.32	.01	.01	.000	.01
11.66	.01	.01	.000	.01
11.99	.01	.01	.000	.01
12.32	.01	.01	.000	.01
12.65	.01	.00	.000	.01
12.99	.01	.00	.000	.01
13.32	.01	.00	.000	.01
13.65	.01	.00	.000	.01
13.99	.01	.00	.000	.01
14.32	.01	.00	.000	.01
14.65	.01	.00	.000	.01
14.99	.01	.00	.000	.01
15.32	.01	.00	.000	.01
15.65	.01	.00	.000	.01
15.98	.01	.00	.000	.01
16.32	.01	.00	.000	.01

```
16.65          .01          .00          .000          .01
16.98          .01          .00          .000          .01
17.32          .01          .00          .000          .01
17.65          .01          .00          .000          .01
17.98          .01          .00          .000          .01
18.32          .01          .00          .000          .01

TIME           INFLOW       ELEV         VOLUME        OUTFLOW
(HRS)          (CFS)        (FEET)       (AC-FT)       (CFS)

18.65          .01          .00          .000          .01
18.98          .01          .00          .000          .01
19.31          .01          .00          .000          .01
19.65          .01          .00          .000          .01
 PEAK DISCHARGE =          1.382 CFS - PEAK OCCURS AT HOUR    1.76
 MAXIMUM WATER SURFACE ELEVATION =          .987
 MAXIMUM STORAGE =          .0671 AC-FT      INCREMENTAL TIME=     .033300HRS

PRINT HYD            ID=3 CODE=1

                                        HYDROGRAPH FROM AREA BASIN_B_ROUTE


    RUNOFF VOLUME =       .89605 INCHES     =         .1352 ACRE-FEET
    PEAK DISCHARGE RATE =        1.38 CFS  AT    1.765 HOURS   BASIN AREA =    .0028 SQ. MI.



*
*S COMPUTE RUNOFF FROM ON-SITE BASIN C
COMPUTE NM HYD       ID=4 HYD=C DA=0.00328 SQ MI
                     %A=0 %B=42 %C=0 %D=58
                     TP=0.1333  RAINFALL=-1

      K =   .072649HR     TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
      UNIT PEAK =   7.5108     CFS   UNIT VOLUME =     .9978       B =   526.28      P60 = 1.8700
      AREA =       .001902 SQ MI     IA =     .10000 INCHES    INF =     .04000 INCHES PER HOUR
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033300


      K =   .130992HR     TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
      UNIT PEAK =   3.3803     CFS   UNIT VOLUME =     .9964       B =   327.09      P60 = 1.8700
      AREA =       .001378 SQ MI     IA =     .50000 INCHES    INF =    1.25000 INCHES PER HOUR
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033300

PRINT HYD            ID=4 CODE=1

                                        HYDROGRAPH FROM AREA C


    RUNOFF VOLUME =      1.64039 INCHES     =         .2870 ACRE-FEET
    PEAK DISCHARGE RATE =        7.11 CFS  AT    1.499 HOURS   BASIN AREA =    .0033 SQ. MI.


*
*S  ADD BASINS A,C
ADD HYD              ID=5  HYD NO=BASINS_AC ID I=1 ID II=4
PRINT HYD            ID=5 CODE=1

                                        HYDROGRAPH FROM AREA BASINS_AC


    RUNOFF VOLUME =      1.64040 INCHES     =         .3403 ACRE-FEET
```

LOS VOLCANES HUD HOUSING AHYMO OUTPUT

PEAK DISCHARGE RATE = 8.45 CFS AT 1.499 HOURS BASIN AREA = .0039 SQ. MI.

```
*
*S ROUTE BASINS THROUGH THE DETENTION POND
ROUTE RESERVOIR     ID=6  HYD NO=BASIN_ROUTE INFLOW ID=5 CODE=10
                    OUTFLOW(CFS)   STORAGE(AC-FT)  ELEVATION(FT)
                    0               0               0
                    2.235           0.1735          1.0

  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
```

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	.00	.000	.00
.33	.00	.00	.000	.00
.67	.00	.00	.000	.00
1.00	.00	.00	.000	.00
1.33	1.97	.05	.009	.12
1.67	4.41	.83	.145	1.87
2.00	1.77	.94	.163	2.10
2.33	.40	.78	.136	1.75
2.66	.16	.58	.101	1.30
3.00	.08	.42	.073	.95
3.33	.05	.31	.053	.68
3.66	.04	.22	.038	.49
4.00	.04	.16	.028	.36
4.33	.04	.12	.020	.26
4.66	.04	.09	.015	.19
5.00	.04	.07	.011	.15
5.33	.04	.05	.009	.11
5.66	.04	.04	.007	.09
5.99	.05	.04	.006	.08
6.33	.05	.03	.005	.07
6.66	.06	.03	.005	.07
6.99	.05	.03	.005	.06
7.33	.05	.03	.005	.06
7.66	.05	.03	.004	.06
7.99	.05	.02	.004	.06
8.33	.05	.02	.004	.05
8.66	.05	.02	.004	.05
8.99	.05	.02	.004	.05
9.32	.05	.02	.004	.05
9.66	.05	.02	.004	.05
9.99	.04	.02	.004	.05
10.32	.04	.02	.004	.05
10.66	.04	.02	.004	.05
10.99	.04	.02	.004	.05
11.32	.04	.02	.003	.04
11.66	.04	.02	.003	.04
11.99	.04	.02	.003	.04
12.32	.04	.02	.003	.04
12.65	.04	.02	.003	.04
12.99	.04	.02	.003	.04
13.32	.04	.02	.003	.04
13.65	.04	.02	.003	.04
13.99	.04	.02	.003	.04
14.32	.04	.02	.003	.04
14.65	.04	.02	.003	.04
14.99	.04	.02	.003	.04
15.32	.04	.02	.003	.04
15.65	.03	.02	.003	.04

```
15.98        .03        .02        .003        .04
16.32        .03        .02        .003        .04
16.65        .03        .02        .003        .03
16.98        .03        .02        .003        .03
17.32        .03        .02        .003        .03
17.65        .03        .01        .003        .03
17.98        .03        .01        .003        .03
18.32        .03        .01        .003        .03

TIME         INFLOW     ELEV       VOLUME      OUTFLOW
(HRS)        (CFS)      (FEET)     (AC-FT)     (CFS)
   18.65        .03        .01        .002        .03
   18.98        .03        .01        .002        .03
   19.31        .03        .01        .002        .03
   19.65        .03        .01        .002        .03
 PEAK DISCHARGE =          2.113 CFS - PEAK OCCURS AT HOUR    1.90
 MAXIMUM WATER SURFACE ELEVATION =          .945
 MAXIMUM STORAGE =          .1640 AC-FT      INCREMENTAL TIME=     .033300HRS

PRINT HYD            ID=6 CODE=1

                                        HYDROGRAPH FROM AREA BASIN_ROUTE


    RUNOFF VOLUME =     1.62898 INCHES     =         .3380 ACRE-FEET
    PEAK DISCHARGE RATE =       2.11 CFS  AT    1.898 HOURS   BASIN AREA =    .0039 SQ. MI.


*
*S COMPUTE RUNOFF FROM ON-SITE BASIN D
COMPUTE NM HYD       ID=1 HYD=G DA=0.00035 SQ MI
                     %A=0 %B=42 %C=0 %D=58
                     TP=0.1333  RAINFALL=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   .80145    CFS   UNIT VOLUME =    .9840       B =   526.28      P60 = 1.8700
    AREA =       .000203 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300


    K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
    UNIT PEAK =   .36070    CFS   UNIT VOLUME =    .9612       B =   327.09      P60 = 1.8700
    AREA =       .000147 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD            ID=1 CODE=1

                                        HYDROGRAPH FROM AREA G


    RUNOFF VOLUME =     1.64051 INCHES     =         .0306 ACRE-FEET
    PEAK DISCHARGE RATE =        .77 CFS  AT    1.499 HOURS   BASIN AREA =    .0004 SQ. MI.


*
*S  ADD BASIN D
ADD HYD              ID=6  HYD NO=BASIN_ACD ID I=1 ID II=6
PRINT HYD            ID=6 CODE=1

                                        HYDROGRAPH FROM AREA BASIN_ACD
```

LOS VOLCANES HUD HOUSING AHYMO OUTPUT

RUNOFF VOLUME = 1.62993 INCHES = .3686 ACRE-FEET
PEAK DISCHARGE RATE = 2.33 CFS AT 1.798 HOURS BASIN AREA = .0042 SQ. MI.

```
*
*S ROUTE BASINS THROUGH THE DETENTION POND
ROUTE RESERVOIR     ID=7  HYD NO=BASIN_ROUTE INFLOW ID=6 CODE=10
                    OUTFLOW(CFS)   STORAGE(AC-FT)  ELEVATION(FT)
                    0               0              0
                    2.10            0.0793         1.5
```

* * * * * * * * * * * * * * * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	.00	.000	.00
.33	.00	.00	.000	.00
.67	.00	.00	.000	.00
1.00	.00	.00	.000	.00
1.33	.30	.02	.001	.03
1.67	2.27	.62	.033	.87
2.00	2.26	1.15	.061	1.61
2.33	1.78	1.30	.069	1.82
2.66	1.31	1.18	.063	1.66
3.00	.95	.98	.052	1.37
3.33	.69	.77	.040	1.07
3.66	.50	.58	.031	.81
4.00	.36	.43	.023	.61
4.33	.26	.32	.017	.45
4.66	.20	.24	.013	.33
5.00	.15	.18	.009	.25
5.33	.12	.13	.007	.19
5.66	.10	.10	.005	.15
5.99	.08	.08	.004	.12
6.33	.08	.07	.004	.10
6.66	.07	.06	.003	.08
6.99	.07	.05	.003	.08
7.33	.06	.05	.003	.07
7.66	.06	.05	.003	.07
7.99	.06	.05	.002	.06
8.33	.06	.04	.002	.06
8.66	.06	.04	.002	.06
8.99	.06	.04	.002	.06
9.32	.05	.04	.002	.06
9.66	.05	.04	.002	.05
9.99	.05	.04	.002	.05
10.32	.05	.04	.002	.05
10.66	.05	.04	.002	.05
10.99	.05	.04	.002	.05
11.32	.05	.04	.002	.05
11.66	.05	.03	.002	.05
11.99	.05	.03	.002	.05
12.32	.05	.03	.002	.05
12.65	.04	.03	.002	.05
12.99	.04	.03	.002	.05
13.32	.04	.03	.002	.04
13.65	.04	.03	.002	.04
13.99	.04	.03	.002	.04
14.32	.04	.03	.002	.04
14.65	.04	.03	.002	.04
14.99	.04	.03	.002	.04
15.32	.04	.03	.002	.04

```
15.65          .04          .03          .002          .04
15.98          .04          .03          .001          .04
16.32          .04          .03          .001          .04
16.65          .04          .03          .001          .04
16.98          .04          .03          .001          .04
17.32          .04          .03          .001          .04
17.65          .04          .03          .001          .04
17.98          .04          .03          .001          .04
18.32          .04          .03          .001          .04

TIME           INFLOW       ELEV         VOLUME        OUTFLOW
(HRS)          (CFS)        (FEET)       (AC-FT)       (CFS)

   18.65          .03          .03          .001          .04
   18.98          .03          .02          .001          .03
   19.31          .03          .02          .001          .03
   19.65          .03          .02          .001          .03
 PEAK DISCHARGE =          1.818 CFS - PEAK OCCURS AT HOUR    2.30
 MAXIMUM WATER SURFACE ELEVATION =          1.299
 MAXIMUM STORAGE =           .0687 AC-FT      INCREMENTAL TIME=     .033300HRS

PRINT HYD            ID=7 CODE=1

                                        HYDROGRAPH FROM AREA BASIN_ROUTE


    RUNOFF VOLUME =      1.62430 INCHES     =          .3673 ACRE-FEET
    PEAK DISCHARGE RATE =         1.82 CFS  AT    2.298 HOURS   BASIN AREA =    .0042 SQ. MI.

*
*S  ADD TOTAL FLOWS EXITING OFF-SITE
ADD HYD              ID=1  HYD NO=BASIN_TOTAL ID I=3 ID II=7
PRINT HYD            ID=1 CODE=1

                                        HYDROGRAPH FROM AREA BASIN_TOTAL


    RUNOFF VOLUME =      1.33279 INCHES     =          .5025 ACRE-FEET
    PEAK DISCHARGE RATE =         2.82 CFS  AT    2.065 HOURS   BASIN AREA =    .0071 SQ. MI.


FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 12:22:28
```

CHAVEZ • GRIEVES
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PHONE (505) 344-4080 • FAX (505) 343-8759

SHEET NO. A-13 OF _____
JOB _____
SUBJECT _____
CLIENT _____ JOB NO. _____
BY _____ DATE _____
CHECKED BY _____ DATE _____

PIPE CAPACITIES

$Q = C_d A \sqrt{2gh}$

$C_d = 0.67$

8" Pipe

$A = 0.352\ ft^2$

$h = 1.17'$

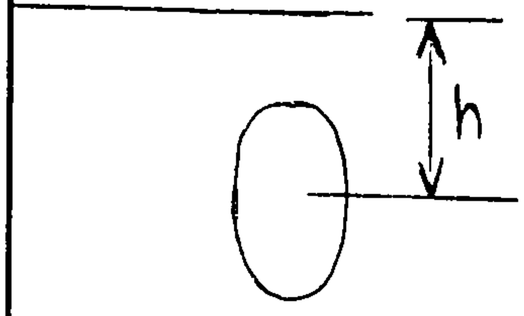
$Q = 2.1$ CFS

10" Pipe

$A = 0.545\ ft^2$

$h = 0.583'$

$Q = 2.24$ CFS



JEFF MORTENSEN & ASSOCIATES, INC.

☐ 6010-B MIDWAY PARK BLVD. N.E.
☐ ALBUQUERQUE ☐ NEW MEXICO 87109
☐ ENGINEERS ☐ SURVEYORS (505) 345-4250
FAX 345-4254

TRANSMITTAL

VIA: ☒ DELIVERY ☐ PICKUP ☐ FAX _____

TO: LISA MANWILL	DATE: 6/11/96
HYDROLOGY SECTION	PROJECT: HUD J10/D17
C.O.A. PUBLIC WORKS DEPT	
	JOB NO: 960112
ATTN:	
RE:	

WE ARE SENDING:

QTY.	DESCRIPTION	FOR
2	Sets of Blueline s	Your use

REMARKS: _____

BY: J. GRAEME MEANS

RECEIVED: _____ DATE: _____