SAWS OAK HAVEN AREA STREET & DRAINAGE (KENTWOOD PHASE 2)

SANITARY SEWER PROJECT

SAWS #23-5562

ORGANIZED SEWAGE COLLECTION SYSTEM PLAN

Prepared for:

TCEQ

The seal appearing on this document was authorized by
CARL BAIN
P.E. 56996 ON
02-27-2025

Prepared By:

BAIN MEDINA BAIN
ENGINEERS & SURVEYORS

TBPE F-1712

7073 SAN PEDRO AVE

SAN ANTONIO, TX 78216

(210)-494-7223

February 2025

Organized Sewage Collection System Plan Checklist

✓ **Edwards Aquifer Application Cover Page (TCEQ-20705)**

✓ **General Information Form (TCEQ-0587)**

- ✓ Attachment A - Road Map
- ✓ Attachment B - USGS / Edwards Recharge Zone Map
- ✓ Attachment C - Project Description

✓ **Geologic Assessment Form (TCEQ-0585)**

- ✓ Attachment A - Geologic Assessment Table (TCEQ-0585-Table)
- ✓ Attachment B - Stratigraphic Column
- ✓ Attachment C - Site Geology
- ✓ Attachment D - Site Geologic Map(s)

✓ **Organized Sewage Collection System Plan (TCEQ-0582)**

- ✓ Attachment A - SCS Engineering Design Report
- N/A Attachment B - Justification and Calculations for Deviation in Straight Alignment Without Manholes
- N/A Attachment C - Justification for Variance from Maximum Manhole Spacing
- N/A Attachment D – Calculations for Slopes for Flows Greater Than 10.0 Feet Per Second
- ✓ Site Plan
- ✓ Final Plan and Profile Sheets

N/A **Lift Station / Force Main System Application (TCEQ-0624) if applicable**

- Attachment A - Engineering Design Report
- Site Plan
- Final Plan and Profile Sheets

✓ **Temporary Stormwater Section (TCEQ-0602)**

- ✓ Attachment A - Spill Response Actions
- ✓ Attachment B - Potential Sources of Contamination
- ✓ Attachment C - Sequence of Major Activities
- ✓ Attachment D - Temporary Best Management Practices and Measures
- N/A Attachment E - Request to Temporarily Seal a Feature (if requested)
- ✓ Attachment F - Structural Practices
- ✓ Attachment G - Drainage Area Map
- N/A Attachment H - Temporary Sediment Pond(s) Plans and Calculations
- ✓ Attachment I - Inspection and Maintenance for BMPs
- ✓ Attachment J - Schedule of Interim and Permanent Soil Stabilization Practices

✓ **Agent Authorization Form (TCEQ-0599), if application submitted by agent**

✓ **Application Fee Form (TCEQ-0574)**

- ✓ **Check Payable to the "Texas Commission on Environmental Quality"**
- ✓ **Core Data Form (TCEQ-10400)**

EDWARDS AQUIFER APPLICATION COVER PAGE

(TCEQ-20705)

Texas Commission on Environmental Quality

Edwards Aquifer Application Cover Page

Our Review of Your Application

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

Administrative Review

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

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

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

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

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

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

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

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

Technical Review

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

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

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

3. We evaluate the application for technical completeness and contact the applicant and agent via Notice of Deficiency (NOD) to request additional information and identify technical deficiencies. There are two deficiency response periods available to the applicant. There are 14 days to resolve deficiencies noted in the first NOD. If a second NOD is issued, there is an additional 14 days to resolve deficiencies. If the response to the second notice is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, the application must be withdrawn or will be denied. Please note that because the technical review is underway, whether the application is withdrawn or denied the application fee will be forfeited.

4. The program has 90 calendar days to complete the technical review of the application. If the application is technically adequate, such that it complies with the Edwards Aquifer rules, and is protective of the Edwards Aquifer during and after construction, an approval letter will be issued. Construction or other regulated activity may not begin until an approval is issued.

Mid-Review Modifications

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

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

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

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

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

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

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

1. Regulated Entity Name: Oak Haven Area Street & Drainage (Kentwood Phase 2)							2. Regulated Entity No.:		
3. Customer Name: San Antonio Water System							4. Customer No.: 600529069		
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):		1.25	
9. Application Fee:	$883.0		10. Permanent BMP(s):			N/A			
11. SCS (Linear Ft.):	1766		12. AST/UST (No. Tanks):			N/A			
13. County:	Bexar		14. Watershed:			Salado Creek			

Application Distribution

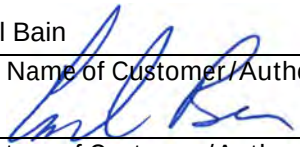
Instructions: Use the table below to determine the number of applications required. One original and one copy of the application, plus additional copies (as needed) for each affected incorporated city, county, and groundwater conservation district are required. Linear projects or large projects, which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

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

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

Austin Region			
County:	Hays	Travis	Williamson
Original (1 req.)	__	__	__
Region (1 req.)	__	__	__
County(ies)	__	__	__
Groundwater Conservation District(s)	__Edwards Aquifer Authority __Barton Springs/ Edwards Aquifer __Hays Trinity __Plum Creek	__Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	__Austin __Buda __Dripping Springs __Kyle __Mountain City __San Marcos __Wimberley __Woodcreek	__Austin __Bee Cave __Pflugerville __Rollingwood __Round Rock __Sunset Valley __West Lake Hills	__Austin __Cedar Park __Florence __Georgetown __Jerrell __Leander __Liberty Hill __Pflugerville __Round Rock

San Antonio Region					
County:	Bexar	Comal	Kinney	Medina	Uvalde
Original (1 req.)	_X_	__	__	__	__
Region (1 req.)	_X _	__	__	__	__
County(ies)	_X _	__	__	__	__
Groundwater Conservation District(s)	_X_ Edwards Aquifer Authority _X_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 _X_ 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.
Carl Bain Print Name of Customer/Authorized Agent
 02/27/2025 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: Carl Bain, P.E.

Date: 02/27/2025

Signature of Customer/Agent:

Project Information

1. Regulated Entity Name: San Antonio Water System
2. County: Bexar
3. Stream Basin: Tributary to Lorence Creek
4. Groundwater Conservation District (If applicable): Edwards Aquifer Authoritiy
5. Edwards Aquifer Zone:

   ☒ Recharge Zone
   ☐ Transition Zone

6. Plan Type:

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

7. Customer (Applicant):

   Contact Person: Cristina Brantley, P.E.
   Entity: San Antonio Water System
   Mailing Address: 2800 U.S Highway 281 North
   City, State: San Antonio, Tx Zip: 78212
   Telephone: 210-233-3734 FAX: _____
   Email Address: cristina.brantley@saws.org

8. Agent/Representative (If any):

   Contact Person: Carl Bain, P.E.
   Entity: Bain Medina Bain, Inc
   Mailing Address: 7073 San Pedro Avenue
   City, State: San Antonio, TX Zip: 78216
   Telephone: 210-494-7223 FAX: 210-490-5120
   Email Address: cbain@bmbi.com

9. Project Location:

   ☒ The project site is located inside the city limits of San Antonio.
   ☐ 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.

    Project covering Parkstone Blvd., Copper Hill Dr., Parhaven Dr., and Town Oak Dr., along with channel improvements to a tributary of Lorence Creek.

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: Existing sewer and manholes replacement.

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:

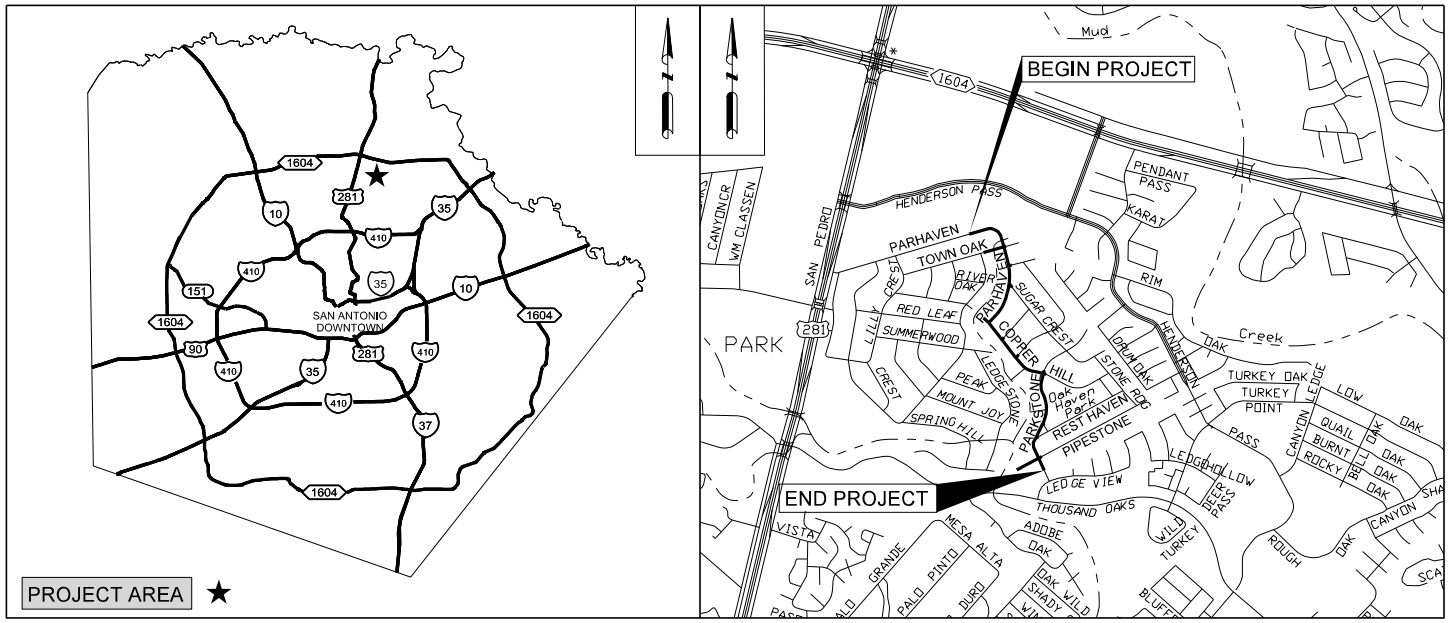
- ☐ TCEQ cashier
- ☐ Austin Regional Office (for projects in Hays, Travis, and Williamson Counties)
- ☒ San Antonio Regional Office (for projects in Bexar, Comal, Kinney, Medina, and Uvalde Counties)

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.

OAK HAVEN AREA STREETS AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT

SAWS JOB NO. 23-5562



VICINITY MAP

NOT TO SCALE

LOCATION MAP

NOT TO SCALE

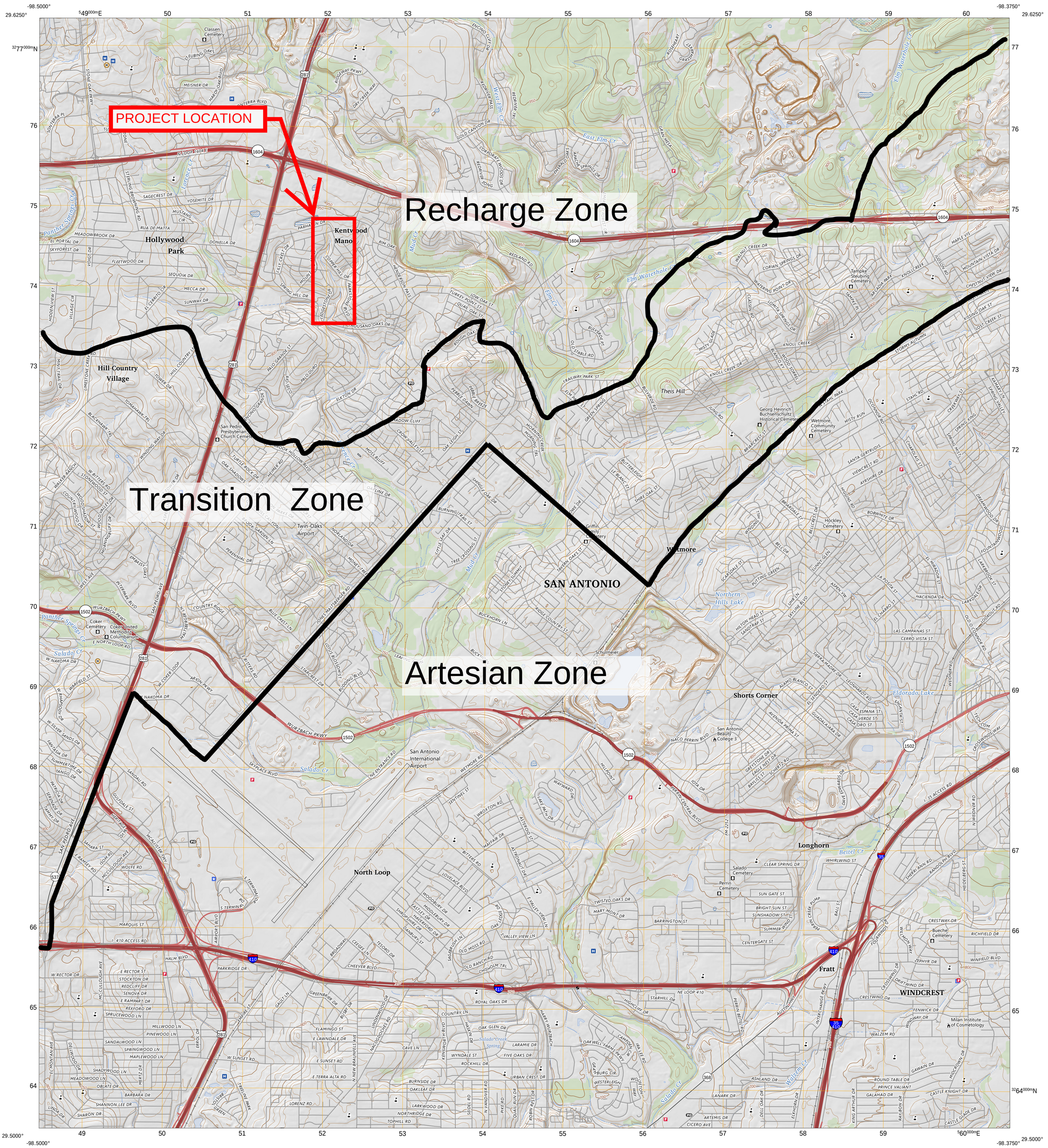
BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

ATTACHMENT A_TCEQ-0587

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map OnDemand Topo

LONGHORN QUADRANGLE
TEXAS - BEXAR COUNTY
7.5-MINUTE TOPO



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid:Universal Transverse Mercator, Zone 14R

Data is provided by The National Map (TNM), is the best available at the time of map generation, and includes data content from supporting themes of Elevation, Hydrography, Geographic Names, Boundaries, Transportation, Structures, Land Cover, and Orthoimagery. Refer to associated Federal Geographic Data Committee (FGDC) Metadata for additional source data information.

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands. Temporal changes may have occurred since these data were collected and some data may no longer represent actual surface conditions.

Learn About The National Map: https://nationalmap.gov

MN
GN
3°51′
68 MILS
0°17′
5 MILS
UTM GRID AND 2021 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000 - m Square ID
NT
Grid Zone Designation
14R

SCALE 1:24 000
1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
CONTOUR SMOOTHNESS = Medium

USER DEFINED CONTENT

TEXAS

QUADRANGLE LOCATION

Camp Bullis	Bulverde	Bat Cave
Castle Hills	Longhorn	Schertz
San Antonio West	San Antonio East	Martinez

ADJOINING QUADRANGLES

ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

LONGHORN, TX
2024

PROJECT DESCRIPTION

The Oak Haven Area Streets and Drainage (Kentwood Phase 02) Project is located at the north side of the City of San Antonio just southeast of the intersection of Loop 1604 and US Highway 281, specifically covering Parkstone Blvd., Copper Hill Dr., Parhaven Dr., and Town Oak Dr., along with channel improvements to a tributary of Lorrence Creek.

The proposed project involves roadway and drainage improvements to the area. Due to the roadway and drainage improvements, some of the existing 8" and 10" PVC sanitary sewer mains and manholes will have to be adjusted or relocated, as well as the reconstruction/rehabilitation of 11 existing sewer manholes along the drainage channels.

This project is located within the Edwards Aquifer Recharge Zone. All work will comply with the applicable codes, ordinances, and requirements of the City of San Antonio Water System.

The project aims to rehabilitate or replace sewer mains and manholes installed between 1984 and 1987. A total of approximately 1,766 linear feet (LF) of sanitary sewer mains will be replaced or improved, divided as follows:

- 138.3 (LF) of 10" PVC will be laid between EXSSMH 5426 and EXSSMH 69165. This segment will include three new sanitary sewer manholes located at:
  N.E (13,768,620.17; 2,139,593.43),
  N.E (13,768,655.92; 2,139,602.85),
  N.E (13,768,753.62; 2,139,576.12).

- 610.5 LF of 8" PVC between EXSSMH 69164 and EXSSMH 71716, with seven new SSMHs located at:
  N.E (13,768,739.16; 2,139,523.37),
  N.E (13,768,762.58; 2,139,608.99),
  N.E (13,768,799.97; 2,139,745.24),
  N.E (13,768,887.96; 2,139,721.17),
  N.E (13,768,964.96; 2,139,684.14),
  N.E (13,769,045.63; 2,139,640.62),
  N.E (13,769,079.06; 2,139,595.60),
  N.E (13,769,094.43; 2,139,533.70).

- 173.7 LF of 10" PVC between EXSSMH 8279 and EXSSMH 8498, with five new SSMHs located at:
  N.E (13,766,791.32; 2,140,098.59),
  N.E (13,766,815.34; 2,140,080.65),
  N.E (13,766,881.68; 2,140,099.16),

N.E (13,766,930.00; 2,140,122.38),
N.E (13,766,938.27; 2,140,141.98).

- 746.1 LF of 8" PVC will be installed between EXSSMH 58300 and EXSSMH 58117, incorporating five new SSMHs located at:
  N.E (13,766,923.82; 2,140,035.66),
  N.E (13,767,062.90; 2,139,920.90),
  N.E (13,767,333.80; 2,139,707.79),
  N.E (13,767,433.77; 2,139,629.15),
  N.E (13,76,7442.27; 2,139,615.45).

- 96.9 LF of 8" PVC will be laid between EXSSMH 58250 and EXSSMH 71714, with two new SSMHs located at:
  N.E (13,765,680.15; 2,140,133.16),
  N.E (13,765,586.21; 2,140,156.59).

Additionally, the project includes the reconstruction of 11 existing sanitary sewer manholes, along with channel improvements. Locations at:

1. N.E (13,767,781.70; 2,139,363.90),
2. N.E (13,767,391.51; 2,139,429.27)
3. N.E (13,767,245.65; 2,139,508.15),
4. N.E (13,767,152.42; 2,139,620.42),
5. N.E (13,767,108.94; 2,139,673.44),
6. N.E (13,766,583.86; 2,140,025.96),
7. N.E (13,766,543.59; 2,140,037.01),
8. N.E (13,766,345.86; 2,140,090.25),
9. N.E (13,766,104.95; 2,140,094.96),
10. N.E (13,765,823.62; 2,140,205.82),
11. N.E (13,765,452.72; 2,140,225.31),

The existing sewage collection system will continue to provide disposal service for all existing residential and commercial developments upstream of the project. The replacement and improvement of the mains and manholes will not alter any previously approved designed flows.

Prior to any installation or improvement, the contractor will install all TBMP according to the "Storm Water Pollution Prevention Plan", and install bypass pumping. The bypass pumping shall be done according to SAWS specification #865.

During construction, the contractor shall minimize any possible excavation, limiting excavation along the proposed sanitary sewer alignments and around the existing and proposed sanitary sewer manholes. Excavation around existing utilities shall be done cautiously, using a small

excavator or hand excavate to minimize chances of damaging any utilities, excavation should be done according to SAWS Specification #804.

After installation and improvement is complete, SAWS and the contractor shall test all new sanitary sewer mains and improved manholes. The contractor shall isolate each sanitary sewer main and manhole and test each element according to SAWS Specification #849.

After all affected elements have passed testing, the bypass can be removed and flows reintroduced into the system.

GEOLOGIC ASSESSMENT FORM
(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

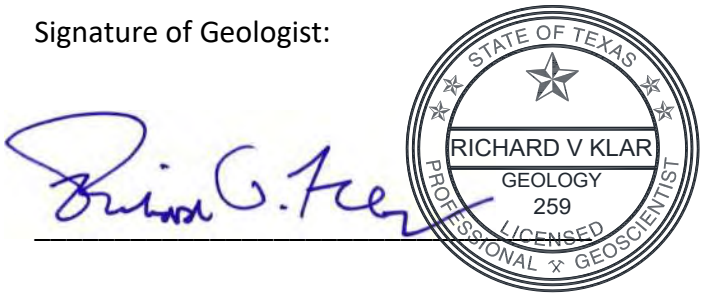
To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

Print Name of Geologist: Richard V. Klar, P.G. Telephone: 210-699-9090

Date: May 17, 2024 Fax: 210-699-6426

Representing: Raba Kistner, Inc., TBPG Firm #50220 / TBPE Firm #3257 for Bain Medina Bain, Inc. (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:



5/17/24

Regulated Entity Name: Oak Haven Area Street & Drainage (Kentwood Phase 2)

Project Information

1. Date(s) of Geologic Assessment was performed: April 10, 2024
2. Type of Project:

☐ WPAP ☐ AST

☒ SCS ☐ 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)
Crawford and Bexar stony soils (Cb)	D	Veneer to 3

**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 thickness 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" = 200'
   Site Geologic Map Scale: 1" = 200'
   Site Soils Map Scale (if more than 1 soil type): 1" = See ***Site Geologic Map***

9. Method of collecting positional data:

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

10. ☒ The project site 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 5 test holes present on the project site and the location is shown and and labeled. (Check all of the following that apply.)
- ☒ The test holes are not in use and have been properly abandoned.
- ☐ The well is 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

☒ 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.

ATTACHMENTS

ATTACHMENT A

GEOLOGIC ASSESSMENT TABLE
(TCEQ-0585-TABLE)

COMMENTS TO GEOLOGIC ASSESSMENT TABLE

SOIL PROFILE

GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: ***Oak Haven Area Street & Drainage (Kentwood Phase 2), San Antonio, Texas*** *(**RKI** Project No. ASF23-058-00)*

LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	>40	<1.6	>1.6	
S-1	29°35'44.35"N	98°27'40.01"W	CD	5	Qal	9.2	3.1	1.0	NE-SW				C/F	6	11	✓			✓	Streambed
S-2	29°35'44.37"N	98°27'40.04"W	CD	5	Qal	7.1	2.5	0.8	E-W				C/F	6	11	✓			✓	Streambed
S-3	29°36'6.24"N	98°27'45.77"W	MB (SS)	30	Qal, Kep	1,017.0	3.0	~8-10					X	8	38	✓			✓	Hilltop, Streambed
S-4	29°36'3.90"N	98°27'44.66"W	MB (W)	30	Qal, Kep	3,680.0	2.0	~4-6					X	6	36	✓			✓	Hilltop, Streambed
S-5	29°36'6.12"N	98°27'47.92"W	MB (FOC)	30	Kep	40.0	2.0	~2-4					X	6	36	✓		✓		Hilltop
S-6	29°36'5.73"N	98°27'45.02"W	MB (FOC)	30	Kep	578.0	2.0	~2-4					X	6	36	✓		✓		Hilltop
S-7	29°36'3.11"N	98°27'46.83"W	MB (FOC)	30	Kep	130.0	2.0	~2-4					X	6	36	✓		✓		Hilltop
S-8	29°36'3.03"N	98°27'46.32"W	MB (FOC)	30	Kep	2,558.0	2.0	~2-4					X	6	36	✓			✓	Hilltop, Streambed
S-9	29°36'3.28"N	98°27'44.42"W	MB (TEL)	30	Kep	561.0	2.0	~2-4					X	8	38	✓		✓		Hilltop
S-10	29°36'3.47"N	98°27'43.99"W	MB (FOC)	30	Kep	63.0	2.0	~2-4					X	6	36	✓		✓		Hilltop
S-11	29°35'54.59"N	98°27'44.24"W	MB (SS)	30	Kep	1,364.0	3.0	~8-10					X	6	36	✓			✓	Hilltop, Streambed
S-12	29°35'53.24"N	98°27'45.47"W	MB (FOC)	30	Kep	109.0	2.0	~2-4					X	6	36	✓		✓		Hilltop
S-13	29°35'52.90"N	98°27'45.76"W	MB (TEL)	30	Kep	383.0	2.0	~2-4					X	6	36	✓		✓		Hilltop
S-14	29°35'34.15"N	98°27'39.07"W	MB (SS)	30	Kep	675.0	3.0	~8-10					X	8	38	✓		✓		Hilltop
S-15	29°35'32.49"N	98°27'39.84"W	MB (FOC)	30	Kep	416.0	2.0	~2-4					X	6	36	✓		✓		Hilltop
S-16	29°35'31.91"N	98°27'40.08"W	MB (TEL)	30	Kep	320.0	2.0	~2-4					X	6	36	✓		✓		Hilltop
S-17	29°35'30.68"N	98°27'38.81"W	MB (G)	30	Kep	108.0	2.0	~2-4					X	6	36	✓		✓		Hilltop
S-18	29°36'3.19"N	98°27'45.84"W	MB (PTH, C-1)	30	Kep	0.3		13.6					Y	6	36	✓		✓		Hilltop
S-19	29°35'52.75"N	98°27'46.11"W	MB (PTH, B-2)	30	Kep	0.3		10.0					Y	6	36	✓		✓		Hilltop
S-20	29°35'47.99"N	98°27'43.59"W	MB (PTH, B-3)	30	Kep	0.3		8.8					Y	6	36	✓		✓		Hilltop
S-21	29°35'44.43"N	98°27'39.88"W	MB (PTH, C-2)	30	Kep	0.3		19.2					Y	6	36	✓		✓		Hilltop
S-22	29°35'33.05"N	98°27'39.92"W	MB (PTH, B-4)	30	Kep	0.3		8.6					Y	6	36	✓		✓		Hilltop

*** DATUM:** ***NAD83***

Formation: Qal = Alluvium; Kep = Person Formation

Features: FOC = fiber optic cable; G - natural gas; PTH = plugged geotechnical test hole, designation; SS = sanitary sewer; TEL = telephone; W = potable water line.

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	***Granular bedding material for utility lines (Features S-3 through S-17)***
Y	***The test holes were plugged to ground surface with soil cuttings and granular bentonite.***

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

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

Date: ***5/17/2024***

Sheet 1 of 1

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

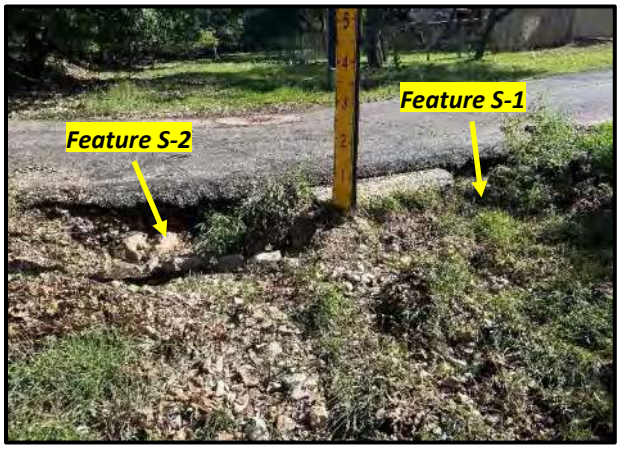
COMMENTS TO GEOLOGIC ASSESSMENT TABLE
Oak Haven Area Street & Drainage (Kentwood Phase 2)
San Antonio, Bexar County, Texas

The locations of the following features are indicated on the ***Site Geologic Map*** provided as ***Attachment D*** of this report.

Non-Karst Closed Depressions

Feature S-1. View to the northeast.

Feature S-2. View to the east.



Features S-1 and S-2 (CD) are located on the south side of Copper Hill Drive along the Lorence Creek Tributary within Study Area 2. These features were formed by erosional scour in the creek channel near the pavement edge. A flood gauge separates the features. The dimensions for ***Feature S-1*** are 9.2 x 3.1 x 1.0 feet in length, width and depth, respectively. The long axis of this feature is oriented NW-SE. ***Feature S-2*** measurements are 7.1 x 2.5 x 0.8 feet in length, width and depth, respectively. The long axis of this feature is oriented E-W.

The features are rimmed by weathered limestone float rock and are soil lined. At the time field activities were conducted, there was no evidence of direct or indirect capacity for rapid infiltration for either feature.

Manmade Features in Bedrock

Sanitary Sewer Utilities

The following San Antonio Water System (SAWS) sanitary sewer utility locations were identified based on review of utility plans provided in electronic format by Bain Medina Bain, Inc. (BMBI, 2024), in addition to observations of manholes and utility paint markings throughout the overall Project area (i.e., Study Areas 1, 2, and 3). Sanitary sewer trenches are estimated to be installed to depths approximately 8-10 feet, terminating in limestone bedrock.

Feature S-3 consists of a utility trench hosting an 8 to 10-inch sanitary sewer line within Study Area 1. The utility trench extends along the north and east sides of Parhaven Drive and extends to the west of Town Oak Drive and then to the south along Drainage Channel A. The length of the utility trench within the project area is approximately 1,017 feet.

Typical sanitary sewer manhole. View to the south along to Copper Hill Drive.

Feature S-11 consists of a utility trench hosting an 8-inch sanitary sewer line. The utility trench ties into at a manhole located at 2207 Parhaven Drive and extends to the southwest through the Project limits (i.e., Study Area 2) along Parhaven Drive to Copper Hill Drive, terminating at Drainage Channel B. The length of the utility trench within the Project area is approximately 1,364 feet.

Feature S-14 consists of a utility trench segment hosting an 8 inch sanitary sewer line within Study Area 3, which extends from Rest Haven Drive along the east side of Parkstone Boulevard. The length of the utility trench within the Project area is approximately 675 feet.

Water Utility

The following locations of the potable utility and associated 2 to 6 inch lateral owned by SAWS were identified based on review of utility plans provided in electronic format by BMBI (2024), in addition to observations of manways, fire hydrants, valves, and paint markings within the Project area (i.e., Study Areas 1, 2, and 3). The potable water trench is estimated to be installed to depths approximately 4-6 feet, terminating in limestone bedrock.

Feature S-4 follows the length of Parhaven Drive, extending along Copper Hill Drive to Parkstone Boulevard. The utility trench extends along Parkstone Boulevard beyond the Project area at Pipestone. The length of the utility trench within the Project area (i.e., Study Areas 1, 2, and 3) is approximately 3,680 feet.

Valve manway located parallel to Copper Hill Drive. View to the west.

Valve caps along Copper Hill Drive. View to the west.

Communication Utilities (i.e., telephone and fiber optic cable)

The following communication utility line locations owned by AT&T and others were based on review of the utility plans provided by BMBI (2024), in addition to observations of utility manways, junction and pedestal boxes, and paint markings throughout the Project area. The telephone and fiber optic cable trenches are estimated to be installed to depths approximately 2-4 feet, terminating in limestone bedrock.

Underground communications (AT&T) utility, parallel to Parkstone Boulevard. View to the south.

Fiber optic line running parallel to Copper Hill Drive toward Parhaven Drive.

Feature S-5 consists of a utility trench hosting a trench hosting a fiber optic cable. This utility trench is within the project limits (i.e., Study Area 1) on the south side of Parhaven Drive near the parcel addressed at 1918 Parhaven Drive. The length of the utility trench within the project area is approximately 40 feet.

Feature S-6 consists of a utility trench hosting a trench hosting a fiber optic cable. This utility trench extends along the north and east sides of Parhaven Drive extending to Town Oak Drive within Study Area 1. The length of the utility trench within the project area is approximately 578 feet.

Feature S-7 consists of a utility trench hosting a fiber optic cable. The utility trench extends into the Project Area (i.e., Study Area 1) along the north side of Town Oak Drive near the parcel addressed at 1923 Town Oak Drive. The length of the utility trench within the project area is approximately 130 feet.

Feature S-8 consists of a utility trench hosting a fiber optic cable is located on south side of Town Oak Drive (i.e., Study Area 1) extending to south along Parhaven Drive to Copper Hill Drive (i.e., Study Area 2) and terminating beyond the assessment area (i.e., Study Area 3) at along Parkstone Boulevard. The length of the utility trench within the project area is approximately 2,558 feet.

Feature S-9 consists of a utility trench hosting a telephone line within Study Area 1. The utility trench is located on east side of Parhaven Drive and extends to the southwest along Town Oak Drive. The length of the utility trench within the project area is approximately 561 feet.

Feature S-10 consists of a utility trench hosting a fiber optic cable within Study Area 1. This trench is located at the southeast corner at the intersection of the Parhaven Drive and Town Oak Drive. The length of the utility trench within the project area is approximately 63 feet.

Feature S-12 consists of a utility trench hosting a fiber optic cable. This trench extends along the southeast side of Parhaven Drive through the Project limits (i.e., Study Area 2) near the parcel addressed as 2215 Parhaven Drive and terminates adjacent to 2219 Parhaven Drive. The length of the utility trench within the project area is approximately 109 feet.

Feature S-13 consists of a utility trench hosting a telephone line located within Study Area 2. Similar to ***Feature S-12***, this trench extends along the southeast side through near the parcel addressed as 2215 Parhaven Drive and extends along Copper Hill Drive, terminating at 2218 Copper Hill Drive. The length of the utility trench within the project area is approximately 383 feet.

Feature S-15 consists of a utility trench hosting a fiber optic cable, which extends within Study Area 3 from Rest Haven Drive and along the east side of Parkstone Drive, terminating beyond the assessments area at Parkstone Boulevard and Pipestone Drive. The length of the utility trench within the project area is approximately 416 feet.

Feature S-16 consists of a utility trench hosting a telephone line within Study Area 3. This utility trench is located near the parcel addressed as 16411 Parkstone Boulevard and extends along the southwest side of the roadway through Study Area 3 and beyond at the assessment limits at the intersection of Pipestone Drive and Parkstone Boulevard. The length of the utility trench within the project area is approximately 320 feet.

Natural Gas Utility

The location of the following natural gas line owned by City Public Service (CPS) Energy is based on review of the utility plans (BMBI, 2024) and observed utility paint markings during field reconnaissance. The natural gas utility trench is estimated to be installed approximately 2-4 feet below the ground surface, terminating in limestone bedrock.

Feature S-16 consists of a utility trench hosting a 4-inch natural gas line located within Study Area 3 along the intersection at Pipestone Drive and Parkstone Boulevard. The length of the utility trench within the project area is approximately 108 feet.

Gas line paint markings (i.e., yellow). View to the northwest from Pipestone Drive.

Test Holes

Features S-18 through S-22 consist of five test holes drilled from August 9 to 11, 2023 for a geotechnical engineering study prepared by **Raba Kistner, Inc (RKI)**. The borings were installed to evaluate soil conditions within the pavement area for the proposed roadway reconstruction low water crossing improvements and installation of an underground storm drain system. These test holes were reportedly installed to depths on the order of 8.6-19.2 feet below ground surface. Based on our interpretation of the boring log data, the borings were terminated in the Person Formation (Kep). Based on the referenced geotechnical boring logs the test holes were effectively plugged and abandoned following completion of drilling activities using soil cuttings with granular bentonite.

SOIL PROFILE
Oak Haven Area Street & Drainage (Kentwood Phase 2)
San Antonio, Bexar County, Texas

SOIL SERIES	THICKNESS ON SITE	DESCRIPTION
Crawford	**Veneer to 3 feet**	***Crawford and Bexar stony soils (Cb):*** These soils occur as large areas and form a nearly continuous belt extending to the west from the northeast portion of Bexar County to south of Helotes. Crawford Soils comprise approximately 51% of the series. The surface layer of Crawford soils is comprised of dark gray to dark reddish-brown, non-calcareous clay and is typically 8-9 inches thick. The subsoil contains chert fragments and limestone flags. Hard limestone below depth of 24-36 inches. Bexar soils comprise approximately 36% of the series. The surface layer is comprised of cherty clay loam and is on the order of 14-22 inches in thickness. The subsoil is cherty clay and is approximately 6-14 inches thick.

The preceding table was prepared based on *Soil Survey of Bexar County, Texas (1962, reissued June 1991)* in addition to field observations. As presented on the attached ***Site Geologic Map***, native soils mapped at the SITE are classified as Crawford and Bexar stony soils (Cb). These soils are weakly-developed and relatively thin, occurring over weathered limestone units of the Person Formation (Kep). Cb soils have the ability to impede rather than transmit fluids to the subsurface. Cb soils have a measured permeability of 1.0 to 1.5 in./hr. and are described as “slow”. The Crawford Series is further described as having a high shrink-swell potential.

Reported test hole data (**Raba Kistner, Inc.**, 2024) indicates the presence of 3.5 feet of dark brown clay overlying the limestone rock units of the Kep in the upland area (i.e., Study Area 1) of the Project. Alluvial soils consisting of dark brown to brown clay ranging in thickness from 1 foot to 3.25 feet and approximately 6 feet of reddish-tan sand overlying the Kep is reported in proximity to the creek channels within Study Areas 1 and 3.

ATTACHMENT B

STRATIGRAPHIC COLUMN

STRATIGRAPHIC COLUMN
Oak Haven Area Street & Drainage (Kentwood Phase 2)
San Antonio, Bexar County, Texas

STRATIGRAPHIC FORMATION	THICKNESS	DESCRIPTION
Alluvium (Qal)	Variable, ~1–6 feet	Unit consists of floodplain deposits comprised of clay, sand, silt, and gravel. ***Exposed in the Lorence Creek Tributary (i.e., Drainage Channels A and B).***
Edwards Limestone (Ked) Person Formation (Kep)	180-224 feet	
Cyclic and Marine Member, undivided	*80-100 feet*	Unit consists of massive mudstone to packstone; *miliolid* grainstone; and chert. Identified in the field by cycles of massive beds to relatively thin beds. ***Limited exposures and float rock were observed in open areas (i.e., not landscaped) throughout the south portion of the Project, within Oak Haven Park, and along the southern segments of the Lorence Creek Tributary.***
Leached and Collapsed Member, undivided	*50-60 feet*	Unit consists of highly altered crystalline limestone, chalky mudstone and chert. Identified in the field by boxwork voids with neospar and travertine frame. ***Not exposed. Inferred to be present in the shallow subsurface within the north portion of the Project.***
Regional Dense Member	*20–24 feet*	Unit consists of dense, argillaceous mudstone. Identified in the field by wispy iron-oxide stains. ***Not exposed. Inferred to be present in the shallow subsurface.***

Note: Stratigraphic Column for the SITE is adapted from Stein and Ozuna (1996) and Collins (2000).

ATTACHMENT C

NARRATIVE OF PROJECT SPECIFIC GEOLOGY

SITE GEOLOGY NARRATIVE
Oak Haven Area Street & Drainage (Kentwood Phase 2)
San Antonio, Bexar County, Texas

Introduction

The following is a project-specific discussion of existing geological conditions and potential recharge features identified for the Oak Haven Area Street and Drainage improvements project. The subject improvements will include street reconstruction, driveway upgrades, and installation of an underground storm drain system consisting of 24-, 30-, and 36-inch reinforced concrete pipes (RCP) with associated inlets. In addition, single and multi-box culverts will be installed at low water crossings associated with the Lorence Creek Tributary channels. The improvements will also include rehabilitation of water and sanitary sewer utility line segments, in addition to installation and rehabilitation of the sanitary sewer manholes.

This assessment was performed by **Raba Kistner, Inc. (RKI)** for Bain Medina Bain, Inc., pursuant to applicable Edwards Aquifer Protection Program Rules as specified in *Title 30 of the Texas Administrative Code, Section 213 (30 TAC §213*, *effective April 24, 2008).* This assessment report is in the format required by the Texas Commission on Environmental Quality (TCEQ) for the Geologic Assessment portion of a Sewage Collection System (SCS) Plan submittal, and was prepared in accordance with the revised *Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones (TCEQ-0585)*, which are applicable to submittals received by the TCEQ after October 1, 2004. This geologic assessment report documents conditions observed by **RKI** within the Project boundaries on April 10, 2024.

Site Description

Site Location. The subject project is contained within an existing residential neighborhood (i.e., Oak Haven Heights/Kenwood Manor), which is located east of Highway 281 between Henderson Pass and Thousand Oaks Drive in north San Antonio, Bexar County, Texas (hereinafter referred to as Project). Based on review of official maps published by the Texas Commission on Environmental Quality (TCEQ), the Project is fully located within the Edwards Aquifer Recharge Zone (EARZ). As such, the performance of a geologic assessment is required to facilitate construction activities for the planned sanitary sewer utility in accordance with applicable provisions set forth in the EAPP rules as specified in *Title 30 of the Texas Administrative Code, Section 213 (30 TAC 213, effective April 24, 2008).* The locations of the sanitary sewer utility were provided by Bain Medina Bain, Inc. (BMBI) on March 26, 2024.

Planned improvements will include the rehabilitation of the sanitary sewer utility, which comprises approximately 2,254 linear feet. For purposes of this Geologic Assessment, the SCS segments are grouped within the following Study Areas: (i) Area 1 is located along Parhaven Drive, north of Town Oak Drive; (ii) Area 2 includes the southmost portion of Parhaven Drive and Copper Hill Drive northwest of Parkstone Boulevard, in addition to a minimal portion of Drainage Channel A; (iii) Area 3 is located along Parkstone Boulevard between Rest Haven and Pipestone Drive. In accordance with TCEQ requirements, special attention was paid to the proposed alignment and surrounding 50-foot buffer zone in conjunction with Geologic Assessment activities. The proposed sewer segments and associated buffer zone for this project are depicted on the attached ***Site Geologic Maps***.

Topography and Drainage. Topographic contours on the U.S. Geological Survey (USGS) 7.5-minute topographic map (i.e., Longhorn Quadrangle, USGS, 2022) was reviewed to evaluate the general surface conditions and drainage patterns**.** The Project area generally consists of gently sloping hilltop topography transected by drainages associated with an unnamed tributary to Lorence Creek. Based on topographic information reviewed, the ground surface elevations range from approximately 930 to 875 feet above mean sea level (amsl) at the north (i.e., Study Area 1) and south (i.e., Study Area 3) portions of the Project, respectively. As depicted on ***Site Geologic Map***, a low elevation of approximately 860 feet amsl is present near the central portion of the Project, associated with a segment of the Lorence Creek tributary channel (i.e., Drainage Channel B). A review of Flood Insurance Rate Map (FEMA, 2010) indicates that no portion of the assessment areas located within the 100-year floodplain.

Historical Property Use. Although research pertaining to past Project operations and historical land use activities was beyond the scope of this assessment, historical aerial imagery was reviewed to evaluate historical land use and the presence of lineations that could indicate the presence of normal faulting. The following aerial photographs from United Aerial Mapping (UAM) and Google Earth™ were reviewed: 1967, 1979, 1981, 1985, 1995, 2002 - 2006, 2008, 2010, and 2012 - 2024. The aerial images indicate that the Project area has remained an undeveloped part of the surrounding residential subdivision since 1967. The Project conditions appear essentially unchanged over this timeframe with the exception of additional residential structures and landscaping improvements. The following photographs depict existing conditions.

View to the northeast at Parhaven and Hill Rise intersection.

View to the west along Copper Hill Dr. near Parkstone Blvd.

View to the northwest of Parkstone Blvd. from Pipestone.

Undeveloped portion of Oak Haven Park.

Classification of Recharge Features: As further described herein, a total of 22 recharge features were identified within Project boundaries including non-karst closed depressions and manmade features (i.e., communications, water, sanitary sewer, and gas utilities, and former geotechnical test holes). The significance of these features was assessed using definitions and guidance provided in *Instructions to Geologists (TCEQ-0585-Instructions, revised October 1, 2004)*. All features within the SITE that met the criteria presented in this reference were mapped. The characteristics of all mapped features and the assessments of these features, as defined by the TCEQ, are presented in the attached ***Geologic Assessment Table (TCEQ-0585)***.

Stratigraphy

As presented in the attached ***Stratigraphic Column***, information pertaining to the lithologies and thickness of geologic units underlying the Project area was primarily taken from Collins (2000) and Stein and Ozuna (1996). Collective published data referenced that the majority of the Project is underlain by the Upper Edwards Limestone (i.e., Person Formation [Kep]) although portions of Drainage Channels A and B host Quaternary Alluvium (Qal) deposits associated with the Lorence Creek Tributary. The Kep, which comprises the uppermost portion of the Edwards Limestone, is commonly subdivided into three discrete members as follows: (i) Cyclic and Marine Member, undivided (Kpcm) – mudstone to packstone, grainstone, and chert; (ii) Leached and Collapsed Member, undivided (Kplc) - unit includes crystalline limestone, mudstone to grainstone, and chert; and (iii) Regional Dense Member - unit consists of dense, carbonate mudstone.

Outcrop of Kep along the east side of Parkstone Boulevard.

Float rock along the northwest section of Copper Hill Drive.

Past geological mapping studies for the Project vicinity conducted by Stein and Ozuna (1996) indicate that the geologic formation underlying the north and south portions (i.e., Study Areas 1 and 3, respectively) of the Project is the Kpcm. The thickness of the Kpcm unit ranges between 80 and 100 feet. The central portion of the Project area (i.e., Study Area 2) along Copper Hill Drive, south of Sugar Crest and a small portion of Parkstone Boulevard is mapped as Kplc. The thickness of the Kplc unit ranges between 50 and 60 feet. Due to impervious cover and landscaping improvements, limited exposures of the Kpcm were observed along the east side of Parkstone Boulevard and within Oak Haven Park. No direct evidence of the Kplc was identified in conjunction within **RKI**'s field mapping effort.

Structure

This Project is located within the Balcones Fault Zone, which possesses a distinct structural trend. This zone generally consists of a northeast-southwest trending, *en echelon* normal fault system, which juxtaposes Upper Cretaceous lithologies in the southeast with Lower Cretaceous lithologies in the northwest. As a result of this larger-scale, regional faulting, minor internal fault sequences and fractures exist within this zone which follow the same structural trend and accommodate localized displacement.

Based on review of published maps, two inferred faults were mapped (Stein and Ozuna, 1996) within the Project. Based on a more recent mapping effort by Collins (2000), there are no normal faults crossing the Project. Although subtle indications of lineations are evident in the 1967 orthoimagery (UAM), no evidence of normal faulting was identified within the Project boundaries during field reconnaissance (i.e., changes in soil or rock type, fractures, lines of vegetation, etc.).

Karst Features

Although patchy exposures of limestone bedrock were identified within Oak Haven Park and along Drainage Channels A and B, the results of field mapping activities within Project boundaries did not reveal the presence of any features that could be attributed to karstification of the underlying limestone terrain. Soil cover of approximately 3 to 3.5 feet is generally present throughout the upland portions of the Project area,

but ranging in 1 to 1.75 feet in thickness in proximity to the drainage channels as indicated by geotechnical boring log data.

Non-Karst Closed Depressions

Features S-1 and S-2 are located on the south side of Copper Hill Drive near the pavement's edge within Drainage Channel B (i.e., Study Area 2). These features were formed by erosional scour. The non-karst closed depressions were observed to be bordered with weathered limestone float rock and soil lined**.** No ponding of water was observed.

The non-karst closed depression features have a low potential of transmitting fluids to the subsurface and are therefore considered not sensitive based upon the point assignment criteria set forth in the ***Geologic Assessment Table (TCEQ-0585)*** and professional judgment.

Manmade Features

As presented on the ***Site Geologic Maps***, a total of 20 manmade features were identified that may potentially serve to enhance the transmission of surface runoff to the subsurface. The features consist of communications, potable water, sanitary sewer, and natural gas utilities, in addition to a storm drain system and plugged test holes, which meet the criteria for assessment as manmade features in bedrock. Information regarding the locations of the existing utility trenches was gleaned from utility plans provided in electronic form BMBI (2024), in addition to field observations of hydrants, manway access points or valves, junction boxes, and utility paint markings. The specific utility trench features identified are listed below:

> ***Features S-3, S-11, and S-14*** consist of sanitary sewer utility trenches owned by San Antonio Water System (SAWS) located within Study Areas 1, 2, and 3.
> ***Feature S-4*** consists of a potable water utility trench owned by SAWS located within Study Areas 1, 2, and 3.
> ***Features S-5, S-6, S-7, S-8, S-10, S-12, and S-15*** consist of fiber optic cable utility trenches located within Study Areas 1, 2, and 3.
> ***Features S-9, S-13, and S-16*** consist of telephone utility trenches located within Study Areas 1, 2, and 3.
> ***Feature S-17*** consists of a natural gas utility trench owned by City Public Service (CPS) Energy located within Study Area 3.

Although not directly observable, it is inferred that the trenches for these subgrade installations are backfilled in accordance with standard construction practices that include the use of structural fill soils (e.g., base course materials, limestone gravel, compacted clay soils, etc.) overlain by native or fill soils, depending upon location and surface improvements. The trenches were not observed in conjunction with any naturally-occurring recharge features. Although the backfilled trenches may exhibit somewhat greater relative infiltration rate than the surrounding soil/rock strata underlying the project boundaries, these manmade features are collectively classified as not sensitive, having a low potential of preferentially transmitting fluids into the Edwards Aquifer. This classification is based upon the point assignment criteria presented in the ***Geologic Assessment Table (TCEQ-0585)*** and professional judgment.

Features S-18 through S-22 are geotechnical soil borings installed within Study Areas 1, 2, and 3 by **RKI** from August 9-11, 2023 to evaluate soil and rock conditions as necessary to develop structural and pavement recommendations for the proposed commercial building development. These borings were reportedly drilled to depths on the order of 8.6 to 19.2 feet, terminating in limestone bedrock. No shallow groundwater was observed during drilling operations. These features were properly plugged and are no longer existing, and therefore collectively classified as not sensitive. The former locations of these features are included on the ***Site Geologic Map***.

Potential for Fluid Migration to the Edwards Aquifer

Based on our review of Project geology, topography and drainage conditions, and the results of our mapping efforts, the overall potential for fluid movement (i.e., surface-derived flow) to the Edwards Aquifer via infiltration is considered to be low to moderate. The following assessment findings support this conclusion:

- The Project is underlain by the Crawford and Bexar soils, with an average thickness of 3 feet based on published data and field observations, and are classified as Hydrologic Soil Group D, having a high runoff potential when thoroughly wet and slow to moderate infiltration rate. Due to the lower permeability of surface soils and presence of impervious cover associated with the paved roadways and landscaping improvements throughout the residential area, there is limited exposure of limestone bedrock within the majority of the Project area, reducing the potential for rapid infiltration.

- No features were identified within the Study Areas 1 through 3 encompass the planned SCS improvements that can be attributed to karstification of limestone terrain. There were no natural karst features observed in the vicinity of any the observed manmade features including the existing utility corridors, which would increase the potential for rapid infiltration of storm water.

- Manmade (geotechnical test holes) features were installed throughout the Project, but effectively plugged to ground surface. Collectively, these and the trenches associated with existing underground utilities are classified as not sensitive based on application of point assignment criteria and professional judgment.

References

Bain Medina Bain, Inc. (BMBI), 2024,*70pct Utility Layout OAK Haven 2024-03-26.pdf* and a Microstation CAD file, *OH-EX-UT 2024-03-28.dgn*, provided to **RKI** via email correspondence on March 26, 2024 and April 22, 2024, respectively.

Barnes, V. L., 1983, Geologic Atlas of Texas San Antonio Sheet; Bureau of Economic Geology, The University of Texas at Austin, Austin, Texas.

Collins, Edward W., 2000, Geologic Map of the New Braunfels, Texas, 30 X 60 Minute Quadrangle: Geologic Framework of an Urban-Growth Corridor along the Edwards Aquifer, South-Central Texas: Bureau of Economic Geology, The University of Texas at Austin, Austin, Texas.

Google Earth™, Aerial images, 1995, 2002 - 2006, 2008, 2010, and 2012 - 2024.

National Flood Insurance Program (NAIP), 2010, Flood Insurance Rate Map, Bexar County, Texas and Incorporated Areas; Federal Emergency Management Agency, September 29, 2010, Map 48029C0255G.

Raba Kistner, Inc. (RKI), 2024, *Geotechnical Engineerng Study*, Project No. ASA23-044-00, Repor dated February 29, 2024

Stein, William G., and Ozuna, George B., 1996, Geologic framework and hydrogeologic characteristics of the Edwards Aquifer recharge Zone, Bexar County, Texas: U.S. Geological Survey Water Resources Investigations Report 95-4030.

Texas Commission on Environmental Quality (TCEQ) Edwards Aquifer Protection Program, 1998, Edwards Aquifer Recharge Zone Map, Longhorn Quadrangle; TNRCC, September 1998.

Texas Water Development Board (TWDB), Water Data Interactive (WDI) Groundwater Data Viewer, https://www2.twdb.texas.gov/apps/WaterDataInteractive/GroundwaterDataViewer/?map=sdr, accessed April 25, 2024.

United Aerial Mapping (UAM), 1967, 1979, 1981, and 1985 orthoimageries.

United States Geological Survey (USGS), 2022, Longhorn Quadrangle; USGS, Denver, Colorado.

United States Department of Agriculture (USDA), Reissued June 1991, Soil Survey of Bexar County, Texas; USDA / Soil Conservation Service / Texas Agricultural Experiment Station.

United States Department of Agriculture (USDA), 1986, Urban Hydrology for Small Watersheds; USDA / Natural Resource Conservation Service, Technical Release (TR-55), June 1986.

ATTACHMENT D

FEATURE POSITION TABLE
(GPS COORDINATES)

PROJECT GEOLOGIC MAP (NORTH SECTION), SHEET 1

PROJECT GEOLOGIC MAP (SOUTH SECTION), SHEET 2

FEATURE POSITION TABLE

Oak Haven Area Street & Drainage (Kentwood Phase 2)

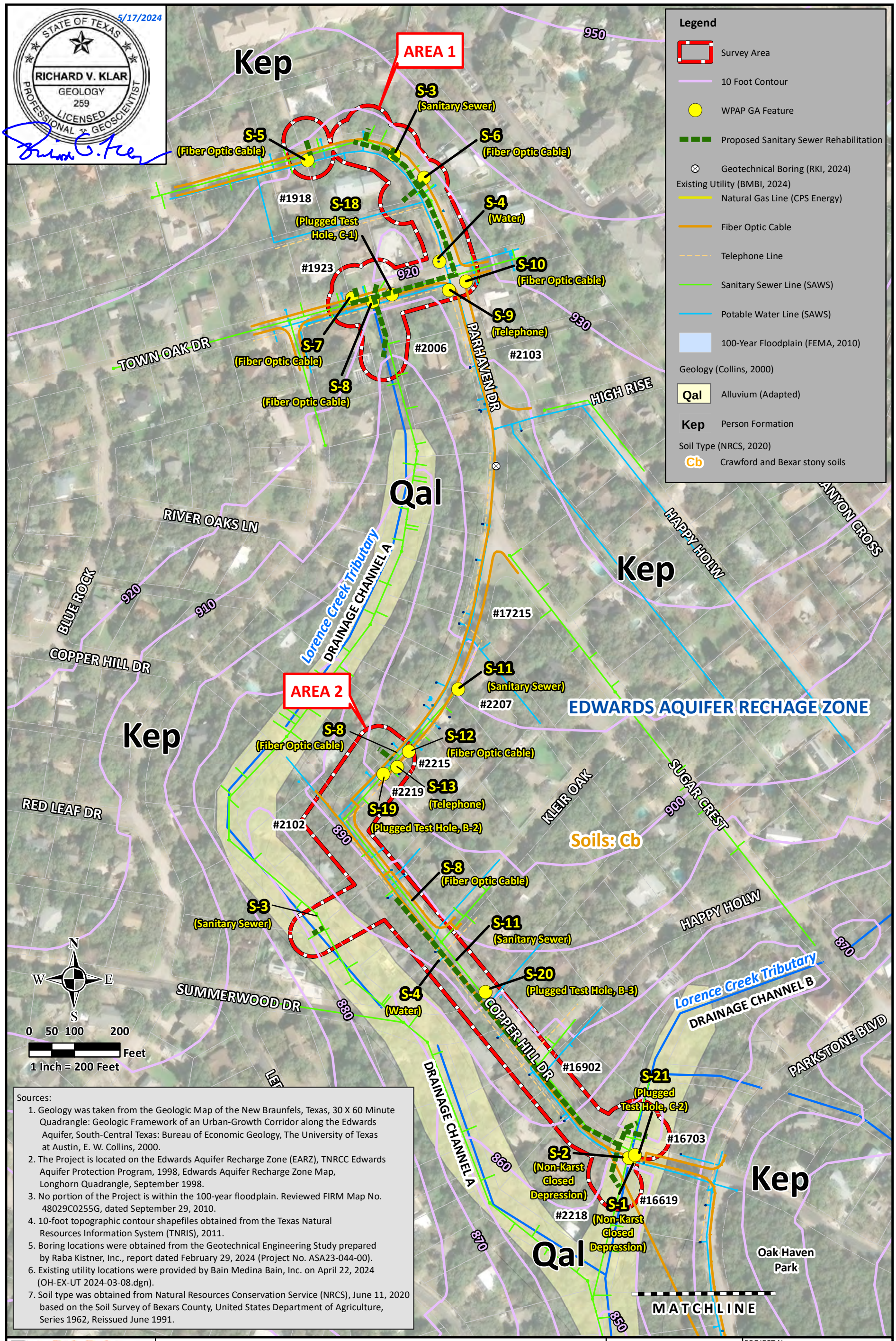
San Antonio, Texas

RKI Project No. ASF23-058-00

Feature Designation	Feature Type	Date Collected	North Latitude	West Longitude	UTM Northing (meters)	UTM Easting (meters)
S-1	Non-karst Closed Depression	4/10/2024	29°35'44.35"N	98°27'40.01"W	3274103	552185
S-2	Non-karst Closed Depression	4/10/2024	29°35'44.37"N	98°27'40.04"W	3274104	552183
S-3	Manmade Feature in Bedrock (Sanitary Sewer Utility Line)	4/10/2024	29°36'6.24"N	98°27'45.77"W	3274776	552026
S-4	Manmade Feature in Bedrock (Potable Water Utility Line)	4/10/2024	29°36'3.90"N	98°27'44.66"W	3274704	552056
S-5	Manmade Feature in Bedrock (Fiber Optic Cable Utility Line)	4/10/2024	29°36'6.12"N	98°27'47.92"W	3274772	551968
S-6	Manmade Feature in Bedrock (Fiber Optic Cable Utility Line)	4/10/2024	29°36'5.73"N	98°27'45.02"W	3274760	552046
S-7	Manmade Feature in Bedrock (Fiber Optic Cable Utility Line)	4/10/2024	29°36'3.11"N	98°27'46.83"W	3274680	551998
S-8	Manmade Feature in Bedrock (Fiber Optic Cable Utility Line)	4/10/2024	29°36'3.03"N	98°27'46.32"W	3274677	552012
S-9	Manmade Feature in Bedrock (Telephone Utility Line)	4/10/2024	29°36'3.28"N	98°27'44.42"W	3274685	552063
S-10	Manmade Feature in Bedrock (Fiber Optic Cable Utility Line)	4/10/2024	29°36'3.47"N	98°27'43.99"W	3274691	552074
S-11	Manmade Feature in Bedrock (Sanitary Sewer Utility Line)	4/10/2024	29°35'54.59"N	98°27'44.24"W	3274418	552069
S-12	Manmade Feature in Bedrock (Fiber Optic Cable Utility Line)	4/10/2024	29°35'53.24"N	98°27'45.47"W	3274376	552036
S-13	Manmade Feature in Bedrock (Telephone Utility Line)	4/10/2024	29°35'52.90"N	98°27'45.76"W	3274365	552028
S-14	Manmade Feature in Bedrock (Sanitary Sewer Utility Line)	4/10/2024	29°35'34.15"N	98°27'39.07"W	3273789	552211
S-15	Manmade Feature in Bedrock (Fiber Optic Cable Utility Line)	4/10/2024	29°35'32.49"N	98°27'39.84"W	3273738	552190
S-16	Manmade Feature in Bedrock (Telephone Utility Line)	4/10/2024	29°35'31.91"N	98°27'40.08"W	3273720	552184
S-17	Manmade Feature in Bedrock (Natural Gas Utility Line)	4/10/2024	29°35'30.68"N	98°27'38.81"W	3273682	552218
S-18	Manmade Feature in Bedrock (Plugged Geotechnical Test Hole, C-1)	8/11/2023	29°36'3.19"N	98°27'45.84"W	3274682	552025
S-19	Manmade Feature in Bedrock (Plugged Geotechnical Test Hole, B-2)	8/9/2023	29°35'52.75"N	98°27'46.11"W	3274361	552019
S-20	Manmade Feature in Bedrock (Plugged Geotechnical Test Hole, B-3)	8/10/2023	29°35'47.99"N	98°27'43.59"W	3274215	552087
S-21	Manmade Feature in Bedrock (Plugged Geotechnical Test Hole, C-2)	8/10/2023	29°35'44.43"N	98°27'39.88"W	3274105	552188
S-22	Manmade Feature in Bedrock (Plugged Geotechnical Test Hole, B-4)	8/11/2023	29°35'33.05"N	98°27'39.92"W	3273755	552188

NOTES:

1. Geographic coordinates are presented Degrees, Minutes, Decimal Seconds
2. Reference Datum is NAD 83
3. Data were collected utilizing a Garmin GPS 60cx Global Positioning System.
4. Horizontal Accuracy: RMS Value < 3 meter ground resolution
5. GPS data was collected by Anthony Krupa (**RKI** Project Professional).
6. Plugged test hole GPS data was collected by R. Boatright (**RKI** Project Professional).
7. GPS coordinates correlate to the points on the map for each feature.



Sources:

1. Geology was taken from the Geologic Map of the New Braunfels, Texas, 30 X 60 Minute Quadrangle: Geologic Framework of an Urban-Growth Corridor along the Edwards Aquifer, South-Central Texas: Bureau of Economic Geology, The University of Texas at Austin, E. W. Collins, 2000.
2. The Project is located on the Edwards Aquifer Recharge Zone (EARZ), TNRCC Edwards Aquifer Protection Program, 1998, Edwards Aquifer Recharge Zone Map, Longhorn Quadrangle, September 1998.
3. No portion of the Project is within the 100-year floodplain. Reviewed FIRM Map No. 48029C0255G, dated September 29, 2010.
4. 10-foot topographic contour shapefiles obtained from the Texas Natural Resources Information System (TNRIS), 2011.
5. Boring locations were obtained from the Geotechnical Engineering Study prepared by Raba Kistner, Inc., report dated February 29, 2024 (Project No. ASA23-044-00).
6. Existing utility locations were provided by Bain Medina Bain, Inc. on April 22, 2024 (OH-EX-UT 2024-03-08.dgn).
7. Soil type was obtained from Natural Resources Conservation Service (NRCS), June 11, 2020 based on the Soil Survey of Bexars County, United States Department of Agriculture, Series 1962, Reissued June 1991.

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SITE GEOLOGIC MAP (NORTH SECTION)

OAK HAVEN AREA STREET AND DRAINAGE
(KENTWOOD PHASE 2)
±3,475 LINEAR FEET (PROPOSED STORM DRAIN)
SAN ANTONIO, BEXAR COUNTY, TEXAS

REVISIONS:

No.	DATE	DESCRIPTION

PROJECT No.:	ASF23-058-00
ISSUE DATE:	5/17/2024
DRAWN BY:	LAW
CHECKED BY:	AJK
REVIEWED BY:	RVK

SHEET 1 OF 2

NOTE: This Drawing is Provided for Illustration Only, May Not be to Scale and is Not Suitable for Design or Construction Purposes

5/17/2024

STATE OF TEXAS
RICHARD V. KLAR
GEOLOGY
259
LICENSED
PROFESSIONAL GEOSCIENTIST

MATCHLINE

EDWARDS AQUIFER
RECHAGE ZONE

Soils: Cb

Kep

MOUNT JOY DR

850

#16515

Oak Haven
Park

890

REST HAVEN

#16503

AREA 3

S-4
(Water)

S-14
(Sanitary Sewer)

S-23
(Plugged Test Hole, B-4)

#16411

#16418

S-8
(Fiber Optic Cable)

S-15
(Fiber Optic Cable)

Qal

LEDGESTONE DR

S-16
(Telephone)

S-17
(Gas)

#2104

PIPESTONE

#2034

PARKSTONE BLVD

880

900

LEDGE OAKS

LEDGE SAGE

LEDGE VW

PIPESTONE

LEDGE VW

870

CARDIGAN HILL

860

THOUSAND OAKS

Qal

Qt

840

Kep

830

BROKEN OAK DR

N
W
E
S

0 50 100 200
Feet
1 Inch = 200 Feet

Kep

ADOBE TRL

820

HEIMER RD

Legend

- Survey Extent
- 10 Foot Contour
- WPAP GA Feature
- Proposed Sanitary Sewer Rehabilitation
- Geotechnical Boring (RKI, 2024)
- Natural Gas Line (CPS Energy)

Existing Utility (BMBI, 2024)

- Fiber Optic Cable
- Telephone Line
- Sanitary Sewer Line (SAWS)
- Potable Water Line (SAWS)
- 100-Year Floodplain (FEMA, 2010)

Geology (Collins, 2000)

- Qal — Alluvium (Adapted)
- Qt — Terrace Deposits (Adapted)
- Kep — Person Formation

Soil Type (NRCS, 2020)

- Cb — Crawford and Bexar stony soils

Sources:

1. Geology was taken from the Geologic Map of the New Braunfels, Texas, 30 X 60 Minute Quadrangle: Geologic Framework of an Urban-Growth Corridor along the Edwards Aquifer, South-Central Texas: Bureau of Economic Geology, The University of Texas at Austin, E. W. Collins, 2000.
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SITE GEOLOGIC MAP (SOUTH SECTION)

OAK HAVEN AREA STREET AND DRAINAGE
(KENTWOOD PHASE 2)
±3,475 LINEAR FEET (PROPOSED STORM DRAIN)
SAN ANTONIO, BEXAR COUNTY, TEXAS

REVISIONS:

No.	DATE	DESCRIPTION

PROJECT No.:	ASF23-058-00
ISSUE DATE:	5/17/2024
DRAWN BY:	LAW
CHECKED BY:	AJK
REVIEWED BY:	RVK

SHEET 2 OF 2

NOTE: This Drawing is Provided for Illustration Only, May Not be to Scale and is Not Suitable for Design or Construction Purposes

ORGANIZED SEWAGE COLLECTION SYSTEM PLAN

(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: Oak Haven Area Street & Drainage (Kentwood Phase 2)

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: Cristina Brantley, P.E.
   Entity: San Antonio Water Sytem
   Mailing Address: 2800 US highway 281
   City, State: San Antonio, Tx Zip: 78212
   Telephone: 210-233-3734 Fax: _____
   Email Address: cristina.brantley@saws.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: Carl Bain, P.E
   Texas Licensed Professional Engineer's Number: 56996
   Entity: Bain Medina Bin, Inc
   Mailing Address: 7073 San Pedro Ave
   City, State:San Antonio, Tx Zip: 78216
   Telephone:210-494-7223 Fax:210-490-5120
   Email Address:cbain@bmbi.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: _____
☐ Multi-family: Number of residential units: _____
☐ Commercial
☐ Industrial
☐ Off-site system (not associated with any development)
☒ Other: Existing sanitary sewer main and manholes to be rehabilitated and reconstructed in a residential area.

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

100% Domestic	_____ gallons/day
_____% Industrial	_____ gallons/day
_____% Commingled	_____ gallons/day
Total gallons/day:	

6. Existing and anticipated infiltration/inflow is N/A gallons/day. This will be addressed by: _____. New Mains and water tight manholes.

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"	1454	PVC-SDR 26	ASTM D-2241
10"	312	PVC - SDR 26	ASTM D-2241

Total Linear Feet: 1766

(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 Dos Rios WTC (name) Treatment Plant. The treatment facility is:

☒ Existing
☐ Proposed

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

☒ The City of San Antonio 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?*
N/A Existing Main Continues	Of		
	Of		
	Of		
	Of		
	Of		

Line	*Shown on Sheet*	*Station*	*Manhole or Clean-out?*
	Of		
	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" = 40'.

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*
Line A	6 of 20	10+00 to
Line C	9 of 20	10+30 to
Line C	9 of 20	11+52 to
Line C	9 of 20	11+73 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*
10" Water Line	Line A (11+22)	Crossing		2'-0"
10" Water Line	Line A (11+28)	Crossing		2'-0"
8" Water Line	Line B (13+40)	Crossing		2'-0"
10" Water Line	Line C (10+76)	Crossing		2'-0"
10" Water Line	Line C (11+10)	Crossing		2'-0"

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*
Line B	B01	9+45	7
Line B	B03	11+75	7

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]**	6,7,8,11 of 20
Manhole, showing inverts comply with 30 TAC §217.55(l)(2) **[Required]**	SAWS DETAIL DD-852-01 of .
Alternate method of joining lateral to existing SCS line for potential future connections **[Required]**	N/A of
Typical trench cross-sections **[Required]**	SAWS DETAIL DD-804-01 of .
Bolted manholes **[Required]**	SAWS DETAIL DD-852-07 of .
Sewer Service lateral standard details **[Required]**	SAWS DETAIL DD-854-EARZ of .
Clean-out at end of line **[Required, if used]**	SAWS DETAIL DD-854-02 of .
Baffles or concrete encasement for shock/erosion protection **[Required, if flow velocity of any section of pipe >10 fps]**	N/A of

Standard Details	*Shown on Sheet*
Detail showing Wastewater Line/Water Line Crossing **[Required, if crossings are proposed]**	6,8,9 of 20
Mandrel detail or specifications showing compliance with 30 TAC §217.57(b) and (c) **[Required, if Flexible Pipe is used]**	SAWS DETAIL DD-849-01 of .
Drop manholes **[Required, if a pipe entering a manhole is more than 24 inches above manhole invert]**	SAWS DETAIL DD-852-08 of .

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: _____

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: Carl Bain, P.E.

Date: 02/27/2025

Place engineer's seal here:

The seal appearing on this document was authorized by CARL BAIN P.E. 56996 ON

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)

Table 3 Continuation - 100-Year Floodplain

Line	*Shown on Sheet*	*Station*	*Manhole or Clean-out?*
Channel A MH04	14 Of 20	20+10	Manhole (To be reconstructed)
Channel A MH07	14 Of 20	25+14	Manhole (To be reconstructed)
Channel A MH08	14 Of 20	26+76	Manhole (To be reconstructed)
Channel A MH12	15 Of 21	28+21	Manhole (To be reconstructed)
Channel A MH13	15 Of 21	28+94	Manhole (To be reconstructed)
Channel A MH15	15 Of 21	35+49	Manhole (To be reconstructed)
Channel B MH16	15 Of 21	14+06	Manhole (To be reconstructed)
Channel B MH17	15 Of 21	16+10	Manhole (To be reconstructed)
Channel B MH18	15 Of 21	18+51	Manhole (To be reconstructed)

ATTACHMENT A

SCS ENGINEERING DESIGN REPORT

A. FLOW DESIGN BASIS

1) Design Flow

a) Basis for average flow used for design of collection system

b) Type of development to be served: **Residential**

c) Peak factor used for design: **2.5**

2) Flow/ Capacity Analysis:

a) Volume of Wastewater Produced:

VOLUME OF WASTEWATER PRODUCED:

1 EDU= 200 GPD

190 Single Family Homes to be served

Single Family Homes = 1 EDU

190 EDU * 200 GPD = **38,000 GPD**

Apartments = 180 EDU

180 EDU * 200 GPD = **36,000 GPD**

Commercial Buildings = **157,700 GPD**

231,700 GPD PRODUCED ON SITE

ANTICIPATED INFLOW AND INFILTRATION:

190 ACRES

600 GAL/DAY PER ACRE (SAN ANTONIO WATER SYSTEM)

INFLOW AND INFILTRATION = 114,000 GPD/ACRE

PEAK DRY WEATHER FLOW:

2.5 TIMES THE WASTEWATER PRODUCED ON SITE

= 579,250 GPD

PEAK WET WEATHER FLOW:

PEAK DRY WEATHER FLOW + INFLOW AND INFILTRATION

= 693,250 GPD

TOTAL REQUIRED CAPACITY FOR PIPE DESIGN:

($Q_{required}$) = 693,250 GALLONS PER DAY

8" SEWER LINE (SDR-26 ASTM D-2241)

MAXIMUM CAPACITY AT MINIMUM SLOPE BASED ON MANNING'S EQUATION IS CALCULATED AS FOLLOWS:

$$Q_{full} = \frac{(1.49AR^{(\frac{2}{3})}S^{(\frac{1}{2})})}{n}$$

Average I.D. = 7.92 in

A = area = 0.342 SF

n = Manning roughness coefficient = 0.013

P = wetted perimeter 2.094 ft

$\mathbf{S_{min}}$ = slope = 0.011 ft/ft

R = Hydraulic Radius = A/P = 0.163ft

$\mathbf{Q_{full}}$ = flow quantity (cfs) full at minimum slope

$$Q_{full} = \frac{(1.49AR^{(\frac{2}{3})}S^{(\frac{1}{2})})}{n}$$

$$Q_{full} = \frac{(1.49(0.342)(0.163)^{(\frac{2}{3})}(0.011)^{(\frac{1}{2})})}{(0.013)}$$

Q_{full} = (1.227 cfs)*(646,190 gpd/cfs)

Q_{full} = 792,715.47 gpd

(Q_{full}) = 792,715.47 gpd

$Q_{required}$< $Q_{full\ @\ minimum\ slope}$ = 693,250 GPD < 792,515.47 GPD → (SIZE IS OK)

10" SEWER LINE (SDR-26 ASTM D-2241)

MAXIMUM CAPACITY AT MINIMUM SLOPE BASED ON MANNING'S EQUATION IS CALCULATED AS FOLLOWS:

$$Q_{full} = \frac{(1.49AR^{(\frac{2}{3})}S^{(\frac{1}{2})})}{n}$$

Average I.D. = 9.87 in

A = area = 0.531 SF

n = Manning roughness coefficient = 0.013

P = wetted perimeter 2.597 ft

$\mathbf{S_{min}}$ = slope = 0.0034 ft/ft

R = Hydraulic Radius = A/P = 0.204 ft

$\mathbf{Q_{full}}$ = flow quantity (cfs) full at minimum slope

$$Q_{full} = \frac{(1.49AR^{(\frac{2}{3})}S^{(\frac{1}{2})})}{n}$$

$$Q_{full} = \frac{(1.49(0.531)(0.204)^{(\frac{2}{3})}(0.0034)^{(\frac{1}{2})})}{(0.013)}$$

Q_{full} = (1.230 cfs)*(646,190 gpd/cfs)

Q_{full} = 794,676.87 gpd

($\mathbf{Q_{full}}$) = 794,676.87 gpd

$\mathbf{Q_{required}}$< $\mathbf{Q_{full\ @\ minimum\ slope}}$ = 693, 250 GPD < 794,676.87 GPD → (SIZE IS OK)

3) Inflow and infiltration

The anticipated inflow and infiltration flows are calculated above in Section 2.a Design Flow/Capacity Analysis. The inflow and infiltration rates have been taken into account for the design of the proposed system. This project has been designed to preclude any connection of storm system to the sanitary sewer system.

The following testing measures shall take place upon completion to minimize the inflow and infiltration rates:

a) Leakage Test:

Testing for Pipes will be performed on all the lines according to TCEQ's 30 TAC 217.57(a)(b).

b) Deflection Test:

All flexible pipe gravity lines will be tested for deflection by pulling a rigid mandrel through the installed pipe. The test will be conducted at least 30 days after placement and compaction of final backfill. No pipe will exceed a deflection of 5%. A rigid mandrel will be used to measure deflection. The test will be performed without mechanical pulling devices. The mandrel's minimum outside diameter will be 95% of the pipes inside diameter. The mandrel will have an odd number of runners, totaling nine or more. The barrel section of the mandrel must have a length at least 75% of the pipe inside diameter.

B. GRAVITY PIPE MATERIAL

1) Engineering Analysis of Structural Components

Watertight, size on size resilient connectors conforming to ASTM C-923 will be specified for connecting pipe to manholes.

Bedding for placement of flexible pipe must comply with ASTM D2321 Class IA, IB, II or III for materials and densification. A minimum of 6 inches of bedding is required for all pipes (specification: SAWS DD-804)

Pipe Diameter: **8" & 10"** Pipe Material: **PVC-SDR 26, ASTM D-2241**
Bedding Class: **IA, IB, II, or III**

2) General Trenching and Backfill:

The trench width (specification: SAWS DD-804) must be minimized while still allowing adequate width for proper compaction of back fill, and while still ensuring that at least 6 inches of backfill exists on each side of the pipe.

Pipe Diameter: **8”** Min. Trench Width: **20.63”** Max. Trench Width: **32.63”**
Pipe Diameter: **10”** Min. Trench Width: **22.75”** Max. Trench Width: **34.75”**

The trench wall will be vertical to at least one foot above the pipe. The backfill will be free of stones greater than 6 inches in diameter and free of organic or any other unstable material.

3) Manholes- General:

Manholes are provided at all changes in size, grade or alignment of pipe. Manholes or cleanouts are provided at the end of all lines.

Maximum TCEQ allowable manhole spacing:
6” - 15” Pipe - 500 lf spacing, however; SAWS spacing, as stated in the guideless, is every 400 feet.

Design:
Pipe Diameter: **8”** Max. Spacing: **344.7 lf spacing**
Pipe Diameter: **10”** Max. Spacing: **101.3 lf spacing**

4) Manholes – Ventilation:

The 23 twenty-three (23) manholes shall be watertight.

5) Manholes- Minimizing Turbulence:

Within this system, there are two drop manholes: MH B01 at STA 19+45.3 and MH B03 at STA 11+75.4. These are used when sewer lines enter a manhole more than 24 inches above the manhole invert.

6) Manhole connection:

The connection to the proposed sewer manholes shall use watertight size on size resilient connectors that allow differential settlement and conform to ASTM C-923 (TCEQ 30TAC 217.55(m)).

7) Inverted Siphons:

This project does not include any sag pipes.

8) Trenchless Technology:

This project does not propose any trenchless installation of pipe.

9) Vertical Curvature:

This project has been designed without vertically curved gravity collection piping between manholes.

10) Horizontal Curvature:

The sewer lines have been designed to be laid in straight alignment with uniform grade between manholes.

11) Rigid Pipe Design: Not Applicable

C. JOINTS FOR GRAVITY PIPES

The joint and fitting materials and construction methods shall be confined compression rubber gasket bell and spigot type joints conforming to the material and performance requirements of ASTM D4161-01.

D. SEPARATION DISTANCES

Sanitary sewer mains crossing or laid in parallel alignment with water mains shall comply with TCEQ 30TAC 217.53(d).

E. BUILDING LATERALS AND TAPS (NOT APPLICABLE FOR THIS PROJECT)

F. BORES OR TUNNELING (NOT APPLICABLE FOR THIS PROJECT)

G. CORROSION PREVENTION

The pipe material to be utilized for this project will be PVC SDR 26, D-2241. Sanitary sewer manholes will be coated as per SAWS Specification DD-852.

H. ODOR CONTROL (NOT APPLICABLE FOR THIS PROJECT)

I. ACTIVE GEOLOGIC FAULTS (NOT APPLICABLE FOR THIS PROJECT)

J. CAPACITY REQUIREMENTS

See Section A. Flow Design Basis.

K. STRUCTURAL ANALYSIS

1) Flexible Pipe Design

The following computations are for 8-inch and 10- inch diameter PVC SDR 26 (ASTM D-2241) pipe.

SDR 26 Properties	
Pipe Compliance:	ASTM D2241
Joint Compliance:	ASTM D3139
Cell Classification:	124454
Minimum Tensile Strength (psi):	7,000
Minimum Modulus of Elasticity (psi):	400,000

This pipe will be used for gravity sanitary sewer system ranging in depth from 5.9' to 12.0'. **There is concrete encasement proposed** as per SAWS Specification DD-858.

2) Live Load Calculations:

Live load calculations for pipes (WL) were based on UNIBELL – Handbook of PVC Pipe, Table 6.6, and for 3.2' of cover on 8" PVC SDR 26 pipe,. For an 8-inch PVC SDR 26 pipe with 8.4 feet of cover, the H20 loading is approximately **0.41 PSI.** For a 10-inch PVC SDR 26 pipe with 6.2 feet of cover, the H20 loading is approximately **1.36 PSI.**

3) Buckling Pressure:

8" & 10" Pipe Characteristics (SDR 26, ASTM D-2241 Pipe)

1. Average depth of cover (6.2' to 12.0')
2. Pipe Wall Thickness (0.332") & (0.413"), t
3. Modulus of Elasticity, E (400,000 psi)
4. Pipe Stiffness, ASTM D-2241 (160 psi) - 160 psi used in calculations below.
5. Standard Dimensional Ratio (26), SDR
6. Outside Pipe Diameter (8.625") & (10.75"), O.D.

From JM Eagle – Vacuum /External pressure applications for PVC Pipe, Eq.1

7. Critical Buckling Pressure:

$$= \frac{2E}{(0.856)(DR-1)^3}$$

$$\mathbf{P_{cr}} = \frac{(2)(400{,}000)}{0.856\,(26-1)^3} = \mathbf{59.81\ PSI}$$

From JM Eagle – Vacuum /External pressure applications for PVC Pipe, Table 2

8. Modulus of Soil Reaction (1000 psi), E'

From JM Eagle – Vacuum /External pressure applications for PVC Pipe, Eq. 3

9. Buckling Pressure $= 1.15[(P_{cr}E')^{\frac{1}{2}}]$

$$\mathbf{P_b} = [1.15][(59.81\ \text{PSI})(1000)]^{\frac{1}{2}} = 281.24\ \mathbf{PSI}$$

10. Height of Saturated Soil (*w* = 120 pcf), H

$$\mathbf{H} = \frac{(281.24\ \text{PSI})\left(144\frac{\text{in}^2}{\text{ft}^2}\right)}{120\ \text{PCF}} = \mathbf{337.5\ FT\ IS\ THE\ MAXIMUM\ COVER\ HEIGHT\ SUCH\ AS\ DEFLECTION\ DOES\ NOT\ EXCEED\ 7.5\%}$$

4) Prism Load: JM Eagle's "Depth of Burial for PVC Pipe," Table 3

8" SEWER LINE (SDR-26 ASTM D-2241)

Maximum Load

1. Prism Load = **9.17 PSI**

Incorporating live loads derived from **JM Eagle's "Depth of Burial for PVC Pipe," Table 2** at approximately 11', the loads have a negligible load influence.

Minimum Load

2. Prism Load = **5.17 PSI**

Incorporating live loads derived from **JM Eagle's "Depth of Burial for PVC Pipe," Table 2** at approximately 8 ft. The total load on a 8” SDR 26 PVC pipe is: Live Load + Minimum Prism Load = 0.41 PSI + 6.67 PSI = **7.08 PSI**

10” SEWER LINE (SDR-26 ASTM D-2241)

Maximum Load

1. Prism Load = **10 PSI**

Incorporating live loads derived from **JM Eagle's "Depth of Burial for PVC Pipe," Table 2** at approximately 12’, the loads have a negligible load influence.

Minimum Load

2. Prism Load = **5.17 PSI**

Incorporating live loads derived from **JM Eagle's "Depth of Burial for PVC Pipe," Table 2** at approximately 6 ft. The total load on a 10” SDR 26 PVC pipe is: Live Load + Minimum Prism Load = 1.36 PSI + 5.17 PSI = **6.53 PSI**

5) Wall Crushing: From UNIBELL – Handbook of PVC Pipe, Equation 7.19 and 7.20

8” SEWER LINE (SDR-26 ASTM D-2241)

1. Vertical Soil Pressure, P_y
2. Outside Diameter, D_o
3. Compressive Stress (4000 psi), σ_c

4. Area of Pipe Wall $\frac{(\pi R^2 - \pi r^2)}{2\pi r}$ = 0.3676 in²/in

$$P_y = \frac{\sigma_c 2A}{D_o} = \frac{(4000\ \text{PSI})(2)(0.37\ \frac{\text{in}^2}{\text{in}})}{8.625\ \text{in}} = \mathbf{343.19\ PSI}$$

5. Depth of Wall Crushing,

$$H = \frac{P_y}{W} = \frac{343.19\ \text{PSI}}{120\ \text{PCF}} = (2.86\text{in})\left(144\ \frac{\text{in}^2}{\text{ft}^2}\right) = \mathbf{411.83\ ft}$$

10" SEWER LINE (SDR-26 ASTM D-2241)

1. Vertical Soil Pressure, P_y
2. Outside Diameter, D_o
3. Compressive Stress (4000 psi), σ_c
4. Area of Pipe Wall $\frac{(\pi R^2 - \pi r^2)}{2\pi r}$ = 0.457 in²/in

$$P_y = \frac{\sigma_c 2A}{D_o} = \frac{(4000\ \text{PSI})(2)(0.457\ \frac{\text{in}^2}{\text{in}})}{10.750\ \text{in}} = \mathbf{340.09\ PSI}$$

5. Depth of Wall Crushing,

$$H = \frac{P_y}{W} = \frac{340.09\ \text{PSI}}{120\ \text{PCF}} = (2.83\text{in})\left(144\ \frac{\text{in}^2}{\text{ft}^2}\right) = \mathbf{408.11\ ft}$$

The resulting Wall Crushing will occur at a greater depth than the deepest burial depth for the proposed SCS lines, therefore pipe design is acceptable.

6) Strain Prediction: From UNIBELL – Handbook of PVC Pipe

Pipe strain, also known as the elongation of the pipe relative to its original length, occurs under normal loading conditions of a PVC pipe. This elongation or straining can result from either the flexure or deflection (i.e.,

bending) of the pipe within the bedding material (i.e., increased or excessive pipe deflection causing the pipe to elongate) or hoop stress within the pipe wall. It is important to note that pipe strain is generally not considered the limiting performance factor during pipe failure.

$$e = e_f + e_h$$ **From UNIBELL – Handbook of PVC Pipe, Equation 7.25**

$$e_f = \frac{1}{DR}\frac{(\frac{3\Delta Y}{D})}{(\frac{1-2\Delta Y}{D})}$$ **From UNIBELL – Handbook of PVC Pipe: 7.24**

$$e_h = \frac{PD}{2tE}$$ **From UNIBELL – Handbook of PVC Pipe, Equation 7.22**

Where:

e = Maximum combined strain in pipe wall, in/in

e_f = Max. Strain in pipe wall due to ring deflection or flexure (in/in)

e_h = Max. Strain on pipe wall due to hoop stress (in/in)

P = pressure on pipe (psi)

E = Modulus of elasticity of pipe material = 400,000 psi

t = pipe wall thickness = 0.332 in & 0.413 in

D = mean pipe diameter = 8.273 in & 10.312 in

ΔY = vertical decrease in diameter

%ΔY/D = 0.657% (from Pipe Deflection, see Section VII)

DR = dimension ratio = 26

D_L= 1.0

8" SEWER LINE (SDR-26 ASTM D-2241)

$$P = \frac{(11.0\text{ ft})(120\text{ pcf})}{144\ \frac{\text{in}^2}{\text{ft}^2}} = 9.17\text{ psi}$$

$$e_f = \frac{\left(\frac{1}{26}\right)[3 * 0.0117]}{(1 - 2 * 0.0117)} = 0.0013823\ \frac{\text{in}}{\text{in}}$$

$$e_h = \frac{(9.17\text{ PSI})(8.273\text{ in})}{[2(0.332)(400{,}000)]} = 0.000286\ \frac{\text{in}}{\text{in}}$$

$$e = e_f + e_h = 0.0013823 + 0.000286 = \mathbf{0.001668}\ \frac{\mathbf{in}}{\mathbf{in}}$$

10" SEWER LINE (SDR-26 ASTM D-2241)

$$P = \frac{(12.0\text{ ft})(120\text{ pcf})}{144\ \frac{\text{in}^2}{\text{ft}^2}} = 10\text{ psi}$$

$$e_f = \frac{\left(\frac{1}{26}\right)[3 * 0.0128]}{(1 - 2 * 0.0128)} = 0.0015157\ \frac{\text{in}}{\text{in}}$$

$$e_h = \frac{(10\text{ PSI})(10.312\text{ in})}{[2(0.413)(400{,}000)]} = 0.0003121\ \frac{\text{in}}{\text{in}}$$

$$e = e_f + e_h = 0.0015157 + 0.0003121 = \mathbf{0.001828}\ \frac{\mathbf{in}}{\mathbf{in}}$$

7) Pipe Deflection: From UNIBELL – Handbook of PVC Pipe, Equation 7.10

8" SEWER LINE (SDR-26 ASTM D-2241)

$$\%\frac{\Delta Y}{D} = \frac{(D_L KP + KW')(100)}{\left[\frac{2E}{(3(DR-1)^3)}\right] + 0.061E'} = \frac{[(1.0)(0.1)(9.17) + (0.1)(0)][100]}{\left[\frac{(2)(400{,}000)}{3(26-1)^3}\right] + (0.061)(1000)}$$

$$= \frac{91.7}{17.067 + 61} = \mathbf{1.17}\%$$

10" SEWER LINE (SDR-26 ASTM D-2241)

$$\%\frac{\Delta Y}{D} = \frac{(D_L KP + KW')(100)}{\left[\frac{2E}{(3(DR-1)^3)}\right] + 0.061E'} = \frac{[(1.0(0.1)(10) + (0.1)(0)][100]}{\left[\frac{(2)(400{,}000)}{3(26-1)^3}\right] + (0.061)(1000)}$$

$$= \frac{100}{17.066 + 61} = \mathbf{1.28}\%$$

where:

D_L = 1.0

P_y = Prism Load (from Unibell Handbook of PVC Pipe, Equation 6.6)

W' = Live Load (see Section IV)

K = Bedding Constant, 0.1

E = Modulus of Elasticity

DR = Dimension Ratio

Pipe Deflection with Zeta Value Correction: **From UNIBELL – Handbook of PVC Pipe, Equation 7.32**

8" SEWER LINE (SDR-26 ASTM D-2241)

$$f = \frac{\frac{b}{d_o} - 1}{1.154 + 0.444\,(\frac{b}{d_o} - 1)} = \frac{3.78}{2.83} = 1.34$$

where:

b = Trench Width (32.63 in. Maximum)

d_o = 8.625 in.

$$zeta = \frac{1.44}{f + (1.44 - f)\frac{E_2}{E_3}} = \frac{1.44}{1.34 + (1.44 - 1.34)(\frac{1000}{1000})} = \frac{1.44}{1.44} = 1$$

Pipe Deflection with Zeta Value

$$\%\frac{\Delta Y}{D} = \frac{(D_L KP + KW')(100)}{\left[\frac{2E}{(3(DR-1)^3)}\right] + 0.061E'zeta} = \frac{[(1.0(0.1)(9.17) + (0.1)(0)][100]}{\left[\frac{(2)(400{,}000)}{3(26-1)^3}\right] + (0.061)(1000)(1)}$$

$$= \frac{91.7}{17.067 + 61} = \mathbf{1.17}\%$$

10" SEWER LINE (SDR-26 ASTM D-2241)

$$f = \frac{\frac{b}{d_o} - 1}{1.154 + 0.444\,(\frac{b}{d_o} - 1)} = \frac{2.23}{2.15} = 1.04$$

where:

b = Trench Width (34.75 in. Maximum)

d_o = 10.75 in.

$$zeta = \frac{1.44}{f + (1.44 - f)\frac{E_2}{E_3}} = \frac{1.44}{1.04 + (1.44 - 1.04)(\frac{1000}{1000})} = \frac{1.44}{1.44} = 1$$

Pipe Deflection with Zeta Value

$$\%\frac{\Delta Y}{D} = \frac{(D_L KP + KW')(100)}{\left[\frac{2E}{(3(DR-1)^3)}\right] + 0.061E'zeta} = \frac{[(1.0(0.1)(10) + (0.1)(0)][100]}{\left[\frac{(2)(400{,}000)}{3(26-1)^3}\right] + (0.061)(1000)(1)}$$

$$= \frac{100}{17.067 + 61} = \mathbf{1.28}\ \%$$

The pipe design is acceptable because both 1.17% and 1.28% are below the 5% threshold.

8) Modulus of Soil Reaction: Soil Reaction for Buried Flexible Pipe

The modulus of soil reaction (E') was derived from Howard, Amster K. "Soil Reaction for Buried Flexible Pipe". Refer to SAWS Specification DD-804 for trenching, and backfilling the sanitary sewer line.

9) Pipe Diameter and Material

Materials Used and ASTM Standards Adhered to: 30 TAC 217.53(b) (1)

Pipe Diameter	Linear Feet	Pipe Material	National Specification Pipe Material	National Standard for Pipe Joints
10" (SSMH A01 TO SSMH A02)	37	SDR 26	ASTM D-2241	ASTM D-3139
10" (SSMH A02 TO SSMH A03)	101.3	SDR 26	ASTM D-2241	ASTM D-3139
8" (SSMH B01 TO SSMH A03)	54.7	SDR 26	ASTM D-2241	ASTM D-3139
8" (SSMH A03 TO SSMH B02)	34.1	SDR 26	ASTM D-2241	ASTM D-3139

8” (SSMH B02 TO SSMH B03)	141.3	SDR 26	ASTM D-2241	ASTM D-3139
8” (SSMH B03 TO SSMH B04)	86.6	SDR 26	ASTM D-2241	ASTM D-3139
8” (SSMH B04 TO SSMH B05)	85.4	SDR 26	ASTM D-2241	ASTM D-3139
8” (SSMH B05 TO SSMH B06)	90.7	SDR 26	ASTM D-2241	ASTM D-3139
8” (SSMH B06 TO SSMH B07)	54.0	SDR 26	ASTM D-2241	ASTM D-3139
8” (SSMH B07 TO EX SSMH B08)	63.7	SDR 26	ASTM D-2241	ASTM D-3139
10” (SSMH C01 TO SSMH C02)	30.0	SDR 26	ASTM D-2241	ASTM D-3139
10” (SSMH C02 TO SSMH C03)	68.9	SDR 26	ASTM D-2241	ASTM D-3139
10” (SSMH C03 TO SSMH C04)	53.6	SDR 26	ASTM D-2241	ASTM D-3139
10” (SSMH C04 TO SSMH C05)	21.3	SDR 26	ASTM D-2241	ASTM D-3139
8” (SSMH C03 TO SSMH D01)	76.2	SDR 26	ASTM D-2241	ASTM D-3139
8” (SSMH D01 TO SSMH D02)	181.9	SDR 26	ASTM D-2241	ASTM D-3139
8” (SSMH D02 TO SSMH D03)	344.7	SDR 26	ASTM D-2241	ASTM D-3139
8” (SSMH D03 TO SSMH D04)	127.2	SDR 26	ASTM D-2241	ASTM D-3139
8” (SSMH D04 TO SSMH D05)	16.1	SDR 26	ASTM D-2241	ASTM D-3139
8” (SSMH E01 TO SSMH E02)	96.9	SDR 26	ASTM D-2241	ASTM D-3139

10) Pipe Diameter and Material: From UNIBELL – Handbook of PVC Pipe, Figure 2.1

The modulus of elasticity (Eb) = **400,000 PSI**

11) Tensile Strength: From UNIBELL – Handbook of PVC Pipe, Figure 2.1

The tensile strength = 7,000 PSI

12) Pipe Stiffness: From UNIBELL – Handbook of PVC Pipe, Equation 7.3

$$\mathrm{PS} = 4.47\left(\frac{\mathrm{E}}{(\mathrm{DR}-1)^3}\right) = 4.47\left(\frac{4000{,}000}{(26-1)^3}\right) = 114.43\ \mathrm{PSI}$$

13) Leonhardt's Zeta Value: From UNIBELL – Handbook of PVC Pipe, Equation 7.32

See Pipe Deflection section for zeta value correction calculations.

14) Trench Width

Trench Width (20.63" Minimum – 34.75" Maximum)

15) Depth Cover

Depth Cover (5.9' to 12.0')

16) Water Table Elevation

The log bores do not show a water table elevation (from Geotechnical Engineering Report, Raba Kistner, Project No. asa23-044-00, dated September 20, 2023).

17) Unit Weight of Soil

Unit Weight of Soil = 120 PCF

L. MINIMUM AND MAXIMUM SLOPES

1) Minimum and Maximum Slopes

All pipes are designed with slopes that will provide a velocity of at least 2 ft/s flowing full, as calculated using Manning's equation with an "n" value of 0.013. Also, the pipes are designed with slopes that will provide a velocity less than 10 ft/s.

Pipe Diameter: **8" SDR-26 (ASTM-D 2241)**

Minimum Slope: **1.1%** Maximum: **7.8%**

Pipe Diameter: **10” SDR-26 (ASTM-D 2241)**

Minimum Slope: **0.34%** Maximum: **4.5%**

Allowable slopes from TCEQ SCS Application – Appendix A

Minimum Slope: **0.33%** Maximum: **8.40%**

Minimum Slope: **0.25%** Maximum: **6.23%**

2) Minimum and Maximum Velocities

Pipe Diameter: **8” SDR-26 (ASTM 2241)**

Velocity at 1.1% (Minimum Velocity): 3.57 ft/ sec

Velocity at 7.8% (Maximum Velocity): 9.49 ft/sec

Pipe Diameter: **10” SDR-26 (ASTM 2241)**

Velocity at 0.34% (Minimum Velocity): 2.30 ft/sec

Velocity at 4.7% (Maximum Velocity): 8.57 ft/sec

M. BY- PASS PUMP

1) Design Flow

a) Basis for average flow used for the design of the collection system: 8" Sewer Pipe – Pipe Full Flow

b) Type of development to be served: Residential Existing

c) Peak factor used for the design: **4**

2) Flow/ Capacity Analysis:

Volume of Wastewater produced:

Pipe Diameter = 8” 0.4% Slope

Full Flow Capacity = 350 GPM = 0.5 MGD

3) By-pass Pumping Plan

The sewer by-pass plan proposed is directed to minimize the disruption to the community. All efforts have been made so that foot traffic and vehicular traffic will be disrupted as little as possible with minimal impact on the community.

For the Flow Management of the project, each by-pass is designed separately and should be capable of the stated flows. All stated flows are based on max/wet peak flows. All efforts will be made to conduct the sewer pipe CIPP during dry weather flow conditions to minimize by-pass efforts and the risk of spills.
Prior to beginning construction, the contractor will coordinate with the on-site SAWS inspector to evaluate the local flows and run a test operation to ensure the integrity of the by-pass system. After the test run operation has been approved by the SAWS Inspector, the same system setup will be used during construction. The temporary flexible pipe will go parallel to the existing sewer lines and carry the flow to the closest downstream manhole.

Sewer By-pass Site No. 1 (EXSSMH #58261):

The designed flow for this bypass is 0.5 MGD (350 GPM).
The by-pass pump specifications and performance curves are attached to this report.
The proposed by-pass piping path is shown on the Suggested Bypass Pumping Plan attached to this report.

Pump: Godwin Dri-Prime CD100S

1,080 GPM: Max Flow Rate @ 10' Max Head

The by-pass will begin at the existing manhole #58261. The suction line will be placed inside the manhole. The pump will discharge into a 4" discharge line. This discharge line will carry the flows to the existing manhole #58799.

Sewer By-pass Site No. 2 (EXSSMH #69164):

The designed flow for this bypass is 0.5 MGD (350 GPM).
The by-pass pump specifications and performance curves are attached to this report.
The proposed by-pass piping path is shown on the Suggested Bypass Pumping Plan attached to this report.

Pump: Godwin Dri-Prime CD100S

1,080 GPM: Max Flow Rate @ 10' Max Head

The by-pass will begin at the existing manhole #69164. The suction line will be placed inside the manhole. The pump will discharge into a 4" discharge line. This discharge line will carry the flows to the existing manhole #58731.

Sewer By-pass Site No. 3 (EXSSMH #58118):

The designed flow for this bypass is 0.5 MGD (350 GPM).

The by-pass pump specifications and performance curves are attached to this report.

The proposed by-pass piping path is shown on the Suggested Bypass Pumping Plan attached to this report.

Pump: Godwin Dri-Prime CD100S

1,080 GPM: Max Flow Rate @ 10' Max Head

The by-pass will begin at the existing manhole #58118 The suction line will be placed inside the manhole. The pump will discharge into a 4" discharge line. This discharge line will carry the flows to the existing manhole #58844.

Sewer By-pass Site No. 4 (EXSSMH #58117):

The designed flow for this bypass is 0.5 MGD (350 GPM).

The by-pass pump specifications and performance curves are attached to this report.

The proposed by-pass piping path is shown on the Suggested Bypass Pumping Plan attached to this report.

Pump: Godwin Dri-Prime CD100S

1,080 GPM: Max Flow Rate @ 10' Max Head

The by-pass will begin at the existing manhole #58117. The suction line will be placed inside the manhole. The pump will discharge into a 4" discharge line. This discharge line will carry the flows to the existing manhole #58257.

Sewer By-pass Site No. 5 (EXSSMH #71714):

The designed flow for this bypass is 0.5 MGD (350 GPM).

The by-pass pump specifications and performance curves are attached to this report.

The proposed by-pass piping path is shown on the Suggested Bypass Pumping Plan attached to this report.

Pump: Godwin Dri-Prime CD100S

1,080 GPM: Max Flow Rate @ 10' Max Head

The by-pass will begin at the existing manhole #71714. The suction line will be placed inside the manhole. The pump will discharge into a 4" discharge line. This discharge line will carry the flows to the existing manhole #58250.

Sewer By-pass Site No. 6 (EXSSMH #58256):

The designed flow for this bypass is 0.5 MGD (350 GPM).

The by-pass pump specifications and performance curves are attached to this report.

The proposed by-pass piping path is shown on the Suggested Bypass Pumping Plan attached to this report.

Pump: Godwin Dri-Prime CD100S

1,080 GPM: Max Flow Rate @ 10' Max Head

The by-pass will begin at the existing manhole #58256. The suction line will be placed inside the manhole. The pump will discharge into a 4" discharge line. This discharge line will carry the flows to the existing manhole #58258.

Sewer By-pass Site No. 7 (EXSSMH #58802 & #58300):

The designed flow for this bypass is 0.5 MGD (350 GPM).

The by-pass pump specifications and performance curves are attached to this report.

The proposed by-pass piping path is shown on the Suggested Bypass Pumping Plan attached to this report.

Pump: Godwin Dri-Prime CD100S

1,080 GPM: Max Flow Rate @ 10' Max Head

The by-pass will begin at the existing manholes #58802 & #58300. The suction line will be placed inside the manholes. The pump will discharge into a 4" discharge line. This discharge lines will carry the flows to the existing manhole #61057.

Sewer By-pass Site No. 9 (EXSSMH #71713):

The designed flow for this bypass is 0.5 MGD (350 GPM).

The by-pass pump specifications and performance curves are attached to this report.

The proposed by-pass piping path is shown on the Suggested Bypass Pumping Plan attached to this report.

Pump: Godwin Dri-Prime CD100S

1,080 GPM: Max Flow Rate @ 10' Max Head

The by-pass will begin at the existing manhole #71713. The suction line will be placed inside the manhole. The pump will discharge into a 4" discharge line. This discharge line will carry the flows to the existing manhole #58251.

Sewer By-pass Site No. 10 (EXSSMH #71713):

The designed flow for this bypass is 0.5 MGD (350 GPM).

The by-pass pump specifications and performance curves are attached to this report.

The proposed by-pass piping path is shown on the Suggested Bypass Pumping Plan attached to this report.

Pump: Godwin Dri-Prime CD100S

1,080 GPM: Max Flow Rate @ 10' Max Head

The by-pass will begin at the existing manhole #71713. The suction line will be placed inside the manhole. The pump will discharge into a 4" discharge line. This discharge line will carry the flows to the existing manhole #71714.

Sewer By-pass Site No. 11 (EXSSMH #71714):

The designed flow for this bypass is 0.5 MGD (350 GPM).

The by-pass pump specifications and performance curves are attached to this report.

The proposed by-pass piping path is shown on the Suggested Bypass Pumping Plan attached to this report.

Pump: Godwin Dri-Prime CD100S

1,080 GPM: Max Flow Rate @ 10' Max Head

The by-pass will begin at the existing manhole #71714. The suction line will be placed inside the manhole. The pump will discharge into a 4" discharge line. This discharge line will carry the flows to the existing manhole #60996.

Sewer By-pass Site No. 11 (EXSSMH #58795):

The designed flow for this bypass is 0.5 MGD (350 GPM).

The by-pass pump specifications and performance curves are attached to this report.

The proposed by-pass piping path is shown on the Suggested Bypass Pumping Plan attached to this report.

Pump: Godwin Dri-Prime CD100S

1,080 GPM: Max Flow Rate @ 10' Max Head

The by-pass will begin at the existing manhole #58795. The suction line will be placed inside the manhole. The pump will discharge into a 4" discharge line. This discharge line will carry the flows to the existing manhole #60996.

Spare/Backup By-pass Pump:

According to SAWS Spec 865, the contractor shall have one backup pump, equal in capacity to the largest pump in the system, and ready for operation in case any of the primary pumps fail.

Pump: Godwin Dri-Prime CD100S

1,080 GPM: Max Flow Rate @ 10' Max Head

4) Construction Operation Scheduling

During rehabilitation and reconstruction, the contractor shall follow basically the following steps:

1) Sanitary sewer cleaning duration: 1 Day (No by-pass pump needed)

2) Sanitary sewer pre-televised video duration: 1 Day (No by-pass pump needed)

3) Liner installation: 3 days (By-pass pump needed)

4) Line curing process: 0.5 days (By-pass pump needed)

5) Liner drying process: 0.5 days (By-pass pump needed)

6) Sanitary sewer post-TV process duration: 0.5 days (No by-pass pump needed)

7) Manhole coating 0.5 days (By-pass pump needed)

5) By-pass Pump:

CD100S Dri-Prime Pump

Max capacity = 1,080 GPM

Fuel capacity = 30 US Gal

Max fuel consumption @ 1,800 rpm: 1.0 Gal/hr

24-hour Operation Fuel Required = 24-Gallons

6) Secondary Containment for the Pump Station

Systems used for the temporary and permanent aboveground storage of hazardous substance must be constructed within controlled drainage areas that are sized to capture one and one-half (1-1/2) times the storage capacity of the system. The controlled drainage area must be constructed of, and in a material impervious to, the substance(s) being stored, and must direct spills to a convenient point for collections and recovery.

Any spills from storage tank facilities must be removed from the controlled drainage area for disposal within 24 hours of the spill.

There should be sorbent material available so that it can be used immediately after a spill occurs. The material that will be used for the area of the secondary containment should be a polypropylene pad liner of 100 mil (See manufacturer specification attached to this report).

The secondary containment drainage area should be constructed with vertical slopes and the top of the containment should be no less than 0.5’ high. (TAC 30 Chapter 213.5.e.1)

Secondary Containment for the Sewer By-pass Sites:

Floor containment length = 15 FT

Floor containment width = 10 FT

Containment floor area = 150 SF

Earth Dike Depth - Sorbent Material = 0.25 FT

Containment Volume Available = 75 CFT = 560 Gal

Volume Required = (24 Gal) * 1.5 = 36 Gal

7) HDPE Hoses

High-Density Polyethylene (HDPE) is the required pipe material for all bypass piping.

HDPE shall be used when bypass discharge pipe will be going through streams, stormwater culverts, the Edward's Aquifer Recharge Zone, environmentally sensitive areas, and all other locations.

1) HDPE pipe must be assembled and joined using couplings, flanges, or fusion welding in order to avoid joint leakage. SAWS shall be notified in sufficient time to allow them to inspect the pipe joints during assembly.

2) HDPE fusion welding must be performed by personnel certified as fusion technician(s) by the manufacturer of HDPE pipe and/or fusing equipment. SAWS shall examine welds prior to use in BPP operation.

3) BPP shall indicate the proposed DR of the pipe to be used.

4) Any hoses or pipes that leak shall be removed and replaced with non-leaking hoses or pipes.

8) Redundancy (Back Up Pumps)

By-pass Pump Plan should have 100% redundancy in pumps. Emergency situations may dictate initial pumping with one pump but a backup redundancy is required as soon as it can be installed on-site, at each location of usage. The secondary pump will be periodically started to verify it is in working condition.

9) Flow Plug

At all times Confined Space procedures and Safety requirements will be in force during installation and inflation, deflation, and removal of plugs. Proper devices and recording of entry conditions are required. Forms should be provided and displayed during any entry or exit situation. Monitoring of atmospheric conditions should be checked regularly and recorded. The forms should be submitted for review to ensure proper procedures are in place. Inflation and visual tests should be performed prior to any use of a specific plug. The proper size for the vessel being

plugged will be verified. Plugs should be placed on the upstream side of the construction unless that is not possible.

10) Construction Site Access: Ingress/Egress

The contractor shall access the site from CoSA ROW, no construction entrances/exits will be necessary due to the methods of construction used for this project.

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TECHNICAL BULLETIN

JANUARY 2009

VACUUM/EXTERNAL PRESSURE APPLICATIONS FOR PVC PIPE

Applications for PVC pipe can sometimes include vacuum and/or external pressure. An example of a vacuum application could be when a length of PVC pipe is used on the suction end of a pump. Examples of external pressure include pipe submerged in water and some well-casing applications.

In terms of forces acting on the pipe, there is no difference between vacuum and external pressure. In either case, greater pressure exists on the outside of the pipe than on the inside. However, it should be remembered that the maximum external pressure achievable from vacuum alone is the atmospheric pressure, or about 15 lbs/in^2 at sea level.

The mode of failure for cases of external pressure is wall buckling. The external pressure at which failure occurs is called the Critical Pressure, or Pcr. Pcr can be calculated for different types of PVC pipe. The following three cases show how this can be done.

CALCULATIONS FOR CRITICAL PRESSURE

Case 1: Unsupported, Unburied Pipe With No Diametric Deflection

Equation 1:

Note: Applicable for solid wall pipes only. See Equation 2 for profile wall pipes.

$$\mathbf{Pcr} = \frac{2E}{0.856\,(DR-1)^3}$$

Where:

Pcr = Critical Pressure (lbs/in^2)

Dr = Dimension Ratio of PVC Pipe
= Average OD/Minimum Wall

E = Modulus of Elasticity for PVC Pipe material (lbs/in^2)

At 73°F, **E** has the following values:

PVC Cell Class 12454: 400,000 (lbs/in^2)
PVC Cell Class 12364: 440,000 (lbs/in^2)

The PVC value for **E** decreases with increasing temperature. For higher temperatures, multiply the value at 73° by the correction factors in Table 1.

Table 1

TEMPERATURE CORRECTIONS FOR E		
At 90° F	Multiply by	0.93
At 100° F	Multiply by	0.88
At 110° F	Multiply by	0.84
At 120° F	Multiply by	0.79
At 130° F	Multiply by	0.75
At 140° F	Multiply by	0.70

For profile wall pipes (e.g. JM Eagle Rib), the equation becomes:

Equation 2:

$$\mathbf{Pcr} = 0.522 \times (PS)$$

Where:

PS = Pipe Stiffness (lbs/in/in)

Note: Obtain **PS** from manufacturer's literature or contact the manufacturer.

For temperatures above 73°F, multiply the result from Equation 2 by the appropriate E correction factor from Table 1.

Case 2: Buried Pipe With Soil Support

Proper soil support will improve a PVC pipe's resistance to buckling. Use the following equation for buried PVC pipes:

Equation 3:

$$\mathbf{Pb} = 1.15\sqrt{Pcr \times E'}$$

Where:

Pb = Buckling Pressure of buried PVC pipe (lbs/in2)

Pcr = Critical Pressure for PVC pipe (found from Equation 1 or Equation 2)

E' = Modulus of Soil Reaction (Table 2 below)

Table 2

AVERAGE VALUES OF MODULUS OF SOIL REACTION, E'				
Soil type-pipe bedding material (Unified Classification System[a]) (1)	E' for Degree of Compaction of Bedding, in pounds per square inch			
	Dumped (2)	Slight < 85% Proctor, < 40% relative density (4)	Moderate 85%-95% Proctor, 40%-70% relative density (4)	High > 95% Proctor, > 70% relative density (5)
Fine-grained Soils (LL>50)[b] Soils with medium to high plasticity CH, MH, CH-MH	No data available; consult a competent soils engineer; Otherwise use E'=0			
Fine-grained Soils (LL<50) Soils with medium to no plasticity CL, ML, ML-CL, with less than 25% coarsegrained particles	50	200	400	1,000
Fine-grained Soils (LL<50) Soils with medium to no plasticity CL, ML, ML-CL, with less than 25% coursegrained particles. Coarse-grained soils with Fines GM, GC, SM SC[c] contains more than 12% fines	100	400	1,000	2,000
Coarse-grained Soils with Little or No Fines GW, GP, SW, SPc contains less than 12% fines	200	1,000	2,000	3,000
Crushed Rock	1,000	3,000	3,000	3,000

[a] ASTM Designation D 2487, USBR Designation E-3
[b] LL = Liquid limit
[c] Or any borderline soil beginning with one of these symbols (i.e. GM-GC,GC-SC)

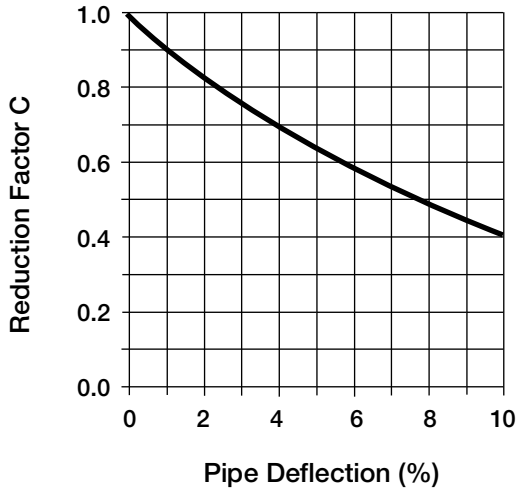
SOURCE: "Soil Reaction for Buried Flexible Pipe" by Amster K. Howard, U.S. Bureau of Reclamation, Denver, Colorado. Reprinted with permission from the UniBell PVC Pipe Association.

Case 3: Pipe with Diametric Deflection

PVC pipes that are deflected diametrically or that are otherwise out-of-round have less resistance tobuckling. In these cases, multiply the result of Equation 1, 2, or 3 by the correction factor C found in Figure 1 in the next column.

Figure 3

CRITICAL BUCKLING PRESSURE REDUCTION FACTOR C FOR SHAPE



Reference: *"Uni-Bell Handbook of PVC Pipe."*

Example:

This example calculates whether vacuum could cause failure in a sewer pipe application.

Given:

1. 15" SDR 35 ASTM D 3034 PVC sewer pipe with cell class 12454
2. Operating temperature is 120° F
3. Pipe is deflected 5%
4. Pipe is bedded in dumped CL soil with < 25% coarse-grained particles

Solution:

$$\mathbf{E} \text{ at } 73°F = 400{,}000 \text{ lbs/in}^2$$

$$\mathbf{E} \text{ at } 120°F = 400{,}000 \text{ lbs/in}^2 \times 0.79$$

$$= 316{,}000 \text{ lbs/in}^2$$

$$\mathbf{E'} = 50 \text{ lbs/in}^2$$

$$\mathbf{C} = 0.63$$

$$\mathbf{Pcr} = \frac{2(316{,}000 \text{ lbs/in}^2)}{0.856 \times (35-1)^3}$$

$$= 18.8 \text{ lbs/in}^2$$

$$\mathbf{Pb} = 1.15\sqrt{18.8 \times 50 \text{ lbs/in}^2}$$

$$\mathbf{Corrected\ Pb} = 35.3 \text{ lbs/in}^2 \times 0.63$$

$$= 22.2 \text{ lbs/in}^2$$

22.2 lbs/in^2 is more than the maximum achievable vacuum (15 lbs/in^2), so it is not possible for vacuum to cause failure in this case.

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TECHNICAL BULLETIN

JANUARY 2009

DEPTH OF BURIAL FOR PVC PIPE

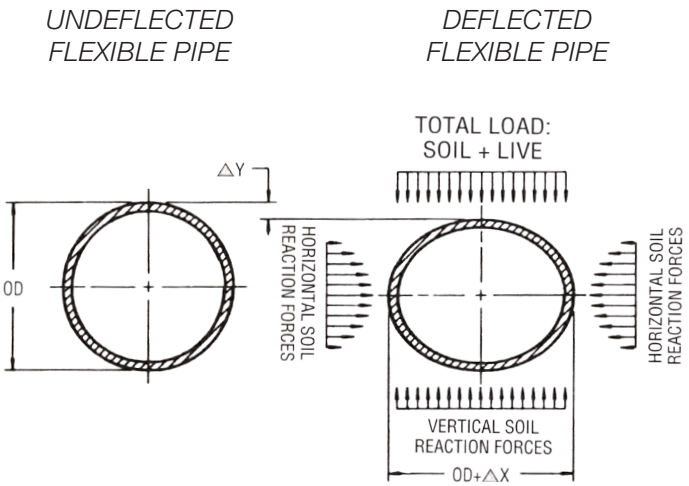
FLEXIBLE PIPE THEORY

PVC pipes are classified as flexible pipes. They flex without breaking when loaded externally from soil weight and vehicular traffic. Rigid pipes, such as those made of concrete or clay, do not perceptibly flex when loaded and experience wall crushing when their load limit is reached. This mode of failure for rigid pipes has given rise to the terms “crush strength” and “D-Load”, but these terms do not apply to PVC pipes.

When a PVC pipe encounters external loading, its diameter will begin to deflect, meaning its sides will move outward and slightly downward. If the pipe is buried in supportive soil, the stiffness of the soil will resist the deflection (see Figure 1). This action and reaction is the key to how a PVC pipe carries external loads.

Figure 1

FLEXIBLE PIPE DEFLECTION



The combination of the embedment soil stiffness and the pipe stiffness form a system that acts to support external loads. By itself, the pipe may not support much weight, but the soil/pipe system can have tremendous load capacity.

A PVC pipe’s resistance to deflection in an unburied state is measured by its “pipe stiffness”. Pipe stiffness is usually less significant than soil stiffness in PVC pipe installations, but in general, a higher pipe stiffness results in a higher load capacity.

Soil stiffness is most affected by the level of compaction achieved, and to a lesser extent by the soil type. Soil stiffness values for various conditions and soil types have been derived through extensive testing.

CALCULATING ALLOWABLE BURIAL DEPTH

Because a PVC pipe flexes rather than breaks when loaded, the failure criterion is not fracture strength. Instead, a limit is placed on pipe diametric deflection. This limit is expressed in terms of percentage reduction in diameter due to external loading. Industry recommendations for maximum deflection are shown in Table 1.

Table 1

MAXIMUM RECOMMENDED DIAMETRIC DEFLECTION

PVC Pressure Pipes	**5%**
PVC Sewer / Drain Pipes	**7½%**
PVC Electrical Conduits	**5%**

A “failure” of a flexible pipe system from external loading is defined by the point at which the top of the pipe begins to experience inverse curvature. Research has shown this point occurs at a minimum of 30% deflection; recommendations for maximum deflection therefore incorporate safety factors of 4:1 or 6:1.

In order to determine the suitability of a particular burial depth, a system designer estimates the pipe deflection through the use of an empirical equation called the "Modified Iowa Equation". A simplified, conservative version of the equation is presented below:

MODIFIED IOWA EQUATION

$$\% \text{ DEFLECTION} = \frac{0.1\,(W' + P)\,100}{0.149\,(PS) + 0.061E'}$$

Where:

% DEFLECTION = predicted percentage of diametric deflection.

W' = **Live Load** (lbs/in^2): pressure transmitted to the pipe from traffic on the ground surface. Live Load values are found in Table 2.

P = **Prism Load** (lbs/in^2): pressure acting on the pipe from the weight of the soil column above the pipe (also called "Dead Load"). Prism Load values are found in Table 3.

PS = **Pipe Stiffness (lbs/in^2)**: a flexible pipe's resistance to deflection in an unburied state. Pipe Stiffness values for JM Eagle products are found in Table 4.

E' = **Modulus of Soil Reaction (lbs/in^2):** stiffness of the embedment soil. Values for Modulus of Soil Reaction are found in Table 5.

Table 2

LIVE LOADS ON PVC PIPE			
HEIGHT OF COVER (FT)	LIVE LOAD TRANSFERRED TO PIPE, (LBS/IN^2)		
	HIGHWAY H2O[1]	RAILWAY E80[2]	AIRPORT[3]
1	12.50		
2	5.56	26.39	13.14
3	4.17	23.61	12.28
4	2.78	18.40	11.27
5	1.74	16.67	10.09
6	1.39	15.63	8.79
7	1.22	12.15	7.85
8	0.69	11.11	6.93
10	*	7.64	6.09
12	*	5.56	4.76
14	*	4.17	3.06
16	*	3.47	2.29
18	*	2.78	1.91
20	*	2.08	1.53
22	*	1.91	1.14
24	*	1.74	1.05
26	*	1.39	*
28	*	1.04	*
30	*	0.69	*
35	*	*	*
40	*	*	*

[1] Simulates 20 ton truck traffic + impact.
[2] Simulates 80,000 lb/ft railway load + impact.
[3] 180,000 lbs. dual tandem gear assembly; 26-inch spacing between tires and 66-inch center-to-center spacing between fore and aft tires under a rigid pavement 12 inches thick + impact.
* Negligible live load influence.

Table 3

PRISM LOAD SOIL PRESSURE (LBS/IN2)					
HEIGHT OF COVER (FT)	SOIL UNIT WEIGHT (LBS/FT3)				
	100	110	120	125	130
1	0.69	0.76	0.83	0.87	0.90
2	1.39	1.53	1.67	1.74	1.81
3	2.08	2.29	2.50	2.60	2.71
4	2.78	3.06	3.33	3.47	3.61
5	3.47	3.82	4.17	4.34	4.51
6	4.17	4.58	5.00	5.21	5.42
7	4.86	5.35	5.83	6.08	6.32
8	5.56	6.11	6.67	6.94	7.22
9	6.25	6.88	7.50	7.81	8.13
10	6.94	7.64	8.33	8.68	9.03
11	7.64	8.40	9.17	9.55	9.93
12	8.33	9.17	10.00	10.42	10.83
13	9.03	9.93	10.83	11.28	11.74
14	9.72	10.69	11.67	12.15	12.64
15	10.42	11.46	12.50	13.02	13.54
16	11.11	12.22	13.33	13.89	14.44
17	11.81	12.99	14.17	14.76	15.35
18	12.50	13.75	15.00	15.63	16.25
19	13.19	14.51	15.83	16.49	17.15
20	13.89	15.28	16.67	17.36	18.06
21	14.58	16.04	17.50	18.23	18.96
22	15.28	16.81	18.33	19.10	19.86
23	15.97	17.57	19.17	19.97	20.76
24	16.67	18.33	20.00	20.83	21.67
25	17.36	19.10	20.83	21.70	22.57
26	18.06	19.86	21.67	22.57	23.47
27	18.75	20.63	22.50	23.44	24.38
28	19.44	21.39	23.33	24.31	25.28
29	20.14	22.15	24.17	25.17	26.18
30	20.83	22.92	25.00	26.04	27.08
31	21.53	23.68	25.83	26.91	27.99
32	22.22	24.44	26.67	27.78	28.89
33	22.92	25.21	27.50	28.65	29.79
34	23.61	25.97	28.33	29.51	30.69
35	24.31	26.74	29.17	30.38	31.60
36	25.00	27.50	30.00	31.25	32.50
37	25.69	28.26	31.67	32.12	33.40
38	26.39	29.03	32.50	32.99	34.31
39	27.08	29.79	33.33	33.85	35.21
40	27.78	30.56	34.17	34.72	36.11
41	28.47	31.32	35.00	35.59	37.01
42	29.17	32.08	35.83	36.46	37.92
43	29.86	32.85	36.67	37.33	38.82
44	30.56	33.61	37.50	38.19	39.72
45	31.25	34.38	38.33	39.06	40.63
46	31.94	35.14	39.17	39.93	41.53
47	32.64	35.90	40.00	40.80	42.43
48	33.33	36.67	41.67	41.67	43.33
49	34.03	37.43	42.53	42.53	44.24
50	34.72	38.19	43.40	43.40	45.14

Table 5

AVERAGE VALUES OF MODULUS OF SOIL REACTION, E' (FOR INITIAL FLEXIBLE PIPE DEFLECTION)					
	PIPE BEDDING MATERIALS	E' FOR DEGREE OF COMPACTION OF PIPE ZONE BACKFILL (PSI)			
SOIL CLASS	SOIL TYPE (Unified Classification System[a])	Loose	Slight < 85% Proctor, < 40% relative density	Moderate 85% - 95% Proctor, 40% - 70% relative density	High > 95% Proctor, > 70% relative density
Class V	Fine-grained Soils (LL>50)[b] Soils with medium to high plasticity CH, MH, CH-MH	No data available; consult a competent soils engineer; Otherwise use E' = 0			
Class IV	Fine-grained Soils (LL < 50)Soils with medium to no plasticity CL, ML,ML-CL, with less than 25% coarse-grained particles	50	200	400	1,000
Class III	Fine-grained Soils (LL < 50)Soils with medium to no plasticity CL, ML,ML-CL, with more than 25% coarse-grained particles 1004001,0002,000 Coarse-grained Soils with Fines GM, GC, SM, SCC contains more than 12% fines	100	400	1,000	2,000
Class II	Coarse-grained Soils with Little or No Fines GW, GP, SW, SPC contains less than 12% fines	200	1,000	2,000	3,000
Class I	Crushed Rock	1,000	3,000	3,000	3,000
	Accuracy in Terms of Percentage Deflection	±2	±2	±1	±0.5

[a] ASTM Designation D 2487, USBR Designation E-3
[b] LL = Liquid limit
[c] Or any borderline soil beginning with one of these symbols (i.e. GM-GC, GC-SC)
[d] For ± 1% accuracy and predicted deflection of 3%, actual deflection would be between 2% and 4%.

Note: Values applicable only for fills less than 50ft (15m). Table does not include any safety factor. For use in predicting initial deflections only; appropriate Deflection Lag Factor must be applied for long-term deflections. If bedding falls on the borderline between two compaction categories, select lower E' value or average the two values. Percentage Proctor based on laboratory maximum dry density from test standards using about 12,500 ft-lb/cu ft (598,000 J/m^3) (ASTM D 698, AASHTO T-99, USBR Designation E-11). 1psi = 6.9kN/m^2.

Source: "Soil Reaction for Buried Flexible Pipe" by Amster K. Howard, U.S. Bureau of Reclamation, Denver Colorado. Reprinted with permission from American Society of Civil Engineers Journal of Geotechnical Engineering Division, January 1977, pp. 33-43.

A pipe system designer uses this equation to predict PVC pipe deflection given type of PVC pipe, burial depth, soil density, type of traffic, type of embedments oil, and compaction density of embedment soil. The designer then compares the predicted deflection to there commended maximum deflection in Table 1 to check if the burial depth is appropriate.

Example 1: Shallow Burial

A pipe system designer is interested in using ASTM D3034 SDR 35 PVC sewer pipe in a shallow-burial installation with the following characteristics: -1 foot burial depth:

- 120 pounds per cubic foot soil density
- H20 highway traffic
- sand embedment material
- 90% Proctor density embedment soil compaction

$$\% \text{ DEFLECTION} = \frac{0.1\ (P+W^1)\ 100}{0.149\ (PS) + 0.061E^1}$$

$$\% \text{ DEFLECTION} = \frac{0.1\ (0.83 + 12.5)\ 100}{0.149\ (46) + 0.061(2{,}000)}$$

$$\% \text{ DEFLECTION} = 1.0 \pm 1\%$$

The maximum predicted deflection is 2.0%, well below the maximum recommended for PVC sewer pipe in Table 1 of 7½%.

Minimum Burial Depth: The minimum recommended burial depth for PVC pipes beneath a highway is one foot. This recommendation assumes proper specification of embedment materials and compaction, and proper installation.

Example 2: Deep Burial

A pipe system designer is interested in using ASTM D3034 SDR 35 PVC sewer pipe in a deep-burial installation with the following characteristics:

- 45 foot burial depth
- 120 pounds per cubic foot soil density
- H20 highway traffic (Note: Live loads are negligible for deep burials)
- sand embedment material
- 90% Proctor density embedment soil compaction

$$\% \text{ DEFLECTION} = \frac{0.1\ (P+W')\ 100}{0.149\ (PS) + 0.061E'}$$

$$\% \text{ DEFLECTION} = \frac{0.1\ (37.5 + 0)\ 100}{0.149\ (46) + 0.061(2{,}000)}$$

$$\% \text{ DEFLECTION} = 1.0 \pm 1\%$$

The maximum predicted deflection is 3.9%, well below the maximum recommended for PVC sewer pipe in Table 1 of 7½%.

For more information, see the following JM Eagle Technical Bulletins:

- PVC Pipe Trench Construction
- Deflection Testing of PVC Sewer Pipe
- PVC Sewer and Drain Pipe Burial Depth Charts
- PVC Water Pipe Burial Depth Charts

Table 4

PVC PIPE STIFFNESS' (PS)		
PIP, WELL CASING, AND IPSSDR WATER PIPES		
PRESSURE RATING (PSI)	**SDR**	**PIPE STIFFNESS (PSI)**
63	64	7
80	51	14
100	41	28
125	32.5	57
160	26	115
200	21	224
315	13.5	916
PVC SEWER / DRAIN PIPES		
SDR 35, PWRIB		
All have a minimum pipe stiffness of 46 psi.SDR 26 has a minimum pipe stiffness of 115 psi.		
ASTM D2729 - DRAIN LINE		
SIZE (INCHES)	**PIPE STIFFNESS (PSI)**	
3	19	
4	11	
6	3	
AWWA C900 WATER PIPES		
PRESSURE CLASS (PSI)	**DR**	**PIPE STIFFNESS (PSI)**
100	25	129
150	18	364
200	14	815
AWWA C905 WATER PIPES		
PRESSURE RATING (PSI)	**DR**	**PIPE STIFFNESS (PSI)**
165	25	129
235	18	364
SCHEDULE 40 COEXCEL DWV PIPE		
SIZE (INCHES)	**PIPE STIFFNESS (PSI)**	
1½	600	
2	300	
3	300	
4	200	
6	120	

PVC PIPE STIFFNESS' (PS)	
PVC ELECTRICAL UTILITY DUCTS	
TYPE	**PIPE STIFFNESS (PSI)**
EB-20	20
EB-35	35
DB-60	60
DB-100	100
DB-120	120
WATER PIPE, WELL CASING, AND ELECTRICAL CONDUITS	
SCHEDULE 40	
SIZE (INCHES)	**PIPE STIFFNESS (PSI)**
½	5,928
¾	3,136
1	2,547
1 ¼	1,397
1 ½	1,008
2	596
2 ½	784
3	509
4	307
6	154
8	104
10	78
12	64
SCHEDULE 80	
SIZE (INCHES)	**PIPE STIFFNESS (PSI)**
½	17,066
¾	9,078
1	6,995
1 ¼	3,930
1 ½	2,911
2	1,846
2 ½	2,141
3	1,473
4	949
6	607
8	417
10	356
12	330

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Let's Solve Water

Godwin CD100S Dri-Prime® Pump

The Godwin CD100S Dri-Prime pump is a versatile, general purpose dewatering pump designed for use in the industry's most challenging construction, municipal, industrial and emergency response applications. This rugged pump is ideally suited for tough dewatering jobs, and is the reliable choice for rental solutions.

The CD100S is a member of the Godwin S Series of Smart pumps, equipped with a new generation of Field Smart Technology (FST) for remote monitoring and control. In addition to improved hydraulic efficiency, greater fuel economy, and streamlined serviceability, the CD impeller is interchangeable with a Flygt N-Technology non-clog impeller, providing the flexibility to tackle stringy, modern wastewater applications with the same pump.

Specifications

Suction connection	4 in (100 mm) flange
Delivery connection	4 in (100 mm) flange
Max capacity	1,079 USGPM † (245 m^3/hr)
Max impeller diameter	10.0 in
Max solids handling	1 ¾ in (45 mm)
Max operating temp	176 °F * (80 °C)
Max working pressure	68 psi (4.7 bar)
Max suction pressure	58 psi (4.0 bar)
Max casing pressure	103 psi (7.1 bar)
Max operating speed	2200 rpm

* Please contact our office for applications in excess of 176°F (80 °C).
† Larger diameter pipes may be required for maximum flows.

Features and benefits

- Interchangeable impellers to tackle a full range of solids handling applications.
- Field Smart Technology (FST) allows the user to monitor & control the pump from anywhere in the world.
- New compressor belt tensioner reduces time to change and adjust belt to approximately 30 minutes.
- New sight glass and measuring stick added to monitor level and quality of mechanical seal oil.
- Improved hydraulic design reduces vibration, maximizes efficiency and fuel economy.
- Fully automatic priming from dry to 28 feet (8.5 meters).
- Venturi priming requires no adjustment or control.
- Available as open set or Sound Attenuated Enclosure.
- Standard build engine 3TNV88F (EPA Final Tier 4).
- Other engine options available.
- Optional environmentally friendly skid base contains all fluid spills.

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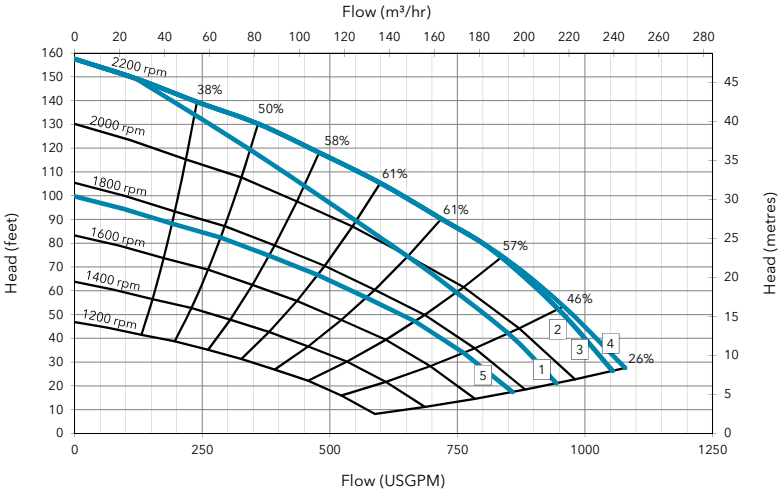
Godwin CD100S Dri-Prime® Pump

Document number 95-27886-3000, Issue 1

Performance curve

Pump curve is based on 0 ft dynamic suction lift.



Suction lift table 1800 rpm

Performance data provided in tables is based on water tests at sea level and 68°F ambient. All information is approximate and for general guidance only. Please contact the factory or office for further details.

Total suction Head (feet)	Total Delivery Head (feet)				
	13	26	39	52	66
	Output (USGPM)				
10	623	574	509	427	328
15	623	558	476	377	262
20	591	525	443	344	230
25	574	492	410	295	164

Open trailer

Fuel capacity 30 US Gal (114 Liters)
Weight dry 1,930 lb (875 kg)
Weight wet 2,150 lb (975 kg)
Dimensions L 102 in x W 54 in x H 70 in (L 2,591 mm x W 1,372 mm x H 1,778 mm)

Information provided above is based on the Yanmar 3TNV88F.

Sound attenuated enclosure

Noise @ 23 ft (7 m) 67 db(A)
Fuel capacity 80 US Gal (303 Liters)
Weight dry 2,670 lb (1,211 kg)
Weight wet 3,250 lb (1,474 kg)
Dimensions L 82 in x W 47 in x H 65 in (L 2,083 mm x W 1,194 mm x H 1,651 mm)

Information provided above is based on the Yanmar 3TNV88F.

Materials

Pump casing	Cast Iron BS EN 1561/EN-JL1030
Wearplates	Cast Iron BS EN 1561/EN-JL1030
Pump shaft	Carbon steel BS970:1991 817M40T
Impeller	Cast Steel BS3100 A5 Hardness to 200 HB Brinell
Mechanical seal faces	Silicon carbide Vs Silicon carbide

	Driver	Power	Energy Use 1800 RPM	Emissions Rating
1	Yanmar 3TNV88F	24 HP	1.0 US Gal/hr	EPA FT4
2	Yanmar 3TNV88C	35 HP	1.2 US Gal/hr	EPA FT4
3	Yanmar 3TNV88BDSA	36 HP	1.2 US Gal/hr	EPA iT4
4	Caterpillar C1.5T	40 HP	1.5 US Gal/hr	EPA iT4
5	Electric motor	20 HP	24.1 A	

Please contact the factory or office for further details. A typical picture of the pump is shown. All information is approximate and for general guidance only. Consult the factory for other driver options.

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www.xylem.com/godwin

PIG Well Pad Liner - 100 mil

Product Information:

Cover your drill site with this ultra-durable, composite liner to protect workers and the environment.

- Goes down as a single layer — eliminates multiple-layer installation
- Polypropylene composite consists of three barrier films sandwiched by double layers of needle-punched geotextile with heat-fused surfaces
- Offers 2X more tear resistance and 4X more puncture resistance than standard 30-mil HDPE liners
- Absorbs nuisance leaks, drips and spills on contact, and embedded barrier films keep all spills from reaching the ground
- High-traction surface minimizes slip-and-fall injuries in wet or dry conditions
- Versatile liner can be used to create secondary containment structures on-site for frac tanks, cylindrical tanks and drill cuttings
- Welds easily for liquid-tight installation
- Recyclable to reduce waste
- Won't stretch or crack like HDPE

PIG Well Pad Liner – 100 mil			
Item #	Master Roll Approx. Dimensions	Approx. Weight	Color
MAT6000	18'W x 460'L	1,420 lbs.	Dark Gray
MAT6004	12'W x 300'L	630 lbs.	Dark Gray
MAT6010	6'W x 1,425'L	1,435 lbs.	Dark Gray
MAT6600	18'W x 460'L	1,420 lbs.	Light Gray

Always in stock. 24/7 customer service. Contact your New Pig Energy sales representative for pricing details.

Need a custom solution for your drilling operation? Call the New Pig Energy secondary containment experts at 1-855-PIG-LINER (744-5463).

See back for additional product specifications.

New Pig Energy

Secondary Containment from the Leak & Spill Experts.™

Phone: 1-855-PIG-LINER
Email: pigliner@newpigenergy.com
Online: newpigenergy.com

330393

PIG Well Pad Liner - 100 mil

Product Specifications:

	MAT6000	MAT6004	MAT6010	MAT6600
Composition:	Polypropylene	Polypropylene	Polypropylene	Polypropylene
Color:	Dark Gray	Dark Gray	Dark Gray	Light Gray
UV Resistant:	Yes	Yes	Yes	Yes
Master Roll Width:	18' (5.5 m)	12' (3.7 m)	6' (1.8 m)	18' (5.5 m)
Thickness:	100 mil	100 mil	100 mil	100 mil
Approximate Roll Length:	460' (140.21 m)	300' (91.4 m)	1,425' (434.3 m)	460' (140.21 m)
Approximate Roll Weight:	1,420 lbs. (644.1 kg)	630 lbs. (285.8 kg)	1,435 lbs. (650.9 kg)	1,420 lbs. (644.1 kg)
Core dia.:	4" (10.2 cm)	4" (10.2 cm)	3" (7.6 cm)	4" (10.2 cm)
Recyclable:	Yes	Yes	Yes	Yes

Testing Information:

MATERIAL	THICKNESS	TENSILE PROPERTIES (MAX STRENGTH)		PUNCTURE RESISTANCE	TEAR RESISTANCE	
PIG Well Pad Liner - 100 mil	ASTM D 5994	ASTM D 6693/GRI, 2 ipm rate		ASTM D 4833	ASTM D 1004 (lbs.)	
	Mils	A-Break lb/in-width	B-Break lb/in-width	(lbs.)	A	B
	108	103	93	255	68	45

Top Side Absorbency: Water = 2.58 gal./100 sq. ft.; Oil = 2.85 gal./100 sq. ft.

Permittivity (ASTM D 4491) = 0

Calculated Darcy Coefficient of Permeability = 0

New Pig Energy

Secondary Containment from the Leak & Spill Experts.™

Phone: 1-855-PIG-LINER
Email: pigliner@newpigenergy.com
Online: newpigenergy.com

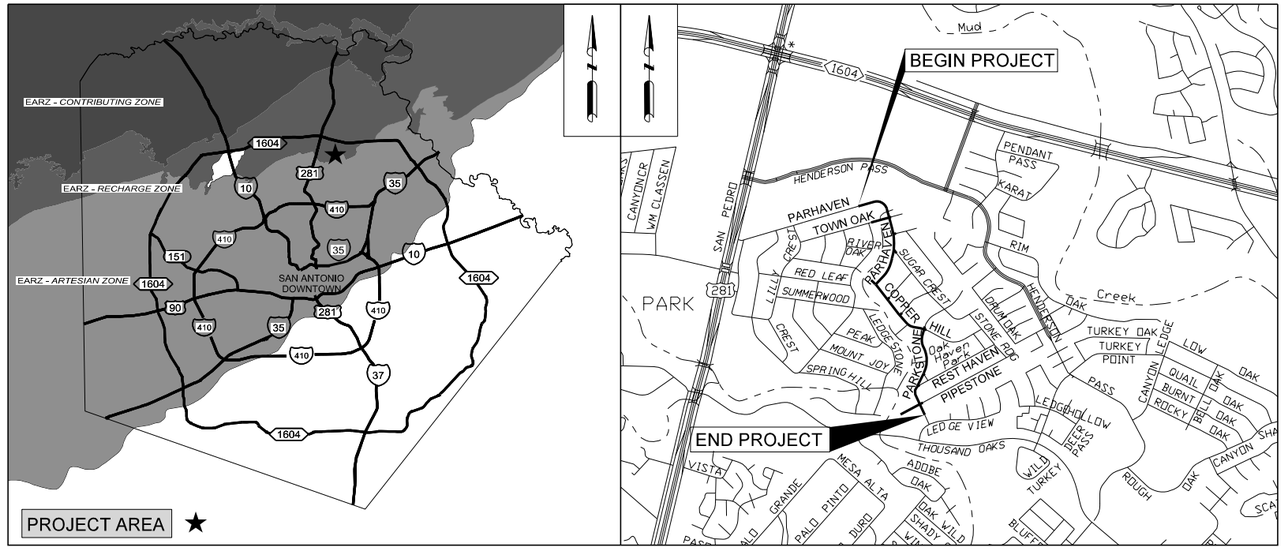
330393

SAN ANTONIO WATER SYSTEM

SAWS JOB NO. 23-5562

OAK HAVEN AREA STREETS AND DRAINAGE PROJECT (KENTWOOD PH 2) SEWER MAIN REPLACEMENT

100% DESIGN



LOCATION MAP

NOT TO SCALE

FEBRUARY 2025

BMB PROJECT NO C-1628.05

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STATE OF TEXAS
CARL BAIN
56996
REGISTERED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CARL BAIN P.E. 56996 ON 3/19/2025

W:\Work\C-1628.05 Oak Haven Area Streets and Drainage - COSA\09 Report\SCS PLAN\SCS Plan Application Forms\4. F-0582 Organized Sewage Collection System Plan Application\PLAN AND PROFILE SHEETS\01 OAK HAVEN TITLE 2025-03-19.dgn

SAWS GENERAL NOTES: UPDATED APRIL 3, 2024

GENERAL CONSTRUCTION

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE APPROVED BY THE SAN ANTONIO WATER SYSTEM (SAWS) AND COMPLY WITH THE PLANS, SPECIFICATIONS, GENERAL CONDITIONS AND WITH THE FOLLOWING AS APPLICABLE:
   - A. CURRENT TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) "DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEM", TEXAS ADMINISTRATIVE CODE (TAC) TITLE 30 PART 1 CHAPTER 217 AND "PUBLIC DRINKING WATER", TAC TITLE 30 PART 1 CHAPTER 290.
   - B. CURRENT TXDOT "STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND DRAINAGE."
   - C. CURRENT "SAN ANTONIO WATER SYSTEM STANDARD SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION."
   - D. CURRENT CITY OF SAN ANTONIO "STANDARD SPECIFICATIONS FOR CONSTRUCTION."
   - E. CURRENT CITY OF SAN ANTONIO "UTILITY EXCAVATION CRITERIA MANUAL" (UECM).
3. THE CONTRACTOR SHALL OBTAIN SAWS STANDARD DETAILS FROM SAWS WEBSITE, HTTPS://APPS.SAWS.ORG/BUSINESS_CENTER/SPECS/CONSTSPECS/ UNLESS OTHERWISE NOTED WITHIN DESIGN PLANS.
4. THE CONTRACTOR IS TO NOTIFY AND MAKE ARRANGEMENTS WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT 210-233-3500 (DURING REGULAR SAWS WORKING HOURS) AND PROVIDE NOTIFICATION PROCEDURES THE CONTRACTOR WILL USE TO NOTIFY AFFECTED HOME RESIDENTS AND/OR PROPERTY OWNERS TWO (2) WEEKS PRIOR TO EXCAVATION. OUTSIDE OF REGULAR SAWS WORKING HOURS THE SAWS EOC SHOULD BE CONTACTED AT 210-704-7297.
5. IF NECESSARY, CONTRACTOR WILL COORDINATE USE OF SAWS PREMISES AT NO ADDITIONAL COST TO SAWS. SUCH EFFORTS INCLUDE, BUT ARE NOT LIMITED TO, OBTAINING SECURITY IDENTIFICATION BADGES REQUIRED FOR ACCESS TO SAWS FACILITIES.
6. LOCATIONS AND DEPTHS OF EXISTING UTILITIES AND SERVICE LATERALS SHOWN ON THE PLANS ARE UNDERSTOOD TO BE APPROXIMATE. ACTUAL LOCATIONS AND DEPTHS MUST BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE UTILITY SERVICE LINES AS REQUIRED FOR CONSTRUCTION AND TO PROTECT THEM DURING CONSTRUCTION AT NO COST TO SAWS.
7. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT. AS-BUILTS FOR SAWS INFRASTRUCTURE CAN BE OBTAINED AT WEBSITE BELOW. CONTRACTOR SHALL COORDINATE PHYSICAL LOCATES FOR SAWS INFRASTRUCTURE THROUGH THE SAWS INSPECTOR. PLEASE ALLOW UP TO 7 BUSINESS DAYS FOR LOCATES REQUESTING PIPE LOCATION MARKERS ON SAWS INFRASTRUCTURE. THE FOLLOWING CONTACT INFORMATION ARE SUPPLIED FOR VERIFICATION PURPOSES:

   SAN ANTONIO WATER SYSTEM:
   REQUEST AS-BUILTS: HTTPS://WWW.SAWS.ORG/SERVICE/LOCATES-SERVICE/

   COSA DRAINAGE 210-206-8433
   COSA TRAFFIC SIGNAL OPERATIONS 210-207-7720

   TEXAS STATEWIDE ONE CALL LOCATOR 1-800-545-6005 OR 811
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING EXISTING FENCES, CURBS, STREETS, DRIVEWAYS, SIDEWALKS, LANDSCAPING, AND STRUCTURES TO ITS ORIGINAL OR BETTER CONDITION AS A RESULT OF DAMAGES DONE BY THE PROJECT'S CONSTRUCTION.
9. CONTRACTOR SHALL NOT MAKE USE OF DUMPSTERS OR WASTE BINS THAT ARE INTENDED TO SERVE RESIDENTS AND/OR BUSINESSES.
10. ALL WORK IN TEXAS DEPARTMENT OF TRANSPORTATION AND BEXAR COUNTY RIGHT-OF-WAY SHALL BE DONE IN ACCORDANCE WITH RESPECTIVE CONSTRUCTION SPECIFICATIONS AND PERMIT.
11. THE CONTRACTOR SHALL COMPLY WITH CITY OF SAN ANTONIO OR OTHER GOVERNING MUNICIPALITY'S TREE ORDINANCES WHEN EXCAVATING NEAR TREES.
12. ALL WORK WITHIN THE 100-YEAR FLOODPLAIN SHALL BE DONE IN ACCORDANCE WITH FLOODPLAIN DEVELOPMENT PERMIT.
13. ANY WORK COMPLETED WITHOUT PRIOR WRITTEN AUTHORIZATION WHICH IS NOT INCLUDED IN THESE PLANS AND SPECIFICATIONS WILL NOT BE COMPENSATED BY THE SAN ANTONIO WATER SYSTEM.
14. HOLIDAY WORK: CONTRACTORS WILL NOT BE ALLOWED TO PERFORM SAWS WORK ON SAWS RECOGNIZED HOLIDAYS.
   - A. WEEKEND WORK: CONTRACTORS ARE REQUIRED TO SUBMIT REQUEST TO THE SAWS INSPECTION CONSTRUCTION DEPARTMENT BY 12:00PM ON THE WEDNESDAY PRIOR TO THE WEEKEND BEING REQUESTED. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG.
   - B. ANY AND ALL SAWS UTILITY WORK INSTALLED WITHOUT WEEKEND APPROVAL WILL BE SUBJECT TO BE UNCOVERED FOR PROPER INSPECTION AT NO COST TO SAWS.
15. PRE-CON SITE VIDEO: BEFORE THE START OF ANY CONSTRUCTION, THE SITE MUST BE VIDEO RECORDED BY THE CONTRACTOR WITH ONE COPY SUBMITTED TO SAWS INSPECTIONS. A PRE-SITE VIDEO WILL PROVIDE ACCURATE DOCUMENTATION OF THE EXISTING CONDITIONS (NSPI).
16. POWER POLE BRACING: CONTRACTORS SHOULD BE ADVISED THAT THERE ARE EXISTING OVERHEAD UTILITY POLES ALONG THE PROJECT CORRIDOR. CONTRACTORS SHOULD FURTHER BE ADVISED THAT IF THE DISTANCE FROM THE OUTSIDE FACE OF A UTILITY TRENCH TO THE FACE OF A UTILITY POLE IS LESS THAN 5 FEET, SAID UTILITY POLE IS SUBJECT TO BRACING, BASED ON A DETERMINATION MADE BY UTILITY POLE OWNER. COSTS INCURRED BY CONTRACTOR FOR BRACING OF THESE UTILITY POLES IS SUBSIDIARY TO THAT RESPECTIVE UTILITY COMPANY'S WORK. IT IS ADVISABLE FOR THE CONTRACTOR TO REVIEW THE CONSTRUCTION DOCUMENTS AND VISIT THE CONSTRUCTION SITE TO DETERMINE POTENTIAL IMPACTS.
17. CONSTRUCTION SEQUENCING: IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO SCHEDULE SEQUENCING FOR REMOVAL AND INSTALLATION OF EXISTING AND PROPOSED SAWS UTILITIES IN CONJUNCTION WITH GENERAL PROJECT CONSTRUCTION. SEQUENCE OF CONSTRUCTION ACTIVITIES SHALL BE CONSIDERED IN ORDER TO MINIMIZE THE EXTENT AND DURATION OF DISTURBANCES.
18. CONTRACTOR SHALL COMPLY WITH APPLICABLE REGULATIONS INCLUDING, BUT NOT LIMITED TO, THOSE OVERSEEN BY THE U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA). OSHA INFORMATION AND RELATED MATERIALS MAY BE OBTAINED AT HTTPS://WWW.OSHA.GOV/ OR AT THE OSHA SAN ANTONIO OFFICE LOCATED AT FOUNTAINHEAD TOWER, SUITE 605 8200 W. INTERSTATE 10 SAN ANTONIO, TX 78230 WHICH IS ALSO REACHABLE BY PHONE AT (210) 472-5040.
19. TRENCH EXCAVATION SAFETY PROTECTION: CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREAS IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES. THE CONTRACTOR'S IMPLEMENTATION OF THE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLIES WITH, AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

SEWER

20. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT NO SANITARY SEWER OVERFLOW (SSO) OCCURS AS A RESULT OF THEIR WORK. ALL CONTRACTOR PERSONNEL RESPONSIBLE FOR SSO PREVENTION AND CONTROL SHALL BE TRAINED ON PROPER RESPONSE. SHOULD AN SSO OCCUR, THE CONTRACTOR SHALL:
   - A. IDENTIFY THE SOURCE OF THE SSO AND NOTIFY SAWS EMERGENCY OPERATIONS CENTER (EOC) IMMEDIATELY AT 210-704-SAWS (210-704-7297). PROVIDE THE ADDRESS OF THE SPILL AND AN ESTIMATED VOLUME OR FLOW.
   - B. ATTEMPT TO ELIMINATE THE SOURCE OF THE SSO.
   - C. CONTAIN SEWAGE FROM THE SSO TO THE EXTENT OF PREVENTING A POSSIBLE CONTAMINATION OF WATERWAYS.
   - D. CLEAN UP SPILL SITE (RETURN CONTAINED SEWAGE TO THE COLLECTION SYSTEM IF POSSIBLE) AND PROPERLY DISPOSE OF CONTAMINATED SOIL/MATERIALS.
   - E. CLEAN THE AFFECTED SEWER MAINS AND REMOVE ANY DEBRIS.
   - F. MEET ALL POST-SSO REQUIREMENTS AS PER THE EPA CONSENT DECREE, INCLUDING LINE CLEANING AND TELEVISING THE AFFECTED SEWER MAINS (AT SAWS DIRECTION) WITHIN 24 HOURS.

   SHOULD THE CONTRACTOR FAIL TO ADDRESS AN SSO IMMEDIATELY AND TO SAWS SATISFACTION, THEY WILL BE RESPONSIBLE FOR ALL COSTS INCURRED BY SAWS, INCLUDING ANY FINES FROM EPA.

   NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE FOR THIS WORK. ALL WORK SHALL BE DONE ACCORDING TO GUIDELINES SET BY THE TCEQ AND SAWS.
21. THE CONTRACTOR SHALL PROVIDE BYPASS PUMPING OF SEWAGE AROUND EACH SEGMENT OF PIPE TO BE REPLACED, IN ACCORDANCE WITH SAWS STANDARD SPECIFICATION ITEM NO. 865, "BYPASS PUMPING SMALL DIAMETER SANITARY SEWER MAINS" AND STANDARD SPECIFICATION ITEM NO. 864, "BYPASS PUMPING LARGE DIAMETER SANITARY SEWER MAINS" AS APPLICABLE. PAYMENT FOR SUCH WORK WILL BE MADE UNDER THE APPROPRIATE BID ITEM ASSOCIATED WITH SANITARY SEWER BYPASS PUMPING IN ACCORDANCE WITH SAWS STANDARD SPECIFICATIONS 865 AND 864.
22. PRIOR TO TIE-INS, ANY SHUTDOWNS OF EXISTING FORCE MAINS OF ANY SIZE MUST BE COORDINATED WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT 210-233-3500 AND/OR SAWS PRODUCTION GROUPS AT LEAST TWO WEEKS OR MORE IN ADVANCE OF THE SHUTDOWN. THE CONTRACTOR MUST ALSO PROVIDE A SEQUENCE OF WORK AS RELATED TO THE TIE-INS; THIS IS AT NO

    ADDITIONAL COST TO SAWS OR THE PROJECT AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SEQUENCE THE WORK ACCORDINGLY.
23. ELEVATIONS POSTED FOR TOP OF MANHOLES ARE FOR REFERENCE ONLY: IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAKE ALLOWANCES AND ADJUSTMENTS FOR TOP OF MANHOLES TO MATCH THE FINISHED GRADE OF THE PROJECT'S IMPROVEMENTS (NSPI).
24. MANHOLE REMOVAL: WHERE EXISTING MANHOLES ARE TO BE REPLACED BY THE CONTRACTOR, THE EXISTING MANHOLES SHALL BE REMOVED. (NSPI)
25. SMART MANHOLE COVERS: THE CONTRACTOR SHALL NOTIFY SAWS EOC AT 210-704- SAWS (210-233-7297) AND EITHER AMERICA ESPINOZA AT 210-233-2934 OR JOSE A. MARTINEZ AT 210-233-3071 A MINIMUM OF 72 HOURS, NOT COUNTING WEEKENDS OR SAWS HOLIDAYS, BEFORE WORKING ON THE PIPE OR MANHOLE, IN ORDER TO HAVE SAWS REMOVE THE SMART COVER. ANY DAMAGE DONE TO THE SMART COVER WILL BE CHARGED TO THE CONTRACTOR THROUGH A CHANGE ORDER.
26. FLOW METERS IN MANHOLES: THE CONTRACTOR SHALL NOTIFY BOBBY JOHNSON AT 210- 233-3493 OR ABEL BORUNDA AT 210-233-3704 A MINIMUM OF 72 HOURS, NOT COUNTING WEEKENDS OR SAWS HOLIDAYS, BEFORE WORKING ON THE PIPE OR MANHOLE, IN ORDER TO HAVE SAWS REMOVE THE FLOW METER IN THE MANHOLE. ANY DAMAGE DONE TO THE FLOW METER WILL BE CHARGED TO THE CONTRACTOR THROUGH A CHANGE ORDER.

CPS ENERGY NOTES:

1. DUE TO FEDERAL REGULATIONS TITLE 49, PART 192, 181, CPS MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES, THE CONTRACTOR MUST PROTECT AND WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING CPS OVERHEAD AND UNDERGROUND ELECTRIC FACILITIES OF ADJACENT TO WORK AREA.

CITY OF SAN ANTONIO NOTES:

1. ALL LIMITS FOR CURB, SIDEWALK, AND TREE PREP BEYOND WHAT IS CONSIDERED INCIDENTAL TO NORMAL UTILITY CONSTRUCTION WILL BE ADDRESSED BY THE SAWS INSPECTOR. ALL COMMUNICATION FROM THE CITY WILL BE COORDINATED THROUGH THE SAWS INSPECTOR.
   SAWS INSPECTOR WILL ALSO DETERMINE IF ADDITIONAL COMPENSATION IS WARRANTED IF LIMITS EXCEED INCIDENTALS.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN ALL REQUIRED STORM WATER PERMITS, FEES, AND APPROVALS. NO CONSTRUCTION OR FABRICATION SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED AND THROUGHLY REVIEWED ALL PERMITS REQUIRED FOR CONSTRUCTION IN DRAINAGE EASEMENTS, RIGHT OF WAYS, AND FLOODPLAINS, SAWS TO OBTAIN FPDP.
3. THE CONTRACTOR SHALL NOTIFY STORM WATER ENGINEERING AT LEAST 24 HOURS PRIOR TO THE INSTALLATION OF ANY DRAINAGE FACILITY WITHIN A DRAINAGE EASEMENT OR STREET RIGHT OF WAY NOT INDICATED ON THE CONSTRUCTION PLANS.

SEWER PHASING NOTES:

1. THE UTILITY INSTALLATION CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE ROADWAY CONTRACTOR ON THE PHASING OF ROADWAY IMPROVEMENTS. TEMPORARY SEWER TIE-INS MAY BE NECESSARY DURING CONSTRUCTION. ADDITIONALLY, THE UTILITY INSTALLATION CONTRACTOR WILL BE RESPONSIBLE FOR INSTALLING TEMPORARY PAVEMENT RESTORATION (ALL-WEATHER SURFACE) TO PREVENT WATER INFILTRATION WHILE AWAITING ROADWAY IMPROVEMENTS. THIS WORK SHALL BE COMPLETED AT NO ADDITIONAL COST TO SAWS.

4. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING DRAINAGE FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING DRAINAGE SYSTEMS, WHETHER OR NOT SHOWN ON THE PLANS, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR AT HIS EXPENSE. THE CONTRACTOR SHALL NOTIFY STORM WATER ENGINEERING AT 210-206-8433 AS SOON AS CONFLICTS WITH UTILITIES ARE ENCOUNTERED OR ANY DRAINAGE SYSTEM IS DAMAGED DURING CONSTRUCTION.
5. CONSTRUCTION SPOILS WILL NOT BE ALLOWED TO BE DEPOSITED ANYWHERE WITHIN A DRAINAGE EASEMENT, RIGHT OF WAY, OR FLOODPLAIN WITHIN THE LIMITS OF THE PROJECT AND SHALL BE DISPOSED OFFSITE IN COMPLIANCE WITH CURRENT APPLICABLE REGULATIONS.
6. NO STRUCTURE, FENCES, WALLS, LANDSCAPING, OR OTHER OBSTRUCTIONS THAT IMPEDE DRAINAGE SHALL BE PLACED WITHIN THE LIMITS OF THE PROJECT AND SHALL BE DISPOSED OFFSITE IN COMPLIANCE WITH CURRENT APPLICABLE REGULATIONS.
7. UPON COMPLETION OF TRENCHING, THE AREA WILL BE BACKFILLED AND COMPACTED TO ITS ORIGINAL CONDITION. TRENCHES/BORE PITS TO BE OPEN AND UNATTENDED LONGER THAN 24 HOURS SHALL BE PROTECTED TO WITHSTAND ALL HYDRODYNAMIC AND HYDROSTATIC FORCES AND PREVENT DOWNSTREAM IMPACTS. TRENCHES/BORE PITS TO BE OPEN LONGER THAN 30 DAYS AFTER STARTING EXCAVATION SHALL BE BACKFILLED WITH A SEMI PERMANENT REPAIR BACKFILL.
8. IMPROVED SECTIONS OF EARTHEN CHANNELS AND/OR WATERWAYS WILL BE VEGETATED BY SEEDING OR SODDING, EIGHTY-FIVE PERCENT OF THE CHANNEL SURFACE AREA MUST HAVE ESTABLISHED VEGETATION BEFORE THE CITY OF SAN ANTONIO WILL ACCEPT THE CHANNEL FOR MAINTENANCE.

INSTALLATION NOTES:

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE AND ACQUIRE THEIR OWN STAGING AREA, INCLUDING PARKING AREA, TO ACCOMMODATE CONSTRUCTION PERSONNEL VEHICLE PARKING(NSPI).
2. AFTER INSTALLATION IS COMPLETED, THE CONTRACTOR SHALL TELEVISE AND VIDEO RECORD THE INSTALLED SEWER MAINS IN ACCORDANCE WITH ITEM NO. 866 "SEWER MAIN TELEVISING INSPECTION" TO DOCUMENT SATISFACTORY COMPLETION OF WORK TO THE ENGINEER AND OWNER.
3. CONTRACTOR SHALL SUPPORT AND PROTECT EXISTING UTILITIES DURING CONSTRUCTION OF SANITARY SEWER LINES AND MANHOLES. (NSPI)
4. CONTRACTOR MUST FIELD VERIFY ALL DEPTHS, DISTANCES, PIPE SIZES, GRADES AND SERVICE LATERALS BEFORE START OF CONSTRUCTION(NSPI)
5. CONTRACTOR TO VERIFY PIPE SIZE DIAMETERS PRIOR TO ORDERING CIPP LINER.

BYPASS PUMPING NOTES

1. CONTRACTOR SHALL SUBMIT BY-PASS AND PHASING PLAN TO SAWS FOR REVIEW AND APPROVAL PRIOR TO COMMENCING OF THE CONSTRUCTION.
2. SEWER WORK AND CLEAN UP SHALL BE IN ACCORDANCE WITH THE GUIDELINE SET FORTH BY TCEQ AND SAWS, CONTRACTOR SHALL IDENTIFY AND TRAIN PERSONNEL RESPONSIBLE FOR SPILLAGE PREVENTION AND CONTROL, CONTRACTOR SHALL ALSO DOCUMENT AND EDUCATE EMPLOYEES IN ADVANCE OF WAKE ABOUT THE WORK ENVIRONMENT INCLUDING WHAT TO DO WHEN THERE ARE SEWER LEAKS AND HOW TO WORK SAFELY AROUND RAW SEWAGE.
3. IN SITUATIONS WHERE BYPASS LINE IS TO BE PLACED THROUGH A CULVERT OR WITHIN THE 100 YEAR FLOODPLAIN, THE CONTRACTOR SHALL BE RESPONSIBLE TO SECURE AND SUPPORT THE BYPASS LINE DURING CONSTRUCTION.
4. CONTRACTOR SHALL COORDINATE WITH THE CITY OF SAN ANTONIO RIGHT OF WAY MANAGEMENT DIVISION AND TXDOT TO IDENTIFY AND OBTAIN ALL NECESSARY PERMITS.
5. CONTRACTOR TO ACQUIRE STAGING LOCATION AND PROVIDE LOCATIONS TO SAWS PRIOR TO COMMENCING OF CONSTRUCTION.

TCEQ BYPASS PUMPING REQUIREMENTS

1. THE USE OF A SECONDARY CONTAINMENT LINER FOR PUMPS AND FUEL STORAGE FOR BYPASS PUMPING OPERATIONS WITHIN ENVIRONMENTALLY SENSITIVE AREAS (EDWARDS AQUIFER RECHARGE ZONE (EARZ) LOCATIONS) IS REQUIRED. LINER SHALL BE OF POLYPROPYLENE COMPOSITE AND CONSIST OF THREE BARRIER FILMS SANDWICHED BY DOUBLE LAYERS OF NEEDLE PUNCHED GEOTEXTILE WITH HEAT FUSED SURFACES. THE LINER SHALL BE A MINIMUM OF 100 MIL THICK. THE INTENT OF THE LINER IS TO ABSORB LEAKS, DRIPS, AND SPILLS ON CONTACT AND BARRIER FILM SHALL KEEP ALL SPILLS FROM REACHING THE GROUND. THERE SHALL BE NO SEPERATE PAYMENT FOR THIS LINER AND IT SHALL BE CONSIDERED INCLUSIVE TO THE OTHER BUD ITEMS ON THIS CONTRACT.
2. ISSUANCE OF NOTICE OF INTENT TO COMMENCE REHABILITATION, PROVIDED TO TCEQ SAN ANTONIO REGIONALOFFICE.NO LATER THAN 48 HOURS PRIOR TO COMMENCEMENT OF ACTIVITIES ON SITE. (SEE 213.5 (F) FOR DETAILS)
3. IF ANY SENSITIVE FEATURES ARE DISCOVERED, ALL REGULATED ACTIVITIES MUST BE SUSPENDED AND SAWS MUST BE IMMEDIATELY NOTIFIED.
4. ISSUANCE OF NOTICE OF TERMINATION OF REHABILITATION, PROVIDED TO TCEQ SAN ANTONIO REGIONAL OFFICE.

SERVICE LATERALS:

1. THE EXACT LOCATION AND ELEVATION OF THE SERVICE LATERALS AND MANHOLES SHALL BE FIELD VERIFIED BY THE CONTRACTOR. (NSPI)
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DISCONNECTING EACH EXISTING SERVICE LINE FROM THE EXISTING MAIN AND RECONNECTING THE SERVICE TO THE NEW SERVICE MAIN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING CONTINUOUS SERVICE. (NSPI)

MOBILIZATION AND PREPARATION OF THE RIGHT-OF-WAY NOTES

1. THE COMBINED TOTAL BIDS FOR SAWS MOBILIZATION, ITEM NO. 100 AND SAWS PREPARING RIGHT-OF-WAY, ITEM NO. 101 SHALL NOT EXCEED 15% OF THE SAWS BASE BID. A SAWS BASE SHALL BE DEFINED AS ALL SAWS BID ITEMS EXCLUDING MOBILIZATION, ITEM NO. 100 AND PREPARING RIGHT-OF-WAY, ITEM NO.101.

STATE OF TEXAS
CARL BAIN
56996
REGISTERED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CARL BAIN P.E. 56996 ON 3/19/2025

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OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT

GENERAL NOTES

DEVELOPER:

CONT. | BUDGET PROJ.

SUBMITTED

APPROVED

MAP No.

SECT. No. | 100% SUBMITTAL

DR. MC | CK. CC/CB | JOB No. 23-5562

W:\Work\C-1628.05 Oak Haven Area Streets and Drainage - COSA\09 Report\SCS PLAN\SCS Plan Application Forms\4. F-0582 Organized Sewage Collection System Plan Application\PLAN AND PROFILE SHEETS\03 OAK HAVEN GENERAL NOTES 2.dgn 3/19/2025 1:10:10 PM

TCEQ WATER AND SEWER NOTES

1. COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS 30 TEXAS ADMINISTRATIVE CODE (TAC) CHAPTER 290 SUBCHAPTER D, WHEN CONFLICTS ARE NOTED WITH LOCAL STANDARDS, THE MORE STRINGENT REQUIREMENT SHALL BE APPLIED, AT A MINIMUM, CONSTRUCTION FOR PUBLIC WATER SYSTEMS MUST ALWAYS MEET TCEQ'S "RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS".

2. ALL NEWLY INSTALLED PIPES AND RELATED PRODUCTS MUST CONFORM TO AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)/NSF INTERNATIONAL STANDARD 61 AND MUST BE CERTIFIED BY AN ORGANIZATION ACCREDITED BY ANSI [§290.44(A)(1)].

3. PLASTIC PIPE FOR USE IN PUBLIC WATER SYSTEMS MUST BEAR THE NSF INTERNATIONAL SEAL OF APPROVAL (NSF-pw) AND HAVE AN ASTM DESIGN PRESSURE RATING OF AT LEAST 150 PSI OR A STANDARD DIMENSION RATIO OF 26 OR LESS [§290.44(A)(2)].

4. NO PIPE WHICH HAS BEEN USED FOR ANY PURPOSE OTHER THAN THE CONVEYANCE OF DRINKING WATER SHALL BE ACCEPTED OR RELOCATED FOR USE IN ANY PUBLIC DRINKING WATER SUPPLY [§290.44(A)(3)].

5. ALL WATER LINE CROSSINGS SHALL BE PERPENDICULAR (WHERE POSSIBLE).

6. WATER TRANSMISSION AND DISTRIBUTION LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS, HOWEVER, THE TOP OF THE WATER LINE MUST BE LOCATED BELOW THE FROST LINE AND IN NO CASE SHALL THE TOP OF THE WATER LINE BE LESS THAN 24 INCHES BELOW GROUND SURFACE [§290.44(A)(4)].

7. THE MAXIMUM ALLOWABLE LEAD CONTENT OF PIPES, PIPE FITTINGS, PLUMBING FITTINGS, AND FIXTURES IS 0.25 PERCENT [§290.44(B)].

8. THE CONTRACTOR SHALL INSTALL APPROPRIATE AIR RELEASE DEVICES WITH VENT OPENINGS TO THE ATMOSPHERE COVERED WITH 16-MESH OR FINER, CORROSION RESISTANT SCREENING MATERIAL OR AN ACCEPTABLE EQUIVALENT [§290.44(D)(1)].

9. THE CONTRACTOR SHALL NOT PLACE THE PIPE IN WATER OR WHERE IT CAN BE FLOODED WITH WATER OR SEWAGE DURING ITS STORAGE OR INSTALLATION [§290.44(F)(1)].

10. WHEN WATERLINES ARE LAID UNDER ANY FLOWING OR INTERMITTENT STREAM OR SEMI-PERMANENT BODY OF WATER THE WATERLINE SHALL BE INSTALLED IN A SEPARA TE WATERTIGHT PIPE ENCASEMENT. VALVES MUST BE PROVIDED ON EACH SIDE OF THE CROSSING WITH FACILITIES TO ALLOW THE UNDERWATER PORTIONS OF THE SYSTEM TO BE ISOLATED AND TESTED [§290.44(F)(2)].

11. PURSUANT TO 30 TAC 290.44(A)(5), THE HYDROSTATIC LEAKAGE RATE SHALL NOT EXCEED THE AMOUNT ALLOWED OR RECOMMENDED BY THE MOST CURRENT AWWA FORMULAS FOR PVC PIPE, CAST IRON AND DUCTILE IRON PIPE. INCLUDE THE FORMULAS IN THE NOTES ON THE PLANS.

A) THE HYDROSTATIC LEAKAGE RATE FOR POLYVINYL CHLORIDE (PVC) PIPE AND APPURTENANCES SHALL NOT EXCEED THE AMOUNT ALLOWED OR RECOMMENDED BY FORMULAS IN AMERICA WATER WORKS ASSOCIATION (AWWA) C-605 AS REQUIRED IN 30 TAC §290.44(A)(5), PLEASE ENSURE THAT THE FORMULA FOR THIS CALCULATION IS CORRECT AND MOST CURRENT FORMULA IS IN USE;

$$Q=(LD*(P)^{.5})/148{,}000$$

B) THE HYDROSTATIC LEAKAGE RATE FOR DUCTILE IRON (DI) PIPE AND APPURTENANCES SHALL NOT EXCEED THE AMOUNT ALLOWED OR RECOMMENDED BY FORMULAS IN AMERICA WATER WORKS ASSOCIATION (AWWA) C-600 AS REQUIRED IN 30 TAC 290.44(A)(5). PLEASE ENSURE THAT THE FORMULA FOR THIS CALCULATION IS CORRECT AND MOST CURRENT FORMULA IS IN USE;

$$Q=(SD*(P)^{.5})/148{,}000$$

12. THE CONTRACTOR SHALL MAINTAIN A MINIMUM SEPARATION DISTANCE IN ALL DIRECTIONS OF NINE FEET BETWEEN THE PROPOSED WATERLINE AND WASTEWATER COLLECTION FACILITIES INCLUDING MANHOLES. IF THIS DISTANCE CANNOT BE MAINTAINED, THE CONTRACTOR MUST IMMEDIATELY NOTIFY THE PROJECT ENGINEER FOR FURTHER DIRECTION. SEPARATION DISTANCES, INSTALLATION METHODS, AND MATERIALS UTILIZED MUST MEET §290.44(E)(1)-(4).

13. THE SEPARATION DISTANCE FROM A POTABLE WATERLINE TO A WASTEWATER MAIN OR LATERAL MANHOLE OR CLEANOUT SHALL BE A MINIMUM OF NINE FEET. WHERE THE NINE-FOOT SEPARATION DISTANCE CANNOT BE ACHIEVED, THE POTABLE WATERLINE SHALL BE ENCASED IN A JOINT OF AT LEAST 150 PSI PRESSURE CLASS PIPE AT LEAST 18 FEET LONG AND TWO NOMINAL SIZES LARGER THAN THE NEW CONVEYANCE. THE SPACE AROUND THE CARRIER PIPE SHALL BE SUPPORTED AT FIVE-FOOT INTERVALS WITH SPACERS OR BE FILLED TO THE SPRINGLINE WITH WASHED SAND. THE ENCASEMENT PIPE SHALL BE CENTERED ON THE CROSSING AND BOTH ENDS SEALED WITH CEMENT GROUT OR MANUFACTURED SEALANT [§290.44(E)(5)].

14. FIRE HYDRANTS SHALL NOT BE INSTALLED WITHIN NINE FEET VERTICALLY OR HORIZONTALLY OF ANY WASTEWATER LINE, WASTEWATER LATERAL, OR WASTEWATER SERVICE LINE REGARDLESS OF CONSTRUCTION [§290.44 (E)(6)].

15. SUCTION MAINS TO PUMPING EQUIPMENT SHALL NOT CROSS WASTEWATER MAINS, WASTEWATER LATERALS, OR WASTEWATER SERVICE LINES. RAW WATER SUPPLY LINES SHALL NOT BE INSTALLED WITHIN FIVE FEET OF ANY TILE OR CONCRETE WASTEWATER MAIN, WASTEWATER LATERAL, OR WASTEWATER SERVICE LINE [§290.44(E)(7)].

16. WATERLINES SHALL NOT BE INSTALLED CLOSER THAN TEN FEET TO SEPTIC TANK DRAINFIELDS [§290.44(E)(8)].

17. THE CONTRACTOR SHALL DISINFECT THE NEW WATERLINES IN ACCORDANCE WITH AWWA STANDARD C-651-14 OR MOST RECENT, THEN FLUSH AND SAMPLE THE LINES BEFORE BEING PLACED INTO SERVICE. SAMPLES SHALL BE COLLECTED FOR MICROBIOLOGICAL ANALYSIS TO CHECK THE EFFECTIVES OF THE DISINFECTION PROCEDURE WHICH SHALL BE REPEATED IF CONTAMINATION PERSIST. A MINIMUM OF ONE SAMPLE FOR EACH 1,000 FEET OF COMPLETED WATERLINE WILL BE REQUIRED OR AT THE NEXT AVAILABLE SAMPLING POINT BEYOND 1,000 FEET AS DESIGNATED BY THE DESIGN ENGINEER [§290.44(F){3)].

18. DECHLORINATION OF DISINFECTING WATER SHALL BE IN STRICT ACCORDANCE WITH CURRENT AWWA STANDARD C655-09 OR MOST RECENT.

AT&T NOTE:

THE EXISTENCE AND LOCATION OF UNDERGROUND CABLE INDICATED ON THE PLANS ARE TAKEN FROM THE BEST RECORDS AVAILABLE AND ARE NOT GUARANTEED TO BE ACCURATE. CONTRACTOR IS TO CONTACT THE TELEPHONE COMPANY LOCATOR 48 HOURS PRIOR TO EXCAVATION AT 1-800-344-8377. CONTRACTOR IS TO PROTECT AND SUPPORT TELEPHONE COMPANY PLANT DURING CONSTRUCTION.

SPECTRUM (TIME WARNER CABLE) NOTE:

CONTRACTOR SHALL CONTACT THE ONE-CALL LOCATOR 48 HOURS PRIOR TO EXCAVATION AT 1-800-344-8377. CONTRACTOR IS RESPONSIBLE FOR PROTECTING AND SUPPORTING CABLE TV PLANT DURING CONSTRUCTION.

STORM WATER GENERAL NOTES:

1. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN ALL REQURIED STORM WATER PERMITS, FEES, AND APPROVALS. NO CONSTRUCTION OR FABRICATION SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED AND THROUGHLY REVIEWED ALL PERMITS REQURIED FOR CONSTRUCTION IN DRAINAGE EASEMENTS, RIGHT-OF-WAYS, AND FLOODPLAINS.

2. THE CONTRACTOR SHALL NOTIFY STORM WATER ENGINEERING AT LEAST 24 HOURS PRIOR TO THE INSTALLATION OF ANY DRAINAGE FACILITY WITHIN A DRAINAGE EASEMENT OR STREET RIGHT-OF-WAY NOT INDICATED ON THE CONSTRUCTION PLANS.

3. THE CONTRACTOR IS RESPONISBLE FOR PROTECTING EXISTING DRAINAGE FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING DRAINGE SYSTEMS, WHETHER OR NOT SHOWN ON THE PLANS, SHALL BE THE RESPONISIBLITY OF THE CONTRACTOR TO REPAIR AT HIS EXPENSE. THE CONTRACTOR SHALL NOTIFY STORM WATER ENGINEERING AT 210-206-8433 AS SOON AS CONFLICTS WITH UTILITES ARE ENCOUNTERED OR ANY DRAINGE SYSTEM IS DAMAGED DURING CONSTRUCTION.

4. CONSTRUCTION SPOILS WILL NOT BE ALLOWED TO BE DEPOSITED ANYWHERE WITHIN DRAINAGE EASEMENT, RIGHT-OF-WAY OR FLOODPLAIN WITHIN THE LIMITS OF THE PROJECT AND SHALL BE DISPOSED OFFSITE IN COMPLIANCE WITH CURRENT APPLICABLE REGULATIONS.

5. NO STRUCTURE, FENCES, WALLS, LANDSCAPING, OR OTHER OBSTRUCTIONS THAT IMPEDE DRAINAGE SHALL BE PLACED WITHIN THE LIMITS OF THE DRAINAGE EASEMENTS SHOWN ON THE CONSTRUCTION DOCUMENTS.

6. UPON COMPLETION OF TRENCHING, THE AREA WILL BE BACKFILLED AND COMPACTED TO ITS ORIGINAL CONDITION. TRENCHES/ BORE PITS TO BE OPEN AND UNATTENDED LONGER THAN 24 HOURS SHALL BE PROTECTED TO WITHSTAND ALL HYDRODYNAMIC AND HYDROSTATIC FORCES AND PREVENT DOWNSTREAM IMPACTS. TRENCHES/ BORE PITS TO BE OPEN LONGER THAN 30 DAYS AFTER STARTING EXCAVATION SHALL BE BACKFILLED WITH A SEMI-PREMANENT REPAIR BACKFILL.

TCP GENERAL NOTES

1. THE CONTRACTOR SHALL NOT HAVE EXCLUSIVE USE OF THE RIGHT OF WAY BUT SHALL COOPERATE IN THE USE OF THE RIGHT OF WAY WITH THE CITY OF SAN ANTONIO AS WELL AS THE VARIOUS PUBLIC UTILITY COMPANIES AS MAY BE REQUIRED. PROSECUTE WORK IN SUCH A MANNER AND SEQUENCE AS TO ALLOW UNFORESEEN UTILITY ADJUSTMENTS TO BE MADE.

2. TRAFFIC MUST BE HANDLED APPROPRIATELY THROUGH THE PROJECT DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE FOR THE SAFETY AND COMFORT OF THE TRAVELING PUBLIC AT ALL TIMES. REQUIRED TO GIVE THE TRAVELING PUBLIC AT LEAST 48 HOURS ADVANCE NOTICE OF ANY LANE CLOSURES OR CHANGE IN TRAFFIC FLOW DIRECTION.

3. ATTENTION IS CALLED TO THE NECESSITY OF ERECTING AND MAINTAINING ALL BARRICADES, WARNING SIGNS, AND DIRECTIONAL SIGNS AT APPROACH STREET INTERSECTIONS TO DIRECT TRAFFIC WITHIN THE LIMITS OF THIS PROJECT. ALL BARRICADES, WARNING SIGNS, AND DIRECTIONAL SIGNS SHALL COMPLY WITH THE LATEST EDITION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).

4. CONTRACTOR IS RESPONSIBLE FOR TRANSITIONING PROPOSED PAVEMENT ELEVATIONS TO EXISTING DRIVEWAYS AND INTERSECTIONS.

5. PROVIDE VEHICULAR INGRESS AND EGRESS ACCESS TO AT LEAST ONE DRIVEWAY, PER PROPERTY AT ALL TIMES, UNLESS OTHERWISE DIRECTED.

6. PLACE PORTABLE CHANGEABLE MESSAGE SIGNS, AS REQUIRED AND APPROVED, PRIOR TO MODIFICATIONS TO CURRENT TRAFFIC FLOW PATTERNS.

7. PROVIDE SMOOTH TRANSITIONS. REMOVE AND CLEAN ANY MATERIALS AND EQUIPMENT THAT ENDANGER THE PUBLIC. A MAX DROP OFF SLOPE OF 3:1 SHALL BE IMPLEMENTED FOR ALL EDGE DROP OFFS NOT PROTECTED BY PORTABLE CONCRETE TRAFFIC BARRIER.

8. ADVANCE WARNING LANE CLOSURE SIGNS SHALL BE COVERED WHEN ALL EXISTING LANES ARE OPEN TO TRAFFIC.

9. PROVIDE POSITIVE DRAINAGE DURING AND AFTER CONSTRUCTION OPERATIONS.

10. SEE PROJECT GENERAL NOTES SHEET FOR ADDITIONAL TRAFFIC CONTROL INFORMATION.

11. ACCESS TO PROPERTIES ADJACENT TO THE RIGHT OF WAY MUST BE PROVIDED AND MAINTAINED AT ALL TIMES UNLESS OTHERWISE DIRECTED BY THE ENGINEER. THE CONTRACTOR WILL PERSONALLY CONTACT THE PROPERTY OWNER AT LEAST 5 DAYS IN ADVANCE OF ANY DRIVEWAY CLOSURE. IF THE PROPERTY HAS MORE THAN ONE DRIVEWAY, THEY SHALL BE CLOSED ONLY ONE AT A TIME. IF THE PROPERTY ONLY HAS ONE ACCESS, THE DRIVEWAY SHALL BE BUILT IN HALF SECTIONS. IF CLOSURE OF A SINGLE ACCESS TO ANY PROPERTY IS REQUIRED FOR UTILITY WORK, THIS ACTIVITY SHALL BE PERFORMED DURING OFF-PEAK HOURS OR AS DIRECTED BY THE ENGINEER.

12. METAL PLATES WILL BE ALLOWED AND REQUIRED TO COVER TRENCHES LEFT OVERNIGHT AND/OR DURING THE DAY THAT HAVE NOT HAD BACKFILL PLACED BUT SHALL NOT BE USED ON ANY SPECIFIC TRENCH FOR MORE THAN 3 CALENDAR DAYS. A HMAC (TYD) MIX OR APPROVED EQUAL BY THE ENGINEER SHALL BE USED AROUND THE EDGES OF ALL METAL PLATES PLACED IN THE PAVEMENT TO PROVIDE A SMOOTH TANSITION OVER THE PLATES. IF CONTRACTOR CHOOSES NOT TO UTILIZE METAL PLATES, ALL OPEN TRENCHES MUST BE BACKFILLED AT THE END OF EACH WORKING DAY TO ALLOW FOR NON-INTERRUPTED, FREE-FLOW TRAFFIC. (REF. COSA ROW DETAILS.)

13. FOR TIE-IN LOCATIONS ON INTERSECTING STREETS AND SERVICE TIE-INS, SEE DETAILS FOR LANE CLOSURES, TRANSITIONING, BARRICADING, AND SIGNAGE.

ENVIROMENTAL

1. THE CONTRACTOR IS REQUIRED TO RE-SEED DISTURBED AREAS WITH NATIVE VEGETATION SEED IN ACCORDANCE WITH COSA ITEM 520 - HYDROMULCHING EXCEPT IN AREAS OF FARM CROPS WHERE THEY ARE TO DISC THE TOPSOIL WITH NO REVEGETATION; IN ADDITION, THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL DAMAGES TO PROPERTY OUTSIDE OF THE EASEMENT LIMITS, INCLUDING REVEGETATION COSTS.

2. CONTRACTOR TO ESTABLISH SILT FENCING AND/OR ROCK BERM IN ALL AREAS TO BE IMPACTED BY CONSTRUCTION AND MAINTAIN UNTIL SUITABLE GROUND COVER/VEGETATION IS ACCEPTED.

3. IF A THREATENED OR ENDANGERED PLANT OR ANIMAL SPECIES AND/OR CULTURAL ARCHAEOLOGICAL RESOURCES ARE ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL STOP WORK IMMEDIATELY AND NOTIFY SAWS.

4. DISPOSAL AREAS, STOCKPILES, AND HAUL ROADS SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE AND CONTROL THE AMOUNT OF SEDIMENT WHICH MAY ENTER RECEIVING WATERS. DISPOSAL AREAS SHALL NOT BE LOCATED ON ANY WETLANDS, WATER BODY, OR STREAM BED. THE CONTRACTOR SHALL LOCATE AND CONSTRUCT CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AND PARKING AREAS IN A MANNER TO MINIMIZE POLLUTANT RUNOFF.

5. THE CONTRACTOR SHALL CLEAR ALL WATER WAYS AS SOON AS PRACTICABLE OF ALL TEMPORARY EMBANKMENT, TEMPORARY BRIDGES, MATTING, FALSEWORK, PILING, DEBRIS, AND OBSTRUCTIONS PLACED DURING CONSTRUCTION OPERATIONS WHICH ARE NOT PART OF THE FINISHED WORK.

6. CONTRACTOR SHALL BE RESPONSIBLE FOR FILING A NOTICE OF INTENT (NOI) AT THE START OF CONSTRUCTION WITH THE TCEQ AND A NOTICE OF TERMINATION (NOT) AT THE END, ALSO WITH THE TCEQ.

NOTES

1. MEASUREMENTS SHOWN BETWEEN SEWER MAINS AND PARALLEL UTILITES ARE TAKEN AS CENTER TO CENTER.

2. NSPI = NOT SEPARATE PAY ITEM.

3. THE CONTRACTOR SHALL CONFINE CONSTRUCTION OPERATIONS TO WITHIN THE EASMENT LIMITS AND/OR THE RIGHT-OF-WAY. EXCEPT AS NOTED ON THE PLANS.

4. CONTRACTOR IS TO FOLLOW ALL COSA REQUIREMENTS FOR PROJECT SIGNAGE AND VISIBLE IDENTIFICATION WHEN WORKING WITHIN COSA ROW.

EROSION AND SEDIMENTATION CONTROL

1. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN ALL REQUIRED STORM WATER PERMITS, FEES AND APPROVALS. NO CONSTRUCTION SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED ALL PERMITS REQUIRED FOR CONSTRUCTION IN DRAINAGE EASEMENTS, RIGHT-OF-WAYS, AND FLOODPLAINS.

2. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING DRAINAGE FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING DRAINAGE SYSTEMS, WHETHER OR NOT SHOWN ON THE PLANS, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR AT HIS EXPENSE. THE CONTRACTOR SHALL NOTIFY COSA STORM WATER ENGINEERING AT 210-207-8052 AS SOON AS CONFLICTS WITH UTILITIES ARE ENCOUNTERED OR ANY DRAINAGE SYSTEM IS DAMAGED DURING CONSTRUCTION.

3. CONSTRUCTION SPOILS WILL NOT BE ALLOWED TO BE DEPOSITED ANYWHERE WITHIN A DRAINAGE EASEMENT, RIGHT-OF-WAY OR FLOODPLAIN WITHIN THE LIMITS OF THE PROJECT AND SHALL BE DISPOSED OFFSITE IN COMPLIANCE WITH CURRENT APPLICABLE REGULATIONS.

4. NO STRUCTURE, FENCES, WALLS, LANDSCAPING, OR OTHER OBSTRUCTIONS THAT IMPEDE DRAINAGE SHALL BE PLACED WITHIN THE LIMITS OF THE DRAINAGE EASEMENTS SHOWN ON THE CONSTRUCTION DOCUMENTS.

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HYDROMULCHING ALL DISTURBED AREAS.

TREE PRESERVATION

1. TREE AND UNDERSTORY PRESERVATION IS A PRIORITY OF THIS PROJECT. CONTRACTOR SHALL MAKE EVERY EFFORT TO MINIMIZE ANY UNNECESSARY TREE OR UNDERSTORY REMOVAL.

2. ALL TREE PROTECTION SHALL BE LUMP SUM.

3. TRIMMING OF TREES SHALL BE ACCOMPLISHED USING A SAW OR PRUNING SHEARS. ALL CUT LIMBS OVER 1 INCH IN DIAMETER SHALL BE PAINTED WITH TREE WOUND PAINT IMMEDIATELY AFTER TREE TRIMMING.

SUBSURFACE AND SOIL CONDITIONS

1. IN ACCORDANCE WITH THE INSTRUCTIONS TO BIDDERS, BIDDERS ARE ENCOURAGED TO VISIT THE SITE AND ACQUAINT THEMSELVES WITH ALL EXISTING CONDITIONS PRIOR TO BIDDING. BIDDERS MAY, AT THEIR OWN EXPENSE, PERFORM THEIR OWN SUBSURFACE INVESTIGATIONS; HOWEVER, ALL SUCH INVESTIGATIONS MUST BE PERFORMED UNDER TIME SCHEDULES AND ARRANGEMENTS APPROVED IN ADVANCE BY THE OWNER.

MATERIALS STAGING AND LAYDOWN AREAS

1. NO PROPERTY HAS BEEN DESIGNATED BY SAWS FOR CONTRACTOR'S MATERIALS STAGING, LAYDOWN, AND FIELD OFFICE AREAS. CONTRACTOR SHALL MAKE SEPARATE ARRANGEMENTS WITH OTHERS FOR ANY SUCH REQUIREMENTS.

2. CONTRACTOR SHALL INDEMNIFY SAWS AND THE ENGINEER FROM ANY THIRD PARTY LIABILITIES ASSOCIATED WITH THE CONTRACTOR'S USE OF ANY SUCH AREAS.

3. PRIOR TO CLEARING ROW AND CONSTRUCTION, CONTRACTOR SHALL STAKES BOTH SIDES OF RIGHT OF ENTRY AREA AT 50 FOOT INTERVALS. STAKING SHALL BE BY SURVEY LATH OR SIMILAR AND SHALL INCLUDE CENTERLINE STATION. STAKING SHALL BE NO SEPARATE PAY ITEM.

STATE OF TEXAS
CARL BAIN
56996
REGISTERED
PROFESSIONAL ENGINEER

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No.	DATE	DESCRIPTION	BY

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OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT

TCEQ & GENERAL NOTES

DEVELOPER:

CONT. | BUDGET PROJ.

SUBMITTED

APPROVED

MAP No.

SECT. No. | 100% SUBMITTAL

DR. MC | CK. CC/CB | JOB No. 23-5562

3

NOTES:

1. TRENCH EXCAVATION SAFETY PROTECTION SHALL BE ACCOMPLISHED AS REQUIRED BY THE MOST RECENT PROVISIONS OF PART 1926, SUBPART P-EXCAVATIONS. TRENCHING AND SHORING OF THE OSHA STANDARDS AND INTERPRETATIONS, AS MAY BE AMENDED.

2. MAINTAIN MINIMUM VERTICAL CLEARANCE OF 2 FT WHERE SEWER MAIN CROSSES EXISTING AND PROPOSED UTILITIES, UNLESS OTHERWISE SHOWN ON PLANS. PROVIDE TEMPORARY SUPPORT OF EXISTING UTILITY AS REQUIRED. WHEN SEWER MAIN PARALLELS WATER MAIN, MAINTAIN MINIMUM 4 FT HORIZONTAL CLEARANCE.

3. SEPARATION DISTANCE BETWEEN PARALLEL WATER MAIN AND SEWER MAINS ARE IN ACCORDANCE WITH SAWS VARIANCES TO SECTIONS OF TCEQ RULES.

4. FLOWABLE FILL TO FOLLOW TXDOT TRENCH BACKFILL WITH PAVED SURFACE DETAILS.

5. ALL TREE WORK SHALL BE PERFORMED BY AN ISA CERTIFIED ARBORIST.

6. TREE PRUNING, PROTECTION, OR TRIMMING SHALL BE COMPLETED TO COMPLY WITH THE CITY OF SAN ANTONIO.

7. CONRACTORS SHALL INDICATE TO THE CITY OF SAN ANTONIO DSD PROPOSED LIMITS OF CLEARANCE WITH TREES DURING PRE-CONSTRUCTION MEETING AND WITH PROJECT SUBMITTALS.

8. CONTRACTOR SHALL MAINTAIN FLOWS IN EXISTING SEWER MAIN.

9. CONTRACTOR SHALL REMOVE AND REPLACE PAVEMENT, DRIVEWAYS, SIDEWALKS, CURB, FENCES, LANDSCAPING, IRRIGATION SYSTEMS AND OTHER SURFACE FEATURES DAMAGED BY CONSTRUCTION ACTIVITIES TO PRE-EXISTING CONDITIONS OR NEW MATERIAL. SURFACE RESTORATION SHALL BE INCIDENTAL TO SANITARY SEWER LATERALS (NSPI)

10. CONTRACTOR TO FIELD VERIFY FOR CAPPED SANITARY SEWER LATERALS AND CONNECT ACTIVE SERVICE.

11. CONTRACTOR TO PROTECT, SUPPORT, MAINTAIN, AND COORDINATE IN ADVANCE WITH SAWS OPERATIONS AS NEEDED TO SHUT OFF THE WATER MAIN DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OF WATER MAIN IF DAMAGED DURING CONSTRUCTION AT NO ADDITIONAL COST TO SAWS.

12. DURING CONSTRUCTION, THE DRIVEWAY WILL CONTINUE TO BE USABLE WITH A ROLLED ASPHALTIC BASE OVER THE DRIVEWAY CUT. THE CONTRACTOR WILL MAINTAIN THE TEMPORARY DRIVEWAY FOR OWNER'S USE.

13. ASPHALT PAVEMENT RESTORATION WILL FOLLOW PERMANENT ASPHALT TRENCH REPAIR DETAIL ON MISCELLANEOUS DETAILS SHEET.

14. CONTRACTOR IS RESPONSIBLE FOR LOCATING A NEARBY FIRE HYDRANT AS A SOURCE OF WATER FOR CIPP OPERATION. IN CASE THAT A FIRE HYDRANT IS NOT NEAR THE AREA, THE CONTRACTOR IS RESPONSIBLE FOR SUPPLING WATER TO COMPLETE THE TASK AT NO ADDITIONAL COST TO SAWS.

15. CONTRACTOR IS RESPONSIBLE TO PROVIDE LIGHTING IF WORK IS REQUIRED TO BE PERFORMED AT NIGHT WHEN TRAFFIC IS MINIMAL. LIGHTING FOR AFTER HOURS CONSTRUCTION IS TO BE SUPPLIED BY THE CONTRACTOR AT NO ADDITIONAL COST TO SAWS.

16. CONTRACTOR IS TO ASSURE THAT ALL MATERIALS NEEDED TO COMPLETE THE CONSTRUCTION ARE ON HAND IN ORDER TO MINIMIZE UNECESSARY WORK STOPPAGE FOR EXTENDED PERIODS OF TIME.

Texas Commission on Environmental Quality
Organized Sewage Collection System
General Construction Notes (Continues)

1. 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 105.2) classes A, B or C.
2. 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).
3. 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

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

Where:
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	1020	133	7.693
21	1190	114	10.471
24	1360	100	13.676
27	1530	88	17.309
30	1700	80	21.369
33	1870	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.

(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.

Texas Commission on Environmental Quality
Organized Sewage Collection System
General Construction Notes

TCEQ San Antonio Regional Office (210) 490-3096

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 Plan Sheet 3.0 of 8.0.
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: N/A
If pipe flexure is proposed, the following method of preventing deflection of the joint must be used: N/A
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 N/A of N/A.
(For potential future laterals).
The private service lateral stub-outs must be installed as shown on the plan and profile sheets on Plan Sheet N/A of and marked after backfilling as shown in the detail on Plan Sheet N/A of N/A.

ITEM	DESCRIPTION	UNIT	QUANT.
413	Flowable Fill	CY	18
550	Trench Excavation Safety Protection	LF	2,951.4
848	8" SDR-26 (D2241) PVC Sanitary Sewer Line (All Depths)	LF	1,364.4
848	10" SDR-26 (D2241) PVC Sanitary Sewer Line (All Depths)	LF	312.0
851	Adjusting Existing Manholes	EA	2
852.1	Sanitary Sewer Manhole (0' - 6')	EA	20
852.2	Sanitary Sewer Drop Manhole (0' - 6')	EA	2
852.3	Extra Depth Manholes (> 6')	VF	82
854	Sanitary Sewer Laterals	LF	623
854.1	Two-Way Sanitary Sewer Clean-out	EA	21
855	Reconstruction of Existing Manhole	EA	12
856	Carrier Pipe (8" SDR-26 D2241)(by Open Cut)	LF	95.0
856	Steel Casing (24")(by Open Cut)	LF	95.0
858	Concrete Encasement, Cradles, Saddles and Collars	CY	109
864-S1	Bypass Pumping (Small Diameter SS)	LS	1
866	Sewer Main Pre Television Inspection (8" - 15")	LF	4,204.0
866	Sewer Main Post Television Inspection (8" - 15")	LF	2,953.9
1103	Point repairs for 8"-10" Dia, (All Depths) including up to 20 LF of piping	EA	2
1109	Service Reconnection (By Open Cut Excavation (All Depths)	EA	10
100	Mobilization (Max. 10%)	LS	1
101	Preparation of Right-of-Way (Max. 5%)	LS	1

STATE OF TEXAS
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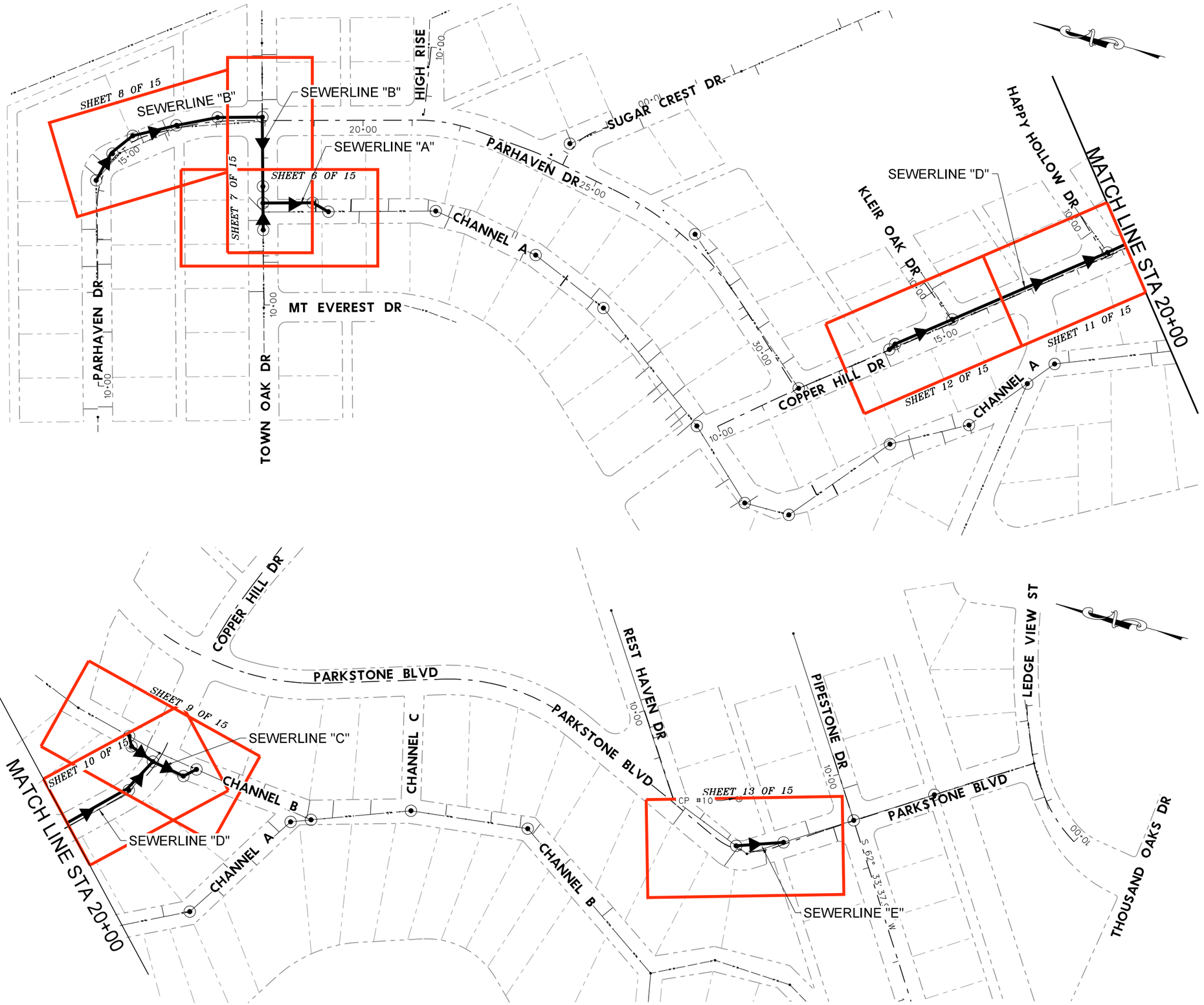
OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT

GENERAL NOTES & QUANTITIES

DEVELOPER:
CONT. | BUDGET PROJ.
SUBMITTED
APPROVED
MAP No.
SECT. No. | 100% SUBMITTAL
DR. MC | CK. CC/CB | JOB No. 23-5562

4



PROJECT CONTROL NOTE:

FOR PROJECT CONTROL POINTS REFERENCE TO COSA PLAN SET ROADWAY SHEETS (SHEET 5).

100 25 0 200
HORIZ SCALE FEET

SCALE:
HORIZ 1"=200'

STATE OF TEXAS
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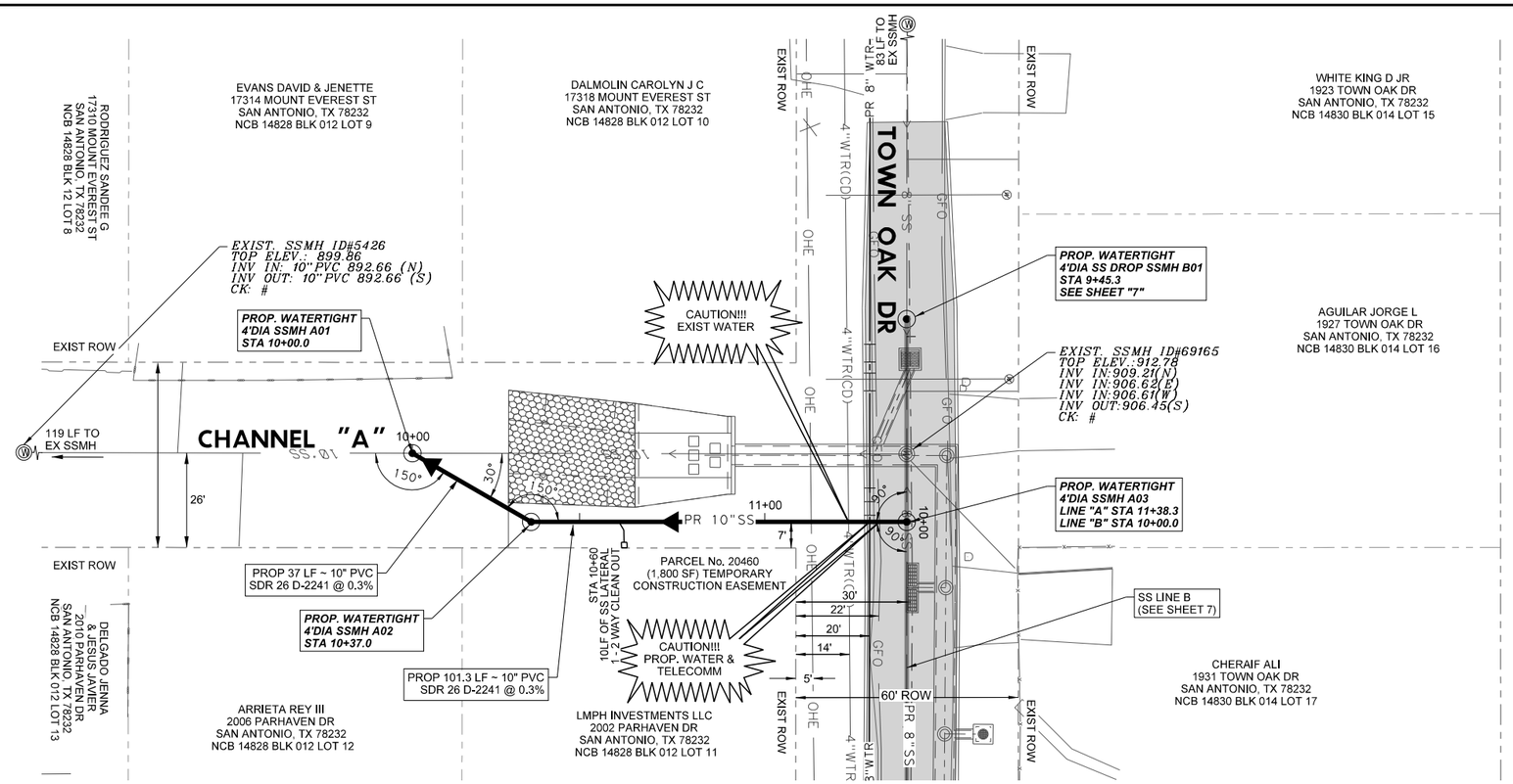
OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT

OVERALL PROJECT LAYOUT

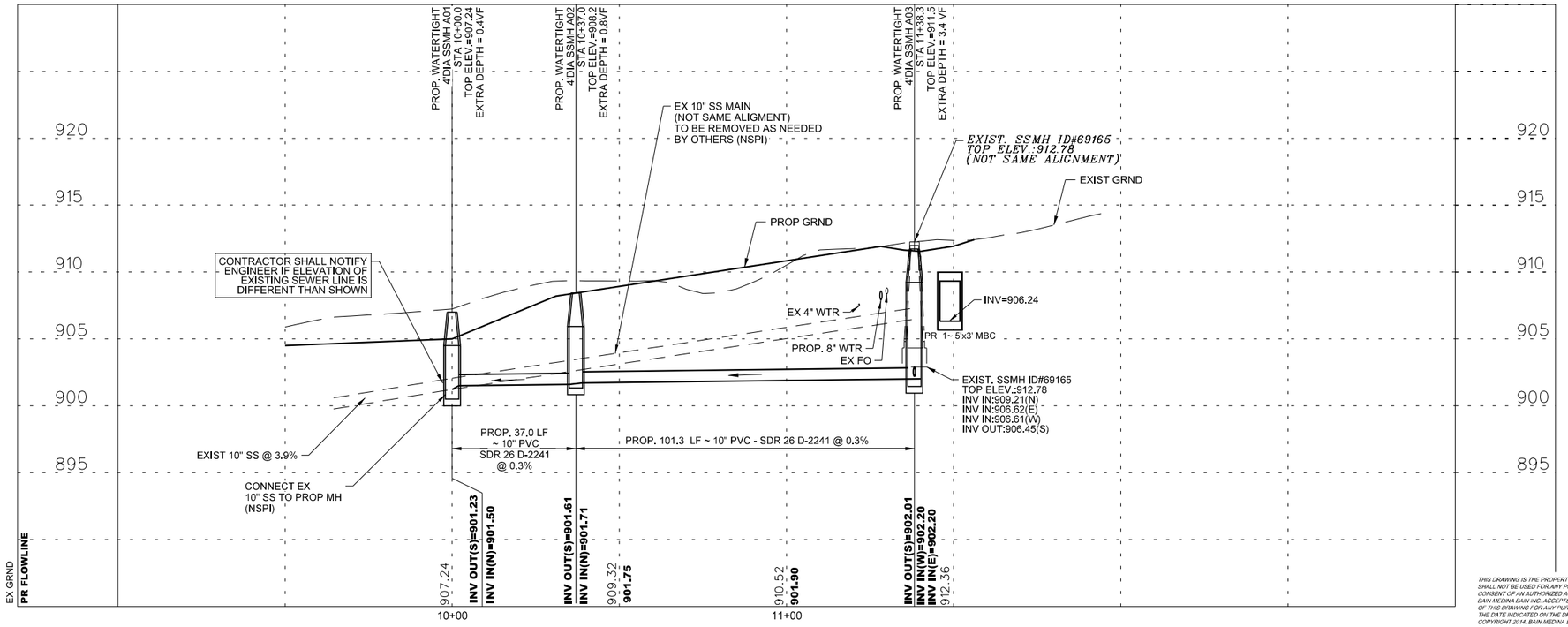
DEVELOPER:			
CONT.		BUDGET PROJ.	
SUBMITTED			
APPROVED			
MAP No.			
SECT. No.		100% SUBMITTAL	
DR. MC	CK. CC/CB	JOB No. 23-5562	5

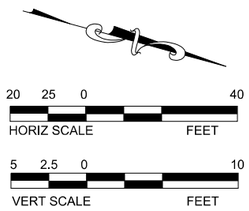
W:\Work\C-1628.05 Oak Haven Area Streets and Drainage - COSA\09 Report\SCS PLAN\SCS Plan Application Forms\4. F-0582 Organized Sewage Collection System Plan Application\PLAN AND PROFILE SHEETS\05 OAK HAVEN PROJECT.dgn

ITEM	DESCRIPTION	UNIT	QUANT.
550	Trench Excavation Safety Protection	LF	138.3
848	10" SDR-26 (D2241) PVC Sanitary Sewer Line (All Depths)	LF	138.3
852.1	Sanitary Sewer Manhole (0' - 6')	EA	3
852.3	Extra Depth Manholes (> 6')	VF	4.6
854	Sanitary Sewer Laterals	LF	10
854.1	Two-Way Sanitary Sewer Clean-out	EA	1
866	Sewer Main Pre Television Inspection (8" - 15")	LF	352.0
866	Sewer Main Post Television Inspection (8" - 15")	LF	139.0



PROP 8" SEWER LINE A
STA 10+00.0 TO STA 11+38.3





SCALE:
HORIZ 1"=40'
VERT 1"=10'

LEGEND

- EXISTING WATER METER
- EXISTING FIRE HYDRANT
- EXISTING POWER POLE
- EXISTING WATER VALVE
- EXISTING MAIL BOX
- EXISTING FLOW ARROW
- PROP WATER MAIN
- EXIST WATER MAIN — 6"W
- PROP SANITARY SEWER
- EXIST SANITARY SEWER — 8"SS
- PROPOSED SEWER MANHOLE
- EXIST SEWER MANHOLE
- PROPOSED SEWER LATERAL AND CLEAN-OUT
- GAS MAIN — 2"G
- OVERHEAD ELECTRIC — OHE
- UNDERGROUND ELECTRIC — UE
- UNDERGROUND TELEPHONE — UT
- PROPOSED FLOW ARROWS
- TREE
- SIGN
- GUY ANCHOR
- TESTHOLE
- CONTROL POINT
- FLOWABLE
- PAVEMENT PATCH
- ROCK RIPRAP
- CAUTION GAS CROSSING

STATE OF TEXAS
CARL BAIN
56996
REGISTERED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CARL BAIN P.E. 56996 ON 5/19/2025

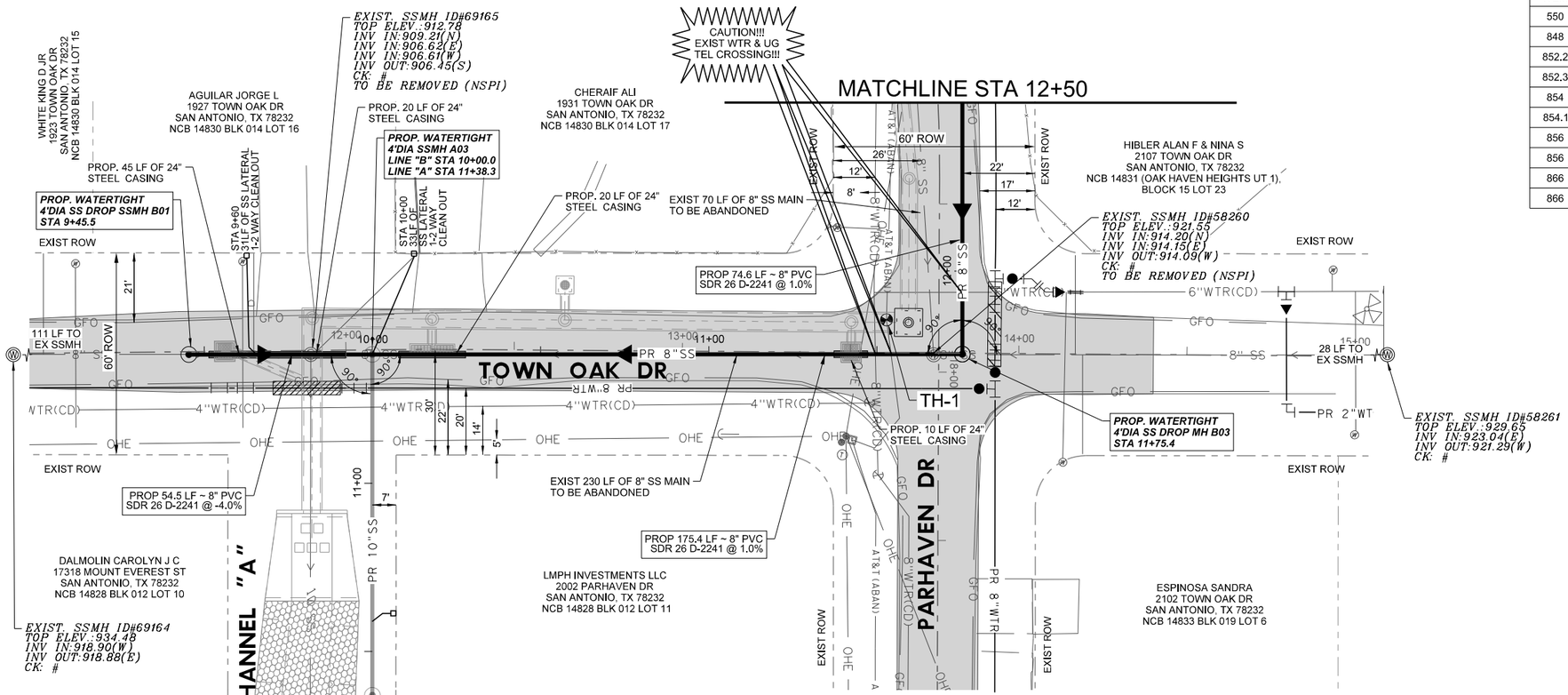
No.	DATE	DESCRIPTION	BY

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT
SANITARY SEWER PLAN & PROFILE
CHANNEL A LINE "A"

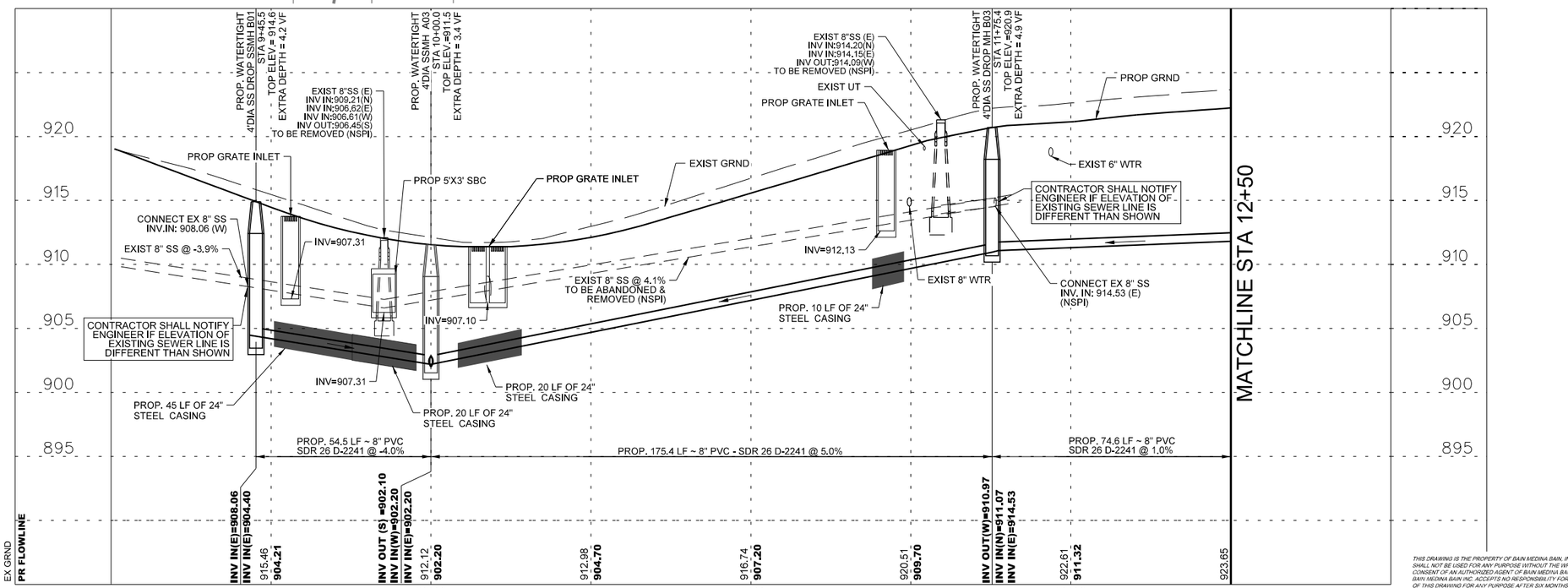
DEVELOPER:
CONT. | BUDGET PROJ.
SUBMITTED
APPROVED
MAP No.
SECT. No.
DR. MC | CK. CC/CB | 100% SUBMITTAL | JOB No. 23-5562 | 6

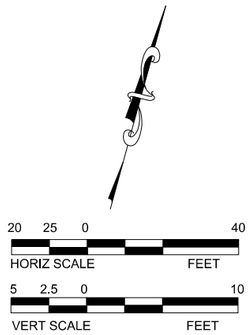
ITEM	DESCRIPTION	UNIT	QUANT.
550	Trench Excavation Safety Protection	LF	304.5
848	8" SDR-26 (D2241) PVC Sanitary Sewer Line (All Depths)	LF	229.5
852.2	Sanitary Sewer Drop Manhole (0' - 6')	EA	2
852.3	Extra Depth Manholes (> 6')	VF	9.1
854	Sanitary Sewer Laterals	LF	64
854.1	Two-Way Sanitary Sewer Clean-out	EA	2
856	Carrier Pipe (8" SDR-26 D2241)(by Open Cut)	LF	75.0
856	Steel Casing (24")(by Open Cut)	LF	75.0
866	Sewer Main Pre Television Inspection (8" - 15")	LF	455.0
866	Sewer Main Post Television Inspection (8" - 15")	LF	304.5



PROP 8" SEWER LINE B
STA 10+00 TO STA 12+50

TEST HOLE	UTILITIES	N	E	GND ELEV	TOP UTIL	DEPTH
TH-01	AT&T	13,768,803.85	2,139,720.83	920.98	919.44	1.54'





SCALE:
HORIZ 1"=40'
VERT 1"=10'

LEGEND

- EXISTING WATER METER
- EXISTING FIRE HYDRANT
- EXISTING POWER POLE
- EXISTING WATER VALVE
- EXISTING MAIL BOX
- EXISTING FLOW ARROW
- PROP WATER MAIN
- EXIST WATER MAIN
- PROP SANITARY SEWER
- EXIST SANITARY SEWER
- PROPOSED SEWER MANHOLE
- EXIST SEWER MANHOLE
- PROPOSED SEWER LATERAL AND CLEAN-OUT
- GAS MAIN
- OVERHEAD ELECTRIC
- UNDERGROUND ELECTRIC
- UNDERGROUND TELEPHONE
- PROPOSED FLOW ARROWS
- TREE
- SIGN
- GUY ANCHOR
- TESTHOLE
- CONTROL POINT
- FLOWABLE
- PAVEMENT PATCH
- ROCK RIPRAP
- CAUTION GAS CROSSING

STATE OF TEXAS
CARL BAIN
56996
REGISTERED PROFESSIONAL ENGINEER

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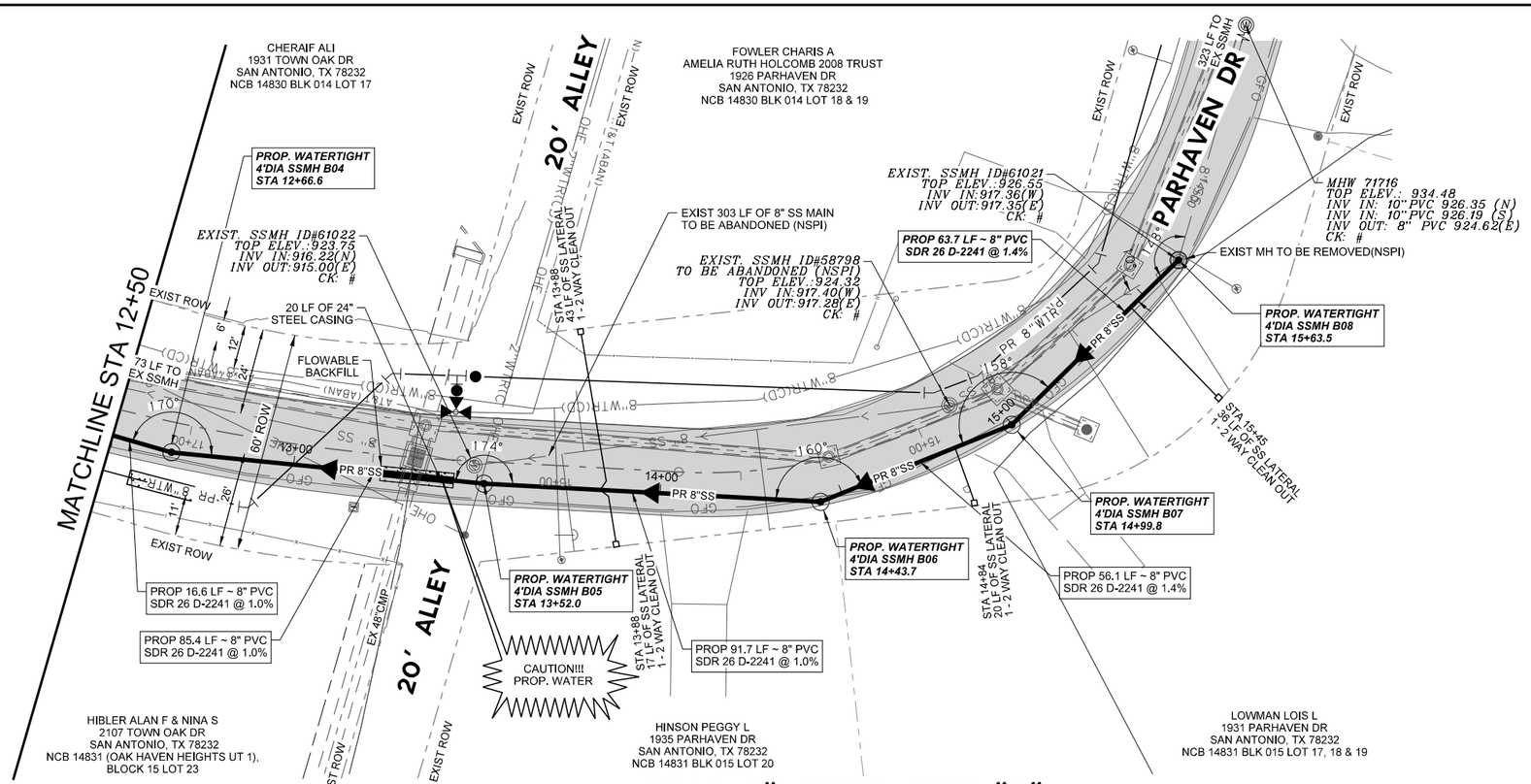
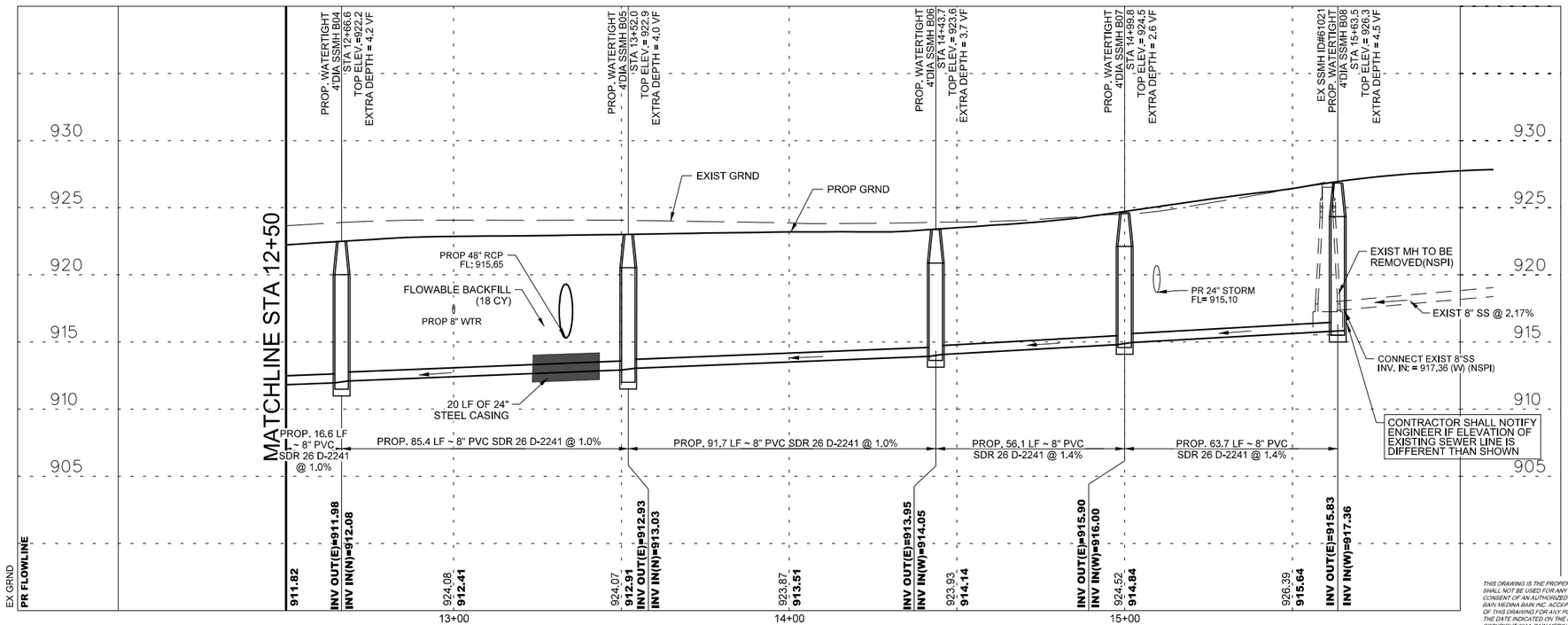
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

OAK HAVEN AREA STREETS AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT
SANITARY SEWER PLAN & PROFILE
TOWN OAK DR LINE "B"

DEVELOPER:
CONT. | BUDGET PROJ.
SUBMITTED
APPROVED
MAP No.
SECT. No.
DR. MC | CK. CC/CB
100% SUBMITTAL
JOB No. 23-5562
7



PROP 8" SEWER LINE "B"
STA 12+50 TO STA 15+61.5



ITEM	DESCRIPTION	UNIT	QUANT.
413	Flowable Fill	CY	18
550	Trench Excavation Safety Protection	LF	313.5
848	8" SDR-26 (D2241) PVC Sanitary Sewer Line (All Depths)	LF	293.5
852.1	Sanitary Sewer Manhole (0' - 6')	EA	5
852.3	Extra Depth Manholes (> 6')	VF	19.0
854	Sanitary Sewer Laterals	LF	116
854.1	Two-Way Sanitary Sewer Clean-out	EA	4
856	Carrier Pipe (8" SDR-26 D2241)(by Open Cut)	LF	20.0
856	Steel Casing (24")(by Open Cut)	LF	20.0
866	Sewer Main Pre Television Inspection (8" - 15")	LF	301.0
866	Sewer Main Post Television Inspection (8" - 15")	LF	313.5

20 25 0 40
HORIZ SCALE FEET

5 2.5 0 10
VERT SCALE FEET

SCALE:
HORIZ 1"=40'
VERT 1"=10'

LEGEND

- EXISTING WATER METER
- EXISTING FIRE HYDRANT
- EXISTING POWER POLE
- EXISTING WATER VALVE
- EXISTING MAIL BOX
- EXISTING FLOW ARROW
- PROP WATER MAIN
- EXIST WATER MAIN (6"W)
- PROP SANITARY SEWER
- EXIST SANITARY SEWER (8"SS)
- PROPOSED SEWER MANHOLE
- EXIST SEWER MANHOLE
- PROPOSED SEWER LATERAL AND CLEAN-OUT
- GAS MAIN (2"G)
- OVERHEAD ELECTRIC (OHE)
- UNDERGROUND ELECTRIC (UE)
- UNDERGROUND TELEPHONE (UT)
- PROPOSED FLOW ARROWS
- TREE
- SIGN
- GUY ANCHOR
- TESTHOLE
- CONTROL POINT
- FLOWABLE
- PAVEMENT PATCH
- ROCK RIPRAP
- CAUTION GAS CROSSING

STATE OF TEXAS
CARL BAIN
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REGISTERED
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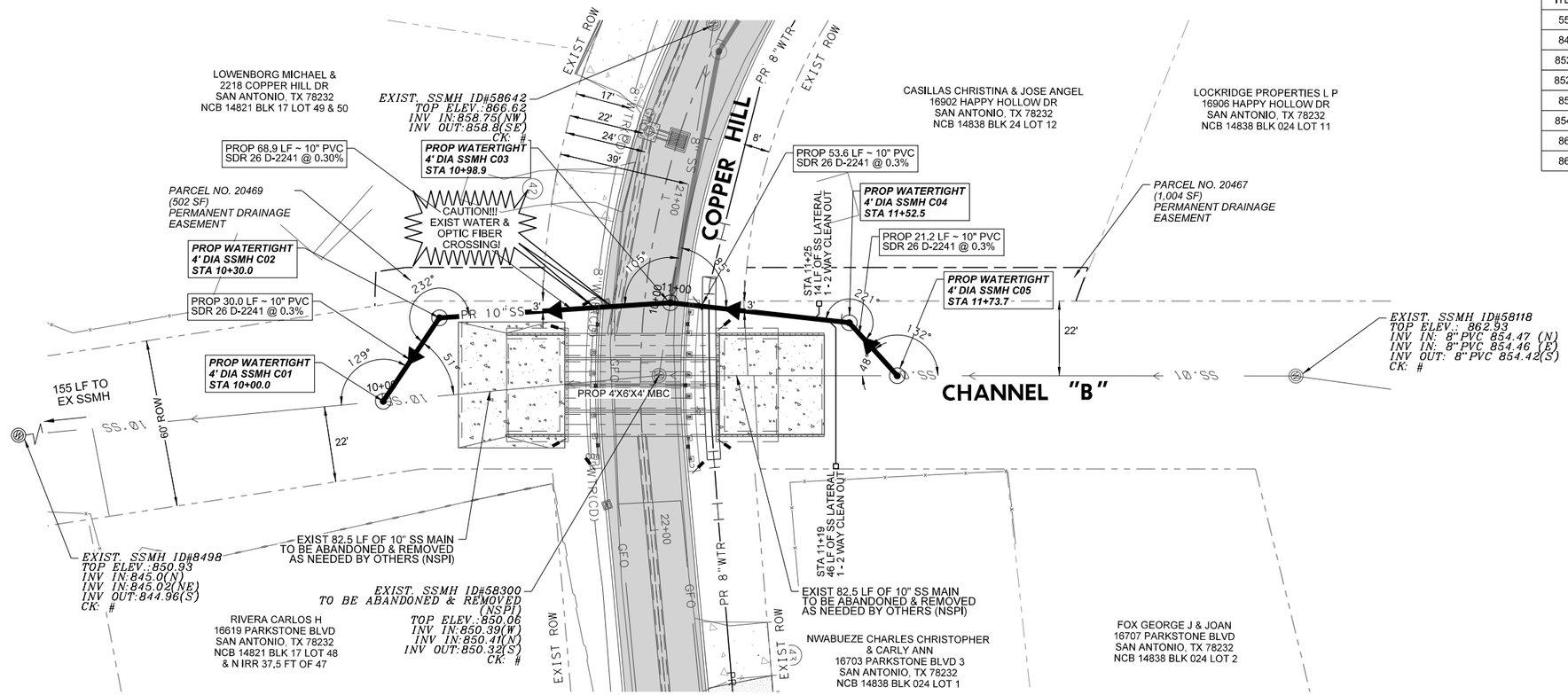
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT
SANITARY SEWER
PLAN & PROFILE
PARHAVEN DR LINE "B"

DEVELOPER:
CONT. | BUDGET PROJ.
SUBMITTED
APPROVED
MAP No.
SECT. No.
DR. MC | CK. CC/CB
100% SUBMITTAL
JOB No. 23-5562
8

ITEM	DESCRIPTION	UNIT	QUANT.
550	Trench Excavation Safety Protection	LF	173.7
848	10" SDR-26 (D2241) PVC Sanitary Sewer Line (All Depths)	LF	173.7
852.1	Sanitary Sewer Manhole (0' - 6')	EA	5
852.3	Extra Depth Manholes (> 6')	VF	22.3
854	Sanitary Sewer Laterals	LF	46
854.1	Two-Way Sanitary Sewer Clean-out	EA	1
866	Sewer Main Pre Television Inspection (8" - 15")	LF	527.0
866	Sewer Main Post Television Inspection (8" - 15")	LF	174.0



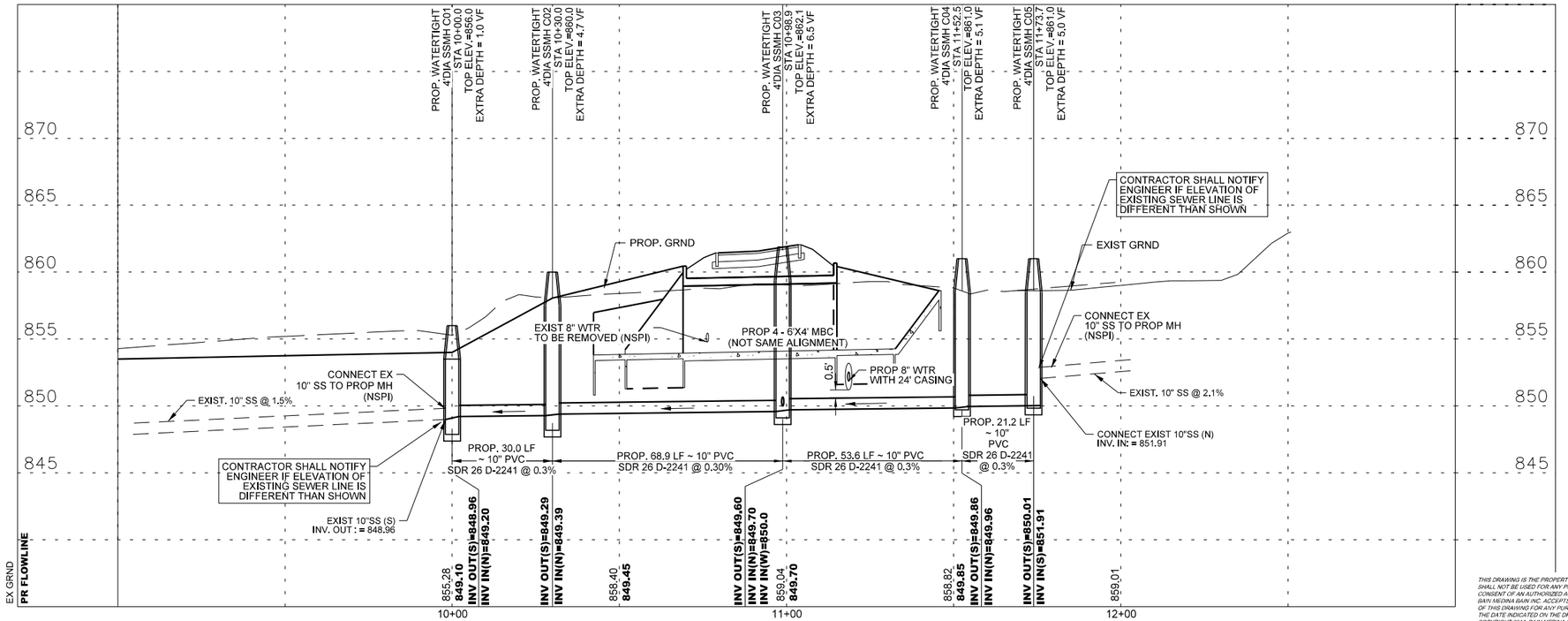
20
5

25 0 40
HORIZ SCALE FEET

2.5 0 10
VERT SCALE FEET

SCALE:
HORIZ 1"=40'

PROP 10" SEWER LINE "C"
STA 10+00 TO STA 11+73.7



LEGEND

- EXISTING WATER METER
- EXISTING FIRE HYDRANT
- EXISTING POWER POLE
- EXISTING WATER VALVE
- EXISTING MAIL BOX
- EXISTING FLOW ARROW
- PROP WATER MAIN
- EXIST WATER MAIN
- PROP SANITARY SEWER
- EXIST SANITARY SEWER
- PROPOSED SEWER MANHOLE
- EXIST SEWER MANHOLE
- PROPOSED SEWER LATERAL AND CLEAN-OUT
- GAS MAIN
- OVERHEAD ELECTRIC
- UNDERGROUND ELECTRIC
- UNDERGROUND TELEPHONE
- PROPOSED FLOW ARROWS
- TREE
- SIGN
- GUY ANCHOR
- TESTHOLE
- CONTROL POINT
- FLOWABLE
- PAVEMENT PATCH
- ROCK RIPRAP
- CAUTION GAS CROSSING

STATE OF TEXAS
CARL BAIN
56996
REGISTERED
PROFESSIONAL ENGINEER

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ENGINEERS & SURVEYORS
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7073 San Pedro, San Antonio, Texas, 78216
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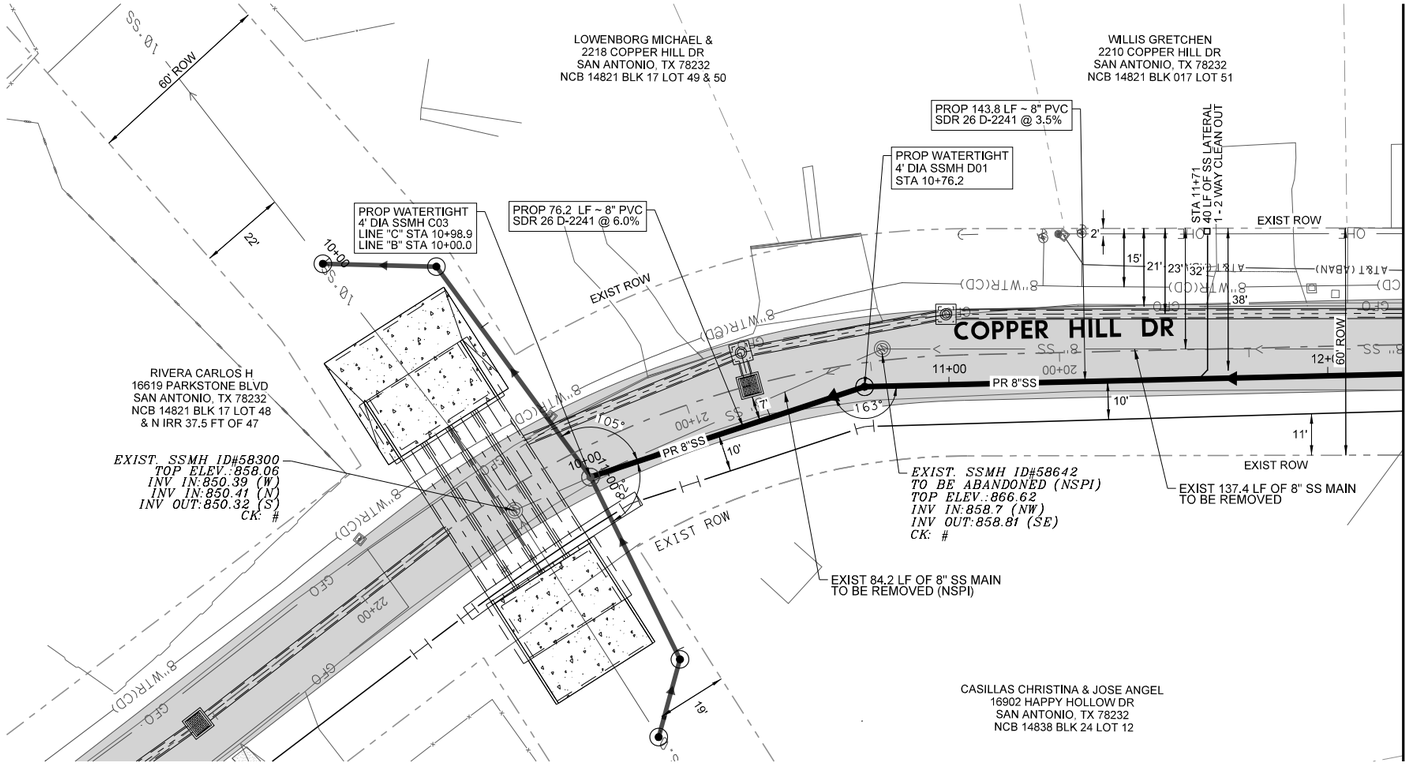
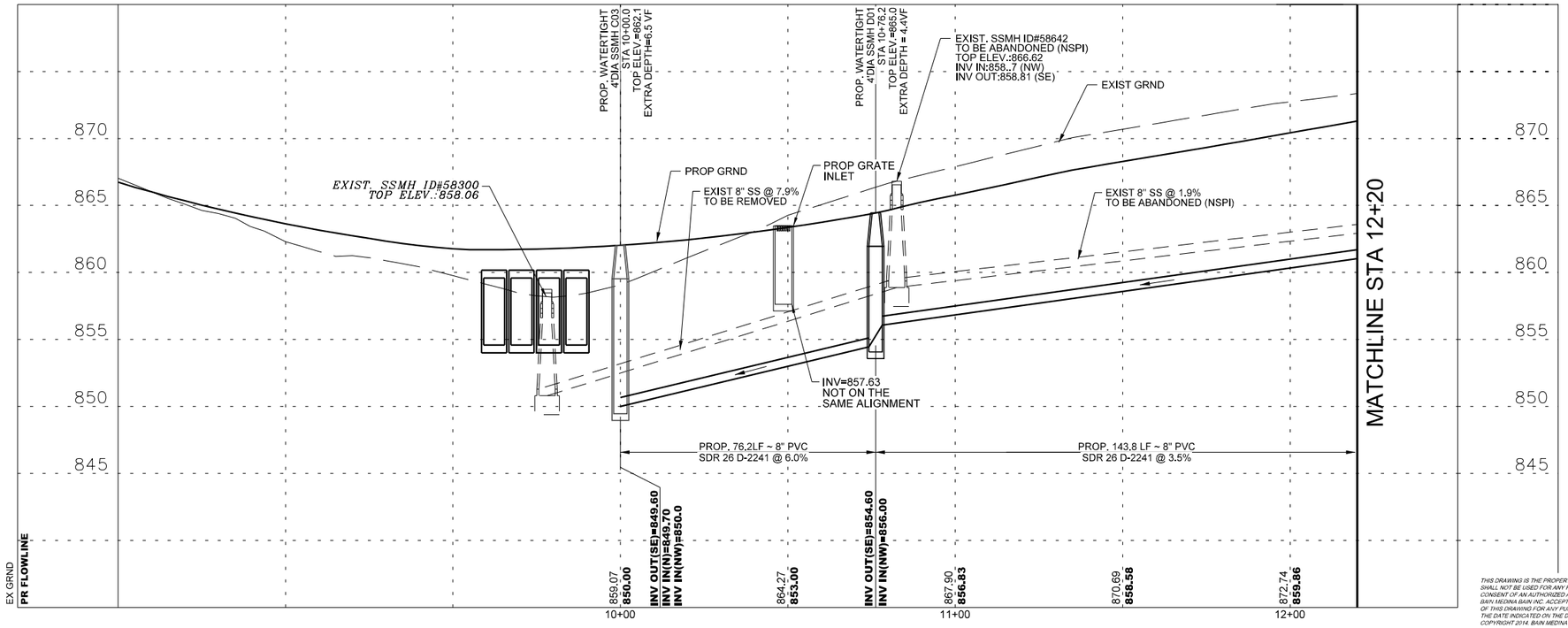
OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT
SANITARY SEWER PLAN & PROFILE
COPPER HILL DR LINE "C"

DEVELOPER:
CONT. BUDGET PROJ.
SUBMITTED
APPROVED
MAP No.
SECT. No.
DR. MC CK. CC/CB
100% SUBMITTAL
JOB No. 23-5562
9



PROP 8" SEWER LINE "D"
STA 10+00 TO STA 12+20



ITEM	DESCRIPTION	UNIT	QUANT.
550	Trench Excavation Safety Protection	LF	220.0
848	8" SDR-26 (D2241) PVC Sanitary Sewer Line (All Depths)	LF	220.0
852.1	Sanitary Sewer Manhole (0' - 6')	EA	1
852.3	Extra Depth Manholes (> 6')	VF	4.4
854	Sanitary Sewer Laterals	LF	40
854.1	Two-Way Sanitary Sewer Clean-out	EA	1
866	Sewer Main Pre Television Inspection (8" - 15")	LF	244.0
866	Sewer Main Post Television Inspection (8" - 15")	LF	220.0

20 25 0 40
HORIZ SCALE FEET
5 2.5 0 10
VERT SCALE FEET

SCALE:
HORIZ 1"=40'
VERT 1"=10'

LEGEND

- EXISTING WATER METER
- EXISTING FIRE HYDRANT
- EXISTING POWER POLE
- EXISTING WATER VALVE
- EXISTING MAIL BOX
- EXISTING FLOW ARROW
- PROP WATER MAIN
- EXIST WATER MAIN — 6"W
- PROP SANITARY SEWER
- EXIST SANITARY SEWER — 8"SS
- PROPOSED SEWER MANHOLE
- EXIST SEWER MANHOLE
- PROPOSED SEWER LATERAL AND CLEAN-OUT
- GAS MAIN — 2"G
- OVERHEAD ELECTRIC — OHE
- UNDERGROUND ELECTRIC — UE
- UNDERGROUND TELEPHONE — UT
- PROPOSED FLOW ARROWS
- TREE
- SIGN
- GUY ANCHOR
- TESTHOLE
- CONTROL POINT
- FLOWABLE
- PAVEMENT PATCH
- ROCK RIPRAP
- CAUTION GAS CROSSING

STATE OF TEXAS
CARL BAIN
56996
REGISTERED
PROFESSIONAL ENGINEER

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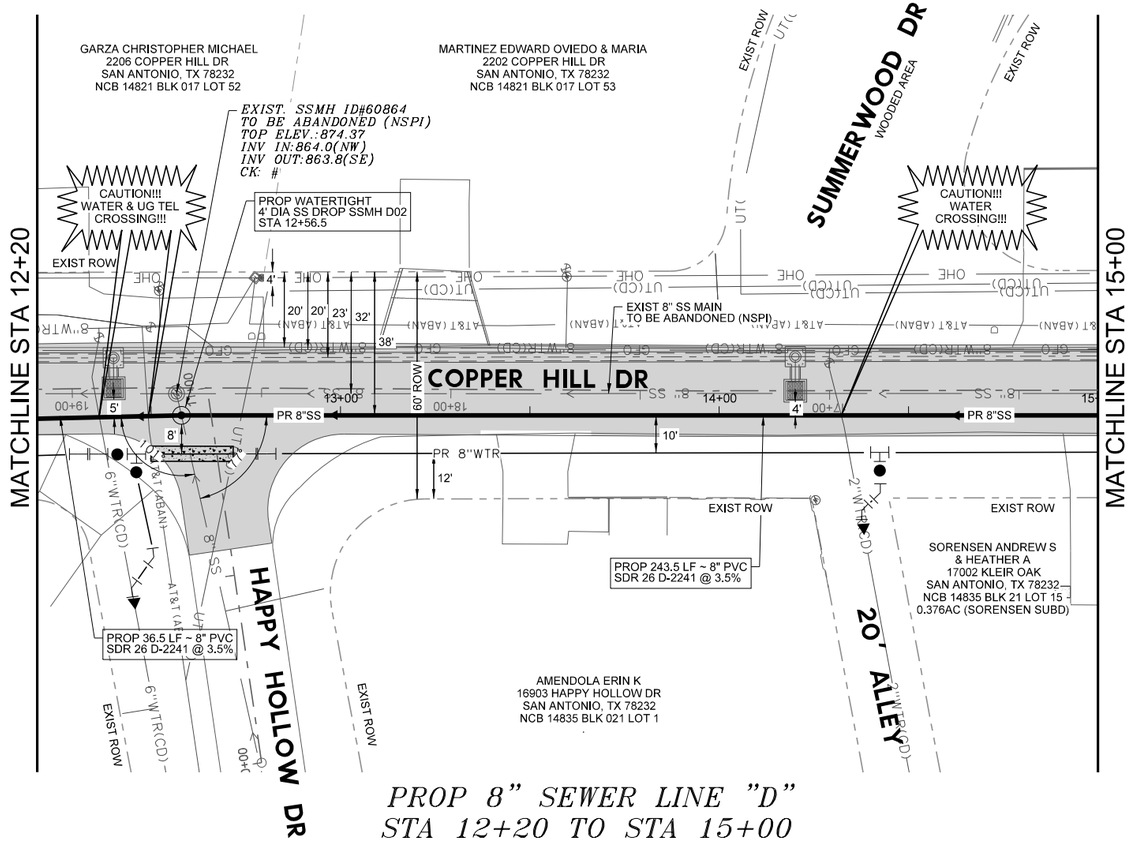
No.	DATE	DESCRIPTION	BY

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

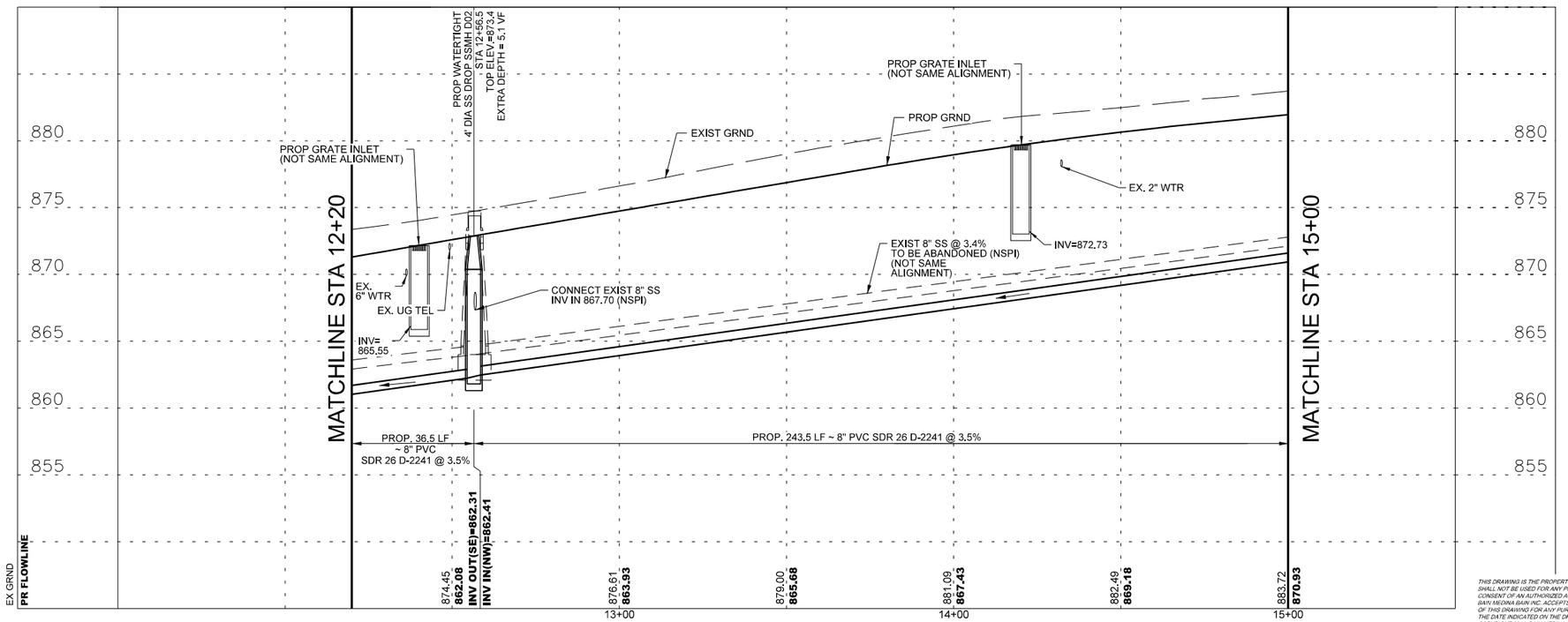
OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT
SANITARY SEWER
PLAN & PROFILE
COPPER HILL DR LINE "D"

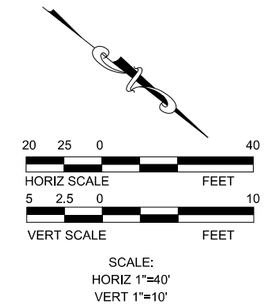
DEVELOPER:
CONT. BUDGET PROJ.
SUBMITTED
APPROVED
MAP No.
SECT. No.
DR. MC CK. CC/CB
100% SUBMITTAL
JOB No. 23-5562
10

ITEM	DESCRIPTION	UNIT	QUANT.
550	Trench Excavation Safety Protection	LF	280.0
848	8" SDR-26 (D2241) PVC Sanitary Sewer Line (All Depths)	LF	280.0
852.1	Sanitary Sewer Manhole (0' - 6')	EA	1
852.3	Extra Depth Manholes (> 6')	VF	5.1
866	Sewer Main Pre Television Inspection (8" - 15")	LF	280.0
866	Sewer Main Post Television Inspection (8" - 15")	LF	280.0



PROP 8" SEWER LINE "D"
STA 12+20 TO STA 15+00





SCALE:
HORIZ 1"=40'
VERT 1"=10'

LEGEND

- EXISTING WATER METER
- EXISTING FIRE HYDRANT
- EXISTING POWER POLE
- EXISTING WATER VALVE
- EXISTING MAIL BOX
- EXISTING FLOW ARROW
- PROP WATER MAIN
- EXIST WATER MAIN (6"W)
- PROP SANITARY SEWER
- EXIST SANITARY SEWER (8"SS)
- PROPOSED SEWER MANHOLE
- EXIST SEWER MANHOLE
- PROPOSED SEWER LATERAL AND CLEAN-OUT
- GAS MAIN (2"G)
- OVERHEAD ELECTRIC (OHE)
- UNDERGROUND ELECTRIC (UE)
- UNDERGROUND TELEPHONE (UT)
- PROPOSED FLOW ARROWS
- TREE
- SIGN
- GUY ANCHOR
- TESTHOLE
- CONTROL POINT
- FLOWABLE
- PAVEMENT PATCH
- ROCK RIPRAP
- CAUTION GAS CROSSING

STATE OF TEXAS
CARL BAIN
56996
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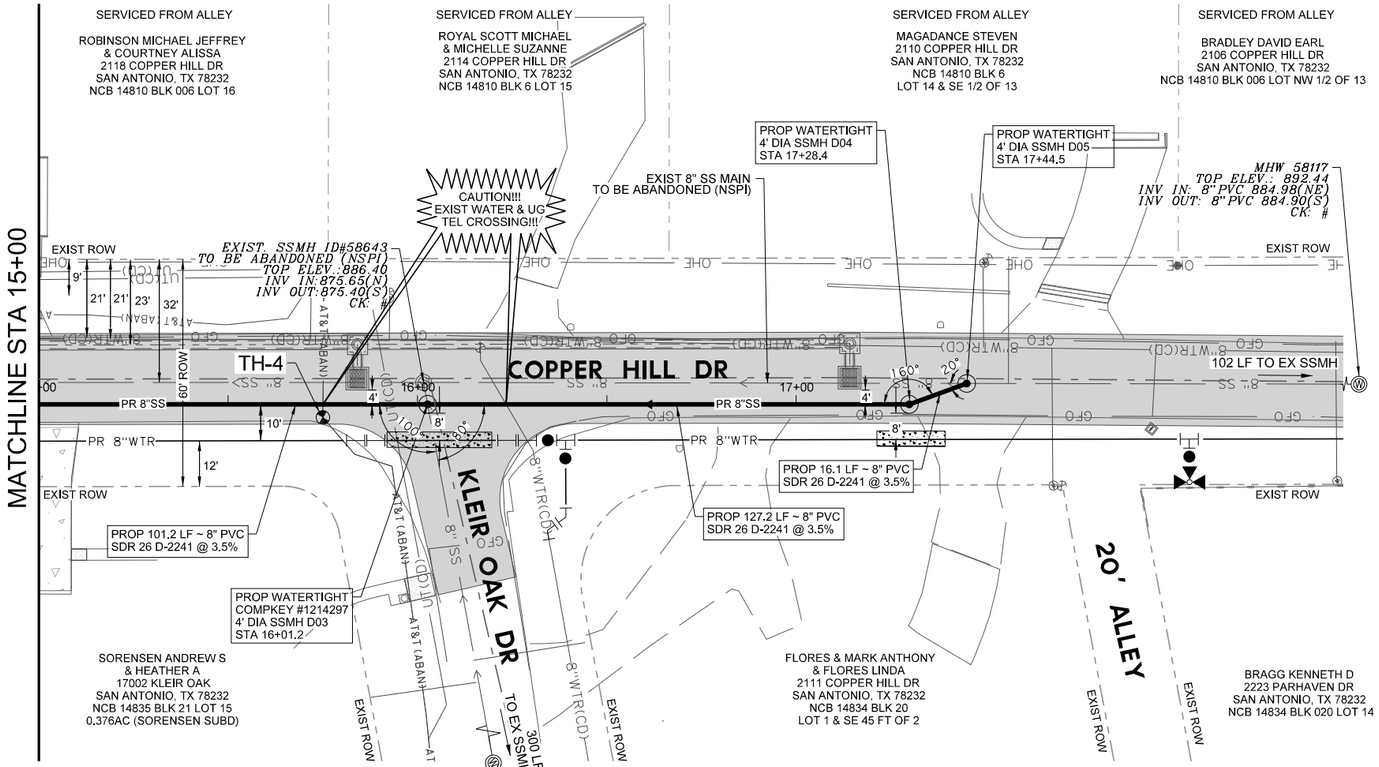
OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT

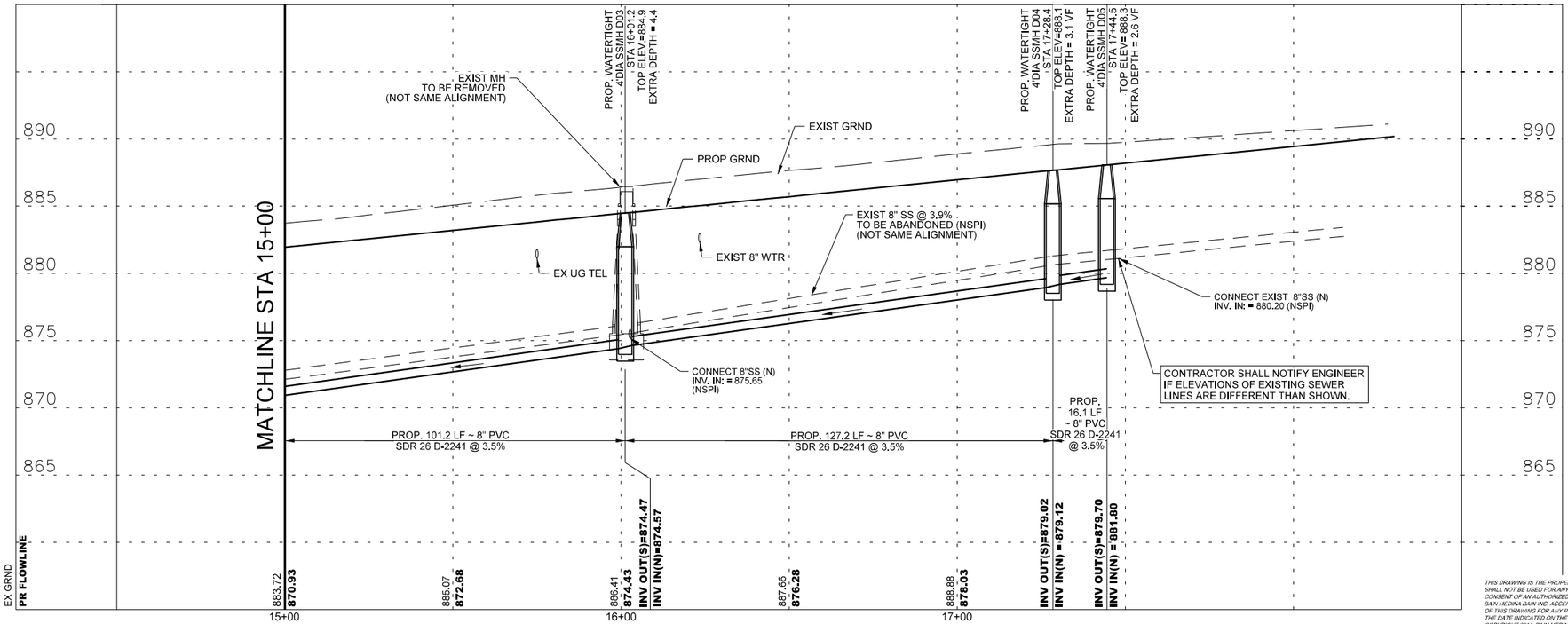
SANITARY SEWER PLAN & PROFILE

COPPER HILL DR LINE "D"

DEVELOPER:
CONT. BUDGET PROJ.
SUBMITTED
APPROVED
MAP No.
SECT. No.
DR. MC CK. CC/CB
100% SUBMITTAL
JOB No. 23-5562
11



PROP 8" SEWER LINE "D"
STA 15+00 TO STA 17+46.0



ITEM	DESCRIPTION	UNIT	QUANT.
550	Trench Excavation Safety Protection	LF	244.5
848	8" SDR-26 (D2241) PVC Sanitary Sewer Line (All Depths)	LF	244.5
852.1	Sanitary Sewer Manhole (0' - 6')	EA	3
852.3	Extra Depth Manholes (> 6')	VF	10.1
866	Sewer Main Pre Television Inspection (8" - 15")	LF	447.0
866	Sewer Main Post Television Inspection (8" - 15")	LF	245.0

20 25 0 40
HORIZ SCALE FEET
5 2.5 0 10
VERT SCALE FEET

SCALE:
HORIZ 1"=40'
VERT 1"=10'

TEST HOLE	UTILITIES	N	E	GND ELEV	TOP UTIL	DEPTH
TH-4	AT&T	13,767,313.24	2,139,726.52	885.98	884.53	1.45'

LEGEND

- EXISTING WATER METER
- EXISTING FIRE HYDRANT
- EXISTING POWER POLE
- EXISTING WATER VALVE
- EXISTING MAIL BOX
- EXISTING FLOW ARROW
- PROP WATER MAIN
- EXIST WATER MAIN (6"W)
- PROP SANITARY SEWER
- EXIST SANITARY SEWER (8"SS)
- PROPOSED SEWER MANHOLE
- EXIST SEWER MANHOLE
- PROPOSED SEWER LATERAL AND CLEAN-OUT
- GAS MAIN (2"G)
- OVERHEAD ELECTRIC (OHE)
- UNDERGROUND ELECTRIC (UE)
- UNDERGROUND TELEPHONE (UT)
- PROPOSED FLOW ARROWS
- TREE
- SIGN
- GUY ANCHOR
- TESTHOLE
- CONTROL POINT
- FLOWABLE
- PAVEMENT PATCH
- ROCK RIPRAP
- CAUTION GAS CROSSING

STATE OF TEXAS
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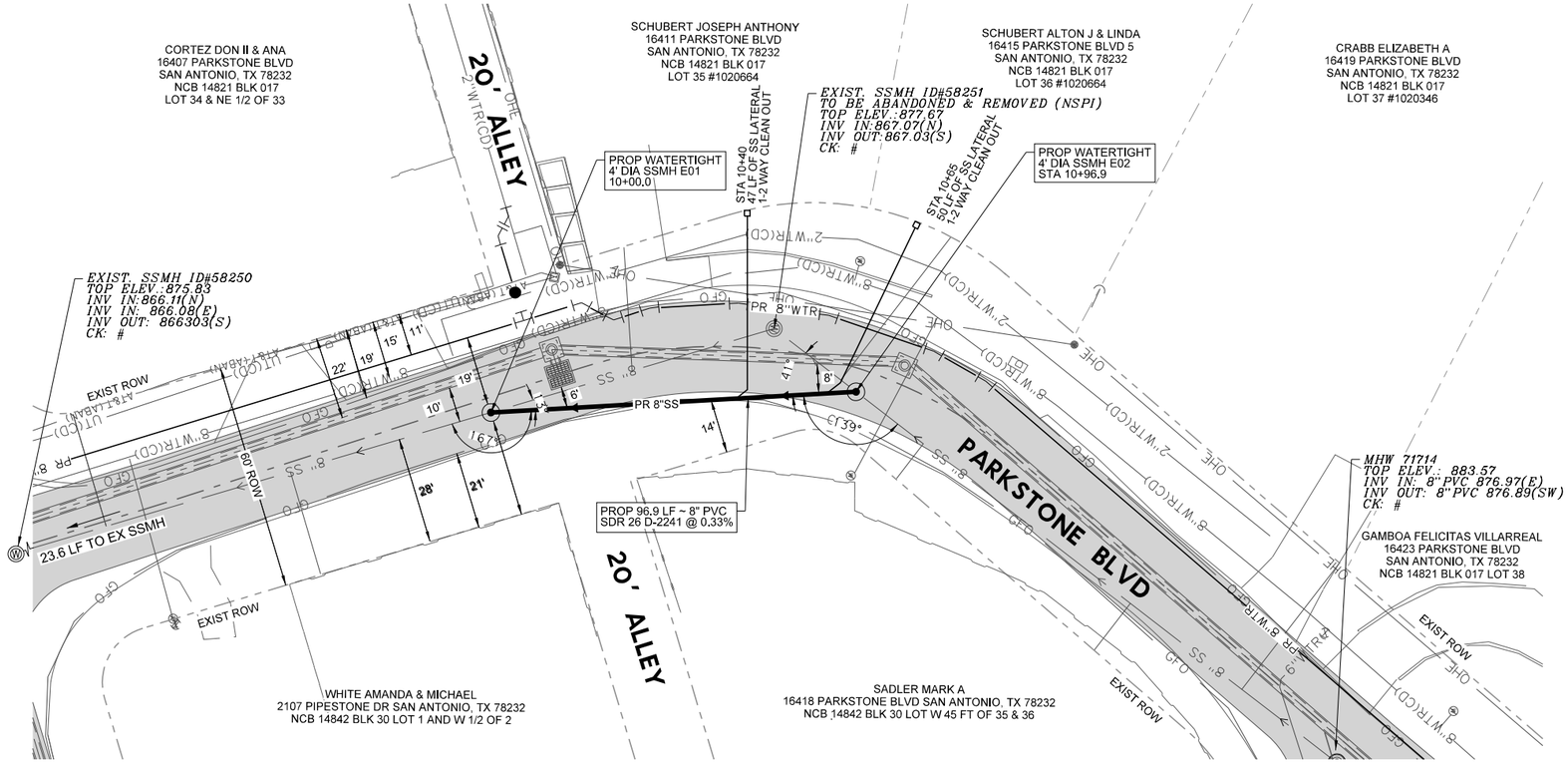
OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT
SANITARY SEWER
PLAN & PROFILE
COPPER HILL DR LINE "D"

DEVELOPER:
CONT. | BUDGET PROJ.
SUBMITTED
APPROVED
MAP No.
SECT. No.
DR. MC | CK. CC/CB | 100% SUBMITTAL | JOB No. 23-5562



ITEM	DESCRIPTION	UNIT	QUANT.
550	Trench Excavation Safety Protection	LF	96.9
848	8" SDR-26 (D2241) PVC Sanitary Sewer Line (All Depths)	LF	96.9
852.1	Sanitary Sewer Manhole (0' - 6')	EA	2
852.3	Extra Depth Manholes (> 6')	VF	7.5
854	Sanitary Sewer Laterals	LF	97
854.1	Two-Way Sanitary Sewer Clean-out	EA	2
866	Sewer Main Pre Television Inspection (8" - 15")	LF	417.0
866	Sewer Main Post Television Inspection (8" - 15")	LF	96.9

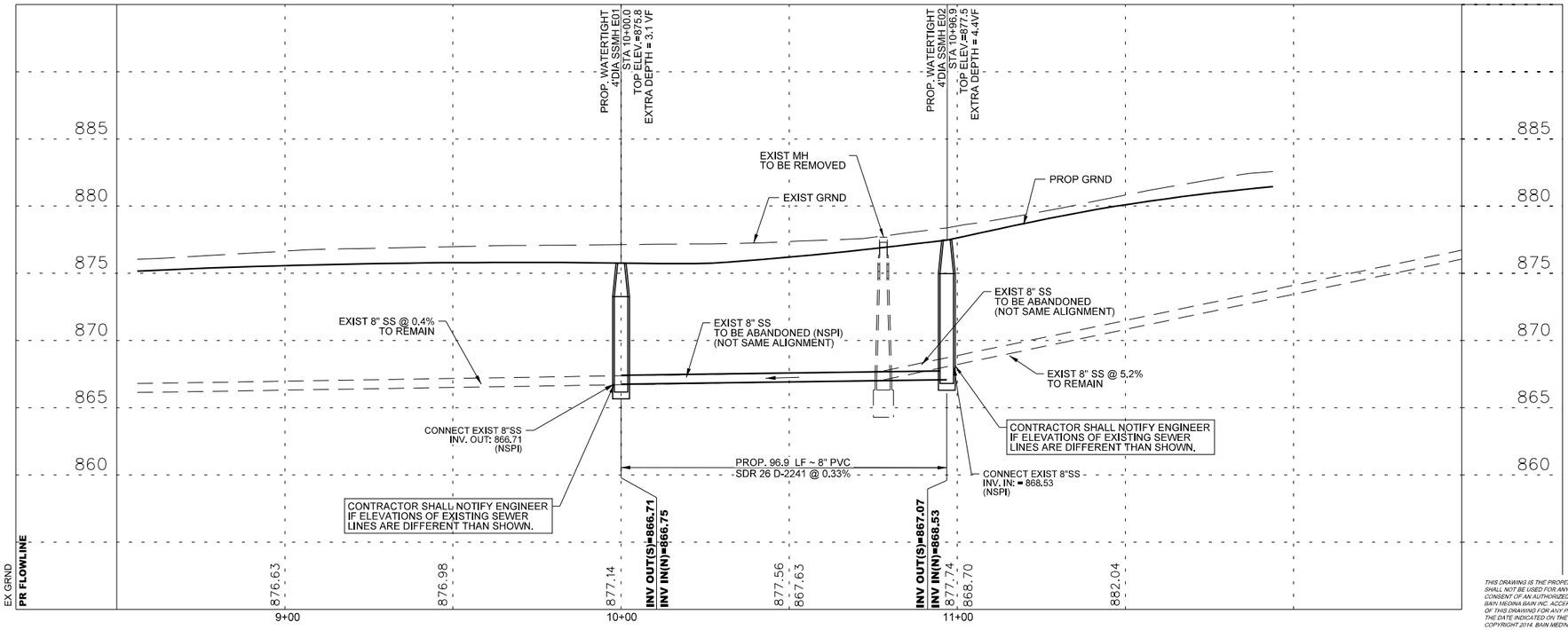
20 25 0 40
HORIZ SCALE FEET
5 2.5 0 10
VERT SCALE FEET

SCALE:
HORIZ 1"=40'
VERT 1"=10'

LEGEND

- EXISTING WATER METER
- EXISTING FIRE HYDRANT
- EXISTING POWER POLE
- EXISTING WATER VALVE
- EXISTING MAIL BOX
- EXISTING FLOW ARROW
- PROP WATER MAIN
- EXIST WATER MAIN 6"W
- PROP SANITARY SEWER
- EXIST SANITARY SEWER 8"SS
- PROPOSED SEWER MANHOLE
- EXIST SEWER MANHOLE
- PROPOSED SEWER LATERAL AND CLEAN-OUT
- GAS MAIN 2"G
- OVERHEAD ELECTRIC OHE
- UNDERGROUND ELECTRIC UE
- UNDERGROUND TELEPHONE UT
- PROPOSED FLOW ARROWS
- TREE
- SIGN
- GUY ANCHOR
- TESTHOLE
- CONTROL POINT
- FLOWABLE
- PAVEMENT PATCH
- ROCK RIPRAP
- CAUTION GAS CROSSING

PROP 8" SEWER LINE "E"
STA 10+00 TO STA 10+96.9



STATE OF TEXAS
CARL BAIN
56996
REGISTERED
PROFESSIONAL ENGINEER

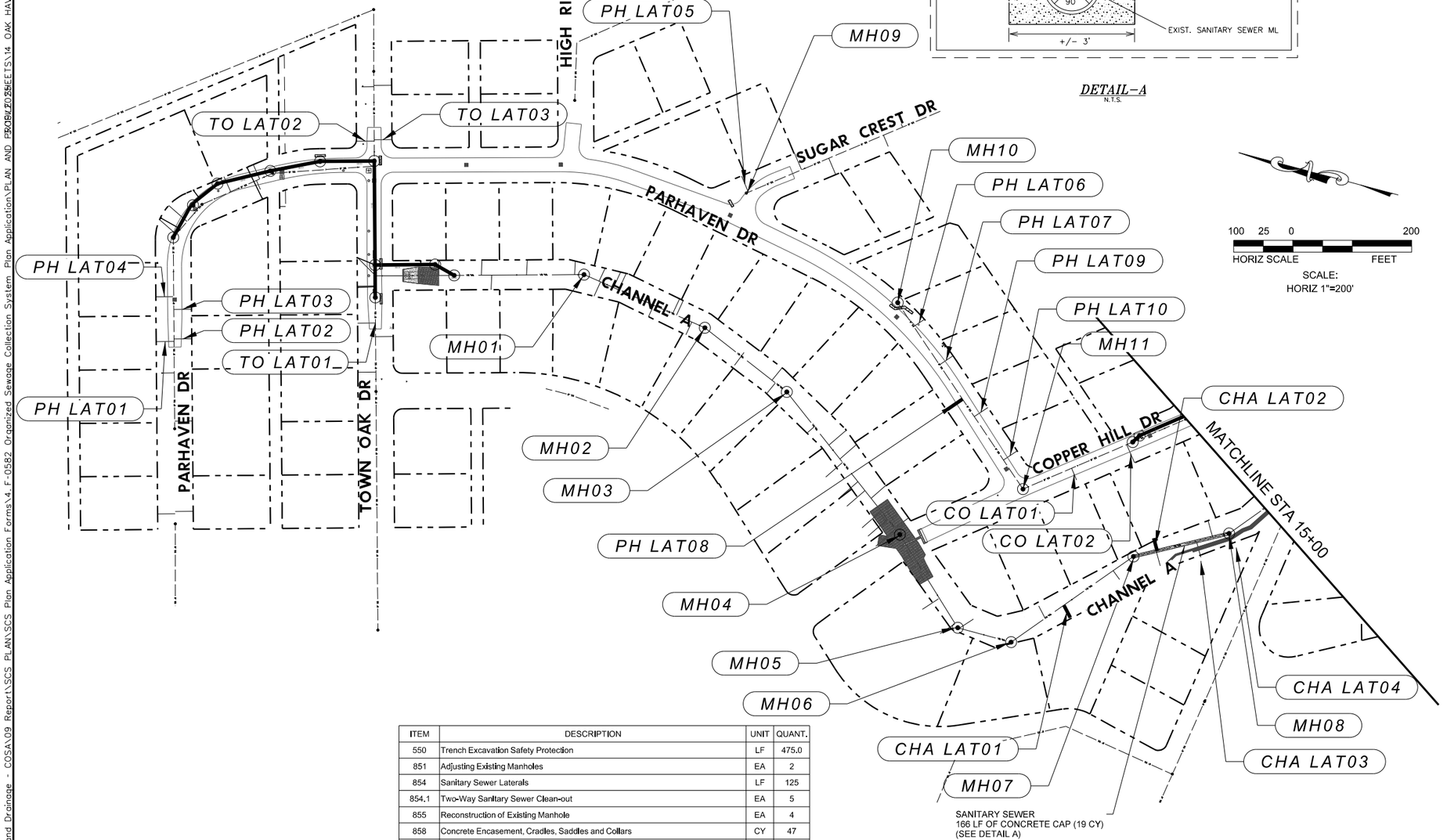
The seal appearing on this document was authorized by CARL BAIN P.E. 56996 ON 3/19/2025

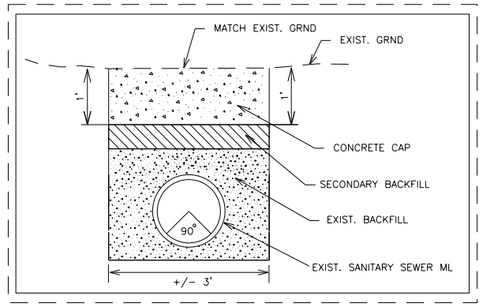
No.	DATE	DESCRIPTION	BY

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT
SANITARY SEWER PLAN & PROFILE
PARKSTONE BLVD LINE "E"

DEVELOPER:
CONT. | BUDGET PROJ.
SUBMITTED
APPROVED
MAP No.
SECT. No.
DR. MC | CK. CC/CB | 100% SUBMITTAL | JOB No. 23-5562 | 13





DETAIL–A
N.T.S.

100 25 0 200
HORIZ SCALE FEET

SCALE:
HORIZ 1"=200'

ITEM	DESCRIPTION	UNIT	QUANT.
550	Trench Excavation Safety Protection	LF	475.0
851	Adjusting Existing Manholes	EA	2
854	Sanitary Sewer Laterals	LF	125
854.1	Two-Way Sanitary Sewer Clean-out	EA	5
855	Reconstruction of Existing Manhole	EA	4
858	Concrete Encasement, Cradles, Saddles and Collars	CY	47
866	Sewer Main Pre Television Inspection (8" - 15")	LF	795.0
866	Sewer Main Post Television Inspection (8" - 15")	LF	795.0
910	Manhole Rehabilitation	VF	15.0
1109	Service Reconnection (By Open Cut Excavation (All Depths)	EA	5

APPROX. LOCATION OF SEWER FEATURES

FEATURE #	DESCRIPTION	STATION	OFFSET	EXIST MH ELEV	PROPOSED ELEV.	PROP IMPROV.
MH01	EXISTING MANHOLE	13+04	6' LF	899.86		
MH02	EXISTING MANHOLE	15+26	0' LF	896.49		
MH03	EXISTING MANHOLE	17+02	0' LF	888.63		
MH04	EXISTING MANHOLE	20+10	3' RT	882.19	884.42	Reconstruct
MH05	EXISTING MANHOLE	21+85	18' RT	879.42		
MH06	EXISTING MANHOLE	22+68	22' RT	878.97		
MH07	EXISTING MANHOLE	25+14	17' LF	873.43	875.09	Reconstruct
MH08	EXISTING MANHOLE	26+76	7' RT	868.17	869.76	Reconstruct
MH09	EXISTING MANHOLE	24+17	45' LF	914.99	915.00	Adjust
MH10	EXISTING MANHOLE	27+25	18' LF	908.68	908.00	Adjust
MH11	EXISTING MANHOLE	31+00	5' LF	892.44	891.50	Reconstruct

FEATURE #	DESCRIPTION	STATION	LATERAL (LF)	ENCASEMENT (CY)
PH LAT01	PROTECT LATERAL	12+44		2
PH LAT02	PROTECT LATERAL	12+48		2
PH LAT03	PROTECT LATERAL	12+98		2
PH LAT04	PROTECT LATERAL	13+20		2
PH LAT05	PROTECT LATERAL	24+20		2
PH LAT06	PROTECT LATERAL	27+71		2
PH LAT07	PROTECT LATERAL	28+48		2
PH LAT08	RELAY LATERAL	29+18	25	
PH LAT09	PROTECT LATERAL	29+53		2
PH LAT10	PROTECT LATERAL	30+41		2
TO LAT01	PROTECT LATERAL	11+10		2
TO LAT02	PROTECT LATERAL	14+16		2
TO LAT03	PROTECT LATERAL	14+19		2
CO LAT01	PROTECT LATERAL	12+72		2
CO LAT02	PROTECT LATERAL	13+73		2
CHA LAT01	RELAY LATERAL	11+65	25	
CHA LAT02	RELAY LATERAL	13+50	25	
CHA LAT03	RELAY LATERAL	14+20	25	
CHA LAT04	RELAY LATERAL	14+75	25	

SANITARY SEWER NOTES:
1. FOR SEWER LATERAL PROTECTION SEE DETAIL DD-858-02 "CONCRETE SADDLE, SAWS SPEC 858.
2. CONTRACTOR TO COORDINATE WITH SAWS INSPECTOR AND ENGINEER DURING CONSTRUCTION TO LOCATE AND DETERMINE THE EXISTING SANITARY SEWER LATERAL ELEVATIONS (NSPI). CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH SAWS INSPECTOR TO DETERMINE IF PROTECTION WILL BE NECESSARY.(NSPI)
3. LATERALS WERE PLACED BY RECORDS ONLY. FINAL LOCATION OF LATERALS WILL BE DETERMINED BY CONTRACTOR'S PRE-CCTV. CONTRACTOR TO PROVIDE PRE-CCTV TO SAWS FOR REVIEW AND DETERMINATION IF LATERALS ARE TO BE RELAYED.

STATE OF TEXAS
CARL BAIN
56996
REGISTERED
PROFESSIONAL ENGINEER

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ENGINEERS & SURVEYORS
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7073 San Pedro, San Antonio, Texas, 78216
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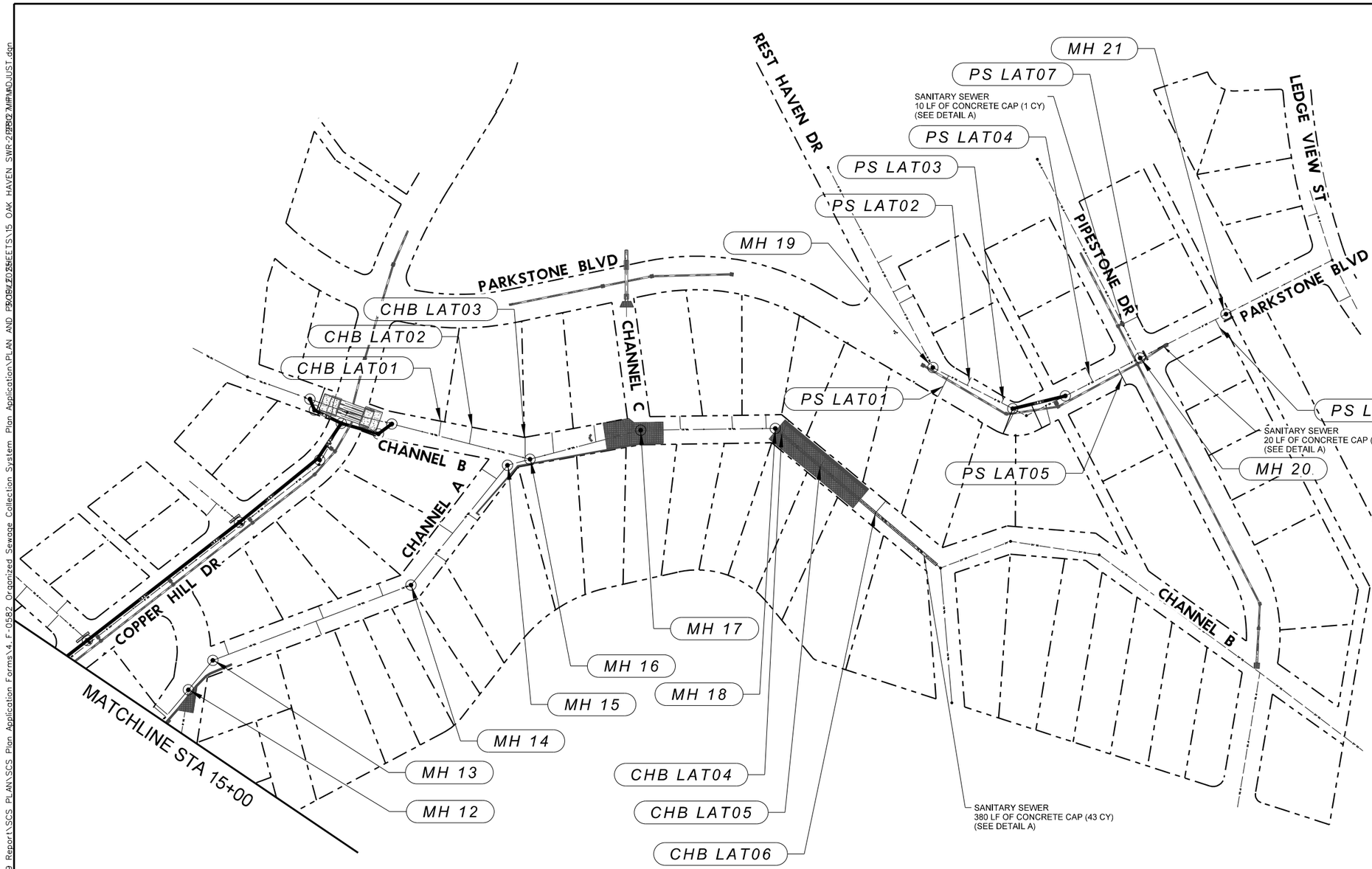
OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
WATER MAIN REPLACEMENT

SEWER MANHOLE ADJUSTMENTS

DEVELOPER:
CONT. BUDGET PROJ.
SUBMITTED
APPROVED
MAP No.
SECT. No.
DR. MC CK. CC/CB
100% SUBMITTAL
JOB No. 23-5063
14

W:\Work\C-1628.05 Oak Haven Area Streets and Drainage - COSA\09 Report\SCS PLAN\SCS Plan Application Forms\4.F-0582 Organized Sewage Collection System Plan Application\PLAN AND PROFILE SHEETS\14 OAK HAVEN SWR-2 PROJECT 2025 MH ADJUST.dgn



APPROX. LOCATION OF SEWER FEATURES

FEATURE #	DESCRIPTION	STATION	OFFSET	EXIST MH ELEV	PROPOSED ELEV	PROP IMPROV.
MH12	EXISTING MANHOLE	28+21	9' RT	866.90	867.90	Reconstruct
MH13	EXISTING MANHOLE	28+94.	0' LF	865.29	866.35	Reconstruct
MH14	EXISTING MANHOLE	32+74	0' RT	858.57		
MH15	EXISTING MANHOLE	35+49	8' RT	853.13	854.50	Reconstruct
MH16	EXISTING MANHOLE	14+06	15' RT	850.93	852.38	Reconstruct
MH17	EXISTING MANHOLE	16+10	0' LF	848.16	849.95	Reconstruct
MH18	EXISTING MANHOLE	18+51	0' LF	846.43	848.38	Reconstruct
MH19	EXISTING MANHOLE	21+37	4' LF	883.57	882.24	Reconstruct
MH20	EXISTING MANHOLE	25+48	0' LF	875.83	875.07	Reconstruct
MH21	EXISTING MANHOLE	27+20	0' LF	871.89		

FEATURE #	DESCRIPTION	STATION	LATERAL (LF)	ENCASEMENT (CY)
PS LAT01	RELAY LATERAL	21+64	25	
PS LAT02	PROTECT LATERAL	22+00		2
PS LAT03	PROTECT LATERAL	22+72		2
PS LAT04	PROTECT LATERAL	24+53		2
PS LAT05	RELAY LATERAL	25+04	25	
PS LAT06	PROTECT LATERAL	26+99		2
PS LAT07	PROTECT LATERAL	25+48		2
CHB LAT01	PROTECT LATERAL	12+43		2
CHB LAT02	PROTECT LATERAL	13+00		2
CHB LATO3	PROTECT LATERAL	14+00		2
CHB LAT04	RELAY LATERAL	18+67	25	
CHB LAT05	RELAY LATERAL	19+57	25	
CHB LATO6	RELAY LATERAL	20+87	25	

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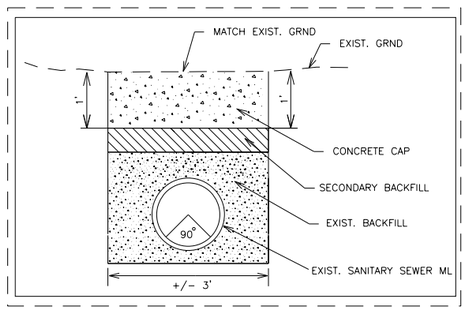
3. LATERALS WERE PLACED BY RECORDS ONLY. FINAL LOCATION OF LATERALS WILL BE DETERMINED BY CONTRACTOR'S PRE-CCTV. CONTRACTOR TO PROVIDE PRE-CCTV TO SAWS FOR REVIEW AND DETERMINATION IF LATERALS ARE TO BE RELAYED.

100 25 0 200
HORIZ SCALE FEET

SCALE:
HORIZ 1"=200'

ITEM	DESCRIPTION	UNIT	QUANT.
550	Trench Excavation Safety Protection	LF	705.0
854	Sanitary Sewer Laterals	LF	125
854.1	Two-Way Sanitary Sewer Clean-out	EA	5
855	Reconstruction of Existing Manhole	EA	8
858	Concrete Encasement, Cradles, Saddles and Collars	CY	62
866	Sewer Main Pre Television Inspection (8" - 15")	LF	386.0
866	Sewer Main Post Television Inspection (8" - 15")	LF	386.0
1109	Service Reconnection (By Open Cut Excavation (All Depths)	EA	5



DETAIL-A
N.T.S.

STATE OF TEXAS
CARL BAIN
56996
REGISTERED
PROFESSIONAL ENGINEER

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No.	DATE	DESCRIPTION	BY

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
WATER MAIN REPLACEMENT

SEWER MANHOLE ADJUSTMENTS

DEVELOPER:

CONT.	BUDGET PROJ.

SUBMITTED
APPROVED

MAP No.			
SECT. No.		100% SUBMITTAL	15
DR. MC	CK. CC/CB	JOB No. 23-5063	

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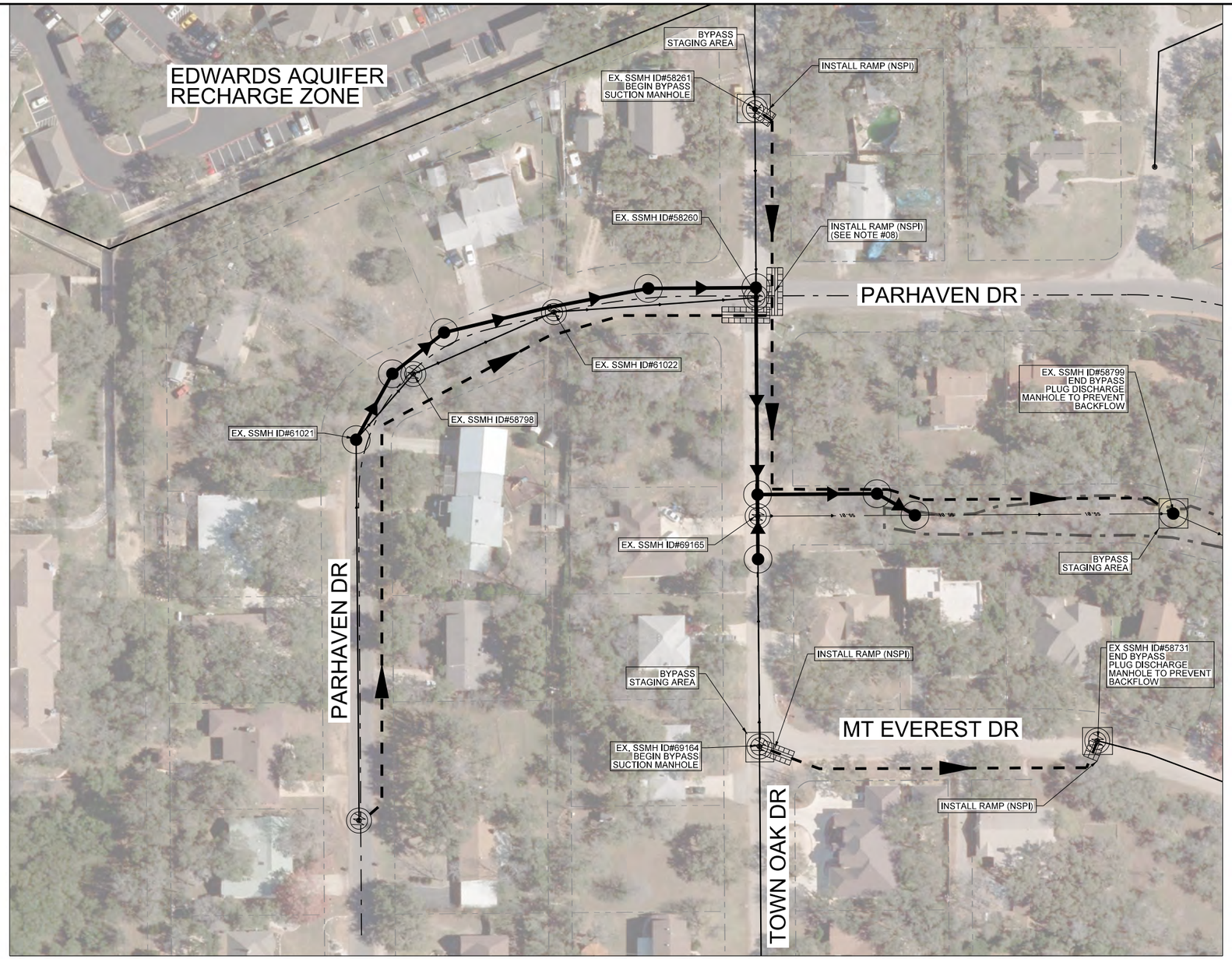

50 25 0 100
HORIZ SCALE FEET

SCALE:
HORIZ 1"=100'

LEGEND

- EXISTING SEWER
- PROPOSED SEWER
- PROPOSED BYPASS
- CONSTRUCTION AREA / BYPASS STAGING
- BYPASS DRIVEWAY RAMP
- FLOOD PLAIN

LEGEND

- EXISTING WATER METER
- EXISTING FIRE HYDRANT
- EXISTING POWER POLE
- EXISTING WATER VALVE
- EXISTING MAIL BOX
- EXISTING FLOW ARROW
- PROP WATER MAIN
- EXIST WATER MAIN
- PROP SANITARY SEWER
- EXIST SANITARY SEWER
- PROPOSED SEWER MANHOLE
- EXIST SEWER MANHOLE
- PROPOSED SEWER LATERAL AND CLEAN-OUT
- GAS MAIN
- OVERHEAD ELECTRIC
- UNDERGROUND ELECTRIC
- UNDERGROUND TELEPHONE
- PROPOSED FLOW ARROWS
- TREE
- SIGN
- GUY ANCHOR
- TESTHOLE
- CONTROL POINT
- FLOWABLE
- PAVEMENT PATCH
- ROCK RIPRAP
- CAUTION GAS CROSSING

SUGGESTED BYPASS PUMPING PLAN

NOTES:
1. INFORMATION ON THIS SHEET IS FOR CONTRACTOR'S INFORMATION ONLY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE INFORMATION.
2. CONTRACTOR SHALL MAINTAIN VEHICULAR ACCESS THROUGH ALL DRIVEWAYS FOR EMERGENCY ACCESS AT ALL TIMES DURING CONSTRUCTION AND BYPASS PUMPING.
3. ANY CHANGES TO THE SUGGESTED BYPASS PLAN WILL NEED TO BE IMMEDIATELY COORDINATED WITH SAWS DUE TO TXDOT PERMITTING REQUIREMENTS AND RESTRICTIONS. SEE CONTRACT DOCUMENTS SPTS SECTION FOR ADDITIONAL INFORMATION.
4. CONTRACTOR SHALL WORK OFF-PEAK HOURS WHEN FLOWS ARE MINIMAL. CONTRACTOR TO COORDINATE W/COSA PRIOR TO BYPASS PUMPING EQUIPMENT SET-UP.
5. CONTRACTOR IS RESPONSIBLE TO MAINTAIN A CLEAR PATH FOR PEDESTRIANS DURING CONSTRUCTION AND BYPASS OPERATION. (NSPI)
6. CONTRACTOR TO INSTALL VEHICULAR RAMPS IF REQUIRED BY THE CITY OF SAN ANTONIO IN ORDER TO MINIMIZE TRAFFIC DISTURBANCE. (NSPI)
7. CONTRACTOR IS RESPONSIBLE TO INSTALL BY-PASS PUMPING OR MANAGE THE SEWER FLOWS DURING EACH OF THE SANITARY SEWER MANHOLE ADJUSTMENT OR RECONSTRUCTION. A BY-PASS PUMPING PLAN WILL HAVE TO BE SUBMITTED AND APPROVED BY THE ENGINEER. THE BY-PASS PUMPING FOR MANHOLE ADJUSTMENTS AND RECONSTRUCTION SHALL BE SUBSIDIARY TO ITEM 851 AND 855.
8. CONTRACTOR IS RESPONSIBLE TO BURY THE BYPASS PIPING WHEN CROSSING ANY WORKSITE STREETS. THE INSTALLATION REMOVAL AND RESTORATION SHALL BE SUBSIDIARY TO THE BYPASS TOTAL COST.

STATE OF TEXAS
CARL BAIN
56996
REGISTERED
PROFESSIONAL ENGINEER

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BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT
SUGGESTED BYPASS
PUMPING PLAN - SS LINES A & B

DEVELOPER:

CONT.	BUDGET PROJ.

SUBMITTED
APPROVED

MAP No.			
SECT. No.		100% SUBMITTAL	16
DR. MC	CK. CC/CB	JOB No. 23-5562	

W:\Work\C-1628.05 Oak Haven Area Streets and Drainage - COSA\09 Report\SCS PLAN\SCS Plan Application Forms\4. F-0582 Organized Sewage Collection System Plan Application\PLAN AND PROFILE SHEETS\16 OAK HAVEN_BY-PASS_PHASE.dwg

50 25 0 100
HORIZ SCALE FEET

SCALE:
HORIZ 1"=100'

LEGEND

- EXISTING SEWER
- PROPOSED SEWER
- PROPOSED BYPASS
- CONSTRUCTION AREA / BYPASS STAGING
- BYPASS DRIVEWAY RAMP
- FLOOD PLAIN

LEGEND

- EXISTING WATER METER
- EXISTING FIRE HYDRANT
- EXISTING POWER POLE
- EXISTING WATER VALVE
- EXISTING MAIL BOX
- EXISTING FLOW ARROW
- PROP WATER MAIN
- EXIST WATER MAIN — 6"W
- PROP SANITARY SEWER
- EXIST SANITARY SEWER — 8"SS
- PROPOSED SEWER MANHOLE
- EXIST SEWER MANHOLE
- PROPOSED SEWER LATERAL AND CLEAN-OUT
- GAS MAIN — 2"G
- OVERHEAD ELECTRIC — OHE
- UNDERGROUND ELECTRIC — UE
- UNDERGROUND TELEPHONE — UT
- PROPOSED FLOW ARROWS
- TREE
- SIGN
- GUY ANCHOR
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STATE OF TEXAS
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SUGGESTED BYPASS PUMPING PLAN

No.	DATE	DESCRIPTION	BY

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TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT

SUGGESTED BYPASS PUMPING PLAN - SS LINE C & D

DEVELOPER:

CONT.	BUDGET PROJ.

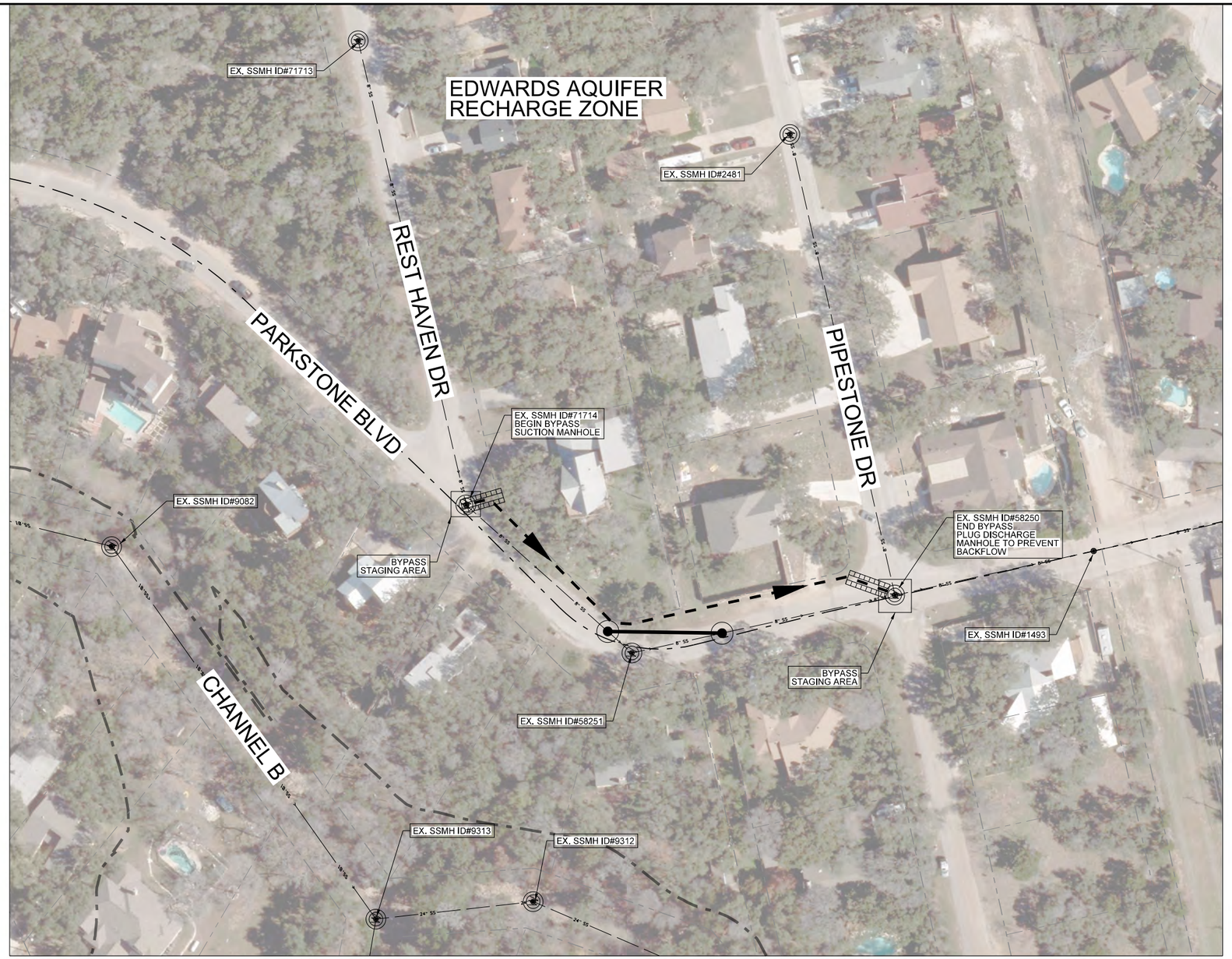
SUBMITTED _____

APPROVED _____

MAP No.

SECT. No.		100% SUBMITTAL	17
DR. MC	CK. CC/CB	JOB No. 23-5562	

W:\Work\C-1628.05 Oak Haven Area Streets and Drainage - COSA\09 Report\SCS PLAN\SCS Plan Application Forms\v4. F-0582 Organized Sewage Collection System Plan Application\PLAN AND PROFILE SHEETS\18 OAK HAVEN-BY-PASS.dgn



50 25 0 100
HORIZ SCALE FEET

SCALE:
HORIZ 1"=100'

LEGEND

- EXISTING SEWER
- PROPOSED SEWER
- PROPOSED BYPASS
- CONSTRUCTION AREA / BYPASS STAGING
- BYPASS DRIVEWAY RAMP
- FLOOD PLAIN

LEGEND

- EXISTING WATER METER
- EXISTING FIRE HYDRANT
- EXISTING POWER POLE
- EXISTING WATER VALVE
- EXISTING MAIL BOX
- EXISTING FLOW ARROW
- PROP WATER MAIN
- EXIST WATER MAIN
- PROP SANITARY SEWER
- EXIST SANITARY SEWER
- PROPOSED SEWER MANHOLE
- EXIST SEWER MANHOLE
- PROPOSED SEWER LATERAL AND CLEAN-OUT
- GAS MAIN
- OVERHEAD ELECTRIC
- UNDERGROUND ELECTRIC
- UNDERGROUND TELEPHONE
- PROPOSED FLOW ARROWS
- TREE
- SIGN
- GUY ANCHOR
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- ROCK RIPRAP
- CAUTION GAS CROSSING

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SUGGESTED BYPASS PUMPING PLAN

No.	DATE	DESCRIPTION	BY

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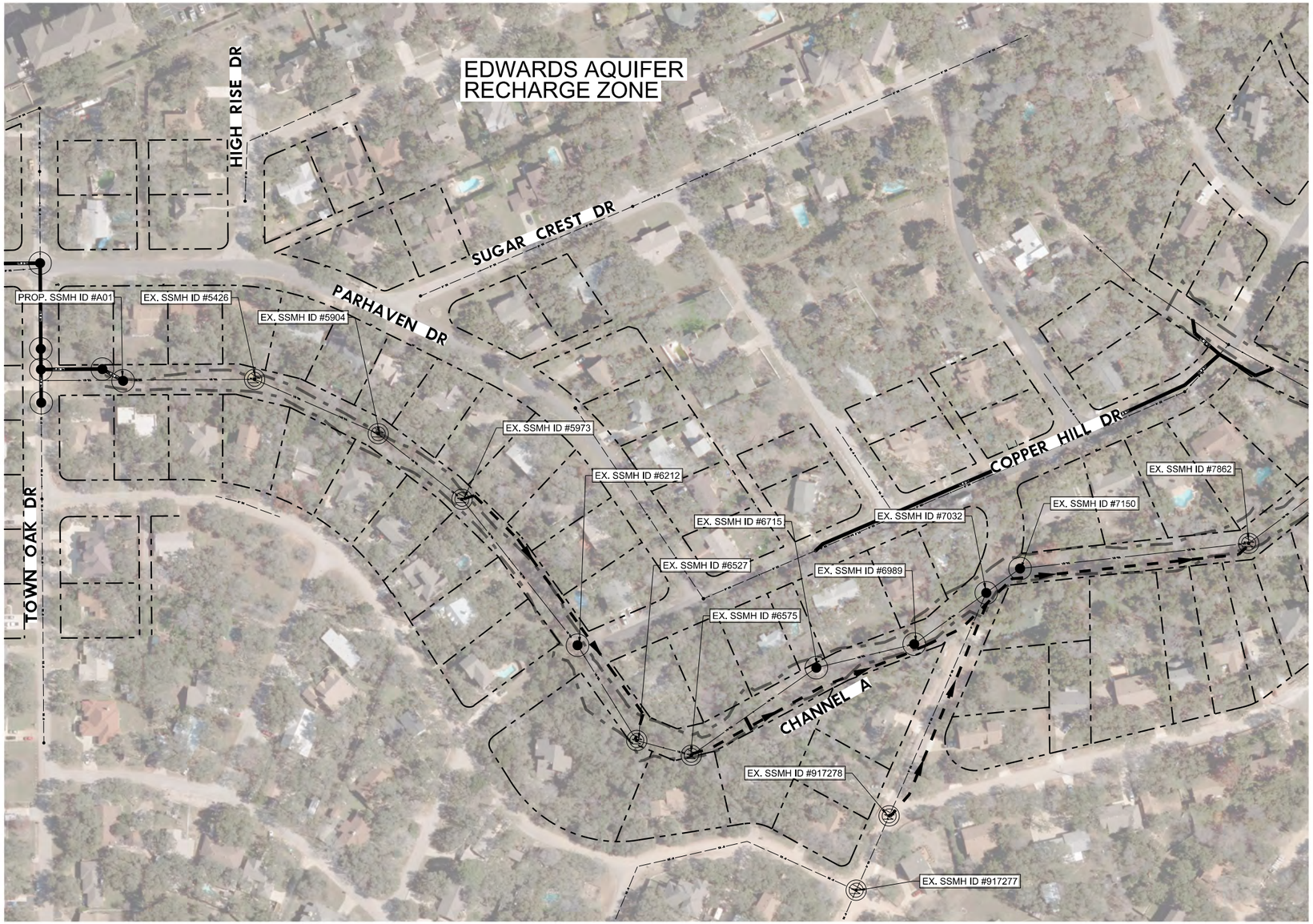
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
SEWER MAIN REPLACEMENT

SUGGESTED BYPASS PUMPING PLAN - SS LINE E

DEVELOPER:
CONT. | BUDGET PROJ.
SUBMITTED
APPROVED
MAP No.
SECT. No.
DR. MC | CK. CC/CB | 100% SUBMITTAL | JOB No. 23-5562 | 18



SUGGESTED BYPASS PUMPING PLAN

NOTES:
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2. CONTRACTOR SHALL MAINTAIN VEHICULAR ACCESS THROUGH ALL DRIVEWAYS FOR EMERGENCY ACCESS AT ALL TIMES DURING CONSTRUCTION AND BYPASS PUMPING.
3. ANY CHANGES TO THE SUGGESTED BYPASS PLAN WILL NEED TO BE IMMEDIATELY COORDINATED WITH SAWS DUE TO TXDOT PERMITTING REQUIREMENTS AND RESTRICTIONS. SEE CONTRACT DOCUMENTS SPTS SECTION FOR ADDITIONAL INFORMATION.
4. CONTRACTOR SHALL WORK OFF-PEAK HOURS WHEN FLOWS ARE MINIMAL. CONTRACTOR TO COORDINATE W/COSA PRIOR TO BYPASS PUMPING EQUIPMENT SET-UP.
5. CONTRACTOR IS RESPONSIBLE TO MAINTAIN A CLEAR PATH FOR PEDESTRIANS DURING CONSTRUCTION AND BYPASS OPERATION. (NSPI)
6. CONTRACTOR TO INSTALL VEHICULAR RAMPS IF REQUIRED BY THE CITY OF SAN ANTONIO IN ORDER TO MINIMIZE TRAFFIC DISTURBANCE. (NSPI)
7. CONTRACTOR IS RESPONSIBLE TO INSTALL BY-PASS PUMPING OR MANAGE THE SEWER FLOWS DURING EACH OF THE SANITARY SEWER MANHOLE ADJUSTMENT OR RECONSTRUCTION. A BY-PASS PUMPING PLAN WILL HAVE TO BE SUBMITTED AND APPROVED BY THE ENGINEER. THE BY-PASS PUMPING FOR MANHOLE ADJUSTMENTS AND RECONSTRUCTION SHALL BE SUBSIDIARY TO ITEM 851 AND 855.

100 25 0 200
HORIZ SCALE FEET

SCALE:
HORIZ 1"=200'

LEGEND

- EXISTING SEWER
- PROPOSED SEWER
- PROPOSED BYPASS
- CONSTRUCTION AREA / BYPASS STAGING
- BYPASS DRIVEWAY RAMP
- FLOOD PLAIN

STATE OF TEXAS
CARL BAIN
56996
REGISTERED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by
CARL BAIN
P.E. 56996 ON
7/19/2025

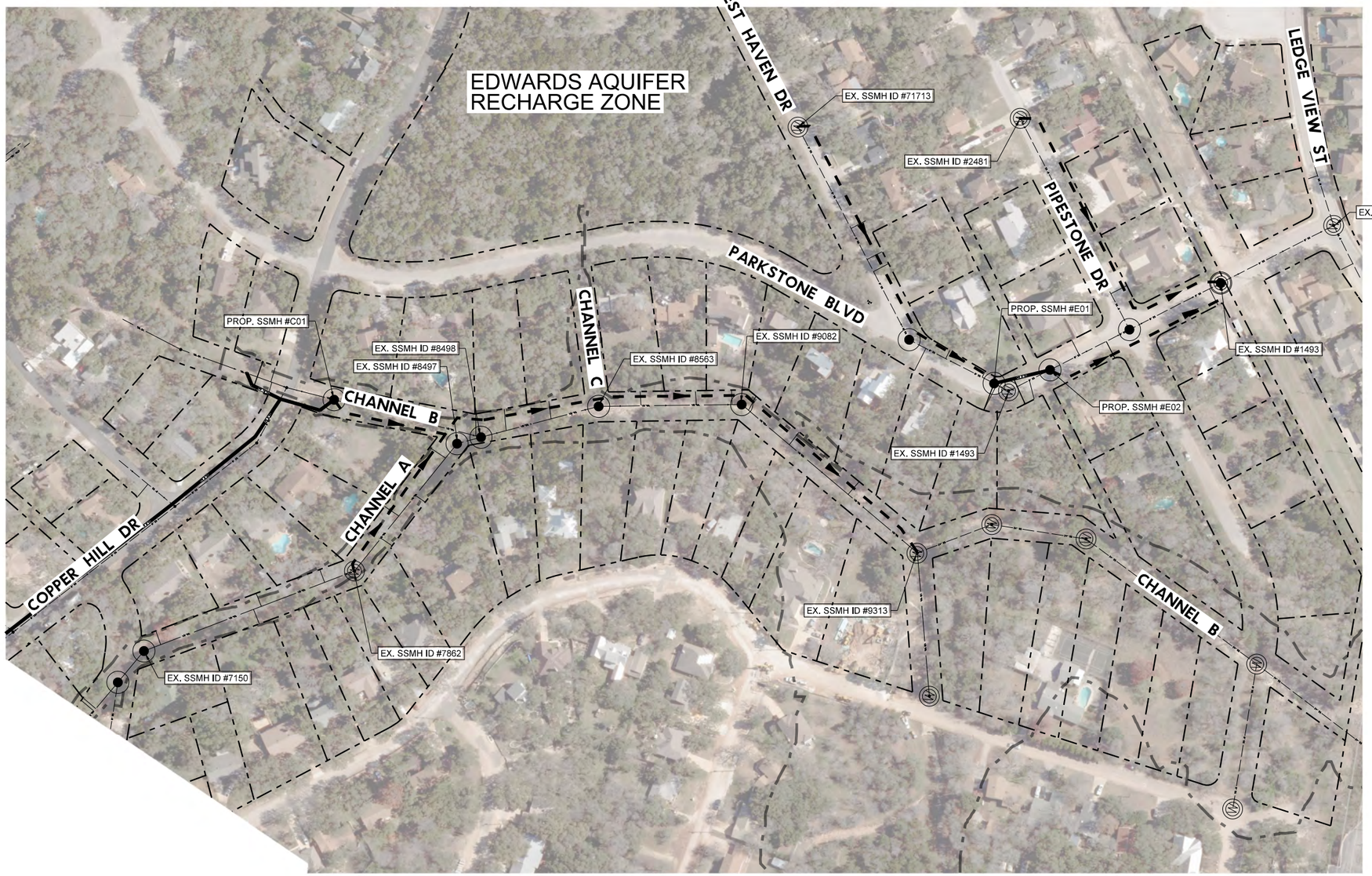
No.	DATE	DESCRIPTION	BY

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
TBPE F-001712
7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

OAK HAVEN AREA STREETS
AND DRAINAGE PROJECT (KENTWOOD PH 2)
WATER MAIN REPLACEMENT

SUGGESTED BYPASS PUMPING PLAN - SS CHNL MHS

DEVELOPER:
CONT. BUDGET PROJ.
SUBMITTED
APPROVED
MAP No.
SECT. No.
DR. MC CK. CC/CB
100% SUBMITTAL
JOB No. 23-5063
19



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HORIZ SCALE FEET

SCALE:
HORIZ 1"=200'

LEGEND

- EXISTING SEWER
- PROPOSED SEWER
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STATE OF TEXAS
CARL BAIN
56996
REGISTERED PROFESSIONAL ENGINEER

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SUGGESTED BYPASS PUMPING PLAN

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JOB No. 23-5063
20

LIFT STATION/FORCE MAIN SYSTEM APPLICATION

(TCEQ-0624)

(Not Applicable)

TEMPORARY STORMWATER SECTION

(TCEQ-0602)

Temporary Stormwater Section

Texas Commission on Environmental Quality

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

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

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

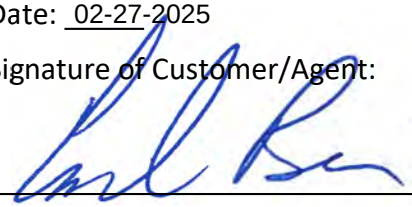
Signature

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

Print Name of Customer/Agent: Carl Bain, P.E

Date: 02-27-2025

Signature of Customer/Agent:



Regulated Entity Name: Oak Haven Area Street & Drainage (Kentwood Phase 2)

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: Diesel

   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: Tributary to Lorrence 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

The objective of this section is to describe measures to prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

The following steps will help reduce the storm water impacts of leaks and spills:

Education

(1) Be aware that different materials pollute in different amounts. Make sure that each employee knows what a “significant spills” is for each material they use, and is the appropriate response for “significant” and “insignificant” spills. Employees should able be aware of when spill must be reported to the TCEQ. Information is available in 30 TAC 327.4 and 40CFR 302.4.
(2) Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
(3) Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
(4) Establish a continuing education program to indoctrinate new employees.
(5) Have contactor’s superintendent or representative oversee and enforce proper spill prevention and control up immediately.

General Measures

1) To the extent the work can be accomplished safety, spills of oil, petroleum, and substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained cleaned up immediately.
2) Store hazardous materials and wastes in covered containers and protect from vandalism.
3) Place a stockpile of spill cleanup materials where it will be readily accessible.
4) Train employees in spill prevention and cleanup.

5) Designate responsible individuals to oversee and enforce control measures.
6) Spills should be covered and protected from storm water runoff during rainfall to the extent that it doesn't compromise clean-up activities.
7) Do not bury or wash spills with water.
8) Store and dispose of used clean up materials contaminated materials, recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
9) Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with applicable regulations.
10) Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
11) Place Material Safety Data Sheets (MSDS), as well as proper storage, cleanup, and spill reporting instruction for hazardous materials being stored or used on the project site in an open, conspicuous, and accessible location.
12) Keep waste storage areas clean, well-organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

1) Clean up leaks and spills immediately
2) Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spill material is hazardous, them the used cleanup materials are also hazardous and must be disposed of as hazardous waste.
3) Never hose down or bury dry material spills. Cleanup as much of the material as possible and dispose of properly. See the waste management DMPs in this section for specific information.

Minor Spills

1) Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
2) Use absorbent materials on small spills rather than hosing down or burying the spill.
3) Absorbent materials should e promptly removed and disposed of properly.
4) Follow the practice below for a minor spill:
    a. Contain the spread of the spill.
    b. Recover spilled materials.
    c. Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

Semi-significant spills still ca be controlled by the first responder along with the aid of other personnel such as labored and the foremen, etc. This response may require the cessation of all other activities.

Spills should be cleaned up immediately:

1) Contain spread of the spill.
2) Notify the project foreman immediately.
3) If the spill occurs on paved or impermeable surfaces, clean up using “dry” methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
4) If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
5) If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/ Hazardous Spills

For significant or hazardous spills that are in reportable quantities:

1) Notify the TCEQ by telephone as soon as possible and within 24 hours at 512-339-2925 (Austin) or 210-490-3096 (San Antonio) between 8 AM and 5 PM. After hours, contact Spill Reporting (24 hour) at 1-800-832-8224. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
2) For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,117 and 302, the contractor should notify the National Response Center at (800) 424-8802.
3) Notification should first be made by telephone and followed up with a written report.
4) The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staff's have arrived at the job site.
5) Other agencies which may need to be consulted include, but are not limited to, the City Police Department, County Sheriff Office, Fire Departments, etc.

More information on spill rules and appropriate responses is available on the TCEQ website at: http://www.tceq.state.tx.us/response/spills

Vehicle and Equipment Maintenance

1) If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runoff of storm water and the runoff of spills.
2) Regularly inspect onsite vehicles and equipment for leaks and repair immediately.
3) Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
4) Always use secondary containment, such as drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.

5) Place drip pans or absorbent materials under paving equipment when not in use.
6) Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
7) Promptly transfer used fluid to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
8) Oil filters disposed of in trash cans or dumpsters can leak oil and pollute storm water. Place the oil filter in a funnel over a water oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
9) Store cracked batteries in a non-leaking secondary container/. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

1) If fueling must occur on site, use designed areas, located away from drainage courses, to prevent the runoff of storm water and the runoff of spills.
2) Discourage "topping off" of fuel tanks.

Always use secondary containment, such as drain pan, when fueling to catch spills/ leaks.

TCEO-0602 ATTACHMENTS

TEMPORARY STORM WATER SECTION

ATTACHMENT B

Inventory of Potential Sources of Contamination:

The materials or substances listed below are or may be expected to be present onsite during construction:

1. Gasoline/diesel
2. Concrete
3. Detergents
4. Fertilizers
5. Pesticides
6. Other petroleum-based products
7. Cleaning solvents
8. Herbicides
9. Seed
10. Portable toilets
11. Accidental turnover of portable toilets
12. Sewage spills
13. Excavation and topsoil disruption due to typical pipeline construction

Good Housekeeping:

The following good housekeeping practices will be followed onsite during the construction period.

1. An effort will be made to store only enough products required to do the job.
2. All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
3. Products will be kept in their original containers with the original manufacturer's label until used.
4. Substances will not be mixed with one another unless recommended by the manufacturer.
5. Whenever possible, all of the products will be used up before disposing of the container.
6. Manufacturer's recommendations for proper use and disposal will be followed.
7. The site superintendent will inspect during work days to ensure proper use and disposal of materials onsite.

TCEO-0602 ATTACHMENTS
TEMPORARY STORM WATER SECTION ATTACHMENT C

Sequence of Major Activities:

1. All spoil piles from excavations to be placed above elevation of100 year flood plain.
2. Install silt fencing down gradient of all spoil piles, bore pits, receiving pits and other structures. Contractor may decide that rock filter berms are appropriate in certain areas.
3. Perform construction.
4. Erect and maintain filter traps for dewatering operations.
5. Stabilize site with vegetation in accordance with project specifications.
6. Remove temporary storm water controls and stabilize areas disturbed by their removal.

Nature of Construction:

Construction will involve the rehabilitation and reconstruction of an existing 8” and 10” PVC sewer main, as well as the reconstruction of 11 existing sewer manholes and 23 proposed sanitary sewer manholes. Excavation should be minimum, only in the area of the existing manholes and pipe alignment. The depth of the existing sanitary sewer lines connecting to the two manholes varies from a minimum of 6' to a maximum of 12'. Therefore, any excavation around the manholes and retrofitting the main lines should not affect the sewer flows lines.

TCEQ-0602 ATTACHMENTS

TEMPORARY STORM WATER SECTION
ATTACHMENT D

Erosion and Sediment Controls:

Temporary stabilization — silt fencing will be installed on natural ground at areas required to control all proposed disturbance.

Permanent stabilization — at the completion of construction activities, all areas of the site disturbed will be seeded or hydro mulched in accordance with the SAWS standard specifications. Sediment controls will remain in effect until the site is fully stabilized. Contractor shall restore the site to its original or better condition. See General Sewer Notes on plans.

Other Controls:

Waste materials: all waste materials generated by construction activities will be collected and stored in lidded containers. These containers will meet all local and any applicable waste management this project.

TCEQ-0602 ATTACHMENTS

TEMPORARY STORM WATER SECTION

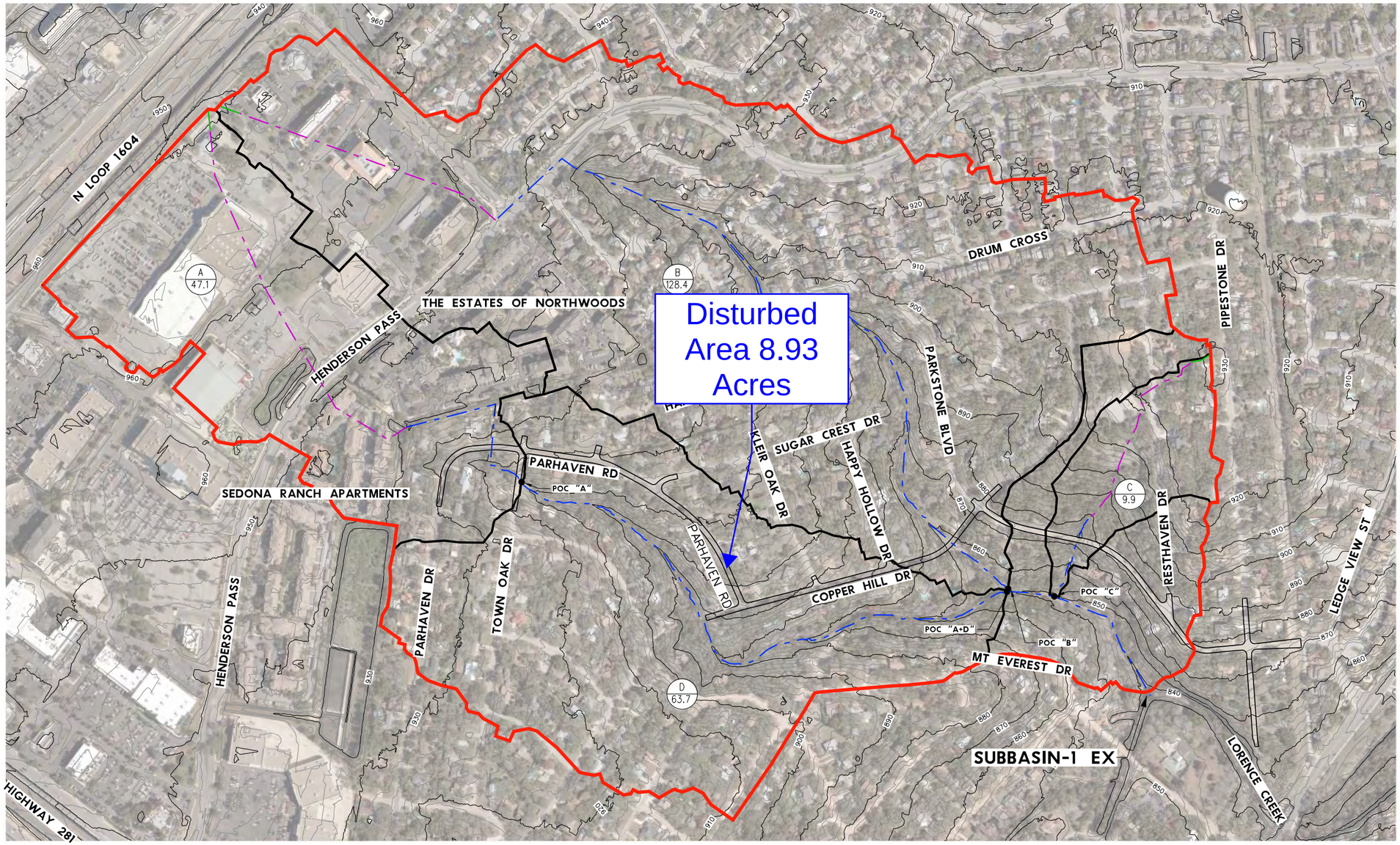
ATTACHMENT F

Structural Control Practices:

The SWP3 shall include a description of any structural control practices used to divert flows away from exposed soils, to limit the contract of runoff with disturbed areas, or to lessen the off-site transport of eroded soils.

A. Sediment basins are not required; the construction area is less than 10 acres.

B. Sediment traps and sediment basins may also be used to control solids in storm water runoff for drainage locations serving less than ten (10) acres. At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries (and for those side slope boundaries deemed appropriate as dictated by individual site conditions) of the construction.



LEGEND

- E1 / 3.40 — DRAINAGE AREA ID / AREA IN ACRES
- DRAINAGE AREA BOUNDARY
- SUBBASIN-1 EX BOUNDARY
- SHEET FLOW
- SHALLOW CONCENTRATED FLOW
- CHANNEL FLOW
- PROJECT LIMITS

NOTE: CONTOURS SHOWN ARE SOURCED FROM TEXAS NATURAL RESOURCE INFORMATION SYSTEM 2021 DATA

250 0 500
HORIZ SCALE FEET

SCALE: 1"=500'

STATE OF TEXAS
CARL BAIN
56996
REGISTERED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CARL BAIN P.E. 56996 ON 3/19/2025

REV	DATE	DESCRIPTION	BY

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ENGINEERS & SURVEYORS
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7073 San Pedro, San Antonio, Texas, 78216
Phone: 210-494-7223 Fax: 210-490-5120 WWW.BMBI.COM

DRAINAGE AREA MAP EXISTING CONDITIONS

OAK HAVEN STREETS AND DRAINAGE
(KENTWOOD PH 2)

ATTACHMENT G

ATTACHMENT H - TEMPORARY SEDIMENT POND PLANS AND CALCULATIONS

A temporary sediment pond will not be needed for this small project. The proposed temporary BMPs will be sufficient to handle the temporary sediment load.

ATTACHMENT I — INSPECTION AND MAINTENANCE

All TBMP'S shall be inspected by the contractor on a weekly basis and after all substantial rain events. The contractor shall keep records of all inspections that were made. Also, the contractor shall repair any damaged or dysfunctional TBMP's. The contractor shall insure that all TBMP's are maintained and inspected to TCEQ'S Technical Guidance Manual.

Inspection and Maintenance shall include but is not limited to:

- The contractor shaft inspects all silt fencing weekly, and after any substantial rainfall for sediment accumulation, torn fabric and crushed or collapsed sections throughout the duration of the construction.
- Sediment shall be removed when sediment buildup reaches 6 inches, or a second line of fencing shall be installed parallel to the original fence.
- Torn fabric shall be replaced by the contractor, a second line of fencing shall be erected parallel to the torn section if replacement is not feasible.
- Contractor shall replace or repair any fence sections crushed or collapsed during the course of construction. Silt fence may be relocated by the contractor to a location where it will provide equal protection should the original/planned installation obstruct vehicular access to the site.
- Contractor shall inspect all rock gabion weekly, and after any substantial rainfall for sediment accumulation or collapsed section throughout the duration of construction.
- Sediment shall be removed from gabion when sediment buildup reaches 6 inches.
- Contractor shall replace or repair any gabion sections crushed or collapsed during the course of construction.
- Records will be kept with the Construction site Superintendent of all inspection and maintenance actions. See maintenance record chart next on the next page.
- 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).
- 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).

ATTACHMENT J - INTERIM AND PERMANENT SOIL STABILIZATION

All disturbed permeable areas shall be stabilized. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporary or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. Where the initiation of stabilization measures by the 14th day after construction activity temporary or permanently cease is prevented by weather conditions,stabilization measures shall be initiated as soon as practicable. Where construction activity on portion of a site is temporarily ceased, and the earth disturbing activities will be resumed within 21 days, temporary stabilization measures do not have to be initiated on that portion of the site. In areas experiencing droughts where the initiation of stabilization measures by the 14th day after the construction activity has temporarily or permanently ceased is precluded by seasonal arid conditions, stabilization measures shall be initiated as soon as practicable.

Examples of acceptable temporary and permanent soil stabilization measures are establishment of temporary vegetation, establishment of permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, or preservation of mature vegetation.

The soil stabilization method used in this project **SHALL** be an approved method within the TCEQ Technical Guidance Manual and **MUST** be approved by the Engineers before it is implemented in the project. The method of soil stabilization approved for the project at bid stage will then be sent to TCEQ for their records.

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 Cristina Brantley, P.E.,
Print Name

Director-Pipelines Engineering,
Title - Owner/President/Other

of San Antonio Water System,
Corporation/Partnership/Entity Name

have authorized Carl Bain, P.E.
Print Name of Agent/Engineer

of Bain Medina Bain, 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 for Oak Haven Area Streets and Drainage (Kentwood Phase 2) Project.

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

02/26/2025
Date

THE STATE OF TEXAS §

County of Bexar §

BEFORE ME, the undersigned authority, on this day personally appeared Cristina Brantley 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 26th day of February, 2025.

ELVIA CORTINAS GUZMAN
Notary Public, State of Texas
Comm. Expires 12-09-2028
Notary ID 5955406

NOTARY PUBLIC

ELVIA CORTINAS GUZMAN
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 12/09/2028

APPLICATION FEE FORM
(TCEQ-0574)

Application Fee Form

Texas Commission on Environmental Quality

Name of Proposed Regulated Entity: Oak Haven Area Street & Drainage (Kentwood Phase 2)

Regulated Entity Location: Along Parkstone Blvd., Copper Hill Dr., Parhaven Dr., and Town Oak Dr., with channel improvements to a tributary of Lorence Creek.

Name of Customer: San Antonio Water System

Contact Person: Carl Bain, P.E. Phone: 210-494-7223

Customer Reference Number (if issued):CN 600529069

Regulated Entity Reference Number (if issued):RN _____

Austin Regional Office (3373)

☐ Hays ☐ Williamson

☐ Travis

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 ☒ San Antonio Regional Office

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

☐ 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	1766 L.F.	$ 883.0
Lift Stations without sewer lines	Acres	$

Type of Plan	Size	Fee Due
Underground or Aboveground Storage Tank Facility	Tanks	$
Piping System(s)(only)	Each	$
Exception	Each	$
Extension of Time	Each	$

Signature: _____ Date: 02-27-2025

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 600529069		**RN**

SECTION II: Customer Information

4. General Customer Information	**5. Effective Date for Customer Information Updates** (mm/dd/yyyy)	7/8/2024

☐ 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:*
San Antonio Water System	

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

11. Type of Customer:	☒ Corporation	☐ Individual	Partnership: ☐ General ☐ Limited
Government: ☒ City ☐ County ☐ Federal ☐ Local ☐ State ☐ Other		☐ Sole Proprietorship	☐ Other:

12. Number of Employees	**13. Independently Owned and Operated?**
☐ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☒ 501 and higher	☐ **Yes** ☒ **No**

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

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

15. Mailing Address:	San Antonio Water System							
	2800 U.S Highway 281 North							
	City	San Antonio	**State**	Tx	**ZIP**	78212	**ZIP + 4**	3106

16. Country Mailing Information *(if outside USA)*	**17. E-Mail Address** *(if applicable)*
	cristina.brantley@saws.org

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

(210) 233-3734		( ) -

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.)*

Oak Haven Area Street & Drainage (Ketwood Phase 2)

23. Street Address of the Regulated Entity: ***(No PO Boxes)***	San Antonio Water System							
	2800 U.S. Highway 281 North							
	City	San Antonio	**State**	Tx	**ZIP**	78212	**ZIP + 4**	3106
24. County	San Antonio							

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

25. Description to Physical Location:	Along Parkstone Blvd., Copper Hill Dr., Parhaven Dr., and Town Oak Dr., with channel improvements to a tributary of Lorence Creek.				
26. Nearest City			**State**	**Nearest ZIP Code**	
San Antonio			Tx	78212	

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

27. Latitude (N) In Decimal:	29.598493		**28. Longitude (W) In Decimal:**	98.4622858	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29°	35'	55.57"	98°	27'	44.23"

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)
1623		237110	

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

San Antonio Water System

34. Mailing Address:	**San Antonio Water System**							
	2800 U.S Highway 281 North							
	City	**San Antonio**	**State**	**TX**	**ZIP**	**78212**	**ZIP + 4**	**3106**
35. E-Mail Address:	**cristina.brantley@saws.org**							

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

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

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

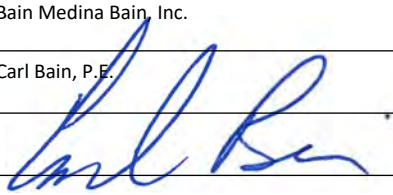
SECTION IV: Preparer Information

40. Name:	Carlo Bain, P.E	**41. Title:**	Executive Vice President

42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(210 **)** 494-7223		**(** 210 **)** 490-5120	cbain@bmbi.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:	Bain Medina Bain, Inc.	**Job Title:**	Agent Engineer
Name *(In Print):*	Carl Bain, P.E.	**Phone:**	**(** 210 **)** 494- **7223**
Signature:		**Date:**	02-27-2025