TCEQ WPAP & SCS APPLICATION

for

SANTA RITA RANCH PHASE 7B SECTION 1 WILLIAMSON COUNTY, TEXAS

Prepared For:

Santa Rita KC, LLC
Attn: James Edward Horne
1700 Cross Creek Lane, Suite 100
Liberty Hill, TX 78642
(512) 502-2050

Prepared By:

Steven P. Cates, P.E.

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CBD No. 5487 January 2022



CARLSON, BRIGANCE & DOERING, INC.

| ID# F3791

3-31-2023

Table of Contents

- I. Edwards Aquifer Application Cover Page (TCEQ-20705)
- II. General Information Form (TCEQ-0587)
 - Attachment A Road Map
 - > Attachment B USGS / Edwards Recharge Zone Map
 - > Attachment C Project Description
- III. Geologic Assessment Form (TCEQ-0585)
 - Attachment A Geologic Assessment Table (TCEQ-0585-Table) Comments to the Geologic Assessment Table
 - ➤ Attachment B Soil Profile and Narrative of Soil Units
 - Attachment C Stratigraphic Column
 - Attachment D Narrative of Site-Specific Geology Site Geologic Map(s)

Table or list for the position of features' latitude/longitude (if mapped using GPS)

- IV. Water Pollution Abatement Plan Application Form (TCEQ-0584)
 - Attachment A Factors Affecting Water Quality
 - Attachment B Volume and Character of Stormwater
- V. 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
 - Attachment F Structural Practices
 - Attachment G Drainage Area Map
 - ➤ 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
- VI. Permanent Stormwater Section (TCEQ-0600)
 - Attachment B BMPs for Upgradient Stormwater
 - > Attachment C BMPs for On-site Stormwater
 - Attachment D BMPs for Surface Streams
 - Attachment F Construction Plans
 - Attachment G Inspection, Maintenance, Repair and Retrofit Plan
 - ➤ Attachment I Measures for Minimizing Surface Stream Contamination
- VII. Organized Sewage Collection System Plan (TCEQ-0582)
 - ➤ Attachment A SCS Engineering Design Report
- VIII. Appendices
 - A. TCEQ TSS Removal Spreadsheets
 - B. WPAP & SCS Approval Letter
 - C. Water Quality Calculation Spreadsheet
 - IX. Agent Authorization Form (TCEQ-0599), if application submitted by agent
 - X. Application Fee Form (TCEQ-0574)
- XI. Check Payable to the "Texas Commission on Environmental Quality"
- XII. Core Data Form (TCEQ-10400)

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. <u>Edwards Aquifer applications</u> 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: Santa Rita Ranch Phase 7B SECTION 1				2. Regulated Entity No.:				
3. Customer Name: Santa Rita KC, LLC.		4. Customer No.:604360008						
5. Project Type: (Please circle/check one)		Modificat	ion	Extension		Exception		
6. Plan Type: (Please circle/check one)	WPAP	SCS US	ST AST	EXP	EXT	Technical Clarification	Optional Enhanced Measures	
7. Land Use: (Please circle/check one)	Residential	Non-resid	lential	tial 8. Site		e (acres):	22.55	
9. Application Fee:	\$5,849	10. Permanent B		BMP(s):	Batch Detention	Batch Detention	
11. SCS (Linear Ft.):	3,699	12. AST/UST (No. Ta			ıks):	N/A		
13. County:	Williamson	14. Watershed:				Middle Fork San Gabriel River		

Application Distribution

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

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

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

Austin Region				
County:	Hays	Travis	Williamson	
Original (1 req.)	_	_	_X_	
Region (1 req.)	_	_	_x_	
County(ies)	_	_	_x_	
Groundwater Conservation District(s)	Edwards Aquifer AuthorityBarton Springs/ Edwards AquiferHays TrinityPlum Creek	Barton Springs/ Edwards Aquifer	NA	
City(ies) Jurisdiction	AustinBudaDripping SpringsKyleMountain CitySan MarcosWimberleyWoodcreek	AustinBee CavePflugervilleRollingwoodRound RockSunset ValleyWest Lake Hills	AustinCedar ParkFlorence _x_GeorgetownJerrellLeander _x_Liberty HillPflugervilleRound Rock	

	San Antonio Region					
County:	Bexar	Comal	Kinney	Medina	Uvalde	
Original (1 req.)	_	_	_	_	_	
Region (1 req.)	_	_			_	
County(ies)	_	_	_		_	
Groundwater Conservation District(s)	Edwards Aquifer Authority Trinity-Glen Rose	Edwards Aquifer Authority	Kinney	EAA Medina	EAA Uvalde	
City(ies) Jurisdiction	Castle HillsFair Oaks RanchHelotesHill Country VillageHollywood ParkSan 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.		
Santa Rita KC, LLC / Carlson, Brigance, & Doering, Inc.		
Print Name of Customer/Authorized Agent		
Stark Cate	3-31-2023	
Signature of Customer/Authorized Agent	Date	

FOR TCEQ INTERNAL USE ONLY					
Date(s)Reviewed:	Pate(s)Reviewed: Date Administratively Complete:				
Received From:	Correct Nu	umber of Copies:			
Received By:	Distribution	on Date:			
EAPP File Number:	Complex:	Complex:			
Admin. Review(s) (No.):	No. AR Ro	No. AR Rounds:			
Delinquent Fees (Y/N):	Review Ti	me Spent:			
Lat./Long. Verified:	SOS Custo	omer Verification:			
Agent Authorization Complete/Notarized (Y/N):	Fee	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

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:

was prepared by:	,	•	
Print Name of Customer/Agent: Steven P. Cate	es, P.E.		
Date: <u>3/31/2023</u>			
Signature of Customer/Agent:			

PI	Project Information			
1.	Regulated Entity Name: Santa Rita Ranch Phase 7B Section	<u>on 1</u>		
2.	2. County: Williamson			
3.	3. Stream Basin: Middle Fork San Gabriel River			
4.	I. Groundwater Conservation District (If applicable): N/A			
5.	5. Edwards Aquifer Zone:			
	Recharge Zone Transition Zone			
6.	5. Plan Type:			
	i scs □ u	ST JST		
		xception Request		

7.	Customer (Applicant):	
	Contact Person: <u>James Edward Horne</u> Entity: <u>Santa Rita KC, LLC</u> Mailing Address: <u>1700 Cross Creek Lane, Suite 100</u> City, State: <u>Liberty Hill, TX</u> Telephone: <u>512-502-2050</u> Email Address: <u>ed@srraustin.com</u>	Zip: <u>78642</u> FAX:
8.	Agent/Representative (If any):	
	Contact Person: Steven P. Cates, P.E. Entity: Carlson, Brigance & Doering, Inc. Mailing Address: 501 W. William Cannon Blvd. City, State: Austin, Texas Telephone: 512-280-5160 Email Address: steve@cbdeng.com	Zip: <u>78749</u> FAX: <u>512-280-5165</u>
9.	Project Location:	
	 ☐ The project site is located inside the city limits of the project site is located outside the city limits jurisdiction) of the City of Liberty Hill. ☐ The project site is not located within any city's 	s but inside the ETJ (extra-territorial
10.	The location of the project site is described belongeral and clarity so that the TCEQ's Regional st boundaries for a field investigation.	
	North of Highway 29, just east of Ronald Reaga	n Blvd.
11.	Attachment A – Road Map. A road map showing project site is attached. The project location and the map.	_
12.	Attachment B - USGS / Edwards Recharge Zone USGS Quadrangle Map (Scale: 1" = 2000') of the The map(s) clearly show:	
	 ☑ Project site boundaries. ☑ USGS Quadrangle Name(s). ☑ Boundaries of the Recharge Zone (and Tran ☑ Drainage path from the project site to the boundaries. 	
13.	The TCEQ must be able to inspect the project so Sufficient survey staking is provided on the protect the boundaries and alignment of the regulated features noted in the Geologic Assessment.	ject to allow TCEQ regional staff to locate
	Survey staking will be completed by this date: 4	<u> 1/28/2023</u>

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:
 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:
 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 $\S 335.1$; 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. T	he 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.

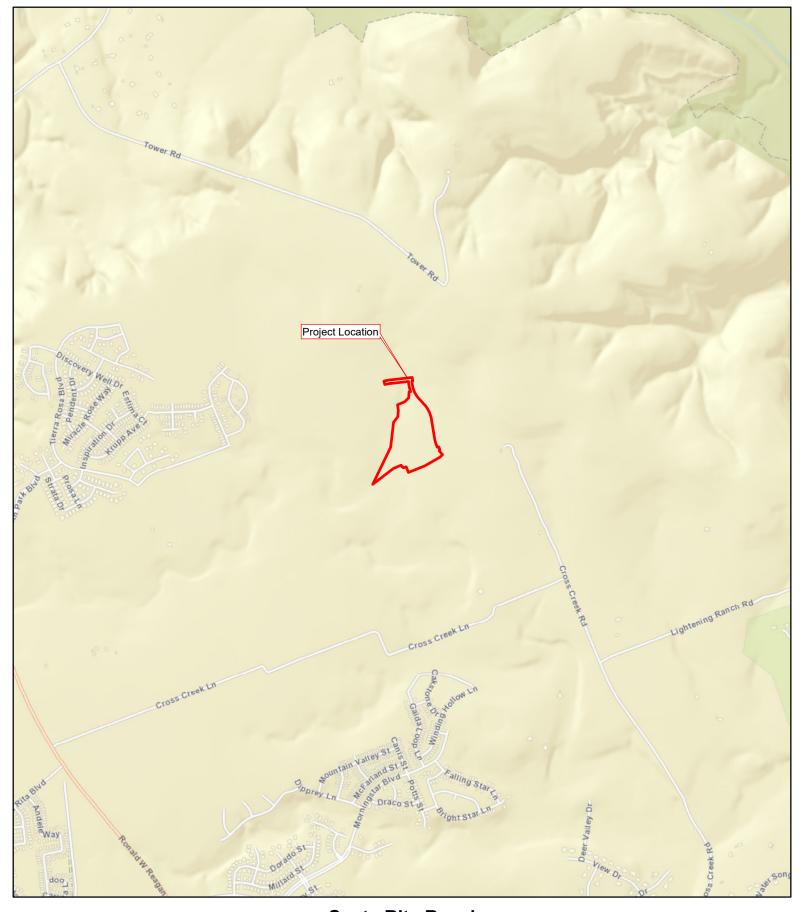
General Information Form ATTACHMENT A

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

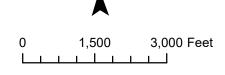
ROAD MAP



Santa Rita Ranch

Water Pollution Abatement Plan Map Leander NE Quadrant





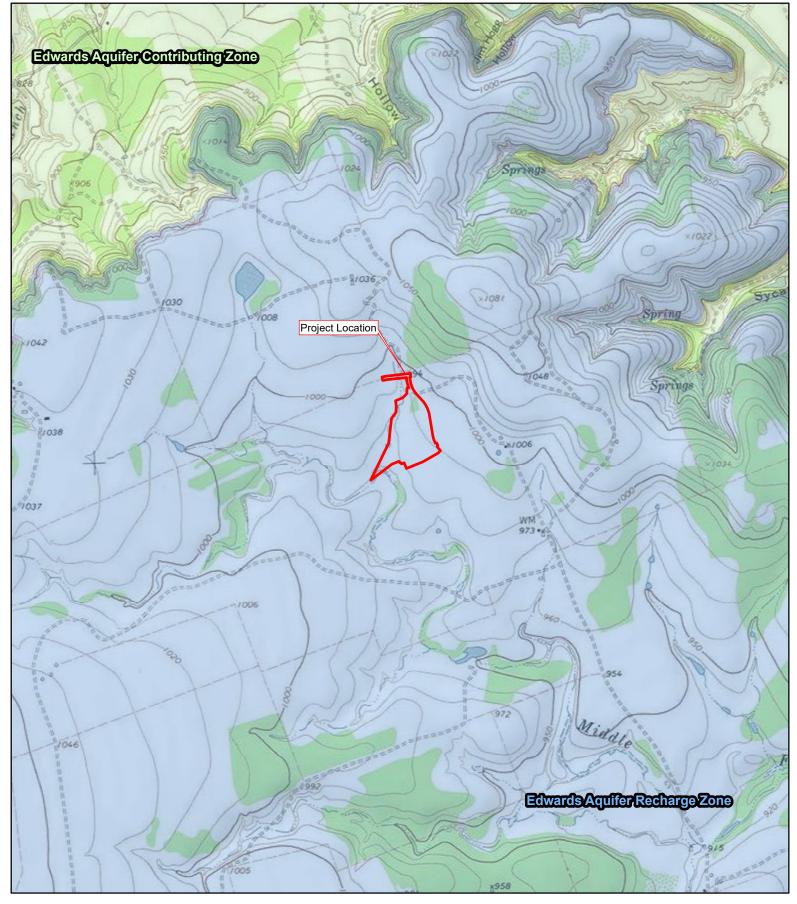
General Information Form ATTACHMENT B

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

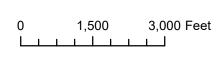
USGS / EDWARDS AUQUIFER RECHARGE ZONE MAP



Santa Rita Ranch

Water Pollution Abatement Plan Map Leander NE Quadrant





General Information Form ATTACHMENT C

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Project Description:

Santa Rita Ranch Phase 7B Section 1 is a 22.55-acre residential development that is composed of 43 single-family lots. The project is located to the South of Tierra Rose Blvd and East of Santa Rita Ranch Phase 7A. The project is located within the City of Liberty Hill ETJ, in Williamson County, Texas. This project includes 4,182 linear feet of roadway, 4,326 linear feet of water main line, 2,591 linear feet of 8" SDR 26 PVC ASTM D3034 wastewater main line, 80 linear feet of 8" C900 (150 psi) PVC AWWA C900 wastewater main line at water crossings, 508 linear feet of 6" C900 DR-18 PVC force main and 520 linear feet of 6" SDR 26 PVC ASTM D3034 of wastewater service line.

The proposed wastewater line will flow into an existing SCS approved gravity system to the Liberty Hill Wastewater Treatment Plant via the Santa Rita Ranch Phase 4 Lift Station.

The site may have soil imported. The fill material shall consist of crushed limestone, select fill, and topsoil. The fill material will be used to facilitate drainage, roadway construction, revegetation of the property, and to elevate the building foundations.

This project is located within the Edwards Aquifer Recharge Zone. Flows were calculated using the National Resource Conservation hydrologic method. Water Quality will be provided by a proposed batch detention pond constructed with this section.

Within the 22.55-acre improvement area, approximately 7.98 acres of impervious cover will be installed (35.40% of total project site). The batch detention ponds 7-1, 7-2 and 7-3 have been designed in accordance with the January 20, 2017 Addendum Sheet to RG-348 which establishes Batch Detention Basins as Section 3.2.17 of RG-348. They have been sized to treat and detain for Phase 7B Section 1 and future sections.



Environmental Services, Inc.

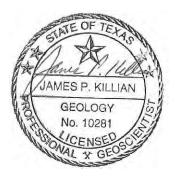
GEOLOGIC ASSESSMENT SANTA RITA NORTH, C7 RANCH, AND MIDDLEBROOK WILLIAMSON COUNTY, TEXAS HJN 130065 GA

PREPARED FOR:

SANTA RITA C7 INVESTMENTS, LLC AUSTIN, TEXAS

PREPARED BY:

HORIZON ENVIRONMENTAL SERVICES, INC.



SEPTEMBER 2014



TABLE OF CONTENTS

SECTION	ON		PAGE
LIST O	F TABLE	:s	iii
LIST O	F APPEN	IDICES	iii
TCEQ		IC ASSESSMENT FORM	
		JECT INFORMATION	
	ADM	IINISTRATIVE INFORMATION	3
ADDIT	IONAL C	OMMENTS	5
1.0	INTR	ODUCTION AND METHODOLOGY	5
2.0	ENVI	IRONMENTAL SETTING	5
	2.1	LAND USE	
	2.2	TOPOGRAPHY AND SURFACE WATER	
	2.3	EDWARDS AQUIFER ZONE	
	2.4	SURFACE SOILS	6
	2.5	GEOLOGY	9
	2.6	WATER WELLS	
	2.7	GEOLOGIC AND MANMADE FEATURES	12
3.0	CON	CLUSIONS AND RECOMMENDATIONS	19
4.0	REFI	ERENCES	21



LIST OF TABLES

TABL	<u>E</u>	PAGE
1 2	SURFACE SOILSGEOLOGIC STRATIGRAPHIC COLUMN	
<u>APPE</u>	LIST OF APPENDICES	
A B C	PROJECT FIGURES SITE GEOLOGIC MAP SITE GEOLOGIC ASSESSMENT TABLE SITE PHOTOGRAPHS	

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.

Cianatura

Si	nynature		
rec Aq	o the best of my knowledge, the responses to this fequested concerning the proposed regulated activition quifer. My signature certifies that I am qualified as 13.	ties and methods to protect the Edwards	
Pri	rint Name of Geologist: <u>James Killian</u>	Геlephone: <u>512 328-2430</u>	
Da	ate: <u>19 December 2019</u>	Fax: <u>512 328-1804</u>	
	epresenting: <u>Horizon Environmental Services, Inc. a</u> Name of Company and TBPG or TBPE registration no		
_	gnature of Geologist: James P. / III. GEOLOGY No. 10281		
/	egulated Entity Name: Santa Rita North, C7 Ranch, exas	and Middlebrook; Williamson County,	
PI	Project Information		
1.	. Date(s) Geologic Assessment was performed: <u>26 June 2014; 2, 7-9, 14, 16, 17, 21, 23, 24, 28-31 July 2014; 4-8, 11, 12, and 15 August 2014</u>		
2.	. Type of Project:		
	☐ WPAP	□AST	

Τ.	Date(s) deologic Assessment was perion	neu. <u>20 June 2014, 2, 7-3, 14, 10, 17, 21, 23, 2</u>	<u> </u>
	28-31 July 2014; 4-8, 11, 12, and 15 A	ugust 2014	
2.	Type of Project:		
3.	WPAPSCSLocation of Project:	☐ AST ☐ UST	
	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)
BkE - Brackett gravelly clay loam, 3-12% slopes	С	1-4
BkG - Brackett-Rock outcrop Real complex, 8- 30% slopes	С	1-2
CfA - Crawford clay, 0-1% slopes	D	1-2

Soil Name	Group*	Thickness(feet)
CfB -		
Crawford clay,		
1-3% slopes	D	1-2
DnB - Denton silty clay, 1-3%		
slopes	D	1-3

- * 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 thicknesses is attached. The outcropping unit, if present, should be at the top of the stratigraphic column. Otherwise, the uppermost unit should be at the top of the stratigraphic column.
- 7. Attachment C Site Geology. A narrative description of the site specific geology including any features identified in the Geologic Assessment Table, a discussion of the potential for fluid movement to the Edwards Aquifer, stratigraphy, structure(s), and karst characteristics is attached.
- 8. Attachment D Site Geologic Map(s). The Site Geologic Map must be the same scale as the applicant's Site Plan. The minimum scale is 1": 400'

Applicant's Site Plan Scale: 1" = 400'

Site Geologic Map Scale: 1" = 400' Site Soils Map Scale (if more than 1 soil type): 1" = 2300' 9. Method of collecting positional data: Global Positioning System (GPS) technology. Other method(s). Please describe method of data collection: 10. The project site and boundaries are clearly shown and labeled on the Site Geologic Map. 11. Surface geologic units are shown and labeled on the Site Geologic Map. 12. Geologic or manmade features were discovered on the project site during the field investigation. They are shown and labeled on the Site Geologic Map and are described in the attached Geologic Assessment Table. Geologic or manmade features were not discovered on the project site during the field investigation. 13. The Recharge Zone boundary is shown and labeled, if appropriate. 14. All known wells (test holes, water, oil, unplugged, capped and/or abandoned, etc.): If applicable, the information must agree with Item No. 20 of the WPAP Application Section. There are 14 (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply.) The wells are not in use and have been properly abandoned. \boxtimes The wells are not in use and will be properly abandoned. The wells are in use and comply with 16 TAC Chapter 76. There are no wells or test holes of any kind known to exist on the project site.

Administrative Information

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

TABLE 1 - SURFACE SOILS, CON'T.

Soil Units, In Characteristics &		ss
Soil Name	Group*	Thickness (feet)
DnC - Denton silty clay, 3-5% slopes	D	1 - 3
DoC - Doss silty clay, moist, 1-5% slopes	С	2 - 4
EaD - Eckrant cobbly clay, 1-8% slopes	D	0 - 1
EeB - Eckrant extremely stony clay, 0-3% slopes	D	1 – 1.5
ErE - Eckrant-Rock outcrop complex, rolling	D	0 – 1.5
ErG - Eckrant-Rock outcrop complex, hilly	D	0 – 1.5
FaA - Fairlie clay, 0-1% slopes	D	1 - 2
FaB - Fairlie clay, 1-2% slopes	D	1 - 2
GeB - Georgetown clay loam, 0-2% slopes	D	2 - 3
GsB - Georgetown stony clay loam, 1-3% slopes	D	1 - 3
SuB - Sunev silty clay loam, 1-3% slopes	В	3 - 5



TCEQ GEOLOGIC ASSESSMENT ADDITIONAL COMMENTS

1.0 INTRODUCTION AND METHODOLOGY

This report and the planned abatement measures are intended to fulfill Texas Commission on Environmental Quality (TCEQ) reporting requirements (TCEQ, 1999). This geologic assessment includes a review of the site for potential aquifer recharge and documentation of general geologic characteristics for the subject site. Horizon conducted the necessary field and literature studies according to TCEQ Instructions to Geologists for completing Geologic Assessments within the Edwards Aquifer Recharge Zone (TCEQ, 2004).

Horizon walked transects spaced less than 50 feet apart and mapped the location of features using a subfoot accurate Trimble GeoHX handheld GPS and post-processed data utilizing aerial photographs, topographic maps, and GPS Pathfinder Office software. Horizon also searched the area around any potential recharge features that were encountered to look for any additional features.

The Geologic Assessment Table in Appendix C provides a description of any features that meet the TCEQ definition of potential recharge features (TCEQ, 2004). Features that do not meet the TCEQ definition, which include surface weathering, karren, or animal burrows, were evaluated in the field and omitted from this report. While walking transects, Horizon removed loose rocks and soil (by hand), when necessary, to preliminarily assess each feature's subsurface extent. However, labor-intensive excavation was not conducted.

The results of this survey do not preclude the possibility of finding subsurface voids or abandoned test or water wells during the clearing or construction phases of the proposed project. If a subsurface void is encountered during any phase of the project, construction should be halted until the TCEQ (or appropriate agency) is contacted and a geologist can investigate the feature.

2.0 ENVIRONMENTAL SETTING

2.1 LAND USE

The subject site consists of approximately 2976 acres of mostly undeveloped rangeland, farmland, and woodland that are currently used to raise beef cattle and/or for row crop production in West-Central Williamson County, Texas. The site is divided into 3 separate tracts identified as Santa Rita North (±1472 acres), C7 Ranch (±1100 acres), and Middlebrook (±404 acres). Access to the site is along Ronald Reagan Boulevard, and/or State Highway 29 (Appendix A, Figure 1). One newly developing residential subdivision is present to the west of Ronald Reagan Boulevard within the Middlebrook tract. A second residential development is under construction along the east side of Ronald Reagan Boulevard at Elizabeth Park Road, within a portion of Santa Rita North. No residential developments are currently under construction within C7 Ranch. Surrounding land use is predominantly undeveloped rangeland, farmland, and/or rural residential.



2.2 TOPOGRAPHY AND SURFACE WATER

The subject site is situated on gently to steeply sloping terrain within the North and Middle Forks of the San Gabriel River watershed (Appendix A, Figures 2 and 3). Surface elevations on the subject site vary from a minimum of approximately 840 feet above mean sea level (amsl) along Sowes Branch at the northern site boundary of Santa Rita North to a maximum of approximately 1070 feet amsl at the west side of Middlebrook. Drainage on most of the site occurs primarily by overland sheet flow, in multiple directions based on location, near several unnamed tributaries of the North and Middle Forks of the San Gabriel River.

2.3 EDWARDS AQUIFER ZONE

As shown in Appendix A, Figure 2, most of the subject site (approximately 2392 acres) is found within the Edwards Aquifer Recharge Zone, as mapped by TCEQ Recharge Zone Boundary Maps. However, approximately 584 acres of Santa Rita North is located outside of the recharge zone and is mapped within the Edwards Aquifer Contributing Zone (TCEQ, 2014).

2.4 SURFACE SOILS

Mapping by the Natural Resources Conservation Service (NRCS, 2014) shows approximately 16 soil mapping units within the subject site (Appendix A, Figure 4) associated with the soil series described below.

Brackett gravelly clay loam, 3 to 12% slopes (BkE) occurs within Santa Rita North. This soil has a moderately alkaline, pale brown, clay loam surface layer about 5 inches thick with about 15% cover of limestone fragments that range from 4 to 12 inches in diameter. The subsoil, to 16 inches, is moderately alkaline, pale yellow clay loam with about 5% weakly cemented fine limestone fragments. The underlying layer is very pale brown, interbedded, calcareous loam and limestone. This soil is well-drained, permeability is moderately slow, and available water capacity is very low. Runoff is rapid.

Brackett-Rock outcrop Real complex, 8 to 30% slopes (BkG) occurs within Santa Rita North and consists of hilly to steep Brackett soils and Rock outcrop on uplands. This complex is made up of about 50% Brackett soils, about 25% Rock outcrop, and 25% other soils. Typically, the Brackett soils have a moderately alkaline, grayish-brown, gravelly, silty clay loam surface layer about 4 inches thick. About 60 to 80% of the surface is covered with limestone pebbles, cobbles, stones, and a few boulders. The subsoil, which extends to a depth of about 12 inches, is moderately alkaline, light brownish-gray, gravelly, silty clay loam. The underlying material is interbedded limestone and marl. The Brackett soils are well-drained. Runoff is rapid, and available water capacity is very low. Erosion is a moderate to severe hazard. Rock outcrop consists of narrow horizontal bands and random areas of marl outcrop. Loose cobbles, stones, and boulders are common on the surface.



Crawford clay, 0 to 1% slopes (CfA) occurs along the southwest side of Middlebrook. Typically, the surface layer is neutral, dark grayish-brown clay about 6 inches thick. The layer below that, to 32 inches, is neutral, dark brown clay. The substratum is fractured, whitish limestone. This soil is well-drained, and permeability is very slow. This soil swells when wet and shrinks when dry. Water enters the soil rapidly when the soil is dry and very slowly when the soil is moist. The available water capacity is low, and runoff is slow.

Crawford clay, 1 to 3% slopes (CfB): This gently sloping soil is on footslopes and at the heads of drainageways on uplands at Santa Rita North and C7 Ranch. Typically, the uppermost layer is neutral clay about 27 inches thick. It is brown in the upper 6 inches and dark reddish-brown below that. The underlying material is whitish, fractured, hard limestone. This soil is well-drained, and the available water capacity is low. When the soil is dry and cracked, permeability is rapid; but, when the soil is wet and the cracks are closed, permeability is very slow. Runoff is medium.

Denton silty clay, 1 to 3% slopes (DnB): This soil occurs near Sowes Branch within Santa Rita North. Typically, the upper layer is dark brown, silty clay about 33 inches thick. The layer below that, to 36 inches, is very pale brown, silty clay loam. The underlying material is fractured limestone and limy material. The soil is calcareous and moderately alkaline throughout. It is well-drained and slowly permeable soil. Runoff is medium, and the available water capacity is medium. This soil cracks when dry, and erosion is a slight hazard.

Denton silty clay, 3 to 5% slopes (DnC) occurs on either side of Sowes Branch within Santa Rita North. Typically, the upper layer is dark brown, silty clay about 18 inches thick. The subsoil, to a depth of about 25 inches, is light brown, silty clay. The layer below that, to 32 inches, is pale brown, silty clay loam. The underlying material is limestone interbedded with weathered limestone and limy material. The soil is calcareous and moderately alkaline. This soil is well-drained, and runoff is medium. Permeability is slow. When dry, the soil cracks and water enters the soil rapidly; but, when the soil is wet, water enters it slowly. The available water capacity is medium, and erosion is a moderate hazard.

Doss silty clay, 1 to 5% (DoC). This gently sloping soil occurs on uplands within the northwest corner of Santa Rita North. Typically, this soil has a dark grayish-brown, silty clay surface layer about 9 inches thick. The subsoil, to 19 inches, is brown, silty clay loam. The underlying material is weakly cemented limy earth interbedded with fragments of limestone. This soil is calcareous and moderately alkaline. This soil is well-drained and has a low available water capacity. Permeability is moderately slow, and runoff is medium. Erosion is a moderate hazard.

Eckrant cobbly clay, 1 to 8% slopes (EaD) occurs within Santa Rita North. This soil has a surface layer about 13 inches thick. The upper part is dark grayish-brown, cobbly clay and the lower part is dark brown, cobbly clay. The underlying material is coarsely fractured, indurated limestone. This soil is calcareous and moderately alkaline. The surface has about 50% cover of limestone fragments that are mostly 4 to 8 inches across. This soil is well-drained, permeability is moderately slow, and runoff is rapid. The available water capacity is very low.



Eckrant extremely stony clay, 0 to 3% slopes (EeB) occurs within Middlebrook and Santa Rita North. Typically, this soil has an extremely stony, very dark gray, clay surface layer about 11 inches thick. The underlying material is indurated limestone. About 25% of the surface is covered with fragments of limestone; most are about 6 inches across, but range from 3 inches to 3 feet across and are as much as 10 inches thick. The soil is calcareous, moderately alkaline, and well-drained. Permeability is moderately slow, and surface runoff is rapid. The fragments of limestone on the surface help to prevent erosion. The available water capacity is very low because of the shallowness of the soil and stones in the soil.

Eckrant-Rock outcrop complex, rolling (ErE) occurs within Santa Rita North and consists of Eckrant soils and Rock outcrop located along hills, ridges, and on sides of drainageways on uplands. This complex is made up of about 70% Eckrant soils, 15% Rock outcrop, and 15% other soils. Typically, the surface layer of Eckrant soils is calcareous, moderately alkaline, dark grayish-brown, extremely stony clay about 8 inches thick. The underlying material is fractured, indurated limestone. Fragments of limestone from 6 inches to 2 feet across cover about 35% of the surface. Rock outcrop consists of exposed limestone bedrock in narrow bands within areas of Eckrant soils. Loose cobbles and stones on the surface are common. Permeability is moderately slow, and surface runoff is rapid. The available water capacity is very low.

Eckrant-Rock outcrop complex, hilly (ErG) occurs within the northeast corner of Santa Rita North, consisting of Eckrant soils and Rock outcrop, mostly along major streams where erosion has formed sharp hills, ridges, and ravines. This complex is made up of about 41% Eckrant soils, 38% Rock outcrop, and 21% other soils. Typically, the Eckrant soils have a calcareous, moderately alkaline, extremely stony, dark grayish-brown, silty clay loam surface layer about 11 inches thick. The underlying material is indurated limestone. About 55% of the soil surface is covered with fragments of limestone that are 1 to 6 feet across. Rock outcrop consists of exposed limestone bedrock below the crests of hills and ridges. Loose cobbles and stones on the surface are common. The other soil included in this complex is Doss. The soils are well-drained, permeability is moderately slow, and surface runoff is rapid. The available water capacity is low.

Fairlie clay, 0 to 1% slopes (FaA) and 1 to 2% slopes (FaB): This nearly level soil is on broad plateaus, slightly depressed areas near the heads of drains, and in shallow valleys on uplands throughout the site. Typically, this soil has a dark gray, clay upper layer about 36 inches thick. The layer below that, which extends to about 46 inches, is gray clay. The underlying material to a depth of 55 inches is weakly cemented limestone interbedded with limy material. This soil is calcareous and moderately alkaline. This soil is moderately well drained. When dry, it has wide cracks, and water enters it rapidly. However, when this soil is wet and the cracks are sealed, water enters it very slowly. Surface runoff is slow when this soil is dry and cracked. The available water capacity is high, and erosion is a slight hazard.

Georgetown clay loam, 0 to 2% slopes (GeB): This nearly level to gently sloping soil is on uplands along the southeast part of C7 Ranch. Typically, the surface layer is slightly acidic, brown, clay loam about 7 inches thick. The subsoil extends to about 35 inches; it is neutral to slightly acidic, reddish-brown clay in the upper part, and cobbly clay in the lower part. The underlying



material is indurated limestone that has limy earth imbedded in the crevices. This soil is well-drained. Permeability is slow, and surface runoff is medium. The available water capacity is low.

Georgetown stony clay loam, 1 to 3% slopes (GsB). This gently sloping soil occurs within upland areas of Santa Rita North and C7 Ranch. Typically, this soil has a slightly acidic, brown, stony clay loam surface layer about 7 inches thick and few stones on or near the surface. The subsoil, which extends down to a depth of about 35 inches, is neutral, reddish-brown clay in the upper part and slightly acidic, reddish-brown, cobbly clay in the lower part. The underlying material is indurated, fractured limestone that has clay loam in crevices and fractures. This soil is well-drained. Permeability is slow, and surface runoff is medium. The available water capacity is low. Reaction is neutral to slightly acidic. The erosion hazard ranges to slight.

Sunev silty clay loam, 1 to 3% slopes (SuB) occurs along the stream terraces of Sowes Branch at Santa Rita North. The upper layer is dark grayish-brown, silty clay loam about 18 inches thick. The subsoil, to 52 inches, is light yellowish-brown silty clay loam. The underlying layer, which extends to 60 inches, is reddish-yellow silty clay loam and has many soft masses and concretions of calcium carbonate. This soil is calcareous and moderately alkaline throughout. This soil is well-drained, permeability is moderate, and surface runoff is medium. The available water capacity is moderate, and erosion is a slight hazard (NRCS, 2014).

2.5 GEOLOGY

A review of existing literature shows most of the subject site is underlain by the undifferentiated Edwards Limestone Formation (Ked) (UT-BEG, 2014) with an estimated maximum thickness of about 85 feet at higher elevations located along the east sides of Santa Rita North and C7 Ranch. The Edwards Formation consists mostly of gray to light brownish-gray, thin to medium-bedded, dense dolomite, dolomitic limestone, and limestone.

The Comanche Peak Limestone Formation (Kc) underlies the Edwards and crops out on the steep, north-facing slopes located above Sowes Branch within Santa Rita North. It is approximately 50 feet thick and consists of white, soft, nodular limestone interbedded with marl and calcareous clay.

Underlying the Comanche Peak Limestone is the Walnut Formation (Kw), which crops out along the moderate to gently sloping areas located near Sowes Branch within Santa Rita North. The uppermost 50 ft of the Walnut is named the Keys Valley Marl Member (Kwkv) and consists of cream-colored, fossiliferous marl with some thin interbeds of soft limestone. The Keys Valley Marl is underlain by the Cedar Park Limestone (Kwcp) and Bee Creek Marl (Kwbc) members of the Walnut Formation.

The Upper Member of the Glen Rose Limestone (Kgru) crops out in the northwest corner of Santa Rita North with an estimated thickness of up to 220 feet. It consists of alternating resistant and recessive beds of light gray to yellowish-gray limestone, dolomite, and marl.



An overlying mantle of recent (Quaternary-age) terrace deposits (QTa) occurs throughout most of the Middlebrook tract and at the West-Central part of C7 Ranch with an estimated thickness of less than 10 feet. These deposits consist of clay, silt, sand, and gravel. In addition, thin deposits (less than 10 feet) of terraces along streams (Qt) occur within an unnamed tributary at the South-Central portion of C7 Ranch. Terraces along streams are predominately gravel, sand, silt, and clay. Thickness varies depending on distance from the floodplain source.

The subject site is located several miles west of the Balcones Fault Zone. However, available geologic reports indicate the immediate area has been affected by geologically inactive, normal faulting. A normal fault is an inclined fault in which the hanging wall appears to have slipped downward relative to the footwall. The nearest mapped fault is located through a portion of Santa Rita North within the Contributing Zone, trending from southwest to northeast at N25-30°E (UT-BEG, 1995 and 2014). In general, the rock strata beneath the site dip to the east-southeast at approximately 35 to 45 feet per mile.

Table 2 depicts the stratigraphic relationship and approximate thicknesses of the uppermost geologic unit found at the subject site.



TABLE 2 – GEOLOGIC STRATIGRAPHIC COLUMN

Geologic Period	Hydrologic Unit	Geologic Unit	Geologic Member	Approximate Thickness (feet)	Description
Quaternary		Terraces (QTa)	-	Up to 10	Gravel, sand, silt, and clay
Quaternary		Terraces along streams (Qt)	+	Up to 10	Gravel, sand, silt, and clay in various proportions, with gravel more prominent in the older, higher terraces
Lower Cretaceous	Edwards Aquifer	Edwards Formation (Ked)		85	Gray to light brownish-gray, thin- to medium-bedded, dense dolomite, dolomitic limestone, and limestone containing rudists (long, conical bivalves); gray to black chert is common; low to moderate cave development
Lower Cretaceous	Edwards Aquifer	Comanche Peak Formation (Kc)		50	Gray to very light brown, fine- grained, nodular limestone, marly limestone, and marl; no cave development.
	Confining Unit	Walnut Formation (Kwa)	Keys Valley Marl (Kwkv) Cedar Park Limestone (Kwcp) Bee Cave Marl (Kwbc)	50	Keys Valley Marl - chalky, soft, white, with marine megafossils; no cave development. Cedar Park Ls - lithologically and
Lower Cretaceous				40	faunally similar to Comanche Peak Ls; low to moderate cave development
				35	Bee Cave Marl - lithologically and faunally similar to Keys Valley Marl, except Exogyra texana more abundant and ammonites are scarce; low cave development
Lower Cretaceous	Confining Unit	Glen Rose Formation (Kgr)	Upper (Kgru)	220	Alternating resistant and recessive beds of limestone, dolomite, and marl; limestone is aphanitic to fine-grained, hard to soft and marly, light gray to yellowish-gray; dolomite is fine-grained, porous, yellowish-brown; marine megafossils include molluscan steinherns, rudistids, oysters, and echinoids; upper part is relatively thinner bedded, more dolomitic, and less fossiliferous than the lower part; some surface cave development



2.6 WATER WELLS

A search was made for water wells on and within 0.5 miles of the subject site. A review of the records of the TCEQ and the Texas Water Development Board (TWDB) revealed no water wells at the subject site and only 1 well within 0.5 miles from the subject site (TWDB, 2014). However, there was evidence of numerous water wells present during the field investigation. A total of 14 water wells were identified (M-4, M-6 to M-10, M-13, M-14, M-16, M-19, and M-20 to M-23). Approximately 6 of these wells (M-8, M-9, M-10, M-13, M-16, and M-21) appear to be currently unused and/or abandoned. Several recently drilled water wells (M-6, M-7, M-14, M-20, and M-22) were observed during the field investigation. The results of this survey do not preclude the existence of additional unused/abandoned wells at the subject site.

Private water well (No. 5818403) was found within 0.5 miles from the subject site (TWDB, 2014). This water well is reported to have been completed in the Glen Rose Formation (Upper and/or Middle Trinity aquifers) at a total depth of 152 feet and is powered by a windmill for domestic use.

Abandoned wells must be capped or properly abandoned according to the Administrative Rules of the Texas Department of Licensing and Regulation, 16 Texas Administrative Code (TAC), Chapter 76, effective 3 January 1999. A plugging report must be submitted (by a licensed water well driller) to the Texas Department of Licensing and Regulation, Water Well Driller's Program, Austin, Texas. If a well is intended for use, it must comply with 16 TAC §76.

2.7 GEOLOGIC AND MANMADE FEATURES

Field surveys of the subject site were conducted by a licensed Horizon geologist with support staff on 26 June 2014; 2, 7 to 9, 14, 16, 17, 21, 23, 24, and 28 to 31 July 2014; 4 to 8, 11, 12, and 15 August 2014. Previous geologic assessments were conducted on portions of the subject site at Santa Rita North by SWCA Environmental Consultants (SWCA, 2006) and J. Jackson Harper, PG Geological and Hydrogeological Consulting (Harper, 2013). SWCA identified approximately 9 geologic features (SF-11 and SF-13 to SF-20) and 1 manmade feature (SF-12, now M-13). Harper identified 1 geologic feature (G-02) and 1 manmade feature (G-01).

A total of 38 natural geologic features (C7 Ranch: C-1 to C-8; Santa Rita North: G-02, SF-11, SF-13 to SF-20, and SR-1 to SR-20) were identified within the subject site. No geologic features were found at Middlebrook. Geologic features at the subject site are prefixed with the following nomenclature: SF, SR, and G for Santa Rita North and C for C7 Ranch.

A total of 25 manmade features (G-01 and M-1 to M-24) were identified at the subject site, 11 of which are stock ponds (G-01, M-1 to M-3, M-5, M-11, M-12, M-15, M-17, M-18, and M-24) and 14 of which are water wells (previously discussed).

Approximately 7 springs (SPG-1 to SPG-7) were identified at the subject site at Santa Rita North within Sowes Branch; however, these springs (discharge features) are located within the



contributing zone of the Edwards Aquifer. No apparent springs were identified within the recharge zone at the subject site. However, the closest spring known to be occupied by a federally listed salamander species is approximately 2.09 miles northeast of the subject site. According to the Texas Parks and Wildlife Department (TPWD) Natural Diversity Database (NDD) data, Walnut Spring, which is located within the North Fork of the San Gabriel River (upstream of Lake Georgetown), is documented habitat for the federally listed Georgetown Salamander species (Eurycea naufragia) (NDD, 2014).

Geologic features at the subject site are described below. A map detailing site geology and the location of the geologic features is provided in Appendix B. Further information pertaining to the geologic features is provided in the Geologic Assessment Table (Appendix C). Photographs of the geologic features are also provided in Appendix D.

C7 RANCH GEOLOGIC FEATURES

Geologic Feature C-1: Sinkhole measuring approximately 10 feet in diameter x 2.5 feet deep with 2 semi-open drainage portal openings (0.5 and 1 foot in diameter x 1 foot deep) located along its weathered rock/clay floor. No air flow conductivity was noted at the openings. Probing with a steel rod encountered clay soil and cobbles about 2 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature C-2: Sinkhole measuring approximately 8 feet long x 5 feet wide x 1.5 feet deep with an apparent animal burrow opening amongst loose rocks and soil. No air flow conductivity was noted at the opening. Probing with a steel rod encountered loose to firm clay soil and cobbles about 2.5 feet below the feature's floor. This feature has a low infiltration rate and a surface runoff catchment of less than 0.1 acres.

Geologic Feature C-3: Two solution cavities spaced about 15 feet apart within an open, scattered cactus area. The larger cavity measures approximately 1.8 feet long x 1 foot wide x 1.5 feet deep and the smaller (due west/northwest) measures 0.3 feet in diameter x 1 foot deep. Slight air flow conductivity was noted at the openings. Probing with a steel rod encountered loose cobbles and soil about 2 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature C-4: Solution cavity in open area measuring approximately 1.5 feet long x 0.5 feet wide x 1 foot deep with smaller open drainage portal openings amongst loose cobbles and soil. Slight air flow conductivity was noted. Probing with a steel rod encountered a snake skin and loose cobbles about 2 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature C-5: Two small solution cavities spaced about 6 feet apart near a small cedar elm tree. The larger cavity measures approximately 1 foot long x 0.3 feet wide x 1 foot deep and the smaller (due southeast next to the tree trunk) measures 0.3 feet in diameter x 1 foot deep. Slight air flow conductivity was noted at the openings. Probing with a steel rod encountered loose



cobbles and soil about 2 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature C-6: Solution-enlarged fracture (azimuth:N215°W) measuring approximately 2.5 feet long x 0.5 feet wide x 1 foot deep with smaller semi-open drainage portal openings amongst loose cobbles and soil. No air flow conductivity was noted. Probing with a steel rod encountered firm soil and cobbles about 2 feet below the feature's floor. This feature has a low to intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature C-7: Large upland sinkhole with a cedar elm tree near its center that is covered with grape vines. The sinkhole measures approximately 18 feet in diameter x 4 feet deep with 1 open drainage portal (1 foot long x 0.5 feet wide x 1 foot deep) located along its rock/clay floor. Very slight air flow conductivity was noted at the opening. Probing with a steel rod encountered clay soil and cobbles about 2 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature C-8: Next to brush thicket, a solution cavity measuring approximately 1 foot in diameter x 1 feet deep that narrows down to a 0.2 feet x 1 foot deep drainage portal opening. Air flow conductivity was noted. Probing with a steel rod encountered loose cobbles/soil about 2 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

SANTA RITA NORTH GEOLOGIC FEATURES

Geologic Feature G-02: This feature has been previously assessed by J. Jackson Harper, PG, as a closed depression measuring approximately 6 feet long x 6 feet wide x 2.5 feet deep resulting from an apparent animal burrow located beneath roots of adjacent oak trees. At the base of the hole, the burrow continued laterally along a soft, thinly bedded, chalky rock layer for a distance of about 1.5 feet before terminating. The burrow contained loose, dry, clayey soil and leaves over weathered, intact limestone. This feature has a very low infiltration rate and was classified as a non-sensitive feature. No protective measures were proposed for this feature (Harper, 2013).

Geologic Feature SF-11: This feature has been previously assessed by SWCA as an unnamed cave within a sinkhole (SWCA, 2006). It measures approximately 12 feet in diameter x 2.5 feet deep and drops into an open portal about 4 feet long x 3 feet wide x 6 feet deep. Two young vultures were observed nesting inside the entrance, which prevented closer investigation. A few semi-open drainage portals were observed along the entrance drop floor amongst rocks, soil, and cobbles. Slight to moderate air flow conductivity was noted near the entrance drop. Based on the presence of air flow conductivity and a very well-defined sinkhole perimeter, the potential for additional subgrade passage is very probable. This feature meets the requirements to be classified as a potential **cave**, based on it being a natural, underground, open space formed by dissolution of limestone that is large enough for an average-sized person to enter. This feature has a high infiltration rate and an apparent surface runoff catchment greater than 1.6 acres.



Geologic Feature SF-13: This feature has been previously assessed by SWCA as a sinkhole (SWCA, 2006). It measures approximately 10 feet in diameter x 2.5 feet deep and has an open drainage portal near its center about 1 foot long x 0.5 feet wide x 4 feet deep. Slight air flow conductivity was noted. This feature has an intermediate infiltration rate and an apparent surface runoff catchment less than 0.4 acres.

Geologic Feature SF-14: This feature has been previously assessed by SWCA as a sinkhole (SWCA, 2006). It measures approximately 6 feet in diameter x 1.5 feet deep with a large boulder and several smaller boulders within the feature. Small semi-open drainage portals were observed amongst the rocks and loose soil about 0.5 feet in diameter x 1 foot deep. Slight air flow conductivity was noted. This feature has an intermediate infiltration rate and an apparent surface runoff catchment less than 0.4 acres.

Geologic Feature SF-15: This feature has been previously assessed by SWCA as 2 small sinkholes that were partially filled with discarded trash (barbed wire and scrap metal) (SWCA, 2006). However, the feature is actually 1 large sinkhole (~50 feet long x 25 feet wide x 3 feet deep) and 1 open solution cavity (~3 feet long x 1.5 feet wide x 6 feet deep) that is located within the sinkhole's catchment area. Near the center of the sinkhole is a partially filled trash area with an open drainage portal about 5 feet long x 3 feet wide x 4 feet deep. Slight to moderate air flow conductivity was noted amongst the trashed portal opening. The solution cavity is located about 20 feet due southeast from the lowest part of the sinkhole with some discarded trash (barbed wire and bottles). It had slight air flow conductivity, and the floor of the cavity appears to slope back towards the sinkhole drainage portal. Based on the presence of air flow conductivity and a very well-defined sinkhole perimeter, the potential for additional subgrade passage is very probable. This feature meets the requirements to be classified as a potential **cave**, based on it being a natural, underground, open space formed by dissolution of limestone that is large enough for an average-sized person to enter. This feature has a high infiltration rate and an apparent surface runoff catchment greater than 3 acres.

Geologic Feature SF-16: This feature has been previously assessed by SWCA as an unnamed cave within a sinkhole that is rimmed with boulders and cobble debris (SWCA, 2006). The sinkhole measures approximately 120 to 130 feet long x 40 to 60 feet wide x 3 to 6 feet deep and funnels into a large, open vertical shaft about 10 feet in diameter x 5 feet deep. Along the west side of the shaft floor is an opening measuring 5 feet long x 4 to 6 feet deep that connects to an apparent low bedding plane void extending about 20 feet (north to south) x 10 feet wide x 3 to 4 feet high. Several internal open drains were observed along the floor at the lowest points of the void. Moderate to strong air flow conductivity was noted along the main shaft opening. This feature meets the requirements to be classified as a **cave**, based on it being a natural underground open space formed by dissolution of limestone that is large enough for an average-sized person to enter. The sinkhole/cave is located in a broader drainage area that appears to have originally drained in excess of 10 acres. An adjacent stock pond (manmade feature M-15) to the northwest/west appears to have impounded half or more of the original drainage area. This cave has a very high infiltration rate and a surface runoff catchment greater than 6 acres.



Geologic Feature SF-17: This feature has been previously assessed by SWCA as a non-karst closed depression (SWCA, 2006). However, an open drainage portal about 0.3 feet in diameter x 1 foot deep was observed within the loose leaves and soil/rock at its lowest point. This feature is identified a sinkhole about 20 feet in diameter x 3 feet deep with an apparent drainage portal. Slight air flow conductivity was noted at the opening. This feature has an intermediate infiltration rate and an apparent surface runoff catchment less than 0.4 acres.

Geologic Feature SF-18: This feature has been previously assessed by SWCA as a solution cavity (SWCA, 2006). It measures approximately 1.5 feet in diameter x 1 foot deep and is located within an exposed slab of limestone about 4 feet x 4 feet. No drainage portals or air flow conductivity were observed along the firm, clay-filled floor. The feature appears to be epikarstic due to surficial weathering processes. This feature has a very low infiltration rate and an apparent surface runoff catchment less than 0.1 acres.

Geologic Feature SF-19: This feature has been previously assessed by SWCA as a sinkhole that has large boulders slumping into it that may have been the result of past ranching activities, such as land clearing (SWCA, 2006). It measures approximately 15 feet long x 12 feet wide x 3 feet deep with several semi-open drainage portals around apparent in-filled (bladed) rocks and boulders. Slight air flow conductivity was noted. This feature has an intermediate infiltration rate and an apparent surface runoff catchment less than 0.4 acres.

Geologic Feature SF-20: This feature has been previously assessed by SWCA as 2 adjacent sinkholes spaced about 15 feet apart (SWCA, 2006). The larger sinkhole measures approximately 15 feet in diameter x 5 feet deep with several semi-open drainage portals amongst solutioned bedrock and/or boulders. The smaller sinkhole measures approximately 10 feet in diameter x 5 feet deep with semi-open drainage portals amongst loose rock and soil. Slight air flow conductivity was noted at both sinkholes. This feature has an intermediate infiltration rate and an apparent surface runoff catchment less than 1 acre.

Geologic Feature SR-1: Small, upland sinkhole measuring approximately 6.5 feet long x 5 feet wide x 1.5 feet deep, rimmed with large rocks, and with a drainage portal opening along the south side about 1.5 feet long x 0.3 feet wide x 1 foot deep. Slight air flow conductivity was noted at the opening. Probing with a steel rod encountered clay soil and cobbles about 2 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-2: Small, upland sinkhole, located about 20 feet due south of SR-1, measuring approximately 6 feet in diameter x 1.5 feet deep with open drainage portals amongst loose rock and leaves. This feature was lightly excavated, revealing a low bedding plane void about 2 feet long x 0.5 feet high with moderate air flow conductivity noted at the opening. Probing with a steel rod encountered loose clay soil and cobbles about 3 feet down below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-3: Small, upland sinkhole, located between 2 live oak trees, measuring approximately 6 feet in diameter x 1 foot deep with an open drainage portal amongst

TCEQ-0585 (Rev. 10-01-10) 16 C7_Santa Rita_Middlebrook GA



loose rocks and soil. This feature was lightly excavated, revealing a portal about 0.5 feet in diameter x 1 foot deep with slight air flow conductivity. Probing with a steel rod encountered loose clay soil and cobbles about 2 feet down below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-4: Solution cavity measuring approximately 0.5 feet in diameter x 1 foot deep, in an open area, that narrows down to a 0.2 feet diameter x 1 foot deep drainage portal opening. Slight air flow conductivity was noted. Probing with a steel rod encountered loose cobbles/soil about 2.5 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-5: Two solution cavities spaced about 8 feet apart in an open area near a cactus patch. Both cavities measure approximately 1 foot in diameter x 1 to 1.5 feet deep. Slight to moderate air flow conductivity was noted at the openings. Probing with a steel rod encountered loose cobbles and soil about 2 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-6: Solution cavity, near a cedar elm tree, measuring approximately 0.5 feet in diameter x 1.5 feet deep. Slight to moderate air flow conductivity was noted. Probing with a steel rod encountered loose soil and rocks about 2.5 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-7: Small, upland sinkhole measuring approximately 5 feet in diameter x 1 foot deep, located under a cluster of live oak trees, with a semi-open drainage portal about 0.5 feet in diameter x 1.5 feet deep. Very slight air flow conductivity was noted. Probing with a steel rod encountered loose leaves, cobbles, and soil about 2.5 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-8: Two solution cavities spaced about 3 feet apart next to a cedar elm tree. The larger cavity measures approximately 0.5 feet in diameter x 1 foot deep and the smaller cavity measures 0.2 feet in diameter x 0.5 feet deep. Slight air flow conductivity was noted at the openings. Probing with a steel rod encountered loose cobbles and soil about 2 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-9: Small, upland sinkhole measuring approximately 6 feet long x 4 feet wide x 1 foot deep with an open solution cavity drainage portal near the center about 1.5 feet long x 1 foot wide x 2.5 feet deep. Slight air flow conductivity was noted. Probing with a steel rod encountered loose leaves, cobbles, and soil about 3.5 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-10: Large, upland sinkhole located near a persimmon tree thicket that measures approximately 18 feet long x 15 feet wide x 3 feet deep with 1 open drainage portal (0.5 feet in diameter x 1 foot deep) located along its rock/clay floor. Slight to moderate air flow conductivity was noted at the opening. Probing with a steel rod encountered loose soil and cobbles

TCEQ-0585 (Rev. 10-01-10) 17 C7_Santa Rita_Middlebrook GA



about 2 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.5 acres.

Geologic Feature SR-11: Solution cavity located near live oak trees and cactus patch. A large rock covering the cavity was removed to facilitate inspection. This feature measures approximately 2 feet long x 1.5 feet wide x 2.5 feet deep with slight to moderate air flow conductivity. Probing with a steel rod encountered loose soil and rocks about 4 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-12: Upland sinkhole measuring approximately 10 feet long x 7 feet wide x 2 feet deep with open drainage portals near the center amongst loose cobbles and soil. Slight to moderate air flow conductivity was noted. Probing with a steel rod encountered loose cobbles and soil about 3.5 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-13: Large, upland sinkhole located amongst scattered mesquite and cedar elm trees. It measures approximately 20 feet long x 10 feet wide x 2.5 feet deep with 2 open drainage portals (1.9 feet long x 0.9 feet wide x 3 feet deep and 0.5 feet in diameter x 1 foot deep) located along its rock/clay floor. Slight air flow conductivity was noted at both openings. Probing with a steel rod encountered firm to loose soil and cobbles about 4 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.5 acres.

Geologic Feature SR-14: Small, upland sinkhole measuring approximately 6 feet long x 4 feet wide x 2.5 feet deep with a semi-open drainage portal near the center about 0.5 feet in diameter x 1 foot deep. No air flow conductivity was noted. Probing with a steel rod encountered firm soil and cobbles about 3 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-15: Solution cavity, located near the bases of mesquite and persimmon trees, measuring approximately 2.5 feet long x 0.5 feet wide x 1.5 feet deep, with semi-open drainage portals amongst vuggy rock and loose soil. No air flow conductivity was noted. Probing with a steel rod encountered loose to firm soil and rocks about 2.5 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-16: Solution cavity measuring approximately 1.3 feet long x 0.8 feet wide x 4.5 feet deep within a very small rock sink (3 feet in diameter x 1 foot deep). Slight air flow conductivity was noted. Probing with a steel rod encountered loose soil and rocks about 5 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-17: Solution cavity about 35 feet due southwest of SR-16. It measures approximately 1.5 feet long x 1 foot wide x 3.5 feet deep within a very small rock sink (3 feet in diameter x 1 foot deep). Slight to moderate air flow conductivity was noted. Probing with a

TCEQ-0585 (Rev. 10-01-10) 18 C7_Santa Rita_Middlebrook GA



steel rod encountered loose soil and rocks about 4.5 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-18: Solution cavity measuring approximately 1 foot long x 0.5 feet wide x 1 foot deep with semi-open drainage portals amongst loose rocks and soil. Slight air flow conductivity was noted. Probing with a steel rod encountered loose soil and rocks about 2 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-19: Solution cavity measuring approximately 3 feet long x 1.5 feet wide x 1.5 feet deep with semi-open drainage portals amongst loose clay soil and rocks. Slight air flow conductivity was noted. Probing with a steel rod encountered loose soil and rocks about 2 feet below the feature's floor. This feature has an intermediate infiltration rate and a surface runoff catchment of less than 0.4 acres.

Geologic Feature SR-20: Mapped normal fault located in Santa Rita North within the contributing zone of the Edwards Aquifer. This feature has an apparent low infiltration rate and is not located in the recharge zone of the Edwards Aquifer. Therefore, it is a non-sensitive feature that would require no protective measures.

3.0 CONCLUSIONS AND RECOMMENDATIONS

Thirty-eight natural geologic features and 25 manmade features were identified at the subject site. All of the features were evaluated for their potential to be significant pathways for fluid movement into the Edwards Aquifer. The Geologic Assessment Table (Appendix C) summarizes this evaluation and assigns each feature's sensitivity a total point value. Those with a point value of 40 or higher are deemed to be sensitive groundwater recharge features and should be protected during site development pursuant to TCEQ rules for protection of the Edwards Aquifer (30 TAC 213).

Thirty-four geologic features (C-1, C-3 to C-8, SF-11, SF-13 to SF-17, SF-19, SF-20, and SR-1 to SR-19) have been evaluated as sensitive for groundwater recharge capability and would therefore require a TCEQ protective setback buffer. In general, a protective buffer encompassing a sensitive feature is recommended to meet the TCEQ guidance for a setback of at least 50 feet in all directions from the feature's areal extent (perimeter), plus its watershed catchment up to 200 feet from the perimeter of the feature. However, a larger protective buffer for 3 of these (cave) features (SF-11, SF-15, and SF-16) is recommended to meet the TCEQ guidance for a setback for each cave with an undetermined subsurface footprint. The cave footprint is assumed to extend 150 feet in all directions from the surface opening(s) and then a protective buffer zone extending an additional 50 feet in all directions from the footprint is applied, plus each cave's watershed catchment up to 200 feet from the footprint. Caves with a known subsurface footprint (i.e., surveyed/mapped) include a protective buffer zone extending an additional 50 feet in all directions from the footprint, plus each cave's watershed catchment up to 200 feet from the footprint.



Four geologic features (C-2, G-02, SF-18, and SR-20) have been evaluated as non-sensitive for groundwater recharge capability and would therefore not require TCEQ protective setback buffers. No further action is recommended for these non-sensitive geologic features.

All of the manmade features (G-01 and M-1 to M-24) have been evaluated as non-sensitive for groundwater recharge capability and would therefore not require TCEQ protective setback buffers. No further action is recommended for these non-sensitive manmade features.

Additionally, no springs were identified within the recharge zone of the subject site that would require protection or mitigation pursuant to the City of Georgetown Edwards Aquifer Recharge Zone Water Quality Ordinance No. 2013-59. However, several streams were identified within the recharge zone of the subject site that would require protection per the City of Georgetown's ordinance.

The site appears generally well-suited to development prospectus. It should be noted that soil and drainage erosion would increase with ground disturbance. Native grasses and the cobbly content of the soil aid to prevent erosion. Soil and sedimentation fencing should be placed in all appropriate areas prior to any site construction activities.

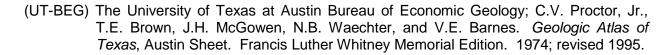
Because part of the subject site is located over the Edwards Aquifer Recharge Zone, it is possible that subsurface voids underlie the site. The nature of the sub-grade is fault-influenced, which can result with variable-sized voids in materials that may otherwise not be noted as void- or cave-forming. If any subsurface voids are encountered during the proposed development, construction should halt immediately so that a geologist may assess the potential for the void(s) to provide meaningful recharge to the Edwards Aquifer.



4.0 REFERENCES

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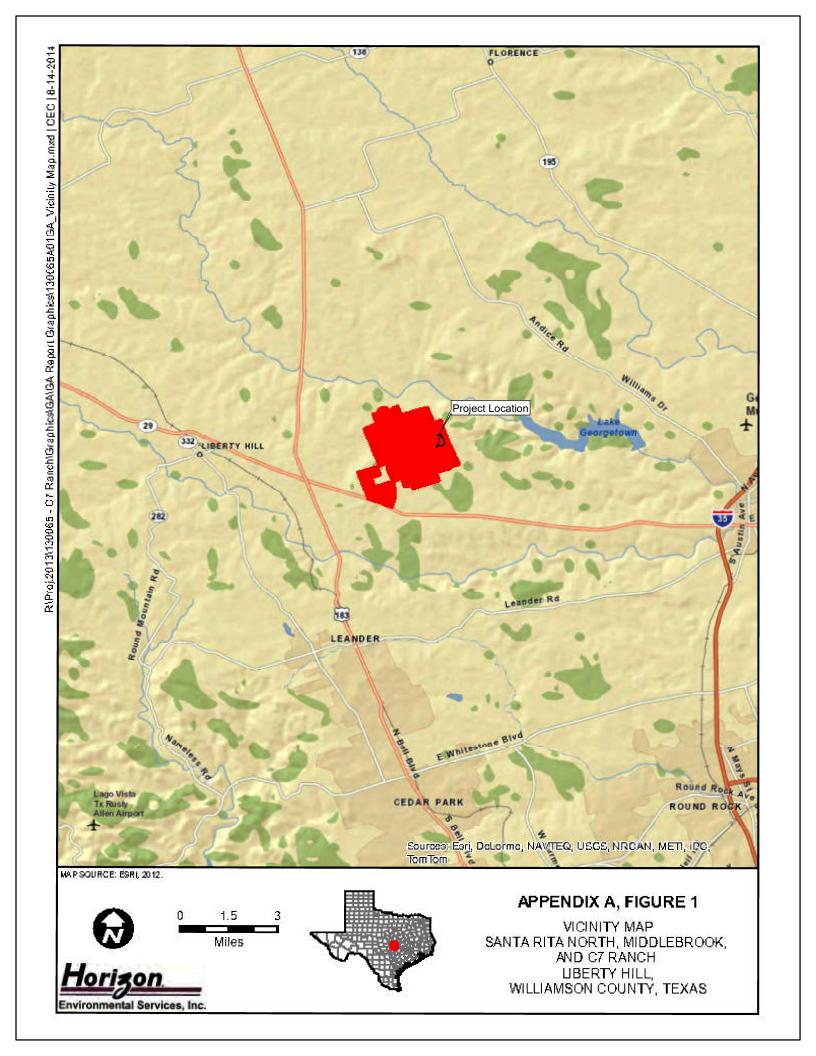
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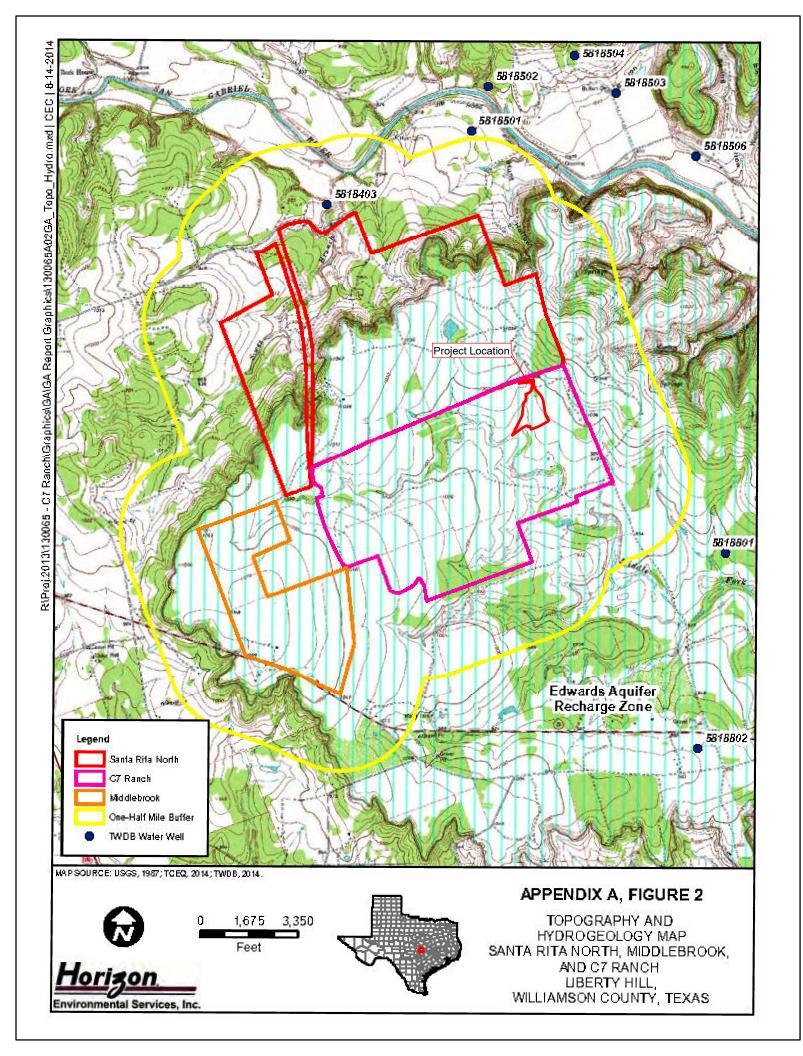
(Werchan et al.) Werchan, L. E., and J. L. Coker. Soil survey of Williamson County, Texas. Soil Conservation Service, US Department of Agriculture, Washington, D.C. 1983.

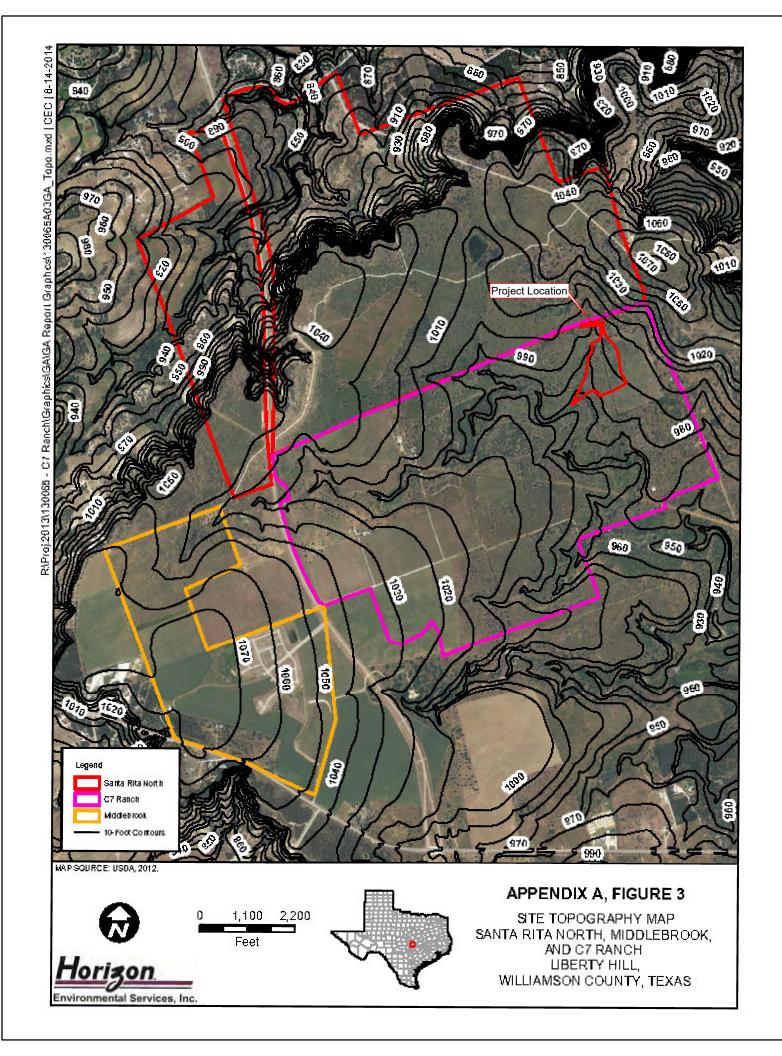


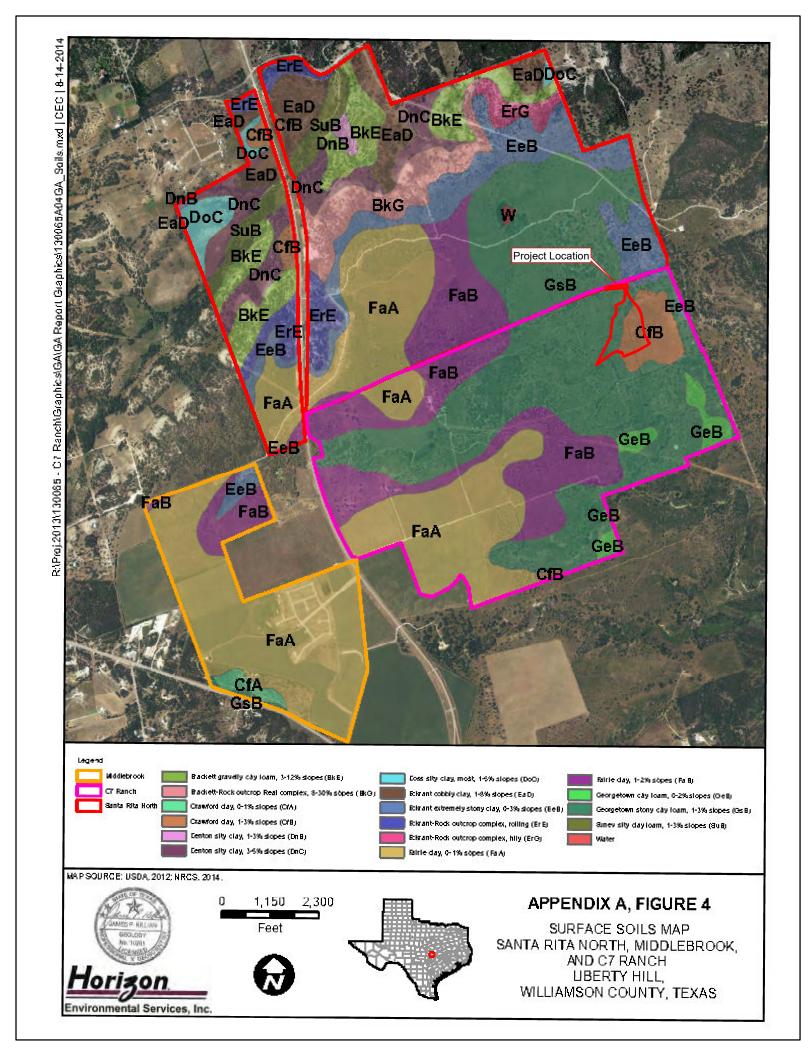
APPENDIX A

PROJECT FIGURES









Geologic Unit	Hydrologic Unit	Approx. Thickness at Project Site (ft)	Elevation (ft msl)	Depth (ft)
Terraces (QTa) and Terraces along streams (Qt)	-	10	1070	0
Edwards Formation (Ked)	Edwards	85		
Comanche Peak Formation (Kc)	Aquifer	50	975	95 —
Keys Valley Marl (KwKv)		50	925	145 —
Cedar Park Limestone (Kwcp)		40	875	195 —
Bee Cave Marl (Kwbc)		35	835	235 —
Upper Glen Rose Limestone (Kgru)	Confining Unit	220	800	270

Note: Unit elevation and thickness given with respect to a ground surface elevation of 1070 ft on the southwestern corner of the project site.

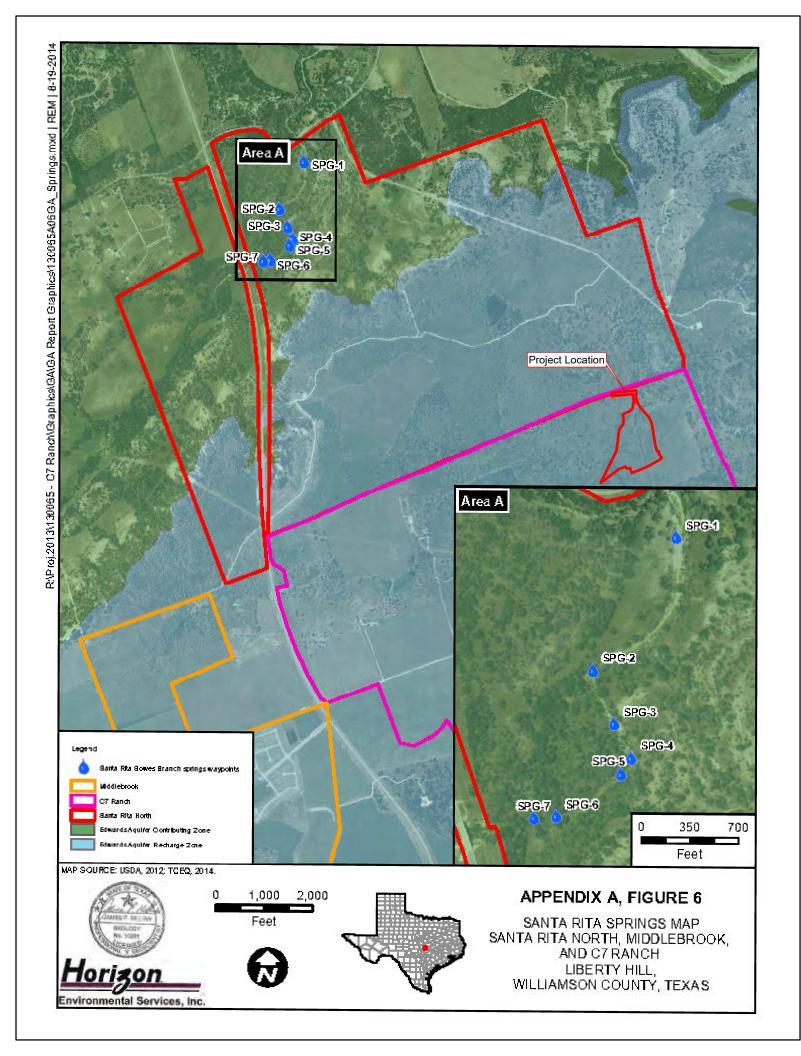






APPENDIX A, FIGURE 5

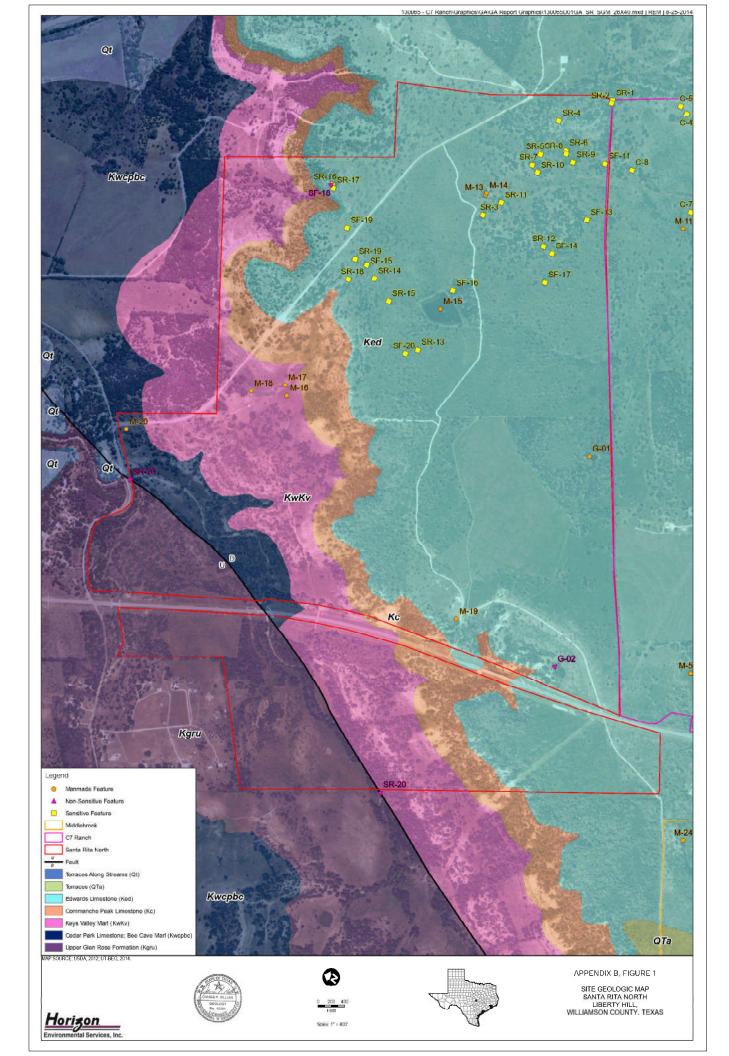
STRATIGRAPHIC COLUMN
SANTA RITA NORTH, MIDDLEBROOK,
AND C7 RANCH
LIBERTY HILL,
WILLIAMSON COUNTY, TEXAS

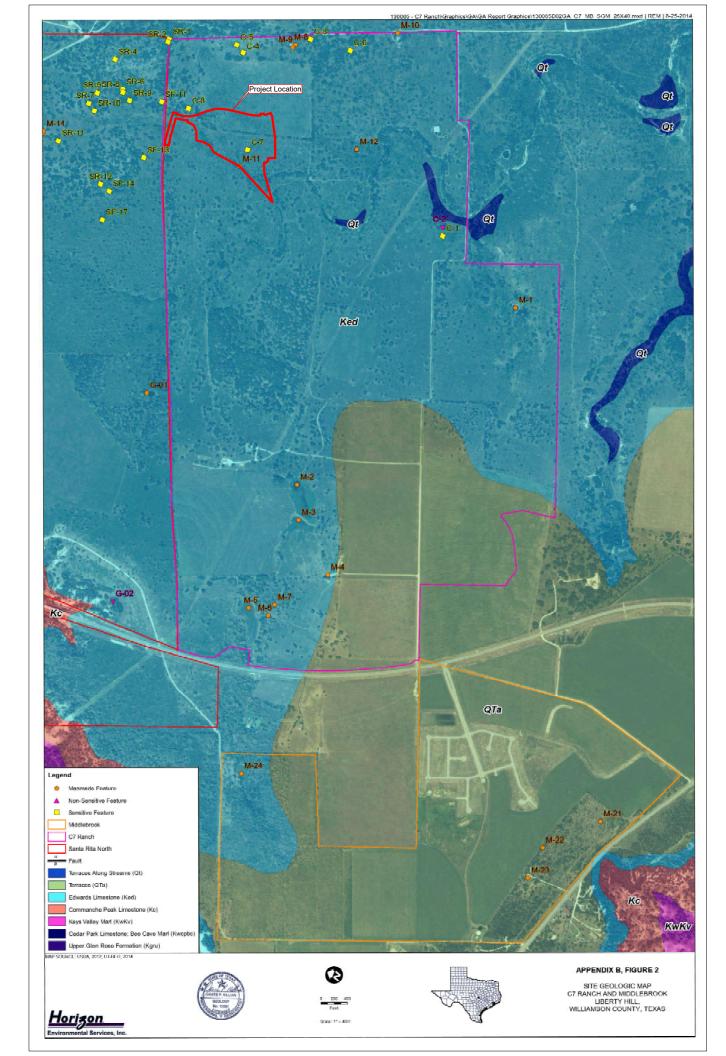




APPENDIX B

SITE GEOLOGIC MAP







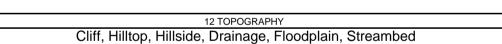
APPENDIX C

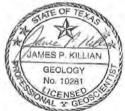
SITE GEOLOGIC ASSESSMENT TABLE

GEOL	OGIC ASSI	ESSMENT T	ABLE	1			PR	OJE	CT NA	ΜE	:	2976-ac Santa Rita North, C7 Ranch, Middlebrook, Williamson Co., TX											
	LOCATIO	ON					FE/	ATUR	E CHAR	AC	TERIS	TICS			EVAL	LUAT	ION	PHY	PHYSICAL SET				
1A	1B *	1C*	2A	2B	3		4		5	5A	6	7	8A	8B	9	1	0	11		12			
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIME			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENS	ITIVITY		ENT AREA RES)	TOPOGRAPHY			
						Х	Υ	Z		10						<40	<u>>40</u>	<1.6	<u>>1.6</u>				
C-1	30.658391	-97.816697	SH	20	Ked	10	10	2.5		0			C,F,O	25	45		Χ	Χ		Hillside			
C-2	30.658554	-97.816288	SH	20	Ked	3	1.5	1.5		0			C,F,O	18	38	Χ		Χ		Hillside			
C-3	30.666383	-97.809982	SC	20	Ked	1.8	1	1.5		0			C,F,O	30	50		Χ	Χ		Hillside			
C-4	30.66883	-97.811714	SC	20	Ked	1.5	0.5	1	-	0	-		C,F,O	30	50		Χ	Χ		Hillside			
C-5	30.669181	-97.809834	SC	20	Ked	1	0.3	1	-	0	-		C,F,O	28	48		Χ	Χ		Hillside			
C-6	30.664682	-97.809834	SF	20	Ked	2.5	0.5	1	-	0	-		C,F,O	20	40		Χ	Χ		Hillside			
C-7	30.667255	-97.816043	SH	20	Ked	18	18	4	-	0	-		C,F,O	30	50		Χ	Χ		Hillside			
C-8	30.670156	-97.815144	SC	20	Ked	1	1	1	-	0	-		C,F,O	30	50		Χ	Χ		Hillside			
G-02	30.666026	-97.838744	CD	5	Ked	6	6	2.5		0			C,F,O	10	15	Χ		Χ		Hillside			
SF-11	30.671298	-97.815299	SH/C	30	Ked	12	12	8.5		0			C,F,O	45	75		Χ		Χ	Hillside			
SF-13	30.671193	-97.81813	SH	20	Ked	10	10	2.5		0			C,F,O	30	50		Χ	Χ		Hillside			

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

	8A INFILLING
N	None, exposed bedrock
С	Coarse - cobbles, breakdown, sand, gravel
0	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
Χ	Other materials





I have read, I understood, and I have followed the Texas Commission on Environmental Quality's Instructions to Geologists. The information presented here complies with that document and is a true representation of the conditions observed in the field.

My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

James P. Millen

Date: 3 September 2014

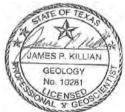
Sheet ___1__ of __6___

GEOL	OGIC ASSE	ESSMENT T	ABLE				PR	OJE	CT NA	ΜE	:	2976-ac Santa Rita North, C7 Ranch, Middlebrook, Williamson Co., TX								
	LOCATIO	N					FE/	ATUR	E CHAR	AC	TERIS	TICS			EVAL	LAU	ION	PHY	SICAL	SETTING
1A	1B *	1C*	2A	2B	3		4		5	5A	6	7	8A	8B	9	1	10	11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIME	NSIONS (FEET)	TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENS	ITIVITY	CATCHMENT AREA (ACRES)		TOPOGRAPHY
						Х	Υ	Z		10						<40	<u>>40</u>	<1.6	<u>>1.6</u>	
SF-14	30.67206	-97.820227	SH	20	Ked	6	6	1.5		0			C,F,O	30	50		Χ	Χ		Hillside
SF-15	30.679111	-97.823843	SH/C	30	Ked	50	25	7		0			C,F,O	35	65		Χ		Χ	Hilltop
SF-16	30.675387	-97.823553	SH/C	30	Ked	130	60	11		0			C,F,O	65	95		Х		Х	Hilltop
SF-17	30.671916	-97.821637	SH	20	Ked	20	20	3		0			C,F,O	28	48		Χ	Χ		Hillside
SF-18	30.691678	-97.820842	SC	20	Ked	1.5	1.5	1		0			C,F,O	10	30	Χ		Χ		Hillside
SF-19	30.680412	-97.822505	SC	20	Ked	15	12	3		0	-		C,F,O	35	55		Χ	Χ		Hillside
SF-20	30.676327	-97.827169	SH	20	Ked	15	15	5		0	-		C,F,O	35	55		Χ	Χ		Hillside
SR-1	30.671914	-97.812342	SH	20	Ked	6.5	5	1.5		0	-		C,F,O	25	45		Χ	Χ		Hillside
SR-2	30.67192	-97.812485	SH	20	Ked	6	6	1.5		0			C,F,O	35	55		Χ	Χ		Hillside
SR-3	30.675314	-97.819649	SH	20	Ked	6	6	1		0			C,F,O	25	45		Χ	X		Hillside
SR-4	30.673724	-97.814153	SC	20	Ked	0.5	0.5	1		0			C,F,O	25	45		Χ	Χ		Hillside

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

	8A INFILLING
N	None, exposed bedrock
С	Coarse - cobbles, breakdown, sand, gravel
0	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
Х	Other materials

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



I have read, I understood, and I have followed the Texas Commission on Environmental Quality's Instructions to Geologists. The information presented here complies with that document and is a true representation of the conditions observed in the field.

My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

James P. Miller

Date: 3 September 2014

Sheet ___2__ of __6___

GEOL	OGIC ASSE	SSMENT T	ABLE				PR	OJE	CT NA	ΜE	:	2976-ac Santa Rita North, C7 Ranch, Middlebrook, Williamson Co., TX								
	LOCATIO	N					FE/	ATUR	E CHAR	AC	ΓERIS	TICS			EVAL	_UAT	SETTING			
1A	1B *	1C*	2A	2B	3		4		5	5A	6	7	8A	8B	9	1	0	11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMEI	DIMENSIONS (FEET)		TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSI	TIVITY	CATCHMENT ARE. (ACRES)		TOPOGRAPHY
						Х	Υ	Z		10						<40	>40	<1.6	>1.6	
SR-5	30.673941	-97.815961	SC	20	Ked	1	1	1.5		0			C,F,O	30	50		Χ	Χ		Hillside
SR-6	30.673001	-97.815382	SC	20	Ked	0.5	0.5	1.5		0			C,F,O	30	50		Χ	Χ		Hillside
SR-7	30.674121	-97.816575	SH	20	Ked	5	5	1		0			C,F,O	22	42		Χ	Χ		Hillside
SR-8	30.672952	-97.815509	SC	20	Ked	0.5	0.5	1		0			C,F,O	25	45		Χ	Χ		Hillside
SR-9	30.672567	-97.81578	SH	20	Ked	6	4	1		0			C,F,O	30	50		Χ	Χ		Hillside
SR-10	30.673796	-97.816829	SH	20	Ked	18	15	3		0	•		C,F,O	35	55		Χ	Χ		Hillside
SR-11	30.674772	-97.818781	SC	20	Ked	2	1.5	2.5		0	•		C,F,O	40	60		Χ	Χ		Hillside
SR-12	30.672494	-97.820046	SH	20	Ked	10	7	2		0	•		C,F,O	30	50		Χ	Χ		Hillside
SR-13	30.675893	-97.826807	SH	20	Ked	20	10	2.5		0			C,F,O	28	48		Х	Χ		Hillside
SR-14	30.678613	-97.824318	SH	20	Ked	6	4	2.5		0			C,F,O	25	45		Χ	Χ		Hilltop
SR-15	30.677735	-97.825099	SC	20	Ked	2.5	0.5	1.5		0			C,F,O	22	42		Χ	Χ		Hilltop

* DATUM:_State Plane Texas Centra

2A TYPE	TYPE	2B POINTS
С	Cave	30
SC	Solution cavity	20
SF	Solution-enlarged fracture(s)	20
F	Fault	20
0	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
С	Coarse - cobbles, breakdown, sand, gravel
0	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
Х	Other materials

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



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James P. Millen

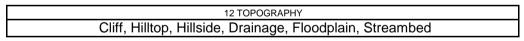
Date: 3 September 2014

Sheet ___3__ of __6___

GEOL	OGIC ASSE		PROJECT NAME: 2976							ac Santa Rita North, C7 Ranch, Middlebrook, Williamson Co., TX										
	LOCATION								FEATURE CHARACTERISTICS								ION	PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3		4		5	5A	6	7	8A	8B	9	1	10		11	12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIME	NSIONS (FEET)	TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENS	ITIVITY		ENT AREA RES)	TOPOGRAPHY
						Х	Υ	Z		10						<40	<u>>40</u>	<1.6	<u>>1.6</u>	
SR-16	30.681607	-97.820807	SC	20	Ked	1.3	8.0	4.5		0			C,F,O	35	55		Χ	Χ		Hilltop
SR-17	30.681526	-97.820942	SC	20	Ked	1.5	1	3.5		0			C,F,O	35	55		Χ	Χ		Hilltop
SR-18	30.679626	-97.8248	SC	20	Ked	1	0.5	1		0			C,F,O	25	45		Χ	Χ		Hilltop
SR-19	30.679644	-97.823785	SC	20	Ked	3	1.5	1.5		0	-		C,F,O	28	48		Χ	Χ		Hilltop
SR-20	30.685264	-97.837461	F	20	Kgru/Kw	5776	75	>100		0			C,F,O	15	35	Χ		Χ		Hilltop
G-01	30.667687	-97.828721	MB	30	Ked	184	180	6		0	-		IF.	5	35	Χ		Χ		Drainage
M-1	30.654518	-97.818719	MB	30	Ked	100	75	6		0			F	5	35	Χ		Χ		Drainage
M-2	30.660492	-97.830379	MB	30	Ked	200	100	6		0	-		IF.	5	35	Χ		Χ		Drainage
M-3	30.65993	-97.831945	MB	30	Ked	400	60	6		0			F	5	35	Χ		Χ		Drainage
M-4	30.657995	-97.833944	MB	30	Ked	0.3	0.3	-		0			Χ	5	35	Χ	·	Χ		Hillside
M-5	30.660606	-97.83676	MB	30	Ked	400	200	6		0			F	5	35	Χ	·	Χ		Drainage

DATON	_ <u>State Flatie Texas Celitiai</u>	
2A TYPE	TYPE	2B POINTS
С	Cave	30
sc	Solution cavity	20
SF	Solution-enlarged fracture(s)	20
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0	Other natural bedrock features	5
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SH	Sinkhole	20
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F	Fines, compacted clay-rich sediment, soil profile, gray or red colors
V	Vegetation. Give details in narrative description
FS	Flowstone, cements, cave deposits
Χ	Other materials





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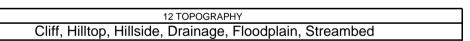
Date: 3 September 2014

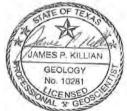
Sheet ___4__ of __6___

GEOL	OGIC ASSE	SSMENT T	ABLE			PROJECT NAME: 2976-ac Santa Rita North, C7								orth, C7 F	Ranch, Middlebrook, Williamson Co., TX					
	LOCATIO		FEATURE CHARACTERISTICS									EVALUATION PHYSICAL SETTING					SETTING			
1A	1B *	1C*	2A	2B	3		4		5	5A	6	7	8A	8B	9	1	10	11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIME	NSIONS (FEET)	TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENS	ITIVITY		ENT AREA RES)	TOPOGRAPHY
						Х	Υ	Z		10						<40	<u>>40</u>	<1.6	<u>>1.6</u>	
M-6	30.65973	-97.836782	MB	30	Ked	0.5	0.5			0			Χ	5	35	Χ		Χ		Hillside
M-7	30.659633	-97.836189	MB	30	Ked	0.5	0.5			0			Χ	5	35	Χ		Χ		Hillside
M-8	30.666906	-97.810477	MB	30	Ked	0.5	0.5			0			Χ	5	35	Χ		Χ		Hillside
M-9	30.666978	-97.810644	MB	30	Ked	0.7	0.7	ŀ		0	i		Χ	5	35	Χ		Χ		Hillside
M-10	30.663087	-97.808239	MB	30	Ked	0.5	0.5	ŀ		0	i		Χ	5	35	Χ		Χ		Hillside
M-11	30.667335	-97.816923	MB	30	Ked	50	50	3		0	i		F	5	35	Χ		Χ		Drainage
M-12	30.663011	-97.814184	MB	30	Ked	100	70	6		0	i		F	5	35	Χ		Χ		Drainage
M-13	30.6755	-97.818701	MB	30	Ked	0.5	0.5	ŀ		0	i		Χ	5	35	Χ		Χ		Hilltop
M-14	30.675505	-97.818599	MB	30	Ked	0.5	0.5			0			Χ	5	35	Χ		Χ		Hilltop
M-15	30.675615	-97.824592	MB	30	Ked	350	200	6		0			C,F	5	35	Χ		Χ		Drainage
M-16	30.68035	-97.831044	MB	30	Kwkv	0.5	0.5			0	-		Χ	5	35	Χ		Χ		Hillside

2A TYPE	TYPE	2B POINTS
С	Cave	30
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SF	Solution-enlarged fracture(s)	20
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Sheet ___5__ of __6___

GEOL	OGIC ASSE		PROJECT NAME: 2976-ac Santa Rita North, C7								Ranch, Middlebrook, Williamson Co., TX									
	LOCATION								FEATURE CHARACTERISTICS								TON	PHY	SICAL	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	DIME	NSIONS (FEET)	TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENS	ITIVITY		ENT AREA RES)	TOPOGRAPHY
						Х	Υ	Z		10						<40	<u>>40</u>	<1.6	<u>>1.6</u>	
M-17	30.680562	-97.830596	MB	30	Kwkv	200	100	6		0			F	5	35	Χ		Χ		Hillside
M-18	30.681799	-97.831428	MB	30	Kwkv	50	50	6		0			F	5	35	Χ		Χ		Hillside
M-19	30.670528	-97.838242	MB	30	Ked	0.5	0.5	1		0	-		Χ	5	35	Χ		Χ		Hilltop
M-20	30.686109	-97.835242	MB	30	Kwcpbc	0.5	0.5	ŀ		0	•		Χ	5	35	Х		Χ		Hilltop
M-21	30.643785	-97.840569	MB	30	Qta/Ked	0.5	0.5	ŀ		0	•		Χ	5	35	Х		Χ		Hillside
M-22	30.645662	-97.842722	MB	30	Qta/Ked	0.5	0.5	ŀ		0	•		Χ	5	35	Х		Χ		Hilltop
M-23	30.645795	-97.844327	MB	30	Qta/Ked	0.5	0.5	1		0			Χ	5	35	Х		Χ		Hilltop
M-24	30.658504	-97.844387	MB	30	Ked	390	160	6		0	-		F	5	35	Χ		Χ		Drainage
		·																		

2A TYPE	TYPE	2B POINTS
С	Cave	30
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SF	Solution-enlarged fracture(s)	20
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12 TOPOGRAPHY	
Cliff, Hilltop, Hillside, Drainage, Floodplain, Streambed	



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James P. Millen

Date: 3 September 2014

Sheet ___6__ of __6___



APPENDIX D

SITE PHOTOGRAPHS



PHOTO 1
View of geologic feature C-1 (sinkhole),
facing down

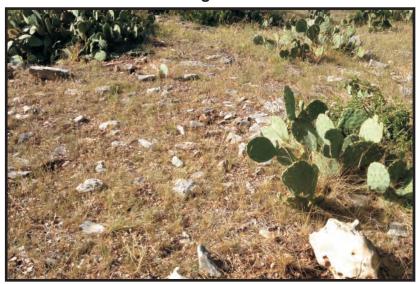


PHOTO 3
View of geologic feature C-3
(2 solution cavities at upper left and lower right),
ison facing southeast



PHOTO 2 View of geologic feature C-2 (sinkhole), facing east



PHOTO 4
View of geologic feature C-4 (solution cavity),
facing northwest



PHOTO 5
View of geologic feature C-5, facing south
(2 solution cavities by tree and white paper),



PHOTO 7
View of geologic feature C-7, facing northwest
(sinkhole under grape arbor)



PHOTO 6
View of geologic feature C-6, facing northwest
(solution-enlarged fracture)



PHOTO 8
View of geologic feature C-8, facing southeast (solution cavity in front of brush)



PHOTO 9
View of geologic feature SF-11 (sinkhole/cave),
facing northeast



PHOTO 11
View of geologic feature SF-13 (sinkhole),
facing southeast



PHOTO 10
View of entrance drop of SF-11 (cave)
with young vultures inside, facing down



PHOTO 12 View of geologic feature SF-14 (sinkhole), facing north

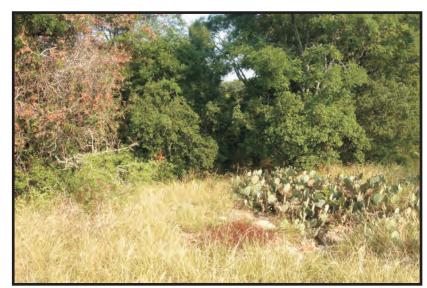


PHOTO 13
View along south side of geologic feature SF-15, facing north (large sinkhole with solution cavity/potential cave)



PHOTO 15 View along north side of SF-15, facing south



PHOTO 14
View looking down open solution cavity at SF-15



PHOTO 16
View along south side of SF-16, facing north
(very large sinkhole/cave)





PHOTO 17
View along north side of geologic feature SF-16, facing south



PHOTO 19
Another view of shaft drop/cave entrance near center of SF-16, facing down



PHOTO 18
View open vertical shaft drop near center of SF-16, facing southwest



PHOTO 20 View of geologic feature SF-17 (sinkhole), facing north



PHOTO 21
View of geologic feature SF-18 (solution cavity), facing south



PHOTO 23
View of geologic feature SF-20, facing southeast
(2 closely spaced sinkholes)

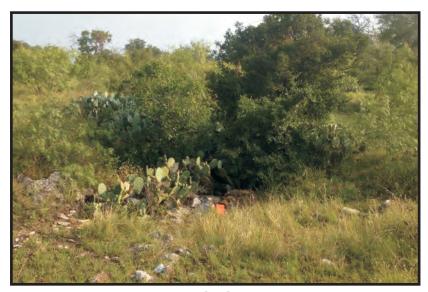


PHOTO 22 View of geologic feature SF-19 (sinkhole), facing north



PHOTO 24
View of geologic feature SR-1 (sinkhole),
facing south



PHOTO 25 View of geologic feature SR-2 (sinkhole), facing down



PHOTO 27
View of geologic feature SR-4 (solution cavity), facing north



PHOTO 26
View of geologic feature SR-3, facing north
(sinkhole between oak trees)



PHOTO 28
View of geologic feature SR-5, facing north
(2 solution cavities)



PHOTO 29
View of geologic feature SR-6 (solution cavity), facing south



PHOTO 31
View of geologic feature SR-8, facing east
(2 closely spaced solution cavities)



PHOTO 30 View of geologic feature SR-7 (sinkhole), facing southeast



PHOTO 32 View of geologic feature SR-9 (sinkhole), facing south



PHOTO 33
View of geologic feature SR-10 (large sinkhole), facing southwest



PHOTO 35
View of geologic feature SR-12 (sinkhole),
facing southeast



PHOTO 34
View of geologic feature SR-11 (solution cavity),
facing northeast



PHOTO 36
View of geologic feature SR-13 (large sinkhole),
facing southwest



PHOTO 37 View of geologic feature SR-14 (sinkhole), facing northeast

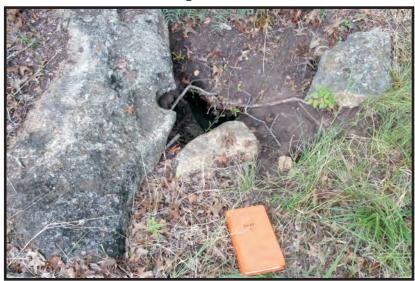


PHOTO 39
View of geologic feature SR-16 (solution cavity), facing down

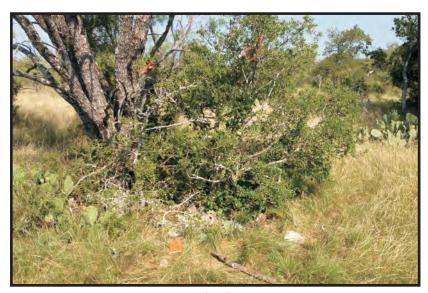


PHOTO 38
View of geologic feature SR-15 (solution cavity), facing west



PHOTO 40
View of geologic feature SR-17 (solution cavity), facing south



PHOTO 41
View of geologic feature SR-18 (solution cavity), facing south



PHOTO 42
View of geologic feature SR-19 (solution cavity), facing east



Water Pollution Abatement Plan Application

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b), Effective June 1, 1999

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

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

Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **Water Pollution Abatement Plan Application Form** is hereby submitted for TCEQ review and Executive Director approval. The form was prepared by:

Print Name of Customer/Agent: <u>Steven P. Cates, P.E.</u>

Date: 3/31/2023

Signature of Customer/Agent:

Regulated Entity Name: Santa Rita Ranch Phase 7B Section 1

Regulated Entity Information

- The type of project is:
 Residential: Number of Lots: 43
 Residential: Number of Living Unit Equivalents:
 Commercial
 Industrial
 Other:
- 2. Total site acreage (size of property):22.55
- 3. Estimated projected population:129
- 4. The amount and type of impervious cover expected after construction are shown below:

Table 1 - Impervious Cover Table

Impervious Cover of Proposed Project	Sq. Ft.	Sq. Ft./Acre	Acres
Structures/Rooftops	158,000	÷ 43,560 =	3.63
Parking	0	÷ 43,560 =	0
Other paved surfaces	189,679	÷ 43,560 =	4.35
Total Impervious Cover	347,679	÷ 43,560 =	7.98

	Total Impervious										
	Cover	347,679	÷ 43,560 =	7.98							
	Total Impervious Cove	er <u>7.98</u> ÷ Total Acreage	22.55 X 100 = <u>35.40</u> % In	npervious Cover							
5.	Attachment A - Factors Affecting Surface Water Quality. A detailed description of all factors that could affect surface water and groundwater quality that addresses ultimate land use is attached.										
ŝ.	Only inert material	s as defined by 30 TAC	§330.2 will be used as fil	l material.							
Fo	or Road Project	ts Only									
Cor	mplete questions 7 - 12	tif this application is e	xclusively for a road pro	ject.							
7.	Type of project:										
	 TXDOT road project. County road or roads built to county specifications. City thoroughfare or roads to be dedicated to a municipality. Street or road providing access to private driveways. 										
3.	Type of pavement or re	oad surface to be used:	:								
	Concrete Asphaltic concrete Other:	pavement									
€.	Length of Right of Way	(R.O.W.): feet.									
	Width of R.O.W.: $L \times W = Ft^2 \div 43$	_ feet. ,560 Ft²/Acre = a	acres.								
10.	Length of pavement ar	ea: feet.									
		.560 Ft²/Acre = a	cres. acres x 100 =9	% impervious cover.							
11.	A rest stop will be i	ncluded in this project.									

A rest stop will not be included in this project.

TCEQ Executive Director. Mo	xisting roadways that do not require approval from the difications to existing roadways such as widening ling more than one-half (1/2) the width of one (1) existing rom the TCEQ.
Stormwater to be generated by the Proposed Project	
volume (quantity) and character occur from the proposed proquality and quantity are base	Character of Stormwater. A detailed description of the cter (quality) of the stormwater runoff which is expected to bject is attached. The estimates of stormwater runoffed on the area and type of impervious cover. Include the for both pre-construction and post-construction conditions
Wastewater to be gene	erated by the Proposed Project
14. The character and volume of wa	stewater is shown below:
100% Domestic% Industrial% Commingled TOTAL gallons/day <u>9,030</u>	9,030 Gallons/day Gallons/day Gallons/day
15. Wastewater will be disposed of l	oy:
On-Site Sewage Facility (OSSI	F/Septic Tank):
will be used to treat and licensing authority's (authority's (authority's (authority) the land is suitable for the requirements for onrelating to On-site Sewag Each lot in this project/desize. The system will be on the size of the size of the size.	y Letter from Authorized Agent. An on-site sewage facility dispose of the wastewater from this site. The appropriate horized agent) written approval is attached. It states that e use of private sewage facilities and will meet or exceed site sewage facilities as specified under 30 TAC Chapter 285 ge Facilities. Evelopment is at least one (1) acre (43,560 square feet) in designed by a licensed professional engineer or registered by a licensed installer in compliance with 30 TAC Chapter
Sewage Collection System (So	ewer Lines):
to an existing SCS.	om the wastewater generating facilities will be connected om the wastewater generating facilities will be connected
☐ The SCS was previously so ☐ The SCS was submitted w ☐ The SCS will be submitted be installed prior to Exec	vith this application. If at a later date. The owner is aware that the SCS may not

	The sewage collection system will convey the wastewater to the <u>Liberty Hill Wastewater</u> <u>Treatment Plant</u> (name) Treatment Plant. The treatment facility is:
	Existing.Proposed.
16.	All private service laterals will be inspected as required in 30 TAC §213.5.
Site	e Plan Requirements
Items	s 17 – 28 must be included on the Site Plan.
17.	\leq The Site Plan must have a minimum scale of 1" = 400'.
Si	te Plan Scale: 1" = <u>50</u> '.
18. 10	00-year floodplain boundaries:
	Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled.
TI m	No part of the project site is located within the 100-year floodplain. he 100-year floodplain boundaries are based on the following specific (including date of naterial) sources(s): FEMA- FIRM Panel #48491C0275E Williamson County, Texas and naterial) sources(s): Effective Date: September 26, 2008
19. 🛭	The layout of the development is shown with existing and finished contours at appropriate, but not greater than ten-foot contour intervals. Lots, recreation centers, buildings, roads, open space, etc. are shown on the plan.
	The layout of the development is shown with existing contours at appropriate, but not greater than ten-foot intervals. Finished topographic contours will not differ from the existing topographic configuration and are not shown. Lots, recreation centers, buildings, roads, open space, etc. are shown on the site plan.
20. A	ll known wells (oil, water, unplugged, capped and/or abandoned, test holes, etc.):
	There are (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply)
	 The wells are not in use and have been properly abandoned. The wells are not in use and will be properly abandoned. The wells are in use and comply with 16 TAC §76.
	$\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $
21. G	eologic or manmade features which are on the site:
	 All sensitive geologic or manmade features identified in the Geologic Assessment are shown and labeled. No sensitive geologic or manmade features were identified in the Geologic Assessment.

	Attachment D - Exception to the Required Geologic Assessment. A request and justification for an exception to a portion of the Geologic Assessment is attached.
22. 🔀 -	The drainage patterns and approximate slopes anticipated after major grading activities
23. 🛛	Areas of soil disturbance and areas which will not be disturbed.
	Locations of major structural and nonstructural controls. These are the temporary and permanent best management practices.
25. 🔀 I	Locations where soil stabilization practices are expected to occur.
26. 🔀 🤉	Surface waters (including wetlands).
	N/A
	Locations where stormwater discharges to surface water or sensitive features are to occur.
	There will be no discharges to surface water or sensitive features.
28. 🔀 I	Legal boundaries of the site are shown.
Adm	inistrative 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.
	Any modification of this WPAP will require Executive Director approval, prior to construction, and may require submission of a revised application, with appropriate fees.

Water Pollution Abatement Plan Application

ATTACHMENT A

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Factors Affecting Water Quality:

During Construction

Non-Stormwater Discharges: The Following non-stormwater discharges may occur from the site during the construction period:

- Utility water line flushing during the initial line testing must use uncontaminated water that is not hyperchlorinated.
- Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred)
- Groundwater (from dewatering of excavation) must be uncontaminated.
- Water used to wash vehicles or control dust must be accomplished using potable water without detergents.

All non-stormwater discharge will be directed to the temporary Erosion and Sedimentation Controls (Best Management Practices) to remove any suspended solids contained therein.

Stormwater during construction will remove loose material and transport it downstream.

Post Construction

Non-stormwater discharges after construction has been completed which can affect water quality include:

- Fertilizers and pesticides
- Household chemicals
- Pet Waste
- Used oil
- Car washing
- Mulching
- Sediment

Post Construction stormwater discharges typically transport sediment in the form of dirt and dust accumulated on the streets and other impervious flatwork, rooftops, and sediment from erosion of grassy areas. That material will be transported through the storm sewer system to the wet basins, where most of the pollutants will be removed.

Water Pollution Abatement Plan Application

ATTACHMENT B

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Volume and Character of Stormwater:

Existing and developed hydrology models were created in HEC-HMS, v.4.8. A 24-hour frequency storm was applied to the meteorological models for the 2, 10, 25, and 100-year storm events. The model was run over a 24-hour period with a computational time interval of 1 minute. Subbasins utilized an SCS Curve Number Loss Method and SCS Unit Hydrograph Transform Method. Reaches utilized either a Muskingum-Cunge or Lag Routing Method. See below for specific model input data.

Meteorological Model

Frequency storms with the following parameters were used to model storm events:

HEC-HMS Meteorological Model Parameters

120 Time inclosionegical incustric			
Probability	2-yr = 50%, 10-yr = 10%, 25-100-yr = Other		
Input Type	Partial Duration		
Output Type Annual Duration (only applicable for 2-10-yr)			
Intensity Duration	5 Minutes		
Storm Duration	1 Day		
Intensity Position	50%		
Storm Area	(Blank if less than 10 mi ²)		
Curve Uniform for all subbasins			

Partial-duration precipitation depths are per the Depth-Duration-Frequency Estimates for the San Gabriel River Zone in Williamson County, Texas, according to NOAA Atlas 14, Volume 11, Version 2. See the table below:

Precipitation Depths (in) per Recurrence Interval

resipitation popula (iii) per researcement interval					
Duration	2-YR	10-YR	25-YR	100-YR	
5-min	0.51	0.757	0.921	1.19	
15-min	1.02	1.51	1.84	2.37	
60-min	1.88	2.79	3.4	4.39	
2-hr	2.3	3.55	4.43	5.98	
3-hr	2.55	4.02	5.09	7.06	
6-hr	2.98	4.81	6.18	8.75	
12-hr	3.44	5.54	7.12	10.1	
24-hr	3.94	6.3	8.04	11.2	

Land Use & Curve Numbers

In existing conditions, the soils are primarily hydrologic soil group D, as per the USDA Web Soil Survey. The soils map and data have been included in Appendix B. The curve numbers were selected from Urban

Hydrology for Small Watersheds based on hydrologic soil groups and aerial maps. See table below. Curve numbers were assessed independently from impervious cover.

Runoff Curve Numbers

Cover Type	Hydrologic Condition	Hydrologic Soil Group	Curve Number
Pasture	Good	D	80
Woods-grass combination	Good	D	79
Meadow	Good	D	78

Existing impervious cover was determined from aerial imagery. Proposed impervious cover was estimated from the proposed and anticipated future layout using TCEQ assumptions for residential tracts. Impervious cover was calculated as a percent of the total drainage basin. Curve number and impervious cover percents were loss inputs for subbasins in the model.

Time of Concentration

All time of concentration calculations were generated using SCS methodology provided in Urban Hydrology for Small Watersheds² for sheet, shallow concentrated, and channel flow. A maximum of 100 feet was used for sheet flow calculations. Lag times were calculated as 60 percent of the time of concentration. Lag times were transform inputs for subbasins and reaches in the model. Times of concentration for future developed drainage areas were approximated based on assumed basin size.

Reaches

Reaches representing the Middle Fork San Gabriel River were modeled using the Muskingum-Cunge routing method with 8-point cross-sections. In developed conditions, reaches contributing to the Middle Fork were modeled with the Lag method.

Reservoirs

All reservoirs were modeled using outflow structures with an elevation-storage method. Initial conditions were elevations set to the bottom of pond elevation for batch detention facilities. The model assumed no tailwater condition. Future batch detention ponds were modeled with a generic stage-storage and outflow spillways assigned to the assumed water quality volume elevation.

¹ Natural Resources Conservation Service, Conservation Engineering Division. 1986. Urban Hydrology for Small Watersheds. Technical Release 55. U.S. Department of Agriculture. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044171.pdf
2 Ibid.

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: <u>Steven P. Cates, P.E.</u>

Date: <u>3/31/2023</u>

Signature of Customer/Agent:

Regulated Entity Name: Santa Rita Ranch Phase 7B Section 1

Project Information

Potential Sources of Contamination

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

1.	Fuels for construction equipment and hazardous substances which will be used during construction:
	The following fuels and/or hazardous substances will be stored on the site:
	These fuels and/or hazardous substances will be stored in:
	Aboveground storage tanks with a cumulative storage capacity of less than 250 gallons will be stored on the site for less than one (1) year.

	 Aboveground storage tanks with a cumulative storage capacity between 250 gallons and 499 gallons will be stored on the site for less than one (1) year. Aboveground storage tanks with a cumulative storage capacity of 500 gallons or more will be stored on the site. An Aboveground Storage Tank Facility Plan application must be submitted to the appropriate regional office of the TCEQ prior to moving the tanks onto the project.
	igotimes 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.
S	equence 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: Middle Fork of the San Gabriel

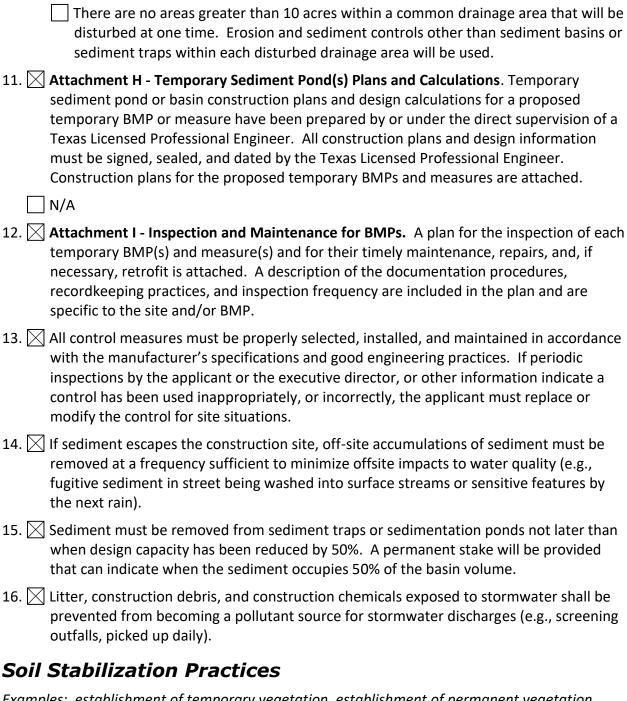
Temporary Best Management Practices (TBMPs)

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:

River

	 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.



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

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

- 18. Records must be kept at the site of the dates when major grading activities occur, the dates when construction activities temporarily or permanently cease on a portion of the site, and the dates when stabilization measures are initiated.
- 19. Stabilization practices must be initiated as soon as practicable where construction activities have temporarily or permanently ceased.

Administrative Information

- 20. All structural controls will be inspected and maintained according to the submitted and approved operation and maintenance plan for the project.
- 21. If any geologic or manmade features, such as caves, faults, sinkholes, etc., are discovered, all regulated activities near the feature will be immediately suspended. The appropriate TCEQ Regional Office shall be immediately notified. Regulated activities must cease and not continue until the TCEQ has reviewed and approved the methods proposed to protect the aquifer from any adverse impacts.
- 22. Silt fences, diversion berms, and other temporary erosion and sediment controls will be constructed and maintained as appropriate to prevent pollutants from entering sensitive features discovered during construction.

Temporary Stormwater Section ATTACHMENT A

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Spill Response Actions:

- 1. Contain the spill.
- 2. Immediately stake off area.
- 3. Notify Hazardous Material team (if necessary); notify TCEQ: (512) 339-2929 or Emergency # 1-800-832-8224
- 4. Take necessary steps to clean up, i.e. notify remediation contractor if large spill, or small spills will be cleaned by the construction contractor.

All site personnel will be made aware of the manufactures' recommended methods for spill cleanup, and the location of the information and cleanup supplies.

Spills will be reported according to the Reportable Quantity, attached on the following page.

Materials and equipment necessary for spill cleanup will be kept onsite in an accessible location known to site personnel.

All Spills will be cleaned up immediately upon discovery. Any spill of hydrocarbons or hazardous substances greater than 25 gallons will require notification to the fire Department Hazardous Materials Team and TCEQ. As with all spills, an effort shall be made to prevent material from entering surface streams and storm drains by using rock or earth berms to contain the material.

Kind of spill	Where discharged	Reportable quantity	Rule, statute, or
			responsible agency
Hazardous substance	onto land	"Final RQ" in Table	30 TAC 327 [₫]
		302.4 in 40 CFR	
		<u>302.4</u> (PDF) ₫	
	into water	"Final RQ" or 100 lbs,	
		whichever is less	
Any oil	coastal waters	as required by the Texas	Texas General Land
		General Land Office	Office 🗗
Crude oil, oil that is neither a	onto land	210 gallons (five barrels)	30 TAC 327 [₫]
petroleum product nor used oil	directly into water	enough to create a	
		sheen	
Petroleum product, used oil	onto land, from an exempt	210 gallons (five barrels)	30 TAC 327 [₫]
	PST facility		
	onto land, or onto land from	25 gallons	
	a non-exempt PST facility		
	directly into water	enough to create a	
		sheen	
Associated with the exploration,	under the jurisdiction of the	as required by the	Railroad Commission
development and production of oil,	Railroad Commission of	Railroad Commission of	of Texas
gas, or geothermal resources	Texas	Texas	
Industrial solid waste or other	into water	100 lbs	30 TAC 327 [₫]
substances			
From petroleum storage tanks,	into water	enough to create a	30 TAC 334.75-81 [₫]
underground or aboveground		sheen on water	
From petroleum storage tanks,	onto land	25 gallons or equal to	30 TAC 327 [₫]
underground or aboveground		the RQ under 40 CFR	
		<u>302</u> ≰	
Other substances that may be useful	into water	100 lbs	30 TAC 327 [₫]
or valuable and are not ordinarily			
considered to be waste, but will			
cause pollution if discharged into			
water in the state			

1.4.16 Spill Prevention and Control

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 stormwater 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 spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills. Employees should also be aware of when spill must be reported to the TCEQ. Information available in 30 TAC 327.4 and 40 CFR 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 contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

- (1) To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and 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 stormwater runon 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, and 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 instructions for hazardous materials 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 spilled material is hazardous, then the used cleanup materials are also hazardous and must be disposed of as hazardous waste.
- (3) Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs 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 be promptly removed and disposed of properly.
- (4) Follow the practice below for a minor spill:
- (5) Contain the spread of the spill.
- (6) Recover spilled materials.
- (7) Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, 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- 339-2929 (Austin) or 210-490-3096 (San Antonio) between 8 AM and 5 PM. After hours, contact the Environmental Release Hotline 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 110,119, 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 staffs 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: https://www.tceq.texas.gov/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 run on of stormwater 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 a 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 fluids 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 trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste 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 designated areas, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- (2) Discourage "topping off" of fuel tanks.
- (3) Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

Temporary Stormwater Section ATTACHMENT B

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Potential Sources of Contamination:

Gasoline, Diesel, and Hydraulic Fluid from construction equipment, Asphalt products,
Construction Materials,
Trash and Debris,
Paint,
Concrete,
Gypsum from sheet rock,
Sediment.

All materials shall be hauled in a manner consistent with the manufacturer's recommendations. Disposal of waste material shall be in conformance with all state and local laws

Temporary Stormwater Section ATTACHMENT C

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Sequence of Major Activities:

- 1. Install and maintain Erosion Control and Tree Protection per the Approved Plans and specifications prior to any clearing and grubbing, grading, excavating, etc... Notify Construction Inspection Division when installed.
- 2. Prior to beginning construction, the owner or his representative shall hold a Pre-Construction Conference between TCEQ, Williamson County, Contractor, and any other affected parties. Notify TCEQ at least 48 hours prior to the time of the conference and 48 hours prior to beginning construction. Prior to Pre-Construction Conference.
- 3. Hold Pre-Construction Conference with contractor, TCEQ, EV Inspector, Engineer, and owner or his representative.
- 4. Rough grade roadway. (Estimate of disturbed area = 4.35 ac)
- 5. Begin installation of storm sewer. Upon completion, restore as much disturbed areas as possible, particularly channels and large open areas. (Estimate of disturbed area = 0.48 ac)
- 6. Regrade streets to subgrade (Estimate of disturbed area = 4.35 ac)
- 7. Ensure that all underground utility crossings are completed. Lay first course base material on all streets. (4.35 ac)
- 8. Install curb and gutter. (Estimate of disturbed area = 0.38 ac)
- 9. Place concrete for common area 4' sidewalk. (Estimate of disturbed area = 0.77 ac)
- 10. Lay final base course on all streets. (4.35 ac)

- 11. Lot grading. (Estimate of disturbed area = 9.75 ac)
- 12. Lay asphalt. (3.57 ac)
- 13. Clean site and revegetate all disturbed area according to the plans and specifications. Stabilization measures should include seeding and/or mulching.
- 14. Complete permanent erosion control and restoration of site vegetation.
- 15. Project Engineer to provide a written concurrence letter, and scheduling final inspection with EV Inspector, prior to the removal of erosion controls.
- 16. Remove and dispose of temporary erosion/sedimentation control measures.
- 17. Complete any necessary final dress up of areas disturbed by Item 16.
- 18. Conduct a final inspection and complete all punch list items.

Clearing and grubbing under a development permit, solely for the purpose of surveying and soil exploration, shall be a hand-cutting or blade-up operation.

Temporary Stormwater Section ATTACHMENT D

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Temporary Best Management Practices and Measures:

Install temporary erosion control measures, stabilized construction entrance, concrete washout area, inlet protection, and tree protection according to the plans and specifications prior to any clearing and grubbing, grading, excavating, etc. Upgradient stormwaters during construction crossing disturbed areas will be filtered utilizing standard Best Management Practices, such as erosion logs and silt fences, prior to leaving the site. The silt fences will be placed along down gradient areas of the site to prevent any sediment from entering storm sewers or surface streams.

Geological features on this site are located outside of the Limits of Construction and no stormwater from the disturbed areas will drain to the geological features.

Temporary Stormwater Section ATTACHMENT F

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Structural Practices:

For areas that will have more than 10 acres within a common drainage area disturbed at one time, a combination of temporary BMPs and measures will be used to protect down slope and side slope boundaries of the construction area. For areas that will have less than 10 acres within a common drainage area disturbed at one time, a combination of a sediment basin and other erosion control measures, such as silt fences and rock berms, will be provided. For any areas not draining to sediment ponds, silt fences shall be provided.

Structural erosion control and pollution prevention practices shall be implemented to limit runoff discharge of pollutants from exposed soils. The structural practices utilized include:

Silt Fence

- Barrier consisting of geotextile fabric supported by metal posts to prevent soil and sediment loss from a site.
 - Silt fence material should be polypropylene, polyethylene or polyamide woven or nonwoven fabric. The fabric width should be 36 inches, with a minimum unit weight of 4.5 oz/yd, mullen burst strength exceeding 190 lb/in2, ultraviolet stability exceeding 70%, and minimum apparent opening size of U.S. Sieve No. 30.
 - 2) Fence posts should be made of hot rolled steel, at least 4 feet long with Tee or Ybar cross section, surface painted or galvanized, minimum nominal weight 1.25 lb/ft2, and Brindell hardness exceeding 140.
 - 3) Woven wire backing to support the fabric should be galvanized 2" x 4" welded wire, 12 gauge minimum.

Fiber Rolls

- Placed at the toe and on the face of slopes to intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff.
 - Core material: Core material should be biodegradable or recyclable. Material may be compost, mulch, aspen wood fibers, chipped site vegetation, agricultural rice or wheat straw, coconut fiber, 100% recyclable fibers, or similar materials.
 - 2) Containment Mesh: Containment mesh should be 100% biodegradable, photodegradable or recyclable such as burlap, twine, UV photodegradable plastic, polyester, or similar material. When the fiber role will remain in place as part of a vegetative system use biodegradable or photodegradable mesh. For temporary installation recyclable mesh is recommended.

Stabilized Construction Entrance

 Stabilized pad of crushed stone located at any point traffic will be entering or leaving the construction site from a public right-of-way, street, alley, sidewalk or parking area.

- 1) The aggregate should consist of 4 to 8 inch washed stone over a stable foundation as specified in the plan.
- 2) The aggregate should be placed with a minimum thickness of 8 inches.
- 3) The geotextile fabric should be designed specifically for use as a soil filtration media with an approximate weight of 6 oz/yd2, a mullen burst rating of 140 lb/in2, and an equivalent opening size greater than a number 50 sieve.
- 4) If a washing facility is required, a level area with a minimum of 4 inch diameter washed stone or commercial rack should be included in the plans. Divert wastewater to a sediment trap or basin.

Inlet Protection

- Filter barrier protection installed around stormwater inlets that provide protection against silt transport or accumulation in storm sewer systems.
 - 1) Filter fabric should be a nylon reinforced polypropylene fabric which meets the following minimum criteria: Tensile Strength, 90 lbs.; Puncture Rating, 60 lbs.; Mullen Burst Rating, 280 psi; Apparent Opening Size, U.S. Sieve No. 70.
 - 2) Posts for fabric should be 2" x 4" pressure treated wood stakes or galvanized steel, tubular in cross-section or they may be standard fence "T" posts.
 - 3) Concrete blocks should be standard 8" x 8" x 16" concrete masonry units.
 - 4) Wire mesh should be standard hardware cloth or comparable wire mesh with an opening size not to exceed 1/2 inch.

Concrete Washout

- Prevent or reduce the discharge of pollutants to stormwater from concrete waste by conducting washout offsite, performing washout in a designated area, and training employees and subcontractors.
 - Plastic lining material should be a minimum of 10 mil in polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.

Temporary Sediment Basin

- Intercepts sediment-laden runoff and trap the sediment in order to protect drainage ways, properties and rights of way downstream.
 - 1) Riser should be corrugated metal or reinforced concrete pipe or box and should have watertight fittings or end to end connections of sections.
 - An outlet pipe of corrugated metal or reinforced concrete should be attached to the riser and should have positive flow to a stabilized outlet on the downstream side of the embankment.
 - 3) An anti-vortex device and rubbish screen should be attached to the top of the riser and should be made of polyvinyl chloride or corrugated metal.

Rock Berm

- Serve as a check dam in areas of concentrated flow, to intercept sediment-laden runoff, detain the sediment and release the water in sheet flow.
 - 1) The berm structure should be secured with a woven wire sheathing having maximum opening of 1 inch and a minimum wire diameter of 20 gauge galvanized and should be secured with shoat rings.
 - Clean, open graded 3- to 5-inch diameter rock should be used, except in areas where high velocities or large volumes of flow are expected, where 5- to 8-inch diameter rocks may be used.

Temporary Stormwater Section ATTACHMENT G

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Drainage Area Map:

An overall drainage area map is included within the plan set submitted with this application.

Temporary Stormwater Section

ATTACHMENT H

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Temporary Sediment Pond(s) Plans and Calculations:

Batch Detention Ponds 7-1, 7-2, and 7-3 will act as a temporary sediment basin. This basin in combination with temporary BMPs will be installed to control sediment transport during construction of the site. The construction plans for Ponds 7-1, 7-2, and 7-3 have been submitted with this application.

Per 30 TAC 213.5(b)(4)(D)(i), temporary sediment ponds shall provide: 1) storage for a calculated volume of runoff from a two-year, 24-hour storm from each disturbed acre drained; 2) storage equivalent to 3,600 cubic feet of storage per acre drained; or 3) equivalent control measures until final stabilization of the site.

The table below provides the required storage equivalent to 3,600 cubic feet per disturbed acre from the proposed site draining to each pond. The proposed batch detention ponds have sufficient storage within the provided water quality storage to collect sediment runoff during construction activities until final stabilization of the site.

Proposed	On-site	Required	Provided
Ponds	Disturbed Area (ac)	Storage (cf)	WQV (cf)
Pond 7-1	0.36	1,296	198,020
Pond 7-2	20.88	75,168	146,397
Pond 7-3	0.90	3,240	279,518

^{*}Sediment control will be provided by a combination of a temporary sediment basin and other structural BMPs such as silt fence, rock berms, and temporary rolled erosion control matting prior to final stabilization.

Temporary Stormwater Section ATTACHMENT I

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Inspection and Maintenance for Best Management Practices:

The Best Management Practices installed during construction will be maintained in accordance with the requirements of the EPA's NPDES/TPDES storm water pollution prevention program (SWPPP). The following maintenance procedures shall be followed until permanent stabilization is complete.

Silt Fence

- Inspect weekly or after each rainfall event and repair or replacement shall be made promptly as needed.
- b. Silt Fence shall be removed when the site is completely stabilized so as to not block or impede storm flow or drainage.
- c. Accumulated silt shall be removed when it reaches a depth of 6 inches. The Silt shall be disposed of on an approved site and in such a manner that will not contribute to additional siltation.

Fiber Rolls

- a. Inspect prior to forecast rain, daily during extended rain events, after rain events, and weekly.
- b. Repair of replace split, torn, unraveling, or slumping fiber rolls.
- c. If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates behind the role shall be periodically removed tin order to maintain its effectiveness. Sediment shall be removed when the accumulation reaches one-half the designated sediment storage depth, usually one-half the distance between the top of the fiber roll and the adjacent ground surface. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed of at an appropriate location.

Stabilized Construction Entrance

- a. The entrance shall be maintained in a condition that will prevent tracking or flowing of sediment onto a public roadway. This may require periodic top dressing with additional stone as conditions demand, as well as repair and clean out of any devices used to trap sediment.
- b. Entrance must be properly graded to incorporate a drain swale or similar measure to prevent runoff from leaving the construction site.

Inlet Protection

- a. Inspection shall be made weekly or after each rainfall event and replacement or repair shall be made promptly as needed.
- b. Accumulated silt shall be removed when it reaches a depth of 6 inches. The Silt shall be disposed of on an approved site and in such a manner that will not contribute to additional siltation
- c. The dyke shall be removed when the site is completely stabilized so as to not block or impede storm flow or drainage.

Temporary Sediment Basins

- a. Inspection shall be made weekly or after each rainfall event. Check the embankment spillways, and outlet for erosion damage, and inspect the embankment for piping and settlement. Repair should be made promptly as needed.
- b. Trash and other debris should be removed after each rainfall event to prevent clogging of the outlet structure.
- c. Accumulated silt should be removed and the basin should be regraded to its original dimensions at such point that the capacity of the impoundment has been reduced to 75% of its storage capacity.
- The removed sediment should be stockpiled or redistributed in areas that are protected from erosion.

Concrete Washout

- a. Inspection shall be made daily or after each rainfall event to check for leaks, identify any plastic linings and sidewalls which have been damaged by construction activities.
- b. When the washout container is filled over 75 % of its capacity, the washwater should be vacuumed off or allowed to evaporate to avoid overflows. When the remaining cementitious solids have hardened, they should be removed and recycled.
- c. Damages to the container should be repaired promptly and as needed.
- d. Before heavy rains, the washout containers liquid level should be lowered or the container should be covered to avoid an overflow during the rain event.

The owner shall hire an E&S compliance company to inspect E&S measures and keep reports of onsite inspections with deficiencies and solutions.

Temporary Stormwater Section ATTACHMENT J

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Schedule of Interim and Permanent Soil Stabilization Practices:

Soil Stabilization for all disturbed areas shall be accomplished by hydraulic planting. Following is an outline to accomplish the required stabilization.

- 1. Preparing Seed Bed. After the designated areas have been rough graded to the lines, grades and typical sections indicated in the Drawings or as provided for in other items of this contract and for any other soil area disturbed by the construction, a suitable seedbed shall be prepared. The seedbed shall consist of a minimum of either 4 inches (100 millimeters) of approved topsoil or 4 inches (100 millimeters) of approved salvaged topsoil, cultivated and rolled sufficiently to enhance the soil to a state of good health, when the soil particles on the surface are small enough and lie closely enough together to prevent the seed from being covered too deeply for optimum germination. The optimum depth for seeding shall be 114 inch (6 millimeters). Water shall be gently applied as required to prepare the seedbed prior to the planting operation either by broadcast seeding or hydraulic planting. Bare soils should be seeded or otherwise stabilized within 14 calendar days after final grading or where construction activity has temporarily ceased for more than 21 days. Seeding shall be performed in accordance with the requirements hereinafter described.
- 2. Watering. All watering shall comply with Santa Rita Ranch Rules and Regulations. Broadcast seeded areas shall immediately be watered with a minimum of 5 gallons of water per square yard (22.5 liters of water per square meter) or as needed and in the marmer and quantity as directed by the Engineer or designated representative. Hydraulic seeded areas and native grass seeded areas shall be watered commencing after the tackifier has dried with a minimum of 5 gallons of water per square yard (22.5 liters of water per square meter) or as needed to keep the seedbed in a wet condition favorable for the growth of grass. Watering applications shall constantly maintain the seedbed in a wet condition favorable for the growth of grass. Watering shall continue until the grass is uniformly 1 1/2 inches (40 mm) in height and accepted by the Engineer or designated representative. Watering can be postponed immediately after a 1/2 inch (12.5 mm) or greater rainfall on the site but shall be resumed before the soil dries out.
- 3. Hydraulic Planting. The seedbed shall be prepared as specified above and hydraulic planting equipment, which is capable of placing all materials in a single operation, shall be used.

March 1 to September 15

Hydraulic planting mixture and minimum rate of application pounds per 1000 square feet (kilograms per 100 square meters):

Planting Mixture				
Hulled Bermuda Seed	Fiber Mulch	Fiber Mulch		
(PLS=0.83)	Cellulose	Wood	Tackifier	
	45.9 Lbs/1000 ft2		1.4 lbs/1000 ft2	
1 lbs/1000 ft2	(22.5 kgs/100m2)		(0.7 kgs/100 m2)	
(0.5 kgs/100 m2)		57.4 lbs/1000 ft2	1.5 lbs/1000 ft2	
		(28.01 kgs/100 m2)	(0.75 kgs/100 m2)	

September 15 to March 1

Add 1.5 pounds per 1000 square feet (0.75 kgs/ 100 m@) of cool season cover crop (see table 1) to above mixture. The fertilizer shall conform to City of Austin Standard Specification Item No. 606S, "Fertilizer".

Table 1 : Cool Season Cover Crop				
Common Name	Botanical Name	Application rates		
Common Name		Lbs/1000 feet ²	Kg/ 100 meter ²	
Wheat	Triticum aestivum	0.5	0.25	
Oats	Avena sativa	0.5	0.25	
Cereal Rye Grain	Secale cereal	0.5	0.25	
Total Cool Season Cover Crop Seeding Rate		1.5	0.75	
Total Cool Season Seeding Rate (Grass Wildflowers, & Cover Crop)		4.5	2.25	

Permanent 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)(C), (D)(Ii), (E), and (5), 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 **Permanent Stormwater Section** is hereby submitted for TCEQ review and executive director approval. The application was prepared by:

Print Name of Customer/Agent: <u>Steven P. Cates, P.E.</u>
Date: 3/31/2023

Signature of Customer/Agent

Regulated Entity Name: Santa Rita Ranch Phase 7B Section 1

Permanent Best Management Practices (BMPs)

Permanent best management practices and measures that will be used during and after construction is completed.

1 Permanent RMPs and measures must be implemented to control the discharge of

	pollution from regulated activities after the completion of construction.
	□ N/A
2.	These practices and measures have been designed, and will be constructed, operated, and maintained to insure that 80% of the incremental increase in the annual mass loading of total suspended solids (TSS) from the site caused by the regulated activity is removed. These quantities have been calculated in accordance with technical guidance prepared or accepted by the executive director.
	The TCEQ Technical Guidance Manual (TGM) was used to design permanent BMPs and measures for this site.

	A technical guidance other than the TCEQ TGM was used to design permanent BMPs and measures for this site. The complete citation for the technical guidance that was used is:
	□ N/A
3.	Owners must insure that permanent BMPs and measures are constructed and function as designed. A Texas Licensed Professional Engineer must certify in writing that the permanent BMPs or measures were constructed as designed. The certification letter must be submitted to the appropriate regional office within 30 days of site completion.
	□ N/A
4.	Where a site is used for low density single-family residential development and has 20 % or less impervious cover, other permanent BMPs are not required. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.
	 The site will be used for low density single-family residential development and has 20% or less impervious cover. The site will be used for low density single-family residential development but has more than 20% impervious cover.
	The site will not be used for low density single-family residential development.
5.	The executive director may waive the requirement for other permanent BMPs for multifamily residential developments, schools, or small business sites where 20% or less impervious cover is used at the site. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.
	 ☐ Attachment A - 20% or Less Impervious Cover Waiver. The site will be used for multi-family residential developments, schools, or small business sites and has 20% or less impervious cover. A request to waive the requirements for other permanent BMPs and measures is attached. ☐ The site will be used for multi-family residential developments, schools, or small business sites but has more than 20% impervious cover. ☐ The site will not be used for multi-family residential developments, schools, or small business sites.
6.	

	 A description of the BMPs and measures that will be used to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site is attached. No surface water, groundwater or stormwater originates upgradient from the site and flows across the site, and an explanation is attached. Permanent BMPs or measures are not required to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site, and an explanation is attached.
7.	
	A description of the BMPs and measures that will be used to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff from the site is attached. Permanent BMPs or measures are not required to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff, and an explanation is attached.
8.	Attachment D - BMPs for Surface Streams . A description of the BMPs and measures that prevent pollutants from entering surface streams, sensitive features, or the aquifer is attached. Each feature identified in the Geologic Assessment as sensitive has been addressed.
	N/A
9.	The applicant understands that to the extent practicable, BMPs and measures must maintain flow to naturally occurring sensitive features identified in either the geologic assessment, executive director review, or during excavation, blasting, or construction.
	 The permanent sealing of or diversion of flow from a naturally-occurring sensitive feature that accepts recharge to the Edwards Aquifer as a permanent pollution abatement measure has not been proposed. Attachment E - Request to Seal Features. A request to seal a naturally-occurring sensitive feature, that includes, for each feature, a justification as to why no reasonable and practicable alternative exists, is attached.
10.	Attachment F - Construction Plans . All construction plans and design calculations for the proposed permanent BMP(s) and measures have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer, and are signed, sealed, and dated. The plans are attached and, if applicable include:
	 ✓ Design calculations (TSS removal calculations) ✓ TCEQ construction notes ✓ All geologic features ✓ All proposed structural BMP(s) plans and specifications
	N/A

11. Attachment G - Inspection, Maintenance, Repair and Retrofit Plan. A plan for the inspection, maintenance, repairs, and, if necessary, retrofit of the permanent BMPs an measures is attached. The plan includes all of the following:
 ☑ Prepared and certified by the engineer designing the permanent BMPs and measures ☑ Signed by the owner or responsible party ☑ Procedures for documenting inspections, maintenance, repairs, and, if necessary retrofit ☑ A discussion of record keeping procedures
□ N/A
12. Attachment H - Pilot-Scale Field Testing Plan. Pilot studies for BMPs that are not recognized by the Executive Director require prior approval from the TCEQ. A plan for pilot-scale field testing is attached.
⊠ N/A
13. Attachment I -Measures for Minimizing Surface Stream Contamination. A description of the measures that will be used to avoid or minimize surface stream contamination and changes in the way in which water enters a stream as a result of the construction and development is attached. The measures address increased stream flashing, the creation of stronger flows and in-stream velocities, and other in-stream effects caused by the regulated activity, which increase erosion that results in water quality degradation.
□ N/A
Responsibility for Maintenance of Permanent BMP(s)
Responsibility for maintenance of best management practices and measures after construction is complete.
14. The applicant is responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property (such as without limitation, an owner's association, a new property owner or lessee, a district, or municipality) or the ownership of the property is transferred to the entity. Such entity shall then be responsible for maintenance until another entity assumes such obligations in writing o ownership is transferred.
□ N/A
15. A copy of the transfer of responsibility must be filed with the executive director at the appropriate regional office within 30 days of the transfer if the site is for use as a multiple single-family residential development, a multi-family residential development or a non-residential development such as commercial, industrial, institutional, schools, and other sites where regulated activities occur.
□ N/A

Permanent Stormwater Section ATTACHMENT B

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Best Management Practices for Upgradient Stormwater:

Upgradient stormwater will travel overland to the curb and gutter and captured by the curb inlets to be conveyed to proposed Batch Detention Ponds 7-1, 7-2, and 7-3. Proposed Batch Detention Ponds 7-1, 7-2, and 7-3 will treat future development as well.

Permanent Stormwater Section ATTACHMENT C

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Best Management Practices for On-site Stormwater:

Stormwater runoff from Phase 7B Section 1 will sheet flow across lawns, be captured in gutters and curb inlets, and piped into proposed Batch Detention Ponds 7-1, 7-2, and 7-3. Proposed Batch Detention Ponds 7-1, 7-2 and 7-3 will treat future development. These water quality ponds provide TSS removal for the upstream sections. The water quality volume provided in these ponds will be sufficient to accommodate TSS removal for Phase 7B Section 1.

TCEQ project and drainage area maps are provided in the included construction plans. TCEQ TSS removal calculations are provided in Appendix A of this application. TCEQ WPAP & SCS approval letters are provided in Appendix B.

Permanent Stormwater Section ATTACHMENT D

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Best Management Practices for Surface Stream Stormwater:

Stormwater runoff from drainage areas A to E will sheet flow across lawns, be captured in gutters and curb inlets, and piped into existing Batch Detention Ponds 7-1, 7-2, and 7-3 as shown on the Drainage Area Plan.

The batch ponds discharge through rock rip-rap and rock berms which will deter heavy floods from entering streams and aid in collection sediment. The remaining site stormwater runoff will sheet flow across the lots and discharge directly into the Middle Fork of the San Gabriel River.

Permanent Stormwater Section ATTACHMENT F

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Construction Plans:

Construction Plans for the erosion and sedimentation control measures proposed with this development are included at the end of this report.

Permanent Stormwater Section ATTACHMENT G

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Inspection, Maintenance, Repair and Retrofit Plan:

Maintenance Guidelines for Batch Detention Basins

Batch detention basins may have somewhat higher maintenance requirements than an extended detention basin since they are active stormwater controls. The maintenance activities are identical to those of extended detention basins with the addition of maintenance and inspections of the automatic controller and the valve at the outlet.

- Inspections. Inspections should take place a minimum of twice a year. One inspection should take place during wet weather to determine if the basin is meeting the target detention time of 12 hours and a drawdown time of no more than 48 hours. The remaining inspections should occur between storm events so that manual operation of the valve and controller can be verified. The level sensor in the basin should be inspected and any debris or sediment in the area should be removed. The outlet structure and the trash screen should be inspected for signs of clogging. Debris and sediment should be removed from the orifice and outlet(s) as described in previous sections. Debris obstructing the valve should be removed. During each inspection, erosion areas inside and downstream of this BMP should be identified and repaired/revegetated immediately.
- Mowing. The basin, basin side-slopes, and embankment of the basin must be mowed to prevent
 woody growth and control weeds. A mulching mower should be used, or the grass clippings
 should be caught and removed. Mowing should take place at least twice a year, or more
 frequently if vegetation exceeds 18 inches in height. More frequent mowing to maintain aesthetic
 appeal may be necessary in landscaped areas.
- Litter and Debris Removal. Litter and debris removal should take place at least twice a year, as
 part of the periodic mowing operations and inspections. Debris and litter should be removed from
 the surface of the basin. Particular attention should be paid to floatable debris around the outlet
 structure. The outlet should be checked for possible clogging or obstructions and any debris
 removed.
- **Erosion control.** The basin side slopes and embankment all may periodically suffer from slumping and erosion. To correct these problems, corrective action, such as regrading and revegetation, may be necessary. Correction of erosion control should take place whenever required based on the periodic inspections.
- **Nuisance Control.** Standing water or soggy conditions may occur in the basin. Some standing water may occur after a storm event since the valve may close with 2 to 3 inches of water in the basin. Some flow into the basin may also occur between storms due to spring flow and residential water use that enters the storm sewer system. Twice a year, the facility should be evaluated in terms of nuisance control (insects, weeds, odors, algae, etc.).

- Structural Repairs and Replacement. With each inspection, any damage to structural elements
 of the basin (pipes, concrete drainage structures, retaining walls, etc.) should be identified and
 repaired immediately. An example of this type of repair can include patching of cracked concrete,
 sealing of voids, removal of vegetation from cracks and joints. The various inlet/outlet structures
 in a basin will eventually deteriorate and must be replaced.
- Sediment Removal. A properly designed batch detention basin will accumulate quantities of sediment over time. The accumulated sediment can detract from the appearance of the facility and reduce the pollutant removal performance of the facility. The sediment also tends to accumulate near the outlet structure and can interfere with the level sensor operation. Sediment shall be removed from the basin at least every 5 years, when sediment depth exceeds 6 inches, when the sediment interferes with the level sensor or when the basin does not drain within 48 hours. Care should be taken not to compromise the basin lining during maintenance.
- Logic Controller. The Logic Controller should be inspected as part of the twice yearly investigations. Verify that the external indicators (active, cycle in progress) are operating properly by turning the controller off and on, and by initiating a cycle by triggering the level sensor in the basin. The valve should be manually opened and closed using the open/close switch to verify valve operation and to assist in inspecting the valve for debris. The solar panel should be inspected and any dust or debris on the panel should be carefully removed. The controller and all other circuitry and wiring should be inspected for signs of corrosion, damage from insects, water leaks, or other damage. At the end of the inspection, the controller should be reset.

Ultimately, these facilities will be owned, operated and maintained by the proposed Williamson County MUD No. 19A. Until the ownership of facilities is transferred to the MUD, Pulte Homes of Texas, L.P. will be responsible for maintenance of these facilities in accordance with the above stated requirements.

Acknowledged by:

James Edward Horne Santa Rita KC, LLC.

BMP DESIGN FIRM INFORMATION

Carlson, Brigance & Doering, Inc. Mr. Steven P. Cates, P.E. Phone: (512) 280-5160 5501 West William Cannnon Austin, TX 78749

The above Inspection, Maintenance, Repair, and Retrofit Plan has been prepared by the undersigned Engineer, and I hereby certify that the above Plan conforms with the minimum requirements of the TCEQ Technical Guidance on Best Management Practices, RG-348.

Steven P. Cates, P.E.

3-31-2023 Date

Seal

CARLSON, BRIGANCE & DOERING, INC. ID# F3791

Permanent Stormwater Section

ATTACHMENT I

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Measures for Minimizing Surface Stream Contamination:

The development minimizes surface stream contamination by maintaining the naturally occurring sheet flow across the lots. Drainage from this development will be directed towards batch detention ponds which will reduce the developed flow rated to predeveloped flow rates. There are no surface streams within this site.

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: Santa Rita Ranch Phase 7B Section 1

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: James Edward Horne

Entity: Santa Rita KC, LLC.

Mailing Address: 1700 Cross Creek Lane, Suite 100

City, State: Liberty Hill, Texas Zip: 78642
Telephone: 512-502-2050 Fax: _____

Email Address: ed@srraustin.com

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: Steven P. Cates, P.E.

Texas Licensed Professional Engineer's Number: 93648

Entity: <u>Carlson, Brigance, and Doering, Inc.</u>
Mailing Address: 5501 W. William Cannon Dr.

City, State: Austin, Texas Zip: 78749

Telephone:512-280-5160 Fax:512-280-5165

Email Address:steve@cbdeng.com

Project Information

4.	Anticipated type of development to be served (est plus adequate allowance for institutional and com	
	Residential: Number of single-family lots: 4 Multi-family: Number of residential units: _ Commercial Industrial Off-site system (not associated with any de Other:	<u></u>
5.	The character and volume of wastewater is shown	below:
	100% Domestic% Industrial% Commingled Total gallons/day: 9,030	9,030 gallons/day gallons/day gallons/day
ŝ.	Existing and anticipated infiltration/inflow is <u>14,56</u> SDR 26 PVC with gasketed joints.	8 gallons/day. This will be addressed by:
7.	A Water Pollution Abatement Plan (WPAP) is requi commercial, industrial or residential project locate	
	 □ The WPAP application for this development was copy of the approval letter is attached. □ The WPAP application for this development was application, but has not been approved. □ A WPAP application is required for an associate □ There is no associated project requiring a WPA 	ed project, but it has not been submitted.

8. Pipe description:

Table 1 - Pipe Description

Pipe Diameter(Inches)	Linear Feet (1)	Pipe Material (2)	Specifications (3)
6"	520	SDR 26 PVC	ASTM D3034
6"	508	C900 DR-18 PVC	AWWA C900
8"	2,591	SDR 26 PVC	ASTM D3034
8"	80	C900 (150 psi) PVC	AWWA C900

Total Linear Feet: 3,699

- (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.	· ·	lant. The treatment facil		erty filli wastewater
	Existing Proposed			
10.	All components of t	nis sewage collection sys	tem will comply with:	
		<u>berty Hill</u> standard speci fications are attached.	fications.	
11.	No force main(s)	and/or lift station(s) are	e associated with this se	wage collection system.
		and/or lift station(s) is as Force Main System App		· · · · · · · · · · · · · · · · · · ·
Αl	ignment			
12.		viations from uniform gra ith open cut constructio	-	ction system without
13.	There are no dev	viations from straight alig es.	gnment in this sewage c	ollection system
	without Manho collection syster allowing pipe cu For curved sewe	lustification and Calcula les. A justification for de- n without manholes with rvature is attached. r lines, all curved sewer ns for the wastewater co	viations from straight al n documentation from p line notes (TCEQ-0596) a	ignment in this sewage ipe manufacturer
M	anholes and	Cleanouts		
		an-outs exist at the end of track additional sheet if		nese locations are listed
	<u> </u>	The Globallouis		Manhole or Clean-
	Line	Shown on Sheet	Station	out?
	Α	47 Of 56	8+42.34	MH
	В	48 Of 56	9+42.63	СО
	С	49 Of 56	8+96.10	MH
	D	50 Of 56	5+08.10	СО
		Of		

Of Of

	Line	Shown on Sheet	Station	Manhole or Clean- out?		
	Line	Of	Station	outr		
		Of				
		Of				
		OI .				
	Manholes are ins line.	stalled at all Points of Cu	rvature and Points of Te	rmination of a sewer		
	The maximum sp greater than:	pacing between manhole	es on this project for eac	h pipe diameter is no		
	Pipe Dian	neter (inches)	Max. Ma	nhole Spacing (feet)		
	ϵ	5 - 15		500		
		6 - 30		800		
		6 - 48		1000		
		≥54		2000		
	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.			e entity which will		
17.	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 Requ	irements				
Items 1	8 - 25 must be in	ncluded on the Site Plan.				
18. 🖂	The Site Plan mu	st have a minimum scale	e of 1" = 400'.			
	Site Plan Scale: 1	<u> " = 40</u> ".				
	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.			r). Site plan must be f not greater than ten		
20. Late	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 prop	posed water lines:	
If not shown on the Site sewer systems.	ition system for this project is sh Plan, a Utility Plan is provided sh nes associated with this project.	
22. 100-year floodplain:		
floodplain, either natura lined channels construction is com have water-tight manhol	•	not include streets or concrete- in the 100-year floodplain will the table below and are shown
Line	Sheet	Station
	of	to
floodplain, either natura lined channels construction is comenced encased in concrete or construction.	nplete, all sections located within apped with concrete. These loca d labeled on the Site Plan. (Do r	not include streets or concrete- n the 5-year floodplain will be ations are listed in the table
Line	Sheet	Station
	of	to
 24. Legal boundaries of the s 25. The <i>final plans and techn</i> sheet of the construction 		

Items 26 - 33 must	tems 26 - 33 must be included on the Plan and Profile sheets.				
sewer lines rated pipe t variance fro	are listed in the tab o be installed show	ole below. These lines of the self on the plan and ssure rated piping	ines must have t profile sheets.	er lines within 9 feet of the type of pressure Any request for a est include a variance	
=	e no water line cros e no water lines wit	•	osed sewer lines	S.	
Table 5 - Water I	Line Crossings		T		
Line	Station or Closest Point	Crossing or Parallel	Horizonta Separation Distance		
WWLN A	5+74.60	CROSSING		26	
WWLN B	2+12.65	CROSSING		94	
WWLN B	9+22.77	CROSSING		48	
WWLN C	0+31.50	CROSSING		73	
required by A portion of the table be provided the table be a portion of venting shat alternative A portion of the table be a portion of the table by the table be a portion of the table by the tabl	his sewer line is wit 30 TAC Chapter 21 f this sewer line is v I at less than 1500 f elow and labeled on f this sewer line is v Il be provided at les means is described f this sewer line is v ger than 1500 feet	7. vithin the 100-yea foot intervals. The the appropriate p vithin the 100-yea s than 1500 feet in on the following p vithin the 100-yea	r floodplain and ese water-tight no profile sheets. If the floodplain and intervals. A descoage.	vever, there is no	
Line	Manho	ole	Station	Sheet	

Line	Manhole	Station	Sheet		
Sewer lines whic 24 inches above appropriate prof §217.55(I)(2)(H).	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				
Table 7 - Drop Manho	oles <i>Manhole</i>	Station	Sheet		
Line	- Widiffioic	Julion -	Silect		
	9. 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 (Fo	or proposed private servi	ice 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				
31. Minimum flow veloc	city (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 veloc	2. Maximum flow velocity/slopes (From Appendix A)				
less than or equa	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.				
Assuming pipes a	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 \geq 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(I)(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]	56 of 56
Manhole, showing inverts comply with 30 TAC §217.55(I)(2) [Required]	56 of 56
Alternate method of joining lateral to existing SCS line for potential future connections [Required]	56 of 56
Typical trench cross-sections [Required]	56 of 56
Bolted manholes [Required]	56 of 56
Sewer Service lateral standard details [Required]	56 of 56
Clean-out at end of line [Required, if used]	56 of 56
Baffles or concrete encasement for shock/erosion protection [Required, if flow velocity of any section of pipe >10 fps]	N/A of N/A
Detail showing Wastewater Line/Water Line Crossing [Required, if crossings are proposed]	56 of 56
Mandrel detail or specifications showing compliance with 30 TAC §217.57(b) and (c) [Required, if Flexible Pipe is used]	N/A of N/A

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

- 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: 4/28/2023
- 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: Steven P. Cates, P.E.

Date: 3/31/2023

Place engineer's seal here:

Signature of Licensed Professional Engineer:

STEVEN P. CATES

93648

93648

OCCENSED

ONAL ENGINEER

ONAL ENGIN

CARLSON, BRIGANCE & DOERING, INC. ID# F3791

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

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

SCS Engineering Design Report

Prepared by:

Steven P. Cates, P.E.
Carlson, Brigance & Doering, Inc.
5501 W. William Cannon
Austin, Texas 78749
(512)-280-5160
Firm # F3791

Prepared for:

Santa Rita KC, LLC. Atten: James Edward Horne 1700 Cross Creek Lane, Suite 100 Liberty Hill, Texas 78642 (512)-502-2050

January 2023 CBD No. 5487



CARLSON, BRIGANCE & DOERING, INC.

ID# F3791

3-31-2023

SCS Engineering Design Report

TABLE OF CONTENTS

- I. General
- II. Description of Proposed System
- **III.** Pipe Deflection Calculations
- IV. System Design

SCS Engineering Design Report

I. GENERAL

Santa Rita Ranch Phase 7B Section 1 is a 22.55-acre residential development that is composed of 43 single-family lots. The project is located to the South of Tierra Rose Blvd and East of Santa Rita Ranch Phase 7A. The project is located within the City of Liberty Hill ETJ, in Williamson County, Texas. This project includes 4,182 linear feet of roadway, 4,326 linear feet of water main line, 2,591 linear feet of 8" SDR 26 PVC ASTM D3034 wastewater main line, 80 linear feet of 8" C900 (150 psi) PVC AWWA C900 wastewater main line at water crossings, 508 linear feet of 6" C900 DR-18 PVC force main and 520 linear feet of 6" SDR 26 PVC ASTM D3034 of wastewater service line.

Flow was calculated using LCRA design criteria (210 gallons per LUE, 1,000 gal/acre/day) assuming 3 people per LUE at 70 gpd/person for residential use.

II. DESCRIPTION OF PROPOSED SYSTEM

The gravity mains and manholes meet the TCEQ requirements of Chapter 217. All the gravity mains with this project are PVC SDR-26 ATSM D3034. The construction plans consist of the following:

Linear Feet	Pipe Material	National Standard
	_	Specification for Pipe
3,111	PVC SDR-26	ASTM D3034
1,028	PVC C900 (150 psi)	AWWA C900

The pipes are designed with a slope that will provide a velocity of at least 2 feet per second, as calculated using Manning's equation with an "n" value of 0.013. Additionally, the collection system is designed to ensure that, with pipes flowing full, the velocities will be less than 10 feet per second.

Pipe Diameter: 8" Min. Slope: 0.34% Max. Slope: 3.26%

The plans and specifications, which describe the project identified in the report, are in compliance with all the requirements of Chapter 217. Refer to the calculations at the end of the report for all the analysis for flows & deflection.

SCS Engineering Design Report

III. Pipe Deflection Calculations

6", 8", & 12" SDR 26 ATSM D3034 – 6ft-16ft Depth of Bury

Given: 6" & 8" SDR 26 PVC ATSM D3034 Pipe

H= 6 ft (Depth of Bury)

 $\gamma = 120 \text{ lbs/cf}$ (Backfill Soil Unit Weight)

DL = 1.0 (Deflection Lag Factor) K = 0.085 (Bedding Constant)

W' = 16,000 moving wheel load (live load) PS = 144 psi (Pipe Stiffness for PVC SDR 26) E^{1} = 3,000 psi (Soil Modulus for Limestone)

PIPE DEFLECTION, %	
(2 Trucks Passing Live Lo	ad)

Including a 16000 Lb MOVING Wheel Load Effective Length of Wheel Load: 3.00 Ft

DLF	= 1.0	00	K =	0.085		PS = 144	psi	E' =	3000 psi
Prisn	n Loa	ad, Wp, Co	nditio	n		Backfill Weight = 120 Lb / Ft ^ 3			/ Ft ^ 3
	ı	Outside D	iame	ters, ins.					
Depth, Ft	I	6.275	I	8.400	Ι	12.500	I	15.300	1
6.00	П	0.32 %	П	0.32 %	П	0.32 %	П	0.32 %	1
8.00	Ì	0.35 %	ı	0.35 %	Ì	0.35 %	ĺ	0.35 %	ĺ
10.00	Ì	0.40 %	Ĺ	0.40 %	Ì	0.40 %	Ì	0.40 %	i
12.00	İ	0.46 %	ĺ	0.46 %	i	0.46 %	ĺ	0.46 %	İ
14.00	i	0.52 %	i	0.52 %	i	0.52 %	i	0.52 %	i
16.00	i	0.58 %	i	0.58 %	i	0.58 %	i	0.58 %	i
18.00	i	0.65 %	i	0.65 %	i	0.65 %	i	0.65 %	i

Deflection = 0.58% < 2.0% ok

SCS Engineering Design Report

6" & 8" SDR 18 PVC AWWA C900 Pipe

Given 6" & 8" SDR 18 PVC AWWA C900 Pipe

H= 3 ft (Mi. Depth of Bury)

 $\gamma = 120$ lbs/cf (Backfill Soil Unit Weight)

D_L = 1.0 (Deflection Lag Factor)

K = 0.085 (Bedding Constant)

W' = 16,000 moving wheel load (live load)

PS = 455 psi (Pipe Stiffness for PVC SDR 18)

 $E^{1} = 3,000 \text{ psi (Soil Modulus for Limestone)}$

PIPE DEFLECTION, % (2 Trucks Passing Live Load)						Including a 16000 Lb MOVING Wheel Load Effective Length of Wheel Load: 3.00 Ft
DLF	= 1.0	00	K =	0.085		PS = 455 psi E' = 3000 psi
Prisr	n Loa	ad, Wp, Co	nditio	n		Backfill Weight = 120 Lb / Ft ^ 3
	Ι	Outside [)iame	ters, ins.		
Depth, Ft	I	6.900	I	9.050	I	
3.00	П	0.35 %	П	0.35 %	Π	
5.00	Ì	0.26 %	İ	0.26 %	Ì	
7.00	Ĺ	0.27 %	ĺ	0.27 %	Ĺ	
9.00	ĺ	0.31 %	ĺ	0.31 %	i	
11.00	ĺ	0.35 %	i	0.35 %	i	
13.00	i	0.40 %	i	0.40 %	i	
15.00	i	0.45 %	i	0.45 %	i	

Deflection = 0.55% < 2.0% ok

SCS Engineering Design Report

IV. System Design

Flow Calculations:

DEV. TYPE Single Family Lots	<u>LUE's</u> 44	Population (PPL) 132	gpd/LUE 210	Flow (gpm) 6.42	<u>I&I Area (ac)</u> 14.72
Peaking Fa PF = (18+(P	` '	0.5)/((4+(PPL/1000)^	0.5))	= 4.21	
Minimum I MF= 0.2(PP				= 0.13	
Inflow & I n I&I = 1000g		(I&I) I Area) ac./1440		=10.22 gpm	
	•	er Flow (Min.DWF) *(MF)/1440gpd/gpm		= 0.86 gpm	
Average Dr $ADWF = (P$	-	Flow (ADWF) 40gpd/gpm		= 6.42 gpm	
	•	ner Flow (Max.DWF) *(PF)/1440gpd/gpm)	= 27.00 gpm	
Maximum V MWWF = N		ner Flow (MWWF) + I&I		= 37.23 gpm	

Pipe Capacity:

37.23 gpm / (448.8 gpm/cfs) = 0.30 cfs

Full Flow of 8" pipe at 0.34% (assuming n = 0.013) = 0.65 cfs

0.30 cfs / 0.65 cfs = 40% pipe capacity

Lift Station Capacity:

Per the Santa Rita Ranch Phase 4 Lift Station Engineering Report, the receiving systems have sufficient capacity to treat flows from proposed Phase 7B Section 1.

Appendix A

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

BMP TSS Removal Worksheet

Phase 7B Section 1

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.

Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.

Characters shown in red are data entry fields.

Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

Project Name: SANTA RITA RANCH PHASE 7B SECTION 1

1/30/2023

Date Prepared:

Calculations from RG-348 Pages 3-27 to 3-30 1. The Required Load Reduction for the total project: Page 3-29 Equation 3.3: L_M = 27.2(A_N x P) $L_{\text{M TOTAL PROJECT}} = \text{Required TSS removal resulting from the proposed development} = 80\% \text{ of increased load}$ where: A_N = Net increase in impervious area for the project P = Average annual precipitation, inches Site Data: Determine Required Load Removal Based on the Entire Project County = Williamson * The values entered in these fields should be for the total project area. SANTA RITA RANCH PHASE 7B S1 Total project area included in plan * acres Predevelopment impervious area within the limits of the plan * acres Total post-development impervious area within the limits of the plan*

Total post-development impervious cover fraction * acres

PROPOSED BATCH DETENTION POND 7-1

0.31

6,154

L_{M TOTAL PROJECT} =

inches

lbs.

SANTA RITA RANCH PHASE 7B SECTION 1		
Total project area included in plan * =	0.36	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	0.36	acres
Total post-development impervious cover fraction * =	1.00	
P =	32	inches
L _{M TOTAL PROJECT} =	313	lbs.
SANTA RITA RANCH PHASE 7A		
Total project area included in plan * =	65.58	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	21.08	acres
Total post-development impervious area within the limits of the plan =	0.32	acres
P =	32	inches
· •		
L _{M TOTAL PROJECT} =	18,348	lbs.
SANTA RITA RANCH (FUTURE)		
Total project area included in plan * =	22.30	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	4.27	acres
Total post-development impervious cover fraction * =	0.19	
P =	32	inches
L _{M TOTAL PROJECT} =	3,717	lbs.
- -		_
L _{M TOTAL} =	22,378	lbs.

PROPOSED BATCH DETENTION POND 7-2

SANTA RITA RANCH PHASE 7B SECTION 1		
Total project area included in plan * =	20.88	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	6.27	acres
Total post-development impervious area within the limits of the plan = Total post-development impervious cover fraction * =	0.30	acies
P =	32	inches
• 1		
L _{M TOTAL PROJECT} =	5,457	lbs.
SANTA RITA RANCH PHASE 7C (FUTURE)		_
Total project area included in plan *=	40.51	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	18.27	acres
Total post-development impervious cover fraction * =	0.45	
P =	32	inches
L _{M TOTAL PROJECT} =	15,902	lbs.
EVAN'S TRACT (FUTURE)		
Total project area included in plan *=	18.00	acres
Predevelopment impervious area within the limits of the plan * =		acres
Total post-development impervious area within the limits of the plan* =	6.02	acres
Total post-development impervious cover fraction * =	0.33	1
P=	32	inches
L _{M TOTAL PROJECT} =	5,240	lbs.
Em TOTAL PROJECT	3,240	103.
		-
L _{M TOTAL} =	26,599	lbs.

PROPOSED BATCH DETENTION POND 7-3

SANTA RITA RANCH PHASE 7B SECTION 1		
Total project area included in plan *=	0.90	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	0.16	acres
Total post-development impervious cover fraction * =	0.18	4
P =	32	inches
L _{M TOTAL PROJECT} =	139	lbs.
SANTA RITA RANCH PHASE 7B SECTION 2 FUTURE	20.54	_
Total project area included in plan * = Predevelopment impervious area within the limits of the plan * =	32.51 0.00	acres
Total post-development impervious area within the limits of the plan* =	14.37	acres
Total post-development impervious cover fraction * =	0.44	acres
P =	32	inches
L _{M TOTAL PROJECT} =	12508	lbs.
SANTA RITA RANCH PHASE 7B SECTION 3 (FUTURE)		_
Total project area included in plan *=	19.33	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	4.45	acres
Total post-development impervious cover fraction * = P =	0.23 32	inches
· · · · · · · · · · · · · · · · · · ·	3873	-
L _{M TOTAL} PROJECT =	30/3	lbs.
SANTA RITA RANCH PHASE 7B SECTION 4 (FUTURE)		
Total project area included in plan * =	3.25	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
·		-
Total post-development impervious area within the limits of the plan* =	1.58	acres
Total post-development impervious cover fraction * =	0.49	╣.
P =	32	inches
L _{M TOTAL PROJECT} =	1375	lbs.
CANTA DITA DANGU DUAGE TO (FUTURE)		
SANTA RITA RANCH PHASE 7C (FUTURE) Total project area included in plan *=	04.40	٦
	21.18	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	9.82	acres
Total post-development impervious cover fraction * =	0.46	4
P =	32	inches
L _{M TOTAL PROJECT} =	8547	lbs.
EVANS TRACT (FUTURE)		_
Total project area included in plan *=	11.62	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	5.72	acres
Total post-development impervious cover fraction * =	0.49	╛
P =	32	inches
L _{M TOTAL PROJECT} =	4979	lbs.
		_
L _{M TOTAL} =	31421	lbs.



CARLSON, BRIGANCE & DOERING, INC. ID# F3791

Appendix A

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

BMP TSS Removal Worksheet

Drainage Basin Pond 7-1

(Overall)

TSS Removal Calculations 04-20-2009

Project Name: BATCH DETENTION POND P7-1

Date Prepared: 1/30/2023

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell. Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.

Characters shown in red are data entry fields.

Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

1. The Required Load Reduction for the total project:

where

Calculations from RG-348

Pages 3-27 to 3-30

Page 3-29 Equation 3.3: L_M = 27.2(A_N x P)

L_{M TOTAL PROJECT} = Required TSS removal resulting from the proposed development = 80% of increased load

A_N = Net increase in impervious area for the project P = Average annual precipitation, inches

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

County = County = Total project area included in plan = 96.58 acres
Predevelopment impervious area within the limits of the plan = 0.00 acres
Total post-development impervious cover fraction = 0.42
Total post-development impervious cover fraction = 0.42
Inches

L_{M TOTAL PROJECT} = 35669 lbs

Number of drainage basins / outfalls areas leaving the plan area =

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

Drainage Basin/Outfall Area No. =

Total drainage basin/outfall area = 72.42 acres
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres
Post-development impervious area within drainage basin/outfall area = 39.34 acres
Post-development impervious fraction within drainage basin/outfall area = 0.54

LM THIS RARNIN = 34242 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Batch Detention
Removal efficiency = 91 percent

SOURCE:

"COMPLYING WITH THE EDWARDS AQUIFER RULES TECHNICAL
GUIDANCE ON BEST MANAGEMENT PRACTICES RG-348 (REVISED JULY
2005)", ADDENDUM DATED JANUARY 20, 2017, SECTION 3.2.17 'BATCH

Aqualogic Cartridge Filter Batch Detention Bioretention Contech StormFilter Constructed Wetland Extended Detention Grassy Swale Retention / Irrigation Sand Filter Stormceptor Vegetated Filter Strips Vortechs Wet Basin

Wet Vault

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

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

where

 A_C = Total On-Site drainage area in the BMP catchment area A_I = Impervious area proposed in the BMP catchment area A_P = Pervious area remaining in the BMP catchment area

 $L_{\rm R}$ = TSS Load removed from this catchment area by the proposed BMP

Calculations from RG-348

 $A_C =$ **72.42** acres $A_I =$ **39.34** acres $A_P =$ **33.08** acres $A_R =$ **40157** lbs

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

Desired L_{M THIS BASIN} = 35669 lbs

F = **0.89**

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.

Rainfall Depth = 1.60 inches

Post Development Runoff Coefficient = 0.38
On-site Water Quality Volume = 160906 cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP = 0.00 acres
Off-site Impervious cover draining to BMP = 0.00 acres
Impervious fraction of off-site area = 0
Off-site Runoff Coefficient = 0.00
Off-site Water Quality Volume = 0 cubic feet

Storage for Sediment = 32181

Total Capture Volume (required water quality volume(s) x 1.20) = 193087 cubic feet

Pages 3-34 to 3-36



CARLSON, BRIGANCE & DOERING, INC.

ID# F3791

3-31-2023

^{*} The values entered in these fields should be for the total project area.

Appendix A

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

BMP TSS Removal Worksheet

Drainage Basin Pond 7-2

(Overall)

TSS Removal Calculations 04-20-2009

Project Name: BATCH DETENTION POND 7-2

Date Prepared: 1/30/2023

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell. Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.

Characters shown in red are data entry fields.

Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

1. The Required Load Reduction for the total project:

where

Calculations from RG-348

Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_{M} = 27.2(A_{N} \times P)$

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

P = Average annual precipitation, inches

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

County = Williamson
Total project area included in plan * = 77.29
Predevelopment impervious area within the limits of the plan * = 0.00 acres
Total post-development impervious cover fraction * = 0.41
Total post-development impervious cover fraction * = 0.41
Inches

L_{M TOTAL PROJECT} = 27348 lbs

Number of drainage basins / outfalls areas leaving the plan area =

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

Drainage Basin/Outfall Area No. =

Total drainage basin/outfall area = 71.33 acres
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres
Post-development impervious area within drainage basin/outfall area = 30.80 acres
Post-development impervious fraction within drainage basin/outfall area = 0.43

LM THIS RARNIN = 26808 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Batch Detention

Removal efficiency = 91 percent

SOURCE:

"COMPLYING WITH THE EDWARDS AQUIFER RULES TECHNICAL
GUIDANCE ON BEST MANAGEMENT PRACTICES RG-348 (REVISED JULY
2005)", ADDENDUM DATED JANUARY 20, 2017, SECTION 3.2.17 'BATCH

Aqualogic Cartridge Filter Batch Detention Bioretention Contech StormFilter Constructed Wetland Extended Detention Grassy Swale Retention / Irrigation Sand Filter Stormceptor Vegetated Filter Strips Vortechs Wet Basin Wet Vault

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

RG-348 Page 3-33 Equation 3.7: $L_R = (BMP \text{ efficiency}) \times P \times (A_1 \times 34.6 + A_P \times 0.54)$

where: A_C = Total On-Site drainage area in the BMP catchment area

 $A_{\text{I}} = \text{Impervious area proposed in the BMP catchment area} \\ A_{\text{P}} = \text{Pervious area remaining in the BMP catchment area}$

L_R = TSS Load removed from this catchment area by the proposed BMP

 $A_C =$ 71.33 acres $A_I =$ 30.80 acres $A_P =$ 40.53 acres $A_R =$ 31670 lbs

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

Desired L_{M THIS BASIN} = 27348 lbs

F = **0.86**

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.

Calculations from RG-348

Pages 3-34 to 3-36

Rainfall Depth = 1.38 inches
Post Development Runoff Coefficient = 0.32
On-site Water Quality Volume = 115157 cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP = 0.00 acres
Off-site Impervious cover draining to BMP = 0.00 acres
Impervious fraction of off-site area = 0
Off-site Runoff Coefficient = 0.00
Off-site Water Quality Volume = 0 cubic feet

Storage for Sediment = 23031

Total Capture Volume (required water quality volume(s) x 1.20) = 138189 cubic feet

* STEVEN P. CATES 93648

CARLSON, BRIGANCE & DOERING, INC.

SIONAL

ID# F3791

3-31-2023

^{*} The values entered in these fields should be for the total project area.

Appendix A

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

BMP TSS Removal Worksheet

Drainage Basin Pond 7-3

(Overall)

TSS Removal Calculations 04-20-2009

Project Name: BATCH DETENTION POND 7-3

Date Prepared: 1/30/2023

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell. Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.

Characters shown in red are data entry fields.

Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

1. The Required Load Reduction for the total project:

Calculations from RG-348

Pages 3-27 to 3-30

Page 3-29 Equation 3.3: L_M = 27.2(A_N x P)

where: $L_{M.TOTAL\,PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load

A_N = Net increase in impervious area for the project P = Average annual precipitation, inches

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

County = Williamson

Total project area included in plan * = 0.00 acres

Predevelopment impervious area within the limits of the plan * = 0.00 acres

Total post-development impervious cover fraction * = 0.41

Total post-development impervious cover fraction * = 0.41

Description:

L_{M TOTAL PROJECT} = 31421 lbs.

Number of drainage basins / outfalls areas leaving the plan area =

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

Drainage Basin/Outfall Area No. =

Total drainage basin/outfall area = 68.41 acres
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres
Post-development impervious area within drainage basin/outfall area = 32.35 acres
Post-development impervious fraction within drainage basin/outfall area = 0.47

LM THIS RARN = 28157 | bs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Batch Detention
Removal efficiency = 91 percent

SOURCE:

"COMPLYING WITH THE EDWARDS AQUIFER RULES TECHNICAL
GUIDANCE ON BEST MANAGEMENT PRACTICES RG-348 (REVISED JULY
2005)", ADDENDUM DATED JANUARY 20, 2017, SECTION 3.2.17 'BATCH

Aqualogic Cartridge Filter Batch Detention Bioretention Contech StormFilter Constructed Wetland Extended Detention Grassy Swale Retention / Irrigation Sand Filter Stormceptor Vegetated Filter Strips Vortechs Wet Basin Wet Vault

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

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

where

 A_C = Total On-Site drainage area in the BMP catchment area A_I = Impervious area proposed in the BMP catchment area A_p = Pervious area remaining in the BMP catchment area

 L_{R} = TSS Load removed from this catchment area by the proposed BMP

 $A_C =$ **68.41** acres $A_I =$ **32.35** acres $A_P =$ **36.06** acres $A_R =$ **33161** lbs

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

Desired L_{M THIS BASIN} = 31421 lbs.

F = **0.95**

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.

Calculations from RG-348

Pages 3-34 to 3-36

Rainfall Depth = 2.60 inches
Post Development Runoff Coefficient = 0.34
On-site Water Quality Volume = 221459 cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP = 0.00 acres
Off-site Impervious cover draining to BMP = 0.00 acres
Impervious fraction of off-site area = 0
Off-site Runoff Coefficient = 0.00
Off-site Water Quality Volume = 0 cubic feet

Storage for Sediment = 44292

Total Capture Volume (required water quality volume(s) x 1.20) = 265751 cubic feet

STEVEN P. CATES

P. 93648

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CARLSON, BRIGANCE & DOERING, INC.

ID# F3791

3-31-2023

^{*} The values entered in these fields should be for the total project area.

Appendix B

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

WPAP and SCS Approval Letters

SRR Phase 7A is currently under TCEQ review, approval letters will be added once approved

Appendix C

TCEQ WPAP & SCS APPLICATION

Santa Rita Ranch Phase 7B Section 1

Williamson County, Texas

Water Quality Calculation

Spreadsheet

SANTA RITA RANCH PHASE 7B, SECTION 1

Table 1 - Impervious Cover per Section

		TCEQ Project Area Per Section							Onsite Drainage Basin to BMP Per Section				
Contributing Sections	Project Area	# Lots		Imperviou	s Areas (ac)		Drainage	Drainage	Impervious Areas (ac)				Removal Required
	(ac)	# LOIS	Lots	ROW	Misc.	Total	Basin (ac)	# Lots	Lots	ROW	Misc.	Total	(lbs)
PROPOSED BATCH DETENTI	ON POND 7-1						=.						
7A	66.44	178	14.57	11.11	0.00	25.68	66.44	124	7.19	8.62	0.00	15.81	18,348
7B-1	0.36	0	0.00	5.00	0.00	5.00	0.36	111	0.00	5.00	0.00	13.43	11,689
FUTURE	22.30	34	7.93	7.37	0.00	15.30	22.30	30	12.23	11.30	0.00	5.72	4,979
ROPOSED BATCH DETENTI	ON POND 7-2												
7B-1	20.88	39	3.25	3.03	0.00	6.28	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	42,163
FUTURE PHASE 7C	40.51	164	13.27	5.00	0.00	18.27	26.28	111	9.06	4.38	0.00	13.43	11,689
EVANS TRACT	18.00	34	2.88	3.14	0.00	6.02	11.61	30	2.41	3.31	0.00	5.72	4,979
ROPOSED BATCH DETENTI	ON POND 7-3												
7B-1	0.90	2	0.16	0.00	0.00	0.16	0.90	2	0.16	0.00	0.00	0.16	139
7B-2	32.51	91	7.35	7.03	0.00	14.38	20.06	69	5.57	5.97	0.00	11.54	12,508
7B-3	19.33	37	3.11	1.34	0.00	4.45	11.21	27	2.22	1.34	0.00	3.56	3,873
7B-4	3.25	13	1.06	0.52	0.00	1.58	3.25	13	1.06	0.52	0.00	1.58	1,375
FUTURE PHASE 7C	21.18	85	6.96	2.87	0.00	9.83	21.18	85	6.96	2.87	0.00	9.83	8,547
EVANS TRACT	11.62	30	2.41	3.31	0.00	5.72	11.62	30	2.41	3.31	0.00	5.72	4,979

Table 2 - BMP Treat	tment Requ	uirements	i							
Project		Drainage Basin								
Project	Area		Ons	ite	Offsit	е	To	tal	Capacity at WQV (cf)	
Total (ac)	Impv Area (ac)	Required TSS Removal (lbs)	Total (ac)	Impv Area (ac)	Total (ac)	Impv Area (ac)	Total (ac)	Impv Area (ac)	Required	Provided
PROPOSED BATCH DETENTION	N POND 7-1									
89.10	45.98	35,016	89.10	34.96	0.00	0.00	89.10	34.96	193,087	198,020
PROPOSED BATCH DETENTION	N POND 7-2		_							
79.39	30.57	58,831	#REF!	#REF!	0.00	0.00	#REF!	#REF!	145,732	146,808
PROPOSED BATCH DETENTION	N POND 7-3									
88.79	36.12	31,421	68.22	32.38	0.00	0.00	68.22	32.38	265,751	279,518

Pond 7-1 Stage-Storage

a	A (. 0	A ()	Incremental	Cumulative	Cumulative	1
Stage	Area (sf)	Area (ac)	Storage (cf)	Storage (cf)	Storage (ac-ft)	
971.00	25	0.00	0	0	0.00	Pond Bottom
972.00	28,415	0.65	14,220	14,220	0.33	
973.00	61,966	1.42	45,191	59,411	1.36]
974.00	86,576	1.99	74,271	133,682	3.07	
974.70				198,020		WQV Provided
975.00	97,249	2.23	91,913	225,594	5.18	
976.00	105,766	2.43	101,508	327,102	7.51	
977.00	111,070	2.55	108,418	435,520	10.00	
978.00	116,435	2.67	113,753	549,272	12.61	
979.00	121,859	2.80	119,147	668,419	15.34	Top of Berm

^{*}Pond 7-1 Stage-Storage per Santa Rita Ranch Phase 7A Construction Plans

Pond 7-2 Stage-Storage

Tond / Pouge Store	-8-					-
Stage	Area (sf)	Area (ac)	Incremental	Cumulative	Cumulative	
Stage	Area (SI)	Area (ac)	Storage (cf)	Storage (cf)	Storage (ac-ft)	1
971.00	25	0.00	0	0	0.000	Pond Bottom
972.00	26,536	0.61	13,281	13,281	0.305	
973.00	37,973	0.87	32,255	45,535	1.045	1
974.00	41,487	0.95	39,730	85,265	1.957	1
975.00	44,431	1.02	42,959	128,224	2.944	1
975.40				146,808		WQV Provided
976.00	47,441	1.09	45,936	174,160	3.998	1
977.00	50,519	1.16	48,980	223,140	5.123]
978.00	53,663	1.23	52,091	275,231	6.318	Top of Berm

^{*}Pond 7-2 Stage-Storage per Santa Rita Ranch Phase 7B Section 1 Construction Plans

rond 7-3 Stage-Storage									
Stage	Area (sf)	Area (ac)	Incremental	Cumulative	Cumulative	1			
Stage	Alea (SI)	Alea (ac)	Storage (cf)	Storage (cf)	Storage (ac-ft)				
958.80	20	0.00	0	0	0.00	Pond Bottom			
959.00	1,590	0.04	161	161	0.00				
960.00	34,763	0.80	18,177	18,338	0.42				
961.00	63,358	1.45	49,061	67,398	1.55				
962.00	75,935	1.74	69,647	137,045	3.15				
963.00	79,329	1.82	77,632	214,677	4.93				
963.80				279,518		WQV Provided			
964.00	82,775	1.90	81,052	295,729	6.79				
965.00	86,294	1.98	84,535	380,263	8.73	Top of Berm			
966.00	89,868	2.06	88,081	468,344	10.75				

^{*}Pond 7-2 Stage-Storage per proposed Santa Rita Ranch Phase 7B Section 2 Construction Plans



CARLSON, BRIGANCE & DOERING, INC. ID# F3791

Agent Authorization Form

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

I	James Edward Horne
	Print Name
	Vice President
	Title - Owner/President/Other
of	Santa Rita C7 Investments LLC
	Corporation/Partnership/Entity Name
have authorized	Steven P. Cates, P.E.
	Print Name of Agent/Engineer
of <u>Carlson, Brig</u>	ance & Doering, Inc.
	Print Name of Firm

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

I also understand that:

- 1. The applicant is responsible for compliance with 30 Texas Administrative Code Chapter 213 and any condition of the TCEQ's approval letter. The TCEQ is authorized to assess administrative penalties of up to \$10,000 per day per violation.
- 2. For those submitting an application who are not the property owner, but who have the right to control and possess the property, additional authorization is required from the owner.
- 3. Application fees are due and payable at the time the application is submitted. The application fee must be sent to the TCEQ cashier or to the appropriate regional office. The application will not be considered until the correct fee is received by the commission.
- 4. A notarized copy of the Agent Authorization Form must be provided for the person preparing the application, and this form must accompany the completed application.
- 5. No person shall commence any regulated activity on the Edwards Aquifer Recharge Zone, Contributing Zone or Transition Zone until the appropriate application for the activity has been filed with and approved by the Executive Director.

SIGNATURE PAGE:

Applicant's Signature

THE STATE OF S

County of S

<u>3 - 28 - 2</u>023 Date

BEFORE ME, the undersigned authority, on this day personally appeared Temes Edward Debut 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 28th day of 10000

SUSAN O MARTIN Notary Public, State of Texas My Commission Expires November 07, 2023 NOTARY ID 1042593-4 Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 11 07 2023

Application Fee Form

Texas Commission on Environmental Quality

Name of Proposed Regulated Entity: Santa Rita Ranch Phase 7B Section 1 Regulated Entity Location: North of Highway 29, just east of Ronald Reagan Blvd. Name of Customer: Santa Rita KC, LLC. Contact Person: James Edward Horne Phone: <u>512-280-5160</u> Customer Reference Number (if issued):CN 604360008 Regulated Entity Reference Number (if issued):RN ______ **Austin Regional Office (3373)** Hays Travis X Williamson San Antonio Regional Office (3362) Medina Uvalde Bexar 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: X Austin Regional Office San Antonio Regional Office Mailed to: TCEQ - Cashier Overnight Delivery to: TCEQ - Cashier **Revenues Section** 12100 Park 35 Circle Mail Code 214 Building A, 3rd Floor P.O. Box 13088 Austin, TX 78753 Austin, TX 78711-3088 (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	22.55 Acres	\$ 4,000
Water Pollution Abatement Plan, Contributing Zone		
Plan: Non-residential	Acres	\$
Sewage Collection System	3,699 L.F.	\$ 1,849.00
Lift Stations without sewer lines	Acres	\$
Underground or Aboveground Storage Tank Facility	Tanks	\$
Piping System(s)(only)	Each	\$
Exception	Each	\$
Extension of Time	Each	\$

Signature:

Date: 3/31/2023

Application Fee Schedule

Texas Commission on Environmental Quality

Edwards Aquifer Protection Program 30 TAC Chapter 213 (effective 05/01/2008)

Water Pollution Abatement Plans and Modifications

Contributing Zone Plans and Modifications

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



TCEQ Core Data Form

TCEQ Use Only

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

SECTION I: (General	Information	ĺ
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ECTION	II GCII	ci ai iiiioi ii	lation								
		sion (If other is	•		•	•	•	и и	P . P	. 1	
			•					th the p her	rogram application	n.)	
	•	ata Form should e Number (if iss				,			d Entity Reference	e Number	(if issued)
		c Hamber (n 100	aca)		his link to s r RN numb				a Linuty Referen	oc italiloci	(II Issued)
CN 6043	CN 604360008 Central Registry** RN										
SECTION	II: Cu	stomer Info	ormation								
4. General C	ustomer l	nformation	5. Effective	Date for	Custome	r Inforr	nation	Update	es (mm/dd/yyyy)		
New Cus			· 	•	Custome				•	•	Entity Ownership
									f Public Accounts)		
		ne submitted f State (SOS)	-	•			-			rrent and	active with the
6. Customer	Legal Na	me (If an individua	l, print last name	e first: eg: l	Doe, John)		<u>If</u>	new Cu	stomer, enter previ	ous Custome	er below:
Santa Rita	ı KC, Ll	LC									
7. TX SOS/C	_	Number	8. TX State 1		digits)				al Tax ID (9 digits)		S Number (if applicable)
80090190	6		32034201	.288			20	03420)128	N/A	
11. Type of (Customer	: Corporati	on		Individ	dual		Pai	rtnership: 🗌 Gener	al Limited	
		County Federal	☐ State ☐ Other		Sole F	Propriet			Other:		
12. Number	of Employ ☐ 21-100	/ees	251-500	<u></u> 50	1 and hig	her	13	3. Indep] Yes	endently Owned	and Opera	ted?
14. Custome	er Role (Pr	oposed or Actual) -	- as it relates to	the Regula	ated Entity	listed or	this for	m. Plea	se check one of the	following:	
☐Owner ☐Occupatio	nal Licens	☐ Opera	tor onsible Party		Owner Volunta	•		plicant	☐Other:		
	1700 0	Cross Creek I	Lane								
15. Mailing Address:	Suite 1	00									
Address.	City	Liberty Hill		State	e TX	-	ZIP	7864	42	ZIP + 4	
16. Country	Mailing In	formation (if outs	ide USA)	•	•	17. E	-Mail <i>A</i>	Address	s (if applicable)		
						ed@	srrau	ıstin.c	com		
18. Telephor	ne Numbe	r		19. Exte	nsion or	Code			20. Fax Numbe	r (if applicat	ole)
(512)50)2-2050								() -		
SECTION	III: Re	egulated En	tity Infor	matio	n						
						elected	below	this for	m should be acco	mpanied by	a permit application)
New Regu	ulated Enti	ty 🔲 Update	to Regulated E	Intity Nan	ne 🗌	Update	to Re	gulated	Entity Information		
•		ity Name sub ndings such	•	•		ordei	to m	eet To	CEQ Agency D	ata Stand	dards (removal
		ame (Enter name				is takind	g place.)			
		Phase 7B Sec		- J							

TCEQ-10400 (04/15) Page 1 of 2

23. Street Address of												
the Regulated Entity:												
(No PO Boxes)	City	State		ZIP			ZIP + 4					
24. County												
	En	ter Physical L	ocatio.	n Descriptio	n if no	street addres	s is provi	ided.				
25. Description to Physical Location:	North of	f Highway 1	29, ju	ist east of	Ronal	ld Reagan	Blvd.					
26. Nearest City	l						State	!	Nea	rest ZIP Code		
		1			ı							
27. Latitude (N) In Decir		30.668886				28. Longitude	(W) In	Decimal:	-97.81531			
Degrees	Minutes		Secon			Degrees		Minutes		Seconds		
30	•	40		7.9896		97			48	55.1232		
29. Primary SIC Code (4 d	igits) 30.	Secondary SI	IC Cod	e (4 digits)	31. P (5 or 6	rimary NAICS digits)	Code	32. S 6 (5 or 6	econdary NAI digits)	CS Code		
1521				236	115							
33. What is the Primary B	this entity?	(Do not i	epeat the SIC or	NAICS (description.)		1					
Single Family Resid						· · · · · · · · · · · · · · · · · · ·						
_		•			Sar	nta Rita KC, L	LC					
34. Mailing Address:		1700 Cross Cr						s Creek Lane, Suite 100				
Audress:	City	City Liberty Hi		II State		X ZIP		78642	ZIP + 4			
35. E-Mail Address:						ed@srraustir	.com					
36. Telepho	ne Number	•		37. Extension	on or C	ode	3	8. Fax Num	ber (if applica	able)		
(512) 5	02-2050							() -			
39. TCEQ Programs and ID form. See the Core Data Form in	Numbers Chatructions for	neck all Program additional guidar	is and w	rite in the perm	its/regis	tration numbers	that will be	e affected by	the updates sub	mitted on this		
☐ Dam Safety	☐ Districts	istricts 🗵 Edwards Aquit			r	☐ Emission	ons Invento	ory Air	Industrial Ha	zardous Waste		
				02962 (WP	AP)							
☐ Municipal Solid Waste	☐ New Sou	rce Review Air OSSF				☐ Petrole	um Storage	e Tank	PWS			
	M • · · ·											
Sludge	⊠ Storm W	/ater		Γitle V Air		Tires			Used Oil			
☐ Voluntary Cleanup	☐ Waste W	Vater	 	Nastewater Agi	riculture	☐ Water F	Rights		Other:			
,	_ 			<u> </u>								
SECTION IV: Prep	oarer Inf	formation				1		1				
40. Name: Steven P.			-			41. Title:	Senior	Project 1	Engineer			
42. Telephone Number	43. Ext.		44. Fax	Number		45. E-Mail A		110,000				
(512)280-5160			(512) 280-5165		steve@cl	odeng.c	om				
SECTION V: Auth	orized S	Signature	•			1	<u> </u>					
		7121141111										
46. By my signature below, I			nowled	lge, that the ir	nformat	ion provided i	n this for	n is true and	l complete, and	d that I have		

Company:	Carlson, Brigance & Doering, Inc.	Job Title:	Senior Pr	Phone: (512) 280-5160			
Name(In Print):	Steven P. Cates			Phone:	(512)280-5160		
Signature:	Sturk Goto			Date:	3/31/2023		

TCEQ-10400 (04/15) Page 2 of 2

ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED IN ACCEPTING THESE PLANS, WILLIAMSON COUNTY MUST RELY UPON THE ADEQUACY OF THE WORK OF THE DESIGN ENGINEER.

THESE WATER SYSTEM PLANS WERE PREPARED, SEALED, SIGNED AND DATED BY A TEXAS LICENSED PROFESSIONAL ENGINEER. THEREFORE BASED ON THE ENGINEER'S CONCURRENCE OF COMPLIANCE, THE CONSTRUCTION PLANS FOR CONSTRUCTION OF THE PROPOSED PROJECT ARE HEREBY APPROVED SUBJECT TO STANDARD CONSTRUCTION SPECIFICATIONS AND DETAILS MANUAL AND ALL OTHER APPLICABLE CITY, STATE AND FEDERAL REQUIREMENTS AND CODES.

SUBMITTED BY:

REV. NO. SHT. NO.

2-27-2023 STEVEN P. CATES, P.E. DATEREGISTERED PROFESSIONAL ENGINEER No. 93648

ACCEPTED FOR CONSTRUCTION:

CITY OF GEORGETOWN (WATER SYSTEM ONLY)	DATE
CURTIS R. STEGER, P.E., CITY ENGINEER (WASTEWATER SYSTEM PLAN)	DATE
JERRY MILLARD, JR., DIRECTOR OF PLANNING (WASTEWATER SYSTEM PLAN)	DATE

Based on the design engineer's certification of compliance with all applicable City, State and Federal regulations the plans and specifications contained herein have been reviewed and are found to be in compliance with the requirements of the City of Liberty Hill.

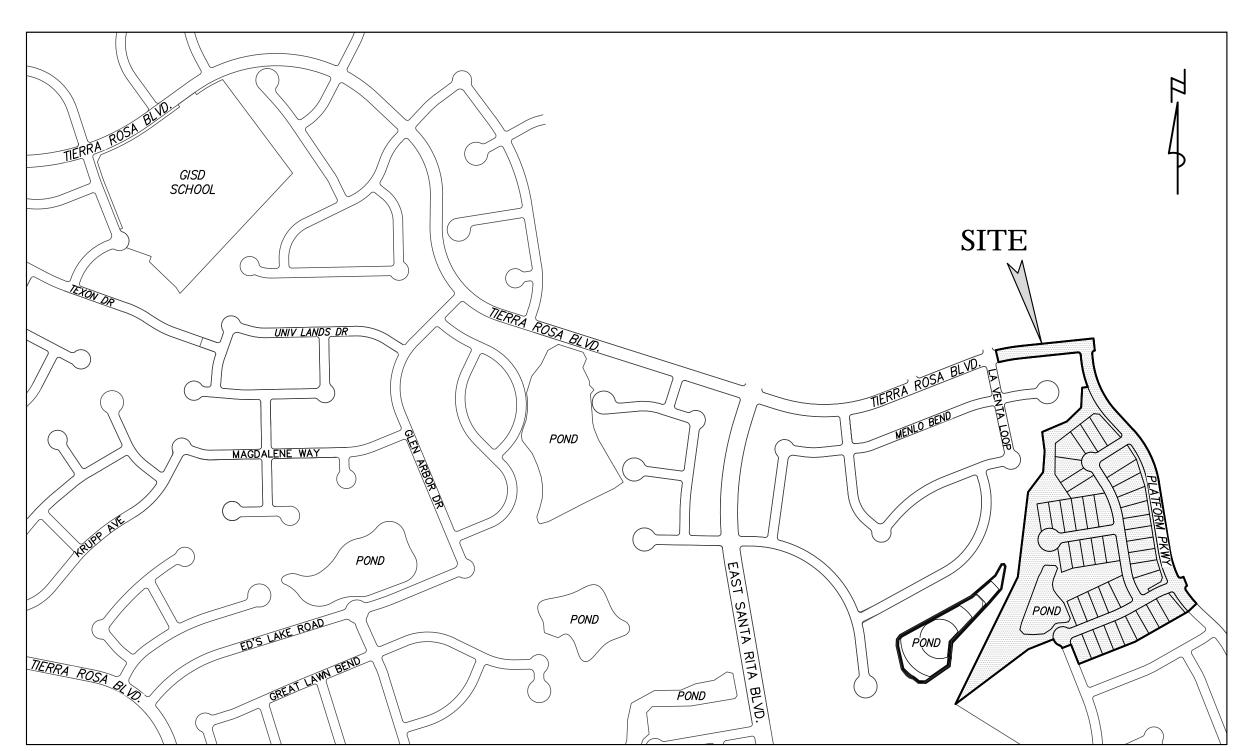
REVIEWED FOR COMPLIANCE WITH COUNTY REQUIREMENTS:

FOR WILLIAMSON COUNTY	DATE
WILLIAMSON COUNTY M.U.D. #19F	DATE

DESCRIPTION OF REVISION

SANTA RITA RANCH PHASE 7B, SECTION 1

WILLIAMSON COUNTY, TEXAS CONSTRUCTION PLANS



LOCATION MAP SCALE: 1" = 500'

WATER POLLUTION ABATEMENT PLAN AND ORGANIZED SEWAGE COLLECTION SYSTEM PLAN APPROVED BY TCEQ ON ______

30 TEXAS ADMINISTRATIVE CODE (TAC) CHAPTER 213 AND CHAPTER 217 EDWARDS AQUIFER EDWARDS AQUIFER PROTECTION PROGRAM ID NO. _____(WPAP) AND _____SCS)

OWNER:

DATE

ACCEPTED

WILLIAMSON COUNTY CITY OF GEORGETOWN CITY OF LIBERTY HILL

ACCEPTED

DATE

ACCEPTED

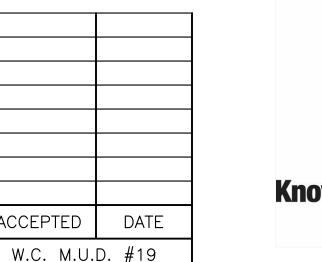
DATE

ACCEPTED

SANTA RITA KC, LLC 1700 CROSS CREEK LANE, STE. 100 LIBERTY HILL, TX. 78642

ENGINEER & SURVEYOR: CARLSON, BRIGANCE & DOERING, INC. 5501 WEST WILLIAM CANNON DRIVE AUSTIN, TEXAS 78749 (512) 280-5160 phone (512) 280-5165 fax

TOTAL ACREAGE: 118.216 AC SURVEY: B. MANLOVE SURVEY,



ABSTRACT NO. 417

F.E.M.A. MAP NO. 48491C 0275E WILLIAMSON COUNTY, TEXAS AND INCORPORATED AREAS. DATED: SEPTEMBER 26, 2008



SHEET INDEX

- 1 COVER SHEET
- 2 GENERAL NOTES (1 OF 2)
- 3 GENERAL NOTES (2 OF 2)
- 4 DRAFT PLAT (1 OF 2)
- 5 DRAFT PLAT (2 OF 2)
- 6 OVERALL EROSION CONTROL PLAN
- 7 EROSION NOTES & DETAILS
- 8 EXISTING HYDROLOGY MAP
- 9 DEVELOPED HYDROLOGY MAP 10 - TCEQ PROJECT AND DRAINAGE AREA MAP
- 11 DRAINAGE PLAN
- 12 DRAINAGE CALCS
- 13 GRADING PLAN (1 OF 2)
- 14 GRADING PLAN (2 OF 2)
- 15 TRAFFIC CONTROL PLAN (1 OF 2)
- 16 TRAFFIC CONTROL PLAN (2 OF 2)
- 17 TIERRA ROSA BOULEVARD (0+00 TO 3+00)
- 18 TIERRA ROSA BOULEVARD (3+00 TO END)
- 19 PLATFORM PARKWAY (0+00 TO 4+00)
- 20 PLATFORM PARKWAY (4+00 TO 8+00)
- 21 PLATFORM PARKWAY (8+00 TO 12+00)
- 22 PLATFORM PARKWAY (12+00 TO END)
- 23 BORREGO BEND (0+00 TO 4+00)
- 24 BORREGO BEND (4+00 TO END)
- 25 LAS POSAS DRIVE (0+00 TO 3+50)
- 26 LAS POSAS DRIVE (3+50 TO 7+00)
- 27 LAS POSAS DRIVE (7+00 TO END)
- 28 TRICIA COURT (0+00 TO 2+50)
- 29 TRICIA COURT (2+50 TO END)
- 30 POND PLAN
- 31 POND CROSS SECTION
- 32 POND DETAILS
- 33 OVERALL STORMSEWER PLAN (1 OF 2)
- 34 OVERALL STORMSEWER PLAN (2 OF 2)
- 35 STORMSEWER LINE A (0+00 TO END)
- 36 STORMSEWER LINE B (0+00 TO END)
- 37 STORMSEWER LINE C AND D (0+00 TO END)
- 38 STORMSEWER LINE E (0+00 TO END)
- 39 STORMSEWER LINE F (0+00 TO END)
- 40 STORMSEWER LINE G (0+00 TO END)
- 41 STORMSEWER LATERALS
- 42 OVERALL WATER PLAN
- 43 WATER LINE A (0+00 TO END)
- 44 WATER LINE B (0+00 TO 9+00)
- 45 WATER LINE B (9+00 TO END)
- 46 OVERALL WASTEWATER PLAN
- 47 WASTEWATER LINE A (0+00 TO END)
- 48 WASTEWATER LINE B (0+00 TO END)
- 49 WASTEWATER LINE C (0+00 TO END)
- 50 WASTEWATER FORCEMAIN D (0+00 TO END)
- 51 CONSTRUCTION DETAILS (1 OF 4)
- 52 CONSTRUCTION DETAILS (2 OF 4)
- 53 CONSTRUCTION DETAILS (3 OF 4)
- 54 CONSTRUCTION DETAILS (4 OF 4)
- 55 WATER DETAILS
- 56 WASTEWATER DETAILS
- 57 (E1.0) ELECTRICAL NOTES, SYMBOLS & ABBREVIATIONS
- 58 (E1.1) ELECTRICAL SPECIFICATIONS
- 59 (E2.0) ELECTRICAL SITE PLAN NEW BATCH POND 7-2
- 60 (E3.0) ELECTRICAL LADDER DIAGRAM
- 61 (E4.0) ELECTRICAL DETAILS

SECTION STEVEN P. CATES 93648

93648 93648 OCENSED ONAL ENGRE CARLSON, BRIGANCE & DOERING, INC.
ID# F3791

2-27-2023 FEB 2023

OB NUMBER 5487

of 56

- GENERAL CONTRACTOR TO INSTALL AND MAINTAIN EROSION CONTROLS AND TREE PROTECTION PER APPROVED PLANS.
- 2. HOLD PRE-CONSTRUCTION CONFERENCE. PROVIDE 72 HOUR NOTIFICATION TO THE OWNER, THE DESIGN ENGINEER, THE CONTRACTOR AND SUBCONTRACTORS, THE M.U.D. ENGINEER (512) 836-4817, THE CITY OF LIBERTY HILL (512) 778-5449, (WAYNE BONNET, DIRECTOR OF PUBLIC WORKS), WILLIAMSON COUNTY INSPECTIONS SUPERVISOR, GEORGE MAYFIELD (512) 943-3324, AND THE CITY OF GEORGETOWN UTILITY SYSTEM (512)930-3640. SEE WILLIAMSON COUNTY SUBDIVISION REGULATIONS CONSTRUCTION-GENERAL NOTE #1 ON THIS
- 3. ROUGH CUT ALL REQUIRED OR NECESSARY PONDS. EITHER THE PERMANENT OUTLET STRUCTURE OR A TEMPORARY OUTLET MUST BE CONSTRUCTED PRIOR TO DEVELOPMENT OF ANY EMBANKMENT OR EXCAVATION THAT LEADS TO PONDING CONDITIONS. THE OUTLET SYSTEM MUST CONSIST OF A LOW-LEVEL OUTLET AND AN EMERGENCY OVERFLOW. THE
- OUTLET SYSTEM SHALL BE PROTECTED FROM EROSION AND SHALL BE MAINTAINED THROUGHOUT THE COURSE OF CONSTRUCTION UNTIL FINAL RESTORATION IS ACHIEVED. 4. ROUGH GRADE STREETS. NO DEVELOPMENT OF EMBANKMENT WILL BE PERMITTED AT THIS TIME. ONCE STREETS ARE ROUGH CUT, THE GEOTECHNICAL ENGINEER IS TO FIELD VERIFY PAVEMENT DESIGN IS APPROPRIATE, AND MODIFY RECOMMENDATIONS ACCORDINGLY.
- 5. INSTALL ALL UTILITIES TO BE LOCATED UNDER THE PROPOSED PAVEMENT. 6. BEGIN INSTALLATION OF STORM SEWER LINES. UPON COMPLETION, RESTORE AS MUCH DISTURBED AREA AS MUCH AS POSSIBLE, PARTICULARLY CHANNELS AND LARGE OPEN AREAS.
- 8. INSURE THAT ALL UNDERGROUND UTILITY CROSSINGS ARE COMPLETED. LAY FIRST COURSE BASE MATERIAL ON ALL STREETS.
- 9. INSTALL CURB AND GUTTER. 10. LAY FINAL BASE COURSE ON ALL STREETS.
- 11. LAY ASPHALT.
- 12. COMPLETE ALL UNDERGROUND INSTALLATIONS WITHIN THE R.O.W. 13. COMPLETE PERMANENT EROSION CONTROL AND RESTORATION OF SITE VEGETATION.
- 14. THE PROJECT ENGINEER INSPECTS JOB AND WRITES CONCURRENCE LETTER TO THE CITY. FINAL INSPECTION IS SCHEDULED UPON RECEIPT OF LETTER. FINAL INSPECTION WITH THE M.U.D. ENGINEER, EV INSPECTOR, THE CITY OF LIBERTY HILL, WILLIAMSON COUNTY, AND THE CITY OF GEORGETOWN PRIOR TO THE REMOVAL OF EROSION CONTROLS.
- 15. REMOVE AND DISPOSE OF TEMPORARY EROSION CONTROLS. TREE PROTECTION SHALL BE REQUIRED TO BE MAINTAINED AND REMAIN IN PLACE FOR EACH RESIDENTIAL LOT THROUGH RECEIPT OF THE CONCURRENCE LETTER TO THE RESIDENTIAL CERTIFICATE OF OCCUPANCY. 16. COMPLETE ANY NECESSARY FINAL DRESS UP OF AREAS DISTURBED BY ITEM 15.

GEORGETOWN UTILITY SYSTEMS GENERAL NOTES:

- 1. THESE CONSTRUCTION PLANS WERE PREPARED, SEALED AND DATED BY A TEXAS LICENSED PROFESSIONAL ENGINEER. THEREFORE BASED ON THE ENGINEER'S CONCURRENCE OF COMPLIANCE, THE CONSTRUCTION PLANS FOR CONSTRUCTION OF THE PROPOSED PROJECT ARE HEREBY APPROVED SUBJECT TO THE STANDARD CONSTRUCTION SPECIFICATIONS AND DETAILS MANUAL AND ALL OTHER APPLICABLE CITY, STATE AND FEDERAL REQUIREMENTS AND CODES.
- THIS PROJECT IS SUBJECT TO ALL CITY STANDARD SPECIFICATIONS AND DETAILS IN EFFECT AT THE TIME OF SUBMITTAL OF THE PROJECT OF THE CITY.
- THE SITE CONSTRUCTION PLANS SHALL MEET ALL REQUIREMENTS OF THE APPROVED SITE PLAN. PRIVATE WATER SYSTEM FIRE LINES SHALL BE TESTED BY THE CONTRACTOR TO 200 PSI FOR 2 HOURS.
- PRIVATE WATER SYSTEM FIRE LINES SHALL BE DUCTILE IRON PIPING FROM THE WATER MAIN TO THE BUILDING SPRINKLER SYSTEM, AND 200 PSI C900 PVC FOR ALL OTHERS.
- PUBLIC WATER SYSTEM MAINS SHALL BE 150 PSI C900 PVC AND TESTED BY THE CONTRACTOR AT 150 PSI FOR 4 HOURS. ALL BENDS AND CHANGES IN DIRECTION ON WATER MAINS SHALL BE RESTRINED AND THRUST BLOCKED.
- LONG FIRE HYDRANT LEADS SHALL BE RESTRAINED. ALL WATER LINES ARE TO BE BACTERIA TESTED BY THE CONTRACTOR ACCORDING TO THE CITY STANDARDS AND SPECIFICATIONS.
- 10. WATER AND SEWER MAIN CROSSINGS SHALL MEET ALL REQUIREMENTS OF THE TCEQ AND THE CITY.
- 11. A MAINTENANCE BOND IS REQUIRED TO BE SUBMITTED TO TEH CITY PRIOR TO ACCEPTANCE OF THE PUBLIC IMPROVMENTS. THIS BOND SHALL BE ESTABLISHED FOR 2 YEARS IN THE AMOUNT OF 10% OF THE COST OF THE PUBLIC IMPROVEMENTS AND SHALL FOLLOW THE CITY FORMAT.
- 12. RECORD DRAWINGS OF THE PUBLIC IMPROVMENTS SHALL BE SUBMITTED TO THE CITY BY THE DESIGN ENGINEER PRIOR TO ACCEPTACNE OF THE PROJECT. THESE DRAWINGS SHALL BE SUBMITTED AS A PDF (300P DPI) ON A FLASH DRIVE, OR BY A CLOUD SOURCE.

STREET AND DRAINAGE NOTES:

- 1. ROADWAY CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT "WILLIAMSON COUNTY SUBDIVISION REGULATIONS," AS APPLICABLE.
- 2. ALL MATERIALS SHALL BE SAMPLED AND TESTED BY AN INDEPENDENT TESTING LABORATORY IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS APPROVED BY THE COUNTY ENGINEER. THE OWNER SHALL PAY FOR ALL TESTING SERVICES AND SHALL FURNISH THE COUNTY ENGINEER WITH CERTIFIED COPIES OF THESE TEST RESULTS. ANY RETESTING SHALL BE PAID FOR BY THE CONTRACTOR. THE COUNTY ENGINEER MUST APPROVE THE TEST RESULTS PRIOR TO CONSTRUCTING THE NEXT COURSE OF THE ROADWAY STRUCTURE. ANY MATERIAL WHICH DOES NOT MEET THE MINIMUM REQUIRED TEST SPECIFICATIONS SHALL BE REMOVED AND RECOMPACTED OR REPLACED UNLESS ALTERNATIVE
- REMEDIAL ACTION IS APPROVED IN WRITING FROM THE COUNTY ENGINEER. 3. BACKFILL BEHIND THE CURB SHALL BE COMPACTED TO OBTAIN A MINIMUM OF 95% MAXIMUM DENSITY TO WITHIN 3" OF TOP OF CURB. MATERIAL USED SHALL BE PRIMARILY GRANULAR WITH NO ROCKS LARGER THAN 6" IN THE GREATEST DIMENSION. THE REMAINING 3" SHALL BE CLEAN TOPSOIL FREE FROM ALL CLODS AND SUITABLE FOR SUSTAINING
- 4. DEPTH OF COVER FOR ALL CROSSINGS UNDER PAVEMENT INCLUDING GAS, ELECTRIC, TELEPHONE, CABLE TV, WATER SERVICES, ETC., SHALL BE A MINIMUM OF 30" BELOW
- 5. STREET RIGHTS-OF-WAY SHALL BE GRADED AT A SLOPE OF 1/4" PER FOOT TOWARD THE CURB UNLESS OTHERWISE INDICATED. HOWEVER, IN NO CASE SHALL THE WIDTH OF RIGHT-OF-WAY AT 1/4" PER FOOT SLOPE BE LESS THAN 10 FEET UNLESS A SPECIFIC REQUEST FOR AN ALTERNATE GRADING SCHEME IS MADE TO AND ACCEPTED BY THE COUNTY ENGINEER. BARRICADES BUILT TO WILLIAMSON COUNTY STANDARDS SHALL BE CONSTRUCTED ON ALL DEAD-END STREETS AND AS NECESSARY DURING CONSTRUCTION TO MAINTAIN JOB AND PUBLIC SAFETY.
- 6. ALL R.C.P. SHALL BE MINIMUM CLASS III, UNLESS OTHERWISE NOTED.

ENGINEERS CONSULTANTS

7. THE PREPARATION OF SUBGRADE SHALL FOLLOW GOOD ENGINEERING PRACTICES AS DIRECTED BY THE COUNTY ENGINEER AND IN CONJUNCTION WITH THE OUTLINED IN THE GEOTECHNICAL REPORT BY MLA LABS, INC., DATED . THE PAVING SECTIONS ARE TO BE CONSTRUCTED AS FOLLOWS:

Street Classification	Subgrade Material	Hot Mix sphaltic rete, in	Stabilized ubgrade, in				
			Stab				
Local Streets	Subgrade PI >	<u>8</u>	8				
Residential Collectors	Subgrade	12	8				
Notes: 1. Where the subgrade is composition or low PI clay (PI < 20), lime stabilization may be omitted. 2. The surface clay must be completed to delegate and curing conditions. A sulfate reaction and a mix design should be completed to delegate and curing conditions.							
3. The subgraudline.		3 feet beyond the back					
4. Thesanticir	. designs are intended ons.	to transfer the load fr	om the				
5. The left to 1 sineer.	ssigning street classification	on to the streets in thi	is project is				

THE GEOTECHNICAL ENGINEER SHALL INSPECT THE SUBGRADE FOR COMPLIANCE WITH THE DESIGN ASSUMPTIONS MADE DURING PREPARATION OF THE SOILS REPORT. ANY ADJUSTMENTS THAT ARE REQUIRED SHALL BE MADE THROUGH REVISION OF THE CONSTRUCTION PLANS.

6. If pave. Lesigns other than those listed above are desired, please contact ETTL

8. WHERE PI'S ARE OVER 20, SUBGRADES MUST BE STABILIZED UTILIZING A METHOD ACCEPTABLE TO THE COUNTY ENGINEER. THE GEOTECHNICAL ENGINEER SHALL RECOMMEND AN APPROPRIATE SUBGRADE STABILIZATION IF SULFATES ARE DETERMINED TO BE PRESENT. SEE THE GEOTECHNICAL REPORT FOR DESIGN GUIDES FOR DIFFERENT PI VALUES. 9. CONTRACTOR IS TO AVOID INSTALLATION OF IRRIGATION, PLANTINGS, SILT FENCE, ETC. IN THE SUBGRADE IMPROVEMENT EXTENDED BEHIND THE CURB.

> PER THE WILLIAMSON COUNTY ENGINEER, THERE MUST BE A TXDOT HMAC WEARTING SURFACE 340 TYPE D, WITHOUT "RAS". WILLIAMSON COUNTY REQUIRES THE 2 INCH WEARING SURFACE TO BE "VIRGIN MIX"

GENERAL NOTES:

- 1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH WILLIAMSON COUNTY, CITY OF ROUND ROCK (WASTEWATER), AND GEORGETOWN UTILITY SYSTEMS (WATER)
- SPECIFICATIONS. 2. DESIGN PROCEDURES ARE IN COMPLETE COMPLIANCE WITH THE CITY OF AUSTIN DRAINAGE CRITERIA MANUAL AND ALL VARIANCES TO THE MANUAL ARE NOTED.
- ANY EXISTING UTILITIES, PAVEMENT, CURBS, SIDEWALKS, STRUCTURES, TREES, ETC., NOT PLANNED FOR DESTRUCTION OR REMOVAL THAT ARE DAMAGED OR REMOVED
- SHALL BE REPAIRED OR REPLACED AT HIS EXPENSE. 4. THE CONTRACTOR SHALL VERIFY ALL DEPTHS AND LOCATIONS OF EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION. ANY DISCREPANCIES WITH THE CONSTRUCTION PLANS FOUND IN THE FIELD SHALL BE BROUGHT IMMEDIATELY TO THE ATTENTION OF THE ENGINEER WHO SHALL BE RESPONSIBLE FOR REVISING THE PLANS ARE
- MANHOLE FRAMES, COVERS, VALVES, CLEANOUTS, ETC. SHALL BE RAISED TO FINISHED GRADE PRIOR TO FINAL PAVING CONSTRUCTION.
- THE CONTRACTOR SHALL GIVE THE CITY OF LIBERTY HILL 48 HOURS NOTICE BEFORE BEGINNING EACH PHASE OF CONSTRUCTION. TELEPHONE 512-778-5449
- ALL AREAS DISTURBED O EXPOSED DURING CONSTRUCTION SHALL BE REVEGETATED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. REVEGETATION MUST EQUAL OR EXCEED THE TYPE OF VEGETATION PRESENT BEFORE CONSTRUCTION.
- 8. THE CONTRACTOR AND THE ENGINEER SHALL KEEP ACCURATE RECORDS OF ALL CONSTRUCTION THAT DEVIATES FROM THE PLANS. THE ENGINEERR SHALL FURNISH THE CITY OF LIBERTY HILL ACCURATE "AS-BUILT" DRAWINGS FOLLOWING COMPLETION OF ALL CONSTRUCTION, THESE "AS-BUILT" DRAWINGS SHALL MEET WITH THE
- SATISFACTION OF THE PLANNING & DEVELOPMENT DEPARTMENT PRIOR TO FINAL ACCEPTANCE THE LIBERTY HILL CITY COUNCIL SHALL NOT BE PETITIONED FOR ACCEPTANCE UNTIL ALL NECESSARY EASEMENT DOCUMENTS HAVE BEEN SIGNED AND RECORDED.
- 10. WHEN CONSTRUCTION IS BEING CARRIED OUT WITHIN EASEMENTS, THE CONTRACTOR SHALL CONFINE HIS WORK TO WITHIN THE PERMANENT AND ANY TEMPORARY EASEMENTS. PRIOR TO FINAL ACCEPTANCE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL TRASH AND DEBRIS WITHIN THE PERMANENT AND TEMPORARY EASEMENTS. CLEANUP SHALL BE TO THE SATISFACTION OF THE COUNTY ENGINEER.
- 11. PRIOR TO ANY CONSTRUCTION, THE CONTRACTOR SHALL APPLY FOR AND SECURE ALL PROPER PERMITS FROM THE APPROPRIATE AUTHORITIES. 12. AVAILABLE BENCHMARKS THAT MAY BE UTILIZED FOR THE CONSTRUCTION OF THIS PROJECT ARE DESCRIBED AS FOLLOWS:

BENCHMARKS:

(PLANNING & DEVELOPMENT DEPARTMENT)

Point #	DESCRIPTION	ELEVATION	NORTHING	EASTING
	MAG NAIL SET ON TRANSFORMER PAD AT			
	NE CORNER OF E. SANTA RITA BLVD. AND			
55004	SINGING DOVE WAY	1,020.29	10,210,674.0710	3,084,333.0300
	MAG NAIL SET ON TOP OF CURB ON THE			
	NORTH SIDE OF E. SANTA RITA BLVD.			
55006	EAST OF MIRA MESA DRIVE	1,002.99	10,211,255.7040	3,085,781.6710

TRENCH SAFETY NOTES:

- 1. IN ACCORDANCE WITH THE LAWS OF THE STATE OF TEXAS AND THE U. S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS, ALL TRENCHES OVER 5 FEET IN DEPTH IN EITHER HARD AND COMPACT OR SOFT AND UNSTABLE SOIL SHALL BE SLOPED, SHORED, SHEETED, BRACED OR OTHERWISE SUPPORTED. FURTHERMORE, ALL TRENCHES LESS THAN 5 FEET IN DEPTH SHALL ALSO BE EFFECTIVELY PROTECTED WHEN HAZARDOUS GROUND MOVEMENT MAY BE EXPECTED. TRENCH SAFETY SYSTEMS TO BE UTILIZED FOR THIS PROJECT WILL BE PROVIDED BY THE CONTRACTOR.
- 2. IN ACCORDANCE WITH THE U. S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS, WHEN PERSONS ARE IN TRENCHES 4-FEET DEEP OR MORE, ADEQUATE MEANS OF EXIT, SUCH AS A LADDER OR STEPS, MUST BE PROVIDED AND LOCATED SO AS TO REQUIRE NO MORE THAN 25 FEET OF LATERAL TRAVEL.
- 3. IF TRENCH SAFETY SYSTEM DETAILS WERE NOT PROVIDED IN THE PLANS BECAUSE TRENCHES WERE ANTICIPATED TO BE LESS THAN 5 FEET IN DEPTH AND DURING CONSTRUCTION IT IS FOUND THAT TRENCHES ARE IN FACT 5 FEET OR MORE IN DEPTH OR TRENCHES LESS THAN 5 FEET IN DEPTH ARE IN AN AREA WHERE HAZARDOUS GROUND MOVEMENT IS EXPECTED, ALL CONSTRUCTION SHALL CEASE, THE TRENCHED AREA SHALL BE BARRICADED AND THE ENGINEER NOTIFIED IMMEDIATELY. CONSTRUCTION SHALL NOT RESUME UNTIL APPROPRIATE TRENCH SAFETY SYSTEM DETAILS, AS DESIGNED BY A PROFESSIONAL ENGINEER, ARE RETAINED AND COPIES SUBMITTED TO THE CITY OF LIBERTY HILL.

- 1. ANY METHODS, STREET MARKINGS AND SIGNAGE NECESSARY FOR WARNING MOTORISTS, WARNING PEDESTRIANS OR DIVERTING TRAFFIC DURING CONSTRUCTION SHALL CONFORM TO THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, LATEST EDITION.
- 2. ALL PAVEMENT MARKINGS, MARKERS, PAINT, TRAFFIC BUTTONS, TRAFFIC CONTROLS AND SIGNS SHALL BE INSTALLED IN ACCORDANCE WITH THE TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES AND, THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, LATEST EDITIONS.

EROSION AND SEDIMENTATION CONTROL NOTES:

- . EROSION CONTROL MEASURES, SITE WORK AND RESTORATION WORK SHALL BE IN ACCORDANCE WITH THE CITY OF LIBERTY HILL EROSION AND SEDIMENTATION CONTROL ORDINANCE. 2. ALL SLOPES SHALL BE SODDED OR SEEDED WITH APPROVED GRASS, GRASS MIXTURES OR GROUND COVER SUITABLE TO THE AREA AND SEASON IN WHICH THEY ARE APPLIED.
- 3. SILT FENCES. ROCK BERMS. SEDIMENTATION BASINS AND SIMILARLY RECOGNIZED TECHNIQUES AND MATERIALS SHALL BE EMPLOYED DURING CONSTRUCTION TO PREVENT POINT SOURCE SEDIMENTATION LOADING OF DOWNSTREAM FACILITIES. SUCH INSTALLATION SHALL BE REGULARLY INSPECTED BY THE CITY OF LIBERTY HILL FOR EFFECTIVENESS. ADDITIONAL MEASURES MAY BE REQUIRED IF. IN THE OPINION OF THE CITY ENGINEER, THEY ARE WARRANTED.
- 4. ALL TEMPORARY EROSION CONTROL MEASURES SHALL NOT BE REMOVED UNTIL FINAL INSPECTION AND APPROVAL OF THE PROJECT BY THE ENGINEER. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN ALL TEMPORARY EROSION CONTROL STRUCTURES AND TO REMOVE EACH STRUCTURE AS APPROVED BY THE ENGINEER.
- 5. ALL MUD. DIRT. ROCKS. DEBRIS. ETC., SPILLED. TRACKED OR OTHERWISE DEPOSITED ON EXISTING PAVED STREETS. DRIVES AND AREAS USED BY THE PUBLIC SHALL BE CLEANED UP IMMEDIATELY.

WILLIAMSON COUNTY SUBDIVISION REGULATIONS

APPENDIX B ADOPTED AND EFFECTIVE AS OF JUNE 22, 2021

<u>B4 - CONSTRUCTION - GENERAL</u>

- B4.1 A PRECONSTRUCTION MEETING SHALL BE SCHEDULED PRIOR TO THE START OF CONSTRUCTION. THE DESIGN ENGINEER, OWNER, CONTRACTOR, SUBCONTRACTORS, AND COUNTY ENGINEER SHALL ATTEND THIS MEETING. ALL ROADS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AS APPROVED BY THE COUNTY ENGINEER AND IN ACCORDANCE WITH THE SPECIFICATIONS FOUND IN THE CURRENT VERSION OF THE "TEXAS DEPARTMENT OF TRANSPORTATION MANUAL STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS, AND BRIDGES" UNLESS OTHERWISE STATED ON THE CONSTRUCTION DOCUMENTS APPROVED BY THE COUNTY ENGINEER.
- B4.2 ALL MATERIALS SHALL BE SAMPLED AND TESTED BY AN INDEPENDENT TESTING LABORATORY IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS APPROVED BY THE COUNTY ENGINEER. THE OWNER SHALL PAY FOR ALL TESTING SERVICES AND SHALL FURNISH THE COUNTY ENGINEER WITH CERTIFIED COPIES OF THESE TEST RESULTS. THE COUNTY ENGINEER MUST APPROVE THE TEST RESULTS PRIOR TO CONSTRUCTING THE NEXT COURSE OF THE ROADWAY STRUCTURE. ANY MATERIAL WHICH DOES NOT MEET THE MINIMUM REQUIRED TEST SPECIFICATIONS SHALL BE REMOVED AND RECOMPACTED OR REPLACED UNLESS ALTERNATIVE REMEDIAL ACTION IS APPROVED IN WRITING FROM THE COUNTY ENGINEER.
- B4.3 EXCEPT FOR ELECTRICAL LINES, ALL UNDERGROUND NONFERROUS UTILITIES WITHIN A RIGHT-OF-WAY OR EASEMENT MUST BE ACCOMPANIED BY FERROUS METAL LINES TO AID IN TRACING THE LOCATION OF SAID UTILITIES THROUGH THE USE OF A METAL DETECTOR.
- B4.4 ALL PAVEMENTS ARE TO BE DESIGNED BY A REGISTERED PROFESSIONAL ENGINEER. THE DESIGN SHALL BE BASED ON A 20-YEAR DESIGN LIFE AND IN CONJUNCTION WITH RECOMMENDATIONS BASED UPON A SOILS REPORT OF SAMPLES TAKEN ALONG THE PROPOSED ROADWAYS. TEST BORINGS SHALL BE PLACED AT A MAXIMUM SPACING OF 500 FEET OR OTHER SAMPLING FREQUENCY APPROVED BY THE COUNTY ENGINEER BASED ON RECOMMENDATIONS PROVIDED BY THE GEOTECHNICAL ENGINEER. BORINGS SHALL BE TO A DEPTH OF TEN FT OR, IF SOLID ROCK IS ENCOUNTERED, ONE FT BELOW NON-FRACTURED ROCK. THE SOILS REPORT AND PAVEMENT DESIGN SHALL BE SUBMITTED TO THE COUNTY ENGINEER FOR REVIEW. THE PAVEMENT DESIGN MUST BE APPROVED BY THE COUNTY ENGINEER PRIOR TO OR CONCURRENTLY WITH THE REVIEW AND APPROVAL OF THE CONSTRUCTION PLANS. IN ADDITION TO THE BASIS OF THE PAVEMENT DESIGN, THE SOILS REPORT SHALL CONTAIN THE RESULTS OF SAMPLED AND TESTED SUBGRADE FOR PLASTICITY INDEX.

<u>B5 – SUBGRADE</u>

- B5.1 THE PREPARATION OF THE SUBGRADE SHALL FOLLOW GOOD ENGINEERING PRACTICES AS DIRECTED BY THE COUNTY ENGINEER IN CONJUNCTION WITH RECOMMENDATIONS OUTLINED IN THE GEOTECHNICAL REPORT. WHEN THE PLASTICITY INDEX (PI) IS GREATER THAN 20, A SUFFICIENT AMOUNT OF LIME SHALL BE ADDED AS DESCRIBED IN ITEM 260 OF THE CURRENT EDITION OF THE TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION UNTIL THE PI IS LESS THAN 20. IF THE ADDITION OF LIME AS DESCRIBED IN ITEM 260 IS NOT FEASIBLE, AN ALTERNATE STABILIZING DESIGN SHALL BE PROPOSED AND SUBMITTED TO THE COUNTY ENGINEER FOR APPROVAL. THE SUBGRADE SHALL BE PREPARED AND COMPACTED TO ACHIEVE A DRY DENSITY PER TXDOT ITEM 132. IN ADDITION, PROOF ROLLING MAY BE REQUIRED BY THE COUNTY ENGINEER.
- B5.2 IF LIME IS NECESSARY, THEN A SUFFICIENT AMOUNT OF LIME SHALL BE ADDED, AS DESCRIBED IN ITEM 260 OF THE CURRENT EDITION OF THE TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION TO PROPERLY STABILIZE SUBGRADE. THE USE OF HYDRATED LIME OR LIME SLURRY IS APPROVED; HOWEVER, THE USE OF PELLETIZED LIME IS NOT APPROVED.
- B5.3 PRIOR TO LIME STABILIZATION, A SULFATE TEST OF IN SITU SOILS SHALL BE PERFORMED BY DEVELOPER TO CONFIRM THE APPROPRIATE MEANS AND METHODS OF STABILIZATION. PROVIDE SULFATE TEST TO COUNTY ENGINEER PRIOR TO STABILIZATION.
- B5.4 ANY VARIATION TO THE COUNTY'S STABILIZATION REQUIREMENTS MUST BE APPROVED BY THE COUNTY ENGINEER.
- B5.5 THE SUBGRADE SHALL BE PREPARED AND COMPACTED TO ACHIEVE A DRY DENSITY PER TXDOT ITEM 132. IN ADDITION, PROOF ROLLING MAY BE REQUIRED BY THE COUNTY ENGINEER. B5.6 THE SUBGRADE SHALL BE INSPECTED AND APPROVED BY AN INDEPENDENT TESTING LABORATORY AND A CERTIFIED COPY OF ALL INSPECTION REPORTS FURNISHED TO THE COUNTY ENGINEER. THE COUNTY ENGINEER MUST APPROVE THE REPORT PRIOR TO APPLICATION OF THE BASE MATERIAL, ALL DENSITY TEST REPORTS SHALL INCLUDE A COPY OF THE WORK

SHEET SHOWING THE PERCENTAGE OF THE MAXIMUM DRY (PROCTOR) DENSITY. THE NUMBER AND LOCATION OF ALL SUBGRADE TESTS SHALL BE DETERMINED BY THE COUNTY ENGINEER. <u>B6 – BASE MATERIAL</u>

B6.1 BASE MATERIAL SHALL CONFORM TO ITEM 247 OF THE CURRENT EDITION OF THE TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, "FLEXIBLE BASE". THE BASE MATERIAL SHALL BE TYPE A GRADE 4, OR AS APPROVED BY THE COUNTY ENGINEER. GRADE 4 MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF TABLE B6.1

ASTER GRADATION SIEVE SIZE	CUMULATIVE % RETAINED
2 1/2"	_
1 3/4"	0
7/8"	10% - 35%
3/8"	30% - 65%
#4	45% - 75%
#40	70% - 90%
11000	0707 0.507

B6.2 EACH LAYER OF BASE COURSE SHALL BE TESTED FOR IN-PLACE DRY DENSITY AND MEASURED FOR COMPACTED THICKNESS. THE NUMBER AND LOCATION OF ALL BASE TEST SAMPLES SHALL BE DETERMINED BY THE COUNTY ENGINEER.

B6.3 THE BASE SHALL BE PREPARED AND COMPACTED TO ACHIEVE A MINIMUM OF 100% OF THE MAXIMUM (PROCTOR) DRY DENSITY OR AS APPROVED BY THE COUNTY ENGINEER UPON RECOMMENDATION BY THE TESTING LABORATORY. THE MAXIMUM LIFT SHALL NOT EXCEED SIX INCHES. THE BASE MUST BE INSPECTED AND APPROVED BY AN INDEPENDENT TESTING LABORATORY AND A CERTIFIED COPY OF THE TEST RESULTS FURNISHED TO THE COUNTY ENGINEER FOR APPROVAL. PRIOR TO THE PLACEMENT OF THE FIRST LIFT OF BASE, THE STOCKPILE SHALL BE TESTED FOR THE SPECIFICATIONS FOUND IN ITEM 247 TABLE 1 AND THE RESULT FURNISHED TO THE COUNTY ENGINEER FOR APPROVAL.

- B7.1 URBAN ROADS REQUIRE A MINIMUM 2 INCH WEARING SURFACE OF HMAC TYPE D. THE MIX SHALL BE FROM A TXDOT CERTIFIED PLANT AND THE MIX DESIGN SHALL BE SUBMITTED TO THE COUNTY ENGINEER FOR APPROVAL PRIOR TO PLACEMENT OF THE MATERIAL.
- B7.2 IF PROVIDING MIXTURE TYPE C OR D, USE PERFORMANCE GRADE (PG) BINDER 70-22. PROVIDE PG BINDER THAT DOES NOT CONTAIN RECYCLED ENGINE OIL BOTTOMS (REOBS) OR POLY PHOSPHORIC ACID (PPA). RECYCLED ASPHALT PAVEMENT (RAP) IS NOT PERMITTED FOR USE AS A COMPONENT OF THE HMACP. THE CONTRACTOR IS ALSO NOT PERMITTED THE USE RECYCLED ASPHALT SHINGLES (RAS) AS A COMPONENT OF THE HMACP.
- B7.3 IF PROVIDING MIXTURE TYPE B, USE PG BINDER 64-22. PROVIDE PG BINDERS THAT DO NOT CONTAIN REOBS OR PPA. FOR SUBSURFACE COURSE TYPE B, THE USE OF TWENTY PERCENT (20%) RAP IS PERMITTED IN THE MIX DESIGN. THE CONTRACTOR IS NOT PERMITTED TO USE RAS AS A COMPONENT OF THE HMACP.
- B7.4 TARGET LABORATORY MOLDED DENSITY IS 96.5% FOR ALL MIXTURES WITHOUT RAP AND WHEN USING A TEXAS GYRATORY COMPACTOR (TGC) FOR DESIGNING THE MIXTURE. WHEN USING SUPERPAVE GYRATORY COMPACTOR (SGC) TO DESIGN MIXTURES, SUBMIT THE SGC MIX DESIGN TO THE ENGINEER FOR APPROVAL.
- B7.5 ALL MIXTURES MUST MEET THE HAMBURG REQUIREMENT AS STATED IN THE TABLE BELOW.
- HIGH-TEMPERATURE BINDER GRADE MINIMUM # OF PASSES @ 0.5" RUT DEPTH (TESTED @ 122°F) PG 64 OR LOWER TEX-242-F

15.000 PG 70 TEX-242-F PG-76 OR HIGHER TEX-242-F 20,000

- * THE COUNTY ENGINEER MAY ACCEPT HAMBURG WHEEL TEST RESULTS FOR PRODUCTION AND PLACEMENT IF NO MORE THAN 10F THE 5 MOST RECENT TESTS IS BELOW THE SPECIFIED NUMBER OF PASSES AND THE FAILING TEST IS NO MORE THAN 2,000 PASSES BELOW THE SPECIFIED NUMBER OF PASSES.
- B7.6 SUBMIT ANY PROPOSED ADJUSTMENTS OR CHANGES TO A JOB MIX FORMULA TO THE COUNTY ENGINEER BEFORE PRODUCTION OF THE NEW JOB MIX FORMULA.
- B7.7 UNLESS OTHERWISE APPROVED, PROVIDE TYPE B MIXTURES THAT HAVE NO LESS THAN 4.5% ASPHALT BINDER, AND TY C AND D MIXTURES WITH NO LESS THAN 4.7% BINDER. B7.8 FOR MIXTURE DESIGN VERIFICATION, PROVIDE THE ENGINEER WITH TWO 5-GALLON BUCKETS OF EACH AGGREGATE STOCKPILE TO BE USED ON THE PROJECT AND THREE GALLONS OF EACH PG BINDER TO BE USED ON THE PROJECT. ALSO PROVIDE SUFFICIENT QUANTITIES OF ANY OTHER ADDITIVES THAT WILL BE USED IN THE HMA MIXTURE. THIS MUST BE DONE PRIOR TO APPROVAL OF THE MIX DESIGN, UNLESS ALREADY PERFORMED WITHIN A ONE-YEAR TIME PERIOD.
- B7.9 PRIOR TO ALLOWING PRODUCTION OF THE TRIAL BATCH, THE ENGINEER WILL USE THE MATERIALS PROVIDED BY THE CONTRACTOR TO PERFORM THE FOLLOWING TESTS TO VERIFY THE HMA MIXTURE DESIGN. 1. INDIRECT TENSILE TEST IN ACCORDANCE WITH TEX-226-F
- 2. HAMBURG WHEEL TEST IN ACCORDANCE WITH TEX-242-F
- 3. OVERLAY TEST IN ACCORDANCE WITH TEX-248-F 4. CANTABRO TEST IN ACCORDANCE WITH TEX-245-F
- FOR MIXTURES DESIGNED WITH A TEXAS GYRATORY COMPACTOR (TGC), THE ENGINEER MAY REQUIRE THAT THE TARGET LABORATORY MOLDED DENSITY BE RAISED TO NO MORE THAN 97.5% OR MAY LOWER THE
- DESIGN NUMBER OF GYRATIONS TO NO LESS THAN 35 FOR MIXTURES DESIGNED WITH AN SGC IF ANY OF THE FOLLOWING CONDITIONS EXIST. 1. THE INDIRECT TENSILE TEST RESULTS IN A VALUE GREATER THAN 200 PSI
- 2. THE HAMBURG WHEEL TEST RESULTS IN A VALUE LESS THAN 3.0 MM
- 3. THE OVERLAY TEST RESULTS IN A VALUE LESS THAN 100 CYCLES 4. THE CANTABRO TEST RESULTS IN A VALUE OF MORE THAN 20% LOSS
- IN LIEU OF, OR IN ADDITION TO EVALUATING THE MIXTURE DESIGN PRIOR TO ALLOWING A TRIAL BATCH TO BE PRODUCED, THE ENGINEER MAY ALSO EVALUATE THE MIXTURE PRODUCED DURING THE TRIAL BATCH FOR COMPLIANCE WITH THE 4 TESTS LISTED ABOVE.
- B7.10 CONTRACTOR'S QUALITY CONTROL (CQC) TEST REPORTS SHALL BE SUBMITTED TO THE COUNTY ENGINEER ON A DAILY BASIS. AS A MINIMUM, DAILY CQC TESTING ON THE PRODUCED MIX SHALL INCLUDE: SIEVE ANALYSIS TEX-200-F, ASPHALT CONTENT TEX-236-F, HVEEM STABILITY TEX-208-F, LABORATORY COMPACTED DENSITY TEX-207-F, AND MAXIMUM SPECIFIC GRAVITY TEX-227-F. THE NUMBER AND LOCATION OF ALL HMAC TESTS SHALL BE DETERMINED BY THE COUNTY ENGINEER WITH A MINIMUM OF THREE, 6-INCH DIAMETER FIELD CORES SECURED AND TESTED BY THE CONTRACTOR FROM EACH DAY'S PAVING. EACH HMAC COURSE SHALL BE TESTED FOR IN-PLACE DENSITY, BITUMINOUS CONTENT AND AGGREGATE GRADATION, AND SHALL BE MEASURED FOR COMPACTED THICKNESS. THE NUMBER AND LOCATION OF ALL
- HMAC TEST SAMPLES SHALL BE DETERMINED BY THE COUNTY ENGINEER. B7.11 RURAL ROADS MAY USE EITHER THE SPECIFICATIONS FOUND IN SECTION B7.1 OR A TWO-COURSE SURFACE IN ACCORDANCE WITH ITEM 316, TREATMENT WEARING SURFACE, OF THE CURRENT EDITION OF THE TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION. THE TYPE AND RATE OF ASPHALT AND AGGREGATE SHALL BE INDICATED ON THE PLANS AS A BASIS OF ESTIMATE AND SHALL BE DETERMINED AT THE PRECONSTRUCTION CONFERENCE. AGGREGATE USED IN THE MIX SHALL BE ON THE TXDOT QUALITY MONITORING SCHEDULE. AGGREGATE SHALL BE TYPE B GRADE 4. GRADATION TESTS SHALL BE REQUIRED FOR EACH 300 CUBIC YARDS OF MATERIAL PLACED WITH A MINIMUM OF TWO TESTS PER EACH GRADE PER EACH PROJECT. TEST RESULTS SHALL BE REVIEWED BY THE COUNTY ENGINEER PRIOR TO APPLICATION OF THE MATERIAL.

B8.1 IN LIEU OF BITUMINOUS PAVEMENT, PORTLAND CEMENT CONCRETE PAVEMENT MAY BE USED. IN SUCH CASES, THE PAVEMENT THICKNESS SHALL BE A MINIMUM OF 9 INCHES OF CONCRETE, AND SHALL BE JOINTED AND REINFORCED IN ACCORDANCE WITH THE DETAIL INCLUDED IN APPENDIX J. THE MIX SHALL BE FROM A TXDOT CERTIFIED PLANT. THE MIX DESIGN SHALL BE SUBMITTED TO THE COUNTY ENGINEER FOR APPROVAL PRIOR TO PLACEMENT OF THE MATERIAL.

<u>B9 – CONCRETE – GENERAL</u>

- B9.1 UNLESS OTHERWISE SPECIFIED, CONCRETE SHALL BE IN ACCORDANCE WITH ITEM 421 OF THE CURRENT EDITION OF THE TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION AND BE PLACED IN ACCORDANCE
- B9.2 ALL CONCRETE SHALL BE TESTED FOR COMPRESSIVE STRENGTH. ONE SET OF THREE CONCRETE TEST CYLINDERS SHALL BE MOLDED FOR EVERY 50 CUBIC YARDS OF CONCRETE PLACED FOR EACH CLASS OF CONCRETE PER DAY, OR AT ANY OTHER INTERVAL AS DETERMINED BY THE COUNTY ENGINEER. A SLUMP TEST SHALL BE REQUIRED WITH EACH SET OF TEST CYLINDERS. ONE CYLINDER SHALL BE TESTED FOR COMPRESSIVE STRENGTH AT AN AGE OF SEVEN DAYS AND THE REMAINING TWO CYLINDERS SHALL BE TESTED AT 28 DAYS OF AGE.

B10 - ROAD NAMES, SIGNS AND MARKERS

- B10.1 ALL ROADS SHALL BE NAMED, WITH PRIOR APPROVAL FOR SAID NAME FROM THE WILLIAMSON COUNTY 911 ADDRESSING COORDINATOR. ROADS MUST BE NAMED IN A MANNER TO AVOID CONFUSION IN IDENTIFICATION. ROADS THAT ARE EXTENSIONS OF EXISTING ROADS MUST CARRY THE NAMES OF THOSE IN EXISTENCE. ROADS THAT ARE NOT CONTINUOUS, OR WHICH HAVE 90 DEGREE TURNS, SHALL HAVE DIFFERENT NAMES. THE OWNER SHALL PROVIDE THE COORDINATOR WITH TWO DIGITAL FILES OF THE PLAT. ONE FILE SHALL BE IN AN ADOBE .PDF FORMAT, AND THE OTHER FILE SHALL BE IN AN AUTOCAD .DWG FORMAT GEOREFERENCED TO NAD 1983 STATE PLANE GRID COORDINATE SYSTEM, TEXAS CENTRAL ZONE (4203), WITH DRAWING UNITS OF US FEET, THE ROAD NAMES SHALL BE DISPLAYED ON STANDARD INTERSECTION ROAD MARKER SIGNS ERECTED BY THE OWNER IN COMPLIANCE WITH THE TXMUTCD "STREET NAME SIGNS" AND AT THE LOCATIONS AS INDICATED ON THE CONSTRUCTION
- B10.2 TRAFFIC CONTROL SIGNS (SUCH AS STOP, YIELD, AND SPEED LIMIT SIGNS) SHALL BE INSTALLED BY THE OWNER OF SAID SUBDIVISION IN COMPLIANCE WITH THE LATEST VERSION OF THE TXMUTCD AND AT THE LOCATIONS AS INDICATED ON THE APPROVED CONSTRUCTION PLANS, OTHER TRAFFIC CONTROL SIGNS, AS SHOWN ON THE CONSTRUCTION PLANS, SHALL BE INSTALLED TO INDICATE ANY UNUSUAL TRAFFIC OR ROAD HAZARD OR CONDITIONS THAT MAY EXIST. ALL TRAFFIC CONTROL DEVICES SHALL BE PLACED IN COMPLIANCE WITH LATEST VERSION OF THE TXMUTCD AND THE CONSTRUCTION COST SHALL BE BORNE BY THE OWNER.

<u>B11 – DRAINAGE AND FLOOD CONTROL</u>

- B11.1 STORMWATER MANAGEMENT CONTROLS SHALL BE DESIGNED, CONSTRUCTED, AND MAINTAINED TO RESTRICT THE RATE OF DRAINAGE FROM THE PLATTED AREA TO THE RATE OF DRAINAGE OF THE LAND IN ITS EXISTING CONDITION. WHEN A DEVELOPMENT SHALL HAVE SEVERAL SECTIONS, STORMWATER MANAGEMENT CONTROLS FOR THE ULTIMATE DEVELOPED AREA SHALL BE CONSTRUCTED IF NOT LOCATED IN THE FIRST PLATTED SECTION. STORMWATER MANAGEMENT CONTROLS ARE TO BE DESIGNED BY A PROFESSIONAL ENGINEER USING A BASIS OF A 2, 10, 25, AND 100-YEAR STORM. IF PROPOSED DEVELOPMENT IS DETENTION EXEMPT. A DETENTION EXEMPTION LETTER, REQUESTING THE DETENTION EXEMPTION TO BE UTILIZED, SHALL BE PROVIDED IN PLACE OF A DRAINAGE REPORT AND THE PLAT SHALL CONTAIN A CORRESPONDING PLAT NOTE FROM APPENDIX C12.
- B11.2 THE PROPOSED TIME OF CONCENTRATIONS AND LAND COVER ROUGHNESS N-VALUES, USED TO CALCULATE TIME OF CONCENTRATION, SHOULD BE CONSISTENT FROM EXISTING TO PROPOSED CONDITIONS. B11.3 WHEN CALCULATING PEAK FLOWS. THE RUNOFF CURVE NUMBER SHALL REMAIN THE SAME BETWEEN EXISTING AND PROPOSED CONDITIONS. USING THE ASSUMPTION OF RAW (UNDEVELOPED) LAND WITH NO IMPERVIOUS COVER. THE EXISTING AND PROPOSED PERCENTAGE OF IMPERVIOUS COVER SHALL BE INPUT INDIVIDUALLY FOR EACH CONDITION. FOR THE PROPOSED CONDITIONS, THE MAXIMUM POTENTIAL PERCENTAGE OF IMPERVIOUS COVER SHALL BE USED.
- B11.4 DETENTION VOLUME SHALL BE SIZED BY COMPARING THE EXISTING PEAK RUNOFF PRODUCED BY THE SITE VERSUS THE PROPOSED PEAK RUNOFF PRODUCED BY THE SITE, FOR THE 2, 10, 25 AND 100-YEAR FREQUENCY RAINFALL EVENT. METHODS USED TO ANALYZE THE PRE AND POST DEVELOPMENT CONDITIONS SHOULD FOCUS ON THE PROPOSED CHANGES IN IMPERVIOUS COVER AND TIME OF CONCENTRATION ASSOCIATED WITH DEVELOPMENT OF THE SITE. THE POINTS OF ANALYSIS MUST BE CONSISTENT BETWEEN EXISTING AND PROPOSED SCENARIOS FOR A DIRECT AND ACCURATE ASSESSMENT OF IMPACTS. THE TIMING OF HYDROGRAPHS MAY NOT BE USED TO DEMONSTRATE A DECREASE OF PROPOSED PEAK FLOWS FROM THE DEVELOPED SITE.
- B11.5 FOR DETENTION DESIGN, NOAA ATLAS 14 PRECIPITATION VALUES SHALL BE TAKEN FROM THE WILLIAMSON COUNTY RAINFALL ZONES FOR A 24-HOUR DURATION STORM. THESE ZONES AND RAINFALL DATA CAN BE FOUND IN EXHIBIT 2 AND THE ASSOCIATED TABLES. B11.6 FOR DETENTION DESIGN, MAJOR CHANNEL DESIGN AND ANALYSIS, DETERMINATION OF PEAK FLOW RATES FOR FLOODPLAIN MODELING, AND HYDROLOGIC CHANNEL ROUTING. THE U.S. ARMY CORPS OF
- ENGINEERS HEC-HMS SOFTWARE IS RECOMMENDED. NOAA ATLAS 14 RAINFALL, PER EXHIBIT 2 RAINFALL DATA, SHALL BE UTILIZED FOR ALL HYDROLOGIC ANALYSES. IF HEC-HMS IS NOT UTILIZED, THE FULL MODEL INPUT AND OUTPUT SHALL BE PROVIDED INCLUDING STRUCTURE AND OUTLET DETAILS AS MODELED. B11.7 IMPERVIOUS COVER ASSUMPTIONS MUST BE CLEARLY STATED WITHIN THE DRAINAGE REPORT.

B11.8 FOR FLOODPLAIN STUDIES, MAJOR CHANNEL DESIGN AND ANALYSIS, AND DETERMINATION OF FINISHED FLOOR ELEVATIONS, THE U.S. ARMY CORPS OF ENGINEERS HEC-RAS SOFTWARE MUST BE UTILIZED.

B11.9 DRAINAGE CALCULATIONS AND DESIGN SHALL BE MADE USING THE LATEST EDITION OF THE CITY OF AUSTIN'S DRAINAGE CRITERIA MANUAL EXCEPT WHERE OTHERWISE SPECIFIED IN THE REGULATIONS HEREIN, OR OTHER METHODS SATISFACTORY TO THE COUNTY ENGINEER. ALL DATA AND CALCULATIONS MUST BE PRESENTED TO THE COUNTY ENGINEER AS PART OF THE CONSTRUCTION PLANS OR DRAINAGE REPORT. THE FOLLOWING REQUIREMENTS SHALL BE INCORPORATED INTO THE DESIGN:

B11.9.1 BRIDGES AND CROSS DRAINAGE STRUCTURES FOR ARTERIAL, COLLECTOR, AND LOCAL ROADS SHALL BE DESIGNED TO CONVEY THE 25-YEAR STORM WITHOUT OVERTOPPING THE FACILITY.

B11.9.2 ALL LONGITUDINAL DRAINAGE STRUCTURES SHALL BE DESIGNED TO CONVEY THE 10-YEAR STORM.

ON THE DOWNSLOPE SIDE OF THE ROADWAY, DOES NOT OBSTRUCT OR REDIRECT FLOW WITHIN THE RIGHT-OF-WAY.

- B11.10 ALL DRAINAGE STRUCTURES AND APPURTENANCES SHALL BE DESIGNED BY A REGISTERED PROFESSIONAL ENGINEER. A PROFILE SHALL BE SHOWN IN THE CONSTRUCTION PLANS FOR ALL DRAINAGE STRUCTURES. EACH PROFILE SHALL SHOW THE DESIGN FLOW, VELOCITY, INVERT ELEVATIONS, AND THE HYDRAULIC GRADE LINE. B11.11 THE USE OF THERMOPLASTIC PIPES (INCLUDING BUT NOT LIMITED TO POLY VINYL CHLORIDE (PVC) PIPE, HIGH DENSITY POLYETHYLENE PIPE (HDPE), POLYPROPYLENE PIPE, ETC.) IS SPECIFICALLY
- PROHIBITED FROM USE FOR CROSS DRAINAGE, PARALLEL DRAINAGE, STORM DRAINS AND ALL OTHER STORMWATER CONVEYANCE WITHIN THE RIGHT OF WAY AND/OR EASEMENTS IN CONNECTION WITH DRAINING OR PROTECTING THE ROAD SYSTEM. B11.12 ALL PIPE USED FOR CROSS DRAINAGE, PARALLEL DRAINAGE, STORM DRAINS, AND ALL OTHER STORM WATER CONVEYANCES WITHIN THE RIGHT OF WAY AND/OR EASEMENTS IN CONNECTION WITH DRAINING OR PROTECTING THE ROAD SYSTEM SHALL BE DESIGNED AND CONSTRUCTED WITH THE CRITERIA IN TABLE B11.12 (PIPE CRITERIA). CAST—IN—PLACE IS PROHIBITED WITHOUT PRIOR APPROVAL
- FROM COUNTY ENGINEER. PIPES MUST HAVE A MINIMUM INTERIOR DIAMETER OF 18" OR EQUIVALENT. B11.15 DRIVEWAY CULVERTS SHALL HAVE A MINIMUM INTERIOR DIAMETER OF 18" OR EQUAL AND A MINIMUM LENGTH OF 22 FEET AND SHALL INCLUDE A CONCRETE APRON SAFETY END TREATMENT IN
- ACCORDANCE WITH CURRENT TXDOT SAFETY END TREATMENT STANDARDS. LARGER OR LONGER CULVERTS SHALL BE INSTALLED IF NECESSARY, TO ACCOMMODATE DRAINAGE BASED UPON A 10-YEAR B11.16 AT SOME POINT WITHIN THE FIRST TEN FEET FROM THE EDGE OF THE ROADWAY GUTTER, THE ENTIRE WIDTH OF A DRIVEWAY SHALL HAVE THE SAME OR GREATER ELEVATION AS THE TOP OF THE CURB AT THE EDGE OF THE ROADWAY.
- B11.17 MAINTENANCE RESPONSIBILITY FOR DRAINAGE WILL NOT TO BE ACCEPTED BY THE COUNTY OTHER THAN THAT ACCEPTED IN CONNECTION WITH DRAINING OR PROTECTING THE ROAD SYSTEM. MAINTENANCE RESPONSIBILITY FOR STORM WATER MANAGEMENT CONTROLS WILL REMAIN WITH THE OWNER. B11.18 EASEMENTS SHALL BE PROVIDED, WHERE NECESSARY, FOR ALL DRAINAGE COURSES AND IDENTIFIED FLOODPLAINS IN AND ACROSS PROPERTY TO BE PLATTED. THE LOCATION AND WIDTH SHALL BE
- AND A "DRAINAGE AND UNDERGROUND UTILITIES EASEMENT" SHALL BE A MINIMUM OF 30 FEET IN WIDTH. B11.19 ALL ROADSIDE DITCHES SHALL HAVE A MINIMUM DEPTH, AS MEASURED FROM THE EDGE OF THE ROAD PAVEMENT, EQUAL TO THE DIAMETER OF THE DRIVEWAY CULVERT PIPE(S) PLUS NINE INCHES, AND A BOTTOM WIDTH EQUAL TO THE DIAMETER OF THE DRIVEWAY CULVERT PIPE(S). THE SIDE SLOPES OF THE DITCHES ARE TO BE 3:1 OR FLATTER, EXCEPT AT PARALLEL CULVERTS WHICH SHALL BE

SHOWN ON THE PLAT AND MARKED "DRAINAGE EASEMENT" OR "DRAINAGE AND UNDERGROUND UTILITIES EASEMENT". IN GENERAL, A "DRAINAGE EASEMENT" SHALL BE A MINIMUM OF 20 FEET IN WIDTH

- 4:1 OR FLATTER TO ACCOMMODATE A STANDARD SAFETY END TREATMENT. B11.20 WHERE ALL LOTS ARE 2 ACRES OR MORE AND EXEMPT FROM DETENTION, ROADSIDE DITCHES MAY BE ELIMINATED WITHIN A RURAL SUBDIVISION PROVIDED THAT THE ROAD HAS 18-INCH RIBBON CURBS, THE ROADWAY SURFACE HAS AN ADEQUATE CROSS SLOPE, AND THE OVERALL DRAINAGE PATTERNS THROUGHOUT THE SUBDIVISION REMAIN AS IN AN UNDEVELOPED STATE. IF INTERNAL SUBDIVISION ROADWAYS ARE PROPOSED WITHIN A NATURAL DRAINAGE PATTERN OR SHEET FLOW SUBDIVISION, A TYPICAL SECTION IS REQUIRED WITHIN CONSTRUCTION PLANS REQUIRING THE CONTRACTOR TO INSURE A MINIMUM 1.5" DROP ON FINISHED GRADE, WITH GRASS OR OTHER LAND COVER, FROM THE BACK OF CURB TO THE SHOULDER ON THE DOWNSLOPE SIDE OF ALL SHEET FLOW STREET SECTIONS, TO INSURE POSITIVE DRAINAGE FROM THE ROADWAY. IT IS THE PROPERTY OWNER'S RESPONSIBILITY TO ENSURE TOP OF GRASS AND OTHER LANDSCAPING ALONG RIBBON CURB,
- B11.21 STORMWATER MANAGEMENT CONTROLS AND INFRASTRUCTURE, INCLUDING BUT NOT LIMITED TO DETENTION AND WATER QUALITY PONDS, SHALL NOT BE LOCATED WITHIN THE RIGHT-OF-WAY NOR ANY ROADWAY EASEMENTS. STORMWATER MANAGEMENT CONTROLS SHALL BE CONTAINED WITHIN A SEPARATE LOT OR EASEMENT FOR DRAINAGE, DETENTION OR WATER QUALITY PURPOSES AND DEDICATED TO THE ENTITY THAT WILL BE RESPONSIBLE FOR THEIR MAINTENANCE. NO PORTION OF ANY STORMWATER MANAGEMENT CONTROLS INCLUDING BUT NOT LIMITED TO WALLS, IMPOUNDMENT STRUCTURES, INLET/OUTLET STRUCTURES, UNDERGROUND VAULTS OR LEVEL SPREADERS SHALL BE PHYSICALLY CONNECTED TO THE ROADWAY, ROADWAY EMBANKMENT OR THE CROSS-DRAINAGE SYSTEM THAT DRAINS THE ROADWAY. THE ROADWAY EMBANKMENT SHALL NOT BE USED FOR THE DUAL PURPOSE OF TEMPORARILY OR PERMANENTLY IMPOUNDING WATER FOR STORMWATER MANAGEMENT OR DETENTION

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CARLSON, BRIGANCE & DOERING, INC ID# F3791 two Cate 2-27-2023

FEB 2023 B NUMBER 5487 2 OF 56

HEET NO.

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

WARDS AQUIFER PROTECTION PROGRAM CONSTRUCTION NOTES - LEGAL DISCLAIME

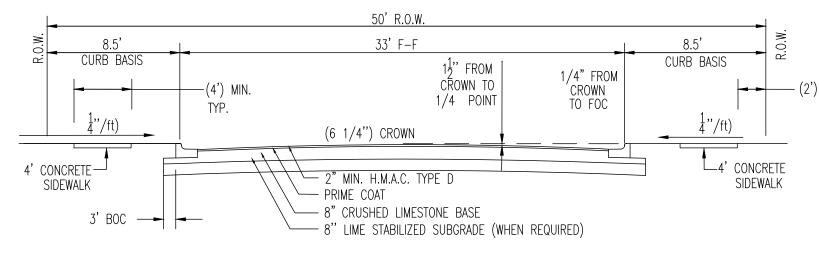
THE FOLLOWING/LISTED "CONSTRUCTION NOTES" ARE INTENDED TO BE ADVISORY IN NATURE ONLY AND DO NOT CONSTITUTE AN APPROVAL OR CONDITIONAL APPROVAL BY TH EXECUTIVE DIRECTOR (ED), NOR DO THEY CONSTITUTE A COMPREHENSIVE LISTING OF RULES OR CONDITIONS TO BE FOLLOWED DURING CONSTRUCTION. FURTHER ACTIONS MAY BE REQUIRED TO ACHIEVE COMPLIANCE WITH TCEO REGULATIONS FOUND IN TITLE 30. TEXAS ADMINISTRATIVE CODE (TAC), CHAPTERS 213 AND 217. AS WELL AS LOCAL ORDINANCES AND REGULATIONS PROVIDING FOR THE PROTECTION OF WATER QUALITY. ADDITIONALLY, NOTHING CONTAINED IN THE FOLLOWING/LISTED "CONSTRUCTION NOTES" RESTRICTS THE POWERS OF THE ED. THE COMMISSION OR ANY OTHER GOVERNMENTAL ENTITY TO PREVENT. CORRECT. OR CURTAIL ACTIVITIES THAT RESULT OR MAY RESULT IN POLLUTION OF THE EDWARDS AQUIFER OR HYDROLOGICALLY CONNECTED SURFACE WATERS. THE HOLDER OF ANY EDWARDS AQUIFER PROTECTION PLAN CONTAINING "CONSTRUCTION NOTES" IS STILL RESPONSIBLE FOR COMPLIANCE WITH TITLE 30, TAC, CHAPTERS 213 OR ANY OTHER APPLICABLE TCEQ REGULATION, AS WELL AS ALL CONDITIONS OF AN EDWARDS AQUIFER PROTECTION PLAN THROUGH ALL PHASES OF PLAN IMPLEMENTATION. FAILURE TO COMPLY WITH ANY CONDITION OF THE ED'S APPROVAL, WHETHER OR NOT IN CONTRADICTION OF ANY "CONSTRUCTION NOTES," IS A VIOLATION OF TCEQ REGULATIONS AND ANY VIOLATION IS SUBJECT TO ADMINISTRATIVE RULES, ORDERS, AND PENALTIES AS PROVIDED UNDER TITLE 30, TAC § 213.10 (RELATING TO ENFORCEMENT). SUCH VIOLATIONS MAY ALSO BE SUBJECT TO CIVIL PENALTIES AND INJUNCTION. THE FOLLOWING/LISTED "CONSTRUCTION NOTES" IN NO WAY REPRESENT AN APPROVED. EXCEPTION BY THE ED TO ANY PART OF TITLE 30 TAC. CHAPTERS 213 AND 217. OR ANY OTHER TCEO APPLICABLE REGULATION

- 1. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE TCEQ REGIONAL OFFICE AT LEAST 48 HOURS PRIOR TO THE START OF ANY REGULATED ACTIVITIES, THIS NOTICE MUST INCLUDE:
 - THE NAME OF THE APPROVED PROJECT;
 - THE ACTIVITY START DATE; AND THE CONTACT INFORMATION OF THE PRIME CONTRACTOR.
- ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT MUST BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED WATER POLLUTION ABATEMENT PLAN (WPAP) AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS ARE REQUIRED TO KEEP ON-SITE COPIES OF THE APPROVED PLAN AND APPROVAL LETTER.
- IF ANY SENSITIVE FEATURE(S) (CAVES, SOLUTION CAVITY, SINK HOLE, ETC.) IS DISCOVERED DURING CONSTRUCTION, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPROPRIATE TCEQ REGIONAL OFFICE MUST BE IMMEDIATELY NOTIFIED OF ANY SENSITIVE FEATURES ENCOUNTERED DURING CONSTRUCTION. CONSTRUCTION ACTIVITIES MAY NOT BE RESUMED UNTIL THE TCEQ HAS REVIEWED AND APPROVED THE APPROPRIATE PROTECTIVE MEASURES IN ORDER TO PROTECT ANY SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM POTENTIALLY ADVERSE IMPACTS TO WATER
- 4. NO TEMPORARY OR PERMANENT HAZARDOUS SUBSTANCE STORAGE TANK SHALL BE INSTALLED WITHIN 150 FEET OF A WATER SUPPLY SOURCE, DISTRIBUTION SYSTEM, WELL, OR SENSITIVE FEATURE.
- PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITY, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND MANUFACTURERS SPECIFICATIONS. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.
- ANY SEDIMENT THAT ESCAPES THE CONSTRUCTION SITE MUST BE COLLECTED AND PROPERLY DISPOSED OF BEFORE THE NEXT RAIN EVENT TO ENSURE IT IS NOT WASHED INTO SURFACE STREAMS, SENSITIVE FEATURES, ETC.
- SEDIMENT MUST BE REMOVED FROM THE SEDIMENT TRAPS OR SEDIMENTATION BASINS NOT LATER THAN WHEN IT OCCUPIES 50% OF THE BASIN'S DESIGN CAPACITY.
- 8. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS EXPOSED TO STORMWATER SHALL BE PREVENTED FROM BEING
- ALL SPOILS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE MUST BE STORED ON-SITE WITH PROPER E&S CONTROLS. FOR STORAGE OR DISPOSAL OF SPOILS AT ANOTHER SITE ON THE EDWARDS AQUIFER RECHARGE ZONE, THE OWNER OF THE SITE MUST RECEIVE APPROVAL OF A WATER POLLUTION ABATEMENT PLAN FOR THE PLACEMENT OF FILL MATERIAL OR MASS GRADING PRIOR TO THE PLACEMENT OF SPOILS AT THE OTHER SITE.
- 0. IF PORTIONS OF THE SITE WILL HAVE A TEMPORARY OR PERMANENT CEASE IN CONSTRUCTION ACTIVITY LASTING LONGER THAN 14 DAYS, SOIL STABILIZATION IN THOSE AREAS SHALL BE INITIATED AS SOON AS POSSIBLE PRIOR TO THE 14TH DAY OF INACTIVITY. IF ACTIVITY WILL RESUME PRIOR TO THE 21ST DAY, STABILIZATION MEASURES ARE NOT REQUIRED, IF DROUGHT CONDITIONS OR INCLEMENT WEATHER PREVENT ACTION BY THE 14TH DAY, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS POSSIBLE.
- 11. THE FOLLOWING RECORDS SHALL BE MAINTAINED AND MADE AVAILABLE TO THE TCEQ UPON REQUEST:
- THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR;
- THE DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE: AND
- THE DATES WHEN STABILIZATION MEASURES ARE INITIATED.
- 12. THE HOLDER OF ANY APPROVED EDWARD AQUIFER PROTECTION PLAN MUST NOTIFY THE APPROPRIATE REGIONAL OFFICE IN WRITING AND OBTAIN APPROVAL FROM THE EXECUTIVE DIRECTOR PRIOR TO INITIATING ANY OF THE FOLLOWING:
- A. ANY PHYSICAL OR OPERATIONAL MODIFICATION OF ANY WATER POLLUTION ABATEMENT STRUCTURE(S), INCLUDING BUT NOT LIMITED TO PONDS, DAMS, BERMS, SEWAGE TREATMENT PLANTS, AND DIVERSIONARY STRUCTURES;
- B. ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FROM THAT WHICH WAS ORIGINALLY APPROVED. OR A CHANGE WHICH WOULD SIGNIFICANTLY IMPACT THE ABILITY OF THE PLAN TO PREVENT POLLUTION OF THE EDWARDS
- C. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED AS UNDEVELOPED IN THE ORIGINAL WATER POLLUTION ABATEMENT

AUSTIN REGIONAL OFFICE 12100 PARK 35 CIRCLE, BUILDING A AUSTIN, TEXAS 78753-1808 PHONE (512) 339-2929 FAX (512) 339-3795

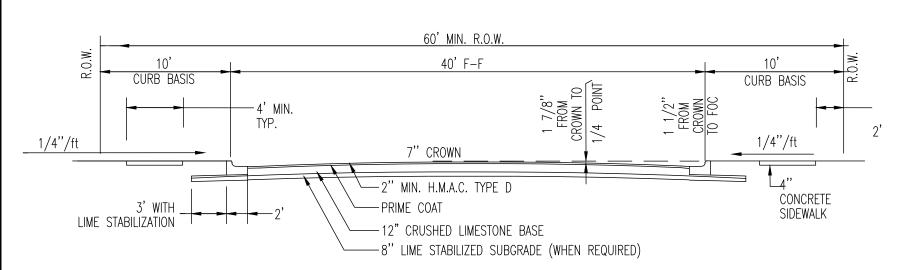
SAN ANTONIO REGIONAL OFFICE 14250 JUDSON ROAD SAN ANTONIO, TEXAS 78233-4480 PHONE (210) 490-3096 FAX (210) 545-4329

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



TCEQ-0592 (REV. JULY 15, 2015

(ALL LOCAL STREETS)



(PLATFORM PARKWAY)

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

DWARDS AQUIFER PROTECTION PROGRAM CONSTRUCTION NOTES - LEGAL DISCLAIMER

THE FOLLOWING/LISTED "CONSTRUCTION NOTES" ARE INTENDED TO BE ADVISORY IN NATURE ONLY AND DO NOT CONSTITUTE AN APPROVAL OR CONDITIONAL APPROVAL BY THE EXECUTIVE DIRECTOR, NOR DO THE CONSTITUTE A COMPREHENSIVE USTING OF RULES OR CONDITIONS TO BE FOULOWED DURING CONSTRUCTION. FURTHER ACTIONS MAY BE REQUIRED TO ACHIEVE COMPULANCE WITH TOFO REGULATIONS FOUND IN TITLE 30. TEXAS ADMINISTRATIVE CODE. CHAPTERS 213 AND 217. AS WELL AS LOCAL ORDINANCES AND REGULATIONS PROVIDING FOR THE PROTECTION OF WATER QUALITY, ADDITIONALLY, NOTHING CONTAINED IN THE FOLLOWING/LISTED "CONSTRUCTION NOTES" RESTRICTS THE POWERS OF THE EXECUTIVE DIRECTOR, THE COMMISSION OR ANY OTHER GOVERNMENTAL ENTITY TO PREVENT, CORRECT, OR CURTAIL ACTIVITIES THAT RESULT OR MAY RESULT IN POLLUTION OF THE EDWARDS AQUIFER OR HYDROLOGICALLY CONNECTED SURFACE WATERS. THE HOLDER OF ANY EDWARDS AQUIFER PROTECTION PLAN CONTAINING "CONSTRUCTION" PROTECTION PLAN THROUGH ALL PHASES OF PLAN IMPLEMENTATION. FAILURE TO COMPLY WITH ANY CONDITION OF THE EXECUTIVE DIRECTOR'S APPROVAL. WHETHER OR NOT IN CONTRADICTION OF ANY "CONSTRUCTION NOTES." IS A VIOLATION OF TCEQ REGULATIONS AND ANY VIOLATION IS SUBJECT TO ADMINISTRATIVE RULES. ORDERS. AND PENALTIES AS PROVIDED UNDER TITLE 30. TEXAS ADMINISTRATIVE CODE § 213.10 (RELATING TO ENFORCEMENT). SUCH VIOLATIONS MAY ALSO BE SUBJECT TO CIVIL PENALTIES AND INJUNCTION. THE FOLLOWING/LISTED "CONSTRUCTION NOTES" IN NO WAY REPRESENT AN APPROVED EXCEPTION BY THE EXECUTIVE DIRECTOR TO ANY PART OF TITLE 30 TEXAS ADMINISTRATIVE CODE. CHAPTERS 213 AND 217. OR ANY OTHER TCEQ APPLICABLE REGULATION.

- 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.
- 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.
- 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
- 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.
- 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
- SEWER LINES LOCATED WITHIN OR CROSSING THE 5-YEAR FLOODPLAIN OF A DRAINAGE WAY WILL BE PROTECTED FROM INUNDATION AND STREAM /ELOCITIES 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.
- 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 $\, 47 \,$ - 50 OF $\, 56. \,$

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.

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: THERE SHALL BE NO CURVATURE OF SANITARY SEWER LINE PIPES.

IF PIPE FLEXURE IS PROPOSED, THE FOLLOWING METHOD OF PREVENTING DEFLECTION OF THE JOINT MUST BE USED: THERE SHALL BE NO FLEXURE OF <u>SANITARY SEER LINE PIPES.</u>

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

12. NEW SEWAGE COLLECTION SYSTEM LINES MUST BE CONSTRUCTED WITH STUB OUTS FOR THE CONNECTION OF ANTICIPATED EXTENSIONS. THE LOCATION OF SUCH STUB OUTS MUST BE MARKED ON THE GROUND SUCH THAT THEIR LOCATION CAN BE EASILY DETERMINED AT THE TIME OF CONNECTION OF THE EXTENSIONS. SUCH STUB OUTS MUST BE MANUFACTURED WYES OR TEES THAT ARE COMPATIBLE IN SIZE AND MATERIAL WITH BOTH THE SEWER LINE AND THE EXTENSION. AT THE TIME OF ORIGINAL CONSTRUCTION, NEW STUB-OUTS MUST BE CONSTRUCTED SUFFICIENTLY TO EXTEND BEYOND THE END OF THE STREET PAVEMENT. ALL STUB-OUTS MUST BE SEALED WITH A MANUFACTURED CAP TO PREVENT LEAKAGE. EXTENSIONS THAT WERE NOT ANTICIPATED AT THE TIME OF ORIGINAL CONSTRUCTION OR THAT ARE TO BE CONNECTED TO AN EXISTING SEWER LINE NOT FURNISHED WITH STUB OUTS MUST BE CONNECTED USING A MANUFACTURED SADDLE AND IN ACCORDANCE WITH ACCEPTED PLUMBING TECHNIQUES. IF NO STUB-OUT IS PRESENT AN ALTERNATE METHOD OF JOINING LATERALS IS SHOWN IN THE DETAIL ON PLAN SHEET __ OF __. (FOR POTENTIAL FUTURE LATERALS). (NOT APPLICABLE)

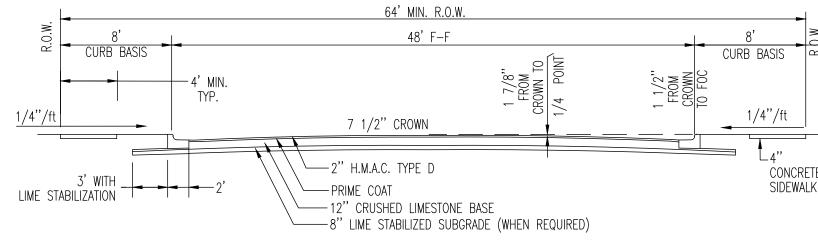
THE PRIVATE SERVICE LATERAL STUB-OUTS MUST BE INSTALLED AS SHOWN ON THE PLAN AND PROFILE SHEETS ON PLAN SHEET 56 OF 56 AND MARKED AFTER BACKFILLING AS SHOWN IN THE DETAIL ON PLAN SHEET _56_ OF 56.

- 13. TRENCHING, BEDDING AND BACKFILL MUST CONFORM WITH 30 TAC §217.54. THE BEDDING AND BACKFILL FOR FLEXIBLE PIPE MUST COMPLY WITH THE STANDARDS OF ASTM D-2321, CLASSES IA, IB, II OR III. RIGID PIPE BEDDING MUST COMPLY WITH THE REQUIREMENTS OF ASTM C 12 (ANSI A 106.2)
- 14. SEWER LINES MUST BE TESTED FROM MANHOLE TO MANHOLE. WHEN A NEW SEWER LINE IS CONNECTED TO AN EXISTING STUB OR CLEAN-OUT, IT MUST BE TESTED FROM EXISTING MANHOLE TO NEW MANHOLE. IF A STUB OR CLEAN-OUT IS USED AT THE END OF THE PROPOSED SEWER LINE, NO PRIVATE SERVICE ATTACHMENTS MAY BE CONNECTED BETWEEN THE LAST MANHOLE AND THE CLEANOUT UNLESS IT CAN BE CERTIFIED AS CONFORMING WITH THE PROVISIONS OF 30 TAC §213.5(C)(3)(E).
- 15. ALL SEWER LINES MUST BE TESTED IN ACCORDANCE WITH 30 TAC §217.57. THE ENGINEER MUST RETAIN COPIES OF ALL TEST RESULTS WHICH MUST BE MADE AVAILABLE TO THE EXECUTIVE DIRECTOR UPON REQUEST. THE ENGINEER MUST CERTIFY IN WRITING THAT ALL WASTEWATER LINES HAVE PASSED ALL REQUIRED TESTING TO THE APPROPRIATE REGIONAL OFFICE WITHIN 30 DAYS OF TEST COMPLETION AND PRIOR TO USE OF THE NEW
- (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
- (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.

WHERE:

- 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



(TIERRA ROSA BLVD.)

(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

PIPE DIAMETER (INCHES)	Minimum Time (seconds)	Maximum Length for Minimum Time (feet)	Time for Longer Length (seconds/foot)
6	340	398	0.8550
8	454	298	1.5200
10	567	239	2.3740
12	680	199	3.4190
15	850	159	5.3420
18	1020	133	7.6930
21	1190	114	10.4710
24	1360	100	13.6760
27	1530	88	17.3090
30	1700	80	21.3690
33	1870	72	25.8560

- (D) AN OWNER MAY STOP A TEST IF NO PRESSURE LOSS HAS OCCURRED DURING THE FIRST 25% OF THE CALCULATED TESTING TIME. 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.
- (E) 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.
- (F) A TESTING PROCEDURE FOR PIPE WITH AN INSIDE DIAMETER GREATER THAN 33 INCHES MUST BE APPROVED BY THE EXECUTIVE
- (2) INFILTRATION/FXFILTRATION 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
- (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 LINDERTAKE 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
- (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. (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.

 - (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.
- 1. 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
- (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
- (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
- 2. ALL PRIVATE SERVICE LATERALS MUST BE INSPECTED AND CERTIFIED IN ACCORDANCE WITH 30 TAC §213.5(C)(3)(I). AFTER INSTALLATION OF AND, PRIOR TO COVERING AND CONNECTING A PRIVATE SERVICE LATERAL TO AN EXISTING ORGANIZED SEWAGE COLLECTION SYSTEM. A TEXAS LICENSED PROFESSIONAL ENGINEER, TEXAS REGISTERED SANITARIAN, OR APPROPRIATE CITY INSPECTOR MUST VISUALLY INSPECT THE PRIVATE SERVICE LATERAL AND THE CONNECTION TO THE SEWAGE COLLECTION SYSTEM, AND CERTIFY THAT IT IS CONSTRUCTED IN CONFORMITY WITH THE APPLICABLE PROVISIONS OF THIS SECTION. THE OWNER OF THE COLLECTION SYSTEM MUST MAINTAIN SUCH CERTIFICATIONS FOR FIVE YEARS AND FORWARD COPIES TO THE APPROPRIATE REGIONAL OFFICE UPON REQUEST. CONNECTIONS MAY ONLY BE MADE TO AN APPROVED SEWAGE COLLECTION SYSTEM.

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SAN ANTONIO REGIONAL OFFICE 14250 JUDSON ROAD SAN ANTONIO, TEXAS 78233-4480 PHONE (210) 490-3096 FAX (210) 545-4329

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

TCEQ WATER DISTRIBUTION SYSTEM GENERAL CONSTRUCTION NOTES

- 1. This water distribution system must be constructed in accordance with the current Texas 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 of wastewater mains shall be perpendicular [§290.44(e)(4)(B)].
- 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 [$\S 290.44(f)(1)$].
- 10. When waterlines are laid under any flowing or intermittent stream or semi-permanent body of water the waterline shall be installed in a separate watertight pipe encasement. Valves must be provided on each side of the crossing with facilities to allow the underwater portion of the system to be isolated and tested [\S 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.
- o 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 = the quantity of makeup water in gallons per hour,
- L = the length of the pipe section being tested, in feet,
- D = the nominal diameter of the pipe in inches, and • P = the average test pressure during the hydrostatic test in pounds per square inch
- o 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;

- L = the quantity of makeup water in gallons per hour,
- S = the length of the pipe section being tested, in feet, • D = the nominal diameter of the pipe in inches, and
- 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 effectiveness of the disinfection procedure which shall be repeated if contamination persists. 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
- 18. Dechlorination of disinfecting water shall be in strict accordance with current AWWA Standard C655-09 or most recent.

Revised October 2017

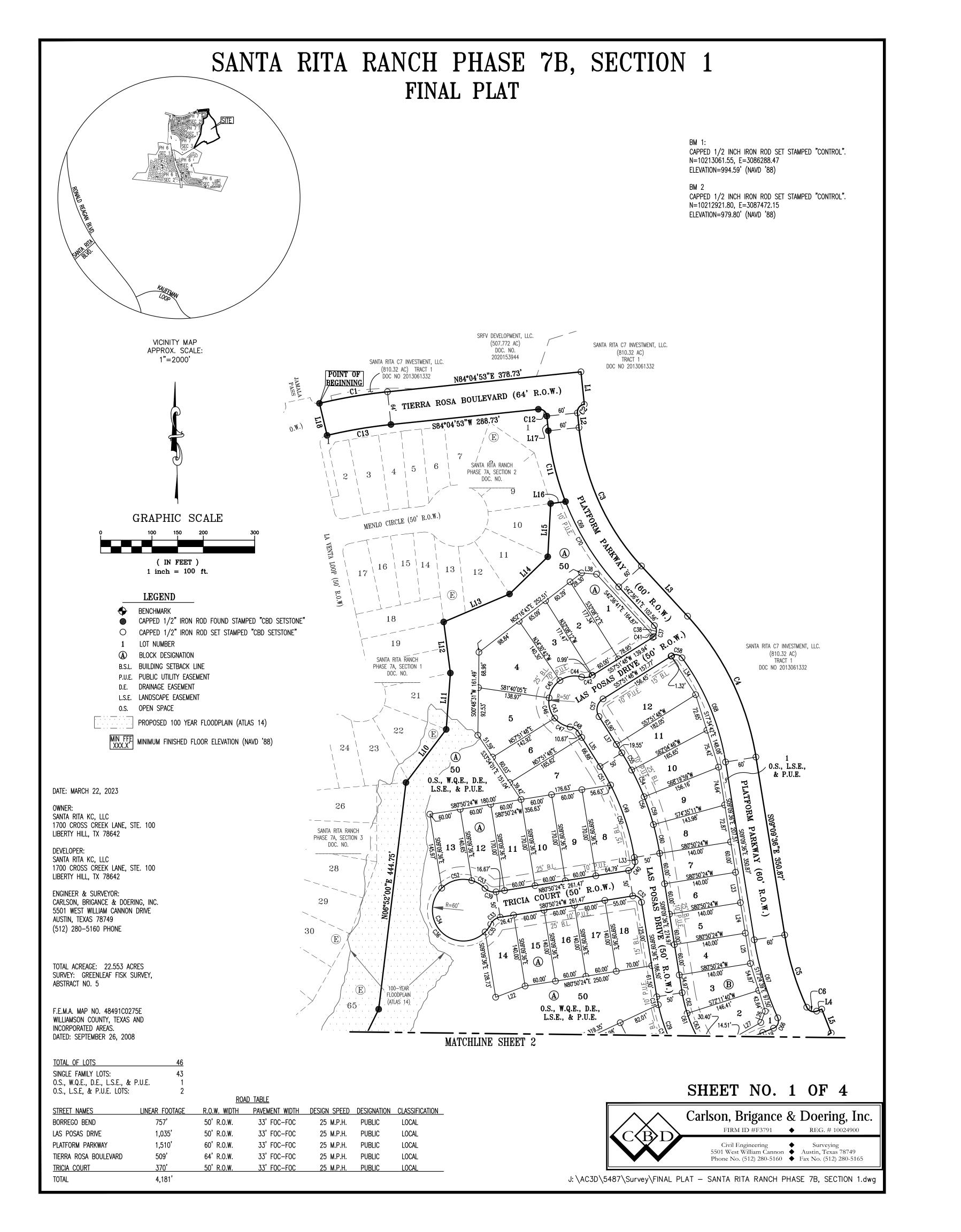
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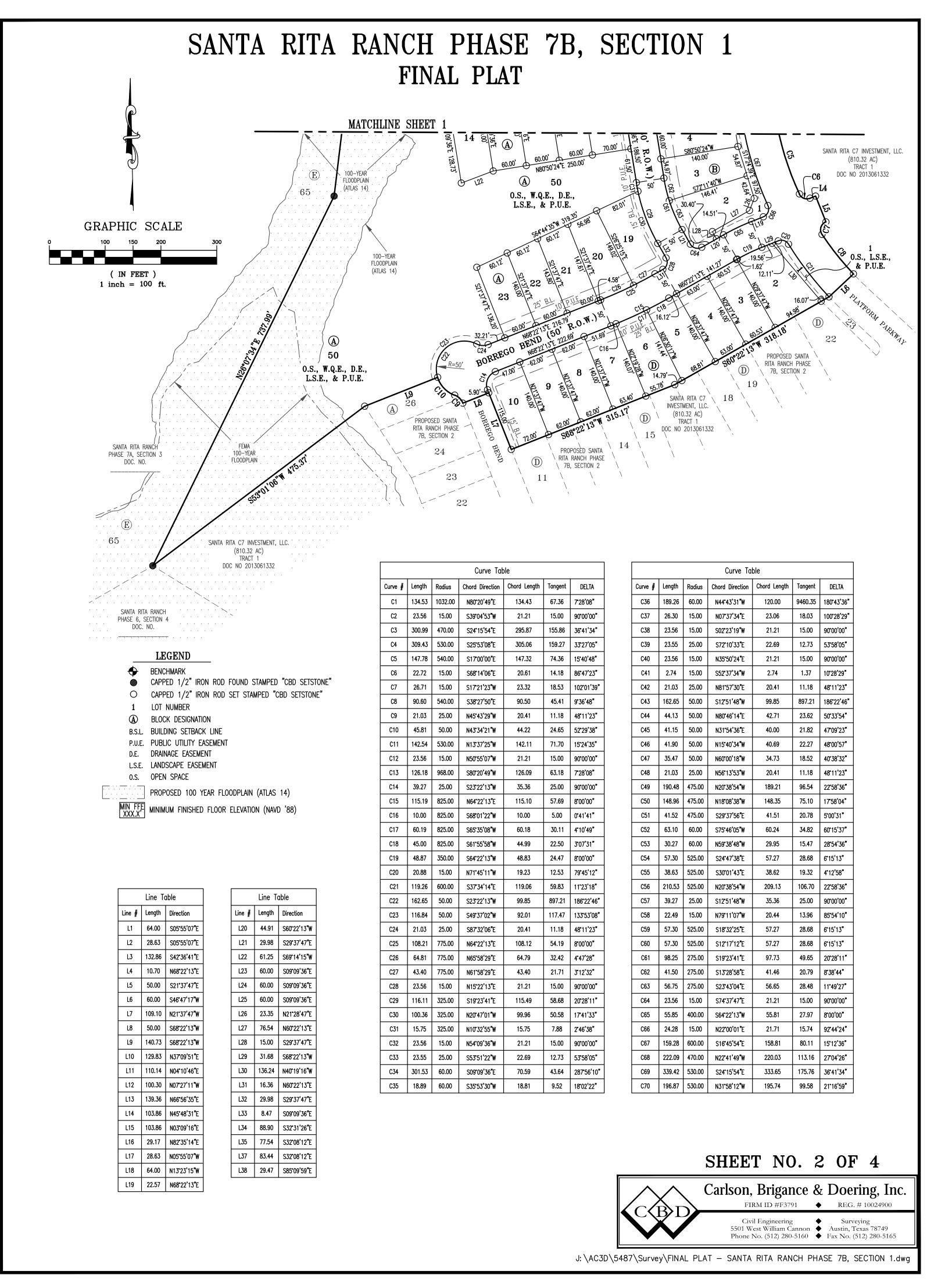
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FEB 2023 DB NUMBER 5487 OF 56

• P = the average test pressure during the hydrostatic test in pounds per square inch





SANTA RITA RANCH PHASE 7B, SECTION 1 FINAL PLAT

METES AND BOUNDS

BEING ALL OF THAT CERTAIN 22.553 ACRE TRACT OR PARCEL OF LAND OUT OF THE GREENLEAF FISK SURVEY, ABSTRACT NUMBER 5, SITUATED IN WILLIAMSON COUNTY, TEXAS, BEING A PORTION OF A CALLED 810.32 ACRE TRACT OF LAND (TRACT 1) CONVEYED TO SANTA RITA C7 INVESTMENTS, LLC, BY DEED RECORDED IN DOCUMENT NUMBER 2013061332, OFFICIAL PUBLIC RECORDS OF WILLIAMSON COUNTY, TEXAS (O.P.R.W.C.TX.), AND BEING A PORTION OF A CALLED 507.772 ACRE TRACT OF LAND CONVEYED TO SRFV DEVELOPMENT, LLC. IN DOCUMENT NUMBER 2020153944, OFFICIAL PUBLIC RECORDS OF WILLIAMSON COUNTY, TEXAS (O.P.R.W.C.TX.), SAID 22.553 ACRE TRACT OF LAND BEING MORE FULLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING, AT A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE" ON THE NORTH RIGHT-OF-WAY LINE OF TIERRA ROSA BOULEVARD (64' R.O.W.) AS DEDICATED BY SANTA RITA RANCH PHASE 7A, SECTION 2, A SUBDIVISION RECORDED IN DOCUMENT NUMBER , O.P.R.W.C.TX., BEING A POINT ON THE SOUTH BOUNDARY LINE OF SAID 507.772 ACRE TRACT OF LAND, AT A POINT OF CURVATURE, FOR A CURVE TO THE RIGHT, FOR THE NORTHWEST CORNER AND THE POINT OF BEGINNING OF THE HEREIN DESCRIBED TRACT OF

THENCE, OVER AND ACROSS SAID 507.772 ACRE TRACT OF LAND AND SAID 810.32 ACRE TRACT OF LAND, THE FOLLOWING TWENTY-FOUR (24) COURSES AND DISTANCES, NUMBERED 1 THROUGH 24,

1) ALONG SAID CURVE TO THE RIGHT, HAVING A RADIUS OF 1032.00 FEET, AN ARC LENGTH OF 134.53 FEET, AND A CHORD THAT BEARS N80°20'49"E, FOR A DISTANCE OF 134.43 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", FOR CORNER,

2) N84°04'53"E, A DISTANCE OF 378.73 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", FOR CORNER,

3) S05*55'07"E, A DISTANCE OF 64.00 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", BEING AT A POINT OF CURVATURE, FOR A CURVE TO THE LEFT,

4) ALONG SAID CURVE TO THE LEFT. HAVING A RADIUS OF 15.00 FEET. AN ARC LENGTH OF 23.56 FEET. AND A CHORD THAT BEARS S39°04'53"W, A DISTANCE OF 21.21 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", FOR CORNER,

5) S05*55'07"E, A DISTANCE OF 28.63 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", BEING AT A POINT OF CURVATURE, FOR A CURVE TO THE LEFT,

6) ALONG SAID CURVE TO THE LEFT, HAVING A RADIUS OF 470.00 FEET, AN ARC LENGTH OF 300.99 FEET, AND A CHORD THAT BEARS \$24'15'54"E. A DISTANCE OF 295.87 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE". FOR CORNER.

7) S42°36'41"E, A DISTANCE OF 132.86 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", BEING AT A POINT OF CURVATURE, FOR A CURVE TO THE RIGHT,

8) ALONG SAID CURVE TO THE RIGHT, HAVING A RADIUS OF 530.00 FEET, AN ARC LENGTH OF 309.43 FEET, AND A CHORD THAT BEARS \$25°53'08"E, A DISTANCE OF 305.06 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", FOR CORNER,

9) S09°09'36"E, A DISTANCE OF 350.87 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", BEING AT A POINT OF

10) ALONG SAID CURVE TO THE LEFT, HAVING A RADIUS OF 540.00 FEET, AN ARC LENGTH OF 147.78 FEET, AND A CHORD THAT BEARS \$17'00'00"E, A DISTANCE OF 147.32 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", BEING AT A POINT OF

11) ALONG SAID CURVE TO THE LEFT, HAVING A RADIUS OF 15.00 FEET, AN ARC LENGTH OF 22.72 FEET, AND A CHORD THAT BEARS S68*14'06"E, A DISTANCE OF 20.61 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", FOR CORNER,

12) N68°22'13"E, A DISTANCE OF 10.70 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", FOR CORNER,

13) S21°37'47"E, A DISTANCE OF 50.00 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", BEING AT A POINT OF CURVATURE, FOR A CURVE TO THE LEFT,

14) ALONG SAID CURVE TO THE LEFT, HAVING A RADIUS OF 15.00 FEET, AN ARC LENGTH OF 26.71 FEET, AND A CHORD THAT BEARS \$17°21'23"W, A DISTANCE OF 23.32 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", BEING AT A POINT OF CURVATURE, FOR A CURVE TO THE LEFT.

15) ALONG SAID CURVE TO THE LEFT, HAVING A RADIUS OF 540.00 FEET, AN ARC LENGTH OF 90.60 FEET, AND A CHORD THAT BEARS S38°27'50"E, A DISTANCE OF 90.50 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", FOR CORNER,

16) S46'47'17"W, A DISTANCE OF 60.00 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", FOR CORNER,

17) S60°22'13"W, A DISTANCE OF 318.18 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", FOR CORNER,

18) S68°22'13"W, A DISTANCE OF 315.17 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", FOR CORNER,

19) N21'37'47"W, A DISTANCE OF 109.10 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", FOR CORNER,

20) S68°22'13"W, A DISTANCE OF 50.00 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", BEING AT A POINT OF CURVATURE. FOR A CURVE TO THE LEFT.

21) ALONG SAID CURVE TO THE LEFT, HAVING A RADIUS OF 25.00 FEET, AN ARC LENGTH OF 21.03 FEET, AND A CHORD THAT BEARS N45°43'29"W, A DISTANCE OF 20.41 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", BEING AT A POINT OF CURVATURE, FOR A CURVE TO THE RIGHT,

22) ALONG SAID CURVE TO THE RIGHT, HAVING A RADIUS OF 50.00 FEET, AN ARC LENGTH OF 45.81 FEET, AND A CHORD THAT BEARS N43'34'21"W, A DISTANCE OF 44.22 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", FOR CORNER,

23) S68°22'13"W, A DISTANCE OF 140.73 FEET TO A CAPPED 1/2 INCH IRON ROD SET STAMPED "CBD SETSTONE", FOR CORNER,

24) S53'01'06"W, A DISTANCE OF 475.37 FEET TO A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE", BEING AT THE NORTH CORNER OF LOT 1, BLOCK E, OF SANTA RITA RANCH PHASE 6, SECTION 4, A SUBDIVISION RECORDED IN DOCUMENT NUMBER ____ O.P.R.W.C.TX., SAME BEING AT THE SOUTHEAST CORNER OF LOT 65, BLOCK A, OF SANTA RITA RANCH PHASE 7A, SECTION 3, RECORDED IN DOCUMENT NUMBER ______ O.P.R.W.C.TX., FOR THE SOUTHWEST CORNER OF THE HEREIN DESCRIBED TRACT OF

THENCE, OVER AND ACROSS SAID 810.32 ACRE TRACT OF LAND, WITH THE EAST LINE OF SAID SANTA RITA RANCH PHASE 7A, SECTION 3, THE EAST LINE OF SANTA RITA RANCH PHASE 7A, SECTION 1, A SUBDIVISION RECORDED IN DOCUMENT NUMBER ______, OFFICIAL PUBLIC RECORDS, WILLIAMSON COUNTY, TEXAS, AND THE EAST LINE OF SAID SANTA RITA RANCH PHASE 7A, SECTION 2, THE FOLLOWING FIFTEEN (15) COURSES AND DISTANCES, NUMBERED 1 THROUGH 15,

1) N26°07'34"E, A DISTANCE 737.99 FEET TO A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE", FOR CORNER,

2) NO6°52'00"E, A DISTANCE OF 444.75 FEET TO A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE", FOR CORNER,

3) N37°09'51″E, A DISTANCE OF 129.83 FEET TO A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE", FOR CORNER,

4) NO4*10'46"E, A DISTANCE OF 110.14 FEET TO A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE", FOR CORNER,

5) NO7'27'11"W, A DISTANCE OF 100.30 FEET TO A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE", FOR CORNER,

6) N66°56'35"E, A DISTANCE OF 139.36 FEET TO A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE", FOR CORNER,

7) N45'48'31"E, A DISTANCE OF 103.86 FEET TO A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE", FOR CORNER,

8) NO3*09'16"E, A DISTANCE OF 103.86 FEET TO A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE", FOR CORNER,

9) N82'35'14"E, A DISTANCE OF 29.17 FEET TO A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE", BEING AT A POINT OF CURVATURE, FOR A CURVE TO THE RIGHT,

10) ALONG SAID CURVE TO THE RIGHT, HAVING A RADIUS OF 530.00 FEET, AN ARC LENGTH OF 142.54 FEET, AND A CHORD THAT BEARS N13°37'25"W, A DISTANCE OF 142.11 FEET TO A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE", FOR CORNER,

11) NO5'55'07"W, A DISTANCE OF 28.63 FEET TO A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE", BEING AT A POINT OF CURVATURE, FOR A CURVE TO THE LEFT, 12) ALONG SAID CURVE TO THE LEFT, HAVING A RADIUS OF 15.00 FEET, AN ARC LENGTH OF 23.56 FEET, AND A CHORD THAT BEARS

N50°55'07"W, A DISTANCE OF 21.21 FEET TO A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE", FOR CORNER, 13) S84°04'53"W, A DISTANCE 288.73 FEET TO A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE", BEING AT A POINT OF

CURVATURE, FOR A CURVE TO THE LEFT, 14) ALONG SAID CURVE TO THE LEFT, HAVING A RADIUS OF 968.00 FEET, AN ARC LENGTH OF 126.18 FEET, AND A CHORD THAT BEARS S80'20'49"W, A DISTANCE OF 126.09 FEET TO A CAPPED 1/2 INCH IRON ROD FOUND STAMPED "CBD SETSTONE", FOR CORNER, AND

15) N13'23'15"W, A DISTANCE OF 64.00 FEET TO THE POINT OF BEGINNING, AND CONTAINING 22.553 ACRES OF LAND.

- 1. BEARINGS ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NAD83.
- 2. THIS SUBDIVISION LIES WITHIN THE CITY OF LIBERTY HILL EXTRA—TERRITORIAL JURISDICTION.
- 3. IT IS THE RESPONSIBILITY OF THE OWNER, NOT THE COUNTY, TO ASSURE COMPLIANCE WITH PROVISIONS OF ALL APPLICABLE STATE, FEDERAL AND LOCAL LAWS, AND REGULATIONS RELATING TO PLATTING AND DEVELOPMENT OF THIS PROPERTY. THE COUNTY ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF REPRESENTATIONS BY OTHER PARTIES IN THIS PLAT. FLOODPLAIN DATA, IN PARTICULAR, MAY CHANGE. IT IS FURTHER UNDERSTOOD THAT THE OWNERS OF THE TRACT OF LAND COVERED BY THIS PLAT MUST INSTALL AT THEIR OWN EXPENSE ALL TRAFFIC CONTROL DEVICES AND SIGNAGE THAT MAY BE REQUIRED BEFORE THE ROADS IN THE SUBDIVISION HAVE FINALLY BEEN ACCEPTED FOR MAINTENANCE BY THE COUNTY.
- 4. ALL PUBLIC ROADWAYS AND EASEMENTS AS SHOWN ON THIS PLAT ARE FREE OF LIENS.

DRAINAGE AND FLOODPLAIN:

- 1. EXCEPT IN CERTAIN ISOLATED AREAS REQUIRED TO MEET ACCESSIBILITY REQUIREMENTS, THE MINIMUM LOWEST FINISHED FLOOR ELEVATION SHALL BE ONE FOOT HIGHER THAN THE HIGHEST SPOT ELEVATION THAT IS LOCATED WITHIN FIVE FEET OUTSIDE THE PERIMETER OF THE BUILDING, OR ONE FOOT ABOVE THE BFE, WHICHEVER IS HIGHER.
- 2. THIS SUBDIVISION IS SUBJECT TO STORM-WATER MANAGEMENT CONTROLS AS REQUIRED BY WILLIAMSON COUNTY SUBDIVISION REGULATIONS, SECTION B11.1, ON NEW DEVELOPMENT THAT WOULD EVOKE SUCH CONTROLS BEYOND EXISTING CONDITIONS.
- 3. MAINTENANCE RESPONSIBILITY OF DRAINAGE WILL NOT BE ACCEPTED BY THE COUNTY OTHER THAN THAT ACCEPTED IN CONNECTION WITH DRAINING OR PROTECTING THE ROAD SYSTEM. MAINTENANCE RESPONSIBILITY FOR STORM WATER MANAGEMENT CONTROLS WILL REMAIN WITH THE OWNER.

- 1. NO LOT IN THIS SUBDIVISION SHALL BE OCCUPIED UNTIL CONNECTION IS MADE TO AN APPROVED PUBLIC SEWER SYSTEM. 2. NO LOT IN THIS SUBDIVISION SHALL BE OCCUPIED UNTIL WATER SATISFACTORY FOR HUMAN CONSUMPTION IS AVAILABLE FROM
- 3. WATER SERVICE IS PROVIDED BY: WILLIAMSON COUNTY MUD 19F/ GEORGETOWN UTILITY SYSTEMS
- 4. WASTEWATER SERVICE IS PROVIDED BY: WILLIAMSON COUNTY MUD 19F/CITY OF LIBERTY HILL
- 5. ELECTRIC SERVICE IS PROVIDED BY: PEC

A SOURCE IN ADEQUATE AND SUFFICIENT SUPPLY.

ROADWAY AND RIGHT-OF-WAY:

1. IN APPROVING THIS PLAT BY THE COMMISSIONERS COURT OF WILLIAMSON COUNTY, TEXAS, IT IS UNDERSTOOD THAT THE BUILDING OF ALL ROADS, AND OTHER PUBLIC THOROUGHFARES AND ANY BRIDGES OR CULVERTS NECESSARY TO BE CONSTRUCTED OR PLACED IS THE RESPONSIBILITY OF THE OWNER(S) OF THE TRACT OF LAND COVERED BY THIS PLAT IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS PRESCRIBED BY THE COMMISSIONERS COURT OF WILLIAMSON COUNTY, TEXAS. SAID COMMISSIONERS COURT ASSUMES NO OBLIGATION TO BUILD ANY OF THE ROADS, OR PUBLIC THOROUGHFARES SHOWN ON THIS PLAT, OR OF CONSTRUCTING ANY OF THE BRIDGES OR DRAINAGE IMPROVEMENTS IN CONNECTION THEREWITH. THE COUNTY WILL ASSUME NO RESPONSIBILITY FOR DRAINAGE WAYS OR EASEMENTS IN THE SUBDIVISION, OTHER THAN THOSE DRAINING OR PROTECTING THE ROAD SYSTEM.

2. SIDEWALKS SHALL BE MAINTAINED BY THE HOMEOWNERS' ASSOCIATION.

3. DRIVEWAY ACCESS TO LOTS WITHIN THIS SUBDIVISION FROM SIDE STREETS IS PROHIBITED.

4. IMPROVEMENTS WITHIN THE COUNTY ROAD RIGHT-OF-WAY INCLUDING, BUT NOT LIMITED TO LANDSCAPING, IRRIGATION, LIGHTING,

CUSTOM SIGNS, ARE PROHIBITED WITHOUT FIRST OBTAINING AN EXECUTED LICENSE AGREEMENT WITH WILLIAMSON COUNTY.

5. NO CONSTRUCTION, PLANTING OR GRADING SHALL BE PERMITTED TO INTERFERE WITH SIGHT EASEMENTS BETWEEN THE HEIGHTS OF THREE AND EIGHT FEET AS MEASURED FROM THE CROWNS OF THE ADJACENT STREETS.

6. THE OWNER SHALL CREATE A MANDATORY HOMEOWNERS' ASSOCIATION THAT SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND LIABILITY OF ANY LANDSCAPING, IRRIGATION, SIDEWALKS, ILLUMINATION, SUBDIVISION IDENTIFICATION SIGNS, WATER QUALITY FEATURES, ETC. PLACED WITHIN THE WILLIAMSON COUNTY RIGHT-OF-WAY. THIS ASSOCIATION SHALL HAVE ASSESSMENT AUTHORITY TO ENSURE THE PROPER FUNDING FOR MAINTENANCE.

7. A PUBLIC UTILITY EASEMENT 10 FEET WIDE IS HEREBY DEDICATED ADJACENT TO ALL STREET RIGHT-OF-WAY.

SHEET NO. 3 OF 4

PRINTED NAME: _____

MY COMMISSION EXPIRES: ______



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SANTA RITA RANCH PHASE 7B. SECTION 1

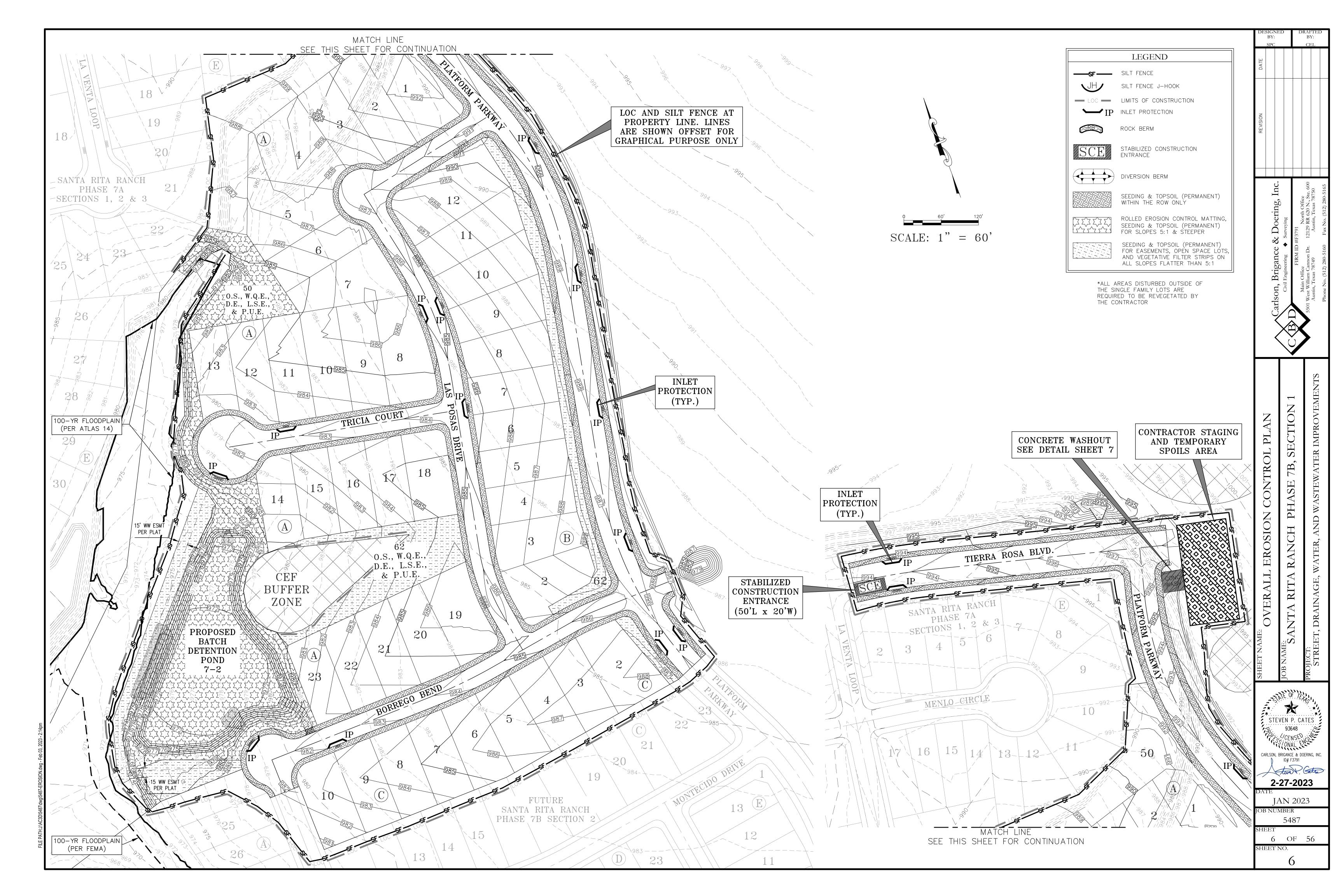
STATE OF TEXAS	§ § KNOW ALL MEN BY THESE PRESENTS;	FINAL			
NUMBER 2013061332, OFFICIA 2020153944, OFFICIAL PUBLIC SHOWN HEREON, AND DO HER HEREON, AND DO HEREBY FORE	PRESIDENT, SANTA RITA KC, LLC. OWNER OF THAT CERTAIN CALLED 810.32 ACRE (TRACT 1) TRACT OF LA PUBLIC RECORDS, WILLIAMSON COUNTY, TEXAS, AND CALLED 507.772 ACRE TRACT OF LAND CONVERECORDS, WILLIAMSON COUNTY, TEXAS, SITUATED IN THE GREENLEAF FISK SURVEY, ABSTRACT NUMBER 5, WILEBY SUBDIVIDE SAID 27.017 ACRE TRACT AS SHOWN HEREON, AND DO HEREBY CONSENT TO ALL PLAT VER DEDICATE TO THE PUBLIC THE ROADS, ALLEYS, RIGHTS-OF-WAY, EASEMENTS AND PUBLIC PLACES SHOWN TRY MAY DEEM APPROPRIATE AND DO HEREBY STATE THAT ALL PUBLIC ROADWAYS AND EASEMENTS AS SHOWN	YED IN DOCUMENT NUMBER LIAMSON COUNTY, TEXAS, AS NOTE REQUIREMENTS SHOWN N HEREON FOR SUCH PUBLIC	STATE OF TEXAS: COUNTY OF TRAVIS: NO PORTION OF THIS TRACT IS WITHIN THE PANEL #48491C0275E, EFFECTIVE SEPTEMBER 26,		FLOOD INSURANCE RATE COMMUNITY
JENS. THIS SUBDIVISION IS TO BE KNO			I, STEVEN P. CATES, P.E., AM AUTHORIZED ENGINEERING, AND HEREBY CERTIFY THAT THIS SUB	UNDER THE LAWS OF THE STATE OF TEX	
SANTA RITA KC, LLC. A TEXAS LIMITED PARTNERSHIP	MY HAND THIS DAY OF, 20		ENGINEERING BY:STEVEN P. CATES, P.E. NO. 93648 CARLSON, BRIGANCE & DOERING, I 5501 WEST WILLIAM CANNON DRIVE AUSTIN, TEXAS 78749	NC.	STEVEN P. CATES
BY: MREM TEXAS MANAGER, A DELAWARE LIMITED LI BY: JAMES EDWARD HORNE, 1700 CROSS CREEK LA LIBERTY HILL, TX 7864	BILITY COMPANY, ITS MANAGER VICE PRESIDENT NE, STE. 100		THIS FLOOD STATEMENT, AS DETERMINED BY A H.U DOES NOT IMPLY THAT THE PROPERTY OR THE INFROM FLOODING OR FLOOD DAMAGE. ON RARE O WILL OCCUR, AND FLOOD HEIGHTS MAY INCREASE E	MPROVEMENTS THEREON WILL BE FREE CCASIONS, GREATER FLOODS CAN AND	93648 CENSE ONAL ENGINE CARLSON, BRIGANCE, & DOERING, INC.
STATE OF TEXAS	\$ •		THIS STATEMENT SHALL NOT CREATE LIABILITY ON T	THE PART OF ENGINEER OR SURVEYOR.	ID # F3791
COUNTY OF WILLIAMSON BEFORE ME THE UNDERSIGNED SUBSCRIBED TO THE FOREGOING THEREIN EXPRESSED AND IN TH	§ AUTHORITY, ON THIS DAY PERSONALLY APPEARED <u>JAMES EDWARD HORNE</u> , KNOWN TO ME TO BE THE PERSON INSTRUMENT OF WRITING, AND HE ACKNOWLEDGED TO ME THAT HE EXECUTED THE SAME FOR THE PURPOSE OF CAPACITY THEREIN, STATED	WHOSE NAME IS S AND CONSIDERATION	STATE OF TEXAS:		
HEREIN EXPRESSED AND IN IP			COUNTY OF TRAVIS: I, JOHN D. KIPP, R.P.L.S., AM AUTHORIZED UNI SURVEYING, AND HEREBY CERTIFY THAT THIS SUBDI ALL EASEMENTS OF RECORD ARE SHOWN OR NOTE	VISION PLAT COMPLIES WITH THE WILLIAM	
AS DOCUMENT NO. 201310300. DATED JANUARY 31, 2018 REC	SOLE OWNER AND HOLDER OF TWO DEED OF TRUST LIENS SECURED BY THE PROPERTY, THE FIRST DATED OF IN THE OFFICIAL PUBLIC RECORDS OF WILLIAMSON COUNTY, TEXAS, SECURING A NOTE OF EVEN DATE THORDED AS DOCUMENT NO. 2018009177, SECURING A NOTE OF EVEN DATE THEREWITH, EXECUTES THIS DECONSENT TO THE TERMS AND PROVISIONS HEREOF.	HEREWITH, AND THE SECOND	SURVEYED BY:	DATE	JOHN DAVID KIPP JOHN DAVID KIPP SURV SU
PRINTED NAME:			STATE OF TEXAS \$ \$ COUNTY OF WILLIAMSON \$	KNOW ALL MEN BY THESE PRES	SENTS;
NSTRUMENT AND ACKNOWLEDGE		SCRIBED TO THE FOREGOING	THE CITY OF LIBERTY HILL, TEXAS ACKNOWLEDGES RECEIF PURPOSES AND PAYMENT OF APPLICABLE FEES FOR THE JERRY L. MILLARD, JR. DIRECTOR OF PLANNING CITY OF LIBERTY HILL, TEXAS	•	
	BY MY HAND THIS DAY OF, 20		ROAD NAME AND ADDRESS ASSIGNMENTS VERIFIED THIS T	HE DAY OF	, 20 A.D.
SRFV DEVELOPMENT, LLC. A TEXAS LIMITED LIABILITY CO	MPANY		WILLIAMSON COUNTY ADDRESSING COORDINATOR WILLIAMSON COUNTY, TEXAS		
IY: AMES EDWARD HORNE, VICE 700 CROSS CREEK LANE, S' IBERTY HILL, TX 78642			PRINTED NAME		
S SUBSCRIBED TO THE FOR CONSIDERATION THEREIN EXPI	S D AUTHORITY, ON THIS DAY PERSONALLY APPEARED <u>JAMES EDWARD HORNE</u> , KNOWN TO ME TO BE TIEGOING INSTRUMENT OF WRITING, AND HE ACKNOWLEDGED TO ME THAT HE EXECUTED THE SAME RESSED AND IN THE CAPACITY THEREIN STATED. OF OFFICE, THIS THE DAY OF, 20 A.D.		SUBDIVISION HAVING BEEN FULLY PRESENTED TO	THE COMMISSIONERS COURT OF WILLIA	HAT THIS MAP OR PLAT, WITH FIELD NOTES HEREON, FOR A AMSON COUNTY, TEXAS, AND BY THE SAID COURT DULY GISTERED AND RECORDED IN THE PROPER RECORDS OF THE
IOTARY PUBLIC IN AND FOR	WILLIAMSON COUNTY, TEXAS		BILL GRAVELL JR., COUNTY JUDGE	DATE	
OCUMENT NO. 2013103003 ECOND DATED JANUARY 31,	E HOLDER OF TWO DEEDS OF TRUST LIENS SECURED BY THE PROPERTY, THE FIRST DATED OCTOBER IN THE OFFICIAL PUBLIC RECORDS OF WILLIAMSON COUNTY, TEXAS, SECURING A NOTE OF EVEN D 2018 RECORDED AS DOCUMENT NO. 2018009177, SECURING A NOTE OF EVEN DATE THEREWITH, EXIDER EVIDENCING ITS CONSENT TO THE TERMS AND PROVISIONS HEREOF.	DATE THEREWITH, AND THE	WILLIAMSON COUNTY, TEXAS STATE OF TEXAS \$ KNOW ALL COUNTY OF WILLIAMSON	_ MEN BY THESE PRESENTS;	
ITERNATIONAL BANK OF COM TEXAS BANKING ASSOCIATIO	·		I, NANCY RISTER, CLERK OF THE COUNTY COURT OF CERTIFICATE OF AUTHENTICATION WAS FILED FOR RECOLUMN. O'CLOCK,M., AND DULY RECORDEDM. IN THE OFFICIAL PUBLIC RECORDS OF SAID	ORD IN MY OFFICE ON THE DAY THIS THE DAY OF	(OF, 20, A.D., AT, 0'CLOCK,
Y:					AT MY OFFICE IN GEORGETOWN, TEXAS, THE DATE LAST
TATE OF TEXAS OUNTY OF			NANCY RISTER, CLERK COUNTY COURT OF WILLIAMSON COUNTY, TEXAS BY:, DEPU	πу	
EFORE ME ON THIS DAY PER HE FOREGOING INSTRUMENT	SONALLY APPEARED, KNOWN TO ME TO BE THE PERSON WHOSE NAMED ACKNOWLEDGED TO ME THAT HE EXECUTED THE SAME FOR THE PURPOSES AND CONSIDERATION	ME IS SUBSCRIBED TO I THEREIN EXPRESSED.	JI, DEPC	SHE	ET NO. 4 OF 4
IVEN UNDER MY HAND AND Y: NOTARY PUBLIC, STA	SEAL OF OFFICE THIS THE DAY OF, 20, A.D TE OF TEXAS			Cariso	on, Brigance & Doering, Inc. FIRM ID #F3791

J:\AC3D\5487\Survey\FINAL PLAT - SANTA RITA RANCH PHASE 7B, SECTION 1.dwg

Civil Engineering • Surveying

5501 West William Cannon ◆ Austin, Texas 78749

5 OF 61







Western Excelsior manufactures a full line of Rolled Erosion Control Products (RECPs). Excel SS-2 temporary Erosion Control Blanket is composed of a 100% certified weed free agricultural straw matrix mechanically (stitch) bound on two inch centers between two photodegradable, synthetic nets. Excel SS-2 is intended for use in channels or on slopes requiring erosion protection for a period up to twelve months. Actual field longevity is dependent on soil and climatic conditions. Each roll of EXCEL SS-2 is made in the USA and manufactured under Western Excelsion's Quality Assurance Program to ensure a continuous distribution of fibers and consistent thickness. Typical manufactured properites are provided in Table 1 and product characteristics are provided in Table 2.

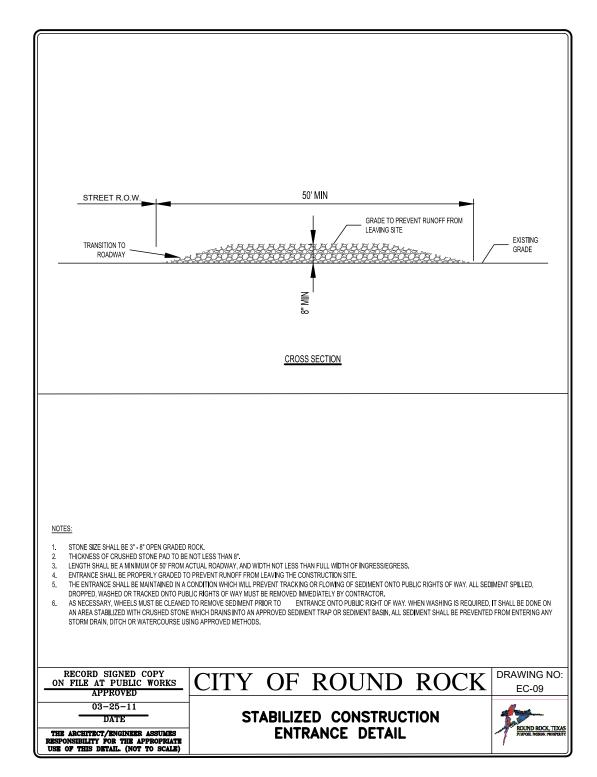
Table 1- Specified Expected Values

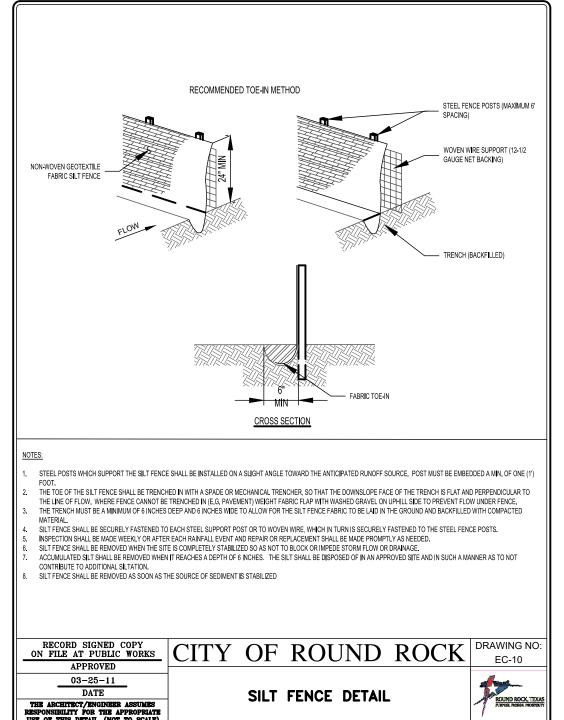
Tested Property	Test Method	Value
Tensile Strength (MD) x (TD)	ASTM D6818	10.0 lb/ln (1.8 kN/m) x 5.2 lb/ln (1.1 kN/m)
Elongation (MD) x (TD)	ASTM D6818	20 % x 26 %
Mass Per Unit Area	ASTM D6475	8.0 oz/yd^2 (271 g/m^2)
Thickness	ASTM D6525	0.28 in (7 mm)
Light Penetration	ASTM D6567	22 % open
Water Absorption	ASTM D1117	450 %

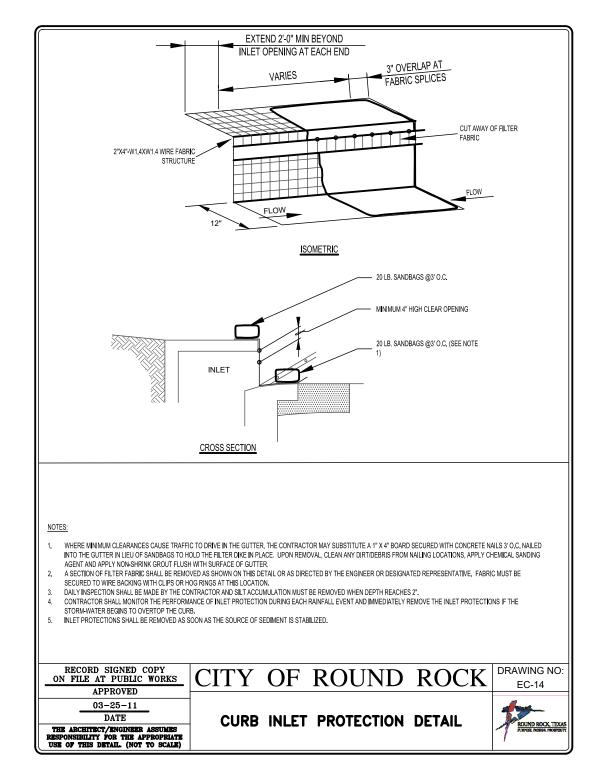
Top Net Type	Synthetic, Photodegradable
Bottom Net Type	Synthetic, Photodegradable
Top Net Opening Dimensions	0.5 in (13 mm) x 0.5 in (13 mm)
lottom Net Opening Dimensions	0.5 in (13 mm) × 0.5 in (13 mm)

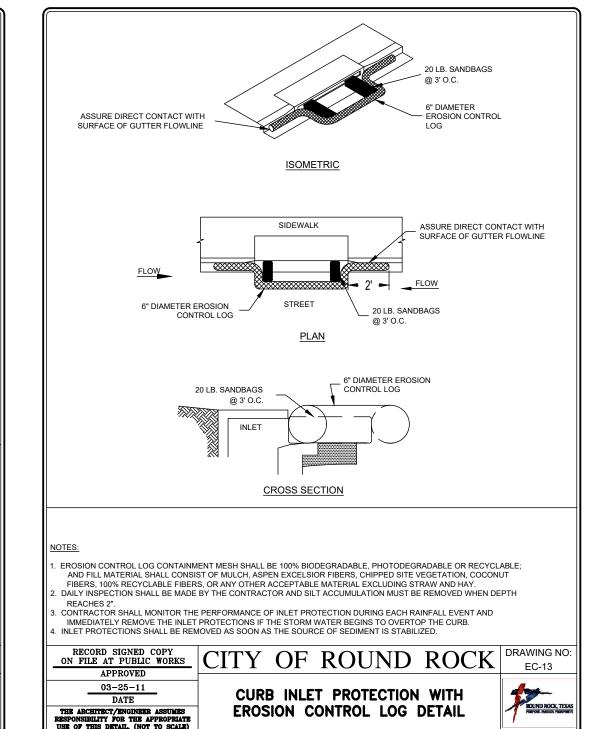
Excel SS-2 is available in multiple roll sizes ranging in width from 8.0 ft to 16.0 ft. and 112.5 ft to 600 ft in length. Standard roll sizes are 100 square yards, measuring 8.0 ft wide by 112.5 ft long. Custom roll sizes are available upon request.

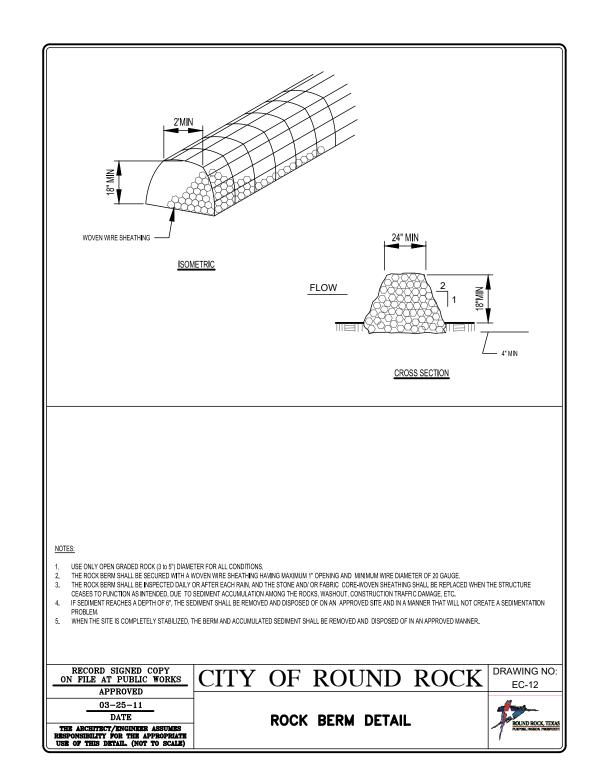
Document # WE_EXCEL_SS2_SPEC. This document has been developed to provide the characteristic properties of the product described. For questions, to request performance data or installation recommendations, contact Western Excelsion at 866-540-9810 or wexcotech@westernexcelsion.com. Updated 4/14/2014.

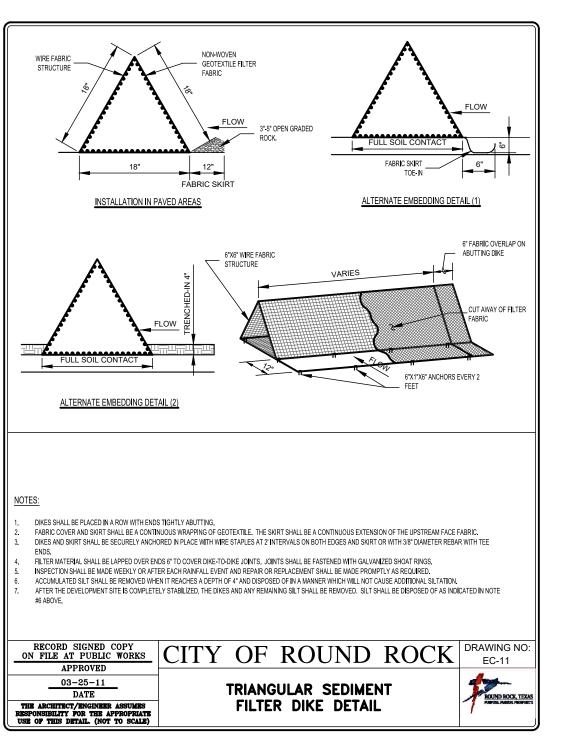


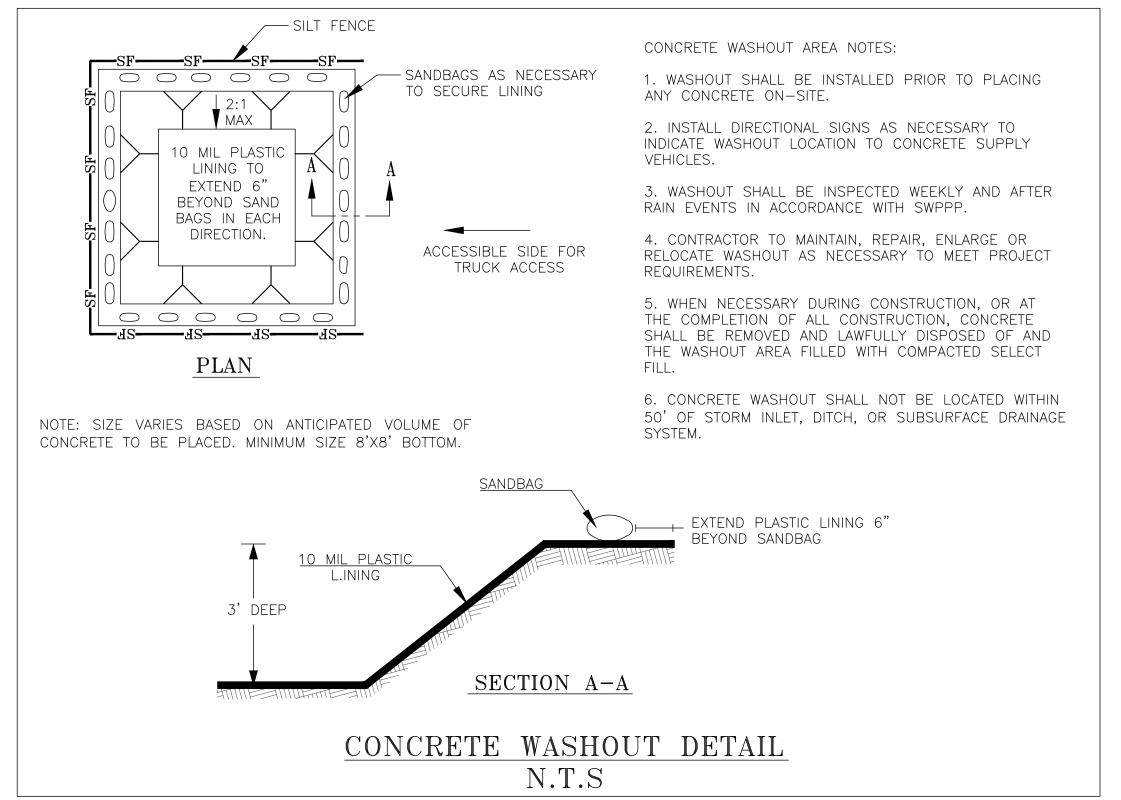














STEVEN P. CATES

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CARLSON, BRIGANCE & DOERING, INC.

1D# F3791

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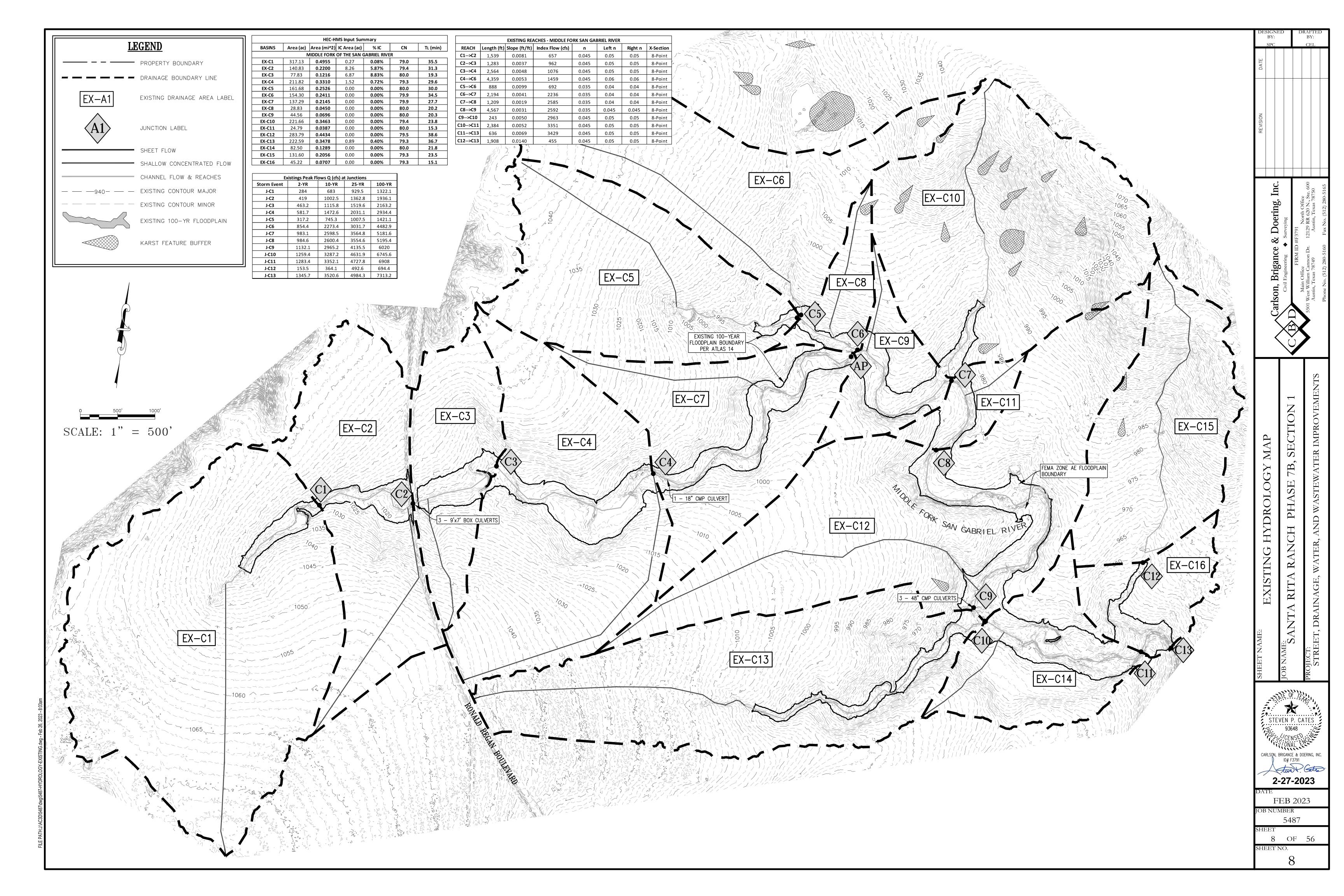
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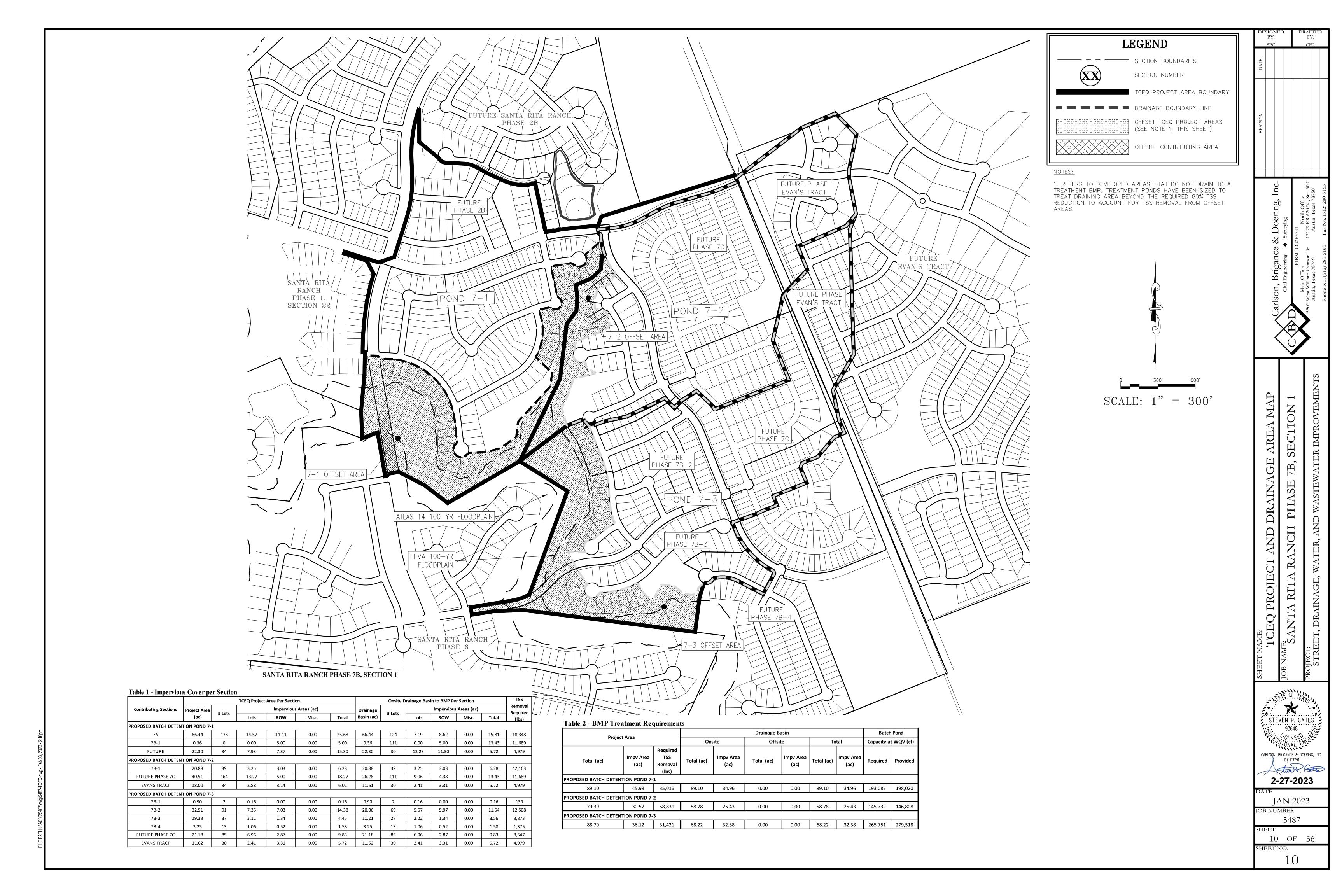
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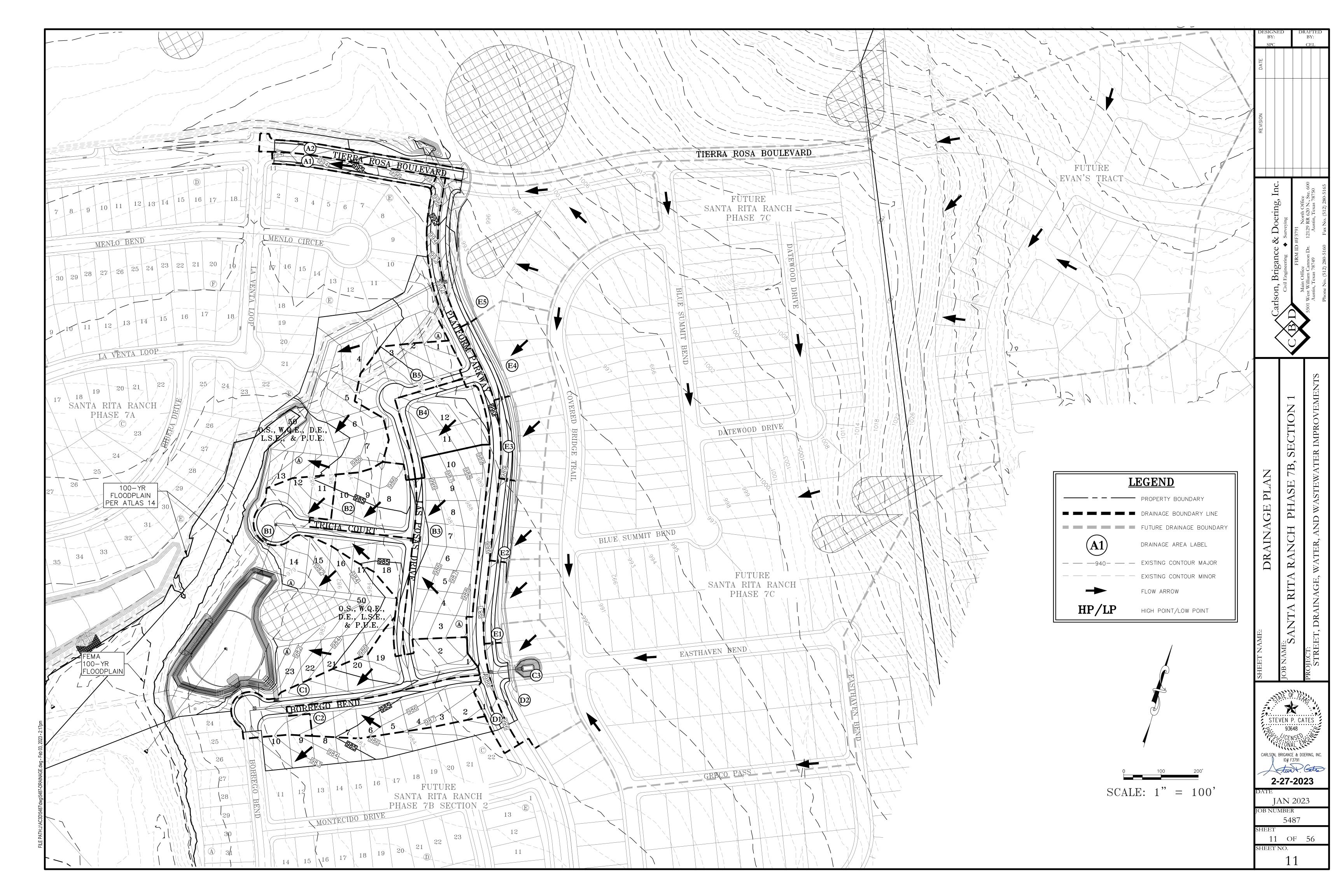
7 OF 56
SHEET NO.

10. 7









	AREA NO.		Junction (JC)			тс				I 10	I 25	I 100	Q 10	Q 25	Q 100
1st / Junc.#	2nd / Junc.#	3rd	or End of Line (X)	Tc (Min.)	AREAS COMBINED	(Min.)	C10*A	C25*A	C100*A	In/Hr	In/Hr	In/Hr	CFS	CFS	CFS
A2	A1		X		A1-A2	10	1.14	1.21	1.35	7.26	8.78	11.23	8.3	10.7	15.2
B5	B4				B4-B5	13	1.12	1.21	1.36	6.53	7.94	10.24	7.3	9.6	13.9
В3			JC		B3-B5	14	2.23	2.41	2.73	6.28	7.64	9.88	14.0	18.4	27.0
B2			JC		B2-B5	14	2.74	2.96	3.36	6.28	7.64	9.88	17.2	22.6	33.2
B1			Х		B1-B5	14	3.49	3.77	4.28	6.28	7.64	9.88	21.9	28.8	42.2
D2	D1		Х		D1-D2	11	1.62	1.74	1.96	6.93	8.40	10.79	11.2	14.6	21.1
E 5	E4				E4-E5	26	2.76	2.97	3.34	4.77	5.85	7.69	13.1	17.4	25.7
E3					E3-E5	26	3.16	3.40	3.84	4.77	5.85	7.69	15.1	19.9	29.5
E2					E2-E5	26	3.50	3.77	4.25	4.77	5.85	7.69	16.7	22.1	32.7
E1			JC		E1-E5	26	3.83	4.13	4.67	4.77	5.85	7.69	18.3	24.2	35.9
D2					D2, E1-E5	26	4.57	4.93	5.57	4.77	5.85	7.69	21.8	28.9	42.8
D1					D1-D2, E1-E5	26	5.45	5.87	6.62	4.77	5.85	7.69	26.0	34.4	50.9
C3			JC		C3, D1-D2, E1-E5	37	34.98	37.66	42.42	3.86	4.76	6.31	134.9	179.2	267.5
C2			JC		C2-C3, D1-D2, E1-E5	37	35.63	38.35	43.21	3.86	4.76	6.31	137.4	182.5	272.5
C1			X		C1-C3, D1-D2, E1-E5	37	36.64	39.45	44.43	3.86	4.76	6.31	141.3	187.7	280.3

Aroo No	Area	TC	Perv.	Imperv.	C 10	C 25	C 100	I 10	1 25	I 100	Q 10	Q 25	Q 100	C10*A	C25*A	C100*A	ADEA NO
Area No.	(Acre)	(Min.)	(%)	(%)	C 10	C 25	C 100	In/Hr	In/Hr	In/Hr	CFS	CFS	CFS	C10"A	C25"A	C100"A	AREA NO.
A 1	0.33	10	14	86	0.73	0.78	0.87	7.26	8.78	11.23	1.7	2.3	3.2	0.24	0.26	0.29	A1
A2	1.23	10	14	86	0.73	0.78	0.87	7.26	8.78	11.23	6.5	8.4	12.0	0.90	0.96	1.06	A2
B1	1.31	10	42	58	0.57	0.62	0.70	7.26	8.78	11.23	5.4	7.1	10.3	0.75	0.81	0.92	B1
B2	0.91	13	45	55	0.56	0.60	0.68	6.57	7.98	10.29	3.3	4.4	6.4	0.51	0.55	0.62	B2
В3	2.10	14	50	50	0.53	0.57	0.65	6.28	7.64	9.88	7.0	9.2	13.6	1.11	1.20	1.37	В3
В4	0.92	13	46	54	0.55	0.60	0.68	6.53	7.94	10.24	3.3	4.4	6.4	0.51	0.55	0.63	B4
B5	1.02	12	46	54	0.60	0.64	0.72	6.89	8.35	10.73	4.2	5.5	7.9	0.61	0.65	0.74	B5
C1	1.64	14	41	59	0.62	0.67	0.75	6.45	7.84	10.12	6.6	8.6	12.4	1.02	1.09	1.23	C1
C2	1.16	14	46	54	0.55	0.60	0.68	6.35	7.72	9.98	4.1	5.4	7.9	0.64	0.70	0.79	C2
С3	49.75	37	47	53	0.59	0.64	0.72	3.86	4.76	6.31	113.9	151.2	225.8	29.53	31.78	35.79	C3
D1	1.28	11	22	78	0.69	0.74	0.82	6.93	8.40	10.79	6.1	7.9	11.3	0.88	0.94	1.05	D1
D2	1.31	11	44	56	0.56	0.61	0.69	7.11	8.62	11.04	5.3	6.9	10.0	0.74	0.80	0.91	D2
E1	0.61	10	46	54	0.55	0.60	0.68	7.26	8.78	11.23	2.4	3.2	4.7	0.34	0.37	0.41	E1
E2	0.61	10	46	54	0.55	0.60	0.68	7.26	8.78	11.23	2.4	3.2	4.7	0.34	0.37	0.41	E2
E3	0.74	15	47	53	0.54	0.59	0.67	6.16	7.50	9.71	2.5	3.3	4.8	0.40	0.44	0.50	E3
E4	1.02	14	50	50	0.58	0.63	0.71	6.47	7.86	10.15	3.8	5.0	7.3	0.59	0.64	0.72	E4
E5	3.65	26	47	53	0.59	0.64	0.72	4.77	5.85	7.69	10.3	13.6	20.2	2.16	2.33	2.62	E5

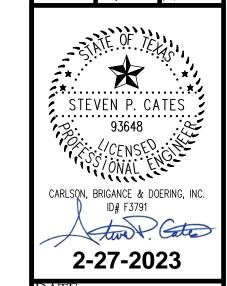
								10 - Y	EAR INLE	T FLOW CALCU	JLATION TABLE	 E						
INLET	DRAINAGE	Q	Q PASS	Q SPILL	Q ADD	Q TOTAL	SLOPE	а	Yo	PAVEMENT	PONDED	00// 0	La	LENGTH	1.// -	- M -	Q/Qa	DEMARK
NUMBER	AREA NO.	(CFS)	(CFS)	(CFS)	(CFS)	Qa (CFS)	(%)	(FT)	(FT)	WIDTH (FT)	WIDTH (FT)	Qa/La	(FT)	(FT)	L/La	a/Yo	Q/Qa	REMARK
A1	A1	1.7				1.7	LP	0.42	0.11	48	2.16	-	-	15	-	3.66	1.00	
A2	A2	6.5				6.5	LP	0.42	0.28	48	5.93	-	-	15	-	1.52	1.00	
B1	B1	5.4				5.4	LP	0.42	0.24	33	4.58	-	-	15	-	1.72	1.00	
B2	B2	3.3				3.3	0.60	0.42	0.18	33	3.27	0.64	5.22	10	1.92	2.33	1.00	
B3	B3	7.0				7.0	LP	0.42	0.29	33	5.57	-	-	15	-	1.46	1.00	
B4	B4	3.3				3.3	0.70	0.42	0.18	33	3.18	0.64	5.23	10	1.91	2.39	1.00	
B5	B5	4.2				4.2	0.70	0.42	0.19	33	3.45	0.65	6.45	10	1.55	2.21	1.00	
C1	C1	6.6				6.6	LP	0.42	0.28	33	5.31	-	-	15	-	1.51	1.00	
C2	C2	4.1				4.1	0.80	0.42	0.18	33	3.34	0.64	6.34	10	1.58	2.28	1.00	
C3	C3	113.9																FUTURE SECTION 7C DRAINAGE
D1	D1	6.1				6.1	LP	0.42	0.26	40	5.21	-	-	15	-	1.59	1.00	
D2	D2	5.3				5.3	LP	0.42	0.24	40	4.65	-	-	15	-	1.76	1.00	
E1	E1	2.4				2.4	0.55	0.42	0.16	40	2.90	0.62	3.97	10	2.52	2.69	1.00	
E2	E2	2.4				2.4	0.55	0.42	0.16	40	2.90	0.62	3.97	10	2.52	2.69	1.00	
E3	E3	2.5			0.7	3.2	0.55	0.42	0.17	40	3.20	0.63	5.04	10	1.98	2.46	1.00	
E4	E4	3.8	0.7		3.6	6.7	0.55	0.42	0.22	40	4.26	0.68	9.91	10	1.01	1.90	1.00	E4 PASSES 0.7 CFS TO E3
E5	E5	10.3	3.6			6.7	0.55	0.42	0.22	40	4.26	0.68	9.87	10	1.01	1.90	1.00	E5 PASSES 3.6 CFS TO E4

								25 - Y	EAR INLE	T FLOW CALCU	JLATION TABLE							
INLET	DRAINAGE	Q	Q PASS	Q SPILL	Q ADD	Q TOTAL	SLOPE	а	Yo	PAVEMENT	PONDED	0-//-	La	LENGTH		- 0/ -	0/0-	DEMARK
NUMBER	AREA NO.	(CFS)	(CFS)	(CFS)	(CFS)	Qa (CFS)	(%)	(FT)	(FT)	WIDTH (FT)	WIDTH (FT)	Qa/La	(FT)	(FT)	L/La	a/Yo	Q/Qa	REMARK
A1	A1	2.3				2.3	LP	0.42	0.14	48	2.62	-	-	15	-	3.09	1.00	
A2	A2	8.4				8.4	LP	0.42	0.33	48	7.30	-	-	15	-	1.29	1.00	
B1	B1	7.1				7.1	LP	0.42	0.29	33	5.66	_		15		1.44	1.00	
								_						_				
B2	B2	4.4				4.4	0.60	0.42	0.20	33	3.61	0.66	6.68	10	1.50	2.12	1.00	
B3	В3	9.2				9.2	LP	0.42	0.35	33	7.05	-	-	15	-	1.21	1.00	
B4	B4	4.4				4.4	0.70	0.42	0.19	33	3.51	0.65	6.71	10	1.49	2.18	1.00	
B5	B5	5.5				5.5	0.70	0.42	0.21	33	3.81	0.67	8.20	10	1.22	2.02	1.00	
C1	C1	8.6				8.6	LP	0.42	0.33	33	6.63	_		15	_	1.27	1.00	
C2	C2	5.4				5.4	0.55	0.42	0.33	33	3.96	0.67	7.97	10	1.25	1.95	1.00	
C3	C3	151.2				3.4	0.55	0.42	0.21	33	3.90	0.07	1.91	10	1.20	1.93	1.00	FUTURE SECTION 7C DRAINAGE
CS	CS	101.2																FUTURE SECTION /C DRAINAGE
D1	D1	7.9				7.9	LP	0.42	0.31	40	6.42	-	-	15	-	1.34	1.00	
D2	D2	6.9				6.9	LP	0.42	0.29	40	5.73	-	-	15	-	1.47	1.00	
E1	E1	3.2				3.2	0.55	0.42	0.17	40	3.21	0.63	5.07	10	1.97	2.45	1.00	
E2	E2	3.2			1.7	4.9	0.55	0.42	0.20	40	3.77	0.66	7.46	10	1.34	2.12	1.00	
E3	E3	3.3	1.7		5.2	6.8	0.55	0.42	0.22	40	4.27	0.68	9.95	10	1.01	1.89	1.00	E3 PASSES 1.7 CFS TO E2
E4	E4	5.0	5.2		6.9	6.7	0.55	0.42	0.22	40	4.26	0.68	9.89	10	1.01	1.90	1.00	E4 PASSES 5.2 CFS TO E3
E5	E5	13.6	6.9			6.7	0.55	0.42	0.22	40	4.26	0.68	9.89	10	1.01	1.90	1.00	E5 PASSES 6.9 CFS TO E4

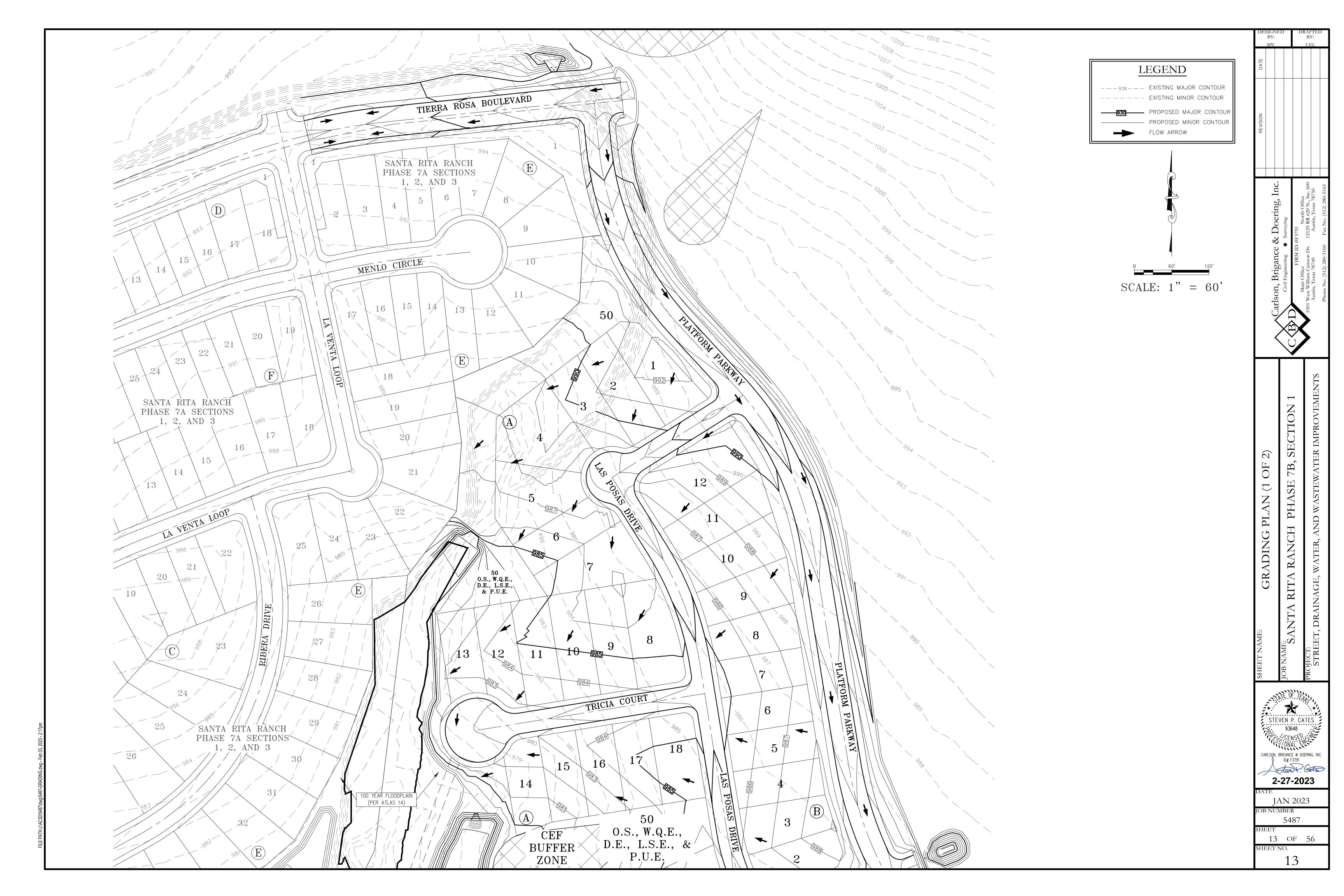
						E	JLATION TABL	T FLOW CALC	EAR INLE	100 - Y								
DEMARK	0/06	-W-	1/1-	LENGTH	La	Qa/La	PONDED	PAVEMENT	Yo	а	SLOPE	Q TOTAL	Q ADD	Q SPILL	Q PASS	Q	DRAINAGE	INLET
REMARK	Q/Qa	a/Yo	L/La	(FT)	(FT)	Qa/La	WIDTH (FT)	WIDTH (FT)	(FT)	(FT)	(%)	Qa (CFS)	(CFS)	(CFS)	(CFS)	(CFS)	AREA NO.	NUMBER
	1.00	2.44	-	15	-	-	3.43	48	0.17	0.42	LP	3.2				3.2	A1	A1
	1.00	1.02	-	15	-	-	9.93	48	0.41	0.42	LP	12.0				12.0	A2	A2
	1.00	1.05	-	15	_	-	8.56	33	0.40	0.42	LP	11.3	1.0			10.3	B1	B1
B2 PASSES 1.0 CFS TO B1	1.00	1.85	1.04	10	9.64	0.69	4.21	33	0.23	0.42	0.60	6.6	1.2		1.0	6.4	B2	B2
	1.00	0.93	-	15	-	-	10.44	33	0.45	0.42	LP	13.6				13.6	В3	В3
	1.00	1.92	1.06	10	9.44	0.68	4.04	33	0.22	0.42	0.70	6.4				6.4	B4	B4
B5 PASSES 1.2 CFS TO B2	1.00	1.89	1.02	10	9.85	0.68	4.11	33	0.22	0.42	0.70	6.7			1.2	7.9	B5	B5
	1.00	0.94		15	_	_	10.32	33	0.45	0.42	LP	13.4	1.0			12.4	C1	C1
C2 PASSES 1.0 CFS TO C1	1.00	1.80	1.01	10	9.94	0.69	4.34	33	0.23	0.42	0.55	6.9	1.0		1.0	7.9	C2	C2
JTURE SECTION 7C DRAINA			-	-											-	225.8	C3	C3
	1.00	1.05	_	15	_	_	8.76	40	0.40	0.42	LP	11.3				11.3	D1	D1
	1.00	0.78	-	15	-	-	14.47	40	0.54	0.42	LP	17.8	7.8			10.0	D2	D2
E1 PASSES 7.8 CFS TO D2	1.00	1.89	1.01	10	9.92	0.68	4.27	40	0.22	0.42	0.55	6.8	9.9		7.8	4.7	E1	E1
E2 PASSES 9.9 CFS TO E1	1.00	1.89	1.01	10	9.92	0.68	4.27	40	0.22	0.42	0.55	6.8	12.0		9.9	4.7	E2	E2
E3 PASSES 12.0 CFS TO E2	1.00	1.89	1.00	10	10.00	0.68	4.28	40	0.22	0.42	0.55	6.8	14.0		12.0	4.8	E3	E3
E4 PASSES 14.0 CFS TO E3	1.00	1.90	1.01	10	9.88	0.68	4.26	40	0.22	0.42	0.55	6.7	13.4		14.0	7.3	E4	E4
E5 PASSES 13.4 CFS TO E4	1.00	1.89	1.01	10	9.93	0.68	4.27	40	0.22	0.42	0.55	6.8			13.4	20.2	E5	E5

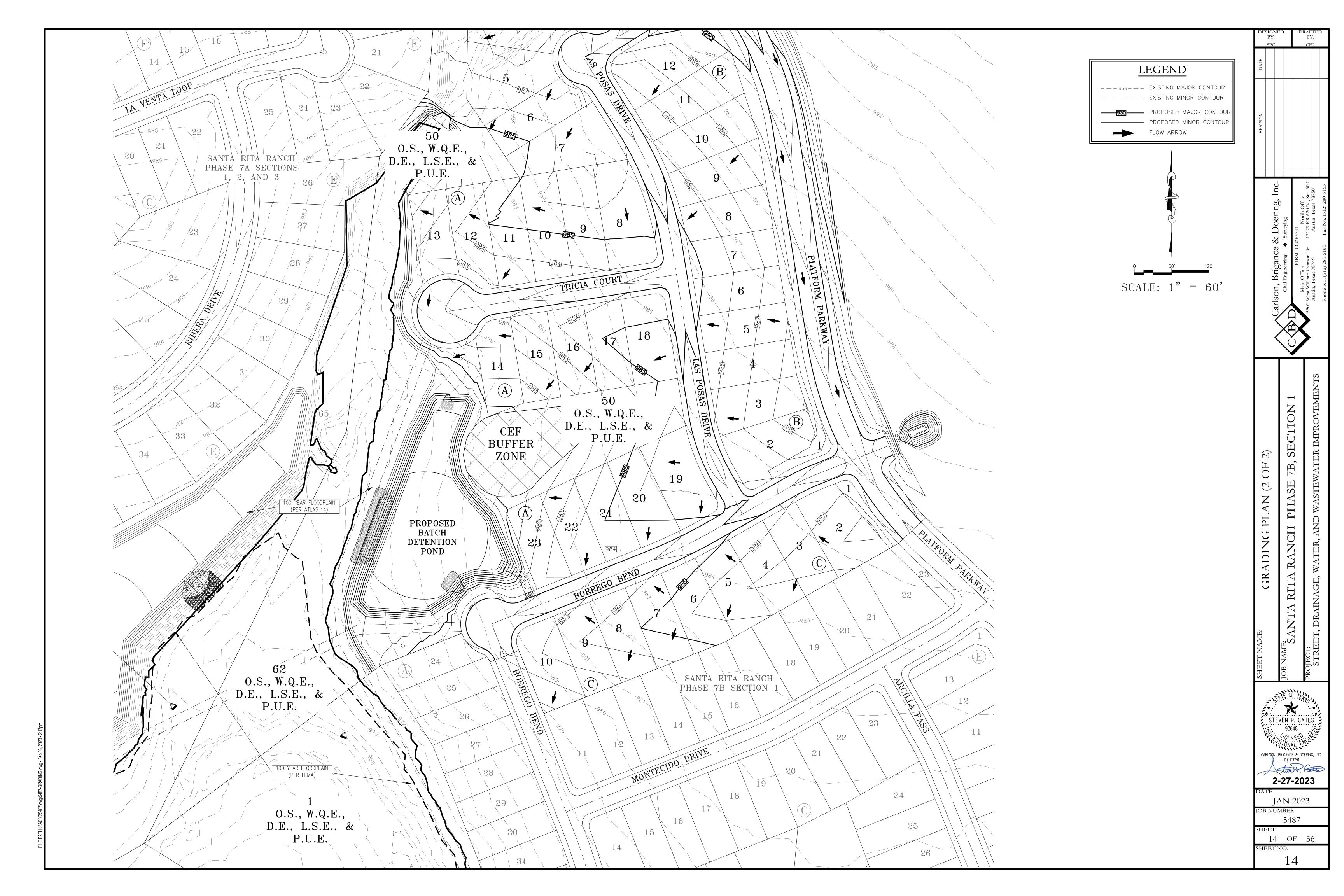
		REVISION	DATE	
	<u>-</u>			SIGI BY: SPC
lson, brigance & Doering, Inc.	Doering, Inc.			:
Civil Engineering • Surveying	Surveying			
FIRM ID #F3791	3791			
Main Office	North Office			
nnon Dr.	12129 RR 620 N., Ste. 600			B' CI
	Austin, Texas 78750			
Phone No. (512) 280-5160	Fax No. (512) 280-5165			

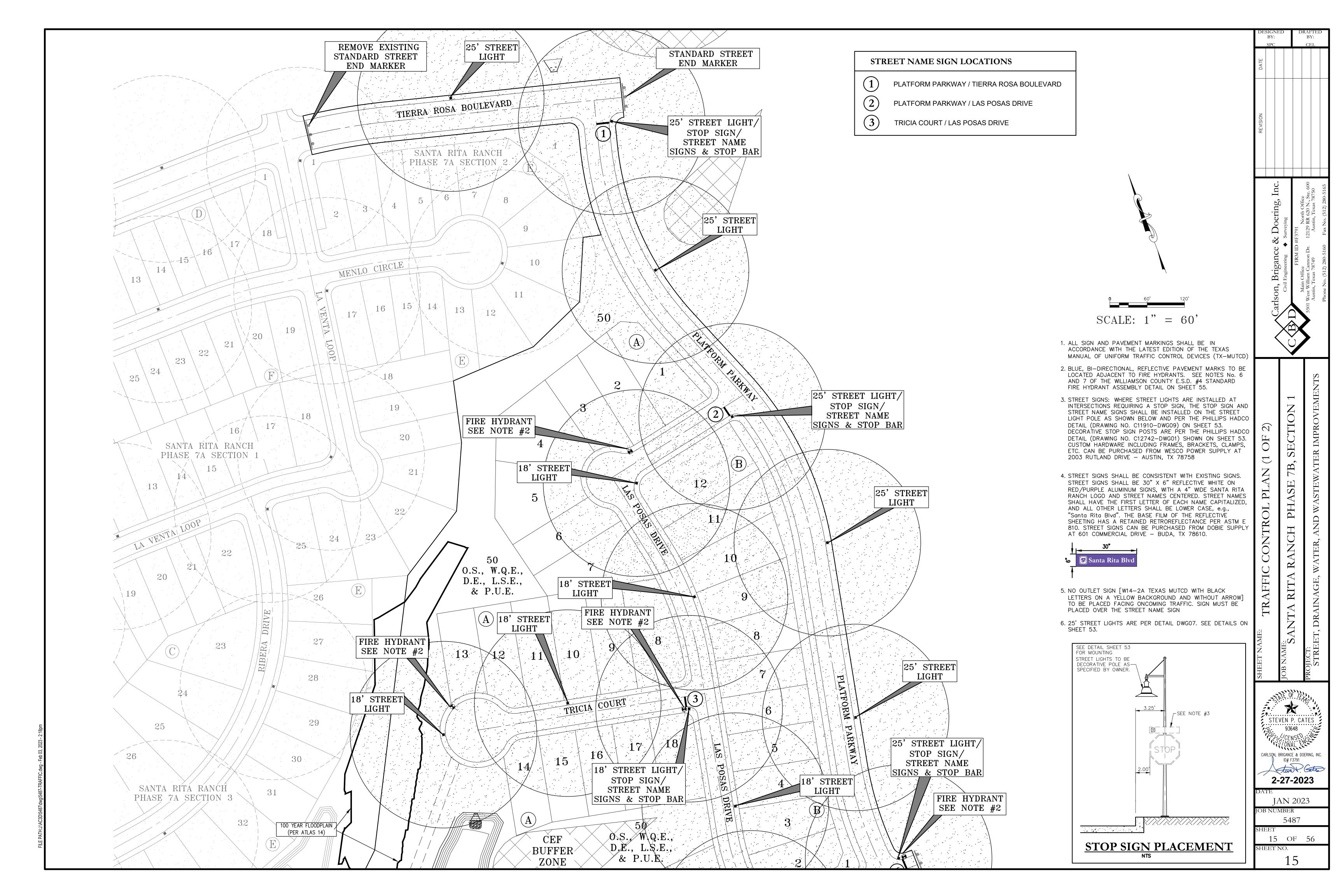
OJECT: STREET, DRAINAGE, WATER, AND WASTEWATER IMPROVEMENTS PHASE 7B, SECTION 1 DRAINAGE CALCS SANTA RITA RANCH

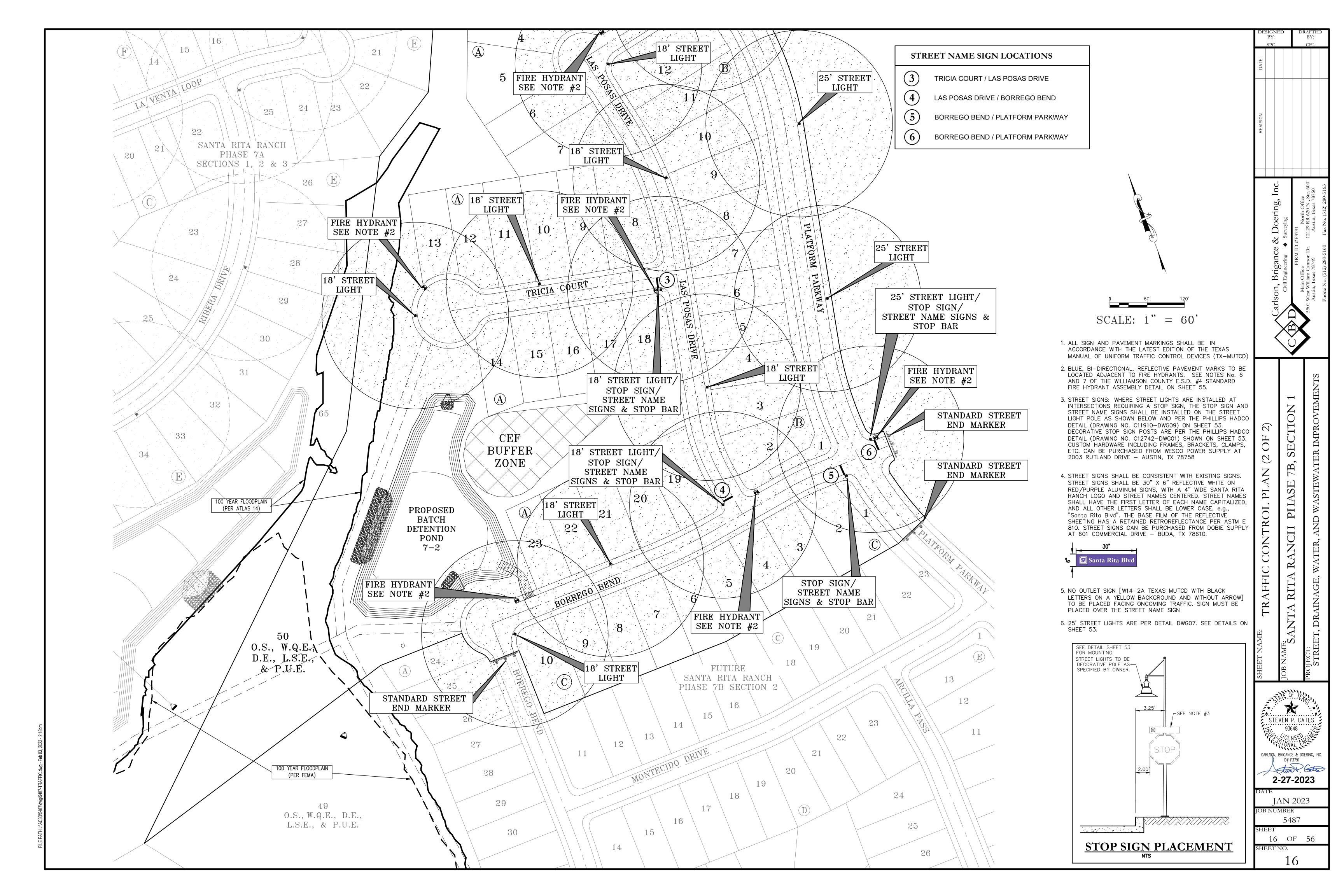


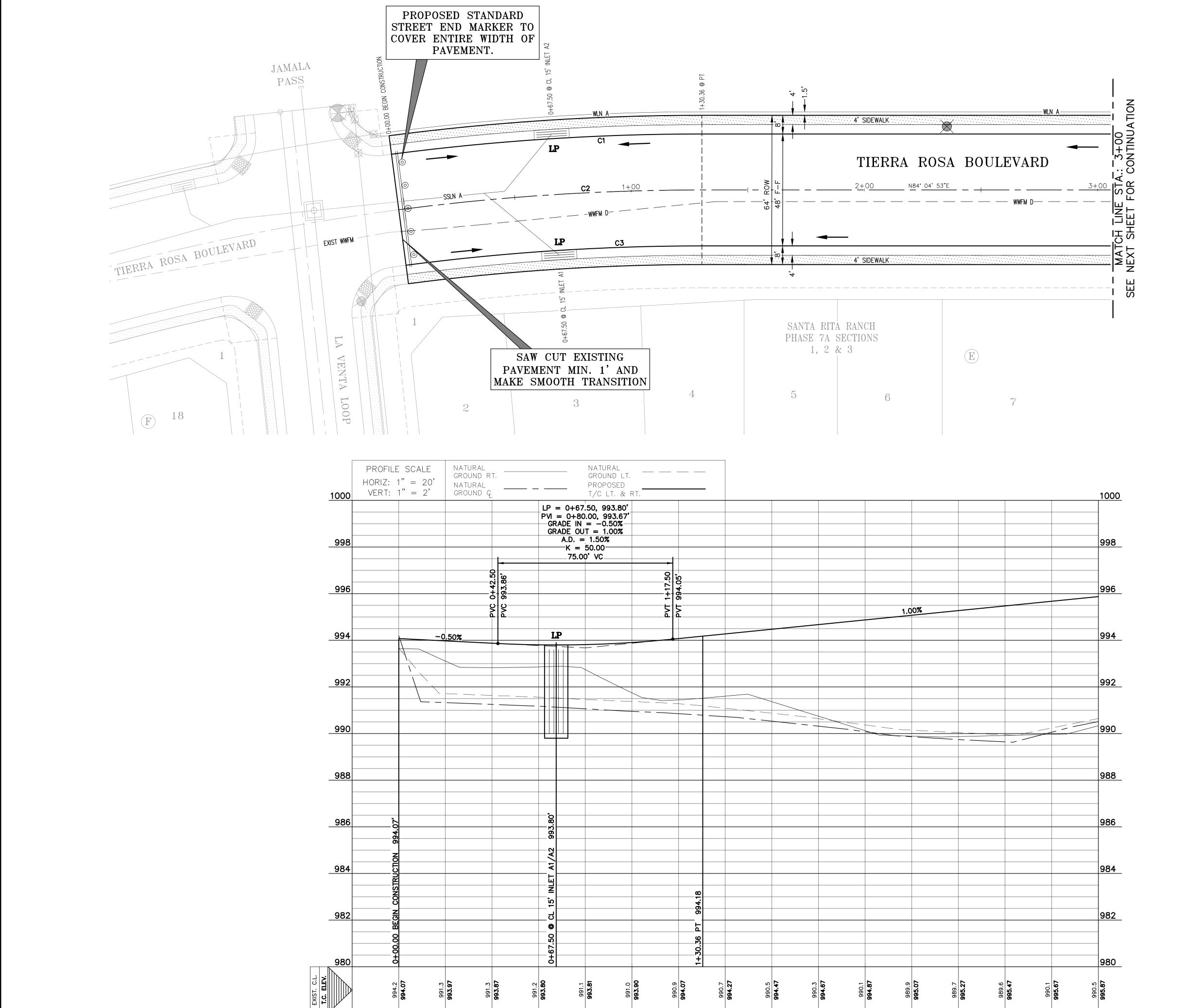
JAN 2023 5487 12 OF 56









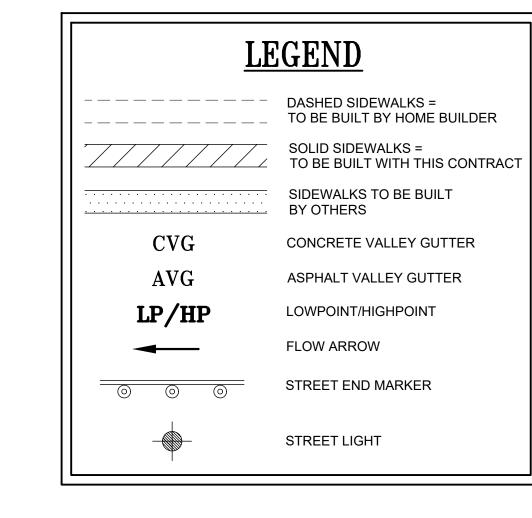


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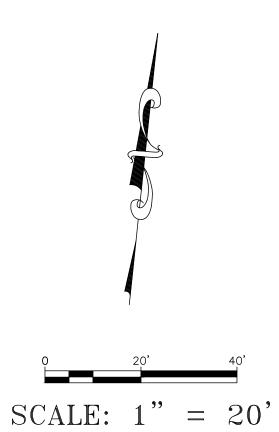
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ROADWAY	CLASSIFICATION	DESIGN SPEED
TIERRA ROSA BOULEVARD PLATFORM PARKWAY LAS POSAS DRIVE TRICIA COURT BORREGO BEND	COLLECTOR ROAD COLLECTOR ROAD LOCAL ROAD LOCAL ROAD LOCAL ROAD	35 MPH 35 MPH 25 MPH 25 MPH 25 MPH



		Cur	ve Table		
Curve #	Radius	Tangent	Delta	Chord	Arc Length
C1	1024.00'	66.84'	007°28'08"	133.39'	133.48'
C2	1000.00'	65.27'	007°28'08"	130.26	130.36'
С3	976.00	63.70'	007°28'08"	127.14'	127.23'

RA ROSA BOULEVARD (0+00 TO 3+00)	★ Carlson, Brigance & Doering.
TA PITA PANCH DHASE 7R SECTION 1	Civil Engineering Surveying
MILLINIA TO THE THEORY ID, SECTION I	FIRM ID #F3791 Main Office North Offi
AINAGE, WATER, AND WASTEWATER IMPROVEMENTS	nnon Dr. 12129 749 Au
	Dhane No. (512) 280-5160 Hav No. (513) 28

STEVEN P. CATES

93648

CARLSON, BRIGANCE & DOERING, INC.

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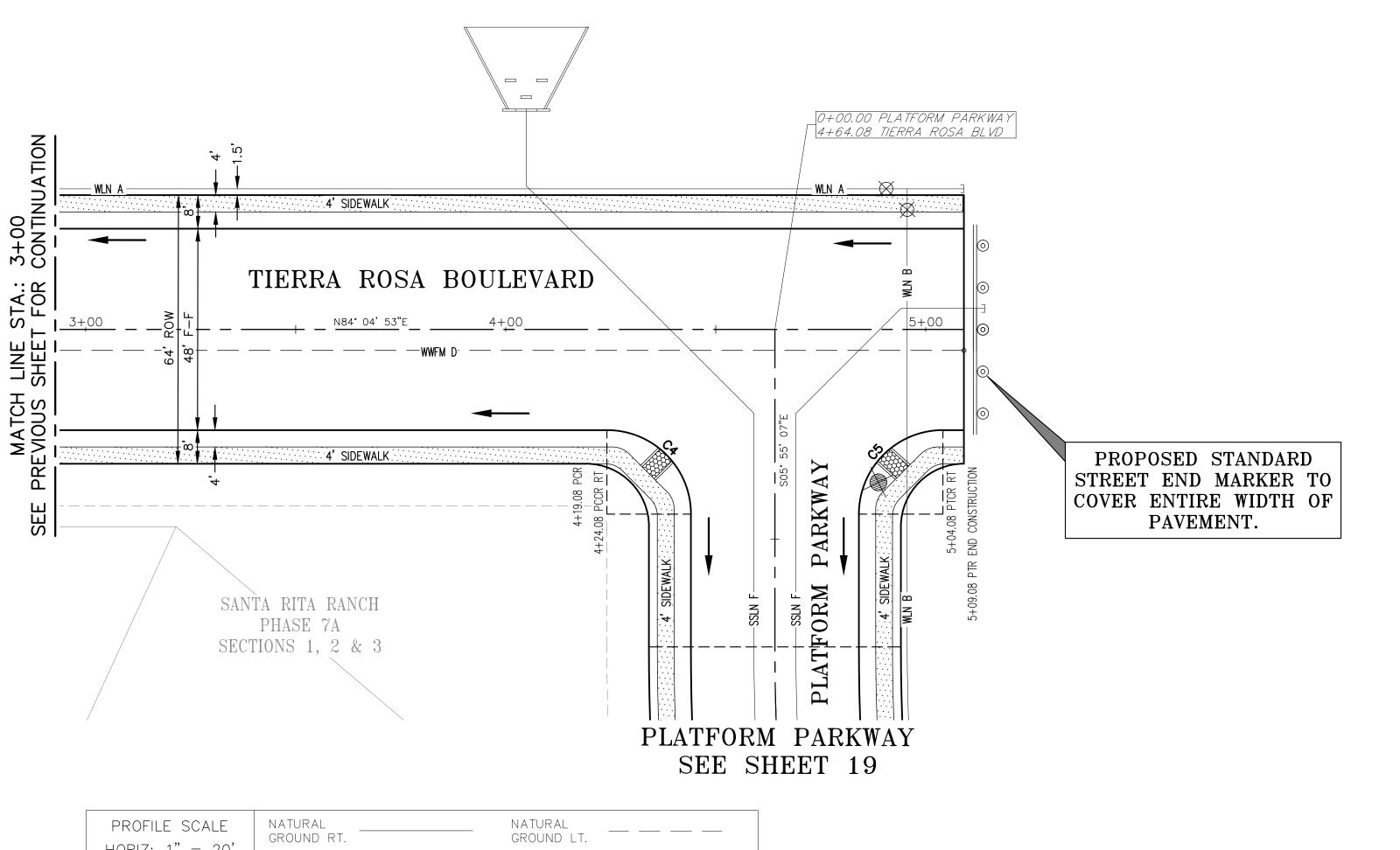
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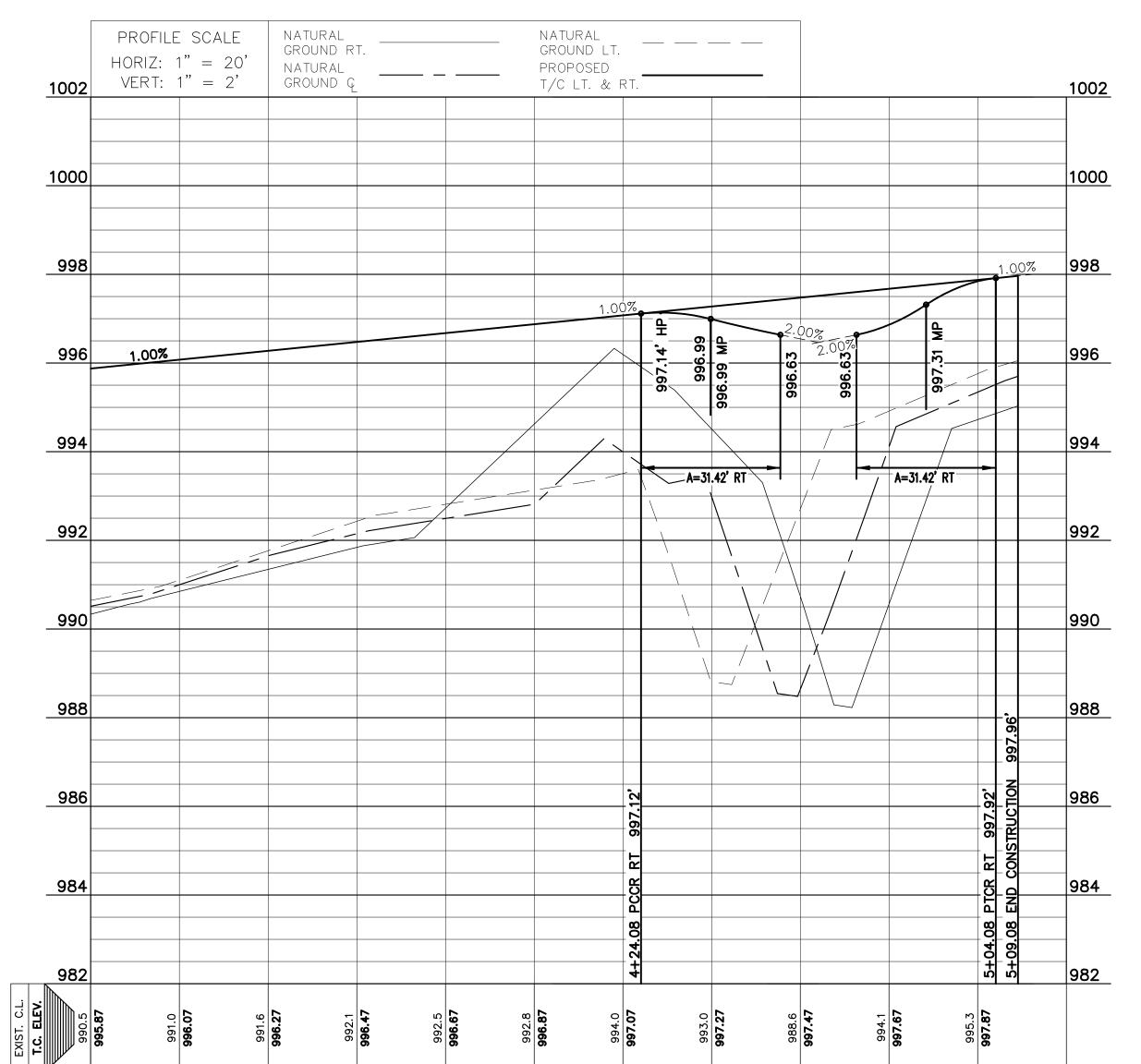
17 OF 56

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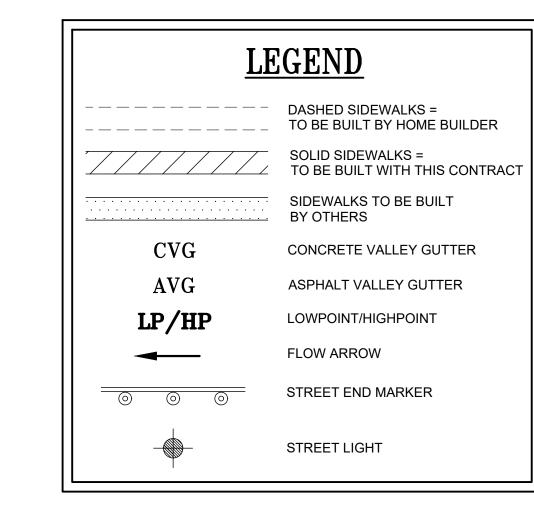
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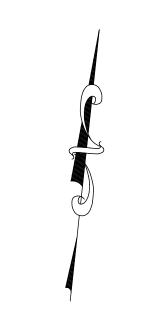


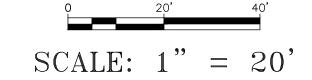
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ROADWAY	CLASSIFICATION	DESIGN SPEED
TIERRA ROSA BOULEVARD PLATFORM PARKWAY LAS POSAS DRIVE TRICIA COURT BORREGO BEND	COLLECTOR ROAD COLLECTOR ROAD LOCAL ROAD LOCAL ROAD LOCAL ROAD	35 MPH 35 MPH 25 MPH 25 MPH 25 MPH

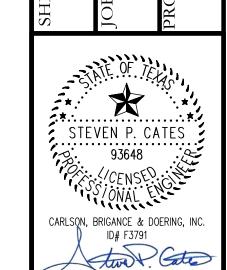




	Curve Table								
Curve #	Radius	Tangent	Delta	Chord	Arc Length				
C4	20.00'	20.02'	090°02'56"	28.30'	31.43'				
C5	20.00'	20.00'	090°00'00"	28.28'	31.42'				

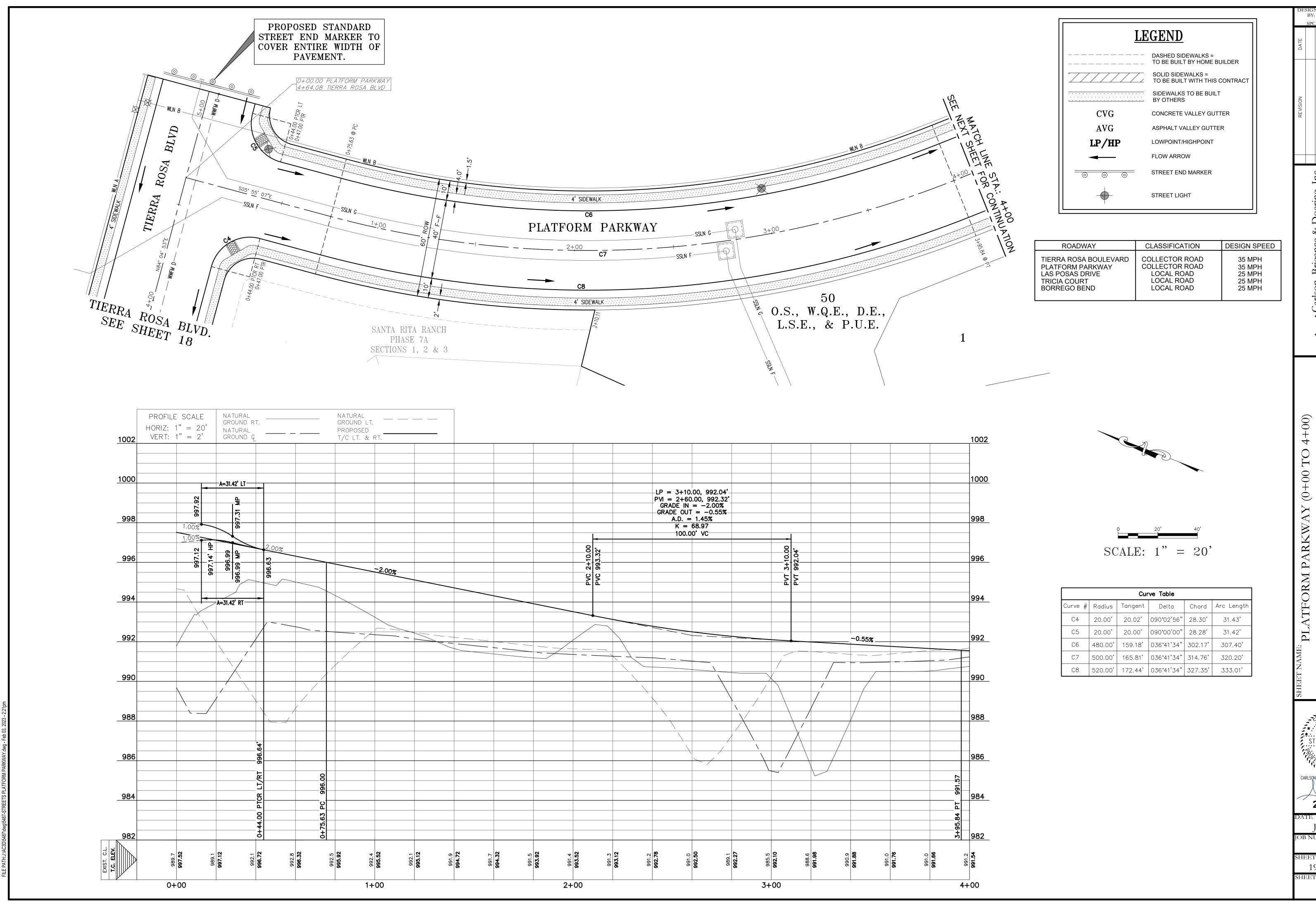
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	DATE							
	REVISION							
PEED			n, brigance \propto Doering, inc.	Jivil Engineering Surveying	FIRM ID #F3791	12		e No. (512) 280-5160 Fax No. (512) 280-5165
H H H			n, Drigai	ivil Engineerir	FIF	Main Office William Cannon Dr.	in, Texas 78749	e No. (512) 28(

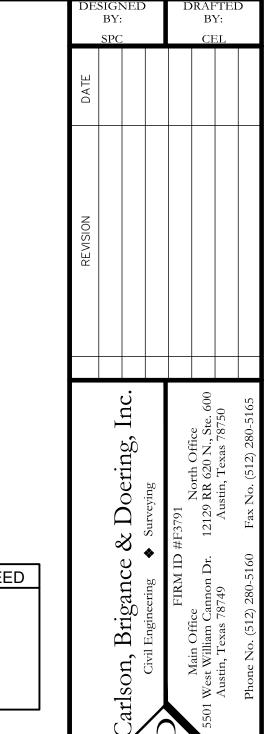
TIERRA ROSA BOULEVARD (3+00 TO END)	SANTA RITA RANCH PHASE 7B, SECTION 1	ET, DRAINAGE, WATER, AND WASTEWATER IMPROVEMENT
TIERRA ROSA	SANTA RITA	ET, DRAINAGE, W



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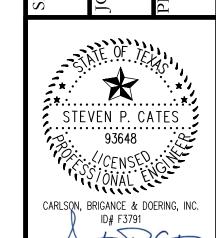
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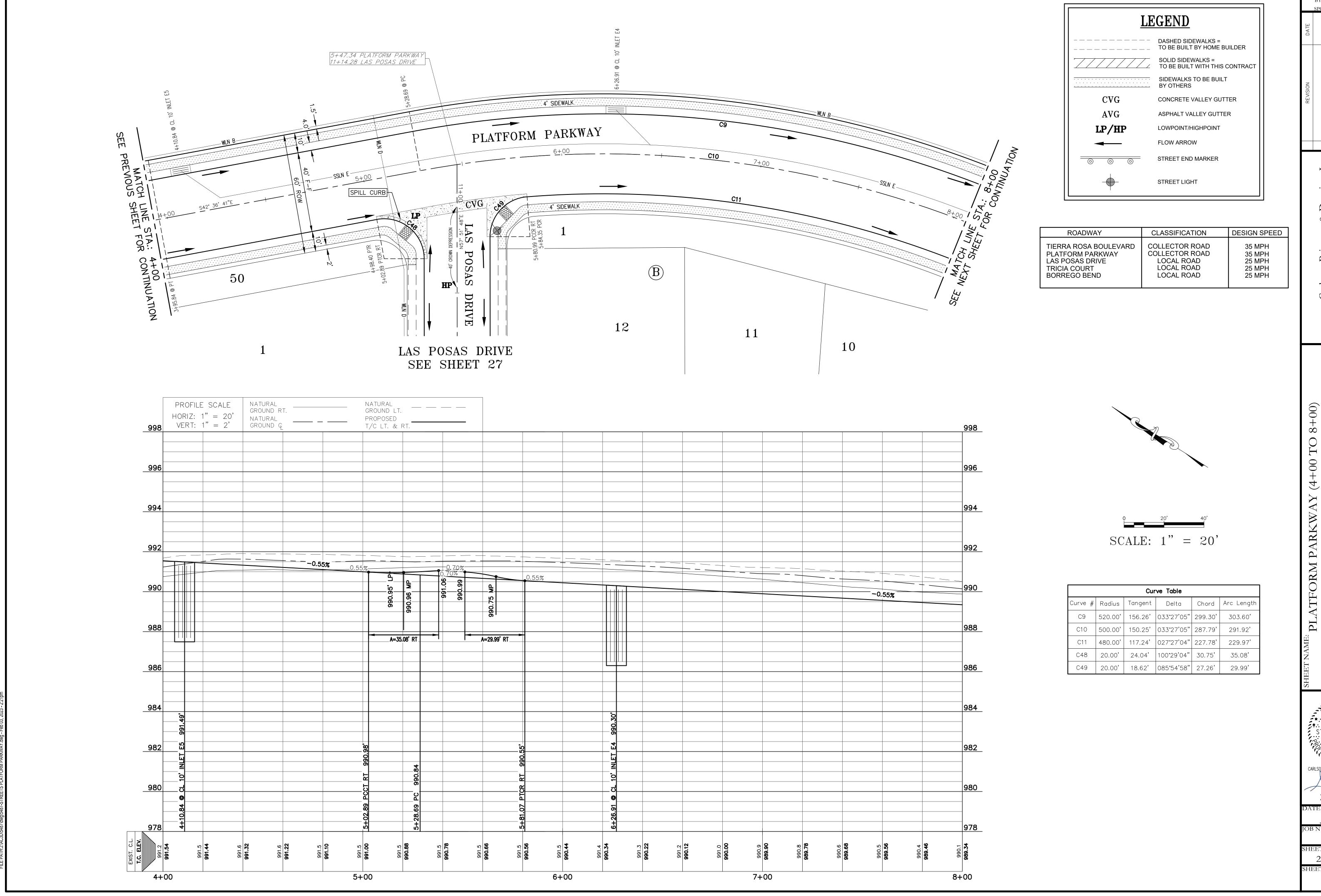
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XWAY (0+00 TO 4+00)	PHASE 7B, SECTION 1
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3'	AJ	A
2'	PLATF	
.0'		SANTA RIT
0'	SHEET NAME:	$ ho_{ ext{E}}$
)1'	Z H	AM
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REVISION DATE

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	🖊 🗡 Carlson, Brigance & 🛚
	Civil Engineering Surv
	Main Office
FNTS	5501 West William Cannon Dr. 1212 Austin, Texas 78749
	Phone No. (512) 280-5160 Ea

(4+00 TO 8+00)	RANCH PHASE 7B, SECTION 1
WAY (PHAS
M PARK	RANCH

JOB NAME:
SANTA RITA RANC
PROJECT:
STREET, DRAINAGE, WATER

STEVEN P. CATES

93648

CARLSON, BRIGANCE & DOERING, INC. ID# F3791

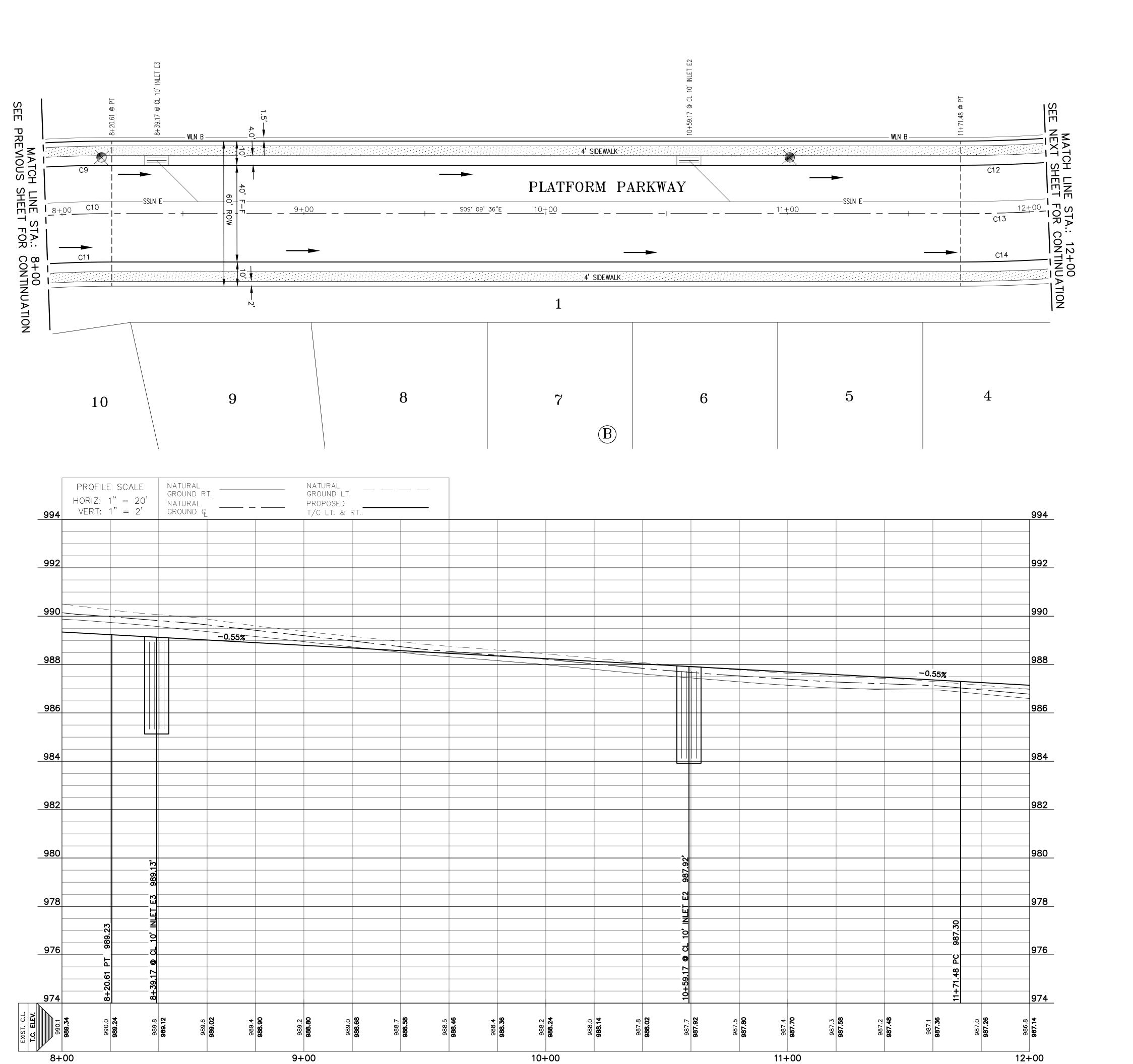
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ID# F3791

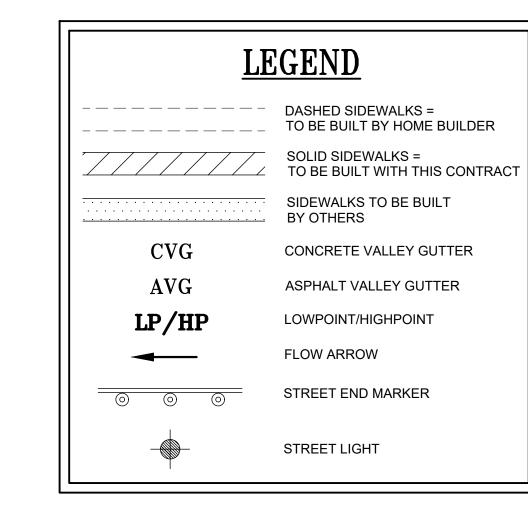
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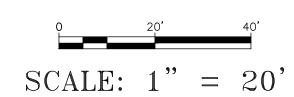
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ROADWAY	CLASSIFICATION	DESIGN SPEED
TIERRA ROSA BOULEVARD PLATFORM PARKWAY LAS POSAS DRIVE TRICIA COURT BORREGO BEND	COLLECTOR ROAD COLLECTOR ROAD LOCAL ROAD LOCAL ROAD LOCAL ROAD	35 MPH 35 MPH 25 MPH 25 MPH 25 MPH





Curve Table					
Curve #	Radius	Tangent	Delta	Chord	Arc Length
С9	520.00'	156.26	033°27'05"	299.30'	303.60'
C10	500.00'	150.25	033°27'05"	287.79'	291.92'
C11	480.00'	117.24	027°27'04"	227.78'	229.97'
C12	550.00'	77.53'	016°02'54"	153.55	154.05'
C13	570.00'	174.85	034°06'27"	334.33'	339.31'
C14	590.00'	81.39'	015°42'32"	161.26	161.76'

<		>
PLAIFURM FARISWAY (8+00 IO 12+00)	SANTA RITA RANCH PHASE 7B, SECTION 1	: eet. drainage, water, and wastewater improvements

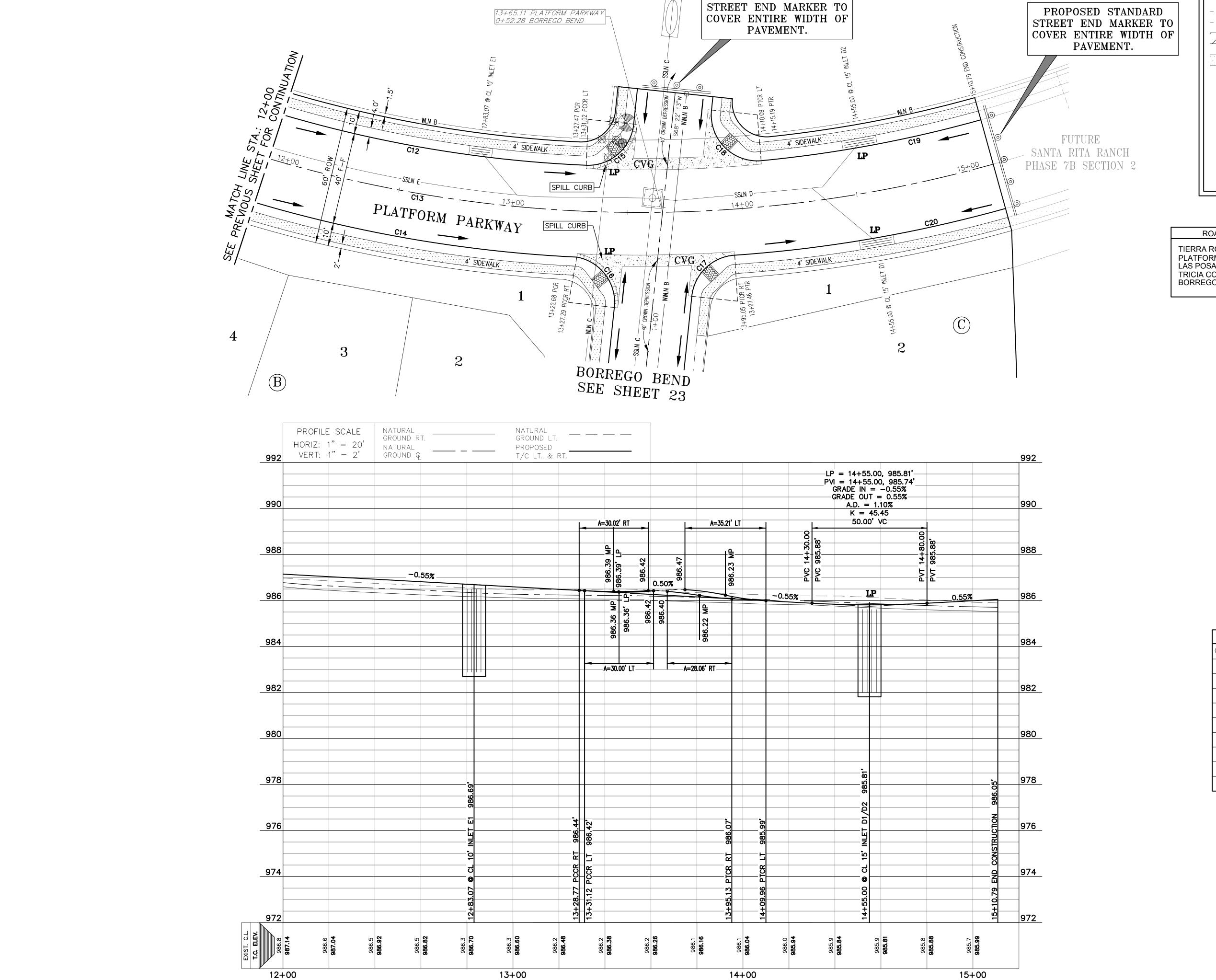
CARLSON, BRIGANCE & DOERING, INC.
ID# F3791

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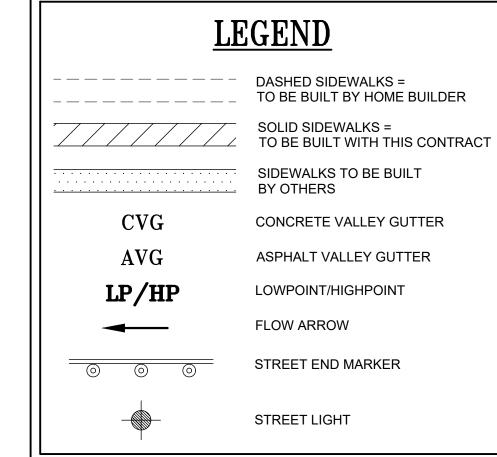
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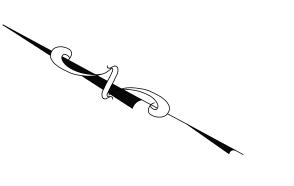
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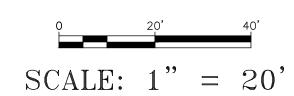


PROPOSED STANDARD



ROADWAY	CLASSIFICATION	DESIGN SPEED
RRA ROSA BOULEVARD TFORM PARKWAY POSAS DRIVE CIA COURT RREGO BEND	COLLECTOR ROAD COLLECTOR ROAD LOCAL ROAD LOCAL ROAD LOCAL ROAD	35 MPH 35 MPH 25 MPH 25 MPH 25 MPH





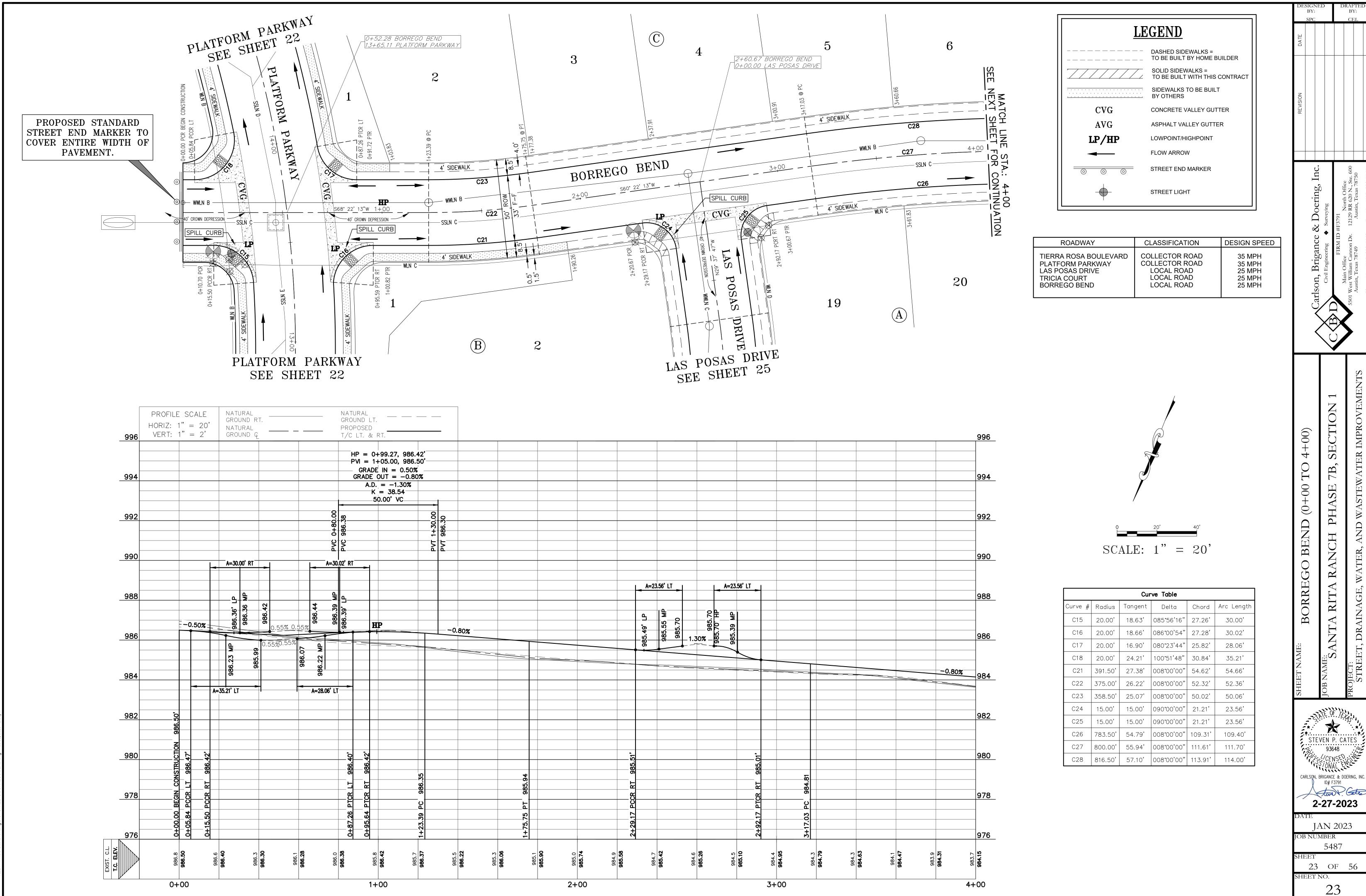
	Curve Table				
Curve #	Radius	Tangent	Delta	Chord	Arc Length
C12	550.00'	77.53'	016°02'54"	153.55	154.05'
C13	570.00'	174.85	034°06'27"	334.33'	339.31'
C14	590.00'	81.39'	015°42'32"	161.26	161.76
C15	20.00'	18.63'	085°56'16"	27.26'	30.00'
C16	20.00'	18.66'	086°00'54"	27.28'	30.02'
C17	20.00'	16.90'	080°23'44"	25.82'	28.06
C18	20.00'	24.21'	100°51'48"	30.84'	35.21'
C19	550.00'	48.80'	010°08'27"	97.22'	97.34'
C20	590.00'	60.07	011°37'36"	119.52	119.72

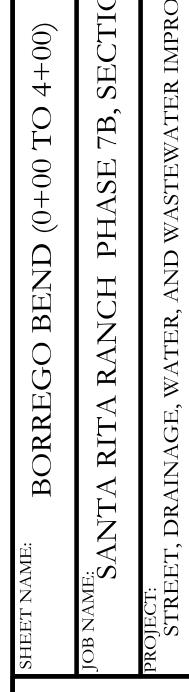
	✓ • Carlson, Brigance & Doering, I
DANICH DHASE 7B SECTION 1	Civil Engineering Surveying
MAINCH FIRMSE (D, SECTION I	FIRM ID #F3791
	Main Office North Office
	n Dr. 12
WATER, AND WASTEWATER IMPROVEMENTS	Austin, Texas 78749 Austin, Texas 7875

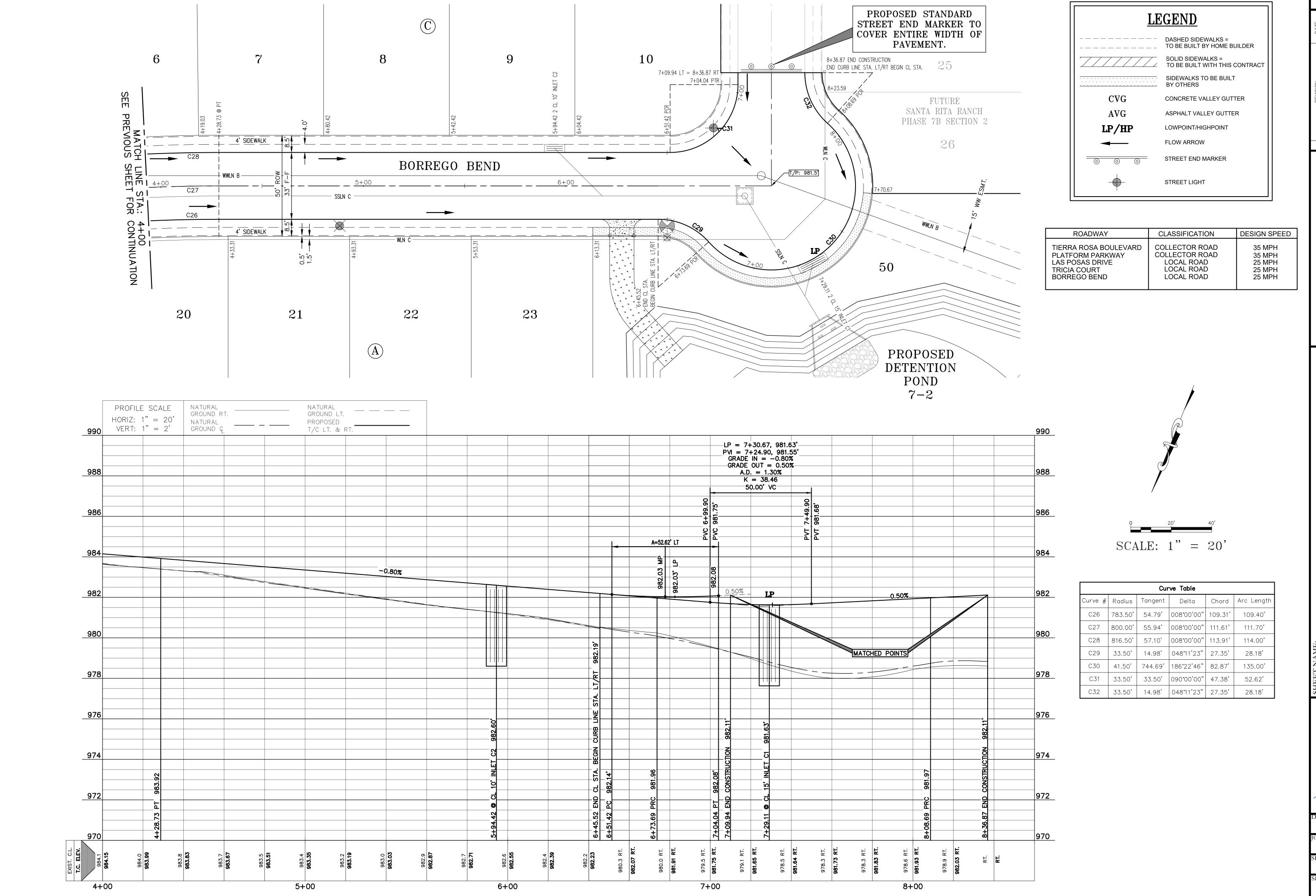
CARLSON, BRIGANCE & DOERING, INC.
ID# F3791

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JAN 2023 22 OF 56







BORREGO BEND

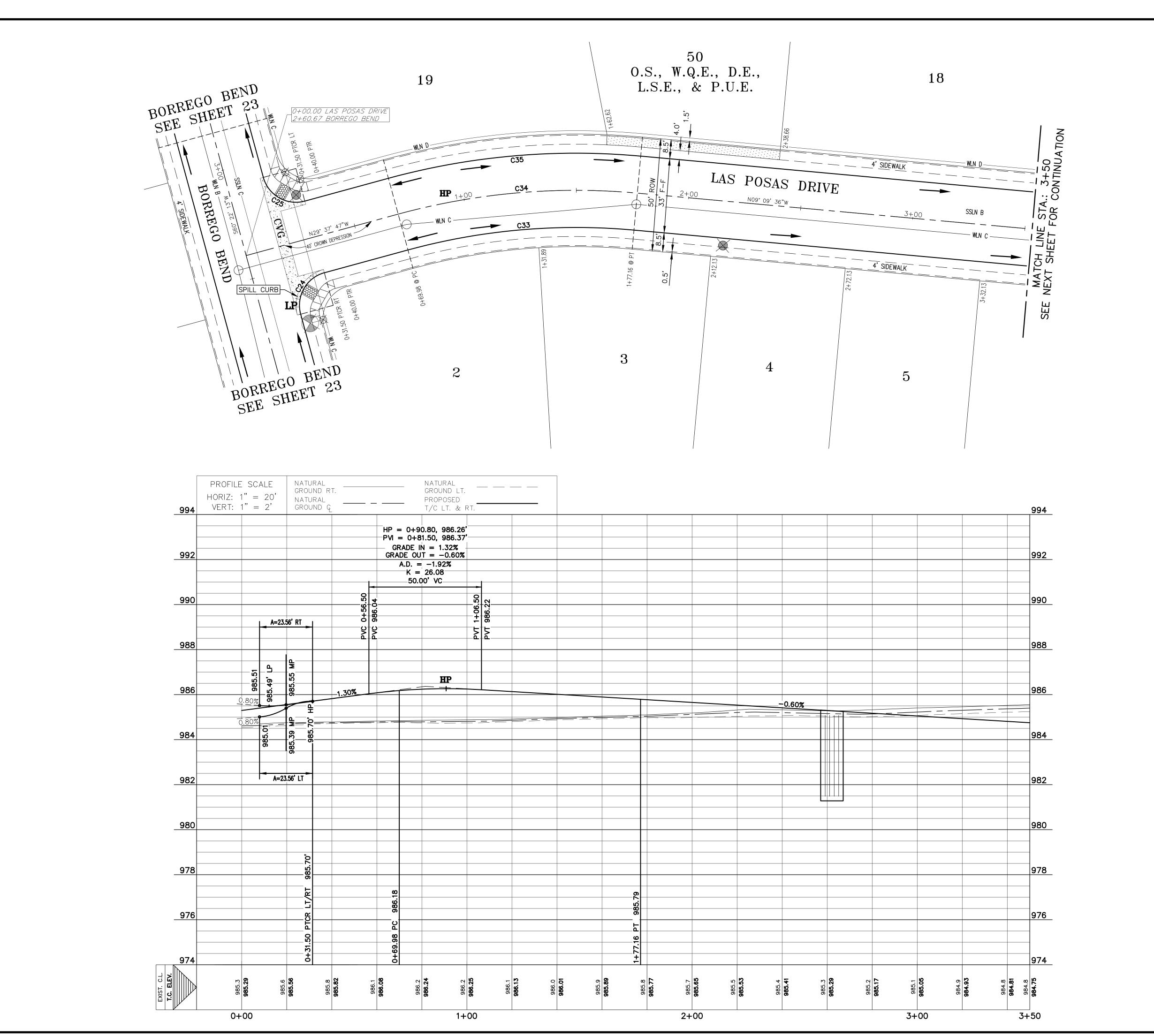
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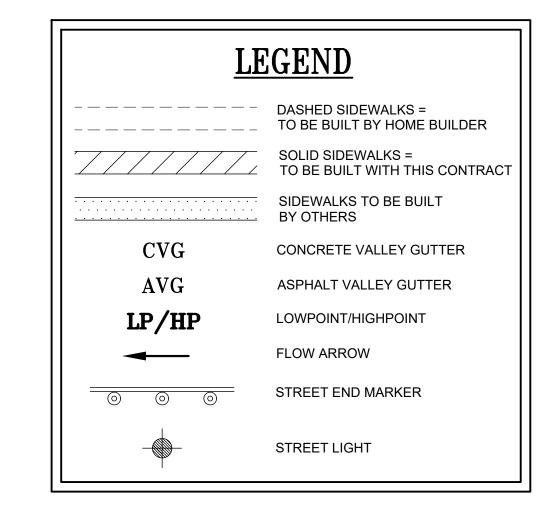
STEVEN P. CATES

CARLSON, BRIGANCE & DOERING, INC.
ID# F3791 2-27-2023

JAN 2023 5487

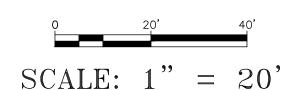
24 OF 56





ROADWAY	CLASSIFICATION	DESIGN SPEED
TIERRA ROSA BOULEVARD PLATFORM PARKWAY LAS POSAS DRIVE TRICIA COURT BORREGO BEND	COLLECTOR ROAD COLLECTOR ROAD LOCAL ROAD LOCAL ROAD LOCAL ROAD	35 MPH 35 MPH 25 MPH 25 MPH 25 MPH





0 "	- ··		rve Table		A 1 11
Curve #	Radius	Tangent	Delta	Chord	Arc Length
C24	15.00'	15.00'	090°00'00"	21.21'	23.56'
C25	15.00'	15.00'	090°00'00"	21.21'	23.56'
C33	283.50'	51.19'	020°28'11"	100.75'	101.28'
C34	300.00'	54.17'	020°28'11"	106.61'	107.18'
C35	316.50	57.15	020°28'11"	112.47	113.07'

DE	SIGN BY: SPC		D	RAF BY CE)
DATE						
REVISION						
	! 	ang, mc.	90	th Office 620 N., Ste. 600	Texas 78750	(512) 280-5165

& Doering,	#F3791 North Office 12129 RR 620 N., S Austin, Texas 78
Carlson, Brigance & Doering,	HRM ID #F3791 Main Office 5501 West William Cannon Dr. 12129 Austin, Texas 78749 Av

RITA RANCH PHASE 7B, SECTION 1	NAGE, WATER, AND WASTEWATER IMPROVEMENTS
ME: SANTA RITA RANCH	T: REET, DRAINAGE, WATER, AN

STEVEN P. CATES

93648

CARLSON, BRIGANCE & DOERING, INC.

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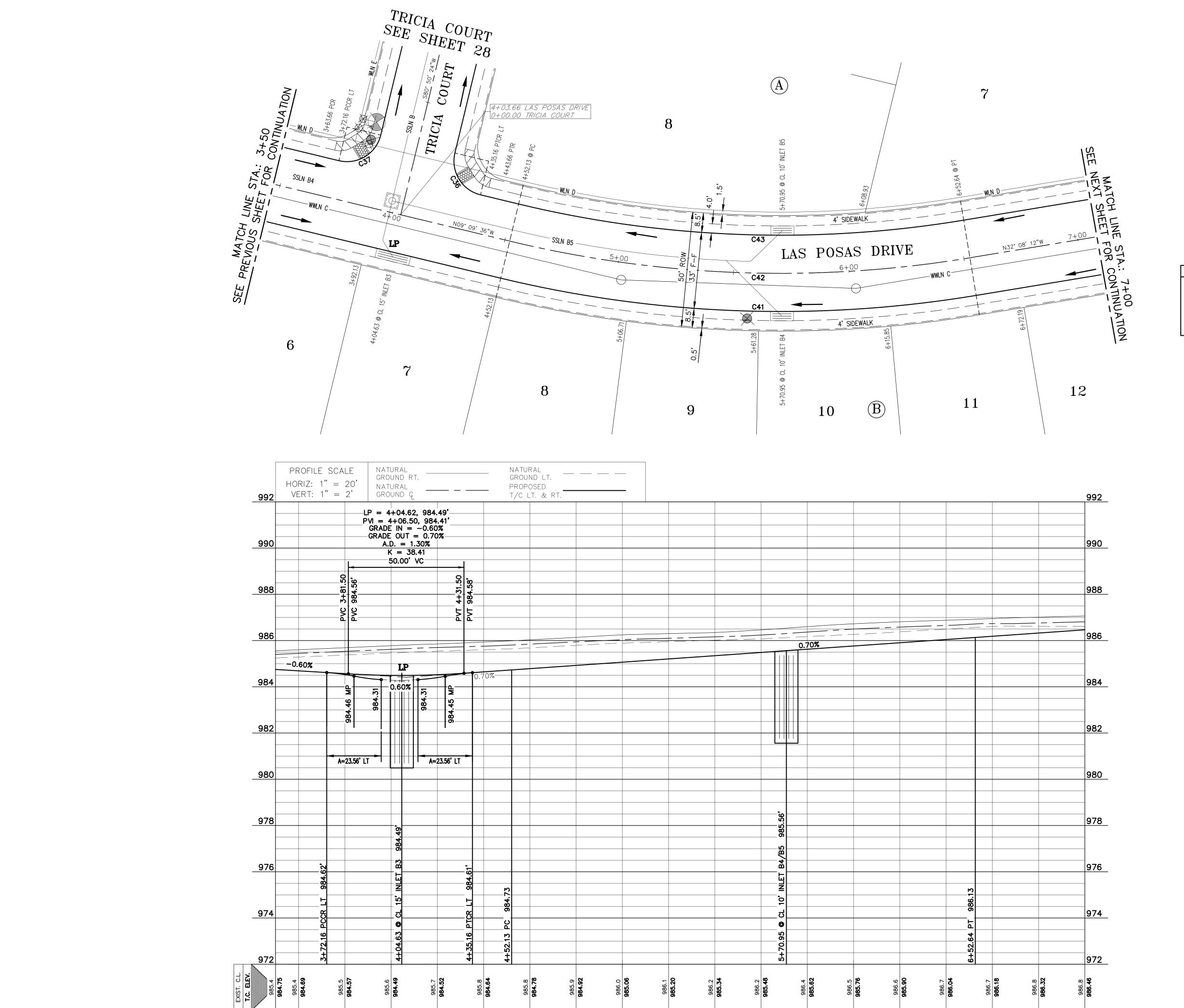
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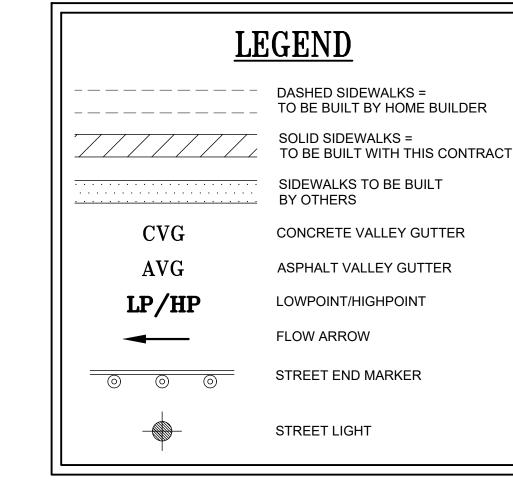


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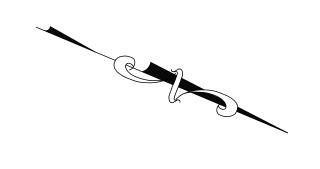
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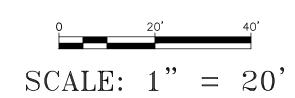
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ROADWAY	CLASSIFICATION	DESIGN SPEED
TIERRA ROSA BOULEVARD PLATFORM PARKWAY LAS POSAS DRIVE TRICIA COURT BORREGO BEND	COLLECTOR ROAD COLLECTOR ROAD LOCAL ROAD LOCAL ROAD LOCAL ROAD	35 MPH 35 MPH 25 MPH 25 MPH 25 MPH





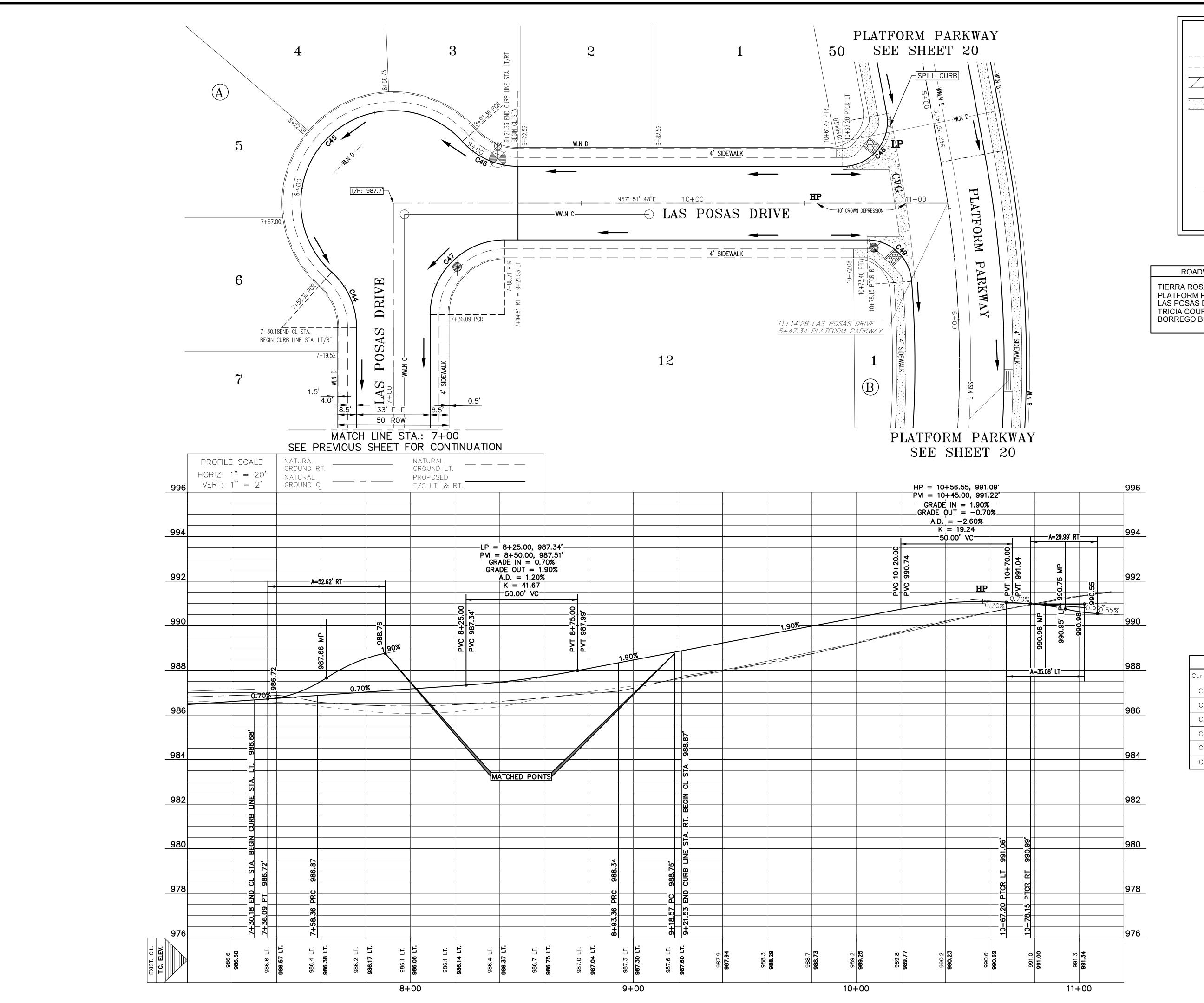
Curve Table					
Curve #	Radius	Tangent	Delta	Chord	Arc Length
C36	15.00'	15.00'	090°00'00"	21.21'	23.56'
C37	15.00'	15.00'	090°00'00"	21.21	23.56'
C41	516.50	104.97	022°58'36"	205.74	207.13'
C42	500.00'	101.62'	022°58'36"	199.17	200.51'
C43	483.50'	98.27'	022°58'36"	192.60'	193.89'

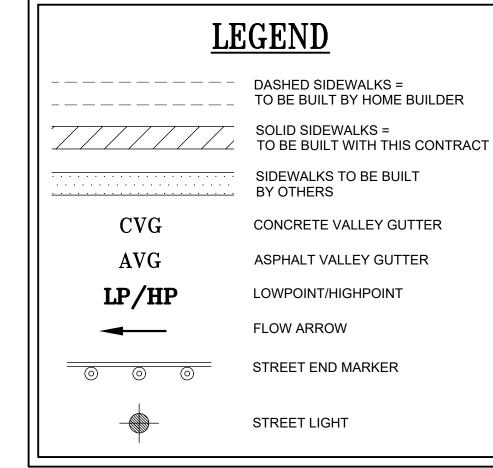
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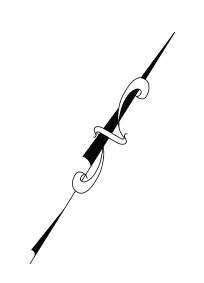
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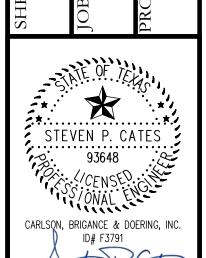
ROADWAY	CLASSIFICATION	DESIGN SPEED
TIERRA ROSA BOULEVARD PLATFORM PARKWAY LAS POSAS DRIVE TRICIA COURT BORREGO BEND	COLLECTOR ROAD COLLECTOR ROAD LOCAL ROAD LOCAL ROAD LOCAL ROAD	35 MPH 35 MPH 25 MPH 25 MPH 25 MPH



SCALE: 1" = 20

Curve Table						
Curve # Radius Tangent Delta Chord Arc Length						
C44	33.50'	14.98'	048°11'23"	27.35	28.18'	
C45	41.50'	754.62'	186°17'44"	82.87	134.94'	
C46	33.50'	15.03'	048°19'11"	27.42'	28.25'	
C47	33.50'	33.50'	090°00'00"	47.38'	52.62'	
C48	20.00'	24.04'	100°29'04"	30.75	35.08'	
C49	20.00'	18.62'	085°54'58"	27.26	29.99'	

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	SANTA RITA RANCH PHASE 7B, SECTION 1
> Carlso	LAS POSAS DRIVE (7+00 TO END)



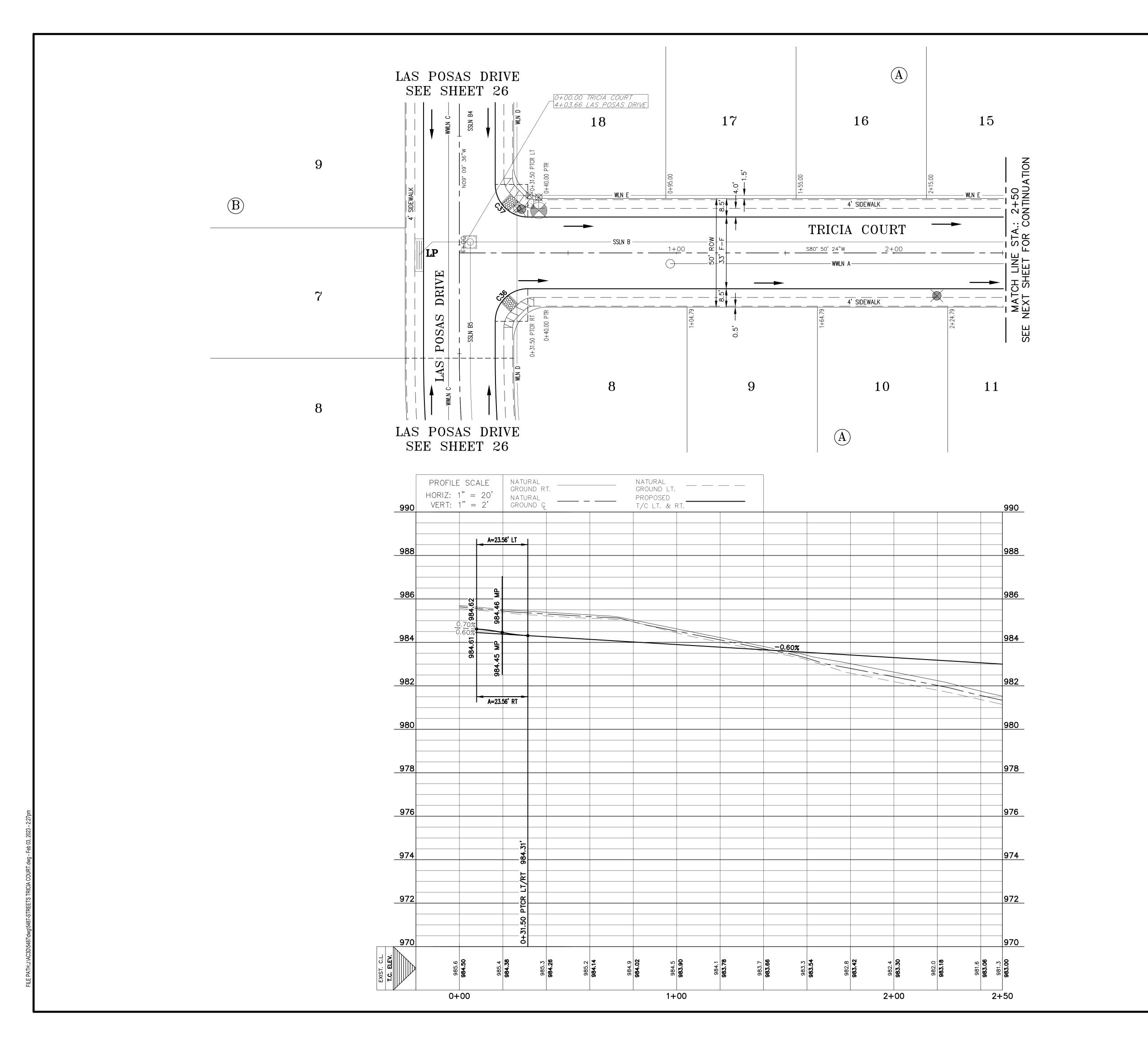
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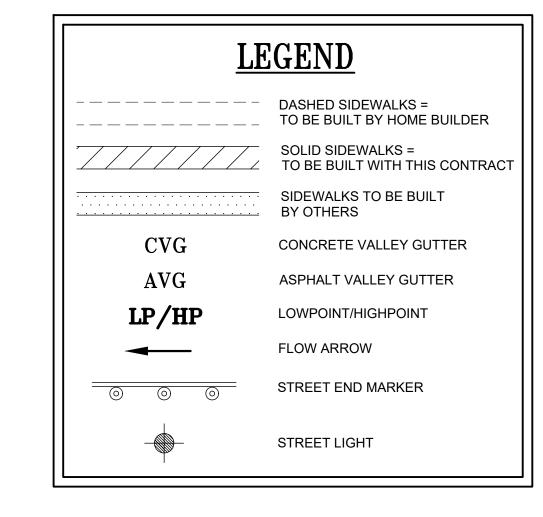
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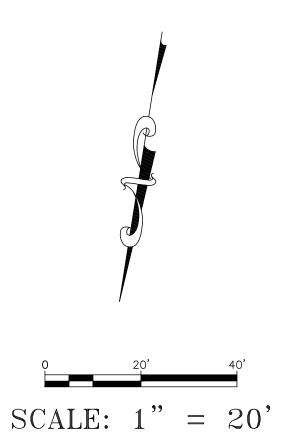
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27 OF 56

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ROADWAY	CLASSIFICATION	DESIGN SPEED
TIERRA ROSA BOULEVARD PLATFORM PARKWAY LAS POSAS DRIVE TRICIA COURT BORREGO BEND	COLLECTOR ROAD COLLECTOR ROAD LOCAL ROAD LOCAL ROAD LOCAL ROAD	35 MPH 35 MPH 25 MPH 25 MPH 25 MPH



Curve Table					
Curve #	Radius	Tangent	Delta	Chord	Arc Lengt
C36	15.00'	15.00'	090°00'00"	21.21'	23.56'
C37	15.00'	15.00'	090°00'00"	21.21'	23.56

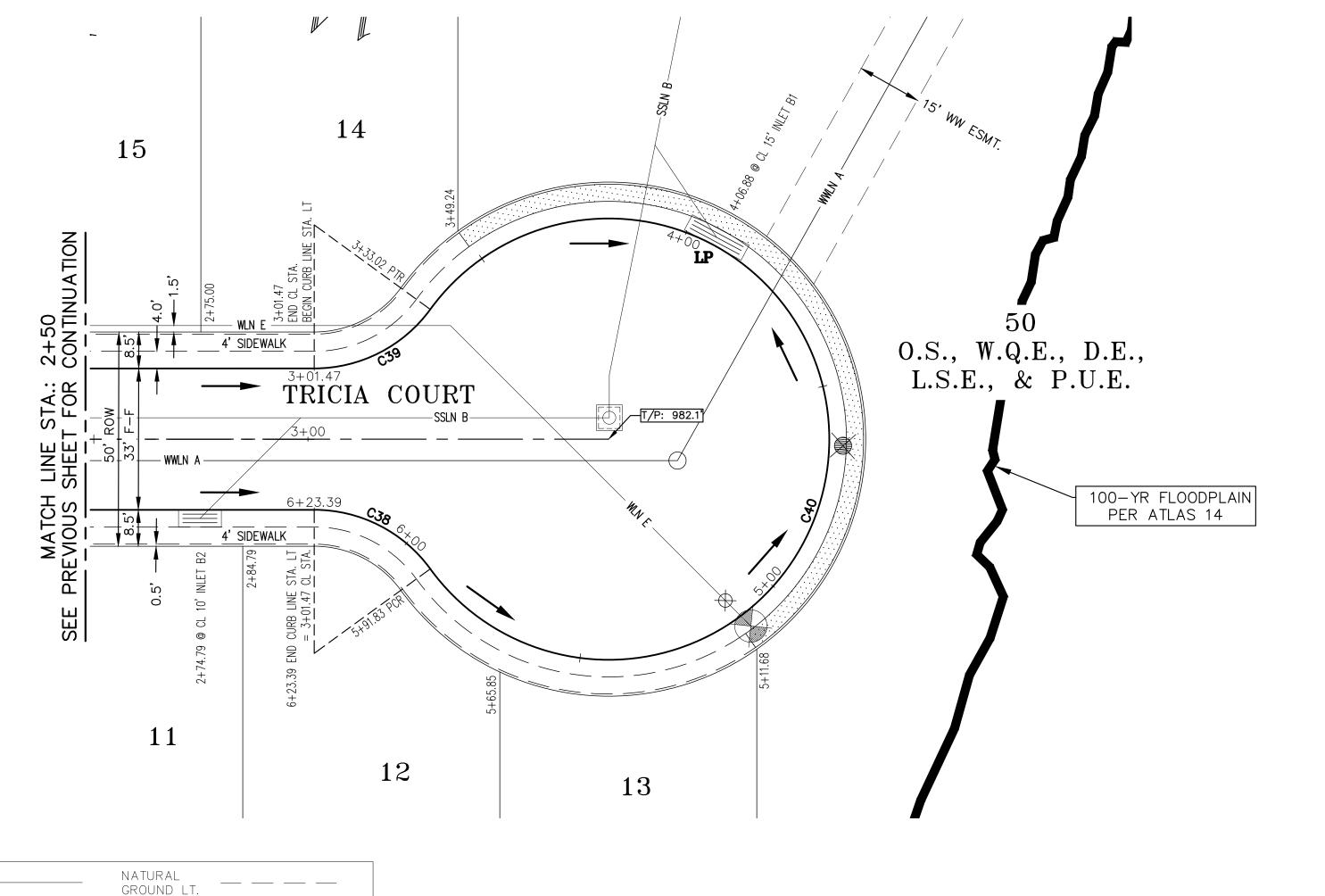
A ACarlson, Brigance &	Civil Engineering Su FIRM ID #F3	5501 Wes Aus
SHEET NAME: TRICIA COURT (0+00 TO 2+50)	JOB NAME: SANTA RITA RANCH PHASE 7B, SECTION 1	PROJECT: STREET, DRAINAGE, WATER, AND WASTEWATER IMPROVEMENTS

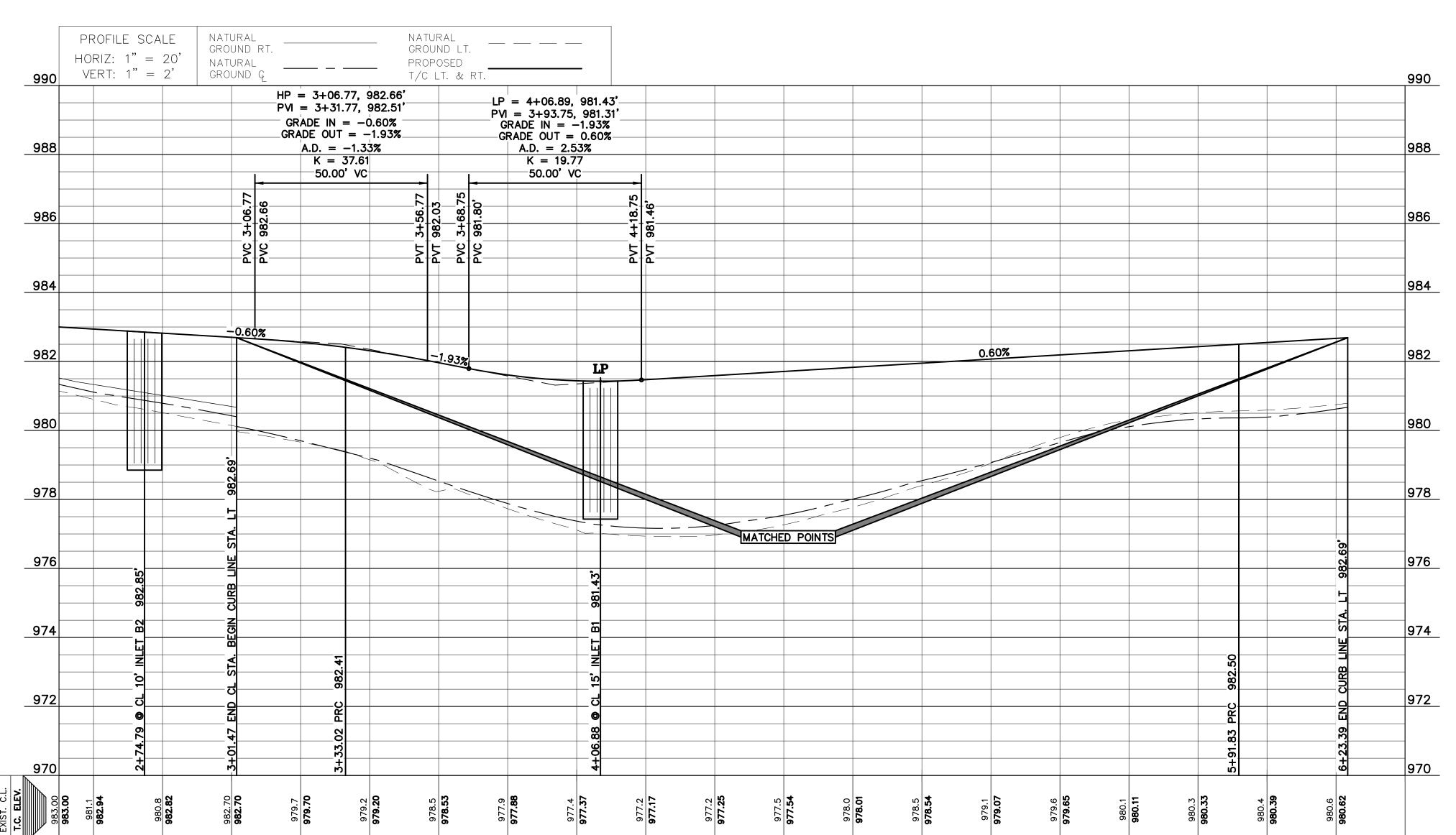
CARLSON, BRIGANCE & DOERING, INC.
ID# F3791

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28 of 56



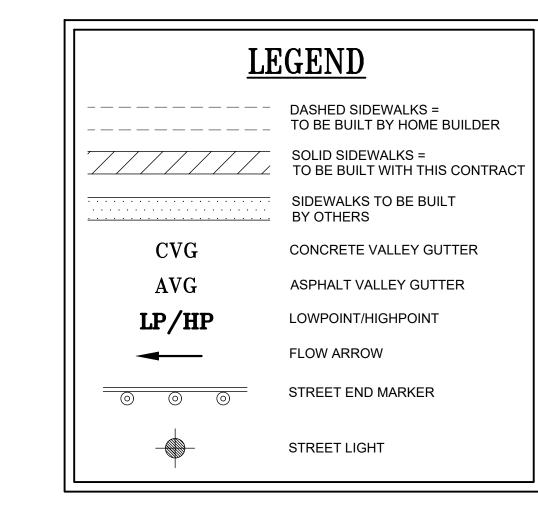


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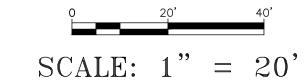
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ROADWAY	CLASSIFICATION	DESIGN SPEED
TIERRA ROSA BOULEVARD PLATFORM PARKWAY LAS POSAS DRIVE TRICIA COURT BORREGO BEND	COLLECTOR ROAD COLLECTOR ROAD LOCAL ROAD LOCAL ROAD LOCAL ROAD	35 MPH 35 MPH 25 MPH 25 MPH 25 MPH





Curve Table						
Curve #	Radius	Tangent	Delta	Chord	Arc Length	
C38	33.50'	17.06'	053°58'05"	30.40'	31.55'	
C39	33.50'	17.06'	053°58'05"	30.40'	31.55'	
C40	51.50'	37.46'	287°56'10"	60.59	258.81'	

6+00

DESIGNED BY: SPC		D	RAF BY CE	Y:)			
DATE								
REVISION								
		nng, mc.		25 (orth Ornce 620 N., Ste. 600	Texas 78750	(512) 280-5165	

& Doering, Surveying	#F3791 North Office 12129 RR 620 N., St Austin, Texas 787
Carlson, Brigance & Doering, Civil Engineering Surveying	FIRM ID #F3791 Main Office 5501 West William Cannon Dr. 12129 Austin, Texas 78749 Av

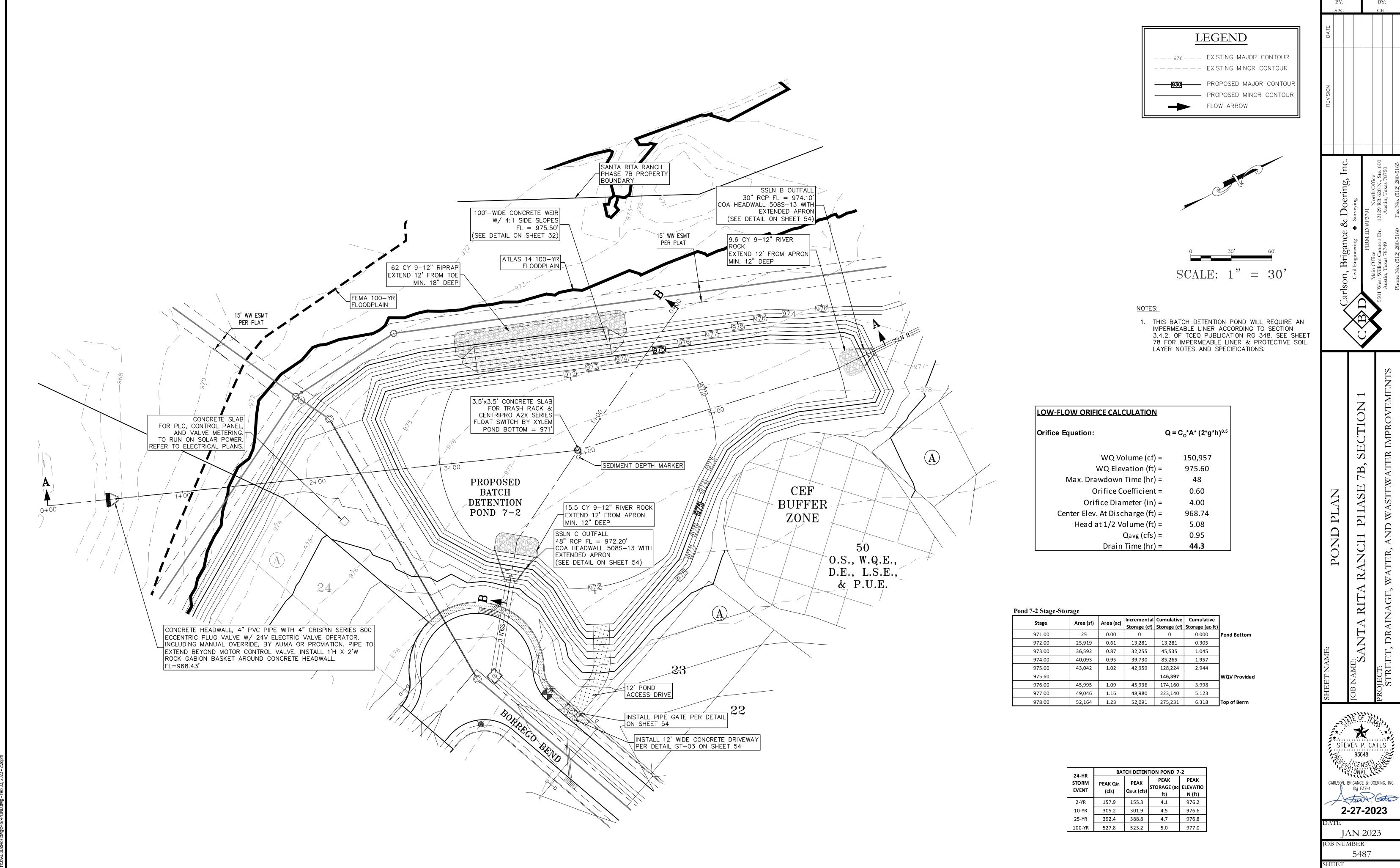
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) END)	AITA RANCH PHASE 7B, SECTION 1	ET, DRAINAGE, WATER, AND WASTEWATER IMPROVEMENTS
'RICIA COURT (2+50 TO END)	PHASE 7	ID WASTEW
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TRIC	SANTA RIT	DRAINAGE,
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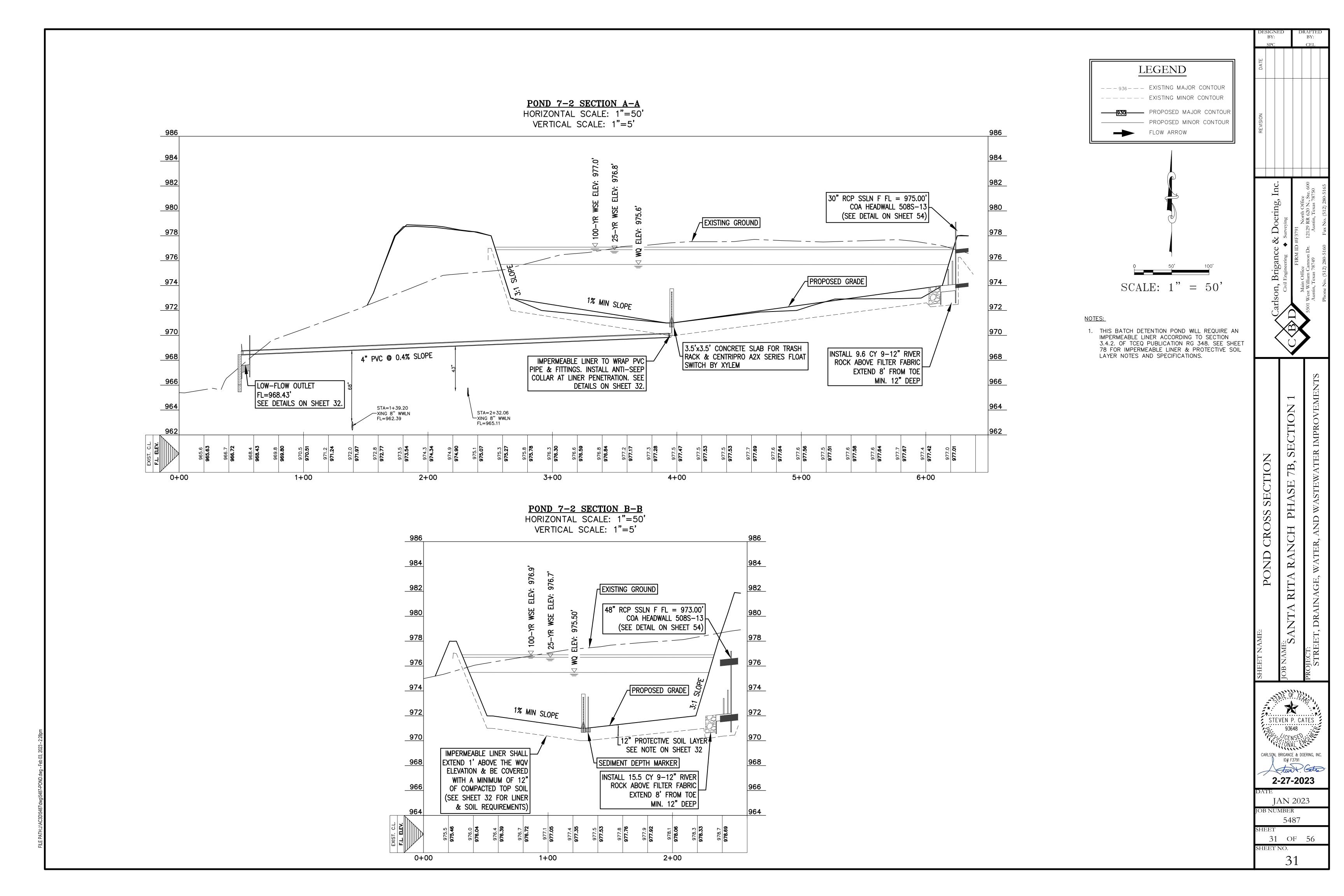
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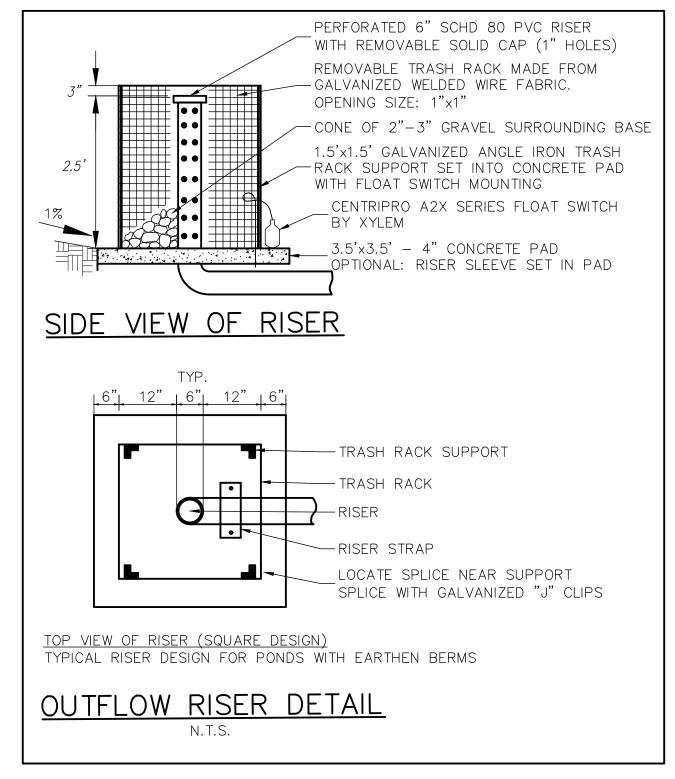
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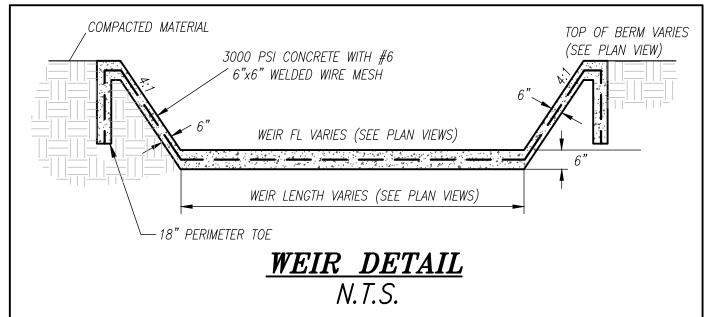
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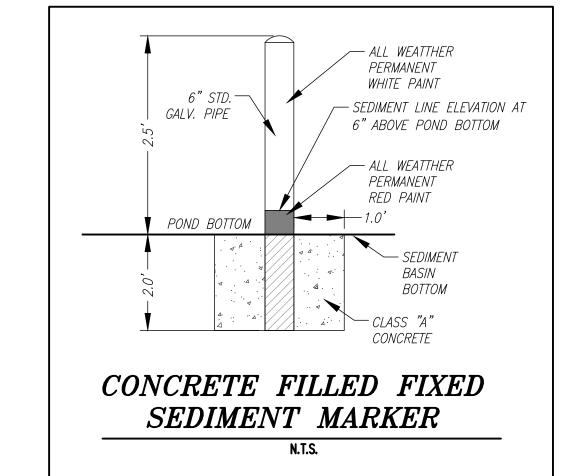
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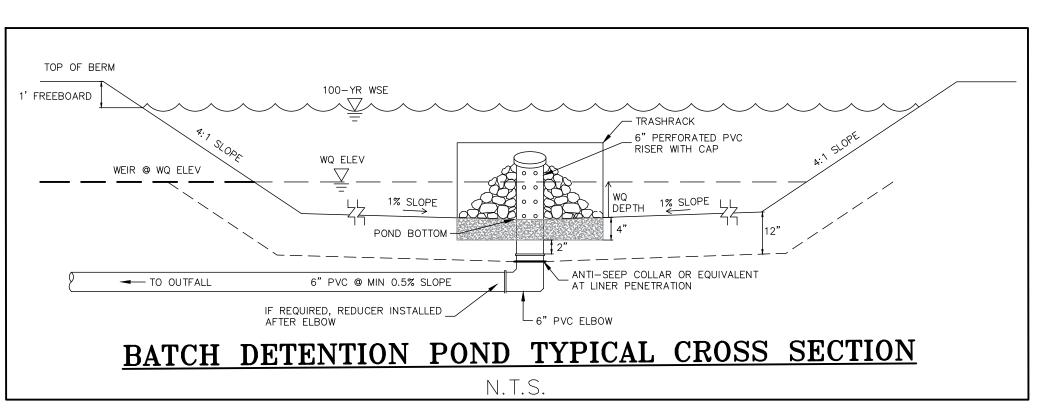


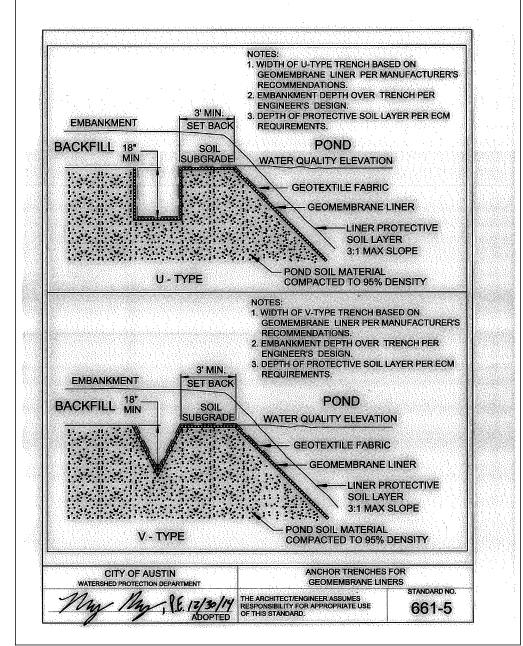


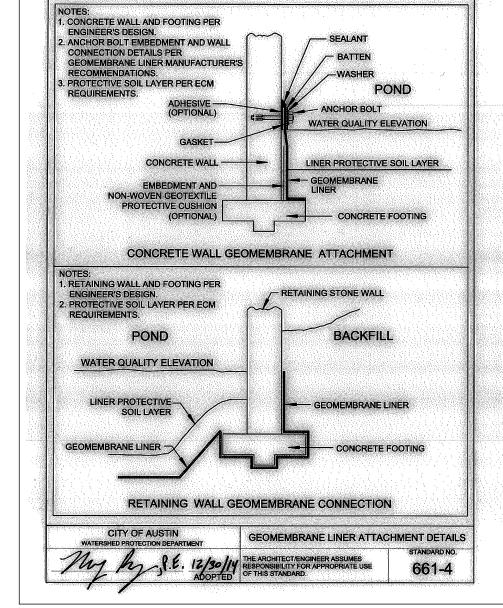












INSPECTION, MAINTENANCE, REPAIR AND RETROFIT PLAN:

TEMPORARY BMP'S:

BEST MANAGEMENT PRACTICES (BMP'S) INSTALLED DURING CONSTRUCTION WILL BE MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EPA'S NPDES STORMWATER POLLUTION PREVENTION PROGRAM. THE CONSTRUCTION SUPERINTENDENT WILL INSPECT TEMPORARY EROSION CONTROLS ON A REGULAR BASIS AND ADJUST THE CONTROLS AND/OR REMOVE ANY SEDIMENT BUILDUP IN ACCORDANCE WITH THE EROSION/SEDIMENTATION CONTROL NOTES AND AS OTHERWISE DIRECTED BY THE OWNER OR HIS DESIGNATED REPRESENTATIVE. TEMPORARY EROSION CONTROLS SHOULD BE INSPECTED, MAINTAINED, AND REPAIRED, AT A MINIMUM, EVERY SEVEN (7) DAYS AND WITHIN 24 HOURS OF A STORM OF 0.5 INCHES OR MORE RAINFALL DEPTH. SEDIMENT SHALL BE REMOVED FROM CONTROLS WHEN 50% OF THE DESIGN HEIGHT IS EXCEEDED. FOLLOWING INSPECTION OF THE BMP'S, DEFICIENCIES SHALL BE NOTED AND CORRECTED BY THE CONTRACTOR.

PERMANENT BMP:

BATCH DETENTION BASINS

- INSPECTIONS. BASINS SHOULD BE INSPECTED AT LEAST TWICE A YEAR (ONCE DURING OR IMMEDIATELY FOLLOWING WET WEATHER) TO EVALUATE FACILITY OPERATION. WHEN POSSIBLE, INSPECTIONS SHOULD BE CONDUCTED DURING WET WEATHER TO DETERMINE IF THE POND IS MEETING THE TARGET DETENTION TIME OF 12 HOURS AND A DRAWDOWN OF NO MORE THAN 48 HOURS. IN PARTICULAR, THE DETENTION CONTROL DEVICE SHOULD BE REGULARLY INSPECTED FOR EVIDENCE OF CLOGGING, OR CONVERSELY, FOR TOO RAPID A RELEASE. IF THE DETENTION TIME IS LESS THAN 12 HOURS OR THE DRAWDOWN TIME IS EXCEEDED BY MORE THAN 24 HOURS, THEN REPAIRS SHOULD BE SCHEDULED IMMEDIATELY. DURING EACH INSPECTION, EROSION AREAS INSIDE AND DOWNSTREAM OF THE BMP SHOULD BE IDENTIFIED AND REPAIRED OR REVEGETATED IMMEDIATELY.
- MOWING. THE BASIN, SIDE SLOPES, EMBANKMENT, AND EMERGENCY SPILLWAY OF A BATCH DETENTION BASIN MUST BE MOWED REGULARLY TO DISCOURAGE WOODY GROWTH AND CONTROL WEEDS. GRASS AREAS IN AND AROUND BASINS SHOULD BE MOWED AT LEAST TWICE ANNUALLY TO LIMIT VEGETATION HEIGHT TO 18 INCHES. MORE FREQUENT MOWING TO MAINTAIN AESTHETIC APPEAL MAY BE NECESSARY IN LANDSCAPED AREAS. WHEN MOWING OF GRASS IS PERFORMED, A MULCHING MOWER SHOULD BE USED, OR GRASS CLIPPINGS SHOULD BE CAUGHT AND REMOVED.
- DEBRIS AND LITTER REMOVAL. DEBRIS AND LITTER WILL ACCUMULATE NEAR THE DETENTION CONTROL DEVICE AND SHOULD BE REMOVED DURING REGULAR MOWING OPERATIONS AND INSPECTIONS. PARTICULAR ATTENTION SHOULD BE PAID TO FLOATING DEBRIS THAT CAN EVENTUALLY CLOG THE CONTROL DEVICE OR RISER.
- EROSION CONTROL. THE BASIN SIDE SLOPES, EMERGENCY SPILLWAY, AND EMBANKMENT ALL MAY PERIODICALLY SUFFER FROM SLUMPING AND EROSION, ALTHOUGH THIS SHOULD NOT OCCUR OFTEN IF THE SOILS ARE PROPERLY COMPACTED DURING CONSTRUCTION. REGRADING AND REVEGETATION MAY BE REQUIRED TO CORRECT THE PROBLEMS.
- STRUCTURAL REPAIRS AND REPLACEMENT. WITH EACH INSPECTION, ANY DAMAGE TO THE STRUCTURAL ELEMENTS OF THE SYSTEM (PIPES, CONCRETE DRAINAGE STRUCTURES, RETAINING WALLS, ETC.) SHOULD BE IDENTIFIED AND REPAIRED IMMEDIATELY. THESE REPAIRS SHOULD INCLUDE PATCHING OF CRACKED CONCRETE, SEALING OF VOIDS, AND REMOVAL OF VEGETATION FROM CRACKS AND JOINTS. THE VARIOUS INLET/OUTLET AND RISER WORKS IN A BASIN WILL EVENTUALLY DETERIORATE AND MUST BE REPLACED. PUBLIC WORKS EXPERTS HAVE ESTIMATED THAT CORRUGATED METAL PIPE (CMP) HAS A USEFUL LIFE OF ABOUT 25 YR, WHEREAS REINFORCED CONCRETE BARRELS AND RISERS MAY LAST FROM 50 TO 75 YR.
- NUISANCE CONTROL. STANDING WATER MAY OCCUR AFTER A STORM EVENT SINCE THE VALVE MAY CLOSE WITH 2 TO 3 INCHES OF WATER IN THE BASIN. FLOW SUCH AS SPRING FLOW AND RESIDENTIAL WATER USE MAY DISCHARGE INTO THE BASIN BETWEEN STORM EVENTS THAT DO NOT ENGAGE THE LEVEL SENSOR. STANDING WATER CAN CREATE NUISANCE CONDITIONS FOR NEARBY RESIDENTS. ODORS, MOSQUITOES, WEEDS, AND LITTER ARE ALL OCCASIONALLY PERCEIVED TO BE PROBLEMS. MOST OF THESE PROBLEMS ARE GENERALLY A SIGN THAT REGULAR INSPECTIONS AND MAINTENANCE ARE NOT BEING PERFORMED (E.G., MOWING, DEBRIS REMOVAL, CLEARING THE OUTLET CONTROL DEVICE). TWICE A YEAR, THE FACILITY SHOULD BE EVALUATED FOR NUISANCE CONTROL.
- SEDIMENT REMOVAL. WHEN PROPERLY DESIGNED, BATCH DETENTION BASINS WILL ACCUMULATE QUANTITIES OF SEDIMENT OVER TIME. SEDIMENT ACCUMULATION IS A SERIOUS MAINTENANCE CONCERN IN BATCH DETENTION PONDS FOR SEVERAL REASONS. FIRST, SEDIMENT ACCUMULATION CAN MAKE BATCH DETENTION BASINS VERY UNSIGHTLY. SECOND, THE SEDIMENT DEPOSITION GRADUALLY REDUCES AVAILABLE STORAGE CAPACITY RESERVED FOR POLLUTANT REMOVAL AND DETENTION WITHIN THE BASIN. THIRD, SEDIMENT TENDS TO ACCUMULATE AROUND THE OUTLET CONTROL DEVICE. THIS INCREASES THE RISK OF CLOGGING THE ORIFICE OR INTERFERING WITH THE LEVEL SENSOR, WHICH CAN IN TURN REDUCE THE TREATMENT EFFICACY OF THE FACILITY. SEDIMENT CAN BE RESUSPENDED IF ALLOWED TO ACCUMULATE OVER TIME AND ESCAPE THROUGH THE HYDRAULIC CONTROL TO DOWNSTREAM CHANNELS AND STREAMS. FOR THESE REASONS, ACCUMULATED SEDIMENT NEEDS TO BE REMOVED FROM THE BASIN WHEN SEDIMENT DEPTH EXCEEDS 6 INCHES, WHEN SEDIMENT INTERFERES WITH THE LEVEL SENSOR, WHEN THE BASIN DOES NOT DRAIN WITHIN 48 HOURS, OR AT LEAST EVERY 5 YEARS.
- LOGIC CONTROLLER. THE LOGIC CONTROLLER SHOULD BE INSPECTED AS PART OF THE TWICE YEARLY INSPECTIONS. VERIFY THAT THE EXTERNAL INDICATORS (ACTIVE, CYCLE IN PROGRESS) ARE OPERATING PROPERLY BY TURNING THE CONTROLLER OFF AND ON, AND BY INITIATING A CYCLE BY TRIGGERING THE LEVEL SENSOR IN THE BASIN. THE VALVE SHOULD BE MANUALLY OPENED AND CLOSED USING THE OPEN/CLOSE SWITCH TO VERIFY VALVE OPERATION AND TO ASSIST IN INSPECTING THE VALVE FOR DEBRIS. THE SOLAR PANEL SHOULD BE INSPECTED AND ANY DUST OR DEBRIS ON THE PANEL SHOULD BE CAREFULLY REMOVED. THE CONTROLLER AND ALL OTHER CIRCUITRY AND WIRING SHOULD BE INSPECTED FOR SIGNS OF CORROSION, DAMAGE FROM INSECTS, WATER LEAKS, OR OTHER DAMAGE. AT THE END OF THE INSPECTION, THE CONTROLLER SHOULD BE RESET.

ULTIMATELY, THESE FACILITIES WILL BE OWNED, OPERATED AND MAINTAINED BY THE PROPOSED WILLIAMSON COUNTY MUD NO. 19C UNTIL THE OWNERSHIP OF FACILITIES IS TRANSFERRED TO THE MUD, SANTA RITA C7 INVESTMENTS LLC WILL BE RESPONSIBLE FOR MAINTENANCE OF THESE FACILITIES IN ACCORDANCE WITH THE ABOVE STATED REQUIREMENTS.

IMPERMEABLE LINER NOTES

IMPERMEABLE LINERS SHOULD BE USED FOR WATER QUALITY BASINS (RETENTION, EXTENDED DETENTION, SAND FILTERS, WET PONDS, CONSTRUCTED WETLANDS, AND BATCH DETENTION PONDS) LOCATED OVER THE RECHARGE ZONE AND IN AREAS WITH THE POTENTIAL FOR GROUNDWATER CONTAMINATION. IMPERMEABLE LINERS MAY BE CLAY, CONCRETE OR GEOMEMBRANE. IF GEOMEMBRANE IS USED, SUITABLE GEOTEXTILE FABRIC SHOULD BE PLACED ON THE TOP AND BOTTOM OF THE MEMBRANE FOR PUNCTURE PROTECTION AND THE LINERS COVERED WITH A MINIMUM OF 6 INCHES OF COMPACTED TOPSOIL. THE TOPSOIL SHOULD BE STABILIZED WITH APPROPRIATE VEGETATION. CLAY LINERS SHOULD MEET THE SPECIFICATIONS IN TABLE 3-6 AND HAVE A MINIMUM THICKNESS OF 12 INCHES.

TABLE 3-6 CLAY LINER SPECIFICATIONS (COA, 2004)						
PROPERTY TEST METHOD UNIT SPECIFICATION (MIN.)						
PERMEABILITY	ASTM D-2434	%	1 x 10 ⁻⁶			
PLASTICITY INDEX OF CLAY	ASTM D-423 & D-424	%	NOT LESS THAN 15			
LIQUID LIMIT OF CLAY	ASTM D-2216	%	NOT LESS THAN 30			
CLAY PARTICLES PASSING	ASTM D-422	%	NOT LESS THAN 30			
CLAY COMPACTION	ASTM D-2216	%	95% OF STANDARD PROCTOR DENSITY			

IF A GEOMEMBRANE LINER IS USED IT SHOULD HAVE A MINIMUM THICKNESS OF 30 MILS AND BE ULTRAVIOLET RESISTANT. THE GEOTEXTILE FABRIC (FOR PROTECTION OF GEOMEMBRANE) SHOULD BE NONWOVEN GEOTEXTILE FABRIC AND MEET THE SPECIFICATIONS IN TABLE 3-7.

TABLE 3-7 GEOTEXTILE FABRIC SPECIFICATIONS (COA, 2004)						
PROPERTY TEST METHOD UNIT SPECIFICATION (
UNIT WEIGHT	UNIT WEIGHT OZ/YD ²					
FILTRATION RATE	IN/SEC	0.0800				
PUNCTURE STRENGTH	ASTM D-751*	lb	125			
MULLEN BURST STRENGTH	ASTM-D751	psi	400			
TENSILE STRENGTH	TENSILE STRENGTH ASTM D-1682 EQUIV. OPENING SIZE US STANDARD SIEVE		200			
EQUIV. OPENING SIZE			80			

PROTECTIVE SOIL LAYER NOTES

THE WET AND BATCH DETENTION PONDS WILL BE CONSTRUCTED WITH A MINIMUM OF 12" OF A PROTECTION SOIL LAYER ABOVE THE SELECTED IMPERMEABLE LINER SO THAT PLANTINGS CAN BE PROPERLY INSTALLED ABOVE THE LINER AND LINER INTEGRITY CAN BE MAINTAINED.

MATERIAL PLACED OVER LINER TO CONSIST OF SOIL THAT CLASSIFIES PER USDA STANDARDS AS A SANDY CLAY LOAM, SANDY CLAY, OR CLAY LOAM. THE SOIL SHALL BE FREE OF ORGANICS AND ANGULAR/SHARP MATERIALS, AND SHALL CONTAIN NO MATERIALS GREATER THAN 1" IN DIAMETER. MATERIAL TO BE PLACED AND COMPACTED IN TWO UNIFORM LIFTS

DESIGNED
BY:
SPC
CEL

AND ONE OF THE PROPERTY

ivil Engineering Surveying

FIRM ID #F3791

ain Office
William Cannon Dr. 12129 RR 620 N., Ste. 600

Austin, Texas 78749

Austin, Texas 78750

Carlson, Br Civil Eng Main Offi 5501 West William Austin, Texas

NTA RITA RANCH PHASE 7B, SECTION
ORAINAGE, WATER, AND WASTEWATER IMPROVE

STEVEN P. CATES

93648

CARLSON, BRIGANCE & DOERING, INC.

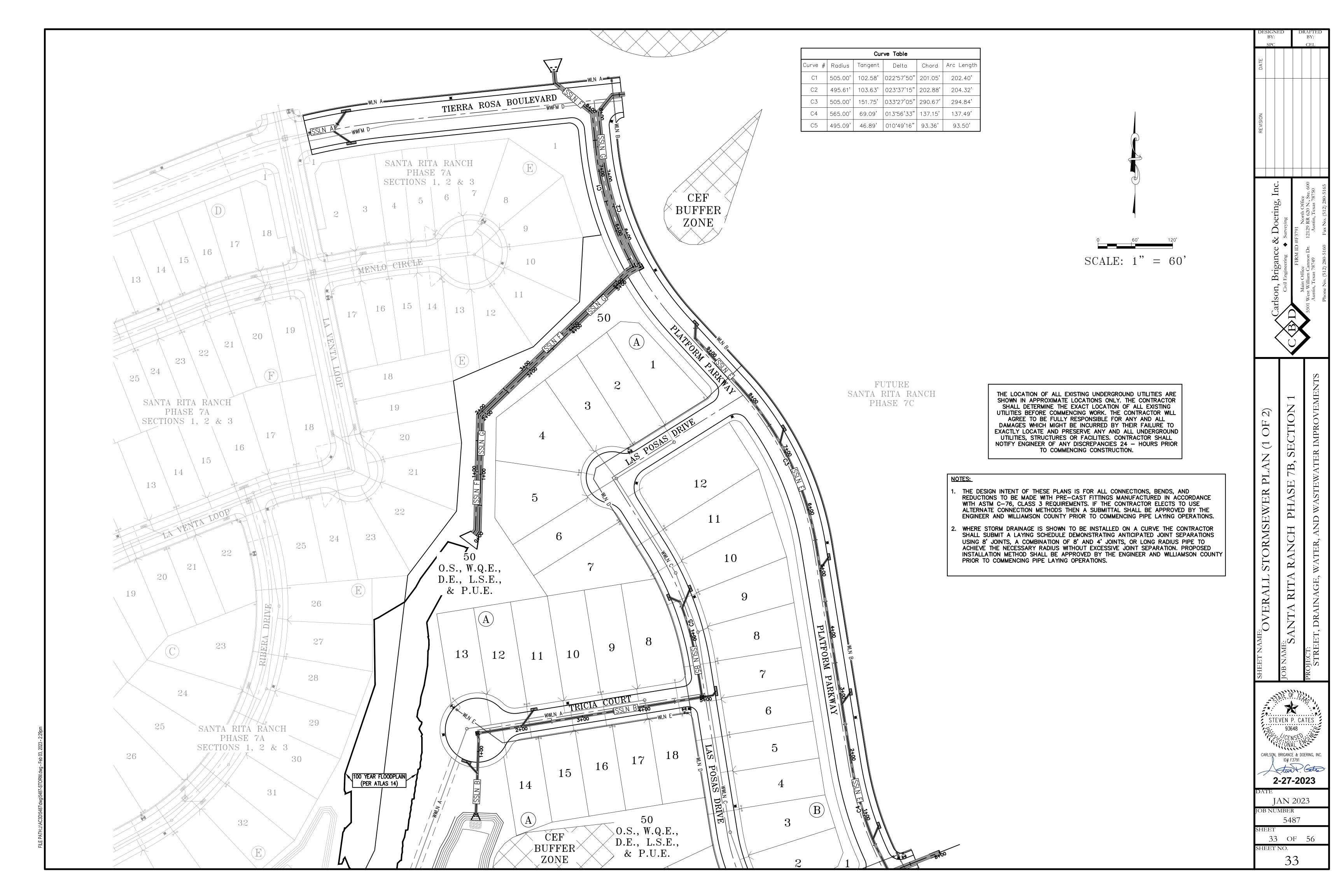
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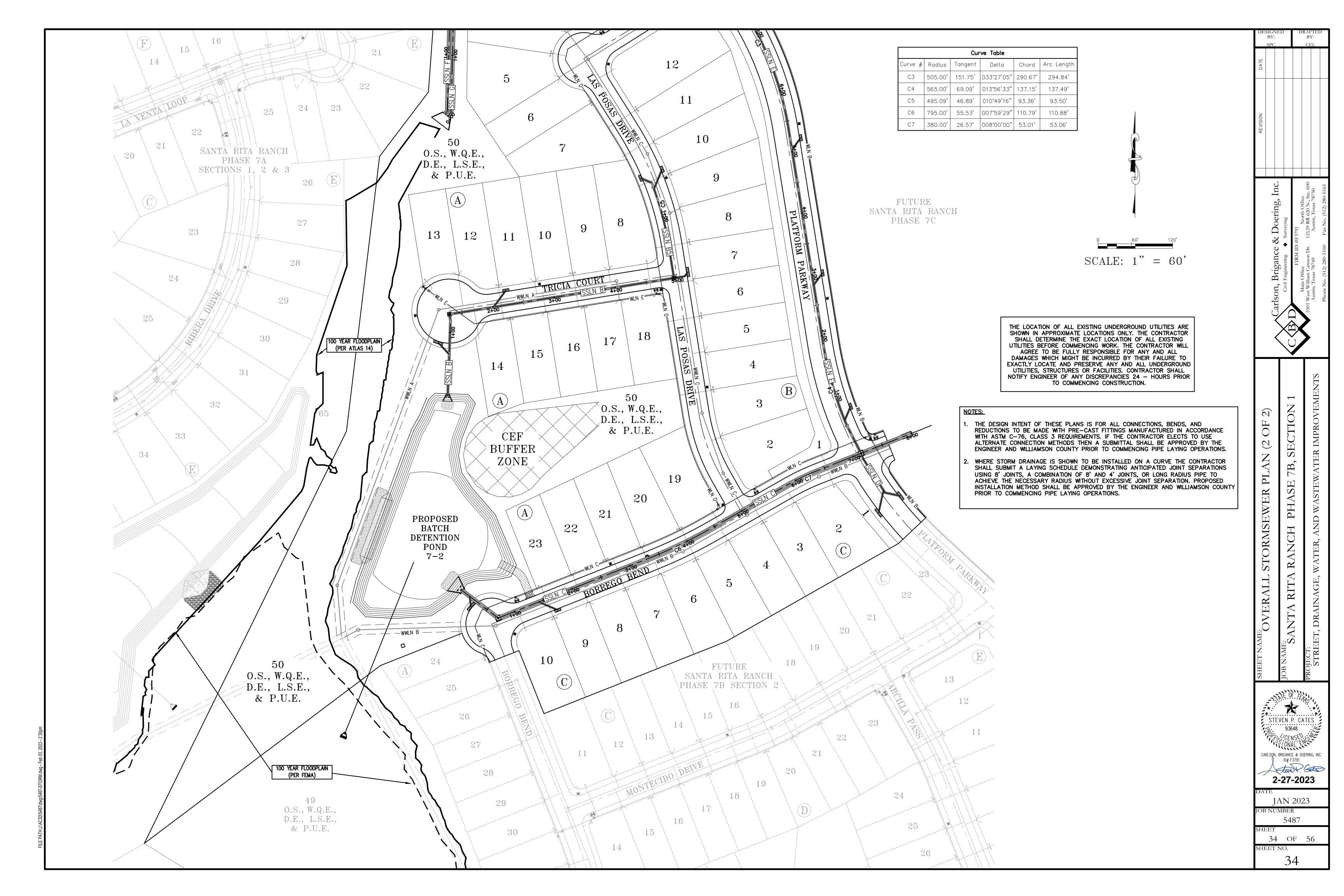
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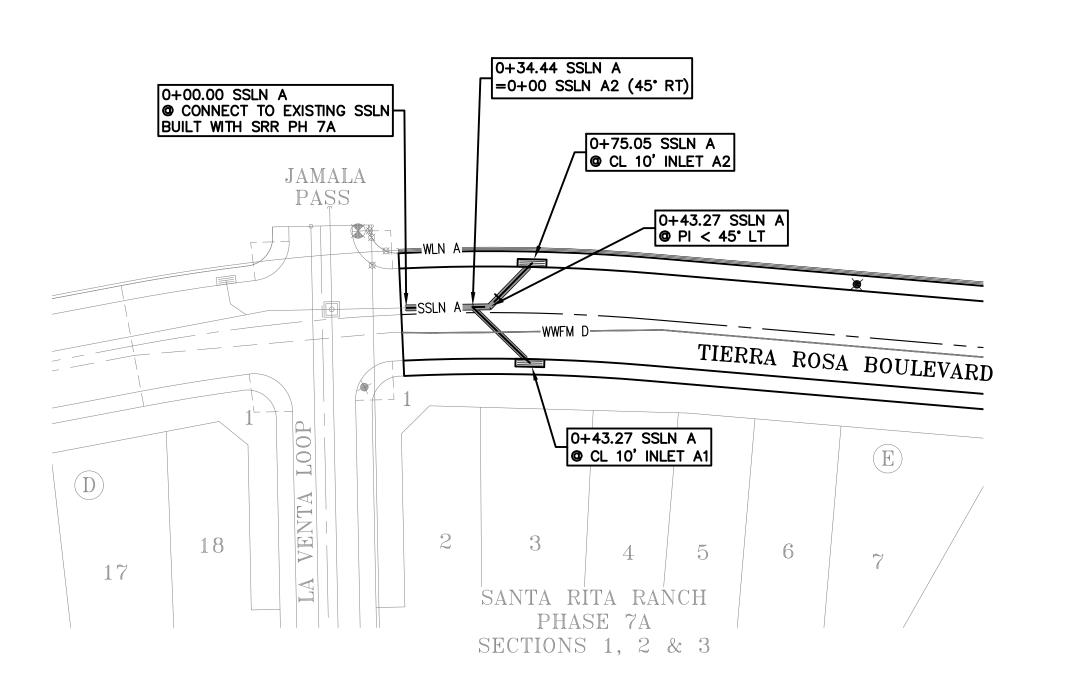
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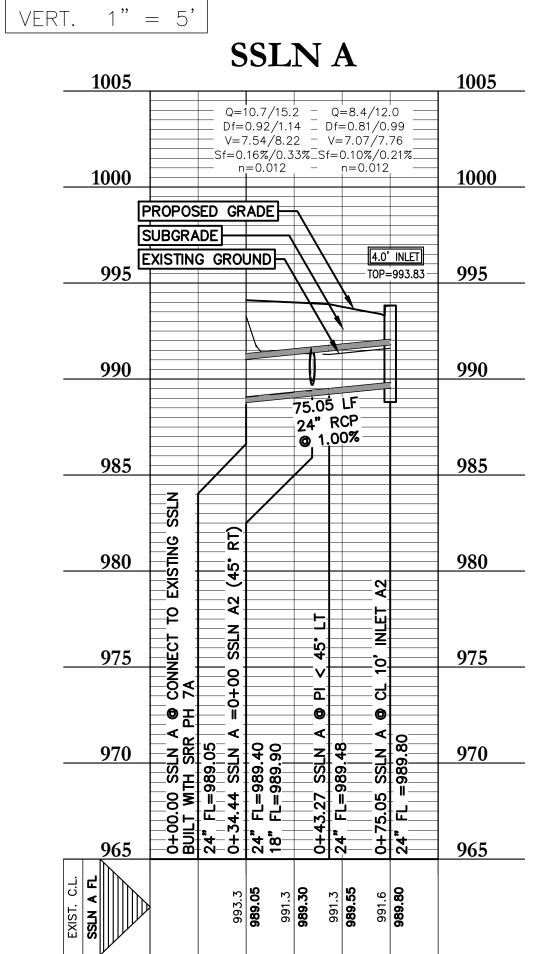
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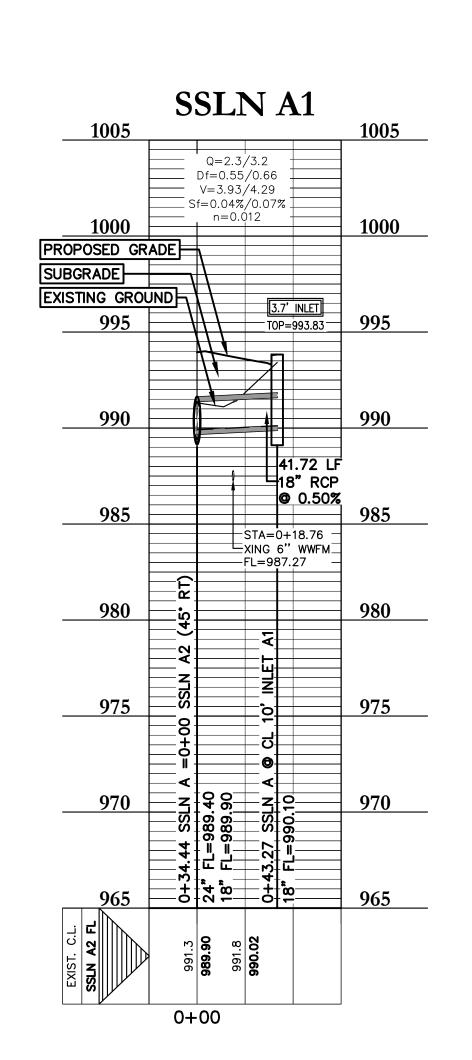


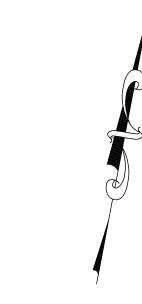


| HORIZ. 1" = 50" |



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SCALE: 1" = 50'

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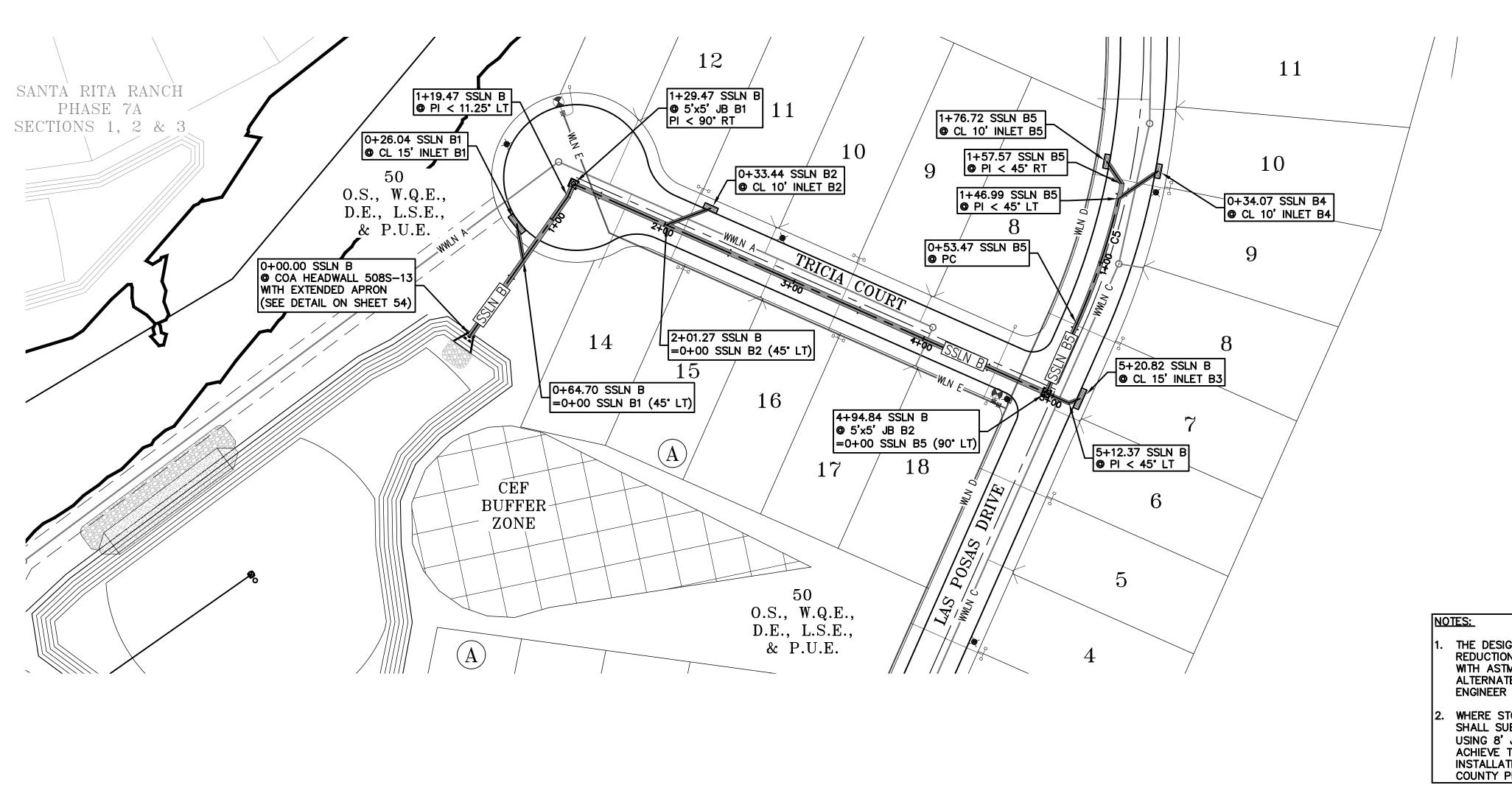
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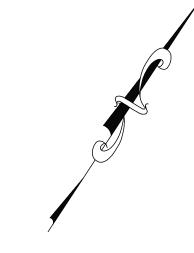
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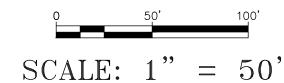
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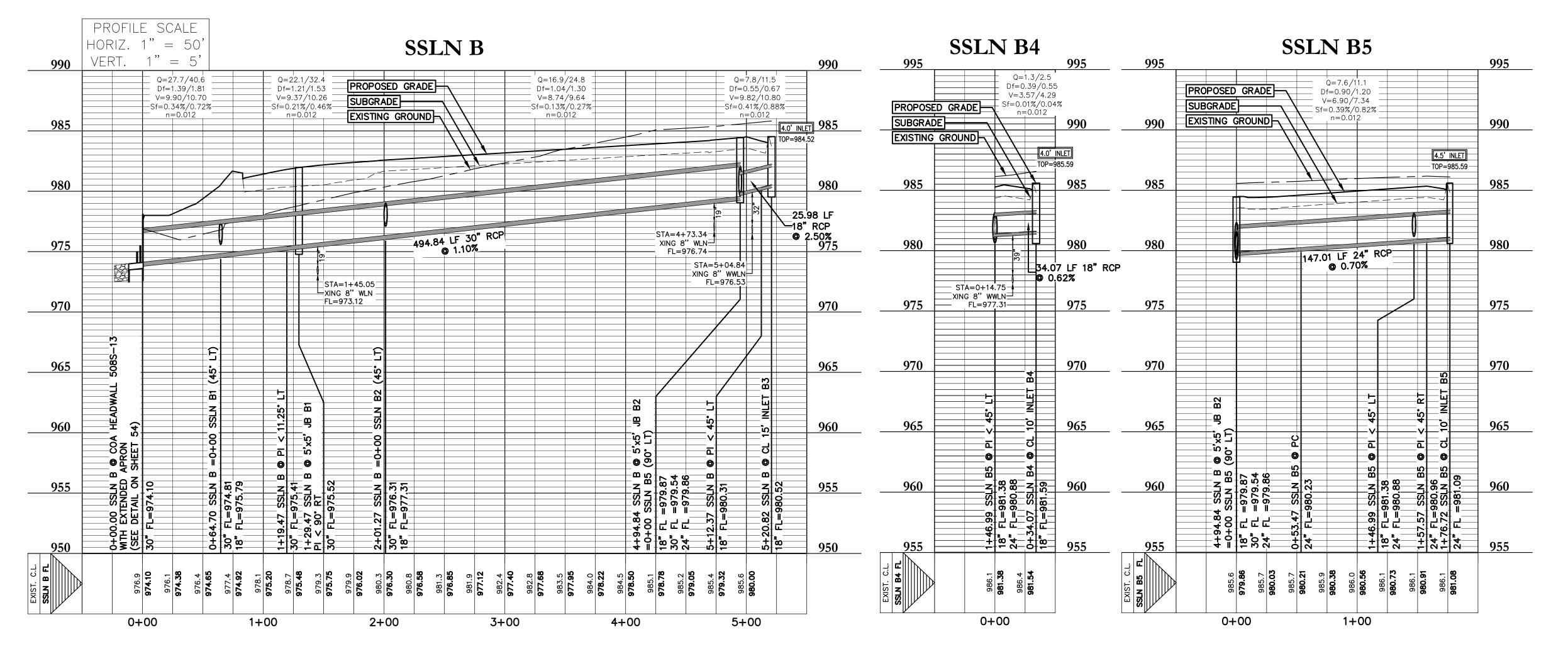


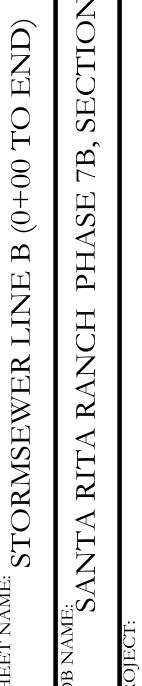


Curve Table									
Curve #	Radius	Tangent	Delta	Chord	Arc Length				
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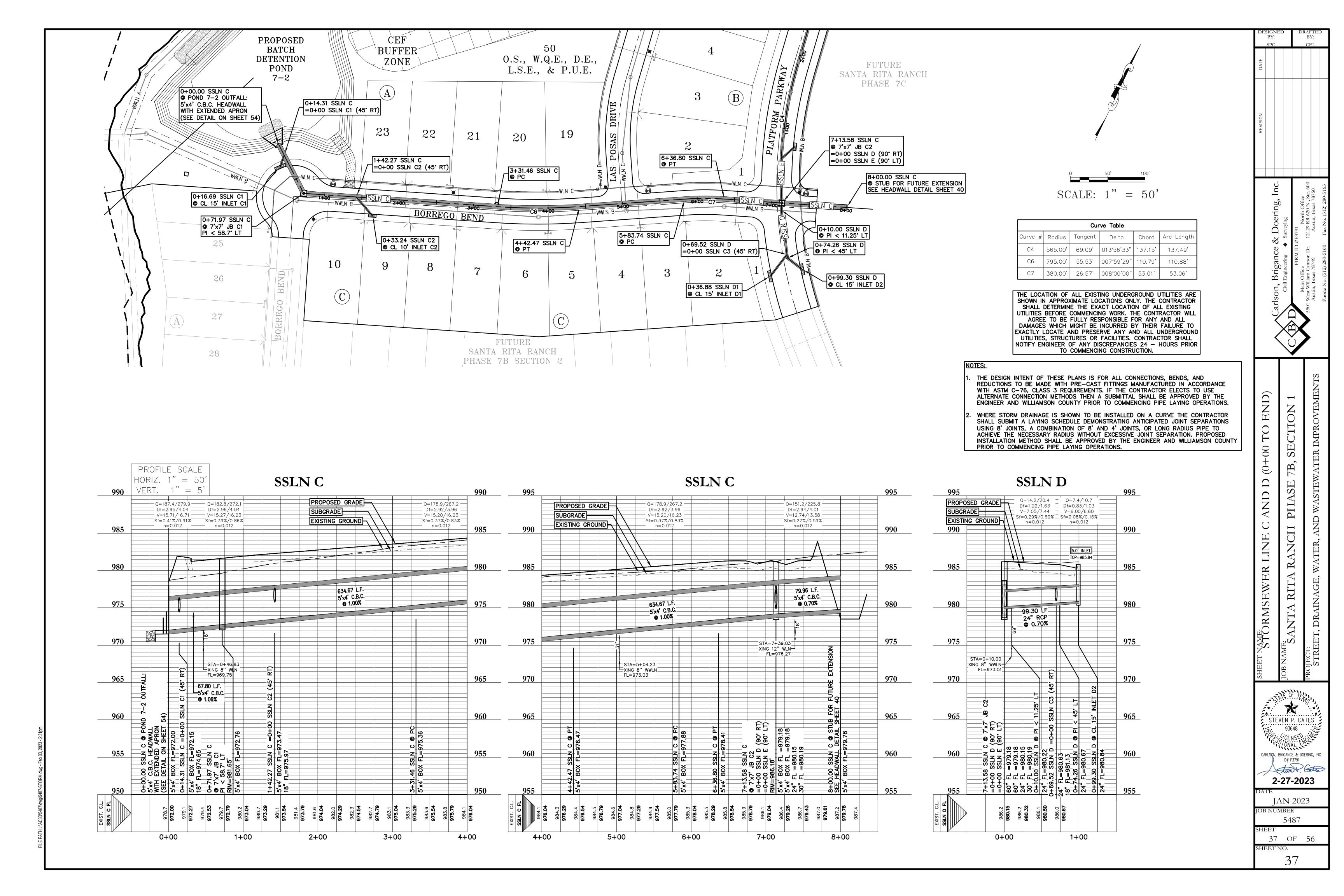


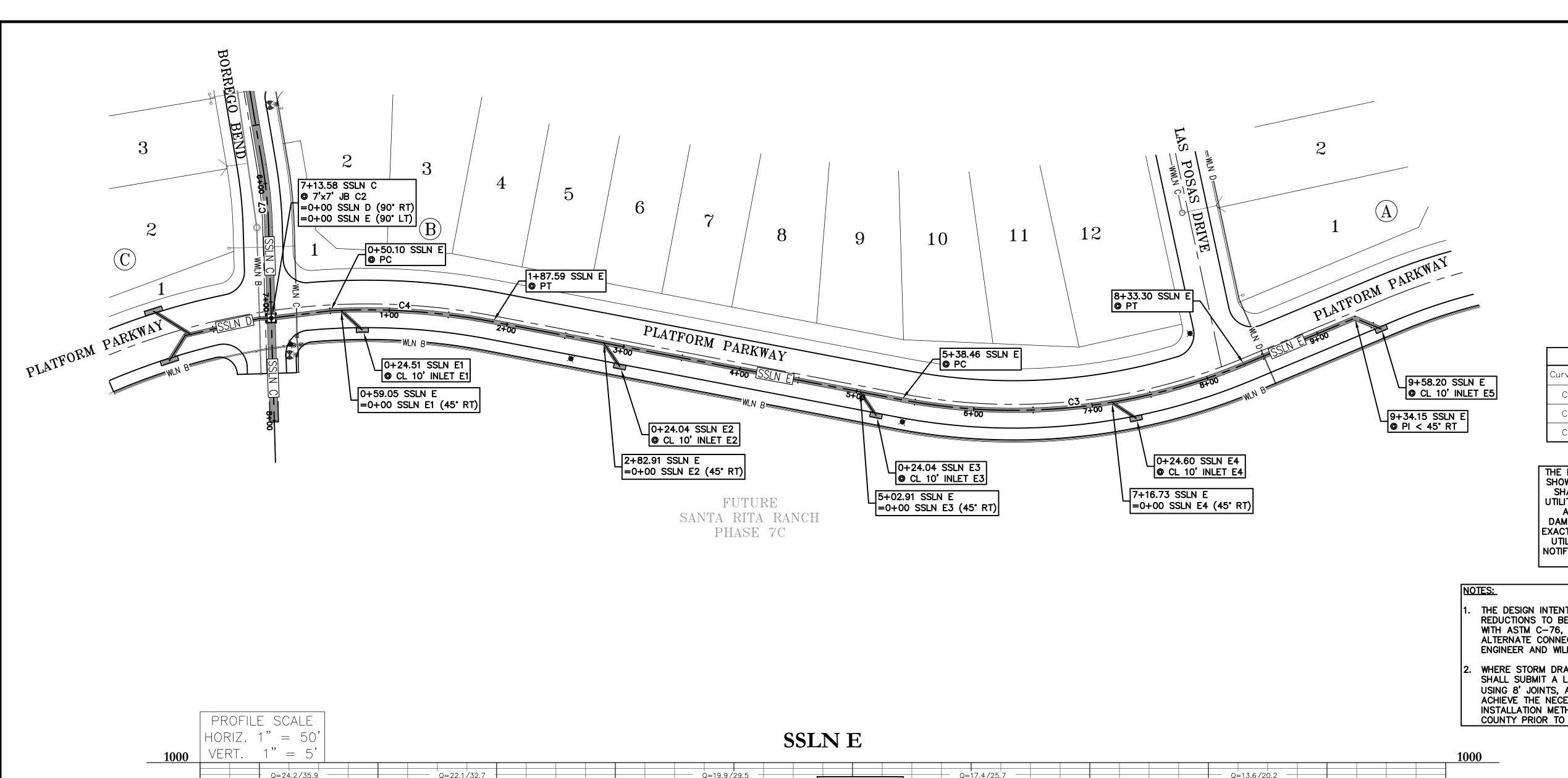
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36 OF 56





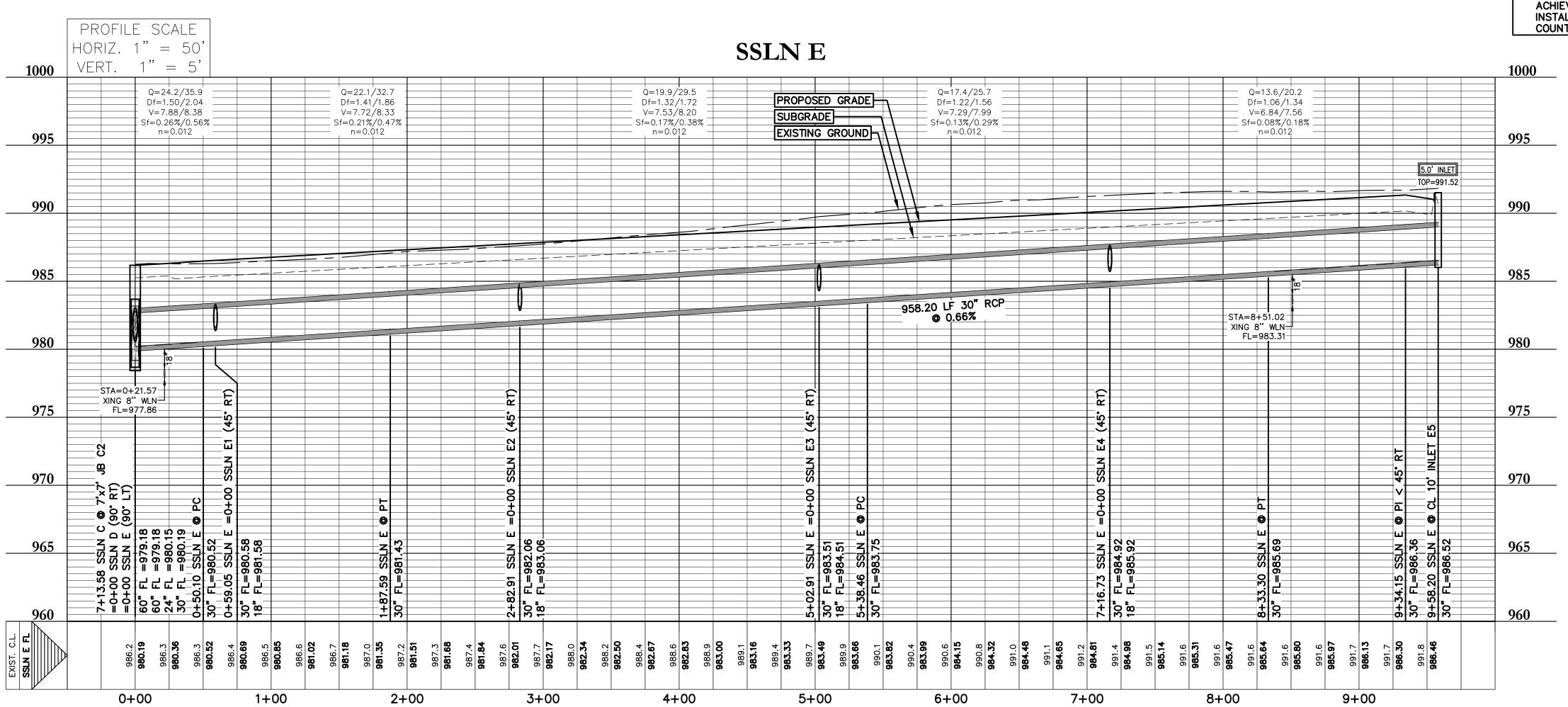




Curve Table										
Curve #	Radius	Tangent	Delta	Chord	Arc Length					
С3	505.00'	151.75'	033°27'05"	290.67	294.84					
C4	565.00'	69.09'	013°56'33"	137.15	137.49					
С7	380.00'	26.57	008°00'00"	53.01	53.06'					

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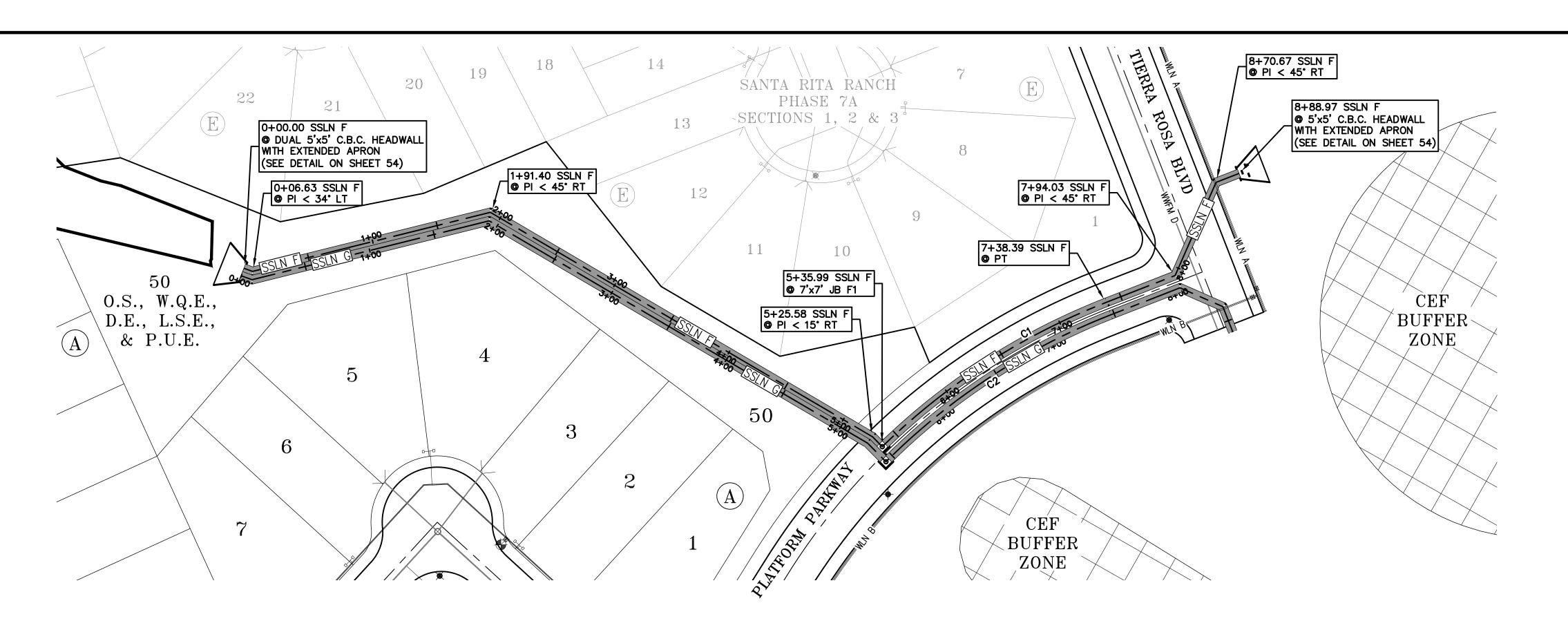
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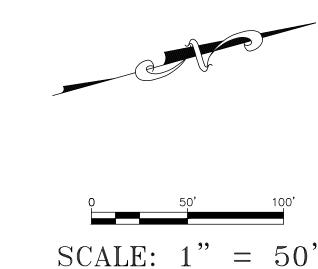
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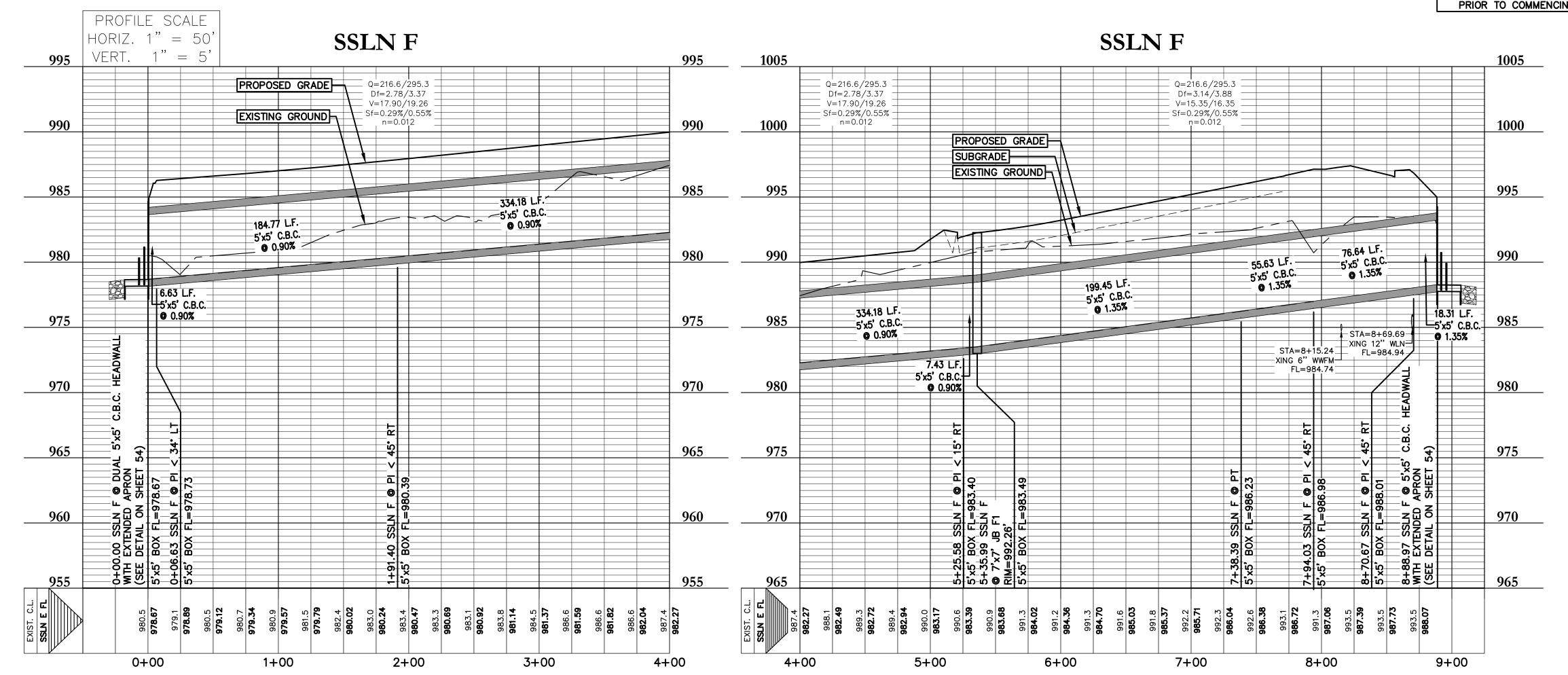


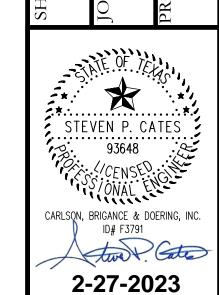


Curve Table											
Curve #	Radius	Tangent	Delta	Chord	Arc Length						
C1	505.00'	102.58'	022°57'50"	201.05	202.40'						
C2	495.61	103.63'	023°37'15"	202.88	204.32'						

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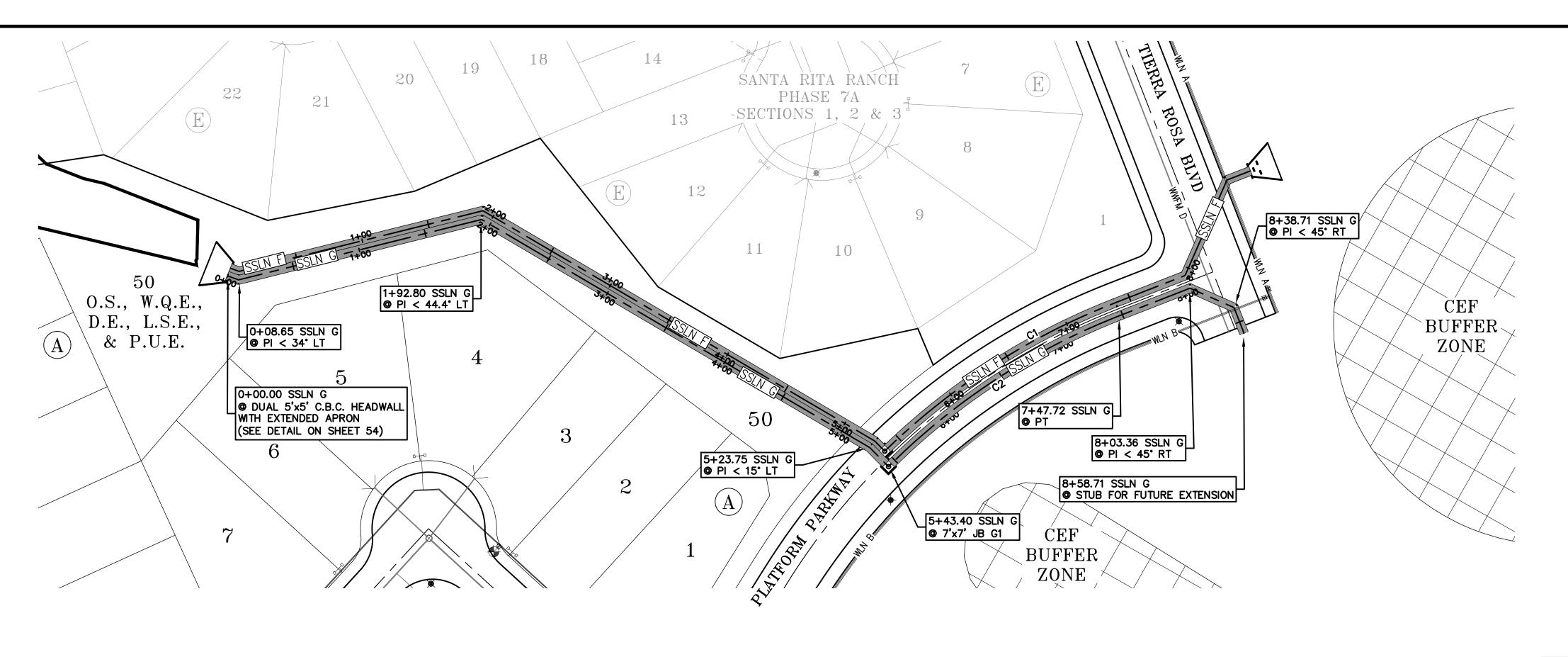


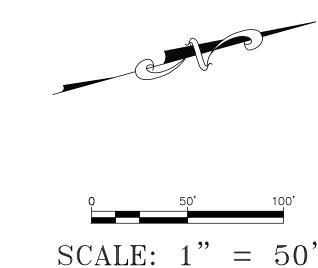
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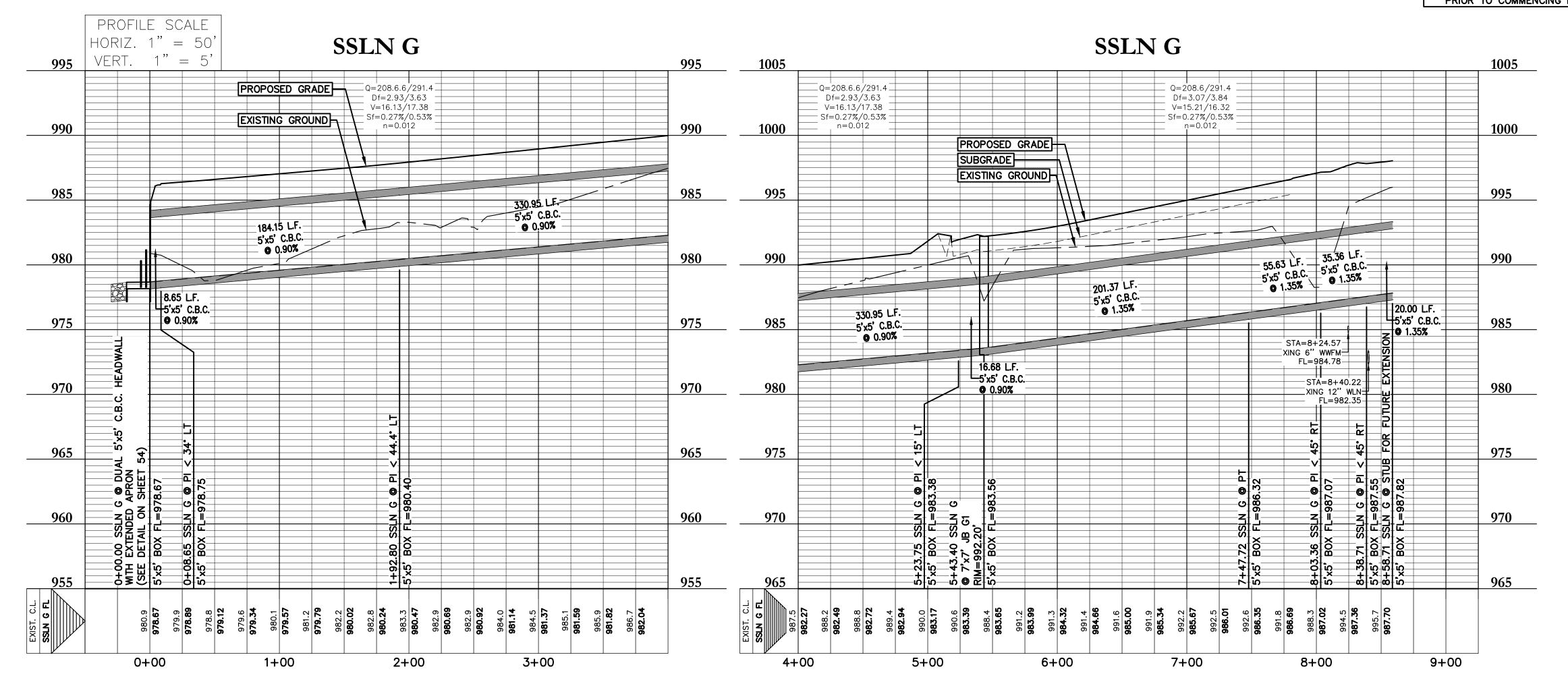


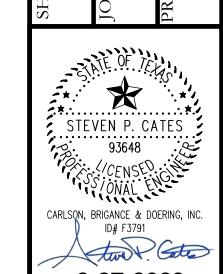
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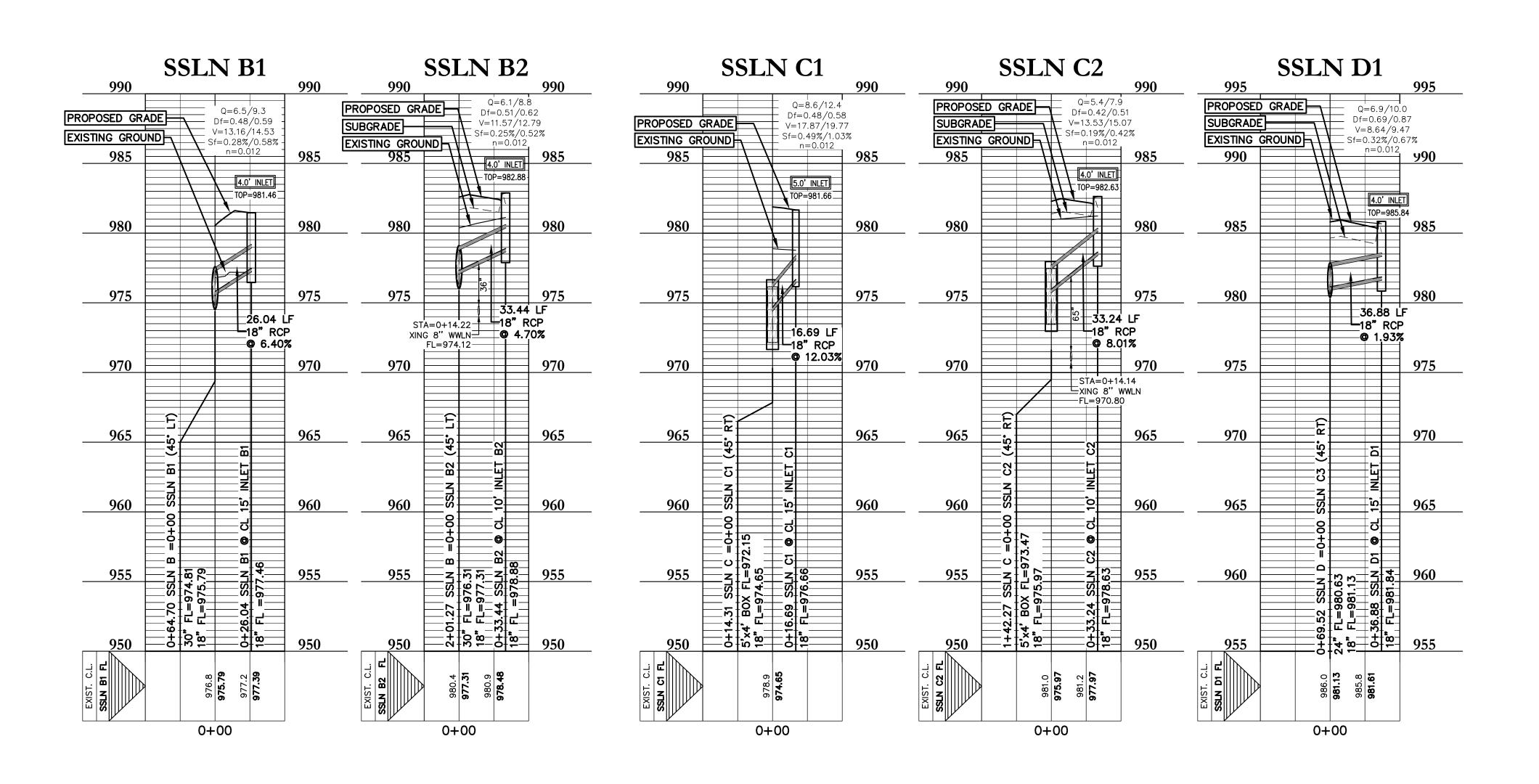
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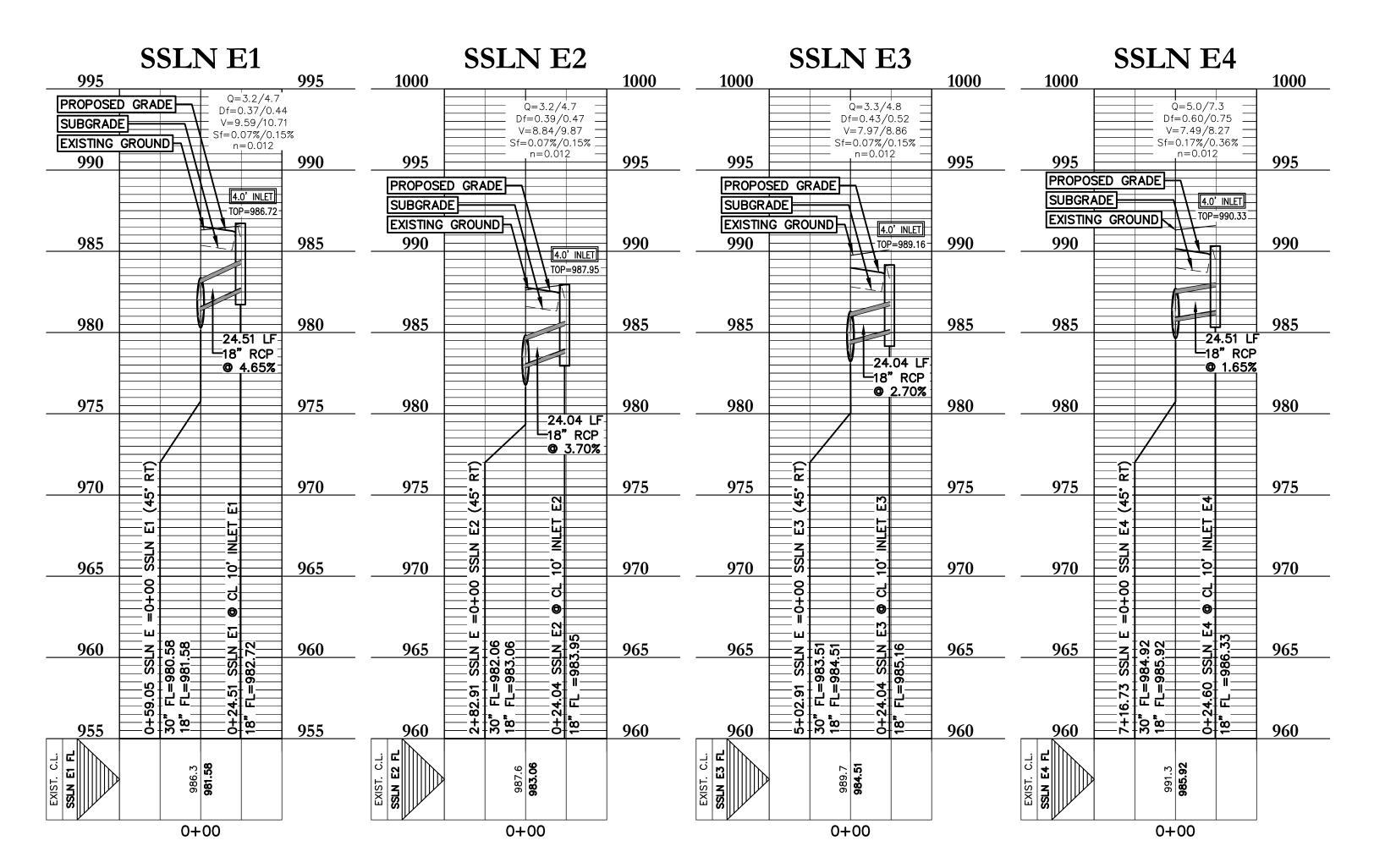
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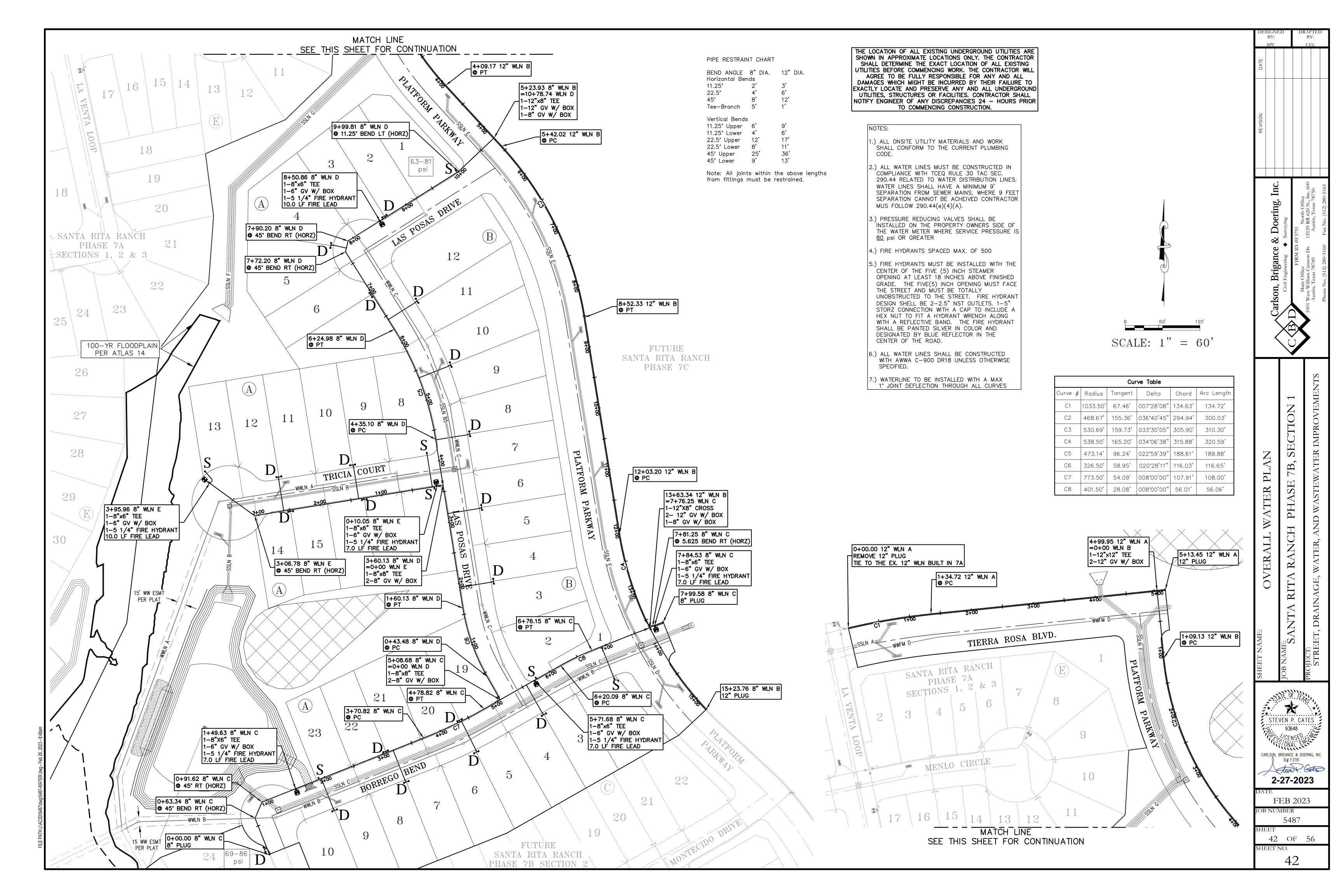
40 OF 56 HEET NO. 40

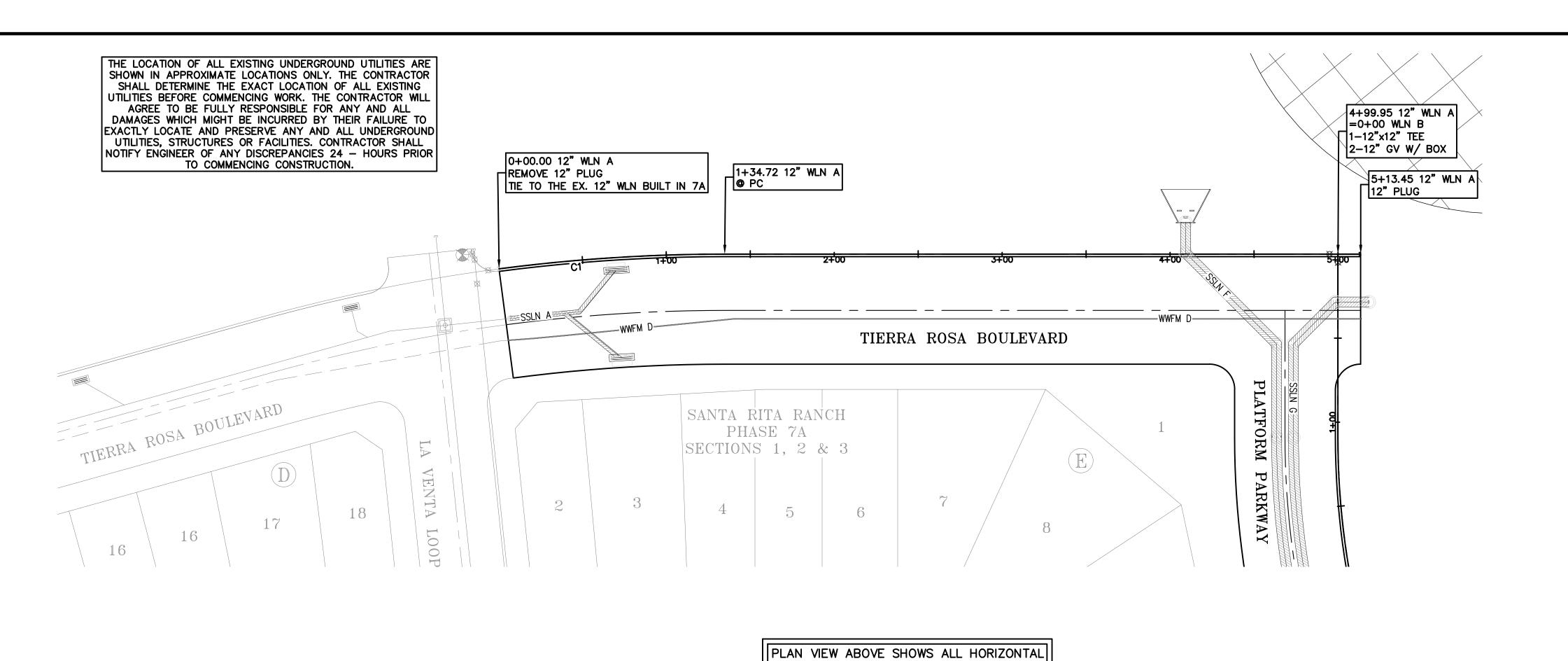
COCC CC - L - MCCAC CCC - FORLIGOCON - I - FAG L = F





SECTION LATER STORMSEWER RITA STEVEN P. CATES 93648 ... 93648 ... 93648 ... 93648 ... 93648 ... 93648 CARLSON, BRIGANCE & DOERING, INC. ID# F3791 2-27-2023 JAN 2023 5487 41 OF 56





1+00

0+00

2+00

 Curve Table

 Curve # Radius
 Tangent
 Delta
 Chord
 Arc Length

 C1
 1033.50'
 67.46'
 007°28'08"
 134.63'
 134.72'

SCALE: 1" = 40

PIPE RESTRAINT CHART

BEND ANGLE Horizontal Ben 11.25° 22.5° 45° Tee—Branch		12" DIA. 3' 6' 12' 1'
Vertical Bends 11.25° Upper 11.25° Lower 22.5° Upper 22.5° Lower 45° Upper 45° Lower	6' 4' 12' 8' 25' 9'	9' 6' 17' 11' 36' 13'

Note: All joints within the above lengths from fittings must be restrained.

NOTES:

.) ALL ONSITE UTILITY MATERIALS AND WORK SHALL CONFORM TO THE CURRENT PLUMBING CODE.

- 2.) ALL WATER LINES MUST BE CONSTRUCTED IN COMPLIANCE WITH TCEQ RULE 30 TAC SEC. 290.44 RELATED TO WATER DISTRIBUTION LINES. WATER LINES SHALL HAVE A MINIMUM 9' SEPARATION FROM SEWER MAINS. WHERE 9 FEET SEPARATION CANNOT BE ACHEIVED CONTRACTOR MUS FOLLOW 290.44(e)(4)(A).
- 3.) PRESSURE REDUCING VALVES SHALL BE
 INSTALLED ON THE PROPERTY OWNERS SIDE OF
 THE WATER METER WHERE SERVICE PRESSURE IS
 80 psi OR GREATER
- 4.) FIRE HYDRANTS SPACED MAX. OF 500
- 5.) FIRE HYDRANTS MUST BE INSTALLED WITH THE CENTER OF THE FIVE (5) INCH STEAMER OPENING AT LEAST 18 INCHES ABOVE FINISHED GRADE. THE FIVE(5) INCH OPENING MUST FACE THE STREET AND MUST BE TOTALLY UNOBSTRUCTED TO THE STREET. FIRE HYDRANT DESIGN SHELL BE 2-2.5" NST OUTLETS. 1-5" STORZ CONNECTION WITH A CAP TO INCLUDE A HEX NUT TO FIT A HYDRANT WRENCH ALONG WITH A REFLECTIVE BAND. THE FIRE HYDRANT SHALL BE PANTED SILVER IN COLOR AND DESIGNATED BY BLUE REFLECTOR IN THE CENTER OF THE ROAD.
- 3.) ALL WATER LINES SHALL BE CONSTRUCTED WITH AWWA C-900 DR18 UNLESS OTHERWISE SPECIFIED.
- 7.) WATERLINE TO BE INSTALLED WITH A MAX
 1° JOINT DEFLECTION THROUGH ALL CURVES

									BEN E PRO	V ABOVE IDS AND DFILE BE) PIPI ELOW	E DEF FOR	LECTION ALL V	ONS ERTI	CAL												
		PROFILE HORIZ. 1								DS AND WATE]												
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1000																											1000
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995														_		- s	TA=4+0 IG 60" S	9.95_ SSLN=									995
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					 												20%				7	9.92 L ©	F 12" P 0.92%	VC			
990										_		=	287.64	LF 1	2" PVC	© 0.9	32%							=			990
		99.86	F 12" PV	/C					EXIS.	TING GRO							7.22 L 2" PV	F	\mathbb{N}			7.24 12" P	LF ====================================				
			-0.53%						[LXI3	IIIO GIO	5140]					_ @ -	-99.08	%/				© 100	0.92%				
985																					4			_	\rightarrow		985
303																			1	+-							303
																				31.	 57 LF						
															DUCTILE UNDER S	IRON	PIPE	1/		— <u></u> 12" —_ @	57 LF D.I. 0.92%						
980															UNDER S	TORM	LINE										980
				VERT)																							
975																											975
	12" PLUG BUILT IN 7A			0.22													VER 1		(VERT)	ERT)		RE CONTROLLER CONTROL		_			
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965	0+0 1E	12.		6	12	1+3												2.	75.	4	12	4 2	4,	<u></u>	7		965
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F.L. EL	994.2	989.84 991.9 989.71	991.8 989.58	989.44	989.31	991.5 989.54	991.2	991.0 990.00	990.7	990.3	990.2	990.	990.92	990.7 991.15	991.3	992.1		991.84	993.2	992.	985.08	991.2 992.55	994.8	995.8 993.01			
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3+00

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5+00

Carlson, Brigance & Doering, Inc.

Givil Engineering & Surveying

FIRM ID #F3791

Main Office

5501 West William Cannon Dr. 12129 RR 620 N., Ste. 600
Austin, Texas 78749

Phone No. (512) 280-5160

Fax No. (512) 280-5165

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ANTA RITA RANCH I

FER IMPROVEMENTS

JOB NAME:
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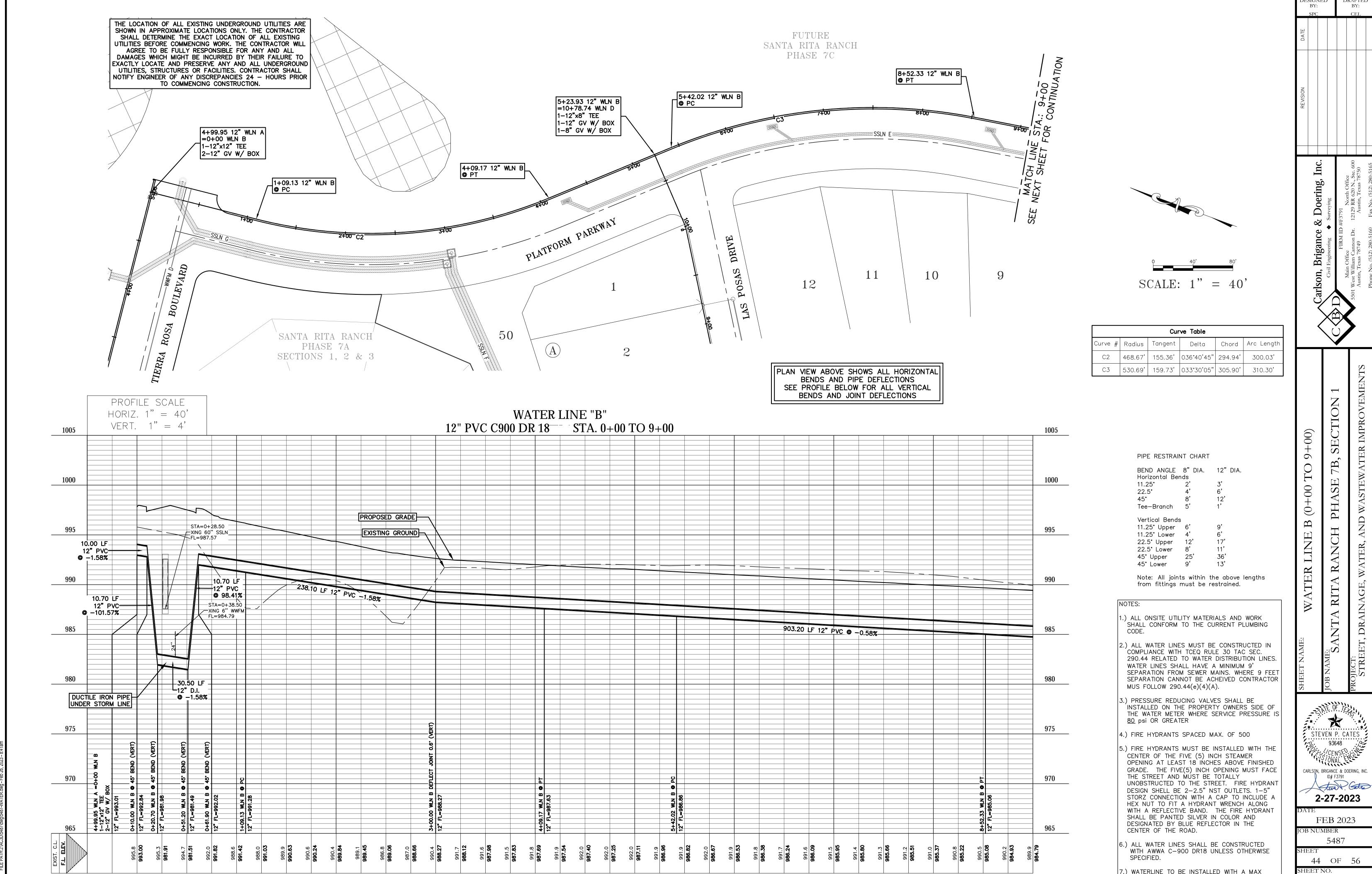
2-27-2023

DATE
FEB 2023

JOB NUMBER
5487

SHEET

43 OF 56
SHEET NO.



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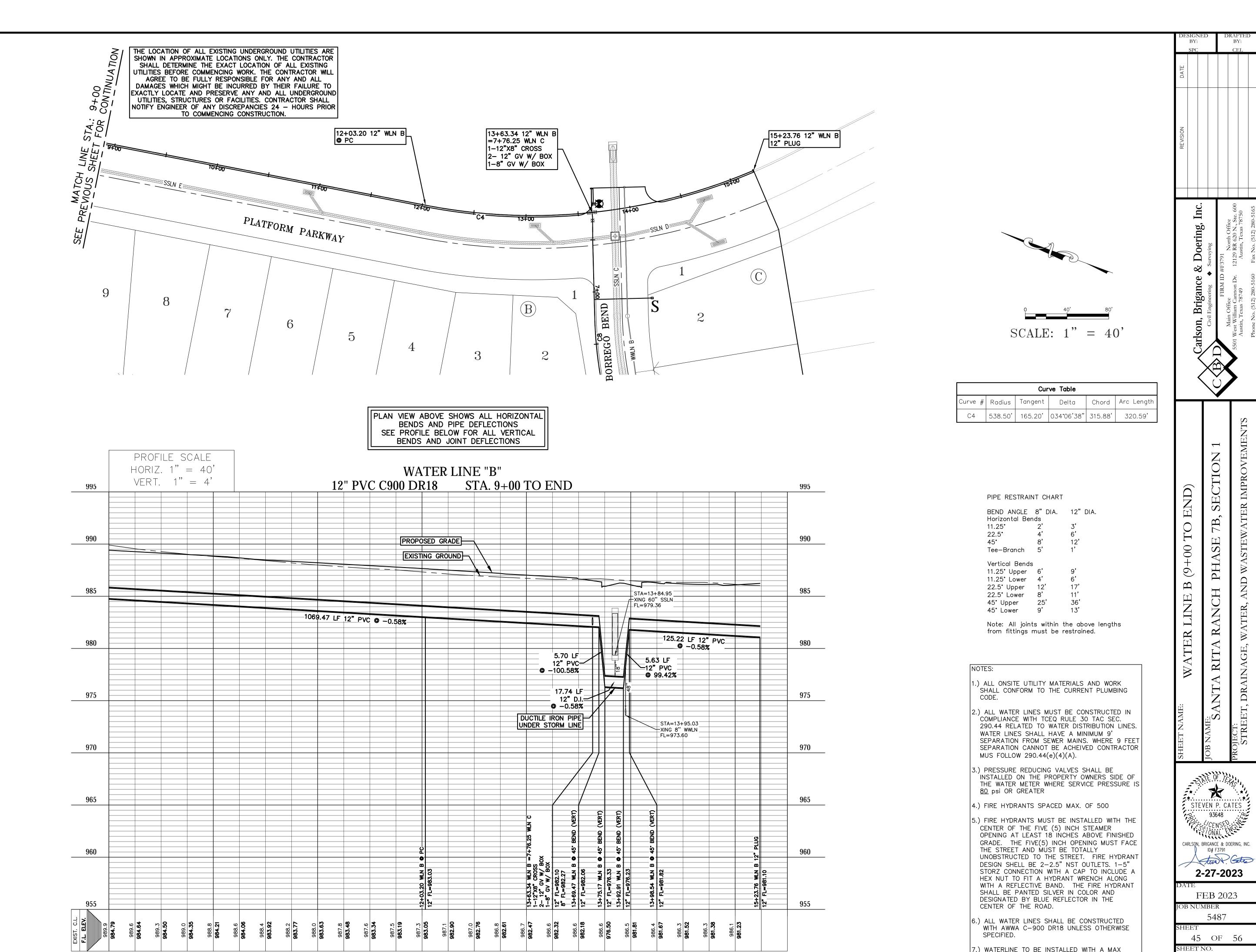
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SHEET NO.

1° JOINT DEFLECTION THROUGH ALL CURVES



15+00

14+00

1° JOINT DEFLECTION THROUGH ALL CURVES

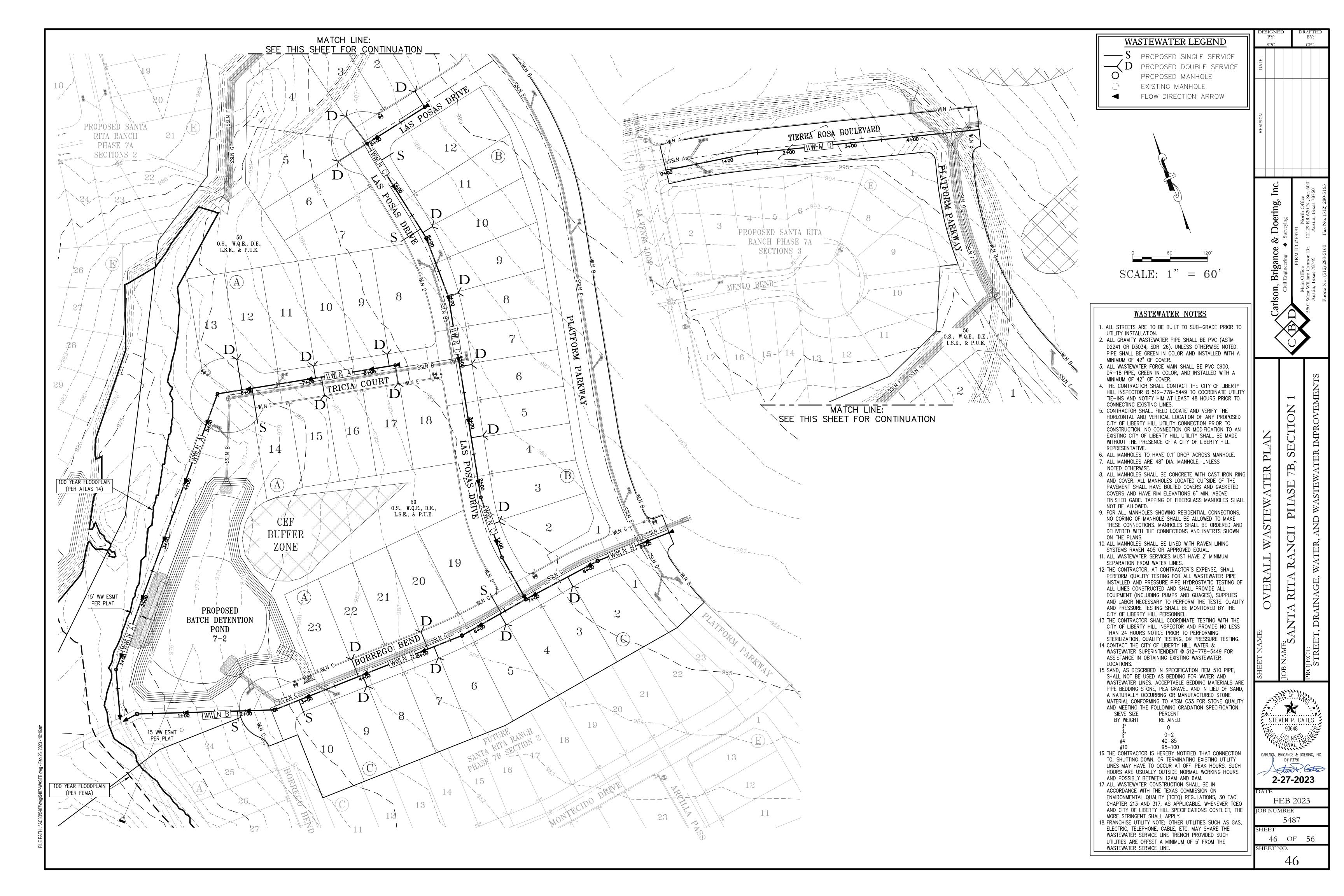
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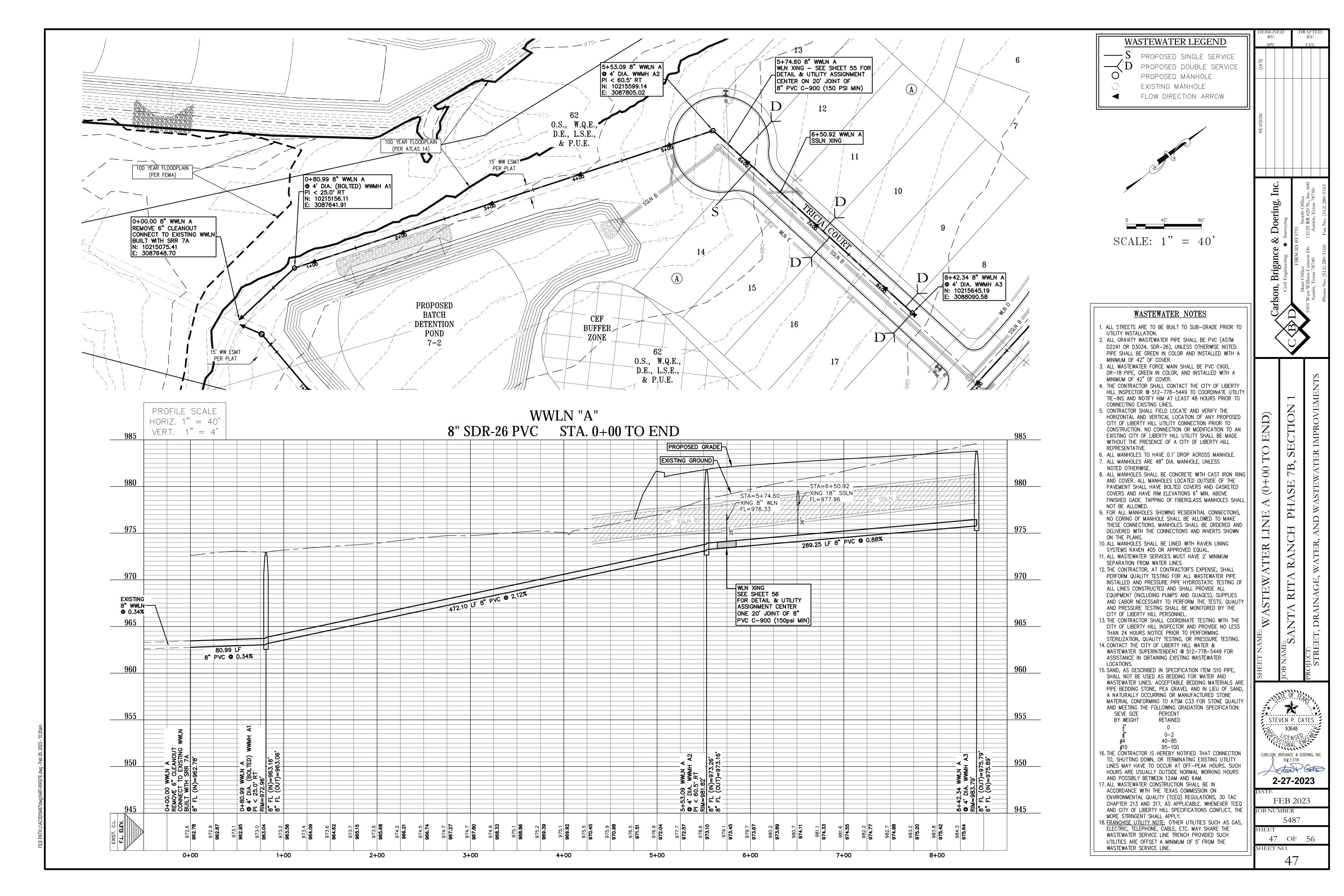
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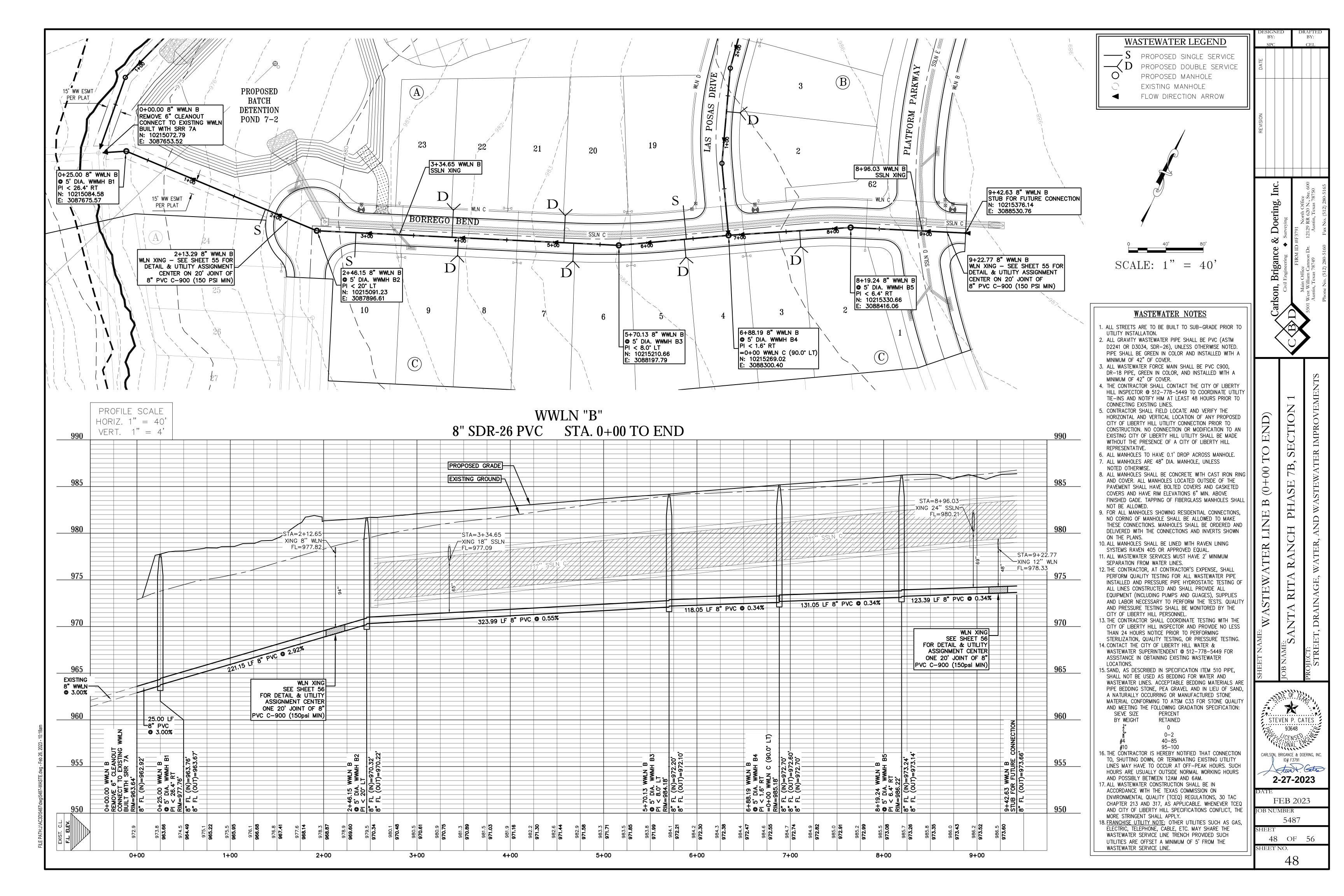
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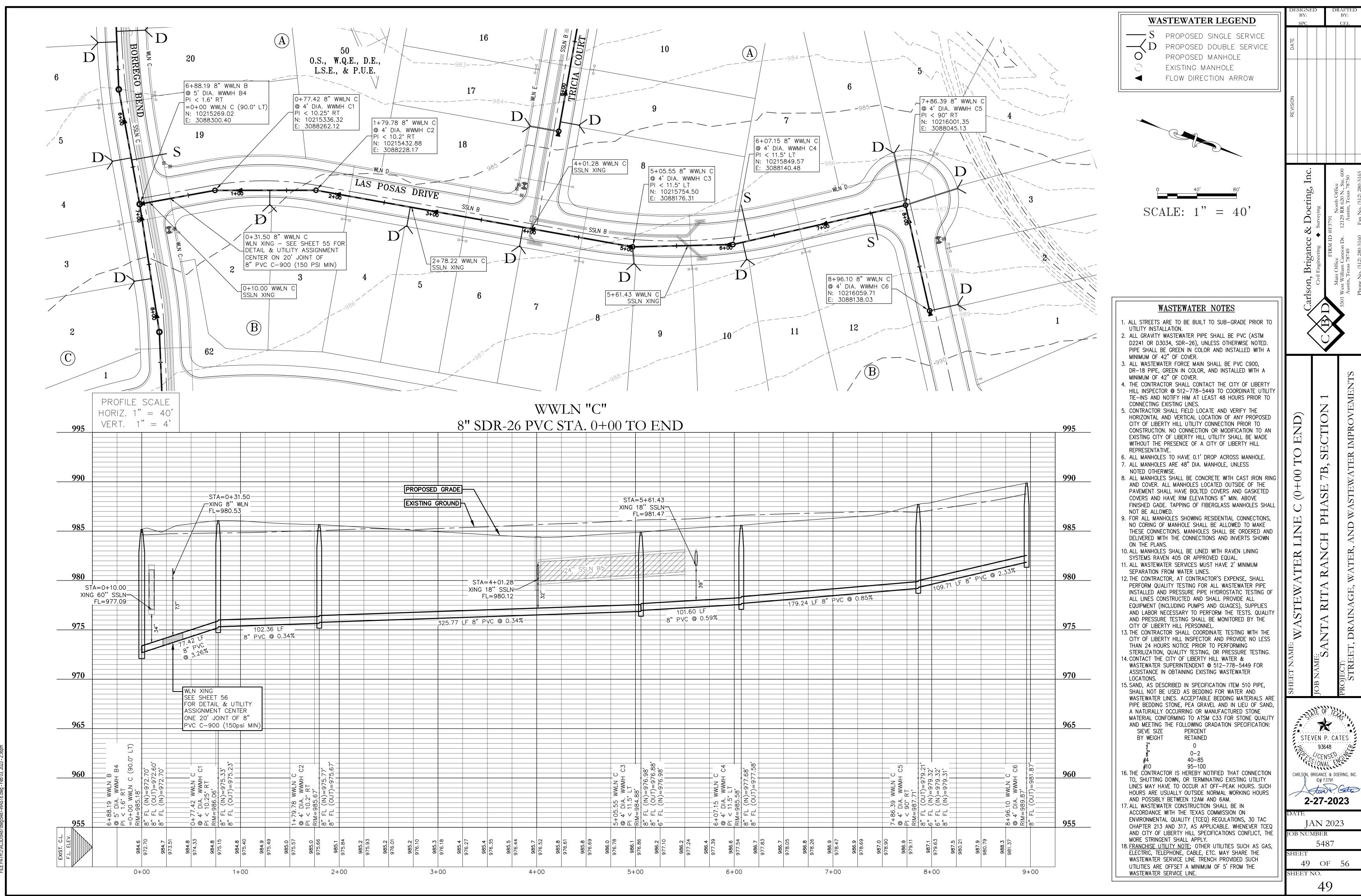
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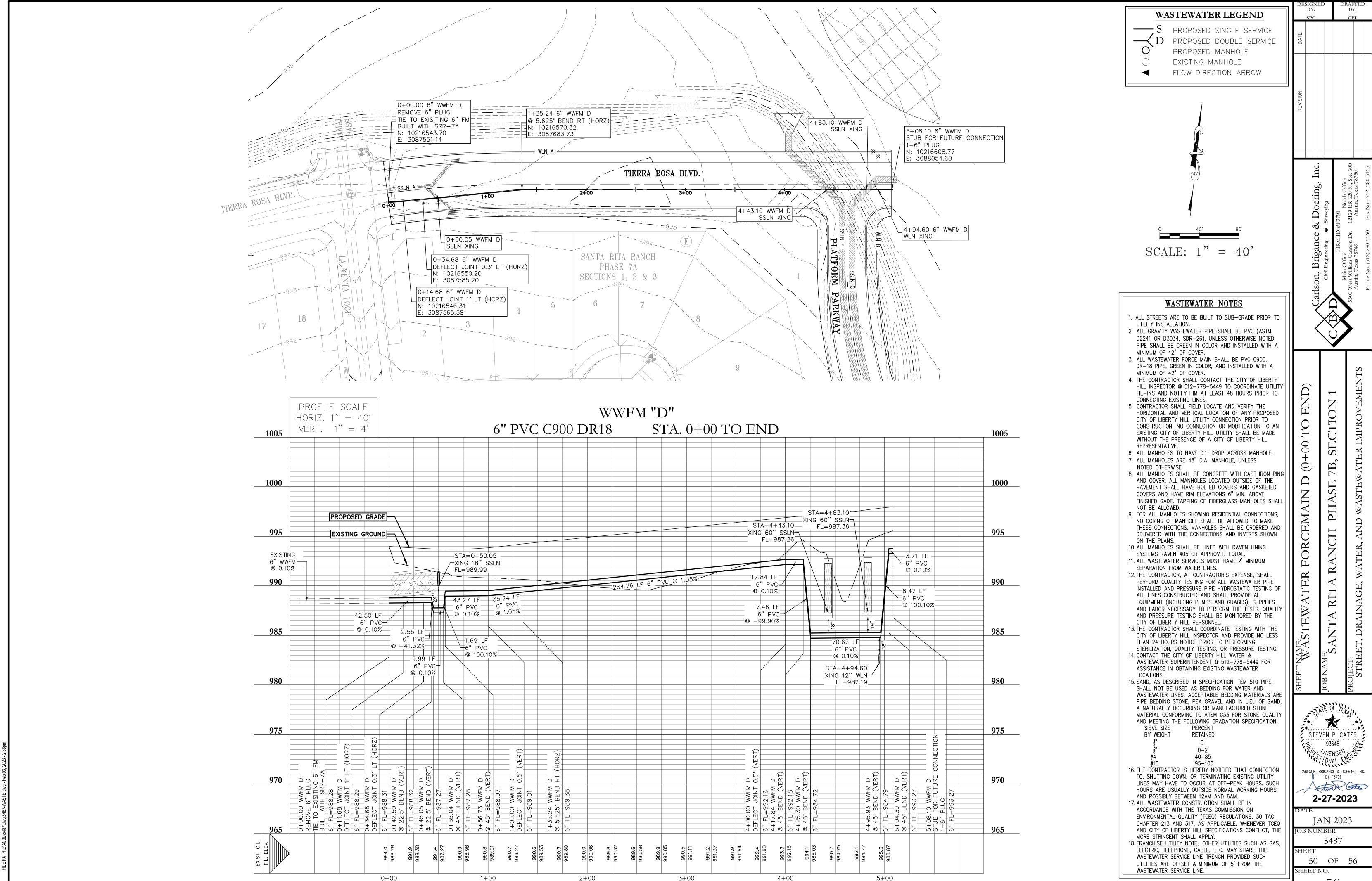
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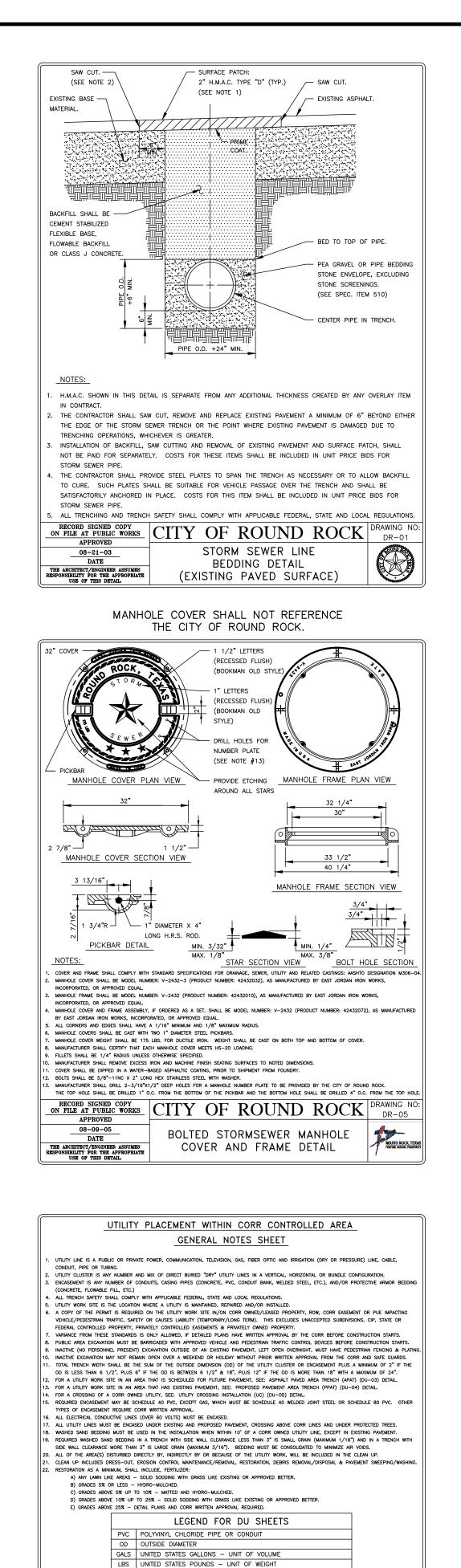












ORR CITY OF ROUND ROCK

02-10-06 DATE

JE PUBLIC UTILITY EASEMENT

ROW RIGHT OF WAY OR RIGHTS OF WAY

ABBREVIATION FOR LABORATORY

UNITED STATES SQUARE YARDS - UNIT OF AREA

UNITED STATES DEGREE - UNIT OF ANGLE

RECORD SIGNED COPY ON FILE AT PUBLIC WORKS CITY OF ROUND ROCK

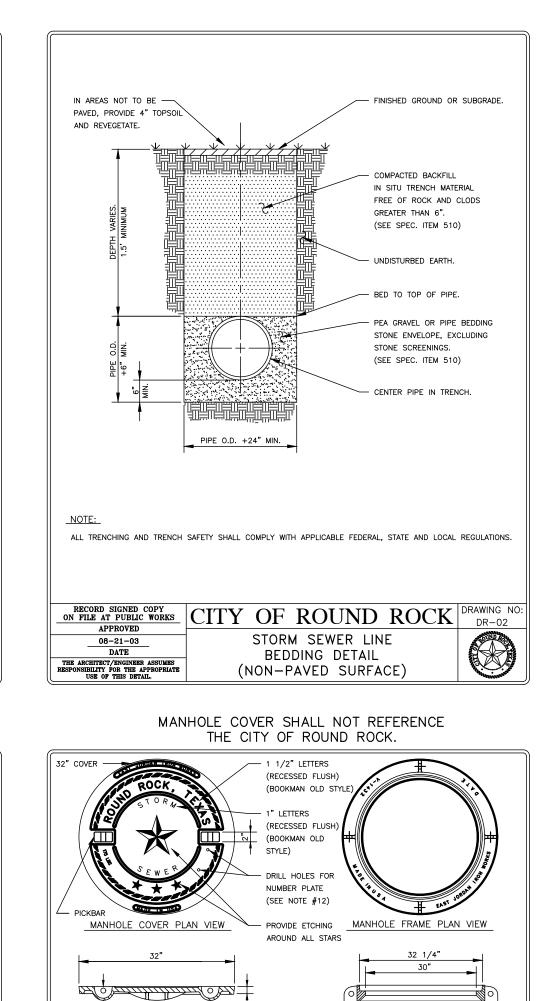
UNITED STATES INCH OR INCHES - UNIT OF LENGTH

ABBREVIATION FOR ET CETERA, IN HENCE TO BE "AND SO FORTH"

DRY UTILITY DETAILS

GENERAL NOTES SHEET

UNITED STATES FOOT OR FEET - UNIT OF LENGTH



(SEE NOTES #20, #21 AND #22 ON DETAIL DU-01)

UTILITY CLUSTER OR

+24" MAXIMUM (SEE NOTES #4 AND #11 ON DETAIL DU-01)

NATURAL GROUND AT PRE-EXISTING GRADE OR FINAL GRADE IF AREA

COMPACTED BACKFILL SHALL BE SELECT MATERIAL. FREE OF ROCK AND

BEDDING (SEE NOTES #18 AND #19 ON DETAIL DU-01) WHERE

REQUIRED, SHALL BE PLACED TO A MINIMUM OF 12" COVER ABOV

BEDDING ENVELOPE SHALL BE WASHED SAND WITH A MAXIMUM GRAIN

SIZE OF 3/16" OR AN ALTERNATE APPROVED BY THE PUBLIC WORKS

ENCASEMENT (SEE NOTES #3, #15, #16 AND #17 ON DETAIL DU-01)

- CENTER UTILITY CLUSTER (SEE NOTE #2 ON DETAIL DU-01) OR

THE HIGHEST ELEVATION OF UTILITY CLUSTER OR ENCASEMENT.

IS TO BE CUT OR FILLED.

IN TRENCH.

FOR ADDITIONAL GENERAL NOTES, SEE DETAIL DU-01

RECORD SIGNED COPY ON FILE AT PUBLIC WORKS CITY OF ROUND ROCK DU-02

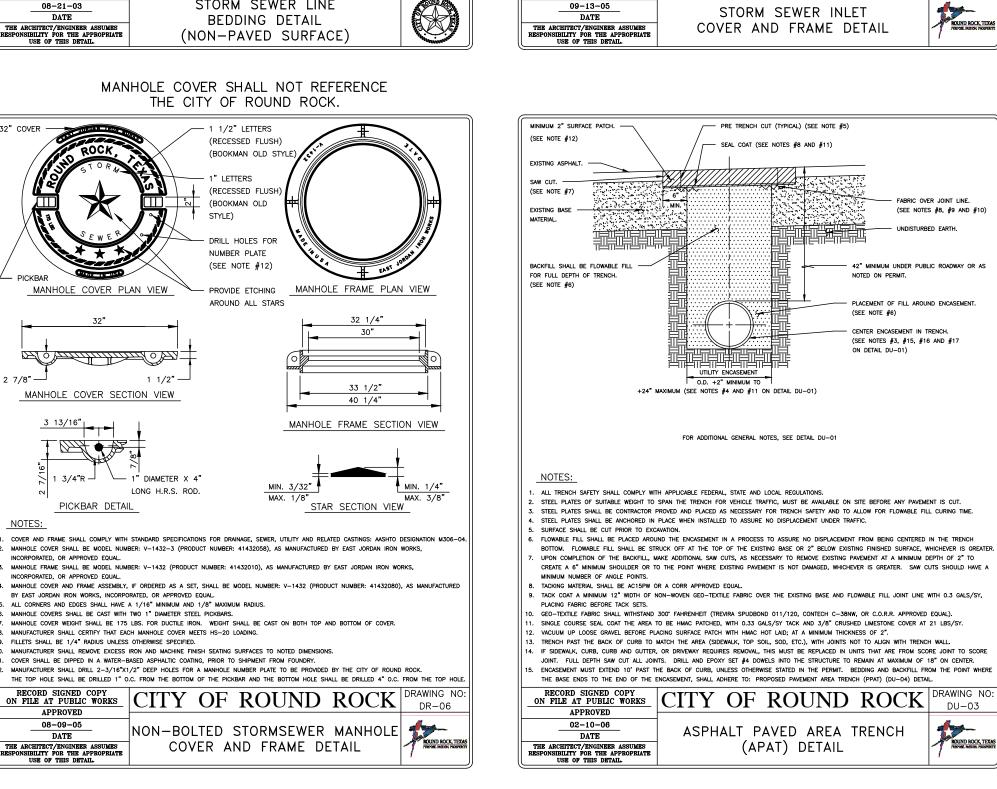
UNPAVED AREA TRENCH

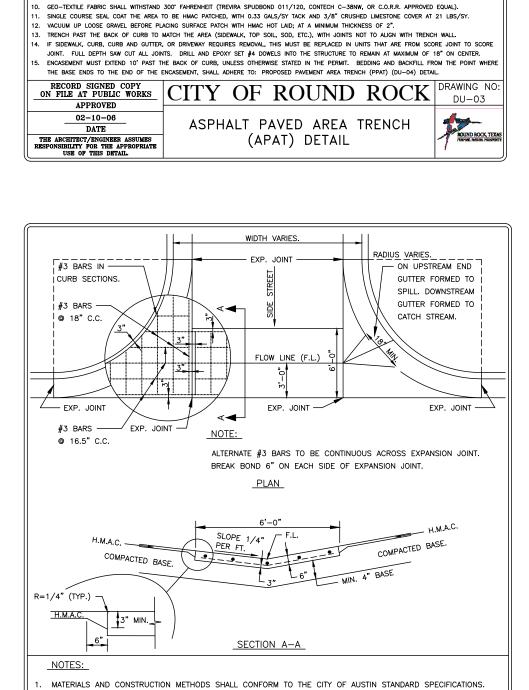
(UAT) DETAIL

2 7/8"—

MINIMUM 3" TOPSOIL. -

3 13/16"





MONOLITHIC CURB & GUTTER SHALL BE MEASURED BY PLAN SQUARE FEET AND PAID AS VALLEY GUTTER.

JOINT. PROVIDE EXPANSION JOINT @ Q FOR WIDTHS GREATER THAN 40 FEET.

THE UPSTREAM CURB MID POINT MUST BE AT OR LOWER THAN THE BEGINNING P.C. AND .5% (MIN.) HIGHER

. ALLOWABLE CONSTRUCTION JOINT AT @ WHEN TRAFFIC FLOW MUST BE MAINTAINED, CONSTRUCTED AS A CONTROL

. ALL EXPANSION JOINTS SHALL BE CONSTRUCTED WITH 1/2" PREMOLDED EXPANSION JOINT MATERIAL AND DOWELS

RECORD SIGNED COPY ON FILE AT PUBLIC WORKS CITY OF ROUND ROCK ST-06

CONCRETE VALLEY GUTTER DETAIL

CONCRETE SHALL BE CLASS "A".

THAN THE OPPOSING MID POINT.

AND CAPS (SEE STANDARD CURB DOWEL DETAIL).

MANHOLE COVER SHALL NOT REFERENCE THE CITY OF ROUND ROCK.

(RECESSED FLUSH)

KEYED LOCKING

CUSTOM LOGO (RECESSED FLUSH

(PROVIDE ETCHING AROUND ALL STARS

AND CUSTOM LOGO)

(RECESSED FLUSH)

(RECESSED FLUSH) (BOOKMAN OLD STYLE)

COVER AND FRAME SHALL COMPLY WITH STANDARD SPECIFICATIONS FOR DRAINAGE, SEWER, UTILITY AND RELATED CASTINGS: AASHTO DESIGNATION M306-04.

INLET COVER AND FRAME ASSEMBLY, IF ORDERED AS A SET, SHALL BE MODEL NUMBER: 106L-4L LK (PRODUCT NUMBER: 35506204), AS MANUFACTURED BY EAST JORDAN IRON WORKS, INCORPORATED, OR APPROVED EQUAL.

RECORD SIGNED COPY ON FILE AT PURISHED WORKS | CITY OF ROUND ROCK | DRAWING DR-07

INLET COVER SHALL BE MODEL NUMBER: 106L LK (PRODUCT NUMBER: 35106204), AS MANUFACTURED BY EAST JORDAN IRON WORKS,

INCORPORATED, OR APPROVED EQUAL

INLET FRAME SHALL BE MODEL NUMBER: 106L LK (PRODUCT NUMBER: 35206004), AS MANUFACTURED BY EAST JORDAN IRON WORKS,

INLET COVER WEIGHT SHALL BE 88 LBS. FOR DUCTILE IRON. WEIGHT SHALL BE CAST ON BOTH TOP AND BOTTOM OF COVER.

MANUFACTURER SHALL REMOVE EXCESS IRON AND MACHINE FINISH SEATING SURFACES TO NOTED DIMENSIONS

(BOOKMAN OLD STYLE)

1/2" LETTERS

INLET COVER PLAN VIEW

INLET COVER SECTION VIEW

ALL CORNERS AND EDGES SHALL HAVE A 1/16" MINIMUM AND 1/8" MAXIMUM RADIUS

FILLETS SHALL BE 1/4" RADIUS UNLESS OTHERWISE SPECIFIED.

INCORPORATED, OR APPROVED EQUAL.

MECHANISM

(BOOKMAN OLD STYLE)

ASTM A48 CL35B

INLET FRAME SECTION VIEW

Ç ROADWAY

FUTURE EXTENSION OF

"STREET NAME"

CITY OF ROUND ROCK PUBLIC WORKS

CALL: 512-218-5555

2" HIGH BLOCK -

BLACK LETTERS.

FUTURE BASE -

COMPACTED BACKFILL SHALL BE -

SELECT MATERIAL, LESS THAN 20 P.I.
FREE OF ROCKS AND CLODS

GREATER THAN 4", COMPACTED IN 6" LIFTS TO 95% DENSITY

4" HIGH BLOCK

RED REFLECTORS 3"

STREET END MARKER DETAIL

+24" MAXIMUM (SEE NOTES #4 AND #10 ON DETAIL DU-01)

THIS DETAIL IS APPLICABLE WHERE FUTURE PAVEMENT IS SCHEDULED TO BE INSTALLED WITHIN TWO YEARS.

ALL TRENCH SAFETY SHALL COMPLY WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.

LAB TEST RESULTS IF THERE IS ANY QUESTION OF ACCEPTABILITY.

FOR ADDITIONAL GENERAL NOTES, SEE DETAIL DU-01

ENCASEMENT MUST EXTEND 10° PAST THE PROPOSED BACK OF CURB.

WORK ON INSTALLATION MUST BE COMPLETE THROUGH CLEAN UP BEFORE WORK RELATED TO PAVEMENT INSTALLATION IS SCHEDULED TO START, EXCEPT

IN THE CASES THAT THE ROAD CONTRACTOR HAS AGREED TO ROUGH CUT BEFORE UTILITY TRENCHING OR THE SAME CONTRACTOR IS PERFORMING BOTH

SPOILS MAY BE USED IF THEY MEET SELECT MATERIAL STANDARDS. THE INSPECTOR MAY STOP BACKFILL OPERATIONS UNTIL THE CONTRACTOR OBTAINS

ON FILE AT PUBLIC WORKS CITY OF ROUND ROCK

— 6" TOPSOIL

— PUBLIC ROADWAY PAVEMENT

(SEE NOTE #4)

42" MINIMUM UNDER PUBLIC ROADWAY OR AS

- BED TO MINIMUM 12" OF COVER FOR THE FULL

BEDDING ENVELOPE SHALL BE WASHED SAND

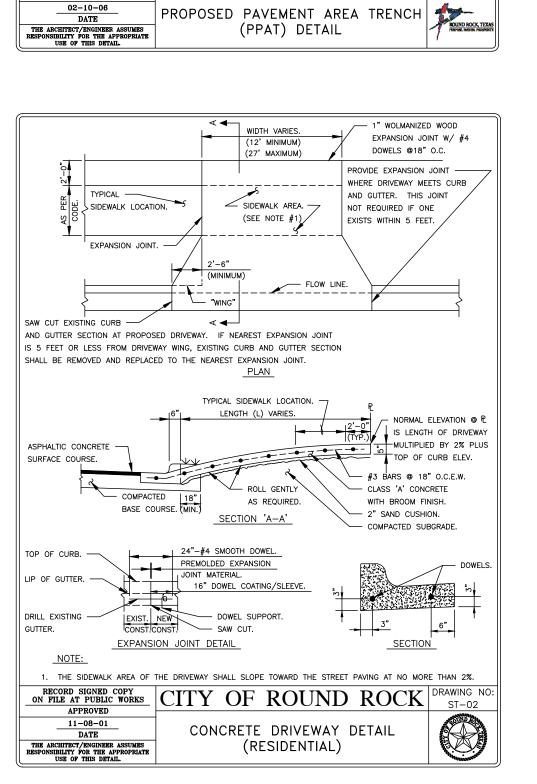
WITH A MAXIMUM GRAIN SIZE OF 3/16" OR AN ALTERNATE APPROVED BY THE PUBLIC WORKS

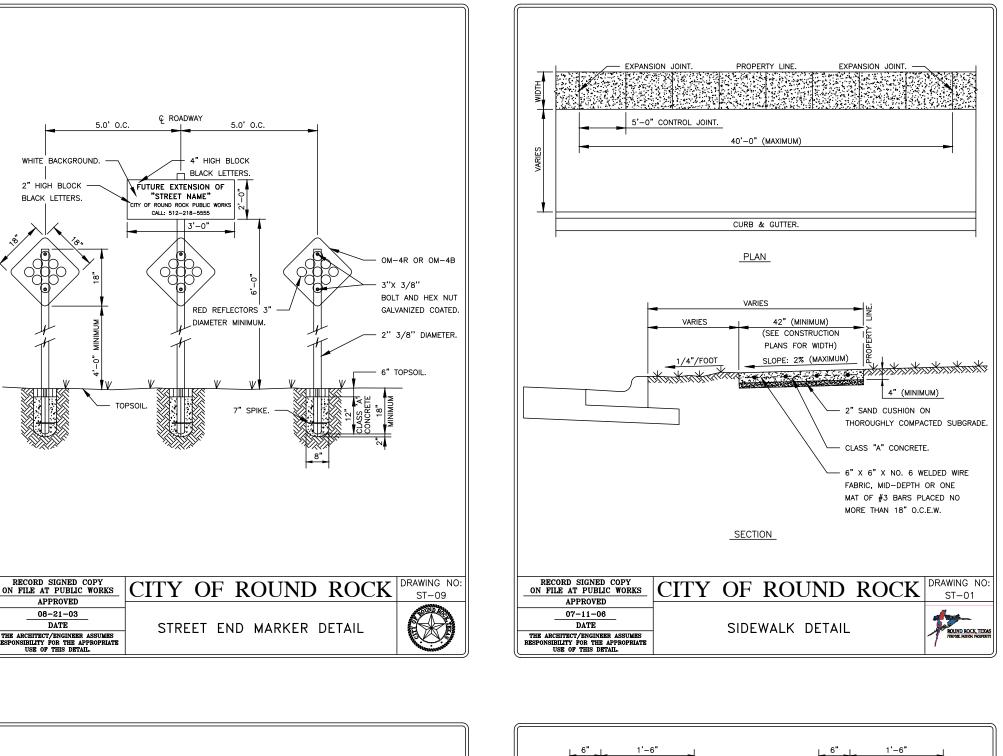
(SEE NOTES #18 AND #19 ON DETAIL DU-01)

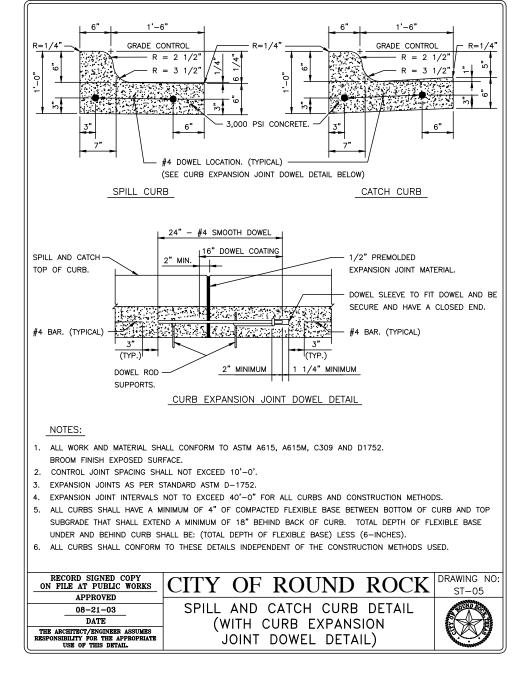
CENTER ENCASEMENT IN TRENCH (SEE NOTES #3, #15, #16 AND #17 ON DETAIL DU-01)

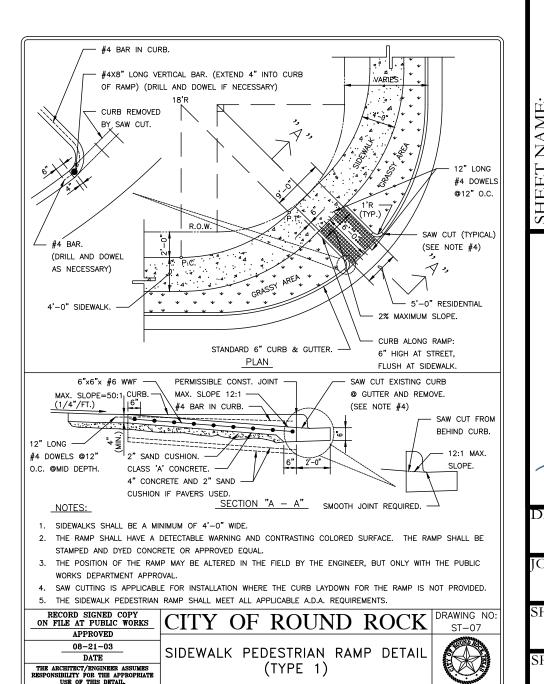
- STABILIZED SUBGRADE BY OTHERS.

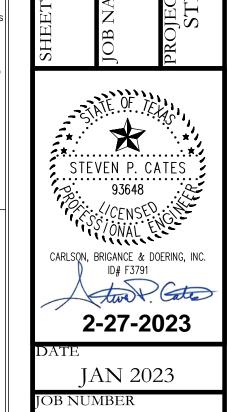
DIAMETER MINIMUM





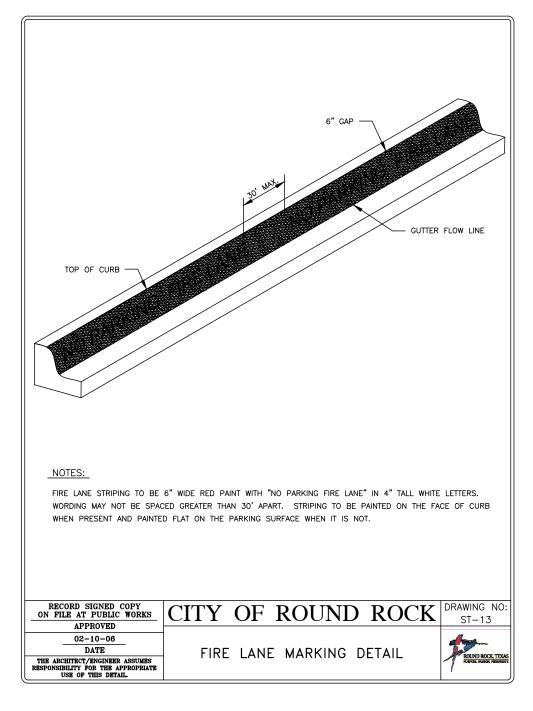


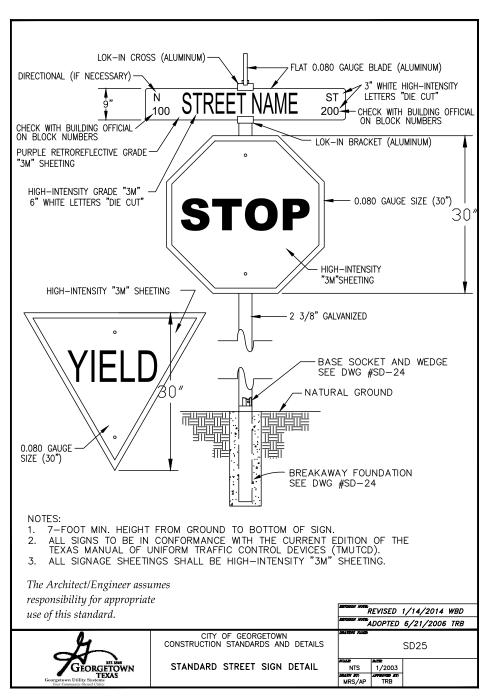


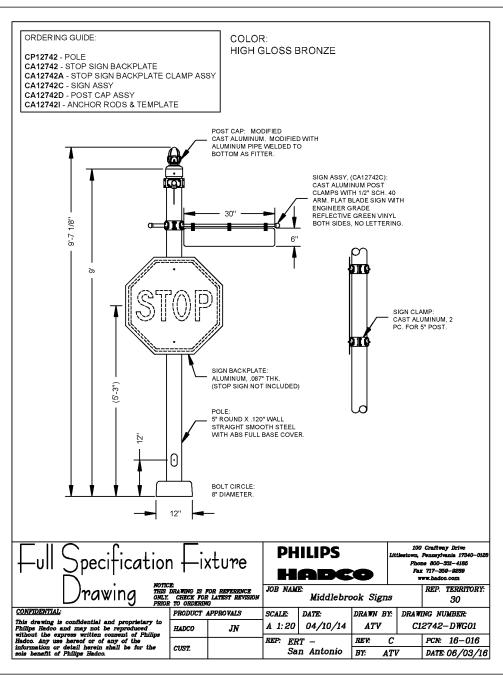


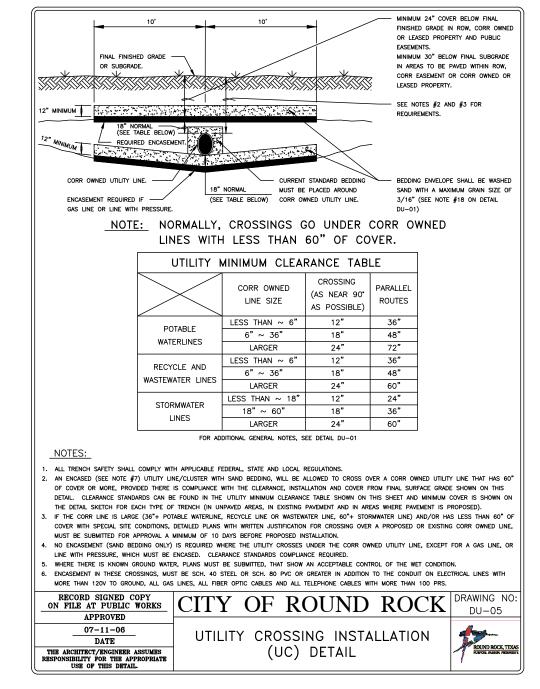
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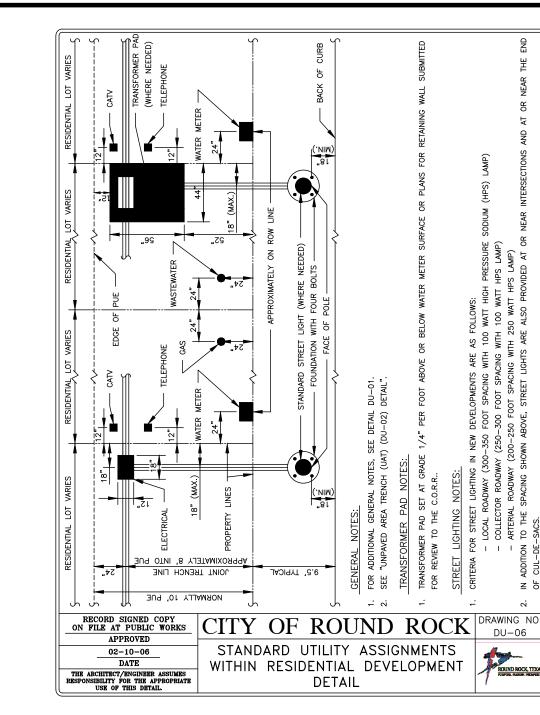
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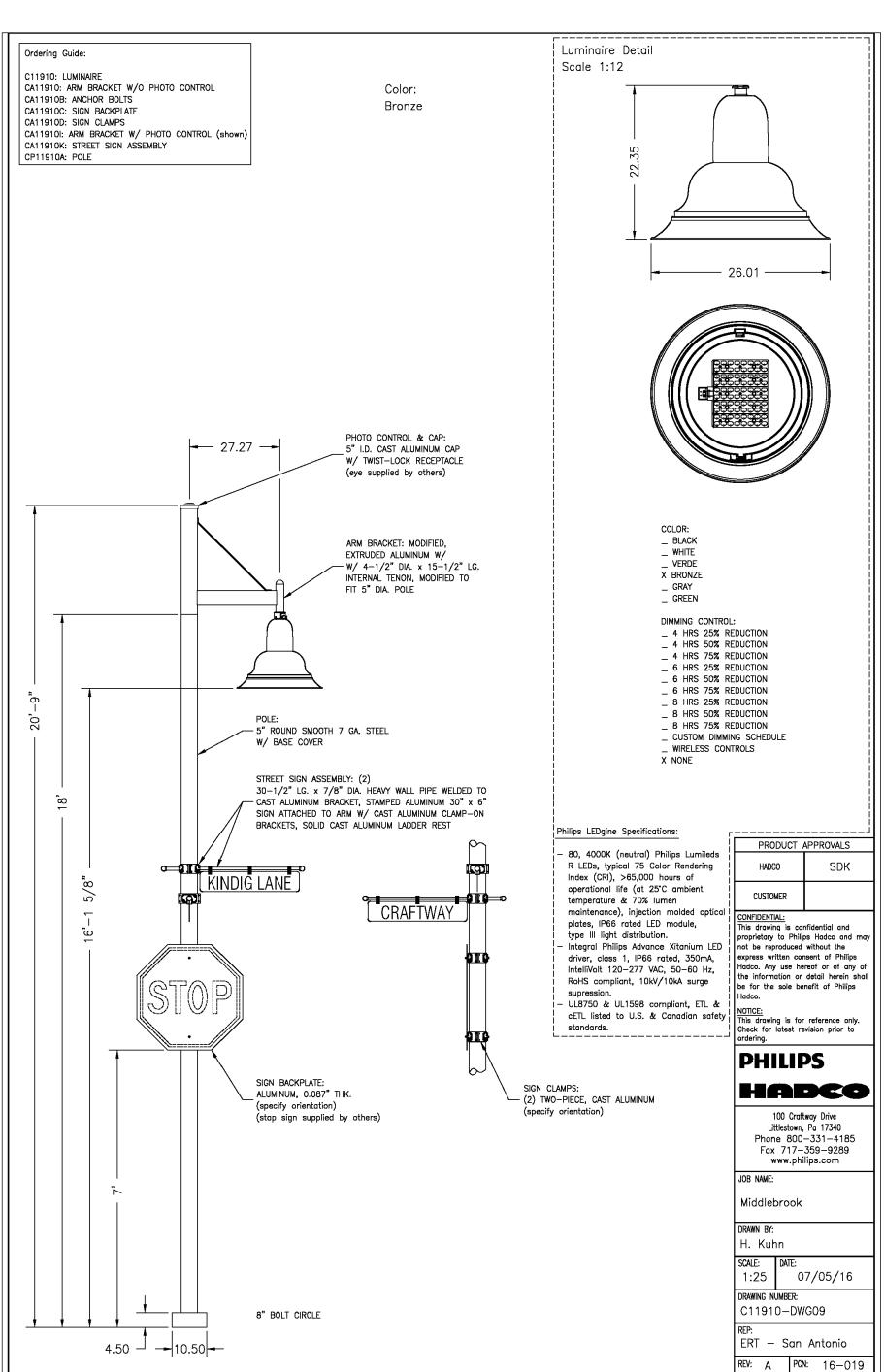




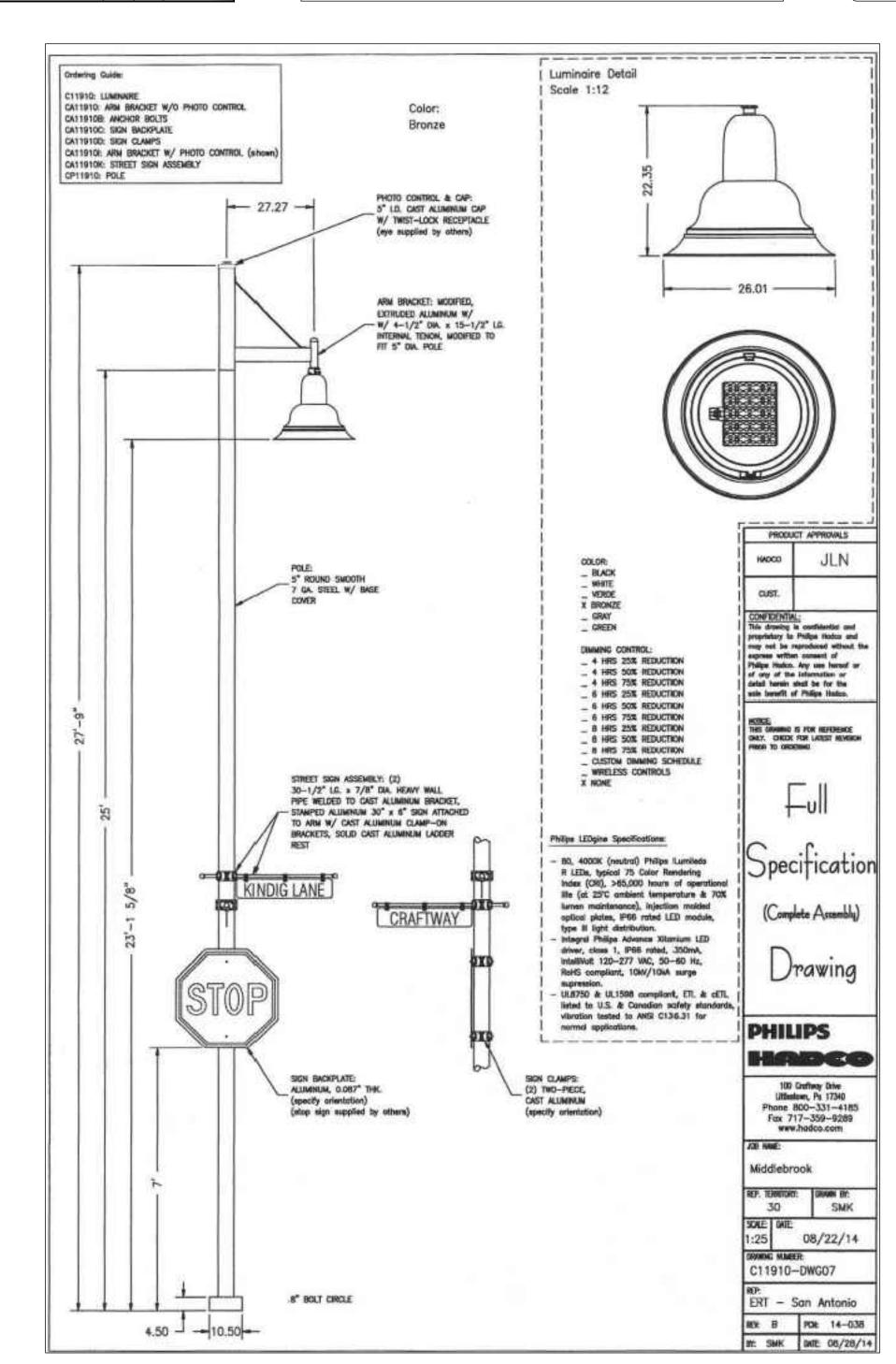


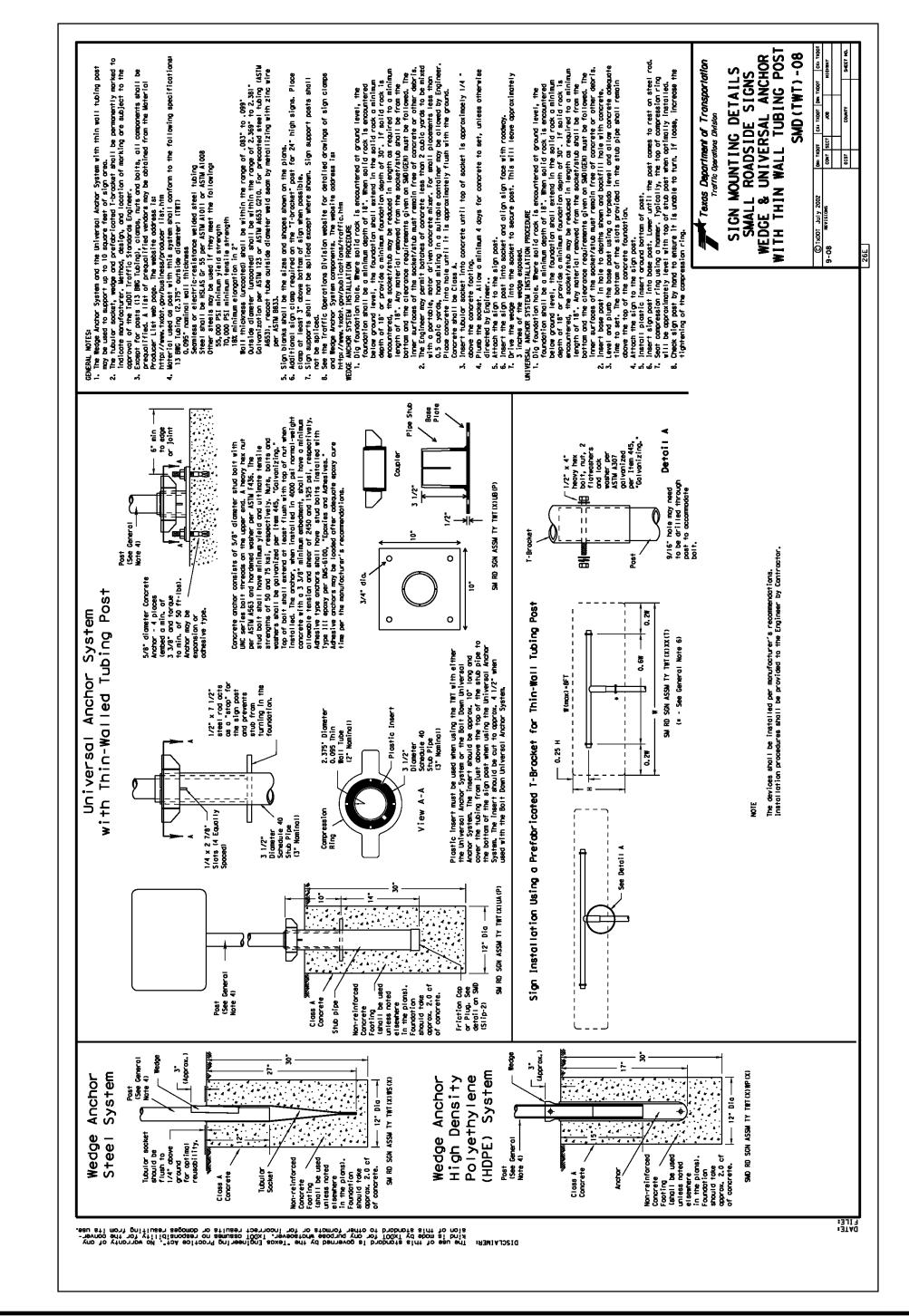


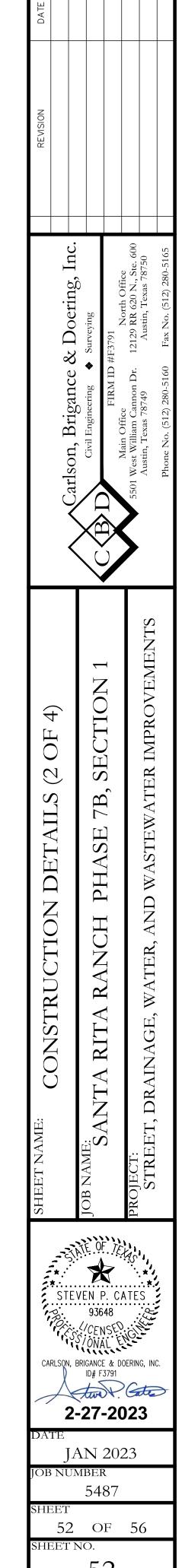


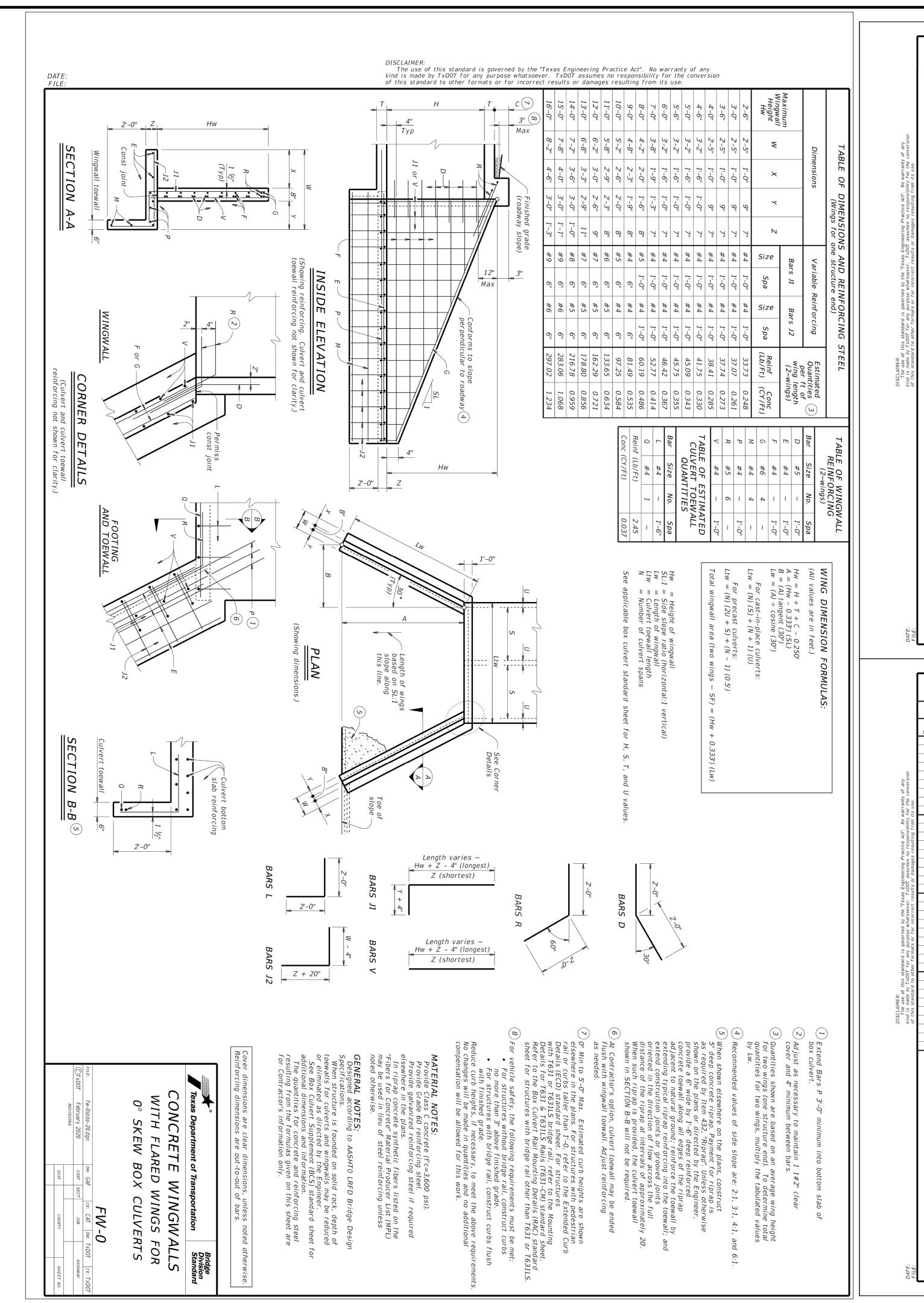


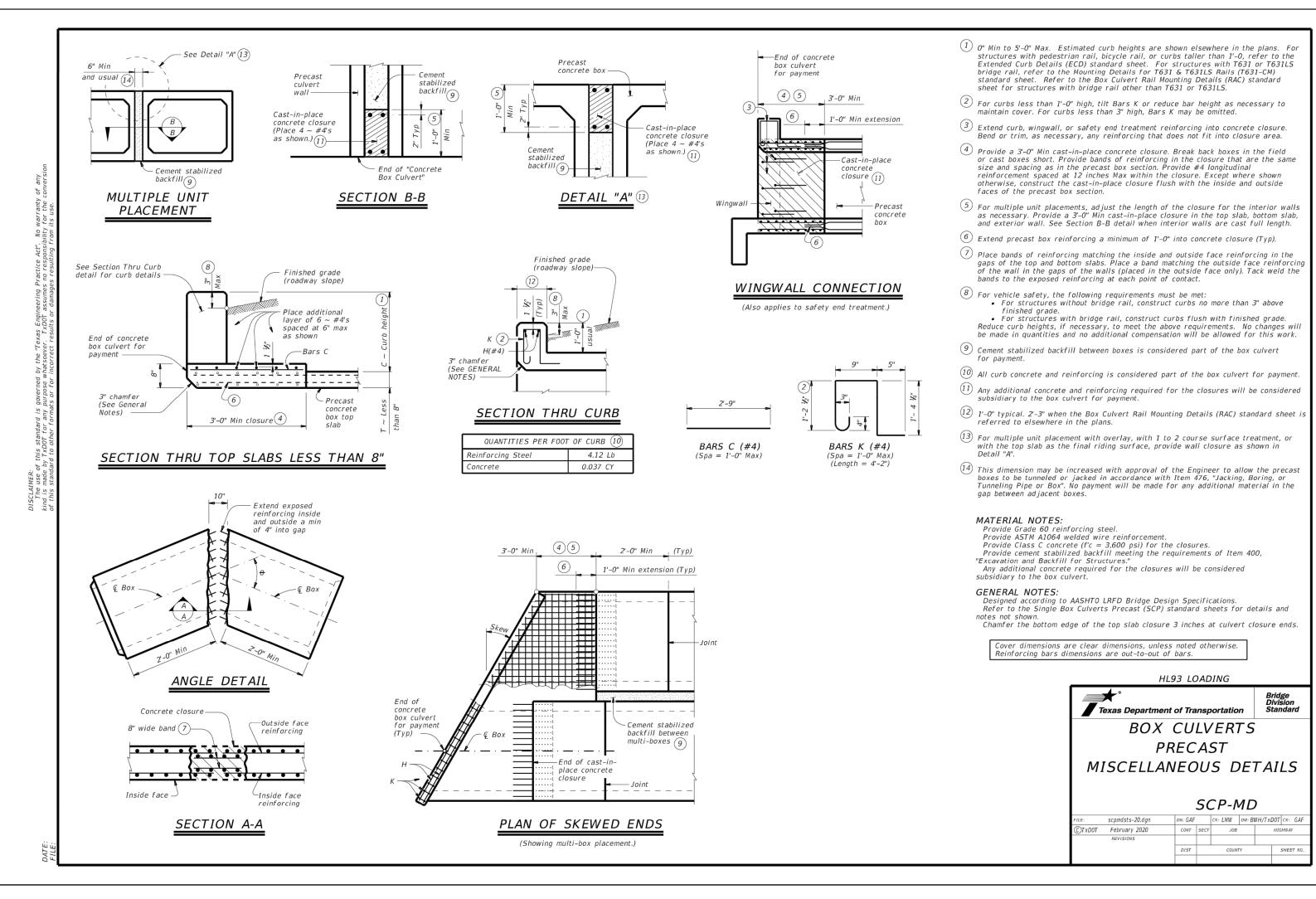
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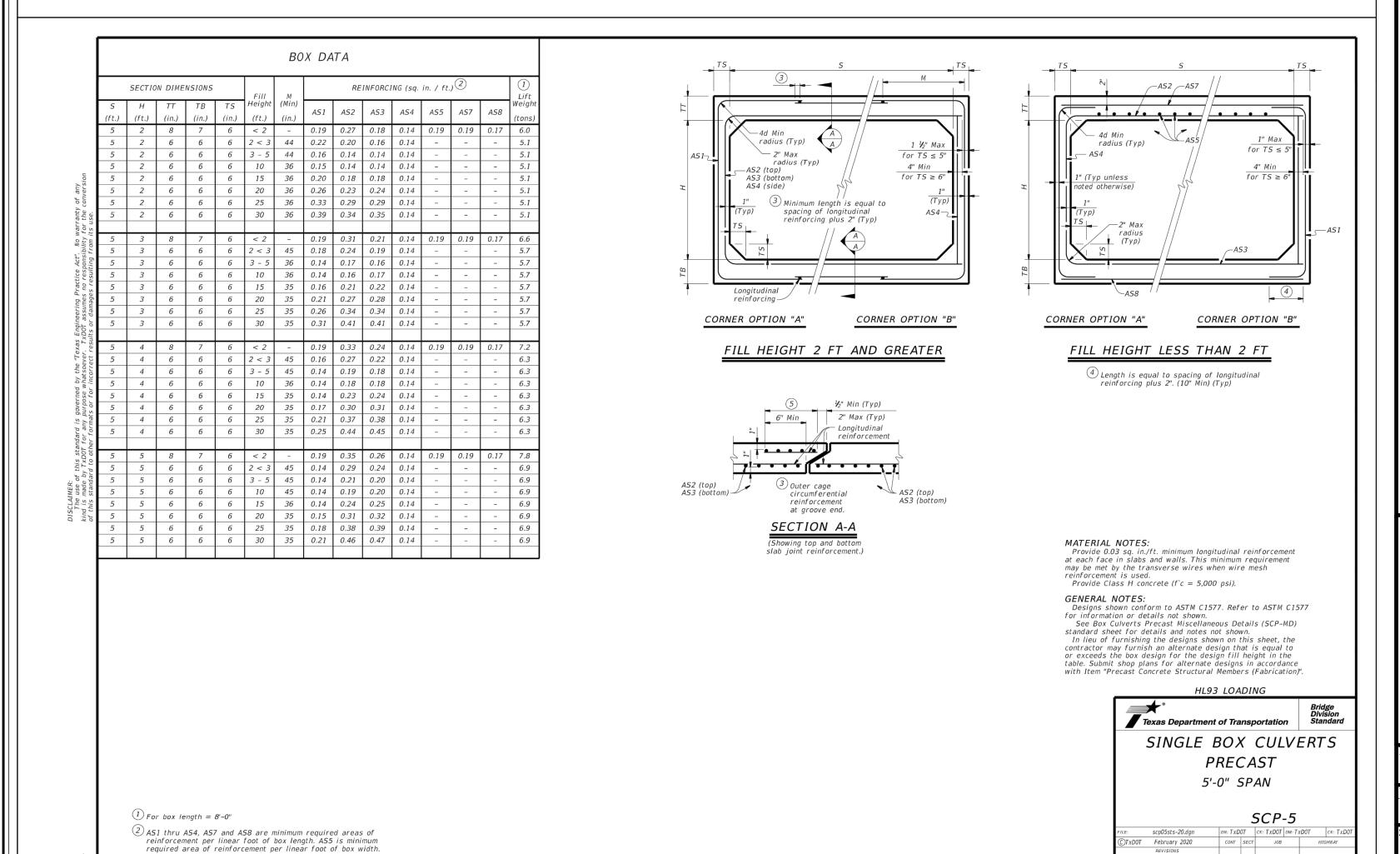


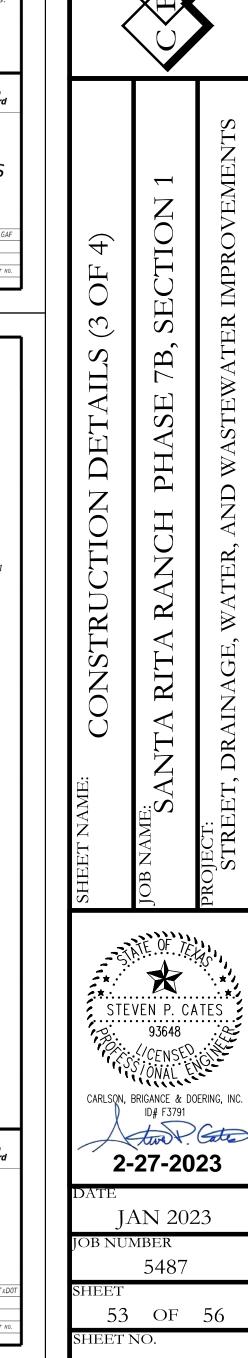


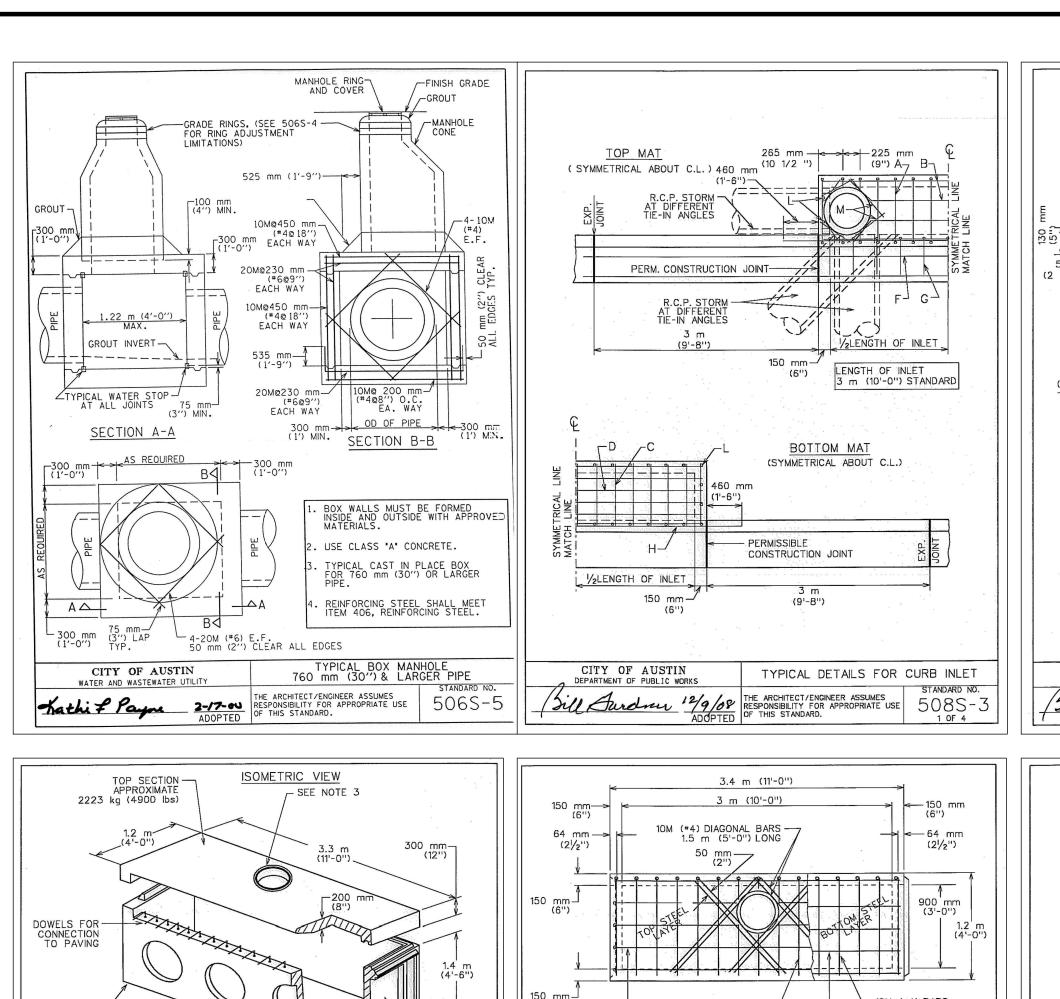


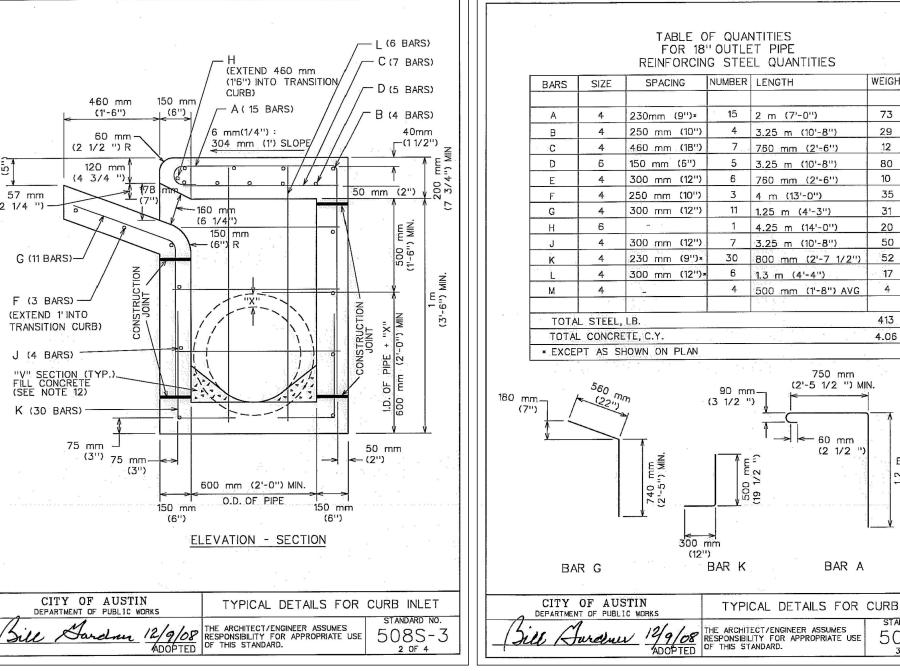


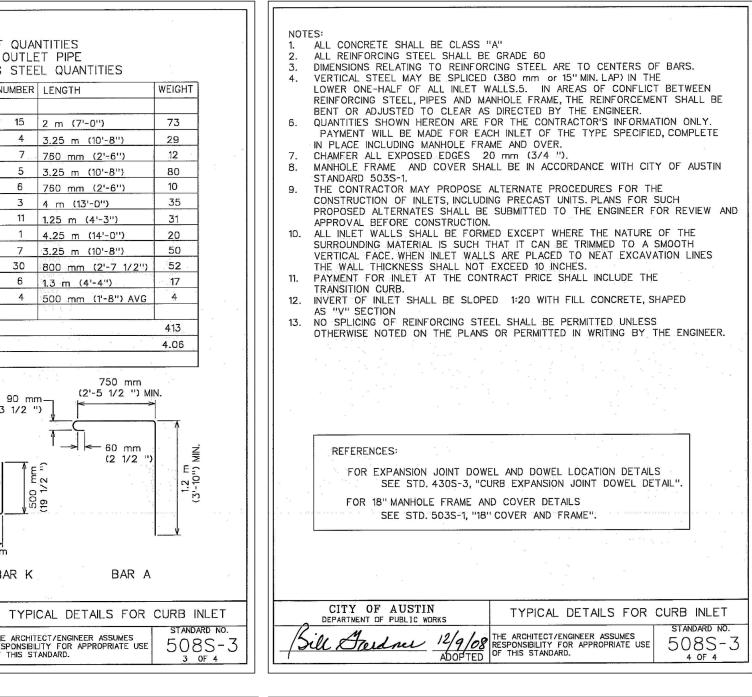


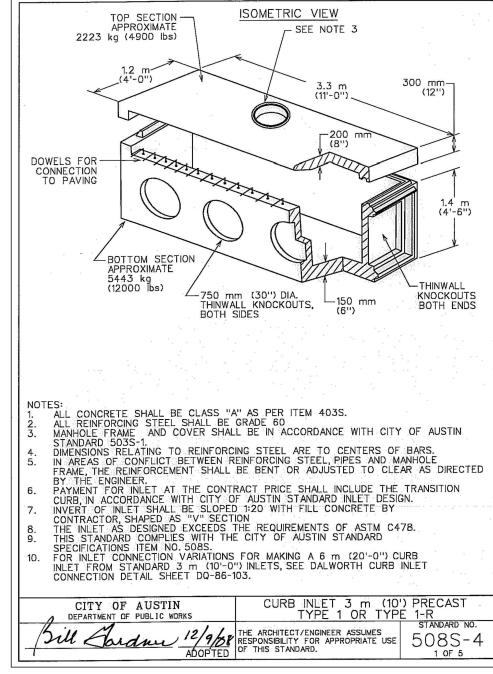


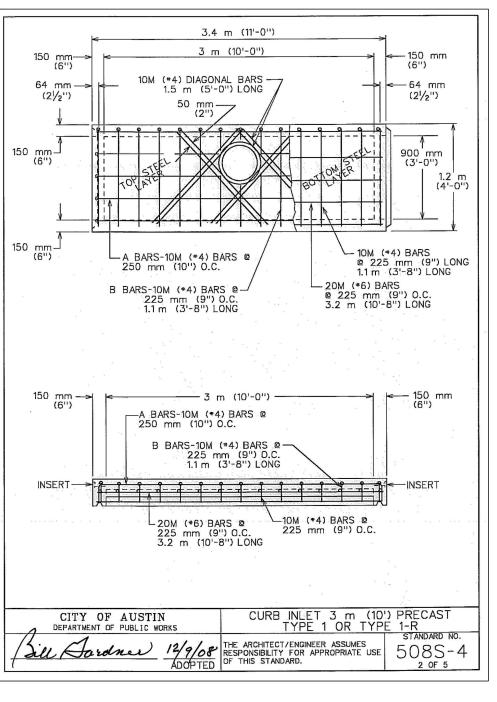


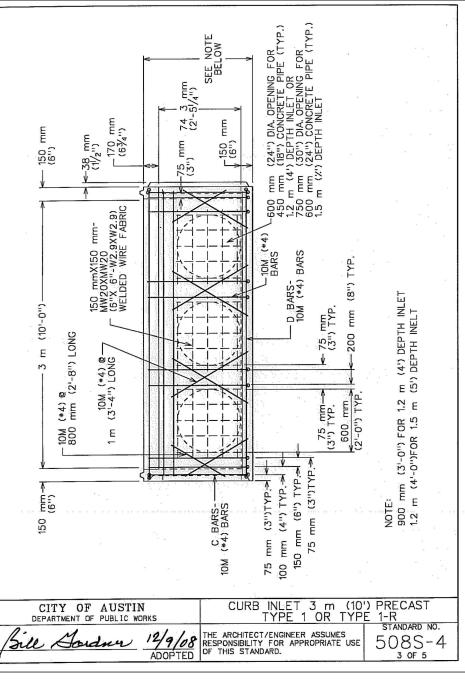


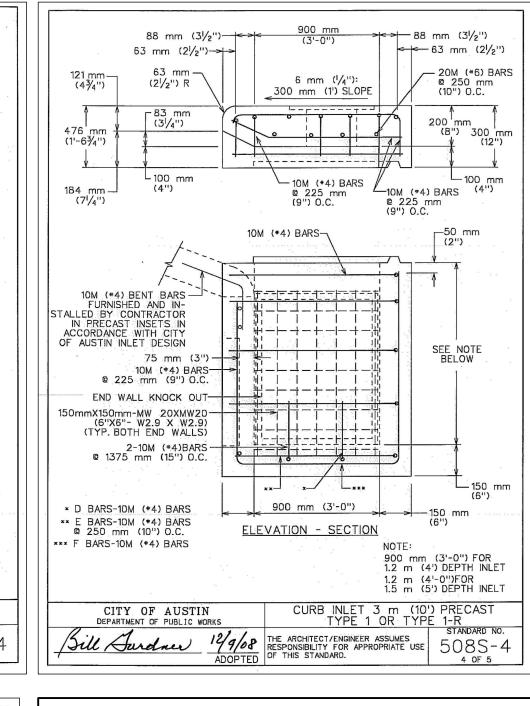




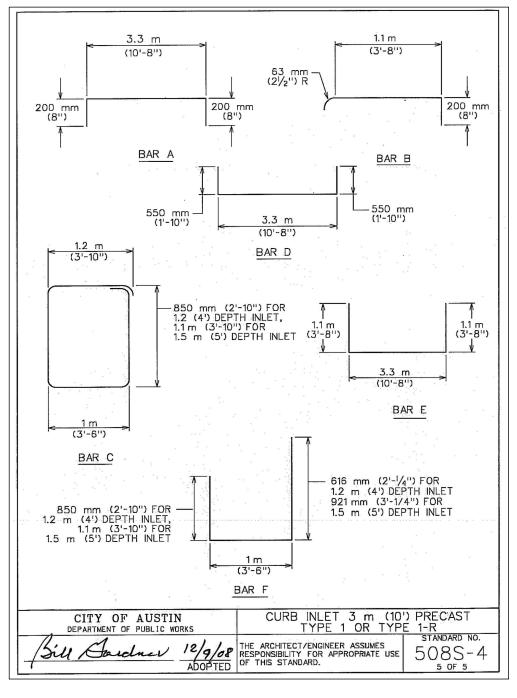


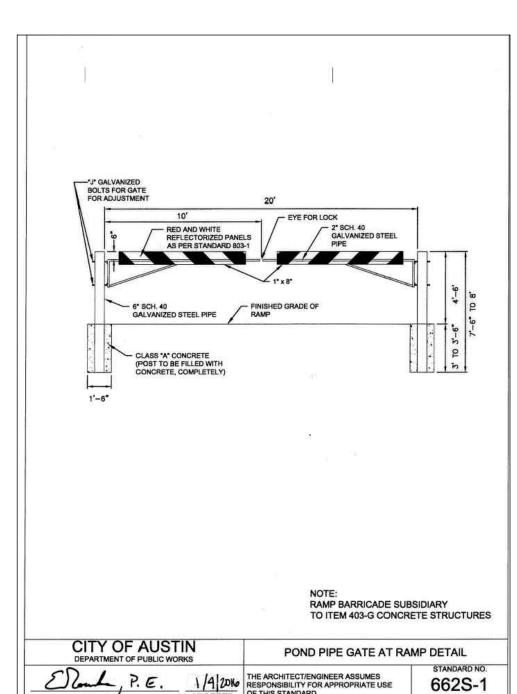


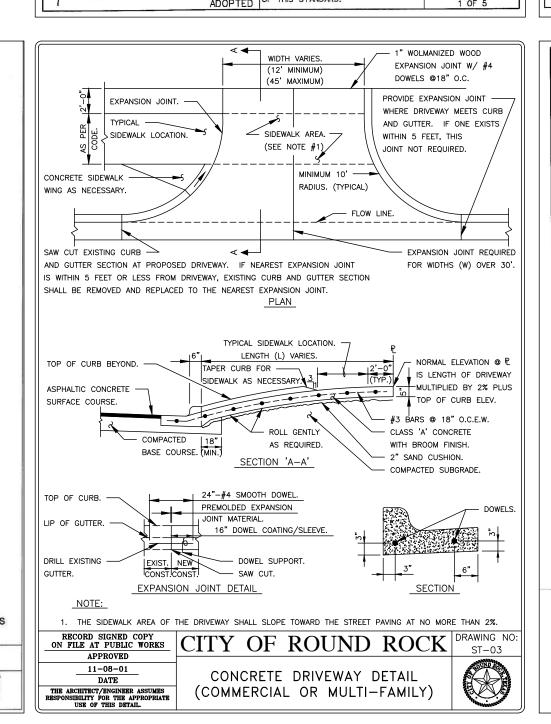


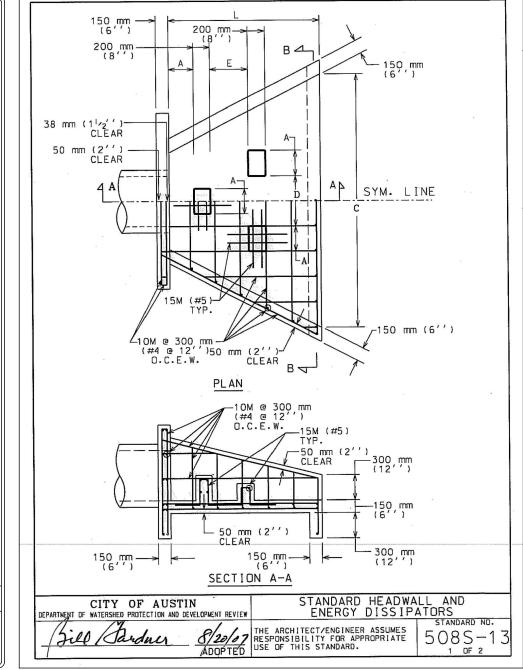


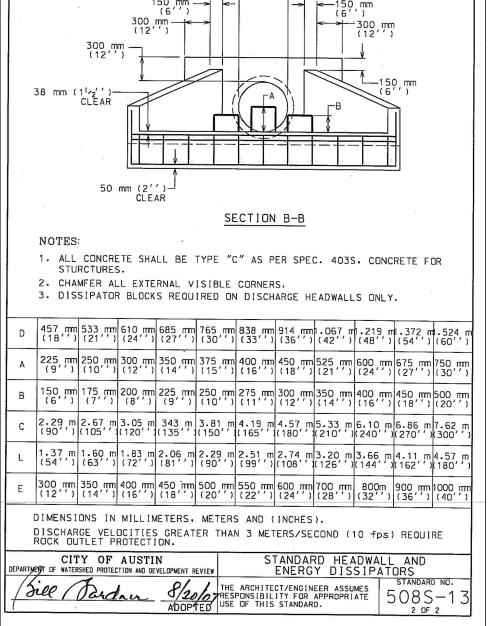
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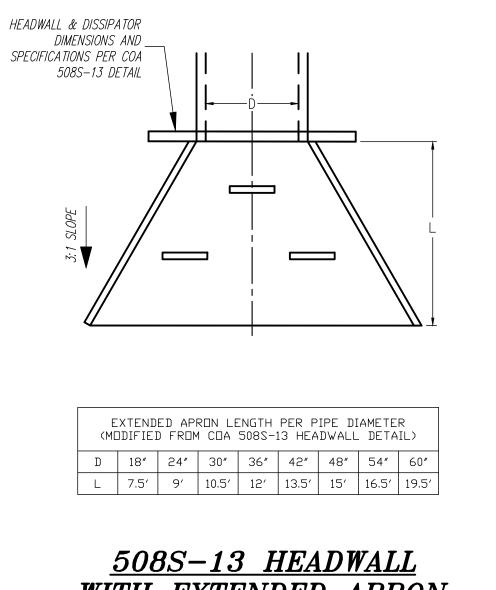


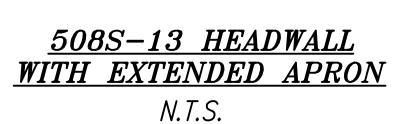


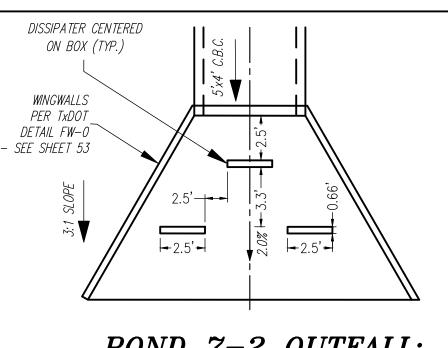












POND 7-2 OUTFALL: 5'x4' C.B.C. HEADWALL <u>DETAIL</u> N.T.S.

CARLSON, BRIGANCE & DOERING, INC. ID# F3791 Atwo Cate 2-27-2023 JAN 2023 5487 54 OF 56 54

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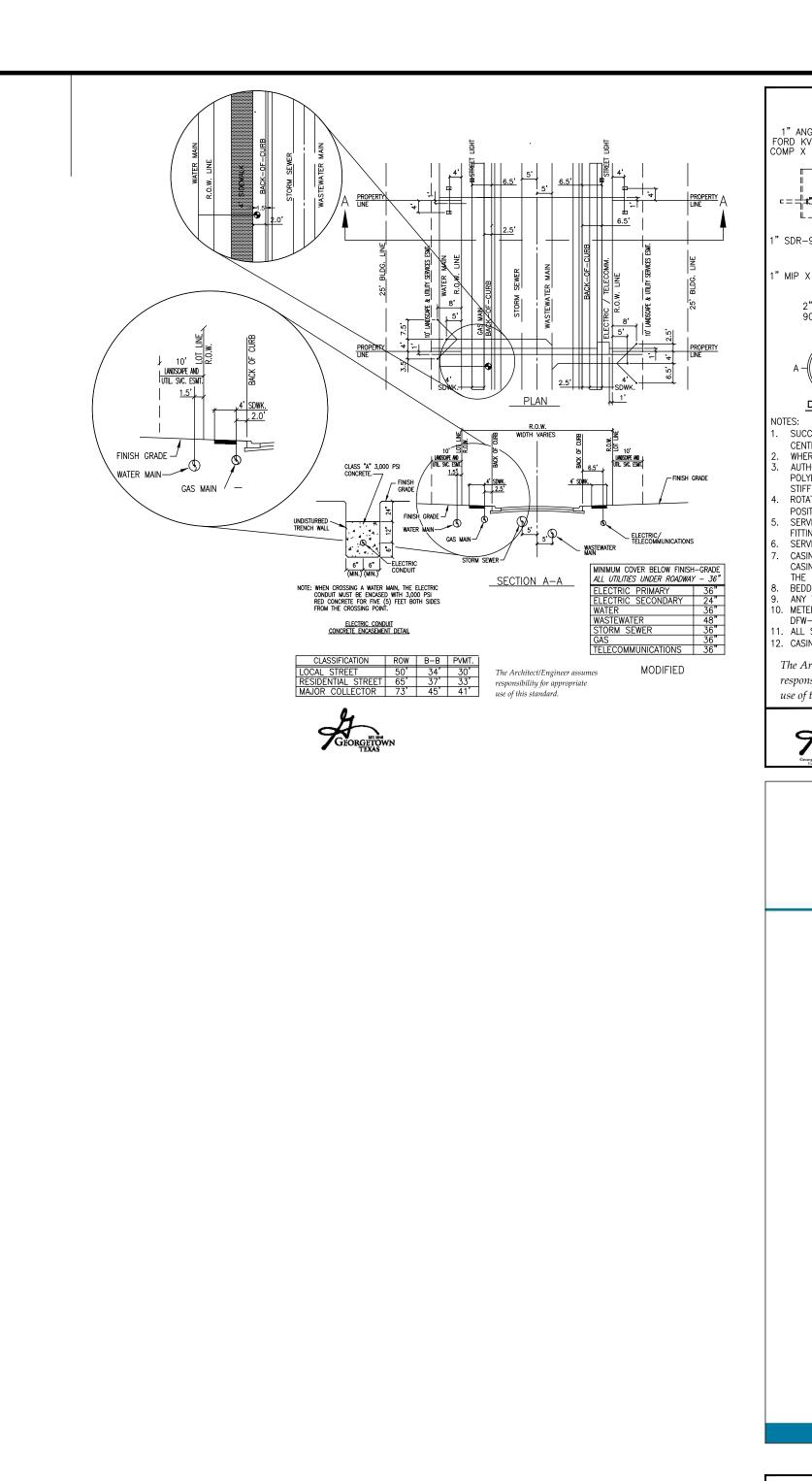
STEVEN P. CATES

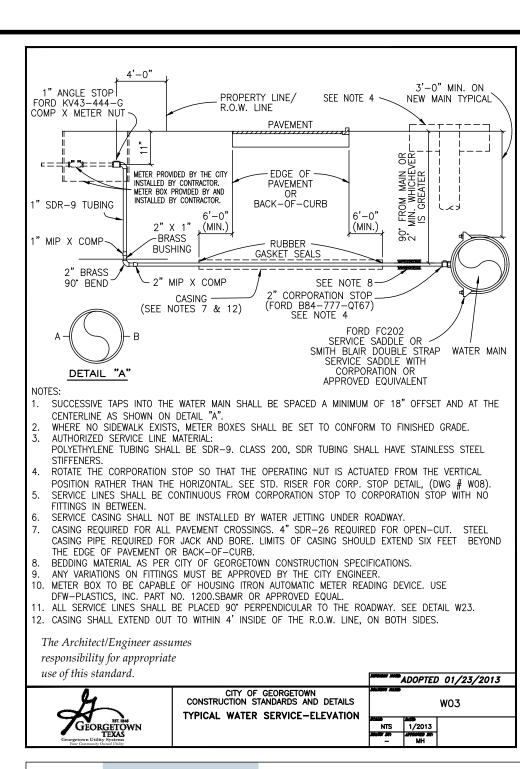
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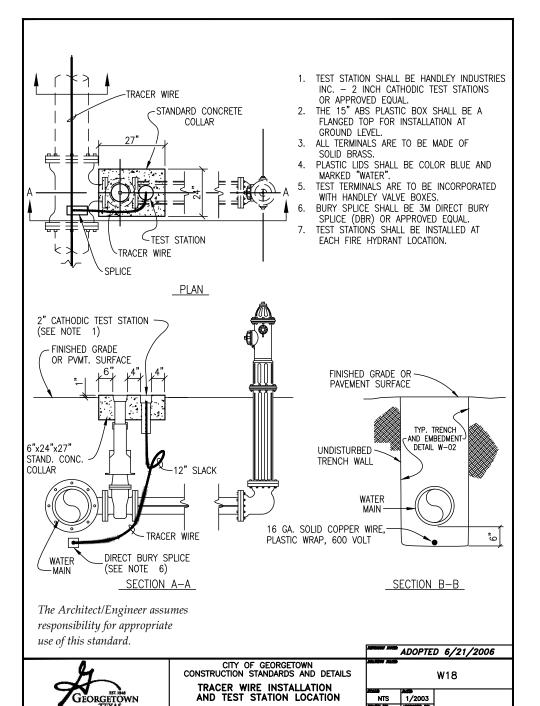
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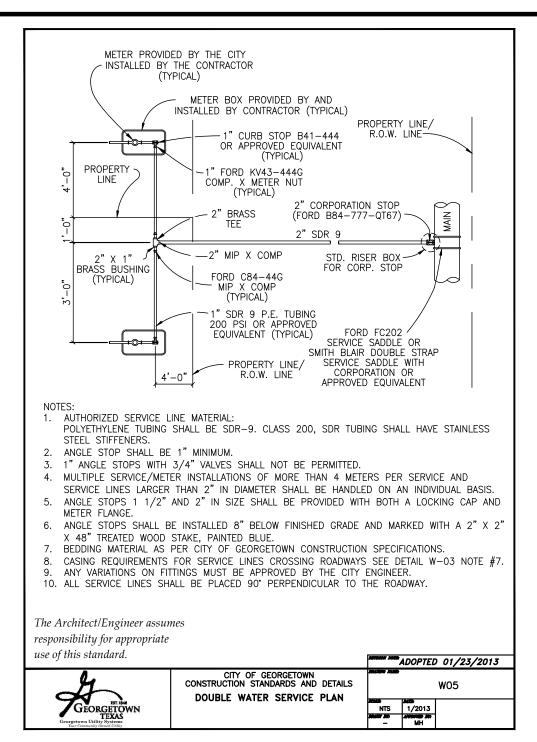
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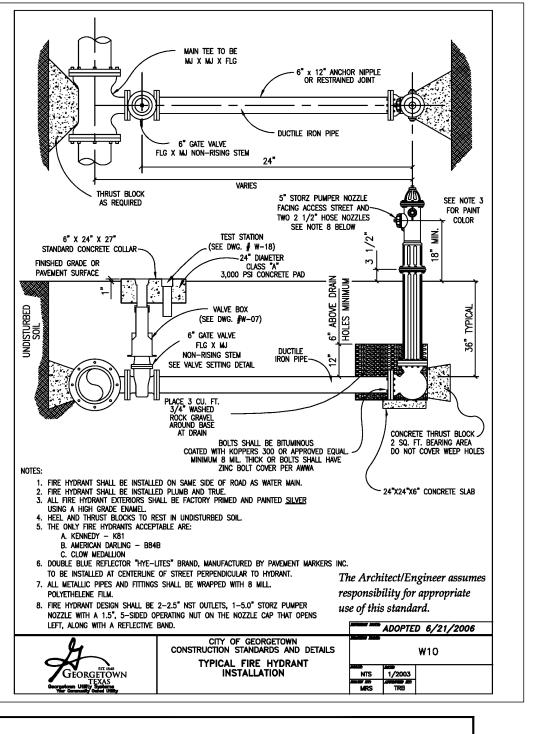


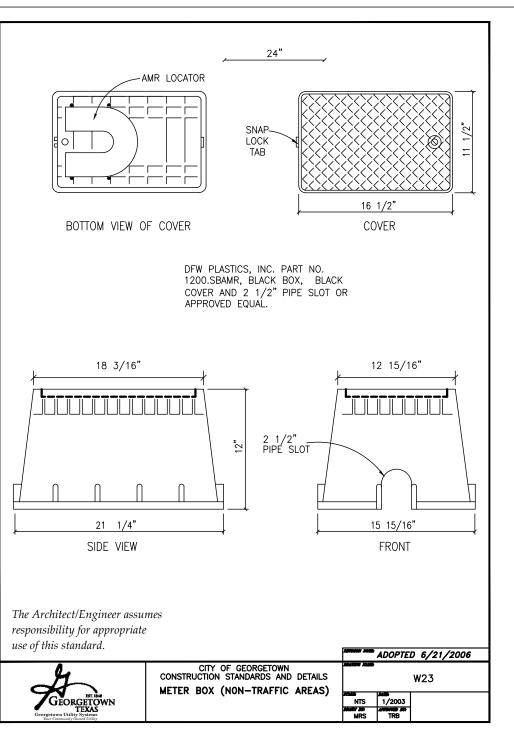


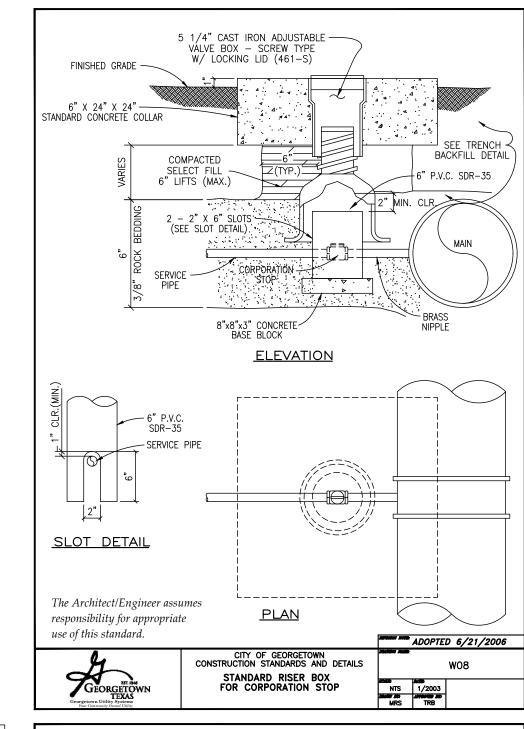


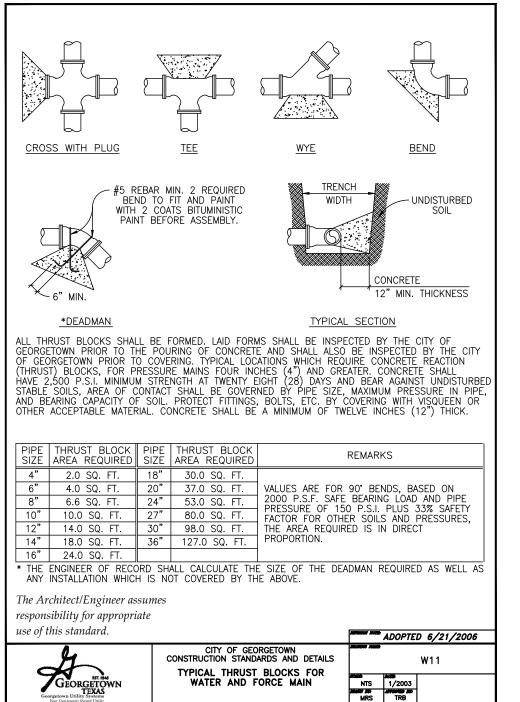


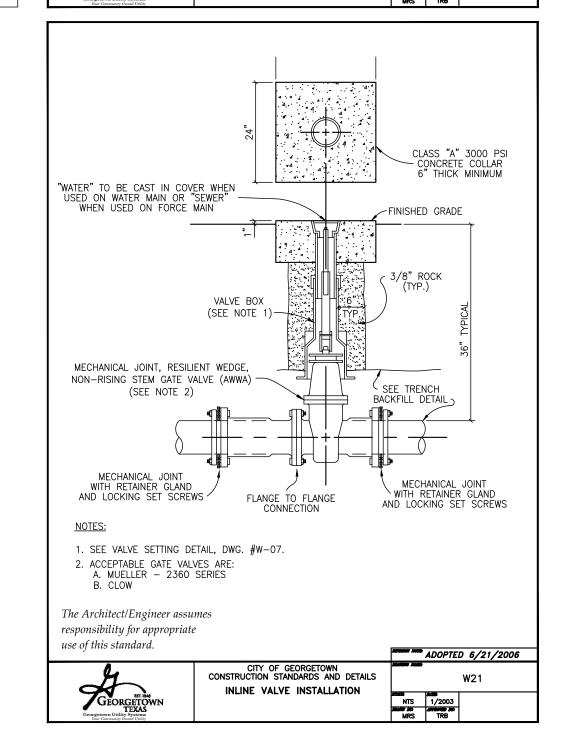


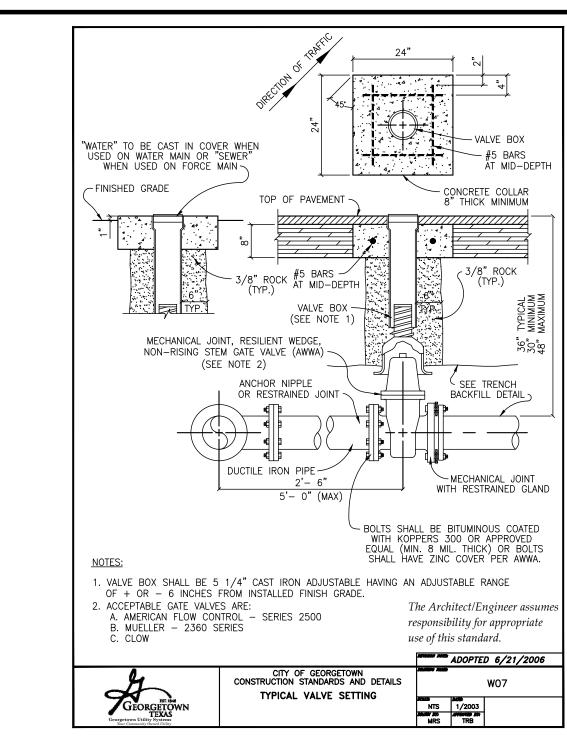


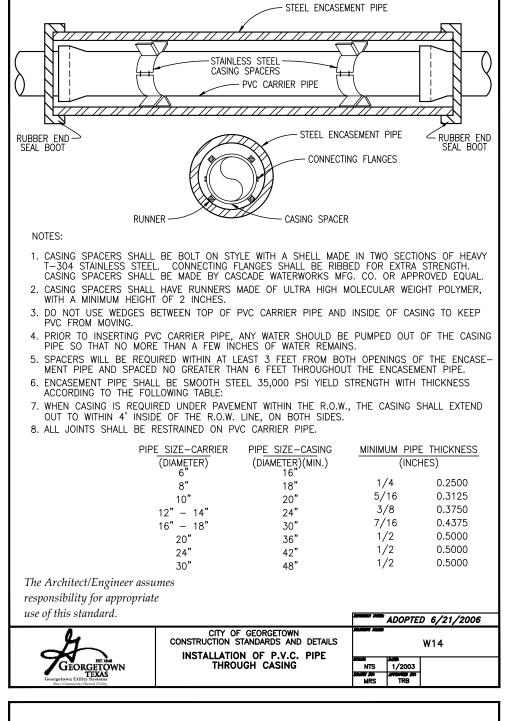


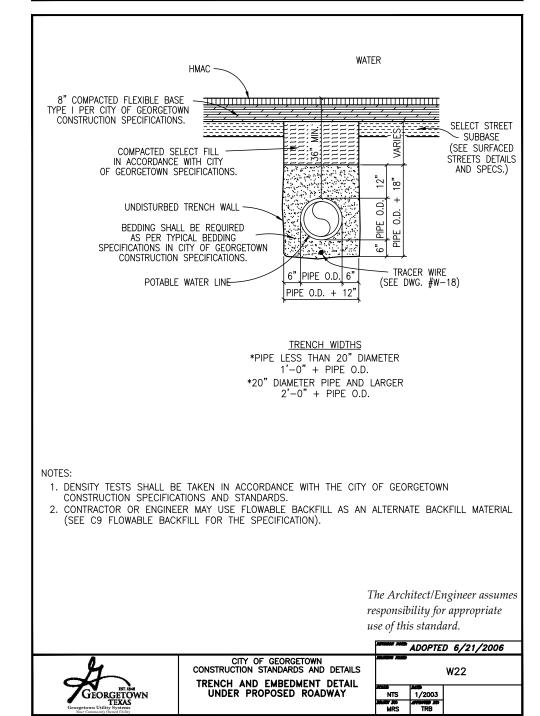


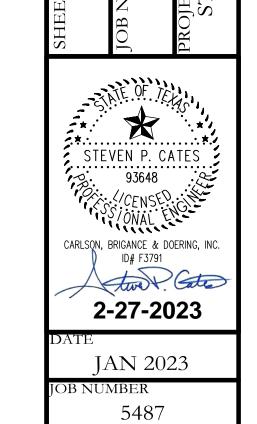








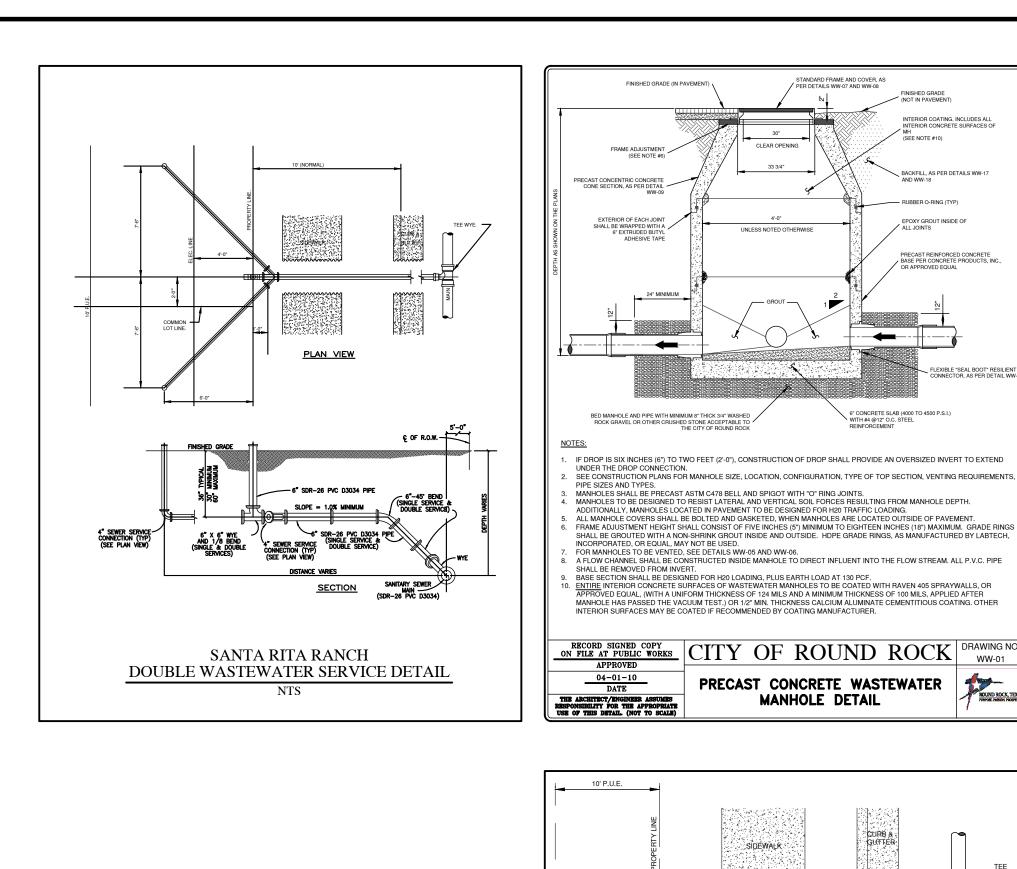


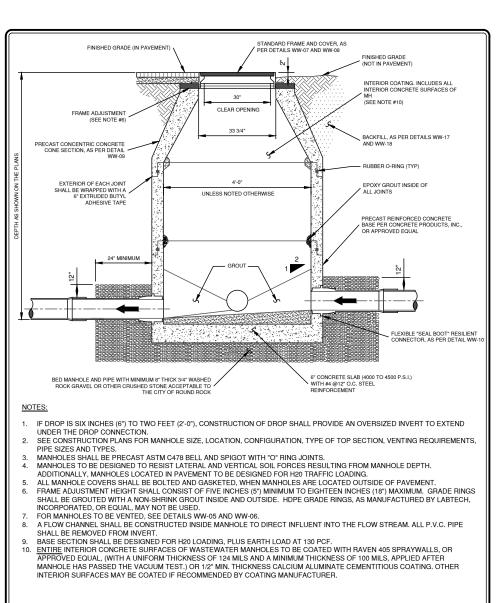


55 OF 56

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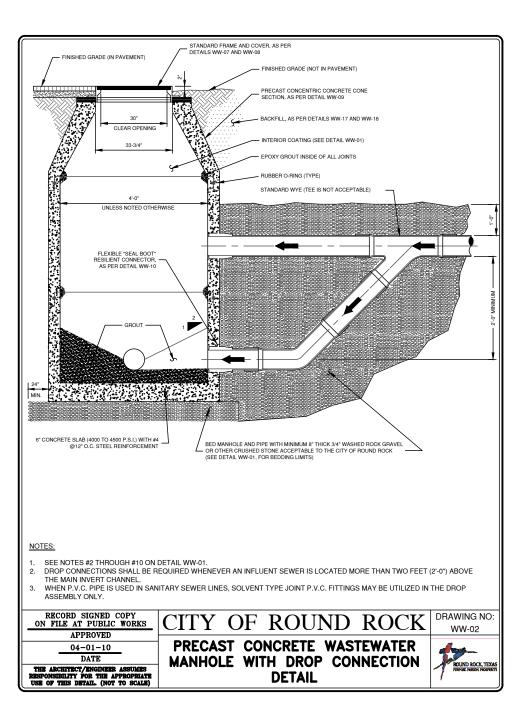
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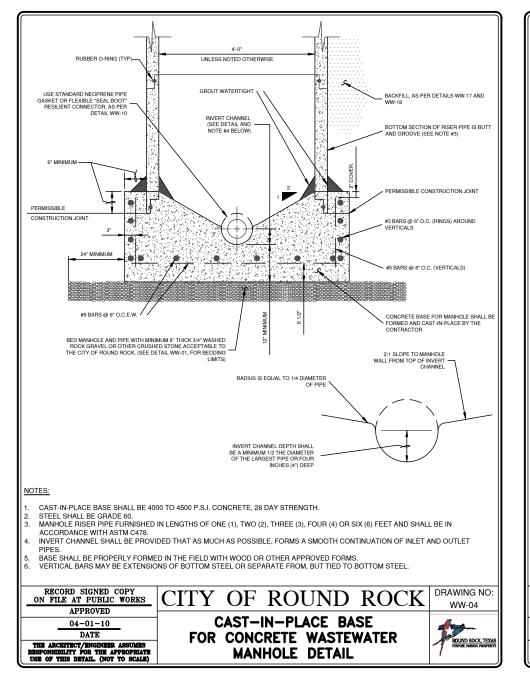


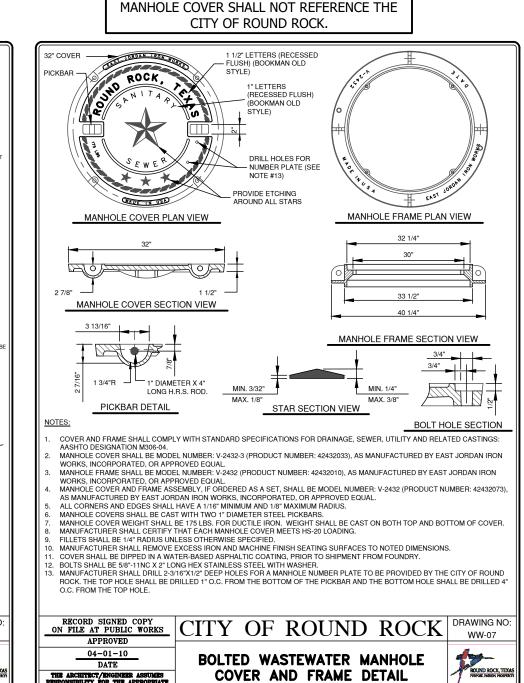


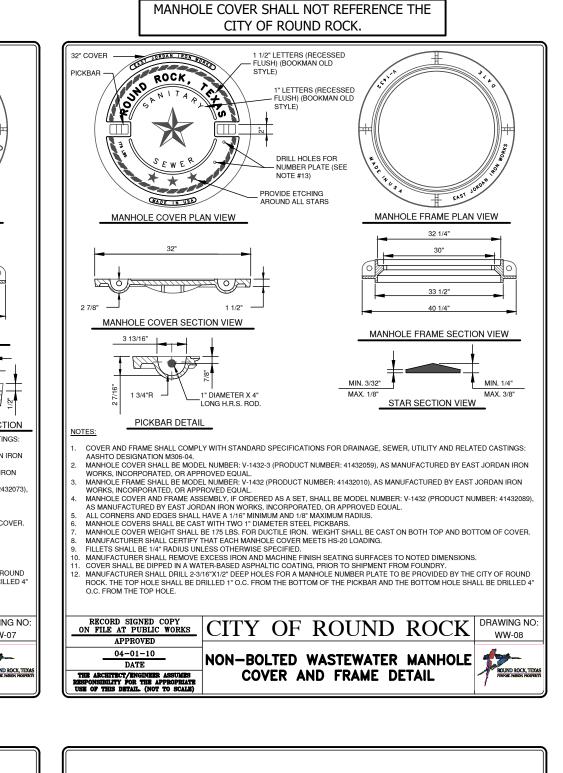
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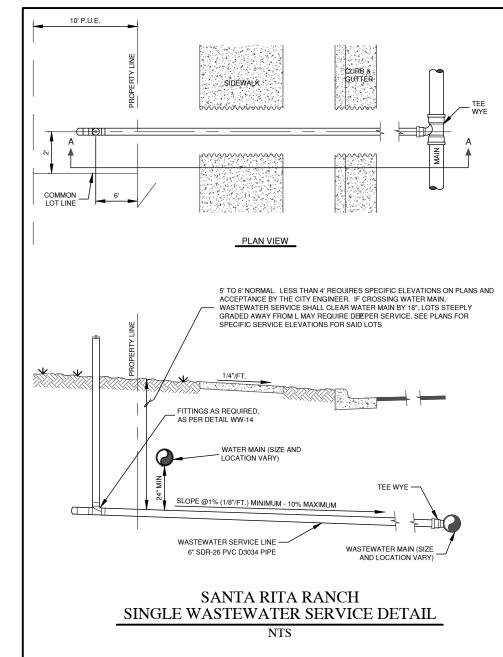
MANHOLE DETAIL

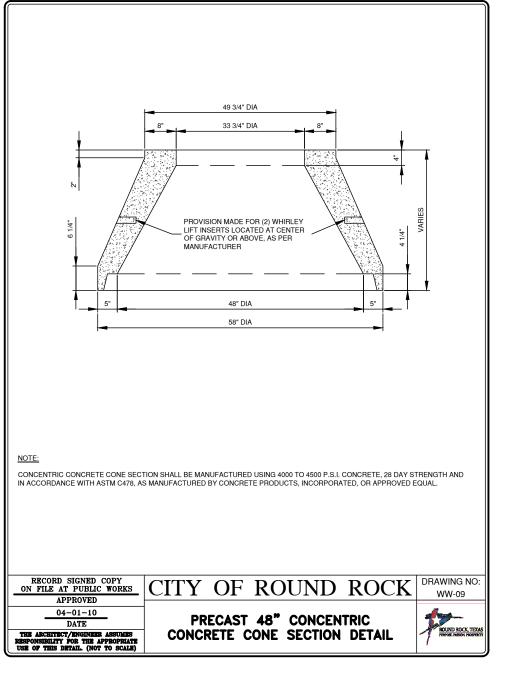


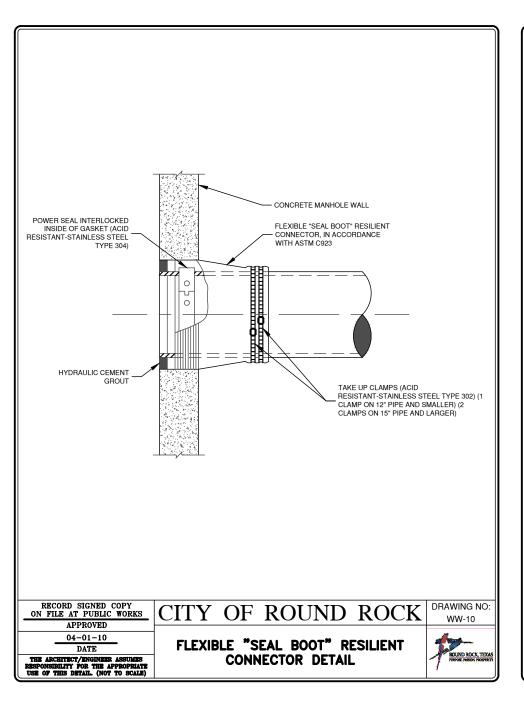


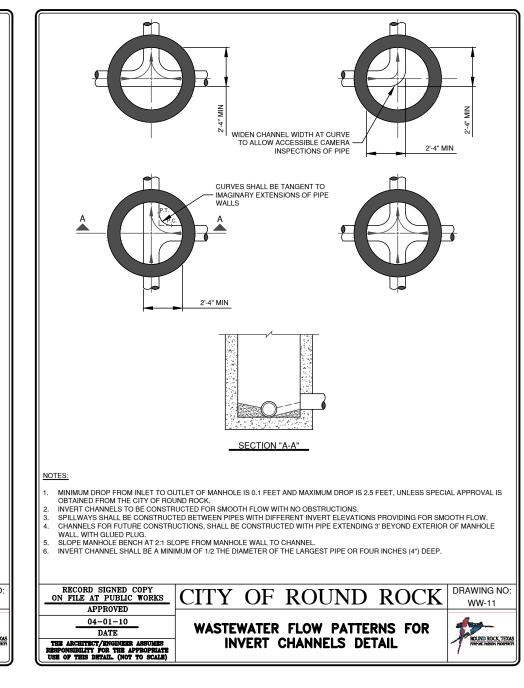


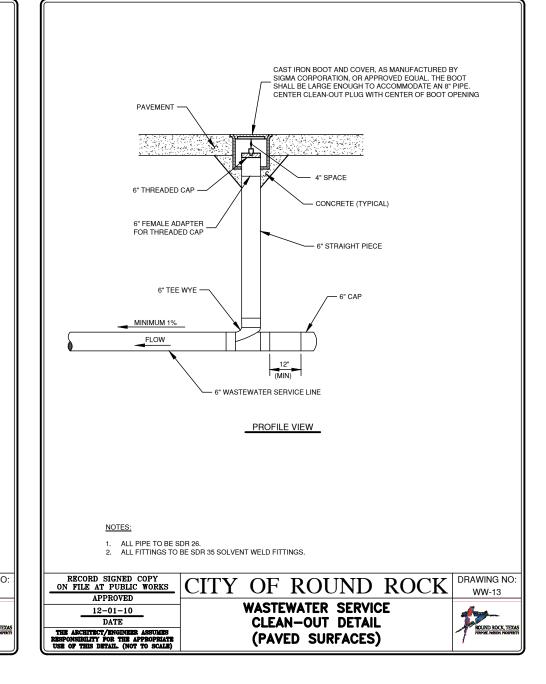


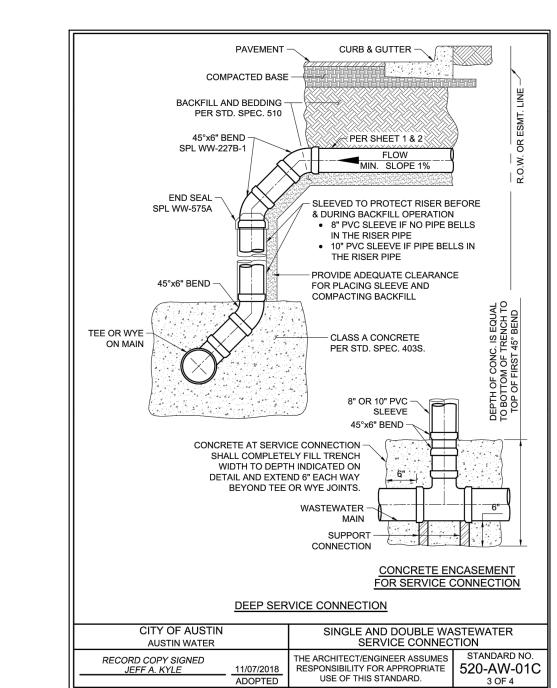


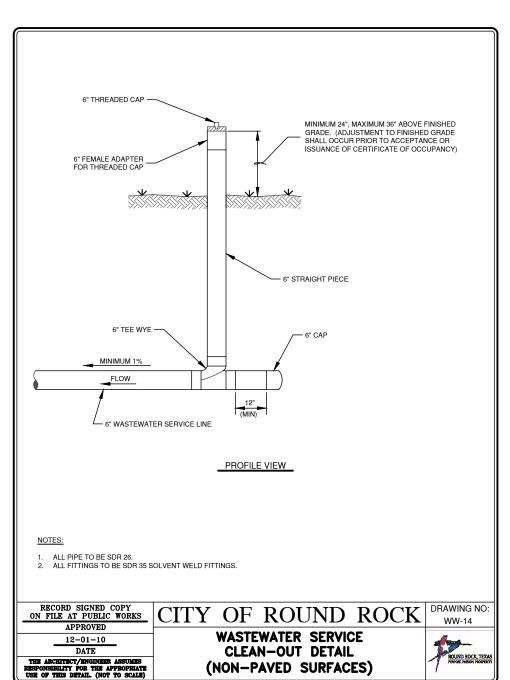


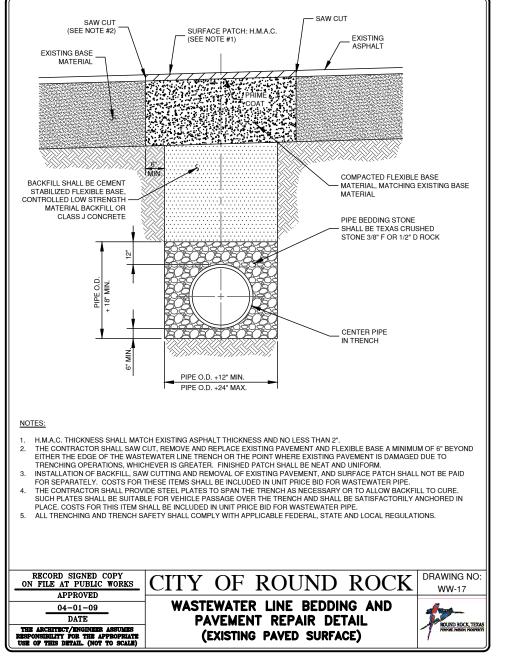


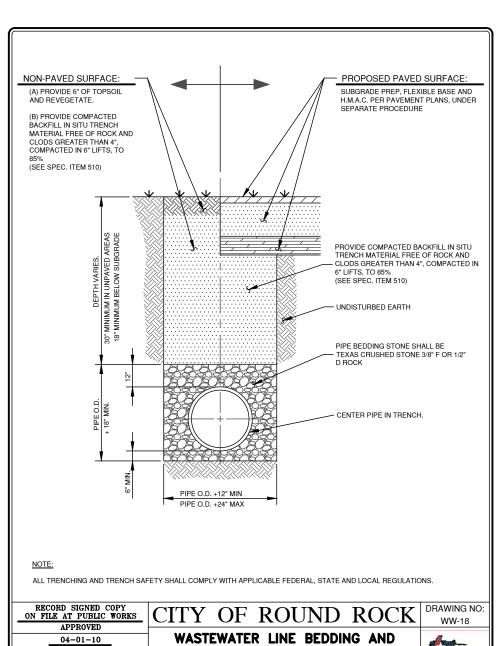






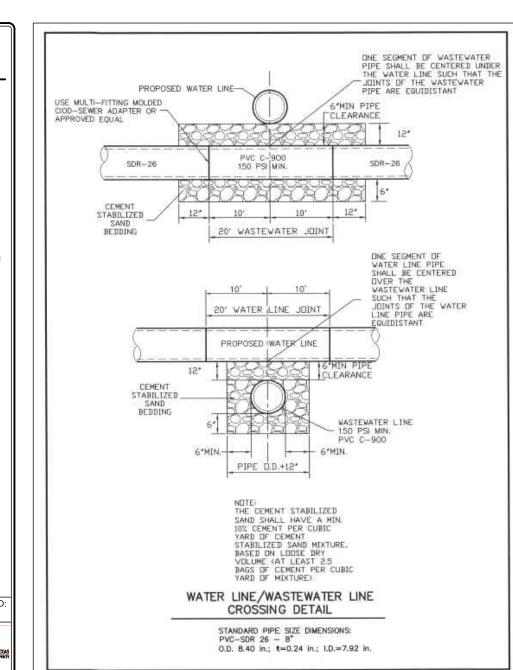






SURFACE REPAIR DETAIL

THE ARCHITECT/ENGINEER ASSURES RESPONSIBILITY FOR THE APPROPRIATE USE OF THESE DETAIL. (NON-PAVED & PROPOSED PAVED SURFACE)





56 OF 56

UNGROUNDED

ELECTRICAL SYMBOL LEGEND NOT ALL SYMBOLS SHOWN MAY BE USED

PLAN LEGEND

SYMBOL DESCRIPTION

ONE LINE AND CONTROL SCHEMATIC LEGEND (CONT'D) <u>SYMBOL</u> <u>DESCRIPTION</u> ──□─┤├─□── INSTRUMENT TRANSFORMER PT-POTENTIAL TRANSFORMER 480V CONTROL POWER TRANSFORMER. VOLTAGE AS SHOWN LIGHTNING ARRESTOR ---- NORMALLY OPEN CONTACT NORMALLY CLOSED CONTACT THREE POSITION MAINTAINED CONTACT SWITCH MOTOR OPERATED VALVE SOLENOID VALVE ELAPSED TIME METER TIME DELAY RELAY. TIMES OUT AFTER ENERGIZATION TIME DELAY RELAY. TIMES OUT AFTER DENERGIZATION R=RED B=BLUE G=GREEN A=AMBER Y=YELLOW LOW LEVEL CUTOFF FLOAT SWITCH MOTOR STARTER FVNR=FULL VOLTAGE NON-REVERSING VFD=VARIABLE FREQUENCY DRIVE WITH BYPASS SIZE SOFT START=ELECTRONIC SOFT START RVNR=REDUCED VOLTAGE NON-REVERSING \top FVNR FVR=FULL VOLTAGE REVERSING

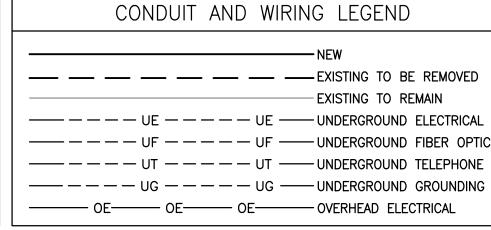
MCP=MOTOR CIRCUIT PROTECTOR SIZE=NEMA STARTER SIZE LEVEL SENSOR TERMINATION ENCLOSURE TEMPERATURE SWITCH MOISTURE PROBE SOLENOID VALVE LIMIT SWITCH AMMETER SWITCH **VOLTMETER SWITCH** PRESSURE SWITCH LIGHTING CONTACTOR



ANALYTIC INDICATOR

LEVEL TRANSDUCER

FLOW METER



ELECTRICAL DRAWING INDEX E1.0 ELECTRICAL NOTES, SYMBOLS AND ABBREVIATIONS E1.1 ELECTRICAL SPECIFICATIONS

E2.0 ELECTRICAL POND SITE PLAN

E3.0 ELECTRICAL LADDER DIAGRAM

E4.0 ELECTRICAL DETAILS

MAIN CIRCUIT BREAKER FAMILIAR WITH THE PROJECT SCOPE OF WORK PRIOR TO SUBMITTING THEIR BID. 10. ALL GROUNDING SHALL BE PER NEC AND LOCAL CODES. 12. ALL WIRING SHALL BE FREE OF SHORTS AND GROUNDS. NO CIRCUIT WIRING SHALL BE LOADED BEYOND THE PERMITTED AMPACITIES ALLOWED BY THE NEC. ALL WIRE SIZES ARE FOR COPPER. 13. CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO SUBMITTING BID. INCLUDING FINAL HOOK-UP OF ALL EQUIPMENT. INCLUDE ALL REQUIRED EQUIPMENT, DEVICES AND ACCESSORIES. REDUCED TO VALUES LESS THAN THOSE REQUIRED BY THE CONTRACT DOCUMENTS. 18. EQUIPMENT SIZES ARE AS DESIGNED. CIRCUIT BREAKERS, CONDUIT, MOTOR STARTERS, DISCONNECT SWITCHES, PLUG-IN'S, ETC.,

MOTOR CONTROL CENTER MOTOR CIRCUIT PROTECTOR AMPERES OR TRIP AMPERES ALTERNATING CURRENT ABOVE COUNTER TOP MINIMUM MAIN LUGS ONLY AIR CONDITIONING MAIN SWITCH BOARD ABOVE FINISHED FLOOR ABOVE FINISHED GRADE MOUNTED SYMMETRICAL AMPS INTERRUPTING CAPACITY NORMALLY CLOSED NATIONAL ELECTRICAL CODE AMERICAN WIRE GAGE BUILDING CONDUIT NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION NEUTRAL NOT IN THIS CONTRACT NORMALLY OPEN NOT TO SCALE CIRCUIT BREAKER CURRENT LIMITING ON CENTER CONNECT OR CONNECTION OVERHEAD CONT'D PHASE CONTRACTOR CONTROL POWER TRANSFORMER PHOTOELECTRIC CURRENT TRANSFORMER **PANELBOARD** PRESSURE REDUCING VALVE POLYVINYL CHLORIDE DISCONNECT SWITCH RELOCATED DIRECT CURRENT RECP **RECEPTACLE** REQ'D REQUIRED ELECTRICAL CONTRACTOR EXHAUST FAN REQ'MTS REQUIREMENTS SCHEDULE MFRGFNCY SERVICE ENTRANCE ELECTRICAL METALLIC TUBING **ENCL** SURFACE MOUNT EQUIP FLA **EQUIPMENT** SOLID NEUTRAL FULL LOAD AMPS SOLENOID OPERATED VALVE FLEXIBLE CONDUIT SPACES(S) ONLY (NO BREAKER OR DEVICE) SPARE BREAKER OR DEVICE GENERAL CONTRACTOR SURGE PROTECTIVE DEVICE GALVANIZED CONTRACT SPECIFICATIONS STAINLESS STEEL HARDWARE GROUND FAULT CIRCUIT INTERRUPTER GROUND FAULT INTERRUPTER SWITCHBOARD SWITCH GEAR HAND-OFF-AUTO ELEPHONE BACKBOARD HORSEPOWER TELEPHONE TERMINAL BOARD UNDERGROUND ELECTRIC UNDERWRITERS LABORATORIES JUNCTION BOX UNLESS OTHERWISE NOTED UNDERGROUND TELEPHONE THOUSAND CIRCULAR MILLS

ABBREVIATIONS (CONT'D)

GENERAL NOTES: (APPLICABLE TO ALL ELECTRICAL SHEETS)

 ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, ALL CITY, COUNTY, AND STATE REGULATIONS, NFPA, ANSI, UL, IEEE, AND THE LOCAL CODE AUTHORITY HAVING JURISDICTION. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMITS AND INSPECTIONS.

VOLT AMPERES

WATER HEATER

WEATHER PROOF TRANSFORMER

SINGLE CONDUCTOR CABLE

THREE CONDUCTOR CABLE

TRANSMITTER

- 2. ALL ELECTRICIANS SHALL BE LICENSED BY THE APPROPRIATE CITY, STATE, OR LOCAL CODE AUTHORITY HAVING JURISDICTION.
- 3. THE ELECTRICAL CONTRACTOR SHALL FOLLOW ALL OSHA AND OWNER SAFETY RULES AS REQUIRED TO WORK ON THIS SITE
- 4. ALL INSTALLATIONS SHALL BE DONE IN A NEAT AND WORKMAN LIKE MANNER.
- 5. ALL POWER OUTAGES SHALL BE PERFORMED DURING NON-BUSINESS HOURS. COORDINATE ALL POWER OUTAGES WITH THE OWNER. NOTIFY THE OWNER IN WRITING 10 DAYS PRIOR TO SCHEDULING ANY POWER OUTAGES.
- 6. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL TEMPORARY ELECTRICAL POWER AND LIGHTING REQUIRED FOR THIS PROJECT.
- 7. THE DEMOLITION DRAWINGS (IF APPLICABLE) ARE DIAGRAMMATIC IN NATURE. THE ELECTRICAL CONTRACTOR SHALL BE THOROUGHLY
- 8. THE ELECTRICAL CONTRACTOR SHALL VERIFY THE ELECTRICAL REQUIREMENTS OF ALL OWNER PROVIDED EQUIPMENT AND SHALL NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
- ALL WORK SHOWN ON DRAWINGS IS NEW UNLESS OTHERWISE NOTED.

KILOVOLT AMPERES

LIGHTNING ARRESTOR

MECHANICAL CONTRACTOR

KILOWATT HOURS

LINE TO LINE LINE TO NEUTRAL

LIGHT OR LIGHTING

KII OWATT

KVA

ABBREVIATIONS

- 11. ALL ELECTRICAL CONSTRUCTION ON THE PROJECT SHALL CONFORM TO THE NEC AND ALL OTHER AUTHORITIES HAVING JURISDICTION. THE CONTRACTOR SHALL OBTAIN ALL PERMITS REQUIRED AND PAY ALL FEES.

- 14. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL EQUIPMENT AND MATERIALS NECESSARY TO MAKE A COMPLETE AND WORKABLE JOB
- 15. FIRE STOP SHALL BE PROVIDED AT ALL LOCATIONS WHERE ELECTRICAL EQUIPMENT OR SYSTEMS PENETRATE FIRE RATED WALLS. SEE ARCHITECTURAL PLANS FOR RATED WALL LOCATIONS. CONTROL WIRING TO MECHANICAL EQUIPMENT IS NOT SHOWN ON THESE
- 16. RISER AND ONE-LINE DIAGRAMS ARE MEANT TO SHOW ONLY VERTICAL AND ELECTRICAL RELATIONSHIPS AND THEREFORE MAY NOT
- 17. EQUIPMENT INTERRUPTING CAPACITIES SPECIFIED IN THE CONTRACT DOCUMENTS ARE BASED UPON EQUIPMENT CHARACTERISTICS AND IMPEDANCES SHOWN ON THE DRAWINGS. IF ACTUAL INSTALLED EQUIPMENT DEVIATES FROM THESE CHARACTERISTICS OR HAS LOWER IMPEDANCES THE CONTRACTOR SHALL INCREASE THE INTERRUPTING CAPACITIES OF ALL ITEMS ON THE LOAD SIDE OF THE DEVIANT EQUIPMENT IN DIRECT PROPORTION TO THE CHANGED CHARACTERISTICS. INTERRUPTING CAPACITIES SHALL NOT BE
- SHALL BE ADJUSTED TO THE EQUIPMENT SUBMITTED AND APPROVED FOR INSTALLATION ON THIS PROJECT.
- 19. REFER TO ARCHITECTURAL OR CIVIL DRAWINGS FOR SITE INFORMATION.
- 20. LIGHT FIXTURE MOUNTING HEIGHTS ARE MEASURED BETWEEN THE FLOOR AND THE BOTTOM OF THE FIXTURE.



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JOB NUMBER

STEVE L. KANETZIKY

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5487 57 OF 61

HEET NO. 57 - E1.0

1.01 WORK INCLUDED

A. ELECTRICAL SYSTEMS

1.02 RELATED WORK

- A. THE WORK COVERED BY THIS SPECIFICATION CONSISTS OF FURNISHING ALL LABOR, SUPPLIES AND MATERIALS, SHOP DRAWINGS AND A LIST OF MAKE AND CATALOG NUMBERS OF ALL EQUIPMENT AND MATERIALS TO BE INSTALLED AND PERFORMING ALL OPERATIONS. INCLUDING INSTALLATION OF LIGHTING FIXTURES, ELECTRICAL EQUIPMENT, CUTTING AND PATCHING, COORDINATION WITH OTHER TRADES ON THE JOB, ETC., NECESSARY FOR THE INSTALLATION OF COMPLETE ELECTRICAL SYSTEMS AS SHOWN ON THE DRAWINGS AND HEREINAFTER SPECIFIED. THESE SPECIFICATIONS SUPPLEMENT THE GENERAL CONDITIONS AND SPECIFICATIONS.
- B. EXAMINATION OF SITE: THE CONTRACTOR SHALL THOROUGHLY EXAMINE SITE AND SATISFY HIMSELF AS TO THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. THE CONTRACTOR SHALL VERIFY AT THE SITE ALL MEASUREMENTS AFFECTING HIS WORK AND SHALL BE RESPONSIBLE FOR THE CORRECTNESS OF THE SAME. NO EXTRA COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR FOR EXPENSES DUE TO HIS NEGLECT TO EXAMINE OR FAILURE TO DISCOVER CONDITIONS WHICH AFFECT HIS WORK. NO EXTRA COMPENSATION WILL BE ALLOWED ON ACCOUNT OF DIFFERENCES BETWEEN ACTUAL DIMENSIONS AND THOSE INDICATED ON THE DRAWINGS.
- C. THE AGREEMENT FORMS, GENERAL CONDITIONS AND SUPPLEMENTARY CONDITIONS OF THE SPECIFICATIONS SHALL APPLY TO THE WORK SPECIFIED IN DIVISION 26

1.03 DEFINITION

- A. "WIRING": WIRE OR CABLE, INSTALLED IN RACEWAY WITH ALL REQUIRED BOXES, FITTINGS, CONNECTORS AND ACCESSORIES, COMPLETELY INSTALLED.
- B. "FEEDER": WIRING TO ANY DEVICE OR EQUIPMENT IN WHICH NUMBER SIX AWG COPPER (#6 CU) OR LARGER CONDUCTORS ARE USED.
- C. "POWER WIRING": WIRING TO ANY DEVICE OR EQUIPMENT SERVED BY A MULTI—POLE BREAKER.

1.04 QUALITY ASSURANCE

- A. CODES: COMPLY WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) AND ANY OTHER AUTHORITIES HAVING JURISDICTION OVER
- B. PERMITS AND INSPECTIONS: PROVIDE ALL PERMITS REQUIRED AND OBTAIN FINAL INSPECTION AND APPROVAL FROM THE INSPECTION DEPARTMENT HAVING JURISDICTION.
- C. WHERE DIFFERENT SECTIONS OF ANY APPLICABLE CODES SPECIFY DIFFERENT MATERIALS, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE SHALL GOVERN.
- D. STANDARDS FOR MATERIAL AND WORKMANSHIP: USE MATERIALS THAT ARE NEW AND LISTED AND LABELED BY UNDERWRITERS LABORATORIES (UL) AS CONFORMING TO ITS STANDARDS, WHERE SUCH A STANDARD HAS BEEN ESTABLISHED FOR THE PARTICULAR TYPE OF MATERIAL IN QUESTION. EXECUTE WORK IN A WORKMAN LIKE MANNER, TO PRESENT A NEAT AND MECHANICAL APPEARANCE WHEN COMPLETED.

1.05 SUBSTITUTION OF MATERIALS

- A. NO SUBSTITUTION OF MATERIAL IS ALLOWED WITHOUT WRITTEN PRIOR AUTHORIZATION FROM THE ENGINEER AND OWNER. DETERMINATION OF WHAT IS CONSIDERED EQUAL IS AT THE SOLE DISCRETION OF THE ENGINEER AND OWNER.
- B. INCLUDE SUFFICIENT DESCRIPTIVE INFORMATION, INCLUDING MANUFACTURER'S PUBLISHED DATA TO ESTABLISH CONTRACT COMPLIANCE. SUBMIT SAMPLES IF REQUESTED BY ARCHITECT/ENGINEER.

1.06 DRAWINGS AND SPECIFICATIONS

A. THE WIRING LAYOUTS ARE SCHEMATIC AND DO NOT NECESSARILY SHOW THE EXACT LOCATION OF RACEWAYS, OUTLETS, ETC. REFER TO THE ARCHITECTURAL DRAWINGS FOR ACTUAL DIMENSIONS. FIT WORK TO CONFORM TO THE DETAILS OF BUILDING CONSTRUCTION. COORDINATE ALL WORK TO ASSURE PROPER CLEARANCE.

1.07 AS-BUILT DRAWINGS

- A. AS WORK PROGRESSES, RECORD ON ONE (1) SET OF ELECTRICAL PRINTS ALL CHANGES AND DEVIATIONS FROM THE CONTRACT DOCUMENTS IN SIZE, LOCATIONS AND TYPES OF ALL MATERIALS AND EQUIPMENT. RECORD FINAL LOCATION OF OUTLETS, SWITCHES, STARTERS, UNDERGROUND AND EXPOSED CONDUITS, ETC. TO INDICATE THE FINAL INSTALLATION. MAKE SUFFICIENT MEASUREMENTS TO LOCATE ALL EQUIPMENT AND CONDUITS. PROVIDE AS-BUILT DRAWINGS.
- THE CONTRACTOR SHALL PREPARE A TYPED PANEL DIRECTORY FOR EACH PANEL UTILIZED FOR THIS PROJECT. THIS DIRECTORY SHALL IDENTIFY THE CIRCUIT NUMBER, DEVICES SERVED, AND LOCATION OF DEVICES BY ROOM NUMBER. HE SHALL FILE THEM WITH THE BUILDING MANAGER WHEN THE WORK IS COMPLETE.

1.08 MAINTENANCE DATA

A. FURNISH AND DELIVER TO THE ARCHITECT/ENGINEER TWO (2) COMPLETE COPIES OF ALL DATA PREPARED BY MANUFACTURERS, DETAILING OPERATION AND MAINTENANCE INSTRUCTION FOR ALL EQUIPMENT.

1.09 PENETRATIONS, CUTTING, AND PATCHING

- A. PERFORM CUTTING AND PATCHING IN ACCORDANCE WITH THE GENERAL AND SUPPLEMENTARY CONDITIONS OF THE CONTRACT.
- B. PROVIDE ALL SLEEVES REQUIRED FOR PROPER INSTALLATION OF WORK INCLUDED IN THIS SECTION.
- MAKE ALL PENETRATIONS THROUGH WALLS AT 90 DEGREE ANGLES. SEAL ALL PENETRATIONS AT FIRE AND SMOKE PARTITIONS WITH FIRE SAFING MATERIAL. SEAL ALL PENETRATIONS AT SOUND WALLS WITH SOUNDPROOFING MATERIAL.

1.10 SUBMITTALS

SHOP DRAWINGS AND MATERIAL BROCHURES: FURNISH AN ELECTRONIC SET OF SHOP DRAWINGS AND PRODUCT DATA IN PDF FORMAT TO THE ARCHITECT/ENGINEER ON THE FOLLOWING MATERIALS:

1. RACEWAYS

- 2. CONDUCTORS
- 3. CONTROL PANELS
- 4. INSTRUMENTATION

1.11 COOPERATION

A. THE CONTRACTOR SHALL SCHEDULE HIS WORK, AND IN EVERY WAY POSSIBLE, COOPERATE WITH ALL OTHER TRADES IN THE JOB TO AVOID DELAYS, INTERFERENCES AND UNNECESSARY WORK. HE SHALL COOPERATE WITH THEM IN PROVIDING FOR THE INSTALLATION OF THIS WORK AND COORDINATE WITH WORK OF OTHER TRADES TO ASSURE PROPER CLEARANCE OF PIPING, DUCTWORK, CONDUIT, ETC. WHEN SUCH IS REQUIRED.

1.12 WIRING WORKMANSHIP

- A. RUN WIRING IN ALL BRANCH CIRCUIT PANELBOARDS AND TERMINAL CABINETS PARALLEL OR AT RIGHT ANGLES TO THE SIDES OR TOP OF THE EQUIPMENT HOUSING.
- B. GROUP AND HARNESS CONDUCTORS TOGETHER USING LOCKING TYPE CABLE TIES. CABLE TIES: AS MANUFACTURED BY THE PANDUIT CORPORATION OR THOMAS AND BETTS.

1.13 STORAGE MATERIALS

A. KEEP THE BUILDING AND PREMISES CLEAN AND CLEAR OF SCRAP MATERIALS AT ALL TIMES. STORE MATERIALS AND EQUIPMENT IN DESIGNATED STORAGE AREAS.

1.14 ORDERING OF MATERIALS

A. ORDER MATERIALS AND EQUIPMENT SO AS NOT TO JEOPARDIZE PROGRESS OF CONSTRUCTION OR COMPLETION DATE.

1.15 SAFETY PRECAUTIONS AND PROGRAMS

A. IT SHALL BE THE DUTY AND RESPONSIBILITY OF THE CONTRACTOR AND ALL OF ITS SUBCONTRACTORS TO BE FAMILIAR AND COMPLY WITH ALL REQUIREMENTS OF PUBLIC LAW 91-96, 29 U.S.C. SECS. 651 ET. SEQ., THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 (OSHA), AND ALL AMENDMENTS THERETO AND TO ENFORCE AND COMPLY WITH ALL OF THE PROVISIONS OF THIS ACT. IN ADDITION, ON PROJECTS IN WHICH TRENCH EXCAVATION WILL EXCEED A DEPTH OF FIVE FEET (5'), THE CONTRACTOR AND ALL OF ITS SUBCONTRACTORS SHALL COMPLY WITH ALL REQUIREMENTS OF 29 C.F.R., SECS. 1926.652 AND 1926.653, OSHA SAFETY AND HEALTH STANDARDS.

1.16 WARRANTY

A. GUARANTEE ALL WORK UNDER THIS SECTION FOR WORKMANSHIP, LABOR AND MATERIALS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ACCEPTANCE BY THE OWNER OR HIS AUTHORIZED REPRESENTATIVE.

PART 2 - PRODUCTS AND EXECUTION

2.01 CONDUIT

A. EXCEPT AS OTHERWISE NOTED, SPECIFIED OR REQUIRED, INSTALL ALL WIRES USED IN THIS PROJECT IN CONDUIT AS HEREINAFTER SPECIFIED: BELOW GRADE: SCHEDULE 40 PVC

ABOVE GRADE (OUTSIDE): ALUMINUM RIGID ABOVE GRADE (INSIDE): ALUMINUM RIGID ELBOWS: PVC COATED RIGID STEEL

- INSTALL CONDUITS CONTINUOUS FROM OUTLET TO OUTLET, FROM OUTLET TO CABINET, JUNCTION BOX AND PULL BOX. SECURE CONDUITS TO ALL BOXES, ETC., IN SUCH A MANNER THAT EACH SYSTEM WILL BE ELECTRICALLY CONTINUOUS FROM SERVICE TO ALL OUTLETS. TERMINATE ALL CONDUIT RUNS FROM CABINETS AND JUNCTION BOXES IN APPROVED OUTLET BOXES. INSTALL CONDUITS AS HIGH AS POSSIBLE UP AGAINST STRUCTURE ABOVE. AVOID ROUTING CONFLICTS WITH HVAC EQUIPMENT/DUCTWORK, SANITARY WASTE, VENT PIPING, AND DOMESTIC WATER PIPING.
- C. INSTALL A NYLON PULL WIRE (200 LB. TEST) AND TIE ENDS IN ALL CONDUIT LINES LEFT EMPTY FOR FUTURE USE.
- TRAPPED OR INACCESSIBLE JUNCTION BOXES, OUTLETS, ETC. ARE NOT ALLOWED.
- E. GENERALLY, CONCEAL ALL CONDUITS UNLESS OTHERWISE DIRECTED OR INDICATED ON THE DRAWINGS.
- F. NO BENDS PERMITTED WITH A RADIUS LESS THAN SIX (6) TIMES THE DIAMETER OF THE CONDUIT OR MORE THAN 900.
- G. PROVIDE JUNCTION BOXES OR PULL BOXES TO AVOID EXCESSIVE RUNS OR TOO MANY BENDS BETWEEN OUTLETS.
- H. INCREASE CONDUIT SIZES SHOWN ON THE PLANS AS REQUIRED FACILITATING PULLING OF CONDUCTORS.
- RUN ALL CONDUITS PARALLEL TO OR AT RIGHT ANGLES TO THE BUILDING WALLS AND SUPPORT FROM WALLS OR CEILINGS AT INTERVALS REQUIRED BY CODE WITH APPROVED CLAMPS OR HANGERS.
- INSTALL APPROVED APPLETON, CROUSE HINDS, OR O.Z. MANUFACTURING CO. EXPANSION FITTINGS IN ALL EMT RUNS WHICH PASS THROUGH EXPANSION JOINTS IN THE BUILDING. OTHER METHODS TO PROVIDE FOR THIS EXPANSION MUST BE APPROVED BY THE ARCHITECT/ENGINEER.

2.02 **WIRING**

- A. INSTALL WIRING AS FOLLOWS:
 - 1. FEEDERS AND POWER WIRING: CONDUCTORS IN RIGID ALUMINUM RIGID CONDUIT WHEN INSTALLED IN DRY LOCATION ABOVE GRADE. SCHEDULE 40 PVC WHEN INSTALLED BELOW GRADE. USE PVC COATED RIGID ELBOWS.
 - 2. BRANCH CIRCUITS: INSTALL CONDUCTORS IN ALUMINUM RIGID CONDUIT.
 - 3. INSTALL ALL WIRING IN CONDUIT. USE ONLY UL LISTED LUBRICANTS IN PULLING THE CONDUCTORS.
 - 4. INSTALL CONDUCTORS CONTINUOUS FROM OUTLET TO OUTLET AND FROM OUTLET TO JUNCTION BOX OR PULL BOX. INSTALL SPLICES AND JOINTS CAREFULLY AND SECURELY TO BE MECHANICALLY AND ELECTRICALLY SOLID WITH PRESSURE TYPE CONNECTORS. USE 3M "SCOTCHLOCK" OR IDEAL "WING NUT" OR EQUAL TWIST-ON CONNECTORS FOR #10 AND SMALLER CONDUCTORS.
 - 5. CONNECT CONDUCTORS FOR LIGHTING AND RECEPTACLE CIRCUITS TO THE PANEL AS DETAILED WITH COLOR CODED JACKET. COLOR CODE ALL WIRES WITH THE TYPE, SIZE, MAKE AND VOLTAGE MARKED ON IT. COLOR CODE WIRING WITH THE SAME COLOR BEING USED WITH ITS RESPECTIVE PHASE AS FOLLOWS, UNLESS OTHERWISE REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION.

<u>1</u>	20/240 VOLT DELTA	120/208 VOLT WYE	480/277 VOLT WYE
PHASE A	RED	RED	BROWN
PHASE B	ORANGE	BLACK	YELLOW
PHASE C	BLACK	BLUE	PURPLE
NEUTRAL	WHITE	WHITE	GRAY
GROUND	GREEN	GREEN	GREEN

- 6. BRANCH CIRCUIT CONDUCTORS SHALL NOT BE SMALLER THAN NO. 12 AWG. INCREASE THE WIRE SIZES UP ONE (1) SIZE WHEREVER THE RUN DISTANCE EXCEEDS 200 FEET.
- 7. ALL WIRING AND CABLE INCLUDING FIBER OPTIC, ELECTRICAL, DATA, TELECOMMUNICATIONS, TEMPERATURE CONTROLS, SECURITY, FIRE
- 8. ELECTRICAL CONTRACTOR MAY GROUP WIRES WITH SAME VOLTAGE FOR FIELD DEVICES IN CONDUIT AS HE DEEMS BEST APPROPRIATE.
- 9. ANALOG AND LOW VOLTAGE SIGNALS SHALL NOT RUN IN SAME CONDUIT AS 120VAC AND 480VAC CIRCUITS.

2.03 CONDUCTORS

- A. COPPER OF 98% CONDUCTIVITY.
- B. NO. 10 AND SMALLER: SOLID TYPE SIMPULL XHHW-2, EXCEPT AS OTHERWISE NOTED.
- C. NO. 8 AND LARGER: STRANDED, TYPE SIMPULL XHHW-2, EXCEPT AS OTHERWISE NOTED.
- D. MINIMUM SIZE CONDUCTORS USED SHALL BE NO. 12 AWG FOR ALL APPLICATIONS EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE (A.C. CONTROLS, ETC.).
- E. USE WIRE AND CABLE FROM ONE (1) MANUFACTURER. DELIVER IN THE ORIGINAL WRAPPING BEARING THE UNDERWRITERS LABORATORIES (UL)

2.04 OUTLETS

- A. USE GALVANIZED STEEL OR CAST TYPE BOXES AT ALL OUTLETS FOR LIGHTING FIXTURES, WALL SWITCHES, WALL RECEPTACLES, ETC.
- B. SECURELY ATTACH OUTLET BOXES FOR FIXTURES AND DEVICES TO THE BUILDING CONSTRUCTION WITH EXPANSION BOLTS.
- C. FLUSH MOUNT ALL OUTLET BOXES, REGARDLESS OF WALL OR CEILING CONSTRUCTION, UNLESS THEY ARE SPECIFICALLY SHOWN AS BEING USED WITH EXPOSED CONDUIT. IF SURFACE MOUNTED, USE CAST TYPE AS SPECIFIED ABOVE. UTILITY BOXES ARE NOT ALLOWED.

2.05 INSTALLATION

- A. INSTALL RACEWAYS EXPOSED. SUPPORT EXPOSED RACEWAYS AT INTERVALS NOT EXCEEDING TEN FEET (10') WITH MACHINE SCREWS FOR METAL CONSTRUCTION AND EXPANSION BOLTS FOR CONCRETE CONSTRUCTION.
- INSTALL THE EDGES OF ALL OUTLET BOXES FLUSH WITH THE SURFACE IN WHICH THEY ARE RECESSED. SCREW ATTACH INTERNAL DEVICES BEFORE ATTACHING COVERPLATE. DO NOT USE COVERPLATES AS A MEANS OF TIGHTENING THE DEVICES IN PLACE.

2.06 DISCONNECT AND FEEDER SWITCHES

- A. FEEDER SWITCHES AND DISCONNECT SWITCHES: HEAVY DUTY, EXCEPT AS OTHERWISE NOTED. IN DAMP LOCATIONS OR EXPOSED TO THE WEATHER, USE NEMA 3R, RAINTIGHT.
- B. DISCONNECT SWITCHES: FACTORY INSTALLED PROVISION FOR PADLOCKING IN EITHER THE "ON" OR "OFF" POSITION.

2.07 FUSES

A. FUSES: BUSSMANN OR APPROVED EQUAL

2.08 LABELING

- A. LABEL ALL PANELS, CONTROL POINTS, SWITCHES, AND MOTORS, AS DIRECTED. IDENTIFY PANELS BY PANEL NUMBER. LABEL SWITCHES, INDICATING THE EQUIPMENT WHICH THEY CONTROL. ALL LABELS SHALL BE ENGRAVED. PANEL DIRECTORIES TO BE TYPED. COORDINATE ALL EQUIPMENT NUMBERING WITH MECHANICAL CONTRACTOR.
- B. INSTALL ARC FLASH HAZARD LABELS ON ALL NEW SWITCHBOARDS, PANELBOARDS, INDUSTRIAL CONTROL PANELS, METER SOCKET ENCLOSURES AND MOTOR CONTROL CENTERS PER NEC 110.16. PANDUIT #PPS0305W2100 OR EQUAL.

2.09 GROUNDING

A. PROVIDE GROUNDING FOR ELECTRICAL SYSTEM IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC)

2.10 COVERPLATES

- A. WHERE WIRING DEVICES ARE FLUSH MOUNTED. INSTALL STAINLESS STEEL COVERPLATES.
- B. WHERE WIRING DEVICES ARE SURFACE MOUNTED, INSTALL FORMED STEEL COVERPLATES WITH CADMIUM PLATING.
- WHERE WEATHERPROOF COVERPLATES ARE REQUIRED, MEET UL "WET LOCATION COVER CLOSED" REQUIREMENTS. USE COVERPLATES THAT ARE HINGED AND GASKETED WITH SPRING LOADED CLOSER.
- D. INSTALL FINISHED COVERPLATES ON ALL JUNCTION BOXES, OUTLET BOXES, SECTIONAL SWITCH BOXES, UTILITY BOXES, ETC.
- WHERE MORE THAN ONE (1) DEVICE IS INDICATED AT A LOCATION, MOUNT DEVICES IN COMBINED SECTION GANG BOXES, COVERED BY A COMMON

2.11 RECEPTACLES

- A. DUPLEX RECEPTACLES: 20 AMPERE, 125 VOLT, SELF OR AUTOMATIC GROUNDING, GFCI.
- SPECIAL MOUNTING HEIGHTS ARE NOTED ON THE ARCHITECTURAL DRAWINGS. UNLESS OTHERWISE INDICATED ON THE ELECTRICAL DRAWINGS, MOUNT DEVICES AT THE FOLLOWING HEIGHTS ABOVE FINISHED FLOOR:

18" 1. DUPLEX RECEPTACLE 2. WALL SWITCHES 3. VOICE & VOICE/DATA OUTLETS

2.12 SWITCHES

PROVIDE HEAVY-DUTY, AC, QUIET SWITCHES. THE SWITCHES SHALL BE HUBBELL 1221 OR EQUAL, 120-277 VOLT, 20 AMPERES, SPECIFICATION GRADE. SWITCHES SHALL BE SINGLE POLE, DOUBLE POLE, THREE WAY, FOUR WAY, OR KEY OPERATED AS SCHEDULED ON THE DRAWINGS AND SHALL BE THE SELF GROUNDING TYPE. COLOR SHALL BE IVORY.

2.13 LIGHTING FIXTURES

4. WALL TELEPHONE OUTLETS

- A. PROVIDE ALL LIGHTING FIXTURES, AS SCHEDULED ON DRAWINGS, COMPLETE WITH LAMPS AND HARDWARE. INSTALL COMPLETELY WIRED, CONNECTED AND IN OPERATING ORDER.
- B. CONFIRM ALL CEILING CONDITIONS, CLEARANCES AND OPERATING VOLTAGES BEFORE ORDERING LIGHTING FIXTURES
- C. SUBMIT SHOP DRAWINGS.

A. INSTALL SCHEDULED LAMPS MANUFACTURED BY GENERAL ELECTRIC, PHILLIPS, OR APPROVED EQUAL.

2.13.2 FIXTURES

- A. PROVIDE LIGHTING FIXTURES WHICH HAVE BEEN TESTED AND CERTIFIED FOR PROPER OPERATION BY THE FIXTURE'S MANUFACTURER.
- B. PROVIDE LIGHTING FIXTURES WITH TRIM COMPATIBLE WITH CEILING OR SURFACE ON OR IN WHICH INSTALLED.
- C. EACH LUMINAIRE SHALL HAVE TWO SUPPORT WIRES INSTALLED, ONE ON EACH END, AT DIAGONAL CORNERS. LUMINAIRES IN FIRE RATED CEILINGS SHALL BE SUPPORTED ON ALL FOUR CORNERS.
- D. SUPPORT AND SECURELY ATTACH WITH GALVANIZED FASTENERS IN A LEVEL POSITION.

A. PROVIDE TEMPORARY POWER (SMALL TOOL) AND LIGHTING PER OSHA REQUIREMENTS.

2.14 TEMPORARY POWER

F. FIRE RATED ASSEMBLIES, COMPLY WITH DETAILS OF LISTED ASSEMBLY.

E. INSTALL ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

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S. Kanetzky Engineering, LLC. 14425 Falcon Head Blvd. Building B, Suite 100 Bee Cave, Texas 78738 (512) 326-3380 www.skaneng.com TBPE Firm No. F-2356 SKE PROJECT # 2490423

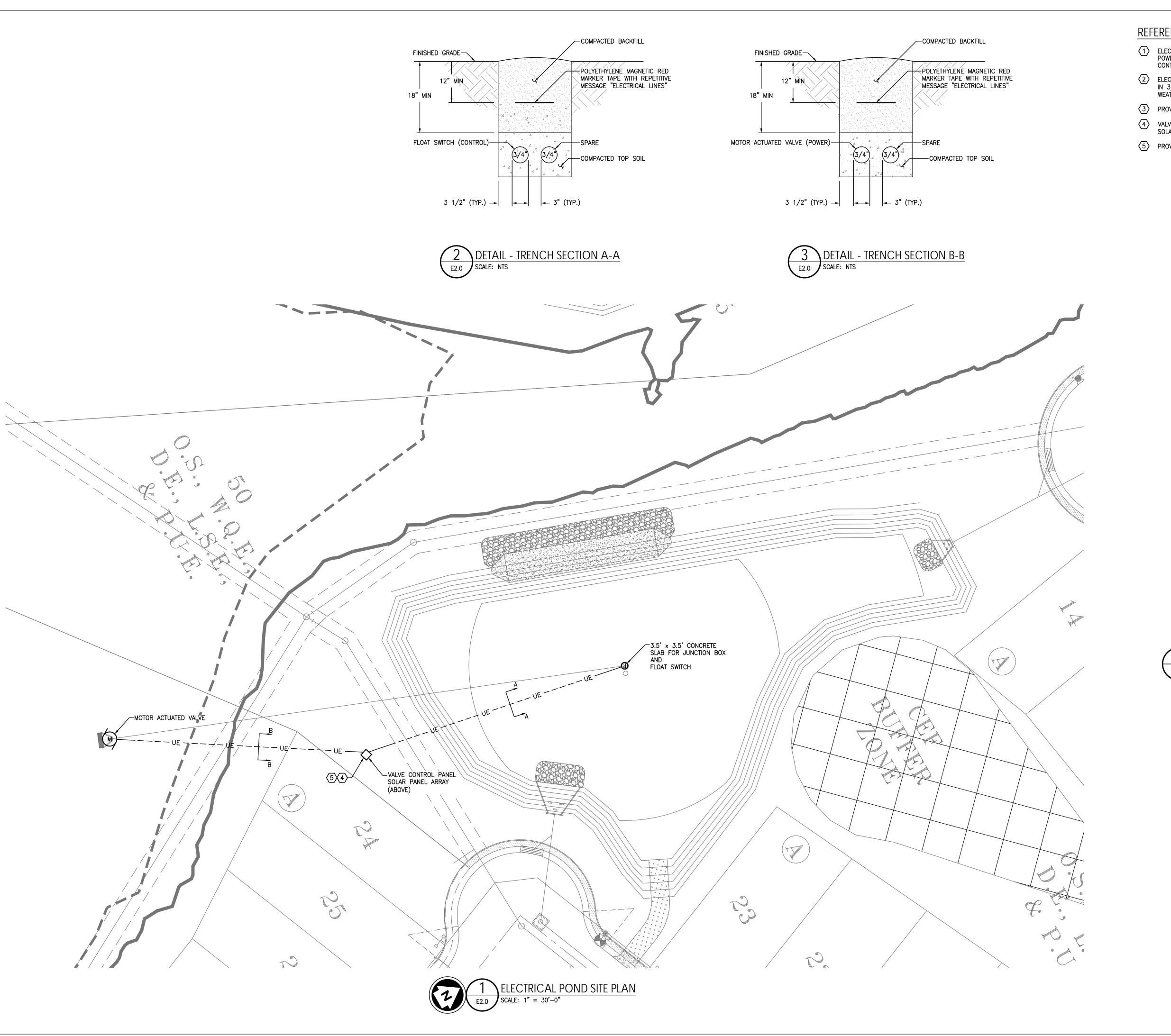
STEVE L. KANETZIK

JAN 2023 JOB NUMBER

5487

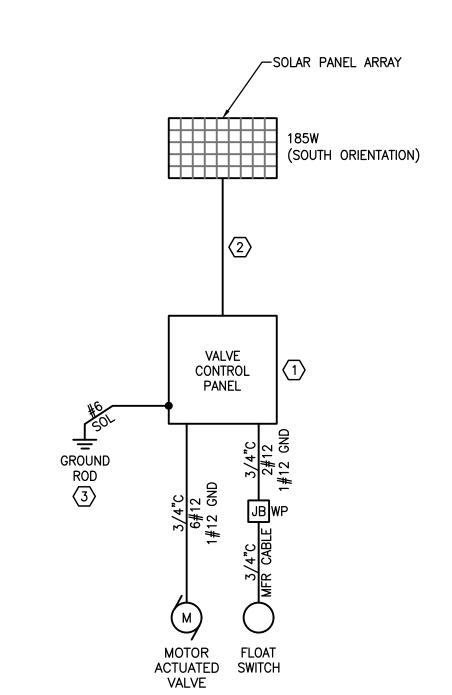
58 OF 61 HEET NO.

58 - E1.1



REFERENCE NOTES

- ELECTRICAL CONTRACTOR SHALL PROVIDE SOLAR POWERED VALVE CONTROL PANEL. SOLAR POWERED VALVE CONTROL PANEL AND SOLAR ARRAY TO BE PROVIDED BY ELECTRICAL CONTRACTOR. SEE SHEET E3.0 FOR VALVE CONTROL PANEL DETAILS.
- 2 ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL TYPE USE-2 SOLAR POWER CABLE IN 3/4" CONDUIT FROM SOLAR ARRAY TO VALVE CONTROL PANEL. PROVIDE AND INSTALL WEATHERPROOF MULTI CONTACT CONNECTOR MC-4 AT SOLAR ARRAY.
- 3 PROVIDE AND INSTALL GROUND ROD PER DETAIL 4/E4.0.
- VALVE CONTROL PANEL'S SOLAR PANEL SHALL NOT BE BLOCKED BY TREES OR SHADE. SOLAR PANEL SHALL BE POINTED TOWARDS SOUTH.
- (5) PROVIDE AND INSTALL RACK PER DETAIL 3/E4.0.



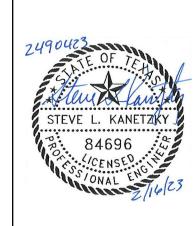
ONE-LINE DIAGRAM - BATCH DETENTION 4 ONE-LIN SCALE: NTS



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JOB NAME: SANTA RITA RANCH PHASE 7B,

PROJECT: STREET, DRAINAGE, WATER, AND WASTEWA

ELECTRICAL POND SITE

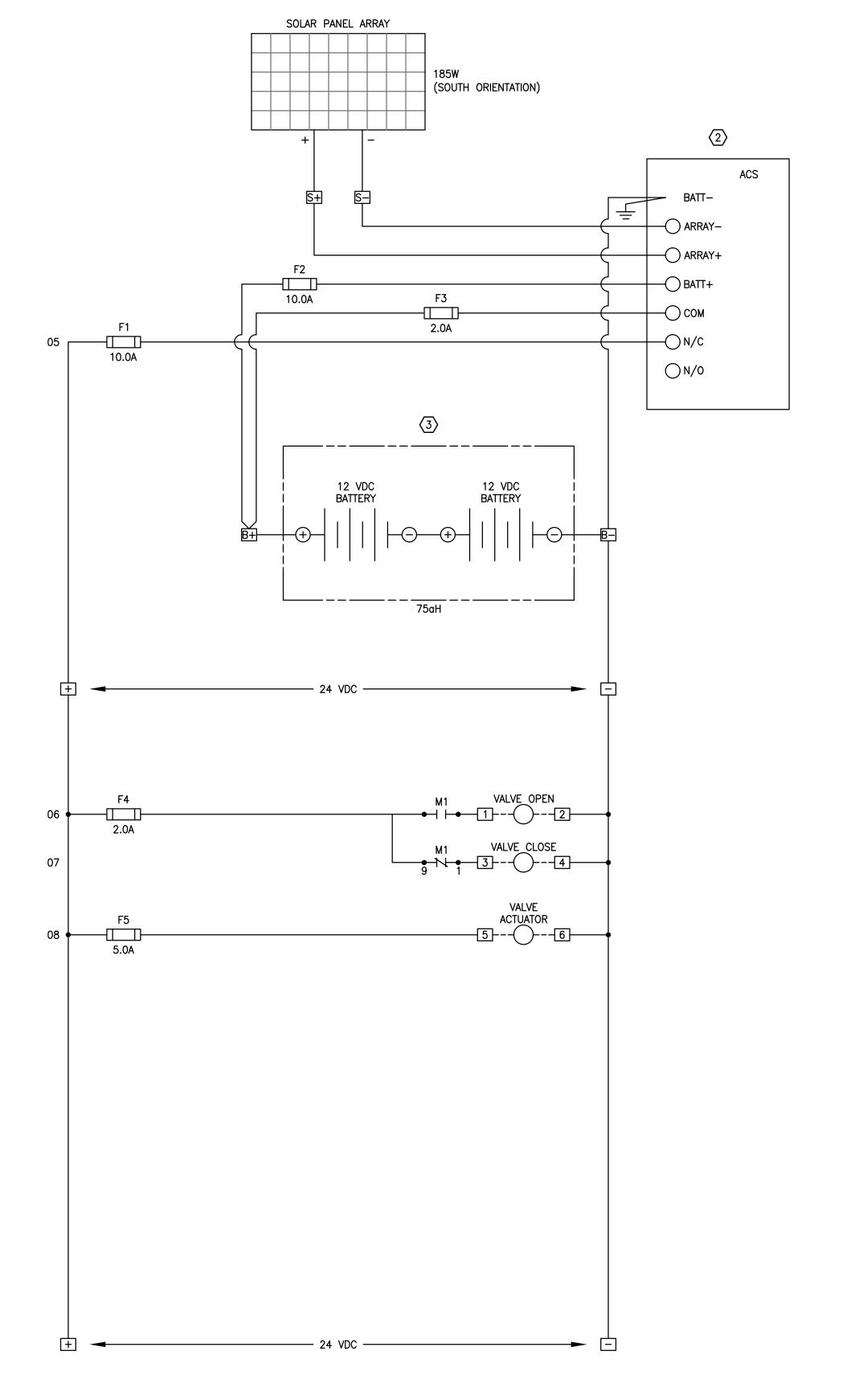
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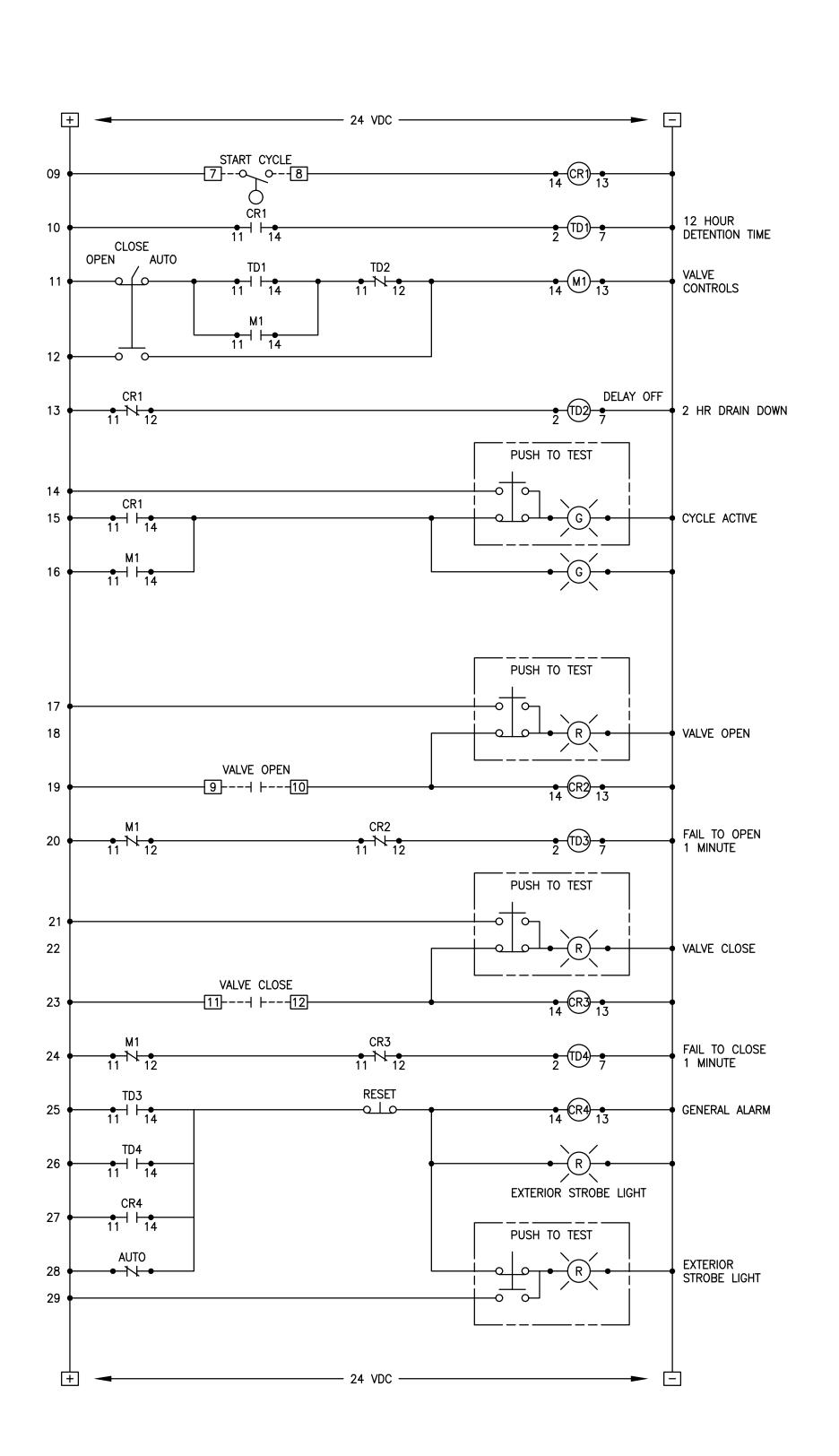
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59 OF 61 59 - E2.0



ELECTRICAL LADDER DIAGRAM (1)

SCALE: NTS

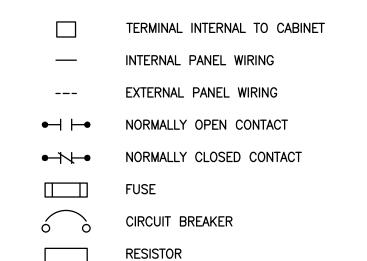


REFERENCE NOTES

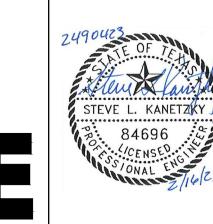
- 1 ELECTRICAL CONTRACTOR TO PROVIDE SOLAR POWERED VALVE CONTROL PANEL AND SOLAR
- 2 PROVIDE AND INSTALL NEW CHARGER CONTROLLER SUNSAVER OR EQUAL.
- 3 PROVIDE AND INSTALL NEW 24VDC 75AH MINIMUM, DEKA OR EQUAL.

CONTROL STRATEGY

- CONTROLLER DETECTS WATER FILLING THE BASIN FROM THE LEVEL SENSOR (FLOAT) AND INITIATES A 12-HOUR DETENTION TIME.
- AFTER THE 12-HOUR DETENTION TIME THE CONTROLLER OPENS THE VALVE. VALVE TO REMAIN OPEN FOR 2 HOURS.
- SUBSEQUENT RAINFALL EVENTS THAT OCCUR PRIOR TO THE BASIN DRAINING SHOULD CAUSE THE VALVE TO REMAIN OPEN.
- ONCE THE BASIN IS DRAINED THE CONTROLLER CLOSES THE VALVE.



WIRING KEY 24 VDC SUPPLY — BLUE #16 AWG RETURN — GRAY #16 AWG



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60 - E3.0

PROJECT: STREET, DRAINAGE, WATER, AND WASTEWATER IMPROVEMENTS

JOB NAME: SANTA RITA RANCH PHASE 7B,

ELECTRICAL LADDER DIAGRAM

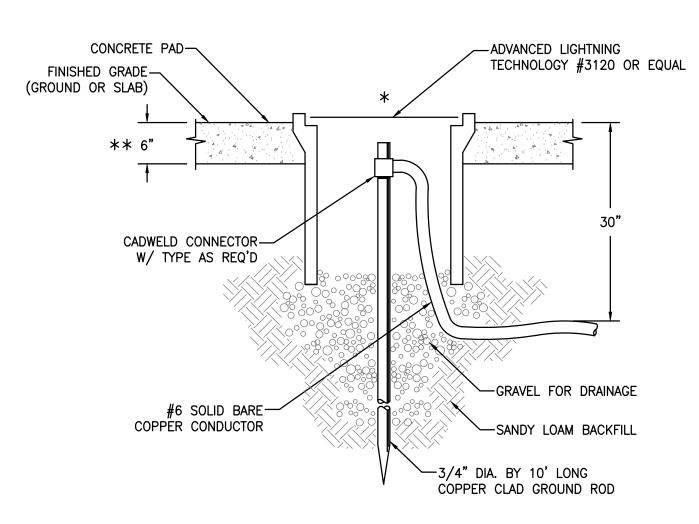
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Engineering, LLC. JAN 2023 14425 Falcon Head Blvd. JOB NUMBER Building B, Suite 100 Bee Cave, Texas 78738 SHEET 60 OF 61 SHEET NO.

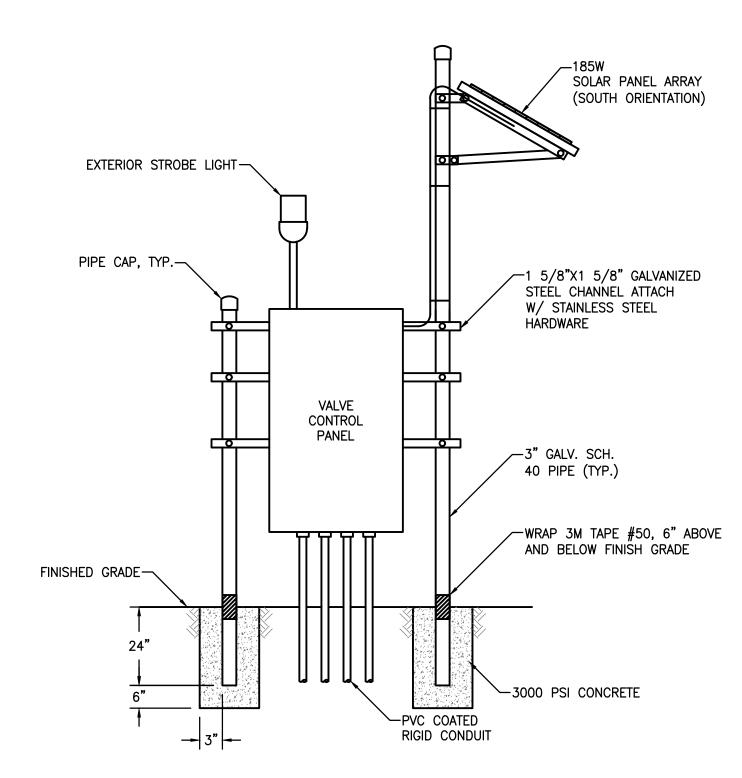




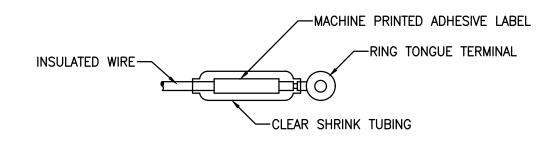
* INSTALL GROUND RODS AWAY FROM HEAVY TRAFFIC AREAS AND SIDEWALKS. COORDINATE EXACT LOCATION WITH CIVIL DRAWINGS.

** INSTALL 2'X2'X6" CONCRETE PAD.

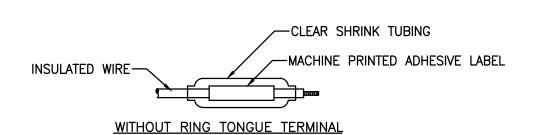
DETAIL - 3/4" X 10' GROUND ROD



DETAIL - ELECTRICAL EQUIPMENT MOUNTING E4.0 SCALE: NTS

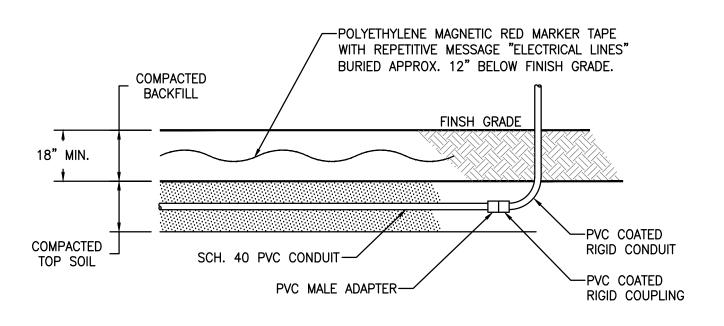


WITH RING TONGUE TERMINAL



WHERE POSSIBLE RING TERMINALS SHALL BE USED. ONE OF THE ABOVE METHODS MUST BE USED ON ALL WIRE #8 AWG & SMALLER. THE SAME MUST ALSO BE USED ON LARGER WIRE UNLESS AN ALTERNATE METHOD IS SUBMITTED & APPROVED.

DETAIL - WIRE TERMINATION AND MARKING



DETAIL - TYPICAL UNDERGROUND CONDUIT RUN E4.0 | SCALE: NTS



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PROJECT: STREET, DRAINAGE, WATER, AND WASTEWATER IMPROVEMENTS

RITA RANCH PHASE 7B,

JOB NAME: SANTA I

ELECTRICAL DETAI

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JAN 2023

5487 61 OF 61

61 - E4.0