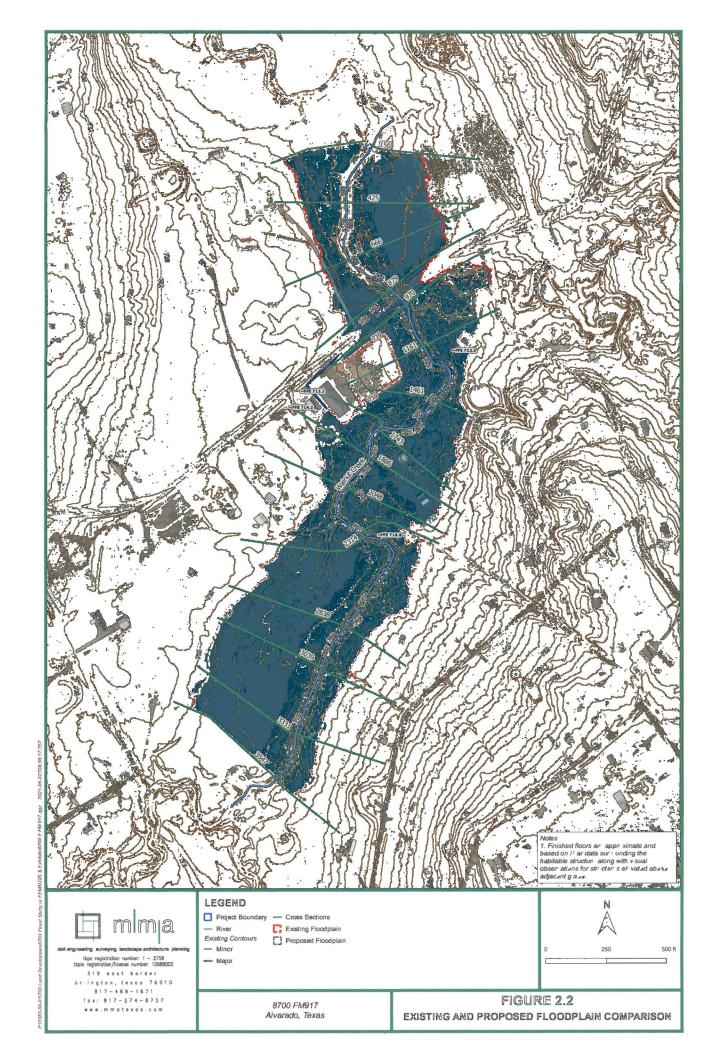
JUN 28 2021

Approve to contact Half & assoc to study property

REQUEST FOR AGENDA PL Submission Deadline - Tuesday, 12:00	
SUBMITTED BY: David Disheroon TODA	AY'S DATE: 06/21/2021
DEPARTMENT:	Public Works
SIGNATURE OF DEPARTMENT HEAD:	
REQUESTED AGENDA DATE:	06/28/2021
Consideration to determine whether to authorize the Acknowledgment for LOMR, for property located at 8700 E. filled in with dirt - Precinct #3. PERSON(S) TO PRESENT ITEM: David Dis SUPPORT MATERIAL: (Must enclose support	FM 917 where the flood plain has been sheroon
TIME: 10 minutes (Anticipated number of minutes needed to discuss item)	ACTION ITEM: X X X X X X X X X X X X X X X X X X X
STAFF NOTICE:	
COUNTY ATTORNEY: X IT DEI AUDITOR: PURCI PERSONNEL: PUBLI BUDGET COORDINATOR: OTHER:	HASING DEPARTMENT: C WORKS: <u>X</u>
**********This Section to be Completed by C	ounty Judge's Office********
ASSIGNED AGENDA	DATE:
REQUEST RECEIVED BY COUNTY JUDGE	S'S OFFICE
COURT MEMBER APPROVAL	Date



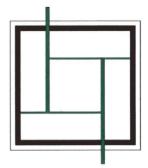
8700 FM917 DRAINAGE STUDY

PROJECT ADDRESS

8700 FM917 Alvarado, TX



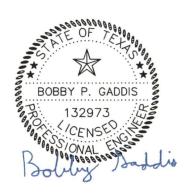
June 2021



PREPARED BY

mma, inc. 519 E. Border St., Arlington, TX 76010 (817) 469-1671

TBPELS Registration No. F-2759



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	ULTIMATE CONDITIONS Error! Bookmark not defined	
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FIGURES

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Appendix B – Hydrologic Data

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Appendix D (folder) - GIS & CAD Data

SECTION 1 INTRODUCTION

1.1 Intent and Purpose statement

The purpose of this study is to demonstrate the impact of the proposed ~1 ac. site expansion at 8700 FM917 Alvarado, TX along Walnut Creek. The expansion being proposed is located within a Zone A floodplain and will require fill to be placed in the floodplain to elevate proposed structures out of the floodplain. Being Zone A, the existing floodplain does not have an effective hydraulic model or base flood elevations. This study will develop the existing conditions hydraulic model and provide a comparison to proposed conditions with fill in place to demonstrate that the proposed development meets the Johnson County requirements for floodplain impact.

1.2 Project Description

The proposed project is in Johnson County along Walnut Creek immediately upstream of FM917, as shown in **Figure 1.1**. A site plan is not being proposed with this study and the study is being utilized to define the minimum finished floor of future proposed structures. In the existing conditions, the site discharges directly to Walnut Creek generally in sheet flow conditions and proposed conditions will also discharge to Walnut Creek in sheet flow conditions.

1.3 Data Collection

Topographic Survey

Existing conditions for the site are based on a 2019 Lidar downloaded from TNRIS. Additional onsite
topography completed in November 2020 by DFW Geodesy. Note that the onsite area east of the existing
concrete drive was adjusted to remove any filled placed in the floodplain to show the topo conditions in
the FEMA effective condition.

Previous Studies Done in the Area

- The effective FEMA zone AE floodplain downstream of FM917 study was completed in 1991. The area
 upstream of this location has had limited development so beyond the erosion that has occurred overtime
 lowering the creek flowline, the effective flow data is reasonable to utilize in this study.
- No other studies are known to have been completed for this area.

Governing Criteria

- The governing criteria for this project is Johnson County Commissioners Court Order #2019-17. The project is not within any city limits and does not fall under any criteria other than Johnson County.
- Particular criteria followed is:
 - Article 4, Section B.9 which states fill is allowed in a floodplain without a floodway if water surface elevation does not rise more than 1' within the community.
 - Article 5, Section B.2 which states the minimum finished floor for nonresidential structures must be 3' above the base flood elevation.

1.4 Methodology

Hydrology

 No hydrology for this project was completed. The flow from the existing study just downstream of FM917 provided by FEMA was utilized.

Hydraulics

- HEC-RAS version 6.0 was utilized to create a 1D steady state model for both existing and proposed conditions
- Flow was applied at the first cross section of the model. No other flow breaks were used.
- Manning's n coefficients are from the iSWM Hydraulic Model with adjustments based on the previously completed study and observations from aerial imagery
- The HEC-RAS model was extended downstream to a point that the proposed improvements no longer caused a water surface change. Although this area was previously studied, it was observed that the updated lidar topo showed the channel invert being approximately 1' lower than the previous study which also lowered the water surface elevation in the results from the FEMA effective model.
- Normal flow depth was utilized as the downstream boundary conditions

Mapping

All GIS data is stored in geopackage or shapefile format and is included in Appendix D. All figures were
created utilizing QGIS 3.18 and the mapping file has been included as well.

SECTION 2 EXISTING CONDITIONS

2.1 Drainage Patterns

The property currently has one building and paved area in existing conditions. These areas in general discharge to the east and south directly to Walnut Creek. Walnut Creek travels east on the south portion of the property and turns north crossing FM 917 below and existing bridge. Heavy vegetation and wooded area provides a buffer between Walnut Creek and the open area on the property.

2.2 Hydrologic Model

No hydrology was complete with this study. Flow from effective FEMA study is utilized. See annotated information received from FEMA in **Appendix A**.

2.3 Hydraulic Model

This area being zone A floodplain, did not have a hydraulic model available for existing conditions. Therefore, the existing conditions model was created from scratch utilizing 2019 lidar. The model is extended far enough upstream and downstream that the impact of the proposed conditions either no longer has an effect on Walnut Creek or changes in water surface elevation are consistent. The hydraulic work map can be seen on **Figure 1.2.**

Downstream, the model is extended north of the existing FM 917 bridge where effective cross sections exist from the effective FIS. The existing cross section, designated L in the FIS, is shown to have a water surface elevation of 709.8 while the corrected effective conditions, created with this study, shows an elevation of 707.77. When comparing the cross section utilized in the FEMA effective data and the 2019 lidar section, the invert of the cross section was observed to be ~1′ lower in the current conditions which contributed to the corrected effective elevation being lower. Differences in the manning's coefficient also contributed as open space areas were revised from the effective cross section to better match observations in aerial imagery. **Figure 1.3** shows the locations of each manning's coefficient that was utilized for this study and **Figure 1.4** shows a comparison of the FEMA effective floodplain limits and the corrected effective limits.

Upstream, the model is extended to the last visible structure after the CR 604 bridge. This location was chosen to ensure any water surface elevation changes between CR 604 and FM 917 that could potentially impact existing structures was shown in pre/post development conditions. Extending the model upstream of CR 604 is not necessary as the upstream water surface rises caused by the proposed development would have minimal effect on the CR 604 bridge as the bridge would generally dictate the upstream water surface elevation since water will impound upstream, similar to the FM 917 bridge.

All structures impacted by floodplain, except for one at section 2314 on the east side of Walnut Creek, appear to be non-habitable structures such as barns or sheds. The existing habitable structure appears to be a manufactured home that is elevated above ground ~3′. Although the exact finished floor is not known, the existing ground elevation from lidar is 713.78 so the finished floor is ~716.78 which compared to cross section 2314 water surface elevation of 713.66, provides 3′ of separation from the floodplain.

2.4 Floodway

A floodway analysis was also completed with this study at the request of county floodplain officials for informational purposes upstream of FM 917 as no effective floodway has been adopted by FEMA at the time of this study. The floodway delineated in this study downstream of FM 917 is not intended to replace the effective floodway currently shown in the FEMA FIRM. The effective floodway should be used for any development at those locations or revised, if necessary, with a separate study and submittal. Any future upstream development should verify from effective FEMA data if an official floodway has been established at the time of development.

			Floodway		Base Flo	ood Water Sur	face Elevation	n (ft)
Cross Secti	on	Width (ft)	Section Area (sq ft)	Mean Velocity (ft/s)	Regulatory	Without Floodway	With Floodway	Increase
3547		274.57	1515.02	5.24	715.40	715.40	716.34	0.94
3331		280.00	1545.09	5.14	714.83	714.83	715.83	1.00
3039		291.00	1764.75	4.50	714.33	714.33	715.24	0.91
2838		253.07	1691.68	4.69	714.06	714.06	714.88	0.82
2314		213.06	1764.65	4.50	713.66	713.66	714.34	0.68
2048		162.00	1204.81	6.59	712.00	712.00	712.98	0.98
1886		250.00	1569.52	5.06	711.70	711.70	712.56	0.86
1743		255.00	1779.52	4.46	711.34	711.34	712.33	0.99
1461		265.00	1737.68	4.57	710.86	710.86	711.62	0.76
1325		275.00	2147.20	3.70	710.79	710.79	711.58	0.79
1161		226.65	1682.74	5.25	710.19	710.19	710.83	0.64
970		398.00	2541.91	4.40	709.54	709.54	710.54	1.00
932 FM917	BR U	236.09	983.19	8.21	709.54	709.54	710.54	1.00
932 FM917	BR D	292.76	865.09	9.18	709.54	709.54	709.84	0.30
879		87.49	1507.91	8.73	707.77	707.77	708.13	0.36
666		330.00	1630.54	4.87	707.02	707.02	707.64	0.62
425		300.00	1444.09	5.50	705.41	705.41	706.38	0.97
156		257.20	1207.77	6.57	703.80	703.80	704.58	0.78

Table 1 Floodway Data Table

SECTION 3 PROPOSED CONDITIONS

3.1 Drainage Patterns

In the proposed conditions, the current cleared open space area will be elevated with fill. Just as in existing conditions, the site will continue to discharge to Walnut Creek in sheet flow conditions. The existing heavy vegetation and wooded area buffer between the open space and the creek will be maintained in order to reduce the potential for erosive conditions to develop and also provide some treatment capacity. The proposed grading will be limited to the floodway limits as determined in the existing conditions.

3.2 Hydrologic Model

No hydrology was complete with this study. Flow from effective FEMA study is utilized. See annotated information received from FEMA in **Appendix A**.

3.3 Hydraulic Model

The corrected effective model was updated to include proposed elevation changes at cross sections 1161,1325, 1461, and 1743. All other cross sections and parameters for the proposed conditions remained the same from existing conditions. The existing and proposed water surface elevation comparison table as well as the velocity comparison can be seen below.

	100-	-Year Water Su	rface Elevation	ı
Cross Section	Corrected Effective	Proposed	Difference	Min FF
3547	715.40	715.69	0.29	
3331	714.83	715.10	0.27	
3039	714.33	714.55	0.22	
2838	714.06	714.23	0.17	
2314	713.66	713.73	0.07	
2048	712.00	712.27	0.27	
1886	711.70	712.01	0.31	
1743	711.34	711.74	0.40	
1461	710.86	710.99	0.13	
1325	710.79	710.80	0.01	
1161	710.19	710.12	-0.07	713.12
970	709.54	709.61	0.07	
932 FM917 BR U	709.54	709.61	0.07	
932FM917 BR D	709.54	709.61	0.07	
879	707.77	707.96	0.19	
666	707.02	707.19	0.17	
425	705.41	705.40	-0.01	
156	703.80	703.80	0.00	

Table 2: Corrected Effective vs. Proposed Water Surface Elevation

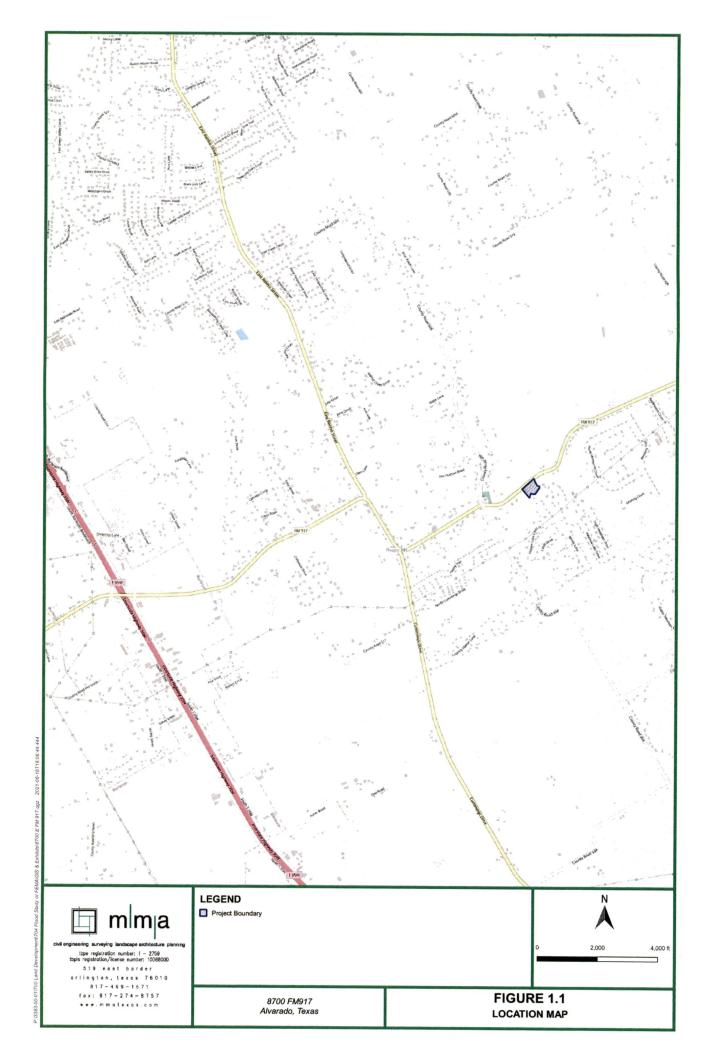
				100-Year	Velocity	
C	ross Sect	ion	Corrected Effective	Proposed	Difference	% Difference
	3547		7.22	7.21	-0.01	-0.1%
	3331		6.80	7.06	0.26	3.7%
	3039		4.95	5.30	0.35	6.6%
	2838		4.43	4.81	0.38	7.9%
	2314		4.21	4.67	0.46	9.9%
	2048		10.55	9.84	-0.71	-7.2%
	1886		7.78	7.25	-0.53	-7.3%
	1743		7.15	6.53	-0.62	-9.5%
	1461		6.26	7.32	1.06	14.5%
	1325		4.77	6.20	1.43	23.1%
	1161		7.29	7.92	0.63	8.0%
	970		6.68	6.62	-0.06	-0.9%
932	FM917	BR U	9.05	8.81	-0.24	-2.7%
932	FM917	BR D	9.99	9.73	-0.26	-2.7%
	879		9.04	8.88	-0.16	-1.8%
	666		8.64	8.79	0.15	1.7%
	425		10.17	10.57	0.40	3.8%
	156		9.18	9.18	0.00	0.0%

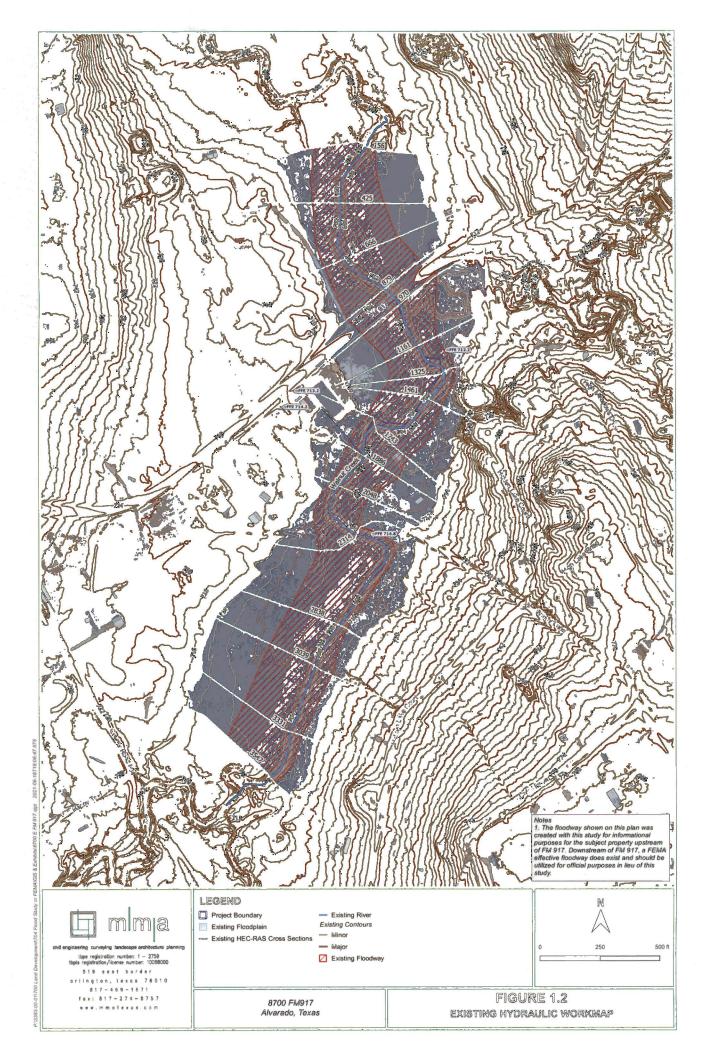
Table 3: Corrected Effective vs. Proposed Velocity

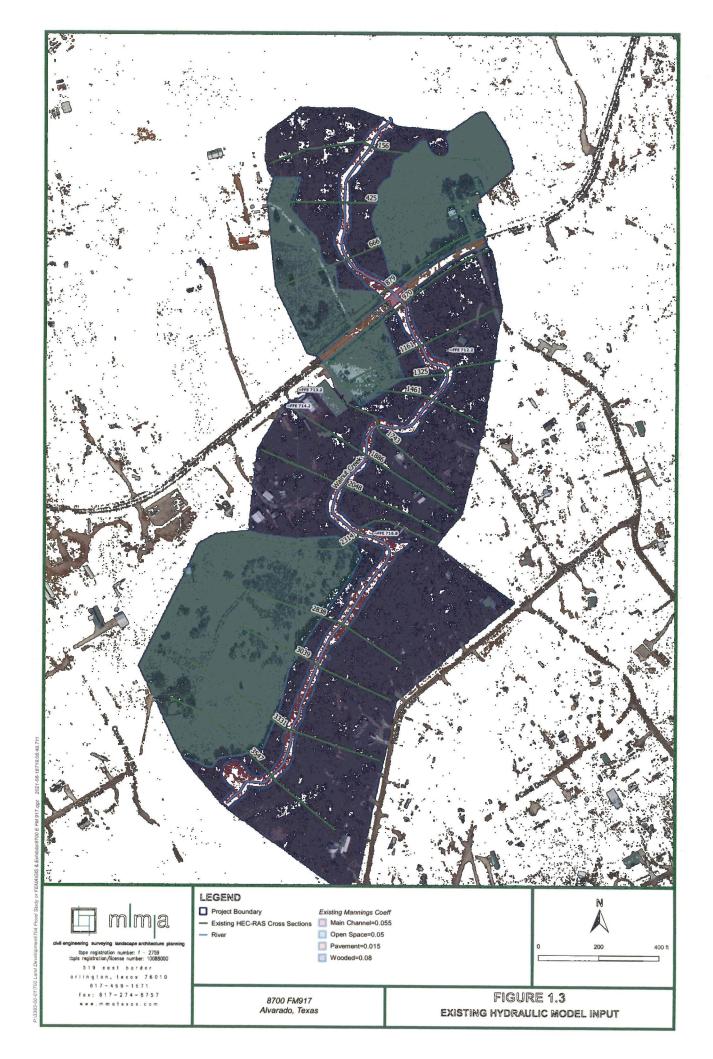
The habitable structure at section 2314, even in proposed conditions is still ~3' above the proposed conditions water surface elevation. Other habitable structure finished floor elevations adjacent to the floodplain are shown on **Figure 2.2** along with the existing and proposed floodplain limits comparison. All existing structure appear to be at minimum 1.46' (cross section 1743) above the proposed water surface elevation.

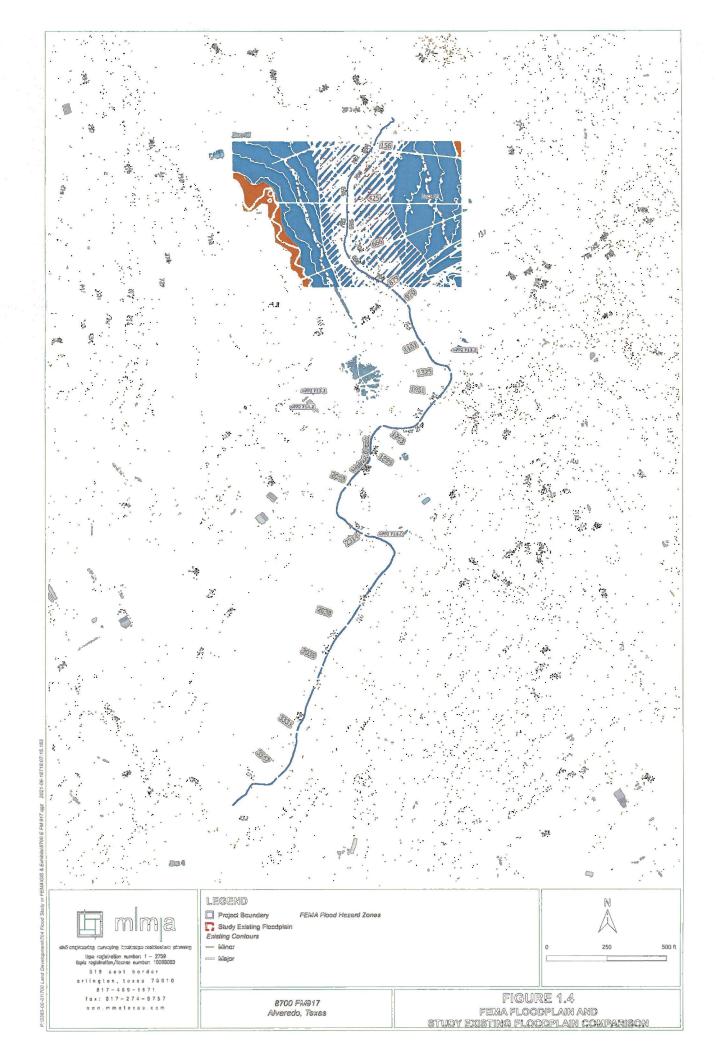
SECTION 4 CONCLUSIONS

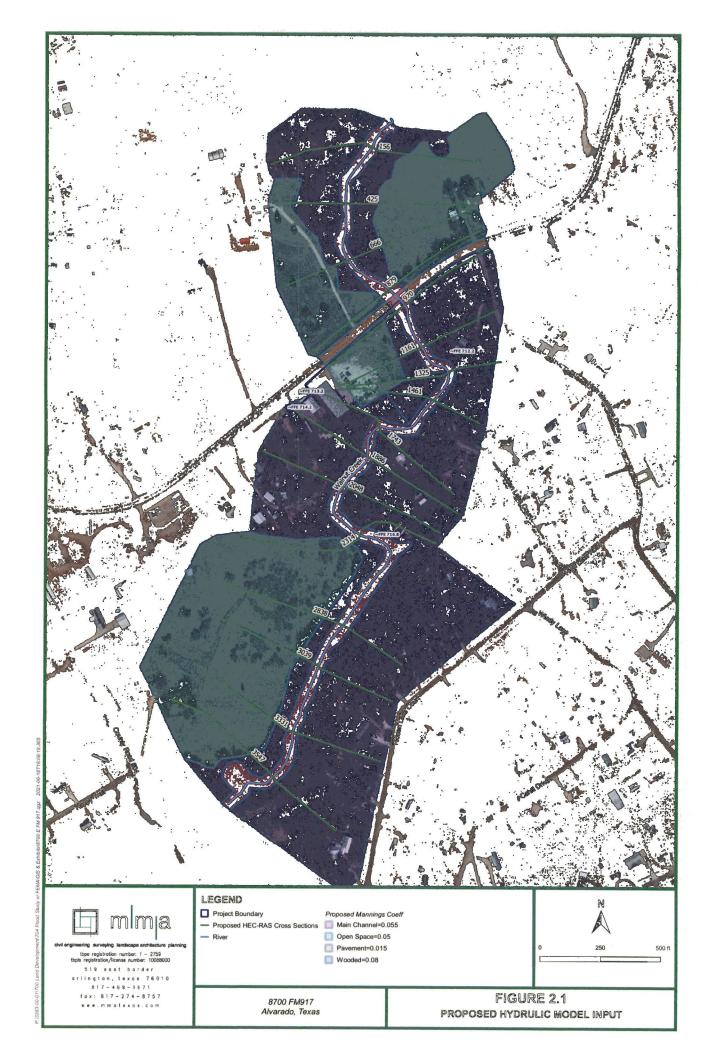
- The proposed fill can be placed and cause less than 1' of rise in water surface elevation meeting Article 4, Section B.9 criteria.
- The existing habitable structure at cross section 2314 is elevated above the water surface elevations determined in this study so as not to be at risk of flooding. No other structures in the floodplain appear to be habitable structure. All other adjacent habitable structures are at minimum 1.46' (cross section 1743) above the proposed water surface elevation.
- The required minimum finished floor for future development is determined in this study to be 3' above the proposed water surface elevation meeting Article 4, Section B.2 requirements.

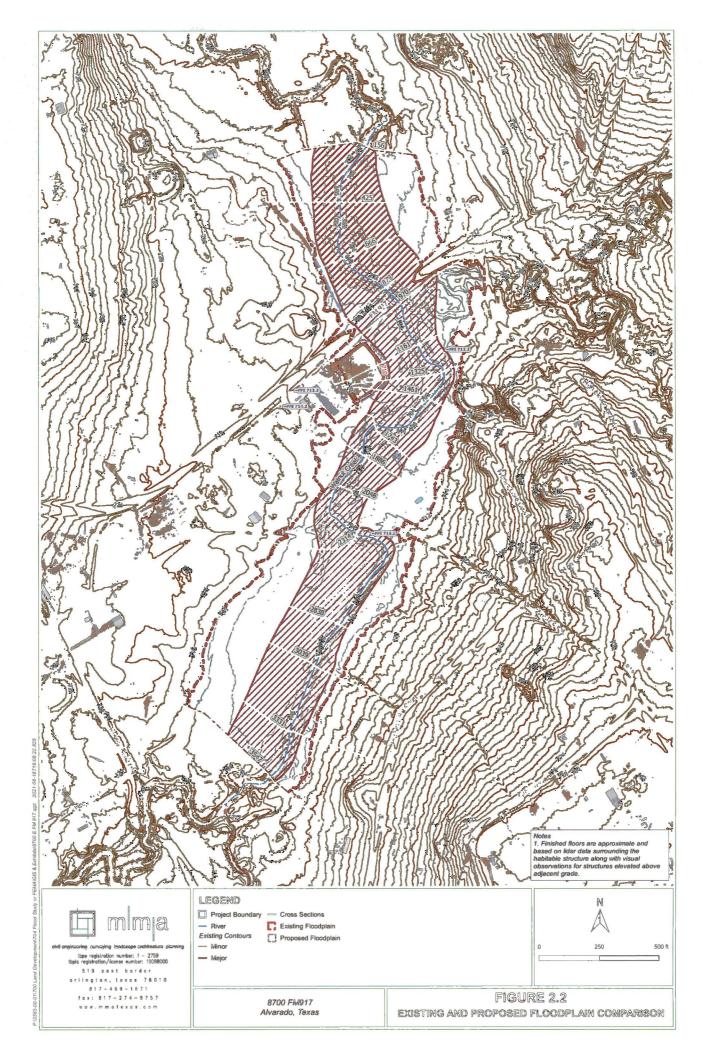












Appendix A Annotated Reference Data



FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP
FOR SPART FIRM PANEL LAYOUT



NOTES TO USERS

SCALE

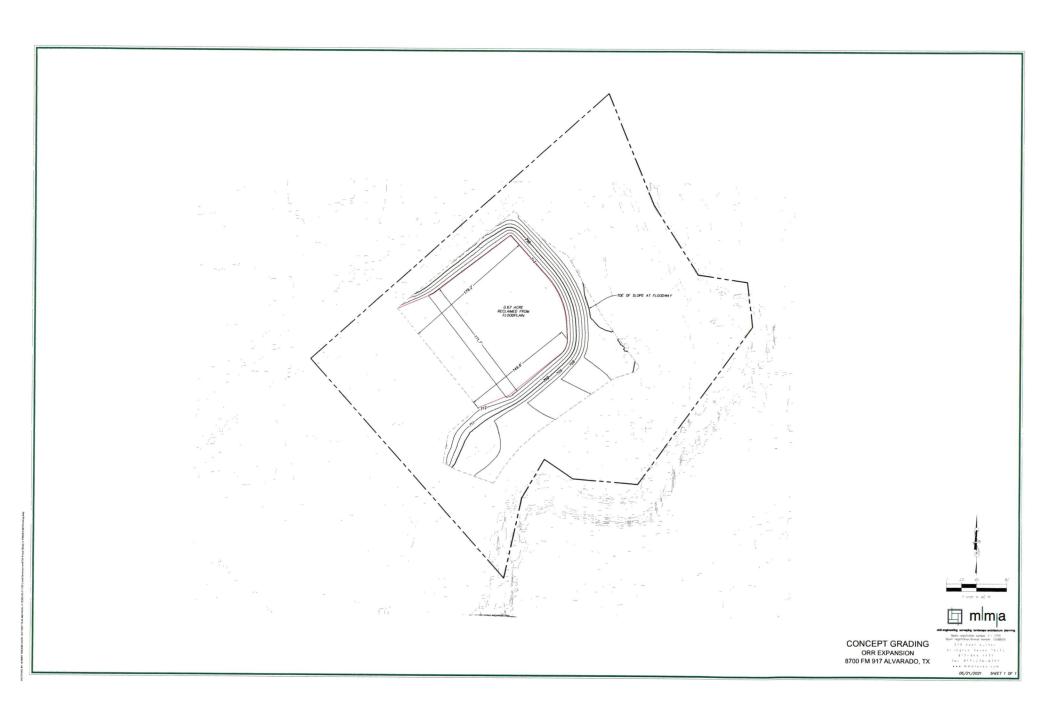
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FEMA National Flood Insurance Program NATIONAL FLOOD INSURANCE PROGRAM FLOOD INSURANCE RATE MAP

JOHNSON COUNTY, TEXAS AND INCORPORATED AREAS PANEL 205 of 475



MAP NUMBER 48251C0205J EFFECTIVE DATE cember 04, 2012

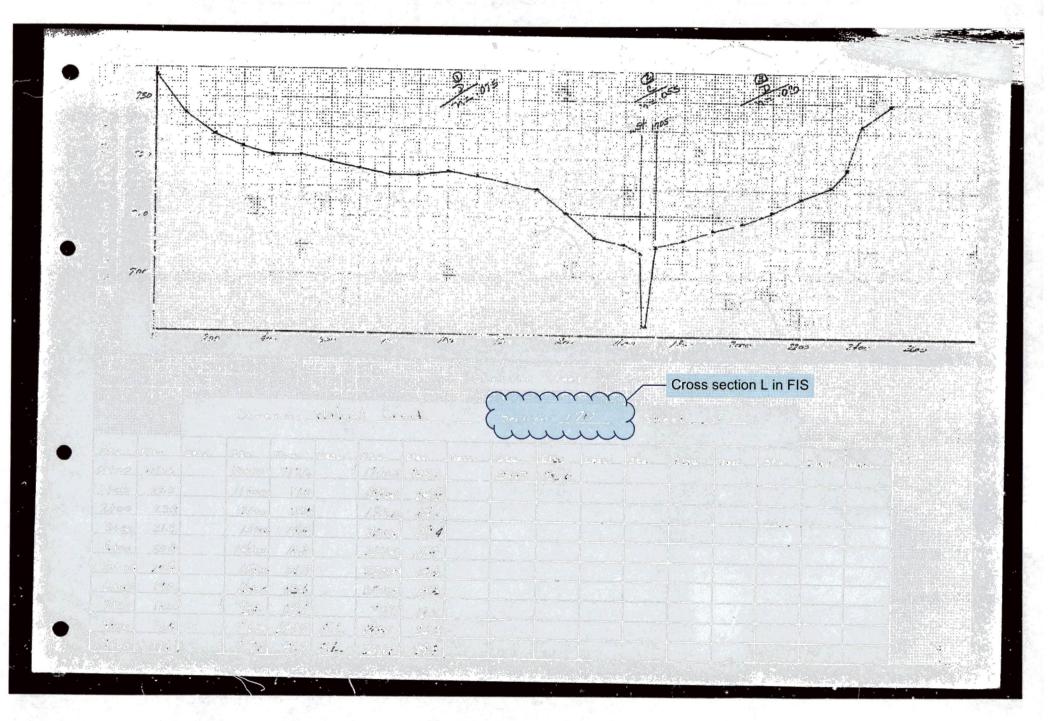


Appendix B Hydrologic Data

Section L in FIS 7/13/88 JOHNSON COUNTY FIS (RBS464/WSP2.0801) PAGE 50 WALNUT CREEK 100YR. STORM EN 07701482 report DA=7946-0 RATING TABLE FOR SECTION 170 CFS ----ACRES FLOODED-----STARTING FRICTION CRIT ELEV NO. CSM SLOPE DAMAGE CHANNEL NON-DAM 691.7 0.0 784.1 5476.6 0.0 8.0 0.0 BANK FULL *****WARNING-BANKFULL OR ZERO DAMAGE ELEV BELOW FIRST PROFILE. FLOW INTERPOLATED LIMEARLY FROM CHANNEL BOTTOM***** 0.0 ZERO DAME 784-1 365.8 5476 . 6 0.0 0.0 *****WARNING-BANKFULL OR ZERO DAMAGE ELEV BELOW FIRST PROFILE. FLOW INTERPOLATED LINEARLY FROM CHANNEL BOTTOM**** 0.0 0.0 1.00 707-1 0-00314 7940.0 0.0 709.7 2083.1 S GMENT TABLE FOR SECTION 170 SEG NO 1 PISCHARGE CFS 7940 -1852. 4700. 1388. 7.29 1.94 1. VELOCITY FPS 5.86 2.56 32486 . 84417. 23976. 1 FLEV 709.7 KD 140879. **Effective Flow**

Appendix C Hydraulic Data

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DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY COMMUNITY ACKNOWLEDGMENT FORM

O.M.B. NO. 1660-0015 Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this data collection is estimated to average 1.38 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and submitting the form. This collection is required to obtain or retain benefits. You are not required to respond to this collection of information unless a valid OMB control number is displayed on this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0015). NOTE: Do not send your completed form to this address.

completed form to this address.	treet, Arlington, VA 20598-3005, Paperwork Reduction Project (1	1660-0015). NOTE: Do not send your
This form must be completed for requests involving the exist remove a property from the SFHA which was previously local	iting or proposed placement of fill (complete Section A) <i>OR</i> to prosted within the regulatory floodway (complete Section B).	ovide acknowledgment of this request to
This form must be completed and signed by the official responsible subject property address must appear in the spaces provide for additional information about this form.	onsible for floodplain management in the community. The six d ed below. Incomplete submissions will result in processing dela	ligit NFIP community number and the lays. Please refer to the MT-1 instructions
Community Number:	Property Name or Address:	
A. REQUESTS INVOLVING THE PLACEMENT OF FILL		
meets or is designed to meet all of the community floor regulatory floodway, and that all necessary Federal, St For Conditional LOMR-F requests, the applicant has or Conditional LOMR-F determination. For LOMR-F reques independently of FEMA's process. Section 9 of the ESA an endangered species, a permit is required from U.S. For actions authorized, funded, or being carried out by Section 7(a)(2) of the ESA will be submitted. In addition from the SFHA are or will be reasonably safe from floor	nanagement, I hereby acknowledge that we have received of request. Based upon the community's review, we find to odplain management requirements, including the requirement, and local permits have been, or in the case of a Condition of the case, I acknowledge that compliance with Sections 9 and 10 appropriate of the compliance with Sections 9 and 10 appropriate of the condition of the case of the condition of the case of the c	the completed or proposed project ement that no fill be placed in the ditional LOMR-F, will be obtained. e to FEMA prior to issuance of the 10 of the ESA has been achieved red species. If an action might harm rvice under Section 10 of the ESA. ncy showing its compliance with proposed structures to be removed able upon request by DHS-FEMA all
Community Official's Name and Title: (Please Print or T		Telephone No.:
Community Official's Name and Title: (<i>Please Print or T</i> Community Name:	Type) Community Official's Signature: (required)	Telephone No.: Date:
	Community Official's Signature: (required)	
B. PROPERTY LOCATED WITHIN THE REGULATORY FLO As the community official responsible for floodplain ma LOMA. We understand that this request is being forwa regulatory floodway. We acknowledge that no fill on the that the completed or proposed project meets or is des Community Comments:	Community Official's Signature: (required) OODWAY anagement, I hereby acknowledge that we have received arded to DHS-FEMA to determine if this property has been bis property has been or will be placed within the designating signed to meet all of the community floodplain management.	Date:
Community Name: B. PROPERTY LOCATED WITHIN THE REGULATORY FLO As the community official responsible for floodplain matches to be understand that this request is being forware gulatory floodway. We acknowledge that no fill on the	Community Official's Signature: (required) OODWAY anagement, I hereby acknowledge that we have received arded to DHS-FEMA to determine if this property has been bis property has been or will be placed within the designating signed to meet all of the community floodplain management.	Date:

FEDERAL EMERGENCY MANAGEMENT AGENCY PAYMENT INFORMATION FORM

Community Name:			
Project Identifier:			
THIS FORM MUST BE MAILED BELOW.), ALONG WITH THE APPROPRIA	ATE FEE, TO THE ADDRESS BELOW OR FAXED	TO THE FAX NUMBER
Please make check or money	y order payable to the National F	Flood Insurance Program.	
Type of Request:	MT-1 application MT-2 application	LOMC Clearinghouse 847 South Pickett Street Alexandria, VA 22304-4605 Attn.: LOMC Manager	
	EDR application	FEMA Project Library 847 South Pickett Street Alexandria, VA 22304-4605 FAX (703) 212-4090	
Request No. (if known):	Check No.:	Amount:	
☐ INITIAL FEE* ☐ FINAL F	FEE FEE BALANCE** M	MASTER CARD VISA CHECK MC	ONEY ORDER
	nd/or Alluvial Fan requests (as ap ting a corrected fee for an ongoi		
COMPLETE THIS SECTION ONI	ILY IF PAYING BY CREDIT CARD		
	CARD NUMBER		EXP. DATE
1 2 3 4 5 6	6 7 8 9 10 11	12 13 14 15 16 Mc	onth Year
Date		Signature	
NAME (AS IT APPEARS ON CAR (please print or type)	<i>RD)</i> :	-	
ADDRESS: (for your credit card receipt-please print or type) DAYTIME PHONE:		-	
DAYTIME PHONE:	***************************************		

In addition to this form (MT-1 Form 1), please complete the checklist below. ALL	requests must include one copy of the following:
Copy of the effective FIRM panel on which the structure and/or propert regulatory floodway will require Section B of MT-1 Form 3)	ty location has been accurately plotted (property inadvertently located in the NFIP
Copy of the Subdivision Plat Map for the property (with recordation date)	ta and stamp of the Recorder's Office)
OR Copy of the Property Deed (with recordation data and stamp of the Reshowing the surveyed location of the property relative to local streets shown on the FIRM panel.	corder's Office), accompanied by a tax assessor's map or other certified map and watercourses. The map should include at least one street intersection that is
Form 2 – Elevation Form. If the request is to remove the structure, and submitted in lieu of Form 2. If the request is to remove the entire legal provided on Form 2.	an Elevation Certificate has already been completed for this property, it may be ally recorded property, or a portion thereof, the lowest lot elevation must be
☐ Please include a map scale and North arrow on all maps submitted.	
For LOMR-Fs and CLOMR-Fs, the following must be submitted in addition to the it Form 3 – Community Acknowledgment Form	ems listed above:
For CLOMR-Fs, the following must be submitted in addition to the items listed about	ove:
determination from the National Marine Fisheries Service (NMFS) or the	Take Permit, an Incidental Take Statement, a "not likely to adversely affect" e U.S. Fish and Wildlife Service (USFWS), or an official letter from NMFS or USFWS s or designated critical habitat. Please refer to the MT-1 instructions for additional
Please do not submit original documents. Please retain a copy of all su	
DHS-FEMA encourages the submission of all required data in a digital f submissions help to further DHS-FEMA's Digital Vision and also may fa	format (e.g. scanned documents and images on Compact Disc [CD]). Digital cilitate the processing of your request.
Incomplete submissions will result in processing delays. For additional info documents listed above, please refer to the MT-1 Form Instructions located	rmation regarding this form, including where to obtain the supporting d at http://www.fema.gov/plan/prevent/fhm/dl_mt-1.shtm.
$\begin{tabular}{ll} \textit{Processing Fee} \end{tabular} (see instructions for appropriate mailing address; or visit schedule) \\ \end{tabular}$	http://www.fema.gov/fhm/frm_fees.shtm for the most current fee
Revised fee schedules are published periodically, but no more than once lot(s)/structure(s) LOMAs are fee exempt. The current review and proces	annually, as noted in the Federal Register . Please note: single/multiple ssing fees are listed below:
Check the fee that applies to your request:	
\$325 (single lot/structure LOMR-F following a CLOMR-F)	
\$425 (single lot/structure LOMR-F)	
\$500 (single lot/structure CLOMA or CLOMR-F)	
\$700 (multiple lot/structure LOMR-F following a CLOMR-F,	or multiple lot/structure CLOMA)
\$800 (multiple lot/structure LOMR-F or CLOMR-F)	
Please submit the Payment Information Form for remittance of applicable	e fees. Please make your check or money order payable to:
National Flood Insurance Program.	
All documents submitted in support of this request are correct to the best of my or imprisonment under Title 18 of the United States Code, Section 1001.	knowledge. I understand that any false statement may be punishable by fine
Applicant's Name (required):	Company (if applicable):
Mailing Address (required):	Daytime Telephone No. (required):
E-Mail Address (optional): By checking here you may receive correspondence electronically at the email address provided):	Fax No. (optional):
Date (required)	Signature of Applicant (required)

DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY ELEVATION FORM

O.M.B. NO. 1660-0015 Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this data collection is estimated to average 1.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and submitting the form. This collection is required to obtain or retain benefits. You are not required to respond to this collection of information unless a valid OMB control number is displayed on this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0015). NOTE: Do not send your completed form to this address.

This form must be completed for requests and must be completed and signed by a registered professional engineer or licensed land surveyor. A DHS - FEMA National Flood Insurance Program (NFIP) Elevation Certificate may be submitted in lieu of this form for single structure requests.

For requests to remove a structure on natural grade OR on engineered fill from the Special Flood Hazard Area (SFHA), submit the lowest adjacent grade (the lowest ground touching the structure), *including an attached deck or garage*. For requests to remove an entire parcel of land from the SFHA, provide the lowest lot elevation; or, if the request involves an area described by metes and bounds, provide the lowest elevation within the metes and bounds description. All measurements are to be rounded to nearest tenth of a foot. In order to process your request, all information on this form must be completed *in its entirety*. Incomplete submissions will result in processing delays.

rou	inded to nearest tenth of a foot. ult in processing delays.	In order to proce	ss your request,	all information on this f	form must be comple	ted <i>in its entirety</i> . Inco	mplete submissions will
1.	NFIP Community Number:	Proper	ty Name or Ac	ldress:			
2.	. Are the elevations listed below based on existing or proposed conditions? (Check one)						
3.	3. For the existing or proposed structures listed below, what are the types of construction? (check all that apply) ☐ crawl space ☐ slab on grade ☐ basement/enclosure ☐ other (explain)						
4.	Has DHS - FEMA identified to If yes, what is the date	this area as subj	ect to land subre-leveling?	osidence or uplift? (se / (month/y		Yes No	
5.	5. What is the elevation datum? NGVD 29 NAVD 88 Other (explain) If any of the elevations listed below were computed using a datum different than the datum used for the effective Flood Insurance Rate Map (FIRM) (e.g., NGVD 29 or NAVD 88), what was the conversion factor? Local Elevation +/- ft. = FIRM Datum						
	Address Lot Number Block Lowest Lot Adjacent Base Flood BFE Source Number Elevation* Grade To Elevation Structure						
	Address	Lot Number		The state of the s	Adjacent Grade To		BFE Source
	Address	Lot Number		The state of the s	Adjacent Grade To		BFE Source
IIIIOI	certification is to be signed and mation. All documents submitt	sealed by a license	Number Number	Flevation* r, registered professiona	Adjacent Grade To Structure	Elevation	sortifical quantities
by fi	certification is to be signed and	sealed by a license	Number Number	Flevation* r, registered professiona	Adjacent Grade To Structure	Elevation	sortifical quantities
by fi	certification is to be signed and mation. All documents submitt ne or imprisonment under Title	sealed by a license	Number Number	r, registered professiona orrect to the best of my tion 1001.	Adjacent Grade To Structure	Elevation ct authorized by law to tand that any false stat	sortifical quantities
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Continued from Page 1.							
Address	Lot Number	Block Number	Lowest Lot Elevation*	Lowest Adjacent Grade To Structure		Base Flood Elevation	BFE Source
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This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.							
Certifier's Name:			License No.:			Expiration Date:	£.
Company Name:			Telephone No.:				
Email:			Fax No.				
Signature:			Date:				
* For requests involving a portion of property, include the lowest ground elevation within the metes and bounds description. Please note: If the Lowest Adjacent Grade to Structure is the only elevation provided, a determination will be issued for the structure only.					al (optional)		

DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY PROPERTY INFORMATION FORM

O.M.B. NO. 1660-0015 Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this data collection is estimated to average 1.63 hours per response. The burden estimate includes the time for reviewing instructions,

accuracy of the burden estimate and any suggestio Emergency Management Agency, 1800 South Bell S form to this address.					
Revision Based on Fill (CLOMR-F) for existing or pro	er, property owner's agent, licensed land surveyor, or registered professional engineer to support a request for a tter of Map Amendment (CLOMA), Letter of Map Revision Based on Fill (LOMR-F), or Conditional Letter of Map poposed, single or multiple lots/structures. In order to process your request, all information on this form must be Incomplete submissions will result in processing delays. Please check the item below that describes your request:				
LOMA	A letter from DHS-FEMA stating that an existing structure or parcel of land that has not been elevated by fill (natural grade) would not be inundated by the base flood.				
CLOMA	A letter from DHS-FEMA stating that a proposed structure that is not to be elevated by fill (natural grade) would not be inundated by the base flood if built as proposed.				
☐ LOMR-F	A letter from DHS-FEMA stating that an existing structure or parcel of land that has been elevated by fill would not be inundated by the base flood.				
☐ CLOMR-F	A letter from DHS-FEMA stating that a parcel of land or proposed structure that will be elevated by fill would not be inundated by the base flood if fill is placed on the parcel as proposed or the structure is built as proposed.				
practice does not alter the existing (natural grade) e Program (NFIP) map showing the area in a Special	g the subject property) placed that raises the ground to or above the Base Flood Elevation (BFE). The common ng material (topsoil) and backfilling with select structural material is not considered the placement of fill if the elevation, which is at or above the BFE. Fill that is placed before the date of the first National Flood Insurance Flood Hazard Area (SFHA) is considered natural grade.				
Has fill been placed on your property to raise ground that was previously below the BFE?	Yes No If yes, when was fill placed?				
Will fill be placed on your property to raise ground that is below the BFE?	mm/dd/yyyy Yes* No If yes, when will fill be placed?				
	mm/dd/yyyy * If yes, Endangered Species Act (ESA) compliance must be documented to FEMA prior to issuance of the CLOMR-F determination (please refer page 4 to the MT-1 instructions).				
 Street Address of the Property (if request street names below): 	t is for multiple structures or units, please attach additional sheet referencing each address and enter				
2. Legal description of Property (Lot, Block, S	Subdivision or abbreviated description from the Deed):				
3. Are you requesting that a flood zone dete	rmination be completed for (check one):				
Structures on the property? What are the dates of construction?(MM/YYYY) A portion of land within the bounds of the property? (A certified metes and bounds description and map of the area to be removed, certified by a licensed land surveyor or registered professional engineer, are required. For the preferred format of metes and bounds descriptions, places are format of the property of the property of the professional engineer.					
The entire legally recorded	ptions, please refer to the MT-1 Form 1 Instructions.)				
4. Is this request for a (check one): Single structure Single lot Multiple structures (How r	many structures are involved in your request? List the number:) ots are involved in your request? List the number:)				

8700 FM917 DRAINAGE STUDY

PROJECT ADDRESS

8700 FM917 Alvarado, TX



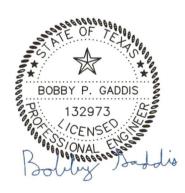
June 2021



PREPARED BY

mma, inc. 519 E. Border St., Arlington, TX 76010 (817) 469-1671

TBPELS Registration No. F-2759



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Figure 1.2 – Existing Hydraulic Workmap

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Figure 1.4 – FEMA Floodplain and Study Existing Floodplain Comparison

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Table 3 – Corrected Effective vs. Proposed Velocity

LIST OF APPENDICES

Appendix A - Annotated Reference Data

Appendix B – Hydrologic Data

Appendix C - Hydraulic Data

Appendix D (folder) - GIS & CAD Data

SECTION 1 INTRODUCTION

1.1 Intent and Purpose statement

The purpose of this study is to demonstrate the impact of the proposed ~1 ac. site expansion at 8700 FM917 Alvarado, TX along Walnut Creek. The expansion being proposed is located within a Zone A floodplain and will require fill to be placed in the floodplain to elevate proposed structures out of the floodplain. Being Zone A, the existing floodplain does not have an effective hydraulic model or base flood elevations. This study will develop the existing conditions hydraulic model and provide a comparison to proposed conditions with fill in place to demonstrate that the proposed development meets the Johnson County requirements for floodplain impact.

1.2 Project Description

3

The proposed project is in Johnson County along Walnut Creek immediately upstream of FM917, as shown in Figure 1.1. A site plan is not being proposed with this study and the study is being utilized to define the minimum finished floor of future proposed structures. In the existing conditions, the site discharges directly to Walnut Creek generally in sheet flow conditions and proposed conditions will also discharge to Walnut Creek in sheet flow conditions.

1.3 Data Collection

Topographic Survey

Existing conditions for the site are based on a 2019 Lidar downloaded from TNRIS. Additional onsite
topography completed in November 2020 by DFW Geodesy. Note that the onsite area east of the existing
concrete drive was adjusted to remove any filled placed in the floodplain to show the topo conditions in
the FEMA effective condition.

Previous Studies Done in the Area

- The effective FEMA zone AE floodplain downstream of FM917 study was completed in 1991. The area
 upstream of this location has had limited development so beyond the erosion that has occurred overtime
 lowering the creek flowline, the effective flow data is reasonable to utilize in this study.
- No other studies are known to have been completed for this area.

Governing Criteria

- The governing criteria for this project is Johnson County Commissioners Court Order #2019-17. The project is not within any city limits and does not fall under any criteria other than Johnson County.
- Particular criteria followed is:
 - Article 4, Section B.9 which states fill is allowed in a floodplain without a floodway if water surface elevation does not rise more than 1' within the community.
 - Article 5, Section B.2 which states the minimum finished floor for nonresidential structures must be 3' above the base flood elevation.

1.4 Methodology

Hydrology

 No hydrology for this project was completed. The flow from the existing study just downstream of FM917 provided by FEMA was utilized.

Hydraulics

- HEC-RAS version 6.0 was utilized to create a 1D steady state model for both existing and proposed conditions
- Flow was applied at the first cross section of the model. No other flow breaks were used.
- Manning's n coefficients are from the iSWM Hydraulic Model with adjustments based on the previously completed study and observations from aerial imagery
- The HEC-RAS model was extended downstream to a point that the proposed improvements no longer caused a water surface change. Although this area was previously studied, it was observed that the updated lidar topo showed the channel invert being approximately 1' lower than the previous study which also lowered the water surface elevation in the results from the FEMA effective model.
- Normal flow depth was utilized as the downstream boundary conditions

Mapping

• All GIS data is stored in geopackage or shapefile format and is included in **Appendix D**. All figures were created utilizing QGIS 3.18 and the mapping file has been included as well.

SECTION 2 EXISTING CONDITIONS

2.1 Drainage Patterns

1

The property currently has one building and paved area in existing conditions. These areas in general discharge to the east and south directly to Walnut Creek. Walnut Creek travels east on the south portion of the property and turns north crossing FM 917 below and existing bridge. Heavy vegetation and wooded area provides a buffer between Walnut Creek and the open area on the property.

2.2 Hydrologic Model

No hydrology was complete with this study. Flow from effective FEMA study is utilized. See annotated information received from FEMA in **Appendix A**.

2.3 Hydraulic Model

This area being zone A floodplain, did not have a hydraulic model available for existing conditions. Therefore, the existing conditions model was created from scratch utilizing 2019 lidar. The model is extended far enough upstream and downstream that the impact of the proposed conditions either no longer has an effect on Walnut Creek or changes in water surface elevation are consistent. The hydraulic work map can be seen on **Figure 1.2.**

Downstream, the model is extended north of the existing FM 917 bridge where effective cross sections exist from the effective FIS. The existing cross section, designated L in the FIS, is shown to have a water surface elevation of 709.8 while the corrected effective conditions, created with this study, shows an elevation of 707.77. When comparing the cross section utilized in the FEMA effective data and the 2019 lidar section, the invert of the cross section was observed to be ~1' lower in the current conditions which contributed to the corrected effective elevation being lower. Differences in the manning's coefficient also contributed as open space areas were revised from the effective cross section to better match observations in aerial imagery. **Figure 1.3** shows the locations of each manning's coefficient that was utilized for this study and **Figure 1.4** shows a comparison of the FEMA effective floodplain limits and the corrected effective limits.

Upstream, the model is extended to the last visible structure after the CR 604 bridge. This location was chosen to ensure any water surface elevation changes between CR 604 and FM 917 that could potentially impact existing structures was shown in pre/post development conditions. Extending the model upstream of CR 604 is not necessary as the upstream water surface rises caused by the proposed development would have minimal effect on the CR 604 bridge as the bridge would generally dictate the upstream water surface elevation since water will impound upstream, similar to the FM 917 bridge.

All structures impacted by floodplain, except for one at section 2314 on the east side of Walnut Creek, appear to be non-habitable structures such as barns or sheds. The existing habitable structure appears to be a manufactured home that is elevated above ground ~3′. Although the exact finished floor is not known, the existing ground elevation from lidar is 713.78 so the finished floor is ~716.78 which compared to cross section 2314 water surface elevation of 713.66, provides 3′ of separation from the floodplain.

2.4 Floodway

A floodway analysis was also completed with this study at the request of county floodplain officials for informational purposes upstream of FM 917 as no effective floodway has been adopted by FEMA at the time of this study. The floodway delineated in this study downstream of FM 917 is not intended to replace the effective floodway currently shown in the FEMA FIRM. The effective floodway should be used for any development at those locations or revised, if necessary, with a separate study and submittal. Any future upstream development should verify from effective FEMA data if an official floodway has been established at the time of development.

			Floodway		Base Flo	od Water Sur	face Elevation	n (ft)
Cı	ross Section	Width (ft)	Section Area (sq ft)	Mean Velocity (ft/s)	Regulatory	Without Floodway	With Floodway	Increase
	3547	274.57	1515.02	5.24	715.40	715.40	716.34	0.94
	3331	280.00	1545.09	5.14	714.83	714.83	715.83	1.00
	3039	291.00	1764.75	4.50	714.33	714.33	715.24	0.91
	2838	253.07	1691.68	4.69	714.06	714.06	714.88	0.82
	2314	213.06	1764.65	4.50	713.66	713.66	714.34	0.68
	2048	162.00	1204.81	6.59	712.00	712.00	712.98	0.98
	1886	250.00	1569.52	5.06	711.70	711.70	712.56	0.86
2	1743	255.00	1779.52	4.46	711.34	711.34	712.33	0.99
	1461	265.00	1737.68	4.57	710.86	710.86	711.62	0.76
	1325	275.00	2147.20	3.70	710.79	710.79	711.58	0.79
	1161	226.65	1682.74	5.25	710.19	710.19	710.83	0.64
	970	398.00	2541.91	4.40	709.54	709.54	710.54	1.00
932	FM917 BR U	236.09	983.19	8.21	709.54	709.54	710.54	1.00
932	FM917 BR D	292.76	865.09	9.18	709.54	709.54	709.84	0.30
	879	87.49	1507.91	8.73	707.77	707.77	708.13	0.36
	666	330.00	1630.54	4.87	707.02	707.02	707.64	0.62
	425	300.00	1444.09	5.50	705.41	705.41	706.38	0.97
	156	257.20	1207.77	6.57	703.80	703.80	704.58	0.78

Table 1 Floodway Data Table

SECTION 3 PROPOSED CONDITIONS

3.1 Drainage Patterns

In the proposed conditions, the current cleared open space area will be elevated with fill. Just as in existing conditions, the site will continue to discharge to Walnut Creek in sheet flow conditions. The existing heavy vegetation and wooded area buffer between the open space and the creek will be maintained in order to reduce the potential for erosive conditions to develop and also provide some treatment capacity. The proposed grading will be limited to the floodway limits as determined in the existing conditions.

3.2 Hydrologic Model

No hydrology was complete with this study. Flow from effective FEMA study is utilized. See annotated information received from FEMA in **Appendix A**.

3.3 Hydraulic Model

The corrected effective model was updated to include proposed elevation changes at cross sections 1161,1325, 1461, and 1743. All other cross sections and parameters for the proposed conditions remained the same from existing conditions. The existing and proposed water surface elevation comparison table as well as the velocity comparison can be seen below.

	100-	Year Water Su	rface Elevation	
Cross Section	Corrected Effective	Proposed	Difference	Min FF
3547	715.40	715.69	0.29	
3331	714.83	715.10	0.27	
3039	714.33	714.55	0.22	
2838	714.06	714.23	0.17	
2314	713.66	713.73	0.07	
2048	712.00	712.27	0.27	
1886	711.70	712.01	0.31	
1743	711.34	711.74	0.40	
1461	710.86	710.99	0.13	
1325	710.79	710.80	0.01	
1161	710.19	710.12	-0.07	713.12
970	709.54	709.61	0.07	
932 FM917 BR U	709.54	709.61	0.07	
932FM917 BR D	709.54	709.61	0.07	
879	707.77	707.96	0.19	
666	707.02	707.19	0.17	
425	705.41	705.40	-0.01	
156	703.80	703.80	0.00	

Table 2: Corrected Effective vs. Proposed Water Surface Elevation

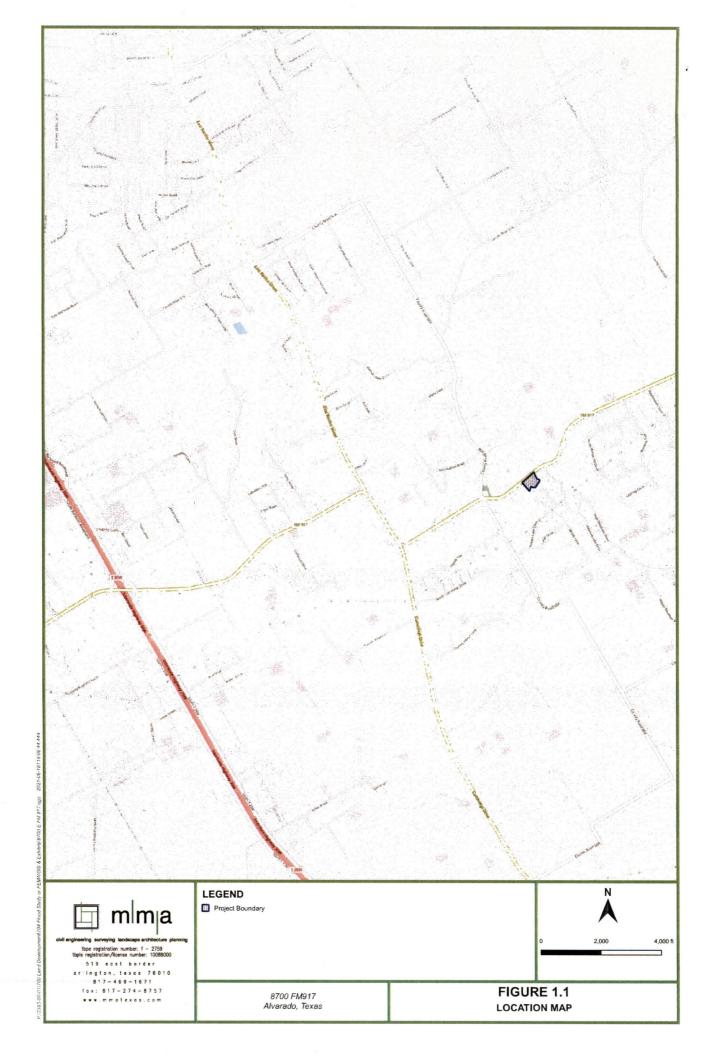
				100-Year	Velocity	
Cro	ss Secti	on	Corrected Effective	Proposed	Difference	% Difference
	3547		7.22	7.21	-0.01	-0.1%
	3331		6.80	7.06	0.26	3.7%
	3039		4.95	5.30	0.35	6.6%
	2838		4.43	4.81	0.38	7.9%
	2314		4.21	4.67	0.46	9.9%
	2048		10.55	9.84	-0.71	-7.2%
	1886		7.78	7.25	-0.53	-7.3%
	1743		7.15	6.53	-0.62	-9.5%
	1461		6.26	7.32	1.06	14.5%
	1325		4.77	6.20	1.43	23.1%
	1161		7.29	7.92	0.63	8.0%
	970		6.68	6.62	-0.06	-0.9%
932 F	F M 917	BR U	9.05	8.81	-0.24	-2.7%
932	FM917	BR D	9.99	9.73	-0.26	-2.7%
	879		9.04	8.88	-0.16	-1.8%
	666		8.64	8.79	0.15	1.7%
	425		10.17	10.57	0.40	3.8%
	156		9.18	9.18	0.00	0.0%

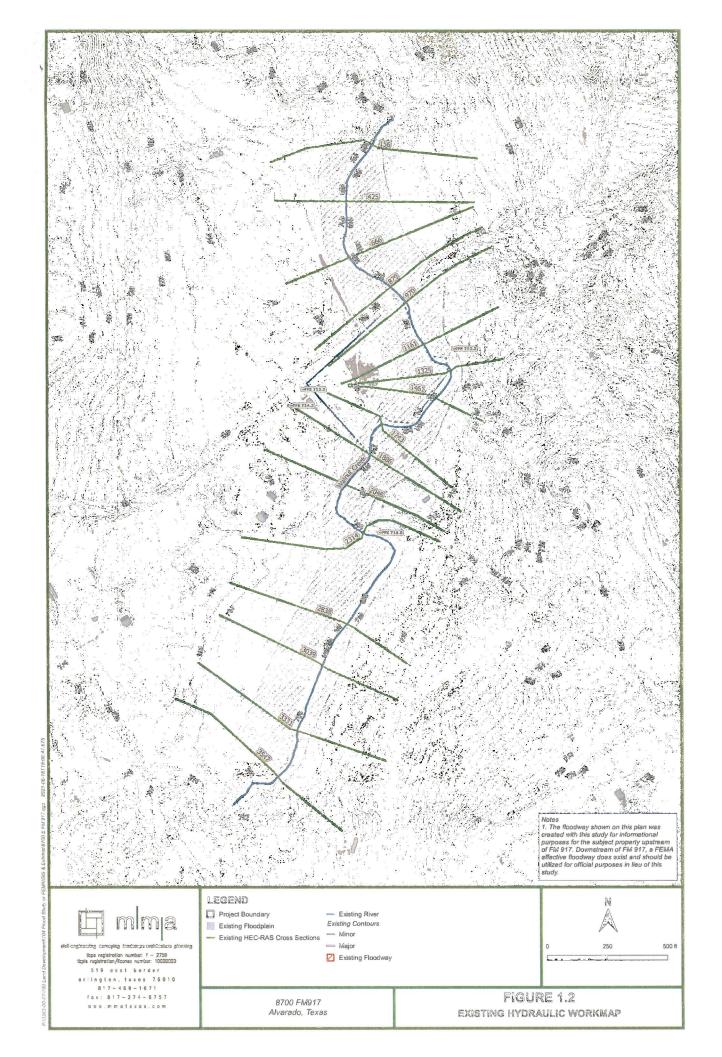
Table 3: Corrected Effective vs. Proposed Velocity

The habitable structure at section 2314, even in proposed conditions is still \sim 3′ above the proposed conditions water surface elevation. Other habitable structure finished floor elevations adjacent to the floodplain are shown on **Figure 2.2** along with the existing and proposed floodplain limits comparison. All existing structure appear to be at minimum 1.46′ (cross section 1743) above the proposed water surface elevation.

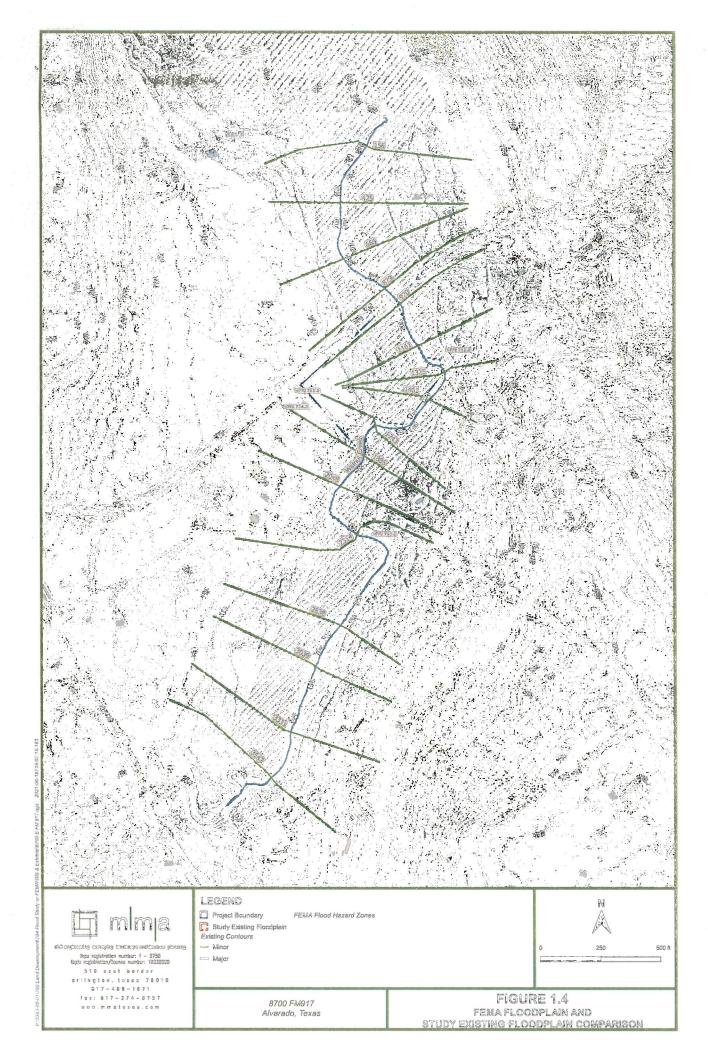
SECTION 4 CONCLUSIONS

- The proposed fill can be placed and cause less than 1' of rise in water surface elevation meeting Article 4, Section B.9 criteria.
- The existing habitable structure at cross section 2314 is elevated above the water surface elevations determined in this study so as not to be at risk of flooding. No other structures in the floodplain appear to be habitable structure. All other adjacent habitable structures are at minimum 1.46' (cross section 1743) above the proposed water surface elevation.
- The required minimum finished floor for future development is determined in this study to be 3' above the proposed water surface elevation meeting Article 4, Section B.2 requirements.

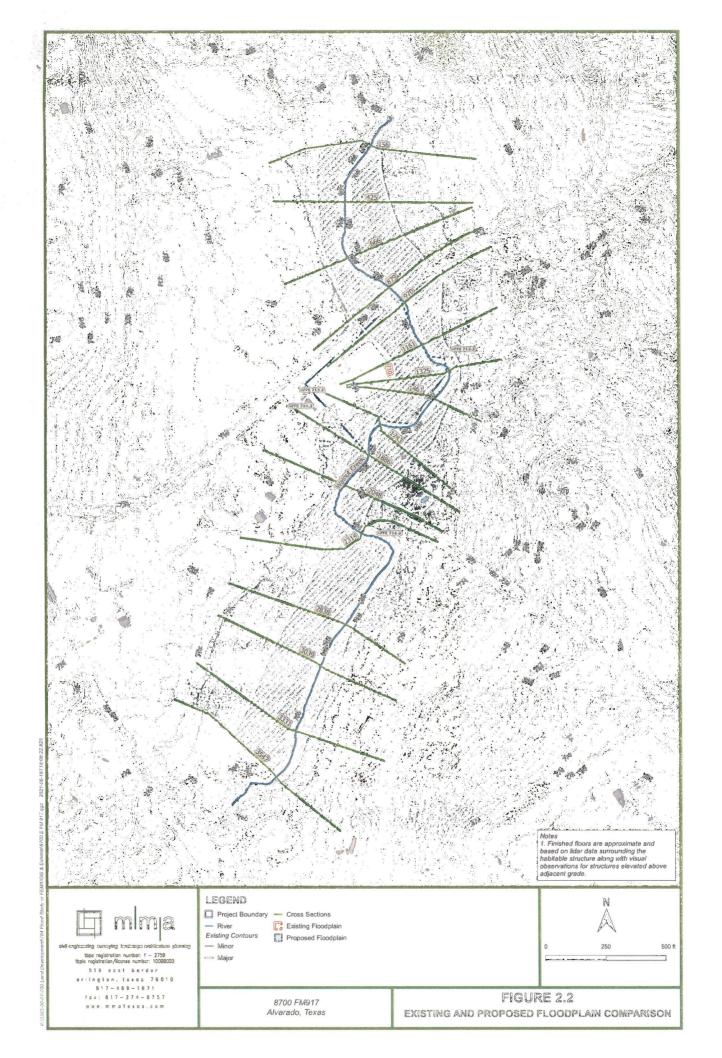




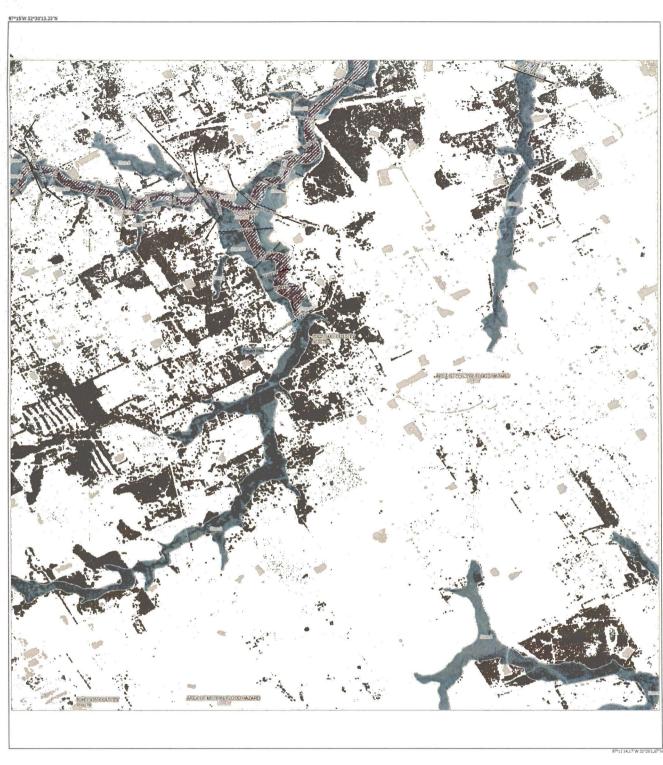








Appendix A Annotated Reference Data





NOTES TO USERS

SCALE

	1	inch =	1,00	0 feet		1:12,0	00
	G	500	1,000		2,000	3,000	4,000
N	Ξ				200	Meters	Fee
1/1	0	105 21	0	420	630	840	



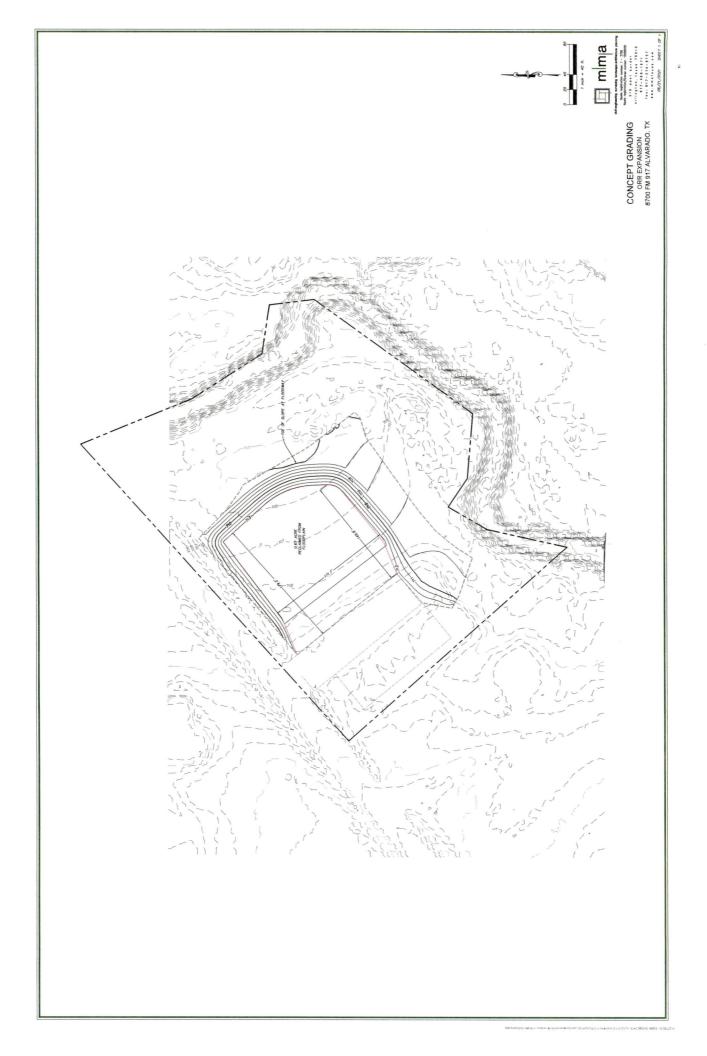
NATIONAL FLOOD INSURANCE PROGRAM FLOOD INSURANCE RATE MAP

JOHNSON COUNTY, TEXAS AND INCORPORATED AREAS PANEL 205 of 475

PANEL	200	UF	415		

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OF BURLESON	485450	0205

MAP NUMBER 48251C0205J EFFECTIVE DATE December 04, 2012



Appendix B Hydrologic Data

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JOHNSON COUNTY 115 TRBS4-7/USP2-08017 Section Lain FIS 7713788 PAGE 50 WALNUT CREEK 100YR. STORM REV 09701782 report DA=7948.0 RATING TABLE FOR SECTION 170 ----- STARTING FRICTION CFS NO. ELEV DAMAGE CHANNEL NON-DAM CSM ELEV SLADE 0.0 691.7 5476.6 0.0 BANK FULL 784-1 365 . 8 0.0 0.0 ****WARRING-BARKFULL OR ZERO DAMAGE ELEV BELOW FIRST PROFILE. FLOW INTERPOLATED LIMEARLY FROM CHANNEL BOTTOR**** 365.8 5476+6 0.0 0.0 0 - 0 ZERO DAME 784-1 *** ** WARNING -BANKFULL OR ZERO BAMAGE ELEY BELOW FIRST PROFILE. FLOW INTERPOLATED LINEARLY FROM CHANNEL BOTTOM 0.0 1.00 0.0 707-1 0-00314 0.0 1 709.7 2083.1 7940.0 S CHENT TABLE FOR SECTION 170 SEG NO C C -------4700. 1388. 1852. 1 DISCHARGE CFS 7940. 1.94 1. VELOCITY FPS 2.56 7.29 32486 . 84417. 23976. 1 FLEV 784.7 KD 140879. Effective Flow

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Appendix C Hydraulic Data

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Sta C too 1100:	Flex 733.6 27.3 23.9		Stre Sta 10+00	61:x 717:6 17:0 15:9	Desc	Sto. 17105	105.2 06.4 08.1	The second secon	Sect.	Elev. 130-4	7 Y 70 	3 5 h	Elev.	o F	The state of the s					
Sta C too 1 too 2 too	753.6 27.3 23.9 21.8	Desc	Stve Sta 10+00 1/1+00 1/2+00	2 m:	Desc	A Cr. 17105 18100 19100	205.2 205.2 26.4 08.1	The second secon	Sect.	Elev. 130-4	Dans.	3 5 h	Elev.	o F	The state of the s					
5ts C too 1 too 2 too 3 too	51ex. 733.6 27.3 23.9 21.8 20.4	Desc	Stve Sta 10+00 12+00 13+00 14+00	17.6 17.6 17.0 15.9 14.4	Desc	A Cr. Sto. 17105 18100 19100 20100 21100	105.2 06.4 08.1 09.4 11.4	The second secon	Sect.	Elev. 130-4	Dans.	3 5 h	Elev.	o F	The state of the s					
5ts C tow 1 too 2 tou 3 too 4 too 5 too	27.3 27.3 23.9 21.8 20.4 20.4	Desc	Stve Sta 10+00 12+00 /3+00	717.6 17.0 15.9 14.4 10.8	Desc	Sto. 17105 18100 19100 20100 21100 22100	105.2 06.4 08.1 09.4 11.4 13.6	The second secon	Sect.	Elev. 130-4	Dans.	3 5 h	Elev.	o F	The state of the s					
5ts C tou 1100 2100 3100 4100 5100	Flex. 753.6 27.3 23.9 21.8 20.4 20.4 19.7	Desc	Stve Sta 10+00 11+00 12+00 13+00 14+00 15+00	717.6 17.0 15.9 14.4 10.8 06.7	Desc	Sto. 17105 18100 19100 20100 21100 22100 23100	105.2 06.4 08.1 09.4 11.4 13.6 15.6	The second secon	Sect.	5 to 4	Dans.	3 5 h	Elev.	o F	The state of the s					
5ts C tow 1 too 2 tou 3 too 4 too 5 too	27.3 27.3 23.9 21.8 20.4 20.4	Desc	Stve Sta 10+00 11+00 13+00 14+00 15+00	117.6 17.0 15.9 14.4 10.8 06.7 05.6	Desc	Sto. 17105 18100 19100 20100 21100 22100	105.2 06.4 08.1 09.4 11.4 13.6	The second secon	Sect.	5 to 4	Dans.	3 5 h	Elev.	o F	The state of the s					

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