Agreements file
MJ

BURNSIDE ENTERPRISES, INC.
P. O. Box 14807, Station "G" • Albuquerque, New Mexico 87111 • 883-3773

November 30, 1976

City of Albuquerque
Department of Public Works
Engineering Department
P. O. Box 1293
Albuquerque, New Mexico 87103

Attention: Mr. V. M. Kimmick, P.E.
City Engineer

Re: Lot 22-A, Block C
Casa Grande Manor

Dear Mr. Kimmick:

Enclosed is a sketch of said lot showing the existing dwelling and the improvements to be made along the east boundary line.

As Construction Superintendent of Burnside Enterprises and future owner of said lot, I hereby guarantee that these improvements are under construction at this time and will be complete within the near future.

Very truly yours,

BURNSIDE ENTERPRISES, INC.

Del Nist, Superintendent

Encl.

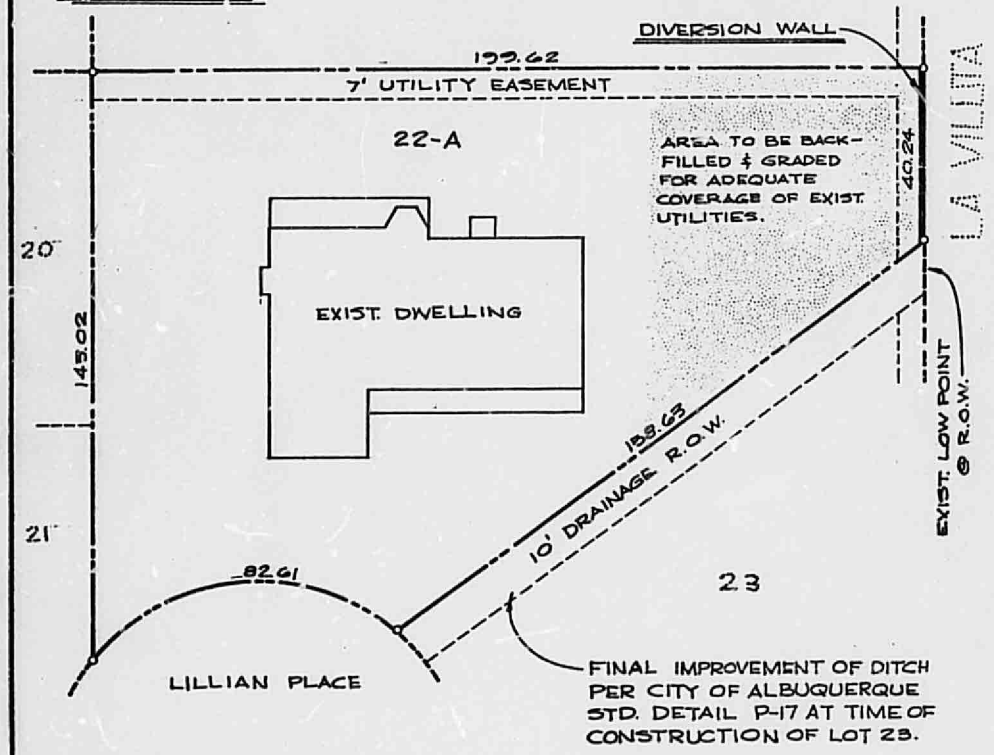
cc: Murray-McCormick, Inc.

PROPOSED IMPROVEMENTS

LOT 22-A, BLOCK C

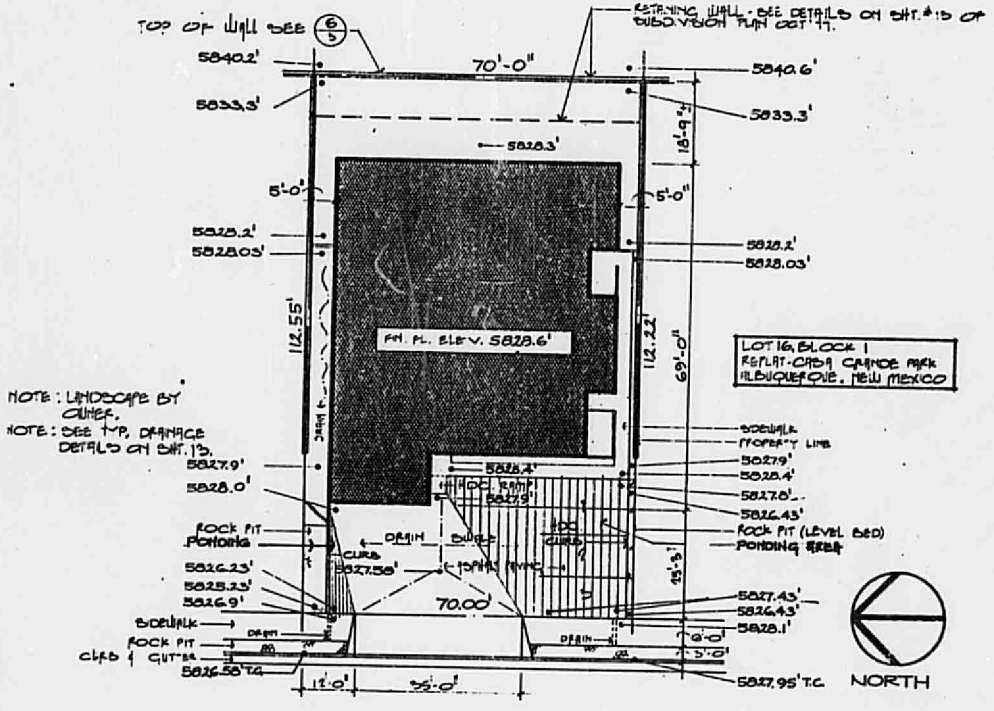
CASA GRANDE MANOR

ALBUQUERQUE, NEW MEXICO



No. 5708
REGISTERED
BOB K.E. JOHNSON
NOV. 30, 1976

MURRAY-McCORMICK, INC
ENVIRONMENTAL DESIG
ENGINEERING-PLANNING-SURVEYI
2601 WYOMING BLVD. N.E. SUITE F ALBUQUERQUE NEW MEXICO 87112 505 292 14



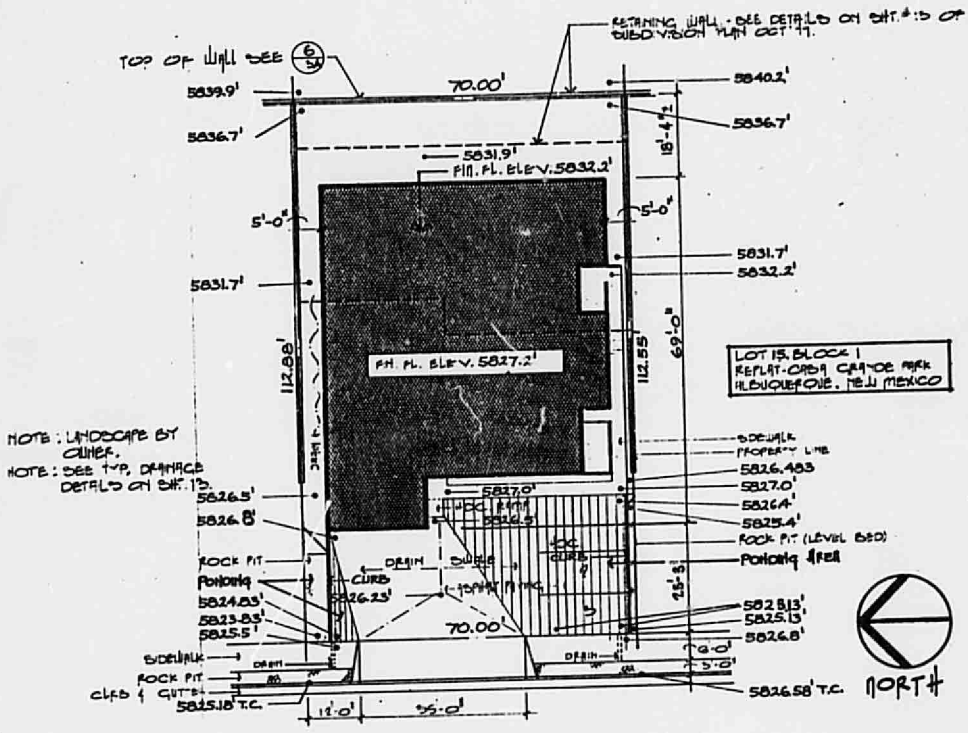
2808 PALO VERDE DR. N.E.

SITE PLAN

1"=20'-0" N.S.

10-10-79

STATE OF NEW MEXICO
BILL J. WATERS
No. 348
ALBUQUERQUE, N. M.
REGISTERED ARCHITECT



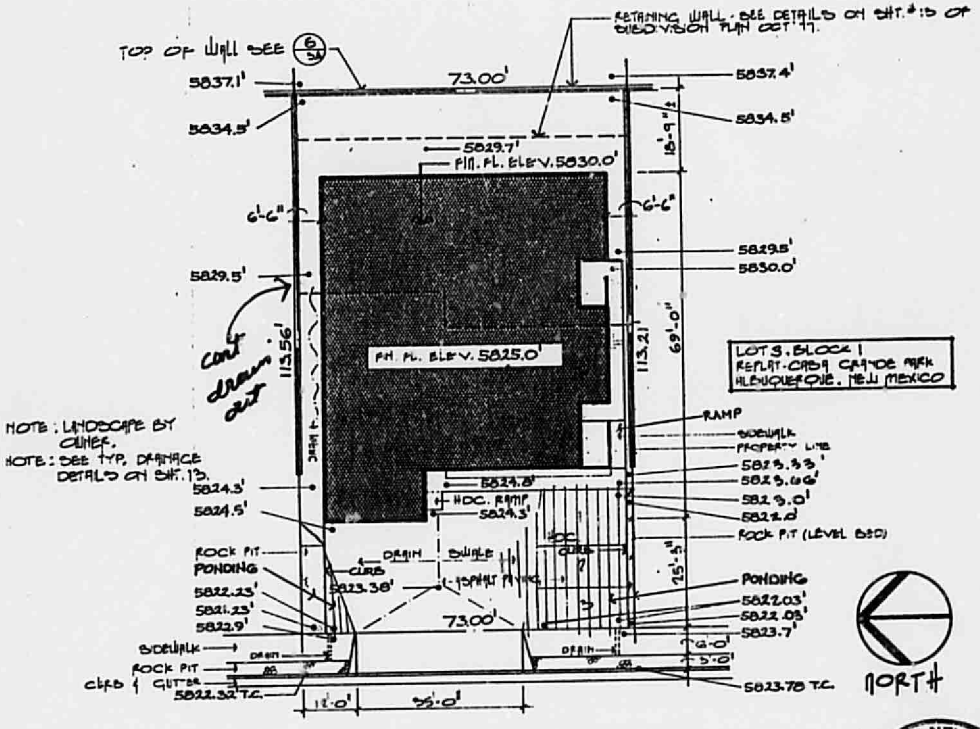
2812 PALO VERDE DR. N.E.

SITE PLAN

1"=20'-0" N.S

10-10-79

STATE OF NEW MEXICO
BILL J. WATERS
No 348
ALBUQUERQUE, N. M.
REGISTERED ARCHITECT



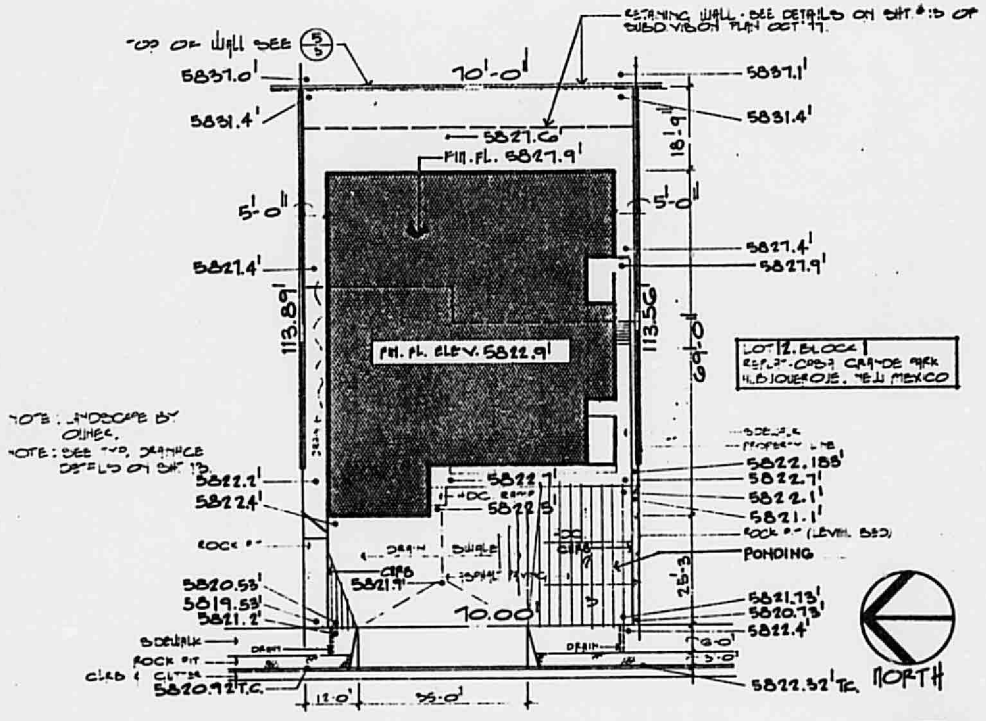
2820 PALO VERDE DR. N.E.

SITE PLAN

1"=20'-0" N.S

10-10-79

STATE OF NEW MEXICO
BILL J. WATERS
No. 348
ALBUQUERQUE, N. Mex.
REGISTERED ARCHITECT

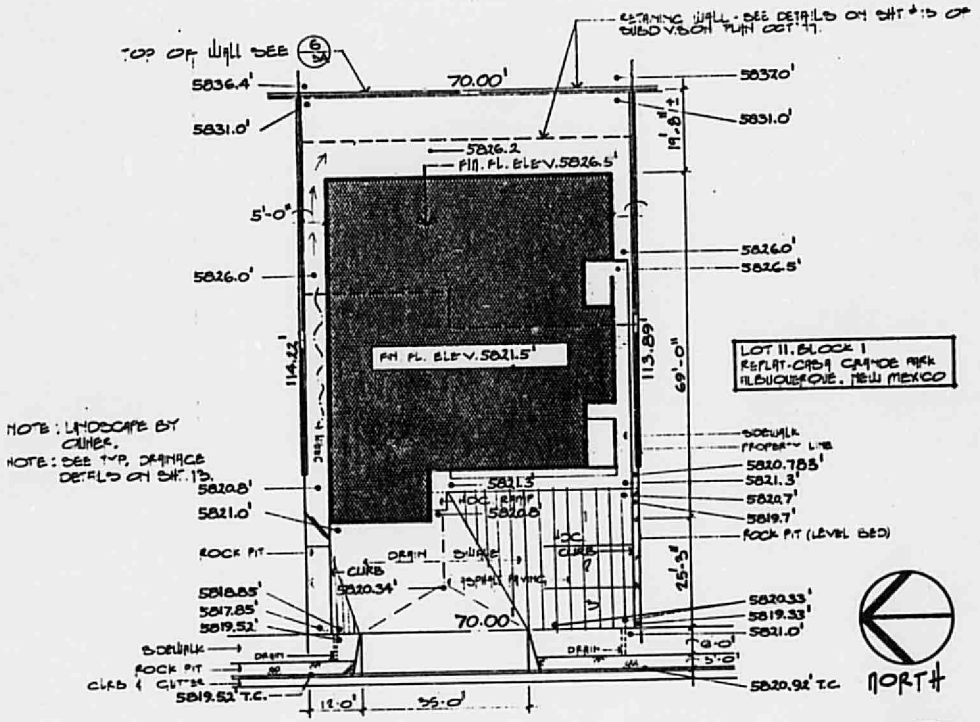


2824 — PALO VERDE DR. N.E.

SITE PLAN 1"-20'-0"

N.S. 10-10-79

STATE OF NEW MEXICO
BILL J. WATERS
No. 348
ALBUQUERQUE, N. M.
REGISTERED ARCHITECT



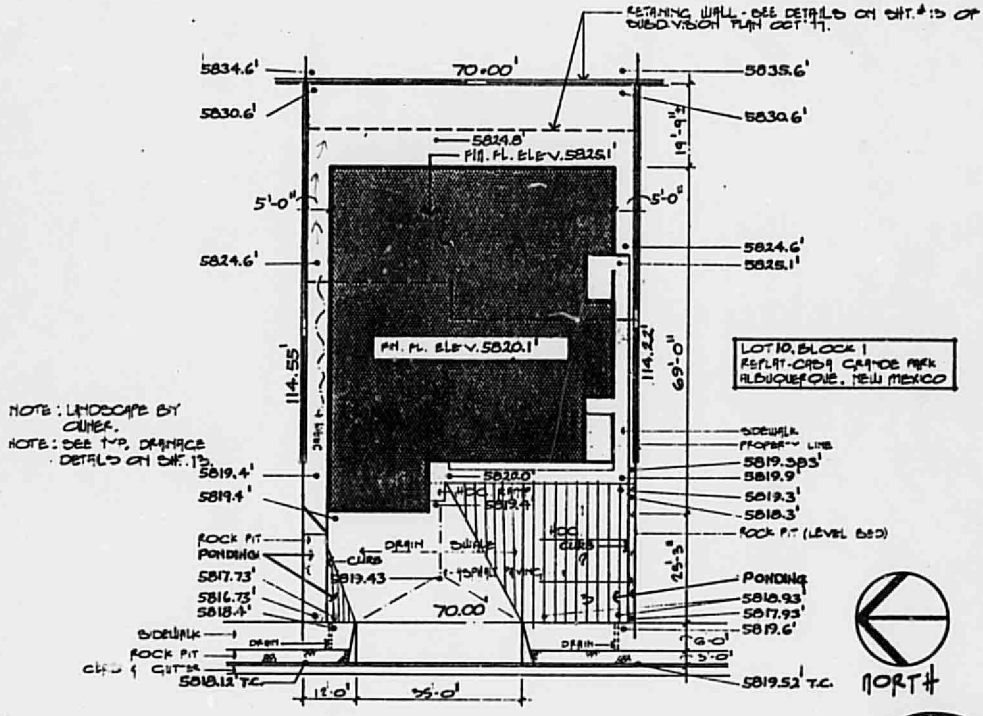
2828 PALO VERDE DR. N.E.

SITE PLAN

1"=20'-0" N.S

10-10-79

STATE OF NEW MEX.
BILL J. WATERS
No. 348
ALBUQUERQUE, N. M.
REGISTERED ARCHITECT



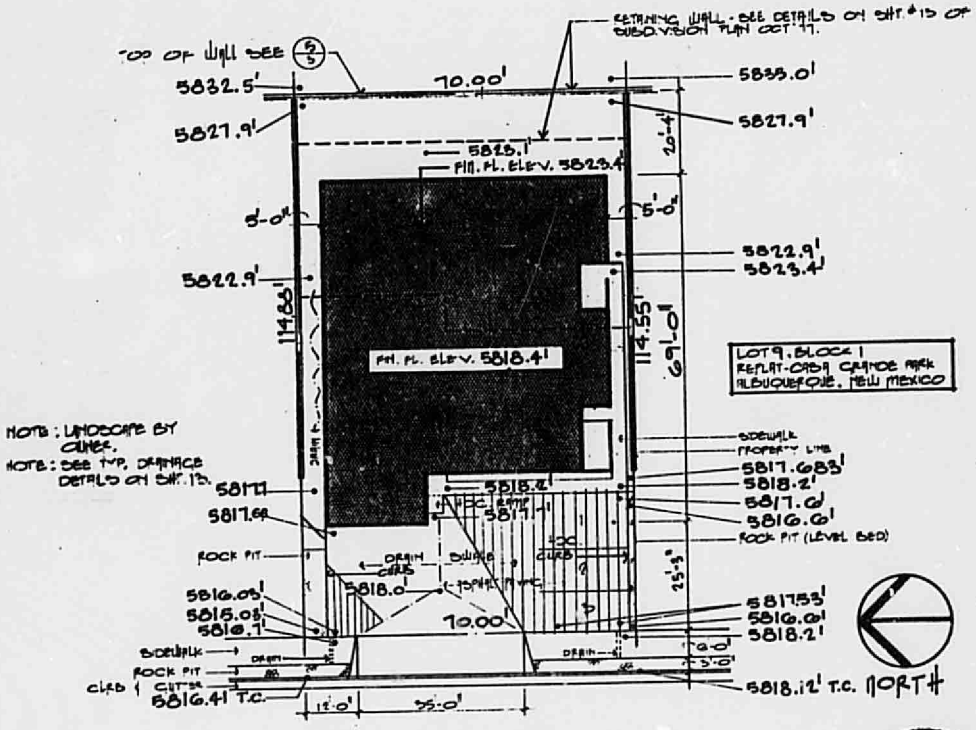
2832 PALO VERDE DR. N.E.

SITE PLAN

1"=20'-0" N. S.

10-10-79

STATE OF NEW MEXICO
BILL J. WATERS
No. 348
ALBUQUERQUE, N. M.
REGISTERED ARCHITECT



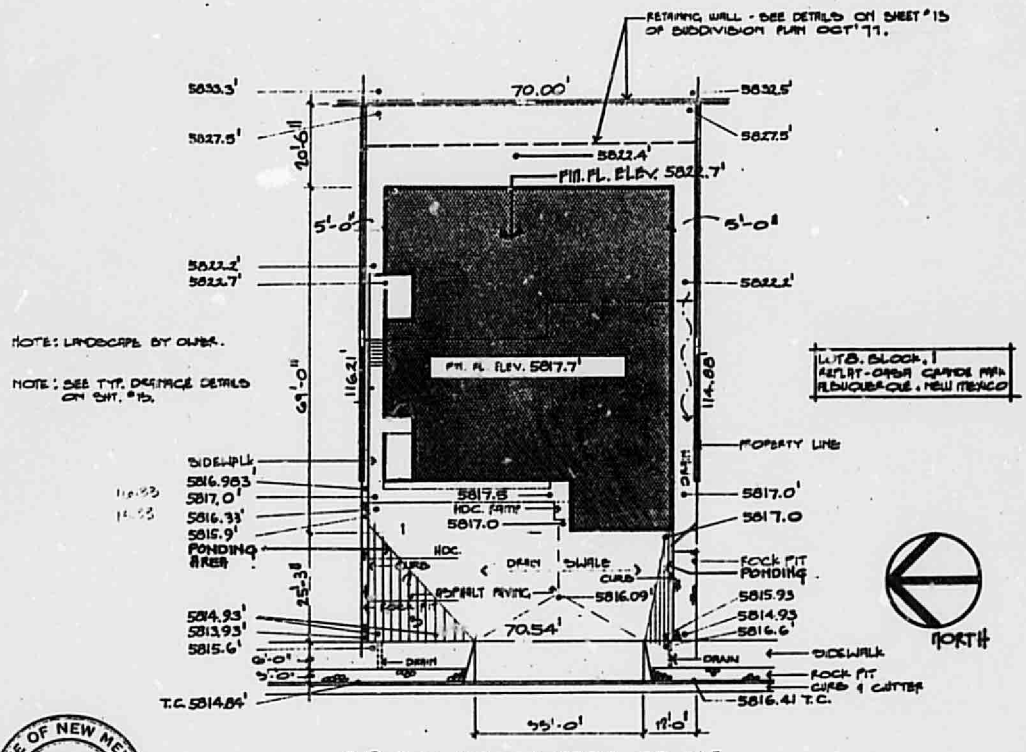
2836 PALO VERDE DR. N.E.

SITE PLAN

1"=10'-0" N.S.

10-10-79

STATE OF NEW MEXICO
BILL J. WATERS
NO. 348
ALBUQUERQUE, N. M.
REGISTERED ARCHITECT



2840 PALO VERDE DR. N.E.

SITE PLAN

1"=20'-0" N.S.

10-10-79

STATE OF NEW MEXICO
BILL J. WATERS
NO. 348
ALBUQUERQUE, N. M.
REGISTERED ARCHITECT

March 7, 1979

RECEIVED
MAR 21 1979
CITY ENGINEERS

Mr. Richard Heller, City Engineer
400 Marquette Avenue NW
Albuquerque, New Mexico

Mr. Heller:

This is in reference to your letter dated December 11, 1978, which was a reply to our letter dated November 3, 1978. A copy of each letter is enclosed for your convenience.

The intake structure and 42 inch drain west of our properties has been completed as your previous letter indicated it would. This takes care of the underground utilities and safety hazards. However, of even more concern to us (part two of the previous letter) is what is going to happen to the easement between our four properties. We would like to know--better still, we would like to be able to offer some suggestions since the "remedial work" you referred to previously will have considerable impact on the appearance, safety, and subsequent value of our properties.

We respectfully suggest a meeting between you, or a representative, Mr. Paul Smith, or a representative, and the four parties undersigned at your earliest convenience. The meeting could be at one of our homes if that would be agreeable to you.

Thank you for your past attention and thank you in advance for your attention to this matter.

Respectfully submitted,

J. W. Leggett
2833 Palo Alto Dr. N.E.
Richard S. Marmon
2828 Palo Alto Dr. N.E.
2900 Palo Alto N.E.
Stephen N. Morris
2901 Palo Alto, N.E.

Enclosures

November 3, 1978

Mr. Richard Heller, City Engineer
400 Marquette Avenue NW
Albuquerque, New Mexico

Mr. Heller:

We have a problem with a drainage easement in the 2800 block of Palo Alto Drive NE that dates back some three years or longer. The drainage passage is nothing but fill dirt which has eroded several feet deep in places, exposing underground telephone and power cables and undermining the footing beneath our backyard block walls--this has occurred several times.

When the houses were built almost four years ago, Mr. Smith, of Paul's Homes Inc., promised drainage-way construction in compliance with the Albuquerque City Engineer's office. It has never happened. Meantime, H.G. Pickard Associates, Inc., has purchased the land to the west of our homes on Palo Alto, and excavated some ten feet or so below the normal drainage bed level. Consequently this has caused a waterfall with resultant huge land chunks crumbling away, threatening our walls, yards, and homes.

Clearly, both Pickard and Paul's Homes share the responsibility in correcting this problem, and to prevent anymore "buck passing", we, the undersigned, would like to go on record as having voiced our concern. After three or four years of contractor procrastination, patience is at a low. We choose to avoid legal action if at all possible, but may have no recourse if the problem is not corrected soon, since damage to private property and underground utilities is inevitable.

We feel that since it will take some coordination between the two mentioned contractors, your office should take the initiative to corrective action. In view of the time that has passed in this matter, we would appreciate your giving us a date at which we can expect a solution.

Respectfully submitted,

Mr & Mrs [illegible] 2833 Palo Alto Dr. NE
Mr & Mrs Richard H Mann 2828 Palo Alto Dr. N.E.
Colonel and Mrs. D.D. James 2901 Palo Alto Dr. N.E.
By Gloria J. Hileman
Mr & Mrs [illegible] 2900 Palo Alto Dr. NE

Addendum enclosed

Mr. Richard Heller November 3, 1978 Addendum

The drawings we have seen on the drainage correction show a little concrete apron with a waterfall step every so many feet--dirt in between. We respectfully suggest that although this is a quick and inexpensive correction, it is really inadequate in solving the problems in total. The easement is and has been an eyesore because of the perpetual mud and weeds. Since it is in effect city property, dispatching the appropriate departments every two weeks or so to clear mud and cut the weeds would seem to be an expense and nuisance the city would like to avoid.

We suggest concreting the entire drainage channel, which would mean the city would probably have to assume some of the expense. Certainly when we look at the annual taxes we pay on these homes on Palo Alto, it doesn't seem an unreasonable request.

An alternative we perhaps could live with would be a shallow concrete gutter, some six or eight feet wide, with shoulders, and traversing the entire lengths of our lots. This would be very inexpensive and would handle the water sufficiently (except in the event of a flood.) With permission from the city, we property owners could put down plastic cover between the concrete gutter shoulders and our property lines, and cover with gravel, thereby eliminating the terrible "back alley look" the easement has at present. We feel we live in a nice area and would like the total of it to appear that way. Some cooperation with the city engineering office in solving our mutual problem is all we ask.

Thank you for considering our suggestions. If the city and the two contractors will bend a little from the original plans, we feel a satisfactory and permanent solution will result.

Respectfully submitted,

Mr & Mrs [illegible] 2833 Palo Alto Dr. NE

Mr & Mrs Richard H Mercer 2828 Palo Alto Dr N.E.

Colonel and Mrs. H.D. James 2901 Palo Alto Dr. N.E.
By Gloria J. Hitchen

Mr & Mrs [illegible] Parson 2700 Palo Alto Dr. NE.

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

December 11, 1978

Mr. & Mrs. J. W. Doggett
2833 Palo Alto Dr. N.E.
Albuquerque, New Mexico 87112

RE: DRAINAGE EASEMENT IN CASA GRANDE MANOR

Dear Mr. Doggett:

The City has been aware of the problem existing in this development for quite some time. The inadequate provisions made by the developer are both a nuisance and safety problem for the residents and a source of continued expenditures for the Street Maintenance Division of this Dept. Because of this situation, the City has witheld a number of building permits to the developer, H. G. Pickard & Associates, for almost six months in order to obtain a drainage solution West of Palo Alto Dr. which would put an end to the conditions lamented in your letter dated Nov. 3, 1978.

I am glad to report to you that the City has received a plan of improvements West of Palo Alto, which includes an intake structure in the drainage easement, a 42" storm sewer outfall pipe, and appropriate retaining walls. This plan has been approved by my staff and myself last Monday and construction should begin in short order.

Regarding the portion of the channel West of La Villita development, the City will have to perform remedial work. Unfortunately, the block-to-block contractor retained by the City has a substantial backlog of projects to execute. I would hope that he may be able to rectify this problem before the beginning of the next rainy season. I will keep you posted on the progress of this effort.

Sincerely Yours,

Richard S. Heller

Richard S. Heller
City Engineer

RSH/BC/tl

cc: Mr. & Mrs. Richard H. Marmon
Colonel & Mrs. G. D. James
Mr. & Mrs. R. B. Barron
C. D. Sheppard, Asst. City Engineer-Field
Bruno Conegliano, Asst. City Engineer-Hydrology

MURRAY-McCORMICK, INC.
ENVIRONMENTAL DESIGN
ARCHITECTURE · ENGINEERING · PLANNING · SURVEYING

November 10, 1976

Mr. Kleston Laws
Drainage Engineer
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: Drainage Easement Variance Request Between Lot 22 and 23, Block C, Lillian Place, Casa Grande Manor

Dear Kleston:

This letter will request a reduction in the storm drain easement width from the platted 20' to 10'. The decrease will be accomplished by moving the northerly right-of-way line 10' toward the south. This will increase the size of Lot 22.

I have made every effort to locate a drainage report for the upstream property (La Villita Townhouses) with no avail.

A field inspection of the site indicates that upstream property is designed to be self contained or ponded. A maximum of one acre would drain into this right-of-way. I also enclose a typical detail of the storm drain channel for your approval.

Very truly yours,

Bo K. Johnson, P.E.
Vice President

join at east end?

BKJ:dw

Encl.

Casa Grande Manor 1.3ac 28.47cfs.
7-1ac 25-30 — 28.4 D=.53 V=6

2601 WYOMING BLVD. NE. SUITE F/ALBUQUERQUE, NEW MEXICO 87110/505-292-1936
CALIFORNIA ALASKA OREGON WASHINGTON TEXAS GEORGIA FLORIDA COLORADO

CALCULATIONS

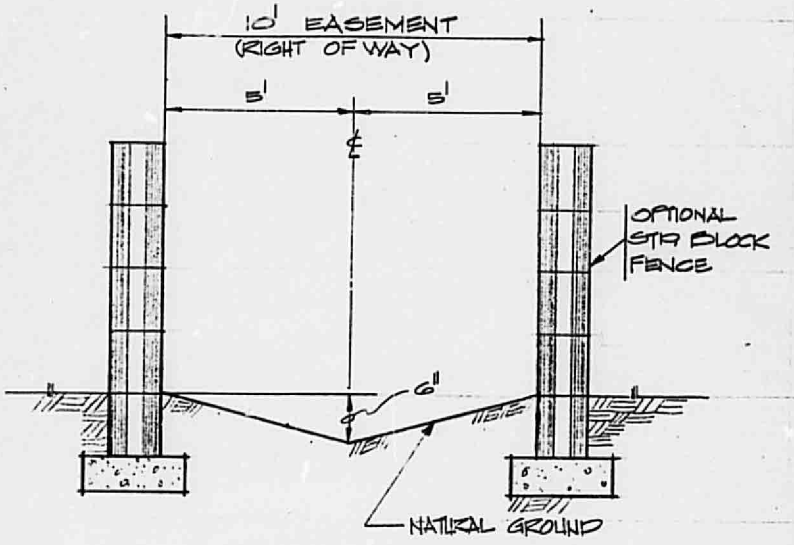
$n = 0.03$

$S = 0.03$ (APROX.)

$A = \left(\frac{1.486}{n}\right) A R^{2/3} S^{1/2}$

$Q = 8.48 \text{ FT}^3/\text{SEC}$

$V = 3.39 \text{ FT/SEC}$



MURRAY - McCORMICK, INC.
ENVIRONMENTAL DESIGN
ENGINEERING · PLANNING · SURVEYING
2001 WYOMING BLVD., NE SUITE F / ALBUQUERQUE, NEW MEXICO 87110 / 505-292-1939

JOB NO. _____ DATE _____

PROJECT _____

SCALE NONE

N. 89°4

LILLIAN PLACE

CASA DEL NORTE

PALO ALTO DRIVE N.E.

DRIVE N.E.

Drainage Easement

Drainage Easement

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

INTER-OFFICE CORRESPONDENCE REF. NO._____

April 8, 1976

TO: Q. R. KIELICH, ASSISTANT CITY ENGINEER - DESIGN
ATTN: K. LAWS
FROM: R. A. FOSNAUGH, TRAFFIC ENGINEER

SUBJECT: CASA GRANDE MANOR DRAINAGE EASEMENT IMPROVEMENTS

The subject plans have been reviewed and the following comments are offered.

1. Are the streets existing?

2. If streets exist, can a small pipe be used to handle low flows?

3. If streets do not exist, can a pipe be used to handle full flow or at least low flows?

dcs

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
Harry E. Kinney

CHIEF
ADMINISTRATIVE OFFICER
Frank A. Kleinhenz

April 26, 1976

Mr. Wilbur D. Stites
8000 East Girard Ave. #306
Denver, Colorado 80231

RE: CASA GRANDE MANOR CHANNEL DESIGN

Dear Mr. Stites:

Enclosed is a marked copy of the plan and profile for the subject channel. Hopefully the comments are self-explanatory. They are compiled from several sources. An appointment with the City Engineer's Wednesday staff review meeting would allow you to question or answer any comments. If I can answer questions, please call.

A reproducible copy will be required for the City Engineers approval before construction can begin. Please make necessary corrections and submit the reproducible.

Very truly yours,

Kleston H Laws

Kleston H. Laws
Assistant City Engineer-Hydrology

KHL/fs
Enclosure

CITY OF ALBUQUERQUE, NEW MEXICO
CITY ENGINEER'S OFFICE

MEMORANDUM - August 13, 1976

TO: Mr. Charles Volz, Bldg. & Insp. Div.
FROM: V. M. Kimmick, City Engineer
SUBJECT: CASA GRANDE MANOR, ISSUANCE OF BUILDING PERMITS

It is requested building permits not be issued for the following lots in Casa Grande Manor without written approval of the City Engineer:

8,15,16,22,23 and 24

This is necessary in order to insure that the easement and the utilities contained in the easement are properly protected from erosion caused by surface water runoff.

VMK/fs

cc: Frank Kleinhenz(2)
E. F. Hensch
Bob Kielich
Kleston Laws
Dwayne Sheppard

TELEPHONE:
(303) 751-1237

STITES & BILLINGSLEY
CONSULTING ENGINEERS, INC.

8000 East Girard Avenue - Suite 306
Denver, Colorado 80231

April 2, 1976

Mr. Kleston H. Laws
Assistant City Engineer - Hydrology
City of Albuqeurque
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: Channel Design
Casa Grande Manor
Albuquerque, New Mexico

Dear Kleston:

I am enclosing four copies of proposed construction details for referenced project for your review and comments or approval.

I am presently discussing with Maccaferri Gabions, Inc. the feasibility and cost of substituting their product for the concrete check dams. In my opinion, the Maccaferri Gabions product would be superior substitution for the concrete check dams as they will adapt to movement in the channel without structural distress. Have mentioned this as would probably ask for the substitution if the cost is comparable.

If you have any questions or require additional information, please contact me.

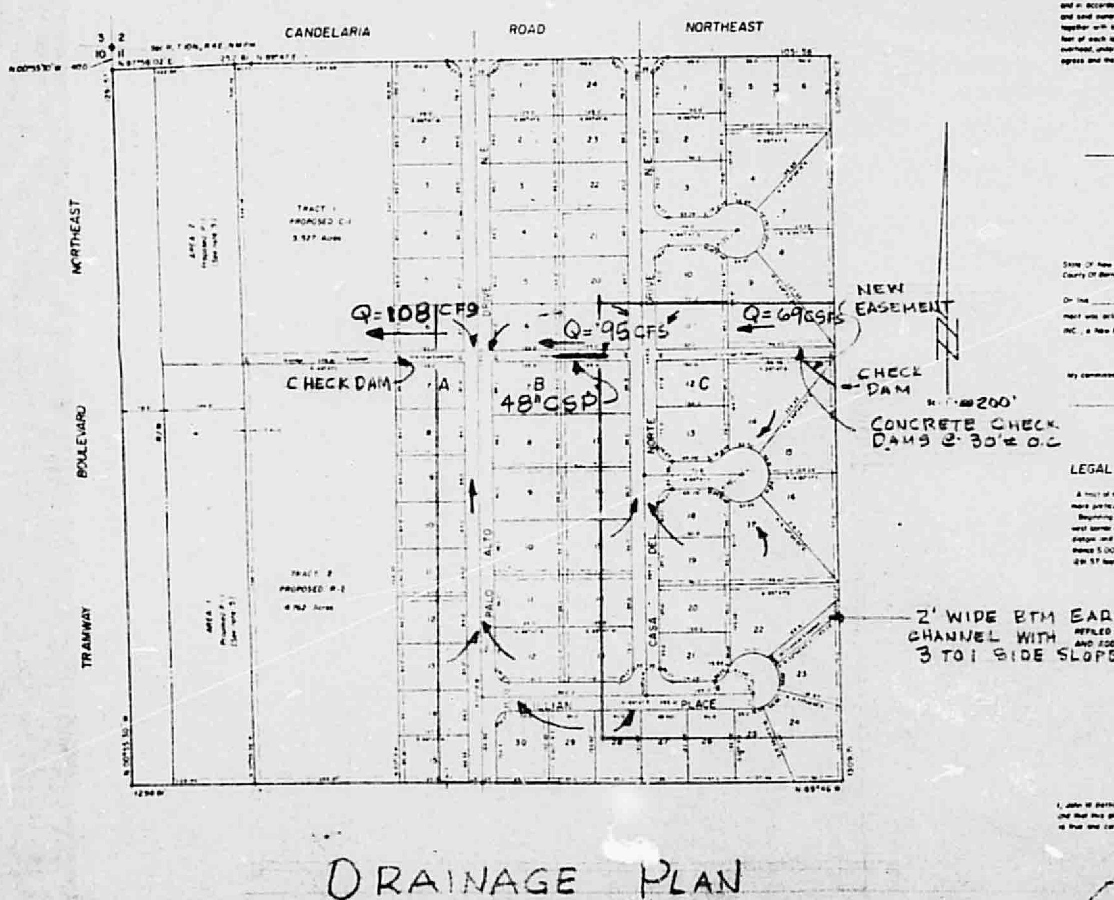
Very truly yours,

Wilbur D. Stites

WDS:mf
cc: Paul's Homes, Inc.

DS-171

CASA GRANDE MANOR
In Northeast
Albuquerque New Mexico



REFILED FOR THE PURPOSE OF CORRECTING SIDELINE EASEMENT AND ZONING NOTE, ALL ON EASEMENT DIAGRAM

DRAINAGE PLAN

ENCHANTMENT ENGINEERING

APPROVALS

City Engineer for the city of Albuquerque, New Mexico — Date

Traffic Engineer for the city of Albuquerque, New Mexico — 7-14-72

Parks and Recreation Dept. for the city of Albuquerque, New Mexico

Mountain States Telephone & Telegraph Co.

Public Service Co. of New Mexico

Southern Union Gas Co.

Chairman Planning Commission — 7-21-72

Executive Secretary, Planning Commission

AMAFCA — 7-26-72

DEDICATION

PAUL S. HOMES, INC.

Paul W. Smith, President

Secretary

State of New Mexico) ss
County of Bernalillo)

Notary Public

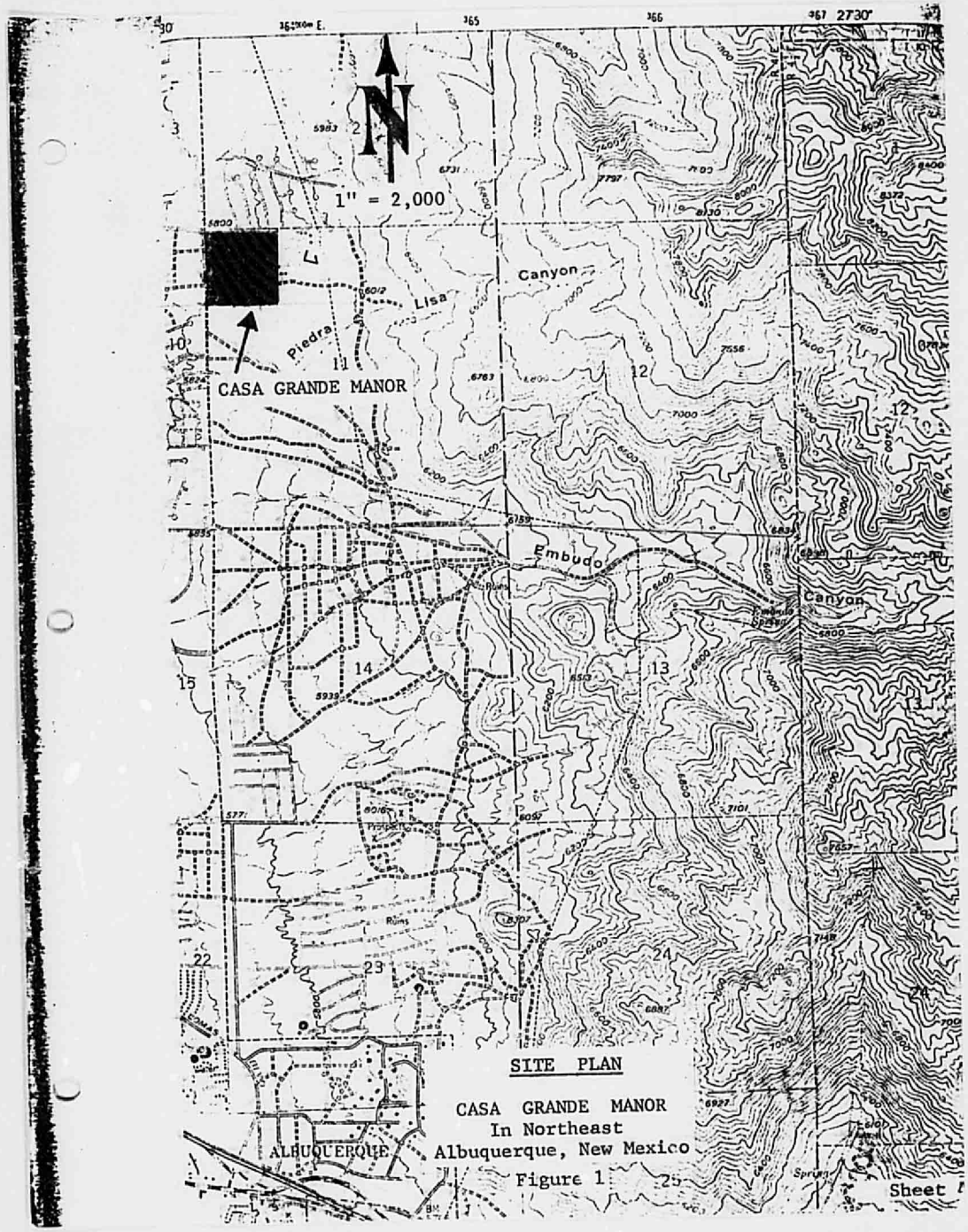
LEGAL DESCRIPTION

NOTES

1. LEGAL DESCRIPTIONS FOR TRACTS OF LAND IN THIS SUBDIVISION SHALL READ AS FOLLOWS:

FIG 2 SHEET 5 S-72-19

DS-171



SITE PLAN

CASA GRANDE MANOR
In Northeast
Albuquerque, New Mexico

Figure 1

2. Install concrete check dams at intervals to maintain a 1 percent slope between check dams and to allow the improved channel grade to follow existing channel grade. (See Figures B-1 and B-2.) See Figure 2 for size of channel.

3. Install control drop on the downstream side of Palo Alto Drive N.E. to reduce the possibility of flooding the lots on the north and south sides of the channel. (See Figure B-3.)

4. Install concrete check dams at the east and west property lines to match existing changes in elevations at these points. (See Figures B-1 and B-2.)

5. Install a 48-inch diameter CSP in the east half of Block B. See Figures B-4 and B-5 for inlet controls and Figures B-6 and B-7 for outlet controls.

6. A 2-foot wide bottom ditch with 3 to 1 side slopes and natural earth lining is adequate to crrry the water in the easement between lots 22 and 23, Block C.

7. Concrete pans across Palo Alto Drive N.E. and Gasa Del Norte Drive N.E. were not required in the original street plans, and it is our opinion that these would provide very small benefit towards reducing problems with nuisance water in a residential street. Infiltration of nuisance water into the stream bed will reduce the problem.

Wilbur D. Stites
New Mexico P.E. NO. 5900

Developed Runoff

The runoff from a 100-year storm was calculated using the Rational Method. The coefficient of runoff for the undeveloped area to the east and south of the site was taken from "Data Book for Civil Engineers - Design," Volume I, by Elwyn E. Seelye, Section 18, Table B. The coefficient of runoff was assumed to be 0.35 corresponding to a soil consisting of gravel ranging from clean to gravel sand mixtures with from no-silt and clay to high clay or silt content with a light vegetation cover. Seelye "C" value ranges from 0.15 to 0.50 for runoff from this combination of soil and vegetation cover. The coefficient of runoff for the developed area to the east was assumed to be equal to 0.35 corresponding to the runoff from the undeveloped area. This assumption was used after an inspection of the developed area revealed that considerable detention ponding has been utilized within the development to limit the developed runoff to historical runoff.

CHANNEL DESIGN

Cost comparisons indicate that the most economical method for constructing the channel will be to utilize the natural ground as a drainage channel. Concrete check dams, located at intervals to provide a one percent slope between check dams and allow the gradient of the new channel bed to follow existing channel gradient, will reduce the flow velocity below critical velocity, prevent excessive scour of the channel, and reduce the possibility of degradation of the channel bed. A 48-inch diameter CSP was designed for use in the east half of the drainage channel in Block B to allow placing fill over the pipe to support existing foundation for wall fences along the north and south sides of the drainage channel.

RECOMMENDATIONS

1. The Owner must dedicate a new 20-foot wide drainage easement to follow the existing drainage channel alignment for that portion of the existing channel between its intersection with the existing 20-foot wide drainage and the east property line. The easement must provide a 100-foot radius curve for the intersection of the new channel alignment with the existing 20-foot wide easement.

PURPOSE OF STUDY

The purpose of this study is to establish the flow rate, resulting from a storm with a return period of 100 years, for the design of a drainage channel running east to west through Casa Grande Manor, a subdivision in Northeast Albuquerque, New Mexico. The drainage channel is located in a dedicated easement twenty feet wide that is situated approximately in the middle of the subdivision.

DESCRIPTION OF PROJECT

Location

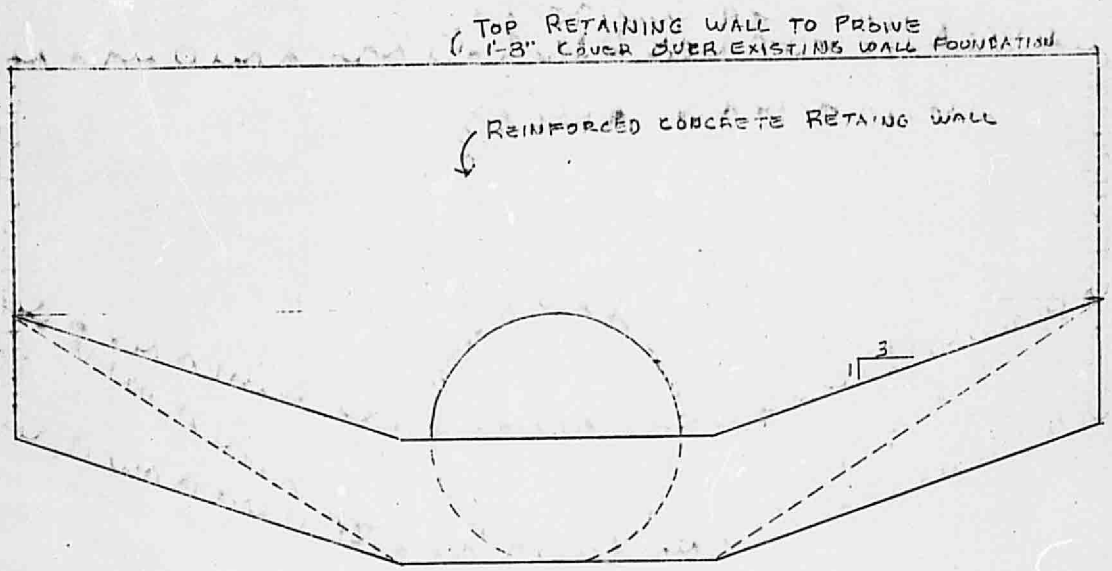
The tract of land under consideration is located in the NW¼, NW¼, Section 11, Township 10 North, Range 4 East, NMPM, City of Albuquerque, County of Bernalillo, New Mexico. (See Figure 1.)

Topography

The tract of land is presently being developed. Street grades were taken from "Proposed Paving and Street Grades in the Casa Grande Manor," P-154-72, prepared by the City of Albuquerque.

Offsite Drainage

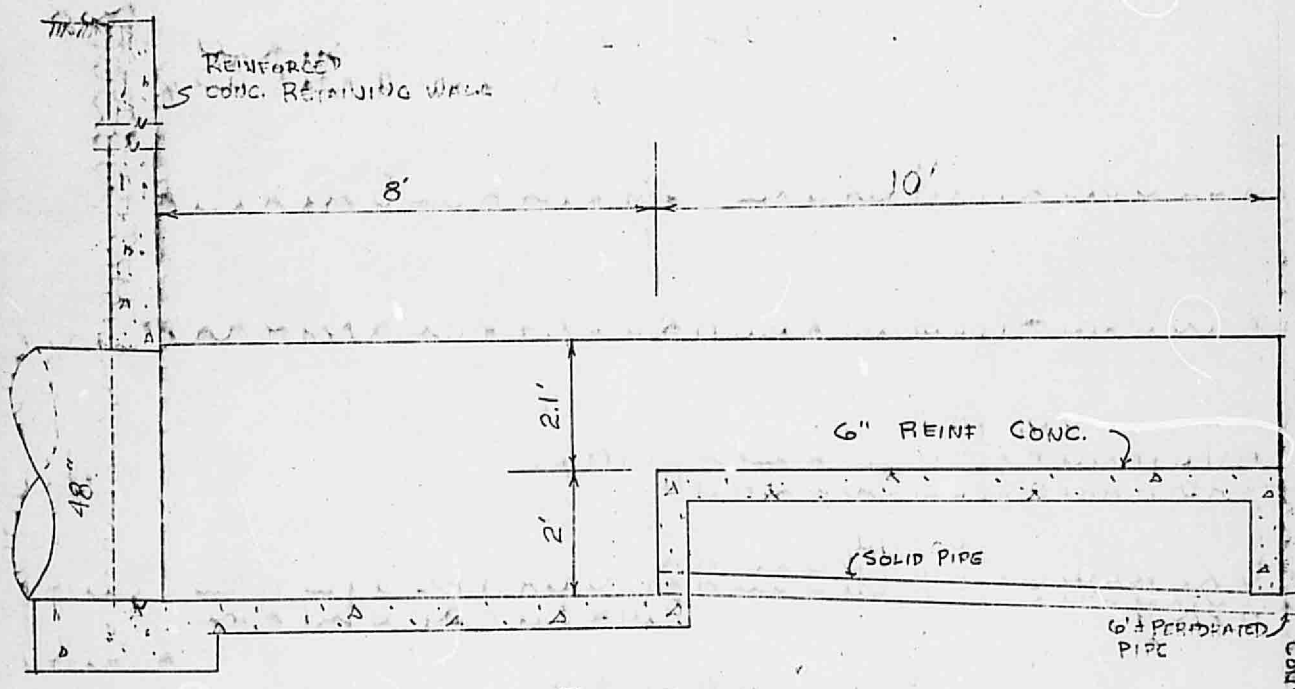
Offsite drainage consists of 22 acres east of the project and 2 acres south of the project. The drainage areas were taken from the Tijeras, New Mexico-Bernalillo County quadrangle published by the U.S. Geological Survey. The 22 acres to the east consist of a developed area, with detention ponding, and undeveloped land in the remaining area. The undeveloped land slopes to the west at an average slope of eight percent. The undeveloped area is covered by sparse vegetation.



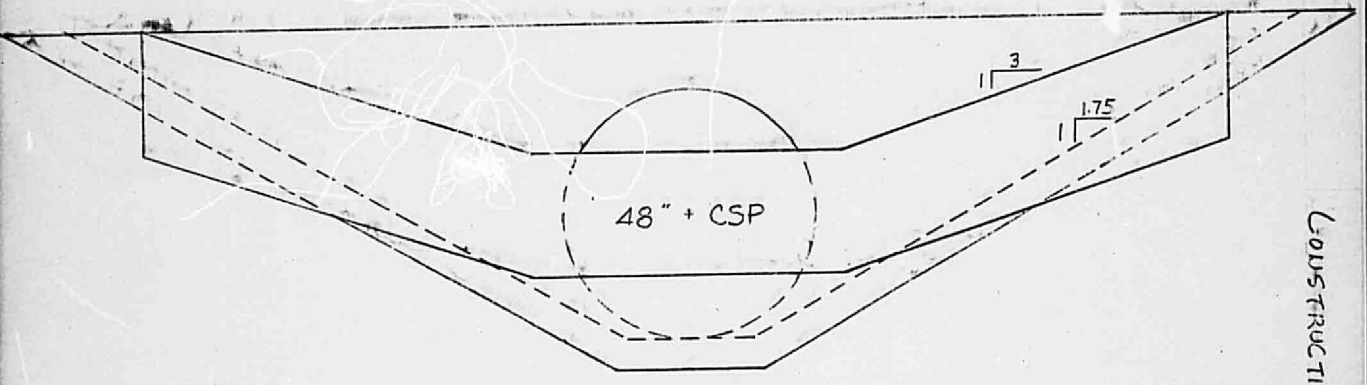
END VIEW

OUTLET 48" CSP

FIGURE B-7



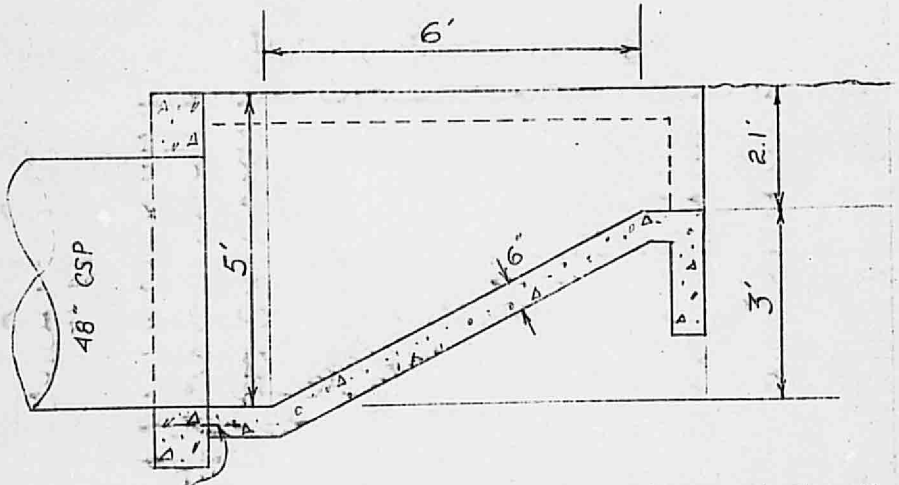
SECTION
OUTLET 48" CSP
FIGURE B-6



END VIEW

INLET 48" CSP

FIGURE B-5



1' "X" Bars on 1' cc or poured monolithically

Headwall and Slope Paving Reinforced with welded wire

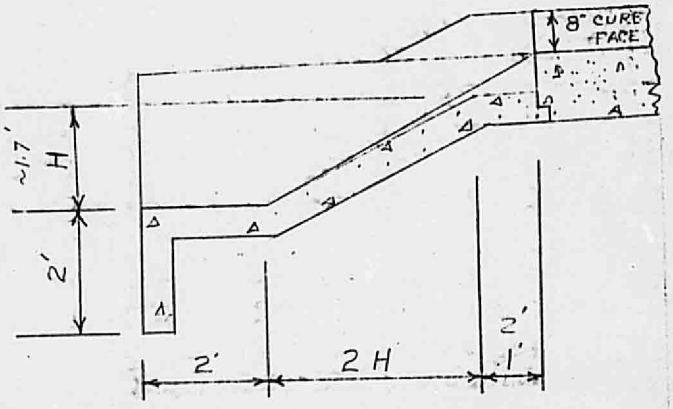
SECTION

INLET OF 48" CSP

FIGURE B-4

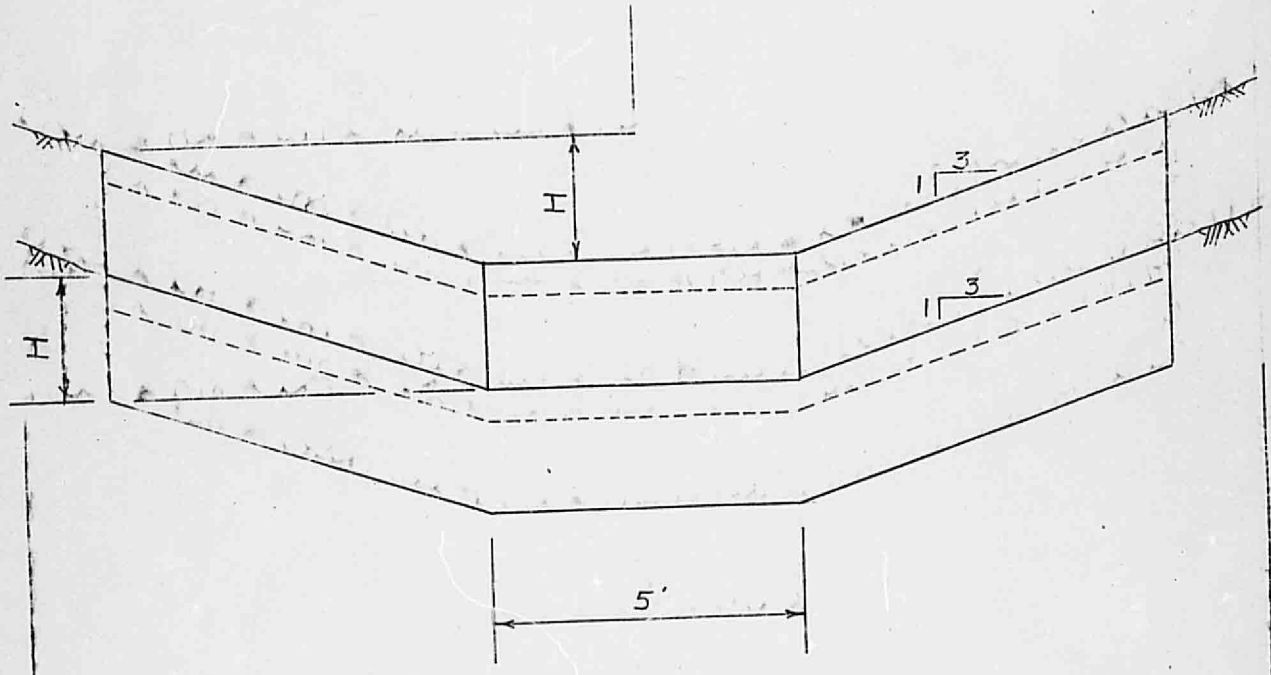
Q = 95 cfs HW = 5'

Q = 48 cfs HW = 3.1'



TRANSITION FROM STREET TO CHANNEL

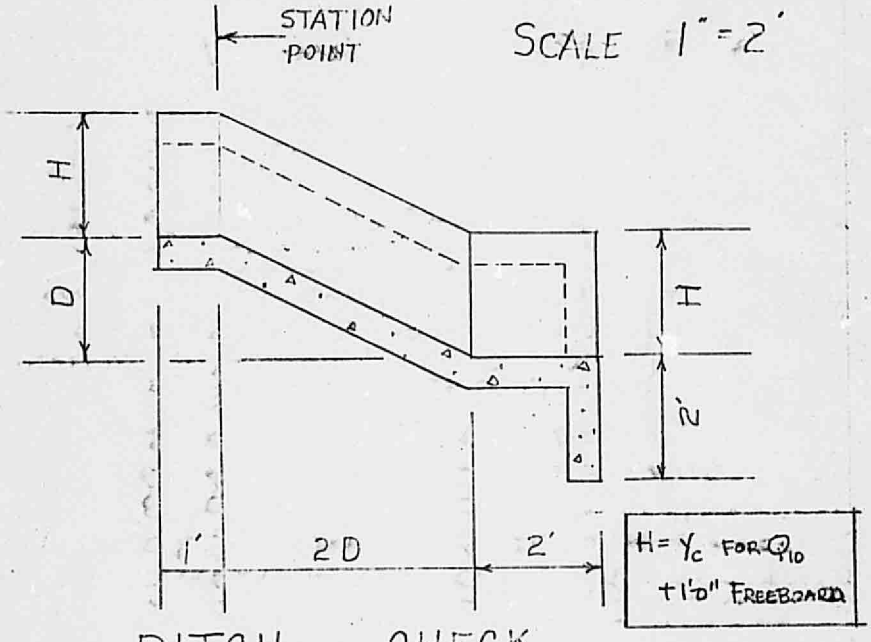
FIGURE B-3



DITCH CHECK

FIGURE B-2

CONSTRUCTION DETAILS



DITCH CHECK

FIGURE B-1

DESIGN ~Q10	Yc	V	Q100	Yc	V	H	
34	0.93	4.7	68	1.36	5.5	2'	(1' freeboard)
48	1.11	5.2	95	1.62	5.9	2.1'	" "
54	1.20	5.6	107	1.73	6.1	2.2'	" "

With an assumed Mannings "n" = .026, normal depth for a 4.0 % slope would be close to critical depth for the Q100. An energy head equal to the velocity head for D would take place below each check. This energy would form a small hole that should fill some what on the receding section of the storm hydrograph.

B-1

CASA GRANDE MANOR CALCULATIONS

OUTLET VELOCITIES 48" CSP

Q_{25} = 95 cfs normal depth @ ~100'

$$\frac{Q n}{D^{8/3} S^{1/2}} = \frac{95 \times .024}{4^{8/3} (.08)^{1/2}} = .20$$

$\frac{d}{D} = .4586$ $\quad \frac{A}{D^2} = .351$

$d = 1.83'$ $\quad A = 5.62$ ft.^{2}

$V_n = 16.9$ fps

Q_{10} = 48 cfs Design normal depth @ ~ 60'

$$\frac{Q n}{D^{8/3} S^{1/2}} = \frac{48 \times .024}{4^{8/3} (.08)^{1/2}} = .10$$

$\frac{d}{D} = .315$ $\quad \frac{A}{D^2} = .2124$

$d = 1.26'$ $\quad A = 3.40$ ft.^{2}

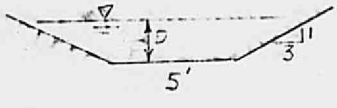
$E = 1.26 + 3.10 = 4.36'$ $\quad$ Vel. = 14.1 fps

$$y_c = \sqrt{\frac{A}{2}} = \sqrt{\frac{3.4}{2}} = 1.305$$

$$Fr = \frac{V}{\sqrt{g y_c}} = \frac{14.1}{\sqrt{32.2 \times 1.3}} = 2.17$$

$$\frac{D_2}{D_1} = \frac{1}{2}\left(\sqrt{1 + 8(Fr_1)^2} - 1\right) = 2.6$$

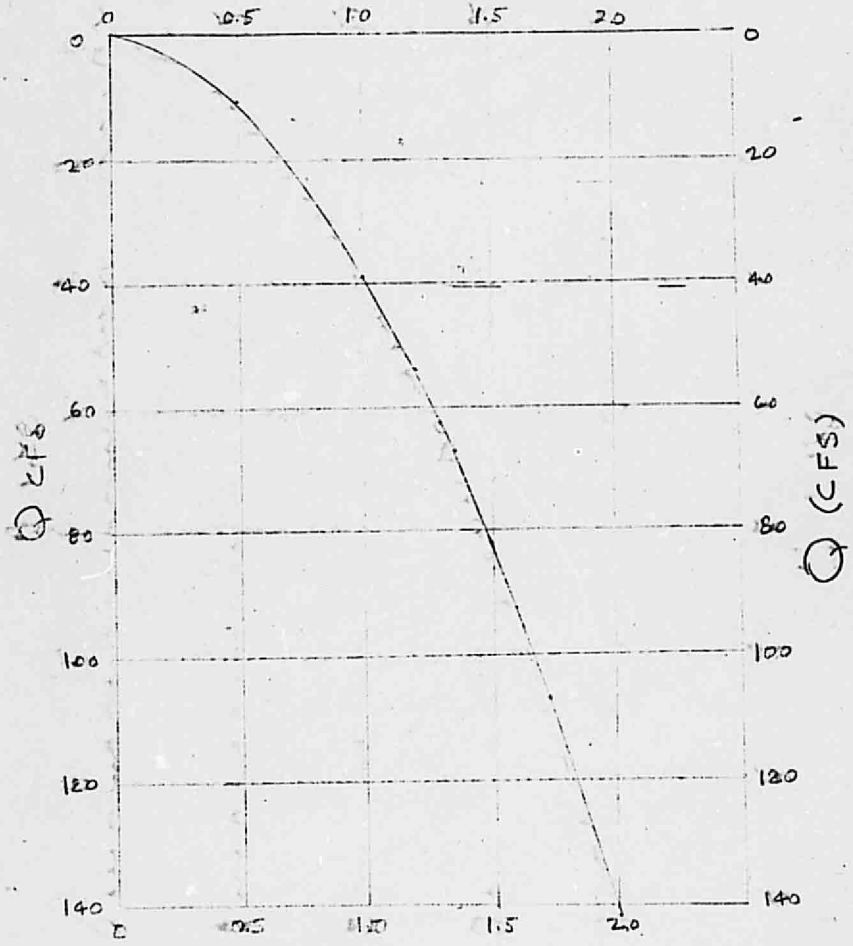
$D_2 = 1.26 \times 2.6 = 3.27'$



$D = 1.1'$ $\quad Q = 48$ cfs $\quad V = 5.25$

Drop = $3.27 - 1.1 = 2.17'$

CRITICAL DEPTH (ft.)



CRITICAL DEPTH VS Q
FOR 5 FT WIDE BTM CHANNEL
3 TO 1 SIDE SLOPES n = .026

CRITICAL DEPTH

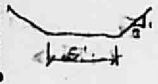

```
            V
SSI      3'/ S
BTM       5' S

       0•5   S
 11•754602  AO
  3•616300  AO

       1•0   S
 36•713868  AO
  4•239233  AO

       1•5   S
 31•530472  AO
  5•724945  AO

       2•0   S
172•016071  AO
  6•435276  AO
```

CASA GRANDE MANOR — CALCULATIONS

NORMAL DEPTH

underwood programma 101 olivetti underwood programma 101 olivetti underwood programma 101 olivetti underwood programma 101 olivetti underwood programm

		V
n	— 0.026	S
SLOPE	— 0.01	S
BTM	— 5	S
S:S.	— 3	S
Y_o	— 1.36	S
B	5.583221	AC
Q	67.057823	AC
	1.62	S
	6.148097	AC
	93.204783	AC
	1.73	S
	6.373433	AC
	112.355138	AC



		V
n	0.026	S
S_o	0.01	S
BTM	5	S
S:SI	3	S
Y_o	1.36	S
A	6.373235	AC
Q	66.353671	AC
	1.62	S
	6.111612	AC
	92.827633	AC
	1.73	S
	6.121300	AC
	93.3962	AC

CRITICAL DEPTH

underwood programma 101 olivetti underwood programma 101 olivetti underwood programma 101 olivetti underwood programma 101 olivetti underwood progra

S:SI	3 S
BTM	5 S
	1.2 S
	53.360150 AC
	5.219006 AC
	1.3 S
	62.419066 AC
	5.334977 AC
	1.35 S
	66.952817 AC
	5.480036 AC
	1.37 S
	68.813020 AC
	5.513554 AC
	1.6 S
	82.200123 AC
	6.000635 AC
	1.65 S
	87.700200 AC
	6.056461 AC
	1.62 S
	84.410548 AC
	6.011122 AC
	1.7 S
	103.552737 AC
	6.211027 AC
	1.73 S
	107.307713 AC
	6.275193 AC

A-4

Q BETWEEN PALO ALTO DRIVE NE AND WEST PROPERTY.

Δ_A = 6.7 ACRES

L = 6.2 MI/HR

$Q_{10} = 1.25 \times 6.2 [.35 \times 22 + .43 (7.7 - 6.7)] = 108$ CFS

COMPOSITE RUN-OFF

TYPICAL LOT	=	85 X 125 = 10,625 FT^2
STREET	=	40 X 85 = 3,400 "
		14,025 "

ROOF + GARAGES	1800 FT^2	x .8	= 1440
WALKS + DRIVES	600 "	x .8	= 480
STREETS + CURB WALK	3400 "	x .82	= 2788
GRASS	8225 "	x .16	= 1316
	14,025		6024 CxA

COMPOSITE C = 6024/14025 = 0.43

Q AREA ① L = 380' AREA = 7.71 AC.

CHANNEL DESIGN FROM EAST PROP LINE TO CASA NORTE DR. N.E.

Q_{100} = 69. CFS

USE CHECK DAMS WITH 1% SLOPE BETWEEN

			V
n	=	0.025	S
W	=	5	S
S/S	=	3	S
SLOPE	=	0.01	S
Yo	=	1	S
V	=	4.7274	A0
Q	=	37.8194	A0
Yo	=	1.25	S
V	=	5.3374	A0
Q		56.3786	A0

Q BETWEEN CASA DEL NORTE DR NE & PALO ALTO DRIVE NE

Δ_{TC} = 310 / [illegible] = 1.2 MIN

TC = 16 MIN

I = 6.9 IN/HR

Q = 1.15 x 6.9 [(.55 x 22) + (.43 x 7.7)] = 95 CFS.

RUNOFF OFFSITE AREA TO EAST

AVERAGE SLOPE = 8%

L = 2,000 FT

FROM " VELOCITIES FOR ESTIMATING T_c' FIG USING THE" NEARLY BARE AND UNTILLED (OVERLAND FLOW) & ALLUVIAL FANS WESTERN MOUNTAIN REGION V = 2.5 FPS

T_c = 2000 / 2.5 × 60 = 14 MINUTES

FROM " RAINFALL INTENSITIES NORTHEAST ALBUQUERQUE" FIG i = 7.2 IN/HR

∴ $Q = CiA = 0.35 \times 7.2 \times 22 = 55$ CFS

$Q_{100} = 1.25\,CiA = 55 \times 1.25 = 69$ CFS.

RAINFALL INTENSITIES NORTHEAST ALBUQUERQUE

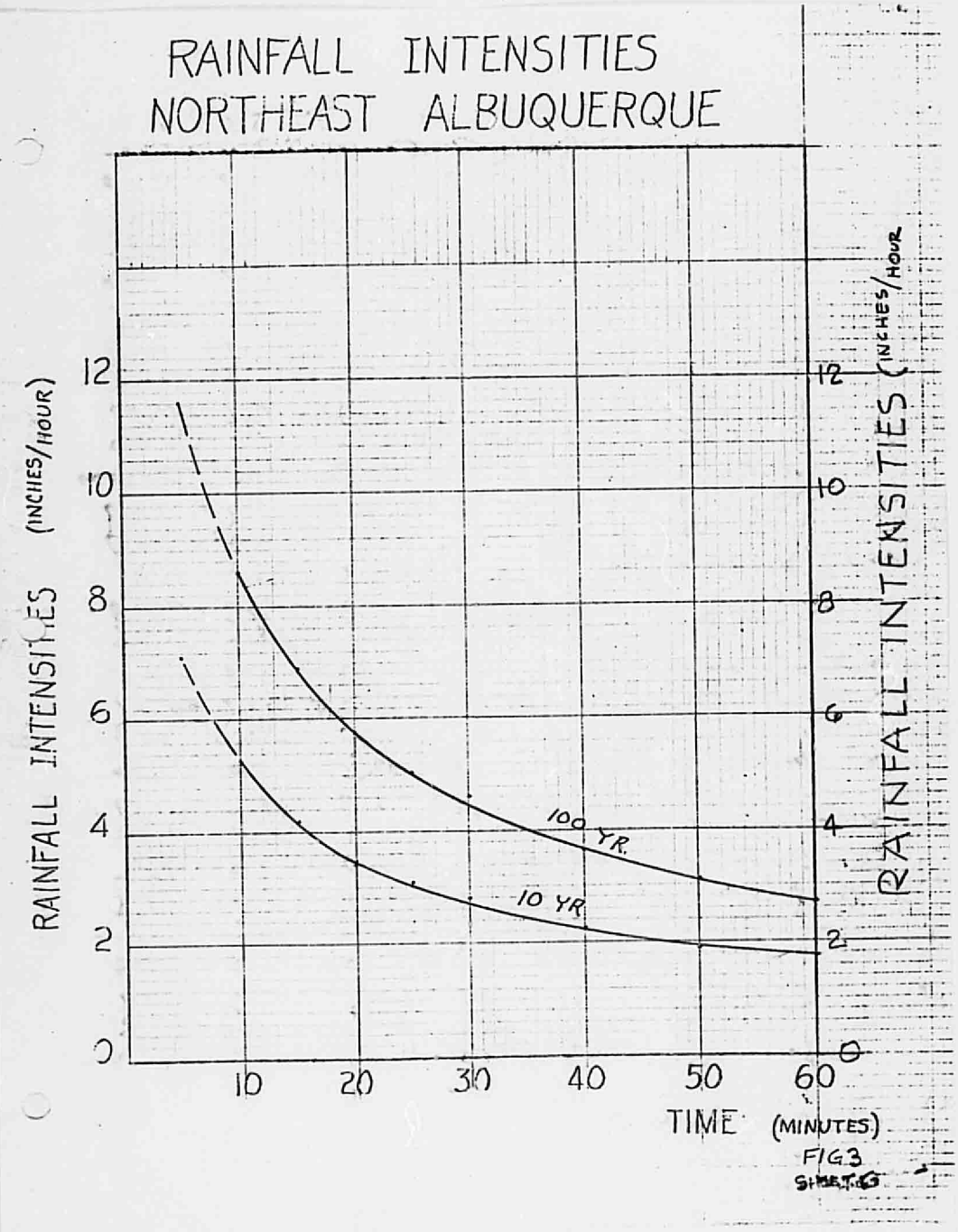


FIG 3
SHEET 6

TELEPHONE:
(303) 751-1237

STITES & BILLINGSLEY
CONSULTING ENGINEERS, INC.

8000 East Girard Avenue - Suite 306
Denver, Colorado 80231

Received 22 March 76

DRAINAGE STUDY

OF

CASA GRANDE MANOR

ALBUQUERQUE, NEW MEXICO

PREPARED FOR

Paul's Homes, Inc.
729 Four Hills Rd. S.E.
Albuquerque, New Mexico 87111

Project No. P8-2
March 11, 1976

TABLE OF CONTENTS

Present Runoff

Area above property* 30.3 Ac.

Quanity of water 76.36 cfs

$30.3 \times .6 \times 4.2 = 76.36$ cfs

I = intensity 100 yr storms 4.2 in/hr

R = Runoff coefficent
natural ground 6% slope .6

Water from Piedra Lisa canyon runs approximatly 1000 feet south of property in question.

* Note:
Area taken from U.S. Dept of Interior Geological Survey Map, Tijeras Quadrangle

On Property

Devel Area	23.16 Acres
Un Devel Area.	9.20 Acres
Total	32.36 Acres

Quantity of water

$32.36 \times .6 \times 4.2 = 81.55$ cfs

Total runoff

$76.36 + 81.55 = 157.91$ cfs

Major amounts of water from above enters in two areas as shown on Topo plat.

Runoff After Development

Runoff Table *

Areas	Road Areas	Lot Area Draining into Street	Lot Area Ponding on Lots	Street Runoff	Lot Runoff	Total Runoff
1	.436	0	2.18	1.465	0	1.465 cfs
2	.304	.114	1.41	1.02	.29 **	1.02 cfs
3	.872	.697	3.66	2.93	1.76	4.69 cfs
4	.608	.486 & .196	2.36	2.04	1.22 & 1.98 **	3.26 cfs
5	.910	1.403	3.86	3.05	3.53	6.58 cfs
6	.541	.843	2.35	1.82	2.124	3.944 cfs
UNDEVEL	0	9.2	0	0	8.06	8.06 cfs
TOTAL	3.67	12.94	15.32	12.33	16.69	29.02 cfs

AREAS ARE TO ℄ of streets EAST & WEST ℄ EASEMENT OR Property line NORTH & SOUTH.

* WATER COMING ON PROPERTY FROM ABOVE IS NOT SHOWN ON TABLE BUT IS SHOWN IN ACCUMULATIVE FIGURES ON DRAINAGE PLAT.

** WATER INTO CANDELARIA NOT COUNTED IN TOTALS

Ponding

WATER TO BE PONDED

$$15.32 \text{ Acres} \times 4.2 \text{ in/hr} \times \frac{1 \text{ ft}}{12 \text{ in}} = 5.362 \frac{\text{Ac-ft}}{\text{hr}}$$

WATER PER LOT

$$5.362 \frac{\text{Ac-ft}}{\text{hr}} \div 68 \text{ Lots} = .078 \frac{\text{Ac-ft}}{\text{hr}} / \text{Lot}$$

Percolation Tests were run in the Area with the minium percolation rate was used for drainage calculations. Test holes were 5.5 in. in Dia. with 15" head of water after 24 hr saturation. Minimum percolation rate is 13.3 minutes to drop 1 in or 4.5 in/hr

Using 400 sq ft Ponding Area & a Percolation Rate of 4.5 in/hr

$$400 \text{ sq ft} \div 43560 \times 4.5 \text{ in/hr} \times \frac{1 \text{ ft}}{12 \text{ in}} = .0034 \frac{\text{Ac-ft}}{\text{hr}}$$

$$.078 \frac{\text{Ac-ft}}{\text{hr}} \text{ (1 in shown on lot)} \div .0034 \frac{\text{Ac-ft}}{\text{hr}}$$

= 22.94 hr to drain

NOTES

1. A RUNOFF COEFFICIENT OF .6 WAS USED FOR LOTS AFTER DEVELOPMENT TO GIVE A WIDE MARGIN OF SAFETY. .6 IN THE COEFFICIENT FOR NATURAL DRAINAGE leveled developed lots will be less.

2. EASEMENTS TO BE FLARED ON THE EAST TO MATCH NATURAL ARROYOS

3. CUT OFF WALLS TO BE BUILT AT EAST END OF EASEMENTS.

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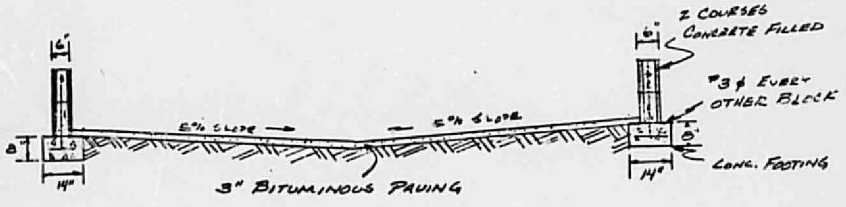


CROSS SECTION

20' DRAINAGE EASEMENTS

SCALE 1" = 4'

Conclusions

1. Total max runoff (runoff leaving property at all points) after development will be less than at present time

   105.38 cfs < 157.91 cfs

2. The 20' Easement will be more than enough to handle the max runoff.

   478.99 cfs >> 105.38 cfs

3. Ponding drainage occures in 23 hr on lots which is less than the 48 hr. required by Federal Housing Administration.

Calculations

Area #1

Road Area
760 x 25 = 19000 sf ÷ 43560 = .436 Ac

Quanity of water
.436 x .8 x 4.2 = 1.465 cfs

Lot Area Pond
760 x 125 ÷ 43560 = 2.18 Ac

Area #2

Road Area
530 x 25 ÷ 43560 = .304 Ac

Quanity of water
.304 x .8 x 4.2 = 1.022 cfs

Lot Area Pond
490 x 125 ÷ 43560 = 1.41 Ac

Lot Area Street
40 x 125 ÷ 43560 = .114 Ac

Quanity of water
.114 x .6 x 4.2 = .289 cfs

Calculations Cont.

Area #3

Road Area
760 x 50 ÷ 43560 = .872 Ac

Quan of water
.872 x .8 x 4.2 = 2.93 cfs

Lot Area Pond
760 x 210 ÷ 43560 = 3.66 Ac

Lot Area Street
40 x 760 ÷ 43560 = .697 Ac

Quan of water
.697 x .6 x 4.2 = 1.756 cfs

Area #4

Road Area
530 x 50 ÷ 43560 = .608 Ac

Quan of water
.608 x .8 x 4.2 = 2.04 cfs

Lot Area Pond
490 x 210 ÷ 43560 = 2.36 Ac

Lot Area Street
40 x 530 ÷ 43560 = .486 Ac
& 40 x 210 ÷ 43560 = .196 Ac

Quan of water
.486 x .6 x 4.2 = 1.22 cfs
.196 x .6 x 4.2 = .485 cfs

Calculations Cont

Area #5

Road Area

760 × 25 ÷ 43560	=	.436
80 × 100 ÷ 43560	=	.114
π(50)² × 2 ÷ 43560	=	.360
Total		.910 Ac

Quan of water

.910 × .8 × 4.2 = 3.05 cfs

Lot Area Pond

300 × 760 ÷ 43560 − 1.877 = 3.36 Ac

Lot Area Street

40 × 650 ÷ 43560	=	.596
2 × π [90² − 50²] ÷ 43560	=	.807
Total		1.403 Ac

Quan of water

1.403 × .6 × 4.2 = 3.53 cfs

Calculations Cont.

Area # 6

Road Area

$25 \times 580 \div 43560$	= .304 Ac
$50 \times 80 \div 43560$	= .057 Ac
$\pi \times 50^2 \div 43560$	= .180 Ac
Total	= .541 Ac

Quanity of water

$.541 \times .8 \times 4.2$ = 1.817 cfs

Lot Area Pond

$530 \times 300 \div 43560 - 1.30$ = 2.35 Ac

Lot Area Road

$40 \times 480 \div 43560$	= .44 Ac
$\pi \times [90^2 - 50^2] \div 43560$	= .403 Ac
$40 \times 250 \div 43560$ (Candelaria)	= .229 Ac
Total	.843 +

Quan of water

$.843 \times .6 \times 4.2$ = 2.124 cfs

+ Area does not include .229 Ac that drains onto candelaria NE

Calculations Cont

Undeveloped Area

307 x 130256 ÷ 43560 = 9.2 Ac

Quan of water

3.2 x .6 x 4.2 = 8.06 cfs

Calculations Cont.

$$Q = \frac{1.486}{n} r^{2/3} S^{1/2} A$$

For A 20' wide x 6" deep easement-paved

$A = 20$

$r = \frac{20}{21} = .952$

$r^{2/3} = .967$

$S = 6.1\%$ from Topo plat

$S^{1/2} = .25$

$n = .015$ Bituminous concrete

$$Q = \frac{1.486}{.015} \times .967 \times .25 \times 20$$

$= 478.99$ cfs

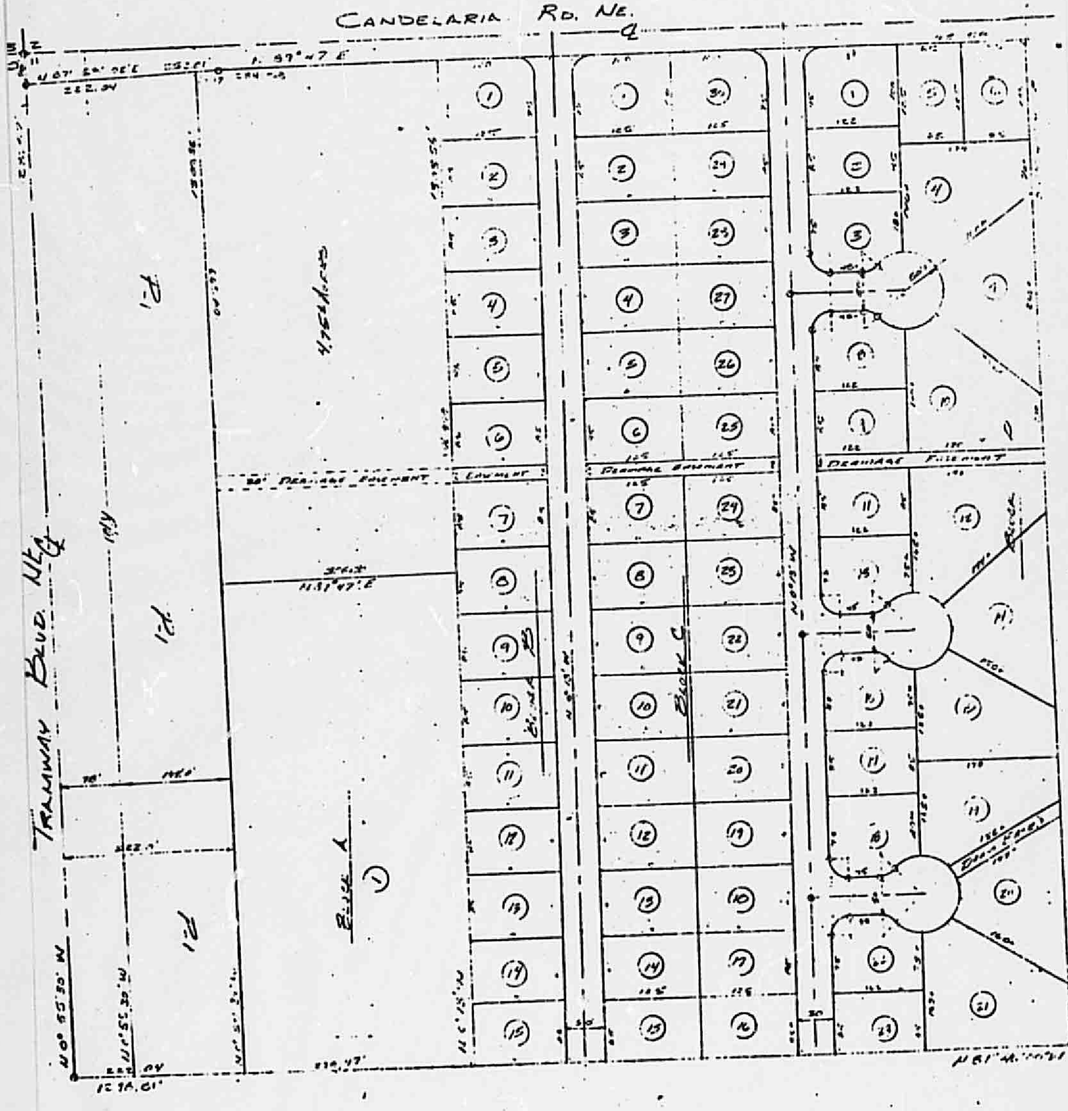
DRAINAGE REPORT

CASA GRANDE MANOR

ALBUQ N.M.

CAMPBELL

ENCHANTMENT ENGINEERING


CANDELARIA RD. NE.
TRAMWAY BLVD. NE
DRAINAGE EASEMENT
BLOCK C
N 87°47' E

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Areas are to ℄ of streets East & West & easement or property line North & South.

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ENCHANTMENT ENGINEERING

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$76.36 + 81.55 = 157.91$ cfs

Major amounts of water from above enters in two arroyos as shown on Topo plat.

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WATER TO BE PONDED

$15.32 \text{ acres} \times 4.2 \text{ in/hr} \times \frac{1 \text{ ft}}{12 \text{ in}} = 5.362 \frac{\text{Ac-ft}}{\text{hr}}$

WATER PER LOT

$5.362 \frac{\text{Ac-ft}}{\text{hr}} \div 68 \text{ lots} = .078 \frac{\text{Ac-ft}}{\text{hr}} / \text{lot}$

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$.078 \frac{\text{Ac-ft}}{\text{hr}} (1 \text{ hr storm on lot}) \div .0034 \frac{\text{Ac-ft}}{\text{hr}}$

= 22.94 hr to drain

Conclusions

1. Total max runoff (runoff leaving property at all points) after development will be less than at present time

105.38 cfs < 157.91 cfs

2. The 20' Easement will be more than enough to handle the max runoff.

478.99 cfs >= 105.38 cfs

3. Ponding drainage occures in 23 hr on lots which is less than the 48 hr required by Federal Housing Administration.

NOTES

1. A RUNOFF COEFFICIENT OF .6 was used for LOT'S AFTER Development to give a wide margin of safety. .6 in the COEFFICENT FOR NATURAL DRAINAGE Leveled DevelopED lots will be less.

Revised Drainage

Due to a request by the Planning Dept. on street alignment and the Removal of one through street the drainage pattern changes slightly.

Some of the lots were increased in size but due to the fact that water is to be ponded on lots no increase in runoff is incurred. .898 Acres were added to the development without increasing runoff into streets thus increasing the differences between existing and developed runoff.

.898 x .6 x 4.2 = 2.26 cfs

Additional new road producing runoff

195 feet x 50 feet = .223 Acres

.223 Acres x .8 x 4.2 = .752 cfs < 2.26 cfs

Direction of flow is shown on Revised Drainage Plat. Total water leaving property does not change significantly from original report.

REVISED DRAINAGE