HYDROLOGY K23/D9 4 PLANS

K23/D9

4 Plans

A&E ENGINEERING INC.
CIVIL ENGINEERING, LAND PLANNING, AND SURVEYING

June 23, 1980

K23-D9

RECEIVED
JUN 26 1980
CITY ENGINEER

City of Albuquerque
Mr. Richard Heller, City Engineer
Albuquerque, New Mexico

RE: GRANADA HILLS, PHASE I

Dear Mr. Heller:

Granada Hills Phase I Subdivision is located east of the Tramway Channel and is bounded on the north by the Lomas Channel. There is not any offsite runoff affecting this subdivision. The 20 foot wide channel on the subdivision's western side, which drains into the Tramway Channel, was originally designed to carry offsite runoff from the east and also the onsite runoff. Since the Lomas channel has been constructed, the offsite runoff does not traverse through this channel. This 20 foot channel is capable of carrying the entire subdivision's onsite runoff without having any ponding on the lots.

Presently our client, U. S. Homes, Inc., is constructing houses on Lots 1 - 10 of block 1 and have encountered a major problem trying to construct ponds on the rear of these lots and the cost of constructing special retaining walls along the rear of these lots is a large economic burden on our client. These lots face west and drain from the rear to the front and on to the street. Since the street and channel are capable of handling additional runoff, we would like to request a waiver on the ponds for these ten lots.

The F. H. A. will not furnish any other commitments to our client until such a waiver is secured. Your utmost attention to this matter will be greatly appreciated.

Yours truly,

John F. Esquibel, President

JFE:lm

APPROVED No ponding Lots 1-10
CITY OF ALBUQUERQUE
Municipal Development Department
R S Weller 6/26/80
By Date

5823 LOMAS N.E. ALBUQUERQUE, NEW MEXICO 87110 505/266-8791

ALBUQUERQUE SERVICE OFFICE
625 TRUMAN STREET, N.E.
ALBUQUERQUE, NEW MEXICO 87110

REGION VI

June 25, 1980

IN REPLY REFER TO:
6.6HTV

U. S. Home
Attn: Mr. Tom Ekenberg
7711 Zuni Rd., NE
Albuquerque, New Mexico 87108

Dear Mr. Ekenberg:

Subject: Granada Hills Phase 1 - FHA File #553
Albuquerque, New Mexico

Our review of the neighborhood drainage plan for the subject subdivision reveals that certain lots will not be acceptable to HUD/FHA for mortgage insurance purposes. The plan and a site inspection indicate the "ponding areas" on a number of the lots will be within fifteen (15) feet of the structure. It is FHA's requirement that no water be ponded within fifteen (15) feet of the structure due to the general soils conditions in the area and the possibility of damage to the structure resulting from moisture infiltration at the footing and foundation.

As a result, and in order for our agency to provide mortgage insurance for these properties, it will be necessary to find an acceptable alternative to ponding to maintain the structural integrity of the proposed units.

If you have any questions, please contact Michael R. Griego, Subdivision Appraiser, at 766-3239.

Sincerely,

I. L. Sanchez-Davis
Service Office Supervisor

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

MAYOR
David Rusk

February 6, 1979

K-23-D9

A & E Engineering Inc.
5823 Lomas Blvd. N.E.
Albuquerque, New Mexico 87110

Subject: Test Turnkey Project Work Authorization #T-36
Granada Hills Subdivision

Gentlemen:

Under the provisions of the Test Turnkey Project procedures, this letter is the Work Authorization to begin field work on the project.

Sincerely,

Richard S. Heller

Richard S. Heller
City Engineer

RSH/fs

cc - H. R. Orr
Salas Construction Co.
Ray Dawson
Water Resources
Dwayne Sheppard
Bob Kielich
LaMonte Urban
Bruno Conegliano
Bill Mueller
Jim Milton-Traffic Engineering

A&E ENGINEERING INC.
CIVIL ENGINEERING, LAND PLANNING, AND SURVEYING

June 23, 1980

City of Albuquerque
Mr. Richard Heller, City Engineer
Albuquerque, New Mexico

RECEIVED
JUN 26 1980
CITY ENGINEER

RE: GRANADA HILLS, PHASE I

Dear Mr. Heller:

Granada Hills Phase I Subdivision is located east of the Tramway Channel and is bounded on the north by the Lomas Channel. There is not any offsite runoff affecting this subdivision. The 20 foot wide channel on the subdivision's western side, which drains into the Tramway Channel, was originally designed to carry offsite runoff from the east and also the onsite runoff. Since the Lomas channel has been constructed, the offsite runoff does not traverse through this channel. This 20 foot channel is capable of carrying the entire subdivision's onsite runoff without having any ponding on the lots.

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The F. H. A. will not furnish any other commitments to our client until such a waiver is secured. Your utmost attention to this matter will be greatly appreciated.

Yours truly,

John F. Esquibel, President

JFE:lm

APPROVED No ponding Lots 1-10
CITY OF ALBUQUERQUE
Municipal Development Department
R S Heller 6/26/80
City Date

5823 LOMAS N.E. ALBUQUERQUE, NEW MEXICO 87110 505/266-8791

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
ALBUQUERQUE SERVICE OFFICE
625 TRUMAN STREET, N.E.
ALBUQUERQUE, NEW MEXICO 87110

REGION VI

June 25, 1980

IN REPLY REFER TO:
6.6HTV

U. S. Home
Attn: Mr. Tom Ekenberg
7711 Zuni Rd., NE
Albuquerque, New Mexico 87108

Dear Mr. Ekenberg:

Subject: Granada Hills Phase 1 - FHA File #553
Albuquerque, New Mexico

Our review of the neighborhood drainage plan for the subject subdivision reveals that certain lots will not be acceptable to HUD/FHA for mortgage insurance purposes. The plan and a site inspection indicate the "ponding areas" on a number of the lots will be within fifteen (15) feet of the structure. It is FHA's requirement that no water be ponded within fifteen (15) feet of the structure due to the general soils conditions in the area and the possibility of damage to the structure resulting from moisture infiltration at the footing and foundation.

As a result, and in order for our agency to provide mortgage insurance for these properties, it will be necessary to find an acceptable alternative to ponding to maintain the structural integrity of the proposed units.

If you have any questions, please contact Michael R. Griego, Subdivision Appraiser, at 766-3239.

Sincerely,

I. L. Sanchez-Davis
Service Office Supervisor

A&E ENGINEERING INC.
CIVIL ENGINEERING, LAND PLANNING, AND SURVEYING

August 10, 1978

Mr. Bruno Conegliano
Albuquerque City Engineering
400 Marquette Avenue N E
Albuquerque, New Mexico

Dear Mr. Conegliano,

Transmitted here with , are the Granada Hills Subdivision plans. Revised per our phone conversation, the morning of August 10, 1978. Your cooperation in this matter is greatly appreciated.

Sincerely yours,

John F. Esquibel
President A&E Engineers

5823 LOMAS N.E. ALBUQUERQUE, NEW MEXICO 87110 505/266-8791

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

June 22, 1978

Skip Mead
Bohannan-Westman-Huston
4125 Carlisle Blvd. N.E.
Albuquerque, New Mexico 87107

Dear Mr. Mead:

This letter is in reference to a proposed dip section across Lomas drainage channel abutting Granada Hills Subdivision. The center line of dip section would be at channel station 8+35.57 with the invert at 5797.67 (computed). This would be in line with Hupmobile St. N.E. Dip section is necessary to provide access from within Granada Hills Subdv. to Lomas Blvd. N.E.

Please include design of this dip section with Lomas Basin Drainage Improvement Plans. We are including preliminary design on this dip section as we are also currently designing a 24" master plan water line along the same alignment of dip section and access road.

Yours Truly,

Quentin R. Kielich

Quentin R. Kielich
Asst. City Engineer-Design

QRK/FG/tl

cc: V. M. Kimmick, City Engineer
Bruno Conegliano, Asst. City Engn.-Hydrology
Walter Nickerson, Chief Engineer-Water Resources
Bob Fosnaugh, Traffic Engineer
Pendleton Construction Co.

A&E ENGINEERING INC.
CIVIL ENGINEERING, LAND PLANNING, AND SURVEYING

October 26, 1977

Mr. Bruno Conegliano
City of Albuquerque
Drainage Engineer
500 Marquette, N.W.
Albuquerque, New Mexico 87102

RE: GRANADA HILLS (PHASE I R-1 SUBDIVISION)

Dear Sir:

Transmitted herewith is the revised drainage report which you requested during our meeting at AMAFCA with Mr. Jim Smith.

The letter committing Granada Hills for the sum of $50,000.00 for their portion of the priviate sector finicial contribution to construct the diversion channel. Since the monies have been pledged and the construction of this division channel is to become a reality, we are asking for your approval of this subdivision since the drainage report shows that the subdivision will not be affected by any offsite drainage.

Your immediate attention to this matter will be greatly appreciated.

Very truly yours,

John F. Esquibel

mea
Enc.

5823 LOMAS N.E. ALBUQUERQUE, NEW MEXICO 87110 505/266-8791

DRAINAGE REPORT

FOR

GRANADA HILLS - PHASE 1
R-1 (SINGLE FAMILY)
RESIDENTIAL DEVELOPMENT

ALBUQUERQUE, NEW MEXICO

PREPARED FOR:

WILLIAM G. PENDELTON
ALBUQUERQUE, NEW MEXICO

PREPARED BY:

A & E ENGINEERING, INC.
5023 LOMAS N.E.
ALBUQUERQUE, NEW MEXICO

SEPTEMBER 17, 1977

PURPOSE

The purpose of this drainage report is to summarize the present drainage development affecting the subject development and to also show that the present redesign of the subdivision will be capable of handling the drainage without providing for temporary and unmaintained drainage facilities.

BACKGROUND

In 1973 this parcel of land was approved for a condominium development and a drainage report for the subject development was approved. Said report was prepared by Bohannan, Westman, Houston & Associates. Due to change in the nation's economy as well as the lack of public demand for that type of development therefore, it did not get developed. On September 16, 1976 the Environmental Planning Commission approved a zone change of the Southern most portion of the formerly Granada Hills to R-1 zoning. Since said date the developer has been preparing plans for the construction of said R-1 portion.

PROPOSED DRAINAGE PLAN

Presently the drainage pattern have not been changed but the purpose for this summary report is to show how the run-off will be diverted from this subject development. It is apparent that this offsite runoff that used to traverse through this proposed will not be traversing through this properly due to the construction of the diversion channel east of Ciudad Vista Subdivision. Attached herein is an overall drainage plan which shows the offsite runoff diverted to the Lomas Channel and not through this development.

The only runoff affecting said development will be onsite drainage generated from within the limit of said subdivision.

ONSITE RUNOFF QUANTITIES

The quantities of onsite storm runoff to be expected from the Granada Hills Subdivision was determined by using the Rational Formula Q= CIA, where Q-quantity of storm runoff in cubic feet per second; C-coefficient of runoff dependent upon the type of surface drained; I-intensity of rainfall in inches per hour for a duration equal to the total accumulation time in minutes; and A-area of contributing water shed in acres.

ONSITE HYDROLIC CALCULATIONS

L_1 = 1200 LF

L = 0.23 miles

C = 0.70 ponding on all lots

Area = 18.22 miles

$Elev._1$ = 58.22

$Elev._2$ = 57.77

H = Difference in elevation = 45 feet

$S = \frac{45}{1200} = 0.0375$

$t_c = \left[\frac{11.2\ (L)^3}{H}\right] = 0.385$

$I = \frac{189}{t_c + 25}$ (100 year frequency)

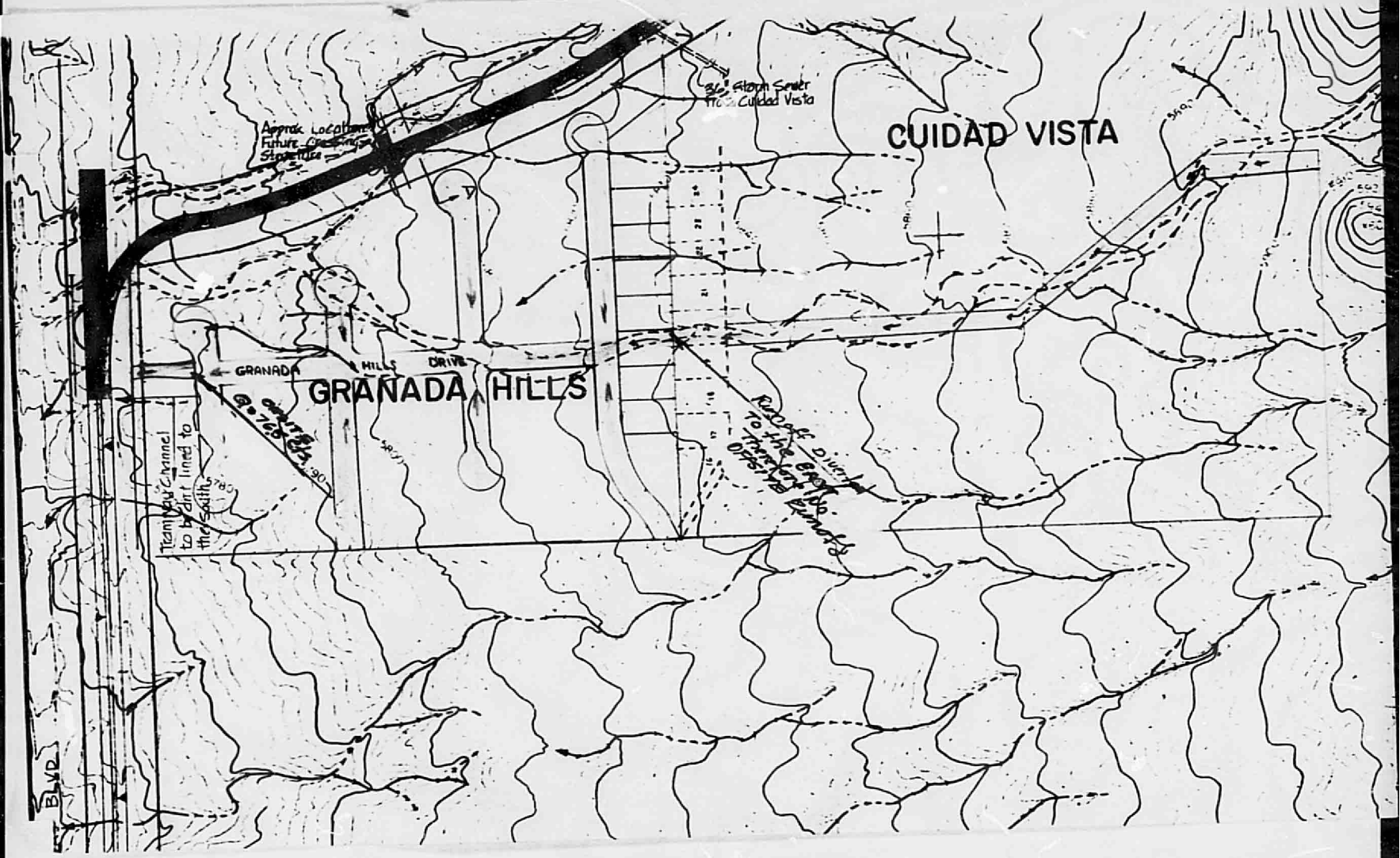
$t_c = \left[\frac{11.2\ (0.23)^3}{45}\right]\ 0.385$

t_c = 6.4 min.

$I = \frac{189}{t_c + 25} = \frac{189}{6.4 + 25} = 6.0$

Q = CIA

(0.7) (6) (18.2) = 76.52 cfs.


CUIDAD VISTA
GRANADA HILLS
GRANADA
HILLS
DRIVE
Storm Sewer
from Cuidad Vista
Approx. Location
Future Crossing
Siphon Line
Runoff Diverted
To the East
Towards the
Offsite Bennett
Trapezoidal Channel
to be dirt lined to
the South
BLVD.

DRAINAGE REPORT

FOR

GRANADA HILLS - PHASE I
R-1 (SINGLE FAMILY)
RESIDENTIAL DEVELOPMENT

ALBUQUERQUE, NEW MEXICO

PREPARED FOR:

WILLIAM G. PENDELTON

ALBUQUERQUE, NEW MEXICO

PREPARED BY:

A & E ENGINEERING, INC.
5823 LOMAS N.E.
ALBUQUERQUE, NEW MEXICO

SEPTEMBER 17, 1977

PURPOSE

The purpose of this drainage report is to summarize the present drainage development affecting the subject development and to also show that the present redesign of the subdivision will be capable of handling the drainage without providing for temporary and unmaintained drainage facilities.

BACKGROUND

In 1973 this parcel of land was approved for a condominium development and a drainage report for the subject development was approved. Said report was prepared by Bohannan, Westman, Houston & Associates. Due to a change in the nation's economy as well as the lack of public demand for that type of development therefor, it did not get developed. On September 16, 1976 the Environmental Planning Commission approved a zone change of the Southern most portion of the formerly Granada Hills to R-1 zoning. Since said date the developer has been preparing plans for the construction of said R-1 portion.

PROPOSED DRAINAGE PLAN

The drainage patterns have not been changed from the time that the Bohannan, Westman, Houston & Associates report was approved where an earth channel was designed to handle the offsite runoff traveling through Ciudad Vista Subdivision and entering this development on the east side.

The existing channel constructed by Ciudad Vista Subdivision enters this development within Lot 4 of Block 1. This lot will be utilized as a temporary drainage easement and an approved velocity reducer will be constructed by Granada Hills. This will allow for the runoff velocity to be slowed up before it enters Granada Hills where the runoff will be carried into the street (Granada Hills Drive). The runoff will be channeled through a 25' drainage easement between Lots 17 & 18 of Block 3. Said drainage easement will be constructed with a concrete channel and 8" block walls four (4) feet high; Lot 18 will also be used as a drainage easement temporarily until such time the runoff can be reduced by the construction of the cut off channel ditch east of Ciudad Vista and which is presently designed by the City of Albuquerque. Construction of said cut off ditch is to be constructed in the near future.

A pond conforming to the design criteria for the Lomas Channel will be excavated west of this development. This pond will retain some of the runoff and will allow for the overflow to drain southerly along Tramway Boulevard.

ONSITE RUNOFF QUANTITIES

The quantities of onsite storm runoff to be expected from the Granada Hills Subdivision was determined by using the Rational Formula Q = CIA, where Q - quantity of storm runoff in cubic feet per second; C = coefficient of runoff dependent upon the type of surface drained; I = intensity of rainfall

in inches per hour for a duration equal to the total accumulation time in minutes; and A = area of contributing water shed in acres.

HYDROLOGIC CALCULATIONS

L = 1200 LF

L = 0.23 miles

C = 0.70 ponding on all lots

Area = 18.22 acres

$Elev._1$ = 58.22

$Elev._2$ = 57.77

H = Difference in elevation = 45 feet

$S = \frac{45}{1200} = 0.0375$

$t_c = \left[\frac{11.2\ (L)^3}{H}\right]^{0.0385}$

$I = \frac{189}{t_c + 25}$ (100 year frequency)

$t_c = \left[\frac{11.2\ (0.23)^3}{45}\right]^{0.385}$

t_c = 6.4 min.

$I = \frac{189}{t_c + 25} = \frac{189}{6.4 + 25} = 6.0$

Q = CIA

(0.7) (6) (18.2) = 76.52 cfs.

STREET RUNOFF CAPACITY

Runoff from Ciudad Vista Subdivision entering the east boundary of Granada Hills Subdivision Lot 4, Block 1, consists of 300 cfs. Said runoff figure is derived from the City of Albuquerque as was reported to the City by Michael Emery of Bohannan, Westman, Houston & Associates, . . design purposes a runoff factor of 350 cfs will be utilized to show the carrying capacity of Granada Hills Boulevard.

S = 0.05, Q = 350 cfs and crossfall = 0.

From enclosed diagram or chart, we will determine: Y_1; ($Y_1 = Y_2$)

At point D-1 find $ACR^{0.5} = Q/S^{0.5} = 350/0.223 = 1569.5$

At point D-2 find cross-fall of 0.0 ft. on $ACR^{0.5}$ curves

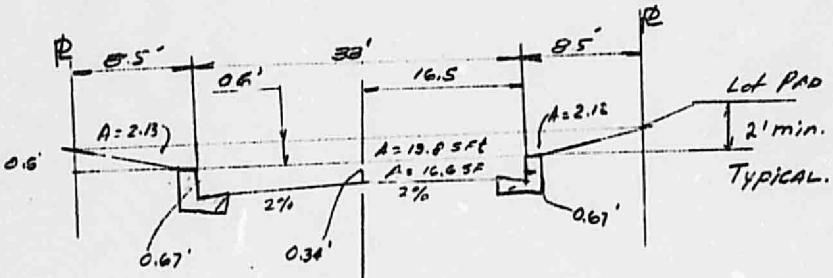
At point D-3 read y_1 = 0.94 ft. (LOW GUTTER).

At point D-4 read 0.94 (DEPTH PLUS CROSS-FALL).
Then 0.94 ft - 0.0 ft = 0.94 feet = y_2 (HIGH GUTTER)

At point D-5 find intersection of water surface with sidewalk.

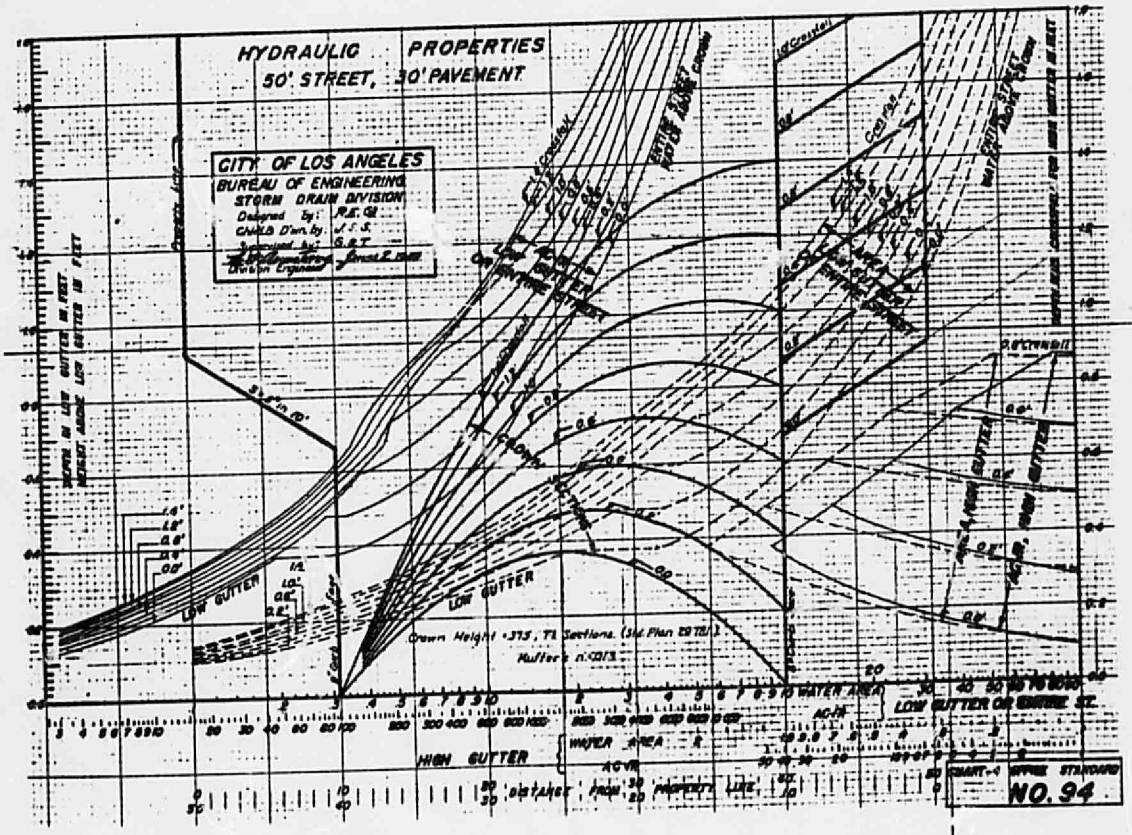
At point D-6 read 0.0 ft (DISTANCE FROM PROPERTY LINE) = 0
Then 50 ft. NW

At point D-7 find cross-fall of 0.0 ft



Total Area for a flow 0.5' above Lip of Curb = 40.65 sq ft

$$V = \frac{Q}{A} = \frac{350 \text{ cfs}}{40.65} = 8.61 \text{ fps}$$

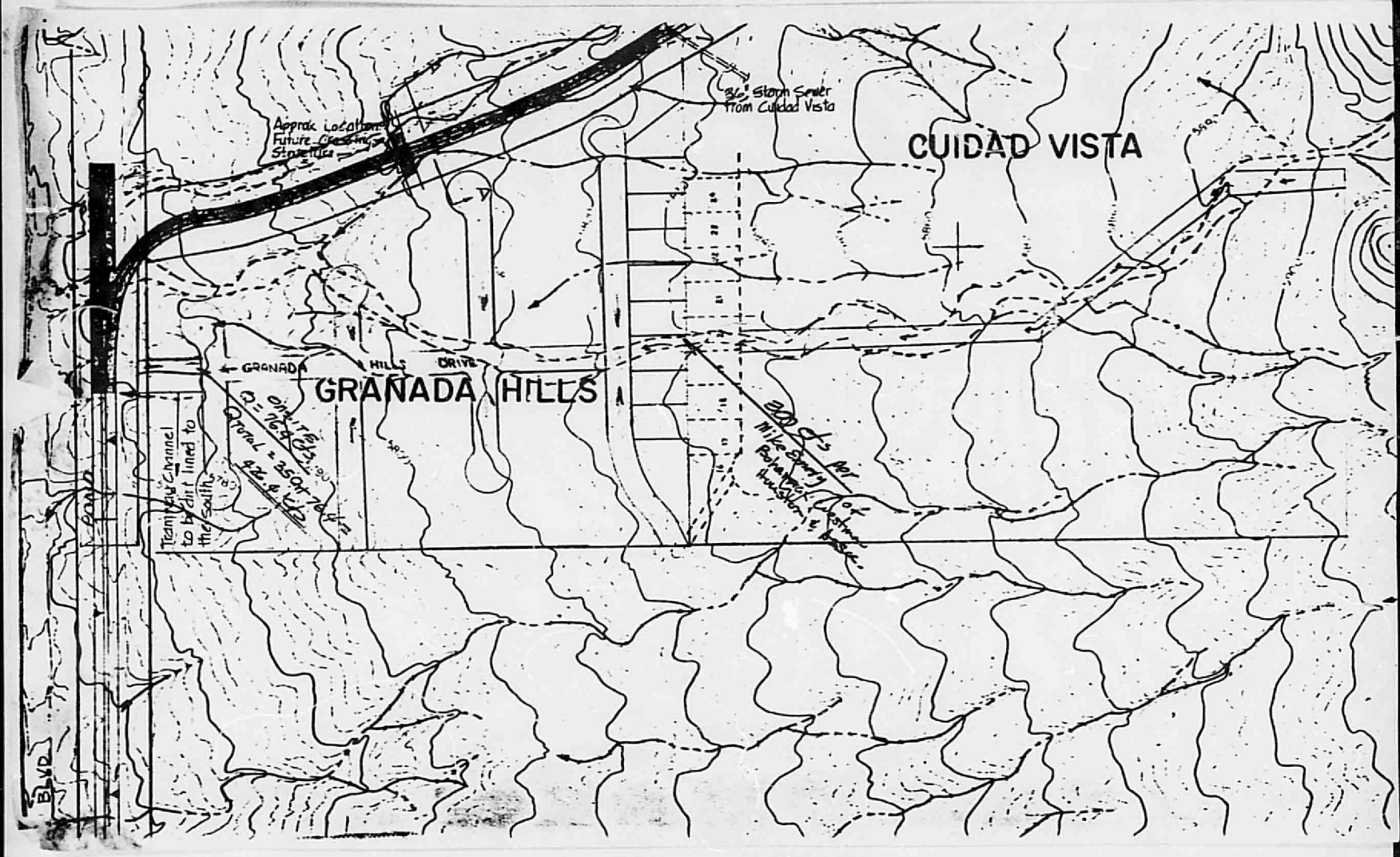


0.94

Q = 350 cfs S = 0.05 Cross Fall = 0.6 Ft. y = 0.94

FIND $y_1 = y_2$ b, A, & V. b = 50' A = 66.66 1 Ft. Hand T. Curb

V = ~~10.50~~ 5.30 0.5.25


CUIDAD VISTA
GRANADA HILLS
GRANADA
HILLS
DRIVE
Approx Location of Future Crossing Structure
84" Storm Sewer From Cuidad Vista
Team Dry Channel to be Cut lined to the South
Q = 76 cfs
Qtotal = 350 cfs
426 cfs
200 cfs per Mike Sperry
BLVD

S-72-39

ENGINEER'S DRAINAGE REPORT

FOR

NW 1/4, NW 1/4, SEC. 23, T10N, R4E

LOCATED AT THE SE CORNER OF LOMAS BLVD. AND TRAMWAY BLVD.

ALBUQUERQUE, NEW MEXICO

WILSON & COMPANY

ALBUQUERQUE, NEW MEXICO

27 JUNE 1972

ENGINEER'S DRAINAGE REPORT
FOR
NW 1/4, NW 1/4, SEC. 23, T10N, R4E
LOCATED AT THE SE CORNER OF LOMAS BLVD. AND TRAMWAY BLVD.
ALBUQUERQUE, NEW MEXICO

PURPOSE: The purpose of this report is to design the typical channel section of the major arroyos crossing the project area, so that the capacity of the arroyos will not be reduced.

RUN-OFF CALCULATION: The amount of run-off is taken from a report entitled "Flood Plain Information - Albuquerque Arroyos - Part II" prepared by the Albuquerque District, U. S. Corps of Engineers, dated July 1971. The flows used were those shown for the Standard Project Flood, which are greater than the flows expected from a 100 year storm.

DISCUSSION: These arroyo channel sections are planned to be grassed open areas within the development. There are three major drainage areas that cross the project area. These are designated drainage areas 4a, 4b, and 4c in the above referenced report.

Drainage area 4a has an area of 288 acres and a Standard Project Flood flow of 1010 c.f.s. at Tramway Boulevard. The proposed channel section has 20 foot bottom width with 4 to 1 side slopes. The design depth of flow is 2 feet on a slope of 4 percent. This section would have a design capacity of 1107 c.f.s.

Drainage area 4b has an area of 218 acres and a Standard Project Flood flow of 650 c.f.s. at Tramway Boulevard. The proposed channel section has 12 foot bottom width with 4 to 1 side slopes. The design depth of flow is 2 feet on a slope of 4 percent. This section would have a design capacity of 750 c.f.s.

Drainage area 4c is intercepted by Lomas Boulevard and would not be a major design problem for this project.

If the Monte Largo Diversion Channel is built to the east of this project the channel sizes indicated above are excessive and local drainage would then be the major concern.

If a diversion channel is constructed along Tramway Boulevard, then these arroyos would discharge into the diversion channel and would need to be of the size indicated above.

All interior drainage would be discharged to the major arroyos. The arroyo crossing within the project area will be designed when final site grading plans are prepared.

COMP. RFS
CK.
DATE 27 June 1972

WILSON & COMPANY
ENGINEERS & ARCHITECTS
BOX 2203
ALBUQUERQUE
NEW MEXICO

LOC. Alb.
PROJ.
SUBJ. Drain Report Calc.

FILE 72-511
SHEET 1
OF

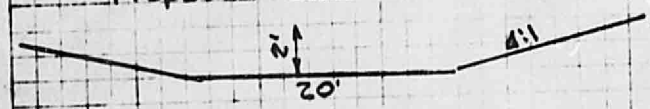
DRAINAGE AREA 4a

Drainage Area: 0.45 mi² = 288 Ac.

Standard Project Flood @ Point T (Tramway Blvd)

Q = 1010 cfs.

Proposed Channel Section



Design Depth Flow = 2.0'

n = 0.020

X Section Area = $A = 2\left(\frac{20+36}{2}\right) = 56\ ft^2$

Slope = s = .04 ft/ft = 4%

Hyd. radius = $r = \frac{A}{WP} = \frac{56}{36.49} = 1.53$

Velocity = $V = \frac{1.486}{n} \times r^{2/3} \times s^{1/2} = \frac{1.486}{.02} \times 1.53^{2/3} \times .04^{1/2}$

$= 74.30 \times 1.33 \times .2$

$V = 19.76$ ft/sec

Capacity = $Q_{cap} = AV$

$= 56 \times 19.76$

$Q_{cap} = 1107$ c.f.s.

$Q_{req} = 1010$ c.f.s.

COMP. RFS

CK.

DATE 27 June 72

WILSON & COMPANY
ENGINEERS & ARCHITECTS
P.O. BOX 3308
ALBUQUERQUE
NEW MEXICO

LOC. Alb FILE 72-511

PROJ. SHEET 2

SUBJ. Drain Report OF Calc.

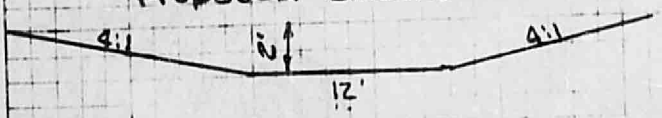
DRAINAGE AREA 4b

Drainage Area = 0.34 mi² = 218 Ac.

Standard Project Flood @ Point T (Tramway)

Q = 650 cfs.

Proposed Channel Section



Design Depth Flow = 2.0'

n = 0.20

X-Section Area = A = $2\frac{(12+28)}{2}$ = 40 ft²

Slope = s = .04 ft/ft = 4%

Hydradius = $r = \frac{A}{WP} = \frac{40}{28.09} = 1.40$

Velocity = $V = \frac{1.486}{n} \times r^{2/3} \times s^{1/2} = \frac{1.486}{.02} \times 1.40^{2/3} \times .04^{1/2}$

$= 74.30 \times 1.25 \times .2$

$V = 18.57$ ft/sec

Capacity = $Q_{cap} = AV$

$= 40 \times 18.57$

$Q_{cap} = 750$ cfs

$Q_{DES} = 650$ cfs.

GRANADA HILLS DEVELOPMENT

DRAINAGE REPORT

Prepared for:

[illegible] Homes
[illegible] San Mateo N.E.
Albuquerque, New Mexico

November, 1972

BOHANNAN WESTMAN HUSTON

DRAINAGE REPORT

FOR

GRANADA HILLS DEVELOPMENT
Bernalillo County, New Mexico

November 9, 1972

PREPARED FOR:

Chandilier Homes
2622 San Mateo N.E.
Albuquerque, New Mexico

BY:

BOHANNAN WESTMAN HUSTON & ASSOCIATES, INC.
4125 Carlisle N.E.
Albuquerque, New Mexico 87107

Raymond R. Gibson, P.E. & L.S.
Chief Engineer

ENGINEERS & PHOTOGRAMMETRISTS

BOHANNAN WESTMAN HUSTON & ASSOCIATES INC.

4125 CARLISLE BLVD., N.E.
ALBUQUERQUE, NEW MEXICO 87107
PHONE 505 345-2681

November 11, 1972

Chandilier Homes
2622 San Mateo N.E.
Albuquerque, New Mexico

Gentlemen:

We are submitting this Drainage Report to you on The Granada Hills Development. The control of the runoff shall comply with the requirements of the Albuquerque Metropolitan Arroyo Flood Control Authority and with present City of Albuquerque policies.

We appreciate this opportunity to serve you. If any questions develop, we will be available to assist you in your response.

Very truly yours,

Raymond R. Gibson, P.E. & L.S.
Chief Engineer

RRG/teg

DRAINAGE REPORT

GRANADA HILLS DEVELOPMENT

Albuquerque, New Mexico

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PLATES

Plate 1	Drainage & Grading Plan
Plate 2	Location Map

DRAINAGE REPORT

GRANADA HILLS DEVELOPMENT

LOCATION AND DESCRIPTION

Granada Hills is located east of Tramway Boulevard and south of Lomas Boulevard. The development is contained in a nominal 40 acre tract, 7.0 acres of which will be dedicated as right-of-way for Drainage channels, Lomas Blvd., and a new road to the east of the property. Drainage of the adjoining streets is handled in the Tramway Boulevard Corridor and Drainage Study, Bohannan Westman Huston and Associates, September 1972 and will not be covered by this report.

Townhouse condominiums consisting of 230 units at a density of 5.75 units/acre will be constructed on the tract while 2.11 acres will be held out for commercial development. Approximately 30 acres will be encompassed in construction of the Townhouses and included channels.

Drainage comes onto the property on the east side at two (2) places. These places are natural channels that intersect on the property to form one (1) channel that leaves the property on the west side. Present runoff from the property is from the one big channel and by several smaller channels on the west side of the property. After development water will continue to leave the property at these points.

Present runoff onto the property from the east for a 100 year 6 hour storm is 2,941 cfs in the big channel and 75 cfs in the second channel.*

*Quantities obtained from the Tramway Boulevard Corridor and Drainage Study, Bohannan Westman Huston & Associates September 1972

Natural runoff from the property encompassed in the constrution at the present time for a 100 year, 6 hour storm is 47.67 cfs. Due to the 4.4% slope and the poor grass surface a (c) .35 and an (i) of 4.5 were used.

DEVELOPMENT

The area to be used for condominiums will be landscaped so to retain enough water on the property so that runoff will not exceed that now experienced. Ponding depressions will be constructed to accomplish this purpose.

The commercial area will be developed such that 50% is paved or under roof and 20% of the rainfall will be retained on the property, in courtyards, planters and miscellaneous landscaping.

The two (2) natural channels will be left in their natural state so as not to increase the quantity or velocity of the runoff. Some shaping will be done where necessary, however, it will be done in such a manner as to not effect natural runoff through these channels.

DISCUSSION OF METHOD

The rational formula for small drainage area was used to compute the expected runoff. The design storm was picked from the 100 year frequency curve in the master plan of drainage for the City of Albuquerque. Times of construction varied from 9 to 28.5 minutes as shown in Table II.

Development of this area will be controlled by the guidelines set forth in the recent Resolution of the Albuquerque Metropolitan Arroyo Flood Control Authority.

Weighted values of (c) were used and the area as shown on Plate I were taken as units.

Ponding areas were calculated such that the volume of water ponded, when subtracted from the total volume expected, would reduce the amount of water and thus the effective area being drained and the cfs runoff from the property. The end result being to produce a cfs after development that is equal to or less than the cfs before development.

TABLE I

CALCULATION OF WEIGHTED "C"

	AREA	%	C	WEIGHTED C
AREA #1				
Roof	.56	16.4	.825	.135
Pave	.70	20.5	.875	.179
Grass	2.16	63.1	.15	.09
TOTAL	3.42	100		.404
AREA #2				
Roof	1.05	50	.81	.405
Pave				
Grass	1.05	50	.15	.075
TOTAL	2.10	100		.475
AREA #3				
Roof	.36	14.6	.825	.120
Pave	1.05	42.5	.875	.372
Grass	1.06	42.9	.15	.064
TOTAL	2.47	100		.556
AREA #4				
Roof	1.12	17.6	.825	.145
Pave	1.44	22.6	.875	.198
Grass	3.81	59.8	.15	.090
TOTAL	6.37	100		.433
AREA #5				
Roof	1.96	17.1	.825	.141
Pave	2.90	25.3	.075	.221
Grass	6.62	57.6	.15	.086
TOTAL	11.48	100		.448

TABLE II

RUNOFF (Q) VALUES

AREA	ACRES	LIN.(FT)	t MIN.	i IN/HR	C	S SLOPE	Q CFS
Channels	4.42	1150	21	4.5	.35	.0426	6.36
1	3.42	100 Gr. 745 Pv.	225	3.98	.404	.0331	5.50
2*	2.11			5.0	.475		5.01
3	2.47	770	9	5.56	.556	.0260	7.63
4	6.37	540	25	3.78	.433	.0444	10.43
5	11.48	300 Gr. 860 Pv.	28.5	3.53	.448	.0327	18.17
						TOTAL	53.10

* 2.11 x .475 x 5.0 = 5.01 cfs

To find the amount of ponding area needed the formula is used:

$$q = \frac{(p) - .2s)^2}{p + .8s}$$

q = volume of water
p = total precipitation in inches
s = retention factor .7 grass .05 paving & roofs

The volume of water ponded reduces the amount of runoff (q) and the effective drainage area.

TABLE III

EFFECTIVE RUNOFF (Q)

AREA	ACRES	q	WATER(Ac-Ft)	PONDED(Ac-Ft)	EFF. ACRE	EFF. Q
Channel	4.42				4.42	6.36
1	3.42	2.51	.715	.105	2.92	4.69
2	2.11				2.11	5.01
3	2.47				2.74	7.63
4	6.37	2.53	1.34	.45	4.23	6.92
5	11.48	2.55	2.44	.457	9.33	14.75
					*TOTAL	45.36

* 100 year storm - 6 hours - 3 inches total rainfall.

CONCLUSIONS

The use of the natural channels will route the water coming on the property across without increase in quantity or velocity.

The ponding area have reduced the on site runoff to 45.36 cfs; below the 47.67 cfs peak runoff under present conditions.

The routing of water off the property at several points as in the proposed Lomas Avenue Channel and into the proposed Tramway Boulevard Channel insure no damage to private property.

It is recommended that this development be approved since the findings of this report indicates that no increased runoff will occur and no damage to the surrounding area will be caused by this development.

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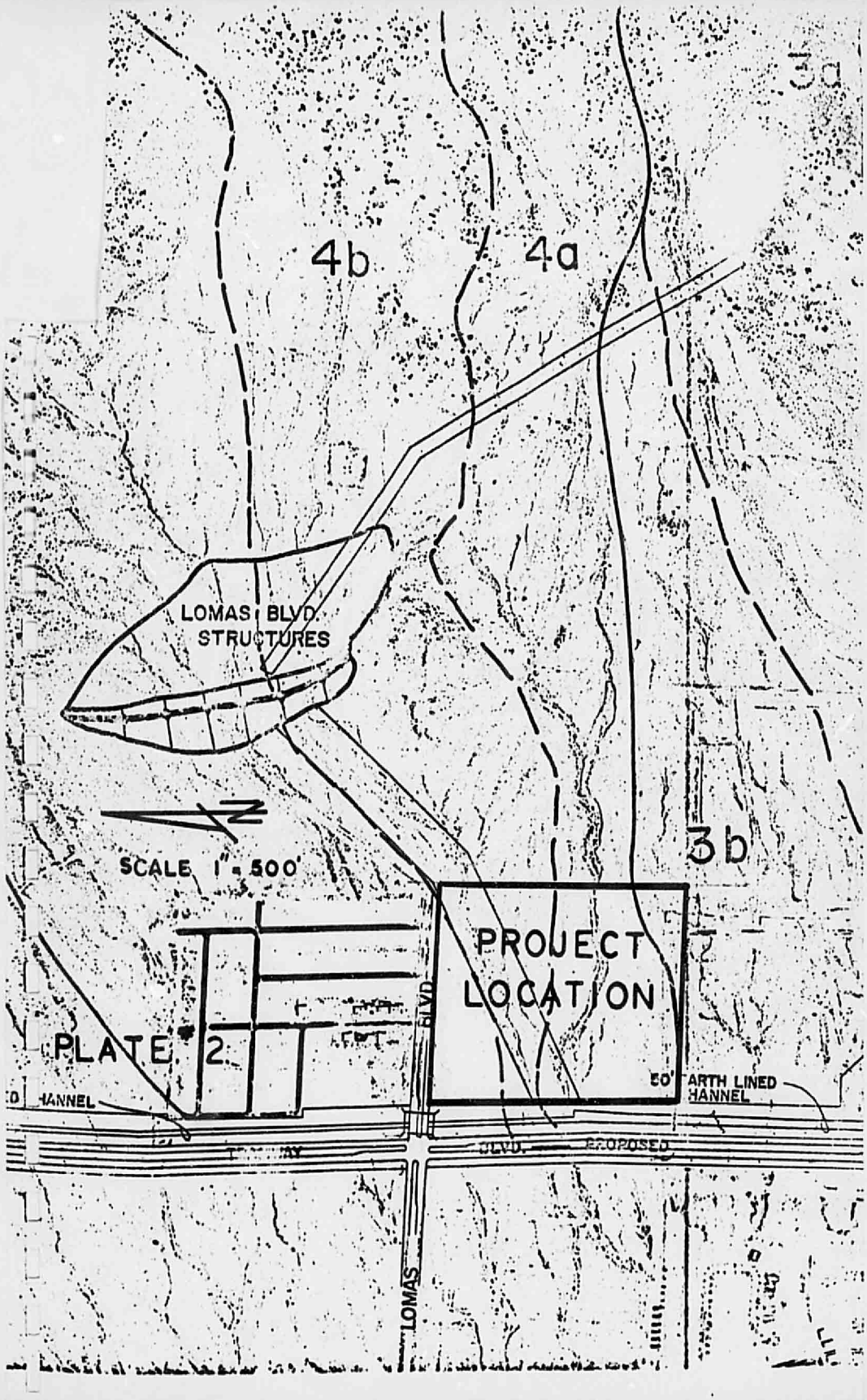
3a
4b
4a
LOMAS BLVD.
STRUCTURES
N
SCALE 1" = 500'
3b
PROJECT
LOCATION
PLATE 2
BLVD.
HANNEL
50' ARTH LINED
HANNEL
BLVD.
PROPOSED
LOMAS

C