HYDROLOGY C20/D2 4 PLANS

C 20/D2

4 Plans

FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

March 13, 1986

Bob Sheppard
FMBSM
5608 Zuni Road, SE
Albuquerque, New Mexico 87108

RE; CONCEPTUAL DRAINAGE PLAN FOR FIRST CHURCH OF THE NAZARENE
RECEIVED FEBRUARY 18, 1986 (C-20/D2)

Dear Mr. Sheppard:

The referenced plan, dated February 13, 1986, is approved for Site Development Plan approval.

Please be advised that AMAFCA will need to be contacted for dedication of the floodplain.

If you have any questions regarding this project, call me at 766-7644.

Cordially,

Carlos A. Montoya, P.E.
City/County Floodplain Administrator

CAM/bsj

DRAINAGE INFORMATION SHEET

PROJECT TITLE: First Church of the Nazarene ZONE ATLAS/DRNG. FILE #: C 20

LEGAL DESCRIPTION: Blocks 1-8 & 25-32, Block 16, Tract 3, Unit 3, N. Albuquerque Acres

CITY ADDRESS: —

ENGINEERING FIRM: FMBSM CONTACT: Bob Sheppard

ADDRESS: 5608 Juni SE PHONE: 268-6783

OWNER: First Church of the Nazarene CONTACT: Randy Smith

ADDRESS: 6605 Bell Ave. SE PHONE: 268-0460

ARCHITECT: FMBSM CONTACT: Earl Hildebey

ADDRESS: 5608 Juni SE PHONE: 268-6783

SURVEYOR: Darry Hugg CONTACT: Darry Hugg

ADDRESS: 1701 Grande Blvd SE Rio Rancho PHONE: 892-8800

CONTRACTOR: N/A CONTACT: —

ADDRESS: — PHONE: —

RECEIVED
JUN 20 1986
HYDROLOGY SECTION

PRE-DESIGN MEETING:

X YES

___ NO

X COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. ___

EPC NO. ___

PROJ. NO. ___

TYPE OF SUBMITTAL:

X DRAINAGE REPORT

X DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAINAGE PLAN

X GRADING PLAN

___ EROSION CONTROL PLAN

___ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL

___ PRELIMINARY PLAT APPROVAL

X SITE DEVELOPMENT PLAN APPROVAL

___ FINAL PLAT APPROVAL

___ BUILDING PERMIT APPROVAL

___ FOUNDATION PERMIT APPROVAL

___ CERTIFICATE OF OCCUPANCY APPROVAL

___ ROUGH GRADING PERMIT APPROVAL

___ GRADING/PAVING PERMIT APPROVAL

___ OTHER ___ (SPECIFY)

DATE SUBMITTED: ___

BY: FMBSM - Bob Sheppard

DRAINAGE REPORT FOR FIRST CHURCH OF THE NAZARENE

Existing Site Conditions:

The site is a 13.8 acre tract bounded by Barstow St., Hollywood Ave. and Paseo del Norte (Los Angeles). (See Plate 1). The vegetation and soil conditions are typical for North Albuquerque Acres Addition. The site is traversed from east to west by a feeder arroyo to the North Domingo Arroyo.

Proposed Condition:

Because the surrounding area is largely underdeveloped, it is proposed that the Phase I construction be situated entirely out of the existing flood plain and that the 100 year natural flood plain be dedicated as interim in accordance with AMAFCA Resolation 1981-1988. (See attached Sheet C-3).

A metes and bounds survey of the dedicated area will be made upon acceptance of the drainage report.

The following calculations will analyze the 100 year and 10 yeár design storms. The procedure for estimating flow will be as outlined in the Devlopment Process Manual, Volume 2, Chapter 22.

Basis of Design:

A (Area) = 13.8 acres

Soil Classificaton - EtC Type. SCS Group - B

P = 2.5" for 100 year storm.

P = 1.64" for 10 year storm.

$T_c = 0.0078\ L^{.77}/s^{.385}$

$i = 6.84\ T_c^{-.51}\ (P)$

$Q = CiA$

$S = \frac{1000}{CN} - 10$

$R.O. = (P - 0.2S)^2/P + 0.8S$

Volume = A (sf) x R.O./12

Existing Conditions:

c = 0.34 (0% impervious)

$T_c = 0.0078\ (1340^{.77})/0.031^{.385} = 7.6$ min. Use 10 min.

$i = 6.84 \times 10^{-.51} \times 2.5 = 5.28$ for 100 yr. storm

$i = 3.47$ for 10 yr. storm

$Q_{100} = 0.34 \times 5.28 \times 13.8 = 24.8$ cfs

$Q_{10} = 16.3$ cfs

CN = 61

S = 6.39

R.O. = 0.20' - 100 yr. storm

R.O. = 0.13" - 10 yr. storm

$V_{100} = 0.20 \times 13.8 \times 43560/12 = 10,000$ cf

$V_{10} = 6,500$ cf

Developed Conditions:

The proposed site development will extend over an area 4.8 acres. Of this 2.4 acres will be mostly hardsurfaced and 2.4 acres will be grassed to serve as a detention pond and a softball playing field.

The two areas will be analyzed as individual watersheds. For the upper (hardsurfaced) area:

C = 0.88 (92% impervious)

$Tc = 0.0078\ (580^{.77})/0.0276^{.385} = 4.2$ min. Use 10 min.

$i = 5.28$ for 100 yr. storm

$i = 3.74$ for 10 yr storm

$Q_{100} = 0.88 \times 5.28 \times 2.4 = 11.2$ cfs

$Q_{10} = 0.88 \times 3.74 \times 2.4 = 7.9$ cfs

CN = 92

Composite CN = 97

S = 0.31

R.O. = 2.16" for 100 yr. storm

$V_{100} = 2.16 \times 2.4 \times 43,560/12 = 18,800$ cf

R.O. = 1.4" for 10 yr. storm

$V_{10} = 12,200$ cf

For grassed area:

C = 0.34 (0%) impervious)

S = 0.0132 ft./ft.

v = 0.8 fps (S.C.S. figure 15.2)

Tc = 340/0.8 x 60 = 7.1 min. Use 10 min.

i = 5.28 for 100 yr. storm

i = 3.74 for 10 yr. storm

Q_{100} = 0.34 x 5.28 x 2.4 = 4.3 cfs

Q_{10} = 0.34 x 3.74 x 2.4 = 3.1 cfs

CN = 61

S = 6.39

R.O. = 0.20" for 100 yr. storm

V_{100} = 0.20 x 2.4 x 43,560/12 = 1,740 sf

R.O. = 0.13" for 10 yr. storm

V_{10} = 0.13 x 2.4 x 43,560/12 = 1,130 cf

Combined volume for the two watersheds is 20,540 cf.

The storm flow will be conveyed from the paved parking area to the detention pond by a grouted riprap run-down.

Detention pond volume formula - $V = h/3 \ (A_1 + \sqrt{A_1 A_2} + A_2)$

Pond volume = 2/3 (30,060 + 9,650 + 3,100) = 28,500 cf

The pond will be drained by an 8" CMP to daylight at existing natural ground and flow to the existing arroyo near the west property line.

Pond drain = 8" CMP at 11.25% gradient

$$Q = 0.349 \times \frac{1.486}{0.024} \times 0.303 \times 0.335 = 2.2 \text{ cfs}$$

The time required to drain the pond 2.6 hours.

Phase II construction is scheduled in 3 to 5 years and at that time a permanent drainage easement will be granted and the required channelization constructed.

PLATE 1

C-20-Z

C20/D2

DRAINAGE INFORMATION SHEET

PROJECT TITLE: First Church of Nazarene ZONE ATLAS/DRNG. FILE #: C-19 / D3

LEGAL DESCRIPTION: Lots 1 thru 8 and 25 thru 32, Blk 10, Tr 3. North Albuquerque Acres

CITY ADDRESS: _____

ENGINEERING FIRM: Santiago Romero & Assoc. CONTACT: Tom Romero

ADDRESS: 2828 12th St NW. Suite "B" PHONE: 345-2733

OWNER: _____ CONTACT: _____

ADDRESS _____ PHONE: _____

ARCHITECT: Flatow Moore Bryan & Assoc. CONTACT: Bob Shappard

ADDRESS: 5608 Zuni SE PHONE: 268-6783

SURVEYOR: Gary Hugg CONTACT: Gary Hugg

ADDRESS: 1701 Grande S.E. Rio Rancho PHONE: 892-8800

CONTRACTOR: n/a CONTACT: _____

ADDRESS: _____ PHONE: _____

PRE-DESIGN MEETING:

X YES

____ NO

X COPY OF CONFERENCE RECAP SHEET PROVIDED

RECEIVED
DEC 20 1985
HYDROLOGY SECTION

DRB NO. 85-718 10/29/8

EPC NO. _____

PROJECT NO. _____

TYPE OF SUBMITTAL:

____ DRAINAGE REPORT

____ DRAINAGE PLAN

X CONCEPTUAL GRADING & DRAIN. PLAN

____ GRADING PLAN

____ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

____ PRELIMINARY PLAT APPROVAL

X SITE DEVELOPMENT PLAN APPROVAL

____ FINAL PLAT APPROVAL

____ BUILDING PERMIT APPROVAL

____ FOUNDATION PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

____ ROUGH GRADING PERMIT APPROVAL

____ GRADING/PAVING PERMIT APPROVAL

OTHER _____ (SPECIFY)

DATE SUBMITTED: Dec. 20, 1985

BY: Thomas A. Romero

Rev. 11/84

C-20-D2

B. H. SWINBURNE, CHAIRMAN
WILLIAM V. HEREFORD, VICE-CHAIRMAN
FRANCES McCOY, SECRETARY-TREASURER
R. WARD HUNNICUTT, DIRECTOR
REX FUNK, DIRECTOR

RICHARD E. LEONARD
EXECUTIVE ENGINEER

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

P. O. BOX 25851 - ALBUQUERQUE, N. M. 87125
TELEPHONE 884-2215

RECEIVED
DEC 0 1986
HYDROLOGY SECTION

December 3, 1986

Mr. Bob Sheppard
FMB&M
5608 Zuni Road SE
Albuquerque, New Mexico 87108

Subject: First Church of the Nazarene
Lots 1-7 & 26-32 Blk 10, Tr 3, Unit 3
North Albuquerque Acres

Dear Bob:

Ref: Letter from Carlos Montoya March 13, 1986
Letter from Carlos Montoya July 10, 1986
Phone conversation with R.E. Leonard wk of July 28, 1986

I understand that the building permit has been issued based on a verbal promise of granting a drainage easement for the arroyo on the north side of the site.

I am enclosing our standard form for dedication of the easement by grant.

Generally a dedication of the 100 year flood plain as shown on the FEMA maps is required until channel improvements are made. Please note that a reverter clause is included for return of right-of-way not needed for drainage purposes.

Please let me know if you have any questions.

Sincerely,

Dan Sabo

Dan Sabo
Drainage Engineer

cc: Carlos Montoya

CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION/DESIGN HYDROLOGY SECTION

CONFERENCE RECAP

DRAINAGE FILE/ZONE ATLAS PAGE NO.: C-19 DATE: 11-1- @ 9:00

PLANNING DIVISION NOS: EPC: _____ DRB: _____

SUBJECT: _____

STREET ADDRESS (IF KNOWN): _____

SUBDIVISION NAME: North Albuquerque Acres, Blk 10, Tract 3 Unit 3 Lots 1-7 & 20-32

APPROVAL REQUESTED:

_____ PRELIMINARY PLAT
_x_ SITE DEVELOPMENT PLAN
_____ OTHER

_____ FINAL PLAT
_____ BUILDING PERMIT
_____ ROUGH GRADING

	WHO	REPRESENTING
ATTENDANCE:	Tom Romero	Santiago Romero Jr & Associates
	Carlos Montoya	Design Hydrology

FINDINGS:

(1) Regrade Concept drainage plan for site plan approval
(2) must address the following in grading plan
(3) Channel — Q's relative to storm
(4) Regrade coordinate with AMAFCA
(5) Need to dedicate to AMAFCA the flood plain as indicated on the channel
(6) Need to get ~~drainage~~ easement and release flows at a safe discharge
(7) Release of the historic flows at Busstow will require methods of ~~Mitigation~~ Hydraulics
(8) Flows for site access need to be analyzed
(9) The building needs to be floodproofed by elevating or channeling the floodplain
(10) Maintenance issues need to be coordinated with AMAFCA.
Need comments for detention pond

The undersigned agrees that the above findings are summarized accurately and are only subject to change if further investigation reveals that they are not reasonable or that they are based on inaccurate information.

SIGNED: Carlos A Montoya
TITLE: _____
DATE: 11-20-85

SIGNED: Thomas Romero
TITLE: _____
DATE: 11/20/85

NOTE PLEASE PROVIDE A COPY OF THIS RECAP WITH THE DRAINAGE SUBMITTAL

BOARD OF COUNTY COMMISSIONERS
PATRICK J. PADILLA, CHAIRMAN
DISTRICT 1
ORLANDO VIGIL, MEMBER
DISTRICT 2
LENTON MALRY, MEMBER
DISTRICT 3
PATRICIA H. CASSIDY, MEMBER
DISTRICT 4
MARION M. COTTRELL, MEMBER
DISTRICT 5
ALEX ABEYTA, JR., COUNTY MANAGER

FILE COPY

County of Bernalillo

State of New Mexico

ONE CIVIC PLAZA, N.W.
ALBUQUERQUE, NEW MEXICO 87102

ALVIN J. CAMPBELL, SHERIFF
JAMES B. LEWIS, TREASURER
DOLORES C. WALLER, COUNTY CLERK
JACK H. DARLING, ASSESSOR
ROBERT H. SCOTT, PROBATE JUDGE

July 10, 1986

Bob Sheppard
FMBSM
5608 Zuni Road, SE
Albuquerque, New Mexico 87108

RE: DRAINAGE PLAN FOR FIRST CHURCH OF THE NAZARENE REDE
JUNE 20, 1986 (C-20/D2)

Dear Mr. Sheppard:

The revised referenced plan, dated June 18, 198
Development Plan approval.

Please be advised that AMAFCA will need to
of the floodplain.

Cord

Ca
C

CAM/bsj

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

January 17, 1986

Tom Romero
Santiago Romero Jr. & Associates
2828 Twelth Street, NW Suite B
Albuquerque, New Mexico 87107

RE: CONCEPTUAL DRAINAGE PLAN FOR FIRST CHURCH OF NAZARENE
RECEIVED DECEMBER 20, 1985 ~~(E-19/D3)~~ C20/D2

Dear Mr. Romero:

As per your request, we are placing your plan in the inactive files.

We will reactivate the project when the new concept is presented for our review.

Please call me if you need to discuss this project further.

Cordially,

Carlos A. Montoya, P.E.
City/County Floodplain Administrator

CAM/bsj

Santiago Romero, Jr. & Associates, Inc.
ENGINEERING □ SURVEYING

CONCEPTUAL DRAINAGE REPORT
FIRST CHURCH OF THE NAZARENE
ALBUQUERQUE, NEW MEXICO

RECEIVED
DEC - 6 1995
HYDROLOGY SECTION

2828 12th St. N.W. Suite "B"
Albuquerque, New Mexico 87107

Phone (505) 345-2733

DESIGN DATA & CALCULATIONS

1. Area of developed site: 12.34 acres

2. Existing Undeveloped Conditions

Soils classification: EtC type (from SCS plate 12), Group B
Impervious soil percent: 0%
6 hr. rainfall volume= 2.5" (from plate 22.2 D-1, DPM)
C= 0.34 (from plate 22.2 C-1, 0% impervious)
L= length of longest channel= 1,390 (estimated from dwgs.)
Average slope= 36'/1,390'
= 0.0259 ft/ft (s)

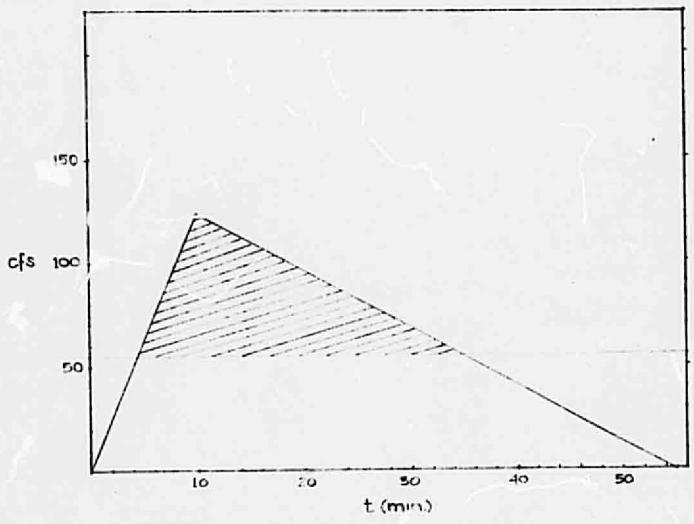
$Tc = 0.0078\ L^{0.77}/s^{0.385}$
= 8.38 min.
(use 10' for calculations)
v= L/Tc (60)
= 1,390/8.38 (60)
= 2.77 fps.
I 6 hr.= 2.1 inch/hr. (plate 22.2 D-2 Tc= 10")
I actual= 5.25 inches
A= 12.34 Ac
Q= 22.03 cfs

3. Developed Conditions

Impervious Area: 85% of total area
CN= 97
C= 0.81 (SCS)
L= 1,090
S= 30'/1,090'
= 2.75%
$Tc = 0.0078\ (1{,}390)^{0.77}/0.0275^{0.385}$
= 6.8 min.
v= 1,090/6.79 (60)
= 2.68 ft/sec.
I= actual= (6hr. rain) 6.84 (Tc- 0.51)
= (2.5) (6.84) (10-051) —
Q= 12.1 cfs
less ?

$Q = C\ I\ A$
$= (.81)(6.84)(12.34) = 68.4$ cfs

4. Unit Inflow Hydrograph for Developed-Land Conditions



5. Flow Detention Facility

Runoff Volume= 29.98 $\left(\frac{123.2 - 56.02}{2}\right)$ × 60 ft^3 (from Hydrograph)

= 60,422 ft^3

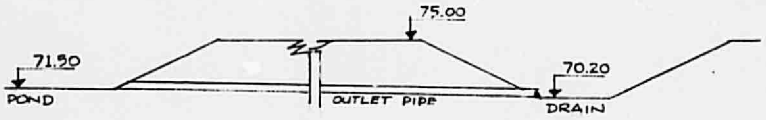
Area required for detention= $\frac{\text{volume}}{\text{depth}}$

= $\frac{60,422}{1.5\ ft}$ (1.5 ft= ave. depth)

= 40,281 ft

6. Drain Channel Through Developed Area

Use a trapezoidal section
Protect bed & enbankment with rip-rap
Max flow velocity for this kind of bed & walls surface: 6.5 fps
Minimum freeboard; 1.5 feet



$Q = \frac{K'}{n} b^{8/3} s^{1/2}$

n= 0.025 (Manning coefficient for cobble surfacing of bed banks)
S= Channel slope

D/b	b	D	S	K'	Q	A	V
0.042	37.5	1.57	0.010	0.00730	460.0	66.50	6.9
0.046	35.0	1.61	0.010		485.1	64.12	7.6
0.045	30.0				309.9		
0.048	30.0	1.44		0.0099	345.0	49.40	6.9
0.050	30.0	1.50	0.01	0.0106	556.1	51.75	10.7
0.05	35.0	1.75	0.008	0.0240	497.1	70.44	7.0
0.05	35.0	1.75	0.007	0.0019	465.0	70 40	6.6
0.06	35.0	2.10	0.006	0.0145	430.5	86.73	4.9
0.06	35.0	2.10	0.006	0.0145	588.9	86.73	6.8
0.055	35.0	1.92	0.006	0.0145	469.0	78.26	6.2

The most efficient channel section will carry the peak flow of the 100 year storm at a depth of 1.92' and a velocity of 6.2 fps. The recommended maximum flow velocity for the designed conditions is 6.5 fps.

7. Controlled- Outlet pipe

Design Conditions

Detained volume is to be evacuated in no more than 3 hours. from the time the Q100 passed the control point (55 minutes from beginning of storm). The only flow down the drain channel at such time will be the flow from detaining pond. Little or no flow will exist through outlet pipe while peak flow is passing through the drain channel. No flow is expected from drain channel into the detaining pond.

Out Pipe Design Parameters

Flowrate: $Q = \frac{60,400 \text{ ft.}^3}{(3.917)3,600}$ (3.971= 3hr. 55 min.)

Pipe length= 115'
Pipe slope: 0.0087
Tailwater: Negligibl for flows of less than 100cfs
Down the drain channes (flow line at outlet pipe invert elevation.)
Assume inlet control conditions, a pipe dia of 12" and mittered entrance type.
HW= 1.5D
=18"

CONCEPTUAL DESIGN RECOMMENDATIONS

1. Provide a drainage channel with the characteristics shown in Exhibit 1 of this report. This channel will carry the peak flow of the 100-year storm as stated in the design concept.

2. Given the mild slope that the channel will require for good hydraulics as opposed to steeper slope the site has, several steps are required along the channel's center line to compensate for the difference in grades.

3. The channel slopes and bed should be surfaced with coarse Aggregate (cobble stone) of size and gradation to protect the channel from erosion. The channels side slopers are conceived to hold such material in place under design flow conditions.

4. A runoff storage facility should be provided to allow the developed-land runoff tho be gradually discharged into the channel at a rate lower than the historic one. This facility will be sited as shown in Exhibit 1 of this report.

REFERENCES

King, H., E. Brater. Handbook of Hydraulics, Fifth Edition. McGraw-Hill, New York.

City of Albuquerque. Development Process Manual, Design Criteria.

Espey, Huston and Associates. Review and Refinement of the Northeast Heights Drainage Management Plan.

ATTACHMENTS

Conference Recap Memo dated November 20, 1985.

CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION/DESIGN HYDROLOGY SECTION

CONFERENCE RECAP

DRAINAGE FILE/ZONE ATLAS PAGE NO.: _____ DATE: 11/20/85 @ 9:00

PLANNING DIVISION NOS: EPC: _____ DRB: _____

SUBJECT: _____

STREET ADDRESS (IF KNOWN): _____

SUBDIVISION NAME: North Alb Acres; Blk 10, Tract 3 Unit 3
Lots 1-7 & 26-32

APPROVAL REQUESTED:

_____ PRELIMINARY PLAT	_____ FINAL PLAT
_X_ SITE DEVELOPMENT PLAN	_____ BUILDING PERMIT
_____ OTHER	_____ ROUGH GRADING

	WHO	REPRESENTING
ATTENDANCE:	Tom Romero	Santiago Romero Jr & Associates
	Carlos Montoya	Design Hydrology

FINDINGS:

(1) Require Conceptual drainage plan for site plan approval
(2) must address the following in greater detail
(a) Channel — Q's velocities & erosion
(3) Require coordination with AMAFCA
(4) Need to dedicate to AMAFCA the floodplain as superseded case for channel
(5) Need to detain developed flows and release flows at/at a safe discharge.
(6) Release of the floodplain at Barstow will require methods of leaving impacts on downstream
(7) Alternative Floodplain Structures for site access need to be analyzed
(8) The buildings needs to be floodproofed by elevating or channelizing the floodplain
(9) Maintenance issues need to be coordinated with AMAFCA.
(10) Need comments for detention pond

The undersigned agrees that the above findings are summarized accurately and are only subject to change if further investigation reveals that they are not reasonable or that they are based on inaccurate information.

SIGNED: Carlos A Montoya	SIGNED: Thomas A Romero S
TITLE: _____	TITLE: _____
DATE: 11-20-85	DATE: 11/20/85

NOTE PLEASE PROVIDE A COPY OF THIS RECAP WITH THE DRAINAGE SUBMITTAL

SRJr. Pad Assoc. Inc.
ENGINEERING • SURVEYING
SANTIAGO ROMERO, JR. and Assoc., Inc.
La Chamisa Compound
2828 12th St. N.W. Suite B
Albuquerque, New Mexico 87107
ph. (505) 345-2733

Proj. No. 85-36

Sept. 20, 1985

Mr. Bob Sheppard
Flatow, Moore Bryan & Assoc.
5608 Zuni S.E.
Albuquerque, New Mexico

RE: Church of The Nazarene
Conceptual Drainage Plan

Dear Bob:

This letter is to acknowledge your verbal instruction on Sept. 19, 1985 to cease work on the Drainage Concept Plan for the above referenced project. The cease in work is due to the site being within a building moritorium imposed by the county. You, however, approved my going ahead with my scheduled meeting with Mr. Dan Sabo, P.E., AMAFCA, to discuss the concerns and requirements of AMAFCA regarding the management of offsite flows, arroyo alignment, and developed flows. The following is a list of items discussed with Mr. Sabo regarding AMAFCA concerns prior to their granting approval:

1. The underground piping as proposed to transmit offsite flows under the proposed phase I parking area is of great concern to AMAFCA due mainly to their not being equipped to maintain such structures including the removal of accumulated sediment that will probably occur from offsite flows.

   Flows will be required to be intercepted and discharged at their present locations.

2. AMAFCA will most likely not approve a concrete lined channel for this short of a run. If the channel were much longer and the adjoiners upstream and downstream approved the concrete lining and alignment then they would probably approve a much longer section of concrete lining, however the interium short section of concrete lining would most likely not be approved. Velocities at the downstream end of the concrete lining would also have to be reduced in order to avoid any erosion downstream created by the increased velocities.

   It was recommended that the channel be earth lined with some protection provided to prevent lateral movement.

3. The Reverter Clause for easement acquisition may be used in that when the final channel improvements are constructed the excess easement no longer required to maintain the arroyo in its near natural conditions will revert back to the adjoiners.

4. Mr. Sabo indicated the possibility of Storm Sewer improvements on Los Angeles Blvd. proposed by the City of Albuquerque, Transportation Dept., that may intercept the offsite flows and thereby reducing the size of easement that may be presently required. Mr. Jim Milton, Transportation Dept. is the contact person who may have additional information pertaining to this matter.

5. Mr. Sabo expressed concern pertaining to this site being located outside the City Limits, however, it is proposed that this site be connected to City services. He stated that this site will require annexation prior to obtaining city services connection. If this is the case, then the site will have to comply with the City of Albuquerque D.P.M. drainage management criteria.

   Presently the site is, or a portion of this site is, within the 100 year Flood Hazard Limits and will require submittal to City Hydrology for review. The concerns for downstream capacity especially at the I-25 culverts will most likely require that developed flows to be managed on site. Therefore the site plan proposed for this development should consider some on site storm run off detention ponding regardless of the annexation concerns.

6. AMAFCA has no requirement for constructing a drainage structure at Barstow. This street is proposed as a major collector therefore under City of Albuquerque policy the city would construct the structure if funding is available. Barstow is presently a County Road and the requirements of the Bernalillo County Road Dept. will have to be addressed pertaining this matter.

Please note that due to the moritorium presently in place and the pending policy and planning criteria which may or may not affect this site the items discussed and concerns presented herein may vary based on the outcome of pending or present discussions affecting the area.

My efforts to date pertaining to preparing the Drainage Concept Plan are within the norm for this type of professional service. I hope that my research & findings to date will assist you in preparing the final plans once the moritorium is lifted.

Please feel free to contact me if you have any question or require further clarification pertaining to the items contained herein. I wish you and your client sucess in your efforts to continue this project.

Sincerely
SANTIAGO ROMERO JR. & ASSOC.

Thomas A. Romero CET