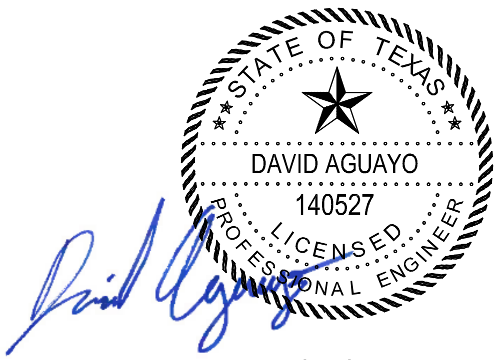
WATER POLLUTION ABATEMENT PLAN

DRY CREEK



04/30/2023

PREPARED FOR

TCEQ

April, 2023

WGA
CONSULTING ENGINEERS

TX ENG FIRM: F-9756

April 14, 2023

Texas Commission on Environment Quality
Austin Region
12100 Park 35 Circle
Austin Texas 78753

Re: Dry Creek
Water Pollution Abatement Plan

Enclosed are one (1) original and five (5) copies of the Dry Creek, Water Pollution Abatement Plan Application. This Application has been prepared to be consistent with the Texas Commission on Environmental Quality (20 TAC 213) and its current policies for development over the Edwards Aquifer Recharge Zone.

This Water Pollution Abatement Plan Application contains a total area of 63.888 acre of storm water accumulation area identified as the project limits. Please review the enclosed report & construction plans for the items it is intended to address, and if acceptable, provide written approval of said plan so that construction may begin at the earliest opportunity. Appropriate review fees in the amount of $8,000.00 and associated fee application are included herein.

If you should have any questions regarding the contained information, please feel free to contact me at 713-789-1900

Respectfully,

David Aguayo, P.E.
Project Manager
Ward, Getz & Associates

Water Pollution Abatement Plan Checklist

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

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

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

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

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

✓ **Water Pollution Abatement Plan Application Form (TCEQ-0584)**

Attachment A - Factors Affecting Surface Water Quality
Attachment B - Volume and Character of Stormwater
Attachment C - Suitability Letter from Authorized Agent (if OSSF is proposed)
Attachment D - Exception to the Required Geologic Assessment (if requested)
Site Plan

✓ **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 E - Request to Temporarily Seal a Feature (if requested)
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

✓ **Permanent Stormwater Section (TCEQ-0600)**

Attachment A - 20% or Less Impervious Cover Waiver (if requested for multi-family, school, or small business site)
Attachment B - BMPs for Upgradient Stormwater
Attachment C - BMPs for On-site Stormwater
Attachment D - BMPs for Surface Streams
Attachment E - Request to Seal Features (if sealing a feature)
Attachment F - Construction Plans
Attachment G - Inspection, Maintenance, Repair and Retrofit Plan
Attachment H - Pilot-Scale Field Testing Plan (if proposed)
Attachment I -Measures for Minimizing Surface Stream Contamination

- ✓ Agent Authorization Form (TCEQ-0599), if application submitted by agent
- ✓ Application Fee Form (TCEQ-0574)
- – Check Payable to the "Texas Commission on Environmental Quality"
- ✓ Core Data Form (TCEQ-10400)

DRY CREEK

WATER POLLUTION ABATEMENT PLAN

PREPARED FOR:

City of Georgetown

WGA

CONSULTING ENGINEERS

SECTION A

Edwards Aquifer Application Cover Page TCEQ-20705

WGA
CONSULTING ENGINEERS

Texas Commission on Environmental Quality

Edwards Aquifer Application Cover Page

Our Review of Your Application

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

Administrative Review

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

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

2. This Edwards Aquifer Application Cover Page form (certified by the applicant or agent) must be included in the application and brought to the administrative review meeting.
3. Administrative reviews are scheduled with program staff who will conduct the review. Applicants or their authorized agent should call the appropriate regional office, according to the county in which the project is located, to schedule a review. The average meeting time is one hour.
4. In the meeting, the application is examined for administrative completeness. Deficiencies will be noted by staff and emailed or faxed to the applicant and authorized agent at the end of the meeting, or shortly after. Administrative deficiencies will cause the application to be deemed incomplete and returned.

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

5. If an application is received by mail, courier service, or otherwise submitted without a review meeting, the administrative review will be conducted within 30 days. The applicant and agent will be contacted with the results of the administrative review. If the application is found to be administratively incomplete, it can be retrieved from the regional office or returned by regular mail. If returned by mail, the regional office may require arrangements for return shipping.
6. If the geologic assessment was completed before October 1, 2004 and the site contains “possibly sensitive” features, the assessment must be updated in accordance with the *Instructions to Geologists* (TCEQ-0585 Instructions).

Technical Review

1. When an application is deemed administratively complete, the technical review period begins. The regional office will distribute copies of the application to the identified affected city, county, and groundwater conservation district whose jurisdiction includes the subject site. These entities and the public have 30 days to provide comments on the application to the regional office. All comments received are reviewed by TCEQ.
2. A site assessment is usually conducted as part of the technical review, to evaluate the geologic assessment and observe existing site conditions. The site must be accessible to our staff. The site boundaries should be

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

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

Mid-Review Modifications

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

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

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

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

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

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

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

<table>
<tr><td colspan="6">1. Regulated Entity Name: Dry Creek</td><td colspan="4">2. Regulated Entity No.:</td></tr>
<tr><td colspan="6">3. Customer Name: Steward Development & Construction</td><td colspan="4">4. Customer No.:</td></tr>
<tr><td>5. Project Type:
(Please circle/check one)</td><td colspan="2">New</td><td colspan="3">Modification</td><td colspan="2">Extension</td><td>Exception</td><td></td></tr>
<tr><td>6. Plan Type:
(Please circle/check one)</td><td>WPAP</td><td>CZP</td><td>SCS</td><td>UST</td><td>AST</td><td>EXP</td><td>EXT</td><td>Technical Clarification</td><td>Optional Enhanced Measures</td></tr>
<tr><td>7. Land Use:
(Please circle/check one)</td><td colspan="2">Residential</td><td colspan="4">Non-residential</td><td colspan="2">8. Site (acres):</td><td>63.888</td></tr>
<tr><td>9. Application Fee:</td><td colspan="2">$ 8,000.00</td><td colspan="5">10. Permanent BMP(s):</td><td colspan="2">Batch Detention/Vegetated Filter Strips</td></tr>
<tr><td>11. SCS (Linear Ft.):</td><td colspan="2">N/A</td><td colspan="5">12. AST/UST (No. Tanks):</td><td colspan="2">N/A</td></tr>
<tr><td>13. County:</td><td colspan="2">Williamson</td><td colspan="5">14. Watershed:</td><td colspan="2">Dry Berry Creek</td></tr>
</table>

Application Distribution

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

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

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

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

San Antonio Region					
County:	**Bexar**	**Comal**	**Kinney**	**Medina**	**Uvalde**
Original (1 req.)	__	__	__	__	__
Region (1 req.)	__	__	__	__	__
County(ies)	__	__	__	__	__
Groundwater Conservation District(s)	__ Edwards Aquifer Authority __Trinity-Glen Rose	__Edwards Aquifer Authority	__Kinney	__EAA __Medina	__EAA __Uvalde
City(ies) Jurisdiction	__Castle Hills __Fair Oaks Ranch __Helotes __Hill Country Village __Hollywood Park __San Antonio (SAWS) __Shavano Park	__Bulverde __Fair Oaks Ranch __Garden Ridge __New Braunfels __Schertz	NA	__San Antonio ETJ (SAWS)	NA

I certify that to the best of my knowledge, that the application is complete and accurate. This application is hereby submitted to TCEQ for administrative review and technical review.

David Aguayo

Print Name of Customer/Authorized Agent

03/02/2023

Signature of Customer/Authorized Agent   Date

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

SECTION A

Property Deeds

CONSULTING ENGINEERS

Prepared by:

Adrienne Collins
Kane Russell Coleman Logan PC
5151 San Felipe
Suite 800
Houston, Texas 77056

After Recording Return to:

Stewart Builders, Inc.
16565 Village Drive
Houston, Texas 77040
Attn: Brett Barnes

(Space above this line reserved for Recorder's use.)

NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.

GENERAL WARRANTY DEED

Date: May 20, 2022

Grantor: GAYLE ANN McELHANON, a married person

Grantee: STEWART BUILDERS, INC., a Texas corporation

Grantee's Mailing Address (including county):

16565 Village Drive
Jersey Village, Texas 77040
Harris County

Consideration: TEN AND NO/100 DOLLARS and other good and valuable consideration.

Property (including any improvements):

BEING 6.883 acres or 299,802 square feet of Land out of the JOHN BERRY SURVEY, Abstract No. 51 in Williamson County. Texas, part of a called 142.07 acre parent tract as conveyed to Henry Buchhorn, as recorded under Volume 289, Page 386 of the Official Records of Williamson County, Texas, more particularly described by metes and bounds in **Exhibit "A"** attached hereto and made a part hereof for all purposes.

Reservations From and Exceptions to Conveyance and Warranty:

Grantor reserves one-half (1/2) of Grantor's interest in and to all oil, gas and other minerals in and under the Property. Seller waives the implied rights of ingress and egress, and waives Seller's right, title, and interest in and to any surface rights, surface minerals, utilities, adjacent streets, alleys, strips, gores, and rights-of-way for mining, drilling, exploring, operating, developing, and/or removing the oil, gas and other minerals.

This conveyance and warranty is subject to those matters listed on **Exhibit "B"** attached hereto and made part hereof (**"Permitted Encumbrances"**), to the extent enforceable and applicable to the Property.

Grantor, for the consideration, receipt of which is hereby acknowledged, and subject to the Reservations From and Exceptions to Conveyance and Warranty, grants, sells and conveys to Grantee the Property, together with all and singular the rights and appurtenances thereto in any wise belonging, to have and hold unto Grantee, Grantee's successors and assigns, forever. Grantor binds Grantor and Grantor's successors to warrant and forever defend all and singular the property unto Grantee and Grantee's successors and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof, except as to the Reservations From and Exceptions to Conveyance and Warranty.

When the context requires, singular nouns and pronouns include the plural. Reference to any gender shall include either gender and, in the case of a legal entity that is not a natural person, shall include the neuter gender, all as the case may be.

(Remainder of Page Intentionally Left Blank)

SIGNATURE PAGE TO GENERAL WARRANTY DEED

Executed to be effective as of the date first above written.

Gayle Ann McElhanon

GAYLE ANN McELHANON

ACKNOWLEDGEMENT

STATE OF TEXAS	§	
	§	
COUNTY OF WILLIAMSON	§	

This instrument was acknowledged before me on May 20, 2022 by Gayle Ann McElhanon, a married person.

Notary Public, State of Texas

MERLIN LESTER
NOTARY PUBLIC
STATE OF TEXAS
MY COMM. EXP. 11/10/25
NOTARY ID 727648-6

JOINDER AND CONSENT OF SPOUSE TO GENERAL WARRANTY DEED

JAMES McELHANON

ACKNOWLEDGEMENT

STATE OF TEXAS §
§
COUNTY OF WILLIAMSON §

This instrument was acknowledged before me on May 20, 2022 by James McElhanon, Spouse of Gayle Ann McElhanon.

Notary Public, State of Texas

MERLIN LESTER
NOTARY PUBLIC
STATE OF TEXAS
MY COMM. EXP. 11/10/25
NOTARY ID 727648-6

EXHIBIT "A"

TRACT 1:

A TRACT OR PARCEL CONTAINING 6.883 ACRES OR 299,802 SQUARE FEET OF LAND, SITUATED IN THE JOHN BERRY SURVEY, ABSTRACT NO. 51, WILLIAMSON COUNTY, BEING OUT OF A CALLED 142.07 ACRE TRACT, AS CONVEYED TO HENRY BUCHHORN, AS RECORDED UNDER VOL. 289, PG. 386, AS RECORDED UNDER WILLIAMSON COUNTY DEED RECORDS (W.C.D.R.) WITH SAID 6.883 ACRE TRACT BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS, WITH ALL BEARINGS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE (NAD83);

COMMENCING AT A TXDOT MONUMENT FOUND ON THE EAST RIGHT-OF-WAY (R.O.W.) LINE OF STATE HIGHWAY I-35 NORTH (WIDTH VARIES), BEING THE SOUTHWEST CORNER OF A CALLED 122.04 ACRE TRACT, CONVEYED TO KENNETH & KATHRYN BUCHHORN, AS RECORDED UNDER WILLIAMSON COUNTY CLERK'S FILE (W.C.C.F.) NO. 2015053354;

THENCE, NORTH 68 DEG. 58 MIN. 00 SEC. EAST, WITH THE SOUTH LINE OF SAID 122.04 ACRE TRACT, A DISTANCE OF 1,833.12 FEET FOR THE NORTHWEST CORNER OF A CALLED 137.5 ACRE TRACT, CONVEYED TO ZETTIE SUE VOGLER, AS RECORDED IN W.C.C.F. NO. 2009058440;

THENCE, SOUTH 21 DEG. 44 MIN. 52 SEC. EAST, WITH THE WEST LINE OF SAID 137.50 ACRE TRACT, A DISTANCE OF 366.07 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR THE NORTHEAST CORNER OF A CALLED 7.74 ACRE TRACT, CONVEYED TO GAYLE AN MCELHANON, AS RECORDED IN VOL. 1739, PAGE 968, W.C.D.R, BEING THE SOUTHEAST CORNER OF SAID CALLED 15.00 ACRE TRACT, AND BEING THE NORTHEAST CORNER AND POINT OF BEGINNING OF THE HEREIN DESCRIBED TRACT;

THENCE, SOUTH 21 DEG. 44 MIN. 52 SEC. EAST, WITH THE LINE COMMON TO SAID 137.50 ACRES AND THE EAST LINE OF SAID 7.74 ACRE TRACT, A DISTANCE OF 501.71 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR THE SOUTHEAST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, SOUTH 69 DEG. 23 MIN. 58 SEC. WEST, THROUGH AND ACROSS SAID 7.74 ACRE TRACT, A DISTANCE OF 306.35 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR AN INTERIOR CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, SOUTH 06 DEG. 26 MIN. 24 SEC. WEST, CONTINUING THROUGH AND ACROSS SAID 7.74 ACRE TRACT AND THROUGH AND ACROSS THE REMAINDER OF A CALLED 10.014 ACRE TRACT, CONVEYED TO GAYLE ANN MCELHANON, AS RECORDED IN VOL. 1611, PG. 663, W.C.D.R., A DISTANCE OF 214.45 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR AN ANGLE POINT;

THENCE, SOUTH 69 DEG. 20 MIN. 17 SEC. WEST, CONTINUING THROUGH AND ACROSS SAID 10.014 ACRE TRACT, A DISTANCE OF 124.35 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET ON THE EAST LINE OF A CALLED 49.975 ACRE TRACT, AS CONVEYED TO KENNETH & KATHRYN BUCHHORN, AS RECORDED UNDER W.C.C.F. NO. 2017039177 AND BEING THE SOUTHWEST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, NORTH 21 DEG. 55 MIN. 12 SEC. WEST, WITH THE EAST LINE OF SAID 49.975 ACRE TRACT, A DISTANCE OF 51.65 FEET, TO CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR THE SOUTHWEST CORNER OF SAID 7.74 ACRE TRACT AND FOR AN ANGLE POINT;

THENCE, NORTH 21 DEG. 51 MIN. 22 SEC. WEST, CONTINUING WITH THE LINE COMMON TO SAID 49.975 ACRE TRACT AND SAID 7.74 ACRE TRACT, A DISTANCE OF 637.35 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR THE NORTHEAST CORNER OF SAID 49.975 ACRE TRACT, BEING THE NORTHWEST CORNER OF SAID 7.74 ACRE TRACT AND OF THE HEREIN DESCRIBED TRACT;

THENCE, NORTH 68 DEG. 58 MIN. 43 SEC. EAST, WITH THE NORTH LINE OF SAID 7.74 ACRE TRACT, A DISTANCE OF 533.39 FEET TO THE POINT OF BEGINNING AND CONTAINING 6.883 ACRES OR 299,802 SQUARE FEET OF LAND.

Exhibit "A"

TRACT 2: EASEMENT TRACT

BEING THE CENTERLINE DESCRIPTION OF A 20 FOOT WIDE ACCESS EASEMENT CROSSING AN 8.518 ACRE TRACT TO BE CONVEYED TO JAMES MCELHANON, ET UX. THIS EASEMENT ALSO BEING PART OF A 129.99 ACRE TRACT IN THE JOHN BERRY SURVEY, ABSTRACT NO. 51, WHICH IS DESCRIBED IN A CONVEYANCE TO LEROY BUCHHORN, ET. UX., AS RECORDED IN VOL. 516, PG. 108, DEED RECORDS OF WILLIAMSON COUNTY, TEXAS. SURVEYED ON THE GROUND IN JUNE OF 1985, BY W.F. FOREST, REGISTERED PUBLIC SURVEYOR NO. 101.

BEGINNING AT AN IRON PIN SET IN THE NORTH LINE OF COUNTY ROAD 150, AS FENCED. THE SOUTHEAST CORNER OF THE 129.99 ACRE TRACT AND THE SOUTHEAST CORNER OF THE 8.518 ACRE TRACT STANDS N 70°42'40" E 236.64 FEET.

THENCE N 53°25'10" W 115.86 FEET, AN IRON PIN SET; N 19°01'10" W 311.21 FEET, AN IRON PIN SET; N 13°11'50" E 185.05 FEET, AN IRON PIN SET; AND N 35°08' W 138.36 FEET TO AN UNMARKED POINT. AN IRON PIN SET STANDS S 72°32'55" W 30.00 FEET.

Note: The Company is prohibited from insuring the area or quantity of the land described herein. Any statement in the above legal description of the area or quantity of land is not a representation that such area or quantity is correct, but is made only for informational and/or identification purposes and does not override Item 2 of Schedule B hereof.

EXHIBIT "B"

Permitted Exceptions

1. Taxes and assessments for the year 2022 and subsequent years, none now due or payable.

2. Rights of Pedernales Electric Cooperative, Inc. in and to that certain Utility Easement recorded under County Clerk's File No. 2013071687, Official Public Records, Williamson County, Texas ("OPRWCT").

3. Terms, conditions and stipulations contained in Wireless Communication Easement and Assignment Agreement between Gayle Ann McElhanon and James E. McElhanon and T10 Unison Site Management LLC as recorded under County Clerk's File No. 2014005685, OPRWCT.

4. Terms, conditions and stipulations contained in Public Utility and Access Easement Agreement between Gayle Ann McElhanon and James E. McElhanon and JYKM Walburg Travel Center, LLC as recorded under County Clerk's File No. 2016105618, OPRWCT.

ELECTRONICALLY RECORDED
OFFICIAL PUBLIC RECORDS

2022067188

Pages: 8 Fee: $50.00
06/01/2022 11:06 AM
BMCKENZIE

Nancy E. Rister

Nancy E. Rister, County Clerk
Williamson County,Texas

Prepared by:

Adrienne Collins
Kane Russell Coleman Logan PC
5151 San Felipe
Suite 800
Houston, Texas 77056

After Recording Return to:

Stewart Builders, Inc.
16565 Village Drive
Houston, Texas 77040
Attn: Brett Barnes

(Space above this line reserved for Recorder's use.)

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GENERAL WARRANTY DEED

Date: May 27, 2022

Grantor: KENNETH BUCHHORN CO-TRUSTEE AND KATHRYN BUCHHORN CO-TRUSTEE OF THE KENNETH AND KATHRYN BUCHHORN REVOCABLE MANAGEMENT TRUST DATED NOVEMBER 8, 2016;
KENNETH BUCHHORN, a married person;
RICHARD WAYNE BUCHHORN, a married person; and
GAYLE ANN McELHANON, a married person

Grantee: STEWART BUILDERS, INC., a Texas corporation

Grantee's Mailing Address (including county):

16565 Village Drive
Jersey Village, Texas 77040
Harris County

Consideration: TEN AND NO/100 DOLLARS and other good and valuable consideration.

Property (including any improvements):

BEING two parcels of approximately 16.018 acres (Parcel 1) and 17.971 (Parcel 2) acres or a total of 1,480,560.84 square feet of Land out of the JOHN BERRY SURVEY, Abstract No. 51 in Williamson County. Texas, part of a called 142.07 acre parent tract as conveyed to Henry Buchhorn, as recorded under Volume 289, Page 386 of the Official Records of Williamson County, Texas, more particularly described by metes and bounds in **Exhibit "A"** attached hereto and made a part hereof for all purposes.

Reservations From and Exceptions to Conveyance and Warranty:

Grantor reserves one-half (1/2) of Grantor's interest in and to all oil, gas and other minerals in and under the Property. Seller waives the implied rights of ingress and egress, and waives Seller's right, title, and interest in and to any surface rights, surface minerals, utilities, adjacent streets, alleys, strips, gores, and rights-of-way for mining, drilling, exploring, operating, developing, and/or removing the oil, gas and other minerals.

This conveyance and warranty is subject to those matters listed on **Exhibit "B"** attached hereto and made part hereof (**"Permitted Encumbrances"**), to the extent enforceable and applicable to the Property.

Grantor, for the consideration, receipt of which is hereby acknowledged, and subject to the Reservations From and Exceptions to Conveyance and Warranty, grants, sells and conveys to Grantee the Property, together with all and singular the rights and appurtenances thereto in any wise belonging, to have and hold unto Grantee, Grantee's successors and assigns, forever. Grantor binds Grantor and Grantor's successors to warrant and forever defend all and singular the property unto Grantee and Grantee's successors and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof, except as to the Reservations From and Exceptions to Conveyance and Warranty.

When the context requires, singular nouns and pronouns include the plural. Reference to any gender shall include either gender and, in the case of a legal entity that is not a natural person, shall include the neuter gender, all as the case may be.

This deed may be executed in multiple counterparts, each of which shall be deemed an original, but all of which shall together constitute but one and the same document.

(Remainder of Page Intentionally Left Blank, signature pages to follow)

SIGNATURE PAGES TO GENERAL WARRANTY DEED

Executed to be effective as of the date first above written.

KENNETH BUCHHORN

ACKNOWLEDGEMENT

STATE OF TEXAS §
§
COUNTY OF WILLIAMSON §

June 1

This instrument was acknowledged before me on ~~May~~ ____, 2022 by Kenneth Bucchorn, a married person.

Notary Public, State of Texas

MERLIN LESTER
NOTARY PUBLIC
STATE OF TEXAS
MY COMM. EXP. 11/10/25
NOTARY ID 727648-6

SIGNATURE PAGES TO GENERAL WARRANTY DEED

Executed to be effective as of the date first above written.

Kenneth Buchhorn
KENNETH BUCHHORN CO-TRUSTEE OF THE KENNETH AND KATHRYN BUCHHORN REVOCABLE MANAGEMENT TRUST DATED NOVEMBER 8, 2016

ACKNOWLEDGEMENT

STATE OF TEXAS §
§
COUNTY OF WILLIAMSON §

This instrument was acknowledged before me on May 27, 2022 by KENNETH BUCHHORN CO-TRUSTEE OF THE KENNETH AND KATHRYN BUCHHORN REVOCABLE MANAGEMENT TRUST DATED NOVEMBER 8, 2016.

Notary Public, State of Texas

NOTARY PUBLIC STATE OF TEXAS
MERLIN LESTER
NOTARY PUBLIC
STATE OF TEXAS
MY COMM. EXP. 11/10/25
NOTARY ID 727648-6

Kathryn Buchhorn

KATHRYN BUCHHORN CO-TRUSTEE OF THE KENNETH AND KATHRYN BUCHHORN REVOCABLE MANAGEMENT TRUST DATED NOVEMBER 8, 2016

ACKNOWLEDGEMENT

STATE OF TEXAS §
§
COUNTY OF WILLIAMSON §

This instrument was acknowledged before me on May 27, 2022 by KATHRYN BUCHHORN CO-TRUSTEE OF THE KENNETH AND KATHRYN BUCHHORN REVOCABLE MANAGEMENT TRUST DATED NOVEMBER 8, 2016.

Merlin Lester

Notary Public, State of Texas

MERLIN LESTER
NOTARY PUBLIC
STATE OF TEXAS
MY COMM. EXP. 11/10/25
NOTARY ID 727648-6

RICHARD WAYNE BUCHHORN

ACKNOWLEDGEMENT

STATE OF TEXAS §
§
COUNTY OF WILLIAMSON §

This instrument was acknowledged before me on May 27, 2022 by Richard Wayne Buchhorn, a married person.

Notary Public, State of Texas

MERLIN LESTER
NOTARY PUBLIC
STATE OF TEXAS
MY COMM. EXP. 11/10/25
NOTARY ID 727648-6

NOTARY PUBLIC
STATE OF TEXAS

Gayle Ann McElhanon
GAYLE ANN McELHANON

ACKNOWLEDGEMENT

STATE OF TEXAS §
§
COUNTY OF WILLIAMSON §

This instrument was acknowledged before me on May 27, 2022 by Gayle Ann McElhanon, a married person.

Merlin Lester
Notary Public, State of Texas

MERLIN LESTER
NOTARY PUBLIC
STATE OF TEXAS
MY COMM. EXP. 11/10/25
NOTARY ID 727648-6

JOINDER AND CONSENT OF SPOUSE TO GENERAL WARRANTY DEED

JAMES McELHANON

ACKNOWLEDGEMENT

STATE OF TEXAS §
§
COUNTY OF WILLIAMSON §

This instrument was acknowledged before me on May 27, 2022 by James McElhanon, spouse of Gayle Ann McElhanon.

Notary Public, State of Texas

MERLIN LESTER
NOTARY PUBLIC
STATE OF TEXAS
MY COMM. EXP. 11/10/25
NOTARY ID 727648-6

JOINDER AND CONSENT OF SPOUSE TO GENERAL WARRANTY DEED

JEAN BUCHHORN

ACKNOWLEDGEMENT

STATE OF TEXAS §
§
COUNTY OF WILLIAMSON §

This instrument was acknowledged before me on May 27, 2022 by Jean Buchhorn, spouse of Richard Wayne Buchhorn.

Notary Public, State of Texas

MERLIN LESTER
NOTARY PUBLIC
STATE OF TEXAS
MY COMM. EXP. 11/10/25
NOTARY ID 727648-6

JOINDER AND CONSENT OF SPOUSE TO GENERAL WARRANTY DEED

Kathryn Buchhorn

KATHRYN BUCHHORN

ACKNOWLEDGEMENT

STATE OF TEXAS §
§
COUNTY OF WILLIAMSON §

This instrument was acknowledged before me on ~~May~~ June 1, 2022 by Kathryn Buchhorn, spouse of Kenneth Buchhorn.

Notary Public, State of Texas

NOTARY PUBLIC
STATE OF TEXAS

MERLIN LESTER
NOTARY PUBLIC
STATE OF TEXAS
MY COMM. EXP. 11/10/25
NOTARY ID 727648-6

EXHIBIT "A"

Legal Description

Parcel 1

DESCRIPTION OF 16.018 ACRES OR 697,730 SQ. FT.

A TRACT OR PARCEL CONTAINING 16.018 ACRES OR 697,730 SQUARE FEET OF LAND, SITUATED IN THE JOHN BERRY SURVEY, ABSTRACT NO. 51, WILLIAMSON COUNTY, BEING ALL OF A CALLED 15.00 ACRE TRACT, AS CONVEYED TO KENNETH BUCHHORN AND RICHARD BUCHHORN, AS RECORDED UNDER WILLIAMSON COUNTY CLERK'S FILE (W.C.C.F.) NO. 2019119923, WITH SAID 16.018 ACRE TRACT BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS, WITH ALL BEARINGS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE (NAD83):

COMMENCING AT A TXDOT MONUMENT FOUND ON THE EAST RIGHT-OF-WAY (R.O.W.) LINE OF STATE HIGHWAY I-35 NORTH (WIDTH VARIES), BEING THE SOUTHWEST CORNER OF LOT 1, BLOCK A, FINAL PLAT WALBURG TRAVEL CENTER, AS RECORDED IN DOC. NO. 2018103825, OF THE OFFICIAL PUBLIC RECORDS OF WILLIAMSON COUNTY (O.P.R.W.C.), BEING THE SOUTHWEST CORNER OF A CALLED 2.06 ACRE TRACT, CONVEYED TO JYKM WALBURG TRAVEL CENTER, LLC, AS RECORDED IN W.C.C.F. NO. 2015053486;

THENCE, NORTH 68 DEG. 58 MIN. 00 SEC. EAST, WITH THE SOUTH LINE OF SAID LOT 1, A DISTANCE OF 62.00 FEET, TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR THE NORTHWEST CORNER AND **POINT OF BEGINNING** OF THE HEREIN DESCRIBED TRACT;

THENCE, NORTH 68 DEG. 58 MIN. 00 SEC. EAST, WITH THE SOUTH LINE OF SAID LOT 1 AND THE SOUTH LINE OF A CALLED 122.04 ACRE TRACT, CONVEYED TO KENNETH & KATHRYN BUCHHORN, AS RECORDED UNDER W.C.C.F. NO. 2015053354, A DISTANCE OF 1,771.12 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR THE NORTHWEST CORNER OF A CALLED 137.5 ACRE TRACT, CONVEYED TO ZETTIE SUE VOGLER, AS RECORDED IN W.C.C.F. NO. 2009058440, AND BEING THE NORTHEAST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, SOUTH 21 DEG. 44 MIN. 52 SEC. EAST, WITH THE WEST LINE OF SAID 137.50 ACRE TRACT, A DISTANCE OF 366.07 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR THE NORTHEAST CORNER OF A CALLED 7.74 ACRE TRACT, CONVEYED TO GAYLE ANN MCELHANON, AS RECORDED IN VOL 1739, PAGE 968 OF THE WILLIAMSON COUNTRY DEED RECORDS (W.C.D.R.), BEING THE SOUTHEAST CORNER OF SAID CALLED 15.00 ACRE TRACT, AND BEING THE SOUTHEAST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, SOUTH 68 DEG. 58 MIN. 43 SEC. WEST, WITH THE LINE COMMON TO SAID 7.74 ACRE TRACT, SAID 15.00 ACRE TRACT, AND OF A TRACT OF LAND CONVEYED TO STEWART FAMILY INTERESTS, LTD., AS RECORDED UNDER W.C.C.F. NOS. 2017039177 & 2018063436, A DISTANCE OF 2,043.27 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET ON THE EAST R.O.W. LINE OF AFORESAID STATE HIGHWAY I-35 NORTH (WIDTH VARIES), BEING THE SOUTHWEST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, NORTH 15 DEG. 10 MIN. 00 SEC. EAST, WITH THE EAST R.O.W. LINE OF SAID STATE HIGHWAY I-35 NORTH, A DISTANCE OF 453.07 FEET TO THE **POINT OF BEGINNING** AND CONTAINING 16.018 ACRES OR 697,730 SQUARE FEET OF LAND, AS SHOWN ON JOB NO. 57456, PREPARED BY WINDROSE LAND SERVICES, INC.

EXHIBIT "A"

Legal Description

Parcel 2

DESCRIPTION OF 17.971 ACRES OR 782,819 SQ. FT.

A TRACT OR PARCEL CONTAINING 17.971 ACRES OR 782,819 SQUARE FEET OF LAND, SITUATED IN THE JOHN BERRY SURVEY, ABSTRACT NO. 51, WILLIAMSON COUNTY, BEING OUT OF A CALLED 49.975 ACRE TRACT, AS CONVEYED TO KENNETH & KATHRYN BUCHHORN, AS RECORDED UNDER WILLIAMSON COUNTY CLERK'S FILE (W.C.C.F.) NO. 2017039177, WITH ALL BEARINGS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE (NAD83):

BEGINNING AT A 1/2 INCH IRON ROD FOUND ON THE EAST RIGHT-OF-WAY (R.O.W.) LINE OF COUNTY ROAD 150 (WIDTH VARIES), BEING THE SOUTHWEST CORNER OF A TRACT OF LAND AS CONVEYED TO STEWART FAMILY INTERESTS, LTD., AS RECORDED UNDER W.C.C.F. NOS. 2017039177 & 2018063436 AND BEING THE MOST WESTERLY SOUTHWEST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, NORTH 68 DEG. 58 MIN. 12 SEC. EAST, WITH THE SOUTH LINE OF SAID TRACT OF LAND DESCRIBED TO STEWART FAMILY INTERESTS, LTD., A DISTANCE OF 1,527.57 FEET TO A CAPPED 1/2 INCH IRON ROD STAMPED "STEGER BIZZEL" FOUND FOR THE SOUTHEAST CORNER OF SAID TRACT OF LAND DESCRIBED TO STEWART FAMILY INTERESTS, LTD. AND FOR AN INTERIOR CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, NORTH 21 DEG. 01 MIN. 17 SEC. WEST, CONTINUING WITH THE EAST LINE OF SAID TRACT OF LAND DESCRIBED TO STEWART FAMILY INTERESTS, LTD. A DISTANCE OF 688.97 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR THE NORTHEAST CORNER OF SAID TRACT OF LAND DESCRIBED TO STEWART FAMILY INTERESTS, LTD., BEING ON THE SOUTH LINE OF A CALLED 15.00 ACRE TRACT OF LAND CONVEYED TO KENNETH & KATHRYN BUCHHORN, AS RECORDED UNDER THE W.C.C.F. NO. 2019119923, BEING ON THE NORTH LINE OF SAID 49.975 ACRE TRACT AND FOR THE NORTHWEST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, NORTH 68 DEG. 58 MIN. 43 SEC. EAST, WITH THE LINE COMMON TO SAID 49.975 ACRE TRACT AND SAID 15.00 ACRE TRACT, A DISTANCE OF 261.40 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR THE NORTHWEST CORNER OF A CALLED 7.74 ACRE TRACT OF LAND CONVEYED TO GAYLE AN MCELHANON IN VOLUME 1739, PAGE 968 OF THE WILLIAMSON COUNTY DEED RECORDS (W.C.D.R.), AND BEING THE NORTHEAST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, SOUTH 21 DEG. 51 MIN. 22 SEC. EAST, WITH THE LINE COMMON TO SAID 49.975 ACRE TRACT AND SAID 7.74 ACRE TRACT, A DISTANCE OF 637.35 FEET, TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR THE SOUTHWEST CORNER OF SAID 7.74 ACRE TRACT AND AN ANGLE POINT OF THE HEREIN DESCRIBED TRACT;

THENCE, SOUTH 21 DEG. 55 MIN. 12 SEC. EAST, WITH THE LINE COMMON TO SAID 49.975 ACRE TRACT AND A CALLED 10.014 ACRE TRACT, CONVEYED TO GAYLE ANN MCELHANON, AS RECORDED IN VOL. 1611, PG. 663, W.C.D.R., A DISTANCE OF 394.02 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR THE SOUTHEAST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, SOUTH 69 DEG. 23 MIN. 58 SEC. WEST, THROUGH AND ACROSS SAID 49.975 ACRE TRACT, A DISTANCE OF 1,769.31 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET ON THE EAST R.O.W. LINE OF AFORESAID COUNTY ROAD 150 AND FOR THE MOST SOUTHERLY SOUTHWEST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, NORTH 28 DEG. 38 MIN. 47 SEC. WEST, WITH THE EAST R.O.W. LINE OF SAID COUNTY ROAD 150, A DISTANCE OF 107.78 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR AN ANGLE POINT;

THENCE, NORTH 26 DEG. 23 MIN. 07 SEC. WEST, WITH THE EAST R.O.W. LINE OF SAID COUNTY ROAD 150, A DISTANCE OF 223.20 FEET TO **POINT OF BEGINNING** AND CONTAINING 17.971 ACRES OR 782,819 SQUARE FEET OF LAND, AS SHOWN ON JOB NO. 57456, PREPARED BY WINDROSE LAND SERVICES, INC.

EXHIBIT "B"

Permitted Exceptions

1. Taxes and assessments for the year 2022 and subsequent years, none now due or payable.

2. Rights of Pedernales Electric Cooperative, Inc. in and to that certain Utility Easement recorded under County Clerk's File No. 2013071687, Official Public Records, Williamson County, Texas ("OPRWCT").

3. Covenants, Conditions and Restrictions contained in Declaration recorded under County Clerk's File No. 2003095155, OPRWCT.

4. Terms, conditions and stipulations contained in Public Utility and Access Easement Agreements between Gayle Ann McElhanon and James E. McElhanon and JYKM Walburg Travel Center, LLC as recorded under County Clerk's File No. 2016105615 and 2016105616, OPRWCT.

FILED AND RECORDED
OFFICIAL PUBLIC RECORDS 2022067955

DEED Fee: $75.00
06/02/2022 11:10 AM OSALINAS

Nancy E. Rister

Nancy E. Rister, County Clerk
Williamson County, Texas

After recording. return to:
Merlin Lester
213-A West 8th Street
Georgetown, Texas 78626

6

ELECTRONICALLY RECORDED 2022102198
Williamson County, Texas Total Pages: 12

Prepared by:

Adrienne Collins
Kane Russell Coleman Logan PC
5151 San Felipe
Suite 800
Houston, Texas 77056

After Recording Return to:

Stewart Builders, Inc.
16565 Village Drive
Houston, Texas 77040
Attn: Brett Barnes

(Space above this line reserved for Recorder's use.)

NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.

GENERAL WARRANTY DEED

Date: August 19, 2022

Grantor: STEWART FAMILY INTERESTS, LTD., a Texas limited partnership

Grantee: STEWART BUILDERS, INC., a Texas corporation

Grantee's Mailing Address (including county):

16565 Village Drive
Jersey Village, Texas 77040
Harris County

Consideration: TEN AND NO/100 DOLLARS and other good and valuable consideration.

Property (including any improvements):

BEING a called 10.01 acre tract of land and a called 3.0 acre tract of land out of the JOHN BERRY SURVEY, Abstract No. 51 in Williamson County, Texas, as conveyed to Stewart Family Interests, Ltd., by deed recorded under Document Number 2018063436 in the Official Public Records of Williamson County, Texas (collectively the "**Property**"), more particularly described by metes and bounds in **Exhibit "A"** attached hereto and made a part hereof for all purposes.

NOTE: The Property conveyed is described in two tracts for convenience. For the purposes of this conveyance, the Property shall be considered to be a single tract, as no subdivision of the 13.01 acres is intended by this conveyance.

Reservations From and Exceptions to Conveyance and Warranty:

This conveyance and warranty is subject to recorded easements, covenants, conditions and restrictions of record, to the extent enforceable and applicable to the Property.

Grantor, for the consideration, receipt of which is hereby acknowledged, and subject to the Reservations From and Exceptions to Conveyance and Warranty, grants, sells and conveys to Grantee the Property, together with all and singular the rights and appurtenances thereto in any wise belonging, to have and hold unto Grantee, Grantee's successors and assigns, forever. Grantor binds Grantor and Grantor's successors to warrant and forever defend all and singular the property unto Grantee and Grantee's successors and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof, except as to the Reservations From and Exceptions to Conveyance and Warranty.

All ad valorem taxes applicable to the Property have been paid up to and including the year 2021. The Property is conveyed subject to all ad valorem taxes applicable to the Property for the year 2022 and subsequent years, which Grantee assumes and agrees to pay.

When the context requires, singular nouns and pronouns include the plural. Reference to any gender shall include either gender and, in the case of a legal entity that is not a natural person, shall include the neuter gender, all as the case may be.

Signatures with Notary Following Pages.

(Remainder of Page Intentionally Left Blank)

SIGNATURE PAGE TO GENERAL WARRANTY DEED

Executed to be effective as of the date first above written.

GRANTOR:

Stewart Family Interests, Ltd.. a Texas limited partnership

By: Mark A Stewart
Print Name: Mark A. Stewart
Title: member

ACKNOWLEDGEMENT

STATE OF TEXAS)
) §
COUNTY OF Harris)

This instrument was acknowledged before me on August 19, 2022 by Mark A. Stewart, as General Partner of Stewart Family Interests, Ltd., a Texas limited partnership on behalf of said partnership.

Lisa R Rodriguez
Notary Public, State of Texas

LISA RENEE RODRIGUEZ
Notary ID #124589043
My Commission Expires
June 13, 2023

NOTARY PUBLIC STATE OF TEXAS

SIGNATURE PAGE TO GENERAL WARRANTY DEED

Executed to be effective as of the date first above written.

GRANTOR:

Stewart Family Interests, Ltd., a Texas limited partnership

By: Donald C. Stewart
Print Name: Donald C. Stewart
Title: VP

ACKNOWLEDGEMENT

STATE OF TEXAS)
) §
COUNTY OF Harris)

This instrument was acknowledged before me on August 19, 2022 by Donald C. Stewart, as General Partner of Stewart Family Interests, Ltd., a Texas limited partnership, on behalf of said partnership.

Amber B. Ramirez
Notary Public, State of Texas

AMBER B. RAMIREZ
MY COMMISSION EXPIRES
DECEMBER 19, 2022
NOTARY ID: 12069922

GRANTOR:

Stewart Family Interests, Ltd., a Texas limited partnership

By: [signature]
Print Name: Donald G. Stewart
Title: Member

ACKNOWLEDGEMENT

STATE OF TEXAS)
) §
COUNTY OF Harris)

This instrument was acknowledged before me on August 19, 2022 by Donald G Stewart, as General Partner of Stewart Family Interests, Ltd., a Texas limited partnership on behalf of said partnership.

Lisa R. Rodriguez
Notary Public, State of Texas

LISA RENEE RODRIGUEZ
Notary ID #124589043
My Commission Expires
June 13, 2023

SIGNATURE PAGE TO GENERAL WARRANTY DEED

Executed to be effective as of the date first above written.

GRANTOR:

Stewart Family Interests, Ltd., a Texas limited partnership

By: ______________________

Print Name: Brad Stewart

Title: Vice President

ACKNOWLEDGEMENT

STATE OF TEXAS)
) §
COUNTY OF Harris)

This instrument was acknowledged before me on August 19, 2022 by Brad Stewart, as General Partner of Stewart Family Interests, Ltd., a Texas limited partnership on behalf of said partnership.

____
Notary Public, State of Texas

LISA RENEE RODRIGUEZ
Notary ID #124589043
My Commission Expires
June 13, 2023

EXHIBIT "A"

Legal Description

Following Pages

EXHIBIT "A"

10.01 Acres
John Berry Survey
Abstract No. 51
Williamson County, Texas

DESCRIPTION

DESCRIPTION OF A 10.01 ACRE TRACT OF LAND LOCATED IN THE JOHN BERRY SURVEY, ABSTRACT NO. 51, WILLIAMSON COUNTY, TEXAS, BEING A PORTION OF A CALLED TRACT ONE 49.975 ACRES CONVEYED IN A SPECIAL WARRANTY DEED TO KENNETH BUCHHORN AND KATHRYN BUCHHORN REVOCABLE MANAGEMENT TRUST OF RECORD IN DOCUMENT NO. 2017039177, OF THE OFFICIAL PUBLIC RECORDS OF WILLIAMSON COUNTY, TEXAS, SAID 10.01 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING, at a 1/2 inch iron rod found with a cap stamped "FOREST RPLS 1847", being in the east right-of-way line of County Road 150, a right-of-way of varying width, and being the southwest corner of a called 10.00 acre tract of land conveyed to Stewart Builders, LTD in Warranty Deed of record in Document No. 2003095156, Official Public Records, Williamson County, Texas, for the most westerly corner of the herein described tract, from which point a 1/2 inch iron rod found with a cap stamped "FOREST RPLS 1847" bears North 26°16'29" West, a distance of 162.52 feet;

THENCE, crossing said 49.975 acre tract of land along the common boundary line of said 10.00 acre Stewart tract and this tract, the following four (4) courses:

1. North 63°39'12" East, a distance of 226.32 feet, 1/2 inch iron rod found with a cap stamped "FOREST RPLS 1847";
2. North 36°32'37" East, a distance of 363.10 feet, to a 1/2 inch iron rod with cap stamped "STEGER BIZZELL", set;
3. North 68°57'16" East, a distance of 385.35 feet, to a 1/2 inch iron rod found;
4. North 21°02'44" West, a distance of 448.67 feet, to a 1/2 inch iron rod found with a cap stamped "FOREST RPLS 1847" in the northeast boundary line of said 49.975 acre tract of land for the northeast corner of said 10.00 acre Stewart tract of land, being a northwest corner of the herein described tract, from which point a MAG-nail found bears South 68°56'53" West, with the northeast boundary line of said 49.975 acre tract of land a distance of 635.60 feet;

THENCE, North 68°56'53" East, with the north line of said 49.975 acre tract of land, being the north boundary line this tract of land, a distance of 423.43 feet, to a 1/2 inch iron rod with cap stamped "STEGER BIZZELL", set, for the northeast corner of the herein described tract;

07/10/2018

STEGER BIZZELL
1978 S. Austin Ave
Georgetown, TX 78626

Page 2 of 2
Proj No. 22556
May 4, 2018
Rev: July 10, 2018

EXHIBIT "A"

10.01 Acres
John Berry Survey
Abstract No. 51
Williamson County, Texas

THENCE, South 21°03'07" East, severing said 49.975 acre tract of land, being the east boundary line of this tract of land, a distance of 688.99 feet, to a 1/2 inch iron rod with cap stamped "STEGER BIZZELL", set for the southwest corner of this tract of land;

THENCE, South 68°56'53" West, continuing to sever said 49.975 acre tract of land, with the southeast line of this tract, a distance of 1338.40 feet, to a 1/2 inch iron rod with cap stamped "STEGER BIZZELL", set in the southwest line of said 49.975 acre tract of land, same line being the east line of County Road 150, and being the southwest corner of this tract, from which point a 3/8 inch iron rod found bears South 26°24'59" East, with the common line of said County Road 150 and said 49.975 acre tract of land, a distance of 223.27 feet;

THENCE, North 26°24'59" West, with the east line of County Road 150, being the west line of said 49.975 acre tract of land, a distance of 25.00 feet, to the **POINT OF BEGINNING,** and containing 10.01 acres of land, more or less, within these metes and bounds.

Bearings are based on the Texas Coordinate System of 1983, Central Zone (NAD_83 (2011)). All distances shown hereon are surface values represented in U.S. Survey Feet based on a Grid-to-Surface Combined Adjustment Factor of 1.00014.

The forgoing metes and bounds description and survey on which it is based is accompanied by and a part of survey map of the subject tract.

I certify that this description was prepared from a survey made on the ground May 2, 2018, under my supervision.

Steger & Bizzell Engineering Inc.

07/10/2018

Miguel A. Escobar, LSLS, RPLS
Texas Reg. No. 5630
1978 South Austin Avenue
Georgetown, Texas 78626
(512) 930-9412
TBPLS Firm No. 10003700

STATE OF TEXAS
REGISTERED
MIGUEL ANGEL ESCOBAR
5630
PROFESSIONAL
LAND SURVEYOR

STEGER BIZZELL
1978 S. Austin Ave
Georgetown, TX 78626

EXHIBIT "A"

Page 1 of 2
Proj No. 22556
June 13, 2018

3.00 Acres
John Berry Survey
Abstract No. 51
Williamson County, Texas

DESCRIPTION

DESCRIPTION OF A 3.00 ACRE TRACT OF LAND LOCATED IN THE JOHN BERRY SURVEY, ABSTRACT NO. 51, WILLIAMSON COUNTY, TEXAS, BEING A PORTION OF A CALLED TRACT ONE 49.975 ACRES CONVEYED IN A SPECIAL WARRANTY DEED TO KENNETH BUCHHORN AND KATHRYN BUCHHORN REVOCABLE MANAGEMENT TRUST OF RECORD IN DOCUMENT NO. 2017039177, OF THE OFFICIAL PUBLIC RECORDS OF WILLIAMSON COUNTY, TEXAS, SAID 3.00 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

COMMENCING, at a 1/2 inch iron rod found with a cap stamped "FOREST RPLS 1847" in the north boundary line of said 49.975 acre tract of land, being in the south line of a called 15.00 acre tract of land conveyed to Kenneth Buchhorn and Kathryn Buchhorn Revocable Management Trust by Special Warranty Deed of record in Document No. 2017039109, Official Public Records, Williamson County, Texas, for the northeast corner of a called 10.00 acre tract of land conveyed to Stewart Builders, LTD in Warranty Deed of record in Document No. 2003095156, Official Public Records, Williamson County, Texas, from which point, a MAG-nail found in the east right-of-way line of Interstate Highway No. 35, a right-of-way of varying width, of record in Volume 456, Page 234, Deed Records, Williamson County, Texas, bears South 68°56'53" West, with the common boundary line of said 49.975 acre tract of land and said 15.00 acre tract of land, a distance of 635.60 feet;

THENCE, North 68°56'53" East, with said common boundary line, a distance of 423.43 feet, to a 1/2 inch iron rod with cap stamped "STEGER BIZZELL", set, for the northwest corner of the herein described tract and being the **POINT OF BEGINNING** of this tract;

THENCE, North 68°56'53" East, with the north line of said 49.975 acre tract of land, being the north boundary line this tract of land, a distance of **189.67 feet**, to a 1/2 inch iron rod with cap stamped "STEGER BIZZELL", set, for the northeast corner of the herein described tract;

THENCE, **South 21°03'07" East**, severing said 49.975 acre tract of land, being the east boundary line of this tract of land, a distance of **688.99 feet**, to a 1/2 inch iron rod with cap stamped "STEGER BIZZELL", set, for the southeast corner of this tract of land;

THENCE, South 68°56'53" West, continuing to sever said 49.975 acre tract of land, with the south line of this tract, a distance of **189.67 feet**, to a 1/2 inch iron rod with cap stamped "STEGER BIZZELL", set, for the southwest corner of this tract of land;

MAC
06/13/2018

STEGER BIZZELL
1978 S. Austin Ave
Georgetown, TX 78626

EXHIBIT "A"

3.00 Acres
John Berry Survey
Abstract No. 51
Williamson County, Texas

THENCE, North 21°03'07" West, severing said 49.975 acre tract of land, being the west boundary line of this tract of land, a distance of 688.99 feet, to the POINT OF BEGINNING, and containing 3.00 acres of land, more or less, within these metes and bounds.

Bearings are based on the Texas Coordinate System of 1983, Central Zone (NAD_83 (2011)). All distances shown hereon are surface values represented in U.S. Survey Feet based on a Grid-to-Surface Combined Adjustment Factor of 1.00014.

The forgoing metes and bounds description and survey on which it is based is accompanied by and a part of survey map of the subject tract.

I certify that this description was prepared from a survey made on the ground June 11, 2018, under my supervision.

Steger & Bizzell Engineering Inc.

06/13/2018

STATE OF TEXAS
REGISTERED
MIGUEL ANGEL ESCOBAR
5630
PROFESSIONAL LAND SURVEYOR

Miguel A. Escobar, LSLS, RPLS
Texas Reg. No. 5630
1978 South Austin Avenue
Georgetown, Texas 78626
(512) 930-9412
TBPLS Firm No. 10003700

P:\22000-22999\22556 Keystone Expansion\Survey Data\Descriptions\22556-Keystone-3.00 Ac.docx

ELECTRONICALLY RECORDED
OFFICIAL PUBLIC RECORDS
2022102198

Pages: 12 Fee: $66.00
08/31/2022 08:00 AM
MBARRICK

Nancy E. Rister

Nancy E. Rister, County Clerk
Williamson County,Texas

Prepared by:

Adrienne Collins
Kane Russell Coleman Logan PC
5151 San Felipe
Suite 800
Houston, Texas 77056

After Recording Return to:

Stewart Builders, Inc.
16565 Village Drive
Houston, Texas 77040
Attn: Brett Barnes

(Space above this line reserved for Recorder's use.)

NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.

GENERAL WARRANTY DEED

Date: August 31, 2022

Grantor: STEWART BUILDERS, INC., a Texas corporation

Grantee: STEWART BUILDERS, INC., a Texas corporation

Grantee's Mailing Address (including county):

16565 Village Drive
Jersey Village, Texas 77040
Harris County

Consideration: TEN AND NO/100 DOLLARS and other good and valuable consideration.

Property (including any improvements):

BEING a 63.888 acre tract of land out of the JOHN BERRY SURVEY, Abstract No. 51 in Williamson County. Texas, consisting of six tracts as conveyed to Stewart Builders, Inc. by deeds recorded under Document Number 2022102198 (called 10.01 acre tract), Document Number 2018063436 (called 10.01 acre tract and called 3.0 acre tract), Document No. 2022067925 (16.018 acre tract and 17.971 acre tract), and Document No. 2022067188 (6.883 acre tract), all in the Official Public Records of Williamson County, Texas, the said 63.888 acre tract being more particularly described by metes and bounds in Exhibit "A" attached hereto and made part hereof for all purposes (the "**Property**").

Reservations From and Exceptions to Conveyance and Warranty:

This conveyance and warranty is subject to recorded easements, covenants, conditions and restrictions of record, to the extent enforceable and applicable to the Property.

Grantor, for the consideration, receipt of which is hereby acknowledged, and subject to the Reservations From and Exceptions to Conveyance and Warranty, grants, sells and conveys to Grantee the Property, together with all and singular the rights and appurtenances thereto in any wise belonging, to have and hold unto Grantee, Grantee's successors and assigns, forever. Grantor binds Grantor and Grantor's successors to warrant and forever defend all and singular the property unto Grantee and Grantee's successors and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof, except as to the Reservations From and Exceptions to Conveyance and Warranty.

All ad valorem taxes applicable to the Property have been paid up to and including the year 2021. The Property is conveyed subject to all ad valorem taxes applicable to the Property for the year 2022 and subsequent years, which Grantee assumes and agrees to pay.

This deed is given for the purpose of consolidating the various tracts into a single, contiguous parcel for real estate tax purposes.

When the context requires, singular nouns and pronouns include the plural. Reference to any gender shall include either gender and, in the case of a legal entity that is not a natural person, shall include the neuter gender, all as the case may be.

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SIGNATURE PAGE TO GENERAL WARRANTY DEED

Executed to be effective as of the date first above written.

GRANTOR:

Stewart Builders, Inc., a Texas corporation

By: Mark A Stewart
Print Name: Mark A. Stewart
Title: President

ACKNOWLEDGEMENT

STATE OF TEXAS)
) §
COUNTY OF Harris)

This instrument was acknowledged before me on August 19, 2022 by Mark A. Stewart, as President of Stewart Builders, Inc, a Texas corporation on behalf of said corporation.

Lisa R. Rodriguez
Notary Public, State of Texas

LISA RENEE RODRIGUEZ
Notary ID #124589043
My Commission Expires
June 13, 2023

NOTARY PUBLIC STATE OF TEXAS

EXHIBIT "A"

Legal Description

Following Pages

WINDROSE
LAND SURVEYING | PLATTING

DESCRIPTION OF
63.888 ACRES OR 2,782,940 SQ. FT.

A TRACT OR PARCEL CONTAINING 63.888 ACRES OR 2,782,940 SQUARE FEET OF LAND, SITUATED IN THE JOHN BERRY SURVEY, ABSTRACT NO. 51, WILLIAMSON COUNTY, BEING ALL OF A CALLED 15.00 ACRE TRACT, CONVEYED TO KENNETH BUCHHORN AND RICHARD BUCHHORN, AS RECORDED UNDER WILLIAMSON COUNTY CLERK'S FILE (W.C.C.F.) NO. 2019119923, ALL OF A CALLED 10.00 ACRE TRACT CONVEYED TO STEWART FAMILY INTERESTS, LTD., AS RECORDED UNDER WILLIAMSON COUNTY CLERK'S FILE NO. 2005052898, A CALLED 10.01 ACRE TRACT CONVEYED TO STEWART FAMILY INTERESTS, LTD., AS RECORDED UNDER WILLIAMSON COUNTY CLERK'S FILE NO. 2018063436, A CALLED 3.00 ACRE TRACT CONVEYED TO STEWART FAMILY INTERESTS, LTD., AS RECORDED UNDER WILLIAMSON COUNTY CLERK'S FILE NO. 2018063436, BEING OUT OF A CALLED 7.74 ACRE TRACT, CONVEYED TO GAYLE ANN MCELHANON, AS RECORDED IN VOL. 1739, PG. 968 OF THE WILLIAMSON COUNTY DEED RECORDS (W.C.D.R.), BEING OUT OF THE REMAINDER OF A CALLED 10.014 ACRE TRACT, CONVEYED TO GAYLE ANN MCELHANON, AS RECORDED IN VOL. 1611, PG. 663, W.C.D.R., AND BEING OUT OF A CALLED 49.975 ACRE TRACT, CONVEYED TO KENNETH & KATHRYN BUCHHORN, AS RECORDED UNDER W.C.C.F. NO. 2017039177, WITH SAID 63.888 ACRE TRACT BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS, WITH ALL BEARINGS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE (NAD83):

COMMENCING AT A TXDOT MONUMENT FOUND ON THE EAST RIGHT-OF-WAY (R.O.W.) LINE OF STATE HIGHWAY I-35 NORTH (WIDTH VARIES), BEING THE SOUTHWEST CORNER OF LOT 1, BLOCK A, FINAL PLAT WALBURG TRAVEL CENTER, AS RECORDED IN DOC. NO. 2018103825, OF THE OFFICIAL PUBLIC RECORDS OF WILLIAMSON COUNTY (O.P.R.W.C.);

THENCE, NORTH 68 DEG. 58 MIN. 00 SEC. EAST, WITH THE SOUTH LINE OF SAID LOT 1, A DISTANCE OF 62.00 FEET, TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR THE NORTHWEST CORNER AND **POINT OF BEGINNING** OF THE HEREIN DESCRIBED TRACT;

THENCE, NORTH 68 DEG. 58 MIN. 00 SEC. EAST, WITH THE SOUTH LINE OF SAID LOT 1 AND THE SOUTH LINE OF A CALLED 122.04 ACRE TRACT, CONVEYED TO KENNETH & KATHRYN BUCHHORN, AS RECORDED UNDER W.C.C.F. NO. 2015053354, A DISTANCE OF 1,771.12 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR THE NORTHWEST CORNER OF A CALLED 137.5 ACRE TRACT, CONVEYED TO ZETTIE SUE VOGLER, AS RECORDED IN W.C.C.F. NO. 2009058440, AND BEING THE NORTHEAST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, SOUTH 21 DEG. 44 MIN. 52 SEC. EAST, WITH THE WEST LINE OF SAID 137.50 ACRE TRACT, A DISTANCE OF 867.78 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR THE MOST EASTERLY SOUTHEAST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, SOUTH 69 DEG. 23 MIN. 58 SEC. WEST, THROUGH AND ACROSS SAID 7.74 ACRE TRACT, A DISTANCE OF 306.35 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR AN INTERIOR CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, SOUTH 06 DEG. 26 MIN. 24 SEC. WEST, CONTINUING THROUGH AND ACROSS SAID 7.74 ACRE TRACT AND THROUGH AND ACROSS SAID 10.014 ACRE TRACT, A DISTANCE OF 214.45 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR AN ANGLE POINT;

THENCE, SOUTH 69 DEG. 20 MIN. 17 SEC. WEST, CONTINUING THROUGH AND ACROSS SAID 10.014 ACRE TRACT, A DISTANCE OF 124.42 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET ON THE EAST LINE OF A SAID 49.975 ACRE TRACT AND FOR AN INTERIOR CORNER OF THE HEREIN DESCRIBED TRACT;

713.458.2281 | 11111 RICHMOND AVE, STE 150, HOUSTON, TX 77082

THENCE, SOUTH 21 DEG. 55 MIN. 12 SEC. EAST, WITH THE LINE COMMON TO SAID 49.975 ACRE TRACT AND SAID 10.014 ACRE TRACT, A DISTANCE OF 342.37 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR THE MOST SOUTHERLY SOUTHEAST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, SOUTH 69 DEG. 23 MIN. 58 SEC. WEST, THROUGH AND ACROSS SAID 49.975 ACRE TRACT, A DISTANCE OF 1,769.31 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET ON THE EAST R.O.W. LINE OF COUNTY ROAD 150, (WIDTH VARIES), BEING THE SOUTHWEST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, WITH THE EAST R.O.W. LINE OF SAID COUNTY ROAD 150, THE FOLLOWING TWO (2) COURSES AND DISTANCES;

NORTH 28 DEG. 38 MIN. 47 SEC. WEST, A DISTANCE OF 107.78 FEET TO A CAPPED 5/8 INCH IRON ROD STAMPED "WINDROSE" SET FOR AN ANGLE POINT;

NORTH 26 DEG. 23 MIN. 07 SEC. WEST, PASSING AT A DISTANCE OF 223.20 FEET TO A 1/2 INCH IRON ROD FOUND BEING THE SOUTHWEST CORNER OF A CALLED 10.01 ACRE TRACT, CONVEYED TO STEWART FAMILY INTERESTS, LTD., AS RECORDED UNDER W.C.C.F. NO. 2018063436 AND CONTINUING FOR A TOTAL DISTANCE OF 410.82 FEET TO A CALCULATED POINT FOUND MARKING THE SOUTH END OF A CLIP CORNER AT THE INTERSECTION OF THE SAID EAST R.O.W. LINE OF COUNTY ROAD 150 AND THE SAID EAST R.O.W. LINE OF STATE HIGHWAY I-35 N, AT A WEST CORNER OF SAID 10.00 ACRE TRACT;

THENCE, WITH SAID CLIP CORNER, NORTH 04 DEG. 16 MIN. 00 SEC. EAST, A DISTANCE OF 94.30 FEET TO A CALCULATED POINT MARKING THE NORTH END OF SAID CLIP CORNER AND AT A WEST CORNER OF SAID 10.00 ACRE TRACT;

THENCE, NORTH 15 DEG. 10 MIN. 00 SEC. WEST, WITH SAID EAST R.O.W. LINE OF STATE HIGHWAY I-35, PASSING AT A DISTANCE OF 464.73 FEET TO MAG NAIL FOUND AT THE NORTHWEST CORNER OF SAID 10.00 ACRE TRACT, BEING AT THE SOUTHWEST CORNER OF SAID 15.00 ACRE TRACT AND CONTINUING FOR A TOTAL DISTANCE OF 917.80 FEET TO THE **POINT OF BEGINNING** AND CONTAINING 63.888 ACRES OR 2,782,940 SQUARE FEET OF LAND, PREPARED BY WINDROSE LAND SERVICES, INC.

STATE OF TEXAS
REGISTERED
ROBERT KNESS
6486
PROFESSIONAL
LAND SURVEYOR

ROBERT KNESS
R.P.L.S. NO. 6486
STATE OF TEXAS
FIRM REGISTRATION NO. 10108800

08-09-2022
DATE:

713.458.2281 I 11111 RICHMOND, STE 150, HOUSTON, TX 77082

Prepared by:

Adrienne Collins
Kane Russell Coleman Logan PC
5151 San Felipe
Suite 800
Houston, Texas 77056

After Recording Return to:

Stewart Builders, Inc.
16565 Village Drive
Houston, Texas 77040
Attn: Brett Barnes

(Space above this line reserved for Recorder's use.)

NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.

GENERAL WARRANTY DEED

Date: August 19, 2022

Grantor: STEWART FAMILY INTERESTS, LTD., a Texas limited partnership

Grantee: STEWART BUILDERS, INC., a Texas corporation

Grantee's Mailing Address (including county):

16565 Village Drive
Jersey Village, Texas 77040
Harris County

Consideration: TEN AND NO/100 DOLLARS and other good and valuable consideration.

Property (including any improvements):

BEING 10.00 acres of land out of the JOHN BERRY SURVEY, Abstract No. 51 in Williamson County. Texas, as conveyed to Stewart Family Interests, Ltd., by deed recorded under Document Number 2005052898, Official Public Records of Williamson County, Texas (the "**Property**").

Reservations From and Exceptions to Conveyance and Warranty:

Grantor reserves all of Grantor's interest in and to all oil, gas and other minerals in and under the Property, if any. Grantor waives any implied rights of ingress and egress, and waives Grantor's right, title, and interest, in and to any surface rights, surface minerals, utilities, adjacent streets, alleys, strips, gores, and rights-of-way for mining, drilling, exploring, operating, developing, and/or removing the oil, gas and other minerals.

This conveyance and warranty is subject to recorded easements, covenants, conditions and restrictions of record, to the extent enforceable and applicable to the Property.

Grantor, for the consideration, receipt of which is hereby acknowledged, and subject to the Reservations From and Exceptions to Conveyance and Warranty, grants, sells and conveys to Grantee the Property, together with all and singular the rights and appurtenances thereto in any wise belonging, to have and hold unto Grantee, Grantee's successors and assigns, forever. Grantor binds Grantor and Grantor's successors to warrant and forever defend all and singular the property unto Grantee and Grantee's successors and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof, except as to the Reservations From and Exceptions to Conveyance and Warranty.

All ad valorem taxes applicable to the Property have been paid up to and including the year 2021. The Property is conveyed subject to all ad valorem taxes applicable to the Property for the year 2022 and subsequent years, which Grantee assumes and agrees to pay.

When the context requires, singular nouns and pronouns include the plural. Reference to any gender shall include either gender and, in the case of a legal entity that is not a natural person, shall include the neuter gender, all as the case may be.

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SIGNATURE PAGE TO GENERAL WARRANTY DEED

Executed to be effective as of the date first above written.

GRANTOR:

Stewart Family Interests, Ltd., a Texas limited partnership

By: Mark A Stewart
Print Name: MARK STEWART
Title: PRESIDENT

ACKNOWLEDGEMENT

STATE OF TEXAS)
) §
COUNTY OF Harris)

This instrument was acknowledged before me on September 28th, 2022 by Mark Stewart, as General Partner of Stewart Family Interests, Ltd., a Texas limited partnership on behalf of said partnership.

Deanna Bouley
Notary Public, State of Texas

DEANNA BOULEY
Notary Public, State of Texas
Comm. Expires 06-02-2026
Notary ID 128269773

EXHIBIT "A"

Legal Description

Following Pages

FOREST SURVEYING AND MAPPING CO. **EXHIBIT A**
1002 Ash St.
Georgetown, Tx. 78626

DESCRIPTION FOR RICHARD BUCHHORN ET. AL. – BRAD STEWART

BEING 10.00 acres of the John Berry Survey, Abstract No. 51, in Williamson County, Texas. This tract is part of the 49.975 acre tract which was described in a deed to Richard Buchhorn et. al., of record in Vol. 2238, Pg. 258, Official Records of Williamson County, Texas. This tract was surveyed on the ground in July of 2003, by William F. Forest, Jr., Registered Professional Land Surveyor No. 1847.

BEGINNING at a concrete nail found in a drilled hole in concrete rip-rap in the East line of Interstate Highway 35 and at the Northwest corner of the said 49.975 acre tract.

THENCE with the North line of the said 49.975 acre tract, remaining North of an existing fence, N 71 deg. 07 min. 45 sec. E 635.67 feet to an iron pin set.

THENCE S 18 deg. 52 min. 15 sec. E 448.48 feet to an iron pin set.

THENCE with the South line of a proposed 40 foot wide access easement, setting iron pins as follows: S 71 deg. 07 min. 45 sec. W 385.62 feet; S 38 deg. 40 min. 52 sec. W 362.81 feet; and S 65 deg. 47 min. 27 sec. W 226.0 feet.

THENCE with the East line of County Road 150, N 24 deg. 12 min. 33 sec. W at 90.6 feet pass an iron pin found, continuing in all 162.63 feet to an iron pin found; and N 26 deg. 30 min. 20 sec. W 37.41 feet to an iron pin found. The top of this stake is an elevation benchmark at the elevation of 690.02'.

THENCE with the East line of Interstate Highway 35, N 02 deg 10 min. W 94.30 feet to an iron pin found; and N 17 deg. 18 min. 32 sec. E 464.39 feet to the POINT OF BEGINNING.

STATE OF TEXAS :
: KNOW ALL MEN BY THESE PRESENTS;
COUNTY OF WILLIAMSON :

I, WM. F. FOREST, JR., do hereby certify that this survey was made on the ground of the property legally described hereon and is correct and that there are no significant boundary line conflicts, shortages in area, apparent protrusions, intrusions or overlapping of improvements, utility lines or roads, except as shown on the attached plat, and that said property abuts a public roadway, except as shown. Ownership and easement information for this tract has not been researched except as shown on the attached plat.

TO CERTIFY WHICH, WITNESS my hand and seal at Georgetown, Texas, this the day of July, 2003, A.D. File: Word29:STEWAR10

WM.F. FOREST JR.
REGISTERED PROFESSIONAL LAND SURVEYOR NO. 1847

STATE OF TEXAS
REGISTERED
WM. F. FOREST JR.
1847
PROFESSIONAL
LAND SURVEYOR

RECORDERS MEMORANDUM
All or part of the text on this page was not clearly legible for satisfactory recordation.

RECORDER'S MEMORANDUM
At the time of recordation, this instrument was found to be inadequate for the best photographic reproduction because of illegibility, carbon or photo copy, discolored paper, etc. All blockouts, additions and changes were present at the time the instrument was filed and recorded

Title Data SW ADI00068 WM 2003095156.003

ELECTRONICALLY RECORDED
OFFICIAL PUBLIC RECORDS
2022112699
Pages: 6 Fee: $42.00
09/29/2022 11:50 AM
LMUELLER

Nancy E. Rister

Nancy E. Rister, County Clerk
Williamson County,Texas

SECTION B

General Information Form TCEQ-0587

CONSULTING ENGINEERS

General Information Form

Texas Commission on Environmental Quality

For Regulated Activities on the Edwards Aquifer Recharge and Transition Zones and Relating to 30 TAC §213.4(b) & §213.5(b)(2)(A), (B) Effective June 1, 1999

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

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

Signature

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

Print Name of Customer/Agent: David Aguayo

Date: 03/02/2023

Signature of Customer/Agent:

Project Information

1. Regulated Entity Name: Dry Creek
2. County: Williamson
3. Stream Basin: Berry Creek
4. Groundwater Conservation District (If applicable): _____
5. Edwards Aquifer Zone:

   ☒ Recharge Zone
   ☐ Transition Zone

6. Plan Type:

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

7. Customer (Applicant):

   Contact Person: Brett Barnes
   Entity: Steward Development & Construction
   Mailing Address: 23000 NW Lake Dr.
   City, State: Houston, TX 77095 Zip: _____
   Telephone: 713-983-8819 FAX: _____
   Email Address: bb@stewartdevelopment.com

8. Agent/Representative (If any):

   Contact Person: David Aguayo
   Entity: WGA Consulting Engineers
   Mailing Address: 2500 Tanglewilde Dr. Suite 120
   City, State: Houston, TX Zip: 77063
   Telephone: 713-789-1900 FAX: _____
   Email Address: daguayo@wga-llp.com

9. Project Location:

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

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

    Site is located West of N IH-35 NB Frontage Road between CR150 and CR196.

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

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

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

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

    ☐ Survey staking will be completed by this date: _____

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

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

15. Existing project site conditions are noted below:

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

Prohibited Activities

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

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

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

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

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

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

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

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

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

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

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

Administrative Information

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

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

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

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

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

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

Attachment A

Project Location Road Map

WGA

CONSULTING ENGINEERS

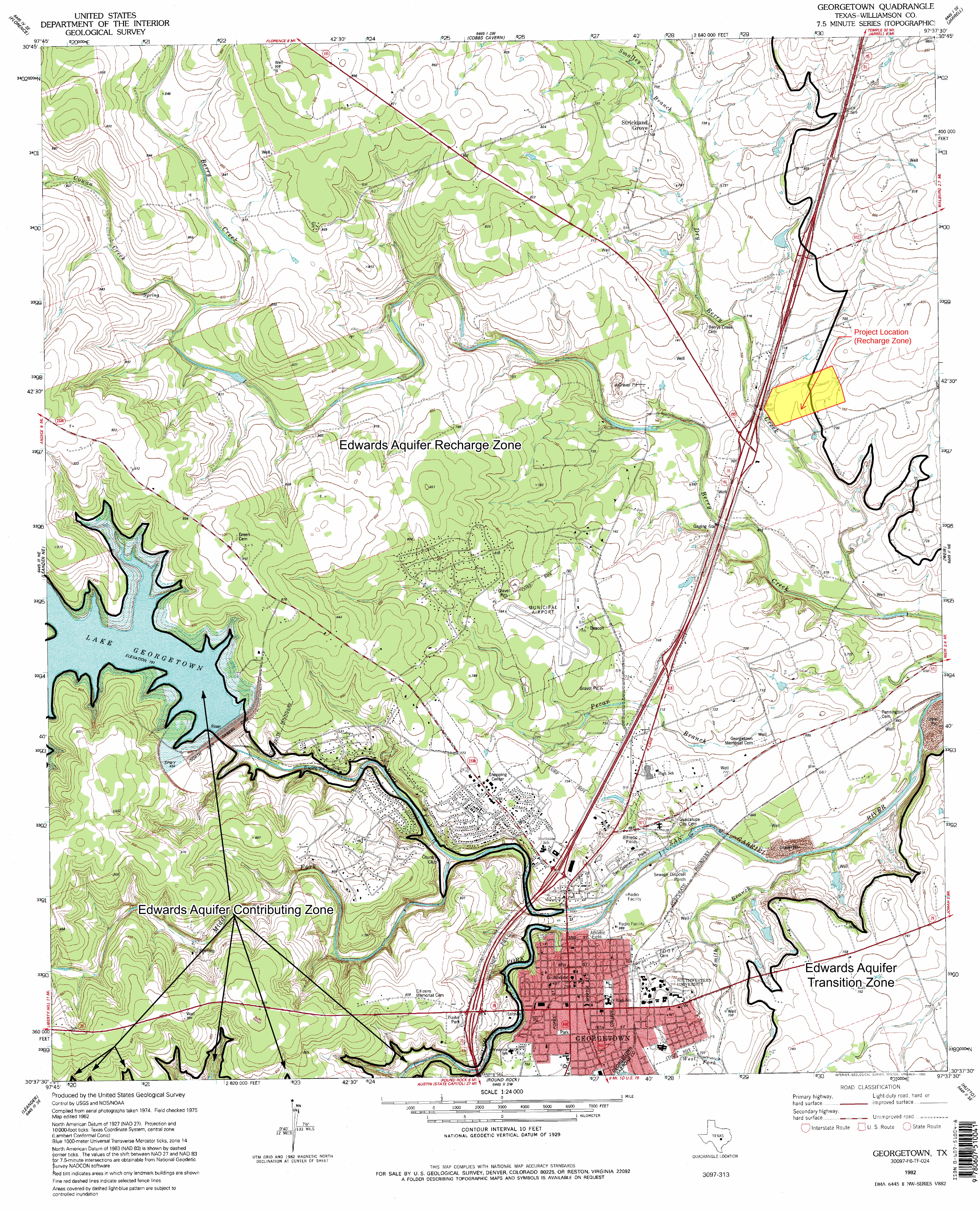
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, Georgetown

Attachment B

Edwards Aquifer Recharge Zone Map

WGA

CONSULTING ENGINEERS



Texas Commission on Environmental Quality
Edwards Aquifer Protection Program

Regulatory Zones

30 TAC Chapter 213- Edwards Aquifer

Effective March 1990

This map was produced by the Groundwater Planning and Assessment Team of the Texas Commission on Environmental Quality to detail the boundaries of the regulatory zones of the Edwards Aquifer Protection Program, as described in Texas Administrative Code Title 30, Part 1, §213.3. No other claims are made to the accuracy or completeness of the data or to its suitability for a particular use. For more information about the Edwards Aquifer Protection Program, please contact the TCEQ Regional Offices in San Antonio or Austin. Printed June 2006.

Attachment C

Project Description

WGA

CONSULTING ENGINEERS

ATTACHMENT C

Project Description

The Property is within the current city limits, and is located at 35 Co Rd 150, Georgetown, TX 78626. The total size of the property is 63.888 acres. The existing amount of impervious cover on the site is 7.24 acres of industrial development including two industrial buildings, a gravel parking lot and concrete roads and parking lot; the rest of the site area is cleared undeveloped land. There is no existing impervious off-site sheet flows passing through the site, and undeveloped off-site sheet flows will be routed around our property via perimeter swale. The proposed improvements amount to an impervious cover on the site of 44.02 acres of industrial development including three large warehouses, a building expansion to an existing facility, a workshop, paved roads and parking lots, four detention basins, the two existing industrial buildings and a portion of the existing concrete roads and parking lot will remain; the existing gravel parking lot will be demolished and replaced with a concrete parking lot. The proposed improvements will serve as an industrial warehouse park and an expansion to the existing Keystone Concrete Placement development. The TSS loading generated by the proposed development will be removed by a combination of permanent SWQ features including three vegetation swales, a grassy swale, a batch detention system located in Pond B and a batch detention system located in Pond C.

The site is located within a mostly commercial area and consists primarily of undeveloped land located within the Dry Berry Creek watershed. Adjacent properties include a truck stop, a single-family residential lot, and undeveloped land. The property has IH-35N feeder road and CR150 frontage.

SECTION C

Geologic Assessment Form TCEQ-0585

WGA
CONSULTING ENGINEERS

GEOLOGIC ASSESSMENT

Georgetown Industrial Phase I Parcels
35 County Road 150
Georgetown, Williamson County, Texas 78626

July 7, 2022

Prepared for:

WGA Consulting Engineers
2500 Tanglewilde Street
Suite 120
Houston, Texas 77063

ECS Project No. 51:2964

ECS SOUTHWEST, LLP

"Setting the Standard for Service"

Geotechnical • Construction Materials • Environmental • Facilities

July 6, 2022

David Aguayo
WGA Consulting Engineers
2500 Tanglewilde Street
Suite 120
Houston, Texas 77063

ECS Project: 51:2964

Subject: TCEQ Geologic Assessment, Georgetown Industrial Phase I Parcels, 35 County Road 150 Georgetown, Williamson County, Texas 78626

Dear Mr. Aguayo:

We are pleased to provide WGA Consulting Engineers with a Geologic Assessment for the above referenced property. ECS' services were conducted in accordance with the services outlined in ECS Proposal 51-3767 dated and authorized on June 16, 2022.

ECS did not observe recharge features on the site. If there are questions regarding this report, or a need for further information, please contact the undersigned at (512) 837-8005.

Respectfully submitted,

Roger S. Willis, M.S.
Senior Environmental Project Manager

Craig Hiatt, M.S.
Director of Environmental Services

Stephen Krogh, P.G. 3387
Senior Environmental Project Manager

STATE OF TEXAS
STEPHEN J. KROGH
GEOLOGY
3387
LICENSED
PROFESSIONAL GEOSCIENTIST

Electronic Seal approved by Stephen Krogh, P.G. on July 6, 2022

GEOLOGIC ASSESSMENT FOR DEVELOPMENT OVER THE EDWARDS AQUIFER

Georgetown Industrial Phase I Parcels
35 CR 150
Georgetown, Williamson County, Texas

TABLE OF CONTENTS

1.0 Introduction

The geologic assessment provided here, as part of the applicant's plan, addresses the required items as cited in Title 30 of the Texas Administrative Code (TAC), Part 1, Chapter 213, Subchapter A, Rule 213.5, relating to development over the Edwards Aquifer. This report identifies observed potential pathways for contaminant movement into the underlying Edwards Aquifer as required by the Texas Commission on Environmental Quality (TCEQ), as well as City of Georgetown Unified Development Code Section 11.07.

The subject property is comprised of approximately 55.22-acres of land identified by the Williamson County Central Appraisal District as parcel R051398 and portions of R038947, R052754, R446034, and R573711, located at 35 County Road 150 in Georgetown, Williamson County, Texas (Figures 1-3). The subject property is largely located over the Edwards Aquifer Recharge Zone (Figure 4).

The purpose of this Geologic Assessment is to fulfill the requirements for the applicant's plan for site improvements on the property. This report will describe surficial geologic units and identify the locations and extent of significant features that may impact the underlying Edwards Aquifer recharge zone.

2.0 Soil Units

According to the United States Department of Agriculture (USDA) Soil Survey of Williamson County, Texas, there are six (6) soil units mapped on the site (Figure 5). The soils on site consists of Austin silty clay, 1 to 3 percent slopes (AsB), Heiden extremely stony clay, 3 to 12 percent slopes (HesE), Houston Black clay, 1 to 3 percent slopes (HoB), Krum silty clay 0 to 1 percent slopes (KrA), Krum silty clay, 1 to 3 percent slopes (KrB), and Oakella silty clay loam, 0 to 2 percent slopes, frequently flooded.

Austin silty clay, 1 to 3 percent slopes (AsB), is formed on ridges from residuum weathered from chalk (USDA, 2022). The Hydrologic Soil Group is listed as D, and the soil is well drained. Flooding or ponding is reported as "none." The depth to a restrictive layer is reported to be 22 to 39 inches to paralithic bedrock, and the available water capacity is listed as low.

Heiden extremely stony clay, 3 to 12 percent slopes (HesE), is formed on ridges from Clayey residuum weathered from clayey shale of eagleford shale or taylor marl (USDA, 2022). The Hydrologic Soil Group is listed as D, and the soil is well drained. Flooding or ponding is reported as “none.” The depth to a restrictive layer is reported to be more than 80 inches, and the available water capacity is listed as high.

Houston Black clay, 1 to 3 percent slopes (HoB), is formed on ridges from Clayey residuum weathered from calcerous mudstone of upped cretaceous age(USDA, 2022). The Hydrologic Soil Group is listed as D, and the soil is moderately well drained. Flooding or ponding is reported as “none.” The depth to a restrictive layer is reported to be more than 80 inches, and the available water capacity is listed as high.

Krum silty clay 0 to 1 percent slopes (KrA), is formed in stream terraces from Clayey alluvium of Pleistocene age derived from mixed sources (USDA, 2022). The Hydrologic Soil Group is listed as C, and the soil is well drained. Flooding or ponding is reported as “none.” The depth to a restrictive layer is reported to be more than 80 inches, and the available water capacity is listed as moderate.

Krum silty clay, 1 to 3 percent slopes (KrB), is formed in stream terraces from Clayey alluvium of Pleistocene age derived from mixed sources (USDA, 2022). The Hydrologic Soil Group is listed as C, and the soil is well drained. Flooding or ponding is reported as “none.” The depth to a restrictive layer is reported to be more than 80 inches, and the available water capacity is listed as moderate.

Oakella silty clay loam, 0 to 2 percent slopes, frequently flooded, is formed in flood plains from Loamy alluvium derived from limestone (USDA, 2022). The Hydrologic Soil Group is listed as B, and the soil is well drained. Flooding is reported as “Frequent/None,” ponding is reported as “none.” The depth to a restrictive layer is reported to be more than 80 inches, and the available water capacity is listed as moderate.

3.0 Regional Geology

Ranging from north to south, two primary physiographic provinces are present in Williamson County: the Great Plain and the Gulf Coastal Plain. The Gulf Coastal Plain is comprised mainly of Blackland prairie.

The Great Plain is comprised chiefly of limestone plains, which merges with the Edwards Plateau in the vicinity of the Colorado River.

Groundwater recharge and flow are controlled by faulted Edwards Aquifer and adjacent strata. Water enters the aquifer by means of solution features controlled by faults, fractures and solution conduits. Solution features are created by the dissolution of limestone primarily from rainwater and groundwater. Deformation of the Balcones fault system controls both the large- and small-scale flow barriers and pathways present in the Edwards Aquifer.

4.0 Site Geology

Geological information pertaining to the area was obtained from the Geologic Atlas of Texas, Austin Sheet, published by University of Texas at Austin, Bureau of Economic Geology (BEG), 1997. The subject property is situated on Terrace deposits (Qt), and Alluvium (Qal) (Figure 6).

BEG describes Qt as “Sand, silt, clay, and gravel in various proportions, with gravel more predominant in older, higher terrace deposits. Locally indurated with calcium carbonate (caliche) in terraces along streams. Along Colorado River clasts mostly limestone, chert, quartz, and various igneous and metamorphic rocks from Llano region and Edwards Plateau. Includes point bar, natural levee, stream channel deposits along valley walls; probably in large part correlatives of Deweyville, Beaumont, Lissie, and Willis deposits. In upland regions (Rolling Plains, Edwards Plateau, etc.) unit includes fluvial terrace deposits, undivided. Light-brown, reddish-brown, gray, or yellowish-brown, gravelly quartz and lithic sand and silt to sandy gravel (Moore and Wermund, 1993). Deposits become increasingly fine grained on Coastal and Nueces Plains. Locally, calcium carbonate-cemented quartz sand, silt, clay, and gravel intermixed and interbedded. Low terraces of major rivers are capped by 2-4 m of clayey sand and silt. Sandy gravel on higher terraces varies somewhat in composition from river to river. Gravel commonly is rounded to angular limestone and chert pebbles and cobbles, some boulders, sparse igneous pebbles along Brazos River in places. In Bastrop Co., a deposit 27 m above Colorado River contains the Lava Creek B (Pearlette O) volcanic ash (age 0.6 Ma). Along the Frio, Leona, and Sabinal Rivers east of Uvalde, gravel is chiefly basalt and pyclastic clasts, locally cemented by iron oxide. Gravel along the Rio Grande is subrounded clasts of locally derived limestone and chert and rounded clasts of basalt, volcanic porphyry, quartzite, milky quartz, and banded chalcedony derived from the west.”

Qal is described as “alluvium and low terrace deposits along streams, sand, silt, clay, and gravel. Thickness variable. The unit appears on Geologic Map of Texas on the lagoon side of barrier islands where they represent lagoon and wind-tidal-flat sand and clay. These deposits of clay and silty, clayey fine to v. fine quartz sand and shell sand accumulate on alternately dry and flooded barren flats 0.3 m below to 1 m above mean sea level. Mapped areas include active eolian sand dunes on the landward side of barrier islands."

Obvious signs of faulting were not mapped or observed on the subject property.

5.0 Site Hydrology

Based upon interpretation of the United States Geological Survey 7.5 Minute Series topographic quadrangle map, Georgetown, Texas Quadrangle (2019), and the onsite reconnaissance, the estimated regional shallow groundwater flow direction is southwesterly. It should be noted that shallow groundwater flow direction is estimated based on a review of published maps, surface topography, and site reconnaissance. Local conditions that may influence the subsurface hydrology would be local topography (hills and valleys), geologic anomalies, utilities, and nearby wells or sumps.

Seeps or springs were not observed on the subject property.

5.1 Surface Water Hydrology

Site drainage appears to consist of overland sheet flow from the northeast to the southwest. A stream was observed in the north portion of the subject property. The stream flows from the east portion of the subject property southwest before flowing into a tributary of Dry Berry Creek, off-site. Field observations and analysis are supported from the Georgetown, Texas (USGS, 2019). We did not observe groundwater seeps or discharges of any type from bedrock observed on the subject site.

6.0 Site Investigation

The site reconnaissance was performed on June, 21, 2022**.** The site investigation was performed by traversing the subject property in meandering transects, spaced 10 to 15 meters apart. Photographs were taken to document any features observed during the reconnaissance.

The subject property is currently partially developed with two commercial buildings and a pole barn in the east portion, the remainder of the subject property is undeveloped. The unimproved portions of subject property is vegetated with native and naturalized grasses, herbs, forbs, shrubs and trees such as mesquite (*Prosopis glandulosa*), Ashe juniper (*Juniperus ashei*), Brazilian bluewood (*Condalia hookeri*), hackberry (*Celtis occidentalis*), cedar elm (*Ulmus crassifolia*), Bermudagrass (*Cynodon dactylon*), perennial reyegrass (*Lolium perenne*), Southern dewberry (*Rubus trivialis*), poison ivy (*Toxicodendron radicans*), curly dock (*Rumex crispus*), ironweed (*Vernonia fasciculata*), yaupon (*Ilex vomitoria*), common sunflower (Helianthus annuus), and horsenettle (*Solanum carolinense*). ECS did not observe potable water wells or septic systems or other manmade systems. Other potential natural recharge features such as caves, sinkholes, closed depressions, solution cavities, fractured rock outcrops, faults or lineaments were not observed on the subject property. Additionally, seeps or springs were not observed on the subject property.

7.0 Summary

The subject property is comprised of approximately 55.22-acres of land identified by the Williamson County Central Appraisal District as parcel R051398 and portions of R038947, R052754, R446034, and R573711, located at 35 County Road 150 in Georgetown, Williamson County, Texas (Figures 1-3). The subject property is largely located over the Edwards Aquifer Recharge Zone.

Karst features were not identified on the site. No caves or cavities were observed on the subject property at the time of the site reconnaissance with the potential for contaminant movement into the Edwards Aquifer. Additionally, seeps or springs were not observed on the subject property.

It appears that the property drains to the southwest**.** Improved drainage features were not observed on the subject property.

8.0 References

(BEG) The University of Texas at Austin Bureau of Economic Geology, Geologic Map of Texas, Austin Sheet, 1997.

(USDA) United States Department of Agriculture (USDA) Custom Soil Survey of Williamson County, 2022.

(USGS) United States Geologic Survey (USGS), 7.5- Minute Topographic Quadrangle, Georgetown, Texas. 2019.

ATTACHMENTS

FIGURES

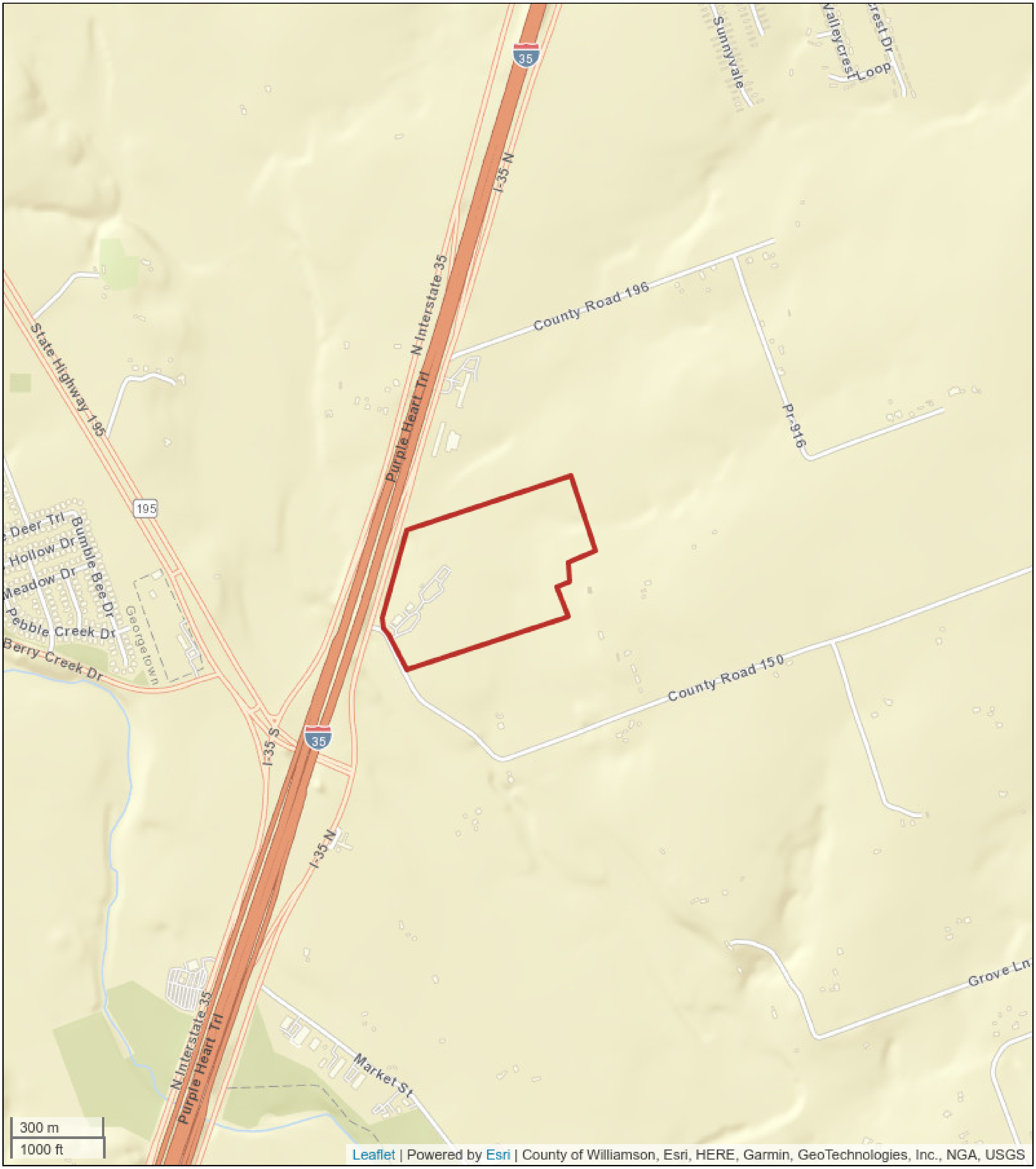


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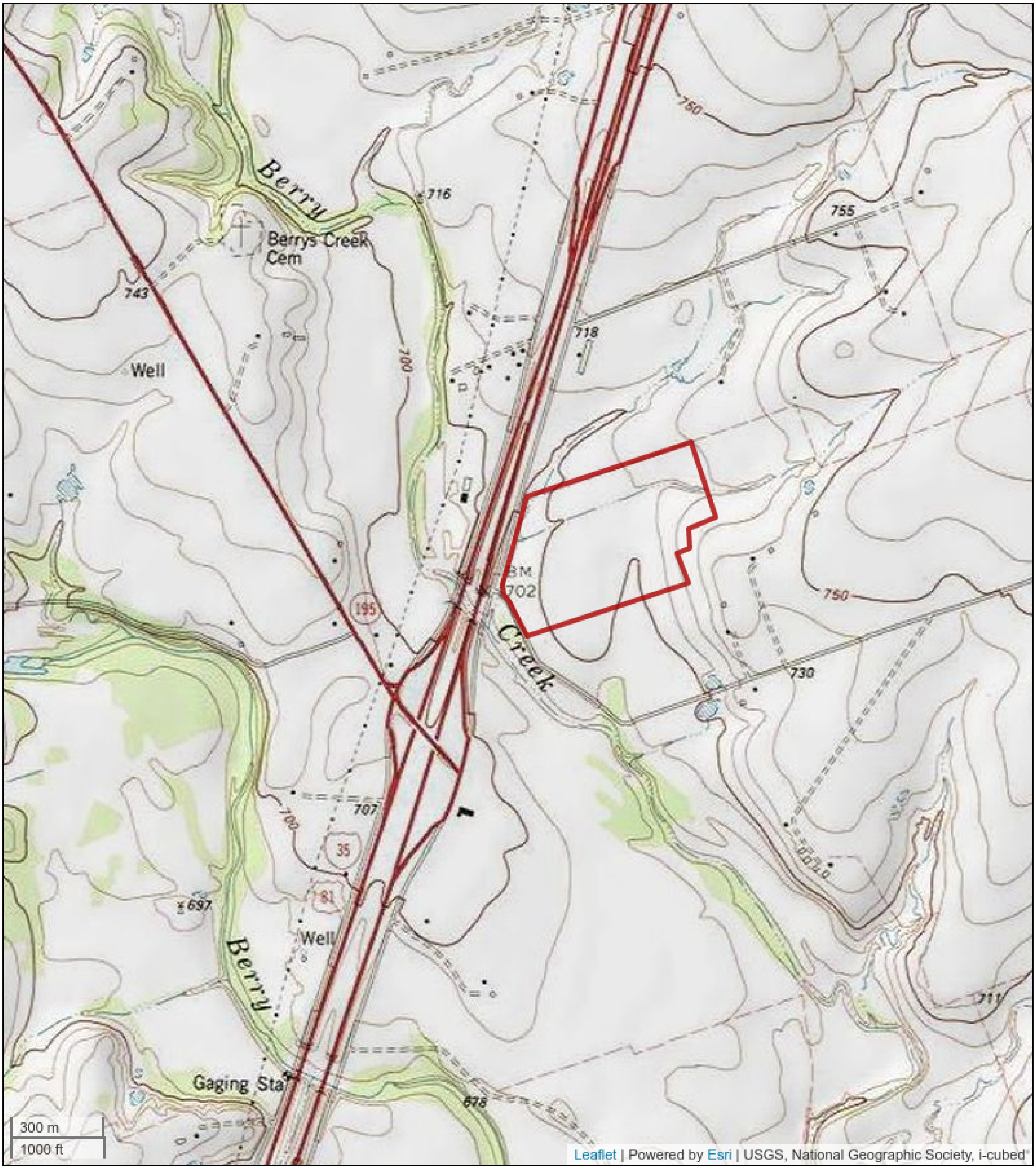
Figure 1- Project Location Map

Georgetown Phase I Parcels
35 Country Road 150
Georgetown, Texas, 78626
ECS Project 51:2964



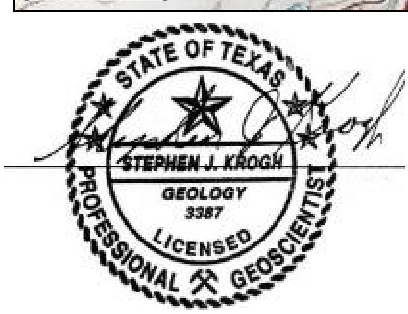


Figure 2- USGS Topographic Map

Georgetown, Texas Quadrangle 2019

Georgetown Phase I Parcels

35 Country Road 150

Georgetown, Texas, 78626

ECS Project 51:2964

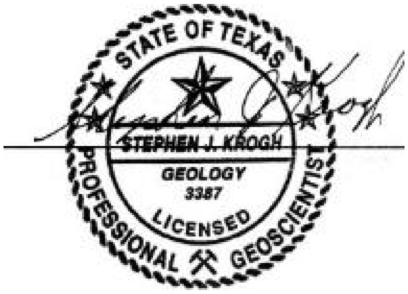


Figure 3 - Subject Property Map

Georgetown Phase I Parcels

35 Country Road 150

Georgetown, Texas, 78626

ECS Project 51:2964

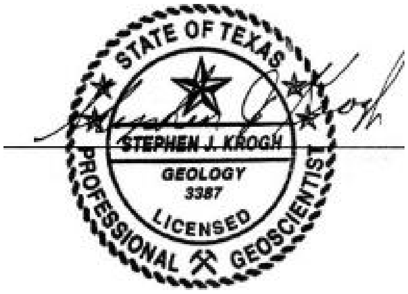


Figure 4 - Edwards Aquifer Recharge Zone Map

Georgetown Phase I Parcels
35 Country Road 150
Georgetown, Texas, 78626
ECS Project 51:2964

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Figure 5 - NRCS Soils Map

Georgetown Phase I Parcels

35 Country Road 150

Georgetown, Texas, 78626

ECS Project 51:2964

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Figure 6 - Geologic Map

Georgetown Phase I Parcels
35 Country Road 150
Georgetown, Texas, 78626
ECS Project 51:2964

APPENDIX

Completed Form TCEQ-0585

Geologic Assessment

Texas Commission on Environmental Quality

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

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

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

Signature

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

Print Name of Geologist: Stephen Krogh

Telephone: 512-837-8005

Date: July 6 2022

Fax: 512-837-8221

Representing: ECS Southwest, LLP, PG 3387 (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:

Stephen J. Krogh

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Regulated Entity Name: Georgetown Phase I Parcels

Project Information

1. Date(s) Geologic Assessment was performed: June 21, 2022
2. Type of Project:

   ☒ WPAP
   ☐ SCS
   ☐ AST
   ☐ UST

3. Location of Project:

   ☒ Recharge Zone
   ☐ Transition Zone
   ☐ Contributing Zone within the Transition Zone

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

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

Table 1 - Soil Units, Infiltration Characteristics and Thickness

Soil Name	Group*	Thickness(feet)
See Attached Table		

** 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" = 300'
   Site Geologic Map Scale: 1" = 300'
   Site Soils Map Scale (if more than 1 soil type): 1" = 400'

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 0 (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply.)
   ☐ The wells are not in use and have been properly abandoned.
   ☐ The wells are not in use and will be properly abandoned.
   ☐ The wells are in use and comply with 16 TAC Chapter 76.
☒ There are no wells or test holes of any kind known to exist on the project site.

Administrative Information

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

GEOLOGIC ASSESSMENT TABLE						PROJECT NAME:														
LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	>40	<1.6	>1.6	
None																				

* DATUM:___________________

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

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

12 TOPOGRAPHY
Hillslope

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.

____ Date 7/6/2022

Sheet ___1___ of ___1___

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

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Georgetown Phase I GA - Soil Units

Soil Series Unit Name	Group	Thickness (ft)
Austin silty clay, 1 to 3 percent slopes	D	~2-~3.5
Heiden extremely stony clay, 3 to 12 percent slopes	D	>6.5
Houston Black clay, 1 to 3 percent slopes	D	>6.5
Krum silty clay, 0 to 1 percent slopes	C	>6.5
Krum silty clay, 1 to 3 percent slopes	C	>6.5
Oakalla silty clay loam, 0 to 2 percent slopes, frequently flooded	B	>6.5

Stratigraphic Column

Stratigraphic Column
Georgetown Phase I GA Parcels
35 County Road 150
Georgetown, Williamson County, Texas

Formation	Thickness (ft)	Description
Alluvium (Qal)	Variable	Sand, Silt, Clay and gravel.
Terrace Deposits (Qt)	~10 - ~20	Sand, silt, clay, and some gravel. Includes terrace alluvium, local drainageway alluvium, and slope-wash alluvium

Narrative Description of Site-Specific Geology

NARRATIVE DESCRIPTION OF SITE-SPECIFIC GEOLOGY

Ranging from north to south, two primary physiographic provinces are present in Williamson County: the Great Plain and the Gulf Coastal Plain. The Gulf Coastal Plain is comprised mainly of Blackland prairie. The Great Plain is comprised chiefly of limestone plains, which merges with the Edwards Plateau in the vicinity of the Colorado River.

Groundwater recharge and flow are controlled by faulted Edwards Aquifer and adjacent strata. Water enters the aquifer by means of solution features controlled by faults, fractures and solution conduits. Solution features are created by the dissolution of limestone primarily from rainwater and groundwater. Deformation of the Balcones fault system controls both the large- and small-scale flow barriers and pathways present in the Edwards Aquifer.

Geological information pertaining to the area was obtained from the Geologic Atlas of Texas, Austin Sheet, published by University of Texas at Austin, Bureau of Economic Geology (BEG), 1997. The subject property is situated on Terrace deposits (Qt) and Alluvium (Qal) (Figure 6).

BEG describes Qt as "Sand, silt, clay, and gravel in various proportions, with gravel more predominant in older, higher terrace deposits. Locally indurated with calcium carbonate (caliche) in terraces along streams. Along Colorado River clasts mostly limestone, chert, quartz, and various igneous and metamorphic rocks from Llano region and Edwards Plateau. Includes point bar, natural levee, stream channel deposits along valley walls; probably in large part correlatives of Deweyville, Beaumont, Lissie, and Willis deposits. In upland regions (Rolling Plains, Edwards Plateau, etc.) unit includes fluvial terrace deposits, undivided. Light-brown, reddish-brown, gray, or yellowish-brown, gravelly quartz and lithic sand and silt to sandy gravel (Moore and Wermund, 1993). Deposits become increasingly fine grained on Coastal and Nueces Plains. Locally, calcium carbonate-cemented quartz sand, silt, clay, and gravel intermixed and interbedded. Low terraces of major rivers are capped by 2-4 m of clayey sand and silt. Sandy gravel on higher terraces varies somewhat in composition from river to river. Gravel commonly is rounded to angular limestone and chert pebbles and cobbles, some boulders, sparse igneous pebbles along Brazos river in places. In Bastrop Co., a deposit 27 m above Colorado River contains the Lava Creek B (Pearlette O) volcanic ash (age 0.6 Ma). Along the Frio, Leona, and Sabinal Rivers east of Uvalde, gravel is chiefly basalt and pyclastic clasts, locally cemented by iron oxide. Gravel along the Rio

Grande is subrounded clasts of locally derived limestone and chert and rounded clasts of basalt, volcanic porphyry, quartzite, milky quartz, and banded chalcedony derived from the west."

Qal is described as "alluvium and low terrace deposits along streams, sand, silt, clay, and gravel. Thickness variable. The unit appears on Geologic Map of Texas on the lagoon side of barrier islands where they represent lagoon and wind-tidal-flat sand and clay. These deposits of clay and silty, clayey fine to v. fine quartz sand and shell sand accumulate on alternately dry and flooded barren flats 0.3 m below to 1 m above mean sea level. Mapped areas include active eolian sand dunes on the landward side of barrier islands."

Obvious signs of faulting were not mapped or observed on the subject property. Additionally, seeps or springs were not observed on the subject property.

Photo Documentation

1 - Pastureland located outside the current improvements

2 - Improved area in east portion

3 - Current improvements in east portion

4 - Along west property boundary

5 - Typical vegetation in the pasture area

6 - Excavated depression

7 - Along west property boundary

8 - Pastureland

9 - Pastureland

10 - West portion of the subject property

11 - Edge of clearing in west portion

12 - Typical Vegetation in west portion

13 - Typical vegetation along access driveway

14 - Typical vegetation in west portion

15 - Typical vegetation in east portion

16 - Clearing in east portion

17 - Typical vegetation

18 - Cattle Trail

19 - Vegetated area in east portion

20 - Streambed in east portion

21 - Clearing in east portion

22 - Geotech boring tailings

23 - Vegetation in northeast portion

24 - Streambed

25 - Streambed in north portion

26 - Vegetation along stream bed

27 - Typical stream bed

28 - Cleared area north of the improved area

29 - Animal Burrow

30 - Streambed

31 - Cleared area north of the improved area

32 - Burrow over culvert

33 - Streambed west of culvert

34 - Access Road

35 - Streambed

36 - Cleared area north of the stream

37 - Along west property boundary

38 - Stream bed outfall

39 - Area east of stream outfall

40 - Improved area

41 - Vegetation north of the improvements

42 - Stream outfall

43 - Along west property boundary

44 - Improved area

45 - Improved area

46 - Pastureland

ATTACHMENTS

Soil Survey

United States Department of Agriculture

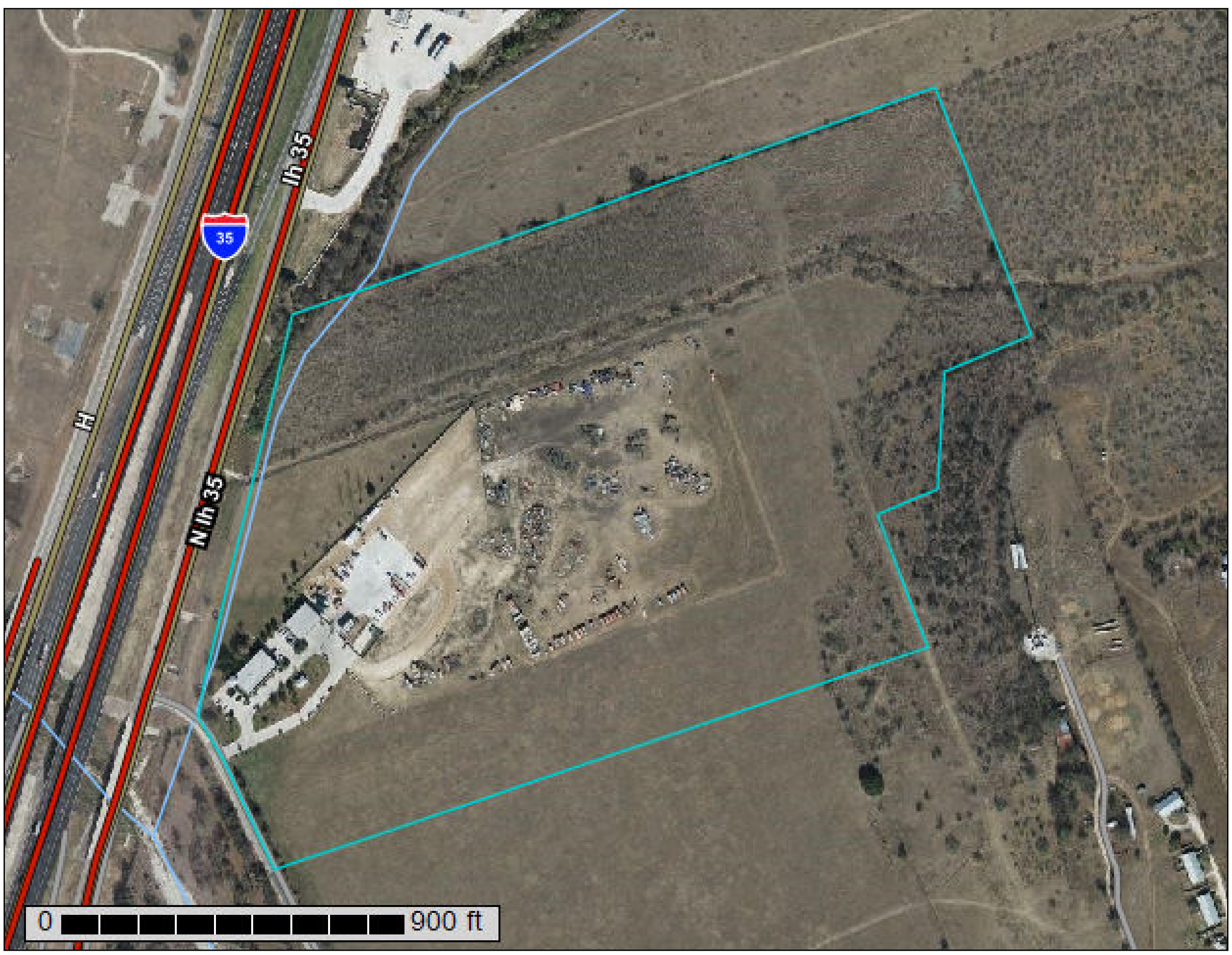
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Williamson County, Texas



June 17, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

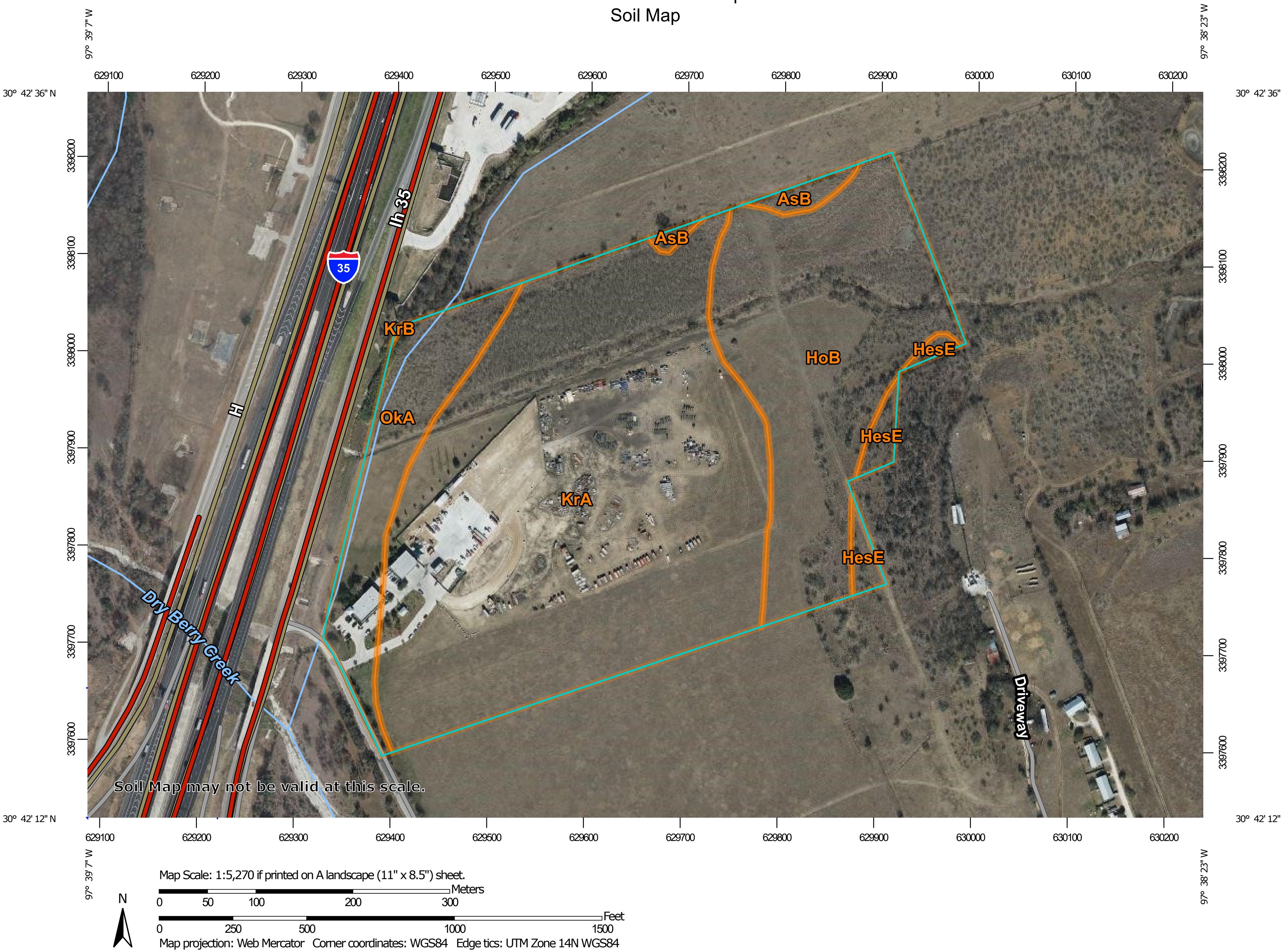
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


97° 39' 7" W
97° 38' 23" W
30° 42' 36" N
30° 42' 12" N
629100
629200
629300
629400
629500
629600
629700
629800
629900
630000
630100
630200
3398200
3398100
3398000
3397900
3397800
3397700
3397600
AsB
AsB
KrB
HoB
HesE
HesE
HesE
OkA
KrA
Ih 35
35
H
Dry Berry Creek
Driveway
Soil Map may not be valid at this scale.
N
Map Scale: 1:5,270 if printed on A landscape (11" x 8.5") sheet.
Meters
0 50 100 200 300
Feet
0 250 500 1000 1500
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Williamson County, Texas
Survey Area Data: Version 22, Sep 10, 2021

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

Date(s) aerial images were photographed: Nov 17, 2020—Dec 4, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AsB	Austin silty clay, 1 to 3 percent slopes	0.7	1.2%
HesE	Heiden extremely stony clay, 3 to 12 percent slopes	1.2	1.9%
HoB	Houston Black clay, 1 to 3 percent slopes	16.3	26.5%
KrA	Krum silty clay, 0 to 1 percent slopes	37.3	60.5%
KrB	Krum silty clay, 1 to 3 percent slopes	0.0	0.0%
OkA	Oakalla silty clay loam, 0 to 2 percent slopes, frequently flooded	6.1	9.9%
Totals for Area of Interest		**61.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Williamson County, Texas

AsB—Austin silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2vtgj
Elevation: 440 to 810 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 228 to 293 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Austin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Austin

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from chalk

Typical profile

Ap - 0 to 16 inches: silty clay
Bw - 16 to 22 inches: silty clay
Bk - 22 to 29 inches: silty clay
Cr - 29 to 57 inches: bedrock

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: 22 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 85 percent
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.1 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

Minor Components

Houston black

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

HesE—Heiden extremely stony clay, 3 to 12 percent slopes

Map Unit Setting

National map unit symbol: djq8
Elevation: 400 to 1,000 feet
Mean annual precipitation: 28 to 42 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 225 to 275 days
Farmland classification: Not prime farmland

Map Unit Composition

Heiden and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Heiden

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from clayey shale of eagleford shale or taylor marl

Typical profile

H1 - 0 to 8 inches: very stony clay
H2 - 8 to 60 inches: clay

Properties and qualities

Slope: 3 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 12.0
Available water supply, 0 to 60 inches: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

HoB—Houston Black clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2ssh0
Elevation: 270 to 1,040 feet
Mean annual precipitation: 33 to 43 inches
Mean annual air temperature: 62 to 63 degrees F
Frost-free period: 217 to 244 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Houston black and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Houston Black

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Clayey residuum weathered from calcareous mudstone of upper cretaceous age

Typical profile

Ap - 0 to 6 inches: clay
Bkss - 6 to 70 inches: clay
BCkss - 70 to 80 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained

Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Minor Components

Heiden

Percent of map unit: 15 percent
Landform: Plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Linear gilgai
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

Fairlie

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R086AY011TX - Southern Blackland
Hydric soil rating: No

KrA—Krum silty clay, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: djqd
Elevation: 600 to 1,300 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 230 to 250 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Krum and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Krum

Setting

Landform: Stream terraces, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Clayey alluvium of pleistocene age derived from mixed sources

Typical profile

H1 - 0 to 6 inches: silty clay
H2 - 6 to 44 inches: silty clay
H3 - 44 to 72 inches: silty clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 50 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

KrB—Krum silty clay, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: djqf
Elevation: 600 to 1,300 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 230 to 250 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Krum and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Krum

Setting

Landform: Stream terraces, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Clayey alluvium of pleistocene age derived from mixed sources

Typical profile

H1 - 0 to 6 inches: silty clay
H2 - 6 to 44 inches: silty clay
H3 - 44 to 72 inches: silty clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 50 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R086AY007TX - Southern Clay Loam
Hydric soil rating: No

OkA—Oakalla silty clay loam, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2t26p
Elevation: 370 to 1,450 feet
Mean annual precipitation: 24 to 35 inches
Mean annual air temperature: 64 to 69 degrees F
Frost-free period: 210 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Oakalla and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oakalla

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium derived from limestone

Typical profile

Ap - 0 to 8 inches: silty clay loam
Ak - 8 to 23 inches: silty clay loam
Bk1 - 23 to 53 inches: silty clay loam
Bk2 - 53 to 80 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Calcium carbonate, maximum content: 60 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B
Ecological site: R081CY561TX - Loamy Bottomland 29-35 PZ
Hydric soil rating: No

Minor Components

Oakalla, occasionally flooded

Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R081CY561TX - Loamy Bottomland 29-35 PZ
Hydric soil rating: No

Dev

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Tread

Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R081CY561TX - Loamy Bottomland 29-35 PZ
Hydric soil rating: No

Krum

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R081CY357TX - Clay Loam 29-35 PZ
Hydric soil rating: No

Unnamed, hydric

Percent of map unit: 1 percent
Landform: Flood-plain steps, depressions
Landform position (three-dimensional): Tread
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Rating by Map Unit (Georgetown Phase I GA)

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

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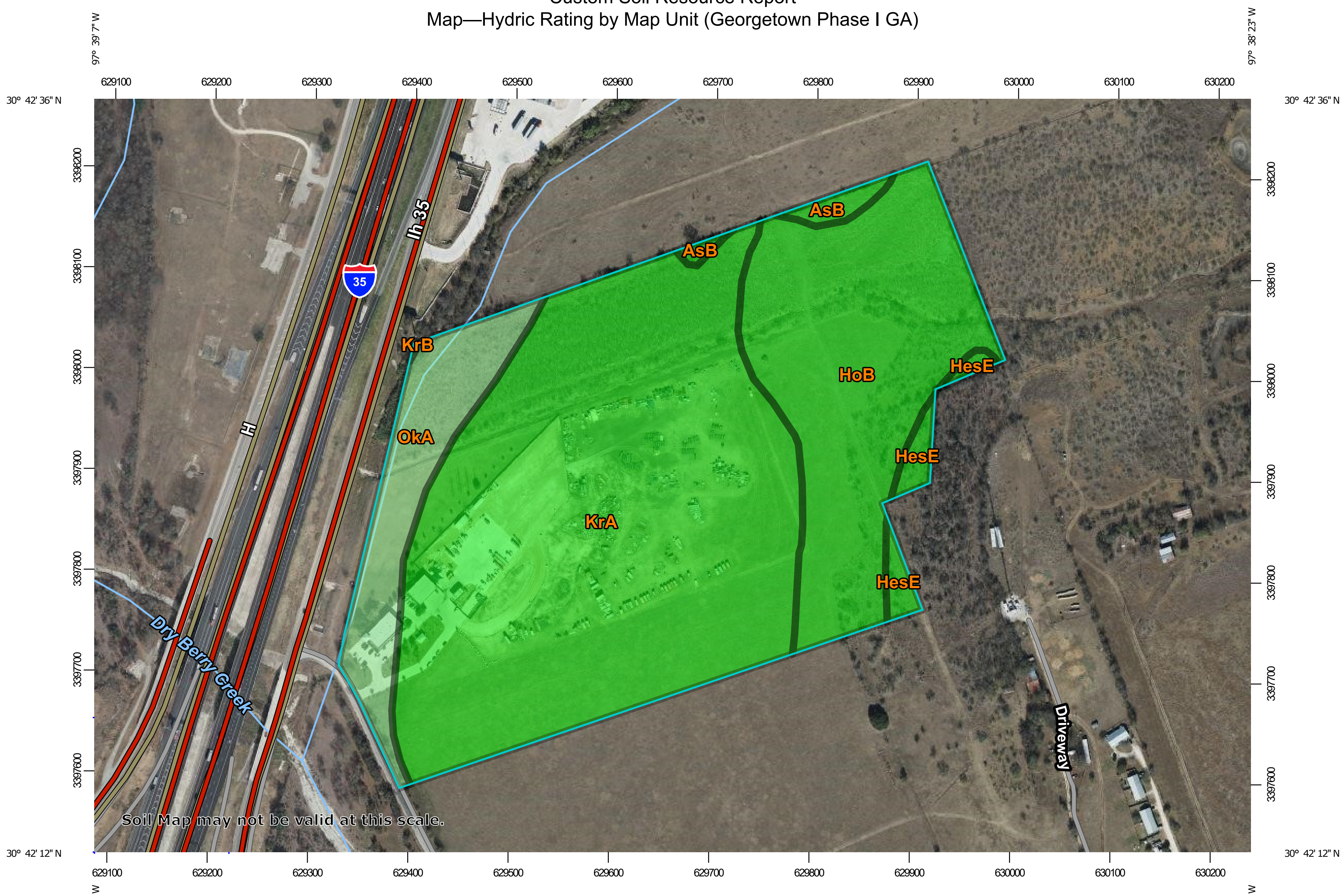
Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Map—Hydric Rating by Map Unit (Georgetown Phase I GA)



Map Scale: 1:5,270 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 50, 100, 200, 300

Feet: 0, 250, 500, 1000, 1500

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

Hydric (100%)

Hydric (66 to 99%)

Hydric (33 to 65%)

Hydric (1 to 32%)

Not Hydric (0%)

Not rated or not available

Soil Rating Lines

Hydric (100%)

Hydric (66 to 99%)

Hydric (33 to 65%)

Hydric (1 to 32%)

Not Hydric (0%)

Not rated or not available

Soil Rating Points

Hydric (100%)

Hydric (66 to 99%)

Hydric (33 to 65%)

Hydric (1 to 32%)

Not Hydric (0%)

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Williamson County, Texas
Survey Area Data: Version 22, Sep 10, 2021

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

Date(s) aerial images were photographed: Nov 17, 2020—Dec 4, 2020

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

Table—Hydric Rating by Map Unit (Georgetown Phase I GA)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AsB	Austin silty clay, 1 to 3 percent slopes	0	0.7	1.2%
HesE	Heiden extremely stony clay, 3 to 12 percent slopes	0	1.2	1.9%
HoB	Houston Black clay, 1 to 3 percent slopes	0	16.3	26.5%
KrA	Krum silty clay, 0 to 1 percent slopes	0	37.3	60.5%
KrB	Krum silty clay, 1 to 3 percent slopes	0	0.0	0.0%
OkA	Oakalla silty clay loam, 0 to 2 percent slopes, frequently flooded	1	6.1	9.9%
Totals for Area of Interest			**61.7**	**100.0%**

Rating Options—Hydric Rating by Map Unit (Georgetown Phase I GA)

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

References

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American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

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Federal Register. September 18, 2002. Hydric soils of the United States.

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United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

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SECTION D

Water Pollution Prevention Plan (WPAP) TCEQ-0584

WGA

CONSULTING ENGINEERS

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: David Aguayo

Date: 03/02/2023

Signature of Customer/Agent:

David Aguayo

Regulated Entity Name: Dry Creek

Regulated Entity Information

1. The type of project is:

   ☐ Residential: Number of Lots:_____
   ☐ Residential: Number of Living Unit Equivalents:_____
   ☐ Commercial
   ☒ Industrial
   ☐ Other:_____

2. Total site acreage (size of property): 63.888 AC

3. Estimated projected population: N/A

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	694,469.32	÷ 43,560 =	15.94
Parking	980,248.56	÷ 43,560 =	22.50
Other paved surfaces	243,054.12	÷ 43,560 =	5.58
Total Impervious Cover	1,917,772.00	÷ 43,560 =	44.02

Total Impervious Cover 44.02 **÷ Total Acreage** 63.888 **X 100 =** 68.90**% Impervious 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.

6. ☒ Only inert materials as defined by 30 TAC §330.2 will be used as fill material.

For Road Projects Only N/A

Complete questions 7 - 12 if this application is exclusively for a road project.

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.

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

   ☐ Concrete
   ☐ Asphaltic concrete pavement
   ☐ Other: _____

9. Length of Right of Way (R.O.W.): _____ feet.

   Width of R.O.W.: _____ feet.
   L x W = _____ Ft^2 ÷ 43,560 Ft^2/Acre = _____ acres.

10. Length of pavement area: _____ feet.

    Width of pavement area: _____ feet.
    L x W = _____ Ft^2 ÷ 43,560 Ft^2/Acre = _____ acres.
    Pavement area _____ acres ÷ R.O.W. area _____ acres x 100 = _____% impervious cover.

11. ☐ A rest stop will be included in this project.

    ☐ A rest stop will not be included in this project.

12. ☐ Maintenance and repair of existing roadways that do not require approval from the TCEQ Executive Director. Modifications to existing roadways such as widening roads/adding shoulders totaling more than one-half (1/2) the width of one (1) existing lane require prior approval from the TCEQ.

Stormwater to be generated by the Proposed Project

13. ☒ **Attachment B - Volume and Character of Stormwater**. A detailed description of the volume (quantity) and character (quality) of the stormwater runoff which is expected to occur from the proposed project is attached. The estimates of stormwater runoff quality and quantity are based on the area and type of impervious cover. Include the runoff coefficient of the site for both pre-construction and post-construction conditions.

Wastewater to be generated by the Proposed Project

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

_____% Domestic	_____Gallons/day
100 % Industrial	_____Gallons/day
_____% Commingled	_____Gallons/day
TOTAL gallons/day 21,458	

15. Wastewater will be disposed of by:

☐ On-Site Sewage Facility (OSSF/Septic Tank):

☐ **Attachment C - Suitability Letter from Authorized Agent**. An on-site sewage facility will be used to treat and dispose of the wastewater from this site. The appropriate licensing authority's (authorized agent) written approval is attached. It states that the land is suitable for the use of private sewage facilities and will meet or exceed the requirements for on-site sewage facilities as specified under 30 TAC Chapter 285 relating to On-site Sewage Facilities.

☐ Each lot in this project/development is at least one (1) acre (43,560 square feet) in size. The system will be designed by a licensed professional engineer or registered sanitarian and installed by a licensed installer in compliance with 30 TAC Chapter 285.

☒ Sewage Collection System (Sewer Lines):

☒ Private service laterals from the wastewater generating facilities will be connected to an existing SCS.(City of Georgetown to construct SCS to service site prior to construction of development)

☐ Private service laterals from the wastewater generating facilities will be connected to a proposed SCS.

☐ The SCS was previously submitted on_____.

☐ The SCS was submitted with this application.

☐ The SCS will be submitted at a later date. The owner is aware that the SCS may not be installed prior to Executive Director approval.

☒ The sewage collection system will convey the wastewater to the Berry Creek (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 Plan Requirements

Items 17 – 28 must be included on the Site Plan.

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

Site Plan Scale: 1" = 80 '.

18. 100-year floodplain boundaries:

☒ Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled.
☐ No part of the project site is located within the 100-year floodplain.
The 100-year floodplain boundaries are based on the following specific (including date of material) sources(s): _____

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. All 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.

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

21. Geologic 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.

24. ☒ Locations of major structural and nonstructural controls. These are the temporary and permanent best management practices.

25. ☐ Locations where soil stabilization practices are expected to occur.

26. ☒ Surface waters (including wetlands). (High water mark on roadside ditch)

    ☐ N/A

27. ☒ Locations where stormwater discharges to surface water or sensitive features are to occur.(Silting basin to be installed in order to precipitate suspended solids prior discharge to roadside ditch)

    ☐ There will be no discharges to surface water or sensitive features.

28. ☒ Legal boundaries of the site are shown.

Administrative Information

29. ☒ 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.

30. ☐ Any modification of this WPAP will require Executive Director approval, prior to construction, and may require submission of a revised application, with appropriate fees.

ATTACHMENT A

Factors affecting Water Quality

WGA

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ATTACHMENT A

Factors affecting Water Quality

Construction
The materials listed below are anticipated to be present on-site during construction and as such may present a potential pollutant source (This is not an all-inclusive list):

- Concrete/Masonry
- Metal studs, Metal reinforcing bars, etc.
- Tar
- Fertilizers
- Petroleum based products
- Cleaning solvents/Detergents
- Wood

Potential sources of pollution that may reasonably be expected to affect the quality of storm water discharges from the site during construction include:

- Soil erosion due to the clearing of the site
- Oil, grease, fuel and hydraulic fluid contamination from equipment and vehicle drippings;
- Hydrocarbons from asphalt paving operations;
- Miscellaneous trash and litter from construction workers and material wrappings;
- Concrete truck washout.

Material management practices will be utilized to reduce the risk of spills, or other accidental exposure of the materials listed above to storm water runoff, including the following:

1. An effort shall be made to store only enough product required to complete the work as so defined in the approved construction documents.
2. All materials stored on-site shall be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
3. Products should be kept in their original containers with the original manufacturer's label.
4. Manufactures' recommendations for proper use and disposal shall be followed.
5. Substances shall not be mixed with one another unless recommended by the manufacturer.
6. Whenever possible, all of a product shall be used before disposing of its respective container.
7. The site superintendent should inspect daily to ensure proper use and disposal of on-site materials.

Post-Construction
The materials listed below are anticipated to be present on-site after construction and as such may present a potential pollutant source (This is not an all-inclusive list):

- Trash and Debris (Litter)
- Discarded Food and Tobacco Products
- Potential sources of pollution that may reasonable be expected to affect the quality of storm
- Water discharges from the site after development includes:
- Oil, grease, fuel and hydraulic fluid contamination from vehicle drippings.
- Dirt and dust which may fall off vehicles, and
- Miscellaneous trash and litter.

ATTACHMENT B

Volume and Character of Stormwater

CONSULTING ENGINEERS

Attachment B

Volume and Character of Stormwater

Stormwater runoff generated from rooftops, parking, sidewalks, and landscapes areas will be of a typical commercial site nature and may contain small amounts of oil, grease, suspended solids, fertilizers, and pesticides. Existing BMPs, both temporary and permanent, have been designed on the basis of the Technical Guidance manual to treat the required volume and character of stormwater runoff to remove at least 80% of the increased TSS generated by the development.

The combined runoff coefficient post development is 0.80 for the commercial development in accordance with City of Georgetown Drainage Criteria Manual. Stormwater runoff generated in area A by the development flow into drainage inlets connected to the proposed private storm sewer system, the developed flows are then routed to the basins and the required volume is treated via expended/batch detention. Some portions of the parking lot, areas B, C, and D, flows are routed and treated through proposed vegetative filter strips. All stormwater from areas A-D will leave the site and enter Dry Berry Creek via outfall storm pipe, areas A-D are denoted as area S in the Drainage Impact Analysis.

Stormwater runoff generated in area E by the development flow into drainage inlets connected to the proposed private storm sewer system, the developed flows are then routed to the basins and the required volume is treated via expended/batch detention. All stormwater from area E will leave the site and enter the Williamson County Road 150 roadside ditch via outfall storm pipe.

The following is a summary of stormwater runoff quantities for the existing and proposed conditions for the development:

Existing Condition (Areas A1-A2):	**TC=39.60 min.; Q100 = 70.20 cfs ; CN = 0.74.41**
Proposed Condition (Area S):	**TC= 11.99 min.; Q100 = 446.50 cfs ; CN = 95.06**
Existing Condition (Areas A4-A6):	**TC=33.23 min.; Q100 = 147.7 cfs ; CN = 73.62**
Proposed Condition (Area E):	**TC= 10.00 min.; Q100 = 132.90 cfs ; CN = 93.47**

***Combined "CN" value**

Existing conditions are shown on Table 2.5 of the Drainage Impact Analysis; proposed conditions are shown on Table 2.6 of the same document provided at Section G.

ATTACHMENT C

Suitability Letter from Authorized Agent

Not applicable to this project

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ATTACHMENT D

Exception to the Required Geological Assessment

Not applicable to this project

WGA
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SITE PLAN

WGA

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SITE		SF
TYPE	AREA	AREA (SF)
INDUSTRIAL SITE AREA	49.27 acres	2,146,086.45 ft²
KEYSTONE SITE AREA	14.26 acres	621,011.71 ft²
	63.52 acres	2,767,098.16 ft²

BUILDING	
TYPE	AREA
CROSS DOCK	457,400 SF
FRONT LOAD	130,761 SF
REAR LOAD	64,053 SF
EXPANSION	6,560 SF
NEW SHOP BLDG	23,420 SF
TOTAL	682,195 SF

SITE COVERAGE	
TYPE	AREA
TOTAL SITE COVERAGE	24.65%
	30% OF INDUSTRIAL BUILDINGS / INDUSTRIAL SITE

PARKING	
TYPE	SPACES
KEYSTONE SURFACE PARKING	73
PUMP TRUCK PARKING 12X55	12
SEMI PARKING 12X70	10
SURFACE PARKING	506
TRAILER STORAGE 12X55	91

SITE INFORMATION	
TYPE	AREA
POND	57,272 SF
POND	135,155 SF
POND	29,587 SF
TOTAL	222,015 SF

CITY OF GEORGETOWN IMPERVIOUS REQUIREMENTS:
*OVER EDWARDS AQUIFER & LARGER THAN 5 ACRES:
Impervious Cover % = [0.70 × 5 acres] + [0.55 × (Total Acreage - 5 acres)] / Total Acreage × 100

Impervious Cover % = [0.70 × 5 acres] + [0.55 × (63.86 ACRES - 5 acres)] / 63.86 × 100 = ***56.17% IMPERVIOUS COVERAGE REQUIRED***

Impervious Coverage Waivers:
A. Approved Waivers-
1. Low Impact Site Design - 7% a.The Director shall increase the amount of permitted impervious cover by seven percent (7%) if the development provides low impact development site design features such as:
   v.Wet ponds; and
   vi.Using grassed filter strips and vegetated swales in place of traditional curb-and-gutter type drainage systems.
2. Parking Lot Design - 5% The Director shall increase the amount of permitted impervious cover by five percent (5%) if the development provides a parking lot design that breaks up the parking area into areas separated by planted or natural landscaping features. The applicant must provide an alternative parking plan as described in Section 9.02.050, and may be able to also receive a reduction of required off-street parking requirements if approved by the Director.
6. Landscaping in the Extraterritorial Jurisdiction - 7% The Director may consider an increase to the amount of permitted impervious cover by seven percent (7%) for development in the extraterritorial jurisdiction that shows compliance with the landscaping requirements of Section 8.04.

IMPERVIOUS COVERAGE REQUIRED = 56.17% + Waivers 1, 2, & 6 (not to exceed 70%) = 56.17% + 7% + 5% + 7% = *75.17% or 70% maximum*

PH I SITE AREA INCLUDING KEYSTONE : 2,767,098 SF
PERVIOUS AREA (KEYSTONE + INDUSTRIAL) = 849,326 SF = 30.6% IMPERVIOUS AREA = 1,917,772 SF = 69.3% OF SITE
*KEYSTONE PERVIOUS AREA IS APPROXIMATE

CITY OF GEORGETOWN, TX PARKING REQUIREMENTS
ALL OTHER INDUSTRIAL MANUFACTURING & WAREHOUSING 1 per 500 ft 2 GFA of indoor facility + 1 additional per 2,500 ft 2 indoor and outdoor storage area

ALL OTHER OFFICES & SERVICES
1/400 SF

BUILDING 1 *-220,780 SF TOTAL (22,078 SF OFFICE, 198,702 SF WH)* ***135 SPACES REQUIRED***

BUILDING 2 *-457,650 SF TOTAL (45,765 SF OFFICE, 411,885 SF WH)* ***280 SPACES REQUIRED***

BUILDING 3 *-130,928 SF TOTAL (13,093 SF OFFICE, 117,835 SF WH)* ***80 SPACES REQUIRED***

TOTAL PARKING REQUIRED - 495 SPACES

NEW SHOP BUILDING *-23,420 SF (2,900 SF OFFICE, 20,520 WH)* ***15 SPACES REQUIRED***

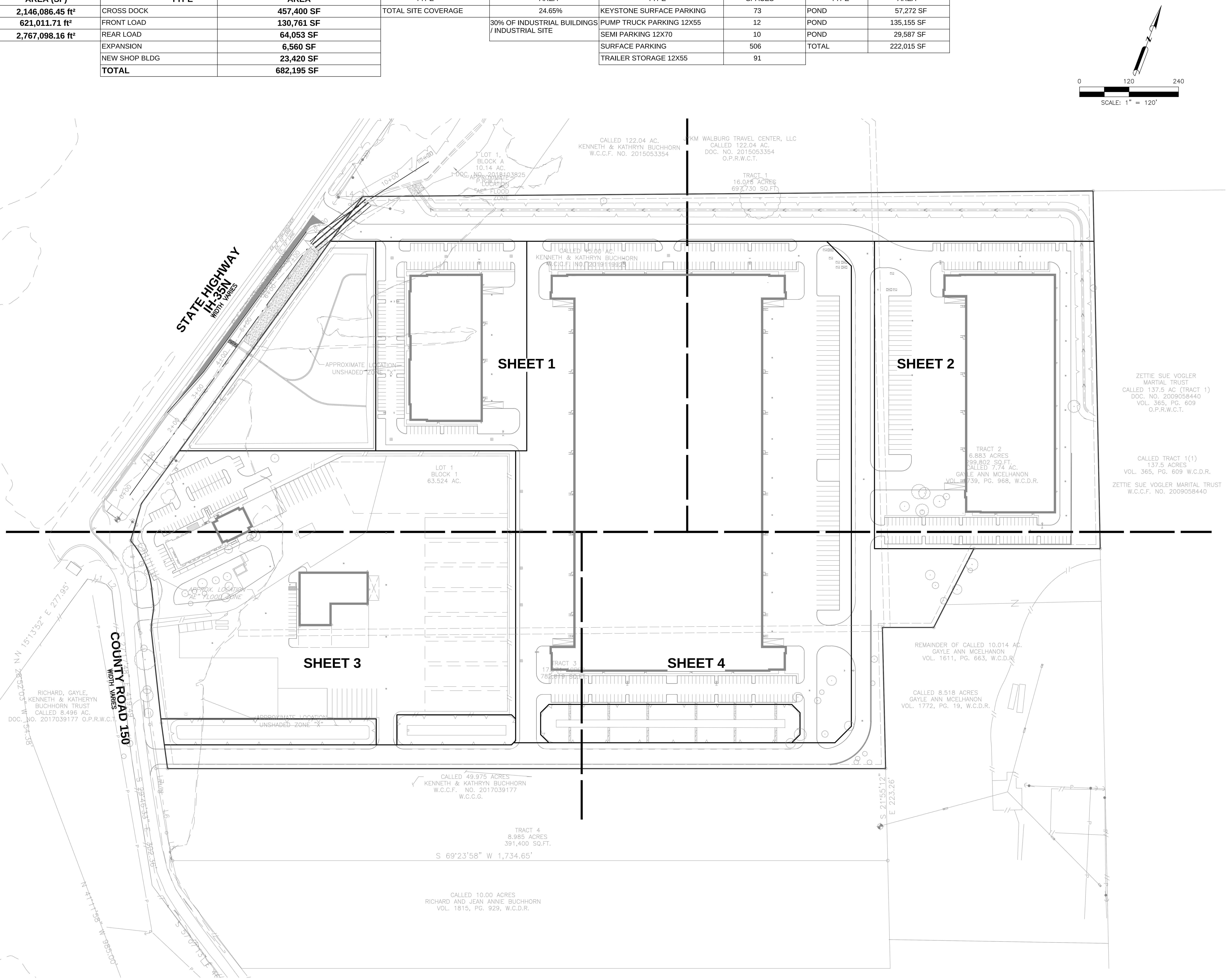
KEYSTONE OFFICE EXPANSION 6,560 SF
-14 SPACES REQUIRED

*CALCULATIONS BASED ON AN ASSUMPTION OF 10% OFFICE AND THE REMAINDER AS STORAGE OCCUPANCY.

LIGHTING: ALL EXTERIOR LIGHTING TO MEET OR EXCEED UDC REQUIREMENTS.

ROOFTOP EQUIPMENT: ALL ROOFTOP EQUIPMENT TO BE ADEQUATELY SCREENED FROM RIGHT-OF-WAYS AND ADJACENT PROPERTIES

DUMPSTER ENCLOSURES: ALL FUTURE DUMPSTER ENCLOSURES TO COMPLY WITH UDC SCREENING REQUIREMENTS.



BENCHMARKS:

TEMPORARY BENCHMARK "A"
ELEVATION - 693.93'
TEMPORARY BENCHMARK "A" IS A BOX CUT SET ON A HEADWALL ON THE EAST R.O.W. OF STATE HIGHWAY I-35 N, BEING APPROXIMATELY 100 FEET NORTHEAST OF THE INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

TEMPORARY BENCHMARK "B"
ELEVATION - 715.12'
TEMPORARY BENCHMARK "B" IS A BOX CUT SET ON A CONCRETE COLUMN FOR A GUY ANCHOR, BEING APPROXIMATELY 2,050 FEET EAST OF INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

FLOOD PLAIN NOTE:

THIS SUBJECT TRACT LIES WITHIN UNSHADED ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN (0.2% ANNUAL FLOODPLAIN CHANCE) AS DELINEATED ON THE FLOOD INSURANCE MAP FOR WILLIAMSON COUNTY, TEXAS AND INCORPORATED AREAS, MAP NO. 48491C0285F MAP REVISED DECEMBER 20, 2019.

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

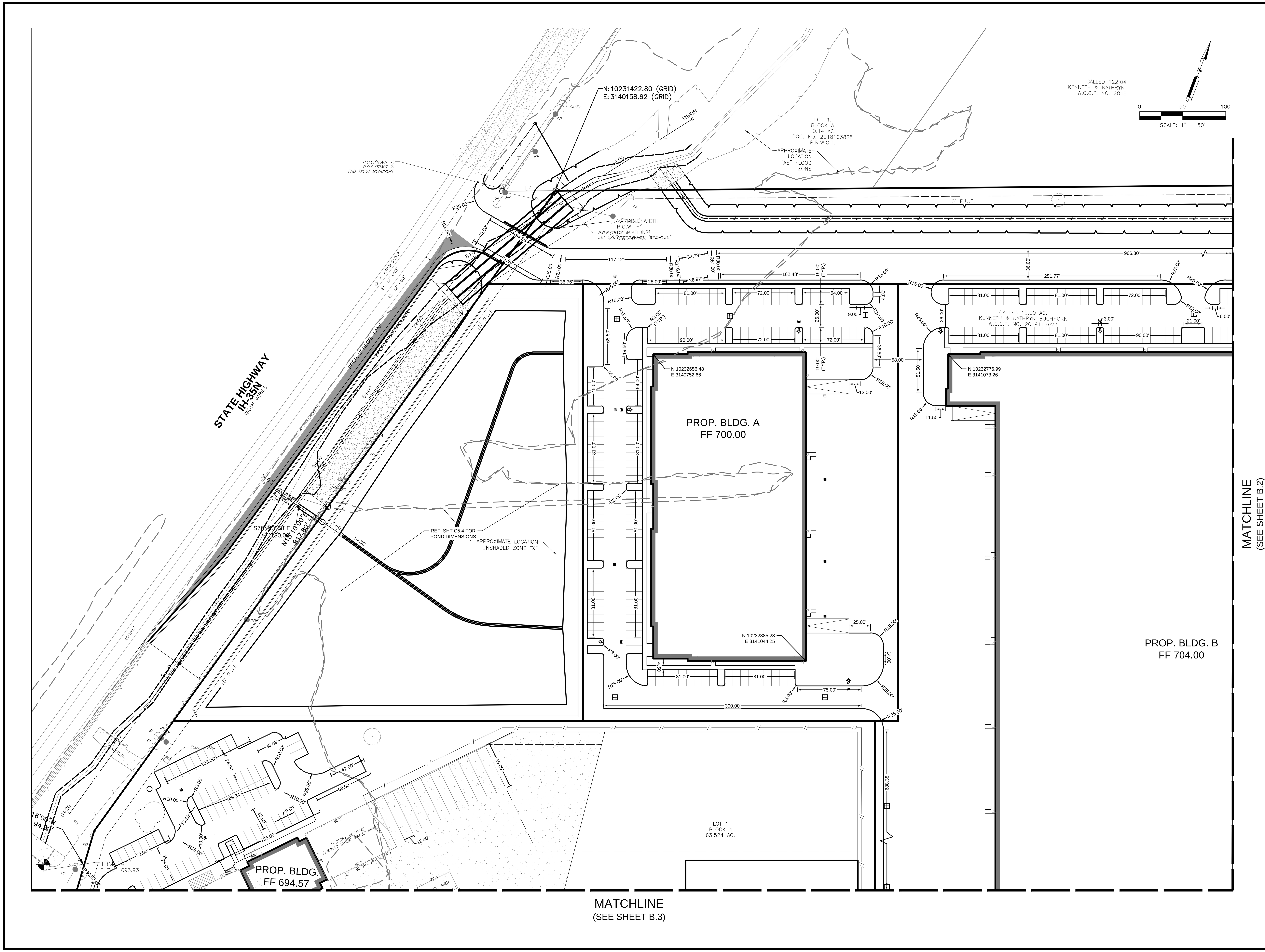
GEORGETOWN KEYSTONE

OVERALL PLAN

SCALE	DESIGN	DRAWN
1"=120'	DA	CR

SHEET
B.0

PROJECT No. 00486-009



BENCHMARKS:

TEMPORARY BENCHMARK "A"
ELEVATION - 693.93'
TEMPORARY BENCHMARK "A" IS A BOX CUT SET ON A HEADWALL ON THE EAST R.O.W. OF STATE HIGHWAY I-35 N, BEING APPROXIMATELY 100 FEET NORTHEAST OF THE INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

TEMPORARY BENCHMARK "B"
ELEVATION - 715.12'
TEMPORARY BENCHMARK "B" IS A BOX CUT SET ON A CONCRETE COLUMN FOR A GUY ANCHOR, BEING APPROXIMATELY 2,050 FEET EAST OF INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

FLOOD PLAIN NOTE:

THIS SUBJECT TRACT LIES WITHIN UNSHADED ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN (0.2% ANNUAL FLOODPLAIN CHANCE) AS DELINEATED ON THE FLOOD INSURANCE MAP FOR WILLIAMSON COUNTY, TEXAS AND INCORPORATED AREAS, MAP NO. 48491C0285F MAP REVISED DECEMBER 20, 2019.

SHEET NOTES:

1. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
2. REFERENCE ARCHITECTURAL PLANS FOR EXACT BUILDING DIMENSIONS.
3. ALL CURB RADII TO BE 3' (FEET) UNLESS OTHERWISE SHOWN ON PLAN.
4. PROPOSED HANDICAP SIGN SEE PAVEMENT DETAILS.
5. PROPOSED SIGN. REFERENCE LANDSCAPE ARCHITECT PLANS FOR DETAILS.
6. CONTRACTOR SHALL REFERENCE THE LANDSCAPE ARCHITECTURAL PLANS FOR ALL COURTYARD DETAILS.
7. EXISTING SURVEY WAS DONE BY WINDROSE LAND SURVEYING/PLATTING WITH THEIR CONTACT INFORMATION AS FOLLOWS:

WINDROSE LAND SURVEYING/PLATTING
11111 RICHMOND AVE,STE150 HOUSTON,TX 77082
Phone (713) 458-2281 FIRM REGISTRATION#10108800

IMPERVIOUS COVER CALCULATIONS

KEYSTONE + INDUSTRIAL IMPERVIOUS AREA = 2,017,403 SQ. FT = 72.91 %
EXISTING IMPERVIOUS AREA = 31,5333 SQ. FT. = 11.40%
PERCENTAGE INCREASE = 61.51%

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

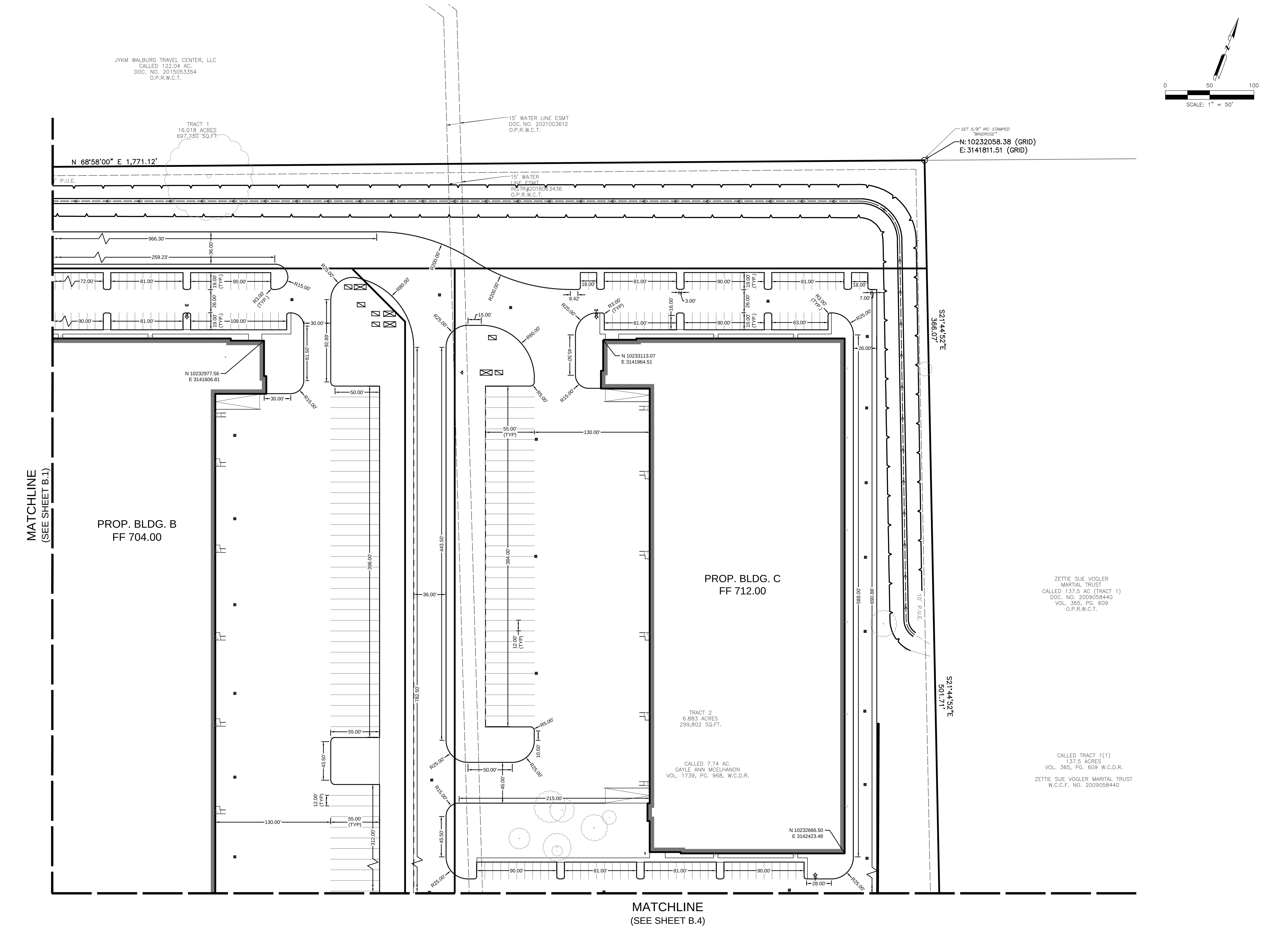
DIMENSION CONTROL PLAN (1 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
B.1

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\B.1-B-4 Dimensional Site Plan.dwg Last Plotted: Thu Apr 13, 2023 - 4:55pm By: asalazar



BENCHMARKS:

TEMPORARY BENCHMARK "A"
ELEVATION - 693.93'
TEMPORARY BENCHMARK "A" IS A BOX CUT SET ON A HEADWALL ON THE EAST R.O.W. OF STATE HIGHWAY I-35 N, BEING APPROXIMATELY 100 FEET NORTHEAST OF THE INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

TEMPORARY BENCHMARK "B"
ELEVATION - 715.12'
TEMPORARY BENCHMARK "B" IS A BOX CUT SET ON A CONCRETE COLUMN FOR A GUY ANCHOR, BEING APPROXIMATELY 2,050 FEET EAST OF INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

FLOOD PLAIN NOTE:

THIS SUBJECT TRACT LIES WITHIN UNSHADED ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN (0.2% ANNUAL FLOODPLAIN CHANCE) AS DELINEATED ON THE FLOOD INSURANCE MAP FOR WILLIAMSON COUNTY, TEXAS AND INCORPORATED AREAS, MAP NO. 48491C0285F MAP REVISED DECEMBER 20, 2019.

SHEET NOTES:

1. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
2. REFERENCE ARCHITECTURAL PLANS FOR EXACT BUILDING DIMENSIONS.
3. ALL CURB RADII TO BE 3' (FEET) UNLESS OTHERWISE SHOWN ON PLAN.
4. PROPOSED HANDICAP SIGN SEE PAVEMENT DETAILS.
5. PROPOSED SIGN. REFERENCE LANDSCAPE ARCHITECT PLANS FOR DETAILS.
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Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

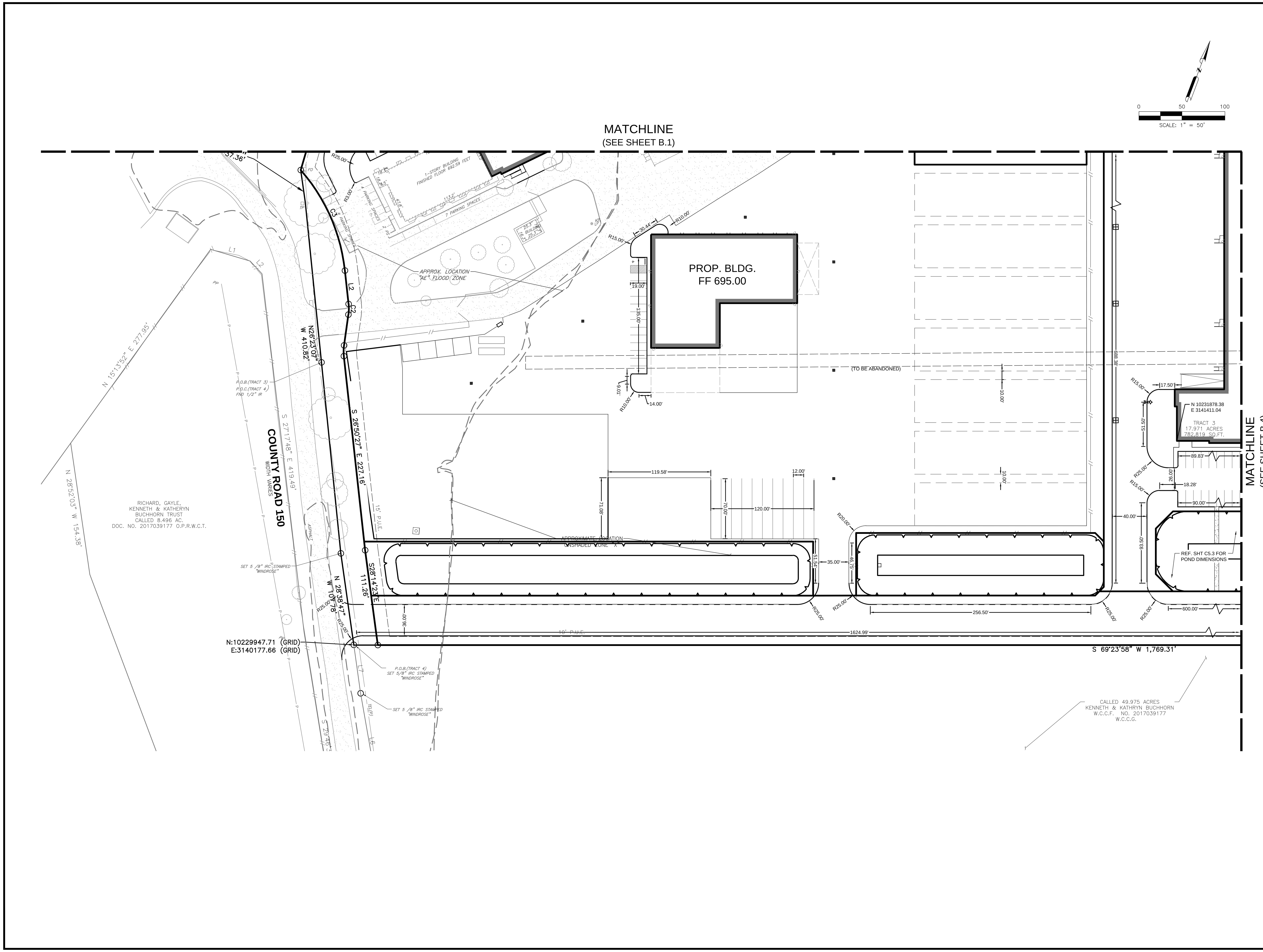
DIMENSION
CONTROL PLAN
(2 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
B.2

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\B.1–B–4 Dimensional Site Plan.dwg Last Plotted: Thu Apr 13, 2023 – 4:56pm By: asalazar



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GEORGETOWN KEYSTONE

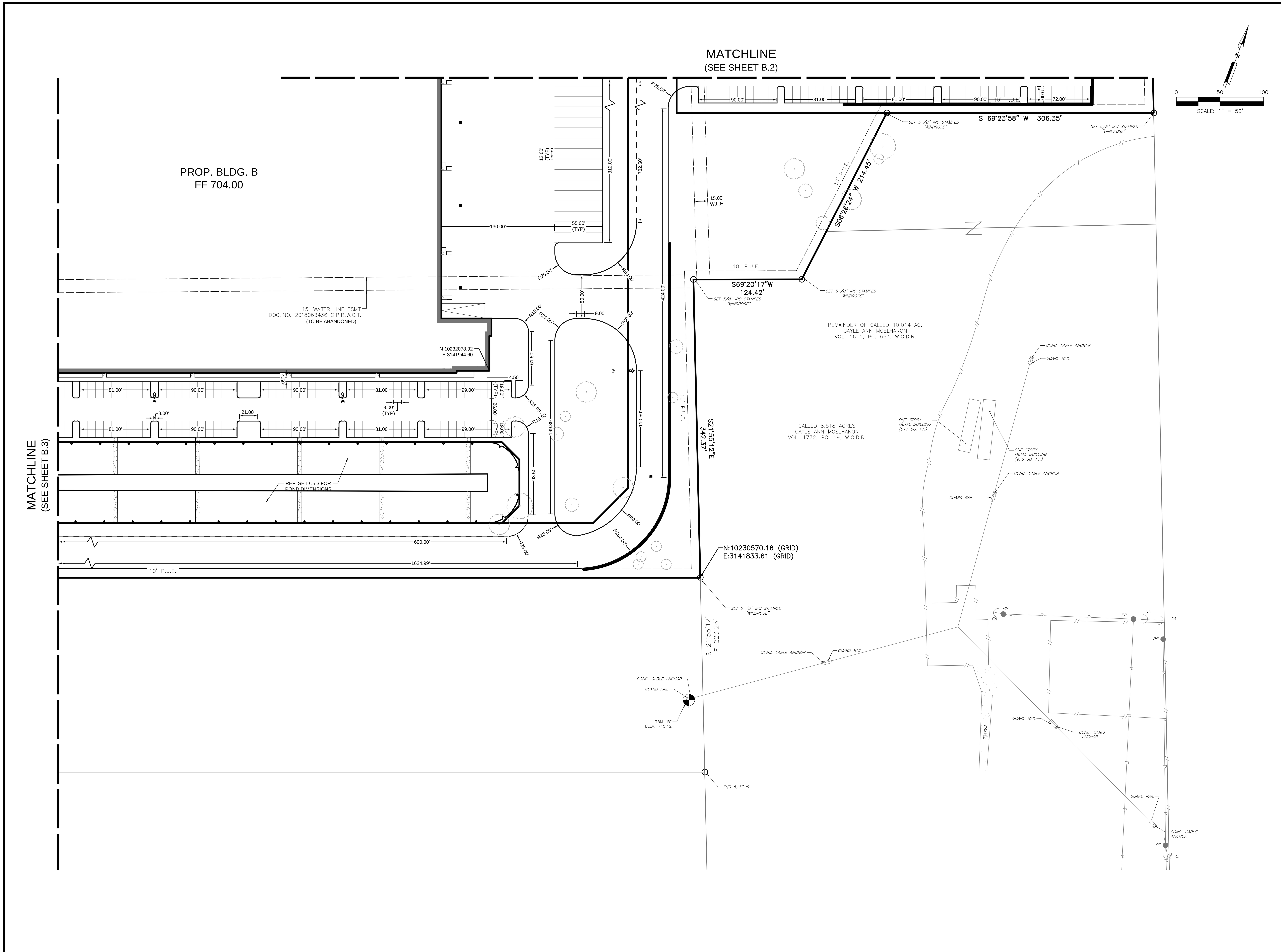
DIMENSION
CONTROL PLAN
(3 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
B.3

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\B.1-B-4 Dimensional Site Plan.dwg Last Plotted: Thu Apr 13, 2023 - 4:56pm By: asalazar



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GEORGETOWN KEYSTONE

DIMENSION CONTROL PLAN (4 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
B.4

PROJECT No. 00486-009

SECTION E

Temporary Stormwater Section – Form TCEQ-0602

CONSULTING ENGINEERS

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: David Aguayo

Date: 03/02/2023

Signature of Customer/Agent:

David Aguayo

Regulated Entity Name: Dry Creek

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.

[X] Fuels and hazardous substances will not be stored on the site.

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

Sequence of Construction

5. [X] **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. [X] 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: Dry Berry Creek Tributary 3

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. [X] **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:

- [x] 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.
- [x] 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.
- [x] A description of how BMPs and measures will prevent pollutants from entering surface streams, sensitive features, or the aquifer.
- [x] 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.
    - [x] There will be no temporary sealing of naturally-occurring sensitive features on the site.

9. [x] **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. [x] **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.
    - [x] For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin or other equivalent controls are not attainable, but other TBMPs and measures will be used in combination to protect down slope and side slope boundaries of the construction area.
    - [ ] There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. A smaller sediment basin and/or sediment trap(s) will be used in combination with other erosion and sediment controls within each disturbed drainage area.

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

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

☒ N/A

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

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

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

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

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

Soil Stabilization Practices

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

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

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

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

Administrative Information

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

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

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

ATTACHMENT A

SPILL RESPONSE ACTIONS

WGA
CONSULTING ENGINEERS

NON-STORMWATER DISCHARGES

The following eligible non-stormwater discharges at the site will be allowed only when such flows are diverted to site erosion and sediment control measures as detailed in Section 4 Controls:

- discharges from firefighting activities (firefighting activities do not include washing of trucks, run-off water from training activities, test water from fire suppression systems, and similar activities);
- uncontaminated fire hydrant flushing's (excluding discharges of hyper chlorinated water, unless the water is first dechlorinated, and discharges are not expected to adversely affect aquatic life), which include flushing's from systems that utilize potable water, surface water, or groundwater that does not contain additional pollutants (uncontaminated fire hydrant flushing's do not include systems utilizing reclaimed wastewater as a source water);
- water from the routine external washing of vehicles, the external portion of buildings or structures, and pavement, where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless spilled materials have been removed; and if local state, or federal regulations are applicable, the materials are removed according to those regulations), and where the purpose is to remove mud, dirt, or dust;
- uncontaminated water used to control dust;
- potable water sources including waterline flushing's (excluding discharges of hyper chlorinated water, unless the water is first dechlorinated, and discharges are not expected to adversely affect aquatic life);
- uncontaminated air conditioning condensate;
- uncontaminated ground water or spring water, including foundation or footing drains
- where flows are not contaminated with industrial materials such as solvents; and
- lawn watering and similar irrigation drainage.

OTHER PERMITTED DISCHARGES

Any discharge authorized under a separate NPDES, TPDES, or TCEQ permit may be combined with discharges authorized by this general permit, provided those discharges comply with the associated permit.

SPILL PREVENTION

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

Good Housekeeping Practices
The following good housekeeping practices will be followed onsite during the construction project.

- An effort will be made to store only enough products required to construct the project.
- All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer, and only when ready to be used.
- Whenever possible, all of a product will be used up before disposing of the container.
- Manufacturers' recommendations for proper use and disposal will be followed.
- The Project Superintendent will inspect daily to ensure proper use and disposal of materials onsite.

Hazardous Product Practices
These practices will be used to reduce the risks associated with hazardous materials, if hazardous materials are used.
Products will be kept in original containers unless they are not re-sealable.

- Original labels and material safety data will be retained.
- If surplus product must be disposed of, manufacturers' or local and state recommended methods for proper disposal will be followed.
- In the event that demolition of any structure with at least 10,000 square feet of floor space that was built or renovated before January 1980, will take place, and the receiving waterbody is impaired for polychlorinated biphenyls (PCBs):
- Implement control to minimize the exposure of PCB-containing building materials, including paint
- caulk and pre-1980 fluorescent lighting fixtures to precipitation and to stormwater; and insure that disposal
- of such materials is performed in compliance with applicable state, federal and local laws.

PRODUCT SPECIFIC PRACTICES

The following product specific practices will be followed onsite:

Petroleum Products
All onsite vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers, which are clearly labeled. Any asphalt substances used onsite will be applied according to manufacturer's recommendations.

Paints
All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the stormwater sewer system but will be properly disposed of according to manufacturer's instructions or State and local regulations.

Fertilizers
Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked in the soil to limit exposure to stormwater. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills or suitably covered storage area.

Concrete Trucks
Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash on this site, except into a specified and properly designated area designed for this purpose.

SPILL PREVENTION PRACTICES

In addition to the good housekeeping and material management practices discussed above, the following practices will be followed for spill prevention and cleanup:

- Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous material will be reported to the appropriate state or local government agency regardless of size.
- The spill prevention plan will be adjusted to include measures to prevent this type of spill from recurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.
- The Project Superintendent responsible for day-to-day site operations will be the spill prevention and cleanup coordinator. He will designate other site personnel who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup.

RELEASES IN EXCESS OF REPORTABLE QUANTITIES

The discharge of hazardous substances or oil in the stormwater discharges will be prevented or minimized as provided below. The General Contractor will comply with the reporting requirements under the Construction General Permit. Spills or releases will be reported immediately to the Texas Commission on Environmental Quality 800.832.8224. The SWPPP will be modified within 14 days to provide description of release, circumstances leading to release and the date of the release.

SPILL RESPONSE PLAN

Leak or Spill

- Employees will not be punished for reporting spills.
- Contain spill and start cleanup
- Report if over reportable quantity.

Point of Contact in Case of Reportable Quantity Release

Texas Commission on Environmental Quality 800.832.8224

Reportable Quantities		
Material	**Material Released To**	**Reportable Quantity**
Engine oil, fuel, hydraulic & brake fluid	Land	~25 gallons
Engine oil, fuel, hydraulic & brake fluid	Water	Visible Sheen
Anti-freeze	Land	100 lbs (~13 Gallons)
Battery Acid	Land, Water	100 lbs (~6 Gallons)
Freon	Air	1 lb
Gasoline	Air, Land, Water	100 lbs (~15 Gallons)
Engine Degreasers	Air, Land, Water	100 lbs (~14 Gallons)

Information to Report
When making a telephone report of a spill or pollution complaint, it will be helpful if the following information is available:
The date and time of the spill or release;

- The identity or chemical name of material released or spill as well as whether the substance is an extremely hazardous material;
- An estimate of the quantity of material released or spilled and the time or duration of the event;
- The exact location of the spill, including the name of the waters involved or threatened, and/or other medium or media affected by the release or spill;
- The source of the release or spill;
- The name, address, and telephone number of the party in charge of, or responsible for the facility, vessel, or activity associated with the release or spill;
- The extent of actual and potential water pollution;
- The party at the release or spill site, who is in charge of operations at the site and the telephone number of this party;
- The steps being taken or proposed to contain and clean up the released or spilled material and any precautions taken to minimize impacts including evacuation;
- The extent of injuries, if any;
- Any known or anticipated health risks associated with the incident and, where appropriate, advice regarding medical attention necessary for exposed individuals;
- Possible hazards to the environment (air, soil, water, wildlife, etc.). This assessment may include references to accepted chemical databases, material safety data sheets, and health advisories. Estimated or measured concentrations of a contaminant may be requested by the TCEQ for the state's hazard assessment; and,
- Identity of governmental and/or private sector representatives responding on-scene.

ATTACHMENT B

Potential Sources of Contamination

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POTENTIALLY POLLUTING MATERIALS

The following potential pollutants listed below are expected to be stored onsite during construction. As they are utilized, they or the waste material generated in utilizing them, may also be stored as waste material prior to being properly disposed of:

Material/Chemical	Physical Description	Stormwater Pollutants	Location *
Pesticides (insecticides, fungicides, herbicides, rodenticides)	Various colored to colorless liquid, powder, pellets or grains	Chlorinated hydrocarbons, organophosphates, carbamates, arsenic	Herbicides used for noxious weed control
Fertilizer	Liquid or solid grains	Nitrogen, phosphorous	Newly seeded areas
Plaster	White granules or powder	Calcium sulphate, calcium carbonate, sulfuric acid	Building construction
Cleaning solvents	Colorless, blue or yellow-green liquid	Perchloroethylene, methylene chloride, trichloroethylene, petroleum distillates	No equipment cleaning allowed in project areas
Asphalt	Black solid	Oil, petroleum distillates	Streets and roofing
Concrete	White solid/grey liquid	Limestone, sand, pH, chromium	Curb and gutter, building construction
Glue, adhesives	White or yellow liquid	Polymers, epoxies	Building construction
Paints	Various colored liquid	Metal oxides, Stoddard solvent, talc, calcium carbonate, arsenic	Building construction
Curing compounds	Creamy white liquid	Naphtha	Curb and gutter
Wood preserves	Clear Amber or dark brown liquid	Stoddard solvent, petroleum distillates, arsenic, copper, chromium	Timber pads and building construction
Hydraulic oil/fluids	Brown oily petroleum hydrocarbon	Mineral oil	Leaks or broken hoses from equipment
Gasoline	Colorless, pale brown or pink petroleum hydrocarbon	Benzene, ethyl benzene, toluene, xylene, MTBE	Secondary containment/staging area
Diesel Fuel	Clear, blue-green to yellow liquid	Petroleum distillate, oil & grease, naphthalene, xylenes	Secondary containment/staging area
Kerosene	Pale yellow liquid petroleum hydrocarbon	Coal oil, petroleum distillates	Secondary containment/staging area
Antifreeze/coolant	Clear green/yellow liquid	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)	Leaks or broken hoses from equipment
Sanitary toilets	Various colored liquid	Bacteria, parasites and viruses	Staging area

*** Area where material/chemical is used on site.**

POTENTIALLY POLLUTING ACTIVITIES

The activities in the following chart have been identified as potentially polluting. The Best Management Practices described in this section, and those described in Section 4 Controls are to be implemented to protect the water quality of any discharge from this site or escape to any adjacent waterway.

	Primary Pollutant	Other Pollutants							
Areas of Consideration	Sediment	Nutrients	Heavy Materials	pH (acids & bases)	Pesticides & Herbicides	Oil & Grease	Bacteria & Viruses	Trash, Debris & Solids	Other Toxic Chemicals
Clearing, grading, excavating and unstabilized areas	✓							✓	
Paving operations	✓							✓	
Concrete washout and waste			✓	✓				✓	
Structure construction/painting/clearing		✓		✓				✓	✓
Demolition and debris disposal	✓							✓	
Dewatering operations	✓	✓							
Drilling and blasting operations	✓			✓				✓	
Material delivery and storage	✓	✓	✓	✓	✓	✓		✓	✓
Material use during building process		✓	✓	✓	✓	✓		✓	✓
Solid waste (trash and debris)								✓	✓
Hazardous waste				✓	✓	✓			✓
Contaminated spills		✓	✓	✓	✓	✓			✓
Sanitary/septic waste		✓		✓			✓		✓
Vehicle/equipment fueling and maintenance						✓			✓
Vehicle/equipment use and storage						✓			✓
Landscaping operation	✓	✓						✓	

ATTACHMENT C

Sequence of Major Activities

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ATTACHMENT C

Sequence of Major Activities

Sequence Item	Description	Approximate Acres Disturbed
1.	Clearing	63.888 Ac.
2.	Set Temporary BMP's	63.888 Ac.
3.	Site Grading & Building Construction & Final Site	63.888 Ac.
4.	Top Soil & Landscaping	63.888 Ac.

ATTACHMENT D

Temporary Best Management Practices and Measures

CONSULTING ENGINEERS

Effluent Limitation Guidelines (ELG) have been established under the renewed March 2018 TPDES General Permit. Please see Section G., page 40 of TXR15000 contained herein behind Tab 9.

EROSION AND SEDIMENTATION CONTROLS

Erosion control and stabilization practices may include but are not limited to: establishment of temporary or permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of existing trees and vegetation, slope texturing, temporary velocity dissipation devices, flow diversion mechanisms, and other similar measures.
Major erosion and sedimentation controls are indicated on the SWPPP Site Plan, located in the previous section, Section 3 Maps and Plans.

Short and Long-Term Goals and Criteria:

- Sediment will be retained on site to the extent practicable with consideration for local topography, soil type, and rainfall.
- Control measures will be properly selected, installed, and maintained in accordance with manufacturers' specifications and good engineering practices.
- If periodic inspections or other information indicates that a control is being used incorrectly, or that the control is performing inadequately, it will be replaced or modified immediately upon discovery.
- If sediment escapes the site, off-site accumulations will be removed at a frequency to minimize negative impacts and whenever feasible, prior to the next rain event.
- Sediment will be removed from sediment traps or sedimentation ponds when design capacity has been reduced by 50%.
- Litter, construction debris, and construction chemicals exposed to stormwater will be removed, covered or otherwise prevented from becoming a pollutant source.
- Offsite materials storage areas, if used (also including overburden and stockpiles of dirt, borrow areas, etc.), are considered a part of the project and will be addressed in the SWPPP.

STABILIZATION PRACTICES

Short and Long-Term Goals and Criteria:

- Erosion Control and Stabilization measures must be initiated immediately in portions of the site where construction activities have temporarily ceased and will not resume for a period exceeding 14 calendar days. Stabilization measures that provide a protective cover must be initiated immediately in portions of the site where construction activities have permanently ceased. The term "immediately" is used to define the deadline for initiating stabilization measures. In the context of this requirement, "immediately" means as soon as practicable, but no later than the end of the next work day, following the day when the earth-disturbing activities have temporarily or permanently ceased
    - Erosion control and stabilization practices may include but are not limited to: establishment of temporary or permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of existing trees and vegetation, slope texturing, temporary velocity dissipation devices, flow diversion mechanisms, and other similar measures.
- Except as provided below, these measures must be completed as soon practicable, but no more than 14 calendar days after the initial of soil stabilization measures:
    - Where the immediate initiation of vegetative stabilization measures after construction activity has temporarily or permanently ceased due to frozen conditions, non-vegetative controls must be implemented until thawing conditions are present, and vegetative stabilization measures can be initiated as soon as practicable.
    - In arid areas, semi-arid areas, or drought-stricken areas, as they are defined in Part I.B of this general permit, where the immediate initiation of vegetative stabilization measures after construction activity has temporarily or permanently ceased or is precluded by arid conditions, other types of erosion control and stabilization

measures must be initiated at the site as soon as practicable. Where vegetative controls are infeasible due to arid conditions, and within 14 calendar days of a temporary or permanent cessation of construction activity in any portion of the site, the operator shall immediately install non-vegetative erosion controls in areas of the construction site where construction activity is complete or has ceased. If non-vegetative controls are infeasible, the operator shall install temporary sediment controls

  - In areas where non-vegetative controls are infeasible, the operator may alternatively utilize temporary perimeter controls. The operator must document in the SWPPP the reason why stabilization measures are not feasible; and must demonstrate that the perimeter controls will retain sediment on site to the extent practicable. The operator must continue to inspect the BMPs at the frequency established for unstabilized sites.
  - The requirement for permittees to initiate stabilization is triggered as soon as it is known with reasonable certainty that construction activity at the site or in certain areas of the site will be stopped for 14 or more additional calendar days. If the initiation or completion of vegetative stabilization is prevented by circumstances beyond the control of the permittee, the permittee must employ and implement alternative stabilization measures immediately. When conditions at the site changes that would allow for vegetative stabilization, then the permittee must initiate or complete vegetative stabilization as soon as practicable.
  - TCEQ does not expect that temporary or permanent stabilization measures to be applied to areas that are intended to be left un-vegetated or un-stabilized following construction (e.g., dirt access roads, utility pole pads, areas being used for storage of vehicles, equipment, or materials).

Interim and Permanent Stabilization Practices for this Site include:

- A stabilized construction exit will be constructed of 3x5 crushed concrete to minimize, to the extent practicable, the offsite tracking of sediment and generation of dust unless existing pavement is available.
- Any staging or parking areas will also be stabilized to minimize to the extent practicable, the offsite tracking of sediment and generation of dust.
- Newly graded areas will have textured soil surfaces to reduce sheet flow and improve surface water impoundment.
- Filter Fabric Fence will be used to protect perimeters and temporary earth stockpiles while they are in use.
- Vegetative stabilization will be initiated on all disturbed soil at the completion of construction.
- Upon completion of construction, landscaping, consisting of sod/hydro-mulch, mulch, trees, shrubs, and miscellaneous plant material will be installed.

Sequence of Major Erosion and Sediment Control Activities

Phase 1
The Filter Fabric Fence will be installed at the site boundaries where needed to prevent the escape of silt and sediment, prior to any disturbance of the soil on this site. Inlet Protection Barriers will be placed in existing storm drain inlets as needed. Existing landscape drains and odd-sized/landscape grates will be wrapped with non-woven geo-textile fabric.

Phase 2
Inlet Protection Barriers will be placed in new storm drain inlets as they are installed. Odd-sized/landscape grates will be wrapped with non-woven geo-textile fabric. Flow Control Barriers will be installed at the detention pond outfall upon completion. Stabilization Measures will be installed at the detention pond slopes upon final grading.

Phase 3
When construction activity is substantially complete, temporary structural controls will then be removed and all disturbed soils will be stabilized with plant material.

SEDIMENTATION CONTROL PRACTICES

Sedimentation Basins

A sedimentation basin is deemed not feasible on this site, for a variety of reasons, including site soils, slope, available area, public safety, precipitation patterns, site geometry, site vegetation, infiltration capacity, geotechnical factors, depth to groundwater, and other similar considerations. Equivalent measures, as described above, will be implemented.

ATTACHMENT E

Request to Temporarily Seal a Feature (if requested)

Not applicable to this project

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ATTACHMENT F

Structural Practices

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STRUCTURAL PRACTICES

These practices will be utilized to divert flows away from exposed soils, to limit contact of runoff with disturbed areas, or to lessen the off-site transport of eroded soils.

- Filter Fabric Fence will be erected at the perimeter of the area to be disturbed, as needed to prevent the escape of silt and sediment from the construction activity.
- Inlet Protection Barriers will be placed in existing storm drain inlets as needed to prevent silt and sediment from entering the storm sewer system.
- Inlet Protection Barriers will also be placed in new storm drain inlets as they are installed.
- Stabilization measures will be utilized on the detention pond slopes to minimize rill erosion.
- Flow Control Barriers, acting as a velocity dissipation device, will be installed at the detention pond outfall to minimize scouring at discharge and the escape of silt and sediments.
- Flow Control Barriers will be placed in the ditch adjacent to the site to provide non-erosive flow velocity, so that natural physical and biological characteristics and functions are maintained and protected.
- Landscape drains and odd-sized grates will be wrapped with non-woven geo-textile fabric to prevent the escape of sediment.
- Any additional controls which are implemented in response to changing conditions during construction are to be noted below:
    - ______________________________
    - ______________________________

ATTACHMENT G

Drainage Area Map

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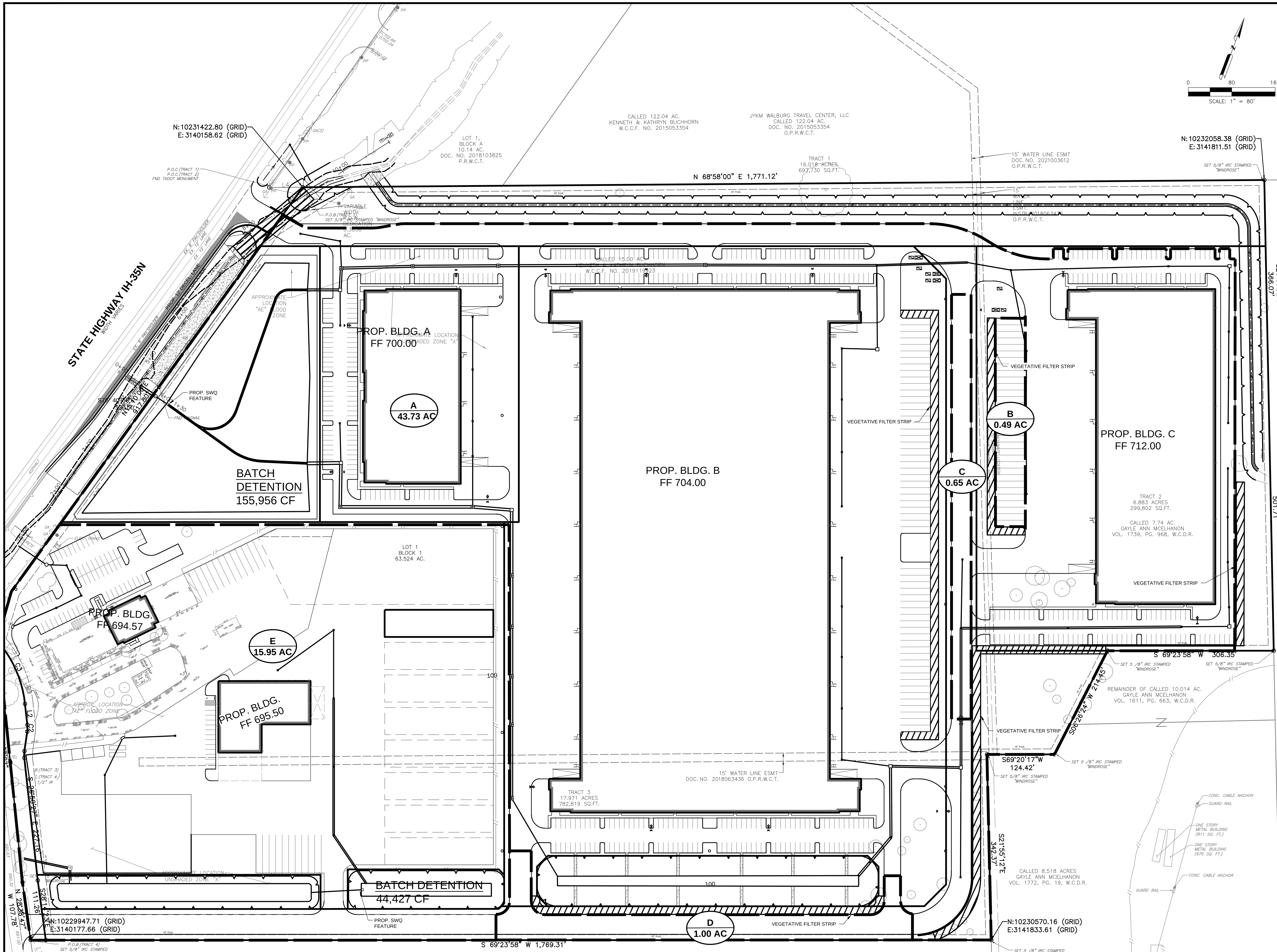

BENCHMARKS:

TEMPORARY BENCHMARK "A"
ELEVATION - 693.93'
TEMPORARY BENCHMARK "A" IS A BOX CUT SET ON A HEADWALL ON THE EAST R.O.W. OF STATE HIGHWAY I-35 N, BEING APPROXIMATELY 100 FEET NORTHEAST OF THE INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

TEMPORARY BENCHMARK "B"
ELEVATION - 715.12'
TEMPORARY BENCHMARK "B" IS A BOX CUT SET ON A CONCRETE COLUMN FOR A GUY ANCHOR, BEING APPROXIMATELY 2,050 FEET EAST OF INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

FLOOD PLAIN NOTE:

THIS SUBJECT TRACT LIES WITHIN UNSHADED ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN (0.2% ANNUAL FLOODPLAIN CHANCE) AS DELINEATED ON THE FLOOD INSURANCE MAP FOR WILLIAMSON COUNTY, TEXAS AND INCORPORATED AREAS, MAP NO. 48491C0285F MAP REVISED DECEMBER 20, 2019.

DRAINAGE BASIN MAP LEGEND:

A 1.52 AC	DRAINAGE BASIN AREA IN ACRES
	DRAINAGE BOUNDARY

REV	DESCRIPTION	DATE

DAVID AGUAYO
140527
LICENSED PROFESSIONAL ENGINEER
4/13/23

CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

STORM WATER QUALITY MANAGEMENT PLAN

SCALE	DESIGN	DRAWN
1"=80'	DA	CR

SHEET
C3.3

PROJECT No. 00486-009

DRAINAGE BASIN A CALCULATIONS:

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Georgetown Industrial
Date Prepared: 2/2/2023

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: $L_M = 27.2(A_N \times P)$

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 * = 63.91 acres
Predevelopment impervious area within the limits of the plan* = 7.24 acres
Total post-development impervious area within the limits of the plan* = 44.10 acres
Total post-development impervious cover fraction * = 0.69
P = 32 inches

$L_{M\ TOTAL\ PROJECT}$ = 32083 lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 5

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

Drainage Basin/Outfall Area No. = A

Total drainage basin/outfall area= 43.73 acres
Predevelopment impervious area within drainage basin/outfall area= 1.33 acres
Post-development impervious area within drainage basin/outfall area= 32.26 acres
Post-development impervious fraction within drainage basin/outfall area= 0.74
$L_{M\ THIS\ BASIN}$ = 26921 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Batch Detention
Removal efficiency = 91 percent

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

RG-348 Page 3-33 Equation 3.7: 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 = 43.73 acres
A_I = 32.26 acres
A_P = 11.47 acres
L_R = 32684 lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 27000 lbs.

F = 0.83

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 = 1.50 inches
Post Development Runoff Coefficient = 0.55
On-site Water Quality Volume = 129963 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 = 25993
Total Capture Volume (required water quality volume(s) x 1.20) = 155956 cubic feet
The following sections are used to calculate the required water quality volume(s) for the selected BMP.
The values for BMP Types not selected in cell C45 will show NA.

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin = 155956 cubic feet

DRAINAGE BASIN C CALCULATIONS:

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Georgetown Industrial
Date Prepared: 2/2/2023

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
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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: $L_M = 27.2(A_N \times P)$

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 * = 63.91 acres
Predevelopment impervious area within the limits of the plan* = 7.24 acres
Total post-development impervious area within the limits of the plan* = 44.10 acres
Total post-development impervious cover fraction * = 0.69
P = 32 inches

$L_{M\ TOTAL\ PROJECT}$ = 32083 lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 5

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

Drainage Basin/Outfall Area No. = C

Total drainage basin/outfall area= 0.65 acres
Predevelopment impervious area within drainage basin/outfall area= 0.00 acres
Post-development impervious area within drainage basin/outfall area= 0.65 acres
Post-development impervious fraction within drainage basin/outfall area= 1.00
$L_{M\ THIS\ BASIN}$ = 566 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
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 = 0.65 acres
A_I = 0.65 acres
A_P = 0.00 acres
L_R = 612 lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 0 lbs.

F = 0.00

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 = #N/A inches
Post Development Runoff Coefficient = 0.82
On-site Water Quality Volume = #N/A 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 = #N/A cubic feet

Storage for Sediment = #N/A
Total Capture Volume (required water quality volume(s) x 1.20) = #N/A cubic feet
The following sections are used to calculate the required water quality volume(s) for the selected BMP.
The values for BMP Types not selected in cell C45 will show NA.

16. Vegetated Filter Strips Designed as Required in RG-348 Pages 3-55 to 3-57

There are no calculations required for determining the load or size of vegetative filter strips.
The 80% removal is provided when the contributing drainage area does not exceed 72 feet (direction of flow) and
the sheet flow leaving the impervious cover is directed across 15 feet of engineered filter strips with maximum slope of 20% or
across 50 feet of natural vegetation with a maximum slope of 10%. There can be a break in grade as long as no slope exceeds 20%.

If vegetative filter strips are proposed for an interim permanent BMP, they may be sized as described on Page 3-56 of RG-348.

DRAINAGE BASIN E CALCULATIONS:

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Georgetown Industrial
Date Prepared: 2/2/2023

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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: $L_M = 27.2(A_N \times P)$

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 * = 63.91 acres
Predevelopment impervious area within the limits of the plan* = 7.24 acres
Total post-development impervious area within the limits of the plan* = 44.10 acres
Total post-development impervious cover fraction * = 0.69
P = 32 inches

$L_{M\ TOTAL\ PROJECT}$ = 32083 lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 5

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

Drainage Basin/Outfall Area No. = E

Total drainage basin/outfall area= 15.95 acres
Predevelopment impervious area within drainage basin/outfall area= 5.91 acres
Post-development impervious area within drainage basin/outfall area= 9.70 acres
Post-development impervious fraction within drainage basin/outfall area= 0.61
$L_{M\ THIS\ BASIN}$ = 3299 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Batch Detention
Removal efficiency = 91 percent

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

RG-348 Page 3-33 Equation 3.7: 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 = 15.95 acres
A_I = 9.70 acres
A_P = 6.25 acres
L_R = 9872 lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 3300 lbs.

F = 0.33

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 = 1.50 inches
Post Development Runoff Coefficient = 0.43
On-site Water Quality Volume = 37023 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 = 7405
Total Capture Volume (required water quality volume(s) x 1.20) = 44427 cubic feet 1.019906988
The following sections are used to calculate the required water quality volume(s) for the selected BMP.
The values for BMP Types not selected in cell C45 will show NA.

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin = 44427 cubic feet

DRAINAGE BASIN B CALCULATIONS:

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Georgetown Industrial
Date Prepared: 2/2/2023

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: $L_M = 27.2(A_N \times P)$

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 * = 63.91 acres
Predevelopment impervious area within the limits of the plan* = 7.24 acres
Total post-development impervious area within the limits of the plan* = 44.10 acres
Total post-development impervious cover fraction * = 0.69
P = 32 inches

$L_{M\ TOTAL\ PROJECT}$ = 32083 lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 5

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

Drainage Basin/Outfall Area No. = B

Total drainage basin/outfall area= 0.49 acres
Predevelopment impervious area within drainage basin/outfall area= 0.00 acres
Post-development impervious area within drainage basin/outfall area= 0.49 acres
Post-development impervious fraction within drainage basin/outfall area= 1.00
$L_{M\ THIS\ BASIN}$ = 426 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
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 = 0.49 acres
A_I = 0.49 acres
A_P = 0.00 acres
L_R = 461 lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 0 lbs.

F = 0.00

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 = #N/A inches
Post Development Runoff Coefficient = 0.82
On-site Water Quality Volume = #N/A 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 = #N/A cubic feet

Storage for Sediment = #N/A
Total Capture Volume (required water quality volume(s) x 1.20) = #N/A cubic feet
The following sections are used to calculate the required water quality volume(s) for the selected BMP.
The values for BMP Types not selected in cell C45 will show NA.

16. Vegetated Filter Strips Designed as Required in RG-348 Pages 3-55 to 3-57

There are no calculations required for determining the load or size of vegetative filter strips.
The 80% removal is provided when the contributing drainage area does not exceed 72 feet (direction of flow) and
the sheet flow leaving the impervious cover is directed across 15 feet of engineered filter strips with maximum slope of 20% or
across 50 feet of natural vegetation with a maximum slope of 10%. There can be a break in grade as long as no slope exceeds 20%.

If vegetative filter strips are proposed for an interim permanent BMP, they may be sized as described on Page 3-56 of RG-348.

DRAINAGE BASIN D CALCULATIONS:

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Georgetown Industrial
Date Prepared: 2/2/2023

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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: $L_M = 27.2(A_N \times P)$

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 * = 63.91 acres
Predevelopment impervious area within the limits of the plan* = 7.24 acres
Total post-development impervious area within the limits of the plan* = 44.10 acres
Total post-development impervious cover fraction * = 0.69
P = 32 inches

$L_{M\ TOTAL\ PROJECT}$ = 32083 lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 6

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

Drainage Basin/Outfall Area No. = E

Total drainage basin/outfall area= 1.00 acres
Predevelopment impervious area within drainage basin/outfall area= 0.00 acres
Post-development impervious area within drainage basin/outfall area= 1.00 acres
Post-development impervious fraction within drainage basin/outfall area= 1.00
$L_{M\ THIS\ BASIN}$ = 870 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
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 = 1.00 acres
A_I = 1.00 acres
A_P = 0.00 acres
L_R = 941 lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 0 lbs.

F = 0.00

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 = #N/A inches
Post Development Runoff Coefficient = 0.82
On-site Water Quality Volume = #N/A 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 = #N/A cubic feet

Storage for Sediment = #N/A
Total Capture Volume (required water quality volume(s) x 1.20) = #N/A cubic feet
The following sections are used to calculate the required water quality volume(s) for the selected BMP.
The values for BMP Types not selected in cell C45 will show NA.

16. Vegetated Filter Strips Designed as Required in RG-348 Pages 3-55 to 3-57

There are no calculations required for determining the load or size of vegetative filter strips.
The 80% removal is provided when the contributing drainage area does not exceed 72 feet (direction of flow) and
the sheet flow leaving the impervious cover is directed across 15 feet of engineered filter strips with maximum slope of 20% or
across 50 feet of natural vegetation with a maximum slope of 10%. There can be a break in grade as long as no slope exceeds 20%.

If vegetative filter strips are proposed for an interim permanent BMP, they may be sized as described on Page 3-56 of RG-348.

BENCHMARKS:

TEMPORARY BENCHMARK "A"
ELEVATION - 693.93'
TEMPORARY BENCHMARK "A" IS A BOX CUT SET ON A HEADWALL ON THE EAST R.O.W. OF STATE HIGHWAY I-35 N, BEING APPROXIMATELY 100 FEET NORTHEAST OF THE INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

TEMPORARY BENCHMARK "B"
ELEVATION - 715.12'
TEMPORARY BENCHMARK "B" IS A BOX CUT SET ON A CONCRETE COLUMN FOR A GUY ANCHOR, BEING APPROXIMATELY 2,050 FEET EAST OF INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

FLOOD PLAIN NOTE:

THIS SUBJECT TRACT LIES WITHIN UNSHADED ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN (0.2% ANNUAL FLOODPLAIN CHANCE) AS DELINEATED ON THE FLOOD INSURANCE MAP FOR WILLIAMSON COUNTY, TEXAS AND INCORPORATED AREAS, MAP NO. 48491C0285F MAP REVISED DECEMBER 20, 2019.

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER

4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

STORM WATER QUALITY MANAGEMENT PLAN CALCULATIONS

SCALE	DESIGN	DRAWN
N/A	DA	CR

SHEET
C3.4

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\C3.3-C3.5 Storm Water Quality Management Plan & Details.dwg Last Plotted: Thu Apr 13, 2023 - 5:42pm By: asalazar

ATTACHMENT H

Temporary Sediment Pond Plans and Calculations

Not applicable to this project

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ATTACHMENT I

Inspection and Maintenance for BMPs

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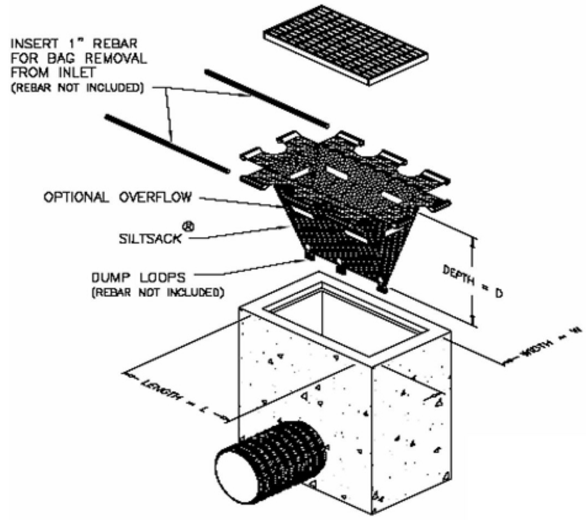
MAINTAINENCE

All erosion and sedimentation control measures and practices identified in this SWPPP are to be maintained in effective operating condition as follows:

- Erosion and sediment control measures that have been improperly installed or have been disabled, run-over, removed, or otherwise rendered ineffective will be replaced or corrected immediately upon discovery.
    - If periodic inspections or other information indicates a control has been used incorrectly, is performing inadequately, or is damaged, then the control will be replaced or modified as practicable after making the discovery.
- Maintenance and repairs identified as necessary in an inspection (see Section 6 Site Inspections below) will be conducted before the next anticipated storm event, if feasible.
- If maintenance prior to the next anticipated storm event is impracticable, the reason will be documented in the SWPPP and maintenance will be scheduled and accomplished as soon as practicable.
- Sediment will be removed from the sediment fences and inlet protection barriers before it reaches 50% of the above ground height of the barrier.
- If sediment escapes the site, accumulations will be removed at a frequency that minimizes off-site impacts, and prior to the next rain event, if feasible. If the permittee does not own or operate the off-site conveyance, then the permittee will work with the owner or operator of the property to remove the sediment

REMOVAL & INSTALLATION GUIDE

The Siltsack is a highly effective Inlet Protection Barrier for grated inlets. Installed below the grate and out of the way, Siltsacks provide a large surface area through which to filter incoming flow, and are equipped with overflow holes that prevent extended ponding following rain events. These heavy duty IPBs are ideal for both Stage 1 and Stage 2 applications, eliminating the need for the traditional two-solution approach. Constructed from high-strength polypropylene geotextile fabric, Siltsacks are durable and stand up to cleaning and reuse.



INSTRUCTIONS

Slide 1" rebar through lifting straps (notched loops in hem of Siltsack) on opposite sides of the grate. Lift Siltsack with forklift by sliding forks under the rebar and through the notches in the lifting straps, or by wrapping chain around the rebar and lifting with a front end loader.

Take Siltsack to appropriate dumping area and place on ground. Remove rebar and insert one rebar through the dump loops sewn into the bottom of the unit. Lift Siltsack by rebar to empty. Beat Siltsack, as you would a rug, to clean sediment from fabric, or wash down with water hose.

Once the Siltsack is clean, you can begin installation of new Silt sack. Remove the grate and wrap the Siltsack around the grate on all four sides. Be sure the rebar straps are above the grate for easy clean out. Use tie wire to secure the Siltsack to the grate on all four sides.

Installation of Siltsack can be performed by one man in less than five minutes, eliminating heavy equipment costs. Once the Siltsack is attached to the grate, place the grate back into the catch basin.

SCOPE OF INSPECTIONS

- Disturbed areas of the construction site which have not been finally stabilized;
- Areas used for storage of materials that are exposed to precipitation will be inspected for evidence of, or the potential for, pollutants entering the drainage system;
- Erosion and sediment control measures identified in the plan will be observed for evidence of, or the potential for, pollutant entering the drainage system---and to ensure that they are operating correctly;
- Locations where vehicles enter or exit the site will be inspected for evidence of offsite sediment tracking; and,
- Where discharge locations or points are accessible, they will be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

SCHEDULE OF INSPECTIONS

- Inspections will be conducted by the responsible person at least once every 7 calendar days.
- In the event of flooding or other uncontrollable situations which prohibit access to the site, inspections will be conducted as soon as access is practicable.
- The above detailed schedule may be changed a maximum of one time each month but must be implemented at the beginning of a calendar month, and the reason to the schedule change must be documented in this SWPPP

SWPPP MODIFICATIONS AS A RESULT OF INSPECTIONS

Based on the results of each inspection, Section 2 Site Description and Section 4 Controls elsewhere in this SWPPP will be revised as appropriate, but in no case later than 7 calendar days following the inspection. If modifications to BMPs are necessary, they will be implemented whenever possible before the next storm event, or if that is impracticable, the changes will be implemented as soon as practicable. Major modifications to this SWPPP will be logged in Section 11 SWPPP Amendments Log as they are made.
In addition to indication changing BMP needs and locations on the SWPPP Site Map, current locations of the following shall also be noted when applicable:

- Portable toilets
- Material storage areas
- Vehicle and equipment fueling and maintenance areas
- Concrete Washouts
- Paint and stucco washouts
- Dumpsters or other trash and debris containers
- Spill Kits
- Stockpiles
- Any temporarily removed structural BMPs

INSPECTION REPORT FORMAT

A report summarizing the scope of the inspection, name of personnel making the inspection, the date of the inspection, major observations relating to the implementation of the SWPPP, and actions taken in accordance the schedule noted above will be made and retained as part of this SWPPP for at least three years from the date that the site is finally stabilized. The reports will be signed in accordance with the TPDES General Permit. The completed Inspection Reports related to this SWPPP are found in Section 12 Inspection Records.

A sample of the Inspection Report Form to be used in conjunction with this SWPPP is included immediately behind this page. Qualifications of the site inspector(s) may be found in Section 10 Certifications and Documents, elsewhere in this SWPPP, as well as

the formal delegation of inspection responsibility by the Operator, to this individual/entity.

SWPPP INSPECTION REPORT

7 DAY CYCLE

PROJECT NAME:	DATE OF INSPECTION:	INSPECTOR NAME:

PHASE: (I) (II)	**CONSTRUCTION PHASE** (MAJOR GRADING AND/OR STABILIZATION ACTIVITIES): DEMO ☐ CLEARING ☐ ROUGH GRADE ☐ UTILITY INSTALL ☐ PAD PREP ☐ SLAB/PAVING PREP ☐ CONCRETE PLACEMENT ☐ FINAL GRADING ☐ LANDSCAPING ☐ FINAL STABILIZATION ☐

SWPPP SIGNAGE: IN PLACE & PROPERLY LOCATED? (Y) (N) **SWPPP POSTINGS:** ACCURATE, LEGIBLE & UP TO DATE? (Y) (N)	**SWPPP BOOK:** ONSITE & ACCESSIBLE? (Y) (N) **SWPPP NARRATIVE:** COMPLETE & UP TO DATE? (Y) (N)	**SWPPP INSPECTOR QUALIFICATIONS:** DOCUMENTED IN THE SWPPP? (Y) (N)

BMP OBSERVATIONS AND COMMENTS			DOCUMENT, INITIAL, & DATE IN FAR RIGHT COLUMN WHEN ISSUES ARE CORRECTED ⟶	INITIAL & DATE CORRECTIONS HERE
SCE	**STABILIZED CONSTRUCTION EXIT**			
DOES ALL TRAFFIC USE THE SCE?		(Y) (N)		
DOES SCE NEED REHABILITATION?		(Y) (N)		
DOES SEDIMENT NEED TO BE CLEANED FROM STREET?		(Y) (N)		
SF	**SILT FENCE**	**(N/A)**		
DOES SF NEED REPAIR OR RESET IN ANY AREA?		(Y) (N)		
IS SEDIMENT REMOVAL NEEDED IN ANY AREA?		(Y) (N)		
ANY EVIDENCE OF OVER-TOPPING OR WASHING-OUT?		(Y) (N)		
IPB	**INLET PROTECTION BARRIERS**	**(N/A)**		
ARE IPBs IN PLACE & FUNCTIONING PROPERLY?		(Y) (N)		
DO ANY IPBs NEED TO BE CLEANED & RESET?		(Y) (N)		
DO ANY IPBs NEED TO BE REPLACED?		(Y) (N)		
CW	**CONCRETE WASHOUT**	**(N/A)**		
IS CW IN PLACE, LOCATED & FUNCTIONING PROPERLY?		(Y) (N)		
DO SOLIDS AND/OR LIQUIDS NEED TO BE REMOVED?		(Y) (N)		
OTHER	**CONTROLS AND STABILIZATION**			
OTHER BMPs:		(N/A)		
ARE THESE BMPs FUNCTIONING PROPERLY?		(Y) (N) (N/A)		
ARE CHANNELS AND OUTFALLS PROTECTED PROPERLY?		(Y) (N) (N/A)		
ARE ANY OTHER BMPs NECESSARY?		(Y) (N)		
ARE ANY STABILIZATION MEASURES REQUIRED?		(Y) (N)		
HAZ ♦ MAT	**HAZARDOUS MATERIALS ONSITE**	**(N/A)**		
ARE HAZARDOUS CHEMICALS STORED PROPERLY?		(Y) (N) (N/A)		
ARE FUEL TANKS PROPERLY LOCATED & PROTECTED?		(Y) (N) (N/A)		
ARE CHEMICAL TOILETS PROPERLY LOCATED?		(Y) (N) (N/A)		
IS DUMPSTER LOCATED & USED APPROPRIATELY?		(Y) (N) (N/A)		
IS TRASH COLLECTED & STORED PROPERLY?		(Y) (N) (N/A)		
ARE ANY IMPROPER WASHDOWN ACTIVITIES EVIDENT?		(Y) (N) (N/A)		
IS ANY IMPROPER EQUIPMENT MAINTENANCE EVIDENT?		(Y) (N) (N/A)		
ARE ANY IMPROPER DEWATERING PRACTICES EVIDENT?		(Y) (N) (N/A)		

ADDITIONAL OBSERVATIONS AND COMMENTS:

CERTIFICATION: I CERTIFY UNDER THE PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHERED AND EVALUATED THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHER THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

IF NO EXCEPTIONS FOUND, I CERTIFY THAT ALL CONTROLS ARE ACCEPTABLE AND THIS PROJECT IS IN COMPLIANCE WITH THE SWPPP AND THE CONSTRUCTION GENERAL PERMIT. ☐

SIGNATURE:

____

_____

ATTACHMENT J

Schedule of Interim and Permanent Soil Stabilization Practices

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Effluent Limitation Guidelines (ELG) have been established under the renewed March 2018 TPDES General Permit. Please see Section G., page 40 of TXR15000 contained herein behind Tab 9.

EROSION AND SEDIMENTATION CONTROLS

Erosion control and stabilization practices may include but are not limited to: establishment of temporary or permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of existing trees and vegetation, slope texturing, temporary velocity dissipation devices, flow diversion mechanisms, and other similar measures.
Major erosion and sedimentation controls are indicated on the SWPPP Site Plan, located in the previous section, Section 3 Maps and Plans.

Short and Long-Term Goals and Criteria:

- Sediment will be retained on site to the extent practicable with consideration for local topography, soil type, and rainfall.
- Control measures will be properly selected, installed, and maintained in accordance with manufacturers' specifications and good engineering practices.
- If periodic inspections or other information indicates that a control is being used incorrectly, or that the control is performing inadequately, it will be replaced or modified immediately upon discovery.
- If sediment escapes the site, off-site accumulations will be removed at a frequency to minimize negative impacts and whenever feasible, prior to the next rain event.
- Sediment will be removed from sediment traps or sedimentation ponds when design capacity has been reduced by 50%.
- Litter, construction debris, and construction chemicals exposed to stormwater will be removed, covered or otherwise prevented from becoming a pollutant source.
- Offsite materials storage areas, if used (also including overburden and stockpiles of dirt, borrow areas, etc.), are considered a part of the project and will be addressed in the SWPPP.

STABILIZATION PRACTICES

Short and Long-Term Goals and Criteria:

- Erosion Control and Stabilization measures must be initiated immediately in portions of the site where construction activities have temporarily ceased and will not resume for a period exceeding 14 calendar days. Stabilization measures that provide a protective cover must be initiated immediately in portions of the site where construction activities have permanently ceased. The term "immediately" is used to define the deadline for initiating stabilization measures. In the context of this requirement, "immediately" means as soon as practicable, but no later than the end of the next work day, following the day when the earth-disturbing activities have temporarily or permanently ceased
    - Erosion control and stabilization practices may include but are not limited to: establishment of temporary or permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of existing trees and vegetation, slope texturing, temporary velocity dissipation devices, flow diversion mechanisms, and other similar measures.
- Except as provided below, these measures must be completed as soon practicable, but no more than 14 calendar days after the initial of soil stabilization measures:
    - Where the immediate initiation of vegetative stabilization measures after construction activity has temporarily or permanently ceased due to frozen conditions, non-vegetative controls must be implemented until thawing conditions are present, and vegetative stabilization measures can be initiated as soon as practicable.
    - In arid areas, semi-arid areas, or drought-stricken areas, as they are defined in Part I.B of this general permit, where the immediate initiation of vegetative stabilization measures after construction activity has temporarily or permanently ceased or is precluded by arid conditions, other types of erosion control and stabilization

measures must be initiated at the site as soon as practicable. Where vegetative controls are infeasible due to arid conditions, and within 14 calendar days of a temporary or permanent cessation of construction activity in any portion of the site, the operator shall immediately install non-vegetative erosion controls in areas of the construction site where construction activity is complete or has ceased. If non-vegetative controls are infeasible, the operator shall install temporary sediment controls

- In areas where non-vegetative controls are infeasible, the operator may alternatively utilize temporary perimeter controls. The operator must document in the SWPPP the reason why stabilization measures are not feasible; and must demonstrate that the perimeter controls will retain sediment on site to the extent practicable. The operator must continue to inspect the BMPs at the frequency established for unstabilized sites.
- The requirement for permittees to initiate stabilization is triggered as soon as it is known with reasonable certainty that construction activity at the site or in certain areas of the site will be stopped for 14 or more additional calendar days. If the initiation or completion of vegetative stabilization is prevented by circumstances beyond the control of the permittee, the permittee must employ and implement alternative stabilization measures immediately. When conditions at the site changes that would allow for vegetative stabilization, then the permittee must initiate or complete vegetative stabilization as soon as practicable.
- TCEQ does not expect that temporary or permanent stabilization measures to be applied to areas that are intended to be left un-vegetated or un-stabilized following construction (e.g., dirt access roads, utility pole pads, areas being used for storage of vehicles, equipment, or materials).

Interim and Permanent Stabilization Practices for this Site include:

- A stabilized construction exit will be constructed of 3x5 crushed concrete to minimize, to the extent practicable, the offsite tracking of sediment and generation of dust unless existing pavement is available.
- Any staging or parking areas will also be stabilized to minimize to the extent practicable, the offsite tracking of sediment and generation of dust.
- Newly graded areas will have textured soil surfaces to reduce sheet flow and improve surface water impoundment.
- Filter Fabric Fence will be used to protect perimeters and temporary earth stockpiles while they are in use.
- Vegetative stabilization will be initiated on all disturbed soil at the completion of construction.
- Upon completion of construction, landscaping, consisting of sod/hydro-mulch, mulch, trees, shrubs, and miscellaneous plant material will be installed.

SECTION F

Permanent Stormwater Section – Form TCEQ-0600

WGA CONSULTING ENGINEERS

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: David Aguayo

Date: 03/02/2023

Signature of Customer/Agent

Regulated Entity Name: Dry Creek

Permanent Best Management Practices (BMPs)

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

1. [X] Permanent BMPs and measures must be implemented to control the discharge of pollution from regulated activities after the completion of construction.

   [ ] N/A

2. [X] 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.

   [X] 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 multi-family 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. ☐ **Attachment B - BMPs for Upgradient Stormwater**.

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

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

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

7. ☒ **Attachment C - BMPs for On-site Stormwater**.

(Please reference the Permanent Stormwater Management in the SWPPP Booklet Sec.4)

☒ 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 and measures is attached. The plan includes all of the following:

(Please reference the SWPPP Booklet Sec.5 and 6)

- ☐ 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 or 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

ATTACHMENT A

20% or Less Impervious Cover Waiver

Not applicable to this project

WGA

CONSULTING ENGINEERS

Attachment B

BMPs for Upgradient Stormwater

Up-gradient stormwater runoff from the commercial property north of the site flows through their respective drainage structures into Dry Berry Creek Tributary 3 and will not flow across the site. The up-gradient stormwater runoff from the undeveloped lands and residential properties east of the site will be routed through a perimeter swale and discharged to Dry Berry Creek Tributary 3.

Upstream developed areas should have accounted for stormwater pollution, therefore implementing permanent BMPs. Undeveloped land up-gradient to the site will be required to comply with Texas Commission on Environmental Quality (TCEQ) regulations for development over the Edwards Aquifer Recharge Zone.

Attachment C

BMPs for On-Site Stormwater

The proposed site will utilize 15-ft wide Vegetative Filter Strips (VFS) for 15-ft wide along sections of the parking lot as shown on the Storm Water Quality Management Plan. The site will also utilize extended/batch detention inside two of the proposed detention ponds within the site via SmartPOND rotary weir features. The proposed best management practices (BMPs) will treat at least 80% of the increase in total suspended solids (TSS) for the site. The proposed VFS have been designed in accordance with the TCEQ Technical Guidance Manual (TGM) RG-348 (2005).

Attachment D

BMPs for Surface Streams

Not applicable to this project

WGA

CONSULTING ENGINEERS

Attachment E

Request to Seal Features

Not applicable until Geological Assessment is performed

WGA

CONSULTING ENGINEERS

Attachment F

Construction Plans

The construction plans and design calculations for the proposed permanent BMPs and measures for the proposed project to have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer and/or Landscape Architect. The design calculations, TCEQ Construction Notes, all man-made or naturally occurring geological features, all proposed structural measures, and appropriate details are shown on the construction plans.

The construction plans are enclosed following this page.

WGA

CONSULTING ENGINEERS

GEORGETOWN KEYSTONE

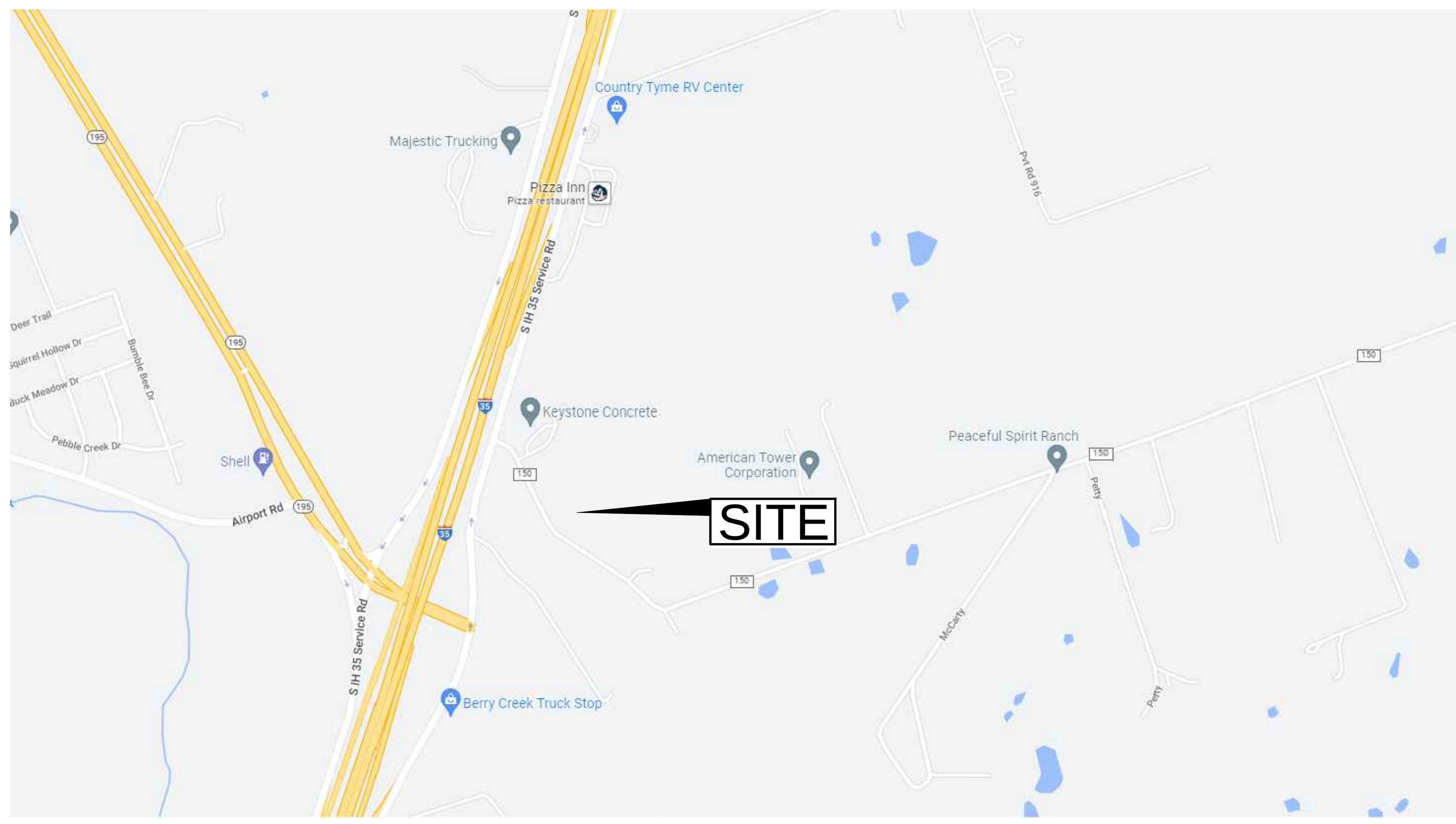
IH-35 & COUNTRY ROAD 150

WITHIN WILLIAMSON COUNTY, TX

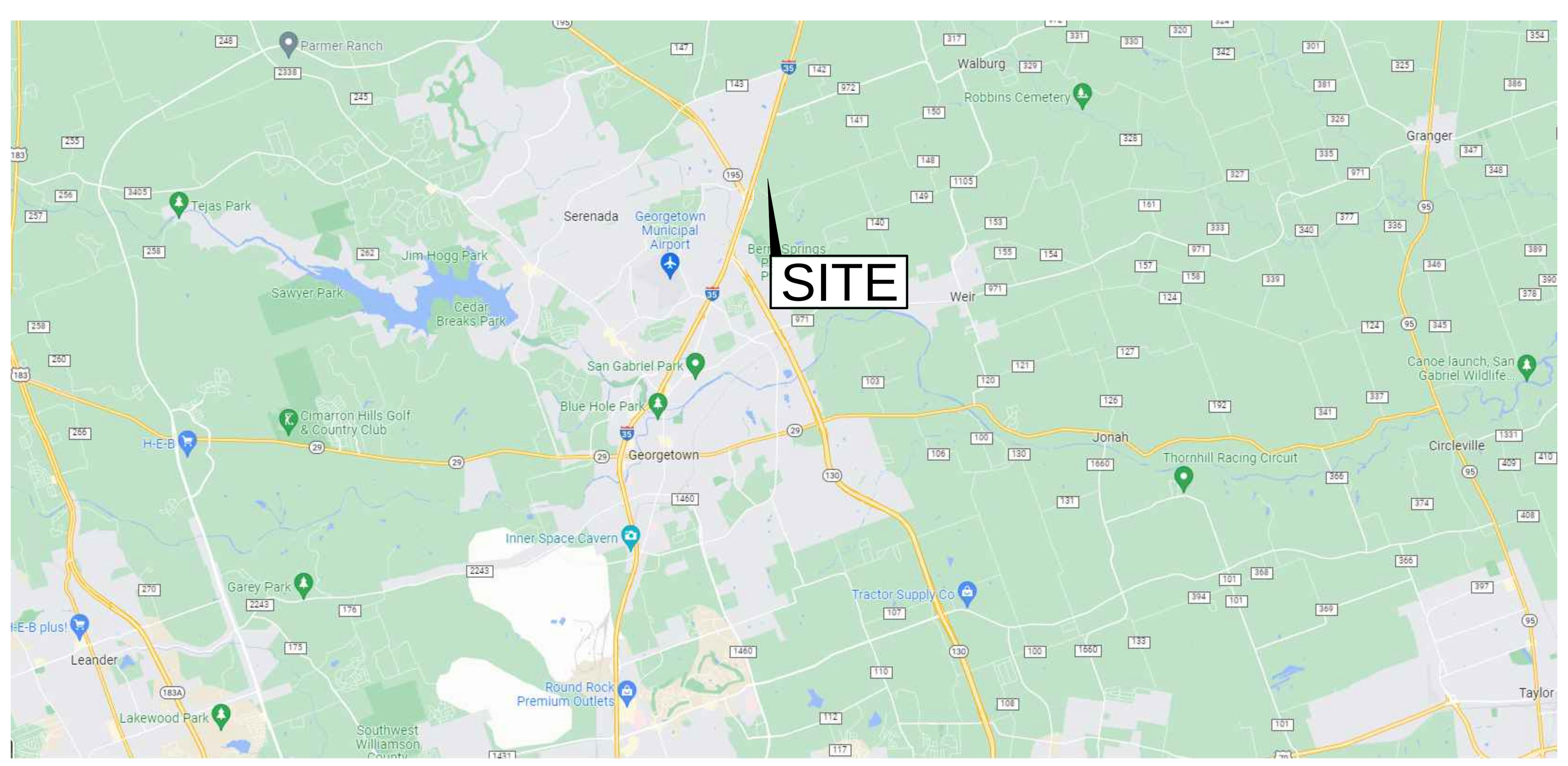
CONSTRUCTION PLANS
FOR PROPOSED

WATER DISTRIBUTION, SANITARY SEWER, PAVING & DRAINAGE

TCEQ PERMIT FOR
GEORGETOWN KEYSTONE



SITE MAP
SCALE: 1"=2,000'



ZIP CODE 78626

VICINITY MAP
SCALE: 1"=20,000'

DRAWING INDEX

DESIGNED BY: DA
CHECKED BY: DA
DRAWN BY: MM

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

December 2022
WGA PROJECT No. 00486-009

ONE-CALL NOTIFICATION SYSTEM
CALL BEFORE YOU DIG!!!
(713) 223-4567 (In Houston)
(New Statewide Number Outside Houston)
1-800-344-8377

C0.0

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\TCEQ Permit\C0.0 Cover_1.dwg Last Plotted: Thu Apr 13, 2023 - 5:41pm By: asalazar

GENERAL CONSTRUCTION NOTES

1. ALL PROPOSED CONSTRUCTION SHALL CONFORM TO THE LATEST STANDARDS, CODES AND SPECIFICATION. WHERE CONFLICT EXIST THE MORE STRINGENT REQUIREMENT SHALL BE ENFORCED.
2. CONTRACTOR SHALL VERIFY ALL EXISTING BENCHMARKS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION. IF NO VERIFICATION IS CONDUCTED CONTRACTOR SHALL ASSUME ALL RESPONSIBILITY.
3. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE TO THE EXISTING PUBLIC OR PRIVATE UTILITY LINES, INCLUDING BUT NOT LIMITED TO WATER LINES, WASTEWATER COLLECTION SYSTEMS AND STORM SEWERS, DURING CONSTRUCTION. ALL DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH ENGINEERING "STANDARD CONSTRUCTION SPECIFICATIONS" WITH LATEST ADDENDA AND AMENDMENTS THERETO, WITH NO COST TO THE PUBLIC.
4. EXISTING UTILITY INFORMATION SHOWN IS NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. ALL EXISTING UTILITY LOCATIONS ARE APPROXIMATE. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PROTECTING ALL EXISTING UTILITIES AND OTHER FACILITIES PRIOR TO CONSTRUCTION. ANY CONFLICT OR DISCREPANCY DISCOVERED MUST BE IMMEDIATELY BROUGHT TO THE ENGINEER'S ATTENTION.
5. THE CONTRACTOR SHALL NOTIFY ALL APPLICABLE AGENCIES AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF WORK, NOTIFICATIONS SHALL BE FOLLOWED WITH A LETTER, COPIES OF WHICH SHALL BE SENT TO THE ENGINEER.
6. THE CONTRACTOR, ON BEHALF OF THE OWNER, IS TO OBTAIN ALL NECESSARY PERMITS REQUIRED BY LOCAL JURISDICTIONS, PRIOR TO STARTING CONSTRUCTION.
7. GUIDELINES SET FORTH IN THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", AS CURRENTLY AMENDED, SHALL BE OBSERVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE FLAG MEN, SIGNAGE, STRIPING, AND WARNING DEVICES, ETC... DURING CONSTRUCTION - BOTH DAY AND NIGHT.
8. THE LOADING AND UNLOADING OF ALL PIPE, VALVES, HYDRANTS, MANHOLES, AND OTHER ACCESSORIES SHALL BE IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDED PRACTICES AND SHALL AT ALL TIMES BE PERFORMED WITH CARE TO AVOID ANY DAMAGE TO THE MATERIAL. THE CONTRACTOR SHALL LOCATE AND PROVIDE THE NECESSARY STORAGE AREAS FOR THE MATERIALS AND EQUIPMENT.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SHIPPING AND STORING OF ALL MATERIALS, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE SUCH MATERIAL AT THE POINT OF DELIVERY AND TO REJECT ALL DEFECTIVE MATERIAL. ANY DEFECTIVE MATERIAL INCORPORATED INTO THE WORK SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE. THERE SHALL BE NO PAYMENT MADE FOR STORED MATERIAL.
10. ALL PIPE AND REINFORCEMENT STEEL SHALL BE KEPT FREE OF DIRT AND OTHER DEBRIS. ANY DAMAGE TO THE COATING OF THE VARIOUS MATERIALS MUST BE REPAIRED.
11. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THE SATISFACTION OF THE OWNING AUTHORITY. ALL CONSTRUCTION STORM RUNOFF SHALL COMPLY WITH THE FINAL DRAFT OF STORMWATER MANAGEMENT HANDBOOK FOR CONSTRUCTION ACTIVITIES AND IN COMPLIANCE WITH THE TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM (TPDES) REQUIREMENTS.
12. ACCESS TO ALL EXISTING STREETS AND DRIVEWAYS SHALL BE MAINTAINED AT ALL TIMES.
13. CONTRACTOR IS TO MAINTAIN A CLEAN PROJECT AREA, FREE FROM WORKMAN TRASH AND REFUSE, AT ALL TIMES.
14. THE CONTRACTOR IS REQUIRED TO FOLLOW ALL APPLICABLE OSHA RULES AND REGULATIONS. TRENCH SAFETY SHALL BE DONE IN ACCORDANCE WITH OSHA STANDARDS.
15. ALL GEOTECHNICAL REPORTS (IF ANY) FOR THIS PROJECT ARE AVAILABLE FOR REFERENCE AT THE OFFICE OF THE ENGINEER.
16. SURFACE RESTORATION: AT THE END OF ALL CONSTRUCTION PROJECTS, THE CONTRACTOR SHALL RESTORE THE EXISTING FACILITIES, I.E. THE PROPERTY, EQUAL TO OR BETTER THAN EXISTING SITE CONDITIONS PRIOR TO THE CONSTRUCTION. ALL FINISHED GRADES SHALL VARY UNIFORMLY BETWEEN THE FINISHED ELEVATIONS SHOWN.
17. CONTRACTOR TO OBTAIN ALL PERMITS REQUIRED BY TEXAS FOR FLOOD PLAIN MANAGEMENT PRIOR TO STARTING CONSTRUCTION.

WATERLINE CONSTRUCTION NOTES

1. WATER LINES SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING.
2. 4" THRU 12" WATER LINES SHALL BE P.V.C. CLASS 150, DR-18, AWWA C-900. SMALLER THAN 4" WATER LINE SHALL BE PVC SCH 40 AS PER ASTM D1785 OR SEAMLESS COPPER TUBING TYPE "K" AS PER ASTM B88.
3. ALL WATERLINES, AFTER INSTALLATION, SHALL BE THOROUGHLY DISINFECTED ACCORDING TO AWWA SPECIFICATION C-651 AND THEN FLUSHED BEFORE BEING PLACED INTO SERVICE. AT LEAST ONE WATER SAMPLE PER 1000 FEET OF FINISHED LINE MUST BE COLLECTED AND SUBMITTED FOR BACTERIOLOGICAL ANALYSIS TO A LABORATORY CERTIFIED BY THE TEXAS DEPARTMENT OF HEALTH AND MUST MEET DEPARTMENT OF HEALTH REQUIREMENTS PRIOR TO PLACING LINES INTO SERVICE.
4. HYDROSTATIC TESTING: ALL WATER PIPE SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH AWWA C-600, SECTION STANDARDS FOR A DURATION OF NOT LESS THAN TWO HOURS. LEAKAGE SHALL BE DEFINED AS THE QUANTITY OF WATER THAT MUST BE SUPPLIED INTO THE NEWLY LAID PIPE OR ANY VALVED SECTION THEREOF, TO MAINTAIN PRESSURE WITHIN 5 PSI OF THE SPECIFIED TEST PRESSURE AFTER THE PIPE HAS BEEN FILLED WITH WATER AND THE AIR HAS BEEN EXPELLED. THE TEST PRESSURE SHALL BE EITHER A MINIMUM OF 125 PSIG OR 1.5 TIMES THE MAXIMUM DESIGN PRESSURE, WHICHEVER IS LARGER. THE MAXIMUM LEAKAGE SHALL BE CALCULATED USING THE FORMULA AS FOLLOWS:

   L = (S)(D)(P^1/2)/133,200
   WHERE L = ALLOWABLE LEAKAGE IN GAL./HR.
   S = LENGTH OF PIPE TESTED IN FEET
   D = INSIDE DIAMETER OF PIPE IN INCHES
   P = PRESSURE IN POUNDS PER SQUARE INCH (GAUGE)
5. 2,500 PSI CONCRETE THRUST BLOCKS SHALL BE PROVIDED AT ALL UNDERGROUND TEES BENDS AND LATERALS. THEY SHALL BE BUILT AS PER THE DETAILS PROVIDED TO PREVENT PIPE MOVEMENT.
6. ALL ABOVE GROUND DUCTILE IRON PIPE CONNECTIONS SHALL BE FLANGED. UNDERGROUND DUCTILE IRON PIPE CONNECTIONS SHALL BE BOLTLESS AND PUSH-ON AFTER THE FIRST FLANGED FITTING BELOW GRADE UNLESS NOTED OTHERWISE ON THE PLANS.
7. ALL FLANGES BELOW GRADE SHALL HAVE STAINLESS STEEL BOLTS AND NUTS AND SHALL BE INSULATED.
8. ALL WATER VALVES SHALL OPEN COUNTER CLOCKWISE. ALL WATER VALVES SHALL BE SUPPLIED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF AWWA C-500 AND SHALL BE OF THE RESILIENT SEAT TYPE.
9. ALL BELOW GRADE VALVES SHALL BE GASKETED, HUB-END GATE VALVES WITH A CAST IRON BOX, EXCEPT WHERE FLANGES ARE CALLED OUT ON THE PLANS.
10. ALL WATER LINES TO HAVE 4' MINIMUM COVER TO FINISHED GRADE AND MINIMUM 12" CLEARANCE TO OTHER UTILITIES AT CROSSING UNLESS OTHERWISE NOTED ON PLANS. ALL WATER LINE INSTALLED OVER 8' DEEP SHALL UTILIZE RESTRAINED JOINT FITTINGS
11. MAINTAIN MINIMUM 9-F00T HORIZONTAL CLEARANCE BETWEEN OUTSIDE OF SANITARY SEWER MANHOLE AND WATERLINE AND IN SEPARATE TRENCHES.
12. SANITARY PRECAUTIONS MUST BE TAKEN DURING WATERLINE CONSTRUCTION, PER AWWA STANDARDS. PRECAUTIONS INCLUDE KEEPING THE PIPE CLEAN AND CAPPING OR OTHERWISE EFFECTIVELY COVERING OPEN PIPE ENDS TO EXCLUDE INSECTS, ANIMALS OR OTHER SOURCES OF CONTAMINATION FORM UNFINISHED PIPE LINES AT TIMES WHEN CONSTRUCTION IS NOT IN PROGRESS.
13. CONTRACTOR SHALL PROVIDE FOR A MINIMUM OF 2 FEET CLEARANCE AT THE STORM SEWER AND WATER LINE CROSSINGS AND SANITARY SEWER AND WATER LINE CROSSINGS. THE WATER LINE SHALL BE LOCATED AT A HIGHER LEVEL THAN THE SANITARY SEWER WHENEVER POSSIBLE.
14. ALL WATER LINE FITTINGS SHALL BE DUCTILE IRON COMPACT FITTINGS PER AWWA 153, UNLESS OTHERWISE NOTED.
15. THE CENTER OF FIRE HYDRANTS ARE TO BE LOCATED 3'-0" BEHIND THE BACK OF CURBS UNLESS OTHERWISE SHOWN. THE STEAMER NOZZLE SHALL BE A MINIMUM OF 18 (AND A MAXIMUM OF 30) INCHES ABOVE FINISHED GRADE, AND SHALL FACE THE STREET PAVEMENT UNLESS OTHERWISE SHOWN. ALL FIRE HYDRANTS SHALL BE PAINTED IN ACCORDANCE WITH LOCAL STANDARDS.

PAVING CONSTRUCTION NOTES

1. CONTRACTOR SHALL OBTAIN ENGINEERS OR OWNERS APPROVAL OF GRADES PRIOR TO PLACEMENT OF ANY PAVEMENT. IF APPROVAL IS NOT OBTAINED CONTRACTOR SHALL BE RESPONSIBLE FOR PAVEMENT PLACED.
2. ALL TEMPORARY AND PERMANENT SIGNAGE MUST COMPLY WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, MOST RECENT EDITION WITH REVISIONS.
3. ALL PAVING WIDTHS, CURB RADII, AND CURB ALIGNMENT SHOWN INDICATE FACE OF CURB. T.C. INDICATES TOP OF CURB. T.P. INDICATES TOP OF PAVEMENT ELEVATIONS.
4. THE CONTRACTOR SHALL PROTECT ALL UTILITIES, SIDEWALKS, PAVEMENT, ETC. AND SHALL REPAIR OR REPLACE AT HIS EXPENSE ANY FACILITIES DAMAGED DURING PAVING OR GRADING OPERATIONS.
5. DRIVEWAY CONNECTIONS IN COUNTY STREET RIGHT-OF-WAY SHALL HAVE COMPLY WITH DETAILS ON THESE PLANS.
6. AREAS TO BE FILLED SHALL BE SCARIFIED AND COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY (+3% OF OPTIMUM MOISTURE) PER ASTM D-698 TO A DEPTH OF 6" PRIOR TO FILL PLACEMENT. FILL MATERIAL SHALL BE PLACED IN MAXIMUM 8" THICK LIFTS (MEASURED LOOSE) AND COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY (+ 3% OF OPTIMUM MOISTURE) PER ASTM D-698. FILL SHALL BE CLEAN EARTH AND BE FREE FROM TRASH, VEGETATION AND LARGE STONES. TEST REPORTS SHALL BE SUBMITTED PRIOR TO PLACEMENT OF PAVEMENT.
7. NECESSARY TESTING OF SUBGRADE AND PAVEMENT TO PROVE THAT THESE ITEMS MEET REQUIREMENTS SHALL BE DONE BY A COMMERCIAL TESTING LABORATORY ENGAGED BY THE CONTRACTOR.
8. WHERE PROPOSED PAVEMENT IS TO MEET EXISTING PAVEMENT, THE EXISTING REBAR OR DOWELS SHALL BE CLEANED AND TIED INTO THE PROPOSED PAVEMENT, USING A MINIMUM OF 30 BAR DIAMETERS LAPS. WHERE PROPOSED CONCRETE ENDS AT A CONSTRUCTION JOINT OR EXPANSION JOINT, THE REBAR SHALL BE EXTENDED A MINIMUM LENGTH OF 30 BAR DIAMETERS, COATED WITH ASPHALT AND WRAPPED WITH BURLAP.
9. ALL CONCRETE PAVEMENT SHALL BE OF SPECIFIED THICKNESS SHOWN. ALL CONCRETE SHALL BE A 5 SACK MIX WITH A MINIMUM 500 P.S.I. FLEXURAL STRENGTH AT 7 DAYS AND A MINIMUM 3500 P.S.I. COMPRESSIVE STRENGTH AT 28 DAYS. REINFORCING STEEL SHALL CONFORM TO ASTM A-615, GRADE 60.
10. ALL CUL-DE-SAC ISLANDS AND MEDIANS SHALL HAVE STANDARD 6"CONCRETE CURBS.
11. SIDEWALKS SHALL BE BUILT IN ACCORDANCE WITH DESIGN STANDARDS. ALL INTERSECTIONS SHALL BE CONSTRUCTED WITH WHEELCHAIR RAMPS, IN CONFORMANCE WITH THE GOVERNOR'S OFFICE OF TRAFFIC SAFETY MEMORANDUM DATED MAY 6, 1976 (HIGHWAY SAFETY ACT, 1973, SEC 288). AMERICANS WITH DISABILITIES ACT (ADA) AND TEXAS ACCESSIBILITY STANDARDS (TAS) SHALL BE COMPLIED WITH IN ALL SIDEWALK CONSTRUCTION.
12. CONCRETE WASH-OUT AREAS ARE TO BE PROVIDED BY THE CONTRACTOR AT A LOCATION ACCEPTABLE TO THE OWNER.UNDER NO CIRCUMSTANCES IS THE CONTRACTOR TO PERMIT CONCRETE TRUCKS TO WASH AT ANY AREA OTHER THAN THAT DESIGNATED.
13. STREET NAME SIGNS SHALL BE BUILT IN ACCORDANCE WITH LOCAL REQUIREMENTS AND SPECIFICATIONS, AND BEAR STREET NAMES AS PER RECORDED PLAT.
14. A DOUBLE-REFLECTORIZED BLUE TRAFFIC MARKER SHALL BE PLACED ON A ONE FOOT OFFSET OF THE PAVEMENT CENTERLINE AT ALL FIRE HYDRANT LOCATIONS BY THE CONTRACTOR. HYDRANTS LOCATED AT INTERSECTIONS SHALL HAVE A MARKER PLACED ON EACH STREET. THERE WILL BE NO SEPARATE PAYMENT FOR THESE MARKERS.

STORM SEWER CONSTRUCTION NOTES

1. ALL STORM SEWERS SHALL BE EITHER REINFORCED CONCRETE PIPE CONFORMING TO ASTM C-76, CLASS III WITH RUBBER GASKET JOINTS PER ASTM C-443, OR HIGH DENSITY POLYETHYLENE PIPE (SMOOTH INTERIOR) CONFORMING TO AASHTO M294 WITH ELASTOMERIC COMPOUND GASKET JOINTS PER ASTM D3212.
2. CIRCULAR AND ELLIPTICAL REINFORCED CONCRETE PIPE SHALL BE INSTALLED USING RUBBER GASKET JOINTS CONFORMING TO ASTM C443 AND ASTM C877 RESPECTIVELY.
3. ALL STORM SEWER MANHOLES SHALL BE STANDARD TYPE "C" MANHOLES UNLESS OTHERWISE NOTED ON PLANS AND MUST INCLUDE THE WORDS "STORM SEWER".
4. ALL INLETS SHALL BE TYPE B-B UNLESS OTHERWISE NOTED ON ALL THE PLANS. DEPTH OF INLETS SHALL BE INCREASED BEGINNING AT 2'-6" AND AS NECESSARY TO ACCOMMODATE THE DIAMETER AND ANGLE OF THE EXIT PIPE.
5. ALL STORM SEWER PIPES AND INLET LEADS WITHIN PUBLIC R.O.W. SHALL BE 24-INCH AND LARGER R.C.P. (C-76, CLASS III).
6. ALL PROPOSED PIPE STUB-OUTS FROM MANHOLES AND INLETS ARE TO BE PLUGGED WITH 8" BRICK WALLS UNLESS OTHERWISE NOTED.
7. STORM SEWERS SHALL BE INSTALLED, BEDDED, AND BACKFILLED IN ACCORDANCE WITH DESIGN STANDARDS AS APPLICABLE UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
8. ALL SEWER UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED AND FUTURE CURBS SHALL BE BACKFILLED WITH 1-1/2 SACK CEMENT/C.Y. STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE. THE REMAINING DEPTH OF TRENCH SHALL BE BACKFILLED WITH SUITABLE EARTH MATERIAL.
9. CONTRACTOR SHALL PROVIDE 12" MINIMUM CLEARANCE AT STORM SEWER AND WATER LINE CROSSINGS.
10. ALL TRENCH BACKFILLS SHALL BE IN 8" LIFTS, WITH TESTS TAKEN AT 100 FOOT INTERVALS ON EACH LIFT, AND MECHANICALLY COMPACTED TO A DENSITY OF NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR COMPACTION TEST (ASTM D-698/AASHTO T99).
11. ADJUST MANHOLE COVERS, INLETS, AND VALVE BOXES TO GRADE.
12. ALL DITCHES SHALL BE REGRADED TO PROPOSED ELEVATIONS TO ENSURE PROPER DRAINAGE. ALL OUTFALLS SHALL BE PROPERLY BACKFILLED AND COMPACTED. ALL DISTURBED AREA SHALL BE REGRADED, SEEDED, AND FERTILIZED.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING, MAINTAINING AND RESTORING ANY BACK SLOPE DRAINAGE SYSTEM DISTURBED AS A RESULT OF HIS WORK.
14. ALL DRIVEWAYS WILL BE LOCATED TO AVOID EXISTING CURB INLET STRUCTURES.
15. FLOW LINES OF CULVERTS IN ROW TO BE SET PER DIRECTION OF COUNTY PRECINCT ENGINEER.

SANITARY SEWER CONSTRUCTION NOTES

1. SANITARY SEWER SHALL BE CONSTRUCTED IN ACCORDANCE WITH ENGINEERING DESIGN STANDARDS.
2. 8" AND LARGER SANITARY SEWER PIPE AND FITTINGS TO BE SDR-26 P.V.C. PIPE MEETING ASTM SPECIFICATION D3034 WITH RUBBER GASKET JOINTS UNLESS OTHERWISE NOTED. 6" AND SMALLER SANITARY SEWER PIPE TO BE SCH. 40 P.V.C. PIPE.
3. NO CONNECTION SHALL BE MADE TO THE EXISTING SANITARY SEWER LINES UNTIL ALL PROPOSED SEWER LINES HAVE BEEN THOROUGHLY CLEANED, TESTED AND APPROVED BY THE ENGINEER. THE ENGINEER SHALL BE NOTIFIED AT LEAST 48 HOURS PRIOR TO THE CONTRACTOR CONNECTING TO ANY EXISTING SEWER LINES.
4. DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE AND SEMI-RIGID PIPE, EXCEPT SERVICE LEADS. THE TEST SHALL BE CONDUCTED AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS. NO PIPE SHALL EXCEED A DEFLECTION OF 5%. THE TEST IS TO BE RUN USING A MANDREL HAVING AN OUTSIDE DIAMETER EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE. THE TEST SHALL BE PERFORMED WITHOUT MECHANICAL PULLING DEVICES.
5. SANITARY LINES CROSSING WATER LINES ARE TO BE GREEN P.V.C. CLASS 150, DR-18, AWWA C-900 AND MUST HAVE A FULL LENGTH JOINT (20' NOMINAL) CENTERED AT THE CROSSING WITH A MINIMUM SEPARATION DISTANCE OF 2 FEET.
6. ALL SEWER LINES (INCLUDING SERVICE LEADS) ENTERING A MANHOLE AT A FLOWLINE HIGHER THAN 24-INCHES ABOVE THE MANHOLE INVERT MUST BE PROVIDED WITH A DROP PIPE AND HAVE THE INVERT FILLETED.
7. ALL SANITARY SEWER MANHOLES SHALL BE PRE-CAST TYPE ONLY AND SHALL INCLUDE THE WORD "SANITARY" ON THE COVER.
8. INFILTRATION/EXFILTRATION TEST: EITHER OF THE FOLLOWING INFILTRATION/EXFILTRATION TESTS SHALL BE PERFORMED WITHIN THE SPECIFIED TOLERANCES ON ALL GRAVITY SEWERS.

   A. WATER TEST: TOTAL LEAKAGE SHALL NOT EXCEED 50 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF 2 FEET.

   B. LOW - PRESSURE AIR TEST: PERFORM TEST ACCORDING TO UNI-B-6-9 OR OTHER APPROPRIATE PROCEDURES. MINIMUM ALLOWABLE TIME FOR PRESSURE DRIP FROM 3.5 PSIG TO 2.5 PSIG SHALL BE AS FOLLOWS:

   8": 530 SECONDS OR 1.7785(L) FOR TEST LENGTHS GREATER THEN 298'.

   10": 664 SECONDS OR 2.7782(L) FOR TEST LENGTHS GREATER THAN 239'.

   12": 795 SECONDS OR 3.995(L) FOR TEST LENGTHS GREATER THAN 199'.
9. PRIVATE SAN. SWRS. ARE TO BE PRIVATELY OWNED, OPERATED AND MAINTAINED BY SERVICED PROPERTY OWNER.

TRAFFIC NOTES

1. CONTRACTOR SHALL PROVIDE AND INSTALL TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH PART VI OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TEXAS MUTCD, MOST RECENT EDITION WITH REVISIONS) DURING CONSTRUCTION.
2. GUIDELINES SET FORTH IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" SHALL BE OBSERVED.
3. NO LANES SHALL BE CLOSED DURING THE HOURS OF 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:30 PM MONDAY THRU FRIDAY.
4. OFF DUTY POLICE OFFICERS/FLAGGERS ARE REQUIRED TO DIRECT TRAFFIC WHEN LANES ARE BLOCKED.
5. CONTRACTOR SHALL COVER THE EXCAVATION WITH STEEL PLATES ANCHORED PROPERLY DURING NON-WORKING HOURS AND ALLOW NORMAL TRAFFIC FLOW. IF COVERING IS NOT FEASIBLE, USE TRANTEX FR 336 EFX 36" DELINEATOR OR APPROVED EQUAL WITH SHEETING AND BASE EPOXIED TO PAVEMENT NEXT TO EXCAVATION DURING NON-WORKING HOURS.
6. APPROVED COPIES OF "TRAFFIC CONTROL PLANS" SHALL BE AVAILABLE FOR INSPECTION AT ALL TIMES.
7. IF THE CONTRACTOR CHOOSES TO USE A DIFFERENT METHOD OF TRAFFIC CONTROL PLAN DURING THE CONSTRUCTION THAN WHAT IS OUTLINED IN THE CONTRACT DRAWINGS, (S)HE SHALL BE RESPONSIBLE TO PREPARE AND SUBMIT ALTERNATE PLANS* FOR APPROVAL TEN WORKING DAYS PRIOR TO IMPLEMENTATION.

* THESE PLANS SHALL BE DRAWN TO SCALE ON REPRODUCIBLE MYLARS AND SEALED BY A LICENSED ENGINEER IN THE STATE OF TEXAS. PLANS WILL BECOME A PART OF THE CONTRACT DRAWINGS.

8. IF THE PROJECT IS WITHIN 400 FEET FROM A SIGNALIZED INTERESCTION, THE CONTRACTOR SHALL CONTACT THE TRAFFIC SIGNAL DIVISION FIVE (5) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION.

SWPPP CONSTRUCTION NOTES

1. CONTRACTOR SHALL IMPLEMENT INLET PROTECTION DEVICES AND REINFORCED FILTER FABRIC BARRIER ALONG ROAD AND SIDE DITCHES AT LOCATIONS SHOWN ON THE TYPICAL STORM WATER POLLUTION PREVENTION (SWPPP) PLANS TO KEEP SILT AND/OR EXCAVATED MATERIALS FROM ENTERING INTO THE STORM WATER INLETS AND DITCHES EVENTUALLY POLLUTING THE RECEIVING STORM.
2. DURING THE EXCAVATION PHASE OF THE PROJECT, CONTRACTOR SHALL SCHEDULE THE WORK IN SHORT SEGMENTS SO THAT EXCAVATED MATERIAL CAN BE QUICKLY HAULED AWAY FROM THE SITE AND TO PREVENT IT FROM STAYING UNCOLLECTED ON THE EXISTING PAVEMENT. ANY LOOSE EXCAVATED MATERIAL WHICH FALL ON PAVEMENTS OR DRIVEWAYS SHALL BE SWEPT BACK INTO THE EXCAVATED AREA.
3. CONTRACTOR SHALL CLEAN UP THE EXISTING STREET INTERSECTIONS AND DRIVEWAYS DAILY, AS NECESSARY, TO REMOVE ANY EXCESS MUD, SILT OR ROCK TRACKED FROM THE EXCAVATED AREA.
4. CONTRACTOR SHALL FOLLOW GOOD HOUSEKEEPING PRACTICES DURING THE CONSTRUCTION OF THE PROJECT, ALWAYS CLEANING UP DIRT AND LOOSE MATERIAL AS CONSTRUCTION PROGRESSES.
5. CONTRACTOR TO INSPECT AND MAINTAIN THE AREAS LISTED BELOW AT LEAST ONCE EVERY FOURTEEN (14) CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.5 INCHES OR GREATER.

   A) DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED.

   B) AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION.

   C) STRUCTURAL CONTROL MEASURES.

   D) LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE.
6. CONTRACTOR TO BE RESPONSIBLE TO MAINTAIN EXISTING DITCHES AND/OR CULVERTS FOR UNOBSTRUCTED DRAINAGE AT ALL TIMES. WHERE SODDING IS DISTURBED BY EXCAVATION ON BACKFILLING OPERATIONS, SUCH AREAS SHALL BE REPLACED BY SEEDING OR SODDING. SLOPES 4:1 OR STEEPER SHALL BE REPLACED BY BLOCK SODDING.

PRIVATE UTILITY NOTES

WARNING: OVERHEAD ELECTRICAL FACILITIES

OVERHEAD LINES MAY EXIST ON THE PROPERTY. THE LOCATION OF OVERHEAD LINES HAS NOT BEEN SHOWN ON THESE DRAWINGS AS THE LINES ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH & SAFETY CODE, FORBIDS ACTIVITIES THAT OCCUR IN CLOSE PROXIMITY TO HIGH VOLTAGE LINES, SPECIFICALLY:

- ANY ACTIVITY WHERE PERSON OR THINGS MAY COME WITHIN SIX(6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES; AND
- OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER, HOISTING EQUIPMENT, OR SIMILAR APPARATUS WITHIN 10 FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES.

PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS, ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL CENTERPOINT ENERGY AT 713-207-2222.

ACTIVITIES ON OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY

NO APPROVAL TO USE, CROSS OR OCCUPY CENTERPOINT FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE CENTERPOINT PROPERTY, PLEASE CONTACT OUR SURVEYING & RIGHT OF WAY DIVISION AT (713) 207-6348 OR (713) 207-5769.

CAUTION: AT&T TEXAS/SWBT FACILITIES

1. THE LOCATIONS OF AT&T TEXAS/SWBT FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.
2. THE CONTRACTOR SHALL CALL 1-800-344-8377 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.
3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OFAT&T TEXAS/SWBT FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING THE CONTRACTOR SHALL EXPOSE THE AT&T TEXAS/SWBT FACILITIES.
4. WHEN AT&T TEXAS/SWBT FACILITIES ARE EXPOSED, THE CONTRACTOR SHOULD PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES, WHEN EXCAVATING NEAR TELEPHONE POLES THE CONTRACTOR SHALL BRACE THE POLE FOR SUPPORT.
5. THE PRESENCE OR ABSENCE OF AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES OR BURIED CABLE FACILITIES SHOWN ON THESE PLANS DOES NOT MEAN THAT THERE ARE NO DIRECT BURIED CABLES OR OTHER CABLES IN CONDUIT IN THE AREA.
6. PLEASE CONTACT THE AT&T TEXAS/SWBT DAMAGE PREVENTION MANAGER MR. ROOSEVELT LEE JR. (713)567-4552 OR E-MAIL HIM AT RL7259@ATT.COM, IF THERE ARE QUESTION ABOUT BORING OR EXCAVATING NEAR OUR AT&T TEXAS/SWBT FACILITIES.

CAUTION: UNDERGROUND GAS FACILITIES

LOCATIONS OF CENTERPOINT ENERGY MAIN LINES (TO INCLUDE CENTERPOINT ENERGY, INTRASTATE PIPELINE LLC, WHERE APPLICABLE) ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. SERVICE LINES ARE USUALLY NOT SHOWN. OUR SIGNATURE ON THESE PLANS ONLY INDICATES THAT OUR FACILITIES ARE SHOWN IN APPROXIMATE LOCATION. IT DOES NOT IMPLY THAT A CONFLICT ANALYSIS HAS BEEN MADE. THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT 1-800-545-6005 OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

WHEN CENTERPOINT ENERGY PIPE LINE MARKINGS ARE NOT VISIBLE, CALL 713-945-8036 OR 713-945-8037 (7:00 AM TO 4:30 PM) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.

WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.

WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.

FOR EMERGENCIES REGARDING GAS LINES CALL (713) 659-3552 OR (713) 207-4200

THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

The following TCEQ requirements (Form TCEQ-0592, Rev. 7/15/15) are applicable to all work in the recharge zone of the Edwards Aquifer in Hays, Travis and/or Williamson Counties and must be adhered to by the Contractor and all Subcontractors:

1. A written notice of construction must be submitted to the TCEQ regional office at least 48 hours prior to the start of any regulated activities. This notice must include:
   - the name of the approved project;
   - the activity start date; and
   - the contact information of the prime contractor.
2. All contractors conducting regulated activities associated with this project must be provided with complete copies of the approved Water Pollution Abatement Plan (WPAP) and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractors are required to keep on-site copies of the approved plan and approval letter.
3. If any sensitive feature(s) (caves, solution cavity, sink hole, etc.) is discovered during construction, all regulated activities near the sensitive feature must be suspended immediately. The appropriate TCEQ regional office must be immediately notified of any sensitive features encountered during construction. Construction activities may not be resumed until the TCEQ has reviewed and approved the appropriate protective measures in order to protect any sensitive feature and the Edwards Aquifer from potentially adverse impacts to water quality.
4. No temporary or permanent hazardous substance storage tank shall be installed within 150 feet of a water supply source, distribution system, well, or sensitive feature.
5. Prior to beginning any construction activity, all temporary erosion and sedimentation (E&S) control measures must be properly installed and maintained in accordance with the approved plans and manufacturers specifications. If inspections indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations. These controls must remain in place until the disturbed areas have been permanently stabilized.
6. Any sediment that escapes the construction site must be collected and properly disposed of before the next rain event to ensure it is not washed into surface streams, sensitive features, etc.
7. Sediment must be removed from the sediment traps or sedimentation basins not later thanwhen it occupies 50% of the basin's design capacity.
8. Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from being discharged offsite.
9. All spoils (excavated material) generated from the project site must be stored on-site with proper E&S controls. For storage or disposal of spoils at another site on the Edwards Aquifer Recharge Zone, the owner of the site must receive approval of a water pollution abatement plan for the placement of fill material or mass grading prior to the placement of spoils at the other site.
10. If portions of the site will have a temporary or permanent cease in construction activity lasting longer than 14 days, soil stabilization in those areas shall be initiated as soon as possible prior to the 14th day of inactivity. If activity will resume prior to the 21st day, stabilization measures are not required. If drought conditions or inclement weather prevent action by the 14th day, stabilization measures shall be initiated as soon as possible.
11. The following records shall be maintained and made available to the TCEQ upon request:
    - the dates when major grading activities occur;
    - the dates when construction activities temporarily or permanently cease on a portion of the site; and
    - the dates when stabilization measures are initiated.
12. The holder of any approved Edward Aquifer protection plan must notify the appropriate regional office in writing and obtain approval from the executive director prior to initiating any of the following:

    A. any physical or operational modification of any water pollution abatement structure(s), including but not limited to ponds, dams, berms, sewage treatment plants, and diversionary structures;
    B. any change in the nature or character of the regulated activity from that which was originally approved or a change which would significantly impact the ability of the plan to prevent pollution of the Edwards Aquifer;
    C. any development of land previously identified as undeveloped in the original water pollution abatement plan.

TCEQ REGIONAL OFFICE

Austin Regional Office
12100 Park 35 Circle
Bldg A, Room 179
Austin, Texas 78753
Phone: (512) 339-2929
Fax: (512) 339-3795

Texas Department of Transportation | Austin District Standard

TCEQ REQUIREMENTS FOR THE RECHARGE ZONE OF THE EDWARDS AQUIFER

TCEQ-RZ-19(AUS)

REVISIONS	CONT	SECT	JOB	HIGHWAY
01/10/14: REQUIREMENTS AND ADDRESS UPDATED 01/21/16: REQUIREMENTS UPDATED 09/24/19: UPDATED RELEASE YEAR				
	DIST	COUNTY		SHEET NO.

GENERAL NOTES

1. It is the responsibility of the property owner, and successors to the current property owner, to ensure the subject property and any improvements are maintained in conformance with this Site Development Plan.
2. This development shall comply with all standards of the Unified Development Code (UDC), the City of Georgetown Construction Standards and Specifications Manual, the Development Manual and all other applicable City standards.
3. This Site Development Plan shall meet the UDC Stormwater requirements.
4. All signage requires a separate application and approval from the Inspection Services Department. No signage is approved with the Site Development Plan.
5. Sidewalks shall be provided in accordance with the UDC.
6. Driveways will require approval by the Development Engineer of the City of Georgetown.
7. Outdoor lighting shall comply with Section 7.04 of the UDC.
8. Screening of mechanical equipment, dumpsters and parking shall comply with Chapter 8 of the UDC. The screening is shown on the Landscape and Architectural Plans, as applicable.
9. The companion Landscape Plan has been designed and plant materials shall be installed to meet all requirements of the UDC.
10. All maintenance of required landscape shall comply with the maintenance standards of Chapter 8 of the UDC.
11. A separate Irrigation Plan shall be required at the time of building permit application.
12. Fire flow requirements of ______ per minute (include amount) are being met by this plan.
13. Any Heritage Tree noted on this Site Development Plan is subject, in perpetuity, to the maintenance, care, pruning and removal requirements of the Unified Development Code.
14. The construction portion of these 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 the Standard Construction Specifications and Details Manual and all other applicable City, State and Federal Requirements and Codes.
15. This project is subject to all City Standard Construction Specifications and Details in effect at the time of submittal of the project to the City.
16. Where no existing overhead infrastructure exists, underground electric utility lines shall be located along the street and within the site. Where existing overhead infrastructure is to be relocated, it shall be re-installed underground and the existing facilities shall be removed at the discretion of the Development Engineer.
17. All electric and communication infrastructure shall comply with UDC Section 13.06.

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

GENERAL NOTES

SCALE	DESIGN	DRAWN
N/A	DA	MM/CR

SHEET
A.1

PROJECT No. 00486-009

SITE		SF
TYPE	AREA	AREA (SF)
INDUSTRIAL SITE AREA	**49.27 acres**	**2,146,086.45 ft²**
KEYSTONE SITE AREA	**14.26 acres**	**621,011.71 ft²**
	63.52 acres	**2,767,098.16 ft²**

BUILDING	
TYPE	AREA
CROSS DOCK	**457,400 SF**
FRONT LOAD	**130,761 SF**
REAR LOAD	**64,053 SF**
EXPANSION	**6,560 SF**
NEW SHOP BLDG	**23,420 SF**
TOTAL	**682,195 SF**

SITE COVERAGE	
TYPE	AREA
TOTAL SITE COVERAGE	24.65%
	30% OF INDUSTRIAL BUILDINGS / INDUSTRIAL SITE

PARKING	
TYPE	SPACES
KEYSTONE SURFACE PARKING	73
PUMP TRUCK PARKING 12X55	12
SEMI PARKING 12X70	10
SURFACE PARKING	506
TRAILER STORAGE 12X55	91

SITE INFORMATION	
TYPE	AREA
POND	57,272 SF
POND	135,155 SF
POND	29,587 SF
TOTAL	222,015 SF

CITY OF GEORGETOWN IMPERVIOUS REQUIREMENTS:
*OVER EDWARDS AQUIFER & LARGER THAN 5 ACRES:
Impervious Cover % = [0.70 × 5 acres] + [0.55 × (Total Acreage - 5 acres)] / Total Acreage × 100

Impervious Cover % = [0.70 × 5 acres] + [0.55 × (63.86 ACRES - 5 acres)] / 63.86 × 100 = ***56.17% IMPERVIOUS COVERAGE REQUIRED***

Impervious Coverage Waivers:
A. Approved Waivers-

1. Low Impact Site Design - 7% a.The Director shall increase the amount of permitted impervious cover by seven percent (7%) if the development provides low impact development site design features such as:
   v.Wet ponds; and
   vi.Using grassed filter strips and vegetated swales in place of traditional curb-and-gutter type drainage systems.
2. Parking Lot Design - 5% The Director shall increase the amount of permitted impervious cover by five percent (5%) if the development provides a parking lot design that breaks up the parking area into areas separated by planted or natural landscaping features. The applicant must provide an alternative parking plan as described in Section 9.02.050, and may be able to also receive a reduction of required off-street parking requirements if approved by the Director.
6. Landscaping in the Extraterritorial Jurisdiction - 7% The Director may consider an increase to the amount of permitted impervious cover by seven percent (7%) for development in the extraterritorial jurisdiction that shows compliance with the landscaping requirements of Section 8.04.

IMPERVIOUS COVERAGE REQUIRED = 56.17% + Waivers 1, 2, & 6 (not to exceed 70%) = 56.17% + 7% + 5% + 7% = *75.17% or 70% maximum*

PH I SITE AREA INCLUDING KEYSTONE : 2,767,098 SF
PERVIOUS AREA (KEYSTONE + INDUSTRIAL) = 849,326 SF = 30.6% IMPERVIOUS AREA = 1,917,772 SF = 69.3% OF SITE
*KEYSTONE PERVIOUS AREA IS APPROXIMATE

CITY OF GEORGETOWN, TX PARKING REQUIREMENTS
ALL OTHER INDUSTRIAL MANUFACTURING & WAREHOUSING 1 per 500 ft 2 GFA of indoor facility + 1 additional per 2,500 ft 2 indoor and outdoor storage area

ALL OTHER OFFICES & SERVICES
1/400 SF

BUILDING 1 *-220,780 SF TOTAL (22,078 SF OFFICE, 198,702 SF WH)* ***135 SPACES REQUIRED***

BUILDING 2 *-457,650 SF TOTAL (45,765 SF OFFICE, 411,885 SF WH)* ***280 SPACES REQUIRED***

BUILDING 3 *-130,928 SF TOTAL (13,093 SF OFFICE, 117,835 SF WH)* ***80 SPACES REQUIRED***

TOTAL PARKING REQUIRED - 495 SPACES

NEW SHOP BUILDING *-23,420 SF (2,900 SF OFFICE, 20,520 WH)* ***15 SPACES REQUIRED***

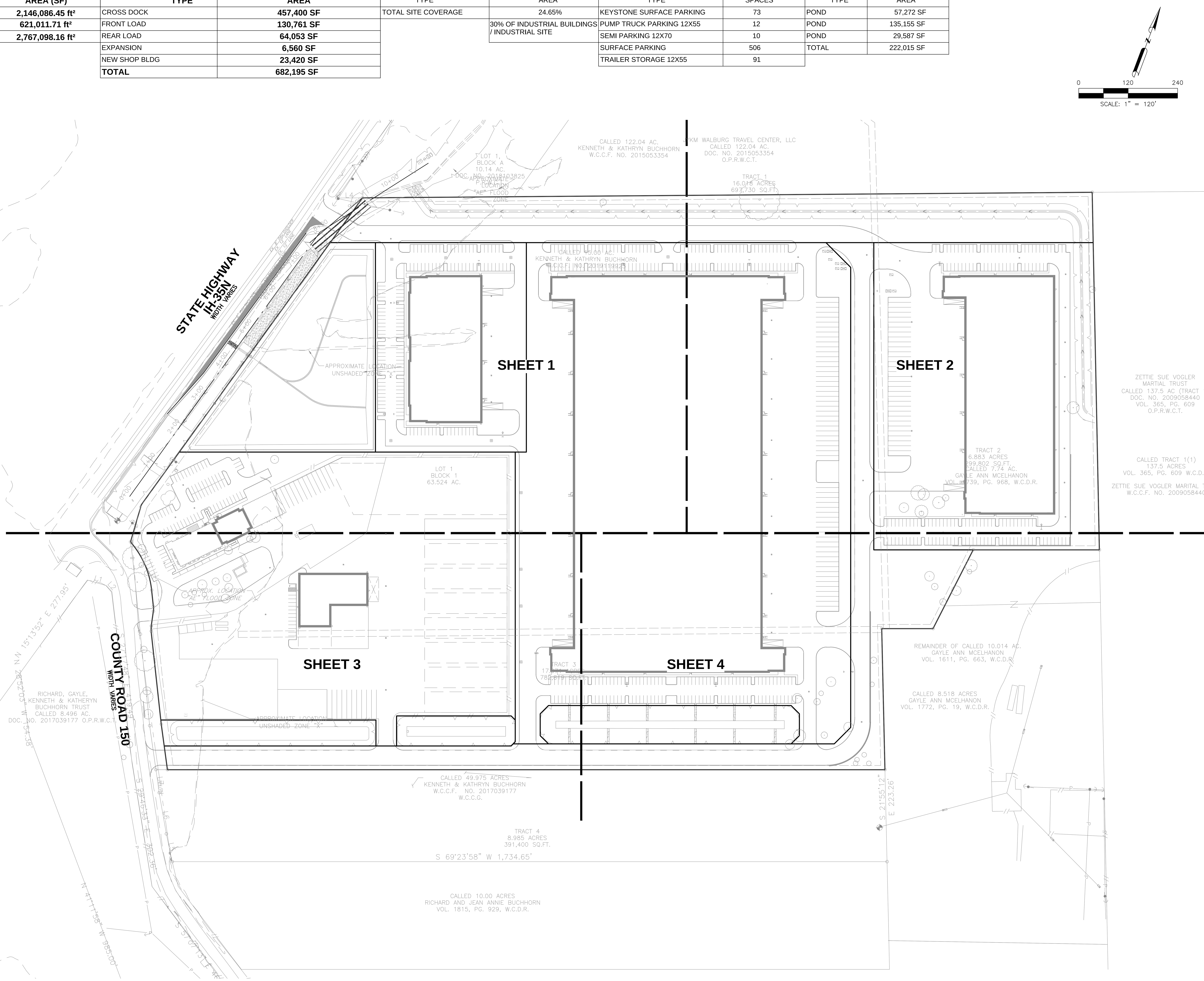
KEYSTONE OFFICE EXPANSION 6,560 SF
-14 SPACES REQUIRED

*CALCULATIONS BASED ON AN ASSUMPTION OF 10% OFFICE AND THE REMAINDER AS STORAGE OCCUPANCY.

LIGHTING: ALL EXTERIOR LIGHTING TO MEET OR EXCEED UDC REQUIREMENTS.

ROOFTOP EQUIPMENT: ALL ROOFTOP EQUIPMENT TO BE ADEQUATELY SCREENED FROM RIGHT-OF-WAYS AND ADJACENT PROPERTIES

DUMPSTER ENCLOSURES: ALL FUTURE DUMPSTER ENCLOSURES TO COMPLY WITH UDC SCREENING REQUIREMENTS.



BENCHMARKS:

TEMPORARY BENCHMARK "A"
ELEVATION - 693.93'
TEMPORARY BENCHMARK "A" IS A BOX CUT SET ON A HEADWALL ON THE EAST R.O.W. OF STATE HIGHWAY I-35 N, BEING APPROXIMATELY 100 FEET NORTHEAST OF THE INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

TEMPORARY BENCHMARK "B"
ELEVATION - 715.12'
TEMPORARY BENCHMARK "B" IS A BOX CUT SET ON A CONCRETE COLUMN FOR A GUY ANCHOR, BEING APPROXIMATELY 2,050 FEET EAST OF INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

FLOOD PLAIN NOTE:

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REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

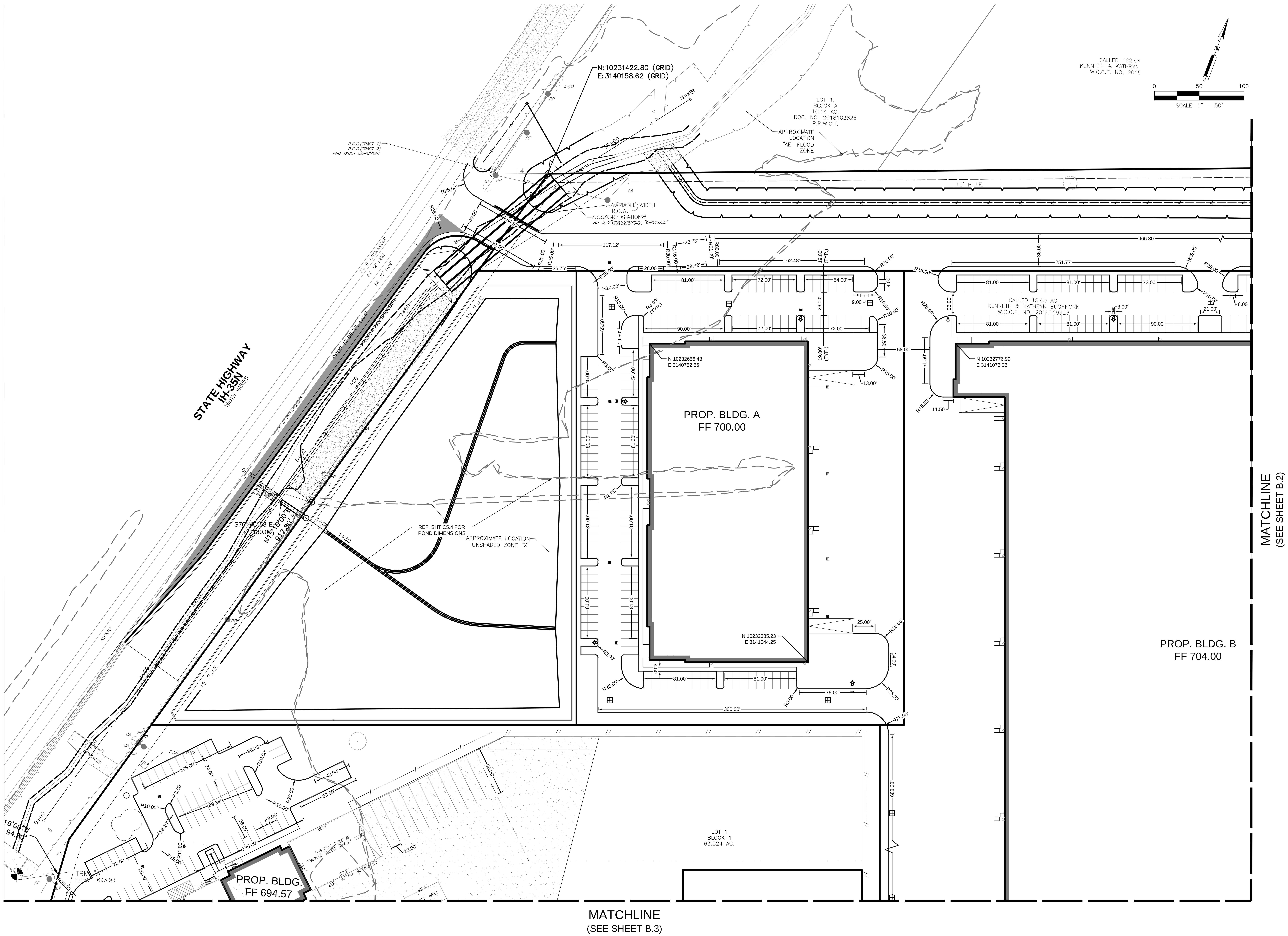
OVERALL PLAN

SCALE	DESIGN	DRAWN
1"=120'	DA	CR

SHEET
B.0

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\B.0 Overall Layout.dwg Last Plotted: Thu Apr 13, 2023 - 4:55pm By: asalazar



MATCHLINE
(SEE SHEET B.3)

BENCHMARKS:

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SHEET NOTES:

1. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
2. REFERENCE ARCHITECTURAL PLANS FOR EXACT BUILDING DIMENSIONS.
3. ALL CURB RADII TO BE 3' (FEET) UNLESS OTHERWISE SHOWN ON PLAN.
4. PROPOSED HANDICAP SIGN SEE PAVEMENT DETAILS.
5. PROPOSED SIGN. REFERENCE LANDSCAPE ARCHITECT PLANS FOR DETAILS.
6. CONTRACTOR SHALL REFERENCE THE LANDSCAPE ARCHITECTURAL PLANS FOR ALL COURTYARD DETAILS.
7. EXISTING SURVEY WAS DONE BY WINDROSE LAND SURVEYING/PLATTING WITH THEIR CONTACT INFORMATION AS FOLLOWS:

WINDROSE LAND SURVEYING/PLATTING
11111 RICHMOND AVE,STE150 HOUSTON,TX 77082
Phone (713) 458-2281 FIRM REGISTRATION#10108800

IMPERVIOUS COVER CALCULATIONS

KEYSTONE + INDUSTRIAL IMPERVIOUS AREA = 2,017,403 SQ. FT = 72.91 %
EXISTING IMPERVIOUS AREA = 31,5333 SQ. FT. = 11.40%
PERCENTAGE INCREASE = 61.51%

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

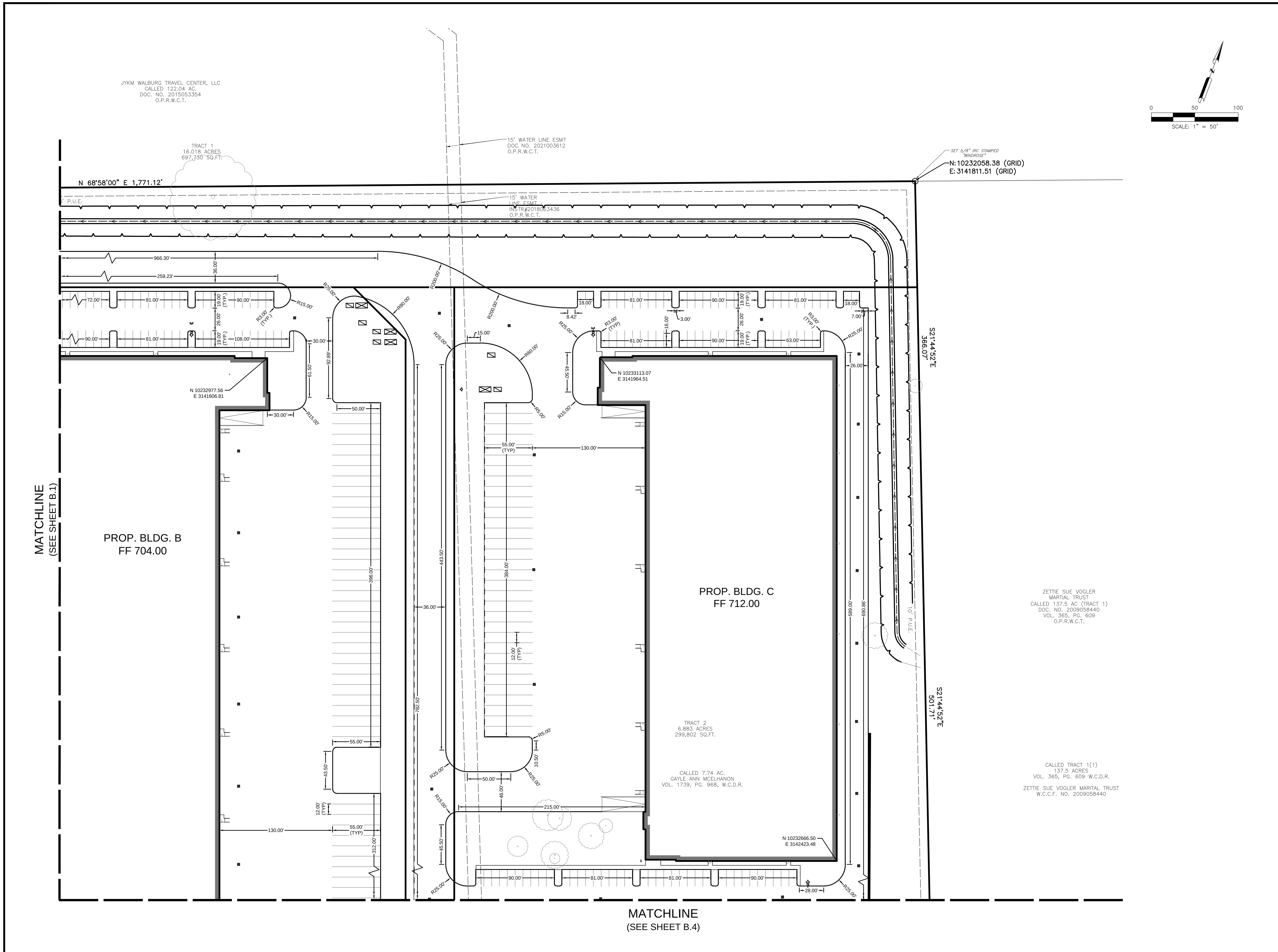
DIMENSION CONTROL PLAN (1 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
B.1

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\B.1-B-4 Dimensional Site Plan.dwg Last Plotted: Thu Apr 13, 2023 - 4:55pm By: asalazar



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SHEET NOTES:

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WINDROSE LAND SURVEYING/PLATTING
11111 RICHMOND AVE,STE150 HOUSTON,TX 77082
Phone (713) 458-2281 FIRM REGISTRATION#10108800

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

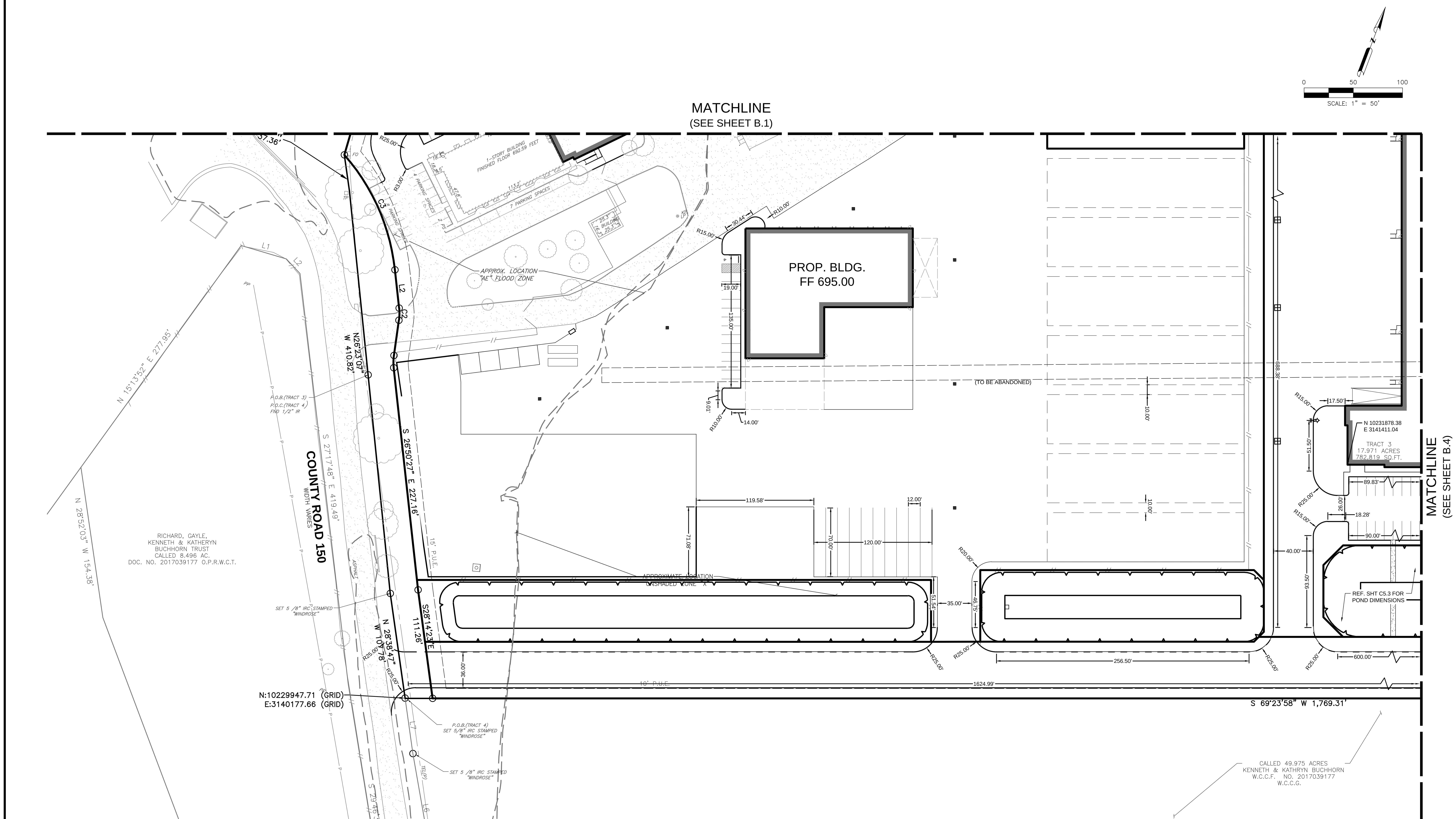
DIMENSION CONTROL PLAN (2 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
B.2

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\B.1-B-4 Dimensional Site Plan.dwg Last Plotted: Thu Apr 13, 2023 - 4:36pm By: asalazar



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11111 RICHMOND AVE,STE150 HOUSTON,TX 77082
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REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

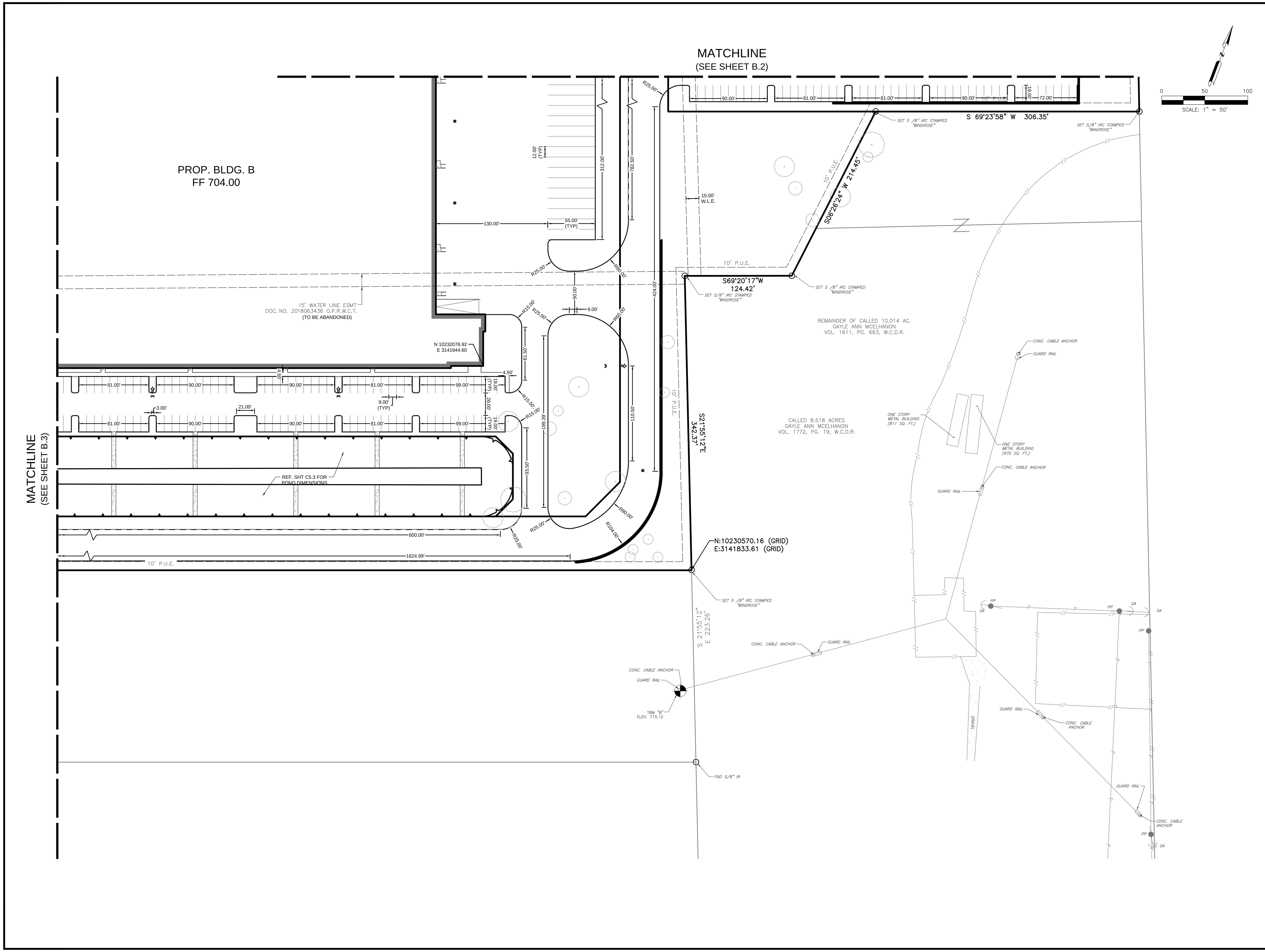
DIMENSION CONTROL PLAN (3 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
B.3

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\B.1-B-4 Dimensional Site Plan.dwg Last Plotted: Thu Apr 13, 2023 - 4:56pm By: asalazar



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TEMPORARY BENCHMARK "B" IS A BOX CUT SET ON A CONCRETE COLUMN FOR A GUY ANCHOR, BEING APPROXIMATELY 2,050 FEET EAST OF INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

FLOOD PLAIN NOTE:

THIS SUBJECT TRACT LIES WITHIN UNSHADED ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN (0.2% ANNUAL FLOODPLAIN CHANCE) AS DELINEATED ON THE FLOOD INSURANCE MAP FOR WILLIAMSON COUNTY, TEXAS AND INCORPORATED AREAS, MAP NO. 48491C0285F MAP REVISED DECEMBER 20, 2019.

SHEET NOTES:

1. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
2. REFERENCE ARCHITECTURAL PLANS FOR EXACT BUILDING DIMENSIONS.
3. ALL CURB RADII TO BE 3' (FEET) UNLESS OTHERWISE SHOWN ON PLAN.
4. PROPOSED HANDICAP SIGN SEE PAVEMENT DETAILS.
5. PROPOSED SIGN. REFERENCE LANDSCAPE ARCHITECT PLANS FOR DETAILS.
6. CONTRACTOR SHALL REFERENCE THE LANDSCAPE ARCHITECTURAL PLANS FOR ALL COURTYARD DETAILS.
7. EXISTING SURVEY WAS DONE BY WINDROSE LAND SURVEYING/PLATTING WITH THEIR CONTACT INFORMATION AS FOLLOWS:

WINDROSE LAND SURVEYING/PLATTING
11111 RICHMOND AVE,STE150 HOUSTON,TX 77082
Phone (713) 458-2281 FIRM REGISTRATION#10108800

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

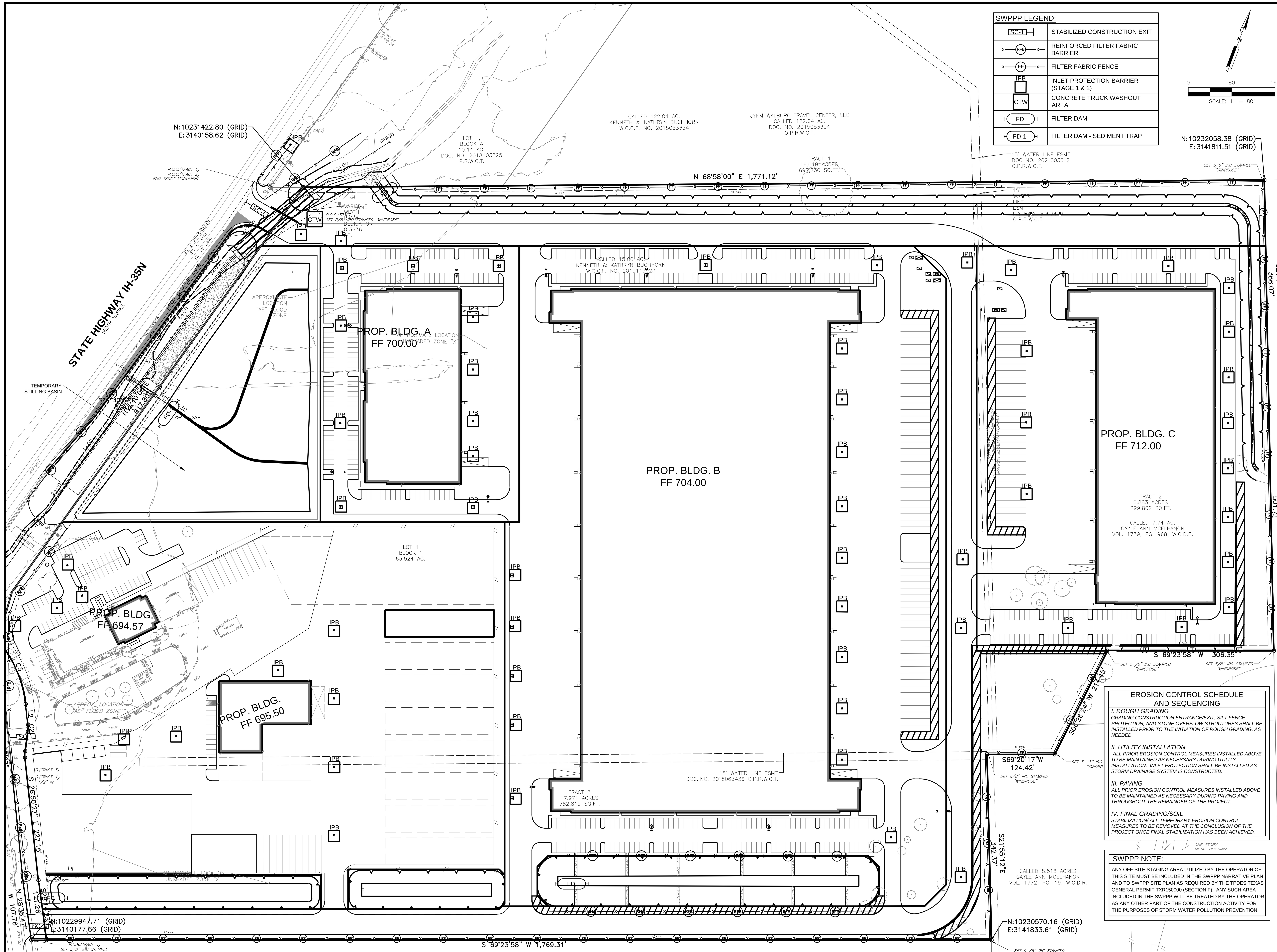
DIMENSION CONTROL PLAN (4 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
B.4

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\B.1-B-4 Dimensional Site Plan.dwg Last Plotted: Thu Apr 13, 2023 - 4:36pm By: asalazar



SWPPP LEGEND:

SC-1	STABILIZED CONSTRUCTION EXIT
RFB	REINFORCED FILTER FABRIC BARRIER
FF	FILTER FABRIC FENCE
IPB	INLET PROTECTION BARRIER (STAGE 1 & 2)
CTW	CONCRETE TRUCK WASHOUT AREA
FD	FILTER DAM
FD-1	FILTER DAM - SEDIMENT TRAP

BENCHMARKS:

TEMPORARY BENCHMARK "A"
ELEVATION - 693.93'
TEMPORARY BENCHMARK "A" IS A BOX CUT SET ON A HEADWALL ON THE EAST R.O.W. OF STATE HIGHWAY I-35 N, BEING APPROXIMATELY 100 FEET NORTHEAST OF THE INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

TEMPORARY BENCHMARK "B"
ELEVATION - 715.12'
TEMPORARY BENCHMARK "B" IS A BOX CUT SET ON A CONCRETE COLUMN FOR A GUY ANCHOR, BEING APPROXIMATELY 2,050 FEET EAST OF INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

FLOOD PLAIN NOTE:

THIS SUBJECT TRACT LIES WITHIN UNSHADED ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN (0.2% ANNUAL FLOODPLAIN CHANCE) AS DELINEATED ON THE FLOOD INSURANCE MAP FOR WILLIAMSON COUNTY, TEXAS AND INCORPORATED AREAS, MAP NO. 48491C0285F MAP REVISED DECEMBER 20, 2019.

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

Edwards Aquifer Protection Program Construction Notes – Legal Disclaimer

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

1. A written notice of construction must be submitted to the TCEQ regional office at least 48 hours prior to the start of any regulated activities. This notice must include:
   - the name of the approved project;
   - the activity start date; and
   - the contact information of the prime contractor.
2. All contractors conducting regulated activities associated with this project must be provided with complete copies of the approved Water Pollution Abatement Plan (WPAP) and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractors are required to keep on-site copies of the approved plan and approval letter.
3. If any sensitive feature(s) (caves, solution cavity, sink hole, etc.) is discovered during construction, all regulated activities near the sensitive feature must be suspended immediately. The appropriate TCEQ regional office must be immediately notified of any sensitive features encountered during construction. Construction activities may not be resumed until the TCEQ has reviewed and approved the appropriate protective measures in order to protect any sensitive feature and the Edwards Aquifer from potentially adverse impacts to water quality.
4. No temporary or permanent hazardous substance storage tank shall be installed within 150 feet of a water supply source, distribution system, well, or sensitive feature.
5. Prior to beginning any construction activity, all temporary erosion and sedimentation (E&S) control measures must be properly installed and maintained in accordance with the approved plans and manufacturers specifications. If inspections indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations. These controls must remain in place until the disturbed areas have been permanently stabilized.
6. Any sediment that escapes the construction site must be collected and properly disposed of before the next rain event to ensure it is not washed into surface streams, sensitive features, etc.
7. Sediment must be removed from the sediment traps or sedimentation basins not later than when it occupies 50% of the basin's design capacity.
8. Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from being discharged offsite.
9. All spoils (excavated material) generated from the project site must be stored on-site with proper E&S controls. For storage or disposal of spoils at another site on the Edwards Aquifer Recharge Zone, the owner of the site must receive approval of a water pollution abatement plan for the placement of fill material or mass grading prior to the placement of spoils at the other site.
10. If portions of the site will have a temporary or permanent cease in construction activity lasting longer than 14 days, soil stabilization in those areas shall be initiated as soon as possible prior to the 14th day of inactivity. If activity will resume prior to the 21st day, stabilization measures are not required. If drought conditions or inclement weather prevent action by the 14th day, stabilization measures shall be initiated as soon as possible.
11. The following records shall be maintained and made available to the TCEQ upon request:
    - the dates when major grading activities occur;
    - the dates when construction activities temporarily or permanently cease on a portion of the site; and
    - the dates when stabilization measures are initiated.
12. The holder of any approved Edward Aquifer protection plan must notify the appropriate regional office in writing and obtain approval from the executive director prior to initiating any of the following:
    A. any physical or operational modification of any water pollution abatement structure(s), including but not limited to ponds, dams, berms, sewage treatment plants, and diversionary structures;
    B. any change in the nature or character of the regulated activity from that which was originally approved or a change which would significantly impact the ability of the plan to prevent pollution of the Edwards Aquifer;
    C. any development of land previously identified as undeveloped in the original water pollution abatement plan.

Austin Regional Office	San Antonio Regional Office
12100 Park 35 Circle, Building A Austin, Texas 78753-1808 Phone (512) 339-2929 Fax (512) 339-3795	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.

EROSION CONTROL SCHEDULE AND SEQUENCING

I. ROUGH GRADING
GRADING CONSTRUCTION ENTRANCE/EXIT, SILT FENCE PROTECTION, AND STONE OVERFLOW STRUCTURES SHALL BE INSTALLED PRIOR TO THE INITIATION OF ROUGH GRADING, AS NEEDED.

II. UTILITY INSTALLATION
ALL PRIOR EROSION CONTROL MEASURES INSTALLED ABOVE TO BE MAINTAINED AS NECESSARY DURING UTILITY INSTALLATION. INLET PROTECTION SHALL BE INSTALLED AS STORM DRAINAGE SYSTEM IS CONSTRUCTED.

III. PAVING
ALL PRIOR EROSION CONTROL MEASURES INSTALLED ABOVE TO BE MAINTAINED AS NECESSARY DURING PAVING AND THROUGHOUT THE REMAINDER OF THE PROJECT.

IV. FINAL GRADING/SOIL
STABILIZATION/ ALL TEMPORARY EROSION CONTROL MEASURES TO BE REMOVED AT THE CONCLUSION OF THE PROJECT ONCE FINAL STABILIZATION HAS BEEN ACHIEVED.

SWPPP NOTE:

ANY OFF-SITE STAGING AREA UTILIZED BY THE OPERATOR OF THIS SITE MUST BE INCLUDED IN THE SWPPP NARRATIVE PLAN AND TO SWPPP SITE PLAN AS REQUIRED BY THE TPDES TEXAS GENERAL PERMIT TXR150000 (SECTION F). ANY SUCH AREA INCLUDED IN THE SWPPP WILL BE TREATED BY THE OPERATOR AS ANY OTHER PART OF THE CONSTRUCTION ACTIVITY FOR THE PURPOSES OF STORM WATER POLLUTION PREVENTION.

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

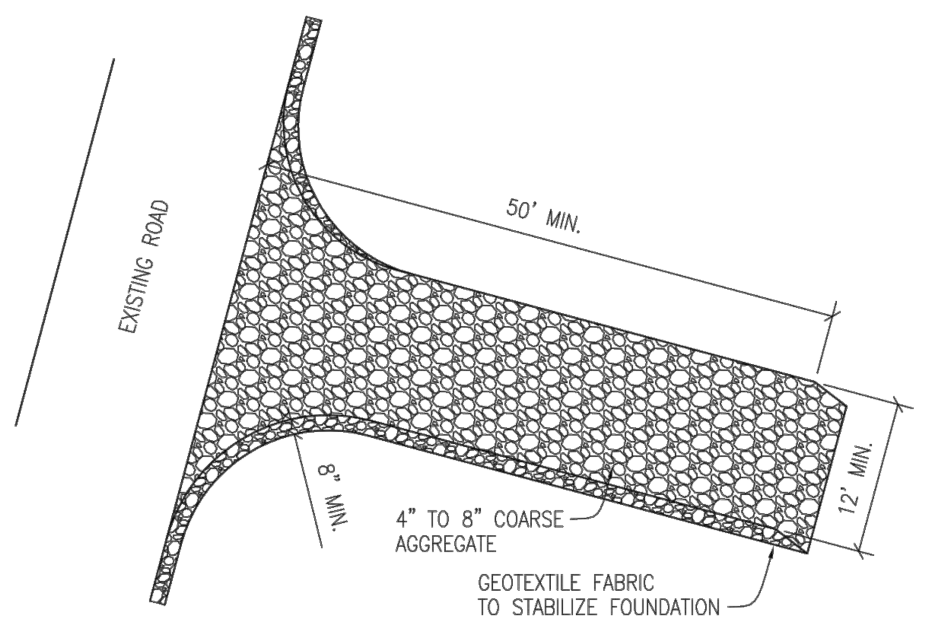
STORM WATER POLLUTION PREVENTION PLAN

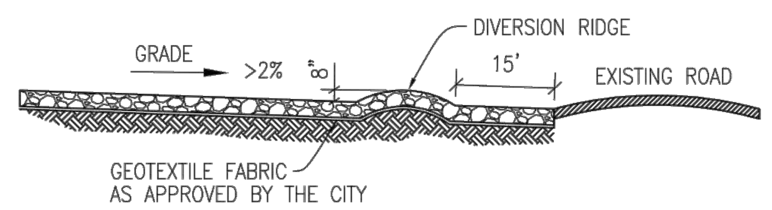
SCALE	DESIGN	DRAWN
1"=80'	DA	CR

SHEET
C3.1

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\C3.1-3.2 SWPPP Plan & Details.dwg Last Plotted: Thu Apr 13, 2023 – 5:41pm By: asalazar





INSTALLATION:

- CLEAR THE AREA OF DEBRIS, ROCKS OR PLANTS THAT WILL INTERFERE WITH INSTALLATION.
- GRADE THE AREA FOR THE ENTRANCE TO FLOW BACK ON TO THE CONSTRUCTION SITE. RUNOFF FROM THE STABILIZED CONSTRUCTION
- PLACE GEOTEXTILE FABRIC AS APPROVED BY THE CITY.
- PLACE ROCK AS APPROVED BY THE CITY.

INSPECTIONS AND MAINTENANCE GUIDELINES:

- THE ENTRANCE SHOULD BE MAINTAINED IN A CONDITION, WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
- ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ON TO PUBLIC RIGHTS-OF-WAY SHOULD BE REMOVED IMMEDIATELY BY CONTRACTOR.
- WHEN NECESSARY, WHEELS SHOULD BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY.
- WHEN WASHING IS REQUIRED, IT SHOULD BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
- ALL SEDIMENT SHOULD BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATER COURSE BY USING APPROVED METHODS.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

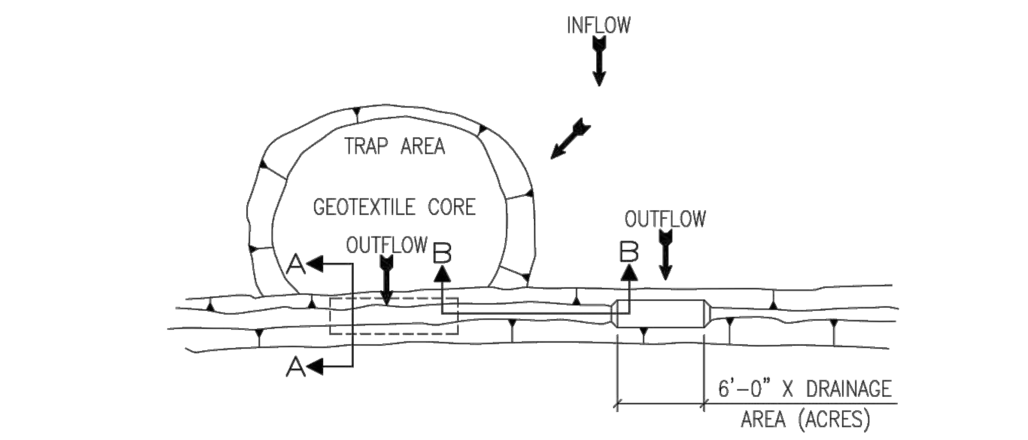
GEORGETOWN TEXAS, EST. 1848, Georgetown Utility Systems, Your Community Owned Utility	CITY OF GEORGETOWN CONSTRUCTION STANDARDS AND DETAILS STABILIZED CONSTRUCTION ENTRANCE	REVISION NOTE: ADOPTED 6/21/2006 DRAWING NAME: EC06 SCALE: NTS · DATE: 1/2003 DRAWN BY: MRS · APPROVED BY: TRB

NOTE: THIS SECTION IS INTENDED TO ASSIST THOSE PERSONS PREPARING WATER POLLUTION ABATEMENT PLANS (WPAP) OR STORM WATER POLLUTION PREVENTION PLANS (SW3P) THAT COMPLY WITH FEDERAL, STATE AND/OR LOCAL STORM WATER REGULATIONS.

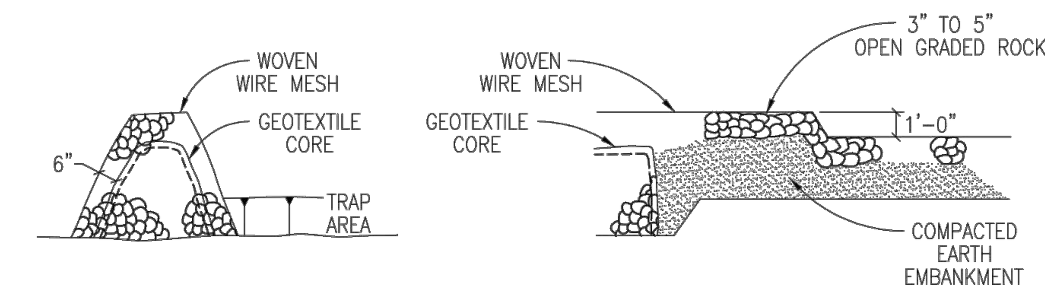
1. THE CONTRACTOR TO INSTALL AND MAINTAIN EROSION/SEDIMENTATION CONTROLS AND TREE/NATURAL AREA PROTECTIVE FENCING PRIOR TO ANY SITE PREPARATION WORK (CLEARING, GRUBBING, GRADING, OR EXCAVATION). CONTRACTOR TO REMOVE EROSION/SEDIMENTATION CONTROLS AT THE COMPLETION OF PROJECT AND GRASS RESTORATION.
2. ALL PROJECTS WITHIN THE RECHARGE ZONE OF THE EDWARD'S AQUIFER SHALL SUBMIT A BEST MANAGEMENT PRACTICES AND WATER POLLUTION AND ABATEMENT PLAN TO THE TNRCC FOR APPROVAL PRIOR TO ANY CONSTRUCTION.
3. THE PLACEMENT OF EROSION/SEDIMENTATION CONTROLS TO BE IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENTATION CONTROL PLAN AND WATER POLLUTION ABATEMENT PLAN. DEVIATIONS FROM THE APPROVED PLAN MUST BE SUBMITTED TO AND APPROVED BY THE OWNER'S REPRESENTATIVE.
4. ALL PLANTING SHALL BE DONE BETWEEN MAY 1 AND SEPTEMBER 15 EXCEPT AS SPECIFICALLY AUTHORIZED IN WRITING. IF PLANTING IS AUTHORIZED TO BE DONE OUTSIDE THE DATES SPECIFIED, THE SEED SHALL BE PLANTED WITH THE ADDITION OF WINTER FESCUE (KENTUCKY 31) AT A RATE OF 100lb/ACRE. GRASS SHALL BE COMMON BERMUDA GRASS, HULLED, MINIMUM 82% PURE LIVE SEED. ALL GRASS SEED SHALL BE FREE FROM NOXIOUS WEED, GRADE "A" RECENT CROP, RECLEANED AND TREATED WITH APPROPRIATE FUNGICIDE AT TIME OF MIXING. SEED SHALL BE FURNISHED IN SEALED, STANDARD CONTAINERS WITH DEALER'S GUARANTEED ANALYSIS.
5. ALL DISTURBED AREAS TO BE RESTORED AS NOTED IN THE WATER POLLUTION ABATEMENT PLAN.
6. THE PLANTED AREA TO BE IRRIGATED OR SPRINKLED IN A MANNER THAT WILL NOT ERODE THE TOPSOIL, BUT WILL SUFFICIENTLY SOAK THE SOIL TO A DEPTH OF FOUR (4) INCHES. THE IRRIGATION TO OCCUR AT 10-DAY INTERVALS DURING THE FIRST TWO MONTHS TO INSURE GERMINATION AND ESTABLISHMENT OF THE GRASS . RAINFALL OCCURRENCES OF 1/2 INCH OR GREATER TO POSTPONE THE WATERING SCHEDULE ONE WEEK.
7. RESTORATION TO BE ACCEPTABLE WHEN THE GRASS HAS GROWN AT LEAST 1-1/2 INCHES HIGH WITH 95*% COVERAGE,* PROVIDED NO BARE SPOTS LARGER THAN 25 SQUARE FEET EXIST.
8. A MINIMUM OF FOUR (4) INCHES OF TOPSOIL TO BE PLACED IN ALL AREAS DISTURBED BY CONSTRUCTION.
9. THE CONTRACTOR TO HYDROMULCH OR SOD (AS SHOWN ON PLANS) ALL EXPOSED CUTS AND FILLS UPON COMPLETION OF CONSTRUCTION.
10. EROSION AND SEDIMENTATION CONTROLS TO BE INSTALLED OR MAINTAINED IN A MANNER WHICH DOES NOT RESULT IN SOIL BUILDUP WITHIN TREE DRIPLINE.
11. TO AVOID SOIL COMPACTION, CONTRACTOR SHALL NOT ALLOW VEHICULAR TRAFFIC, PARKING, OR STORAGE OF EQUIPMENT OR MATERIALS IN THE TREE DRIPLINE AREAS.
12. WHERE A FENCE IS CLOSER THAN FOUR (4) FEET TO A TREE TRUNK, PROTECT THE TRUNK WITH STRAPPED-ON PLANKING TO A HEIGHT OF EIGHT (8) FEET (OR TO THE LIMITS OF LOWER BRANCHING) IN ADDITION TO THE FENCING.
13. TREES TO BE REMOVED IN A MANNER WHICH DOES NOT IMPACT TREES TO BE PRESERVED.
14. ANY ROOT EXPOSED BY CONSTRUCTION ACTIVITY TO BE PRUNED FLUSH WITH THE SOIL. BACKFILL ROOT AREAS WITH GOOD QUALITY TOPSOIL AS SOON AS POSSIBLE. IF EXPOSED ROOT AREAS ARE NOT BACKFILLED WITHIN TWO DAYS, COVER THEM WITH ORGANIC MATERIAL IN A MANNER WHICH REDUCES SOIL TEMPERATURE AND MINIMIZES WATER LOSS DUE TO EVAPORATION.
15. CONTRACTOR TO PRUNE VEGETATION TO PROVIDE CLEARANCE FOR STRUCTURES, VEHICULAR TRAFFIC, AND EQUIPMENT BEFORE DAMAGE OCCURS (RIPPING OF BRANCHES, ETC.). ALL FINISHED PRUNING TO BE DONE ACCORDING TO RECOGNIZED, APPROVED STANDARDS OF THE INDUSTRY (REFERENCE THE "NATIONAL ARBORIST ASSOCIATION PRUNING STANDARDS FOR SHADE TREES").
16. THE CONTRACTOR IS TO INSPECT THE CONTROLS AT WEEKLY INTERVALS AND AFTER EVERY RAINFALL EXCEEDING 1/4 INCH TO VERIFY THAT THEY HAVE NOT BEEN SIGNIFICANTLY DISTURBED. ANY ACCUMULATED SEDIMENT AFTER A SIGNIFICANT RAINFALL TO BE REMOVED AND PLACED IN THE OWNER DESIGNATED SPOIL DISPOSAL SITE. THE CONTRACTOR TO CONDUCT PERIODIC INSPECTIONS OF ALL EROSION/SEDIMENTATION CONTROLS AND TO MAKE ANY REPAIRS OR MODIFICATIONS NECESSARY TO ASSURE CONTINUED EFFECTIVE OPERATION OF EACH DEVICE.
17. WHERE THERE IS TO BE AN APPROVED GRADE CHANGE, IMPERMEABLE PAVING SURFACE, TREE WELL, OR OTHER SUCH SITE DEVELOPMENT IMMEDIATELY ADJACENT TO A PROTECTED TREE, ERECT THE FENCE APPROXIMATELY TWO TO FOUR FEET (2'-4') BEHIND THE AREA IN QUESTION.
18. NO ABOVE AND/OR BELOW GROUND TEMPORARY FUEL STORAGE FACILITIES TO BE STORED ON THE PROJECT SITE.
19. IF EROSION AND SEDIMENTATION CONTROL SYSTEMS ARE EXISTING FROM PRIOR CONTRACTS, OWNER'S REPRESENTATIVE AND THE CONTRACTOR TO EXAMINE THE EXISTING EROSION AND SEDIMENTATION CONTROL SYSTEMS FOR DAMAGE PRIOR TO CONSTRUCTION. ANY DAMAGE TO PREEXISTING EROSION AND SEDIMENTATION CONTROLS NOTED TO BE REPAIRED AT OWNERS EXPENSE.
20. INTENTIONAL RELEASE OF VEHICLE OR EQUIPMENT FLUIDS ONTO THE GROUND IS NOT ALLOWED. CONTAMINATED SOIL RESULTING FROM ACCIDENTAL SPILL TO BE REMOVED AND DISPOSED OF PROPERLY.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

GEORGETOWN TEXAS, EST. 1848, Georgetown Utility Systems, Your Community Owned Utility	CITY OF GEORGETOWN CONSTRUCTION STANDARDS AND DETAILS EROSION AND SEDIMENTATION AND TREE PROTECTION NOTES	REVISION NOTE: ADOPTED 6/21/2006 DRAWING NAME: EC01A SCALE: NTS · DATE: 1/2003 DRAWN BY: MRS · APPROVED BY: TRB



PLAN VIEW



SECTION A-A   SECTION B-B

INSTALLATION:

- LOCATE THE SEDIMENT TRAP SO AS TO DISTURB AS FEW TREES AS POSSIBLE.
- CLEAR AND GRUB THE AREA UNDER THE EMBANKMENT OF ALL VEGETATION AND ROOT MATS.
- LAYOUT THE WIRE MESH AND THEN THE GEOTEXTILE FABRIC.
- CONSTRUCT THE GEOTEXTILE CORE AND CORRESPONDING ROCK EMBANKMENT TO THE DESIGNATED HEIGHT AND CONFIGURATION.
- WRAP THE STRUCTURE WITH THE PREVIOUSLY PLACED WIRE MESH SECURE ENOUGH SO THAT WHEN WALKED ACROSS THE STRUCTURE RETAINS IT'S SHAPE. SECURE WITH TIE WIRE.
- PLACE THE EMBANKMENT MATERIAL IN 8 TO 12 INCH LIFTS AND MACHINE COMPACT.

INSPECTION AND MAINTENANCE GUIDELINES:

- INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL. CHECK THE EMBANKMENT, SPILLWAYS, AND OUTLET FOR EROSION DAMAGE AND INSPECT THE EMBANKMENT FOR PIPING AND SETTLEMENT. REPAIR SHOULD BE MADE PROMPTLY AS NEEDED BY THE CONTRACTOR.
- TRASH AND OTHER DEBRIS SHOULD BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO HALF OF THE DESIGN DEPTH OF THE TRAP.
- SEDIMENT REMOVED FROM THE TRAP SHOULD BE DEPOSITED IN AN APPROVED SPOILS AREA AND IN SUCH A MANNER THAT IT WILL NOT CAUSE ADDITIONAL SILTATION.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

GEORGETOWN TEXAS, EST. 1848, Georgetown Utility Systems, Your Community Owned Utility	CITY OF GEORGETOWN CONSTRUCTION STANDARDS AND DETAILS SEDIMENT TRAP DETAIL	REVISION NOTE: ADOPTED 6/21/2006 DRAWING NAME: EC07 SCALE: NTS · DATE: 1/2003 DRAWN BY: MRS · APPROVED BY: TRB

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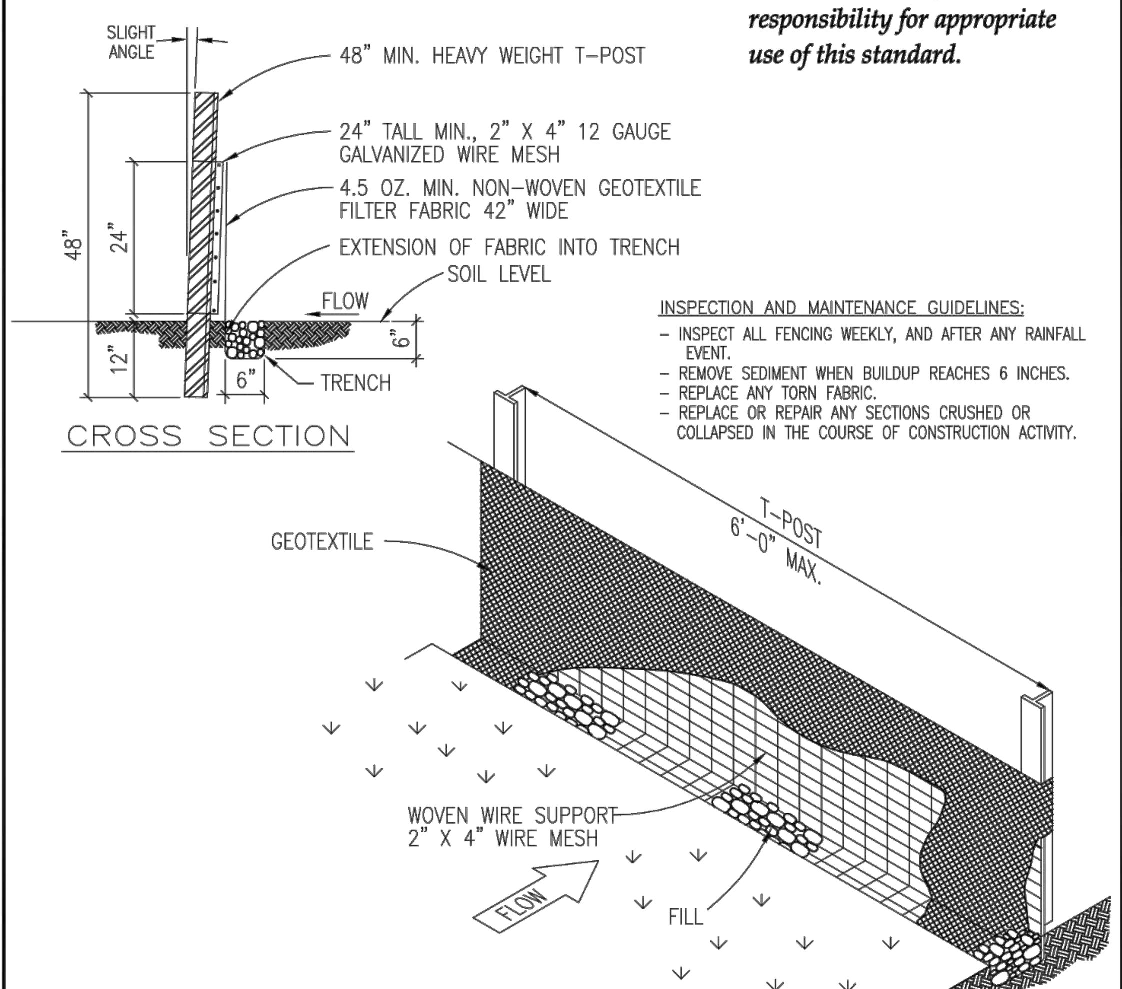


INSPECTION AND MAINTENANCE GUIDELINES:

- INSPECT ALL FENCING WEEKLY, AND AFTER ANY RAINFALL EVENT.
- REMOVE SEDIMENT WHEN BUILDUP REACHES 6 INCHES.
- REPLACE ANY TORN FABRIC.
- REPLACE OR REPAIR ANY SECTIONS CRUSHED OR COLLAPSED IN THE COURSE OF CONSTRUCTION ACTIVITY.

INSTALLATION:

- LAYOUT THE SILT FENCE FOLLOWING AS CLOSELY AS POSSIBLE TO THE CONTOUR.
- CLEAR THE GROUND OF DEBRIS, ROCKS, PLANTS (INCLUDING GRASSES TALLER THAN 2") TO PROVIDE A SMOOTH FLOW APPROACH SURFACE. EXCAVATE 6" DEEP X 6" WIDE TRENCH ON UPSTREAM SIDE OF FACE PER PLANS.
- DRIVE THE HEAVY DUTY T-POST AT LEAST 12 INCHES INTO THE GROUND AND AT A SLIGHT ANGLE TOWARDS THE FLOW.
- ATTACH THE 2" X 4" 12 GAUGE WELDED WIRE MESH TO THE T-POST WITH 11 1/2 GAUGE GALVANIZED T-POST CLIPS. THE TOP OF THE WIRE TO BE 24" ABOVE GROUND LEVEL. THE WELDED WIRE MESH TO BE OVERLAPPED 6" AND TIED AT LEAST 6 TIMES WITH HOG RINGS.
- THE SILT FENCE TO BE INSTALLED WITH A SKIRT A MINIMUM OF 6" WIDE PLACED ON THE UPHILL SIDE OF THE FENCE INSIDE EXCAVATED TRENCH. THE FABRIC TO OVERLAP THE TOP OF THE WIRE BY 1".
- ANCHOR THE SILT FENCE BY BACKFILLING WITH EXCAVATED DIRT AND ROCKS (NOT LARGER THAN 2").
- GEOTEXTILE SPLICES SHOULD BE A MINIMUM OF 18" WIDE ATTACHED IN AT LEAST 6 PLACES. SPLICES IN CONCENTRATED FLOW AREAS WILL NOT BE ACCEPTED.
- SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

GEORGETOWN TEXAS, EST. 1848, Georgetown Utility Systems, Your Community Owned Utility	CITY OF GEORGETOWN CONSTRUCTION STANDARDS AND DETAILS SILT FENCE DETAIL	REVISION NOTE: ADOPTED 6/21/2006 DRAWING NAME: EC02 SCALE: NTS · DATE: 1/2003 DRAWN BY: MRS · APPROVED BY: TRB

GUIDELINES FOR DESIGN AND INSTALLATION OF TEMPORARY EROSION AND SEDIMENTATION CONTROLS

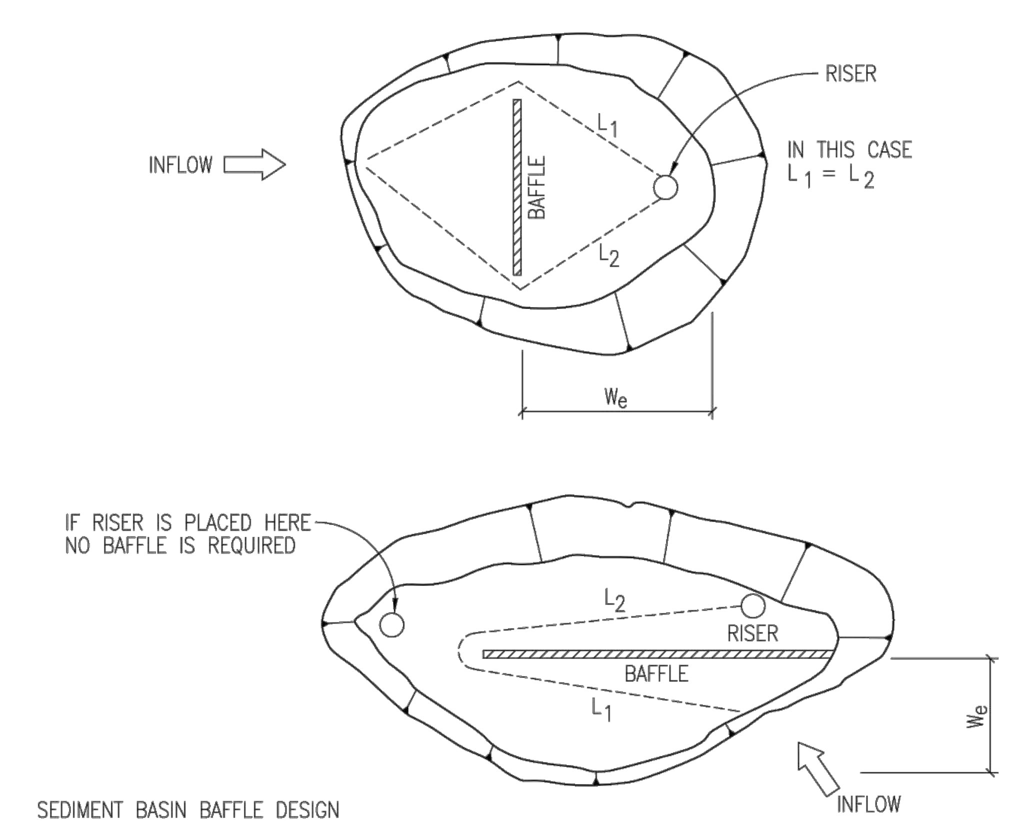
TYPE OF STRUCTURE	REACH LENGTH	MAXIMUM DRAINAGE AREA	SLOPE
SILT FENCE	N/A	2 ACRES	0 – 10%
	200 FEET	2 ACRES	10 – 20%
	100 FEET	1 ACRE	20 – 30%
	50 FEET	1/2 ACRE	> 30%
TRIANGLE FILTER DIKE	100 FEET	1/2 ACRE	< 30% SLOPE
	50 FEET	1/4 ACRE	> 30% SLOPE
ROCK BERM *, **	500 FEET	< 5 ACRES	0 – 10%

* FOR ROCK BERM DESIGN WHERE PARAMETERS ARE OTHER THAN STATED, DRAINAGE AREA CALCULATIONS AND ROCK BERM DESIGN MUST BE SUBMITTED FOR REVIEW.

** HIGH SERVICE ROCK BERMS MAY BE REQUIRED IN AREAS OF ENVIRONMENTAL SIGNIFICANCE AS DETERMINED BY THE CITY OF GEORGETOWN.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

GEORGETOWN TEXAS, EST. 1848, Georgetown Utility Systems, Your Community Owned Utility	CITY OF GEORGETOWN CONSTRUCTION STANDARDS AND DETAILS TEMPORARY EROSION AND SEDIMENTATION CONTROL GUIDELINES	REVISION NOTE: ADOPTED 6/21/2006 DRAWING NAME: EC01 SCALE: NTS · DATE: 1/2003 DRAWN BY: MRS · APPROVED BY: TRB



SEDIMENT BASIN BAFFLE DESIGN

$W_e = A / (L_1 + L_2)$

W_e = EFFECTIVE WIDTH OF BASIN

A = SURFACE AREA OF BASIN WHEN FILLED TO RISER CREST

L_1, L_2 = SHORTEST TRAVEL DISTANCE AROUND THE BAFFLE FROM INLET TO OUTLET

INSPECTION AND MAINTENANCE GUIDELINES:

- INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL. CHECK THE EMBANKMENT, SPILLWAYS, AND OUTLET FOR EROSION DAMAGE, AND INSPECT THE EMBANKMENT FOR PIPING AND SETTLEMENT. REPAIR SHOULD BE MADE PROMPTLY AS NEEDED BY THE CONTRACTOR.
- TRASH AND OTHER DEBRIS SHOULD BE REMOVED AFTER EACH RAINFALL TO PREVENT CLOGGING OF THE OUTLET STRUCTURE.
- ACCUMULATED SILT SHOULD BE REMOVED AND THE BASIN SHOULD BE RE-GRADED TO ITS ORIGINAL DIMENSIONS AT SUCH POINT THAT THE CAPACITY OF THE IMPOUNDMENT HAS BEEN REDUCED TO 1/2 OF ITS ORIGINAL STORAGE CAPACITY.
- THE REMOVED SEDIMENT SHOULD BE STOCKPILED OR REDISTRIBUTED IN AREAS THAT ARE PROTECTED FROM EROSION.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

GEORGETOWN TEXAS, EST. 1848, Georgetown Utility Systems, Your Community Owned Utility	CITY OF GEORGETOWN CONSTRUCTION STANDARDS AND DETAILS SEDIMENT BASIN BAFFLE DESIGN	REVISION NOTE: ADOPTED 6/21/2006 DRAWING NAME: EC08 SCALE: NTS · DATE: 1/2003 DRAWN BY: MRS · APPROVED BY: TRB

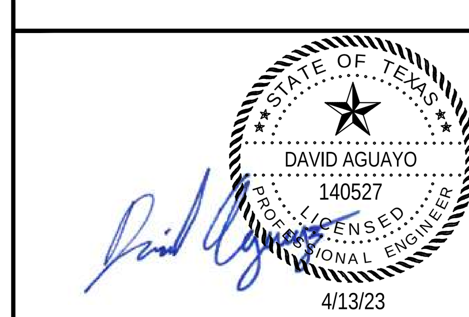
BENCHMARKS:

TEMPORARY BENCHMARK "A"
ELEVATION - 693.93'
TEMPORARY BENCHMARK "A" IS A BOX CUT SET ON A HEADWALL ON THE EAST R.O.W. OF STATE HIGHWAY I-35 N, BEING APPROXIMATELY 100 FEET NORTHEAST OF THE INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

TEMPORARY BENCHMARK "B"
ELEVATION - 715.12'
TEMPORARY BENCHMARK "B" IS A BOX CUT SET ON A CONCRETE COLUMN FOR A GUY ANCHOR, BEING APPROXIMATELY 2,050 FEET EAST OF INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

FLOOD PLAIN NOTE:

THIS SUBJECT TRACT LIES WITHIN UNSHADED ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN (0.2% ANNUAL FLOODPLAIN CHANCE) AS DELINEATED ON THE FLOOD INSURANCE MAP FOR WILLIAMSON COUNTY, TEXAS AND INCORPORATED AREAS, MAP NO. 48491C0285F MAP REVISED DECEMBER 20, 2019.



WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

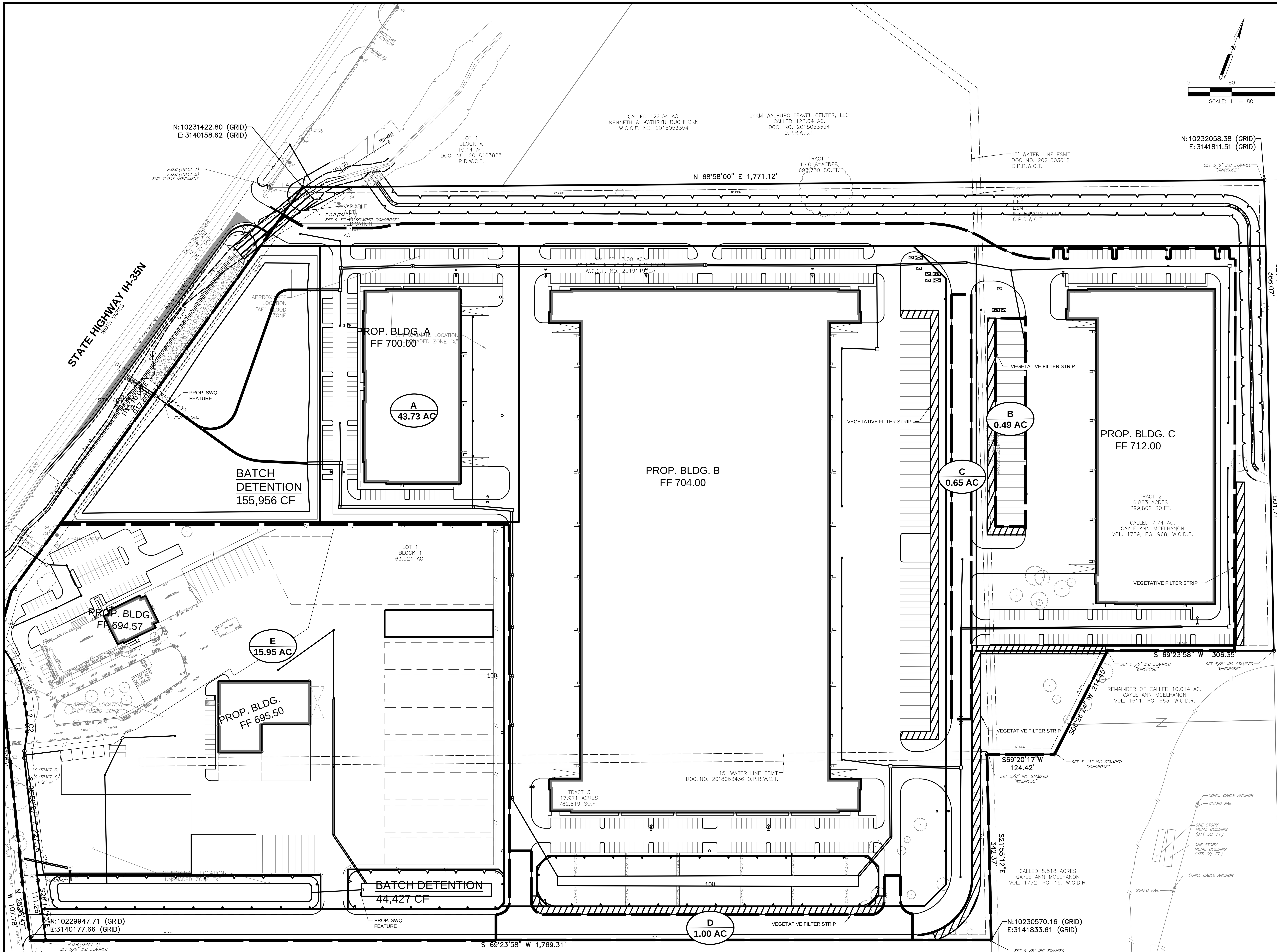
STORM WATER POLLUTION PREVENTION PLAN DETAILS

SCALE	DESIGN	DRAWN
N/A	DA	CR

SHEET
C3.2

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\C3.1-3.2 SWPPP Plan & Details.dwg Last Plotted: Thu Apr 13, 2023 - 5:41pm By: asalazar



BENCHMARKS:

TEMPORARY BENCHMARK "A"
ELEVATION - 693.93'
TEMPORARY BENCHMARK "A" IS A BOX CUT SET ON A HEADWALL ON THE EAST R.O.W. OF STATE HIGHWAY I-35 N, BEING APPROXIMATELY 100 FEET NORTHEAST OF THE INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

TEMPORARY BENCHMARK "B"
ELEVATION - 715.12'
TEMPORARY BENCHMARK "B" IS A BOX CUT SET ON A CONCRETE COLUMN FOR A GUY ANCHOR, BEING APPROXIMATELY 2,050 FEET EAST OF INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

FLOOD PLAIN NOTE:

THIS SUBJECT TRACT LIES WITHIN UNSHADED ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN (0.2% ANNUAL FLOODPLAIN CHANCE) AS DELINEATED ON THE FLOOD INSURANCE MAP FOR WILLIAMSON COUNTY, TEXAS AND INCORPORATED AREAS, MAP NO. 48491C0285F MAP REVISED DECEMBER 20, 2019.

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

STORM WATER QUALITY MANAGEMENT PLAN

SCALE	DESIGN	DRAWN
1"=80'	DA	CR

SHEET
C3.3

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\C3.3-C3.5 Storm Water Quality Management Plan & Details.dwg Last Plotted: Thu Apr 13, 2023 - 5:42pm By: asalazar

DRAINAGE BASIN A CALCULATIONS:

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Georgetown Industrial
Date Prepared: 2/2/2023

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: $L_M = 27.2(A_N \times P)$

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 * = 63.91 acres
Predevelopment impervious area within the limits of the plan* = 7.24 acres
Total post-development impervious area within the limits of the plan* = 44.10 acres
Total post-development impervious cover fraction * = 0.69
P = 32 inches

$L_{M\ TOTAL\ PROJECT}$ = 32083 lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 5

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

Drainage Basin/Outfall Area No. = A

Total drainage basin/outfall area= 43.73 acres
Predevelopment impervious area within drainage basin/outfall area= 1.33 acres
Post-development impervious area within drainage basin/outfall area= 32.26 acres
Post-development impervious fraction within drainage basin/outfall area= 0.74
$L_{M\ THIS\ BASIN}$ = 26921 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Batch Detention
Removal efficiency = 91 percent

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

RG-348 Page 3-33 Equation 3.7: 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 = 43.73 acres
A_I = 32.26 acres
A_P = 11.47 acres
L_R = 32684 lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 27000 lbs.

F = 0.83

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 = 1.50 inches
Post Development Runoff Coefficient = 0.55
On-site Water Quality Volume = 129963 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 = 25993
Total Capture Volume (required water quality volume(s) x 1.20) = 155956 cubic feet
The following sections are used to calculate the required water quality volume(s) for the selected BMP.
The values for BMP Types not selected in cell C45 will show NA.

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin = 155956 cubic feet

DRAINAGE BASIN C CALCULATIONS:

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Georgetown Industrial
Date Prepared: 2/2/2023

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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: $L_M = 27.2(A_N \times P)$

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 * = 63.91 acres
Predevelopment impervious area within the limits of the plan* = 7.24 acres
Total post-development impervious area within the limits of the plan* = 44.10 acres
Total post-development impervious cover fraction * = 0.69
P = 32 inches

$L_{M\ TOTAL\ PROJECT}$ = 32083 lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 5

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

Drainage Basin/Outfall Area No. = C

Total drainage basin/outfall area= 0.65 acres
Predevelopment impervious area within drainage basin/outfall area= 0.00 acres
Post-development impervious area within drainage basin/outfall area= 0.65 acres
Post-development impervious fraction within drainage basin/outfall area= 1.00
$L_{M\ THIS\ BASIN}$ = 566 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
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 = 0.65 acres
A_I = 0.65 acres
A_P = 0.00 acres
L_R = 612 lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 0 lbs.

F = 0.00

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 = #N/A inches
Post Development Runoff Coefficient = 0.82
On-site Water Quality Volume = #N/A 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 = #N/A cubic feet

Storage for Sediment = #N/A
Total Capture Volume (required water quality volume(s) x 1.20) = #N/A cubic feet
The following sections are used to calculate the required water quality volume(s) for the selected BMP.
The values for BMP Types not selected in cell C45 will show NA.

16. Vegetated Filter Strips Designed as Required in RG-348 Pages 3-55 to 3-57

There are no calculations required for determining the load or size of vegetative filter strips.
The 80% removal is provided when the contributing drainage area does not exceed 72 feet (direction of flow) and the sheet flow leaving the impervious cover is directed across 15 feet of engineered filter strips with maximum slope of 20% or across 50 feet of natural vegetation with a maximum slope of 10%. There can be a break in grade as long as no slope exceeds 20%.

If vegetative filter strips are proposed for an interim permanent BMP, they may be sized as described on Page 3-56 of RG-348.

DRAINAGE BASIN E CALCULATIONS:

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Georgetown Industrial
Date Prepared: 2/2/2023

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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: $L_M = 27.2(A_N \times P)$

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 * = 63.91 acres
Predevelopment impervious area within the limits of the plan* = 7.24 acres
Total post-development impervious area within the limits of the plan* = 44.10 acres
Total post-development impervious cover fraction * = 0.69
P = 32 inches

$L_{M\ TOTAL\ PROJECT}$ = 32083 lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 5

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

Drainage Basin/Outfall Area No. = E

Total drainage basin/outfall area= 15.95 acres
Predevelopment impervious area within drainage basin/outfall area= 5.91 acres
Post-development impervious area within drainage basin/outfall area= 9.70 acres
Post-development impervious fraction within drainage basin/outfall area= 0.61
$L_{M\ THIS\ BASIN}$ = 3299 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Batch Detention
Removal efficiency = 91 percent

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

RG-348 Page 3-33 Equation 3.7: 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 = 15.95 acres
A_I = 9.70 acres
A_P = 6.25 acres
L_R = 9872 lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 3300 lbs.

F = 0.33

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 = 1.50 inches
Post Development Runoff Coefficient = 0.43
On-site Water Quality Volume = 37023 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 = 7405
Total Capture Volume (required water quality volume(s) x 1.20) = 44427 cubic feet 1.019906988
The following sections are used to calculate the required water quality volume(s) for the selected BMP.
The values for BMP Types not selected in cell C45 will show NA.

8. Extended Detention Basin System Designed as Required in RG-348 Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin = 44427 cubic feet

DRAINAGE BASIN B CALCULATIONS:

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Georgetown Industrial
Date Prepared: 2/2/2023

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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: $L_M = 27.2(A_N \times P)$

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 * = 63.91 acres
Predevelopment impervious area within the limits of the plan* = 7.24 acres
Total post-development impervious area within the limits of the plan* = 44.10 acres
Total post-development impervious cover fraction * = 0.69
P = 32 inches

$L_{M\ TOTAL\ PROJECT}$ = 32083 lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 5

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

Drainage Basin/Outfall Area No. = B

Total drainage basin/outfall area= 0.49 acres
Predevelopment impervious area within drainage basin/outfall area= 0.00 acres
Post-development impervious area within drainage basin/outfall area= 0.49 acres
Post-development impervious fraction within drainage basin/outfall area= 1.00
$L_{M\ THIS\ BASIN}$ = 426 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
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 = 0.49 acres
A_I = 0.49 acres
A_P = 0.00 acres
L_R = 461 lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 0 lbs.

F = 0.00

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 = #N/A inches
Post Development Runoff Coefficient = 0.82
On-site Water Quality Volume = #N/A 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 = #N/A cubic feet

Storage for Sediment = #N/A
Total Capture Volume (required water quality volume(s) x 1.20) = #N/A cubic feet
The following sections are used to calculate the required water quality volume(s) for the selected BMP.
The values for BMP Types not selected in cell C45 will show NA.

16. Vegetated Filter Strips Designed as Required in RG-348 Pages 3-55 to 3-57

There are no calculations required for determining the load or size of vegetative filter strips.
The 80% removal is provided when the contributing drainage area does not exceed 72 feet (direction of flow) and the sheet flow leaving the impervious cover is directed across 15 feet of engineered filter strips with maximum slope of 20% or across 50 feet of natural vegetation with a maximum slope of 10%. There can be a break in grade as long as no slope exceeds 20%.

If vegetative filter strips are proposed for an interim permanent BMP, they may be sized as described on Page 3-56 of RG-348.

DRAINAGE BASIN D CALCULATIONS:

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Georgetown Industrial
Date Prepared: 2/2/2023

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
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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: $L_M = 27.2(A_N \times P)$

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 * = 63.91 acres
Predevelopment impervious area within the limits of the plan* = 7.24 acres
Total post-development impervious area within the limits of the plan* = 44.10 acres
Total post-development impervious cover fraction * = 0.69
P = 32 inches

$L_{M\ TOTAL\ PROJECT}$ = 32083 lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 5

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

Drainage Basin/Outfall Area No. = D

Total drainage basin/outfall area= 1.00 acres
Predevelopment impervious area within drainage basin/outfall area= 0.00 acres
Post-development impervious area within drainage basin/outfall area= 1.00 acres
Post-development impervious fraction within drainage basin/outfall area= 1.00
$L_{M\ THIS\ BASIN}$ = 870 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
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 = 1.00 acres
A_I = 1.00 acres
A_P = 0.00 acres
L_R = 941 lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 0 lbs.

F = 0.00

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 = #N/A inches
Post Development Runoff Coefficient = 0.82
On-site Water Quality Volume = #N/A 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 = #N/A cubic feet

Storage for Sediment = #N/A
Total Capture Volume (required water quality volume(s) x 1.20) = #N/A cubic feet
The following sections are used to calculate the required water quality volume(s) for the selected BMP.
The values for BMP Types not selected in cell C45 will show NA.

16. Vegetated Filter Strips Designed as Required in RG-348 Pages 3-55 to 3-57

There are no calculations required for determining the load or size of vegetative filter strips.
The 80% removal is provided when the contributing drainage area does not exceed 72 feet (direction of flow) and the sheet flow leaving the impervious cover is directed across 15 feet of engineered filter strips with maximum slope of 20% or across 50 feet of natural vegetation with a maximum slope of 10%. There can be a break in grade as long as no slope exceeds 20%.

If vegetative filter strips are proposed for an interim permanent BMP, they may be sized as described on Page 3-56 of RG-348.

BENCHMARKS:

TEMPORARY BENCHMARK "A"
ELEVATION - 693.93'
TEMPORARY BENCHMARK "A" IS A BOX CUT SET ON A HEADWALL ON THE EAST R.O.W. OF STATE HIGHWAY I-35 N, BEING APPROXIMATELY 100 FEET NORTHEAST OF THE INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

TEMPORARY BENCHMARK "B"
ELEVATION - 715.12'
TEMPORARY BENCHMARK "B" IS A BOX CUT SET ON A CONCRETE COLUMN FOR A GUY ANCHOR, BEING APPROXIMATELY 2,050 FEET EAST OF INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

FLOOD PLAIN NOTE:

THIS SUBJECT TRACT LIES WITHIN UNSHADED ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN (0.2% ANNUAL FLOODPLAIN CHANCE) AS DELINEATED ON THE FLOOD INSURANCE MAP FOR WILLIAMSON COUNTY, TEXAS AND INCORPORATED AREAS, MAP NO. 48491C0285F MAP REVISED DECEMBER 20, 2019.

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

STORM WATER QUALITY MANAGEMENT PLAN CALCULATIONS

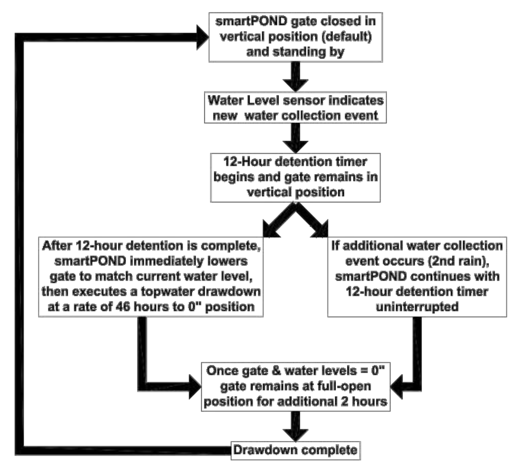
SCALE	DESIGN	DRAWN
N/A	DA	CR

SHEET
C3.4

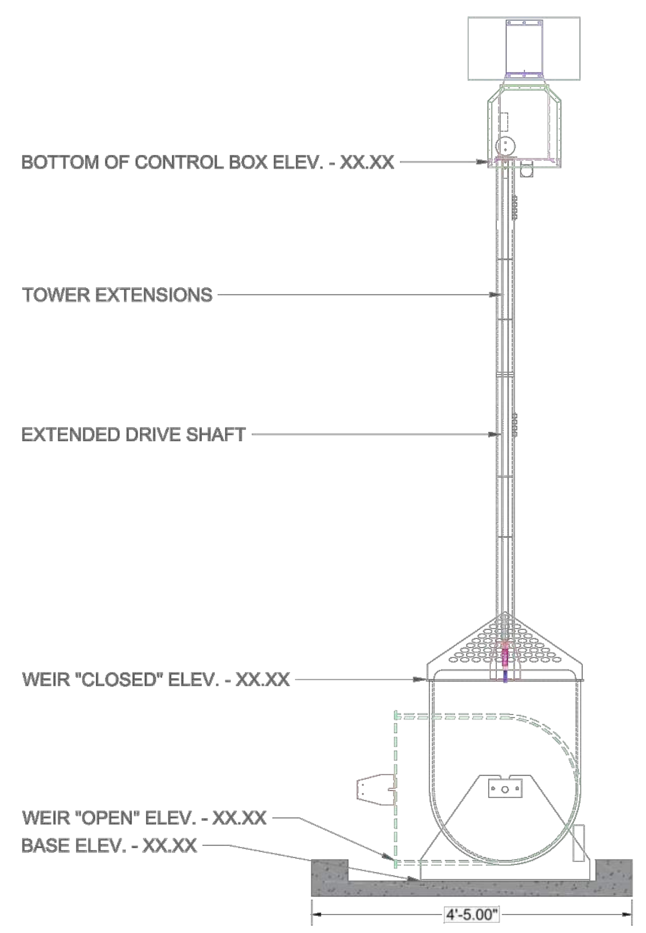
PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\C3.3-C3.5 Storm Water Quality Management Plan & Details.dwg Last Plotted: Thu Apr 13, 2023 - 5:42pm By: asalazar

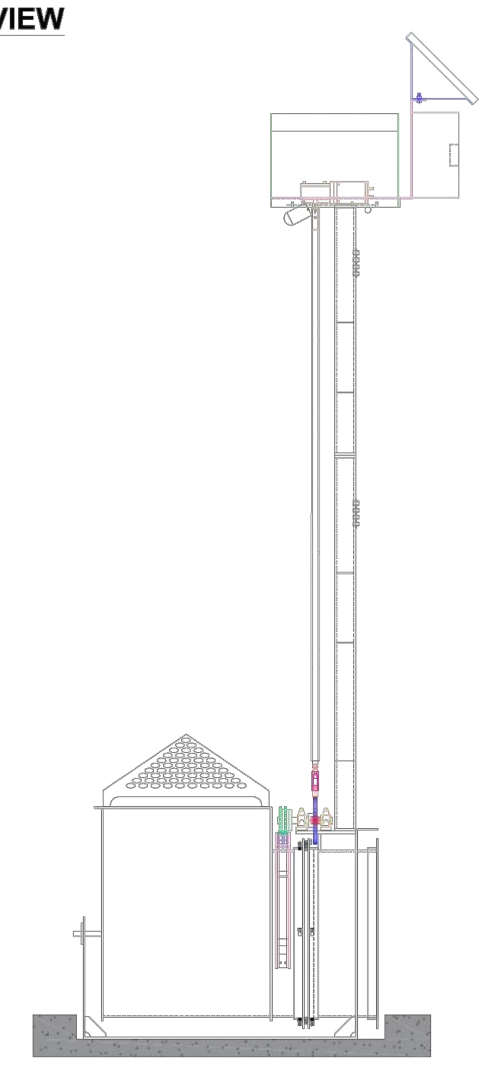
PROGRAMMABLE LOGIC FLOW CHART



FRONT VIEW



SIDE VIEW



CONSTRUCTION ECO SERVICES

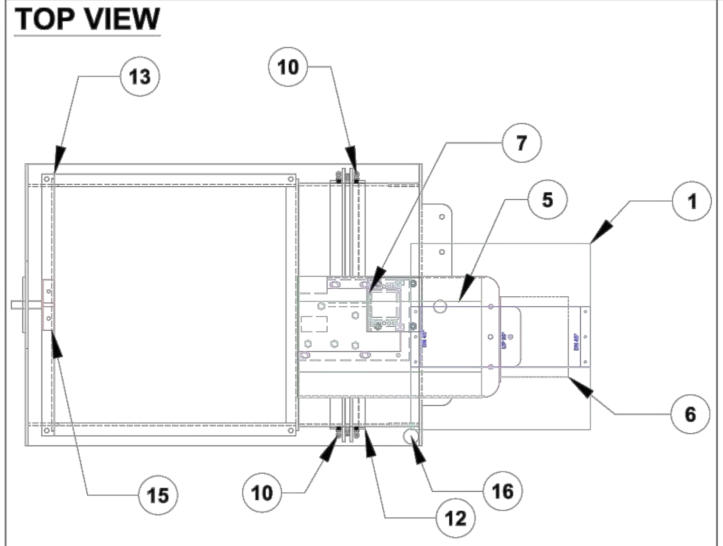
smartPOND Automated Stormwater Control.

FOR ADDITIONAL INFORMATION PLEASE CONTACT: CONSTRUCTION ECO SERVICES, 832-456-1000, www.ecosvs.com

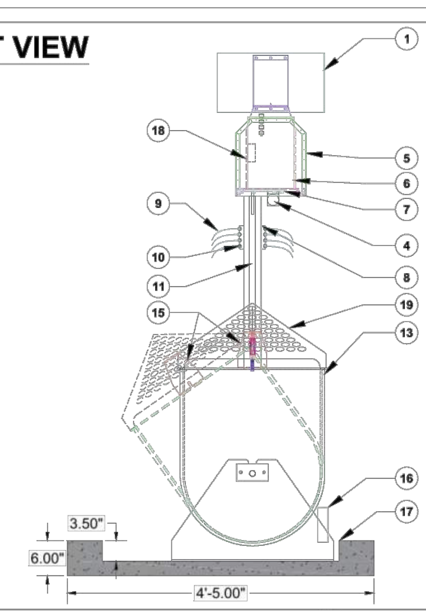
CONVERGENT WATER TECHNOLOGIES

DATE OF ISSUE: 7/27/22

TOP VIEW

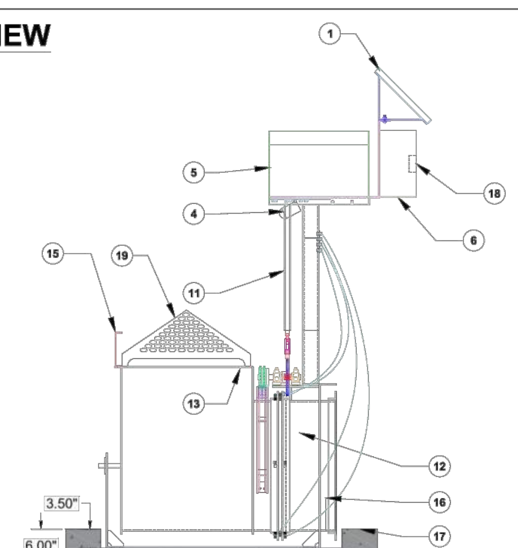


FRONT VIEW

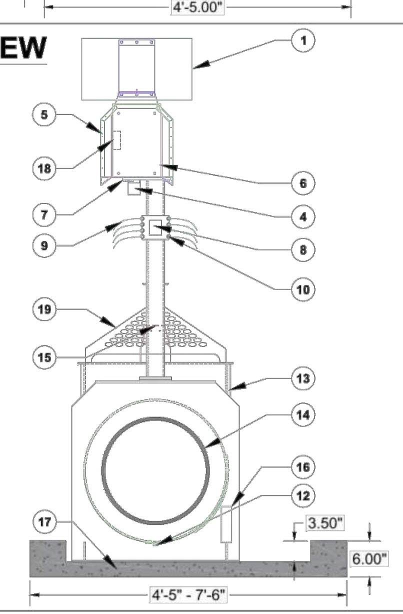


Parts List	
Item	**smartPOND Components**
1	12 V SOLAR PANEL WITH 30 WATT CHARGING CAPACITY
2	ANTENNA (NOT DISPLAYED)
3	CELL DATA MODEM (NOT DISPLAYED)
4	CAMERA
5	LOCKABLE WEATHERPROOF ELECTRONIC BOX
6	CONTROL BOX W/ LOCKING LATCHES
7	PEDESTAL
8	REMOTE GREASE MANIFOLD
9	GREASE TUBES
10	GREASE FITTINGS
11	EXTENDED DRIVE SHAFT
12	24" Rotary Valve
13	24" Drum (30"-70" TALL)
14	Outlet Pipe (Size TBD By Engineer, Max 24")
15	Inclinometer
16	Level Transducer
17	6" Concrete Pad (By Others, Size Varies)
18	ON/OFF SWITCH
19	TRASH RACK

SIDE VIEW



BACK VIEW



NOTES:

FOR ABOVE GROUND APPLICATIONS, THE ENTIRE SYSTEM INCLUDING ALL NECESSARY COMPONENTS FOR OPERATION ASSEMBLE INTO ONE KIT AND ARE HOUSED UNDER A SINGLE LOCKABLE STEEL ENCLOSURE WITH THE SOLAR PANEL MOUNTED ON TOP. IN THIS CONFIGURATION, THE UNIT CAN BE INSTALLED ON A STABLE, LEVEL PAD AND BE BOLTED ONTO THE BACK OF THE OUTFALL PIPE WITH SIX ¾" BOLTS AND THEN SWITCHED TO THE "ON" POSITION.

FOR UNDERGROUND APPLICATIONS, THE VALVE IS INSTALLED IN A VAULT OR CONCRETE ENCASEMENT AS NEEDED. AN EXTENDED DRIVE SHAFT CONNECTS BETWEEN THE UNDERGROUND VALVE AND THE REST OF THE COMPONENTS, INCLUDING THE MOTOR AND ALL ELECTRONICS, WHICH ARE HOUSED IN THE LOCKABLE STEEL ENCLOSURE DIRECTLY ABOVE GROUND.

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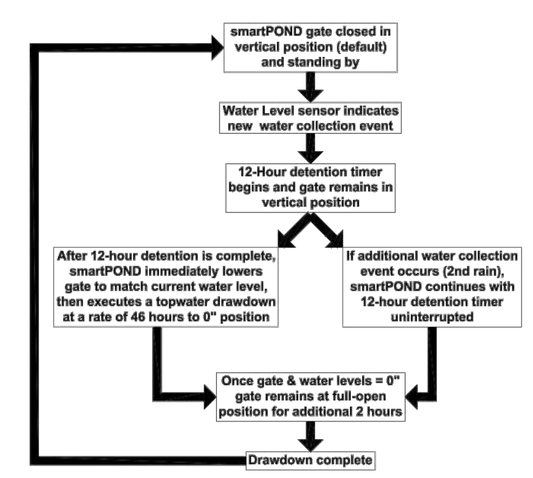
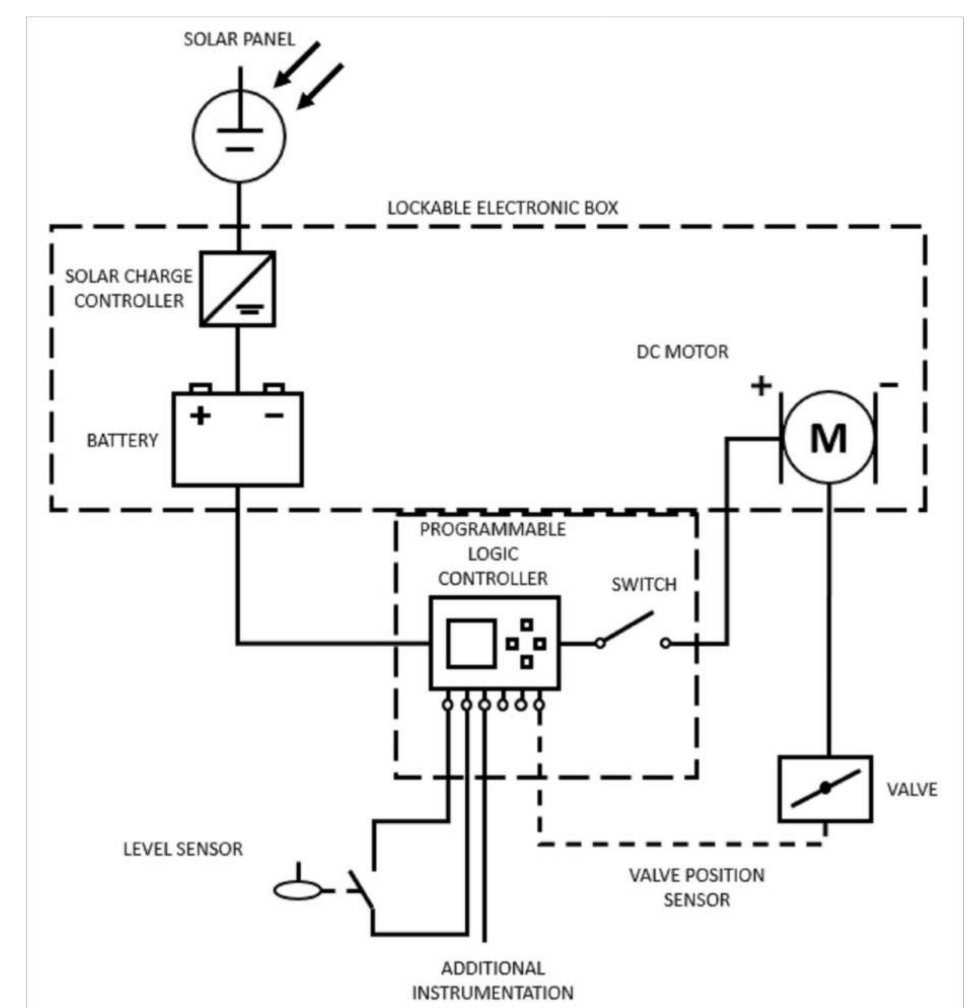
CONVERGENT WATER TECHNOLOGIES

DATE OF ISSUE: 7/27/22

PROGRAMMABLE LOGIC FLOW CHART



BLOCK DIAGRAM



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CONVERGENT WATER TECHNOLOGIES

DATE OF ISSUE: 7/27/22

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ELEVATION - 693.93'
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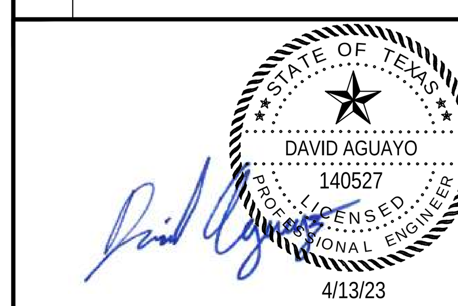
REV	DESCRIPTION	DATE



4/13/23

WGA CONSULTING ENGINEERS

WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

STORM WATER QUALITY MANAGEMENT DETAILS

SCALE	DESIGN	DRAWN
N/A	DA	CR

SHEET
C3.5

PROJECT No. 00486-009

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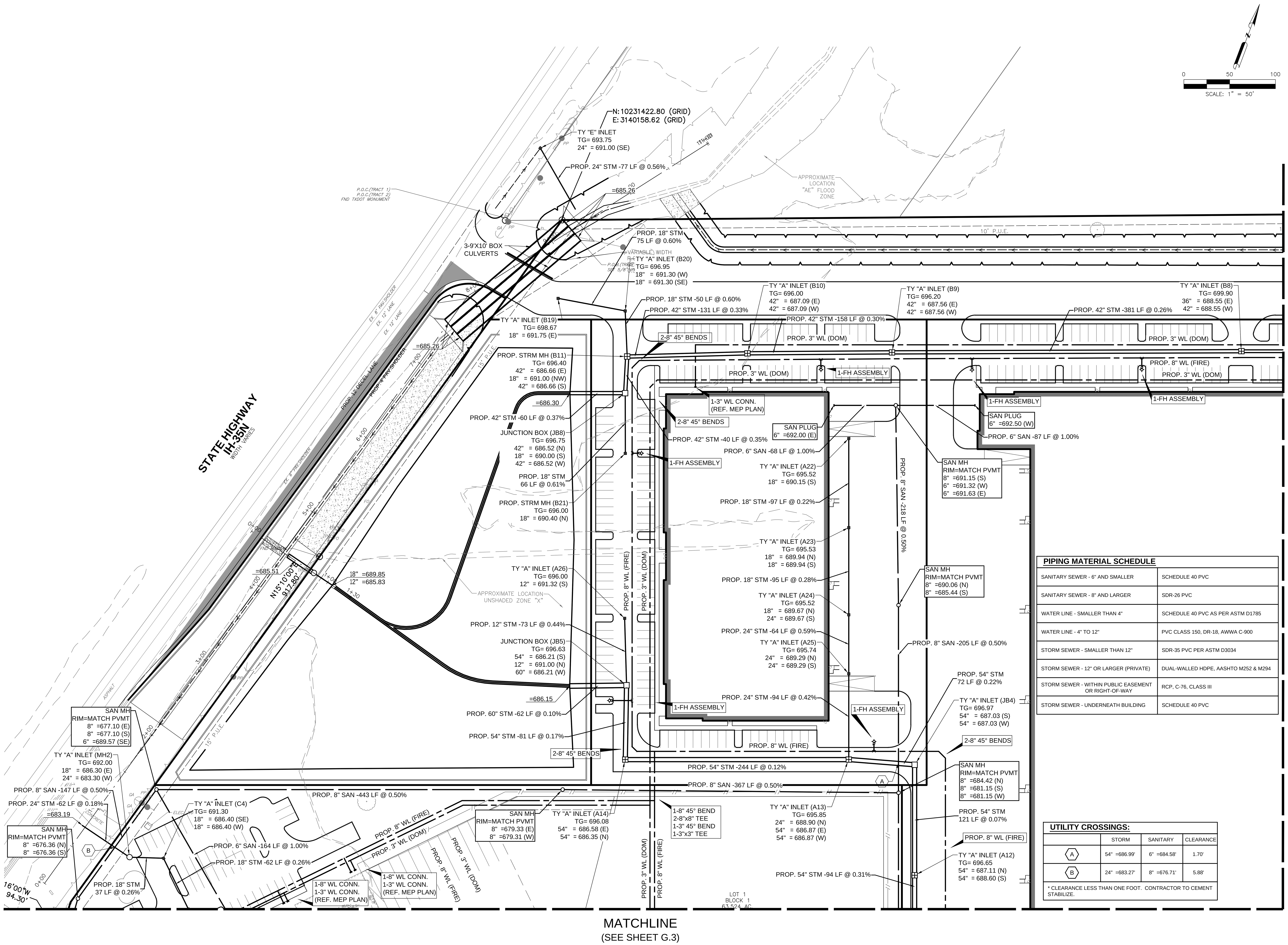

UTILITY NOTES:

1. PRIVATE STORM SEWER TO BE HDPE UNLESS OTHERWISE NOTED. FOR PUBLIC STORM SEWER REFERENCE GENERAL NOTES.
2. UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY EXISTING UTILITY LOCATIONS PRIOR TO CONSTRUCTION AND IMMEDIATELY NOTIFY ENGINEER OF ANY CONFLICT OR DISCREPANCIES.
3. CONTRACTOR TO COORDINATE WITH UTILITY COMPANIES FOR SERVICE ORIGINATION AND CONNECTION.
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7. CONTRACTOR TO COORDINATE LOCATIONS OF UNDERGROUND CONDUIT FOR SITE LIGHTING PRIOR TO PAVING.
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9. ALL SANITARY SEWERS CROSSING WATER LINES WITH A 6 INCHES TO 9 FEET CLEARANCE SHALL HAVE A MINIMUM OF 18' JOINT OF 150 P.S.I. SDR 26 PVC PIPE MEETING ASTM SPECIFICATION D2241 CENTERED ON WATER LINE. WHEN WATER LINE IS BELOW SANITARY SEWER PROVIDE MINIMUM 2 FOOT SEPARATION.
10. REFERENCE MEP PLANS FOR UTILITY CONDUIT LOCATIONS.
11. CONTRACTOR TO ADJUST ALL EXISTING APPURTENANCES ON SITE TO PROPOSED GRADE, AS APPLICABLE.

PIPING MATERIAL SCHEDULE

SANITARY SEWER - 6" AND SMALLER	SCHEDULE 40 PVC
SANITARY SEWER - 8" AND LARGER	SDR-26 PVC
WATER LINE - SMALLER THAN 4"	SCHEDULE 40 PVC AS PER ASTM D1785
WATER LINE - 4" TO 12"	PVC CLASS 150, DR-18, AWWA C-900
STORM SEWER - SMALLER THAN 12"	SDR-35 PVC PER ASTM D3034
STORM SEWER - 12" OR LARGER (PRIVATE)	DUAL-WALLED HDPE, AASHTO M252 & M294
STORM SEWER - WITHIN PUBLIC EASEMENT OR RIGHT-OF-WAY	RCP, C-76, CLASS III
STORM SEWER - UNDERNEATH BUILDING	SCHEDULE 40 PVC

UTILITY CROSSINGS:

	STORM	SANITARY	CLEARANCE
A	54" =686.99'	6" =684.58'	1.70'
B	24" =683.27'	8" =676.71'	5.88'

* CLEARANCE LESS THAN ONE FOOT. CONTRACTOR TO CEMENT STABILIZE.

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

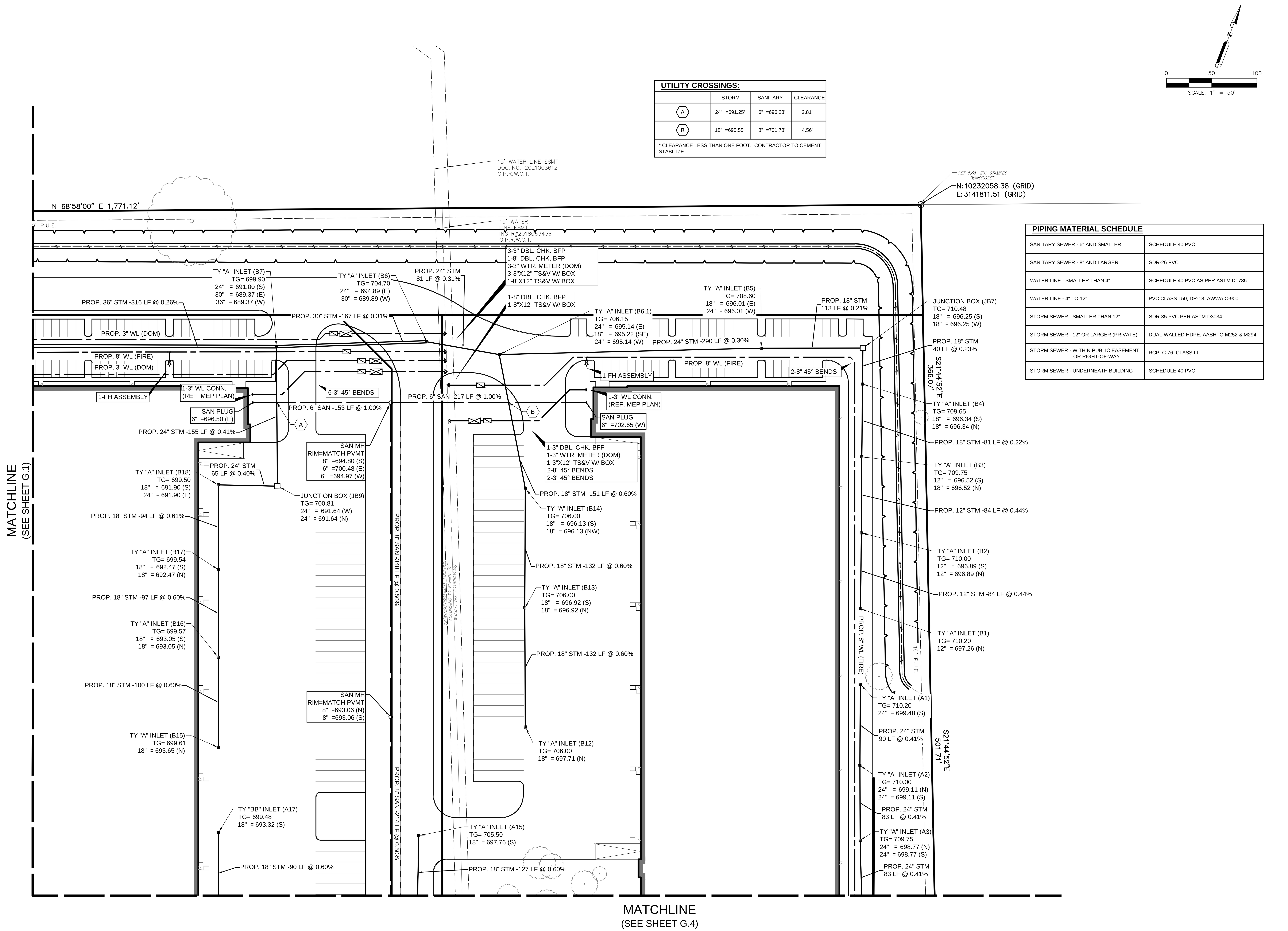
UTILITY PLAN
(1 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
G.1

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\G.1-G.4 Utility Plan.dwg Last Plotted: Thu Apr 13, 2023 - 4:56pm By: asalazar



MATCHLINE
(SEE SHEET G.4)

UTILITY CROSSINGS:

	STORM	SANITARY	CLEARANCE
A	24" =691.25'	6" =696.23'	2.81'
B	18" =695.55'	8" =701.78'	4.56'

* CLEARANCE LESS THAN ONE FOOT. CONTRACTOR TO CEMENT STABILIZE.

PIPING MATERIAL SCHEDULE

SANITARY SEWER - 6" AND SMALLER	SCHEDULE 40 PVC
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WATER LINE - SMALLER THAN 4"	SCHEDULE 40 PVC AS PER ASTM D1785
WATER LINE - 4" TO 12"	PVC CLASS 150, DR-18, AWWA C-900
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BENCHMARKS:

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ELEVATION - 693.93'
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REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

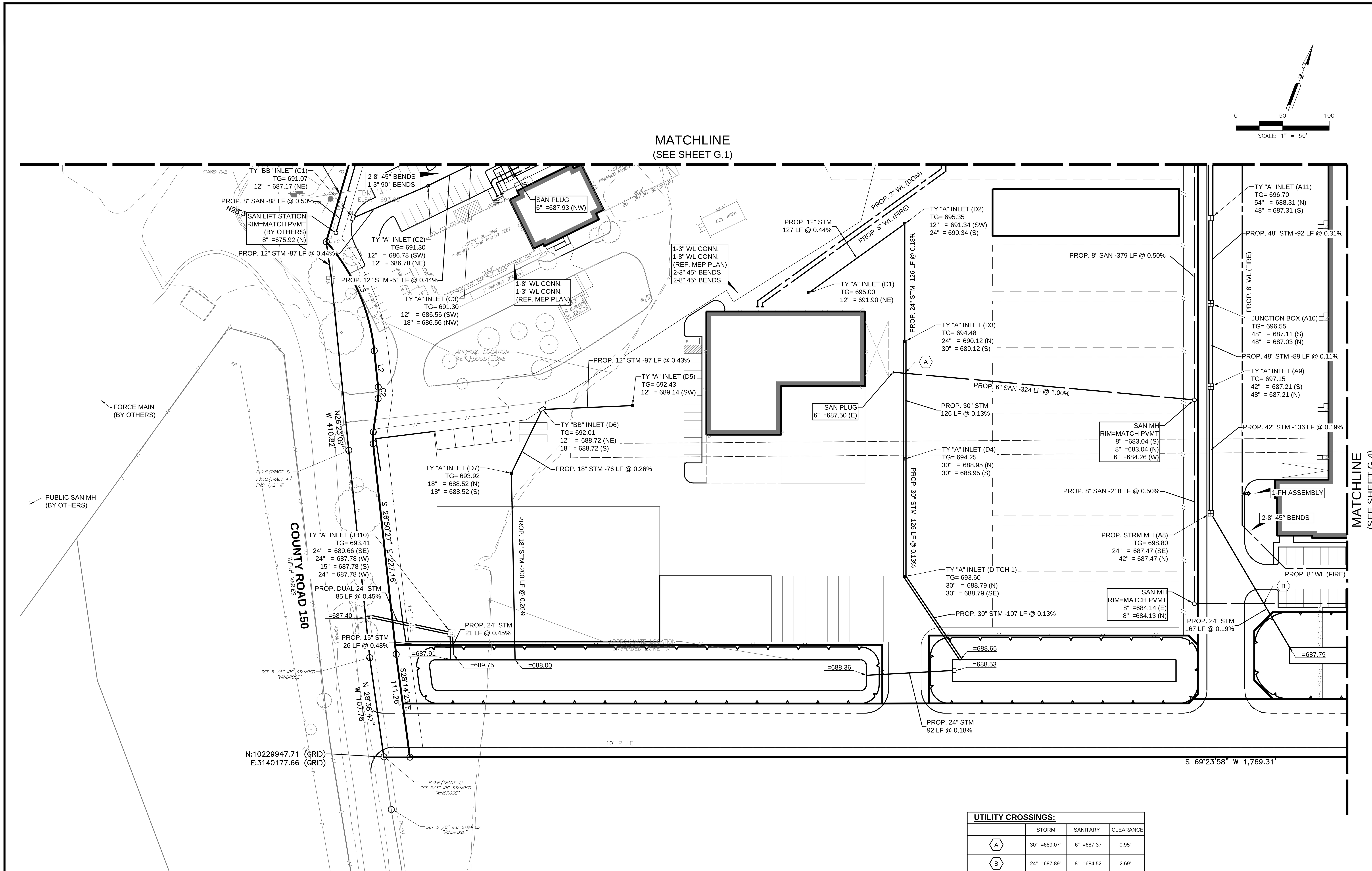
UTILITY PLAN
(2 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
G.2

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\G.1-G.4 Utility Plan.dwg Last Plotted: Thu Apr 13, 2023 - 4:56pm By: asalazar



UTILITY CROSSINGS:

	STORM	SANITARY	CLEARANCE
A	30" =689.07'	6" =687.37'	0.95'
B	24" =687.89'	8" =684.52'	2.69'

* CLEARANCE LESS THAN ONE FOOT. CONTRACTOR TO CEMENT STABILIZE.

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4/13/23

WGA
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WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

UTILITY PLAN
(3 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
G.3

PROJECT No. 00486-009

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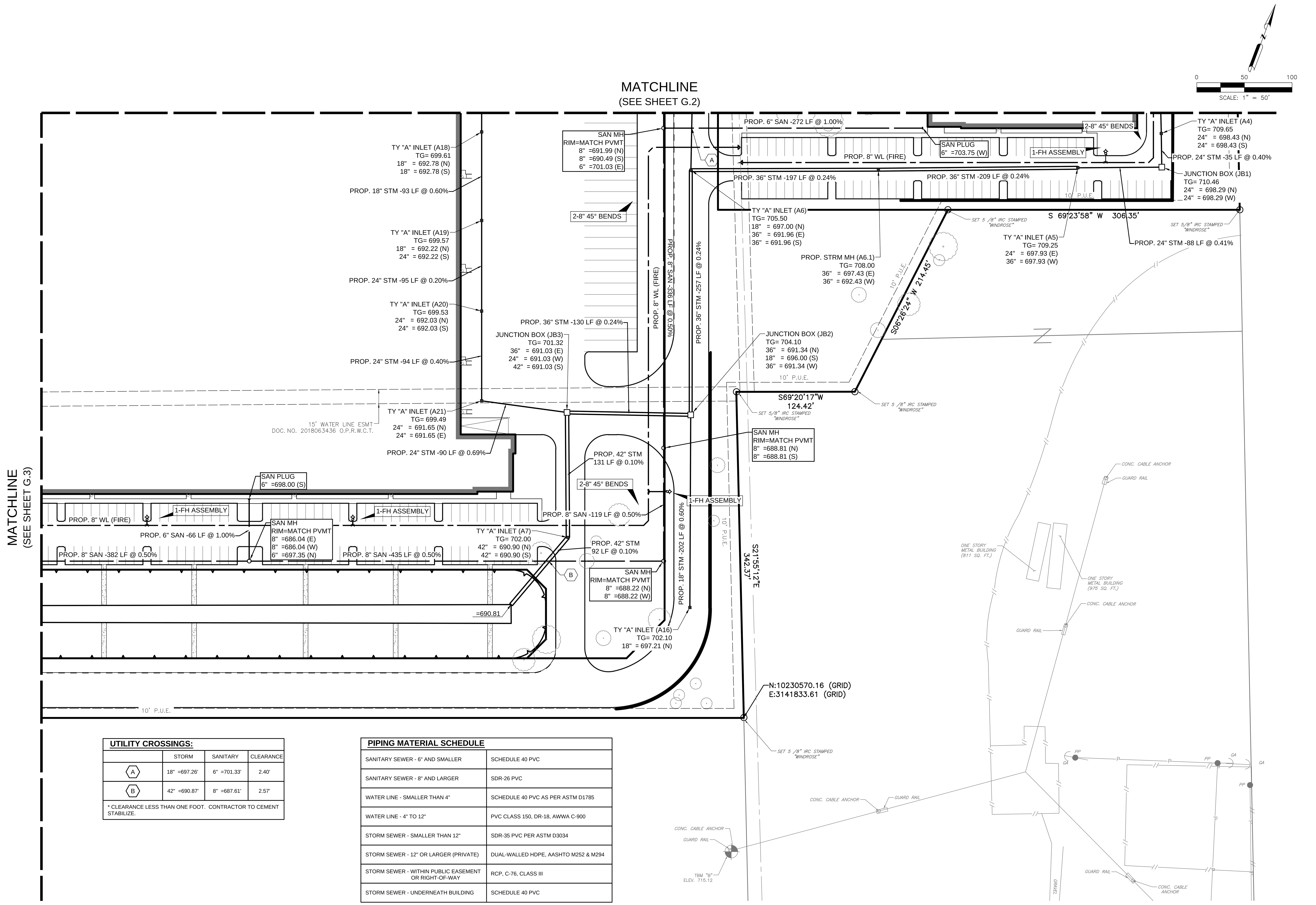

UTILITY CROSSINGS:

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A	18" =697.26'	6" =701.33'	2.40'
B	42" =690.87'	8" =687.61'	2.57'

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DAVID AGUAYO
140527
LICENSED
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4/13/23

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Houston, Texas 77063
713.789.1900

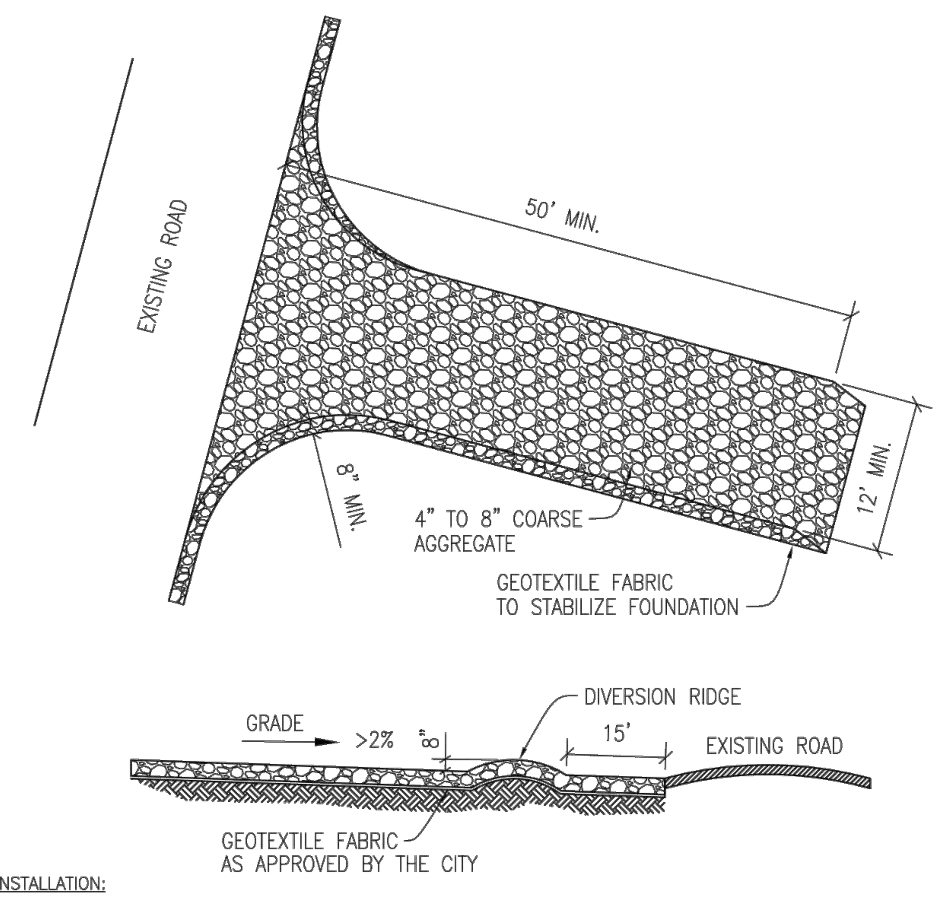
GEORGETOWN KEYSTONE

UTILITY PLAN (4 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
G.4

PROJECT No. 00486-009



INSTALLATION:

- CLEAR THE AREA OF DEBRIS, ROCKS OR PLANTS THAT WILL INTERFERE WITH INSTALLATION.
- GRADE THE AREA FOR THE ENTRANCE TO FLOW BACK ON TO THE CONSTRUCTION SITE. RUNOFF FROM THE STABILIZED CONSTRUCTION
- PLACE GEOTEXTILE FABRIC AS APPROVED BY THE CITY.
- PLACE ROCK AS APPROVED BY THE CITY.

INSPECTIONS AND MAINTENANCE GUIDELINES:

- THE ENTRANCE SHOULD BE MAINTAINED IN A CONDITION, WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
- ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ON TO PUBLIC RIGHTS-OF-WAY SHOULD BE REMOVED IMMEDIATELY BY CONTRACTOR.
- WHEN NECESSARY, WHEELS SHOULD BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY.
- WHEN WASHING IS REQUIRED, IT SHOULD BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
- ALL SEDIMENT SHOULD BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATER COURSE BY USING APPROVED METHODS.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

REVISION NOTE: ADOPTED 6/21/2006

GEORGETOWN TEXAS EST. 1848 — Georgetown Utility Systems — Your Community Owned Utility

CITY OF GEORGETOWN
CONSTRUCTION STANDARDS AND DETAILS
STABILIZED CONSTRUCTION ENTRANCE

DRAWING NAME: EC06
SCALE: NTS | DATE: 1/2003
DRAWN BY: MRS | APPROVED BY: TRB

NOTE: THIS SECTION IS INTENDED TO ASSIST THOSE PERSONS PREPARING WATER POLLUTION ABATEMENT PLANS (WPAP) OR STORM WATER POLLUTION PREVENTION PLANS (SW3P) THAT COMPLY WITH FEDERAL, STATE AND/OR LOCAL STORM WATER REGULATIONS.

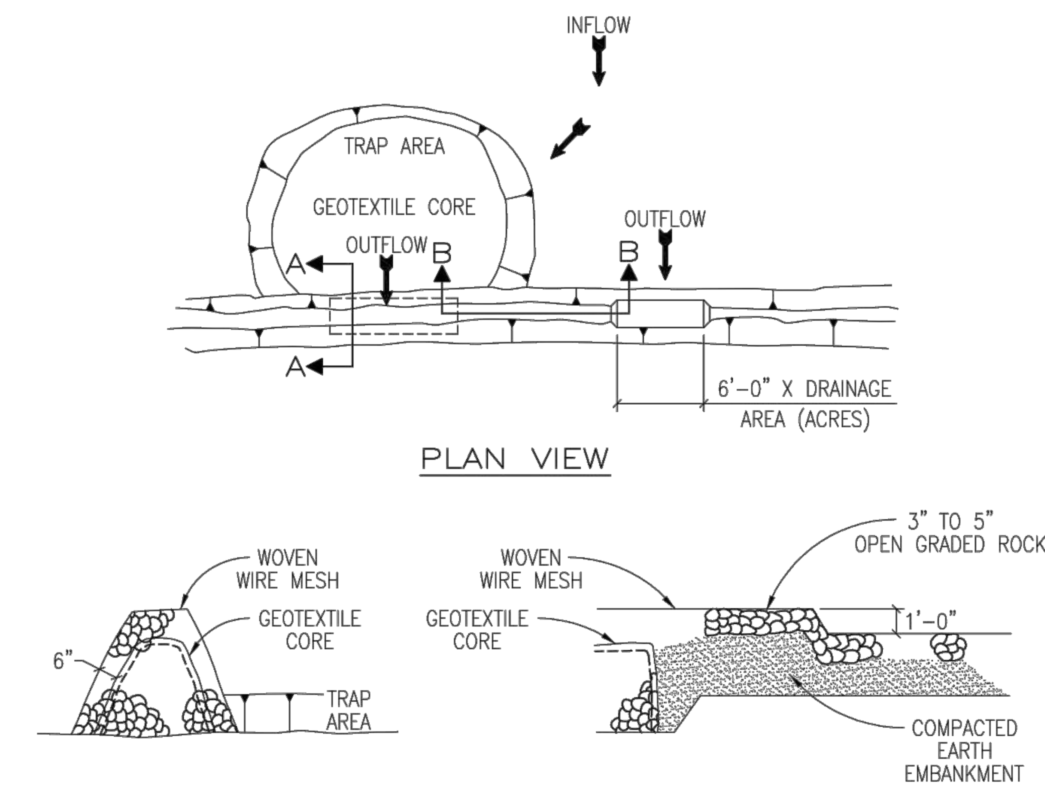
1. THE CONTRACTOR TO INSTALL AND MAINTAIN EROSION/SEDIMENTATION CONTROLS AND TREE/NATURAL AREA PROTECTIVE FENCING PRIOR TO ANY SITE PREPARATION WORK (CLEARING, GRUBBING, GRADING, OR EXCAVATION). CONTRACTOR TO REMOVE EROSION/SEDIMENTATION CONTROLS AT THE COMPLETION OF PROJECT AND GRASS RESTORATION.
2. ALL PROJECTS WITHIN THE RECHARGE ZONE OF THE EDWARD'S AQUIFER SHALL SUBMIT A BEST MANAGEMENT PRACTICES AND WATER POLLUTION AND ABATEMENT PLAN TO THE TNRCC FOR APPROVAL PRIOR TO ANY CONSTRUCTION.
3. THE PLACEMENT OF EROSION/SEDIMENTATION CONTROLS TO BE IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENTATION CONTROL PLAN AND WATER POLLUTION ABATEMENT PLAN. DEVIATIONS FROM THE APPROVED PLAN MUST BE SUBMITTED TO AND APPROVED BY THE OWNER'S REPRESENTATIVE.
4. ALL PLANTING SHALL BE DONE BETWEEN MAY 1 AND SEPTEMBER 15 EXCEPT AS SPECIFICALLY AUTHORIZED IN WRITING. IF PLANTING IS AUTHORIZED TO BE DONE OUTSIDE THE DATES SPECIFIED, THE SEED SHALL BE PLANTED WITH THE ADDITION OF WINTER FESCUE (KENTUCKY 31) AT A RATE OF 100lb/ACRE. GRASS SHALL BE COMMON BERMUDA GRASS, HULLED, MINIMUM 82% PURE LIVE SEED. ALL GRASS SEED SHALL BE FREE FROM NOXIOUS WEED, GRADE "A" RECENT CROP, RECLEANED AND TREATED WITH APPROPRIATE FUNGICIDE AT TIME OF MIXING. SEED SHALL BE FURNISHED IN SEALED, STANDARD CONTAINERS WITH DEALER'S GUARANTEED ANALYSIS.
5. ALL DISTURBED AREAS TO BE RESTORED AS NOTED IN THE WATER POLLUTION ABATEMENT PLAN.
6. THE PLANTED AREA TO BE IRRIGATED OR SPRINKLED IN A MANNER THAT WILL NOT ERODE THE TOPSOIL, BUT WILL SUFFICIENTLY SOAK THE SOIL TO A DEPTH OF FOUR (4) INCHES. THE IRRIGATION TO OCCUR AT 10-DAY INTERVALS DURING THE FIRST TWO MONTHS TO INSURE GERMINATION AND ESTABLISHMENT OF THE GRASS. RAINFALL OCCURRENCES OF 1/2 INCH OR GREATER TO POSTPONE THE WATERING SCHEDULE ONE WEEK.
7. RESTORATION TO BE ACCEPTABLE WHEN THE GRASS HAS GROWN AT LEAST 1-1/2 INCHES HIGH WITH 95% *COVERAGE*, PROVIDED NO BARE SPOTS LARGER THAN 25 SQUARE FEET EXIST.
8. A MINIMUM OF FOUR (4) INCHES OF TOPSOIL TO BE PLACED IN ALL AREAS DISTURBED BY CONSTRUCTION.
9. THE CONTRACTOR TO HYDROMULCH OR SOD (AS SHOWN ON PLANS) ALL EXPOSED CUTS AND FILLS UPON COMPLETION OF CONSTRUCTION.
10. EROSION AND SEDIMENTATION CONTROLS TO BE INSTALLED OR MAINTAINED IN A MANNER WHICH DOES NOT RESULT IN SOIL BUILDUP WITHIN TREE DRIPLINE.
11. TO AVOID SOIL COMPACTION, CONTRACTOR SHALL NOT ALLOW VEHICULAR TRAFFIC, PARKING, OR STORAGE OF EQUIPMENT OR MATERIALS IN THE TREE DRIPLINE AREAS.
12. WHERE A FENCE IS CLOSER THAN FOUR (4) FEET TO A TREE TRUNK, PROTECT THE TRUNK WITH STRAPPED-ON PLANKING TO A HEIGHT OF EIGHT (8) FEET (OR TO THE LIMITS OF LOWER BRANCHING) IN ADDITION TO THE FENCING.
13. TREES TO BE REMOVED IN A MANNER WHICH DOES NOT IMPACT TREES TO BE PRESERVED.
14. ANY ROOT EXPOSED BY CONSTRUCTION ACTIVITY TO BE PRUNED FLUSH WITH THE SOIL. BACKFILL ROOT AREAS WITH GOOD QUALITY TOPSOIL AS SOON AS POSSIBLE. IF EXPOSED ROOT AREAS ARE NOT BACKFILLED WITHIN TWO DAYS, COVER THEM WITH ORGANIC MATERIAL IN A MANNER WHICH REDUCES SOIL TEMPERATURE AND MINIMIZES WATER LOSS DUE TO EVAPORATION.
15. CONTRACTOR TO PRUNE VEGETATION TO PROVIDE CLEARANCE FOR STRUCTURES, VEHICULAR TRAFFIC, AND EQUIPMENT BEFORE DAMAGE OCCURS (RIPPING OF BRANCHES, ETC.). ALL FINISHED PRUNING TO BE DONE ACCORDING TO RECOGNIZED, APPROVED STANDARDS OF THE INDUSTRY (REFERENCE THE "NATIONAL ARBORIST ASSOCIATION PRUNING STANDARDS FOR SHADE TREES").
16. THE CONTRACTOR IS TO INSPECT THE CONTROLS AT WEEKLY INTERVALS AND AFTER EVERY RAINFALL EXCEEDING 1/4 INCH TO VERIFY THAT THEY HAVE NOT BEEN SIGNIFICANTLY DISTURBED. ANY ACCUMULATED SEDIMENT AFTER A SIGNIFICANT RAINFALL TO BE REMOVED AND PLACED IN THE OWNER DESIGNATED SPOIL DISPOSAL SITE. THE CONTRACTOR TO CONDUCT PERIODIC INSPECTIONS OF ALL EROSION/SEDIMENTATION CONTROLS AND TO MAKE ANY REPAIRS OR MODIFICATIONS NECESSARY TO ASSURE CONTINUED EFFECTIVE OPERATION OF EACH DEVICE.
17. WHERE THERE IS TO BE AN APPROVED GRADE CHANGE, IMPERMEABLE PAVING SURFACE, TREE WELL, OR OTHER SUCH SITE DEVELOPMENT IMMEDIATELY ADJACENT TO A PROTECTED TREE, ERECT THE FENCE APPROXIMATELY TWO TO FOUR FEET (2'-4') BEHIND THE AREA IN QUESTION.
18. NO ABOVE AND/OR BELOW GROUND TEMPORARY FUEL STORAGE FACILITIES TO BE STORED ON THE PROJECT SITE.
19. IF EROSION AND SEDIMENTATION CONTROL SYSTEMS ARE EXISTING FROM PRIOR CONTRACTS, OWNER'S REPRESENTATIVE AND THE CONTRACTOR TO EXAMINE THE EXISTING EROSION AND SEDIMENTATION CONTROL SYSTEMS FOR DAMAGE PRIOR TO CONSTRUCTION. ANY DAMAGE TO PREEXISTING EROSION AND SEDIMENTATION CONTROLS NOTED TO BE REPAIRED AT OWNERS EXPENSE.
20. INTENTIONAL RELEASE OF VEHICLE OR EQUIPMENT FLUIDS ONTO THE GROUND IS NOT ALLOWED. CONTAMINATED SOIL RESULTING FROM ACCIDENTAL SPILL TO BE REMOVED AND DISPOSED OF PROPERLY.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

REVISION NOTE: ADOPTED 6/21/2006

CITY OF GEORGETOWN
CONSTRUCTION STANDARDS AND DETAILS
EROSION AND SEDIMENTATION AND TREE PROTECTION NOTES

DRAWING NAME: EC01A
SCALE: NTS | DATE: 1/2003
DRAWN BY: MRS | APPROVED BY: TRB



SECTION A-A

SECTION B-B

INSTALLATION:

- LOCATE THE SEDIMENT TRAP SO AS TO DISTURB AS FEW TREES AS POSSIBLE.
- CLEAR AND GRUB THE AREA UNDER THE EMBANKMENT OF ALL VEGETATION AND ROOT MATS.
- LAYOUT THE WIRE MESH AND THEN THE GEOTEXTILE FABRIC.
- CONSTRUCT THE GEOTEXTILE CORE AND CORRESPONDING ROCK EMBANKMENT TO THE DESIGNATED HEIGHT AND CONFIGURATION.
- WRAP THE STRUCTURE WITH THE PREVIOUSLY PLACED WIRE MESH SECURE ENOUGH SO THAT WHEN WALKED ACROSS THE STRUCTURE RETAINS IT'S SHAPE. SECURE WITH TIE WIRE.
- PLACE THE EMBANKMENT MATERIAL IN 8 TO 12 INCH LIFTS AND MACHINE COMPACT.

INSPECTION AND MAINTENANCE GUIDELINES:

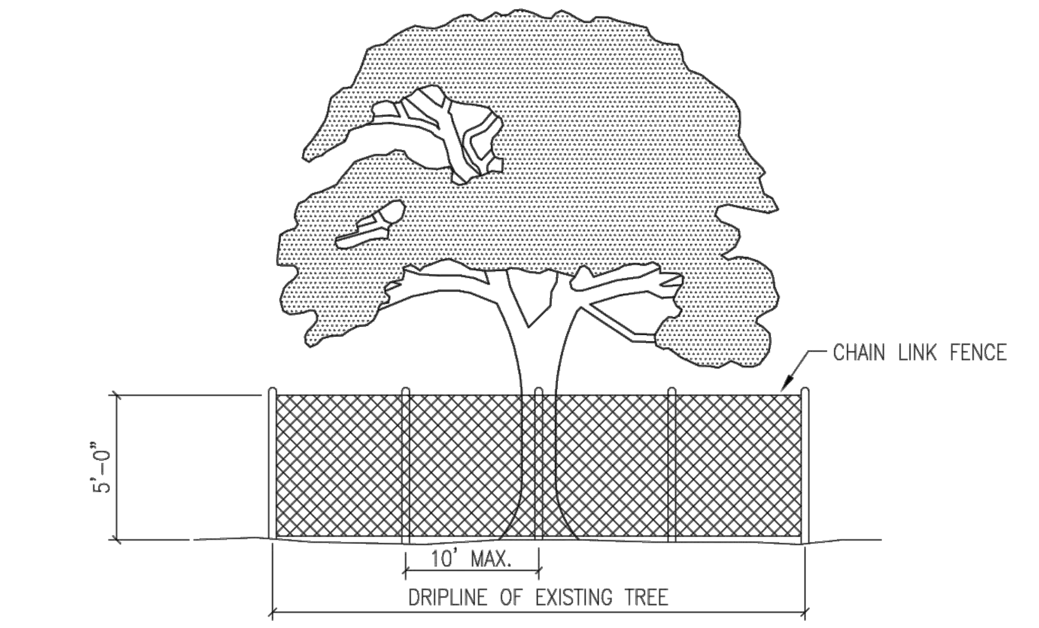
- INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL. CHECK THE EMBANKMENT, SPILLWAYS, AND OUTLET FOR EROSION DAMAGE AND INSPECT THE EMBANKMENT FOR PIPING AND SETTLEMENT. REPAIR SHOULD BE MADE PROMPTLY AS NEEDED BY THE CONTRACTOR.
- TRASH AND OTHER DEBRIS SHOULD BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO HALF OF THE DESIGN DEPTH OF THE TRAP.
- SEDIMENT REMOVED FROM THE TRAP SHOULD BE DEPOSITED IN AN APPROVED SPOILS AREA AND IN SUCH A MANNER THAT IT WILL NOT CAUSE ADDITIONAL SILTATION.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

REVISION NOTE: ADOPTED 6/21/2006

CITY OF GEORGETOWN
CONSTRUCTION STANDARDS AND DETAILS
SEDIMENT TRAP DETAIL

DRAWING NAME: EC07
SCALE: NTS | DATE: 1/2003
DRAWN BY: MRS | APPROVED BY: TRB



NOTES:

1. TREE PROTECTION FENCES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY SITE PREPARATION WORK (CLEARING, GRUBBING OR GRADING).
2. FENCES SHALL COMPLETELY SURROUND THE TREE, OR CLUSTERS OF TREES; WILL BE LOCATED AT THE OUTERMOST LIMIT OF THE TREE BRANCHES (DRIPLINE), AND WILL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PROJECT IN ORDER TO PREVENT THE FOLLOWING:
   A. SOIL COMPACTION IN THE ROOT ZONE AREA RESULTING FROM VEHICULAR TRAFFIC, OR STORAGE OF EQUIPMENT OR MATERIALS.
   B. ROOT ZONE DISTURBANCES DUE TO GRADE CHANGES (GREATER THAN SIX INCHES (6") CUT OR FILL, OR TRENCHING NOT REVIEWED AND AUTHORIZED BY THE CITY.
   C. WOUNDS TO EXPOSED ROOTS, TRUNKS OR LIMBS BY MECHANICAL EQUIPMENT.
   D. OTHER ACTIVITIES DETRIMENTAL TO TREES, SUCH AS CHEMICAL STORAGE, CEMENT TRUCK CLEANING AND FIRE.
3. EXCEPTIONS TO INSTALLING FENCES AT TREE DRIPLINES MAY BE PERMITTED IN THE FOLLOWING CASES:
   A. WHERE PERMEABLE PAVING IS TO BE INSTALLED, ERECT THE FENCE AT THE OUTER LIMITS OF THE PERMEABLE PAVING AREA.
   B. WHERE TREES ARE CLOSE TO PROPOSED BUILDINGS, ERECT THE FENCE NO CLOSER THAN SIX FEET (6'-0") TO BUILDING.

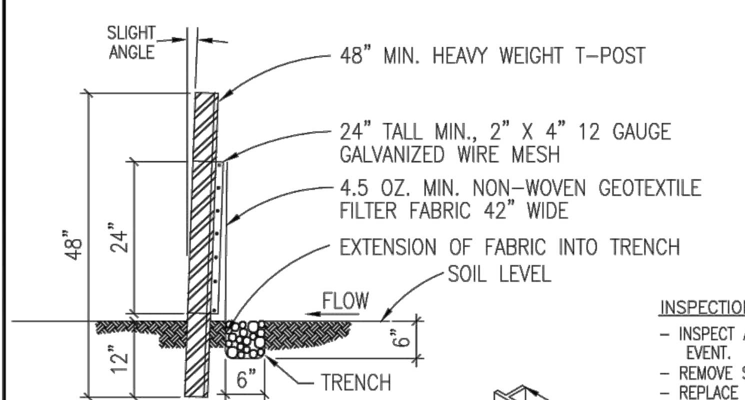
The Architect/Engineer assumes responsibility for appropriate use of this standard.

REVISION NOTE: ADOPTED 6/21/2006

CITY OF GEORGETOWN
CONSTRUCTION STANDARDS AND DETAILS
TREE PROTECTION – CHAIN LINK FENCE

DRAWING NAME: EC09
SCALE: NTS | DATE: 1/2003
DRAWN BY: MRS | APPROVED BY: TRB

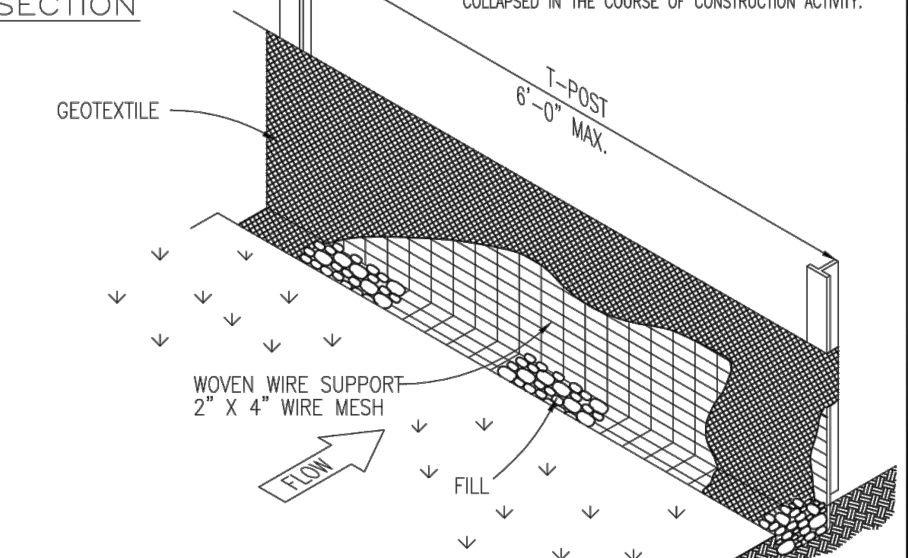
The Architect/Engineer assumes responsibility for appropriate use of this standard.



CROSS SECTION

INSPECTION AND MAINTENANCE GUIDELINES:

- INSPECT ALL FENCING WEEKLY, AND AFTER ANY RAINFALL EVENT.
- REMOVE SEDIMENT WHEN BUILDUP REACHES 6 INCHES.
- REPLACE ANY TORN FABRIC.
- REPLACE OR REPAIR ANY SECTIONS CRUSHED OR COLLAPSED IN THE COURSE OF CONSTRUCTION ACTIVITY.



INSTALLATION:

- LAYOUT THE SILT FENCE FOLLOWING AS CLOSELY AS POSSIBLE TO THE CONTOUR.
- CLEAR THE GROUND OF DEBRIS, ROCKS, PLANTS (INCLUDING GRASSES TALLER THAN 2") TO PROVIDE A SMOOTH FLOW APPROACH SURFACE. EXCAVATE 6" DEEP X 6" WIDE TRENCH ON UPSTREAM SIDE OF FACE PER PLANS.
- DRIVE THE HEAVY DUTY T-POST AT LEAST 12 INCHES INTO THE GROUND AND AT A SLIGHT ANGLE TOWARDS THE FLOW.
- ATTACH THE 2" X 4" 12 GAUGE WELDED WIRE MESH TO THE T-POST WITH 11 1/2 GAUGE GALVANIZED T-POST CLIPS. THE TOP OF THE WIRE TO BE 24" ABOVE GROUND LEVEL. THE WELDED WIRE MESH TO BE OVERLAPPED 6" AND TIED AT LEAST 6 TIMES WITH HOG RINGS.
- THE SILT FENCE TO BE INSTALLED WITH A SKIRT A MINIMUM OF 6" WIDE PLACED ON THE UPHILL SIDE OF THE FENCE INSIDE EXCAVATED TRENCH. THE FABRIC TO OVERLAP THE TOP OF THE WIRE BY 1".
- ANCHOR THE SILT FENCE BY BACKFILLING WITH EXCAVATED DIRT AND ROCKS (NOT LARGER THAN 2").
- GEOTEXTILE SPLICES SHOULD BE A MINIMUM OF 18" WIDE ATTACHED IN AT LEAST 6 PLACES. SPLICES IN CONCENTRATED FLOW AREAS WILL NOT BE ACCEPTED.
- SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

REVISION NOTE: ADOPTED 6/21/2006

CITY OF GEORGETOWN
CONSTRUCTION STANDARDS AND DETAILS
SILT FENCE DETAIL

DRAWING NAME: EC02
SCALE: NTS | DATE: 1/2003
DRAWN BY: MRS | APPROVED BY: TRB

GUIDELINES FOR DESIGN AND INSTALLATION OF TEMPORARY EROSION AND SEDIMENTATION CONTROLS

TYPE OF STRUCTURE	REACH LENGTH	MAXIMUM DRAINAGE AREA	SLOPE
SILT FENCE	N/A	2 ACRES	0 - 10%
	200 FEET	2 ACRES	10 - 20%
	100 FEET	1 ACRE	20 - 30%
	50 FEET	1/2 ACRE	> 30%
TRIANGLE FILTER DIKE	100 FEET	1/2 ACRE	< 30% SLOPE
	50 FEET	1/4 ACRE	> 30% SLOPE
ROCK BERM *, **	500 FEET	< 5 ACRES	0 - 10%

* FOR ROCK BERM DESIGN WHERE PARAMETERS ARE OTHER THAN STATED, DRAINAGE AREA CALCULATIONS AND ROCK BERM DESIGN MUST BE SUBMITTED FOR REVIEW.

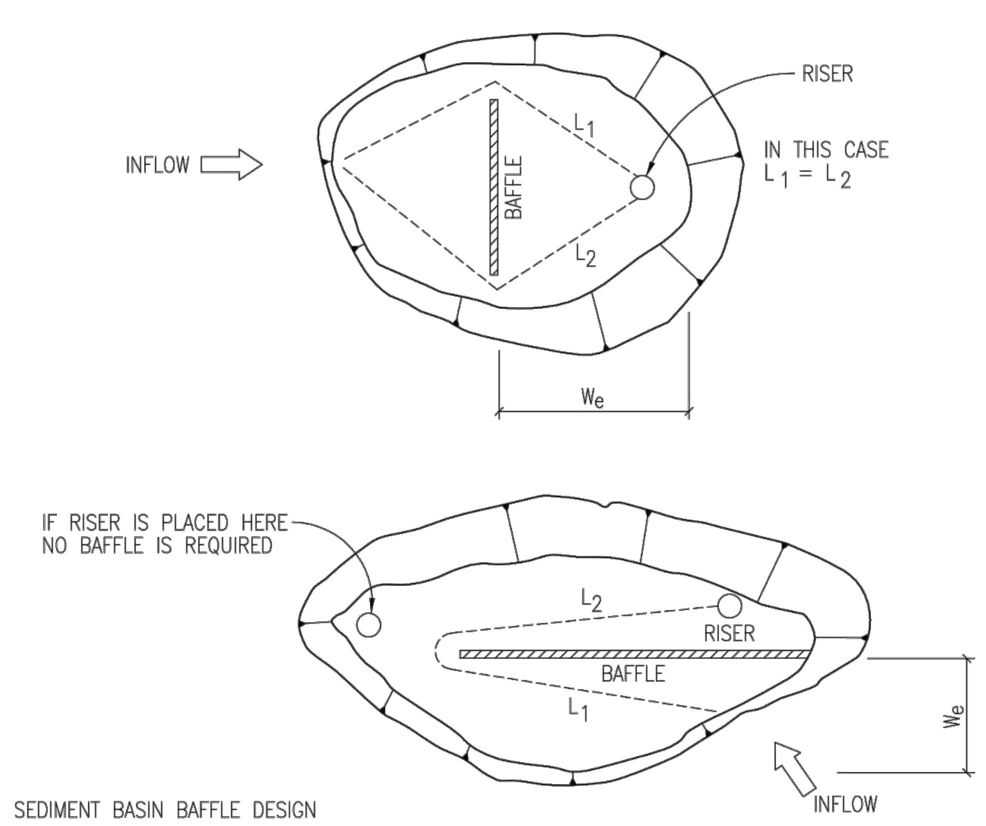
** HIGH SERVICE ROCK BERMS MAY BE REQUIRED IN AREAS OF ENVIRONMENTAL SIGNIFICANCE AS DETERMINED BY THE CITY OF GEORGETOWN.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

REVISION NOTE: ADOPTED 6/21/2006

CITY OF GEORGETOWN
CONSTRUCTION STANDARDS AND DETAILS
TEMPORARY EROSION AND SEDIMENTATION CONTROL GUIDELINES

DRAWING NAME: EC01
SCALE: NTS | DATE: 1/2003
DRAWN BY: MRS | APPROVED BY: TRB



SEDIMENT BASIN BAFFLE DESIGN

$W_e = A / (L_1 + L_2)$

W_e = EFFECTIVE WIDTH OF BASIN

A = SURFACE AREA OF BASIN WHEN FILLED TO RISER CREST

L_1, L_2 = SHORTEST TRAVEL DISTANCE AROUND THE BAFFLE FROM INLET TO OUTLET

INSPECTION AND MAINTENANCE GUIDELINES:

- INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL. CHECK THE EMBANKMENT, SPILLWAYS, AND OUTLET FOR EROSION DAMAGE, AND INSPECT THE EMBANKMENT FOR PIPING AND SETTLEMENT. REPAIR SHOULD BE MADE PROMPTLY AS NEEDED BY THE CONTRACTOR.
- TRASH AND OTHER DEBRIS SHOULD BE REMOVED AFTER EACH RAINFALL TO PREVENT CLOGGING OF THE OUTLET STRUCTURE.
- ACCUMULATED SILT SHOULD BE REMOVED AND THE BASIN SHOULD BE RE-GRADED TO ITS ORIGINAL DIMENSIONS AT SUCH POINT THAT THE CAPACITY OF THE IMPOUNDMENT HAS BEEN REDUCED TO 1/2 OF ITS ORIGINAL STORAGE CAPACITY.
- THE REMOVED SEDIMENT SHOULD BE STOCKPILED OR REDISTRIBUTED IN AREAS THAT ARE PROTECTED FROM EROSION.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

REVISION NOTE: ADOPTED 6/21/2006

CITY OF GEORGETOWN
CONSTRUCTION STANDARDS AND DETAILS
SEDIMENT BASIN BAFFLE DESIGN

DRAWING NAME: EC08
SCALE: NTS | DATE: 1/2003
DRAWN BY: MRS | APPROVED BY: TRB

REV	DESCRIPTION	DATE

STATE OF TEXAS — DAVID AGUAYO — 140527 — LICENSED PROFESSIONAL ENGINEER

4/13/23

WGA CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

EROSION CONTROL PLAN DETAILS

SCALE	DESIGN	DRAWN
N/A	DA	CR

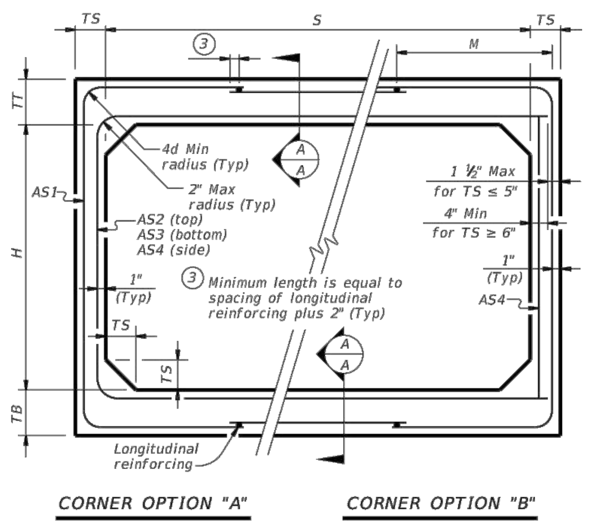
SHEET G.5

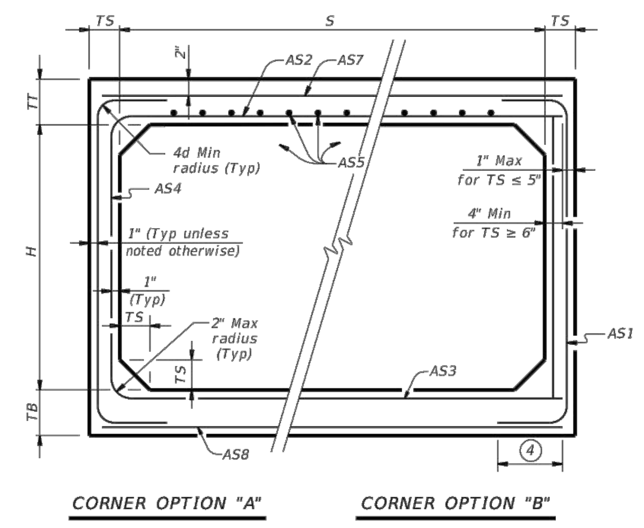
PROJECT No. 00486-009

BOX DATA

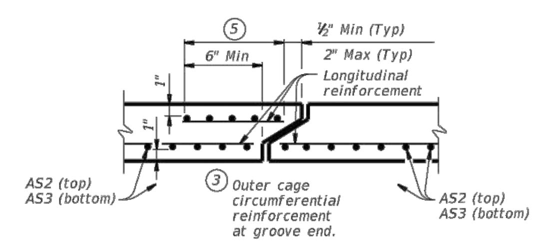
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	Fill Height (ft.)	M (Min) (in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(1) Lift Weight (tons)
							REINFORCING (sq. in. / ft.) (2)							
9	4	9	9	9	< 2	–	0.30	0.36	0.28	0.22	0.22	0.22	0.22	13.7
9	4	9	9	9	2 < 3	54	0.35	0.34	0.31	0.22	–	–	–	13.7
9	4	9	9	9	3 – 5	50	0.28	0.27	0.27	0.22	–	–	–	13.7
9	4	9	9	9	10	49	0.31	0.30	0.31	0.22	–	–	–	13.7
9	4	9	9	9	15	49	0.40	0.40	0.41	0.22	–	–	–	13.7
9	4	9	9	9	20	44	0.52	0.51	0.52	0.22	–	–	–	13.7
9	4	9	9	9	25	44	0.65	0.64	0.65	0.22	–	–	–	13.7
9	5	9	9	9	< 2	–	0.28	0.38	0.31	0.22	0.22	0.22	0.22	14.6
9	5	9	9	9	2 < 3	54	0.32	0.38	0.34	0.22	–	–	–	14.6
9	5	9	9	9	3 – 5	49	0.25	0.30	0.30	0.22	–	–	–	14.6
9	5	9	9	9	10	49	0.28	0.33	0.34	0.22	–	–	–	14.6
9	5	9	9	9	15	44	0.36	0.43	0.45	0.22	–	–	–	14.6
9	5	9	9	9	20	44	0.47	0.56	0.57	0.22	–	–	–	14.6
9	5	9	9	9	25	44	0.58	0.69	0.71	0.22	–	–	–	14.6
9	6	9	9	9	< 2	–	0.25	0.40	0.34	0.22	0.22	0.22	0.22	15.5
9	6	9	9	9	2 < 3	54	0.29	0.41	0.38	0.22	–	–	–	15.5
9	6	9	9	9	3 – 5	49	0.23	0.33	0.33	0.22	–	–	–	15.5
9	6	9	9	9	10	49	0.26	0.35	0.37	0.22	–	–	–	15.5
9	6	9	9	9	15	44	0.33	0.46	0.48	0.22	–	–	–	15.5
9	6	9	9	9	20	44	0.42	0.60	0.61	0.22	–	–	–	15.5
9	6	9	9	9	25	44	0.52	0.74	0.75	0.22	–	–	–	15.5
9	7	9	9	9	< 2	–	0.23	0.42	0.36	0.22	0.22	0.22	0.22	16.4
9	7	9	9	9	2 < 3	59	0.26	0.44	0.41	0.22	–	–	–	16.4
9	7	9	9	9	3 – 5	54	0.22	0.35	0.35	0.22	–	–	–	16.4
9	7	9	9	9	10	49	0.24	0.37	0.39	0.22	–	–	–	16.4
9	7	9	9	9	15	44	0.31	0.48	0.51	0.22	–	–	–	16.4
9	7	9	9	9	20	44	0.39	0.62	0.65	0.22	–	–	–	16.4
9	8	9	9	9	< 2	–	0.22	0.43	0.39	0.22	0.22	0.22	0.22	17.3
9	8	9	9	9	2 < 3	59	0.24	0.46	0.43	0.22	–	–	–	17.3
9	8	9	9	9	3 – 5	59	0.22	0.37	0.38	0.22	–	–	–	17.3
9	8	9	9	9	10	54	0.22	0.39	0.41	0.22	–	–	–	17.3
9	8	9	9	9	15	44	0.29	0.50	0.53	0.22	–	–	–	17.3
9	8	9	9	9	20	44	0.36	0.64	0.67	0.22	–	–	–	17.3
9	9	9	9	9	< 2	–	0.22	0.44	0.42	0.22	0.22	0.22	0.22	18.2
9	9	9	9	9	2 < 3	72	0.23	0.49	0.46	0.22	–	–	–	18.2
9	9	9	9	9	3 – 5	72	0.22	0.39	0.40	0.22	–	–	–	18.2
9	9	9	9	9	10	59	0.22	0.40	0.43	0.22	–	–	–	18.2
9	9	9	9	9	15	49	0.27	0.51	0.55	0.22	–	–	–	18.2
9	9	9	9	9	20	49	0.34	0.66	0.69	0.22	–	–	–	18.2

SECTION DIMENSIONS: S, H, TT, TB, TS.





(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A
(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:
Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
Provide Class H concrete (f'c = 5,000 psi).

GENERAL NOTES:
Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

SINGLE BOX CULVERTS
PRECAST
9'-0" SPAN

SCP-9

FILE: scp09sts-20.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT
©TxDOT February 2020

(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.

DATE:
FILE:

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

Maximum Wingwall Height Hw	W	X	Y	Z	Bars J1 Size	Bars J1 Spa	Bars J2 Size	Bars J2 Spa	Reinf (Lb/Ft)	Conc (CY/Ft)
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing length (2~wings) (3)	
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-6"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

TABLE OF WINGWALL REINFORCING
(2~wings)

Bar	Size	No.	Spa
D	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
R	#5	6	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

WING DIMENSION FORMULAS:
(All values are in feet.)

Hw = H + T + C – 0.250'
A = (Hw – 0.333') (SL)
B = (A) tangent (30°)
Lw = (A) ÷ cosine (30°)

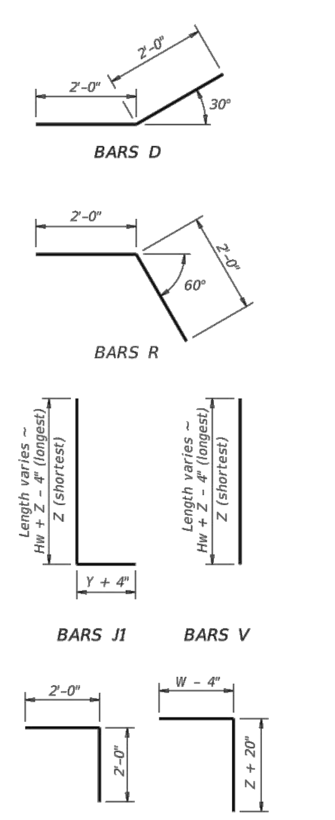
For cast-in-place culverts:
Ltw = (N) (S) + (N + 1) (U)

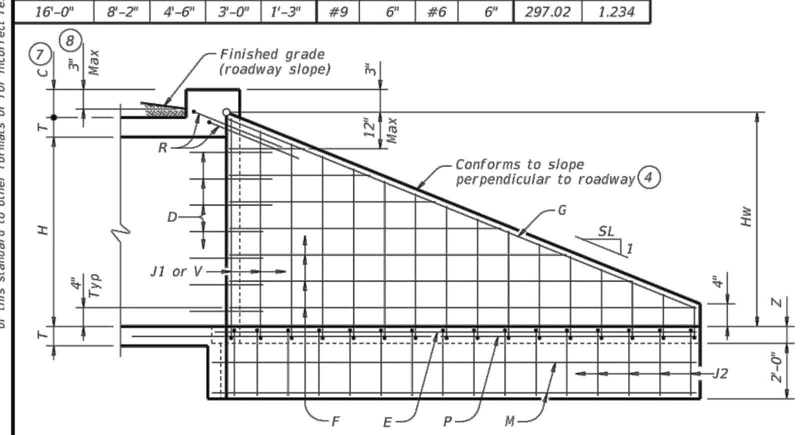
For precast culverts:
Ltw = (N) (2U + S) + (N – 1) (0.5')

Total wingwall area (two wings ~ SF) = (Hw + 0.333') (Lw)

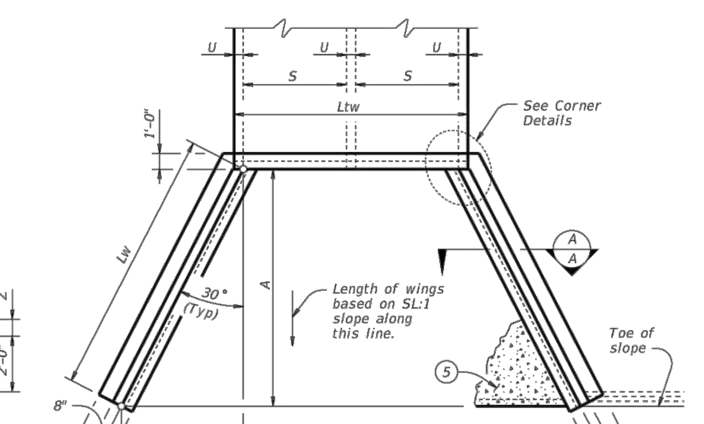
Hw = Height of wingwall
SL:1 = Side slope ratio (horizontal:1 vertical)
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans

See applicable box culvert standard sheet for H, S, T, and U values.

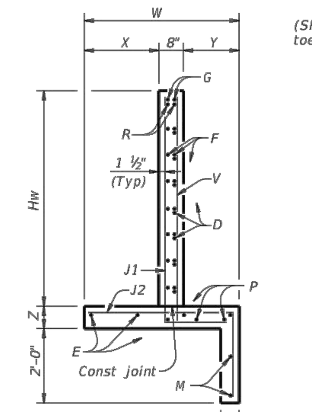




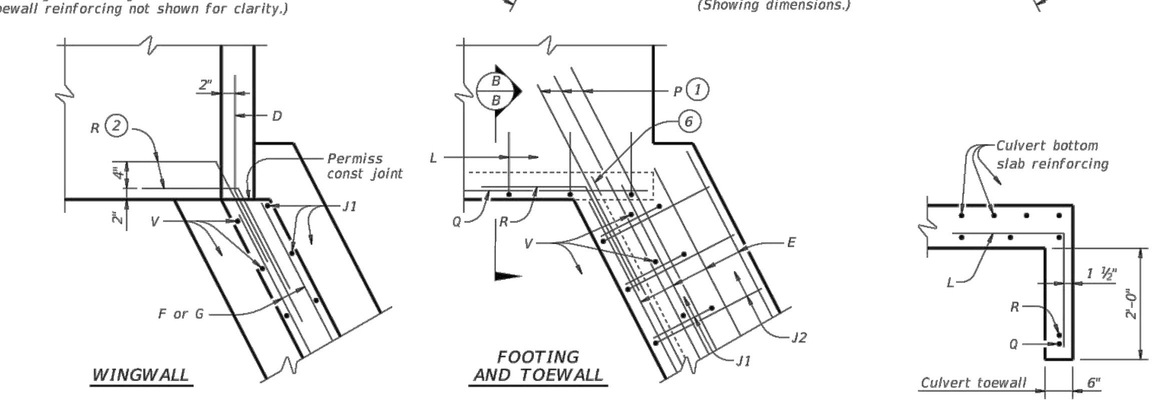
INSIDE ELEVATION
(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)



PLAN
(Showing dimensions.)



SECTION A-A



WINGWALL
FOOTING AND TOEWALL
CORNER DETAILS
(Culvert and culvert toewall reinforcing not shown for clarity.)

SECTION B-B (5)

(1) Extend Bars P 3'-0" minimum into bottom slab of box culvert.
(2) Adjust as necessary to maintain 1 1⁄4" clear cover and 4" minimum between bars.
(3) Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by Lw.
(4) Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.
(5) When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, provide a 6" wide by 1'-6" deep reinforced concrete toewall along all edges of the riprap adjacent to natural ground; reinforce the toewall by extending typical riprap reinforcing into the toewall; and extend construction joints or grooved joints oriented in the direction of flow across the full distance of the riprap at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B will not be required.
(6) At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.
(7) 0" Min to 9'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CR) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
(8) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing unless noted otherwise.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

Texas Department of Transportation — Bridge Division Standard

CONCRETE WINGWALLS
WITH FLARED WINGS FOR
0° SKEW BOX CULVERTS

FW-0

FILE: fw-0stde-20.dgn | DN: GAF | CK: CAT | DW: TxDOT | CK: TxDOT
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DATE:
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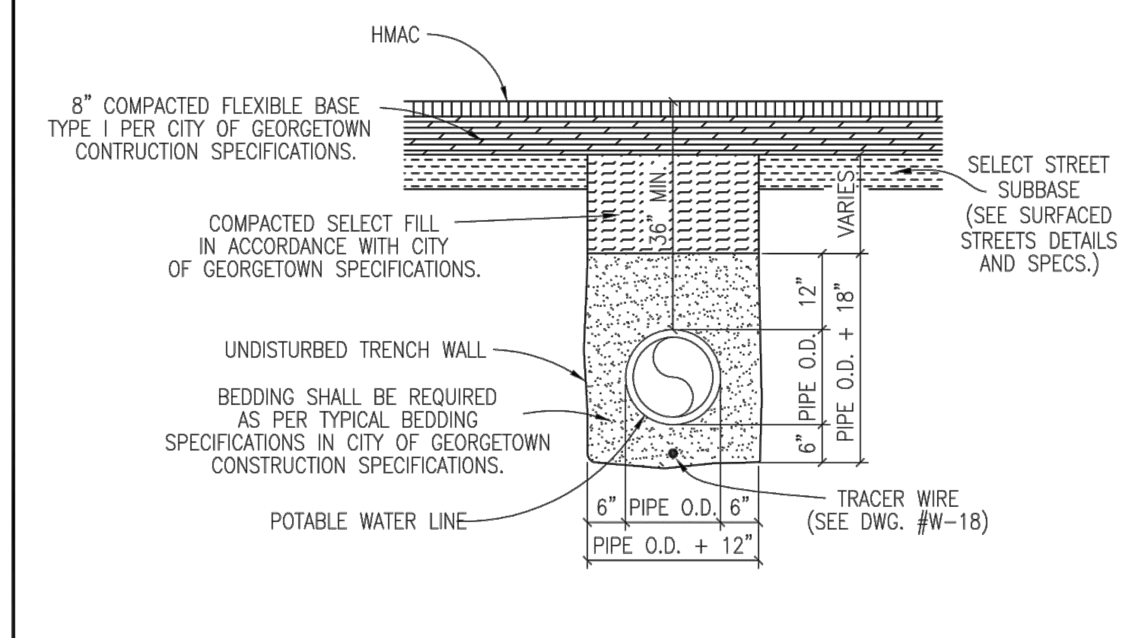


TRENCH WIDTHS
*PIPE LESS THAN 20" DIAMETER
1'-0" + PIPE O.D.
*20" DIAMETER PIPE AND LARGER
2'-0" + PIPE O.D.

NOTES:
1. DENSITY TESTS SHALL BE TAKEN IN ACCORDANCE WITH THE CITY OF GEORGETOWN CONSTRUCTION SPECIFICATIONS AND STANDARDS.
2. CONTRACTOR OR ENGINEER MAY USE FLOWABLE BACKFILL AS AN ALTERNATE BACKFILL MATERIAL (SEE C9 FLOWABLE BACKFILL FOR THE SPECIFICATION).

The Architect/Engineer assumes responsibility for appropriate use of this standard.

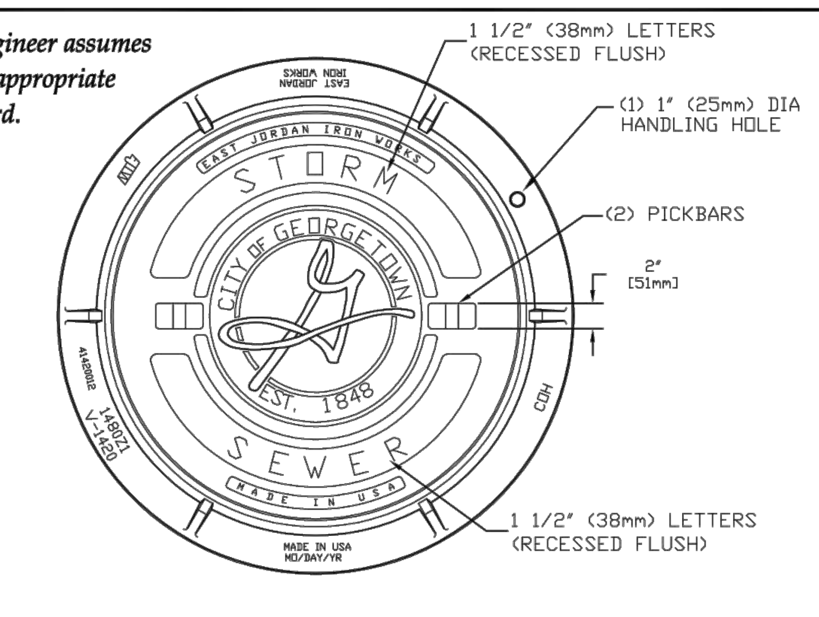
ADOPTED 6/21/2006

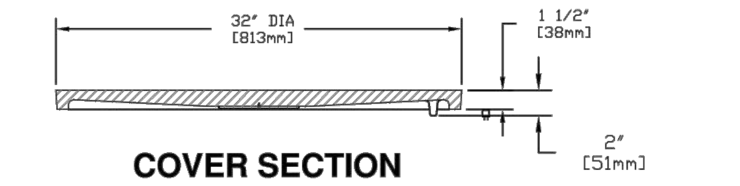
Georgetown Utility Systems — Your Community Owned Utility

CITY OF GEORGETOWN
CONSTRUCTION STANDARDS AND DETAILS
TRENCH AND EMBEDMENT DETAIL UNDER PROPOSED ROADWAY

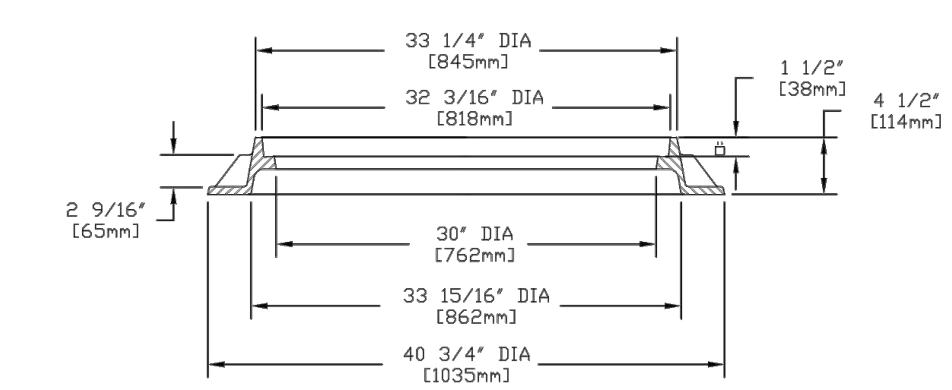
W22
SCALE: NTS | DATE: 1/2003
DRAWN BY: MRS | APPROVED BY: TRB

The Architect/Engineer assumes responsibility for appropriate use of this standard.





COVER SECTION



FRAME SECTION

NOTES:
1. STANDARD STORM SEWER MANHOLE SET TO BE EAST JORDAN IRON WORKS, INC. CATALOG NO. 1480A V-1420\1480Z1, COVER TO BE STAMPED WITH "STORM SEWER".
2. STANDARD STORM SEWER MANHOLE SET TO BE HEAVY DUTY LOAD RATED.
3. FOR MORE DETAILED SPECIFICATIONS REFER TO EAST JORDAN IRON WORKS, INC. REFERENCE PRODUCT DRAWING 41420012 00148391.
4. FOR BOLTED STORM SEWER MANHOLE SET REFER TO DETAIL SD11A.

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CITY OF GEORGETOWN
CONSTRUCTION STANDARDS AND DETAILS
STANDARD STORM SEWER MANHOLE SET

SD11
SCALE: NTS | DATE: 1/2003
DRAWN BY: MRS | APPROVED BY: TRB

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

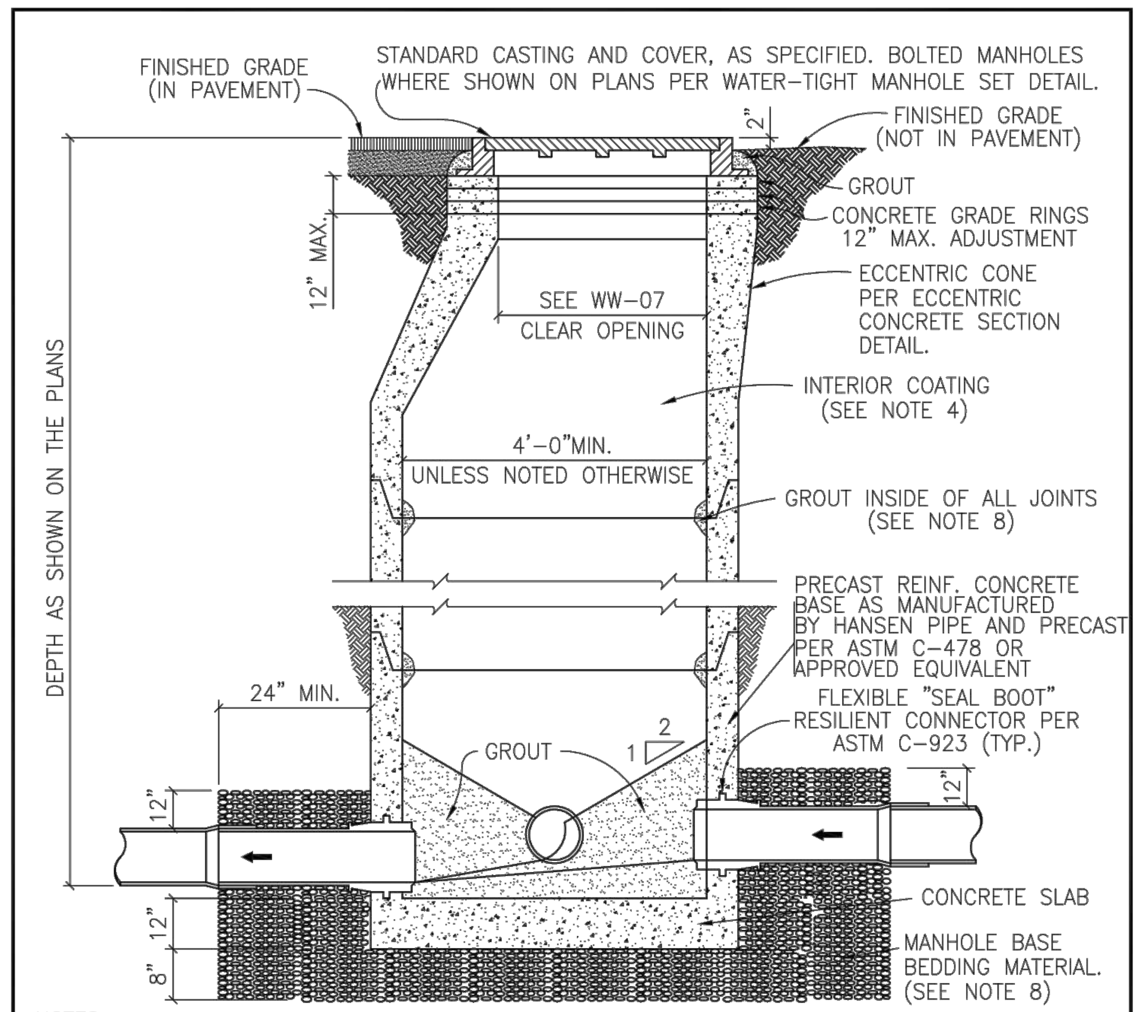
STORM SEWER DETAILS

SCALE	DESIGN	DRAWN
N/A	DA	CR

SHEET
G.6

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\G.6 Storm Sewer Details.dwg Last Plotted: Thu Apr 13, 2023 – 4:57pm By: asalazar



NOTES:

1. MANHOLES SHALL BE PRECAST ASTM C-478 BELL AND SPIGOT WITH PROFILE GASKET – SINGLE OFF-SET JOINTS.
2. SEE PLANS AND MANHOLE SCHEDULE, FOR MANHOLE SIZE, LOCATION, CONFIGURATION, TYPE OF TOP SECTION, VENTING REQUIREMENTS, PIPE SIZE AND TYPES.
3. SEE SPECIFICATIONS ON MATERIALS AND CONSTRUCTION.
4. AN 80 MIL. COAT OF RAVEN LINING SYSTEMS, RAVEN 405 ULTRA HIGH BUILD EPOXY COATING, OR SPRAY WALL EPOXY COATING, OR APPROVED EQUAL, TO BE APPLIED TO ENTIRE INTERIOR OF EACH WASTEWATER MANHOLE AND UNDERSIDE OF FLAT TOPS.
5. ALL MANHOLE COVERS SHALL BE BOLTED AND GASKETTED WHEN MANHOLES ARE LOCATED OUT FROM PAVEMENT.
6. MANHOLES TO BE VENTED ARE IDENTIFIED ON MANHOLE SCHEDULE. REFERENCE MANHOLE VENT DETAIL.
7. MANHOLES ARE TO BE DESIGNED TO RESIST LATERAL AND VERTICAL SOIL FORCES RESULTING FROM MANHOLE DEPTH. ADDITIONALLY, MANHOLES LOCATED IN PAVEMENT TO BE DESIGNED FOR HS-20 TRAFFIC LOADS.
8. GROUT SHALL MEET THE REQUIREMENTS AS STATED BY THE COATING MANUFACTURER.
9. MANHOLE BASE BEDDING MATERIAL SPECS. FOR 3/4" WASHED GRAVEL:
   SIEVE SIZE 2", PERCENT (%) RETAINED 0
   SIEVE SIZE 1 1/2", % RETAINED 0-10
   SIEVE SIZE 1", % RETAINED 45-80
   SIEVE SIZE 3/4", % RETAINED 85-100
   SIEVE SIZE 3/8", % RETAINED 95-100

The Architect/Engineer assumes responsibility for appropriate use of this standard.

REVISION NOTE: ADOPTED 6/21/2006

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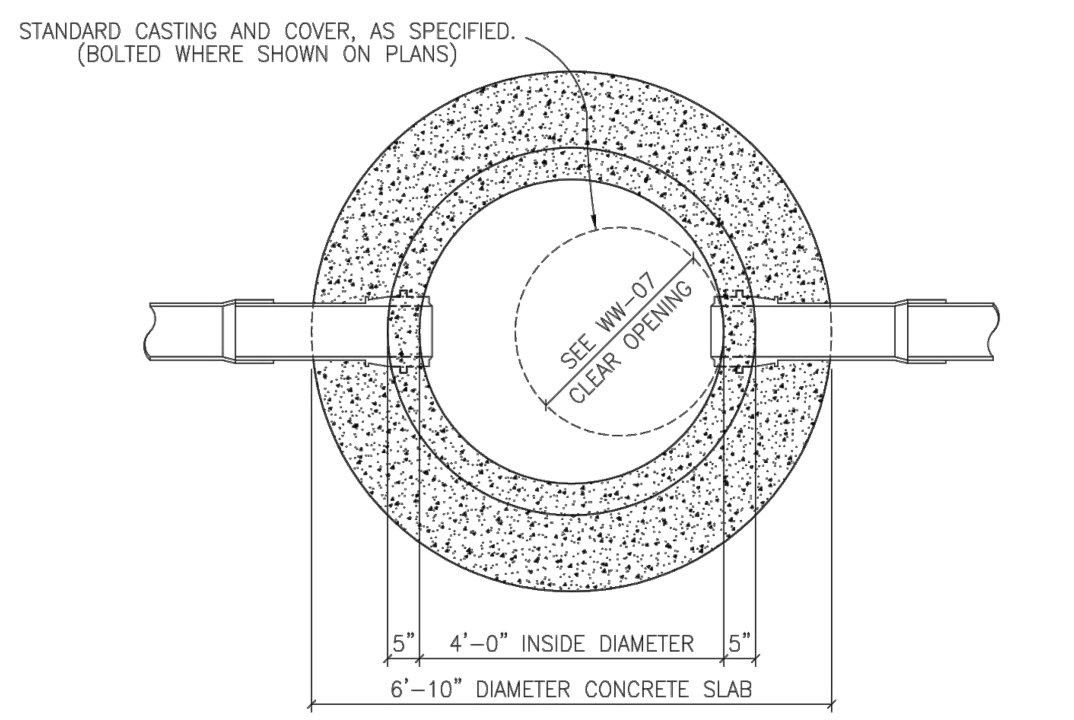
CITY OF GEORGETOWN
CONSTRUCTION STANDARDS AND DETAILS
STANDARD MANHOLE – SECTION

DRAWING NAME: WW03	
SCALE: NTS	DATE: 1/2003
DRAWN BY: MRS	APPROVED BY: TRB



SEE DETAIL WW-03

MANHOLE PLAN

CITY OF GEORGETOWN NOTES:

MANHOLE DETAILS SHALL REFLECT THE CITY'S MINIMUM SPECIFICATIONS, AS STATED BELOW:

A. ALL MANHOLES SHALL BE 48" I.D., R.C.P., CLASS III, WITH RUBBER PROFILE GASKET – SINGLE OFF-SET JOINT CONFORMING TO ASTM C478, C433 AND C76.
B. ALL MANHOLES SHALL HAVE FRAME AND COVER, AS MANUFACTURED BY EAST JORDAN IRON WORKS (AS PER DETAIL # WW-07) OR APPROVED EQUIVALENT.
C. ALL MANHOLES SHALL BE CONCRETE WITH CAST IRON FRAME AND COVER.
D. ALL MANHOLES SHALL HAVE AN ECCENTRIC CONE.
E. MANHOLES MAY HAVE A FLAT LID, IF APPROVED BY CITY OF GEORGETOWN, BEING 12" THICK WITH A MINIMUM 30" OPENING, AS MANUFACTURED BY HANSEN PIPE AND PRECAST OR APPROVED EQUAL M.F.G. CONFORMING TO ASTM C478, 5000 P.S.I. CONCRETE, TRAFFIC BEARING AND WITH PROFILE GASKET – SINGLE OFF-SET JOINT CONFORMING TO ASTM C443.
F. INVERTS AND FLEXIBLE SEAL BOOTS, PER ASTM C-923, SHALL BE CAST INTO BASE SECTION.
G. MINIMUM DROP BETWEEN INVERTS SHALL BE ONE-TENTH OF A FOOT (0.1').
H. GRADE RINGS WITH AN I.D. TO MATCH FRAMES CLEAR OPENING WITH A MAXIMUM ADJUSTMENT OF 12" ARE ALLOWED.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

REVISION NOTE: ADOPTED 6/21/2006

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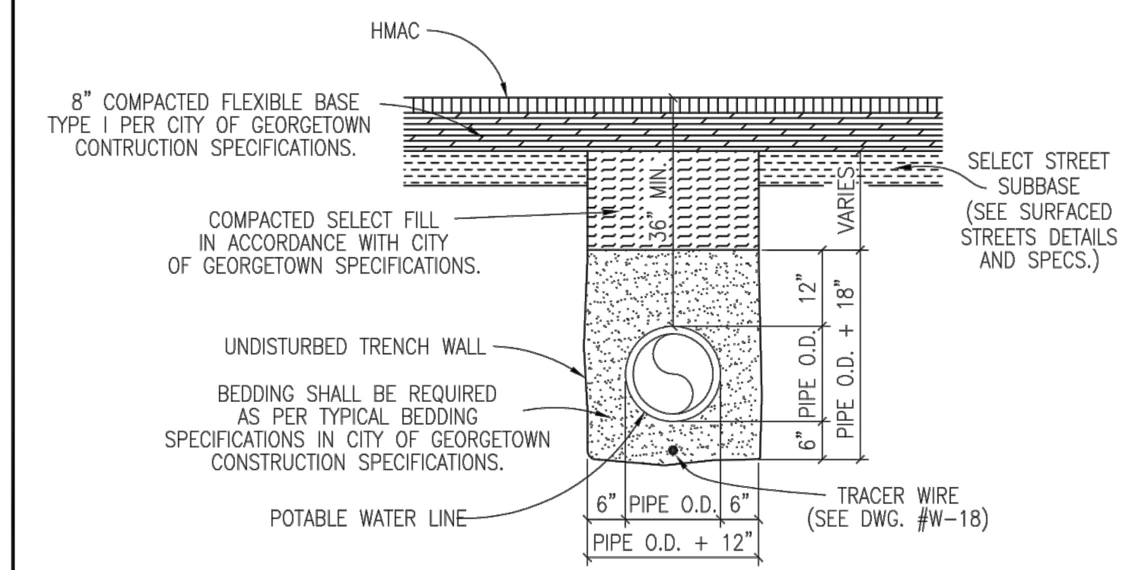
CITY OF GEORGETOWN
CONSTRUCTION STANDARDS AND DETAILS
STANDARD MANHOLE – PLAN

DRAWING NAME: WW02	
SCALE: NTS	DATE: 1/2003
DRAWN BY: MRS	APPROVED BY: TRB



TRENCH WIDTHS
*PIPE LESS THAN 20" DIAMETER
1'-0" + PIPE O.D.
*20" DIAMETER PIPE AND LARGER
2'-0" + PIPE O.D.

NOTES:

1. DENSITY TESTS SHALL BE TAKEN IN ACCORDANCE WITH THE CITY OF GEORGETOWN CONSTRUCTION SPECIFICATIONS AND STANDARDS.
2. CONTRACTOR OR ENGINEER MAY USE FLOWABLE BACKFILL AS AN ALTERNATE BACKFILL MATERIAL (SEE C9 FLOWABLE BACKFILL FOR THE SPECIFICATION).

The Architect/Engineer assumes responsibility for appropriate use of this standard.

REVISION NOTE: ADOPTED 6/21/2006

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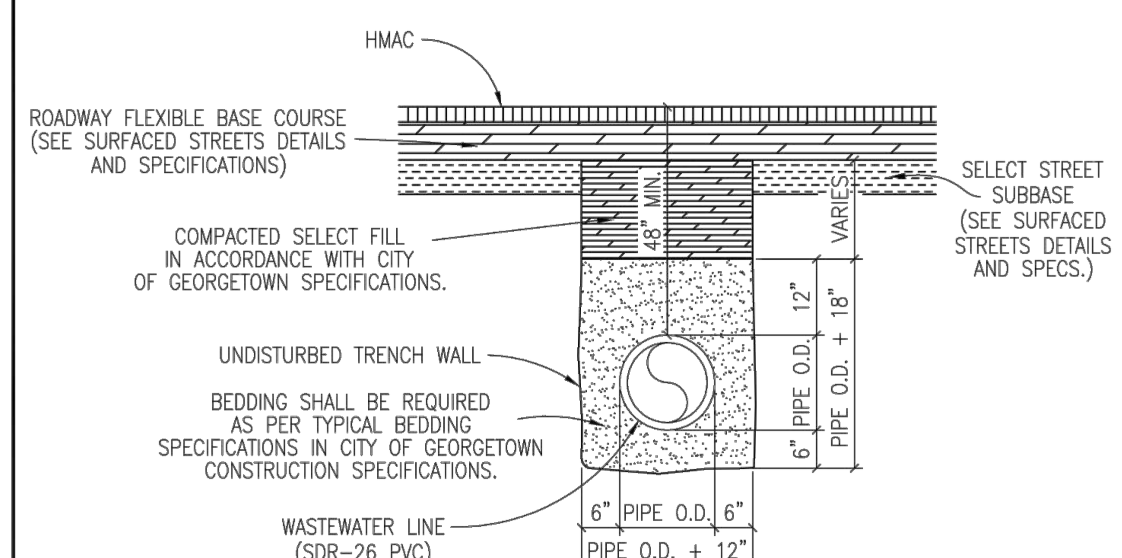
CITY OF GEORGETOWN
CONSTRUCTION STANDARDS AND DETAILS
TRENCH AND EMBEDMENT DETAIL UNDER PROPOSED ROADWAY

DRAWING NAME: W22	
SCALE: NTS	DATE: 1/2003
DRAWN BY: MRS	APPROVED BY: TRB



TRENCH WIDTHS
*PIPE LESS THAN 20" DIAMETER
1'-0" + PIPE O.D.
*20" DIAMETER PIPE AND LARGER
2'-0" + PIPE O.D.

NOTES:

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2. CONTRACTOR OR ENGINEER MAY USE FLOWABLE BACKFILL AS AN ALTERNATE BACKFILL MATERIAL (SEE C9 FLOWABLE BACKFILL FOR THE SPECIFICATION).

The Architect/Engineer assumes responsibility for appropriate use of this standard.

REVISION NOTE: ADOPTED 6/21/2006

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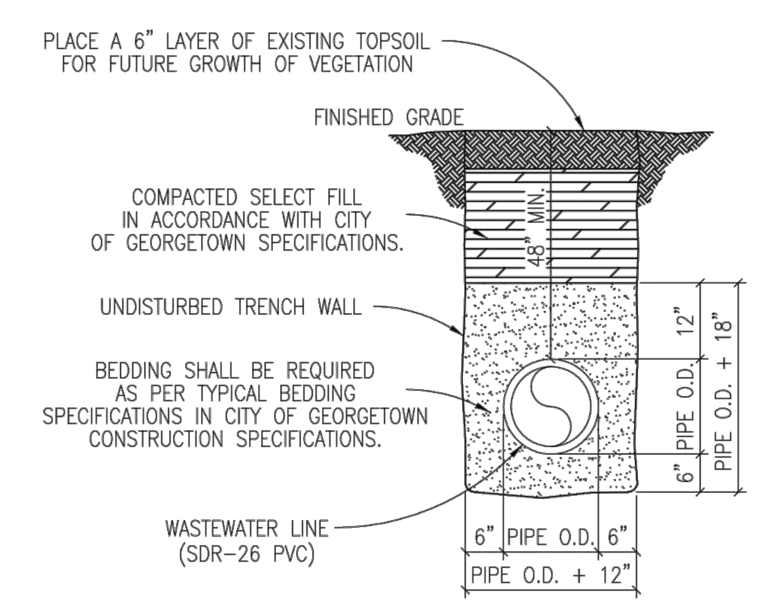
CITY OF GEORGETOWN
CONSTRUCTION STANDARDS AND DETAILS
TRENCH AND EMBEDMENT DETAIL UNDER PROPOSED ROADWAY

DRAWING NAME: WW18	
SCALE: NTS	DATE: 1/2003
DRAWN BY: MRS	APPROVED BY: TRB



TRENCH WIDTHS
*PIPE LESS THAN 20" DIAMETER
1'-0" + PIPE O.D.
*20" DIAMETER PIPE AND LARGER
2'-0" + PIPE O.D.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

REVISION NOTE: ADOPTED 6/21/2006

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CITY OF GEORGETOWN
CONSTRUCTION STANDARDS AND DETAILS
TRENCH AND EMBEDMENT DETAIL UNDER NON-PAVED AREAS

DRAWING NAME: WW16	
SCALE: NTS	DATE: 1/2003
DRAWN BY: MRS	APPROVED BY: TRB

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

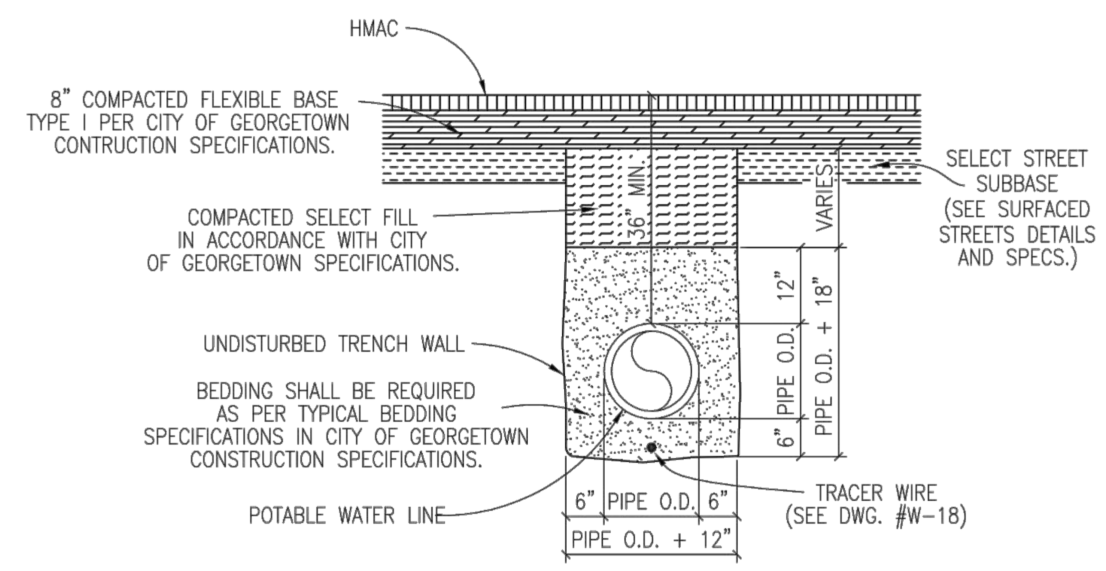
SANITARY SEWER DETAILS

SCALE	DESIGN	DRAWN
N/A	DA	CR

SHEET
G.7

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\G.7 Sanitary Sewer Details.dwg Last Plotted: Thu Apr 13, 2023 – 4:57pm By: aaalazar

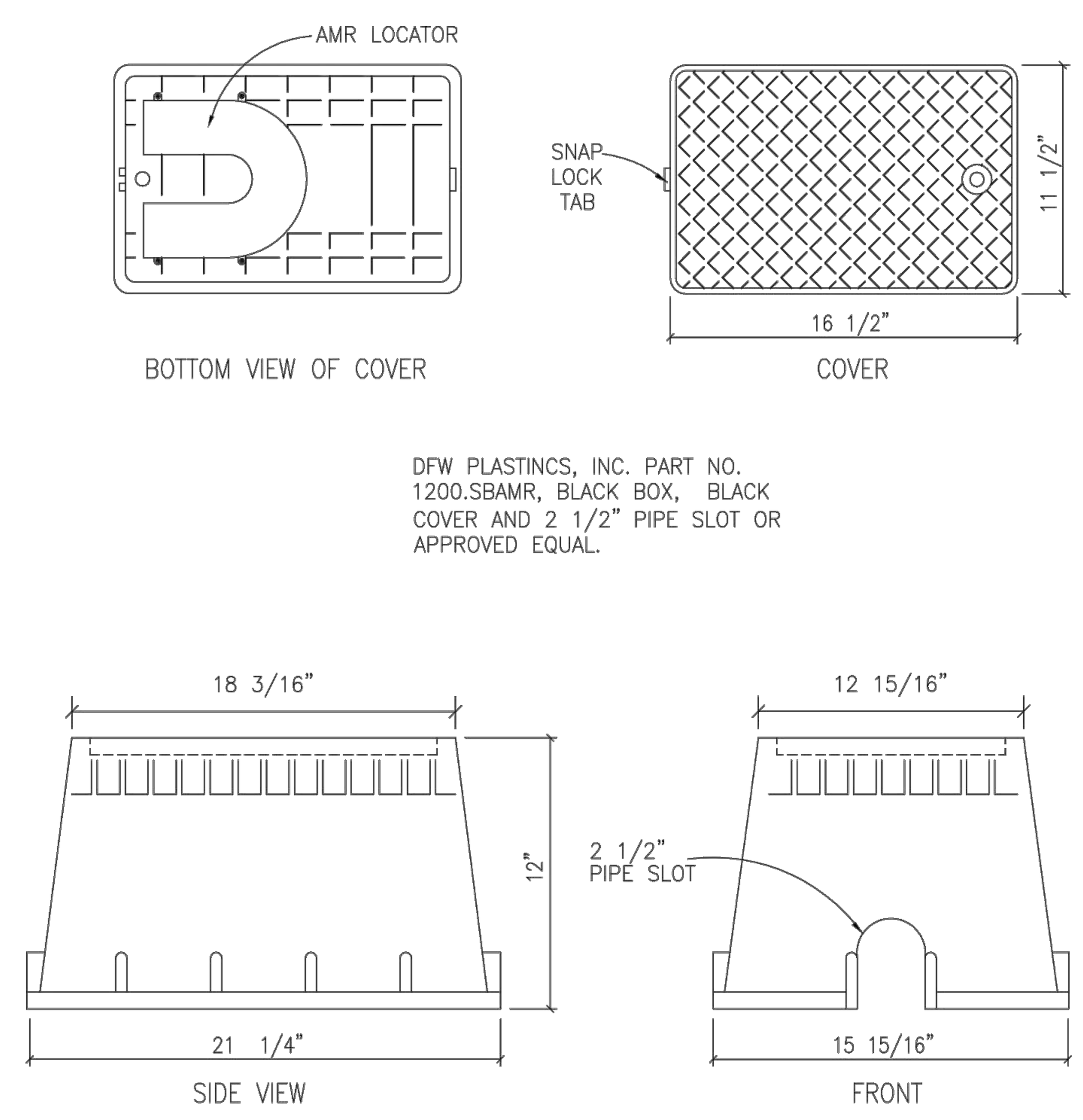


TRENCH WIDTHS
*PIPE LESS THAN 20" DIAMETER
1'-0" + PIPE O.D.
*20" DIAMETER PIPE AND LARGER
2'-0" + PIPE O.D.

NOTES:
1. DENSITY TESTS SHALL BE TAKEN IN ACCORDANCE WITH THE CITY OF GEORGETOWN CONSTRUCTION SPECIFICATIONS AND STANDARDS.
2. CONTRACTOR OR ENGINEER MAY USE FLOWABLE BACKFILL AS AN ALTERNATE BACKFILL MATERIAL (SEE C9 FLOWABLE BACKFILL FOR THE SPECIFICATION).

The Architect/Engineer assumes responsibility for appropriate use of this standard.

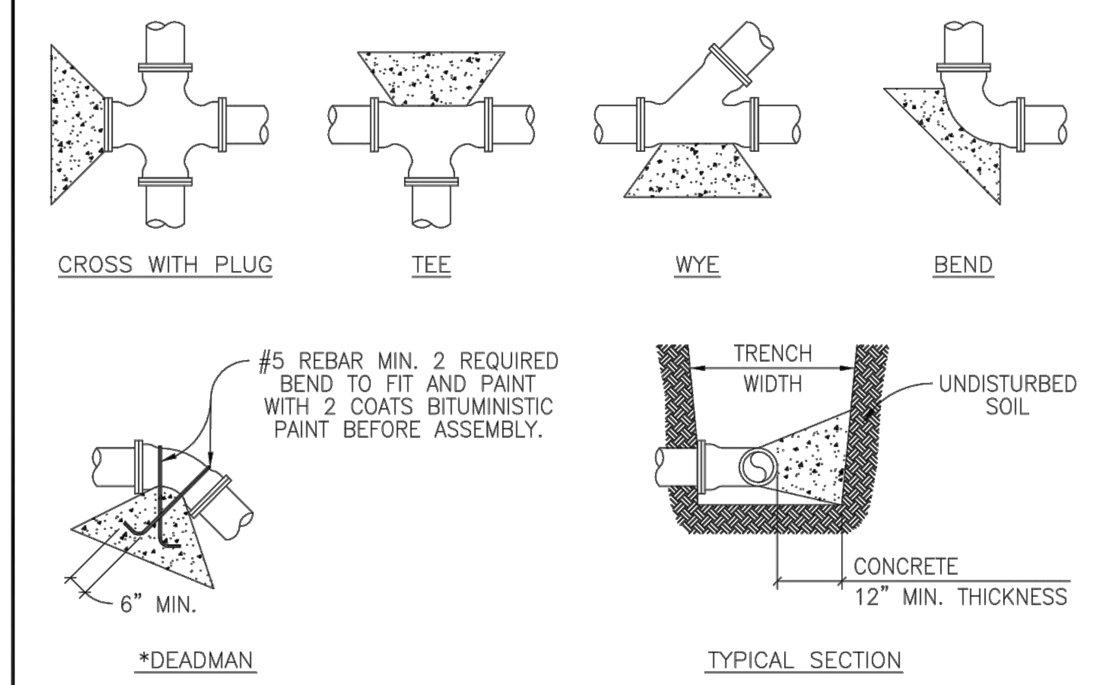
ADOPTED 6/21/2006
GEORGETOWN TEXAS — Georgetown Utility Systems, Your Community Owned Utility
CITY OF GEORGETOWN CONSTRUCTION STANDARDS AND DETAILS
TRENCH AND EMBEDMENT DETAIL UNDER PROPOSED ROADWAY
W22
SCALE: NTS | DATE: 1/2003 | DRAWN BY: MRS | APPROVED BY: TRB



DFW PLASTINCS, INC. PART NO. 1200.SBAMR, BLACK BOX, BLACK COVER AND 2 1/2" PIPE SLOT OR APPROVED EQUAL.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

ADOPTED 6/21/2006
CITY OF GEORGETOWN CONSTRUCTION STANDARDS AND DETAILS
METER BOX (NON-TRAFFIC AREAS)
W23
SCALE: NTS | DATE: 1/2003 | DRAWN BY: MRS | APPROVED BY: TRB



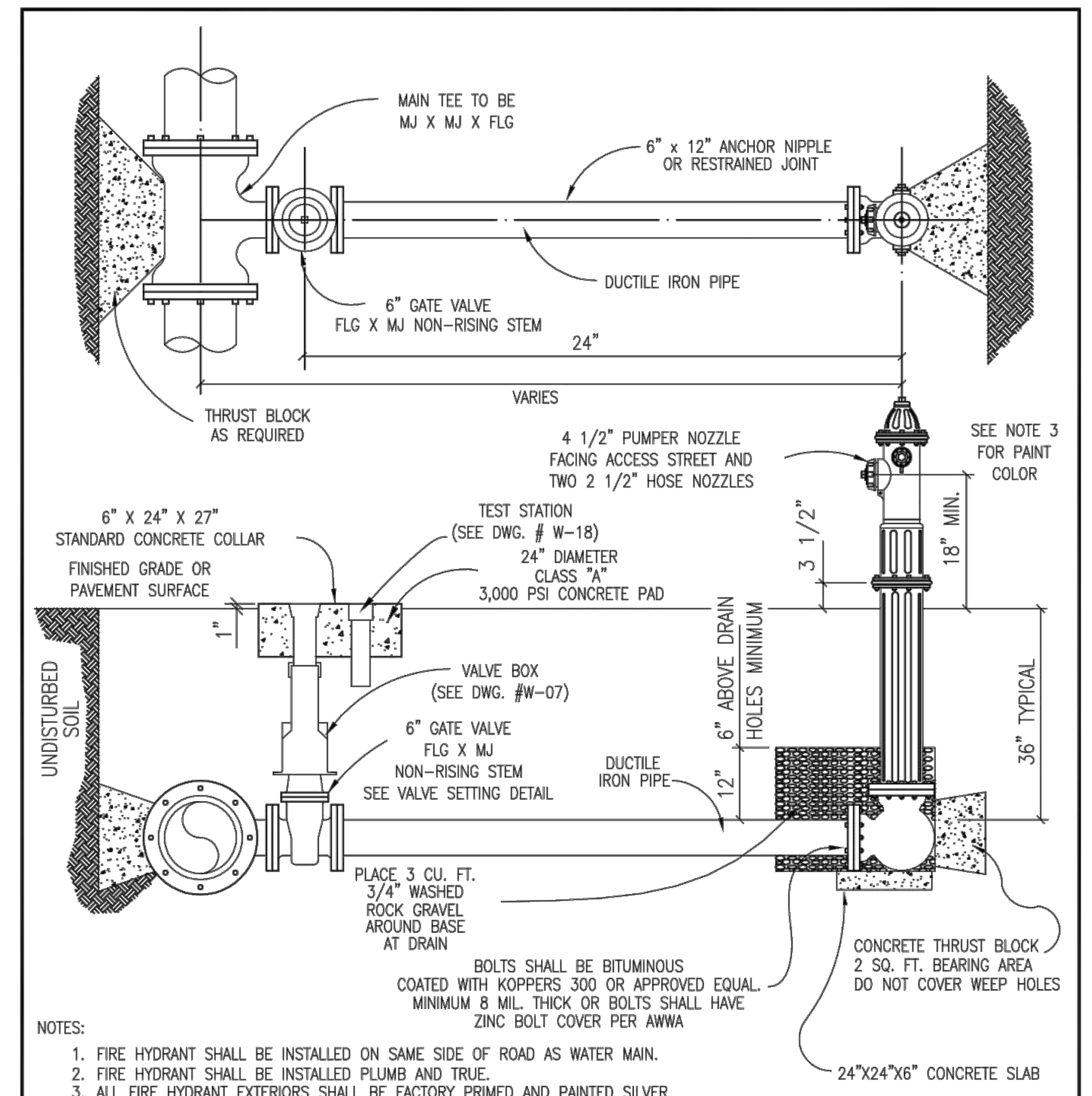
ALL THRUST BLOCKS SHALL BE FORMED. LAID FORMS SHALL BE INSPECTED BY THE CITY OF GEORGETOWN PRIOR TO THE POURING OF CONCRETE AND SHALL ALSO BE INSPECTED BY THE CITY OF GEORGETOWN PRIOR TO COVERING. TYPICAL LOCATIONS WHICH REQUIRE CONCRETE REACTION (THRUST) BLOCKS, FOR PRESSURE MAINS FOUR INCHES (4") AND GREATER. CONCRETE SHALL HAVE 2,500 P.S.I. MINIMUM STRENGTH AT TWENTY EIGHT (28) DAYS AND BEAR AGAINST UNDISTURBED STABLE SOILS, AREA OF CONTACT SHALL BE GOVERNED BY PIPE SIZE, MAXIMUM PRESSURE IN PIPE, AND BEARING CAPACITY OF SOIL. PROTECT FITTINGS, BOLTS, ETC. BY COVERING WITH VISQUEEN OR OTHER ACCEPTABLE MATERIAL. CONCRETE SHALL BE A MINIMUM OF TWELVE INCHES (12") THICK.

PIPE SIZE	THRUST BLOCK AREA REQUIRED	PIPE SIZE	THRUST BLOCK AREA REQUIRED	REMARKS
4"	2.0 SQ. FT.	18"	30.0 SQ. FT.	VALUES ARE FOR 90° BENDS, BASED ON 2000 P.S.F. SAFE BEARING LOAD AND PIPE PRESSURE OF 150 P.S.I. PLUS 33⅓% SAFETY FACTOR FOR OTHER SOILS AND PRESSURES, THE AREA REQUIRED IS IN DIRECT PROPORTION.
6"	4.0 SQ. FT.	20"	37.0 SQ. FT.	
8"	6.6 SQ. FT.	24"	53.0 SQ. FT.	
10"	10.0 SQ. FT.	27"	80.0 SQ. FT.	
12"	14.0 SQ. FT.	30"	98.0 SQ. FT.	
14"	18.0 SQ. FT.	36"	127.0 SQ. FT.	
16"	24.0 SQ. FT.			

* THE ENGINEER OF RECORD SHALL CALCULATE THE SIZE OF THE DEADMAN REQUIRED AS WELL AS ANY INSTALLATION WHICH IS NOT COVERED BY THE ABOVE.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

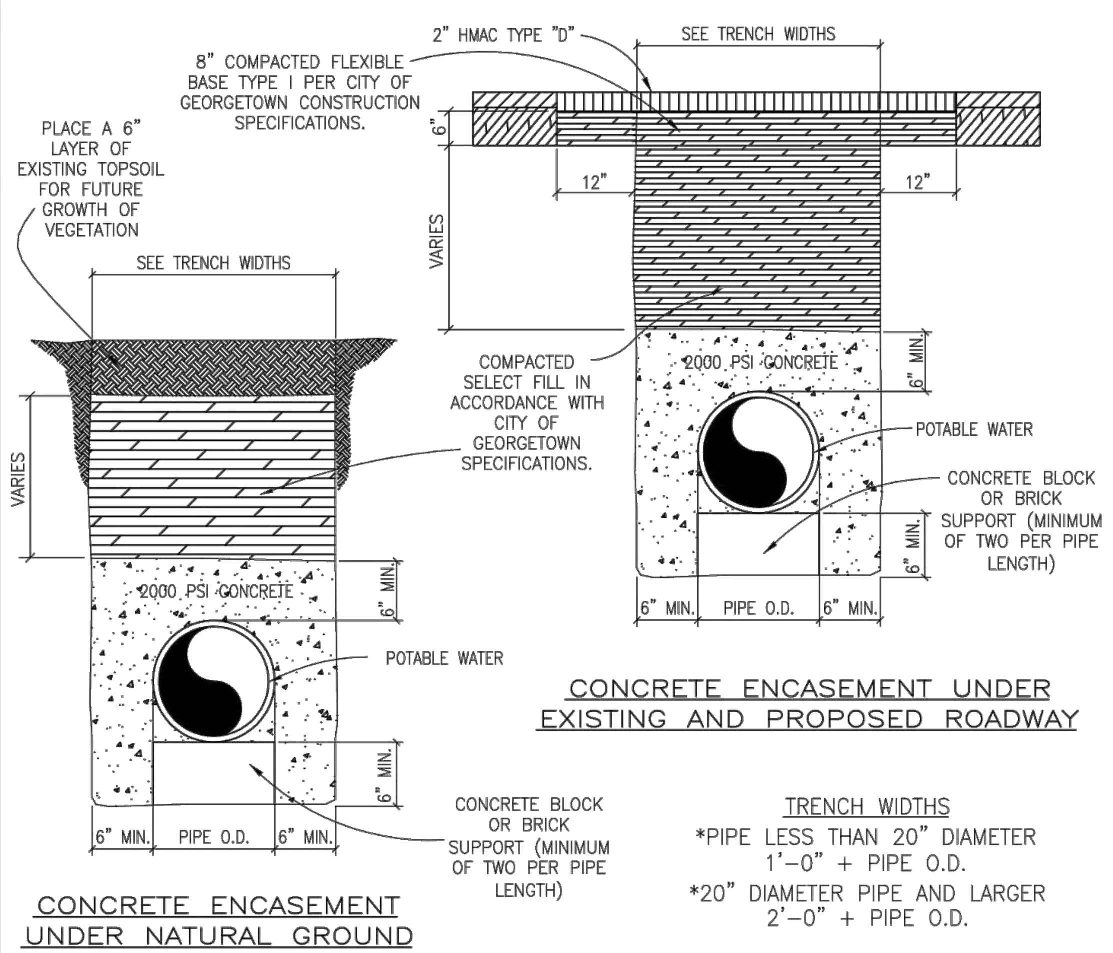
ADOPTED 6/21/2006
CITY OF GEORGETOWN CONSTRUCTION STANDARDS AND DETAILS
TYPICAL THRUST BLOCKS FOR WATER AND FORCE MAIN
W11
SCALE: NTS | DATE: 1/2003 | DRAWN BY: MRS | APPROVED BY: TRB



NOTES:
1. FIRE HYDRANT SHALL BE INSTALLED ON SAME SIDE OF ROAD AS WATER MAIN.
2. FIRE HYDRANT SHALL BE INSTALLED PLUMB AND TRUE.
3. ALL FIRE HYDRANT EXTERIORS SHALL BE FACTORY PRIMED AND PAINTED SILVER USING A HIGH GRADE ENAMEL.
4. HEEL AND THRUST BLOCKS TO REST IN UNDISTURBED SOIL.
5. THE ONLY FIRE HYDRANTS ACCEPTABLE ARE:
   A. KENNEDY – K81
   B. AMERICAN DARLING – B84B
   C. CLOW MEDALLION
6. DOUBLE BLUE REFLECTOR "HYE-LITES" BRAND, MANUFACTURED BY PAVEMENT MARKERS INC. TO BE INSTALLED AT CENTERLINE OF STREET PERPENDICULAR TO HYDRANT.
7. ALL METALLIC PIPES AND FITTINGS SHALL BE WRAPPED WITH 8 MILL. POLYETHELENE FILM.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

ADOPTED 6/21/2006
CITY OF GEORGETOWN CONSTRUCTION STANDARDS AND DETAILS
TYPICAL FIRE HYDRANT INSTALLATION
W10
SCALE: NTS | DATE: 1/2003 | DRAWN BY: MRS | APPROVED BY: TRB



CONCRETE ENCASEMENT UNDER EXISTING AND PROPOSED ROADWAY

CONCRETE ENCASEMENT UNDER NATURAL GROUND

TRENCH WIDTHS
*PIPE LESS THAN 20" DIAMETER
1'-0" + PIPE O.D.
*20" DIAMETER PIPE AND LARGER
2'-0" + PIPE O.D.

NOTES:
1. ENCASEMENT TO BE CONSTRUCTED WHERE SEWER LINES PASS OVER OR UNDER A WATER MAIN WITH LESS THAN TWELVE INCHES (12") CLEAR DISTANCE.
2. AT CROSSINGS, ENCASEMENT SHALL EXTEND TEN FEET (10'-0") ON EITHER SIDE OF CROSSING.
3. BEGINNING AND ENDING OF ENCASEMENTS SHALL NOT BE MORE THAN SIX INCHES (6") FROM A PIPE JOINT.
4. WHERE WATER AND SEWER LINES PARALLEL WITH LESS THAN TEN FEET (10'-0") HORIZONTAL CLEAR DISTANCE, NO ENCASEMENT IS REQUIRED IF BOTH LINES ARE 150 PSI PRESSURE PIPE.
5. RAW WATER MAINS SHALL BE 150 PSI PRESSURE RATED WHEN PARALLELING POTABLE WATER MAINS WITH LESS THAN NINE FEET (9'-0") HORIZONTAL CLEARANCE.
6. WHERE MINIMUM COVER, THIRTY SIX INCHES (36") IS NOT AVAILABLE, ENCASEMENT WILL BE REQUIRED.
7. ALL CONCRETE ENCASEMENTS MUST BE FORMED AND INSPECTED BY THE CITY OF GEORGETOWN INSPECTOR PRIOR TO PLACING CONCRETE AND BACKFILLING.
8. CONTRACTOR OR ENGINEER MAY USE FLOWABLE BACKFILL AS AN ALTERNATE BACKFILL MATERIAL (SEE C9 FLOWABLE BACKFILL FOR THE SPECIFICATION).

The Architect/Engineer assumes responsibility for appropriate use of this standard.

ADOPTED 6/21/2006
CITY OF GEORGETOWN CONSTRUCTION STANDARDS AND DETAILS
CONCRETE ENCASEMENT DETAIL
W15
SCALE: NTS | DATE: 1/2003 | DRAWN BY: MRS | APPROVED BY: TRB

REV	DESCRIPTION	DATE

STATE OF TEXAS — DAVID AGUAYO — 140527 — LICENSED PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

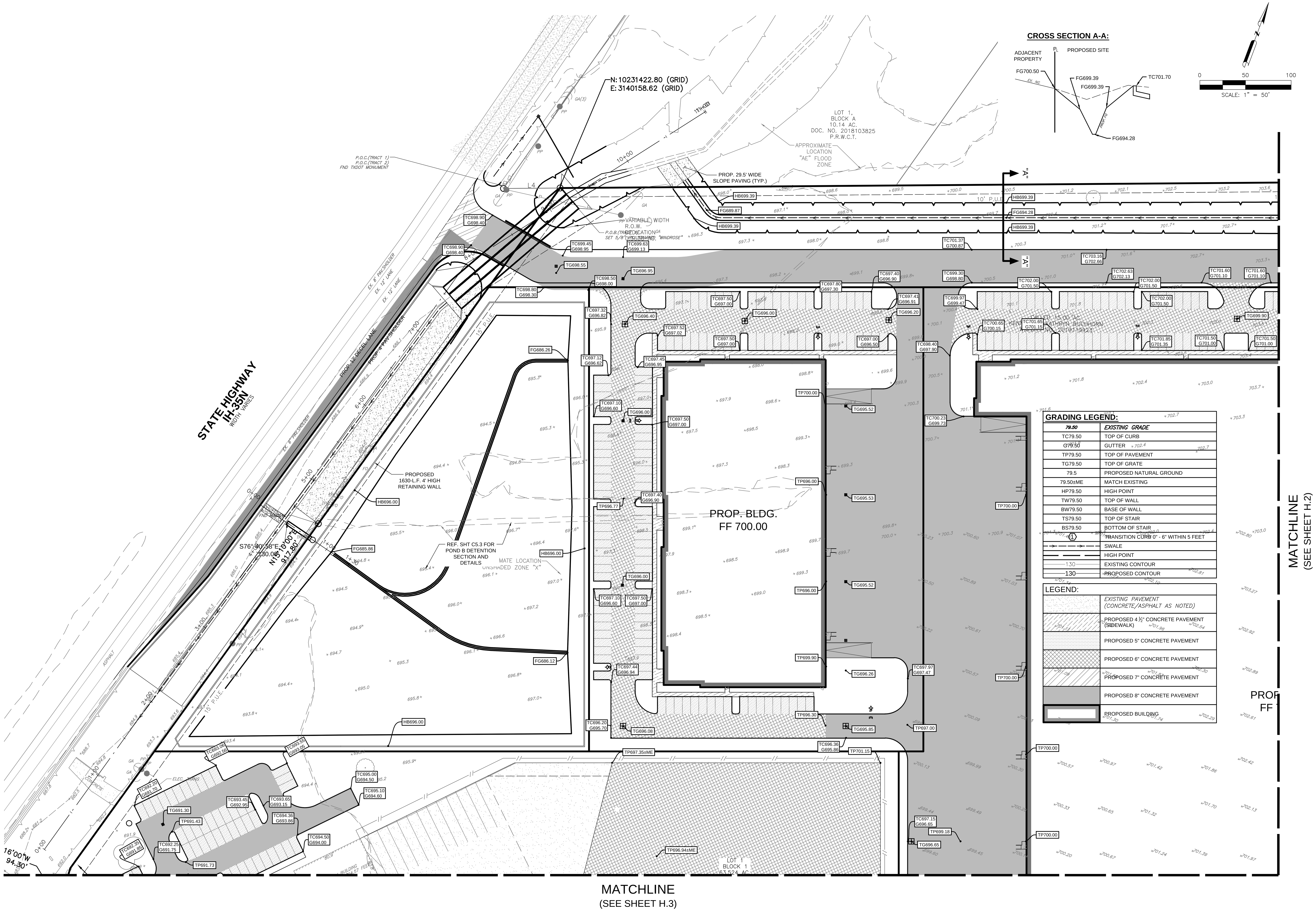
WATER DETAILS

SCALE	DESIGN	DRAWN
N/A	DA	CR

SHEET
G.8

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\G.8 Water Details.dwg Last Plotted: Thu Apr 13, 2023 – 4:58pm By: aaalazar



BENCHMARKS:

TEMPORARY BENCHMARK "A"
ELEVATION - 693.93'
TEMPORARY BENCHMARK "A" IS A BOX CUT SET ON A HEADWALL ON THE EAST R.O.W. OF STATE HIGHWAY I-35 N, BEING APPROXIMATELY 100 FEET NORTHEAST OF THE INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

TEMPORARY BENCHMARK "B"
ELEVATION - 715.12'
TEMPORARY BENCHMARK "B" IS A BOX CUT SET ON A CONCRETE COLUMN FOR A GUY ANCHOR, BEING APPROXIMATELY 2,050 FEET EAST OF INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

FLOOD PLAIN NOTE:

THIS SUBJECT TRACT LIES WITHIN UNSHADED ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN (0.2% ANNUAL FLOODPLAIN CHANCE) AS DELINEATED ON THE FLOOD INSURANCE MAP FOR WILLIAMSON COUNTY, TEXAS AND INCORPORATED AREAS, MAP NO. 48491C0285F MAP REVISED DECEMBER 20, 2019.

LEGEND:

	EXISTING PAVEMENT (CONCRETE/ASPHALT AS NOTED)
	PROPOSED 4 ½" CONCRETE PAVEMENT (SIDEWALK)
	PROPOSED 5" CONCRETE PAVEMENT
	PROPOSED 6" CONCRETE PAVEMENT
	PROPOSED 8" CONCRETE PAVEMENT
	PROPOSED BUILDING

GRADING NOTES:

1. ALL SPOT ELEVATIONS ARE TO TOP OF PAVEMENT UNLESS OTHERWISE NOTED.
2. ALL SIDEWALKS AND ACCESSIBLE ROUTES, INCLUDING DRIVEWAY CROSSWALKS, SHALL CONFORM TO ALL APPLICABLE AMERICANS WITH DISABILITIES ACT STANDARDS AND THE TEXAS ACCESSIBILITY STANDARDS. IF ANY DISCREPANCY IS DISCOVERED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO POURING ANY PAVEMENT.
3. ALL SIDEWALKS AND ACCESSIBLE ROUTES, INCLUDING DRIVEWAY CROSSWALKS, SHALL NOT EXCEED A RUNNING SLOPE OF 5% (1:20) WITHOUT A RAMP, AND SHALL NOT EXCEED A 2% CROSS SLOPE (1:50).
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7. CONTRACTOR SHALL ENSURE THERE IS POSITIVE DRAINAGE FROM THE PROPOSED BUILDINGS AND NO PONDING IN PAVED AREAS, AND SHALL NOTIFY ENGINEER IF ANY GRADING DISCREPANCIES ARE FOUND IN THE EXISTING AND PROPOSED GRADES PRIOR TO PLACEMENT OF PAVEMENT OR UTILITIES.

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

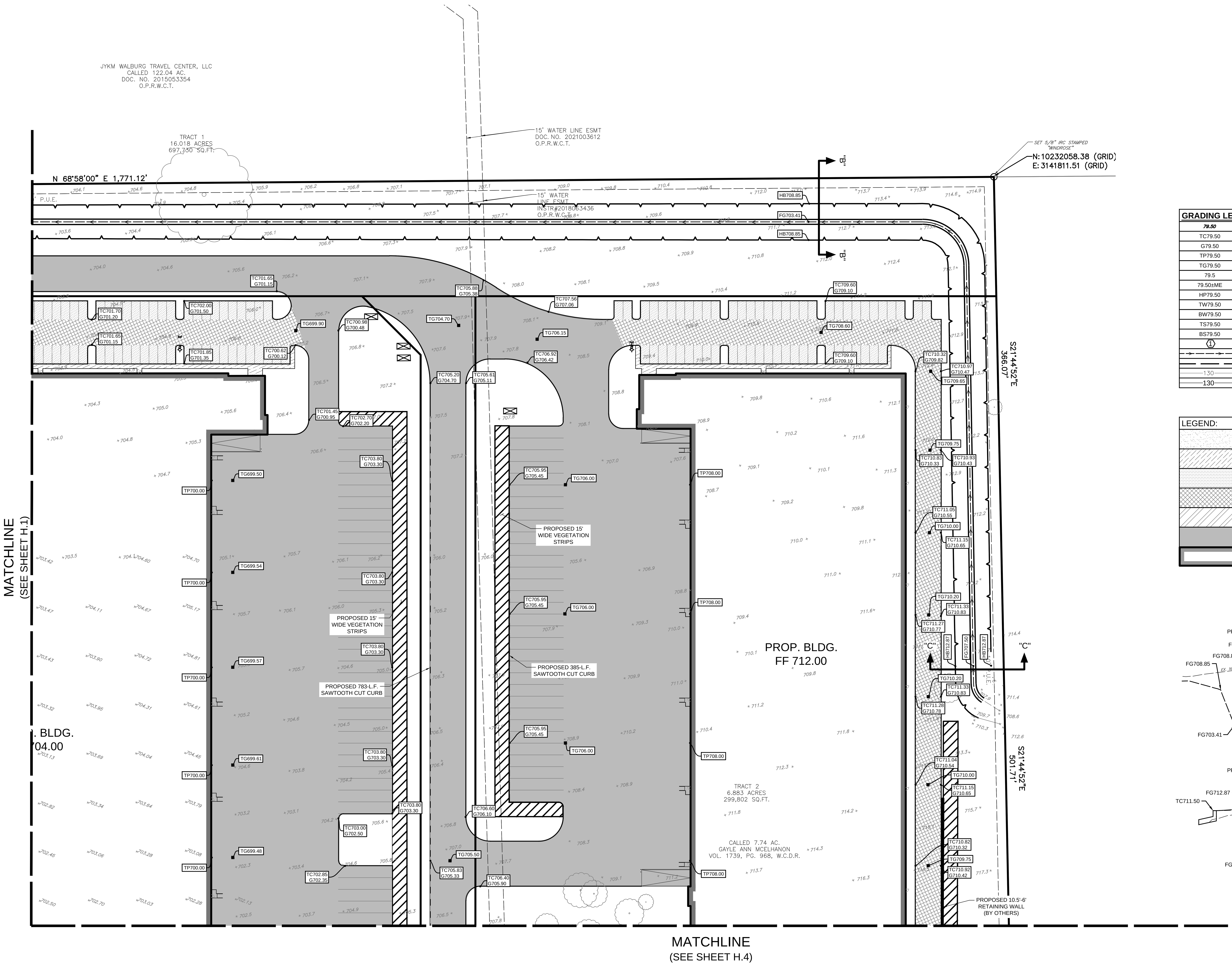
GRADING PLAN
(1 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
H.1

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\H.1-H.4 Grading Plan.dwg Last Plotted: Thu Apr 13, 2023 - 4:58pm By: avalazar



SCALE: 1" = 50'

BENCHMARKS:

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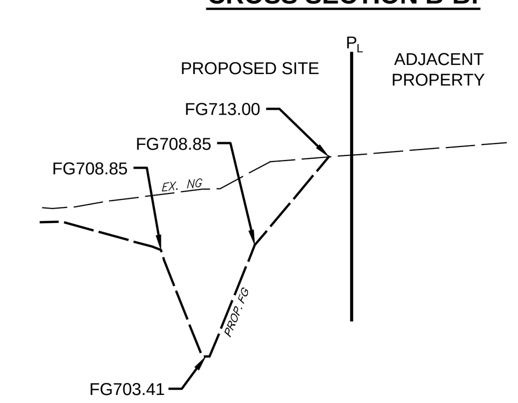
GRADING LEGEND:

79.50	*EXISTING GRADE*
TC79.50	TOP OF CURB
G79.50	GUTTER
TP79.50	TOP OF PAVEMENT
TG79.50	TOP OF GRATE
79.5	PROPOSED NATURAL GROUND
79.50±ME	MATCH EXISTING
HP79.50	HIGH POINT
TW79.50	TOP OF WALL
BW79.50	BASE OF WALL
TS79.50	TOP OF STAIR
BS79.50	BOTTOM OF STAIR
1	TRANSITION CURB 0" - 6" WITHIN 5 FEET
	SWALE
	HIGH POINT
130	EXISTING CONTOUR
130	PROPOSED CONTOUR

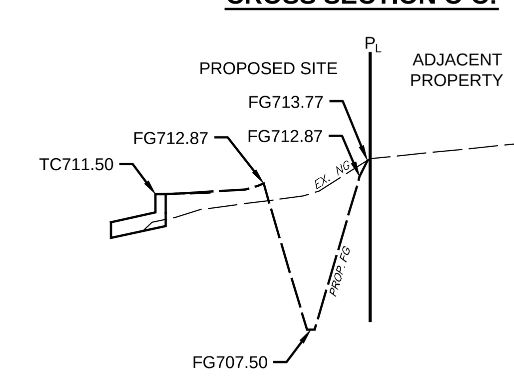
LEGEND:

	EXISTING PAVEMENT (CONCRETE/ASPHALT AS NOTED)
	PROPOSED 4½" CONCRETE PAVEMENT (SIDEWALK)
	PROPOSED 5" CONCRETE PAVEMENT
	PROPOSED 6" CONCRETE PAVEMENT
	PROPOSED 7" CONCRETE PAVEMENT
	PROPOSED 8" CONCRETE PAVEMENT
	PROPOSED BUILDING

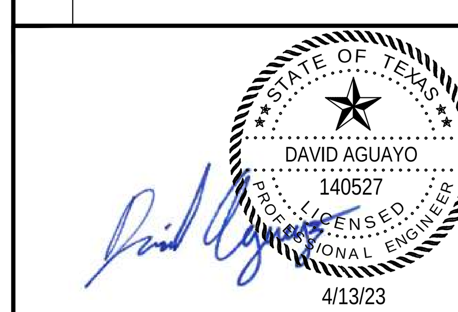
CROSS SECTION B-B:



CROSS SECTION C-C:



REV	DESCRIPTION	DATE



4/13/23

WGA
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TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

GRADING PLAN (2 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
H.2

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\H.1-H.4 Grading Plan.dwg Last Plotted: Thu Apr 13, 2023 - 4:58pm By: avalazar

LEGEND:

	EXISTING PAVEMENT (CONCRETE/ASPHALT AS NOTED)
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	SWALE
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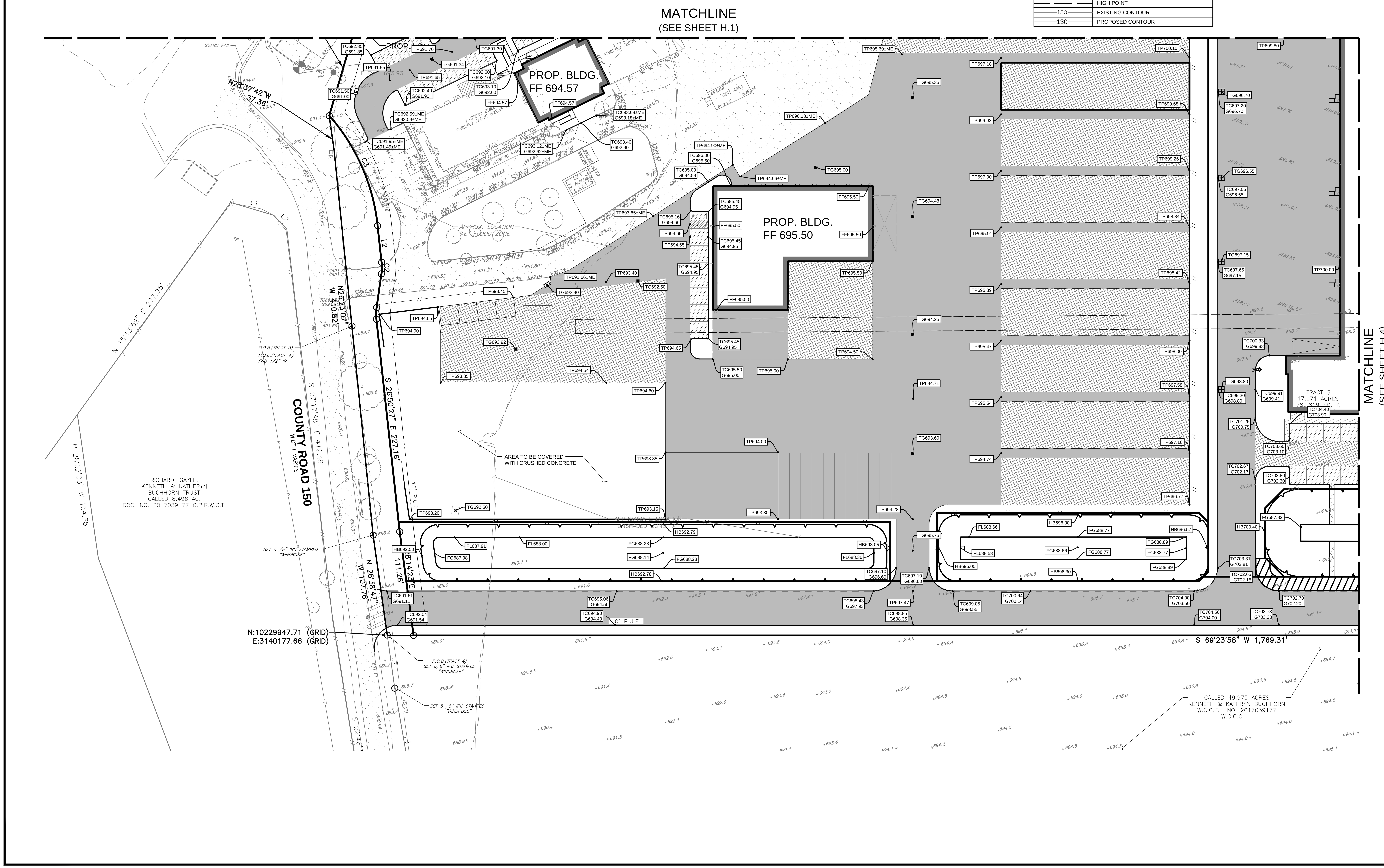

BENCHMARKS:

TEMPORARY BENCHMARK "A"
ELEVATION - 693.93'
TEMPORARY BENCHMARK "A" IS A BOX CUT SET ON A HEADWALL ON THE EAST R.O.W. OF STATE HIGHWAY I-35 N, BEING APPROXIMATELY 100 FEET NORTHEAST OF THE INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

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FLOOD PLAIN NOTE:

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GRADING NOTES:

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REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

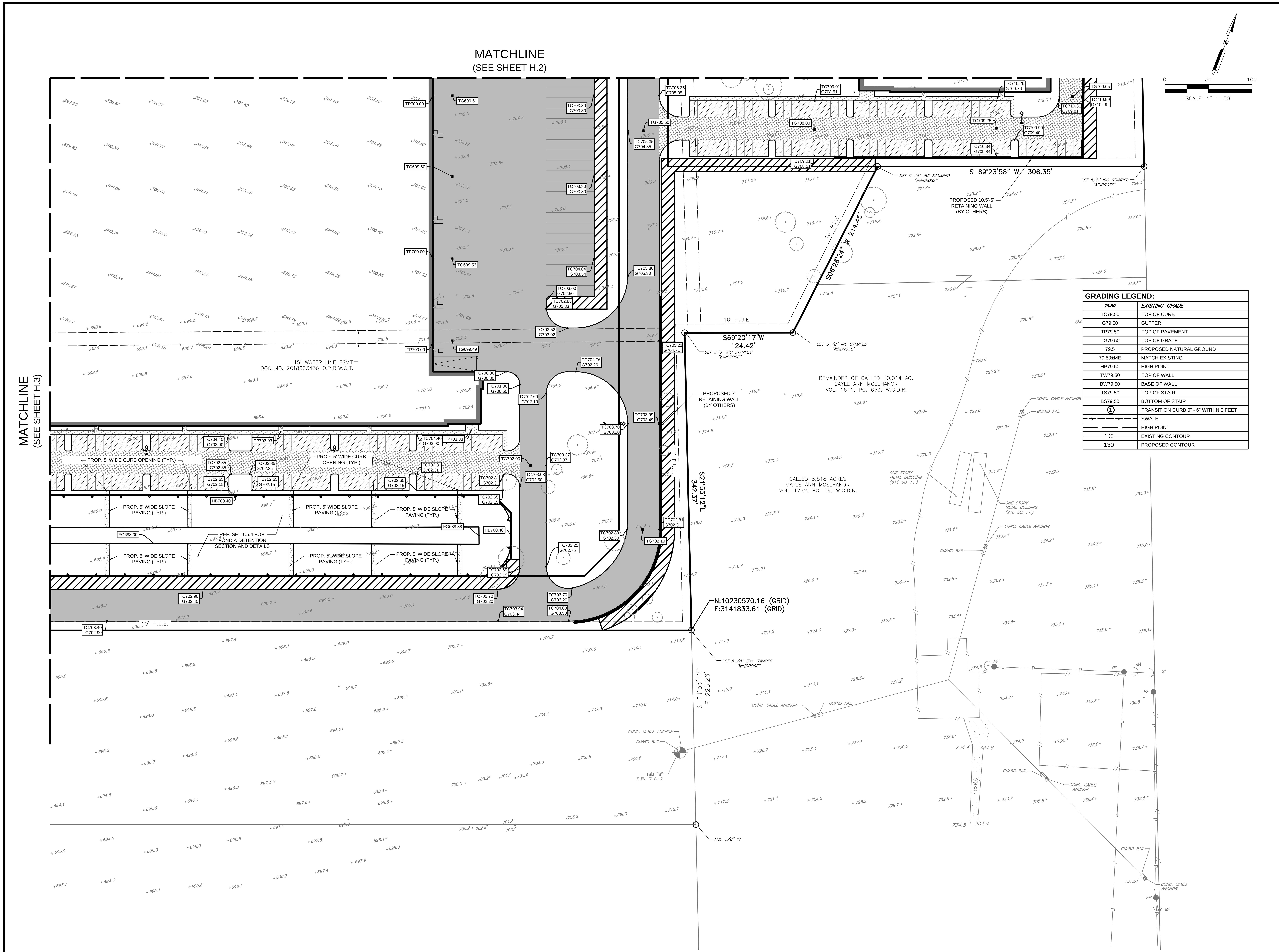
GRADING PLAN
(3 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
H.3

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\H.1-H.4 Grading Plan.dwg Last Plotted: Thu Apr 13, 2023 - 4:59pm By: avalazar



GRADING LEGEND:

79.50	EXISTING GRADE
TC79.50	TOP OF CURB
G79.50	GUTTER
TP79.50	TOP OF PAVEMENT
TG79.50	TOP OF GRATE
79.5	PROPOSED NATURAL GROUND
79.50±ME	MATCH EXISTING
HP79.50	HIGH POINT
TW79.50	TOP OF WALL
BW79.50	BASE OF WALL
TS79.50	TOP OF STAIR
BS79.50	BOTTOM OF STAIR
1	TRANSITION CURB 0" - 6" WITHIN 5 FEET
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BENCHMARKS:

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	PROPOSED BUILDING

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

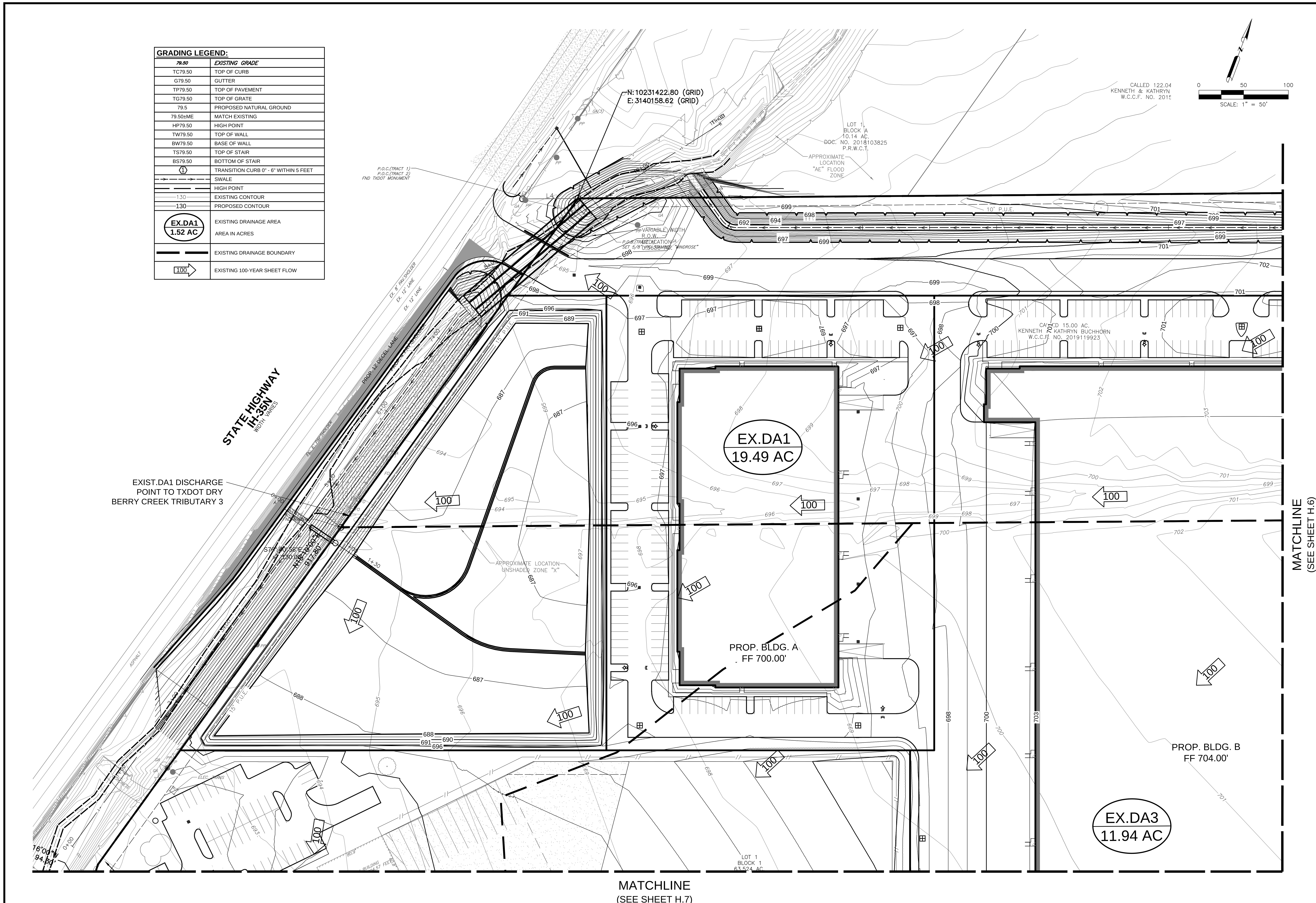
GRADING PLAN (4 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
H.4

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\H.1-H.4 Grading Plan.dwg Last Plotted: Thu Apr 13, 2023 - 4:59pm By: aealazar



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	SWALE
	HIGH POINT
130	EXISTING CONTOUR
130	PROPOSED CONTOUR
EX.DA1 1.52 AC	EXISTING DRAINAGE AREA AREA IN ACRES
	EXISTING DRAINAGE BOUNDARY
100	EXISTING 100-YEAR SHEET FLOW

BENCHMARKS:

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STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

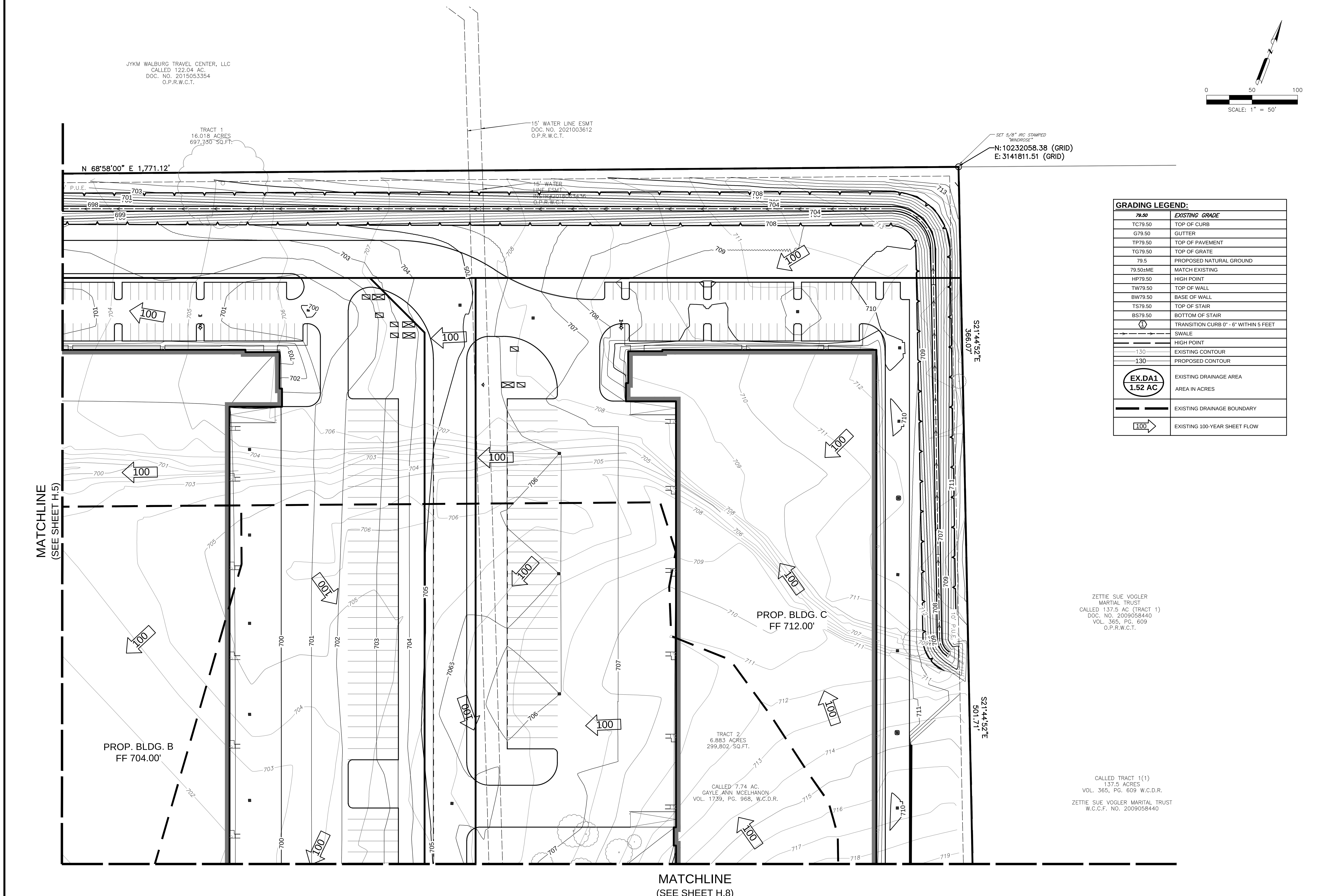
CONTOUR PLAN
(1 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
H.5

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\H.5-H.8 Contour Plan.dwg Last Plotted: Thu Apr 13, 2023 - 4:59pm By: asalazar



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TP79.50	TOP OF PAVEMENT
TG79.50	TOP OF GRATE
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79.50±ME	MATCH EXISTING
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	SWALE
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130	EXISTING CONTOUR
130	PROPOSED CONTOUR
EX.DA1 1.52 AC	EXISTING DRAINAGE AREA AREA IN ACRES
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BENCHMARKS:

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GEORGETOWN KEYSTONE

CONTOUR PLAN
(2 OF 4)

SCALE	DESIGN	DRAWN
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SHEET
H.6

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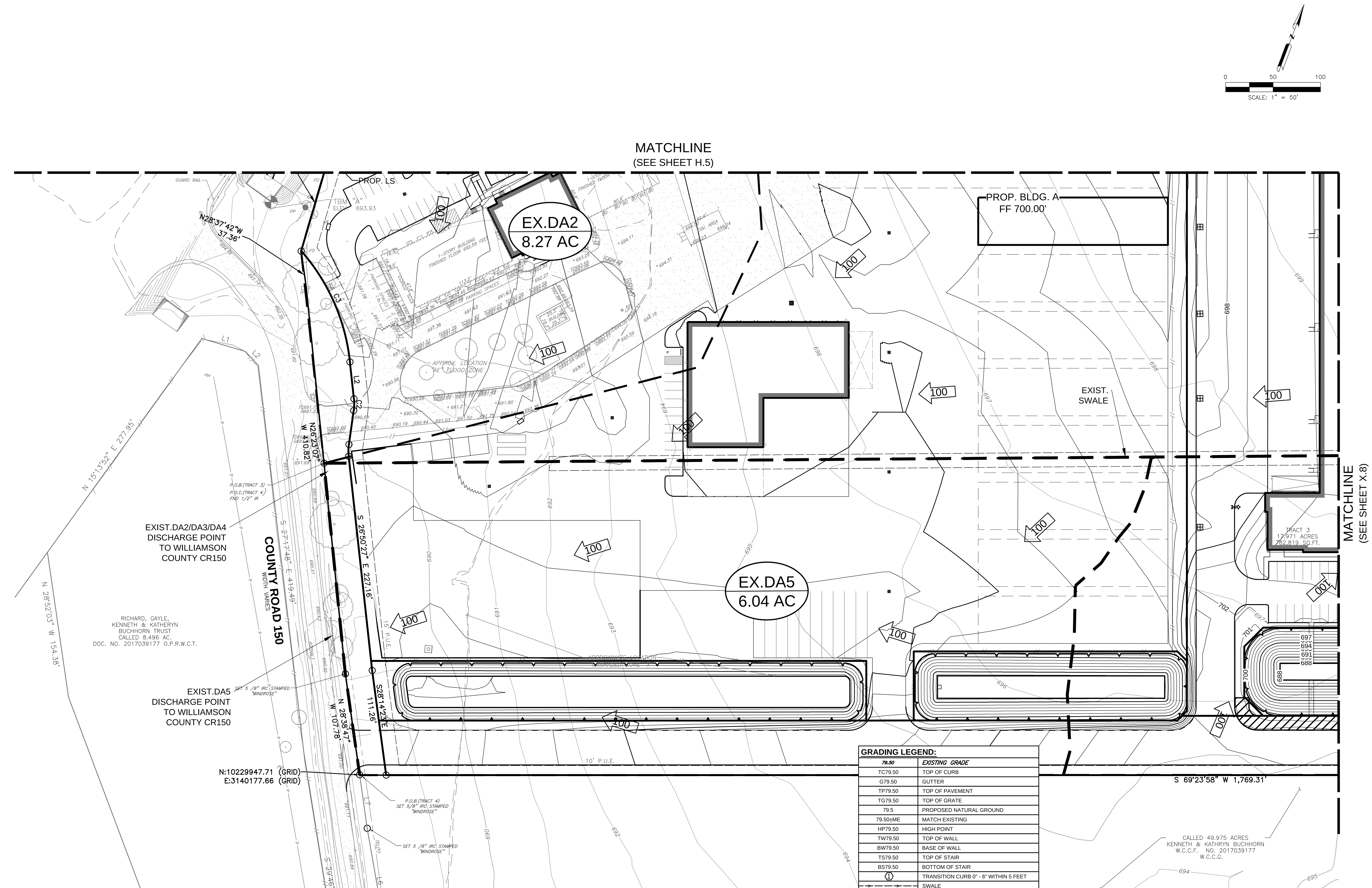

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GEORGETOWN KEYSTONE

CONTOUR PLAN
(3 OF 4)

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SHEET
H.7

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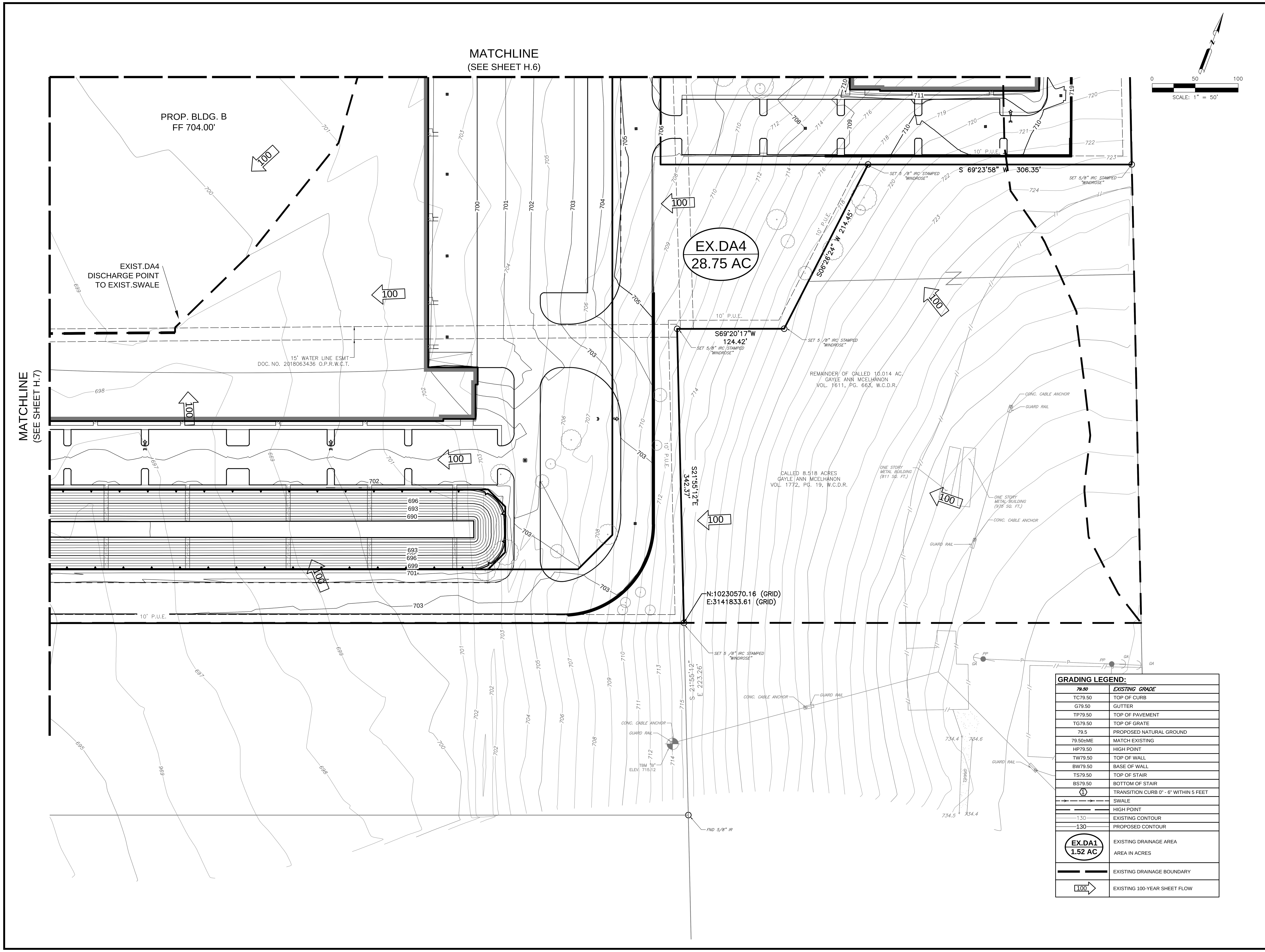

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GEORGETOWN KEYSTONE

CONTOUR PLAN
(4 OF 4)

SCALE	DESIGN	DRAWN
1"=50'	DA	CR

SHEET
H.8

PROJECT No. 00486-009

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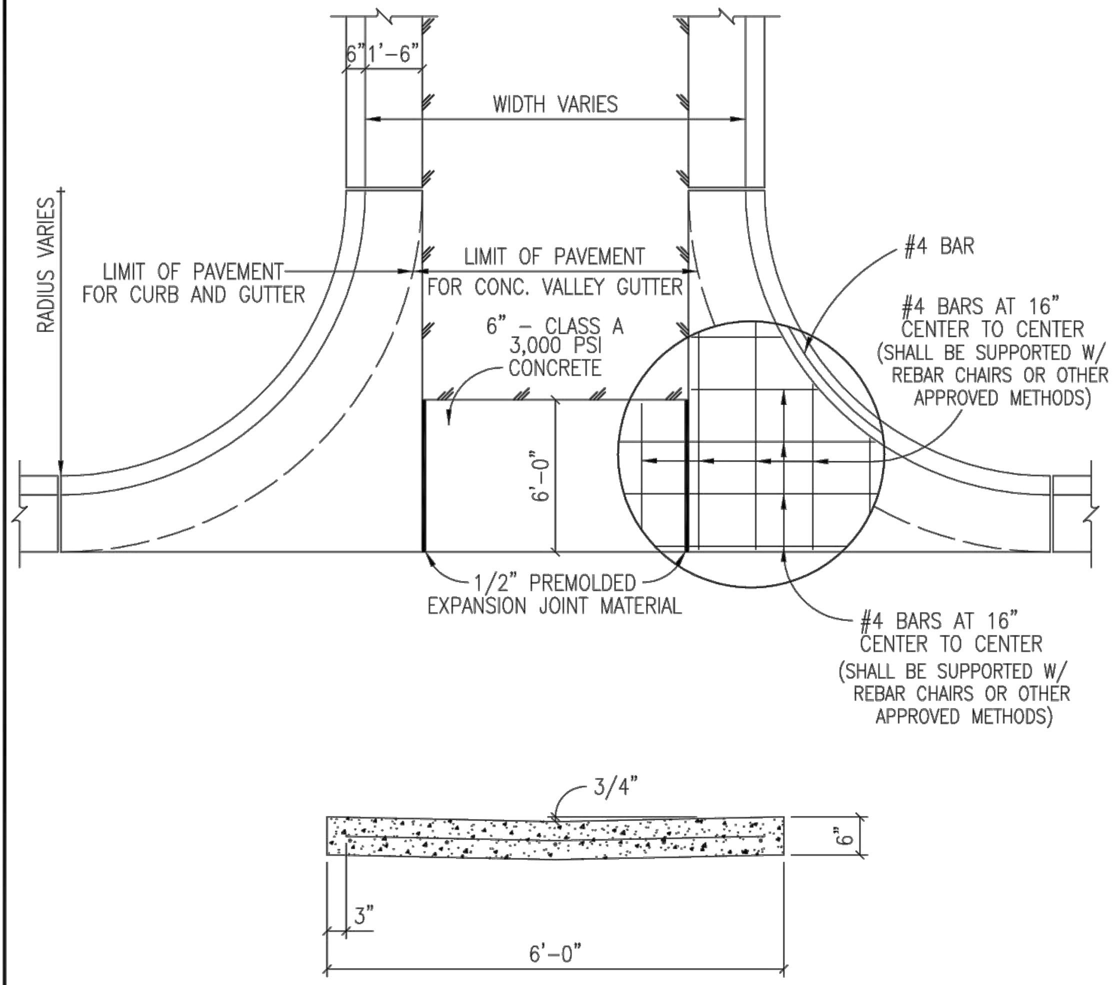
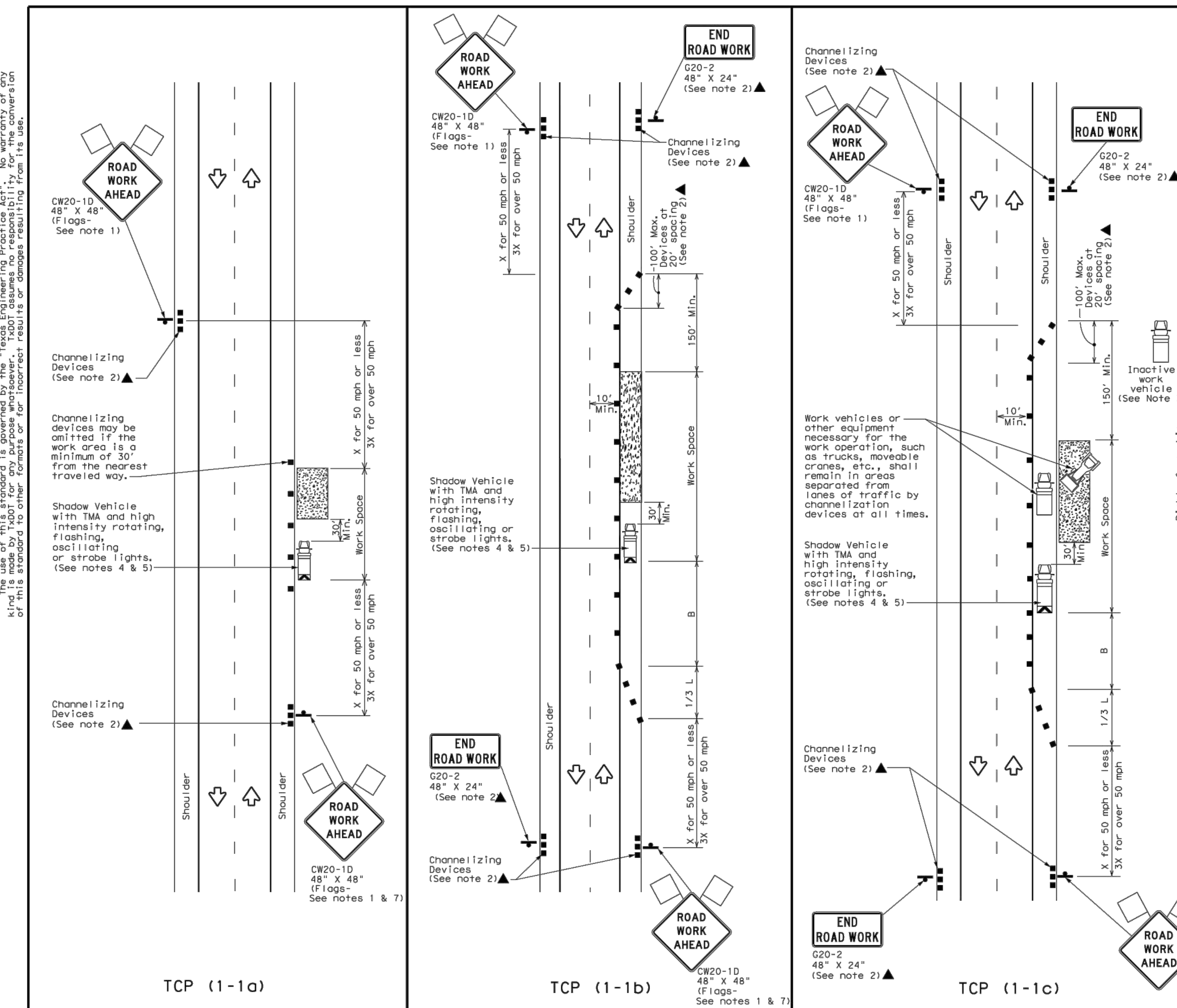


The Architect/Engineer assumes responsibility for appropriate use of this standard.

GEORGETOWN TEXAS	CITY OF GEORGETOWN CONSTRUCTION STANDARDS AND DETAILS	ADOPTED 6/21/2006
	CONCRETE VALLEY GUTTER DETAIL	SD03
	SCALE: NTS	DATE: 1/2003
	DRAWN BY: MRS	APPROVED BY: TRB



TCP (1-1a)
WORK SPACE NEAR SHOULDER
Conventional Roads

TCP (1-1b)
WORK SPACE ON SHOULDER
Conventional Roads

TCP (1-1c)
WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

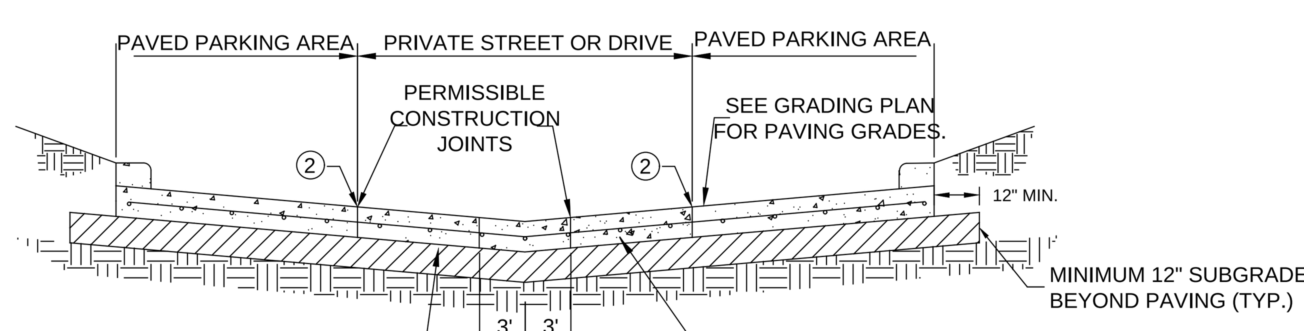
GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
6. See TCP(5-1)for shoulder work on divided highways, expressways and freeways.
7. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP(1-1)-18



ALL CONCRETE 5"-7" TO HAVE 3,500 PSI COMPRESSIVE STRENGTH @ 28 DAYS. ALL STEEL TO BE GRADE 60.

SUBGRADE PREPARATION IN ALL AREAS AFTER REACHING ROUGH GRADE SHOULD CONSISTS OF SCARIFYING TO A DEPTH OF TWELVE (12) INCHES, THEN RECOMPACTION TO A MINIMUM 95% OF STANDARD PROCTOR DENSITY AS DETERMINED BY THE ASTM D-698 PROCEDURE, AT OPTIMUM MOISTURE CONTENT (0 TO ±4%)

IF WET CONDITIONS EXISTS AT TIME OF CONSTRUCTION, AND STABILIZATION IS REQUIRED, IT SHOULD BE PERFOMED USING LIME-FLY ASH STABILIZATION .

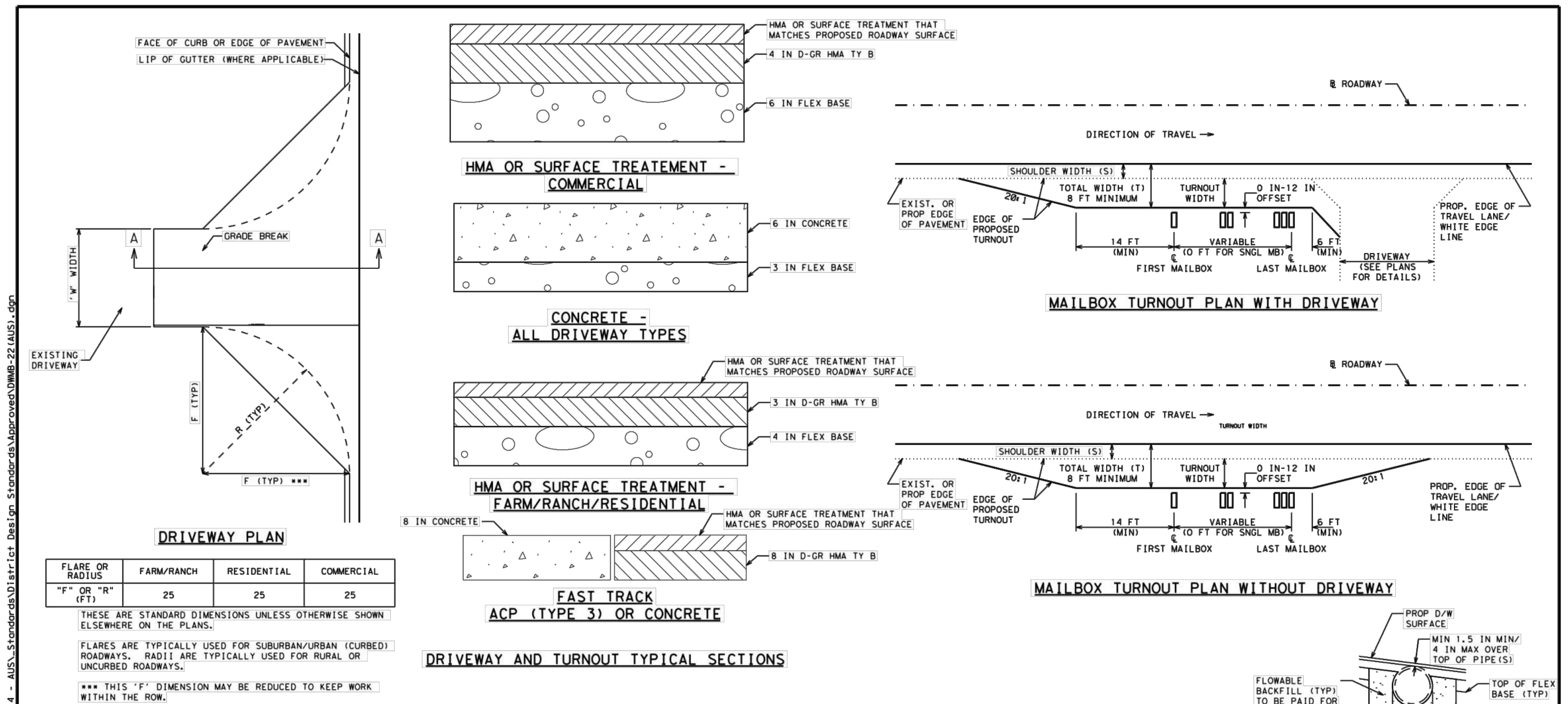
IT IS RECOMMENDED THAT THE UPPER 8 INCHES OF CLAY SUBGRADE BE STABILIZED WITH 4-6 PERCENT HYDRATED LIME, BY DRY UNIT WEIGHT.

1. REINFORCING STEEL: 5" THICK CONCRETE PAVEMENT TO HAVE #3 GRADE 60 BARS SPACED AT 24 INTERVALS
6" THICK CONCRETE PAVEMENT TO HAVE #3 GRADE 60 BARS SPACED AT 18" INTERVALS
7" THICK CONCRETE PAVEMENT TO HAVE #3 GRADE 60 BARS SPACED AT 18" INTERVALS
8" THICK CONCRETE PAVEMENT TO HAVE #4 GRADE 60 BARS SPACED AT 18" INTERVALS
2. *CONTROL JOINT SPACING: 24 TIMES PAVEMENT THICKNESS FOR ALL PAVING THICKNESS MAXIMUM OF 15'
3. EXPANSION JOINT: PLACED WHERE PAVEMENT ABUTS ANY STRUCTURE AND TO BE SPACED AT A MAXIMUM OF 60 FEET IN ANY DIRECTION
4. DOWELS AT EXPANSION JOINTS: ½THE SLAB THICKNESS, 18" IN LENGTH, SPACED AT 12" CENTERS AT EACH JOINT, AND BE EMBEDDED AT LEAST 9"

*CONTROL JOINTS CUT WITHIN 6-12 HOURS OF CONCRETE PLACEMENT

1A TYPICAL CONCRETE PAVEMENT SECTION

N.T.S.
SEE GEOTECHNICAL ENGINEERING REPORT BY RINER ENGINEERING
(PROJECT No. 22-0355, DATED JUNE 30 2022)



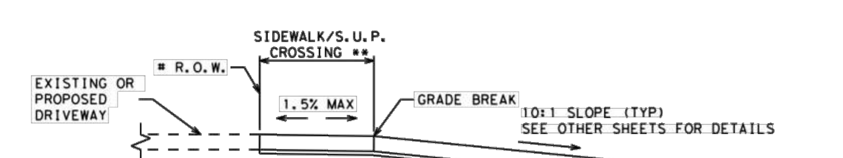
FLARE OR RADIUS	FARM/RANCH	RESIDENTIAL	COMMERCIAL
"F" OR "R" (FT)	25	25	25

THESE ARE STANDARD DIMENSIONS UNLESS OTHERWISE SHOWN ELSEWHERE ON THE PLANS.

FLARES ARE TYPICALLY USED FOR SUBURBAN/URBAN (CURBED) ROADWAYS. RADII ARE TYPICALLY USED FOR RURAL OR UNCURBED ROADWAYS.

*** THIS 'F' DIMENSION MAY BE REDUCED TO KEEP WORK WITHIN THE ROW.

ONLY ONE PIPE SHOWN SEE ELSEWHERE ON THE PLANS FOR SPECIFIC DRIVEWAY DETAILS



* ACTUAL TIE-IN SHOWN ELSEWHERE IN PLANS OR AS DIRECTED

DRIVEWAY WITH GUTTER SECTION A-A

ENSURE GRADE BREAK DOES NOT EXCEED 8% UNLESS OTHERWISE DIRECTED. PROVIDE ABSOLUTE MINIMUM SIDEWALK CROSSING WIDTH OF 4' FOR DRIVEWAYS WIDTH OF 20' OR LESS

** LOCATE SIDEWALK CROSSING TO ALIGN WITH ADJACENT SIDEWALK; SIDEWALK/S.U.P. WIDTH AND LOCATION SHOWN ELSEWHERE ON THE PLANS.

GENERAL NOTES

PROVIDE EXPANSION 20 FT C-C FOR WIDTH OR LENGTH OVER 25 FT. EXPANSION JOINT PER AUS STANDARD FOR SIDEWALK (MCPSWMD).

REINFORCEMENT WILL BE IN ACCORDANCE WITH ITEM 432.3.1 USING NO. 3 OR NO. 4 BARS.

FIBER REINFORCEMENT IS NOT ALLOWED. CLASS A CONCRETE IS ALLOWED TO USE COARSE AGGREGATE GRADES 1-8.

IN LIEU OF PFC OR TOM, SURFACE MUST BE 1.5" D-GR HMA TY D. IF SURFACE IS A MULTIPLE COURSE SURFACE TREATEMENT, ALL COURSES MUST BE PLACED ON DRIVEWAY. SURFACE HMA IS PG 76-22. NON SURFACE HMA IS PG 64-22 AND MAY BE BLADE LAID.

FURNISH BASE MEETING THE REQUIREMENTS FOR ANY TYPE OR GRADE IN ACCORDANCE WITH ITEM 247. BASE COMPRESSIVE STRENGTHS ARE WAIVED.

THE BASE UNDER THE CONCRETE MAY BE REPLACED WITH CONCRETE AT A RATIO OF 3 INCHES OF BASE EQUALS 2 INCHES OF CONCRETE.

FAST TRACK DRIVEWAYS MUST BE CLOSED, CONSTRUCTED, AND REOPENED WITHIN 24 HOURS.

IF ROOTS ARE ENCOUNTERED VERIFY WITH THE ENGINEER PRIOR TO ACCOMMODATING OR REMOVING 2 IN. DIAMETER OR LARGER ROOTS. ROOT REMOVAL MUST BE IN ACCORDANCE WITH ITEM 752.4.2. ROOTS MAY REMAIN IN THE BASE. FOR IMPROVEMENTS WITHIN 6 IN. OF A ROOT, THE CONCRETE THICKNESS MAY BE REDUCED BY 1 IN. AND THE BASE INCREASED BY 1 IN. TO MINIMIZE IMPACTS TO THE ROOTS. ADJUST BASE AND SURFACE PROFILE TO PROVIDE A 1 IN. BASE CUSHION AROUND THE ROOTS. THE SURFACE PROFILE MAY BE ADJUSTED TO THE EXTENT ALLOWED BY ADA. THIS WORK IS SUBSIDIARY.

Texas Department of Transportation — Austin District Standard

DRIVEWAYS
AND
MAILBOX TURNOUTS

DWMB-22 (AUS)

REV	DESCRIPTION	DATE

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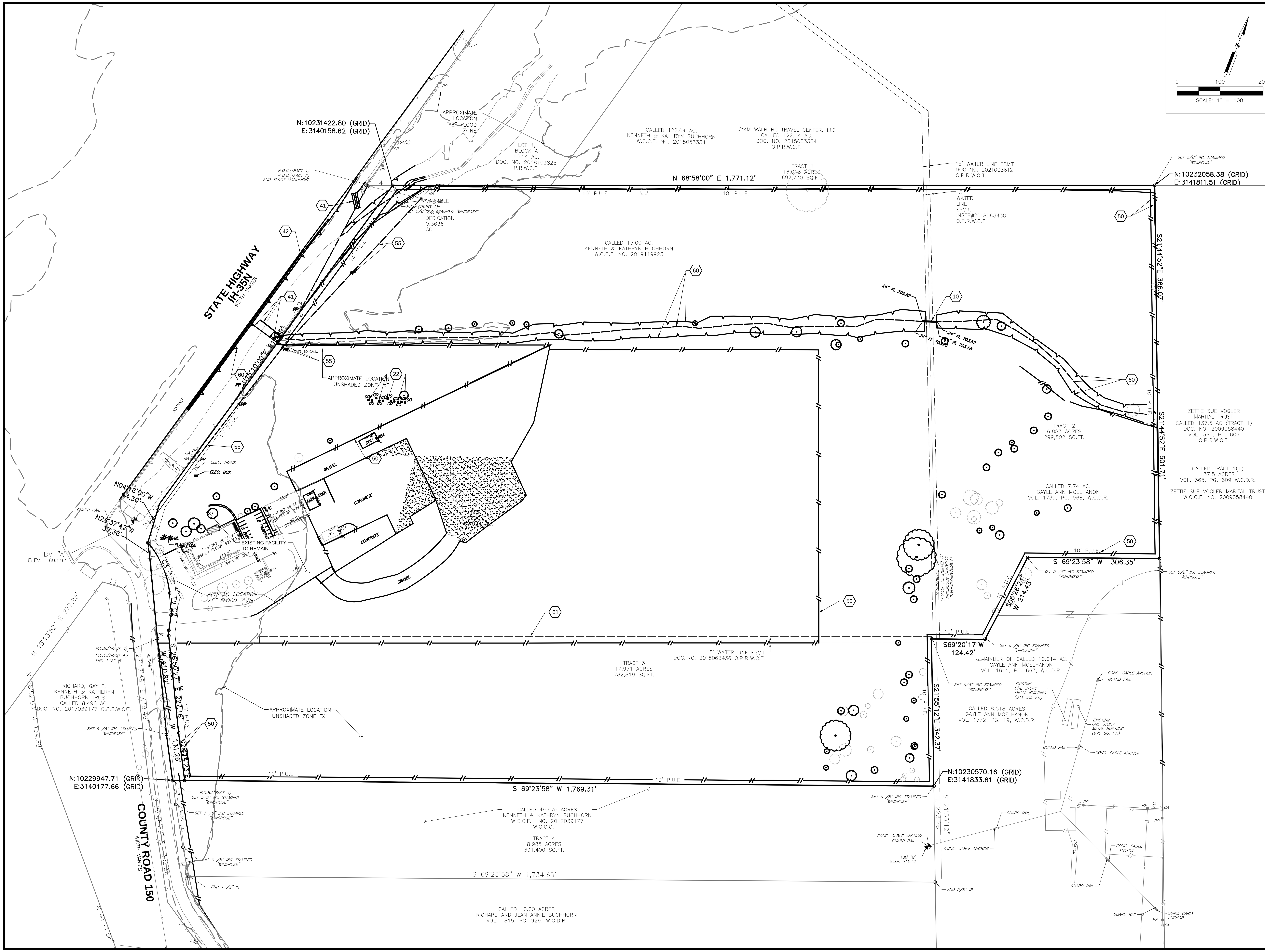
GEORGETOWN KEYSTONE

PAVING DETAILS

SCALE	DESIGN	DRAWN
N/A	DA	CR

SHEET
H.9

PROJECT No. 00486-009



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STORM SEWER DEMOLITION:

10 STORM SEWER TO BE REMOVED

SANITARY SEWER DEMOLITION:

22 SEPTIC FIELD TO BE REMOVED ONCE SANITARY CONNECTION IS IN PLACE

PAVEMENT DEMOLITION:

41 CONCRETE PAVING TO BE REMOVED

42 CURB TO BE REMOVED

MISCELLANEOUS DEMOLITION:

50 FENCING TO BE REMOVED

55 ELECTRICAL TO BE REMOVED

60 DITCH TO BE RELOCATED

61 EXISTING WATERLINE EASEMENT TO BE ABANDONED

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

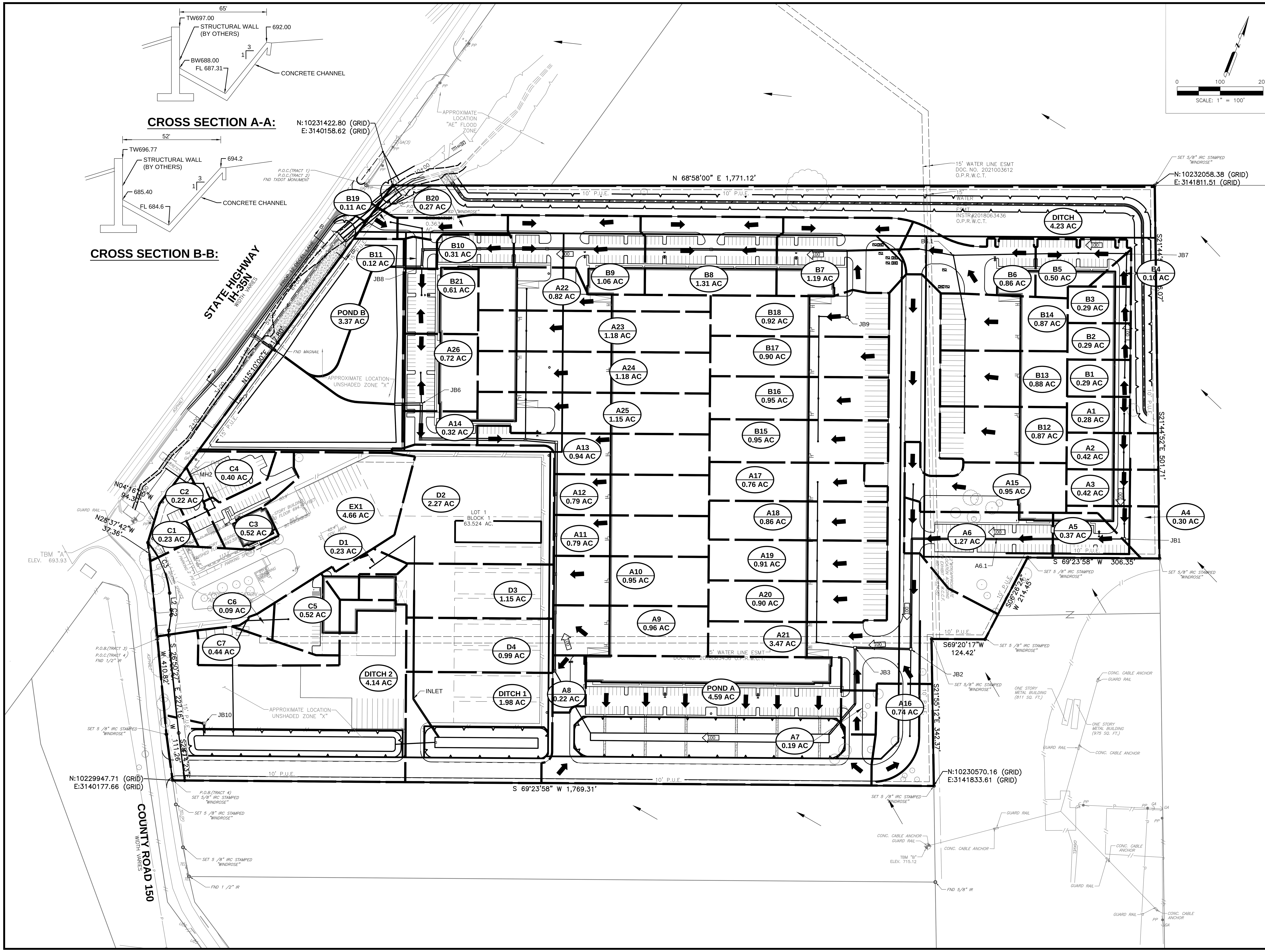
GEORGETOWN KEYSTONE

EXISTING CONDITIONS

SCALE	DESIGN	DRAWN
1"=100'	DA	CR

SHEET
I.0

PROJECT No. 00486-009



BENCHMARKS:

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DRAINAGE AREA MAP LEGEND:

A 1.52 AC	DRAINAGE AREA AREA IN ACRES
	DRAINAGE BOUNDARY
	2-YEAR SHEET FLOW
100	100-YEAR SHEET FLOW
	OFF-SITE SHEET FLOW

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GEORGETOWN KEYSTONE

DRAINAGE PLAN

SCALE	DESIGN	DRAWN
1"=100'	DA	CR

SHEET
I.1

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\I.1-I.2 Drainage Plan.dwg   Last Plotted: Thu Apr 13, 2023 - 5:01pm   By: asdiazar

WGA

STORM SEWER CALCULATIONS

Project: Georgetown Keystone

WGA

STORM SEWER CALCULATIONS

Project: Georgetown Keystone

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REV	DESCRIPTION	DATE

Stormwater Detention Summary Table (Dry Berry Creek Trib. 3)

	Project Name: Georgetown Keystone						Date: February 10, 2023
	Outfall Location	Dry Berry Creek Tributary 3 (DBCT3)					
	Total Drainage Area Contributing to DBCT3 at outfall	212.1 acres					
	Total Detention Service Area	50.23 acres					
	Offsite Detention Service Area	6.46 acres					
	Storm Event	50% (2-yr)	20% (5-yr)	10% (10-yr)	4% (25-yr)	2% (50-yr)	1% (100-yr)
Flows (cfs)	Total Maximum Allowable Outflow (Based on pre-project flows to DBC T3 routed in EPA-SWMM)	119.02	178.65	234.51	317.60	385.89	462.09
Flows (cfs)	Total Maximum Outflow Provided* (Based on combined peak outflow to DBC T3 routed in EPA-SWMM)	118.23	178.08	234.44	315.91	382.95	455.41
Flows (cfs)	Site Post-Project Inflow (Based on inflows to Ponds A & B, including off-site flows)	190.9	247.7	295.2	364.5	418.9	476.2
Flows (cfs)	Maximum Outflow Provided (Based on routed outflow from Pond B outfall only)	8.94	15.02	21.11	27.73	32.98	37.90
Elevations (1988 NGVD, 2001 adj.)	Lowest Natural or Finished Ground Elevation Estimate	696.0[B] 700.4[A]					
Elevations (1988 NGVD, 2001 adj.)	Maximum Allowable Water Surface	695.0[B] 699.4[A]					
Elevations (1988 NGVD, 2001 adj.)	Based on	Elevation of Pond High Bank and 1-ft Freeboard					
Elevations (1988 NGVD, 2001 adj.)	Design Water Surface Elevation	690.17[B] 693.33[A]	691.11[B] 694.4[A]	691.83[B] 695.29[A]	692.89[B] 696.64[A]	693.81[B] 697.76[A]	694.80[B] 699.00[A]
Elevations (1988 NGVD, 2001 adj.)	Water Surface Elevation Calculated (pond)	690.17[B] 693.33[A]	691.11[B] 694.4[A]	691.83[B] 695.29[A]	692.89[B] 696.64[A]	693.81[B] 697.76[A]	694.80[B] 699.00[A]
Storage	Detention Storage Provided** (ac-ft)	10.78	14.31	17.22	21.72	25.73	30.36
Storage	Storage Rate Provided*** (ac-ft/acre)	0.19	0.25	0.30	0.38	0.46	0.54
Outflow Structure	Restrictor Size, if applicable (ft)	12" Orifice/Storm Water Quality Unit, secondary 18" pipe set at 689.85 ft					
Outflow Structure	Outflow Pipe Size (ft)	54" RCP					
Outflow Structure	Outflow Velocity into Channel (ft/second)	2.10	2.43	2.66	2.85	2.97	3.06
Outflow Structure	Weir Description, if applicable (type, size, elevation, etc.)	N/A					

*Combined peak outflows include from the realigned swale, Pond B, and undetained proposed drainage area L
**Detention Volume is the sum of peak volumes for Ponds A & B for each storm event
***Detention Rate computed for entire site
[A] Pond A
[B] Pond B

Stormwater Detention Summary Table (Williamson Co. Ro. 150)

	Project Name: Georgetown Keystone						Date: February 10, 2023
	Outfall Location	Williamson County Road 150					
	Total Detention Service Area	14.72 acres					
	Offsite Detention Service Area	0.00 acres					
	Storm Event	50% (2-yr)	20% (5-yr)	10% (10-yr)	4% (25-yr)	2% (50-yr)	1% (100-yr)
Flows (cfs)	Site Post-Development Inflow	53.20	59.30	82.60	101.90	117.00	132.90
Flows (cfs)	Maximum Allowable Outflow (Based on pre-project peak flows to WCR 150)	14.90	23.70	32.00	44.60	54.90	66.30
Flows (cfs)	Maximum Outflow Provided (Based on routed peak flows from outfall to WCR 150)	14.75	20.55	25.67	31.79	37.11	42.36
Elevations (1988 NGVD, 2001 adj.)	Lowest Natural or Finished Ground Elevation Estimate	692.5[1] 696.0[2]					
Elevations (1988 NGVD, 2001 adj.)	Maximum Allowable Water Surface	692.5[1] 696.0[2]					
Elevations (1988 NGVD, 2001 adj.)	Based on	Elevation of lowest grade along the high bank of each ditch					
Elevations (1988 NGVD, 2001 adj.)	Design Water Surface Elevation (Based on the 100-year Storm routed in EPA-SWMM)	692.45[1] 695.57[2]					
Elevations (1988 NGVD, 2001 adj.)	Water Surface Elevation Calculated (Based on the 100-year Storm routed in EPA-SWMM)	692.45[1] 695.57[2]					
Storage	Detention Storage Provided* (ac-ft)	1.36	1.82	2.22	2.85	3.37	3.95
Storage	Storage Rate Provided** (ac-ft/acre)	0.19	0.25	0.30	0.38	0.46	0.54
Outflow Structure	Restrictor Size, if applicable (ft)	15" DIA RCP					
Outflow Structure	Outflow Pipe Size (ft)	(2) 24" RCP					
Outflow Structure	Outflow Velocity into Channel (ft/second)	4.23	4.54	4.75	5.13	5.91	6.74
Outflow Structure	Weir Description, if applicable (type, size, elevation, etc.)	N/A					

*Detention storage for Williamson County outfall is provided in ditches
**Detention Rate for the entire site considered
[1]Ditch 1
[2]Ditch 2

TxDOT Summary Table (For Dry Berry Creek Tributary 3 Outfall)

Georgetown Keystone		Unit
TxDot Tracking number (TR#)	#22-43452	
Highway	South Interstate 35	
TxDOT frontage	1012.1	FT
TxDOT Area (the strip of site within 150-ft frontage)	1.64	AC
Total tract area based on submitted survey map	63.89	AC
Proposed disturbed area*	63.21 (43.56)	AC
Project contributing drainage area to TxDOT	51.67	AC
Off-site contributing area (if applicable)	6.46	AC
Increased impervious area	51.02	AC
10-yr required detention volume	19.31	AC-FT
10-yr proposed detention volume	19.31	AC-FT
10-yr design W.S.E.	691.83[B] 695.29[A]	FT
10-yr Pre-developed peak flow	35.00	CFS
10-yr Post-developed peak flow	280.10	CFS
10-yr Proposed discharge to TxDOT R.O.W.	21.11	CFS
100-yr required detention volume	34.10	AC-FT
100-yr proposed detention volume	34.10	AC-FT
100-yr design W.S.E.	694.80[B] 699.00[A]	FT
100-yr Pre-developed peak flow	70.20	CFS
100-yr Post-developed peak flow	446.50	CFS
100-yr Proposed discharge to TxDOT R.O.W.	37.90	CFS
TxDOT as built or calculated allowable discharge	45.30	CFS
Primary tie-in/outfall structure size	54" RCP	Inch
Primary restrictor size	12-inch Diameter Orifice	Inch
Primary restrictor maximum discharge	12.00	CFS
Secondary outfall device size (if applicable)	18-inch Diameter RCP	Feet
Secondary outfall discharge (if applicable)	25.88	CFS
Maximum combined pumped discharge (if applicable)	N/A	(CFS)
% Pumped discharge volume (if applicable)	N/A	AC-FT
Effective gravity discharge elevation (if applicable)	685.80	FT
B.F.E per effective FIRM (if applicable)	Varies from 689.09 – 694.25	FT
Proposed fill below B.F.E. (if applicable)	TBD	AC-FT
Proposed cut below B.F.E. (if applicable)	TBD	AC-FT

*Entire disturbed area on the site, only 43.56 of that area is proposed to drain into the TXDOT ROW (DBC Trib. 3)
[A]Pond A
[B]Pond B

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GEORGETOWN KEYSTONE

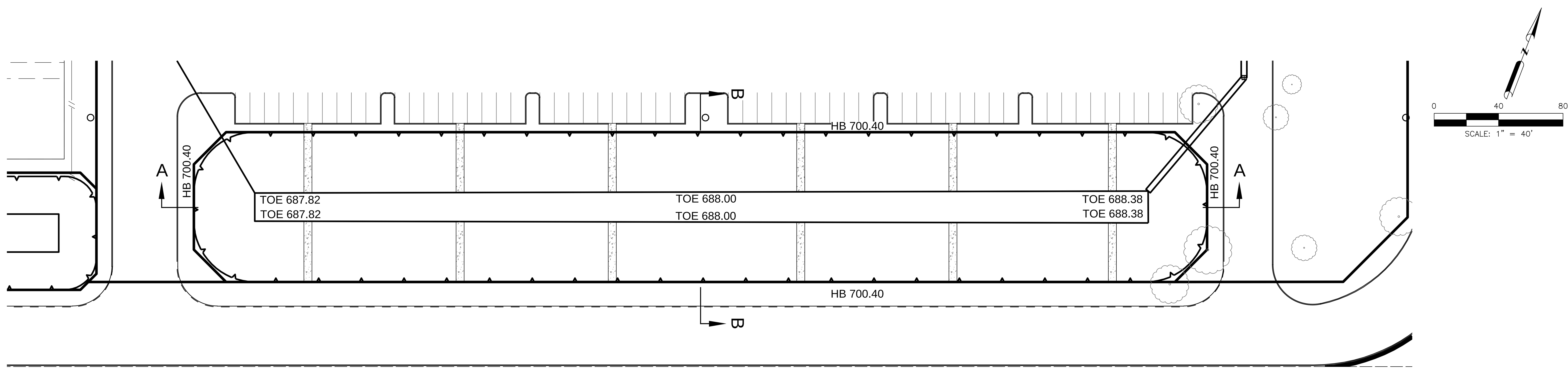
DRAINAGE PLAN CALCULATIONS

SCALE	DESIGN	DRAWN
N/A	DA	CR

SHEET
I.2

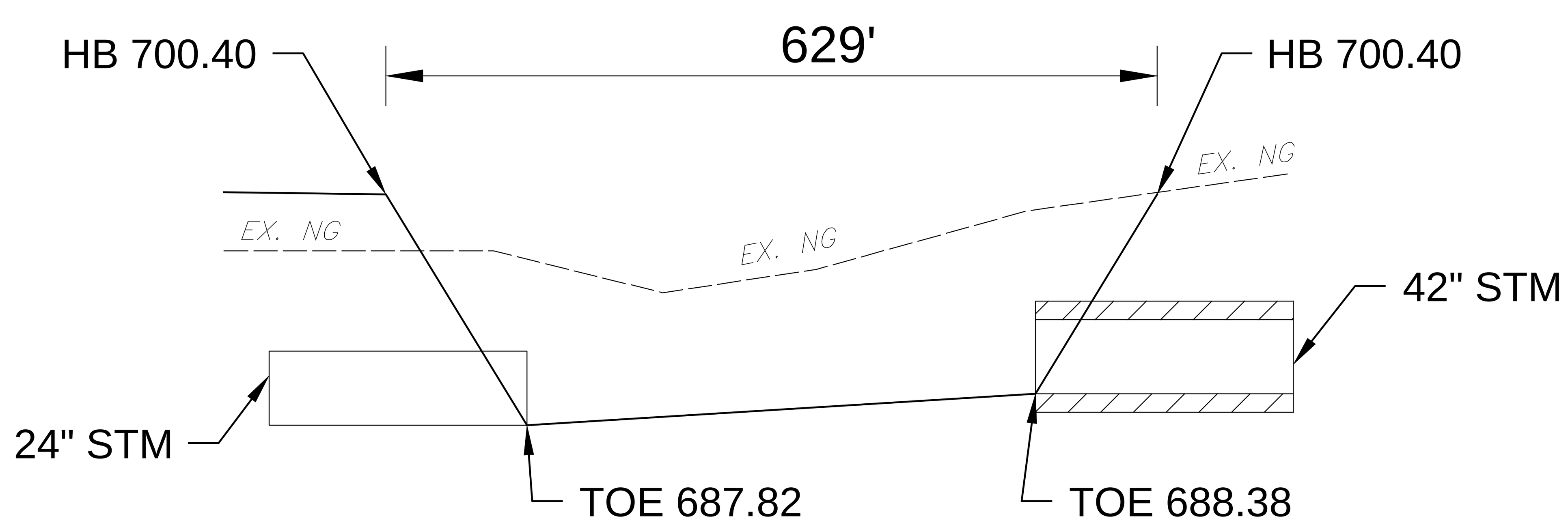
PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\I.1-I.2 Drainage Plan.dwg Last Plotted: Thu Apr 13, 2023 - 5:01pm By: asdiaz



POND A

Pond A Detention Storage Calculations				
Water Elevation ft	Surface Area ft^2	Total Volume ft^3	Total Volume ac-ft	Comment
688.00	3,454	0	0.00	Pond Bottom
689.00	13,521	7,936	0.18	
690.00	17,096	23,210	0.53	
691.00	20,724	42,091	0.97	
692.00	24,405	64,631	1.48	
693.00	28,137	90,880	2.09	
694.00	31,923	120,890	2.78	
695.00	35,757	154,712	3.55	
696.00	39,639	192,393	4.42	
697.00	43,573	233,984	5.37	
698.00	47,558	279,535	6.42	
699.00	51,595	329,098	7.56	
699.40	53,224	350,061	8.04	100-Year WSE
700.00	55,683	382,731	8.79	
700.40	57,274	405,321	9.30	High Bank



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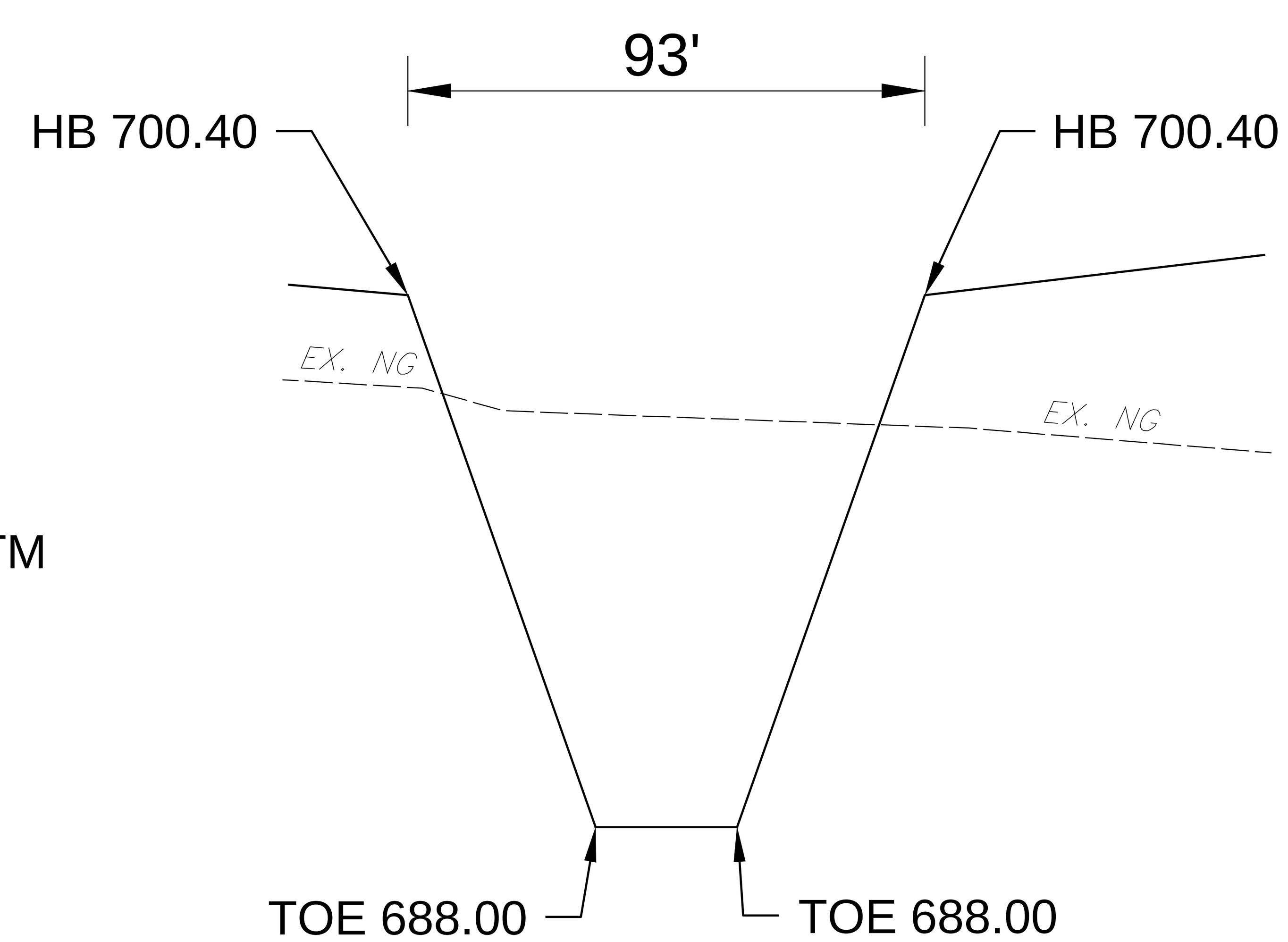

CROSS SECTION B-B:

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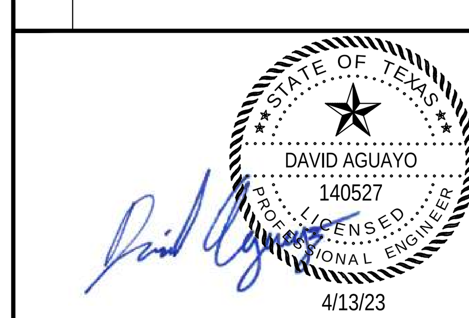

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GEORGETOWN KEYSTONE

DETENTION POND PLAN & CALCULATIONS (POND A)

SCALE	DESIGN	DRAWN
1"=40'	DA	CR

SHEET
I.3

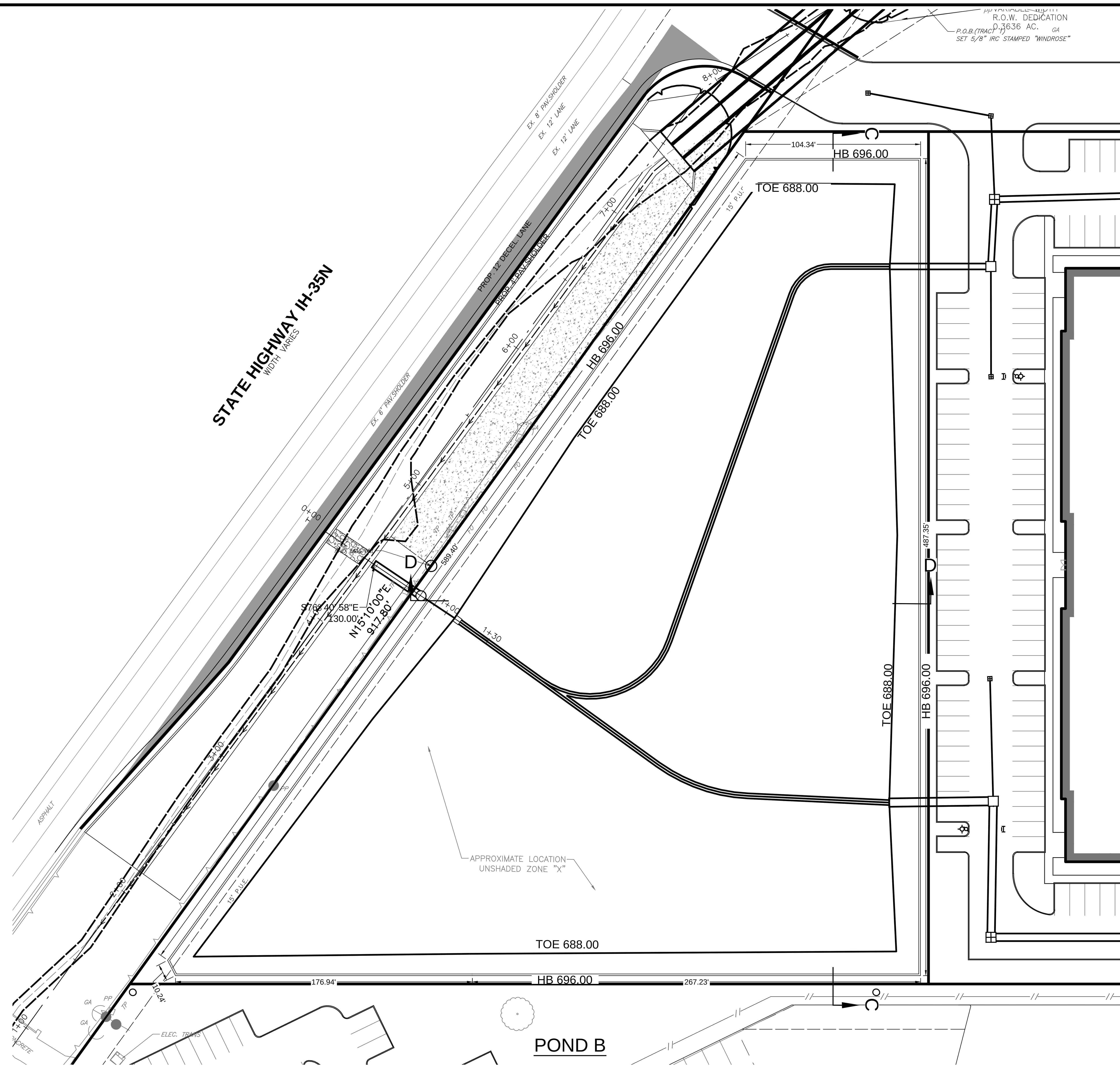
PROJECT No. 00486-009

Pond B Detention Storage Calculations

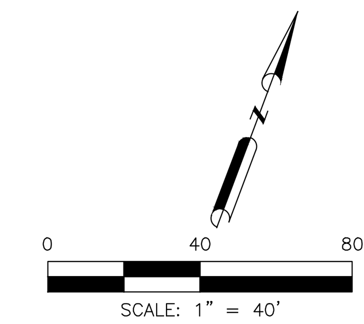
Water Elevation ft	Surface Area ft^2	Total Volume ft^3	Total Volume ac-ft	Comment
686.00	100	0	0.00	
687.00	54,180	18,868	0.43	
688.00	110,452	99,531	2.28	Pond Bottom
689.00	120,554	214,997	4.94	
690.00	125,222	337,877	7.76	
691.00	129,972	465,467	10.69	
692.00	134,550	597,722	13.72	
693.00	134,550	732,272	16.81	
694.00	134,550	866,822	19.90	
695.00	134,550	1,001,372	22.99	100-Year WSE
696.00	134,550	1,135,922	26.08	High Bank

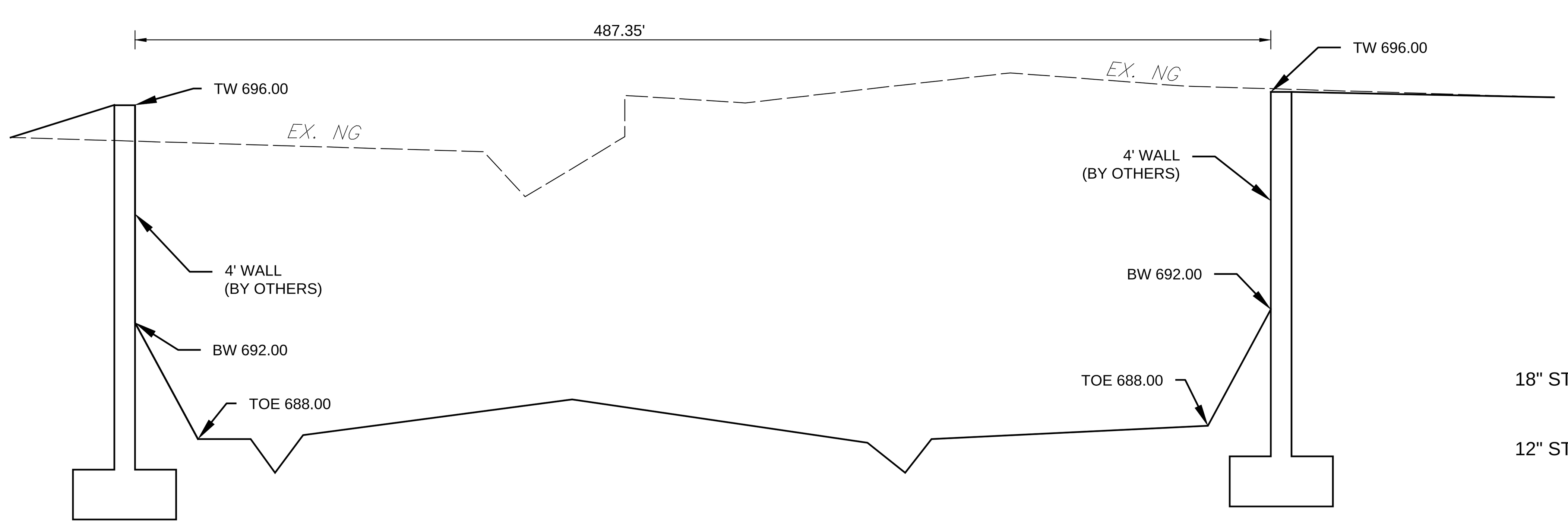
CITY OF GEORGETOWN STORMWATER DETENTION VOLUME DETERMINATION

TOTAL CONTRIBUTING AREA	46.77	ACRES
REQUIRED DETENTION VOLUME PER DIA	28.10	ACRES-FEET
PROPOSED VOLUME OF DETENTION IN POND A	8.03	ACRE - FEET
PROPOSED VOLUME OF DETENTION IN POND B	22.99	ACRE - FEET
PROPOSED VOLUME OF DETENTION IN POND C	1.91	ACRE - FEET
PROPOSED VOLUME OF DETENTION IN POND D	2.04	ACRE - FEET
TOTAL DETENTION STORAGE PROVIDED	34.31	ACRE - FEET

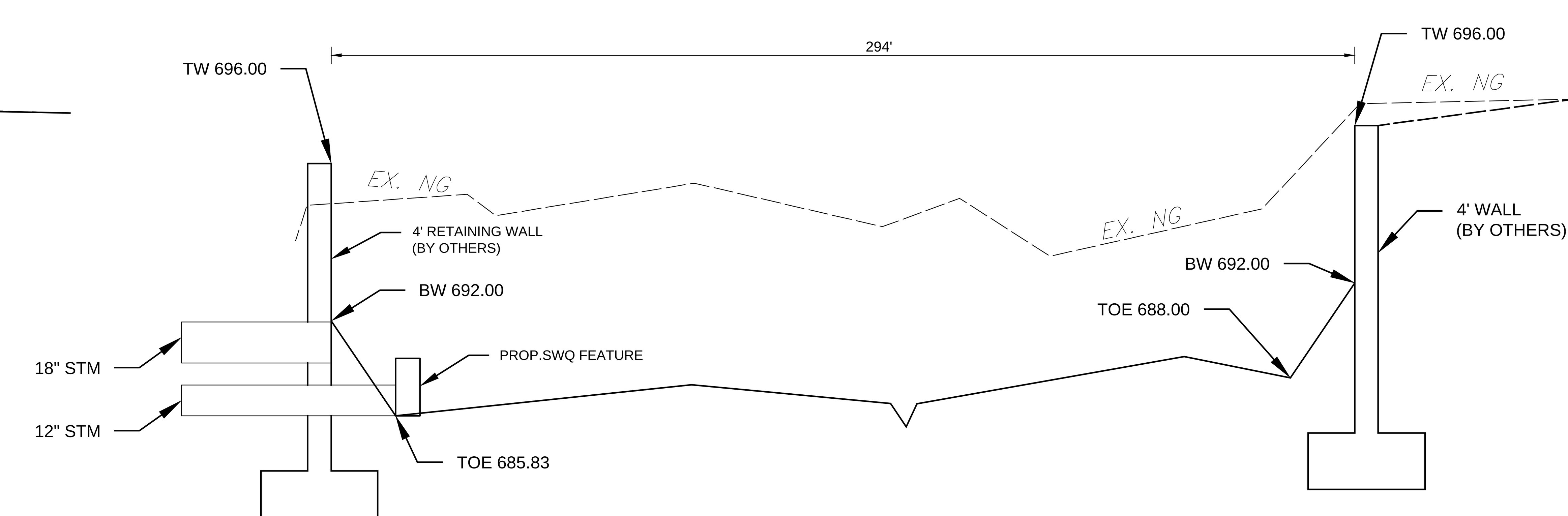


POND B





CROSS SECTION C-C:



CROSS SECTION D-D:

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GEORGETOWN KEYSTONE

DETENTION POND PLAN & CALCULATIONS (POND B)

SCALE	DESIGN	DRAWN
1"=40'	DA	CR

SHEET
I.4

PROJECT No. 00486-009

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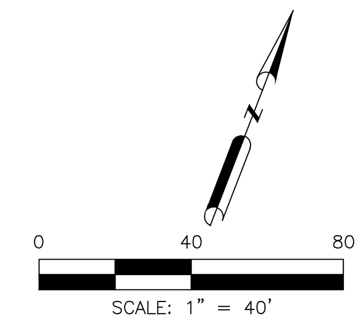
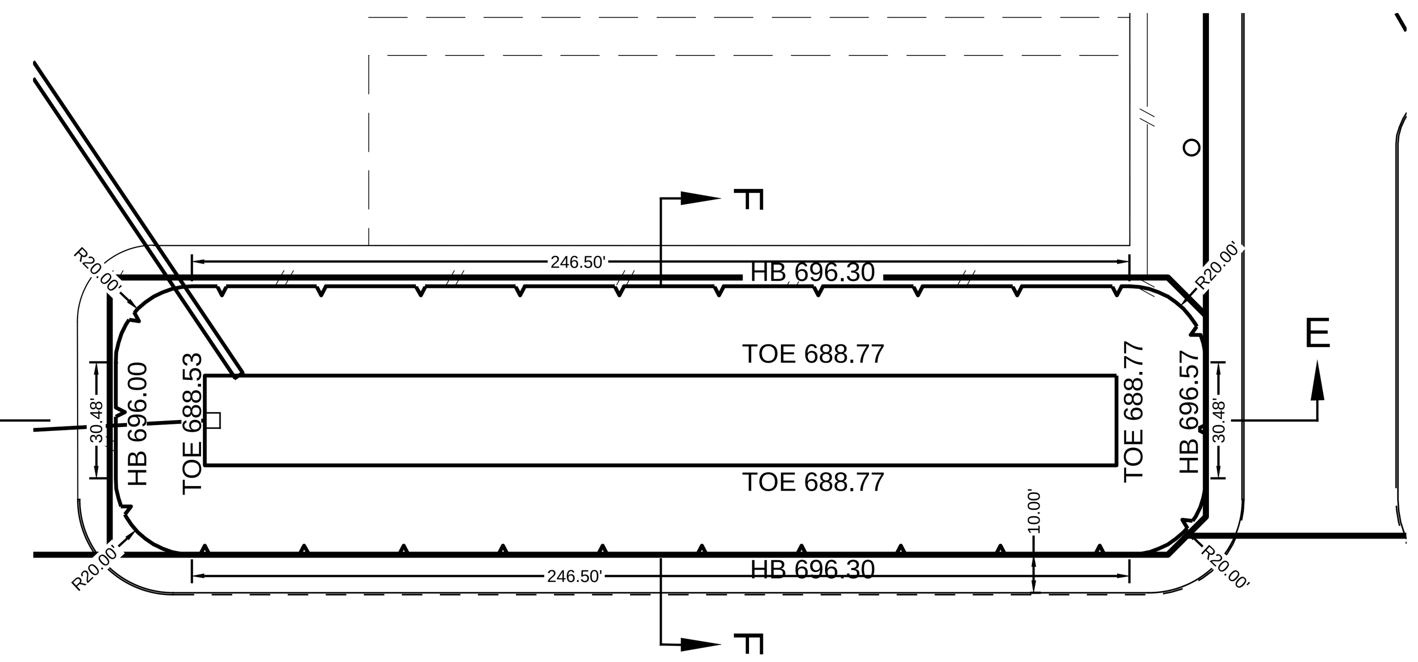
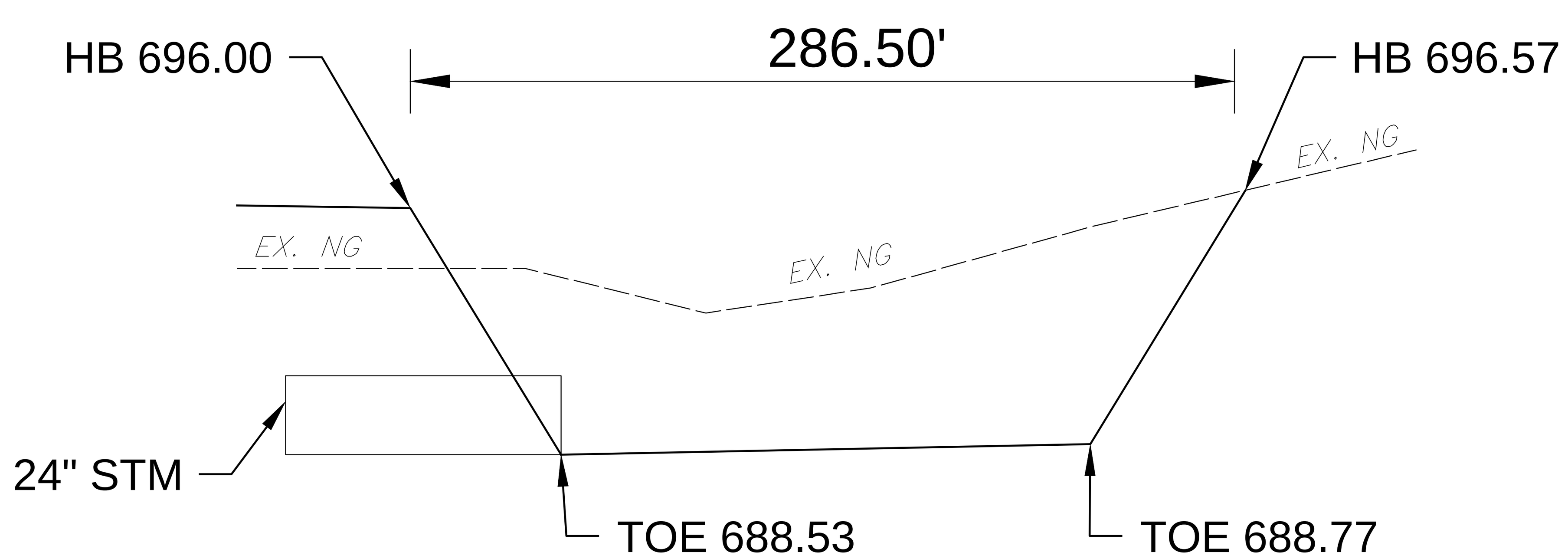
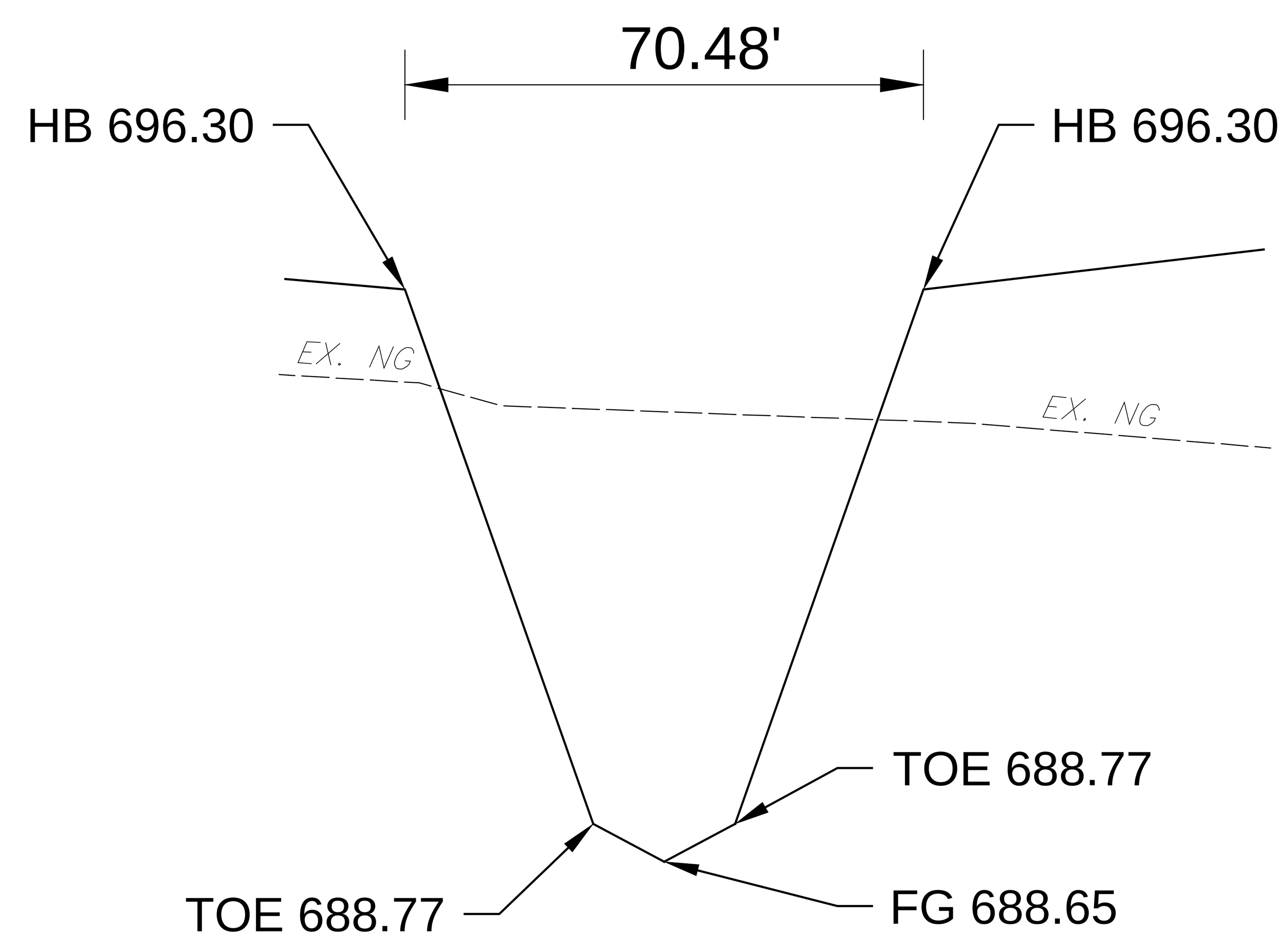




POND C

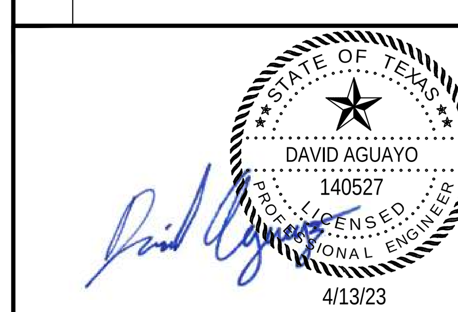


CROSS SECTION E-E:



CROSS SECTION F-F:

REV	DESCRIPTION	DATE



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GEORGETOWN KEYSTONE

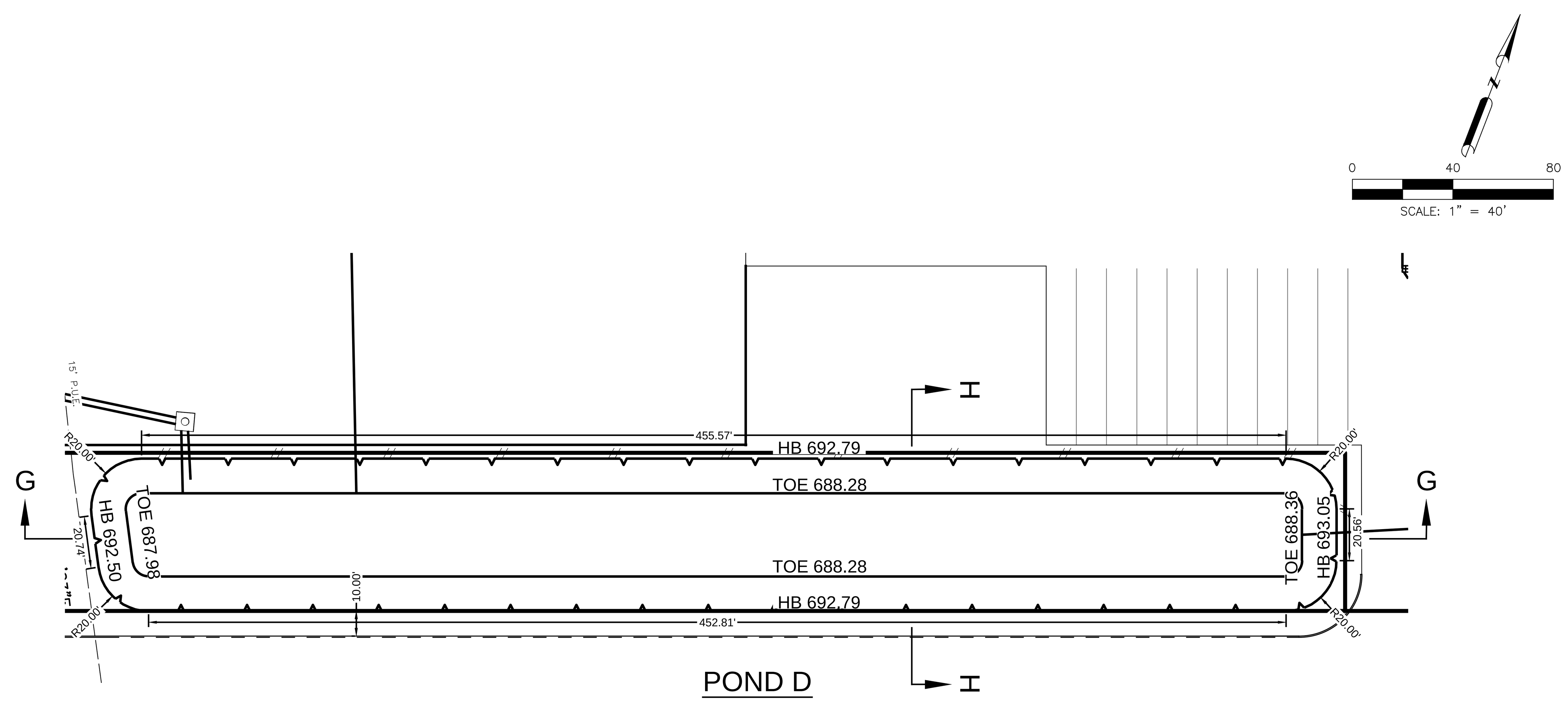
DETENTION POND PLAN & CALCULATIONS (POND C)

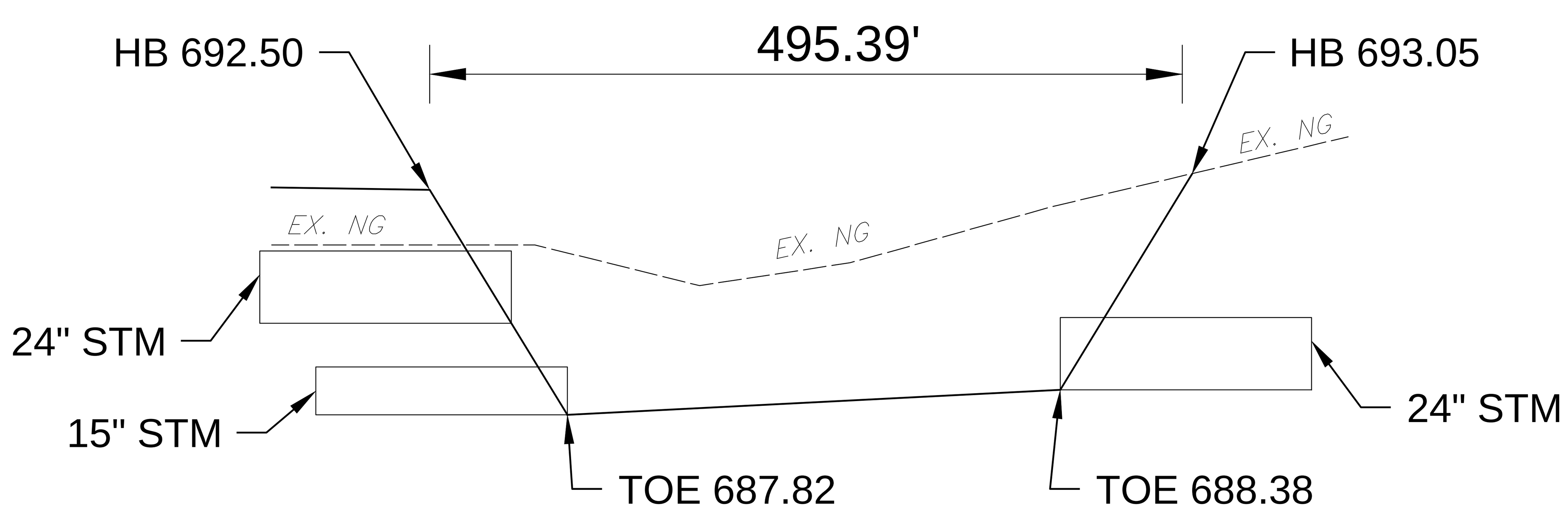
SCALE	DESIGN	DRAWN
1"=40'	DA	CR

SHEET
I.5

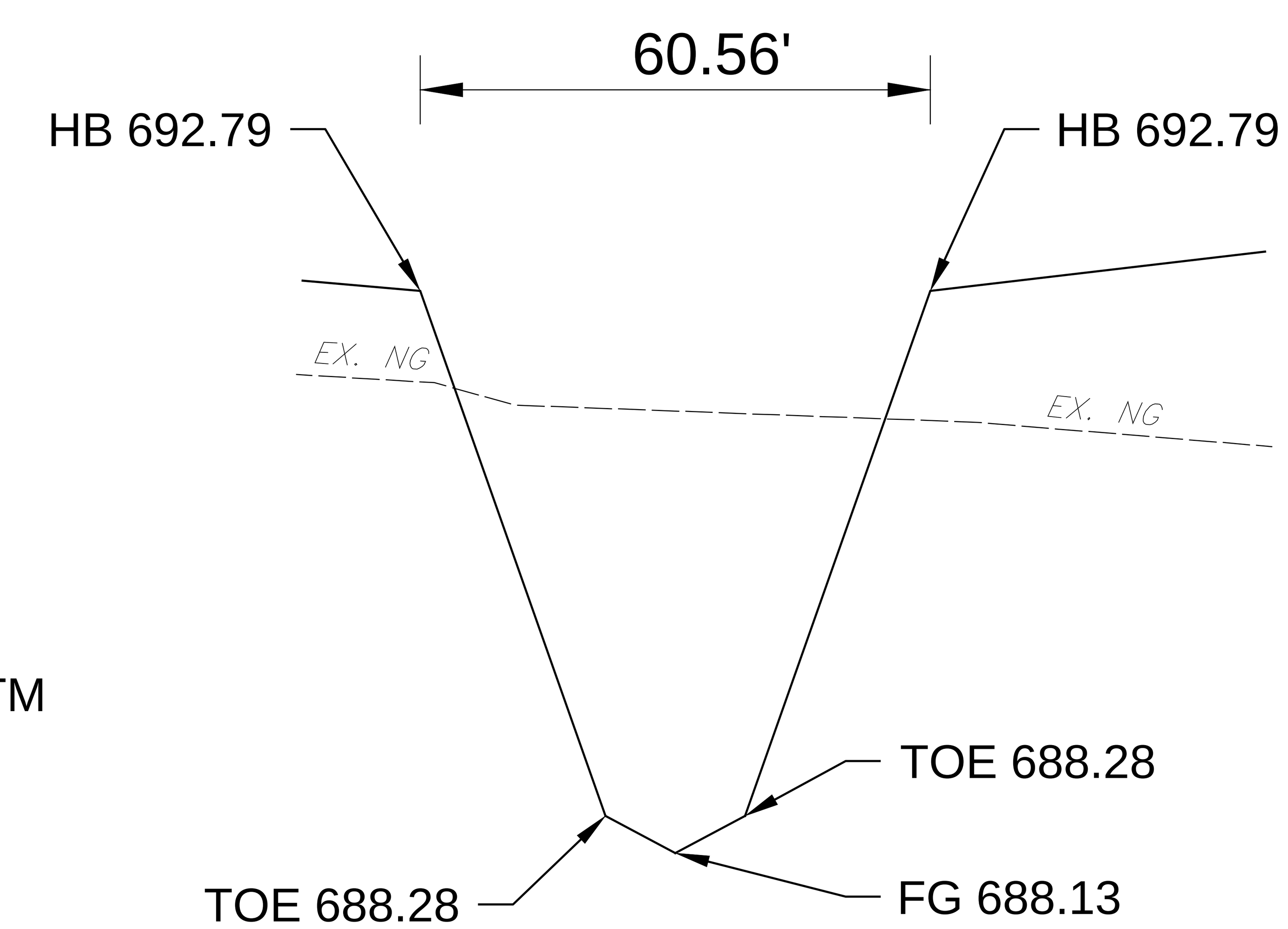
PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\I Pond Sections.dwg Last Plotted: Thu Apr 13, 2023 - 5:00pm By: asalazar





CROSS SECTION G-G:



CROSS SECTION H-H:

BENCHMARKS:

TEMPORARY BENCHMARK "A"
ELEVATION - 693.93'
TEMPORARY BENCHMARK "A" IS A BOX CUT SET ON A HEADWALL ON THE EAST R.O.W. OF STATE HIGHWAY I-35 N, BEING APPROXIMATELY 100 FEET NORTHEAST OF THE INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

TEMPORARY BENCHMARK "B"
ELEVATION - 715.12'
TEMPORARY BENCHMARK "B" IS A BOX CUT SET ON A CONCRETE COLUMN FOR A GUY ANCHOR, BEING APPROXIMATELY 2,050 FEET EAST OF INTERSECTION OF STATE HIGHWAY I-35 N AND COUNTY ROAD 150.

FLOOD PLAIN NOTE:

THIS SUBJECT TRACT LIES WITHIN UNSHADED ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN (0.2% ANNUAL FLOODPLAIN CHANCE) AS DELINEATED ON THE FLOOD INSURANCE MAP FOR WILLIAMSON COUNTY, TEXAS AND INCORPORATED AREAS, MAP NO. 48491C0285F MAP REVISED DECEMBER 20, 2019.

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

WGA
CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

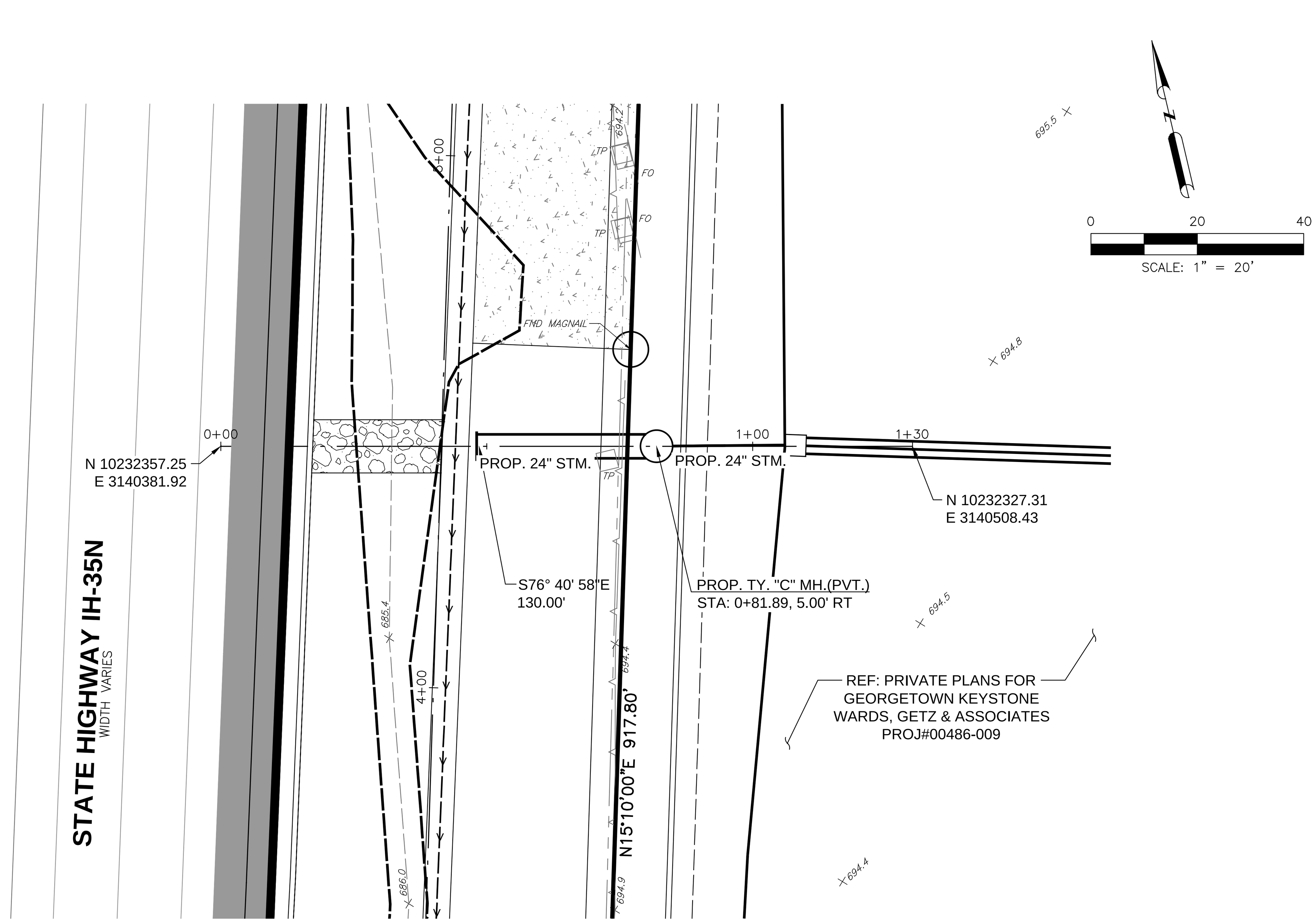
DETENTION POND PLAN & CALCULATIONS (POND D)

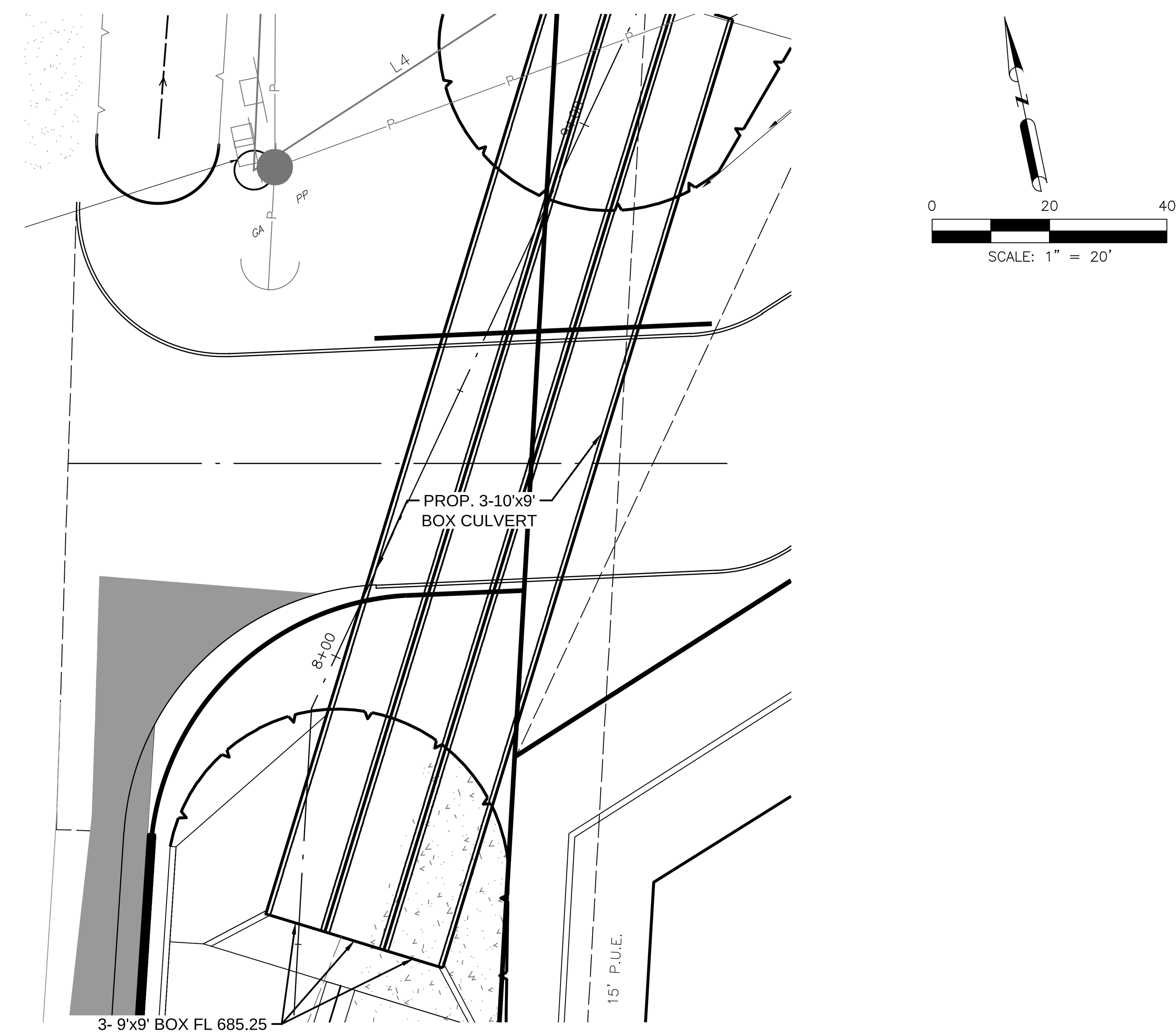
SCALE	DESIGN	DRAWN
1"=40'	DA	CR

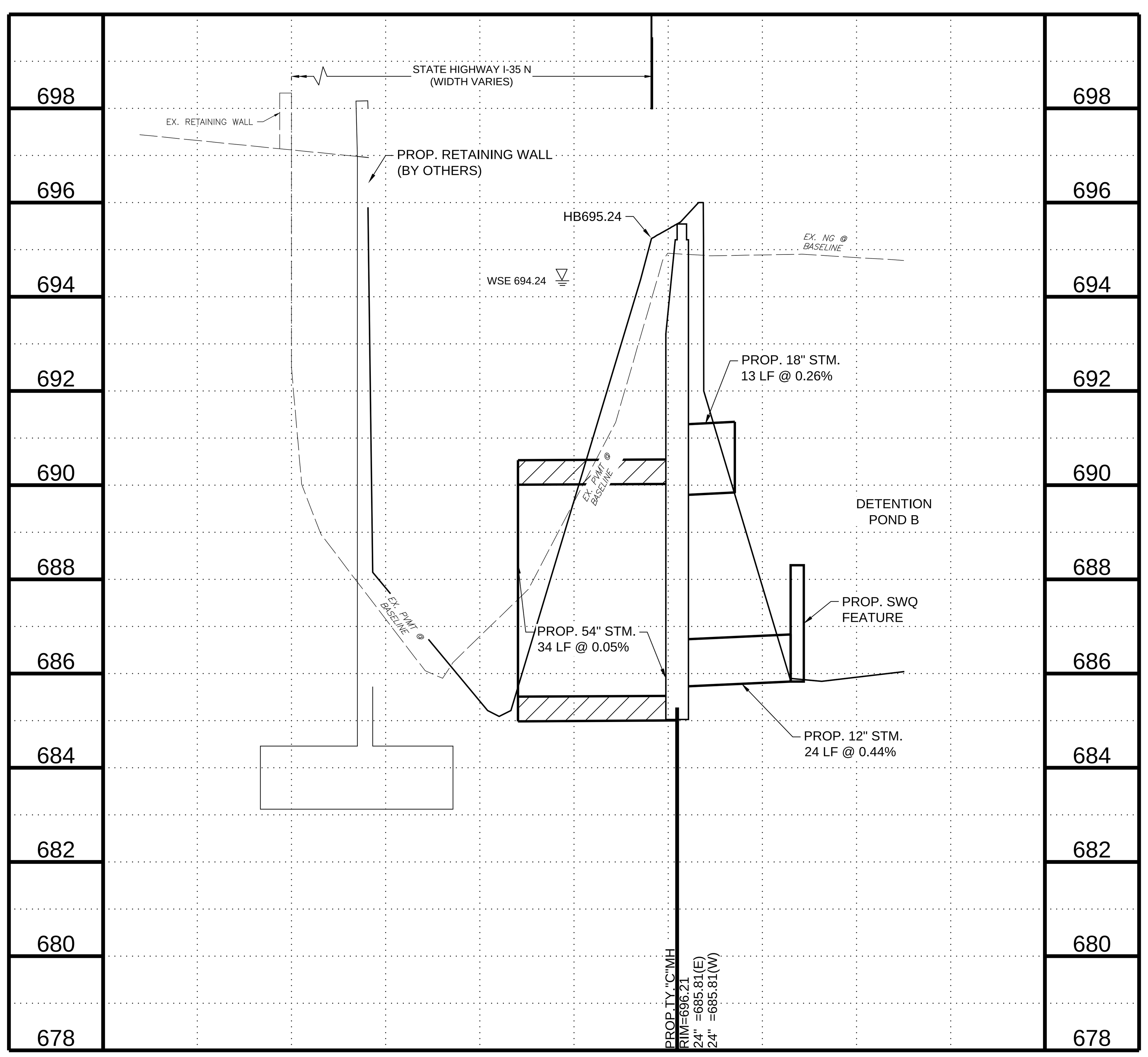
SHEET
I.6

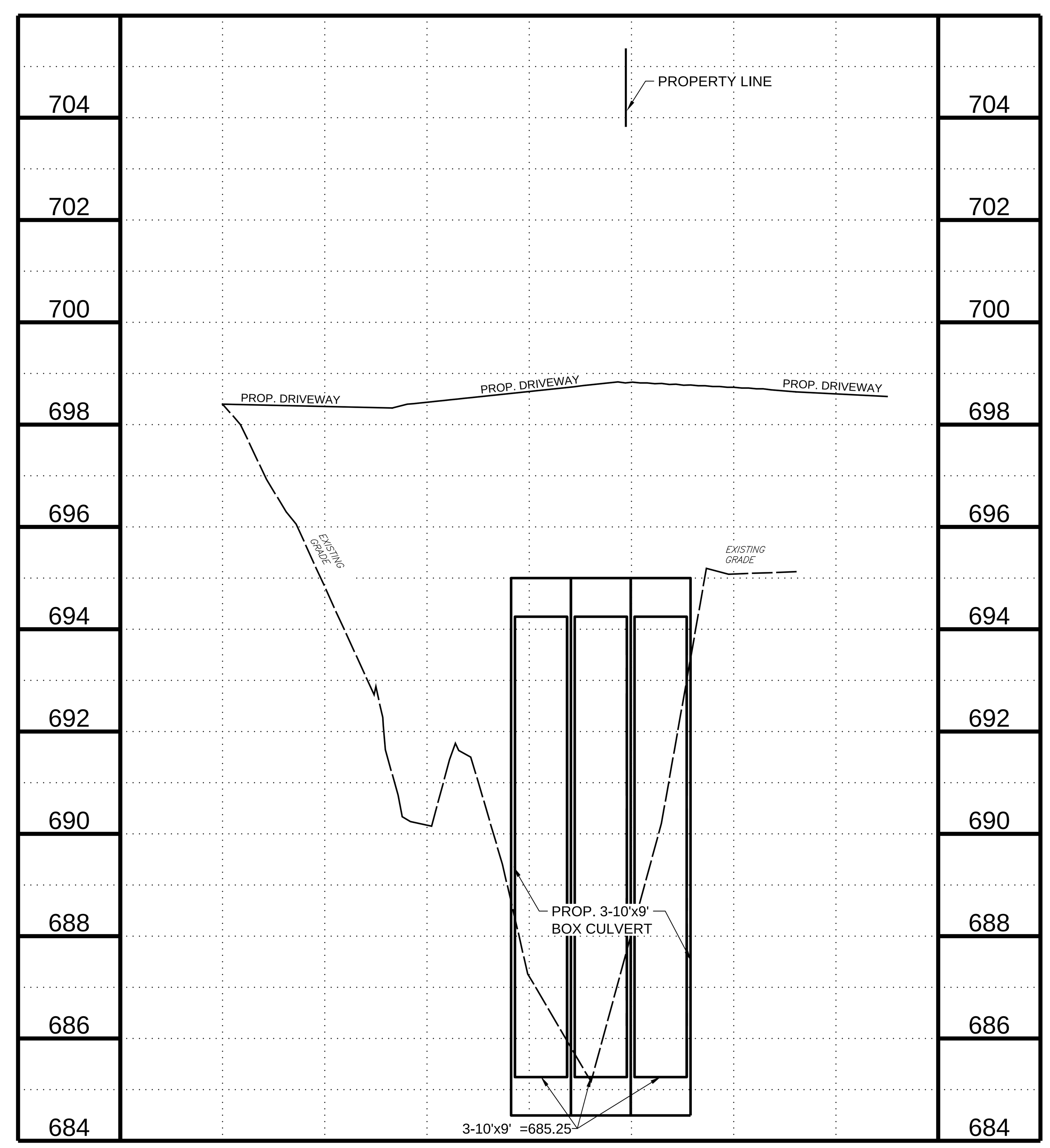
PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\I Pond Sections.dwg Last Plotted: Thu Apr 13, 2023 - 5:00pm By: asalazar









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ATTENTION

ALL EXISTING UTILITIES ARE REPRESENTED TO THE BEST OF OUR KNOWLEDGE. THE CONTRACTOR MUST FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY IF A CONFLICT ARISES.

REV	DESCRIPTION	DATE

STATE OF TEXAS
DAVID AGUAYO
140527
LICENSED
PROFESSIONAL ENGINEER
4/13/23

CONSULTING ENGINEERS
WARD, GETZ & ASSOCIATES, PLLC
TEXAS REGISTERED ENGINEERING FIRM F-9756
2500 Tanglewilde, Suite 120
Houston, Texas 77063
713.789.1900

GEORGETOWN KEYSTONE

STORM SEWER & DRIVEWAY PLAN & PROFILE

SCALE	DESIGN	DRAWN
HORIZ: 1"=20' VERT: 1"=2'	DA	MM/CR

SHEET
I.7

PROJECT No. 00486-009

Drawing: Z:\00486 (Stewart Builders)\009 Georgetown Keystone\CAD\Site Development Permit\I.7 Storm Sewer & Driveway P&P.dwg Last Plotted: Thu Apr 13, 2023 - 5:03pm By: asalazar

ATTACHMENT G

Inspection, Maintenance, Repair, And Retrofit Plan

WGA

CONSULTING ENGINEERS

Attachment G

Inspection, Maintenance, Repair, And Retrofit Plan

Dry Creek
35 County Road 150.
Georgetown, TX 78626

Permanent Pollution Abatement Measures
Maintenance Schedule and Maintenance Procedures

This document has been prepared to provide a description and schedule for the performance of maintenance of permanent pollution abatement measures for Dry Creek. Maintenance measures to be performed will be dependent on what permanent pollution abatement measures are incorporated into the project. The project specific water pollution abatement plan should be reviewed to determine what permanent pollution abatement measures are incorporated into a project.

Where a project is occupied by the owner, the owner may provide for maintenance with his own skilled forces or contract for recommended maintenance of Permanent Best Management Practices. Where a project is occupied or leased by a tenant, the owner shall require tenants to contract for such maintenance services either through a least agreement, property owners' association covenants, or other binding document.

Vegetative Filter Strips

Once a vegetated area is well established, little additional maintenance is generally necessary. The key to establishing a viable vegetated feature is the care and maintenance it receives in the first few months after it is planted. Once established, all vegetated BMPs require some basic maintenance to ensure the health of the plants including:

Pest Management. An Integrated Pest Management (IPM) Plan should be developed for vegetated areas. This plan should specify how problem insects and weeds will be controlled with minimal or no use of insecticides and herbicides.

Seasonal Mowing and Lawn Care. If the filter strip is made up of turf grass, it should be mowed as needed to limit vegetation height to 18 inches, using a mulching mower (or removal of clippings). If native grasses are used, the filter may require less frequent mowing, but a minimum of twice annually. Grass clippings and brush debris should not be deposited on vegetated filter strip areas. Regular mowing should also include weed control practices; however, herbicide use should be kept to a minimum (Urbonas et al., 1992). Healthy grass can be maintained without using fertilizers because runoff usually contains sufficient nutrients. Irrigation of the site can help assure a dense and healthy vegetative cover.

Inspection. Inspect filter strips at least twice annually for erosion or damage to vegetation; however, additional inspection after periods of heavy runoff is most desirable. The strip should be checked for uniformity of grass cover, debris and litter, and areas of sediment accumulation. More frequent inspections of the grass cover during the first few years after establishment will help to determine if any problems are developing, and to plan for long-term restorative maintenance needs. Bare spots and areas of erosion identified during semi-annual inspections must be replanted and 3-91 restored to meet specifications. Construction of a level spreader device may be necessary to reestablish shallow overland flow.

Debris and Litter Removal. Trash tends to accumulate in vegetated areas, particularly along highways. Any filter strip structures (i.e. level spreaders) should be kept free of obstructions to reduce floatable being flushed downstream, and for aesthetic reasons. The need for this practice is determined through periodic inspection, but should be performed no less than 4 times per year.

Sediment Removal. Sediment removal is not normally required in filter strips, since the vegetation normally grows through it and binds it to the soil. However, sediment may accumulate along the upstream boundary of the strip preventing uniform overland flow. Excess sediment should be removed by hand or with flat-bottomed shovels.

Grass Reseeding and Mulching. A healthy dense grass should be maintained on the filter strip. If areas are eroded, they should be filled, compacted, and reseeded so that the final grade is level. Grass damaged during the sediment removal process should be promptly replaced using the same seed mix used during filter strip establishment. If possible, flow should be diverted from the damaged areas until the grass is firmly established. Bare spots and areas of erosion identified during semi-annual inspections must be replanted and restored to meet specifications. Corrective maintenance, such as weeding or replanting should be done more frequently in the first two to three years after installation to ensure stabilization. Dense vegetation may require irrigation immediately after planting, and during particularly dry periods, particularly as the vegetation is initially established.

Extended Detention Basins

Extended detention basins have moderate to high maintenance requirements, depending on the extent to which future maintenance needs are anticipated during the design stage. Responsibilities for both routine and nonroutine maintenance tasks need to be clearly understood and enforced. If regular maintenance and inspections are not undertaken, the basin will not achieve its intended purposes.

There are many factors that may affect the basin's operation and that should be periodically checked. These factors can include mowing, control of pond vegetation, removal of accumulated bottom sediments, removal of debris from all inflow and outflow structures, unclogging of orifice perforations, and the upkeep of all physical structures that are within the detention pond area. One should conduct periodic inspections and after each significant storm. Remove floatables and correct erosion problems in the pond slopes and bottom. Pay particular attention to the outlet control perforations for signs of clogging. If the orifices are clogged, remove sediment and other debris. The generic aspects that must be considered in the maintenance plan for a detention facility are as follows:

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 times. In particular, the extended detention control device should be regularly inspected for evidence of clogging, or

conversely, for too rapid a release. If the design drawdown times are exceeded by more than 24 hours,
then repairs should be scheduled immediately. The upper stage pilot channel, if any, and its flow path to the lower stage should be checked for erosion problems. During each inspection, erosion areas inside and downstream of the BMP should be identified and repaired or revegetated immediately. Mowing. The upper stage, side slopes, embankment, and emergency spillway of an extended 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 extended 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 pond 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. Similarly, the channel connecting an upper stage with a lower stage may periodically need to be replaced or repaired.

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 (not desired in a extended detention basin) or soggy conditions within the lower stage of the basin 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).

Sediment Removal. When properly designed, dry extended detention basins will accumulate quantities of sediment over time. Sediment accumulation is a serious maintenance concern in extended detention dry ponds for several reasons. First, the sediment gradually reduces available stormwater management storage capacity within the basin. Second, unlike wet extended detention basins (which have a permanent pool to conceal deposited sediments), sediment accumulation can make dry extended detention basins very unsightly. Third, and perhaps most importantly, sediment tends to accumulate around the control device. Sediment deposition increases the risk that the orifice will become clogged, and gradually reduces storage capacity reserved for pollutant removal. Sediment can also 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 lower stage when sediment buildup fills 20% of the volume of the basin or at least every 10 years.

Documentation Procedures

1 A copy of the inspection report along with referenced maintenance task/ procedure descriptions are located on the following pages.
2. The inspection report must be maintained by responsible party and shall be readily available upon request.
3. The inspection report is incorporated as part of the WPAP. The responsible party is responsible for completing and updating the form in compliance with TCEQ rules.

GEORGETOWN TEXAS EST. 1848

CITY OF GEORGETOWN
PLANNING DEPARTMENT

Edwards Aquifer Recharge Zone Water Quality Acknowledgement form

A signed and notarized copy of this form is required to be submitted with a required development application [Plat (Preliminary, Final, Minor, Amending and Replat); Subdivision Construction Plan, Site Development Plan; or Stormwater Permit] for all Regulated Activity for property located over the Edwards Aquifer Recharge Zone ("EARZ") within the City Limits and its Extraterritorial Jurisdiction ("ETJ"). **No application will be accepted without completing this form.**

PROPERTY INFORMATION

Property Address: 35 CR 150, Georgetown, TX 78628

Legal Description: Buisness Personal Property at 35 CR 150; John Berry Survey Abst. 51

City/ETJ: City of Georgetown Acres: 63.524

PROJECT INFORMATION

Name of Project: Georgetown Industrial Phase 1

Application Type: Commercial

Proposed Use: Industrial Warehouse No. of Lots: ______

PROPERTY OWNER/REPRESENTATIVE INFORMATION

Business Name: WGA Engineers, Inc

Point of Contact: David Aguayo, P.E.

Address: 2500 Tanglewilde Street Houston, TX 77063

Contact Information: Phone: 713-789-1900 Email: daguayo@wga-llp.com

PROPERTY OWNER'S CONSENT

I, MARK STEWART of Stewart Family Interests LTD, swear and affirm that I am the owner of property at 35 CO RD 150, Georgetown, TX, as shown in the records of Williamson County, Texas, which is the subject of this form.

I, MARK STEWART, the owner of the property subject to this form, authorize WGA Engineers INC to submit this acknowledgement form and serve as my representative for this request.

Property Owner's Signature: Mark A Stewart Date: 4/20/2023

AFFIDAVIT

My name is Mark A. Stewart, and I am the owner or authorized representative of the property that is subject of this request to the City of Georgetown, Texas. I hereby certify under penalty of perjury the following:

1. The Regulated Activity, as proposed, is in compliance with the City's Water Quality Best Management Practices (UDC Section 11.07.004); and

☐ 2. The subject property has an Occupied Site, or is located within 984 feet of an Occupied Site; and
- ☐ The Regulated Activity, as submitted, complies with the Federal standards in UDC Appendix A; or
- ☐ A variance request has been submitted to the Williamson County Conservation Foundation Adaptive Management Working Group on the Federal standards outlined in UDC Appendix A; or
- ☐ The owner of property will coordinate directly with the USFWS; or

☒ 3. The subject property is located more than 984 feet from an Occupied Site, and the Regulated Activity, as submitted, complies with UDC Section 11.07. In addition,
- ☒ A Geologic Assessment was completed in accordance with UDC Section 11.07 and is made part of this development application (attached); or
- The project, as proposed:
  - ☒ Does not meet the definition of a Regulated Activity; or
  - ☐ Meets <u>all</u> of the criteria below:
    - Proposed development is Single-Family Residential or Two-Family Residential; and
    - Subject property is located on an individual lot that is less than 5 acres; and
    - Subdivision (to include replat) is 5 lots or less, and no more than 5 gross acres; and
    - Subject property is located within a drainage area that is less than 64 acres.
      NOTE: A letter signed by an Engineer certifying the drainage area and identifying any springs on the subject property must be submitted with the required application.

  Thus no Geologic Assessment is required with this development application.

Signed this 20th day of April, 2023

Signature: Mark A Stewart

STATE OF TEXAS {

KNOW ALL MEN BY THESE PRESENTS

COUNTY OF ~~WILLIAMSON~~ Harris {

Sworn and subscribed before me by Mark A. Stewart on this 20th day of April in the year 2023, to certify which witness my hand and seal of office.

Amber Ramirez

Notary Public in and for the State of Texas

My Commission expires on: 12/19/2026

AMBER RAMIREZ NOTARY PUBLIC STATE OF TEXAS EXPIRES DECEMBER 19, 2026 NOTARY ID: 12069922

INSPECTION AND MAINTENANCE SCHEDULE FOR PERMANENT POLLUTION ABATEMENT MEASURES
DRY CREEK,
35 COUNTY ROAD 150
GEORGETOWN, TX 78626

Recommended Frequency	Tasks to be performed																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
After Significant Rainfall																						
Biannually																						

*At least one biannual inspection must occur during or immediately after a rainfall event.
✓ Indicates maintenance procedure that applies to this specific site

See description of maintenance task to be performed on the following pages. Frequency of maintenance tasks may vary depending on amount of rainfall and other weather-related conditions.
A written record should be kept of inspection reports and maintenance performed

	Vegetative Filter Strips Tasks			
1	Pest Management	Yes	No	N/A
2	Seasonal Moving & Lawn Care	Yes	No	N/A
3	Inspection	Yes	No	N/A
4	Debris and Litter Removal	Yes	No	N/A
5	Sediment Removal	Yes	No	N/A
6	Grass Reseeding and Mulching	Yes	No	N/A

	Extended Detention Tasks			
7	Inspection	Yes	No	N/A
8	Mowing	Yes	No	N/A
9	Debris and Litter Removal	Yes	No	N/A
10	Erosion Control	Yes	No	N/A
11	Structural Repairs and Replacement	Yes	No	N/A
12	Nuisance Control	Yes	No	N/A
13	Sediment Removal	Yes	No	N/A

	SmartPOND Tasks			
14	Grease	Yes	No	N/A
15	Flanged Bolts	Yes	No	N/A
16	Packing Band	Yes	No	N/A
17	Digging Around Valve	Yes	No	N/A
18	Solar Panel	Yes	No	N/A
19	Cable Slack	Yes	No	N/A
20	Cable Connections	Yes	No	N/A
21	Battery	Yes	No	N/A
22	Camera	Yes	No	N/A

By my signature below, I certify that all items have been inspected and are acceptable & in compliance with TCEQBMP regulations or have been recommended for repair as noted.

Inspector's Name

Inspector's Signature

Name of owner/Operator (firm)

Date

MAINTENANCE PROCEDURES FOR

PERMANENT POLLUTION ABATEMENT MEASURES

1 Vegetative Filter Strips. Vegetation height for native grasses shall be limited to no more than 18-inches. When vegetation exceeds that height, the filter strip shall be cut to a height of approximately 4 inches. Turf grass shall be limited to a height of 4inches with regular maintenance that utilizes a mulching mower. Trash and debris shall be removed from filter strip prior to cutting. Check filter strip for signs of concentrated flow and erosion. Areas of filter strip showing signs of erosion shall be repaired by scarifying the eroded area, reshaping, regarding and placement of block sod in a checkerboard pattern over the affected area. A written record should be kept of inspection results and maintenance performed

SPECIFICATION
AUTOMATED ROTARY BATCH DETENTION SYSTEM (ARBDS)
Components, Applications, and Function Specification

1. Introduction

The following specifications describe the components, general functions, and applications of an Automated Rotary Batch Detention System (ARBDS). The system functions as an electronically controlled stormwater management device, providing precision management capabilities and real-time in-field data. Using sensors, solar power, an electronic actuator, camera, and an internet-based control interface, the ARBDS connects to a drain pipe to enable managers to precisely control surface water retention and detention remotely. The 24" rotary valve allows precise water level management with 1" resolution and only releases water from the surface. The control panel can be configured for full automation, real-time remote control, or scheduling of future events. Detention times, dewatering rates, dewatering depths and more can all be managed with the ARBDS. Constructed of ¼" powder-coated steel, the ARBDS is built to last in harsh environments.

2. ARBDS Applications in Stormwater Management

The ARBDS is a device for active Stormwater management. As opposed to passive devices like a floating skimmer, active water management dramatically increases the efficiency and effectiveness of a detention pond. Where a passive skimmer or weir allows water to leave immediately upon collection, the ARBDS can detain newly caught Stormwater and allow it to settle for a period of 12 hours before automatically dewatering. By releasing water only from the surface, settling pond characteristics can be maintained during dewatering. The Automated Rotary Batch Detention System is comprised of the following components:

3. Components

3.1 Hardware and Configuration

The standard ARBDS features a 24" square-top rotary valve 30" tall. The back plate of the ARBDS where the drain pipe connects is a flat 30-inch square sheet of steel which can be cut to fit any size pipe up to 24" in diameter. Larger pipes can be retrofitted to this back plate. Pipes larger than 24" will result in flow capacity being restricted by the ARBDS's valve. Above the 30" valve mounts the pedestal. On top of the pedestal is mounted the control box. The pedestal contains a remote grease manifold with eight standard terminals connecting to the ARBDS's rotary flanges. Inside the steel hood of the control box is a battery, motor, cable winch, and solar charge controller. In front of the hood is the weatherproof electronics box where all electronic boards and connections are housed. Above the electronics box is the 30-watt solar panel.

The standard ARBDS measures a 30” maximum valve height (meaning 30” maximum water depth), with the pedestal extending 33” above the top of the maximum valve height. The top of the solar panel sits 24” above the top of the pedestal, giving the standard ARBDS a total height of 87”.

The maximum valve height of the ARBDS can be increased up to a total height of 70” tall by installing 4” or 12” spacers. Spacers are stackable and bolt on to the square top of the valve. It is recommended that the joints between spacers and the valve are sealed with silicone after installation. With the addition of spacers where valve heights exceed 42”, pedestal spacers must be added in order to maintain a control box height at least 20” above the maximum valve height. When pedestal spacers are installed the user must also add cable extenders.

The swivel component of the ARBDS consists of five parts: the tab, two flanges, packing material, and a packing material clamp. A series of bolts connect the two flanges which pull against the internal tab. This holds the valve of the ARBDS to the frame and creates a rotary union between the two. ½” square packing material fits between the two flanges and against the 24” drum to provide lubrication and a water tight seal. This packing material is held in place with a steel band which clamps around the outside of the material and is tightened with a bolt. Eight grease fittings encircle the inner and outer flanges and connect with grease tubes to remote grease terminals on the pedestal.

The 3/16” galvanized cable is wound through the 2-direction winch spool and connected to a tab at the bottom of the ARBDS’s valve by eye bolts. The cable is secured with two cable clamps per end.

The installer should always allow at least 12 inches of space between the maximum valve height, or fully closed position, and the top of the levee or embankment. Similarly, the control box should be at least 6” above the top of the levee or embankment in case of extreme flood or storm surge events.

3.2 Electronics and Software Specifications

- **Main board**

  The main board of the ARBDS’s electronics box is the large green board in the center. It serves as the main connection terminal for all sensors.

- **Motor Controller Board**
  The motor controller board of the ARBDS regulates the connection between the battery and the motor, and receives inputs from the main board to control motor direction. It also powers the main board.

On the motor controller board are two small white buttons labeled “A” and “B”. These are intermittent switches which bypass all other controls to directly activate the motor. The “A” button moves the ARBDS’s valve in the closing direction and the “B” button moves the valve in the opening direction. It is important that the user not over-rotate the ARBDS’s valve when using the intermittent switches as this can damage the cable drive or valve.

- **Motor**

The ARBDS’s motor operates on 12-volts and has two wires connecting to the motor controller board. It is mounted on a bracket and connects with the square output shaft to the cable drive winch with a 5/8” socket.

- **Battery**

The ARBDS is powered by a 12-volt, 65 amp/hour deep cycle battery. two terminals at the top connect the power wires to the motor controller board and the solar charge controller to the battery.

- **Solar Panel**

The solar panel of the ARBDS is 12-volts with 30 watt charging capability. It connects to a solar charge controller which regulates the voltage and current before connecting with two wires to the positive and negative battery terminals.

- **Cell Data Modem**

The cell data modem is the small green board above the main board inside the electronics box. It handles all cellular communication and data transfer to the Autoflow app. The cell data board plugs into the main board and only has one wire connecting to the exterior antenna. A SIM card plugs into the left side of the board.

- **Antenna**

The antenna connects to the cellular data board inside the electronics box and magnetically mounts between the ARBDS’s hood and electronics box bracket. If the ARBDS is installed in an area with low cellular reception, the user may have to mount the antenna higher above the unit, using the extra cable coiled inside the electronics box.

- **Camera**

  The ARBDS's camera mounts beneath the control box and wires directly to the main board inside the electronics box. The view angle is 90° and the enclosure is fully weatherproof. The ARBDS is pre-programmed to take two photos—one in the morning and one in the afternoon—every day and upload them to its page on the Autoflow app. This will ensure that the user is always looking at a current photo when logging in. The photo can also be updated on demand through the app.

- **Sensors**
  - Water level sensor

    The water level sensor is a pressure sensor capable of staying submersed in water indefinitely. It mounts on the side of the ARBDS's lower frame.

  - Inclinometer

    The ARBDS's valve position sensor is an inclinometer. This sensor measures the tilt of the valve and translates that angle to valve height.

  - Temperature Sensor

    The primary function of the temperature sensor is to provide warnings to the manager through the Autoflow app in the event that ice may have formed in the detention pond and the ARBDS valve is attempting to move. It also relays current and historical on-site temperature data to the Autoflow app.

4. In Case of Failure

There are several ways to bypass the ARBDS's normal electronic functions to control the valve position in case of failure.

4.1 Pre-determined fail positions

In the configuration page of the Autoflow app (see Autoflow App, section ii), a user can pre-determine the "fail position" for each ARBDS based on their needs for that particular site. The fail position refers to where the ARBDS's valve should move immediately prior to a critically low battery. The options are:

- Fail open – move the valve to 0" prior to battery failure
- Fail closed – move the valve to the full-vertical position prior to battery failure

- Fail in place – allow the valve to stay in its current position prior to battery failure

4.2 Intermittent switches

Inside the electronics box on the black motor controller board there are two small white buttons labeled "A" and "B". These buttons bypass all other systems to directly control the motor. The "A" button will move the ARBDS's valve in the closing direction and the "B" button will move it in the opening direction. It is important that the user not over-rotate the valve when using the intermittent switches as rotating the valve too far can damage the cable drive or the valve of the ARBDS.

4.3 Removal of motor and manual direct winch control

In case of a total electronic failure or motor failure, the motor and motor bracket can be uninstalled together by removing the two bolts at the bottom of the motor bracket. With the motor and motor bracket removed, the 5/8" output shaft on the cable drive winch can be directly controlled with an electric hand drill, socket wrench, or any other tool that can grip the output shaft.

4.4 Disconnection of the cable and direct valve control

In case of total electronic failure and cable drive winch failure, the cable can be disconnected from the bottom of the ARBDS's valve and the valve can be rotated using a lever. Insert the lever into the inside of the valve and lever against the inside of the open square top in order to rotate the valve.

5. Autoflow App

The Autoflow app is a simple and user-friendly interface that makes monitoring and controlling the ARBDS fast and easy. There are options for real-time direct control as well as fully automated operating modes.

To begin, a user must log in with a username and password. After logging in, the user will be directed to the home page where all of their ARBDS units will be displayed. On this home page the user may select which ARBDS they want to view or control by clicking on the button displaying the unit's name. The following sections will break down the different parts of the app and explain how each function works.

5.1 Unit Display Page

After logging in and selecting a specific ARBDS, the user will be taken to that unit's Unit Display Page. This page displays current water level, valve position, and target valve position (if a move is being executed) for that unit as well as a current photo with a time stamp. The photo is updated every morning and every afternoon automatically, but by clicking the "Update Photo" button, the user may update the photo on demand at any time. By clicking the Autoflow logo in the top left of the screen the user will be taken back to the home page where they can select between all of their ARBDS units. The "Send New Command" button and "Data" buttons are discussed in detail in the sections below.

5.2 Configuration Page

The first step after installing a new ARBDS is to log in to the Autoflow app and access that unit's configuration page. To access this page, open that ARBDS's unit display page, click the "Data" button, and at the bottom of the first section labeled "Latest Readings" select the "Edit Device Configuration" button. In this section the user may enter a custom name for that unit, enter a water level calibration, configure the unit's height, select direct real-time control or Auto-Dewatering mode, and select the fail position.

The Water Level Calibration section is a useful feature for fine-tuning the water level reading. If the user notices that the water level and valve positions are not reading equally, or, in other words, the water level is even with the lip of the valve but they are displaying different numbers, the user can input a water level offset in the water level calibration box. This will offset the water level reading. For example, if the user notices that the water level is consistently reading 2" lower than the valve level, the user may input the number "2" in the water level calibration box and that will create a 2" offset. This will make the water level and valve levels display equivalent levels when the water is even with the lip of the valve. Likewise, if the water level is consistently reading 2" *higher* than the valve level, the user may input a "-2" in the water level calibration box to offset the water level reading two inches *lower*.

The Riser Configuration box is a very important setting. This box tells the ARBDS how tall it is, thus affecting its rotation arc and valve movements. Standard ARBDSs are 30" tall, but with the addition of Autoflow's 4" and 12" spacers, this height can be increased up to a maximum of 70". It is critical that any time the height of an ARBDS is changed, the user updates the height of that riser on the configuration page. This will ensure that the ARBDS's valve rotates in accordance with its total height.

Below the Riser Configuration box is the Control Method option. Here, the user may choose between "Real-Time Control" or "Auto-Dewater Mode". Real-time control enables the user to send commands to the ARBDS using the command page in the Autoflow app (explained in part ii of the Autoflow App section). Auto-dewater mode will enable the ARBDS to automatically control the holding and release of water without any input from the user.

If the user selects auto-dewater mode, they must also select a "Target Dewatering Depth" input. This input tells the ARBDS how low to drain the water before returning the valve to the fully closed, or vertical, position. Users may select any number down to 0". Auto-dewater mode functions as follows:

Assuming that the ARBDS is in the full closed position and the water level is at its target dewatering depth, the device will be standing by for a water level increase. When the next rain event occurs, the water level sensor on the ARBDS will recognize a water level increase. The device will stand by until the water level increase plateaus for a period of two hours. At that point the ARBDS will start a 12-hour detention timer to allow settling to occur. Once the 12-hour detention period has elapsed, the ARBDS will begin a drawdown from the surface—maintaining a valve position four-inches below the surface water level, continuously, until the Target Dewatering Depth is reached. Once dewatering is completed, the ARBDS's valve will return to the full closed position and stand by for the next water collection event.

If the ARBDS is configured in auto-dewater mode, it is also recommended that a "Fail Position" is selected. The fail position tells the ARBDS where to move the valve immediately prior to a low battery failure. There are three options here:

- Fail open – move the valve to 0" prior to battery failure
- Fail closed – move the valve to the full-vertical position prior to battery failure
- Fail in place – allow the valve to stay in its current position prior to battery failure

Any time a setting is updated in the configuration page the user must press the "Update Information" button to save that new setting.

5.3 Command Page

To directly control to the ARBDS through the Autoflow app, the user should already be looking at that unit's display page. From there, select the "Send Command" button. The command page requires three steps to complete a new command for the ARBDS:

Step 1. Select new target valve position

This functions as a drop-down menu where the user may select what height (in inches) the ARBDS's valve will move to.

Step 2. Choose Rate

This determines the rate at which the ARBDS's valve will move from its current position to the new target valve position selected in step 1. There are four options:

1. Standard – moves the valve ½" per hour
2. Drawdown—moves the valve 1" per 3-day period
3. Nonstop—moves immediately and all at once

4. Custom—user may enter number of hours for move to cover (must be entered as a whole number). This number will determine the rate at which the valve moves from its current position to the new desired valve position.

Step 3. When to Start

There are two options for this step:

1. Now – begin the move determined in steps one and two immediately
2. Date—user may select future date and time for move determined in steps one and two to begin

5.4 Data Page

By clicking on the Data button on the Unit Display Page, the user will be directed to that unit's data page. The data page is constantly refreshing itself with current in-field conditions and updating the information in the app. There is a lot of information available here.

The top section of the data page, "Latest Readings" displays current field conditions, much like the top of the unit display page. Current valve level, water level, target level, temperature, and battery voltage can be seen here. If the ARBDS is in the process of a move, the "rate" of the move will be displayed in this section as well. Keep in mind that the ARBDS operates on a 12-volt battery, so any battery voltage reading below 11.5 volts is considered a critically low battery while voltages up to 13.5 are considered fully charged. The "Edit Device Configuration" button is located in this section as well. This button will be addressed below in section ii.

Below the Latest Readings section is the "Pending Commands" section. This box will display the scheduled start time, new target valve level, and valve movement rate of any user-scheduled future commands. If the user has not scheduled any future commands, this section will be empty.

Below the Pending Commands section is a small box that allows the user to manipulate the timeframe displayed in the various charts and graphs below. The standard timeframe for the charts and graphs displayed on the data page is 14 days, but by clicking on this button the user may change this timeframe to 3, 7, 14, or 30 days. It is also possible to select a start and end date if the user would like to see a specific period of time displayed in the charts and graphs. If the timeframe is changed, the user must press the "Update Graph" button to see the updated data.

Below this box are the various charts and graphs. The first graph displays historical valve positions, water levels, and battery conditions from the selected time period. Below that graph are the same data lines broken into individual graphs for each respective category, including temperatures.

Below the graphs is the “Recent Commands” chart which displays details of the most recent commands received by the ARBDS including when the command was received, the target valve level of that command, and the valve movement rate.

The next section is the “Recent Logs” chart displaying the most recent data updates from the ARBDS. This section displays the time of the data log, as well as valve position, temperature, water level, and battery voltage at that time.

The final section at the bottom of the data page is “Device Information”. This information is used in identifying that specific ARBDS’s serial number, ICCID number, and current height configuration. This information will be needed in order to address any troubleshooting or customer service questions.

At the bottom of the data page is the “Contact Us” information for any customer service questions.

5.5 **Warnings**

The Autoflow app will display warnings to the manager if any of the following circumstances occur:

5.6 **Ice**

If the temperature sensor of the ARBDS detects temperatures below freezing within the past 24 hours, an ice warning will display in the Autoflow app. The manager should refer to the displayed photo on that unit’s display page before sending any commands to move the valve.

5.7 Leak

If the valve position remains constant and a water level decrease of more than 2” in 24 hours occurs, the ARBDS will display a warning in the Autoflow app signaling that there may be a leak.

5.8 Blockage

If the water level remains 2” higher than the valve position for more than 24 hours, or if the valve attempts to drain the water and no water level decrease is recorded, the ARBDS will display a warning in the Autoflow app signaling that a drain blockage may have occurred.

6. Spare Parts List

6.1 Spacers

The standard ARBDS is 30” tall, meaning a maximum water depth of 30” can be detained. To increase this depth, 4” and 12” spacers are available which bolt to the top of the valve. Spacers are stackable and easy to install. It is recommended that installers use silicone to help seal the joints between spacers and the ARBDS valve to ensure they stay watertight.

6.2 Trash Guard

The trash guard mounts on top of the ARBDS's valve or on top of a spacer to protect against large debris clogging the ARBDS's valve or drain pipe.   The Trash guard mounts with four bolts.

6.3 Pedestal Spacer and Cable Extensions

If more than 20" of spacers are added to the ARBDS, it is recommended that the installer add a pedestal spacer to raise the control box higher above the maximum riser height. This will help ensure that the control box will not become submerged during extreme flood or storm surge events. If pedestal spacers are installed, cable extensions will be needed as well.

7. Maintenance

7.1 Grease

The ARBDS features a remote grease terminal on the pedestal. There are eight terminals that connect with grease tubes to the inner and outer flanges of the rotary valve. Autoflow recommends the ARBDS be greased at least twice per year. It is also recommended that a thick, mildly heat-resistant grease be used to avoid grease melting through lines during the summer months.

To grease the ARBDS's flanges, use a standard grease gun to pump grease through the fittings. By either logging into the Autoflow app and using the command page (see Autoflow App, section ii), or by pressing the intermittent switches (see In Case of Failure, section 2), cycle the ARBDS from the full closed position to the full open position. While the ARBDS's valve rotates, alternate greasing between all eight grease fittings. When the ARBDS completes the movement, cycle it again from the full open position to the full closed position and repeat the greasing process.

Besides the eight grease terminals on the pedestal, the only other location where grease is needed is the worm gear on the cable drive winch. To access the winch, loosen the four jam screws on the control box hood. It is not necessary to completely remove the jam screws. With the screws loose, remove the hood. Apply grease to the vertically oriented worm gear.

7.1 Flange Bolts

There are 10 bolts connecting the two flanges which encircle the ARBDS's 24" swivel. These bolts should be evenly tightened, allowing for a 1/16" gap between the flanges and the stainless steel packing band inside. Do not over-tighten the flange bolts, as this will pinch the steel packing band and cause the swivel to bind.

7.2 Packing Band

The stainless steel packing band between the two flanges of the ARBDS swivel tightens with an Allen-head bolt to secure the packing material beneath in place. This band should be snug at all times but not over-tightened. Over time, the rotation of the ARBDS's valve will wear on the packing material, so the packing band will need to be re-tightened on occasion to ensure that the material is well seated against the swivel surface.

7.3 Digging around Valve

Depending on the installation location of the ARBDS it is possible that silt, sediment, and debris can build up around the unit. An annual inspection of the unit is necessary to ensure that excess debris and sediment has not limited the rotation arc of the valve. If the ARBDS's valve cannot rotate to the 0" or fully opened level, it will not be able to fully drain the impoundment area.

7.4 Solar Panel

The solar panel is commonly utilized by birds and insects. It is important to keep the surface clean of bird litter, insect nests and debris in order to maintain optimal performance.

7.5 Cable Slack

The drive cable of the ARBDS routes from the cable drive winch inside the control box to a tab at the bottom at the ARBDS's valve. To test cable slack, move the valve of the ARBDS in either the closing or opening direction using the intermittent switches (see 'In Case of Failure', section 2). Moving the valve will cause one side of the cable to tighten and the other side to loosen. The loose side should always have five inches of perpendicular slack. For slight adjustments, tighten or loosen the nut of the eye bolt on the loose cable side as needed. For major adjustments, loosen the cable clamps at the bottom of the ARBDS's valve and adjust slack through the eye bolt. With the proper five inches of slack adjusted into the loose side cable, retighten the cable clamps. Clamps must be secured very tightly to avoid cable slippage.

7.6 Cable Connections

The drive cable of the ARBDS is connected at the bottom of the ARBDS's valve with eye bolts and cable clamps. Check annually for corrosion or broken parts. Make sure the cable clamps are secured tightly and the eye bolts are intact. Replace as needed.

7.7 Battery

Over time, battery terminals may corrode. Check annually for corrosion and clean as needed.

7.8 Camera

Check the lens glass annually for insect nests or debris and clean as needed. One nut connects the camera frame to the control box and two small set screws secure the camera to the camera frame. These can be loosened in order to adjust the camera's aim and then retightened to secure it in place.

7.9 Important Safety Information and Warnings

- Always keep hands clear of the ARBDS's valve, swivel, and cable drive system when unit is in operation.
- Turn the power switch off when doing any electrical work
- Do not enter the water when the ARBDS is actively draining water
- Do not stand inside or on top of the ARBDS's valve
- Always wear gloves when doing any work on the cable drive system

7.10 Storage

The ARBDS is shipped in a near-fully assembled configuration and should be stored likewise. The systems are transported and stored on pallets and must remain secured via straps or steel bands to said pallet at all times. The battery and solar panel are not installed at times of transport or storage. Solar panels may be stored inside the ARBDS's valve. Batteries must not be stored on concrete surfaces and must be kept with terminals upright.

8. Installation

The ARBDS can be installed in a near-completely assembled configuration. Only the battery and solar panel should be removed during the installation process. There are several ways to install the ARBDS but these key points must be met to ensure proper function:

8.1 Leveling

The ARBDS must be level when welded to the drain pipe, especially perpendicular to the levee or embankment.

8.2 Pipe Placement

To attach the drain pipe to the ARBDS, first position the back plate against the drain pipe in the position it will be installed. When positioning the ARBDS against the pipe, make sure that the bottom of the drain pipe aligns with the bottom of the ARBDS's 24" drum. Use soapstone to trace the pipe against the back plate so that the hole may be cut out with a torch. With the hole cut out, the ARBDS may be realigned with the pipe and welded.

8.3 Height Configuration

Depending on the site, the ARBDS may require spacers to achieve the desired detention depth. Always allow at least 12” of space between the maximum valve height and levee height. The control box of the ARBDS should never be configured less than 6” above the levee or embankment height.

8.4 Structure Support

If the ARBDS is being installed on a pipe measuring less than 16” in diameter, permanent structural support such as a concrete pad or steel frame must be installed beneath the base of the device. Pipes larger than 16” in diameter can support the weight of the ARBDS and therefore a permanent support structure beneath the device is optional. The standard fully assembled ARBDS weights 600 pounds. This does not include spacers or trash guards.

9. PRODUCTS

A. **Acceptable Automated Rotary Batch Detention Systems**
“smartBatch” Automated Batch Detention System

B. **Acceptable System Supplier**
Convergent Water Technologies, Inc.
(800) 711-5428
www.convergentwater.com

C. **Authorized Value Added Reseller**

10. Quality Assurance and Performance Specifications

The quality of all system components and all other appurtenances and their assembly process shall be subject to inspection upon delivery of the system to the work site.

Installation is to be performed only by skilled work people with satisfactory record of performance on earthworks, pipe, welding, chamber, or pond/landfill construction projects of comparable size and quality.

Attachment H

Pilot-Scale Field Testing Plan

Not applicable to this project

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Attachment I

Measures for Minimizing Surface Stream Contamination

Not applicable to this project

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SECTION G

Agent Authorization – Form TCEQ-0599

WGA

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

I Mark Stewart,
Print Name

Owner,
Title - Owner/President/Other

of Stewart Family Interests, LTD,
Corporation/Partnership/Entity Name

have authorized David Aguayo
Print Name of Agent/Engineer

of WGA Consulting Engineers, PLLC
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:

Mark A Stewart
Applicant's Signature

3/9/23
Date

THE STATE OF Texas §

County of Harris §

BEFORE ME, the undersigned authority, on this day personally appeared Mark Stewart 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 9th day of March, 2023.

DEANNA BOULEY
Notary Public, State of Texas
Comm. Expires 06-02-2026
Notary ID 128269773

Deanna Bouley
NOTARY PUBLIC

Deanna Bouley
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 6/2/26

SECTION G

Application Fee – Form TCEQ-0574

WGA

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Application Fee Form

Texas Commission on Environmental Quality
Name of Proposed Regulated Entity: Dry Creek
Regulated Entity Location: Georgetown, TX
Name of Customer: Steward Development & Construction
Contact Person: David Aguayo Phone: 713-789-1900
Customer Reference Number (if issued):CN ______
Regulated Entity Reference Number (if issued):RN ______

Austin Regional Office (3373)

☐ Hays ☐ Travis ☒ Williamson

San Antonio Regional Office (3362)

☐ Bexar ☐ Medina ☐ Uvalde
☐ Comal ☐ Kinney

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

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

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

Site Location (Check All That Apply):

☒ Recharge Zone ☐ Contributing Zone ☐ Transition Zone

Type of Plan	***Size***	***Fee Due***
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	63.888 Acres	$ 8,000.00
Sewage Collection System	L.F.	$
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: 03/02/2023

Application Fee Schedule

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

Water Pollution Abatement Plans and Modifications

Contributing Zone Plans and Modifications

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

Organized Sewage Collection Systems and Modifications

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

Underground and Aboveground Storage Tank System Facility Plans and Modifications

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

Exception Requests

Project	***Fee***
Exception Request	$500

Extension of Time Requests

Project	***Fee***
Extension of Time Request	$150

SECTION G

TCEQ Core Data – Form TCEQ-10400

WGA

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TCEQ Use Only

TCEQ Core Data Form

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

SECTION I: General Information

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

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

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

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

SECTION II: Customer Information

4. General Customer Information | **5. Effective Date for Customer Information Updates** (mm/dd/yyyy)

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

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

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

Steward Builders	Previous Customer

7. TX SOS/CPA Filing Number	**8. TX State Tax ID** (11 digits)	**9. Federal Tax ID** (9 digits)	**10. DUNS Number** *(if applicable)*
800837396	3-20-33248181	76-0362047	n/a

11. Type of Customer: ☐ Corporation ☐ Individual Partnership: ☐ General ☒ Limited

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

12. Number of Employees

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

13. Independently Owned and Operated?

☒ **Yes** ☐ **No**

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

☐ Owner ☐ Operator ☐ Owner & Operator ☒ Other: Authorized Agent - Ward, Getz and Associates, PLLC
☐ Occupational Licensee ☐ Responsible Party ☐ VCP/BSA Applicant

15. Mailing Address:

2500 Tanglewilde St., Suite 120

City	Houston	**State**	TX	**ZIP**	77063	**ZIP + 4**	

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

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

(713) 789-1900		( ) -

SECTION III: Regulated Entity Information

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

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

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

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

Dry Creek

23. Street Address of the Regulated Entity: ***(No PO Boxes)***							
	35 Co Rd 150						
	City	Georgetown	**State**	TX	**ZIP**	78626	**ZIP + 4**
24. County	Williamson						

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

25. Description to Physical Location:	

26. Nearest City	**State**	**Nearest ZIP Code**

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

27. Latitude (N) In Decimal:			**28. Longitude (W) In Decimal:**		
Degrees 30	Minutes 05	Seconds 25.47	Degrees -97	Minutes 38	Seconds 56.35

29. Primary SIC Code (4 digits)	**30. Secondary SIC Code** (4 digits)	**31. Primary NAICS Code** (5 or 6 digits)	**32. Secondary NAICS Code** (5 or 6 digits)
n/a		238110	

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

Business Park

34. Mailing Address:							
	Georgetown Keystone						
	35 Co Rd						
	City	**Georgetown**	**State**	**TX**	**ZIP**	**78626**	**ZIP + 4**
35. E-Mail Address:							

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

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

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

SECTION IV: Preparer Information

40. Name:	David Aguayo	**41. Title:**	Project Manager
42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(713) 789-1900		( ) -	daguayo@wga-llp.com

SECTION V: Authorized Signature

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

Company:	Ward, Getz and Associates, PLLC	**Job Title:**	Project Manager
Name *(In Print)*:	David Aguayo	**Phone:**	(713) 789- **1900**
Signature:	David Aguayo	**Date:**	3/2/2023

SECTION G

Original Approval Letter and Approved Modification Letters

WGA
CONSULTING ENGINEERS

COPY

R-11

Jon Niermann, *Chairman*
Emily Lindley, *Commissioner*
Toby Baker, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

January 23, 2019

Mr. Brad Stewart
Stewart Family Interests, LTD
35 CR 150
Georgetown, TX 78626

Re: Edwards Aquifer, Williamson County

NAME OF PROJECT: Keystone Concrete Placement; Located 35 County Road 150; Georgetown, Texas

TYPE OF PLAN: Request for Modification of an Approved Water Pollution Abatement Plan (WPAP); 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer

Edwards Aquifer Protection Program ID No. 11001349; Regulated Entity No. RN103952677

Dear Mr. Stewart:

The Texas Commission on Environmental Quality (TCEQ) has completed its review of the WPAP Modification for the above-referenced project submitted to the Austin Regional Office by Mr. David Platt, P.E. on behalf of Stewart Family Interests, LTD on November 12, 2018. Final review of the WPAP was completed after additional material was received on January 18, 2019. As presented to the TCEQ, the Temporary and Permanent Best Management Practices (BMPs) were selected and construction plans were prepared by a Texas Licensed Professional Engineer to be in general compliance with the requirements of 30 TAC Chapter 213. These planning materials were sealed, signed and dated by a Texas Licensed Professional Engineer. Therefore, based on the engineer's concurrence of compliance, the planning materials for construction of the proposed project and pollution abatement measures are hereby approved subject to applicable state rules and the conditions in this letter. The applicant or a person affected may file with the chief clerk a motion for reconsideration of the executive director's final action on this Edwards Aquifer Protection Plan. A motion for reconsideration must be filed no later than 23 days after the date of this approval letter. *This approval expires two (2) years from the date of this letter unless, prior to the expiration date, more than 10 percent of the construction has commenced on the project or an extension of time has been requested.*

BACKGROUND

EAPP 11-03090504 was approved on November 18, 2003 with 1.30 acres of impervious cover to be treated with vegetated filter strips.

PROJECT DESCRIPTION

The proposed commercial project will have an area of approximately 23.01 acres. It will include the addition of a new building with associated parking and additional paving for equipment storage. The impervious cover will be 16.10 acres (70 percent). According to a letter dated, August 28, 2003, signed by Paulo Pinto, with Williamson County, the site in the development is acceptable for the use of on-site sewage facilities.

PERMANENT POLLUTION ABATEMENT MEASURES

To prevent the pollution of stormwater runoff originating on-site or upgradient of the site and potentially flowing across and off the site after construction, a batch detention basin, a sedimentation/filtration basin and vegetated filter strips, designed using the TCEQ technical guidance document, Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices (2005), will be constructed to treat stormwater runoff. The required total suspended solids (TSS) treatment for this project is 14,021 pounds of TSS generated from the 16.11 acres of impervious cover. The batch detention basin is designed to remove 3,679 pounds of TSS with a water quality volume of 37,260 cubic feet (35,449 cubic feet required). The sedimentation/filtration basin is designed to remove 10,146 pounds of TSS with a water quality volume of 120,270 cubic feet (117,997 cubic feet required). The two vegetated filter strips remove 183 pounds and 235 pounds of TSS. The approved measures meet the required 80 percent removal of the increased load in TSS caused by the project.

GEOLOGY

According to the Geologic Assessment included with the application, no sensitive features were observed on the site. The Austin Regional Office site assessment conducted on January 14, 2019 revealed the site to be generally as described in the application.

SPECIAL CONDITIONS

I. This modification is subject to all Special and Standard Conditions listed in the WPAP approval letter dated November 18, 2003.

II. All permanent pollution abatement measures shall be operational prior to occupancy of the facility.

III. All sediment and/or media removed from the water quality basin during maintenance activities shall be properly disposed of according to 30 TAC 330 or 30 TAC 335, as applicable.

STANDARD CONDITIONS

1. Pursuant to Chapter 7 Subchapter C of the Texas Water Code, any violations of the requirements in 30 TAC Chapter 213 may result in administrative penalties.

2. The holder of the approved Edwards Aquifer protection plan must comply with all provisions of 30 TAC Chapter 213 and all best management practices and measures contained in the approved plan. Additional and separate approvals, permits, registrations and/or authorizations from other TCEQ Programs (i.e., Stormwater, Water Rights, UIC) can be required depending on the specifics of the plan.

3. In addition to the rules of the Commission, the applicant may also be required to comply with state and local ordinances and regulations providing for the protection of water quality.

Prior to Commencement of Construction:

4. Within 60 days of receiving written approval of an Edwards Aquifer Protection Plan, the applicant must submit to the Austin Regional Office, proof of recordation of notice in the county deed records, with the volume and page number(s) of the county deed records of the county in which the property is located. A description of the property boundaries shall be included in the deed recordation in the county deed records. A suggested form (Deed Recordation Affidavit, TCEQ-0625) that you may use to deed record the approved WPAP is enclosed.

5. All contractors conducting regulated activities at the referenced project location shall be provided a copy of this notice of approval. At least one complete copy of the approved WPAP and this notice of approval shall be maintained at the project location until all regulated activities are completed.
6. Modification to the activities described in the referenced WPAP application following the date of approval may require the submittal of a plan to modify this approval, including the payment of appropriate fees and all information necessary for its review and approval prior to initiating construction of the modifications.
7. The applicant must provide written notification of intent to commence construction, replacement, or rehabilitation of the referenced project. Notification must be submitted to the Austin Regional Office no later than 48 hours prior to commencement of the regulated activity. Written notification must include the date on which the regulated activity will commence, the name of the approved plan and program ID number for the regulated activity, and the name of the prime contractor with the name and telephone number of the contact person. The executive director will use the notification to determine if the approved plan is eligible for an extension.
8. Temporary erosion and sedimentation (E&S) controls, i.e., silt fences, rock berms, stabilized construction entrances, or other controls described in the approved WPAP, must be installed prior to construction and maintained during construction. Temporary E&S controls may be removed when vegetation is established and the construction area is stabilized. If a water quality pond is proposed, it shall be used as a sedimentation basin during construction. The TCEQ may monitor stormwater discharges from the site to evaluate the adequacy of temporary E&S control measures. Additional controls may be necessary if excessive solids are being discharged from the site.
9. All borings with depths greater than or equal to 20 feet must be plugged with non-shrink grout from the bottom of the hole to within three (3) feet of the surface. The remainder of the hole must be backfilled with cuttings from the boring. All borings less than 20 feet must be backfilled with cuttings from the boring. All borings must be backfilled or plugged within four (4) days of completion of the drilling operation. Voids may be filled with gravel.

<u>During Construction:</u>

10. During the course of regulated activities related to this project, the applicant or agent shall comply with all applicable provisions of 30 TAC Chapter 213, Edwards Aquifer. The applicant shall remain responsible for the provisions and conditions of this approval until such responsibility is legally transferred to another person or entity.
11. This approval does not authorize the installation of temporary aboveground storage tanks on this project. If the contractor desires to install a temporary aboveground storage tank for use during construction, an application to modify this approval must be submitted and approved prior to installation. The application must include information related to tank location and spill containment. Refer to Standard Condition No. 6, above.
12. If any sensitive feature (caves, solution cavities, sink holes, etc.) is discovered during construction, all regulated activities near the feature must be suspended immediately. The applicant or his agent must immediately notify the Austin Regional Office of the discovery of the feature. Regulated activities near the feature may not proceed until the executive director has reviewed and approved the methods proposed to protect the feature and the aquifer from potentially adverse impacts to water quality. The plan must be sealed, signed, and dated by a Texas Licensed Professional Engineer.
13. One well exists on site. All water wells, including injection, dewatering, and monitoring wells must be in compliance with the requirements of the Texas Department of Licensing

COPY

and Regulation under Title 16 TAC Chapter 76 (relating to Water Well Drillers and Pump Installers) and all other locally applicable rules, as appropriate.

14. If sediment escapes the construction site, the sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain). Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50 percent. Litter, construction debris, and construction chemicals shall be prevented from becoming stormwater discharge pollutants.
15. Intentional discharges of sediment laden water are not allowed. If dewatering becomes necessary, the discharge will be filtered through appropriately selected best management practices. These may include vegetated filter strips, sediment traps, rock berms, silt fence rings, etc.
16. The following records shall be maintained and made available to the executive director 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.
17. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, and construction activities will not resume within 21 days. When the initiation of stabilization measures by the 14th day is precluded by weather conditions, stabilization measures shall be initiated as soon as practicable.

After Completion of Construction:

18. 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 Austin Regional Office within 30 days of site completion.
19. The applicant shall be 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. The regulated entity shall then be responsible for maintenance until another entity assumes such obligations in writing or ownership is transferred. A copy of the transfer of responsibility must be filed with the executive director through Austin Regional Office within 30 days of the transfer. A copy of the transfer form (TCEQ-10263) is enclosed.
20. Upon legal transfer of this property, the new owner(s) is required to comply with all terms of the approved Edwards Aquifer protection plan. If the new owner intends to commence any new regulated activity on the site, a new Edwards Aquifer protection plan that specifically addresses the new activity must be submitted to the executive director. Approval of the plan for the new regulated activity by the executive director is required prior to commencement of the new regulated activity.
21. An Edwards Aquifer protection plan approval or extension will expire and no extension will be granted if more than 50 percent of the total construction has not been completed within ten years from the initial approval of a plan. A new Edwards Aquifer protection plan must be submitted to the Austin Regional Office with the appropriate fees for review and approval by the executive director prior to commencing any additional regulated activities.
22. At project locations where construction is initiated and abandoned, or not completed, the site shall be returned to a condition such that the aquifer is protected from potential contamination.

This action is taken under authority delegated by the Executive Director of the Texas Commission on Environmental Quality. If you have any questions or require additional information, please contact Kyle Virr, P.E. of the Edwards Aquifer Protection Program of the Austin Regional Office at (512) 339-2929.

Sincerely,

Robert Sadlier, Water Section Team Leader
Austin Region Office
Texas Commission on Environmental Quality

RCS/kmv

Enclosure: Deed Recordation Affidavit, Form TCEQ-0625
Change in Responsibility for Maintenance of Permanent BMPs, Form TCEQ-10263

Modification of a Previously Approved Plan

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Transition Zone and Relating to 30 TAC 213.4(j), 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 request for a **Modification of a Previously Approved Plan** is hereby submitted for TCEQ review and executive director approval. The request was prepared by:

Print Name of Customer/Agent: David Aguayo

Date: 03/02/2023

Signature of Customer/Agent:

David Aguayo

Project Information

1. Current Regulated Entity Name: Dry Creek
   Original Regulated Entity Name: RN103952677
   Regulated Entity Number(s) (RN): _____
   Edwards Aquifer Protection Program ID Number(s): 11001349
   ☐ The applicant has not changed and the Customer Number (CN) is: _____
   ☒ The applicant or Regulated Entity has changed. A new Core Data Form has been provided.

2. ☒ **Attachment A: Original Approval Letter and Approved Modification Letters**. A copy of the original approval letter and copies of any modification approval letters are attached.

3. A modification of a previously approved plan is requested for (check all that apply):
   - ☒ 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;
   - ☐ Change in the nature or character of the regulated activity from that which was originally approved or a change which would significantly impact the ability of the plan to prevent pollution of the Edwards Aquifer;
   - ☒ Development of land previously identified as undeveloped in the original water pollution abatement plan;
   - ☐ Physical modification of the approved organized sewage collection system;
   - ☐ Physical modification of the approved underground storage tank system;
   - ☐ Physical modification of the approved aboveground storage tank system.

4. ☒ Summary of Proposed Modifications (select plan type being modified). If the approved plan has been modified more than once, copy the appropriate table below, as necessary, and complete the information for each additional modification.

WPAP Modification Summary	***Approved Project***	***Proposed Modification***
Acres	23.01	63.888
Type of Development	Non-residential	Non-residential
Number of Residential Lots	N/A	N/A
Impervious Cover (acres)	16.10	44.02
Impervious Cover (%	69.97	68.9
Permanent BMPs	Batch detention, sedimentation & filtration basin, and vegetated filter strips	Batch detention, vegetated filter strips
Other		

SCS Modification Summary	***Approved Project***	***Proposed Modification***
Linear Feet		
Pipe Diameter		
Other		

AST Modification Summary	***Approved Project***	***Proposed Modification***
Number of ASTs	_____	_____
Volume of ASTs	_____	_____
Other	_____	_____

UST Modification Summary	***Approved Project***	***Proposed Modification***
Number of USTs	_____	_____
Volume of USTs	_____	_____
Other	_____	_____

5. ☒ **Attachment B: Narrative of Proposed Modification**. A detailed narrative description of the nature of the proposed modification is attached. It discusses what was approved, including any previous modifications, and how this proposed modification will change the approved plan.

6. ☒ **Attachment C: Current Site Plan of the Approved Project**. A current site plan showing the existing site development (i.e., current site layout) at the time this application for modification is attached. A site plan detailing the changes proposed in the submitted modification is required elsewhere.
   ☒ The approved construction has not commenced. The original approval letter and any subsequent modification approval letters are included as Attachment A to document that the approval has not expired.
   ☐ The approved construction has commenced and has been completed. Attachment C illustrates that the site was constructed as approved.
   ☐ The approved construction has commenced and has been completed. Attachment C illustrates that the site was **not** constructed as approved.
   ☐ The approved construction has commenced and has **not** been completed. Attachment C illustrates that, thus far, the site was constructed as approved.
   ☐ The approved construction has commenced and has **not** been completed. Attachment C illustrates that, thus far, the site was **not** constructed as approved.

7. ☒ The acreage of the approved plan has increased. A Geologic Assessment has been provided for the new acreage.
   ☐ Acreage has not been added to or removed from the approved plan.

8. ☒ 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.

SECTION G

Narrative of Proposed Modification

WGA

CONSULTING ENGINEERS

ATTACHMENT B

Narrative of Proposed Modification

The site located at 35 Co Rd 150, Georgetown, TX 78626 received TCEQ approval for a WPAP plan on January 23, 2019. The approved WPAP plan accounted for a fraction, approximately 23.01 acres, of the total project boundary area, 63.888 acres. The TSS loading generated by the previously proposed commercial development was to be treated via Batch detention, sedimentation & filtration basin, and vegetated filter strips on site. The previously proposed improvements included 16.10 acres of industrial development including an office building expansion to an existing facility, a workshop, paved roads and parking lots, a partial sedimentation sand filter basin, a batch detention basin, future proposed gravel drive aisles, the two existing industrial buildings and a portion of the existing concrete roads and parking lot will remain; the existing gravel parking lot will be demolished and replaced with a concrete parking lot. At this time, the approved construction has not commenced and the improvements and permanent BMPs have changed as shown in the TCEQ-0600 attachment F.

The revised WPAP plan accounted for TSS loading generated in the entire site acreage via batch detention and vegetated filter strips. The proposed improvements amount to an impervious cover on the site of 44.02 acres of industrial development including three large warehouses, an office building expansion to an existing facility, a workshop, paved roads, and parking lots, four detention basins, the two existing industrial buildings and a portion of the existing concrete roads and parking lot will remain; the existing gravel parking lot will be demolished and replaced with a concrete parking lot.

SECTION G

Current Site Plan of the Approved Project

WGA
CONSULTING ENGINEERS

WARNING!
There are existing water pipelines, underground telephone cables and other above and below ground utilities in the vicinity of this project. The Contractor shall contact all appropriate companies prior to any construction in the area and determine if any conflicts exist. If so, the Contractor shall immediately contact the Engineer who shall revise the design as necessary.

BID DOCUMENT NOT FOR CONSTRUCTION

NO.	REVISION	BY	DATE

KMM DLP — DESIGNED BY:	08/30/18 — DATE
KMM DLP — DRAWN BY:	08/30/18 — DATE
CHECKED BY:	DATE
APPROVED BY:	DATE

FOR REVIEW.

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF REVIEW UNDER THE AUTHORITY OF DAVID L. PLATT, P.E. REG. #115964 ON 03/01/19. IT IS NOT TO BE USED FOR BIDDING, PERMIT OR CONSTRUCTION.

STEGER BIZZELL

ADDRESS 1978 S. AUSTIN AVENUE GEORGETOWN, TX 78626
METRO 512.930.9412 TEXAS REGISTERED ENGINEERING FIRM F-181 TBPLS FIRM No.10003700 WEB STEGERBIZZELL.COM
SERVICES >>ENGINEERS >>PLANNERS >>SURVEYORS

SITE PLAN
for
KEYSTONE CONCRETE PLACEMENT
35 COUNTY ROAD 150
CITY OF GEORGETOWN
WILLIAMSON COUNTY, TEXAS

Project No: 22556

SHEET **9** of 28

SECTION G

Drainage Impact Analysis

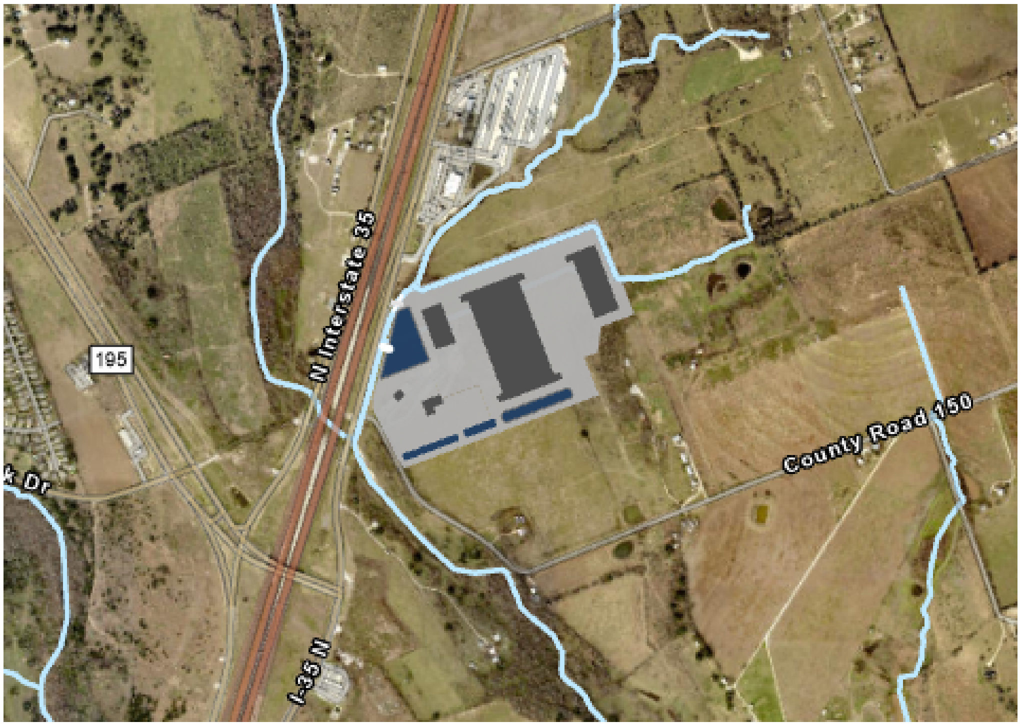
WGA

CONSULTING ENGINEERS

GEORGETOWN KEYSTONE

DRAINAGE IMPACT ANALYSIS

February 2023



CONSULTING ENGINEERS

Ward, Getz and Associates, PLLC
2500 Tanglewilde, Suite 120
Houston, TX 77063
(713) 789-1900

Texas Firm Number F-9756

WGA Project # 0486-009

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Executive Summary

This study analyzes the impact of proposed drainage infrastructure to adjacent drainage and flood hazard from the project identified as Georgetown Keystone, a proposed industrial development located within Williamson County, Texas. This 63.89-acre site lies directly east of the S Interstate Highway 35 (IH 35) Service Road and northeast of Williamson County Road 150. The site is bordered by Dry Berry Creek Tributary 3 (DBC Trib. 3), which is maintained by TxDOT and within their right-of-way. Additionally, an unnamed tributary to DBC Trib. 3 runs through the site, east to west, and outfalls into DBC Trib. 3.

The site is currently undeveloped except for 6.5-acres of building and associated parking lot currently used as a storage yard by Keystone Concrete. In existing conditions, the drainage generally flows from northeast to southwest across the site with off-site flow conveyed to the site via sheet flow and the unnamed tributary across the site. The site ultimately drains to Dry Berry Creek, within Berry Creek Watershed. A portion of the site currently drains via sheet flow and channel flow through the unnamed tributary within the property to a segment of DBC Trib. 3 located within the TxDOT right-of-way along IH 35 service road. There are three independent outfall points considered from the site, including DBC Trib. 3 to the east, a dual 24-inch culvert under County Road 150 to the southeast, and runoff that exits the site across the southern border to the neighboring property. A small portion of the property lies within flood risk areas, with 6.99-acres in the 500-year floodplain, see Exhibit 2.

In the proposed drainage plan, two separate detention systems are employed to mitigate the impact of the development and the unnamed tributary through the site will be realigned to run along the boundary of the site. The runoff from approximately 34.19 acres will be diverted from flowing south to the two ponds and stormsewer system out falling into DBC Trib. 3, including some off-site area draining through the proposed site. Approximately 2.39 acres will be diverted from a downstream culvert crossing of the county road. This area will be collected on the site and outfall to the dual 24-inch culverts under the road adjacent to the site. A total of 31.84 acre-feet of detention storage is provided on the site for the 100-year, 24-hour storm event with a detention rate of 0.50 acre-feet/acre. Approximately 820 linear feet of channel improvements and a bridge crossing are proposed along DBC Trib. 3 for access to the site from the interstate and to accommodate the proposed encroachment of the frontage road within the channel.

The hydrologic modeling using the NRCS method and HEC-HMS is performed to determine the allowable flows and produce hydrographs for the existing and proposed drainage areas adjacent to the site based on the Atlas 14 100, 50, 25, 10, 5, and 2-year storm events. An EPA-SWMM model was used to design and evaluate the realignment of the unnamed tributary within the site and the detention volume and outfall sizing for the development for each of the storm events. Additionally, the HEC-RAS hydraulic model is used to analyze the impact of the development and proposed crossing on the surrounding area along DBC Trib. 3 using Atlas 14, 24-hour duration for the 100, 50, 25, 10, 5, and 2-year storm events.

This report outlines the steps and procedures followed in preparing the drainage analyses. Based on the findings provided, it is concluded that the proposed development will result in no adverse impact to flood hazard conditions on the receiving waterways, including downstream properties, for storm events up to and including the Atlas-14, 100-year storm event.

Stormwater Detention Summary Table (Dry Berry Creek Trib. 3)

	Project Name: Georgetown Keystone					Date: February 10, 2023	
	Outfall Location	Dry Berry Creek Tributary 3 (DBCT3)					
	Total Drainage Area Contributing to DBCT3 at outfall	212.1 acres					
	Total Detention Service Area	50.23 acres					
	Offsite Detention Service Area	6.46 acres					
	Storm Event	50% (2-yr)	20% (5-yr)	10% (10-yr)	4% (25-yr)	2% (50-yr)	1% (100-yr)
Flows (cfs)	Total Maximum Allowable Outflow (Based on pre-project flows to DBC T3 routed in EPA-SWMM)	119.02	178.65	234.51	317.60	385.89	462.09
	Total Maximum Outflow Provided* (Based on combined peak outflow to DBC T3 routed in EPA-SWMM)	118.23	178.08	234.44	315.91	382.95	455.41
	Site Post-Project Inflow (Based on inflows to Ponds A & B, including off-site flows)	190.9	247.7	295.2	364.5	418.9	476.2
	Maximum Outflow Provided (Based on routed outflow from Pond B outfall only)	8.94	15.02	21.11	27.73	32.98	37.90
Elevations (1988 NGVD, 2001 adj.)	Lowest Natural or Finished Ground Elevation Estimate	696.0[B] 700.4[A]					
	Maximum Allowable Water Surface	695.0[B] 699.4[A]					
	Based on	Elevation of Pond High Bank and 1-ft Freeboard					
	Design Water Surface Elevation	690.17[B] 693.33[A]	691.11[B] 694.4[A]	691.83[B] 695.29[A]	692.89[B] 696.64[A]	693.81[B] 697.76[A]	694.80[B] 699.00[A]
	Water Surface Elevation Calculated (pond)	690.17[B] 693.33[A]	691.11[B] 694.4[A]	691.83[B] 695.29[A]	692.89[B] 696.64[A]	693.81[B] 697.76[A]	694.80[B] 699.00[A]
Storage	Detention Storage Provided** (ac-ft)	10.78	14.31	17.22	21.72	25.73	30.36
	Storage Rate Provided*** (ac-ft/acre)	0.19	0.25	0.30	0.38	0.46	0.54
Outflow Structure	Restrictor Size, if applicable (ft)	12" Orifice/Storm Water Quality Unit, secondary 18" pipe set at 689.85 ft					
	Outflow Pipe Size (ft)	54" RCP					
	Outflow Velocity into Channel (ft/second)	2.10	2.43	2.66	2.85	2.97	3.06
	Weir Description, if applicable (type, size, elevation, etc.)	N/A					

*Combined peak outflows include from the realigned swale, Pond B, and undetained proposed drainage area L
**Detention Volume is the sum of peak volumes for Ponds A & B for each storm event
***Detention Rate computed for entire site
[A] Pond A
[B] Pond B

Stormwater Detention Summary Table (Williamson Co. Ro. 150)

	Project Name: Georgetown Keystone					Date: February 10, 2023	
	Outfall Location	Williamson County Road 150					
	Total Detention Service Area	14.72 acres					
	Offsite Detention Service Area	0.00 acres					
	Storm Event	50% (2-yr)	20% (5-yr)	10% (10-yr)	4% (25-yr)	2% (50-yr)	1% (100-yr)
Flows (cfs)	Site Post-Development Inflow	53.20	59.30	82.60	101.90	117.00	132.90
	Maximum Allowable Outflow (Based on pre-project peak flows to WCR 150)	14.90	23.70	32.00	44.60	54.90	66.30
	Maximum Outflow Provided (Based on routed peak flows from outfall to WCR 150)	14.75	20.55	25.67	31.79	37.11	42.36
Elevations (1988 NGVD, 2001 adj.)	Lowest Natural or Finished Ground Elevation Estimate	692.5[1] 696.0[2]					
	Maximum Allowable Water Surface	692.5[1] 696.0[2]					
	Based on	Elevation of lowest grade along the high bank of each ditch					
	Design Water Surface Elevation (Based on the 100-year Storm routed in EPA-SWMM)	692.45[1] 695.57[2]					
	Water Surface Elevation Calculated (Based on the 100-year Storm routed in EPA-SWMM)	692.45[1] 695.57[2]					
Storage	Detention Storage Provided* (ac-ft)	1.36	1.82	2.22	2.85	3.37	3.95
	Storage Rate Provided** (ac-ft/acre)	0.19	0.25	0.30	0.38	0.46	0.54
Outflow Structure	Restrictor Size, if applicable (ft)	15” DIA RCP					
	Outflow Pipe Size (ft)	(2) 24” RCP					
	Outflow Velocity into Channel (ft/second)	4.23	4.54	4.75	5.13	5.91	6.74
	Weir Description, if applicable (type, size, elevation, etc.)	N/A					

*Detention storage for Williamson County outfall is provided in ditches
**Detention Rate for the entire site considered
[1]Ditch 1
[2]Ditch 2

TxDOT Summary Table (For Dry Berry Creek Tributary 3 Outfall)

Georgetown Keystone		Unit
TxDot Tracking number (TR#)	#22-43452	
Highway	South Interstate 35	
TxDOT frontage	1012.1	FT
TxDOT Area (the strip of site within 150-ft frontage)	1.64	AC
Total tract area based on submitted survey map	63.89	AC
Proposed disturbed area*	63.21 (43.56)	AC
Project contributing drainage area to TxDOT	51.67	AC
Off-site contributing area (if applicable)	6.46	AC
Increased impervious area	51.02	AC
10-yr required detention volume	19.31	AC-FT
10-yr proposed detention volume	19.31	AC-FT
10-yr design W.S.E.	691.83[B] 695.29[A]	FT
10-yr Pre-developed peak flow	35.00	CFS
10-yr Post-developed peak flow	280.10	CFS
10-yr Proposed discharge to TxDOT R.O.W.	21.11	CFS
100-yr required detention volume	34.10	AC-FT
100-yr proposed detention volume	34.10	AC-FT
100-yr design W.S.E.	694.80[B] 699.00[A]	FT
100-yr Pre-developed peak flow	70.20	CFS
100-yr Post-developed peak flow	446.50	CFS
100-yr Proposed discharge to TxDOT R.O.W.	37.90	CFS
TxDOT as built or calculated allowable discharge	45.30	CFS
Primary tie-in/outfall structure size	54" RCP	Inch
Primary restrictor size	12-inch Diameter Orifice	Inch
Primary restrictor maximum discharge	12.00	CFS
Secondary outfall device size (if applicable)	18-inch Diameter RCP	Feet
Secondary outfall discharge (if applicable)	25.88	CFS
Maximum combined pumped discharge (if applicable)	N/A	(CFS)
% Pumped discharge volume (if applicable)	N/A	AC-FT
Effective gravity discharge elevation (if applicable)	685.80	FT
B.F.E per effective FIRM (if applicable)	Varies from 689.09 – 694.25	FT
Proposed fill below B.F.E. (if applicable)	TBD	AC-FT
Proposed cut below B.F.E. (if applicable)	TBD	AC-FT

*Entire disturbed area on the site, only 43.56 of that area is proposed to drain into the TXDOT ROW (DBC Trib. 3)
[A]Pond A
[B]Pond B

Section 1 – Project Overview

1.1 Project Name and Purpose

For this study, the proposed project is identified as Georgetown Keystone. The purpose of this study is to analyze the impact of the proposed 63.89-acre industrial development with associated buildings, parking/paved areas and accompanying stormwater drainage infrastructure on the drainage of adjacent properties and waterways.

1.2 Project Description and Location

The proposed project is located within Berry Creek Watershed. The site is bordered by east S Interstate 35 Service Road to the west, and Williamson County Road 150 to the south, outside City of Georgetown limits. See Exhibit 1 for the location and vicinity map.

1.3 Project Objectives, Assumptions and Constraints

The objective of this study is to analyze the designed site and rerouting of the creek to ensure the drainage features will be sized to ensure no adverse impacts to existing flood hazards along, or peak storm runoff to Dry Berry Creek Tributary 3 or to Williamson County Road 150 and surrounding areas. The peak allowable discharge rate is determined using the National Resources Conservation Service (NRCS), also known as Soil Conservation Service (SCS), method with Atlas 14 rainfall intensity rates for the undeveloped site. Storm runoff of the 63.89-acre site will out fall through one of two outfalls, a 54-inch reinforced concrete pipe (RCP) to Dry Berry Creek Tributary 3 or to 2-24” RCPs under County Road 150.

1.4 Pre-Development

In pre-development conditions, the site is mostly undeveloped grassland. A creek runs through the site from east to west before out falling into Dry Berry Creek Tributary 3. In existing conditions, much of the site is undeveloped, but approximately 6.5-acres of the proposed site is currently used as a storage yard and accompanying building by Keystone Concrete. A portion of the site is currently used as a storage yard for Keystone Concrete and will be redeveloped in proposed conditions. The topography of the site varies with natural ground elevations ranging from 715-to-689 feet and generally sloping from northeast to the southwest. Flowing from the east side of the site to the west, there is an unmaintained tributary to Dry Berry Creek Tributary 3. Along the western border of the site, Dry Berry Creek Tributary 3 flows from north to south and is used in part as TxDOT drainage for IH 35. See Exhibit 4 for the pre-development conditions.

1.5 Post-Development

The proposed development will feature 3 industrial buildings along with the associated parking and drainage infrastructure. There will be two drainage ultimate drainage areas on the site, one out falling to DBC Trib.3 and one out falling to Williamson County Road 150. The drainage infrastructure for the DBC Trib. 3 outfall includes underground storm sewer to collect runoff from the site and the water to one of the two proposed detention ponds on the site before flowing through a high flow/low flow restrictor and then DBC Trib. 3. The infrastructure relating to the county road outfall includes two large ditches to act as detention and are restricted by a 15” RCP with a secondary 24” RCP set at a higher elevation for larger storm events, before exiting through dual 24” RCPs to the county road. The proposed project also includes the rerouting of the unnamed tributary through the site, to around the north of the site. A new bridge will be constructed over DBC Trib. 3, along with three 10’ x 9’ box culverts to convey the water from the creek under the bridge, a deceleration lane will be constructed along the east side of the IH 35 service road, narrowing the creek through this section. To ensure no adverse impacts to the creek, parts of the creek will be concrete lined and expanded. See Exhibit 5 for the proposed design and infrastructure.

Section 2 – Hydrologic Conditions Analysis

The hydrologic method employed for this analysis was the full hydrologic method outlined by the National Resource Conservation Service (NRCS) or previously known as the Soil Conservation Service (SCS) method prescribed by the City of Georgetown Drainage Criteria Manual, effective 2004. The U.S. Army Corps of Engineers' hydrologic modeling software, HEC-HMS was used to create a hydrologic model to determine the peak runoffs and generate hydrographs. The existing peak runoff flows were used to establish the allowable flows from the site based on the Atlas 14 100, 50, 25, 10, 5, and 2-year storm events. Additionally, the HEC-HMS models were used to produce hydrographs for the existing and proposed drainage areas adjacent to and through the site based on each of the storm events for further hydraulic analysis. The following section describes the detailed methodology, calculations and results for the hydrologic analysis performed for Georgetown Keystone.

2.1 Drainage Area Delineation

The drainage areas were determined relative to the outfall locations immediately downstream of the site and the contributing areas determined based on topography. The drainage area boundaries were delineated based on a combination of 2015 and 2016 Lidar, obtained from Texas Natural Resource Information System (TNRIS), see Exhibit 6. For existing conditions, the drainage area boundaries onsite were confirmed based on recent topographic survey, see Exhibit 7. In existing conditions, the total area contributing runoff to the two outfalls, which flows through the site is 41.90 acres, with 153.97 acres of off-site flow to the site to the unnamed tributary. The drainage area contributing to Dry Berry Creek Tributary 3 (DBC Trib. 3) upstream of the site is 1349.03 acres, represented by the drainage area named "US DBC Trib. 3." The existing drainage areas contributing to the flow across the site are divided by outfall location and considering off-site areas and on-site areas to for a "like to like" comparison against proposed conditions drainage areas. The drainage area locations, names, and areas are shown in Exhibits 6 and 7 and correspond to the values shown in Table 2.5.

For the proposed drainage areas, the boundaries were determined based on the grading plan for the site, while the off-site areas are assumed to be the same and remain unchanged from existing to proposed. There is a second offsite area, 6.46 acres that currently runs off to the south, that will be diverted and collected in the developed site. Within the site, there are two major outfall locations proposed corresponding to two separate stormsewer systems and detention facilities proposed for the site dividing the site into these general drainage areas. The contributing area within the site producing runoff to the properties to the south of the site in existing conditions, will be diverted and collected in one of the two stormwater systems draining to either the outfall to DBC Trib. 3 or to the dual 24-inch culverts under County Road 150. The drainage area locations, names, and areas are shown in Exhibit 8 and correspond to the values shown in Table 2.6.

2.2 Time of Concentration

The hydrologic method employed is the National Soil Conservation Service (NRCS), or the Soil Conservation Service (SCS) Method, is used based on the guidance from the City of Georgetown Drainage Criteria Manual, updated 2004. Within the SCS Method, the time of concentration is determined using the NRCS Velocity Method which uses a sum of travel times for flow following the longest flow path for each of the drainage areas. For existing conditions, the overall flow paths were determined based on the longest estimated distance of runoff to the outfall of the drainage area, based on the surface and slope assumed upon visual inspection of aerial imagery for both off and on site. For the drainage areas on-site in proposed conditions the flow paths were determined based on the longest estimated distance of runoff to the point of collection into the stormwater system within the site. Each of the flow paths used to calculate the time of concentration for each of the drainage areas are mapped on Exhibits 6, 7, and 8.

This method assumes three types of flow, including sheet flow, shallow concentrated flow and open channel flow. The travel time for sheet flow is determined using the following equation.

NRCS's Sheet Flow Travel Time Equation

$$t_{sh} = \frac{0.42\,(nl)^{0.8}}{(P_2)^{0.5} S^{0.4}}$$

Where:

t_{sh} = travel time (min)
n = Manning's roughness for sheet flow (Table A1)
l = length of sheet flow segment (ft)
P_2 = 2-year, 24-hour rainfall depth (in)
S = Slope of sheet flow segment (ft/ft)

The overland surfaces and associated manning's n coefficients for sheet flow referenced to determine the coefficient for the time of concentration calculations are shown in Table 2.1. The manning's roughness coefficient (n) is determined based on the surface beneath the sheet flow path and based on the values taken from NRCS National Engineering Handbook, Table 15-1, also referenced in the City of Georgetown Drainage Criteria Manual, Table 3-8.

Table 2.1– Manning's Roughness Coefficient for Sheet Flow

Surface description	n [1]
Smooth surface (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated soils:	
Residue cover ≤ 20%	0.06
Residue cover > 20%	0.17
Grass:	
Short-grass prairie	0.15
Dense grasses [2]	0.24
Bermudagrass	0.41
Range (natural)	0.13
Woods: [3]	
Light underbrush	0.40
Dense underbrush	0.80

1 The Manning's n values are a composite of information compiled by Engman (1986).
2 Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.
3 When selecting n, consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

The sheet flow equation assumes after approximately 100-ft of sheet flow, the depth of water collected is such that the flow transitions to shallow concentrated flow, thereby the length of sheet flow is limited to 100-ft maximum. The 2-year, 24-hour rainfall depth used in the sheet flow equation is determined to be 3.94-inches based on NOAA Atlas 14 rainfall values established for the San Gabriel River Zone in Exhibit 2, Table 2 for of Williamson County Subdivision Regulations (adopted December 2021).

After 100-ft of sheet flow, the flow is assumed to transfer to shallow concentrated flow based on the increasing depth of the runoff without a well-defined channel. The travel time for shallow concentrated flow along segments of the flow path are calculated using the following equation which is a reconfiguration of the equation for velocity given in the City of Georgetown Drainage Criteria Manual, equation 3-12 based on the shallow concentrated flow velocity curves determined by NRCS.

NRCS's Shallow Concentrated Flow Travel Time Equation

$$t_{sc} = \frac{L}{60\,V} = \frac{L}{60 * K\,S^{0.5}}$$

Where:

t_{sc} = travel time (min)
V = velocity of shallow concentrated flow segment (fps)
K = 20.328 for paved surface, and 16.135 for unpaved surface
L = length of shallow concentrated flow segment (ft)
S = Slope of sheet flow segment (ft/ft)

The travel time for a segment of channel flow for the NRCS time of concentration method is using the length of channel flow and the velocity calculated using Manning's equation for open channel flow. Based on Manning's equation, the following formula is used to determine the time runoff moves through a channel segment.

NRCS's Channel Flow Travel Time Equation

$$t_{ch} = \frac{n\,L}{1.49 * 60(R^{0.67} * S^{0.5})}$$

Where:

t_{ch} = travel time (min)
n = Manning's roughness coefficient (open channel flow)
L = length of channel segment (ft)
R = hydraulic radius (ft)
S = channel slope (ft/ft)

The total time of concentration for each of the drainage areas is the sum for the travel time for sheet flow, shallow concentrated flow, and channel flow. The resulting time of concentrations for existing and proposed conditions are shown in Tables 2.2 and 2.3, respectively, with tables showing the detailed calculations using the NRCS method in Appendix A.

Table 2.2 – Time of Concentration for Existing Conditions Drainage Areas

Drainage Area ID	T_{sht} (min)	T_{sc} (min)	T_{ch} (min)	T_C (min)
A1	22.39	17.21	0.00	39.60
A2	22.39	6.67	0.00	29.06
A3	10.04	2.54	9.48	22.06
A4	15.37	17.86	0.00	33.23
A5	11.30	12.50	0.00	23.80
A6	7.20	17.90	0.00	25.11
TS	13.71	31.55	6.45	51.71
DBC Trib. 3	14.24	32.68	85.12	132.05

Table 2.3 – Time of Concentration for Proposed Conditions Drainage Areas

Drainage Area ID	T_{sht} (min)	T_{sc} (min)	T_{ch} (min)	T_C (min)
S	1.09	1.18	9.72	11.99
E	2.86	2.23	2.88	10.00
SW	0.00	0.00	5.49	10.00
L	6.77	0.95	0.30	10.00
O	12.42	3.85	0.00	16.28

2.3 NRCS Hydrologic Method

The hydrologic method employed is the National Soil Conservation Service (NRCS), or the Soil Conservation Service (SCS) Method, based on the guidance from the City of Georgetown Drainage Criteria Manual, updated 2004. The stormwater runoff for each drainage area is calculated using the U.S. Army Corps of Engineers HEC-HMS (version 4.9) computer program. The hydrologic analysis considers the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year Atlas 14 storm events for the site and offsite drainage areas using SCS Unit Hydrograph method develop hydrographs and peak flows for each subbasin.

Rainfall losses for each sub-basin were simulated using the SCS curve number methos loss rate routine. The SCS curve number estimates the excess precipitation as a function of cumulative precipitation, soil type, land use, and antecedent moisture conditions. Infiltrations rates of different soils is incorporated in the SCS curve number through the NRCS classification system, with four hydrologic soil groups: A, B, C, and D, which represent high, moderate, low, and very low infiltration rates, respectively. The soil classification of the site is determined form the United States Department of Agriculture (USDA) Natural Resources Conservation Service's (NRSC) Web Soil Survey. Soil groups of B, C, and D exist within the site, while much of the surrounding, offsite areas are a soil class of D, see Exhibit 3 for a soil classification map of the site and surrounding area. Composite CN values for each drainage area are calculated based on the weighted averages of various land uses and soil classifications throughout each drainage area. Much of the undeveloped site is considered to be meadow, herbaceous and brush, the offsite areas are considered to be pasture, meadow, wood-grass combination, along with some spread out developments, roadways and other impervious areas. Recommended CN value based on land types for the drainage areas are taken from Tables 3-4 through 3-7 of the City of Georgetown Drainage Criteria Manual, effective January 2004. Composite CN values for existing and proposed drainage areas are shown in Tables 2.5 and 2.6, respectively.

NOAA's Atlas 14 rainfall depth values for a 24-hour storm duration using in the analysis were obtained from Table 2, Exhibit 2 of the Williamson County Drainage Criteria Manual for the San Gabriel River Zone in Williamson County and provided below.

EXHIBIT 2 - TABLE 2, DEPTH-DURATION-FREQUENCY VALUES
SAN GABRIEL RIVER ZONE

DURATION	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	500-YR	1000-YR
5 MIN	0.51	0.643	0.757	0.921	1.05	1.19	1.53	1.69
15 MIN	1.02	1.29	1.51	1.84	2.1	2.37	3.03	3.33
1 HR	1.88	2.37	2.79	3.4	3.88	4.39	5.79	6.47
2 HR	2.3	2.95	3.55	4.43	5.16	5.98	8.28	9.43
3 HR	2.55	3.3	4.02	5.09	6.01	7.06	10.1	11.6
6 HR	2.98	3.91	4.81	6.18	7.38	8.75	12.7	14.7
12 HR	3.44	4.51	5.54	7.12	8.48	10.1	14.6	16.9
24 HR	3.94	5.15	6.3	8.04	9.53	11.2	16.1	18.6

The initial abstraction for the SCS curve number loss method is calculated based on the composite CN value and the equations provided in City of Georgetown Drainage Criteria Manual. The SCS curve number definition and initial abstraction equations 3-7 and 3-9 are provided below. Appendix B shows the calculated initial abstraction depth for each drainage area.

EQUATION 3-7 SCS INITIAL ABSTRACTION AND MAXIMUM RETENTION RELATIONSHIP[5]

$$I_a = 0.2S$$

EQUATION 3-9 SCS CURVE NUMBER DEFINITION[5]

$$CN = \frac{1000}{(10+S)}$$

or

$$S = \frac{1000}{CN} - 10$$

The transformation of rainfall into a storm water runoff hydrograph for each sub-basin is accomplished using the SCS Unit Hydrograph method of HEC-HMS. This method generates runoff hydrographs from the inputs of SCS curve number and lag time for each sub-basin. To use hydrographs that better represent the upstream land uses of the area, the peaking factor is changed from the default value of 484 to a value of 200 for a land description of rural, slight slopes, reflecting the area in existing conditions. Table 2.4, below, provides the recommended peaking factors, taken from Table 2 of the National Weather Service – Office of Hydrology Hydrologic Research Laboratory & National Operational Hydrologic Remote Sensing Center (NOHRSC) Unit Hydrograph Technical Manual, on the SCS Dimensionless Unit Hydrograph.

Table 2.4 – Peaking Factor Recommendations

General Description	Peaking Factor	Limb Ratio (Recession to Rising)
Urban areas; steep slopes	575	1.25
Typical SCS	484	1.67
Mixed urban/rural	400	2.25
Rural, rolling hills	300	3.33
Rural, slight slopes	200	5.50
Rural, very flat	100	12.0

The lag time input is required as a part of the Unit Hydrograph development. To calculate the lag time, the time of concentration was multiplied by 0.6, an approximation stated in the City of Georgetown DCM. The HEC-HMS parameters and resulting lag time, curve number and peak flows for each sub-basin are provided in Tables 2.5 and 2.6 for existing and proposed drainage areas, respectively. The peak flow of the drainage area upstream of DBC Trib. 3 is determined following the same criteria and is also shown in Table 2.5. See Appendix B for a detailed breakdown of the HEC-HMS inputs used for existing and developed site conditions.

Table 2.5 – Unrouted Peak Runoff Values (Existing)

Drainage Area ID	Area (AC)	T_C (min)	T_{lag} (min)	CN	Peak Flow (cfs)					
					2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
A1	10.07	39.60	23.76	75.67	6.60	10.30	13.90	19.30	23.80	28.60
A2	3.22	29.06	17.44	66.99	1.60	2.80	4.00	6.00	7.60	9.40
A3	7.41	22.06	13.24	80.56	8.90	13.20	17.10	22.70	27.30	32.20
A4	21.20	33.23	19.94	74.71	14.90	23.70	32.00	44.60	54.90	66.30
A5	4.60	23.80	14.28	71.00	3.30	5.50	7.60	10.90	13.60	16.50
A6	17.39	25.11	15.06	75.15	15.10	23.70	31.80	44.10	54.10	64.90
TS	153.97	51.71	31.02	80.62	104.80	156.40	204.80	276.90	336.40	401.50
Dry Berry Creek Trib.3	1349.03	132.05	79.23	81.80	468.60	703.70	934.50	1286.50	1590.20	1935.00

Table 2.6 – Unrouted Peak Runoff Values (Proposed)

Drainage Area ID	Area (AC)	T_C (min)	T_{lag} (min)	CN	Peak Flow (cfs)					
					2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
S	43.56	11.99	7.19	95.06	183.50	236.30	280.10	343.90	393.90	446.50
SW	4.23	10.00	6.00	83.91	9.00	12.70	16.00	20.80	24.50	28.40
TS	153.97	51.71	31.02	80.62	104.80	156.40	204.80	276.90	336.40	401.50
O	6.46	16.28	9.77	78.48	8.40	12.70	16.60	22.30	26.90	31.80
E	14.72	10.00	6.00	93.47	53.20	69.30	82.60	101.90	117.00	132.90
L	1.38	10.00	6.00	80.62	2.10	3.10	3.90	5.00	5.90	6.90

2.4 Allowable Peak Flow Determination

To determine the allowable for the Pond B outfall, the total runoff to DBC Trib. 3 in existing conditions is calculated and compared to the total flow to the DBC Trib. 3 in proposed conditions. This includes using the Environmental Protection Agency's Storm Management Model (EPA-SWMM) computer program (version 5.2) to route the appropriate HEC-HMS hydrographs through the unnamed tributary for existing and proposed conditions. The methodology of the determining the peak routing of the existing and proposed unnamed tributary is discussed further in Section 4. For the outfall to Williamson County Road 150, the drainage area of the runoff that flows to the dual 24-inch culverts under the County Road is used to determine the allowable peak flow to Williamson County Road 150. Tables 2.7 and 2.8 show the calculated allowable peak flow for DBC Trib. 3 and the county road, respectively.

Table 2.7 – Allowable Peak Flow (cfs) to Dry Berry Creek Tributary 3

Source/ Drainage Area	Flow Type	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
A1	Runoff	6.60	10.30	13.90	19.30	23.80	28.60
A2	Runoff	1.60	2.80	4.00	6.00	7.60	9.40
Unnamed Tributary	Routed	110.83	165.56	216.65	292.30	355.28	424.58
Total Allowable	-	**119.03**	**178.66**	**234.55**	**317.60**	**386.68**	**462.58**

For the outfall to Williamson County Road 150, the drainage area of the runoff that flows to the dual 24-inch culverts under the County Road is used to determine the allowable peak flow to Williamson County Road 150. Tables 2.7 and 2.8 show the calculated allowable peak flow for DBC Trib. 3 and the county road, respectively.

Table 2.8 – Allowable Peak Flow (cfs) to Williamson County Road 150

Source/ Drainage Area	Flow Type	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
A4	Runoff	14.90	23.70	32.00	44.60	54.10	66.30

Section 3 - Detention Analysis and Design

The development of the 63.89-acres will include the construction of 3 industrial buildings with associated paving and stormwater detention. In proposed conditions, the existing Keystone Concrete buildings will remain with an addition of a large pavement area added near these buildings, see Exhibit 5. All the drainage from the site and any remaining offsite flows originally sheet-flowing onto the site will be directed to the detention ponds, the drainage ditches along the south of the site, flow directly into DBCT3, or the unnamed tributary, rerouted along the north boundary of the site. The site will be divided into two separate stormwater systems based on two of the current outfall locations, which are shown by the two drainage area boundaries on the site in proposed conditions, S and E, see Exhibit 8. The first system captures the runoff from 43.56-acres of the site and ultimately outfalls from Pond B to TxDOT maintained, Dry Berry Creek Tributary 3 (DCB Trib. 3). The runoff in this system is routed through two detention ponds (Ponds A & B) connected by storm which outfalls through a restrictor and a 54-inch reinforced concrete pipe. The second system captures runoff from 14.72 acres of the proposed disturbed area of the site and routes the storm water two 24-inch culverts draining under Williamson County Road 150. The County Road 150 stormwater system will collect the runoff in two oversized ditches along the southern border of the site and will outfall via a high-flow/low-flow restrictor to the dual 24-inch reinforced concrete pipes under the county road. Runoff from drainage area L, a proposed parking lot, will flow undetained into DBCT3, and is accounted for in the calculation of the allowable release rate for the detention pond. Each stormwater system will have associated detention facilities to negate the impact of development on the peak flows. The proposed site plan, including the drainage infrastructure can be seen in Exhibit 5, as well as, detailed plan and profiles of the site and outfalls

The hydraulic modeling is used to determine the outfall, restrictor, and detention facility design by simulating the routing of proposed hydrographs to determine the infrastructure needed to release lower peak flows in developed conditions than the established allowable flows. The hydraulic modeling is simulated using the Environmental Protection Agency's Stormwater Management Model (EPA-SWMM) computer program (version 5.2). See Exhibit 16 for the proposed EPA-SWMM map and Appendix E for EPA-SWMM input and output data. The stormwater runoff hydrographs for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year storm-event hydrographs are routed. Each stormwater system assumes normal depth as the downstream boundary condition. The detailed impact analysis and resulting infrastructure sizing for the stormwater systems draining to DBC Trib. 3 and County Road 150 can be found respectively in Sections 3.1 and 3.2.

3.1 Dry Berry Creek Tributary 3 Outfall System

The proposed system to detain flow from the site to DBC Trib. 3 includes the on-site flows from 43.56-acres of the proposed development and 6.46-acres of off-site flow into the site. Of the total 50.02-acres 34.19-acres are diverted into the system from draining south to County Road 150 or to the properties along the southern border. The allowable flow from the pond in this system is dependent on the overall existing flow going to DBC Trib. 3 (including drainage areas A1 & A2 and the routed flow from the existing unnamed tributary running through the site discussed in Section 4.1) minus the flow from the realigned unnamed tributary and the runoff from drainage area L in proposed conditions.

The two ponds, Pond A and Pond B, are connected via the proposed HDPE stormsewer on the site and designed to drain using gravity only. Pond A, the smaller pond at the south of the site is designed with 3:1 side slopes and minimum 10-ft wide maintenance berms. The lowest toe elevation of Pond A is at 687.82 feet, the high bank elevation of the pond is at 700.4 feet. Pond A outfalls to the stormsewer system via a 164.75-ft long, 24-inch diameter HDPE. The 24-inch pipe will act as a restrictor, allowing Pond A to detain a portion of the runoff storm water before flowing towards Pond B. Pond B is also designed with 3:1 side slopes at the base of the toe before meeting a 4-foot tall retaining wall up to the high bank, with a starting elevation of 692.0 ft, to maximize the volume in the pond. A 3-ft wide pilot channel at a slope of 0.1% runs along the toe of the pond from the outfall structure. The outfall from the Pond B, the ultimate outfall of the site, is separated into two sections by the Storm Water Quality (SWQ) unit and an outfall pipe set at a raised elevation. The SWQ unit is used to detain a volume of 3.58 ac-ft of water for 12 hours before allowing it to outfall from the site. To model the SWQ unit, an orifice is used in EPA-SWMM, the controls for the orifice are set so that for the first 12 hour of the simulation run time, it is closed. At 12 hours the orifice will then open, similar to how the SWQ box tilts to allow water to flow into the unit after 12 hours. The outfall for this unit is a 12” pipe that will tie in with the secondary outfall pipe at a junction box adjacent to the pond, before connecting to the ultimate outfall. The secondary outfall pipe is a 30-foot, 18” RCP set at an elevation of 689.85 ft, to allow more flow out from the pond during larger storm events. The ultimate outfall pipe for the site is a 37-foot, 54” RCP, allowing water to flow from the junction box to Dry Berry Creek Tributary 3. The ultimate outfall pipe is oversized to help reduce the velocity of the water flowing into the creek. See Exhibits 9 and 10 for the plan and profiles of Ponds A and B. The stage-storage relationships for Ponds A and B are shown in Tables 3.1 and 3.2 below, respectively.

Table 3.1 – Pond A Stage-Storage Relationship

Elevation (ft)	Area (ac)	Incremental Volume (ac-ft)	Total Volume (ac-ft)
688.0	0.08	0.00	0.00
688.5	0.27	0.08	0.08
689.0	0.31	0.14	0.23
689.5	0.35	0.17	0.39
690.0	0.39	0.19	0.58
690.5	0.43	0.21	0.79
691.0	0.48	0.23	1.01
691.5	0.52	0.25	1.26
692.0	0.56	0.27	1.53
692.5	0.60	0.29	1.82
693.0	0.65	0.31	2.13

693.5	0.69	0.33	2.47
694.0	0.73	0.36	2.82
694.5	0.78	0.38	3.20
695.0	0.82	0.40	3.60
695.5	0.87	0.42	4.02
696.0	0.91	0.44	4.46
696.5	0.96	0.47	4.93
697.0	1.00	0.49	5.42
697.5	1.05	0.51	5.93
698.0	1.09	0.53	6.47
698.5	1.14	0.56	7.02
699.0	1.18	0.58	7.60
699.5	1.23	0.60	8.21
700.0	1.28	0.63	8.83

Table 3.2 – Pond B Stage-Storage Relationship

Elevation (ft)	Area (ac)	Incremental Volume (ac-ft)	Total Volume (ac-ft)
685.9	0.00	0.00	0.00
686.4	0.04	0.01	0.01
686.9	1.01	0.26	0.24
687.6	2.26	1.14	1.06
688.1	2.59	1.21	2.28
688.6	2.74	1.33	3.62
689.1	2.78	1.38	4.99
689.6	2.83	1.40	6.39
690.1	2.89	1.43	7.82
690.6	2.94	1.46	9.28
691.1	2.99	1.48	10.76
691.6	3.05	1.51	12.28
692.1	3.09	1.54	13.82
692.6	3.09	1.55	15.37
693.1	3.09	1.55	16.92
693.6	3.09	1.55	18.48
694.1	3.09	1.55	20.04
694.6	3.09	1.55	21.60
695.1	3.09	1.55	23.16
695.6	3.09	1.55	24.73
695.9	3.09	0.93	25.67

The HDPE stormwater line connecting Pond A to Pond B, and the outfall to the creek are modeled within the EPA-SWMM model. Nodes along the stormwater line allow for multiple inlet hydrograph locations which better represents the flow that will enter the system, see Appendix D for the factor applied to the inflow hydrograph for each node. The hydrographs of the 43.56-acre north portion of the site drainage area (S) and 6.46 acres offsite drainage area (O) are combined and routed through the proposed EPA-SWMM models for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year storm events. Table 3.3 shows the resulting detention summary for the outfall to DBC Trib. 3.

Table 3.3 – Dry Berry Creek Tributary 3 Outfall Summary

Proposed Site		2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Total Allowable		119.03	178.66	234.55	317.60	386.68	462.58
Unnamed Tributary (Proposed Realignment)*		107.12	159.85	209.27	282.92	343.76	410.38
L (Undetained Runoff)**		2.10	3.10	3.90	5.00	5.90	6.90
Remaining Allowable (Pond B)		9.81	15.71	21.38	29.68	37.02	45.30
Peak Outflow (Pond B)		8.94	15.02	21.11	27.73	32.98	37.88
Max Velocity		2.10	2.43	2.66	2.85	2.97	3.06
Pond Elevation	Pond B	690.17	691.11	691.83	692.89	693.81	694.84
	Pond A	693.33	694.4	695.29	696.64	697.76	699.03
Pond Volume	Pond B	8.40	11.16	13.36	16.64	19.51	22.70
	Pond A	2.38	3.15	3.87	5.08	6.22	7.66
	Total	10.78	14.31	17.22	21.72	25.73	30.36

*Analysis and results of the routed proposed peak outfall for the unnamed tributary can be found in Section 4.2
**Results and analysis for proposed drainage area L runoff peak flow can be found in Section 2.3

Based on the results of the EPA-SWMM model outflows, the total proposed flows into DBC Trib. 3, including the routed flow from Pond B and the unnamed tributary and runoff from drainage area L, are lower than the allowable flows from the site for all storm events. A total detention volume of 30.36 acre-feet is achieved in this system sustaining at least 1-ft of freeboard within the ponds for the 100-year storm event. Therefore, there is no anticipated adverse impacts to Dry Berry Creek Tributary 3 and the surrounding drainage.

3.2 Williamson County Road 150 Outfall System

The southwestern portion of the site is generally lower in elevation for existing conditions and therefore the storm water system and detention facilities outfalling to the DBC Trib. 3 would be ineffective at capturing and detaining the runoff from the proposed 14.72-acre area. Therefore, the proposed site drainage area labeled E is routed through the drainage infrastructure consisting of three oversized ditches along the proposed road at the southern portion of the site, restricted at the outfall, to act as detention. Proposed drainage area includes 2.39 acres of contributing area that is diverted to the 24-inch culverts crossing under Williamson County Road 150.

The oversized ditches are identified by numbers 1 and 2, from west to east respectively, ultimately outfall through a high-flow/low-flow restrictor before flowing through two dual 24” RCPs towards the Williamson County Road. The high-flow/low-flow restrictor is two outfall pipes. One pipe is set at the flow line of ditch 1 and is a 15-inch diameter RCP, the second pipe is a 24-inch diameter RCP set at an elevation of 689.75 ft. The second pipe acts as an outfall for the larger storm events to convey more water towards the outfall. The two pipes connect to dual 24” RCPs before exiting to the Williamson County Road. The SWQ unit for this system is located in Ditch 2 and acts as the only outfall from Ditch 2 to Ditch 1. The SWQ unit is modeled to function the same as in the large detention pond, only opening after the simulation time hits 12 hours. The connection between the two ditches is a 24" pipe to allow the water to flow through after the SWQ unit has opened. The geometry of the each of the proposed ditches is provided in Table 3.4 and see Exhibit 12 for the Williamson County Road outfall plan and profile.

Table 3.4 - Proposed Ditches Geometry

Ditch	Length (ft)	Bottom Width (ft)	Top Width (ft)	Depth (ft)	Side Slopes (H:V)	Lowest HB Elevation (ft)	100-Year WSEL (ft)
1	494.0	33.0	60.5	4.5	3:1	692.50	692.45
2	286.5	23.6	70.5	7.45	3:1	696.00	695.57

The proposed EPA-SWMM model simulates the two proposed ditches by routing the hydrograph developed in HEC-HMS through the proposed system, see Section 2 for hydrology and hygrograph development. The input hydrograph for the drainage area that flows to these ditches is divided into multiple nodes to better represent where the runoff will flow into the ditches. The fractions of the hydrograph and their respective nodes are described in Appendix D.

The ultimate outfall for the ditch is to the dual 24-inch RCPs that run under the county road, so that the storm water can be conveyed under the road to an existing swale towards Dry Berry Creek. Table 3.5 shows the resulting detention summary for the Williamson County outfall for the 2-year, 5-year, 10-year, 25-year, 50-year and 100-year, Atlas 14 rainfall events.

Table 3.5 – Williamson County Road 150 Outfall Summary

Williamson Co. Outfall		2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Allowable (cfs)		14.90	23.70	32.00	44.60	54.90	66.30
Peak Outflow (cfs)		14.75	20.55	25.67	31.79	37.11	42.36
Max Velocity (ft/s)		4.23	4.54	4.75	5.13	5.91	6.74
WSEL (ft)	Ditch 1	690.40	690.88	691.24	691.73	692.08	692.45
	Ditch 2	691.17	692.00	692.77	693.85	694.70	695.57
Storage Provided (ac-ft)	Ditch 1	0.94	1.19	1.38	1.67	1.88	2.12
	Ditch 2	0.43	0.63	0.84	1.18	1.48	1.8
	Total	1.36	1.82	2.22	2.85	3.37	3.95

3.3 Results and Site Detention Summary

Based on the analysis for both separate stormwater systems, a total detention volume of 34.31 ac-ft of detention, with a detention rate of 0.54 ac-ft/ac was achieved within the proposed detention facilities. The combined peak outflow for the systems in proposed conditions is 80.24 cfs which is 31.36 cfs below the combined allowable peak flow for the two outfalls of 111.60 cfs for the 100-year, Atlas 14 rainfall event. The detention summary table is for the entirety of the proposed developed site is provided in Table 3.6. The comparison of flows to show no adverse impact due to flows from the proposed site for both outfall locations considered can be found in Table 3.7.

Table 3.6 – Overall Site Detention Summary

Outfall Location	Property	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
DBC Trib. 3	Allowable (Pond B) (cfs)	9.81	15.71	21.38	29.68	37.02	45.30
DBC Trib. 3	Outfall (Pond B) (cfs)	8.94	15.02	21.11	27.73	32.98	37.88
DBC Trib. 3	Detention Provided (ac/ft)	10.78	14.31	17.22	21.72	25.73	30.36
County Road 150	Allowable (cfs)	14.90	23.70	32.00	44.60	54.90	66.30
County Road 150	Outfall (cfs)	14.75	20.55	25.67	31.79	37.11	42.36
County Road 150	Detention Provided (ac/ft)	1.36	1.82	2.22	2.85	3.37	3.95
	Total Site Detention (ac/ft)	12.14	16.12	19.45	24.57	29.10	34.31
	Detention Rate (ac/ft/ac)	0.19	0.25	0.30	0.38	0.46	0.54

Table 3.7 – Flow Comparison from Overall Site for No Impact Analysis

	Source/ Drainage Area	Flow Type	2-Year Flow (cfs)	5-Year Flow (cfs)	10-Year Flow (cfs)	25-Year Flow (cfs)	50-Year Flow (cfs)	100-Year Flow (cfs)
Outfall to DBC Trib. 3	A1	Runoff	6.60	10.30	13.90	19.30	23.80	28.60
Outfall to DBC Trib. 3	A2	Runoff	1.60	2.80	4.00	6.00	7.60	9.40
Outfall to DBC Trib. 3	Unnamed Tributary	Routed	110.83	165.56	216.65	292.30	355.28	424.58
Outfall to DBC Trib. 3	Total Allowable	-	119.03	178.66	234.55	317.60	386.68	462.58
Outfall to DBC Trib. 3	Unnamed Tributary (Proposed Realignment)	Routed	107.12	159.85	209.27	282.92	343.76	410.38
Outfall to DBC Trib. 3	L (Undetained runoff)	Runoff	2.10	3.10	3.90	5.00	5.90	6.90
Outfall to DBC Trib. 3	Site (Pond B Outflow)	Routed	8.94	15.02	21.11	27.73	32.98	37.88
Outfall to DBC Trib. 3	Total Proposed Outflow	-	118.16	177.97	234.28	315.65	382.64	455.16
Outfall to DBC Trib. 3	Change	-	-0.87	-0.69	-0.27	-1.95	-4.04	-7.42
Outfall to WCR 150	Allowable	Runoff	14.90	23.70	32.00	44.60	54.90	66.30
Outfall to WCR 150	Proposed Outflow	Routed	14.75	20.55	25.67	31.79	37.11	42.36
Outfall to WCR 150	Change		-0.15	-3.15	-6.33	-12.81	-17.79	-23.94

Section 4 - Conveyance Systems Analysis and Design

This section presents the detailed hydraulic analysis of the existing conveyance systems and proposed modifications to these systems and their impacts to ensure no adverse impacts of the conveyance systems on the surrounding areas. The two conveyance systems analyzed are the unnamed tributary for existing and the planned realignment of a section of the stream through the site (section 4.1) and Dry Berry Creek Tributary 3 (DBC Trib. 3) to inform the design of the crossing from the site to IH 35 service road (section 4.2). The hydrologic method used to determine the peak flows used for both the unnamed tributary and DBC Trib. 3 were performed using the method described in Section 2 of this report. While the hydraulic analysis was performed using both EPA-SWMM and HEC-RAS modeling software. Detailed descriptions of the conveyance analysis and the results for each of the systems and their proposed design can be found in the following sections.

4.1 Realignment of Unnamed Tributary to Dry Berry Creek Tributary 3

An unnamed tributary runs through the center of the site conveying the flows from approximately 153.97 acres upstream and to the east of the site, and outfalls to Dry Berry Creek Tributary 3 (DCB Trib. 3) through a drop structure along the western border of the site, see Exhibit 4. The unnamed tributary is currently unmaintained with much of the stream containing dense brush and grass along its banks. Within the site, there are two 24-inch reinforced concrete pipes through a low water crossing restricting a portion of the stream. The unnamed tributary is to be realigned along the border of the site to allow for a more efficient site plan. The newly constructed section of channel is sized to convey the 100-year storm event within its banks with an additional 1-ft of freeboard, assuming a trapezoidal cross-section with maximum side slope of 3:1. The new outfall for the channel will connect 551 feet upstream of the existing outfall into DBC Trib. 3, see Exhibit 11 for the proposed outfall plan and profile. The upstream portion of the realigned channel will tie back into the existing unnamed tributary on the east boundary of the property. See Exhibit 5 for the overall proposed plan and Exhibit 13 and 14 for the detailed realignment plan and cross-sections. A combination of HEC-HMS hydrologic modeling and EPA-SWMM hydraulic modeling are used to determine the existing conditions and to inform the design of the realigned channel for no impacts to the receiving stream.

4.1.1 Hydrologic Analysis

The full NRCS hydrologic method is applied based on the requirements in the City of Georgetown Drainage Criteria Manual, 2004. The hydrologic model HEC-HMS (version 4.9) is used to determine the peak flows and create hydrographs for the drainage areas contributing to the unnamed tributary for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year, NOAA Atlas 14 storm events. Two drainage areas were considered to contribute to the flows within the unnamed tributary, including drainage areas A3 (SW in proposed) and TS. TS is the drainage area leading up to the point where the unnamed tributary enters the site and A3/SW covers the area draining to the tributary within the boundaries of the site, see Exhibits 7 and 8 for existing and proposed drainage areas respectively. The resulting drainage area, time of concentration, and peak flows are shown in Table 4.1. A detailed description of the hydrologic method applied is outlined in Section 2 of this report with the detailed time of concentration calculations in Appendix A, and HEC-HMS inputs in Appendix B.

Table 4.1 – Hydrologic Summary of Unnamed Tributary Drainage Areas for Existing and Proposed Conditions

Condition	Drainage Area ID	Drainage Area (AC)	CN	T_C (min)	Peak Flow Out (cfs)					
					2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Existing	A3	7.41	80.56	22.06	8.90	13.20	17.10	22.70	27.30	32.20
Existing	TS	153.97	80.62	51.71	104.80	156.40	204.80	276.90	336.40	401.50
Proposed	SW	4.23	83.91	10.00	9.00	12.70	16.00	20.80	24.50	28.40

4.1.2 Hydraulic Modeling Inputs

The EPA-SWMM model (version 5.2) is used to route the hygrographs from HEC-HMS and determine the existing and proposed routed maximum outflow and hydraulic grade line within the unnamed tributary for the NOAA Atlas 14 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year storm events. The peak outflow from the EPA-SWMM models, representing each of the storm events and conditions, are applied to a HEC-RAS hydraulic model for DBC Trib.3 at their respective inflow locations along the cross-sections to assess no adverse impact to the receiving stream.

The existing conditions routed maximum outflow from EPA-SWMM was added to the peak sheet flow, from the site to DBC Trib. 3 to establish the total allowable peak flow from the site to DBC Trib. 3 for each of the storm events. The tributary top width of the bank varies from 25 to 50 feet and the depth of the channel cross-section varies from 3 to 5 feet. For the EPA-SWMM existing model, 4 nodes represent various points along the tributary to the outfall at DBC Trib. 3. Links connecting the nodes are modeled as irregular cross-sections represented by four cross-section elevation-station relationships determined from recent topographic survey. Two 24-inch RCPs are modeled with a weir to allow for overtopping the low-water crossing. The hydrograph from the drainage area TS is applied at the upstream end of the model, at the border of the site, while the hydrograph for drainage area A3 is divided into the remaining nodes along the unnamed tributary. The resulting peak flow from the existing unnamed tributary for each of the storm events can be found in Table 4.2 while the detailed determination of the allowable peak flows can be found in Section 3.1 for the system out falling to DBC Trib. 3.

The purpose of using a hydraulic model to determine the proposed routed flow from the realigned unnamed tributary is two-fold, to establish no impact from the detention facilities of the site and to inform design of the realigned channel. First, the proposed routed peak flow from the outfall of the site detention system to DBC Trib. 3 and the routed peak flow from the proposed realigned unnamed tributary were summed to calculate the total peak flow leaving the site and establish no impact from the development to DBC Trib. 3. Second, the proposed model was used to inform the design for the cross-sections and slope of the realigned tributary by ensuring the peak water surface elevations in the channel were below the 1-ft freeboard of the high bank per the City of Georgetown Drainage Criteria Manual.

The cross-section geometry initially used in EPA-SWMM for the proposed unnamed tributary was calculated with Manning's equation using the combined 100-year peak flow for the drainage areas TS and SW and assuming a trapezoidal cross-section. The proposed segment has a lower roughness coefficient than existing conditions in the links of the EPA-SWMM models due to the new construction of the straight and clean tributary segment. Within EPA-SWMM the hydrograph from TS was applied at the upstream end (unchanged from existing conditions) and the SW hydrograph was divided between the nodes along the proposed channel, see Appendix D for the specific fraction of hydrograph SW applied to each of the nodes in the proposed unnamed tributary.

4.1.2 Hydraulic Analysis Results and Discussion

An iterative approach was used to define the designed cross-sections along the proposed tributary segment. Small adjustments of the cross-section geometry and slope of the links in the model were made with the aim of getting the peak water surface elevation lower than 1-foot of freeboard below the high bank of the proposed cross-section at each of the nodes until optimal cross-section and flowline elevations were determined. This resulted in proposed cross-sections which vary slightly for each link, but in general the proposed tributary has a 5 to 6-foot bottom width with 3:1 side slopes. The resulting flowline slope for the proposed tributary segment varies from 0.67% at the upstream end to 1.43% at the downstream end. See Exhibits 13 and 14 for the proposed realignment of the unnamed tributary segment plan and cross-section details, respectively. The resulting peak outflow from the existing and proposed unnamed tributary for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year are compared in Table 4.2 below.

Table 4.2 – Unnamed Tributary Peak Outflow (Routed)

Condition	Drainage Area (AC)	Manning's n	Peak Flow Out (cfs)					
			2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Existing	161.38	0.055	110.83	165.56	216.65	292.30	355.28	424.58
Proposed	158.19	0.04	107.12	159.85	209.27	282.92	343.76	410.38
Difference			-3.71	-5.71	-7.38	-9.38	-11.52	-14.20

While an increased peak flow would be expected from the proposed realignment and removal of brush in this segment of the unnamed tributary, the realignment lengthened the tributary segment and reduced the drainage area flowing directly to the tributary from the site. Based on the resulting peak outflow, the reduction in drainage area counteracted the proposed improvement to conveyance and associated higher peak flows that would have been expected. The outfall for the unnamed tributary was moved 551 feet upstream along DBC Trib. 3 as a part of the proposed realignment, see Exhibit 11. To determine if this would impact the receiving stream, the updated peak flows from the realigned unnamed tributary, as well as from the detention pond, were input into the DBC Trib. 3 proposed model at the cross-sections corresponding with the proposed outfall locations. These flows were included in the conveyance analysis of the channel crossing and improvements to Dry Berry Creek Tributary 3 (DBC Trib. 3) with results and detailed analysis in Section 4.2 of this report.

In addition to analyzing the potential impacts downstream of the proposed realignment of the unnamed tributary, the resulting water surface elevations were determined for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year at the upstream node of the unnamed tributary segment across the site are compared for existing and proposed conditions in Table 4.3.

Table 4.3 – Unnamed Tributary Upstream Node Water Surface Elevations

Condition	WSEL of the Upstream Node (ft)					
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Existing	710.59	711.06	711.42	711.98	712.09	712.37
Proposed	710.08	710.56	710.92	711.37	711.70	712.00
Difference	-0.51	-0.50	-0.50	-0.61	-0.39	-0.37

The water surface elevations at the upstream boundary were compared for existing and proposed to ensure no impact on the upstream of the site for each of the storm events. This assumes that if the proposed water surface elevation at the site is at or below the existing water surface elevation, that there is no additional impairment of water getting across the site from the upstream adjacent properties.

4.2 Channel Crossing and Improvement to Dry Berry Creek Tributary 3 (TxDOT)

Dry Berry Creek Tributary 3 (DBC Trib. 3) flows along the site boundary to the west of the site, disconnecting the site from the northbound IH 35 service road. This segment of DBC Trib. 3 is maintained by and within the right-of-way for TxDOT. To gain additional roadway access to the site, a bridge crossing over a portion of DBC Trib. 3 is proposed, with the additional need for a deceleration lane along the IH 35 service road which requires the roadway and shoulder to encroach on the creek. The bridge crossing will have a 45-ft wide road but spans approximately 169-ft wide with three - 10’ x 9’ reinforced box culverts to convey the creek under the crossing. The encroachment into DBC Trib. 3 due to the deceleration lane is directly downstream of the crossing and extends 575-ft southward with a maximum encroachment into the creek of 16-ft. The hydraulic analysis to determine existing conditions and to inform the channel improvements to offset the encroachment along DBC Trib. 3 were performed using a steady, hydraulic model created by US Army Corps of Engineers (HEC-RAS version 6.3.1). The following section outlines the methods and results for the conveyance analysis of DBC Trib. 3.

4.2.1 Peak Flows and Flow File Inputs

Based on the City of Georgetown Drainage Criteria Manual, the NRCS hydrologic method using HEC-HMS (version 4.9) is used to determine the peak flows and create hydrographs for the drainage areas contributing to the unnamed tributary for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year, NOAA Atlas 14 storm events. A detailed description of the hydrologic method applied is outlined in Section 2 of this report, with the detailed time of concentration calculations in Appendix A and HEC-HMS inputs in Appendix B. The subbasins ultimately draining to DBC Trib. 3 at the site with the contributing area, time of concentrations and peak flows are listed in Table 4.4. The majority of flow contributing to DBC Trib. 3 is received from upstream of the northern site boundary and is represented in the drainage area called US DBC Trib. 3, see Exhibit 6 for the drainage area boundary. See Exhibits 7 and 8 for existing and proposed drainage areas on the site respectively.

Table 4.4 – Hydrologic Summary of DBC Trib.3 Drainage Areas for Existing and Proposed Conditions

Condition	Drainage Area Name	Drainage Area (ac)	CN	TC (min)	Peak Flow (cfs)					
					2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Existing	A1	10.07	75.67	39.60	6.60	10.30	13.90	19.30	23.80	28.60
Existing	A2	3.22	66.99	29.06	1.60	2.80	4.00	6.00	7.60	9.40
Existing	A3	7.41	80.56	22.06	8.90	13.20	17.10	22.70	27.30	32.20
Existing	TS	153.97	80.62	51.71	104.80	156.40	204.80	276.90	336.40	401.50
Existing	US DBC Trib. 3	1349.03	81.80	132.05	468.60	703.70	934.50	1286.50	1590.20	1935.00
Proposed	S	43.56	95.06	11.99	183.50	236.30	280.10	343.90	393.90	446.50
Proposed	SW	4.23	83.91	10.00	9.00	12.70	16.00	20.80	24.50	28.40
Proposed	TS	153.97	80.62	51.71	104.80	156.40	204.80	276.90	336.40	401.50
Proposed	US DBC Trib. 3	1349.03	81.80	132.05	468.60	703.70	934.50	1286.50	1590.20	1935.00

The steady state flow inputs are determined based on the peak runoff from HEC-HMS for all the subbasins except the routed peak flows from the unnamed tributary in existing and proposed and the routed peak flow from the site in proposed conditions. In existing conditions, fractions of the peak runoff for drainage areas A1 and A2 are incrementally added to each of the cross-sections based on where the area flows into the creek. The upstream flows for DBC Trib. 3 remain the same between existing and developed conditions since it is assumed there is no change from existing to proposed in the upstream drainage area. The realigned unnamed tributary is reflected in the model by applying the flows from the new swale at the appropriate cross-section further upstream. The outfall of the detention pond on the site is also added at the appropriate cross-section to reflect the changes made to the site in the developed condition. The list of river stations with inputs and associated flows and source of flows for the HEC-RAS model 100-year storm in existing and proposed conditions are shown in Table 4.5.

Table 4.5 – Dry Berry Creek Tributary 3 Inflows for the 100-Year Storm

100-Year	Existing			Proposed		
River Station	Source	Source Flow (cfs)	Total Flow (cfs)	Source	Source Flow (cfs)	Total Flow (cfs)
2756	DBC Trib. 3	1935.00	1935.00	DBC Trib. 3	1935.00	1935.00
1323	-	-	1935.00	PR Unnamed Trib.	410.38	2345.38
1239	.33 A1	9.44	1944.44	-	-	2345.38
1035	.34 A1	9.72	1954.16	-	-	2345.38
931	.33 A1	9.44	1963.60	-	-	2345.38
773	EX Unnamed Trib.	424.09	2387.69	-	-	2345.38
689	.5 A2	4.70	2392.39	Pond	37.88	2383.26
629	.5 A2	4.70	2397.09	-	-	2383.26
391	-	-	2397.09	Parking Lot	6.90	2390.16

4.2.2 HEC-RAS Geometry Setup

A hydraulic HEC-RAS model was created to evaluate the effect of the proposed changes on the receiving stream, DBC Trib. 3 based on comparing the resulting water surface elevations in the creek. The HEC-RAS geometry is modeling a segment from the outfall of DBC Trib. 3 into Dry Berry Creek, approximately 2756 linear feet upstream, just downstream of an unmarked low-water crossing. The station elevation data in the existing conditions geometry file determined using a combination of 2015 and 2016 LiDAR, from TNRIS, and recent topographic survey. The location of the river station cross-sections and structures remain unchanged from existing to proposed conditions, see Exhibit 18. Along the modeled segment DBC Trib. 3, there is an existing low-water crossing, two concrete drop structures and a bridge with three 9' x 9' box culverts, just downstream of the site. The Manning's n-value for the existing creek of 0.055 is determined based on Table 6-1 in the City of Georgetown Drainage Criteria Manual, adopted 2004, for an unmaintained grass lined channel, shown in Table 4.6.

Table 4.6 – Typical Manning's n-Value (Table 6-1 in the COG DCM)

6.5.4 Channel Description	6.5.5 Typical Manning's "n" Value
Man Made Maintained Grass Lined	.040
Man Made Unmaintained Grass Lined	.055
Concrete Lined	.015
Rock Riprap Lined	.045
Overbanks and Existing Unimproved Channels	See References 1 and 2

In order to create the proposed HEC-RAS geometry, the cross-sections were copied from existing conditions and modified to reflect the proposed changes to DBC Trib. 3 based on the proposed plan and grading. The changes reflected in the HEC-RAS cross-section geometry include a new bridge spanning across DBC Trib. 3 with a width of 169-ft and three - 10’ x 9’ reinforced concrete boxes allowing flow under the crossing with a flow line of 685.26 ft. The cross-sections intersecting the proposed deceleration lane were updated to reflect the offset due to the intrusion of the proposed retaining wall for the S IH 35 Service Road. To remedy the loss of conveyance due to narrowing of the creek, the flowline and slopes are to be improved by creating a smooth straight flowline with a regular cross-section, removing additional areas that are uneven and creating a more efficient section of the ditch. In addition, the 278.07-ft long portion of the ditch, from the outfall of the box culverts to the end of the deceleration lane, will need to have the side-slope nearest the site concrete lined to further improve conveyance. Also, between the area just south of the new confluence of the tributary and the box culverts, the creek is slightly benched to improve conveyance even further. The amount of reshaping and length of concrete lining of the ditch is determined using the HEC-RAS model, by adjusting the length and cross-sections along the creek until there were no increases in water surface elevations along DBC Trib. 3.

4.2.3 HEC-RAS Results and Discussion

Table 4.7 below shows the resulting water surface elevations along DBC Trib. 3 for the existing and proposed conditions for the 100-year storm event. Additionally, the resulting water surface elevation comparisons for each of the storm events for each river station can be found in the tables in Appendix C.

Table 4.7 – Comparison of HEC-RAS Water Surface Elevations (ft) for 100-year storm event

River Station	Description	100-Year		
		Existing	Developed	Difference
2756		706.38	706.38	0.00
2481.432		704.21	704.2	-0.01
2339.3		703.18	703.16	-0.02
2186.27		702.42	702.38	-0.04
2033.3		700.84	700.71	-0.13
1873.491		700.18	700.02	-0.16
1754.75		699.73	699.48	-0.25
1669.61		698.87	698.77	-0.10
1636		698.81	698.72	-0.09
1606.165		697.66	697.52	-0.14
1446.556		697.41	697.17	-0.24
1329.233	Proposed creek confluence	696.82	695.77	-1.05
1239.248	Proposed bridge and culverts	696.04	695.73	-0.31
1035.045		695.19	694.11	-1.08
931.5203		694.97	693.91	-1.06
859.808		694.51	693.67	-0.84
773.1894	Existing creek confluence	694.29	693.49	-0.80
688.8698	Proposed pond outfall	693.77	693.15	-0.62
629.3376		693.39	692.93	-0.46
546.6989		692.91	692.81	-0.10
482.2835		692.47	692.45	-0.02
391.3088	Parking lot runoff	692.45	692.43	-0.02
316.3175	Williamson County Road 150	692.02	692.01	-0.01
61		689.11	689.11	0
30		689.11	689.1	-0.01

Based on the results of the conveyance analysis, the proposed crossing with three 10’ x 9’ box culverts and cross-section adjustments, including concrete lining and straightening of the ditch section show no adverse impacts to Dry Berry Creek Tributary 3.

Summary

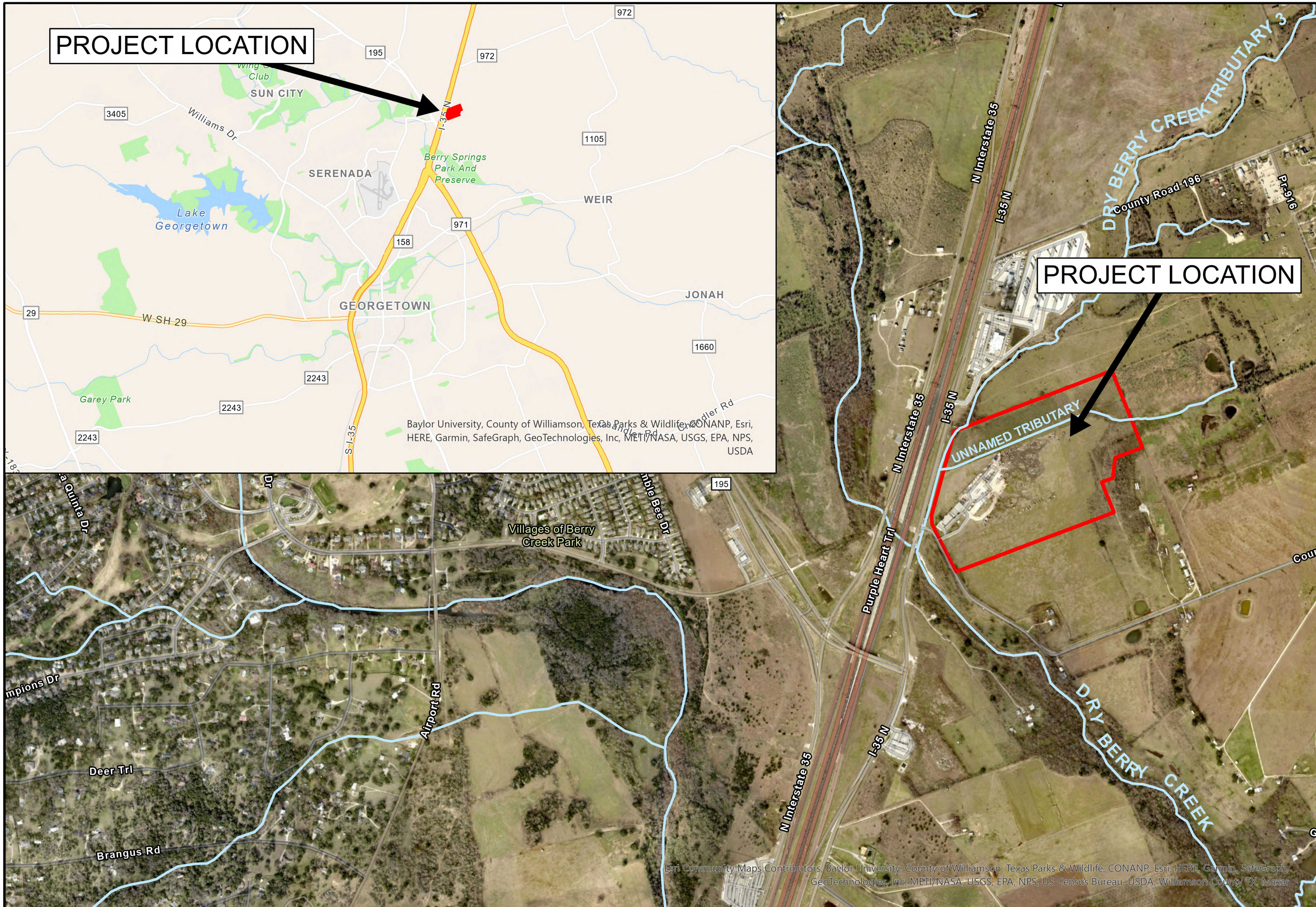
Based on the above onsite detention and conveyance analyses, it is concluded that the proposed project has no adverse impact to flood hazard conditions on the receiving waterways, including downstream properties within Williamson County and the City of Georgetown, for storm events up to and including the Atlas 14 100-year storm event. The following storm water detention routing table for the development of Georgetown Keystone is provided:

Storm Water Routing Summary Table

Rainfall Event Probability	Allowable Peak Flow (cfs)	Post-Project Peak Runoff to Site (cfs)	Peak Outflow from Site (cfs)	Max Water Surface Elevation[1] (ft)	Peak Storage Volume (ac-ft)	Storage Rate (ac-ft/ac)
50% Exceedance (2-Year)	119.02[1] 14.90[2]	190.90[1] 53.20[2]	8.94[1] 14.75[2]	690.17[B] 693.33[A]	12.14	0.19
20% Exceedance (5-Year)	178.65[1] 23.70[2]	247.70[1] 69.30[2]	15.02[1] 20.55[2]	691.11[B] 694.40[A]	16.13	0.25
10% Exceedance (10-Year)	234.51[1] 32.00[2]	295.20[1] 82.60[2]	21.11[1] 25.67[2]	691.83[B] 695.29[A]	35.57	0.30
4% Exceedance (25-Year)	317.60[1] 44.60[2]	364.50[1] 101.90[2]	27.73[1] 31.79[2]	692.89[B] 696.64[A]	24.58	0.38
2% Exceedance (50-Year)	385.89[1] 54.90[2]	418.90[1] 117.00[2]	32.98[1] 37.11[2]	693.81[B] 697.76[A]	29.1	0.46
1% Exceedance (100-Year)	462.09[1] 66.30[2]	476.20[1] 132.90[2]	37.88[1] 42.36[2]	694.80[B] 699.00[A]	34.31	0.54

[1]Dry Berry Creek Tributary 3 Outfall (Allowable peak flow is the sum of the unnamed tributary peak outflow, Pond B peak outflow and the undetained area L peak runoff Post-development peak flow is the sum of the unnamed tributary peak outflow, Pond B peak outflow and the peak runoff from the undetained area L)
[2]Williamson County Road 150 Outfall
[A]Pond A
[B]Pond B

EXHIBITS



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GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

LOCATION AND VICINITY

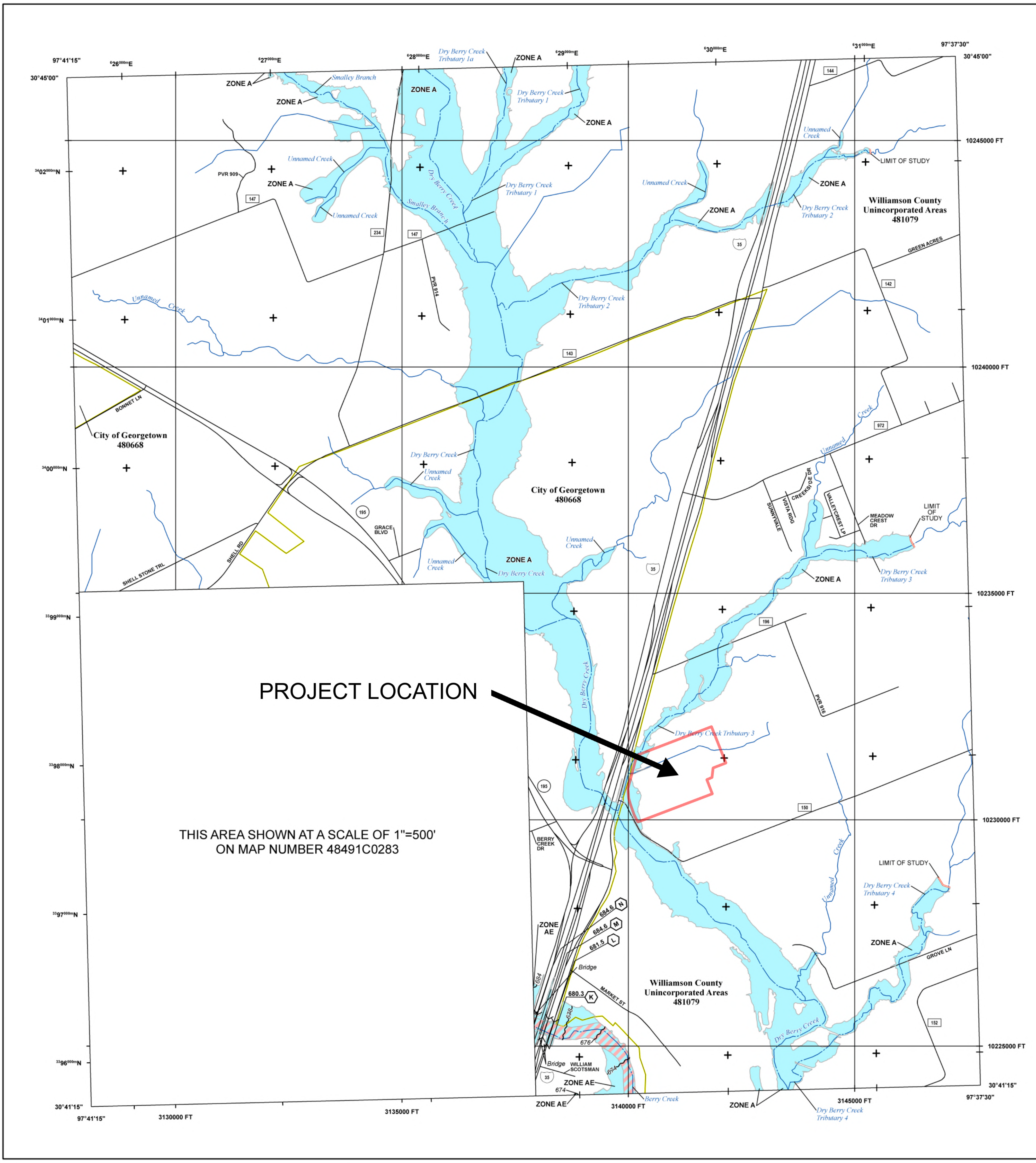
N

Feet
0 500 1,000

EXHIBIT 1

2/10/2023

Path: Z:_GIS_Projects\00400\00486_StewartBuilders\009-GeorgetownNEW\Georgetown\Georgetown.aprx



FLOOD HAZARD INFORMATION

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

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

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

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

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

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

OTHER FEATURES
- (E) 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- (8) Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

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

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

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

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

Base map information shown on this FIRM was derived from digital data obtained from Texas Natural Resource Information Systems (TNRIS), dated 2000; United States Census Bureau, dated 2015; United States Geological Survey, dated 2005; and the Williamson County Geographic Information Systems (GIS) Department, dated 2014 and 2017.

SCALE

N

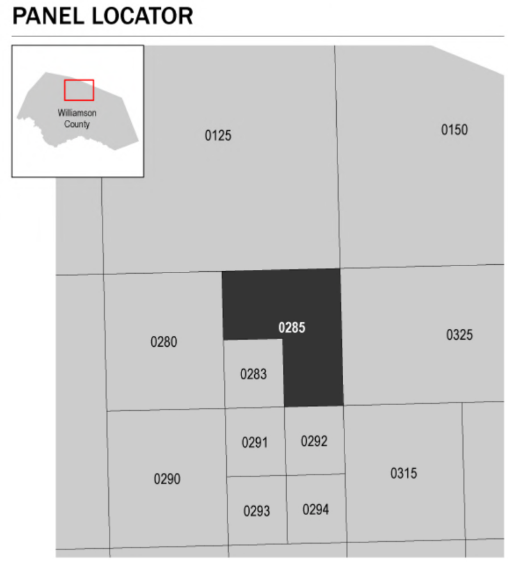
Map Projection:
Texas State Plane Central (FIPS ZONE 4203); North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 1,000 feet 1:12,000

0 1,000 2,000 4,000 feet

0 250 500 1,000 meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

WILLIAMSON COUNTY, TEXAS
and Incorporated Areas

PANEL **285** OF **750**

FEMA

Panel Contains:

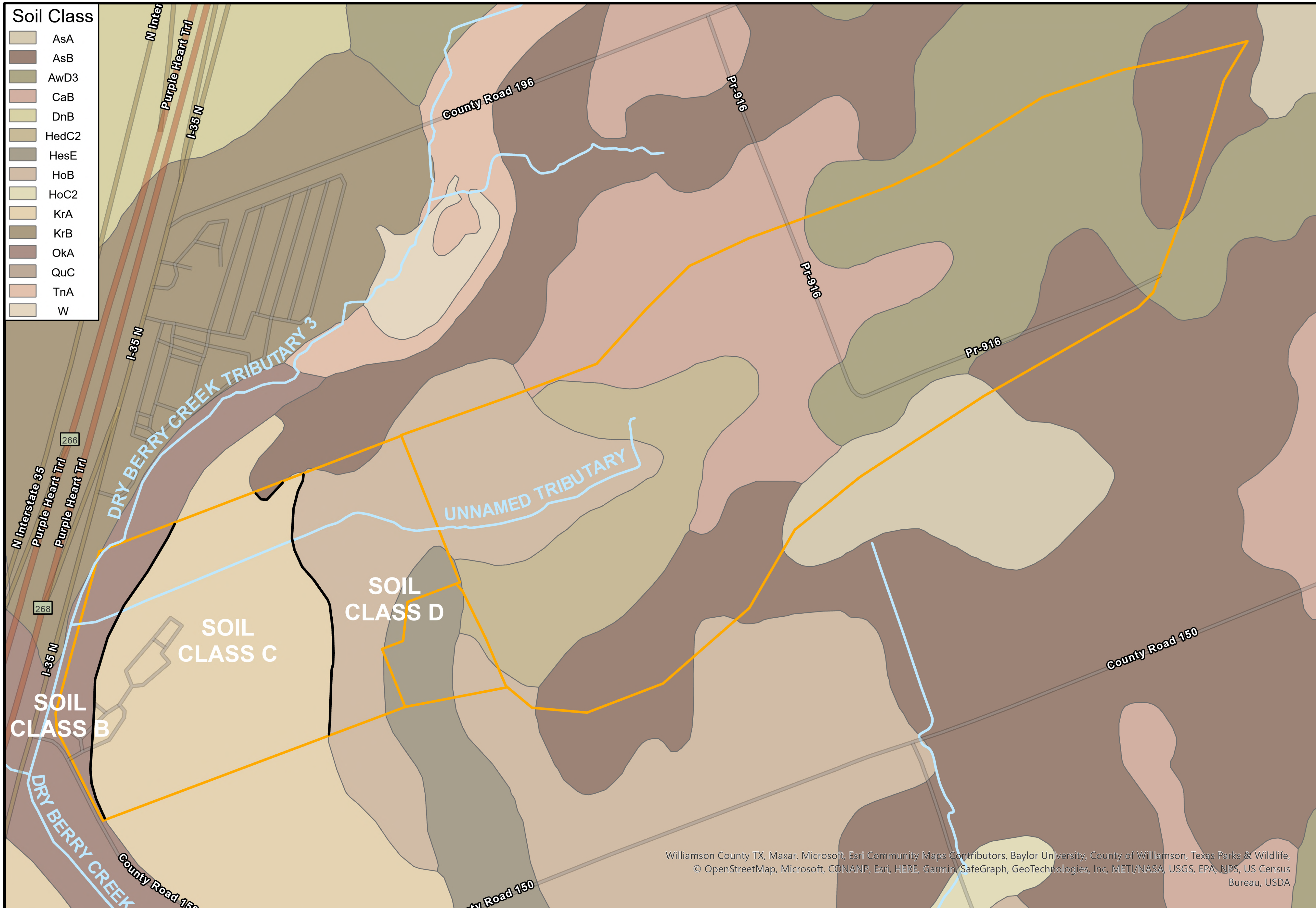
COMMUNITY	NUMBER	PANEL	SUFFIX
GEORGETOWN, CITY OF	480668	0285	F
WILLIAMSON COUNTY	481079	0285	F

EXHIBIT 2
2/10/2023

VERSION NUMBER
2.3.3.3

MAP NUMBER
48491C0285F

MAP REVISED
DECEMBER 20, 2019



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GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

USDA SOIL CLASS MAP

N

Feet
0 290 580

EXHIBIT 3

2/10/2023

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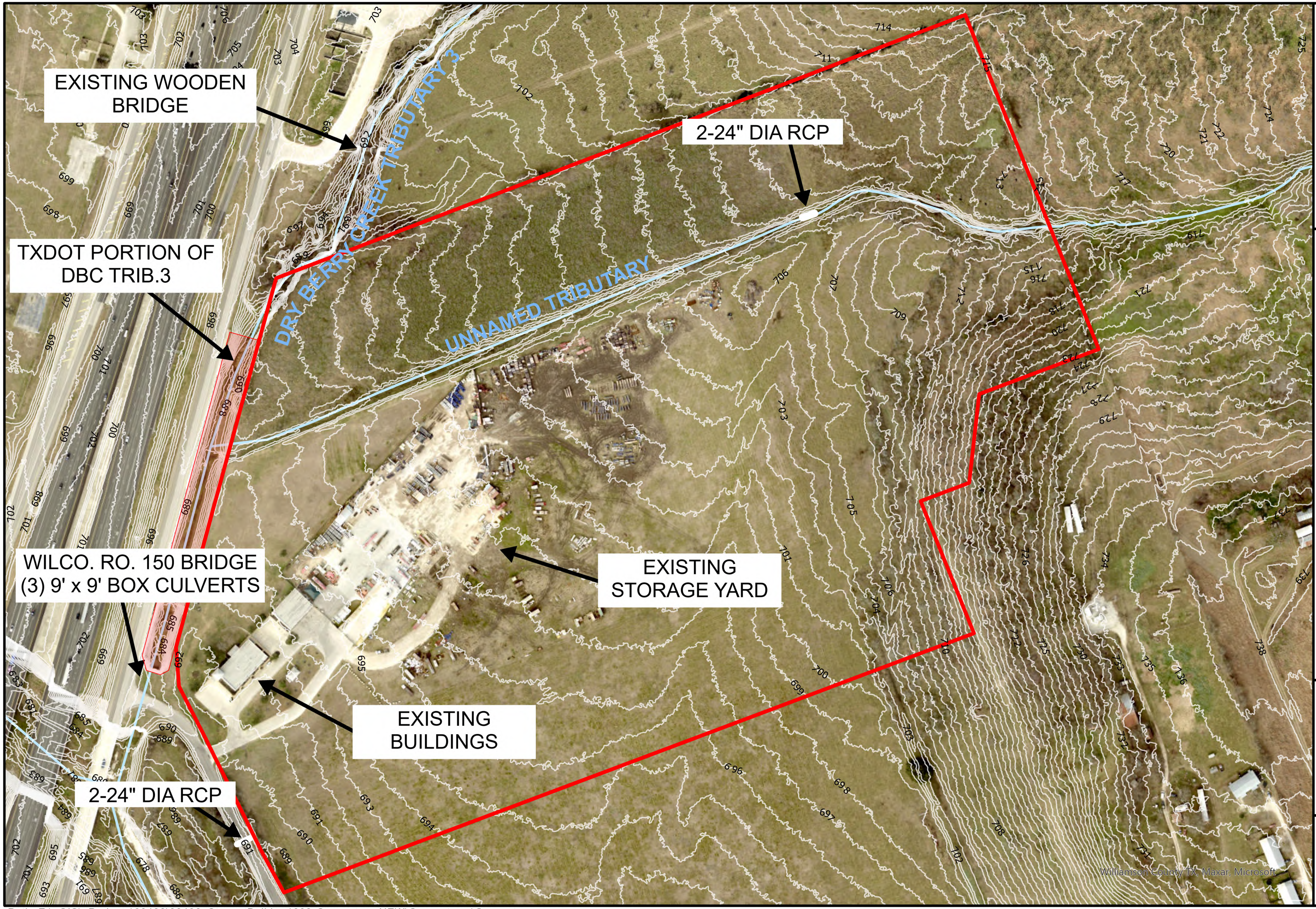

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GEORGETOWN KEYSTONE DRAINAGE IMPACT ANALYSIS

EXISTING SITE CONDITIONS

N

Feet
0 137.5 275

EXHIBIT 4

2/10/2023

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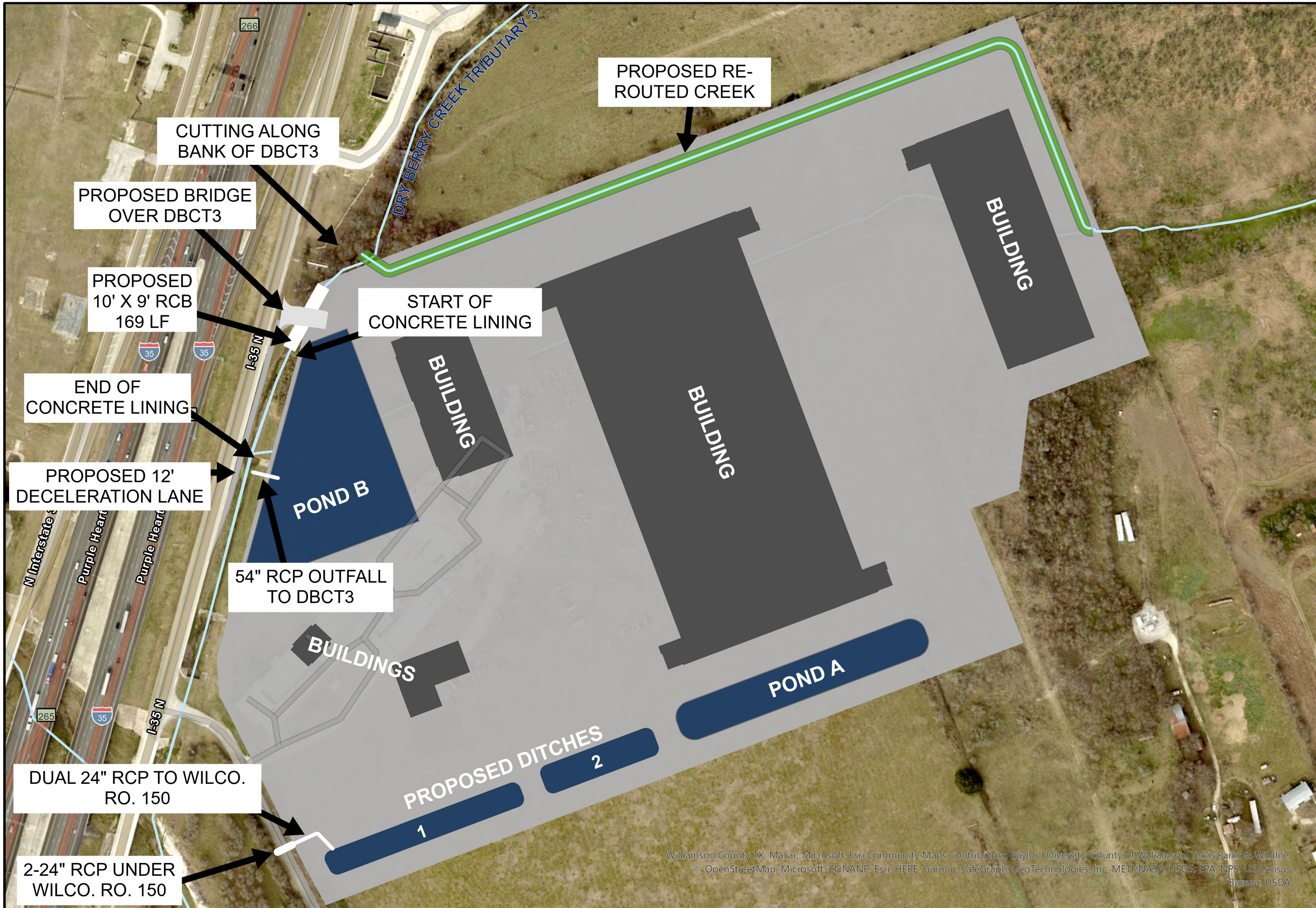

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GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

DEVELOPED SITE CONDITIONS

N

Feet
0 125 250

EXHIBIT 5

2/10/2023

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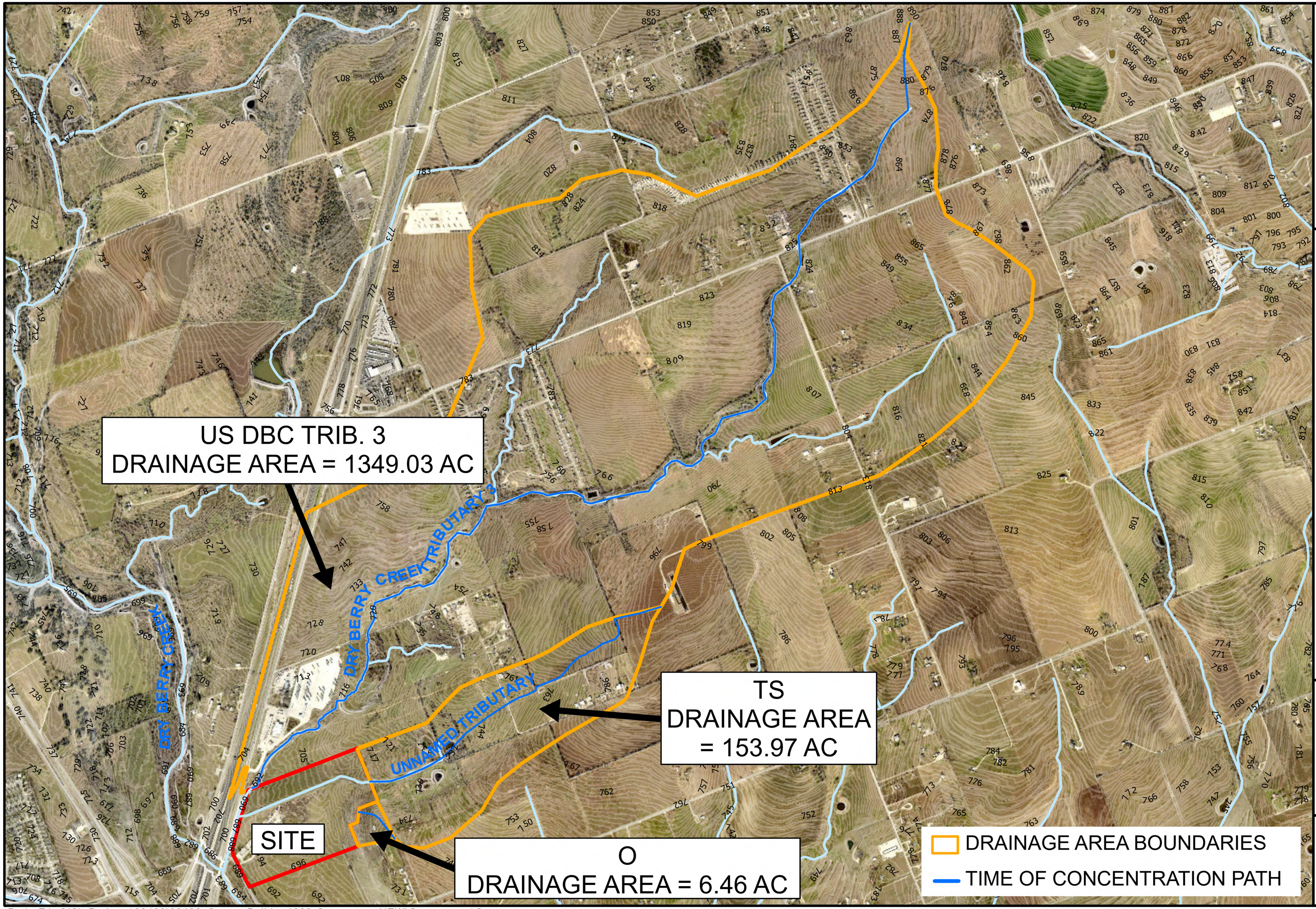

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GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

OFFSITE DRAINAGE AREAS

N

Feet
0 500 1,000

EXHIBIT 6

2/10/2023

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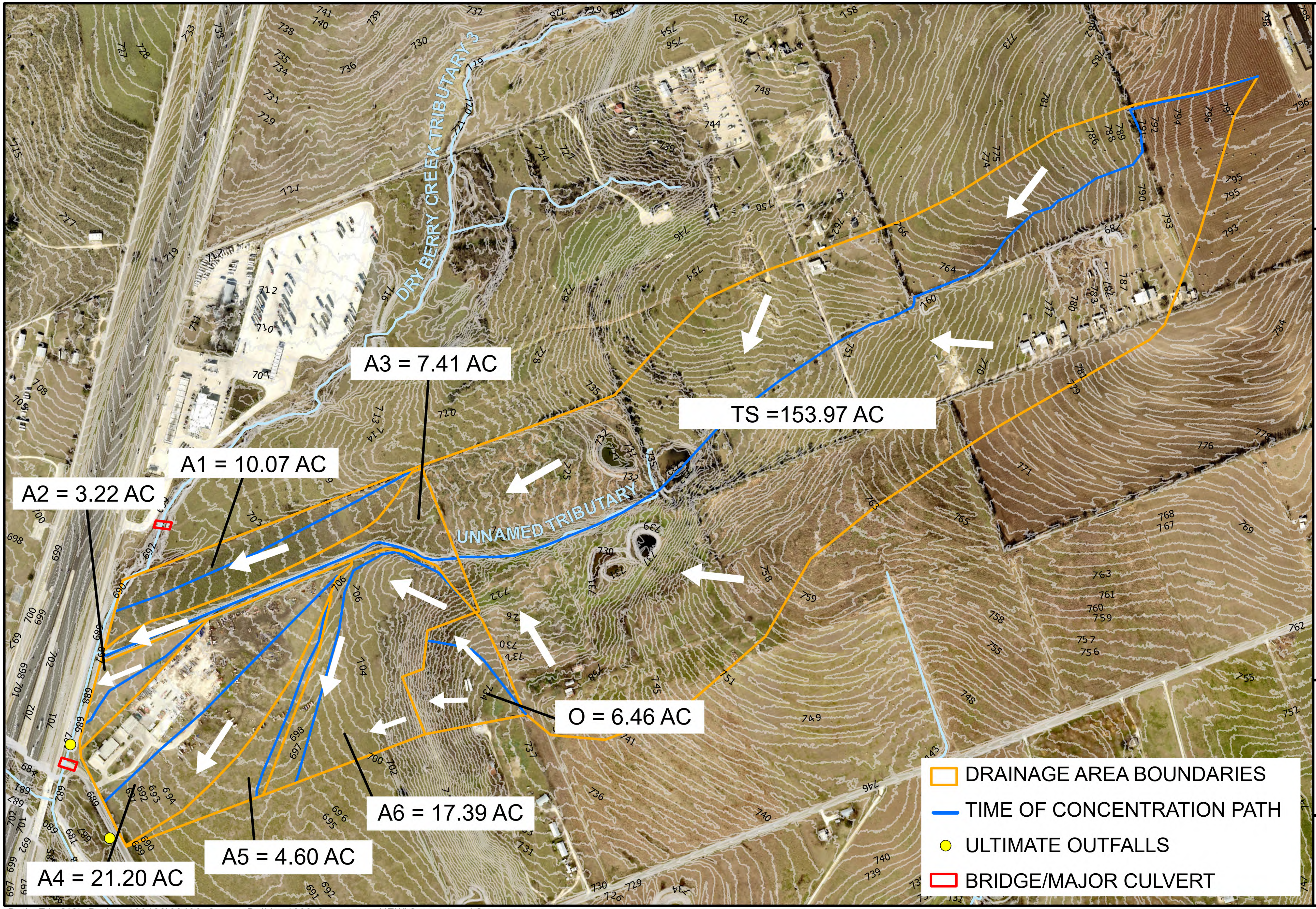

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GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

EXISTING DRAINAGE AREAS

N

Feet
0 315 630

EXHIBIT 7

2/10/2023

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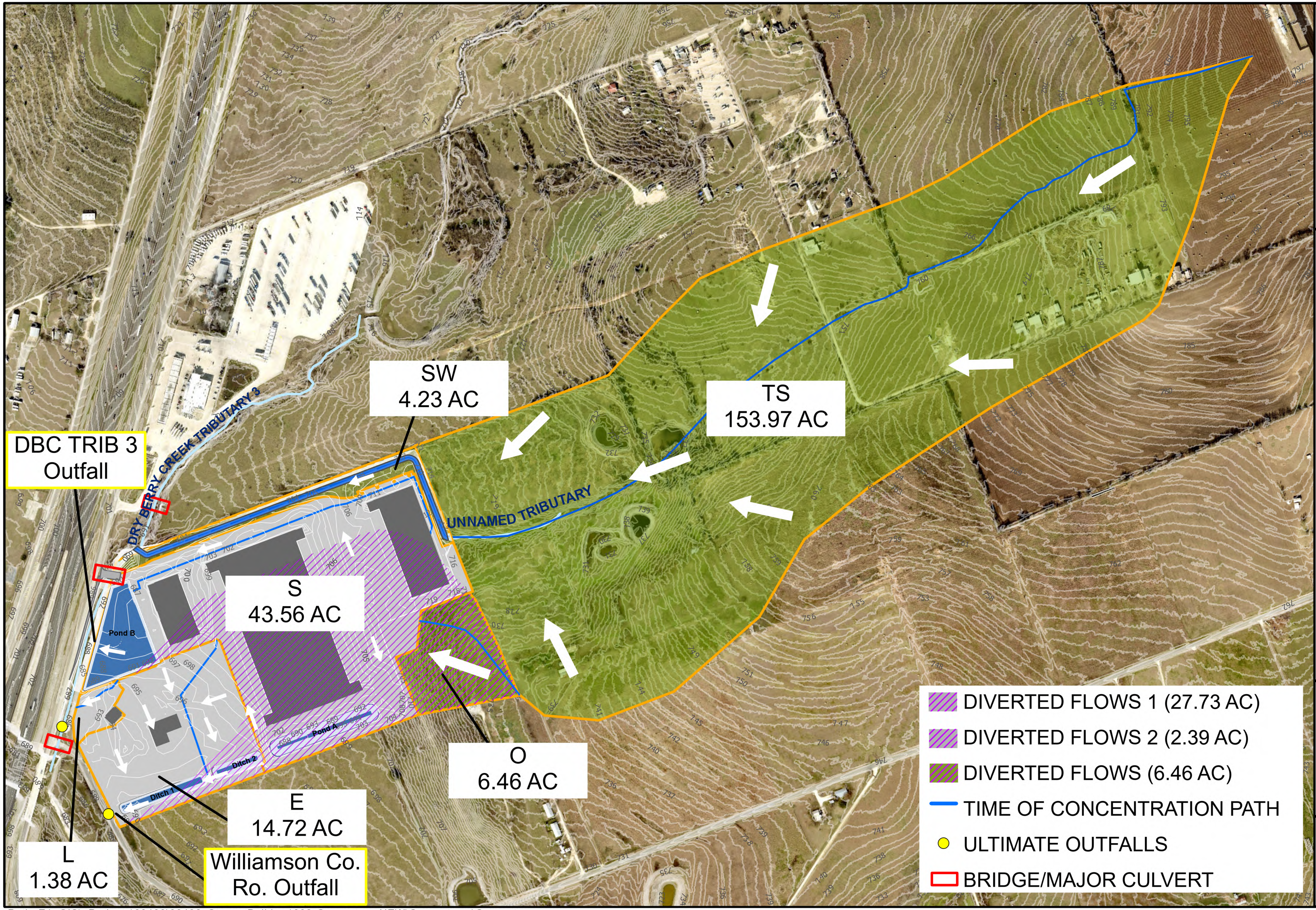

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GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

PROPOSED DRAINAGE AREAS

N

Feet
0 290 580

EXHIBIT 8

2/10/2023

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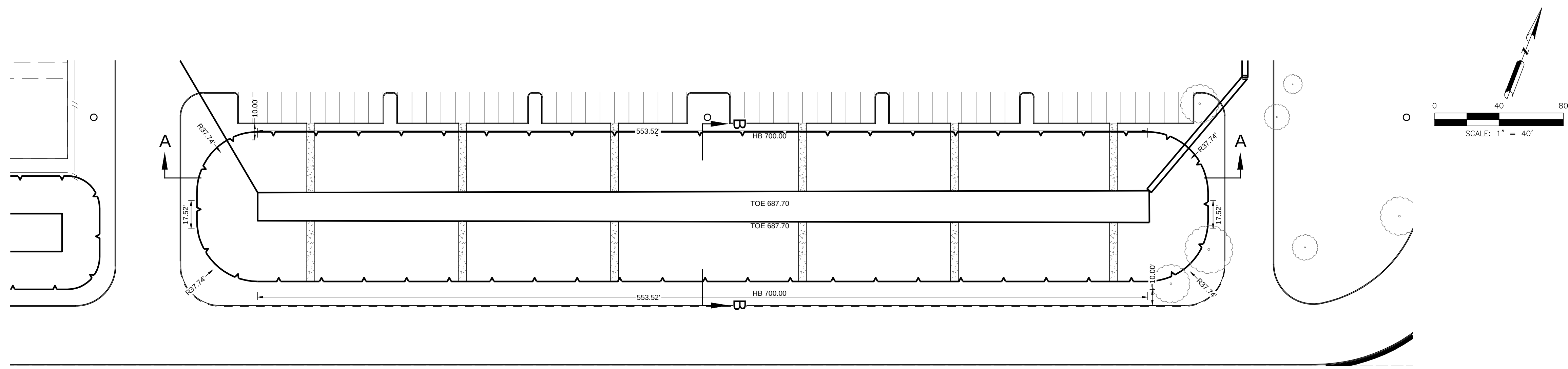
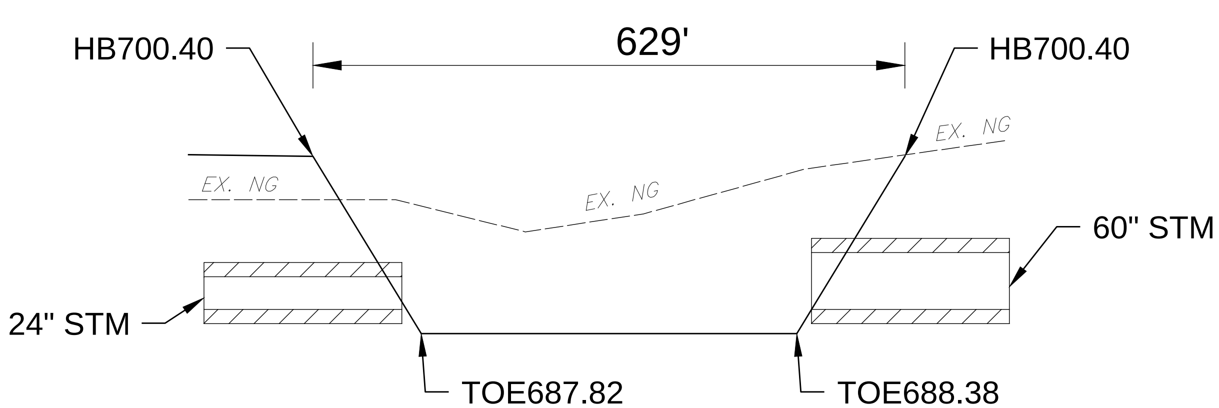
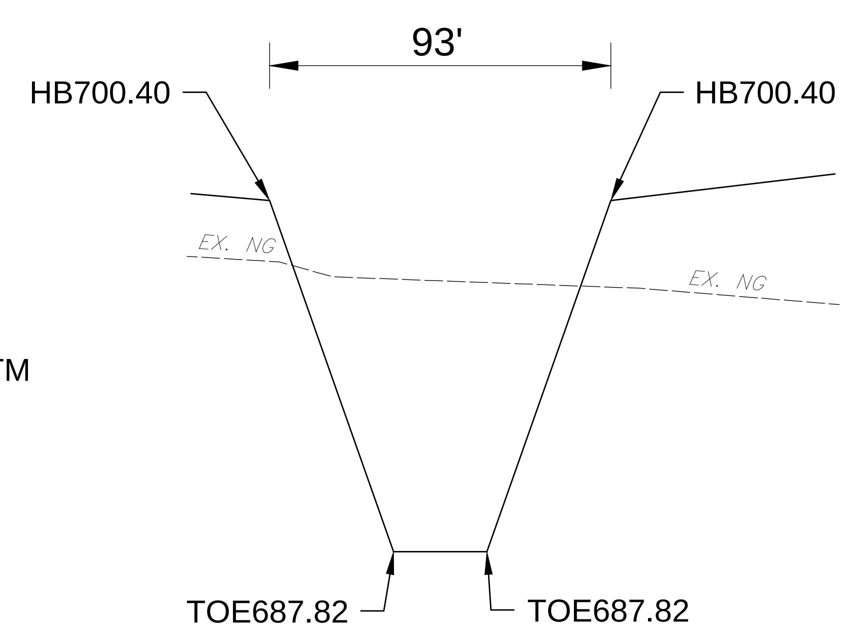


POND A



CROSS SECTION A-A:



CROSS SECTION B-B:

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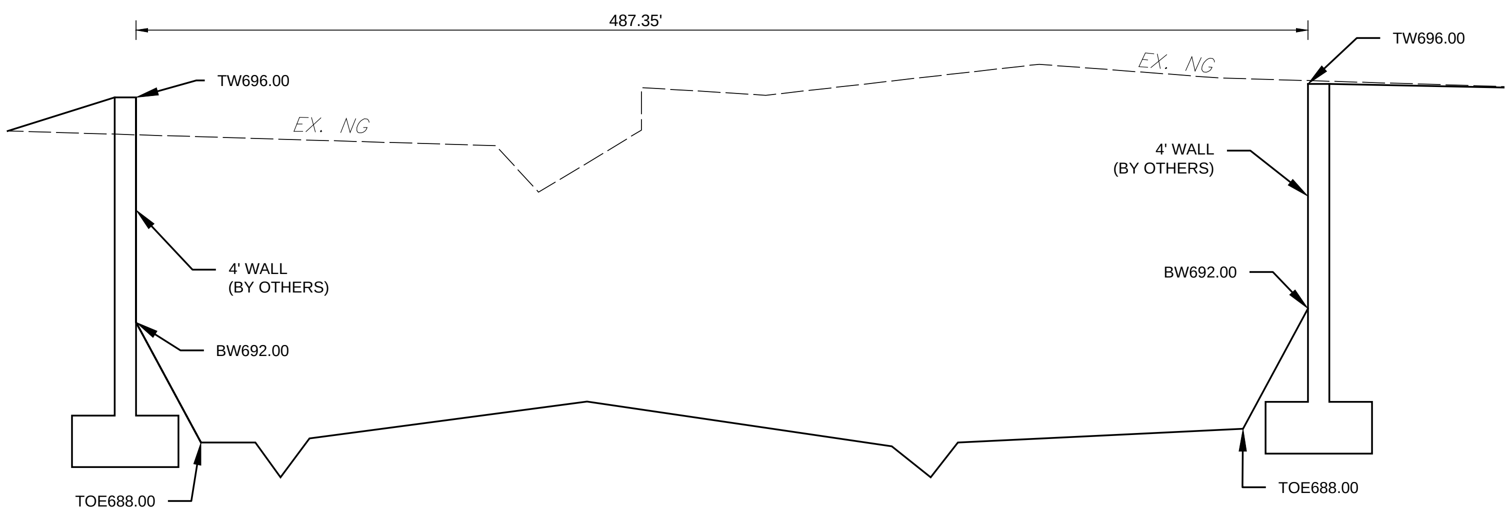
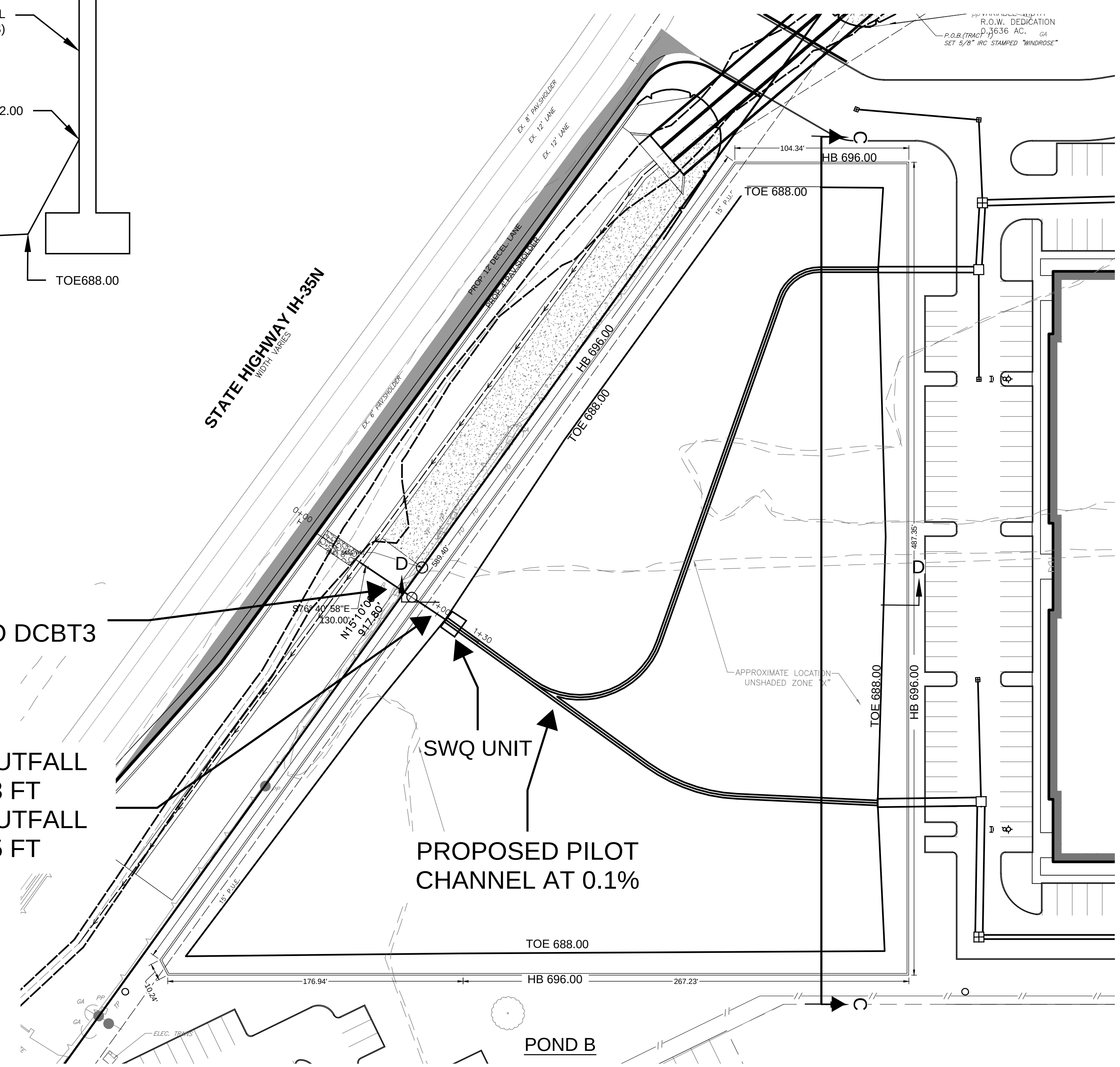
GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

DETENTION POND A
PLAN AND PROFILE

EXHIBIT 9

2/10/2023





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GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

**DETENTION POND B
PLAN AND PROFILE**

EXHIBIT 10

12/09/2022

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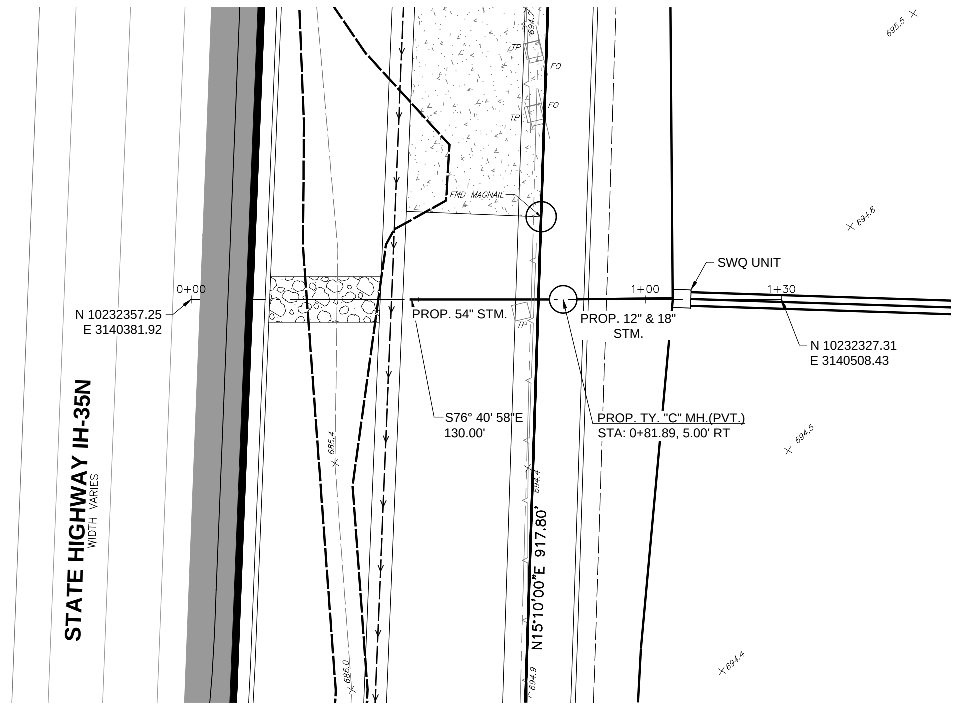

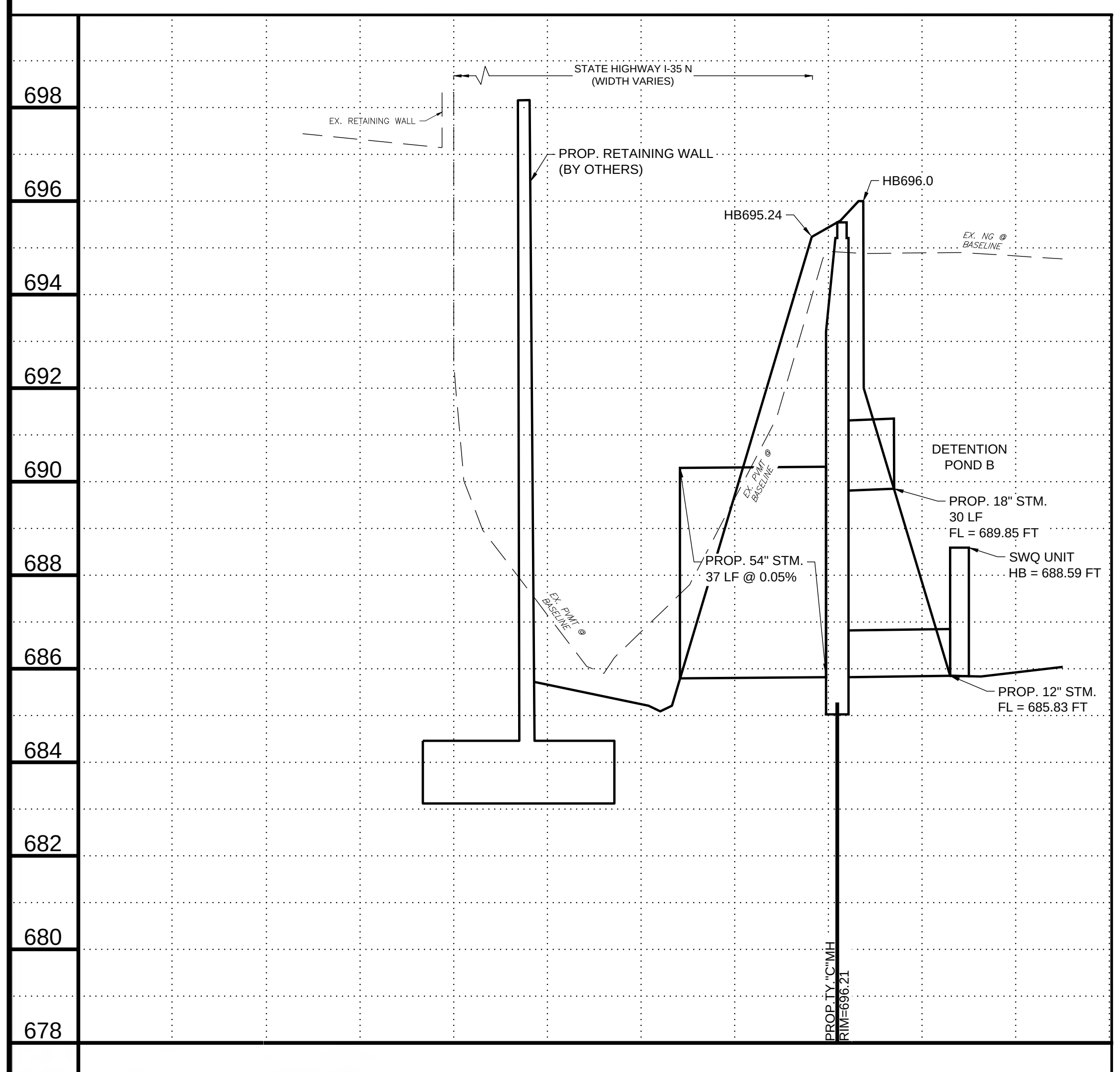

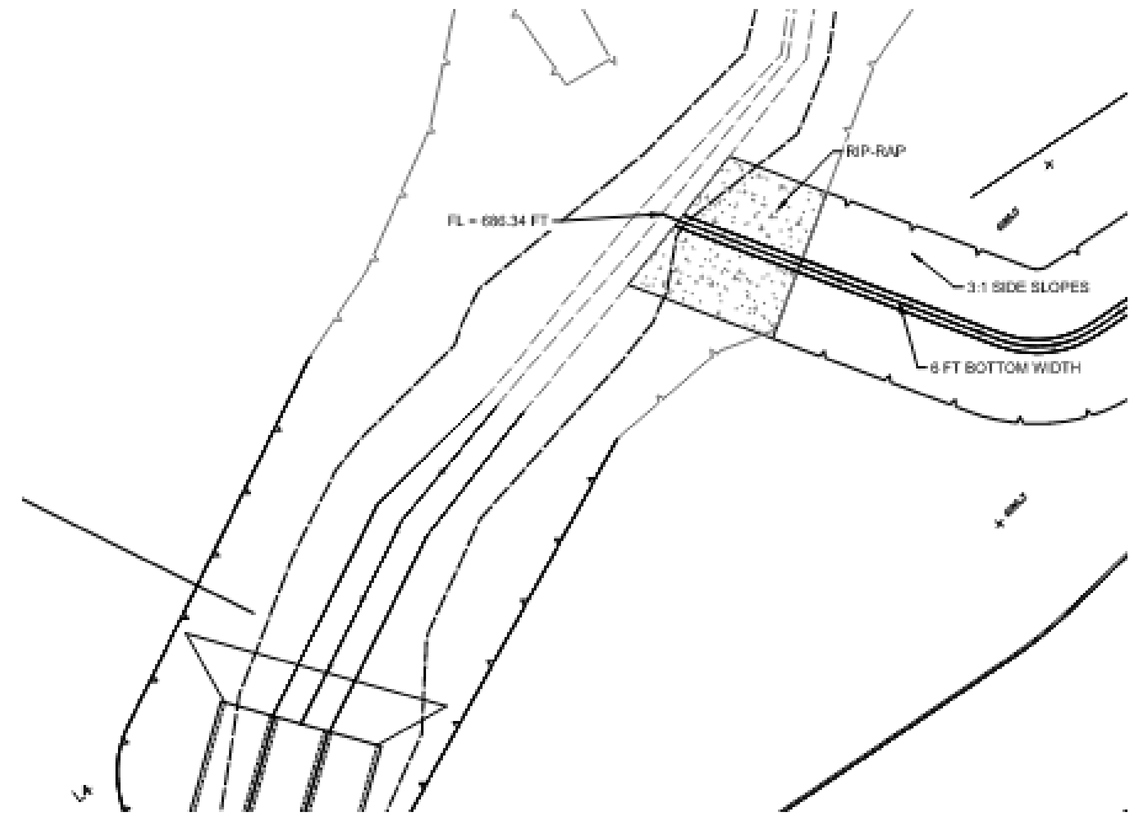

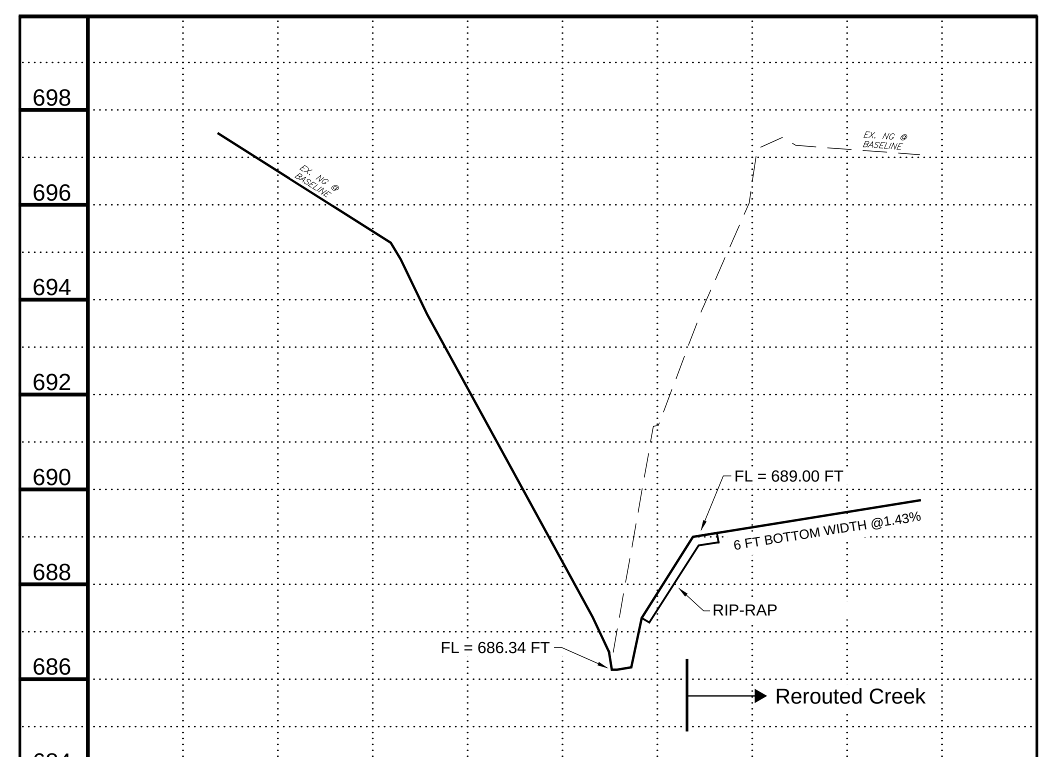

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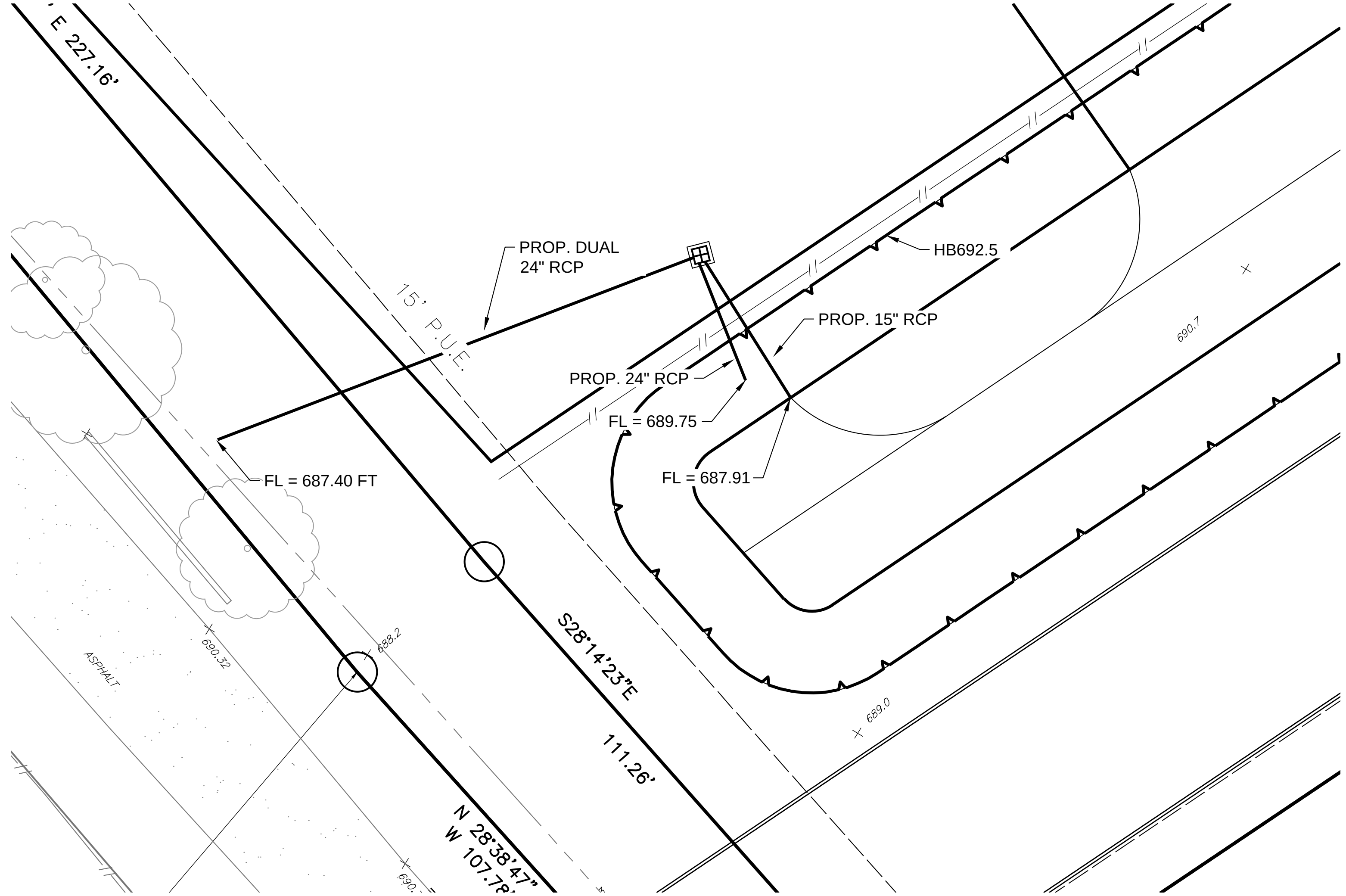
GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

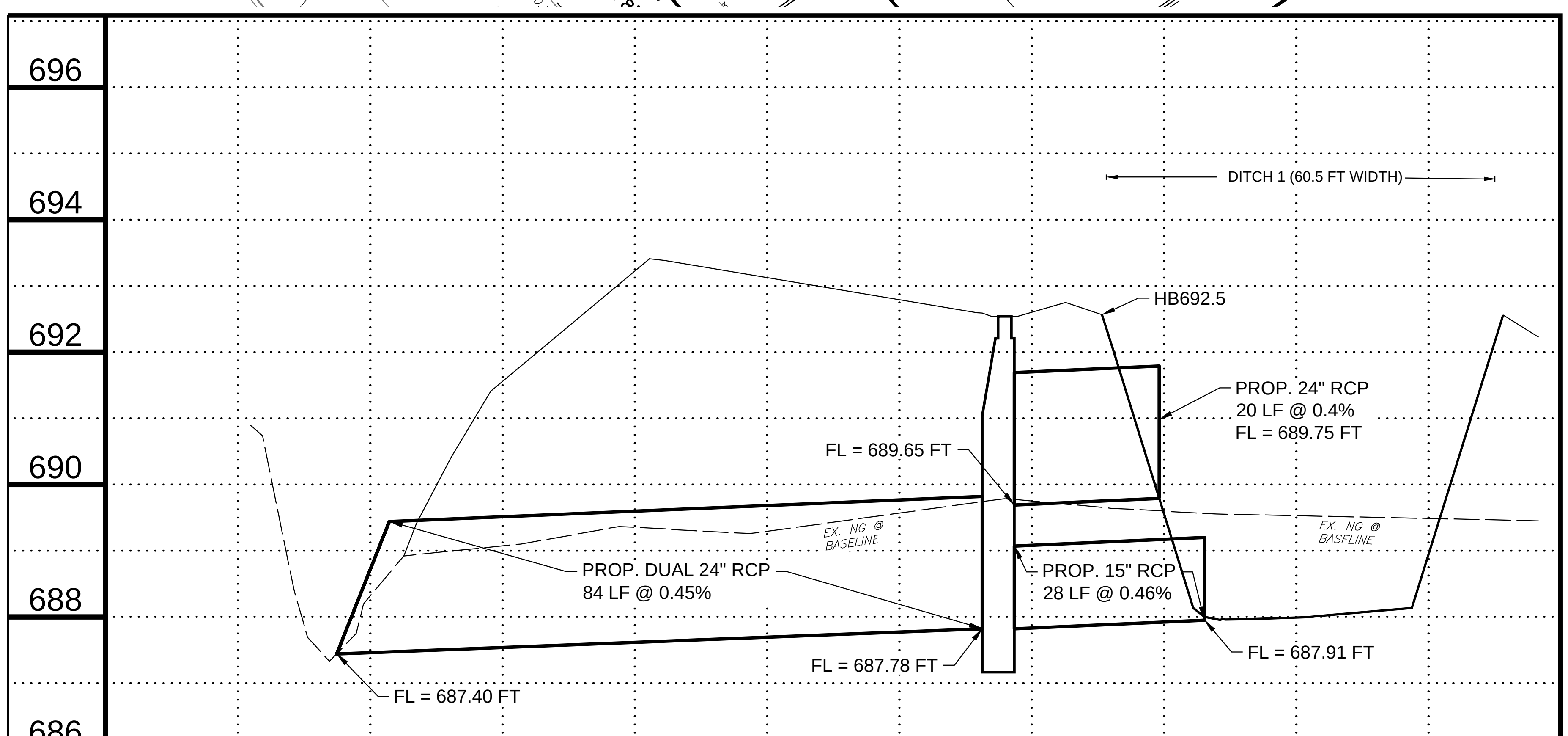
DBC TRIB. 3 OUTFALL PLAN AND PROFILE

0 20 40
SCALE: 1" = 20'

EXHIBIT 11

2/10/2023





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GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

WILLIAMSON COUNTY ROAD 150
OUTFALL PLAN AND PROFILE

EXHIBIT 12

2/10/2023

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Cross Section B	
Flow Line Elevation (ft)	704.50
Top Width (ft)	37.40
Bottom Width (ft)	5.00
Side Slopes	3:1
HB Elevation (ft)	709.90
100 Year WSEL (ft)	708.68

Cross Section C	
Flow Line Elevation (ft)	700.20
Top Width (ft)	36.20
Bottom Width (ft)	5.00
Side Slopes	3:1
HB Elevation (ft)	705.40
100 Year WSEL (ft)	704.35

Cross Section D	
Flow Line Elevation (ft)	694.90
Top Width (ft)	32.94
Bottom Width (ft)	6.00
Side Slopes	3:1
HB Elevation (ft)	699.39
100 Year WSEL (ft)	698.39

Cross Section A	
Flow Line Elevation (ft)	707.76
Top Width (ft)	36.50
Bottom Width (ft)	5.00
Side Slopes	3:1
HB Elevation (ft)	713.01
100 Year WSEL (ft)	712.00

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GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

UNNAMED TRIBUTARY PROPOSED REALIGNMENT & GEOMETRY

EXHIBIT 13

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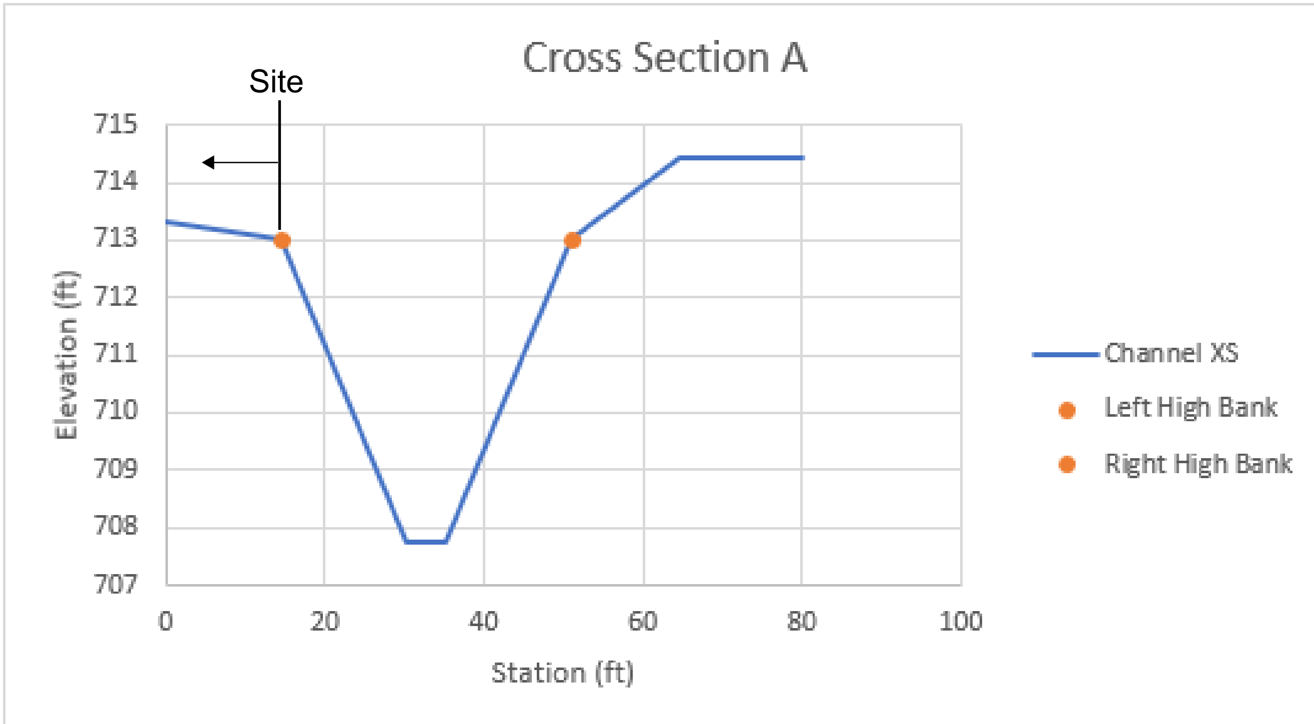

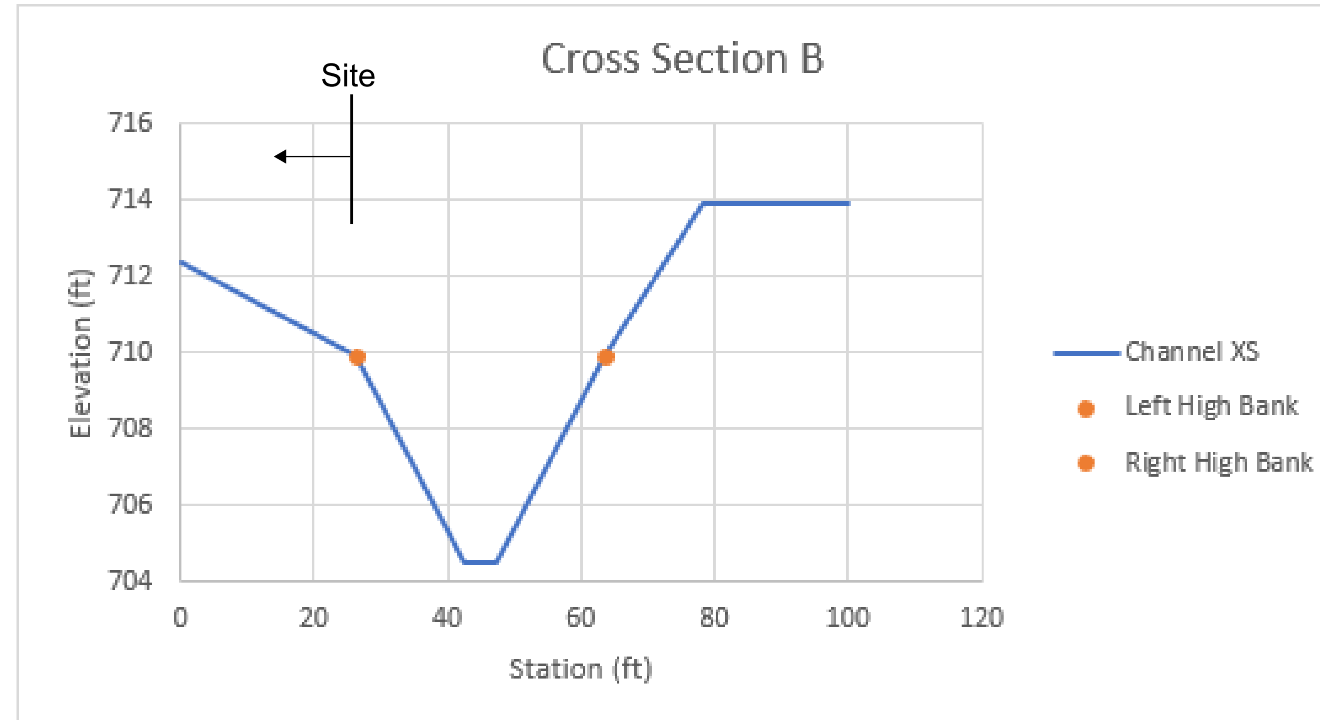

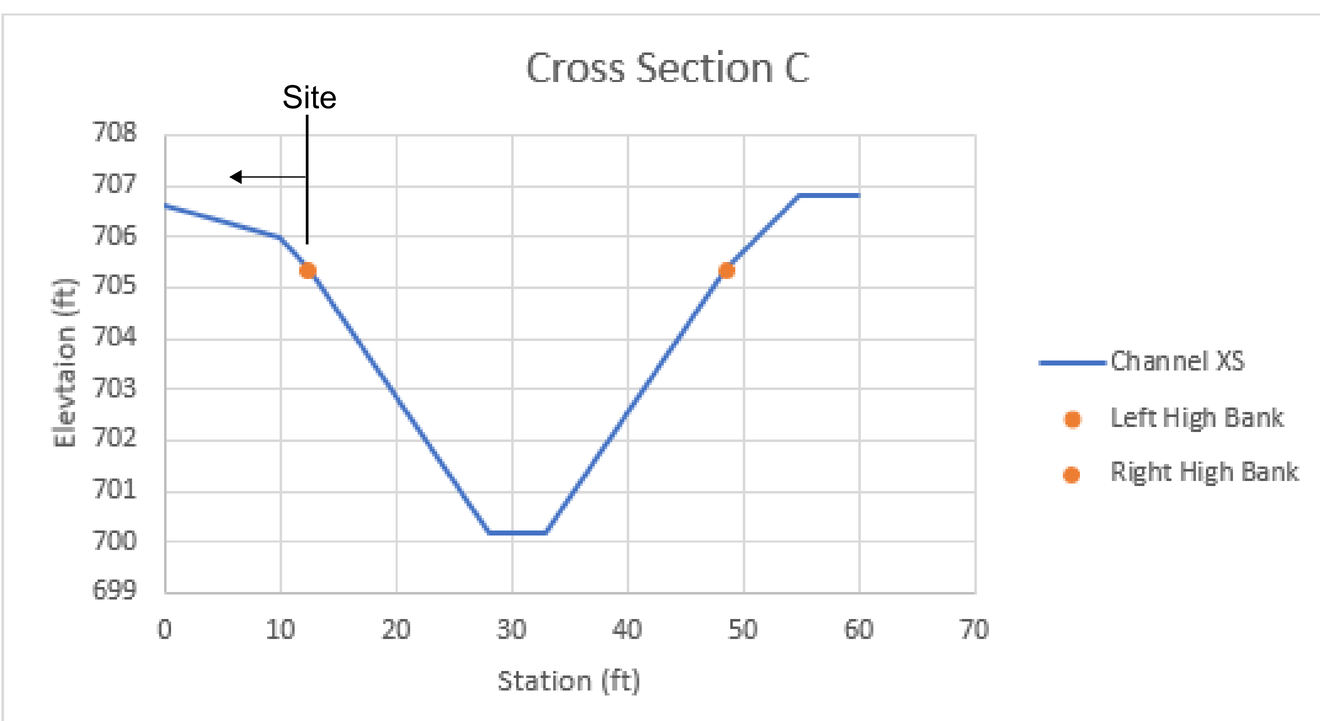

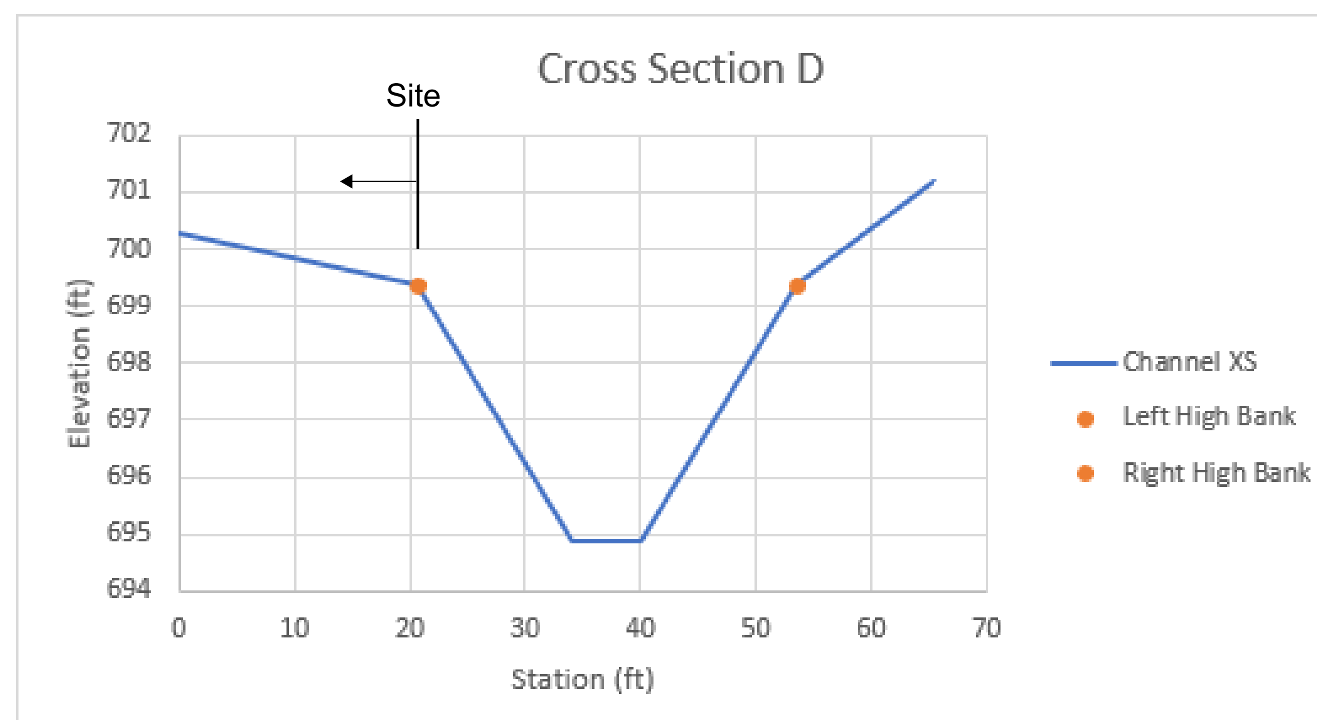

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GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

UNNAMED TRIBUTARY PROPOSED GEOMETRY

EXHIBIT 14

2/10/2023

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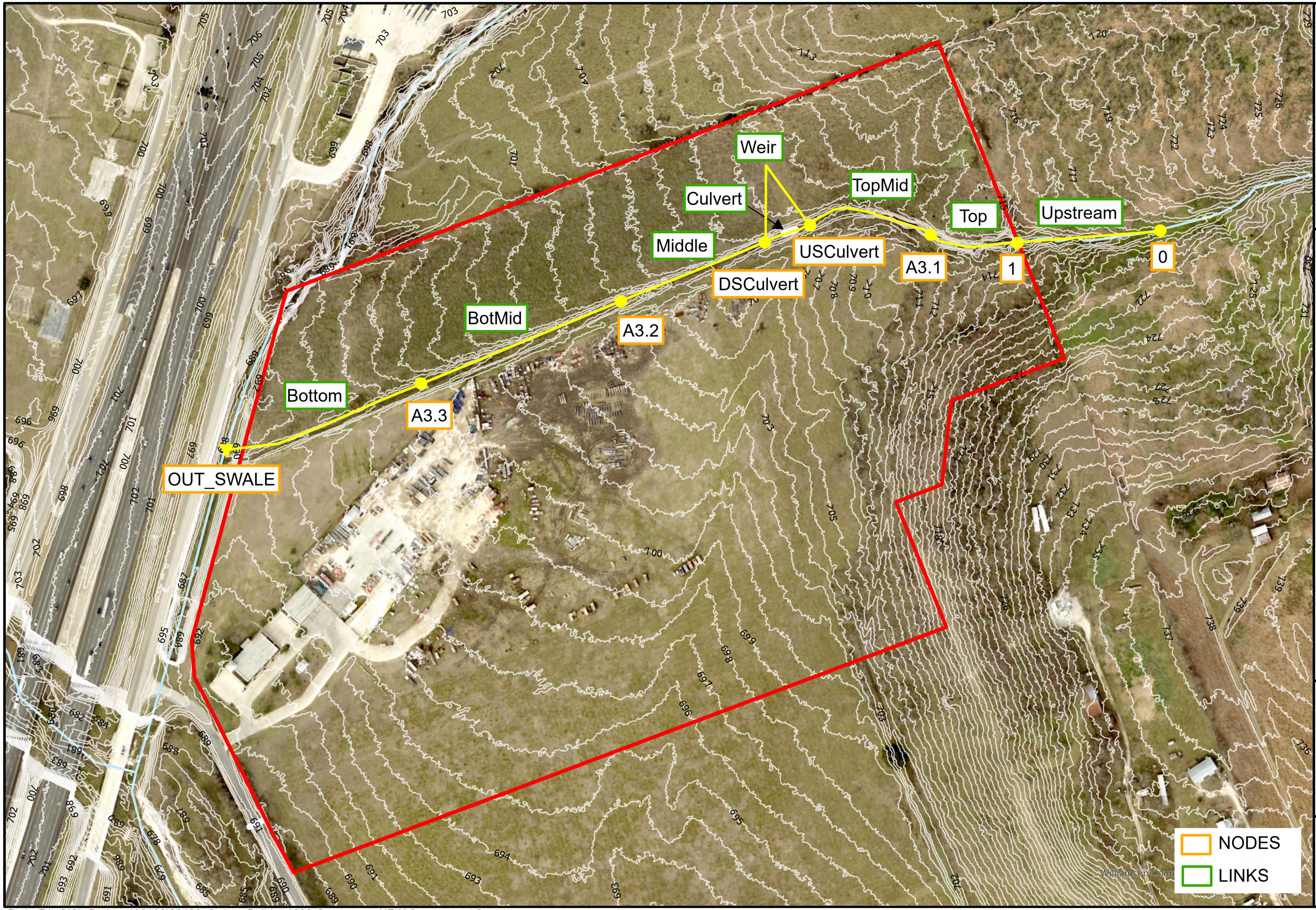

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GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

EXISTING CONDITIONS
EPA-SWMM LAYOUT

N

Feet
0 145 290

EXHIBIT 15

2/10/2023

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GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

PROPOSED SWMM LAYOUT

N

Feet
0 145 290

EXHIBIT 16

2/10/2023

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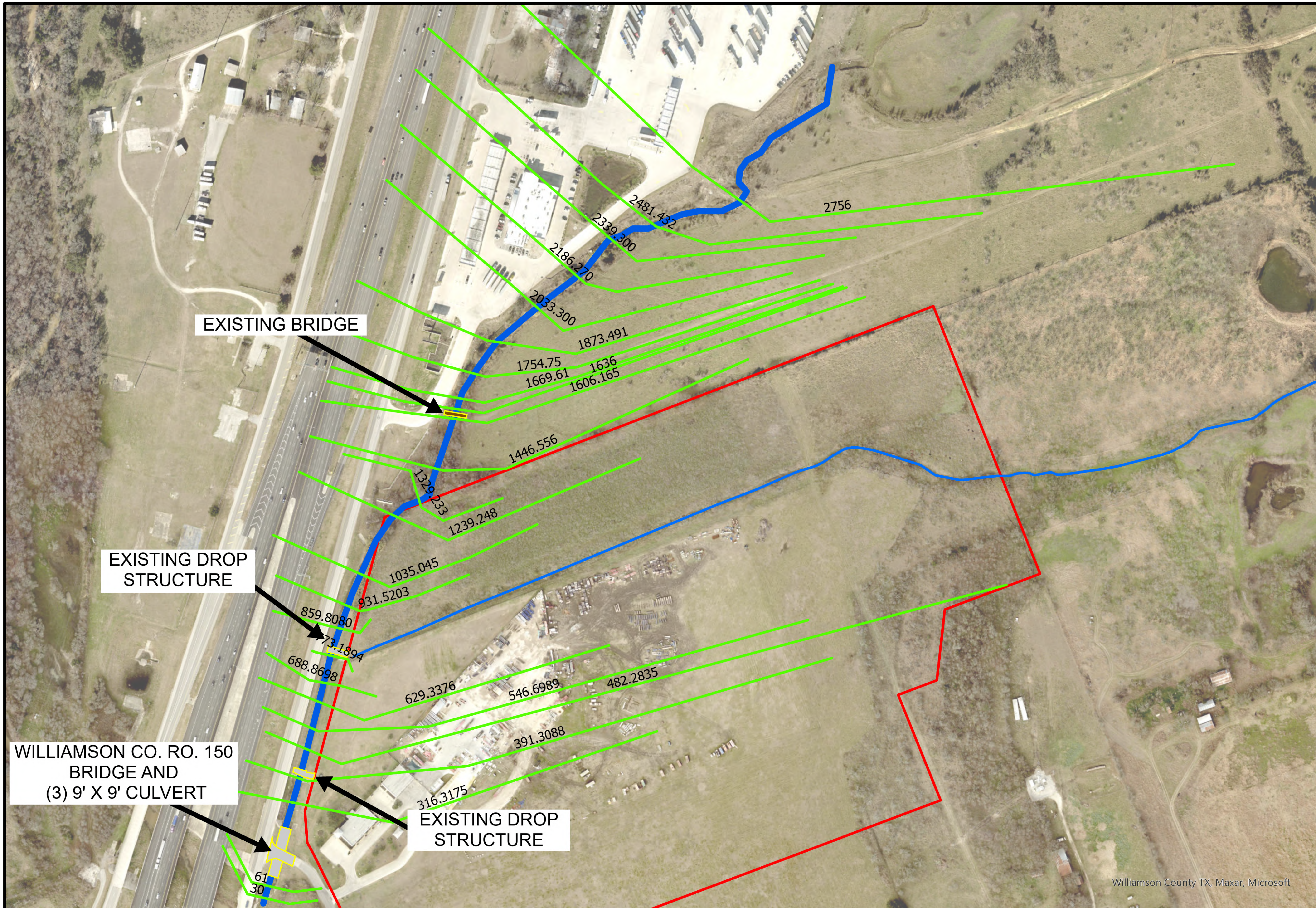

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GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

HEC-RAS EXISITNG CONDITIONS GEOMETRY

N

Feet
0 170 340

EXHIBIT 17

2/10/2023

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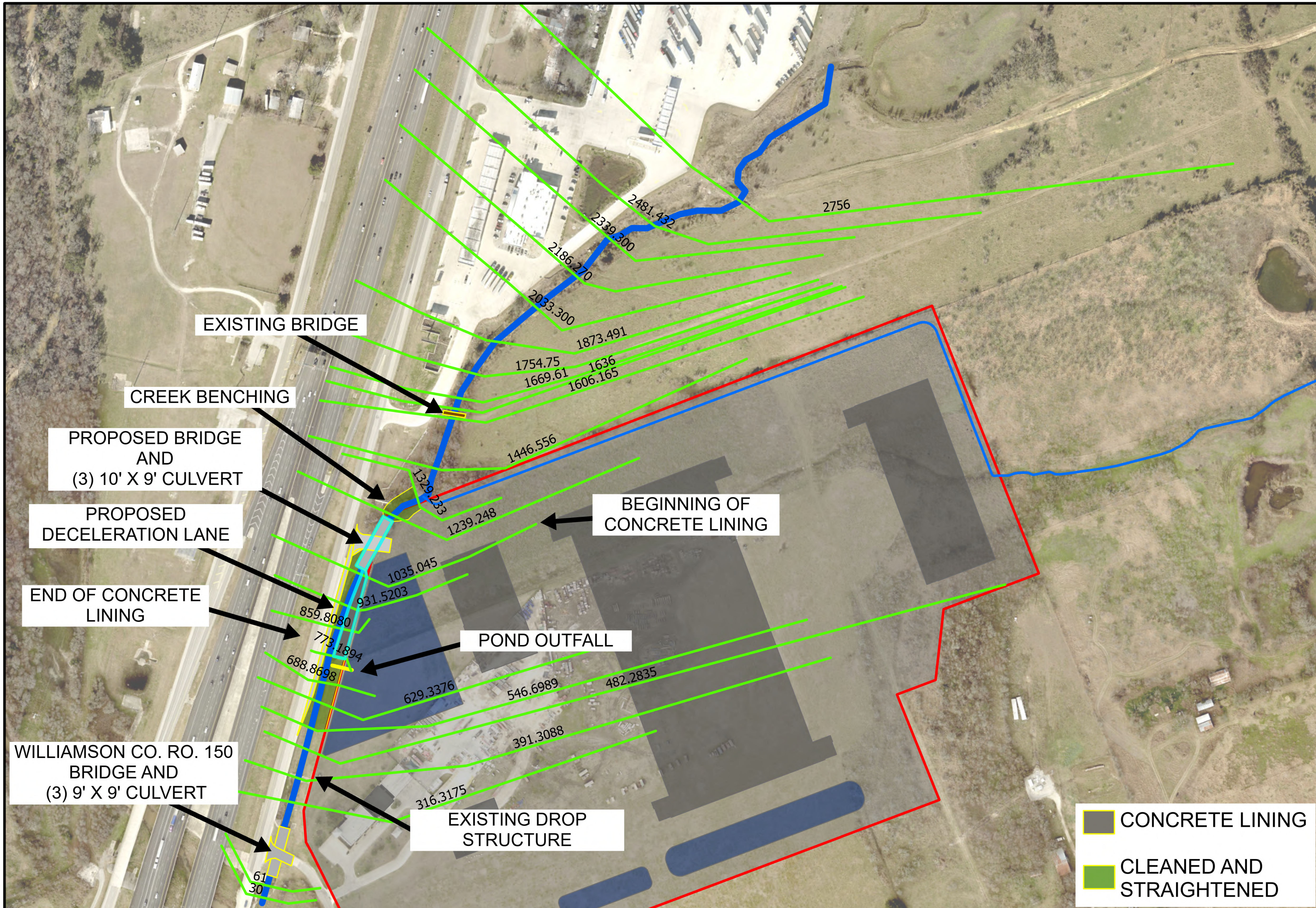

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GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

HEC-RAS PROPOSED CONDITIONS GEOMETRY

N

Feet

0 160 320

EXHIBIT 18

2/10/2023

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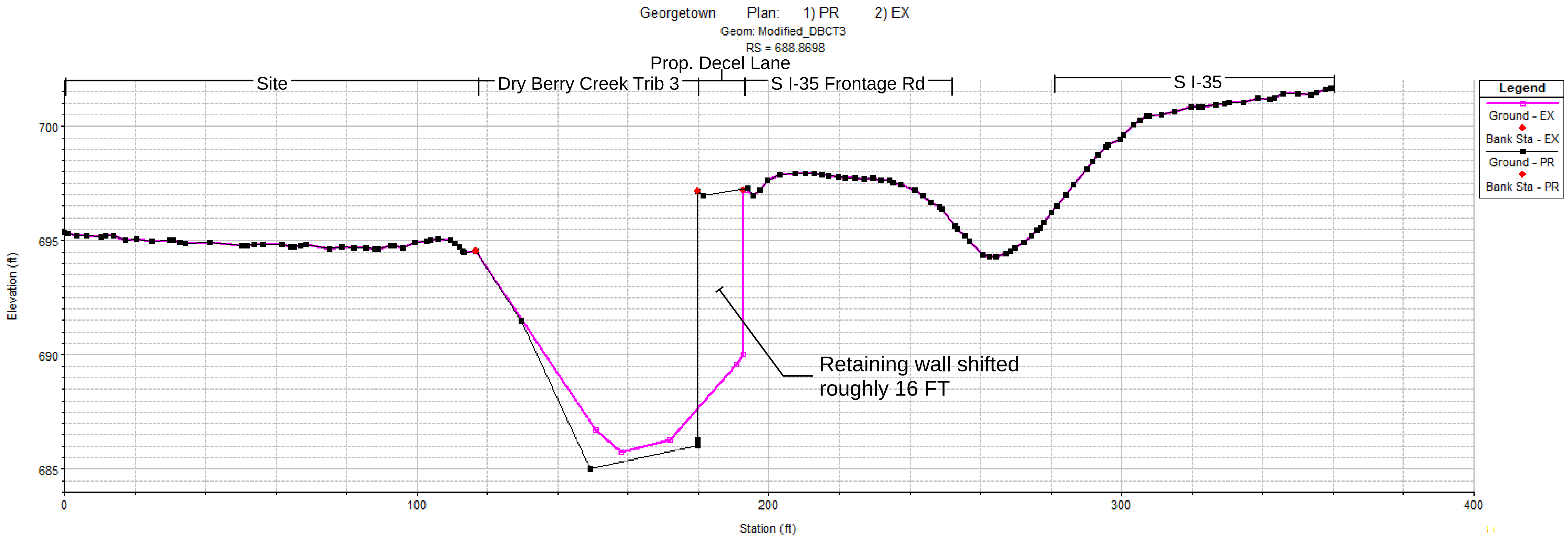

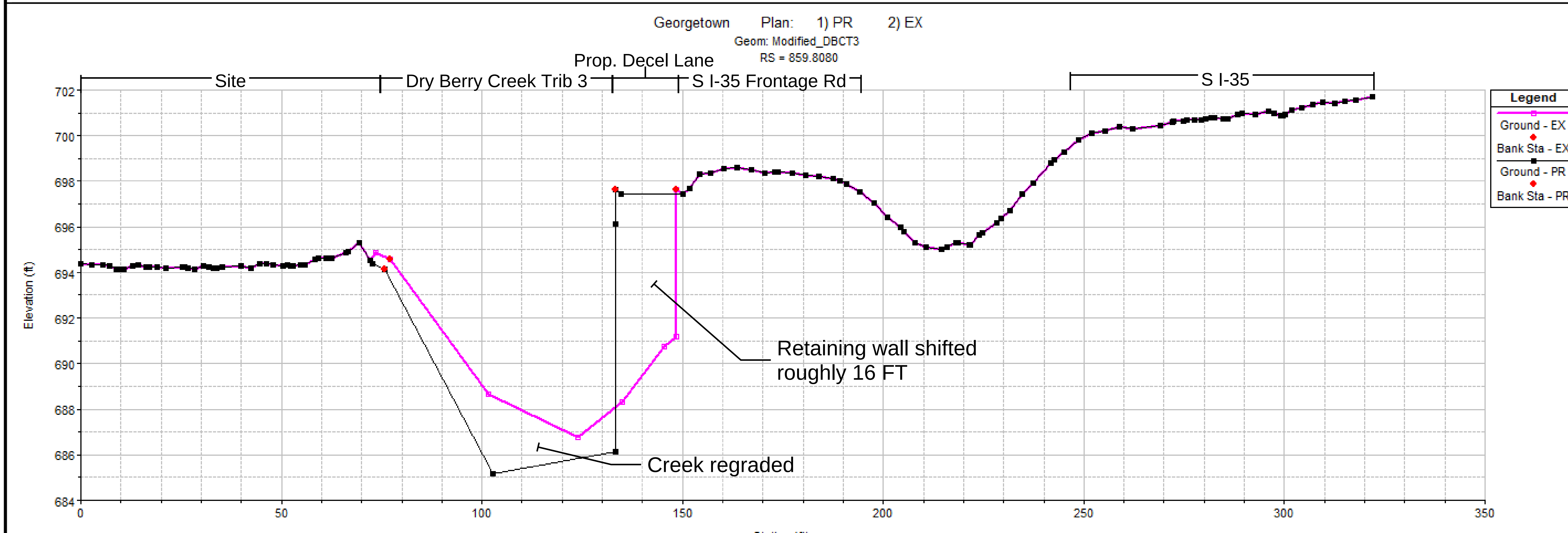

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GEORGETOWN KEYSTONE
DRAINAGE IMPACT ANALYSIS

TYPICAL HEC-RAS CROSS SECTIONS

EXHIBIT 19

2/10/2023

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APPENDIX A

Time of Concentration Calculations

Appendix A

Time of Concentration Calculations

For this study, the hydrologic method employed is the National Soil Conservation Service (NRCS), or the Soil Conservation Service (SCS) Method, is used based on the guidance from the City of Georgetown Drainage Criteria Manual, updated 2004. Within the SCS Method, the time of concentration is determined using the NRCS Velocity Method which uses a sum of travel times for flow following the longest flow path for each of the drainage areas. This method assumes three types of flow, including sheet flow, shallow concentrated flow and open channel flow.

The sheet flow equation assumes after approximately 100-ft of sheet flow, the depth of water collected is such that the flow transitions to shallow concentrated flow, thereby the length of sheet flow is limited to 100-ft maximum. The 2-year, 24-hour rainfall depth used in the sheet flow equation is determined to be 3.94-inches based on NOAA Atlas 14 rainfall values established for the San Gabriel River Zone in Exhibit 2, Table 2 for of Williamson County Subdivision Regulations (adopted December 2021).

The following Tables A1.1 and A1.2 show the resulting sheet flow travel time for existing and proposed conditions, respectively.

Table A1.1 – Sheet Flow Travel Time and Calculations for Existing Drainage Areas

Drainage Area ID	Length (ft)	n-Value	P2,24 (in.)	Slope (ft/ft)	Tsht (min)
A1	100	0.24	3.94	0.005	22.39
A2	100	0.24	3.94	0.0075	19.04
A3	100	0.15	3.94	0.0145	10.04
A4	100	0.15	3.94	0.005	15.37
A5	100	0.15	3.94	0.0108	11.30
A6	100	0.15	3.94	0.0333	7.20
TS	100	0.13	3.94	0.005	13.71
US DBC Trib. 3	100	0.17	3.94	0.008	14.24

Table A1.2 – Sheet Flow Travel Time and Calculations for Proposed Drainage Areas

Drainage Area ID	Length (ft)	n-Value	P2,24 (in.)	Slope (ft/ft)	Tsht (min)
S	100	0.011	3.94	0.02	1.09
E	28.19	0.13	3.94	0.02	2.86
SW	-	-	-	-	0.00
L	70	0.13	3.94	0.014	6.77
O	100	0.13	3.94	0.0064	12.42

After 100-ft of sheet flow, the flow is assumed to transfer to shallow concentrated flow based on the increasing depth of the runoff without a well-defined channel. Tables A2.1 and A2.2 show the resulting shallow concentrated flow travel time for existing and proposed conditions, respectively.

Table A2.1 – Shallow Concentrated Flow Travel Time for Existing Drainage Areas

Drainage Area ID	Length (ft)	Slope (ft/ft)	K-Value	Tsc (min)
A1	1785.12	0.011	16.1345	17.21
A2	820.89	0.010	16.1345	8.49
A3	337.84	0.019	16.1345	2.54
A4	1703.92	0.010	16.1345	17.86
A5	1104.91	0.008	16.1345	12.50
A6	1949.16	0.013	16.1345	17.90
TS	3892.81	0.016	16.1345	31.55
US DBC Trib. 3	4026.82	0.016	16.1345	32.68

Table A2.2 - Shallow Concentrated Flow Travel Time for Existing Drainage Areas

Drainage Area ID	Length (ft)	Slope (ft/ft)	K-Value	Tsc (min)
S	157.20	0.012	20.3282	1.18
E	348.62	0.0165	20.3282	2.23
SW	-	-	-	0.00
L	155.20	0.018	20.3282	0.95
O	623.32	0.028	16.1345	3.85

When the flow enters a well-defined channel or storm sewer system, it is considered channel flow. For proposed storm sewer systems water is designed to flow at a velocity of 3 ft/second and is used when calculating the developed conditions channel flow within the proposed storm sewer. Tables A3.1 and A3.2 show the resulting channel flow travel time for existing and proposed conditions, respectively.

Table 3.1 – Channel Flow Travel Time for Existing Drainage Areas

Drainage Area ID	Length (ft)	Slope (ft/ft)	n-Value	R	T_{ch}
A1	-	-	-	-	0.00
A2	-	-	-	-	0.00
A3	1695	0.009	0.055	1.29	9.48
A4	-	-	-	-	0.00
A5	-	-	-	-	0.00
A6	-	-	-	-	0.00
TS	1522.27	0.015	0.055	1.29	6.45
US DBC Trib. 3	14243.28	0.009	0.055	1.09	85.12

Table 3.2 – Channel Flow Travel Time for Proposed Drainage Areas

Drainage Area ID	Length (ft)	Slope (ft/ft)	n-Value	R	T_{ch}
S	1750.09	3*			9.72
E	518.33	3*			2.88
SW	2115.7	0.01	0.04	2.73	5.49
L	70	3*			0.30
O	-	-	-	-	0.00

*Velocity of 3 ft/s assumed for proposed storm sewer

The total time of concentration for each drainage area is summarized below. 10 minutes is used as the minimum time of concentration for drainage areas where the calculated value is less than 10. Tables A4.1 and A4.2 show the resulting time of concentration for each drainage area in existing and proposed conditions, respectively.

Table A4.1 – Total Time of Concentration for Existing Drainage Areas

Drainage Area ID	T_{sht} (min)	T_{sc} (min)	T_{ch} (min)	T_C (min)
A1	22.39	17.21	0.00	39.60
A2	22.39	6.67	0.00	29.06
A3	10.04	2.54	9.48	22.06
A4	15.37	17.86	0.00	33.23
A5	11.30	12.50	0.00	23.80
A6	7.20	17.90	0.00	25.11
TS	13.71	31.55	6.45	51.71
US DBC Trib 3	14.24	32.68	85.12	132.05

Table A4.2 – Total Time of Concentration for Proposed Drainage Areas

Drainage Area ID	T_{sht} (min)	T_{sc} (min)	T_{ch} (min)	T_C (min)
S	1.09	1.18	9.72	11.99
E	2.86	2.23	2.88	10.00
SW	0.00	0.00	5.49	10.00
L	6.77	0.95	0.30	10.00
O	12.42	3.85	0.00	16.28

APPENDIX B

HEC-HMS Inputs

Appendix B

HEC-HMS INPUTS

For this study, hydrographs were developed for each of the drainage areas including existing and proposed for the Atlas 14, 100-year, 50-year, 25-year, 10-year, 5-year, and 2-year rainfall events using U.S. Army Corps of Engineers HEC-HMS modeling software. The rainfall input for the meteorological model is taken from the "Williamson County Subdivision Regulations (Effective December 7, 2021)" based on San Gabriel River Zone. Table B1 shows the duration and rainfall depth for each storm event.

Table B1 – San Gabriel River Zone, Atlas 14 Rainfall Depth per Duration

Duration	Depth (in)					
	50% AEP 2-Year	20% AEP 5-Year	10% AEP 10-Year	4% AEP 25-Year	2% AEP 50-Year	1% AEP 100-Year
5-min	0.51	0.643	0.757	0.921	1.05	1.19
15-min	1.02	1.29	1.51	1.84	2.10	2.37
1-hour	1.88	2.37	2.79	3.40	3.88	4.39
2-hour	2.30	2.95	3.55	4.43	5.16	5.98
3-hour	2.55	3.3	4.02	5.09	6.01	7.06
6-hour	2.98	3.91	4.81	6.18	7.38	8.75
12-hour	3.44	4.51	5.54	7.12	8.48	10.10
1-day	3.94	5.15	6.30	8.04	9.53	11.20

The loss method, based on the City of Georgetown Drainage Criteria Manual, is the SCS Curve Number Loss Method. The composite curve number of each drainage area is determined from their soil group classification and land usage. SCS Unit Hydrographs are developed for each of the drainage areas based on the lag time and peak rate factor of each. Lag time is calculated by multiplying the time of concentration by 0.6, the approximation provided in the City of Georgetown DCM. Peak rate factors of the drainage areas are modified following the recommendations of the National Operational Hydrologic Remote Sensing Center's Unit Hydrograph Technical Manual. Undeveloped/rural areas considered in the analysis are given a peaking factor of 200 based on the general description of "Rural, slight slopes." The developed areas considered have the standard peaking factor of 484. Table B2 shows the general descriptions and recommended peaking factor to match, taken from Unit Hydrograph Technical Manual.

Table B2 – Peaking Factor Recommendations

General Description	Peaking Factor	Limb Ratio (Recession to Rising)
Urban areas; steep slopes	575	1.25
Typical SCS	484	1.67
Mixed urban/rural	400	2.25
Rural, rolling hills	300	3.33
Rural, slight slopes	200	5.50
Rural, very flat	100	12.0

Tables B3.1 and B3.2 show the SCS Unit Hydrograph inputs for each subbasin to determine the peak flow and generate hydrographs used in the analysis.

Table B3.1 SCS Unit Hydrograph Parameters for Existing Subbasins

Subbasin	Area (sq mi)	Curve Number	Initial Abstraction (in)	Lag Time (min)	Peak Rate Factor
A1	0.016	75.67	0.643	23.76	200
A2	0.005	67.00	0.985	17.44	200
A3	0.012	80.56	0.483	13.24	200
A4	0.033	74.71	0.677	19.94	200
A5	0.007	71.00	0.817	14.28	200
A6	0.027	75.15	0.661	15.06	200
TS	0.241	80.62	0.481	31.02	200
US DBC Trib. 3	2.108	81.80	0.445	79.23	200

Table B3.2 SCS Unit Hydrograph Parameters for Proposed Subbasins

Subbasin	Area (sq mi)	Curve Number	Initial Abstraction (in)	Lag Time (min)	Peak Rate Factor
S	0.068	95.06	0.104	7.19	484
E	0.023	93.47	0.140	6.00	484
SW	0.0066	83.91	0.383	6.00	484
L	0.00215	82.97	0.411	6.00	484
TS	0.241	80.62	0.481	31.02	200
O	0.010	78.48	0.549	9.77	200

APPENDIX C

Additional HEC-RAS Tables for Cross-Section WSELs

Appendix C

Additional HEC-RAS Results Tables for Cross-Section WSELs

A HEC-RAS (version 6.3.1) steady state model is used to analyze the impacts of the proposed improvements to the site and Dry Berry Creek Tributary 3. Tables C.1 - C.4 below show the incremental and cumulative inflows input into the HEC-RAS model for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year storm events, to analyze the impacts of the improvements made to Dry Berry Creek Tributary 3.

Table C.1 - Dry Berry Creek Tributary 3 Existing Conditions Inflow Locations (2-. 5-. and 10-Year Storms)

River Station	Source	2-Year		5-Year		10-Year	
		Source Flow (cfs)	Total Flow (cfs)	Source Flow (cfs)	Total Flow (cfs)	Source Flow (cfs)	Total Flow (cfs)
2756	DBC Trib. 3	468.60	468.60	703.70	703.70	934.50	934.50
1239	.33 A1	2.18	470.78	3.40	707.10	4.59	939.09
1035	.34 A1	2.24	473.02	3.50	710.60	4.73	943.81
931	.33 A1	2.18	475.20	3.40	714.00	4.59	948.40
773	EX Unnamed Trib.	110.82	586.02	165.55	879.55	216.61	1165.01
689	.5 A2	0.80	586.82	1.40	880.95	2.00	1167.01
629	.5 A2	0.80	587.62	1.40	882.35	2.00	1169.01

Table C.2 – Dry Berry Creek Tributary 3 Existing Conditions Inflow Locations (25-, 50-, and 100-Year Storms)

River Station	Source	25-Year		50-Year		100-Year	
		Source Flow (cfs)	Total Flow (cfs)	Source Flow (cfs)	Total Flow (cfs)	Source Flow (cfs)	Total Flow (cfs)
2756	DBC Trib. 3	1286.50	1286.50	1590.2	1590.20	1935.00	1935.00
1239	.33 A1	6.37	1292.87	7.854	1598.05	9.44	1944.44
1035	.34 A1	6.56	1299.43	8.092	1606.15	9.72	1954.16
931	.33 A1	6.37	1305.80	7.854	1614.00	9.44	1963.60
773	EX Unnamed Trib.	292.30	1598.10	354.49	1968.49	424.09	2387.69
689	.5 A2	3.00	1601.10	3.80	1972.29	4.70	2392.39
629	.5 A2	3.00	1604.10	3.80	1976.09	4.70	2397.09

Table C.3 – Dry Berry Creek Tributary 3 Proposed Conditions Inflow Locations (2-, 5-, and 10-Year Storms)

River Station	Source	2-Year		5-Year		10-Year	
		Source Flow (cfs)	Total Flow (cfs)	Source Flow (cfs)	Total Flow (cfs)	Source Flow (cfs)	Total Flow (cfs)
2756	DBC Trib. 3	468.60	468.60	703.70	703.70	934.50	934.50
1323	PR Unnamed Trib.	107.12	575.72	159.85	863.55	209.27	1143.77
689	Pond Outfall	8.94	584.66	15.02	878.57	21.11	1164.88
391	Parking Lot	2.1	586.76	3.10	881.67	3.9	1168.78

Table C.4 – Dry Berry Creek Tributary 3 Proposed Conditions Inflow Locations (25-, 50-, and 100-Year Storms)

River Station	Source	25-Year		50-Year		100-Year	
		Source Flow (cfs)	Total Flow (cfs)	Source Flow (cfs)	Total Flow (cfs)	Source Flow (cfs)	Total Flow (cfs)
2756	DBC Trib. 3	1286.50	1286.50	1590.20	1590.20	1935.00	1935.00
1323	PR Unnamed Trib.	282.92	1569.42	343.76	1933.96	410.38	2345.38
689	Pond Outfall	27.73	1597.15	32.98	1966.94	37.88	2383.26
391	Parking Lot	5	1602.15	5.90	1972.84	6.90	2390.16

The resulting water surface elevations within the cross-sections for the existing conditions, HEC-RAS steady-state model along the channel are compared to those of the proposed model for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year storm events in Tables C5 – C7.

Table C5 – Existing versus Proposed WSEL based on Steady-State HEC-RAS Results (50- and 100-Year Storms)

River Station	Description	50-Year			100-Year		
		Existing	Developed	Difference	Existing	Developed	Difference
2756		706.14	706.14	0.00	706.38	706.38	0.00
2481.432		703.61	703.6	-0.01	704.21	704.2	-0.01
2339.3		702.51	702.49	-0.02	703.18	703.16	-0.02
2186.27		701.62	701.59	-0.03	702.42	702.38	-0.04
2033.3		699.93	699.76	-0.17	700.84	700.71	-0.13
1873.491		699.3	699.05	-0.25	700.18	700.02	-0.16
1754.75		698.78	698.4	-0.38	699.73	699.48	-0.25
1669.61		697.78	697.45	-0.33	698.87	698.77	-0.10
1636		697.73	697.38	-0.35	698.81	698.72	-0.09
1606.165		696.97	696.64	-0.33	697.66	697.52	-0.14
1446.556		696.67	696.21	-0.46	697.41	697.17	-0.24
1329.233	Proposed creek confluence	696.06	694.38	-1.68	696.82	695.77	-1.05
1239.248	Proposed bridge and culverts	695.29	694.4	-0.89	696.04	695.73	-0.31
1035.045		694.48	693.3	-1.18	695.19	694.11	-1.08
931.5203		694.2	693.07	-1.13	694.97	693.91	-1.06
859.808		693.74	692.85	-0.89	694.51	693.67	-0.84
773.1894	Existing creek confluence	693.54	692.67	-0.87	694.29	693.49	-0.80
688.8698	Proposed pond outfall	693	692.31	-0.69	693.77	693.15	-0.62
629.3376		692.59	692.07	-0.52	693.39	692.93	-0.46
546.6989		692.05	691.92	-0.13	692.91	692.81	-0.10
482.2835		691.48	691.47	-0.01	692.47	692.45	-0.02
391.3088	Parking lot runoff	691.46	691.44	-0.02	692.45	692.43	-0.02
316.3175	Williamson County Road 150	691	690.99	-0.01	692.02	692.01	-0.01
61		688.16	688.16	0.00	689.11	689.11	0.00
30		688.08	688.08	0.00	689.11	689.1	-0.01

Table C6 – Existing versus Proposed WSEL based on Steady-State HEC-RAS Results (10- and 25-Year Storms)

River Station	Description	10-Year			25-Year		
		Existing	Developed	Difference	Existing	Developed	Difference
2756		705.3	705.3	0.00	705.86	705.86	0.00
2481.432		702.21	702.21	0.00	703.03	703.03	0.00
2339.3		701.02	701.02	0.00	701.81	701.81	0.00
2186.27		699.97	699.97	0.00	700.85	700.84	-0.01
2033.3		698.19	698.12	-0.07	699.13	699.03	-0.10
1873.491		697.61	697.47	-0.14	698.5	698.31	-0.19
1754.75		697.07	696.82	-0.25	697.93	697.63	-0.30
1669.61		695.7	695.57	-0.13	696.66	696.43	-0.23
1636		695.54	695.37	-0.17	696.55	696.28	-0.27
1606.165		695.3	695.06	-0.24	696.27	695.98	-0.29
1446.556		694.89	694.52	-0.37	695.92	695.49	-0.43
1329.233	Proposed creek confluence	694.31	692.27	-2.04	695.32	693.26	-2.06
1239.248	Proposed bridge and culverts	693.66	691.93	-1.73	694.59	693.29	-1.30
1035.045		692.93	691.6	-1.33	693.8	692.55	-1.25
931.5203		692.61	691.35	-1.26	693.5	692.3	-1.20
859.808		692.14	691.21	-0.93	693.03	692.12	-0.91
773.1894	Existing creek confluence	692.01	691.04	-0.97	692.87	691.93	-0.94
688.8698	Proposed pond outfall	691.51	690.74	-0.77	692.33	691.59	-0.74
629.3376		691.09	690.52	-0.57	691.9	691.34	-0.56
546.6989		690.52	690.35	-0.17	691.32	691.18	-0.14
482.2835		689.83	689.82	-0.01	690.66	690.64	-0.02
391.3088	Parking lot runoff	689.11	689.11	0.00	690.37	690.36	-0.01
316.3175	Williamson County Road 150	688.33	688.33	0.00	689.8	689.8	0.00
61		687.19	687.19	0.00	687.74	687.74	0.00
30		687.04	687.04	0.00	687.62	687.62	0.00

Table C7 – Existing versus Proposed WSEL based on Steady-State HEC-RAS Results (2- and 5-Year Storms)

River Station	Description	2-Year			5-Year		
		Existing	Developed	Difference	Existing	Developed	Difference
2756		704.25	704.25	0.00	704.76	704.76	0.00
2481.432		700.68	700.68	0.00	701.46	701.46	0.00
2339.3		699.54	699.54	0.00	700.43	700.43	0.00
2186.27		698.43	698.43	0.00	699.33	699.33	0.00
2033.3		696.77	696.73	-0.04	697.54	697.49	-0.05
1873.491		696.21	696.1	-0.11	696.97	696.86	-0.11
1754.75		695.7	695.48	-0.22	696.44	696.21	-0.23
1669.61		694.27	694.24	-0.03	695.03	694.95	-0.08
1636		693.99	693.92	-0.07	694.82	694.7	-0.12
1606.165		693.69	693.56	-0.13	694.56	694.38	-0.18
1446.556		693.06	692.82	-0.24	694.07	693.75	-0.32
1329.233	Proposed creek confluence	692.51	690.8	-1.71	693.5	691.62	-1.88
1239.248	Proposed bridge and culverts	692	689.82	-2.18	692.92	690.94	-1.98
1035.045		691.44	689.95	-1.49	692.25	690.86	-1.39
931.5203		691.11	689.78	-1.33	691.92	690.64	-1.28
859.808		690.62	689.67	-0.95	691.45	690.52	-0.93
773.1894	Existing creek confluence	690.57	689.52	-1.05	691.36	690.35	-1.01
688.8698	Proposed pond outfall	690.14	689.32	-0.82	690.89	690.1	-0.79
629.3376		689.76	689.15	-0.61	690.49	689.9	-0.59
546.6989		689.24	689.01	-0.23	689.94	689.75	-0.19
482.2835		688.56	688.55	-0.01	689.25	689.24	-0.01
391.3088	Parking lot runoff	687.35	687.35	0.00	688.27	688.26	-0.01
316.3175	Williamson County Road 150	686	685.99	-0.01	687.3	687.3	0.00
61		686.06	686.06	0.00	686.74	686.74	0.00
30		685.88	685.88	0.00	686.56	686.56	0.00

The results of the HEC-RAS steady-state analysis shows no increases in maximum water surface elevations for the storm events analyzed, and thereby there are no adverse impacts anticipated to conveyance of Dry Berry Creek Tributary 3.

APPENDIX D

Inflow Hydrograph Locations and Fractions

Appendix D

Inflow Hydrograph Location and Fraction

For both the existing and proposed conditions there are drainage areas that are distributed into multiple inflow locations within the EPA-SWMM models. Tables D1.1 and D1.2 show each inflow location in EPA-SWMM with the corresponding inflow hydrograph and fraction of the hydrograph that is distributed there for the existing and proposed conditions, respectively.

Table D1.1 – Existing Conditions Hydrograph Fractions

EPA-SWMM Node	Hydrograph	Fraction
0	To Swale	1.00
A3.1	Swale	0.50
A3.2	Swale	0.25
A3.3	Swale	0.25

Table D1.2 – Proposed Conditions Hydrograph Fractions

EPA-SWMM Node	Hydrograph	Fraction
0	To Swale	1.00
2	Swale	0.20
3	Swale	0.43
4	Swale	0.37
PondA	Site+Offsite	0.36
A8	Site+Offsite	0.005
A9	Site+Offsite	0.021
JB4	Site+Offsite	0.017
A26	Site+Offsite	0.017
A27	Site+Offsite	0.021
A10	Site+Offsite	0.021
A25	Site+Offsite	0.095
A13	Site+Offsite	0.007
JB6	Site+Offsite	0.016
PondB	Site+Offsite	0.406
Ditch2	Expansion	0.40
Ditch1	Expansion	0.39
32	Expansion	0.13
33	Expansion	0.08

APPENDIX E

EPA-SWMM Inputs

EPA-SWMM MODEL INPUTS

```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         HORTON
FLOW_ROUTING         DYNWAVE
LINK_OFFSETS         ELEVATION
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           07/01/2022
START_TIME           00:00:00
REPORT_START_DATE    07/01/2022
REPORT_START_TIME    00:00:00
END_DATE             07/03/2022
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:05:00
DRY_STEP             01:00:00
ROUTING_STEP         0:00:20
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.566
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
1                707.76     10         0          10         0
A3.1             704.93     10         0          10         0
A3.2             702.73     10         0          10         0
A3.3             695.48     10         0          10         0
DSCulvert        703.75     20         0          0          0
USCulvert        703.55     20         0          0          0
0                711.58     10         0          10         0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
OUT_SWALE        686.34     NORMAL                      NO

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow
MaxFlow
```

```
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- ------
----
Top              1                A3.1             339.2097   0.055      *          *          0          0
Middle           DSCulvert        A3.2             150.5      0.055      *          *          0          0
BotMid           A3.2             A3.3             853.843    0.055      *          *          0          0
Bottom           A3.3             OUT_SWALE        491.08     0.055      *          *          0          0
Culvert          USCulvert        DSCulvert        33         0.013      *          *          0          0
TopMid           A3.1             USCulvert        256.17     0.055      *          *          0          0
16               0                1                86.53      0.055      *          *          0          0

[WEIRS]
;;Name           From Node        To Node          Type         CrestHt    Qcoeff     Gated    EndCon   EndCoeff
Surcharge  RoadWidth  RoadSurf   Coeff. Curve
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- -------- --------
-- ---------- ---------- ---------- ----------------
Weir             USCulvert        DSCulvert        TRANSVERSE   706.8      2.6        NO       0        0
YES

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
Top              IRREGULAR    Top
Middle           IRREGULAR    TopMid
BotMid           IRREGULAR    BotMid
Bottom           IRREGULAR    Bottom
Culvert          CIRCULAR     2                0          0          0          2
TopMid           IRREGULAR    TopMid
16               IRREGULAR    Upstream
Weir             RECT_OPEN    4                80         0          0

[TRANSECTS]
;;Transect Data in HEC-2 format
;
NC 0.06     0.06     0.055
X1 Top               9        87.8     118.2    0.0      0.0      0.0      0.0      0.0
GR 715.65   0        712.07   85.0     711.87   87.8     708.58   98.3     707.76   101.6
GR 708.96   107.6    711.35   118.2    712.33   128.7    714.45   179.9
;
NC 0.06     0.06     0.055
X1 TopMid            10       175.0    197.7    0.0      0.0      0.0      0.0      0.0
GR 709.91   0        709.3    55.6     708.82   124.0    708.17   175.0    705.98   182.1
GR 704.93   189.3    705.44   190.2    708.42   197.7    709.17   251.1    710.14   301.1
;
NC 0.06     0.06     0.055
X1 BotMid            10       160.0    209.0    0.0      0.0      0.0      0.0      0.0
GR 705.7    0        706.06   75.3     706.09   122.8    704.84   160.0    704.09   174.9
GR 702.73   185.2    703.39   192.9    704.95   209.0    706.6    241.2    706.53   311.9
;
NC 0.06     0.06     0.055
X1 Bottom            10       74.4     135.7    0.0      0.0      0.0      0.0      0.0
GR 699.18   0        698.93   42.0     699.4    71.6     698.26   74.4     696.58   83.4
GR 695.59   92.1     695.48   98.5     695.48   104.8    698.34   135.7    698.61   209.3
;
NC 0.06     0.06     0.055
X1 Upstream          212      25.476   109.833  0.0      0.0      0.0      0.0      0.0
GR 716.976  0        716.943  0.33     716.821  1.369    716.627  2.844    716.551  3.45
GR 716.446  4.896    716.406  5.359    716.317  6.996    716.25   7.874    716.139  10.015
GR 716.139  10.015   716.117  10.542   716.104  10.908   716.099  12.903   716      14.088
GR 715.725  15.418   715.535  16.921   715.421  17.634   715.421  17.634   715.381  17.932
GR 715.325  18.66    715.203  20.447   715.161  21.18    715.125  22.962   715.075  24.726
GR 714.971  25.476   714.662  27.305   714.56   27.991   714.539  28.272   714.509  28.945
GR 714.42   30.506   714.386  31.818   714.265  33.02    713.901  34.957   713.84   35.364
GR 713.84   35.364   713.834  35.535   713.813  35.95    713.813  35.95    713.702  38.05
GR 713.592  38.911   713.447  40.564   713.419  40.969   713.304  42.457   713.304  42.457
GR 713.185  43.079   712.829  44.596   712.829  44.596   712.591  45.593   712.496  46.003
GR 712.496  46.003   712.307  46.981   712.084  48.108   711.817  49.549   711.817  49.549
GR 711.826  50.623   711.993  52.994   711.997  53.095   711.997  53.095   712.005  53.241
```

```
GR 712.005  53.241   712.034  55.652   712.027  56.641   711.815  58.167   711.724  59.006
GR 711.581  60.187   711.581  60.187   711.604  60.681   711.652  61.886   711.652  61.886
GR 711.715  63.196   711.723  63.733   711.723  63.733   711.784  65.018   711.828  65.711
GR 711.868  67.279   711.868  67.279   711.992  68.225   712.352  70.531   712.407  70.826
GR 712.749  73.255   712.892  74.372   712.892  74.372   712.955  75.769   713.063  77.918
GR 713.063  77.918   713.088  78.284   713.174  79.177   713.174  79.177   713.313  80.799
GR 713.375  81.464   713.466  83.054   713.487  83.313   713.553  85.828   713.661  87.822
GR 713.661  87.822   713.719  88.556   713.719  88.556   713.768  89.067   714.063  92.102
GR 714.063  92.102   714.214  93.372   714.342  95.079   714.396  95.648   714.396  95.648
GR 714.411  95.886   714.469  96.467   714.469  96.467   714.648  98.401   714.702  99.194
GR 714.702  99.194   714.782  100.916  714.789  101.091  714.858  102.74   714.858  102.74
GR 714.924  103.43   715.158  105.112  715.327  106.287  715.327  106.287  715.416  107.103
GR 715.549  108.46   715.719  109.833  715.719  109.833  715.658  110.974  715.545  113.115
GR 715.531  113.379  715.531  113.379  715.539  113.489  715.561  113.758  715.561  113.758
GR 715.739  116.004  715.755  116.925  715.755  116.925  715.811  118.518  715.84   119.128
GR 715.896  120.471  715.896  120.471  715.88   121.033  715.824  122.403  715.824  122.403
GR 715.805  124.017  715.805  124.017  715.816  125.14   715.837  126.062  715.825  127.563
GR 715.825  127.563  715.844  128.577  715.966  131.048  715.966  131.048  715.968  131.091
GR 715.968  131.109  715.968  131.152  715.955  133.606  715.956  134.655  715.956  134.655
GR 716.002  136.121  716.061  137.164  716.109  138.202  716.109  138.202  716.137  138.635
GR 716.204  139.693  716.204  139.693  716.26   141.15   716.305  141.748  716.305  141.748
GR 716.274  143.665  716.289  145.294  716.289  145.294  716.305  146.179  716.317  148.339
GR 716.317  148.339  716.311  148.694  716.307  148.84   716.314  149.188  716.328  151.209
GR 716.373  152.386  716.373  152.386  716.318  153.723  716.215  155.932  716.215  155.932
GR 716.236  156.238  716.293  156.984  716.293  156.984  716.398  158.753  716.406  159.478
GR 716.201  161.213  716.195  161.267  715.994  163.024  715.994  163.024  715.978  163.782
GR 716.006  165.629  716.006  165.629  716.028  166.297  716.041  166.57   716.041  166.57
GR 716.103  167.225  716.258  168.811  716.376  170.116  716.376  170.116  716.31   171.326
GR 716.088  173.237  716.049  173.663  716.034  173.84   716.02   174.274  716.02   174.274
GR 715.98   176.355  716.011  177.209  716.011  177.209  716.013  178.87   716.015  179.107
GR 716.015  179.107  716.015  179.107

[LOSSES]
;;Link           Kentry     Kexit      Kavg       Flap Gate  Seepage
;;-------------- ---------- ---------- ---------- ---------- ----------
Bottom           0          1          0          NO         0
Culvert          0.5        1          0          NO         0

[INFLOWS]
;;Node           Constituent      Time Series      Type     Mfactor  Sfactor  Baseline Pattern
;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
A3.1             FLOW             A3               FLOW     1.0      0.5
A3.2             FLOW             A3               FLOW     1.0      0.25
A3.3             FLOW             A3               FLOW     1.0      0.25
0                FLOW             ToSwale          FLOW     1.0      1.0

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
Volume           Storage    0          487.13
Volume                      1          4600.68
Volume                      1.5        16447.14
Volume                      2          35828.80
Volume                      2.5        62732.42
Volume                      3          99279.09
Volume                      3.5        131767.92
Volume                      4          145017.78
Volume                      4.5        148698.53
Volume                      5          152414.47
Volume                      5.5        156165.59
Volume                      6          159951.92
Volume                      6.5        163773.48
Volume                      7          167630.22
Volume                      7.5        171522.18
Volume                      8          175449.37
Volume                      8.5        179411.76
Volume                      9          183528.33
```

```
[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS -2727.273 0.000 12727.273 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
1                8055.866           6055.866
A3.1             7329.609           6435.754
A3.2             5709.497           6558.659
A3.3             4008.581           6434.898
DSCulvert        6574.310           6644.513
USCulvert        6719.305           6638.936
0                8679.384           5850.015
OUT_SWALE        2480.447           6368.715

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Top              7620.112           6156.425
Middle           6546.427           6640.331
Middle           6468.353           6622.206
BotMid           5675.978           6536.313
BotMid           5217.877           6480.447
BotMid           4905.028           6480.447
Bottom           3690.520           6460.008
Bottom           3005.587           6413.408
TopMid           7226.785           6528.796
TopMid           7080.397           6609.659
TopMid           6929.825           6637.542
Weir             6649.894           6725.089


[BACKDROP]
FILE       "Z:\00486 (Stewart Builders)\009 Georgetown Keystone\ENGR\H&H\Models\EPA-SWMM (V5.2)\Existing.jpg"
DIMENSIONS -2727.273 0.000 12727.273 10000.000
```

```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         HORTON
FLOW_ROUTING         DYNWAVE
LINK_OFFSETS         ELEVATION
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           07/01/2022
START_TIME           00:00:00
REPORT_START_DATE    07/01/2022
REPORT_START_TIME    00:00:00
END_DATE             07/03/2022
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:05:00
DRY_STEP             01:00:00
ROUTING_STEP         0:00:01
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.566
MAX_TRIALS           8
HEAD_TOLERANCE       0.0001
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.1
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
1                707.76     10         0          10         0
2                704.5      10         0          10         0
3                700.2      10         0          10         0
4                694.9      10         0          10         0
A8               687.47     10         0          10         0
A27              687.31     10         0          10         0
A26              687.11     10         0          10         0
A25              686.87     10         0          10         0
JB6              686.21     10         0          10         0
A10              687.03     10         0          10         0
A13              686.35     10         0          10         0
JB1              685.815    20         0          0          0
5                689        10         0          0          0
31               688.53     10         0          0          0
32               688.59     10         0          0          0
33               687.78     10         0          0          0
A9               687.21     10         0          10         0
JB4              687.03     10         0          10         0
0                711.58     10         0          10         0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
OUT              685.796    NORMAL                      NO
OUT_SWALE        686.34     NORMAL                      NO
WilCoOut         687.40     NORMAL                      NO

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Type/Params            SurDepth  Fevap    Psi      Ksat     IMD
;;-------------- -------- ---------- ----------- ---------- ---------------------------- --------- --------          -------- --------
PondB            685.83   20         0          TABULAR    PondA                        0         0
PondA            687.82   20         0          TABULAR    PondB                        0         0
```

```
Ditch1           687.91   10        0          TABULAR    Ditch1                        0         0
Ditch2           688.53   10        0          TABULAR    Ditch2                        0         0

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- ----------
Outfall          JB1              OUT              37         0.013      *          *          0          0
Swale1           1                2                486.9      0.04       *          *          0          0
Swale2           2                3                600        0.04       *          *          0          0
Swale3           3                4                600        0.04       *          *          0          0
Swale4           4                5                413.6      0.04       *          *          0          0
10PondAOut       PondA            A8               167        0.011      687.47     *          0          0
11               A8               A9               136        0.011      *          *          0          0
14               A27              A26              94         0.011      *          *          0          0
16               A10              A25              72         0.011      *          *          0          0
18               A13              JB6              81         0.011      *          *          0          0
19               JB6              PondB            62.06      0.011      *          686.15     0          0
15               A26              A10              121        0.011      *          *          0          0
17               A25              A13              244        0.011      688.9      688.6      0          0
31               31               Ditch1           92         0.011      *          688.36     0          0
OutControl       PondB            JB1              30         0.013      689.81     689.85     0          0
32               32               Ditch1           208        0.011      *          688.00     0          0
33               Ditch1           33               28         0.013      *          *          0          0
34               33               WilCoOut         84         0.013      *          *          0          0
12               A9               JB4              89         0.011      *          687.11     0          0
13               JB4              A27              92         0.011      *          *          0          0
Upstream         0                1                86.53      0.055      *          *          0          0
Highflow         Ditch1           33               22         0.013      689.75     689.65     0          0

[ORIFICES]
;;Name           From Node        To Node          Type         Offset     Qcoeff     Gated    CloseTime
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- ----------
SWQ              PondB            JB1              SIDE         *          .8         NO       0
SWQSouth         Ditch2           31               SIDE         *          0.8        NO       0

[WEIRS]
;;Name           From Node        To Node          Type         CrestHt    Qcoeff     Gated    EndCon   EndCoeff   Surcharge  RoadWidth  RoadSurf
Coeff. Curve
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- -------- ---------- ---------- ---------- ---------- -
---------------
WeirSwale        5                OUT_SWALE        TRAPEZOIDAL  *          2.6        NO       0        0          YES

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
Outfall          CIRCULAR     4.5              0          0          0          1
Swale1           TRAPEZOIDAL  10               5          3          3          1
Swale2           TRAPEZOIDAL  10               5          3          3          1
Swale3           TRAPEZOIDAL  10               5          3          3          1
Swale4           TRAPEZOIDAL  10               6          3          3          1
10PondAOut       CIRCULAR     2                0          0          0          1
11               CIRCULAR     3.5              0          0          0          1
14               CIRCULAR     2.5              0          0          0          1
16               CIRCULAR     4.5              0          0          0          1
18               CIRCULAR     4.5              0          0          0          1
19               CIRCULAR     5                0          0          0          1
15               CIRCULAR     4                0          0          0          1
17               CIRCULAR     2.5              0          0          0          1
31               CIRCULAR     2                0          0          0          1
OutControl       CIRCULAR     1.5              0          0          0          1
32               CIRCULAR     2                0          0          0          1
33               CIRCULAR     1.25             0          0          0          1
34               CIRCULAR     2                0          0          0          2
12               CIRCULAR     4                0          0          0          1
13               CIRCULAR     2.5              0          0          0          1
Upstream         IRREGULAR    Upsteam
Highflow         CIRCULAR     2                0          0          0          1
SWQ              CIRCULAR     1                0          0          0
SWQSouth         CIRCULAR     2                0          0          0
WeirSwale        TRAPEZOIDAL  10               6          3          3

[TRANSECTS]
;;Transect Data in HEC-2 format
;
NC 0.011    0.06     0.055
X1 WilCoDitch        5        10.17    81.60    0.0      0.0      0.0      0.0      0.0
GR 691.22   0        690.77   10.17    688.24   20.35    688.98   81.60    690.65   183.98
;
NC 0.06     0.06     0.055
X1 Upsteam           212      25.476   109.833  0.0      0.0      0.0      0.0      0.0
GR 716.976  0        716.943  0.33     716.821  1.369    716.627  2.844    716.551  3.45
GR 716.446  4.896    716.406  5.359    716.317  6.996    716.25   7.874    716.139  10.015
GR 716.139  10.015   716.117  10.542   716.104  10.908   716.099  12.903   716      14.088
```

```
GR 715.725  15.418   715.535  16.921   715.421  17.634   715.421  17.634   715.381  17.932
GR 715.325  18.66    715.203  20.447   715.161  21.18    715.125  22.962   715.075  24.726
GR 714.971  25.476   714.662  27.305   714.56   27.991   714.539  28.272   714.509  28.945
GR 714.42   30.506   714.386  31.818   714.265  33.02    713.901  34.957   713.84   35.364
GR 713.84   35.364   713.834  35.535   713.813  35.95    713.813  35.95    713.702  38.05
GR 713.592  38.911   713.447  40.564   713.419  40.969   713.304  42.457   713.304  42.457
GR 713.185  43.079   712.829  44.596   712.829  44.596   712.591  45.593   712.496  46.003
GR 712.496  46.003   712.307  46.981   712.084  48.108   711.817  49.549   711.817  49.549
GR 711.826  50.623   711.993  52.994   711.997  53.095   711.997  53.095   712.005  53.241
GR 712.005  53.241   712.034  55.652   712.027  56.641   711.815  58.167   711.724  59.006
GR 711.581  60.187   711.581  60.187   711.604  60.681   711.652  61.886   711.652  61.886
GR 711.715  63.196   711.723  63.733   711.723  63.733   711.784  65.018   711.828  65.711
GR 711.868  67.279   711.868  67.279   711.992  68.225   712.352  70.531   712.407  70.826
GR 712.749  73.255   712.892  74.372   712.892  74.372   712.955  75.769   713.063  77.918
GR 713.063  77.918   713.088  78.284   713.174  79.177   713.174  79.177   713.313  80.799
GR 713.375  81.464   713.466  83.054   713.487  83.313   713.553  85.828   713.661  87.822
GR 713.661  87.822   713.719  88.556   713.719  88.556   713.768  89.067   714.063  92.102
GR 714.063  92.102   714.214  93.372   714.342  95.079   714.396  95.648   714.396  95.648
GR 714.411  95.886   714.469  96.467   714.469  96.467   714.648  98.401   714.702  99.194
GR 714.702  99.194   714.782  100.916  714.789  101.091  714.858  102.74   714.858  102.74
GR 714.924  103.43   715.158  105.112  715.327  106.287  715.327  106.287  715.416  107.103
GR 715.549  108.46   715.719  109.833  715.719  109.833  715.658  110.974  715.545  113.115
GR 715.531  113.379  715.531  113.379  715.539  113.489  715.561  113.758  715.561  113.758
GR 715.739  116.004  715.755  116.925  715.755  116.925  715.811  118.518  715.84   119.128
GR 715.896  120.471  715.896  120.471  715.88   121.033  715.824  122.403  715.824  122.403
GR 715.805  124.017  715.805  124.017  715.816  125.14   715.837  126.062  715.825  127.563
GR 715.825  127.563  715.844  128.577  715.966  131.048  715.966  131.048  715.968  131.091
GR 715.968  131.109  715.968  131.152  715.955  133.606  715.956  134.655  715.956  134.655
GR 716.002  136.121  716.061  137.164  716.109  138.202  716.109  138.202  716.137  138.635
GR 716.204  139.693  716.204  139.693  716.26   141.15   716.305  141.748  716.305  141.748
GR 716.274  143.665  716.289  145.294  716.289  145.294  716.305  146.179  716.317  148.339
GR 716.317  148.339  716.311  148.694  716.307  148.84   716.314  149.188  716.328  151.209
GR 716.373  152.386  716.373  152.386  716.318  153.723  716.215  155.932  716.215  155.932
GR 716.236  156.238  716.293  156.984  716.293  156.984  716.398  158.753  716.406  159.478
GR 716.201  161.213  716.195  161.267  715.994  163.024  715.994  163.024  715.978  163.782
GR 716.006  165.629  716.006  165.629  716.028  166.297  716.041  166.57   716.041  166.57
GR 716.103  167.225  716.258  168.811  716.376  170.116  716.376  170.116  716.31   171.326
GR 716.088  173.237  716.049  173.663  716.034  173.84   716.02   174.274  716.02   174.274
GR 715.98   176.355  716.011  177.209  716.011  177.209  716.013  178.87   716.015  179.107
GR 716.015  179.107  716.015  179.107

[LOSSES]
;;Link           Kentry     Kexit      Kavg       Flap Gate  Seepage
;;-------------- ---------- ---------- ---------- ---------- ----------
Outfall          0          1          0          NO         0
10PondAOut       0.5        0          0          NO         0
19               0          1          0          NO         0
31               0          1          0          NO         0
OutControl       0.5        0          0          NO         0
32               0          1          0          NO         0
33               0.5        0          0          NO         0
34               0          1          0          NO         0
Highflow         0.5        0          0          NO         0

[CONTROLS]
Rule 1
IF SIMULATION TIME < 12
THEN ORIFICE SWQ SETTING = 0
ELSE ORIFICE SWQ SETTING = 1
PRIORITY 1

Rule 2
IF SIMULATION TIME < 12
THEN ORIFICE SWQSouth SETTING = 0
ELSE ORIFICE SWQSouth SETTING = 1


[INFLOWS]
;;Node           Constituent      Time Series      Type     Mfactor  Sfactor  Baseline Pattern
;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
2                FLOW             Swale            FLOW     1.0      0.20
3                FLOW             Swale            FLOW     1.0      0.43
4                FLOW             Swale            FLOW     1.0      0.37
A8               FLOW             Site+Offsite     FLOW     1.0      0.005
A27              FLOW             Site+Offsite     FLOW     1.0      0.021
A26              FLOW             Site+Offsite     FLOW     1.0      0.017
A25              FLOW             Site+Offsite     FLOW     1.0      0.095
JB6              FLOW             Site+Offsite     FLOW     1.0      0.016
A10              FLOW             Site+Offsite     FLOW     1.0      0.021
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A13              FLOW             Site+Offsite     FLOW     1.0      0.007
32               FLOW             Expansion        FLOW     1.0      0.13
33               FLOW             Expansion        FLOW     1.0      0.08
A9               FLOW             Site+Offsite     FLOW     1.0      0.021
JB4              FLOW             Site+Offsite     FLOW     1.0      0.017
0                FLOW             ToSwale          FLOW     1.0      1.0
PondB            FLOW             Site+Offsite     FLOW     1.0      0.42
PondA            FLOW             Site+Offsite     FLOW     1.0      0.36
Ditch1           FLOW             Expansion        FLOW     1.0      0.39
Ditch2           FLOW             Expansion        FLOW     1.0      .4

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
PondA            Storage    0          0.10
PondA                       0.07       11.91
PondA                       0.17       99.81
PondA                       0.27       350.66
PondA                       0.37       702.87
PondA                       0.47       1009.07
PondA                       0.57       1778.89
PondA                       0.67       7614.18
PondA                       0.77       14149.26
PondA                       0.87       22858.61
PondA                       0.97       33450.08
PondA                       1.07       44130.02
PondA                       1.17       54179.50
PondA                       1.27       63601.74
PondA                       1.47       80498.55
PondA                       1.57       87866.60
PondA                       1.77       98303.48
PondA                       1.87       102053.16
PondA                       1.97       105131.94
PondA                       2.07       107906.16
PondA                       2.17       110451.68
PondA                       2.27       112752.43
PondA                       2.37       114666.54
PondA                       2.47       116227.18
PondA                       2.57       117430.07
PondA                       2.67       118288.15
PondA                       2.77       119277.46
PondA                       2.87       119172.36
PondA                       2.97       119631.81
PondA                       3.07       120092.16
PondA                       3.17       120553.57
PondA                       3.27       121016.12
PondA                       3.37       121479.57
PondA                       3.47       121943.97
PondA                       3.57       122409.38
PondA                       3.67       122875.82
PondA                       3.77       123343.14
PondA                       3.87       123811.33
PondA                       3.97       124280.56
PondA                       4.07       124750.72
PondA                       4.17       125221.70
PondA                       4.27       125693.49
PondA                       4.37       126166.10
PondA                       4.47       126639.55
PondA                       4.57       127113.87
PondA                       4.67       127588.93
PondA                       4.77       128064.73
PondA                       4.87       128541.24
PondA                       4.97       129018.40
PondA                       5.07       129495.82
PondA                       5.17       129972.44
PondA                       5.27       130449.61
PondA                       5.37       130927.24
PondA                       5.47       131405.24
PondA                       5.57       131881.07
PondA                       5.67       132350.66
PondA                       5.77       132820.45
PondA                       5.87       133291.17
PondA                       5.97       133762.84
PondA                       6.07       134235.79
PondA                       6.37       134776.50
PondA                       6.47       134877.36
PondA                       6.57       134962.82
PondA                       6.67       135031.23
PondA                       6.77       135098.72
PondA                       6.87       135165.91
PondA                       6.97       135233.25
PondA                       7.07       135288.80
PondA                       7.17       135342.13
```

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PondA                          7.27       135395.45
PondA                          7.37       135448.82
PondA                          7.47       135502.29
PondA                          7.57       135555.86
PondA                          7.67       135609.58
PondA                          7.77       135663.42
PondA                          7.87       135717.41
PondA                          7.97       135771.53
PondA                          8.07       135825.79
PondA                          8.17       135880.14
PondA                          8.27       135937.31
PondA                          8.37       135994.59
PondA                          8.47       136052.01
PondA                          8.57       136109.51
PondA                          8.67       136167.07
PondA                          8.77       136224.64
PondA                          8.87       136282.18
PondA                          8.97       136339.66
PondA                          9.07       136396.97
PondA                          9.17       136454.08
PondA                          9.27       136510.86
PondA                          9.37       136567.20
PondA                          9.47       136622.96
PondA                          9.57       136657.91
PondA                          9.67       136692.70
PondA                          9.77       136726.81
PondA                          9.87       136749.10
PondA                          9.97       136760.40
PondA                          10.07      136769.00
;
PondB            Storage       0          0.10
PondB                          0.08       1491.83
PondB                          0.18       3454.42
PondB                          0.28       5531.54
PondB                          0.38       7667.75
PondB                          0.48       9885.82
PondB                          0.58       11400.47
PondB                          0.68       11751.79
PondB                          0.78       12104.77
PondB                          0.88       12458.00
PondB                          0.98       12811.69
PondB                          1.08       13165.96
PondB                          1.18       13520.71
PondB                          1.28       13875.93
PondB                          1.38       14231.67
PondB                          1.48       14587.93
PondB                          1.58       14944.70
PondB                          1.68       15302.00
PondB                          1.78       15659.82
PondB                          1.88       16018.17
PondB                          1.98       16377.04
PondB                          2.08       16736.43
PondB                          2.18       17096.36
PondB                          2.28       17456.80
PondB                          2.38       17817.76
PondB                          2.48       18179.24
PondB                          2.58       18541.25
PondB                          2.68       18903.80
PondB                          2.78       19266.85
PondB                          2.88       19630.43
PondB                          2.98       19994.53
PondB                          3.08       20359.15
PondB                          3.18       20724.33
PondB                          3.28       21090.00
PondB                          3.38       21456.20
PondB                          3.48       21822.92
PondB                          3.58       22190.19
PondB                          3.68       22557.96
PondB                          3.78       22926.25
PondB                          3.88       23295.07
PondB                          3.98       23664.41
PondB                          4.08       24034.27
PondB                          4.18       24404.66
PondB                          4.28       24775.58
PondB                          4.38       25147.05
PondB                          4.48       25519.01
PondB                          4.58       25891.49
PondB                          4.68       26264.54
PondB                          4.78       26638.07
PondB                          4.88       27012.13
PondB                          4.98       27386.72
PondB                          5.08       27761.82
PondB                          5.18       28137.45
```

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PondB                      5.28      28513.61
PondB                      5.38      28890.29
PondB                      5.48      29267.50
PondB                      5.58      29645.23
PondB                      5.68      30023.48
PondB                      5.78      30402.30
PondB                      5.88      30781.60
PondB                      5.98      31161.43
PondB                      6.08      31541.82
PondB                      6.18      31922.70
PondB                      6.28      32304.10
PondB                      6.38      32686.02
PondB                      6.48      33068.46
PondB                      6.58      33451.40
PondB                      6.68      33834.56
PondB                      6.78      34218.22
PondB                      6.88      34602.27
PondB                      6.98      34986.65
PondB                      7.08      35371.54
PondB                      7.18      35756.94
PondB                      7.28      36142.86
PondB                      7.38      36529.35
PondB                      7.48      36916.30
PondB                      7.58      37303.81
PondB                      7.68      37691.79
PondB                      7.78      38080.28
PondB                      7.88      38469.29
PondB                      7.98      38858.81
PondB                      8.08      39248.85
PondB                      8.18      39639.39
PondB                      8.28      40030.46
PondB                      8.38      40422.03
PondB                      8.48      40814.12
PondB                      8.58      41206.73
PondB                      8.68      41599.84
PondB                      8.78      41993.48
PondB                      8.88      42387.62
PondB                      8.98      42782.29
PondB                      9.08      43177.46
PondB                      9.18      43573.20
PondB                      9.28      43969.45
PondB                      9.38      44366.17
PondB                      9.48      44763.39
PondB                      9.58      45161.13
PondB                      9.68      45559.38
PondB                      9.78      45958.15
PondB                      9.88      46357.44
PondB                      9.98      46757.23
PondB                      10.08     47157.54
PondB                      10.18     47558.37
PondB                      10.28     47959.71
PondB                      10.38     48361.57
PondB                      10.48     48763.94
PondB                      10.58     49166.84
PondB                      10.68     49570.24
PondB                      10.78     49974.16
PondB                      10.88     50378.59
PondB                      10.98     50783.54
PondB                      11.08     51189.01
PondB                      11.18     51595.10
PondB                      11.28     52001.59
PondB                      11.38     52408.60
PondB                      11.48     52816.12
PondB                      11.58     53224.16
PondB                      11.68     53632.71
PondB                      11.78     54041.78
PondB                      11.88     54451.36
PondB                      11.98     54861.46
PondB                      12.08     55272.08
PondB                      12.18     55683.21
PondB                      12.28     56094.49
PondB                      12.38     56506.25
PondB                      12.48     56918.26
;
SmallPond        Storage   0         0.00
SmallPond                  0.25      44.60
SmallPond                  0.75      362.86
SmallPond                  1.25      829.35
SmallPond                  1.75      1309.04
SmallPond                  2.25      1801.95
SmallPond                  2.75      2308.07
SmallPond                  3.25      2827.40
SmallPond                  3.75      3359.95
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SmallPond                4.25      3905.70
SmallPond                4.75      4464.66
SmallPond                5.25      5036.83
SmallPond                5.75      5622.23
SmallPond                6.25      6220.84
SmallPond                6.75      6220.84
SmallPond                7.25      6220.84
;
Ditch1          Storage  0         1000.74
Ditch1                   0.2       4057.55
Ditch1                   0.3       7674.14
Ditch1                   0.4       11422.28
Ditch1                   0.5       14964.06
Ditch1                   0.6       16058.73
Ditch1                   0.7       16361.82
Ditch1                   0.8       16665.70
Ditch1                   0.9       16970.14
Ditch1                   1.0       17275.14
Ditch1                   1.1       17580.70
Ditch1                   1.2       17886.82
Ditch1                   1.3       18193.49
Ditch1                   1.4       18500.72
Ditch1                   1.5       18808.50
Ditch1                   1.6       19116.84
Ditch1                   1.7       19425.74
Ditch1                   1.8       19735.20
Ditch1                   1.9       20045.21
Ditch1                   2.0       20355.79
Ditch1                   2.1       20666.91
Ditch1                   2.2       20978.59
Ditch1                   2.3       21290.82
Ditch1                   2.4       21603.62
Ditch1                   2.5       21916.96
Ditch1                   2.6       22230.86
Ditch1                   2.7       22545.31
Ditch1                   2.8       22860.32
Ditch1                   2.9       23175.88
Ditch1                   3.0       23492.00
Ditch1                   3.1       23808.68
Ditch1                   3.2       24125.91
Ditch1                   3.3       24443.70
Ditch1                   3.4       24762.05
Ditch1                   3.5       25080.97
Ditch1                   3.6       25400.43
Ditch1                   3.7       25720.45
Ditch1                   3.8       26041.03
Ditch1                   3.9       26362.17
Ditch1                   4.0       26683.87
Ditch1                   4.1       27006.12
Ditch1                   4.2       27328.94
Ditch1                   4.3       27652.31
Ditch1                   4.4       27976.24
Ditch1                   4.5       28301.03
Ditch1                   4.6       28301.03
Ditch1                   4.7       28301.03
Ditch1                   4.8       28301.03
Ditch1                   4.9       28301.03
Ditch1                   5.0       28301.03
Ditch1                   5.1       28301.03
;
Ditch2          Storage  0         490.68
Ditch2                   0.2       2633.33
Ditch2                   0.3       4974.25
Ditch2                   0.4       5886.92
Ditch2                   0.5       6052.08
Ditch2                   0.6       6217.91
Ditch2                   0.7       6384.36
Ditch2                   0.8       6551.43
Ditch2                   0.9       6719.12
Ditch2                   1.0       6887.43
Ditch2                   1.1       7056.36
Ditch2                   1.2       7225.91
Ditch2                   1.3       7396.09
Ditch2                   1.4       7566.88
Ditch2                   1.5       7738.29
Ditch2                   1.6       7910.33
Ditch2                   1.7       8082.98
Ditch2                   1.8       8256.26
Ditch2                   1.9       8430.15
Ditch2                   2.0       8604.66
Ditch2                   2.1       8779.79
Ditch2                   2.2       8955.55
Ditch2                   2.3       9131.92
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Ditch2                        2.4        9308.91
Ditch2                        2.5        9486.52
Ditch2                        2.6        9664.76
Ditch2                        2.7        9843.61
Ditch2                        2.8        10023.09
Ditch2                        2.9        10203.18
Ditch2                        3.0        10383.90
Ditch2                        3.1        10565.24
Ditch2                        3.2        10747.20
Ditch2                        3.3        10929.77
Ditch2                        3.4        11112.97
Ditch2                        3.5        11296.79
Ditch2                        3.6        11481.22
Ditch2                        3.7        11666.28
Ditch2                        3.8        11851.96
Ditch2                        3.9        12038.25
Ditch2                        4.0        12225.17
Ditch2                        4.1        12412.71
Ditch2                        4.2        12600.87
Ditch2                        4.3        12789.64
Ditch2                        4.4        12979.04
Ditch2                        4.5        13169.06
Ditch2                        4.6        13359.70
Ditch2                        4.7        13550.96
Ditch2                        4.8        13742.84
Ditch2                        4.9        13935.34
Ditch2                        5.0        14128.46
Ditch2                        5.1        14322.20
Ditch2                        5.2        14516.57
Ditch2                        5.3        14711.55
Ditch2                        5.4        14907.15
Ditch2                        5.5        15103.37
Ditch2                        5.6        15300.22
Ditch2                        5.7        15497.68
Ditch2                        5.8        15695.76
Ditch2                        5.9        15894.46
Ditch2                        6.0        16093.78
Ditch2                        6.1        16293.74
Ditch2                        6.2        16494.30
Ditch2                        6.3        16695.49
Ditch2                        6.4        16897.29
Ditch2                        6.5        17099.71
Ditch2                        6.6        17302.76
Ditch2                        6.7        17506.42
Ditch2                        6.8        17710.71
Ditch2                        6.9        17915.62
Ditch2                        7.0        18121.14
Ditch2                        7.1        18327.28
Ditch2                        7.2        18534.05
Ditch2                        7.3        18741.43
Ditch2                        7.4        18949.43
Ditch2                        7.5        18949.43
Ditch2                        7.6        18949.43
Ditch2                        7.7        18949.43
Ditch2                        7.8        18949.43
Ditch2                        7.9        18949.43
Ditch2                        8.0        18949.43


[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS -2500.000 0.000 13120.177 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
1                10837.989          5430.168
2                10770.950          8011.173
3                5865.922           8134.078
4                2876.220           8155.578
A8               3733.552           2137.069
A27              3736.907           3343.667
A26              3733.552           3642.273
A25              3307.447           4654.966
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JB6              2018.062           5385.433
A10              3733.552           4654.966
A13              2012.528           4649.432
JB1              479.338            6612.449
5                1759.484           7982.700
31               1232.211           1409.379
32               114.376            2588.087
33               -212.121           1879.755
A9               3736.907           2542.072
JB4              3731.634           2958.690
0                12447.398          5426.357
OUT              378.156            6687.038
OUT_SWALE        1566.939           8073.825
WilCoOut         -1008.176          1916.283
PondB            1039.106           6189.944
PondA            4782.123           1653.631
Ditch1           -136.269           1413.936
Ditch2           2485.228           1405.641

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Swale1           10815.642          7810.056
Swale2           10603.352          8089.385
Swale2           9441.341           8100.559
Swale3           3807.531           8145.819
Swale3           3468.746           8150.002
Swale3           3159.238           8151.396
Swale4           2513.734           8147.213
Swale4           2247.446           7981.306
19               1139.665           6156.425
OutControl       610.417            6679.977
OutControl       568.962            6700.704
OutControl       524.743            6721.432
Highflow         -307.486           1651.609
SWQ              392.254            6475.901
SWQSouth         1857.535           1846.552

[Polygons]
;;Storage Node   X-Coord            Y-Coord
;;-------------- ------------------ ------------------


[BACKDROP]
FILE       "Z:\00486 (Stewart Builders)\009 Georgetown Keystone\ENGR\H&H\Models\EPA-SWMM (V5.2)\Backdrop.jpg"
DIMENSIONS -2500.000 0.000 12500.000 10000.000
```