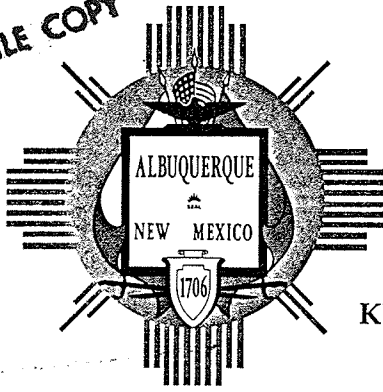


FILE COPY



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
KEN SCHULTZ

CHIEF
ADMINISTRATIVE OFFICER
GENE ROMO

DEPUTY CAO
DEVELOPMENT & ENTERPRISE SERVICES
LARRY LARRANAGA

DEPUTY CAO
PUBLIC SERVICES
DAN WEAKS

August 17, 1988

Jeff Mortensen, P.E.
Jeff Mortensen & Associates, Inc.
811 Dallas, NE
Albuquerque, New Mexico 87110

RE: REVISED DRAINAGE PLAN FOR MONTGOMERY BOULEVARD CHURCH OF CHRIST
(F-19/D3) REVISION DATED AUGUST 3, 1988

Dear Mr. Mortensen:

Based on the information provided on your resubmittal of August 4, 1988, the above referenced plan is approved for Site Development and Building Permit.

Please be advised that the Building Permit has already been issued, therefore, please provide the contractor with this revised plan. Also, upon completion of the above Phase I construction, we will need Engineer's Certification for the drainage easement improvements.

Prior to any release for any future development, we will require a separate submittal for each phase involved.

Construction within City right-of-way involves a separate permit. The contractor must have a copy of this letter on hand when applying for his excavation permit.

If I can be of further assistance, please feel free to call me at 768-2650.

Cordially,

Bernie J. Montoya
Bernie J. Montoya, C.E.
Engineering Assistant

BJM/bsj

xc: Becky Sandoval



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

FILE COPY

July 25, 1983

Mr. Wayne Stell
Associate Minister
Church of Christ
7201 Montgomery Boulevard NE
Albuquerque, NM 87109

REF: CHURCH OF CHRIST DRAINAGE COMPLAINT (F19-D3)

Dear Mr. Stell:

It has been brought to our attention that a ponding area has been created by the blockage of storm runoff at the far north portion of the church property. On July 14, 1983 a field inspection was made to determine if there was any blockage of storm runoff at the referenced area. Our field inspection reveals that the runoff from Novella Park and portions of the runoff from the Little Turtle Townhouses, which are suppose to enter the drainage easement along the east property line of the church is being blocked and eventually ponded at the far north portion of the church property.

After doing some research into the problem, a drainage report for the Church of Christ done by Mr. Bo Johnson of Murray-McCormich, Inc., shows that there is a drainage easement starting at the intersection of Gene Avenue and the Northeast corner of the church property and running along the east property line towards Montgomery Boulevard; therefore, no ponding was suppose to take place in that area. Attached you will find copies of plate 1 and 3 of the drainage report.

The only ponding and eventual discharge that should take place within the church property will take place after completion of the parking areas shown on plate 3. It is critical that this matter be looked into as soon as possible. The majority of the undrained and non-maintained ponding areas become mosquito breeding area.

If you have any questions regarding the above comments, please feel free to call me at 766-7644

Sincerely,

Bernie J. Montoya

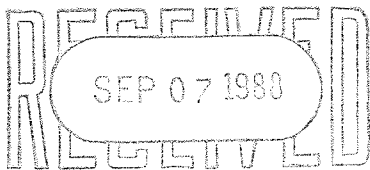
Bernie J. Montoya
Hydrologic Engineering Technician

BJM:mrk



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103



September 6, 1988

Mr. Homer McIlroy, President
Montgomery Blvd. Church of Christ
7201 Montgomery Blvd., NE
Albuquerque, NM 87109

RE: TRACT A-1, KNAPP HEIGHTS ADDITION, UNIT 2 (MONTGOMERY BLVD. CHURCH OF CHRIST)

Dear Mr. McIlroy:

Enclosed please find an executed copy of the Drainage Covenant for the above referenced property.

Please call me if I may be of further assistance.

Sincerely,

Theresa R. Shultz, Administrative Aide
Development Div./Design Review Section

Enclosure (1)

cc: Project File
Bernie Montoya, Hydrology Section

PUBLIC WORKS DEPARTMENT

Walter H. Nickerson, Jr., P.E.
Assistant Director Public Works

ENGINEERING GROUP

Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

DRAINAGE COVENANT

This Drainage Covenant, between [state the name of the present real property owner exactly as shown on the real estate document conveying title to the present owner and state the legal status of the owner, for example, "single person," "husband and wife," "corporation of the State of X," "partnership":] Montgomery Boulevard Church of Christ

("Owner"), whose address is 7201 Montgomery Boulevard N.E., Albuquerque, NM 87109, and the City of Albuquerque, a New Mexico municipal corporation ("City"), whose address is P. O. Box 1293, Albuquerque, New Mexico 87103, is made in Albuquerque, Bernalillo County, New Mexico and is entered into as of the date Owner signs this Easement.

1. Recital. Owner is the owner of certain real property located at [give general description, for instance, subdivision, lot and block or street address:] Tract A-1 Knapp Heights Addition Unit 2 in Bernalillo County, New Mexico (the "Property").

Pursuant to City ordinances, regulations and other applicable laws, the Owner is required to construct and maintain certain drainage facilities on the Property, and the parties wish to enter into this agreement to establish the obligations and responsibilities of the parties.

2. Description and Construction of Drainage Facilities. Owner shall construct the following "Drainage Facility" within the Property at Owner's sole expense in accordance with the standards, plans and specifications approved by the City: Asphalt drainage channel within the existing drainage easement which runs along the east property boundary.

The Drainage Facility is more particularly described in the attached Exhibit A. The Owner will not permit the Drainage Facility to constitute a hazard to the health or safety of the general public.

3. Maintenance of Drainage Facility. The Owner will maintain the Drainage Facility at Owner's cost in accordance with the approved Drainage Report and plans.

4. City's Right of Entry. The City has the right to enter upon the Property at any time and perform whatever inspection of the Drainage Facility it deems appropriate, without liability to the Owner.

5. Demand for Construction or Repair. The City may send written notice ("Notice") to the Owner requiring the Owner to construct or repair the Drainage Facility within _____ days ("Deadline") of receipt of the Notice, as provided in Section 12, and the Owner will comply promptly with the requirements of

RECEIVED
HYDROLOGY SECTION

(Approved by Legal Dept.

as to form only 5/22/88

the Notice. The Owner will perform all required work by the Deadline, at Owner's sole expense.

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

7. Liability of City for Repair after Notice or as a Result of Emergency. The City shall not be liable to the Owner for any damages resulting from the City's repair or maintenance following notice to the Owner as required in this agreement or in an emergency unless the damages are the result of the reckless conduct or gross negligence of the City.

8. Indemnification. As a part of the consideration for this grant, subject to the provisions of the New Mexico Tort Claims Act and all other applicable New Mexico laws, the City agrees to save Owner harmless from any and all liability arising from the City's negligent use of the Drainage Facility. The City does not agree to save Owner harmless from any liability which may arise from Owner's use of the Drainage Facility and the Property.

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

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

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

Montgomery Boulevard Church of Christ
7201 Montgomery Boulevard N.E.
Albuquerque, NM 87109

Notice may be given to the Owner either in person or by mailing the notice by regular U.S. mail, postage paid. Notice will be considered to have been received by the Owner within 6 days after the notice is mailed if there is no actual evidence of receipt. The Owner may change Owner's address by giving written notice of the change by certified mail, return receipt requested, to the City Public Works Department, P.O. Box 1293, Albuquerque, New Mexico 87103.

12. Term. This agreement shall continue until terminated by the City pursuant to Section 7 above.

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

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

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

16. Construction and Severability. If any part of this agreement is held to be invalid or unenforceable, the remainder of the agreement will remain valid and enforceable if the remainder is reasonably capable of completion.

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

18. Form Not Changed. Owner agrees that changes to the wording of this form are not binding upon the City unless initiated by the Owner and approved and signed by the City Legal Department in writing on this form.

OWNER: Montgomery Boulevard
 Church of Christ

By: William Harvey Porter
 Its: Minister
 Dated: 8-4-88

823

STATE OF New Mexico)
COUNTY OF Bernalillo) 88

4th The foregoing instrument was acknowledged before me this
day of August, 1988, by [name of person signing:]
William Harvey Porter, [title or capacity, for instance,
"President" or "Owner":] Minister of [name of
the entity which owns the Property if other than the individual
signing, for instance, the name of the corporation, partnership,
or joint venture:] Montgomery Boulevard Church of Christ.

Doris Jean Grey
Notary Public

My Commission Expires:
November 23, 1990

CITY OF ALBUQUERQUE:

Approved:

By: *Robert M. [Signature]* 3m
Title: CITY ENGINEER
Dated: 8/19/88

STATE OF NEW MEXICO
COUNTY OF BERNALILLO
FILED FOR RECORD

88 SEP -7 AM 10:48

(EXHIBIT A ATTACHED)

MS 66/17 PG 820-831
GLADYS M. DAVIS
SO. CLERK & RECORDER
[Signature] DEPUTY

(Approved by Legal Dept.)

APPROVED FOR DRAINAGE

KW Laws *ACE Hydel*
SIGNATURE TITLE

CONTINGENCIES _____

DRAINAGE REPORT
FOR

EXPANSION OF THE
CHURCH OF CHRIST

LOCATED AT

7201 MONTGOMERY BLVD. N.E.
ALBUQUERQUE, NEW MEXICO

FOR

KENT NOWLIN CONSTRUCTION

PREPARED BY

MURRAY-McCORMICK, INC.

2601-F WYOMING BLVD. N.E.
ALBUQUERQUE, NEW MEXICO

(505) 292-1936

October 7, 1975

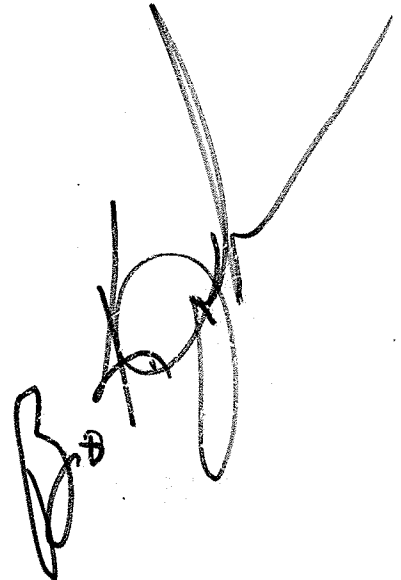
A large, stylized handwritten signature, likely belonging to B. J. Hydel, is written in the bottom right corner of the page. The signature is written in dark ink and is quite fluid and expressive.

TABLE OF CONTENTS

I	General Introduction
II	Existing Drainage Conditions
III	Storm Drain Design
IV	Storm Drain Analysis
V	Summary of Results
VI	Recommendations

Appendix

I GENERAL INTRODUCTION

The Church of Christ, located at 7201 Montgomery Blvd. N.E., is expanding the size of its' church building as well as the parking lot area. The extent of the expansion can be seen by observing the area of land replatted for Church Use on Plate 1 entitled "KNAPP HEIGHTS, UNIT 2, BEING A REPLAT OF BLOCK 5 & A PORTION OF BLOCK 4 OF KNAPP HEIGHTS". With final approval of the plat, Mesilla N.E., and 40 single family lots will be vacated and reserved for Church Use. The abandonment or relocation of the existing utility easements shown on the plat will be handled by a separate instrument.

The proposed church structures and adjacent parking are located approximately 1,000 feet east of Louisiana Blvd. N.E., on the north side of Montgomery Blvd. N.E., in Section 31, Township 11 North, Range 4 East in the City of Albuquerque.

The site is bounded on the west by Chama N.E.; on the north by Gene Avenue N.E.; on the south by Montgomery Blvd. N.E.; and on the east by the parking lot driveway of Executive North Apartments, 7303 Montgomery Blvd. N.E.

This study will show that the development of this property, approximately 9.7 acres, can be accomplished within drainage requirements of the City of Albuquerque and A.M.A.F.C.A.

II EXISTING DRAINAGE CONDITIONS

At the beginning of this study a great deal of time was spent in attempting to locate the necessary topographic maps. After

BIBLIOGRAPHY OF REFERENCES

Butler, Stanley S., Engineering Hydrology.

New Jersey: Prentice-Hall, Inc., 1959

Herkenhoff, Gordon & Associates, "Master Plan of Drainage, City of Albuquerque, New Mexico and Environs, 1963," Albuquerque; Gordon Herkenhoff & Associates, Consulting Engineers.

King, H.W., and Brater, E.F., Handbook of Hydraulics.

New York: McGraw-Hill Book Company, 1963

U.S. Department of Commerce, "Technical Paper, No. 40, Rainfall Frequency Atlas of the United States," Washington, D.C., U.S. Government Printing Office, 1963.

Wright-McLaughlin Engineers, "Urban Storm Drainage Criteria Manual, Vol. I.," Denver, Colorado: Wright-McLaughlin Engineers, 1969.

Yrjanainen, G. and Warren, A.W., "A Simple Method for Retention Basin Design," Water and Sewage Works, December, 1973.

$$T^2 + 50T + 625 - \frac{283,500}{40Q_0} = 0$$

"This is a quadratic equation which may be reduced to the form: $ax^2 + bx + c = 0$ "

Where x is T, $a = 1$, $b = 50$, and $c = 625 - \frac{283,500}{40Q_0}$

The general solution is $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$T = \frac{-50 \pm \sqrt{(50)^2 - 4(1)(625 - \frac{283,500}{40Q_0})}}{2(1)}$$

$$T = \frac{-50 \pm \sqrt{2500 - 2500 + \frac{28,350}{Q_0}}}{2}$$

$$T = -25 \pm \sqrt{\frac{7087.5}{Q_0}}$$

$I = \frac{189}{T+25}$ for a 100 year storm from Master Plan of
 Drainage, City of Albuquerque, New Mexico, 1963-
 Herkenhoff & Associates.

$$Q_n = (100\%) \left(\frac{189}{T+25} \right) (1)$$

$$= \frac{189}{T+25}$$

$$V_n = Q_n \times T \times 60 \text{ sec./min.}$$

$$V_n = \frac{11,340T}{T+25}$$

Storage

$$V_s = V_n - V_o$$

$$V_s = \frac{11,340T}{T+25} - 40 Q_o T$$

"Since Q_o is a fixed maximum outflow that will only occur for the peak storm, it is necessary to find the time from the instant the storage begins until the instant the peak storage is attained. This can be done by taking the first derivative of the storage volume equation and setting it equal to zero."

$$\frac{dV_s}{dT} = \frac{d \frac{11,340T}{T+25}}{dT} - \frac{d(40 Q_o T)}{dT}$$

$$\frac{dV_s}{dT} = \frac{(T+25)(11,340) - (11,340T)(1)}{(T+25)^2} - 40 Q_o$$

$$\frac{dV_s}{dT} = \frac{283,500}{T^2+50T+625} - 40 Q_o = 0$$

Reference "Water & Sewage Works," December, 1973, Page 41.

Derivation for an Orifice Outlet.

Outflow

Orifice formula (P4-3, King's Handbook)

$$Q_i = ca\sqrt{2gh}$$

"Assume that the storm that fills the basin to the peak volume causes the water level to rise at a constant rate ($h=k_1t$)"

$$Q_i = ca\sqrt{2gk_1t}$$

$$\text{Let } K_2 = ca\sqrt{2gk_1}$$

$$Q_i = K_2t^{1/2}$$

$$V_o = 60 \int_0^T Q_i dt$$

"A conversion factor of 60 sec/min is required because Q_i is in cfs and t is in minutes."

$$V_o = 60K_2 \int_0^T t^{1/2} dt$$

$$V_o = 60K_2 (2/3)T^{3/2}$$

$$V_o = 40K_2 T^{1/2}(T)$$

"Assume the maximum outflow occurs only at the end of the peak storm such that $Q_o = K_2T^{1/2}$."

$$\therefore V_o = 40 Q_o T$$

Inflow

Q_n = CIA Rational Formula

$$\text{Let } C = 100\%$$

$$A = 1 \text{ Acre}$$

APPENDIX

VI RECOMMENDATIONS

The access easement on the east boundary will have to be constructed to the cross-sections shown on Plate 4 in order to handle the off-site flows. Where the easement intersects Montgomery Blvd., the opening should be widened and sloped toward the south to facilitate the turning of flows onto Montgomery.

Every effort should be made to utilize the on-site run-off in the landscape platers. This will sustain the growies and further reduce the quantity of run-off departing the site.

By utilizing detention ponding and routing of flows thru the landscape areas, this property will contribute less internal run-off to surrounding areas than that which existed before development. In conclusion, the development of this plan should have a beneficial effect on the drainage characteristics of this area.

Respectfully submitted,

the landscaping. This can best be accomplished by allowing the runoff to enter the landscape areas thru a series of openings in the curbs. This will further reduce the amount of run-off reaching Chama Street.

The off-site flow of 67 c.f.s. entering the site at the northeast corner of the site will pass directly thru the site along the east boundary. Flows will be contained within a 20' road access easement and turned out onto Montgomery Blvd. A typical section for the 20' easement would have a header curb on the east side, 6:1 slope on the west side, 15' bottom at 0.6% slope. Where the access narrows to a 10' easement next to the church, concrete header walls should be constructed on both sides of the easement. (See Plate #4 for typical cross-sections) This section of the access-easement would have to be at 0.6% min. slope. These sections will handle in excess of the 67 c.f.s.

V SUMMARY OF RESULTS

A. Total Run-off Uncontrolled = Sections A_7 and A_8 - 19 c.f.s.

B. Total Run-off Controlled = Sections A_1 thru A_6 - 4 c.f.s.

This flow will be controlled through orifice outlets.

C. Therefore summing total run-off rates under developed conditions vs undeveloped conditions -

Developed Site

23 c.f.s.

vs

Undeveloped Site

24 c.f.s.

The net result is a reduction of the run-off rate by 1 c.f.s.

The principle behind the routing of flows is as follows: Flows from Area A_1 will be detained behind the curb and allowed to flow onto Area A_2 at a controlled rate of 0.50 c.f.s. Flows from area A_2 depart to A_3 , A_3 to A_4 , and flows from A_4 flow into the landscape area, with overflow out onto Chama Street. As the flows from Area A_1 enter A_2 , A_2 is emptying into area A_3 , etc. Each area has the capacity to completely pond the flows originating within that area. Note that the area of A_2 , 0.51 Ac., is less than the area of A_1 , 0.55 Ac., but the flow rate has been increased to offset this area difference. Thereafter, the outlet flow rates of the downstream receiving area was increased to prevent the inflows from overflowing the capacity of the pond.

The area required for ponding of Area A_5 is 8794 ft³. The surface area of the landscape area within A_5 is 9300 ft², for a ponding depth of 0.94'. The volume that fails to soak into the ground from the upstream areas will pass thru this ponding area and overflow thru a controlled orifice onto Chama Street.

The flows originating from Areas A_5 and A_6 will be released onto Chama Street at their respective exit points thru controlled orifices.

Area A_7 , a single family residence, has an uncontrolled run-off rate of 1 c.f.s. emptying onto the existing parking lot of the church property.

While the calculations reflect a single orifice outlet application, the developer would like to use the run-off waters to sustain

$Q = ca\sqrt{2gh}$ - note $C = 0.80$ from trial and error solutions from Table 4-10, Handbook of Hydraulics, King & Brater, 1963.

Solving for "a"

$$a = \frac{Q}{C\sqrt{2gh}} = \frac{0.50}{0.80 \sqrt{2(32.2)(0.50)}}$$

$$= \frac{0.50}{0.80 \sqrt{32.2}} = \frac{0.50}{0.80 \times 5.67}$$

$$a = 0.110 \text{ ft}^2$$

Select a 4-1/2" pipe

Table of Controlled Outflows

Areas 1 thru 6

	<u>Area 1</u>	<u>Area 2</u>	<u>Area 3</u>	<u>Area 4</u>	<u>Area 5</u>	<u>Area 6</u>
Area (Ac.)	0.55	0.51	0.58	1.37	1.54	0.67
Allowable Outflow (C.F.S.)	0.50	0.55	0.60	1.0	1.0	2.0
Run-off Coeff.	0.90	0.90	0.90	0.90	0.90	0.90
Qo (cfs/Ac. imp.)	1.01	1.20	1.15	0.81	0.72	3.32
T (minutes)	58.8	51.85	53.51	68.48	74.11	21.20
Vs (ft ³ /Ac. imp.)	5584	5162	5268	6089	6345	2388
Vt (ft ³)	2764	2369	2750	7507	8794	1439
Head (ft)	0.5	0.50	0.50	0.50	0.50	0.80
a (ft ²)	0.110	0.121	0.132	0.22	0.22	0.22
Size Pipe (in.)	4-1/2	4-3/4	5	6	6	6

2. Calculate time in minutes that the maximum volume of storage will occur from the orifice outlet storage time equation.

$$\begin{aligned}
 T &= -25 + \sqrt{\frac{7087.5}{Q_o}} \\
 &= -25 + \sqrt{\frac{7087.5}{1.01}} = -25 + \sqrt{7017.33} \\
 &= -25 + 83.77 \\
 &= \underline{58.8} \text{ minutes}
 \end{aligned}$$

3. Calculate the maximum volume of storage per acre imperviousness from the orifice outlet storage equation.

$$\begin{aligned}
 V_s &= \frac{11,340 T}{T + 25} - 40 Q_o T \\
 V_s &= \frac{(11,340)(58.8)}{58.8 + 25} - 40 (1.01)(58.8) \\
 V_s &= 7959.79 - 2375.52 \\
 V_s &= 5584.27 \text{ ft}^3 / \text{Ac. Imp.}
 \end{aligned}$$

4. Calculate the total volume of storage required for the contributing Area A_1 .

$$\begin{aligned}
 V_t &= V_s \times \# \text{ Acres} \times \text{Run-off Coefficient} \\
 V_t &= (5584.27)(0.55)(0.90) \\
 V_t &= \underline{2764} \text{ ft}^3
 \end{aligned}$$

5. Select an outflow pipe from the orifice formula that will yield the allowable outflow of 0.50 c.f.s. under a head of 0.5:

run-off coefficient (considering existing grass and pavement) of 0.40, would be:

$$Q = 0.4 \times 5.4 \times 7.4 = 16 \text{ c.f.s.}$$

The remaining land, area #12, has an undeveloped flow of $Q = 0.4 \times 5.4 \times 0.3 = 24 \text{ c.f.s.}$ 165

C. On-Site (Developed)

The development plan calls for a considerable parking area and substantial roof area to be constructed.

The area under consideration for ponding is 5.4 acres. The remaining $9.2 - 5.4 = 3.8$ acres will generate $Q = 0.9 \times 5.4 \times 3.79 = 18 \text{ c.f.s.}$, of uncontrolled runoff. Since this developed discharge is less than the 24 c.f.s. occurring in the natural state, controlled flow orifices will be constructed to release no more than $24 - 18 = 6 \text{ c.f.s.}$, from Area A, thru A₆, and Area A₇, which will have uncontrolled run-off.

The following is the format for calculating the peak discharge and the allowable run-off from each sub-area. Area A₁ will be shown as an example. The remaining areas are summarized in table form. Refer to the appendix for the derivation of the calculations.

Area A₁

Area = 0.55 acres; set allowable outflow discharge @ 0.50 c.f.s.

1. From the design criteria, calculate Q_o

$$Q_o = \frac{\text{Allowable outflow}}{\text{Acreage} \times \text{run-off coefficient}}$$

$$Q_o = \frac{0.50 \text{ c.f.s.}}{0.55 \text{ Ac.} \times 0.90} = 1.01 \text{ c.f.s./Ac. Imp.}$$

ponded on asphalt in between lots.

	<u>"C"</u>	<u>Area</u>	<u>Q = CIA</u>
1. Area "A"	0.3	13.60	22 ¹
2. Little Turtle Townhomes	0.4	13.15	28 ²
3. Executive North Apts.	0.9	2.49	12
4. Novella Park	0.4	2.07	4
5. Existing homes	0.5	0.52	1

The total off-site run-off to the site, water that formerly discharged down Mesilla N.E., is 67 c.f.s.

B. On-Site (Natural)

The existing church building and parking lot occupies the southerly portion of the site (south of Mesilla N.E.) adjacent to Montgomery Blvd. N.E. Part of the roof flows and a majority of the existing parking lot, Area #10, drains to Montgomery Blvd. N.E. It is intended that this drainage pattern remain unchanged. This area contains 1.5 acres and the expected run-off is $Q = 0.9 \times 5.4 \times 1.5 = 7$ c.f.s., discharging directly onto Montgomery Blvd. N.E.

An additional on-site area of 7.4 acres, Area #11, drains to Mesilla N.E. from the north, and then to Montgomery Blvd. N.E. This land is vacant at the present time with the exception of one house. The expected run-off from this area, using a natural

-
1. The development of Area "A" would be expected not to discharge any more flow than it does in the natural condition.
 2. The resulting run-off of 28 c.f.s., in the undeveloped state is larger than the 19.4 c.f.s., shown on the grading plan for the townhouses after development. To be conservative, use the larger value of 28 c.f.s.

IV STORM DRAIN ANALYSIS

A. Off-Site

The total off-site drainage area contributing to the flows on the subject property is 26.96 acres of natural cover, 4.87 acres of impervious cover, for a total of 31.83 acres.

A further breakdown of the contributing areas is shown below:

	<u>Coverage in Acres</u>		<u>Total Area</u>
	<u>Grass</u>	<u>Pavement</u>	
1. Area "A:	13.6	0	13.60
2. Little Turtle Townhomes	11.43	1.72	13.15
3. Executive North Apts.	0	2.49	2.49
4. Novella Park incl. Gene Ave. N.E.	1.67	0.4	2.07
5. Existing homes incl. Prairie Road N.E.	0.26	0.26	0.52
	<hr/>	<hr/>	<hr/>
	26.96	4.87	31.83

The following is a breakdown of the run-off rates from the off-site areas, using a 10 minute time of concentration

($I = 5.4"/\text{hr.}$):

The schematic lines drawn on the Executive North Apartments site are as a result of field investigation. Basically, the north half of the northerly buildings and the adjacent parking lot drain to Mesilla N.E.

After complete development, the Little Turtle Townhomes complex will drain 19.4 c.f.s., to Mesilla N.E. This magnitude flow will depend heavily on the proper construction and maintenance of the proposed ponding areas. For the purpose of this report the higher value between the developed and the natural flow will be considered.

III STORM DRAIN DESIGN

As directed by the Albuquerque Metropolitan Arroyo Flood Control Authority drainage solution, the analysis for this subdivision is based on a 100-year frequency storm with the rainfall intensity determined from the intensity duration frequency curves Chart 1 in the Master Plan of Drainage, City of Albuquerque, New Mexico & Environs 1963, prepared by Gordon Herkenhoff & Associates.

1. Parameters Intensity "/Hr. $i = \frac{189}{t+25}$

 t - duration in minutes

2. Rational Method $Q = CiA$

 C = run-off coefficient

 A - area in acres

3. Velocity calculation by Mannings Formula

$$V = \frac{1.486}{n} R^{2/3} S^{1/2}$$

checking all reasonable sources, it seems that no topographic map is available for this area.

The topography shown on the on-site drainage plan is taken from field notes provided by Kent Nowlin Construction.

Since two existing projects are upstream from and drain water onto the site, an attempt was made to locate the drainage reports for the Executive North Apartments and Little Turtle Townhomes. A report was found for the latter under the name of "The Triminium", but no report was found for the Executive North Apartments.

The lands adjacent to and upstream of the subject property drain basically to the southwest. With the exception of the two noted projects, the land is presently open with a light grass cover so prominent in this area. Only the easterly 350'±, facing Pennsylvania Avenue N.E., of the Little Turtle Townhomes project has been developed, leaving the remaining 950'± with its natural cover.

To the east, Pennsylvania Avenue N.E., interrupts flow from the east as it discharges water to an existing drainage ditch and Montgomery Blvd. N.E.

To the west of Pennsylvania Avenue N.E., and north of the Little Turtle Townhomes there is a parcel of undeveloped open ground, draining southwest. Block walls around adjacent homes to the north and west prohibit flow to or from this parcel (see off-site hydrology map, Plate I).

DRAINAGE INFORMATION SHEET

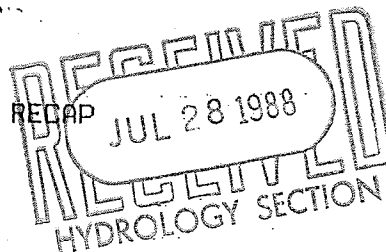
PROJECT TITLE: MONTGOMERY CHURCH OF CHRIST REVISED PHASE I ZONE ATLAS/DRNG. FILE #: F-19/D3
 LEGAL DESCRIPTION: TRACT A BLOCK 5 & A PORTION OF BLOCK 4 OF KNAPP HEIGHTS
 CITY ADDRESS: _____
 ENGINEERING FIRM: JEFF MORTENSEN & ASSOC. CONTACT: Peter M. Lujan
 ADDRESS: 811 DALLAS N.E. PHONE: 265-5611
 OWNER: MONTGOMERY CHURCH OF CHRIST CONTACT: ARCHITECT
 ADDRESS: _____ PHONE: _____
 ARCHITECT: MILLER & ASSOCIATES CONTACT: JIM MILLER
 ADDRESS: 2819 RICHMOND DR NE PHONE: 834-1255
 SURVEYOR: JEFF MORTENSEN & ASSOC. CONTACT: PETER M LUJAN
 ADDRESS: 811 DALLAS NE PHONE: 265-5611
 CONTRACTOR: UNKNOWN CONTACT: _____
 ADDRESS: _____ PHONE: _____

PRE-DESIGN MEETING:

☐ YES

☒ NO

☐ COPY OF CONFERENCE RECORD SHEET PROVIDED



DRB NO. _____

EPC NO. _____

PROJ. NO. F-19/D3

TYPE OF SUBMITTAL:

☐ DRAINAGE REPORT

☐ DRAINAGE PLAN

☒ CONCEPTUAL GRADING & DRAINAGE PLAN

☐ GRADING PLAN

☐ EROSION CONTROL PLAN

☐ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

☐ SKETCH PLAT APPROVAL

☐ PRELIMINARY PLAT APPROVAL

☒ SITE DEVELOPMENT PLAN APPROVAL

☐ FINAL PLAT APPROVAL

☐ BUILDING PERMIT APPROVAL

☐ FOUNDATION PERMIT APPROVAL

☐ CERTIFICATE OF OCCUPANCY APPROVAL

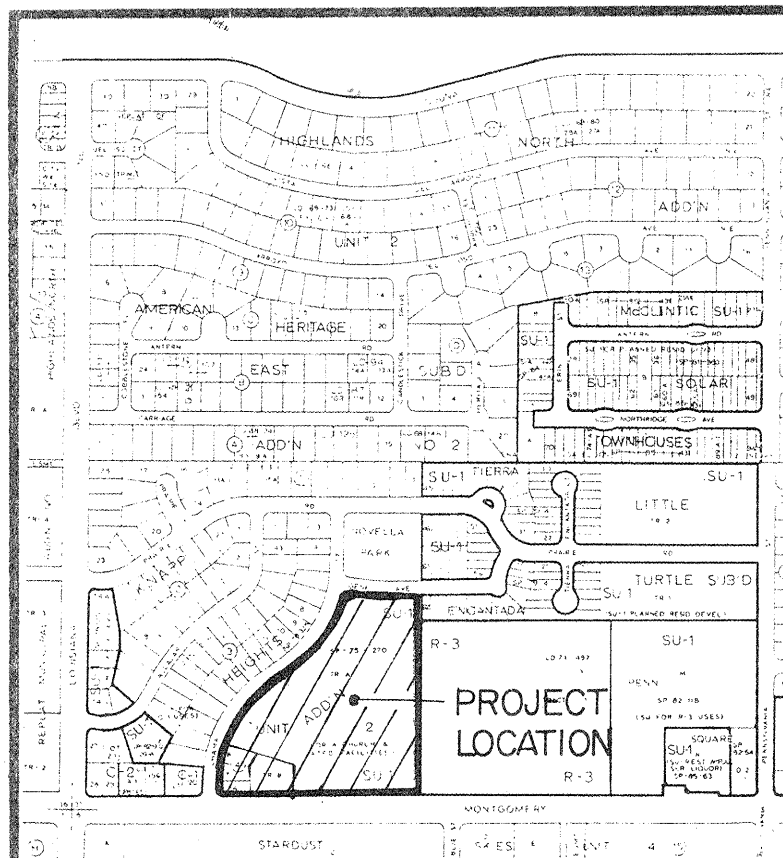
☐ ROUGH GRADING PERMIT APPROVAL

☐ GRADING/PAVING PERMIT APPROVAL

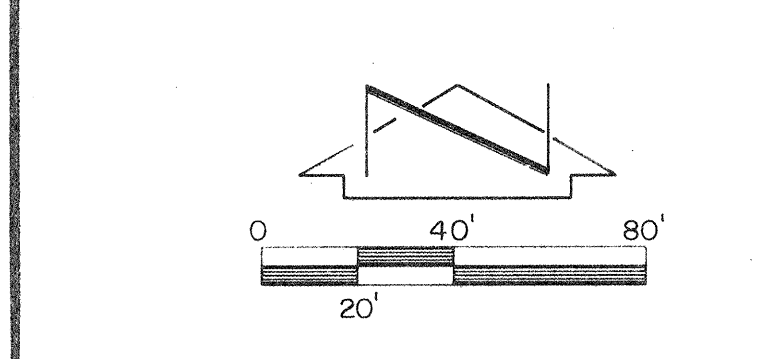
☒ OTHER REVISED (SPECIFY)

DATE SUBMITTED: 7/28/88

BY: Peter M. Lujan



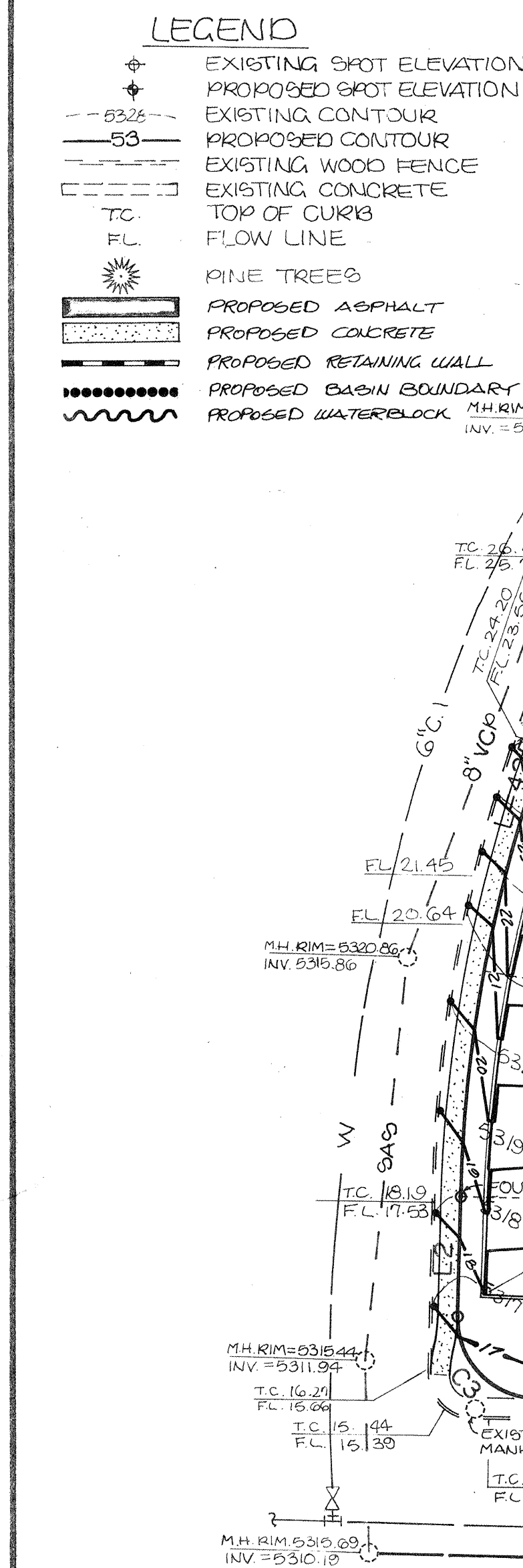
VICINITY MAP
SCALE: 1" = 800'



CHANNEL SECTION A-A
HORIZONTAL SCALE: 1" = 10'

STATION	CHORD BEARING	DISTANCE	DELTA	RADIUS
1	S 89° 48' 00" W	745.10	23.42	23.42
2	S 89° 48' 00" W	745.10	23.42	23.42
3	S 89° 48' 00" W	745.10	23.42	23.42

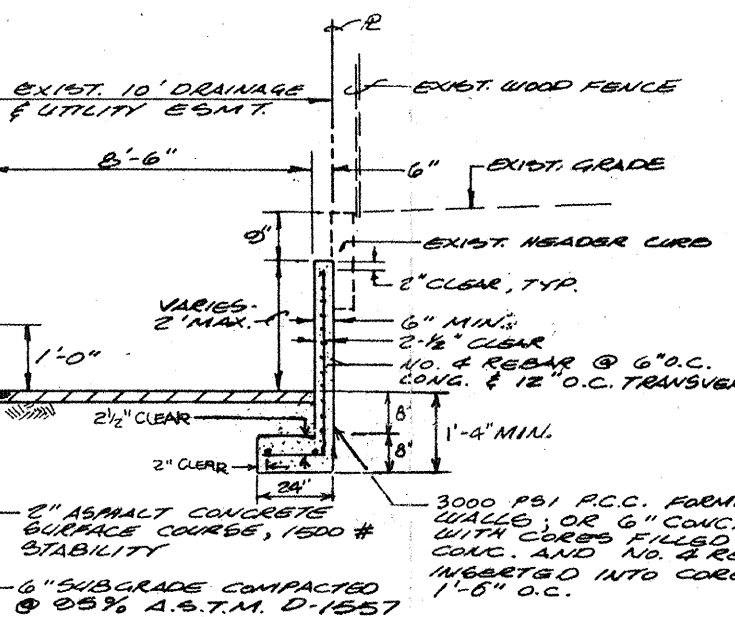
LEGEND



PROJECT BENCHMARK
A SQUARE, 2, CHISELED ON TOP OF CONCRETE CURB AT THE EGE RETURN AT THE JUNCTION OF MONTGOMERY BLVD AND JULIE ST.
ELEVATION: 5332.12 FEET (M.S.L.D.)

T.B.M.
TOP OF M.H. RIM AT THE INTERSECTION OF MONTGOMERY BLVD. NE. & CHAMA ST. AS SHOWN HEREON.
ELEVATION: 5315.69 FEET (M.S.L.D.)

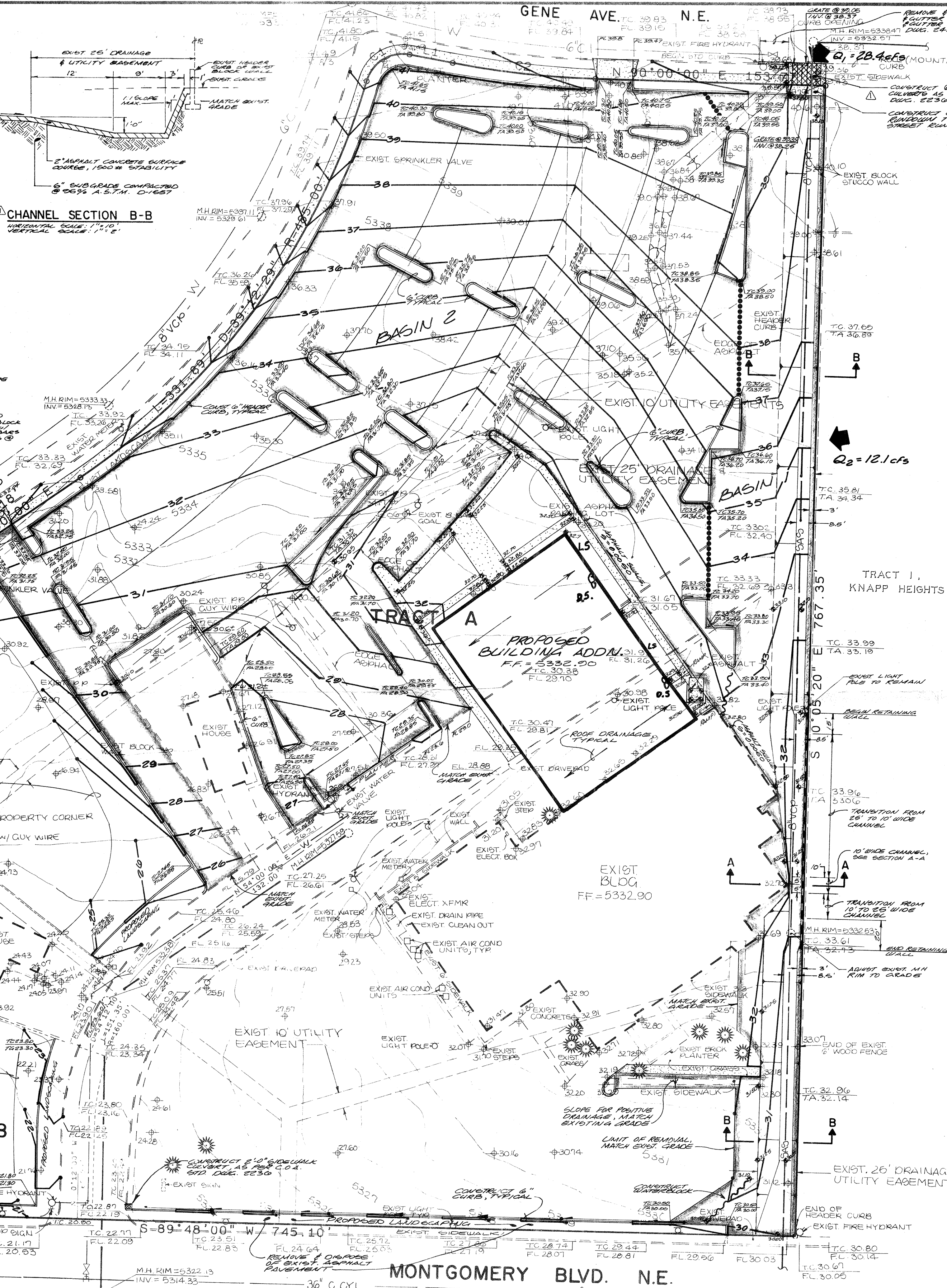
LEGAL DESCRIPTION
TRACT A, BLOCK 5 & A PORTION OF BLOCK 4 OF KNAPP HEIGHTS



CHANNEL SECTION B-B
HORIZONTAL SCALE: 1" = 10'

CONSTRUCTION NOTES:

1. TWO (2) WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT LINE LOCATING SERVICE 765-1234, FOR LOCATION OF EXISTING UTILITIES.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL POTENTIAL OBSTRUCTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.
3. ALL WORK ON THIS PROJECT SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL LAWS, RULES AND REGULATIONS CONCERNING CONSTRUCTION SAFETY AND HEALTH.
4. ALL CONSTRUCTION WITHIN PUBLIC RIGHT-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE CITY OF ALBUQUERQUE STANDARDS AND PROCEDURES.
5. IF ANY UTILITY LINES, PIPELINES, OR UNDERGROUND UTILITY LINES ARE SHOWN ON THESE DRAWINGS, THEY ARE SHOWN IN AN APPROXIMATE MANNER ONLY, AND SUCH LINES MAY EXIST WHERE NOT SHOWN. IF ANY SUCH EXISTING LINES ARE SHOWN, THE LOCATION IS BASED UPON INFORMATION PROVIDED BY THE OWNER OF SAID UTILITY, AND THE INFORMATION MAY BE INCOMPLETE, OR MAY BE OBSOLETE BY THE TIME CONSTRUCTION COMMENCES. THE ENGINEER HAS UNDERTAKEN NO FIELD VERIFICATION OF THE LOCATION, DEPTH, SIZE, OR TYPE OF EXISTING UTILITY LINES, PIPELINES, OR UNDERGROUND UTILITY LINES, MAKES NO REPRESENTATION PERTAINING THERETO, AND ASSUMES NO RESPONSIBILITY OR LIABILITY THEREFOR. THE CONTRACTOR SHALL INFORM ITSELF OF THE LOCATION OF ANY UTILITY LINE, PIPELINE, OR UNDERGROUND UTILITY LINE IN OR NEAR THE AREA OF THE WORK IN ADVANCE OF AND DURING EXCAVATION WORK. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE CAUSED BY ITS FAILURE TO LOCATE, IDENTIFY AND PRESERVE ANY AND ALL EXISTING UTILITIES, PIPELINES,



GENE AVE. N.E.

CHAMA ST. W.

MONTGOMERY BLVD. N.E.

TRACT A, BLOCK 5 & A PORTION OF BLOCK 4 OF KNAPP HEIGHTS

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APPROVALS

NAME	DATE
J. Mortensen	8/1/88
B. Medina	8/1/88

REVISIONS

NO.	DATE	BY	REVISIONS
1	8/1/88	P.M.L.	REVISED SECTIONS A-A & B-B, CALCS. AND SIDEWALKS
2	8/1/88	R.A.R.	CULVERTS

DESIGNED BY P.M.L.
DRAWN BY R.A.R.
APPROVED J.G.M.

JOB NO. 61764
DATE 7-1988

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REVISIONS

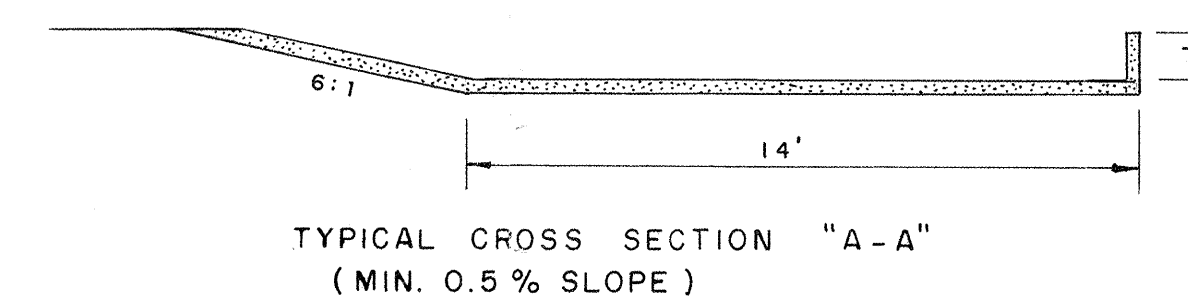
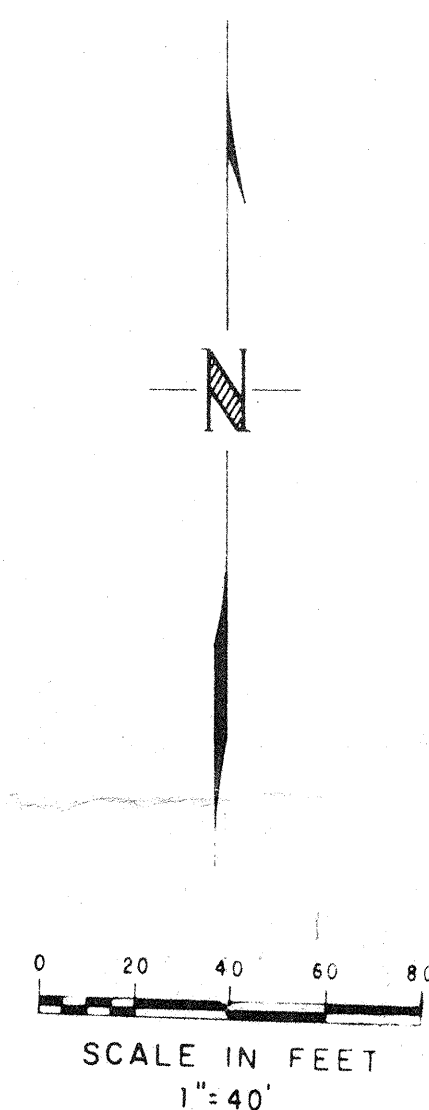
NO.	DATE	BY	REVISIONS
1	8/1/88	P.M.L.	REVISED SECTIONS A-A & B-B, CALCS. AND SIDEWALKS
2	8/1/88	R.A.R.	CULVERTS

DESIGNED BY P.M.L.
DRAWN BY R.A.R.
APPROVED J.G.M.

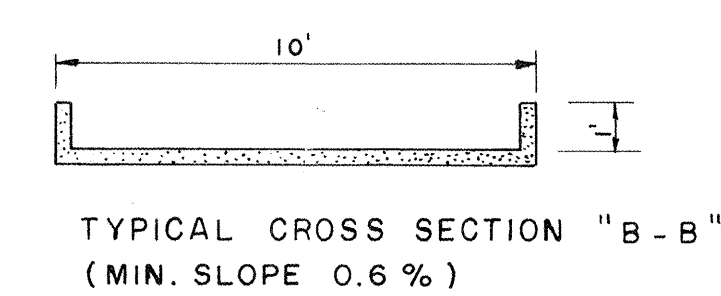
JOB NO. 61764
DATE 7-1988

REVISIONS

NO.	DATE	BY
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- A₁ = 0.55 Ac.
- A₂ = 0.51 Ac.
- A₃ = 0.58 Ac.
- A₄ = 1.37 Ac.
- A₅ = 1.35 Ac.
- A₆ = 0.86 Ac.
- A₇ = 0.20 Ac.
- A₈ = 3.79 Ac.




NO. DATE BY				REVISIONS			
Designed By				Drawn By			
				Checked By			
				Approved By			
 MURRAY-McCORMICK, INC. ENVIRONMENTAL DESIGN ENGINEERING-PLANNING-SURVEYING <small>2601 WYOMING BLVD. N.E. SUITE F ALBUQUERQUE NEW MEXICO 87110 505-292-1936</small>							

PLATE 3

ON SITE DRAINAGE DEVELOPED CONDITION

DATE	SCALE	SHEET OF
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