engineers
surveyors
landscape architects

August 2025

San Antonio District WPAP Report

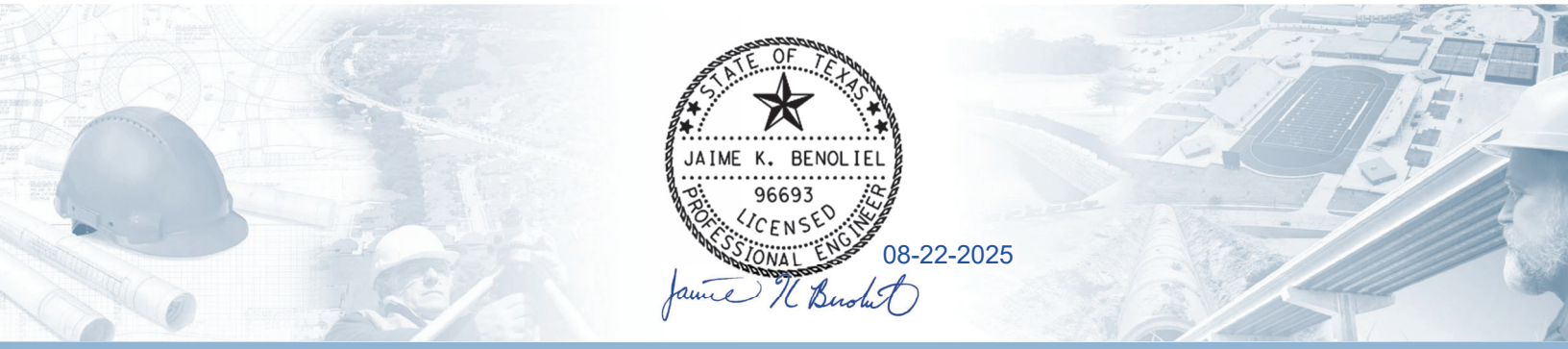
FM 1560 from Galm/Shaenfield to SH 16

CSJ: 2230-01-021

Bexar County, Texas

Prepared for:

Texas Department of Transportation



Prepared by: Teague Nall and Perkins, Inc.
1221 Park West Green Drive, Suite 100
Katy, Texas 77493 | 832.220.1205 phone

www.tnpinc.com

TNP Firm Registrations
Texas Board of Professional Engineers, Firm No. F-230 | Georgia Board of Professional Engineers, Firm No. PEF007431
Texas Board of Professional Land Surveying, Firm No. 10011600 | 10194381 | 10011601

EDWARDS AQUIFER APPLICATION COVER PAGE (TCEQ-20705)

Texas Commission on Environmental Quality

Edwards Aquifer Application Cover Page

Our Review of Your Application

The Edwards Aquifer Program staff conducts an administrative and technical review of all applications. The turnaround time for administrative review can be up to 30 days as outlined in 30 TAC 213.4(e). Generally administrative completeness is determined during the intake meeting or within a few days of receipt. The turnaround time for technical review of an administratively complete Edwards Aquifer application is 90 days as outlined in 30 TAC 213.4(e). Please know that the review and approval time is directly impacted by the quality and completeness of the initial application that is received. In order to conduct a timely review, it is imperative that the information provided in an Edwards Aquifer application include final plans, be accurate, complete, and in compliance with 30 TAC 213.

Administrative Review

1. Edwards Aquifer applications must be deemed administratively complete before a technical review can begin. To be considered administratively complete, the application must contain completed forms and attachments, provide the requested information, and meet all the site plan requirements. The submitted application and plan sheets should be final plans. Please submit one full-size set of plan sheets with the original application, and half-size sets with the additional copies.

   To ensure that all applicable documents are included in the application, the program has developed tools to guide you and web pages to provide all forms, checklists, and guidance. Please visit the below website for assistance: http://www.tceq.texas.gov/field/eapp.

2. This Edwards Aquifer Application Cover Page form (certified by the applicant or agent) must be included in the application and brought to the administrative review meeting.

3. Administrative reviews are scheduled with program staff who will conduct the review. Applicants or their authorized agent should call the appropriate regional office, according to the county in which the project is located, to schedule a review. The average meeting time is one hour.

4. In the meeting, the application is examined for administrative completeness. Deficiencies will be noted by staff and emailed or faxed to the applicant and authorized agent at the end of the meeting, or shortly after. Administrative deficiencies will cause the application to be deemed incomplete and returned.

   An appointment should be made to resubmit the application. The application is re-examined to ensure all deficiencies are resolved. The application will only be deemed administratively complete when all administrative deficiencies are addressed.

5. If an application is received by mail, courier service, or otherwise submitted without a review meeting, the administrative review will be conducted within 30 days. The applicant and agent will be contacted with the results of the administrative review. If the application is found to be administratively incomplete, it can be retrieved from the regional office or returned by regular mail. If returned by mail, the regional office may require arrangements for return shipping.

6. If the geologic assessment was completed before October 1, 2004 and the site contains "possibly sensitive" features, the assessment must be updated in accordance with the *Instructions to Geologists* (TCEQ-0585 Instructions).

Technical Review

1. When an application is deemed administratively complete, the technical review period begins. The regional office will distribute copies of the application to the identified affected city, county, and groundwater conservation district whose jurisdiction includes the subject site. These entities and the public have 30 days to provide comments on the application to the regional office. All comments received are reviewed by TCEQ.

2. A site assessment is usually conducted as part of the technical review, to evaluate the geologic assessment and observe existing site conditions. The site must be accessible to our staff. The site boundaries should be

clearly marked, features identified in the geologic assessment should be flagged, roadways marked and the alignment of the Sewage Collection System and manholes should be staked at the time the application is submitted. If the site is not marked the application may be returned.

3. We evaluate the application for technical completeness and contact the applicant and agent via Notice of Deficiency (NOD) to request additional information and identify technical deficiencies. There are two deficiency response periods available to the applicant. There are 14 days to resolve deficiencies noted in the first NOD. If a second NOD is issued, there is an additional 14 days to resolve deficiencies. If the response to the second notice is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, the application must be withdrawn or will be denied. Please note that because the technical review is underway, whether the application is withdrawn or denied **the application fee will be forfeited**.
4. The program has 90 calendar days to complete the technical review of the application. If the application is technically adequate, such that it complies with the Edwards Aquifer rules, and is protective of the Edwards Aquifer during and after construction, an approval letter will be issued. Construction or other regulated activity may not begin until an approval is issued.

Mid-Review Modifications

It is important to have final site plans prior to beginning the permitting process with TCEQ to avoid delays.

Occasionally, circumstances arise where you may have significant design and/or site plan changes after your Edwards Aquifer application has been deemed administratively complete by TCEQ. This is considered a "Mid-Review Modification". Mid-Review Modifications may require redistribution of an application that includes the proposed modifications for public comment.

If you are proposing a Mid-Review Modification, two options are available:

- If the technical review has begun your application can be denied/withdrawn, your fees will be forfeited, and the plan will have to be resubmitted.
- TCEQ can continue the technical review of the application as it was submitted, and a modification application can be submitted at a later time.

If the application is denied/withdrawn, the resubmitted application will be subject to the administrative and technical review processes and will be treated as a new application. The application will be redistributed to the affected jurisdictions.

Please contact the regional office if you have questions. If your project is located in Williamson, Travis, or Hays County, contact TCEQ's Austin Regional Office at 512-339-2929. If your project is in Comal, Bexar, Medina, Uvalde, or Kinney County, contact TCEQ's San Antonio Regional Office at 210-490-3096

Please fill out all required fields below and submit with your application.

1. Regulated Entity Name: FM 1560 Shaenfield/Galm to SH 16						**2. Regulated Entity No.:** New			
3. Customer Name: TXDOT						**4. Customer No.:** CN600803456			
5. Project Type: **(Please circle/check one)**	New		Modification			Extension		Exception	Roadway
6. Plan Type: **(Please circle/check one)**	WPAP	CZP	SCS	UST	AST	EXP	EXT	Technical Clarification	Optional Enhanced Measures
7. Land Use: **(Please circle/check one)**	Residential		Non-residential			**8. Site (acres):**			33.57
9. Application Fee:	N/A		**10. Permanent BMP(s):**			Jellyfish Filter			
11. SCS (Linear Ft.):	N/A		**12. AST/UST (No. Tanks):**			N/A			
13. County:	Bexar County		**14. Watershed:**			Leon Creek			

Application Distribution

Instructions: Use the table below to determine the number of applications required. One original and one copy of the application, plus additional copies (as needed) for each affected incorporated city, county, and groundwater conservation district are required. Linear projects or large projects, which cross into multiple jurisdictions, can require additional copies. Refer to the "Texas Groundwater Conservation Districts within the EAPP Boundaries" map found at:

http://www.tceq.texas.gov/assets/public/compliance/field_ops/eapp/EAPP%20GWCD%20map.pdf

For more detailed boundaries, please contact the conservation district directly.

Austin Region			
County:	**Hays**	**Travis**	**Williamson**
Original (1 req.)	___	___	___
Region (1 req.)	___	___	___
County(ies)	___	___	___
Groundwater Conservation District(s)	___Edwards Aquifer Authority ___Barton Springs/ Edwards Aquifer ___Hays Trinity ___Plum Creek	___Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	___Austin ___Buda ___Dripping Springs ___Kyle ___Mountain City ___San Marcos ___Wimberley ___Woodcreek	___Austin ___Bee Cave ___Pflugerville ___Rollingwood ___Round Rock ___Sunset Valley ___West Lake Hills	___Austin ___Cedar Park ___Florence ___Georgetown ___Jerrell ___Leander ___Liberty Hill ___Pflugerville ___Round Rock

San Antonio Region					
County:	**Bexar**	**Comal**	**Kinney**	**Medina**	**Uvalde**
Original (1 req.)	_1_	___	___	___	___
Region (1 req.)	_1_	___	___	___	___
County(ies)	_1_	___	___	___	___
Groundwater Conservation District(s)	_1_ Edwards Aquifer Authority ___Trinity-Glen Rose	___Edwards Aquifer Authority	___Kinney	___EAA ___Medina	___EAA ___Uvalde
City(ies) Jurisdiction	___Castle Hills ___Fair Oaks Ranch _1_Helotes ___Hill Country Village ___Hollywood Park ___San Antonio (SAWS) ___Shavano Park	___Bulverde ___Fair Oaks Ranch ___Garden Ridge ___New Braunfels ___Schertz	NA	_1_San Antonio ETJ (SAWS)	NA

I certify that to the best of my knowledge, that the application is complete and accurate. This application is hereby submitted to TCEQ for administrative review and technical review.
Brian Witherell Print Name of Customer/Authorized Agent
Signature of Customer/Authorized Agent — Date: 8/26/2025

FOR TCEQ INTERNAL USE ONLY				
Date(s)Reviewed:		Date Administratively Complete:		
Received From:		Correct Number of Copies:		
Received By:		Distribution Date:		
EAPP File Number:		Complex:		
Admin. Review(s) (No.):		No. AR Rounds:		
Delinquent Fees (Y/N):		Review Time Spent:		
Lat./Long. Verified:		SOS Customer Verification:		
Agent Authorization Complete/Notarized (Y/N):		Fee Check:	Payable to TCEQ (Y/N):	
Core Data Form Complete (Y/N):			Signed (Y/N):	
Core Data Form Incomplete Nos.:			Less than 90 days old (Y/N):	

EDWARDS AQUIFER PROTECTION PROGRAM
ROADWAY APPLICATION
(TCEQ-20872)

Edwards Aquifer Protection Program Roadway Application

Texas Commission on Environmental Quality

This application is intended only for projects which a major roadway is designed for construction, such as State highways, County roads, and City thoroughfares.

Designed for Regulated Activities on the Contributing Zone to the Edwards Aquifer in relation to 30 TAC §213.24, Regulated Activities on the Edwards Aquifer Recharge Zone, in relation to 30 TAC §213.5(b), Effective June 1, 1999.

To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.

Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.

Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer.

The application was prepared by:

Print Name of Customer/Agent: TxDOT/Brian Witherell

Date: 8/26/25

Signature of Customer/Agent:

Project Information

1. Regulated Entity (Project) Name: FM 1560 Shaenfield/Galm to SH 16
2. County: Bexar County
3. Stream Basin(s): Culebra Creek Trib C1 and Helotes Creek
4. Groundwater Conservation District (if applicable): Edwards Aquifer Authority
5. Customer (Applicant):

   Contact Person: Charles C. Benavidez, P.E.
   Entity: Texas Department of Transportation
   Mailing Address: 4615 Northwest Loop 410
   City, State: San Antonio, TX Zip: 78229
   Telephone: (210)-615-5801
   Email Address: charles.benavidez@txdot.gov

6. Agent (Representative):

   Contact Person: Brian M. Witherell
   Entity: TxDOT
   Mailing Address: 4615 NW Loop 410
   City, State: San Antonio Zip: 78229
   Telephone: (210) 615-5846
   Email Address: Brian.Witherell@txdot.gov

7. Landowner of R.O.W. (Right of Way)
   Person or entity responsible for maintenance of water quality Best Management Practices (BMPs), if not applicant.

   Contact Person: _____
   Entity: _____
   Mailing Address: _____
   City, State: _____ Zip: _____
   Telephone: _____
   Email Address: _____

8. ☒ **The TCEQ must be able to inspect the project site or the application will be returned**. Sufficient survey marking is provided on the project to allow TCEQ regional staff to locate the boundaries and alignment of any regulated activities and the geologic or manmade features noted in the Geologic Assessment.

   ☒ Survey marking will be completed by this date: when advised of TCEQ site inspection

9. ☒ **Attachment A - Road Map**. A road map showing directions to and the location of the project site is attached. The map clearly shows the boundary of the project site.

10. ☒ **Attachment B - USGS Quadrangle**. A copy of the official 7 ½ minute USGS Quadrangle Map (Scale: 1" = 2000') is attached. The map(s) clearly show:

    ☒ Project site boundaries
    ☒ USGS Quadrangle Name(s)
    ☒ All drainage paths from site to surface waters

11. ☒ **This project extends into (Check all that apply):**

    ☒ Recharge Zone (RZ)
    ☐ Contributing Zone (CZ)
    ☒ Transition Zone (TZ)
    ☐ Contributing Zone within Transition Zone (CZ/TZ)
    ☐ Zone not regulated by EAPP

12. ☒ **Attachment C - Project Description**. A detailed narrative description of the proposed project is attached. The project description is consistent throughout the application and contains, at a minimum, the following details:

- ☒ Complete site area [Acres]
- ☒ Offsite upgradient stormwater areas to be captured
- ☒ Impervious area [Acres]
- ☒ Permanent BMP(s)
- ☒ Proposed site use
- ☒ Existing roadway (paved and/or unpaved)
- ☒ Structures to be demolished [Include demo phase]
- ☐ Major interim phases

13. Existing project site conditions are noted below:

- ☒ Existing paved and/or unpaved roads
- ☐ Undeveloped (Cleared)
- ☐ Undeveloped (Undisturbed/Not cleared)
- ☐ Existing commercial site
- ☐ Existing industrial site
- ☐ Existing residential site
- ☐ Other: _____

14. ☒ **Attachment D - Factors Affecting Surface Water Quality**. A detailed description of all factors that could affect surface water quality is attached.

15. ☒ Only inert materials as defined by 30 TAC §330.3 will be used as fill material.

16. Type of pavement or road surface to be used:

- ☐ Concrete
- ☒ Asphaltic concrete pavement
- ☐ Permeable Friction Course (PFC)
- ☐ Other: _____

17. Right of Way (R.O.W.) and Pavement Area:

R.O.W. for project: 33.57 (ac.)
Length: 9917.15 ft.
Width: varies from 120 ft. to 120 ft.
Impervious cover (IC): 20.51 (ac.)
Total of Pavement area 20.51 (ac.) ÷ R.O.W. area 33.57 (ac.) x 100 = 61.1% IC.

- ☒ CAD program was used to determine areas.
- ☒ Number of travel lanes: proposed: 5, existing: 4
- ☒ Typical widths of lanes: 12 (ft.)
- ☒ Are intersections also being improved? (Y/N) Y

Site Plan Requirements

Items 18 - 28 must be included on the Site Plan.

18. ☒ The Site Plan must have a minimum scale of 1" = 400'.
    Site Plan Scale: 1" = 100'

19. 100-year floodplain boundaries:

    ☒ Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled. The 100-year floodplain boundaries are based on the following specific (including date of material) source(s):Flood Insurance Rate Map for Bexar County, Texas, Map Number 48029C0205G and 48029C0215G, revised on Spetember 29, 2010.

    ☐ No part of the project site is located within the 100-year floodplain.

20. ☒ A layout of the development with existing and finished contours at appropriate, but not greater than ten-foot contour intervals is shown. Sensitive features, lots, wells, buildings, roads, culverts, etc. are shown on the site plan.

21. ☒ A figure (map) indicating all paths of drainage from the site to surface waters.

    ☒ Name all stream crossings: Culebra Creek, Helotes Creek
    ☒ Drainage patterns and approximate slopes.
    ☐ There will be no discharge to surface waters.

22. ☒ Distinguish between areas of soil disturbance and areas which will not be disturbed.

23. ☒ Show locations of major structural and nonstructural controls. These are the temporary and permanent best management practices. Include the following:

    ☐ Show design and location of any hazardous materials traps.
    ☒ Show design at outfalls of major control structures and conveyances.
    ☒ A description of the BMPs and measures that prevent pollutants from entering surface streams.

24. Show locations of staging areas or project specific locations (PSL). Are they:

    ☐ Onsite, within project R.O.W.
    ☐ Offsite.
    ☒ Not yet determined. (Requires future authorization)

25. ☒ Show locations where soil stabilization practices are expected to occur.

26. ☒ Show surface waters (including wetlands).

27. Temporary aboveground storage tank facilities:

    ☐ Temporary aboveground storage tank facilities will be located on this site. Show on site plan.
    ☒ Temporary aboveground storage tank facilities will not be located on this site.

28. ☒ Plan(s) also include:

    ☒ Sidewalks
    ☒ Related turn lanes
    ☐ Shared-use paths
    ☐ Off-site improvements and staging areas

☐ Demolition plans ☐ Utility relocations
☐ Other improved areas: _____

Permanent Best Management Practices (BMPs)

Description of practices and measures that will be used after construction is completed.

29. ☒ Permanent BMPs and measures have been designed, and will be constructed, operated, and maintained to ensure that 80% of the incremental increase in the annual mass loading of total suspended solids (TSS) from the site caused by the regulated activity is removed. These quantities have been calculated in accordance with technical guidance accepted by the executive director.

    ☒ The TCEQ Technical Guidance Manual (TGM) was used to design permanent BMPs and measures for this site.

    ☐ A technical guidance other than the TCEQ TGM was used to design permanent BMPs and measures for this site. The complete citation for the technical guidance that was used: _____

30. ☒ **Attachment E - BMPs for Upgradient (Offsite) Stormwater.**

    ☒ A description of the BMPs and measures that will be used to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site is attached.

    ☐ No surface water, groundwater or stormwater originates upgradient from the site and flows across the site, and an explanation is attached.

    ☐ Permanent BMPs or measures are not required to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site, and an explanation is attached.

31. ☒ **Attachment F - BMPs for On-site Stormwater**.

    ☒ A description of the BMPs and measures that will be used to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff from the site is attached.

    ☐ Permanent BMPs or measures are not required to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff, and an explanation is attached.

32. ☒ **Attachment G - Construction Plans**. Construction plans and design calculations for the proposed permanent BMPs and measures have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer, and are signed, sealed, and dated. Construction plans for the proposed permanent BMPs and measures are attached and include all proposed structural plans and specifications, and appropriate details.

    ☒ Major bridge cross-sections, and roadway plan and profiles

    ☒ BMP plans and details ☒ Design calculations

    ☒ Erosion control ☒ TCEQ Construction Notes

    ☒ SW3P ☒ EPIC, as necessary

33. ☒ **Attachment H - Inspection, Maintenance, Repair and Retrofit Plan**. A site and BMP specific plan for the inspection, maintenance, repair, and, if necessary, retrofit of the permanent BMPs and measures is attached. The plan fulfills all the following:

    ☒ Prepared and certified by the engineer designing the permanent BMPs and measures.
    ☒ Signed by the owner or responsible party.
    ☒ Outlines specific procedures for documenting inspections, maintenance, repairs, and, if necessary, retrofit.
    ☒ Contains a discussion of recordkeeping procedures.

34. ☐ **Attachment I - Pilot-Scale Field Testing Plan.** Pilot studies for BMPs that are not recognized by the Executive Director require prior approval from the TCEQ. A plan for pilot-scale field testing is attached.

    ☒ N/A

35. ☒ **Attachment J - Measures for Minimizing Surface Stream Contamination.** A description of the measures that will be used to avoid or minimize surface stream contamination and changes in the way in which water enters a stream as a result of the construction and development is attached. The measures address increased stream flashing, the creation of stronger flows, and in-stream effects caused by the regulated activity which increase erosion or may result in water quality degradation.

    ☒ Include permanent spill measures used to contain hydrocarbons or hazardous substances by way of traps, or response contingencies.

36. The applicant is responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity.

    If the applicant intends to transfer responsibility, check the box below.

    ☐ Yes

    A copy of the transfer of responsibility must be filed with the executive director at the appropriate regional office within 30 days.

Stormwater to be generated by the Proposed Project

Description of practices and measures that will be used during construction.

37. ☒ The site description, controls, maintenance, and inspection requirements for the Storm Water Pollution Prevention Plan (SWPPP or SW3P) developed under the Texas Pollutant Discharge Elimination System (TPDES) general permits for stormwater discharges have been submitted to fulfill paragraphs 30 TAC §213.24(1-5) & §213.5(b) of the technical report.

    ☒ The Temporary Stormwater Section (TCEQ-0602) is included with the application.
    ☒ The SWPPP (SW3P) will serve as the Temporary Stormwater Section (TCEQ-0602).

38. ☒ **Attachment K - Volume and Character of Stormwater**. A detailed description of the volume (quantity) and character (quality) of the stormwater runoff expected to occur from the proposed project is attached. The estimates of stormwater runoff quality and quantity are based on area and type of impervious cover.

    ☒ Include the pre-construction runoff coefficient.
    ☒ Include the post-construction runoff coefficient.

Administrative Information

39. ☒ Submit one (1) original and one (1) copy of the application, plus one electronic copy as needed, for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ is required to distribute the additional copies to these jurisdictions.

40. The fee for the plan(s) is based on:

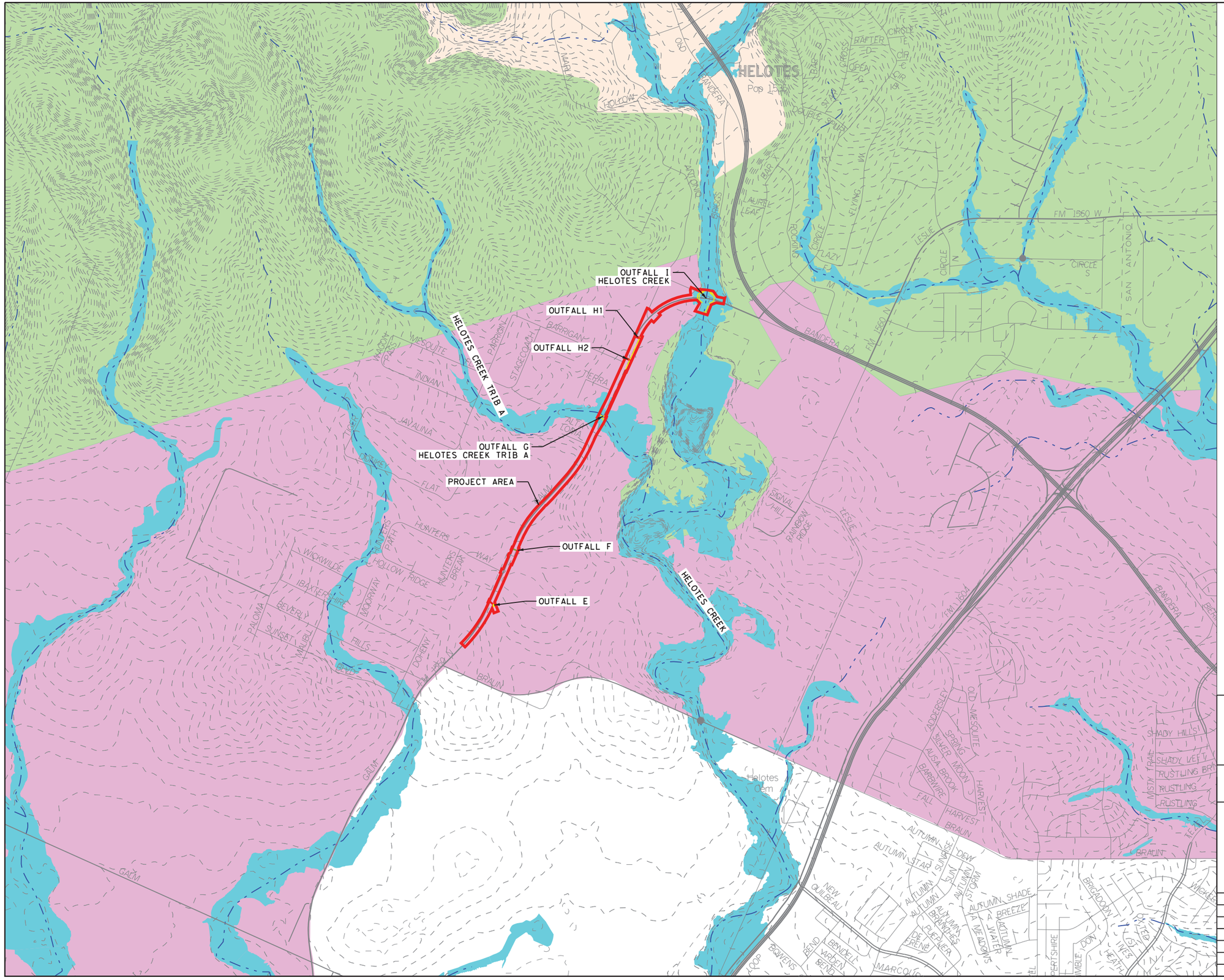
    ☐ The total R.O.W. (as in Item 17).

    ☒ TxDOT roadway project.

EAPP ROADWAY APPLICATION ATTACHMENTS

Attachment A – Road Map

Road Map is attached.



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Scale 1" = 2000′

LEGEND

- WPAP PROJECT AREA
- STREETS
- CONTOURS
- STREAMS
- 100-YR FLOODPLAIN
- EDWARDS AQUIFER RECHARGE ZONE
- EDWARDS AQUIFER CONTRIBUTING ZONE
- EDWARDS AQUIFER TRANSITION ZONE

STATE OF TEXAS
JAIME K. BENOLIEL
96693
LICENSED
PROFESSIONAL ENGINEER

08-22-2025

FIRM REGISTRATION NO. F-230

tnp

Texas Department of Transportation

FM 1560
WPAP
ROAD MAP

DESIGN: JKB	DRAFT: CA	CHECK: JAT

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6		

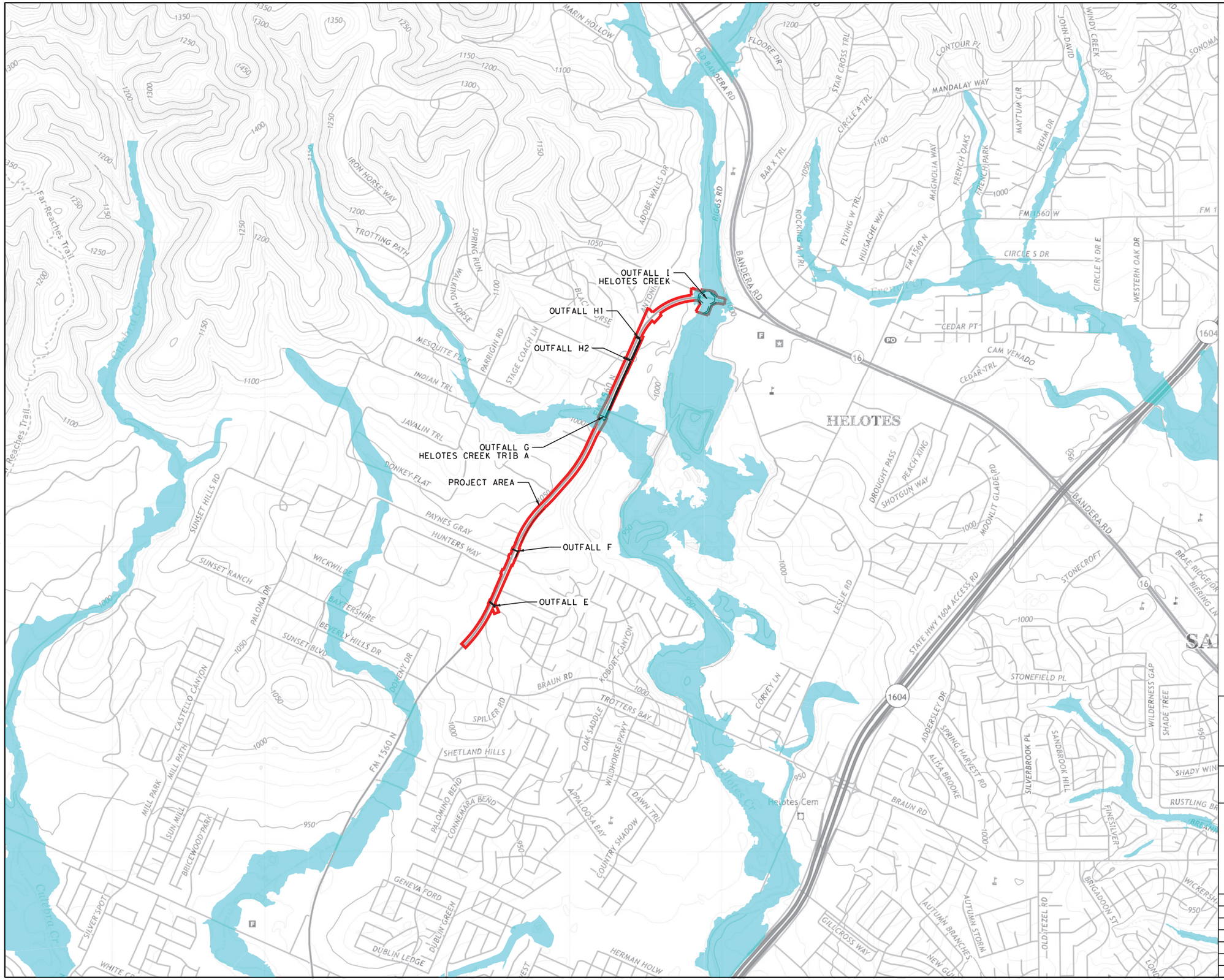
STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
2230	01	020	FM 1560

8/20/2025 8:44:39 AM
T:\Groups\00*KATY\PROJECTS\TXDT17105\12 FM 1560\CAD\WPAP\Attachment A - ROAD MAP.dgn

Attachment B – USGS Quadrangle

USGS Map is attached.



N

0′ 2000′

Scale 1" = 2000′

LEGEND

- WPAP PROJECT AREA
- STREETS
- 100-YR FLOODPLAIN

NOTES:

1. USGS MAP OF HELOTES QUADRANGLE

STATE OF TEXAS
JAIME K. BENOLIEL
96693
LICENSED
PROFESSIONAL ENGINEER
08-22-2025

FIRM REGISTRATION NO. F-230

tnp

Texas Department of Transportation

FM 1560
WPAP
USGS MAP

DESIGN: JKB	DRAFT: CA		CHECK: JAT
FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6			
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
2230	01	020	FM 1560

8/20/2025 8:53:09 AM
T:\Groups\00*KATY\PROJECTS\TXDOT17105\12 FM 1560\CAD\WPAP\Attachment B - USGS.dgn

Attachment C – Project Description

The proposed project includes the widening and reconstruction of FM 1560 from Galm/Shaenfield Road to SH 16. The existing roadway is typically a 36-foot wide asphalt rural section with two 12-foot lanes in both directions and drains by roadside ditches. The proposed roadway is typically a 72-foot asphaltic concrete urban section with two 12-foot lanes and a 5-foot bike lane in both directions and a 14-foot center turn lane that drains by storm sewer. The total drainage areas consist of 33.57 acres on site area with 61.1% impervious coverage, and 40.65 acres offsite area with 30.9% impervious coverage. There are 10 outfalls located within the project limits, however only 6 of the outfalls drain into the Edwards aquifer recharge and transitions zones. The six outfalls consist of two bridge structures, one located at Helotes Creek and one at Helotes Creek Tributary A, two bridge class culverts and two cross culverts. The six outfall crossings are listed below.

- Outfall E Culebra Creek Trib C1 (CC-E) (Existing: 3-36" RCP, Proposed: 3-4'X4' MBC)
- Culebra Creek Trib C1 (CC-F) (Existing: N/A, Proposed: 1-5'X3' SBC)
- Helotes Creek Tributary A (BS-G)
- Unnamed Tributary to Helotes Creek (BCC-H1) (Existing: N/A, Proposed: 4-6'X3' SBC)
- Unnamed Tributary to Helotes Creek (BCC-H2) (Existing: 18" CMP, Proposed: 3-6'X3' SBC)
- Helotes Creek (BS-I)

The project will include new drainage structures, curb and gutter, inlets, connecting drainage pipe, channel grading, and Jellyfish inlets. The proposed drainage structures were designed to meet the 10-year frequency storm event.

Jellyfish Filters will be used to prevent pollution of surface waters due to on-site stormwater runoff. The stormwater runoff draining to the proposed BMPS for systems E1, F and G will be overtreated, allowing on-site runoff from systems E2, H, and I to leave the site untreated. See Attachment E & F for detail information.

Attachment D – Factors Affecting Surface Water Quyality

The proposed project is a roadway widening project; therefore, the factors affecting water quality are due to the proposed increase in imperviousness and conveyance. The factors affecting water quality due to increase in imperviousness and conveyance include increases in peak discharge and velocity that can cause flooding and erosion, reduction in recharge, and pollutant transport.

The increase in impervious and conveyance within the Culebra Creek and Helotes Creek watershed is negligible and results in minor changes to the peak discharge and velocities. The proposed crossings have been designed to cause no adverse impact to the receiving streams. Therefore, the slight changes in peak discharge and velocity due to the proposed project will not affect the water quality.

Due to the increase in imperviousness and a change in conveyance from roadside ditches to storm sewer a reduction in recharge is expected. The slight reduction in recharge due to the increased imperviousness and change in conveyance in currently undeveloped areas will be mitigated.

The factors affecting water quality due to pollutant transport from the proposed roadway widening project include potential sediment, debris, and chemical pollutants that can occur both during and after construction. Possible sources of containments include sediment, debris, and chemicals from stormwater runoff due to construction and the proposed increased impervious of the project. Chemical pollutants consist of oil, gasoline, and automotive fluids that can enter the stormwater runoff from the proposed roadway. Permanent BMPs are proposed to meet the required 80% TSS removal of these pollutants from the stormwater runoff.

Attachment E – BMPs for Upgradient Stormwater

Most of the surface water that originates upgradient from the proposed site and flows toward the site flows to the outfall stream and drains under the proposed roadway at cross culverts and bridges. Some of the surface water that originates upgradient from the proposed site will be collected in roadside ditches and flow to storm sewer inlets/SETs or to the proposed culvert or bridge crossing. A small portion of the surface water that originates upgradient from the proposed site will drain to the roadway and will be collected in the storm sewer inlets.

For the upgradient surface water that doesn't flow across the proposed roadway, there is no change in the water quality of these flows. Therefore, no BMPs or measures are required to prevent pollution of these flows.

The upgradient surface water that flows to the existing roadway is collected in roadside ditches and drains to the outfall. For proposed conditions this flow will be collected in the proposed storm sewer system and will be treated with the on-site stormwater runoff using Jellyfish Filters.

For system E1 the upgradient flows drain to proposed ditch E1-07 that drains to cross culvert CC-E. No upgradient flow drains across the roadway for system E1. For system E2, most of the upgradient flow will drain under the proposed roadway to cross culvert E. 17.09 acres offsite area will drain to the proposed roadway and be collected in storm sewer inlets and outfalls to Culebra Creek Trib C1 untreated.

For System F the existing upgradient flow drains to the existing roadside ditch. For existing conditions, the roadside ditch flows to Outfall E existing cross culvert, however some of the flow sheet flows across the roadway to Outfall F. For proposed conditions most of the upgradient flow will drain under the proposed roadway to cross culvert F. However, a portion of the upgradient flows will drain to the proposed roadway and be collected in storm sewer inlets as part of system F1. Approximately 40% of the upgradient flow that drains under the roadway in cross culvert CC-F will outfall to the system E2 storm sewer and the remain 60% of the flow drain to outfall F. The Outfall F flow was designed to match the existing sheet flow that outfalls today. Since the upgradient flow from CC-F at Outfall F will no longer flow across the proposed roadway, no BMP measures are required to prevent pollution of this flow. The portion of the flow outfalling to System E2 will be untreated. For system F1 8.33 acres of off-site flow drain to the proposed roadway and is treated with the system F1 on-site runoff with 8' x 12' Jellyfish Filter Unit JFPD0812-24-5.

For system G1 11.26 acres of off-site area drains to the proposed roadway and enters the proposed storm sewer system at inlets and SETs. The upgradient flow will be treated with the on-site runoff using 8' x 16' Jellyfish Filter Unit JFPD0816-38-8. For system G2 the upgradient runoff will be collected in proposed roadside ditches and conveyed to the Helotes Creek Tributary A bridge crossing. Therefore, the upgradient flow will not drain across the proposed project resulting in no change to the water quality of this flow. No BMPs or measures are required to prevent pollution of system G2 upgradient runoff.

The existing system H1 and H2 upgradient runoff drains to the existing FM 1560 roadside ditches. An existing 18" RCP at Parrigin Road balance the flow between the two ditches, however larger storm events overtop the roadway and sheet flow offsite. The proposed upgradient runoff for systems H1 and H2 will be convey under the roadway at cross culverts to a proposed trapezoidal channel parallel to FM 1560

that outfalls to Helotes Creek Tributary A via culvert G. The proposed upgradient flow will drain under the roadway, therefore reducing pollution to these flows. No BMPs or measures are required to prevent pollution to systems H1 and H2 upgradient runoff.

For system I1 3.97 acres of off-site area drains to the proposed roadway and enters the proposed storm sewer system at proposed inlets and leave system untreated. No upgradient runoff drains to system I2.

Attachment F – BMPs for On-site Stormwater

Jellyfish Filters will be used to prevent pollution of surface waters due to on-site stormwater runoff. As stated in Attachment E, upgradient runoff draining to the proposed roadway and entering the proposed storm sewer systems will be treated with on-site runoff using the Jellyfish Filters. The stormwater runoff draining to the proposed BMPS for systems E1, F, and G will be over treated allowing on-site runoff from systems E2, H, and I to leave the site untreated. See Attachment F for the drainage area map interior and storm drain plan and profile for details of the proposed storm sewer systems.

The proposed Jellyfish Filter design detail sheet for each system is included in attachment G. The table below summarizes the Jellyfish design for each system. The Jellyfish Filters are located at the downstream end of the system just before the outfall to the receiving stream.

System	Jellyfish Size	# of Draindown Cartridges	# of Hi-Flo Cartridges	Inflow Elevation ft	Outflow Elevation ft	Jellyfish Filters
E1	8' x 8'	3	12	998.34	997.84	650868-010
F1	8' x 12'	5	24	1022.2	1021.7	650868-040
G1	8' x 16'	8	38	994.84	994.34	650868-050
G2	8' x 14'	4	16	990.55	990.55	650868-060

The Jellyfish Filters were designed to exceed the required TSS removal. The required TSS removal for the total project site is 9,222 pounds and the total designed TSS removal by the proposed Jellyfish BMPs is 9,222 pounds. Detailed calculations of the TSS removal for each Jellyfish BMP is included in Attachment F. Since the designed TSS removal is greater than the required TSS removal, there will be no adverse impact due to the proposed project.

Attachment G – Construction Plans

Construction plans and TSS removal calculations are attached.

Texas Commission on Environmental Quality
Water Pollution Abatement Plan
General Construction Notes

Edwards Aquifer Protection Program Construction Notes – Legal Disclaimer

The following/listed "construction notes" are intended to be advisory in nature only and do not constitute an approval or conditional approval by the Executive Director (ED), nor do they constitute a comprehensive listing of rules or conditions to be followed during construction. Further actions may be required to achieve compliance with TCEQ regulations found in Title 30, Texas Administrative Code (TAC), Chapters 213 and 217, as well as local ordinances and regulations providing for the protection of water quality. Additionally, nothing contained in the following/listed "construction notes" restricts the powers of the ED, the commission or any other governmental entity to prevent, correct, or curtail activities that result or may result in pollution of the Edwards Aquifer or hydrologically connected surface waters. The holder of any Edwards Aquifer Protection Plan containing "construction notes" is still responsible for compliance with Title 30, TAC, Chapters 213 or any other applicable TCEQ regulation, as well as all conditions of an Edwards Aquifer Protection Plan through all phases of plan implementation. Failure to comply with any condition of the ED's approval, whether or not in contradiction of any "construction notes," is a violation of TCEQ regulations and any violation is subject to administrative rules, orders, and penalties as provided under Title 30, TAC § 213.10 (relating to Enforcement). Such violations may also be subject to civil penalties and injunction. The following/listed "construction notes" in no way represent an approved exception by the ED to any part of Title 30 TAC, Chapters 213 and 217, or any other TCEQ applicable regulation

1. A written notice of construction must be submitted to the TCEQ regional office at least 48 hours prior to the start of any regulated activities. This notice must include:
   - the name of the approved project;
   - the activity start date; and
   - the contact information of the prime contractor.

2. All contractors conducting regulated activities associated with this project must be provided with complete copies of the approved Water Pollution Abatement Plan (WPAP) and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractors are required to keep on-site copies of the approved plan and approval letter.

3. If any sensitive feature(s) (caves, solution cavity, sink hole, etc.) is discovered during construction, all regulated activities near the sensitive feature must be suspended immediately. The appropriate TCEQ regional office must be immediately notified of any sensitive features encountered during construction. Construction activities may not be resumed until the TCEQ has reviewed and approved the appropriate protective measures in order to protect any sensitive feature and the Edwards Aquifer from potentially adverse impacts to water quality.

4. No temporary or permanent hazardous substance storage tank shall be installed within 150 feet of a water supply source, distribution system, well, or sensitive feature.

5. Prior to beginning any construction activity, all temporary erosion and sedimentation (E&S) control measures must be properly installed and maintained in accordance with the approved plans and manufacturers specifications. If inspections indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations. These controls must remain in place until the disturbed areas have been permanently stabilized.

6. Any sediment that escapes the construction site must be collected and properly disposed of before the next rain event to ensure it is not washed into surface streams, sensitive features, etc.

7. Sediment must be removed from the sediment traps or sedimentation basins not later than when it occupies 50% of the basin's design capacity.

8. Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from being discharged offsite.

9. All spoils (excavated material) generated from the project site must be stored on-site with proper E&S controls. For storage or disposal of spoils at another site on the Edwards Aquifer Recharge Zone, the owner of the site must receive approval of a water pollution abatement plan for the placement of fill material or mass grading prior to the placement of spoils at the other site.

10. If portions of the site will have a temporary or permanent cease in construction activity lasting longer than 14 days, soil stabilization in those areas shall be initiated as soon as possible prior to the 14th day of inactivity. If activity will resume prior to the 21st day, stabilization measures are not required. If drought conditions or inclement weather prevent action by the 14th day, stabilization measures shall be initiated as soon as possible.

11. The following records shall be maintained and made available to the TCEQ upon request:
    - the dates when major grading activities occur;
    - the dates when construction activities temporarily or permanently cease on a portion of the site; and
    - the dates when stabilization measures are initiated.

12. The holder of any approved Edward Aquifer protection plan must notify the appropriate regional office in writing and obtain approval from the executive director prior to initiating any of the following:

    A. any physical or operational modification of any water pollution abatement structure(s), including but not limited to ponds, dams, berms, sewage treatment plants, and diversionary structures;

    B. any change in the nature or character of the regulated activity from that which was originally approved or a change which would significantly impact the ability of the plan to prevent pollution of the Edwards Aquifer;

    C. any development of land previously identified as undeveloped in the original water pollution abatement plan.

Austin Regional Office 12100 Park 35 Circle, Building A Austin, Texas 78753-1808 Phone (512) 339-2929 Fax (512) 339-3795	San Antonio Regional Office 14250 Judson Road San Antonio, Texas 78233-4480 Phone (210) 490-3096 Fax (210) 545-4329

THESE GENERAL CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.

STATE OF TEXAS
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PROFESSIONAL ENGINEER
08-22-2025

FIRM REGISTRATION NO. F-230
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Texas Department of Transportation

FM 1560
TCEQ
GENERAL NOTES

DESIGN: JKB	DRAFT: CA	CHECK: JAT
FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6		

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
2230	01	020	FM 1560

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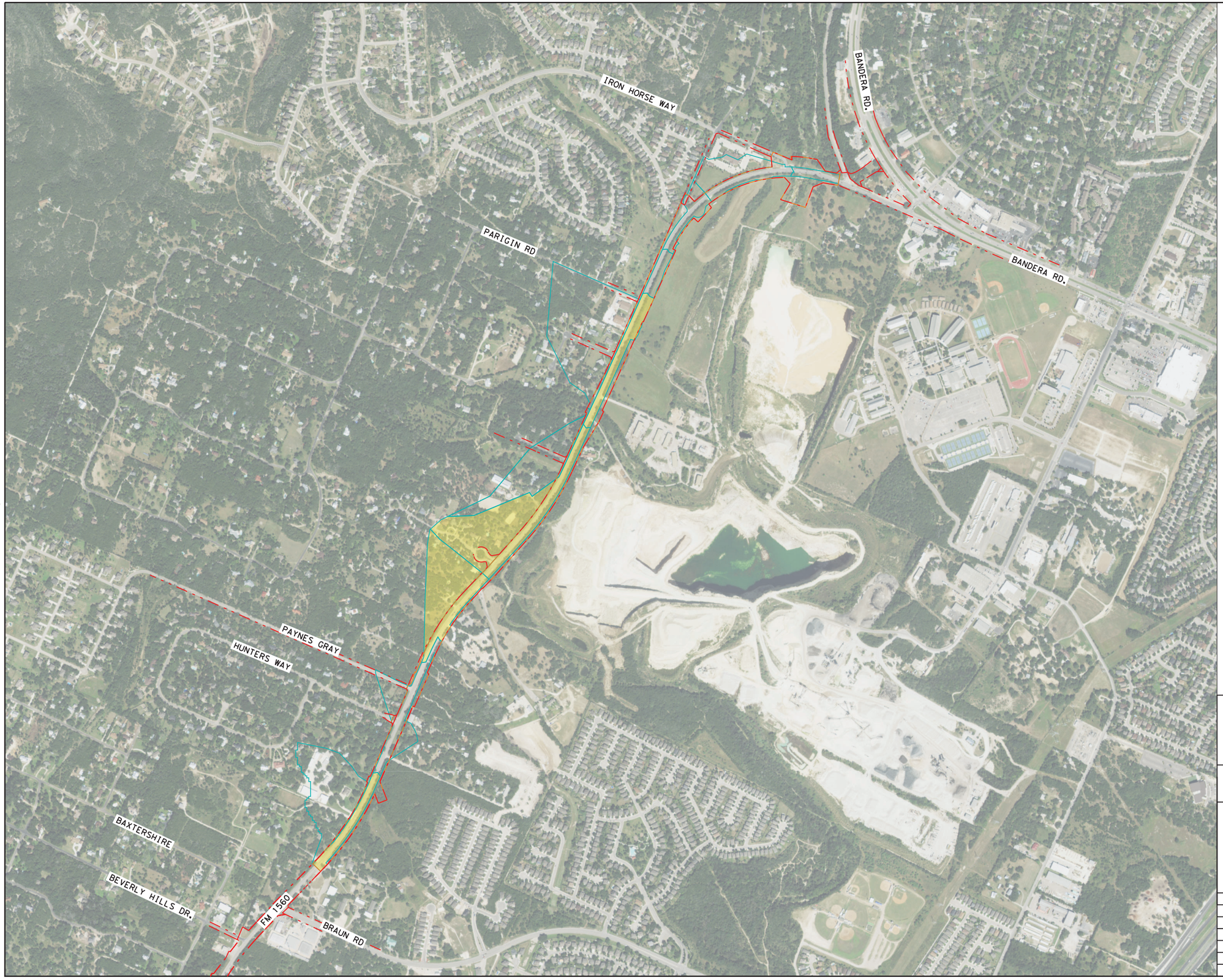

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0' 1000'

Scale 1" = 1000'

LEGEND

- PROJECT AREA
- ROW
- DRAINAGE AREA
- BMP AREA

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FM 1560
WPAP LAYOUT

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6			
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
2230	01	020	FM 1560

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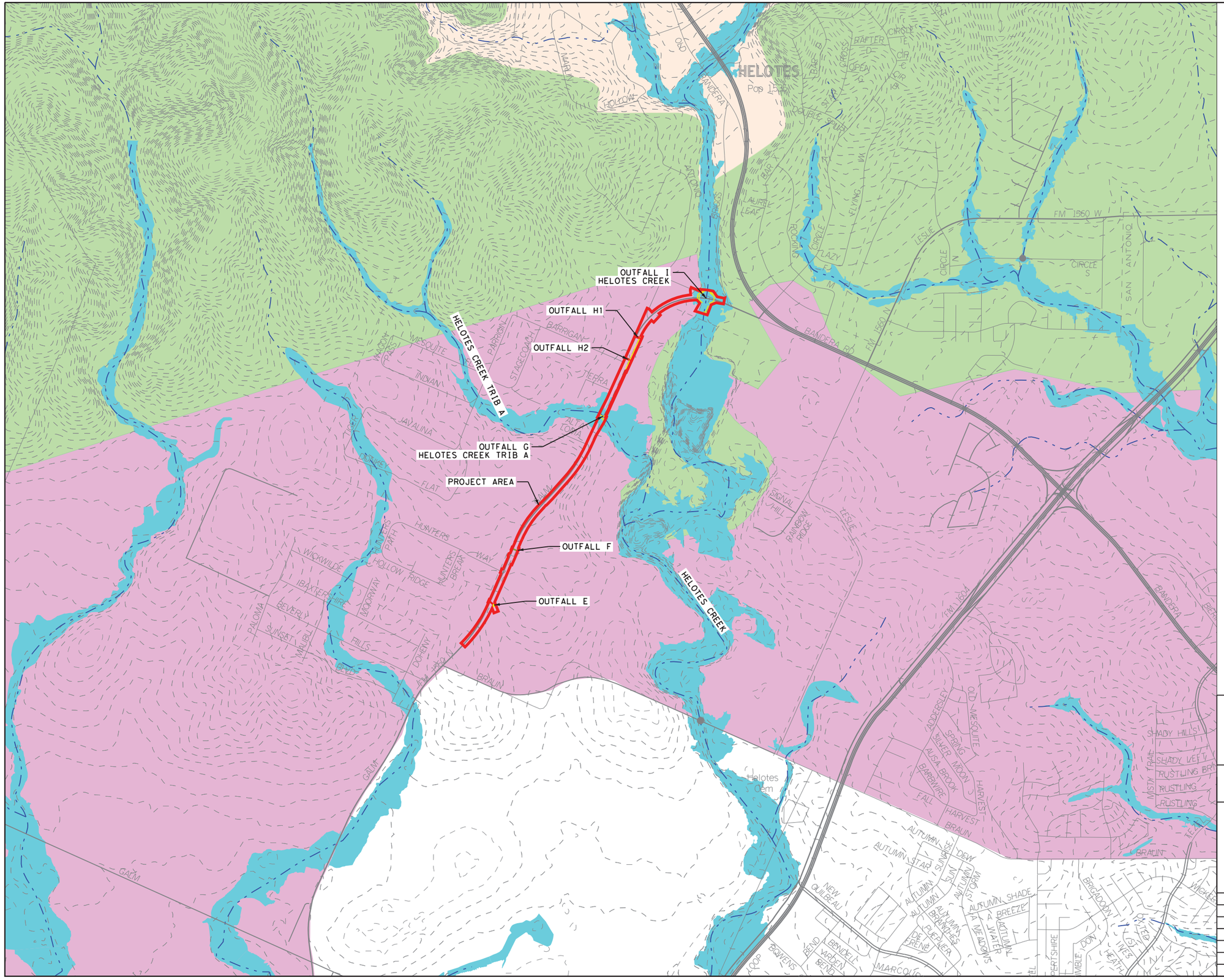

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Scale 1" = 2000'

LEGEND

- WPAP PROJECT AREA
- STREETS
- CONTOURS
- STREAMS
- 100-YR FLOODPLAIN
- EDWARDS AQUIFER RECHARGE ZONE
- EDWARDS AQUIFER CONTRIBUTING ZONE
- EDWARDS AQUIFER TRANSITION ZONE

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FM 1560
WPAP
ROAD MAP

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6		

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
2230	01	020	FM 1560

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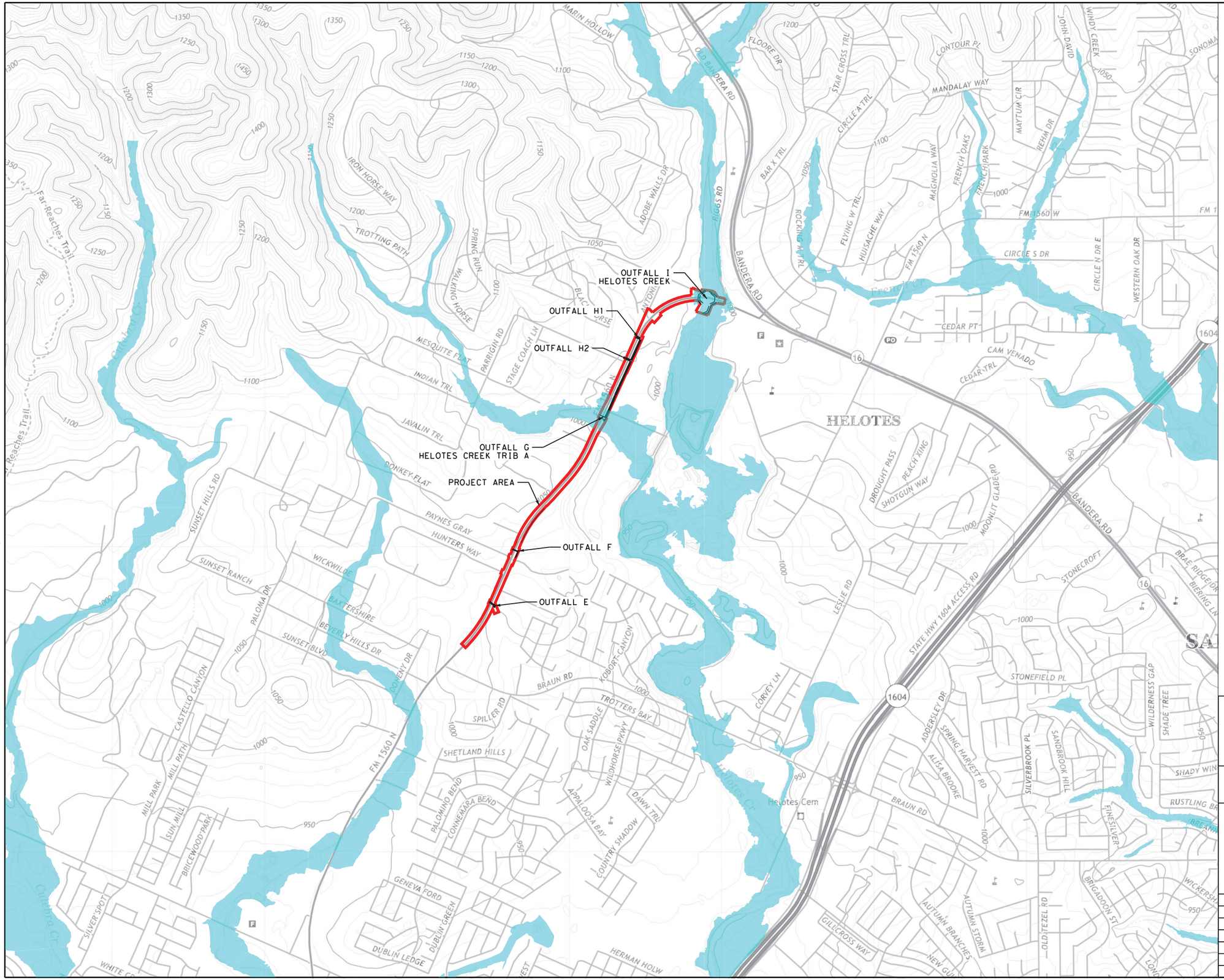

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0′ 2000′

Scale 1" = 2000′

LEGEND

- WPAP PROJECT AREA
- STREETS
- 100-YR FLOODPLAIN

NOTES:

1. USGS MAP OF HELOTES QUADRANGLE

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FM 1560
WPAP
USGS MAP

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6			
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
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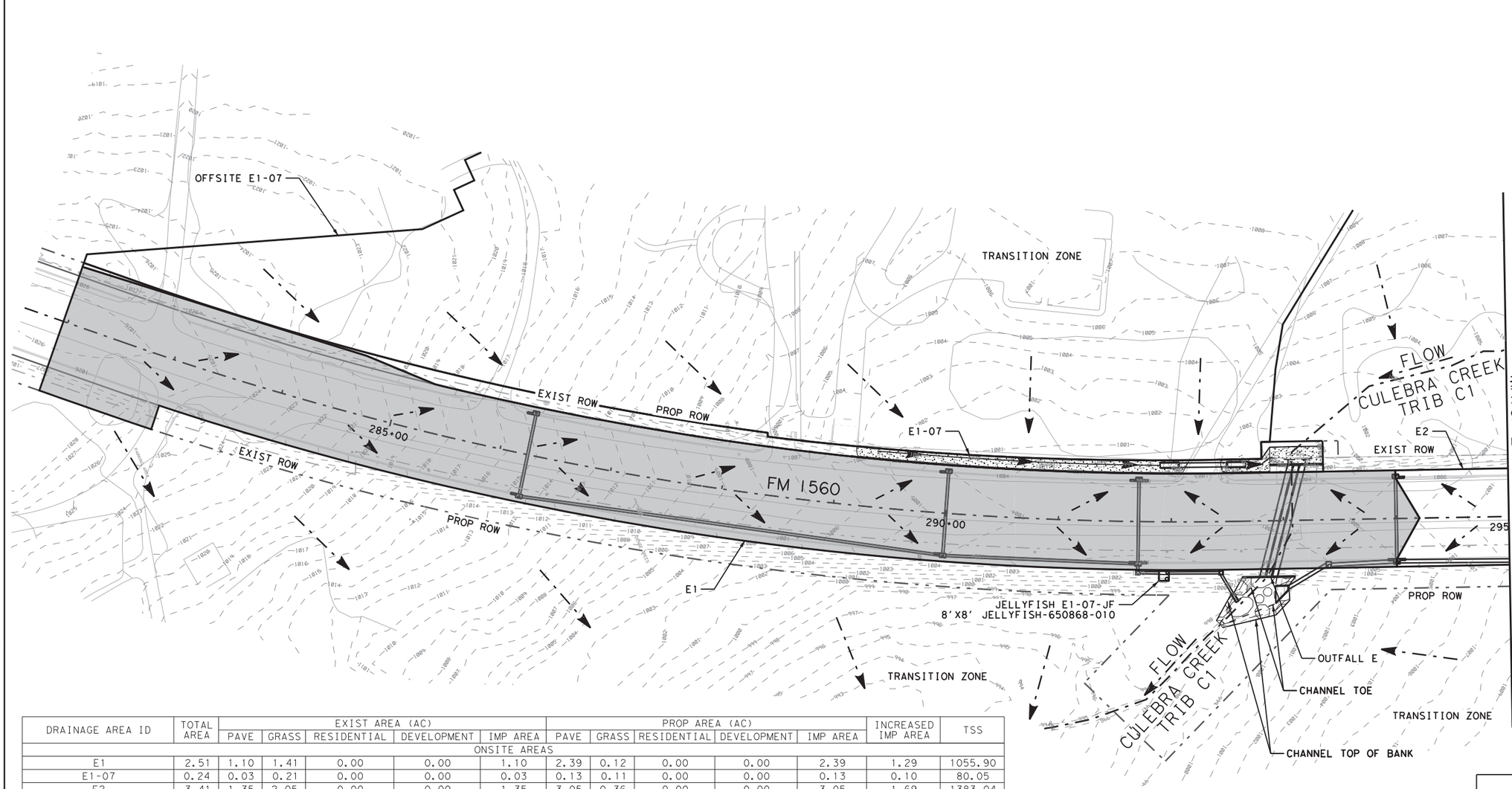

LEGEND

- EXIST ROW
- PROP ROW
- DIRECTION OF FLOW
- OUTFALL AREA
- BMP DRAINAGE AREA
- 100 YEAR FLOODPLAIN
- PROPOSED STORM SEWER
- PROPOSED CURVERT
- PROPOSED DITCH
- STREAMS

NOTES:

1. THE WPAP PROJECT AREA LIMITS OF PROPOSED CONSTRUCTION IS WITHIN THE FM 1560 PROPOSED ROW.

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DRAINAGE AREA ID	TOTAL AREA	EXIST AREA (AC)					PROP AREA (AC)					INCREASED IMP AREA	TSS
		PAVE	GRASS	RESIDENTIAL	DEVELOPMENT	IMP AREA	PAVE	GRASS	RESIDENTIAL	DEVELOPMENT	IMP AREA		
ONSITE AREAS													
E1	2.51	1.10	1.41	0.00	0.00	1.10	2.39	0.12	0.00	0.00	2.39	1.29	1055.90
E1-07	0.24	0.03	0.21	0.00	0.00	0.03	0.13	0.11	0.00	0.00	0.13	0.10	80.05
E2	3.41	1.35	2.05	0.00	0.00	1.35	3.05	0.36	0.00	0.00	3.05	1.69	1383.04
F1	2.46	1.06	1.39	0.00	0.00	1.06	1.99	0.47	0.00	0.00	1.99	0.93	756.60
G1	4.32	1.84	2.48	0.00	0.00	1.84	3.95	0.37	0.00	0.00	3.95	2.11	1720.70
G1-16	0.34	0.01	0.33	0.00	0.00	0.01	0.07	0.27	0.00	0.00	0.07	0.06	48.06
G2	3.64	1.42	2.22	0.00	0.00	1.42	3.09	0.55	0.00	0.00	3.09	1.67	1363.13
G2-07	0.60	0.07	0.54	0.00	0.00	0.07	0.13	0.47	0.00	0.00	0.13	0.07	53.61
H1	2.13	0.70	1.43	0.00	0.00	0.70	1.50	0.63	0.00	0.00	1.50	0.80	654.11
H2	1.46	0.44	1.02	0.00	0.00	0.44	1.02	0.44	0.00	0.00	1.02	0.58	476.05
I1-A	2.57	0.88	1.69	0.00	0.00	0.88	1.94	0.63	0.00	0.00	1.94	1.06	867.73
I2	1.16	0.47	0.69	0.00	0.00	0.47	1.08	0.08	0.00	0.00	1.08	0.61	501.35
TOTALS	24.83	9.37	15.46	0.00	0.00	9.37	20.35	4.48	0.00	0.00	20.35	10.98	8960.33
OFFSITE AREAS													
OFFSITE E1-07	11.34	0.00	0.00	11.34	0.00	2.84	0.00	0.00	11.34	0.00	2.84	0.00	0.00
OFFSITE E2-B	2.11	0.30	0.00	1.80	0.00	0.75	0.30	0.00	1.80	0.00	0.75	0.00	0.00
OFFSITE E2-A	1.19	0.00	0.02	1.16	0.00	0.29	0.00	0.02	1.16	0.00	0.29	0.00	0.00
OFFSITE F1	8.33	0.35	0.00	7.98	0.00	2.35	0.35	0.00	7.98	0.00	2.35	0.00	0.00
OFFSITE G1	11.26	0.03	0.08	11.15	0.00	2.82	0.03	0.08	11.15	0.00	2.82	0.00	0.00
OFFSITE G1-16	9.27	0.02	0.03	9.22	0.00	2.32	0.02	0.03	9.22	0.00	2.32	0.00	0.00
OFFSITE G2-07	20.44	0.56	0.17	17.59	2.12	6.76	0.56	0.17	17.59	2.12	6.76	0.00	0.00
OFFSITE H1	0.50	0.04	0.45	0.00	0.00	0.04	0.04	0.45	0.00	0.00	0.04	0.00	0.00
OFFSITE I1	3.98	0.10	2.19	0.00	1.68	1.53	0.10	2.19	0.00	1.68	1.53	0.00	0.00
TOTALS	68.41	1.40	2.95	60.25	3.81	19.70	1.40	2.95	60.25	3.81	19.70	0.00	0.00
TOTAL ONSITE AND	93.24	10.77	18.41	60.25	3.81	29.07	21.75	7.43	60.25	3.81	40.05	10.98	8960.33
TOTAL PROJECT AREA	33.57	9.80	23.77	0.00	0.00	9.80	21.11	12.47	0.00	0.00	21.11	11.30	9222.43
ONSITE BMP TOTAL	12.92	5.42	7.50	0.00	0.00	5.42	11.42	1.50	0.00	0.00	11.42	6.00	10217.03

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FM 1560
WPAP
SITE PLAN

SHEET 1 OF 8

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FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6		

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
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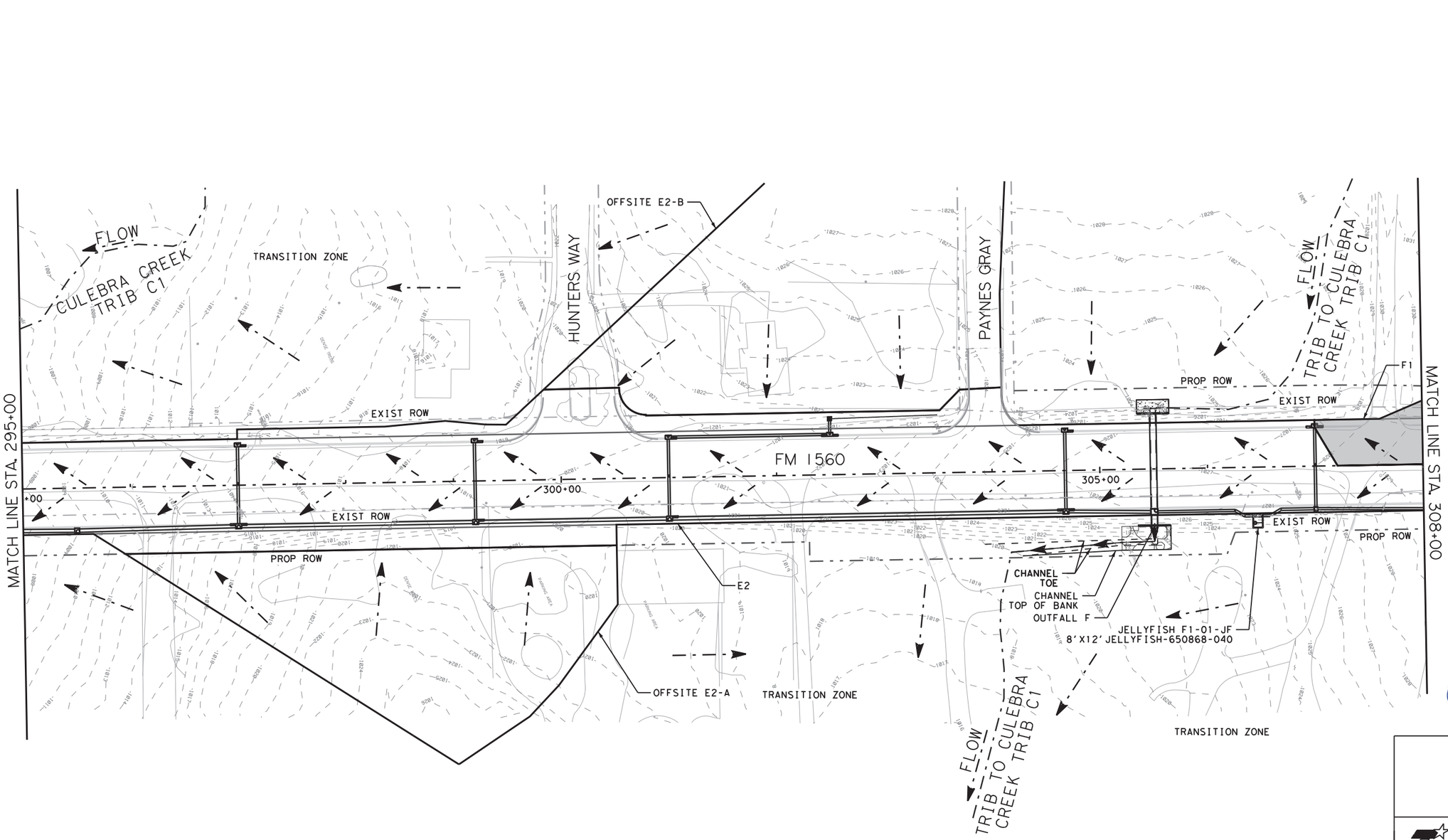

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LEGEND

- EXIST ROW
- PROP ROW
- DIRECTION OF FLOW
- OUTFALL AREA
- BMP DRAINAGE AREA
- 100 YEAR FLOODPLAIN
- PROPOSED STORM SEWER
- PROPOSED CURVERT
- PROPOSED DITCH
- STREAMS

NOTES:

1. THE WPAP PROJECT AREA LIMITS OF PROPOSED CONSTRUCTION IS WITHIN THE FM 1560 PROPOSED ROW.
2. 40% OF OFFSITE CC-F, F1, AND OFFSITE F1 DRAINAGE AREAS OUTFALL TO SYSTEM E2.

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FM 1560
WPAP
SITE PLAN

SHEET 2 OF 8

DESIGN: JKB	DRAFT: CA	CHECK: JAT

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6		

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
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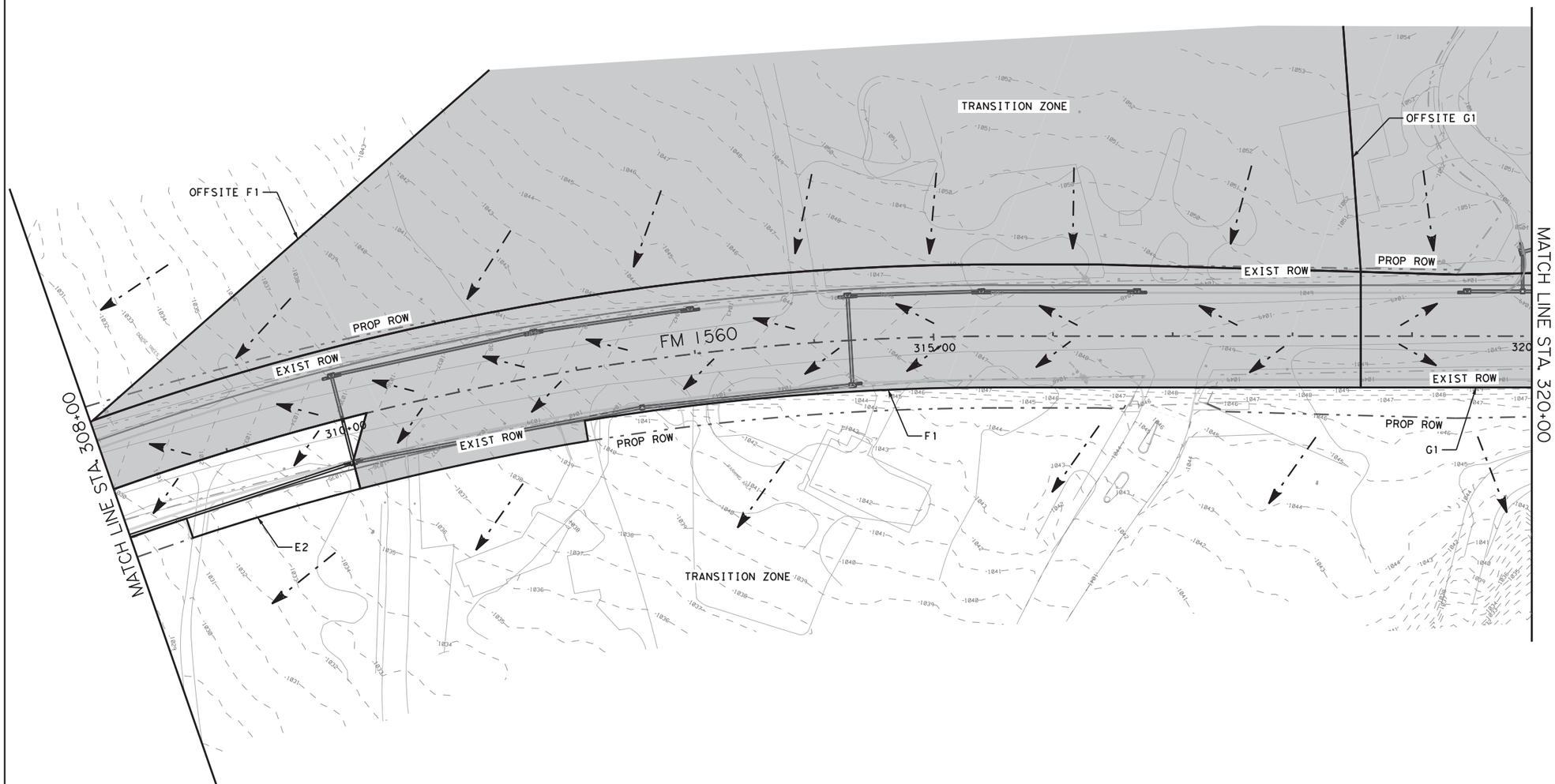

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SCALE: 1" = 100'

LEGEND

- EXIST ROW
- PROP ROW
- DIRECTION OF FLOW
- OUTFALL AREA
- BMP DRAINAGE AREA
- 100 YEAR FLOODPLAIN
- PROPOSED STORM SEWER
- PROPOSED CURVERT
- PROPOSED DITCH
- STREAMS

NOTES:

1. THE WPAP PROJECT AREA LIMITS OF PROPOSED CONSTRUCTION IS WITHIN THE FM 1560 PROPOSED ROW.

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WPAP
SITE PLAN

SHEET 3 OF 8

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FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6		

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
2230	01	020	FM 1560

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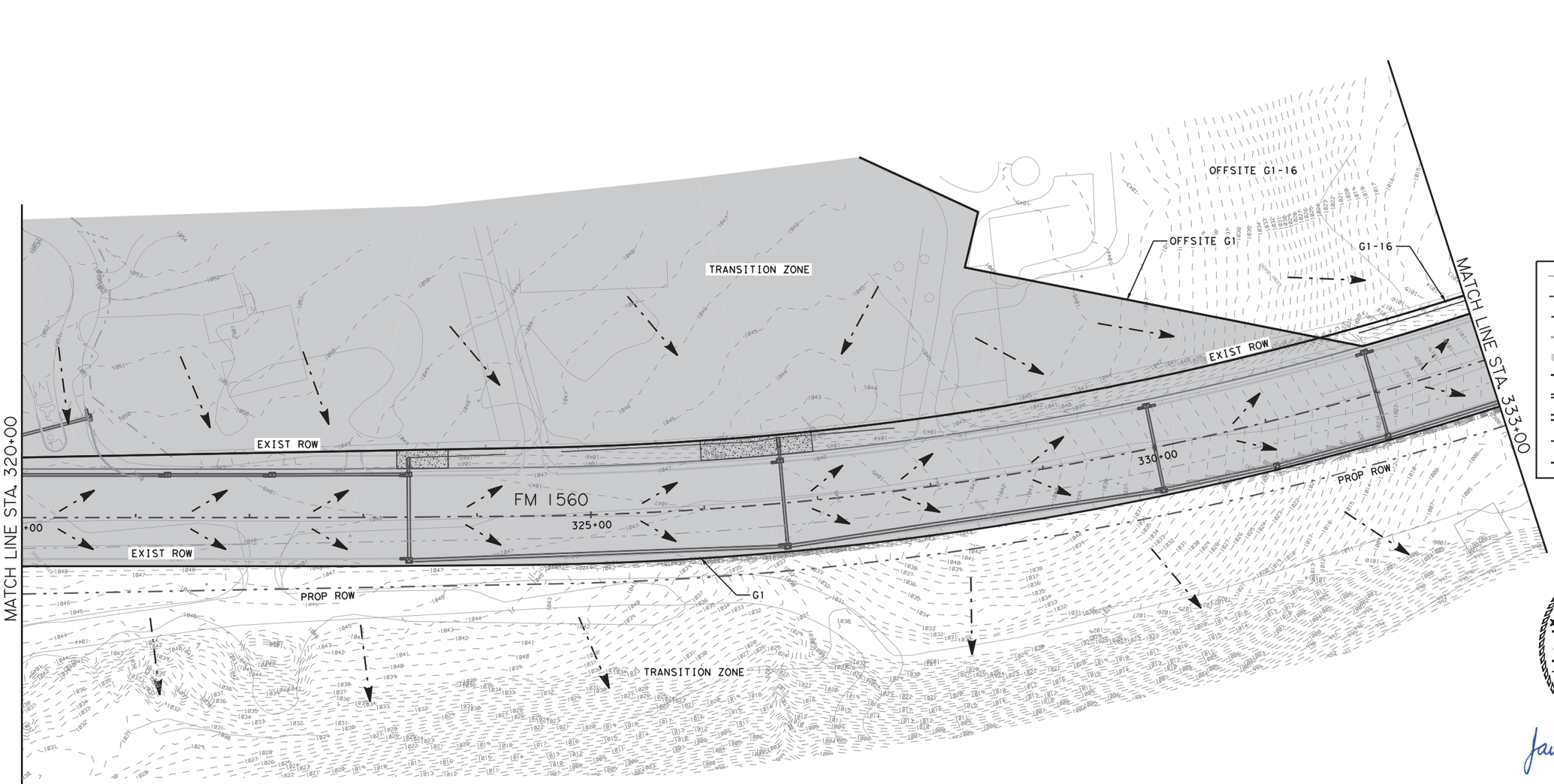

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SCALE: 1" = 100'

LEGEND

- EXIST ROW
- PROP ROW
- DIRECTION OF FLOW
- OUTFALL AREA
- BMP DRAINAGE AREA
- 100 YEAR FLOODPLAIN
- PROPOSED STORM SEWER
- PROPOSED CURVERT
- PROPOSED DITCH
- STREAMS

NOTES:

1. THE WPAP PROJECT AREA LIMITS OF PROPOSED CONSTRUCTION IS WITHIN THE FM 1560 PROPOSED ROW.

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WPAP
SITE PLAN

SHEET 4 OF 8

DESIGN: JKB	DRAFT: CA	CHECK: JAT

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6		

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
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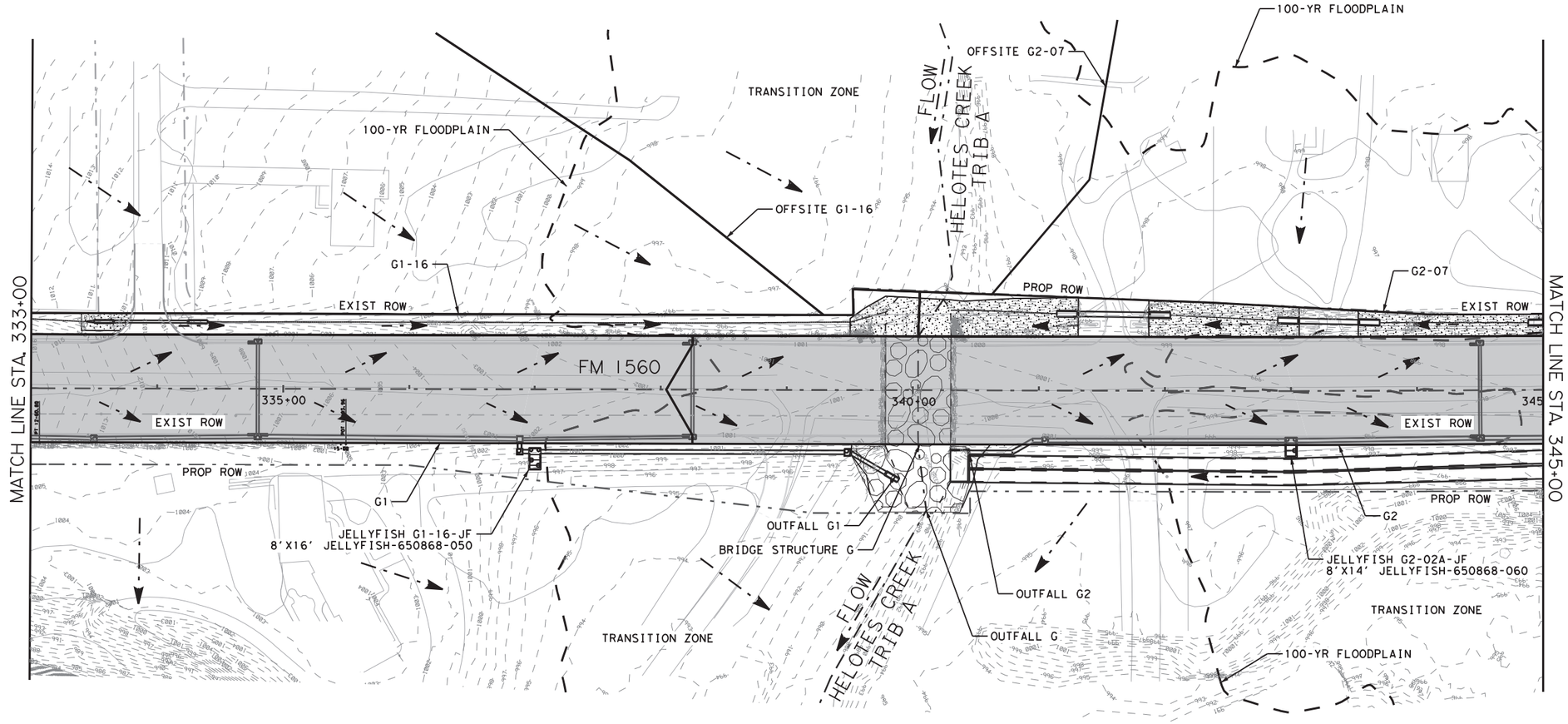

N

0 20 100
SCALE: 1"= 100'

LEGEND

- EXIST ROW
- PROP ROW
- DIRECTION OF FLOW
- OUTFALL AREA
- BMP DRAINAGE AREA
- 100 YEAR FLOODPLAIN
- PROPOSED STORM SEWER
- PROPOSED CURVERT
- PROPOSED DITCH
- STREAMS

NOTES:

1. THE WPAP PROJECT AREA LIMITS OF PROPOSED CONSTRUCTION IS WITHIN THE FM 1560 PROPOSED ROW.

STATE OF TEXAS
JAIME K. BENOLIEL
96693
LICENSED
PROFESSIONAL ENGINEER
08-22-2025

FIRM REGISTRATION NO. F-230
tnp

Texas Department of Transportation

WPAP
SITE PLAN

SHEET 5 OF 8

DESIGN: JKB	DRAFT: CA	CHECK: JAT

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6		

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
2230	01	020	FM 1560

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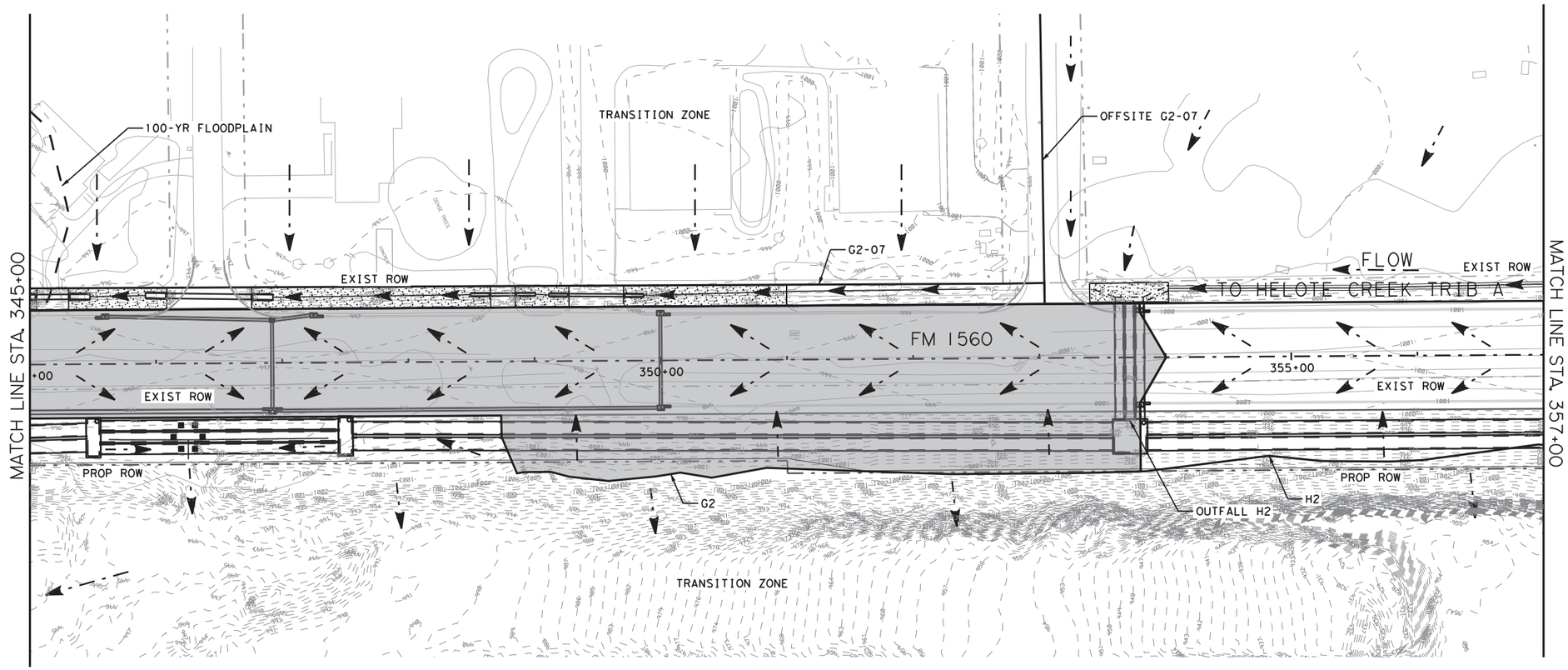

N

0 20 100
SCALE: 1" = 100'

LEGEND

- EXIST ROW
- PROP ROW
- DIRECTION OF FLOW
- OUTFALL AREA
- BMP DRAINAGE AREA
- 100 YEAR FLOODPLAIN
- PROPOSED STORM SEWER
- PROPOSED CURVERT
- PROPOSED DITCH
- STREAMS

NOTES:

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Texas Department of Transportation

FM 1560
WPAP
SITE PLAN

SHEET 6 OF 8

DESIGN: JKB	DRAFT: CA	CHECK: JAT

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6		

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY NO.
2230	01	020	FM 1560

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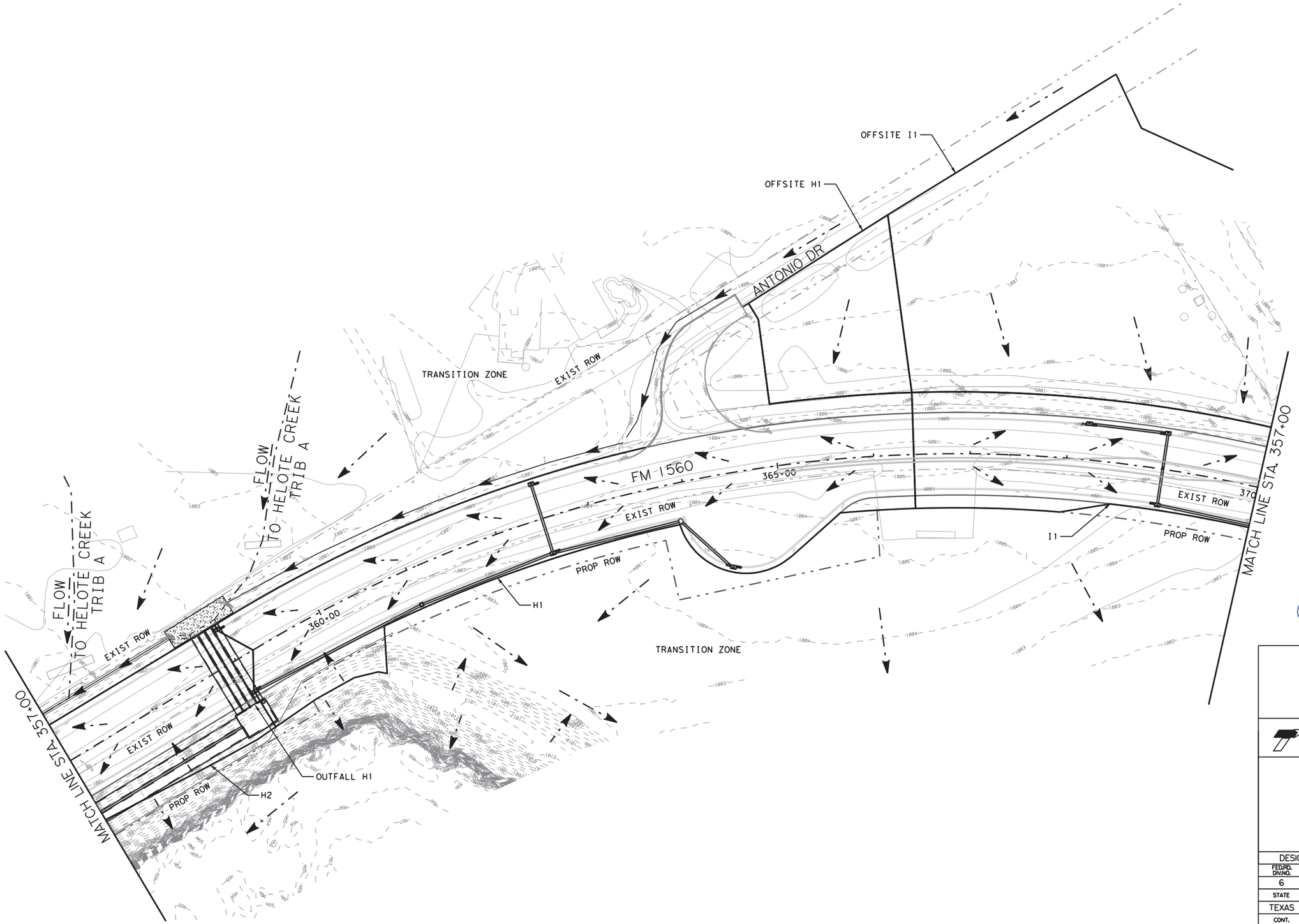

N

0 20 100
SCALE: 1" = 100'

LEGEND

- EXIST ROW
- PROP ROW
- DIRECTION OF FLOW
- OUTFALL AREA
- BMP DRAINAGE AREA
- 100 YEAR FLOODPLAIN
- PROPOSED STORM SEWER
- PROPOSED CURVERT
- PROPOSED DITCH
- STREAMS

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STATE OF TEXAS
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08-22-2025

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Texas Department of Transportation

FM 1560
WPAP
SITE PLAN

SHEET 7 OF 8

DESIGN: JKB	DRAFT: CA	CHECK: JAT

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6		

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
2230	01	020	FM 1560

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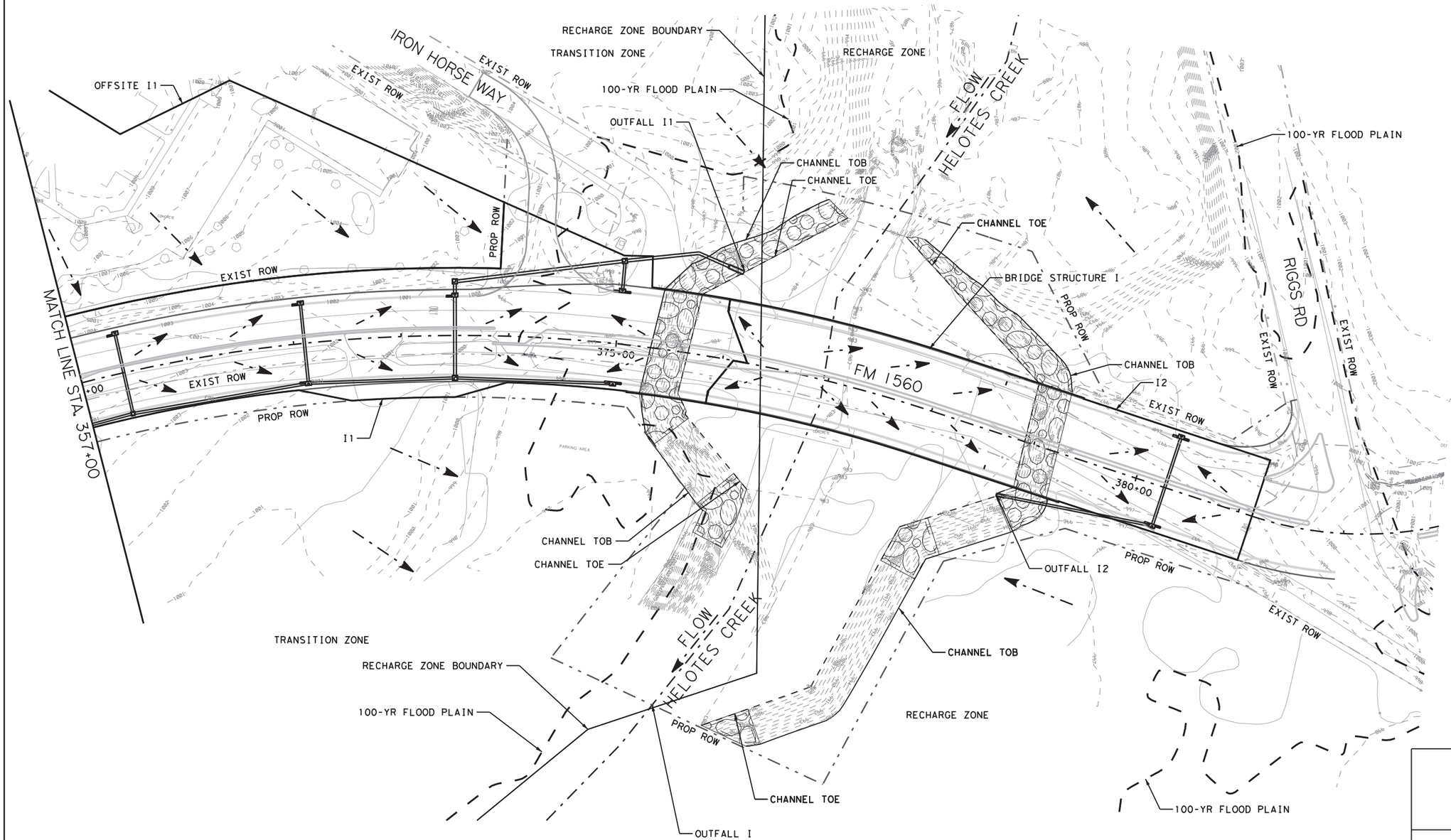

LEGEND

- EXIST ROW
- PROP ROW
- DIRECTION OF FLOW
- OUTFALL AREA
- BMP DRAINAGE AREA
- 100 YEAR FLOODPLAIN
- PROPOSED STORM SEWER
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08-22-2025

FIRM REGISTRATION NO. F-230

tnp

Texas Department of Transportation

FM 1560
WPAP
SITE PLAN

SHEET 8 OF 8

DESIGN: JKB	DRAFT: CA	CHECK: JAT

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6		

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
2230	01	020	FM 1560

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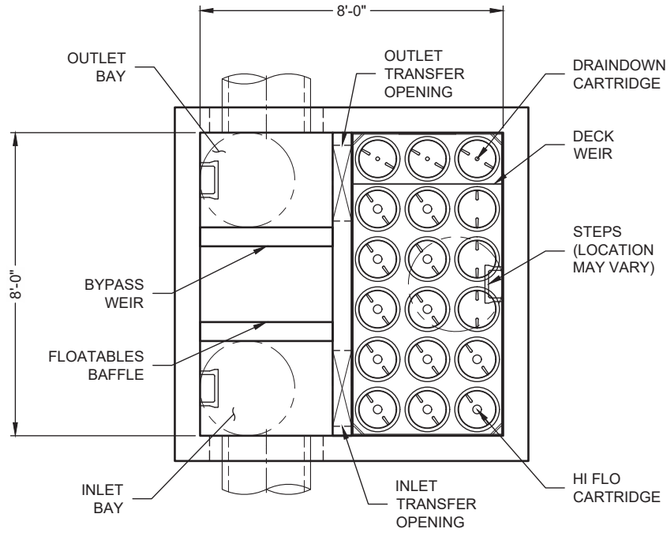
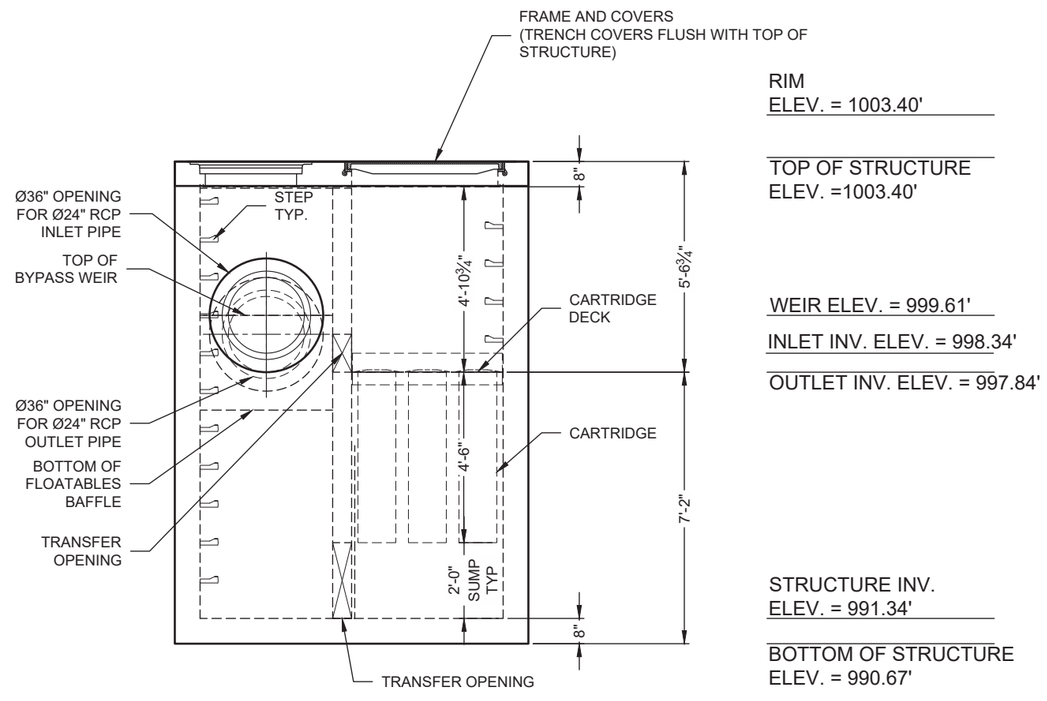


PLAN VIEW

(TOP SLAB NOT SHOWN FOR CLARITY)



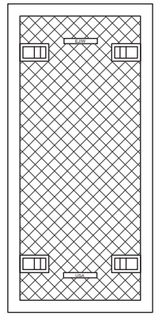
ELEVATION VIEW

JELLYFISH DESIGN NOTES

JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE LENGTH AND THE NUMBER OF CARTRIDGES. THE STANDARD PEAK DIVERSION STYLE WITH PRECAST TOP SLAB IS SHOWN. ALTERNATE OFFLINE VAULT AND/OR SHALLOW ORIENTATIONS ARE AVAILABLE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD

CARTRIDGE SELECTION

CARTRIDGE LENGTH	54"
OUTLET INVERT TO STRUCTURE INVERT (A)	6'-6"
FLOW RATE HI-FLO / DRAINDOWN (CFS) (PER CART)	0.178 / 0.089
MAX. TREATMENT (CFS)	2.94
DECK TO INSIDE TOP (MIN) (B)	5.00



24"
TRENCH COVER
(LENGTH VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	E1
WATER QUALITY FLOW RATE (cfs)	2.41
PEAK FLOW RATE (cfs)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
# OF CARTRIDGES REQUIRED (HF / DD)	12/3
CARTRIDGE LENGTH	54"

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	998.34	RCP	24	*	*
INLET #2	*	*	*	*	*
OUTLET	997.84	RCP	24	*	*

SEE GENERAL NOTES 6-7 FOR INLET AND OUTLET HYDRAULIC AND SIZING REQUIREMENTS.

RIM ELEVATION	1003.40

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES:

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE. www.ContechES.com
3. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0' - 10', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-857, ASTM C-918, AND AASHTO LOAD FACTOR DESIGN METHOD.
6. OUTLET PIPE INVERT IS EQUAL TO THE CARTRIDGE DECK ELEVATION.
7. THE OUTLET PIPE DIAMETER FOR NEW INSTALLATIONS IS RECOMMENDED TO BE ONE PIPE SIZE LARGER THAN THE INLET PIPE AT EQUAL OR GREATER SLOPE.
8. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

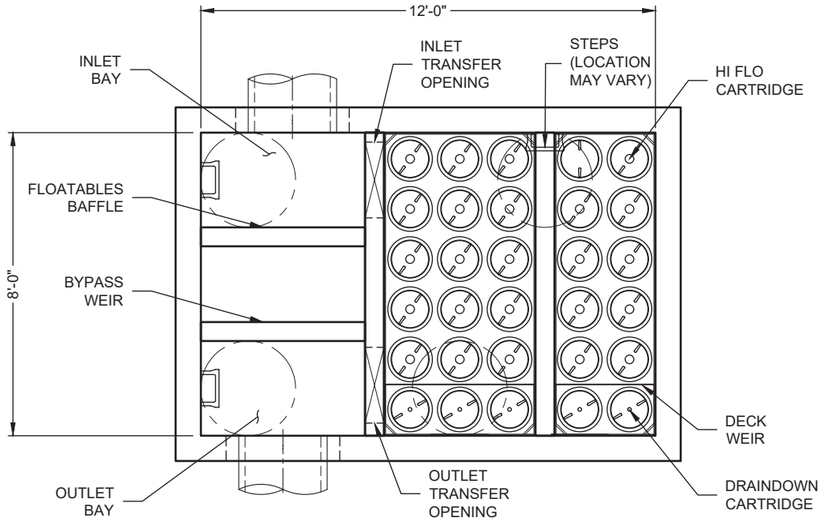
INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE.
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT).
D. CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION.

Jellyfish Filter

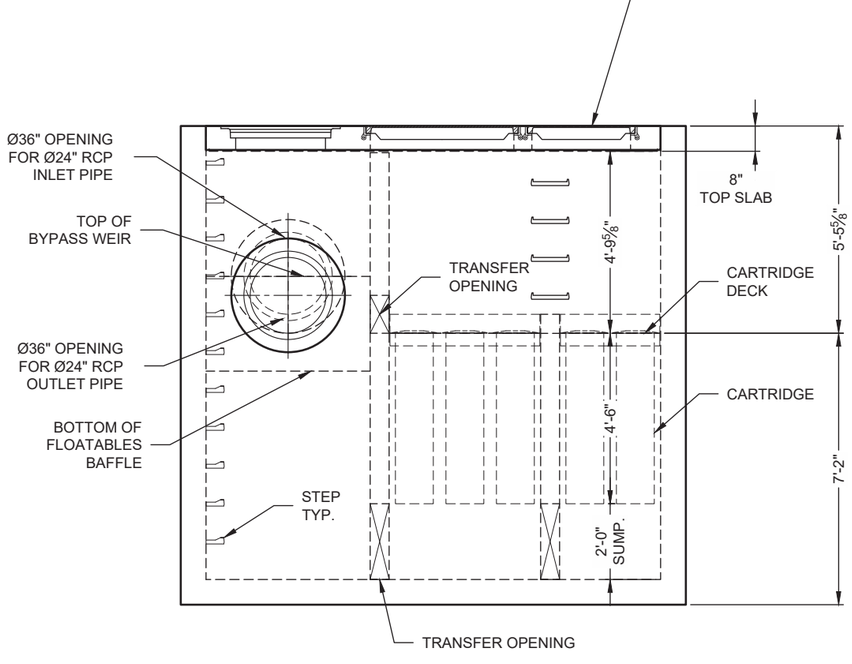
CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9100 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

JELLYFISH JFPD0808 - 650868 - 010
TXDOT - FM 1560 FROM SHEANFIELD/GALM TO SH 16
LOCATION: SAN ANTONIO, TX
SITE DESIGNATION: E1



PLAN VIEW

(TOP SLAB NOT SHOWN FOR CLARITY)



ELEVATION VIEW

RIM
ELEV. = 1027.17'
TOP OF STRUCTURE
ELEV. = 1027.17'

WEIR ELEV. = 1023.65'

INLET INV. ELEV. = 1022.20'

OUTLET INV. ELEV. = 1021.70'

STRUCTURE INV.
ELEV. = 1015.20'

BOTTOM OF STRUCTURE
ELEV. = 1015.20'

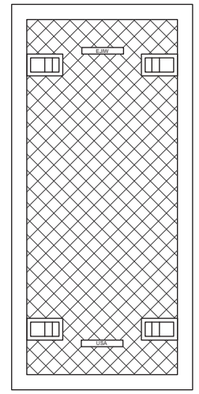
Jellyfish Filter

JELLYFISH DESIGN NOTES

JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE LENGTH AND THE NUMBER OF CARTRIDGES. THE STANDARD PEAK DIVERSION STYLE WITH PRECAST TOP SLAB IS SHOWN. ALTERNATE OFFLINE VAULT AND/OR SHALLOW ORIENTATIONS ARE AVAILABLE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD

CARTRIDGE SELECTION

CARTRIDGE LENGTH	54"
OUTLET INVERT TO STRUCTURE INVERT (A)	6'-6"
FLOW RATE HIGH-FLO / DRAINDOWN (CFS) (PER CART)	0.178 / 0.089
MAX. TREATMENT (CFS)	4.90
DECK TO INSIDE TOP (MIN) (B)	5.00



24"
TRENCH COVER
(LENGTH VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	F1
WATER QUALITY FLOW RATE (cfs)	4.72
PEAK FLOW RATE (cfs)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
# OF CARTRIDGES REQUIRED (HF / DD)	24/5
CARTRIDGE LENGTH	54"

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	1022.20	RCP	24	*	*
INLET #2	*	*	*	*	*
OUTLET	1021.70	RCP	24	*	*

SEE GENERAL NOTES 6-7 FOR INLET AND OUTLET HYDRAULIC AND SIZING REQUIREMENTS.

RIM ELEVATION	1027.17

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:
VAULT TO BE UPSIZED TO 8X12 FOR MANUFACTURING LEAD TIMES
* PER ENGINEER OF RECORD

GENERAL NOTES:
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7. THE OUTLET PIPE DIAMETER FOR NEW INSTALLATIONS IS RECOMMENDED TO BE ONE PIPE SIZE LARGER THAN THE INLET PIPE AT EQUAL OR GREATER SLOPE.
8. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE.
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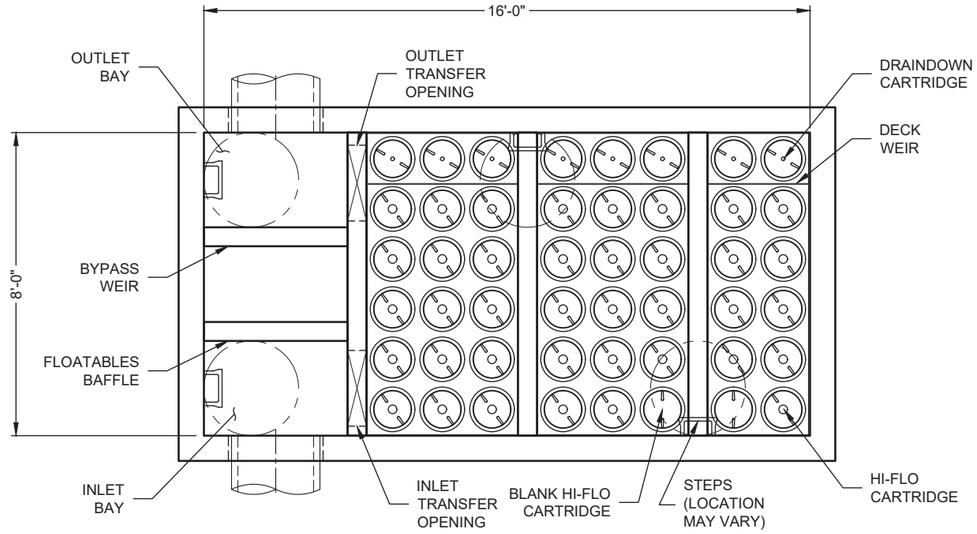
D. CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION.

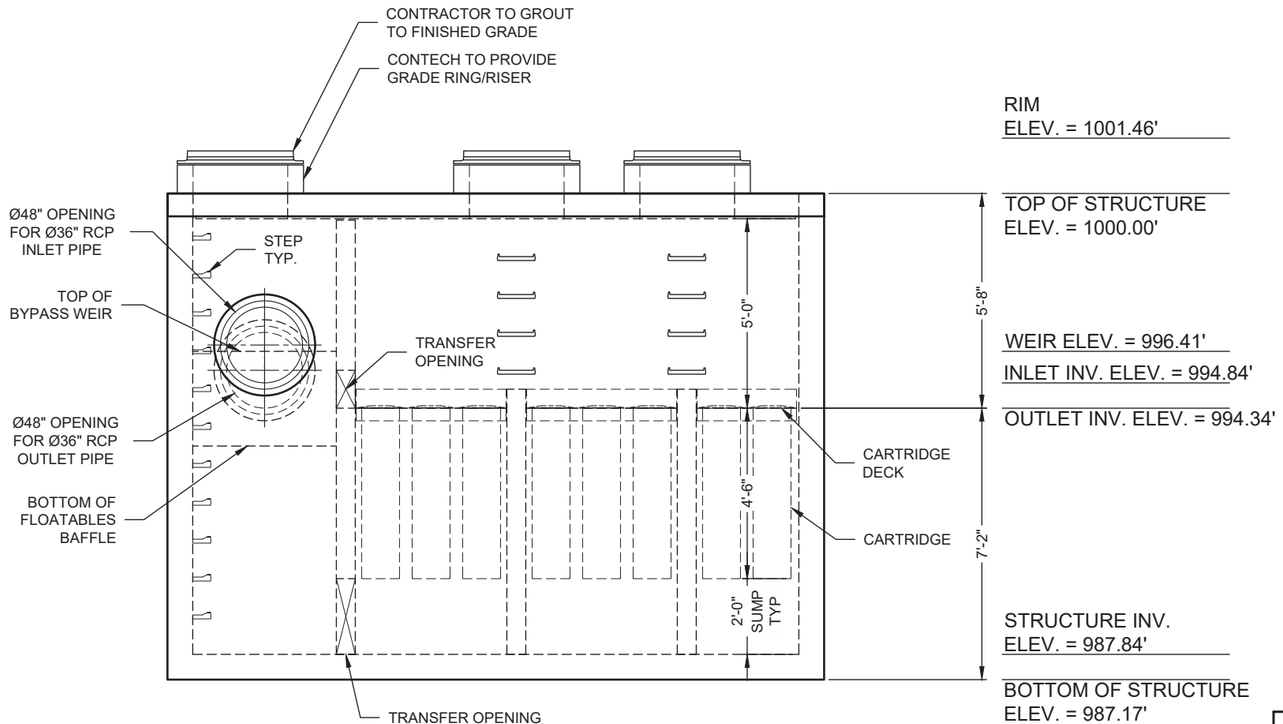
CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9100 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

8' x 11' JELLYFISH - 650868 - 040
TXDOT - FM 1560 FROM SHEANFIELD/GALM TO SH 16
SAN ANTONIO, TX
SITE DESIGNATION: F1



PLAN VIEW

(TOP SLAB NOT SHOWN FOR CLARITY)



ELEVATION VIEW

JELLYFISH DESIGN NOTES

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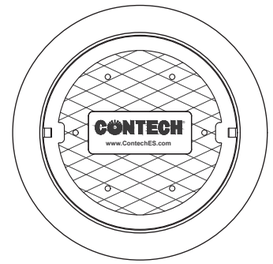
CARTRIDGE SELECTION

CARTRIDGE LENGTH	54"
OUTLET INVERT TO STRUCTURE INVERT (A)	6'-6"
FLOW RATE HI-FLO / DRAINDOWN (CFS) (PER CART)	0.178 / 0.089
MAX. TREATMENT (CFS)	7.84
DECK TO INSIDE TOP (MIN) (B)	5.00



FRAME AND COVER

(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	G1
WATER QUALITY FLOW RATE (cfs)	7.48
PEAK FLOW RATE (cfs)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
# OF CARTRIDGES REQUIRED (HF / DD)	38/8
CARTRIDGE LENGTH	54"

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	994.84	RCP	36	*	*
INLET #2	*	*	*	*	*
OUTLET	994.34	RCP	36	*	*

SEE GENERAL NOTES 6-7 FOR INLET AND OUTLET HYDRAULIC AND SIZING REQUIREMENTS.

RIM ELEVATION	1001.46

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

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Jellyfish Filter

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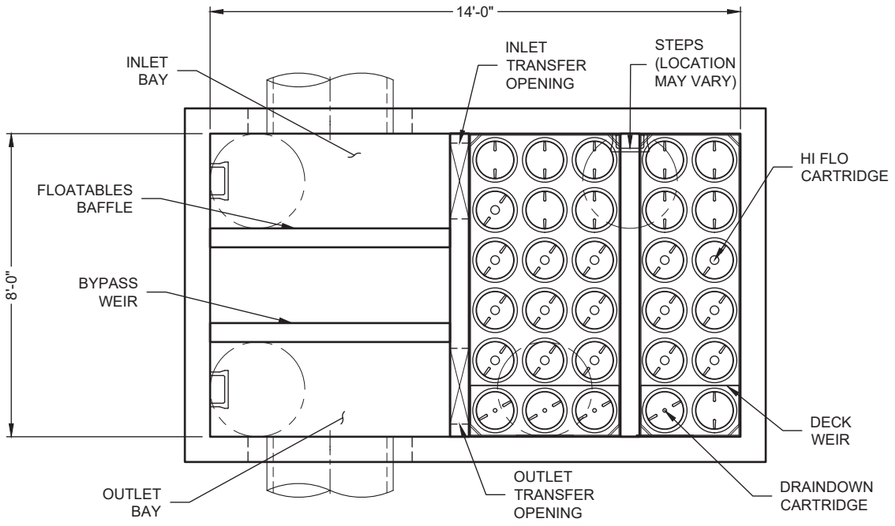
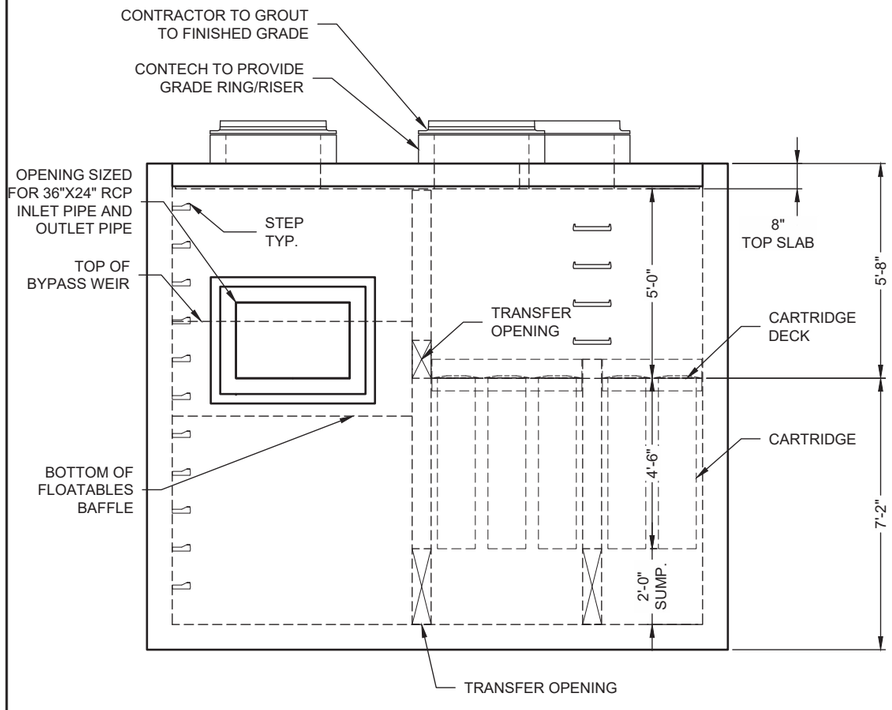
9100 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

8' x 16' JELLYFISH - 650868 - 050
TXDOT - FM 1560 FROM SHEANFIELD/GALM TO SH 16
SAN ANTONIO, TX
SITE DESIGNATION: G1



PLAN VIEW

(TOP SLAB NOT SHOWN FOR CLARITY)



ELEVATION VIEW

JELLYFISH DESIGN NOTES

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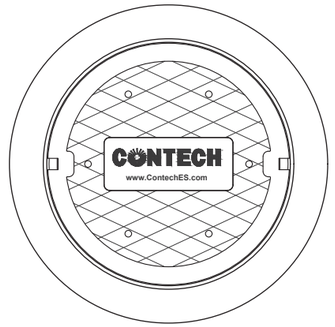
CARTRIDGE SELECTION

CARTRIDGE LENGTH	54"
OUTLET INVERT TO STRUCTURE INVERT (A)	6'-6"
FLOW RATE HIGH-FLO / DRAINDOWN (CFS) (PER CART)	0.178 / 0.089
MAX. TREATMENT (CFS)	4.90
DECK TO INSIDE TOP (MIN) (B)	5.00



FRAME AND COVER

(DIAMETER VARIES)

N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	G2
WATER QUALITY FLOW RATE (cfs)	3.21
PEAK FLOW RATE (cfs)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
# OF CARTRIDGES REQUIRED (HF / DD)	16/4
CARTRIDGE LENGTH	54

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	990.55	RCB	3'X2'	*	*
INLET #2	*	*	*	*	*
OUTLET	990.55	RCB	3'X2'	*	*

SEE GENERAL NOTES 6-7 FOR INLET AND OUTLET HYDRAULIC AND SIZING REQUIREMENTS.

RIM ELEVATION	999.82

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	54"

NOTES/SPECIAL REQUIREMENTS:
VAULT TO BE UPSIZED TO 8X14 TO ACCOMMODATE INLET AND OUTLET PIPE SIZE
* PER ENGINEER OF RECORD

GENERAL NOTES:

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE. www.ContechES.com
3. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0' - 10', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-857, ASTM C-918, AND AASHTO LOAD FACTOR DESIGN METHOD.
6. OUTLET PIPE INVERT IS EQUAL TO THE CARTRIDGE DECK ELEVATION.
7. THE OUTLET PIPE DIAMETER FOR NEW INSTALLATIONS IS RECOMMENDED TO BE ONE PIPE SIZE LARGER THAN THE INLET PIPE AT EQUAL OR GREATER SLOPE.
8. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE.
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT).
D. CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION.

Jellyfish Filter

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9100 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

8' x 11' JELLYFISH - 650868 - 060
TXDOT - FM 1560 FROM SHEANFIELD/GALM TO SH 16
SAN ANTONIO, TX
SITE DESIGNATION: G2

Contech Engineered Solutions Calculations for Texas Commission on Environmental Quality
TSS Removal Calculations

Project Name: FM 1560
Date Prepared: 7/10/2025

1. The Required Load Reduction for the total project:

Calculations from RG-348 Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$
Pages 3-27 to 3-30

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Bexar	
Total project area included in plan * =	33.568	acres
Predevelopment impervious area within the limits of the plan * =	9.803	acres
Total post-development impervious area within the limits of the plan* =	21.105	acres
Total post-development impervious cover fraction * =	0.63	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	9222	lbs.
Number of drainage basins / outfalls areas leaving the plan area =	9	

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. =	**E1**	
Total drainage basin/outfall area =	2.510	acres
Predevelopment impervious area within drainage basin/outfall area =	1.097	acres
Post-development impervious area within drainage basin/outfall area =	2.391	acres
Post-development impervious fraction within drainage basin/outfall area =	0.95	
$L_{M\ THIS\ BASIN}$ =	1056	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP =	JF	abbreviation
Removal efficiency =	86	percent

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7:
LR = (BMP efficiency) x P x (A_I x 34.6 + A_P x 0.54)

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	2.510	acres
A_I =	2.390	acres
A_P =	0.12	acres
L_R =	2135	lbs.

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ =	1921	lbs.
F =	0.90	

6. Calculate Treated Flow required by the BMP Type for this drainage basin / outfall area.

Offsite area draining to BMP =	0.000	acres
Offsite impervious cover draining to BMP =	0.000	acres
Rainfall Intensity =	1.10	inches per hour
Effective Area =	2.15	acres
Cartridge Length =	54	inches
Peak Treatment Flow Required =	2.39	cubic feet per second

Calculations from RG-348
Pages Section 3.2.22

7. Jellyfish
Designed as Required in RG-348
Section 3.2.22

Flow Through Jellyfish Size

Jellyfish Size for Flow-Based Configuration =	JFPD0808-12-3	
Jellyfish Treatment Flow Rate =	2.41	cfs

Contech Engineered Solutions Calculations for Texas Commission on Environmental Quality
TSS Removal Calculations

Project Name: FM 1560
Date Prepared: 7/10/2025

1. The Required Load Reduction for the total project:

Calculations from RG-348 Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$
Pages 3-27 to 3-30

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Bexar	
Total project area included in plan * =	33.568	acres
Predevelopment impervious area within the limits of the plan * =	9.803	acres
Total post-development impervious area within the limits of the plan* =	21.105	acres
Total post-development impervious cover fraction * =	0.63	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	9222	lbs.
Number of drainage basins / outfalls areas leaving the plan area =	9	

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. =	**F1**	
Total drainage basin/outfall area =	10.790	acres
Predevelopment impervious area within drainage basin/outfall area =	3.410	acres
Post-development impervious area within drainage basin/outfall area =	4.340	acres
Post-development impervious fraction within drainage basin/outfall area =	0.40	
$L_{M\ THIS\ BASIN}$ =	759	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP =	JF	abbreviation
Removal efficiency =	86	percent

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7:
LR = (BMP efficiency) x P x (A_I x 34.6 + A_P x 0.54)

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	2.460	acres
A_I =	1.990	acres
A_P =	0.47	acres
L_R =	1783	lbs.

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ =	1605	lbs.
F =	0.90	

6. Calculate Treated Flow required by the BMP Type for this drainage basin / outfall area.

Offsite area draining to BMP =	8.330	acres
Offsite impervious cover draining to BMP =	2.350	acres
Rainfall Intensity =	1.10	inches per hour
Effective Area =	4.10	acres
Cartridge Length =	54	inches
Peak Treatment Flow Required =	4.55	cubic feet per second

Calculations from RG-348
Pages Section 3.2.22

7. Jellyfish
Designed as Required in RG-348
Section 3.2.22

Flow Through Jellyfish Size

Jellyfish Size for Flow-Based Configuration =	JFPD0811-24-5	
Jellyfish Treatment Flow Rate =	4.72	cfs

STATE OF TEXAS
JAIME K. BENOLIEL
96693
LICENSED
PROFESSIONAL ENGINEER
08-22-2025

FIRM REGISTRATION NO. F-230

tnp

Texas Department of Transportation

FM 1560
STORM WATER TREATMENT UNIT CALCULATION

SHEET 1 OF 2

DESIGN: JKB	DRAFT: CA	CHECK: JAT

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6		

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
2230	01	020	FM 1560

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Contech Engineered Solutions Calculations for Texas Commission on Environmental Quality
TSS Removal Calculations

Project Name: FM 1560
Date Prepared: 7/10/2025

1. The Required Load Reduction for the total project:

Calculations from RG-348 Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$
Pages 3-27 to 3-30

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Bexar	
Total project area included in plan * =	33.568	acres
Predevelopment impervious area within the limits of the plan * =	9.803	acres
Total post-development impervious area within the limits of the plan* =	21.105	acres
Total post-development impervious cover fraction * =	0.63	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	9222	lbs.
Number of drainage basins / outfalls areas leaving the plan area =	9	

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. =	**G1**	
Total drainage basin/outfall area =	15.570	acres
Predevelopment impervious area within drainage basin/outfall area =	4.660	acres
Post-development impervious area within drainage basin/outfall area =	6.780	acres
Post-development impervious fraction within drainage basin/outfall area =	0.44	
$L_{M\ THIS\ BASIN}$ =	1730	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP =	JF	abbreviation
Removal efficiency =	86	percent

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7:
LR = (BMP efficiency) x P x (A_I x 34.6 + A_P x 0.54)

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	4.320	acres
A_I =	3.950	acres
A_P =	0.37	acres
L_R =	3531	lbs.

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ =	3215	lbs.
F =	0.91	

6. Calculate Treated Flow required by the BMP Type for this drainage basin / outfall area.

Offsite area draining to BMP =	11.250	acres
Offsite impervious cover draining to BMP =	2.830	acres
Rainfall Intensity =	1.15	inches per hour
Effective Area =	6.37	acres
Cartridge Length =	54	inches
Peak Treatment Flow Required =	7.38	cubic feet per second

Calculations from RG-348
Pages Section 3.2.22

7. Jellyfish
Designed as Required in RG-348
Section 3.2.22

Flow Through Jellyfish Size

Jellyfish Size for Flow-Based Configuration =	JFPD0816-38-8	
Jellyfish Treatment Flow Rate =	7.48	cfs

Contech Engineered Solutions Calculations for Texas Commission on Environmental Quality
TSS Removal Calculations

Project Name: FM 1560
Date Prepared: 7/10/2025

1. The Required Load Reduction for the total project:

Calculations from RG-348 Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$
Pages 3-27 to 3-30

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Bexar	
Total project area included in plan * =	33.568	acres
Predevelopment impervious area within the limits of the plan * =	9.803	acres
Total post-development impervious area within the limits of the plan* =	21.105	acres
Total post-development impervious cover fraction * =	0.63	
P =	30	inches
$L_{M\ TOTAL\ PROJECT}$ =	9222	lbs.
Number of drainage basins / outfalls areas leaving the plan area =	9	

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. =	**G2**	
Total drainage basin/outfall area =	3.630	acres
Predevelopment impervious area within drainage basin/outfall area =	1.420	acres
Post-development impervious area within drainage basin/outfall area =	3.080	acres
Post-development impervious fraction within drainage basin/outfall area =	0.85	
$L_{M\ THIS\ BASIN}$ =	1355	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP =	JF	abbreviation
Removal efficiency =	86	percent

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7:
LR = (BMP efficiency) x P x (A_I x 34.6 + A_P x 0.54)

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	3.630	acres
A_I =	3.080	acres
A_P =	0.55	acres
L_R =	2757	lbs.

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ =	2481	lbs.
F =	0.90	

6. Calculate Treated Flow required by the BMP Type for this drainage basin / outfall area.

Offsite area draining to BMP =	0.000	acres
Offsite impervious cover draining to BMP =	0.000	acres
Rainfall Intensity =	1.10	inches per hour
Effective Area =	2.79	acres
Cartridge Length =	54	inches
Peak Treatment Flow Required =	3.09	cubic feet per second

Calculations from RG-348
Pages Section 3.2.22

7. Jellyfish
Designed as Required in RG-348
Section 3.2.22

Flow Through Jellyfish Size

Jellyfish Size for Flow-Based Configuration =	JFPD0811-16-4	
Jellyfish Treatment Flow Rate =	3.21	cfs

STATE OF TEXAS
JAIME K. BENOLIEL
96693
LICENSED
PROFESSIONAL ENGINEER
08-22-2025

FIRM REGISTRATION NO. F-230

tnp

Texas Department of Transportation

FM 1560
STORM WATER TREATMENT UNIT CALCULATION

SHEET 2 OF 2

DESIGN: JKB	DRAFT: CA	CHECK: JAT

FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6		

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
2230	01	020	FM 1560

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Attachment H – Inspection, Maintenance, Repair, and Retrofit Plan

All inspection, maintenance, repair, and retrofit of the permanent BMPs and measures are required to be documented and recorded and these activities shall be maintained by TxDOT San Antonio District.

Jellyfish Filter

Inspections: Post-construction inspection is required prior to putting the Jellyfish Filter into service. Conduct routine quarterly inspections during the first year of operation to accurately assess the sediment and floatable pollutant accumulation, and to ensure that the automatic backwash feature is functioning properly. Inspection frequency in subsequent years is based on the maintenance plan developed in the first year, but must occur annually at a minimum. Inspections should also be preformed immediately after oil, fuel, or other chemical spill.

Unit Cleaning: The unit must be cleaned annually, including the removal and appropriate disposal of all water, sediment, oil and grease, and debris that has accumulated within the unit. The Jellyfish Filter must be inspected and maintained by professional vacuum cleaning service providers with experience in the maintenance of underground tanks, sewers, and catch basins. Since some of the maintenance procedures require manned entry into the Jellyfish structure, only professional maintenance service providers trained in confined space entry procedures should enter the vessel. The unit should be cleaned out immediately after an oil, fuel, or chemical spill.

Filter Cartridges: Cartridges should be tested for adequate flow rate, every 12 months and cleaned and recommissioned, or replaced if necessary. A manual backflush must be preformed on a single draindown cartridge using a Jellyfish Cartridge backflush pipe. If the time required to drain 14 gallons of backflush water from the backflush pipe (from top of pipe to the top of the open flapper valve) exceeds 15 seconds, it is recommended to preform a manual backflush on each of the cartridges. After the manual backflush, the draindown test should be repeated on a single cartridge to determine if the cartridge can drain 14 gallons of water in 15 seconds. If the cartridge still does not achieve the design flow rate, it must be replaced.

External Rinsing: This cartridge cleaning procedure is performed by removing the cartridge from the cartridge deck and externally rinsing the filtration tentacles using a low-pressure water sprayer, as described in the Jellyfish Filter Owner's Manual. If this procedure is performed within the structure, the cartridge or individual filtration tentacles should be rinsed while safely suspended over the maintenance access wall opening in the cartridge deck, such that rinsed flows into the lower chamber of the Jellyfish Filter. If the rinsing procedure is performed outside the structure, the cartridge or individual filtration tentacles should be rinsed in a suitable basin such as a plastic barrel or tub and rinsed flows poured into the maintenance access wall opening in the cartridge deck.

Sediment Removal: Sediment is removed from the lower chamber by standard vacuum service.

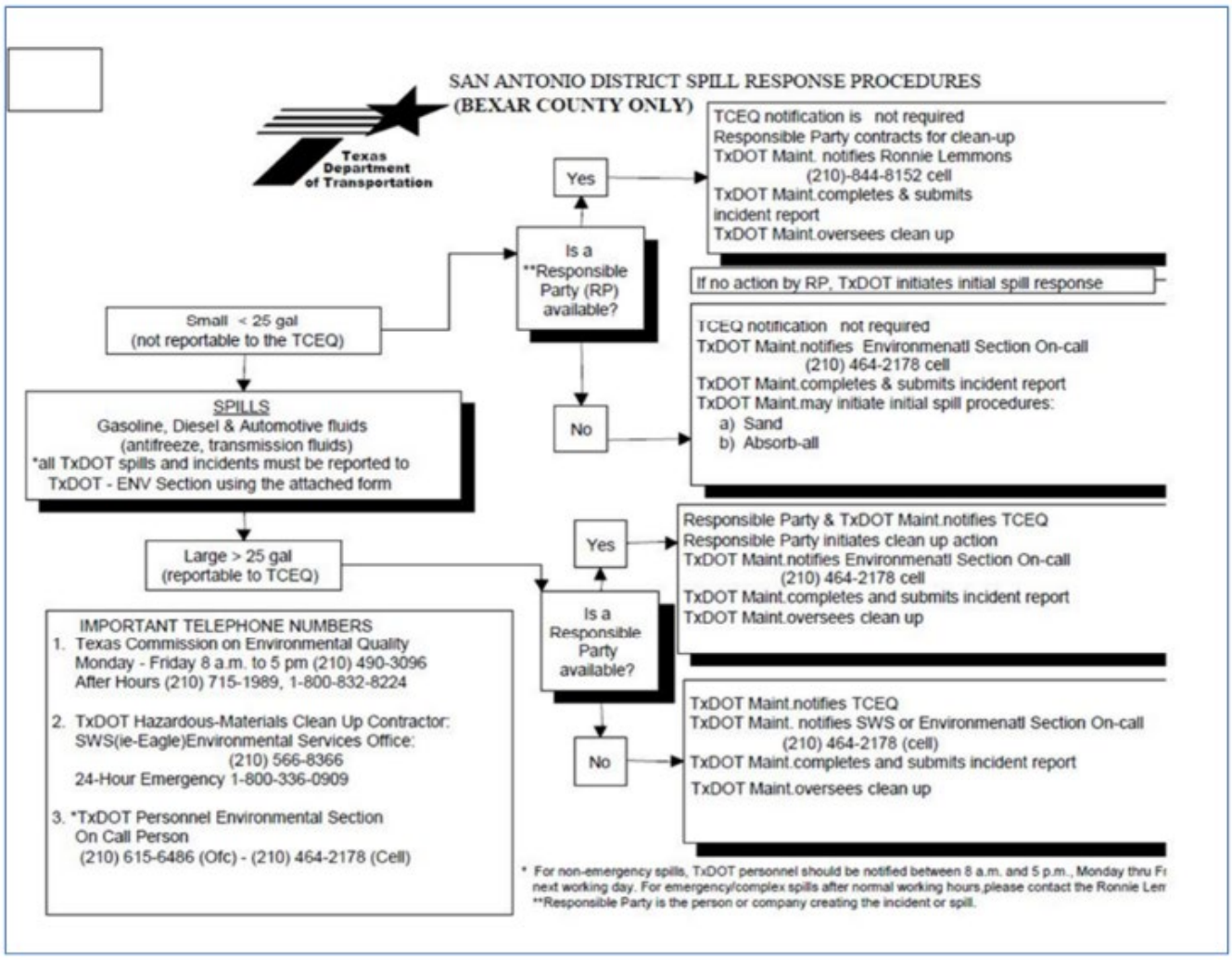
Maintenance Contact: The Maintenance Supervisor may be contacted for questions or concerns pertaining to maintenance of the facility.

Mr. Henry J. Fojtik
TxDOT Department of Transportation
Transportation Engineer Supervisor
4615 NW Loop 410
San Antonio, Texas 78229
(210) 615-5935

Signature of Responsible Party: _____

Attachment J – Measures for Minimizing Surface Stream Contamination

TxDOT's Spill Response Procedures are shown in Image 1, below.



The following describes measures that will be used to minimize surface stream contamination and changes in the way water will enter streams as a result of the construction. Three surface streams receive runoff from the project, Culebra Creek Tributary C1, Helotes Creek Tributary A, and Helotes Creek. These exhibits show stream locations with respect to project area and other information relevant to this attachment:

1. Attachment B, the USGS/Ewards Recharge Zone Map,
2. The Site Plan and Impervious Area Exhibit,
3. The Storm Water Pollution Prevention Plan (SW3P) in the Construction Plans in Attachment G, and
4. The Drainage Area Map in the Construction Plans in Attachment G.

During construction, surface stream contamination will be minimized by implementation of the SW3P. Off-site sheet flow draining to the proposed roadway and On-site storm water runoff from the proposed roadway will be treated through Jellyfish Filters.

As a result of the construction, rainwater which previously drained by roadside ditches will now be captured via curbs and storm sewers and treated through Jellyfish filters prior to discharge into the streams. No significant changes will be made to the way in which water enters the stream as a result of the proposed construction.

Due to redirection of storm flows through BMP's prior to discharge into the stream, no increase in flow or stream flashing will occur due to this project.

The proposed culvert crossings are larger than the existing culvert at the same location; therefore, more flow area is available for stream flow, roadway overtopping is reduced or eliminated, and lower stream velocities with less erosive potential will occur downstream from the culverts.

The bridge crossing at Helotes Creek Tributary a is being widened with gabion walls resulting in a larger opening area under the bridge which will reduce the roadway overtopping and lower stream velocities with less erosive potential will occur downstream from the bridge.

The bridge crossing at Helotes Creek is being lengthen with channel improvements resulting in a larger opening area under the bridge which will reduce the roadway overtopping and lower stream velocities with less erosive potential will occur downstream from the bridge.

Attachment K – Volume and Character of Stromwater

The volume and character of the stormwater will not experience any significant change. The proposed project is a roadway widening project; therefore, the only change in volume and character of stormwater is due to the increase in impervious area and change in conveyance. The runoff from the additional pavement and change in conveyance will cause a minimal increase in the total volume of runoff arriving at each outfall structure. The overall drainage area surrounding the project site will remain unchanged. The increase in impervious and conveyance has a minimal affect on the overall runoff resulting in no significant change in volume and character of the stormwater.

The increase in drainage released from culverts, storm sewers, ditches and slopes are designed to reduce erosion or scour.

The proposed temporary BMPs will be evaluated as the project progresses. On-site and site-specific temporary controls and treatments will commence and continue as directed by the Engineer. It is noteworthy that the project will only entail narrow areas of soil disturbance and will not remain exposed very long before side slopes are seeded for vegetative cover.

The stormwater will be treated by proposed permanent BMPs, which include Jellyfish Filters to prevent pollutants from entering the surface water. The required TSS removal for the total project site is 9222 lbs. and the total designed TSS removal by the proposed BMPs is 9222 lbs. Detailed calculations are included in Attachment G. The design TSS removal is greater than the required TSS removal for the proposed project.

There will be no adverse impact to the volume and character of the storm water due to the proposed project.

GEOLOGIC ASSESSMENT

GEOLOGIC ASSESSMENT

FM 1560 at SH 16
CSJ:0915-12-529
Helotes, Bexar County, Texas
Terracon Project No 90135213-R2.GA
Revised September 24, 2015

Prepared For:
LJA Engineering, Inc.
2929 Briar Park Drive, Suite 600
Houston, Texas 77042-3703

Prepared by:
Terracon Consultants, Inc.
San Antonio, Texas

6911 Blanco Road (210)641-2112
San Antonio, TX 78216 terracon.com

Terracon

Environmental • Facilities • Geotechnical • Materials

September 24, 2015

Terracon

Mr. Todd Thurber, P.E.
LJA Engineering, Inc.
2929 Briar Park Drive, Suite 600
Houston, Texas 77042-3703

RE: Geologic Assessment
FM 1560 at SH 16
CSJ:0915-12-529
Helotes, Bexar County, Texas
Terracon Project Nº 90135213-R2.GA

Dear Mr. Collins:

Terracon Consultants, Inc. (Terracon) is pleased to submit the enclosed ***revised*** Geologic Assessment conducted at the above referenced site. This study was performed by Mr. Kevin K. Bryant, P.G. in accordance with TxDOT Contract # 32-332P5032 at the request of Mr. Todd Thurber, P.E. of LJA Engineering, Inc. The attached report has been prepared in accordance with Title 30 of the Texas Administration Code Chapter 213: Permanent Rules for the Edwards Aquifer. I appreciate the opportunity to perform these services for you. Please contact Kevin Bryant if you have questions regarding technical aspects of this report.

Sincerely,
Terracon Consultants, Inc.

Kevin K Bryant, P.G.
Project Geologist
Project Manager

STATE OF TEXAS
KEVIN K. BRYANT
GEOLOGY
No. 10399
LICENSED
PROFESSIONAL GEOSCIENTIST
9/24/15

Jim Major, P.G
Investigation/Remediation Group Leader
Technical Reviewer

Attachments:
Geologic Assessment Form
Geologic Assessment Narrative Text
Geologic Assessment Table
Stratigraphic Column
Site Photographs
Water Well Log
Exhibit 1: Soils Map
Exhibit 2: Site Geologic Map

Copies Submitted: LJA Engineering (1 original and 4 copies)

Geologic Assessment

Texas Commission on Environmental Quality

For Regulated Activities on The Edwards Aquifer Recharge/transition Zones and Relating to 30 TAC §213.5(b)(3), Effective June 1, 1999

To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.

Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.

Signature

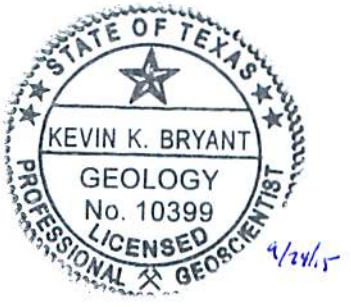
To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

Print Name of Geologist: Kevin K. Bryant Telephone: 210-641-2112

Date: Septmber 24, 2015 Fax: 210-641-2124

Representing: Terracon Consultants Inc, TBPG 50058 (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:



Regulated Entity Name: FM 1560

Project Information

1. Date(s) Geologic Assessment was performed: September 17, 2015
2. Type of Project:
   - ☒ WPAP
   - ☐ SCS
   - ☐ AST
   - ☐ UST
3. Location of Project:
   - ☒ Recharge Zone
   - ☒ Transition Zone
   - ☐ Contributing Zone within the Transition Zone

4. ☒ **Attachment A - Geologic Assessment Table**. Completed Geologic Assessment Table (Form TCEQ-0585-Table) is attached.

5. ☒ Soil cover on the project site is summarized in the table below and uses the SCS Hydrologic Soil Groups* (Urban Hydrology for Small Watersheds, Technical Release No. 55, Appendix A, Soil Conservation Service, 1986). If there is more than one soil type on the project site, show each soil type on the site Geologic Map or a separate soils map.

Table 1 - Soil Units, Infiltration Characteristics and Thickness

Soil Name	Group*	Thickness(feet)
Lewisville	B	0-3 (estimated)
Crawford	D	0-3 (estimated
Tarrant	C	0-2 (estimated)
Patrick	B	0-2 (estimated)

** Soil Group Definitions (Abbreviated)*

A. Soils having a high infiltration rate when thoroughly wetted.
B. Soils having a moderate infiltration rate when thoroughly wetted.
C. Soils having a slow infiltration rate when thoroughly wetted.
D. Soils having a very slow infiltration rate when thoroughly wetted.

6. ☒ **Attachment B – Stratigraphic Column**. A stratigraphic column showing formations, members, and thicknesses is attached. The outcropping unit, if present, should be at the top of the stratigraphic column. Otherwise, the uppermost unit should be at the top of the stratigraphic column.

7. ☒ **Attachment C – Site Geology**. A narrative description of the site specific geology including any features identified in the Geologic Assessment Table, a discussion of the potential for fluid movement to the Edwards Aquifer, stratigraphy, structure(s), and karst characteristics is attached.

8. ☒ **Attachment D – Site Geologic Map(s)**. The Site Geologic Map must be the same scale as the applicant's Site Plan. The minimum scale is 1": 400'

   Applicant's Site Plan Scale: 1" = 100'
   Site Geologic Map Scale: 1" = 300'
   Site Soils Map Scale (if more than 1 soil type): 1" = 300'

9. Method of collecting positional data:

   ☒ Global Positioning System (GPS) technology.
   ☐ Other method(s). Please describe method of data collection: _____

10. ☒ The project site and boundaries are clearly shown and labeled on the Site Geologic Map.

11. ☒ Surface geologic units are shown and labeled on the Site Geologic Map.

12. ☒ Geologic or manmade features were discovered on the project site during the field investigation. They are shown and labeled on the Site Geologic Map and are described in the attached Geologic Assessment Table.

    ☐ Geologic or manmade features were not discovered on the project site during the field investigation.

13. ☒ The Recharge Zone boundary is shown and labeled, if appropriate.

14. All known wells (test holes, water, oil, unplugged, capped and/or abandoned, etc.): If applicable, the information must agree with Item No. 20 of the WPAP Application Section.

    ☒ There are 1 (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply.)
    - ☐ The wells are not in use and have been properly abandoned.
    - ☐ The wells are not in use and will be properly abandoned.
    - ☒ The wells are in use and comply with 16 TAC Chapter 76.

    ☐ There are no wells or test holes of any kind known to exist on the project site.

Administrative Information

15. ☒ Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.

Geologic Assessment
FM 1560 at SH 16
CSJ:0915-12-529
FM 1560 at SH 16
Helotes, Bexar County, Texas
Terracon Project No 90135213-R2.GA
Revised September 24, 2015

INTRODUCTION

LJA Engineering, Inc. retained Terracon Consultants, Inc. to conduct a Geologic Assessment (GA) of the site located at the intersection of State Highway (SH) 16 (Bandera Road) and FM 1560 in Helotes, Bexar County, Texas. The site consists of portions of SH 16, FM 1560, Circle A Trail, and Riggs Road along with portions of a few private lots that are proposed for future expansion of roadways. The site lies within the designated Edwards Aquifer Recharge Zone and Transition Zone. Therefore, future intended development of the site must conform with the Texas Commission on Environmental Quality (TCEQ) Edwards Aquifer Protection Program Rules specified in Title 30 of the Texas Administrative Code, Section 213 (30 TAC§ 213).

EXPLANATION OF ASSESSMENT

This assessment follows general guidelines contained in the TCEQ "*Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/ Transition Zones"* (TCEQ Guidance 0585). The site is located on an area of the Recharge Zone and Transition Zone that may contain karst features formed by selective dissolving of limestone bedrock by water. Karst features may be formed and be visible at the ground surface but more commonly tend to be smaller at the surface and develop with depth.

The assessment, originally performed on various dates between December, 2013 and October, 2014, and revised through an additional site visit on September 17, 2015, consisted of pedestrian surveys of the subject property and non-intrusive visual observations of readily accessible and visible surface conditions. Intrusive subsurface testing such as excavation, cave mapping, infiltrometer testing, geophysical studies, or tracer studies was not required for the geologic assessment of any feature in accordance with the practice guidelines.

For this assessment, geologic or manmade feature are those features that are visible at the ground surface on the Recharge Zone and Transition Zone of the Edwards Aquifer with a potential for hydraulic interconnectedness between the surface and the Edwards Aquifer.

GENERAL SITE DESCRIPTION

The site is situated on a nearly flat to gently-sloping hill top that is currently developed as public roadways and private residential and commercial lots in the vicinity of SH 16 at FM 1560. The project site consists of the area immediately around the intersection of Bandera Road at FM 1560, as well as portions of SH 16 north and south of the intersection, portions of FM 1560 west of SH 16, just west of Helotes Creek, and the portion of Riggs Road immediately north of FM 1560. Most of the project site is covered with pavement consisting of asphalt and concrete with grassy medians and shoulders along the roadways. The private lots near the center of the site are covered in grassy vegetation with scattered trees.

Light detection and ranging (LIDAR) topographic contours, obtained from the San Antonio River Authority (SARA), indicate that the site elevation ranges from approximately 980 feet above mean sea level (amsl) in Helotes Creek to approximately 1035 feet amsl in the northern portion of the site along SH 16.

Historical aerial photographs available through Google Earth software (google.com) reviewed during this assessment depicted the site as developed roadways consisting of pavement, grassy medians, and paved/gravel shoulders with undeveloped residential lots, single-family residential lots, and commercial properties. Vegetation and ground cover shown in these aerial photographs was typical of what was encountered during the on-site observations.

SOIL DESCRIPTION

Based on a review of the *United States Department of Agriculture (USDA) Soil Survey, Bexar County, Texas* (1962) and *Urban Hydrology for Small Watersheds* (Technical Release No. 55, Engineering Division, Natural Resources Conservation Service, USDA, December 1986) the primary soil types located within the boundaries of the GA are mapped as the Crawford Clay (Ca), the Crawford and Bexar stoney soils (Cb), the Tarrant Association, gently undulating (TaB), the Lewisville silty clay (1-3% slopes) (LvB), and the Patrick soils, 1-3% slopes (PaB). A Soils Map depicting the soils located in and around the project site is presented as Exhibit 1.

The Ca soils are mapped in the eastern and central portions of the site near the intersection of SH 16 and FM 1560. Typically, Ca soils are scattered throughout the northern part of the county in hard limestone areas, mostly in uplands, but occasionally in valleys. Regionally, the Ca soils have an average depth of 24 to 36 inches to lithic bedrock. The Ca soils are naturally well drained, water intake is slow, and water erosion is a hazard. These soils are classified as Soil Group D, having a very slow infiltration rate when thoroughly wetted.

The Cb soils are mapped as a thin area just west and north of the intersection of FM 1560 and SH 16. Typically, Cb occurs in large areas, generally hundreds of acres in size, and forms a nearly continuous band between Helotes to the northeastern portion of Bexar County. Regionally, these soils have an average thickness of a few inches up to 14 inches to lithic bedrock. The Cb soils are naturally well drained. These soils are classified as Soil Group D, having a very slow infiltration rate when thoroughly wetted.

The TaB soils are mapped at the northern end of the project site along SH 16 and the intersection of Riggs Road at FM 1560. Typically, TaB soils occur on nearly level and gently sloping areas of typical prairie and plateau topography, in the northern third of Bexar County. Slopes are as steep as 12 percent in places and are usually associated with deeper canyons and draws. Regionally, the soils have an average depth of 18 inches to lithic bedrock. These soils have rapid surface drainage and good internal drainage, water erosion is a hazard, and the soils have a slow transmission rate. These soils are classified as Soil Group C, having a slow infiltration rate when thoroughly wetted.

The LvB soils are mapped in the extreme eastern portion of the project site. Typically, LvB soils occur in long, narrow, sloping areas that separate nearly level terrace soil from uplands and also occupy slopes of major drainage channels. Regionally, the LvB soils are approximately 37 inches deep. If unprotected, the soil is susceptible to water erosion, especially in sloping areas. Lewisville soils have slow to medium surface drainage and medium internal drainage. The capacity to hold water is good. These soils are classified as Soil Group B, having a moderate infiltration rate when thoroughly wetted.

The PaB soils are mapped in the extreme western portion of the project site along FM 1560. Typically, PaB soils occur in the northern portion of the county, on nearly level to gently sloping terraces along streams that drain limestone prairies. Regionally, the PaB soils are usually located 3 to 30 feet above existing streambeds. The PaB soils average 17 inches deep before lithic bedrock is encountered. Unless protected, the soil is susceptible to water erosion, especially in more sloping areas. Patrick soils have slow to rapid surface drainage, medium internal drainage, and limited capacity to hold water. These soils are classified as Soil Group B, having a moderate infiltration rate when thoroughly wetted.

NARRATIVE DESCRIPTION OF SITE GEOLOGY

Various maps were researched to determine the geology in the vicinity of the project site including the *Geologic Map of the Edwards Aquifer Recharge Zone, South-Central Texas* (USGS, 2005), the *Geologic Framework and Hydrogeologic Characteristics of the Edwards Aquifer Recharge Zone, Bexar County, Texas* [USGS Water-Resources Investigations (WRI) Report 95-4030 (1995)], and the *Geologic Map of the Helotes Quadrangle, Texas* (E.W. Collins, 1995). The Collins map from 1995 most closely resembled the geology noted during the field inspection of the site. Therefore, according to the 1995 Collins map, the site is located on the Cretaceous Buda Limestone (Kbu), Cretaceous Del Rio Clay (Kdr), Quaternary Terrace deposits (Qt), Quaternary Alluvium (Qal), and Cretaceous Edwards Limestone Kainer Formation (Kk). Finally, based on observations in the field, it is believed that portions of the Cretaceous Georgetown formation (Kgt) are located along the stream bed of Helotes Creek. A Geologic Map depicting the geologic formations present in and around the project site is presented at the end of this report as Exhibit 2.

The Buda Limestone (Kbu) is mapped in the northern portion of the site along SH 16. The Buda Limestone is a hard and dense chalky limestone that is buff to light gray in color. It is poorly bedded to nodular and glauconitic. Small, calcite-filled veins are common. Typically, karst features are minor and are generally found near the surface. The Buda Limestone has both low porosity and low permeability and ranges from 40 to 50 feet thick.

The Del Rio Clay (Kdr) is mapped in the central and eastern portions of the site along FM 1560 and SH 16. The Del Rio formation is an expansive clay that is blue-green to yellow-brown in color. Abundant *Ilymatogyra arientina* are present. Because the Del Rio is clay, no karst features develop in this formation. The Del Rio has no meaningful porosity nor permeability and is considered the upper confining unit of the Edwards Aquifer. Regionally, the Del Rio Clay is 40 to 50 feet thick but can be as thin as 15 feet in some places.

The Quaternary alluvium (Qal) is mapped in the western portion of the site along FM 1560. The Qal is a combination of recently deposited sediments. Grain sizes vary from clays and silts to sands as well as larger gravel and boulders. Thickness of the alluvium deposits varies from a few inches to several feet and since the sediments are reworked during rain events, cementation of the materials is rare. Permeability of these alluvium deposits varies.

The Fluviatile Terrace Deposits (Qt) is mapped in the western portion of the site along FM 1560 and Riggs Road. The Qt are predominately gravel composed of chert, limestone, and dolomite within increasing amounts of sand, silt and clay the further the sediments are from hard bedrock outcrops. Thickness varies but can be several feet in places. Permeability of these deposits is variable based on factors such as particle size and partial cementation.

The Cretaceous Kainer Formation (Kk) of the Edwards Limestone is mapped at the northern end of SH 16. The Kk contains mudstones, crystalline limestone, and *miliolid* grainstone. The formation is commonly fossiliferous with characteristic rudistid-rich mudstones and wackestones grading into intertidal and supratidal dolomitic mudstones and associated evaporates and *miliolid* grainstones. Other fossils include gastropods and oysters. Chert is common throughout the unit in varying amounts. The limestone and dolostone of the formation represent cyclic subtidal to tidal flat depositional environments. Regionally, the Kainer formation ranges from approximately 250 to over 300 feet thick.

The Georgetown formation (Kgt) is mapped slightly northeast of the southwestern end of SH16. The Kgt consists of reddish-brown, gray, and light tan marly limestone. This formation is easily identifiable in the field by the presence of the characteristic fossil *Waconella wacoensis*. No cavern development occurs within the formation and the porosity and permeability are both low. The Georgetown is very thin locally, usually measuring from 2 to 20 feet in thickness.

The above-referenced geologic maps indicate two faults (Feature S-9 and S-10, see below) are depicted crossing the site and are labeled on Exhibit 2. The first fault (Feature S-9) crosses over SH 16 in the north-central portion of the site. This fault also crosses Riggs Road and FM 1560 in the western portions of project site. The orientation of the fault is approximately N73^{o}E and displacement along the fault is believed to be minimal based on the mapped surface geology being the same on both sides of the fault.

The second fault (Feature S-10) also crosses SH 16 in the northern portion of the project site. The orientation of the fault is approximately N64ºE. The fault is inferred based on the presence of Edwards Kainer limestone forming the footwall to the north of the fault and Buda limestone forming the hanging wall to the south of the fault. These two lithologic units are normally separated by the Georgetown Limestone, Del Rio Clay, and the Person formation of the Edwards Limestone. Therefore, the displacement of the fault is believed to be at least 187 feet (the minimum combined thickness of the geologic units between the Buda and Kainer formations in this portion of Bexar County). No indications of the mapped faults, or any additional faults, were noted within the project site while conducting on-site field observations.

A water well log for an observation well (Feature S-11, Texas Water Well State ID 68-27-512) was reviewed to evaluate the depth to limestone in the central portion of the site. According to this water well log, 2 feet of black soil is located at the surface with the Del Rio Clay formation present from 2 feet to 8 feet below existing grade. The top of the Georgetown Limestone is located at 8 feet below existing grade. A copy of the water well log for feature S-11 is attached at the end of this report.

SITE SPECIFIC GEOLOGIC FEATURE DESCRIPTIONS

The following are description of the features observed during the field observations at the site. The site survey was conducted to identify possible features such as caves, solution cavities, solution-enlarged fractures, faults, other natural bedrock features, manmade features in bedrock, swallow holes, sinkholes, non-karst closed depressions, and zone/clustered/aligned features. Observed features, were evaluated using the survey guidance from the Texas Commission on Environmental Quality (TCEQ) *Instructions to Geologists for Geologic Assessments* as revised October 1, 2004. The features identified at the site are listed in the following subsections.

Several potential features were identified during the site reconnaissance. However, upon further evaluation, some of these identified areas are either not within the boundaries of the project site or were determined to not be a geologic or manmade feature in bedrock. The numbering system of the individual features discussed below has been preserved to remain consistent with the field markings such as stakes and flagging that were used to mark potential features at the site. Accordingly, the feature numbering system is not sequential.

For the purposes of completing the GA forms and associated table included at the end of this report text, each feature has been assigned a point value where higher values indicate an increased chance for rapid infiltration into the subsurface. As required by the TCEQ survey guidance documents, some features such as mapped faults, not readily identifiable in the field, have also been included in this section. Exhibit 2 depicts the locations of the geologic features discussed below.

Features

S-1, S-4, and S-6: Manmade Feature in Bedrock: These features are manholes for a sanitary sewer line. According to the San Antonio Water System (SAWS) maps available at https://transfer.saws.org, the diameter of the sewer lines range from 10 inches to 27 inches while length of the sewer line that crosses all portions of the project site is estimated to be several thousands of feet. According to the SAWS sewer maps, the depths of the sewer lines range from approximately 4.5 feet to 17 feet below existing grade. Typically, sewer lines are installed into trenches excavated into near surface soils and shallow bedrock. Once the utility line has been installed, select materials, such as sand or pea gravel, are typically used to backfill around the utility line, though reuse of excavated materials removed during the trench excavation is also common. The sewer lines are mostly located in hilltop areas along FM 1560, Riggs Road, and SH 16. Since the sewer lines are estimated to be thousands of feet long across the project site, the potential catchment area is likely to be greater than 1.6 acres. Additionally, features S-4 and S-6 are mapped within the 100-year floodplain. However, the majority of the lines are covered with pavement at the surface, prohibiting direct infiltration of rainwater. The majority of the sewer lines are also mapped in geologic units that are stratigraphically younger than the Edwards Limestone and, since the Del Rio clay acts as an aquitard with extremely low permeability, the potential recharge to the underlying Edwards is severely diminished. Therefore, given the nature of the feature's origin, location within geologic units with diminished potential for direct recharge to the Edwards Aquifer, and impervious cover at the surface in most areas, potential recharge into the feature to the Edwards Aquifer is believed to be low - scoring 35 points on the Geologic Assessment Table (see end of this report). Since the features have been determined to rank less than 40 points, the features would not be considered sensitive.

S-2 and S-5: Manmade Feature in Bedrock: These features are fire hydrants and valve covers for water lines. According to the SAWS maps available at https://transfer.saws.org, the diameters of the water lines range from 6 inches to 24 inches while the total length of the water line crossings throughout the project site are estimated to be thousands of feet. The depths of the water lines are unknown but anticipated to be only a few feet. Typically, water lines are installed into trenches excavated into near surface soils and shallow bedrock. Once the utility line has been installed, select materials, such as sand or pea gravel, are typically used to backfill around the utility line, though reuse of excavated materials removed during the trench excavation is also common. The water lines are mostly located in hilltop areas along FM 1560, Riggs Road, and SH 16. Since the water lines are estimated to be around thousands of feet long across the project site, the potential catchment area is likely to be greater than 1.6 acres. Feature S-5 is also mapped within the 100-year floodplain. However, the majority of the lines are covered with pavement at the surface, prohibiting direct infiltration of rainwater. The majority of the water lines are also mapped in geologic units that are stratigraphically younger than the Edwards Limestone and, since the Del Rio clay acts as an aquitard with extremely low permeability, the potential recharge to the underlying Edwards is severely diminished.

Therefore, given the nature of the feature's origin, location within geologic units with diminished potential for direct recharge to the Edwards Aquifer, and impervious cover at the surface in most areas, potential recharge into the features to the Edwards Aquifer is believed to be low - scoring 35 points on the Geologic Assessment Table (see end of this report). Since the feature has been determined to rank less than 40 points, the features would not be considered sensitive.

S-8: Non-Karst Closed Depression: This feature is a drainage culvert underneath FM 1560 where FM 1560 intersects with SH 16. The outflow (southeastern) side of the culvert has built up soil, causing the creation of the closed depression. The culvert consists of corrugated metal pipe set in concrete. The culvert is approximately 40 feet in length and 4 feet wide. Soil build-up deposited from up-gradient erosion at the outflow of the culvert is nearly a foot deep. The drainage culvert is located along a drainage area on the side of the road. Since the culvert is meant to direct stormwater drainage along SH 16, the potential catchment area is likely to be greater than 1.6 acres. However, the underlying geology in this portion of the site is likely the Del Rio Clay which is stratigraphically younger than Edwards Limestone and is essentially an aquitard to the Edwards Aquifer, preventing direct recharge. Therefore, given the nature of the feature's origin, the lining of the feature with metal and concrete, and the installation within areas believed to be Del Rio Clay, potential recharge into the feature to the Edwards Aquifer is believed to be low - scoring 10 points on the Geologic Assessment Table (see end of this report). Since the feature has been determined to rank less than 40 points, the feature would not be considered sensitive.

S-9: Fault: This feature is a mapped fault that crosses the north-central portion of the site across SH 16 as well as areas of Riggs Road and FM 1560. The portion of the fault crossing the site is approximately 857 feet long with an unknown depth and width. The primary orientation of the fault as it crosses the site is approximately N73^{o}E, which is the dominant structural trend in the area. No evidence of the fault scarp, differential vegetation, or topographic change across the fault was noted in the field. No evidence of voids or other conduits capable of promoting recharge were noted around the fault in the field. No evidence of decreased flow in drainage ways across the fault was noted through assessment of alluvial deposits and estimated ordinary high water marks in the field. The fault is believed to have a large catchment area on site and is located on hillside topography with the western portions of the site crossed by the fault also mapped as being within the 100-year floodplain. Given the lack of identified conduits capable of promoting recharge to the subsurface in the vicinity of the fault, the presence of large amounts of impervious cover, and the apparent lack of decreased flow indicators across the fault, potential recharge into the feature to the Edwards Aquifer is believed to be low - scoring 38 points on the Geologic Assessment Table (see end of this report). Since the feature has been determined to rank less than 40 points, the feature would not be considered sensitive.

S-10: Fault: This feature is a mapped inferred fault that crosses the northern portion of the site, across SH 16. The portion of the fault crossing the site is approximately 142 feet long with an unknown depth and width. The primary orientation of the fault is approximately N64°E as it crosses the site. This is in line with the regional dominant trend of N73°E as established by the mapped fault to the south (see Feature S-9). The fault is inferred based on the presence of Edwards Kainer limestone forming the footwall to the north and Buda limestone forming the hanging wall to the south. These litholgic units are normally separated by the Georgetown Limestone, Del Rio Clay, and the Person formation of the Edwards Limestone. Therefore, the displacement of the fault is believed to be at least 187 feet (the minimum combined thickness of the geologic units between the Buda and Kainer formations in this portion of Bexar County). No evidence of the fault scarp, differential vegetation, or topographic change across the fault was noted in the field. No evidence of voids or other conduits capable of promoting recharge were noted around the fault in the field. No evidence of decreased flow in drainage ways across the fault was noted during the field investigation. The fault is believed to have a large catchment area on-site and is located on hillside topography. Given the lack of identified conduits capable of promoting recharge to the subsurface in the vicinity of the fault, the presence of large amounts of impervious cover over the fault, and the apparent lack of decreased flow indicators across the fault, potential recharge into the feature to the Edwards Aquifer is believed to be low - scoring 38 points on the Geologic Assessment Table (see end of this report). Since the feature has been determined to rank less than 40 points, the feature would not be considered sensitive.

S-11: Man-made Boring in Bedrock: This feature is an observation well installed by the Texas Water Development Board in 1971, Texas State Well ID No. 68-27-512. The well is utilized for checking the depth to water in the Edwards Aquifer. Review of the water well log indicates the well is constructed with 7-inch diameter steel casing from approximately 1.8 feet aboveground to 18 feet below ground. From the 18-foot below ground interval, the well boring is a 6.12-inch diameter open hole in bedrock to a depth of 495 feet. The log indicates the well was drilled to 502 feet but drill cuttings or infill likely from partial collapse of the borehole wall settled to the bottom of the hole. The steel pipe of the well aboveground is covered with a locking steel cap. According to the well log, soil and the Del Rio Clay are present from the surface to 8 feet below existing ground level. At 8 feet, the Georgetown Limestone was encountered, followed by the Edwards Limestone at 11 feet below ground surface. The Edwards Limestone extends to approximately 490 feet below ground level, with the Walnut Clay underneath and Glen Rose Limestone present at the bottom of the boring. The catchment area is believed to be small as the casing for the well extends approximately 1.8 feet above the surrounding ground surface. Because the well is a direct conduit to the Edwards Limestone, potential recharge into the feature to the Edwards Aquifer is believed to be high - scoring 65 points on the Geologic Assessment Table (see end of this report). Since the feature has been determined to rank more than 40 points, the feature would be considered sensitive.

S-12: Non-Karst Closed Depressions: This feature is a drainage culvert underneath a driveway along SH-16. The outflow (eastern) side of the culvert has built up soil, causing the creation of the closed depression. The culvert consists of corrugated metal pipe set in concrete. The closed depression is approximately 5 feet wide and 20 feet long. Soil build-up from up-gradient erosion deposited at the outflow of the culvert is nearly 9 inches deep. The drainage culvert is located along a drainage area on the side of the road. Since the culvert is meant to direct stormwater drainage along SH 16, the potential catchment area is likely to be greater than 1.6 acres. However, the underlying geology in this portion of the site is the Del Rio Clay which is stratigraphically younger than Edwards Limestone and is essentially an aquitard to the Edwards Aquifer, preventing direct recharge. Therefore, given the nature of the feature's origin, the lining of the feature with metal and concrete, and the installation within areas believed to be Del Rio Clay, potential recharge into the feature to the Edwards Aquifer is believed to be low - scoring 10 points on the Geologic Assessment Table (see end of this report). Since the feature has been determined to rank less than 40 points, the feature would not be considered sensitive.

S-13: Non-Karst Closed Depressions: This feature is a drainage culvert underneath a driveway along SH-16. The outflow (eastern) side of the culvert has built up soil, causing the creation of the closed depression. The culvert consists of corrugated metal pipe set in concrete. The closed depression is approximately 5 feet wide and 10 feet long. Soil build-up from up-gradient erosion deposited at the outflow of the culvert is nearly 9 inches deep. The drainage culvert is located along a drainage area on the side of the road. Since the culvert is meant to direct stormwater drainage along SH 16, the potential catchment area is likely to be greater than 1.6 acres. However, the underlying geology in this portion of the site is the Del Rio Clay which is stratigraphically younger than Edwards Limestone and is essentially an aquitard to the Edwards Aquifer, preventing direct recharge. Therefore, given the nature of the feature's origin, the lining of the feature with metal and concrete, and the installation within areas believed to be Del Rio Clay, potential recharge into the feature to the Edwards Aquifer is believed to be low - scoring 10 points on the Geologic Assessment Table (see end of this report). Since the feature has been determined to rank less than 40 points, the feature would not be considered sensitive.

S-14: Non-Karst Closed Depressions: This feature is a depression created along the streambed of Helotes Creek. Flood debris deposited during heavy rains have built up on the southern (down-gradient) side of the feature, causing a backup of ponded water covering areas approximately 175 feet long, 50 feet wide and 2.5 feet deep. Fine grained materials and coarse gravels/cobbles/boulders line the bottom and sides of the depressions. The drainage culvert is located in a streambed and is also mapped inside the 100-year floodplain. The catchment area is believed to be greater than 1.6 acres. Hydrophytic plants, including cat-tails (*Typha sp.*), small fish and frogs were also noted within the feature during the September, 2015 field inspection, indicating that the duration of ponding inside the feature is likely long. Therefore, given the nature of the

feature's origin, the lining of the feature with clay and soil, and the long duration of ponding within the feature, potential recharge into the feature to the Edwards Aquifer is believed to be low - scoring 13 points on the Geologic Assessment Table (see end of this report). Since the feature has been determined to rank less than 40 points, the feature would not be considered sensitive.

FILE REVIEW OF PREVIOUS TCEQ DOCUMENTS

Terracon contacted the TCEQ office in San Antonio, Texas in an attempt to procure copies of previous GA reports for properties in the vicinity of the project site. Information on approximately 33 properties in the vicinity of the site was requested from the TCEQ; however, documentation on only two properties – the Forrest Hills Presbyterian Church and a Northside Independent School District Property (Sandra Day O'Conner High School) – was available for review. Terracon personnel reviewed the documentation on November 25, 2014. The files dated back to the mid-1990s and some documentation was not present within the files. However, information relating to the presence of sensitive potential recharge features was not noted in the files for areas near the proposed FM 1560 project site. Information regarding best management practices (BMPs) for protection of sensitive recharge features was not present in the files.

COMMENTS AND OBSERVATIONS

During this geologic assessment, 12 potential recharge features were observed on-site or reported in researched literature. Except for the observation well, feature S-11, none of the features identified in this report are considered sensitive by having a potential for rapid infiltration into the Edwards Aquifer. The observation well is considered sensitive. However, based on review of June 30, 2015 roadway improvement schematic, the well is located approximately 470 feet east-southeast beyond the southeastern extent of the proposed grading and roadway modifications. Measures to mark and protect the well should be considered.

Slight modification of the site topography or surface water flow during construction is anticipated. Within the Edwards Aquifer Recharge Zone, potential recharge features lacking visible surface expression (such as subsurface solution enlarged fractures, caves, cavities, and other karst features) are often present which would not be identifiable during the site inspection. Accordingly, this assessment does not address the possible presence of subsurface conditions that may be exposed during excavation or other construction activities. Should solution features or conditions be exposed during construction, construction should be halted and the TCEQ Edwards Aquifer Protection Program should be contacted and notified of the site conditions immediately in accordance with 30 TAC §213.5(f)(2).

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Veni, George., 1988, The Caves of Bexar County, 2nd Edition, Texas Memorial Museum Speleological Monographs, 2.

San Antonio Water System (SAWS). 2015. Water and Sewer Maps.

GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: FM 1560 (Terracon Project No. 90135213-R2.GA)

LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B*	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DIP	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	≥40	<1.6	≥1.6	
S-1	29° 33' 52.092"	-98° 41' 14.028"	MB	30	Kdr	0.83-2.25	0.83-2.25	?					X	5	35	X			X	Hillside
S-2	29° 33' 47.52"	-98° 41' 6.036"	MB	30	Kdr	0.5-2	0.5-2	?					X	5	35	X			X	Hillside
S-4	29° 33' 52.848"	-98° 41' 24.432"	MB	30	Qt	0.83-2.25	0.83-2.25	?					X	5	35	X			X	Hillside/Flooplain
S-5	29° 33' 54.108"	-98° 41' 23.856"	MB	30	Qt	0.5-2	0.5-2	?					X	5	35	X			X	Hillside/Flooplain
S-6	29° 33' 55.44"	-98° 41' 23.748"	MB	30	Qt	0.83-2.25	0.83-2.25	?					X	5	35	X			X	Hillside/Flooplain
S-8	29° 33' 50.472"	-98° 41' 14.928"	CD	5	Kdr	40	4	1					X,F	5	10	X			X	Drainage
S-9	29° 34' 8.32"	-98° 41' 22.34"	F	20	Kbu, Qt, Qal	857	?	?	73	10			C,F,X	8	38	X			X	Hillside/Flooplain
S-10	29° 33' 57.92"	-98° 41' 19.93"	F	20	Kk, Kbu	142	?	?	64	10			C,F,X	8	38	X			X	Hillside
S-11	29° 33' 45.252"	-98° 41' 0.276"	MB	30	Kdr	0.58	0.58	495					X,F	35	65		X	X		Hilltop
S-12	29° 33' 45.648"	-98° 41' 1.428"	CD	5	Kdr	5	20	0.75					X,F	5	10	X			X	Drainage
S-13	29° 33' 46.512"	-98° 41' 3.876"	CD	5	Kdr	5	10	0.75					X,F	5	10	X			X	Drainage
S-14	29° 33' 54.612"	-98° 41' 29.004"	CD	5	Kgt?	175	50	2.5					C,F,V	8	13	X			X	Streambed/Floodplain

* DATUM NAD 83

2A TYPE	TYPE	2B POINTS
C	Cave	30
SC	Solution cavity	20
SF	Solution-enlarged fracture(s)	20
F	Fault	20
O	Other natural bedrock features	5
MB	Manmade feature in bedrock	30
SW	Swallow hole	30
SH	Sinkhole	20
CD	Non-karst closed depression	5
Z	Zone, clustered or aligned features	30

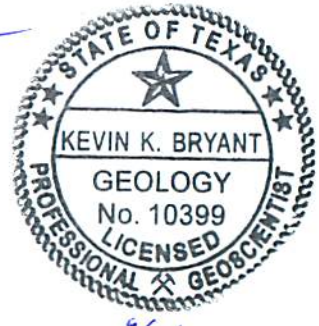
8A INFILLING	
N	None, exposed bedrock
C	Coarse - cobbles, breakdown, sand, gravel
O	Loose or soft mud or soil, organics, leaves, sticks, dark colors
F	Fines, compacted clay-rich sediment, soil profile, gray or red colors
V	Vegetation. Give details in narrative description
FS	Flowstone, cements, cave deposits
X	Other materials

12 TOPOGRAPHY
Cliff, Hilltop, Hillside, Drainage, Floodplain, Streambed

I have read, I understood, and I have followed the Texas Commission on Environmental Quality's Instructions to Geologists. The information presented here complies with that document and is a true representation of the condtions observed in the field. My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

Date: September 24, 2015

Sheet 1 of 1



9/24/15

TCEQ-0585-Table (Rev. 10-01-04)

STRATIGRAPHIC COLUMN
FM 1560 AT SH 16
CSJ:0915-12-529
FM 1560 AT SH 16
HELOTES, BEXAR COUNTY, TEXAS

Hydrogeologic subdivision			Group, formation, or member			Hydo-logic function	Thickness (feet)	Lithology	Field Identification	Cavern development	Porosity/ permeability type
Upper Cretaceous	Upper confining unit		Leona Formation, Uvalde Gravel, Escondido Formation, Anacacho Limestone, and Austin Group, undivided			CU, except for Leona Formation and Uvalde Gravel	665 - 1,200	Argillaceous, light-gray to buff, fossilferous limestone; chalky, marly, and hard limestone; clay, silt, and sandstone	Chert and limestone cobbles; clay, silt, sand, shale, and soft, marly limestone	Rare to none	Low to high porosity/ low to high permeability
			Eagle Ford Group			CU	30 - 50	Brown, flaggy shale and argillaceous limestone	*	None	Low porosity/low permeability
			Buda Limestone			CU	40 - 50	Buff, light-gray, dense mudstone	*	None	Low porosity/low permeability
			Del Rio Clay			CU	40 - 50	Bluish-green to yellowish brown clay	*	None	Low porosity/low permeability
Lower Cretaceous	I	Edwards Aquifer	Georgetown Formation			Karst AQ; not karst CU	2 - 20	Reddish-brown, gray to light-tan, marly limestone	*	None	Low porosity/low permeability
	II		Devils River Formation	Person Formation	Cyclic and marine members, undivided	AQ	0 -10	Mudstone to packstone; *miliolid* grainstone; chert	*	Many subsurface; might be associated with earlier karst development	Laterally extensive; both fabric and not fabric/water yielding
	III				Leached and collapsed members, undivided	AQ	70 - 90	Crystalline limestone; mudstone to grainstone; chert; collapsed breccia	Bioturbated iron-stained beds separated by massive limestone beds; stomatilitic limestone	Extensive lateral development; large rooms	Majority not fabric/one of the most porous and permeable
	IV				Regional dense member	CU	16 - 20	Dense, argillaceous mudstone	Wispy iron-oxide stains	Very few; only vertical fracture enlargement	Not fabric/low permeability; vertical barrier
	V		Edwards Group	Kainer Formation	Grainstone member	AQ	50 - 60	*Miliolid* grainstone; mudstone to wackestone; chert	White crossbedded grainstone	Few caves	Not fabric/one of the most porous and permeable
	VI				Kirschberg evaporite member	AQ	50 - 60	Highly altered crystalline limestone; chalky mudstone; chert	Box work voids, with neospar and travertine frame	Probably extensive cave development	Majority fabric/one of the most porous and permeable
	VII				Dolomite member	AQ	110 - 140	Mudstone to grainstone; crystalline limestone; chert	Massively bedded, light gray; *Toucasia* abundant	Caves related to structure or bedding planes	Mostly not fabric; some bedding-plane fabric/water-yielding
	VIII				Basal nodular member	Karst AQ; not karst CU	50 - 60	Shaly, fossilferous, nodular limestone; mudstone; *miliolid* grainstone	Massive, nodular, and mottled; abundant gastropods and *Exogyra texana*	Large lateral caves at surface; a few caves near Koenig Creek (see pl. 1)	Fabric; stratigraphically controlled/large conduit flow at surface; no permeability in subsurface
	Upper Trinity aquifer		Upper member of the Glen Rose Limestone			CU; evaporite beds AQ	350 - 500	Yellowish-tan, thinly bedded limestone and marl	Stair-step topography; alternating limestone and marl; *Orbitoline minuta*	Some surface cave development	Some water production at evaporite beds/relatively permeable
	Middle Trinity Aquifer		Lower member of the Glen Rose Limestone			AQ	300 - 320	Massive fossiliferous limestone; rudistid reefs and caves; few thin beds of marl and dolomitic limestone	Massive, reefal limestone; *orbitolina texana and Corbula marinae*	Some cave development	Mostly fabric; small to moderate quantities of water from caves and reefs/low permeability

Based on information provided in the Geologic Framework and Hydrogeologic Characteristics of the Outcrops of the Edwards Aquifer Recharge Zone, Bexar County, Texas (USGS, 1995).
CU - Confining unit
AQ - Aquifer
* - See Lithology description

Based on information provided in the *Geologic Framework and Hydrogeologic Characteristics of the Outcrops of the Edwards Aquifer Recharge Zone, Bexar County, Texas* (USGS, 1995).

Photo #1 Typical view of one of the few sanitary sewer manhole covers (feature S-1) noted throughout the site.

Photo #2 View of Bandera Road, looking south.

Photo #3 View of non-karst closed depression (drainage culvert, feature S-8).

Photo #4 Typical view of one of the few sanitary sewer manhole covers (feature S-6) noted throughout the site.

Photo #5 View along FM 1560, looking west.

Photo #6 View along FM 1560, looking east.

Photo #7 View along Bandera Road at Circle A Trail, looking east.

Photo #8 View of fire hydrant (feature S-2).

Photo #9 View of fire hydrant (feature S-5).

Photo #10 View observation well (feature S-11).

Photo #11 View of non-karst closed depression (drainage ditch, feature S-12).

Photo #12 View of non-karst closed depression (drainage ditch, feature S-13).

Photo #13 View of non-karst closed depression (feature S-14).

GW 1

TEXAS WATER DEVELOPMENT BOARD

WELL SCHEDULE

Aquifer Edwards | Field No. | State Well No. AY-68-27-512

Owner's Well No. TH AY-1 | County Bexar

1. Location: ___ 1/4, ___ 1/4 Sec. ___, Block ___ Survey ___
1.1mi NW on St 16 from FM1604, on east side of road 4' from ROW
2. Owner: Texas Water Development Board Address: San Antonio, TX
Tenant: Mr. R.O. Brown Address:
Driller: Texas Water Development Board Address: Projects Division, Austin
3. Elevation of ground is ~~995~~ 995 ft. above msl, determined by Bench Marks published in Tom's Rd.
4. Drilled: Dec. 4 1971; Dug, Cable Tool, (Rotary), No mud
5. Depth: Rept. 502 ft. Meas. 497 ft.
6. Completion: (Open Hole) Straight Wall, Underreamed, Gravel Packed
7. Pump: Mfgr. Type NONE
No. Stages ___, Bowls Diam. ___ in., Setting ___ ft.
Column Diam. ___ in., Length Tailpipe ___ ft.
8. Motor: Fuel NONE Make & Model HP.
9. Yield: Flow ___ gpm, Pump 200 gpm, Meas., Rept., (Est.)
10. Performance Test: Date ___ Length of Test ___ Made by
Static Level ___ ft. Pumping Level ___ ft. Drawdown ___ ft.
Production ___ gpm Specific Capacity ___ gpm/ft.
11. Water Level ? 251 ? ft. rept. (meas.) 11-16 1971 above (below) ground level which is 0.0 ft. above (below) surface.
___ ft. rept. meas. 19__ above below which is ___ ft. above below surface.
___ ft. rept. meas. 19__ above below which is ___ ft. above below surface.
___ ft. rept. meas. 19__ above below which is ___ ft. above below surface.
12. Use: Dom., Stock, Public Supply, Ind., Irr., Waterflooding, (Observation), Not Used,
13. Quality: (Remarks on taste, odor, color, etc.) 180-200 TDS
Temp. 70 °F, Date sampled for analysis ___ Laboratory
Temp. ___ °F, Date sampled for analysis ___ Laboratory
Temp. ___ °F, Date sampled for analysis ___ Laboratory
14. Other data available as circled: (Driller's Log), (Radioactivity Log), (Electric Log), (Formation Samples), (Pumping Test) enclosed with schedule
15. Record by: T. Sieh Date 12-5 1971
Source of Data Obs & instruments
16. Remarks:
TEST HOLE IS 1.58 NNW OF Present Water Supply for City of Hewlotes

odd-shaped section
see Highway location map.

CASING & BLANK PIPE
Cemented From +0.3 ft. to 10 ft.

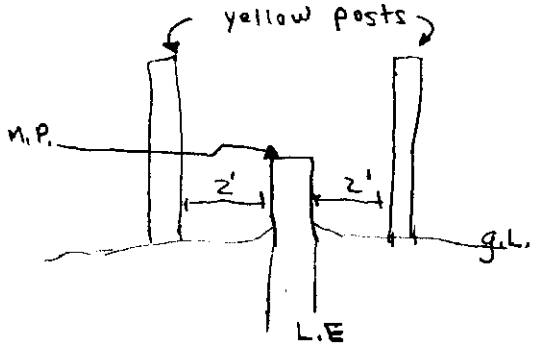
Diam. (in.)	Type	Setting, ft. from	to
7" OD	Steel	+1.8	≈18

WELL SCREEN
Screen Openings

Diam. (in.)	Type	Setting, ft. from	to
6 1/8	open hole	18	495
	filled in from 502	495	to

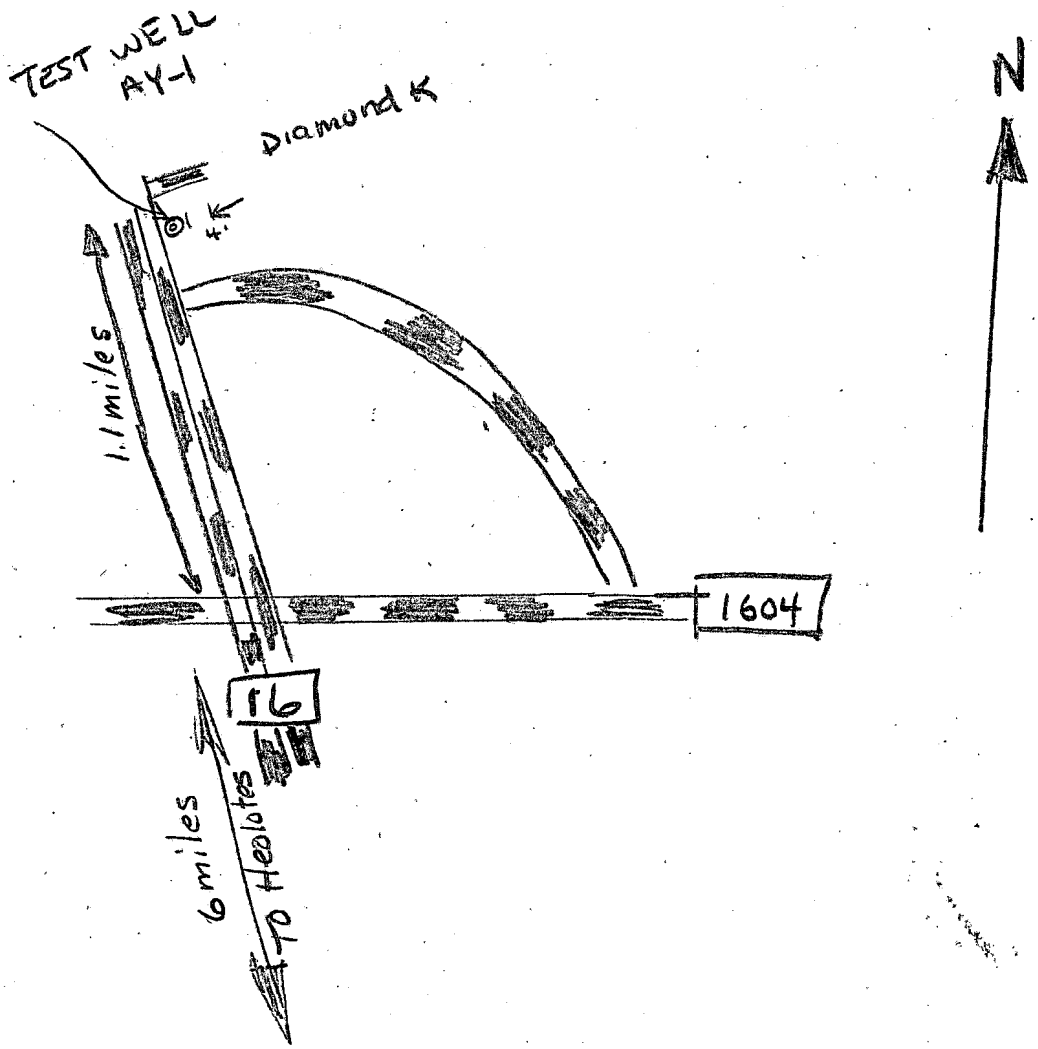
Ob. Well

Q-82



over (Sketch)

TWDBE-GW-49


TEST WELL
AY-1
Diamond K
4.
1.1 miles
1604
16
6 miles
To Hebbronville
N

TEXAS WATER DEVELOPMENT BOARD

WELL SCHEDULE

Aquifer Kea Field No. AY1 State Well No. 68 27 512

Owner's Well No. County Bexar

1. Location: 1/4, 1/4 Sec., Block, Survey
4.5 N L 3.4 E L 1 mi to on st. 16 from 160 ft on each side of
2. Owner: Texas Water Development Board Address: road 4' from row
Tenant: Mr. R. O. Brown Address:
Driller: TWDB Address:
3. Elevation of is 995.- ft. above msl, determined by
4. Drilled: Dec 4 1971; Dug, Cable Tool, Rotary no mud
5. Depth: Rept. 502 ft. Meas. ft.
6. Completion: Open Hole, Straight Wall, Underreamed, Gravel Packed
7. Pump: Mfgr. Type N
No. Stages, Bowls Diam. in., Setting ft.
Column Diam. in., Length Tailpipe ft.
8. Motor: Fuel N Make & Model HP.
9. Yield: Flow gpm, Pump 200 gpm, Meas., Rept., Est.
10. Performance Test: Date Length of Test Made by
Static Level ft. Pumping Level ft. Drawdown ft.
Production gpm Specific Capacity gpm/ft.

CASING & BLANK PIPE
Cemented From 0 ft. to 10 ft.

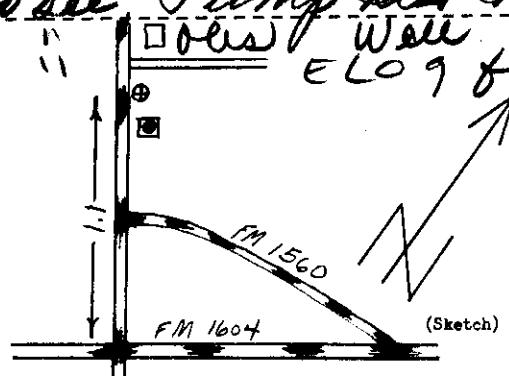
Diam. (in.)	Type	Setting, ft. from	to
7	steel	1.8 0	18

11. Water Level: 200.24 ft. rept. meas. 12-20 1971 above below Top of Casing which is 1.4 ft. above below surface.
251.0 ft. rept. meas. 11-16 1971 above below g l which is 0 ft. above below surface.
ft. rept. meas. 19 above below which is ft. above below surface.
ft. rept. meas. 19 above below which is ft. above below surface.
12. Use: Dom., Stock, Public Supply, Ind., Irr., Waterflooding, Observation, Not Used, Current
13. Quality: (Remarks on taste, odor, color, etc.) 180 - 200 TDS
Temp. 70 °F, Date sampled for analysis Laboratory
Temp. °F, Date sampled for analysis Laboratory
Temp. °F, Date sampled for analysis Laboratory
14. Other data available as circled: Driller's Log, Radioactivity Log, Electric Log, file
Formation Samples, Pumping Test,
15. Record by: G. Marquardt Date 6-17 1976
Source of Data Schedule
16. Remarks: Test Hole - TWDB
Test hole is 158 NNW of present water supply for City of Helotes
for info see Pump test folder Jack T-1

WELL SCREEN
Screen Openings

Diam. (in.)	Type	Setting, ft. from	to
6⅝	open	18	502

filled in from 495 to 502

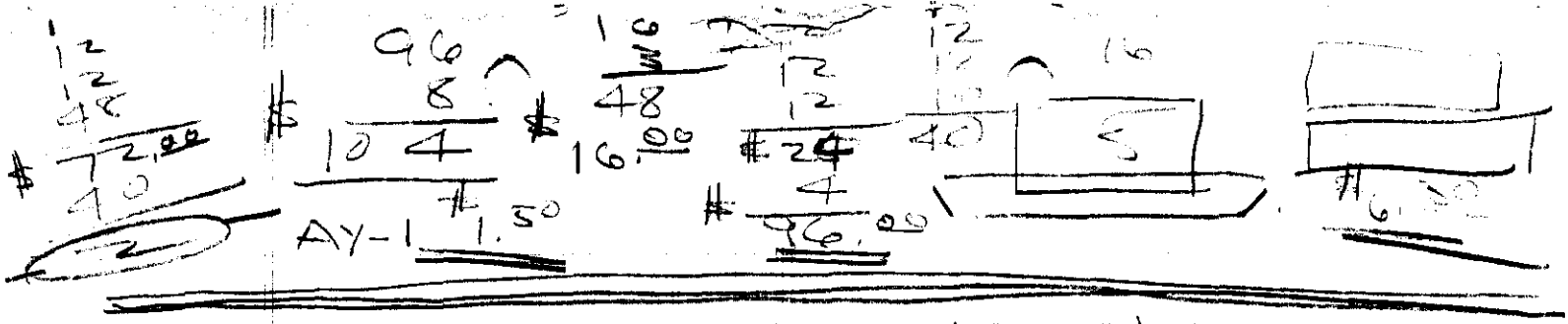


(Sketch)

Q-82

TWDBE-WD-2

AY68-27-512



268 - 268½ (Honey Comb)

unit weight 160.37 #/ft³

adsorption 1.24% - matrix more dense than grain

Compressive Strength 4,230 PSI

Bulk Mod. 840,000

Total Porosity 8.2%

Imper Vert. (no perm)

295½ - 296 (Dense)

unit weight 160.37 #/ft³

adsorption 2.03% (Sat Surface dry & Ovendry) The d.f

Compressive Strength 6020 PSI

Bulk Mod. 200 5000

Total Porosity <1.0%

Imper. Vert. no Perm

FU20

Bill file this with Test Hole AY-1 (Bexar Co.) Helotes

Edwards Aquifer Study

AY 68-27-572

TEXAS HIGHWAY DEPARTMENT
P. O. Box 5250
San Antonio, Texas 78284
September 23, 1971

IN REPLY REFER TO
FILE NO.

District 15
Test Holes - Ground-Water Study

Texas Water Development Board
P. O. Box 13087
Capitol Station
Austin, Texas 78711

Attention Mr. C. R. Baskin, Chief Engineer

Gentlemen:

Reference is made to your letter of September 20, 1971 requesting use of State right-of-way on State Highway 16 near Helotes in order to drill a test hole to study the Edwards Aquifer (Balcones Fault Zone) in the San Antonio Region.

We have reviewed your proposed location and will offer no objections to the work planned by you; however, highway construction is scheduled for this area next spring and any drilling work that has not been completed should be coordinated with that of the highway contractor.

Please notify this office prior to beginning work.

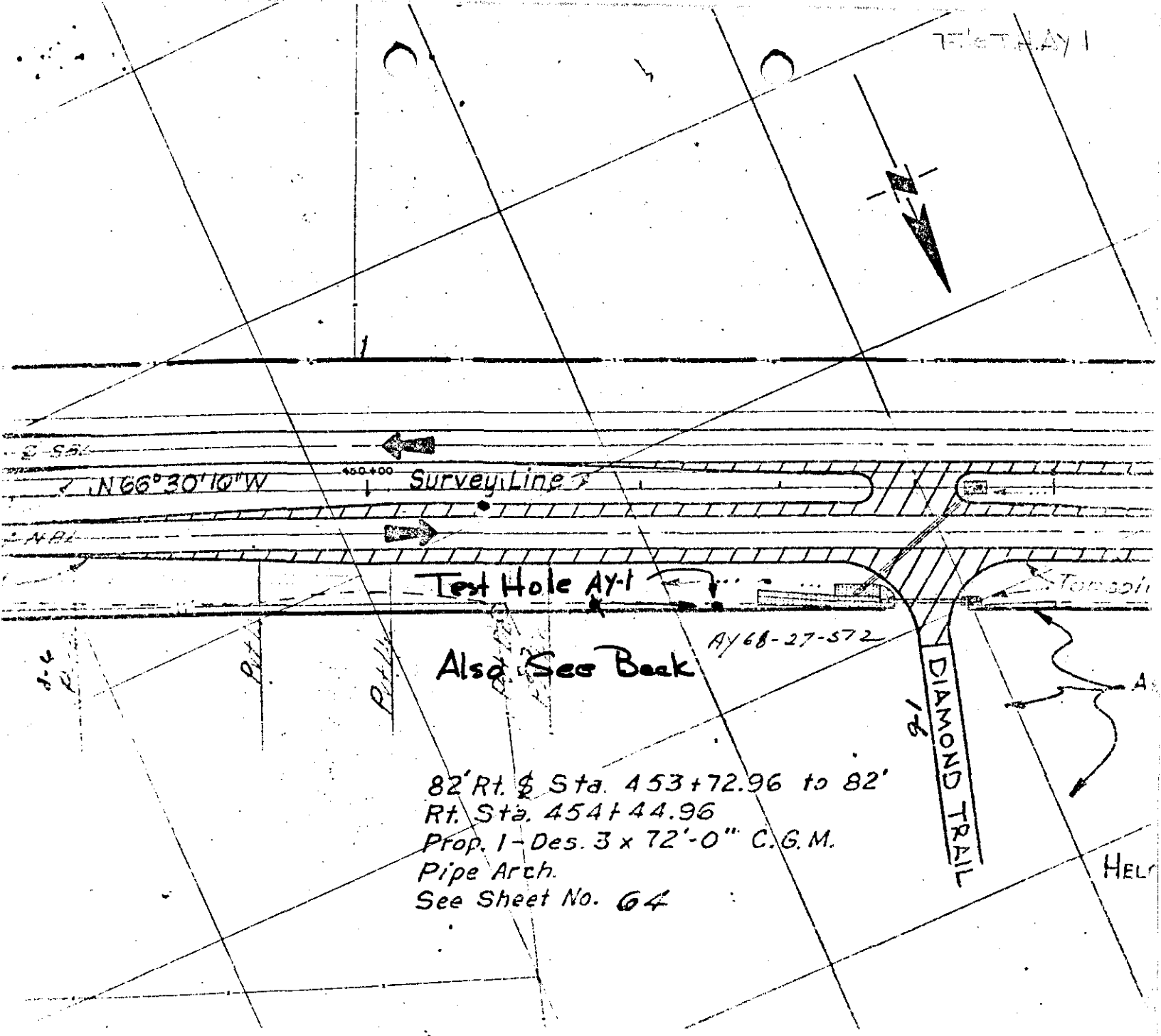
Very truly yours,

R. O. Lytton
District Engineer

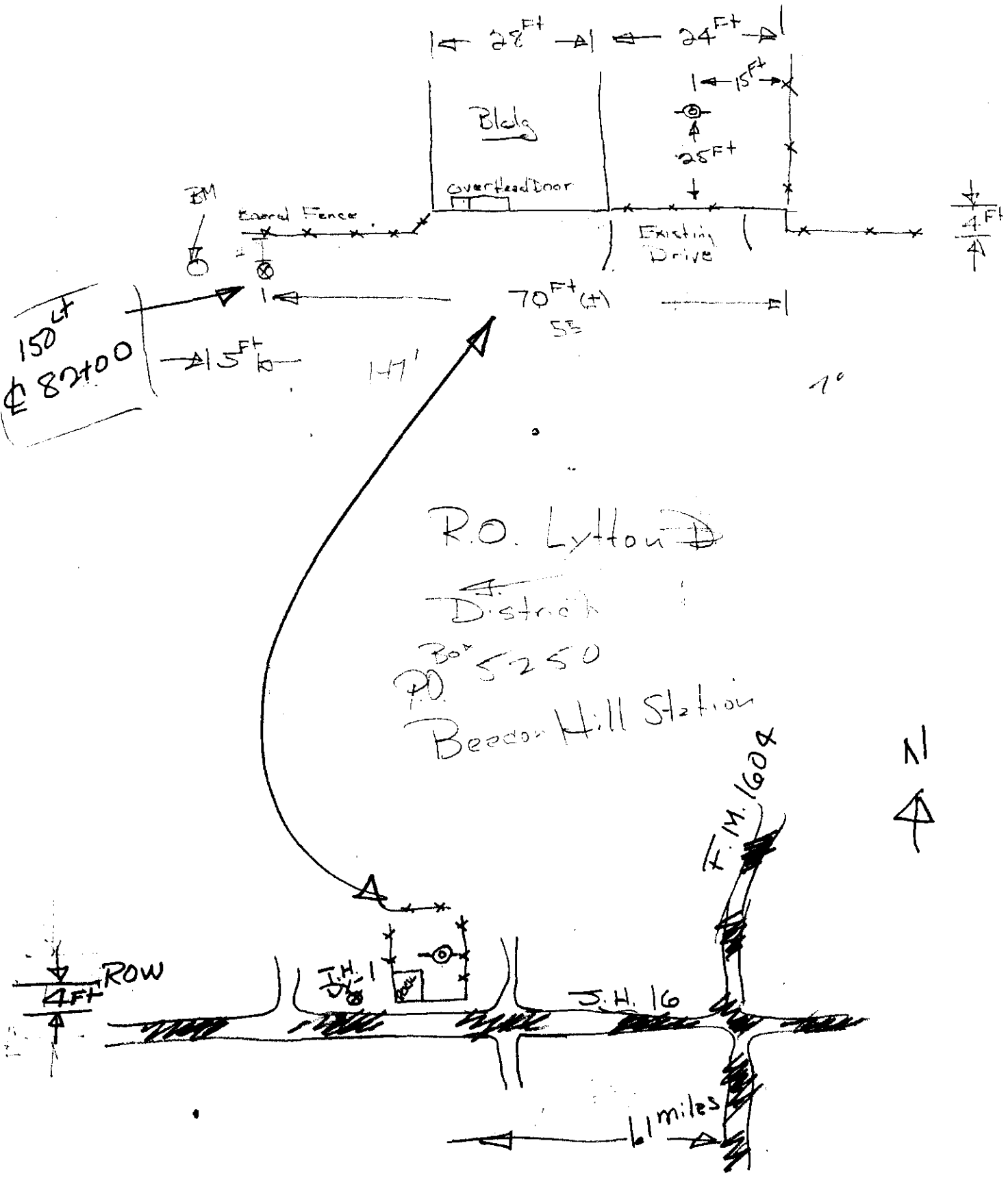
Walter B. Collier
District Maintenance Engineer

CWS:gi

AY-68-27-514



493	383	305	487	496	489	441	400	
0	0	0	3	0	6	6	6	
511	456	444	500	522	533	533	544	

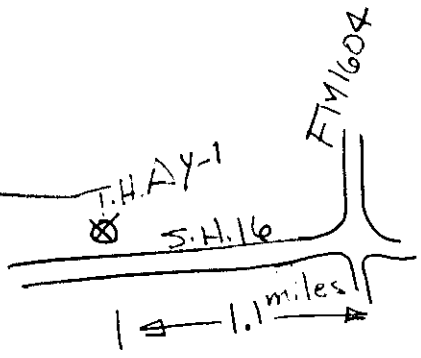

28 Ft
24 Ft
15 Ft
Bldg
25 Ft
overhead Door
BM
Barred Fence
Existing Drive
4 Ft
150 Ft
℄ 82+00
70 Ft (+)
5 Ft
147'
R.O. Lytton
District
P.O. Box 5250
Beeton Hill Station
N
F.M. 1604
ROW
4 Ft
J.H. 1
J.H. 16
6.1 miles

Mr. R O. Brown
695-3712

90845 (st)
90883 stop

874.6 @ 1604
875.7 @ Bexar Co. Water Dist. #17

#17
TD 500 Ft (Pb3)
250 GPM
Driller Bob Johnson
WL 300-400 Ft



2 well
200 GPM / DD 18 Ft (±)

#1 [redacted]

Static WL 262

0 - 2 Black Soil
2 - 8 ~~Bc~~ Del Rio
8 - 11 Georgetown
11 - ~~498~~ Edwards Lime
493 - 499 Walnut Clay
499 - 508 Glen Rose

REQUEST FOR WELL-LOGGING SERVICE

Requested by: Thomas W. Sieh Coordinators' Approval: William B. Klemt

County: BEXAR Well Number: AY-68-27-512

Charge to project: 02-426 Ground Water Phase of Joint Water Development Study

Intervals to be logged: (0-505)

Accessibility to within 100 feet of well site: e.g., all-weather or dry weather: all weather

Desired during period between 12:00 11-30-71 and 5:00 11-30-71

Type of log desired: Electrical ✓ Caliper ✓

Gamma Ray ✓

Temperature ✓

Geologic formations to be logged: Del Rio, Georgetown, Edwards, Commanche Peak, Walnut & Glen Rose

YOU MUST GET OWNER'S PERMISSION TO RUN LOG PRIOR TO REQUEST FOR LOGGER!!!

Please furnish with request for logger, a copy of your well schedule for well to be logged. Especially important are the well depth and the casing record, giving the interval of each casing size and the location of the screened or slotted interval and the uncased portion, if any. Also indicate whether well is underreamed and gravelpacked and if the casing is cemented; this information will aid in both the logging and the interpretation of the log.

The drillers' log (if available) should be included for comparison. Indicate tools necessary to gain access to well itself--e.g., cutting torch, wrenches, chain tongs, etc.

TEXAS WATER DEVELOPMENT BOARD

INTEROFFICE MEMORANDUM

TO : Chief, San Antonio District DATE: May 5, 1972

THRU : Director, Technical Review Division, Principal Engineer-Data and Technical Review, Principal Engineer- Project Development, and Director, Water Availability Division

FROM : Chief, Materials Testing Lab and Core Drill Branch

SUBJECT: Core Test Results, Edwards Aquifer Study, Test Holes AY-1 Bexar County and DX-2 Comal County

The test results enclosed reflect the various characteristics of the cores tested. Selection of the cores that were submitted for testing was performed by a geologist from the San Antonio District Office at the rig site.

The following sequence of events occurred to each core received at the Materials Testing Laboratory.

1. Parallel ends were sawed on the core samples. Cores that shattered upon sawing and cores that were less than four inches in length were discarded, as they could not be tested by the equipment in the Laboratory.
2. Next the unit weight of the core sample was determined in a saturated surface dry condition.
3. Next the percent absorption was determined.
4. Next the percent porosity was determined.
5. Next the vertical permeability was determined. The permeability test was performed with a constant water head of 66 inches. Cores were left in the permeameter until they developed a constant rate of flow, or 48 hours, which ever was greater.
6. Next the cores were tested for ultimate compressive strength.
7. Next the modulus of elasticity was calculated.

Attempts to measure the resistance of the cores to an electrical current were unsatisfactory with equipment available in the Laboratory.

None of the cores were observed to have uniform porosity. The porosity that was visible normally occurred in voids oriented horizontally across the cores. Many voids were not connected to others in the cores. Cores with vertical fractures or connected porous zones usually disintegrated while being sawed. This explains the fact that many of the cores were impervious in the vertical direction and yet they passed considerable porosity.

It is also necessary to point out that cores were only obtained from the more competent sections of the formation. Thus, these test results are representative of the more dense portion of the Edwards Aquifer, only.

Henry H. Sampson Jr. P. E.
Chief, Materials Testing Lab
and Core Drill Branch

Enclosure

Table — ~~RESULTS OF TWDB LABORATORY TESTS and Measurements~~

TEST ~~HOLE~~ well AY-1 (68-27-512)
BEXAR COUNTY

	Depth Ft. to Ft.	Unit Weight lbs/cu.ft.	Absorption %	EP	Porosity %	Vertical Permeability gpd/ft^2	Compressive Strength psi	Modulus of Elasticity psi
1	430 - 440	156.0	2.7	6.7	9.4	.119	3710	952,000
2	480 - 490	161.0	3.0	2.7	5.7	.002	7300	1,378,000
3	560 - 570	162.9	2.0	1.6	3.6	Imp.	9540	2,980,000
4	610 - 620	159.1	1.1	1.8	2.9	.109	7520	1,671,000
5	69 - 70	167.2	0.5	3.3	3.8	Imp.	9650	2,053,000
6	75 - 76	165.4	1.0	.8	1.8	Imp.	14,140	3,626,000
7	80 - 81	164.1	7.2	29.0	36.2	.009	5800	3,221,000
8	105 - 106	165.4	0.7	7.3	8.0	Imp.	9400	1,775,000
9	138 - 139	154.8	2.2	4.5	6.7	Imp.	7700	2,749,000
10	148 - 149	161.0	2.9	1.4	4.3	Imp.	12,470	2,310,000
11	162 - 163	164.7	1.1	5.6	6.7	Imp.	6220	1,552,000
12	169 - 170	158.5	2.5	1.9	4.4	Imp.	7940	2,335,000
13	[redacted] 180-181	159.1	1.6	.3	1.9	Imp.	10,130	2,844,000
14	[redacted] 199-200	164.1	1.9	.2	2.1	Imp.	8820	2,866,000
15	267 - 268	160.4	1.2	6.0	8.2	Imp.	4230	846,000
16	~~280 - 281~~ 284 - 290	151.6	6.1	3.0	9.1	.029	2250	500,000
17	293 - 294	149.8	3.4	3.0	6.4	.039	2350	904,000
18	295 - 296	160.4	2.0	2.0	4.0	Imp.	8020	2,005,000
19	357 - 358	157.9	3.6	4.8	8.4	Imp.	7700	1,200,000
20	367 - 368	146.6	9.5	1.6	11.1	Imp.	2230	685,000
21	372 - 373	161.6	2.5	4.4	6.9	Imp.	4740	1,974,000
22	374 - 375	150.4	7.5	2.8	9.5	Imp.	6300	1,536,000
23	377 - 378	149.8	8.9	2.8	11.7	Imp.	3780	880,000

IMP

Impermeable
1.000

TEST HOLE AY-1
BEXAR COUNTY

Depth Ft. to Ft.	Unit Weight lbs/cu.ft.	Absorption %		Porosity %	Vertical Permeability gpd/ft.^{2}	Compressive Strength psi	Modulus of Elasticity psi
24 451 - 452	156.6	6.3	1.4	7.7	Imp.	7050	1,568,000
25 453 - 454	156.0	6.2	0	6.2	Imp.	4580	1,433,000
459 - 460	147.9	9.0	.9	9.9	Imp.	4750	1,200,000
463 - 464	161.0	4.4	8.1	12.5	Imp.	6990	2,119,000
478 - 479	154.1	6.6	1.9	8.5	Imp.	6150	1,078,000
482 - 483	155.4	5.6	.3	5.9	Imp.	3560	584,000
493 - 494	147.9	7.4	2.2	9.6	.101	5270	1,973,000

Observation Well

PUMPING TEST DATA

Number 68-27-512 AY-1

Date test started 12-20, 1971

Location Hebbes, Texas Bexar County

Owner Bexar County WCID #17

Driller TWDB

Date Well Completed 11-29-71

Altitude above sea level 994.5 feet

Type of well (pumping, observation) observation

Depth of well 502 feet

Diameter of well 7 inches

Depth to top of bed 7' (Georgetown) feet

Well casing depth 20 feet

Geologic formation Edwards

Character of material-

Test conducted by TWDB & USGS

Accuracy (~~excellent~~, good, ~~fair~~, ~~poor~~)

Method of lift None Power

Duration of test 47 hrs

Average rate of pumpage 340 gpm

Drawdown feet; Time (hours, days)

Use of water Public

Chemical analysis (yes, no) no

Water temperature —

Electric log (yes, no) yes

Static water level below surface 202.25 feet; Date 12-20-71; Time 122pm

Pumping level feet below surface after (hours, days)

Coefficient of transmisaibility 35,800 gpd/ft. (drawdown gpd/ft. (recovery)

Coefficient of storage .02 (drawdown) (recovery)

Permeability 169.6 gpd/ft.^{2}; Method of determination 35800/211 (Sat thickness)

Screened aettings ft. to ft.; ft.to ft.; ft. to ft.

Specific capacity gpm/ft. (observed); gpm/ft. (calculated); (time)

Pump setting ft.; Airline ft.; Bown and suction length ft.

County : Bexar
Location: Helotes, Texas

Observation well no. AY-1
Pumped well no. AY 68-27-512

Average Q _____ gpm r = 158 ft. r^2 = _____

observation well
Page 1 of 6

Date	Hour	t (min)	t' (min)	t/t'	Depth to water	s (unadjusted)	Adjustment Δs	s' (adjusted)	Q (gpm)	Remarks
12-20-71	1100				Static 200.24					MP Top of csg
	1255				Static 202.25					1.4 > LSD
12-20-71					2.27	= 202.25				
12-20-71										Pump on @
	1322.5	1/2			2.27	0				1322
	1323	1			2.37	0.10				
	1323.5	1½			2.47	0.20				
	1324	2			2.47	0.20				
	1324.5	2½			2.55	0.28				
	1325	3			2.62	0.35				
	1325.5	3½			2.67	0.40				
	1326	4			2.70	0.43				
	1326.5	4½			2.73	0.46				
	1327	5			2.75	0.48				
	1328	6			2.77	0.50				
	1329	7			2.80	0.53				
	1330	8			2.85	0.58				
	1331	9			2.90	0.63				
	1332	10			2.90	0.63				
	1334	12			2.95	0.68				
	1336	14			2.99	0.72				
	1338	16			3.05	0.78				
	1340	18			3.10	0.83				
	1342	20			3.10	0.83				

County : Bexar

Location: Helotes

Observation well no. AY-1

Pumped well no. AY68-27-512

Average Q _____ gpm r = _____ ft. r^2 = _____

Observation Well

Date	Hr	t (min)	t' (min	t/t'	Depth H_2O from MP					
12-20-71	1344	22			3.10	0.83				
	1346	24			3.14	0.87				
	1348	26			3.17	0.90				
	1350	28			3.18	0.91				
	1352	30			3.20	0.93				
	1354	32			3.25	0.98				
	1356	34			3.27	1.00				
	1358	36			3.30	1.03				
	1400	38			3.30	1.03				
	1402	40			3.30	1.03				
	1407	45			3.34	1.07				
	1412	50			3.33	~~1.06~~				Tape slipped these values may not be good
	1417	55			3.30	~~1.03~~				
	1422	60			3.29	~~1.02~~				
	1427	65			3.26	~~0.99~~				
	1432	70			3.80	1.53				Tape slipped Re taped
	1437	75			3.82	1.55				
	1442	80			3.87	~~1.60~~				
	1447	85			3.87	1.60				
	1452	90			3.94	1.67				
	1457	95			3.94	1.67				
	1502	100			3.95	1.68				
	1512	110			3.97	1.70				
	1522	120			—	—				
	1532	130			4.09	1.82				

2.27

County : Bexar
Location: Helotes Texas

Observation well no. AY-1
Pumped well no. AY68-37-512

Average Q _____ gpm r = 158 ft. r^2 = _____

observation well
Page 3 of 6

Date	Hour	t (min)	t' (min)	t/t'	Depth to water	s (unadjusted)	Adjustment Δs	s' (adjusted)	Q (gpm)	Remarks
	1542	140			4.12	1.85				
	1552	150			4.14	1.87				
	1602	160			4.12	1.85				
	1612	170			4.09	1.82				
	1622	180			4.11	1.84				
	1632	190			4.12	1.85				
	1642	200			4.12	1.85				
	1652	210			4.12	1.85				
	1702	220			4.10	1.83				
	1722	240			4.11	1.84				
	1742	260			4.32	2.05				
	1802	280			4.38	2.11				
	1822	300			4.40	2.13				
	1842	320			4.42	2.15				
	1902	340			4.45	2.18				
	1942	380			4.45	2.18				
	2022	420			4.55	2.28				
	2102	460			4.73	2.46				
	2142	500			4.75	2.48				
	2222	540			4.87	2.60				
	2302	580			5.03	2.76				
	2342	620			5.17	2.90				
12-21-71	0022	660			5.17	2.90				
	0102	700			5.17	2.90				
	0142	740			5.20	2.93				

County : Bexar

Location: Helotes

Observation well no. AY-1

Pumped well no. AY-68-37-502

Observation Well

2.27

Average Q 330 gpm r = 158 ft. r^2 = .

Date	Hour	t (min)	t' (min)	t/t'	Depth to water	s (unadjusted)	Adjustment Δs	s' (adjusted)	Q (gpm)	Remarks
12-21-71	0222	780			5.19	2.92				
	0302	820			5.16	2.89				
	0342	860			5.18	2.91				
	0422	900			5.30	3.03				
	0502	940			5.33	3.06				
	0542	980			5.37	3.10				
	0622	1020			5.38	3.11				
	0702	1060			5.39	3.12				
	0742	1100			5.44	3.17				
	0822	1140			5.55	3.28				
	0902	1180			5.55	3.28				
	1002	1240			5.60	3.33				
	1102	1300			5.67	3.40				
	1202	1360			5.67	3.40				
	1302	1420			5.70	3.43				
	1402	1480			5.70	3.43				
	1502	1540			5.73	3.46				
	1602	1600			5.77	3.50				
	1702	1660			5.83	3.56				
	1802	1720			5.88	3.61				
	1902	1780			5.96	3.69				
	2002	1840			6.03	3.76				
	2102	1900			6.07	3.80				
	2202	1960			6.15	3.88				
	2302	2020			6.22	3.95				

County : Bexar
Location: Helotes (2-27)

Observation well no. AY-1
Pumped well no. AY-66-23-512 Observation Well

Average Q _____ gpm r = _____ ft. r^2 = _____

Date	Hour	t (min)	t' (min)	t/t'	Depth to water	s (unadjusted)	Adjustment Δs	s' (adjusted)	Q (gpm)	Remarks
12-22-71	0002	2080			6.25	3.98				
	0102	2140			6.45	4.18				
	0202	2200			6.45	4.18				
	0302	2260			6.53	4.26				
	0402	2320			6.59	4.32				
	0502	2380			6.60	4.33				
	0602	2440			6.66	4.39				
	0702	2500			7.00	4.43				
	0802	2560								
	0830	2540			6.75	4.48				
			— Recovery —							
12-22-71					6.76					Pump off at
			1		6.76	0.00				900 Am 12-22-71
			2		6.73	0.03				
			3		6.66	0.07				
			4		6.57	0.16				
			5		6.54	0.19				
			6							
			7							
			8		6.48	0.23				
			9							
			10		6.36	0.35				
9:13			13		6.25	0.46				
9:15			15		6.20	0.51				
9:17			17		6.16	0.55				

County : Bexar

Location: Helotes

Observation well no. AY-1

Pumped well no. AY68-27-512

Observation Well

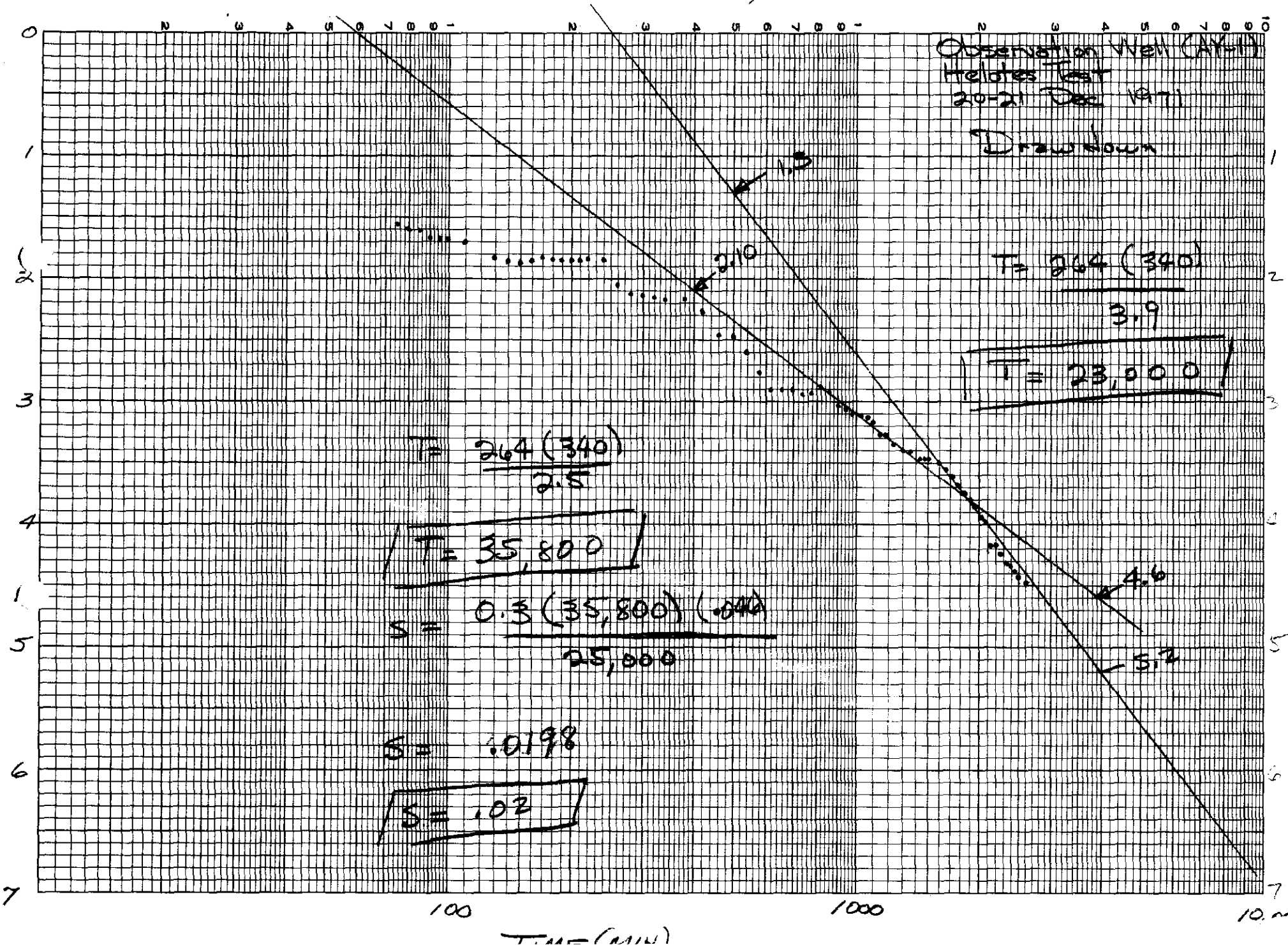
Average Q _____ gpm r = 158 ft. r^2 = _____

Date	Hr	t (min)	t' (min)	t/t'	Depth	S unadjusted				
	9:20		20		6.13	0.58				
	9:25		25		6.08	0.63				
	9:30		30		6.02	0.69				
	9:40		40		5.95	0.76				
	9:50		50		5.90	0.81				
	10:00		60		5.82	0.89				
	10:10		70		5.76	0.95				
	10:20		80		5.70	1.01				
	10:30		90		5.68	1.03				
	10 40		100		5.62	1.09				
	11 00		120		5.55	1.16				
	1120		140		5.50	1.21				
	1140		160		5.45	1.26				
	1200		180		5.45	1.26				
	1220		200		5.40	1.30				
	1240		220							
	1300		240							

NO. 340-L310 DIETZGEN GRAPH PAPER
SEMI-LOGARITHMIC
3 CYCLES X 10 DIVISIONS PER INCH

EUGENE DIETZGEN CO.
MADE IN U. S. A.

AY 68-27-512



$$T = \frac{264\ (340)}{3.9}$$

$$T = 23{,}000$$

$$T = \frac{264\ (340)}{2.5}$$

$$T = 35{,}800$$

$$S = \frac{0.3\ (35{,}800)\ (.044)}{25{,}000}$$

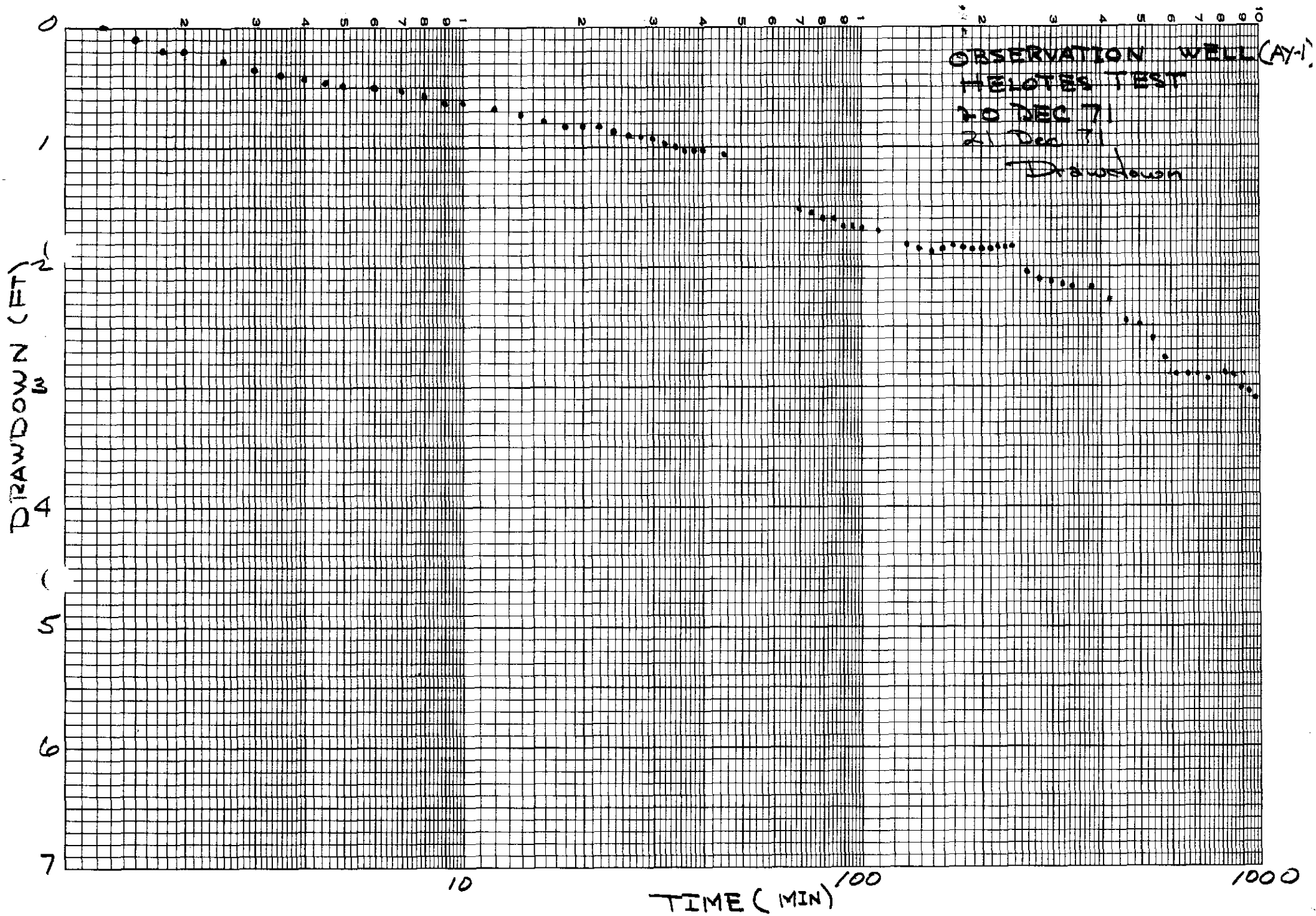
$$S = .0198$$

$$S = .02$$

NO. 340-L310 DIETZGEN GRAPH PAPER
SEMI-LOGARITHMIC
3 CYCLES X 10 DIVISIONS PER INCH

EUGENE DIETZGEN CO.
MADE IN U. S. A.

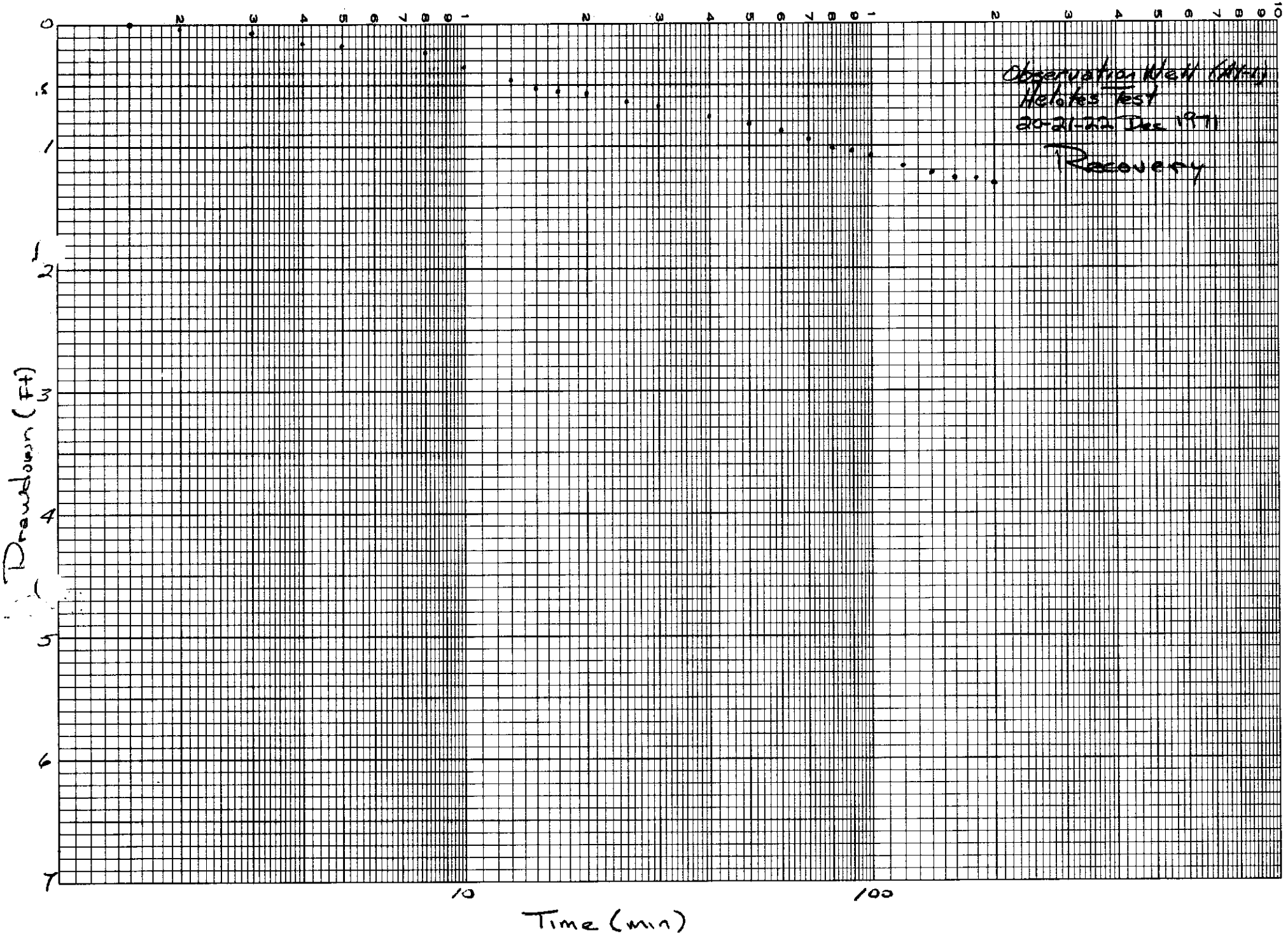
AY 68-21-512

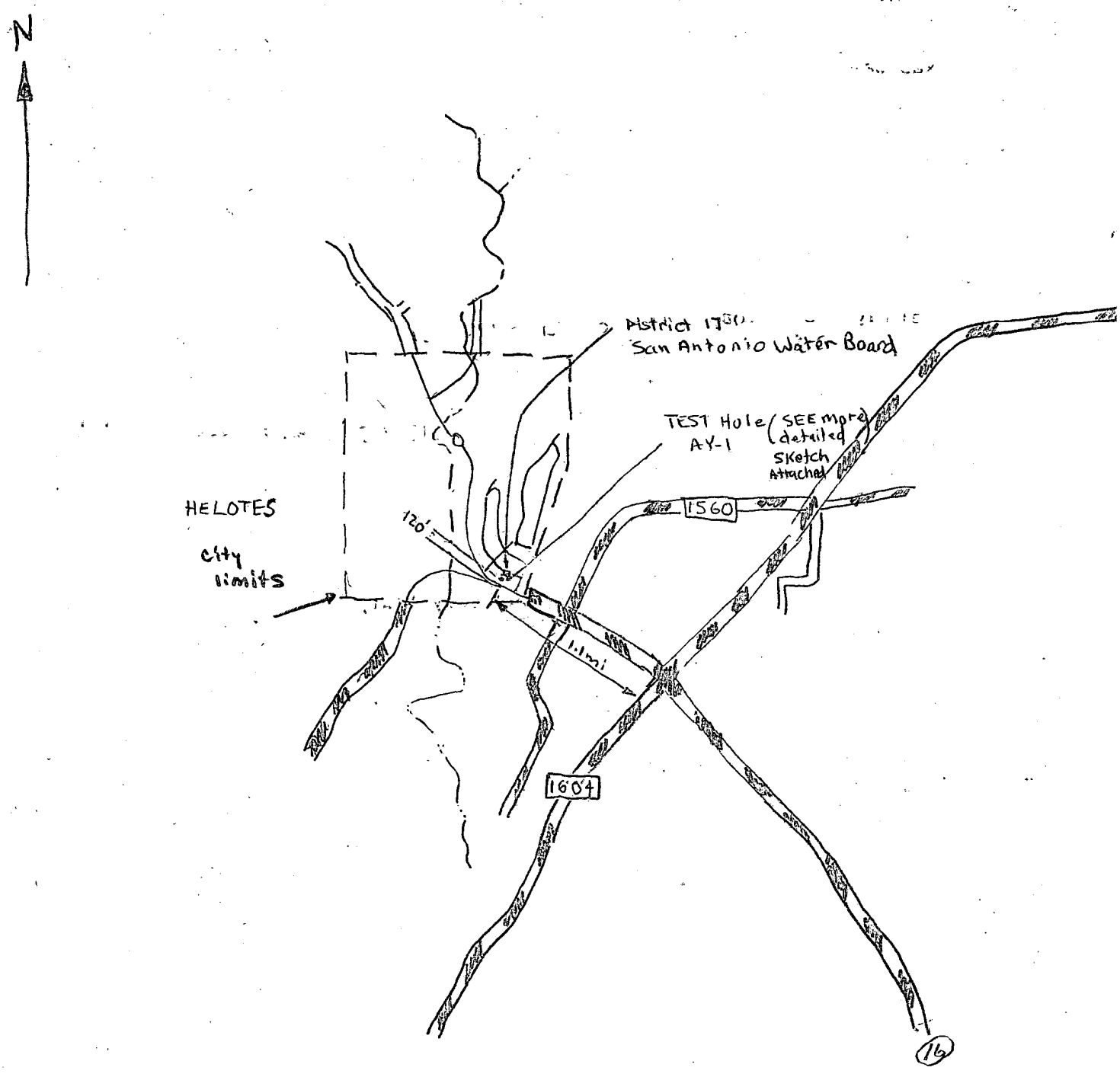


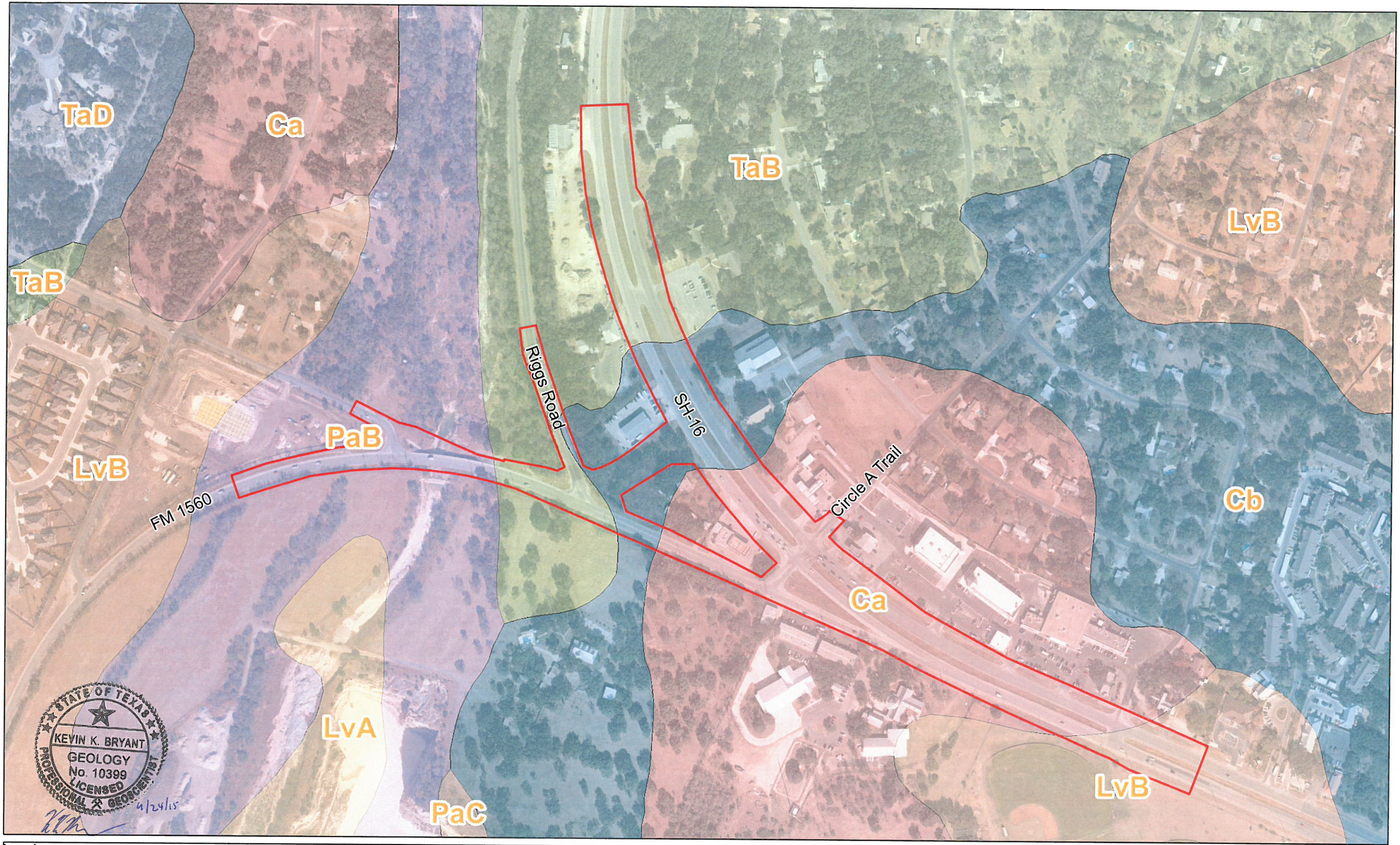
NO. 340-L310 DIETZGEN GRAPH PAPER
SEMI-LOGARITHMIC
3 CYCLES X 10 DIVISIONS PER INCH

EUGENE DIETZGEN CO.
MADE IN U. S. A.

AY68-27-512




N
District 17
San Antonio Water Board
TEST Hole
AY-1
(SEE more detailed Sketch Attached)
HELOTES
city limits
120'
1560
1.1mi
1604



Legend

Investigation Area

Soils: Ca, Cb, LvA, LvB, PaB, PaC, TaB, TaD

0 150 300 600 Feet

N

NOTE: SOILS DATA FROM USDA SOILS CONSERVATION SERVICE. SOIL SURVEY FOR BEXAR COUNTY, TEXAS (1962)
AERIAL PHOTOGRAPH FROM TNRIS, HELOTES QUAD, TEXAS (2012)

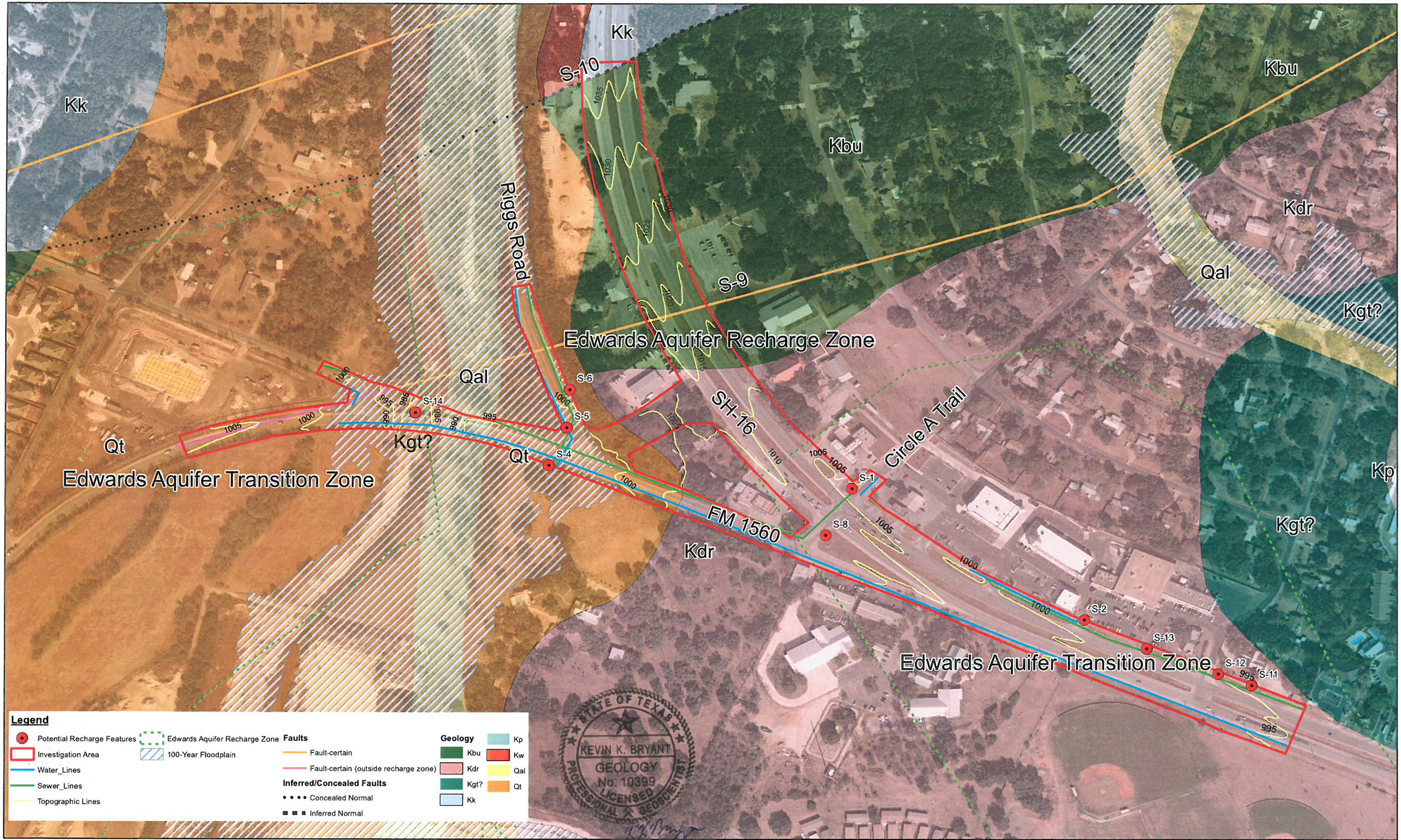
Project Mngr:	KKB
Drawn By:	KKB
Checked By:	JRM
Approved By:	KKB
Project No.	90135213-R2
Scale:	1 in = 300 ft
TBPE Firm No.	F-3272
Date:	09-18-2015

Terracon
Consulting Engineers & Scientists
6911 Blanco Road San Antonio, TX 78216
PH (210) 641-2112 Fax (210) 641-2124

SOILS MAP

FM 1560
FM 1560 and Highway 16
Helotes, Bexar County, Texas

Exhibit 1



300 150 0 300 Feet

N

NOTE: TOPOGRAPHIC DATA FROM CITY OF SAN ANTONIO LIDAR MODELING (2013)
GEOLOGY AND FAULT INFORMATION FROM THE BUREAU OF ECONOMIC GEOLOGY OPEN-FILE. USGS QUAD MAP OF HELOTES. TEXAS (1995)
FLOOD PLAIN INFORMATION FROM GIS.SARA-TX.ORG

Project Mngr:	KKB
Drawn By:	KKB
Checked By:	JRM
Approved By:	KKB
Project No.	90135213-R2
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PH (210) 641-2112 Fax (210) 641-2124

GEOLOGIC MAP

FM 1560
FM 1560 and Highway 16
Helotes, Bexar County, Texas

Exhibit

2

TEMPORARY STORMWATER SECTION (TCEQ-0602)

Temporary Stormwater Section

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b)(4)(A), (B), (D)(I) and (G); Effective June 1, 1999

To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.

Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.

Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **Temporary Stormwater Section** is hereby submitted for TCEQ review and executive director approval. The application was prepared by:

Print Name of Customer/Agent: TxDOT/Brian Witherell

Date: 8/26/25

Signature of Customer/Agent:

Regulated Entity Name: FM 1560 Shaenfield/Galm to SH 16

Project Information

Potential Sources of Contamination

Examples: Fuel storage and use, chemical storage and use, use of asphaltic products, construction vehicles tracking onto public roads, and existing solid waste.

1. Fuels for construction equipment and hazardous substances which will be used during construction:

   ☐ The following fuels and/or hazardous substances will be stored on the site: _____

   These fuels and/or hazardous substances will be stored in:

   ☐ Aboveground storage tanks with a cumulative storage capacity of less than 250 gallons will be stored on the site for less than one (1) year.

☐ Aboveground storage tanks with a cumulative storage capacity between 250 gallons and 499 gallons will be stored on the site for less than one (1) year.

☐ Aboveground storage tanks with a cumulative storage capacity of 500 gallons or more will be stored on the site. An Aboveground Storage Tank Facility Plan application must be submitted to the appropriate regional office of the TCEQ prior to moving the tanks onto the project.

☒ Fuels and hazardous substances will not be stored on the site.

2. ☒ **Attachment A - Spill Response Actions**. A site specific description of the measures to be taken to contain any spill of hydrocarbons or hazardous substances is attached.

3. ☐ Temporary aboveground storage tank systems of 250 gallons or more cumulative storage capacity must be located a minimum horizontal distance of 150 feet from any domestic, industrial, irrigation, or public water supply well, or other sensitive feature.

4. ☒ **Attachment B - Potential Sources of Contamination**. A description of any activities or processes which may be a potential source of contamination affecting surface water quality is attached.

Sequence of Construction

5. ☒ **Attachment C - Sequence of Major Activities**. A description of the sequence of major activities which will disturb soils for major portions of the site (grubbing, excavation, grading, utilities, and infrastructure installation) is attached.

   ☒ For each activity described, an estimate (in acres) of the total area of the site to be disturbed by each activity is given.

   ☒ For each activity described, include a description of appropriate temporary control measures and the general timing (or sequence) during the construction process that the measures will be implemented.

6. ☒ Name the receiving water(s) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project: A classified stream does not pass through the project site.

Temporary Best Management Practices (TBMPs)

Erosion control examples: tree protection, interceptor swales, level spreaders, outlet stabilization, blankets or matting, mulch, and sod. Sediment control examples: stabilized construction exit, silt fence, filter dikes, rock berms, buffer strips, sediment traps, and sediment basins. Please refer to the Technical Guidance Manual for guidelines and specifications. All structural BMPs must be shown on the site plan.

7. ☒ **Attachment D – Temporary Best Management Practices and Measures**. TBMPs and measures will prevent pollution of surface water, groundwater, and stormwater. The construction-phase BMPs for erosion and sediment controls have been designed to retain sediment on site to the extent practicable. The following information is attached:

☒ A description of how BMPs and measures will prevent pollution of surface water, groundwater or stormwater that originates upgradient from the site and flows across the site.

☒ A description of how BMPs and measures will prevent pollution of surface water or groundwater that originates on-site or flows off site, including pollution caused by contaminated stormwater runoff from the site.

☒ A description of how BMPs and measures will prevent pollutants from entering surface streams, sensitive features, or the aquifer.

☒ A description of how, to the maximum extent practicable, BMPs and measures will maintain flow to naturally-occurring sensitive features identified in either the geologic assessment, TCEQ inspections, or during excavation, blasting, or construction.

8. ☒ The temporary sealing of a naturally-occurring sensitive feature which accepts recharge to the Edwards Aquifer as a temporary pollution abatement measure during active construction should be avoided.

☐ **Attachment E - Request to Temporarily Seal a Feature**. A request to temporarily seal a feature is attached. The request includes justification as to why no reasonable and practicable alternative exists for each feature.

☒ There will be no temporary sealing of naturally-occurring sensitive features on the site.

9. ☒ **Attachment F - Structural Practices**. A description of the structural practices that will be used to divert flows away from exposed soils, to store flows, or to otherwise limit runoff discharge of pollutants from exposed areas of the site is attached. Placement of structural practices in floodplains has been avoided.

10. ☒ **Attachment G - Drainage Area Map**. A drainage area map supporting the following requirements is attached:

☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin will be provided.

☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a smaller sediment basin and/or sediment trap(s) will be used.

☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin or other equivalent controls are not attainable, but other TBMPs and measures will be used in combination to protect down slope and side slope boundaries of the construction area.

☐ There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. A smaller sediment basin and/or sediment trap(s) will be used in combination with other erosion and sediment controls within each disturbed drainage area.

☒ There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. Erosion and sediment controls other than sediment basins or sediment traps within each disturbed drainage area will be used.

11. ☐ **Attachment H - Temporary Sediment Pond(s) Plans and Calculations**. Temporary sediment pond or basin construction plans and design calculations for a proposed temporary BMP or measure have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer. All construction plans and design information must be signed, sealed, and dated by the Texas Licensed Professional Engineer. Construction plans for the proposed temporary BMPs and measures are attached.

☒ N/A

12. ☒ **Attachment I - Inspection and Maintenance for BMPs.** A plan for the inspection of each temporary BMP(s) and measure(s) and for their timely maintenance, repairs, and, if necessary, retrofit is attached. A description of the documentation procedures, recordkeeping practices, and inspection frequency are included in the plan and are specific to the site and/or BMP.

13. ☒ All control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. If periodic inspections by the applicant or the executive director, or other information indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations.

14. ☒ If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain).

15. ☒ Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50%. A permanent stake will be provided that can indicate when the sediment occupies 50% of the basin volume.

16. ☒ Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from becoming a pollutant source for stormwater discharges (e.g., screening outfalls, picked up daily).

Soil Stabilization Practices

Examples: establishment of temporary vegetation, establishment of permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, or preservation of mature vegetation.

17. ☒ **Attachment J - Schedule of Interim and Permanent Soil Stabilization Practices**. A schedule of the interim and permanent soil stabilization practices for the site is attached.

18. ☒ Records must be kept at the site of the dates when major grading activities occur, the dates when construction activities temporarily or permanently cease on a portion of the site, and the dates when stabilization measures are initiated.

19. ☒ Stabilization practices must be initiated as soon as practicable where construction activities have temporarily or permanently ceased.

Administrative Information

20. ☒ All structural controls will be inspected and maintained according to the submitted and approved operation and maintenance plan for the project.

21. ☒ If any geologic or manmade features, such as caves, faults, sinkholes, etc., are discovered, all regulated activities near the feature will be immediately suspended. The appropriate TCEQ Regional Office shall be immediately notified. Regulated activities must cease and not continue until the TCEQ has reviewed and approved the methods proposed to protect the aquifer from any adverse impacts.

22. ☒ Silt fences, diversion berms, and other temporary erosion and sediment controls will be constructed and maintained as appropriate to prevent pollutants from entering sensitive features discovered during construction.

TEMPORARY STORMWATER SECTION ATTACHMENTS

Attachment A – Spill Response Actions

Refer to the waste materials, hazardous waste (including spill reporting), and sanitary waste sections on the TxDOT Storm Water Pollution Prevention Plan (SW3P) included in the construction plans and the construction plans general notes.

Attachment B – Potential Sources of Contamination

Refer to major soil disturbing activities on the TxDOT Storm Water Pollution Prevention Plan (SW3P) included in the construction plans.

Attachment C – Sequence of Major Activities

Refer to the sequence of construction (Storm Water Management) activities section on the TxDOT Storm Water Pollution Prevention Plan (SW3P) and the sequence of construction included in the construction plans. The following table shows the major soil disturbing activities and an estimate of the total area disturbed during each activity.

Major Soil Disturbing Activity	Area Disturbed				
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Install Controls					
Right-of-way Preparation					
Cut and or fill to improve roadway profile					
Placement of roadway base					
Extensive ditch grading					
Replacing culvert & bridges					
Final grading and placement of topsoil					

Attachment D – Temporary Best Management Practices and Measures

Refer to Best Management Practices on the Storm Water Pollution Prevention Plan (SW3P), Storm Water Pollution Prevention Plan Phase 1-5, Traffic Control Plan Narrative, and General Notes included in the construction plans (Applicable pages are included in this section).

Temporary Erosion Control Measures Include:

- Temporary Mulching (hay or straw). All limits are to be temporary mulched during construction. Temporary mulching will help to stabilize disturbed areas and limit erosion from polluting runoff.

Temporary Sediment Control Measures Include:

- Temporary construction entrance/exit - Providing a temporary construction entrance/exit with rock bedding will reduce or eliminate the tracking of mud and sediment onto surrounding roadways.

- Silt fences – Using temporary silt fences to intercept flow will help prevent sediment loss from disturbed areas. The silt fences intercept and detain sediment from leaving the construction site while allowing flow to pass through.

- Rock filter dams – Rock filter dams are used in areas of concentrated flow to intercept sediment and release flow at a lower velocity.

Attachment F – Structural Practices

Refer to the structural practices section of the Storm Water Pollution Prevention Plan (SW3P) and the Storm Water Pollution Prevention Plan Phase 1-5 included in the construction plans.

Structural Practices Include:

- Temporary construction entrance/exit - Providing a temporary construction entrance/exit with rock bedding will reduce or eliminate the tracking of mud and sediment onto surrounding roadways.

- Silt fences – Using temporary silt fences to intercept flow will help prevent sediment loss from disturbed areas. The silt fences intercept and detain sediment from leaving the construction site while allowing flow to pass through.

- Rock filter dams – Rock filter dams are used in areas of concentrated flow to intercept sediment and release flow at a lower velocity.

Attachment G – Drainage Area Map

Refer to drainage area map included in the construction plans.

Attachment I – Inspection and Maintenance for BMPs

Refer to maintenance and inspection section on the Storm Water Pollution Prevention Plan (SW3P) included in the construction plans.

Attachment J – Schedule of Interim and Permanent Soil Stabilization Practices

Refer to Traffic Control Plan Narrative for sequence of work and Storm Water Pollution Prevention Plan Phase 1-5 included in the construction plans.

TCEQ CORE DATA FORM
(TCEQ-10400)

TCEQ Use Only

TCEQ Core Data Form

For detailed instructions on completing this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission (*If other is checked please describe in space provided.*)

☒ New Permit, Registration or Authorization (*Core Data Form should be submitted with the program application.*)

☐ Renewal *(Core Data Form should be submitted with the renewal form)*

☐ Other

2. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	**3. Regulated Entity Reference Number** *(if issued)*
CN 600803456		**RN**

SECTION II: Customer Information

4. General Customer Information

5. Effective Date for Customer Information Updates (mm/dd/yyyy)

☐ New Customer ☐ Update to Customer Information ☐ Change in Regulated Entity Ownership
☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).

6. Customer Legal Name *(If an individual, print last name first: eg: Doe, John)*

If new Customer, enter previous Customer below:

Texas Department of Transportation

7. TX SOS/CPA Filing Number	**8. TX State Tax ID** (11 digits)	**9. Federal Tax ID** (9 digits)	**10. DUNS Number** *(if applicable)*

11. Type of Customer:

☐ Corporation ☐ Individual Partnership: ☐ General ☐ Limited

Government: ☐ City ☐ County ☐ Federal ☐ Local ☐ State ☐ Other ☐ Sole Proprietorship ☐ Other:

12. Number of Employees

☐ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher

13. Independently Owned and Operated?

☐ **Yes** ☐ **No**

14. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check one of the following*

☐ Owner ☐ Operator ☐ Owner & Operator
☐ Occupational Licensee ☐ Responsible Party ☐ VCP/BSA Applicant ☐ Other:

15. Mailing Address:							
	City		**State**		**ZIP**		**ZIP + 4**	

16. Country Mailing Information *(if outside USA)*	**17. E-Mail Address** *(if applicable)*

18. Telephone Number	19. Extension or Code	20. Fax Number *(if applicable)*
( ) -		( ) -

SECTION III: Regulated Entity Information

21. General Regulated Entity Information *(If 'New Regulated Entity" is selected, a new permit application is also required.)*

☐ New Regulated Entity ☐ Update to Regulated Entity Name ☒ Update to Regulated Entity Information

The Regulated Entity Name submitted may be updated, in order to meet TCEQ Core Data Standards (removal of organizational endings such as Inc, LP, or LLC).

22. Regulated Entity Name *(Enter name of the site where the regulated action is taking place.)*

FM 1560 Shaenfield/Galm to SH 16

23. Street Address of the Regulated Entity: ***(No PO Boxes)***							
	City		**State**		**ZIP**		**ZIP + 4**
24. County	Bexar						

If no Street Address is provided, fields 25-28 are required.

25. Description to Physical Location:	FM 1560 Shaenfield/Galm to SH 16				
26. Nearest City			**State**	**Nearest ZIP Code**	
Helotes			TX	78023	

Latitude/Longitude are required and may be added/updated to meet TCEQ Core Data Standards. (Geocoding of the Physical Address may be used to supply coordinates where none have been provided or to gain accuracy).

27. Latitude (N) In Decimal:	29.558442		**28. Longitude (W) In Decimal:**	-98.698258	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	33	30.4	98	41	53.7

29. Primary SIC Code (4 digits)	**30. Secondary SIC Code** (4 digits)	**31. Primary NAICS Code** (5 or 6 digits)	**32. Secondary NAICS Code** (5 or 6 digits)
1611		237310	

33. What is the Primary Business of this entity? *(Do not repeat the SIC or NAICS description.)*

TxDOT roadway construction

34. Mailing Address:	**4615 NW Loop 410**						
	City	**San Antonio**	**State**	**TX**	**ZIP**	**78229**	**ZIP + 4**
35. E-Mail Address:	**charles.benavidez@txdot.gov**						

36. Telephone Number	37. Extension or Code	38. Fax Number *(if applicable)*
(210) 615-5801		( ) -

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☐ Edwards Aquifer	☐ Emissions Inventory Air	☐ Industrial Hazardous Waste
☐ Municipal Solid Waste	☐ New Source Review Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS
☐ Sludge	☐ Storm Water	☐ Title V Air	☐ Tires	☐ Used Oil
☐ Voluntary Cleanup	☐ Wastewater	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:

SECTION IV: Preparer Information

40. Name:	Jaime K Benoliel	**41. Title:**	Senior Project Manager

42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(346) 353-9332		( ) -	

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	TxDOT	**Job Title:**	Environmental Cooridnator
Name *(In Print)*:	Brian Witherell	**Phone:**	(210) 615- **5846**
Signature:		**Date:**	8/26/2025