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: Brushy Creek Municipal Utility District						**2. Regulated Entity No.:**			
3. Customer Name: Brushy Creek MUD						**4. Customer No.: CN 600646574**			
5. Project Type: **(Please circle/check one)**	New		Modification			Extension		Exception	
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):**		0.05	
9. Application Fee:	$650		**10. Permanent BMP(s):**			N/A			
11. SCS (Linear Ft.):	543		**12. AST/UST (No. Tanks):**			0			
13. County:	Williamson		**14. Watershed:**			Brazos River Basin			

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.)	___	___	_X_
Region (1 req.)	___	___	_X_
County(ies)	___	___	_X_
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 _X_Round Rock

San Antonio Region					
County:	**Bexar**	**Comal**	**Kinney**	**Medina**	**Uvalde**
Original (1 req.)	___	___	___	___	___
Region (1 req.)	___	___	___	___	___
County(ies)	___	___	___	___	___
Groundwater Conservation District(s)	___ Edwards Aquifer Authority ___Trinity-Glen Rose	___Edwards Aquifer Authority	___Kinney	___EAA ___Medina	___EAA ___Uvalde
City(ies) Jurisdiction	___Castle Hills ___Fair Oaks Ranch ___Helotes ___Hill Country Village ___Hollywood Park ___San Antonio (SAWS) ___Shavano Park	___Bulverde ___Fair Oaks Ranch ___Garden Ridge ___New Braunfels ___Schertz	NA	___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. Maninder S. Randhawa, P.E.
Print Name of Customer/Authorized Agent
M. Randhawa 11/20/2023 Signature of Customer/Authorized Agent Date

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):	

GENERAL INFORMATION FORM (TCEQ 0587)

General Information Form

Texas Commission on Environmental Quality

For Regulated Activities on the Edwards Aquifer Recharge and Transition Zones and Relating to 30 TAC §213.4(b) & §213.5(b)(2)(A), (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.

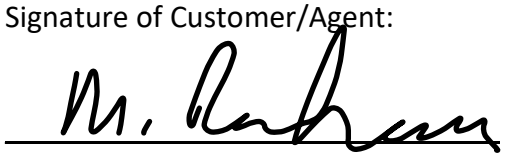
Signature

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. This **General Information Form** is hereby submitted for TCEQ review. The application was prepared by:

Print Name of Customer/Agent: Maninder Randhawa, P.E.

Date: 11/20/2025

Signature of Customer/Agent:



Project Information

1. Regulated Entity Name: Brushy Creek Municipal Utility District
2. County: Williamson
3. Stream Basin: Brazos River Basin
4. Groundwater Conservation District (If applicable): N/A
5. Edwards Aquifer Zone:

   ☒ Recharge Zone
   ☐ Transition Zone

6. Plan Type:

   ☐ WPAP
   ☒ SCS
   ☐ Modification
   ☐ AST
   ☐ UST
   ☐ Exception Request

7. Customer (Applicant):

   Contact Person: Amy Giannini, P.E., CFM
   Entity: Brushy Creek Municipal Utility District
   Mailing Address: 16318 S Great Oaks Dr
   City, State: Round Rock, TX Zip: 78735
   Telephone: 512-255-7871 FAX: _____
   Email Address: a-giannini@bcmud.org

8. Agent/Representative (If any):

   Contact Person: Maninder Randhawa, P.E.
   Entity: Weston Solutions, Inc
   Mailing Address: 5301 Southwest Parkway Suite 450
   City, State: Austin, TX Zip: 78735
   Telephone: 512-920-4847 FAX: _____
   Email Address: maninder.randhawa@westonsolutions.com

9. Project Location:

   ☒ The project site is located inside the city limits of Round Rock.
   ☐ The project site is located outside the city limits but inside the ETJ (extra-territorial jurisdiction) of _____.
   ☐ The project site is not located within any city's limits or ETJ.

10. ☒ The location of the project site is described below. The description provides sufficient detail and clarity so that the TCEQ's Regional staff can easily locate the project and site boundaries for a field investigation.

    The project site is located at the intersection of Hillside Dr and Sutter Creek Trail (30.513435, -97.741671). The project extends 133' North on Sutter Creek Trail and 85' East on Hillside Dr from the intersection.

11. ☒ **Attachment A – Road Map**. A road map showing directions to and the location of the project site is attached. The project location and site boundaries are clearly shown on the map.

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

    ☒ Project site boundaries.
    ☒ USGS Quadrangle Name(s).
    ☒ Boundaries of the Recharge Zone (and Transition Zone, if applicable).
    ☒ Drainage path from the project site to the boundary of the Recharge Zone.

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

☐ Survey staking will be completed by this date: _____

14. ☒ **Attachment C – Project Description**. Attached at the end of this form is a detailed narrative description of the proposed project. The project description is consistent throughout the application and contains, at a minimum, the following details:

    ☒ Area of the site
    ☒ Offsite areas
    ☒ Impervious cover
    ☒ Permanent BMP(s)
    ☒ Proposed site use
    ☒ Site history
    ☒ Previous development
    ☒ Area(s) to be demolished

15. Existing project site conditions are noted below:

    ☐ Existing commercial site
    ☐ Existing industrial site
    ☐ Existing residential site
    ☒ Existing paved and/or unpaved roads
    ☐ Undeveloped (Cleared)
    ☐ Undeveloped (Undisturbed/Uncleared)
    ☐ Other: _____

Prohibited Activities

16. ☒ I am aware that the following activities are prohibited on the Recharge Zone and are not proposed for this project:

    (1) Waste disposal wells regulated under 30 TAC Chapter 331 of this title (relating to Underground Injection Control);

    (2) New feedlot/concentrated animal feeding operations, as defined in 30 TAC §213.3;

    (3) Land disposal of Class I wastes, as defined in 30 TAC §335.1;

    (4) The use of sewage holding tanks as parts of organized collection systems; and

    (5) New municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41(b), (c), and (d) of this title (relating to Types of Municipal Solid Waste Facilities).

    (6) New municipal and industrial wastewater discharges into or adjacent to water in the state that would create additional pollutant loading.

17. ☒ I am aware that the following activities are prohibited on the Transition Zone and are not proposed for this project:

    (1) Waste disposal wells regulated under 30 TAC Chapter 331 (relating to Underground Injection Control);

(2) Land disposal of Class I wastes, as defined in 30 TAC §335.1; and

(3) New municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41 (b), (c), and (d) of this title.

Administrative Information

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

- ☐ For a Water Pollution Abatement Plan or Modification, the total acreage of the site where regulated activities will occur.
- ☒ For an Organized Sewage Collection System Plan or Modification, the total linear footage of all collection system lines.
- ☐ For a UST Facility Plan or Modification or an AST Facility Plan or Modification, the total number of tanks or piping systems.
- ☐ A request for an exception to any substantive portion of the regulations related to the protection of water quality.
- ☐ A request for an extension to a previously approved plan.

19. ☒ Application fees are due and payable at the time the application is filed. If the correct fee is not submitted, the TCEQ is not required to consider the application until the correct fee is submitted. Both the fee and the Edwards Aquifer Fee Form have been sent to the Commission's:

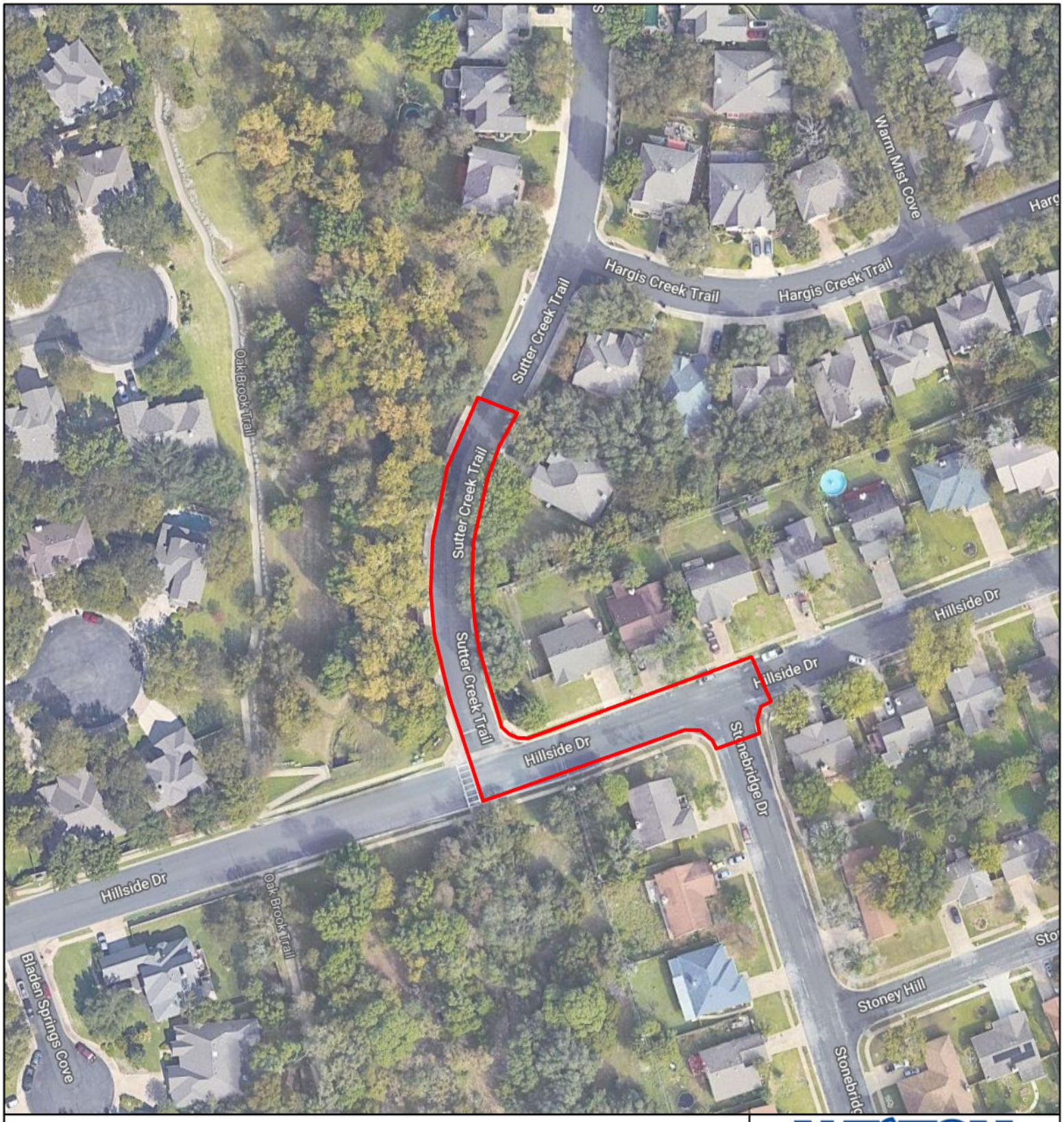
- ☐ TCEQ cashier
- ☒ Austin Regional Office (for projects in Hays, Travis, and Williamson Counties)
- ☐ San Antonio Regional Office (for projects in Bexar, Comal, Kinney, Medina, and Uvalde Counties)

20. ☒ 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.

21. ☒ No person shall commence any regulated activity until the Edwards Aquifer Protection Plan(s) for the activity has been filed with and approved by the Executive Director.

ATTACHMENT A

ROAD MAP



Legend

0 55 110 220 US Feet

Hillside Dr - Project Site

N

Service Layer Credits: Google Hybrid: © OpenStreetMap (and) contributors, CC-BY-SA

WESTON SOLUTIONS

ATTACHMENT A

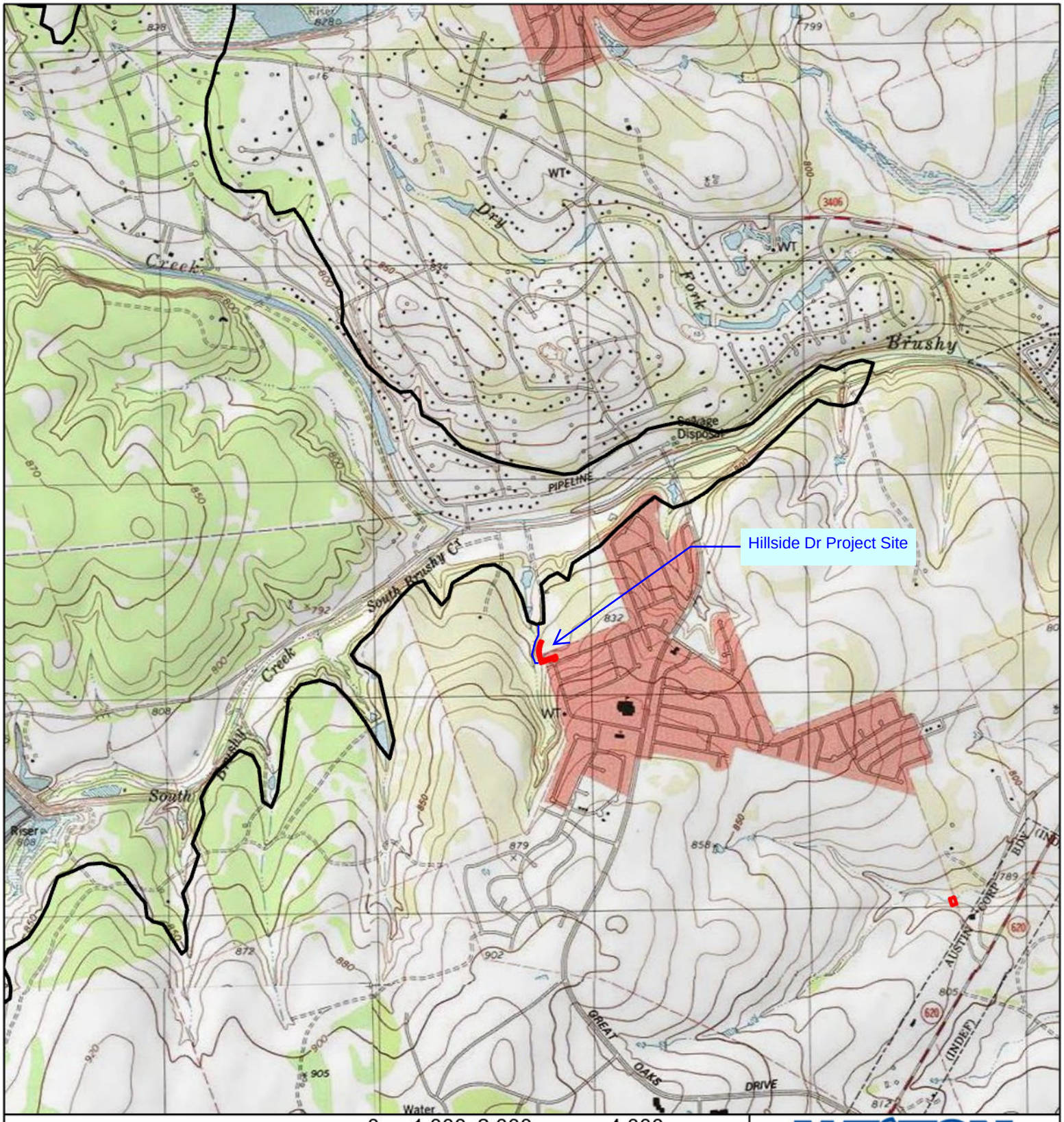
HILLSIDE DRIVE
ROAD MAP
BRUSHY CREEK MUD
BRUSHY CREEK, WILLIAMSON COUNTY, TEXAS

DATE	PROJECT NO	SCALE
SEPTEMBER 2023	06141.036.005.1000	AS SHOWN

FILE: C:\Users\randhawm\OneDrive - Weston Solutions, Inc\ArcGIS\Weston\Weston.aprx 4:17 PM 9/20/2023 randhawm

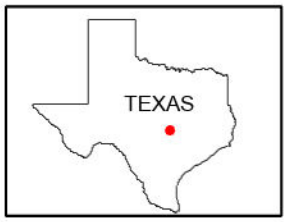
ATTACHMENT B

USGS/EDWARDS AQUIFER RECHARGE ZONE MAP



Legend

- Hillside Dr - Project Site
- Drainage Path to EARZ Boundary
- Edwards Aquifer Recharge Zone



N

SOURCE: U.S. GEOLOGIC SURVEY 7.5 MIN TOPOGRAPHIC QUADRANGLE, AUSTIN WEST, TEXAS 2023.
FEMA FLOOD INSURANCE RATE MAP (FIRM) DATA.
DISCLAIMER: THIS FIGURE IS PREPARED FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED, AND IS NOT INTENDED FOR, SURVEY OR ENGINEERING PURPOSES.

WESTON SOLUTIONS

ATTACHMENT B

HILLSIDE DRIVE
USGS/EDWARDS RECHARGE ZONE MAP
BRUSHY CREEK MUD
BRUSHY CREEK, WILLIAMSON COUNTY, TEXAS

DATE	PROJECT NO	SCALE
SEPTEMBER 2023	06141.036.005.1000	AS SHOWN

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ATTACHMENT C

PROJECT DESCRIPTION

PROJECT DESCRIPTION

AREA OF THE SITE

The project will decommission the existing Hillside Dr Lift Station (owned and operated by Brushy Creek MUD) into a gravity wastewater conveyance system. The existing Hillside Dr LS is a 6-ft-diameter duplex, submersible lift station that was constructed in the late 1970s. The project scope consists of abandoning the existing lift station and installing 543 LF of gravity main and 5 associated manholes. The work is proposed in the street Right of Way on Hillside Dr and Sutter Creek Trail in Round Rock, TX (Site). The project site is approximately 790 feet above mean sea level and slopes towards northward Brushy Creek.

OFFSITE AREAS

A drainage ditch is located west of the Site which conveys storm water discharge from the street inlets and storm drains to Brushy Creek just north of the site. A Geologic Assessment performed as part of this SCS application (included in Geologic Assessment section) showed that there are no environmentally sensitive features within a 50 ft buffer of the proposed construction limits.

IMPERVIOUS COVER

The proposed limits of construction are completely within the street ROW and will involve disturbance and subsequent restoration of street's Asphalt Concrete impervious cover. The project scope does not include addition or reduction in the surface area of the impervious cover.

TEMPORARY AND PERMANENT BMPs

Owner will test the new gravity system for structural damage and defects that would allow for exfiltration to occur as required by the SCS and TCEQ Regulations per 30 TAC §217. Temporary BMPs are designed with respect to local and state regulations to ensure construction does not contaminate the nearby residential and public properties. All existing wastewater structures will be abandoned per TCEQ regulations and Owner will test the collection system every five years after being put in service. Any defects will be repaired within one year of discovery.

PROPOSED SITE USE

Once construction has expired, the site will be utilized as a two-way street for traffic and will contain an active gravity sewer line. It will be the responsibility of the Owner to operate and maintain the sewer line beyond the one-year warranty time frame.

SITE HISTORY

Site had previously been used as a two-way street for traffic, containing a lift station.

PREVIOUS DEVELOPMENT

The site was previously developed as a residential neighborhood and contains a 6-ft-diameter duplex submersible lift station, force mains, and gravity mains that were constructed in the late 1970s.

AREA(s) TO BE DEMOLISHED

The project scope consists of demolishing and abandoning the existing lift station and associated force main and equipment.

GEOLOGICAL ASSESSMENT (TCEQ 0585)

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

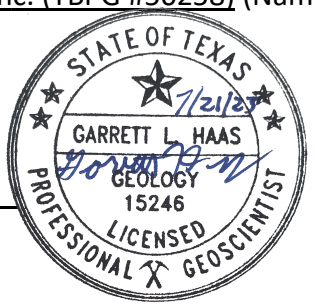
To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

Print Name of Geologist: Garrett Haas Telephone: 469-666-5527

Date: July 21, 2023 Fax: _____

Representing: Weston Solutions, Inc. (TBPG #50258) (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:



Regulated Entity Name: _____

Project Information

1. Date(s) Geologic Assessment was performed: June 1, 2023
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)

Soil Name	Group*	Thickness(feet)
Eckrant-Rock Outcrop (ErE)	D	0.5-2
Georgetown Stony Clay Loam (GsB)	C	0.5-5

** 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" = 60'
   Site Geologic Map Scale: 1" = 2,000'
   Site Soils Map Scale (if more than 1 soil type): 1" = 90'

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 _____ (#) 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.

ATTACHMENT A

GEOLOGICAL ASSESSMENT TABLE

GEOLOGIC ASSESSMENT TABLE	PROJECT NAME: Hillside Drive Lift Station Decomissioning

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 (DEGREEES)	D O M	DENSITY (No./Ft)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	≥40	<1.6	≥1.6	
G1	30.5134	-97.7418	O	5	Ked	1.5	1	0.1				0	N	5	10	X		X		Hillside
G2	30.5134	-97.7414	O	5	Ked	3	2	1				0	N	5	10	X		X		Hillside
G3	30.5134	-97.7413	O	5	Ked	3	3	2				0	N	5	10	X		X		Hillside
G4	30.5135	-97.7412	O	5	Ked	3	2.5	1.5				0	N	5	10	X		X		Hillside
G5	30.5141	-97.7419	CD	5	Ked	0.5	0.5	0.2				0	N	5	10	X		X		Streambed
G6	30.5136	-97.7419	CD	5	Ked	1	0.5	0.1				0	N	5	10	X		X		Hillside
G7																				
G8																				
G9																				
G10																				
G11																				
G12																				
G13																				
G14																				
G15																				

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

ATTACHMENT B

STRATIGRAPHIC COLUMN

Series	Group	Stratigraphic Unit		Hydrologic Unit	Maximum Thickness (Feet)
Gulf	Navarro			navarro and	850
	Taylor			Taylor Group	850
	Austin			Austin Chalk	450
Comanche	Eagle Ford				50
	Washita	Buda Limestone			50
		Del Rio Clay			60
		Georgetown Formation		Edwards Aquifer	100
	Fredericksburg	Edwards Limestone			200
		Comanche Peak Limestone			50
		Walnut Formation			150
	Trinity	Paluxy Formation		Upper Trinity	10
		Glen Rose	Upper Membrane		450
			Lower Membr		450
		Travis Peak	Hensell Sand Member		100
			Cow Cr. Limestone Member	Middle Trinity	100
			Hammett Shale Member		50
			Sligo member		150
			Hosston Member	Lower Trinity	850

Extracted from *Groundwater Availability Modeling: Northern Segment of the Edwards Aquifer*, Texas Water Development Board Report 358. December 2003.

WESTON SOLUTIONS

FIGURE 5

STRATIGRAPHIC SEQUENCE

HILLSIDE DR

BRUSHY CREEK, WILLIAMSON COUNTY, TX

DATE	PROJECT NO	SCALE
JULY 2023	15960.0001.001	AS SHOWN

ATTACHMENT C

SITE GEOLOGY NARRATIVE

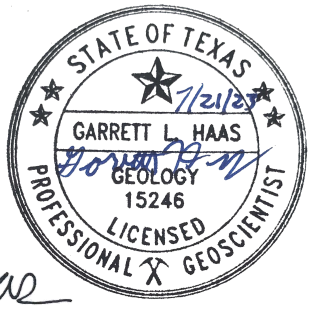
GEOLOGIC ASSESSMENT
HILLSIDE DRIVE LS DECOMISSIONING PROJECT
HILLSIDE DRIVE & SUTTER CREEK TRAIL
ROUND ROCK, TEXAS

Prepared for:
Brushy Creek Municipal Utility District
16318 Great Oaks
Round Rock, Texas 78681

Prepared by:
WESTON SOLUTIONS, INC.
5301 Southwest Parkway; Suite 450
Austin, Texas 78735
512-651-7100

July 2023

W.O. No. 15690.001.001.2000



P.G. No. 15246; TBPG Firm No. 50258

Weston Solutions, Inc.
5301 Southwest Parkway; Suite 450
Austin, TX 78735
512-651-7100
WestonSolutions.com

21 July, 2023

Ms. Amy Giannini, P.E., CFM
District Engineer
Brushy Creek Municipal Utility District
16318 Great Oaks,
Round Rock, TX 78681

Re: Geologic Assessment
Hillside Drive LS Decommissioning Project
Hillside Drive & Sutter Creek Trail
Round Rock, Texas

Dear Ms. Giannini:

Weston Solutions, Inc. (WESTON®) completed the enclosed Geologic Assessment (GA) prepared for the above referenced project pursuant to 30 Texas Administrative Code (TAC) §213.5(b)(3). The GA was performed in accordance with the Texas Commission on Environmental Quality (TCEQ) "Instructions to Geologists", TCEQ-0585-Instructions (Rev. 10-1-04).

Thank you for the opportunity to assist Brushy Creek MUD on this project. Please contact me at 210-308-4371 with questions or comments you might have regarding this report.

Sincerely,

WESTON SOLUTIONS, INC.

STATE OF TEXAS
GARRETT L. HAAS
GEOLOGY
15246
LICENSED
PROFESSIONAL GEOSCIENTIST
7/21/23

Garrett Haas, P.G.
Project Geoscientist

TABLE OF CONTENTS

Section **Page**

LIST OF FIGURES

Attachments:
Attachment 1 - Geological Assessment Form and Table (TCEQ Form 0585)
Attachment 2 – Photographic Log

1. PURPOSE AND SCOPE OF SERVICES

Weston Solutions, Inc. (WESTON®) has conducted a Geologic Assessment (GA) of the Hillside Drive Lift Station Decommissioning Project as part of permitting requirements for the planned engineering improvements to the local sanitary sewer system. This assessment was conducted in accordance with Edwards Aquifer Protection Plans described in the Texas Commission on Environmental Quality (TCEQ) Edwards Aquifer Rules promulgated in 30 TAC 213.5(b)(3), Geologic Assessments.

1.1 PROJECT DESCRIPTION

The planned engineering improvements will include decommissioning an existing sanitary sewer lift station and installing a new gravity sanitary sewer line located in the street right of way (ROW) of Hillside Drive, Sutter Creek Trail, and Stonebridge Drive.

1.2 LOCATION

The work area is proposed to start at the intersection of Hillside Drive and Stonebridge Drive and terminate on Sutter Creek Trail in Round Rock, TX (Site). To comply with TCEQ regulations, the focus of this GA was limited to the street ROW with a 50-foot buffer. The Site overview and topography are depicted in the Site Location Map (**Figure 1**), and an overview of the Site and 50-foot buffer are included in the Site Map (**Figure 2**).

2. GEOLOGIC ASSESSMENT

2.1 COMPONENTS OF REPORT

In accordance with the Instructions to Geologists, the attached GA form includes the following:

- Soils description
- Site geologic map
- Stratigraphic column
- Geologic assessment table

- Narrative description of site geology

Additionally, the Geologic Assessment Form TCEQ-0585, (Rev. 2-11-15), Stratigraphic Column, and the Geologic Assessment Table have also been included in this GA.

2.2 REVIEW OF EXISTING INFORMATION

A desktop review of the available information was performed, including:

- U.S.D.A. Soil Survey of Williamson County, Texas (web-based viewer).
- U.S. Geological Survey (U.S.G.S.) 7.5 Minute Quadrangle Maps, Austin West (2013),
- TCEQ Edwards Aquifer Map Viewer (web-based viewer),
- Geologic Atlas of Texas, Austin Sheet,
- Flood Insurance Rate Maps (FIRM) from the Federal Emergency Management Agency (FEMA),

3. DESCRIPTION OF STUDY AREA

3.1 SOILS

According to the National Resource Conservation Service Web Soil Survey (USDA, 2023), the soils at the Site consist of the Eckrant-Rock Outcrop, 1 to 10 percent slope, and Georgetown stony clay loam, 1 to 3 percent slope. The Eckrant-Rock Outcrop is a well-drained, clayey soil which consists of thin cobbly sandy clay at surface covered with cobbles, stones, or boulders, underlain by shallow bedrock. The Georgetown stony clay loam consists of surface area covered with cobbles, stones, or boulders and is also well-drained soil. A copy of the Web Soil Survey Map with a superimposed Site boundary is attached (**Figure 3**).

3.2 TOPOGRAPHY

According to the U.S.G.S. 7.5-Minute Quadrangle Map, Austin West, Texas Quadrangle Map (2013), the project Site elevation is approximately 790 feet above mean sea level. The Site generally slopes northward towards Brushy Creek and conveys runoff through a drainage ditch which is located downhill from Site. The 7.5-minute topographic quadrangle and Site location are depicted on the Site Location Map (**Figure 1**).

3.3 GEOLOGY

According to the Geologic Atlas of Texas Austin Sheet, the Site is situated over the Edwards Limestone Formation or kep. The Edwards limestone is described as 20 to 350 feet of highly fractured and thickly bedded to massive limestone or dolomite, with minor shale, clay, and siliceous limestone. (TWDB 2003). A copy of the Geologic Map with site location is depicted on F**igure 4**.

Stratigraphic units of the Comanche Series are the geologic groups/formation of interest in the Round Rock area and are presented in the required Stratigraphic Section on **Figure 5**. The Comanche Series is broken into four major groups (from youngest to oldest): Eagle Ford Group, Washita Group, Fredericksburg Group, and Trinity Group. The Georgetown Formation of the Washita Group, and Edwards and Comanche Peak Limestone of the Fredericksburg Group make up the Edwards Formation and associated limestone in the area (sometimes Walnut Formation included as well). In Central Texas, the Balcones Fault Zone, a belt of northeast-trending, downthrown, normal faults, has created hydrologic connectivity between exposed limestone formations at the surface, and the Edwards Aquifer on subsurface. Blocks of Edwards and associated limestone exposed at the surface on the west side of the fault zone are connected to downthrown blocks of Edwards and associated limestone in the subsurface on the east side of the faults, resulting in the communication of groundwater from the exposed blocks to the Edwards Aquifer in the subsurface. These limestone formations form the important underground karst aquifer (Edwards Aquifer), which supplies water to local municipalities and utilities, and is characterized by large-diameter secondary porosity, fracture porosity, and high velocity, fracture- and conduit-dominated flow characteristics (TWDB 2003).

3.4 RECHARGE/TRANSISTION ZONE

According to the Edwards Aquifer Map Viewer, the Site is located on the western boundary of the Edwards Aquifer Recharge Zone (EARZ), just east of the Edwards Aquifer Contributing Zone. A figure of the EARZ with the Site identified is included as **Figure 7**.

The project area is located in the Edwards Aquifer Recharge Zone, specifically the northern segment. The north segment of the EARZ is located north of the Colorado River and south of the Lampasas River, and stretches across parts of Travis, Williamson, and Bell Counties in Central Texas. The northern segment of the Edwards Aquifer consists of the Comanche Peak Limestone,

Edward Limestone, and Georgetown Formation, and are collectively referred to as the Edwards and associated limestones (TWDB 2003). The Edwards and associated limestones overlie the older Walnut Formation and Glen Rose Formations, which outcrop to the west and typically mark the confining base of the Edward Aquifer in the subsurface; and underlie the younger Del Rio Clay, Buda Limestone, and Austin Chalk, which outcrop to the east and cap the Edwards Aquifer in the subsurface. The Aquifer is unconfined in the western portion of the Recharge Zone where the Edwards and associated limestones outcrop and becomes confined in the eastern portion of the northern recharge zone where the del Rio clay and younger formations overlie the aquifer.

3.5 FLOOD PRONE AREAS

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps for Williamson County Unincorporated Areas, Texas (Community Panel Number 48491C0488F, dated 20 December 2019, the Site is located in "Zone X", which represents mapped areas of minimal flood hazard. A copy of the FEAM FIRM map with the Site identified is included as **Figure 7**.

4. SURVEY METHODOLOGY

4.1 FIELD PROCEDURES

After reviewing the available information, a field investigation was performed to identify any geologic or manmade potential recharge features, including faults. The project area was transected on foot, as recommended in the "Instructions to Geologists", TCEQ-0585-Instructions (Rev. 10-1-04). The GA was performed on 1 June 2023, by Mr. Garrett Haas, P.G., with Weston Solutions, Inc. Mr. Haas is a licensed Professional Geoscientist in the State of Texas (License No. 15246).

4.2 SUMMARY OF FINDINGS

The sanitary sewer lines being repaired during this work are located in the roadway easements. Geologic Features 1 through 4 (G1 through G4) consisted of limestone bedrock outcrop features located in residential laws along the east side of Hillside Dive, likely where the sloped ground was excavated to flatten and area for Hillside Dr. The bedrock features were large boulders of weathered, vuggy, limestone with quartz crystals. Geologic Features 5 and 6 (G5 and G6) consisted

of limestone bedrock outcrops on the slope down from Hillside Drive and Sutter Creek Trail to a drainage creek west of Sutter Creek Trail. G5 and G6 were small outcrops of weathered limestone with minimal surface exposed. The ditch was beyond the 50-foot buffer of the work area and not included in this assessment, but was observed with standing water. No potential recharge features, faults, springs, or sinkholes were identified on the Site.

The TCEQ Geological Assessment form and Table (TCEQ Form 0585) and Photographic Log showing geological features documented are included as Attachments 1 and 2 of this report.

5. RECOMMENDATIONS

If voids (i.e. solution cavities, caves, sinkholes) that could be potential recharge features are discovered during excavation activities, construction should be halted so that an evaluation can be made of the newly discovered feature(s). Propper stormwater management and spill containment and control measures should be implemented during all phases of construction.

6. REFERENCES

Bureau of Economic Geology. Geologic Atlas of Texas, Austin Sheet. Published 1981.

Federal Emergency Management Agency, Federal Insurance Administration, National Flood Insurance Program, Flood Insurance Map, Community Panel Number 48491C0488F dated December 20, 2019.

Texas Commission on Environmental Quality (TCEQ) Edwards Aquifer Map Viewer. Accessed 16 June 2023. https://tceq.maps.arcgis.com/apps/webappviewer/index.html.

TCEQ-0585-Instructions (Rev. 10-1-04), "Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zone".

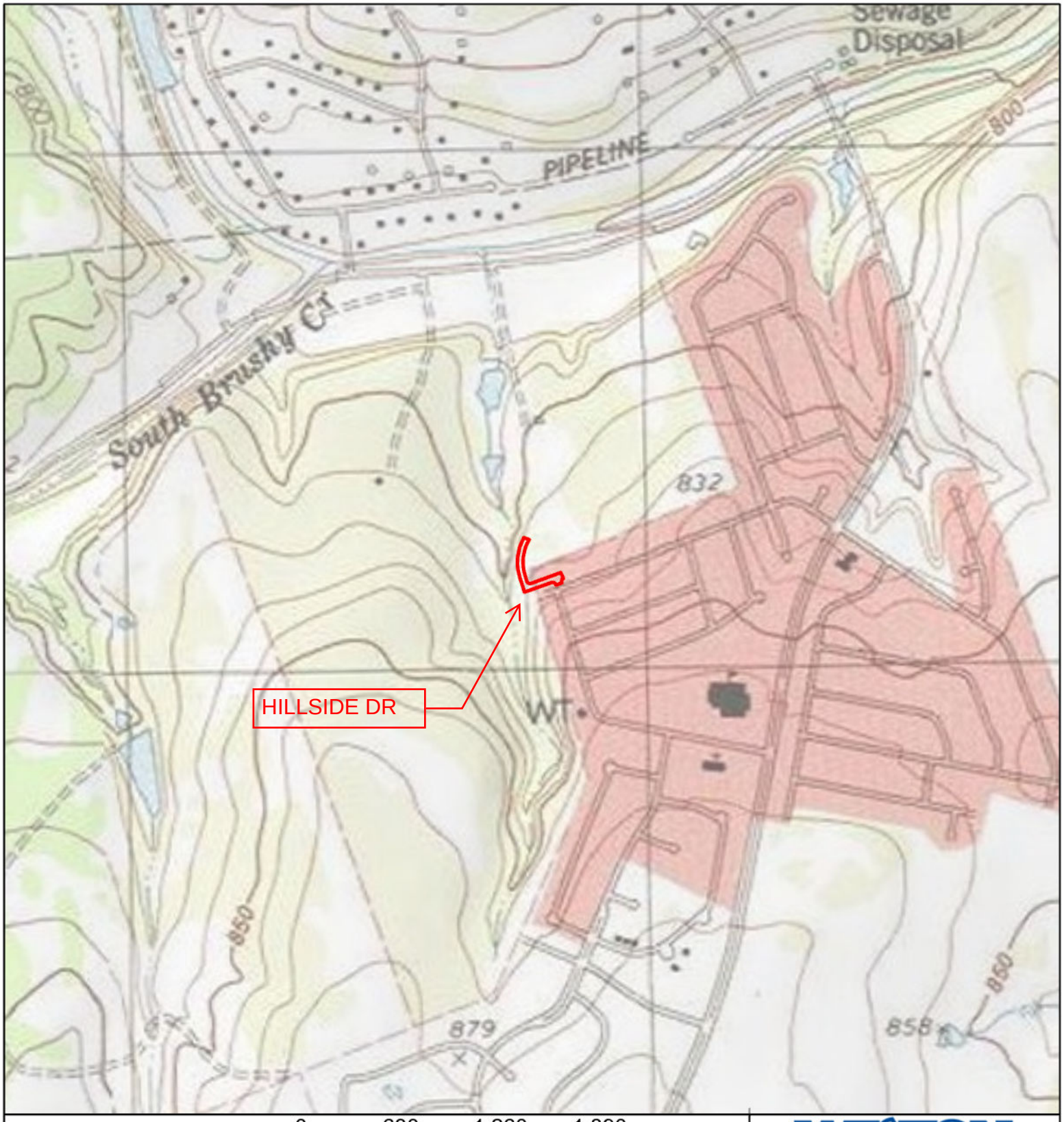
Texas Water Development Board (TWDB) - Report 358. December 2003. *Groundwater Availability Modeling: Northern Segment of the Edwards Aquifer, Texas*. Jones, Ian C. Ph.D., P.G.

USDA (U.S. Department of Agriculture, National Resource Conservation Service) 2023. Web Soil Survey. Accessed 16 June 2023. https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

USGS (U.S. Geological Survey). 2013. 7.5-minute quadrangle map for West Austin, Texas.

ATTACHMENT D-1

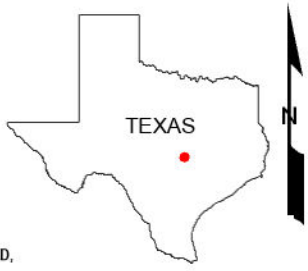
SITE LOCATION MAP



0 630 1,260 1,890 US Feet

Legend

Hillside Dr - Project Site



SOURCE: U.S. GEOLOGIC SURVEY 7.5 MIN TOPOGRAPHIC QUADRANGLE, AUSTIN WEST, TEXAS 2013.
FEMA FLOOD INSURANCE RATE MAP (FIRM) DATA.
DISCLAIMER: THIS FIGURE IS PREPARED FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED, AND IS NOT INTENDED FOR, SURVEY OR ENGINEERING PURPOSES.

WESTON SOLUTIONS

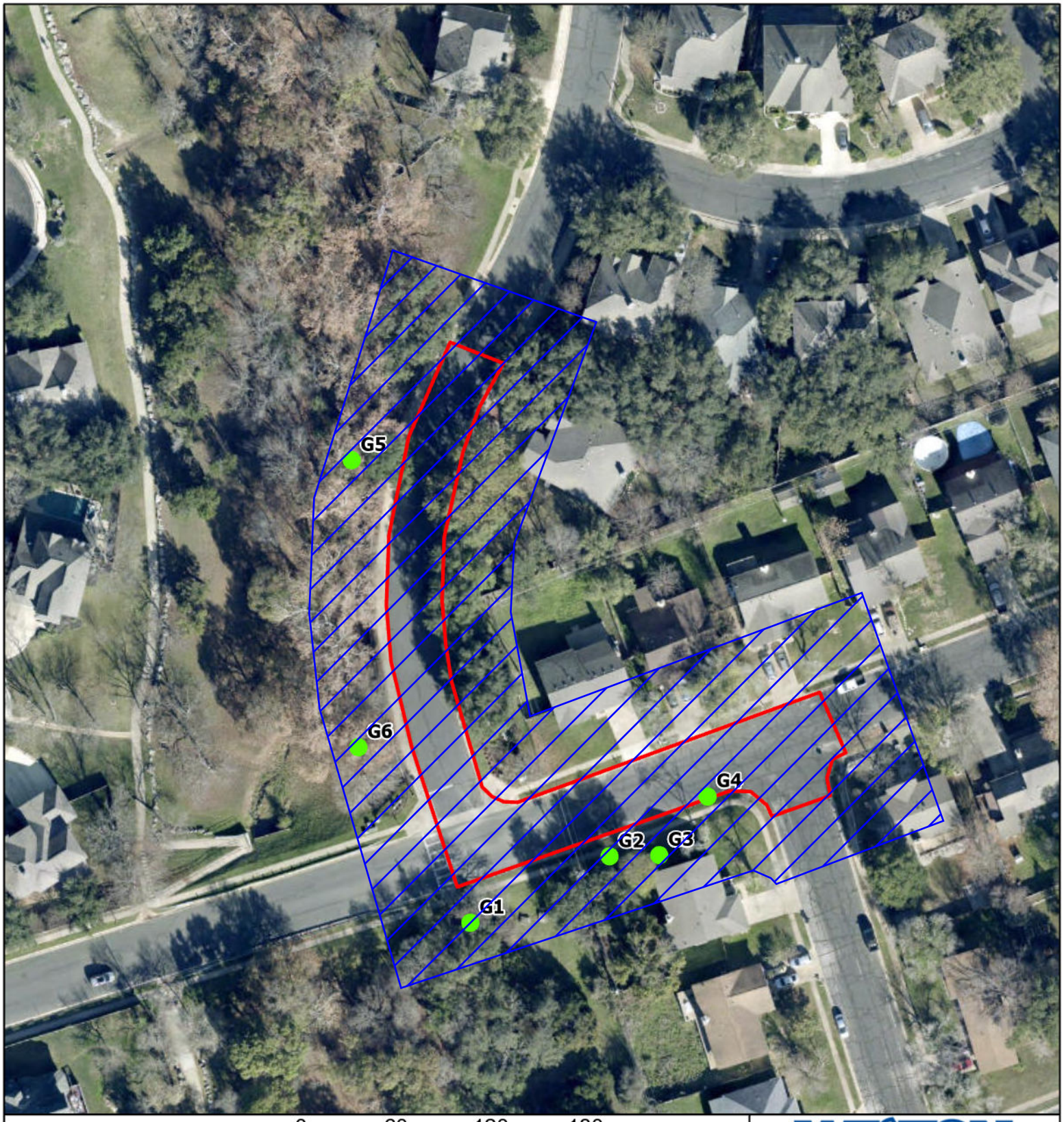
FIGURE 1
HILLSIDE DRIVE
SITE LOCATION MAP
BRUSHY CREEK MUD
BRUSHY CREEK, WILLIAMSON COUNTY, TEXAS

DATE	PROJECT NO	SCALE
JULY 2023	06141.036.005.1000	AS SHOWN

FILE: C:\Users\randhawm\OneDrive - Weston Solutions, Inc\Documents\ArcGIS\Projects\Weston\Weston.aprx 2:19 PM 7/18/2023 randhawm

ATTACHMENT D-2

SITE MAP



0 60 120 180 US Feet

Legend

- Hillside Dr - Project Site
- Survey Limits
- Hillside Dr - Geologic Features

N

SOURCE: U.S. GEOLOGIC SURVEY 7.5 MIN TOPOGRAPHIC QUADRANGLE, AUSTIN WEST, TEXAS 2013.
FEMA FLOOD INSURANCE RATE MAP (FIRM) DATA.
DISCLAIMER: THIS FIGURE IS PREPARED FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED, AND IS NOT INTENDED FOR, SURVEY OR ENGINEERING PURPOSES.

WESTON SOLUTIONS

FIGURE 2
HILLSIDE DRIVE SITE MAP
BRUSHY CREEK MUD
BRUSHY CREEK, WILLIAMSON COUNTY, TEXAS

DATE	PROJECT NO	SCALE
JULY 2023	06141.036.005.1000	AS SHOWN

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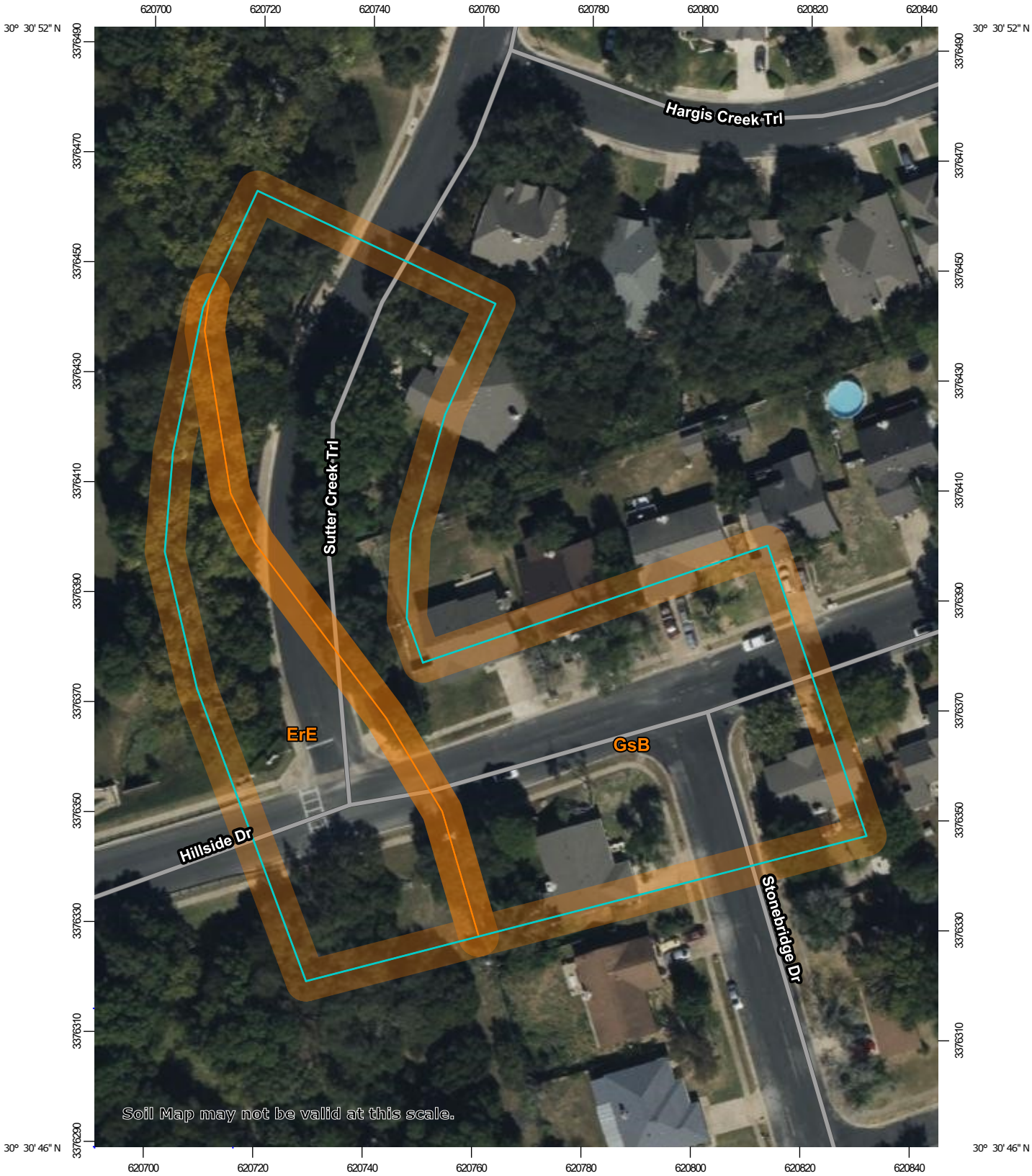
ATTACHMENT D-3

SOIL MAP

Soil Map—Williamson County, Texas
(Hillside Soil Map)



Map Scale: 1:994 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 10 20 40 60

Feet
0 45 90 180 270

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Williamson County, Texas
Survey Area Data: Version 23, Aug 24, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Data not available.

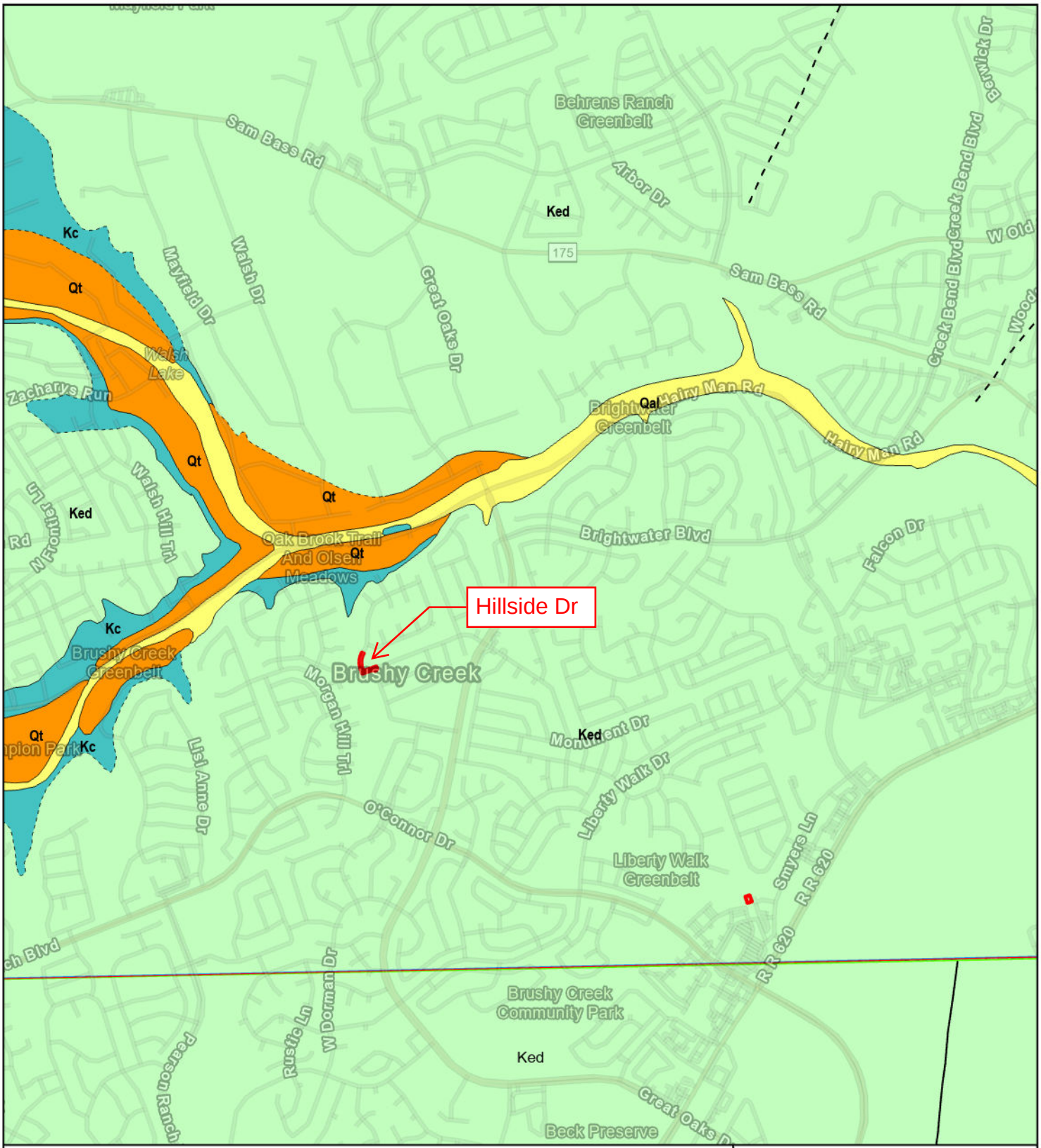
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ErE	Eckrant-Rock outcrop association, 1 to 10 percent slopes	0.7	28.3%
GsB	Georgetown stony clay loam, 1 to 3 percent slopes	1.7	71.7%
Totals for Area of Interest		**2.3**	**100.0%**

ATTACHMENT D-4

GEOLOGIC MAP



LEGEND

0 2,000 4,000

Feet

Legend

- Project Sites
- Kc - Comanche Peak Limestone
- Ked - Edwards Limestone
- Qal - Alluvium
- Qt - Fluviatille Terrace Deposits

N

SOURCE: U.S. GEOLOGIC SURVEY 7.5 MIN TOPOGRAPHIC QUADRANGLE, AUSTIN WEST, TEXAS 2013

DISCLAIMER: THIS FIGURE IS PREPARED FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED, AND IS NOT INTENDED FOR, SURVEY OR ENGINEERING PURPOSES.

WESTON SOLUTIONS

FIGURE 4

REGIONAL GEOLOGIC MAP

BRUSHY CREEK
MUNICIPAL UTILITIES DISTRICT
WILLIAMSON COUNTY, TEXAS

DATE	PROJECT NO	SCALE
JULY 2023	06141.036.005.1000	AS SHOWN

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APPENDIX A

HILLSIDE DR EDWARDS AQUIFER RECHARGE ZONE MAP

Hillside EARZ Map

6/22/2023, 1:49:59 PM

1:18,056

0 0.13 0.25 0.5 mi

0 0.2 0.4 0.8 km

Edwards Aquifer Label

Edwards Aquifer Boundary

Edwards Aquifer Boundary central line

City/Place

TX Counties

7.5 Minute Quad Grid

TCEQ_EDWARDS_OFFICIAL_MAPS

TCEQ, Esri Community Maps Contributors, Austin Community College, City of Austin, County of Williamson, Texas Parks & Wildlife, CONANP, Esri,

Web AppBuilder for ArcGIS

TCEQ | Williamson County TX, Maxar | Esri Community Maps Contributors, Austin Community College, City of Austin, County of Williamson, Texas Parks & Wildlife, © OpenStreetMap, Microsoft, CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc,

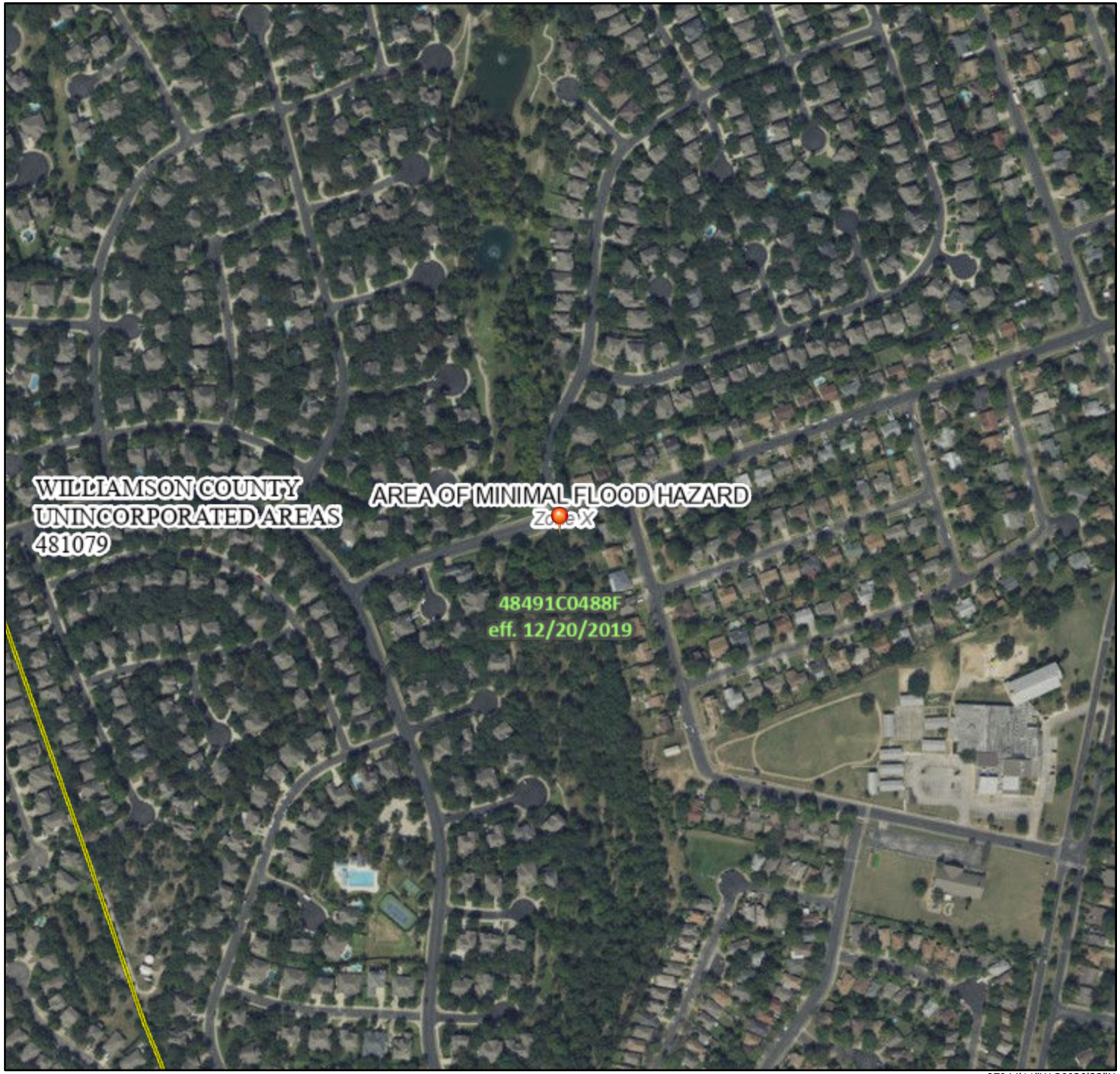
APPENDIX B

HILLSIDE DR FLOOD INSURANCE RATE MAP (FEMA)

National Flood Hazard Layer FIRMette

FEMA

97°44'49"W 30°31'3"N



97°44'11"W 30°30'32"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/22/2023 at 1:54 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX C

SITE PHOTO LOG

PHOTOGRAPH NO. 1

Date:	6/1/2023
Description:	
View of Geologic Feature 1 (G1). View facing northeast.	

PHOTOGRAPH NO. 2

Date:	6/1/2023
Description:	
View of Geologic Featuer 2 (G2). View facing south-southeastt.	

PHOTOGRAPH NO. 3

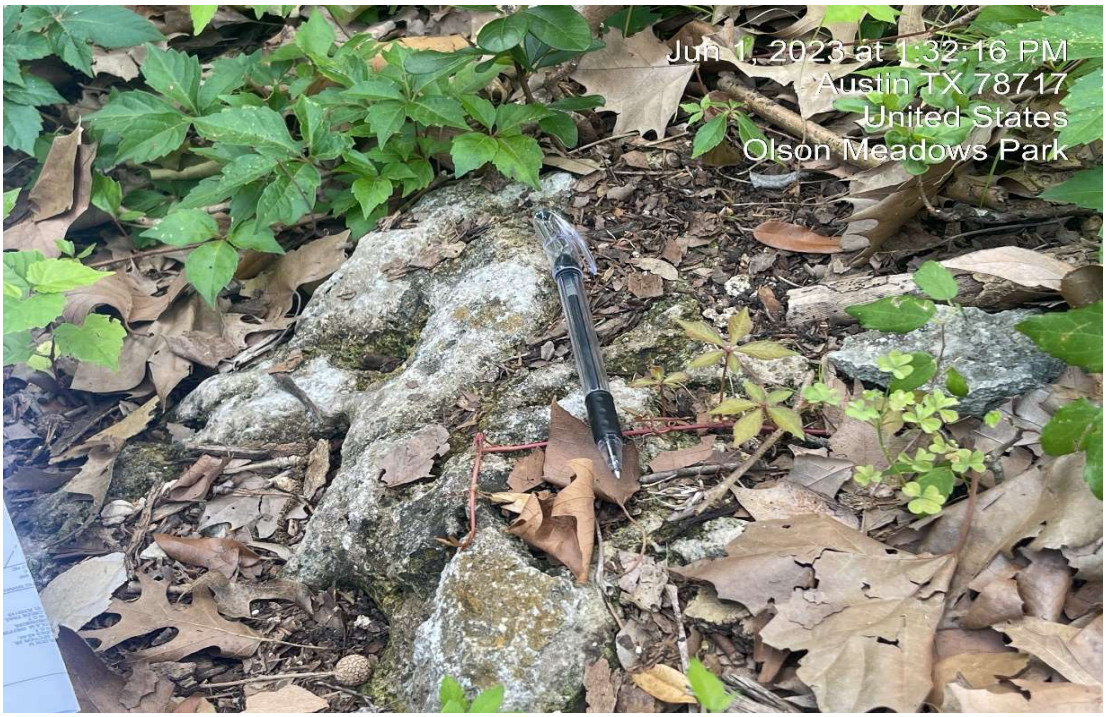
Date:	6/1/2023
Description:	
View of Geologic Feature 3 (G3). View facing south-southeast.	

PHOTOGRAPH NO. 4

Date:	6/1/2023
Description:	
View of Geologic Featuer 4 (G4). View facing south-southeast.	

PHOTOGRAPH NO. 5

Date:	6/1/2023
Description:	
View of Geologic Feature 5 (G5). View facing east-southeast.	



PHOTOGRAPH NO. 6

Date:	6/1/2023
Description:	
View of Geologic Featuer 6 (G6). View facing south-southeast.	

SCS FORM (TCEQ 0582)

Organized Sewage Collection System Application

Texas Commission on Environmental Quality

For Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(c), 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.

Regulated Entity Name: Brushy Creek Municipal Utilities District

1. ☒ **Attachment A – SCS Engineering Design Report**. This Engineering Design Report is provided to fulfill the requirements of 30 TAC Chapter 217, including 217.10 of Subchapter A, §§217.51 – 217.70 of Subchapter C, and Subchapter D as applicable, and is required to be submitted with this SCS Application Form.

Customer Information

2. The entity and contact person responsible for providing the required engineering certification of testing for this sewage collection system upon completion (including private service connections) and every five years thereafter to the appropriate TCEQ region office pursuant to 30 TAC §213.5(c) is:

   Contact Person: Amy Giannini, P.E.
   Entity: Brushy Creek Municipal Utility District
   Mailing Address: 16318 S Great Oaks Dr
   City, State: Round Rock, TX Zip: 78735
   Telephone: 512-255-7871 Fax: _____
   Email Address: a.giannini@bcmud.org
   The appropriate regional office must be informed of any changes in this information within 30 days of the change.

3. The engineer responsible for the design of this sewage collection system is:

   Contact Person: Maninder Randhawa, P.E.
   Texas Licensed Professional Engineer's Number: 145867
   Entity: Weston Solutions, Inc
   Mailing Address: 5301 SW Parkway, Suite 450
   City, State:Austin, TX Zip: 78735
   Telephone:512-920-4847 Fax:NA
   Email Address:maninder.randhawa@westonsolutions.com

Project Information

4. Anticipated type of development to be served (estimated future population to be served, plus adequate allowance for institutional and commercial flows):

   ☒ Residential: Number of single-family lots: 16
   ☐ Multi-family: Number of residential units: _____
   ☐ Commercial
   ☐ Industrial
   ☐ Off-site system (not associated with any development)
   ☐ Other: _____

5. The character and volume of wastewater is shown below:

100% Domestic	24,192 gallons/day
_____% Industrial	_____ gallons/day
_____% Commingled	_____ gallons/day

   Total gallons/day: 24,192

6. Existing and anticipated infiltration/inflow is 1,596 gallons/day. This will be addressed by: proper sizing of the pipe. The max anticipated velocity is approximately 2.79 feet per second.

7. A Water Pollution Abatement Plan (WPAP) is required for construction of any associated commercial, industrial or residential project located on the Recharge Zone.

   ☐ The WPAP application for this development was approved by letter dated _____. A copy of the approval letter is attached.
   ☐ The WPAP application for this development was submitted to the TCEQ on _____, but has not been approved.
   ☐ A WPAP application is required for an associated project, but it has not been submitted.
   ☒ There is no associated project requiring a WPAP application.

8. Pipe description:

Table 1 - Pipe Description

Pipe Diameter(Inches)	*Linear Feet (1)*	*Pipe Material (2)*	*Specifications (3)*
8	91.08'	PVC, SDR 26	ASTM D-3034
8	123.07'	PVC, SDR 26	ASTM D-3034
8	118.68'	PVC, SDR 26	ASTM D-3034
8	190.71'	PVC, SDR 26	ASTM D-3034
8	18.54'	PVC, SDR 26	ASTM D-3034

Total Linear Feet: 542.08

(1) Linear feet - Include stub-outs and double service connections. Do not include private service laterals.
(2) Pipe Material - If PVC, state SDR value.

(3) Specifications - ASTM / ANSI / AWWA specification and class numbers should be included.

9. The sewage collection system will convey the wastewater to the Brushy Creek Regional WWTP (name) Treatment Plant. The treatment facility is:

☒ Existing
☐ Proposed

10. All components of this sewage collection system will comply with:

☐ The City of _____ standard specifications.
☒ Other. Specifications are attached.

11. ☒ No force main(s) and/or lift station(s) are associated with this sewage collection system.

☐ A force main(s) and/or lift station(s) is associated with this sewage collection system and the **Lift Station/Force Main System Application** form (TCEQ-0624) is included with this application.

Alignment

12. ☒ There are no deviations from uniform grade in this sewage collection system without manholes and with open cut construction.

13. ☒ There are no deviations from straight alignment in this sewage collection system without manholes.

☐ **Attachment B - Justification and Calculations for Deviation in Straight Alignment without Manholes**. A justification for deviations from straight alignment in this sewage collection system without manholes with documentation from pipe manufacturer allowing pipe curvature is attached.

☐ For curved sewer lines, all curved sewer line notes (TCEQ-0596) are included on the construction plans for the wastewater collection system.

Manholes and Cleanouts

14. ☒ Manholes or clean-outs exist at the end of each sewer line(s). These locations are listed below: (Please attach additional sheet if necessary)

Table 2 - Manholes and Cleanouts

Line	*Shown on Sheet*	*Station*	*Manhole or Clean-out?*
C	13 Of 18	1+00.00	Manhole
C	13 Of 18	1+91.08	Manhole
C	14 Of 18	3+14.15	Manhole
C	14 Of 34	4+28.53	Manhole
D	15 Of 34	2+90.71	Manhole
D	15 Of 34	3+09.25	Manhole

Line	*Shown on Sheet*	*Station*	*Manhole or Clean-out?*
	Of		
	Of		
	Of		
	Of		

15. ☒ Manholes are installed at all Points of Curvature and Points of Termination of a sewer line.

16. ☒ The maximum spacing between manholes on this project for each pipe diameter is no greater than:

Pipe Diameter (inches)	**Max. Manhole Spacing (feet)**
6 - 15	500
16 - 30	800
36 - 48	1000
≥54	2000

☐ **Attachment C – Justification for Variance from Maximum Manhole Spacing**. The maximum spacing between manholes on this project (for each pipe diameter used) is greater than listed in the table above. A justification for any variance from the maximum spacing is attached, and must include a letter from the entity which will operate and maintain the system stating that it has the capability to maintain lines with manhole spacing greater than the allowed spacing.

17. ☐ All manholes will be monolithic, cast-in-place concrete.

☒ The use of pre-cast manholes is requested for this project. The manufacturer's specifications and construction drawings, showing the method of sealing the joints, are attached.

Site Plan Requirements

Items 18 - 25 must be included on the Site Plan.

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

Site Plan Scale: 1" = 20'.

19. ☒ The Site Plan must include the sewage collection system general layout, including manholes with station numbers, and sewer pipe stub outs (if any). Site plan must be overlain by topographic contour lines, using a contour interval of not greater than ten feet and showing the area within both the five-year floodplain and the 100-year floodplain of any drainage way.

20. Lateral stub-outs:

☒ The location of all lateral stub-outs are shown and labeled.

☐ No lateral stub-outs will be installed during the construction of this sewer collection system.

21. Location of existing and proposed water lines:

☐ The entire water distribution system for this project is shown and labeled.
☐ If not shown on the Site Plan, a Utility Plan is provided showing the entire water and sewer systems.
☒ There will be no water lines associated with this project.

22. 100-year floodplain:

☒ After construction is complete, no part of this project will be in or cross a 100-year floodplain, either naturally occurring or manmade. (Do not include streets or concrete-lined channels constructed above of sewer lines.)
☐ After construction is complete, all sections located within the 100-year floodplain will have water-tight manholes. These locations are listed in the table below and are shown and labeled on the Site Plan. (Do not include streets or concrete-lined channels constructed above sewer lines.)

Table 3 - 100-Year Floodplain

Line	***Sheet***	***Station***
	of	to
	of	to
	of	to
	of	to

23. 5-year floodplain:

☒ After construction is complete, no part of this project will be in or cross a 5-year floodplain, either naturally occurring or man-made. (Do not include streets or concrete-lined channels constructed above sewer lines.)
☐ After construction is complete, all sections located within the 5-year floodplain will be encased in concrete or capped with concrete. These locations are listed in the table below and are shown and labeled on the Site Plan. (Do not include streets or concrete-lined channels constructed above sewer lines.)

Table 4 - 5-Year Floodplain

Line	***Sheet***	***Station***
	of	to
	of	to
	of	to
	of	to

24. ☒ Legal boundaries of the site are shown.

25. ☒ The ***final plans and technical specifications*** are submitted for the TCEQ's review. Each sheet of the construction plans and specifications are dated, signed, and sealed by the Texas Licensed Professional Engineer responsible for the design on each sheet.

Items 26 - 33 must be included on the Plan and Profile sheets.

26. ☒ All existing or proposed water line crossings and any parallel water lines within 9 feet of sewer lines are listed in the table below. These lines must have the type of pressure rated pipe to be installed shown on the plan and profile sheets. Any request for a variance from the required pressure rated piping at crossings must include a variance approval from 30 TAC Chapter 290.

☐ There will be no water line crossings.
☐ There will be no water lines within 9 feet of proposed sewer lines.

Table 5 - Water Line Crossings

Line	*Station or Closest Point*	*Crossing or Parallel*	*Horizontal Separation Distance*	*Vertical Separation Distance*
D	1+14.15	Crossing	N/A	6"

27. Vented Manholes:

☒ **No part** of this sewer line is within the 100-year floodplain and vented manholes are not required by 30 TAC Chapter 217.
☐ **A portion** of this sewer line is within the 100-year floodplain and vented manholes will be provided at less than 1500 foot intervals. These water-tight manholes are listed in the table below and labeled on the appropriate profile sheets.
☐ **A portion** of this sewer line is within the 100-year floodplain and an alternative means of venting shall be provided at less than 1500 feet intervals. A description of the alternative means is described on the following page.
☐ **A portion** of this sewer line is within the 100-year floodplain; however, there is no interval longer than 1500 feet located within. No vented manholes will be used.

Table 6 - Vented Manholes

Line	*Manhole*	*Station*	*Sheet*

Line	*Manhole*	*Station*	*Sheet*

28. Drop manholes:

☐ There are no drop manholes associated with this project.
☒ Sewer lines which enter new or existing manholes or "manhole structures" higher than 24 inches above the manhole invert are listed in the table below and labeled on the appropriate profile sheets. These lines meet the requirements of 30 TAC §217.55(l)(2)(H).

Table 7 - Drop Manholes

Line	*Manhole*	*Station*	*Sheet*
Wastewater Line D	D2	3+09.25	15 of 18

29. Sewer line stub-outs (For proposed extensions):

☐ The placement and markings of all sewer line stub-outs are shown and labeled.
☒ No sewer line stub-outs are to be installed during the construction of this sewage collection system.

30. Lateral stub-outs (For proposed private service connections):

☐ The placement and markings of all lateral stub-outs are shown and labeled.
☒ No lateral stub-outs are to be installed during the construction of this sewage collection system.

31. Minimum flow velocity (From Appendix A)

☒ Assuming pipes are flowing full; all slopes are designed to produce flows equal to or greater than 2.0 feet per second for this system/line.

32. Maximum flow velocity/slopes (From Appendix A)

☒ Assuming pipes are flowing full, all slopes are designed to produce maximum flows of less than or equal to 10 feet per second for this system/line.
☐ **Attachment D – Calculations for Slopes for Flows Greater Than 10.0 Feet per Second.** Assuming pipes are flowing full, some slopes produce flows which are greater than 10 feet per second. These locations are listed in the table below. Calculations are attached.

Table 8 - Flows Greater Than 10 Feet per Second

Line	*Profile Sheet*	*Station to Station*	*FPS*	*% Slope*	*Erosion/Shock Protection*

33. Assuming pipes are flowing full, where flows are ≥ 10 feet per second, the provisions noted below have been made to protect against pipe displacement by erosion and/or shock under 30 TAC §217.53(l)(2)(B).

☐ Concrete encasement shown on appropriate Plan and Profile sheets for the locations listed in the table above.

☐ Steel-reinforced, anchored concrete baffles/retards placed every 50 feet shown on appropriate Plan and Profile sheets for the locations listed in the table above.

☒ N/A

Administrative Information

34. ☒ The final plans and technical specifications are submitted for TCEQ review. Each sheet of the construction plans and specifications are dated, signed, and sealed by the Texas Licensed Professional Engineer responsible for the design on each sheet.

35. ☒ Standard details are shown on the detail sheets, which are dated, signed, and sealed by the Texas Licensed Professional Engineer, as listed in the table below:

Table 9 - Standard Details

Standard Details	*Shown on Sheet*
Lateral stub-out marking **[Required]**	Na of Na
Manhole, showing inverts comply with 30 TAC §217.55(l)(2) **[Required]**	17 of 18
Alternate method of joining lateral to existing SCS line for potential future connections **[Required]**	18 of 18
Typical trench cross-sections **[Required]**	22 of 46
Bolted manholes **[Required]**	18 of 18
Sewer Service lateral standard details **[Required]**	17 of 18
Clean-out at end of line **[Required, if used]**	NA of NA
Baffles or concrete encasement for shock/erosion protection **[Required, if flow velocity of any section of pipe >10 fps]**	NA of NA
Detail showing Wastewater Line/Water Line Crossing **[Required, if crossings are proposed]**	17 of 18
Mandrel detail or specifications showing compliance with 30 TAC §217.57(b) and (c) **[Required, if Flexible Pipe is used]**	Spec 33 05 05.43 of 1

Standard Details	*Shown on Sheet*
Drop manholes **[Required, if a pipe entering a manhole is more than 24 inches above manhole invert]**	17 of 18

36. ☒ All organized sewage collection system general construction notes (TCEQ-0596) are included on the construction plans for this sewage collection system.

37. ☒ All proposed sewer lines will be sufficiently surveyed/staked to allow an assessment prior to TCEQ executive director approval. If the alignments of the proposed sewer lines are not walkable on that date, the application will be deemed incomplete and returned.

    ☒ Survey staking was completed on this date: December 27, 2022

38. ☒ 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.

39. ☒ Any modification of this SCS application will require TCEQ approval, prior to construction, and may require submission of a revised application, with appropriate fees.

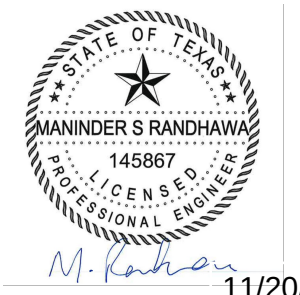
Signature

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 **Organized Sewage Collection System Application** is hereby submitted for TCEQ review and executive director approval. The system was designed in accordance with the requirements of 30 TAC §213.5(c) and 30 TAC §217 and prepared by:

Print Name of Licensed Professional Engineer: Maninder Randhawa, P.E.

Date: 11/20/2023

Place engineer's seal here:



11/20/2023

Signature of Licensed Professional Engineer:

Appendix A-Flow Velocity Table

Flow Velocity (Flowing Full) All gravity sewer lines on the Edwards Aquifer Recharge Zone shall be designed and constructed with hydraulic slopes sufficient to give a velocity when flowing full of not less than 2.0 feet per second, and not greater than 10 feet per second. The grades shown in the following table are based on Manning's formula and an n factor of 0.013 and shall be the minimum and maximum acceptable slopes unless provisions are made otherwise.

Table 10 - Slope Velocity

Pipe Diameter(Inches)	*% Slope required for minimum flow velocity of 2.0 fps*	*% Slope which produces flow velocity of 10.0 fps*
6	0.50	12.35
8	0.33	8.40
10	0.25	6.23
12	0.20	4.88
15	0.15	3.62
18	0.11	2.83
21	0.09	2.30
24	0.08	1.93
27	0.06	1.65
30	0.055	1.43
33	0.05	1.26
36	0.045	1.12
39	0.04	1.01
>39	*	*

**For lines larger than 39 inches in diameter, the slope may be determined by Manning's formula (as shown below) to maintain a minimum velocity greater than 2.0 feet per second when flowing full and a maximum velocity less than 10 feet per second when flowing full.*

$$v = \frac{1.49}{n} \times R_h^{0.67} \times \sqrt{S}$$

Figure 1 - Manning's Formula

Where:

v = velocity (ft/sec)
n = Manning's roughness coefficient (0.013)
Rh = hydraulic radius (ft)
S = slope (ft/ft)

ATTACHMENT A

SCS ENGINEERING DESIGN REPORT

DESIGN ENGINEERING REPORT

CAT HOLLOW LIFT STATION IMPROVEMENTS & HILLSIDE DRIVE LIFT STATION DECOMMISSIONING

Prepared for:

Brushy Creek Municipal Utility District
16318 S Great Oaks Drive
Round Rock, TX 78681Prepared by

WESTON Solutions, Inc.
5301 Southwest Parkway, Suite 450

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED
PROFESSIONAL ENGINEER

3-23-2023

Austin, TX 78735

Firm Registration: F-3123

March 2023

W.O.N. 15960.001.001.1000

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LIST OF ACRONYMS

>	greater than
<	less than
%	percent
ADF	average daily flow
AMSL	above mean sea level
ARPA	American Rescue Plan Act
ATS	Automatic Transfer Switch
BCMUD	Brushy Creek Municipal Utility District
BMP	best management practice
CHLS	Cat Hollow Lift Station
CPUSA	Control Panels USA Inc.
DER	Design Engineering Report
EARZ	Edwards Aquifer Recharge Zones
FBMUD	Fern Bluff Municipal Utility District
FEMA	Federal Emergency Management Agency
fps	feet per second
FS	factor of safety
ft	foot (feet)
GPM	gallon(s) per minute
hp	horsepower
HSLS	Hillside Drive Lift Station
Hz	hertz
I&C	instrumentation and controls
kVA	kilovolt ampere(s)
kW	kilowatt(s)
LF	linear foot (feet)
LUE	Living Unit Equivalent
MDS	Main Disconnect Switch
NAVD 88	North American Vertical Datum of 1988
NCSS	National Cooperative Soil Survey
NEC	National Electric Code
NFPA	National Fire Protection Association
no.	number
NPSH	Net Positive Suction Head

$NPSH_A$	available system NPSH
NRCS	Natural Resources Conservation Service
Oncor	Oncor Electric Delivery
OPCC	Opinion of Probable Construction Cost
OSHA	Occupational Safety and Health Administration
PF	Peaking Factor
PUE	public utility easement
PVC	polyvinyl chloride
PWWF	peak wet weather flow
ROW	right of way
RTU	remote terminal unit
SDR	standard dimension ratio
SCS	Sewage Collection System
SF	square foot (feet)
SU	standard unit(s)
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TDH	Total Dynamic Head
TPDES	Texas Pollutant Discharge Elimination System
U.S.	United States
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
UTBEG	University of Texas at Austin Bureau of Economic Geology
V	volt(s)
WESTON®	Weston Solutions, Inc.
WPAP	Water Pollution Abatement Plan

1. INTRODUCTION

1.1 PROJECT BACKGROUND

WESTON Solutions, Inc. (WESTON®) was retained by the Brushy Creek Municipal Utility District (BCMUD) to provide professional engineering services for the Cat Hollow Lift Station Improvements & Hillside Drive Lift Station Decommissioning Project. WESTON will provide preliminary design, final design, and bid phases for the improvements to the Cat Hollow Lift Station (CHLS) and decommissioning of Hillside Drive Lift Station (HSLS), converting this lift station into a gravity conveyance system. The design and bid phase work is funded by the BCMUD; construction funding is proposed under the American Rescue Plan Act (ARPA) (A.L.N. 21.027) from Williamson County.

This Design Engineering Report (DER) provides a basis of design for the proposed improvements of this project. The following Appendices are included for supplementary drawings, tables, data, and calculations:

- Appendix A Drawings
- Appendix B Utility Companies Correspondence and Information
- Appendix C Site Photographs
- Appendix D Floodplain and Wetlands Maps
- Appendix E Texas Historical Commission Correspondence
- Appendix F U.S. Fish and Wildlife Correspondence
- Appendix G Pump Calculations
- Appendix H Hillside Drive Alternative Matrix Analysis
- Appendix I Opinion of Probable Construction Cost (OPCC)
- Appendix J Schedule

The existing CHLS is a triplex lift station with separate dry well and wet well configuration that was constructed in approximately 1988. At present, the CHLS and lift stations upstream service a total of 4,825 residences, or Living Unit Equivalents (LUEs), per the 2020 Asset Management Report. The CHLS has undergone several improvements since its construction. The existing pumps are rated at 2,000 gallons per minute (GPM), and sewage is pumped through 5,605 linear feet (LF), 18-inch-diameter, ductile iron force main into the regional wastewater interceptor. In

late 2021, Control Panels USA Inc. (CPUSA) was contracted by BCMUD to install new pump and remote terminal unit (RTU) control panels after an incident that resulted in the flooding of the dry well. New pump starters and new instrumentation and controls (I&C) features were also installed as part of this project.

The existing HSLS is a 6-ft-diameter duplex, submersible lift station that was constructed in the late 1970s. The smaller of the two lift stations, the HSLS, serves a total of 21 LUEs near the northwest border of BCMUD Section 1 and Fern Bluff Municipal Utility District (FBMUD). The HSLS wet well and associated valve vault are located under the pavement of Hillside Drive. Wastewater is pumped to the nearest gravity wastewater system just east of the HSLS through a 675-LF, 4-inch-diameter, ductile iron force main to the nearest gravity manhole just northeast of the HSLS.

1.2 SCOPE OF WORK

The scope of work for the CHLS Improvements & HSLS Decommissioning project is detailed in the following sections.

1.2.1 Cat Hollow Lift Stations Improvements

CHLS improvements include the following:

- Design of new wet well or converting the existing wet well to function with submersible pumps (decided by BCMUD)
- Design of submersible pumps, piping, motors, valves, guide rails, and other appurtenances
- Demolition of the existing dry well and/or wet well, including removal and/or salvage of pumps, piping, electrical, and other components
- Site improvements involving crushed limestone gravel cover and a perimeter fence
- Design of a new foundation pad for generator
- Design of a new jib crane, including a foundation pad
- Design of a new activated carbon-based passive drum scrubber and foundation pad
- Integration of recently upgraded electrical and I&C systems into the new design
- Design of a new canopy to protect aboveground electrical and I&C controls

For the CHLS project site, this DER primarily focuses on the preliminary design and basis of design of pumps and motors and site improvements (or integration of recent improvements), including electrical, I&C, and odor control. **Figure 1-1** shows the project for CHLS.

1.2.2 HSLS Decommissioning

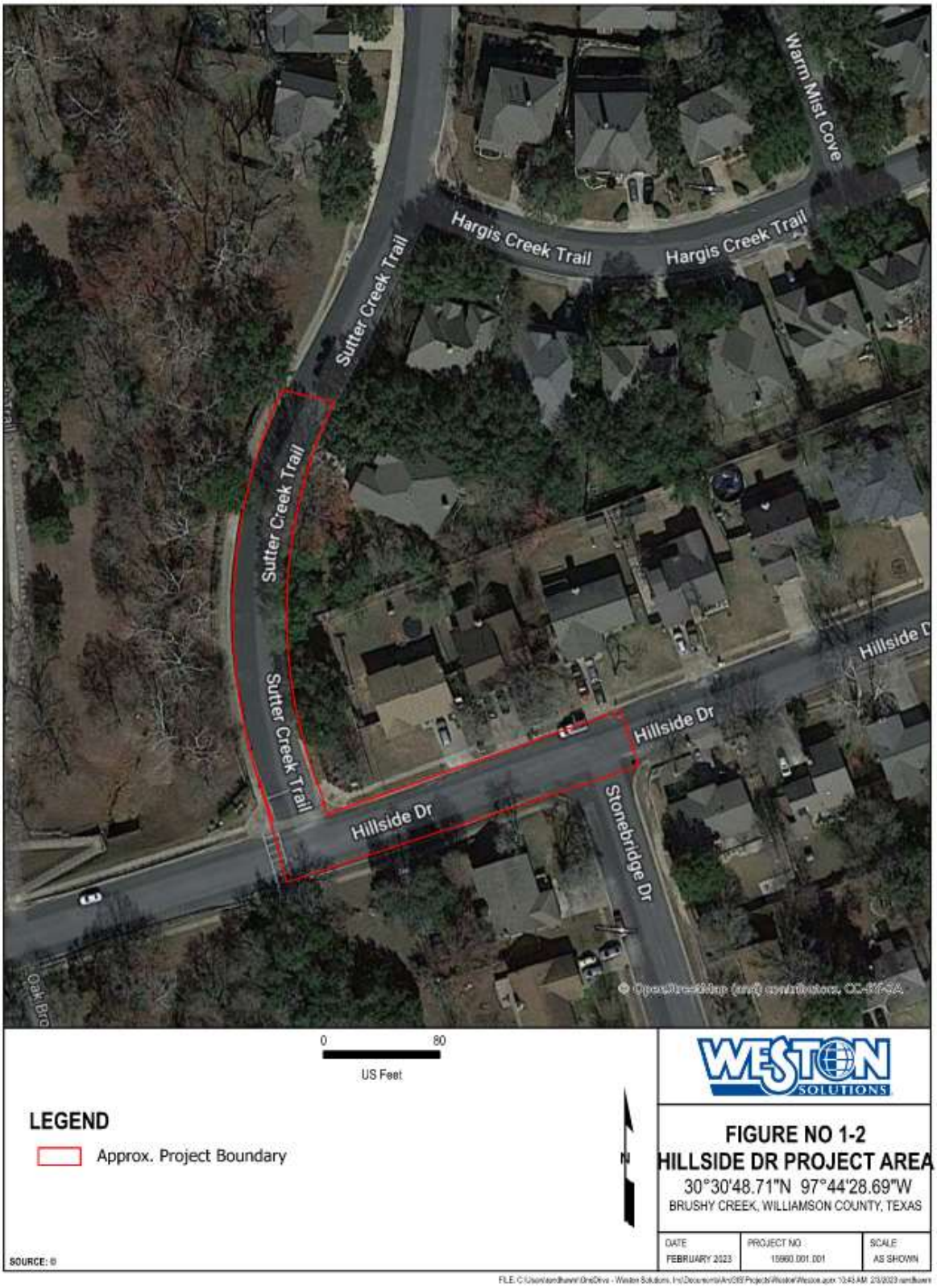
HSLS decommissioning includes the following:

- Demolition and/or salvage of all pumps, motors, couplings, valves, and controls associated with the existing lift station
- Demolition of existing wet well and valve vault
- Abandonment of the existing force main and gravity piping
- Design of a new gravity sewer main connected to the nearby FBMUD gravity system
- Traffic control for the area in project right of way (ROW)

This DER for the HSLS project site primarily focuses on the preliminary design and the basis of design of the new gravity main that will convey sewage from the northwest boundary of BCMUD Section 1 to the nearby FBMUD gravity manhole on Sutter Creek Trail. **Figure 1-2** highlights the HSLS project.

Figure 1-1 Cat Hollow Project Site

Figure 1-2 Hillside Drive Project Site



1.3 PROJECT TEAM

WESTON is the prime consultant responsible for the overall design, project management, direction, and quality assurance for this project. The WESTON team consists of the following subconsultants for their respective services:

- Landmark Surveying, LP – Surveying Services
- JRSA Engineering, Inc. – Electrical and I&C Design
- Holt Engineering, Inc. – Geotechnical Investigations

1.4 GOVERNING STATE AND LOCAL REGULATIONS

Construction and rehabilitation related to an existing or new organized sewage collection system (SCS) in the Edwards Aquifer Recharge Zone is governed by the Texas Commission on Environmental Quality (TCEQ) regulations, in accordance with Texas Administrative Code (TAC) Chapter 213 – Edwards Aquifer, "Subchapter A – Edwards Aquifer in Medina, Bexar, Comal, Kinney, Uvalde, Hays, Travis, and Williamson Counties" (30 TAC §213).

Wastewater collection system pipeline and lift station construction, operation, maintenance, and testing are governed by TCEQ regulations, in accordance with Chapter 217 – Design Criteria for Domestic Wastewater Systems, "Subchapter C – Conventional Collection Systems" (30 TAC §217).

Requirements contained in 30 TAC §217 are also applicable to the rehabilitation, replacement, and upgrade of existing wastewater collection system pipelines and lift stations if the improvements "materially alter" or "expand" the existing collection system. Section §217.11(e) states:

> *"An owner that materially alters or expands an existing collection system or treatment facility or builds a new facility must comply with the requirements of this chapter [TCEQ Chapter 217] that are in effect on the date the plans and specifications are submitted for approval unless granted a variance in accordance with §217.1(c)."*

Additional criteria are applicable to lift station design, which are governed by the National Electric Code (NEC), the Occupational Safety and Health Administration (OSHA), and the National Fire Protection Associate (NFPA). The feasibility of all improvements related to this project is determined based on the above rules and regulations.

Locally, the "Williamson County Subdivision Regulations" (December, 2021) and the "Texas Manual on Uniform Traffic Control Devices" specify requirements for infrastructure, utilities developments and traffic control in Williamson County.

2. ENVIRONMENTAL ASSESSMENT

The purpose of this section is to evaluate the potential environmental impacts from the construction of the proposed improvements and to identify potential constraints on the project resulting from the presence of critical environmental features, endangered species habitats, and cultural resources.

2.1 TOPOGRAPHY

Landmark Surveying, LP, completed a topographic and tree survey of both project sites and the immediate vicinity. The topography survey within the existing fence line of CHLS yielded elevations ranging from 788 to 791 feet (ft) above mean sea level (AMSL). Surface runoff exits the CHLS site as sheet flow into the drainage channel located north and west of the property line. The terrain on Hillside Drive and Sutter Creek Trail in the public ROW ranges from 811 to 829 ft AMSL. Williamson County plat maps show the 100-year flood plain to the west of Sutter Creek Trail for the HSLS project site, but, according to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map number (no.) 48491C0488F (panel 488 of 750) for Williamson County, no portion of either project site is within the 100-year flood plain. The FEMA Flood Insurance Rate Map and Williamson County plat maps are attached to **Appendix D** of this report.

2.2 GEOLOGY AND HYDROLOGY

Geological information for the project area was obtained from the *Geologic Atlas of Texas* published by the University of Texas at Austin Bureau of Economic Geology (UTBEG) (1974). The primary geologic formation underlying both project sites is of the Cretaceous age, composed of Del Rio Clay ("Grayson Mark") and Georgetown Formation. The formation contains limestone, which is fine grained and massive-to-thin bedded; dolomite, which is fine and very fine grained and porous; and cert, which varies in amount from bed to bed. The rock thickness is 60 to 350 ft and starts to thin northwards.

Trenching and excavation for this project are anticipated to be between the depths of approximately 5 and 13 ft. Slight variations in soil composition are expected and the project specifications will require the contractor to be responsible if such variations occur. A Geotechnical Baseline Report will be completed during the 60% design phase and included in the bid documents. Both project

sites are within Edwards Aquifer Recharge Zones (EARZ), and special TCEQ regulations that apply to construction in EARZ are discussed in Section 3.3.

2.3 SOILS

A review of the soils present within the project areas is based on data from *National Cooperative Soil Survey* (NCSS) and *Soil Survey of Williamson County, Texas* published by the United States (U.S.) Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) (1984).

The soils in the Hillside Drive project area are comprised primarily of Georgetown Series (1 to 3 percent [%] slopes), whereas the CHLS project site is dominated by soils of Eckrant Series (1 to 60% slopes). The Georgetown Series consists of moderately deep, well-drained, very slowly permeable soils with a surface layer that is brown in color. The Eckrant Series consists of well-drained, moderately slow permeable cobbly clay soils with a dark gray surface layer. Both soils are very shallow and hard with limestone bedrock starting at a depth of approximately 1 ft for Eckrant Series and approximately 3 ft for Georgetown Series.

2.4 WETLANDS

There is a stream with 100-year floodplain adjacent to Sutter Creek Trail which is in the Hillside Drive project ROW. The project area of disturbance is located completely outside the floodplain. Furthermore, all proposed limits of construction are in previously disturbed and/or paved locations where no wetlands are present.

As of spring 2021, Williamson County has kicked off the Atlas 14 Floodplain Mapping Study to update rainfall data, model streams and waterways, and identify where flood risks are located throughout the county. This study will update floodplain information with the most recent scientific data including National Oceanic & Atmospheric Administration's (NOAA) Atlas 14 rainfall data and model streams and waterways that have never been studied. The Atlas 14 study will include the stream adjacent to the Hillside Drive project ROW (Sutter Creek Trail) and modeling is expected to be complete in early 2024. WESTON will continue monitor all developments related to the Atlas 14 study and its impacts to this project to ensure all state and locals regulations are met.

2.5 THREATENED, ENGAGERED, AND OTHER PROTECTED SPECIES

A review of the Critical Habitat for Threatened & Endangered Species from the U.S. Fish and Wildlife Service (USFWS) reveals the project area does not contain any critical habitats for threatened or endangered species nor will the construction of improvements have an effect on these species in any way. (USFWS, 2020).

WESTON contacted USFWS, in a letter dated 19 January 2023, regarding the presence of any listed endangered species and/or critical habitats within the project area. A copy of the letter and a map confirming the nonexistence of any critical habitats in the project ROW have been included in **Appendix F**. WESTON will continue to monitor all communication to ensure that there are no endangered or threatened species in the project ROW and will provide a final clearance letter from USFWS once it is received.

2.6 GEOTECHNICAL ASSESSMENT

A Geotechnical Baseline Report will be completed during the 60% design phase of the project and included in the project manual.

3. PERMITTING REQUIREMENTS

3.1 STORMWATER PERMIT

The Texas Pollutant Discharge Elimination System (TPDES) program's stormwater permits for construction activities are required based on the size of the construction activity (acres disturbed). Construction activities disturbing greater than or equal to 5 acres are considered large construction activities and require a permit.

This project will include improvements for the CHLS in the fence-lined area of approximately 9,200 square feet (SF) or 0.2 acres. The HSLS decommissioning will require installation of approximately 550 LF of gravity wastewater line with a trench width of 3 ft per LF length. An average working width of 40 ft from curb to curb is anticipated for the 550-LF installation of wastewater main, resulting in a limited disturbance of approximately 22,000 SF or 0.51 acres. Since the overall limit of disturbance for both project sites are far less than the threshold of 5 acres, this project will not require a stormwater permit.

The proposed improvements will have no effect on existing or future drainage systems in the area and will not change the natural or traditional character of both sites. No floodplain modification is proposed or anticipated due to this project. Stormwater runoff quality will be treated by filtration using silt fences and mulch socks at downstream limits of construction in unpaved areas. Mulch socks, or equivalent protections, for stormwater inlet protection will be used along the streets, and filter dikes will be used for dirt stockpiles in paved area. Stabilized construction entrances are not required because the HSLS project site is completely within public ROW and because CHLS has an existing concrete driveway that will be used during construction.

3.2 TREE MITIGATION PERMIT

Trees are present adjacent to the eastern boundary of the CHLS project site, but the critical root zone is expected to be outside of the project ROW. No trees with critical root zones are present within the HSLS project ROW. The proposed improvements in the CHLS project site will be designed to avoid all trees and their critical root zones; no tree removals are expected. A tree mitigation table is not expected at this stage but will be completed during the design phase of the project if deemed necessary.

3.3 EDWARDS AQUIFER REQUIREMENTS

The CHLS and HSLS project sites both lie within the Edwards Aquifer Recharge Zone. Per TCEQ regulations summarized in Section 1.4 – Governing State and Local Regulations, a Water Pollution Abatement Plan and an Organized Sewage Collection System Plan must be developed and approved by TCEQ. The following sections describe these requirements in more detail.

3.3.1 Water Pollution Abatement Plan (WPAP)

A Water Pollution Abatement Plan (WPAP) outlines best management practices (BMPs) that will be implemented to protect water quality when any construction-related or post-construction-related activities are proposed in the EARZ. The WPAP for both project sites will be developed during the 60% design phase. The WPAP application must be approved through a formal submittal to TCEQ before construction can begin.

The WPAP will require the following information:

- Edwards Aquifer Application Cover Page [TCEQ-20705]
- General Information Form [TCEQ-0587]
- Geological Assessment [TCEQ-0585]
- WPAP application form [TCEQ-0584]
- Temporary Stormwater BMPs Section [TCEQ-0602]
- Permanent Stormwater Section [TCEQ-0600]
- Agent Authorization Form [TCEQ-0559]
- Core Data Form [TCEQ-10400]

The contractor will be required to coordinate with TCEQ on construction activities and BMPs prior to construction, during construction, and after construction has concluded. Any geologic or manmade features identified by the engineer or discovered during construction will require all regulated construction activities to be suspended, immediately pending review and approval of construction methods proposed to protect the geologic or manmade feature and the aquifer from potentially adverse impacts to water quality. The plan must be signed and sealed by a Texas Professional Engineer.

The types of geologic or manmade features include, but are not limited to, the following:

- Sinkholes
- Caves
- Faults
- Wells

- Permeable fractures
- Solution zones
- Surface streams
- Other sensitive features

3.3.2 Organized Sewage Collection System (SCS) Plan

A Sewage Collection System (SCS) plan is a detailed plan that outlines BMPs that are implemented to protect water quality when an organized sewage collection system is constructed in the EARZ. An SCS plan must go through a formal application submission and review process and must be approved prior to the commencement of construction.

The SCS plan requires the following information:

- Edwards Aquifer Application Cover Page [TCEQ-0587]
- General Information Page [TCEQ-0587]
- Geologic Assessment Form [TCEQ-0585]
- Organized Sewer Collection System Plan [TCEQ-0582]
- Lift Station/ Force Main System Application [TCEQ-0624]
- Temporary Stormwater Section [TCEQ-0602]
- Agent Authorization Form [TCEQ-0599]
- Core Data Form [TCEQ-10400]

The contractor will be required to coordinate with TCEQ on construction activities and BMPs prior to construction, during construction, and after construction is completed. Furthermore, once construction has concluded, BCMUD (owner) is required to test the wastewater system, in accordance with TCEQ requirements, and submit test results to TCEQ before the system can be put into operation. The system must also be tested ever 5 years after initial certification [30 TAC §213 and §217].

In addition to the above requirements, and similar to the WPAP, any sensitive environmental features discovered during construction will require all regulated construction activities to be suspended, immediately pending review and approval of methods proposed to protect the feature and the aquifer from potentially adverse impacts to water quality. The plan must be signed and sealed by a Texas Professional Engineer to ensure approval from TCEQ.

3.4 WILLIAMSON COUNTY UTILITY INSTALLATION PERMIT

WESTON coordinated with the Williamson County to confirm a utility installation permit is needed for Hillside Dr project site. WESTON will apply for the permit during the 60% design phase of the project.

3.5 WILLIAMSON COUNTY FLOODPLAIN PERMIT

The project ROW does not include any areas in the 100-year floodplain; therefore, a floodplain permit is not needed for this project. Per county ordinance, a Certificate of Compliance is required for all structures or other developments outside of a floodplain in unincorporated areas of the county. The Certificate of Compliance verifies that no 100-year floodplain exists in the area of proposed development. WESTON will submit the Certificate of Compliance.

4. UTILITY CONFLICTS AND COORDINATION

4.1 EXISTING UTILITIES

WESTON contacted various utilities requesting information regarding future expansion projects and/or existing utilities in the project area. **Appendix B** includes records of communications and information received from each of the entities that have responded. **Table 4-1** presents contact information and the status of information that has been requested as of the date of this report.

WESTON reviewed available utility information and proposed alignment alternatives by coordinating with utility providers in the area to minimize conflicts between the proposed gravity main on Hillside Drive, existing utilities, and anticipated future improvements. The approximate locations of relevant underground utilities were obtained by reviewing utility maps received from the different entities that were contacted.

4.2 EXISTING EASEMENTS/PUBLIC RIGHT OF WAY

Existing easements on the Cat Hollow property include a shared electric and telephone easement, a public utility easement (PUE), a wastewater and access easement, and a drainage easement. An additional 15-ft-wide electric easement is located adjacent to the western boundary of the site on the neighboring property that is separated by the subdivision line. The 10-ft wide electric and telephone easement is located on the southeast boundary of the property line. This easement is separated from the 15-ft-wide electric easement (neighboring easement) by the subdivision line. The 20-ft PUE shares half of its width with the 10-ft electric and telephone easement and extends another 10 ft toward the northern end of the site driveway. The wastewater and access easement is located just north of the 20-ft PUE and makes up the northern boundary of the site access road. Finally, the drainage easement varies in width and surrounds the northern perimeter of the site and contains the drainage channel that makes outfall west of the project site.

The Hillside Drive project site has a 60-ft public ROW, and the Sutter Creek Trail ROW varies in width. A 10-ft utility easement terminates at the public ROW close to the intersection of Hillside Drive and Sutter Creek Trail. **Appendix A** includes the Topographic survey for both project sites that highlights the existing easements and their proximity to the improvements proposed in later sections of this report.

Table 4-1 Utility Listing

Company	Contact	Address and/or Email	Phone	Conflict? (Y/N)	Comments
Texas Gas Service	Thomas Perkins	Thomas.Perkins@onegas.com	--	--	Awaiting response
Astound Broadband	Daniel Pena	Daniel.pena@mygrande.com	--	--	--
AT&T Texas	Hugo Vasquez	HV5621@att.com	737-255-4822	Y	Has conflicts in Cat Hollow area.
AT&T Corp Legacy	Clayton Martin	cm2642@att.com	817-781-5819	N	
AT&T Metro	Roger	RA973j@att.com	--	--	--
Charter/Spectrum	Lance Davis	Lance.Davis@charter.com	512-745-3522	Y	Has conflicts in Hillside area.
Google Fiber Texas	Kari McNelly	kmcnelly@txue-inc.com; TXUERelo@txue-inc.com	--	N	--
Verizon/XO Communication	Brian Chernoff	brian.chernoff@verizon.com	--	--	--
Lumen	Aliyah Skaro	Aliyah.skaro@lumen.com	--	N	--
LOGIX	Morris Bankhead	Morris.bankhead@alpheuscommunications.com	--	--	--
Fiberlight	Doug Klunder	Doug.Klunder@fiberlight.com	--	--	--
Tel Pacific Network	Robert Cuevas	RCuevas@TPX.com	--	--	--
Zayo	Pete Nielsen	Pete.Nielsen@zayo.com	--	--	--
Znet	Chad Hambacher	chambacher@bellsouth.net	504-416-5313	N	--
Atmos Gas	George Turcios	George.Turcios@atmosenergy.com	--	--	--
Flint Hill Resources	Christopher Palmer	Chris.Palmer@kplsrv.com	--	N	--

Table 4-1 Utility Listing (Continued)

Company	Contact	Address and/or Email	Phone	Conflict? (Y/N)	Comments
Kinder Morgan Pipeline	Jim Ephraim	Jim.ephraim@kindermorgan.com	--	--	--
Enterprise Pipeline	Charley Rogers	Crogers@epco.com	--	--	--
Pedernales Electric (PEC)	Dawn Southwell	Dawn.Southwell@peci.com	830-225-8435	Y	Has conflicts in Hillside area.
Bluebonnet Electric	Melissa Wickel	Melissa.Wickel@bluebonnet.coop	--	--	--
Chevron Pipeline	--	--	--	--	--
AT&T Singular	Steven Doggett	sd9482@att.com	512-810-3570	N	--
T-Mobile (Extenet)	Princess Sanders	PSanders@extenetsystems.com	832-647-5952	N	--
TXU Electric	--	--	--	N	Uses Oncor for utility installation.
Ambit Energy	--	--	--	N	Uses Oncor for utility installation.
Reliant Energy	--	--	--	N	Uses Oncor for utility installation.
Oncor	--	--	888-222-8045	N	Spoke to a representative who checked their coverage to project maps.

5. BASIS OF DESIGN – CAT HOLLOW LIFT STATION IMPROVEMENTS

This section briefly summarizes existing conditions, data collection, design parameters and proposed improvements, and the 30% Opinion of Probable Construction Cost (OPCC) for the CHLS project site.

5.1 EXISTING OPERATION PARAMETERS

WESTON collected, reviewed, and evaluated existing relevant data/documents made available for CHLS to identify the existing operation and design parameters for proposed improvements. The current and historical data that are available for the CHLS is summarized as follows:

- Site visit photographs, included in **Appendix C**.
- As-built drawings for the existing CHLS and associated force main.
- Asset Management Plan dated May 18, 2020, by Steger Bizzell.
- Project drawings and schematics for recent electrical and I&C improvements made by CPUSA.
- Topography survey of the existing site, included in **Appendix A**.
- Existing lift station operation parameters such as pump drawdown test summaries, pump runtimes, and LUEs serviced.
- FEMA Flood Zone Map and Atlas 14 additions, included in **Appendix D**.

The existing operation parameters were determined based on the information above and are summarized in **Table 5-1**.

Table 5-1 Existing Operation Parameters

Parameter	Summary
Station Type	Dry Pit and Wet Well Configuration
Wet Well Inside Dimensions (L by W)	25 by 8 ft
Force Main Length	5,605 ft
Force Main Diameter	18 inches
Number of LUEs Serviced	3,142 (4,825 including other LSs)
Pump Configuration	Two Alternating Pumps + 1 Backup
Existing Flow Condition – ADF	664 GPM
Existing Flow Condition – PWWF	2,655 GPM
Power	480V, Three-Phase, 60 Hz
Wet Well Top Elevation (NAVD 88)	791.90 ft
Lowest Invert Elevation (NAVD 88)	777.50 ft
Wet Well Bottom Elevation (NAVD 88)	762.70 ft

Notes:
ADF – average daily flow
Hz – Hertz
NAVD 88 – North American Vertical Datum of 1988
PWWF – peak wet weather flow
V – volt(s)

5.2 DESIGN CALCULATIONS

WESTON will design the CHLS improvements to accommodate, at minimum, the peak wet weather flow (PWWF) of 2,655 GPM and additionally design for a pumping capacity of 4,250 GPM. The reason for such a high design capacity is discussed in detail in Section 5.3.3. BCMUD has also advised WESTON that minimal future growth is anticipated for the area served by the CHLS and therefore improvements shall be designed to only meet the current PWWF condition of the system. WESTON will design installation of the FRP wet well with three new submersible pumps. Since the force main is in service for 30 years, BCMUD should consider evaluating the condition of the force main and make plans for rehabilitation/replacement. The design calculations for the proposed improvements at CHLS are summarized and described in the sections below, and are provided in detail in **Appendix G**.

5.2.1 Design Flow

To ensure the future CHLS is able meet the flow demands imposed by the wastewater system, the average daily flow (ADF) and PWWF rates under each scenario were crosschecked against the flowrates referenced in the Asset Management Report. **Table 5-2** below summarizes the results of this exercise. Flow rates were calculated based on total number of LUE servicing the CHLS. The BCMUD estimation criteria of 270 Gallons Per Capita Per Day (GPCPD) was used to determine the ADF. A peaking factor of 4.0, which is recommended by TCEQ when there are no records of flow measurement, was used to estimate the PWWF for the CHLS. In February 2023, Weston received an updated database of BCMUD's current service area as another source to calculate a more current flowrate. This information is also summarized in **Table 5-2** below.

Table 5-2 Verification of Design Flowrate

Flow	Asset Management Report (GPM)	WESTON Calculated Flowrate (GPM)	BCMUD-GIS Verified Flowrate (GPM)
ADF	837	905 (1)	664(3)
PWWF (Design Flow)	3,351	3,619 (2)	2,655

(1) = 4,825 (LUEs) * 270 gal/day / 1,440 min/day

(2) = 4 * ADF, where 4 is the peaking factor used

(3) = 3,541 (LUEs) * 270 gal/day / 1,440 min/day

Based on these results and the size of the existing force main (discussed in Section 5.3.3), the minimum firm design flowrate of 2,655 GPM (updated in 2023) was selected to size new submersible pumps for the CHLS. The design flowrate of 2,655 was selected to size the lift station wet well and determine operation related parameters for improvements at the CHLS.

5.2.2 Wet Well Volume Analysis

The topographic survey conducted by Landmark Surveying, LLC. confirmed the existing wet well internal dimensions to be 25 ft by 8 ft. Based on the minimum pump cycle times referenced from TCEQ regulations below in **Table 5-3**, a pump cycle of 10 minutes was selected.

Table 5-3 Minimum Pump Cycle Times

Pump Horsepower	Minimum Cycle Times (minutes)
< 50	6
50–100	10
> 100	15

Notes:
< – less than
> – greater than

The minimum volume of storage required is 6,638 gallons or 4.4 ft of depth. The total available operating depth is 11.3 ft for the existing CHLS wet well. The operating depth is simply the depth at which the lift station pumps are programmed to discharge flow for standard operation. To analyze the worst-case scenario which could result in partial or complete failure of lift station pumps during power outage, the emergency storage depth and emergency storage volume were analyzed and determined to be 19.1 ft and 28,499 gallons, respectively. This equates to approximately 10.7 minutes at PWWF. Since the emergency detention time is less than 20 minutes, a generator is needed to satisfy provisions of TCEQ regulations [30 TAC §217.63(g)].

Due to the age and unknown structural condition of the existing wet well, a new 15.5 ft diameter, 28 ft deep circular Fiberglas Reinforce Plastic (FRP) wet well was also analyzed as an alternative option for the CHLS. Based on the criteria in **Table 5-3**, the minimum storage volume was determined to be 6,638 gallons at an operating depth of 4.7 ft. The emergency storage depth and volume were calculated to be 18.4 ft and 25,900 gallons, respectively. This will provide an emergency detention time of 9.8 minutes. Since the emergency detention time is less than 20 minutes, a generator is needed to satisfy provisions of TCEQ regulations [30 TAC §217.63(g)].

Finally, the pump starting sequence with elevations for three-pump configurations with respect to minimum and emergency storage volumes for the existing CHLS wet well and new FPR wet well are summarized in **Table 5-4** below.

Table 5-4 Pump Starting Sequence with Elevations

Sequence	Existing Wet Well (ft)	New FRP Wet Well (ft)
High Level Alarm (LHH)	777.50	777.68

Third Pump On (LH1)	776.50	776.68
Second Pump On (LH1)	774.80	775.14
Third Pump Off (LL1)	772.68	773.34
First Pump On (LH1)	770.85	771.54
Second Pump Off (LL2)	768.03	769.97
First Pump Off (LLL)	765.20	766.40
Low Level Alarm	764.70	765.90

5.2.3 Static Head

In lift station design, the static head is the difference in elevation of wastewater surface between the highest elevation of the force main and the pump volute inside the wet well. From the as-built drawings of the existing force main, the high point of the force main is at station (STA) 32+00, at an elevation of 834 ft AMSL. The pump volute elevation is 764.7 ft, which also equals the minimum submergence level of the pump and was derived from the pump specification sheet in **Appendix G** of this report. The static head for the "pump off" and "pump on" elevations are 69.3 ft and 62.5 ft, respectively, for the existing wet well. The static head elevations for the new FRP wet well are 70.1 ft and 63.6 ft for "pump off" and "pump on" conditions, respectively.

5.2.4 Net Positive Suction Head

The Net Positive Suction Head (NPSH) is a measure of head or pressure that is experienced by wastewater on the suction side of pump. For pump design, the available system NPSH (i.e., $NPSH_A$) at the eye of the impeller is compared to the selected pump's NPSH and must be greater than the $NPSH_A$ for the pump to discharge at its firm design capacity. The $NPSH_A$ for the CHLS system was determined to 34.5 ft, which is greater than $NPSH_R$ for the proposed submersible pumps.

5.3 Force Main and Velocity Analysis

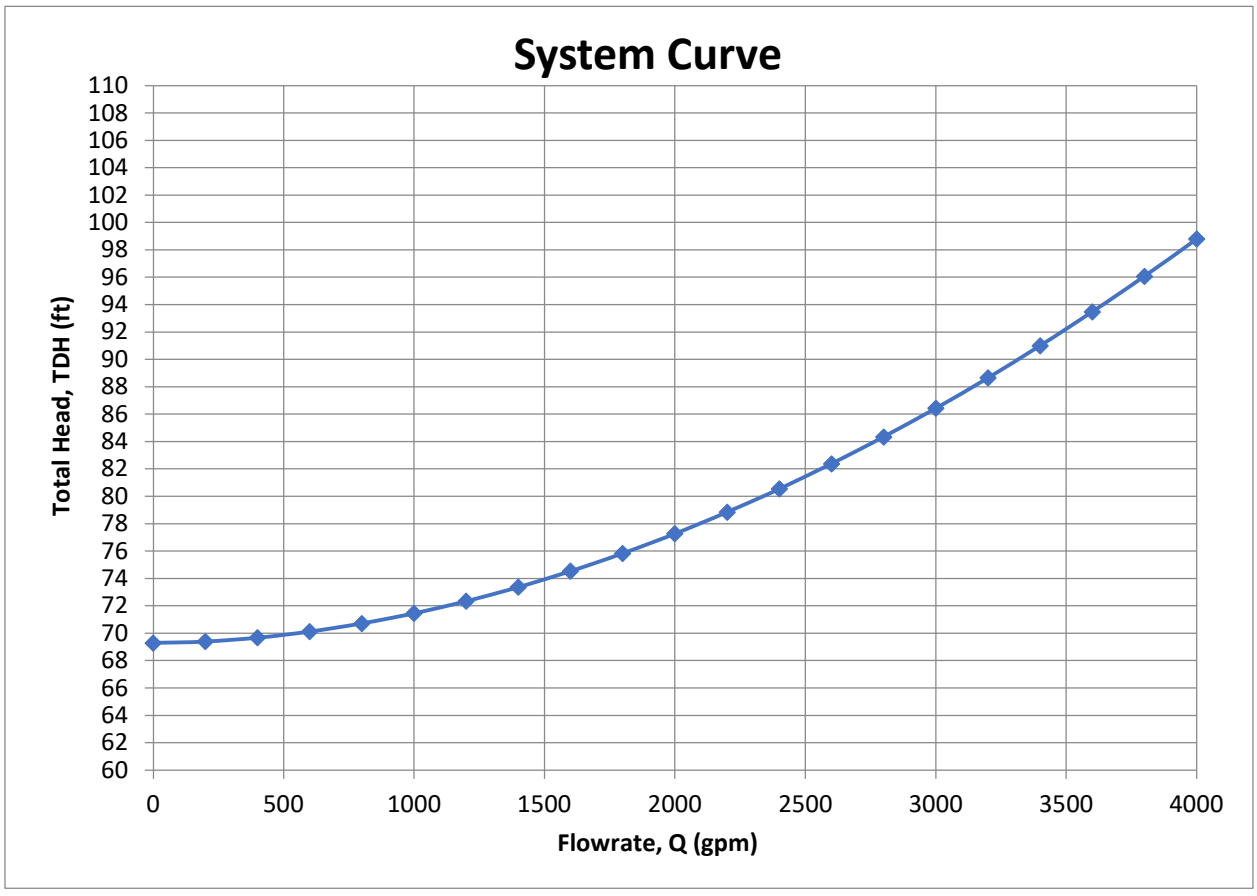
The existing 18-inch diameter force main was also analyzed to ensure that TCEQ regulations are met by the proposed CHLS improvements. The proposed discharge pipe inside the wet well is ductile iron and is 12 inches in diameter. A 12-inch diameter pipe will ensure that the discharge piping inside the wet well does not reach a surge velocity above 7 fps. The proposed discharge

pipe will run up the wet well wall, through the top of the wet well, and connect to the existing 18-inch-diameter force main inside the fence line of the CHLS.

5.3.1 Total Dynamic Head

The Total Dynamic Head (TDH) in lift station design is the total head loss or pressure experienced by a pumping system when wastewater is being pumped from a wet well to the discharge point. The TDH is the sum of the static head, head loss due to friction and minor losses (or head loss experienced due to various pipe fittings on the entire length of the force main). Both the friction losses and minor losses are functions of flow and are dynamic in nature. A system curve is a graphical representation of the relationship between flow rate and the associated TDH. When plotted against one or multiple pump curve(s), the point at which the system curve meets the manufacturer's produced pump curve is known as the operating point of the pump(s). The system curve developed for the CHLS in shown below as **Figure 5-1**.

Figure 5-1 System Curve for Cat Hollow Lift Station



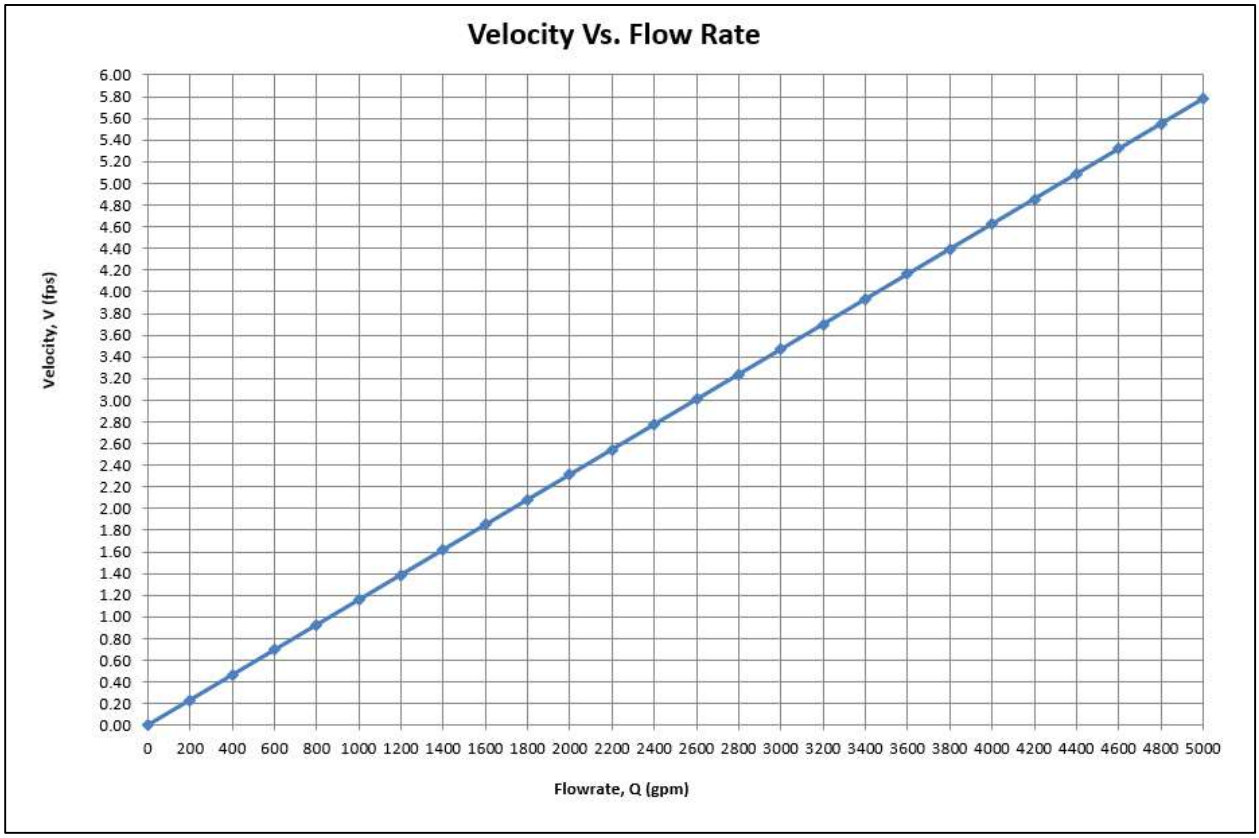
5.3.2 Force Main Velocity

30 TAC §217.67, Force Main Design establishes the following criteria for velocities of wastewater in a force main:

> *(1) A force main must be a minimum of 4.0 inches in diameter, unless it is used in conjunction with a grinder pump station. The executive director may approve pipes with a diameter less than 4.0 inches where grinder pumps are used, on a case-by-case basis in writing.*
>
> *(2) For a lift station with two pumps, the minimum velocity is 3.0 feet per second with one pump in operation;*
>
> *(3) For a lift station with three or more pumps;*
>
> *(A) the minimum velocity in a force main is 2.0 feet per second with only the smallest pump operating at full speed; and*
>
> *(B) a minimum flushing velocity of 5.0 feet per second or greater must occur in a force main at least twice daily.* (2015)
>
> *(4) The engineering report must certify that a pipeline with a velocity greater than 6.0 feet per second can withstand high and low negative surge pressures in the event of sudden pump failure.*

Figure 5-2 depicts the linear relationship between the CHLS flow and force main velocity. For a two-pump configuration (with one pump running), the pump curve yields a minimum velocity of 3.0 feet per second (fps) at a flowrate of 2,600 GPM. For a three-pump configuration (two pumps running and one on standby), the above TCEQ regulations state that each pump must provide a minimum velocity of 2.0 fps and that the force main system must reach a minimum velocity of 5.0 fps at least twice daily. As shown in **Figure 5-2**, the system will achieve the required minimum velocity of 5.0 fps at a flow rate of 4,250 GPM.

Figure 5-2 CHLS System Velocity vs Flow Rate



5.3.3 Force Main Size

TCEQ regulations recommend that a lift station force main should be designed to meet sewage velocities greater than 2.0 fps and less than 6.0 fps, and, if sewage velocity exceeds 6.0 fps, a complete surge analysis must be performed (30 TAC §217.67(a)). Additionally, as discussed in Section 5.3.2, TCEQ regulations also establish that a lift station design with two pumps must convey a minimum velocity of 3.0 fps with each pump, whereas a lift station design with three pumps is required to convey a minimum velocity of 5.0 fps.

Figure 5-2 shows that, for a two-pump configuration, each pump must be sized for a firm capacity of 2,600 GPM to achieve the required 3.0 fps of minimum velocity. For a three-pump configuration, in addition to achieving a 2.0 fps minimum velocity with each pump, the system must achieve a minimum velocity of 5.0 fps. This will require a pumping capacity of 4,250 GPM in the CHLS system. WESTON contacted TCEQ to obtain additional clarification on regulations set forth in 30 TAC §217.67 and has determined that

a variance can be requested allowing all three pumps (2 lead + 1 redundant) to be programmed to operate simultaneously to achieve a 5.0 fps velocity to flush the force main. WESTON will apply for this variance during the 60% Design Phase of the project.

5.3.4 Odor Control Scrubber

An activated carbon-based odor control scrubber will be designed for CHLS and included in the 60% design.

5.3.5 Water Hammer/Surge Analysis

Water hammer is defined as changes in pressure that are brought about by abrupt changes in flow within a pipe. Any change in flow will produce a change in pressure. The most extreme scenario occurs during power failure when the pump(s) is in operation. A maximum water hammer pressure (pounds per square inch [psi]) was calculated to be 207 psi for a worst a scenario where pumps are discharging at the maximum design velocity of 5.0 fps. This is lower than the pipe pressure rating of 300 to 350 psi for a Class 50 ductile iron pipe; therefore; no surge control measure is needed for the force main. However, it should be noted that the existing force main is approximately 32 years old, and, depending on the condition, the actual FS could be lower.

5.3.6 Buoyancy

The below-grade wet well is subject to buoyant forces by the groundwater table. The uplift load due to buoyancy is equal to the change in buoyant force due to the volume of groundwater that is displaced by the wet well structure. At this stage of the project, groundwater table is assumed to be at the level of existing grade to analyze the worst-case scenario. The resisting loads include the dead load of the structure, possible overburden over the top of the structure, and possible soil load over any foundation extension beyond the exterior walls. A complete buoyancy analysis was performed for the existing CHLS wet well, and a factor of safety (FS) of 1.55 standard units (SU) against flotation (buoyancy) was determined. An FS greater than 1.0 SU means that the existing structural dead loads and soil loads over the foundation extension are sufficient to counter the buoyancy force exerted by the change displacement of groundwater.

5.4 ELECTRICAL AND INSTRUMENTATION AND CONTROLS DESIGN

The CHLS is powered by an overhead transformer bank that is supplied by Oncor Utility. The existing overhead transformers are 25 kilovolt amperes (kVA), for a total load of 75 kVA. The

new proposed connected load, as detailed on the one-line diagram attached in **Appendix A**, is approximately 225 kVA. The new electrical design will provide 480 volts (V) of power through a Main Disconnect Switch (MDS) and Automatic Transfer Switch (ATS). Power distributing for the lighting and low-voltage loads will be supplied through a mini power center, with an internal 480 to 120V transformer.

The recently improved pump starters and pump controls are contained in a single control panel. The starters were sized for the previous 100-horsepower (hp) pumps and are sufficient for the new proposed KSB KRT K 150-400/556 XEG-S 74-hp pumps (discussed in detail in **Section 7.1.1**). The new RTU panel, which provides communication to the BCMUD overall system, will also be repurposed for the proposed improvements.

Additional electrical and I&C improvements include a new wet well rack, an electrical shelter, and duct banks. The new wet well rack will be designed to hold pump junction boxes and I&C junction box. The electrical rack will hold the MDS, ATS, pump control panel, RTU pane, and mini power center/low-voltage panel. The new electrical duct banks will be installed between the wet well junction box rack and the electrical canopy, the electrical canopy and the generator, and the electrical canopy and the Oncor Electric Delivery (Oncor) service. WESTON will design a new canopy to protect all relocated and proposed electrical components from the weather elements.

5.5 GENERATOR AND FOUNDATION DESIGN

The existing portable generator provides 80 kilowatts (kW) (per the Asset Management Report) of power during emergencies, which is not adequate power to run one of the proposed pumps. The electrical load analysis has shown that emergency power to the site will need to be provided through an ATS and a permanent diesel generator. A 175-kW generator can operate two pumps to avoid burnout, as well as the other low-voltage loads. The generator footprint is estimated to be 12.5 by 4 ft but will vary by manufacturing companies and models. WESTON will design a permanent generator with a double wall fuel tank of adequate capacity to provide at least 24 hours of emergency power. An estimated price for a diesel-powered generator has been included in the 30% Preliminary Design Phase Opinion of Probable Construction Cost (OPCC) in **Section 5-7** of this report**.**

WESTON will design a reinforced concrete foundation pad for the permanent generator considering the soil conditions of the site, the generator and fuel tank operating weight, and a containment base to prevent fuel tank failure. The proposed site plan in **Appendix A** shows the proposed location for the future generator and foundation pad.

5.6 DESIGN PARAMETERS AND PROPOSED IMPROVEMENTS

WESTON is presenting two options for improvements at the CHLS. Option 1 will install a new 15.5 ft diameter 28 ft deep FRP wet well with three submersible pumps and re-rout the gravity lines into the new wet well. Option 2 proposes to reuse the existing wet well structure and install three new submersible pumps. Both options will completely abandon the existing dry pit and include an onsite generator, a new canopy for electrical improvements, and an odor control scrubber. Option 1 is proposed due to the unknown condition of the 35-year-old wet well. An FRP wet well is proposed since the material is highly effective in resisting the corrosive nature of wastewater and sewer gases. Additionally, the material is lighter, stronger and cheaper than reinforced concrete since FRP structures are mass produced in controlled settings for various wastewater industry applications. Option 1 would also minimize bypass pumping since the existing wet well would remain in operation until the FRP wet well and pumps have been installed. Option 2 would require an in-depth condition assessment of the existing wet well, and epoxy coating of the structure to preserve its structural integrity against future degradation. Option 2 would also require greater amount of bypass pumping since the existing pumps would have to be removed prior to starting work on the wet well. The design parameters for the proposed improvements (Option 1 and Option 2) at CHLS are summarized in **Table 5-5**.

5.6.1 Table 5-5 Design Parameters for Improvements at Cat Hollow Lift Station

Design Parameter	Option 1 – New FRP Wet Well	Option 2 - Existing Wet Well
Lift Station Design Type	Submersible with three pumps	Submersible with three pumps
Wet Well Dimensions	15.5 ft Diameter	25 ft by 8 ft, Rectangular
Force Main Length	5,655 LF	5,632 LF
Force Main Internal Diameter	18.6 inches	18.6 inches
Pump Configuration	Two Alternating Pumps with One Backup	Two Alternating Pumps with One Backup

Table 5-5 Design Parameters for Improvements at Cat Hollow Lift Station (Continued)

Design Parameter	Option 1 – New FRP Wet Well	Option 2 - Existing Wet Well
Design Flow Condition (Three-Pump Configuration)	2 @ 3600 3 @ 4,250 GPM	2 @ 3600 GPM 3 @ 4,250 GPM
TDH	103.7 ft	105.0
NPSH	34.5 ft	34.5 ft
Emergency Detention Time at PWWF	9.8 minutes	10.7 minutes
Power	480V, Three-Phase, 60 Hz	480V, Three-Phase, 60 Hz
Water Hammer Pressure	207 PSI	207 PSI
Buoyancy FS	1.5 to 2	1.55

The improvements for the CHLS will include the following:

- Improvements of wet well.
  - Option 1 – Replacement of existing wet well with new FRP wet well.
  - Option 2 – Existing wet well remains and is rehabilitated as needed.
- Removal of all pumps, piping, and equipment w from the existing dry pit and salvaged per the instructions from BCMUD.
- Proper abandonment of the existing dry pit.
- Installation of three new submersible pumps include an above ground valve system and all appurtenances.
- Installation of a new access hatch.
- Installation of a jib-crane for routine and preventative maintenance.
- Connection to the existing 18-inch diameter force main.
- Integration of recently improved control panels and I&C system.
- Installation of new pads for generator and odor control scrubber.
- Installation of crushed stone finishing for non-paved areas.
- Installation of new chain link fence to enclose the site.

5.7 DEMOLITION OF EXISTING STRUCTURES

Appendix A contains a site demolition plan that shows the existing site and the structures at CHLS that are proposed for demolition and abandonment. The demolition will include the removal and

possible salvaging of pumps, panels, piping, access door, and fittings, and electrical equipment. The walls of the existing dry pit will be demolished to a minimum depth of 5 ft, and the structure will be filled in with cement stabilized sand and covered with topsoil to grade.

5.8 30% OPINION OF PROBABLE CONSTRUCTION COST

The OPCC for improvements at CHLS is summarized in **Table 5-6** below. A 30% contingency has been added to this estimate to account for any changes that may occur during the design phase. A detailed OPCC is provided in **Appendix H**. The OPCC provided below is a Class 3 Estimate as described in the Association of the Advancement of Cost Engineering (AACE) and the accuracy of this OPCC is -20% to +30%.

Table 5-6 30% Preliminary Design Phase OPCC Summary for Cat Hollow Lift Station

30% Preliminary Design Phase - OPCC Summary							
Project Site / Option	**Description**	**Estimate**	**Site Subtotal**	**Mobilization (6%)**	**Contractor's OH&P (15%)**	**Contingency (30%)**	**Site Total**
Cat Hollow - Option 1	Civil	$ 987,315.00	$ 1,253,315.00	$ 75,198.90	$ 187,997.25	$ 375,994.50	**$ 1,892,505.65**
	Electrical and I&C	$ 266,000.00					
Cat Hollow - Option 2	Civil	$ 630,710.00	$ 896,710.00	$ 53,802.60	$ 134,506.50	$ 269,013.00	**$ 1,354,032.10**
	Electrical and I&C	$ 266,000.00					

6. BASIS OF DESIGN – HILLSIDE LIFT STATION DECOMISSIONING

This section summarizes existing conditions, data collection, documents, design parameters and proposed improvements, and the 30% OPCC for the HSLS project site.

6.1 EXISTING OPERATIONAL PARAMETERS

WESTON collected, reviewed, and evaluated existing relevant data, documents made available for HSLS to identify the existing operation parameters and design parameters for proposed improvements. The data available for the HSLS are summarized below:

- Site visit photographs, included in **Appendix C**.
- As-built drawings for the existing HSLS and associated force main.
- Asset Management Plan, dated May 18, 2020, by Steger Bizzell.
- Topography survey of the existing site, included in **Appendix A**.
- Existing lift station operation parameters, such as pump runtimes and LUEs serviced.
- FEMA Flood Zone Map and Atlas 14 additions, included in **Appendix D**.

Based on the above information, the existing operation parameters were determined and are summarized in **Table 6-1** below:

Table 6-1 Existing Operation parameters for HSLS

Parameter	Summary
Station Type	Duplex Submersible
Wet Well Inside Diameter	6 ft
Force Main Length	958 ft
Force Main Diameter	4 inches
Number of LUEs Serviced	21
Pump Configuration	Two Alternating Pumps
Existing Flow Condition – ADF	3 GPM
Existing Flow Condition – PDF	11 GPM
Wet Well Top Elevation (NAVD 88)	824.61 ft
Lowest Invert Elevation (NAVD 88)	816.86 ft
Wet Well Bottom Elevation (NAVD 88)	813.19 ft

6.2 FLOW CALCULATIONS

Average Dry Flow (ADF) and PWWF were verified against the flowrates referenced in the Asset Management Report. **Table 6-2** below summarizes the results of this exercise.

Table 6-2 Verification of Design Flowrate for HSLS

Flow	Asset Management Report (GPM)	WESTON Calculated Flowrate (GPM)	Percent Difference (GPM)
Average Dry Weather - ADF	3	3.6	3.3%
Peak Wet Weather - PWWF	11	15.3	26.6%

The high percentage difference between the PWWFs can be attributed to the estimating methodologies. WESTON calculated the PWWF by estimating the area that could contribute to Inflow and Infiltration (I&I), whereas the Asset Management Report uses a Peaking Factor (PF) of 4. Additionally, with the estimate of such slow flow rates, small changes translate to relatively large differences.

6.3 PROPOSED IMPROVEMENTS

The proposed improvements for the Hillside Drive project site are as follows:

1. Removal of all pumps, piping, and equipment from the existing HSLS wet well and valve vault, salvaged based on in the instructions form BCMUD.
2. Cutting, plugging, and abandonment of the existing 4-inch-diameter force main by grout filling.
3. Installation of a new gravity sewer from the existing upstream manhole in the intersection of Hillside Drive and Stonebridge Drive to the nearest FBMUD manhole on Sutter Creek Trail.
4. Fill in and abandonment of the existing HSLS wet well.
5. Restoration of pavement by mill and overlay for the full street width in the limits of construction.

6.4 HILLSIDE DRIVE GRAVITY MAIN ALTERNATIVES MATRIX ANALYSIS

An alternatives matrix analysis was compiled to ensure that all advantages and disadvantages are considered for the new gravity main alignment for Hillside Drive. A total of four alternatives were identified and the following criteria was considered:

Table 6-3 Alternatives Evaluation Criteria

Criteria	Weight
Construction Length	4
Client Preference	5
Major Challenges (Design and Construction)	5
No. of Intermediate MHs Needed	3
Cost Benefit	3

The detailed alternative matrix is attached to **Appendix H** of this report. Based on this analysis, the most feasible alignment for the gravity sewer is to start at the manhole on the intersection of Hillside Drive/Stonebridge Drive and terminate by connecting to the existing FBMUD-owned-and-operated manhole on Sutter Creek Trail.

In addition to the four alternatives presented in **Appendix H**, two options were considered for the recommended alignment associated with Alternative 1. These can be seen in **Appendix A**. Option 1 would install an additional manhole to the north of the existing wet well, valve vault, and piping to offset the alignment and allow the lift station to remain in service for as long as possible during construction. Option 2 would use bypass pumping to enable the demolition of the lift station and valve vault and subsequent installation of the proposed wastewater main in the same location and the same alignment as the upstream existing wastewater piping. Option 2 eliminates a manhole installation, avoids having two manholes in close proximity, and may allow for easier future pipe replacement upstream. However, if complications are present during construction when demolishing the existing lift station, additional bypass pumping may cause an increase in costs.

6.5 DEMOLITION AND ABANDONMENT OF EXISTING STRUCTURES

Appendix A contains an overall site plan that shows the proposed improvements to the wastewater system on Hillside Drive. The demolition will include the removal and potential salvaging of all pumps and associate piping and appurtenances, controls, and electrical equipment from the existing HSLS wet well and the concrete valve vault. The structure of the 5 ft by 4.5 ft concrete valve vault will also be demolished and removed. The existing 6-ft-diameter, 12-ft-deep HSLS

wet well structure is designed as three circular concrete rings that are joined together. Each ring is approximately 4 ft in height.

Two options are presented in **Appendix A** for the alignment on Hillside Drive from the upstream manhole at Stoneridge Drive to the manhole at Sutter Creek Trail. For Option 1, one of the three concrete rings will be demolished to a depth of roughly 4 ft and removed.. For Option 2, the existing wet well will be demolished to a depth of roughly two concrete rings, or 8 ft, to make way for the proposed gravity main that will be installed in the same alignment as the existing gravity main. Prior to installing the proposed gravity main, the contractor will first fill the existing wet well with cement stabilized sand up to 1 ft below the proposed gravity main pipe. Once the proposed pipe has been installed, the trench will be backfilled, compacted, and finally restored after the new main is in operation.

All existing HSLS control panels and electrical equipment located on the pole next to the sidewalk will also be demolished and removed or salvaged as directed by BCMUD. The existing force main piping will be cut to a minimum length of 20 ft from the wet well. At this point, the existing 4-inch diameter ductile iron force main will be filled with grout and plugged from both sides and abandoned in its entirety.

6.6 30% OPINION OF PROBABLE CONSTRUCTION COST

The OPCC for improvements at the Hillside Drive project site are summarized in **Table 6-4** below. A 30% contingency has been added to this estimate to account for any changes that may occur during the design phase. A full, detailed OPCC is provided in **Appendix H**. The OPCC provided below is a Class 3 Estimate as described in the Association of the Advancement of Cost Engineering (AACE) and the accuracy of this OPCC is -20% to +30%.

Table 6-4 30% Preliminary Design Phase OPCC for Hillside Drive

30% Preliminary Design Phase OPCC Summary					
PROJECT SITE / OPTION	**SITE SUBTOTAL**	**MOBILIZATION (6%)**	**CONTRACTOR'S OH&P (15%)**	**CONTINGENCY (30%)**	**SITE TOTAL**
Hillside Dr – Option 1 (away from LS)	$ 200, 640.00	$ 12,034.40	$ 30,096.00	$ 60,192.00	**$ 302,996.40**
Hillside Dr – Option 2 (through wet well)	$ 204,880.00	$ 12,292.80	$ 30,732.00	$ 60,192.00	**$ 309,368.80**

7. SUMMARY OF RECOMMENDATIONS

The final design of the CHLS Improvements and HSLS Decommissioning project will provide a complete set of engineering drawings, OPCC, and a project manual for successful bidding and construction of the project. This section summarizes the recommendations for the improvements at both project sites based on the engineering analysis discussed in above sections.

7.1 CAT HOLLOW LIFT STATION IMPROVEMENTS RECOMMENDATIONS

7.1.1 Submersible Pumps

WESTON recommends a configuration with three submersible pumps, with each pump designed to meet TCEQ requirements of a minimum velocity of 3.0 fps in the system. The proposed pumps will be installed with constant speed drives. WESTON is recommending the KSB Pumps with model no. KRT K 150-400/566 XEG-S to match same pump vendor that was used for Woods LS. The specification sheets for the pumps are included in **Appendix G**.

The proposed pumps include moisture sensors and over-temperature sensors. The taller KSB motor comes with a cooling jacket and can be run with the motor exposed, if needed. A summary of proposed submersible pumps is presented in **Table 7-1** below. The pump curves from KSB are included in **Appendix G**.

Table 7-1 Proposed KSB Pump Data

Parameter	Cat Hollow Lift Station
Pump Model	KRT K 150-402/606 XNG-S
Number of Pumps	3
Impeller Diameter	15.33 inches
Pump Type	Submersible
Pump Capacity/each	2,500 GPM
Firm Capacity	3,618 GPM
TDH	81 ft
Horsepower	74 hp
Efficiency	83.4%

Notes:
hp – horsepower

7.2 HILLSIDE DRIVE IMPROVEMENTS RECOMMENDATIONS

WESTON recommends installing the new Hillside Drive gravity main starting from the gravity manhole just upstream of HSLS and terminating at the existing FBMUD-owned-and-operated gravity manhole on Sutter Creek Trail. While performing the alternatives analysis for the new gravity main alignment, a higher preference was given to terminate the proposed gravity main at the Sutter Creek trail manhole based on BCMUD and FBMUD preference.

7.2.1 Pipe Size and Material

Considering the flow demands of the system, WESTON recommends installing an 8-inch-diameter sewer main of standard dimension ratio (SDR) 26 D-3034 PVCto convey 15.3 GPM of PWWF into the existing FBMUD manhole on Sutter Creek Trail. An 8-inch-diameter sewer main with a flow velocity of 2 fps is able to convey up to 300 GPM of wastewater before it reaches capacity, therefore, the actual PWWF are expected to be less than the calculated value. The SDR 26 D-3034 PVC pipe is pressure tested to at least 150 psi.

7.2.2 Pipe Alignment

WESTON is proposing two alternative alignments both of which start at the existing manhole at the intersection of Hillside Dr and Stonebridge Dr and terminate at the first gravity manhole on Sutter Creek Trail (included in **Appendix A**). The new gravity main will include five new manholes for Option 1 and four new manholes for Option 2; the existing manhole on Hillside Dr and Stonebridge Dr will be replaced due to its present condition. Because the surface elevations decrease from the starting point (Hillside Drive Manhole) to the terminating point (Sutter Creek Tail Manhole) of the pipe by almost 16 ft, the pipe slope between all new manholes will be kept within 1.5 to 5.0%. This range will ensure that there is adequate self-cleaning velocity within the pipe and that the construction costs related to trenching are kept to minimum. Three of the proposed manholes are intermediate manholes that will need to be installed at locations where the pipe turns to stay within the public ROW and connect to the existing gravity manhole on Sutter Creek Trail. The proposed manhole spacing for all manholes is less than the required maximum of 500 ft, per TCEQ regulations (30 TAC §217.55(g)).

7.2.3 Pavement Restoration

The project limits of construction for HSLS are entirely within the public ROW, in the pavement limits, and under asphalt pavement. As discussed in Section 6.5, for Option 1 proposed alignment, roughly one-third of the depth of the existing 6-ft-diameter HSLS wet well will be excavated and properly abandoned. The new gravity main will run just north of the existing gravity main and the force main. For the Alt. 2 alignment, the new gravity main is proposed to run in the same alignment as the existing gravity main and therefore two-thirds (approximately 8 ft) of the depth of the wet well will be excavated and removed to make way for the new gravity main. The valve vault will be completely removed for both alignments. Once the new gravity main is installed, all excavated areas will be backfilled and compacted. All street surfaces will be repaired and restored upon completion when the new gravity main is in operation, with full-width mill and overlay planned for the limits of construction.

7.2.4 Traffic Control

Traffic control design will be provided as part of the 60% design submittal for the duration of construction phase for the Hillside Drive project ROW. Traffic control design will include all plan sheets and standard details for construction in a residential community. WESTON will submit traffic control plans to Williamson County to acquire the Williamson County Utility Installation Permit for the Hillside Dr project site once BCMUD has approved the 60% Engineering Plans.

8. REFERENCES

FEMA (Federal Emergency Management Agency). 2012. *Flood Insurance Rate Map Number 48055C0100E.* June.

NEC (National Electrical Code). 2011. *National Electrical Code (NFPA 70) Handbook*.

NFPA (National Fire Protection Association). (2020). NFPA 820. *Standard for Fire Protection in Wastewater Treatment and Collection Facilities.*

TCEQ (Texas Commission on Environmental Quality). (2016). *Title 30, Chapter 213 (30 TAC 213) Chapter 213 – Edwards Aquifer*.

TCEQ (2015). *Title 30, Chapter 217 (30 TAC 217), Design Criteria for Domestic Wastewater Systems, Texas Commission on Environmental Quality.*

USDA NRCS (U.S. Department of Agriculture Natural Resources Conservation Service). 1984. *Soil Survey of Williamson County, Texas.* USDA NRCS. (YEAR). *Web Soil Survey. http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.*

USFWS (U.S. Fish and Wildlife Service). 2020. *Critical Habitat for Threatened & Endangered Species*. https://www.arcgis.com/home/webmap/print.html.

UTBEG (The University of Texas at Austin Bureau of Economic Geology). 1974. *Geological Atlas of Texas – Seguin Sheet*.

APPENDIX A

DRAWINGS

AS-BUILT SURVEY OF "HILLSIDE LIFT STATION"
WILLIAMSON COUNTY, TEXAS

LEGEND

	CONTROL POINT SET
E	ELECTRIC UTILITY POLE
W	WATER METER
W	WATER VALVE
SD	STORM MANHOLE
E	ELECTRIC JUNCTION BOX
WW	WASTEWATER MANHOLE - WWMH
E PB	ELECTRIC PULL BOX
	CONCRETE IMPROVEMENT
N.T.S.	NOT TO SCALE
( )	RECORD INFORMATION
LS#	LANDMARK SURVEYING POINT NUMBER
ROW	RIGHT-OF-WAY
D.R.W.C.T.	DEED RECORDS, WILLIAMSON COUNTY, TEXAS
P.R.W.C.T.	PLAT RECORDS WILLIAMSON COUNTY, TEXAS
O.P.R.W.C.T.	OFFICIAL PUBLIC RECORDS, WILLIAMSON COUNTY, TEXAS
	WHITE STRIPE - SOLID
	PEDESTRIAN CROSSWALK (SOLID WHITE STRIPES)
	WHITE STRIPE - STOP BAR
600	MAJOR CONTOURS
599	MINOR CONTOURS
	RIGHT OF WAY LINE (APPROXIMATE)
	PROPERTY LINE (APPROXIMATE)
	EDGE OF PAVEMENT
E OH	CURB LINE OVERHEAD ELECTRIC OR UTILITY LINES

UTILITY LOCATION AND LINE IDENTIFICATION SHOWN HEREON THIS SURVEY ARE PER CONSTRUCTION PLAN DEVELOPED BY SNOWDEN & MEYER INC. DECEMBER 1976, FOR "BRUSHY CREEK SUBDIVISION SECTION 1 - SANITARY SEWER SYSTEM".

	WASTEWATER LINE (PER CONSTRUCTION PLAN)
	FORCE MAIN LINE (PER CONSTRUCTION PLAN)

0 20 40
HORIZONTAL SCALE IN FEET
SCALE 1"=20'

BOUNDARY NOTE
THIS DOES NOT REPRESENT A BOUNDARY SURVEY.

NOTE
THIS DRAWING IS BASED ON MEASURED DISTANCES IN THE FIELD NOT ON GRID DISTANCES.

TITLE COMMITMENT NOTE
A TITLE COMMITMENT ON PRIVATE PROPERTY WAS NOT AVAILABLE AT THE TIME OF THIS SURVEY; THEREFORE, EASEMENTS MAY EXIST WHICH ARE NOT SHOWN HEREON.

FLOODPLAIN NOTE
THIS PROJECT SITE OCCUPIES AREAS WITHIN THE "100-YEAR FLOOD PLAIN"- (PER PLAT, SEE DRAWING FOR APPROXIMATE LOCATION) AND ZONE "X" PER FIRM MAP NUMBER 48491C0488F, DATED DECEMBER 20, 2019, AS PUBLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, THE PURPOSE OF WHICH IS FOR FLOOD INSURANCE ONLY.

UTILITY AND IMPROVEMENT NOTE
UTILITY LINES SHOWN ON THIS SURVEY ARE BASED ON CONSTRUCTION PLAN OF "BRUSHY CREEK SUBDIVISION SECTION 1 - SANITARY SEWER SYSTEM, DEVELOPED BY SNOWDEN & MEYER INC. DECEMBER 1976". ONLY SURFACE EVIDENCE OF UTILITIES, UTILITY FEATURES AND IMPROVEMENTS ARE SHOWN ON THIS SURVEY; THEREFORE, UTILITIES MAY EXIST WHICH ARE NOT SHOWN HEREON.

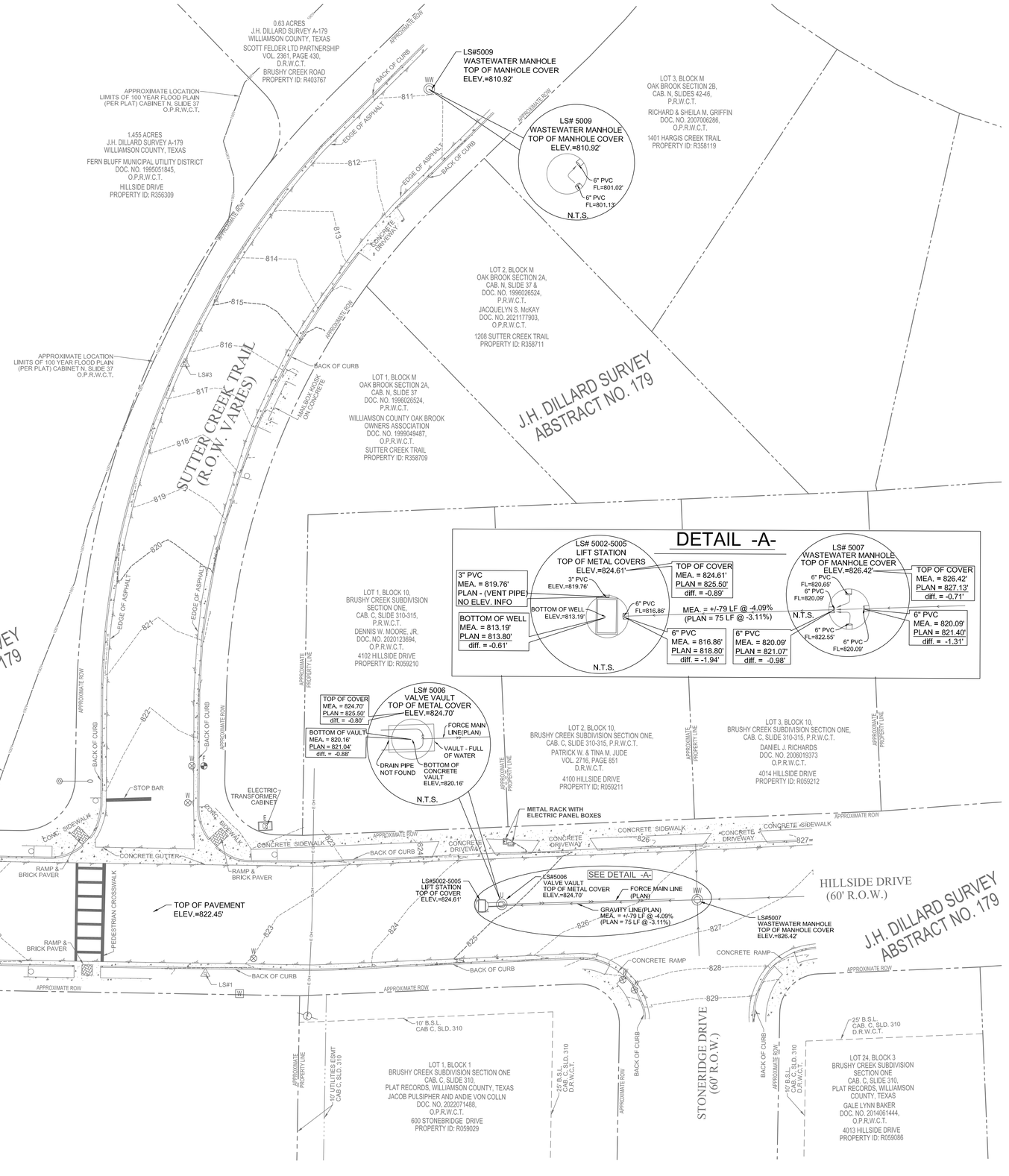
BASIS OF HORIZONTAL DATUM
TEXAS COORDINATE SYSTEM OF 1983, (CENTRAL ZONE-4203) NAD 83, (CORS) U.S. SURVEY FEET, GEOID MODEL 12B (CONUS)
COMBINED SCALE FACTOR 0.9998825145; AND SURFACE ADJUSTMENT FACTOR 1.0001174993; PROJECT CONTROL POINTS WERE ESTABLISHED USING REDUNDANT RTK METHODOLOGY, UTILIZING THE TRIMBLE RTKNET NORTH AMERICAN NETWORK BASED ON REFERENCE STATION SMNM_1012. GRID COORDINATES FOR LS#1 USED AS PROJECT CONTROLLING POINT FOR AVERAGED COMBINED SCALE FACTOR.

VERTICAL DATUM
VERTICAL DATUM WAS ESTABLISHED USING REDUNDANT RTK METHODOLOGY UTILIZING TRIMBLE NORTH AMERICAN NETWORK BASED ON REFERENCE STATION SMNM_1012, GEOID MODEL 12B (CONUS). DIFFERENTIAL LEVELING FROM PROJECT CONTROL (LS#1) WAS USED TO ESTABLISH ELEVATION FOR LANDMARK SURVEYING PRIMARY CONTROL POINTS LS#2 THROUGH LS#3.

SURVEY NOTE
1.) NO EVIDENCE OF UTILITY PAINT MARKS WERE FOUND AT TIME OF LANDMARK'S FIELD SURVEY.
2.) NO EVIDENCE OF BORE HOLES WERE FOUND AT TIME OF LANDMARK'S FIELD SURVEY.

LANDMARK SURVEYING CONTROL POINTS (GRID COORDINATES)

LS#	NORTHING (GRID)	EASTING (GRID)	ELEVATION	DESCRIPTION
LS#1	10,159,950.19	3,112,619.41	823.31	1/2"IRON ROD FOUND WITH RED CAP STAMPED"LANDMARK CONTROL"
LS#2	10,159,934.19	3,112,416.80	820.95	1/2"IRON ROD FOUND WITH RED CAP STAMPED"LANDMARK CONTROL"
LS#3	10,16,016.87	3,112,540.37	816.35	MAG NAIL SET



AS SURVEYED BY
LANDMARK SURVEYING, LP
TEXAS FIRM REGISTRATION NO. 100727-00

JUAN M. CANALES, JR.
TEXAS REGISTERED PROFESSIONAL LAND SURVEYOR NO. 4453
DATE: DECEMBER 27, 2022

REVIEWED BY
01-11-2023
Date

STATE OF TEXAS
REGISTERED
JUAN M. CANALES, JR.
4453
PROFESSIONAL
LAND SURVEYOR

Client:	WESTON
Date:	JANUARY 11, 2023
Office:	M.BOUADI, E.LEOS
Crew:	S.DUNN, J.MALDONADO
F.B.:	194176, 194426
Path:	T:\WESTON\BRUSHY CREEK MUD LIFT STATIONS\LANDMARK DRAWINGS\GRID STAFF\HILLSIDE LIFT_BCMUD-FINAL_01.11.2023.DWG
Job No.:	193-13-01/02/03/04/05

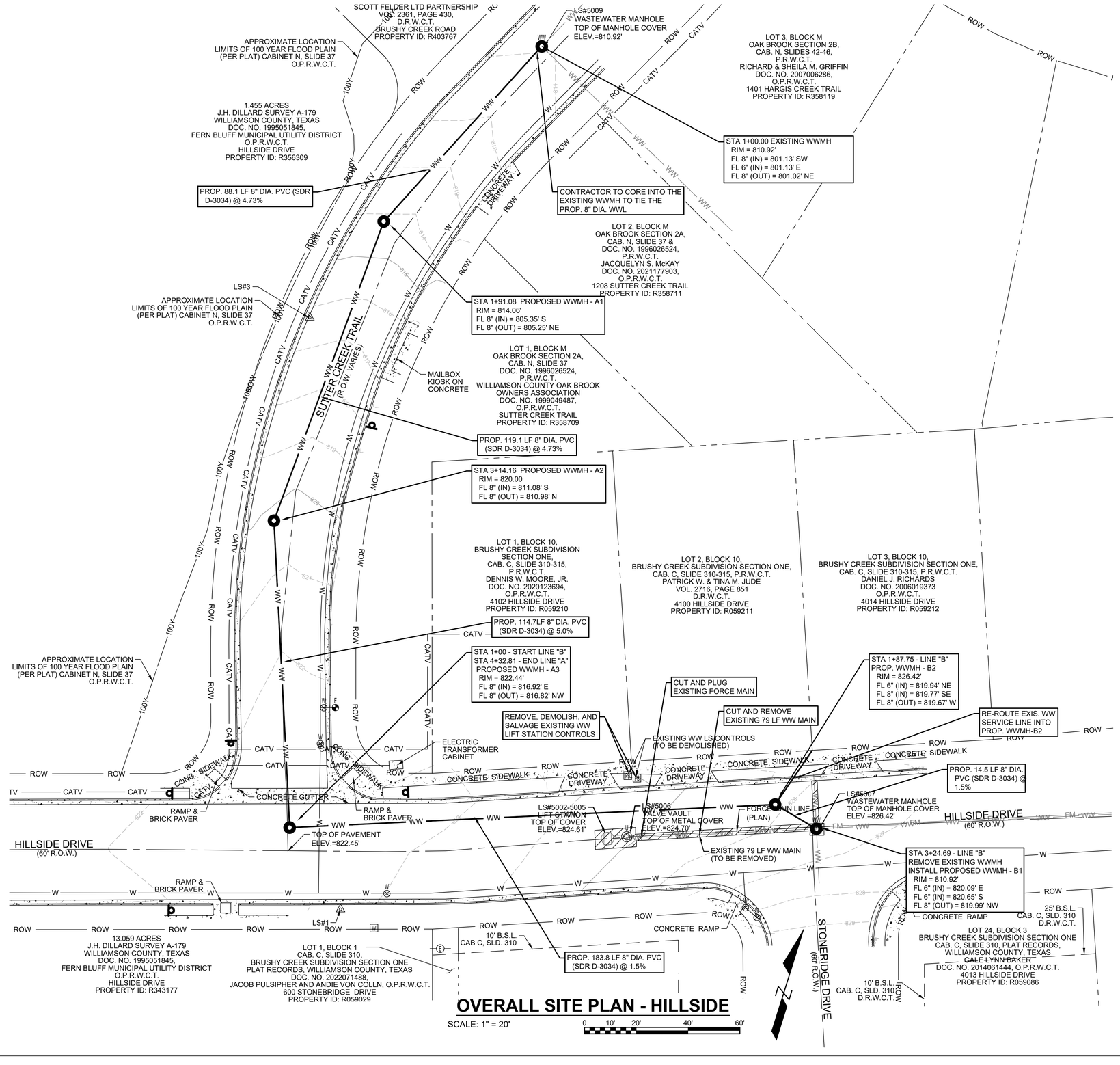
SUBCONTRACT NO. 0110496
PURCHASE ORDER: 0110496

NO.	DATE	REVISION
1		
2		
3		
4		
5		
6		

BRUSHY CREEK MUD GENERAL ENGINEERING SERVICES FOR 2022-2024
HILLSIDE LIFT STATION ABANDONMENT
BRUSHY CREEK SUBDIVISION
WILLIAMSON COUNTY, TEXAS

Landmark SURVEYING, LP
2205 EAST 5TH STREET
AUSTIN, TEXAS 78702
PH: (512)328-7411 FAX: (512)328-7413
TEXAS FIRM REGISTRATION NO. 100727-00

SHEET
1 OF 1



OVERALL SITE PLAN - HILLSIDE

SCALE: 1" = 20'

0 10' 20' 40' 60'

LEGEND

	CONTROL POINT SET
BM	BENCHMARK SET (DESCRIBED)
BM	BENCHMARK FOUND (DESCRIBED)
	1/2" IRON ROD FOUND
	60D NAIL FOUND
	1" AXLE FOUND
E	ELECTRIC UTILITY POLE
W	WATER METER
	WATER VALVE
SD	STORM MANHOLE
E	ELECTRIC JUNCTION BOX
E	ELECTRIC METER
WW	WASTEWATER MANHOLE - WWMH
	PROPOSED WASTEWATER MANHOLE
E	ELECTRIC PULL BOX
E	ELECTRIC MANHOLE
	BREAK-ON LINE (NOT TO SCALE)
( )	RECORD INFORMATION
LS#	LANDMARK SURVEYING POINT NUMBER
ROW	RIGHT-OF-WAY
D.R.W.C.T.	DEED RECORDS, WILLIAMSON COUNTY, TEXAS
P.R.W.C.T.	PLAT RECORDS WILLIAMSON COUNTY, TEXAS
O.P.R.W.C.T.	OFFICIAL PUBLIC RECORDS, WILLIAMSON COUNTY, TEXAS
<> <>	CHAINLINK FENCE
X X X X	BARBED WIRE FENCE
600	MAJOR CONTOURS
599	MINOR CONTOURS
ROW	RIGHT OF WAY LINE (APPROXIMATE)
	PROPERTY LINE (APPROXIMATE)
	EDGE OF PAVEMENT
	CURB LINE
OHE	OVERHEAD ELECTRIC LINES
WW	EXISTING WASTEWATER LINE
W	EXISTING WATER LINE (APPROXIMATE)
CATV	EXISTING SPECTRUM LINE (APPROXIMATE)
WW	PROPOSED WASTEWATER LINE
	CONCRETE IMPROVEMENT
	TO BE DEMOLISHED

NOTES

1. CONTRACTOR TO SALVAGE ELECTRICAL SERVICE DISCONNECT, ATS, AND I&C SYSTEM AND PROVIDE TO OWNER FOR REUSE.
2. CONTRACTOR TO CALL ALL APPROPRIATE COMPANIES AND LOCATE ALL EXISTING UTILITIES PRIOR TO DEMOLITION AND CONSTRUCTION.

THIS WAS PRELIMINARY SITE PLAN OPTION SUBMITTED WITH DESIGN ENGINEERING REPORT. PLEASE REFER TO DRAWING C-06 FOR THE FINAL SITE PLAN.

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	REVISION	BY
..	..	..	..

BRUSHY CREEK M.U.D.

BRUSHY CREEK
MUNICIPAL UTILITY DISTRICT

OPTION 1 - HILLSIDE DR - OVERALL SITE PLAN

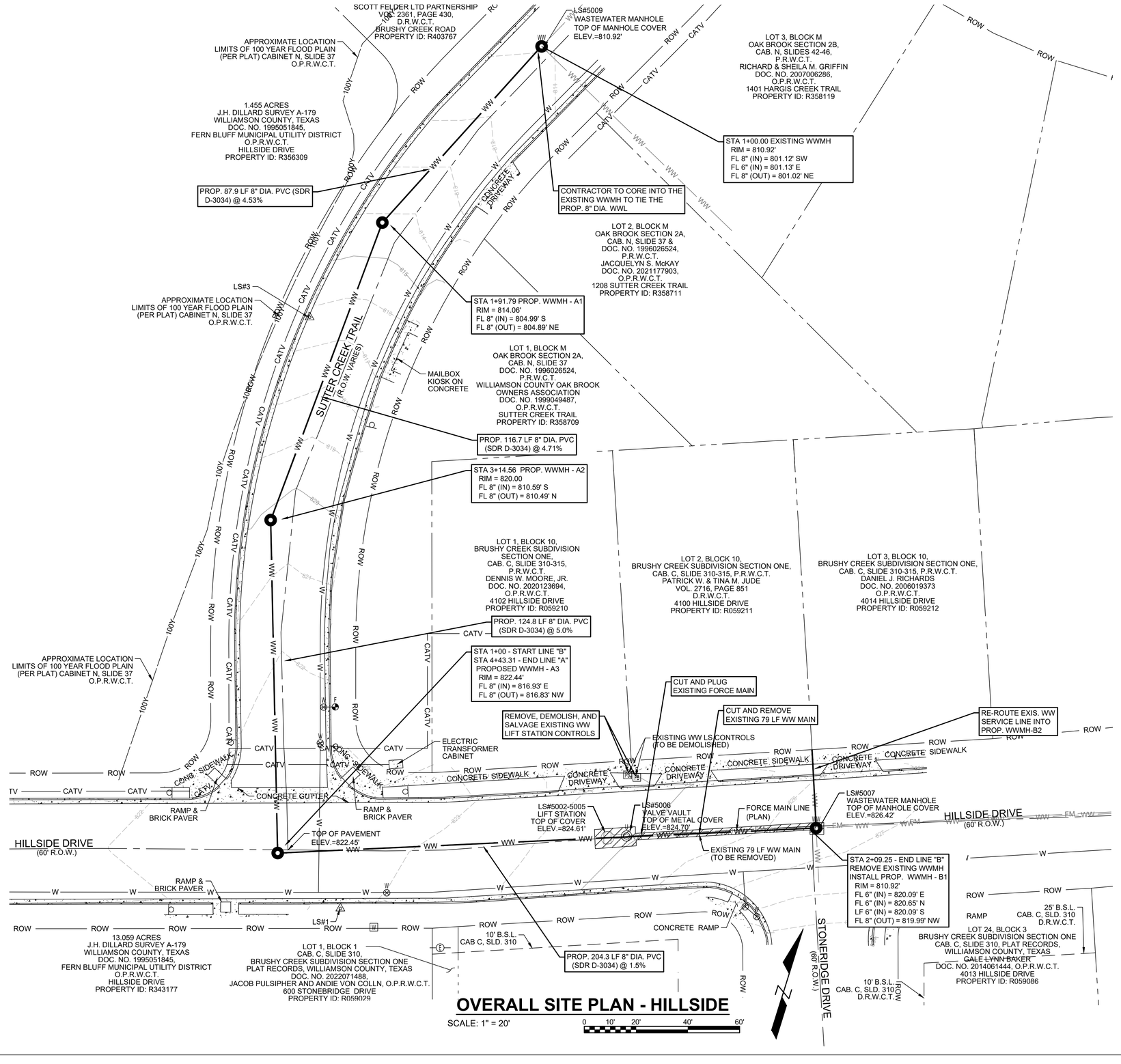
THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF
MANINDER RANDHAWA, P.E.
14586
MARCH 2023
THIS DOCUMENT IS NOT INTENDED FOR BIDDING, PERMITTING AND/OR CONSTRUCTION PURPOSES

BAR IS ONE INCH ON ORIGINAL DRAWING.
ONE INCH

DESIGNED --
DRAWN JWG
CHECKED --
REVIEWED --
Seq. ## of ##

Dwg. No. C–01B

WON: 000000000000



OVERALL SITE PLAN - HILLSIDE

SCALE: 1" = 20'

0 10' 20' 40' 60'

LEGEND

	CONTROL POINT SET
BM	BENCHMARK SET (DESCRIBED)
BM	BENCHMARK FOUND (DESCRIBED)
	1/2" IRON ROD FOUND
	60D NAIL FOUND
	1" AXLE FOUND
E	ELECTRIC UTILITY POLE
W	WATER METER
	WATER VALVE
SD	STORM MANHOLE
E	ELECTRIC JUNCTION BOX
E	ELECTRIC METER
WW	WASTEWATER MANHOLE - WWMH
	PROPOSED WASTEWATER MANHOLE
E	ELECTRIC PULL BOX
E	ELECTRIC MANHOLE
	BREAK-ON LINE (NOT TO SCALE)
( )	RECORD INFORMATION
LS#	LANDMARK SURVEYING POINT NUMBER
ROW	RIGHT-OF-WAY
D.R.W.C.T.	DEED RECORDS, WILLIAMSON COUNTY, TEXAS
P.R.W.C.T.	PLAT RECORDS WILLIAMSON COUNTY, TEXAS
O.P.R.W.C.T.	OFFICIAL PUBLIC RECORDS, WILLIAMSON COUNTY, TEXAS
<> <>	CHAINLINK FENCE
X X X X	BARBED WIRE FENCE
600	MAJOR CONTOURS
599	MINOR CONTOURS
ROW	RIGHT OF WAY LINE (APPROXIMATE)
	PROPERTY LINE (APPROXIMATE)
	EDGE OF PAVEMENT
	CURB LINE
OHE	OVERHEAD ELECTRIC LINES
WW	EXISTING WASTEWATER LINE
W	EXISTING WATER LINE (APPROXIMATE)
CATV	EXISTING SPECTRUM LINE (APPROXIMATE)
WW	PROPOSED WASTEWATER LINE
	CONCRETE IMPROVEMENT
	TO BE DEMOLISHED

NOTES

1. CONTRACTOR TO SALVAGE ELECTRICAL SERVICE DISCONNECT, ATS, AND I&C SYSTEM AND PROVIDE TO OWNER FOR REUSE.
2. CONTRACTOR TO CALL ALL APPROPRIATE COMPANIES AND LOCATE ALL EXISTING UTILITIES PRIOR TO DEMOLITION AND CONSTRUCTION.

THIS WAS PRELIMINARY SITE PLAN OPTION SUBMITTED WITH DESIGN ENGINEERING REPORT. PLEASE REFER TO DRAWING C-06 FOR THE FINAL SITE PLAN.

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	REVISION	BY
..	..	..	..

BRUSHY CREEK M.U.D.

BRUSHY CREEK
MUNICIPAL UTILITY DISTRICT

OPTION 2 - HILLSIDE DR - OVERALL SITE PLAN

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF MANINDER RANDHAWA, P.E. 145867 MARCH 2023 THIS DOCUMENT IS NOT INTENDED FOR BIDDING, PERMITTING AND/OR CONSTRUCTION PURPOSES

BAR IS ONE INCH ON ORIGINAL DRAWING.
ONE INCH

DESIGNED --
DRAWN JWG
CHECKED --
REVIEWED --
Seq. ## of ##

Dwg. No. C-01B

WON: 000000000000

\\nasatx1\ATX_DATA\Aqua Texas (15700)\02 Sunset Oaks WWTP Design 15700.003.001\9.0 Design Engineering\CAD
H:\Brushy Creek MUD\Cat Hollow and Hill Side LS Improvements\09 - Engineering\AutoCAD-Civil3D (SYNC)\Production DWGs\C-01 - Alt. 2.dwg Mar 23,2023 - 11:28am randhawm

ONCOR DISTRIBUTION SYSTEM

3 EMPTY 4" C

UTILITY PRIM

UTILITY XMFR

PRIMARY

480/277V, 3Ø,4W

400:5

3

M

SER-MSD

MSD

400A/3P/400AF

N

G

GROUND LOOP

3P-30A

SPD1

ATS-1
3P/400A

ATS-WW

3P-300A

DIESEL GENERATOR
175kW, .8pf,
218.8kVA

LOAD CALCULATION			
LOAD	HP	AMPS	KVA
LSP-1	72	86	74
LSP-2	72	86	74
LSP-3	72	86	74
KVA		32	15
25% LARGEST MOTOR		21.5	
TOTAL:		311.5A	259KVA

WIREWAY

PCP-P

PUMP CONTROL PANEL

MPZ-P

"MPZ"

2P-60A

15 KVA

2P-70A

GROUND LOOP

PUMP CONTROLS & PLC

LIT

RTU PANEL

GROUND LOOP

LSP1-JB

LSP2-JB

LSP3-JB

I-JB

74

M S H

T S H

LIFT STATION PUMP
LSP-1
86 FLA

LIFT STATION PUMP
LSP-2
86 FLA

LIFT STATION PUMP
LSP-3
86 FLA

LSH 100

LE 100

LS2 100

LS1 100

LS0 100

LSL 100

JRSA
ENGINEERING, INC.
Consulting Electrical Engineers, TBPE #F-3997
6101 West Courtyard Drive, Bldg. 1, Suite 200
Austin, Texas 78730
(512) 452-8789

REV. NO.	BY	DATE	REVISION DESCRIPTION

THESE DOCUMENTS ARE FOR INTERIM REVIEW AND NOT FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.

RESPONSIBLE ENGINEER: ELIZABETH SEGNER-ZARATE, PE TBPE NO. 108870 1/20/2023

BRUSHY CREEK MUD
CAT HOLLOW LIFT STATION IMPROVEMENTS
ELECTRICAL ONE LINE DIAGRAM

CITY OF HUTTO

SCALE	
DATE	JANUARY 2023
SHEET NUMBER	E1

APPENDIX B

UTILITY COMPANIES CORRESPONDENCE AND INFORMATION

External Map Request for Weston Solutions

Cat_Hollow_Bcmud_Sw9369 Project

Date: 1/4/2023

Page Name: A1

3502

MIDWOOD LN

3500

OAK VISTA LN

3501

PARK OAK DR

A1

PARK PLACE CIR

WOODSPRINGS LN

OAK HAVEN DR

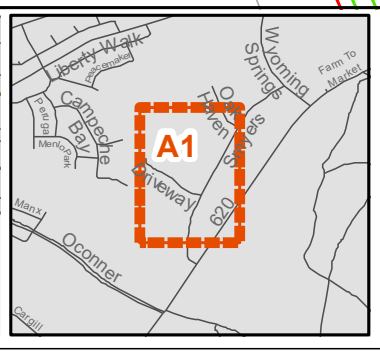
AUSTIN-ROUND ROCK Wirecenter

3499

SMYERS LN

RM-620

UNK



1:1,820

N

- Poles
- Manholes
- Aerial
- Building
- Buried
- Underground
- Conduit
- Street Centerlines
- Mapping Index
- Wirecenter Boundary
- Parcels

AUSTTXRR(MI)

External Map Request for Weston Solutions

Cat_Hollow_Bcmud_Sw9369 Project

Date: 1/4/2023

Index Map

PARK PLACE CIR

A1

AUSTIN-ROUND ROCK Wirecenter

SMYERS LN

87

KING OF KING XING

1:1,040

N

- Poles
- Manholes
- Aerial
- Buried
- Underground
- Conduit
- Street Centerlines
- Mapping Index
- Wirecenter Boundary
- Parcels
- JobAOI

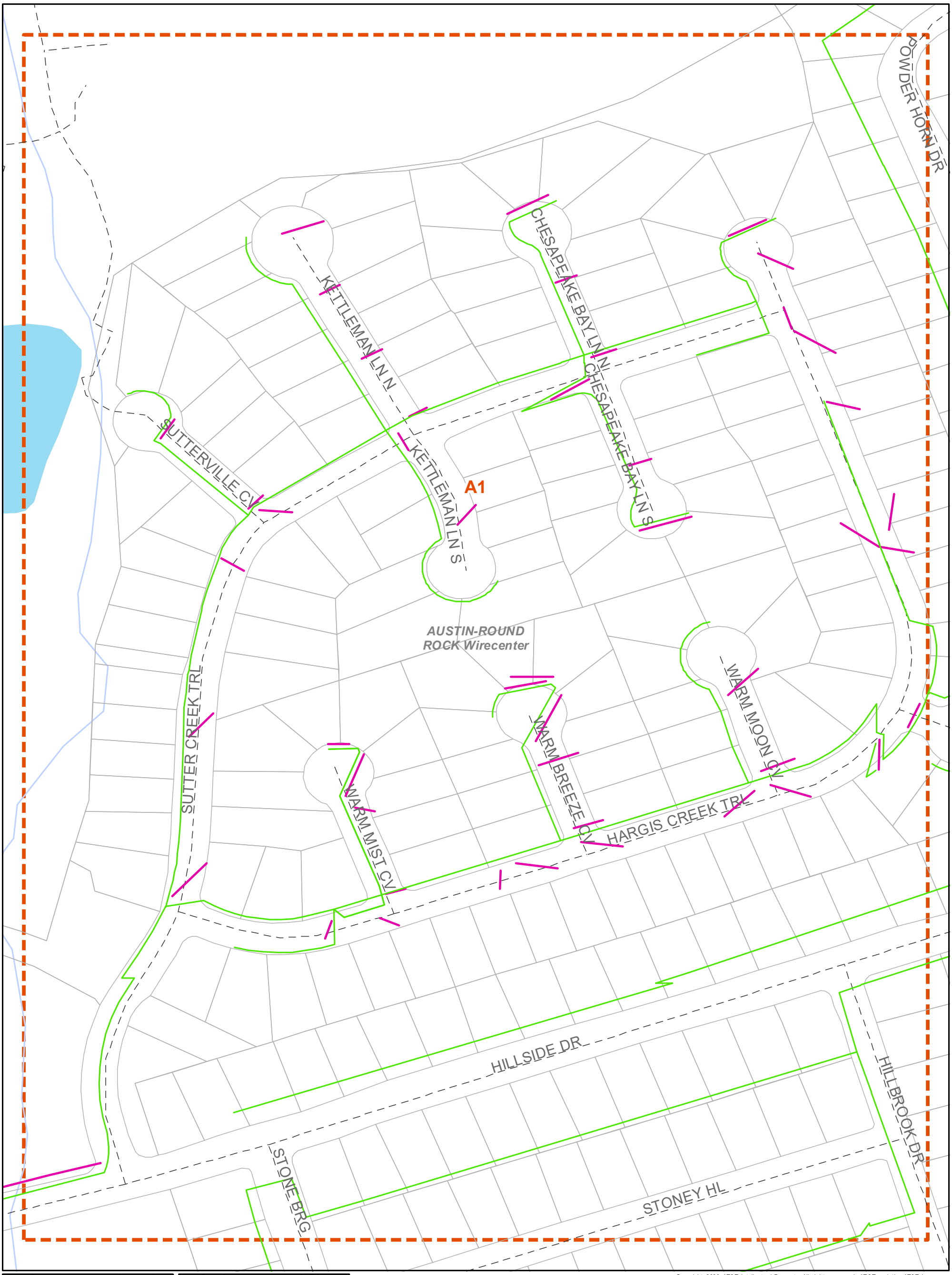
AUSTXRR(M)

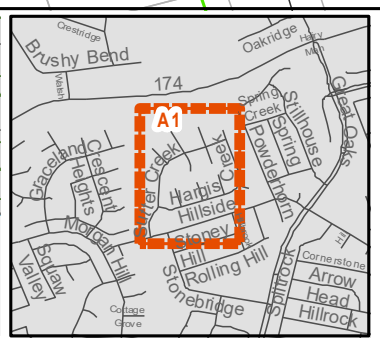
External Map Request for Weston Solutions

Hillside_Dr_Bcmud_Sw9369 Project

Date: 1/4/2023

Page Name: A1





1:1,820

N

- Buried
- Conduit
- Street Centerlines
- Mapping Index
- Wirecenter Boundary
- Parcels

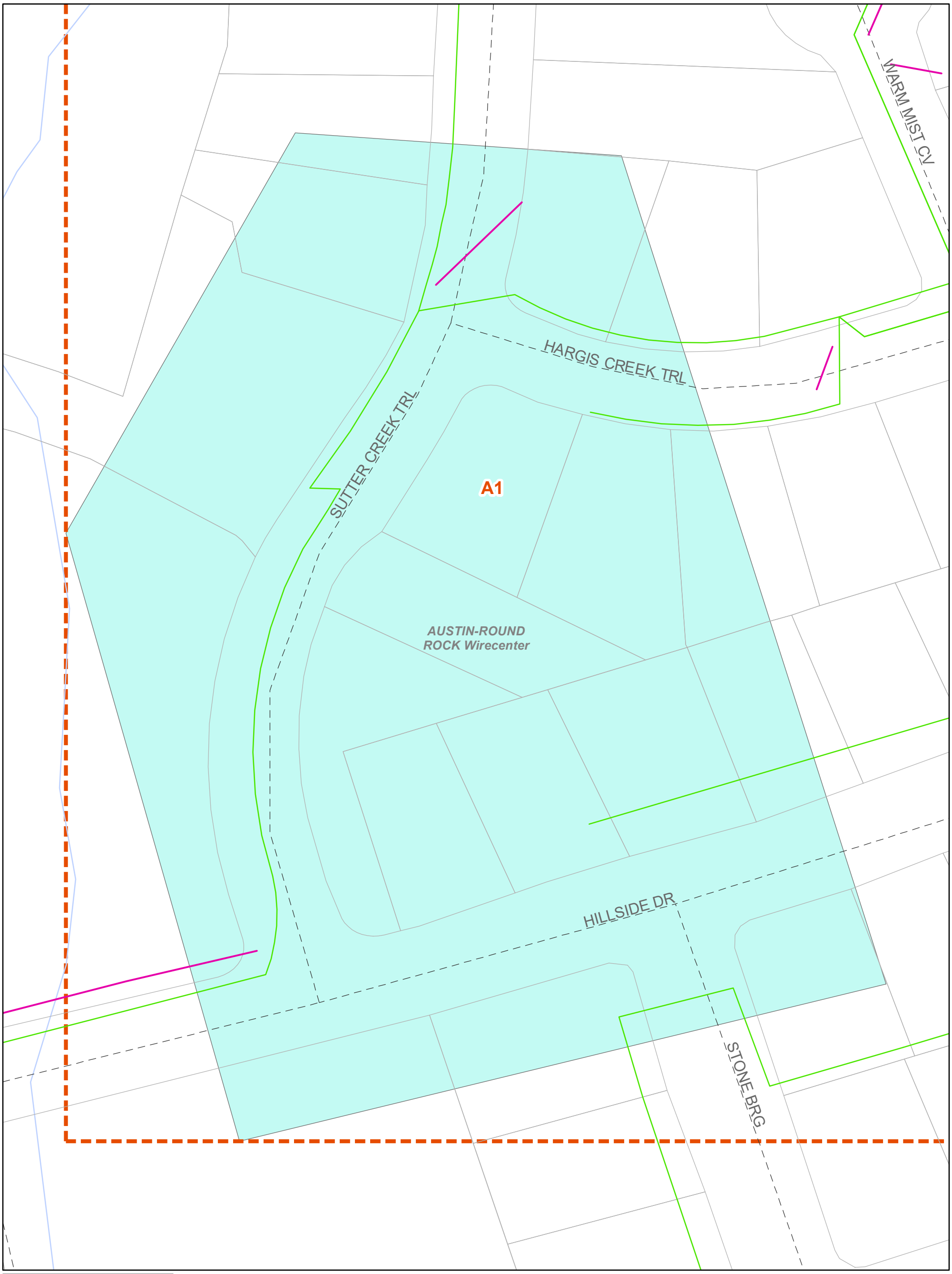
AUSTTXRRIM1

External Map Request for Weston Solutions

Hillside_Dr_Bcmud_Sw9369 Project

Date: 1/4/2023

Index Map



1:730

N

- Buried
- Conduit
- Street Centerlines
- Mapping Index
- Wirecenter Boundary
- Parcels
- JobAOI

AUSTXRR(M)

Disclaimer: This product is for informational purposes only and was not prepared for or suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries and facilities. This product is distributed "AS-IS" and without warranties of any kind, either express or implied, including but not limited to warranties of fitness for a particular purpose or use, or as to its performance, accuracy, freedom from error, or as to any results generated through its use.

PEC 3 PH ENCLOSURE AND 1 PH TRANSFORMER

PEC 3 PHASE UNDERGROUND (3) 3" CONDUITS. ~30" BELOW GRADE.

R358153

OAKBROOKSEC2B

PEC UNDERGROUND SERVICE LINE & HAND HOLES. (1) 3" CONDUIT. ~24" BELOW GRADE.

R358119

R358121

R358122

M

OAKBROOKSEC2A

R358120

R358711

M

R358709

R342981

R342982

R356309

PEC 3 PHASE UNDERGROUND. (3) 3" CONDUITS. ~30" BELOW GRADE.

CHEEK RD

CWCOR OVERHEAD POWER LINES.

R059210

R059211

R059212

R059213

10

MANITOU SPRINGS

R342983

BRUSHYGRKSEG1 (SOUTH)

R059086

R342984

A

PEC 3 PH ENCLOSURE AND 1 PH TRANSFORMER

PEC SERVICE BOUNDARY LINE

R059029

R0590301

HILLSIDE DR

R343177

Spectrum Utility Map For Hillside Dr

APPENDIX C

SITE PHOTOGRAPHS

PHOTOGRAPH NO. 1

Date: 12/12/22
Direction: 1

Description:

Cat Hollow Lift Station - Property

PHOTOGRAPH NO. 2

Date: 12/12/22
Direction: 2

Description:

Cat Hollow LS – Inside Fence Line

PHOTOGRAPH NO. 3

Date: 12/12/22
Direction: 3

Description:

Cat Hollow Lift Station – Dry Pit Access Hatch.

PHOTOGRAPH NO. 4

Date: 12/12/22
Direction: 4

Description:

Cat Hollow LS - Existing Dry Pit and Hatch and Temporary Canopy.

PHOTOGRAPH NO. 5

Date: 12/12/22
Direction: 5

Description:

Cat Hollow Lift Station – Temporary Canopy Covering Electrical Improvements (By Others)

PHOTOGRAPH NO. 6

Date: 12/12/22
Direction: 6

Description:

Cat Hollow LS – Existing Wet Well

PHOTOGRAPH NO. 7

Date: 12/12/22
Direction: 7

Description:

Cat Hollow Lift Station – Inside Wet Well.

PHOTOGRAPH NO. 8

Date: 12/12/22
Direction: 8

Description:
Cat Hollow LS – Force Main Valve Vault

PHOTOGRAPH NO. 9

Date: 12/12/22
Direction: 9

Description:

Cat Hollow LS – Upstream MH on WWL A.

PHOTOGRAPH NO. 10

Date: 12/12/22
Direction: 10

Description:

Cat Hollow Lift Station – Existing Bypass Port

PHOTOGRAPH NO. 11

Date: 12/12/22
Direction: 11

Description:

Cat Hollow Lift Station – Existing Trailer Mounted Diesel Generator

PHOTOGRAPH NO. 12

Date: 12/12/22
Direction: 12

Description:

Hillside Dr Lift Station – Street View

PHOTOGRAPH NO. 13

Date: 11/21/22
Direction: 13

Description:

Hillside Dr Lift Station – Street View

PHOTOGRAPH NO. 14

Date: 11/21/22
Direction: 14

Description:

Hillside Dr Lift Station – Valve Vault

PHOTOGRAPH NO. 15

Date: 12/13/22
Direction: 15

Description:

Hillside Dr Lift Station – Existing Wet Well

PHOTOGRAPH NO. 16

Date: 12/03/22
Direction: 16

Description:

Hillside Dr Lift Station – Existing Wet Well.

PHOTOGRAPH NO. 17

Date: 11/21/22
Direction: 17

Description:

Hillside Dr. Lift Station – Wet Well Cover.

PHOTOGRAPH NO. 18

Date: 11/21/22
Direction: 18

Description:

Hillside Dr Lift Station – Upsream Manhole on the intersection of Hillside Dr and Stronebridge Dr.

PHOTOGRAPH NO. 19

Date: 11/21/22
Direction: 19

Description:

Hillside Dr Lift Station – Fern Bluff MUD manhole on Hillside Dr, east of the lift station

PHOTOGRAPH NO. 20

Date: 11/21/22
Direction: 20

Description:

Hillside Dr Lift Station – Intersection of Hillside Dr and Sutter Creek Trail Dr

APPENDIX D

FLOODPLAIN AND WETLANDS MAPS

97°45'W 30°31'59.11"N

97°43'7.1"W 30°29'53.43"N

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR DRAFT FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS

- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by the United States Geological Survey (USGS). The basemap shown is the USGS National Map: Orthoimagery. Last refreshed October, 2020.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **1/12/2023 7:51 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at https://www.fema.gov/media-library/assets/documents/118418

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

SCALE

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: NAVD88

For information about the specific vertical datum for elevation features, datum conversions, or vertical monuments used to create this map, please see the Flood Insurance Study (FIS) Report for your community at https://msc.fema.gov

N

1 inch = 500 feet 1:6,000

0 250 500 1,000 1,500 2,000 Feet

0 50 100 200 300 400 Meters

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

PANEL **488** OF **750**

Panel Contains:

COMMUNITY	NUMBER	PANEL
CITY OF CEDAR PARK	481282	0488
WILLIAMSON COUNTY	481079	0488
CITY OF ROUND ROCK	481048	0488
CITY OF AUSTIN	480624	0488

MAP NUMBER
48491C0488F
EFFECTIVE DATE
December 20, 2019

LEGEND

1 BRANYON-HOUSTON BLACK-BURLESON: Deep, calcareous and noncalcareous, clayey soils formed in clayey alluvium and marine clays and shales; on ancient stream terraces and uplands

2 DENTON-ECKRANT-DOSS: Moderately deep, shallow and very shallow, calcareous, clayey, cobbly and stony soils formed in indurated fractured limestone or limy earths; on uplands

3 ECKRANT-GEORGETOWN: Very shallow to moderately deep, calcareous and noncalcareous, stony, cobbly, and loamy soils formed in indurated fractured limestone; on uplands

4 AUSTIN-HOUSTON BLACK-CASTEPHEN: Deep to shallow, calcareous clayey soils formed in marine chalk, marl, shale, and clays; on uplands

5 WILSON-CROCKETT-BEHRING: Deep, noncalcareous, loamy soils formed in marine clays, marls, and shales; on uplands

6 BRACKETT-ECKRANT-DOSS: Shallow and very shallow, calcareous, loamy and clayey, gravelly, stony, and cobbly soils formed in indurated limestone and marl; on uplands

7 AXTELL-ROSANKY-RADER: Deep, noncalcareous, loamy and sandy soils formed in marine sands, sandstones, and clays; on uplands

8 OAKALLA-SUNEV: Deep, calcareous, loamy soils formed in alluvium; on bottom lands and stream terraces

9 TINN: Deep, calcareous, clayey soils formed in recent clayey alluvium; on bottom lands

Compiled 1982

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
TEXAS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

WILLIAMSON COUNTY, TEXAS

Scale 1:316,800
1 0 1 2 3 4 5 Miles
1 0 5 10 Km

N

APPENDIX E

TEXAS HISTORICAL COMISSION CORRESPONDENCE

Clow, Reagan

From: Clow, Reagan
Sent: Wednesday, January 18, 2023 11:02 AM
To: thc@thc.texas.gov
Subject: Lift Station Construction in Brushy Creek, TX Area
Attachments: BCMUD_Cat Hollow.pdf; BCMUD_Hillside Dr.pdf; Cat Hollow LS.kmz; Hillside LS.kmz

Good afternoon,

My name is Reagan Clow, and I am an Associate Engineer for Weston Solutions, Inc. Weston is in the preliminary design phase of The Cat Hollow Lift Station (L.S.) Improvements & Hillside Dr Lift Station Decommissioning Project with Brushy Creek Municipal Utilities District (BCMUD). I am reaching out to day to see if there are any historical conflicts with the US Fish and Wildlife services at one or both of the project sites. The project scope is two-parts; to make improvements at the BCMUD owned and operated Cat Hollow sewer L.S., and to decommission the Hillside Dr sewer L.S.

The Cat Hollow LS improvements will be completely within the BCMUD owned land parcel. The Hillside Dr. L.S. decommissioning however will require a new gravity main to convey sewer from the existing L.S. to the nearest gravity manhole on Sutter Creek Trl. This will involve open cutting/trenching within the street ROW to install a new pipe from point A on Hillside Dr to point B on Sutter Creek Trl. Attached, I have provided project maps that highlight the rough project boundaries for both sites as well as Google Earth (.KMZ) files showing the exact location of each site.

Can you please confirm if there are any protected areas in either of these project sites? If there is conflict, please forward a map or schematic that shows the location of the areas and/or any additional information.

Thank you in advance for your assistance in the matter.

Reagan Clow
Associate Project Engineer
Weston Solutions, Inc.
(830)-388-6138 Direct
reagan.clow@westonsolutions.com
5301 Southwest Parkway Suite 450
Austin, TX 78735

APPENDIX F

U.S. FISH AND WILDLIFE SERVICE CORRESPONDENCE

Clow, Reagan

From: Williams, Christina <christina_williams@fws.gov>
Sent: Thursday, January 19, 2023 4:20 PM
To: Clow, Reagan
Subject: [EXT]:FW: Lift Station Construction Project in the Brushy Creek, TX area

Reagan,

We recommend you first run your project through our Information for Planning and Consultation (IPaC) program. This program will provide a list of possible species of concern in the project area. Then we recommend reviewing details about each of the species in the list provided, which you can access via our species pages: https://www.fws.gov/program/endangered-species to determine if the species may actually be in the area.

Once you've gone through that step, you will then need to determine if the activities for the project will/could impact any listed species. You should make one of the following determinations for each species:

- A determine of "no effect" indicates the species is not in the area or will not be impacted in any way by implementation of the project. Note that we do not consult or concur on determinations of "no effect." We ask that you keep the documentation as part of your records in case of inquiry.
- A determination of "may affect, not likely to adversely affect" indicates that there will be effects (this connection/link must be made, not just presumed in an effort to get a concurrence letter). This determination must show the effects on listed species are discountable (extremely unlikely to occur), insignificant (so small they cannot be meaningfully measured, detected, or evaluated), or wholly beneficial (all effects benefit the species and/or critical habitat). The discountable and insignificant thresholds are usually reached through avoidance and minimization measures implemented as part of the project.
- A determination of "may affect, likely to adversely affect" indicates that take of a listed species is likely to result from the project and a formal consultation should be requested by the Federal Action Agency along with submission of a Biological Evaluation/Assessment.

If a Federal agency is to fund or permit all or part of the project, the project may affect any listed species, and impacts cannot be avoided, then the Federal agency must consult with our office pursuant to section 7 of the Act. If no Federal agency is involved, you may choose to get a section 10(a)(1)(B) permit (also referred to as a Habitat Conservation Plan), if take of listed species is expected to occur, as a result of the proposed project. Take, as defined by the Act, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Take is further defined to include "significant habitat modification where it actually kills or injures wildlife by significantly interfering with essential behavioral patterns such as breeding, feeding and sheltering" (50 Code of Federal Regulations 17.3).

Please let us know if you have any concerns with your project with regard to listed species.

Thank you,

Christina

Christina Williams
Division Supervisor
Consultations and HCPs
U.S. Fish and Wildlife Service
1505 Ferguson Lane
Austin, Texas 78754

Cell 512-850-0980

Our mission is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.

From: Warriner, Michael D <michael_warriner@fws.gov>
Sent: Thursday, January 19, 2023 2:15 PM
To: Williams, Christina <christina_williams@fws.gov>
Subject: Fw: Lift Station Construction Project in the Brushy Creek, TX area

---

From: Reagan Clow <usfws@fws.gov>
Sent: Thursday, January 19, 2023 2:11 PM
To: Warriner, Michael D <michael_warriner@fws.gov>
Subject: Lift Station Construction Project in the Brushy Creek, TX area

U.S. FISH & WILDLIFE SERVICE

This email has been sent to you via "send a message" on your FWS.gov profile.

Submitted on Thu, 01/19/2023 - 20:11

Age
I am 13 years old or older

Your name
Reagan Clow

Your email address
Reagan.Clow@westonsolutions.com

Subject
Lift Station Construction Project in the Brushy Creek, TX area

Message
Good afternoon,

My name is Reagan Clow, and I am an Associate Engineer for Weston Solutions, Inc. Weston is in the preliminary design phase of The Cat Hollow Lift Station (L.S.) Improvements & Hillside Dr Lift Station Decommissioning Project with Brushy Creek Municipal Utilities District (BCMUD). I am reaching out to day to see if there are any regulatory conflicts with the US Fish and Wildlife services at one or both of the project sites. The project scope is two-parts; to make improvements at the BCMUD owned and operated Cat Hollow sewer L.S., and to decommission the Hillside Dr sewer L.S.

The Cat Hollow LS improvements will be completely within the BCMUD owned land parcel. The Hillside Dr. L.S. decommissioning however will require a new gravity main to convey sewer from the existing L.S. to the nearest gravity manhole on Sutter Creek Trl. This will involve open cutting/trenching within the street ROW to install a new pipe from point A on Hillside Dr to point B on Sutter Creek Trl. Upon request I can provide project maps that

highlight the rough project boundaries for both sites as well as Google Earth (.KMZ) files showing the exact location of each site.

Can you please confirm if there are any protected areas in either of these project sites? If there is conflict, please forward a map or schematic that shows the location of the areas and/or any additional information.

Thank you in advance for your assistance in the matter.

Http Referer
https://www.fws.gov/office/austin-ecological-services/contact-us

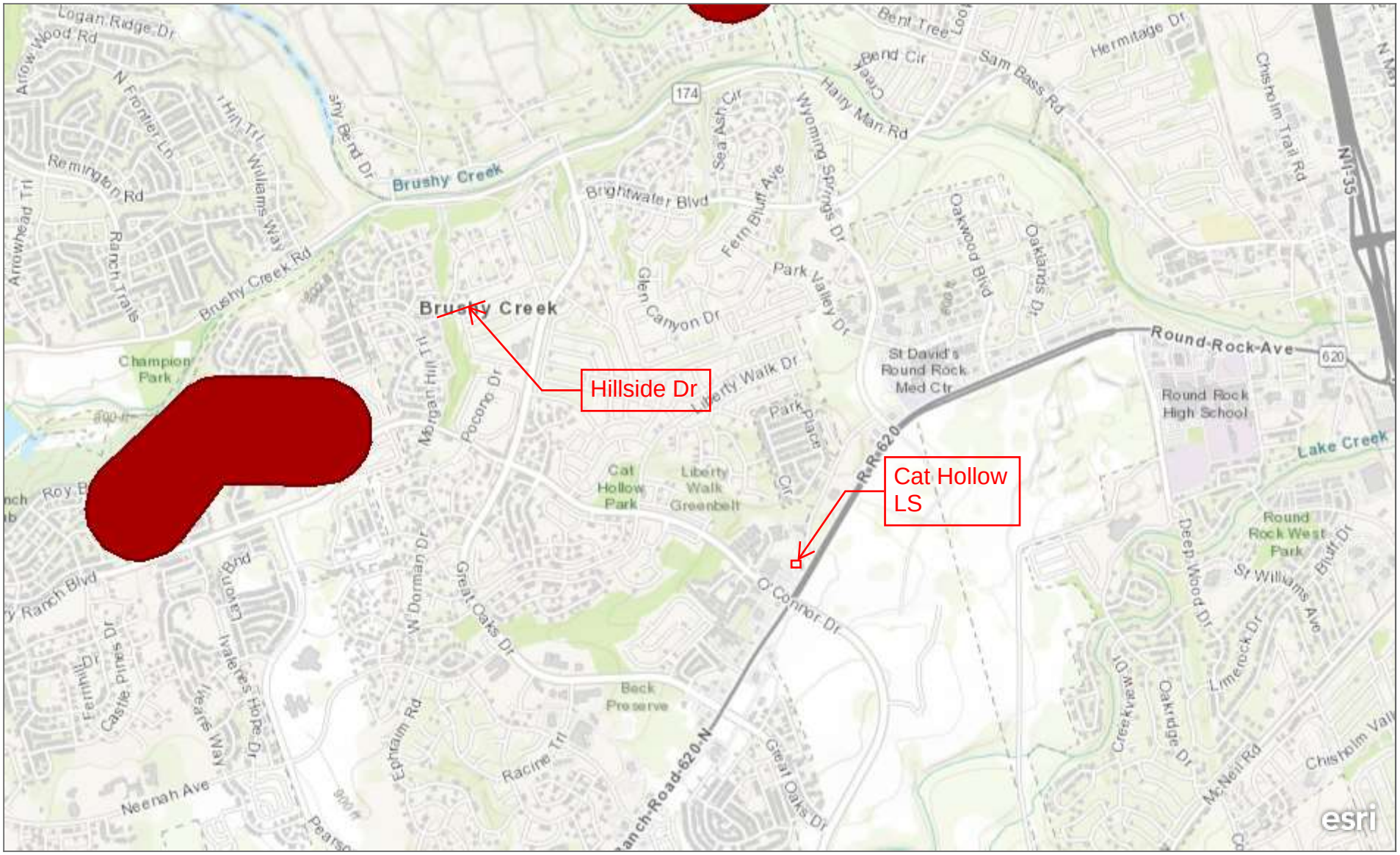
Submitted from Michael Warriner

Path: https://www.fws.gov/staff-profile/michael-warriner

Working with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people.

fws.gov

Critical Habitat for Threatened & Endangered Species [USFWS]



A specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.

APPENDIX G

PUMP CALCULATIONS

Brushy Creek MUD

Wastewater Pump Station
&
Force Main
Design Calculations

Project Name:	**Cat Hollow LS Improvements**
Location:	**Brushy Creek, TX**
Designed By:	**Maninder Randhawa, P.E.**
Checked By:	**Dain Chernick, P.E.**
Date:	**3/9/2023**
Project no.:	**15960.001.001**

Texas Registered Engineering Firm: F-3123

Weston Solutions, Inc.
5301 Southwest Parkway, Suite 450
Austin, Texas 78735
512-651-7100 • Fax 512-651-7101

Brushy Creek MUD

Wastewater Pump Station
&
Force Main
Project Summary

Project Name:	**Cat Hollow LS Improvements**
Average Daily Flow (GPM):	**664**
Pump Operational Point No. 1 (PWWF, GPM):	**2655**
Pump Operational Point, No. 2 (5.0 FPS Velocity, GPM):	**4250**
Pump Manufacturer:	**KSB**
Model Number:	**KRT K 150-400/556 XEG**
Impeller Diameter:	**15 inches**
Horse Power:	**74**
Voltage:	**460V**
Force Main Diameter (in):	**18 Inches**
Force Main Length (ft):	**Varies with Design**

Design Pumping Flow Rate

Peaking Factor Calculation	
LUEs	3,541
Population =	12,391.8
Consumption =	270 Gal/capita/day
PDWF (GPM) =	664
Peak Factor =	4
PWWF (GPM)=	2655
Design Flow (GPM) =	2655

Determine Minimum Pump Rate		
Average Daily Flow =	955,935	GPD
Peak Wet Weather Flow =	3,823,740	GPD
Minimum Pumping Rate Required =	2655	GPM
Design Pumping Rate =	**4250**	GPM

Cycle Time & Existing Wet Well Geometry

Target Cycles Per Hour			
ADF	=	664	gpm
(PWWF)	=	2655	gpm
Time	=	10.0	min.
Cycles Per Hour Allowed =		**6.0**	
Cycles Per Hour (PDWF)=		**8.2**	

Required Storage Volume		
Required Volume =	6638	Gallons
Wet-Well Length=	**25.0**	Ft
Wet-well Width =	**8.0**	
Storage Volume Needed =	**4.44**	Vert. Ft

Vertical Datum Used: **NAVD 88**

Determine Wet Well Invert & Float Elevations

Wet well Depth = **29.2** Ft

Top Elev=	791.90		
Gnd Elev=	790.50		
Lowest Invert	777.50		
		777.50	High Level Alarm (LHH)
		776.49	Third Pump On (LH1)
	LVL 3	774.80	Second Pump On (LH1)
	LVL 2	772.68	Third Pump Off (LL1)
		770.85	First Pump On (LH1)
	LVL 1	768.03	Second Pump off (LL2)
		765.20	First Pump Off (LL2)
		764.70	Min. Pump Submergence
		764.70	Low Level Alarm EL.
Wet-Well Bottom Elev.	762.70		

Cycle Time & New (FRP) Wet Well Geometry

Target Cycles Per Hour			
ADF	=	664	gpm
(PWWF)	=	2655	gpm
Time	=	10.0	min.
Cycles Per Hour Allowed =		**6.0**	
Cycles Per Hour (PDWF)=		**8.2**	

Required Storage Volume		
Required Volume =	6638	Gallons
Wet-Well Diameter =	**15.5**	Ft
Wet-well Area =	**188.6**	
Storage Volume Needed =	**4.71**	Vert. Ft

Vertical Datum Used: **NAVD 88**

Determine Wet Well Invert & Float Elevations

Wet well Depth = **28.0** Ft

Top Elev=	791.90			
Gnd Elev=	790.50			
Lowest Invert	777.68			
			777.68	High Level Alarm (LHH)
			776.68	Third Pump On (LH1)
		LVL 3	775.14	Second Pump On (LH1)
		LVL 2	773.34	Third Pump Off (LL1)
			771.54	First Pump On (LH1)
		LVL 1	768.97	Second Pump off (LL2)
			766.40	First Pump Off (LL2)
			765.90	Min. Pump Submergence
			765.90	Low Level Alarm EL.
Wet-Well Bottom Elev.	763.90			

Force Main & Piping Design for Exis. Wet Well

Off-Site Force Main Data		
Design Pump Rate (gpm) =	4250	
Select Force Main Size (in) =	**18.61**	
Velocity (fps) =	5.01	
Meets Minimum Velocity Requirement?	**OK > 2 FPS**	
Meets Maximum Velocity Requirement?	**OK < 7 FPS**	
Required Pump?	**Use Non-Clog Pump**	
Line Length (ft) =	**5,655**	

Connection Point:	**21" & 24" Gravity Main**

Pump Station Discharge Piping Data	
Design Pump Rate (gpm) =	2400
Pick Wet Well & Valve Piping Size (in) =	**12**
Velocity (fps) =	6.81
Meets Minimum Velocity Requirement?	**OK > 2 FPS**
Less than Maximum Velocity Requirement?	**OK < 7 FPS**

Item	Number of Fittings	Coefficient	Minor Losses
11.25º Bend	6	0.05	0.30
45º Bend	7	0.2	1.40
90º Bend	5	0.4	2.00
Tee, Flow thru Line	3	0.35	1.05
Tee, Flow thru Stem	1	1.8	1.80
Check Valve	3	2.5	7.50
Gate Valve	3	0.15	0.45
Plug Valve	2	0.23	0.46
Coupling or Union	4	0.1	0.40
Reducer/Increaser	3	0.25	0.75
Cross	0	0.75	0.00
Exit Loss	1	1	1.00
		Total Loss Coefficient, K	17
$h_m = K (v^2/2g)$		h_m = Minor Headloss due to Fittings	6.68

h_f = Friction Headloss due to Pipe		
$h_f = 0.002083 \times L \times (100/C)^{1.85} \times (Q^{1.85} / d^{4.865})$		
L =	5695	ft (FM Length)
C =	120	(Hazen-Wms "C")
Q =	4250.0	gpm (q from above)
d=	18.6	in (FM diameter)
h_f =	29.03	ft

hs = Stati Head	
h_s = Static Head = Max Syst Elev - Pump Volute Elev	
Maximum System Elevation (ft)	834.00
Pump Volute Elevation (ft)	764.70
h_s (ft) =	69.30

Total Dynamic Head	
Total Dynamic Head (TDH) = $h_s + h_f + h_m$	
TDH (ft) =	**105.01**

Force Main & Piping Design for new FRP Wet Well

Off-Site Force Main Data		
Design Flow Rate (gpm) =	4250	
Select Force Main Size (in) =	**18.61**	
Velocity (fps) =	5.01	
Meets Minimum Velocity Requirement?	**OK > 2 FPS**	
Meets Maximum Velocity Requirement?	**OK < 7 FPS**	
Required Pump?	**Use Non-Clog Pump**	
Line Length (ft) =	**5,632**	

Connection Point:	**21" & 24" Gravity Main**

Pump Station Discharge Piping Data	
Design Pump Rate (gpm) =	2400
Pick Wet Well & Valve Piping Size (in) =	**12**
Velocity (fps) =	6.81
Meets Minimum Velocity Requirement?	**OK > 2 FPS**
Less than Maximum Velocity Requirement?	**OK < 7 FPS**

Item	Number of Fittings	Coefficient	Minor Losses
1.25º Bend	6	0.05	0.30
45º Bend	7	0.2	1.40
90º Bend	5	0.4	2.00
Tee, Flow thru Line	3	0.35	1.05
Tee, Flow thru Stem	1	1.8	1.80
Check Valve	3	2.5	7.50
Gate Valve	3	0.15	0.45
Plug Valve	2	0.23	0.46
Coupling or Union	4	0.1	0.40
Reducer/Increaser	3	0.25	0.75
Cross	0	0.75	0.00
Exit Loss	1	1	1.00
		Total Loss Coefficient, K	17
$h_m = K (v^2/2g)$		h_m = Minor Headloss due to Fittings	6.68

h_f = Friction Headloss due to Pipe		
$h_f = 0.002083 \times L \times (100/C)^{1.85} \times (Q^{1.85} / d^{4.865})$		
L =	5682	ft (FM Length)
C =	120	(Hazen-Wms "C")
Q =	4250.0	gpm (q from above)
d=	18.6	in (FM diameter)
h_f =	28.97	ft

hs = Stati Head	
h_s = Static Head = Max Syst Elev - Pump Volute Elev	
Maximum System Elevation (ft)	834.00
Pump Volute Elevation (ft)	765.90
h_s (ft) =	68.10

Total Dynamic Head	
Total Dynamic Head (TDH) = $h_s + h_f + h_m$	
TDH (ft) =	**103.74**

Pump Check

NPSHR = Net Positive Suction head Required

NPSHR = **14.1** ft

From Pump Manufacturer

NPSHA = Net Positive Suction Head Available

NPSHA = $P_B + H_S$ - Pv - Hf_s

Check Wet well Cycle Times

Atmospher	33.4	ft
Vapor Pres	1.4	ft
mum Depth of Submergence at Low Water Level =	2.5	ft
friction loss in suction =	0.2	ft
NPSHA =	**34.5**	**ft**

NPSH is OK because NPSHA > NPSHR.

Station Operation Check

Existing Wet Well

Proposed Operational Point

PDWF =	**664**	GPM
PWWF =	**2655**	GPM

**Assuming generator powers 1 pump during power outages at PWWF

Check Wet well Cycle Times

Wet well Dimensions (ft X ft)	Wet-Well Storage Depth (ft)	Wet well Cycle (ft)	Storage Volume (gal)
25 x 8	19.1	4.4	28499

Emergency Detention Time = Wet well Volume / ADF = 42.9 minutes

Emergency Detention Time = Wet well Volume / PWWF = 10.7 minutes (> 20 mins @ PF per TCEQ)

Station Operation Check

New FRP Wet Well

Proposed Operational Point

PDWF =	**664**	GPM
PWWF =	**2655**	GPM

**Assuming generator powers 1 pump during power outages at PWWF

Check Wet well Cycle Times

Wet well Diameter (ft)	Wet-Well Storage Depth (ft)	Wet well Cycle (ft)	Storage Volume (gal)
15.5	18	4.7	25900

Emergency Detention Time = Wet well Volume / ADF = 39.0 minutes

Emergency Detention Time = Wet well Volume / PWWF = 9.8 minutes (> 20 mins @ PF per TCEQ)

PUMP STATION DESIGN CALCULATIONS

PROJECT NAME: Cat Hollow LS Improvements - Existing Wet Well PROJECT No: 15960.001.001

STATION INFORMATION

Elevation at Lift Station =	0.0	ft
Inlet Pipe Invert Elevation =	-14.5	ft
Minimum Fluid elevation in Wetwell =	-24.2	ft
Thickness of Wet Well Footer =	2.3	ft
Total Depth of Wet Well =	-31.5	ft

BUOYANT FORCE (VOLUME DISPLACED BY WET-WELL STRUCTURE)

Volume of wet-well	9497	cu ft
Area of footer	510	Sq. ft
Volume of Footer	1147.5	cu ft
Total Volume Displaced, V_D	10644.5	cu ft
Bouyant Force, $F_B = V_D$ x 62.4 lbs/ft^3 =	**664216.8**	lbs

CONCRETE WEIGHT

Inner Length of WW	25	ft
Inner Width of WW	8	ft
Inner Area of Wet-well	200	Sq. ft
Outside Area 1 of wet-well	270	Sq. ft
Thickness 1 of walls	1	ft
Depth 1	13.5	ft
Inner area 2 of wet-well	200	Sq. ft
Outside Area 2 of wet-well	308	Sq. ft
Thickness 2 of walls	1.5	ft
Depth 2	19	ft
Footer extension beyond WW walls	9	ft
Volume of concrete in wet-well	2997	Cu ft
Volume of concrete in footer	114.75	Cu ft
Concrete density	150	lbs/cu. Ft
Total weight of concrete	**466762.5**	lbs

WEIGHT OF SOIL OVERBURDEN

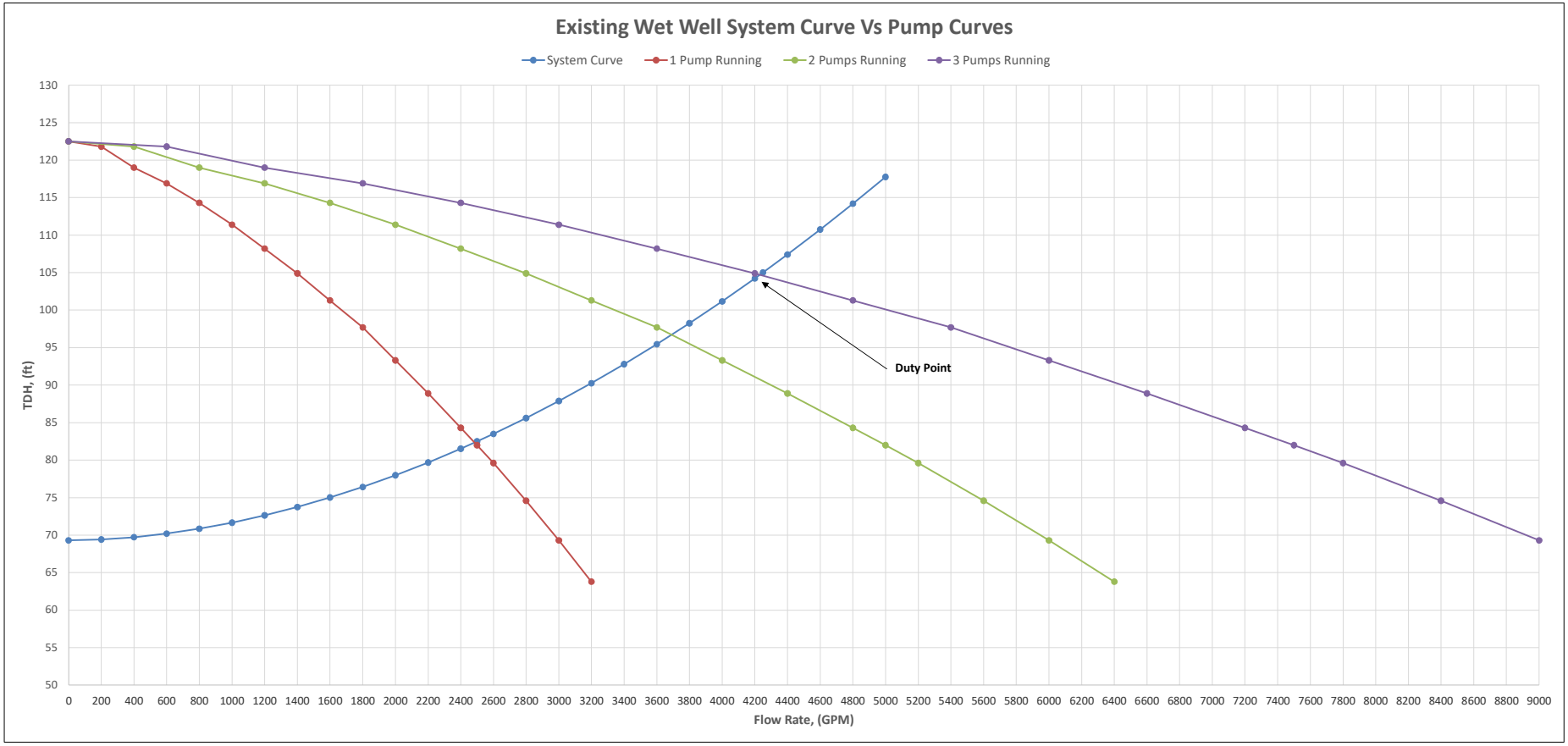
Soil burden longer wall at Depth 1	2528.72	cu ft
Soil burden on shorter wall at depth 1	936.56	cu ft
Soil burden on longer wall at depth 2	1139.06	cu ft
Soil burden on shorter wall at depth 2	489.38	cu ft
Assumed soil density	110	lbs/cu ft
Weight of Soil in Overburden cone	**560309**	lbs

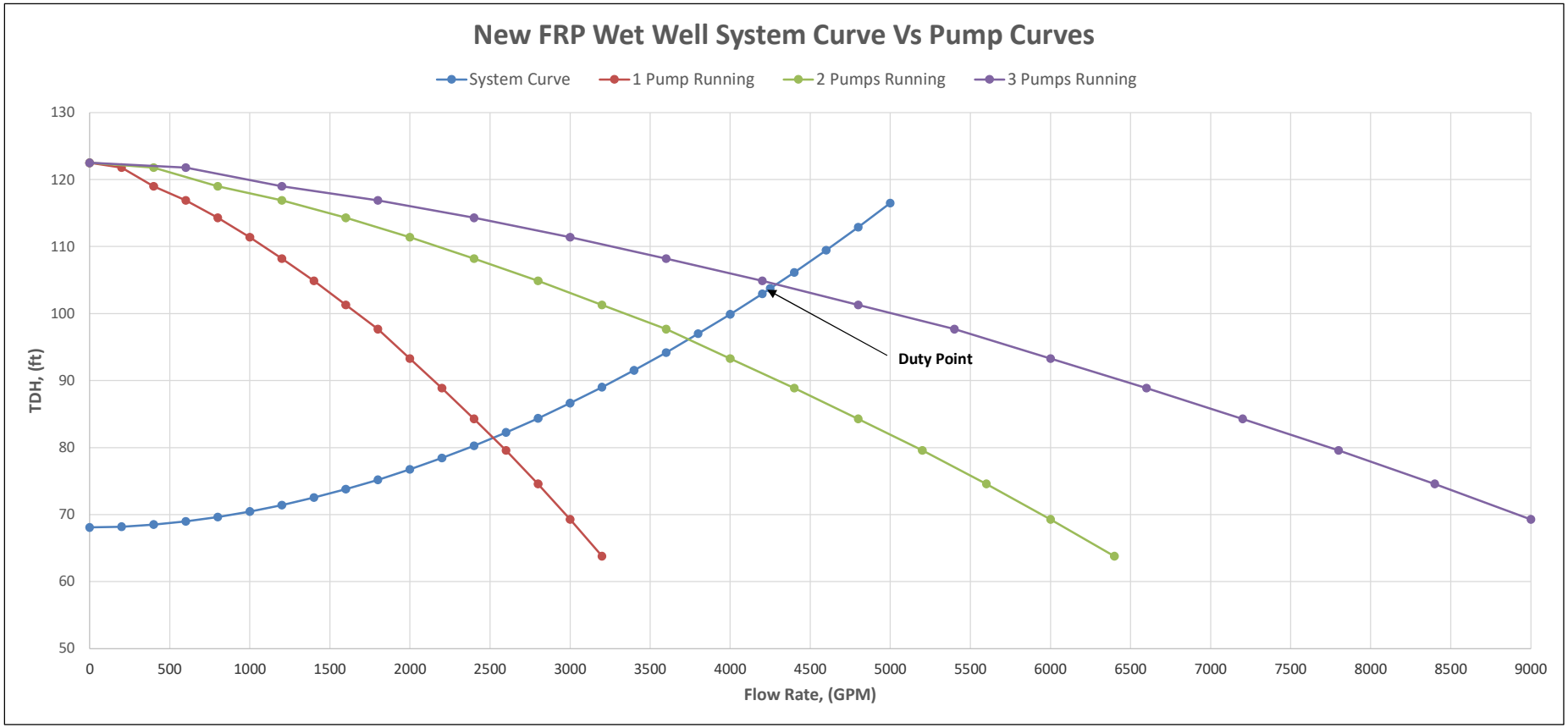
BOUYANCY DETERMINATION

Total Downward Force on Dry Wet Well	1027072	Lbs

Buoyancy is OK because 1,027,072 lbs. is greater than 560309 lbs.

Factor of Safety = $\frac{1,027,072}{664,217}$ = **1.55**


Existing Wet Well System Curve Vs Pump Curves
System Curve
1 Pump Running
2 Pumps Running
3 Pumps Running
TDH, (ft)
Flow Rate, (GPM)
Duty Point
130
125
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200 3400 3600 3800 4000 4200 4400 4600 4800 5000 5200 5400 5600 5800 6000 6200 6400 6600 6800 7000 7200 7400 7600 7800 8000 8200 8400 8600 8800 9000


New FRP Wet Well System Curve Vs Pump Curves
System Curve
1 Pump Running
2 Pumps Running
3 Pumps Running
TDH, (ft)
130
120
110
100
90
80
70
60
50
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8000
8500
9000
Flow Rate, (GPM)
Duty Point

Data sheet

Pump type KRT K 150-400/556XEG-S

Operating data

Flow	2,400	US g.p.m.	Fluid		
Head	84.3	ft	Density of fluid	62.3	lb/ft³
Operating speed	1,189	rpm	Viscosity	1.08E-5	ft²/s
Shaft power	61.3	hp	Temperature	68	°F
Efficiency	83.4	%	Hydraulic acceptance acc.	ANSI HI 2B	
Required pump NPSH	14.1	ft			
Head H(Q=0)	122	ft			
Application range	Head		Flow		
From	117	ft	577	US g.p.m.	
To	62.9	ft	3,230	US g.p.m.	

Design

Make	KSB		Impeller type	Multi channel impeller	
Design	Submersible pump			Closed	
Series	KRT K		Impeller size	(389) 15 5/16	inch
Frame size	150-400			Max. (408) 16 1/16	inch
Stages	1			Min. (300) 11 13/16	inch
Curve number	K43190s/1		Free passage	3 inch	inch
			Weight	1,607.1	lb
Type of bearings	Antifriction				
Nos. of bearings	1 / 1				
Lubrication	Grease lubrication. lubricated for lifetime				
Suction port	Pressure rating		--		
	Flange size	DN0	---		
	Flange size	DN1	8"		
	Norm		--		
Discharge port	Pressure rating		CLASS 125		
	Flange size	DN2	6 inch		
	Flange size	DN3	6 inch		
	Norm		ASME/ANSI B16.1		

Suction port: pump (DN1)
Discharge port: discharge elbow (DN3)

Materials

Pump casing	Grey cast iron EN-GJL-250 (A 48 Class 35B)
Discharge cover	Grey cast iron EN-GJL-250 (A 48 Class 35B)
Impeller	Grey cast iron EN-GJL-250 (A 48 Class 35B)
Shaft	Stainless steel EN-1.4021+QT800 (A 276 Type 420)
Bearing bracket	Grey cast iron EN-GJL-250 (A 48 Class 35B)
Motor casing	Grey cast iron EN-GJL-250 (A 48 Class 35B)
Bolts. nuts	Stainless steel A4 (EN-1.4571) (A 276 Type 316)
Cooling jacket	---
Shaft protection sleeve	---
Casing wear ring	Grey cast iron EN-GJL-250 (A 48 Class 35B)
Impeller wear ring	---
O-Rings	Nitrile rubber (NBR)

Data sheet

Pump type **KRT K 150-400/556XEG-S**

Shaft seal

Type of seal	Double mechanical seal
Arrangement:	Tandem
Seal on medium side	with elastomer bellows
Mechanical seal. pump-side	Silicon carbide / Silicon carbide
Mechanical seal. bearing-side	Carbon / Silicon carbide

Monitoring

Thermal winding protection	By temperature sensitive switches
Explosion proof protection	By PTC (Explosion proof models only)
Motor housing monitoring	By conductive moisture sensor electrode
Mechanical seal leakage detection	---
Bearing temperature monitoring	---

Coating

Preparatory treatment	SSPC near white SP 10
Blasting method	Steel grit blasting
Primer	Zinc phosphate or Zinc dust
Dry film thickness primer	> 1 1/2 mils (35 microns)
Top coat	2-component epoxy resin
Solids content	> 82 %
Dry film thickness top coat	> 6 mils (150 microns)
Color	Ultramarine Blue (RAL 5002 to DIN 6174)

Installation

INSTALLATION
Type of installation: Wet well installation designed for automatic connection to a permanently installed discharge elbow
Discharge elbow size (DN2/DN3): 6 inch / 6 inch

Flange to suit	: ASME/ANSI B16.1, CLASS 125
Claw	: Bolted to the pump
Guide system	: Double guide bars, by contractor
Guide bar dimension	: 2" diameter pipes
Installation depth	: 15 ft (4.5 m)
Lifting device	: stainless steel lifting chain
Length of lifting device	: 33 ft (10 m)
Lifting loops	: Every 8 ft (2.5 m)
Installation accessories	: Discharge elbow, 6 inch / {P.PartNo[Co, GuideRail].Bend DN DS[Co];;;0} fasteners, claw, bracket, lifting chain, but without guide bars

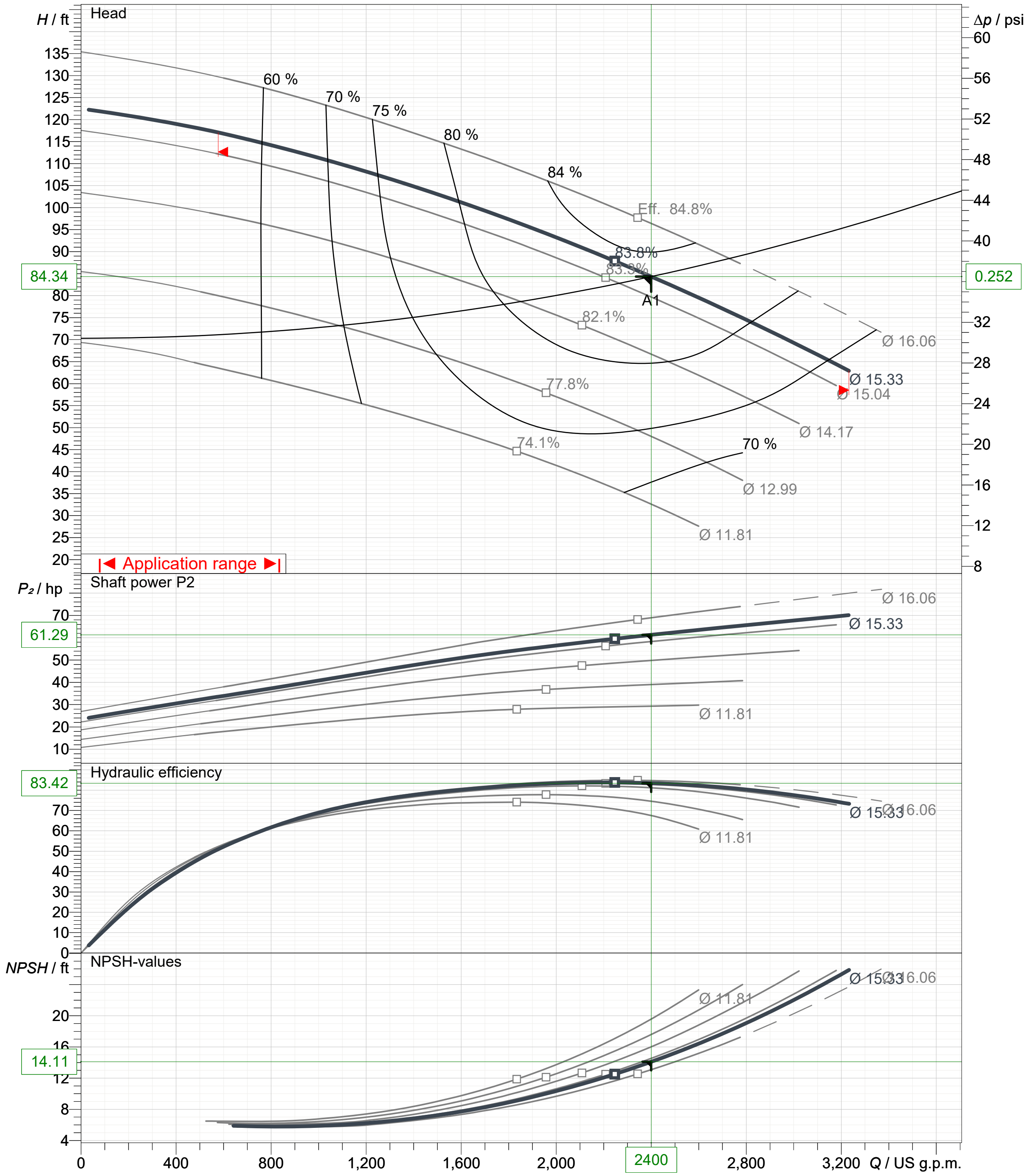
Materials:

Discharge elbow	: Grey cast iron EN-GJL-250 (A 48 Class 35B)

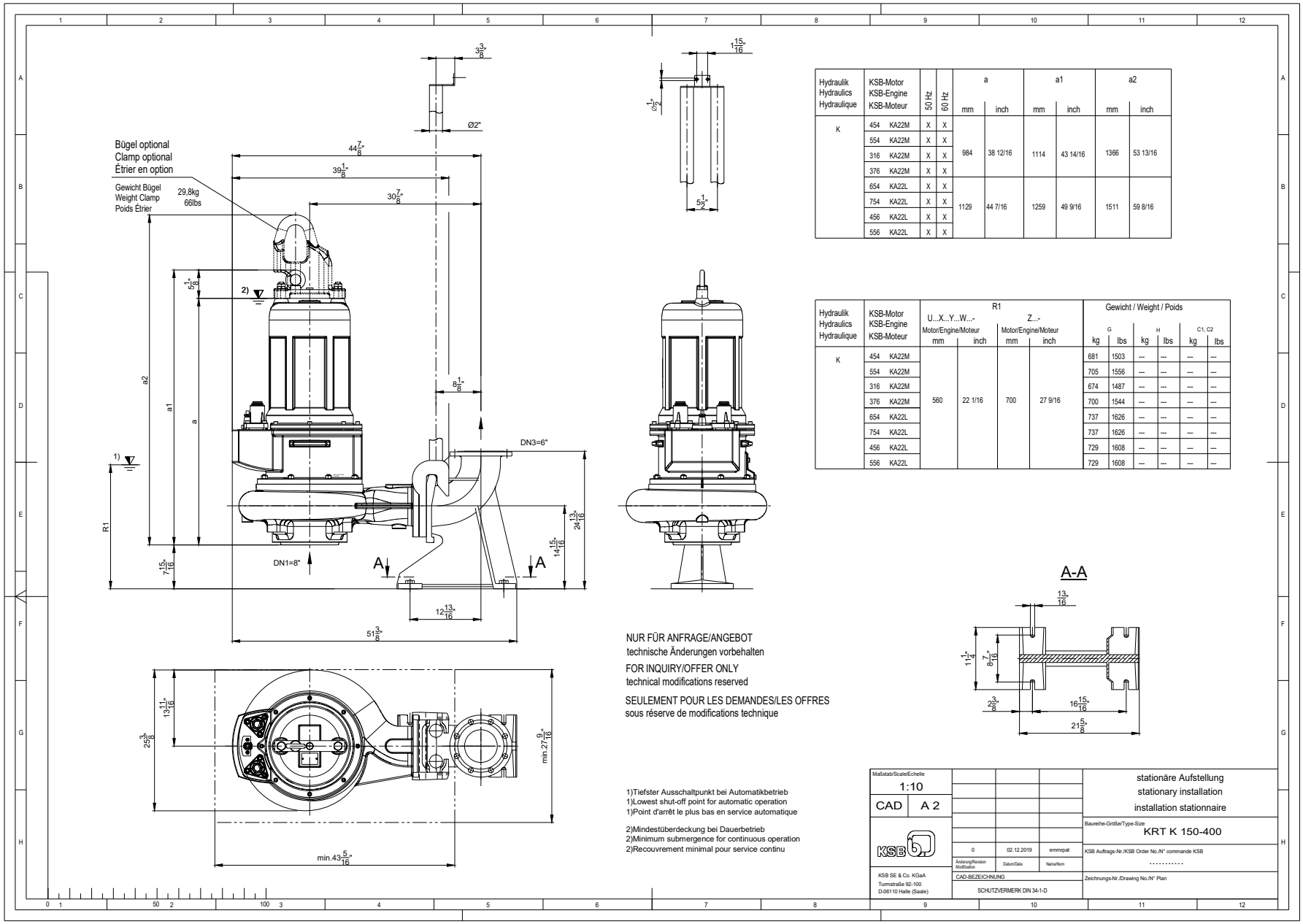
Project	**Weston Solutions**	
Customer pos.no		
Project ID	**Brushy Creek MUD - CAt Hollow LS**	
Pos.no	**2**	
Created by		
	Created	2023-01-12
	Update	2023-01-12

Performance curve

Pump type KRT K 150-400/556XEG-S



Impeller type	Multi channel impeller Closed			Curve number	K43190s/1
Free passage	3 inch	Density of fluid	62.322 lb/ft³	Frequency	60 Hz
Impeller size	15 5/16inch (389)	Viscosity	1.082E-5 ft²/s	Speed	1,189 1/min
					ANSI HI 2B



Hydraulik Hydraulics Hydraulique	KSB-Motor KSB-Engine KSB-Moteur	50 Hz	60 Hz	a mm	a inch	a1 mm	a1 inch	a2 mm	a2 inch
K	454 KA22M	X	X	984	38 12/16	1114	43 14/16	1366	53 13/16
	554 KA22M	X	X						
	316 KA22M	X	X						
	376 KA22M	X	X						
	654 KA22L	X	X	1129	44 7/16	1259	49 9/16	1511	59 8/16
	754 KA22L	X	X						
	456 KA22L	X	X						
	556 KA22L	X	X						

Hydraulik Hydraulics Hydraulique	KSB-Motor KSB-Engine KSB-Moteur	R1 U...X..Y..W...- Motor/Engine/Moteur mm	R1 U...X..Y..W...- Motor/Engine/Moteur inch	R1 Z...- Motor/Engine/Moteur mm	R1 Z...- Motor/Engine/Moteur inch	Gewicht / Weight / Poids G kg	G lbs	H kg	H lbs	C1, C2 kg	C1, C2 lbs
K	454 KA22M	560	22 1/16	700	27 9/16	681	1503	---	---	---	---
	554 KA22M					705	1556	---	---	---	---
	316 KA22M					674	1487	---	---	---	---
	376 KA22M					700	1544	---	---	---	---
	654 KA22L					737	1626	---	---	---	---
	754 KA22L					737	1626	---	---	---	---
	456 KA22L					729	1608	---	---	---	---
	556 KA22L					729	1608	---	---	---	---

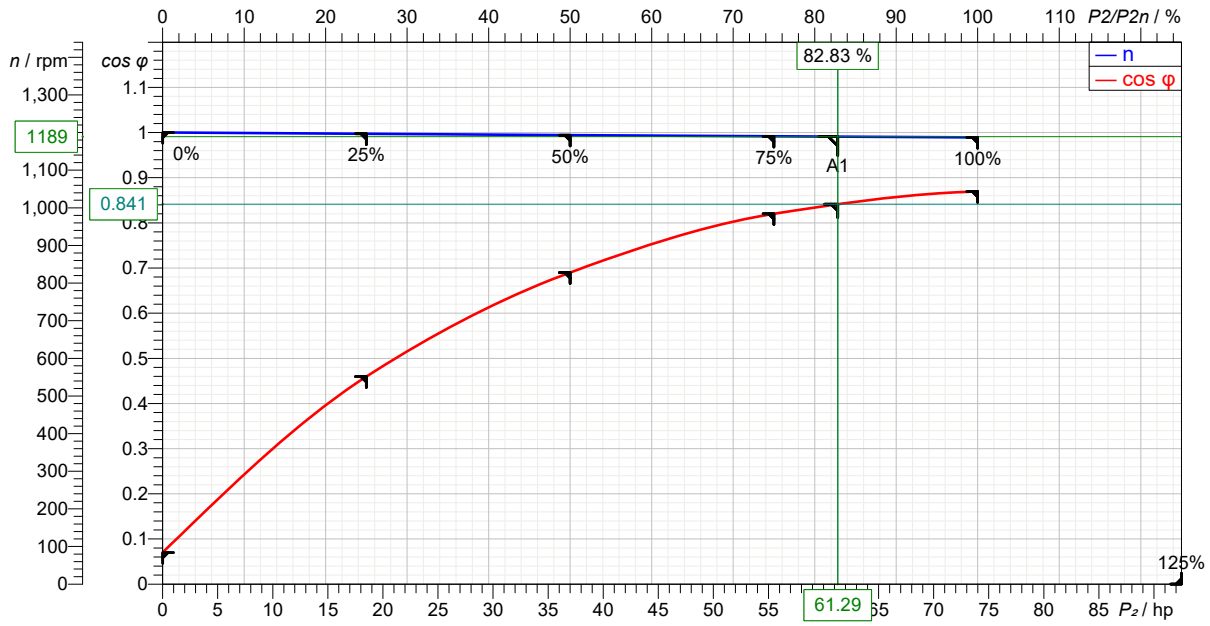
Data sheet: Motor data

Motor type 556XEG

Motor manufacturer	KSB SE & Co. KGaA	Rated voltage	460	V
Design acc. standard	-	Rated frequency	60	Hz
Service factor	1.14	Rated HP (D.O.L) or VFD	74	hp
Degree of protection	IP68	Rated current	86.1	A
Insulation class		Nominal speed	1,187	rpm
Starting mode	Direct starting	NEMA code letter	J	
No. starts / h	10	Starting to rated current	7.8	
Coolant temperature	< / = 104 °F (40 °C)	Starting current	671.6	A
Motor casing	Grey cast iron EN-GJL-250 (A 48 Class 35B)			
Explosion protection	Class I, Div. 1, Groups C&D T3			
Pump type	KRT K 150-400/556XEG-S			

Load	P1 kW	P2 hp	eta %	cos phi	I A
4/4	59.65	74.0	92.5	0.87	86.1
3/4	44.89	55.5	92.2	0.82	68.7
2/4	30.35	37.0	90.9	0.69	55.2
1/4	16.08	18.5	85.8	0.46	43.9

Main cable	2 x AWG 7-4	Diameter	0.72 inch...0.77 inch
Control cable	1 x AWG 15-8	Diameter	0.56 inch...0.60 inch
Cable. outer sheath	Waterproof synthetic rubber compound		
Cable length	50 ft (15 m)		



KSB Inc., 4415 Sarellen Road, Richmond, Virginia 23231, Phone: 001-804-222-1818, Fax: 001-804-226-6961
KSB Pumps Inc, 5885 Kennedy Road, Mississauga, Ontario L4Z 2G3 (Canada), Phone: (0905) 568-9200, Fax: (0905) 568-9120

KSB SE & Co. KGaA, Turmstrasse 92, 06110 Halle (Germany), Phone +49 (345) 48260, Fax +49 (345) 4826 4699, www.ksb.com

BERLCC_

Pump type KRT K 150-400/556XEG-S

Calculation of energy costs

Calculation specifications

Evaluation period	10	Year(s)
Operating hours	6,840.00	h/a
Lastprofil	Full-load operation	
Electricity tariff	0.20	EUR/kWh
JaeStromSt	6	%
JaeKostSt	3	%
ZinsS	7	%
CO2-factor	0.62	kg/kWh

Qp %	Qu	Q US g.p.	H ft	P1 hp	E kWh/a	K EUR/a
100	1	2,400	84.3	66.3	338,000	67,672.80
Energy requirements					338,400	kWh/a
Annual energy costs					67,672.80	EUR/a

Energy costs for 10 years 640,949.70 EUR

BERCO2

JAECO2	463.98	t/a
Co2 emission for 10 years	4,639.82	t

BERLCC

Pump and accessories	On req.	EUR
De-installation / installation	0.00	EUR
Disposal	0.00	EUR
Sum of investment		EUR
Energy requirements	338,364.00	kWh /a
Energy costs	67,672.80	EUR
Routine maintenance	0.00	EUR
Servicing	0.00	EUR
Environ. contamin.	0.00	EUR
Costs for loss of production	0.00	EUR
Other costs	0.00	EUR
Sum of annual costs	67,672.80	EUR

Life cycle cost (LCC) for 10 years EUR

APPENDIX H

HILLSIDE DRIVE ALTERNATIVE MATRIX ANALYSIS

Hillside Dr Alternatives Matrix Criteria		
Criteria	**Minimum Score**	**Maximum Score**
Construction Length	1	4
No of Intermediate MHs needed	1	3
Major Challenges (Design and Construction)	1	5
Client Preference	1	5
Cost Benefit	1	3
Total	**5**	**20**

Hillside Dr. Gravity Sewer Alignment Alternative Matrix Analysis

Alt. 1		**Alt. 2**		**Alt. 3**		**Alt. 4**	
Gravity Line from USMH to SCT_MH	**Score**	**Gravity Line from USMH to BC_HS_MH**	**Score**	**Gravity line from Hillside LS wet well to SCT_MH**	**Score**	**Gravity Line from Hillside LS wet well to BC_HS_MH**	**Score**
Construction Length 554 LF	1	**Construction Length** 406 LF	3	**Construction Length** 479 LF	2	**Construction Length** 330 LF	4
Client Preferences **Yes**	5	**Client Preferences** **No**	1	**Client Preferences** **Yes**	5	**Client Preferences** **No**	0
Challenges Water main crossing (1) Seperation from Exis. WW??	5	**Challenges** Deep Trenching approx. 12-15 ft Water Main Crossing (1) Seperation from Exis. WW??	2	**Challenges** Routine Maintenance Challenges Wet-well is not in good structural condition Odor Issues Water main crossing (1)	1	**Challenges** Deep Trenching Routine Maintenance Challenges Wet-well is not in good structural condition Water main crossing (1)	1
No. of Intermediate MHs needed 4 or 5	1	**No. of Intermediate MHs needed** 1	2	**No. of Intermediate MHs needed** 4 or 5	1	**No. of Intermediate MHs needed** 0	0
Cost Benefit Highest LF Discharge MH Depth Approx. 8' 3 Intermediate MHs	3	**Cost Benefit** Lower LF Discharge MH Depth Approx. 14' No Intermediate MHs	2	**Cost Benefit** Higher LF High cost to rehab/convert exis. Wet - well to a MH High lifetime cost of maintenance Discharge MH Depth Approx. 8' 2 Intermediate MHs	1	**Cost Benefit** Lowest LF High Cost to rehab/convert exis. Wet-well to MH High lifetime cost of maintenance Discharge MH Depth Approx. 14' No Intermediate MHs	2
Total Score	**15**	**Total Score**	**10**	**Total Score**	**10**	**Total Score**	**7**

Notes:

USMH = Upstream manhole on intersection of Hillside Dr and Stonebridge Dr

BC_HS_MH = Fern Bluff manhole on Hillside Dr

SCT_MH = Fern Bluff manhole on Sutter Creek Trail Dr

HS_WW = Existing Hillside Dr Lift Station Wet Well

APPENDIX I

OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

30% Preliminary Design Phase - OPCC Summary

Project Site / Option	Description	Estimate	Site Subtotal	Mobilization (6%)	Contractor's OH&P (15%)	Contingency (30%)	Site Total
Cat Hollow - Option 1	Civil	$ 987,315.00	$ 1,253,315.00	$ 75,198.90	$ 187,997.25	$ 375,994.50	**$ 1,892,505.65**
	Electrical and I&C	$ 266,000.00					
Cat Hollow - Option 2	Civil	$ 630,710.00	$ 896,710.00	$ 53,802.60	$ 134,506.50	$ 269,013.00	**$ 1,354,032.10**
	Electrical and I&C	$ 266,000.00					
Hillside Dr - Option 1	Civil	$ 200,640.00	$ 200,640.00	$ 12,038.40	$ 30,096.00	$ 60,192.00	**$ 302,966.40**
Hillside Dr - Option 2	Civil	$ 204,880.00	$ 204,880.00	$ 12,292.80	$ 30,732.00	$ 61,464.00	**$ 309,368.80**
30% PRELIMINARY DESIGN OPCC This opinion of probable construction cost is released for the purpose of interim review under the authority of Maninder Randhawa, P.E., 145867, on March 12, 2023.	**High End Totals**		**$ 1,458,195.00**	$ 87,491.70	$ 218,729.25	$ 437,458.50	**$ 2,201,874.45**
	Low End Totals		**$ 1,097,350.00**	$ 65,841.00	$ 164,602.50	$ 329,205.00	**$ 1,656,998.50**

Brushy Creek MUD

Cat Hollow LS Improvements - OPTION 1

30% Opinion of Probable Construction Cost (OPCC) - 12 March 2023

Item No.	Est. Qty.	Unit	Description	Unit Price	Total
1	1	LS	Preparing Right of Way	$ 16,000.00	$ 16,000.00
2	110	SF	Remove P.C. Concrete Sidewalks	$ 5.00	$ 550.00
3	1	LS	Remove of Miscellaneous P.C. Concrete	$ 2,000.00	$ 2,000.00
4	90	LF	Removal of P.C. Concrete Curb	$ 10.00	$ 900.00
5	78	CY	Dry Well Excavation	$ 15.00	$ 1,170.00
6	175	CY	Flexible Base	$ 50.00	$ 8,750.00
7	24	CY	New Asphalt Driveway	$ 120.00	$ 2,880.00
8	75	SF	New P.C. Concrete Sidewalks, 4 Inch Thickness	$ 8.00	$ 600.00
9	200	LF	Trench Excavation Safety Protection Systems, (all depths)	$ 10.00	$ 2,000.00
10	120	LF	Pipe, 12" Dia, Ductile Iron (All depths), including Excavation and Backfill	$ 180.00	$ 21,600.00
11	10	LF	Pipe, 18" Dia., Ductile Iron (All Depths), including Excavation and Backfill	$ 320.00	$ 3,200.00
12	80	LF	Pipe, 18" Dia., PVC (All depths), including Excavation and Backfill	$ 250.00	$ 20,000.00
13	4	EA	Standard Pre-cast Manhole w/Pre-cast Base, 4 ft Dia.	$ 8,000.00	$ 32,000.00
14	1	LS	New FRP Wet Well	$ 210,000.00	$ 210,000.00
15	1.5	TON	Ductile Iron Fittings	$ 9,000.00	$ 13,500.00
16	400	LF	Protective Fencing Type A Chain Link fence (Typical Application-high damage potential)	$ 55.00	$ 22,000.00
17	275	LF	Silt Fence	$ 8.00	$ 2,310.00
18	1	EA	C.I.P. Project Sign	$ 1,000.00	$ 1,000.00
19	1	LS	Bypass Pumping	$ 50,000.00	$ 50,000.00
20	1	LS	Submersible Non-clog pumps (3 Installed)	$ 315,000.00	$ 315,000.00
21	3	EA	Eccentric Plug Valve, 12" diameter	$ 4,500.00	$ 13,500.00
22	1	EA	Air Release and Vacuum Valve, 12" dia.	$ 6,000.00	$ 6,000.00
23	3	EA	Check Valve, Ductile Iron Swing Check Valve, 12" dia	$ 14,235.00	$ 42,705.00
24	55	CY	Drywell Controlled Low-Strength Material Fill	$ 225.00	$ 12,375.00
25	1	LS	Drywell Demo and Abandonment	$ 15,000.00	$ 15,000.00
26	185	CY	Wet Well Controlled Low-Strength Material Fill	$ 225.00	$ 41,625.00
27	1	LS	Wet Well Demo and Abandonment	$ 25,000.00	$ 25,000.00
28	6	CY	Electrical Generator Pad - Concrete w/ Forms and Rebar, Complete and In Place	$ 1,300.00	$ 7,500.00
29	2	CY	Jib Crane Pad - Concrete w/ Forms and Rebar, Complete and In Place	$ 1,300.00	$ 2,300.00
30	1	CY	Odor Control Pad - Concrete w/ Forms and Rebar, Complete and In Place	$ 1,300.00	$ 1,300.00
31	1	LS	Odor Control Scrubber	$ 1,500.00	$ 1,500.00
32	4.5	CY	Discharge Valve Foundation Pad - Concrete w/ Forms and Rebar, Complete and In Place	$ 1,300.00	$ 5,900.00

33	1	EA	Jib Crane - Hoist System, Complete and In Place	$ 45,000.00	$ 45,000.00
34	1	LS	Metal Building + Poles, Complete and In Place	$ 18,800.00	$ 18,800.00
35	4.5	CY	Electrical Controls & Panel Pad, Complete and In Place	$ 1,300.00	$ 5,850.00
36	1.0	EA	Flow Meter W/ Vault	$ 15,000.00	$ 15,000.00
37	1.0	EA	Bypass Pumping Connection	$ 2,500.00	$ 2,500.00
			Subtotal		**$ 987,315.00**
			Total Mobilization Payment (6%)	$ 59,238.90	
			Contractor's OH&P (15%)	$ 148,097.25	
			Contingency (30%)	$ 296,194.50	$ -
OPINION OF PROBABLE CONSTRUCTION COST				**$**	**1,490,845.65**

This opinion of probable construction cost is released for the purpose of interim review under the authority of Maninder Randhawa, P.E., 145867, on March12, 2023.

Brushy Creek MUD

Cat Hollow LS Improvements - OPTION 2

30% Opinion of Probable Construction Cost (OPCC) - 12 March 2023

Item No.	Est. Qty.	Unit	Description	Unit Price	Total
1	1	LS	Preparing Right of Way	$ 8,000.00	$ 8,000.00
2	110	SF	Remove P.C. Concrete Sidewalks	$ 5.00	$ 550.00
3	1	LS	Remove of Miscellaneous P.C. Concrete	$ 2,000.00	$ 2,000.00
4	78	CY	Dry Well Excavation	$ 15.00	$ 1,170.00
5	175	CY	Flexible Base	$ 50.00	$ 8,750.00
6	75	SF	New P.C. Concrete Sidewalks, 4 Inch Thickness	$ 8.00	$ 600.00
7	200	LF	Trench Excavation Safety Protection Systems, (all depths)	$ 10.00	$ 2,000.00
8	120	LF	Pipe, 12" Dia, Ductile Iron (All depths), including Excavation and Backfill	$ 180.00	$ 21,600.00
9	50	LF	Pipe, 18" Dia, Ductile Iron (All depths), including Excavation and Backfill	$ 120.00	$ 6,000.00
10	1.5	TON	Ductile Iron Fittings	$ 9,000.00	$ 13,500.00
11	400	LF	Protective Fencing Type A Chain Link fence (Typical Application-high damage potential)	$ 55.00	$ 22,000.00
12	275	LF	Silt Fence	$ 8.00	$ 2,310.00
13	1	EA	C.I.P. Project Sign	$ 1,000.00	$ 1,000.00
14	1	LS	Bypass Pumping	$ 50,000.00	$ 50,000.00
15	1	LS	Submersible Non-clog pumps (3 Installed)	$ 315,000.00	$ 315,000.00
16	3	EA	Eccentric Plug Valve, 12" diameter	$ 4,500.00	$ 13,500.00
17	1	EA	Air Release and Vacuum Valve, 12" dia.	$ 3,000.00	$ 3,000.00
18	3	EA	Check Valve, Ductile Iron Swing Check Valve, 12" dia	$ 14,235.00	$ 42,705.00
19	55	CY	Drywell Controlled Low-Strength Material Fill	$ 225.00	$ 12,375.00
20	1	LS	Drywell Demo	$ 15,000.00	$ 15,000.00
21	6	CY	Electrical Generator Pad - Concrete w/ Forms and Rebar, Complete and In Place	$ 1,300.00	$ 7,500.00
22	1	CY	Jib Crane Pad - Concrete w/ Forms and Rebar, Complete and In Place	$ 1,300.00	$ 1,300.00
23	1	CY	Odor Control Pad - Concrete w/ Forms and Rebar, Complete and In Place	$ 1,300.00	$ 1,300.00
24	6	CY	Discharge Valve Foundation Pad - Concrete w/ Forms and Rebar, Complete and In Place	$ 1,300.00	$ 8,400.00
25	1	LS	Odor Control Scrubber	$ 1,500.00	$ 1,500.00
26	1	EA	Jib Crane - Hoist System	$ 45,000.00	$ 45,000.00
27	1	LS	Metal Building + Poles	$ 18,800.00	$ 18,800.00
28	4.5	CY	Electrical Controls & Panel Pad, Complete and In Place	$ 1,300.00	$ 5,850.00
			Subtotal		**$ 630,710.00**
			Total Mobilization Payment (6%)	$ 37,842.60	
			Contractor's OH&P (15%)	$ 94,606.50	
			Contingency (30%)	$ 189,213.00	
OPINION OF PROBABLE CONSTRUCTION COST				**$**	**952,372.10**

This opinion of probable construction cost is released for the purpose of interim review under the authority of Maninder Randhawa, P.E., 145867, on March12, 2023.

Brushy Creek MUD

Hillside Dr LS Decommissioning - OPTION 1

30% Opinion of Probable Construction Cost (OPCC) - 12 March 2023

Item No.	Est. Quantity	Unit	Item Description	Unit Price	Unit Total
1	6	100' STA	Preparing Right of Way	$ 1,000.00	$ 5,500.00
2	550	LF	Flexible Base	$ 12.00	$ 6,600.00
3	80	SY	Surface Milling	$ 7.00	$ 560.00
4	250	SY	Hot Mix Asphaltic Concrete Pavement, 2.5 inches, Type D	$ 30.00	$ 7,500.00
5	5	EA	Standard Pre-cast Manhole w/Pre-cast Base, 4 ft Dia.	$ 8,000.00	$ 40,000.00
6	1	EA	Connect to Existing MH	$ 4,000.00	$ 4,000.00
7	525	LF	Trench Excavation Safety Protection Systems, (all depths)	$ 4.00	$ 2,100.00
8	525	LF	Pipe, 8" Dia, SDR 26 PVC (All depths), including Excavation and Backfill	$ 160.00	$ 84,000.00
9	2	EA	Connecting New 6" Service to Existing Private Service with or without service stack (6" Dia. New Service to 6" Dia. Private Service) Single Service	$ 1,300.00	$ 2,600.00
10	3	EA	Connecting New 6" Service to Existing Private Service with or without service stack (6" Dia. New Service to 6" Dia. Private Service) Double Service	$ 1,900.00	$ 5,700.00
11	115	LF	Sediment Containment Dikes with filter fabric	$ 12.00	$ 1,380.00
12	20	LF	Mulch Sock	$ 10.00	$ 200.00
13	1	EA	C.I.P. Project Sign	$ 1,000.00	$ 1,000.00
14	120	CD	Barricades, Signs and Traffic Handling	$ 165.00	$ 19,800.00
15	1,200	LF	Safety Fencing	$ 3.00	$ 3,600.00
16	1	LS	Demolition of Concrete Valve Vault	$ 900.00	$ 900.00
17	1	LS	Demolition of Wet Well	$ 6,000.00	$ 6,000.00
18	1	LS	Abandon Forcemain	$ 4,000.00	$ 4,000.00
19	20	LF	Removal of 6" Gravity Main	$ 10.00	$ 200.00
20	1	EA	Bypass Pumping	$ 5,000.00	$ 5,000.00
			Subtotal		**$ 200,640.00**
			Total Mobilization Payment (6%)	$ 12,038.40	
			Contractor's OH&P (15%)	$ 30,096.00	
			Contingency (30%)	$ 60,192.00	
OPINION OF PROBABLE CONSTRUCTION COST				**$**	**302,966.40**

This opinion of probable construction cost is released for the purpose of interim review under the authority of Maninder Randhawa, P.E., 145867, on March 12, 2023.

Brushy Creek MUD

Hillside Dr LS Decommissioning - OPTION 2

30% Opinion of Probable Construction Cost (OPCC) - 12 March 2023

Item No.	Est. Quantity	Unit	Item Description	Unit Price	Unit Total
1	6	100' STA	Preparing Right of Way	$ 1,000.00	$ 5,500.00
2	550	LF	Flexible Base	$ 12.00	$ 6,600.00
3	80	SY	Surface Milling	$ 7.00	$ 560.00
4	250	SY	Hot Mix Asphaltic Concrete Pavement, 2.5 inches, Type D	$ 30.00	$ 7,500.00
5	4	EA	Standard Pre-cast Manhole w/Pre-cast Base, 4 ft Dia.	$ 8,000.00	$ 32,000.00
6	1	EA	Connect to Existing MH	$ 4,000.00	$ 4,000.00
7	535	LF	Trench Excavation Safety Protection Systems, (all depths)	$ 4.00	$ 2,140.00
8	535	LF	Pipe, 8" Dia, SDR 26 PVC (All depths), including Excavation and Backfill	$ 160.00	$ 85,600.00
9	2	EA	Connecting New 6" Service to Existing Private Service with or without service stack (6" Dia. New Service to 6" Dia. Private Service) Single Service	$ 1,300.00	$ 2,600.00
10	3	EA	Connecting New 6" Service to Existing Private Service with or without service stack (6" Dia. New Service to 6" Dia. Private Service) Double Service	$ 1,900.00	$ 5,700.00
11	115	LF	Sediment Containment Dikes with filter fabric	$ 12.00	$ 1,380.00
12	20	LF	Mulch Sock	$ 10.00	$ 200.00
13	1	EA	C.I.P. Project Sign	$ 1,000.00	$ 1,000.00
14	120	CD	Barricades, Signs and Traffic Handling	$ 165.00	$ 19,800.00
15	1,200	LF	Safety Fencing	$ 3.00	$ 3,600.00
16	1	LS	Demolition of Concrete Valve Vault	$ 900.00	$ 900.00
17	1	LS	Demolition of Wet Well	$ 6,000.00	$ 6,000.00
18	1	LS	Abandon Forcemain	$ 4,000.00	$ 4,000.00
19	80	LF	Removal of 6" Gravity Main	$ 10.00	$ 800.00
20	1	EA	Bypass Pumping	$ 15,000.00	$ 15,000.00
			Subtotal		**$ 204,880.00**
			Total Mobilization Payment (6%)	$ 12,292.80	
			Contractor's OH&P (15%)	$ 30,732.00	
			Contingency (30%)	$ 61,464.00	
OPINION OF PROBABLE CONSTRUCTION COST				**$**	**309,368.80**

This opinion of probable construction cost is released for the purpose of interim review under the authority of Maninder Randhawa, P.E., 145867, on March 12, 2023.

JRSA ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
TBPE FIRM # 3997
6101 West Courtyard Dr., Bldg. 1, Suite 200 3 Austin, Texas 78730
V 512.452.8789

Cat Hollow- EIC Cost Estimate	
Electrical Equipment	**COST**
Electrical Service Upgrade*	$15,000.00
Main Service Disconnect	$7,500.00
Automatic Transfer Switch	$7,500.00
Diesel Generator	$150,000.00
MPZ	$10,000.00
Wetwell Junction Boxes (4 Total)	$16,000.00
Wetwell Instrumentation (Floats, LT)	$10,000.00
Lighting	$10,000.00
Grounding	$10,000.00
Conduit, Wire, Ductbanks, Pullboxes	$15,000.00
Electrical Rack	$15,000.00
Electrical Contingency (20%)	$53,200.00
TOTAL ELECTRICAL COST	
	$319,200.00

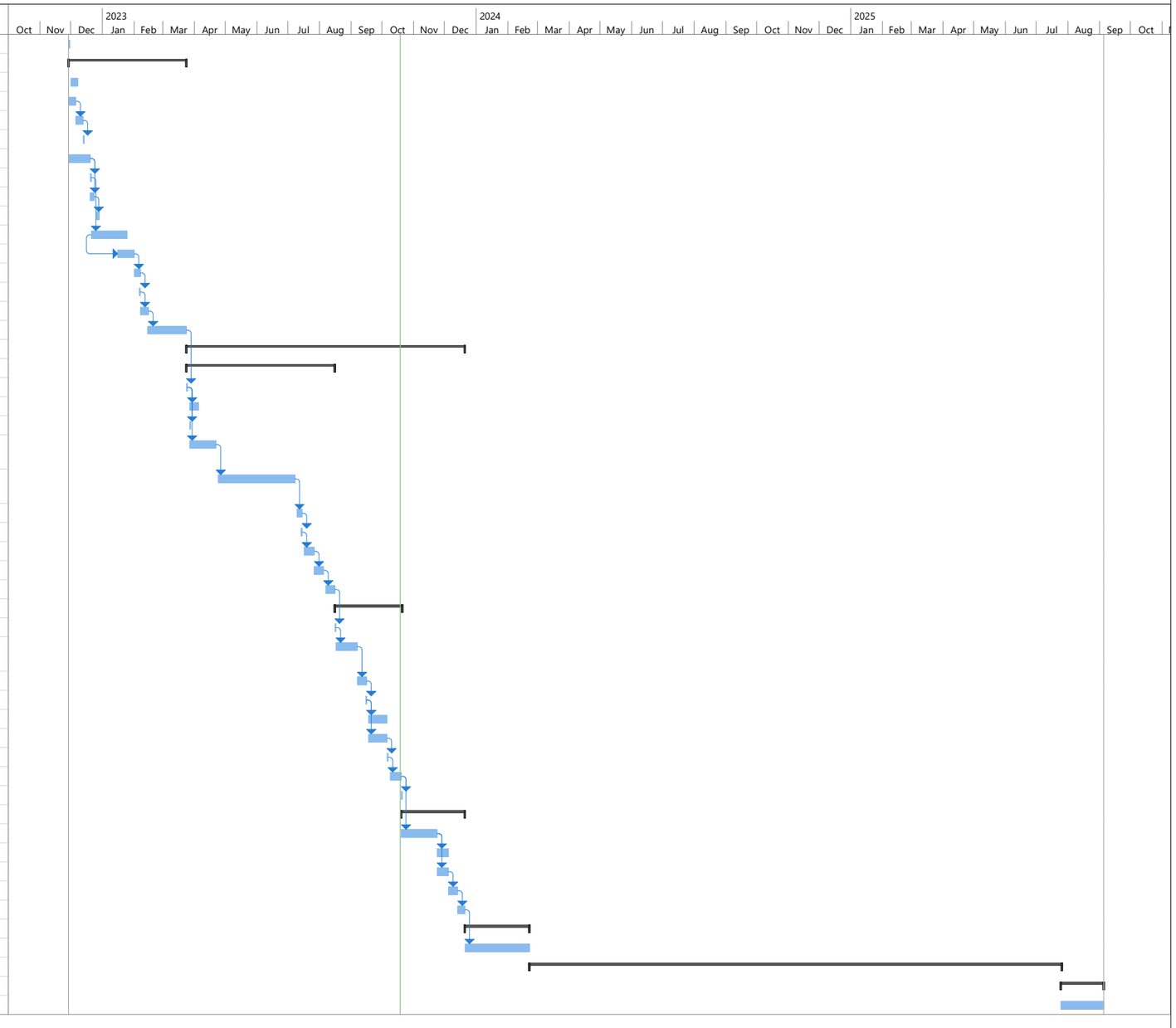
*Electrical Service may not require an upgrade. This item is TBD.

APPENDIX J

SCHEDULE

Project - Cat Hollow LS Improvements & Hillside Dr Lift Station Decomissioning Project

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		Kickoff Meeting - NTP	1 day	Tue 11/29/22	Tue 11/29/22	
2		**30% Preliminary Design Phase**	**83 days**	**Tue 11/29/22**	**Thu 3/23/23**	
3		Review of Recored Drawings and Data	5 days	Thu 12/1/22	Wed 12/7/22	
4		Data Collection and Site Visit	5 days	Tue 11/29/22	Mon 12/5/22	
5		Pump & Wet-Well Capacity Analysis - Cat Hollow	5 days	Tue 12/6/22	Mon 12/12/22	4
6		Permitting & Outside Agency Coordination Letters	1 day	Tue 12/13/22	Tue 12/13/22	5
7		Survey (CH & HS)	15 days	Tue 11/29/22	Mon 12/19/22	
8		Geotechnical Borings(s) Plan & Layout	1 day	Tue 12/20/22	Tue 12/20/22	7
9		Cat Hollow Site Layout	4 days	Tue 12/20/22	Fri 12/23/22	7
10		Hillside Dr. Gravity Pipe Alignment	3 days	Mon 12/26/22	Wed 12/28/22	9
11		30% Design Deliverables	25 days	Wed 12/21/22	Tue 1/24/23	8
12		Design Engineering Report	12 days	Mon 1/16/23	Tue 1/31/23	11SS+14 days
13		Internal QA/QC Deliverables	4 days	Wed 2/1/23	Mon 2/6/23	12
14		Submit 30% Design Deliverables	1 day	Mon 2/6/23	Mon 2/6/23	13FS-1 day
15		BCMUD Review	6 days	Tue 2/7/23	Tue 2/14/23	14
16		Finalize 30% Design with BCMUD Comments	28 days	Tue 2/14/23	Thu 3/23/23	15FS-1 day
17		**Design Phase**	**194 days?**	**Fri 3/24/23**	**Wed 12/20/23**	
18		**60% Design Phase**	**103 days**	**Fri 3/24/23**	**Tue 8/15/23**	
19		Kickoff Meeting	1 day	Fri 3/24/23	Fri 3/24/23	16
20		Geotechnical Investigations	7 days	Mon 3/27/23	Tue 4/4/23	19
21		Design Phase Site Visit	1 day	Mon 3/27/23	Mon 3/27/23	19
22		Water Pollution Abatement Plan (WPAP) & Organized Sewer Collection System (SCS) Plan	20 days	Mon 3/27/23	Fri 4/21/23	19
23		60% Design Deliverables (Plans, Specs, OPCC, and Cons. Schedule)	55 days	Mon 4/24/23	Fri 7/7/23	22
24		Internal QA/QC Design Deliverables	5 days	Mon 7/10/23	Fri 7/14/23	23
25		Submit 60% Design Deliverables	1 day	Fri 7/14/23	Fri 7/14/23	24FS-1 day
26		BCMUD Review of 60% Deliverables	8 days	Mon 7/17/23	Wed 7/26/23	25
27		Review 60% Comments with BCMUD & FBMUD	7 days	Thu 7/27/23	Fri 8/4/23	26
28		FBMUD Review of 60% Design (Hillside)	7 days	Mon 8/7/23	Tue 8/15/23	27
29		**90% Design Phase**	**48 days?**	**Wed 8/16/23**	**Fri 10/20/23**	
30		WPAP and SCS Coordination with TCEQ	1 day	Wed 8/16/23	Wed 8/16/23	28
31		90% Design Deliverables (Plans, Specs, OPCC, and Cons. Schedule)	15 days	Thu 8/17/23	Wed 9/6/23	30
32		Internal QA/QC Design Deliverables	7 days	Thu 9/7/23	Fri 9/15/23	31
33		Submit 90% Design	1 day	Fri 9/15/23	Fri 9/15/23	32FS-1 day
34		BCMUD Review of 90% Design	14 days	Mon 9/18/23	Thu 10/5/23	33
35		FBMUD Review of 90% (Hillside Dr)	14 days	Mon 9/18/23	Thu 10/5/23	33
36		BCMUD Board Meeting	1 day	Fri 10/6/23	Fri 10/6/23	35
37		Address all Final Comments	9 days	Mon 10/9/23	Thu 10/19/23	36
38		90% Design Review Meeting	1 day?	Fri 10/20/23	Fri 10/20/23	37
39		**100% Design Phase**	**44 days**	**Fri 10/20/23**	**Wed 12/20/23**	
40		100% Design Deliverables	25 days	Fri 10/20/23	Thu 11/23/23	37
41		BCMUD Review and Address	7 days	Fri 11/24/23	Mon 12/4/23	40
42		FBMUD Review and Address	7 days	Fri 11/24/23	Mon 12/4/23	40
43		Review 100% Comments with BCMUD & FBMUD	7 days	Tue 12/5/23	Wed 12/13/23	42
44		Finalize All Bid Documents	5 days	Thu 12/14/23	Wed 12/20/23	43
45		**Bid Phase**	**45 days**	**Thu 12/21/23**	**Wed 2/21/24**	
46		Bid Phase	45 days	Thu 12/21/23	Wed 2/21/24	44
47		**Construction Phase**	**372 days**	**Thu 2/22/24**	**Fri 7/25/25**	
107		**Post Construction Phase**	**30 days**	**Fri 7/25/25**	**Thu 9/4/25**	
108		Record Drawing Phase	30 days	Fri 7/25/25	Thu 9/4/25	106



Project: CH LS & HS LS Project
Date: Thu 10/19/23

Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Progress
Manual Progress

ATTACHMENT B

(NOT APPLICABLE)

ATTACHMENT C

(NOT APPLICABLE)

ATTACHMENT D

FLOW VELOCITY CALCULATIONS (NOT APPLICABLE)

TEMPORARY STORMWATER (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: Maninder Randhawa, P.E.

Date: 11/20/2023

Signature of Customer/Agent:

M. Randhawa

Regulated Entity Name: Brushy Creek Municipal Utility District

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: Brushy Creek

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.

ATTACHMENT A

SPILL RESPONSE ACTIONS

SPILL RESPONSE ACTIONS

Upon determination that a spill of petroleum products has occurred exceeding the Final Reportable Quantity of 25 gallons, immediate action is required. These actions include abating and containing the spill by stopping the spill, minimizing impact to the public health and environment, neutralizing the effects of the incident, removing the spilled substance, and managing the wastes. The contractor shall notify the TCEQ as soon as possible but not more than 24 hours after discovery of the spill. The notification report will include the following:

1. The name address and telephone number of the person making the report;
2. The date, time and location of the spill;
3. A specific description of the substance that was spilled;
4. An estimate of the quantity of the spill;
5. The duration of the incident;
6. The source of the spill;
7. A description of the extent of actual or potential harmful impacts to the environment or anticipated health risks;
8. A description of any actions that have been taken, are being taken, or will be taken to contain and respond to the spill;
9. The identity of any third parties responding to the spill.

The report shall be submitted to the State Emergency Response Center at 1-800-832-8224 or to the regional office of the TCEQ if the notification report is submitted during normal business hours.

If the spill constitutes an immediate health threat, the contractor shall immediately notify and cooperate with local emergency authorities to support and implement appropriate notification and response actions. Within two weeks of the spill, the contractor will reasonably attempt to notify the owner or occupant of the property upon which the spill occurred as well as the occupants of any property that the contractor reasonably believes will be adversely affected.

Within 30 days of the spill, the contractor shall submit in writing to the TCEQ regional manager details of the spill and verification that the spill response was adequate. The submission will include one of the following:

1. A statement that the spill response actions have been completed and a description of how the response action was conducted. The statement must include the information contained in the notification report.
2. A request for an extension of time to complete the response action along with the reasons for the request. A projected work schedule outlining the time required to complete the response action is also should also be included. The executive director may grant an extension of up to six months from the sate of the spill was reported.
3. A statement that the spill response has not been completed and will not be completed within the maximum allowable six month extension. The statement should include why the completion of the response actions is not feasible and a projected work schedule outlining the remaining tasks necessary to complete the response actions.

ATTACHMENT B

POTENTIAL SOURCES OF CONTAMINATION

POTENTIAL SOURCES OF CONTAMINATION

Potential sources of sediment to stormwater runoff:

Surface runoff of dirt, tracking of mud, construction debris, and windblown dust will be controlled through the use of temporary erosion control practices.

Potential pollutants and sources, other than sediment, to stormwater runoff:

Temporary potential sources of contamination include:

1. Equipment fuel and oil
2. Concrete
3. Asphalt pavement products
4. Sewer spills

ATTACHMENT C

SEQUENCE OF MAJOR ACTIVITIES

SCHEDULE OF MAJOR ACTIVITIES

ACTIVITY	AREA DISTURBED (ac)	TEMPORARY CONTROLS
Excavate	0.0373	Triangular filter dyke, mulch socks for inlets
Install Pipe & Manholes	0.0373	Triangular filter dyke, mulch socks for inlets
Backfill	0.0373	Triangular filter dyke, mulch socks for inlets
Demolition	0.000023	Triangular filter dyke, mulch socks for inlets
Connect Gravity System	0.000023	Triangular filter dyke, mulch socks for inlets
Pavement Restoration	0.0373	Triangular filter dyke, mulch socks for inlets

ATTACHMENT D

TEMPORARY BEST MANAGEMENT PRACTICES AND MEASURES

TEMPORARY BEST MANAGEMENT PRACTICES AND MEASURES

The general construction sequence will be as follows:

1. Schedule and conduct the preconstruction conference.
2. Install temporary erosion controls, pedestrian protection measures, and traffic control measures.
3. Clear and excavate the project site.
4. Install piped and manholes.
5. Backfill the trenched areas.
6. Complete bypass operation.
7. Shut down the wet well.
8. Conduct demolition of previous Hillside Lift Station.
9. Restore project site.
10. Connect to existing gravity sewer system.
11. Final dress site and remove temporary erosion controls.

As stated in 2. the temporary erosion controls will be installed before any other construction activity commences.

The temporary erosion controls are listed below. The mulch sock inlet protection and triangular filter dykes will prevent the pollution of surface water, groundwater and stormwater by not allowing the sediment from construction activities to leave the site. All sediment contained in flows that cross the site, including flow that originates upstream of the site, will be filtered by the temporary erosion controls listed. The mulch sock inlet protection filters will filter out sediment in the stormwater as it leaves the site. The measures will then be cleaned, as described on the schedule below, to ensure that they remain functioning.

BMP Description: Mulch Sock Inlet Protection

Installation Schedule:	Prior to commencement of construction activity
Maintenance and Inspection:	Weekly and after each significant rainfall
Responsible Staff:	TBD

BMP Description: Triangular Filter Dyke

Installation Schedule:	Prior to commencement of construction activity
Maintenance and Inspection:	Weekly and after each significant rainfall
Responsible Staff:	TBD

ATTACHMENT E

REQUEST TO TEMPORARILY SEAL A FEATURE (NOT APPLICABLE)

ATTACHMENT F

STRUCTURAL PRACTICES (NOT APPLICABLE)

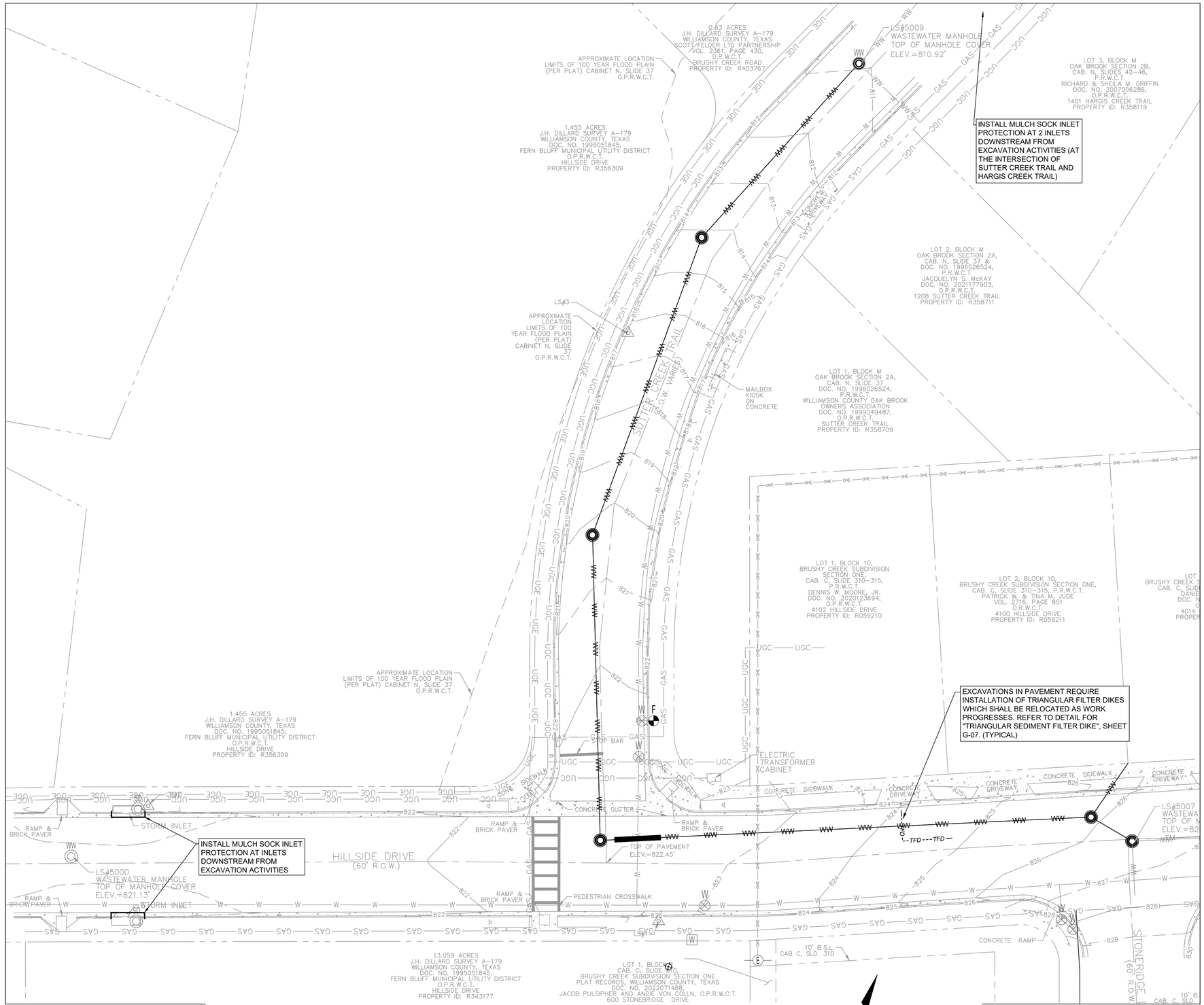
ATTACHMENT G

DRAINAGE AREA MAP

DRAINAGE AREA MAP

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. These other methods include:

1. Material Storage
2. Stockpipe Management
3. Solid Waste Management
4. Inlet Protection
5. Triangular Filter Dykes



HILLSIDE DRIVE EROSION AND SEDIMENTATION CONTROL

SCALE: 1" = 8'

0 4' 8' 16' 24'

LEGEND

	CONTROL POINT SET
BM	BENCHMARK SET (DESCRIBED)
BM	BENCHMARK FOUND (DESCRIBED)
	1/2" IRON ROD FOUND
	60D NAIL FOUND
	1" AXLE FOUND
E	ELECTRIC UTILITY POLE
W	WATER METER
	WATER VALVE
S	STORM MANHOLE
E	ELECTRIC JUNCTION BOX
E	ELECTRIC METER
WW	WASTEWATER MANHOLE - WWMH
E	ELECTRIC PULL BOX
E	ELECTRIC MANHOLE
	BREAK-ON LINE (NOT TO SCALE)
( )	RECORD INFORMATION
LS#	LANDMARK SURVEYING POINT NUMBER
ROW	RIGHT-OF-WAY
D.R.W.C.T.	DEED RECORDS, WILLIAMSON COUNTY, TEXAS
P.R.W.C.T.	PLAT RECORDS WILLIAMSON COUNTY, TEXAS
O.P.R.W.C.T.	OFFICIAL PUBLIC RECORDS, WILLIAMSON COUNTY, TEXAS
	CHAINLINK FENCE
	BARBED WIRE FENCE
600	MAJOR CONTOURS
599	MINOR CONTOURS
ROW	RIGHT OF WAY LINE (APPROXIMATE)
	PROPERTY LINE (APPROXIMATE)
	EDGE OF PAVEMENT
	CURB LINE
OHE	OVERHEAD ELECTRIC LINES
WW	WASTEWATER LINE
	CONCRETE IMPROVEMENT
	TO BE DEMOLISHED

SURVEYOR NOTE

UTILITY LOCATION AND LINE IDENTIFICATION SHOWN HEREON THIS SURVEY ARE PER CONSTRUCTION PLAN DEVELOPED BY GRAY ENGINEERING, INC FOR "WILLIAMSON COUNTY MUNICIPAL UTILITY DISTRICT NO. 2. LIFT STATION NO. 3", PROJECT NO. 927-2496, ACCEPTED AND APPROVED FOR CONSTRUCTION JUNE 22, 1990.

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	REVISION	BY

BRUSHY CREEK M.U.D.

BRUSHY CREEK
MUNICIPAL UTILITY DISTRICT

HILLSIDE DRIVE EROSION AND SEDIMENT CONTROL

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF MANINDER RANDHAWA, P.E. 145867 JULY 2023 THIS DOCUMENT IS NOT INTENDED FOR BIDDING, PERMITTING AND/OR CONSTRUCTION PURPOSES

BAR IS ONE INCH ON ORIGINAL DRAWING.
ONE INCH

DESIGNED	---
DRAWN	---
CHECKED	---
REVIEWED	---
Seq.	1 of 42
Dwg. No.	G-11
WON: 15960.001.001.2000	

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ATTACHMENT H

TEMPORARY SEDIMENT POND PLANS AND CALCULATIONS (NOT APPLICABLE)

ATTACHMENT I

INSPECTION AND MAINTENANCE FOR BEST MANAGEMENT PRACTICES

Project Name:

BEST MANAGEMENT PRACTICE INSPECTION AND MAINTENANCE REPORT FORM

MULCH SOCK INLET PROTECTION BARRIERS

Name of Inspector: _____ Inspection Date: _____
Days Since Last Rainfall: _____ Amount of Last Rainfall: _____ inches

Location	In Place?	Depth of Sediment	Condition of Inlet

MAINTENANCE REQUIRED FOR INLET PROTECTION BARRIERS: _____

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

Project Name:

BEST MANAGEMENT PRACTICE INSPECTION AND MAINTENANCE REPORT FORM

TRIANGULAR FILTER DYKE PROTECTION BARRIERS

Name of Inspector: _____ Inspection Date: _____
Days Since Last Rainfall: _____ Amount ofLast Rainfall:_____inches

Location	In Place?	Depth of Sediment	Condition of Inlet

MAINTENANCE REQUIRED FOR INLET PROTECTION BARRIERS: _____

TO BE PERFORMED BY:_____ ON OR BEFORE: _____

ATTACHMENT J

SCHEDULE OF INTERIM AND PERMANENT SOIL STABILIZATION PRACTICES

SCHEDULE OF INTERIM AND PERMANENT SOIL STABILIZATION PRACTICES

Permanent soil stabilization practices will include:

1. Asphalt restoration by mill and overlay.

No permanent soils slopes steeper than three horizontal to one vertical will be created as a result of this project.

BMP Description: Asphalt restoration by mill and overlay.

Installation Schedule:	Per sequence of construction
Maintenance and Inspection:	N/A
Responsible Staff:	TBD

AGENT AUTHORIZATION FORM (TCEQ 0599)

Agent Authorization Form
For Required Signature
Edwards Aquifer Protection Program
Relating to 30 TAC Chapter 213
Effective June 1, 1999

I Shean Dalton,
Print Name

General Manager,
Title - Owner/President/Other

of **Brushy Creek MUD**,
Corporation/Partnership/Entity Name

have authorized **Maninder Randhawa, P.E.**
Print Name of Agent/Engineer

of **Weston Solutions, Inc**
Print Name of Firm

to represent and act on the behalf of the above named Corporation, Partnership, or Entity for the purpose of preparing and submitting this plan application to the Texas Commission on Environmental Quality (TCEQ) for the review and approval consideration of regulated activities.

I also understand that:

1. The applicant is responsible for compliance with 30 Texas Administrative Code Chapter 213 and any condition of the TCEQ's approval letter. The TCEQ is authorized to assess administrative penalties of up to $10,000 per day per violation.

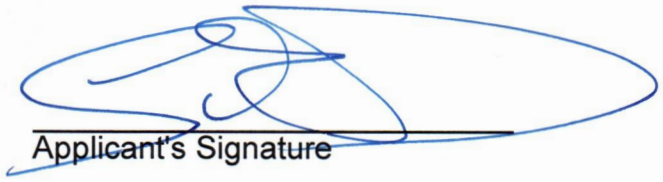
2. For those submitting an application who are not the property owner, but who have the right to control and possess the property, additional authorization is required from the owner.

3. Application fees are due and payable at the time the application is submitted. The application fee must be sent to the TCEQ cashier or to the appropriate regional office. The application will not be considered until the correct fee is received by the commission.

4. A notarized copy of the Agent Authorization Form must be provided for the person preparing the application, and this form must accompany the completed application.

5. No person shall commence any regulated activity on the Edwards Aquifer Recharge Zone, Contributing Zone or Transition Zone until the appropriate application for the activity has been filed with and approved by the Executive Director.

SIGNATURE PAGE:



Applicant's Signature

10/11/23
Date

THE STATE OF TX §

County of Williamson §

BEFORE ME, the undersigned authority, on this day personally appeared Shean Dalton known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that (s)he executed same for the purpose and consideration therein expressed.

GIVEN under my hand and seal of office on this 11 day of October, 2023

NOTARY PUBLIC

Chelsea Lockhart
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 05/01/2024

APPLICATION FEE FORM (TCEQ 0574)

Application Fee Form

Texas Commission on Environmental Quality
Name of Proposed Regulated Entity: Brushy Creek Municipal Utility District
Regulated Entity Location: Round Rock, TX
Name of Customer: Brushy Creek Municipal Utilities District
Contact Person: Amy Giannini, P.E. Phone: 512-255-7871
Customer Reference Number (if issued):CN 600646574
Regulated Entity Reference Number (if issued):RN 105482053

Austin Regional Office (3373)

☐ Hays ☐ Travis ☒ Williamson

San Antonio Regional Office (3362)

☐ Bexar ☐ Medina ☐ Uvalde
☐ Comal ☐ Kinney

Application fees must be paid by check, certified check, or money order, payable to the **Texas Commission on Environmental Quality**. Your canceled check will serve as your receipt. **This form must be submitted with your fee payment**. This payment is being submitted to:

☒ Austin Regional Office
☐ Mailed to: TCEQ - Cashier
Revenues Section
Mail Code 214
P.O. Box 13088
Austin, TX 78711-3088

☐ San Antonio Regional Office
☐ Overnight Delivery to: TCEQ - Cashier
12100 Park 35 Circle
Building A, 3rd Floor
Austin, TX 78753
(512)239-0357

Site Location (Check All That Apply):

☒ Recharge Zone ☐ Contributing Zone ☐ Transition Zone

Type of Plan	***Size***	***Fee Due***
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	Acres	$
Sewage Collection System	542.08 L.F.	$ 650
Lift Stations without sewer lines	Acres	$
Underground or Aboveground Storage Tank Facility	Tanks	$
Piping System(s)(only)	Each	$
Exception	Each	$
Extension of Time	Each	$

Signature: M. Lehrer Date: 11/20/2023

Application Fee Schedule

Texas Commission on Environmental Quality
Edwards Aquifer Protection Program 30 TAC Chapter 213 (effective 05/01/2008)

Water Pollution Abatement Plans and Modifications

Contributing Zone Plans and Modifications

Project	*Project Area in Acres*	*Fee*
One Single Family Residential Dwelling	< 5	$650
Multiple Single Family Residential and Parks	< 5 5 < 10 10 < 40 40 < 100 100 < 500 ≥ 500	$1,500 $3,000 $4,000 $6,500 $8,000 $10,000
Non-residential (Commercial, industrial, institutional, multi-family residential, schools, and other sites where regulated activities will occur)	< 1 1 < 5 5 < 10 10 < 40 40 < 100 ≥ 100	$3,000 $4,000 $5,000 $6,500 $8,000 $10,000

Organized Sewage Collection Systems and Modifications

Project	*Cost per Linear Foot*	*Minimum Fee-Maximum Fee*
Sewage Collection Systems	$0.50	$650 - $6,500

Underground and Aboveground Storage Tank System Facility Plans and Modifications

Project	*Cost per Tank or Piping System*	*Minimum Fee-Maximum Fee*
Underground and Aboveground Storage Tank Facility	$650	$650 - $6,500

Exception Requests

Project	*Fee*
Exception Request	$500

Extension of Time Requests

Project	*Fee*
Extension of Time Request	$150

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 600646574		**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:*

Brushy Creek Municipal Utility District

7. TX SOS/CPA Filing Number	**8. TX State Tax ID** (11 digits)	**9. Federal Tax ID** (9 digits)	**10. DUNS Number** *(if applicable)*
	0174-200680	74-2006801	03-984-2885

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: Municipal Utility District

15. Mailing Address:	16318 Great Oaks Drive						
	City	Round Rock	**State**	TX	**ZIP**	78681	**ZIP + 4**	2506

16. Country Mailing Information *(if outside USA)*	**17. E-Mail Address** *(if applicable)*
	b.carr@bcmud.org

18. Telephone Number	19. Extension or Code	20. Fax Number *(if applicable)*
(512) 255-7871	401	( ) -

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.)*

Brushy Creek Municipal Utility District

23. Street Address of the Regulated Entity: ***(No PO Boxes)***	Hillside Dr and Sutter Creek Trail							
	City	Round Rock	**State**	TX	**ZIP**	78681	**ZIP + 4**	2506
24. County	Williamson							

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

25. Description to Physical Location:					
26. Nearest City			**State**		**Nearest ZIP Code**
Round Rock			TX		78681

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:	30.513418		**28. Longitude (W) In Decimal:**	-97.741674	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds

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)
9631		00221	

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

Municipal Utility District providing water, wastewater, and stormwater services.

34. Mailing Address:	**16318 Great Oaks Drive**							
	City	**Round Rock**	**State**	**TX**	**ZIP**	**78681**	**ZIP + 4**	**2506**
35. E-Mail Address:	b.carr@bcmud.org							

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(512) 255-7871	401	( ) -

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
				PWS 2400661
☐ Sludge	☒ Storm Water	☐ Title V Air	☐ Tires	☐ Used Oil
	TXR0400049			
☐ Voluntary Cleanup	☒ Wastewater	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:
	WQ0010264001			

SECTION IV: Preparer Information

40. Name:	Maninder Randhawa, P.E.	41. Title:	Professional Engineer
42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(512) 920-4847		( ) -	maninder.randhawa@westonsolutions.com

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:	Brushy Creek MUD	**Job Title:**	Utilities System Manager
Name *(In Print):*	William Carr	**Phone:**	(512) 255-7871 **x401**
Signature:	William Carr	**Date:**	10-10-23

RELEVANT PLAN SHEETS

PROJECT INFORMATION:

CAT HOLLOW LIFT STATION
O'CONNOR DRIVE
ROUND ROCK, TX 78664

HILLSIDE LIFT STATION
1208 SUTTER CREEK TRAIL
AUSTIN, TX 78717
AND
4014, 4100, 4102 HILLSIDE DRIVE
ROUND ROCK, TX 78681

OWNER:

BRUSHY CREEK MUNICIPAL UTILITY DISTRICT
16318 GREAT OAKS
ROUND ROCK, TX 78681

DISTRICT ENGINEER:

AMY GIANNINI, P.E.
16318 S GREAT OAKS DR
ROUND ROCK, TX 78735
512-255-7871 EXT. 237
A.GIANNINI@BCMUD.ORG

BOARD MEMBERS:

REBECCA B. TULLOS, PLACE 1	– TREASURER
MICHAEL TUCKER, PLACE 2	– PRESIDENT, ASSISTANT TREASURER
KIM FILIATRAULT, PLACE 3	– VICE PRESIDENT
(VACANT), PLACE 4	
KEN REIFSHCLAGER, PLACE 5	– SECRETARY

BUSINESS PERSONNEL:

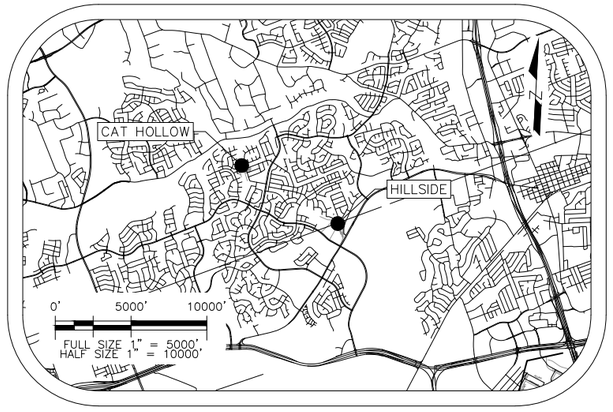
SHEAN R. DALTON	– GENERAL MANAGER
BILL CARR	– UTILITY SYSTEMS MANAGER
AMY GIANNINI	– DISTRICT ENGINEER

CONTACT:
SAM IRRINKI, P.E.
PHONE: 512-651-7106
FAX: 512-651-7101
sam.irrinki@westonsolutions.com

Brushy Creek Municipal Utility District

CAT HOLLOW LIFT STATION IMPROVEMENTS AND HILLSIDE LIFT STATION DECOMMISSIONING

8 NOVEMBER 2023



WESTON SOLUTIONS
TEXAS REGISTERED ENGINEERING FIRM F-3123
SUBMITTAL PREPARED BY: WESTON SOLUTIONS, INC.
70 N.E. LOOP 410, SUITE 200 SAN ANTONIO, TX 78216

Sheet List Table

Sheet Number	DWG Number	Sheet Title
1	G-01	COVER SHEET AND INDEX
2	G-02	ABBREVIATIONS AND LEGEND
3	G-03	GENERAL NOTES
4	G-04	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY NOTES (1 of 2)
5	G-05	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY NOTES (2 of 2)
6	G-06	TREE PROTECTION AND E&S NOTES
7	G-07	TREE PROTECTION AND E&S DETAILS
8	G-08	CAT HOLLOW SURVEY CONTROL
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13	C-01	CAT HOLLOW OVERALL SITE DEMOLITION PLAN
14	C-02	CAT HOLLOW PROPOSED SITE PLAN
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16	C-04	CAT HOLLOW WASTEWATERLINE A & B PLAN & PROFILE STA. 1+00 TO 2+66
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18	C-06	HILLSIDE DRIVE OVERALL SITE PLAN
19	C-07	HILLSIDE DR WASTEWATERLINE C PLAN & PROFILE STA. 1+00 TO 4+32.83
20	C-08	HILLSIDE DR WASTEWATERLINE C PLAN & PROFILE STA. 1+00 TO 2+66
21	C-09	HILLSIDE DR WASTEWATER LINE D PLAN & PROFILE STA. 1+00 TO 3+09
22	D-01	PROJECT DETAILS
23	D-02	STANDARD DETAILS (1 OF 2)
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25	M-01	CAT HOLLOW PROPOSED LIFT STATION AND VALVE PAD PLAN
26	M-02	CAT HOLLOW PROPOSED LIFT STATION AND VALVE PAD SECTION A-A
27	M-03	CAT HOLLOW PROPOSED LIFT STATION AND VALVE PAD SECTION B-B
28	M-04	CAT HOLLOW VALVE PAD AND FLOW METER VAULT SECTION C-C AND DETAIL
29	M-05	LIFT STATION DETAILS
30	S-01	CAT HOLLOW STRUCTURAL GENERAL NOTES
31	S-02	CAT HOLLOW TOP SLAB AND MAT FOUNDATION PLAN AND SECTIONS
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33	S-04	CAT HOLLOW ELECTRICAL AND ODOR CONTROL PAD PLAN AND SECTIONS
34	S-05	JIB CRANE FOUNDATION, PLAN AND SECTION
35	TC-01	TRAFFIC CONTROL GENERAL NOTES AND TABLE
36	TC-02	TRAFFIC CONTROL PLAN - HILLSIDE DRIVE
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44	E-03	ONE LINE DIAGRAM
45	E-04	ELECTRICAL EQUIPMENT RACK ELEVATION
46	E-05	WET WELL DETAILS
47	E-06	ELECTRICAL DETAILS

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED
PROFESSIONAL ENGINEER
11-8-2023

100% SUBMITTAL

ABBREVIATIONS:

@	AT
ABAND	ABANDONED
ADF	AVERAGE DAILY FLOW
APPROX	APPROXIMATELY
AC	ASBESTOS CEMENT
BLDG	BUILDING
C/C	CENTER TO CENTER
CCT	CHLORINE CONTACT TANK
CCTV	CLOSED CIRCUIT TELEVISION VIDEO
CFM	CUBIC FEET PER MINUTE
CIPP	CURED-IN-PLACE PIPE
CI	CAST IRON
℄	CENTER LINE
CLR	CLEAR, CLEARANCE
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUATION
C.R.Z.	CRITICAL ROOT ZONE
CS	CARBON STEEL
DI	DUCTILE IRON
DIA	DIAMETER
DTL	DETAIL
DWG	DRAWING
E&S	EROSION AND SEDIMENTATION
EFF	EFFLUENT
ELEC	ELECTRIC
ELEV/EL	ELEVATION
ESMT	EASEMENT
EX.	EXISTING
EXT	EXTERIOR
FG	FINISHED GRADE
FL	FLOWLINE
FLG	FLANGE
FRP	FIBERGLASS REINFORCED PLASTIC
FS	FINISHED SURFACE
FT	FEET
FTG	FOOTING
GALV	GALVANIZED
GB	GRADE BREAK
GPM	GALLONS PER MINUTE
GV	GATE VALVE
HDPE	HIGH DENSITY POLYETHYLENE
HMWPE	HIGH MOLECULAR WEIGHT POLYETHYLENE
HOR	HORIZONTAL
HZ	HERTZ
IAW	IN ACCORDANCE WITH
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IN	INCH
INV	INVERT
LDPE	LOW DENSITY POLY ETHYLENE
LF	LINEAR FEET
LS	LIFT STATION
MAX	MAXIMUM
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MJ	MECHANICAL JOINT
NA	NOT APPLICABLE
NO.	NUMBER
NTS	NOT TO SCALE
NWP	NATION WIDE PERMIT
O.C.	ON CENTER
PDF	PEAK DAILY FLOW
PF	PEAK FLOW
PHF	PEAK HOURLY FLOW
PROP	PROPOSED
PSIG	POUNDS PER SQUARE INCH GAUGE
PVC	POLYVINYL CHLORIDE
R	RADIUS
RAS	RETURN ACTIVATED SLUDGE
RED	REDUCER
RCP	REINFORCED CONCRETE PIPE
R.O.W.	RIGHT-OF-WAY
SCH	SCHEDULE
SEC	SECTION
SEQ	SEQUENCE
SF	SQUARE FEET
SHT	SHEET
SS	STAINLESS STEEL
SWPPP	STORM WATER POLLUTION PREVENTION PLAN
TB	THRUST BLOCK
TC	TOP OF CURB
TDH	TOTAL DYNAMIC HEAD
T.O.C.	TOP OF CONCRETE
TP	TOP OF PIPE
TYP	TYPICAL
UG	UNDERGROUND
VERT	VERTICAL
VOL	VOLUME
WAS	WASTE ACTIVATED SLUDGE
WW	WASTEWATER
WWTP	WASTEWATER TREATMENT PLANT

LEGEND SYMBOLS:

IRF ●	1/2" REBAR FOUND (OR AS NOTED)
	BENCHMARK/ CONTROL POINT
	BORE HOLE STAKE LOCATION (FOUND)
X	SPOT ELEVATION
953	EX. CONTOUR LINE
LOC	LIMITS OF CONSTRUCTION
TP	TREE PROTECTION
	PROPERTY LINE
	EX. ELECTRIC OVERHEAD
G	EX. GAS LINE
	EX. UG COMMUNICATION LINE
SD	EX. STORM DRAIN
	EX. WASTEWATER LINE
W	EX. WATER LINE
	EDGE OF ASPHALT PAVEMENT
X	EX. CHAIN LINK FENCE
	EX. WROUGHT IRON FENCE
	EX. WOOD FENCE
	PROP. WASTEWATER LINE
	PROP. WATER LINE
	PROP. DRAIN LINE
	PROP. FORCE MAIN LINE
	PROP. ELECTRIC LINE
	PROP. CHAIN LINK FENCE
	PROP. WASTEWATER MANHOLE
CO	PROP. CLEANOUT

	SIGN
	TREE
Ⓥ	VALVE
Ⓘ	PIPE INFLOW
Ⓞ	PIPE OUTFLOW
	PIPE (AS NOTED)
Ⓜ	MOTOR (TOP CENTER)
Ⓟ	TOP OF PIPE
Ⓕ	FACE OF PIPE
Ⓦ	WATER METER
	FIRE HYDRANT
	UTILITY POLE
	GUY WIRE
OU	OVERHEAD UTILITIES
Ⓔ	ELECTRIC UTILITY
	WASTEWATER MANHOLE
SSMH	STORMSEWER MANHOLE
CO	CLEANOUT
	BOLLARD
T.O.N.	TOP OF NUT MEASUREMENT
T.O.P.	TOP OF PIPE MEASUREMENT
( )	RECORD INFORMATION
	POWER POLE
	DOWN GUY
	PROP. GATE VALVE
	PROP. BALL VALVE

LEGEND PROFILE SYMBOLS:

EX. GROUND

EX. WASTEWATER LINE

PROP. WASTEWATER LINE

EX. WASTEWATER MANHOLE

PROP. WASTEWATER MANHOLE

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	
A	11/8/23	100% SUBMITTAL MR
		REVISION BY

BRUSHY CREEK M.U.D.

BRUSHY CREEK
MUNICIPAL UTILITY DISTRICT

ABBREVIATIONS AND LEGEND

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Maninder S. Randhawa, P.E. 145867 on 11-08-2023

08 NOVEMBER 2023

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Seq. 2 of 46

Dwg. No. G-02

WON: 15960.001.001.2000

GENERAL CONSTRUCTION NOTES

1. CONTRACTOR SHALL NOTIFY BRUSHY CREEK MUD 48 HOURS PRIOR TO STARTING CONSTRUCTION OR CLEARING OPERATIONS.

2. CONTRACTOR SHALL "ONE CALL" AT 1-800-344-8377 FOR UTILITY LOCATIONS AT LEAST 48 HOURS PRIOR TO ANY WORK IN CITY EASEMENTS OR STREET RIGHT-OF-WAYS.

3. THIS PROJECT SITE IS NOT LOCATED WITHIN THE 100-YEAR FLOODPLAIN, PER FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAPS (FIRM): FIRM 48491C0488F, EFFECTIVE 12/20/2019.

4. THIS PROJECT IS WITHIN THE EDWARDS AQUIFER RECHARGE ZONE AS DEFINED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ). THIS PROJECT IS NOT WITHIN THE EDWARDS AQUIFER RECHARGE ZONE AS REGULATED BY TCEQ.

5. THERE ARE CRITICAL ENVIRONMENTAL FEATURES WITHIN 150' OF ANY PORTION OF THIS PROJECT. A FIELD INVESTIGATION HAS BEEN PERFORMED AS A PART OF THIS PROJECT.

6. APPROPRIATE EASEMENTS/APPROVALS MUST BE SECURED AND DOCUMENTED FOR ANY WORK OUTSIDE OF RIGHT-OF-WAYS. NO WORK SHALL BE PERFORMED WITHIN THESE AREAS UNTIL ASSOCIATED RIGHT-OF-WAY ENTRY HAD BEEN SECURED.

7. THE PROJECT MANUAL CONTAINS IMPORTANT INFORMATION THAT IS NOT REPEATED IN THE PLAN SET. THE CONTRACTOR SHALL KEEP THE PROJECT MANUAL ON SITE AND IMMEDIATELY AVAILABLE TO THOSE PERSONS PERFORMING THE WORK. UPON REQUEST, THE CONTRACTOR SHALL PRESENT THIS COPY OF THE PROJECT MANUAL TO THE CONSTRUCTION INSPECTOR, ENGINEER OR PROJECT MANAGER.

8. THE CONTRACTOR WILL NOTIFY THE OWNER'S REPRESENTATIVE FORTY-EIGHT (48) HOURS IN ADVANCE OF BEGINNING ANY CONSTRUCTION IN THE RIGHT OF WAY OR EASEMENTS.

9. CONTRACTOR AND SUB-CONTRACTORS MUST BE LICENSED BY WILLIAMSON COUNTY FOR CONDUCTING WORK WITHIN THE STREET RIGHT-OF-WAY, ALLEYS, OR EASEMENTS AND ARE REQUIRED TO ABIDE BY ALL WILLIAMSON COUNTY REGULATIONS.

10. CONTRACTOR MUST OBTAIN A UTILITY DEVELOPMENT PERMITS FOR THE HILLSIDE DR PROJECT LOCATION FROM WILLIAMSON COUNTY PRIOR TO COMMENCEMENT OF WORK.

11. THE CONTRACTOR SHALL NOTIFY EACH OF THE FOLLOWING ENTITIES OF THE CONSTRUCTION SCHEDULE AT LEAST TWO WEEKS IN ADVANCE OF PROPOSED CONSTRUCTION OPERATIONS AND PROVIDE PERTINENT INFORMATION ABOUT LANE CLOSURES AND DETOURS.

    BRUSHY CREEK MUD.....512-974-0130
    WILLIAMSON COUNTY.....512-974-5000
    FERN BLUFF MUD 512-238-0606

12. THE INFORMATION SHOWN ON THESE DRAWINGS INDICATING TYPE AND LOCATION OF SURFACE, SUBSURFACE, AND AERIAL UTILITIES IS NOT GUARANTEED TO BE EXACT OR COMPLETE. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT TYPE AND LOCATION OF ALL UTILITIES AFFECTED BY THE CONSTRUCTION IN ORDER TO AVOID DAMAGING THOSE UTILITIES.

13. THE CONTRACTOR SHALL COORDINATE WITH OTHER CONTRACTORS AND UTILITIES IN THE VICINITY OF THIS PROJECT. THIS INCLUDES, BUT IS NOT LIMITED TO, GAS, WATER, WASTEWATER, ELECTRIC, TELEPHONE, CABLE TELEVISION, PETROLEUM PIPELINES, FIBER OPTIC, STREET, DRAINAGE, AND ANY OTHER WORK OCCURRING IN OR NEAR THE PROJECT SITE. ONCE THE CONTRACTOR BECOMES AWARE OF A POSSIBLE CONFLICT, IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNER'S REPRESENTATIVE IMMEDIATELY, BUT NO LATER THAN TWENTY-FOUR (24) HOURS AFTER DISCOVERY.

14. SHOULD THE CONTRACTOR DAMAGE A UTILITY DURING THE COURSE OF THE WORK, THE CONTRACTOR SHALL IMMEDIATELY ARRANGE FOR REPAIR AND RESTORATION OF THE DAMAGED UTILITY. THE EXPENSE FOR THESE REPAIRS WILL BE AT THE CONTRACTOR'S SOLE EXPENSE.

15. ALL EXISTING STRUCTURES, FACILITIES, AND UTILITIES DAMAGED BY CONSTRUCTION SHALL BE REMOVED AND RESTORED WITH MATERIALS EQUAL TO OR BETTER THAN THE ORIGINAL AND TO CONDITIONS EQUAL TO OR BETTER THAN THE ORIGINAL. UNLESS OTHERWISE NOTED IN THE PLANS, THIS WILL NOT BE MEASURED AND PAID FOR DIRECTLY, BUT SHALL BE AT THE CONTRACTOR'S SOLE EXPENSE.

16. SLOPES OF ROADWAY CUTS AND EMBANKMENTS DAMAGED BY ANY OPERATION OF THE CONTRACTOR DURING THE EXECUTION OF THIS PROJECT SHALL BE REPAIRED AND RESTORED TO THE ORIGINAL PRE-CONSTRUCTION CONDITION. BACKFILL AND FILL PLACED DURING REMEDIAL GRADING SHALL BE COMPACTED TO AT LEAST 95% COMPACTION AND TO THE SATISFACTION OF THE ENGINEER AND GOVERNING AUTHORITIES.

17. GEOTECHNICAL INFORMATION IS PROVIDED IN THE PROJECT MANUAL SECTION SR-01.

18. SEE PROJECT MANUAL SECTION 01 70 00 - CLOSEOUT REQUIREMENTS FOR RECORD DRAWINGS INFORMATION.

19. THE ENGINEER SHALL PROVIDE ADDITIONAL INFORMATION TO CONTRACTOR VIA RFIs (REQUEST FOR INFORMATION) DURING CONSTRUCTION PHASE.

20. THE STANDARD CONSTRUCTION SPECIFICATIONS CURRENT AT THE TIME OF BIDDING SHALL COVER MATERIALS AND METHODS USED TO DO THIS WORK.

21. THE CONTRACTOR SHALL CONTACT THE ROUND ROCK AREA "ONE CALL" SYSTEM AT FOR EXISTING UTILITY LOCATIONS PRIOR TO ANY EXCAVATION IN ADVANCE OF CONSTRUCTION. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL UTILITIES TO BE EXTENDED, TIED TO, OR ALTERED, OR SUBJECT TO DAMAGE/INCONVENIENCE BY THE CONSTRUCTION OPERATIONS. THE OWNER'S WATER AND WASTEWATER MAINTENANCE RESPONSIBILITY ENDS AT R.O.W./EASEMENT LINES.

22. NO OTHER UTILITY SERVICE/APPURTENANCES SHALL BE PLACED NEAR THE PROPERTY LINE, OR OTHER ASSIGNED LOCATION DESIGNATED FOR WATER AND WASTEWATER UTILITY SERVICE THAT WOULD INTERFERE WITH THE WATER AND WASTEWATER SERVICES.

23. THE SPECIFICATION ITEM TRENCH EXCAVATION SAFETY PROTECTION SYSTEM WILL BE REQUIRED AS A MINIMUM TRENCH SAFETY MEASURE.

24. ALL MATERIALS TESTS ORDERED BY THE OWNER FOR QUALITY ASSURANCE PURPOSES, SHALL BE CONDUCTED BY AN INDEPENDENT LABORATORY AND FUNDED BY THE OWNER.

25. WHEN AN EXISTING WATERLINE SHUT OUT IS NECESSARY AND POSSIBLE, THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE WHO WILL COORDINATE WITH THE BRUSHY CREEK MUD AND THE AFFECTED CUSTOMERS A MINIMUM OF SEVENTY-TWO (72) HOURS IN ADVANCE.

26. WATER AND WASTE WATER SERVICES WILL NEED TO BE REPLACED UP TO THE MAIN. REPAIR COUPLINGS ARE NOT ALLOWED ON NEW INSTALLATIONS.

27. THE CONTRACTOR SHALL VERIFY ALL VERTICAL AND HORIZONTAL LOCATIONS OF EXISTING UTILITIES, BELOW GROUND AND OVERHEAD, PRIOR TO STARTING ONSITE UTILITY WORK.

28. ALL WATER AND WASTEWATER MAINS SHALL BE INSTALLED IN ACCORDANCE WITH THE SEPARATION DISTANCES INDICATED IN CHAPTER 290 - DRINKING WATER STANDARDS, CHAPTER 217 - DESIGN CRITERIA FOR SEWERAGE SYSTEMS AMD CHAPTER 210 - DESIGN CRITERIA FOR RECLAIMED SYSTEMS OF TCEQ RULES.

29. SHOP DRAWINGS SIGNED AND SEALED BY A PROFESSIONAL STRUCTURAL ENGINEER, REGISTERED IN THE STATE OF TEXAS, SHALL BE SUBMITTED FOR ENGINEER'S APPROVAL FOR LARGE DIAMETER PRE-CAST MANHOLES, JUNCTION BOXES, WET WELLS, AND SIMILAR STRUCTURES. THE SHOP DRAWINGS SHALL INCLUDE FLOWLINE ELEVATIONS OF ALL INCOMING AND OUTGOING PIPES, ELEVATION OF TRANSITION FROM LARGE DIAMETER SECTIONS TO 48" ID SECTION, TOP OF MANHOLE ELEVATION, SURROUNDING GROUND ELEVATION, AS WELL AS SPECIAL CONSTRUCTION CONSIDERATIONS THAT ARE SPECIFIED IN THE CONTRACT DRAWINGS.

30. VALVE STEM EXTENSIONS SHALL CONSIST OF A SINGLE PIECE OF IRON ROD OF THE REQUIRED LENGTH WITH A SOCKET ON ONE END AND NUT ON THE OTHER.

31. ALL GRAVITY LINES SHALL BE INSTALLED DOWNSTREAM TO UPSTREAM.

32. METER BOXES AND CLEAN OUTS SHALL NOT BE LOCATED WITHIN PAVED AREAS SUCH AS DRIVEWAYS AND SIDEWALKS.

SEQUENCE OF CONSTRUCTION

1. SEE TREE PROTECTION NOTES ON SHEET G-04.

2. SECURE ALL APPLICABLE PERMITS.

3. HOLD PRE-CONSTRUCTION CONFERENCE.

4. TEMPORARY EROSION AND SEDIMENTATION CONTROLS SHALL BE INSTALLED AS INDICATED ON THE PLANS. INSTALL TREE PROTECTION AND INITIATE TREE MITIGATION MEASURES.

5. NOTIFY WILLIAMSON COUNTY TEMPORARY TRAFFIC CONTROL REPRESENTATIVE PRIOR TO PLACEMENT OF TEMPORARY TRAFFIC CONTROLS. ALL PROPOSED PHASING OF CONTROLS MUST BE INDICATED ON APPROVED TEMPORARY TRAFFIC CONTROL PLAN AND SEALED BY PROFESSIONAL ENGINEER.

6. THE CONTRACTOR SHALL PROVIDE WRITTEN NOTIFICATION TO TCEQ OF INTENT TO COMMENCE CONSTRUCTION.

7. TEMPORARY EROSION AND SEDIMENTATION CONTROLS WILL BE REVISED, IF NEEDED, TO COMPLY WITH INSPECTORS' DIRECTIVES, AND REVISED CONSTRUCTION SCHEDULE RELATIVE TO THE WATER QUALITY PLAN REQUIREMENTS AND THE EROSION PLAN.

8. THE CONTRACTOR SHALL FOLLOW REQUIREMENTS PROVIDED IN THE EDWARDS AQUIFER SCS AND WPAP AND IN THE TCEQ'S SCS AND WPAP APPROVALS. THESE INCLUDE MAINTENANCE AND INSPECTION OF ENVIRONMENTAL CONTROLS, PREVENTING SEDIMENT MIGRATION, MAINTENANCE OF RECORDS OF CONSTRUCTION ACTIVITIES AND EROSION CONTROLS, AND REQUIREMENTS FOR STABILIZATION.

9. PLACE TEMPORARY TRAFFIC CONTROL DEVICES.

10. BEGIN SITE CLEARING/CONSTRUCTION (OR DEMOLITION) ACTIVITIES.

11. COMPLETE CONSTRUCTION AND START REVEGETATION OF THE SITE AND INSTALLATION OF LANDSCAPING.

12. AFTER A FINAL INSPECTION HAS BEEN CONDUCTED , REMOVE THE TEMPORARY EROSION AND SEDIMENTATION CONTROLS AND COMPLETE ANY NECESSARY FINAL REVEGETATION RESULTING FROM REMOVAL OF THE CONTROLS. CONDUCT ANY MAINTENANCE AND REHABILITATION OF THE WATER QUALITY PONDS OR CONTROLS.

13. COMPLETE PERMANENT EROSION CONTROL AND SITE RESTORATION. REMOVE TEMPORARY EROSION/SEDIMENTATION CONTROLS AND TREE PROTECTION. RESTORE ANY AREAS DISTURBED DURING REMOVAL OF EROSION/SEDIMENTATION CONTROLS.

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	
A	11/8/23	100% SUBMITTAL MR
		REVISION BY

BRUSHY CREEK M.U.D.

BRUSHY CREEK
MUNICIPAL UTILITY DISTRICT

GENERAL NOTES

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED PROFESSIONAL ENGINEER
The seal appearing on this document was authorized by Maninder S. Randhawa, P.E. 145867 on 11-08-2023
08 NOVEMBER 2023

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY - WATER POLLUTION ABATEMENT PLAN - GENERAL CONSTRUCTION NOTES

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

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY - ORGANIZED SEWAGE COLLECTION SYSTEM - GENERAL CONSTRUCTION NOTES

1. THIS ORGANIZED SEWAGE COLLECTION SYSTEM (SCS) MUST BE CONSTRUCTED IN ACCORDANCE WITH 30 TEXAS ADMINISTRATIVE CODE (TAC) §213.5(C), THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S (TCEQ) EDWARDS AQUIFER RULES AND ANY LOCAL GOVERNMENT STANDARD SPECIFICATIONS.

2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROPOSED REGULATED PROJECT MUST BE PROVIDED WITH COPIES OF THE SCS PLAN AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS MUST BE REQUIRED TO KEEP ON-SITE COPIES OF THE PLAN AND THE APPROVAL LETTER.

3. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE PRESIDING 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.

4. ANY MODIFICATION TO THE ACTIVITIES DESCRIBED IN THE REFERENCED SCS APPLICATION FOLLOWING THE DATE OF APPROVAL MAY REQUIRE THE SUBMITTAL OF AN SCS APPLICATION TO MODIFY THIS APPROVAL, INCLUDING THE PAYMENT OF APPROPRIATE FEES AND ALL INFORMATION NECESSARY FOR ITS REVIEW AND APPROVAL.

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 MANUFACTURERS SPECIFICATIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.

6. IF ANY SENSITIVE FEATURES ARE DISCOVERED DURING THE WASTEWATER LINE TRENCHING ACTIVITIES, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPLICANT MUST IMMEDIATELY NOTIFY THE APPROPRIATE REGIONAL OFFICE OF THE TCEQ OF THE FEATURE DISCOVERED. A GEOLOGIST'S ASSESSMENT OF THE LOCATION AND EXTENT OF THE FEATURE DISCOVERED MUST BE REPORTED TO THAT REGIONAL OFFICE IN WRITING AND THE APPLICANT MUST SUBMIT A PLAN FOR ENSURING THE STRUCTURAL INTEGRITY OF THE SEWER LINE OR FOR MODIFYING THE PROPOSED COLLECTION SYSTEM ALIGNMENT AROUND THE FEATURE. THE REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MAY NOT PROCEED UNTIL THE EXECUTIVE DIRECTOR HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT THE SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM ANY POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY WHILE MAINTAINING THE STRUCTURAL INTEGRITY OF THE LINE.

7. SEWER LINES LOCATED WITHIN OR CROSSING THE 5-YEAR FLOODPLAIN OF A DRAINAGE WAY WILL BE PROTECTED FROM INUNDATION AND STREAM VELOCITIES WHICH COULD CAUSE EROSION AND SCOURING OF BACKFILL. THE TRENCH MUST BE CAPPED WITH CONCRETE TO PREVENT SCOURING OF BACKFILL, OR THE SEWER LINES MUST BE ENCASED IN CONCRETE. ALL CONCRETE SHALL HAVE A MINIMUM THICKNESS OF 6 INCHES.

8. BLASTING PROCEDURES FOR PROTECTION OF EXISTING SEWER LINES AND OTHER UTILITIES WILL BE IN ACCORDANCE WITH THE NATIONAL FIRE PROTECTION ASSOCIATION CRITERIA. SAND IS NOT ALLOWED AS BEDDING OR BACKFILL IN TRENCHES THAT HAVE BEEN BLASTED. IF ANY EXISTING SEWER LINES ARE DAMAGED, THE LINES MUST BE REPAIRED AND RETESTED.

9. ALL MANHOLES CONSTRUCTED OR REHABILITATED ON THIS PROJECT MUST HAVE WATERTIGHT SIZE ON SIZE RESILIENT CONNECTORS ALLOWING FOR DIFFERENTIAL SETTLEMENT. IF MANHOLES ARE CONSTRUCTED WITHIN THE 100-YEAR FLOODPLAIN, THE COVER MUST HAVE A GASKET AND BE BOLTED TO THE RING. WHERE GASKETED MANHOLE COVERS ARE REQUIRED FOR MORE THAN THREE MANHOLES IN SEQUENCE OR FOR MORE THAN 1500 FEET, ALTERNATE MEANS OF VENTING WILL BE PROVIDED. BRICKS ARE NOT AN ACCEPTABLE CONSTRUCTION MATERIAL FOR ANY PORTION OF THE MANHOLE.

   THE DIAMETER OF THE MANHOLES MUST BE A MINIMUM OF FOUR FEET AND THE MANHOLE FOR ENTRY MUST HAVE A MINIMUM CLEAR OPENING DIAMETER OF 30 INCHES. THESE DIMENSIONS AND OTHER DETAILS SHOWING COMPLIANCE WITH THE COMMISSION'S RULES CONCERNING MANHOLES AND SEWER LINE/MANHOLE INVERTS DESCRIBED IN 30 TAC §217.55 ARE INCLUDED ON DETAIL SHEET D-02 .

   IT IS SUGGESTED THAT ENTRANCE INTO MANHOLES IN EXCESS OF FOUR FEET DEEP BE ACCOMPLISHED BY MEANS OF A PORTABLE LADDER. THE INCLUSION OF STEPS IN A MANHOLE IS PROHIBITED.

10. WHERE WATER LINES AND NEW SEWER LINE ARE INSTALLED WITH A SEPARATION DISTANCE CLOSER THAN NINE FEET (I.E., WATER LINES CROSSING WASTEWATER LINES, WATER LINES PARALLELING WASTEWATER LINES, OR WATER LINES NEXT TO MANHOLES) THE INSTALLATION MUST MEET THE REQUIREMENTS OF 30 TAC §217.53(D) (PIPE DESIGN) AND 30 TAC §290.44(E) (WATER DISTRIBUTION).

11. WHERE SEWERS LINES DEVIATE FROM STRAIGHT ALIGNMENT AND UNIFORM GRADE ALL CURVATURE OF SEWER PIPE MUST BE ACHIEVED BY THE FOLLOWING PROCEDURE WHICH IS RECOMMENDED BY THE PIPE MANUFACTURER:

    A. INSTALLING NEW MANHOLES AT POINTS WHERE CHANGES IN ALIGNMENT AND/OR GRADES ARE PROPOSED.

    IF PIPE FLEXURE IS PROPOSED, THE FOLLOWING METHOD OF PREVENTING DEFLECTION OF THE JOINT MUST BE USED:

    A. PIPE JOINT IS DEFLECTED LESS THAN 5 DEGREES.

    B. 80% OF THE MANUFACTURER'S RECOMMENDED MAXIMUM JOINT OFFSET; OR

    C. 80% OF THE APPROPRIATE ASTM, AWWA, ANSI, OR OTHER NATIONALLY ESTABLISHED STANDARD FOR JOINT OFFSET.

    SPECIFIC CARE MUST BE TAKEN TO ENSURE THAT THE JOINT IS PLACED IN THE CENTER OF THE TRENCH AND PROPERLY BEDDED IN ACCORDANCE WITH 30 TAC §217.54.

12. ~~NEW SEWAGE COLLECTION SYSTEM LINES MUST BE CONSTRUCTED WITH STUB OUTS FOR THE CONNECTION OF ANTICIPATED EXTENSIONS. THE LOCATION OF SUCH STUB OUTS MUST BE MARKED ON THE GROUND SUCH THAT THEIR LOCATION CAN BE EASILY DETERMINED AT THE TIME OF CONNECTION OF THE EXTENSIONS. SUCH STUB OUTS MUST BE MANUFACTURED WYES OR TEES THAT ARE COMPATIBLE IN SIZE AND MATERIAL WITH BOTH THE SEWER LINE AND THE EXTENSION. AT THE TIME OF ORIGINAL CONSTRUCTION, NEW STUB-OUTS MUST BE CONSTRUCTED SUFFICIENTLY TO EXTEND BEYOND THE END OF THE STREET PAVEMENT. ALL STUB-OUTS MUST BE SEALED WITH A MANUFACTURED CAP TO PREVENT LEAKAGE. EXTENSIONS THAT WERE NOT ANTICIPATED AT THE TIME OF ORIGINAL CONSTRUCTION OR THAT ARE TO BE CONNECTED TO AN EXISTING SEWER LINE NOT FURNISHED WITH STUB OUTS MUST BE CONNECTED USING A MANUFACTURED SADDLE AND IN ACCORDANCE WITH ACCEPTED PLUMBING TECHNIQUES.~~

    ~~IF NO STUB-OUT IS PRESENT AN ALTERNATE METHOD OF JOINING LATERALS IS SHOWN IN THE DETAIL ON PLAN SHEET OF______. (FOR POTENTIAL FUTURE LATERALS).~~

    ~~THE PRIVATE SERVICE LATERAL STUB-OUTS MUST BE INSTALLED AS SHOWN ON THE PLAN AND PROFILE SHEETS ON PLAN SHEET OF AND MARKED AFTER BACKFILLING AS SHOWN IN THE DETAIL ON PLAN SHEET OF______.~~

13. TRENCHING, BEDDING AND BACKFILL MUST CONFORM WITH 30 TAC §217.54. THE BEDDING AND BACKFILL FOR FLEXIBLE PIPE MUST COMPLY WITH THE STANDARDS OF ASTM D-2321, CLASSES IA, IB, II OR III. RIGID PIPE BEDDING MUST COMPLY WITH THE REQUIREMENTS OF ASTM C 12 (ANSI A 106.2) CLASSES A, B OR C.

14. SEWER LINES MUST BE TESTED FROM MANHOLE TO MANHOLE. WHEN A NEW SEWER LINE IS CONNECTED TO AN EXISTING STUB OR CLEAN-OUT, IT MUST BE TESTED FROM EXISTING MANHOLE TO NEW MANHOLE. IF A STUB OR CLEAN-OUT IS USED AT THE END OF THE PROPOSED SEWER LINE, NO PRIVATE SERVICE ATTACHMENTS MAY BE CONNECTED BETWEEN THE LAST MANHOLE AND THE CLEANOUT UNLESS IT CAN BE CERTIFIED AS CONFORMING WITH THE PROVISIONS OF 30 TAC §213.5(C)(3)(E).

15. ALL SEWER LINES MUST BE TESTED IN ACCORDANCE WITH 30 TAC §217.57. THE ENGINEER MUST RETAIN COPIES OF ALL TEST RESULTS WHICH MUST BE MADE AVAILABLE TO THE EXECUTIVE DIRECTOR UPON REQUEST. THE ENGINEER MUST CERTIFY IN WRITING THAT ALL WASTEWATER LINES HAVE PASSED ALL REQUIRED TESTING TO THE APPROPRIATE REGIONAL OFFICE WITHIN 30 DAYS OF TEST COMPLETION AND PRIOR TO USE OF THE NEW COLLECTION SYSTEM. TESTING METHOD WILL BE:

    (a) FOR A COLLECTION SYSTEM PIPE THAT WILL TRANSPORT WASTEWATER BY GRAVITY FLOW, THE DESIGN MUST SPECIFY AN INFILTRATION AND EXFILTRATION TEST OR A LOW-PRESSURE AIR TEST. A TEST MUST CONFORM TO THE FOLLOWING REQUIREMENTS:

    (1) LOW PRESSURE AIR TEST.

    (A) A LOW PRESSURE AIR TEST MUST FOLLOW THE PROCEDURES DESCRIBED IN AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) C-828, ASTM C- 924, OR ASTM F-1417 OR OTHER PROCEDURE APPROVED BY THE EXECUTIVE DIRECTOR, EXCEPT AS TO TESTING TIMES AS REQUIRED IN TABLE C.3 IN SUBPARAGRAPH (C) OF THIS PARAGRAPH OR EQUATION C.3 IN SUBPARAGRAPH (B)(II) OF THIS PARAGRAPH.

    (B) FOR SECTIONS OF COLLECTION SYSTEM PIPE LESS THAN 36 INCH AVERAGE INSIDE DIAMETER, THE FOLLOWING PROCEDURE MUST APPLY, UNLESS A PIPE IS TO BE TESTED AS REQUIRED BY PARAGRAPH (2) OF THIS SUBSECTION.

    (i) A PIPE MUST BE PRESSURIZED TO 3.5 POUNDS PER SQUARE INCH (PSI) GREATER THAN THE PRESSURE EXERTED BY GROUNDWATER ABOVE THE PIPE.

    (ii) ONCE THE PRESSURE IS STABILIZED, THE MINIMUM TIME ALLOWABLE FOR THE PRESSURE TO DROP FROM 3.5 PSI GAUGE TO 2.5 PSI GAUGE IS COMPUTED FROM THE FOLLOWING EQUATION:

    EQUATION C.3

    WHERE:

$$T = \frac{0.085 \times D \times K}{Q}$$

    T = TIME FOR PRESSURE TO DROP 1.0 POUND PER SQUARE INCH GAUGE IN SECONDS

    K = 0.000419 X D X L, BUT NOT LESS THAN 1.0 D = AVERAGE INSIDE PIPE DIAMETER IN INCHES

    L = LENGTH OF LINE OF SAME SIZE BEING TESTED, IN FEET

    Q = RATE OF LOSS, 0.0015 CUBIC FEET PER MINUTE PER SQUARE FOOT INTERNAL SURFACE

    (C) SINCE A K VALUE OF LESS THAN 1.0 MAY NOT BE USED, THE MINIMUM TESTING TIME FOR EACH PIPE DIAMETER IS SHOWN IN THE FOLLOWING TABLE C.3:

PIPE DIAMETER (INCHES)	MINIMUM TIME (SECONDS)	MAXIMUM LENGTH FOR MINIMUM TIME (FEET)	TIME FOR LONGER LENGTH (SECONDS/FOOT)
6	340	398	0.855
8	454	298	1.520
10	567	239	2.374
12	680	199	3.419
15	850	159	5.342
18	1,020	133	7.693
21	1,190	114	10.471
24	1,360	100	13.676
27	1,530	88	17.309
30	1,700	80	21.369
33	1,870	72	25.856

    (D) AN OWNER MAY STOP A TEST IF NO PRESSURE LOSS HAS OCCURRED DURING THE FIRST 25% OF THE CALCULATED TESTING TIME.

    (E) IF ANY PRESSURE LOSS OR LEAKAGE HAS OCCURRED DURING THE FIRST 25% OF A TESTING PERIOD, THEN THE TEST MUST CONTINUE FOR THE ENTIRE TEST DURATION AS OUTLINED ABOVE OR UNTIL FAILURE.

    (F) WASTEWATER COLLECTION SYSTEM PIPES WITH A 27 INCH OR LARGER AVERAGE INSIDE DIAMETER MAY BE AIR TESTED AT EACH JOINT INSTEAD OF FOLLOWING THE PROCEDURE OUTLINED IN THIS SECTION.

    (G) A TESTING PROCEDURE FOR PIPE WITH AN INSIDE DIAMETER GREATER THAN 33 INCHES MUST BE APPROVED BY THE EXECUTIVE DIRECTOR.

    (2) INFILTRATION/EXFILTRATION TEST.

    (A) THE TOTAL EXFILTRATION, AS DETERMINED BY A HYDROSTATIC HEAD TEST, MUST NOT EXCEED 50 GALLONS PER INCH OF DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF 2.0 FEET ABOVE THE CROWN OF A PIPE AT AN UPSTREAM MANHOLE.

    (B) AN OWNER SHALL USE AN INFILTRATION TEST IN LIEU OF AN EXFILTRATION TEST WHEN PIPES ARE INSTALLED BELOW THE GROUNDWATER LEVEL.

    (C) THE TOTAL EXFILTRATION, AS DETERMINED BY A HYDROSTATIC HEAD TEST, MUST NOT EXCEED 50 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF TWO FEET ABOVE THE CROWN OF A PIPE AT AN UPSTREAM MANHOLE, OR AT LEAST TWO FEET ABOVE EXISTING GROUNDWATER LEVEL, WHICHEVER IS GREATER.

    (D) FOR CONSTRUCTION WITHIN A 25-YEAR FLOOD PLAIN, THE INFILTRATION OR EXFILTRATION MUST NOT EXCEED 10 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT THE SAME MINIMUM TEST HEAD AS IN SUBPARAGRAPH (C) OF THIS PARAGRAPH.

    (E) IF THE QUANTITY OF INFILTRATION OR EXFILTRATION EXCEEDS THE MAXIMUM QUANTITY SPECIFIED, AN OWNER SHALL UNDERTAKE REMEDIAL ACTION IN ORDER TO REDUCE

    THE INFILTRATION OR EXFILTRATION TO AN AMOUNT WITHIN THE LIMITS SPECIFIED. AN OWNER SHALL RETEST A PIPE FOLLOWING A REMEDIATION ACTION.

    (b) IF A GRAVITY COLLECTION PIPE IS COMPOSED OF FLEXIBLE PIPE, DEFLECTION TESTING IS ALSO REQUIRED. THE FOLLOWING PROCEDURES MUST BE FOLLOWED:

    (1) FOR A COLLECTION PIPE WITH INSIDE DIAMETER LESS THAN 27 INCHES, DEFLECTION MEASUREMENT REQUIRES A RIGID MANDREL.

    (A) MANDREL SIZING.

    (i) A RIGID MANDREL MUST HAVE AN OUTSIDE DIAMETER (OD) NOT LESS THAN 95% OF THE BASE INSIDE DIAMETER (ID) OR AVERAGE ID OF A PIPE, AS SPECIFIED IN THE APPROPRIATE STANDARD BY THE ASTMS, AMERICAN WATER WORKS ASSOCIATION, UNI-BELL, OR AMERICAN NATIONAL STANDARDS INSTITUTE, OR ANY RELATED APPENDIX.

    (ii) IF A MANDREL SIZING DIAMETER IS NOT SPECIFIED IN THE APPROPRIATE STANDARD, THE MANDREL MUST HAVE AN OD EQUAL TO 95% OF THE ID OF A PIPE. IN THIS CASE, THE ID OF THE PIPE, FOR THE PURPOSE OF DETERMINING THE OD OF THE MANDREL, MUST EQUAL BE THE AVERAGE OUTSIDE DIAMETER MINUS TWO MINIMUM WALL THICKNESSES FOR OD CONTROLLED PIPE AND THE AVERAGE INSIDE DIAMETER FOR ID CONTROLLED PIPE.

    (iii) ALL DIMENSIONS MUST MEET THE APPROPRIATE STANDARD.

    (B) MANDREL DESIGN.

    (i) A RIGID MANDREL MUST BE CONSTRUCTED OF A METAL OR A RIGID PLASTIC MATERIAL THAT CAN WITHSTAND 200 PSI WITHOUT BEING DEFORMED.

    (ii) A MANDREL MUST HAVE NINE OR MORE ODD NUMBER OF RUNNERS OR LEGS.

    (iii) A BARREL SECTION LENGTH MUST EQUAL AT LEAST 75% OF THE INSIDE DIAMETER OF A PIPE.

    (iv) EACH SIZE MANDREL MUST USE A SEPARATE PROVING RING.

    (C) METHOD OPTIONS.

    (i) AN ADJUSTABLE OR FLEXIBLE MANDREL IS PROHIBITED.

    (ii) A TEST MAY NOT USE TELEVISION INSPECTION AS A SUBSTITUTE FOR A DEFLECTION TEST.

    (iii) IF REQUESTED, THE EXECUTIVE DIRECTOR MAY APPROVE THE USE OF A DEFLECTOMETER OR A MANDREL WITH REMOVABLE LEGS OR RUNNERS ON A CASE-BY-CASE BASIS.

    (2) FOR A GRAVITY COLLECTION SYSTEM PIPE WITH AN INSIDE DIAMETER 27 INCHES AND GREATER, OTHER TEST METHODS MAY BE USED TO DETERMINE VERTICAL DEFLECTION.

    (3) A DEFLECTION TEST METHOD MUST BE ACCURATE TO WITHIN PLUS OR MINUS 0.2% DEFLECTION.

    (4) AN OWNER SHALL NOT CONDUCT A DEFLECTION TEST UNTIL AT LEAST 30 DAYS AFTER THE FINAL BACKFILL.

    (5) GRAVITY COLLECTION SYSTEM PIPE DEFLECTION MUST NOT EXCEED FIVE PERCENT (5%).

    (6) IF A PIPE SECTION FAILS A DEFLECTION TEST, AN OWNER SHALL CORRECT THE PROBLEM AND CONDUCT A SECOND TEST AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS.

16. ALL MANHOLES MUST BE TESTED TO MEET OR EXCEED THE REQUIREMENTS OF 30 TAC §217.58.

    (a) ALL MANHOLES MUST PASS A LEAKAGE TEST.

    (b) AN OWNER SHALL TEST EACH MANHOLE (AFTER ASSEMBLY AND BACKFILLING) FOR LEAKAGE, SEPARATE AND INDEPENDENT OF THE COLLECTION SYSTEM PIPES, BY HYDROSTATIC EXFILTRATION TESTING, VACUUM TESTING, OR OTHER METHOD APPROVED BY THE EXECUTIVE DIRECTOR.

    (1) HYDROSTATIC TESTING.

    (A) THE MAXIMUM LEAKAGE FOR HYDROSTATIC TESTING OR ANY ALTERNATIVE TEST METHODS IS 0.025 GALLONS PER FOOT DIAMETER PER FOOT OF MANHOLE DEPTH PER HOUR.

    (B) TO PERFORM A HYDROSTATIC EXFILTRATION TEST, AN OWNER SHALL SEAL ALL WASTEWATER PIPES COMING INTO A MANHOLE WITH AN INTERNAL PIPE PLUG, FILL THE MANHOLE WITH WATER, AND MAINTAIN THE TEST FOR AT LEAST ONE HOUR.

    (C) A TEST FOR CONCRETE MANHOLES MAY USE A 24-HOUR WETTING PERIOD BEFORE TESTING TO ALLOW SATURATION OF THE CONCRETE.

    (2) VACUUM TESTING.

    (A) TO PERFORM A VACUUM TEST, AN OWNER SHALL PLUG ALL LIFT HOLES AND EXTERIOR JOINTS WITH A NON-SHRINK GROUT AND PLUG ALL PIPES ENTERING A MANHOLE.

    (B) NO GROUT MUST BE PLACED IN HORIZONTAL JOINTS BEFORE TESTING.

    (C) STUB-OUTS, MANHOLE BOOTS, AND PIPE PLUGS MUST BE SECURED TO PREVENT MOVEMENT WHILE A VACUUM IS DRAWN.

    (D) AN OWNER SHALL USE A MINIMUM 60 INCH/LB TORQUE WRENCH TO TIGHTEN THE EXTERNAL CLAMPS THAT SECURE A TEST COVER TO THE TOP OF A MANHOLE.

    (E) A TEST HEAD MUST BE PLACED AT THE INSIDE OF THE TOP OF A CONE SECTION, AND THE SEAL INFLATED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

    (F) THERE MUST BE A VACUUM OF 10 INCHES OF MERCURY INSIDE A MANHOLE TO PERFORM A VALID TEST.

    (G) A TEST DOES NOT BEGIN UNTIL AFTER THE VACUUM PUMP IS OFF.

    (H) A MANHOLE PASSES THE TEST IF AFTER 2.0 MINUTES AND WITH ALL VALVES CLOSED, THE VACUUM IS AT LEAST 9.0 INCHES OF MERCURY.

17. ALL PRIVATE SERVICE LATERALS MUST BE INSPECTED AND CERTIFIED IN ACCORDANCE WITH 30 TAC §213.5(C)(3)(I). AFTER INSTALLATION OF AND, PRIOR TO COVERING AND CONNECTING A PRIVATE SERVICE LATERAL TO AN EXISTING ORGANIZED SEWAGE COLLECTION SYSTEM, A TEXAS LICENSED PROFESSIONAL ENGINEER, TEXAS REGISTERED SANITARIAN, OR APPROPRIATE CITY INSPECTOR MUST VISUALLY INSPECT THE PRIVATE SERVICE LATERAL AND THE CONNECTION TO THE SEWAGE COLLECTION SYSTEM, AND CERTIFY THAT IT IS CONSTRUCTED IN CONFORMITY WITH THE APPLICABLE PROVISIONS OF THIS SECTION. THE OWNER OF THE COLLECTION SYSTEM MUST MAINTAIN SUCH CERTIFICATIONS FOR FIVE YEARS AND FORWARD COPIES TO THE APPROPRIATE REGIONAL OFFICE UPON REQUEST. CONNECTIONS MAY ONLY BE MADE TO AN APPROVED SEWAGE COLLECTION SYSTEM.

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY - LIFT STATIONS AND FORCE MAINS GENERAL CONSTRUCTION NOTES:

1. THIS LIFT STATION AND/OR FORCE MAIN MUST BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S (TCEQ) EDWARDS AQUIFER RULES 30 TEXAS ADMINISTRATIVE CODE (TAC) §213.5C., THE DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEMS 30 TAC CHAPTER 217, AND THE CITY OF ROUND ROCK STANDARD SPECIFICATIONS.

2. ANY MODIFICATION TO THE ACTIVITIES DESCRIBED IN THE REFERENCED LIFT STATION/FORCE MAIN SYSTEM APPLICATION FOLLOWING THE DATE OF APPROVAL MAY REQUIRE THE SUBMITTAL OF A LIFT STATION/FORCE MAIN SYSTEM APPLICATION TO MODIFY THIS APPROVAL, INCLUDING THE PAYMENT OF APPROPRIATE FEES AND ALL INFORMATION NECESSARY FOR ITS REVIEW AND APPROVAL.

3. PRIOR TO COMMENCING ANY REGULATED ACTIVITY, THE APPLICANT OR HIS AGENT MUST NOTIFY THE AUSTIN REGIONAL OFFICE, IN WRITING, OF THE DATE ON WHICH THE REGULATED ACTIVITY WILL BEGIN.

4. UPON COMPLETION OF THE WET WELL EXCAVATION, A GEOLOGIST MUST CERTIFY THAT THE EXCAVATION HAS BEEN INSPECTED FOR THE PRESENCE OF SENSITIVE FEATURES AND THE CERTIFICATION MUST BE SUBMITTED TO THE APPROPRIATE REGIONAL OFFICE. FURTHER ACTIVITIES MAY NOT PROCEED UNTIL THE EXECUTIVE DIRECTOR HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT ANY SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY FROM THE LIFT STATION. CONSTRUCTION MAY CONTINUE IF THE GEOLOGIST CERTIFIES THAT NO SENSITIVE FEATURE OR FEATURES ARE PRESENT.

5. IF ANY SENSITIVE FEATURES ARE DISCOVERED DURING THE WASTEWATER LINE TRENCHING ACTIVITIES, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPLICANT MUST IMMEDIATELY NOTIFY THE APPROPRIATE REGIONAL OFFICE OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY OF THE FEATURE DISCOVERY. A GEOLOGIST'S ASSESSMENT OF THE LOCATION AND EXTENT OF THE FEATURE DISCOVERED MUST BE REPORTED TO THAT REGIONAL OFFICE IN WRITING WITHIN TWO WORKING DAYS. THE APPLICANT MUST SUBMIT A PLAN FOR ENSURING THE STRUCTURAL INTEGRITY OF THE SEWER LINE OR FOR MODIFYING THE PROPOSED COLLECTION SYSTEM ALIGNMENT AROUND THE FEATURE. THE REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MAY NOT PROCEED UNTIL THE EXECUTIVE DIRECTOR HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT THE SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM ANY POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY WHILE MAINTAINING THE STRUCTURAL INTEGRITY OF THE LINE.

6. LIFT STATIONS SHALL BE DESIGNED TO WITHSTAND AND OPERATE DURING A 100-YEAR FLOOD EVENT AND SHALL BE ACCESSIBLE DURING A 25-YEAR FLOOD. ALL LIFT STATIONS SHALL BE INTRUDER-RESISTANT WITH A CONTROLLED ACCESS.

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NO.	DATE	REVISION	BY
A	11/8/23	100% SUBMITTAL	MR

Brushy Creek Municipal Utility District

BRUSHY CREEK
M.U.D.

BRUSHY CREEK
MUNICIPAL UTILITY DISTRICT

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY NOTES (1 OF 2)

MANINDER S RANDHAWA
145867

The seal appearing on this document was authorized by Maninder S. Randhawa, P.E. 145867 on 11-08-2023

08 NOVEMBER 2023

BAR IS ONE INCH ON ORIGINAL DRAWING.

ONE INCH

DESIGNED MR
DRAWN ---
CHECKED MR
REVIEWED ---

Seq. 4 of 46

Dwg. No. G-04

WON: 15960.001.001.2000

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY - LIFT STATIONS AND FORCE MAINS GENERAL CONSTRUCTION NOTES (CONTINUED):

8. PUMP CONTROLS.
   - A. A LIFT STATION PUMP MUST OPERATE AUTOMATICALLY, BASED ON THE WATER LEVEL IN A WET WELL.
   - B. THE LOCATION OF A WET WELL LEVEL MECHANISM MUST ENSURE THAT THE MECHANISM IS UNAFFECTED BY CURRENTS, RAGS, GREASE, OR OTHER FLOATING MATERIALS.
   - C. A LEVEL MECHANISM MUST BE ACCESSIBLE WITHOUT ENTERING THE WET WELL.
   - D. WET WELL CONTROLS WITH A BUBBLER SYSTEM REQUIRE DUAL AIR SUPPLY AND DUAL CONTROLS.
   - E. MOTOR CONTROL CENTERS MUST BE MOUNTED AT LEAST 4.0 INCHES ABOVE GRADE TO PREVENT WATER INTRUSION AND CORROSION FROM STANDING WATER IN THE ENCLOSURE.
   - F. ELECTRICAL EQUIPMENT AND ELECTRICAL CONNECTIONS IN A WET WELL MUST MEET NATIONAL FIRE PREVENTION ASSOCIATION 70 NATIONAL ELECTRIC CODE EXPLOSION PREVENTION REQUIREMENTS, UNLESS CONTINUOUS VENTILATION IS PROVIDED.
9. WET WELLS.
   - A. A WET WELL MUST BE ENCLOSED BY WATERTIGHT AND GAS TIGHT WALLS.
   - B. A PENETRATION THROUGH A WALL OF A WET WELL MUST BE GAS TIGHT.
   - C. A WET WELL MUST NOT CONTAIN EQUIPMENT REQUIRING REGULAR OR ROUTINE INSPECTION OR MAINTENANCE, UNLESS INSPECTION AND MAINTENANCE CAN BE DONE WITHOUT STAFF ENTERING THE WET WELL.
   - D. A GRAVITY PIPE DISCHARGING TO A WET WELL MUST BE LOCATED SO THAT THE INVERT ELEVATION IS ABOVE THE LIQUID LEVEL OF A PUMP'S "ON" SETTING.
   - E. GATE VALVES AND CHECK VALVES ARE PROHIBITED IN A WET WELL.
   - F. GATE VALVES AND CHECK VALVES MAY BE LOCATED IN A VALVE VAULT NEXT TO A WET WELL.
   - G. PUMP CYCLE TIME, BASED ON PEAK FLOW, MUST EQUAL OR EXCEED THOSE IN THE FOLLOWING TABLE:

     PUMP HORSEPOWER MINIMUM CYCLE TIMES (MINUTES)

PUMP HORSEPOWER	MINIMUM CYCLE TIMES (MINUTES)
< 50	6
50-100	10
> 100	15

   - H. AN EVALUATION OF MINIMUM WET WELL VOLUME REQUIRES THE FOLLOWING FORMULA:

     $V = \frac{T \times Q}{4 \times 7.48}$

     WHERE:

     V = ACTIVE VOLUME (CUBIC FEET)
     Q = PUMP CAPACITY (GALLONS PER MINUTE)
     T = CYCLE TIME (MINUTES)
     7.48 = CONVERSION FACTOR (GALLONS/CUBIC FOOT)
10. WET WELL SLOPES.
    - A. A WET WELL FLOOR MUST HAVE A SMOOTH FINISH AND MINIMUM SLOPE OF 10% TO A PUMP INTAKE.
    - B. A WET WELL DESIGN MUST PREVENT DEPOSITION OF SOLIDS UNDER NORMAL OPERATING CONDITIONS.
    - C. A LIFT STATION WITH GREATER THAN 5.0 MILLION GALLONS PER DAY FIRM PUMPING CAPACITY MUST HAVE ANTI-VORTEX BAFFLING.
12. VENTILATION SHALL BE PROVIDED FOR LIFT STATIONS, INCLUDING BOTH WET.
13. HOISTING EQUIPMENT. A LIFT STATION MUST HAVE PERMANENT HOISTING EQUIPMENT OR BE ACCESSIBLE TO PORTABLE HOISTING EQUIPMENT FOR REMOVAL OF PUMPS, MOTORS, VALVES, PIPES, AND OTHER SIMILAR EQUIPMENT.
14. A FLOOR DRAIN FROM A VALVE VAULT TO A WET WELL MUST PREVENT GAS FROM ENTERING A VALVE VAULT BY INCLUDING FLAP VALVES, "P" TRAPS, SUBMERGED OUTLETS, OR A COMBINATION OF THESE DEVICES.
15. PUMPS.
    - K. GENERAL REQUIREMENTS. A RAW WASTEWATER PUMP, WITH THE EXCEPTION OF A GRINDER PUMP, MUST:
      - (1) BE DESIGNED TO PREVENT CLOGGING;
      - (2) BE CAPABLE OF PASSING A SPHERE OF 2.5 INCHES IN DIAMETER OR GREATER; AND
      - (3) HAVE GREATER THAN 3.0 INCH DIAMETER SUCTION AND DISCHARGE OPENINGS.
    - L. SUBMERSIBLE AND NON-SUBMERSIBLE PUMPS.
      - (1) A NON-SUBMERSIBLE PUMP MUST HAVE INSPECTION AND CLEANOUT PLATES ON BOTH THE SUCTION AND DISCHARGE SIDES OF EACH PUMPING UNIT THAT FACILITATE LOCATING AND REMOVING BLOCKAGE-CAUSING MATERIALS, UNLESS THE PUMP DESIGN ACCOMMODATES EASY REMOVAL OF THE ROTATION ELEMENTS.
      - (2) A PUMP SUPPORT MUST PREVENT MOVEMENT AND VIBRATION DURING OPERATION.
      - (3) A SUBMERSIBLE PUMP MUST USE A RAIL-TYPE PUMP SUPPORT SYSTEM WITH MANUFACTURER-APPROVED MECHANISMS DESIGNED TO ALLOW PERSONNEL TO REMOVE AND REPLACE ANY SINGLE PUMP WITHOUT ENTERING OR DEWATERING THE WET WELL.
      - (4) SUBMERSIBLE PUMP RAILS AND LIFTING CHAINS MUST BE CONSTRUCTED OF A MATERIAL THAT PERFORMS TO AT LEAST THE STANDARD OF SERIES 300 STAINLESS STEEL.
    - M. LIFT STATION PUMPING CAPACITY. THE FIRM PUMPING CAPACITY OF A LIFT STATION MUST HANDLE THE EXPECTED PEAK FLOW.
    - N. PUMP HEAD CALCULATIONS.
      - (1) AN OWNER SHALL SELECT A PUMP BASED UPON ANALYSIS OF THE SYSTEM HEAD AND PUMP CAPACITY CURVES THAT DETERMINE THE PUMPING CAPACITIES ALONE AND WITH OTHER PUMPS AS THE TOTAL DYNAMIC-HEAD INCREASES DUE TO ADDITIONAL FLOWS PUMPED THROUGH A FORCE MAIN.
      - (2) THE PIPE HEAD LOSS CALCULATIONS, USING THE HYDRAULIC INSTITUTE STANDARDS, PERTAINING TO HEAD LOSSES THROUGH PIPES, VALVES, AND FITTINGS, MUST BE INCLUDED IN THE REPORT.
      - (3) THE SELECTED FRICTION COEFFICIENT (HAZEN-WILLIAMS "C" VALUE) USED IN FRICTION HEAD LOSS CALCULATIONS MUST BE BASED ON THE PIPE MATERIAL SELECTED.
      - (4) FOR A LIFT STATION WITH MORE THAN TWO PUMPS, A FORCE MAIN IN EXCESS OF ONE-HALF MILE, OR FIRM PUMPING CAPACITY OF 100 GALLONS PER MINUTE OR GREATER, SYSTEM CURVES MUST BE PROVIDED FOR BOTH THE NORMAL AND PEAK OPERATING CONDITIONS AT C VALUES FOR PROPOSED AND EXISTING PIPE.
    - O. FLOW CONTROL.
      - (1) A LIFT STATION OR A TRANSFER PUMPING STATION LOCATED AT OR DISCHARGING DIRECTLY TO A WASTEWATER TREATMENT SYSTEM MUST HAVE A PEAK PUMP CAPACITY EQUAL TO OR LESS THAN THE PEAK DESIGN FLOW, UNLESS EQUALIZATION IS PROVIDED.
      - (2) A WASTEWATER TREATMENT SYSTEM WITH A PEAK FLOW THAT IS GREATER THAN 300,000 GALLON PER DAY MUST USE THREE OR MORE PUMPS, UNLESS DUPLEX, AUTOMATICALLY CONTROLLED, VARIABLE CAPACITY PUMPS ARE PROVIDED.
    - P. SELF-PRIMING PUMPS.
      - (1) A SELF-PRIMING PUMP MUST BE CAPABLE OF PRIMING WITHOUT RELIANCE UPON A SEPARATE PRIMING SYSTEM, AN INTERNAL FLAP VALVE, OR ANY EXTERNAL MEANS FOR PRIMING.
      - (2) A SELF-PRIMING PUMP MUST USE A SUCTION PIPE VELOCITY AT LEAST 3.0 FEET PER SECOND BUT NOT MORE THAN 7.0 FEET PER SECOND, AND MUST INCORPORATE ITS OWN SUCTION PIPE.
      - (3) A SELF-PRIMING PUMP MUST VENT AIR BACK INTO THE WET WELL DURING PRIMING.
    - Q. VACUUM-PRIMING PUMPS.
      - (1) A VACUUM-PRIMED PUMP MUST BE CAPABLE OF PRIMING BY USING A SEPARATE POSITIVE PRIMING SYSTEM WITH A DEDICATED VACUUM PUMP FOR EACH MAIN WASTEWATER PUMP.
      - (2) A VACUUM-PRIMING PUMP MUST USE A SUCTION PIPE VELOCITY AT LEAST 3.0 FEET PER SECOND BUT LESS THAN 7.0 FEET PER SECOND AND MUST HAVE ITS OWN SUCTION PIPE.
    - R. VERTICAL POSITIONING OF PUMPS. A RAW WASTEWATER PUMP MUST HAVE POSITIVE STATIC SUCTION HEAD DURING NORMAL ON-OFF CYCLING, EXCEPT A SUBMERSIBLE PUMP WITH "NO SUCTION" PIPES, A VACUUM-PRIMED PUMP, OR A SELF-PRIMING UNIT CAPABLE OF SATISFACTORY OPERATION UNDER ANY NEGATIVE SUCTION HEAD ANTICIPATED FOR THE LIFT STATION.
    - S. INDIVIDUAL GRINDER PUMPS. A GRINDER PUMP SERVING ONLY ONE RESIDENTIAL OR COMMERCIAL STRUCTURE THAT IS PRIVATELY OWNED, MAINTAINED, AND OPERATED IS NOT SUBJECT TO THE RULES OF THIS CHAPTER.
    - T. PUMP FOR LOW-FLOW LIFT STATION. A PUMP USED FOR A LIFT STATION WITH A PEAK FLOW OF LESS THAN 120 GALLONS PER MINUTE MUST BE SUBMERSIBLE AND INCLUDE A GRINDER.
16. PIPING.
    - A. HORIZONTAL PUMP SUCTIONS.
      - (1) EACH PUMP MUST HAVE A SEPARATE SUCTION PIPE THAT USES AN ECCENTRIC REDUCER.
      - (2) PIPES IN A WET WELL MUST HAVE A TURNDOWN TYPE FLARED INTAKE.
    - B. VALVES.
      - (1) THE DISCHARGE SIDE OF EACH PUMP FOLLOWED BY A FULL-CLOSING ISOLATION VALVE MUST ALSO HAVE A CHECK VALVE.
    - A. A CHECK VALVE MUST BE A SWING TYPE VALVE WITH AN EXTERNAL LEVER.
    - B. A VALVE MUST INCLUDE A POSITION INDICATOR TO SHOW ITS OPEN AND CLOSED POSITIONS, UNLESS A FULL-CLOSING VALVE IS A RISING-STEM GATE VALVE.
      - (1) A GRINDER PUMP INSTALLATION MAY USE A RUBBER-BALL CHECK VALVE OR A SWING-TYPE CHECK VALVE.
      - (2) A BUTTERFLY VALVE, TILTING-DISC CHECK VALVE, OR ANY OTHER VALVE USING A TILTING-DISC IN A FLOW PIPE IS PROHIBITED.
    - C. PIPES.
      - (1) A LIFT STATION PIPE MUST HAVE FLANGED OR FLEXIBLE CONNECTIONS TO ALLOW FOR REMOVAL OF PUMPS AND VALVES WITHOUT INTERRUPTION OF THE LIFT STATION OPERATIONS.
      - (2) WALL PENETRATIONS MUST ALLOW FOR PIPE FLEXURE WHILE EXCLUDING EXFILTRATION OR INFILTRATION.
      - (3) PIPE SUCTION VELOCITIES MUST BE AT LEAST 3.0 FEET PER SECOND BUT NOT MORE THAN 7.0 FEET PER SECOND.
17. EMERGENCY PROVISIONS FOR LIFT STATIONS.
    - A. A COLLECTION SYSTEM LIFT STATION MUST BE EQUIPPED WITH A TESTED QUICK-CONNECT MECHANISM OR A TRANSFER SWITCH PROPERLY SIZED TO CONNECT TO A PORTABLE GENERATOR, IF NOT EQUIPPED WITH AN ONSITE GENERATOR.
    - B. LIFT STATIONS MUST INCLUDE AN AUDIOVISUAL ALARM SYSTEM AND THE SYSTEM MUST TRANSMIT ALL ALARM CONDITIONS THROUGH USE OF AN AUTO-DIALER SYSTEM, SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM, OR TELEMETERING SYSTEM CONNECTED TO A CONTINUOUSLY MONITORED LOCATION.
    - C. AN ALARM SYSTEM MUST SELF-ACTIVATE FOR A POWER OUTAGE, PUMP FAILURE, OR A HIGH WET WELL WATER LEVEL.
    - D. A LIFT STATION CONSTRUCTED TO PUMP RAW WASTEWATER MUST HAVE SERVICE RELIABILITY BASED ON:
      - (1) RETENTION CAPACITY.
        - (I) THE RETENTION CAPACITY IN A LIFT STATION'S WET WELL AND INCOMING GRAVITY PIPES MUST PREVENT DISCHARGES OF UNTREATED WASTEWATER AT THE LIFT STATION OR ANY POINT UPSTREAM FOR A PERIOD OF TIME EQUAL TO THE LONGEST ELECTRICAL OUTAGE RECORDED DURING THE PAST 24 MONTHS, BUT NOT LESS THAN 20 MINUTES.
        - (II). FOR CALCULATION PURPOSES, THE OUTAGE PERIOD BEGINS WHEN A LIFT STATION PUMP FINISHED ITS LAST NORMAL CYCLE, EXCLUDING A STANDBY PUMP.
      - (2) ON-SITE GENERATORS. A LIFT STATION MAY BE PROVIDED EMERGENCY POWER BY ON-SITE, AUTOMATIC ELECTRICAL GENERATORS SIZED TO OPERATE THE LIFT STATION AT ITS FIRM PUMPING CAPACITY OR AT THE AVERAGE DAILY FLOW, IF THE PEAK FLOW CAN BE STORED IN THE COLLECTION SYSTEM.
      - (3) PORTABLE GENERATORS AND PUMPS.
    - E. A LIFT STATION MAY USE PORTABLE GENERATORS AND PUMPS TO GUARANTEE SERVICE IF THE REPORT INCLUDES:
      - (1) THE STORAGE LOCATION OF EACH GENERATOR AND PUMP;
      - (2) THE AMOUNT OF TIME THAT WILL BE NEEDED TO TRANSPORT EACH GENERATOR OR PUMP TO A LIFT STATION;
      - (3) THE NUMBER OF LIFT STATIONS FOR WHICH EACH GENERATOR OR PUMP IS DEDICATED AS A BACKUP; AND
      - (4) THE TYPE OF ROUTINE MAINTENANCE AND UPKEEP PLANNED FOR EACH PORTABLE GENERATOR AND PUMP TO ENSURE THAT THEY WILL BE OPERATIONAL WHEN NEEDED.
    - F. AN OPERATOR THAT IS KNOWLEDGEABLE IN OPERATION OF THE PORTABLE GENERATORS AND PUMPS SHALL BE ON CALL 24 HOURS PER DAY EVERY DAY.
    - G. THE SIZE OF A PORTABLE GENERATOR MUST HANDLE THE FIRM PUMPING CAPACITY OF THE LIFT STATION.
    - E. SPILL CONTAINMENT STRUCTURES.
      - (1) THE USE OF A SPILL CONTAINMENT STRUCTURE AS A SOLE MEANS OF PROVIDING SERVICE RELIABILITY IS PROHIBITED.
      - (2) A LIFT STATION MAY USE A SPILL CONTAINMENT STRUCTURE IN ADDITION TO ONE OF THE SERVICE RELIABILITY OPTIONS DETAILED IN THIS IN SUBSECTION A. OF THIS SECTION.
      - (3) THE REPORT MUST INCLUDE A DETAILED MANAGEMENT PLAN FOR CLEANING AND MAINTAINING EACH SPILL CONTAINMENT STRUCTURE.
      - (4) A SPILL CONTAINMENT STRUCTURE MUST HAVE A LOCKED GATE AND BE SURROUNDED AN INTRUDER RESISTANT FENCE THAT IS 6.0 FEET HIGH CHAIN LINK, MASONRY, OR BOARD FENCE WITH AT LEAST THREE STRANDS OF BARBED WIRE OR 8.0 FEET HIGH CHAIN LINK, MASONRY, OR BOARD FENCE WITH AT LEAST ONE STRAND OF BARBED WIRE.
    - F. A LIFT STATION MUST BE FULLY ACCESSIBLE DURING A 25-YEAR 24-HOUR RAINFALL EVENT.
    - G. LIFT STATION SYSTEM CONTROLS MUST PREVENT OVER-PUMPING UPON RESUMPTION OF NORMAL POWER AFTER A POWER FAILURE. BACKUP OR STANDBY UNITS MUST BE ELECTRICALLY INTERLOCKED TO PREVENT OPERATION AT THE SAME TIME THAT OTHER LIFT STATIONS PUMPS ARE OPERATING ONLY ON THE RESUMPTION OF NORMAL POWER AFTER A POWER FAILURE. THESE LIFT STATION AND FORCE MAINS CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	REVISION	BY
A	11/8/23	100% SUBMITTAL	MR

BRUSHY CREEK M.U.D.

BRUSHY CREEK
MUNICIPAL UTILITY DISTRICT

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY NOTES (2 OF 2)

The seal appearing on this document was authorized by Maninder S. Randhawa, P.E. 145867 on 11-08-2023

08 NOVEMBER 2023

BAR IS ONE INCH ON ORIGINAL DRAWING.
ONE INCH

DESIGNED MR
DRAWN JWG
CHECKED MR
REVIEWED ---

Seq. 5 of 46

Dwg. No. G-05

WON: 15960.001.001.2000

ENVIRONMENTAL NOTES

DEWATERING:

CONTRACTOR IS RESPONSIBLE FOR DEWATERING OF WORK AREA. CONTRACTOR MUST SECURE ENGINEER'S APPROVAL OF PROPOSED DEWATERING PROCEDURES PRIOR TO INSTALLATION OR USE. CONTRACTOR MUST PROVIDE COMPLETE SUBMITTAL TO ENGINEER AND OWNER, AND ALLOW AN ONE WEEK (MIN.) COMMENT PERIOD FOR EACH REVIEW.

FUEL STORAGE:

FUEL STORAGE IS PROHIBITED ON THIS PROJECT. ADDITIONALLY, THE CONTRACTOR IS REQUIRED TO NOTIFY OWNER IMMEDIATELY FOLLOWING ANY SPILL OF FUEL OR OTHER TOXIC MATERIAL. CONTRACTOR IS REQUIRED TO FOLLOW-UP WITH WRITTEN DOCUMENTATION, INCLUDING A COMPLETE DESCRIPTION OF THE INCIDENT, MATERIAL SPILLED, AND ACTIONS TAKEN TO CONTAIN AND CLEAN-UP MATERIAL.

FUGITIVE DUST CONTROL:

CONTRACTOR SHALL CONTROL AIRBORNE DUST AT THE PROJECT SITES AND COMPLIANCE IS REQUIRED FOR ENTIRE PROJECT SITE AS WELL AS ASSOCIATED OPERATIONS. CONTACT THE ENGINEER FOR RECOMMENDED CONTROL METHODS.

SPOILS STORAGE:

NO SPOILS STORAGE IS ALLOWED WITHIN A CRITICAL WATER QUALITY ZONE, A 100-YEAR FLOODPLAIN, OR ON A SLOPE WITH A GRADIENT OF MORE THAN 15 PERCENT.

E/S CONTROLS FOR BORE / RECEIVING PIT LOCATIONS:

TEMPORARY E/S CONTROLS MUST SURROUND THE ENTIRETY OF BORING OPERATIONS, INCLUDING PIT, EQUIPMENT, ETC. FOR LOCATIONS WITHIN IMPERVIOUS AREAS, TEMPORARY CONTROL WILL BE TRIANGULAR FILTER DIKE. DIKE FLAP WILL BE CONTINUOUSLY WEIGHTED DOWN THROUGH THE USE OF 1" BY 4" WOOD STRIPS NAILED TO THE PAVEMENT, EXCEPT FOR THE ACCESS POINT. PLACEMENT OF TEMPORARY E/S CONTROLS ACROSS ACCESS POINT WILL BE REQUIRED WHENEVER THE SITE IS NOT ACTIVELY USED. FOR LOCATIONS WITHIN PERVIOUS AREAS, TEMPORARY CONTROL WILL BE SILT FENCE OR MULCH SOCKS , AS INDICATED ON APPROVED PLANS.

SOIL RETENTION BLANKET:

UNLESS OTHERWISE INDICATED IN THE PROJECT DOCUMENTS, INSTALLATION OF SOIL RETENTION BLANKET WILL BE REQUIRED FOR ALL IMPACTED SLOPES GREATER THAN 3:1 AND ALL IMPACTED AREAS WITHIN DRAINAGE CONVEYANCES. SOIL RETENTION BLANKET SUBMITTAL MUST BE APPROVED BY PROJECT ENGINEER AND WILLIAMSON COUNTY REPRESENTATIVE PRIOR TO USE AND MUST INCLUDE PRODUCT AND INSTALLATION DETAILS PROVIDED BY MANUFACTURER. FINISH GRADING MUST BE INSPECTED AND APPROVED BY ENGINEER PRIOR TO BLANKET INSTALLATION. INSTALLATION MUST BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND MUST BE INSPECTED AND APPROVED BY ENGINEER PRIOR TO ACCEPTANCE.

SOD INSTALLATION:

REVEGETATION WITHIN MANAGED TURF AREAS MUST BE ACCOMPLISHED THROUGH THE INSTALLATION OF SOLID BLOCK GRASS SOD. SOD TYPE MUST MATCH ADJACENT GRASS TYPE.

TREE AND NATURAL AREA PROTECTION NOTES

1. ALL TREES AND NATURAL AREAS SHOWN ON PLAN TO BE PRESERVED SHALL BE PROTECTED DURING CONSTRUCTION WITH TEMPORARY MEASURES.
2. PROTECTIVE MEASURES SHALL BE INSTALLED ACCORDING TO CONTRACT DOCUMENTS.
3. PROTECTIVE MEASURES SHALL BE INSTALLED PRIOR TO THE START OF ANY SITE PREPARATION WORK (CLEARING, GRUBBING OR GRADING), AND SHALL BE MAINTAINED THROUGHOUT ALL PHASES OF THE PROJECT.
4. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED OR MAINTAINED IN A MANNER WHICH DOES NOT RESULT IN SOIL BUILD-UP, COMPACTION OR CUTTING OF CRITICAL ROOT ZONE WITHIN TREE DRIP LINES.
5. TREE PROTECTION SHALL COMPLETELY SURROUND THE TREES OR GROUP OF TREES AND WILL BE LOCATED AT THE OUTERMOST LIMIT OF BRANCHES (DRIP LINE). FOR NATURAL AREAS, PROTECTIVE MEASURES SHALL FOLLOW THE LIMIT OF CONSTRUCTION LINE, IN ORDER TO PREVENT THE FOLLOWING:
   A. SOIL COMPACTION IN THE ROOT ZONE AREA RESULTING FROM VEHICULAR TRAFFIC OR STORAGE OF EQUIPMENT OR MATERIALS;
   B. ROOT ZONE DISTURBANCES DUE TO GRADE CHANGES (GREATER THAN 6 INCHES CUT OR FILL) OR TRENCHING NOT REVIEWED AND AUTHORIZED BY THE WILLIAMSON COUNTY
   C. WOUNDS TO EXPOSED ROOTS, TRUNK OR LIMBS BY MECHANICAL EQUIPMENT;
   D. OTHER ACTIVITIES DETRIMENTAL TO TREES SUCH AS CHEMICAL STORAGE, CEMENT TRUCK CLEANING, AND FIRES.
6. EXCEPTIONS TO INSTALLING PROTECTIVE FENCES AT CRITICAL ROOT ZONES MAY BE PERMITTED IN THE FOLLOWING CASES:
   A. WHERE THERE IS TO BE AN APPROVED GRADE CHANGE, IMPERMEABLE PAVING SURFACE, TREE WELL, OR OTHER SUCH SITE DEVELOPMENT, ERECT THE FENCE APPROXIMATELY 2 FEET BEYOND THE AREA DISTURBED;
   B. WHERE PERMEABLE PAVING IS TO BE INSTALLED, ERECT THE FENCE AT THE OUTER LIMITS OF THE PERMEABLE PAVING AREA
   C. WHERE TREES ARE CLOSE TO PROPOSED BUILDINGS, ERECT THE FENCE NO CLOSER THAN 6 FEET TO THE BUILDING
   D. WHERE THERE ARE SEVERE SPACE CONSTRAINTS DUE TO TRACT SIZE, OR OTHER SPECIAL REQUIREMENTS, CONTACT BRUSHY CREEK MUD TO DEVELOP ALTERNATIVES.

EROSION AND SEDIMENTATION CONTROL NOTES

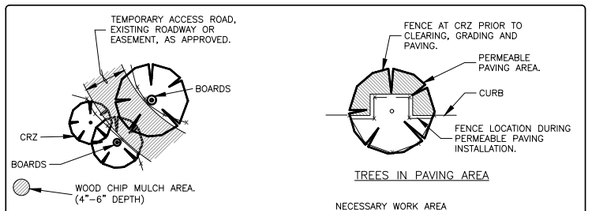
1. THE CONTRACTOR SHALL INSTALL EROSION/SEDIMENTATION CONTROLS AND TREE/NATURAL AREA PROTECTIVE FENCING PRIOR TO ANY SITE PREPARATION WORK (CLEARING, GRUBBING, OR EXCAVATION).
2. THE PLACEMENT OF EROSION/SEDIMENTATION CONTROLS AND TREE/NATURAL AREA PROTECTIVE FENCING SHALL BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. ANY SIGNIFICANT VARIATION IN MATERIALS OR LOCATIONS OF CONTROLS OR FENCES FROM THOSE SHOWN ON THE APPROVED PLANS MUST BE APPROVED BY THE ENGINEER.
4. INLET PROTECTION SHALL BE INSTALLED IMMEDIATELY PRIOR TO STREET WORK, AND WILL BE REMOVED AS SOON AS THE GENERAL PERMIT PROGRAM REPRESENTATIVE AGREES THAT THERE IS NO POTENTIAL FOR SEDIMENTATION.
5. THE CONTRACTOR IS REQUIRED TO INSPECT THE CONTROLS AND FENCES AT DAILY INTERVALS AND AFTER SIGNIFICANT RAINFALL EVENTS TO ENSURE THAT THEY ARE FUNCTIONING PROPERLY. THE PERSON(S) RESPONSIBLE FOR MAINTENANCE OF CONTROLS AND FENCES SHALL IMMEDIATELY MAKE ANY NECESSARY REPAIRS TO DAMAGED AREAS. SILT ACCUMULATION AT CONTROLS MUST BE REMOVED WHEN THE DEPTH REACHES 6 INCHES. SILT ACCUMULATION AT INLET DEVICES SHOULD BE REMOVED WHEN THE DEPTH REACHES 2 INCHES.
6. PRIOR TO FINAL ACCEPTANCE BY THE OWNER, HAUL ROADS AND WATERWAY CROSSINGS CONSTRUCTED FOR TEMPORARY CONTRACTOR ACCESS MUST BE REMOVED, ACCUMULATED SEDIMENT REMOVED FROM THE WATERWAY, AND THE AREA RESTORED TO THE ORIGINAL GRADE AND REVEGETATED. ALL LAND CLEARING DEBRIS SHALL BE DISPOSED OF IN APPROVED SPOIL DISPOSAL SITES.
7. ALL WORK MUST STOP IF A VOID IN THE ROCK SUBSTRATE IS DISCOVERED WHICH IS ONE SQUARE FOOT OR LARGER IN TOTAL AREA, BLOWS AIR FROM WITHIN THE SUBSTRATE, AND/OR CONSISTENTLY RECEIVES WATER DURING ANY RAIN EVENT. AT THIS TIME, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO IMMEDIATELY CONTACT THE OWNER FOR FURTHER INVESTIGATION.
8. FIELD REVISIONS TO THE EROSION/SEDIMENTATION CONTROL PLAN MAY BE REQUIRED BY THE OWNER/ENGINEER DURING THE COURSE OF CONSTRUCTION TO CORRECT CONTROL INADEQUACIES. ANY REVISIONS TO THE PERMITTED PLAN MUST BE APPROVED BY THE ENGINEER.
9. PERMANENT EROSION/SEDIMENTATION CONTROL: ALL DISTURBED AREAS SHALL BE RESTORED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. WHERE THE CONTRACT DOCUMENTS DIFFER THE MOST ENVIRONMENTALLY BENEFICIAL MATERIALS/METHOD SHALL BE REQUIRED UNLESS OTHERWISE APPROVED BY THE ENGINEER.
10. ADDITIONAL TRENCH E/S CONTROL: TRIANGULAR SEDIMENT FILTER DIKE WILL BE INSTALLED ACROSS FULL WIDTH OF TRAFFIC CLOSURE AND DOWNSTREAM OF CONSTRUCTION AREA, PERPENDICULAR TO THE CURB. FILTER DIKE TO FOLLOW ACTIVE CONSTRUCTION. REMOVING AND RE-SETTING FILTER DIKE IS CONSIDERED SUBSIDIARY TO BARRICADES AND TRAFFIC HANDLING
11. DEVELOPER INFORMATION:

OWNER: BRUSHY CREEK MUD
CONTACT: AMY GIANNINI, P.E.
ADDRESS: 16318 S GREAT OAKS DR
ROUND ROCK, TX 78676
PHONE: 512-255-7871 X237
E-MAIL: A.GIANNINI@BCMUD.ORG

OWNER'S REPRESENTATIVE RESPONSIBLE FOR PLAN ALTERATIONS:
COMPANY: WESTON SOLUTIONS, INC.
CONTACT: MANINDER RANDHAWA, P.E.
ADDRESS: 5301 SOUTHWEST PARKWAY, #450
AUSTIN, TX 78735
PHONE: 512-920-4847
E-MAIL: MANINDER.RANDHAWA@WESTONSOLUTIONS.COM

PARTY RESPONSIBLE FOR EROSION/SEDIMENTATION CONTROL MAINTENANCE:
COMPANY: CONTRACTOR

PARTY RESPONSIBLE FOR TREE/NATURAL AREA PROTECTION MAINTENANCE:
COMPANY: CONTRACTOR

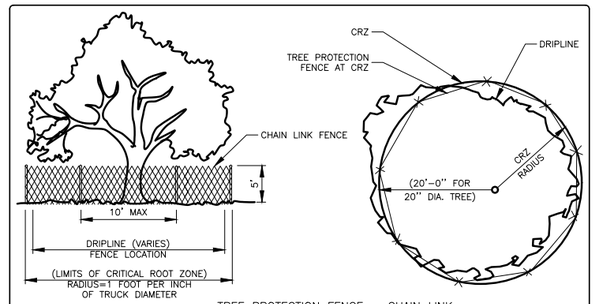


FOR QUESTIONS CONCERNING THIS DETAIL, PLEASE CONTACT THE FORESTRY MANAGER.

RECORD SIGNED COPY ON FILE AT PUBLIC WORKS
APPROVED
03-25-11
DATE
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE)

TREE PROTECTION FENCE LOCATIONS

DRAWING NO: EC-03



FOR QUESTIONS CONCERNING THIS DETAIL, PLEASE CONTACT THE FORESTRY MANAGER.

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TREE PROTECTION FENCE CHAIN LINK

DRAWING NO: EC-04

1. ALL TREES NOT LOCATED WITHIN THE LIMITS OF CONSTRUCTION AND OUTSIDE OF DISTURBED AREAS SHALL BE PRESERVED. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL TREES TO BE PRESERVED FROM HIS ACTIVITIES.
2. ALL TREES SHOWN TO BE RETAINED WITHIN THE LIMITS OF CONSTRUCTION ON THE PLANS, SHALL BE PROTECTED DURING CONSTRUCTION WITH FENCING. SEE: TREE PROTECTION TREE WELLS (EC-02), TREE PROTECTION TREE LOCATION (EC-03) AND TREE PROTECTION FENCE-CHAIN LINK (EC-04).
3. TREE PROTECTION FENCES SHALL BE ERECTED ACCORDING TO CITY STANDARDS FOR TREE PROTECTION, INCLUDING TYPES OF FENCING AND SIGNAGE.
4. TREE PROTECTION FENCES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY SITE PREPARATION WORK (CLEARING, GRUBBING, OR GRADING) AND SHALL BE MAINTAINED THROUGHOUT ALL PHASES OF THE CONSTRUCTION PROJECT.
5. EROSION AND SEDIMENTATION CONTROL BARRIERS SHALL BE INSTALLED OR MAINTAINED IN A MANNER WHICH DOES NOT RESULT IN SOIL BUILD-UP WITHIN TREE DRIPLINES.
6. FENCES SHALL COMPLETELY SURROUND THE TREE OR CLUSTERS OF TREES, LOCATED AT THE OUTERMOST LIMITS OF THE TREE BRANCHES (DRIPLINE) OR CRITICAL ROOT ZONE (CRZ), WHICHEVER IS GREATER; AND SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PROJECT IN ORDER TO PREVENT THE FOLLOWING:
   6A. SOIL COMPACTION IN CRZ AREA RESULTING FROM VEHICULAR TRAFFIC OR STORAGE OF EQUIPMENT OR MATERIAL.
   6B. CRZ DISTURBANCES DUE TO GRADE CHANGES OR TRENCHING NOT REVIEWED AND AUTHORIZED BY THE FORESTRY MANAGER.
   6C. WOUNDS TO EXPOSED ROOTS, TRUNK, OR LIMBS BY MECHANICAL EQUIPMENT
   6D. OTHER ACTIVITIES DETRIMENTAL TO TREES SUCH AS CHEMICAL STORAGE, CONCRETE TRUCK CLEANING, AND FIRES.
7. EXCEPTIONS TO INSTALLING TREE FENCES AT THE TREE DRIPLINES OR CRZ, WHICHEVER IS GREATER, MAY BE PERMITTED IN THE FOLLOWING CASES:
   7A. WHERE THERE IS TO BE AN APPROVED GRADE CHANGE, IMPERMEABLE PAVING SURFACE, OR TREE WELL;
   7B. WHERE PERMEABLE PAVING IS TO BE INSTALLED, ERECT THE FENCE AT THE OUTER LIMITS OF THE PERMEABLE PAVING AREA.
   7C. WHERE TREES ARE CLOSE TO PROPOSED BUILDINGS, ERECT THE FENCE NO CLOSER THAN 6 FEET TO THE BUILDING.
   7D. WHERE THERE ARE SEVERE SPACE CONSTRAINTS DUE TO TRACT SIZE, OR OTHER SPECIAL REQUIREMENTS, CONTACT THE FORESTRY MANAGER TO DISCUSS ALTERNATIVES.
8. WHERE ANY OF THE ABOVE EXCEPTIONS RESULT IN A FENCE THAT IS CLOSER THAN 5 FEET TO A TREE TRUNK, THE TRUNK SHALL BE PROTECTED BY STRAPPED-ON PLANKING TO A HEIGHT OF 8 FEET (OR TO THE LIMITS OF LOWER BRANCHING) IN ADDITION TO THE REDUCED FENCING PROVIDED.
9. WHERE ANY OF THE ABOVE EXCEPTIONS RESULT IN AREAS OF UNPROTECTED ROOT ZONES UNDER THE DRIPLINE OR CRZ, WHICHEVER IS GREATER, THOSE AREAS SHOULD BE COVERED WITH 4 INCHES OF ORGANIC MULCH TO MINIMIZE SOIL COMPACTION.
10. ALL GRADING WITHIN CRZ AREAS SHALL BE DONE BY HAND OR WITH SMALL EQUIPMENT TO MINIMIZE ROOT DAMAGE. PRIOR TO GRADING, RELOCATE PROTECTIVE FENCING TO 2 FEET BEHIND THE GRADE CHANGE AREA.
11. ANY ROOTS EXPOSED BY CONSTRUCTION ACTIVITY SHALL BE PRUNED FLUSH WITH THE SOIL AND BACKFILLED WITH GOOD QUALITY TOP SOIL WITHIN TWO DAYS. IF EXPOSED ROOT AREAS CANNOT BE BACKFILLED WITHIN 2 DAYS, AN ORGANIC MATERIAL WHICH REDUCES SOIL TEMPERATURE AND MINIMIZES WATER LOSS DUE TO EVAPORATION SHALL BE PLACED TO COVER THE ROOTS UNTIL BACKFILL CAN OCCUR.
12. PRIOR TO EXCAVATION OR GRADE CUTTING WITHIN TREE DRIPLINES, A CLEAN CUT SHALL BE MADE WITH A ROCK SAW OR SIMILAR EQUIPMENT, IN A LOCATION AND TO A DEPTH APPROVED BY THE FORESTRY MANAGER, TO MINIMIZE DAMAGE TO REMAINING ROOTS.
13. TREES MOST HEAVILY IMPACTED BY CONSTRUCTION ACTIVITIES WILL BE WATERED DEEPLY ONCE A WEEK DURING PERIODS OF HOT, DRY WEATHER. TREE CROWNS ARE TO BE SPRAYED WITH WATER PERIODICALLY TO REDUCE DUST ACCUMULATION ON LEAVES.
14. WHEN INSTALLING CONCRETE ADJACENT TO THE ROOT ZONE OF A TREE, A PLASTIC VAPOR BARRIER SHALL BE PLACED BEHIND THE CONCRETE TO PROHIBIT LEACHING OF LIME INTO THE CRZ.
15. ANY TRENCHING REQUIRED FOR THE INSTALLATION OF LANDSCAPE IRRIGATION SHALL BE PLACED AS FAR FROM EXISTING TREE TRUNKS AS POSSIBLE.
16. NO LANDSCAPE TOPSOIL DRESSING GREATER THAN FOUR (4) INCHES SHALL BE PERMITTED WITHIN THE DRIPLINE OR CRZ OF TREES, WHICHEVER IS GREATER. NO TOPSOIL IS PERMITTED ON ROOT FLARES OF ANY TREE.
17. PRUNING TO PROVIDE CLEARANCE FOR STRUCTURES, VEHICULAR TRAFFIC, AND CONSTRUCTION EQUIPMENT SHALL TAKE PLACE BEFORE CONSTRUCTION BEGINS. ALL PRUNING MUST BE DONE ACCORDING TO CITY STANDARDS AND AS OUTLINED IN LITERATURE PROVIDED BY THE INTERNATIONAL SOCIETY OF ARBORICULTURE (ISA PRUNING TECHNIQUES).
18. ALL OAK TREE CUTS, INTENTIONAL OR UNINTENTIONAL, SHALL BE SEALED WITH AN APPROVED PRUNING SEALER IMMEDIATELY (WITHIN 10 MINUTES). TREE PAINT MUST BE KEPT ON SITE AT ALL TIMES.
19. THE FORESTRY MANAGER HAS THE AUTHORITY TO REQUIRE ADDITIONAL TREE PROTECTION BEFORE OR DURING CONSTRUCTION.
20. TREES APPROVED FOR REMOVAL SHALL BE REMOVED IN A MANNER WHICH DOES NOT IMPACT TREES TO BE PRESERVED. REFER TO THE CITY OF ROUND ROUND ROCK TREE TECHNICAL MANUAL FOR APPROPRIATE REMOVAL METHODS.
21. PRIOR TO CONSTRUCTION, ALL LOWER TREE LIMBS OVER ROADWAYS MUST BE PRUNED TO A HEIGHT OF 14 FEET USING THE TECHNIQUES DESCRIBED IN THE CITY OF ROUND ROCK TREE TECHNICAL MANUAL.
22. DEVIATIONS FROM THE ABOVE REQUIREMENTS AND NEGLIGENT DAMAGE TO TREES MAY BE CONSIDERED AS ORDINANCE VIOLATIONS.

FOR QUESTIONS CONCERNING THIS DETAIL, PLEASE CONTACT THE FORESTRY MANAGER.

RECORD SIGNED COPY ON FILE AT PUBLIC WORKS
APPROVED
03-25-11
DATE
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE)

TREE PROTECTION NOTES

DRAWING NO: EC-01

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	REVISION	BY
A	11/8/23	100% SUBMITTAL	MR

BRUSHY CREEK M.U.D.

BRUSHY CREEK MUNICIPAL UTILITY DISTRICT

TREE PROTECTION AND E&S NOTES

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Maninder S. Randhawa, P.E. 145867 on 11-08-2023

08 NOVEMBER 2023

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DRAWN ---
CHECKED MR
REVIEWED ---

Seq. 6 of 46

Dwg. No. G-06

WON: 15960.001.001.2000

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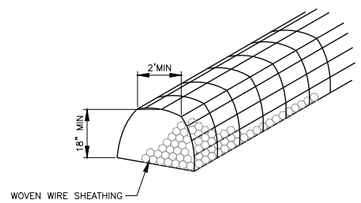

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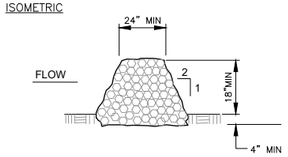
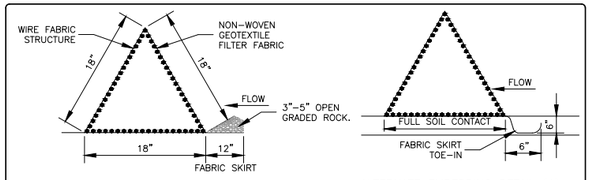


CROSS SECTION

NOTES:

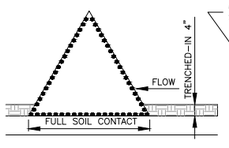
1. USE ONLY OPEN GRADED ROCK (3 to 5") DIAMETER FOR ALL CONDITIONS.
2. THE ROCK BERM SHALL BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM 1" OPENING AND MINIMUM WIRE DIAMETER OF 20 GAUGE.
3. THE ROCK BERM SHALL BE INSPECTED DAILY OR AFTER EACH RAIN, AND THE STONE AND/ OR FABRIC CORE–WOVEN SHEATHING SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED, DUE TO SEDIMENT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.
4. IF SEDIMENT REACHES A DEPTH OF 6", THE SEDIMENT SHALL BE REMOVED AND DISPOSED OF ON AN APPROVED SITE AND IN A MANNER THAT WILL NOT CREATE A SEDIMENTATION PROBLEM.
5. WHEN THE SITE IS COMPLETELY STABILIZED, THE BERM AND ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER.

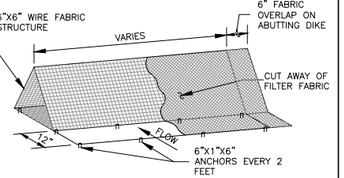
RECORD SIGNED COPY ON FILE AT PUBLIC WORKS	ROCK BERM DETAIL	DRAWING NO: EC–12
APPROVED 03–25–11 DATE		
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL (NOT TO SCALE)		



INSTALLATION IN PAVED AREAS

ALTERNATE EMBEDDING DETAIL (1)



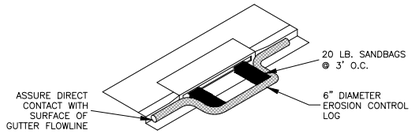


ALTERNATE EMBEDDING DETAIL (2)

NOTES:

1. DIKES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING.
2. FABRIC COVER AND SKIRT SHALL BE A CONTINUOUS WRAPPING OF GEOTEXTILE. THE SKIRT SHALL BE A CONTINUOUS EXTENSION OF THE UPSTREAM FACE FABRIC.
3. DIKES AND SKIRT SHALL BE SECURELY ANCHORED IN PLACE WITH WIRE STAPLES AT 2' INTERVALS ON BOTH EDGES AND SKIRT OR WITH 3/8" DIAMETER REBAR WITH TEE ENDS.
4. FILTER MATERIAL SHALL BE LAPPED OVER ENDS 6" TO COVER DIKE–TO–DIKE JOINTS. JOINTS SHALL BE FASTENED WITH GALVANIZED SHOAT RINGS.
5. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS REQUIRED.
6. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 4" AND DISPOSED OF IN A MANNER WHICH WILL NOT CAUSE ADDITIONAL SILTATION.
7. AFTER THE DEVELOPMENT SITE IS COMPLETELY STABILIZED, THE DIKES AND ANY REMAINING SILT SHALL BE REMOVED. SILT SHALL BE DISPOSED OF AS INDICATED IN NOTE #6 ABOVE.

RECORD SIGNED COPY ON FILE AT PUBLIC WORKS	TRIANGULAR SEDIMENT FILTER DIKE DETAIL	DRAWING NO: EC–11
APPROVED 03–25–11 DATE		
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL (NOT TO SCALE)		



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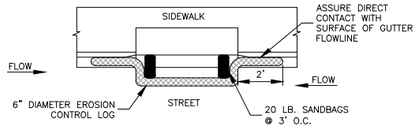
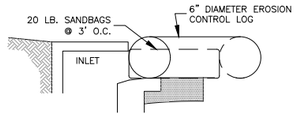


PLAN

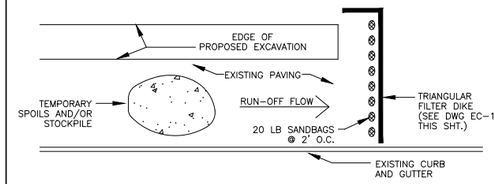


CROSS SECTION

NOTES:

1. EROSION CONTROL LOG CONTAINMENT MESH SHALL BE 100% BIODEGRADABLE, PHOTODEGRADABLE OR RECYCLABLE; AND FILL MATERIAL SHALL CONSIST OF MULCH, ASPEN EXCELSIOR FIBERS, CHIPPED SITE VEGETATION, COCONUT FIBERS, 100% RECYCLABLE FIBERS, OR ANY OTHER ACCEPTABLE MATERIAL EXCLUDING STRAW AND HAY.
2. DAILY INSPECTION SHALL BE MADE BY THE CONTRACTOR AND SILT ACCUMULATION MUST BE REMOVED WHEN DEPTH REACHES 2".
3. CONTRACTOR SHALL MONITOR THE PERFORMANCE OF INLET PROTECTION DURING EACH RAINFALL EVENT AND IMMEDIATELY REMOVE THE INLET PROTECTIONS IF THE STORM WATER BEGINS TO OVERTOP THE CURB.
4. INLET PROTECTIONS SHALL BE REMOVED AS SOON AS THE SOURCE OF SEDIMENT IS STABILIZED.

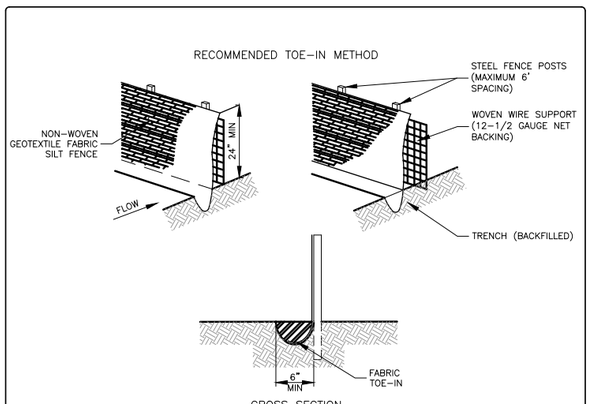
RECORD SIGNED COPY ON FILE AT PUBLIC WORKS	CURB INLET PROTECTION WITH EROSION CONTROL LOG DETAIL	DRAWING NO: EC–13
APPROVED 03–25–11 DATE		
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL (NOT TO SCALE)		



NOTES:

1. THE TEMPORARY SPOILS/STOCKPILE STORAGE AREA AND STAGING AREA MAY BE LOCATED DIRECTLY ADJACENT TO THE EXCAVATION AND ON THE PAVEMENT.
2. ANY SPOIL NOT INTENDED TO BE REUSED WILL BE HAULED TO AN APPROVED OR PERMITTED DISPOSAL SITE DAILY.
3. INSTALL TRIANGULAR SEDIMENT FILTER DIKE (SEE DWG EC–11 THIS SHT.) ACROSS FULL WIDTH OF TRAFFIC CLOSURE AND DOWNSTREAM OF CONSTRUCTION AREA, PERPENDICULAR TO CURB AND PLACED TO EFFECTIVELY CATCH AND CONTAIN SEDIMENT LADEN RUNOFF FROM THE EXCAVATED AREA. FILTER DIKE TO FOLLOW ACTIVE CONSTRUCTION. REMOVING AND RE–SETTING FILTER DIKE IS CONSIDERED SUBSIDIARY TO BARRICADES AND TRAFFIC HANDLING.

ADDITIONAL EROSION/SEDIMENTATION CONTROL FOR WORK IN PAVED AREAS

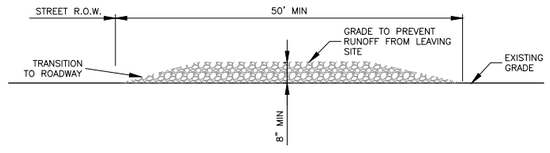


CROSS SECTION

NOTES:

1. STEEL POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MIN. OF ONE (1') FOOT.
2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (E.G. PAVEMENT) WEIGHT FABRIC FLAP WITH WASHED GRAVEL ON UPHILL SIDE TO PREVENT FLOW UNDER FENCE.
3. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
4. SILT FENCE SHALL BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IN TURN IS SECURELY FASTENED TO THE STEEL FENCE POSTS.
5. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
6. SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 6 INCHES. THE SILT SHALL BE DISPOSED OF IN AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITIONAL SILTATION.
8. SILT FENCE SHALL BE REMOVED AS SOON AS THE SOURCE OF SEDIMENT IS STABILIZED

RECORD SIGNED COPY ON FILE AT PUBLIC WORKS	SILT FENCE DETAIL	DRAWING NO: EC–10
APPROVED 03–25–11 DATE		
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL (NOT TO SCALE)		

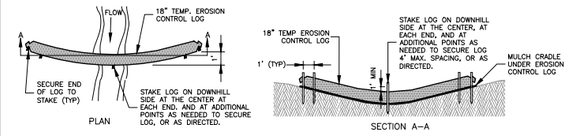


CROSS SECTION

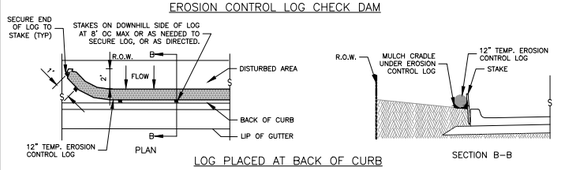
NOTES:

1. STONE SIZE SHALL BE 3" – 8" OPEN GRADED ROCK.
2. THICKNESS OF CRUSHED STONE PAD TO BE NOT LESS THAN 8".
3. LENGTH SHALL BE A MINIMUM OF 50' FROM ACTUAL ROADWAY, AND WIDTH NOT LESS THAN FULL WIDTH OF INGRESS/EGRESS.
4. ENTRANCE SHALL BE PROPERLY GRADED TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.
5. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY BY CONTRACTOR.
6. AS NECESSARY, WHEELS MUST BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT OF WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.

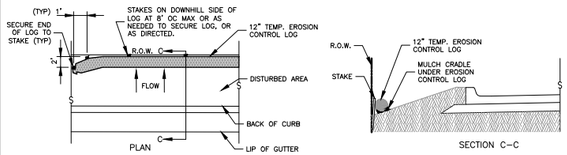
RECORD SIGNED COPY ON FILE AT PUBLIC WORKS	STABILIZED CONSTRUCTION ENTRANCE DETAIL	DRAWING NO: EC–9
APPROVED 03–25–11 DATE		
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL (NOT TO SCALE)		



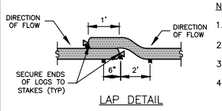
EROSION CONTROL LOG CHECK DAM



LOG PLACED AT BACK OF CURB



LOG PLACED AT EDGE OF RIGHT–OF–WAY



LAP DETAIL

NOTES:

1. DAILY INSPECTION SHALL BE MADE BY THE CONTRACTOR AND SILT ACCUMULATION MUST BE REMOVED WHEN DEPTH REACHES 6".
2. CONTRACTOR SHALL MONITOR THE PERFORMANCE OF LOGS DURING RAINFALL EVENT FOR PROPER PERFORMANCE.
3. LOGS SHALL CONSIST OF 100% BIODEGRADABLE, PHOTODEGRADABLE OR RECYCLABLE CONTAINMENT MESH STUFFED WITH FILTER MATERIAL.
4. STUFF LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE DENSITY THAT WILL HOLD SHAPE WITHOUT EXCESSIVE DEFORMATION. FILTER MATERIAL SHALL CONSIST OF MULCH, ASPEN EXCELSIOR WOOD FIBERS, CHIPPED SITE VEGETATION, COCONUT FIBERS,100% RECYCLABLE FIBERS, OR ANY OTHER ACCEPTABLE MATERIAL, EXCLUDING STRAW AND HAY.
5. STAKES SHALL BE 2" X 2" WOOD, 4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED.

RECORD SIGNED COPY ON FILE AT PUBLIC WORKS	EROSION CONTROL LOG DETAIL	DRAWING NO: EC–17
APPROVED 03–25–11 DATE		
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL (NOT TO SCALE)		

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	REVISION	BY
A	11/8/23	100% SUBMITTAL	MR

BRUSHY CREEK M.U.D.

BRUSHY CREEK MUNICIPAL UTILITY DISTRICT

TREE PROTECTION AND E&S DETAILS

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Maninder S. Randhawa, P.E. 145867 on 11–08–2023

08 NOVEMBER 2023

BAR IS ONE INCH ON ORIGINAL DRAWING.

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DESIGNED	MR
DRAWN	---
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Seq.	7 of 46
Dwg. No.	G–07
WON:	15960.001.001.2000

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LEGEND

◬	CONTROL POINT SET
E	ELECTRIC UTILITY POLE
W	WATER METER
W	WATER VALVE
SD	STORM MANHOLE
E	ELECTRIC JUNCTION BOX
WW	WASTEWATER MANHOLE - WWMH
E	ELECTRIC PULL BOX
	CONCRETE IMPROVEMENT
N.T.S.	NOT TO SCALE
( )	RECORD INFORMATION
LS#	LANDMARK SURVEYING POINT NUMBER
ROW	RIGHT-OF-WAY
D.R.W.C.T.	DEED RECORDS, WILLIAMSON COUNTY, TEXAS
P.R.W.C.T.	PLAT RECORDS WILLIAMSON COUNTY, TEXAS
O.P.R.W.C.T.	OFFICIAL PUBLIC RECORDS, WILLIAMSON COUNTY, TEXAS
	WHITE STRIPE - SOLID
	PEDESTRIAN CROSSWALK (SOLID WHITE STRIPES)
	WHITE STRIPE - STOP BAR
600	MAJOR CONTOURS
599	MINOR CONTOURS
	RIGHT OF WAY LINE (APPROXIMATE)
	PROPERTY LINE (APPROXIMATE)
	EDGE OF PAVEMENT
	CURB LINE
E OH E OH	OVERHEAD ELECTRIC OR UTILITY LINES

UTILITY LOCATION AND LINE IDENTIFICATION SHOWN HEREON THIS SURVEY ARE PER CONSTRUCTION PLAN DEVELOPED BY SNOWDEN & MEYER INC. DECEMBER 1976, FOR "BRUSHY CREEK SUBDIVISION SECTION 1 - SANITARY SEWER SYSTEM".

	WASTEWATER LINE (PER CONSTRUCTION PLAN)
	FORCE MAIN LINE (PER CONSTRUCTION PLAN)

0 20 40

HORIZONTAL SCALE IN FEET

SCALE 1"=20'

BOUNDARY NOTE
THIS DOES NOT REPRESENT A BOUNDARY SURVEY.

NOTE
THIS DRAWING IS BASED ON MEASURED DISTANCES IN THE FIELD NOT ON GRID DISTANCES.

TITLE COMMITMENT NOTE
A TITLE COMMITMENT ON PRIVATE PROPERTY WAS NOT AVAILABLE AT THE TIME OF THIS SURVEY; THEREFORE, EASEMENTS MAY EXIST WHICH ARE NOT SHOWN HEREON.

FLOODPLAIN NOTE
THIS PROJECT SITE OCCUPIES AREAS WITHIN THE "100-YEAR FLOOD PLAIN"- (PER PLAT, SEE DRAWING FOR APPROXIMATE LOCATION) AND ZONE "X" PER FIRM MAP NUMBER 48491C0488F, DATED DECEMBER 20, 2019, AS PUBLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, THE PURPOSE OF WHICH IS FOR FLOOD INSURANCE ONLY.

UTILITY AND IMPROVEMENT NOTE
UTILITY LINES SHOWN ON THIS SURVEY ARE BASED ON CONSTRUCTION PLAN OF "BRUSHY CREEK SUBDIVISION SECTION 1 - SANITARY SEWER SYSTEM, DEVELOPED BY SNOWDEN & MEYER INC. DECEMBER 1976". ONLY SURFACE EVIDENCE OF UTILITIES, UTILITY FEATURES AND IMPROVEMENTS ARE SHOWN ON THIS SURVEY; THEREFORE, UTILITIES MAY EXIST WHICH ARE NOT SHOWN HEREON.

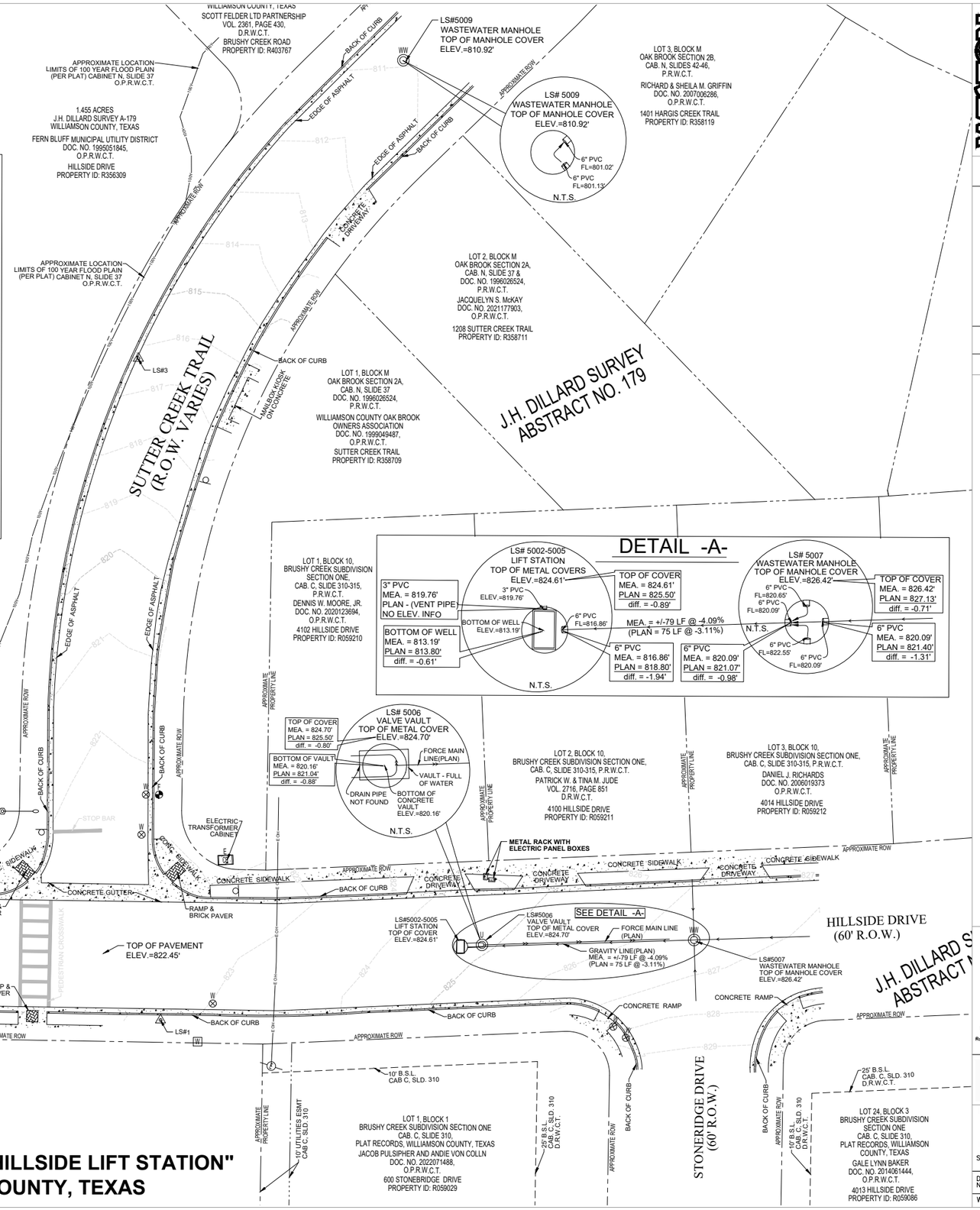
BASIS OF HORIZONTAL DATUM
TEXAS COORDINATE SYSTEM OF 1983, (CENTRAL ZONE-4203) NAD 83, (CORS) U.S. SURVEY FEET, GEOID MODEL 12B (CONUS)
COMBINED SCALE FACTOR 0.9998825145; AND SURFACE ADJUSTMENT FACTOR 1.0001174993; PROJECT CONTROL POINTS WERE ESTABLISHED USING REDUNDANT RTK METHODOLOGY, UTILIZING THE TRIMBLE RTKNET NORTH AMERICAN NETWORK BASED ON REFERENCE STATION SMNM_1012. GRID COORDINATES FOR LS#1 USED AS PROJECT CONTROLLING POINT FOR AVERAGED COMBINED SCALE FACTOR.

VERTICAL DATUM
VERTICAL DATUM WAS ESTABLISHED USING REDUNDANT RTK METHODOLOGY UTILIZING TRIMBLE NORTH AMERICAN NETWORK BASED ON REFERENCE STATION SMNM_1012, GEOID MODEL 12B (CONUS). DIFFERENTIAL LEVELING FROM PROJECT CONTROL (LS#1) WAS USED TO ESTABLISH ELEVATION FOR LANDMARK SURVEYING PRIMARY CONTROL POINTS LS#2 THROUGH LS#3.

SURVEY NOTE
1.) NO EVIDENCE OF UTILITY PAINT MARKS WERE FOUND AT TIME OF LANDMARK'S FIELD SURVEY.
2.) NO EVIDENCE OF BORE HOLES WERE FOUND AT TIME OF LANDMARK'S FIELD SURVEY.

LANDMARK SURVEYING CONTROL POINTS (GRID COORDINATES)

LS#	NORTHING (GRID)	EASTING (GRID)	ELEVATION	DESCRIPTION
LS#1	10,159,950.19	3,112,619.41	823.31	1/2"IRON ROD FOUND WITH RED CAP STAMPED"LANDMARK CONTROL"
LS#2	10,159,934.19	3,112,416.80	820.95	1/2"IRON ROD FOUND WITH RED CAP STAMPED"LANDMARK CONTROL"
LS#3	10,16,0164.87	3,112,540.37	816.35	MAG NAIL SET



AS SURVEYED BY
LANDMARK SURVEYING, LP
TEXAS FIRM REGISTRATION NO. 100727-00

Client: WESTON
Date: JANUARY 11, 2023
Office: M.BOUADI, E.LEOS
Crew: S.DUNN, J.MALDONADO
F.B.: 1941/76, 1944/26
Path: C:\USERS\PASATIED\ONEDRIVE - WESTON SOLUTIONS, INC\DAVEH\BRUSHY-CREEK\G-09.DWG
Job No.: 193-13-01/02/03/04/05

AS-BUILT SURVEY OF "HILLSIDE LIFT STATION"
WILLIAMSON COUNTY, TEXAS

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	REVISION	BY
A	11/8/23	100% SUBMITTAL	MR

BRUSHY CREEK M.U.D.

Brushy Creek Municipal Utility District

BRUSHY CREEK MUNICIPAL UTILITY DISTRICT

HILLSIDE DR SURVEY CONTROL

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED PROFESSIONAL ENGINEER
The seal appearing on this document was authorized by Manindar Randhawa, P.E. 145867 on 11-08-2023
08 NOVEMBER 2023

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Seq.	9 of 46
Dwg. No.	G-09
WON:	15960.001.001.2000

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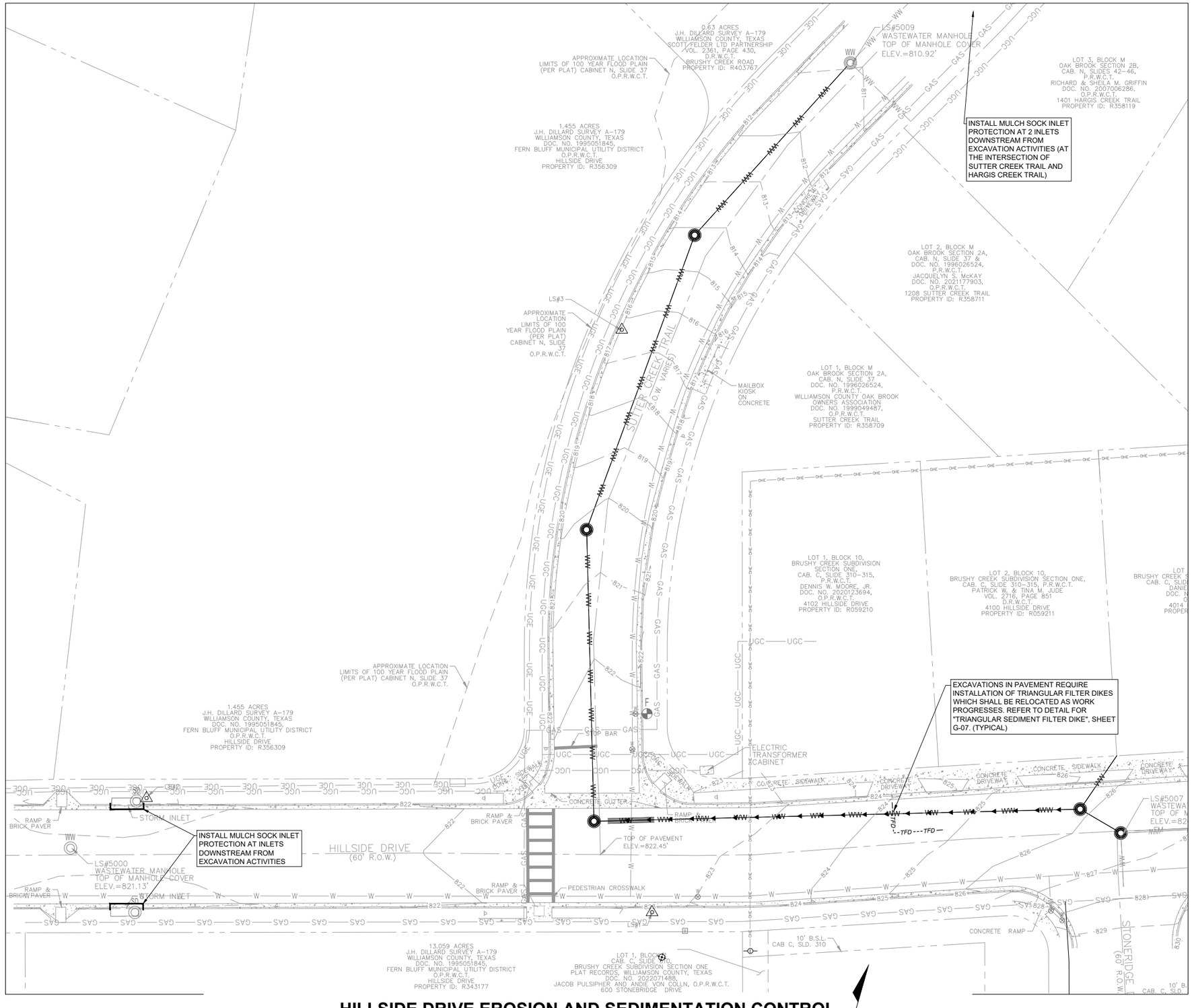

HILLSIDE DRIVE EROSION AND SEDIMENTATION CONTROL

SCALE: 1" = 20'

0 10 20' 40' 60'

LEGEND

- CONTROL POINT SET
- BENCHMARK SET (DESCRIBED)
- BENCHMARK FOUND (DESCRIBED)
- 1/2" IRON ROD FOUND
- 60D NAIL FOUND
- 1" AXLE FOUND
- ELECTRIC UTILITY POLE
- WATER METER
- WATER VALVE
- STORM MANHOLE
- ELECTRIC JUNCTION BOX
- ELECTRIC METER
- WASTEWATER MANHOLE - WWMH
- ELECTRIC PULL BOX
- ELECTRIC MANHOLE
- BREAK-ON LINE (NOT TO SCALE)
- ( ) RECORD INFORMATION
- LS# LANDMARK SURVEYING POINT NUMBER
- ROW RIGHT-OF-WAY
- D.R.W.C.T. DEED RECORDS, WILLIAMSON COUNTY, TEXAS
- P.R.W.C.T. PLAT RECORDS WILLIAMSON COUNTY, TEXAS
- O.P.R.W.C.T. OFFICIAL PUBLIC RECORDS, WILLIAMSON COUNTY, TEXAS
- CHAINLINK FENCE
- BARBED WIRE FENCE
- 600 MAJOR CONTOURS
- 599 MINOR CONTOURS
- ROW RIGHT OF WAY LINE (APPROXIMATE)
- PROPERTY LINE (APPROXIMATE)
- EDGE OF PAVEMENT
- CURB LINE
- OHE OVERHEAD ELECTRIC LINES
- WW WASTEWATER LINE
- CONCRETE IMPROVEMENT
- TO BE DEMOLISHED

SURVEYOR NOTE

UTILITY LOCATION AND LINE IDENTIFICATION SHOWN HEREON THIS SURVEY ARE PER CONSTRUCTION PLAN DEVELOPED BY GRAY ENGINEERING, INC FOR "WILLIAMSON COUNTY MUNICIPAL UTILITY DISTRICT NO. 2. LIFT STATION NO. 3", PROJECT NO. 927-2496, ACCEPTED AND APPROVED FOR CONSTRUCTION JUNE 22, 1990.

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	REVISION	BY
A	11/8/23	100% SUBMITTAL	MR

BRUSHY CREEK M.U.D.

BRUSHY CREEK
MUNICIPAL UTILITY DISTRICT

HILLSIDE DRIVE EROSION AND SEDIMENT CONTROL

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Maninder S. Randhawa, P.E. 145867 on 11-08-2023

08 NOVEMBER 2023

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Seq.	11 of 46
Dwg. No.	G-11
WON:	15960.001.001.2000

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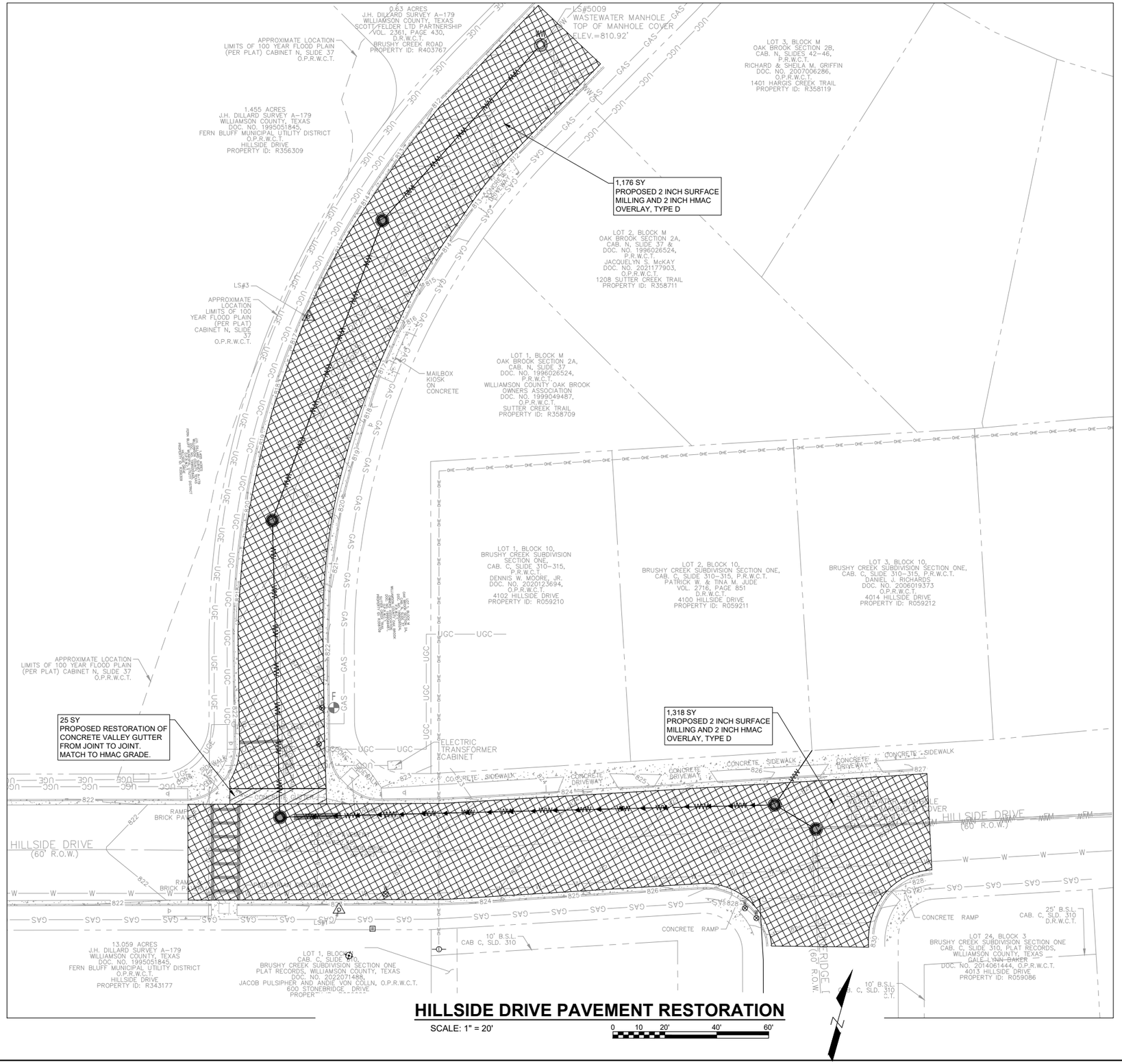

HILLSIDE DRIVE PAVEMENT RESTORATION

SCALE: 1" = 20'

0 10 20' 40' 60'

LEGEND

	CONTROL POINT SET
BM	BENCHMARK SET (DESCRIBED)
BM	BENCHMARK FOUND (DESCRIBED)
	1/2" IRON ROD FOUND
	60D NAIL FOUND
	1" AXLE FOUND
E	ELECTRIC UTILITY POLE
W	WATER METER
W	WATER VALVE
S	STORM MANHOLE
E	ELECTRIC JUNCTION BOX
E	ELECTRIC METER
WW	WASTEWATER MANHOLE - WWMH
E	ELECTRIC PULL BOX
E	ELECTRIC MANHOLE
	BREAK-ON LINE (NOT TO SCALE)
( )	RECORD INFORMATION
LS#	LANDMARK SURVEYING POINT NUMBER
ROW	RIGHT-OF-WAY
D.R.W.C.T.	DEED RECORDS, WILLIAMSON COUNTY, TEXAS
P.R.W.C.T.	PLAT RECORDS WILLIAMSON COUNTY, TEXAS
O.P.R.W.C.T.	OFFICIAL PUBLIC RECORDS, WILLIAMSON COUNTY, TEXAS
—<>—<>—	CHAINLINK FENCE
—X—X—X—X—	BARBED WIRE FENCE
600	MAJOR CONTOURS
599	MINOR CONTOURS
ROW	RIGHT OF WAY LINE (APPROXIMATE)
	PROPERTY LINE (APPROXIMATE)
	EDGE OF PAVEMENT
	CURB LINE
OHE	OVERHEAD ELECTRIC LINES
WW	WASTEWATER LINE
	CONCRETE IMPROVEMENT
	TO BE DEMOLISHED

SURVEYOR NOTE

UTILITY LOCATION AND LINE IDENTIFICATION SHOWN HEREON THIS SURVEY ARE PER CONSTRUCTION PLAN DEVELOPED BY GRAY ENGINEERING, INC FOR "WILLIAMSON COUNTY MUNICIPAL UTILITY DISTRICT NO. 2. LIFT STATION NO. 3", PROJECT NO. 927-2496, ACCEPTED AND APPROVED FOR CONSTRUCTION JUNE 22, 1990.

NOTES:

1. TRENCH REPAIR, INCLUDING PASSING COMPACTION TESTING, SHALL BE COMPLETED PRIOR TO THE STREET MILL AND OVERLAY INSTALLATION OR RESTORATION OF CONCRETE.
2. ALL FINAL GRADES OF INSTALLED PAVEMENT RESTORATION SHALL MATCH PRE-CONSTRUCTION EXISTING GRADES.

WESTON SOLUTIONS
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PHONE: 512-451-7100
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NO.	DATE	REVISION	BY
A	11/8/23	100% SUBMITTAL	MR

BRUSHY CREEK M.U.D.

BRUSHY CREEK
MUNICIPAL UTILITY DISTRICT

HILLSIDE DRIVE PAVEMENT RESTORATION

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED PROFESSIONAL ENGINEER

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Seq.	12 of 46
Dwg. No.	G-12
WON:	15960.001.001.2000

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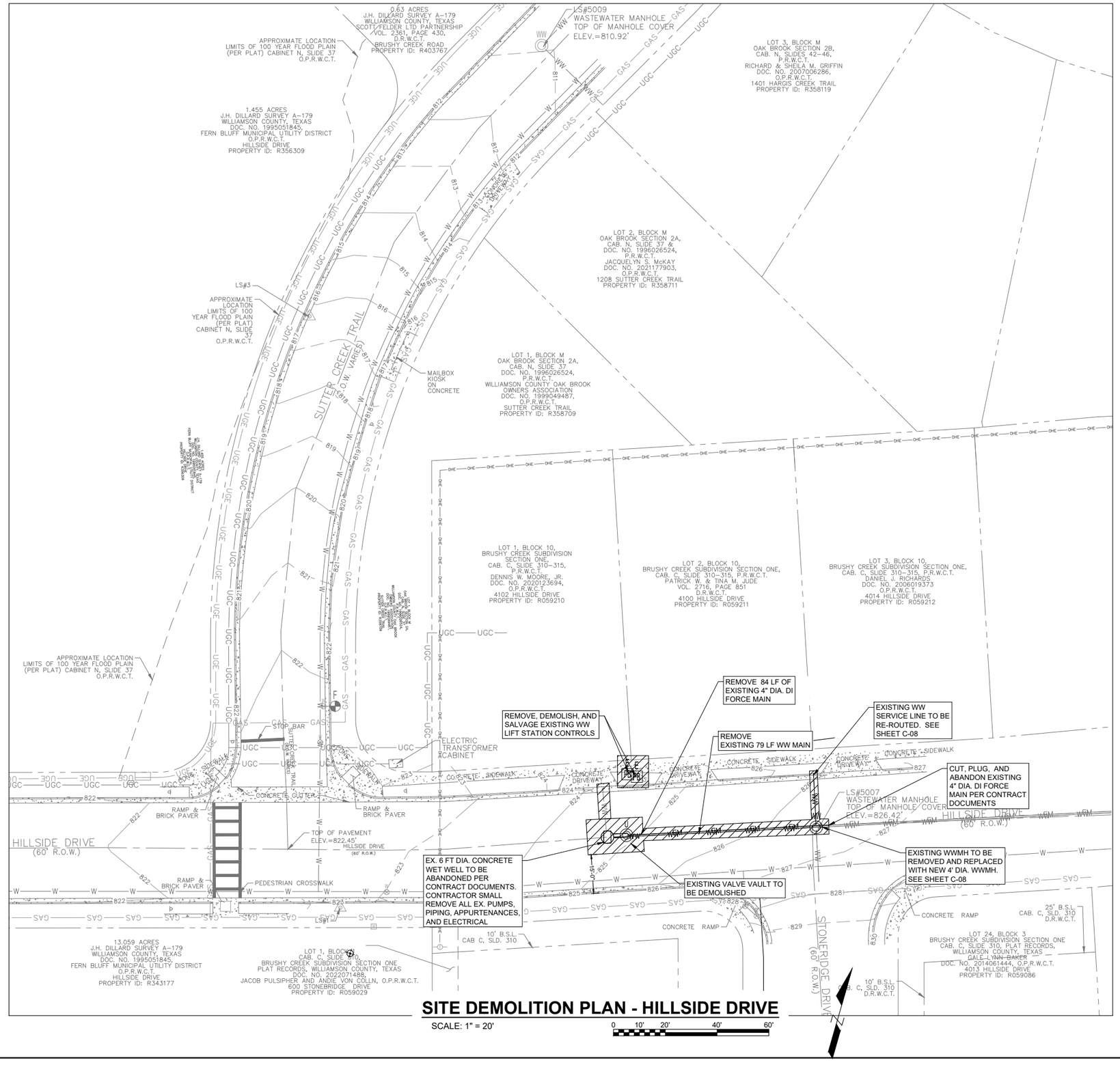

SITE DEMOLITION PLAN - HILLSIDE DRIVE

SCALE: 1" = 20'

0 10' 20' 40' 60'

LEGEND

	CONTROL POINT SET
BM	BENCHMARK SET (DESCRIBED)
BM	BENCHMARK FOUND (DESCRIBED)
	1/2" IRON ROD FOUND
	60D NAIL FOUND
	1" AXLE FOUND
	ELECTRIC UTILITY POLE
W	WATER METER
	WATER VALVE
S	STORM MANHOLE
E	ELECTRIC JUNCTION BOX
E	ELECTRIC METER
WWMH	WASTEWATER MANHOLE - WWMH
E	ELECTRIC PULL BOX
E	ELECTRIC MANHOLE
	BREAK-ON LINE (NOT TO SCALE)
( )	RECORD INFORMATION
LS#	LANDMARK SURVEYING POINT NUMBER
ROW	RIGHT-OF-WAY
D.R.W.C.T.	DEED RECORDS, WILLIAMSON COUNTY, TEXAS
P.R.W.C.T.	PLAT RECORDS WILLIAMSON COUNTY, TEXAS
O.P.R.W.C.T.	OFFICIAL PUBLIC RECORDS, WILLIAMSON COUNTY, TEXAS
	CHAINLINK FENCE
	BARBED WIRE FENCE
600	MAJOR CONTOURS
599	MINOR CONTOURS
ROW	RIGHT OF WAY LINE (APPROXIMATE)
	PROPERTY LINE (APPROXIMATE)
	EDGE OF PAVEMENT
	CURB LINE
OHE	OVERHEAD ELECTRIC LINES
WW	WASTEWATER LINE
	CONCRETE IMPROVEMENT
	TO BE DEMOLISHED

NOTES

1. CONTRACTOR SHALL SALVAGE ELECTRICAL SERVICE DISCONNECT, ATS, AND I&C SYSTEM AND PROVIDE TO OWNER FOR REUSE.
2. CONTRACTOR SHALL CALL ALL APPROPRIATE COMPANIES AND LOCATE ALL EXISTING UTILITIES PRIOR TO DEMOLITION AND CONSTRUCTION.
3. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNERS TO MAINTAIN ACCESS TO PRIVATE PROPERTIES AT ALL TIMES.
4. WASTEWATER SERVICES TO ALL HOMES SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION ACTIVITIES.
5. THE FOLLOWING ITEMS SHALL BE SALVAGED AND DELIVERED TO BCMUD MAINTENANCE YARD AY 3800 GREAT OAKS DRIVE, ROUND ROCK, TX 78681:
   - 2 PUMPS
   - BOTH CONTROL PANELS

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	REVISION	BY
A	11/8/23	100% SUBMITTAL	MR

BRUSHY CREEK M.U.D.

BRUSHY CREEK
MUNICIPAL UTILITY DISTRICT

HILLSIDE DR SITE DEMOLITION PLAN

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED
PROFESSIONAL ENGINEER
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Seq.	17 of 46
Dwg. No.	C-05
WON:	15960.001.001.2000

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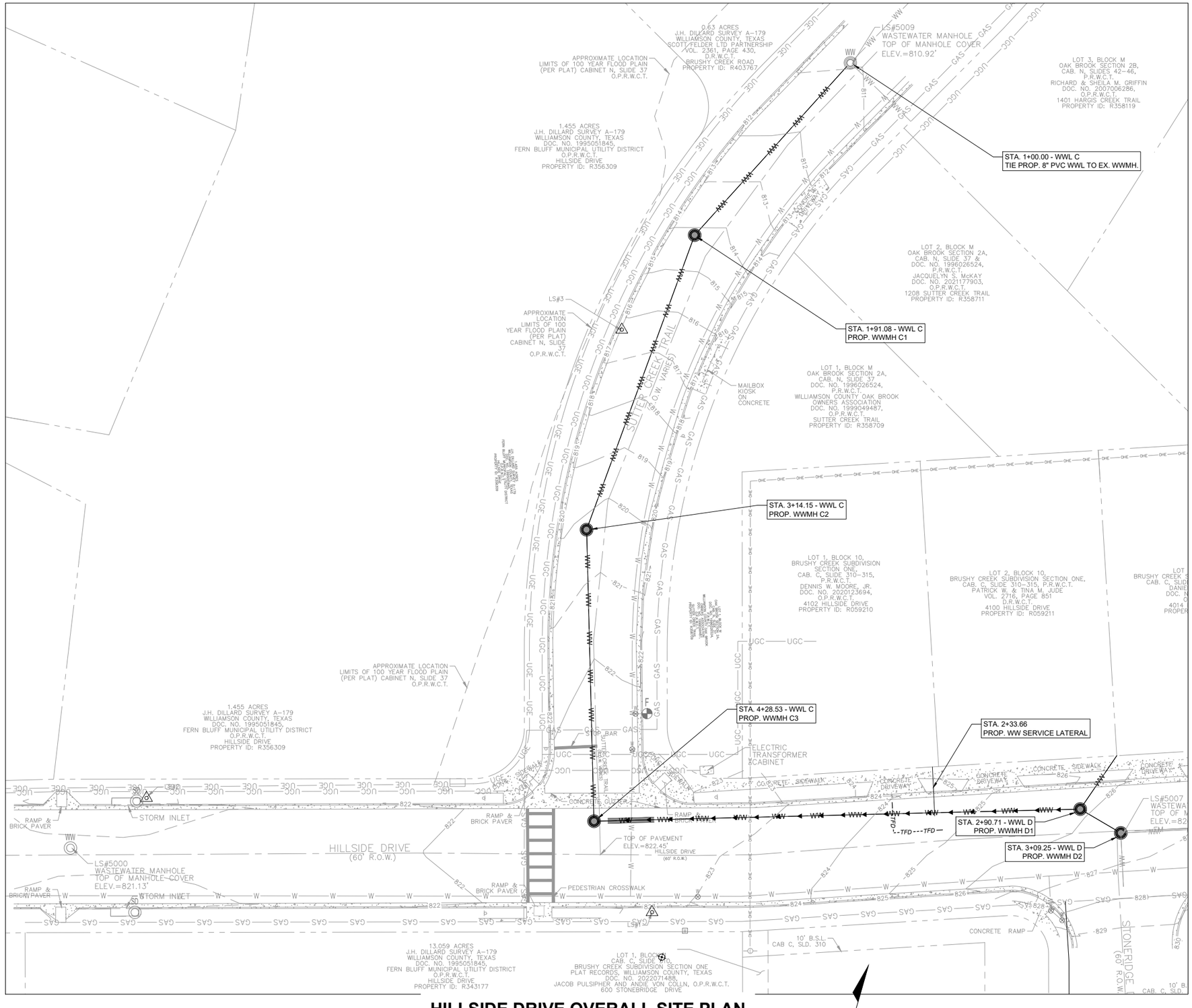

HILLSIDE DRIVE OVERALL SITE PLAN

SCALE: 1" = 20'

0 10 20' 40' 60'

LEGEND

	CONTROL POINT SET
BM	BENCHMARK SET (DESCRIBED)
BM	BENCHMARK FOUND (DESCRIBED)
	1/2" IRON ROD FOUND
	60D NAIL FOUND
	1" AXLE FOUND
E	ELECTRIC UTILITY POLE
W	WATER METER
	WATER VALVE
S	STORM MANHOLE
E	ELECTRIC JUNCTION BOX
E	ELECTRIC METER
WW	WASTEWATER MANHOLE - WWMH
E	ELECTRIC PULL BOX
E	ELECTRIC MANHOLE
	BREAK-ON LINE (NOT TO SCALE)
( )	RECORD INFORMATION
LS#	LANDMARK SURVEYING POINT NUMBER
ROW	RIGHT-OF-WAY
D.R.W.C.T.	DEED RECORDS, WILLIAMSON COUNTY, TEXAS
P.R.W.C.T.	PLAT RECORDS WILLIAMSON COUNTY, TEXAS
O.P.R.W.C.T.	OFFICIAL PUBLIC RECORDS, WILLIAMSON COUNTY, TEXAS
—<>—<>—	CHAINLINK FENCE
—X—X—X—X—	BARBED WIRE FENCE
600	MAJOR CONTOURS
599	MINOR CONTOURS
ROW	RIGHT OF WAY LINE (APPROXIMATE)
	PROPERTY LINE (APPROXIMATE)
	EDGE OF PAVEMENT
	CURB LINE
OHE	OVERHEAD ELECTRIC LINES
WW	WASTEWATER LINE
	CONCRETE IMPROVEMENT
	TO BE DEMOLISHED

SURVEYOR NOTE

UTILITY LOCATION AND LINE IDENTIFICATION SHOWN HEREON THIS SURVEY ARE PER CONSTRUCTION PLAN DEVELOPED BY GRAY ENGINEERING, INC FOR "WILLIAMSON COUNTY MUNICIPAL UTILITY DISTRICT NO. 2. LIFT STATION NO. 3", PROJECT NO. 927-2496, ACCEPTED AND APPROVED FOR CONSTRUCTION JUNE 22, 1990.

NOTES

1. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNERS TO MAINTAIN ACCESS TO ADJACENT PROPERTIES AT ALL TIMES.
2. IF BACKFILLING OF A MANHOLE EXCAVATION OR OVER-EXCAVATED AREA DOES NOT MEET COMPACTION REQUIREMENTS AS PER THE CONTRACT DOCUMENTS, THE CONTRACTOR MAY USE CLSM FOR BACKFILL MATERIAL, IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS AT NO ADDITIONAL COST TO THE OWNER.
3. FOR CONSTRUCTION REQUIREMENTS AT CROSSINGS OF THE WATER LINE, SEE SHEET D-01.
4. WASTEWATER SERVICES SHALL BE REPLACED FROM THE MAIN TO THE METER.
5. WASTEWATER SERVICES TO ALL HOMES SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION ACTIVITIES.

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	REVISION	BY
A	11/8/23	100% SUBMITTAL	MR

BRUSHY CREEK M.U.D.

BRUSHY CREEK
MUNICIPAL UTILITY DISTRICT

HILLSIDE DRIVE OVERALL SITE PLAN

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED
PROFESSIONAL ENGINEER

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Seq.	18 of 46
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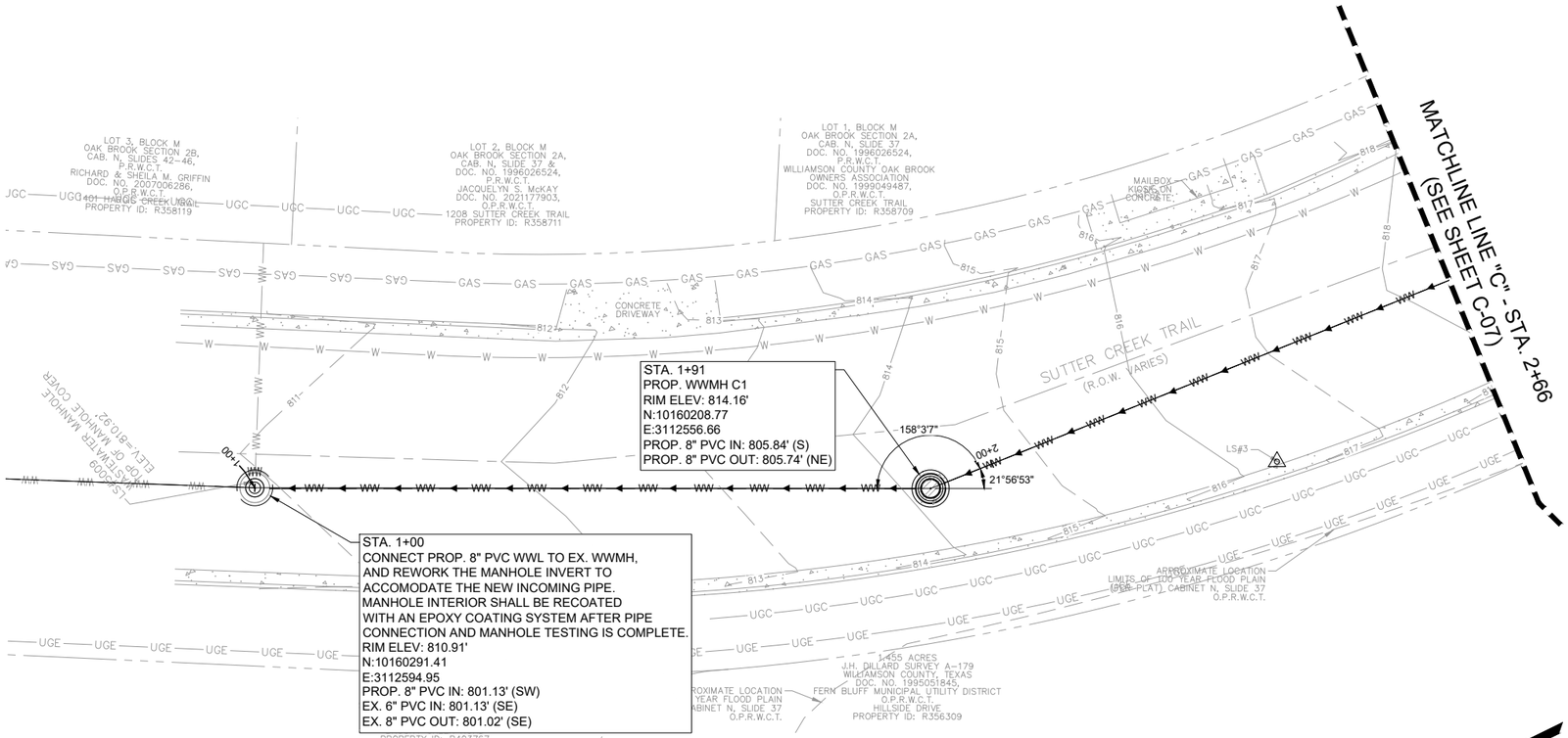
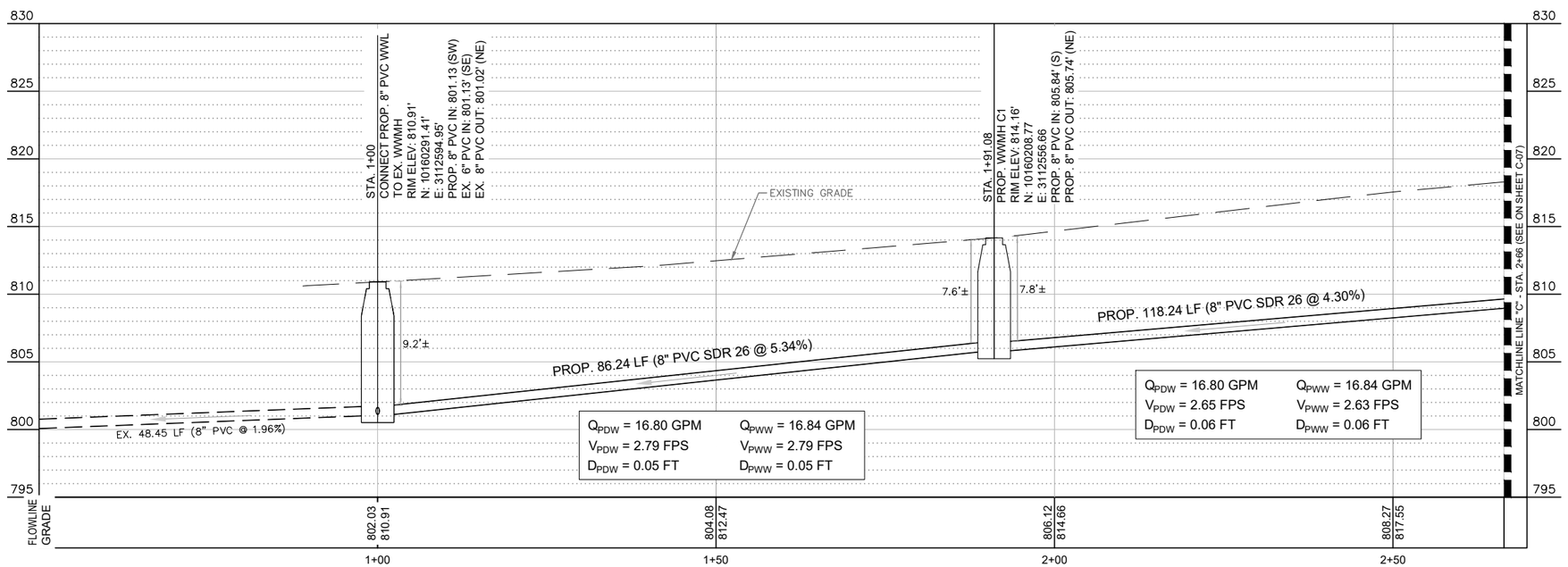


SUTTER CREEK TRAIL WASTEWATER LINE "C" PLAN STA. 1+00 TO 2+66

SCALE: 1" = 10'

0 5' 10' 20' 30'



LEGEND

	CONTROL POINT SET
BM	BENCHMARK SET (DESCRIBED)
BM	BENCHMARK FOUND (DESCRIBED)
	1/2" IRON ROD FOUND
	60D NAIL FOUND
	1" AXLE FOUND
	ELECTRIC UTILITY POLE
W	WATER METER
	WATER VALVE
S	STORM MANHOLE
E	ELECTRIC JUNCTION BOX
E	ELECTRIC METER
WW	WASTEWATER MANHOLE - WWMH
E	ELECTRIC PULL BOX
	ELECTRIC MANHOLE
	BREAK-ON LINE (NOT TO SCALE)
( )	RECORD INFORMATION
LS#	LANDMARK SURVEYING POINT NUMBER
ROW	RIGHT-OF-WAY
D.R.W.C.T.	DEED RECORDS, WILLIAMSON COUNTY, TEXAS
P.R.W.C.T.	PLAT RECORDS WILLIAMSON COUNTY, TEXAS
O.P.R.W.C.T.	OFFICIAL PUBLIC RECORDS, WILLIAMSON COUNTY, TEXAS
—<>—<>—	CHAINLINK FENCE
—X—X—X—X—	BARBED WIRE FENCE
600	MAJOR CONTOURS
599	MINOR CONTOURS
ROW	RIGHT OF WAY LINE (APPROXIMATE)
	PROPERTY LINE (APPROXIMATE)
	EDGE OF PAVEMENT
	CURB LINE
OHE	OVERHEAD ELECTRIC LINES
WW	WASTEWATER LINE
	CONCRETE IMPROVEMENT
	TO BE DEMOLISHED

SURVEYOR NOTE

UTILITY LOCATION AND LINE IDENTIFICATION SHOWN HEREON THIS SURVEY ARE PER CONSTRUCTION PLAN DEVELOPED BY GRAY ENGINEERING, INC FOR "WILLIAMSON COUNTY MUNICIPAL UTILITY DISTRICT NO. 2. LIFT STATION NO. 3", PROJECT NO. 927-2496, ACCEPTED AND APPROVED FOR CONSTRUCTION JUNE 22, 1990.

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNERS TO MAINTAIN ACCESS TO ADJACENT PROPERTIES AT ALL TIMES.
2. IF BACKFILLING OF A MANHOLE EXCAVATION OR OVER-EXCAVATED AREA DOES NOT MEET COMPACTION REQUIREMENTS AS PER THE CONTRACT DOCUMENTS, THE CONTRACTOR MAY USE CLSM FOR BACKFILL MATERIAL, IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS AT NO ADDITIONAL COST TO THE OWNER.
3. FOR CONSTRUCTION REQUIREMENTS AT CROSSINGS OF THE WATER LINE, SEE SHEET D-01.
4. WASTEWATER SERVICES SHALL BE REPLACED FROM THE MAIN TO THE METER.
5. WASTEWATER SERVICES TO ALL HOMES SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION ACTIVITIES.

0' 5' 10'
FULL SIZE 1" = 5'
HALF SIZE 1" = 10'
VERTICAL SCALE

0' 10' 20'
FULL SIZE 1" = 10'
HALF SIZE 1" = 20'
HORIZONTAL SCALE

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	REVISION	BY
A	11/8/23	100% SUBMITTAL	MR

BRUSHY CREEK M.U.D.

BRUSHY CREEK
MUNICIPAL UTILITY DISTRICT

HILLSIDE DR WASTEWATERLINE C PLAN & PROFILE STA. 1+00 TO 4+32.83

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED
PROFESSIONAL ENGINEER

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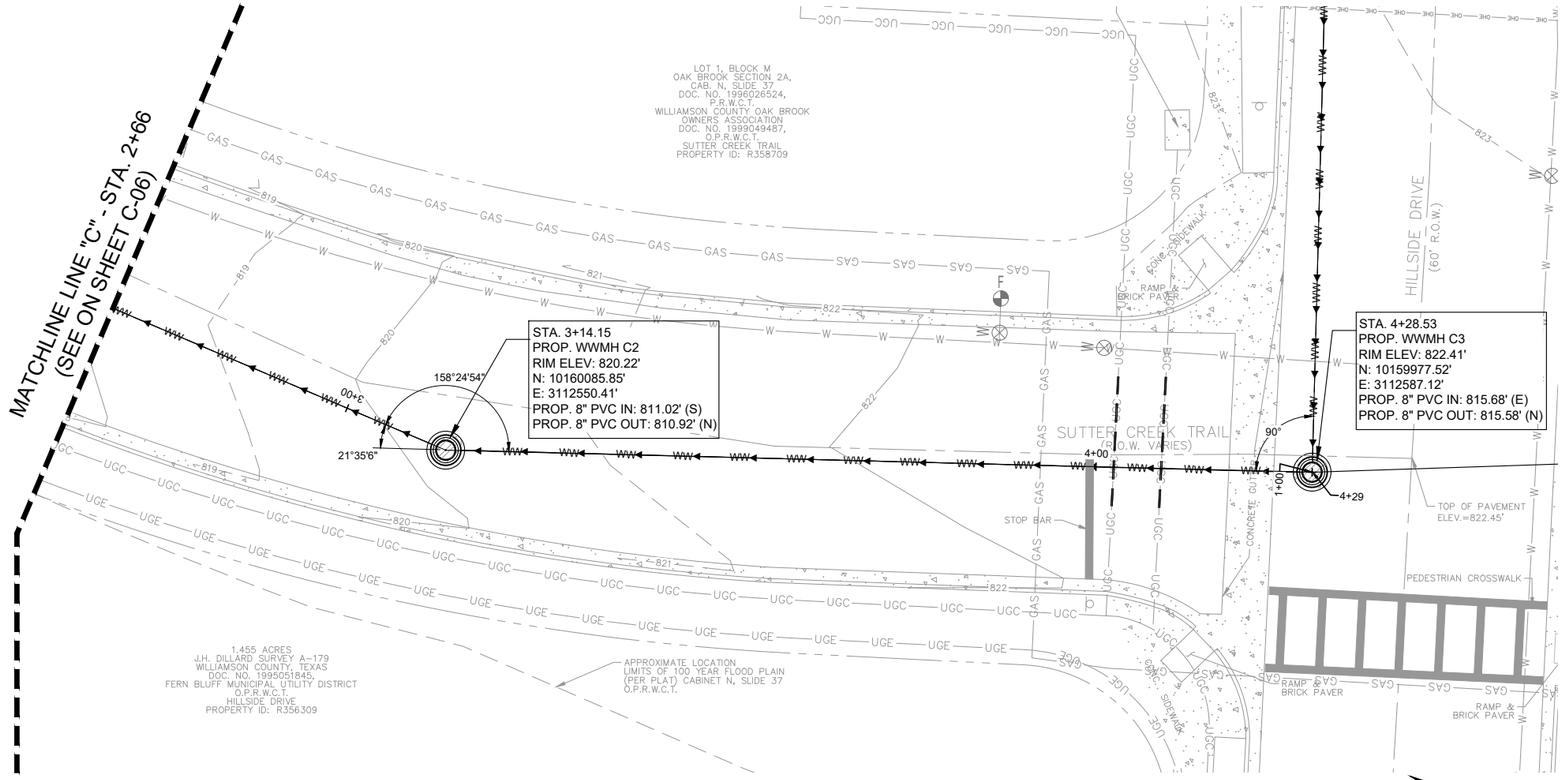
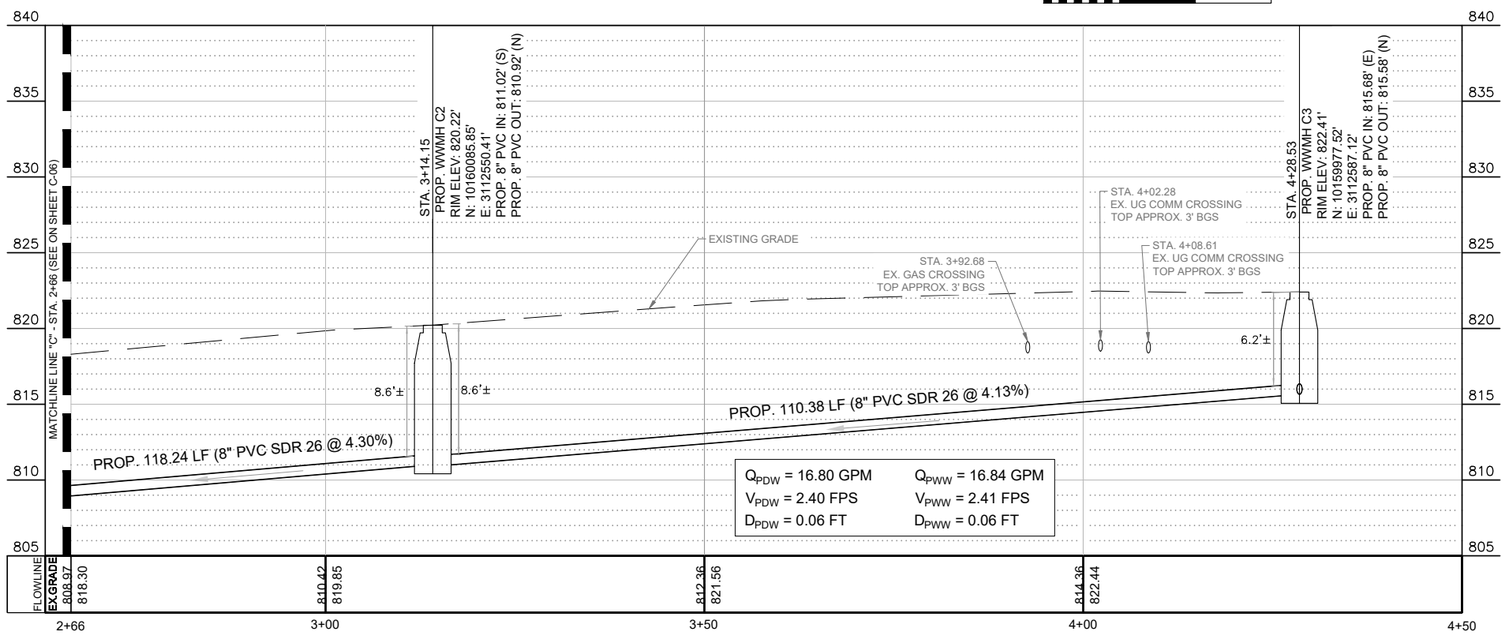


SUTTER CREEK TRAIL WASTEWATER LINE "C" PLAN STA. 2+66 TO 4+32.83

SCALE: 1" = 10'

0 5' 10' 20' 30'



0' 5' 10'
FULL SIZE 1" = 5'
HALF SIZE 1" = 10'
VERTICAL SCALE

0' 10' 20'
FULL SIZE 1" = 10'
HALF SIZE 1" = 20'
HORIZONTAL SCALE

LEGEND

	CONTROL POINT SET
BM	BENCHMARK SET (DESCRIBED)
BM	BENCHMARK FOUND (DESCRIBED)
	1/2" IRON ROD FOUND
	60D NAIL FOUND
	1" AXLE FOUND
E	ELECTRIC UTILITY POLE
W	WATER METER
W	WATER VALVE
S	STORM MANHOLE
E	ELECTRIC JUNCTION BOX
E	ELECTRIC METER
WW	WASTEWATER MANHOLE - WWMH
E	ELECTRIC PULL BOX
E	ELECTRIC MANHOLE
	BREAK-ON LINE (NOT TO SCALE)
( )	RECORD INFORMATION
LS#	LANDMARK SURVEYING POINT NUMBER
ROW	RIGHT-OF-WAY
D.R.W.C.T.	DEED RECORDS, WILLIAMSON COUNTY, TEXAS
P.R.W.C.T.	PLAT RECORDS WILLIAMSON COUNTY, TEXAS
O.P.R.W.C.T.	OFFICIAL PUBLIC RECORDS, WILLIAMSON COUNTY, TEXAS
	CHAINLINK FENCE
	BARBED WIRE FENCE
600	MAJOR CONTOURS
599	MINOR CONTOURS
ROW	RIGHT OF WAY LINE (APPROXIMATE)
	PROPERTY LINE (APPROXIMATE)
	EDGE OF PAVEMENT
	CURB LINE
OHE	OVERHEAD ELECTRIC LINES
WW	WASTEWATER LINE
	CONCRETE IMPROVEMENT
	TO BE DEMOLISHED

SURVEYOR NOTE

UTILITY LOCATION AND LINE IDENTIFICATION SHOWN HEREON THIS SURVEY ARE PER CONSTRUCTION PLAN DEVELOPED BY GRAY ENGINEERING, INC FOR "WILLIAMSON COUNTY MUNICIPAL UTILITY DISTRICT NO. 2. LIFT STATION NO. 3", PROJECT NO. 927-2496, ACCEPTED AND APPROVED FOR CONSTRUCTION JUNE 22, 1990.

NOTES:

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2. IF BACKFILLING OF A MANHOLE EXCAVATION OR OVER-EXCAVATED AREA DOES NOT MEET COMPACTION REQUIREMENTS AS PER THE CONTRACT DOCUMENTS, THE CONTRACTOR MAY USE CLSM FOR BACKFILL MATERIAL, IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS AT NO ADDITIONAL COST TO THE OWNER.
3. FOR CONSTRUCTION REQUIREMENTS AT CROSSINGS OF THE WATER LINE, SEE SHEET D-01.
4. WASTEWATER SERVICES SHALL BE REPLACED FROM THE MAIN TO THE METER.
5. WASTEWATER SERVICES TO ALL HOMES SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION ACTIVITIES.

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
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NO.	DATE	REVISION	BY
A	11/8/23	100% SUBMITTAL	MR

BRUSHY CREEK M.U.D.

BRUSHY CREEK
MUNICIPAL UTILITY DISTRICT

HILLSIDE DR WASTEWATERLINE C PLAN & PROFILE STA. 1+00 TO 2+66

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED
PROFESSIONAL ENGINEER

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Seq. 20 of 46

Dwg. No. C-08

WON: 15960.001.001.2000

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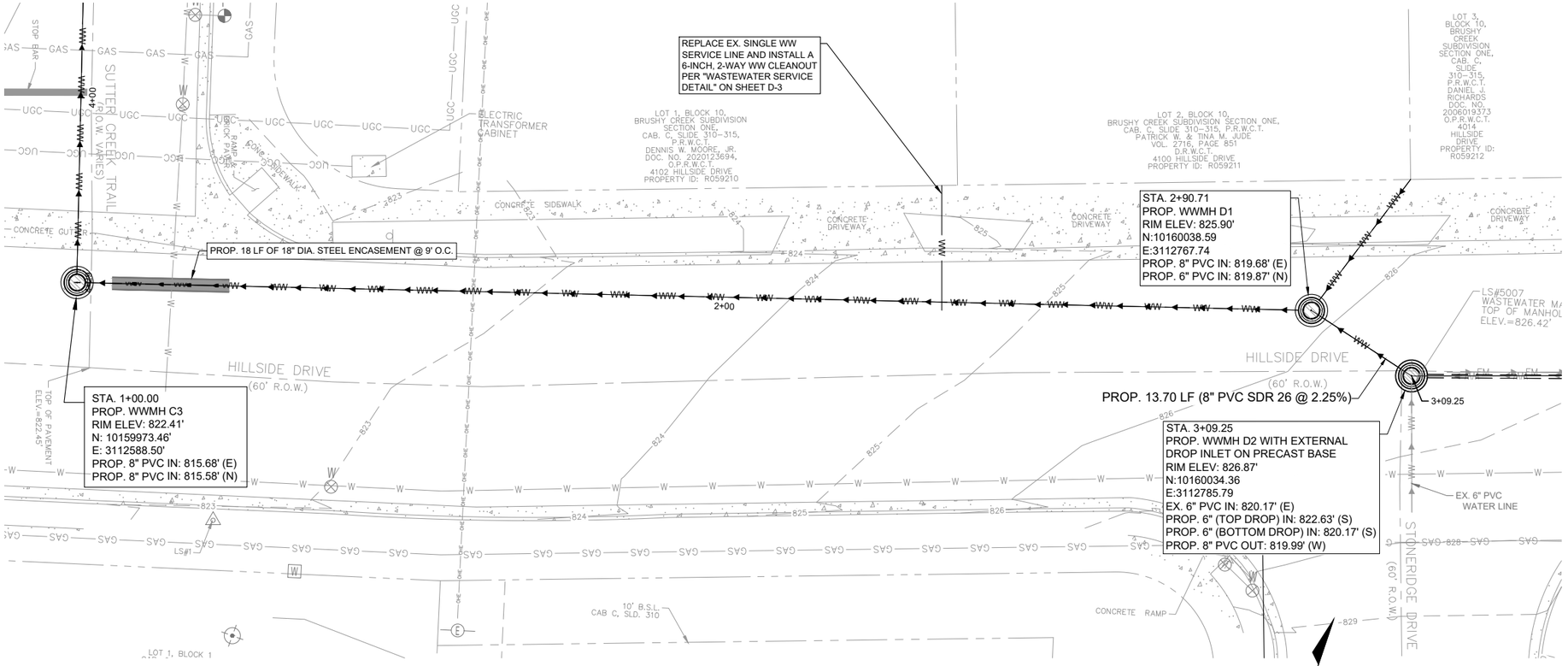
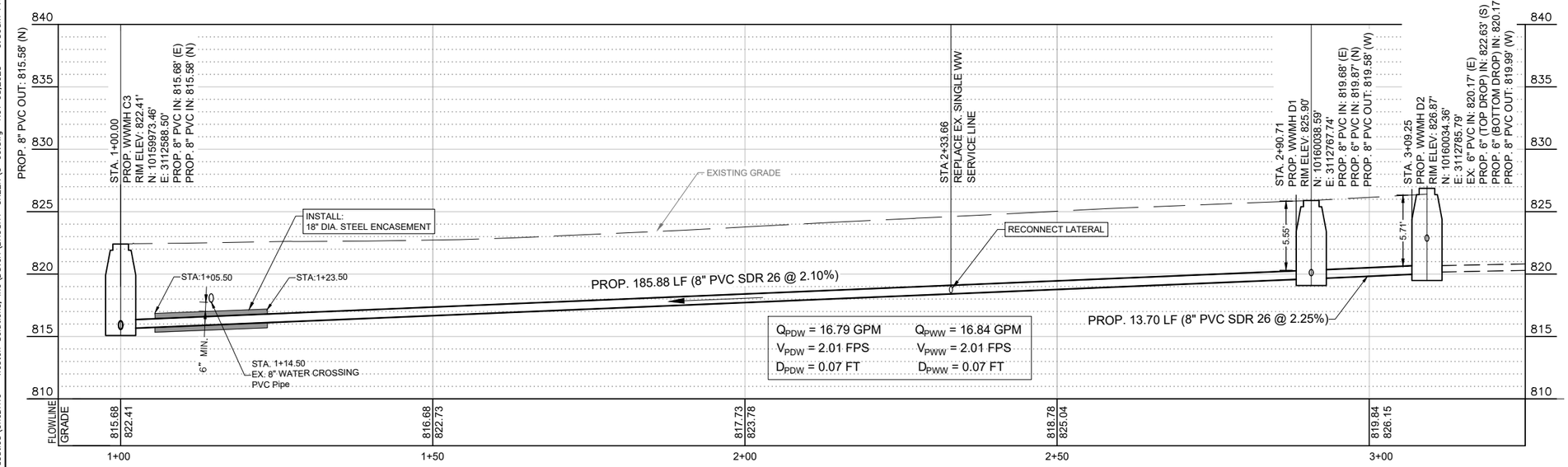


HILLSIDE DR WASTEWATER LINE "D" PLAN STA. 1+00 TO 3+09.25

SCALE: 1" = 10'

0 5' 10' 20' 30'



0' 5' 10'
FULL SIZE 1" = 5'
HALF SIZE 1" = 10'
VERTICAL SCALE

0' 10' 20'
FULL SIZE 1" = 10'
HALF SIZE 1" = 20'
HORIZONTAL SCALE

LEGEND

	CONTROL POINT SET
BM	BENCHMARK SET (DESCRIBED)
BM	BENCHMARK FOUND (DESCRIBED)
	1/2" IRON ROD FOUND
	60D NAIL FOUND
	1" AXLE FOUND
E	ELECTRIC UTILITY POLE
W	WATER METER
	WATER VALVE
S	STORM MANHOLE
E	ELECTRIC JUNCTION BOX
E	ELECTRIC METER
WW	WASTEWATER MANHOLE - WWMH
E	ELECTRIC PULL BOX
E	ELECTRIC MANHOLE
	BREAK-ON LINE (NOT TO SCALE)
( )	RECORD INFORMATION
LS#	LANDMARK SURVEYING POINT NUMBER
ROW	RIGHT-OF-WAY
D.R.W.C.T.	DEED RECORDS, WILLIAMSON COUNTY, TEXAS
P.R.W.C.T.	PLAT RECORDS WILLIAMSON COUNTY, TEXAS
O.P.R.W.C.T.	OFFICIAL PUBLIC RECORDS, WILLIAMSON COUNTY, TEXAS
—<>—<>—	CHAINLINK FENCE
—X—X—X—X—	BARBED WIRE FENCE
600	MAJOR CONTOURS
599	MINOR CONTOURS
ROW	RIGHT OF WAY LINE (APPROXIMATE)
	PROPERTY LINE (APPROXIMATE)
	EDGE OF PAVEMENT
	CURB LINE
OHE	OVERHEAD ELECTRIC LINES
WW	WASTEWATER LINE
	CONCRETE IMPROVEMENT
	TO BE DEMOLISHED

SURVEYOR NOTE

UTILITY LOCATION AND LINE IDENTIFICATION SHOWN HEREON THIS SURVEY ARE PER CONSTRUCTION PLAN DEVELOPED BY GRAY ENGINEERING, INC FOR "WILLIAMSON COUNTY MUNICIPAL UTILITY DISTRICT NO. 2. LIFT STATION NO. 3", PROJECT NO. 927-2496, ACCEPTED AND APPROVED FOR CONSTRUCTION JUNE 22, 1990.

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNERS TO MAINTAIN ACCESS TO ADJACENT PROPERTIES AT ALL TIMES.
2. IF BACKFILLING OF A MANHOLE EXCAVATION OR OVER-EXCAVATED AREA DOES NOT MEET COMPACTION REQUIREMENTS AS PER THE CONTRACT DOCUMENTS, THE CONTRACTOR MAY USE CLSM FOR BACKFILL MATERIAL, IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS AT NO ADDITIONAL COST TO THE OWNER.
3. FOR CONSTRUCTION REQUIREMENTS AT CROSSINGS OF THE WATER LINE, SEE SHEET D-01.
4. WASTEWATER SERVICES SHALL BE REPLACED FROM THE MAIN TO THE METER.
5. WASTEWATER SERVICES TO ALL HOMES SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION ACTIVITIES.

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	REVISION	BY
A	11/8/23	100% SUBMITTAL	MR

BRUSHY CREEK M.U.D.

BRUSHY CREEK MUNICIPAL UTILITY DISTRICT

HILLSIDE DR WASTEWATER LINE D PLAN & PROFILE STA. 1+00 TO 3+09

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED PROFESSIONAL ENGINEER
The seal appearing on this document was authorized by Maninder S. Randhawa, P.E. 145867 on 11-08-2023
08 NOVEMBER 2023

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Dwg. No.	C-09
WON:	15960.001.001.2000

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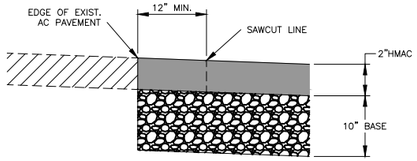
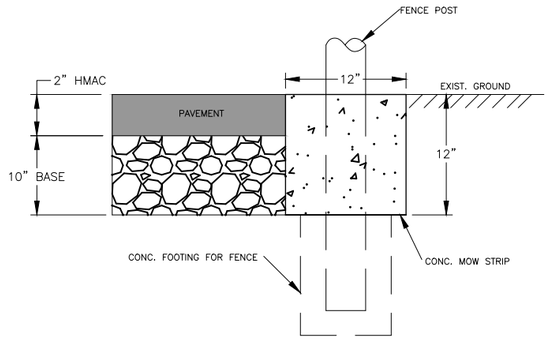
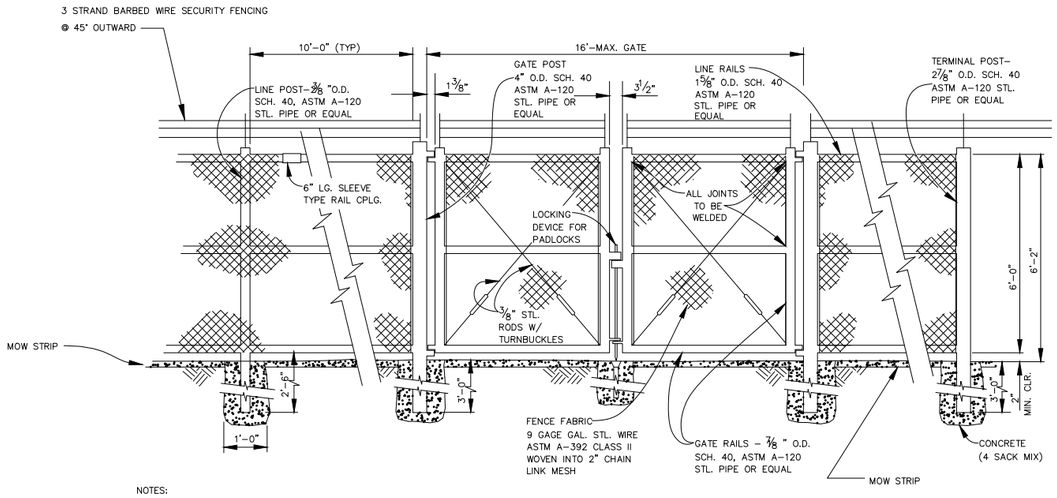


1 — SAWCUT PAVEMENT CONFORM DETAIL (CAT HOLLOW)
SCALE: NTS



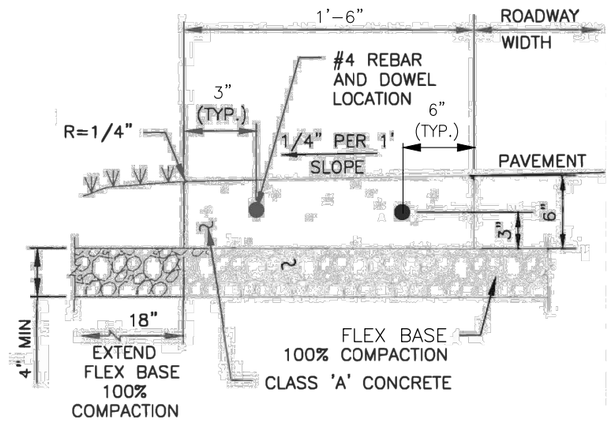
2 — 12" CONCRETE MOW STRIP DETAIL
SCALE: NTS



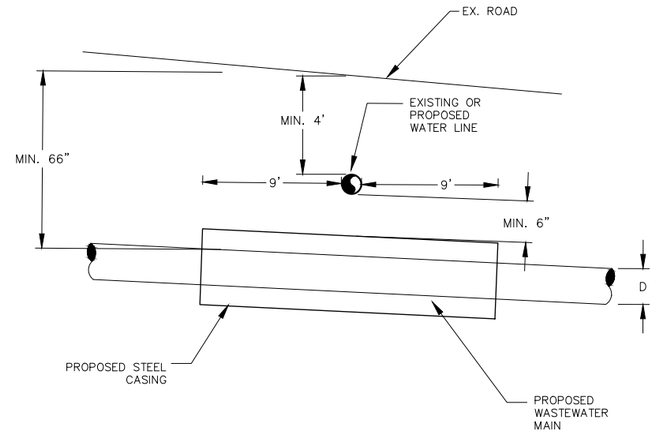
NOTES:

1. ALL STEEL MATERIALS-FABRICS, PIPE, AND FITTINGS TO BE HOT DIP GALVANIZED.
2. NEW FENCE AND GATE SHALL BE GROUNDED.

3 — CHAIN LINK FENCE AND GATE DETAIL
SCALE: NTS



4 — RIBBON CURB DETAIL
SCALE: NTS



NOTES:

1. PROPOSED WASTEWATER LINE SHALL BE INSTALLED WITH A MINIMUM VERTICAL CLEARANCE OF 6 IN UNDER THE EXISTING OR PROPOSED WATER MAIN ENCASED WITH A STEEL CASING.
2. THE 18-FOOT JOINT OF PROPOSED WASTEWATER MAIN SHALL BE CENTERED ON EXISTING OR PROPOSED WATER MAIN AND TERMINATE AT JOINTS THAT ARE DESIGNED TO SEAL AT ATMOSPHERIC PRESSURE.
3. PIPE ENCASEMENT USING CEMENT STABILIZED SAND SHALL NOT BE PERMITTED.

5 — WASTEWATER MAIN CROSSING UNDER WATER MAIN DETAIL
SCALE: NTS

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
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NO.	DATE	REVISION	BY
A	11/8/23	100% SUBMITTAL	MR

BRUSHY CREEK M.U.D.

BRUSHY CREEK MUNICIPAL UTILITY DISTRICT

PROJECT DETAILS

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED PROFESSIONAL ENGINEER
The seal appearing on this document was authorized by Maninder S. Randhawa, P.E. 145867 on 11-08-2023
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WON: 15960.001.001.2000

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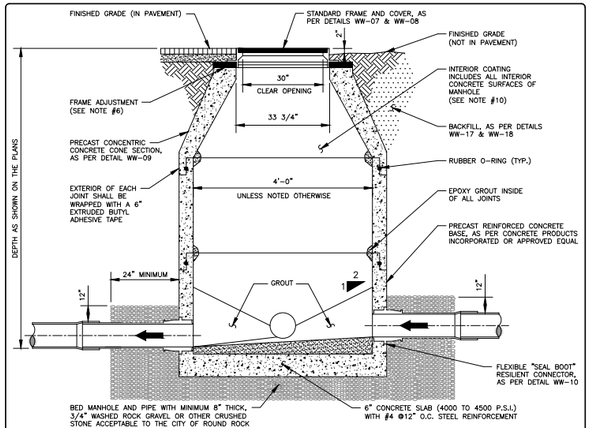
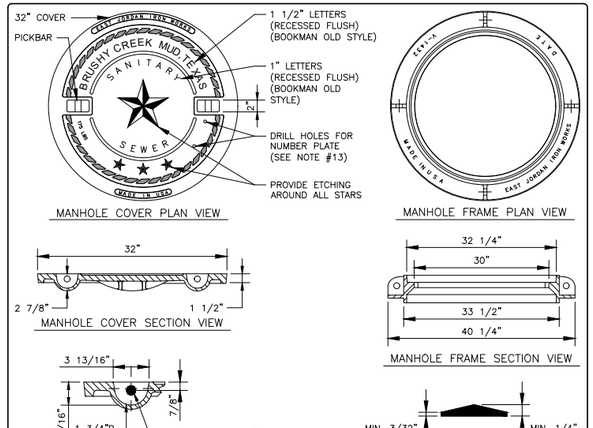


NOTES:

1. IF DROP IS SIX INCHES (6") TO TWO FEET (2'-0"), CONSTRUCTION OF DROP SHALL PROVIDE AN OVERSIZED INVERT TO EXTEND UNDER THE DROP CONNECTION.
2. SEE CONSTRUCTION PLANS FOR MANHOLE SIZE, LOCATION, CONFIGURATION, TYPE OF TOP SECTION, VENTING REQUIREMENTS, PIPE SIZES AND TYPES.
3. MANHOLES SHALL BE PRECAST A.S.T.M. C478 BELL AND SPIGOT WITH "O" RING JOINTS.
4. MANHOLES TO BE DESIGNED TO RESIST LATERAL AND VERTICAL SOIL FORCES RESULTING FROM MANHOLE DEPTH. ADDITIONALLY, MANHOLES LOCATED IN PAVEMENT TO BE DESIGNED FOR H20 TRAFFIC LOADING.
5. ALL MANHOLE COVERS SHALL BE BOLTED AND GASKETED, WHEN MANHOLES ARE LOCATED OUTSIDE OF PAVEMENT.
6. FRAME ADJUSTMENT HEIGHT SHALL CONSIST OF FIVE INCHES (5") MINIMUM TO EIGHTEEN INCHES (18") MAXIMUM. GRADE RINGS SHALL BE GROUTED WITH A NON-SHRINK GROUT INSIDE AND OUTSIDE. HDPE GRADE RINGS, MAY NOT BE USED.
7. FOR MANHOLES TO BE VENTED, SEE DETAILS WW-05 AND WW-06.
8. A FLOW CHANNEL SHALL BE CONSTRUCTED INSIDE MANHOLE TO DIRECT INFLUENT INTO THE FLOW STREAM. ALL P.V.C. PIPE SHALL BE REMOVED FROM INVERT.
9. BASE SECTION SHALL BE DESIGNED FOR H20 LOADING, PLUS EARTH LOAD AT 130 PCF.
10. ENTIRE INTERIOR CONCRETE SURFACES OF WASTEWATER MANHOLES TO BE COATED WITH RAVEN 405, SPRAYWALL, OR APPROVED EQUAL, (WITH A UNIFORM THICKNESS OF 124 MILS AND A MINIMUM THICKNESS OF 100 MILS, APPLIED AFTER MANHOLE HAS PASSED THE VACUUM TEST). FOR REHABILITATING MANHOLES 1/2" MINIMUM THICKNESS CALCIUM ALUMINATE CEMENTITIOUS COATING AND OTHER INTERIOR SURFACES MAY BE COATED IF RECOMMENDED BY COATING MANUFACTURER. (IN LIEU OF INTERIOR COATINGS NEW PRECAST MANHOLES CONTAINING CONSHIELD WILL BE ACCEPTED PROVIDING THE MANUFACTURER STENCILS "CONSHIELD" ON THE INSIDE AND OUTSIDE OF ALL MANHOLE SECTIONS.)

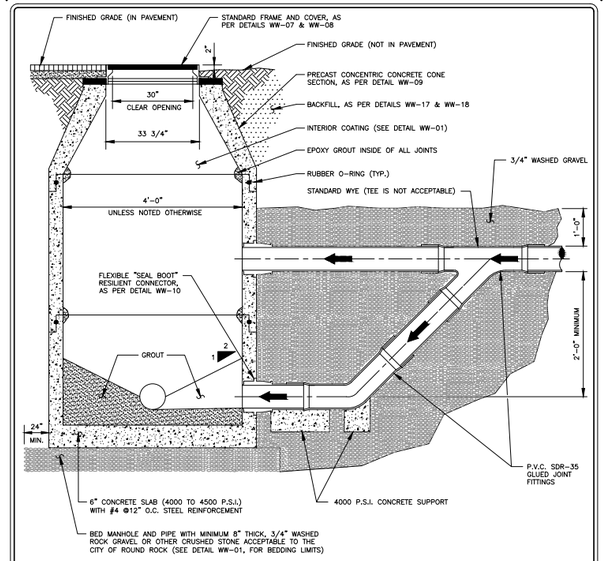
RECORD SIGNED COPY ON FILE AT U&ES DEPARTMENT	CITY OF ROUND ROCK	DRAWING NO: WW-01
APPROVED 03-01-18 DATE	PRECAST CONCRETE WASTEWATER MANHOLE DETAIL	ROUND ROCK TEXAS
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE)		



NOTES:

1. COVER AND FRAME SHALL COMPLY WITH STANDARD SPECIFICATIONS FOR DRAINAGE, SEWER, UTILITY AND RELATED CASTINGS: AASHTO DESIGNATION M306-04.
2. MANHOLE COVER SHALL BE MODEL NUMBER: V-1432-3 (PRODUCT NUMBER: 41432059), AS MANUFACTURED BY EAST JORDAN IRON WORKS INCORPORATED, OR APPROVED EQUAL.
3. MANHOLE FRAME SHALL BE MODEL NUMBER: V-1432 (PRODUCT NUMBER: 41432010), AS MANUFACTURED BY EAST JORDAN IRON WORKS INCORPORATED, OR APPROVED EQUAL.
4. MANHOLE COVER AND FRAME ASSEMBLY, IF ORDERED AS A SET, SHALL BE MODEL NUMBER: V-1432 (PRODUCT NUMBER: 41432089), AS MANUFACTURED BY EAST JORDAN IRON WORKS INCORPORATED, OR APPROVED EQUAL.
5. ALL CORNERS AND EDGES SHALL HAVE A 1/16" MINIMUM AND 1/8" MAXIMUM RADIUS.
6. MANHOLE COVERS SHALL BE CAST WITH TWO 1" DIAMETER STEEL PICKBARS.
7. MANHOLE COVER WEIGHT SHALL BE 175 LBS. FOR DUCTILE IRON. WEIGHT SHALL BE CAST ON BOTH TOP AND BOTTOM OF COVER.
8. MANUFACTURER SHALL CERTIFY THAT EACH MANHOLE COVER MEETS HS-20 LOADING.
9. FILLETS SHALL BE 1/4" RADIUS UNLESS OTHERWISE SPECIFIED.
10. MANUFACTURER SHALL REMOVE EXCESS IRON AND MACHINE FINISH SEATING SURFACES TO NOTED DIMENSIONS.
11. COVER SHALL BE DIPPED IN A WATER-BASED ASPHALTIC COATING, PRIOR TO SHIPMENT FROM FOUNDRY.
12. MANUFACTURER SHALL DRILL 2-3/16" X 1/2" DEEP HOLES FOR A MANHOLE NUMBER PLATE TO BE PROVIDED BY THE CITY OF ROUND ROCK. THE TOP HOLE SHALL BE DRILLED 1" O.C. FROM THE BOTTOM OF THE PICKBAR AND THE BOTTOM HOLE SHALL BE DRILLED 4" O.C. FROM THE TOP HOLE.

RECORD SIGNED COPY ON FILE AT U&ES DEPARTMENT	CITY OF ROUND ROCK	DRAWING NO: WW-08
APPROVED 03-01-18 DATE	NON-BOLTED WASTEWATER MANHOLE COVER AND FRAME DETAIL (MODIFIED FOR BRUSHY CREEK MUD)	ROUND ROCK TEXAS
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE)		



NOTES:

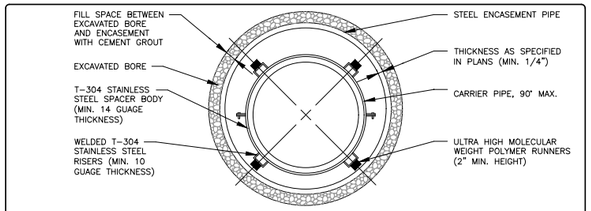
1. SEE NOTES #2 THROUGH #10 ON DETAIL WW-01.
2. DROP CONNECTIONS SHALL BE REQUIRED WHENEVER AN INFLUENT SEWER IS LOCATED MORE THAN TWO FEET (2'-0") ABOVE THE MAIN INVERT CHANNEL.
3. WHEN P.V.C. PIPE IS USED IN SANITARY SEWER LINES, SOLVENT TYPE JOINT P.V.C. FITTINGS TO BE UTILIZED IN THE DROP ASSEMBLY ONLY. FITTINGS SHALL BE P.V.C. SDR-35 WITH TWO PART WATER RESISTANT GLUE AT ALL JOINTS.

RECORD SIGNED COPY ON FILE AT U&ES DEPARTMENT	CITY OF ROUND ROCK	DRAWING NO: WW-02
APPROVED 03-01-18 DATE	PRECAST CONCRETE WASTEWATER MANHOLE WITH DROP CONNECTION DETAIL	ROUND ROCK TEXAS
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE)		

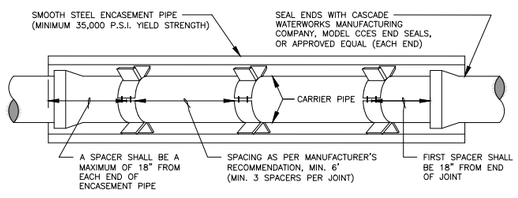
NOTES:

1. REVISE PRECAST CONCRETE WASTEWATER MANHOLE WITH DROP CONNECTION DETAIL, NOTE 3 AS FOLLOWS:

   "WHEN P.V.C. PIPE IS USED IN SANITARY SEWER LINES, SOLVENT TYPE JOINT P.V.C. FITTINGS TO BE UTILIZED IN THE DROP ASSEMBLY ONLY. FITTINGS TO BE P.V.C. SDR-26 WITH TWO PART WATER RESISTANT GLUE AT ALL JOINTS."



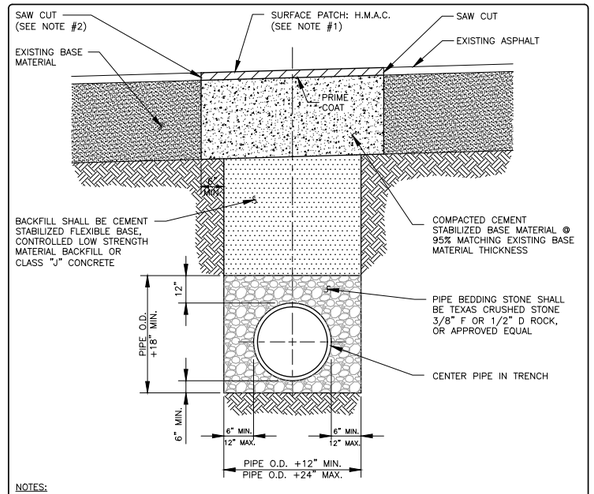
PIPE SIZE-CARRIER (DIAMETER)	PIPE SIZE-CASING (DIAMETER) (MIN.)	MINIMUM PIPE THICKNESS (INCHES)	
6"	16"	1/4	0.2500
8"	18"	1/4	0.2500
10"	20"	5/16	0.3125
12" ~ 14"	24"	3/8	0.3750
16" ~ 18"	30"	7/16	0.4375
20"	36"	1/2	0.5000
24"	42"	1/2	0.5000
30"	48"	1/2	0.5000



NOTES:

1. CASING SPACER CONFIGURATION AND SPACING SHALL BE AS SHOWN ON MANUFACTURER'S DRAWINGS FOR SPECIFIC WORK; THESE MUST BE ACCEPTABLE TO THE CITY OF ROUND ROCK.
2. CASING SPACER SHALL BE AS MANUFACTURED BY CASCADE WATERWORKS MANUFACTURING COMPANY, MODEL CCS, OR APPROVED EQUAL.

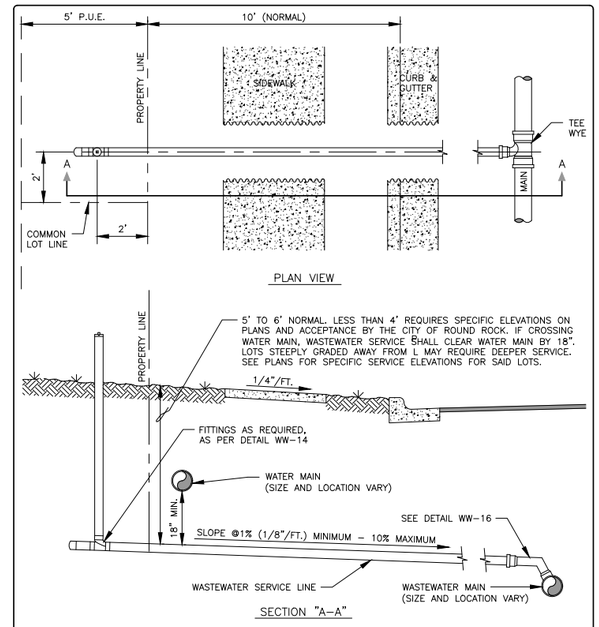
RECORD SIGNED COPY ON FILE AT U&ES DEPARTMENT	CITY OF ROUND ROCK	DRAWING NO: WT-16
APPROVED 03-01-18 DATE	PIPE ENCASEMENT DETAIL	ROUND ROCK TEXAS
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE)		



NOTES:

1. H.M.A.C. THICKNESS SHALL MATCH EXISTING ASPHALT THICKNESS AND NO LESS THAN 2".
2. THE CONTRACTOR SHALL SAW CUT, REMOVE AND REPLACE EXISTING PAVEMENT AND FLEXIBLE BASE A MINIMUM OF 6" BEYOND EITHER THE EDGE OF THE WASTEWATER LINE TRENCH OR THE POINT WHERE EXISTING PAVEMENT IS DAMAGED DUE TO TRENCHING OPERATIONS, WHICHEVER IS GREATER. FINISHED PATCH SHALL BE NEAT AND UNIFORM.
3. INSTALLATION OF BACKFILL, SAW CUTTING AND REMOVAL OF EXISTING PAVEMENT AND SURFACE PATCH SHALL NOT BE PAID FOR SEPARATELY. COSTS FOR THESE ITEMS SHALL BE INCLUDED IN UNIT PRICE BID FOR WASTEWATER PIPE.
4. THE CONTRACTOR SHALL PROVIDE STEEL PLATES TO SPAN THE TRENCH AS NECESSARY OR TO ALLOW BACKFILL TO CURE. SUCH PLATES SHALL BE SUITABLE FOR VEHICLE PASSAGE OVER THE TRENCH AND SHALL BE SATISFACTORILY ANCHORED IN PLACE. COSTS FOR THIS ITEM SHALL BE INCLUDED IN UNIT PRICE BID FOR WASTEWATER PIPE.
5. ALL TRENCHING AND TRENCH SAFETY SHALL COMPLY WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.

RECORD SIGNED COPY ON FILE AT U&ES DEPARTMENT	CITY OF ROUND ROCK	DRAWING NO: WW-17
APPROVED 03-01-18 DATE	WASTEWATER LINE BEDDING AND SURFACE REPAIR DETAIL (EXISTING PAVED SURFACE)	ROUND ROCK TEXAS
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE)		



RECORD SIGNED COPY ON FILE AT U&ES DEPARTMENT	CITY OF ROUND ROCK	DRAWING NO: WW-12
APPROVED 03-01-18 DATE	WASTEWATER SERVICE DETAIL	ROUND ROCK TEXAS
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE)		

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	REVISION	BY
A	11/8/23	100% SUBMITTAL	MR

BRUSHY CREEK M.U.D.

BRUSHY CREEK MUNICIPAL UTILITY DISTRICT

STANDARD DETAILS (1 OF 2)

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED PROFESSIONAL ENGINEER
M. Randhawa
The seal appearing on this document was authorized by Maninder S. Randhawa, P.E. 145867 on 11-08-2023
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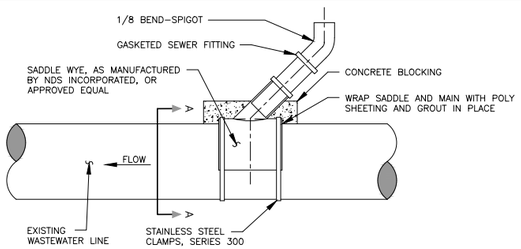
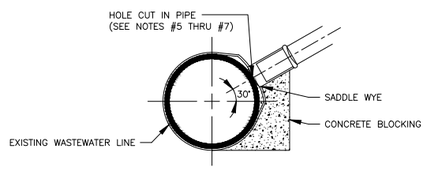


PLAN VIEW

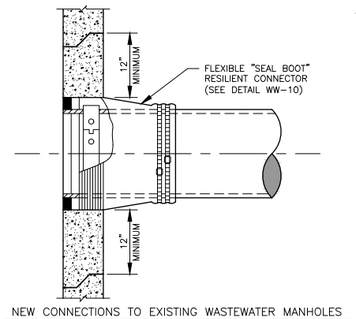


SECTION "A–A"

NOTES:

1. FLEXIBLE SADDLE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
2. EXCAVATE AROUND EXISTING WASTEWATER PIPE, EXPOSING SUFFICIENT ROOM FOR STAINLESS STEEL CLAMPS.
3. THOROUGHLY CLEAN AND DRY THE MATING SURFACE.
4. MARK THE SIZE OF THE HOLE TO BE CUT USING THE SADDLE ITSELF AS A TEMPLATE.
5. SAW OUT THE SECTION OF THE PIPE WHERE THE SADDLE WILL BE LOCATED, WITH A SABER OR KEY HOLE SAW. PIPE COUPONS SHALL BE REMOVED FROM EXISTING MAIN AND DISCARDED. PIPE CUTTINGS IN EXCESS OF 1" IN DIAMETER SHALL NOT BE LEFT IN EXISTING MAIN.
6. ENSURE SADDLE FITS HOLE PROPERLY.
7. PLACE GASKET SKIRT AND SADDLE OVER OPENING AND TIGHTEN BAND CLAMPS EVENLY UNTIL SADDLE IS FIRMLY ATTACHED TO THE PIPE. APPLY PRESSURE ON THE SADDLE AGAINST THE PIPE WHILE TIGHTENING THE CLAMPS AS INDICATED ABOVE. DO NOT OVER TIGHTEN AND DO NOT STRIP THREAD.
8. SERVICE PIPE SHALL BE INSERTED FULLY TO CONTACT SEAT FORMED IN FITTING.
9. REPLACE THE BEDDING AND BACKFILL IN ACCORDANCE WITH THE TRENCH EMBEDMENT DETAIL.

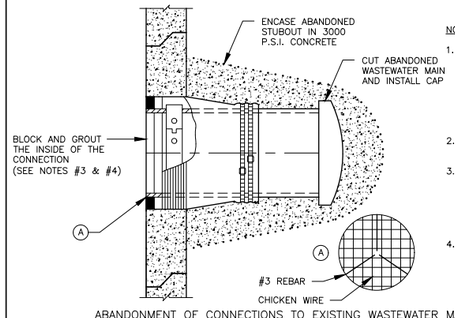
RECORD SIGNED COPY ON FILE AT U&ES DEPARTMENT	CITY OF ROUND ROCK	DRAWING NO: WW–16
APPROVED 03–01–18 DATE	WASTEWATER LATERAL CONNECTION TO EXISTING WASTEWATER MAIN DETAIL	ROUND ROCK TEXAS
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE)		



NEW CONNECTIONS TO EXISTING WASTEWATER MANHOLES

NOTES:

1. EXISTING MANHOLES TO BE VACUUM TESTED PRIOR TO ANY CONNECTIONS.
2. NEW CONNECTIONS TO HAVE MINIMUM VERTICAL AND HORIZONTAL SEPARATION OF 12" ON THE OUTSIDE FACE OF THE MANHOLE FROM ANY EXISTING PENETRATIONS AND/OR MANHOLE JOINTS.
3. CONNECTIONS MADE INTO EXISTING MANHOLES ARE TO BE CORED AND NOT DRILLED/CHISELED.
4. CUT, SHAPE AND SLOPE NEW INVERT CHANNEL IN THE EXISTING CONCRETE BENCH FOR SMOOTH FLOW FROM THE NEW WASTEWATER CONNECTION.
5. EXISTING MANHOLES TO BE RECOATED AFTER ANY NEW WASTEWATER CONNECTION IS ADDED.



ABANDONMENT OF CONNECTIONS TO EXISTING WASTEWATER MANHOLES

NOTES:

1. THIS DETAIL IS INTENDED FOR WASTEWATER MANHOLES THAT WILL REMAIN IN SERVICE. FOR WASTEWATER MANHOLES THAT ARE TO BE ABANDONED, REFERENCE DETAIL WW–15.
2. WASTEWATER MANHOLE TO BE RECOATED AFTER GROUT IS INSTALLED.
3. BLOCK THE INLET OF THE MANHOLE WITH CHICKEN WIRE AND 3–#3 REBAR. GROUT THE INSIDE OF THE MANHOLE FLUSH WITH THE MANHOLE WALL.
4. CONNECTIONS 24" AND LARGER REQUIRE BRICK BLOCKING TO BE INSTALLED PRIOR TO GROUTING.

RECORD SIGNED COPY ON FILE AT U&ES DEPARTMENT	CITY OF ROUND ROCK	DRAWING NO: WW–21
APPROVED 03–01–18 DATE	EXISTING WASTEWATER MANHOLE CONNECTION DETAIL	ROUND ROCK TEXAS
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE)		

WESTON SOLUTIONS
FIRM REGISTRATION No. 3123
5301 SOUTHWEST PARKWAY, SUITE 450
AUSTIN, TEXAS 78735
PHONE: 512-451-7100
FAX: 512-451-7101

NO.	DATE	BY
A	11/8/23	MR
	100% SUBMITTAL	
	REVISION	

BRUSHY CREEK M.U.D.

BRUSHY CREEK MUNICIPAL UTILITY DISTRICT

STANDARD DETAILS (2 OF 2)

STATE OF TEXAS
MANINDER S RANDHAWA
145867
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Maninder S Randhawa, P.E. 145867 on 11–08–2023

08 NOVEMBER 2023

BAR IS ONE INCH ON ORIGINAL DRAWING.

ONE INCH

DESIGNED	MR
DRAWN	JWG
CHECKED	MR
REVIEWED	–––

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Dwg. No. D–03

WON: 15960.001.001.2000