CITY OF ALBUQUERQUE

Hydrology Section Planning Department
David S. Campbell, Director

Timothy M. Keller, Mayor

December 10, 2018

Richard Stevenson
Tierra West, LLC
5571 Midway Park Place NE
Albuquerque, NM, 87109

RE: 7201 Montgomery Blvd NE Church of Christ
Grading Plan Engineer's Stamp Date: 12/07/2018
Hydrology File: F19D003A

Based upon the information provided in your submittal received 12/07/2018, the Grading and Drainage Plan cannot be approved for SO-19, Building Permit, or Grading Permit until the following conditions are addressed.

1. Add standard SO-19 notes available on the hydrology web page.
2. There are two sets of contours inside the ponds making the plan hard to read. Please revise so the pond contours are legible.
3. The drainage rundowns into the ponds and the sidewalk culverts need to be sized using both the weir equation and normal depth, whichever is the more limiting. At 8" depth they have capacity for about 1.25 cfs per foot width. The width of the rundowns and the sidewalk culverts needs to be increased to provide 100 year capacity.
4. Please provide normal depth calculations for sizing the curb height in the parking lot. Curb heights in the parking lot should be specified on the plan and curb with gutter recommended where the parking lot curb is used to collect and convey the drainage.
5. The water quality precipitation depth in the calculations on the plan (Sheet C-2) needs to match the depth in the report, 0.26" for re-development.
6. As a reminder, if the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required to be submitted to the Stormwater Quality Engineer (Curtis Cherne, PE, ccherne@cabq.gov, 924-3420) 14 days prior to any earth disturbance.
7. Please provide a Private Facility Drainage Covenant per Chapter 17 of the DPM for BMP pond prior to Certificate of Occupancy. Please submit this on the 4th floor of Plaza de Sol. A $25 fee will be required.

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

If you have any questions, please contact me at 924-3986 or e-mail jhughes@cabq.gov.

Sincerely,

James D. Hughes, P.E.
Principal Engineer, Planning Dept.
Development and Review Services

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 6/2018)

Project Title: Montgomery Church Building Permit #:_____ Hydrology File #: F19D003A

DRB#: _____ EPC#: _____ Work Order#: _____

Legal Description: TR A-1 Plat of TR A-1

City Address: 7201 Montgomery Blvd NE Albuquerque NM 87109

Applicant: Tierra West, LLC Contact: Richard Stevenson

Address: 5571 Midway Park Place NE Albuquerque NM 87109

Phone#: 505-858-3100 Fax#: 505-858-1118 E-mail: rstevenson@tierrawestllc.com

Other Contact: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

TYPE OF DEVELOPMENT: _____ PLAT (# of lots) _____ RESIDENCE X DRB SITE ___ ADMIN SITE

IS THIS A RESUBMITTAL? _____ Yes X No

DEPARTMENT _____ TRANSPORTATION X HYDROLOGY/DRAINAGE

Check all that Apply:

TYPE OF SUBMITTAL:

___ ENGINEER/ARCHITECT CERTIFICATION
___ PAD CERTIFICATION
___ CONCEPTUAL G & D PLAN
X GRADING PLAN
X DRAINAGE REPORT
___ DRAINAGE MASTER PLAN
___ FLOODPLAIN DEVELOPMENT PERMIT APPLIC
___ ELEVATION CERTIFICATE
___ CLOMR/LOMR
___ TRAFFIC CIRCULATION LAYOUT (TCL)
___ TRAFFIC IMPACT STUDY (TIS)
___ STREET LIGHT LAYOUT
___ OTHER (SPECIFY) _____
___ PRE-DESIGN MEETING?

RECEIVED
DEC 07 2018
LAND DEVELOPMENT SECTION

TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

X BUILDING PERMIT APPROVAL
___ CERTIFICATE OF OCCUPANCY

___ PRELIMINARY PLAT APPROVAL
___ SITE PLAN FOR SUB'D APPROVAL
___ SITE PLAN FOR BLDG. PERMIT APPROVAL
___ FINAL PLAT APPROVAL

___ SIA/ RELEASE OF FINANCIAL GUARANTEE
___ FOUNDATION PERMIT APPROVAL
___ GRADING PERMIT APPROVAL
___ SO-19 APPROVAL
___ PAVING PERMIT APPROVAL
___ GRADING/ PAD CERTIFICATION
___ WORK ORDER APPROVAL
___ CLOMR/LOMR
___ FLOODPLAIN DEVELOPMENT PERMIT
___ OTHER (SPECIFY) _____

DATE SUBMITTED: 12/07/2018 By: Richard Stevenson

COA STAFF: ELECTRONIC SUBMITTAL RECEIVED:_____

FEE PAID:_____

City of Albuquerque Planning Department

One Stop Shop – Development and Building Services

12/07/2018 Issued By: E08375 364331

Permit Number: **2018 060 649** **Category Code 970**

Application Number: **18REV-60649**, Review:Drain Plan-Lomr-Traffic Impact

Address:

Location Description: MONTGOMERY CHURCH

Project Number: null

Applicant
TIERRA WEST LLC
RONALD BOHANNAN
5571 MIDWAY PARK PL NE
ALBUQUERQUE NM 87109
505-858-3100
kkrueger@tierrawestllc.com

Agent / Contact
TIERRA WEST LLC
RONALD BOHANNAN
5571 MIDWAY PARK PL NE
ALBUQUERQUE NM 87109
505-858-3100
KKRUEGER@TIERRAWESTLLC.COM

Application Fees

REV Actions	$610.00
TOTAL:	**$610.00**

City of Albuquerque Treasury
Date:12/7/2018 Office:ANNEX
Stat ID: 9861 Cashier:E39083
Batch: Trans #:45
Permit: 2018060649
Receipt Num 00537250
Payment Total:$610.00
0909 REV Actions $610.00
Check Tendered $610.00

DRAINAGE REPORT

Montgomery Church of Christ

7201 Montgomery Blvd NE,
Albuquerque, NM 87109

Prepared for:

Montgomery Blvd. Church of Christ, Inc.
7201 Montgomery Blvd NE,
Albuquerque, NM 87109

Prepared by:

Tierra West, LLC
5571 Midway Park Place NE
Albuquerque, New Mexico 87109

December, 2018

I certify that this report was prepared under my supervision, and I am a registered Professional Engineer in the State of New Mexico in good standing.

RONALD R BOHANNAN
NEW MEXICO
7868
REGISTERED PROFESSIONAL ENGINEER

Ronald R. Bohannan
PE # 7868

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Job No. 2016037

TABLE OF CONTENTS

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Appendices

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Purpose

The purpose of this report is to outline the Drainage Plan for the development of the proposed Montgomery Church of Christ and Building Permit Approval for the new facilities, located on the undeveloped lot at the south west corner of Montgomery Blvd. and Chama St. at 7201 Montgomery Blvd NE, Albuquerque, NM 87109. The Church is in the process of subdividing the property and will retain a ±3.73 acre tract to develop the new facility. The proposed worship facility will consist of a single-story 23,995 square foot building with 142 parking stalls and just over 12,000 square foot of landscape areas.

This report outlines the developed flows associated in developing a portion of the subdivided lot, approximately ±2.48 acres. The balance of the property will remain in its current state with paved parking areas. The project was delegated by the Environmental Planning Commission on April 12, 2018. This report supports the application to the Development Review Board for the signoff of the Site Development Plan for Building Permit.

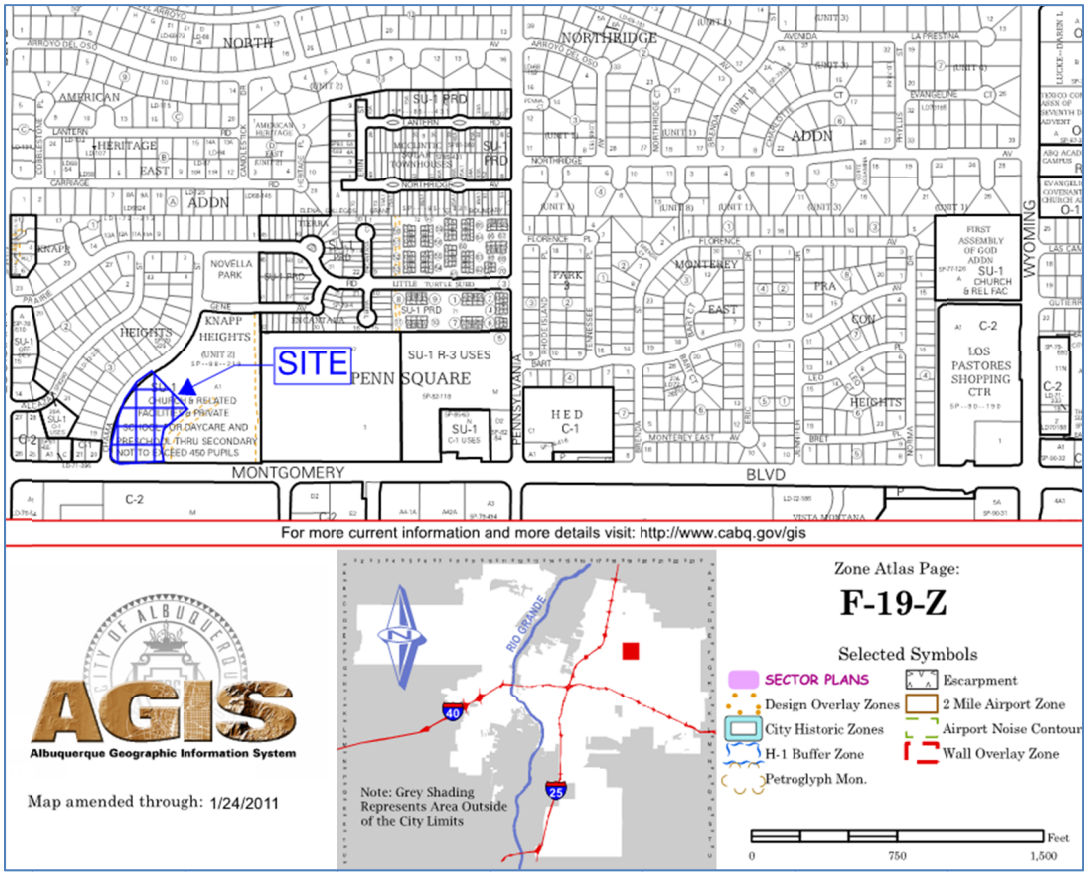


Exhibit A – Vicinity Map

Location and Background

The subdivided parcel is located at the south west corner of Montgomery Blvd. and Chama St. Recently two residential houses were vacated and demolished on the site. The balance of the site is undeveloped with areas of scrub and small vegetation. The site is bounded to the north by the balance of the subdivided lot; hardscaped parking areas, to the east by Mesilla St., to the south by Montgomery Blvd. and to the west by Chama St.

The existing parcel drainage number is F19D003. The entire church site was previously approved under a Grading and Drainage Plan that was updated on August 3, 1988 and submitted to the City by Jeff Mortensen & Associated, Inc. This was a revision based on the approved Masterplan for the entire site by Murray-McCormick, Inc. in 1975. The entire ±10.28 acre site has free discharge to Montgomery Blvd. under a full build out condition. The site under development that is covered by this drainage report is the final undeveloped parcel for the 'Church of Christ' site and consists of ±2.48 acres.

Exhibit B – Site Aerial Image

Flood Plain

The floodplain information is published for the site by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Bernalillo County, New Mexico and Incorporated Areas. The subject site is detailed on Community Panel Number 35001C0139G dated July 26, 2008 and is shown below.

The subject site is located within Flood Zone X, which is which is defined as, “Areas determined to be outside the 0.2% annual chance floodplain”. The site does not lie within a Flood Hazard Area as shown on the FEMA map requiring no further flood-proofing or other flood mitigation.

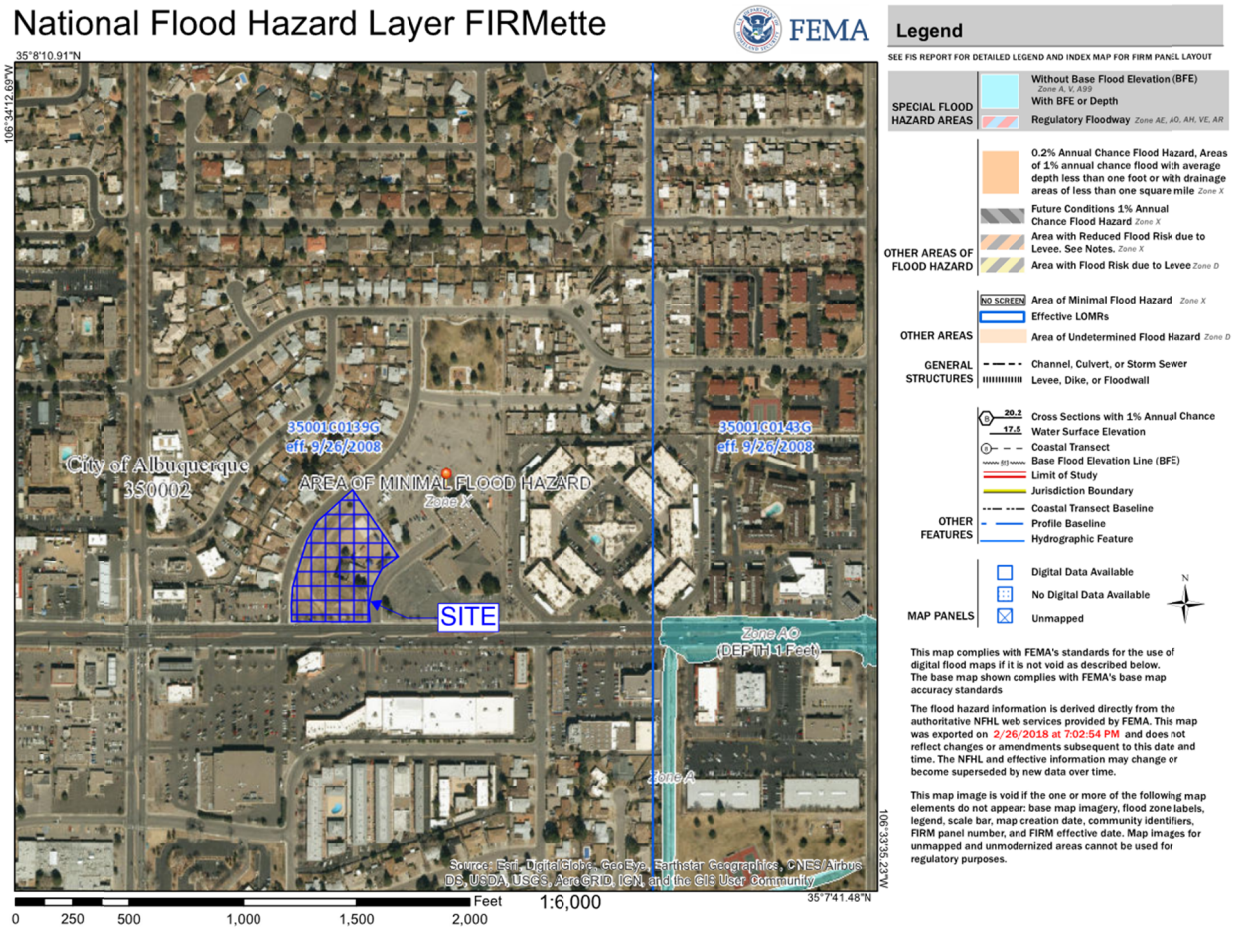


Exhibit C – FIRM Map

Calculations

The site is located within Precipitation Zone 3, between San Mateo Blvd. and Eubank Blvd. as specified in Chapter 22, Section A.1 of the City of Albuquerque Development Process Manual Volume I – Design Criteria, 2006 Revision (DPM). The principal design storm is the 100-year 6 hour event. No detention basins or retention basins are proposed and therefore longer duration design storms are not considered in the calculations. As stated in the DPM in Chapter 22 Section A.2, the 100-year 6 hour event is 2.60 inches. The appropriate land treatments A through D, as defined in the DPM Chapter 22 Section A.3, will be applied to the various pervious and impervious areas for the proposed re-developed site.

Excess precipitation is the depth of runoff remaining after the initial volume of rainfall retained on the surface and infiltration has been subtracted from the design storm hydrograph. The DPM defines the excess precipitation for the 100-year 6 hour event in Chapter 22 Table A-8 for Zone 2 with the corresponding land treatments.

A weighted excess precipitation rate is used to calculate the volume runoff as defined in the DPM Chapter 22 (a-5, a-6). The calculation requires the sum of excess precipitation multiplied by the corresponding treatment areas divided by the total area, multiplied by the weighted excess precipitation of the watershed area.

To determine the peak discharge for the re-development the corresponding treatment areas are multiplied by the peak rate for each treatment and sum to compute the total flow. The peak rates for the treatment areas are defined in the DPM Chapter 22 Table A-9 for the 100 year event.

As this site is a re-development the storm water quality volume is calculated based on the 0.48 inch storm. To calculate the required storm water quality volume to be captured and retained onsite, the impervious areas are multiplied by 0.26 inches for the 80th percentile storm.

Existing Conditions

The site generally drains from the northeast to the southwest with sheet flow draining directly into Montgomery Blvd and Charma St. There are no offsite flows that enter the site. The offsite sheet flow generated by the parking lot to the north is directed to Mesilla St. by the existing topography along an access way. At the proposed driveway entrances to the site a water block is established preventing this runoff entering into the undeveloped site.

The peak discharge calculated for the existing undeveloped conditions is 5.35 cfs. The existing hydrology calculations are detailed in the hydrology table in the appendix.

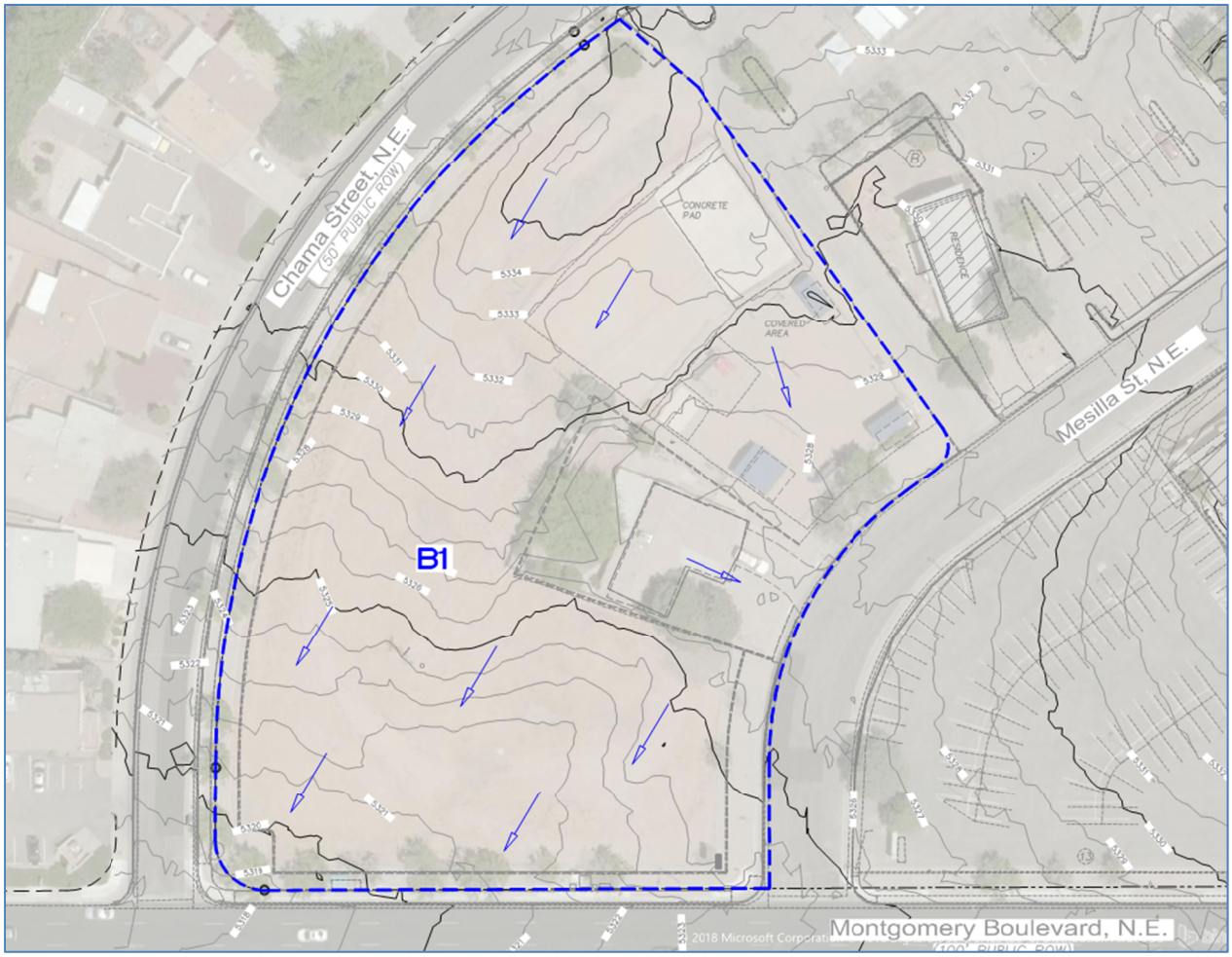


Exhibit D – Existing Site Conditions

Proposed Conditions

The proposed additions to the property consist of a new building, paving, and landscaping in its entirety. The landscaping requirements (15% net site minimum) results in a lower discharge than was previously calculated in the 1988 plans, coupled with the first flush volume retention, the proposed drainage flows do not exceed what was previously approved. The site shall continue as previously approved to free discharge for the developed condition as there is no downstream volume constraint within Montgomery Blvd.

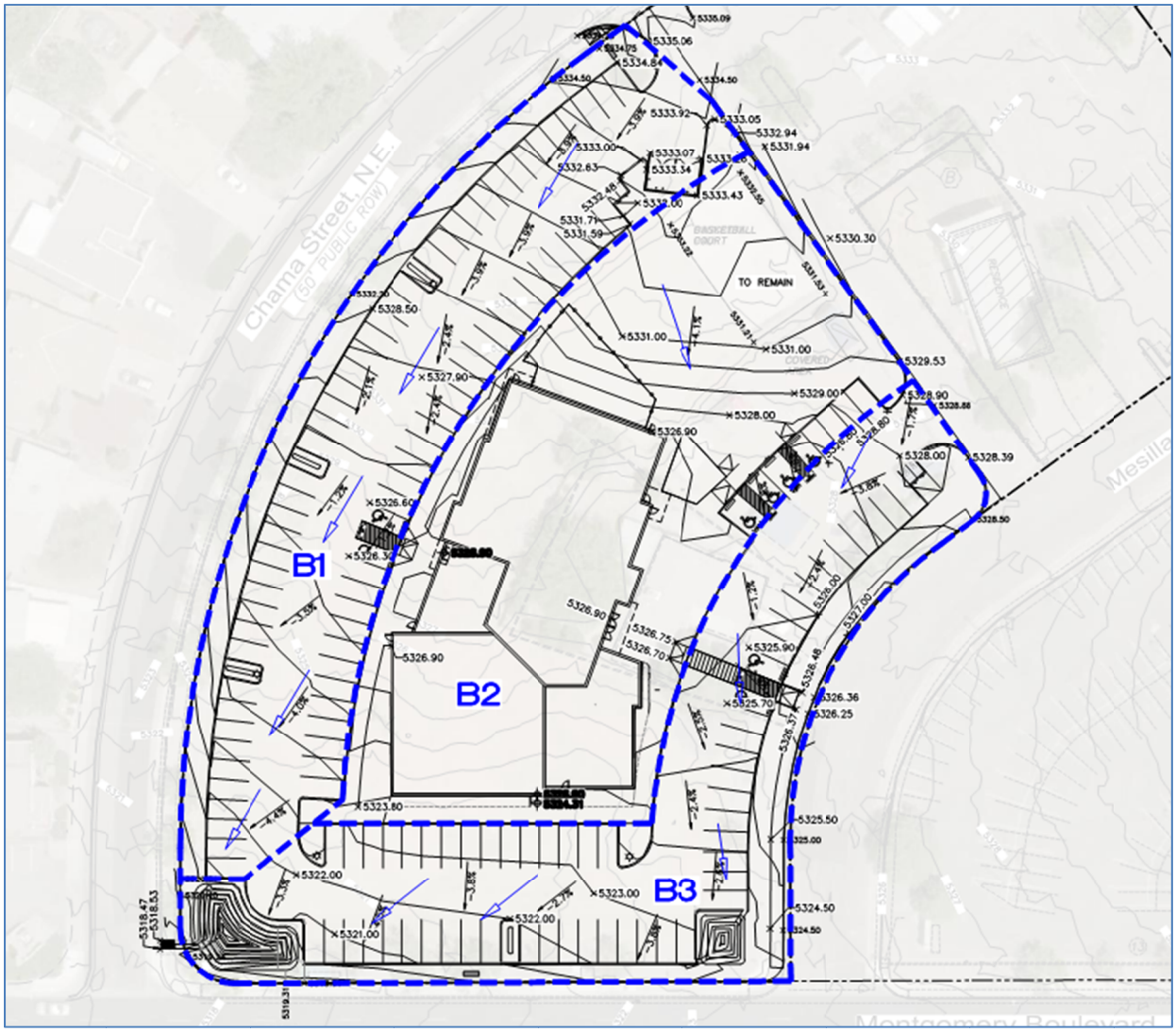


Exhibit E – Drainage Basin Map

The proposed developed site is divided into three basins B1-B3. There are two BMP surface Stormwater Quality Volume (SWQV) ponds proposed to capture the required volume. The calculated total runoff from the developed site for the 100-year 6 hour event is 11.66 cfs or a volume of 0.442 ac-ft that passes directly into Chama St. 20-feet north of the intersection with Montgomery Blvd. At the point of discharge Chama St. is at a gradient of 3.6% and is a 32-foot wide (face-to-face) roadway with standard curb and gutter and has the capacity to accept the 11.66 cfs discharge from the Church site.

On site the runoff is designed to sheet flow to curb and gutters around the perimeter of the parking areas that will then be directed through the SWQV ponds. The runoff is consolidated in the larger SWQV pond at the south east corner of the site and is then passed through two 24-

inch sidewalk culverts into Chama St. This was intentional to circumvent discharging directly into Montgomery Blvd. as this roadway conveys significant flow during high storm events. The designed sidewalk culvert outlets that discharge the event flow of 11.6 cfs have a total capacity of 14.4 cfs. Roof drains are proposed for the church building that will discharge into the parking lot areas and sheet flow away from the building.

Both SWQV ponds will be xeriscaped to blend with the existing right-of-way landscaping. The water quality pond #1 will retain a volume of 420 cubic feet. Water quality pond #2 will have rip rap sides and have a capacity of 2,175 cubic feet. The total SWQV onsite is 2,595 which is slightly greater than the required 2,420 cubic feet. Included in the appendix are the calculations for the proposed site conditions.

Stormwater Quality Volume Management

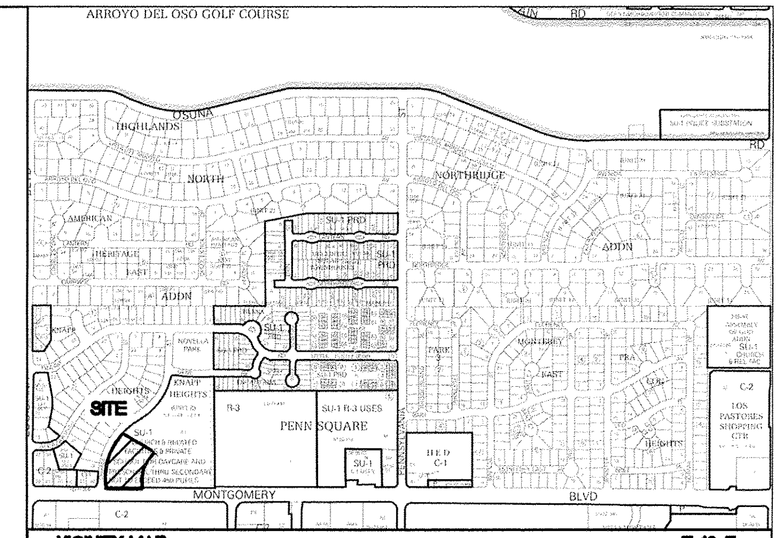
As this site is a development of an undeveloped site, the water quality volume is calculated based on retaining the 0.44- inch and considering 0.1-inch for infiltration. The formula used to calculate the Stormwater Quality Volume is = (.44”-0.1”)*1/12*I*43,560 where I is the impervious area in acres.

The total impervious area is 1.96 acres and requires a total SWQV retention of 2,420 cubic feet. A combine total of 2,420 cubic feet is provided for SWQV and is detailed on the grading plan. The water quality volume calculations are detailed on the hydrology table in the appendix.

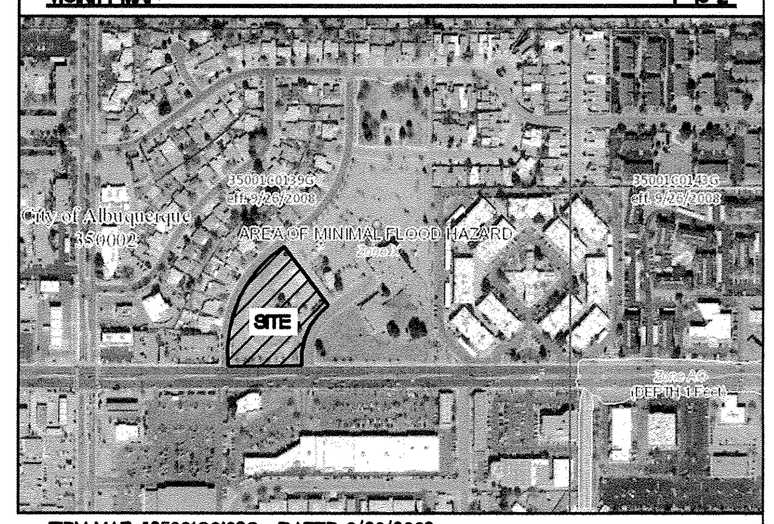
Summary

This report outlines the Drainage Plan and presents the on-site BMP SWQV ponding and drainage improvements needed to safely convey the developed flows for the development of the site into a new Montgomery Church building. The developed discharge passes through the required SWQV ponding before being released into Charma St. and thereafter Montgomery Blvd. The developed site conforms to the previously approved Master Drainage Plan for the parcel submitted to the City in 1975. The drainage plan presented meets the current DPM requirements and includes LID treatments to safely control and pass the site runoff.

APPENDIX A



VICINITY MAP: F-19-Z



FIRM MAP: #35001C0139G DATED 9/26/2008

LEGAL DESCRIPTION:

A-1-B KNAPP HEIGHTS UNIT 2

LEGEND

- CURB & GUTTER
- BOUNDARY LINE
- EASEMENT
- CENTERLINE
- RIGHT-OF-WAY
- BUILDING
- SIDEWALK
- RETAINING WALL
- EXISTING CURB & GUTTER
- EXISTING BOUNDARY LINE
- DRAINAGE BASIN BOUNDARY
- FLOW DIRECTION

Basin Descriptions											100-Year, 6-Hr			10-Year, 6-Hr			Water Quality Volume	
Basin ID	Area (sf)	Area (acres)	Area (sq miles)	Treatment A %	Treatment A (acres)	Treatment B %	Treatment B (acres)	Treatment C %	Treatment C (acres)	Treatment D %	Treatment D (acres)	Weighted E (in)	Volume (ac-ft)	Flow cfs	Weighted E (in)	Volume (ac-ft)	Flow cfs	FF Pond Required CF	FF Pond Provided CF
1	31,711	0.728	0.00114	0%	0.000	0%	0.000	12%	0.087	88%	0.641	2.232	0.135	3.52	1.394	0.085	2.35	790	
2	43,626	1.002	0.00156	0%	0.000	0%	0.000	27%	0.270	73%	0.731	2.071	0.173	4.60	1.262	0.105	3.02	901	
3	33,021	0.758	0.00118	0%	0.000	0%	0.000	22%	0.167	78%	0.591	2.125	0.134	3.54	1.306	0.083	2.34	729	2,595
Total	**108,358**	**2.488**	**0.00389**		**0.000**		**0.000**		**0.525**		**1.963**		**0.442**	**11.66**		**0.272**	**7.70**	**2,420**	**2,595**

Equations:

Weighted E = Ea*Aa + Eb*Ab + Ec*Ac + Ed*Ad / (Total Area)

Volume = Weighted E * Total Area

Flow = Qa*Aa + Qb*Ab + Qc*Ac + Qd*Ad

Excess Precipitation, E (in.)		
Zone 3	100-Year	10-Year
Ea	0.66	0.19
Eb	0.92	0.36
Ec	1.29	0.62
Ed	2.36	1.50

Peak Discharge (cfs/acre)		
Zone 3	100-Year	10-Year
Qa	1.87	0.58
Qb	2.6	1.19
Qc	3.45	2.00
Qd	5.02	3.39

Water Quality Volume

Total Impervious Area =	85,509 SF
Retainage depth = 0.44"-0.1" = 0.34" =	0.0283 FT
Retention Volume = (Area x 0.0283) =	2,420 CF

GRAPHIC SCALE

30 15 0 15 30

SCALE: 1"=30'

MONTGOMERY CHURCH OF CHRIST

ENGINEER'S SEAL

RONALD R BOHANNAN NEW MEXICO 7868 REGISTERED PROFESSIONAL ENGINEER

RONALD R. BOHANNAN P.E. #7868

MONTGOMERY CHURCH OF CHRIST

7201 MONTGOMERY BLVD. NE

DEVELOPED DRAINAGE PLAN

TIERRA WEST, LLC
5571 MIDWAY PARK PLACE NE
ALBUQUERQUE, NM 87109
(505) 858-3100
www.tierrawestllc.com

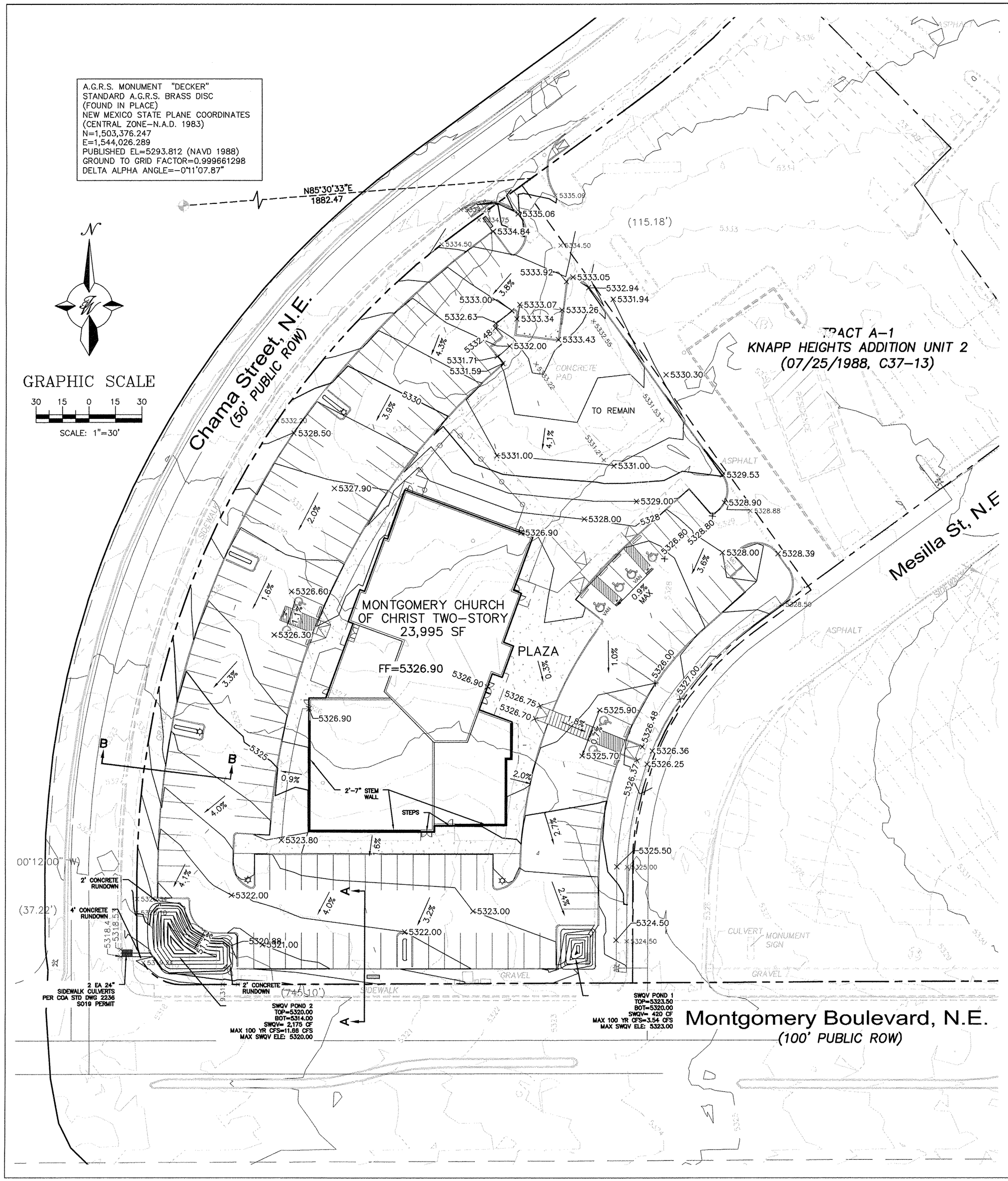
DRAWN BY: BF

DATE: 12/7/18

2016037—DRAINAGE DEVELOPED

SHEET # C2

JOB # 2016037



LEGEND

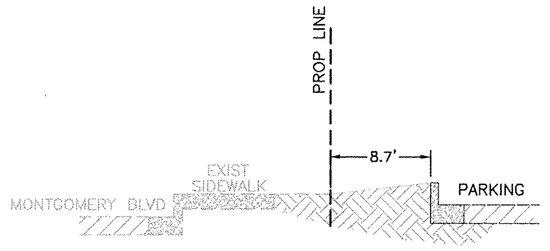
- CURB & GUTTER
- BOUNDARY LINE
- EASEMENT
- CENTERLINE
- RIGHT–OF–WAY
- LIMITS OF CONSTRUCTION
- BUILDING
- SIDEWALK
- RETAINING WALL
- 5010 CONTOUR MAJOR
- 5011 CONTOUR MINOR
- x 5048.25 SPOT ELEVATION
- FLOW ARROW
- EXISTING CURB & GUTTER
- EXISTING BOUNDARY LINE
- 5016 EXISTING CONTOUR MAJOR
- 5011 EXISTING CONTOUR MINOR
- x 5048.25 EXISTING SPOT ELEVATION

NOTICE TO CONTRACTORS

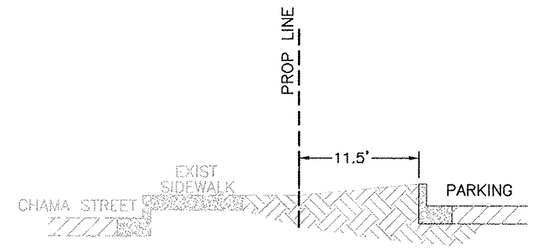
1. AN EXCAVATION/CONSTRUCTION PERMIT WILL BE REQUIRED BEFORE BEGINNING ANY WORK WITHIN CITY RIGHT–OF–WAY.
2. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED, EXCEPT AS OTHERWISE STATED OR PROVIDED HERON, SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF ALBUQUERQUE INTERIM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1985.
3. TWO WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTOR MUST CONTACT NEW MEXICO ONE CALL, DIAL "811" [OR (505) 260–1990] FOR THE LOCATION OF EXISTING UTILITIES.
4. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL CONNECTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL
5. NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.
6. BACKFILL COMPACTION SHALL BE ACCORDING TO TRAFFIC/STREET USE.
7. MAINTENANCE OF THESE FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER OF THE PROPERTY SERVED.
8. WORK ON ARTERIAL STREETS SHALL BE PERFORMED ON A 24–HOUR BASIS.
9. CONTRACTOR MUST CONTACT JASON RODRIGUEZ AT 235–8016 AND CONSTRUCTION COORDINATION AT 924–3416 TO SCHEDULE AN INSPECTION.

EROSION CONTROL NOTES:

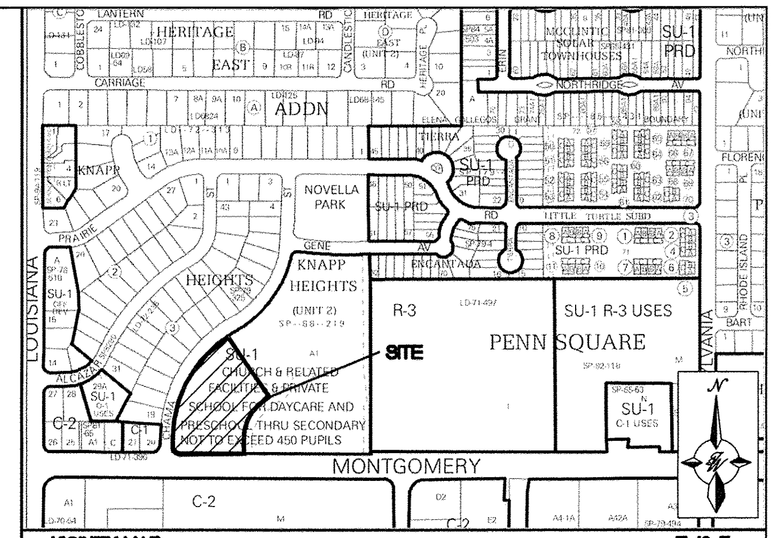
1. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A TOPSOIL DISTURBANCE PERMIT PRIOR TO BEGINNING WORK.
2. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING RUN–OFF ON SITE DURING CONSTRUCTION.
3. CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL SEDIMENT THAT GETS INTO EXISTING RIGHT–OF–WAY.
4. REPAIR OF DAMAGED FACILITIES AND CLEANUP OF SEDIMENT ACCUMULATIONS ON ADJACENT PROPERTIES AND IN PUBLIC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. ALL EXPOSED EARTH SURFACES MUST BE PROTECTED FROM WIND AND WATER EROSION PRIOR TO FINAL (CITY) ACCEPTANCE OF ANY PROJECT.



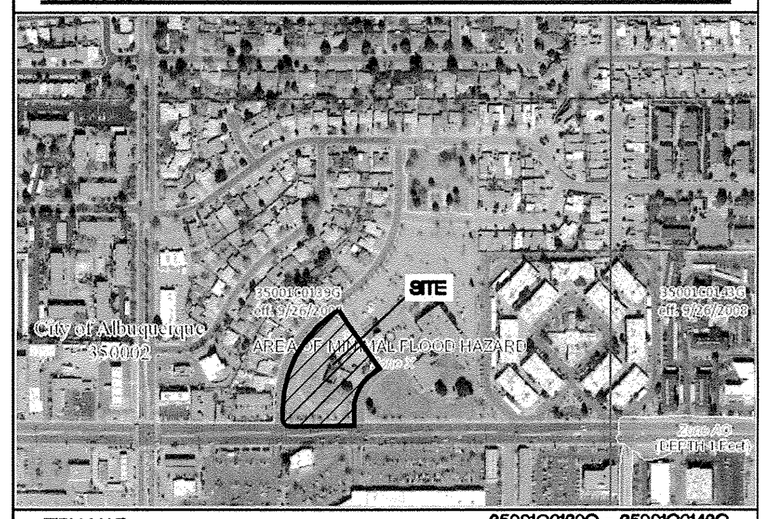
SECTION A–A
NTS



SECTION B–B
NTS



VICINITY MAP: F–19–Z



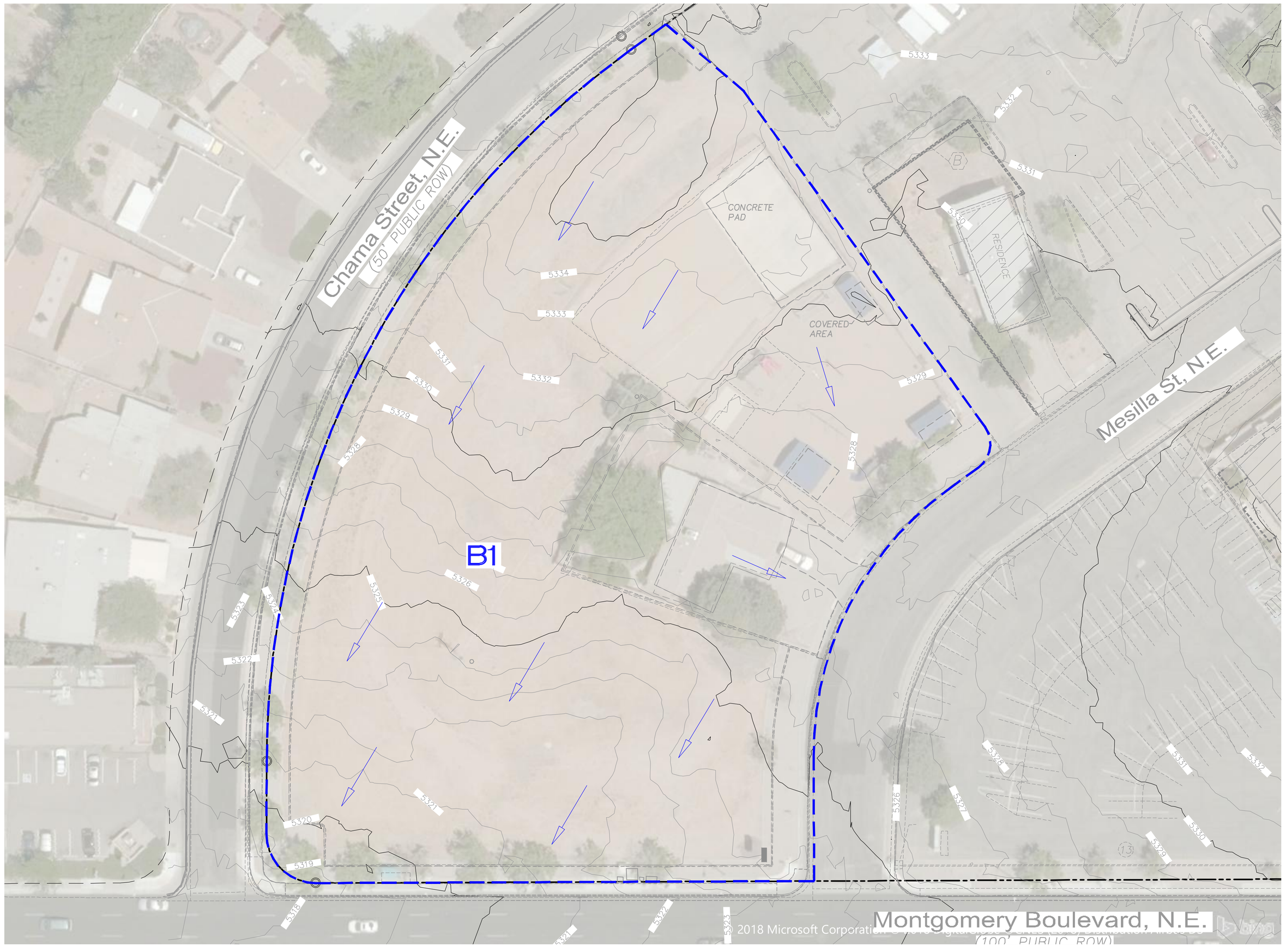
FIRM MAP: 35001C0139G – 35001C0143G

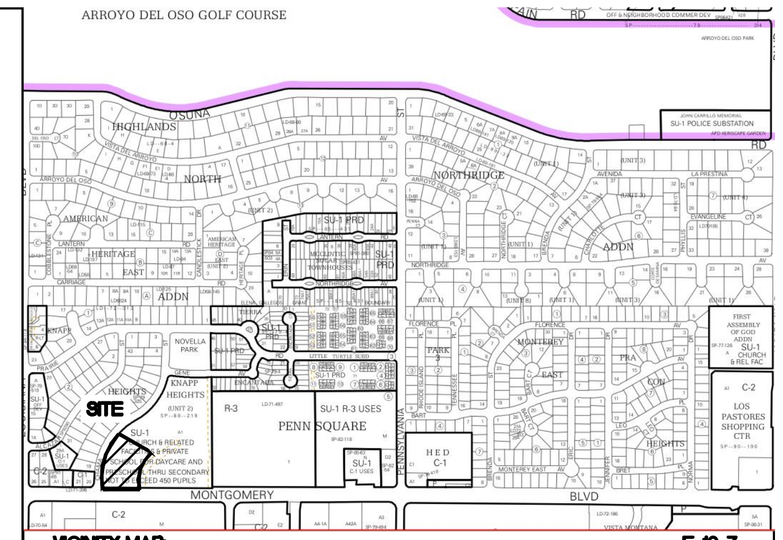
LEGAL DESCRIPTION:
A-1-B KNAPP HEIGHTS UNIT 2

CAUTION:
ALL EXISTING UTILITIES SHOWN WERE OBTAINED FROM RESEARCH, AS–BUILTS, SURVEYS OR INFORMATION PROVIDED BY OTHERS. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO CONDUCT ALL NECESSARY FIELD INVESTIGATIONS PRIOR TO AND INCLUDING ANY EXCAVATION, TO DETERMINE THE ACTUAL LOCATION OF UTILITIES AND OTHER IMPROVEMENTS, PRIOR TO STARTING THE WORK. ANY CHANGES FROM THIS PLAN SHALL BE COORDINATED WITH AND APPROVED BY THE ENGINEER.

MONTGOMERY CHURCH OF CHRIST

ENGINEER'S SEAL	MONTGOMERY CHURCH OF CHRIST 7201 MONTGOMERY BLVD. NE	DRAWN BY BF
RONALD R. BOHANNAN P.E. #7868	GRADING PLAN	DATE 12/7/18
		2016037_GRB
	TIERRA WEST, LLC 5571 MIDWAY PARK PLACE NE ALBUQUERQUE, NM 87109 (505) 858–3100 www.tierrawestllc.com	SHEET # C3
		JOB # 2016037





VICINITY MAP: F-19-Z

FIRM MAP: #35001C0139G DATED 9/26/2008

LEGAL DESCRIPTION:

A-1-B KNAPP HEIGHTS UNIT 2

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- RETAINING WALL
- EXISTING CURB & GUTTER
- EXISTING BOUNDARY LINE
- DRAINAGE BASIN BOUNDARY
- FLOW DIRECTION

Existing Conditions - Free Discharge

Basin Descriptions											100-Year, 6-Hr			10-Year, 6-Hr		
Basin ID	Area (sf)	Area (acres)	Area (sq miles)	Treatment A %	Treatment A (acres)	Treatment B %	Treatment B (acres)	Treatment C %	Treatment C (acres)	Treatment D %	Treatment D (acres)	Weighted E (in)	Volume (ac-ft)	Flow cfs	Weighted E (in)	Volume (ac-ft)	Flow cfs
1	108,358	2.488	0.00389	78%	1.940	17%	0.423	0%	0.000	5%	0.124	0.789	0.164	5.35	0.284	0.059	2.05
Total	**108,358**	**2.488**	**0.00389**		**0.000**		**0.423**		**0.000**		**0.124**		**0.164**	**5.35**		**0.059**	**2.05**

Equations:

Weighted E = Ea*Aa + Eb*Ab + Ec*Ac + Ed*Ad / (Total Area)

Volume = Weighted E * Total Area

Flow = Qa*Aa + Qb*Ab + Qc*Ac + Qd*Ad

Excess Precipitation, E (in.)		
Zone 3	100-Year	10-Year
Ea	0.66	0.19
Eb	0.92	0.36
Ec	1.29	0.62
Ed	2.36	1.50

Peak Discharge (cfs/acre)		
Zone 3	100-Year	10-Year
Qa	1.87	0.58
Qb	2.6	1.19
Qc	3.45	2.00
Qd	5.02	3.39

N

GRAPHIC SCALE

30 15 0 15 30

SCALE: 1"=30'

ENGINEER'S SEAL

RONALD R. BOHANNAN
P.E. #7868

MONTGOMERY CHURCH OF CHRIST
7201 MONTGOMERY BLVD. NE

HISTORIC DRAINAGE PLAN

TIERRA WEST, LLC
5571 MIDWAY PARK PLACE NE
ALBUQUERQUE, NM 87109
(505) 858-3100
www.tierrawestllc.com

DRAWN BY: BF

DATE: 12/6/18

2016037-DRAINAGE HISTORIC

SHEET # C1

JOB # 2016037

DPM Weighted E Method

Precipitation Zone 3

Montgomery Church of Christ, 7201 Montgomery Blvd NE, Albuquerque, NM

TWLLC **Date** 12/6/2018

Existing Conditions - Free Discharge

Basin Descriptions												100-Year, 6-Hr			10-Year, 6-Hr		
Basin ID	Area (sf)	Area (acres)	Area (sq miles)	Treatment A %	Treatment A (acres)	Treatment B %	Treatment B (acres)	Treatment C %	Treatment C (acres)	Treatment D %	Treatment D (acres)	Weighted E (in)	Volume (ac-ft)	Flow cfs	Weighted E (in)	Volume (ac-ft)	Flow cfs
1	108,358	2.488	0.00389	78%	1.940	17%	0.423	0%	0.000	5%	0.124	0.789	0.164	5.35	0.284	0.059	2.05
Total	**108,358**	**2.488**	**0.00389**		**0.000**		**0.423**		**0.000**		**0.124**		**0.164**	**5.35**		**0.059**	**2.05**

Proposed Conditions - Free Discharge

Basin Descriptions												100-Year, 6-Hr			10-Year, 6-Hr			Water Quality Volume	
Basin ID	Area (sf)	Area (acres)	Area (sq miles)	Treatment A %	Treatment A (acres)	Treatment B %	Treatment B (acres)	Treatment C %	Treatment C (acres)	Treatment D %	Treatment D (acres)	Weighted E (in)	Volume (ac-ft)	Flow cfs	Weighted E (in)	Volume (ac-ft)	Flow cfs	FF Pond Required CF	FF Pond Provided CF
1	31,711	0.728	0.00114	0%	0.000	0%	0.000	12%	0.087	88%	0.641	2.232	0.135	3.52	1.394	0.085	2.35	790	
2	43,626	1.002	0.00156	0%	0.000	0%	0.000	27%	0.270	73%	0.731	2.071	0.173	4.60	1.262	0.105	3.02	901	
3	33,021	0.758	0.00118	0%	0.000	0%	0.000	22%	0.167	78%	0.591	2.125	0.134	3.54	1.306	0.083	2.34	729	2,595
Total	**108,358**	**2.488**	**0.00389**		**0.000**		**0.000**		**0.525**		**1.963**		**0.442**	**11.66**		**0.272**	**7.70**	**2,420**	**2,595**

Equations:

Weighted E = Ea*Aa + Eb*Ab + Ec*Ac + Ed*Ad / (Total Area)

Volume = Weighted E * Total Area

Flow = Qa*Aa + Qb*Ab + Qc*Ac + Qd*Ad

Excess Precipitation, E (in.)				Peak Discharge (cfs/acre)		
Zone 3	100-Year	10-Year	2- Year	Zone 3	100-Year	10-Year
Ea	0.66	0.19	0	Qa	1.87	0.58
Eb	0.92	0.36	0.06	Qb	2.6	1.19
Ec	1.29	0.62	0.2	Qc	3.45	2.00
Ed	2.36	1.50	0.89	Qd	5.02	3.39

Water Quality Volume

Total Impervious Area =	85,509 SF
Retainage depth = 0.44"-0.1" = 0.34" =	0.0283 FT
Retention Volume = (Area x 0.0283) =	2,420 CF

Worksheet for 2' Concrete Sidewalk Culvert at 2% Slope

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	0.02000	ft/ft
Normal Depth	0.50	ft

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.58
0+00	0.08
0+01	0.00
0+02	0.08
0+02	0.58

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.58)	(0+02, 0.58)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Discharge	6.97	ft³/s
Elevation Range	0.00 to 0.58 ft	
Flow Area	0.92	ft²
Wetted Perimeter	2.84	ft
Hydraulic Radius	0.32	ft
Top Width	2.00	ft
Normal Depth	0.50	ft
Critical Depth	0.76	ft

Worksheet for 2' Concrete Sidewalk Culvert at 2% Slope

Results

Critical Slope		0.00550	ft/ft
Velocity		7.61	ft/s
Velocity Head		0.90	ft
Specific Energy		1.40	ft
Froude Number		1.98	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.50	ft
Critical Depth	0.76	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.00550	ft/ft

Cross Section for 2% Slope

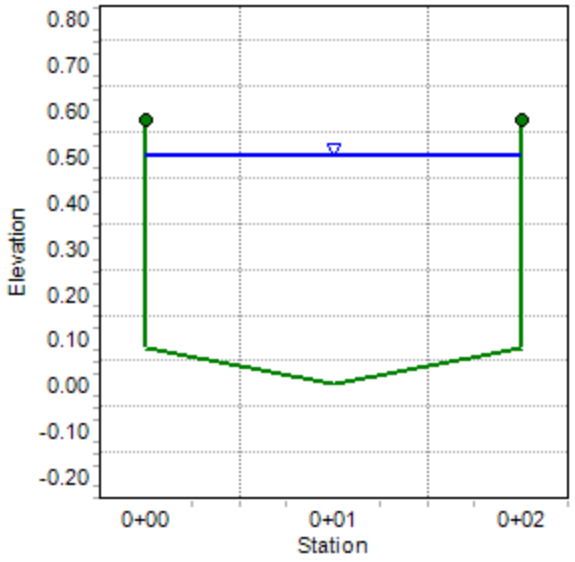
Project Description

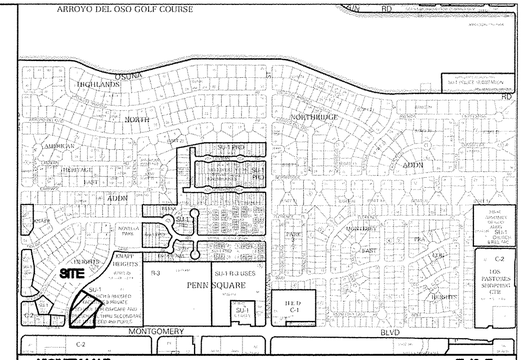
Friction Method	Manning Formula
Solve For	Discharge

Input Data

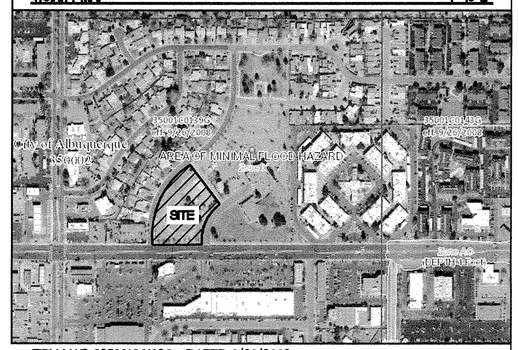
Channel Slope	0.02000	ft/ft
Normal Depth	0.50	ft
Discharge	6.97	ft³/s

Cross Section Image





VICINITY MAP: F-19-Z



FIRM MAP: #35001C0139G DATED 9/26/2008

LEGAL DESCRIPTION:

A-1-B KNAPP HEIGHTS UNIT 2

LEGEND

- CURB & GUTTER
- BOUNDARY LINE
- EASEMENT
- CENTERLINE
- RIGHT-OF-WAY
- BUILDING
- SIDEWALK
- RETAINING WALL
- EXISTING CURB & GUTTER
- EXISTING BOUNDARY LINE
- DRAINAGE BASIN BOUNDARY
- FLOW DIRECTION

Basin Descriptions											100-Year, 6-Hr			10-Year, 6-Hr			Water Quality Volume	
Basin ID	Area (sf)	Area (acres)	Area (sq miles)	Treatment A %	Treatment A (acres)	Treatment B %	Treatment B (acres)	Treatment C %	Treatment C (acres)	Treatment D %	Treatment D (acres)	Weighted E (in)	Volume (ac-ft)	Flow cfs	Weighted E (in)	Volume (ac-ft)	Flow cfs	FF Pond Required CF	FF Pond Provided CF
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Total	**108,358**	**2.488**	**0.00389**		**0.000**		**0.000**		**0.525**		**1.963**		**0.442**	**11.66**		**0.272**	**7.70**	**2,420**	**2,595**

Equations:

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Flow = Qa*Aa + Qb*Ab + Qc*Ac + Qd*Ad

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N

GRAPHIC SCALE

30 15 0 15 30

SCALE: 1"=30'

MONTGOMERY CHURCH OF CHRIST

ENGINEER'S SEAL

RONALD R BOHANNAN NEW MEXICO 7868 REGISTERED PROFESSIONAL ENGINEER

RONALD R. BOHANNAN P.E. #7868

MONTGOMERY CHURCH OF CHRIST

7201 MONTGOMERY BLVD. NE

DEVELOPED DRAINAGE PLAN

TIERRA WEST, LLC
5571 MIDWAY PARK PLACE NE
ALBUQUERQUE, NM 87109
(505) 858-3100
www.tierrawestllc.com

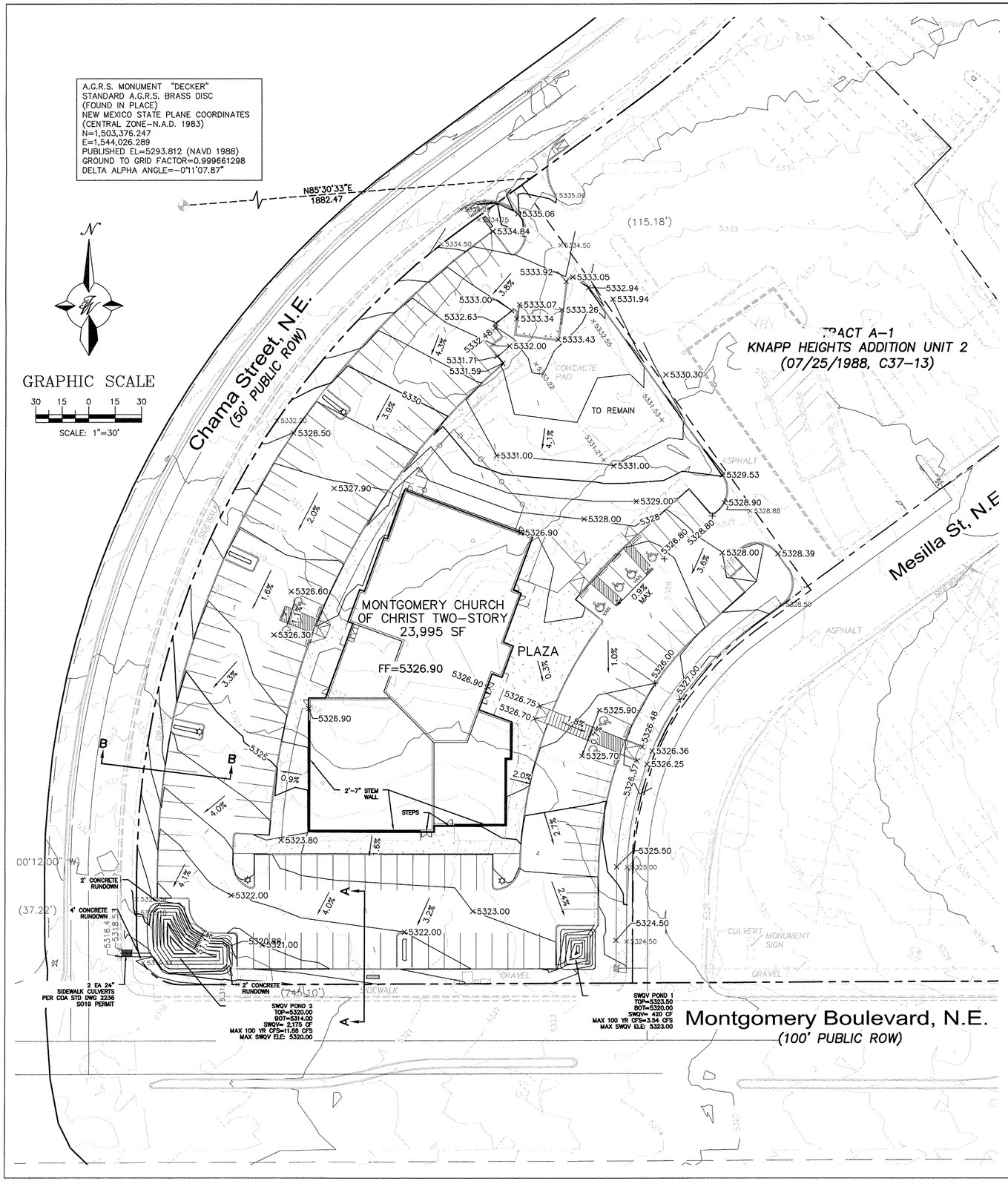
DRAWN BY: BF

DATE: 12/7/18

2016037—DRAINAGE DEVELOPED

SHEET # C2

JOB # 2016037



LEGEND

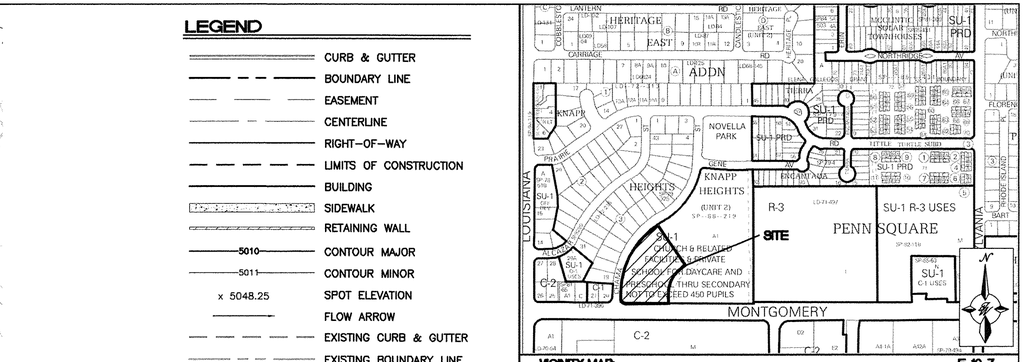
- CURB & GUTTER
- BOUNDARY LINE
- EASEMENT
- CENTERLINE
- RIGHT–OF–WAY
- LIMITS OF CONSTRUCTION
- BUILDING
- SIDEWALK
- RETAINING WALL
- 5010 CONTOUR MAJOR
- 5011 CONTOUR MINOR
- x 5048.25 SPOT ELEVATION
- FLOW ARROW
- EXISTING CURB & GUTTER
- EXISTING BOUNDARY LINE
- 5010 EXISTING CONTOUR MAJOR
- 5011 EXISTING CONTOUR MINOR
- x 5048.25 EXISTING SPOT ELEVATION

NOTICE TO CONTRACTORS

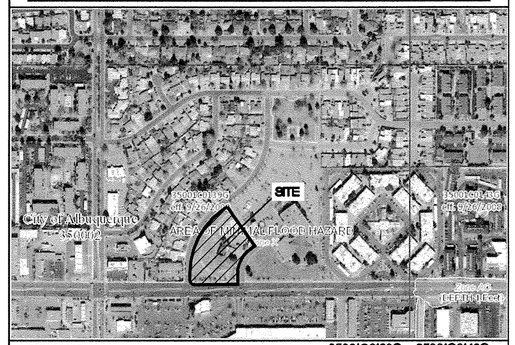
1. AN EXCAVATION/CONSTRUCTION PERMIT WILL BE REQUIRED BEFORE BEGINNING ANY WORK WITHIN CITY RIGHT–OF–WAY.
2. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED, EXCEPT AS OTHERWISE STATED OR PROVIDED HERON, SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF ALBUQUERQUE INTERIM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1985.
3. TWO WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTOR MUST CONTACT NEW MEXICO ONE CALL, DIAL "811" [OR (505) 260–1990] FOR THE LOCATION OF EXISTING UTILITIES.
4. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL CONNECTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL
5. NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.
6. BACKFILL COMPACTION SHALL BE ACCORDING TO TRAFFIC/STREET USE.
7. MAINTENANCE OF THESE FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER OF THE PROPERTY SERVED.
8. WORK ON ARTERIAL STREETS SHALL BE PERFORMED ON A 24–HOUR BASIS.
9. CONTRACTOR MUST CONTACT JASON RODRIGUEZ AT 235–8016 AND CONSTRUCTION COORDINATION AT 924–3416 TO SCHEDULE AN INSPECTION.

EROSION CONTROL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A TOPSOIL DISTURBANCE PERMIT PRIOR TO BEGINNING WORK.
2. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING RUN–OFF ON SITE DURING CONSTRUCTION.
3. CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL SEDIMENT THAT GETS INTO EXISTING RIGHT–OF–WAY.
4. REPAIR OF DAMAGED FACILITIES AND CLEANUP OF SEDIMENT ACCUMULATIONS ON ADJACENT PROPERTIES AND IN PUBLIC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. ALL EXPOSED EARTH SURFACES MUST BE PROTECTED FROM WIND AND WATER EROSION PRIOR TO FINAL (CITY) ACCEPTANCE OF ANY PROJECT.



VICINITY MAP: F-19-Z



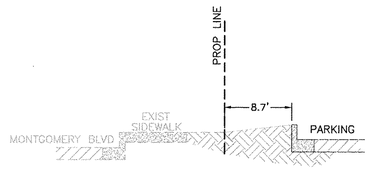
FIRM MAP: 35001C0139G – 35001C0143G

LEGAL DESCRIPTION:

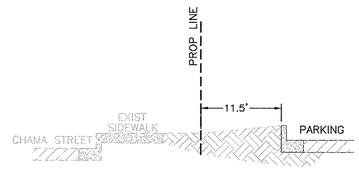
A-1-B KNAPP HEIGHTS UNIT 2

CAUTION:

ALL EXISTING UTILITIES SHOWN WERE OBTAINED FROM RESEARCH, AS–BUILTS, SURVEYS OR INFORMATION PROVIDED BY OTHERS. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO CONDUCT ALL NECESSARY FIELD INVESTIGATIONS PRIOR TO AND INCLUDING ANY EXCAVATION, TO DETERMINE THE ACTUAL LOCATION OF UTILITIES AND OTHER IMPROVEMENTS, PRIOR TO STARTING THE WORK. ANY CHANGES FROM THIS PLAN SHALL BE COORDINATED WITH AND APPROVED BY THE ENGINEER.



SECTION A-A
NTS



SECTION B-B
NTS

MONTGOMERY CHURCH OF CHRIST

ENGINEER'S SEAL

RONALD R. BOHANNAN P.E. #7868

MONTGOMERY CHURCH OF CHRIST
7201 MONTGOMERY BLVD. NE

GRADING PLAN

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DRAWN BY: BF
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2016037_GRB
SHEET #: C3
JOB #: 2016037