CITY OF ALBUQUERQUE

Richard J. Berry, Mayor

April 6, 2017

James D. Hughes, P.E.
Mark Goodwin & Associates
PO Box 90606
Albuquerque, NM, 87199

RE: Juan Tabo Hills Estates
Drainage Report- Bank Protection, Volume 2 of 3
Stamp Date: 3/15/2017
Hydrology File- M21D018; DRB# 1005278; CoA Project# 654886

Dear Mr. Hughes:

Based upon the information provided in your submittal received 3/16/17, the Drainage Report is approved for Work Order for construction of the bank protection features as shown in Project# 654886.

Final design of the outfall from the storm water quality pond may be addressed in the related Onsite Drainage Analysis Report (Volume 1 of 3). Since the submittal of this Drainage Report on 3/16/17, the following actions have been taken:

- FEMA has approved the CLOMR
- The ESC has been submitted and approved
- The Floodplain Permit has been submitted and approved
- USACE has concurred that the project (within their jurisdiction) is allowed to proceed
- The Grading and Drainage Plan has been approved for Preliminary Plat and Grading Permit.
- Work Order Sets for the bank protection features (Project# 654886) and the subdivision public improvements (Project# 654887) are in DRC, but are not yet approved.

Please inform Mr. Rudy Rael at 924-3977 prior to commencing work in the floodplain. If you have any questions, you can contact me at 924-3695.

Sincerely,

Dana Peterson, P.E.
Senior Engineer, Planning Dept.
Development Review Services

Orig: Drainage File

PO Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 09/2015)

Project Title: Juan Tabo Hills West Building Permit #: _____ City Drainage #: M-21D018

DRB#: 1005278 EPC#: 1001370 Work Order#: 654885

Legal Description: Tract A Juan Tabo Hills West/Tract 1-A-1 Juan Tabo Hills Unit 2

City Address: Juan Tabo and Tijeras Arroyo

Engineering Firm: Mark Goodwin & Associates, PA Contact: Doug Hughes

Address: PO BOX 90606, Albuquerque, NM 87199

Phone#: 505-828-2200 Fax#: _____ E-mail: doug@goodwinengineers.com

Owner: Eastland Development, Inc. Contact: Rex Wilson

Address: PO BOX 9470, Albuquerque, NM 87119

Phone#: 505-899-6768 Fax#: _____ E-mail: rwr2d2@aol.com

Architect: _____ Contact: _____

Address: _____

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

Other Contact: Aldrich Land Surveying Contact: Tim Aldrich

Address: PO BOX 30701, Albuquerque, NM 87190

Phone#: 505-328-3988 Fax#: _____ E-mail: tim.aldrich@comcast.net

Check all that Apply:

DEPARTMENT:

X HYDROLOGY/ DRAINAGE

_____ TRAFFIC/ TRANSPORTATION

_____ MS4/ EROSION & SEDIMENT CONTROL

TYPE OF SUBMITTAL:

_____ ENGINEER/ ARCHITECT CERTIFICATION

_____ CONCEPTUAL G & D PLAN

_____ GRADING PLAN

_____ DRAINAGE MASTER PLAN

_____ DRAINAGE REPORT

_____ CLOMR/LOMR

_____ TRAFFIC CIRCULATION LAYOUT (TCL)

_____ TRAFFIC IMPACT STUDY (TIS)

_____ EROSION & SEDIMENT CONTROL PLAN (ESC)

X OTHER (SPECIFY) Design Calcs for DRC Plans

CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

_____ 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

_____ PRE-DESIGN MEETING

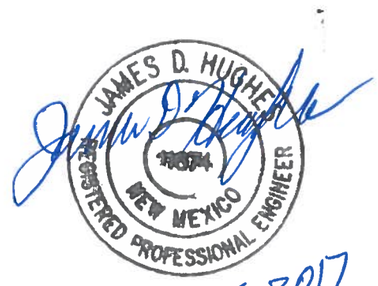
X OTHER (SPECIFY) DRC

IS THIS A RESUBMITTAL?: _____ Yes _____ No

DATE SUBMITTED: March 16, 2017 By: Doug Hughes, PE

COA STAFF: ELECTRONIC SUBMITTAL RECEIVED: ___

Juan Tabo Hills Estates
Bank Protection Report
Volume 2 of 3



3-15-2017

Prepared For:

Eastside Development Inc.
P.O. Box 9470
Albuquerque, NM 87119
(505) 899-6768

Prepared By:

Mark Goodwin & Associates, PA
PO BOX 90606
Albuquerque, NM 87199
(505) 828-2200

Contents

1. Purpose

Eastside Development Inc. owns Tract 'A' of Juan Tabo Hills West (85.1ac) and wishes to subdivide the property into about 329 single family detached residential lots role large, and tracts to be owned by the Home Owners Association for the purposes of landscaping trails and recreation. The development includes placement of fill in the existing FEMA floodplains to elevate them above the 100-year and 500-year floor elevations of the Tijeras arroyo and construction of shotcrete bank protection along the south bank of the Tijeras arroyo to prevent lateral migration of the arroyo into the development. Both the existing floodplains and the existing current limit are to be removed from the development by the placement of the fill and construction of the bank protection respectively. The Albuquerque Metropolitan Arroyo Flood Control Authority, AMAFCA, Board has approved a Turnkey Agreement to maintain the bank protection if it is designed and constructed in accordance with the AMAFCA Standard Specifications and the Erosion and Sediment Design Guide. Eastside Development Inc. hired mark Goodwin and associates to provide engineering design analysis and construction plans for bank protection along the south bank of the Tijeras arroyo to protect the development on Tract 'A' from flooding and erosion. The purpose of this report is to provide the engineering design calculations and analysis used to determine the size and location of the bank protection when the cell bank of the Tijeras arroyo so that the construction plans may be approved by AMAFCA.

2. Scope

The scope of this report is limited to engineering and design of the bank protection along the south side of the Tijeras Arroyo. Specifically, it includes scour depth calculations next to the bank protection. It does not include consideration of onsite surface drainage and storm drain design which is contained in the Juan Tabo Hills Estates Onsite Drainage Report Volume 1 of 3 with engineer's stamp dated 2-10-2016 that was approved by City Hydrology in a letter written on Feb. 24, 2016. This report does not include any hydrology or hydraulic analysis, neither for onsite nor for the Tijeras Arroyo. The arroyo hydrology and hydraulic analysis was addressed in the request for CLOMR Volume 3 of 3 which was approved in two letters from FEMA dated November 14, 2016 one addressed to the City of Albuquerque and the other addressed to the County of Bernalillo.

3. Other Reports and Approvals

The Juan Tabo Hills Estates project site covers an area of 78 acres. The site was annexed into the City of Albuquerque (COA) in 2007. The Preliminary Plat was approved by the City of Albuquerque Development Review Board on Feb. 24, 2016 and was granted a one year extension by the DRB on Jan 25, 2017.The approved preliminary plat shows the proposed development of about 350 single family residential lots with all public streets and several HOA tracts for landscaping and trails. An Amended G&D plan with engineer's stamp dated Jan. 26, 2017 shows the same streets and storm drains but shows fewer lots. The city hydrology department approved the Amended G&D Plan in a letter that was written on Feb 23, 2017 with the condition that these detailed calculations be provided prior to construction plan approval.

In addition to the above mentioned Due to the nature of this site, the project also requires bank protection of the Tijeras Arroyo, a CLOMR and a 404 Permit. These are addressed in separate volumes of this Drainage Analysis Report as listed below:

- *Volume 1 Onsite Drainage Report with engineer's stamp dated 2-10-2016* was approved by City Hydrology in a letter written on Feb. 24, 2016.
- *Volume 1 Addendum 1 (HGL)* contains detailed hydraulic analysis of the onsite storm drains, and has not yet been submitted for review. It is intended to accompany and justify the design in the On-site Construction Plans (Project No. 654887).
- *Volume 2: Bank Protection*. This volume addresses the bank protection to prevent lateral migration of the Tijeras Arroyo. The Preliminary version of this It is intended to accompany and justify the design in the Bank Protection Construction Plans (Project No. 654886).
- *Volume 3: CLOMR.* This volume addresses the fill to remove the FEMA floodplain from within the development. The CLOMR was written by FEMA on Nov. 14, 2016 Case No. 16-06-2447R.
- A Pre-Construction Notification was turned into the USACE and the NMED on June 21, 2016 for use of NWPs 7 and 13 (Outfall Structures and Bank Stabilization) as authorized under sections 404 and 401 of the Clean Water Act. The USACE letter dated July 22, 2016 verified that the activities are authorized and assigned Action No. SPA-2012-00299-ABQ.

4. Vicinity Map & Legal Description

Figure 1 below shows the location of the project site. The site is located on Zone Atlas Map M-21.

Legal Description: *Tract of land situated within Sections 33 and 34, Township 10 North, Range 4 East, New Mexico Principal Meridian, City of Albuquerque, Bernalillo County, New Mexico being all of TRACT A, JUAN TABO HILLS WEST, as the same is shown and designated on said plat filed for record in the office of the County Clerk of Bernalillo County, New Mexico on June 14, 2007 in Book 2007C, Page 161 and TRACT 1-A-1, JUAN TABO HILLS, UNIT 2, as the same is shown and designated on said plat filed for record in the office of County Clerk of Bernalillo County, New Mexico on February 20, 2008 in Book 2008C, Page 30.*

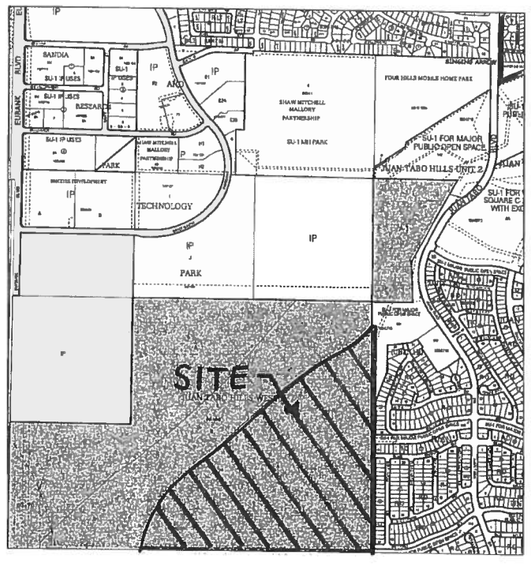
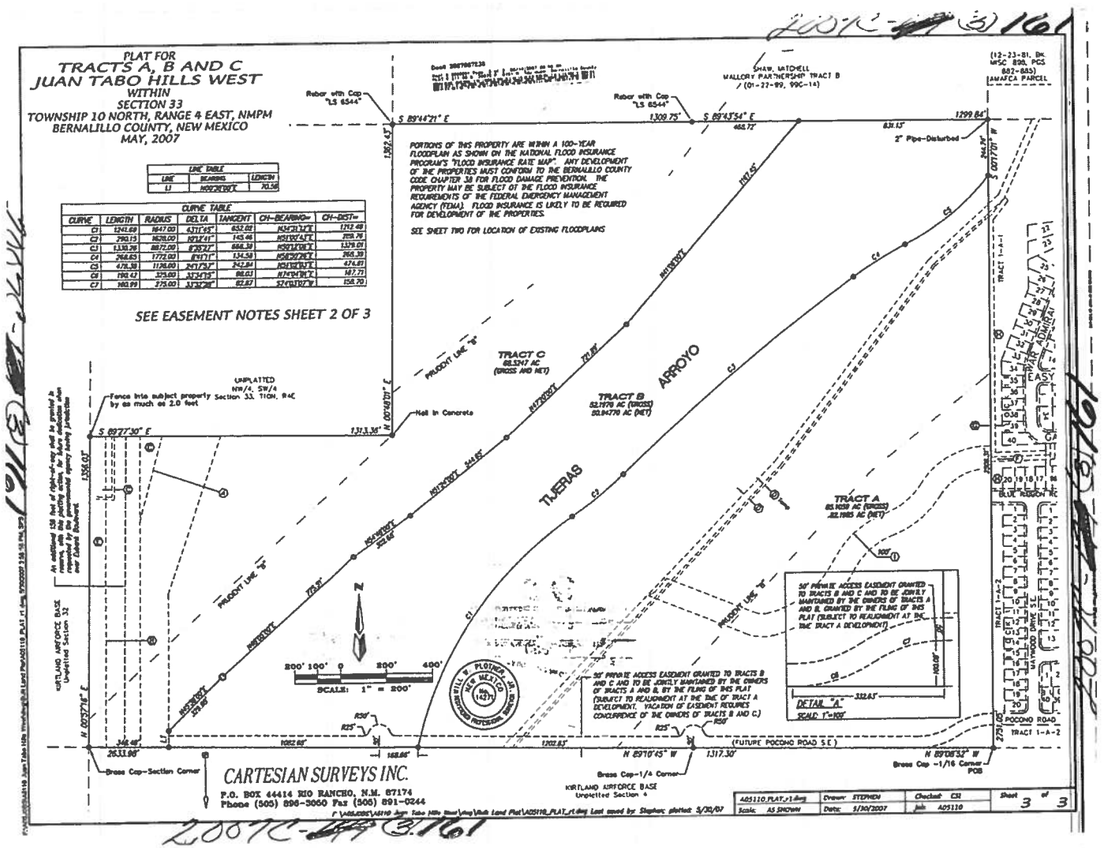


Figure 1: Vicinity Map

5. Planning History and Considerations

On February 3,1986 the Albuquerque City Council and the Board of Bernalillo County Commissioners adopted the *Facility Plan for Arroyos* (CITY, 1986) which designated this portion of the Tijeras Arroyo as a "Major Open Space Arroyo". The portion of this property that is to be dedicated to the City of Albuquerque was identified in the Development Agreement at the time of annexation. Tract B of the Juan Tabo Hills West plat (see below) will be dedicated to the City of Albuquerque, but the shotcrete does not follow the Tract B boundary, instead the shotcrete follows the edge of the existing FEMA Floodway and the of Waters of the US.



In 1990 Phase 2 of the *Tijeras Arroyo Drainage Management Plan* (Inc., 1990) included 4 potential arroyo treatment alternatives and recommended the Prudent Line (see Tract A above). The report says that development should not be allowed beyond the Prudent Line unless lateral migration is prevented by one of the other treatments.

In 2008 AMAFCA hired Resource Technologies Inc.to provide *Investigation of the Lower Tijeras Arroyo Flow Capacities* (Resource Technologies, Inc., 2008) which determined a 500-year flow rate for this stretch of the arroyo of 35,853 cfs for future developed conditions.

The 2012 Flood Insurance Study by FEMA shows a 100-year flow rate of 18,065 cfs and a 500-year flow rate of 30,500 cfs.

The current effective FEMA floodplains or based on information contained in a letter of map revision dated February 1, 2013 that became effective June 17, 2013.

6. Design Procedure

The bank protection is located as close to the arroyo as possible without placing any fill in FEMA's regulatory floodway and without any portion of the bank protection inside the jurisdictional Waters of the United States. Dirt access ramps are provided from the top of the shotcrete down into the arroyo at both the upstream and downstream ends of the shotcrete. The upstream ramp is accessible via a driveway off of Rocky Top Drive.

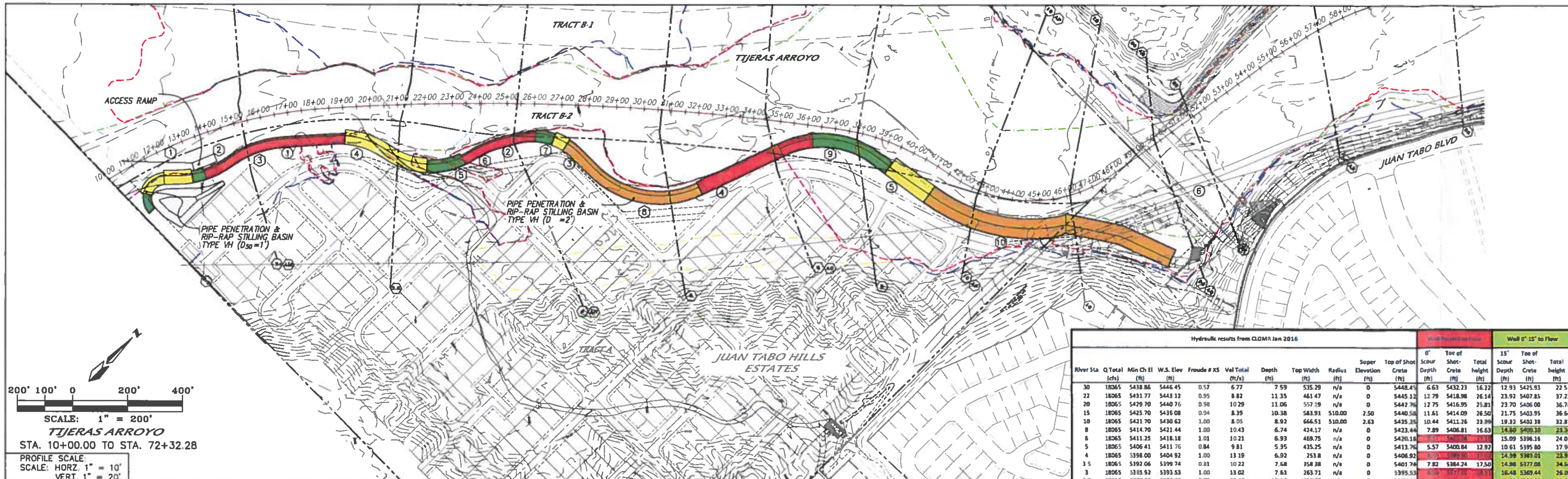
The top of the bank protection is designed to be at or above the 100-year water surface elevation, plus 2' freeboard, plus superelevation where on the outside of a curve. As a check the top of bank must also be above the water surface elevation for the 500-year design flow of 35,853 cfs for future developed conditions.

The bottom of the bank protection is designed to be at or below the scour depth elevation calculated in accordance with AMAFCA's Sediment Design Guide by Resource Consultants & Engineers Inc. March 1994. Equation 3.90 accounts for flow impacting the bank protection at an angle (Θ).

$$Y_s/Y_1 = (0.73 + 0.14\ \pi\ F_r^2)\ \cos\Theta + 4\ F_r^{0.33}\ \sin\Theta$$

The HEC-RAS summary output tables that were sent to FEMA Aug. 25, 2016 as the bases for the CLOMR Letter is in appendix 2 along with the Topo Work Maps. The results from HEC-RAS were put into an Excel spreadsheet which was used to calculate the scour depth at each cross-section for several different angles of impingement. The preliminary design that was provided with the Preliminary Plat application to the DRB Feb 9, 2016 is in appendix 1. Scour, freeboard, and super-elevation calculations are calculated below using the final version of HEC-RAS sent to FEMA, with little to no change to the preliminary design that was submitted to the DRB at the time of Preliminary Plat approval. The only significant change is at section 2.9 where FEMA required that the extra sections that were added to model the Kirtland AFB fence be removed, so the final version of the HEC-RAS shows the 100-year water surface elevation 2.94' lower at the downstream end.

Hydraulic results from CLOMR August 2016											Wall Paralell to Flow			Wall 0°-15° to Flow			Wall 15°-30° to Flow			Wall Perpendicular to Flow			Wall 30°-45° to Flow		
River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Froude # XS	Vel Total (ft/s)	Depth (ft)	Top Width (ft)	Radius (ft)	Super Elevation (ft)	Top of Shot-Crete (ft)	0° Scour Depth (ft)	Toe of Shot-Crete (ft)	Total height (ft)	15° Scour Depth (ft)	Toe of Shot-Crete (ft)	Total height (ft)	30° Scour Depth (ft)	Toe of Shot-Crete (ft)	Total height (ft)	90° Scour Depth (ft)	Toe of Shot-Crete (ft)	Total height (ft)	45° Scour Depth (ft)	Toe of Shot-Crete (ft)	Total height (ft)
30	18065	5438.86	5446.45	0.57	6.77	4.98	535.29	n/a	0	5448.45	4.35	5434.51	13.94	8.49	5430.37	18.08	12.04	5426.82	21.63	16.55	5422.31	26.14	14.77	5424.09	24.36
22	18065	5431.77	5443.12	0.95	8.82	4.44	461.47	n/a	0	5445.12	5.00	5426.77	18.35	9.36	5422.41	22.71	13.06	5418.71	26.41	17.46	5414.31	30.81	15.89	5415.88	29.24
20	18065	5429.70	5440.76	0.98	10.29	5.18	557.19	n/a	0	5442.76	5.97	5423.73	19.03	11.10	5418.60	24.16	15.46	5414.24	28.52	20.58	5409.12	33.64	18.78	5410.92	31.84
15	18065	5425.70	5436.08	0.94	8.39	3.69	583.91	510.00	2.50	5440.58	4.13	5421.57	19.01	7.73	5417.97	22.62	10.81	5414.89	25.69	14.46	5411.24	29.34	13.14	5412.56	28.03
10	18065	5421.70	5430.64	1.01	7.99	3.39	667.00	510.00	2.59	5435.23	4.00	5417.70	17.53	7.38	5414.32	20.92	10.26	5411.44	23.80	13.60	5408.10	27.14	12.45	5409.25	25.98
8	18065	5415.70	5421.51	0.99	10.27	4.13	426.24	n/a	0	5423.51	4.80	5410.90	12.61	8.90	5406.80	16.71	12.39	5403.31	20.20	16.47	5399.23	24.28	15.03	5400.67	22.84
6	18065	5411.25	5418.21	1.00	10.11	3.80	470.15	n/a	0	5420.21	4.45	5406.80	13.41	8.23	5403.02	17.19	11.45	5399.80	20.41	15.20	5396.05	24.16	13.89	5397.36	22.85
5	18065	5406.41	5411.79	0.83	9.73	4.26	435.54	n/a	0	5413.79	4.40	5402.01	11.78	8.40	5398.01	15.78	11.82	5394.59	19.20	16.02	5390.39	23.40	14.44	5391.97	21.82
4	18065	5398.00	5404.92	1.00	13.20	5.39	253.80	n/a	0	5406.92	6.31	5391.69	15.23	11.68	5386.32	20.60	16.24	5381.76	25.16	21.56	5376.44	30.48	19.70	5378.30	28.62
3.5	18065	5392.06	5399.74	0.81	10.22	4.93	358.38	n/a	0	5401.74	5.02	5387.04	14.70	9.62	5382.44	19.30	13.55	5378.51	23.23	18.40	5373.66	28.08	16.56	5375.50	26.24
3	18065	5385.92	5393.53	1.00	13.02	5.26	263.71	n/a	0	5395.53	6.15	5379.77	15.76	11.39	5374.53	21.00	15.85	5370.07	25.46	21.04	5364.88	30.65	19.23	5366.69	28.84
2.9	18065	5378.85	5389.00	0.73	10.46	6.38	1326.78	n/a	0	5391.00	6.15	5372.70	18.30	11.90	5366.95	24.05	16.83	5362.02	28.98	23.00	5355.85	35.15	20.62	5358.23	32.77



CURVE DATA – TOP OF SHOTCRETE

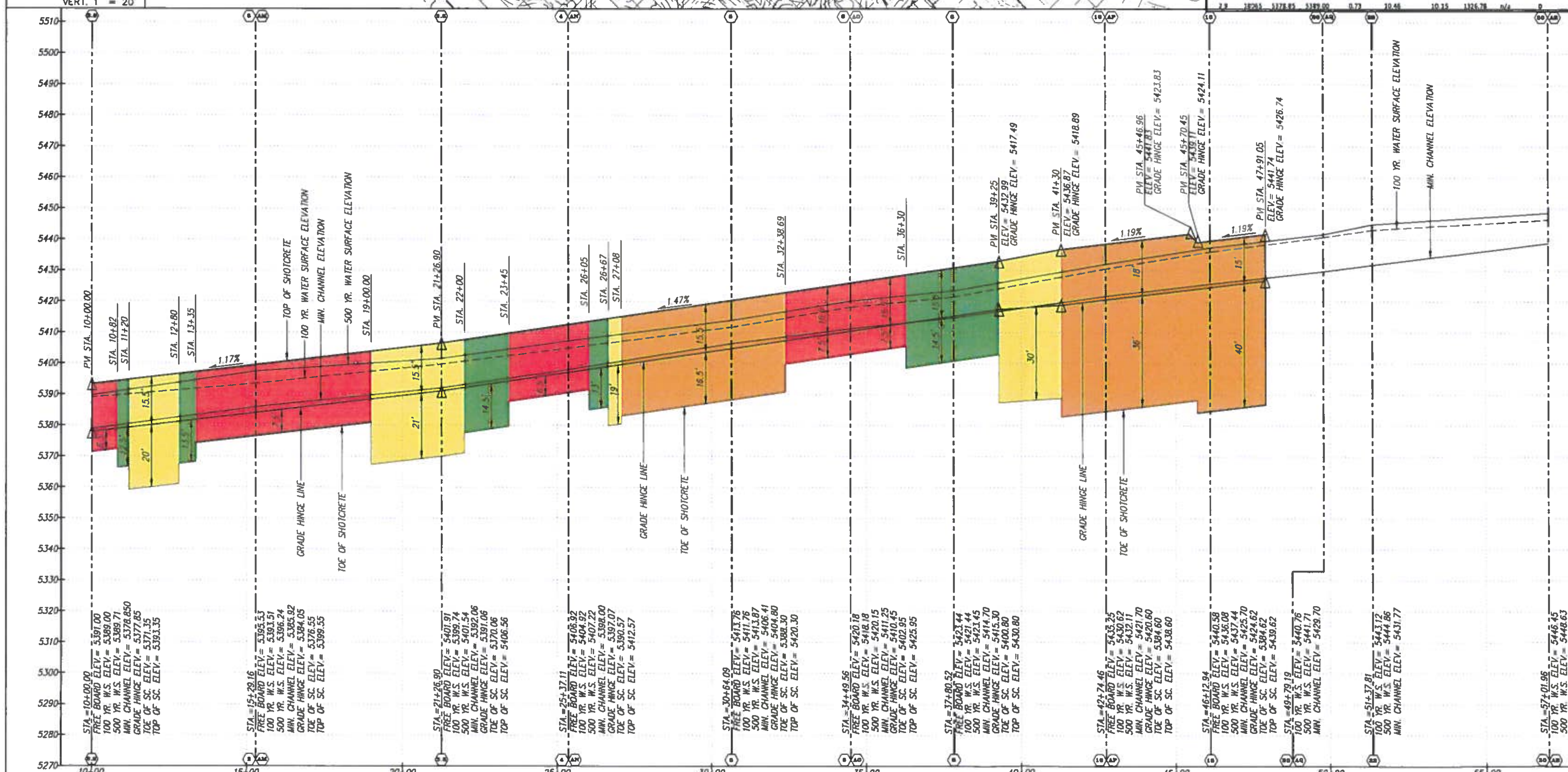
Curve	Δ	L	R	Tan
1	30°08'26"	184.12	350.00	94.24
2	37°55'34"	231.68	350.00	120.26
3	32°21'15"	197.64	350.00	101.53
4	38°49'36"	186.36	275.00	96.92
5	68°09'28"	356.87	300.00	202.95
6	17°51'44"	93.53	300.00	47.15
7	60°36'42"	222.15	210.00	122.74
8	70°27'14"	448.82	365.00	257.74
9	61°03'59"	322.21	302.32	178.31
10	33°54'37"	383.52	648.00	197.56
11	17°56'44"	191.37	611.00	96.47

LINE DATA – TOP OF SHOTCRETE

Line	Bearing	Length
1	N41°08'27"E	185.211'
2	N29°40'19"E	69.74'
3	S89°42'59"E	79.46'
4	N19°49'46"E	338.81'
5	N81°09'26"E	251.48'
6	N25°04'21"E	468.37'

Hydraulic results from CLOMR Jan 2016

River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Froude # XS	Vel Total (ft/s)	Depth (ft)	Top Width (ft)	Radius (ft)	Super Elevation (ft)	Top of Shot Crete (ft)	Wall Parallel to Flow: 0° Scour Depth (ft)	Toe of Shot-Crete (ft)	Total height (ft)	Wall 0°-15° to Flow: 15° Scour Depth (ft)	Toe of Shot-Crete (ft)	Total height (ft)	Wall 15°-30° to Flow: 30° Scour Depth (ft)	Toe of Shot-Crete (ft)	Total height (ft)	Wall Perpendicular to Flow: 90° Scour Depth (ft)	Toe of Shot Crete (ft)	Total height (ft)	Wall 30°-45° to Flow: 45° Scour Depth (ft)	Toe of Shot-Crete (ft)	Total height (ft)
30	18065	5438.86	5446.45	0.57	6.77	7.59	535.29	n/a	0	5448.45	6.63	5432.23	16.22	12.93	5425.93	22.52	18.35	5420.51	27.94	25.22	5413.64	34.81	22.52	5416.34	32.11
22	18065	5431.77	5443.12	0.95	8.82	11.35	461.47	n/a	0	5445.12	12.79	5418.98	26.14	23.92	5407.85	37.27	33.40	5398.37	46.75	44.64	5387.13	57.99	40.61	5391.16	53.96
20	18065	5429.70	5440.76	0.98	10.29	11.06	557.19	n/a	0	5442.76	12.75	5416.95	25.81	23.70	5406.00	36.76	33.01	5396.69	46.07	43.95	5385.75	57.01	40.09	5389.61	53.15
15	18065	5425.70	5436.08	0.94	8.39	10.38	583.91	510.00	2.50	5440.58	11.61	5414.09	26.50	21.75	5403.95	36.64	30.40	5395.30	45.28	40.68	5385.02	55.56	36.98	5388.72	51.86
10	18065	5421.70	5430.62	1.00	8.05	8.92	666.51	510.00	2.63	5435.25	10.44	5411.26	23.09	19.32	5402.38	32.87	26.88	5394.82	40.43	35.68	5386.02	49.23	32.61	5389.09	46.16
8	18065	5414.70	5421.44	1.00	10.43	6.74	424.17	n/a	0	5423.44	7.89	5406.81	16.63	14.60	5400.10	23.34	20.31	5394.39	29.05	26.96	5387.74	35.70	24.64	5390.06	33.38
6	18065	5411.25	5418.18	1.01	10.21	6.93	469.75	n/a	0	5420.18	[illegible]	[illegible]	[illegible]	15.09	5396.16	24.02	20.98	5390.27	29.91	27.81	5383.44	36.74	25.44	5385.81	34.37
5	18065	5406.41	5411.76	0.84	9.81	5.35	435.25	n/a	0	5413.76	5.57	5400.84	12.92	10.61	5395.80	17.96	14.92	5391.49	22.27	20.20	5386.21	27.55	18.22	5388.19	25.57
4	18065	5398.00	5404.92	1.00	13.19	6.92	253.8	n/a	0	5406.92	[illegible]	[illegible]	[illegible]	14.99	5383.01	23.91	20.85	5377.15	29.77	27.68	5370.32	36.60	25.30	5372.70	34.22
3.5	18065	5392.06	5399.74	0.81	10.22	7.68	358.38	n/a	0	5401.74	7.82	5384.24	17.50	14.98	5377.08	34.66	21.10	5370.96	30.78	28.66	5363.40	38.34	25.79	5366.27	35.47
3	18065	5385.92	5393.53	1.00	13.02	7.61	263.71	n/a	0	5395.53	[illegible]	[illegible]	[illegible]	16.48	5369.44	26.09	22.93	5362.99	32.54	30.44	5355.48	40.05	27.82	5358.10	37.43
2.9	18065	5378.85	5389.00	0.73	10.46	10.15	1326.78	n/a	0	5391.00	[illegible]	[illegible]	21.94	18.93	5359.92	31.08	26.78	5352.07	38.93	36.60	5342.25	48.75	32.80	5346.05	44.93



NOTES

1. CONCEPTUAL DESIGN IS BASED ON HEC-RES MODEL OF REVISED FEMA FLOOD PLAINS FOR THIS PROJECT WITH FLOW RATES: FEMA Q = 18,065 cfs, FEMA Q = 30,500 cfs AND FUTURE Q = 35,853 cfs.
2. CURRENT EFFECTIVE FEMA FLOOD PLAINS ARE BASED ON A INFORMATION CONTAINED IN A LETTER OF MAP REVISION, LOMR, DATED FEB. 1, 2013 THAT BECAME EFFECTIVE JUNE 17, 2013.
3. THE BANK PROTECTION IS LOCATED AS CLOSE TO THE ARROYO AS POSSIBLE WITHOUT PLACING ANY FILL IN FEMA'S REGULATORY FLOODWAY AND WITHOUT ANY OF THE BANK PROTECTION INSIDE THE TIJERAS ARROYO JURISDICTIONAL WATERS OF THE UNITED STATES.
4. THE LOCATION OF THE WATERS OF THE UNITED STATES ARE FROM A DELINEATION REPORT BY ECOSYSTEM MANAGEMENT INC. FEB. 2014 AS SUBMITTED TO THE CORPS OF ENGINEERS FOR APPROVED JURISDICTIONAL DETERMINATION MARCH 7, 2014.
5. THE 500 YR WATER SURFACE ELEVATIONS SHOWN IN THE PROFILE ARE BASED ON THE FUTURE FLOW OF 35,853 cfs FOR DESIGN.
6. CONCEPTUAL SCOUR DEPTHS ARE CALCULATED IN ACCORDANCE WITH AMAFCA'S EROSION DESIGN GUIDE BY RESOURCE CONSULTANTS & ENGINEERS, INC. MARCH 1994, EQUATION (3.90) $Y_s / Y = (0.73 + 0.14 \pi Fr^2)\cos\theta + 4Fr^{0.33}\sin\theta$

LEGEND

- LIMITS 100 YEAR FLOOD PLAIN
- LIMITS 500 YEAR FLOOD PLAIN
- LIMITS OF FLOODWAY
- LIMITS AO ZONE
- BANK PROTECTION WITH IMPINGING FLOW ANGLE OF = 30° TO 45°
- BANK PROTECTION WITH IMPINGING FLOW ANGLE OF = 30° TO 15°
- BANK PROTECTION WITH IMPINGING FLOW ANGLE OF = 15° TO 0°
- BANK PROTECTION WITH PARALLEL FLOW
- EXISTING SOIL CEMENT BANK PROTECTION
- MITIGATION 0.5 ac SWQ POND

JUAN TABO HILLS ESTATES - OCTOBER 2015

PRELIMINARY
TIJERAS ARROYO BANK PROTECTION

dmg MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
(505)828-2200, FAX (505)797-9539

Designed: JDH	Drawn: ACH	Checked: DMG	Sheet 1 of 1
Scale: 1" = 100'	Date: 02/10/16	Job: A10029	

HEC-RAS Plan: RevFP2016-08-30 River: Tijeras Arroyo Reach: 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2.9	PF 1	6285.00	5378.85	5385.70	5383.87	5386.40	0.003296	6.69	939.65	978.15	0.55
1	2.9	PF 2	14300.00	5378.85	5388.00	5386.58	5389.48	0.005241	9.77	1463.77	1305.05	0.72
1	2.9	PF 3	18065.00	5378.85	5389.00	5387.48	5390.70	0.005150	10.46	1727.69	1326.78	0.73
1	2.9	PF 4	30500.00	5378.85	5391.80	5390.03	5394.10	0.004433	12.16	2508.35	1674.57	0.72
1	2.9	PF 5	35853.00	5378.85	5391.80	5390.81	5394.97	0.006126	14.29	2508.35	1674.57	0.84
1	3	PF 1	6285.00	5385.92	5390.24	5390.24	5391.84	0.012423	10.15	619.07	194.90	1.00
1	3	PF 2	14300.00	5385.92	5392.68	5392.68	5395.01	0.011068	12.25	1167.42	253.59	1.01
1	3	PF 3	18065.00	5385.92	5393.53	5393.53	5396.17	0.010492	13.02	1387.13	263.71	1.00
1	3	PF 4	30500.00	5385.92	5396.24	5396.24	5399.33	0.008021	14.14	2246.82	520.47	0.92
1	3	PF 5	35853.00	5385.92	5397.46	5397.46	5400.27	0.006243	13.73	2990.54	680.95	0.83
1	3.5	PF 1	6285.00	5392.06	5396.73		5397.73	0.007826	8.02	783.65	248.04	0.80
1	3.5	PF 2	14300.00	5392.06	5399.00		5400.40	0.007238	9.49	1506.26	348.78	0.81
1	3.5	PF 3	18065.00	5392.06	5399.74		5401.36	0.007036	10.22	1767.14	358.38	0.81
1	3.5	PF 4	30500.00	5392.06	5401.54	5400.93	5404.00	0.007374	12.57	2425.82	373.16	0.87
1	3.5	PF 5	35853.00	5392.06	5401.71	5401.63	5404.93	0.009382	14.40	2490.44	374.55	0.98
1	4	PF 1	6285.00	5398.00	5402.10	5402.10	5403.49	0.013144	9.44	665.56	244.72	1.01
1	4	PF 2	14300.00	5398.00	5404.11	5404.11	5406.46	0.010897	12.33	1162.42	251.17	1.00
1	4	PF 3	18065.00	5398.00	5404.92	5404.92	5407.64	0.010216	13.25	1368.91	253.80	1.00
1	4	PF 4	30500.00	5398.00	5407.23	5407.23	5411.03	0.009117	15.68	1962.00	261.21	1.00
1	4	PF 5	35853.00	5398.00	5408.06	5408.06	5412.32	0.009002	16.60	2181.88	264.71	1.00
1	5	PF 1	6285.00	5406.41	5409.59		5410.32	0.009406	6.89	918.47	414.26	0.82
1	5	PF 2	14300.00	5406.41	5411.14		5412.43	0.008461	9.20	1576.38	429.84	0.85
1	5	PF 3	18065.00	5406.41	5411.79		5413.27	0.007975	9.88	1856.32	435.54	0.85
1	5	PF 4	30500.00	5406.41	5413.92		5415.78	0.006182	11.09	2802.61	458.37	0.79
1	5	PF 5	35853.00	5406.41	5414.93		5416.80	0.005488	11.11	3287.39	489.81	0.76
1	6	PF 1	6285.00	5411.25	5415.47	5415.47	5416.79	0.012097	9.50	709.30	293.35	0.98
1	6	PF 2	14300.00	5411.25	5417.63	5417.63	5419.28	0.009537	10.95	1515.46	463.85	0.93
1	6	PF 3	18065.00	5411.25	5418.21	5418.21	5420.11	0.009437	11.85	1786.73	470.15	0.95
1	6	PF 4	30500.00	5411.25	5419.49	5419.49	5422.48	0.011281	15.12	2393.99	484.68	1.07
1	6	PF 5	35853.00	5411.25	5420.91	5420.91	5423.42	0.007420	14.10	3237.97	631.31	0.90
1	8	PF 1	6285.00	5415.70	5419.31	5419.07	5420.26	0.008475	8.75	896.16	357.57	0.84
1	8	PF 2	14300.00	5415.70	5420.92	5420.79	5422.63	0.009770	12.08	1512.97	407.80	0.96

HEC-RAS Plan: RevFP2016-08-30 River: Tijeras Arroyo Reach: 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	8	PF 3	18065.00	5415.70	5421.51	5421.46	5423.53	0.010142	13.23	1759.76	426.24	0.99
1	8	PF 4	30500.00	5415.70	5423.59	5423.50	5425.91	0.008344	14.75	2877.03	644.82	0.94
1	8	PF 5	35853.00	5415.70	5424.52	5424.52	5426.83	0.007424	15.03	3494.23	674.00	0.91
1	10	PF 1	6285.00	5421.70	5426.05	5426.05	5428.03	0.012400	11.75	569.07	147.05	1.04
1	10	PF 2	14300.00	5421.70	5430.02	5430.02	5431.60	0.004858	11.26	1850.37	654.59	0.72
1	10	PF 3	18065.00	5421.70	5430.64	5430.64	5432.35	0.005078	12.14	2260.79	667.00	0.75
1	10	PF 4	30500.00	5421.70	5432.16	5432.16	5434.32	0.005783	14.52	3279.73	677.66	0.82
1	10	PF 5	35853.00	5421.70	5432.67	5432.67	5435.04	0.006074	15.40	3630.87	680.49	0.85
1	15	PF 1	6285.00	5425.70	5434.01	5434.01	5435.04	0.005446	9.01	1014.41	489.45	0.71
1	15	PF 2	14300.00	5425.70	5435.54	5435.54	5437.01	0.006767	11.75	1843.57	581.06	0.83
1	15	PF 3	18065.00	5425.70	5436.08	5436.08	5437.72	0.007082	12.69	2154.44	583.91	0.86
1	15	PF 4	30500.00	5425.70	5437.44	5437.44	5439.73	0.008156	15.38	2955.14	591.18	0.95
1	15	PF 5	35853.00	5425.70	5438.02	5438.02	5440.49	0.008127	16.07	3298.68	594.26	0.96
1	20	PF 1	6285.00	5429.70	5436.35	5436.35	5438.63	0.009735	12.14	529.94	292.80	0.95
1	20	PF 2	14300.00	5429.70	5439.92	5439.92	5442.11	0.005521	13.05	1477.80	534.02	0.78
1	20	PF 3	18065.00	5429.70	5440.76	5440.76	5443.22	0.005725	14.13	1755.36	557.19	0.81
1	20	PF 4	30500.00	5429.70	5441.71	5441.71	5443.13	0.003918	12.46	3721.30	587.60	0.68
1	20	PF 5	35853.00	5429.70	5441.71	5441.71	5443.68	0.005414	14.65	3721.30	587.60	0.80
1	22	PF 1	6285.00	5431.77	5439.46	5439.46	5441.37	0.007757	11.34	641.98	227.05	0.86
1	22	PF 2	14300.00	5431.77	5442.40	5442.40	5444.24	0.005313	12.55	1717.90	449.89	0.77
1	22	PF 3	18065.00	5431.77	5443.12	5443.12	5445.12	0.005454	13.45	2048.62	461.47	0.79
1	22	PF 4	30500.00	5431.77	5444.86	5444.86	5447.52	0.006258	16.19	2861.54	475.69	0.87
1	22	PF 5	35853.00	5431.77	5445.48	5445.48	5448.42	0.006521	17.16	3160.92	480.83	0.90
1	30	PF 1	6285.00	5438.86	5443.54		5443.92	0.002677	4.97	1271.58	379.71	0.47
1	30	PF 2	14300.00	5438.86	5445.67		5446.36	0.002590	6.75	2256.71	518.34	0.51
1	30	PF 3	18065.00	5438.86	5446.45		5447.26	0.002571	7.35	2667.02	535.29	0.52
1	30	PF 4	30500.00	5438.86	5448.63		5449.75	0.002489	8.81	3902.46	597.23	0.53
1	30	PF 5	35853.00	5438.86	5449.45		5450.66	0.002438	9.26	4391.45	603.78	0.54
1	35	PF 1	6285.00	5445.97	5449.21	5449.21	5450.35	0.013655	8.54	738.47	338.32	1.00
1	35	PF 2	14300.00	5445.97	5451.01	5451.01	5452.65	0.009346	10.45	1493.63	524.86	0.91
1	35	PF 3	18065.00	5445.97	5451.70	5451.70	5453.45	0.008305	10.93	1873.28	577.04	0.88
1	35	PF 4	30500.00	5445.97	5453.23	5453.23	5455.53	0.007970	12.90	2771.76	596.85	0.91

HEC-RAS Plan: RevFP2016-08-30 River: Tijeras Arroyo Reach: 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	35	PF 5	35853.00	5445.97	5453.77	5453.77	5456.31	0.008034	13.67	3090.36	603.53	0.92
1	40	PF 1	6285.00	5452.50	5455.80	5455.53	5456.74	0.009502	8.46	857.98	346.37	0.87
1	40	PF 2	14300.00	5452.50	5457.27	5457.27	5459.16	0.011445	12.19	1392.70	374.95	1.02
1	40	PF 3	18065.00	5452.50	5457.93	5457.93	5460.10	0.011092	13.17	1642.55	383.35	1.03
1	40	PF 4	30500.00	5452.50	5459.77	5459.77	5462.75	0.010440	15.71	2370.22	408.72	1.05
1	40	PF 5	35853.00	5452.50	5460.50	5460.50	5463.75	0.010071	16.50	2670.42	418.74	1.05
1	41	PF 1	6285.00	5452.70	5457.90	5457.83	5458.96	0.012580	8.27	759.90	330.38	0.96
1	41	PF 2	14300.00	5452.70	5459.54	5459.48	5461.39	0.010778	10.91	1321.74	365.78	0.97
1	41	PF 3	18065.00	5452.70	5460.17	5460.17	5462.33	0.010390	11.83	1554.60	373.62	0.98
1	41	PF 4	30500.00	5452.70	5461.99	5461.99	5464.99	0.009307	14.02	2243.44	380.79	0.98
1	41	PF 5	35853.00	5452.70	5462.68	5462.68	5466.01	0.009058	14.80	2505.03	383.48	0.98
1	42	PF 1	6285.00	5457.70	5463.17	5463.17	5464.71	0.004026	9.94	632.46	204.91	1.00
1	42	PF 2	14300.00	5457.70	5465.48	5465.48	5468.00	0.003406	12.74	1122.79	295.89	0.99
1	42	PF 3	18065.00	5457.70	5466.37	5466.37	5469.27	0.003217	13.68	1320.87	321.46	0.99
1	42	PF 4	30500.00	5457.70	5468.84	5468.84	5472.94	0.002927	16.25	1876.83	346.61	1.00
1	42	PF 5	35853.00	5457.70	5469.81	5469.81	5474.34	0.002821	17.09	2097.86	350.22	1.00
1	43	PF 1	6285.00	5458.43	5463.44	5463.44	5465.02	0.004150	10.08	623.72	202.03	1.01
1	43	PF 2	14300.00	5458.43	5465.73	5465.73	5468.39	0.003488	13.08	1093.53	208.89	1.01
1	43	PF 3	18065.00	5458.43	5466.66	5466.66	5469.71	0.003280	14.01	1289.64	211.68	1.00
1	43	PF 4	30500.00	5458.43	5469.26	5469.26	5473.48	0.002976	16.49	1849.74	219.47	1.00
1	43	PF 5	35853.00	5458.43	5470.22	5470.22	5474.92	0.002922	17.39	2062.13	222.35	1.01
1	43.5		Bridge									
1	44	PF 1	6285.00	5459.03	5465.75	5464.07	5466.42	0.001012	6.59	953.47	201.23	0.53
1	44	PF 2	14300.00	5459.03	5469.13	5466.38	5470.30	0.000905	8.68	1648.41	209.63	0.55
1	44	PF 3	18065.00	5459.03	5470.45	5467.30	5471.81	0.000882	9.38	1926.52	212.90	0.55
1	44	PF 4	30500.00	5459.03	5474.15	5469.95	5476.09	0.000840	11.16	2733.05	222.12	0.56
1	44	PF 5	35853.00	5459.03	5475.55	5470.96	5477.70	0.000831	11.78	3044.67	225.57	0.56
1	45	PF 1	6285.00	5459.31	5465.78		5466.48	0.001144	6.74	932.84	209.35	0.56
1	45	PF 2	14300.00	5459.31	5469.20		5470.35	0.000921	8.58	1667.63	219.57	0.55
1	45	PF 3	18065.00	5459.31	5470.56		5471.87	0.000873	9.18	1967.23	223.61	0.55
1	45	PF 4	30500.00	5459.31	5474.38		5476.17	0.000787	10.72	2844.41	235.02	0.54

HEC-RAS Plan: RevFP2016-08-30 River: Tijeras Arroyo Reach: 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	45	PF 5	35853.00	5459.31	5475.82		5477.79	0.000766	11.25	3186.86	239.33	0.54
1	46	PF 1	6285.00	5464.70	5467.93	5467.93	5468.93	0.013962	8.54	822.77	419.66	1.01
1	46	PF 2	14300.00	5464.70	5469.82		5471.14	0.008426	10.00	1626.13	431.94	0.87
1	46	PF 3	18065.00	5464.70	5471.48		5472.48	0.004154	8.80	2350.02	442.71	0.65
1	46	PF 4	30500.00	5464.70	5475.76		5476.67	0.001897	8.61	4403.60	563.76	0.48
1	46	PF 5	35853.00	5464.70	5477.43		5478.27	0.001442	8.32	5352.24	569.82	0.43
1	50	PF 1	6285.00	5470.50	5473.43	5473.00	5474.09	0.008770	7.15	999.17	435.44	0.81
1	50	PF 2	14300.00	5470.50	5474.51	5474.43	5476.09	0.013163	11.22	1486.44	467.05	1.06
1	50	PF 3	18065.00	5470.50	5474.98	5474.98	5476.91	0.013699	12.44	1709.36	490.91	1.10
1	50	PF 4	30500.00	5470.50	5476.69	5476.69	5479.06	0.010753	14.00	2633.54	550.00	1.04
1	50	PF 5	35853.00	5470.50	5477.85		5479.96	0.007555	13.28	3277.31	557.92	0.90
1	51	PF 1	6285.00	5472.30	5475.02	5475.02	5476.01	0.013934	8.26	815.52	428.33	1.00
1	51	PF 2	14300.00	5472.30	5476.48	5476.48	5478.09	0.011514	10.65	1493.76	538.32	0.99
1	51	PF 3	18065.00	5472.30	5477.14	5477.14	5478.86	0.009990	11.11	1859.11	560.38	0.95
1	51	PF 4	30500.00	5472.30	5478.60	5478.60	5480.94	0.009509	13.20	2691.69	581.25	0.97
1	51	PF 5	35853.00	5472.30	5479.16	5479.16	5481.72	0.009275	13.88	3020.13	588.32	0.98
1	52	PF 1	6285.00	5474.70	5477.65	5477.65	5478.50	0.014036	7.75	904.17	573.86	0.99
1	52	PF 2	14300.00	5474.70	5478.90	5478.90	5480.22	0.011774	9.93	1664.71	637.37	0.98
1	52	PF 3	18065.00	5474.70	5479.36	5479.36	5480.88	0.011441	10.71	1961.79	654.39	0.99
1	52	PF 4	30500.00	5474.70	5480.69	5480.69	5482.75	0.010433	12.61	2868.44	706.69	1.00
1	52	PF 5	35853.00	5474.70	5481.18	5481.18	5483.44	0.010201	13.27	3215.03	717.06	1.00
1	54	PF 1	6285.00	5476.70	5479.90		5480.43	0.008696	6.87	1239.89	826.42	0.80
1	54	PF 2	14300.00	5476.70	5481.15		5481.86	0.007114	8.31	2406.46	995.69	0.78
1	54	PF 3	18065.00	5476.70	5481.67		5482.42	0.006302	8.57	2931.72	1015.02	0.75
1	54	PF 4	30500.00	5476.70	5483.21		5484.05	0.004726	9.20	4511.04	1038.67	0.68
1	54	PF 5	35853.00	5476.70	5483.81		5484.69	0.004361	9.45	5130.39	1047.47	0.67
1	60	PF 1	6285.00	5486.70	5488.90	5488.90	5489.53	0.017064	7.00	1048.38	855.42	1.04
1	60	PF 2	14300.00	5486.70	5489.83	5489.83	5490.85	0.014366	9.00	1890.74	951.01	1.03
1	60	PF 3	18065.00	5486.70	5490.18	5490.18	5491.35	0.014036	9.74	2224.19	986.30	1.05
1	60	PF 4	30500.00	5486.70	5491.20	5491.20	5492.75	0.012267	11.29	3276.88	1049.57	1.03
1	60	PF 5	35853.00	5486.70	5491.55	5491.55	5493.27	0.012111	11.91	3646.54	1056.30	1.04

HEC-RAS Plan: RevFP2016-08-30 River: Tijeras Arroyo Reach: 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	70	PF 1	6285.00	5503.70	5506.87	5506.87	5507.68	0.009997	8.17	1034.92	627.11	0.88
1	70	PF 2	14300.00	5503.70	5508.06	5508.06	5509.33	0.010494	10.71	1835.36	712.74	0.96
1	70	PF 3	18065.00	5503.70	5508.52	5508.52	5509.96	0.010469	11.52	2167.14	745.35	0.98
1	70	PF 4	30500.00	5503.70	5509.73	5509.73	5511.64	0.010329	13.50	3094.32	774.25	1.01
1	70	PF 5	35853.00	5503.70	5510.20	5510.20	5512.27	0.010194	14.15	3455.13	781.40	1.02

HEC-RAS Plan: RevFP2016-08-30 River: Tijeras Arroyo Reach: 1

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
1	2.9	PF 1	5386.40	5385.70	0.69				6285.00		978.15
1	2.9	PF 2	5389.48	5388.00	1.48				14300.00		1305.05
1	2.9	PF 3	5390.70	5389.00	1.70				18065.00		1326.78
1	2.9	PF 4	5394.10	5391.80	2.30				30500.00		1674.57
1	2.9	PF 5	5394.97	5391.80	3.17				35853.00		1674.57
1	3	PF 1	5391.84	5390.24	1.60	3.06	0.27		6285.00		194.90
1	3	PF 2	5395.01	5392.68	2.33	3.91	0.25		14300.00		253.59
1	3	PF 3	5396.17	5393.53	2.63	3.79	0.28		18065.00		263.71
1	3	PF 4	5399.33	5396.24	3.09	3.11	0.24		30323.91	176.09	520.47
1	3	PF 5	5400.27	5397.46	2.81	3.34	0.04		34365.71	1487.29	680.95
1	3.5	PF 1	5397.73	5396.73	1.00	5.83	0.06		6285.00		248.04
1	3.5	PF 2	5400.40	5399.00	1.40	5.30	0.09		14300.00		348.78
1	3.5	PF 3	5401.36	5399.74	1.62	5.10	0.10		18065.00		358.38
1	3.5	PF 4	5404.00	5401.54	2.45	4.61	0.06		30500.00		373.16
1	3.5	PF 5	5404.93	5401.71	3.22	4.54	0.12		35853.00		374.55
1	4	PF 1	5403.49	5402.10	1.38	4.09	0.12		6285.00		244.72
1	4	PF 2	5406.46	5404.11	2.36	3.60	0.29	11.68	14288.31		251.17
1	4	PF 3	5407.64	5404.92	2.72	3.45	0.33	28.65	18036.35		253.80
1	4	PF 4	5411.03	5407.23	3.80	3.35	0.40	135.33	30364.67		261.21
1	4	PF 5	5412.32	5408.06	4.26	3.77	0.31	201.91	35651.09		264.71
1	5	PF 1	5410.32	5409.59	0.73	6.77	0.07	455.97	5829.03		414.26
1	5	PF 2	5412.43	5411.14	1.29	5.86	0.11	861.02	13438.98		429.84
1	5	PF 3	5413.27	5411.79	1.48	5.51	0.12	1046.19	17018.81		435.54
1	5	PF 4	5415.78	5413.92	1.86	4.55	0.19	1665.75	28834.25		458.37
1	5	PF 5	5416.80	5414.93	1.87	4.24	0.24	1974.64	33878.36		489.81
1	6	PF 1	5416.79	5415.47	1.33	4.52	0.18	537.84	5645.20	101.97	293.35
1	6	PF 2	5419.28	5417.63	1.65	3.81	0.11	1192.28	11769.25	1338.47	463.85
1	6	PF 3	5420.11	5418.21	1.90	3.68	0.12	1428.53	14461.50	2174.97	470.15
1	6	PF 4	5422.48	5419.49	2.99	3.47	0.34	2228.45	23260.77	5010.78	484.68
1	6	PF 5	5423.42	5420.91	2.51	2.69	0.19	2531.47	26708.59	6612.95	631.31

HEC-RAS Plan: RevFP2016-08-30 River: Tijeras Arroyo Reach: 1 (Continued)

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
1	8	PF 1	5420.26	5419.31	0.95	3.42	0.04	386.14	4453.98	1444.88	357.57
1	8	PF 2	5422.63	5420.92	1.71	3.33	0.02	833.31	9083.43	4383.27	407.80
1	8	PF 3	5423.53	5421.51	2.02	3.38	0.04	1041.11	11131.59	5892.30	426.24
1	8	PF 4	5425.91	5423.59	2.32	3.36	0.07	1699.36	17104.18	11696.46	644.82
1	8	PF 5	5426.83	5424.52	2.31	2.60	0.02	1988.61	19542.00	14322.39	674.00
1	10	PF 1	5428.03	5426.05	1.97	4.96	0.31	1045.68	5239.33		147.05
1	10	PF 2	5431.60	5430.02	1.58	3.30	0.01	2134.25	10308.33	1857.42	654.59
1	10	PF 3	5432.35	5430.64	1.71	3.45	0.03	2492.20	12033.34	3539.45	667.00
1	10	PF 4	5434.32	5432.16	2.16	3.45	0.02	3556.54	17072.36	9871.10	677.66
1	10	PF 5	5435.04	5432.67	2.37	3.36	0.02	3989.29	19088.17	12775.54	680.49
1	15	PF 1	5435.04	5434.01	1.03	2.63	0.09		5019.75	1265.25	489.45
1	15	PF 2	5437.01	5435.54	1.46	1.84	0.01	163.74	8636.04	5500.22	581.06
1	15	PF 3	5437.72	5436.08	1.64	1.91	0.01	379.96	10120.48	7564.56	583.91
1	15	PF 4	5439.73	5437.44	2.29	2.15	0.04	1288.76	14715.38	14495.86	591.18
1	15	PF 5	5440.49	5438.02	2.47	2.19	0.03	1774.61	16465.13	17613.26	594.26
1	20	PF 1	5438.63	5436.35	2.28	2.55	0.37	17.41	6263.55	4.04	292.80
1	20	PF 2	5442.11	5439.92	2.19	2.13	0.22	2366.30	11485.32	448.38	534.02
1	20	PF 3	5443.22	5440.76	2.46	2.21	0.24	3700.48	13635.58	728.94	557.19
1	20	PF 4	5443.13	5441.71	1.43	1.92	0.09	16324.75	13236.21	939.05	587.60
1	20	PF 5	5443.68	5441.71	1.97	2.30	0.05	19189.88	15559.27	1103.86	587.60
1	22	PF 1	5441.37	5439.46	1.90	1.38	0.04	293.85	5974.90	16.24	227.05
1	22	PF 2	5444.24	5442.40	1.84	0.87	0.04	3887.39	10228.44	184.17	449.89
1	22	PF 3	5445.12	5443.12	2.00	0.90	0.05	5883.21	11908.48	273.31	461.47
1	22	PF 4	5447.52	5444.86	2.66	0.79	0.37	12793.81	17092.49	613.70	475.69
1	22	PF 5	5448.42	5445.48	2.93	0.96	0.29	15899.25	19170.33	783.42	480.83
1	30	PF 1	5443.92	5443.54	0.38	2.40	0.15		6268.99	16.01	379.71
1	30	PF 2	5446.36	5445.67	0.69	2.01	0.12	327.55	13869.35	103.10	518.34
1	30	PF 3	5447.26	5446.45	0.80	2.01	0.12	698.68	17207.08	159.24	535.29
1	30	PF 4	5449.75	5448.63	1.11	2.07	0.15	2350.28	27750.76	398.97	597.23
1	30	PF 5	5450.66	5449.45	1.22	2.08	0.17	3342.11	31989.63	521.26	603.78

HEC-RAS Plan: RevFP2016-08-30 River: Tijeras Arroyo Reach: 1 (Continued)

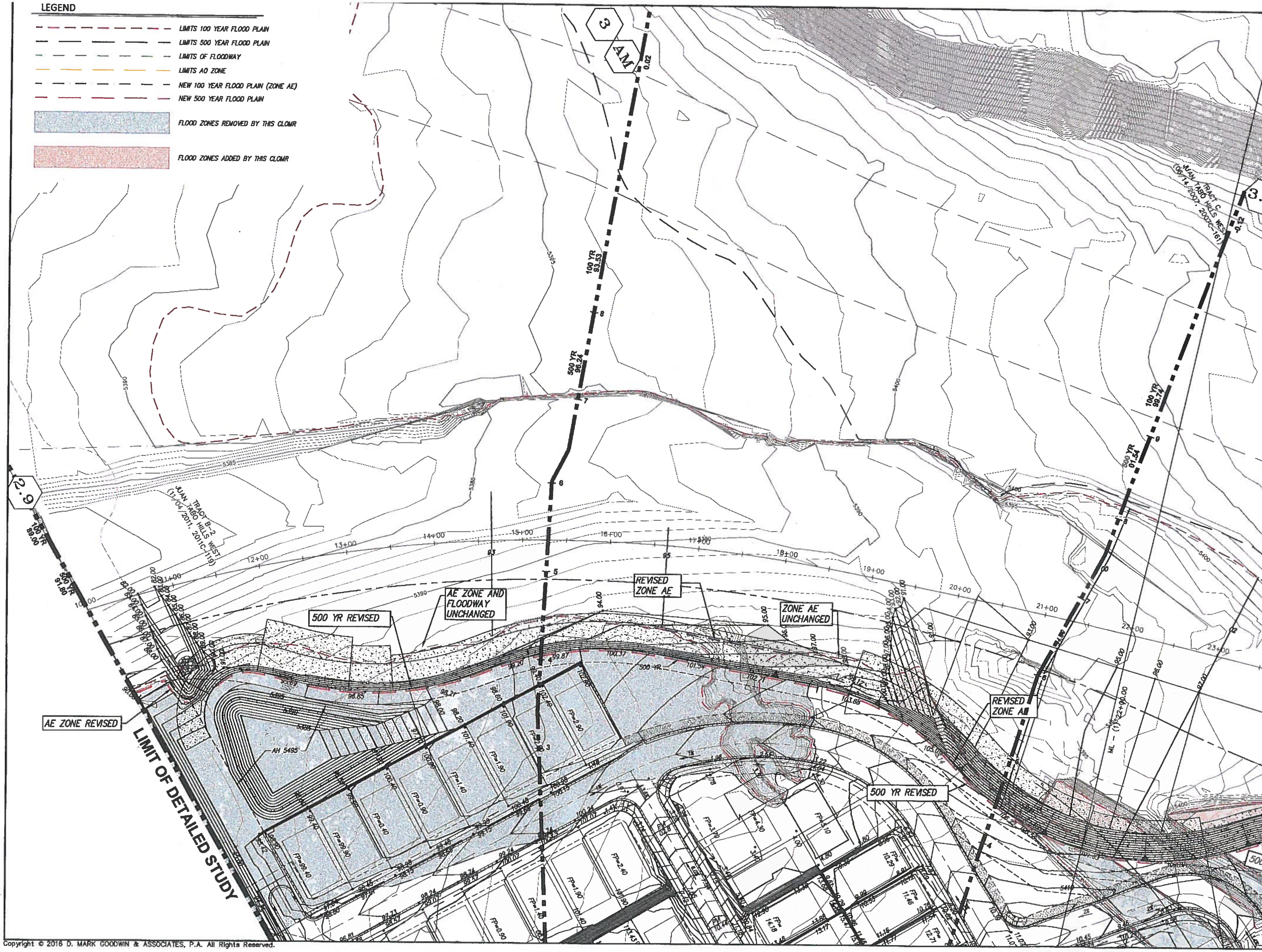
Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
1	35	PF 1	5450.35	5449.21	1.13	2.71	0.23	3.26	6279.70	2.03	338.32
1	35	PF 2	5452.65	5451.01	1.64	2.34	0.29	411.38	13794.74	93.88	524.86
1	35	PF 3	5453.45	5451.70	1.75	2.23	0.28	1004.93	16882.75	177.32	577.04
1	35	PF 4	5455.53	5453.23	2.30	2.14	0.36	3640.10	26338.83	521.07	596.85
1	35	PF 5	5456.31	5453.77	2.55	2.12	0.40	4876.87	30271.58	704.54	603.53
1	40	PF 1	5456.74	5455.80	0.94	6.38	0.02	290.86	4429.48	1564.66	346.37
1	40	PF 2	5459.16	5457.27	1.88	5.81	0.07	1307.85	9598.63	3393.52	374.95
1	40	PF 3	5460.10	5457.93	2.16	5.37	0.12	1963.52	11925.34	4176.14	383.35
1	40	PF 4	5462.75	5459.77	2.98	5.08	0.20	4297.41	19393.01	6809.59	408.72
1	40	PF 5	5463.75	5460.50	3.26	5.01	0.21	5358.92	22503.77	7990.31	418.74
1	41	PF 1	5458.96	5457.90	1.06	2.18	0.04		6285.00		330.38
1	41	PF 2	5461.39	5459.54	1.85	2.23	0.00	24.51	14274.38	1.10	365.78
1	41	PF 3	5462.33	5460.17	2.16	2.15	0.00	113.67	17946.54	4.78	373.62
1	41	PF 4	5464.99	5461.99	3.00	1.98	0.00	633.80	29827.10	39.10	380.79
1	41	PF 5	5466.01	5462.68	3.33	1.92	0.02	905.95	34883.24	63.82	383.48
1	42	PF 1	5464.71	5463.17	1.53	1.66	0.24		6285.00		204.91
1	42	PF 2	5468.00	5465.48	2.52	1.41	0.34		14300.00		295.89
1	42	PF 3	5469.27	5466.37	2.90	1.34	0.37		18065.00		321.46
1	42	PF 4	5472.94	5468.84	4.10	1.21	0.55		30500.00		346.61
1	42	PF 5	5474.34	5469.81	4.54	1.17	0.60		35853.00		350.22
1	43	PF 1	5465.02	5463.44	1.58	0.21	0.02		6285.00		202.03
1	43	PF 2	5468.39	5465.73	2.66	0.18	0.07		14300.00		208.89
1	43	PF 3	5469.71	5466.66	3.05	0.17	0.07		18065.00		211.68
1	43	PF 4	5473.48	5469.26	4.22	0.15	0.06		30500.00		219.47
1	43	PF 5	5474.92	5470.22	4.69	0.15	0.08		35853.00		222.35
1	43.5		Bridge								
1	44	PF 1	5466.42	5465.75	0.67				6285.00		201.23
1	44	PF 2	5470.30	5469.13	1.17				14300.00		209.63
1	44	PF 3	5471.81	5470.45	1.37				18065.00		212.90
1	44	PF 4	5476.09	5474.15	1.93				30500.00		222.12

HEC-RAS Plan: RevFP2016-08-30 River: Tijeras Arroyo Reach: 1 (Continued)

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
1	44	PF 5	5477.70	5475.55	2.15				35853.00		225.57
1	45	PF 1	5466.48	5465.78	0.70	0.05	0.02		6285.00		209.35
1	45	PF 2	5470.35	5469.20	1.14	0.04	0.01		14300.00		219.57
1	45	PF 3	5471.87	5470.56	1.31	0.04	0.02		18065.00		223.61
1	45	PF 4	5476.17	5474.38	1.79	0.03	0.04		30500.00		235.02
1	45	PF 5	5477.79	5475.82	1.97	0.03	0.06		35853.00		239.33
1	46	PF 1	5468.93	5467.93	0.99	0.99	0.09	110.43	4634.30	1540.27	419.66
1	46	PF 2	5471.14	5469.82	1.31	0.74	0.05	838.88	10025.84	3435.28	431.94
1	46	PF 3	5472.48	5471.48	1.00	0.59	0.03	1370.37	12373.55	4321.08	442.71
1	46	PF 4	5476.67	5475.76	0.91	0.41	0.09	3058.42	21112.22	6329.35	563.76
1	46	PF 5	5478.27	5477.43	0.84	0.37	0.11	3632.63	23787.49	8432.88	569.82
1	50	PF 1	5474.09	5473.43	0.66	5.12	0.03	50.03	3854.68	2380.29	435.44
1	50	PF 2	5476.09	5474.51	1.58	4.87	0.08	224.23	8748.17	5327.61	467.05
1	50	PF 3	5476.91	5474.98	1.93	3.24	0.28	297.94	10999.06	6767.99	490.91
1	50	PF 4	5479.06	5476.69	2.38	1.76	0.44	1376.65	17710.60	11412.76	550.00
1	50	PF 5	5479.96	5477.85	2.11	1.31	0.38	2276.10	20250.39	13326.51	557.92
1	51	PF 1	5476.01	5475.02	0.99	1.74	0.10	36.49	5694.41	554.10	428.33
1	51	PF 2	5478.09	5476.48	1.60	1.97	0.01	344.65	12429.93	1525.42	538.32
1	51	PF 3	5478.86	5477.14	1.71	1.86	0.02	665.87	15349.42	2049.71	560.38
1	51	PF 4	5480.94	5478.60	2.34	1.61	0.00	2216.08	24522.26	3761.66	581.25
1	51	PF 5	5481.72	5479.16	2.56	1.33	0.13	2969.73	28325.60	4557.66	588.32
1	52	PF 1	5478.50	5477.65	0.85	2.25	0.01	106.32	5357.49	821.19	573.86
1	52	PF 2	5480.22	5478.90	1.32	1.88	0.03	838.52	11340.12	2121.36	637.37
1	52	PF 3	5480.88	5479.36	1.52	1.72	0.02	1274.58	14016.24	2774.18	654.39
1	52	PF 4	5482.75	5480.69	2.06	1.61	0.03	2983.58	22558.90	4957.53	706.69
1	52	PF 5	5483.44	5481.18	2.26	1.57	0.03	3897.49	26076.57	5878.94	717.06
1	54	PF 1	5480.43	5479.90	0.53	1.91	0.03	653.69	3818.32	1812.99	826.42
1	54	PF 2	5481.86	5481.15	0.71	1.58	0.06	2849.29	7141.84	4308.87	995.69
1	54	PF 3	5482.42	5481.67	0.74	1.46	0.08	4179.35	8456.94	5428.71	1015.02
1	54	PF 4	5484.05	5483.21	0.84	1.18	0.12	8888.95	12507.62	9103.44	1038.67

HEC-RAS Plan: RevFP2016-08-30 River: Tijeras Arroyo Reach: 1 (Continued)

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
1	54	PF 5	5484.69	5483.81	0.89	1.12	0.14	10958.49	14212.63	10681.88	1047.47
1	60	PF 1	5489.53	5488.90	0.63	8.17	0.03	0.78	4521.49	1762.73	855.42
1	60	PF 2	5490.85	5489.83	1.01	6.76	0.09	73.70	9628.14	4598.16	951.01
1	60	PF 3	5491.35	5490.18	1.18	6.24	0.13	147.90	11950.50	5966.61	986.30
1	60	PF 4	5492.75	5491.20	1.55	4.97	0.21	594.23	19101.22	10804.54	1049.57
1	60	PF 5	5493.27	5491.55	1.72	4.70	0.25	834.69	22058.67	12959.65	1056.30
1	70	PF 1	5507.68	5506.87	0.81	17.03	0.05	725.08	4577.60	982.33	627.11
1	70	PF 2	5509.33	5508.06	1.27	16.26	0.08	2371.45	8688.81	3239.75	712.74
1	70	PF 3	5509.96	5508.52	1.44	16.08	0.08	3274.50	10447.96	4342.54	745.35
1	70	PF 4	5511.64	5509.73	1.90	15.02	0.11	6956.37	15679.42	7864.21	774.25
1	70	PF 5	5512.27	5510.20	2.08	14.84	0.11	8654.13	17813.44	9385.43	781.40



THE CONTOURS AND SPOT ELEVATIONS SHOWN ON SHEETS 1 - 5 IS BASED ON NAVD 1988. THE CONTOURS AND SPOT ELEVATIONS ON SHEETS 6 & 7 IS BASED ON NGVD 1929, AND MAY BE CONVERTED TO NAVD 88 BY ADDING 2.7'.

I, JAMES D. HUGHES DO HEREBY CERTIFY THAT NO STRUCTURES ARE LOCATED IN AREAS THAT WOULD BE IMPACTED BY THE INCREASED BFEs BECAUSE OF THESE TWO PROJECTS. (JUAN TABO HILLS AND JUAN TABO HILLS SUBDIVISION, UNIT 3B)

JAMES D. HUGHES   3-30-2016
DATE

ENGINEER'S SEAL

SURVEY INFORMATION — FIELD NOTES

NO.	BY	DATE

BENCH MARKS

STATION "5-M22" IS LOCATED 8.7 MI. SE OF DOWNTOWN ALBUQUERQUE ON THE EAST SIDE OF THE MUNICIPAL LIMITS LINE IN THE FOUR HILLS SUBDIVISION AREA. STATION IS 600 FT. EAST OF MUNICIPAL LIMITS LINE, 77.9' SE OF POWER POLE #SE37 & 186.0' NW OF POWER POLE #60. STATION IS A STANDARD ACS BRASS DISK SET IN A CONCRETE MONUMENT IN THE GROUND. STATION IS STAMPED "5-M22".

AS BUILT INFORMATION

CONTRACTOR	
WORK STAKED BY	DATE
INSPECTOR'S ACCEPTANCE BY	DATE
FIELD VERIFICATION BY	DATE
DRAWINGS CORRECTED BY	DATE

MICRO-FILM INFORMATION

NO.	DATE	REMARKS	BY

REVISIONS

DESIGN		DATE
DESIGNED BY	JDH	06/14
DRAWN BY	ACH	06/14

SCALE: 1" = 50'

MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
OFFICE (505) 828-2200, FAX (505) 797-9539

CITY PROJECT NO.	ZONE MAP NO.	SHEET	OF
	M-21-Z	1	7

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3.5 | 4 AN | 5 | 6 AO

TRACT B-1
JUAN TABO HILLS WEST
(11/04/2011, 2011C-119)

TRACT B-2
JUAN TABO HILLS WEST
(11/04/2011, 2011C-119)

100 YR 09.74
500 YR 01.54
100 YR 04.92
500 YR 07.22
100 YR 11.79
500 YR 13.62
100 YR 18.29
500 YR 18.49

FLOODWAY UNCHANGED
REVISED ZONE AE
500 YR REVISED
FLOODWAY UNCHANGED
REVISED ZONE AE
500 YR REVISED

ML - 13, 22+00.00

THE CONTOURS AND SPOT ELEVATIONS SHOWN ON SHEETS 1 - 5 IS BASED ON NAVD 1988. THE CONTOURS AND SPOT ELEVATIONS ON SHEETS 6 & 7 IS BASED ON NGVD 1929, AND MAY BE CONVERTED TO NAVD 88 BY ADDING 2.7'.

I, JAMES D. HUGHES DO HEREBY CERTIFY THAT NO STRUCTURES ARE LOCATED IN AREAS THAT WOULD BE IMPACTED BY THE INCREASED BFEs BECAUSE OF THESE TWO PROJECTS. (JUAN TABO HILLS AND JUAN TABO HILLS SUBDIVISION, UNIT 3B)

JAMES D. HUGHES — DATE

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

BENCH MARKS

STATION "5-422" IS LOCATED 0.7 MI. SE OF DOWNTOWN ALBUQUERQUE ON THE EAST SIDE OF THE MUNICIPAL LIMITS LINE IN THE FOUR HILLS SUBDIVISION AREA. STATION IS 600 FT. EAST OF MUNICIPAL LIMITS LINE, 77.9' SE OF POWER POLE #JC37 & 186.0' NW OF POWER POLE #60. STATION IS A STANDARD ACS BRASS DISK SET IN A CONCRETE MONUMENT IN THE GROUND. STATION IS STAMPED "5-422".

AS BUILT INFORMATION

CONTRACTOR

	DATE
WORK STAKED BY	
ACCEPTANCE BY	
FIELD VERIFICATION BY	
DRAWINGS CORRECTED BY	

ENGINEER'S SEAL

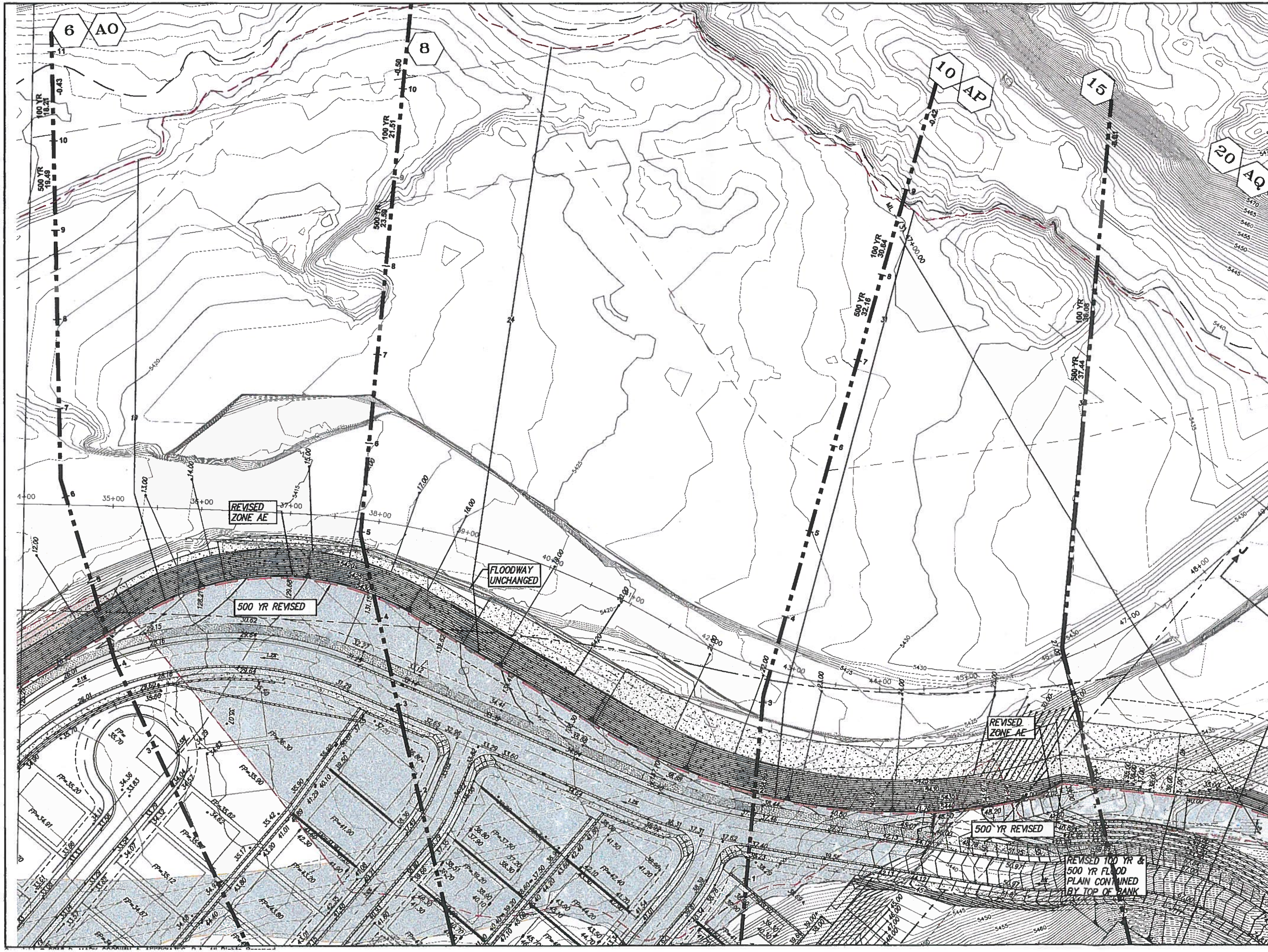
JAMES D. HUGHES — NEW MEXICO — REGISTERED PROFESSIONAL ENGINEER

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	JDH 06/14
		DRAWN BY	ACH 06/14

50' 25' 0 50' 100'
SCALE: 1" = 50'

dmg
MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
OFFICE (505) 828-2200, FAX (505) 767-9539

CITY PROJECT NO. | ZONE MAP NO. M-21-Z | SHEET 2 OF 7



THE CONTOURS AND SPOT ELEVATIONS SHOWN ON SHEETS 1 - 5 IS BASED ON NAVD 1988. THE CONTOURS AND SPOT ELEVATIONS ON SHEETS 6 & 7 IS BASED ON NGVD 1929, AND MAY BE CONVERTED TO NAVD 88 BY ADDING 2.7'.

I, JAMES D. HUGHES DO HEREBY CERTIFY THAT NO STRUCTURES ARE LOCATED IN AREAS THAT WOULD BE IMPACTED BY THE INCREASED BFEs BECAUSE OF THESE TWO PROJECTS. (JUAN TABO HILLS AND JUAN TABO HILLS SUBDIVISION, UNIT 3B)

JAMES D. HUGHES — 8-30-2016 DATE

ENGINEER'S SEAL

SURVEY INFORMATION — FIELD NOTES

NO.	BY	DATE

BENCH MARKS

STATION "5-M22" IS LOCATED 8.7 MI. SE OF DOWNTOWN ALBUQUERQUE ON THE EAST SIDE OF THE MUNICIPAL LIMITS LINE IN THE FOUR HILLS SUBDIVISION AREA. STATION IS 600 FT. EAST OF MUNICIPAL LIMITS LINE, 77.9' SE OF POWER POLE #537 & 186.0' NW OF POWER POLE #60. STATION IS A STANDARD ACS BRASS DISK SET IN A CONCRETE MONUMENT IN THE GROUND. STATION IS STAMPED "5-M22".

AS BUILT INFORMATION

CONTRACTOR		
WORK STAKED BY		DATE
INSPECTOR'S ACCEPTANCE BY		DATE
FIELD VERIFICATION BY		DATE
DRAWINGS CORRECTED BY		DATE

MICRO-FILM INFORMATION

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NO.	DATE	REMARKS	BY

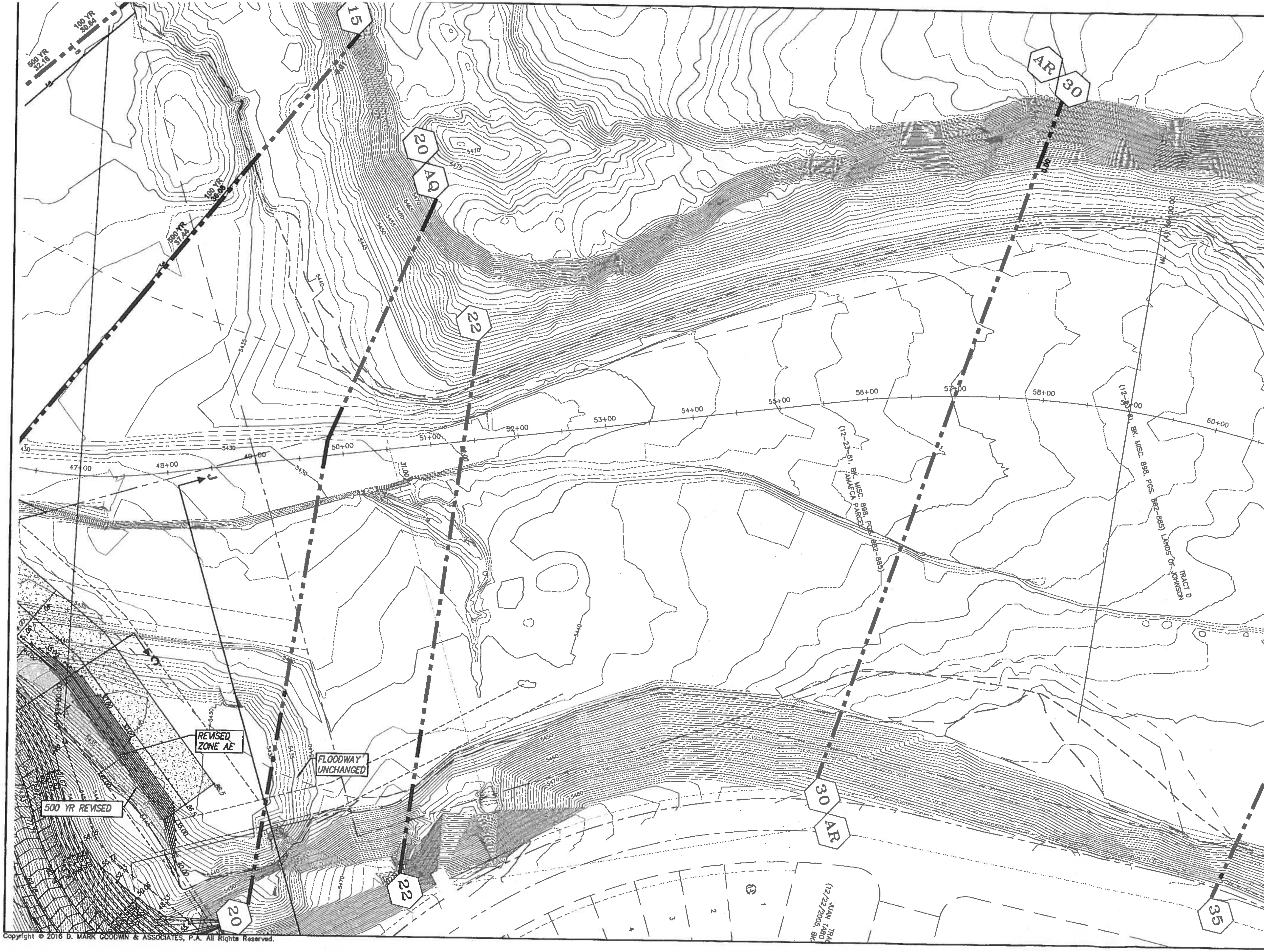
REVISIONS

DESIGN		DATE
DESIGNED BY	JDH	06/14
DRAWN BY	ACH	06/14

SCALE: 1" = 50'

MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
OFFICE (505) 828-2200, FAX (505) 797 953

CITY PROJECT NO.	ZONE MAP NO.	SHEET OF
	M-21-Z	3



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JAMES D. HUGHES 9-30-2016
DATE

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ENGINEER'S SEAL	SURVEY INFORMATION	BENCH MARKS	AS BUILT INFORMATION
JAMES D. HUGHES, NEW MEXICO, 9534, REGISTERED PROFESSIONAL ENGINEER 9-30-2016	FIELD NOTES	STATION "3-M22" IS LOCATED 8.7 MI. SE OF DOWNTOWN ALBUQUERQUE ON THE EAST SIDE OF THE MUNICIPAL LIMITS LINE IN THE FOUR HILLS SUBDIVISION AREA. STATION IS 600 FT. EAST OF MUNICIPAL LIMITS LINE. 77.9' SE OF POWER POLE #SE37 & 186.0' NW OF POWER POLE #60. STATION IS A STANDARD ACS BRASS DISK SET IN A CONCRETE MONUMENT IN THE GROUND. STATION IS STAMPED "3-M22".	CONTRACTOR / WORK STAKED BY DATE / INSPECTOR'S ACCEPTANCE BY DATE / FIELD VERIFICATION BY DATE / DRAWINGS CORRECTED BY DATE / MICRO-FILM INFORMATION
	NO. BY DATE		

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
DESIGNED BY	JDH	DATE	06/14
DRAWN BY	ACH	DATE	06/14
CHECKED BY	DMG	DATE	06/14

SCALE: 1" = 50'

50' 25' 0 50' 100'

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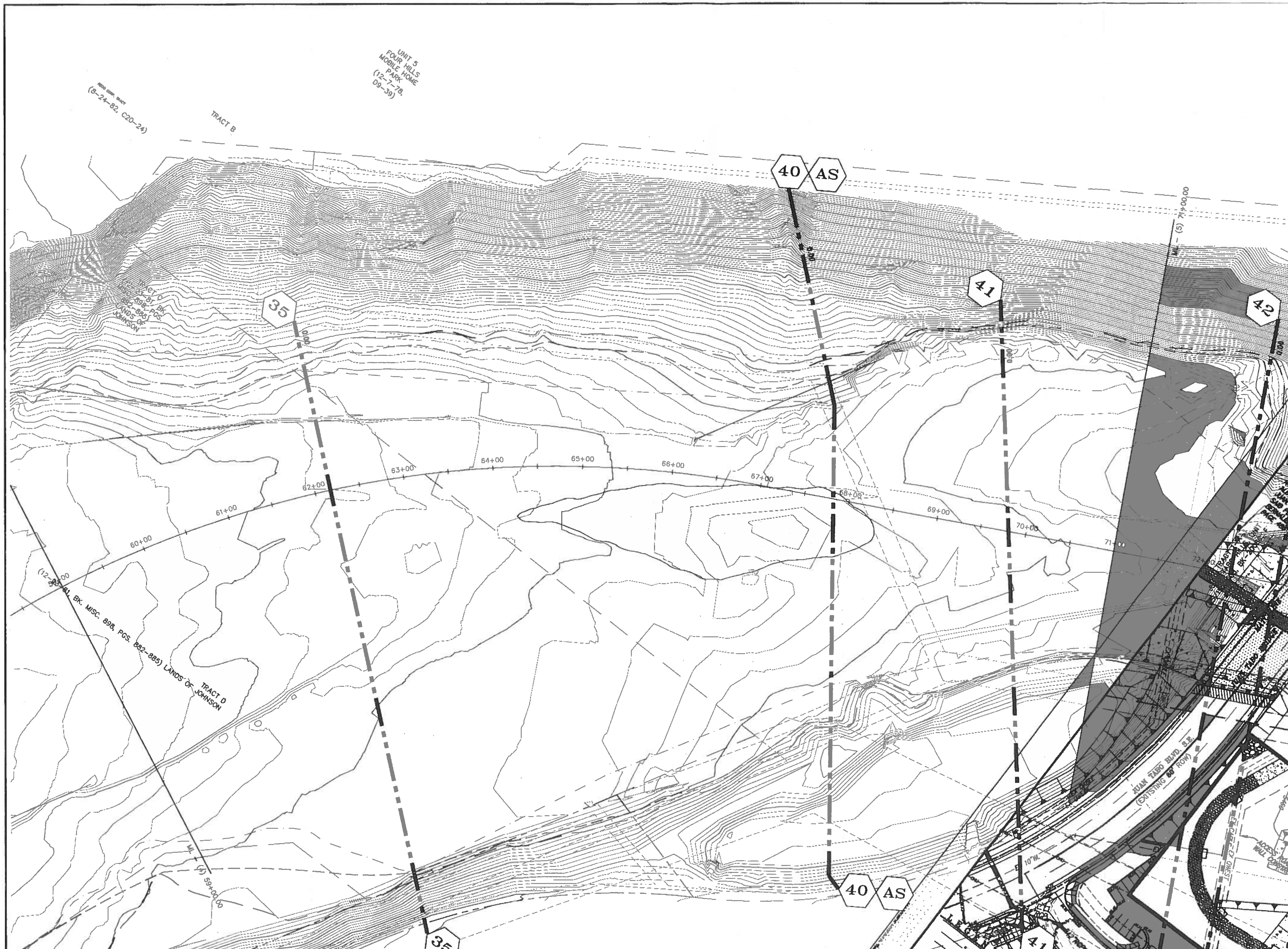
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
OFFICE (505) 828-2200, FAX (505) 797-9539

CITY PROJECT NO.	ZONE MAP NO.	SHEET	OF
	M-21-Z	4	7



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James D. Hughes — JAMES D. HUGHES — 8-30-2016 — DATE

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ENGINEER'S SEAL

JAMES D. HUGHES — NEW MEXICO — REGISTERED PROFESSIONAL ENGINEER

SURVEY INFORMATION

FIELD NOTES		
NO.	BY	DATE

BENCH MARKS

STATION "5-M22" IS LOCATED 8.7 MI. SE OF DOWNTOWN ALBUQUERQUE ON THE EAST SIDE OF THE MUNICIPAL LIMITS LINE IN THE FOUR HILLS SUBDIVISION AREA. STATION IS 600 FT. EAST OF MUNICIPAL LIMITS LINE, 77.9' SE OF POWER POLE #SE37 & 186.0' NW OF POWER POLE #60. STATION IS A STANDARD ACS BRASS DISK SET IN A CONCRETE MONUMENT IN THE GROUND. STATION IS STAMPED "5-M22".

AS BUILT INFORMATION

CONTRACTOR	
WORK STAKED BY	DATE
INSPECTOR'S ACCEPTANCE BY	DATE
FIELD VERIFICATION BY	DATE
DRAWINGS CORRECTED BY	DATE

MICRO-FILM INFORMATION

NO.

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NO.	DATE	REMARKS	BY

REVISIONS

DESIGN

DESIGNED BY	JDH	DATE	06/14
DRAWN BY	JDH	DATE	06/

50' 25' 0 50' 100'

SCALE: 1" = 60'

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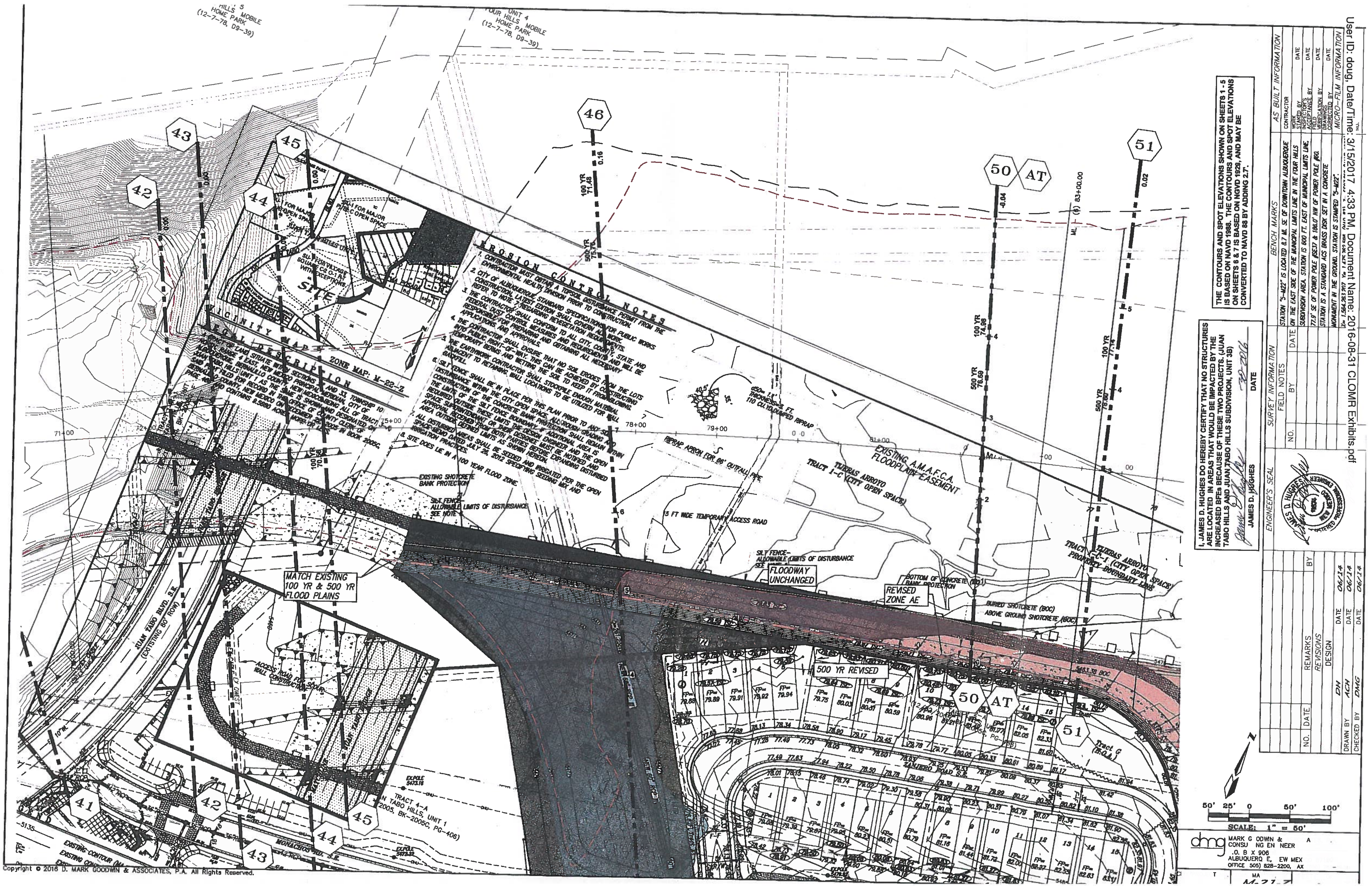
CITY PROJECT NO.	ZONE MAP NO.	SHEET OF
	M-21-Z	5



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UNIT 5 FOUR HILLS MOBILE HOME PARK (12-7-78, D9-39)
UNIT 4 FOUR HILLS MOBILE HOME PARK (12-7-78, D9-39)
42
43
44
45
46
50
AT
51
41
0.00
0.16
-0.04
0.02
100 YR 71.48
500 YR 75.76
100 YR 70.58
100 YR 74.98
500 YR 76.69
100 YR 77.14
500 YR 78.60
83+00.00
71+00
72+00
75+00
78+00
79+00
81+00
SU-1 FOR MAJOR PUBLIC OPEN SPACE
SU-1 FOR VILLAGE SQUARE C2 O-1 R-T WITH EXCEPTIONS
SITE
VICINITY MAP
ZONE MAP: M-22-Z
LEGAL DESCRIPTION
A TRACT OF LAND SITUATE WITHIN SECTIONS 32 AND 33, TOWNSHIP 10 NORTH, RANGE 4 EAST, NEW MEXICO PRINCIPAL MERIDIAN, CITY OF ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO BEING ALL OF TRACT 3, JUAN TABO HILLS UNIT 1 AS THE SAME IS SHOWN AND DESIGNATED ON SAID PLAT FILED FOR RECORD IN THE OFFICE OF COUNTY CLERK OF BERNALILLO COUNTY, NEW MEXICO ON DECEMBER 2005 IN BOOK 2005C, PAGE 406 AND CONTAINS 8.5690 ACRES MORE OR LESS.
EROSION CONTROL NOTES
1. CONTRACTOR MUST OBTAIN A TOPSOIL DISTURBANCE PERMIT FROM THE ENVIRONMENTAL HEALTH DIVISION PRIOR TO CONSTRUCTION.
2. CITY OF ALBUQUERQUE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, LATEST EDITION SHALL GOVERN ALL WORK. REFER TO NOTE 7 REGARDING REVEGETATION REQUIREMENTS.
3. THE CONTRACTOR SHALL CONFORM TO ALL CITY, COUNTY, STATE AND FEDERAL DUST CONTROL MEASURES AND REQUIREMENTS AND WILL BE RESPONSIBLE FOR PREPARING AND OBTAINING ALL NECESSARY APPLICATIONS AND APPROVALS.
4. THE CONTRACTOR SHALL ENSURE THAT NO SOIL ERODES FROM THE LOTS INTO PUBLIC RIGHT-OF-WAY. THIS CAN BE ACHIEVED BY CONSTRUCTING TEMPORARY BERMS AND WETTING THE SOIL TO KEEP IT FROM BLOWING.
5. THE EARTHWORK CONTRACTOR SHALL STOCKPILE ENOUGH MATERIAL ADJACENT TO RETAINING WALL LOCATIONS TO BE UTILIZED FOR WALL BACKFILL.
6. SILT FENCE SHALL BE IN PLACE PER THIS PLAN PRIOR TO ANY SOIL DISTURBANCE WITHIN THE CITY OPEN SPACE. ALL ROUGH GRADING AND CONSTRUCTION OF THE CONCRETE BANK PROTECTION SHALL REMAIN WITHIN THE LIMITS OF THE SILT FENCE BOUNDARY. IF ADDITIONAL AREA IS REQUIRED OUTSIDE THESE LIMITS THE DESIGN ENGINEER AND THE OPEN SPACE SUPERINTENDANT OR THEIR DESIGNEE MUST BE NOTIFIED AND APPROVAL RECEIVED FROM BOTH PARTIES BEFORE EXPANDING DISTURBED AREA OUTSIDE DEFINED LIMITS AS SHOWN HEREON.
7. ALL DISTURBED AREAS SHALL BE SEEDED AND IRRIGATED PER THE OPEN SPACE MEMO DATED JULY 26, 2012 SPECIFYING SEEDING MIX AND IRRIGATION PRACTICES.
8. SITE DOES LIE IN A 100 YEAR FLOOD ZONE.
EXISTING SHOTCRETE BANK PROTECTION
SILT FENCE-ALLOWABLE LIMITS OF DISTURBANCE SEE NOTE
650± 1.5' THICKNESS=3 FT. 110 CU.YD.DUMPED RIPRAP
RIPRAP APRON FOR 66" OUTFALL PIPE
15 FT WIDE TEMPORARY ACCESS ROAD
EXISTING A.M.A.F.C.A. FLOODPLAIN EASEMENT
TIJERAS ARROYO TRACT 1-C (CITY OPEN SPACE)
TIJERAS ARROYO TRACT 1-C-1 (CITY OPEN SPACE) PROPERTY BOUNDARY LINE
MATCH EXISTING 100 YR & 500 YR FLOOD PLAINS
FLOODWAY UNCHANGED
REVISED ZONE AE
500 YR REVISED
BOTTOM OF CONCRETE BANK PROTECTION
BURIED SHOTCRETE (BOC)
ABOVE GROUND SHOTCRETE (BOC)
JUAN TABO BLVD. S.E. (EXISTING 80' ROW)
ACCESS ROAD FOR SCOUR WALL CONSTRUCTION
TRACT 4-A JUAN TABO HILLS, UNIT 1 (2005, BK-2005C, PG-406)
MONACHOS RD. S.E.
ZANJERO ROAD S.E.
Tract G (H.O.A.)
EXISTING CONTOUR
EX.POLE 5473.18
FP= 79.88
FP= 79.89
FP= 79.91
FP= 79.92
FP= 79.94
FP= 79.75
FP= 80.03
FP= 80.51
FP= 80.59
FP= 80.96
FP= 81.77
FP= 82.05
FP= 82.33
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JAMES D. HUGHES
DATE
ENGINEER'S SEAL
JAMES D. HUGHES NEW MEXICO REGISTERED PROFESSIONAL ENGINEER
SURVEY INFORMATION
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DATE
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AS BUILT INFORMATION
CONTRACTOR
WORK STAKED BY
INSPECTOR'S ACCEPTANCE BY
FIELD VERIFICATION BY
DRAWINGS CORRECTED BY
DATE
MICRO-FILM INFORMATION
NO.
DATE
REMARKS
BY
REVISIONS
DESIGN
DATE 06/14 DH
DRAWN BY ACH DATE 06/14
CHECKED BY DMG DATE 06/14
SCALE: 1" = 50'
50' 25' 0 50' 100'
dmg MARK GOODWIN & ASSOCIATES, PA CONSULTING ENGINEERS P.O. BOX 90606 ALBUQUERQUE, NEW MEXICO OFFICE (505) 828-2200, FAX
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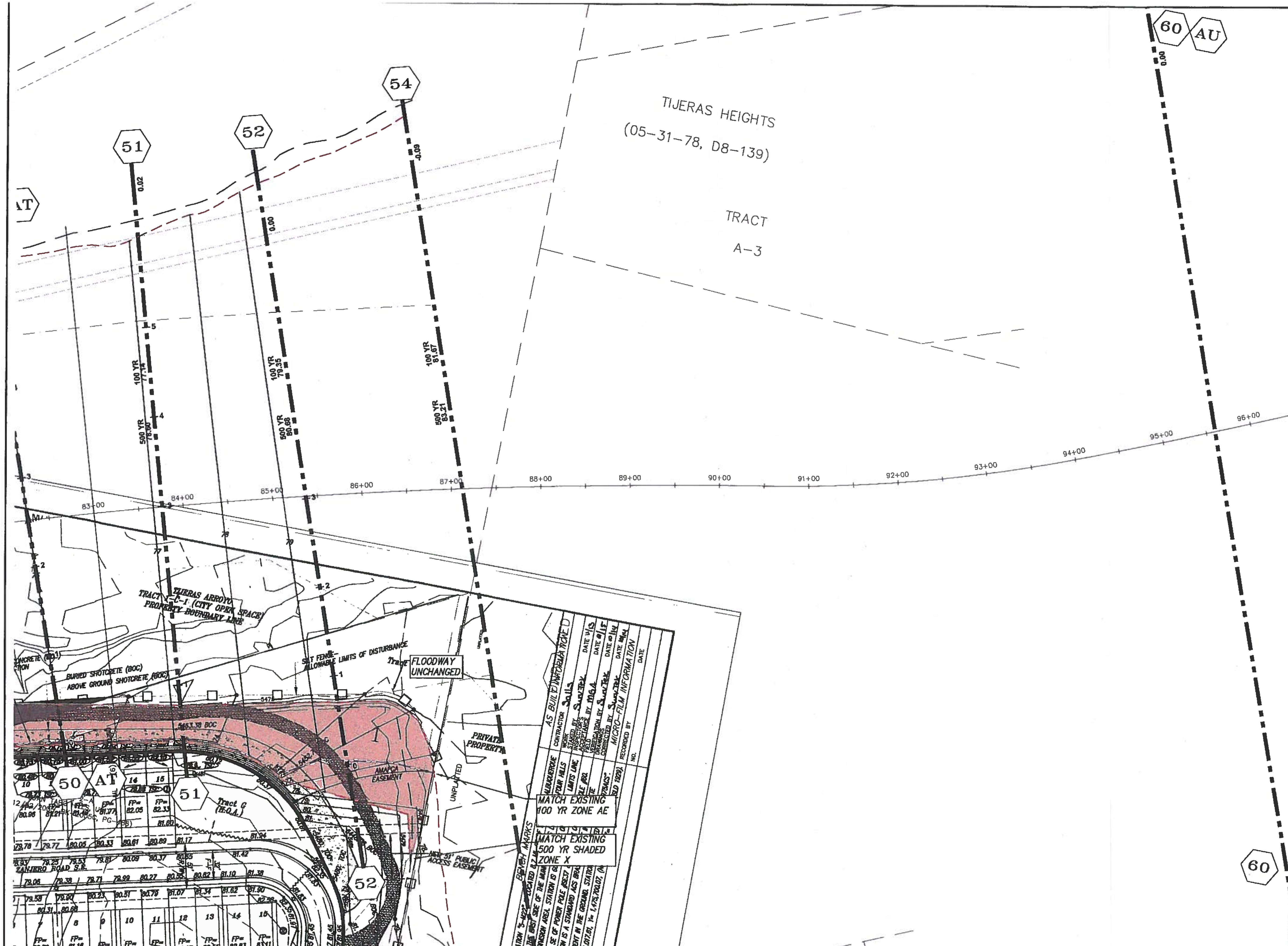

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[illegible] 8-30-2016

JAMES D. HUGHES DATE

AS BUILT INFORMATION	
CONTRACTOR	
WORK STAKED BY	DATE
INSPECTOR'S ACCEPTANCE BY	DATE
FIELD VERIFICATION BY	DATE
DRAWINGS CORRECTED BY	DATE

MICRO-FILM INFORMATION

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SURVEY INFORMATION

FIELD NOTES		
NO.	BY	DATE

ENGINEER'S SEAL

JAMES D. HUGHES NEW MEXICO REGISTERED PROFESSIONAL ENGINEER

8-30-16

NO.	DATE	REMARKS	BY

REVISIONS

DESIGN

DESIGNED BY	JDH	DATE	06/14
DRAWN BY	ACH	DATE	06/14

50' 25' 0 50' 100'

SCALE: 1" = 50'

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CITY PROJECT NO.	ZONE MAP NO.	SHEET OF
	M-21-Z	7 7