

## **Solicitation 1708-182**

**River Rd & Old Windmill Rd**

**Bid Designation: Public**



**Williamson County, Texas**

## Bid 1708-182 River Rd & Old Windmill Rd

Bid Number 1708-182  
 Bid Title River Rd & Old Windmill Rd  
 Bid Start Date In Held  
 Bid End Date Sep 5, 2017 3:00:00 PM CDT  
 Question & Answer End Date Aug 30, 2017 5:00:00 PM CDT

Bid Contact Will Hutchinson  
 Purchasing Specialist III  
 512-943-1553  
 will.hutchinson@wilco.org

Contract Duration 1 year  
 Contract Renewal Not Applicable  
 Prices Good for 365 days  
 Pre-Bid Conference Aug 29, 2017 9:00:00 AM CDT  
 Attendance is optional  
 Location: 3151 South East Inner Loop  
 Georgetown, TX 78626

Bid Comments **Williamson County is seeking qualified Contractors to provide materials and equipment to rehabilitate River Rd and Old Windmill Rd.**

### Item Response Form

Item 1708-182--01-01 - Attach Documents Here

Quantity 1 each

Prices are not requested for this item.

Delivery Location **Williamson County, Texas**

No Location Specified

Qty 1

#### Description

Attach Documents Here

Item 1708-182--01-02 - Total Price

Quantity 1 lump sum

Unit Price

Delivery Location **Williamson County, Texas**

No Location Specified

Qty 1

**Description**

Place Bid Total here. Note this does not replace the bid Tabulation that you must upload.

[Empty input field for bid total]



## PUBLIC ANNOUNCEMENT AND GENERAL INFORMATION

### **WILLIAMSON COUNTY PURCHASING DEPARTMENT SOLICITATION 1708-182 River Rd & Old Windmill Rd**

**BIDS MUST BE RECEIVED ON OR BEFORE:  
Sep 5, 2017 3:00:00 PM CDT**

**BIDS WILL BE PUBLICLY OPENED:  
Sep 5, 2017 3:00:00 PM CDT**

Notice is hereby given that sealed Bids for the above-mentioned goods and/or services will be accepted by the Williamson County Purchasing Department. Williamson County uses BidSync to distribute and receive bids. Specifications for this IFB may be obtained by registering at [www.bidsync.com](http://www.bidsync.com).

**Williamson County prefers and requests electronic submittal of this Bid.**

**All electronic bids must be submitted via: [www.bidsync.com](http://www.bidsync.com)**

Electronic bids are requested, however paper bids will currently still be received, until further notice and may be mailed or delivered to the address listed below.

**Bidders are strongly encouraged to carefully read this entire IFB.**

All interested Bidders are invited to submit a Bid in accordance with the Instructions and General Requirements, Bid Format, Bid Specifications, and Definitions, Terms and Conditions stated in this IFB.

**Please note that a complete package must be submitted choosing one of the above two methods. Split packages submitted will be considered “unresponsive” and will not be accepted or evaluated.**

**Williamson County will not accept any Bids received after the submittal deadline, and shall return such Bids unopened to the Bidder.**

General Information:

- If mailed or delivered in person, Bids and Bid addenda are to be delivered in sealed envelope on or before the submittal deadline, as noted in the Public Announcement and General Information listed above for this IFB, to:

Williamson County Purchasing Department  
Attn: **BID NAME AND NUMBER**  
901 South Austin Avenue  
Georgetown, Texas 78626

- Bidders should list the Bid Number, Bid Name, Name and Address of Bidder, and the Date of the Bid opening on the outside of the box or envelope and note "Sealed Bid Enclosed."
  - Bidder should submit one (1) original.
  - Williamson County will NOT be responsible for unmarked or improperly marked envelopes.
  - Williamson County will not accept any responsibility for Bids being delivered by third party carriers.
  - Facsimile transmittals will NOT be accepted.
- Bids will be opened publicly in a manner; however, to avoid public disclosure of contents only the names and of Bidders and prices will be read aloud.
  - All submitted questions with their answers will be posted and updated on [www.bidsync.com](http://www.bidsync.com).
  - It is the Bidder's responsibility to review all documents in BidSync, including any Addenda that may have been added after the document packet was originally released and posted.
    - Any Addenda and/or other information relevant to the IFB will be posted on [www.bidsync.com](http://www.bidsync.com).
    - The Williamson County Purchasing Department takes no responsibility to ensure any interested Bidder has obtained any outstanding addenda or additional information.



## Williamson County – Invitation for Bid (IFB)

### SECTION 1 - DEFINITIONS

**Addendum/Addenda** – means any written or graphic instruments issued by the County prior to the consideration of Bids which modify or interpret the Bid Documents by additions, deletions, clarifications, or corrections.

**Agreement/Ensuing Agreement(s)** – means the Successful Bidder may be required by the County to sign an additional Agreement containing terms necessary to ensure compliance with the IFB and the Bidder's Bid. Such Ensuing Agreement(s) shall contain the Bid specifications, terms and conditions that are derived from the IFB.

**Bid Documents** – means the Legal Notice, IFB including attachments, and any Addenda issued by the County prior to the consideration of any Bids.

**Bid** – means the completed and signed bid form, (sometimes referred to as the Price Sheet), and ALL required forms and documentation listed in the IFB package which have been submitted in accordance with the terms and conditions described in the IFB package. A Bid submitted in accordance with this IFB is irrevocable during the specified period for evaluation and acceptance of Bids unless a waiver is obtained from the Williamson County Purchasing Agent.

**Bidder** – means a person or entity who submits a Bid in response to this IFB.

**Contract** – means this IFB and the Bid of the Successful Bidder shall become a Contract between the Successful Bidder and the County once the Successful Bidder's Bid is properly accepted by the Williamson County Commissioners Court.

**Commissioner's Court** – means the Williamson County Commissioners Court.

**County** – means Williamson County, a political subdivision of the State of Texas.

**Invitation for Bid (IFB)** – means this document, together with the attachments thereto and any future Addenda issued by the County.

**Successful Bidder** – means the liable Bidder to whom the County intends to award the Contract.

## **SECTION 2 - BID FORMAT AND SUBMISSION**

### **2.1 ORGANIZATION OF BID CONTENTS FOR SUBMITTAL**

Each Bid should be organized and items submitted in the order described below:

- A. Transmittal Letter. Please see Section 2.3, Transmittal Letter, for more information.
- B. Price Sheet.
- C. Conflict of Interest Questionnaire. Please see Section 2.2, Conflict of Interest, for more information in regards to this. Please note that even if you deem there to be no Conflict of Interest, this signed questionnaire must be included in your package.
- D. References. Please see Section 3.15, References, for more information.
- E. Bid Affidavit.
- F. Form 1295. Please see Section 2.4, Certificate of Interested Parties – Form 1295.

### **2.2 CONFLICT OF INTEREST**

No public official shall have interest in a Contract, in accordance with Vernon's Texas Codes Annotated, Local Government Code, Title 5, Subtitle C, Chapter 171, as amended.

As of January 1, 2006, all Bidders are responsible for complying with Local Government Code, Title 5, Subtitle C, Chapter 176. Additional information may be obtained from the County's website at the following link:

<http://www.wilco.org/CountyDepartments/Purchasing/ConflictofInterestDisclosure/tabid/689/language/en-US/Default.aspx>

Each Bidder must disclose any existing or potential conflict of interest relative to the performance of the requirements of this IFB. **Examples of potential conflicts of interest may include an existing business or personal relationship between the Bidder, its principal, or any affiliate or subcontractor with the County or any other entity or person involved in any way with the project that is subject to this IFB.** Similarly, any personal or business relationship between the Bidder, the principals, or any affiliate or subcontractor with any employee, or official of the County or its suppliers must be disclosed. Any such relationship that might be perceived or represented as a conflict must be disclosed. Failure to disclose any such relationship or reveal personal relationships with the County employees or officials may be cause for termination.

The County will decide if an actual or perceived conflict should result in Bid disqualification.

By submitting a Bid in response to this IFB, all Bidders affirm they have not given, nor intend to give, at any time hereafter, any economic opportunity, future employment, gift, loan, gratuity, special discount, trip, favor, or service to a the County public servant or any employee, official or representative of same, in connection with this procurement.

**Each Bidder must provide a Conflict of Interest Statement with their Bid Package. Package may be deemed incomplete without this form.**

### **2.3 TRANSMITTAL LETTER**

The Bidder should submit a Transmittal Letter that provides the following information:

- A. Name and address of individual or business entity submitting the Bid.
- B. Name, physical address, email address, business and fax number of the Bidder's principal contact person regarding all contractual matters relating to this IFB.
- C. The Bid's Federal Employer Identification Number.
- D. If the Proposal being submitted will have an effect on air quality for the County (as it relates to any state, federal, or voluntary air quality standard), then the Respondent is encouraged to provide information in narrative indicating the anticipated air quality impact. See Section 4.36, Air Quality for more information.

## 2.4 CERTIFICATE OF INTERESTED PARTIES – FORM 1295

As of January 1, 2016, all Successful Bidders are responsible for complying with the Texas Government Code, Section 2252.908. The law states that the County may not enter into certain contracts with a Bidder unless the Bidder submits a disclosure of interested parties to the County at the time the Bidder submits the signed Contract. The law applies only to a Contract of the County on or after January 1, 2016 that either:

- A. Requires an action or vote by the Commissioners Court before the Contract may be signed (all contracts that fall under the jurisdiction of the Commissioners Court approval, such as contracts resulting from an Initiation for Bid (IFB), RFP, Request for Qualifications (RFQ), etc., excluding, but not limited to, certain Juvenile Service contracts, contracts funded with Sheriff's seized monies, etc.); or
- B. Has a value of at least \$1,000,000.

By January 1, 2016, the Texas Ethics Commission will make available on its website, a new filing application that must be used to file Form 1295. Information regarding how to use the filing application is available on the Texas Ethics Commission website at the following link:

[https://www.ethics.state.tx.us/whatsnew/elf\\_info\\_form1295.htm](https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm)

A Respondent must:

- A. Use the online application to process the required information on Form 1295.
- B. Print a copy of the form which will contain a unique certification number.
- C. An authorized agent of the Bidder must sign the printed copy of the form.
- D. Have the form notarized.
- E. File the completed Form 1295 and certification of filing (scanning and emailing form is sufficient) with Williamson County Purchasing Agent at the time the signed Contract is submitted for approval.

After the Commissioners Court award of the Contract, the County shall notify the Texas Ethics Commission, using the Texas Ethics Commission's filing application, of the receipt of the filed Form 1295 and certification of filing not later than the 30th day after the date the Contract binds all parties to the Contract. The Texas Ethics Commission will post the completed Form 1295 to its website within seven business days after receiving notice from the County.

## 2.5 ETHICS

The Bidder shall not accept or offer gifts or anything of value nor enter into any business arrangement with any employee, official or agent of the County.

## 2.6 BID SUBMITTAL DEADLINE

The Bid is due no later than the submittal date and time set forth in the Public Announcement and General Information listed in this IFB package. Contents of each Bid shall be submitted in accordance with this IFB.

## 2.7 DELIVERY OF BIDS

The County uses BidSync to distribute and receive Bids and proposals. It is preferred that Bids submitted electronically through BidSync; however, Bidders can submit a hard copy.

Refer to [www.bidsync.com](http://www.bidsync.com) for further information on how to submit electronically.

If mailed or delivered in person, Bids and Bid Addenda are to be delivered in sealed envelope on or before the submittal deadline, as noted in the Public Announcement and General Information listed in this IFB package, to:

Williamson County Purchasing Department  
Attn: **Bid Name and Number**  
901 South Austin Avenue  
Georgetown, Texas 78626

Also, all Bidders should list their Name and Address, and the Date of the Bid opening on the outside the box or envelope and note "Sealed Bid Enclosed." The County will not accept any Bids received after the submittal deadline, and shall return such Bids unopened to the Bidder. The County will not accept any responsibility for Bids being delivered by third party carriers.

Bids will be opened publically and the names of Bidders and pricing will be read aloud.

## **SECTION 3 - INSTRUCTIONS AND GENERAL REQUIREMENTS**

### **3.1 INSTRUCTIONS**

Read this document carefully, and follow all instructions and requirements. All Bidders are responsible for fulfilling all requirements and specifications. Be sure to have a clear understanding of this IFB.

General requirements apply to all advertised IFBs; however, these may be superseded, in whole or in part, by the bid specifications, Addenda and modifications issued as a part of this IFB. Be sure your Bid package is complete.

### **3.2 AMBIGUITY, CONFLICT, OR OTHER ERRORS IN THIS IFB**

If a Bidder discovers any ambiguity, conflict, discrepancy, omission or other error in this IFB, the Bidder shall immediately notify the County Purchasing Department of such error in writing and request modification or clarification of the document.

Modifications will be made by issuing Addenda. If the Bidder fails to notify the County prior to the date and time fixed for submission of Bids of an error or ambiguity in the IFB known to the Bidder, or an error or ambiguity that reasonably should have been known to the Bidder, then the Bidder shall be deemed to have waived the error or ambiguity or its later resolution.

The County may also modify the IFB, no later than forty-eight (48) hours prior to the date and time fixed for submission of Bids, by issuance of an Addendum. All Addenda will be numbered consecutively, beginning with one (1).

### **3.3 NOTIFICATION OF MOST CURRENT ADDRESS**

All Bidders in receipt of this IFB shall notify the Williamson County Purchasing Department of any address changes, contact person changes, and/or telephone number changes no later than forty-eight (48) hours prior to the date and time fixed for submission of Bids.

### **3.4 SIGNATURE OF BIDDER**

- A. If the Bidder is a Corporation or Limited Liability Company, the legal name of the Corporation Limited Liability Company shall be provided together with the signature of the officer or officers authorized to sign on behalf of such entity.
- B. If the Bidder is a General Partnership, the true name of the firm shall be provided with the signature of each partner authorized to sign.
- C. If the Bidder is a Limited Partnership, the name of the Limited Partner's General Partner shall be provided with the signature of the officer authorized to sign on behalf of the General Partner.
- D. If the Bidder is a Sole Proprietor(s) (individual), each Sole Proprietor(s) shall sign.
- E. If signature is by an agent, other than the Sole Proprietor(s) or an officer of a Corporation, Limited Liability Company, General Partner or a member of a General Partnership, a power of attorney equivalent document must be submitted to the Williamson County Purchasing Department.

### **3.5 ASSUMED BUSINESS NAME**

If the Bidder operates business under an Assumed Business Name, the Bidder must have on file with the

Williamson County Clerk a current Assumed Name Certificate and provide a file marked copy of same.

### **3.6 BID OBLIGATION**

The contents of the IFB, Bid, and any clarification thereof submitted by the Successful Bidder shall become part of the contractual obligation and incorporated by reference into the Contract and any Ensuing Agreement(s).

### **3.7 COMPLIANCE WITH IFB SPECIFICATIONS**

It is intended that this IFB describe the requirements and the Bid format in sufficient detail to secure comparable Bids. Failure to comply with all provisions of the IFB may, at the sole discretion of the County, result in disqualification.

### **3.8 WITHDRAWAL OF BID**

The Bidder may withdraw its Bid by submitting a written request with the company letterhead and the signature of an authorized individual, as described in Section 3.4, Signature of Bidder, to the Williamson County Purchasing Department any time prior to the submission deadline.

The Bidder may submit a new Bid prior to the deadline. Alterations of the Bid in any manner will not be considered if submitted after the deadline. Withdrawal of a Bid after the deadline will be subject to written approval of the Williamson County Purchasing Agent.

### **3.9 EVALUATION AND AWARD**

The County reserves the right to use all pertinent information (also learned from sources other than disclosed in the Bid process) that might affect the County's judgment as to the appropriateness of award to the lowest and best evaluated Bid. This information may be appended to the Bid evaluation process results. Information on a Bidder from reliable sources, and not within the Bidder's Bid, may also be noted and made part of the evaluation file. The County shall have sole discretion for determining the reliability of the source.

To ensure the proper and fair evaluation of a solicitation, the County prohibits unsolicited communication initiated by the Bidder to the County Official or Employee evaluating or considering the Bids prior to the time an award has been made. Unsolicited communication may be ground for disqualifying the offending Bidder from consideration or award of the solicitation, or any future solicitation.

Communication between the Bidder and the County will be initiated by the appropriate County Official Employee in order to obtain information or clarification needed to develop a proper and accurate evaluation of the solicitation.

The County intends to award a Contract to the most responsible and responsive Bidder whose Bid will be most advantageous to the County. In accordance with Texas Government Code and Local Government Code, the County may consider, to the extent allowed by law, the following:

- A. Price;
- B. The Bidder's experience and reputation;
- C. Quality of the Bidder's goods and/or services;
- D. The Bidder's safety record;
- E. The Bidder's proposed personnel;
- F. The Bidder's financial capabilities; and
- G. Any other relevant factors specifically listed in this IFB or authorized by law.

### **3.10 CONSIDERATION OF LOCATION OF PRINCIPAL OFFICE**

Pursuant to Texas Local Government Code, Section 271.905, in purchasing any real property or personal property that is not affixed to real property, if the County receives one or more Bids from a Bidder whose principal place of business is in Williamson County and whose Bid is within three (3) percent of the lowest Bid price received by the County from a Bidder who is not a resident of Williamson County, the County may enter into a contract with:

- A. The lowest Bidder; or the Bidder whose principal place of business is in Williamson County if the Commissioners Court determines, in writing, that the local Bidder offers the County the best combination of contract price and additional economic development opportunities Williamson County created by the contract award, including the employment of residents Williamson County and increased tax revenues to Williamson County.

It is understood that the Commissioners Court of Williamson County, Texas, reserves the right to accept or reject any and/or all Bids for any or all goods and/or services covered in this IFB, and to waive informalities or defects in the Bid or to accept such Bid, if it shall deem to be in the best interest of the County.

Awards should be made approximately sixty (60) business days after the Bid opening date. Results may be obtained by viewing the Williamson County vendor portal at the following link:

<http://www.wilco.org/CountyDepartments/Purchasing/SearchforaPastBid/tabid/5213/language/en-US/Default.aspx>

### **3.11 RESPONSIBILITY**

It is expected that a prospective Bidder will be able to affirmatively demonstrate responsibility. A prospective Bidder should be able to meet the following requirements:

- A. Have adequate financial resources, or the ability to obtain such resources as required;
- B. Be able to comply with the required or proposed delivery schedule;
- C. Have a satisfactory record of performance that can be determined thru references provided; and
- D. Be otherwise qualified and eligible to receive an award.

The County may request representation and other information sufficient to determine the Bidder's ability to meet these minimum standards listed above.

### **3.12 FIRM PRICING**

For unit price items, all of the items listed are to be on a "per unit" basis, stating a firm price per unit or unit quantity of each item. The Bidder must submit a firm price that must be good from the date of Bid opening for the fixed period of time set out in this IFB. Unless the IFB expressly states otherwise, this period shall be until the end of the Initial Contract Period.

Bids which do not state a fixed price, or which are subject to change without notice, will not be considered. The Court may award a Contract for the period implied or expressly stated in the lowest and best Bid.

### **3.13 PURCHASE ORDERS**

If required by the Williamson County Purchasing Department, a purchase order(s) may be generated to the Successful Bidder for goods and/or services. If a purchase order is issued, the purchase order number must appear on all itemized invoices and/or requests for payment.

### **3.14 SILENCE OF SPECIFICATIONS**

The apparent silence of these specifications as to any detail or to the apparent omission from it of a

detailed description concerning any point, shall be regarded as meaning that only the best practices are to prevail. All interpretations of these specifications shall be made on the basis of this statement.

### **3.15 REFERENCES**

The County may require the Bidder to supply a list of at least three (3) references where like services and/or goods have been supplied by their firm within the past five (5) years, to include names, titles, phone numbers and email addresses of key personnel, and dates of performance.

The County may contact some or all of the references in order to determine the Respondent performance record on work similar to that described in this RFP. The County reserves the right to contact references other than those provided in the response and to use the information gained from them in the evaluation process.

References, if requested, should be provided in accordance with this IFB. Bid may not be deemed complete without the inclusion of requested references.

## **SECTION 4 - TERMS AND CONDITIONS**

### **4.1 VENUE AND GOVERNING LAW**

The Bidder hereby agrees and acknowledges that venue and jurisdiction of any suit, right, or cause of action arising out of or in connection with this IFB, the Contract and any Ensuing Agreement(s), shall lie exclusively in either Williamson County, Texas or in the Austin Division of the Western Federal District of Texas, and the parties hereto expressly consent and submit to such jurisdiction. Furthermore, except to the extent that this IFB, the Contract and any Ensuing Agreement(s) is governed by the laws of the United States, this IFB, the Contract and any Ensuing Agreement(s) shall be governed by and construed in accordance with the laws of the State of Texas, excluding, however, its choice of law rules.

### **4.2 INCORPORATION BY REFERENCE AND PRECEDENCE**

- A. The Contract shall be derived from the IFB and its Addenda (if applicable), and the Bidder's Bid. In the event of a dispute under the Contract, applicable documents will be referred to for the purpose of clarification or for additional detail in the following order of precedence:
1. The IFB and its Addenda (if applicable); and
  2. The Bidder's Bid.
- B. In the event the County requires that an Ensuing Agreement be executed following award and a dispute arises between the terms and conditions of the Ensuing Agreement, the IFB and its Addenda (if applicable), and the Bidder's Bid, applicable documents will be referred to for the purpose of clarification or for additional detail in the following order of precedence:
1. Terms and conditions of the Ensuing Agreement;
  2. The IFB its Addenda; and
  3. The Bidder's Bid.

### **4.3 OWNERSHIP OF BID**

Each Bid shall become the property of the County upon submittal and will not be returned to Bidders unless received after the submittal deadline.

### **4.4 DISQUALIFICATION OF BIDDER**

Upon signing and submittal of the Bid, a Bidder offering to sell supplies, materials, services, or equipment to the County, certifies that the Bidder has not violated the antitrust laws of the State of Texas codified in Business & Commerce Code, Section 15.01, or the Federal Antitrust Laws, and has not communicated directly or indirectly the offer made to any competitor or any other person engaged in such line of business. Any or all Bids may be rejected if the County believes that collusion exists among the Bidders.

### **4.5 FUNDING**

The County intends to budget and make sufficient funds available and authorize funds for expenditure to finance the costs of the Contract. All Bidders understand and agree that the County's payment of amounts under the Contract shall be contingent on the County receiving appropriations or other expenditure authority sufficient to allow the County, in the exercise of reasonable administrative discretion, to make payments under this Contract.

#### 4.6 ASSIGNMENT, SUCCESSORS AND ASSIGNS

The Successful Bidder may not assign, sell, or otherwise transfer the Contract or any other rights or interests obtained under the Contract without written permission of the Commissioners Court. The Contract and any Ensuing Agreement(s) shall be binding upon and inure to the benefit of the contracting parties hereto and their respective successors and permitted assigns.

#### 4.7 IMPLIED REQUIREMENTS

Products or services not specifically described or required in the IFB, but are necessary to provide the functional capabilities described by the Bidder, shall be implied and deemed to be included in the Bid.

#### 4.8 TERMINATION

- A. Termination for Cause:** The County reserves the right to terminate the Contract and/or any Ensuing Agreement(s) for default if the Successful Bidder breaches any of the Bid specifications, terms and conditions, including warranties of the Bidder, if any, or if the Successful Bidder becomes insolvent or commits acts of bankruptcy. Such right of termination is in addition to and not in lieu of any other remedies the County may have at law or in equity or as may otherwise provided hereunder. Default may be construed as, but not limited to, failure to deliver the proper goods and/or services within the proper amount of time, and/or to properly perform any and all other requirements to the County's satisfaction, and/or to meet all other obligations and requirements.
- B. Termination for Convenience:** The County may terminate the Contract and/or any Ensuing Agreement(s) for convenience and without cause or further liability, upon no less than thirty (30) calendar days written notice to the Successful Bidder. The County reserves the right to extend this period if it is in the best interest of the County. In the event the County exercises its right to terminate without cause, it is understood and agreed that only the amounts due to the Successful Bidder for goods, commodities and/or services provided and expenses incurred to and including the date of termination, will be due and payable. No penalty will be assessed for the County termination for convenience.

#### 4.9 NON-PERFORMANCE

It is the objective of the County to obtain complete and satisfactory performance of the requirements set forth herein. In addition to any other remedies available at law, in equity or that may be set out herein, failure to perform may result in a deduction of payment equal to the amount of the goods and/or services that were not provided and/or performed to the County's satisfaction.

In the event of such non-performance, the County shall have the right, but shall not be obligated, to complete the services itself or by others and/or purchase the goods from other sources. If the County elects to acquire the goods or perform the services itself or by others, pursuant to the foregoing, the Successful Bidder shall reimburse the County, within ten (10) calendar days of demand, for all costs incurred by the County (including, without limitation, applicable, general, and administrative expenses, and field overhead, and the cost of necessary equipment, materials, and field labor) in correcting the nonperformance which the Successful Bidder fails to meet pursuant to the requirements set out herein. In the event the Successful Bidder refuses to reimburse the County as set out in this provision, the County shall have the right to deduct such reimbursement amounts from any amounts that may be then owing or that may become owing in the future to the Successful Bidder.

#### 4.10 PROPRIETARY INFORMATION AND THE TEXAS PUBLIC INFORMATION ACT

All material submitted to the County shall become public property and subject to the Texas Public Information Act upon receipt. If a Bidder does not desire proprietary information in the Bid to be

disclosed, each page must be clearly identified and marked proprietary at time of submittal or, more preferably, all proprietary information may be placed in a folder or appendix and be clearly identified and marked as being proprietary. Failure to clearly identify and mark information as being proprietary as set forth under this provision will result in all unmarked information being deemed non-proprietary and available to the public. For all information that has not been clearly identified and marked as proprietary by the Bidder, the County may choose to place such information on the County's website and/or a similar public database without obtaining any type of prior consent from the Bidder.

The County will, to the extent allowed by law, endeavor to protect from public disclosure the information that has been identified and marked as proprietary. The final decision as to what information must be disclosed, however, lies with the Texas Attorney General.

To the extent, if any, that any provision in this IFB or in the Bidder's Bid is in conflict with Texas Government Code, Chapter 552, as amended (the "Public Information Act"), the same shall be of no force or effect. Furthermore, it is expressly understood, and agreed, that the County, and its officers and employees, may request advice, decisions and opinions of the Attorney General of the State of Texas in regard to the application of the Public Information Act to any items or data furnished to the County as to whether or not the same are available to the public. It is further understood that the County, and its officers and employees, shall have the right to rely on the advice, decisions and opinions of the Attorney General, and that the County, its officers and employees shall have no liability or obligation to any party hereto for the disclosure to the public, or to any person or persons, of any items or data furnished to the County by a party hereto, in reliance of any advice, decision or opinion of the Attorney General of the State of Texas.

#### **4.11 RIGHT TO AUDIT**

The Successful Bidder agrees that the County or its duly authorized representatives shall, until the expiration of three (3) years after termination or expiration of the services to be performed, have access to and the right to examine and photocopy any and all books, documents, papers and records of the Successful Bidder, which are directly pertinent to the services to be performed or goods to be delivered for the purposes of making audits, examinations, excerpts and transcriptions. The Successful Bidder agrees that the County shall have access during normal working hours to all necessary facilities and shall be provided adequate and appropriate work space in order to conduct audits in compliance with the provisions of this section. The County shall give the Successful Bidder reasonable advance notice of intended audits.

#### **4.12 TESTING AND INSPECTIONS**

The County reserves the right to inspect and test equipment, supplies, materials and goods for quality and compliance with this IFB, and ability to meet the needs of the user. Demonstration units must be available for review. Should the goods or services fail to meet requirements and/or be unavailable for evaluation, the County can deem the Bidder to be in breach and terminate the Contract and/or any Ensuing Agreement(s).

#### **4.13 BID PREPARATION COSTS**

The cost of developing Bids is the sole responsibility of the Bidders and shall not be charged to the County. There is no expressed or implied obligation for the County to reimburse the Bidders for any expense incurred in preparing a Bid in response to this IFB and the County will not reimburse the Bidders for such expenses.

#### **4.14 INDEMNIFICATION**

The Successful Bidder shall indemnify, defend and save harmless, the County, its officials, employees, agents and agent's employees from, and against, all claims, liability, and expenses including reasonable attorneys' fees, arising from activities of the Bidder, its agents, servants or employees, performed

hereunder that result from the negligent act, error, or omission of the Bidder or any of the Bidder agents, servants or employees, as well as all claims of loss or damage to the Bidder's and the County property, equipment, and/or supplies.

Furthermore, the County, its officials, employees, agents and agents' employees shall not be liable for damages to the Successful Bidder arising from any act of any third party, including, but not limited to, theft. The Successful Bidder further agrees to indemnify, defend and save harmless, the County from its officials, employee, agents and agents' employees against all claims of whatever nature arising from any accident, injury, or damage whatsoever, caused to any person, or the property of any person, occurring in relation to the Successful Bidder's performance of any services requested hereunder during the term of the Contract and/or any Ensuing Agreement(s).

The Successful Bidder shall timely report all claims, demands, suits, actions, proceedings, liens or judgements to the County and shall, upon the receipt of any claim, demand, suit, action, proceeding, lien or judgement, not later than the fifteenth (15<sup>th</sup>) day of each month; provide the County with a written report on each such matter, setting forth the status of each matter, the schedule or planned proceedings with respect to each matter and the cooperation or assistance, if any, of the County required by the Successful Bidder in the defense of each matter. The Successful Bidder's duty to defend, indemnify and hold the County harmless shall be absolute. It shall not abate or end by reason of the expiration or termination of the Contract and/or any Ensuing Agreement(s), unless otherwise agreed by the County in writing. The provisions of this section shall survive the termination of the Contract and shall remain in full force and effect with respect to all such matters no matter when they arise.

In the event of any dispute between the parties, as to whether a claim, demand, suit, action, proceeding, lien or judgement, that appears to have been caused by or appears to have arisen out of or in connection with acts or omissions of the County, the Bidder shall nevertheless fully defend such claim, demand, suit or action, proceeding, lien or judgement, until and unless there is a determination by a court of competent jurisdiction that the acts and omissions of the Bidder are not an issue in the matter.

The Successful Bidder's indemnification shall cover, and the Successful Bidder agrees to, indemnify the County, in the event the County is found to have been negligent for having selected the Successful Bidder to perform the work described in this request. The provision by the Successful Bidder of insurance shall not limit the liability of the Successful Bidder under the Contract and/or any Ensuing Agreement(s).

#### **4.15 WAIVER OF SUBROGATION**

The Successful Bidder and the Successful Bidder's insurance carrier waive any and all rights whatsoever with regard to subrogation against the County as an indirect party to any suit arising out of personal or property damages resulting from the Bidder's performance under this Contract and any Ensuing Agreement(s).

#### **4.16 RELATIONSHIP OF THE PARTIES**

The Successful Bidder shall be an independent contractor and shall assume all of the rights, obligations, liabilities, applicable to it as such independent contractor hereunder and any provisions herein which may appear to give the County the right to direct the Successful Bidder as to details of doing work herein covered, or to exercise a measure of control over the work, shall be deemed to mean that the Successful Bidder shall follow the desires of the County in the results of the work only. The County shall not retain or have the right to control the Successful Bidder's means, methods or details pertaining to the Successful Bidder's performance of the work. The County and the Successful Bidder hereby agree and declare that the Successful Bidder is an independent contractor and as such meets the qualifications of an "Independent Contractor" under Texas Workers Compensation Act, Texas Labor Code, Section 406.141, that the Successful Bidder is not an employee of the County, and that the Successful Bidder and its employees, agents and subcontractors shall not be entitled to workers compensation coverage or any other type of insurance coverage held by the County.

#### **4.17 SOLE PROVIDER**

The Successful Bidder agrees and acknowledges that it shall not be considered a sole provider of the goods and/or services described herein and that the County may contract with other providers of such goods and/or services if the County deems, at its sole discretion, that multiple providers of the same goods and/or services will serve the best interest of the County.

#### **4.18 FORCE MAJEURE**

If the party obligated to perform is prevented from performance by an act of war, order of legal authority, act of God, or other unavoidable cause not attributable to the fault or negligence of said party, the other party shall grant such party relief from the performance. The burden of proof for the need of such relief shall rest upon the party obligated to perform. To obtain release based on force majeure, the party obligated to perform shall file a written request with the other party.

#### **4.19 SEVERABILITY**

If any provision of this IFB, the Contract or any Ensuing Agreement(s) shall be held invalid or unenforceable by any court of competent jurisdiction, such holding shall not invalidate or render unenforceable any other provision thereof, but rather the entire IFB, Contract or any Ensuing Agreement (s) will be construed as if not containing the particular invalid or unenforceable provision or provisions, and the rights and obligation of the parties shall be construed and enforced in accordance therewith. The parties acknowledge that if any provision of this IFB, the Contract or any Ensuing Agreement(s) is determined to be invalid or unenforceable, it is the desire and intention of each that such provision be reformed and construed in such a manner that it will, to the maximum extent practicable, give effect to the intent of this IFB, the Contract or any Ensuing Agreement(s) and be deemed to be validated and enforceable.

#### **4.20 EQUAL OPPORTUNITY**

Neither party shall discriminate against any employee or applicant for employment because of race, color, sex, religion or national origin.

#### **4.21 NOTICE**

Any notice to be given shall be in writing and may be distributed by personal delivery, or by registered or certified mail, return receipt requested, addressed to the proper party, at the following address:

The County: Williamson County Purchasing Department  
Attn: Purchasing Agent  
901 South Austin Avenue  
Georgetown, Texas 78626

The Bidder: Address set out in Bidder's Transmittal Letter.

Notices given in accordance with this provision shall be effective upon (1) receipt by the party to which notice is given, or (2) on the third (3rd) calendar day following mailing, whichever occurs first.

#### **4.22 SALES AND USE TAX EXEMPTION**

The County is a body, corporate and politic, under the laws of the State of Texas and claims exemption from sales and use taxes under Texas Tax Code, Section 151.309, as amended, and the services and/or goods subject hereof are being secured for use by the County.

#### **4.23 COMPLIANCE WITH LAWS**

The County and the Successful Bidder shall comply with all federal, state, and local laws, statutes, ordinances, rules and regulations, and the orders and decrees of any courts or administrative bodies or tribunals in any matter affecting the performance of the Contract and any Ensuing Agreement(s), including, without limitation, Workers' Compensation laws, salary and wage statutes and regulations, licensing laws and regulations. When required, the Successful Bidder shall furnish the County with certification of compliance with said laws, statutes, ordinances, rules, regulations, orders, and decrees above specified.

#### **4.24 INCORPORATION OF EXHIBITS, APPENDICES AND ATTACHMENTS**

All of the Exhibits, Appendices and Attachments referred to herein are incorporated by reference as if set forth verbatim herein. Any conflicting terms in the Contract documents will be resolved at the sole discretion of the Commissioners Court.

#### **4.25 NO WAIVER OF IMMUNITIES**

Nothing herein shall be deemed to waive, modify or amend any legal defense available at law or in equity to the County, its past or present officers, employees, or agents, nor to create any legal rights or claim on behalf of any third party. The County does not waive, modify, or alter to any extent whatsoever the availability of the defense of governmental immunity under the laws of the State of Texas and of the United States.

#### **4.26 NO WAIVER**

The failure or delay of any party to enforce at any time or any period of time any of the provisions of this IFB, the Contract or any Ensuing Agreement(s) shall not constitute a present or future waiver of such provisions nor the right of either party to enforce each and every provision. Furthermore, no term or provision hereof shall be deemed waived and no breach excused unless such waiver or consent shall be in writing and signed by the party claimed to have waived or consented. Any consent by any party to, or waiver of, a breach by the other, whether expressed or implied, shall not constitute a consent to, waiver of or excuse for any other, different or subsequent breach.

#### **4.27 CURRENT REVENUES**

The obligations of the parties under the Contract and any Ensuing Agreement(s) do not constitute a general obligation or indebtedness of the County for which the County is obligated to levy, pledge, or collect any of taxation. It is understood and agreed that the County shall have the right to terminate the Contract and any Ensuing Agreement(s) at the end of any the County fiscal year if the governing body of the County does not appropriate sufficient funds as determined by the County's budget for the fiscal year in question. The County may effect such termination by giving written notice of termination to Successful Bidder at the end of its then-current fiscal year.

#### **4.28 FOB DESTINATION**

To the extent applicable to this IFB, all of the items listed are to be Free On Board to final destination (FOB Destination) with all transportation charges if applicable to be included in the Bid, unless otherwise specified in the Invitation for Bids. The title and risk of loss of the goods shall not pass to the County until receipt and acceptance takes place at the FOB Destination point.

#### **4.29 BINDING EFFECT**

This Contract and any Ensuing Agreement(s) shall be binding upon and inure to the benefit of the parties

and their respective permitted assigns and successors.

#### **4.30 ASSIGNMENT**

The Successful Bidder's interest and duties hereunder may not be assigned or delegated to a third party without the express written consent of the County.

#### **4.31 SAFETY**

The Successful Bidder is responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with any services to be provided hereunder. The safety program shall comply with all applicable requirements of the current federal Occupational Safety and Health Act and all other applicable federal, state and local laws and regulations.

#### **4.32 GENERAL OBLIGATIONS AND RELIANCE**

The Successful Bidder shall perform all services and/or provide all goods, as well as those reasonably inferable and necessary for completion and provision of services and/or goods required hereunder. The Successful Bidder shall keep the County informed of the progress and quality of the services. The Successful Bidder agrees and acknowledges that the County is relying on the Successful Bidder's represented expertise and ability to provide the goods and/or services described herein. The Successful Bidder agrees to use its best efforts, skill, judgment, and abilities to perform its obligations in accordance with the highest standards used in the profession and to further the interests of the County accordance with the County's requirements and procedures. The Successful Bidder's duties, set forth herein, shall at no time be in any way diminished by reason of any approval by the County, nor shall the Successful Bidder be released from any liability by reason of such approval by the County, it being understood that the County at all times is ultimately relying upon the Successful Bidder's skill and knowledge in performing the services and providing any goods required hereunder.

#### **4.33 ESTIMATED QUANTITIES**

To the extent applicable to this IFB, the estimated quantity of each item listed in this IFB is only estimate; the actual quantity to be purchased may be more or less. The County is not obligated purchase any minimum amount, and the County may purchase any reasonable amount greater than the estimate for the same unit price. Any limit on quantities available must be stated expressly in the Bid.

#### **4.34 CONTRACTUAL DEVELOPMENT**

The contents of the IFB and the Successful Bidder's Bid will become an integral part of the Contract, but may be modified, at the County's sole discretion, by provisions of an Ensuing Agreement. Therefore, the Bidder must agree to an inclusion of an Ensuing Agreement of the Bid specifications, terms and conditions of this IFB. If an Ensuing Agreement is required under this IFB, information relative to the Agreement will be located in the Special Provisions Section of this IFB.

#### **4.35 SURVIVABILITY**

All applicable agreements that were entered into between the Successful Bidder and the County, under the terms and conditions of the Contract and/or any Ensuing Agreement(s), shall survive the expiration or termination thereof for ninety (90) days unless a new contract has been awarded.

The County may exercise, by written notice to the Successful Bidder no later than ten (10) calendar days of the Contract expiration, this clause for emergencies only.

#### **4.36 AIR QUALITY**

In determining the overall best Bid, the County may, to the extent applicable, exercise the option granted to local governments under the Texas Local Government Code, Section 271.907.

This option allows the County to evaluate Bids and give preference to goods and/or services of a Bidder that demonstrates that the Bidder meets or exceeds any and all state or federal environmental standards, including voluntary standards, relating to air quality. If the Bid being submitted will have an effect on air quality for the County (as it relates to any state, federal, or voluntary air quality standard), then the Bidder is encouraged to provide information in narrative indicating the anticipated air quality impact. All Bidders are expected to meet all mandated state and federal air quality standards.

#### **4.37 ENTIRE AGREEMENT**

The Contract and any Ensuing Agreement(s) shall supersede all prior Agreements, written or oral between the Successful Bidder and the County and shall constitute the entire Agreement and understanding between the parties with respect to the services and/or goods to be provided. Each of the provisions herein shall be binding upon the parties and may not be waived, modified, amended or altered, except by writing signed by the Successful Bidder and the County.

#### **4.38 PAYMENT**

The County's payment for goods and services shall be governed by the Texas Government Code, Chapter 2251. An invoice shall be deemed overdue the thirty-first (31<sup>st</sup>) day after the later of the following:

- A. The date the County receives the goods under the Contract;
- B. The date the performance of the service under the Contract is completed; or
- C. The date the Williamson County Auditor receives an invoice for the goods or services.

Interest charges for any overdue payments shall be paid by the County in accordance with Texas Government Code, Section 2251.025. More specifically, the rate of interest that shall accrue on a late payment is the rate in effect on September 1 of the County's fiscal year in which the payment becomes due. The said rate in effect on September 1 shall be equal to the sum of one (1) percent, and the prime rate published in the Wall Street Journal on the first (1<sup>st</sup>) day of July of the preceding fiscal year that does not fall on a Saturday or Sunday.

In the event that an error appears in an invoice submitted by the Successful Bidder, the County shall notify the Successful Bidder of the error not later than the twenty-first (21<sup>st</sup>) day after the date the County receives the invoice. If the error is resolved in favor of the Successful Bidder, the Successful Bidder shall be entitled to receive interest on the unpaid balance of the invoice submitted by the Successful Bidder beginning on the date that the payment for the invoice became overdue. If the error is resolved in favor of the County, the Successful Bidder shall submit a corrected invoice that must be paid in accordance within the time set forth above. The unpaid balance accrues interest as provided by the Texas Government Code, Chapter 2251, if the corrected invoice is not paid by the appropriate date.

As a minimum, invoices shall include:

- A. Name, address, and telephone number of the Successful Bidder and similar information in the event the payment is to be made to a different address.
- B. The County Contract, Purchase Order.
- C. Identification of items or service as outlined in the Contract.
- D. Quantity or quantities, applicable unit prices, total prices and total amount.

E. Any additional payment information which may be called for by the Contract.

Payment inquiries should be directed to the following address:

Williamson County Auditor's Office, Accounts Payable Department  
Email: [accountspayable@wilco.org](mailto:accountspayable@wilco.org)  
Phone: 512-943-1500

#### **4.39 CONTRACTUAL FORMATION AND ENSUING AGREEMENT**

The IFB and the Bidder's Bid, when properly accepted by the Commissioners Court, shall constitute a Contract equally binding between the Successful Bidder and the County.

**If an Ensuing Agreement is required by this IFB, that information will be provided in Special Provisions section of this IFB.** The Successful Bidder shall be required to execute the Agreement at the Williamson County Purchasing Department approximately ten (10) calendar days after the Successful Bidder is notified of award. The Ensuing Agreement shall be in the same form as the Agreement which is attached to the end of this IFB. The only anticipated changes in the Ensuing Agreement will be to include additional exhibits, to fill in blanks to identify the Successful Bidder, and terms relating to the compensation, or to revise the Agreement to accommodate corrections, changes in the scope of services, or changes pursuant to Addenda issued. **Bidders should raise any questions regarding the terms of the Agreement in the form of written questions or submittals as described in the Public Announcement and General Information portion of this IFB.** Because the signed Ensuing Agreement will be substantively and substantially derived from the attached Agreement, each Bidder is urged to seek independent legal counsel as to any questions about the terms, conditions or provisions contained in the Agreement *before* submitting a Bid. Again, the attached Agreement, if applicable, contains important legal provisions and is considered part and parcel of this IFB. Failure or refusal to sign aforesaid Agreement shall be grounds for the County to revoke any award which has been issued, forfeit Bid security, if applicable, and select another Bidder.

#### **4.40 COOPERATIVE PURCHASING PROGRAM**

During the term of the Contract resulting from this IFB, the County would like to afford the same prices, terms and conditions to other political subdivisions or public entities. Another entity's participation in the Contract resulting from this IFB is subject to a properly authorized Purchasing Cooperative Inter-local Agreement with the County. Any liability created by purchase orders issued against the Contract shall be the sole responsibility of the governmental agency placing the order.

#### **4.41 INSURANCE REQUIREMENTS**

To the extent applicable Insurance information will appear in the Additional Stipulations section that is in this IFB Package.

#### **4.42 BIDDERS BOND, WARRANTY BOND, PERFORMANCE AND PAYMENT BONDS**

To the extent applicable Bond information will appear in the Additional Stipulations section that is in this IFB Package.

#### **4.43 LEGAL LIABILITY INFORMATION**

The Successful Bidder shall disclose all legal liability information by listing any pending litigation anticipated litigation that your firm is involved in including, but not limited to, potential or actual legal matters with private parties and any local, state, federal or international governmental entities. The County reserves the right to consider legal liability information in the recommendation of any proposed contract to the Commissioners Court.

#### 4.44 INCLEMENT WEATHER

In case of inclement weather or any other unforeseen event causing the County to close for business on the date of a Bid submission deadline, the Bid closing will automatically be postponed until the next business day the County is open. If inclement weather conditions or any other unforeseen event causes delays in carrier service operations, the County may issue an Addendum to all known Bidders interested in the project to extend the deadline. It will be the responsibility of the Bidder to notify the County of their interest in the project if these conditions are impacting their ability to turn in a submission within the stated deadline. The County reserves the right to make the final judgement call to extend any deadline.

#### 4.45 PREVAILING WAGE RATES

To the extent this procurement is for the construction of a public work, including a building, highway, road, excavation, and repair work or other project development or improvement, paid for in whole or in part from public funds, without regard to whether the work is done under public supervision or direction, Texas Government Code, Chapter 2258, shall apply and the contractor shall pay not less than the wage scale of the various classes of labor as shown on the "Prevailing Wage Schedule" provided by the County. Pursuant to Texas Government Code, Section 2258.022(a)(2), the County has determined the general prevailing rate of the "Prevailing Wage Schedule" in the locality in which the public work is to be performed for each craft or type of worker needed to execute the contract and the prevailing rate for legal holiday and overtime work by using the prevailing wage rate as determined by the United States Department of Labor in accordance with the United States Code, Section 276a (Davis-Bacon Act).

The specified wage rates are minimum rates only, and are not representations that qualified labor adequate to perform the work is available locally at the prevailing wage rates. The County is not bound to pay—and will not consider—any claims for additional compensation made by any contractor because the contractor pays wages in excess of the applicable minimum rate contained in the Contract Documents. The "Prevailing Wage Schedule" is not a representation that quantities of qualified labor adequate to perform the work may be found locally at the specified wage rates.

For classifications not shown, workers shall not be paid less than the wage indicated for laborers. The contractor shall notify each worker commencing work on the project the worker's job classification and the established minimum wage rate required to be paid, as well as the actual amount being paid. The notice must be delivered to and signed in acknowledgement of receipt by the employee and must list both the monetary wages and fringe benefits to be paid or furnished for each classification in which the worker is assigned duties. When requested by the County, competent evidence of compliance with the Texas Prevailing Wage Law shall be furnished by contractor. A copy of each worker wage rate notification shall be submitted to the County with the Application for Payment for the period during which the worker began on-site activities.

Should the contractor at any time become aware that a particular skill or trade not reflected on the County's "Prevailing Wage Schedule" will be or is being employed in the work, whether by the contractor or by a subcontractor, the contractor shall promptly inform the County and shall specify a wage rate for that skill or trade, which shall bind the contractor.

The contractor and any subcontractor shall pay to the County a penalty of sixty dollars (\$60.00) for each worker employed for each calendar day, or portion thereof, that the worker is paid less than the wage rates stipulated in the "Prevailing Wage Schedule" or any supplement thereto. The contractor and each subcontractor shall keep, or cause to be kept, an accurate record showing the names and occupations of all workers employed in connection with the work, and showing the actual per diem wages paid to each worker, which records shall be open at all reasonable hours for the inspection by the County.

Within thirty-one (31) days of receipt of information concerning a violation of the Texas Government Code Chapter 2258, the County shall make an initial determination as to whether good cause exists to believe a violation occurred. The County's decision on the initial determination shall be reduced to writing and sent to the contractor or subcontractor against whom the violation was alleged, and to the affected

worker. When a good cause finding is made, the County shall retain the full amounts claimed by the claimant or claimants as the difference between wages paid and wages due under the "Prevailing Wage Schedule" and any supplements thereto, together with the applicable penalties, such amounts being subtracted from successive progress payments pending a final decision on the violation.

After the County makes its initial determination, the affected contractor or subcontractor and worker have fourteen (14) calendar days in which to resolve the issue of whether a violation occurred, including the amount that should be retained by the County or paid to the affected worker. If the contractor or subcontractor and affected worker reach an agreement concerning the worker's claim, the contractor shall promptly notify the County in a written document signed by the worker. If the contractor or Subcontractor and affected worker do not agree before the fifteenth (15<sup>th</sup>) calendar day after the County determination, the contractor or subcontractor and affected worker must participate in binding arbitration in accordance with the Texas General Arbitration Act, Chapter 171, (Texas Civil Practice and Remedies Code). The parties to the arbitration have ten (10) calendar days after the expiration of the fifteen (15) calendar days referred to above, to agree on an arbitrator; if by the eleventh (11<sup>th</sup>) calendar day there is no agreement to an arbitrator, a district court shall appoint an arbitrator on the petition of any of the parties to the arbitration.

If an arbitrator determines that a violation has occurred, the arbitrator shall assess and award against the contractor or subcontractor the amount of penalty as provided above and the amount owed the worker. The County may use any amounts retained hereunder to pay the worker the amount as designated in the arbitration award. If the County has not retained enough from the contractor or subcontractor to pay the worker in accordance with the arbitration award, the worker has a right of action against the contractor and subcontractor as appropriate, and the surety of either to receive the amount owed, attorneys' fees and court costs. The contractor shall promptly furnish a copy of the arbitration award to the County.

Money retained pursuant to the provisions above shall be used to pay the claimant or claimants the difference between the amount the worker received in wages for labor on the project at the rate paid by the contractor or subcontractor and the amount the worker would have received at the general prevailing wage rate as provided by the agreement of the claimant and the contractor or subcontractor affected, or in the arbitrator's award. The full statutory penalty of sixty dollars (\$60.00) per calendar day of violation per worker shall be retained by Williamson County to offset its administrative costs, pursuant to Texas Government Code, Section, 2258.023. Any retained funds in excess of these amounts shall be paid to the contractor on the earlier of the next progress payment or final payment. Provided, however, that the County shall have no duty to release any funds to either the claimant or the contractor until it has received the notices of agreement or the arbitration award as provided under the provision herein-above.

#### **4.46 CONFIDENTIALITY**

The Bidder expressly agrees that it will not use any direct or incidental confidential information that may be obtained while working in a governmental setting for its own benefit, and agrees that it will not access unauthorized areas or confidential information and it will not disclose any information to unauthorized third parties, and will take care to guard the security of the information at all times.



## **Additional Stipulations**

### **1 Additional Stipulations**

#### **1.1 Introduction**

The Bid evaluation and selection process is detailed in this section, as are other factors, and the format in which the Price Bid of each Bid should be submitted.

#### **1.2 Contract Administrator**

J. Terron Evertson, P.E. (or successor), County Engineer, Williamson County 3151 South East Inner Loop, Suite B, Georgetown, Texas shall serve as the County's Technical Contact with designated responsibility to ensure compliance with the requirements of the Contract and any Ensuing Agreement, such as, but not limited to, acceptance, inspection and delivery. The Technical Contact together with the Purchasing Department will serve as a liaison between the Williamson County Commissioners Court and the Successful Bidder.

#### **1.3 Time for Performance**

A time frame of sixty (60) days (fifty (50) to substantial completion / Sixty (60) to final completion) is given for completion of plans on this bid. This may begin at the time specified by the County within the three hundred sixty-five (365) days of the pricing quoted on this bid, starting on the day of award. The Contractor will be given written notice to begin work on this project. The Work on this project shall begin within five (5) calendar days after such notification.

Liquidated damages for failure to substantially complete the work within the allotted time will be applied. Liquidated damages are \$200 per working day.

The Contractor will be given written notice to begin work on this project. Work on this project shall begin within five (5) working days after such notification. Failure to begin work within the allotted time will result in liquidated damages being incurred at the rate of \$200 per working day.

## Additional Stipulations - Bid

## 1.4 Performance and Payment Bonds

To the extent, this IFB is for the procurement of a public work contract, and the following shall apply:

Texas Local Government Code, Chapter 262.032, governs the requirements for performance bonds for government entities making public work contracts. A performance bond is required if the contract is in excess of \$50,000 and is to be made for the full amount of the contract.

Texas Government Code, Chapter 2253.021, governs the requirements for payment bonds for government entities making public work contracts. A payment bond is required if the contract is in excess of \$25,000 and is to be made for the full amount of the contract.

The bonds are to be executed and delivered to the County **prior to issuing Notice to Proceed**. The bonds must be executed by a corporate surety or sureties in accordance with the Texas Insurance Code. For unit price contracts, the total contract price shall be estimated and calculated by multiplying the estimated quantities to the Bidder's unit bid price.

If the public works contract is less than \$50,000, the performance bond will not be required as long as the contract provides that payment is not due until the work is completed and accepted by the County.

## 1.5 Bidder's Bonds

All Bids requiring a Bid Bond shall be accompanied by a certified cashier's check upon a National or State bank in an amount not less than five (5) percent of the total maximum bid price, payable without recourse to the County, or a bid bond in the same amount from a reliable surety company, as a guarantee that the Bidder will enter into a contract and **execute and deliver to the County performance and payment bonds prior to being recommended for award of the Contract. Bid guarantees must be submitted in the same sealed envelope with the Bid.** Bids submitted without check or bid bonds will not be considered. For unit price contracts, the total maximum bid price shall be estimated and calculated by multiplying the estimated quantities to the unit bid price.

## 1.6 Warranty Bonds

**When a Warranty Bond is required it shall be submitted by the Successful Bidder prior to issuing Notice to Proceed**, and shall be in the amount of twenty (20) percent of the total project construction cost. This Warranty Bond shall be security for the true and faithful performance of all warranties for one (1) year from the date of final payment. For unit price contracts, the total project construction cost shall be estimated and calculated by multiplying the estimated quantities to the bidder's unit bid price.

## Additional Stipulations - Bid

**1.7 Insurance Requirements**

By signing its Bid, the Bidder agrees to maintain at all times during any term of the Contract and any ensuing Agreement at Bidder's cost, insurance in accordance with this provision.

Bidder will be required to submit Certificates of Insurance **prior to contract award and any renewals.**

All certificates of insurance coverage as specified below must be provided to the following location:

Williamson County Purchasing Department  
901 S Austin Ave  
Georgetown, Texas 78626

Failure to comply with these Insurance Requirements may result in the termination of the Contract and any ensuing Agreement(s) between the Successful Bidder and County.

The following coverage limits shall be required at a minimum:

A.	Worker's Compensation	Statutory – Texas Law
B.	Employer's Liability:	
	Bodily Injury by Accident	\$500,000 Ea. Accident
	Bodily Injury by Disease	\$500,000 Ea. Employee
	Bodily Injury by Disease	\$500,000 Policy Limit
C.	Comprehensive general liability including completed operations and contractual liability insurance for bodily injury, death, or property damages in the following amounts:	
	COVERAGES	PER PERSON    PER OCCURRENCE
	Comprehensive General Liability	\$1,000,000    \$1,000,000
	Aggregate policy limits:	\$1,000,000

Successful Bidder's property will not be covered by any insurance that may be carried by the County. Successful Bidder assumes the risk of loss on its contents and property that are situated on/in/around the County property. The Successful Bidder is strongly encouraged to obtain insurance on its property to the extent deemed necessary by the Successful Bidder.

The deductible for an insurance policy required hereunder shall not exceed \$100,000. **The County shall be named as an additional insured under any policy of insurance required hereunder.**

Successful Bidder shall not commence any work until it has obtained all required insurance and such insurance has been approved by County. Successful Bidder shall not allow any subcontractor(s) to commence work to be performed until all required insurance has been obtained by such subcontractor(s) and approved by County. Approval of the insurance by County shall not relieve or decrease the liability of Successful Bidder or its subcontractor(s) hereunder.

## Additional Stipulations - Bid

The required insurance must be written by a company approved to do business in the State of Texas with a financial standing of at least an A- rating, as reflected in Best's insurance ratings or by a similar rating system recognized within the insurance industry at the time the policy is issued. Successful Bidder shall furnish County with a certificate of coverage issued by the insurer. Successful Bidder shall not cause any insurance to be canceled nor permit any insurance to lapse. ALL INSURANCE CERTIFICATES SHALL INCLUDE A CLAUSE TO THE EFFECT THAT THE POLICY SHALL NOT BE CANCELED OR REDUCED, RESTRICTED OR LIMITED UNTIL TEN (10) CALENDAR DAYS AFTER COUNTY HAS RECEIVED WRITTEN NOTICE AS EVIDENCED BY RETURN RECEIPT OF REGISTERED OR CERTIFIED LETTER.

It is the intention of the County, and agreed to and hereby acknowledged by the Successful Bidder, that no provision of this Contract or any ensuing Agreement shall be construed to require the County to submit to mandatory arbitration or mediation in the settlement of any claim, cause of action or dispute, except as specifically required in direct connection with an insurance claim or threat of claim under an insurance policy required hereunder which absolutely requires arbitration or mediation of such claim, or as otherwise required by law or a court of law with jurisdiction over the provisions of this Contract or any ensuing Agreement.

**Workers' Compensation Coverage Requirements**

The Texas Labor Code, Section 406.096, requires workers' compensation insurance coverage for all persons providing services on a building or construction project for a governmental entity such as the County. The rule requires the County to timely obtain certificates of coverage and retain them for the duration of the project. The rule also sets out the language to be included in the Bid specifications and in contracts awarded by a governmental entity and the information required to be in the posted notice to employees. The rule is adopted under the Texas Labor Code, Section 402.061.

The information provided below is a result of this rule. By submitting your Bid to the County, you are acknowledging that this rule is a part of these Bid specifications, and that you will observe and abide by all of the requirements outlined in the rule. You are further agreeing that should your Bid be accepted by the Williamson County Commissioners Court, the necessary certificates of coverage showing workers' compensation coverage, will be provided to the following name and address prior to beginning work:

Williamson County Purchasing Department  
901 S. Austin Ave.  
Georgetown, TX 78626

Failure to comply with this request may result in termination of the Contract and any ensuing Agreement. If you have any questions related to this ruling and/or requirement, you are encouraged to contact either the Williamson County Purchasing Department at (512) 943-1546, or you may call the Texas Workers' Compensation Commission at (800) 372-7713.

- A. The following words and terms, when used in this provision, shall have the following meanings. Terms not defined in this rule shall have the meaning defined in the Texas Labor Code, if so defined.

## Additional Stipulations - Bid

1. Certificate of coverage (certificate) – A copy of a certificate of insurance, a certificate of authority to self-insure issued by the commission, or a workers' compensation coverage agreement (TWCC-81, TWCC-82, TWCC-83, or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees (including those subject to a coverage agreement) providing services on a project, for the duration of the project.
  2. Building or Construction – Has the meaning defined in the Texas Labor Code, Section 406.096(e)(1).
  3. Contractor – A person bidding for or awarded a building or construction project by Williamson County.
  4. Coverage – Workers' compensation insurance meeting the statutory requirements of the Texas Labor Code, Section 401.011(44).
  5. Coverage agreement – A written agreement on form TWCC-81, form TWCC-82, form TWCC-83, or form TWCC-84, filed with the Texas Workers' Compensation Commission which establishes a relationship between the parties for purposes of the Texas Workers' Compensation Act, pursuant to the Texas Labor Code, Chapter 406, Subchapters F and G, as one of employer/employee and establishes who will be responsible for providing workers' compensation coverage for persons providing services on the project.
  6. Duration of the project--Includes the time from the beginning of work on the project until the work on the project has been completed and accepted by the County.
  7. Persons providing services on the project ("subcontractor" in the Texas Labor Code, Section 406.096) – includes all persons or entities performing all or part of the services the contractor has undertaken to perform on the project, regardless of whether that person contracted directly with the contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.
  8. Project – Includes the provision of all services related to a building or construction contract for the County.
- B. The contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of the Texas Labor Code, Section 401.011(44), for all employees of the contractor providing services on the project, for the duration of the project.
- C. The Contractor must provide a certificate of workers compensation coverage to Williamson County prior to being awarded the Contract.

## Additional Stipulations - Bid

- D. If the coverage period shown on the contractor's current certificate of coverage ends during the duration of the project, the contractor must, prior to the end of the coverage period, file a new certificate of coverage with Williamson County showing that coverage has been extended.
- E. The contractor shall obtain from each person providing services on a project, and provide to the County:
  - 1. A certificate of coverage, prior to that person beginning work on the project, so Williamson County will have on file certificates of coverage showing coverage for all persons providing services on the project; and
  - 2. No later than seven days after receipt by the contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.
- F. The contractor shall retain all required certificates of coverage for the duration of the project and for one year thereafter.
- G. The contractor shall notify the County in writing by certified mail or personal delivery, within ten (10) days after the contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project.
- H. The contractor shall post on each project site a notice, in the text, form and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.
- I. The contractor shall contractually require each person with whom it contracts to provide services on a project, to:
  - 1. Provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44), for all of its employees providing services on the project, for the duration of the project;
  - 2. Provide to the contractor, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;
  - 3. Provide the contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

## Additional Stipulations - Bid

4. Obtain from each other person with whom it contracts, and provide to the contractor:
    - i. (a) a certificate of coverage, prior to the other person beginning work on the project; and
    - ii. (b) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;
  5. Retain all required certificates of coverage on file for the duration of the project and for one year thereafter;
  6. Notify the County in writing by certified mail or personal delivery, within ten (10) days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and
  7. Contractually require each person with whom it contracts, to perform as required by paragraphs 1 – 7, with the certificates of coverage to be provided to the person for whom they are providing services
- J. By signing this Contract or providing or causing to be provided a certificate of coverage, the contractor is representing to Williamson County that all employees of the contractor who will provide services on the project will be covered by workers' compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.
- K. The contractor's failure to comply with any of these provisions is a breach of Contract by the contractor which entitles the County to declare the contract void if the contractor does not remedy the breach within ten (10) days after receipt of notice of breach from the County.

## GENERAL NOTES AND TECHNICAL SPECIFICATIONS

### DEFINITION OF TERMS

Asphalt Season: April 1 through September 30.

County: Williamson County acting through the Road and Bridge Division.

Contractor: Successful bidder of the IFB.

Engineer: Williamson County Engineer of Road and Bridge, or designee.

Inspector: Engineer, or designee, supplied full time or part time to the contractor's crew for the oversight of the work.

Specifications: Texas Department of Transportation Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges 2014.

TxDOT: Texas Department of Transportation

Working Day: Monday through Friday (excluding County approved holidays), if weather permits the performance of the contract (as determined by the Inspector) for a continuous period of at least 8 hrs. (excluding lunch) between 8:00 A.M. and 5:00 P.M. Time begins with crews on site with equipment and ready for operation.

### CONTROL OF MATERIALS

**Source Control.** The Contractor shall use only materials that meet Contract requirements. Unless otherwise specified or approved by the Engineer, the Contractor shall use new materials for the work. The Contractor shall secure the Engineer's approval of the proposed source of materials to be used before their delivery to the site. Materials can be approved by the Engineer at a supply source or staging area but may be re-inspected at the job site. Contractor shall be responsible for cost of additional sampling and testing if material source changes.

**Material Quality.** It is the Contractor's responsibility to correct or remove materials that fail to meet the Contract requirements.

Materials not meeting Contract requirements will be rejected, unless the Engineer approves corrective actions. Upon rejection by the Engineer, the Contractor must immediately remove and replace rejected materials.

If the Contractor does not comply with this Article, the County may remove and replace defective material. The cost of testing, removal, and replacement will be deducted from invoice submitted to the County.

**Manufacturer Warranties.** Contractor shall transfer to the County warranties and guarantees required by the Contract, from Contractor sources, or received as part of normal trade practice.

### **Plant Inspection and Testing**

The Engineer may, but is not obligated to, inspect materials at the acquisition or manufacturing source. Material samples will be obtained and tested for compliance with quality requirements. Materials produced under County inspection are for County use only unless released in writing by the Engineer.

If inspection is at the plant, Contractor shall meet the following conditions unless otherwise specified:

- Cooperate fully and assist the Engineer during the inspection.
- Ensure the Engineer has full access to all parts of the plant used to manufacture or produce materials.
- In accordance with pertinent Items and the Contract, provide a facility at the plant for use by the Engineer as an office or laboratory.

The Engineer may provide inspection for periods other than daylight hours if:

- Continuous production of materials for County use is necessary due to the production volume being handled at the plant, and
- The lighting is adequate to allow satisfactory inspection.

The Contractor shall provide copies of all test results to the County and the Engineer prior to the County's acceptance of improvements.

The Contractor shall coordinate with the County's field representative 48 hours prior to schedule density testing. The County's field representative shall witness all testing.

### **GENERAL NOTES**

Unless set forth otherwise, all Work performed shall comply with requirements which pertain to the various items of Work included as *Standard Specification for Construction of Highways, Streets and Bridges* of the Texas Department of Transportation, adopted November 1, 2014, and as amended and/or updated, which is incorporated herein by reference for all purposes. In the event that any specification set out herein conflicts with the said TxDOT specifications, the specification set out herein shall control and govern.

The Contractor will be given written Notice to Proceed on this project. The project shall begin within five (5) working days after such notification and shall continue for sixty (60) working days.

Contractor shall not begin asphalt work prior to the beginning of the asphalt season (April 1), nor after the ending of the asphalt season (September 30), except with the approval of the Engineer.

Contractor specifically acknowledges that Williamson County will sustain damages for each working day beyond the date in which construction work is to begin. Once the written Notice to Proceed is given by Williamson County, the Contractor has five (5) working days to begin the work. Contractor agrees that two-hundred and No/100 Dollars (\$200.00) per working day shall be retained by Williamson County from any amounts due Contractor for every day that Contractor does not begin the construction work.

Contractor specifically acknowledges that Williamson County will sustain damages for each working day beyond the required dates of substantial completion of the project. Because of the impracticality and extreme difficulty of fixing and ascertaining Williamson County's actual damages, Contractor agrees that two-hundred and No/100 Dollars (\$200.00) per working day shall be retained by Williamson County from any amounts due Contractor for every day that Contractor does not complete the project.

Periods of time (i) during which Williamson County suspends the work by written notice to Contractor, or (ii) during which contractor has performed work and is waiting for Williamson County's acceptance, or (iii) during which a delay directly related to delays caused by "Acts of God", non-county governmental processes, national emergency, or any other causes beyond Contractor's or Williamson County's reasonable control, shall not be taken into account in computing the amount retained. In the event that work received by Williamson County is found to be incomplete, the period of time from the end of the performance of the work to the receipt of subsequent performance necessary to produce completed work will be taken into account in computing the number of days and the amount retained.

Contractor shall submit a basic work plan, bar chart, or schedule for the Engineer to review one week prior to commencement of work.

Once work begins, Contractor shall continuously execute the work until completion, unless otherwise directed by the Engineer.

Weekend and holiday work is allowed with prior approval by the Engineer.

The Contractor shall perform work during appropriate weather conditions, unless otherwise directed by the Engineer. If work is performed at the Contractor's option during, or prior to, inclement weather conditions and the work is damaged, the Contractor is responsible for all costs associated with replacing the work.

Do not park equipment or make stockpiles where driver sight distance to residences and side street intersections is obstructed, especially after work hours. If it is necessary

to park where drivers' views are blocked, Contractor shall make every effort to flag traffic accordingly. Give the travelling public first priority.

An English-speaking Superintendent shall be available on the project at all times when work is being performed. The Contractor shall provide the Inspector with contact information for the Superintendent.

Contractor shall provide at least one portable restroom near the work site at all times in order to provide a bathroom to individuals providing work hereunder.

If multiple days are required to complete work, Contractor shall not leave work in hazardous conditions, as determined by the Engineer.

Contractor shall maintain positive drainage for permanent and temporary site conditions for duration of project.

The actual quantity required may vary from the estimated quantities in the contract. The Contractor shall be compensated for satisfactory completed work based on actual quantities per bid Item. This price shall be full compensation for furnishing all labor, equipment, time, materials and incidentals necessary to complete the work.

Testing may be performed at the request of the County any time during the length of the contract through an independent testing laboratory. Testing may be requested by the County on any and/or all items on this contract. If the results determine the item did not meet specifications, then the cost of the testing will be borne by the Contractor. If the results of the test determine that the item did meet specifications, the cost of the testing will be borne by the County.

Final cleanup will include the removal of excess material considered detrimental to vegetation growth within the working area. Materials such as excess concrete and other materials, as specified by the Engineer, will be removed at the Contractor's expense.

All construction equipment involved in roadway work shall be equipped with a permanently mounted 360 degree revolving or strobe warning light with amber lens. This light shall have a minimum lens height of 5 inches and a diameter of 5 inches.

This light shall have a mounting height of not less than 6 feet above the roadway surface and shall be visible from all sides. This equipment shall also have attached at each side of the rear end of the vehicle an approved orange warning flag mounted not less than 6 feet above the roadway surface.

Contractor's equipment and vehicles shall not be maintained on-site during construction, except at designated sites as approved by the Inspector.

Contractor shall mark and maintain 100 ft stations for the duration of the project, as directed. This work shall be considered subsidiary to the various bid items.

### **BLASTING**

No Blasting will be allowed on the project.

### **ENTRY INTO AND PROTECTION OF ADJACENT PROPERTIES**

Design of this project did not contemplate a need to enter adjacent properties except where permanent or temporary work easements are shown on the Plans. Should it be necessary during construction of the work to enter on adjacent properties, the County shall be notified. The contractor shall be responsible for all arrangements to enter and shall be liable for repair of fences and restoration of any property damage outside the right-of-way and easements shown in the plans.

Access to the right-of-way and easements adjacent to private property shall be coordinated with the adjacent property owner at least 48 hours in advance.

### **LOCATION AND PROTECTION OF UTILITIES**

The Contractor shall determine the exact location of all existing utilities before commencing work, and is fully responsible for any and all damages associated by Contractor's failure to locate and preserve utilities.

Notwithstanding any other provision of this Contract, the Contractor shall be solely responsible for the location and protection of any and all public and/or private utility lines and utility customer service lines in the work area. The Contractor shall exercise due care to locate and to mark, uncover, or otherwise protect all such lines in the construction zone and any of the Contractor's work or storage areas.

Upon request, the County may provide such information that it has about the location and grade of water, telephone, cable, and electric lines and other utilities on the work area, but such information shall not relieve or be deemed to be in satisfaction of the Contractor's obligation hereunder, which shall be primary and nondelegable. Any such lines damaged by the Contractor's operations shall be immediately repaired by the Contractor or damage shall be repaired at Contractor's expense.

### **SURPLUS MATERIAL**

Excavated or surplus natural soil and rock material, unless otherwise noted in the Plans or Specifications, shall be known as "spoil" and the Contractor shall be responsible for hauling and disposing of all excavated materials off the project site, unless otherwise directed by the Engineer. Consider subsidiary to the pertinent Items.

### **RESTORATION/REVEGETATION**

All disturbed areas within the right of way, easements, and limits of construction shall be restored. Restoration shall include all topsoil, seeding/sodding, watering, fertilizer, labor and equipment necessary to complete the project in accordance with the Plans and Specifications.

Restoration shall be installed and vegetation established prior to final acceptance of the project, or as approved by the County.

Care shall be exercised to prevent damage to all property in and around the construction zone. The Contractor shall be liable for the repair and restoration of any property damaged as a result of the contractor's prosecution of the work. This shall include, but is not limited to, re-vegetation of all areas damaged or destroyed by construction. The Contractor will be held liable and responsible for such areas until growth is reestablished to the satisfaction of the County.

Ornamental landscape plantings of trees, shrubs and grasses that are damaged or destroyed during construction shall be replaced with plant material of comparable size and quality approved by the County.

Revegetation measures will begin as soon as practical. The County reserves the right to require the immediate installation of revegetation measures whenever deemed necessary.

The County reserves the right to require additional revegetation measures deemed necessary at any time after construction has begun until the County has accepted the erosion control measures and revegetation measures.

The Contractor shall be responsible for maintaining, repairing or replacing all erosion control devices as may be directed by the Inspector. This work shall be considered subsidiary to the various bid Items.

### **ITEM 100 – PREPARING ROW**

The Contractor shall notify the Inspector prior to clearing operations. Upon notification, the Inspector will schedule a walk-through with the Contractor and designate all trees and other features to be protected during construction. The Contractor shall not begin any clearing of the right-of-way prior to this walk-through. The designated trees shall be protected in accordance with the plans and specifications, or as directed by the Inspector. No fences shall be removed without notification to the Inspector.

Removal of any obstructions on the right-of-way that are not shown on the plans is included under preparing of right-of-way. The Inspector shall be notified prior to removal of obstructions. All right-of-way clearing operations will be coordinated with the project's SW3P and as directed or approved by the Inspector.

Burning of brush will not be permitted, unless otherwise directed by the Engineer.

The Contractor may be required to trim or prune and remove brush and trees in order to construct the project or to provide a horizontal clearance of approximately 2 feet inside the right-of-way line and a vertical clearance of at least 14 feet. For this operation, the selected method shall be approved by the Inspector.

### **ITEM 110 – EXCAVATION**

To the extent possible, all existing topsoil shall be salvaged, stockpiled and redistributed to the graded areas.

### **ITEM 132 – EMBANKMENT**

All materials brought to project site shall have a maximum PI of 25 and minimum PI of 6. Borrow sources shall be submitted and approved by the Inspector prior to delivery to project.

To the extent possible, all existing topsoil shall be salvaged, stockpiled and redistributed to the graded areas.

### **ITEM 160 – TOPSOIL**

Obtain approval of all topsoil sources before digging begins. Ensure off-site topsoil has a minimum PI of 25, liquid limit of 75, and plastic limit of 35 or as directed. The County reserves the right to take samples, as needed, to assure that the material meets the PI, levels of nitrogen, phosphorus and potassium content, and other requirements as indicated in the Specifications (Fertility, Organics, Erodability, etc.).

No Sandy Loam allowed, unless the project dictates otherwise.

Construct topsoil stockpiles of no more than five (5) feet in height.

Track ALL topsoiled slopes left idle for more than 14 days, within or at the end of the 14-day idle period, to prevent erosion. Tracking consists of operating a tracked vehicle or equipment up and down the slope, leaving track marks perpendicular to the direction of the slope. Retrack slopes after rain event, as directed. Consider the tracking of slopes to prevent erosion as subsidiary to the pertinent Items.

Upon final grading, immediately track all topsoiled slopes to prevent erosion as directed. Consider subsidiary to the pertinent Items.

Place topsoil four (4) inches thick to the areas of seeding and sod as shown in the Plans.

Contractor is fully responsible for maintenance/repair of placed topsoil, including damage caused by travelling public, until topsoil is compacted and vegetation is fully established.

#### **ITEM 164 – SEEDING FOR EROSION CONTROL**

Drill seeding to be distributed uniformly over the area shown on the Typical Section in the Plans.

After 60 days, areas with little or no growth shall be re-seeded at contractor's expense.

#### **ITEM 166 – FERTILIZER**

Fertilizer shall be applied before seeding.

The fertilizer required by the County maybe adjusted to help establish vegetation, verify County approval of fertilizer prior to purchasing.

Fertilizer shall be delivered in bags unless otherwise specified or approved prior to delivery. Bags shall be clearly labeled showing contents. When non-bagged, loose fertilizer is approved, documentation will be required for each load of material delivered verifying authenticity of material.

Fertilizer shall be granular and essentially dust free.

#### **ITEM 168 – VEGETATIVE WATERING**

The Contractor shall obtain water at a source that is metered or shall furnish the manufacturer's specifications showing tank capacity for each truck used.

The Contractor shall notify the Inspector prior to watering that the Inspector may verify meter readings or truck counts.

Water all areas of the project to be top soiled and seeded. Maintain the seed bed in a condition favorable for the growth of grass.

Watering can be postponed immediately after a rainfall on the site of ½ inch or grater, but shall be resumed before the soil dries out, continue watering until final acceptance.

The County is not responsible for the source of water to be used on the project even during a drought condition.

Watering rates shall be 12,000 gallons/acre per working day for 15 consecutive working days.

Rate and frequency may be adjusted with the approval of the Engineer, to meet site

conditions.

### **ITEM 204 – SPRINKLING**

Apply water for dust control as directed. When dust control is not being maintained, cease operations until dust control is maintained. Consider subsidiary to the pertinent Items.

### **ITEM 216 – PROOF ROLLING**

Correct and perform “Proof Rolling” retest at the Contractor’s expense, to the satisfaction of the Engineer, when initial “Proof Rolling” yields a failing result. Consider subsidiary to the pertinent Items.

### **ITEM 247 – FLEXIBLE BASE**

Complete all subgrade, ditches, slopes, and place all drainage structures to conform to required line, grades, and cross-sections, as shown and directed, prior to the placement of Flex Base.

Do not use a vibratory roller to compact the material directly over a box culvert.

### **ITEM 260 – LIME TREATMENT (ROAD-MIXED)**

Stabilize subgrade with 6% lime slurry. Once lime is cured, place and proof-roll 1” of Flex Base material as a temporary riding surface for traffic. The Flex Base material will be compensated by Item 247. The temporary riding surface shall be maintained uniformity until the final grade of Flex Base is placed and this work is subsidiary to the pertinent Items.

### **ITEM 300 – ASPHALTS, OILS, AND EMULSIONS**

Asphalt season starts April 1 and ends September 30.

No engine oil shall be used as a component of any asphalt or emulsion.

### **ITEM 316 – SURFACE TREATMENTS**

Previously tested aggregates delivered to the project which are found to contain excessive quantities of dust (more than 0.5 percent passing the no. 40 sieve) during pre-coating, stockpiling or hauling operations, will be rejected, unless otherwise directed. Use test method Tex-200-F, Part I, for testing.

Perform work during appropriate weather conditions, unless otherwise directed. If work is performed at the Contractor’s option, during, or prior to, inclement weather conditions,

and the work is damaged, the Contractor is responsible for all costs associated with replacing the work.

All accepted sealing will be measured by the gallon of asphalt (oil) and by cubic yard of aggregate. Thickness of sealing shall be no greater than ¼" per single course.

Do not apply asphalt within 1½ hours of sunset, or later, unless otherwise directed.

Ensure the accuracy of the Distance Measuring Instrument (DMI) with the Engineer, prior to marking the Asphalt and Rock Land shots.

Surface all transitions, tapers, climbing lanes and intersections to the limits as directed.

Continue sweeping excess aggregate off the roadway and concrete area riprap up to two weeks after completing the work. This work is subsidiary to the pertinent Items.

#### **ITEM 354 – PLANING AND TEXTURING PAVEMENT**

Mill existing roadway to proposed subgrade elevation. This work shall only be performed in 1,500 ft sections at a time. Ramp existing driveways at 10:1 slopes or flatter according to detail in the Plans. The Contractor shall provide drainage outfall to the ditch at ponding areas. Consider this work as subsidiary to the pertinent Items.

#### **ITEM 460 – CORRUGATED METAL PIPE**

Field adjust pipe end to maintain the necessary slope. Field cutting of pipe end is allowed. Coat all field cuts with asphalt paint.

#### **ITEM 462, 464, 466 & 467 – CONCRETE BOX CULVERT, REINFORCED CONCRETE PIPE & END TREATMENTS**

For precast units, the fill material between the boxes shall consist of concrete aggregate with two sacks of Portland Cement per cubic yard (two sack concrete). The two sacks of cement are considered subsidiary to the pertinent bid items.

If required, concrete collars, as approved, will be used at pipe joints. Collars will be reinforced as directed. No direct compensation will be made for concrete collars and they will be subsidiary to the pertinent Items.

Trench excavation protection and temporary special shoring are required for headwalls 5' and taller. Those work are considered subsidiary to the pertinent bid Items.

Structural excavation and bedding shall be considered subsidiary to the pertinent Items.

#### **ITEM 465 –INLET**

If necessary, place concrete (CL B) on the bottom of inlet in order to match flow line grades of the adjacent storm drain lines. This work will not be paid for directly but will be subsidiary to the pertinent Items.

#### **ITEM 466 – HEADWALLS AND WINGWALLS**

Use Class C concrete for headwalls or wingwalls.

Remove all loose formwork and other materials from the Floodplain or drainage areas, daily, which could float off in a stormwater event, as directed.

#### **ITEM 496 – REMOVING STRUCTURES**

If necessary, Contractor shall perform traffic control for any structure removal, as directed by the Engineer.

Material removed under this Item will not be deemed salvageable.

#### **ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING**

The contractor shall provide two (2) “electronic” Portable Changeable Message Signs at locations requiring lane closures for one-week prior to the closures, or as directed. Obtain approval from Engineer for the actual message that will appear on the boards. If more than two phases of a message are required per board, then provide additional PCMS’s to meet the two-phases-per-board requirement. This shall not be paid for directly, but shall be considered subsidiary to this bid Item.

Contractor shall provide all traffic control measures to prosecute the work and to ensure a minimum inconvenience to traffic around the construction area. Should the contractor’s traffic control measures be found unsatisfactory by the Engineer or Inspector, work will cease.

Traffic Control Plans shown in Plans are a minimum requirement. The contractor shall be responsible for any additional signs, barricades, flagmen or other traffic control devices as necessary for the safety of the traveling public. All traffic control devices shall be compliant with the current Texas Manual of Uniform Traffic Control Devices.

The Contractor shall notify the County when any traffic changes are to be made. The Contractor shall also notify all affected emergency service districts, school districts, and U.S. Postal Offices. The notifications must be made TWO DAYS prior to any change.

Maintain enough workers to revise traffic control as directed.

Necessary barricades, sufficient lighting, signage and other traffic control methods may be necessary for the protection and safety of the public; and shall be provided by the Contractor and maintained during the construction operation. Any open trenches shall

be covered and protected overnight as needed. The traffic control shall be adjusted in the morning prior to beginning any work.

Within the limits of the project, provide standard barricades, warning signs, delineators, lights, 28-inch cones, and flaggers in sufficient numbers and combinations, as directed. All traffic control devices are listed in TxDOT's WZTCDL.

Maintain access to all streets and driveways at all times, unless otherwise approved. Consider subsidiary to the pertinent Items.

Cover or remove any existing sign(s), which conflict with temporary traffic control operations. Install all permanent signs, delineation, and object markers necessary for the operation of any roadway before opening that section of roadway to traffic, regardless of the phase during which the roadway construction occurs. Erect the signs on temporary mounts until the permanent mounts are installed. Consider any costs associated with the temporary mounts as subsidiary. Repair or replace any signs which are damaged by the Contractor's operations during construction or which are deemed not sufficient. The Engineer will be the sole judge of the adequacy of the sign(s). Consider this work as subsidiary to the pertinent Items.

Maintain Sandbags that are used for ballast, as directed. Consider subsidiary to the pertinent Items.

The Contractor's crew leader shall be a competent person who will be responsible and available on the project site or in the immediate area to insure compliance with the TCP.

### **ITEM 506 – TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS**

The County will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown in Plans.

### **ITEM 530 – DRIVEWAYS**

The Contractor shall notify the County and property owners a minimum of 48 hours in advance of beginning work on their driveways, and provide the County a list of each notification and contact prior to each closure.

The Contractor will be required to maintain access to adjacent properties at all times. Construct driveways in one-half sections, to allow access. Do not completely close driveways for reconstruction purposes, unless a reasonable alternate access exists to the property, as approved by the Engineer. If any temporary closure of driveways should be needed, contractor shall coordinate with county and property owner a minimum of 24 hrs prior to temporary closure.

The Contractor shall repair any damages to adjacent properties to equal or better conditions at the Contractor's expense.

### **ITEM 560 – MAILBOXES**

The Contractor shall coordinate the locations of temporary mailboxes with the Engineer and homeowners. The Contractor shall install the temporary mailboxes by using the relocated existing mailboxes. This work shall be considered subsidiary to this bid Item.

The Contractor shall replace all mailboxes disturbed by the work with the existing mailboxes removed or with mailboxes approved by the Engineer. This work shall be coordinated with the sequence of construction within the Plans. All permanent replacement products used shall match the existing mailboxes removed or be replaced with Gibraltar mailboxes Freemont post mount mailbox and post kit model #FC000B01 or equivalent approved by the Engineer.

### **ITEMS CIP AND W PER CITY OF GEORGETOWN CONSTRUCTION SPECIFICATIONS AND STANDARDS**

The Contractor shall notify the Engineer when unforeseen water lines are damaged and/or in conflict with the proposed roadway work during construction.

These Items only will be used and compensated for the repair and/or relocation of unforeseen water lines. All the repair and/or relocation of water lines must be inspected and tested by Aqua Texas, Inc.

**GOVERNING SPECIFICATIONS (STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND SPECIAL SPECIFICATIONS)**

WHERE DISCREPENCIES OCCUR BETWEEN THE VARIOUS GOVERNING SPECIFICATIONS, THE SPECIAL PROVISIONS SHALL GOVERN OVER BOTH STANDARD SPECIFICATIONS AND SPECIAL SPECIFICATIONS.

ALL SPECIFICATIONS AND SPECIAL PROVISIONS APPLICABLE TO THIS PROJECT ARE IDENTIFIED AS FOLLOWS:

STANDARD SPECIFICATIONS: ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION NOVEMBER 1, 2014. STANDARD SPECIFICATIONS ARE INCORPORATED INTO THE CONTRACT BY REFERENCE.

( ) REFERENCE ITEMS USED ON THIS CONTRACT

ITEMS 1 – 9 ARE SUPERSEDED BY THE CONTRACT GENERAL AND SPECIAL CONDITIONS, WHERE APPLICABLE. WHEREVER, IN THE TXDOT STANDARD SPECIFICATIONS, REFERENCE IS MADE TO THE STATE OF TEXAS, THE DEPARTMENT AND ITS REPRESENTATIVES, SUCH REFERENCE SHALL BE TAKEN TO MEAN WILLIAMSON COUNTY AND ITS REPRESENTATIVES.

ITEM 100 PREPARING ROW  
 ITEM 110 EXCAVATION (132)  
 ITEM 132 EMBANKMENT (100)(160)(204)(210)(216)(400)  
 ITEM 160 FURNISHING AND PLACING TOPSOIL (168)  
 ITEM 162 SODDING FOR EROSION CONTROL (166)(168)  
 ITEM 164 SEEDING FOR EROSION CONTROL (166)(168)  
 ITEM 166 FERTILIZER  
 ITEM 168 VEGETATIVE WATERING  
 ITEM 169 SOIL RETENTION BLANKET  
 ITEM 247 FLEXIBLE BASE (204)(210)(216)(520)  
 ITEM 260 LIME TREATMENT (204)(210)(216)(247)  
 ITEM 300 ASPHALTS, OILS, AND EMULSIONS  
 ITEM 302 AGGREGATES FOR SURFACE TREATMENTS (300)(301)  
 ITEM 310 PRIME COAT (300)(316)  
 ITEM 316 SURFACE TREATMENTS (210)(300)(302)(520)  
 ITEM 354 PLANE ASPHALT CONCRETE PAVEMENT  
 ITEM 432 RIPRAP (420)(421)(440)  
 ITEM 460 CORRUGATED METAL PIPE (400)(445)(467)  
 ITEM 462 REINFORCED CONCRETE BOX  
 (400)(402)(403)(420)(421)(424)(440)(467)  
 ITEM 464 REINFORCED CONCRETE PIPE  
 (400)(402)(403)(420)(421)(424)(440)(467)

ITEM 465 JUNCTION BOXES, MANHOLES, AND INLETS  
 (400)(420)(421)(424)(440)(471)  
 ITEM 466 WINGWALL (400)(402)(403)(420)(421)(432)(440)(462)(464)  
 ITEM 467 SAFETY END TREATMENT  
 (400)(420)(421)(432)(440)(442)(445)(460)(464)  
 ITEM 496 REMOVE STRUCTURE  
 ITEM 500 MOBILIZATION  
 ITEM 502 BARRICADES, SIGNS, AND TRAFFIC HANDLING  
 ITEM 506 EROSION CONTROL (432)  
 ITEM 530 DRIVEWAYS (316)  
 ITEM 540 METAL BEAM GUARD FENCE (421)(441)(445)  
 ITEM 560 MAILBOX INSTALL

SPECIAL PROVISIONS: THE CONTENT OF THE SPECIAL PROVISIONS ARE INCLUDED ON THE FOLLOWING PAGES.

SPECIAL PROVISION TO ITEM 7 (007-004)  
 SPECIAL PROVISION TO ITEM 132 (132-002)  
 SPECIAL PROVISION TO ITEM 300 (300-005)  
 SPECIAL PROVISION TO ITEM 506 (506-003)

STANDARD SPECIFICATIONS: ADOPTED BY CITY OF GEORGETOWN CONSTRUCTION SPECIFICATIONS AND STANDARDS, SERIES CIP, G, W, ADOPTED JUNE 21, 2006, AS AMENDED. CONSTRUCTION SPECIFICATIONS, AND STANDARDS ARE INCORPORATED INTO THE CONTRACT BY REFERENCE.

WHEREVER, IN THE CITY OF GEORGETOWN CONSTRUCTION SPECIFICATIONS AND STANDARDS, REFERENCE IS MADE TO THE CITY OF GEORGETOWN, THE CITY AND ITS REPRESENTATIVES, SUCH REFERENCE SHALL BE TAKEN TO MEAN WILLIAMSON COUNTY AND ITS REPRESENTATIVES.

#### CAPITAL IMPROVEMENT PROJECT REQUIREMENTS

CIP6 Control of Work  
 CIP11 Trench Safety Requirements  
 CIP12 Testing of Pipelines and Manholes

#### GENERAL SPECIFICATIONS

G2 Site Preparation  
 G3 Site Clearing  
 G4 Pipe Excavation, Trenching, Embedment, Encasement and Backfilling  
 G5 Granular Fill Materials  
 G8 Miscellaneous Work and Clean-up

#### WATER SPECIFICATIONS

- W1 Ductile Iron Pipe and Fittings
- W2 Polyvinyl Chloride (PVC) Pipe – Water
- W3 Valves, Hydrants and Appurtenances

**CONCRETE SPECIFICATIONS**

- C9 Flowable Backfill

**SPECIAL PROVISIONS: THE CONTENT OF THE SPECIAL PROVISIONS ARE INCLUDED ON THE FOLLOWING PAGES.**

- SPECIAL PROVISION W1 Ductile Iron Pipe and Fittings
- SPECIAL PROVISION W2 Polyvinyl Chloride (PVC) Pipe

## Special Provision to Item 7

### Legal Relations and Responsibilities



Item 7, "Legal Relations and Responsibilities," of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Section 7.7.2., "Texas Pollutant Discharge Elimination System (TPDES) Permits and Storm Water Pollution Prevention Plans (SWP3)," is voided and replaced by the following:**

**7.2. Texas Pollution Discharge Elimination System (TPDES) Permits and Storm Water Pollution Prevention Plans (SWP3).**

**7.2.1. Projects with less than one acre of soil disturbance including required associated project specific locations (PSL's) per TPDES GP TXR 150000.**

No posting or filing will be required for soil disturbances within the right of way. Adhere to the requirements of the SWP3.

**7.2.2. Projects with one acre but less than five acres of soil disturbance including required associated PSL's per TPDES GP TXR 150000.**

The Department will be considered a primary operator for Operational Control Over Plans and Specifications as defined in TPDES GP TXR 150000 for construction activity in the right of way. The Department will post a small site notice along with other requirements as defined in TPDES GP TXR 150000 as the entity of having operational control over plans and specifications for work shown on the plans in the right of way.

The Contractor will be considered a Primary Operator for Day-to-Day Operational Control as defined in TPDES GP TXR 150000 for construction activity in the right of way. In addition to the Department's actions, the Contractor will post a small site notice along with other requirements as defined in TPDES GP TXR 150000 as the entity of having day-to-day operational control of the work shown on the plans in the right of way. This is in addition to the Contractor being responsible for TPDES GP TXR 150000 requirements for on- right of way and off- right of way PSL's. Adhere to all requirements of the SWP3 as shown on the plans. The Contractor will be responsible for Implement the SWP3 for the project site in accordance with the plans and specifications, TPDES General Permit TXR150000, and as directed.

**7.2.3. Projects with 5 acres or more of soil disturbance including required associated PSL's per TPDES GP TXR 150000.**

The Department will be considered a primary operator for Operational Control Over Plans and Specifications as defined in TPDES GP TXR 150000 for construction activities in the right of way. The Department will post a large site notice, file a notice of intent (NOI), notice of change (NOC), if applicable, and a notice of termination (NOT) along with other requirements per TPDES GP TXR 150000 as the entity having operational control over plans and specifications for work shown on the plans in the right of way.

The Contractor will be considered a primary operator for Day-to-Day Operational Control as defined in TPDES GP TXR 150000 for construction activities in the right of way. In addition to the Department's actions, the Contractor shall file a NOI, NOC, if applicable, and NOT and post a large site notice along with other requirements as the entity of having day-to-day operational control of the work shown on the plans in the right of way. This is in addition to the Contractor

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being responsible for TPDES GP TXR 150000 requirements for on- right of way and off- right of way PSL's. Adhere to all requirements of the SWP3 as shown on the plans.

# Special Provision to Item 132

## Embankment



Item 132, "Embankment" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 132.3.4., "Compaction Methods."** The last sentence is replaced by the following.

Compact embankments in accordance with Section 132.3.4.1., "Ordinary Compaction," or Section 132.3.4.2., "Density Control," as shown on the plans. The Contractor may use Section 132.3.4.3., "Density Control by Computer-Generated (CG) Curve," as an option for density control.

**Article 132.3.4., "Compaction Methods,"** is supplemented by the following.

**3.4.3. Density Control by Computer-Generated (CG) Curve.** At the Contractor's discretion, CG curves may be used for density control.

Compact each layer to the required density using equipment complying with Item 210, "Rolling." Determine the maximum lift thickness based on the ability of the compacting operation and equipment to meet the required density. Do not exceed layer thickness of 12 in. loose or 10 in. compacted material, unless otherwise approved. Maintain a level layer with consistent thickness to ensure uniform compaction.

When using this method for each source and type of material, or when directed, sample and conduct testing according to the input parameters specified in Table 3 and provide CG field moisture-density curves based on each soil-compactors-lift thickness combination and CG Tex-114-E moisture-density curves based on each lift of soil. The CG field dry density ( $D_{fcg}$ ) must be greater than or equal to the CG Tex-114-E maximum dry density ( $D_{acg}$ ). The Engineer may obtain independent soil samples for supplemental Tex-114-E lab tests to check a supplemental maximum dry density ( $D_a$ ) and optimum moisture content ( $W_{opt}$ ) for reference when new CG curves are submitted. Provide access to the computer program used to generate the curve, when directed.

**Table 3**  
**Computer-Generated Lab and Field Compaction Curve Input Criteria**

Input Variables	Test Method
Liquid Limit, %	Tex-104-E
Plasticity Index (PI), %	Tex-106-E
Soil gradation	Tex-110-E Tex-111-E
Soil classification	Tex-112-E
Compaction roller brand, type, and model	N/A
Loose lift thickness, in.	N/A
Soil specific gravity	Use 2.65 for soil type SC. Use 2.68 for soil type CL. Use 2.69 for soil type CH.

Provide a compaction control report showing all input and output parameters and CG compaction curves, including:

- CG Tex-114-E laboratory maximum dry density ( $D_{acg}$ ),
- CG Tex-114-E laboratory optimum moisture content ( $W_{optcg}$ ),
- CG field maximum dry density ( $D_{fcg}$ ),

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- CG field optimum moisture content ( $W_{f_{optcg}}$ ),
- graph of CG laboratory and field compaction curves and the “Zero Air Voids Line,” and
- minimum number of roller passes to achieve the required density and moisture content.

Meet the requirements for field maximum dry density ( $D_{fcg}$ ) and field optimum moisture content ( $W_{f_{optcg}}$ ) specified in Table 4, unless otherwise shown on the plans. Use only the specific roller and soil properties utilized in lift construction as input parameters to generate the CG field curve used to meet moisture-density requirements in construction.

**Table 4**  
**Computer-Generated Lab and Field Compaction Curve Input Criteria**

Description	Density	Moisture Content
	Tex-115-E	
$PI \leq 15$	$\geq 98\% D_{fcg}$	$\geq W_{f_{optcg}}$
$15 < PI \leq 35$	$\geq 98\% D_{fcg}$ and $\leq 102\% D_{fcg}$	$\geq W_{f_{optcg}}$
$PI > 35$	$\geq 95\% D_{acg}$ and $\leq 100\% D_{acg}$	$\geq W_{f_{optcg}}$

Each layer is subject to testing by the Engineer for density and moisture content. During compaction, the moisture content of the soil should be above CG optimum moisture content but should not exceed the value shown on the moisture-density curve, above optimum, required to achieve 98% dry density.

When the CG field maximum dry density ( $D_{fcg}$ ) is not achieved, perform the following steps in order.

- Verify that construction controls including lift soil properties, minimum number and uniformity of compactor passes, lift thickness, and moisture content are correct.
- If needed, rework the lift with the corrected controls using the original CG curve.
- Generate a new CG field compaction curve based on actual in-place soil properties and rework the lift.
- Generate a non-CG Tex-114-E moisture-density reference standard and rework the material using this reference standard.

When required, remove small areas of the layer to allow for density tests. Replace the removed material and recompact at no additional expense to the Department. Proof-roll in accordance with Item 216, “Proof Rolling,” when shown on the plans or as directed. Correct soft spots as directed.

**Article 132.3.5., “Maintenance of Moisture and Reworking.”** The first sentence is replaced by the following.

Maintain the density and moisture content once all requirements in Table 2 or 4 are met.

# Special Provision to Item 300

## Asphalts, Oils, and Emulsions



For this project, Item 300, "Asphalts, Oils, and Emulsions," of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Section 300.2.4, "Emulsified Asphalt."** Table 10 is voided and replaced by the following:

**Table 10**  
**Polymer Modified Cationic Emulsified Asphalt**

Type-Grade	Test Procedure	Rapid Setting						Slow Setting	
		CRS-1P		CRS-2P		CRS-2TR		CSS-1P	
Property		Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol 77°F, sec.	T 72	-	-	-	-	-	-	20	100
122°F, sec.		50	150	150	400	150	500	-	-
Sieve Test, %	T 59	-	0.1	-	0.1	-	0.1	-	0.1
Demulsibility, 35 ml of 0.8% sodium dioctyl sulfosuccinate, %	T 59	60	-	70	-	40	-	-	-
Storage Stability, 1 day, %	T 59	-	1	-	1	-	1	-	1
Breaking Index, g	Tex-542-C	-	80	-	-	-	-	-	-
Particle Charge	T 59	positive		positive		positive		positive	
Distillation Test: <sup>1</sup>	T 59								
Residue by Distillation, % by wt.		65	-	65	-	65	-	62	-
Oil Distillate, % by volume of emulsion		-	3	-	0.5	-	3	-	0.5
Tests on Residue from Distillation:									
Modifier type		Polymer		Polymer		Tire Rubber		Polymer	
Modifier Content, wt. % (solids basis)		-	-	3.0	-	5.0	-	3.0	-
Penetration, 77°F, 100 g, 5 sec.	T 49	225	300	90	150	90	150	-	90
Viscosity, 140°F, poise	T 202	-	-	1300	-	1000	-	-	-
Solubility in Trichloroethylene, %	T 44	97.0	-	97.0	-	98	-	97.0	-
Softening Point, °F	T 53	-	-	-	-	-	-	135	-
Ductility, 77°F, 5 cm/min., cm	T 51	-	-	-	-	40	-	70	-
Ductility <sup>2</sup> , 39.2°F, 5 cm/min., cm	T 51	-	-	50	-	-	-	-	-
Elastic Recovery <sup>2</sup> , 50°F, %	Tex-539-C	45	-	55	-	-	-	-	-

<sup>1</sup>Exception to T 59: Bring the temperature on the lower thermometer slowly to 350°F ± 0°F. Maintain at this temperature for 20 min. Complete total distillation in 60 ± 5 min. from the first application of heat.

<sup>2</sup>CRS-2P must meet one of either the ductility or elastic recovery requirements.

# Special Provision to Item 506

## Temporary Erosion, Sedimentation, and Environmental Controls



Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls," of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 506.1., "Description."** The second paragraph is voided and replaced by the following.

Contractor is considered primary operator to have day-to-day operational control as defined in TPDES GP TXR150000.

- 1.1. For projects with soil disturbance of less than 1 acre, no submittal to TCEQ will be required but Contractor will follow SWP3. For projects with soil disturbance of 1 acre to less than 5 acres a small site notice will be posted at the site. For projects with soil disturbance of 5 acres or more a notice of intent (NOI) is required and a large site notice posted at site. Postings will be in accordance with TPDES GP TXR150000. Postings not associated with project specific locations will be in same location as Department's postings.
- 1.2. **Notice of Intent (NOI).** Submit a NOI, if applicable, with the TCEQ under the TPDES GP TXR150000 at least 7 days prior to commencement of construction activities at the project site. Provide a signed copy to the Engineer and any other MS4 operators at the time of submittal. The Department will submit their NOI prior to contractor submission and will provide a copy for Contractor's use in completing the Contractor's NOI form.
- 1.3. **Notice of Change (NOC).** Upon concurrence of the Engineer, submit a NOC, if applicable, to the TCEQ within 14 days of discovery of a change or revision to the NOI as required by the TPDES GP TXR150000. Provide a signed copy of the NOC to the Engineer and any other MS4 operators at the time of submittal.
- 1.4. **Notice of Termination (NOT).** Upon concurrence of the Engineer, submit a NOT, if applicable, to the TCEQ within 30 days of the Engineer's approval that 70% native background vegetative cover is met or equivalent permanent stabilization have been employed in accordance with the TPDES GP TXR 150000. Provide a signed copy of the NOT to the Engineer and any other MS4 operators at the time of submittal.

**Section 506.3.3., "Training,"** is supplemented by the following:

Training is provided by the Department at no cost to the Contractor and is valid for 3 yr. from the date of completion. The Engineer may require the following training at a frequency less than 3 yr. based on environmental needs:

- "Environmental Management System: Awareness Training for the Contractor" (English and Spanish) (Approximate running time 20 min.), and
- "Storm Water: Environmental Requirements During Construction" (English and Spanish) (Approximate running time 20 min.)

The CRPE, alternate CRPE designated for emergencies, Contractor's superintendent, Contractor, and subcontractor lead personnel involved in soil disturbing or SWP3 activities must enroll in and complete the training listed below and provide the certificate of completion to the Engineer before performing soil disturbing or SWP3 activities on the project. Coordinate enrollment as prescribed by the Department and pay associated fees for the following training:

- "Revegetation During Construction"
- "Construction General Permit Compliance," and

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- "Construction Stage Gate Checklist (CSGC)."

Training and associated fee will not be measure or paid for directly but are subsidiary to this Item.

TECHNICAL SPECIFICATIONSSECTION CIP6 – CONTROL OF WORKCIP6.01 SCOPE OF WORK

- A. This specification covers the requirements for exercising control of work performed on the Project.

CIP6.02 AUTHORITY OF ENGINEER OR INSPECTOR

- A. The work will be done in accordance with the Contract, Plans and Specifications. The Engineer or Inspector will decide all questions which may arise as to the quality or acceptability of materials furnished and work performed and the interpretations of the Plans and Specifications. His decisions will be final, and he will have executive authority to enforce and make effective such decisions and orders.

CIP6.03 CONFORMITY WITH PLANS, SPECIFICATIONS AND SPECIAL PROVISIONS

- A. All work performed and all materials furnished shall be in reasonable close conformity with the lines, grades, cross sections, dimensions, details, gradations, physical and chemical characteristics of materials in accordance with tolerances shown on the Plans or indicated in the Specifications and Special Provisions. The limits establishing reasonable close conformity will be as defined in these items of the contract.
- B. In the event the City finds that the work performed or the materials used are not within reasonable close conformity with the Plans, Specifications and Special Provisions, the affected material or product shall be removed and replaced or otherwise satisfactorily corrected by and at the expense of the Contractor.
- C. Deviations from the Plans and approved working drawings as may be required will in all cases be determined by the City and authorized in writing. Before final acceptance of the project is issued by the City, the Contractor shall provide the City with a set of record drawings for the project certified by the Engineer of record.

CIP6.04 COORDINATION OF PLANS, SPECIFICATIONS AND SPECIAL PROVISIONS

- A. The Specifications, the accompanying Plans, Special Provisions, and Supplemental Agreements, are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be co-operative and to describe and provide for a complete work. In cases of disagreement, figured dimensions shall govern over scaled dimensions, the Plans shall govern over Specifications, and Special Provisions shall govern over both Specifications and Plans.

CIP6.05 AUTHORITY AND DUTIES OF INSPECTORS

- A. Inspectors will be authorized to inspect all work done and all materials furnished. Such inspection may extend to all or to any part of the work and to the preparation or Manufacturer of the materials to be used. Such inspection will not relieve the Contractor from any obligation to perform the work in accordance with the requirements of the Specifications. In case of any dispute arising between the Contractor and the Inspector as to materials furnished or the manner of performing the work, the Inspector will have authority to reject materials or suspend work until the question at issue can be referred to and decided by the City. The Inspector will not be authorized to revoke, alter, enlarge, or release any requirement of these Specifications, nor to approve or accept any portion of work, nor to issue instruction contrary to the Plans and Specifications. He will in no case act as foreman or perform other duties for the Contractor nor interfere with the management of the work.

CIP6.06

PLANT

- A. The Contractor shall furnish plant and equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress which will insure the completion of the work within the time stipulated in the Proposal. If at any time such plant appears to the Engineer to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character or increase the plant and equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to secure the quality of work and rate of progress required.

CIP6.07

PRIVATE LAND

- A. The Contractor shall not enter or occupy private land outside of easements, except by written permission of the respective landowner.

CIP6.08

PIPE LOCATIONS

- A. Pipelines shall be located substantially as indicated on the Plans, but the Engineer and the City reserve the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings are noted on the Plans, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

CIP6.09

OPEN EXCAVATIONS

- A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access during construction shall be removed when no longer required. The length or size of excavation will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as limiting the length of the open trench, prohibiting stacking excavated material in the street, and requiring that the trench shall not remain open overnight. The Contractor shall take precautions, such as fences and barricades, to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles, which could be dangerous to the public, shall be well lighted at night. All trenches shall conform to the requirements of OSHA.

CIP6.10

TEST PITS

- A. Test pits for the purpose of locating underground pipelines or structures in advance of the construction shall be excavated and backfilled by the Contractor at the direction of the Engineer or the City. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Engineer and the City.

CIP6.11

MAINTENANCE OF TRAFFIC

- A. Unless permission to close a street is received in writing from the proper authority, all excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the Contractor's operations cause traffic hazards, he shall repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the Engineer and the City.
- B. Detours around construction will be subject to the approval of the City and the Engineer. Where detours are permitted, the Contractor shall provide all necessary barricades and signs as required to divert the flow of traffic. While traffic is detoured, the Contractor shall expedite construction operations and periods when traffic is being detoured will be strictly controlled by the City.
- C. The Contractor shall take precautions to prevent injury to the public due to open trenches. Night watchmen may be required where special hazards exist, or police protection provided for traffic while work is in

progress. The Contractor shall be fully responsible for damage or injuries whether or not police protection has been provided.

CIP6.12 BLASTING

- A. No blasting shall be allowed unless approved in writing by the City of Georgetown.

CIP6.13 CARE AND PROTECTION OF PROPERTY

- A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition equal or better than existing before the damage was done, or he shall make good the damage in some other manner acceptable to the Engineer and the City.

CIP6.14 MAINTENANCE OF FLOW

- A. The Contractor shall, at his own cost, provide for the flow of sewers, drains and water courses interrupted during the progress of the work, and shall immediately cart away and remove all offensive matter. The entire procedure of maintaining existing flow shall be fully discussed with the Engineer and the City well in advance of the interruption of any flow.

CIP6.15 COOPERATION WITHIN THIS CONTRACT

- A. The Contractor shall cooperate with Subcontractors or trades, and shall assist in incorporating the work of other trades where necessary or required.
- B. Cutting and patching, drilling and fitting shall be carried out where required by the Contractor and his Subcontractor having jurisdiction, unless otherwise indicated herein or directed by the Engineer or the City.

CIP6.16 CLEANUP

- A. During the course of the work, the Contractor shall keep the site of his operations in as clean and neat a condition as is possible. The Contractor shall dispose of all rubbish resulting from the construction work and, at the conclusion of the work, he shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operations, and shall leave the entire site of the work in a neat and orderly condition.

CIP6.17 FINAL INSPECTION

- A. Whenever the work provided for in, and contemplated under, the contract has been satisfactorily completed, the City will make the "Final Inspection". If the work is found to be satisfactory, the Contractor will be notified in writing of the acceptance of the same. The City will require a Certificate of Completion and Final Acceptance from the Inspector before any building, electric or plumbing permits will be issued or any City utilities provided. No such Certificate will be issued until all monuments have been set and record drawing reviewed by the Engineer of Record are provided to the City. If items are found in need of repair or completion, a final punch list will be generated and the items shall be completed by the Contractor. The City will inspect the punch list items one time following their completion. Any subsequent inspections due to inadequate repair or completion of the punch list items shall be paid for by the Contractor or Developer at \$200.00 per inspection.
- B. Final acceptance of the Project or Development does not relieve the Contractor or Developer of the responsibility of insuring all work shown on the Plans has been completed. If any portion of the work is found at a later date to be inferior or incomplete, the Contractor or Developer shall replace or complete the work at no expense to the City.

CIP6.18 PAYMENT

- A. No separate payment will be made for work performed in accordance with this section of the specifications, and the cost thereof shall be included in the appropriate items of the Proposal and Bid Schedule.

END OF SECTION

TECHNICAL SPECIFICATIONSSECTION CIP11 – TRENCH SAFETY REQUIREMENTS

## CIP11.01

SCOPE OF WORK

- A. This specification covers the requirements to plan, design, construct, install, maintain, monitor, modify as necessary, and remove upon completion, a Trench Safety System as specified herein.
- B. The requirements of this Section apply to all trenches which equal or exceed a depth of five (5) feet, measured from the ground surface at the highest side of the trench to the trench bottom.
- C. All applicable and non-conflicting portions of Section G4- TRENCHING, BACKFILLING AND COMPACTION apply as appropriate.

## CIP11.02

SUBMITTALS

- A. Within 30 days after the Notice to Proceed, but not less than 10 calendar days prior to execution of any trench excavation operations, the Contractor shall submit a site specific Trench Safety System Conformance Affidavit stating that operations will be conducted in full conformance with the OSHA Standards.
  - 1. The Conformance Letter shall also describe the Trench Safety System techniques proposed to be used on the Project.
  - 2. Specific references to the applicable OSHA Standards sections shall be included for each technique to be used.
- B. The Trench Safety System Plan shall be in writing, site specific and sufficiently detailed and clear to be understandable and usable by all personnel who will be executing, supervising and witnessing the trenching operations. A copy of the Trench Safety System Plan shall be available at the site of trenching operations at all times.
- C. If borings and/or detailed geotechnical analyses are required to develop the Trench Safety System Plan, they shall be executed by the Contractor at his cost.
- D. For trenches having depths greater than the various limits given in the OSHA Standards (8, 12 or 20 feet, depending on the techniques used), a site specific protective system shall be designed by a Registered Professional Engineer, registered in the State of Texas experienced in soil mechanics and structural design. The design shall be signed, sealed and dated by the Professional Engineer, and it shall identify those specific locations where the design is applicable.

## CIP11.03

GENERAL

- A. All materials and products incorporated into the Trench Safety System shall be suitable for their intended uses; shall meet all design criteria and parameters used by the Trench Safety System designer; and shall meet all applicable requirements of OSHA Standards.

## CIP11.04

METHODS OF PROVIDING FOR TRENCH SAFETY

- A. Protective systems referenced in this Section shall be as defined and described in 29 CFR 1962.652, "Requirements for Protective Systems."
- B. It is the duty, responsibility and prerogative of the Contractor to determine the specific applicability of a proposed Trench Safety System for each field condition encountered on the Project. Contractor specifically holds the City, Engineer, and any of their designated representatives harmless in any actions resulting from the failure or inadequacy of the Trench Safety System used to complete the Project.
- C. Unless otherwise noted on the drawings or excluded below, Sloping/Benching, Trench Shielding with trench boxes, and/or Sheeting/Shoring/Bracing protective systems may be used on this Project.

- D. Restrictions on the use of the various protective systems for this Project are as follows:
1. Sloping or Benching. Allowed with prior approval from the City.
  2. Trench Shields/Boxes. No restrictions.
  3. Sheeting/Shoring/Bracing. No restrictions.

## CIP11.05

INSPECTION DUTIES OF CONTRACTOR

- A. Provide a Competent Person, as defined in the OSHA Standards, to make frequent inspections of the trenching operations and the Trench Safety System in full conformance with the OSHA Standards.
- B. If evidence of a possible cave-in or landslide is apparent, all work in the trench shall immediately cease and not be resumed until all necessary precautions have been taken to safeguard personnel entering the trench.
- C. In an emergency situation, which may threaten or affect the safety or welfare of any persons or properties, the Contractor shall act at his discretion to prevent possible damage, injury or loss. Any additional compensation or time extension claimed for such actions shall be considered in view of the cause of the emergency and in accordance with the General Conditions.

## CIP11.06

MEASUREMENT AND PAYMENT

- A. Payment for the Trench Safety Plan shall be on a Lump Sum price basis, the Lump Sum price being as given in the Bid Proposal.
- B. Payment for the Trench Safety Plan Implementation shall be on a unit price basis, the unit price being as given in the Bid Proposal, and the unit of measure being linear feet of trench and/or square foot of bore pit or structure, without regard to whether specific trench safety precautions are required or used for the trench reach being measured.

END OF SECTION

TECHNICAL SPECIFICATIONSSECTION CIP12 – TESTING OF PIPELINES AND MANHOLESCIP12.01 SCOPE OF WORK

- A. This specification covers the requirements to perform ex-filtration testing and deflection testing of gravity pipelines and to perform pressure and leakage testing of pressure pipelines.

CIP12.02 SUBMITTALS

- A. Within 30 days after the Notice to Proceed, the Contractor shall submit to the Engineer or the City for approval, technical product literature including a description of the deflection test procedure for flexible pipe greater than 27-inches in diameter, video inspection of gravity wastewater lines, and all other pertinent data to illustrate conformance to the specification found within.

CIP12.03 GENERAL

- A. The entire length of the installed gravity line and the force main shall be field tested for water tightness. Gravity wastewater lines shall be video taped by camera.
- B. Hydrostatic pressure and leakage tests shall be made on all pressure pipelines carrying wastewater or water.
- C. All labor and equipment, including, but not limited to test pump with regulated by-pass meters and gauges required for conducting pipeline tests, shall be furnished by the Contractor. The Contractor shall furnish equipment and necessary piping as required to transport water used in testing from source to test location.
- D. Time and sequence of testing shall be scheduled by the Contractor, subject to observation and approval by the City. The Contractor shall provide adequate labor, tools and equipment to operate valves and to locate and repair any leaks discovered during the initial filling of the pipeline prior to actual testing or during the course of the tests.

CIP12.04 CLEANING

- A. At the conclusion of the work, thoroughly clean all pipelines by flushing with water or other means to remove all dirt, stones, pieces of wood, or other material which may have entered the pipes during the construction period. Debris cleaned from the lines shall be removed from the low end of the pipeline. If after this cleaning, obstructions remain, they shall be removed. After the pipelines are cleaned and if the groundwater level is above the pipe or following a heavy rain, the Engineer will examine the pipes for leaks. If any defective pipes or joints are discovered, they shall be repaired, and/or replaced by the Contractor at his expense.

CIP12.05 TEST PROCEDURES FOR GRAVITY PIPELINES, FORCE MAINS AND MANHOLES

- A. Scope: After sewers and manholes have been installed and backfilled, subject newly laid gravity lines and manholes to a leakage test. Contractor to furnish all labor, materials, tools and equipment to test lines. Take such precautions as required to prevent damage to lines and appurtenances being tested. Repair any damage resulting from test at Contractor's expense. Conduct test in presence of Engineer or designated City Representative.
- B. Test Procedures for Leakage Test of Gravity Sewer: Contractor, at his option, may test lines by hydrostatic or low pressure air test as specified below. However, the Engineer may direct a specific test be performed in specified areas of the Project.

C. Infiltration or Exfiltration Test (for Gravity Sewer)

1. Preparation: Seal ends of line section being tested with water tight plugs, equipped with pipe riser inserted and braced in the inlet of the manholes. Fill section with water 24-hours prior to start of test. Fill slowly from downstream manhole in test section so that no air is trapped in the line. Leave outlets of stacks and service lines exposed and unplugged until after exfiltration test has been made. Outlets terminating below level of test water surface to be temporarily extended upward by installing additional lengths of pipe. After completion of satisfactory test, remove lengths of pipe added for test.
2. Duration of Test: Test for 24-hours. Minimum head of either two (2) feet measured above the crown, inside pipe at upper end of section or four (4) feet measured above trench water table, whichever is higher, so that a net positive of two (2) feet TCEQ is used for testing.
3. Allowable Leakage: Allowable leakage or exfiltration in any individual section under construction shall not exceed 10 gallons per inch of inside diameter per mile of pipe per 24 hours.

D. Low Pressure Air Test

1. Preparation: Clean pipe to be tested by propelling snug fitting inflated rubber ball through the pipe with water or by use of water jet cleaning equipment. After manhole to manhole reach of pipe has been backfilled and cleaned, pneumatic plugs shall be placed in the line at each manhole and inflated to 25 psig. Add air slowly to the section under test until the internal pressure of 4.0 psig is obtained. Allow at least two (2) minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.

2. Duration of Test and Allowable Leakage

Decrease pressure to 3.5 psig and start stopwatch. Determine the time in seconds that is required for the internal air pressure to reach 2.5 psig. Minimum permissible pressure holding times are indicated in seconds and shall be computed by the following equation:

$$T = (0.085 \times D \times K) / Q$$

T = time for pressure to drop 1.0 pound per square inch gauge in seconds

K =  $0.000419 \times D \times L$ , but not less than 1.0

D = average inside diameter in inches

L = length of line of same pipe size being tested, in feet

Q = rate of loss assume 0.0015 cubic feet per minute per square foot internal surface shall be used

Since K value of less than 1.0 shall not be used, there are minimum times for each pipe diameter as outlined below:

Pipe Diameter (inches)	Minimum Time (seconds)	Length for Minimum Time (feet)	Time for Longer Length (seconds)
6	340	398	0.855(L)
8	454	298	1.520(L)
10	567	239	2.374(L)
12	680	199	3.419(L)
15	850	159	5.342(L)
18	1020	133	7.693(L)
21	1190	114	10.471(L)
24	1360	100	13.676(L)

Pipe Diameter	Minimum Time	Length for Minimum Time	Time for Longer Length
27	1530	88	17.309(L)
30	1700	80	21.369(L)
33	1870	72	25.856(L)
36	2040	66	30.771(L)

The test may be stopped if no pressure loss has occurred during the first 25% of the calculated testing time. If any pressure loss or leakage has occurred during the first 25% of the testing period, then the test shall continue for the entire test duration as outlined above or until failure. Lines with a 27-inch average inside diameter and larger may be air tested at each joint. If the joint test is used, a visual inspection of the joint shall be performed immediately after testing. The pipe is to be pressurized to 3.5 psi greater than the pressure exerted by groundwater above the pipe. Once the pressure has stabilized, the minimum time allowable for the pressure to drop from 3.5 psi gauge to 2.5 psi gauge shall be 10 seconds.

E. Test Procedures for Hydrostatic Test for Manholes

1. Manholes shall be tested for leakage separately and independently of the wastewater lines by hydrostatic exfiltration testing, or other methods acceptable to the City. If a manhole fails a leakage test, the manhole must be made water tight and retested. The maximum leakage for hydrostatic testing shall be 0.025 gallon per vertical foot per hour. Alternative test methods must ensure compliance with the above allowable leakage. Hydrostatic exfiltration testing shall be performed as follows: all wastewater lines coming into the manhole shall be sealed with an internal pipe plug, then the manhole shall be filled with water and maintained full for at least one (1) hour. For concrete manholes a wetting period of 24-hours may be used prior to testing in order to allow saturation of the concrete.

F. Test Procedures for Vacuum Testing Manholes

1. In lieu of the hydrostatic exfiltration test, manholes may be tested by vacuum. Manholes tested by vacuum shall be performed by the Contractor in compliance with these specifications.
2. Manholes shall be tested after installation of all connections (existing and/or proposed) in place. All lift holes shall be plugged with an approved non-shrink grout and all drop connections and gas sealing connections shall be installed prior to testing. The lines entering the manhole shall be temporarily plugged with the plugs braced to prevent them from being drawn into the manhole. The plugs shall be installed in the lines beyond the drop-connections, gas sealing connections, etc. The test head shall be placed inside the frame at the top of the manhole and inflated in accordance with the manufacturer's recommendations. A vacuum of 10-inches of mercury shall be drawn, and the vacuum pump shall be turned off. With the valve closed, the level of vacuum shall be read after the required test time as shown in the following table. If the drop in the level is less than one (1) inch of mercury (final vacuum of nine (9) inches of mercury), the manhole will have passed the vacuum test. The required test time shall be 120-seconds.
3. Manholes which have a final vacuum of nine (9) inches of mercury after the time indicated will be accepted. Any manhole which fails the vacuum test as described above shall be repaired with an approved non-shrink grout or other material acceptable to the Engineer and the City based on the material from which the manhole is constructed. The manhole shall be retested as described above until a successful test is made.

G. Exfiltration Test

1. Preparation: Seal ends of manhole being tested with watertight plugs. Fill manhole 24-hours prior to start of test. Manholes to be filled to top of manhole cone section.
2. Duration of Test: The test shall be performed for a 24-hour duration.
3. Allowable Leakage: No leakage is allowed. The water elevation shall be the same at beginning and end of test period.

H. Deflection Testing

1. Deflection tests shall be performed on all flexible pipes. For pipes with inside diameters less than 27-inches, a rigid mandrel shall be used to measure deflection. For pipelines with an inside diameter of 27-inches and greater, the Contractor shall submit to the Engineer the proposed method, with which shall provide a precision of  $\pm$  two tenths of one percent (0.2%) deflection, for review and approval by the Texas Commission on Environmental Quality. The test shall be conducted after final backfill has been in place at least 30 days in the presence of a representative of the City's Utilities Department. No pipe shall exceed a deflection of five percent (5%). If a pipe should fail to pass the deflection test, the problem shall be corrected and a second test shall be conducted after the final backfill has been in place an additional 30 days. Test shall be performed without mechanical pulling devices.
  2. Mandrel Sizing: The rigid mandrel shall have an outside diameter (O.D.) equal to 95% of the inside diameter (I.D.) of the pipe. The inside diameter of the pipe, for the purpose of determining the outside diameter of the mandrel, shall be the average outside diameter of the pipe minus two minimum wall thickness for O.D. controlled pipe and the average inside diameter for the I.D. Controlled pipe, all dimensions shall be per appropriate standard. Statistical or other "tolerance packages" shall not be considered in mandrel sizing.
  3. Mandrel Design: The rigid mandrel shall be constructed of a metal or rigid plastic material that can withstand 200 psi without being deformed. The mandrel shall have nine or more "runners" or "legs" as long as the total number of legs is an odd number. The barrel section of the mandrel shall have a length of at least 75% of the inside diameter of the pipe. A proving ring shall be provided and used for each size mandrel in use.
  4. Method Options: Adjustable or flexible mandrels are prohibited. A television inspection is not a substitute for the deflection test. A deflectometer may be approved provided the Contractor notifies the Engineer in a timely manner and submits adequate information for the Engineer to submit to the Texas Commission on Environmental Quality for review and approval. Mandrels with removable legs or runners may also be approved provided the Contractor notifies the Engineer in a timely manner and submits adequate information for the Engineer to submit to the Texas Commission on Environmental Quality for review and approval.
- I. Repairs of Lines: Remove and replace or make approved corrective repairs to any section of line or manhole which has leakage that exceeds above amounts. Repair any individual leaks that may appear whether or not overall section meets leakage requirements. Individual leaks will ordinarily be revealed by looking through sewer with a light while groundwater level is over sewer, during water tamping operations or immediately after water leakage is emptied from sewer.
- J. Retest: Sewers and/or manholes failing to meet requirements of leakage test will, after repair by Contractor, be tested again for leakage. No sewer or manhole will be accepted until leakage is less than allowable amount.

K. Video Inspection

1. The use of a television camera for inspection prior to placing the sewer in service will be required. Video inspection is at the cost of the Contractor, and copies of the DVD will be presented to the City prior to final acceptance. One (1) copy of the DVD shall be submitted to the City.
2. Post construction video of the gravity wastewater lines will be evaluated on a case-by-case basis for acceptance. Preparation for video taping of wastewater line shall be as follows:
  - a. Flush and clean the gravity wastewater line prior to video taping.
  - b. The videotape shall display the station, in accordance with the Plans and Standards, and counter on the screen. Manhole numbers and stations shall correspond to the contract documents.
  - c. If debris is evident in the line during the video, the line will be flushed and cleaned to allow a clean video.
  - d. All manholes will be identified at the beginning and end of the video corresponding to contract documents with upstream and downstream ends identified.
  - e. Additional video inspections shall be performed prior to completion of one-year warranty period and submitted on DVD.

L. Force Main

1. Force Main shall be pressure tested one and one-half (1 1/2) times the maximum output of the pumps. The allowable hydrostatic leakage rate shall be based on CIP 12.06 Table 6A.

CIP12.06

TEST PROCEDURES FOR PRESSURE PIPELINESA. General

1. After the pipe has been laid and backfilled and the backfill has been otherwise consolidated, all newly laid pipe, or any valved section thereof, shall be subjected to the hydrostatic pressure specified below for that particular type of pipe. The duration of the hydrostatic test shall be at least two (2) hours. Unless otherwise specified or noted on the Plans. All meters, fixtures, devices or appliances which are connected to the pipeline system and which might be damaged if subjected to the specified test pressure shall be disconnected and the ends of the branch lines plugged or capped during the testing procedures.
2. Each valved (capped or plugged) section of pipe shall be filled slowly with water and all air shall be expelled. If permanent air vents are not located at all high points, the Contractor shall install, at his own expense, corporation or blow-off cocks at such points so that air can be expelled as filling takes place. After verification that all air has been expelled, the cocks shall be closed and the pipe kept filled until tested. All exposed pipe, fittings, valves, hydrants and joints shall be examined while under test pressure and all visible leaks shall be stopped. Any cracked or defective pipe, fittings, valves or hydrants discovered during testing shall be removed and replaced by the Contractor. Replacement shall be with sound material and the test shall be repeated until satisfactory to the City.

B. Special Requirements: Where any section of pipeline is provided with concrete reaction blocking, the hydrostatic pressure shall not be made until at least five (5) days have elapsed after installation of the blocking. However, if high-early-strength cement is used in the concrete, two (2) days shall have elapsed prior to testing.

C. Leakage Test: A Leakage Test will be conducted on each valved section over the entire Project. The leakage test shall be at 150 psi for at least four (4) hours. Fire lines shall be tested at 200 psi for two (2)

hours with 0 loss.

D. Allowable Leakage

1. The allowable hydrostatic leakage rate shall be based on the following formula:

Fire lines 0 loss

$$L = \frac{SD}{133,200} \sqrt{P}$$

L = testing allowance in gallons per hour

S = length of pipe tested in feet

D = nominal diameter of the pipe in inches

P = average test pressure during the hydrostatic test in pounds per square inch (gauge)

Table 6A  
Hydrostatic testing allowance per 1,000 ft of pipeline<sup>†</sup> - *gph*<sup>†</sup>

Avg. Test Pressure <i>psi</i>	Nominal Pipe Diameter – in.																	
	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	54	60	64
450	.48	.64	.95	1.27	1.59	1.91	2.23	2.55	2.87	3.18	3.82	4.78	5.73	6.69	7.64	8.60	9.56	10.19
400	.45	.60	.90	1.20	1.50	1.80	2.10	2.40	2.70	3.00	3.60	4.50	5.41	6.31	7.21	8.11	9.01	9.61
350	.42	.56	.84	1.12	1.40	1.69	1.97	2.25	2.53	2.81	3.37	4.21	5.06	5.90	6.74	7.58	8.43	8.99
300	.39	.52	.78	1.04	1.30	1.56	1.82	2.08	2.34	2.60	3.12	3.90	4.68	5.46	6.24	7.02	7.80	8.32
275	.37	.50	.75	1.00	1.24	1.49	1.74	1.99	2.24	2.49	2.99	3.73	4.48	5.23	5.98	6.72	7.47	7.97
250	.36	.47	.71	.95	1.19	1.42	1.66	1.90	2.14	2.37	2.85	3.56	4.27	4.99	5.70	6.41	7.12	7.60
225	.34	.45	.68	.90	1.13	1.35	1.58	1.80	2.03	2.25	2.70	3.38	4.05	4.73	5.41	6.03	6.76	7.21
200	.32	.43	.64	.85	1.06	1.28	1.48	1.70	1.91	2.12	2.55	3.19	3.82	4.46	5.09	5.73	6.37	6.80
175	.30	.40	.59	.80	.99	1.19	1.39	1.59	1.79	1.98	2.38	2.98	3.58	4.17	4.77	5.36	5.96	6.36
150	.28	.37	.55	.74	.92	1.10	1.29	1.47	1.66	1.84	2.21	2.76	3.31	3.86	4.41	4.97	5.52	5.88
125	.25	.34	.50	.67	.84	1.01	1.18	1.34	1.51	1.68	2.01	2.52	3.02	3.53	4.03	4.53	5.04	5.37
100	.23	.30	.45	.60	.75	.90	1.05	1.20	1.35	1.50	1.80	2.25	2.70	3.15	3.60	4.05	4.50	4.80

\* If the pipeline under test contains sections of various diameters, the testing allowance will be the sum of the testing allowance for each size.

† Calculated on the basis of Eq. 1.

- a. These formulas are based on a testing allowance of 11.65 gpd/mi/in. (1.079 L/d/km/mm) of nominal diameter at a pressure of 150 psi (1,034 kPa).
- b. 5.2.1.6.1 Testing allowance at various pressures is shown in Tables 6A and 6B.
- c. 5.2.1.6.2 When testing against closed metal-seated valves, an additional testing allowance per closed valve of 0.0078 gal/h/in. (1.2 mL/h/mm) of nominal valve size shall be allowed.
- d. 5.2.1.6.3 When hydrants are in the test section, the test shall be made against the main valve in the hydrant.
- e. 5.2.1.7 Acceptance of installation. Acceptance shall be determined on the basis of testing allowance. If any test of laid pipe discloses a testing allowance greater than that specified in Sec. 5.2.1.6, repairs or replacements shall be accomplished in accordance with the specifications.
- f. 5.2.1.7.1 All visible leaks are to be repaired regardless of the allowance used for

testing.

2. If such testing discloses leakage in excess of this specified allowable, the Contractor, at his expense, shall locate and correct all defects in the pipeline until the leakage is within the specified allowance. All known leaks, irregardless of this test, shall be repaired.
- E. Pressure Test: After satisfactorily completing the leakage test, each valved section over the entire project, shall be tested at 200 psi for a sufficient period (approximately 10 min) to discover all leaking or defective materials and/or workmanship.
- F. Disinfecting Water Mains: The Contractor shall disinfect all water mains before the new facilities are placed into service. Disinfection must be performed in accordance with AWWA C651, latest revision and water samples must be submitted to a laboratory approved by the Texas Department of Health. Sample must be collected by the Contractor or his representative in the presence of the City or his representative. The Contractor shall be responsible for delivering the samples to an approved laboratory for testing. Sample results must indicate the facility is free of microbiological contamination before it is placed into service. It shall be the Contractor's responsibility to obtain a current copy of AWWA C651 to determine the correct forms of chlorine for disinfection, the basic disinfection procedure, preventive and corrective measures during construction, methods of chlorination, final flushing procedures, procedures for bacteriological tests, procedures for re-disinfection and disinfection procedures when cutting into existing mains. The Contractor, at its expense, will supply the concentrated chlorine disinfecting material, the City's personnel will supervise and direct the overall sterilization procedure. The Contractor, at his own expense, shall provide all other equipment, supplies and necessary labor to perform the sterilization under general supervision by the City.
- G. General
1. All valves shall be arranged to prevent the strong disinfecting dosage from flowing back into the existing water supply piping. The new pipeline shall then be completely filled with disinfecting solution by feeding the concentrated chlorine and approved water from the existing system uniformly into the new piping in such proportions that every part of the line has a minimum concentration of chlorine as prescribed in AWWA C651.
  2. Unless otherwise identified, all quantities called for herein refer to measurements by the testing procedures in the current edition of "Standard Methods of Examination of Water and Wastewater". The chlorine concentration of each step in the sterilization procedure shall be verified by chlorine residual determinations. This disinfecting solution shall be retained in the piping for at least twenty-four (24) hours, and all valves, hydrants, etc., shall be operated to disinfect all their parts. After this retention period, the water shall contain no less than the chlorine residual prescribed in AWWA C651 throughout the treated section of the pipeline.
  3. This heavily chlorinated water shall then be carefully flushed from the line until the chlorine concentration is not higher than the residual generally prevailing in the existing distribution system, or approximately 1.0 parts per million. Proper planning and appropriate preparations to handle, dilute and dispose of this strong chlorine solution without causing injury or damage to the public, the water system, the environment must be approved by the City before flushing of the line may begin, and the flushing shall be witnessed by an authorized representative of the City.
- H. Bacteriological Testing
1. After final flushing of the strong disinfecting solution, water samples from the line shall be tested for bacteriological quality, at the Contractor's expense, and must be found free of coliform organisms before the pipeline may be placed in service. One (1) test sample shall be drawn from the end of the main and additional samples collected at intervals of not more than one-thousand (1,000) feet along the pipeline. A minimum of three (3) samples must be collected.
  2. The Contractor, at his own expense, shall install sufficient sampling taps at proper locations along the pipeline. Each sampling tap shall consist of a standard corporation cock installed in

the line and extended with a copper tubing gooseneck assembly. After samples have been collected, the gooseneck assembly shall be removed and retained for future use.

3. Samples for bacteriological analysis shall be collected only from suitable taps, in sterile bottles. Collection of the test samples shall be made in the presence of City personnel. If the initial disinfection fails to produce acceptable sample tests, the disinfection procedure shall be repeated (without extra compensation) until satisfactory test results have been obtained, before the piping may be placed in service.

CIP12.07

FINAL ACCEPTANCE

- A. No pipe installation will be accepted until all known leaks have been repaired whether or not leakage is within allowable limits. Locating and repairing of leaks shall be performed by the Contractor at no additional cost to the City.
- B. The City will certify that all required pressure and leakage tests have been successfully completed before the pipeline is accepted.

CIP12.08

PAYMENT

- A. No separate payment will be made for work completed in accordance with this specification, and the cost thereof will be included in the appropriate items of the Proposal and Bid Schedule.

END OF SECTION

TECHNICAL SPECIFICATIONSSECTION G2 – SITE PREPARATIONG2.01 SCOPE OF WORK

- A. This specification covers the requirements for performing all clearing, grubbing and stripping of topsoil complete as shown on the Plans and as specified herein.

G2.02 SUBMITTALS

- A. None required unless specifically called for in the Plans, Standards or requested by the City or the Engineer.

G2.03 CLEARING AND GRUBBING

- A. Except as otherwise directed, cut, grub, remove and dispose of all trees, stumps, brush, shrubs, roots and any other objectionable material within the limits defined on the Plans.
- B. All trees, stumps, brush, shrubs, roots and other objectionable material shall be cut, grubbed, removed and disposed of from areas to be occupied by buildings, structures, roads, pipelines and any other areas to be stripped. Trees and brush shall be removed to a depth at least three (3) feet below the finished grade.
- C. In addition, heavy growths of weeds or other plants shall be stripped from the surface in order to provide clear access to the work site and to prevent their inclusion in stockpiled soil which is to be reused later. Trees, stumps, surface plants and all debris removed from the site shall be disposed of off-site by the Contractor at his own expense.
- D. Before the start of construction, protect trees or groups of trees, designated by the Engineer to remain, from damage by all construction operations by erecting suitable barriers, or by other approved means. Clearing operations shall be conducted in a manner to prevent falling trees from damaging trees designated to remain.
- E. Areas outside the limits of clearing shall be protected from damage and no equipment or materials shall be stored in these areas.
- F. No stumps, trees, limbs, or brush shall be buried in any fills or embankments.

G2.04 STRIPPING

- A. Strip topsoil from all areas to be occupied by buildings, structures, roadways and all areas to be excavated or filled. Avoid mixing topsoil with subsoil and stockpile topsoil in areas on the site as approved by the Engineer. Topsoil shall be free from brush, trash, large stones and other extraneous material and protected until it is placed as specified under Section G7- LOAMING, HYDROSEEDING AND PERMANENT EROSION CONTROL. Dispose of any remaining topsoil as directed by the City. All excess topsoil shall remain property of the City at its option, and Contractor shall place extra materials at a site designated by the City.

G2.05 DISPOSAL OF MATERIALS

- A. All tree trunks, limbs, roots, stumps, brush, foliage, other vegetation and objectionable material shall be removed from the site and disposed of in a permitted disposal site in a manner satisfactory to the Engineer.
- B. Burning of cleared and grubbed materials will not be permitted.
- C. Disposal of Excavated Materials
1. Suitable excavated materials may be stockpiled to be used for backfilling. Excess excavated

materials and unsuitable backfill materials shall be disposed of by the Contractor in the following manner:

- a. Clays, sands and gravel in excess of project requirements shall be disposed of by the Contractor at such locations and under consideration arranged by the Contractor at his expense.
  - b. Limestone and other rock excavation shall be disposed of by the Contractor at such locations and under consideration arranged by the Contractor at his expense.
2. The classification of clays, sands, gravel, limestone and rock shall be made in accordance with the Unified Soil Classification System, U.S. Army Corps of Engineers, T.M. 3-357.
  3. Desirable topsoil, sod, or area fill shall be carefully removed and piled separately adjacent to the work when required. Excavated materials shall be handled at all times in such a manner as to cause a minimum of inconvenience to the City's operations, and to permit safe and convenient access to private and public property adjacent to the work

G2.06 UNAUTHORIZED EXCAVATION

- A. Whenever the excavation is carried beyond or below the lines and grades as shown on the plans, except as specified above, all such excavated space shall be refilled with such material and in such a manner, as may be directed by the City, so as to insure the stability of the affected structure. Beneath all structures, space excavated without authority shall be refilled by the Contractor, at his own expense, with Class "C" concrete, crushed stone or selected fill materials, as directed by the City.

G2.07 PAYMENT

- A. Payment will be made for work performed in accordance with this specification by the unit quantity for the item for right-of-way preparation in the Proposal and Bid Schedule.

END OF SECTION

TECHNICAL SPECIFICATIONSSECTION G3 – SITE CLEARINGG3.01 SCOPE OF WORK

- A. This specification covers the requirements for site clearing operations for this Project.

G3.02 SUBMITTALS

- A. None required unless specifically called for in the Plans, Standards, or requested by the City or the Engineer.

G3.03 TRAFFIC

- A. Conduct site-clearing operations to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction.

G3.04 PROTECTION

- A. Provide temporary fences, barricades, coverings, or other protection to preserve existing items indicated to remain and to prevent injury or damage to persons or property. Provide protection for adjacent properties as required.
- B. Restore damaged work to condition existing prior to start of work.
- C. Protect existing trees and vegetation that are indicated to remain from physical damage. Do not store materials or equipment within tree drip line. Replace damaged trees that cannot be restored to full growth, as determined by arborist, unless otherwise acceptable to the Engineer or the City.
- D. Protect existing property and easement corners and pins. In the event that property or easement corners or pins are moved, disturbed or destroyed the Contractor shall replace them at his own expense. They shall be replaced by a Registered Professional Land Surveyor registered in the State of Texas.

G3.05 EXISTING SERVICES

- A. Locations indicated are approximate; determine exact location before commencing work. Coordinate with local utility service requirements and comply with their instructions.

G3.06 SITE CLEARING

- A. Remove trees, shrubs, grass and other vegetation, improvements, or obstructions as indicated or that interfere with new construction. Removal includes digging out stumps and roots, together with subsequent off-site disposal.
- B. Strip and stockpile topsoil that will be reused in the Work.
- C. Remove existing improvements, both above-grade and below-grade, to extent indicated or as otherwise required to permit new construction.

G3.07 SALVAGEABLE ITEMS

- A. Carefully remove items indicated to be salvaged and store on the City's premises where indicated or directed.

G3.08 AIR POLLUTION

- A. Control air pollution caused by dust and dirt; comply with governing regulations.

G3.09

REGRADING

- A. Fill depressions and voids resulting from site-clearing operations. Using satisfactory soil materials, place in maximum six (6) inch deep horizontal layers and compact each layer to density of surrounding original ground.
- B. Grade ground surface to conform to required contours and to provide surface drainage.

G3.10

DISPOSAL OF MATERIAL

- A. Dispose of waste materials including trash, debris and excess topsoil. No waste material shall remain on the City's property.
- B. Burning waste materials on site is not permitted.

G3.11

PAYMENT

- A. No separate payment will be made for work performed in accordance with this specification, and the cost thereof shall be included in the proper items of the Proposal and Bid Schedule.

END OF SECTION

TECHNICAL SPECIFICATIONSSECTION G4 - PIPE EXCAVATION, TRENCHING, EMBEDMENT,  
ENCASEMENT AND BACKFILLINGG4.01 SCOPE OF WORK

- A. This specification covers the requirements for furnishing all labor, equipment and material and performing all work necessary, in connection with excavation, trenching, embedment, encasement, and backfilling, for the installation of water lines, storm sewer lines, wastewater lines, etc. in this Project.

G4.02 SUBMITTALS

- A. Within 30 days after the Notice to Proceed, the Contractor shall submit to the Engineer or the City for approval, technical product literature including a Trench Safety Plan (which shall be sealed by a Professional Engineer registered in the State of Texas, if required) embedment material (source, gradation and type), backfill material (source, gradation and type), encasement material (if required), equipment and all other pertinent data to illustrate conformance to the specification found within.

G4.03 EXCAVATIONA. General

1. Excavation shall include the removal of any trees, stumps, brush, debris, or other obstacles that may obstruct the line of work, and the excavation and removal of all earth, rock or other materials to the extent necessary to install the pipe and appurtenances in conformance with the line and grades shown in the Plans, or as specified.

B. Maximum and Minimum Width of Trenches

1. The sides of all trenches shall be cut as nearly vertical as possible. Unless otherwise specified on the Plans, the minimum width of trench in which the pipe may be installed shall not be less than 12-inches plus the outside diameter of the pipe, and the maximum width shall not be more than 24-inches plus the outside diameter of the pipe, measured at an elevation in the trench which is 12-inches above the top of the pipe when it is laid to grade.
2. Wherever the prescribed maximum trench width is exceeded, the Contractor shall use the class embedment or encasement required by the Engineer to provide the load carrying capacity for the trench width as actually cut, and the additional cost incurred will be borne by the Contractor.

C. Sheeting and Shoring

1. Where required in the Contractor's Trench Safety System, or where required for other reasons in caving ground, or in wet, saturated or flowing materials, the sides of all trenches and excavations shall be adequately sheeted and braced so as to maintain the excavation free from slides or cave-ins.
2. Sheeting and shoring shall not be left in place unless its removal is impractical.

D. Dewatering Excavations

1. There shall be sufficient pumping equipment, in good working order, available at all times to remove any water that accumulates in excavations. Where the pipeline crosses natural drainage channels, the work shall be conducted in such a manner that unnecessary damage or delays in the prosecution of the work will be prevented. Provisions shall be made for the

satisfactory disposal of surface water pumped so as to prevent damage to public or private property. The Contractor shall be responsible for maintaining safe working conditions and suitable construction techniques.

E. Disposal of Excavated Materials

1. Suitable excavated materials may be piled adjacent to the work to be used for backfilling. Excavated materials unsuitable for backfilling, or in excess of that required for backfilling, shall be disposed of by the Contractor. Desirable topsoil, sod, etc. shall be carefully removed and piled separately adjacent to the work when required. Excavated materials shall be handled at all times in such a manner as to cause a minimum of inconvenience to public travel. Suitable selected bedding or backfill material shall be provided at no additional cost to the City.

F. Trench Depth

1. Excavation for the pipeline shall be removed to a depth below the pipe barrel and pipe bell as shown in the Plans for the type of embedment specified, and the bottom of the trench brought to true subgrade with the embedment or encasement shown in the Plans.

G. Soft Subgrade

1. Where soft or spongy material is encountered in the excavation at subgrade level, it shall be removed to such a depth that a stable foundation is achieved by replacing the unsuitable material with tamped gravel, brought to the level of the bottom of bedding.
2. Gravel used shall be washed gravel or crushed stone and may fit any gradation of size up to three (3) inches. The particular gradation shall take into consideration the actual field conditions.

H. Excavated Materials

1. Excavated materials shall be piled adjacent to the work to be used for backfilling as required. After the trench has been refilled, topsoil shall be replaced to the extent that rock excavated from the trench will be completely covered and the area is returned to its original condition.
2. Where required on the Plans or when otherwise specified, desirable topsoil shall be piled separately in a careful manner and replaced in its original position.
3. Where a trench is required to cross a paved area, the asphalt or concrete shall be saw cut and removed for a total width that is two (2) feet greater than the trench width. The Contractor shall dispose of all excavated concrete, asphalt and subgrade material that is unsuitable for backfilling or in excess of that required for backfilling.

I. Damage to Existing Utilities

1. Where existing utilities are damaged, they shall be replaced immediately with material equal to or better than the existing material. Such work shall be at the entire expense of the Contractor.

G4.04 EMBEDMENT AND ENCASEMENT

A. General

1. Embedment shall be as required in the Plans or Standards. All embedment materials shall be free of grass, roots, vegetation, and other deleterious materials. Embedment Standards are shown on the Plans or Standards.

2. When the pipe has been checked for line and grade, the trench shall be backfilled with enough granular material or concrete on both sides to hold the pipe firmly in position. When placing granular material or concrete around the pipe, care shall be taken to fill all voids around the pipe. The pipe shall not be floated. The embedment or encasement material shall be carefully tamped to assure uniform pipe support and density.

B. Embedment Materials

1. Material for embedment shall conform to the following sieve analysis:

<u>Sieve Size</u>	<u><math>\frac{3}{8}</math>" F % Retained</u>	<u><math>\frac{1}{2}</math>" D % Retained</u>
$\frac{1}{2}$ "	0	0
$\frac{3}{8}$ "	0-2	5-25
4m	40-85	80-100
10m	95-100	96-100

C. Concrete Embedment and Encasement

1. Concrete embedment and encasement and cap shall have a minimum compressive strength of 2,000 pounds per square inch at 28 days.
2. Dry mix will not be permitted. The concrete cushion portion of the embedment or encasement will be mixed moist or damp to give a slump of not more than one (1) inch. Concrete for the sides and top, if specified, shall be mixed to obtain a slump of not less than one (1) inch or more than three (3) inches.
3. After pipe joints are completed, the voids at the joints in the embedment section shall be filled with concrete, and the embedment shall be brought up to proper grade. Where concrete is placed over or along the pipe, it shall be placed in such a manner as not to damage or injure the joints or displace the pipe. Care shall be taken in the placement of concrete to assure that a uniform pad, free of voids and of specified thickness, is constructed under the entire pipe section.
4. A cleavage line between the base concrete and the side embedment concrete will not be allowed. Backfilling shall be done in a careful manner and at such time, after concrete embedment or encasement has been placed, as not to damage the concrete in any way.

G4.05

BACKFILLING

A. General

1. Backfilling shall include the refilling and consolidating of the fill in trenches and excavations up to the surrounding ground surface or road grade at crossings. No backfill shall be placed until the Engineer, the City or his authorized Inspector has inspected the trench and pipe in place and has authorized the placing of backfill.
2. Backfilling shall be done with select material or concrete backfill as described hereafter and shown on the Plans. No material of a perishable, spongy or otherwise unsuitable nature shall be used in backfilling.

B. Select Backfill Material

1. Unless otherwise shown on the Plans, or approved by the Engineer, the select material backfill shall be Specification Section SD4 Flexible Base, Type A Grade 1.

2. If approved by the Engineer, good, sound earth may be used as select material for backfill over the pipe. Good, sound earth as defined as gravel, sandy loam or loam, free from excessive clay. Select material shall not have rocks with an average dimension larger than one (1) inch, and no dimension greater than two (2) inches.
3. An alternative to the flexible base as select backfill will be on-site or imported select material so long as it is properly moisture-conditioned, placed and compacted.
4. It shall be the full responsibility of the Contractor to explore the project and subsurface materials to determine if the trench excavation will be suitable for use as select materials and to follow as closely as possible this Specification to insure a good, sound pipeline when completed.

C. Concrete Trench Cap

1. Where 36-inch minimum cover cannot be obtained or due to potential surface loading, the City may require a cap to be installed.

D. Concrete Backfill

1. Where shown on the Plans, concrete backfill shall consist of selected rock material or granular sand material mixed with a minimum of three sacks of cement per cubic yard. All material shall be mixed in a concrete mixer or transit mixed unless otherwise approved by the City.

E. Backfilling Operation

1. Backfilling operation outside of pavement shall be compacted to the required density without damaging the pipe or bedding. Backfill under non paved areas, two feet outside of any structure or utilities and excluding lines within a floodplain, streams and watercourses shall be compacted to 90% of the maximum dry density in accordance Tex-114-E. Areas within two feet of structures or existing utilities and areas within a floodplain, streams and water courses shall be compacted to 95% in accordance with Tex-114-E. Prior to any compaction, moisture shall be within  $\pm 3\%$  of the optimum moisture content.
2. All trenches under proposed or existing concrete roadways, driveways and sidewalks, paved waterways, brick roadways, asphaltic roadways with concrete base, gravel roadways, and roadways with gravel base and asphalt surface, shall be backfilled to the required density in six (6) inch maximum lifts without damaging the pipe or bedding except the first lift over the pipe bedding will be twelve (12) inches in depth. Swelling soils (soils with a plasticity index of 20 or more) shall be sprinkled as required to provide not less than optimum moisture nor more than 3% over the optimum moisture content to the extent necessary to provide not less than 95% nor more than 102% of the maximum dry density as determined in accordance with Tex-114-E. Non-swelling soils (soils with a plasticity index less than 20) shall be sprinkled as required and compacted to the extent necessary to provide not less than 95% of the optimum dry density with the moisture within  $\pm 3\%$  of the optimum moisture content in accordance with Tex-114-E. Jetting with water will not be permitted. Flexible base used as select backfill shall be compacted to 95% of Tex-113E at  $\pm 3\%$  of the optimum moisture content.
3. After the trench has been refilled, topsoil shall be replaced to the extent that rock excavated from the trench will be completely covered or removed and the area is returned to its original condition, except that in cultivated areas a minimum of six (6) inches of topsoil shall be replaced.

G4.06

PAYMENT

G4-4

PIPE EXCAVATION, TRENCHING,  
EMBEDMENT, ENCASEMENT  
AND BACKFILLING

- A. No separate payment will be made for work performed under this Specification for excavating, trenching, embedment, and backfilling. All costs incurred shall be included in the contract price for the appropriate items in the Proposal and Bid Schedule.
- B. No separate payment will be made for the bedding used in embedment. All costs incurred shall be included in the contract price for the appropriate bid item.
- C. Separate payment, if authorized by the City, will be made for crushed stone or washed gravel as described in these specifications under Section G4.02(G), SOFT SUBGRADE, at the contract unit price per cubic yard as provided in the Proposal and Bid Schedule under "Extra Gravel for Embedment."
- D. Separate payment will be made for 2,000 psi Concrete Encasement or Backfill at the contract unit price per cubic yard or linear foot as provided in the Proposal and Bid Schedule under 2,000 psi Concrete Encasement. Concrete and three (3) sack granular sand or rock material mix backfill will be measured in cubic yards or linear feet actually placed based on actual trench width not to exceed the specified maximum trench width and will be paid for at the contract price per cubic yard or linear foot as provided in the Proposal and Bid Schedule.
- E. Where authorized by the Engineer, gravel used to replace unsuitable material will be paid for at the unit bid price for Extra Gravel for embedment.

END OF SECTION

TECHNICAL SPECIFICATIONSSECTION G5 – GRANULAR FILL MATERIALSG5.01 SCOPE OF WORK

- A. This specification covers the requirements for the use of granular fill materials for this Project.

G5.02 SUBMITTALS

- A. Within 30 days after the Notice to Proceed, the Contractor shall submit to Engineer or the City for approval, technical product literature including the source of the material, gradation, type of material, and all other pertinent data to illustrate conformance to the specification found within.

G5.03 GENERAL

- A. Granular fill materials are specified in this Section, but their use for bedding pipe, pavement base, are specified in detail in sections G4 TRENCHING, BACKFILLING AND COMPACTION and SD4 FLEXIBLE BASE. The Engineer may respectively order the use of fill materials for purposes other than those specified in other Sections if, in his/her opinion, such use is advisable.

G5.04 MATERIALS

- A. Common fill shall consist of mineral soil, substantially free of clay, organic material, loam, wood, trash, and other objectionable material which may be compressible, or which cannot be compacted properly. Common fill shall not contain stones larger than six (6) inches in any dimension, broken concrete, masonry, rubble, asphalt pavement, or other similar materials. It shall have physical properties, as approved by the Engineer, such that it can be readily spread and compacted.
- B. Select common fill shall be as specified above for common fill except that the material shall contain no stones larger than two (2) inches in its largest dimension.
- C. Crushed Stone Backfill shall consist of hard, durable, particles of proper size and gradation, free from sand, loam, clay, excess fines and deleterious materials. The size of the particles shall be uniformly graded such that the following bedding specifications are met:

<u>Sieve Size</u>	<u><math>\frac{3}{8}</math>" F % Retained</u>	<u><math>\frac{1}{2}</math>" D % Retained</u>	<u>Washed Gravel % Retained</u>
$\frac{1}{2}$ "	0	0	0
$\frac{3}{8}$ "	0-2	5-25	---
4m	40-85	80-100	---
10m	95-100	96-100	---
$\frac{3}{4}$ "	---	---	100

- D. Crushed Stone Base shall consist of sound, durable stone, free of any foreign material, angular in shape, free from structural defects and comparatively free of chemical decay. This material shall comply with Texas Department of Transportation Item 248, Type "A", Grade 1 unless otherwise shown on the Plans or Standards. The stone shall have a maximum size of  $\frac{7}{8}$ -inch.
- E. Cement Stabilization Sand Backfill shall consist of a mixture of ASTM C33 fine aggregate and Type I cement. The mix shall be proportioned of two (2) sacks of cement per cubic yard.

G5.05 PAYMENT

- A. No separate payment will be made for work performed in accordance with this specification, and the cost thereof shall be included in the proper items of the Proposal and Bid Schedule.

END OF SECTION

## TECHNICAL SPECIFICATIONS

SECTION G8 – MISCELLANEOUS WORK AND CLEANUPG8.01 SCOPE OF WORK

- A. This specification covers the requirements to do the miscellaneous work not specified in other sections but obviously necessary for the proper completion of the work as shown on the Plans.

G8.02 SUBMITTALS

- A. Within 10 days after the Notice to Proceed, the Contractor shall submit to the Engineer, in triplicate, a breakdown of any lump sum included in the Proposal and Bid Form. This breakdown shall be subject to approval by the Engineer and when so approved shall become the basis for determining progress payments and for negotiation of change orders, if required. In some contracts a lump sum item shall not be provided in the Proposal and Bid Form and shall be subsidiary to the other work items.

G8.03 GENERAL

- A. When applicable, the Contractor will perform the work in accordance with other sections of this Specification. When no applicable specification exists the Contractor shall perform the work in accordance with the best modern practice and/or as directed by the Engineer.
- B. The work of this Section includes, but is not limited to, the following:
1. Crossing and Relocating Existing Utilities
  2. Restoring Driveways, Fences and Curbing
  3. Cleaning Up
  4. Incidental Work
  5. Restoring Easements and Rights-of-Way

G8.04 CROSSING AND RELOCATING EXISTING UTILITIES

- A. This item includes any extra work required in crossing culverts, water courses including streams and drainage ditches, drains, gas mains, water mains and water services and other utilities. This work shall include but is not limited to the following: bracing, hand excavation and backfill (except screened gravel) and any other work required for crossing the utility or obstruction not included for payment in other items of this specification. Notification of Utility Companies shall be the Contractor's responsibility.
- B. In locations where existing utilities cannot be crossed without interfering with the construction of the work as shown on the Plans, the Contractor shall remove and relocate the utility as directed by the Engineer or Representative of the City or cooperate with the Utility Companies concerned if they relocate their own utility.
- C. At pipe crossings and where designated by the Plans, the Contractor shall furnish and place crushed stone bedding so that the existing utility or pipe is firmly supported for its entire exposed length. The bedding shall extend to the mid-diameter of the pipe crossed.

G8.05 RESTORING OF DRIVEWAYS AND FENCES

- A. Existing public and private driveways disturbed by the construction shall be replaced. Paved drives shall be repaved to the limits and thicknesses existing prior to construction. Gravel dirt roads and drives shall be replaced and regraded.
- B. Fences in the vicinity of the work shall be protected from damage. If damaged, fences shall be replaced in condition equal to that prior to being damaged and the work shall be satisfactory to the City.

G8.06 CLEANING UP

- A. The Contractor shall remove all construction material, excess excavation, buildings, equipment and other debris remaining on the job as a result of construction operations and shall restore the site of the work to a neat and orderly condition. All stored materials shall be kept in a neat manner, secured and protected from the public.

G8.07 INCIDENTAL WORK

- A. Do all incidental work not otherwise specified, but obviously necessary to the proper completion of the Contract as specified and as shown on the Plans.

G8.08 RESTORING THE EASEMENTS AND RIGHTS-OF-WAY

- A. Portions of the work may be within easements through private property. The Contractor shall be responsible for all damage to private property due to his/her operations. The Contractor shall protect from injury all walls, fences, cultivated shrubbery and vegetables, fruit trees, pavement, underground facilities, such as water pipes, or other utilities which may be encountered along the easement. If removal and replacement are required, it shall be done in a workmanlike manner so that replacement is equivalent to that which existed prior to construction.
- B. Existing lawn and sod surfaces damaged by construction in easements shall be replaced. The Contractor may cut and replace the lawn and sod, or may restore the areas with an equivalent depth and quality of loam, seeded and fertilized as specified in Section G7- LOAMING, HYDROSEEDING AND PERMANENT EROSION CONTROL if acceptable to the owner of the private property and the City. These areas shall be maintained and re-seeded or re-sodded at the option of the owner of the private property and the City, if necessary, until all work under this Contract has been completed and accepted. Any additional work required to restore easements to their original condition shall be performed by the Contractor.

G8.09 PAYMENT

- A. No separate payment shall be made for work performed in accordance with this section of the specifications, and the cost thereof shall be included in the proper items of the Proposal and Bid Schedule.

END OF SECTION

TECHNICAL SPECIFICATIONSSECTION W1 – DUCTILE IRON PIPE AND FITTINGSW1.01 SCOPE OF WORK

- A. This specification covers the requirements to furnish and install ductile iron pipe and ductile iron pipe fittings including bracing, pipe laying, jointing, testing, blocking, and any other work that is required or necessary to complete the installation as shown on the Plans and as specified herein.

W1.02 SUBMITTALS

- A. Within 30 days of the Notice to Proceed, the Contractor shall submit to the Engineer for approval, technical product literature including the name of the pipe and fitting suppliers and a list of materials to be furnished, completely detailed working drawings and schedules of all ductile-iron pipe and fittings required, prior to each shipment of pipe, submit certified test reports that the pipe for this Contract was manufactured and tested in accordance with the ASTM and ANSI/AWWA Standards specified herein.

W1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
1. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs 60,000 PSI Tensile Strength.
- B. American Water Works Association (AWWA)
1. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pressure Pipe and Fittings.
  2. AWWA C105 - Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids.
  3. AWWA C110 - Ductile-Iron and Gray-Iron Fittings, 3-inch Through 48-in for Water and Other Liquids.
  4. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  5. AWWA C115 - Standard for Flanged Ductile-Iron Pipe with Threaded Flanges.
  6. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids.
  7. AWWA C153 - Ductile-Iron Compact Fittings, 3-inch Through 16-inch for Water and Other Liquids.
  8. AWWA C600 - Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances.
  9. AWWA C651 - Disinfection Water Mains
- C. American National Standards Institute (ANSI)
1. ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
- D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

W1.04 QUALITY ASSURANCE

- A. All ductile-iron pipe and fittings shall be from a single Manufacturer. All ductile-iron pipe to be installed under this Contract may be inspected at the foundry for compliance with these Specifications by an independent testing laboratory provided by the City. The Contractor shall require the Manufacturer's cooperation in these inspections. The cost of foundry inspection of all pipe approved for this Contract, plus the cost of inspection of disapproved pipe will be borne by the Contractor.
- B. Inspection of the pipe will be made by the Engineer or other representatives of the City after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the job.

## W1.05

MATERIALS

- A. Ductile iron pipe shall conform to AWWA C151, be manufactured from metal having a minimum tensile strength of 60,000 psi, a minimum yield strength of 42,000 psi, and a minimum elongation of 10 percent (60-42-10), and be provided in the following minimum pressure classes:
  - 1. 12-inch and smaller, Class 350.
  - 2. 14-inch through 20-inch, Class 250.
  - 3. 24-inch, Class 200.
  - 4. 30-inch and larger, Class 150.
- B. Ductile iron fittings shall conform to AWWA C110 or C153.
- C. All pipe and fittings shall have a bituminous outside coating in accordance with AWWA C151 and C110, respectively. All pipe and fittings shall be cement-mortar lined and seal coated in accordance with AWWA C104. Cement mortar lining shall be double thickness.
- D. Ductile iron pipe with push-on or mechanical joints shall be centrifugally cast pipe in accordance with AWWA C150 and C151.
- E. Restrained joints shall be restrained push-on joints, TR Flex by U.S. Pipe and Foundry; Lok-Fast by American Cast Iron Pipe Company, or equal. Joints shall be suitable for 250 psi working pressure and be fabricated of heavy section ductile iron casting. Bolts and nuts shall be low carbon steel conforming to ASTM A307, Grade B.
- F. Sleeve type couplings shall be of steel and shall be Style 38 by Dresser Manufacturing Division, Smith-Blair or equal. Couplings shall be furnished with black steel bolts and nuts and with pipe stop removed. Gaskets shall be of a material suitable for exposure to liquid within the pipe.

## W1.06

POLYETHYLENE ENCASEMENT

- A. All buried ductile iron pipe and metallic fittings shall be encased with 8 mil, Type I, Grade E-1, polyethylene film conforming to AWWA C105. Class usage shall be:
  - 1. Class A - Natural Color where exposure to weather (including sunlight) is less than 48 hours total before burial.
  - 2. Class C - Black where exposure to weather (including sunlight) may be more than 48 hours.
- B. Exposure to weather shall be kept to a minimum, and in no case shall it exceed 10 days. The Class of polyethylene used shall be approved by the Engineer.
- C. Polyethylene encasement shall not be paid for separately, but the cost there of shall be included in the appropriate item of the Proposal and Bid Schedule.

## W1.07

LAYING DUCTILE IRON PIPE AND FITTINGS

- A. Care shall be taken in loading, transporting and unloading to prevent injury to the pipe, lining or coatings. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying and no piece shall be installed which is found to be defective. Any damage to the pipe linings or coatings shall be repaired as directed by the Engineer. Handling and laying of pipe and fittings shall be in accordance with the Manufacturer's instruction and as specified herein.
- B. All pipe and fittings shall be thoroughly cleaned before laying, shall be kept clean until they are used in the work, and when laid, shall conform to the lines and grades required. Pipe shall not be laid unless the subgrade is free of water and in a satisfactory condition. Ductile iron pipe and fittings shall be installed in accordance with the requirements of AWWA C600 except as otherwise provided herein. All piping on this project regardless of size or class shall be placed in the embedment as shown on the detail sheets in the Plans. If any defective pipe is discovered after it has been laid, it shall be removed and replaced with a sound pipe in a satisfactory manner by the Contractor, at his own expense.
- C. All pipe shall be sound and clean before laying. When laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by watertight plugs or other approved means. Good alignment shall be preserved in laying. The deflection at joints shall not exceed that recommended by the Manufacturer. Fittings, in addition to those shown on the Plans, shall be provided, if required, for crossing utilities which may be encountered upon opening the trench. Solid sleeves shall be used only where approved by the Engineer and the City.
- D. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be joined with a bell shall be beveled to conform to the manufactured spigot end. Cement lining shall be undamaged.
- E. Joints shall be protected by eight (8) mil. Polyethylene film prior to placing concrete. Concrete shall be placed against undisturbed material, and shall not cover joints, bolts or nuts, or interfere with the removal of any joint.

W1.08

PUSH-ON JOINTS

- A. Push-on joints shall be made in accordance with AWWA C111 and the Manufacturer's instructions. Pipe shall be laid with bell ends in the direction of trenching. A rubber gasket shall be inserted in the groove of the bell end of the pipe, and the joint surfaces cleaned and lubricated. The plain end of the pipe to be laid shall then be aligned and inserted in the bell of the pipe to which it is to be joined and pushed home with a jack or by other means. After joining the pipe, a metal feeler shall be used to make certain that the rubber gasket is correctly located.

W1.09

MECHANICAL JOINTS

- A. Mechanical joints shall be made in accordance with Appendix "A" of AWWA C111 and the Manufacturer's instructions. Thoroughly clean and lubricate the joint surfaces and rubber gasket with soapy water before assembly. Bolts shall be tightened to the specified torque. Under no conditions shall extension wrenches or pipe over the handle of ordinary ratchet wrench be used to secure greater leverage.

W1.10 RESTRAINED JOINTS

- A. Restrained joints shall be installed where shown on the Plans. The joint assemblies shall be made in accordance with the Manufacturer's recommendations.

W1.11 SLEEVE TYPE COUPLINGS

- A. Couplings shall be installed where shown on the Plans. Couplings shall not be assembled until adjoining push-on joints have been assembled. After installation, apply a heavy bitumastic coating to bolts and nuts.

W1.12 POLYETHYLENE ENCASEMENT

- A. The polyethylene encasement shall be installed in accordance with either method specified in AWWA C105.

W1.13 CONCRETE AND BLOCKING

- A. 2,500 psi concrete shall be placed for blocking at each change in direction in the pipeline, in such manner as will substantially brace the pipe against undisturbed trench walls. Concrete blocking, made from Type I cement, shall have been in place four (4) days prior to testing the pipeline as hereinafter specified. Test may be made in two (2) days after completion of blocking if Type III cement is used.
- B. At all points where wet connections are made to existing lines, the existing lines shall be adequately blocked and the tapping connection fittings shall be supported by blocking up to the spring line with 2,500 psi concrete.
- C. Concrete blocking will not be measured or paid for as a separate item but the cost thereof shall be included in the proper items listed in the Proposal and Bid Schedule.

W1.14 CLEANING

- A. At the conclusion of the work thoroughly clean all of the new pipelines by flushing with water or other means to remove all dirt, stones, pieces of wood or other material which may have entered during the construction period. If obstructions remain after this cleaning, the obstructions shall be removed.

W1.15 CONNECTIONS AND APPURTENANCES

- A. The Contractor shall make the alterations and the necessary connections to existing water mains as shown on the Plans. Such connection shall be made at such time and in a manner approved by the City; in each case, when the work is started, it shall be prosecuted expeditiously and continuously until completed.
- B. Fittings, bends, plugs and valves shall be of standard manufacture and mechanical joint type to fit AWWA pipe specifications in Classes A, B, C and D, unless otherwise shown on the Plans.
- C. Payment for fittings and gate valves shall be restrained and shall be made separately under the appropriate bid items listed in the Proposal and Bid Schedule.

W1.16 LEAKAGE TESTING AND STERILIZATION

- A. All Ductile Iron Pipe shall be leak tested and sterilized according to Section CIP12 – TESTING OF PIPELINES.

W1.17

PAYMENT

- A. The pipeline, complete in place, including cleanup, will be measured for payment in linear feet along the centerline of the pipe actually installed. Measurement shall be through all fittings, specials, valves, etc., and no deduction in length shall be made for such appurtenances. Installation of the pipeline will be paid for at the unit contract price per linear foot as provided in the Proposal and Bid Schedule.
- B. Payment of the unit contract price for the items of work performed shall be the total compensation for furnishing all labor, materials, tools, equipment and incidentals and performing all work that is necessary for the installation, testing, and sterilization of the pipe, fittings, connections, blocking, embedment or placing in encasement pipe and all other appurtenances in accordance with the Plans and the provisions of the Specifications.

END OF SECTION

TECHNICAL SPECIFICATIONSSECTION W2 – POLYVINYL CHLORIDE (PVC) PIPE-WATERW2.01 SCOPE OF WORK

- A. This specification covers the requirements to install polyvinyl chloride (PVC) water pipe and ductile iron fittings for the water line, including excavation, sheeting, shoring, dewatering, pipe laying, jointing, testing, backfilling and any other work that is required or necessary to complete the installation as shown on the Plans and as specified herein.

W2.02 SUBMITTALS

- A. Within 30 days of the Notice to Proceed, the Contractor shall submit to the Engineer or the City for approval, technical product literature including the name of the pipe and fittings suppliers, a list of materials to be furnished, shop drawings and schedules of all PVC pipe and fittings required, prior to each shipment of pipe, submit certified test reports that the pipe for this Contract was Manufactured and tested in accordance with the ASTM Standards specified herein.

W2.03 QUALITY ASSURANCE

- A. All PVC pipe and fittings shall be from a single Manufacturer. The supplier shall be responsible for the provisions of all test requirements specified in ASTM D3034 or ASTM F789 and/or ASTM F758 as applicable. In addition, all PVC pipe to be installed under this Contract may be inspected at the plant for compliance with these specifications by an independent testing laboratory provided by the City. The Contractor shall require the Manufacturer's cooperation in these inspections. The cost of plant inspection of all pipe approved for this Contract, plus the cost of inspection of disapproved pipe, will be borne by the Contractor.
- B. Inspections of the pipe may also be made by the Engineer or other representatives of the City after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall be removed from the job at once.

W2.04 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

- A. Polyvinyl chloride pipe for water lines, unless otherwise specifically shown on the Plans, or approved in writing, shall be AWWA C900, C905, or C909 Class 150 psi with a dimension ratio of 18 (DR-18), for water lines and shall be extruded, be of rubber gasket type, and be furnished in 20-foot nominal laying lengths. All such pipe shall bear a mark denoting approval by the Underwriters' Laboratories of Chicago, Illinois, so that it will be acceptable to the Texas State Fire Insurance Commission for use in fire protection lines without penalty. All joints shall be of the type which provides a recession in the bell for the employment of a single rubber gasket to be placed before the insertion of the succeeding spigot. Each size of polyvinyl chloride pipe shall have the same outside diameter as the corresponding size of castiron pipe.
- B. Fittings shall be ductile iron, mechanical joint or flanged type and shall be Class 250 in accordance with AWWA Specifications C110-77, C-111-80, and C115-75. Flanges shall be faced and drilled in accordance with ASA Standard B16.1, Class 125 unless otherwise shown on the Plans or in the Special Conditions. All fittings shall be tar coated on the outside surface and shall have an interior cement lining with seal coat per AWWA Specifications C104-80 unless otherwise shown or specified.
- C. The Contractor shall obtain installation instructions, including support spacing and solvent welding, from the supplying Manufacturer, shall comply with the instructions, and shall meet the requirements of ASTM D-2855, Standard Recommended Practice for making Solvent Cemented Joints with PVC Pipe and Fittings. The PVC solvent cement shall comply with ASTM D-2564 and shall be furnished by the pipe and fitting Manufacturer for the class and type of pipe supplied to the project.

W2.05

HANDLING AND CUTTING PIPE

- A. Pipe and fittings are slightly brittle. Care shall be taken in shipping, handling and laying to avoid damaging the pipe and fittings. Extra care will be necessary during cold weather construction.
- B. Any pipe or fitting showing a crack or which has received a blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.
- C. All pipe ends shall be square after cutting.
- D. While stored, pipe shall be adequately supported from below at not more than three (3) foot intervals to prevent deformation. Pipe shall not be stacked higher than six (6) feet. Pipe and fittings shall be stored in a manner which will keep them at ambient outdoor temperatures and out of direct sunlight. Temporary shading as required to meet this requirement shall be provided. Simple covering of the pipe and fittings which allows temperature buildup when exposed to direct sunlight will not be permitted.

W2.06

JOINTING POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

- A. PVC pipe and fittings shall be jointed in accordance with the recommendations of the latest ASTM Standards and detailed instructions of the Manufacturer.

W2.07

INSTALLING POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

- A. Unless otherwise specified on the Plans, polyvinyl chloride pipe shall be installed to clear all utility lines and shall have three (3) feet minimum cover. For water lines to be constructed under a future roadway, the cover may be increased to allow for future paving grades. The depth of cover, where shown on the Plans, is that distance from the top of the pipe to the approximate proposed grade line.
- B. No single piece of pipe shall be laid unless it is generally straight. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than  $\frac{1}{16}$ -inch per foot of length. If a piece of pipe fails to meet this requirement check for straightness, it shall be rejected and removed from the site. Laying instructions of the Manufacturer shall be explicitly followed.
- C. Any pipe or fittings discovered to be defective after laying shall be removed and replaced with a sound piece.
- D. The Engineer or the City may examine each bell and spigot end to determine whether any preformed joint has been damaged prior to installation. Any pipe having defective joint surfaces shall be rejected, marked as such, and immediately removed from the job site.
- E. All pipe shall be sound and clean before laying. When laying is not in progress, including lunch time, the open ends of the pipe shall be closed by watertight plugs or other approved means. Good alignment shall be preserved in laying.
- F. Pipe and fittings shall be installed in accordance with the instructions of the Manufacturer, ASTM D2321 and as specified herein. As soon as the excavation is complete to normal grade of the bottom of the trench, embedment material shall be placed, compacted and graded to provide firm, uniform and continuous support for the pipe. Bell holes shall be excavated so that only the barrel of the pipe bears upon the bedding. The pipe shall be laid accurately to the lines and grades indicated on the Plans. The specified embedment shall be accurately shaped and trimmed to receive the pipe barrel and each pipe section, when in place, shall have a uniform bearing on the subgrade for the full length of the pipe barrel. Pipe shall not be laid unless the subgrade is free of water and in a satisfactory condition. Embedment material shall be placed evenly on each side of the pipe to mid-diameter and hand tools shall be used to force the embedment material under the haunches of the pipe and into the bell holes to give firm continuous support for the pipe. Embedment material shall then be placed to 12-inches above the top of the pipe. Next, the varying depths of select material backfill above the embedment material backfill shall be placed according to the Plan Details and carefully compacted. Generally, the compaction shall be done evenly on each side of the pipe and compaction equipment shall not be operated directly over the

pipe until sufficient select material backfill has been placed to ensure that such compaction equipment will not have a damaging effect on the pipe. Equipment used in compacting the varying depths of select material backfill shall be approved by the pipe Manufacturer's representative prior to use. Adjustments of the pipe to line and grade shall be made by scraping away or filling in with granular material, and not by wedging or blocking up the bell.

- G. Perforated PVC Pipe and fittings shall be installed in accordance with the instructions of the Manufacturer, ASTM F758 and as specified herein. As soon as the excavation for the trench is complete to normal grade of the bottom of the trench, geotextile fabric shall be laid and then the pea gravel bedding shall be carefully placed (so not to damage the geotextile fabric) and graded to provide uniform and continuous support for the pipe. Bell holes shall be excavated so that only the barrel of the pipe bears upon the bedding. Before the perforated pipe is laid on the trench, the perforated pipe shall be wrapped around and closed according to the Manufacturer's closure recommendations with the geotextile fabric. The pipe shall be laid accurately to the lines and grades indicated on the Plans. Blocking under the perforated PVC pipe will not be permitted. Pea gravel shall be placed evenly on each side of the pipe to mid-diameter and hand tools shall be used to gently place the pea gravel under the haunches of the pipe and into the bell holes to give firm continuous support for the pipe. Making sure not to damage the geotextile fabric, pea gravel shall then be carefully placed above the top of the perforated pipe varying from two to three (2-3) feet depending on the Plans. Once the remaining pea gravel has been placed, overlap or close the geotextile fabric according to the Manufacturer's recommendations or six (6) inches minimum overlap. Then one (1) foot of topsoil shall be placed over the pea gravel to the ground level with proper grass sodding on top.
- H. Joints shall not be "pulled" or "cramped". Each joint of pipe shall be completed in compliance with Manufacturer's recommendations.
- I. Before any joint is made, the pipe shall be checked to assure that a close joint with the next adjoining pipe has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to grade by striking it.
- J. Precautions shall be taken to prevent flotation of the pipe in the trench.
- K. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and backfill or embedment material. Trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend below mid-diameter of the pipe. As trench boxes, moveable sheeting, shoring or plates are moved, embedment material shall be placed to fill any voids created and the embedment material and backfill shall be recompact to provide uniform side support for the pipe.

## W2.08

CONCRETE AND BLOCKING

- A. 2,500 psi concrete shall be placed for blocking at each change in direction in the pipeline, as shown in the Standard Details and in such manner as will substantially brace the pipe against undisturbed trench walls. In no event shall this quantity of concrete blocking be less than those shown in the Plans. Concrete blocking, made from Type I cement, shall have been in place four (4) days prior to testing the pipeline as hereinafter specified. Tests may be made in two (2) days after completion of blocking if Type III cement is used.
- B. At all points where wet connections are made to existing lines, the existing lines shall be adequately blocked and the tapping connection fittings shall be supported by blocking up to the spring line with 2,500 psi concrete.
- C. Concrete blocking will not be measured or paid for as a separate item but the cost thereof shall be included in the various items listed in the Proposal and Bid Schedule.

## W2.09

TESTING AND ALLOWABLE LEAKAGE

- A. All PVC pipe and fittings shall be leak tested and sterilized according to Section CIP12.05- TEST PROCEDURES FOR PRESSURE PIPELINES.

W2.10

PAYMENT

- A. The pipeline, complete in place, including cleanup, will be measured for payment in linear feet along the centerline of the pipe actually installed. Measurement shall be through all fittings, specials, valves, etc., and no deduction in length shall be made for such appurtenances. Installation of the pipeline will be paid for at the unit contract price per linear foot as provided in the Proposal and Bid Schedule.
- B. Payment of the unit contract price for the items of work performed shall be the total compensation for furnishing all labor, materials, tools, equipment and incidentals and performing all work that is necessary for the installation, testing, and sterilization of the pipe, fittings, connections, blocking, embedment or placing in encasement pipe and all other appurtenances in accordance with the Plans and the provisions of the Specifications.

END OF SECTION

TECHNICAL SPECIFICATIONSSECTION W3 – VALVES, HYDRANTS AND APPURTENANCESW3.01 SCOPE OF WORK

- A. This specification covers the requirements to provide all buried valves, valves in manholes and underground vaults, hydrants and appurtenances complete with actuators and all accessories as shown on the Plans and as specified herein.

W3.02 SUBMITTALS

- A. Within 30 days of the Notice to Proceed, the Contractor shall submit to the Engineer or the City for approval, technical product literature including Manufacturer's literature, illustrations, specifications and engineering data which includes dimensions, size, materials of construction, weight, protection coating, and all other pertinent data to illustrate conformance to the specification found within. The Contractor shall also submit four (4) copies of all certified shop test results specified herein, complete operation and maintenance manuals including all copies of all approved shop drawings, and certificates of compliance where required by referenced standards: For each valve specified to be manufactured and/or installed in accordance with AWWA and other standards, submit an affidavit of compliance with the appropriate standards, including certified results of required tests, and certification of proper installation.

W3.03 REFERENCE STANDARDS

- A. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. American Water Works Association (AWWA)
1. AWWA C515 - Gate Valves, three (3)-inch through 48-inch NPS, for Water and Sewage Systems.
  2. AWWA C502 - Dry-Barrel Fire Hydrants.
  3. AWWA C509 - Resilient-Seated Gate Valves, three (3) inch through 12-inch NPS, for Water and Sewage Systems.
- C. American National Standards Institute (ANSI)
1. ANSI B16.1 - Cast-Iron Pipe Flanges and Flanged Fittings.
  2. ANSI C111 - Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.
- D. American Society for Testing and Materials (ASTM)
1. ASTM A48 - Gray Iron Castings.
  2. ASTM A126 - Gray Iron Castings for Valves, Flanges and Pipe Fittings
  3. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware
  4. ASTM A276 - Standard Specification for Stainless and Heat Resisting Steel Bars and Shapes.
  5. ASTM A536 - Ductile Iron Castings.
- E. Steel Structures Painting Council (SSPC)
1. SSPC SP-6 - Commercial Blast Cleaning

- F. Where reference is made to one (1) of the above standards, the revision in effect at the time of bid opening shall apply.

W3.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site to ensure uninterrupted progress of the work.
- B. Protect threads and seats from corrosion and damage. Rising stems and exposed stem valves shall be coated with a protective oil film which shall be maintained until time of use.
- C. Provide covers for all openings.
1. All valves three (3) inches and larger shall be shipped and stored on site until time of use with wood or plywood covers on each valve end.
  2. All valves smaller than three (3) inches shall be shipped and stored as above except that heavy card board covers may be furnished instead of wood.
- D. Store equipment to permit easy access for inspection and identification. Any corrosion in evidence at the time of City acceptance shall be removed, or the valve shall be removed from the job.
- E. Store all equipment in covered storage off the ground.

W3.05 COORDINATION

- A. Review installation procedures under other Sections and coordinate with the work which is related to this Section including buried piping installation and site utilities.
- B. Contractor shall coordinate the location and placement of concrete thrust blocks when required.

W3.06 GENERAL

- A. All valves shall open counter-clockwise.
- B. The use of a Manufacturer's name and/or model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.
- C. Valves shall be of the size shown on the Plans or as noted, and as far as possible equipment of the same type shall be identical and from one Manufacturer.
- D. Valves shall have the name of the maker, nominal size, flow directional arrows, working pressure for which they are designed and standard to which they are manufactured cast in raised letters on some appropriate part of the body.
- E. Unless otherwise noted, valves shall have a minimum working pressure of 200 psi or be of the same working pressure as the pipe they connect to, whichever is higher, and suitable for the pressures noted where they are installed.
- F. Valves shall be of the same nominal diameter as the pipe or fittings they are connected to. Except as otherwise noted, joints shall be mechanical joints, with joint restraint where the adjacent piping is required to be restrained.
- G. Valves shall be constructed for buried service.

W3.07 VALVE BOXES

- A. All gate valves shall be provided with extension shafts (where the operating nut is greater than five (5) feet below grade), operating nuts and valve boxes as follows:

1. Extension shafts shall be steel and the operating nut shall be two (2) inches square. Shafts shall be designed to provide a factor of safety of not less than four (4). Operating nuts shall be pinned to the shafts.
2. Valve boxes shall be a heavy-pattern cast iron, three (3) piece, telescoping type box with dome base suitable for installation on the buried valves. Inside diameter shall be at least 5¼-inches. Barrel length shall be adapted to the depth of cover, with a lap of at least six (6) inches when in the most extended position. Covers shall be cast iron with integrally-cast direction-to-open arrow and "WATER" shall be cast in the cover when used on a water line or "SEWER" when used on a wastewater force main. Aluminum or plastic are not acceptable. A means of lateral support for the valve extension shafts shall be provided in the top portion of the valve box. The valve box lid shall be furnished with a pentagon-head bolt for locking.
3. The upper section of each box shall have a bottom flange of sufficient bearing area to prevent settling. The bottom of the lower section shall enclose the stuffing box and operating nut of the valve and shall be oval.
4. An approved operating key or wrench shall be provided.
5. All fasteners shall be Type 304 stainless steel.

W3.08

RESILIENT SEATED GATE VALVES

- A. Valves shall be manufactured in accordance with AWWA C509.

Acceptable Gate Valves are:

1. American Flow Control – Series 2500
  2. Mueller – 2360 Series
  3. Clow
- B. Valves shall be provided with a minimum of two (2) O-ring stem seals.
- C. Bonnet and gland bolts and nuts shall be either fabricated from a low alloy-steel for corrosion resistance or electroplated with zinc or cadmium. The hot-dip process in accordance with ASTM A153 is not acceptable.
- D. Wedges shall be totally encapsulated with rubber.
- E. Units shall be, in addition, UL and FM approved.
- F. Resilient wedge gate valves shall be furnished and installed in sizes and shall be manufactured in accordance with the latest AWWA C-509 and cast iron shall conform to the latest ASTM A-126 standards. Gate valves furnished under these specifications shall be of the solid wedge, resilient seat type with cast iron/ductile iron body and bronze stem designed for 250 pounds per square inch working pressure. All gate valves shall be tested hydrostatically to 400 pounds per square inch. Gate valves shall meet the latest AWWA standard specifications (C-509).
- G. The seat shall be made of Styrene Butadiene rubber and provide a positive water tight seal. The seat shall be permanently bonded or mechanically attached to the wedge with stainless steel screws. If bonded, ASTM P-429 requirements shall be followed. Non-rising stem gate valves shall be equipped with "O" ring type packing gland consisting of at least two (2) "O" rings. The thrust collar shall work in an "O" ring seal lubricant reservoir or against bearings or washers, above and below constructed of Delrin or approved equal material. Gate valve stems, shall be fabricated from solid bronze rod having a tensile strength of not less than 60,000 pounds per square inch, and a minimum yield strength of 30,000 pounds per square inch.

- H. Cast iron body shall be of iron with an even grain and shall possess a tensile strength of not less than 32,000 pounds per square inch. All bronze castings, except the stem, shall have a tensile strength of not less than 30,000 pounds per square inch. The entire internal valve body surfaces shall be coated with a factory applied two (2) component epoxy system or approved equal. The seating surface shall be machined or otherwise constructed to provide a smooth, even surface for the resilient seat. All valves shall open left (counter clockwise) and have a two (2) inch square wrench nut unless specified otherwise.

W3.09

TAPPING SLEEVES AND TAPPING VALVES

- A. Tapping sleeves shall be of cast iron epoxy coated, designated for working pressure not less than 200 psi. Armored end gaskets shall be provided for the full area of the sleeve flanges. Sleeves shall be as manufactured by A.P. Smith Division of U.S. Pipe, Mueller, Clow, or equal. Nuts and bolts shall be Type 304 stainless steel.
- B. Size-on-Size tapping sleeve shall be ductile iron or cast iron.
- C. Tapping valves shall conform to the requirements specified above for gate valves except that one (1) end shall be flanged and one (1) mechanical. Tapping valves shall be provided with an oversized opening to permit the use of full size cutters. Tapping valves shall be Ford B81-777 or equal.

W3.10

CHECK VALVES

- A. Controlled Closing Swing Check Valves (lever & weight)
1. Check valves shall be of the controlled closing swing type. The controlled closing swing check valves shall be guaranteed to operate under severe conditions as check valves. The valve shall be designed to open smoothly, provide full pipe line flow, permit minimum head loss and close at a controlled rate of speed for the final predetermined portion of its stroke. All bolts and nuts used in the assembly shall be steel, commercial.
  2. The valve body shall be Cast Iron ASTM A126-B/ductile iron ASTM A536. The disc arm and chamber level shall be of heavy steel construction and keyed to the hinge shaft. The hinge shaft shall be of 18-8 stainless steel and of adequate diameter to withstand a complete hydraulic unbalance pressure of 125 psi on the valve disc. A single cushioning device mounted on the external side of the valve shall control the valve closure by way of the interchange of oil to and from an oil reservoir. The use of air or gas pressurized oil reservoir shall not be permitted. The oil plunger assembly shall be rigidly attached to the valve body by shoulder bolts or dowel pins to prevent fretting.
  3. The Manufacturer, if required by the Engineer or the City, shall submit design calculations of principle component stresses to substantiate the integrity of the valve for the working pressure involved.
  4. The valve when closed shall be tight seating by way of a resilient replaceable seat against a bronze seat ring in the body.

5. Valves shall be as manufactured by GA Industries or Series 6000 as manufactured by APCO. The City reserves the right to inspect all valves before shipment is made. Any failure of valves to operate satisfactorily during the first year of installation due to faulty workmanship or defective material shall be replaced and made good by the Manufacturer. Under these specifications, any valve stuffing box that leaks for any reason or because of excessive wear or deterioration of packing, shall be reason for classification as defective material.

B. Slanted / Tilted Check Valves

1. Slanted or tilted check valves shall be furnished and installed where shown on the Plans.
2. The body of the valve shall be ductile iron or cast iron with access ports to the disc. The disc shall be cast iron. The seat and disc rings shall be bronze. Pivot pins and bushings shall be bronze or stainless steel. The valve shall include a localized indicator of the position of the valve.
3. The valves shall include a top mounted oil dash pot to prevent slamming of the disc. The dash pot shall control the last 10% of closure of the disc. The speed of closure within this 10% shall be adjustable.
4. Valves shall be APCO Slanting Disc, Valmatic or Golden Anderson Tilted Disc or approved equal.

W3.11 FLANGES

- A. Flanges shall be cast solid and faced accurately at right angles to the axis of the casting. Dimensions and drilling of flanges shall be in accordance with the American Standard Association for a working pressure of 125 pounds per square inch. Special drilling shall be provided where necessary.

W3.12 FIRE HYDRANTS

- A. Fire hydrants shall be dry-barrel type conforming to the requirements of the latest revision of AWWA C502. Hydrants shall be designed such that the hydrant valve closes with line pressure preventing loss of water and consequent flooding in the event of traffic damage.
- B. Hydrants shall have six (6)-inch mechanical joint inlet connections, two 2½-inch hose connections and one 4½-inch pumper connection. Threads for the hose and pumper connections shall be in accordance with National Standard Thread. Hydrants shall be according to Manufacturer's standard pattern. Hydrants shall be equipped with "O" ring packing. Each nozzle cap shall be provided with a Buna-N rubber washer.
- C. Hydrants shall be so arranged that the direction of outlets may be turned 90 degrees without interference with the drip mechanism or obstructing the discharge from any outlet. The body of the hydrant shall be equipped with a breakable flange, or breakable cast iron flange bolts, just above the grade line.
- D. A bronze or rustproof steel nut and check nut shall be provided to hold the main hydrant valve on its stem.
- E. Hydrant valve opening shall have an area at least equal to that area of a 4½-inch minimum diameter circle and be obstructed only by the valve rod. Each hydrant shall be able to deliver 500 gallons minimum through its two 2½-inch hose nozzles when opened together with a loss of not more than two (2) psi in the hydrant.
- F. Hydrants shall be designed for installation in a trench that will provide minimum cover as noted on Plans and for the flange to be 3 ½-inches above ground surface. Hydrant extensions shall be as manufactured by the company furnishing the hydrants and of a style appropriate for the hydrants as furnished.
- G. Hydrants shall be provided with an automatic and positively operating, non-corrodible drain or drip valve so as to drain the hydrant completely when the main valve is shut. A drain valve operating by

springs or gravity is not acceptable.

- H. Operating stems whose threads are located in the barrel or waterway shall be of manganese bronze, everdur, or other high-quality non-corrodible metal, and all working parts in the waterway shall be bronze to bronze.
- I. Hydrants shall open by turning operating nut to left (counter-clockwise) and shall be marked with a raised arrow and the word "open" to indicate the direction to turn stem to open hydrant.
- J. Hydrants shall be furnished with caps, double galvanized steel hose cap chain, galvanized steel pumper hose cap chain, a galvanized steel chain holder and any other hooks and/or appurtenances required for proper use.
- K. Hydrant operating nut shall be AWWA Standard pentagonal type measuring 1½-inch point to flat.
- L. Hydrants shall be hydrostatically tested as specified in AWWA C502.
- M. Hydrants shall be of the following:
  - 1. Kennedy – K81
  - 3. American Darling – B84B
  - 2. Clow Medallion
- N. All iron work to be set below ground, after being thoroughly cleaned, shall be painted with two (2) coats of asphalt varnish specified in AWWA C502. Iron work to be left above ground shall be factory primed and painted silver using a high grade enamel paint of quality and color to correspond to the present standard of the City.
- O. Fire hydrants shall be installed on the same side of the street or roadway as the water main and shall be installed plumb and true.
- P. Heel and thrust blocks shall be placed in undisturbed soil as shown in the details of the Plans.
- Q. Double blue reflector "HYE – LITES" brand as manufactured by pavement markers ink shall be installed at the centerline of the street or roadway perpendicular to the hydrant.

#### W3.13 CORPORATION STOPS

- A. Corporation stops shall be brass, not less than 1-inch in diameter and shall be installed where shown, specified or required.
- B. Provide corporation stops as manufactured by the following:
  - 1. Ford Company

#### W3.14 COMBINATION AIR-VACUUM RELIEF VALVES

- A. The air-vacuum release valves shall be installed as shown on the Plans. The valve body shall be of cast iron ASTM A126-B; the floats, float guide, and stem shall be of Type 316 stainless steel. The resilient seat shall be of Buna N. The valve shall be suitable for 150 psig working pressure. Valve shall have standard NPT inlets and outlet ports with diameters as indicated on the Plans. Valve shall be Model 200A Series by APCO Valve and Primer Corporation, Schaumburg, IL, or approved equal.

#### W3.15 SURFACE PREPARATION AND SHOP COATINGS

- A. The interior ferrous metal surfaces, except finished or bearing surfaces, shall be blast cleaned in accordance with SSPC SP-6 and painted with two (2) coats of an approved two (2) component coal tar

epoxy coating specifically formulated for potable water use. The coating used must appear on the current edition of the United States Environmental Protection Agency's list entitled "Accepted Categories and Subcategories of Coatings, Liners and Paints for Potable Water Usage."

- B. Exterior ferrous metal surfaces of all buried valves and hydrants shall be blast cleaned in accordance with SSPC SP-6 and given two (2) shop coats of a heavy coat tar enamel or an approved two (2) component coat tar epoxy paint.

W3.16 INSPECTION AND PREPARATION

- A. During installation of all valves and appurtenances, the Contractor shall verify that all items are clean, free of defects in material and workmanship and function properly.
- B. All valves shall be closed and kept closed until otherwise directed by the Engineer or the City.

W3.17 INSTALLATION OF BURIED VALVES AND VALVE BOXES

- A. Buried valves shall be cleaned and manually operated before installation. Buried valves and valve boxes shall be set with the stem vertically aligned in the center of the valve box. Valves shall be set on a firm foundation and supported by tamping pipe bedding material under the sides of the valve. The valve box shall be supported during backfilling and maintained in vertical alignment with the top flush with finish grade. The valve box shall be set so as not to transmit traffic loads to the valve.
- B. Before backfilling, all exposed portions of any bolts shall be coated with two (2) coats of bituminous paint.

W3.18 INSTALLATION OF TAPPING SLEEVES AND VALVES

- A. The City of Georgetown shall be contacted and their permission granted prior to tapping a line. The required procedures and time table shall be followed exactly.
- B. Installation shall be made under pressure and flow shall be maintained. The diameters of the tap shall be a minimum of  $\frac{1}{4}$ -inch less than the inside diameter of the branch line.
- C. The entire operation shall be conducted by workers experienced in the installation of tapping sleeves and valves. The tapping machine shall be furnished by the Contractor.
- D. Determine the location of the line to be tapped to confirm that the proposed location will be satisfactory and that no interference will be encountered such as joints or fittings. No tap or sleeve will be made closer than three (3) feet from a pipe joint.
- E. A tapping sleeve and valve with boxes shall be set squarely centered on the line to be tapped. Adequate support shall be provided under the sleeve and valve during the tapping operation. Thrust blocks or other permanent restraint acceptable to the Engineer and the City shall be provided behind all tapping sleeves. Proper tamping of supporting pipe bedding material around and under the valve and sleeve is mandatory for buried installations.
- F. After completing the tap, the valve shall be flushed to ensure that the valve seat is clean. All proper regulatory procedures (including disinfection) shall be followed exactly.

W3.19 INSTALLATION OF FIRE HYDRANTS

- A. Fire hydrants shall be set at the locations as shown on the Plans and bedded on a firm foundation. Hydrants and connecting pipe shall have at least the same depth of cover as the distributing pipe. A drainage pit as detailed on the Plans shall be filled with  $\frac{3}{4}$ -inch washed rock gravel and compacted. The hydrants shall be set upon a slab of concrete not less than four (4)-inches thick and 15-inches square. During backfilling, additional screened gravel shall be brought up around and six (6) inches over the drain port. Each hydrant shall be set in true vertical alignment and properly braced.

- B. 2,500 psi concrete thrust blocks shall be placed between the back of the hydrant inlet and undisturbed soil at the end of the trench. Minimum bearing area shall be as shown on the Plans. Eight (8) mil. Polyethylene film shall be placed around the hydrant elbow before placing concrete. CARE SHALL BE TAKEN TO ENSURE THAT CONCRETE DOES NOT PLUG THE DRAIN PORTS.
- C. All connections from the main to the fire hydrants shall be anchoring mechanical joints designed to prevent movement due to thrust or pressure.
- D. The hydrant shall be tied to the pipe with suitable rods or clamps, and shall be coated with Koppers 300 or approved equal at a minimum of 8 mil. thick. Bolts shall have a zinc bolt cover per AWWA. Hydrant paint shall be touched up as required after installation.
- E. Fire hydrants shall be factory primed and painted silver using a high grade enamel.
- F. Fire sprinkler lines shall be protected by a reduced pressure zone (RPZ). All fire lines shall be ductile iron pipe. All private fire lines shall be separated by double detecta check.

W3.20

FIELD TESTS AND ADJUSTMENTS

- A. Conduct a functional field test of each valve, including actuators and valve control equipment, in presence of Engineer or the Representative of the City to demonstrate that each part and all components together function correctly. All testing equipment required shall be provided by the Contractor at his/her sole expense.

W3.21

PAYMENT

- A. Gate valves, tapping sleeves and tapping valves, fire hydrants, and air and vacuum relief valves complete in place as shown on the Plans and as specified, will be paid for at the unit contract price per each as provided in the Proposal and Bid Schedule.
- B. The unit price per each installation shall be the total compensation for furnishing all labor, materials, tools, equipment and incidentals necessary to complete the work including excavation, base blocking, disposal of surplus materials and backfill in conformance with the Plans and these specifications. The six (6) inch connection pipe, six (6) inch gate valve, test station, concrete collar, thrust block, drain pit, concrete pad, rods, bolts, paint, protective coatings, and fittings for fire hydrants shall not be paid for separately.
- C. Fire hydrants shall be furnished with the proper length of barrel to comply with these specifications. Barrel extensions will not be measured and paid for separately.
- D. No separate payment shall be made for work performed in accordance with this specification, other than that listed in Parts A-C of this subsection, and the cost thereof shall be included in the proper items of the Proposal and Bid Schedule.

END OF SECTION

TECHNICAL SPECIFICATIONSSECTION C9 – FLOWABLE BACKFILLC9.01 SCOPE OF WORK

- A. This specification covers the requirements for the furnishing and placing of flowable backfill as indicated on the Plans.

C9.02 SUBMITTALS

- A. Within 30 days after the Notice to Proceed, the Contractor shall submit to the Engineer or the City for approval, technical product literature including flowable backfill mix design, curing method, and all other pertinent data to illustrate conformance to the specification found within.

C9.03 CONSTRUCTION METHODS

- A. All trenches to be backfilled shall be properly prepared according to the Plans and Specifications prior to placement of flowable backfill.

C9.04 FLOWABLE BACKFILL

- A. Flowable backfill shall be placed in accordance with the details and to the dimensions shown on the Plans or as established by the City.
- B. The mixture shall consist of 188 pounds of Type III Portland cement, 94 pounds of fly ash and 3,000 pounds of sand per cubic yard of flowable backfill.
- C. The minimum allowable slump for flowable backfill is 6-inches.
- D. Immediately following the placement of flowable backfill, it shall be cured in accordance with Section C1- CONCRETE STRUCTURES.

C9.05 PAYMENT

- A. Payment for flowable backfill shall be subsidiary to the appropriate bid items of the Proposal and Bid Schedule.

END OF SECTION

**Special Provision W1 – Ductile Iron Pipe and Fittings**

Delete and Replace the section W1.17 with the following:

- A. The pipeline, complete in place, including cleanup, will be measured for payment in linear feet along the centerline of the pipe actually installed. Measurement shall be through all fittings, specials, valves, etc., and no deduction in length shall be made for such appurtenances. Installation of the pipeline will be paid for at the unit contract price per linear foot as provided in the Proposal and Bid Schedule.
- B. Payment of the unit contract price for the items of work performed shall be the total compensation for furnishing all labor, materials, tools, equipment and incidentals and performing all work that is necessary for the installation, testing, and sterilization of the pipe, blocking, embedment or placing in encasement pipe and all other appurtenances in accordance with the Plans and the provisions of the Specifications.
- C. Fittings:  
Ductile iron fittings, furnished in accordance with these specifications, will be paid for at the unit price bid per ton, complete in place, according to the schedule of weights in the City of Austin Standard Products List WW-27C. Bolts, glands, and gaskets will not be paid for separately and shall be included in the contract unit price for fittings.
- D. Wet Connections to Potable Water Mains:  
When called for in the bid, wet connections will be paid at the unit price bid per each, complete in place, according to the size of the main that is in service and shall be full compensation for all Work, including labor and materials, required to make the connection and place the pipe in service.
- E. Pressure Connections to Potable Water Mains  
When called for in the bid, pressure connections will be paid at the unit price bid per each, complete in place, according to the size of the main that is in service and shall be full compensation for all Work, including labor and materials, required to make the connection and place the pipe in service.
- F. Abandonment of Pipes, Valves, and Appurtenances:  
The installation of proposed pipeline shall include the abandonment of existing pipe, valves, and appurtenances affected. The existing pipe under roadways are to be cut, capped, and filled with flowable fill. Existing pipes to be abandoned in place and are not under a roadway or driveway, will be capped. Payment is subsidiary to the cost of the installation of the proposed pipeline.

**Special Provision W2 – Polyvinyl Chloride (PVC) Pipe - Water**

Delete and Replace the section W2.10 with the following:

- A. The pipeline, complete in place, including cleanup, will be measured for payment in linear feet along the centerline of the pipe actually installed. Measurement shall be through all fittings, specials, valves, etc., and no deduction in length shall be made for such appurtenances. Installation of the pipeline will be paid for at the unit contract price per linear foot as provided in the Proposal and Bid Schedule.
- B. Payment of the unit contract price for the items of work performed shall be the total compensation for furnishing all labor, materials, tools, equipment and incidentals and performing all work that is necessary for the installation, testing, and sterilization of the pipe, blocking, embedment or placing in encasement pipe and all other appurtenances in accordance with the Plans and the provisions of the Specifications.
- C. Fittings:  
Ductile iron fittings, furnished in accordance with these specifications, will be paid for at the unit price bid per ton, complete in place, according to the schedule of weights in the City of Austin Standard Products List WW-27C. Bolts, glands, and gaskets will not be paid for separately and shall be included in the contract unit price for fittings.
- D. Wet Connections to Potable Water Mains:  
When called for in the bid, wet connections will be paid at the unit price bid per each, complete in place, according to the size of the main that is in service and shall be full compensation for all Work required, including labor and materials, to make the connection and place the pipe in service.
- E. Pressure Connections to Potable Water Mains:  
When called for in the bid, pressure connections will be paid at the unit price bid per each, complete in place, according to the size of the main that is in service and shall be full compensation for all Work required, including labor and materials, to make the connection and place the pipe in service.
- F. Abandonment of Pipes, Valves, and Appurtenances:  
The installation of proposed pipeline shall include the abandonment of existing pipe, valves, and appurtenances affected. The existing pipe under roadways are to be cut, capped, and filled with flowable fill. Existing pipes to be abandoned in place and are not under a roadway or driveway, will be capped. Payment is subsidiary to the cost of the installation of the proposed pipeline.



ESTIMATE OF QUANTITIES SUMMARY  
RIVER RD & OLD WINDMILL RD

ITEM	NO	DESCRIPTION	UNITS	QUANTITY
100	6002	PREPARING ROW	STA	80
100	6017	PREP ROW (TREE) (GREATER THAN 8 IN DIA)	EA	20
110	6001	EXCAVATION (ROADWAY)	CY	3741
110	6002	EXCAVATION (CHANNEL)	CY	226
132	6001	EMBANKMENT (FINAL)(ORD COMP)(TY A)	CY	821
160	6003	FURNISHING AND PLACING TOPSOIL (4")	SY	24626
162	6002	BLOCK SODDING	SY	379
164	6033	DRILL SEEDING (PERM) (RURAL) (SANDY)	SY	24626
166	6001	FERTILIZER	AC	5
168	6001	VEGETATIVE WATERING	MG	959
169	6001	SOIL RETENTION BLANKETS (CL I) (TY A)	SY	7587
247	6041	FL BS (CMP IN PLC)(TYA GR1-2)(FNAL POS	CY	2626
260	6079	LIME TRT (SUBGRADE) (6")	SY	18905
310	6027	PRIME COAT (MC-30 OR AE-P)	GAL	3437
316	6175	AGGR (TY-B GR-4 SAC-B)	CY	300
316	6466	ASPH (CHFRS-2P OR CRS-2P)	GAL	12032
354	6100	PLANE ASPH CONC PAV (5")	SY	18905
432	6002	RIPRAP (CONC)(5 IN)	CY	18
432	6035	RIPRAP (STONE PROTECTION) (24 IN)	CY	350
432	6045	RIPRAP (MOW STRIP) (4 IN)	CY	49
460	6009	CMP AR (GAL STL DES 2)	LF	490
460	6010	CMP AR (GAL STL DES 3)	LF	60
460	6011	CMP AR (GAL STL DES 4)	LF	295
462	6010	CONC BOX CULV (6 FT X 3 FT)	LF	29
464	6017	RC PIPE (CL IV)(18 IN)	LF	49
464	6018	RC PIPE (CL IV)(24 IN)	LF	422
464	6019	RC PIPE (CL IV)(30 IN)	LF	39
464	6020	RC PIPE (CL IV)(36 IN)	LF	40
465	6187	INLET(COMPL)(DROP)(TY 1)(1 GRATE)	EA	1
466	6039	HEADWALL (CH - FW - 30) (DIA= 36 IN)	EA	1
466	6134	HEADWALL (CH - PW - S) (DIA= 36 IN)	EA	1
466	6152	WINGWALL (FW - 0) (HW=5 FT)	EA	1
466	6179	WINGWALL (PW - 1) (HW=4 FT)	EA	1
467	6356	SET (TY II) (18 IN) (RCP) (3: 1) ( C)	EA	4
467	6388	SET (TY II) (24 IN) (RCP) (3: 1) ( C)	EA	8
467	6395	SET (TY II) (24 IN) (RCP) (6: 1) ( P)	EA	1
467	6417	SET (TY II) (30 IN) (RCP) (3: 1) ( C)	EA	2
467	6525	SET (TY II) (DES 2) (CMP) (6: 1) ( P)	EA	32
467	6537	SET (TY II) (DES 3) (CMP) (6: 1) ( P)	EA	4
467	6551	SET (TY II) (DES 4) (CMP) (6: 1) ( P)	EA	4
496	6006	REMOV STR (HEADWALL)	EA	2
496	6007	REMOV STR (PIPE)	LF	300
496	6050	REMOV STR (DRIVEWAY CULVERT)	EA	12
500	6001	MOBILIZATION	LS	1
502	6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3
506	6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	245
506	6011	ROCK FILTER DAMS (REMOVE) (TY 2)	LF	245
506	6020	CONSTRUCTION EXISTS (INSTALL) (TY 1)	SY	333
506	6024	CONSTRUCTION EXISTS (REMOVE)	SY	333
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	6729
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	6729
530	6006	DRIVEWAYS (SURF TREAT)	SY	2690
540	6001	MTL W-BEAM GD FEN (TIM POST)	LF	1000
540	6014	SHORT RADIUS	LF	25
540	2005	TERMINAL ANCHOR SECTION	EA	8
560	6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	57
UNFORSEEN WATER LINE ITEMS (from Cobb Fendley)				
W2.10.A.6"		Pipe, 6" Dia. PVC Water, Complete in Place, Including Excavation and Backfill	LF	800
W2.10.AR.6"		Pipe, 6" Dia. PVC Water (Restrained), Complete in Place, Including Excavation and Backfill	LF	200
W1.17.A		Ductile Iron Fittings	TON	2
W1.17.B6x6		Wet Connection, 6"x6" Dia.	EA	6
CIP11.06.B		Trench Excavation Safety Protection System (All Depths)	LF	1200
W2.10.A2		Pipe, 2" Dia. SDR-9 PE, New Service Line	LF	100
W3.21.A6		Valves, Gate 6" Dia.	EA	3
W3.21.ARV2		Air Release Valve, 2"	EA	2
W3.21.B		Fire Hydrant Assembly	EA	2
W-04		Reconnect single service connections, incl. new meters per detail W-04	EA	10



*Kelly G. Morrelli*  
8/8/17

ND.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> DEPT. OF INFRASTRUCTURE 1848			
<b>RIVER RD &amp; OLD WINDMILL RD</b> ESTIMATE OF QUANTITIES SUMMARY			
Designed: <u>KGM</u>	3151 S.E. INNER LOOP, SUITE B		SHEET NO.
Checked: <u>KOK</u>	GEORGETOWN, TEXAS 78626		<b>2</b>
Drawn: <u>KGM</u>	943-3330		
Checked: <u>KOK</u>	www.wilco.org		

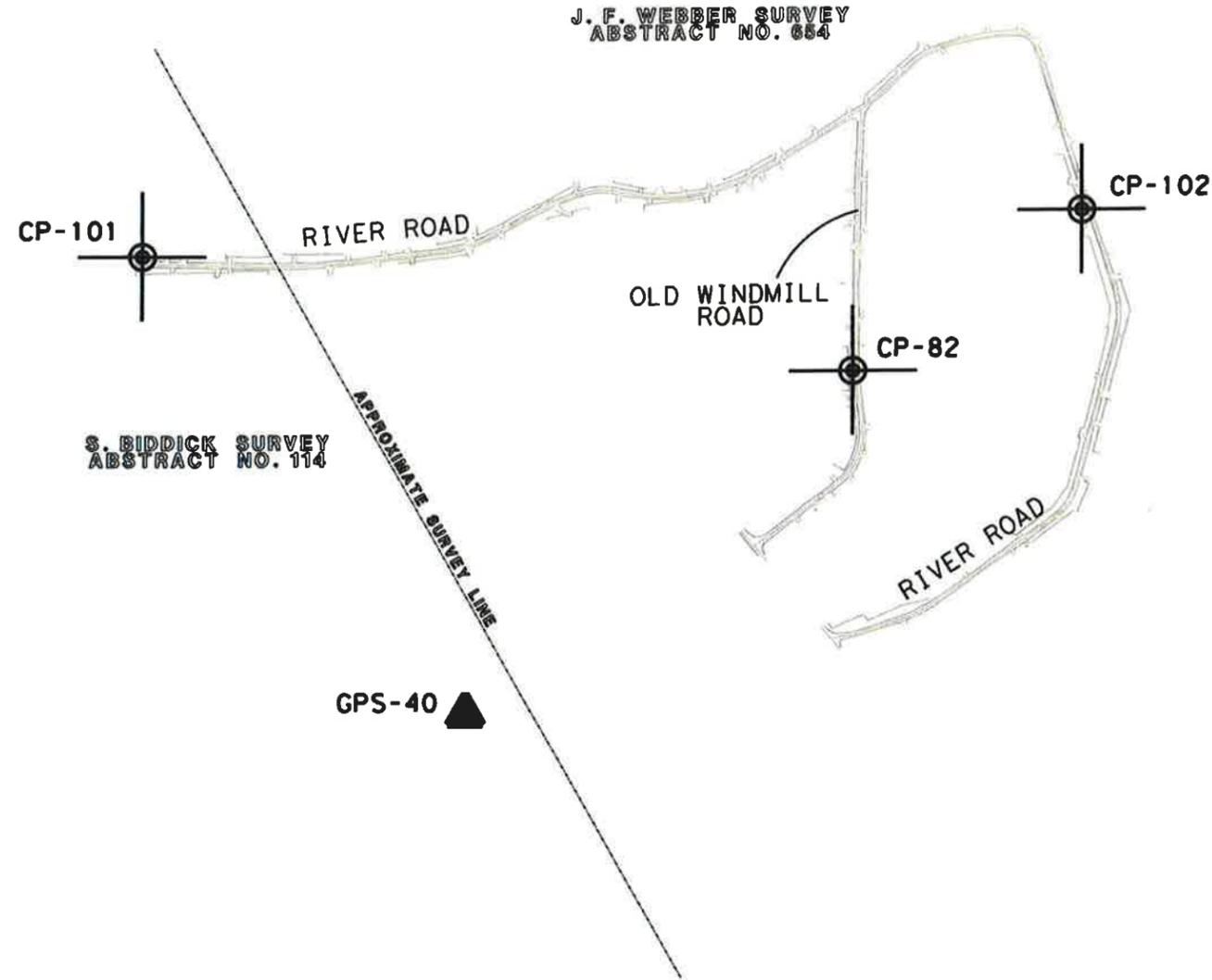
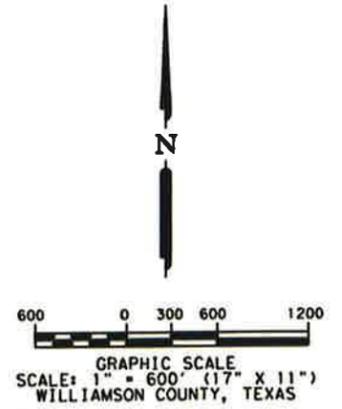
RIVER OLD WINDMILL\_EST OF QTY.dgn  
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PROJECT CONTROL HORIZONTAL AND VERTICAL VALUES  
GRID COORDINATES

Point	North	East	Elevation	Description
40	10233276.43	3058281.76	902.36'	GPS-TYPE II MONUMENT FOUND
82	10234472.27	3059650.82	927.14'	5/8" IR W/WILLIAMSON COUNTY CAP FND
101	10234883.70	3057132.69	960.14'	5/8" IR W/PLASTIC SAM CAP SET
102	10235031.52	3060462.36	891.32'	5/8" IR W/PLASTIC SAM CAP SET

PROJECT CONTROL HORIZONTAL AND VERTICAL VALUES  
SURFACE COORDINATES

Point	North	East	Elevation	Description
40	10234763.34	3058726.13	902.36'	GPS-TYPE II MONUMENT FOUND
82	10235959.35	3060095.39	927.29'	5/8" IR W/WILLIAMSON COUNTY CAP FND
101	10236370.84	3057576.89	960.14'	5/8" IR W/PLASTIC SAM CAP SET
102	10236518.68	3060907.05	891.32'	5/8" IR W/PLASTIC SAM CAP SET



NOTES:

1. ALL PROJECT COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NAD 83(2011) EPOCH 2010.00/NAVD 88. ALL COORDINATES SHOWN HEREON ARE ADJUSTED TO SURFACE BY USING A COMBINED SCALE FACTOR OF 0.99985472 AS PROVIDED BY WILLIAMSON COUNTY. UNITS: U.S. SURVEY FEET
2. ELEVATIONS WERE DERIVED FROM GPS OBSERVATIONS USING GEOID 3 (CONUS) AND VERIFIED WITH DIFFERENTIAL LEVEL RUNS STARTING AT "GPS 40" "2007-40" WILLIAMSON COUNTY GPS MONUMENT ELEVATION: 902.36'. UNITS: U.S. SURVEY FEET
3. PERFORMING A SITE CALIBRATION/LOCALIZATION SHOULD ALWAYS BE DONE WHEN UTILIZING THE CONTROL SHOWN HEREON.

Survey Date: NOVEMBER, 2016



CONTROL INDEX SHEET

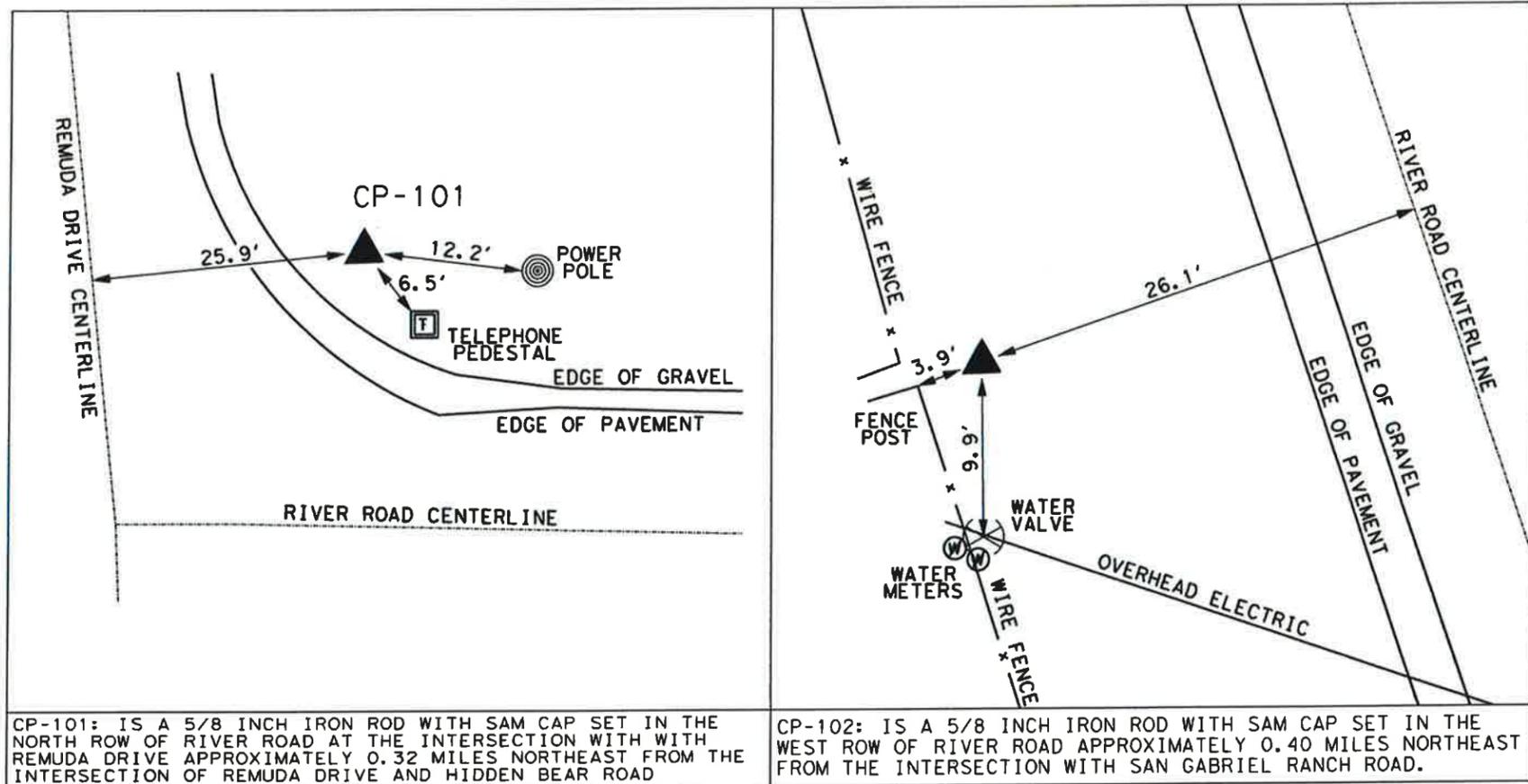
1 OF 2

SAN GABRIEL RANCH	WILLIAMSON COUNTY PROJECT NO.	SHEET NO.
		1
STATE	DISTRICT	COUNTY
TEXAS		WILLIAMSON
CONTROL	SECTION	JOB
		25093
		FIELD BOOK NO.:
		RIVER ROAD

RIVER ROAD - SAN GABRIEL RANCH  
WILLIAMSON COUNTY  
SAM JOB No. 37470  
DATE: FEBRUARY, 2017  
FIELD BOOK NO.: 25093

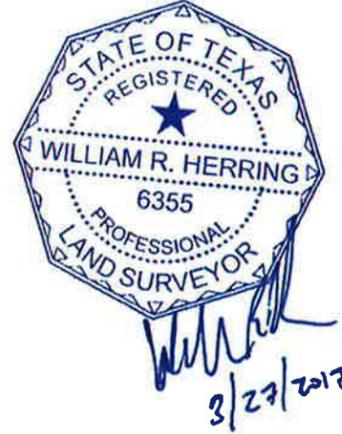


NOT TO SCALE  
WILLIAMSON COUNTY, TEXAS



CP-101: IS A 5/8 INCH IRON ROD WITH SAM CAP SET IN THE NORTH ROW OF RIVER ROAD AT THE INTERSECTION WITH WITH REMUDA DRIVE APPROXIMATELY 0.32 MILES NORTHEAST FROM THE INTERSECTION OF REMUDA DRIVE AND HIDDEN BEAR ROAD

CP-102: IS A 5/8 INCH IRON ROD WITH SAM CAP SET IN THE WEST ROW OF RIVER ROAD APPROXIMATELY 0.40 MILES NORTHEAST FROM THE INTERSECTION WITH SAN GABRIEL RANCH ROAD.



NOTES:

1. ALL PROJECT COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NAD 83 (2011) EPOCH 2010.00/NAVD 88. ALL COORDINATES SHOWN HEREON ARE ADJUSTED TO SURFACE BY USING A COMBINED SCALE FACTOR OF 0.99985472 AS PROVIDED BY WILLIAMSON COUNTY. UNITS: U. S. SURVEY FEET
2. ELEVATIONS WERE DERIVED FROM GPS OBSERVATIONS USING GEOID 3 (CONUS) AND VERIFIED WITH DIFFERENTIAL LEVEL RUNS STARTING AT "GPS 40" "2007-40" WILLIAMSON COUNTY GPS MONUMENT ELEVATION: 902.36'. UNITS: U. S. SURVEY FEET
3. PERFORMING A SITE CALIBRATION/LOCALIZATION SHOULD ALWAYS BE DONE WHEN UTILIZING THE CONTROL SHOWN HEREON.

Survey Date: NOVEMBER, 2016

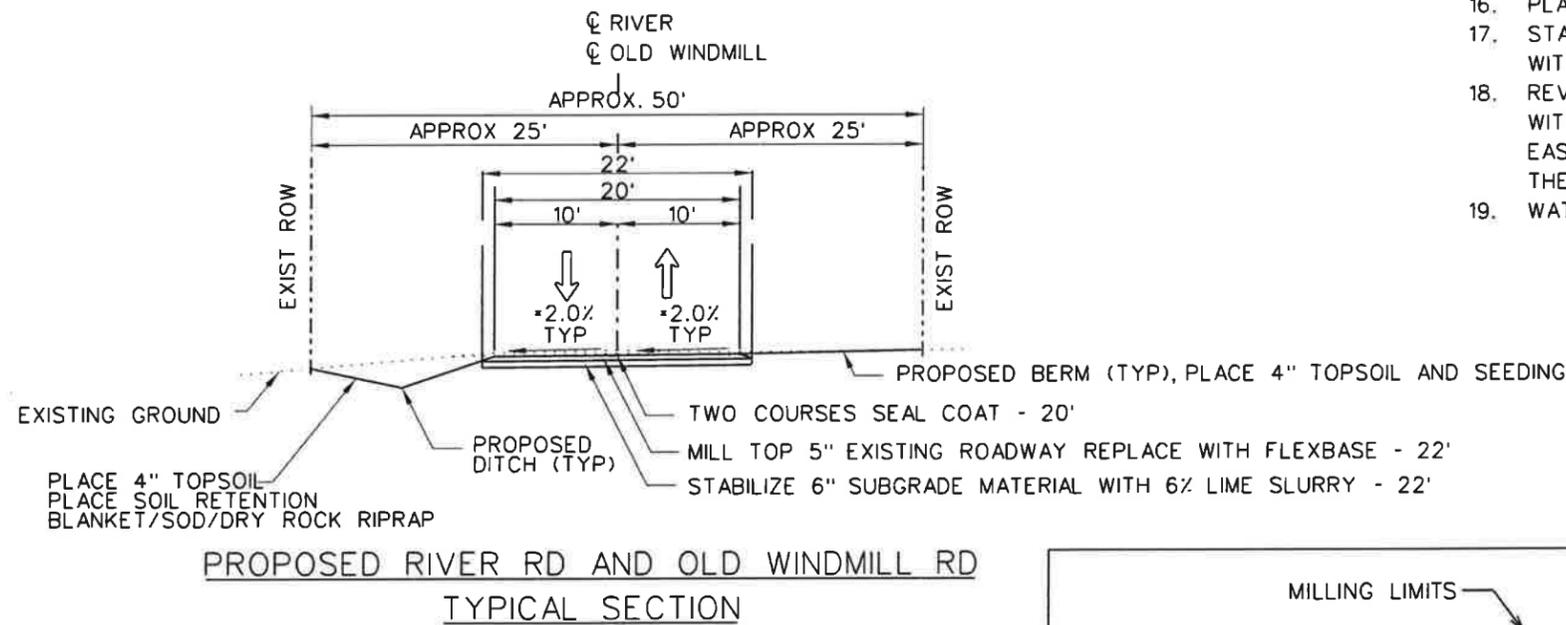
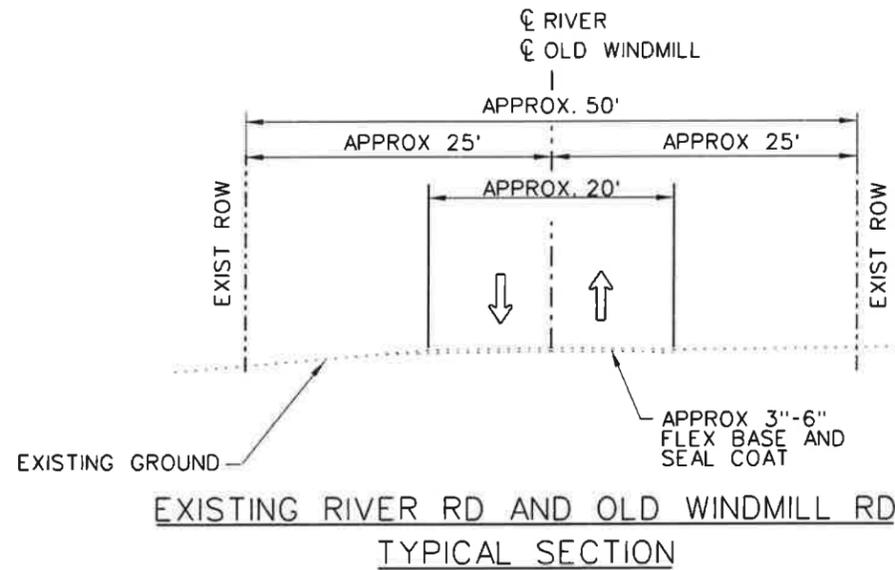


HORIZONTAL AND VERTICAL SURVEY CONTROL SHEETS

2 OF 2

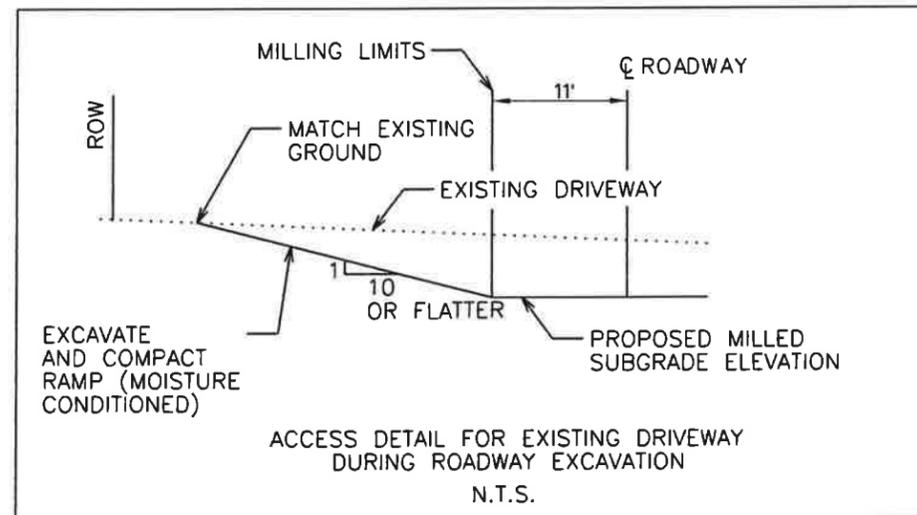
SAN GABRIEL RANCH		WILLIAMSON COUNTY PROJECT NO.		SHEET NO.	
				2	
STATE	DISTRICT	COUNTY			
TEXAS		WILLIAMSON			
CONTROL	SECTION	JOB	HIGHWAY NO.		
			RIVER ROAD		

RIVER ROAD - SAN GABRIEL RANCH  
WILLIAMSON COUNTY  
SAM JOB No. 37470  
DATE: FEBRUARY, 2017  
FIELD BOOK NO.: 25093



\*NORMAL CROWN ON RIVER RD  
 STA 36+50 - STA 39+40  
 STA 57+60 - STA 62+60  
 STA 64+90 - STA 68+40  
 STA 73+00 - STA 73+36.06

NOTE: SEE CROSS SECTIONS FOR MORE INFORMATION



SEQUENCE OF CONSTRUCTION:

1. PLACE SIGNING WITHIN PROJECT LIMITS ACCORDING TO BC (2)-14.
2. REROUTE TRAFFIC THROUGH DETOUR AS SHOWN IN THE PLANS.
3. POST TCEQ LARGE CONSTRUCTION SITE NOTICE AND INSTALL RAIN GAUGE.
4. PLACE TEMPORARY EROSION CONTROL DEVICES AS SHOWN IN THE PLANS, AND AS DIRECTED BY THE ENGINEER, PRIOR TO BEGINNING ANY OTHER WORK.
5. CLEAR AND GRUB ROW AND STOCKPILE TOPSOIL.
6. CUT DITCHES TO FINAL GRADE.
7. INSTALL DRAINAGE CULVERTS AND HEADWALLS.
8. MILL EXISTING ROADWAY TO PROPOSED SUBGRADE ELEVATION. THIS WORK SHALL ONLY BE PERFORMED IN 1,500 FT SECTIONS AT A TIME.
9. RAMP EXISTING DRIVEWAYS AT 10:1 SLOPES OR FLATTER ACCORDING TO DETAIL IN PLANS. CONTRACTOR SHALL PROVIDE DRAINAGE OUTFALL TO THE DITCH AT PONDING AREAS.
10. STABILIZE SUBGRADE WITH 6% LIME SLURRY. ONCE LIME IS CURED, PLACE AND PROOF-ROLL 1" OF ROADWAY BASE AS A TEMPORARY RIDING SURFACE FOR TRAFFIC IN 1,500 FT SECTION; CONTRACTOR MAY BEGIN MILLING ON NEXT 1,500 FT SECTION.
11. PLACE ROADWAY BASE AT FINAL GRADE.
12. REGRADE ROADSIDE DITCHES AND PLACE TOPSOIL (4" DEPTH).
13. INSTALL CONCRETE AND DRY ROCK RIPRAP AT CULVERT ENDS AND SPECIFIED SLOPES.
14. APPLY PRIME COAT.
15. APPLY TWO COURSES SEAL COAT.
16. PLACE ROADSIDE SIGNAGE AND PAVEMENT MARKINGS, IF REQUIRED.
17. STABILIZE BARE AREAS AND STOCKPILE AREAS WITH TEMPORARY SEEDING WITHIN 14 DAYS OF LAST CONSTRUCTION ACTIVITY IN THE AREAS.
18. REVEGETATE ALL DISTURBED AREAS, INCLUDING TEMPORARY SEEDING, WITHIN THE ROW, DRAINAGE EASEMENTS, AND TEMPORARY CONSTRUCTION EASEMENTS WITH PERMANENT SEEDING UNLESS SEASON DICTATES THE USE OF TEMPORARY SEEDING.
19. WATER REVEGETATED AREAS UNTIL GRASS IS ESTABLISHED.



*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE
 WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE 1848			
RIVER RD & OLD WINDMILL RD CONSTRUCTION NOTES & TYPICAL SECTIONS			
Designed: KGM	KGM	3151 S.E. INNER LOOP, SUITE B	
Checked: KOK	KOK	GEORGETOWN, TEXAS 78626	
Drawn: KGM	KGM	943-3330	
Checked: KOK	KOK	www.wilco.org	
SHEET NO.			5

RIVER OLD WINDMILL\_TYFSEC01.dgn  
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Chain RIVER contains:  
RIVER1 CUR RIVER\_3 CUR RIVER\_6 CUR RIVER\_9 CUR RIVER\_12 CUR RIVER\_15 CUR RIVER\_18 CUR RIVER\_21 CUR RIVER\_24 CUR RIVER\_27 CUR RIVER\_30 RIVER32

Beginning chain RIVER description

Point RIVER1 N 10,236,350.0550 E 3,057,257.6433 Sta 10+00.00

Course from RIVER1 to PC RIVER\_3 S 89° 02' 37.71" E Dist 818.7576

Curve Data

Curve RIVER\_3  
P.I. Station = 19+45.50 N 10,236,334.2765 E 3,058,203.0134  
Delta = 8° 03' 19.77" (LT)  
Degree = 3° 10' 59.16"  
Tangent = 126.7442  
Length = 253.0707  
Radius = 1,800.0000  
External = 4.4567  
Long Chord = 252.8623  
Mid. Ord. = 4.4457  
P.C. Station = 18+18.76 N 10,236,336.3916 E 3,058,075.2869  
P.T. Station = 20+71.83 N 10,236,349.9407 E 3,058,328.7859  
C.C. = N 10,238,136.1409 E 3,058,106.3251  
Back = S 89° 02' 37.71" E  
Ahead = N 82° 54' 02.52" E  
Chord Bear = N 86° 55' 42.40" E

Course from PT RIVER\_3 to PC RIVER\_6 N 82° 54' 02.52" E Dist 353.8479

Curve Data

Curve RIVER\_6  
P.I. Station = 24+86.72 N 10,236,401.2173 E 3,058,740.4996  
Delta = 19° 47' 16.28" (LT)  
Degree = 16° 22' 12.80"  
Tangent = 61.0466  
Length = 120.8771  
Radius = 350.0000  
External = 5.2839  
Long Chord = 120.2773  
Mid. Ord. = 5.2054  
P.C. Station = 24+25.68 N 10,236,393.6726 E 3,058,679.9211  
P.T. Station = 25+46.55 N 10,236,428.8247 E 3,058,794.9469  
C.C. = N 10,236,740.9893 E 3,058,636.6648  
Back = N 82° 54' 02.52" E  
Ahead = N 63° 06' 46.24" E  
Chord Bear = N 73° 00' 24.38" E

Course from PT RIVER\_6 to PC RIVER\_9 N 63° 06' 46.24" E Dist 268.0178

Curve Data

Curve RIVER\_9  
P.I. Station = 29+37.98 N 10,236,605.8402 E 3,059,144.0577  
Delta = 34° 17' 29.92" (RT)  
Degree = 14° 19' 26.20"  
Tangent = 123.4063  
Length = 239.4008  
Radius = 400.0000  
External = 18.6038  
Long Chord = 235.8437  
Mid. Ord. = 17.7770  
P.C. Station = 28+14.57 N 10,236,550.0316 E 3,059,033.9917  
P.T. Station = 30+53.97 N 10,236,589.9365 E 3,059,266.4349  
C.C. = N 10,236,193.2720 E 3,059,214.8856  
Back = N 63° 06' 46.24" E  
Ahead = S 82° 35' 43.83" E  
Chord Bear = N 80° 15' 31.21" E

Course from PT RIVER\_9 to PC RIVER\_12 S 82° 35' 43.83" E Dist 70.7823

Curve Data

Curve RIVER\_12  
P.I. Station = 33+68.53 N 10,236,549.3986 E 3,059,578.3677  
Delta = 38° 24' 04.04" (LT)  
Degree = 8° 11' 06.40"  
Tangent = 243.7735  
Length = 469.1582  
Radius = 700.0000  
External = 41.2324  
Long Chord = 460.4263  
Mid. Ord. = 38.9388  
P.C. Station = 31+24.75 N 10,236,580.8145 E 3,059,336.6270  
P.T. Station = 35+93.91 N 10,236,674.9389 E 3,059,787.3297  
C.C. = N 10,237,274.9772 E 3,059,426.8383  
Back = S 82° 35' 43.83" E  
Ahead = N 59° 00' 12.12" E  
Chord Bear = N 78° 12' 14.15" E

Course from PT RIVER\_12 to PC RIVER\_15 N 59° 00' 12.12" E Dist 345.2183

Curve Data

Curve RIVER\_15  
P.I. Station = 40+08.83 N 10,236,888.6156 E 3,060,142.9947  
Delta = 11° 22' 19.92" (LT)  
Degree = 8° 11' 06.40"  
Tangent = 69.6978  
Length = 138.9376  
Radius = 700.0000  
External = 3.4613  
Long Chord = 138.7097  
Mid. Ord. = 3.4443  
P.C. Station = 39+39.13 N 10,236,852.7221 E 3,060,083.2500  
P.T. Station = 40+78.07 N 10,236,935.5850 E 3,060,194.4890  
C.C. = N 10,237,452.7604 E 3,059,722.7586  
Back = N 59° 00' 12.12" E  
Ahead = N 47° 37' 52.20" E  
Chord Bear = N 53° 19' 02.16" E

Course from PT RIVER\_15 to PC RIVER\_18 N 47° 37' 52.20" E Dist 115.1845

Curve Data

Curve RIVER\_18  
P.I. Station = 43+30.64 N 10,237,105.7938 E 3,060,381.0953  
Delta = 36° 13' 38.51" (RT)  
Degree = 13° 38' 30.67"  
Tangent = 137.3882  
Length = 265.5604  
Radius = 420.0000  
External = 21.8999  
Long Chord = 261.1589  
Mid. Ord. = 20.8146  
P.C. Station = 41+93.25 N 10,237,013.2079 E 3,060,279.5898  
P.T. Station = 44+58.81 N 10,237,120.4921 E 3,060,517.6949  
C.C. = N 10,236,702.9026 E 3,060,562.6281  
Back = N 47° 37' 52.20" E  
Ahead = N 83° 51' 30.71" E  
Chord Bear = N 65° 44' 41.46" E

Course from PT RIVER\_18 to PC RIVER\_21 N 83° 51' 30.71" E Dist 123.8053



*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> DEPT. OF <b>WILLIAMSON COUNTY</b> INFRASTRUCTURE 1818			
<b>RIVER RD</b> <b>HORIZONTAL ALIGNMENT DATA</b>			
Designed:	KGM	3151 S E INNER LOOP, SUITE B	SHEET NO.
Checked:	KOK	GEORGETOWN, TEXAS 78626	6
Drawn:	KGM	943-3330	
Checked:	KOK	www.wilco.org	

RIVER\_HORIZ ALIGN DATA.dgn  
10/31/2017 10:35:23 AM

Curve Data

Curve RIVER\_21  
 P.I. Station = 46+71.60 N 10,237,143.2565 E 3,060,729.2568  
 Delta = 77° 56' 16.94" (RT)  
 Degree = 52° 05' 13.46"  
 Tangent = 88.9778  
 Length = 149.6303  
 Radius = 110.0000  
 External = 31.4816  
 Long Chord = 138.3580  
 Mid. Ord. = 24.4765  
 P.C. Station = 45+82.62 N 10,237,133.7373 E 3,060,640.7897  
 P.T. Station = 47+32.25 N 10,237,058.7317 E 3,060,757.0528  
 C.C. = N 10,237,024.3686 E 3,060,652.5579  
 Back = N 83° 51' 30.71" E  
 Ahead = S 18° 12' 12.35" E  
 Chord Bear = S 57° 10' 20.82" E

Course from PT RIVER\_21 to PC RIVER\_24 S 18° 12' 12.35" E Dist 854.8893

Curve Data

Curve RIVER\_24  
 P.I. Station = 56+76.35 N 10,236,161.8822 E 3,061,051.9814  
 Delta = 33° 07' 16.05" (RT)  
 Degree = 19° 05' 54.94"  
 Tangent = 89.2091  
 Length = 173.4218  
 Radius = 300.0000  
 External = 12.9828  
 Long Chord = 171.0172  
 Mid. Ord. = 12.4443  
 P.C. Station = 55+87.14 N 10,236,246.6267 E 3,061,024.1132  
 P.T. Station = 57+60.56 N 10,236,075.6798 E 3,061,029.0162  
 C.C. = N 10,236,152.9092 E 3,060,739.1272  
 Back = S 18° 12' 12.35" E  
 Ahead = S 14° 55' 03.71" W  
 Chord Bear = S 1° 38' 34.32" E

Course from PT RIVER\_24 to PC RIVER\_27 S 14° 55' 03.71" W Dist 539.3666

Curve Data

Curve RIVER\_27  
 P.I. Station = 63+76.49 N 10,235,480.5078 E 3,060,870.4563  
 Delta = 40° 03' 46.47" (RT)  
 Degree = 27° 17' 01.34"  
 Tangent = 76.5643  
 Length = 146.8382  
 Radius = 210.0000  
 External = 13.5220  
 Long Chord = 143.8651  
 Mid. Ord. = 12.7040  
 P.C. Station = 62+99.93 N 10,235,554.4917 E 3,060,890.1663  
 P.T. Station = 64+46.76 N 10,235,436.5711 E 3,060,807.7533  
 C.C. = N 10,235,608.5522 E 3,060,687.2440  
 Back = S 14° 55' 03.71" W  
 Ahead = S 54° 58' 50.17" W  
 Chord Bear = S 34° 56' 56.94" W

Course from PT RIVER\_27 to PC RIVER\_30 S 54° 58' 50.17" W Dist 426.6919

Curve Data

Curve RIVER\_30  
 P.I. Station = 70+50.05 N 10,235,090.3748 E 3,060,313.6899  
 Delta = 21° 03' 37.94" (RT)  
 Degree = 6° 01' 52.08"  
 Tangent = 176.5913  
 Length = 349.1970  
 Radius = 950.0000  
 External = 16.2735  
 Long Chord = 347.2344  
 Mid. Ord. = 15.9994  
 P.C. Station = 68+73.46 N 10,235,191.7124 E 3,060,458.3107  
 P.T. Station = 72+22.65 N 10,235,047.7766 E 3,060,142.3135  
 C.C. = N 10,235,969.7223 E 3,059,913.1497  
 Back = S 54° 58' 50.17" W  
 Ahead = S 76° 02' 28.12" W  
 Chord Bear = S 65° 30' 39.15" W

Course from PT RIVER\_30 to RIVER32 S 76° 02' 28.12" W Dist 275.9742

Point RIVER32 N 10,234,981.2047 E 3,059,874.4890 Sta 74+98.63

Ending chain RIVER description



*Kelly G. Morrelli*  
 8/7/17

NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> DEPT. OF INFRASTRUCTURE			
<b>RIVER RD</b> <b>HORIZONTAL ALIGNMENT DATA</b>			
Designed: <u>KGM</u>	3151 S.E. INNER LOOP, SUITE B		SHEET NO.
Checked: <u>KOK</u>	GEORGETOWN, TEXAS 78626		7
Drawn: <u>KGM</u>	943-3330		
Checked: <u>KOK</u>	www.wilco.org		

RIVER\_HORIZ\_ALIGN\_DATA\_02.dgn  
7/12/2017 10:36:37 AM

Chain WINDMILL contains:  
10 CUR WINDMILL1 CUR WINDMILL2 11

Beginning chain WINDMILL description

Point 10 N 10,237,050.5943 E 3,060,128.2276 Sta 10+00.00

Course from 10 to PC WINDMILL1 S 1' 13' 55.51" W Dist 966.9690

Curve Data

Curve WINDMILL1  
P.I. Station = 20+42.47 N 10,236,008.3663 E 3,060,105.8121  
Delta = 7' 12' 00.82" (LT)  
Degree = 4' 46' 28.73"  
Tangent = 75.5000  
Length = 150.8012  
Radius = 1,200.0000  
External = 2.3728  
Long Chord = 150.7020  
Mid. Ord. = 2.3681  
P.C. Station = 19+66.97 N 10,236,083.8488 E 3,060,107.4355  
P.T. Station = 21+17.77 N 10,235,933.2755 E 3,060,113.6623  
C.C. = N 10,236,058.0461 E 3,061,307.1581  
Back = S 1' 13' 55.51" W  
Ahead = S 5' 58' 05.31" E  
Chord Bear = S 2' 22' 04.90" E

Course from PT WINDMILL1 to PC WINDMILL2 S 5' 58' 05.31" E Dist 180.5643

Curve Data

Curve WINDMILL2  
P.I. Station = 24+11.05 N 10,235,641.5812 E 3,060,144.1566  
Delta = 58' 48' 39.78" (RT)  
Degree = 28' 38' 52.40"  
Tangent = 112.7196  
Length = 205.2893  
Radius = 200.0000  
External = 29.5772  
Long Chord = 196.3951  
Mid. Ord. = 25.7667  
P.C. Station = 22+98.33 N 10,235,753.6899 E 3,060,132.4365  
P.T. Station = 25+03.62 N 10,235,573.4983 E 3,060,054.3210  
C.C. = N 10,235,732.8948 E 3,059,933.5205  
Back = S 5' 58' 05.31" E  
Ahead = S 52' 50' 34.47" W  
Chord Bear = S 23' 26' 14.58" W

Course from PT WINDMILL2 to 11 S 52' 50' 34.47" W Dist 443.8601

Point 11 N 10,235,305.4057 E 3,059,700.5723 Sta 29+47.48

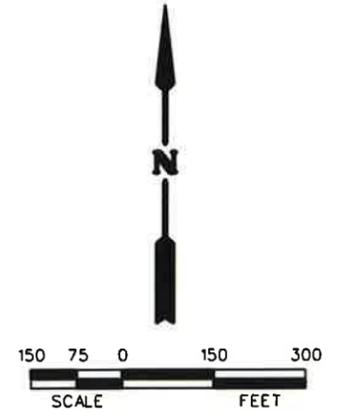
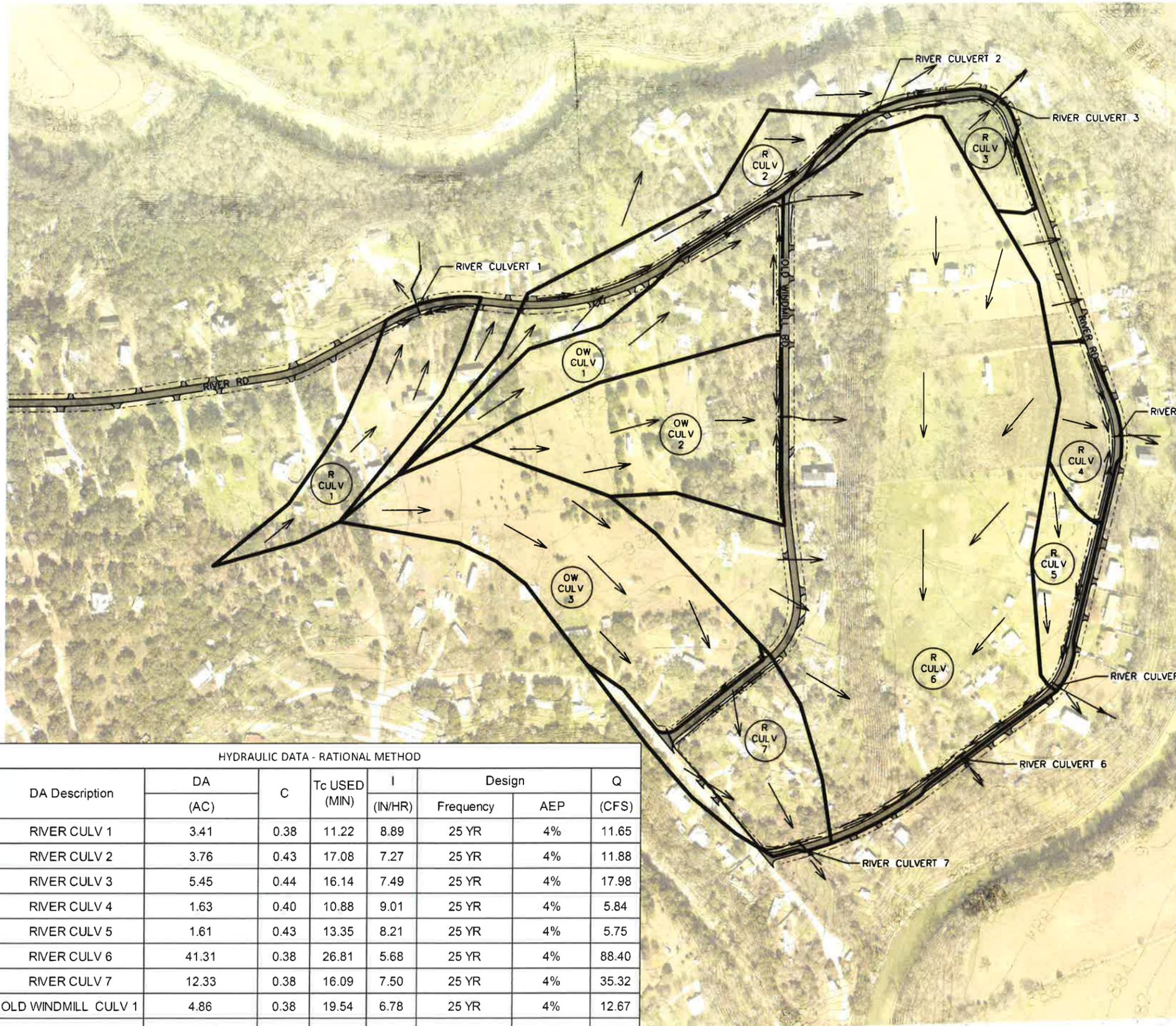
Ending chain WINDMILL description



*Kelly G. Morrelli*  
*8/7/17*

NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> DEPT. OF <b>WILLIAMSON COUNTY</b> INFRASTRUCTURE <small>IRIS</small>			
<b>OLD WINDMILL RD</b> <b>HORIZONTAL ALIGNMENT DATA</b>			
Designed:	KGM	3151 S.E. INNER LOOP, SUITE B	
Checked:	KOK	GEORGETOWN, TEXAS 78626	
Drawn:	KGM	943-3330	
Checked:	KOK	www.wilco.org	
			SHEET NO. <b>8</b>

OLD WINDMILL - HORZ ALIGN DATA\_01.dgn 7/12/2017 10:37:47 AM



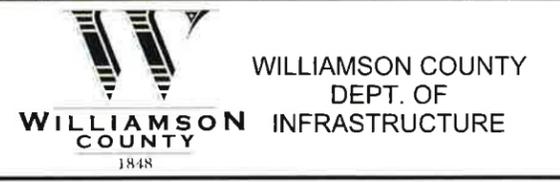
- LEGEND**
- XXX DRAINAGE AREA LABEL
  - DRAINAGE FLOW
  - DITCH FLOW LINE
  - DRAINAGE BOUNDARY

- NOTES:**
1. FLOWS DETERMINED USING RATIONAL METHOD UNLESS OTHERWISE NOTED.
  2. COMPUTATIONS ARE BASED ON TXDOT HYDRAULIC MANUAL USING RAINFALL COEFFICIENTS FOR WILLIAMSON COUNTY.



*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE

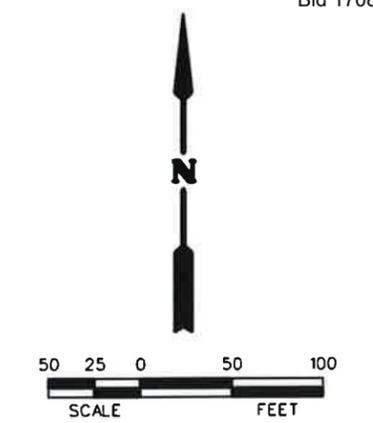
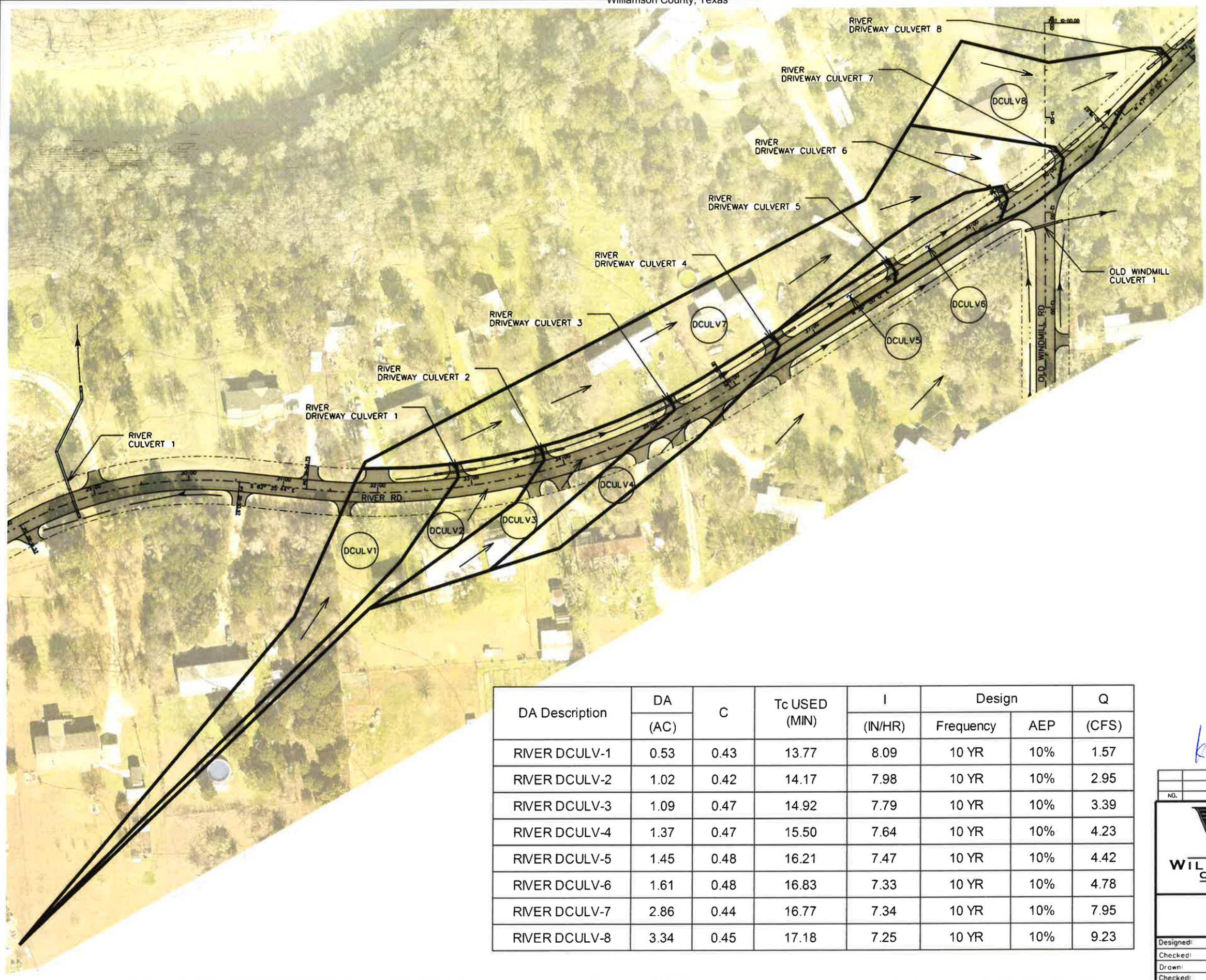


**RIVER RD AND OLD WINDMILL RD  
EXTERNAL DRAINAGE AREA MAP**

Designed: <b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>9</b>
Checked: <b>KQK</b>		
Drawn: <b>KGM</b>		
Checked: <b>KQK</b>		

HYDRAULIC DATA - RATIONAL METHOD							
DA Description	DA (AC)	C	Tc USED (MIN)	I (IN/HR)	Design		Q (CFS)
					Frequency	AEP	
RIVER CULV 1	3.41	0.38	11.22	8.89	25 YR	4%	11.65
RIVER CULV 2	3.76	0.43	17.08	7.27	25 YR	4%	11.88
RIVER CULV 3	5.45	0.44	16.14	7.49	25 YR	4%	17.98
RIVER CULV 4	1.63	0.40	10.88	9.01	25 YR	4%	5.84
RIVER CULV 5	1.61	0.43	13.35	8.21	25 YR	4%	5.75
RIVER CULV 6	41.31	0.38	26.81	5.68	25 YR	4%	88.40
RIVER CULV 7	12.33	0.38	16.09	7.50	25 YR	4%	35.32
OLD WINDMILL CULV 1	4.86	0.38	19.54	6.78	25 YR	4%	12.67
OLD WINDMILL CULV 2	6.09	0.36	15.19	7.72	25 YR	4%	16.75
OLD WINDMILL CULV 3	8.40	0.36	14.53	7.89	25 YR	4%	23.73

RIVER OLD WINDMILL EXT DA MAP.dgn  
 7/12/2017 4:32:36 PM  
 8/10/2017 9:17 AM



- LEGEND**
- XXX DRAINAGE AREA LABEL
  - ← DRAINAGE FLOW
  - DITCH FLOW LINE
  - DRAINAGE BOUNDARY

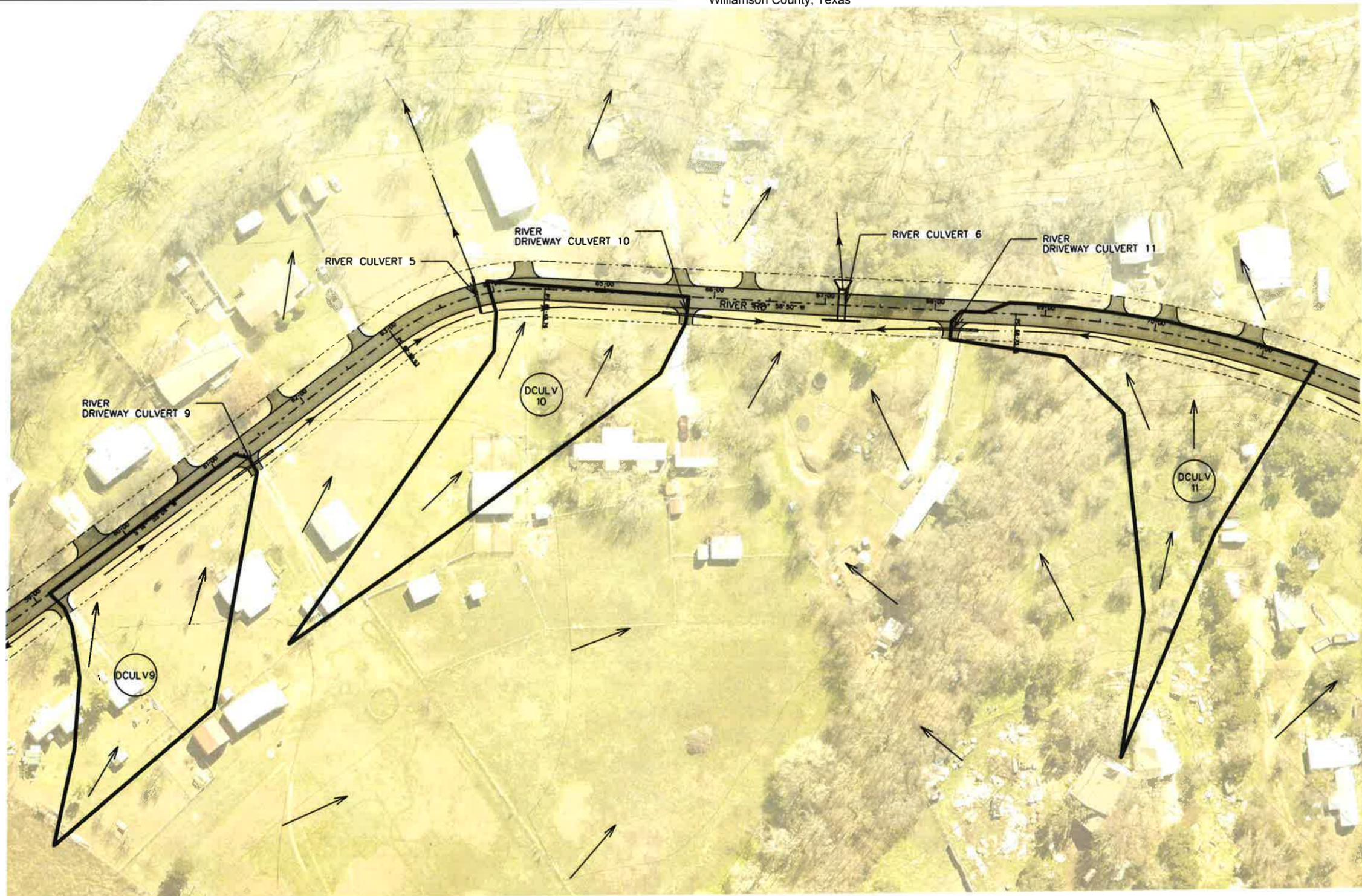
- NOTES:**
1. FLOWS DETERMINED USING RATIONAL METHOD UNLESS OTHERWISE NOTED.
  2. COMPUTATIONS ARE BASED ON TXDOT HYDRAULIC MANUAL USING RAINFALL COEFFICIENTS FOR WILLIAMSON COUNTY.

DA Description	DA (AC)	C	Tc USED (MIN)	I (IN/HR)	Design		Q (CFS)
					Frequency	AEP	
RIVER DCULV-1	0.53	0.43	13.77	8.09	10 YR	10%	1.57
RIVER DCULV-2	1.02	0.42	14.17	7.98	10 YR	10%	2.95
RIVER DCULV-3	1.09	0.47	14.92	7.79	10 YR	10%	3.39
RIVER DCULV-4	1.37	0.47	15.50	7.64	10 YR	10%	4.23
RIVER DCULV-5	1.45	0.48	16.21	7.47	10 YR	10%	4.42
RIVER DCULV-6	1.61	0.48	16.83	7.33	10 YR	10%	4.78
RIVER DCULV-7	2.86	0.44	16.77	7.34	10 YR	10%	7.95
RIVER DCULV-8	3.34	0.45	17.18	7.25	10 YR	10%	9.23



NO.	REVISION	BY	DATE
<b>WILLIAMSON COUNTY</b> 1848			
WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE			
<b>RIVER RD</b> INTERNAL DRAINAGE AREA MAP			
Designed: <b>KGM</b>	3151 S.E. INNER LOOP, SUITE B		SHEET NO.
Checked: <b>KQK</b>	GEORGETOWN, TEXAS 78626		<b>10</b>
Drawn: <b>KGM</b>	943-3330		
Checked: <b>KQK</b>	www.wilco.org		

RIVER\_INT\_DA\_MAP\_01.dgn 8/12/2017 4:34:52 PM



- LEGEND**
- XXX DRAINAGE AREA LABEL
  - ← DRAINAGE FLOW
  - DITCH FLOW LINE
  - DRAINAGE BOUNDARY

- NOTES:**
1. FLOWS DETERMINED USING RATIONAL METHOD UNLESS OTHERWISE NOTED.
  2. COMPUTATIONS ARE BASED ON TXDOT HYDRAULIC MANUAL USING RAINFALL COEFFICIENTS FOR WILLIAMSON COUNTY.



*Kelly G. Morrelli*  
8/7/17

DA Description	DA (AC)	C	Tc USED (MIN)	Design			Q (CFS)
				I (IN/HR)	Frequency	AEP	
RIVER DCULV-9	0.76	0.40	12.19	8.57	10 YR	10%	2.23
RIVER DCULV-10	0.77	0.40	11.14	8.91	10 YR	10%	2.32
RIVER DCULV-11	0.85	0.44	10.00	9.33	10 YR	10%	2.99

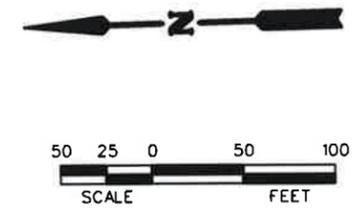
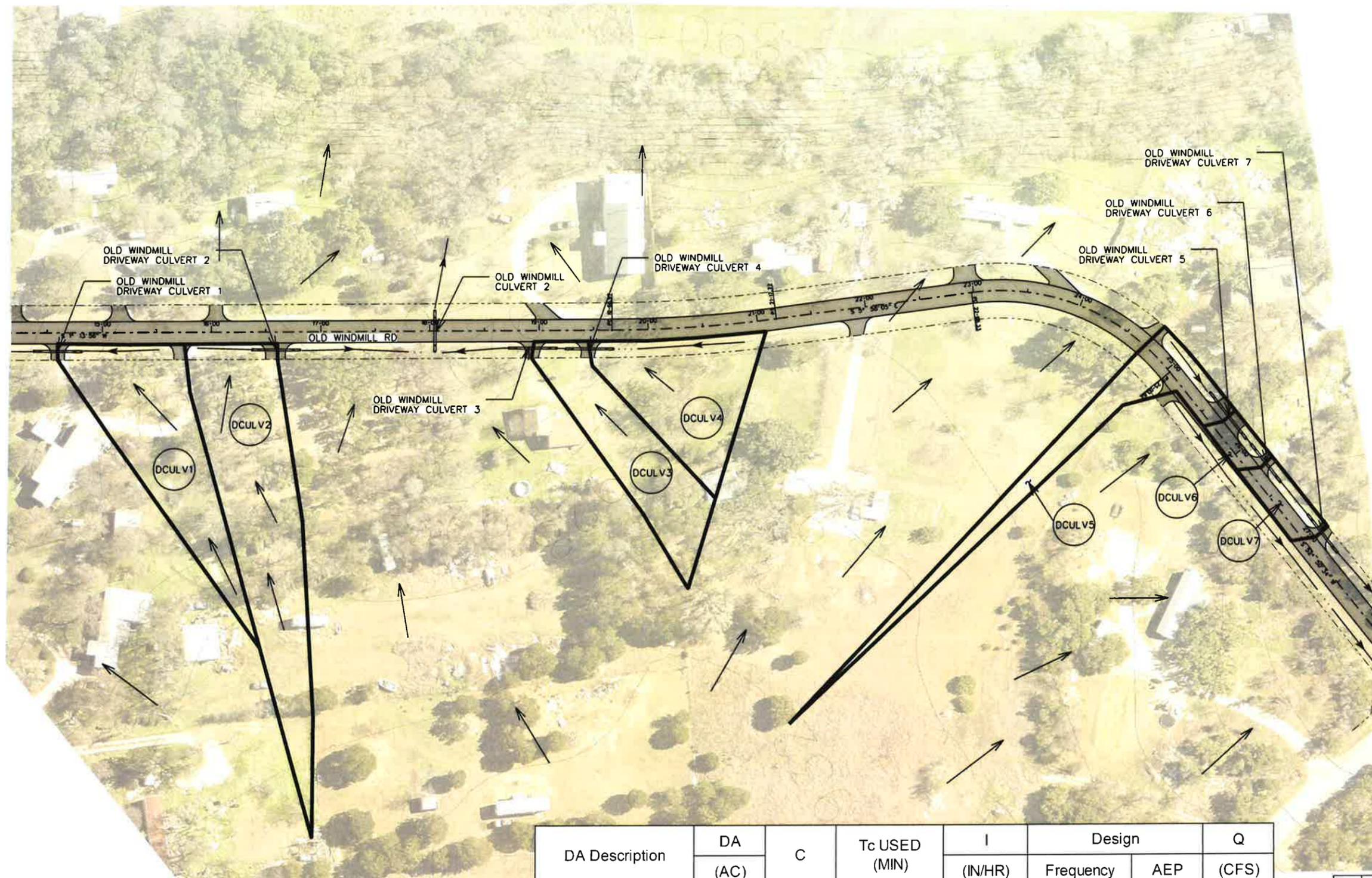
NO.	REVISION	BY	DATE



**RIVER RD  
INTERNAL DRAINAGE AREA MAP**

Designed: <b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>11</b>
Checked: <b>KQK</b>		
Drawn: <b>KGM</b>		
Checked: <b>KQK</b>		

RIVER INT DA MAP\_02.dgn 7/12/2017 4:36:25 PM



- LEGEND**
- XXX DRAINAGE AREA LABEL
  - ← DRAINAGE FLOW
  - DITCH FLOW LINE
  - DRAINAGE BOUNDARY

- NOTES:**
1. FLOWS DETERMINED USING RATIONAL METHOD UNLESS OTHERWISE NOTED.
  2. COMPUTATIONS ARE BASED ON TXDOT HYDRAULIC MANUAL USING RAINFALL COEFFICIENTS FOR WILLIAMSON COUNTY.

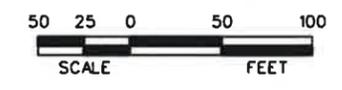
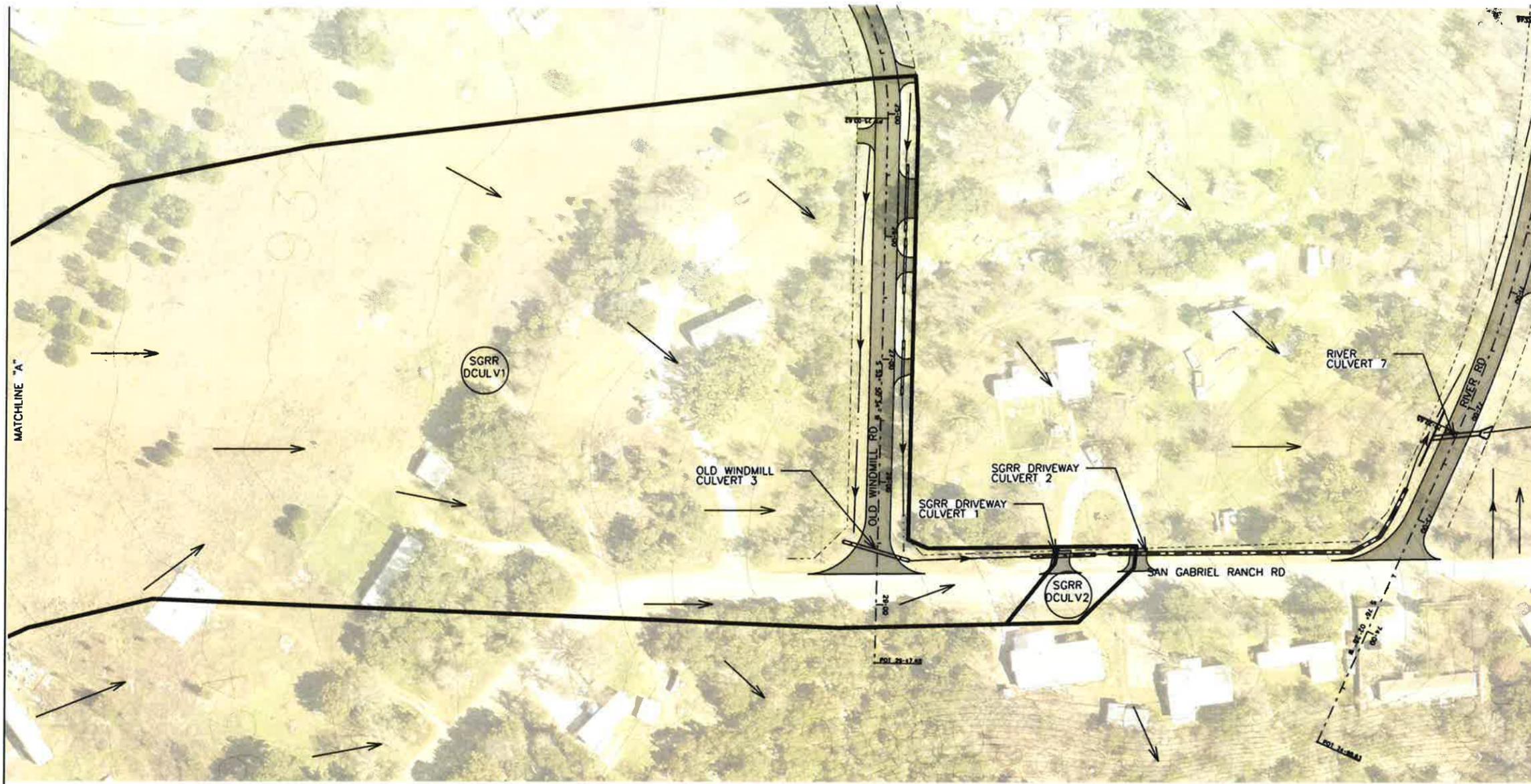


*Kelly G. Morrelli*  
8/7/17

DA Description	DA (AC)	C	Tc USED (MIN)	I (IN/HR)	Design		Q (CFS)
					Frequency	AEP	
WINDMILL DCULV-1	0.39	0.35	10.00	9.33	10 YR	10%	1.09
WINDMILL DCULV-2	0.54	0.35	10.26	9.23	10 YR	10%	1.49
WINDMILL DCULV-3	0.57	0.36	10.00	9.33	10 YR	10%	1.64
WINDMILL DCULV-4	0.30	0.36	10.00	9.33	10 YR	10%	0.85
WINDMILL DCULV-5	0.22	0.48	11.13	8.92	10 YR	10%	0.80
WINDMILL DCULV-6	0.26	0.52	11.78	8.70	10 YR	10%	1.00
WINDMILL DCULV-7	0.33	0.55	12.37	8.51	10 YR	10%	1.32

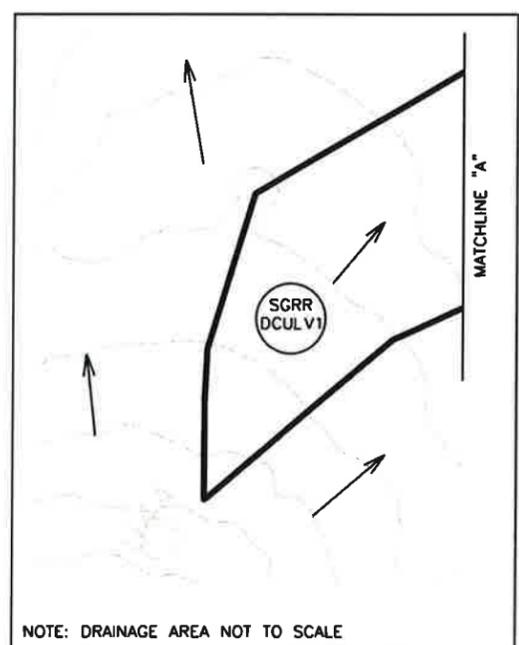
NO.	REVISION	BY	DATE
<b>WILLIAMSON COUNTY</b> 1848 WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE			
<b>OLD WINDMILL RD</b> <b>INTERNAL DRAINAGE AREA MAP</b>			
Designed:	<b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO.
Checked:	<b>KQK</b>		12
Drawn:	<b>KGM</b>		
Checked:	<b>KQK</b>		

8/10/2017 9:17 AM OLD WINDMILL INT DA MAP\_01.dgn 4:38:15 PM



- LEGEND**
- XXX DRAINAGE AREA LABEL
  - DRAINAGE FLOW
  - DITCH FLOW LINE
  - DRAINAGE BOUNDARY

- NOTES:**
1. FLOWS DETERMINED USING RATIONAL METHOD UNLESS OTHERWISE NOTED.
  2. COMPUTATIONS ARE BASED ON TXDOT HYDRAULIC MANUAL USING RAINFALL COEFFICIENTS FOR WILLIAMSON COUNTY.

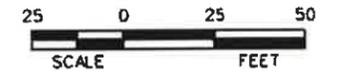
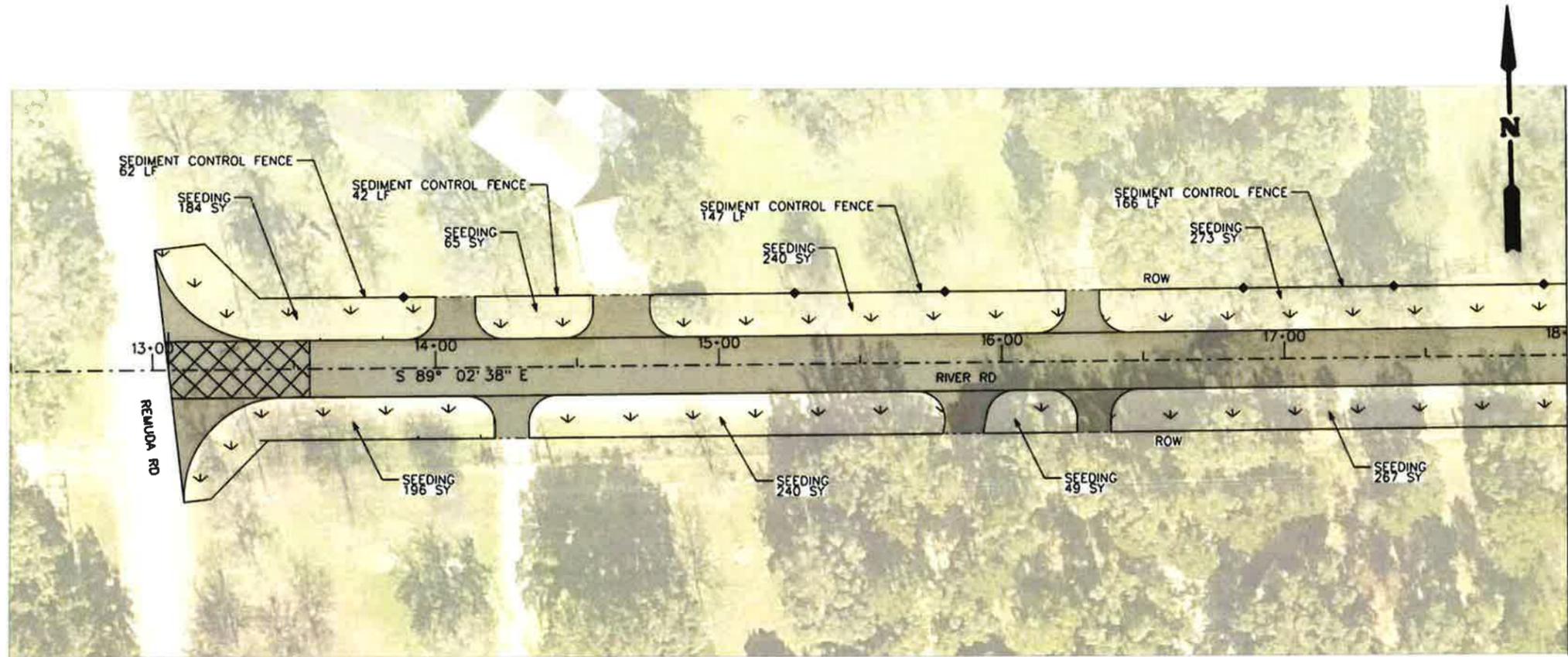


NOTE: DRAINAGE AREA NOT TO SCALE

DA Description	DA (AC)	C	Tc USED (MIN)	Design			Q (CFS)
				I (IN/HR)	Frequency	AEP	
SGRR DCULV-1	9.30	0.38	14.96	7.78	10 YR	10%	23.36
SGRR DCULV-2	9.40	0.38	15.19	7.72	10 YR	10%	23.56

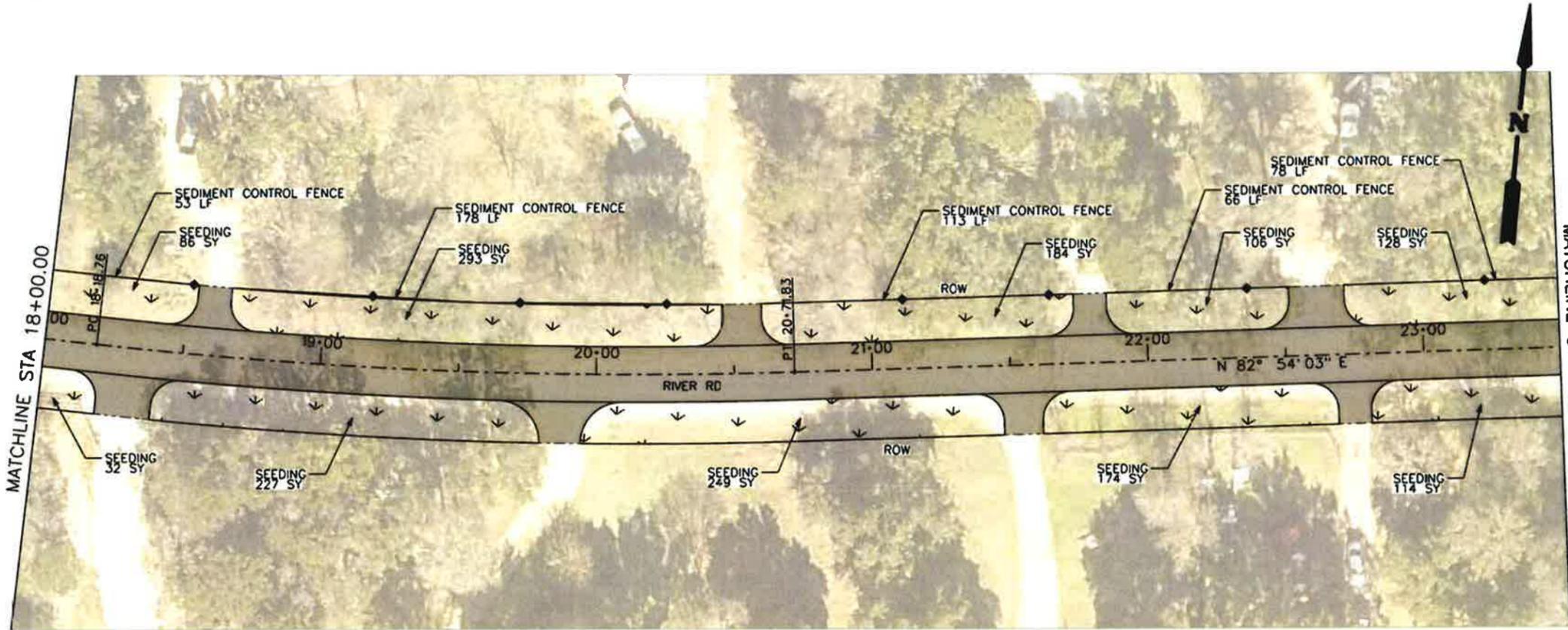


NO.	REVISION	BY	DATE
<b>WILLIAMSON COUNTY</b> DEPT. OF INFRASTRUCTURE 1848			
<b>SAN GABRIEL RANCH RD</b> <b>INTERNAL DRAINAGE AREA MAP</b>			
Designed:	<b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>13</b>
Checked:	<b>KQK</b>		
Drawn:	<b>KGM</b>		
Checked:	<b>KQK</b>		



- LEGEND**
- SEEDING
  - SOIL RETENTION BLANKET
  - SOD
  - ROCK RIPRAP
  - CONCRETE RIPRAP
  - STABILIZED CONSTRUCTION ENTRANCE, TYPE I, 20' X 50'
  - SEDIMENT CONTROL FENCE
  - ROCK FILTER DAM
  - DITCH FLOW LINE

**NOTES:**  
 1. ALL DEVICES TO BE PLACED AS SHOWN IN TXDOT STANDARDS EC(1)-EC(3) EXCEPT AS DIRECTED BY THE ENGINEER.  
 2. ALL PERIMETER SEDIMENT CONTROL FENCE AND ROCK FILTER DAMS TO REMAIN UNTIL END OF CONSTRUCTION.



*Kelly G. Morrelli*  
 8/7/17

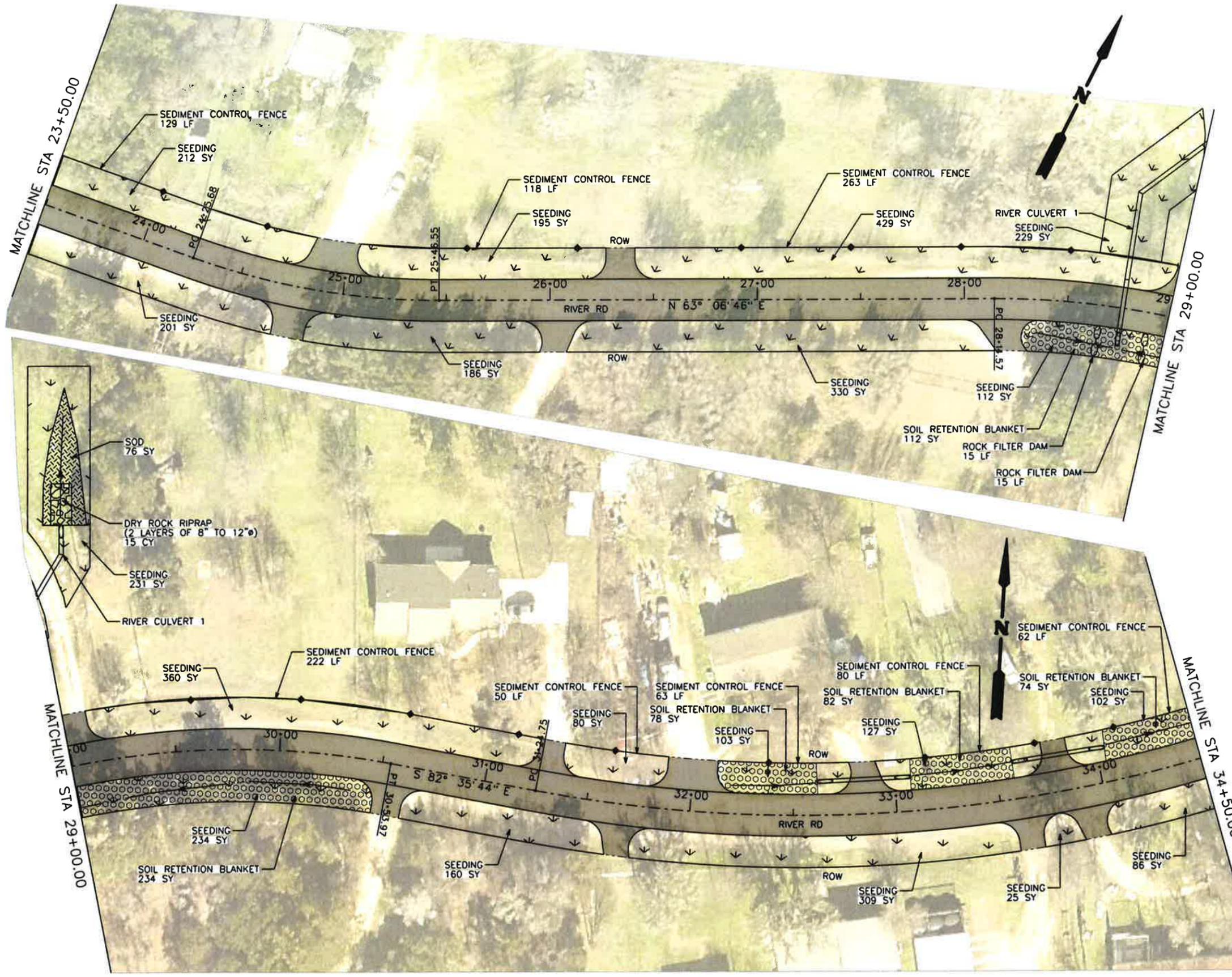
NO.	REVISION	BY	DATE



**RIVER RD  
 EROSION CONTROL PLAN**

Designed:	<b>KGM</b>	3151 S E INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>14</b>
Checked:	<b>KQK</b>		
Drawn:	<b>KGM</b>		
Checked:	<b>KQK</b>		

RIVER\_EROSION\_CONTROL01.dgn  
 7/12/2017 9:59:57 AM



- LEGEND**
- SEEDING
  - SOIL RETENTION BLANKET
  - SOD
  - ROCK RIPRAP
  - CONCRETE RIPRAP
  - STABILIZED CONSTRUCTION ENTRANCE, TYPE I, 20' x 50'
  - SEDIMENT CONTROL FENCE
  - ROCK FILTER DAM
  - DITCH FLOW LINE

- NOTES:**
1. ALL DEVICES TO BE PLACED AS SHOWN IN TXDOT STANDARDS EC(1)-EC(3) EXCEPT AS DIRECTED BY THE ENGINEER.
  2. ALL PERIMETER SEDIMENT CONTROL FENCE AND ROCK FILTER DAMS TO REMAIN UNTIL END OF CONSTRUCTION.



*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE

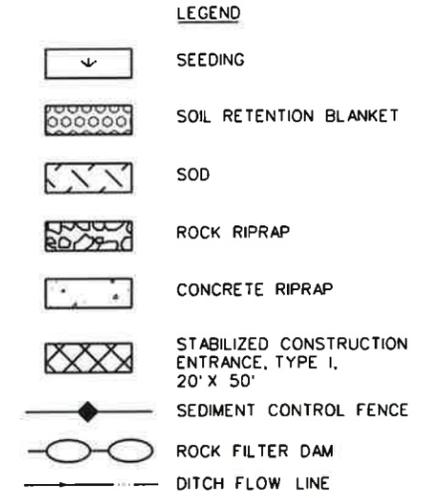
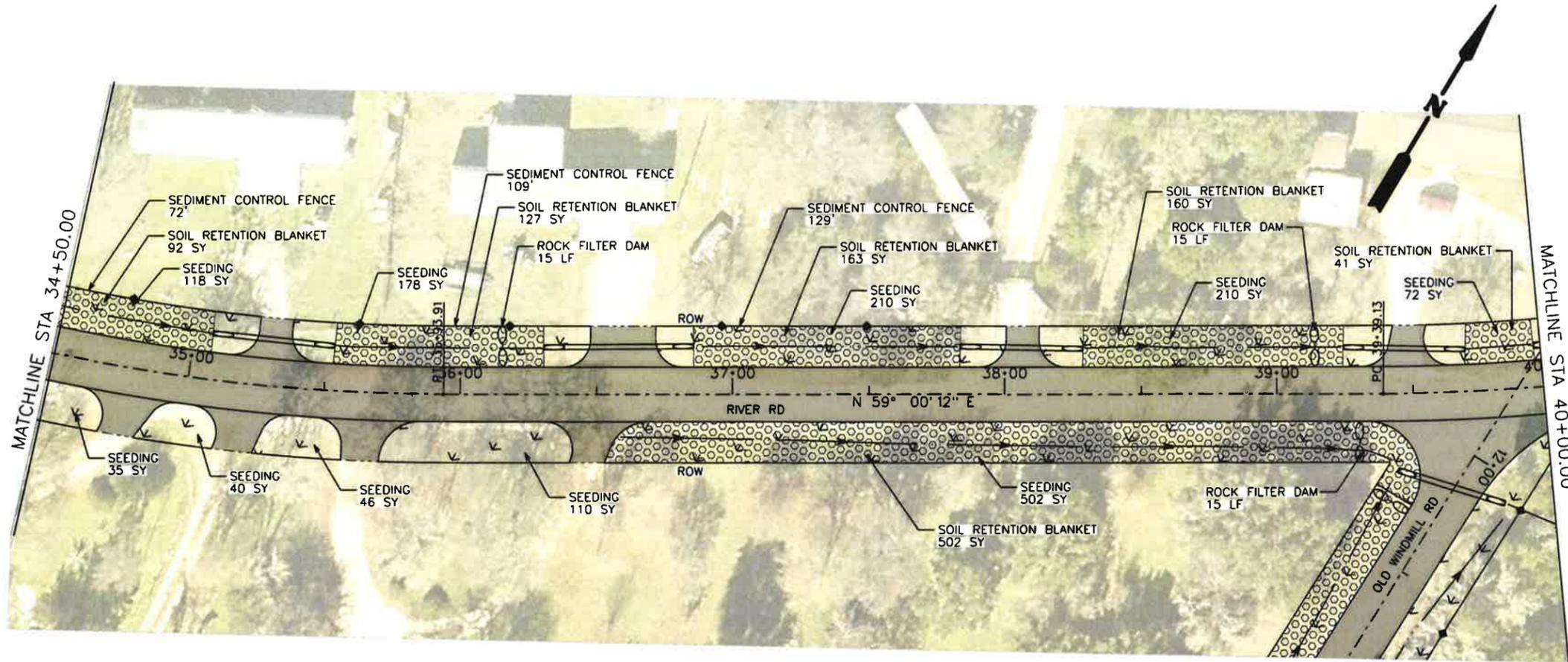
**WILLIAMSON COUNTY**  
1848

**WILLIAMSON COUNTY**  
DEPT. OF INFRASTRUCTURE

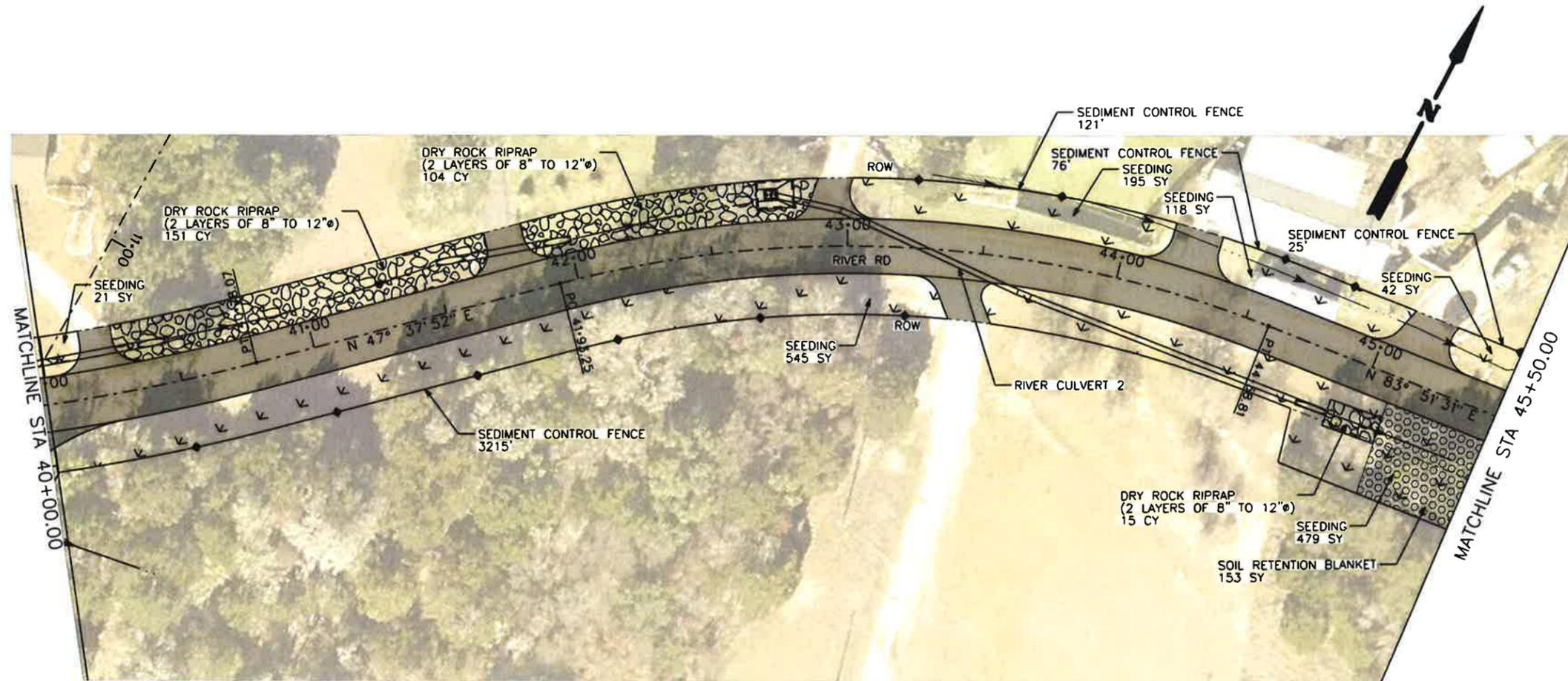
**RIVER RD  
EROSION CONTROL PLAN**

Designed:	<b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>15</b>
Checked:	<b>KQK</b>		
Drawn:	<b>KGM</b>		
Checked:	<b>KQK</b>		

RIVER\_EROSION\_CONTROL02.dgn 9:38:37 AM 7/14/2017



**NOTES:**  
 1. ALL DEVICES TO BE PLACED AS SHOWN IN TXDOT STANDARDS EC(1)-EC(3) EXCEPT AS DIRECTED BY THE ENGINEER.  
 2. ALL PERIMETER SEDIMENT CONTROL FENCE AND ROCK FILTER DAMS TO REMAIN UNTIL END OF CONSTRUCTION.



*Kelly G. Morrelli*  
 8/7/17

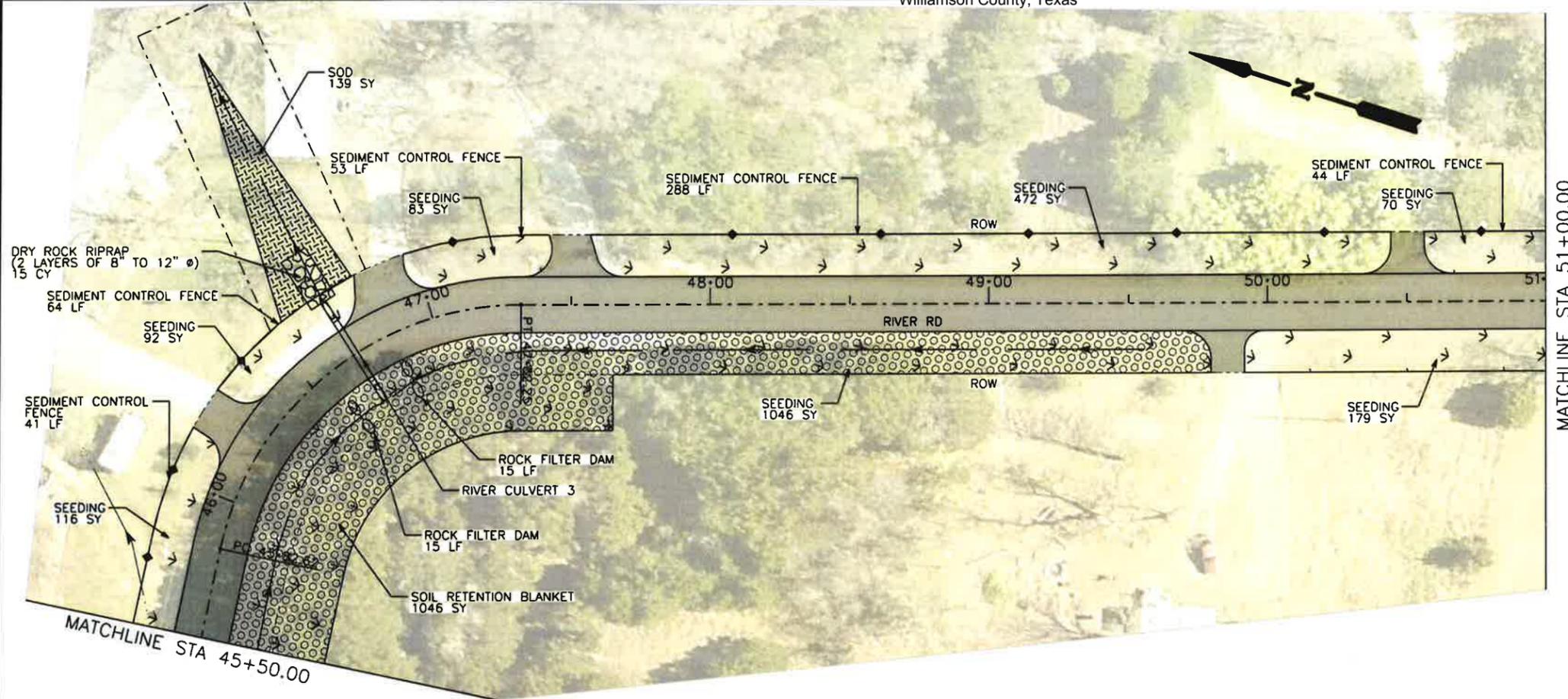
NO.	REVISION	BY	DATE

**WILLIAMSON COUNTY**  
 DEPT. OF INFRASTRUCTURE  
 18-18

**RIVER RD  
 EROSION CONTROL PLAN**

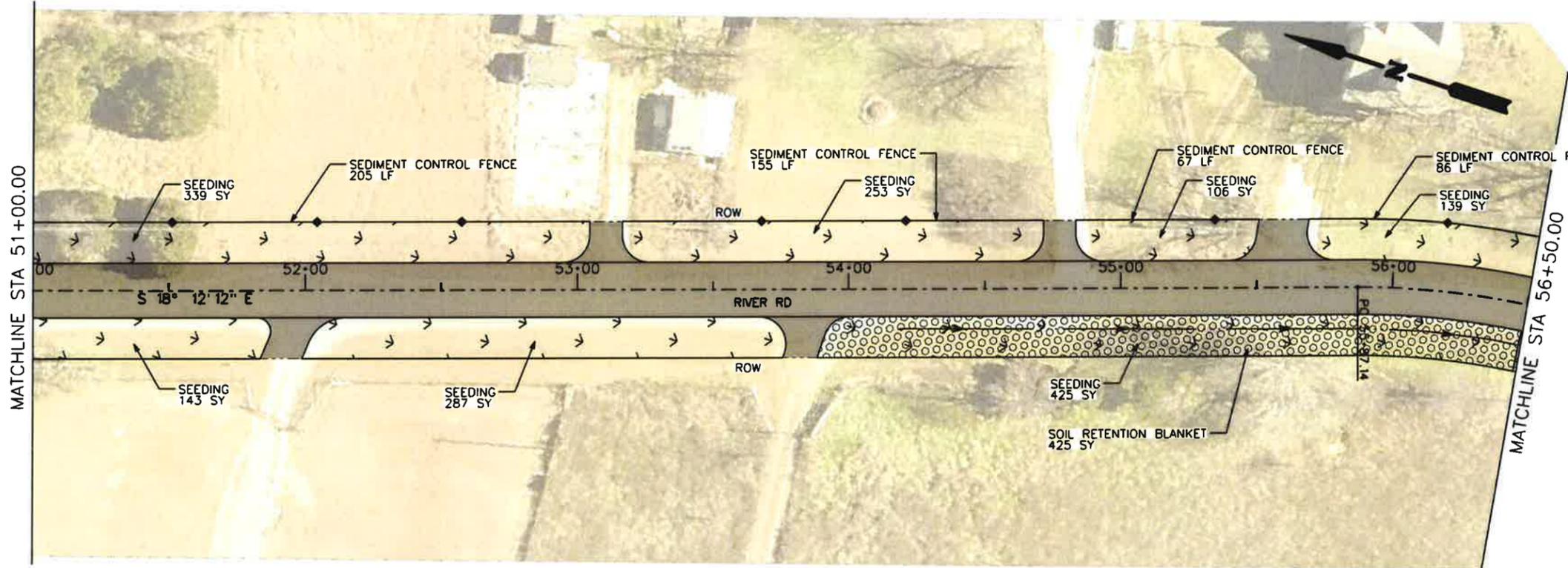
Designed: <b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>16</b>
Checked: <b>KOK</b>		
Drawn: <b>KGM</b>		
Checked: <b>KOK</b>		

RIVER\_EROSION\_CONTROLO3.dgn  
 7/14/2017 9:38:54 AM



- LEGEND**
- SEEDING
  - SOIL RETENTION BLANKET
  - SOD
  - ROCK RIPRAP
  - CONCRETE RIPRAP
  - STABILIZED CONSTRUCTION ENTRANCE, TYPE 1, 20' X 50'
  - SEDIMENT CONTROL FENCE
  - ROCK FILTER DAM
  - DITCH FLOW LINE

- NOTES:**
1. ALL DEVICES TO BE PLACED AS SHOWN IN TXDOT STANDARDS EC(1)-EC(3) EXCEPT AS DIRECTED BY THE ENGINEER.
  2. ALL PERIMETER SEDIMENT CONTROL FENCE AND ROCK FILTER DAMS TO REMAIN UNTIL END OF CONSTRUCTION.



*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE

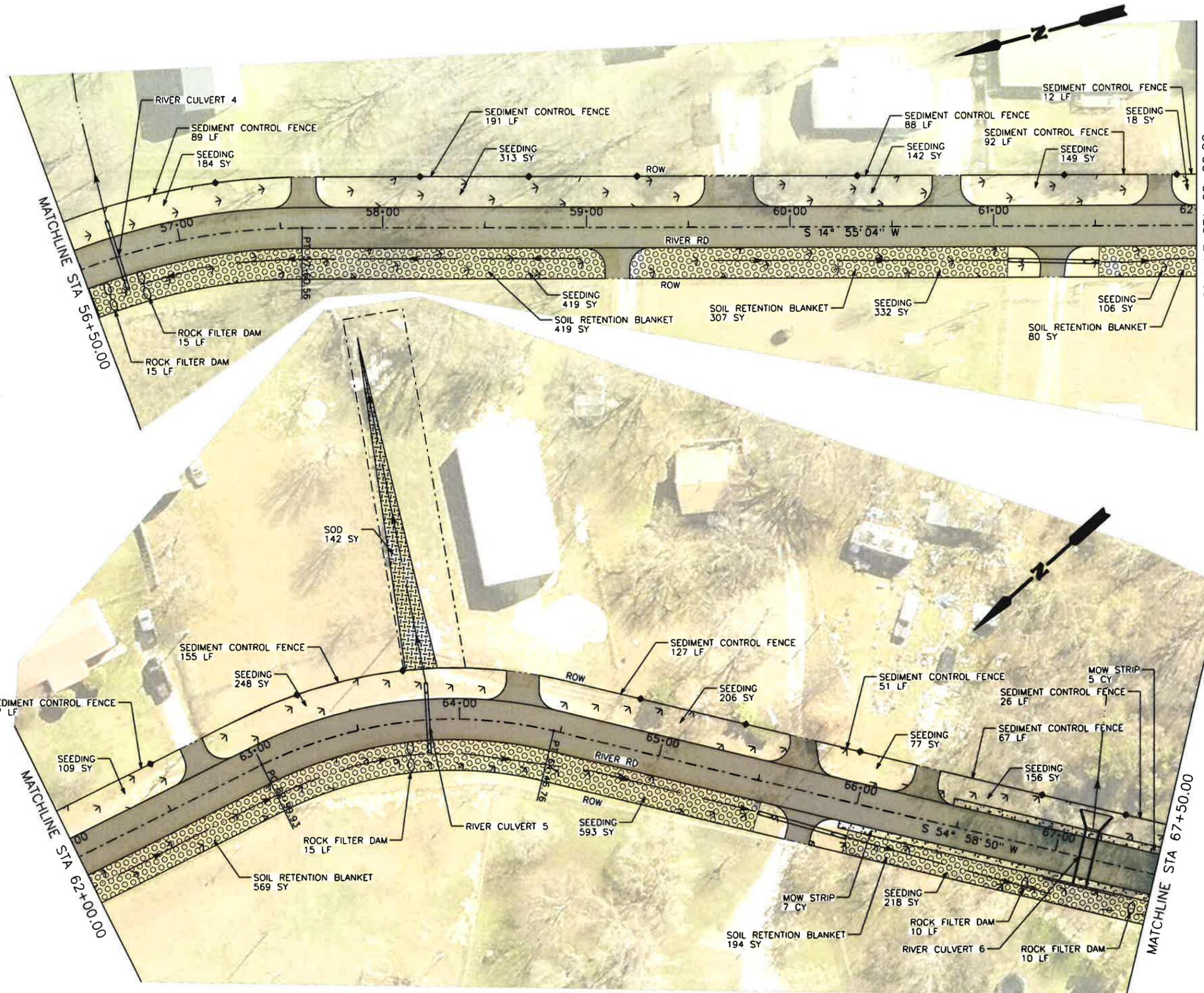
**WILLIAMSON COUNTY**  
1848

**WILLIAMSON COUNTY**  
DEPT. OF INFRASTRUCTURE

**RIVER RD**  
**EROSION CONTROL PLAN**

Designed:	<b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>17</b>
Checked:	<b>KQK</b>		
Drawn:	<b>KGM</b>		
Checked:	<b>KQK</b>		

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- LEGEND**
- SEEDING
  - SOIL RETENTION BLANKET
  - SOD
  - ROCK RIPRAP
  - CONCRETE RIPRAP
  - STABILIZED CONSTRUCTION ENTRANCE, TYPE I, 20' X 50'
  - SEDIMENT CONTROL FENCE
  - ROCK FILTER DAM
  - DITCH FLOW LINE

**NOTES:**  
 1. ALL DEVICES TO BE PLACED AS SHOWN IN TXDOT STANDARDS EC(1)-EC(3) EXCEPT AS DIRECTED BY THE ENGINEER.  
 2. ALL PERIMETER SEDIMENT CONTROL FENCE AND ROCK FILTER DAMS TO REMAIN UNTIL END OF CONSTRUCTION.



*Kelly G. Morrelli*  
 8/7/17

NO.	REVISION	BY	DATE

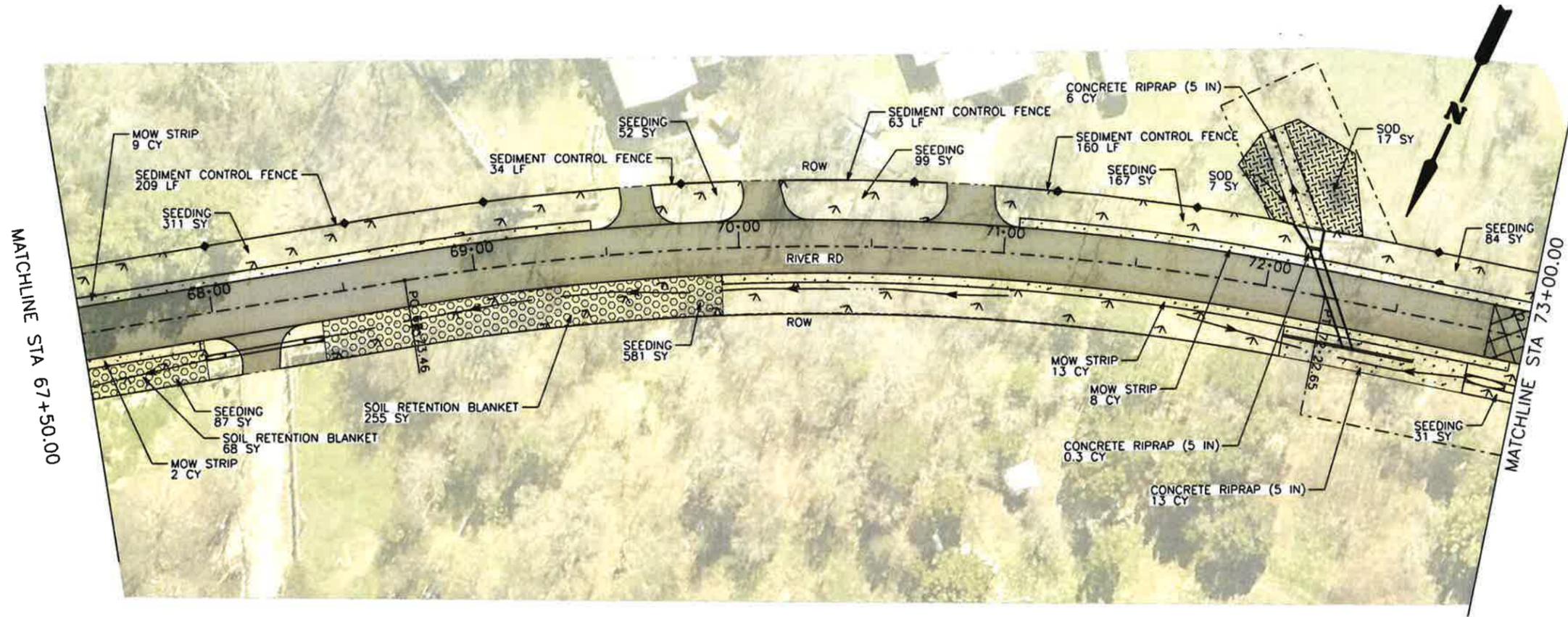
**WILLIAMSON COUNTY**  
 1848

**WILLIAMSON COUNTY**  
 DEPT. OF INFRASTRUCTURE

**RIVER RD**  
**EROSION CONTROL PLAN**

Designed: <b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO.
Checked: <b>KQK</b>		18
Drawn: <b>KGM</b>		
Checked: <b>KQK</b>		

RIVER\_EROSION\_CONTROL.05.dgn 7/14/2017 9:39:29 AM



- LEGEND**
- SEEDING
  - SOIL RETENTION BLANKET
  - SOD
  - ROCK RIPRAP
  - CONCRETE RIPRAP
  - STABILIZED CONSTRUCTION ENTRANCE, TYPE I, 20' X 50'
  - SEDIMENT CONTROL FENCE
  - ROCK FILTER DAM
  - DITCH FLOW LINE

- NOTES:**
1. ALL DEVICES TO BE PLACED AS SHOWN IN TXDOT STANDARDS EC(1)-EC(3) EXCEPT AS DIRECTED BY THE ENGINEER.
  2. ALL PERIMETER SEDIMENT CONTROL FENCE AND ROCK FILTER DAMS TO REMAIN UNTIL END OF CONSTRUCTION.



*Kelly G. Morrelli*  
8/17/17

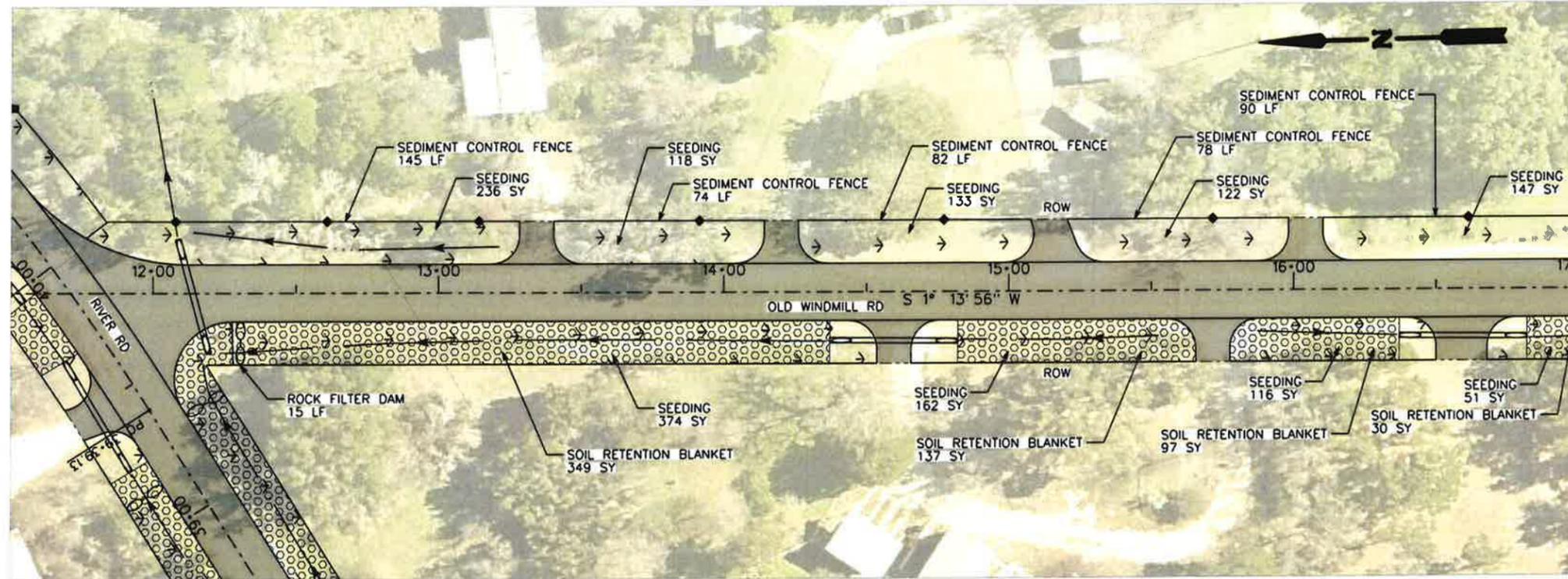
NO.	REVISION	BY	DATE

**WILLIAMSON COUNTY**  
1848

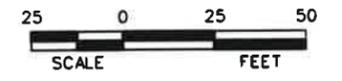
**WILLIAMSON COUNTY**  
DEPT. OF INFRASTRUCTURE

**RIVER RD**  
**EROSION CONTROL PLAN**

Designed: <b>KGM</b>	3151 S.E. INNER LOOP, SUITE B	SHEET NO. <b>19</b>
Checked: <b>KOK</b>	GEORGETOWN, TEXAS 78626	
Drawn: <b>KGM</b>	943-3330	
Checked: <b>KOK</b>	www.wilco.org	

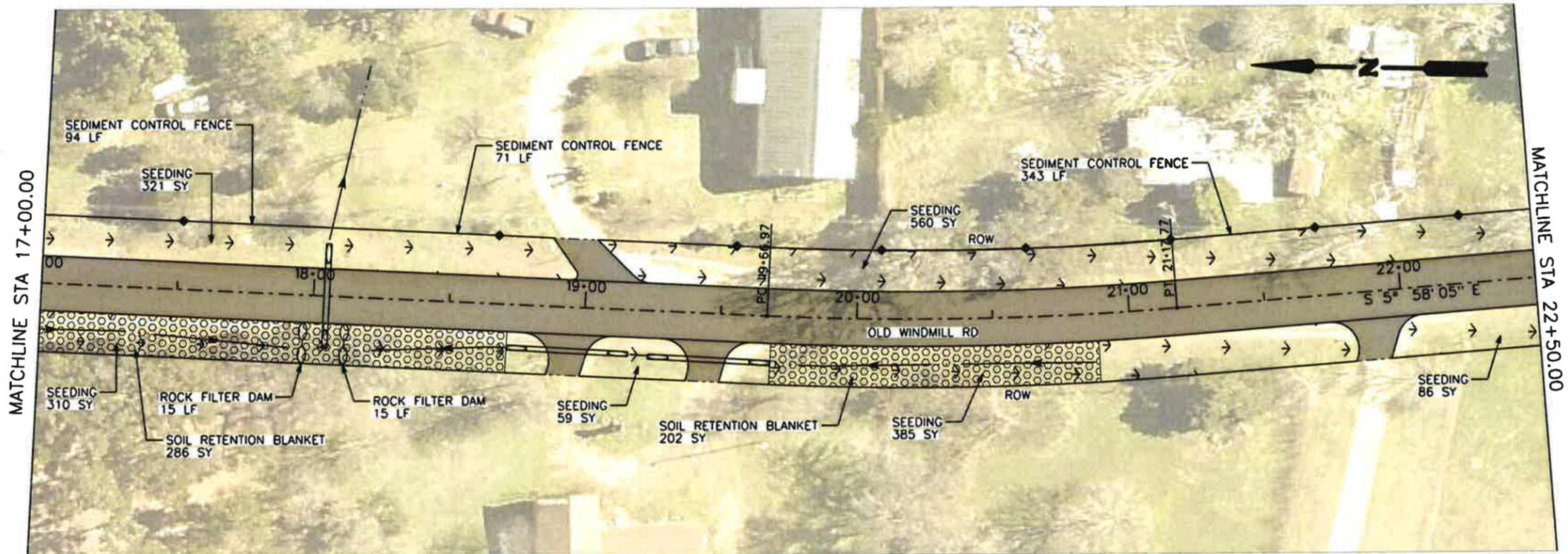


MATCHLINE STA 17+00.00



- LEGEND**
- SEEDING
  - SOIL RETENTION BLANKET
  - SOD
  - ROCK RIPRAP
  - CONCRETE RIPRAP
  - STABILIZED CONSTRUCTION ENTRANCE, TYPE I, 20' X 50'
  - SEDIMENT CONTROL FENCE
  - ROCK FILTER DAM
  - DITCH FLOW LINE

- NOTES:**
1. ALL DEVICES TO BE PLACED AS SHOWN IN TxDOT STANDARDS EC(1)-EC(3) EXCEPT AS DIRECTED BY THE ENGINEER.
  2. ALL PERIMETER SEDIMENT CONTROL FENCE AND ROCK FILTER DAMS TO REMAIN UNTIL END OF CONSTRUCTION.



MATCHLINE STA 17+00.00

MATCHLINE STA 22+50.00



*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE

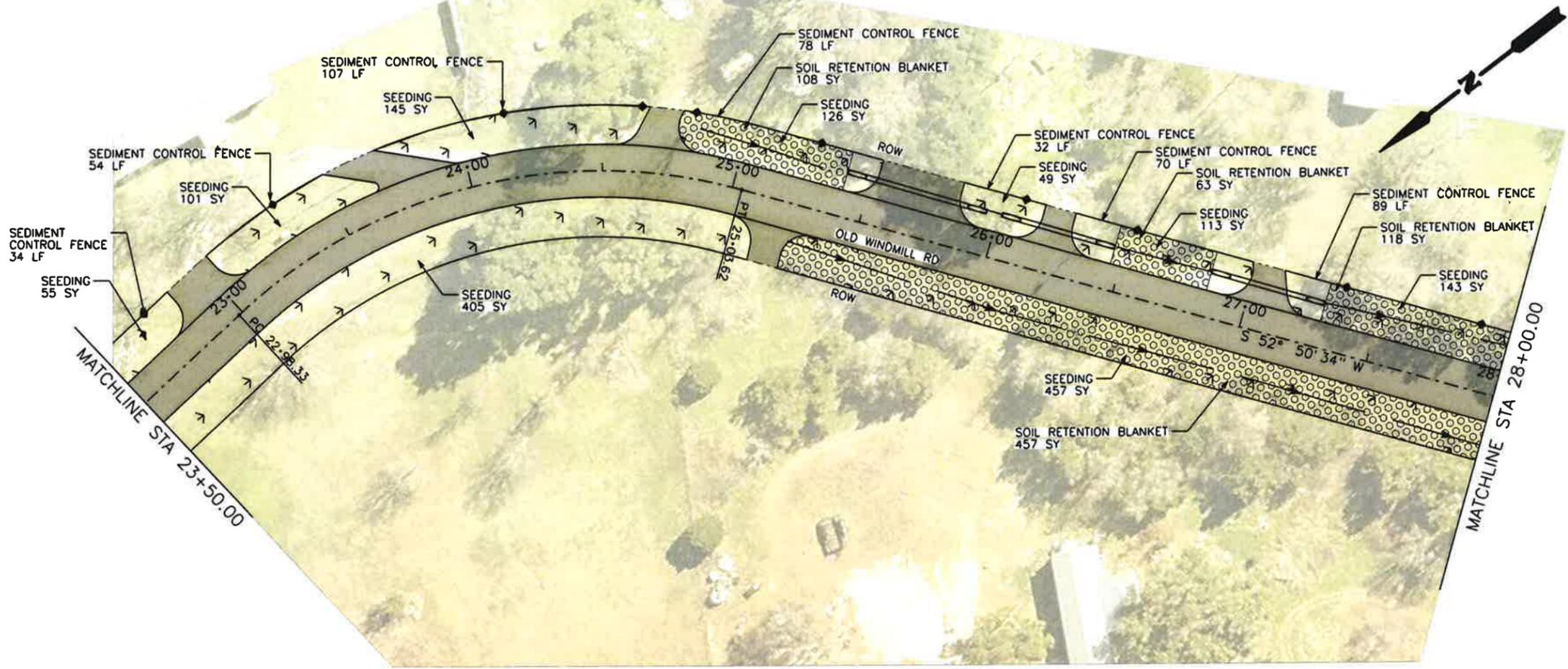
**WILLIAMSON COUNTY**  
 1848

**WILLIAMSON COUNTY**  
 DEPT. OF  
 INFRASTRUCTURE

**OLD WINDMILL RD  
EROSION CONTROL PLAN**

Designed: <b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO.
Checked: <b>KQK</b>		<b>20</b>
Drawn: <b>KGM</b>		
Checked: <b>KQK</b>		

OLD WINDMILL-EROSION CONTROL01.dgn  
7/14/2017 9:41:44 AM



- LEGEND**
- SEEDING
  - SOIL RETENTION BLANKET
  - SOD
  - ROCK RIPRAP
  - CONCRETE RIPRAP
  - STABILIZED CONSTRUCTION ENTRANCE, TYPE I, 20' X 50'
  - SEDIMENT CONTROL FENCE
  - ROCK FILTER DAM
  - DITCH FLOW LINE

- NOTES:**
1. ALL DEVICES TO BE PLACED AS SHOWN IN TXDOT STANDARDS EC(1)-EC(3) EXCEPT AS DIRECTED BY THE ENGINEER.
  2. ALL PERIMETER SEDIMENT CONTROL FENCE AND ROCK FILTER DAMS TO REMAIN UNTIL END OF CONSTRUCTION.



NO.	REVISION	BY	DATE

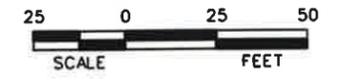
**WILLIAMSON COUNTY**  
 1848

**WILLIAMSON COUNTY**  
 DEPT. OF  
 INFRASTRUCTURE

**OLD WINDMILL RD  
EROSION CONTROL PLAN**

Designed:	<b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>21</b>
Checked:	<b>KQK</b>		
Drawn:	<b>KGM</b>		
Checked:	<b>KQK</b>		

LD\_WINDMILL\_EROSION\_CONTROL.02.dgn  
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**LEGEND**

- SEEDING
- SOIL RETENTION BLANKET
- SOD
- ROCK RIPRAP
- CONCRETE RIPRAP
- STABILIZED CONSTRUCTION ENTRANCE, TYPE I, 20' x 50'
- SEDIMENT CONTROL FENCE
- ROCK FILTER DAM
- DITCH FLOW LINE

- NOTES:**
1. ALL DEVICES TO BE PLACED AS SHOWN IN TxDOT STANDARDS EC(1)-EC(3) EXCEPT AS DIRECTED BY THE ENGINEER.
  2. ALL PERIMETER SEDIMENT CONTROL FENCE AND ROCK FILTER DAMS TO REMAIN UNTIL END OF CONSTRUCTION.



*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE

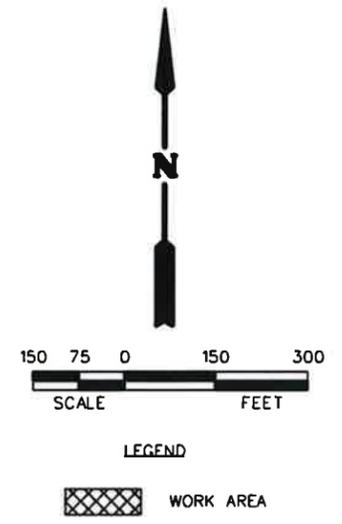
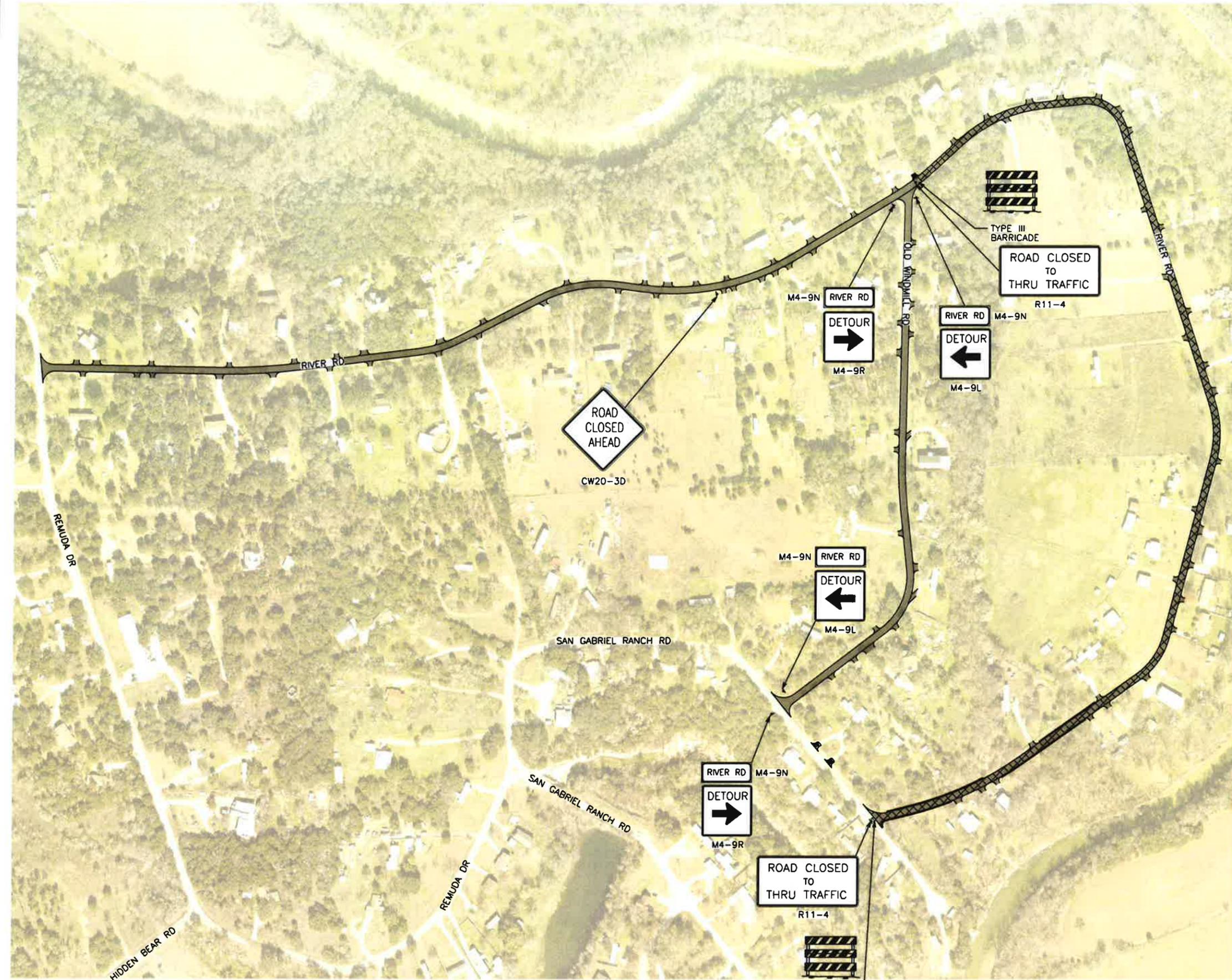
**WILLIAMSON COUNTY**  
 1848

**WILLIAMSON COUNTY**  
 DEPT. OF  
 INFRASTRUCTURE

**SAN GABRIEL RANCH RD  
EROSION CONTROL PLAN**

Designed:	<b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>22</b>
Checked:	<b>KQK</b>		
Drawn:	<b>KGM</b>		
Checked:	<b>KQK</b>		

GRR\_EROSION\_CONTROL01.dgn  
 8/14/2017 9:43:58 AM



- NOTES:
1. ADDITIONAL GUIDE SIGNS MAY BE REQUIRED AT INTERSECTING PUBLIC ROADWAYS OR AS DIRECTED.
  2. ACCESS TO ADJACENT PROPERTIES SHALL REMAIN OPEN AT ALL TIMES. IF ANY TEMPORARY CLOSURE OF DRIVEWAYS SHOULD BE NEEDED, CONTRACTOR SHALL COORDINATE WITH COUNTY AND PROPERTY OWNER A MINIMUM OF 24 HRS PRIOR TO TEMPORARY CLOSURE. CONTRACTOR SHALL REPAIR ANY DAMAGES TO ADJACENT PROPERTIES TO EQUAL OR BETTER CONDITIONS AT CONTRACTOR'S EXPENSE.
  3. WORK WITHIN "WORK AREA" SHALL ONLY BE PERFORMED IN 1500 FT SECTIONS AT A TIME.



*Kelly G. Morrelli*  
8/7/17

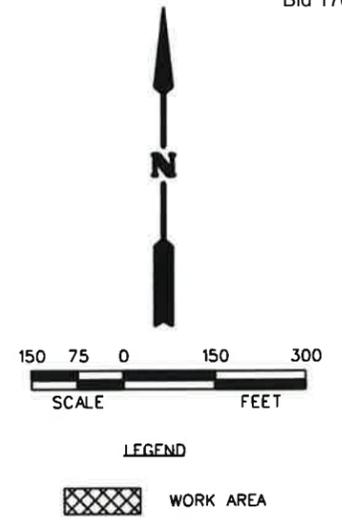
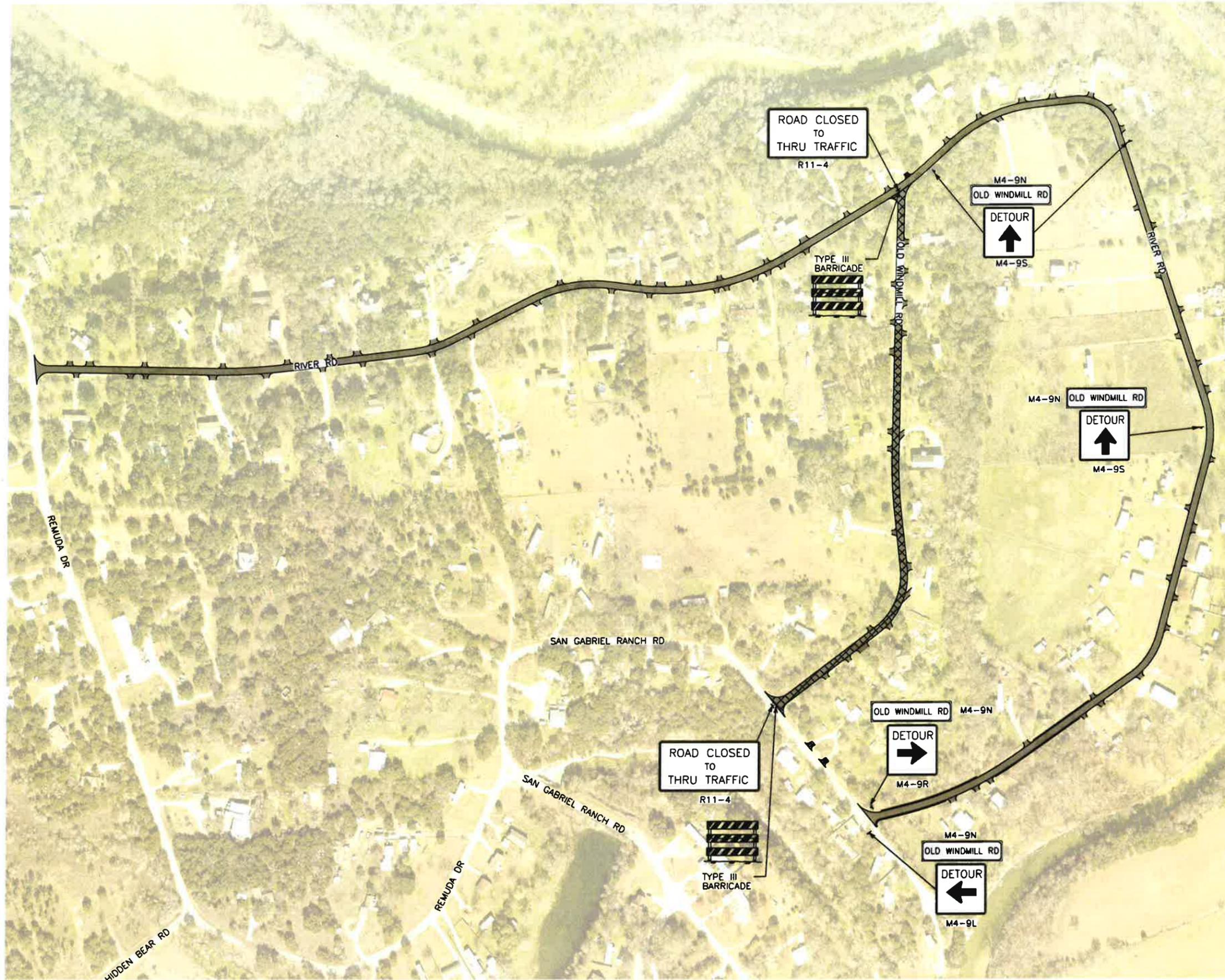
NO.	REVISION	BY	DATE

**W** WILLIAMSON COUNTY  
DEPT. OF INFRASTRUCTURE  
1848

RIVER RD & OLD WINDMILL RD  
TRAFFIC CONTROL PLAN

Designed: <b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>23</b>
Checked: <b>KOK</b>		
Drawn: <b>KGM</b>		
Checked: <b>KOK</b>		

RIVER OLD WINDMILL TCP01.dgn  
8/7/2017 2:21:40 PM



- NOTES:
1. ADDITIONAL GUIDE SIGNS MAY BE REQUIRED AT INTERSECTING PUBLIC ROADWAYS OR AS DIRECTED.
  2. ACCESS TO ADJACENT PROPERTIES SHALL REMAIN OPEN AT ALL TIMES. IF ANY TEMPORARY CLOSURE OF DRIVEWAYS SHOULD BE NEEDED, CONTRACTOR SHALL COORDINATE WITH COUNTY AND PROPERTY OWNER A MINIMUM OF 24 HRS PRIOR TO TEMPORARY CLOSURE. CONTRACTOR SHALL REPAIR ANY DAMAGES TO ADJACENT PROPERTIES TO EQUAL OR BETTER CONDITIONS AT CONTRACTOR'S EXPENSE.
  3. WORK WITHIN "WORK AREA" SHALL ONLY BE PERFORMED IN 1500 FT SECTIONS AT A TIME.



NO.	REVISION	BY	DATE

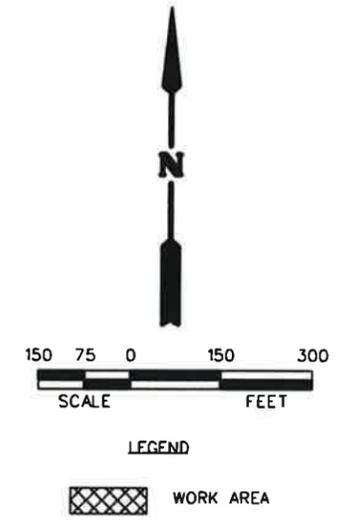
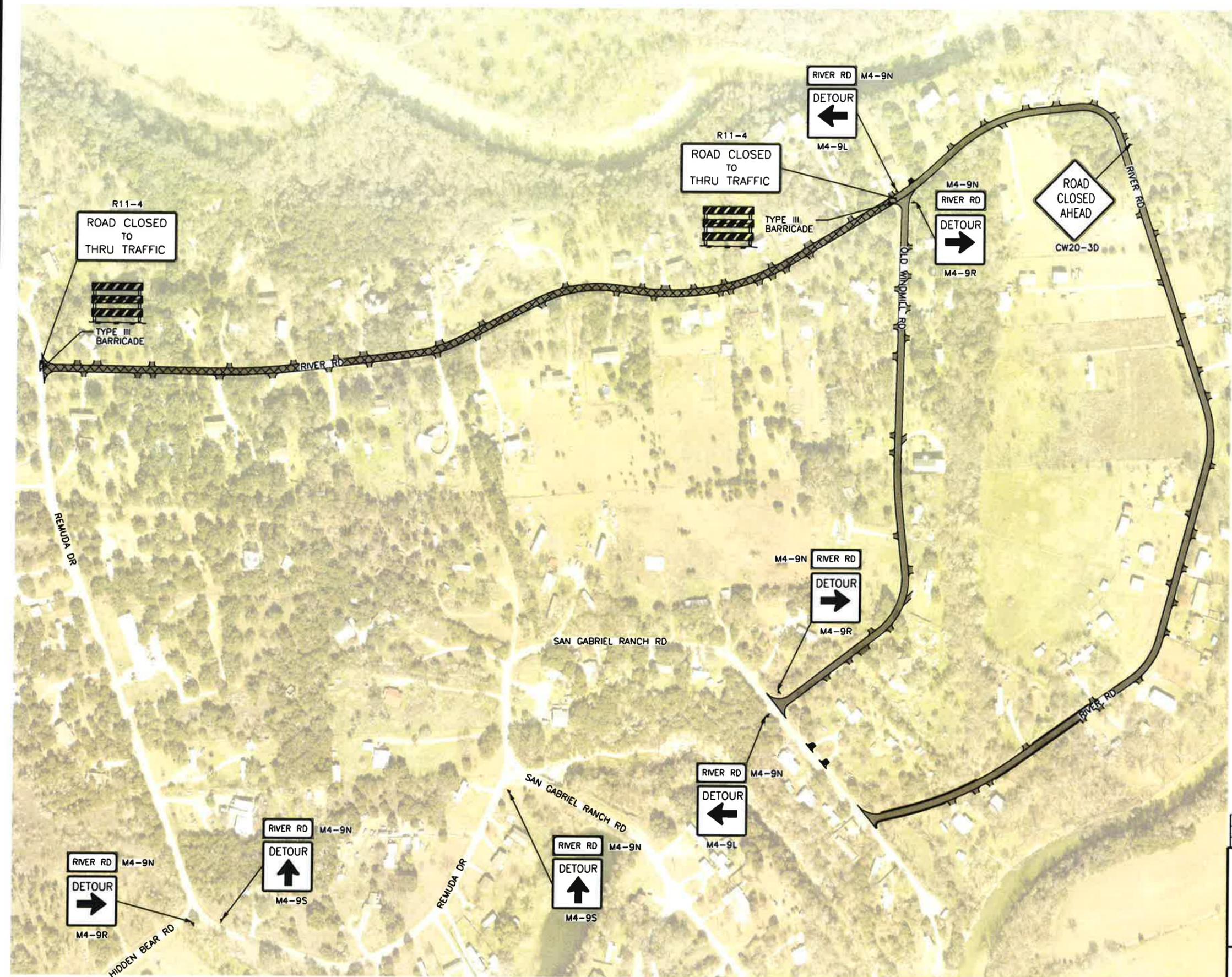
**WILLIAMSON COUNTY**  
1848

**WILLIAMSON COUNTY**  
DEPT. OF  
INFRASTRUCTURE

**RIVER RD & OLD WINDMILL RD  
TRAFFIC CONTROL PLAN**

Designed: <b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>24</b>
Checked: <b>KOK</b>		
Drawn: <b>KGM</b>		
Checked: <b>KOK</b>		

RIVER OLD WINDMILL TCP02.dgn  
8/7/2017 2:22:35 PM



- NOTES:
1. ADDITIONAL GUIDE SIGNS MAY BE REQUIRED AT INTERSECTING PUBLIC ROADWAYS OR AS DIRECTED.
  2. ACCESS TO ADJACENT PROPERTIES SHALL REMAIN OPEN AT ALL TIMES. IF ANY TEMPORARY CLOSURE OF DRIVEWAYS SHOULD BE NEEDED, CONTRACTOR SHALL COORDINATE WITH COUNTY AND PROPERTY OWNER A MINIMUM OF 24 HRS PRIOR TO TEMPORARY CLOSURE. CONTRACTOR SHALL REPAIR ANY DAMAGES TO ADJACENT PROPERTIES TO EQUAL OR BETTER CONDITIONS AT CONTRACTOR'S EXPENSE.
  3. WORK WITHIN "WORK AREA" SHALL ONLY BE PERFORMED IN 1500 FT SECTIONS AT A TIME.



*Kelly G. Morrelli*  
8/7/17

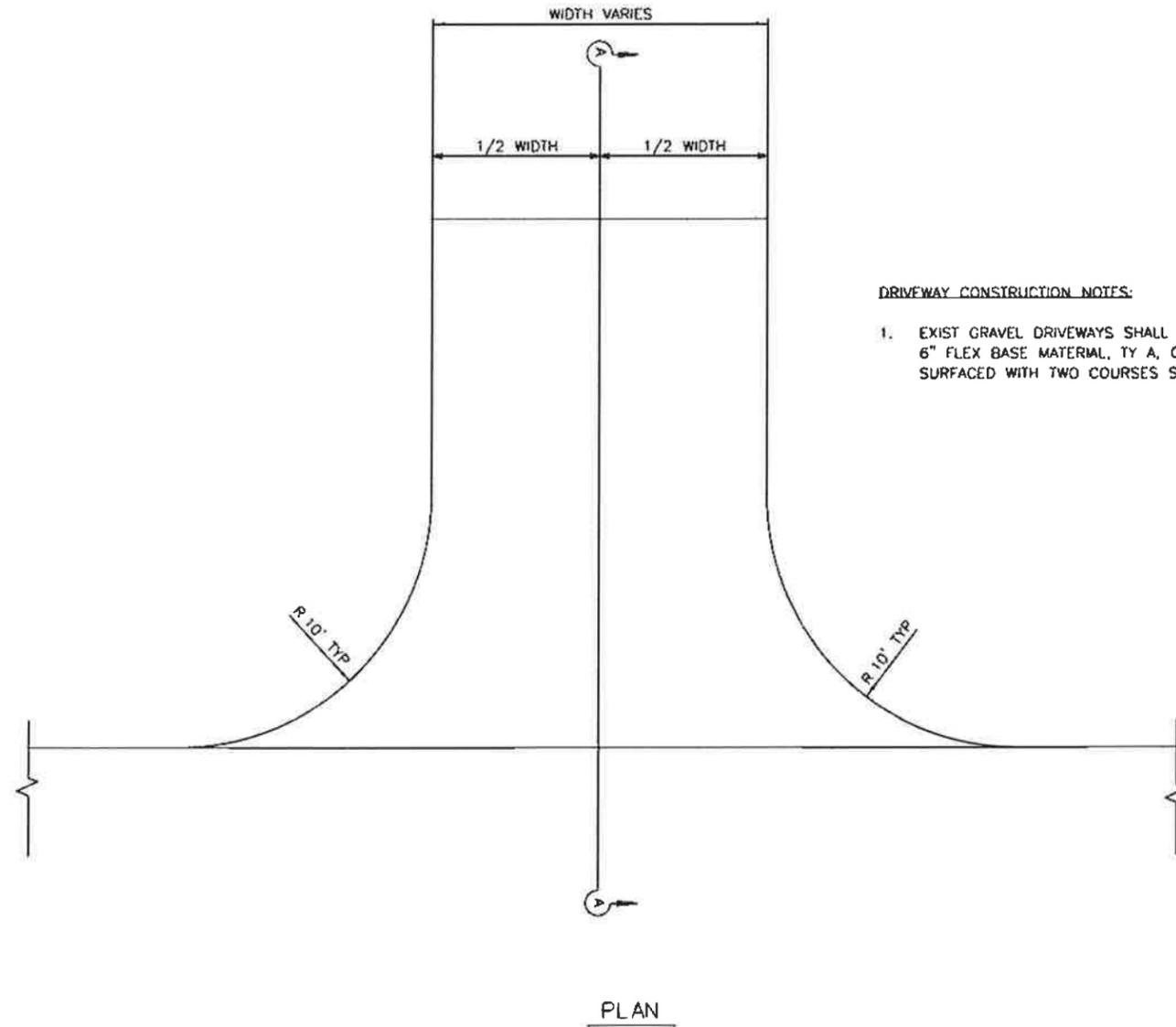
NO.	REVISION	BY	DATE

**W** WILLIAMSON COUNTY  
DEPT. OF  
WILLIAMSON COUNTY INFRASTRUCTURE  
1848

RIVER RD & OLD WINDMILL RD  
TRAFFIC CONTROL PLAN

Designed: <b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET No. <b>25</b> 125
Checked: <b>KOK</b>		
Drawn: <b>KGM</b>		
Checked: <b>KOK</b>		

RIVER OLD WINDMILL TCPO3.dgn  
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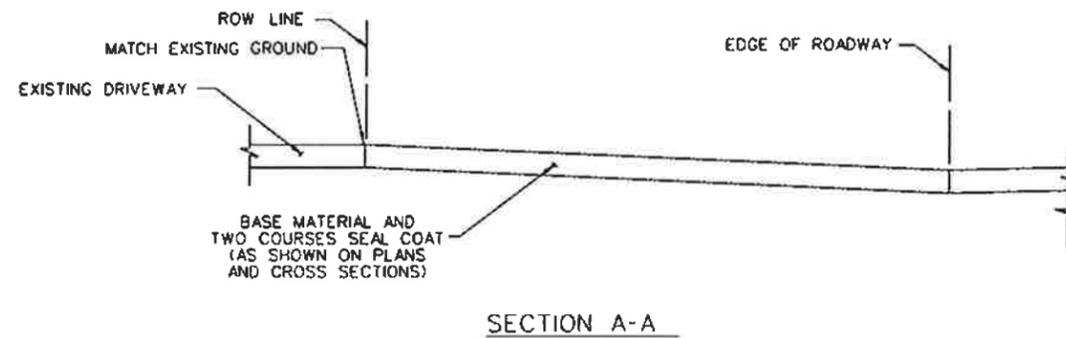


DRIVEWAY CONSTRUCTION NOTES:

- EXIST GRAVEL DRIVEWAYS SHALL BE RE-CONSTRUCTED WITH 6" FLEX BASE MATERIAL, TY A, GRADE 2, PRIME COATED, AND SURFACED WITH TWO COURSES SURFACE TREATMENT.

NOTE:

- SEE DRIVEWAY DETAILS SUMMARY SHEET AND CROSS SECTIONS FOR MORE DETAIL.



*Kelly G. Morrelli*  
8/7/17

RIVER OLD WINDMILL DRIVEWAY DETAILS.dgn  
10:02:56 AM  
7/12/2017

NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> <small>1878</small>			
<b>WILLIAMSON COUNTY</b> DEPT. OF INFRASTRUCTURE			
<b>RIVER RD, OLD WINDMILL RD &amp; SGRR</b> <b>DRIVEWAY DETAILS</b>			
Designed:	<b>KGM</b>	3151 S E INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>26</b>
Checked:	<b>XQK</b>		
Drawn:	<b>KGM</b>		
Checked:	<b>XQK</b>		

ALIGN	DRIVEWAY NO	STATION	SIDE	WIDTH (FT)	AREA (SY)	RADIUS		NOTES	PROPOSED DRIVEWAY CULVERT
						L	R		
RIVER	1	14+07.08	LT	14	28	10'	10'		N/A
RIVER	2	14+26.77	RT	12	25	10'	10'		N/A
RIVER	3	14+65.70	LT	20	38	10'	10'		N/A
RIVER	4	15+87.10	RT	14	29	10'	10'	11.2324 SKEW	N/A
RIVER	5	16+28.53	LT	12	25	10'	10'		N/A
RIVER	6	16+32.40	RT	12	25	10'	10'		N/A
RIVER	7	18+30.32	RT	20	38	10'	10'		N/A
RIVER	8	18+59.63	LT	12	25	10'	10'		N/A
RIVER	9	19+87.10	RT	15	35	15'	15'		N/A
RIVER	10	20+53.09	LT	14	28	10'	10'		N/A
RIVER	11	21+54.48	RT	14	28	10'	10'		N/A
RIVER	12	21+79.43	LT	12	25	10'	10'		N/A
RIVER	13	22+61.60	LT	20	38	10'	10'		N/A
RIVER	14	22+74.57	RT	12	25	10'	10'		N/A
RIVER	15	24+77.40	RT	16	31	10'	10'		N/A
RIVER	16	24+93.00	LT	20	42	10'	10'	17.3433 SKEW	N/A
RIVER	17	26+03.52	RT	12	28	10'	10'	22.975 SKEW	N/A
RIVER	18	26+33.97	LT	14	28	10'	10'		N/A
RIVER	19	28+17.85	RT	14	32	10'	10'	35.5015 SKEW	N/A
RIVER	20	29+02.28	LT	12	27	15'	10'		N/A
RIVER	21	30+55.40	RT	14	28	10'	10'		N/A
RIVER	22	31+29.06	LT	12	25	10'	10'		N/A
RIVER	23	31+66.28	RT	12	25	10'	10'	14.6106 SKEW	N/A
RIVER	24	31+99.76	LT	24	45	10'	10'		N/A
RIVER	25	32+85.67	LT	12	28	10'	10'	19.1947 SKEW	DCULV 1
RIVER	26	33+62.38	RT	12	25	10'	10'		N/A
RIVER	27	33+79.62	LT	12	25	10'	10'		DCULV 2
RIVER	28	33+91.86	RT	12	26	10'	10'	16.7056 SKEW	N/A
RIVER	29	34+79.60	RT	12	30	10'	10'	29.4143 SKEW	N/A
RIVER	30	35+20.44	RT	14	31	10'	10'	19.9707 SKEW	N/A
RIVER	31	35+30.53	LT	12	25	10'	10'		DCULV 3
RIVER	32	35+66.67	RT	14	31	10'	15'		N/A
RIVER	33	36+50.18	RT	12	29	10'	15'	21.8565 SKEW	N/A
RIVER	34	36+59.65	LT	24	45	10'	10'		DCULV 4
RIVER	35	38+06.52	LT	12	25	10'	10'		DCULV 5
RIVER	36	39+48.93	LT	12	26	10'	10'	12.2239 SKEW	DCULV 6
RIVER	37	40+21.06	LT	12	25	10'	10'		DCULV 7
RIVER	38	41+76.79	LT	14	28	10'	10'		DCULV 8
RIVER	39	42+93.99	LT	12	27	10'	10'	20.9734 SKEW	N/A
RIVER	40	43+40.86	RT	14	29	10'	10'	26.0299 SKEW	N/A
RIVER	41	44+24.39	LT	18	34	10'	10'		N/A
RIVER	42	45+14.07	LT	16	35	10'	10'	20.3841 SKEW	N/A

ALIGN	DRIVEWAY NO	STATION	SIDE	WIDTH (FT)	AREA (SY)	RADIUS		NOTES	PROPOSED DRIVEWAY CULVERT
						L	R		
RIVER	43	46+22.61	LT	16	30	10'	10'		N/A
RIVER	44	46+86.16	LT	18	37	15'	10'	23.7522 SKEW	N/A
RIVER	45	47+50.91	LT	14	30	10'	10'	15.8343 SKEW	N/A
RIVER	46	49+84.32	RT	12	24	10'	10'		N/A
RIVER	47	50+50.39	LT	12	25	10'	10'		N/A
RIVER	48	51+98.75	RT	14	29	10'	10'	23.1943 SKEW	N/A
RIVER	49	53+10.56	LT	12	25	10'	10'		N/A
RIVER	50	53+83.74	RT	12	27	10'	10'	19.0167 SKEW	N/A
RIVER	51	54+77.49	LT	12	25	10'	10'		N/A
RIVER	52	55+59.25	LT	18	36	10'	10'	9.6826 SKEW	N/A
RIVER	53	57+61.21	LT	12	25	10'	10'		N/A
RIVER	54	59+15.23	RT	12	25	10'	10'		N/A
RIVER	55	59+69.88	LT	24	45	10'	10'		N/A
RIVER	56	60+76.70	LT	14	28	10'	10'		N/A
RIVER	57	61+29.26	RT	12	25	10'	10'	6.4976 SKEW	DCULV 9
RIVER	58	61+81.79	LT	12	25	10'	10'		N/A
RIVER	59	62+73.02	LT	12	25	10'	10'		N/A
RIVER	60	64+28.24	LT	16	31	10'	10'	8.6718 SKEW	N/A
RIVER	61	65+68.46	LT	12	28	10'	10'	21.9893 SKEW	N/A
RIVER	62	65+75.57	RT	12	25	10'	10'		DCULV 10
RIVER	63	66+30.04	LT	12	25	10'	10'		N/A
RIVER	64	68+15.70	RT	14	29	10'	10'	11.3142 SKEW	DCULV 11
RIVER	65	69+62.83	LT	12	25	10'	10'	6.2164 SKEW	N/A
RIVER	66	70+09.58	LT	14	29	10'	10'	13.6893 SKEW	N/A
RIVER	67	70+86.47	LT	18	35	10'	10'	5.0222 SKEW	N/A
OLD WINDMILL	1	13+34.34	LT	12	25	10'	10'		N/A
OLD WINDMILL	2	14+20.11	LT	12	25	10'	10'		N/A
OLD WINDMILL	3	14+59.63	RT	12	25	10'	10'		DCULV 1
OLD WINDMILL	4	15+15.96	LT	12	28	10'	10'	20.8879 SKEW	N/A
OLD WINDMILL	5	15+71.54	RT	12	25	10'	10'		N/A
OLD WINDMILL	6	16+04.23	LT	12	25	10'	10'		N/A
OLD WINDMILL	7	16+58.93	RT	18	35	10'	10'		DCULV 2
OLD WINDMILL	8	18+94.08	RT	12	26	10'	10'	15.0706 SKEW	DCULV 3
OLD WINDMILL	9	19+09.36	LT	12	32	10'	10'	47.9375 SKEW	N/A
OLD WINDMILL	10	19+45.38	RT	12	26	10'	10'	13.8405 SKEW	DCULV 4
OLD WINDMILL	11	21+90.35	RT	12	28	10'	10'	20.7323 SKEW	N/A
OLD WINDMILL	12	22+93.98	LT	20	38	10'	10'		N/A
OLD WINDMILL	13	23+82.31	LT	12	40	10'	10'	68.1255 SKEW	N/A
OLD WINDMILL	14	24+70.04	LT	12	27	10'	10'	23.6743 SKEW	N/A
OLD WINDMILL	15	25+18.98	RT	12	25	10'	10'		N/A
OLD WINDMILL	16	25+68.57	LT	32	58	10'	10'		DCULV 5
OLD WINDMILL	17	26+22.62	LT	12	25	10'	10'		DCULV 6
OLD WINDMILL	18	27+06.55	LT	12	27	10'	10'	20.0806 SKEW	DCULV 7
ALIGN	DRIVEWAY NO	STATION	SIDE	WIDTH (FT)	AREA (SY)	RADIUS		NOTES	PROPOSED DRIVEWAY CULVERT
SGRR	1	1+23.32	LT	14	35	10'	10'	12.9472 SKEW	DCULV1
SGRR	2	1+87.23	LT	14	34	10'	10'		DCULV2

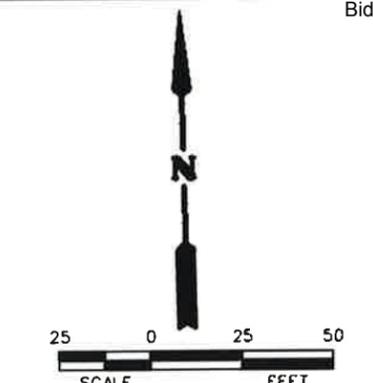
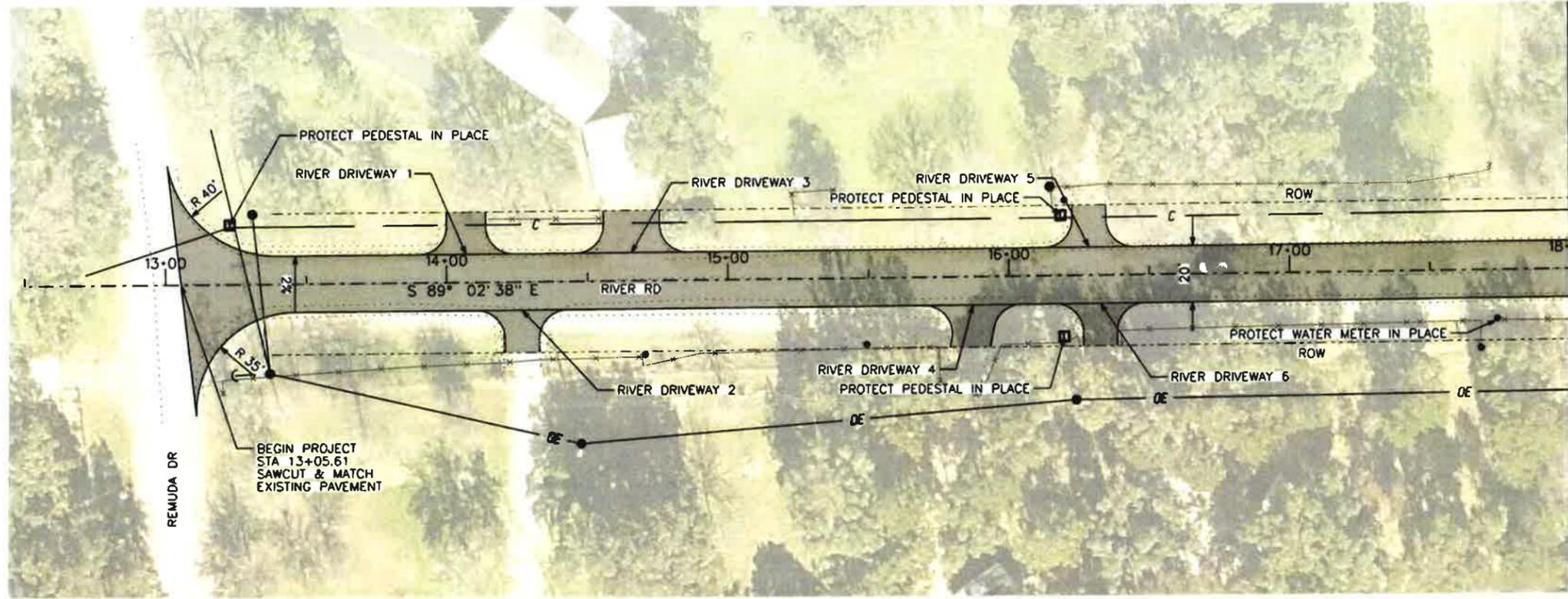
NOTE:  
1. SEE DRIVEWAY DETAILS SHEET AND CROSS SECTIONS FOR MORE DETAIL.



*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> DEPT. OF INFRASTRUCTURE 1818			
<b>RIVER RD, OLD WINDMILL RD &amp; SGRR DRIVEWAY DETAIL SUMMARY</b>			
Designed:	<b>KGM</b>	3151 S.E. INNER LOOP, SUITE B	
Checked:	<b>KQK</b>	GEORGETOWN, TEXAS 78626	
Drawn:	<b>KGM</b>	943-3330	
Checked:	<b>KQK</b>	www.wilco.org	
			SHEET NO. <b>27</b>

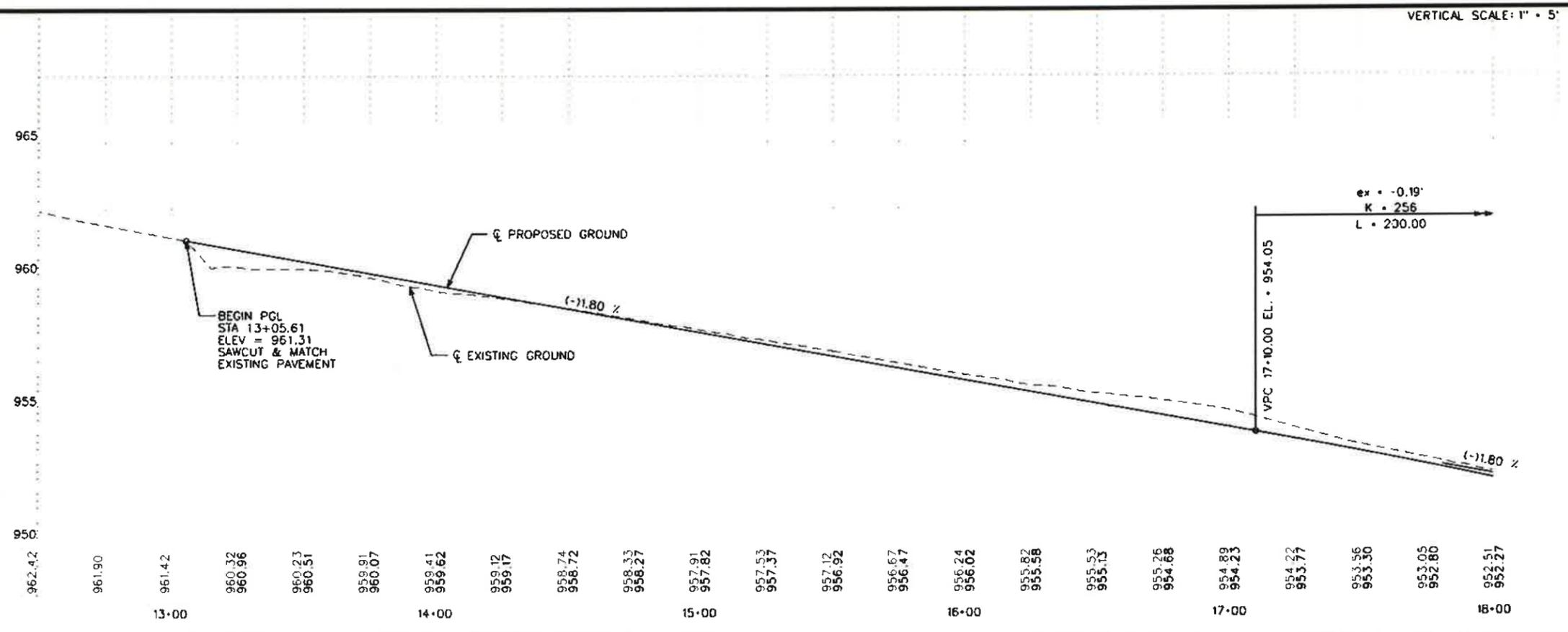
RIVER, OLD WINDMILL DRIVEWAY DETAIL SUMMARY.dgn 10:03:10 AM 7/12/2017



- LEGEND**
- TWO COURSE SEAL COAT
  - W EXIST WATER LINE
  - xx EXIST FENCE
  - OEOE EXIST OVERHEAD ELECTRIC
  - CC EXIST UNDERGROUND CABLE
  - DD DITCH FLOW LINE
  - WATER METER
  - TELEPHONE PEDESTAL

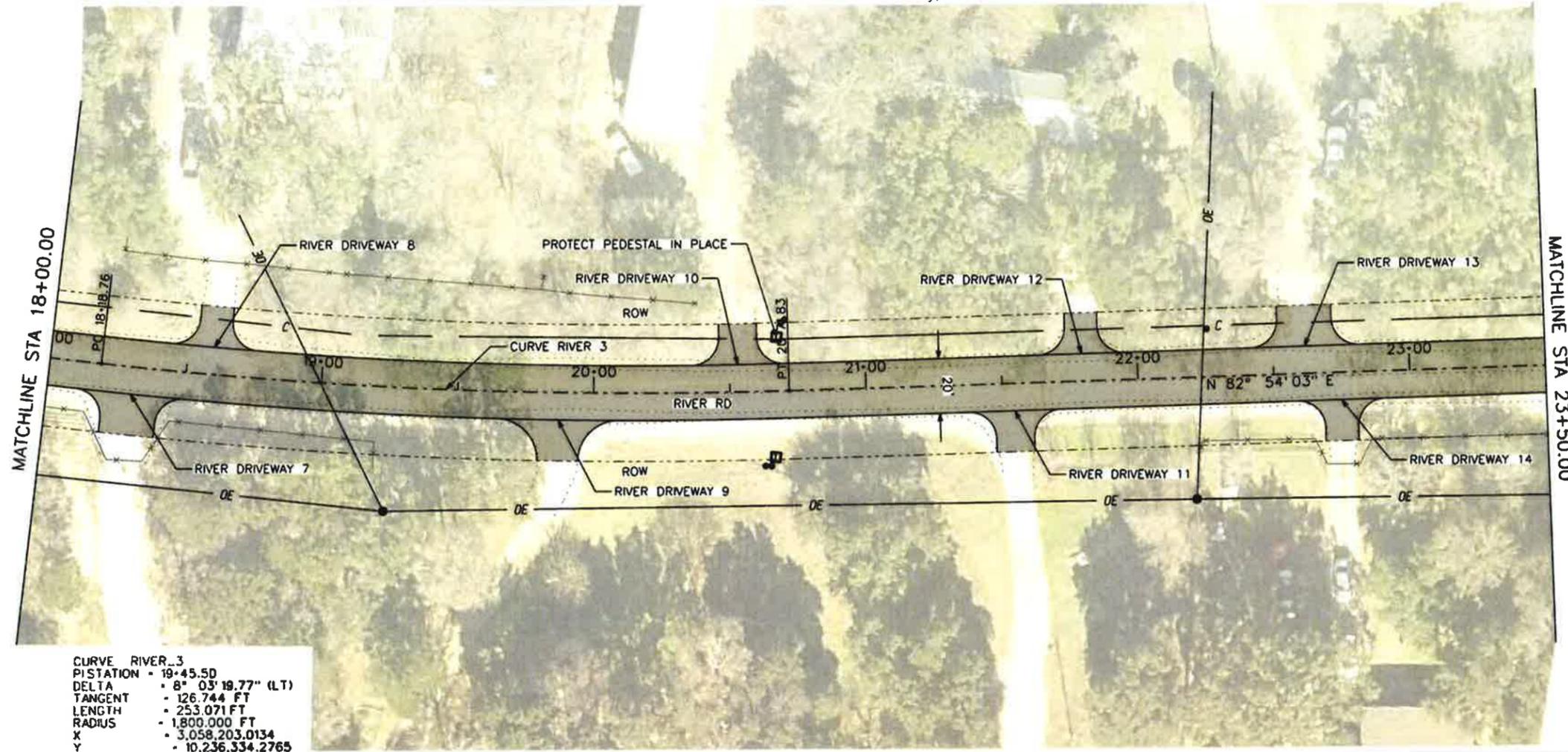
- NOTES:**
1. ALL UTILITIES SHOWN ARE BY APPROXIMATE LOCATION ONLY AND ARE TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO BEGINNING CONSTRUCTION.
  2. CONTRACTOR SHALL REPAIR / RECONNECT EXISTING UTILITIES DISCONNECTED OR DAMAGED DURING CONSTRUCTION.
  3. THE "ONE CALL" SYSTEM WILL BE USED TO LOCATE EXISTING UNDERGROUND UTILITIES.
  4. CONTRACTOR SHALL RETURN THE GROUND AREA DISTURBED BY CONSTRUCTION ACTIVITY TO EQUAL OR BETTER CONDITION IN SUCH A MANNER AS NOT TO CHANGE THE ROUTE OF STORM WATER FLOW.
  5. EXIST MAILBOXES TO BE RELOCATED TO EDGE OF PROPOSED SHOULDER AS REQUIRED.
  6. SEE DRIVEWAY DETAILS FOR MORE INFORMATION.

VERTICAL SCALE: 1" = 5'

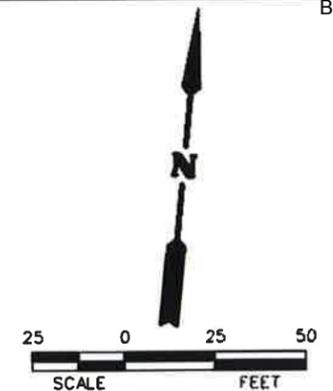


	REVISION	BY	DATE
<b>WILLIAMSON COUNTY</b> DEPT. OF INFRASTRUCTURE			
<b>RIVER RD</b> <b>PLAN AND PROFILE</b>			
Designed:	KGM	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626	
Checked:	KOK	943-3330	
Drawn:	KGM	www.wilco.org	
Checked:	KOK		
			SHEET NO. <b>28</b>

RIVER\_PPO1.dgn 10/03/23 AM  
 8/10/2017 9:17 AM



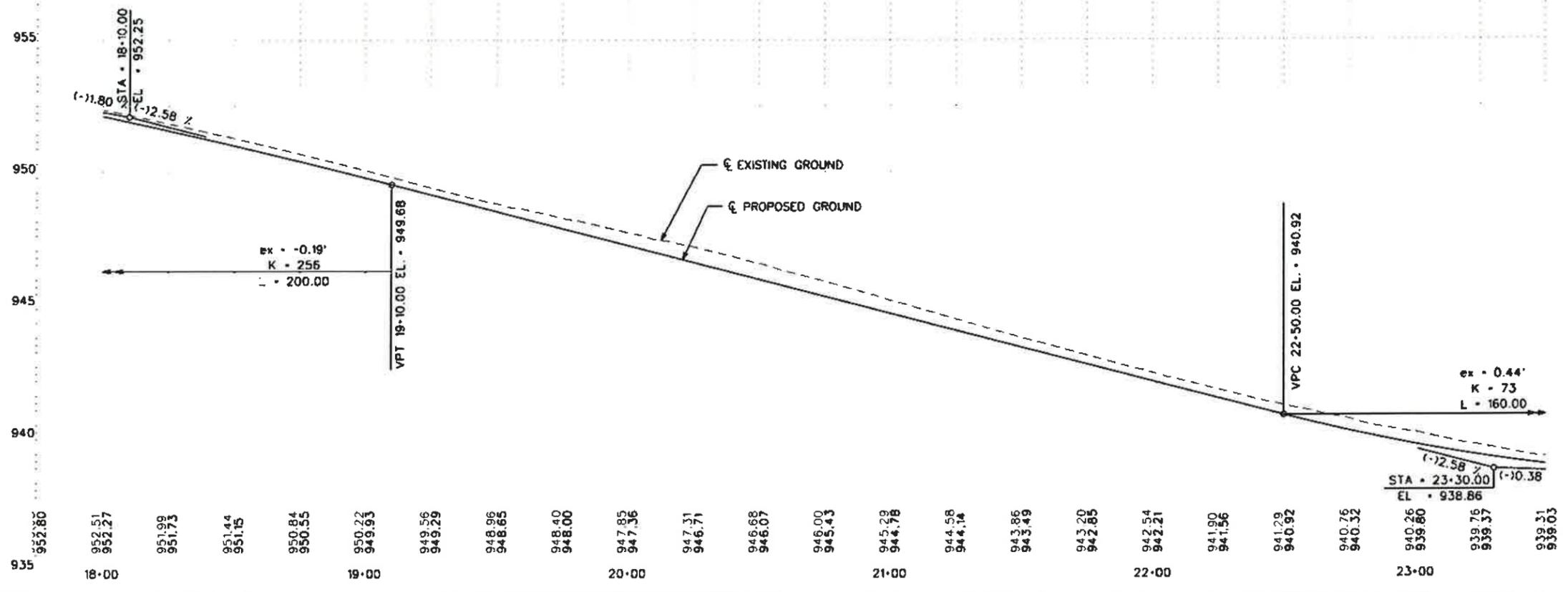
CURVE RIVER\_3  
 PISTATION - 19+45.50  
 DELTA - 8° 03' 19.77" (LT)  
 TANGENT - 126.744 FT  
 LENGTH - 253.071 FT  
 RADIUS - 1,800.000 FT  
 X - 3,058,203.0134  
 Y - 10,236,334.2765



- LEGEND**
- TWO COURSE SEAL COAT
  - EXIST WATER LINE
  - EXIST FENCE
  - EXIST OVERHEAD ELECTRIC
  - EXIST UNDERGROUND CABLE
  - DITCH FLOW LINE
  - WATER METER
  - TELEPHONE PEDESTAL

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VERTICAL SCALE: 1" = 5'

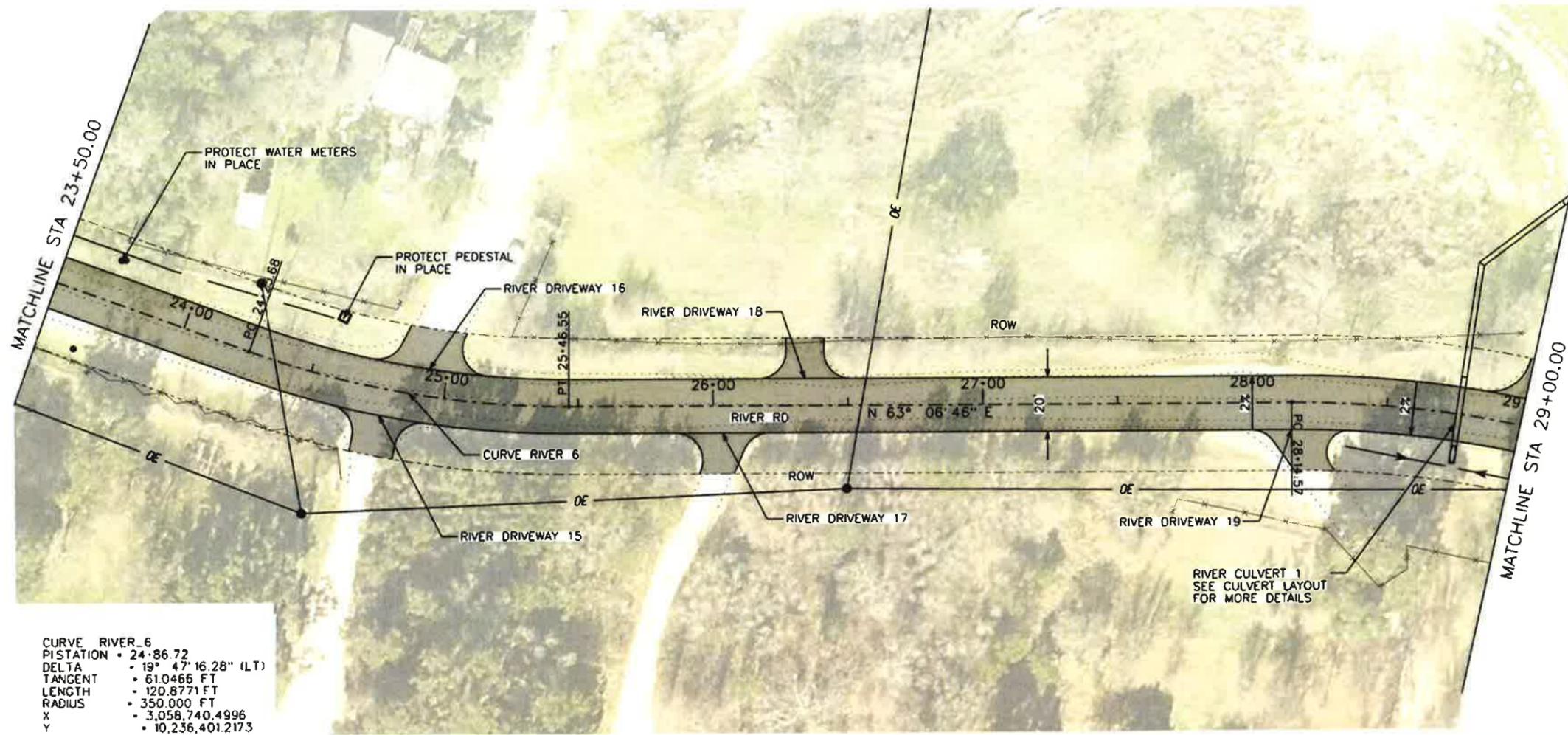


*Kelly G. Morrelli*  
 8/17/17

NO.	REVISION	BY	DATE



<b>RIVER RD PLAN AND PROFILE</b>		3151 S E INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>29</b>
Designed:	KGM		
Checked:	KQK		
Drawn:	KGM		



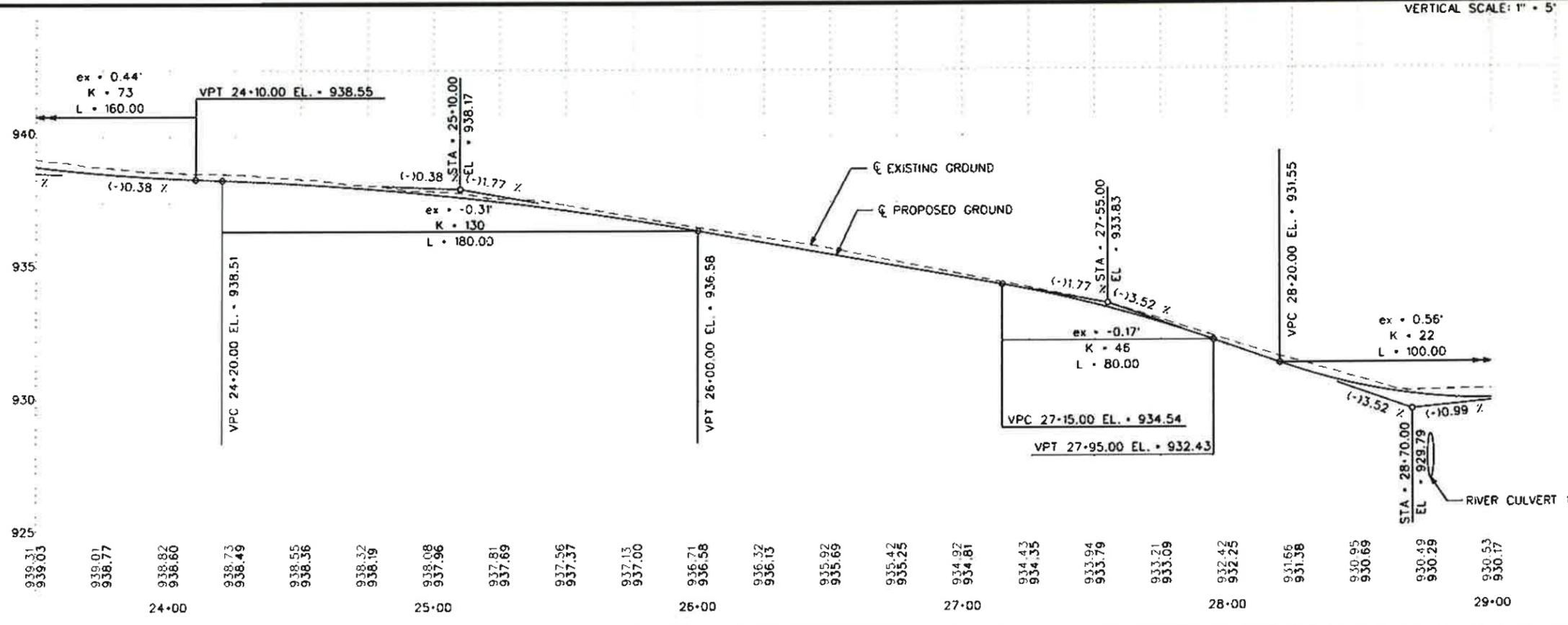
**CURVE RIVER\_6**  
 PISTATION • 24+86.72  
 DELTA • 19° 47' 16.28" (LT)  
 TANGENT • 61.0466 FT  
 LENGTH • 120.8771 FT  
 RADIUS • 350.000 FT  
 X • 3,058,740.4996  
 Y • 10,236,401.2173

**LEGEND**

- TWO COURSE SEAL COAT
- EXIST WATER LINE
- EXIST FENCE
- EXIST OVERHEAD ELECTRIC
- EXIST UNDERGROUND CABLE
- DITCH FLOW LINE
- WATER METER
- TELEPHONE PEDESTAL

- NOTES:**
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  - SEE DRIVEWAY DETAILS FOR MORE INFORMATION.

VERTICAL SCALE: 1" = 5'



*Kelly G. Morrelli*  
 8/7/17

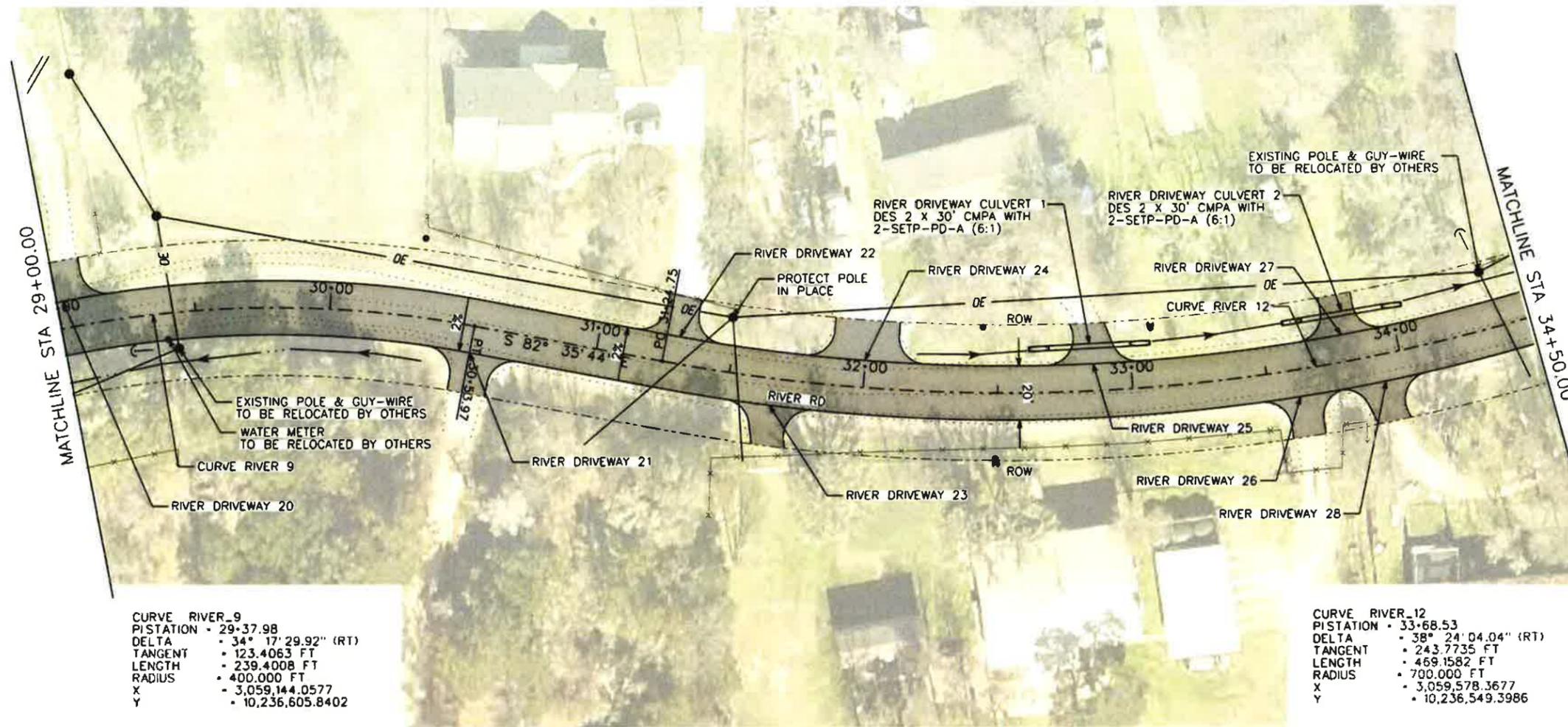
NO.	REVISION	BY	DATE



**RIVER RD  
 PLAN AND PROFILE**

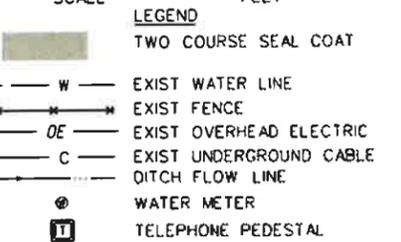
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Checked:	KOK		
Drawn:	KGM		
Checked:	KOK		

RIVER\_PPO3.dgn  
 10-03-45 AM  
 8/10/2017 9:17 AM



**CURVE RIVER\_9**  
 PISTATION - 29+37.98  
 DELTA - 34° 17' 29.92" (RT)  
 TANGENT - 123.4063 FT  
 LENGTH - 239.4008 FT  
 RADIUS - 400.000 FT  
 X - 3,059,144.0577  
 Y - 10,236,605.8402

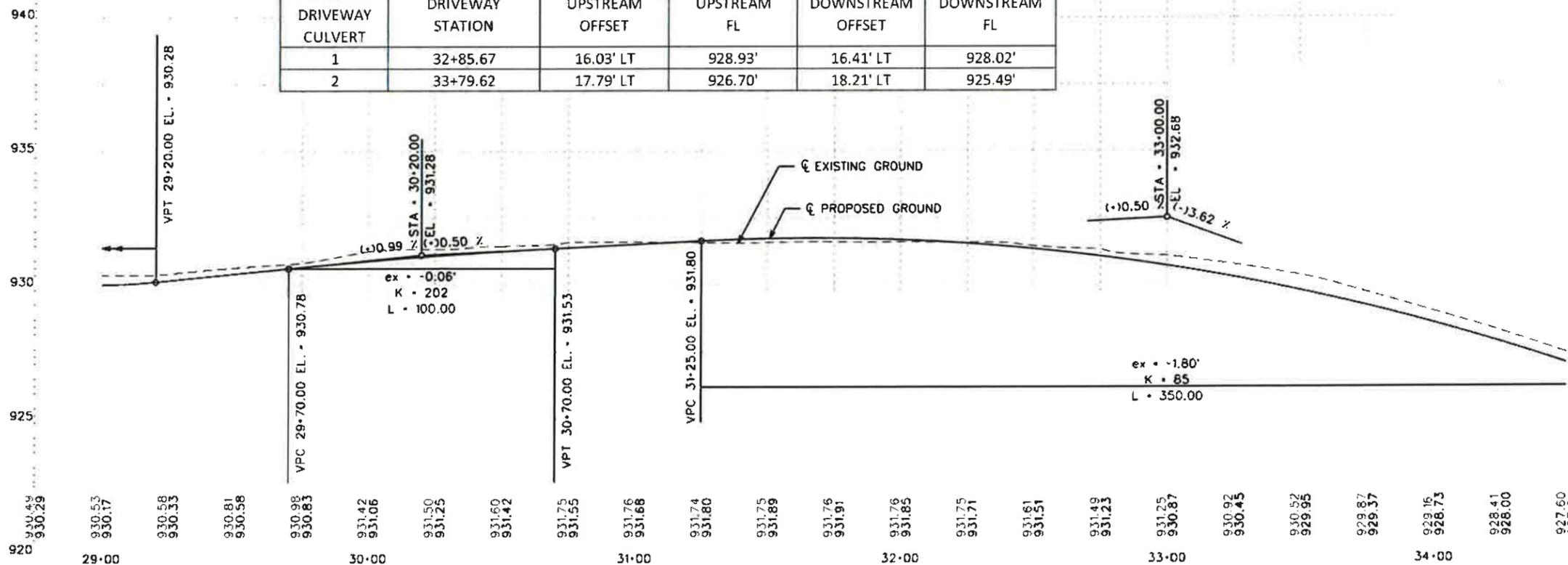
**CURVE RIVER\_12**  
 PISTATION - 33+68.53  
 DELTA - 38° 24' 04.04" (RT)  
 TANGENT - 243.7735 FT  
 LENGTH - 469.1582 FT  
 RADIUS - 700.000 FT  
 X - 3,059,578.3677  
 Y - 10,236,549.3986



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  5. EXIST. MAILBOXES TO BE RELOCATED TO EDGE OF PROPOSED SHOULDER AS REQUIRED.
  6. SEE DRIVEWAY DETAILS FOR MORE INFORMATION.

VERTICAL SCALE: 1" = 5'

RIVER DRIVEWAY CULVERT	DRIVEWAY STATION	UPSTREAM OFFSET	UPSTREAM FL	DOWNSTREAM OFFSET	DOWNSTREAM FL
1	32+85.67	16.03' LT	928.93'	16.41' LT	928.02'
2	33+79.62	17.79' LT	926.70'	18.21' LT	925.49'



*Kelly G. Morrelli*  
 8/7/17

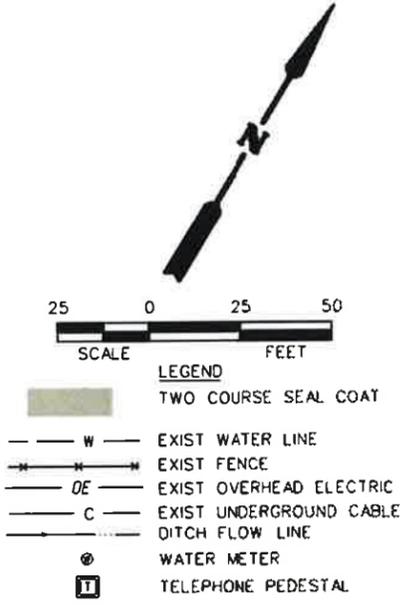
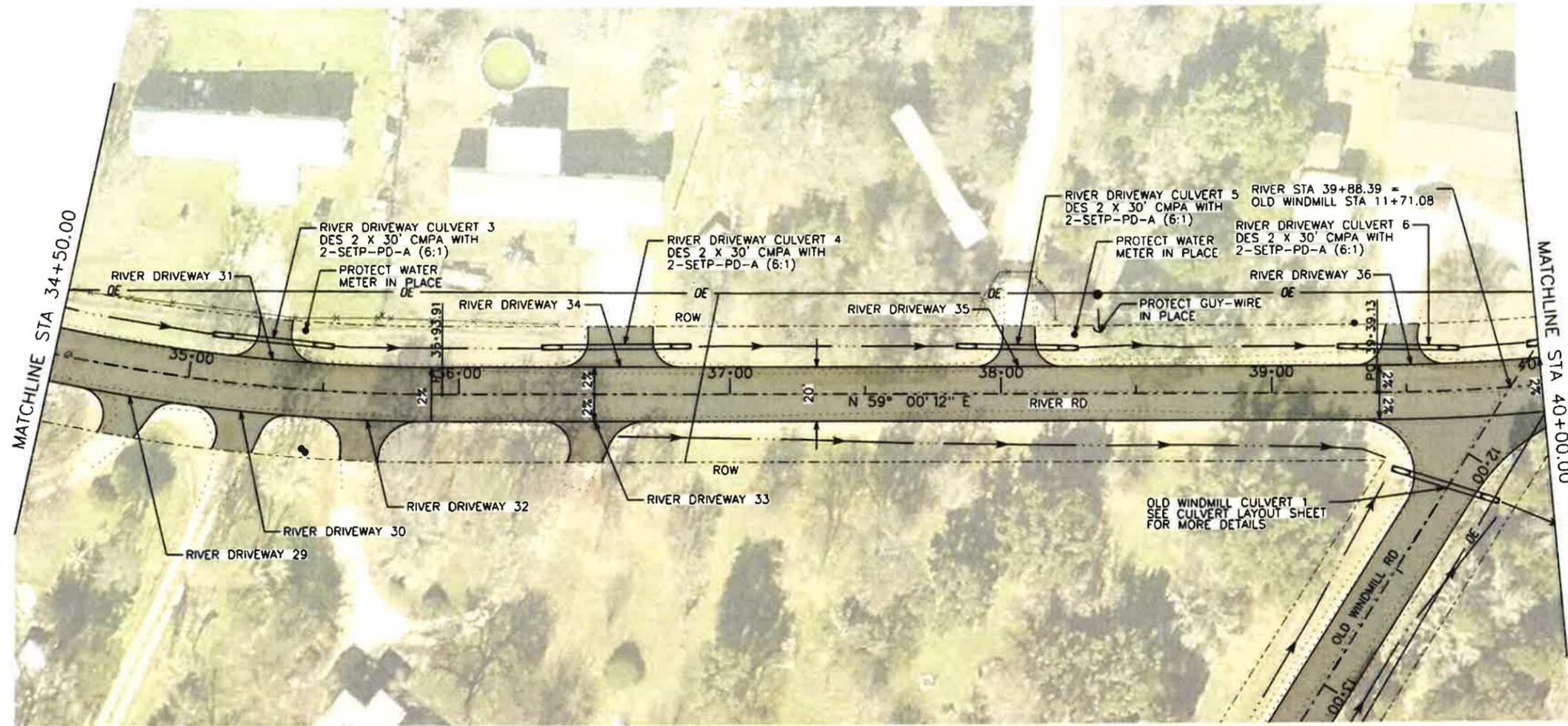
NO.	REVISION	BY	DATE

**WILLIAMSON COUNTY**  
 1818

**WILLIAMSON COUNTY**  
 DEPT. OF INFRASTRUCTURE

**RIVER RD**  
 PLAN AND PROFILE

Designed: KGM	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>31</b>
Checked: KQK		
Drawn: KGM		
Checked: KQK		

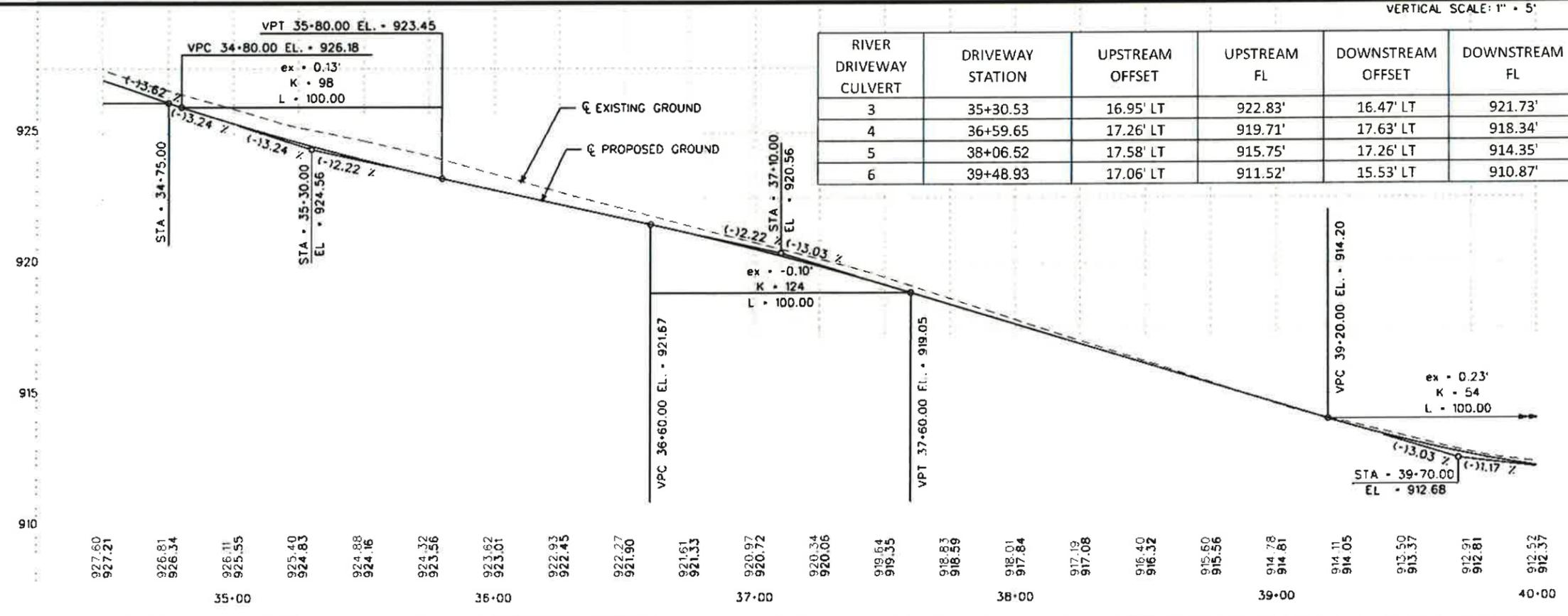


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  6. SEE DRIVEWAY DETAILS FOR MORE INFORMATION.



RIVER DRIVEWAY CULVERT	DRIVEWAY STATION	UPSTREAM OFFSET	UPSTREAM FL	DOWNSTREAM OFFSET	DOWNSTREAM FL
3	35+30.53	16.95' LT	922.83'	16.47' LT	921.73'
4	36+59.65	17.26' LT	919.71'	17.63' LT	918.34'
5	38+06.52	17.58' LT	915.75'	17.26' LT	914.35'
6	39+48.93	17.06' LT	911.52'	15.53' LT	910.87'

VERTICAL SCALE: 1" = 5'

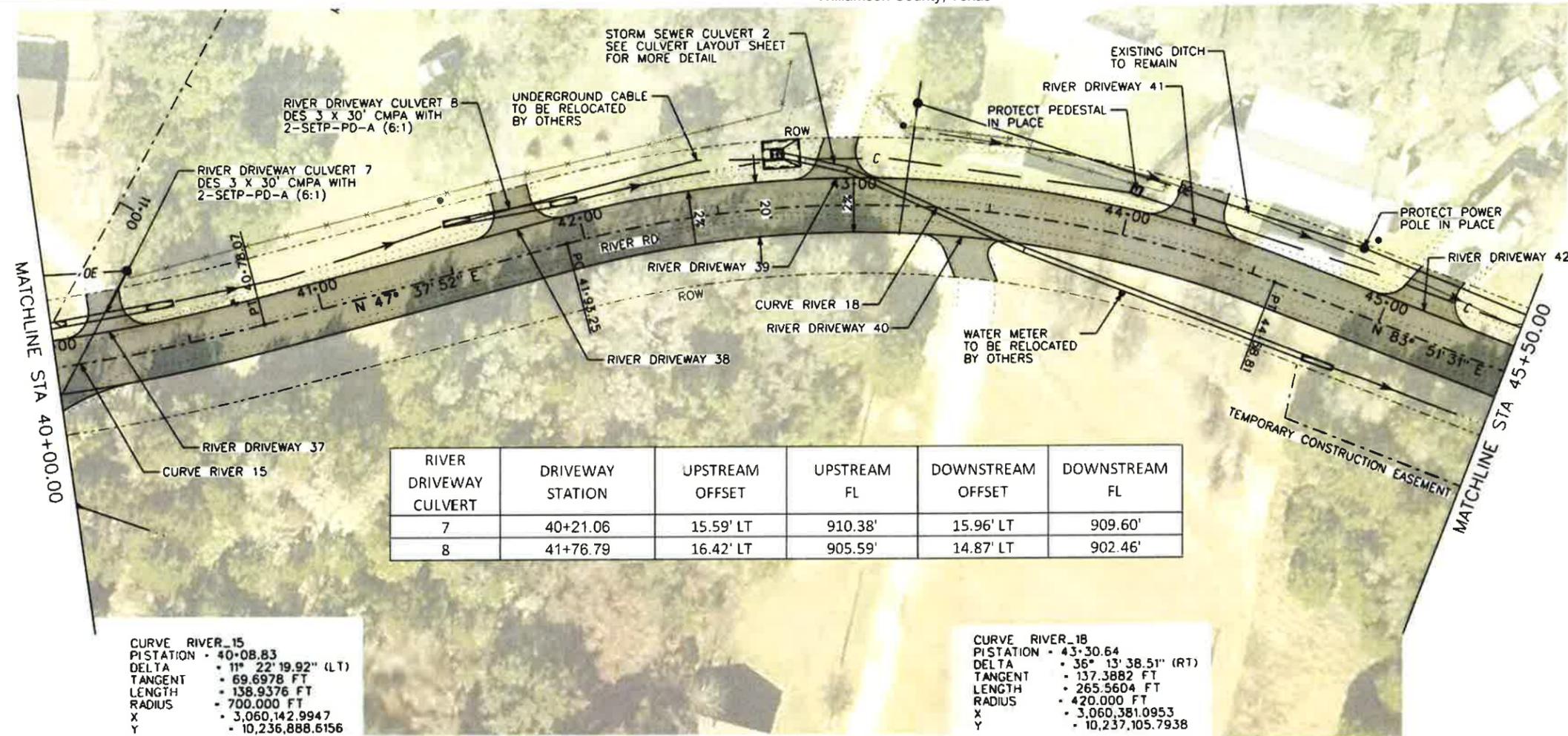


NO.	REVISION	BY	DATE

**WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE**

**RIVER RD PLAN AND PROFILE**

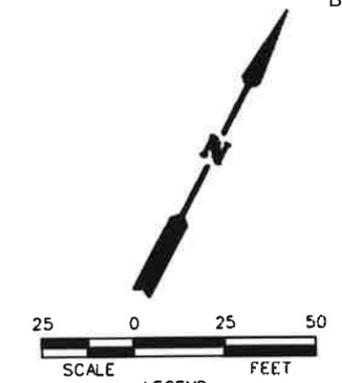
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Checked: KQK		
Drawn: KGM		
Checked: KQK		



RIVER DRIVEWAY CULVERT	DRIVEWAY STATION	UPSTREAM OFFSET	UPSTREAM FL	DOWNSTREAM OFFSET	DOWNSTREAM FL
7	40+21.06	15.59' LT	910.38'	15.96' LT	909.60'
8	41+76.79	16.42' LT	905.59'	14.87' LT	902.46'

**CURVE RIVER\_15**  
 PISTATION - 40+08.83  
 DELTA - 11° 22' 19.92" (LT)  
 TANGENT - 69.6978 FT  
 LENGTH - 138.9376 FT  
 RADIUS - 700.000 FT  
 X - 3,060,142.9947  
 Y - 10,236,888.6156

**CURVE RIVER\_18**  
 PISTATION - 43+30.64  
 DELTA - 36° 13' 38.51" (RT)  
 TANGENT - 137.3882 FT  
 LENGTH - 265.5604 FT  
 RADIUS - 420.000 FT  
 X - 3,060,381.0953  
 Y - 10,237,105.7938



- LEGEND**
- TWO COURSE SEAL COAT
  - W EXIST WATER LINE
  - x EXIST FENCE
  - oe EXIST OVERHEAD ELECTRIC
  - c EXIST UNDERGROUND CABLE
  - d DITCH FLOW LINE
  - WATER METER
  - TELEPHONE PEDESTAL

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  6. SEE DRIVEWAY DETAILS FOR MORE INFORMATION.



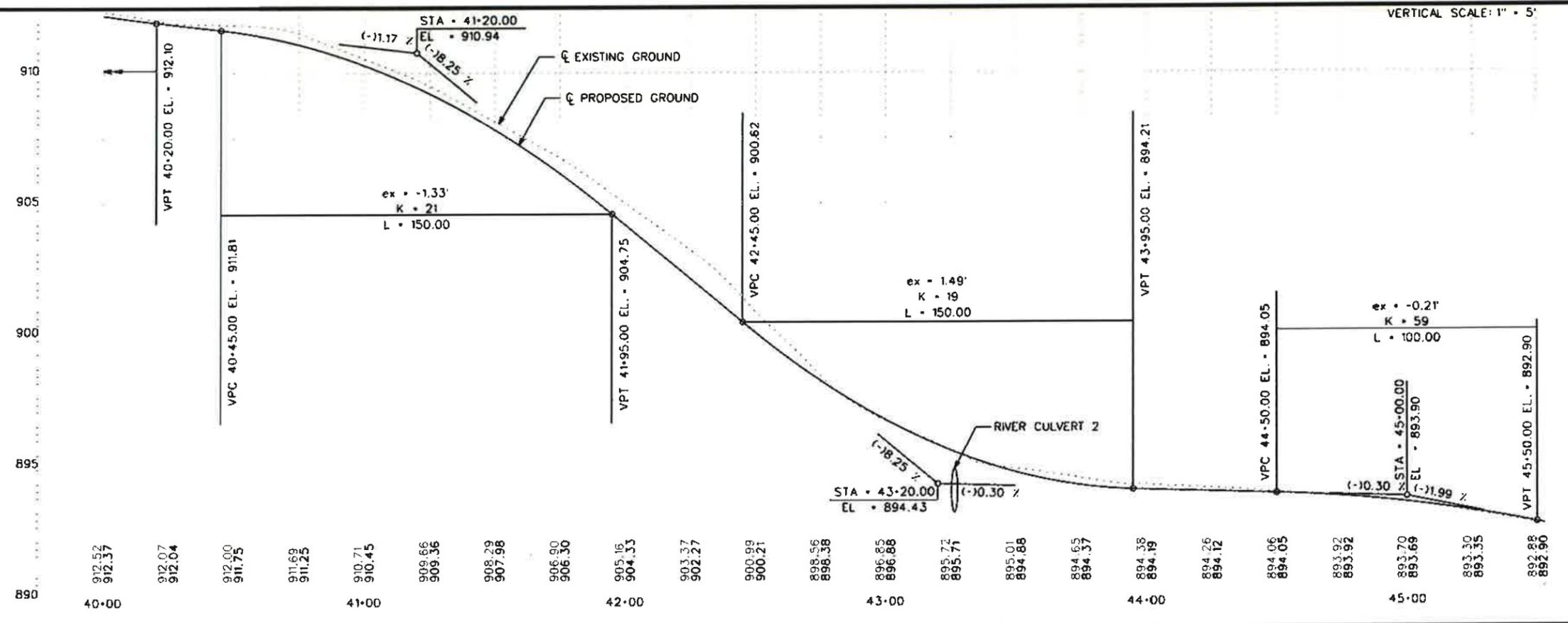
*Kelly G. Morrelli*  
 8/7/17

NO.	REVISION	BY	DATE

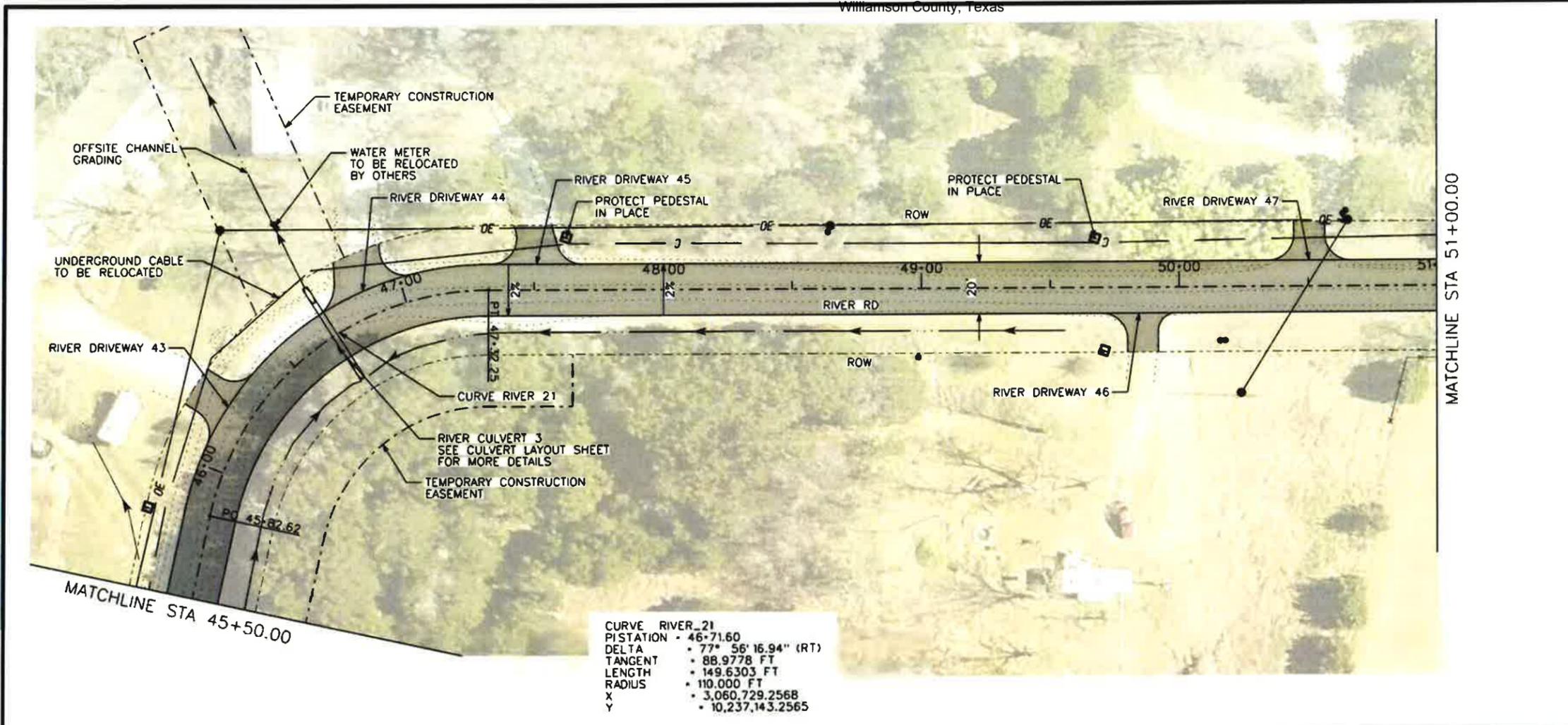


**RIVER RD  
 PLAN AND PROFILE**

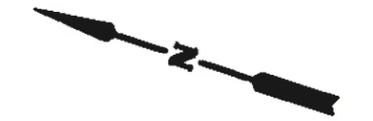
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Checked:	KQK		
Drawn:	KGM		
Checked:	KQK		



8/10/2017 9:17 AM  
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 10:04:20 AM

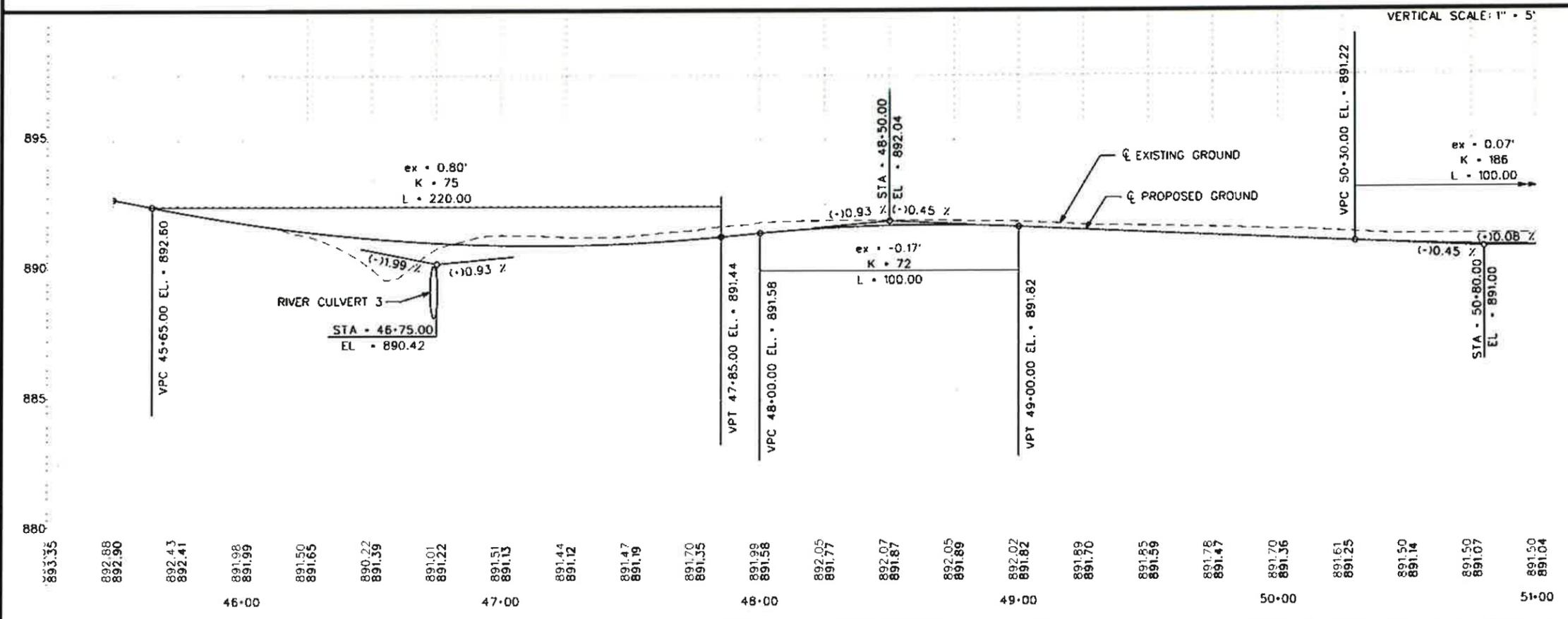


CURVE RIVER\_21  
PISTATION - 46+71.60  
DELTA - 77° 56' 16.94" (RT)  
TANGENT - 88.9778 FT  
LENGTH - 149.6303 FT  
RADIUS - 110.000 FT  
X - 3,060.729.2568  
Y - 10,237,143.2565



- LEGEND
- TWO COURSE SEAL COAT
  - W EXIST WATER LINE
  - EXIST FENCE
  - DE EXIST OVERHEAD ELECTRIC
  - C EXIST UNDERGROUND CABLE
  - DITCH FLOW LINE
  - WATER METER
  - TELEPHONE PEDESTAL

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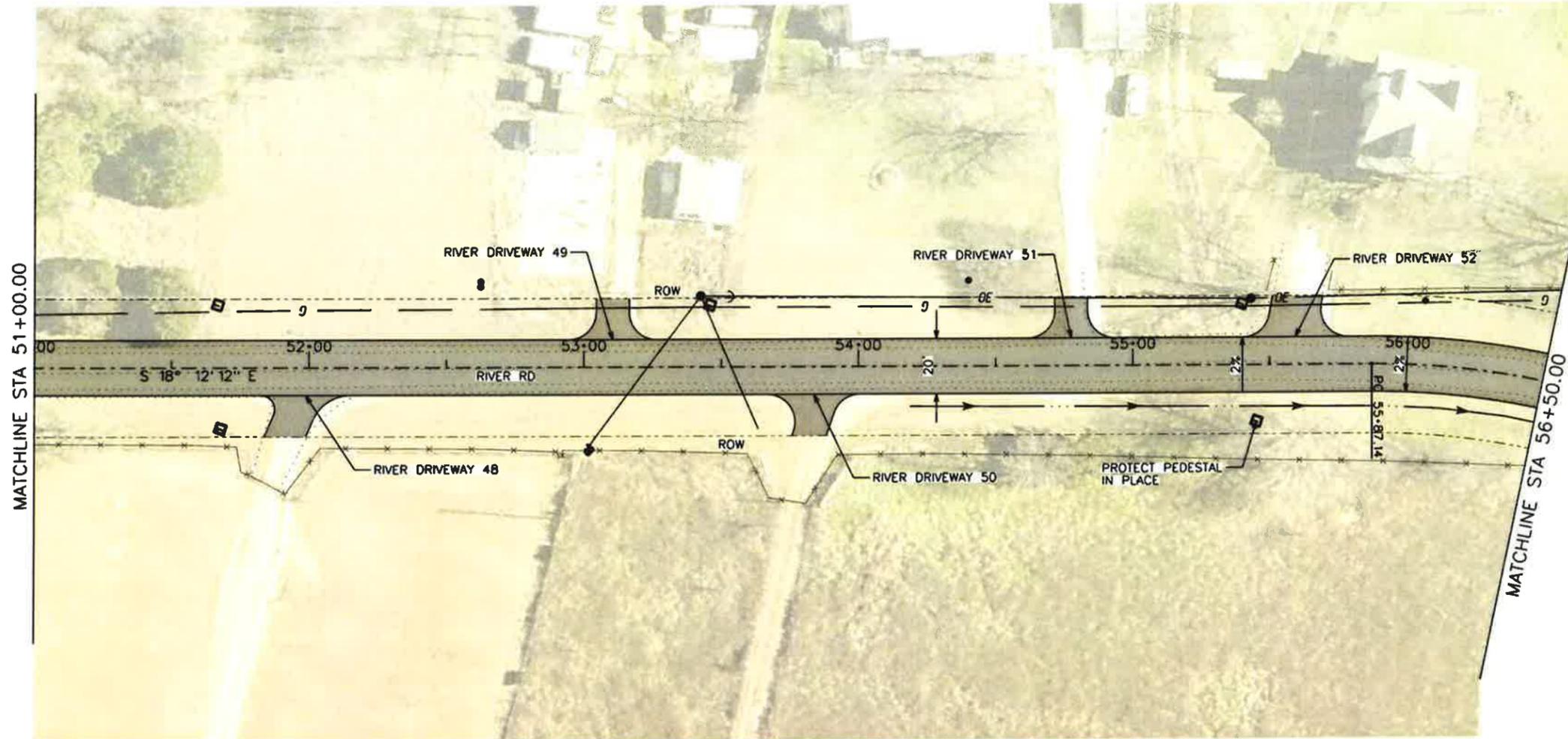


NO.	REVISION	BY	DATE

WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE

RIVER RD  
PLAN AND PROFILE

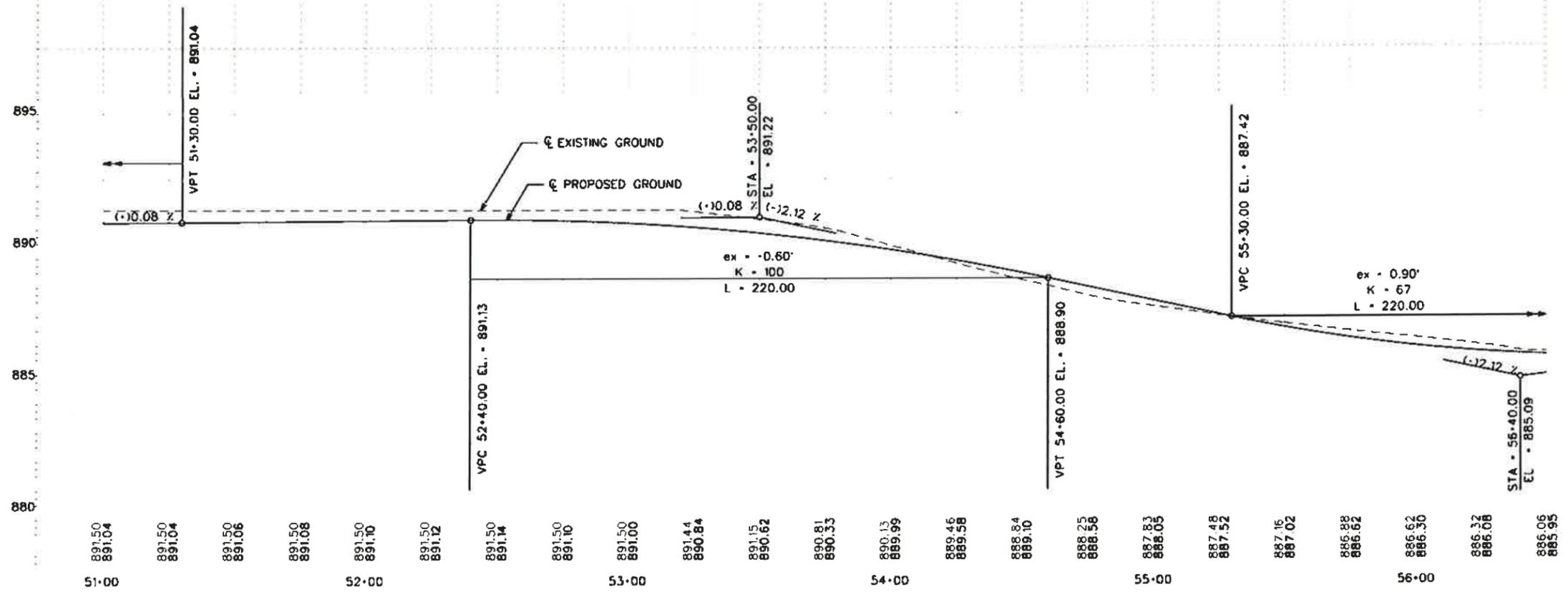
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Checked:	KOK		
Drawn:	KGM		
Checked:	KOK		



- LEGEND**
- TWO COURSE SEAL COAT
  - W — EXIST WATER LINE
  - F — EXIST FENCE
  - OE — EXIST OVERHEAD ELECTRIC
  - C — EXIST UNDERGROUND CABLE
  - D — DITCH FLOW LINE
  - ⊙ WATER METER
  - ⊠ TELEPHONE PEDESTAL

- NOTES:**
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  2. CONTRACTOR SHALL REPAIR / RECONNECT EXISTING UTILITIES DISCONNECTED OR DAMAGED DURING CONSTRUCTION.
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  5. EXIST. MAILBOXES TO BE RELOCATED TO EDGE OF PROPOSED SHOULDER AS REQUIRED.
  6. SEE DRIVEWAY DETAILS FOR MORE INFORMATION.

VERTICAL SCALE: 1" = 5'



NO.	REVISION	BY	DATE

**WILLIAMSON COUNTY**  
1818

**WILLIAMSON COUNTY**  
DEPT. OF  
INFRASTRUCTURE

**RIVER RD  
PLAN AND PROFILE**

Designed: KGM	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>35</b>
Checked: KQM		
Drawn: KGM		
Checked: KQM		

RIVER\_PP08.dgn 10:04:42 AM 8/12/2017  
8/10/2017 9:17 AM



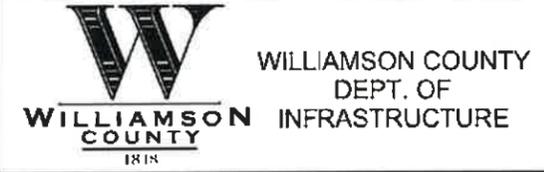
- LEGEND**
- TWO COURSE SEAL COAT
  - EXIST WATER LINE
  - EXIST FENCE
  - EXIST OVERHEAD ELECTRIC
  - EXIST UNDERGROUND CABLE
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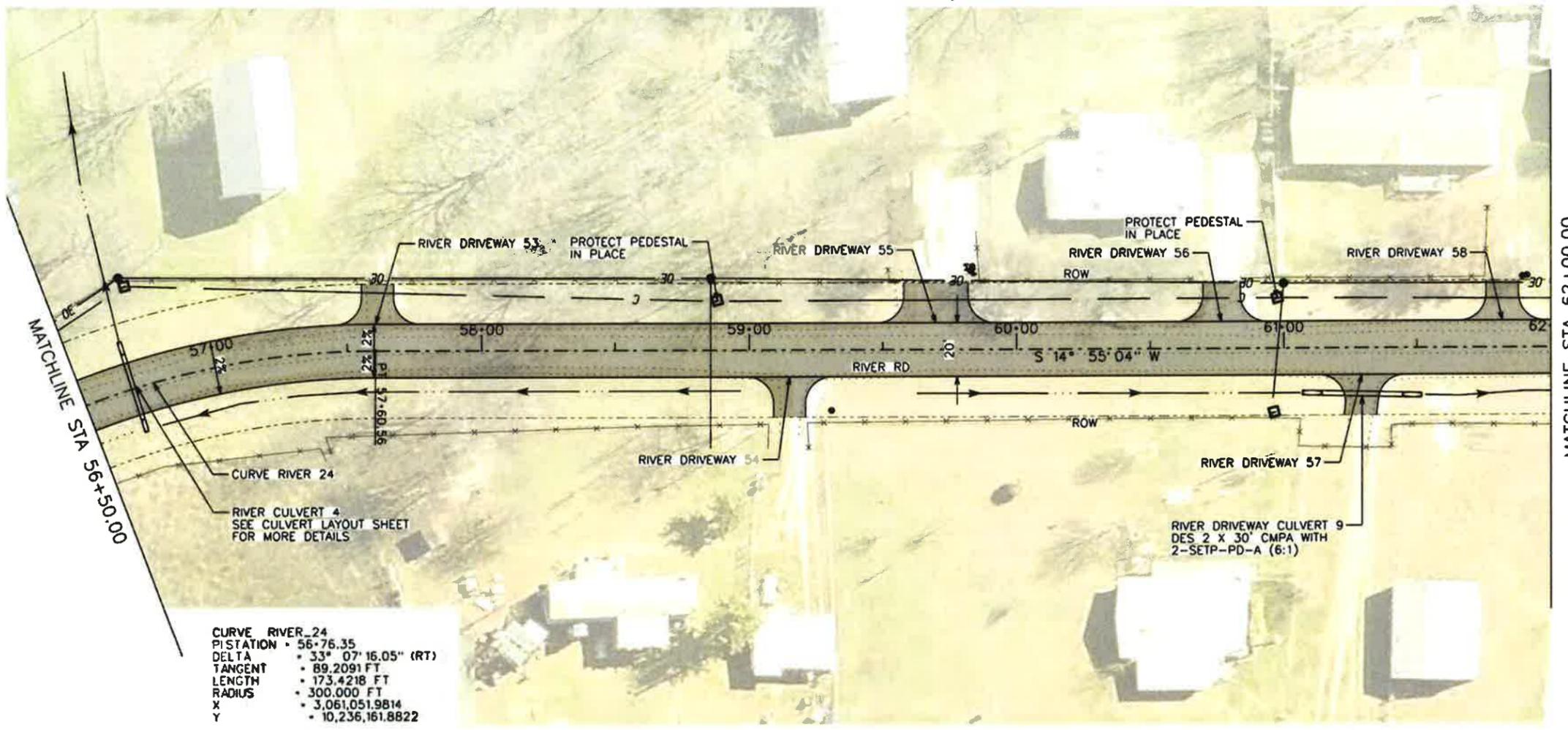
*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE



**RIVER RD  
PLAN AND PROFILE**

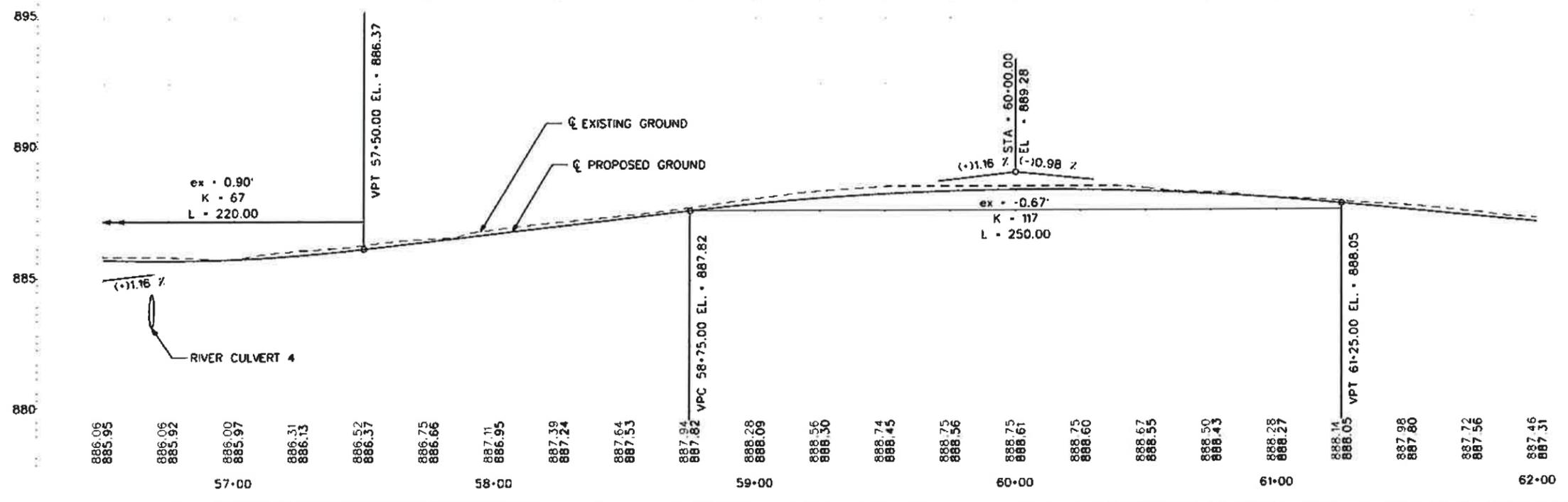
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Checked:	KQK		
Drawn:	KGM		
Checked:	KQK		



**CURVE RIVER\_24**  
 PISTATION • 56+76.35  
 DELTA • 33° 07' 16.05" (RT)  
 TANGENT • 89.2091 FT  
 LENGTH • 173.4218 FT  
 RADIUS • 300.000 FT  
 X • 3,061,051.9814  
 Y • 10,236,161.8822

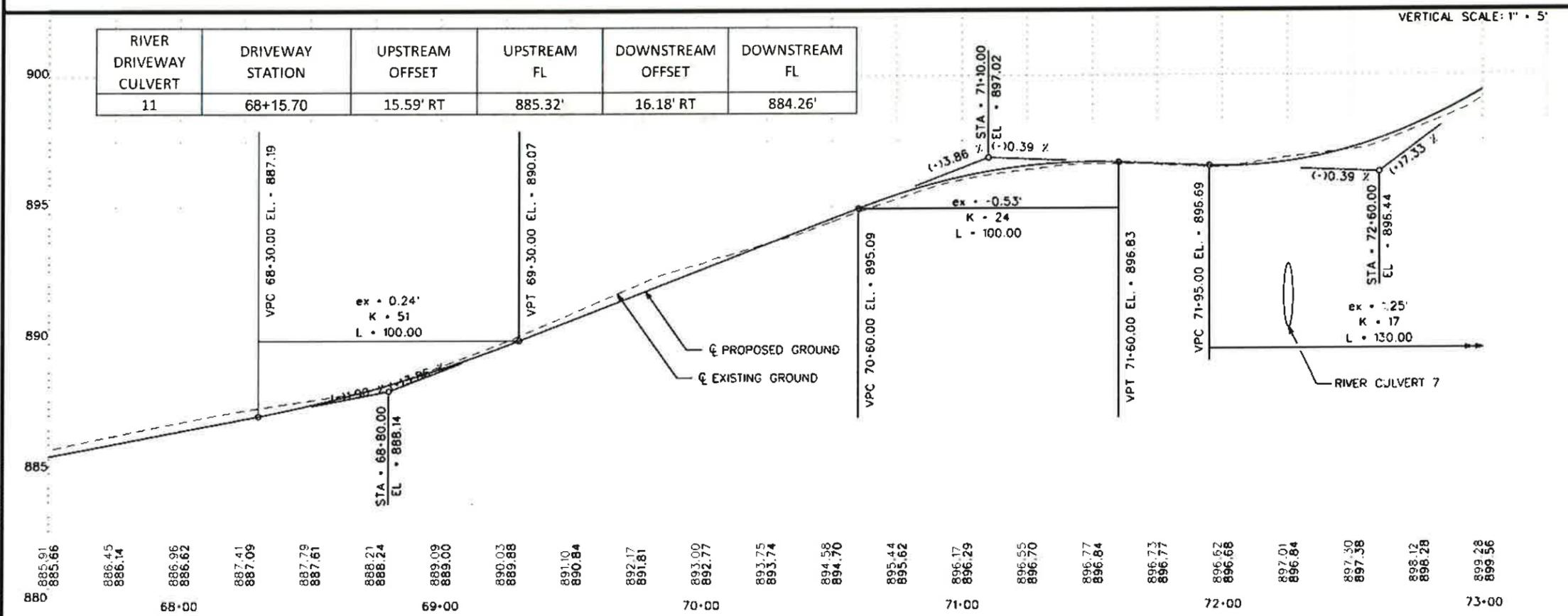
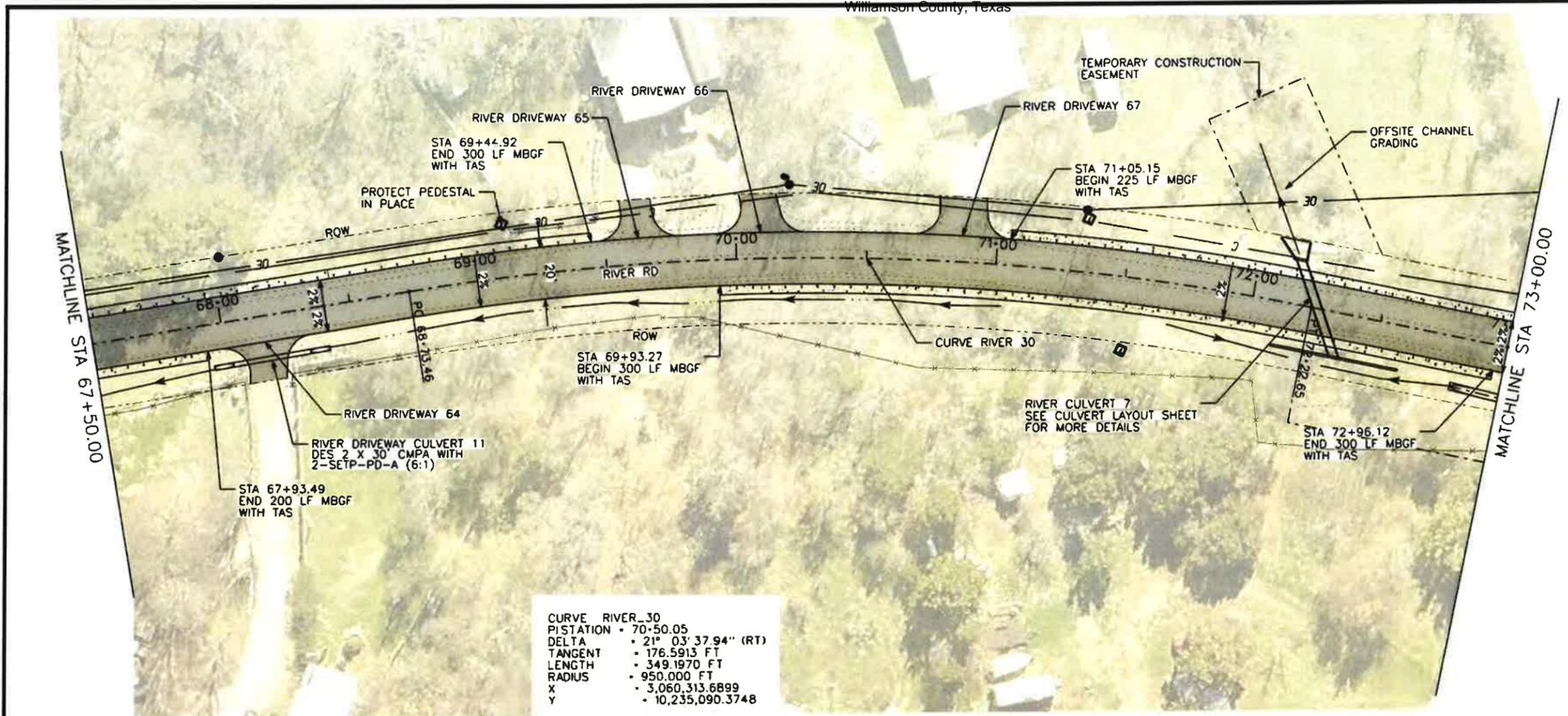
VERTICAL SCALE: 1" = 5'

RIVER DRIVEWAY CULVERT	DRIVEWAY STATION	UPSTREAM OFFSET	UPSTREAM FL	DOWNSTREAM OFFSET	DOWNSTREAM FL
9	61+29.26	16.64' RT	885.87'	16.53' RT	885.41'



RIVER\_PFD09.dgn 10:04:54 AM 7/12/2017





Scale: 25 0 25 50 FEET

LEGEND

- TWO COURSE SEAL COAT
- W EXIST WATER LINE
- F EXIST FENCE
- OE EXIST OVERHEAD ELECTRIC
- C EXIST UNDERGROUND CABLE
- DITCH FLOW LINE
- WATER METER
- TELEPHONE PEDESTAL

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  - EXIST MAILBOXES TO BE RELOCATED TO EDGE OF PROPOSED SHOULDER AS REQUIRED.
  - SEE DRIVEWAY DETAILS FOR MORE INFORMATION.

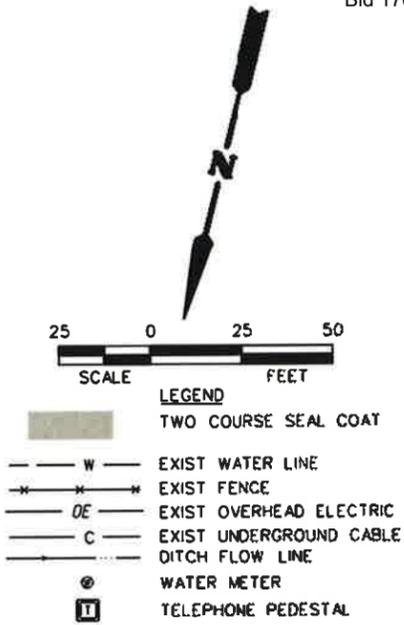
STATE OF TEXAS  
 KELLY G. MORRELLI  
 97412  
 LICENSED PROFESSIONAL ENGINEER

*Kelly G. Morrelli*  
8/7/17

WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE

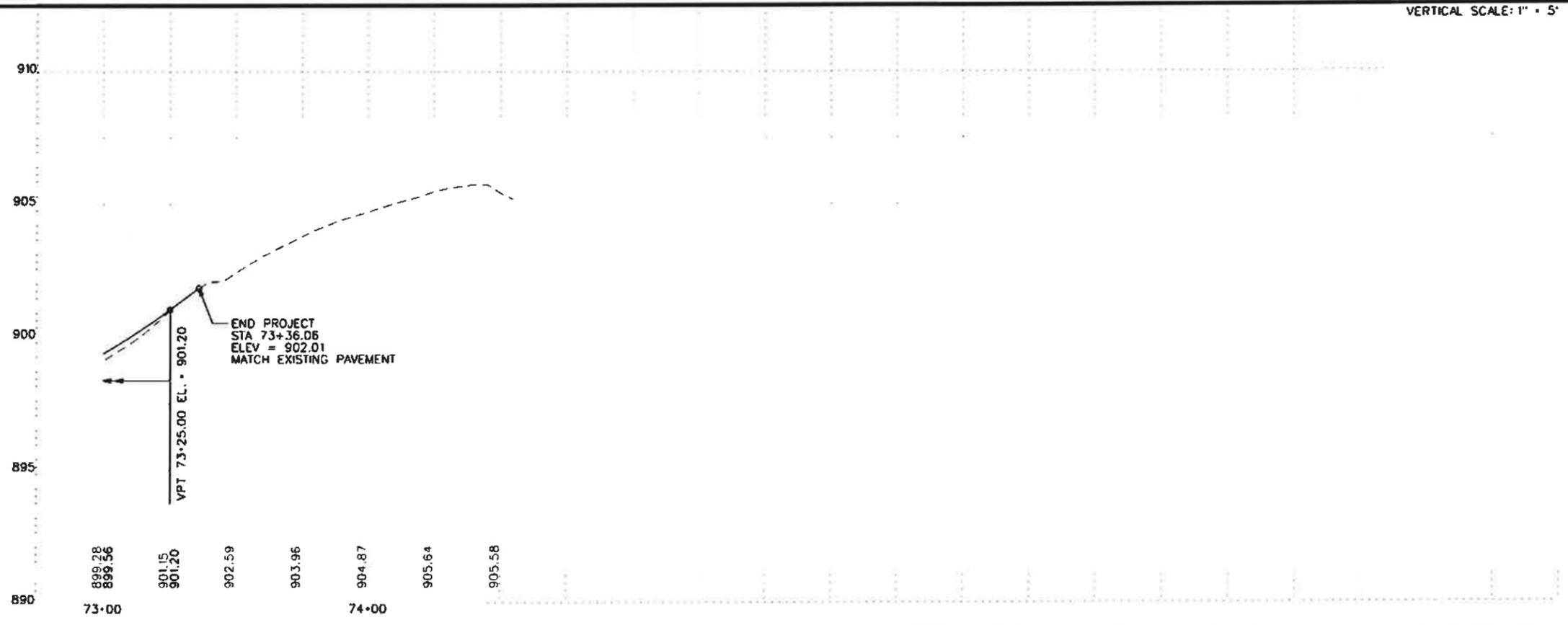
RIVER RD PLAN AND PROFILE

Designed: KGM	3151 S.E. INNER LOOP, SUITE B	SHEET NO.
Checked: KOK	GEORGETOWN, TEXAS 78626	38
Drawn: KGM	943-3330	
Checked: KOK	www.wilco.org	



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  6. SEE DRIVEWAY DETAILS FOR MORE INFORMATION.

VERTICAL SCALE: 1" = 5'



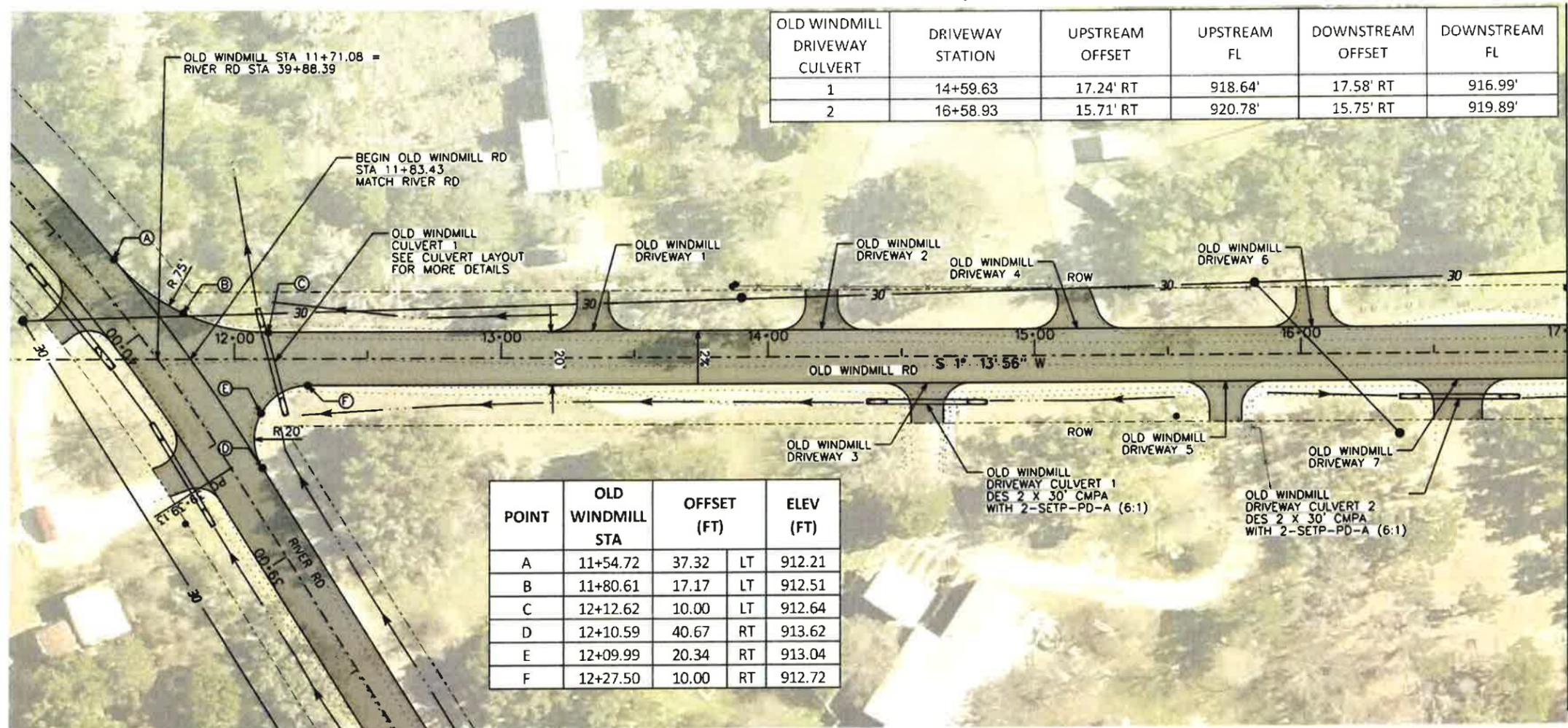
*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE



**RIVER RD  
PLAN AND PROFILE**

Designed: KGM	3151 S E INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>39</b>
Checked: KOK		
Drawn: KGM		
Checked: KOK		



- LEGEND**
- TWO COURSE SEAL COAT
  - EXIST WATER LINE
  - EXIST FENCE
  - EXIST OVERHEAD ELECTRIC
  - EXIST UNDERGROUND CABLE
  - DITCH FLOW LINE
  - WATER METER
  - TELEPHONE PEDESTAL

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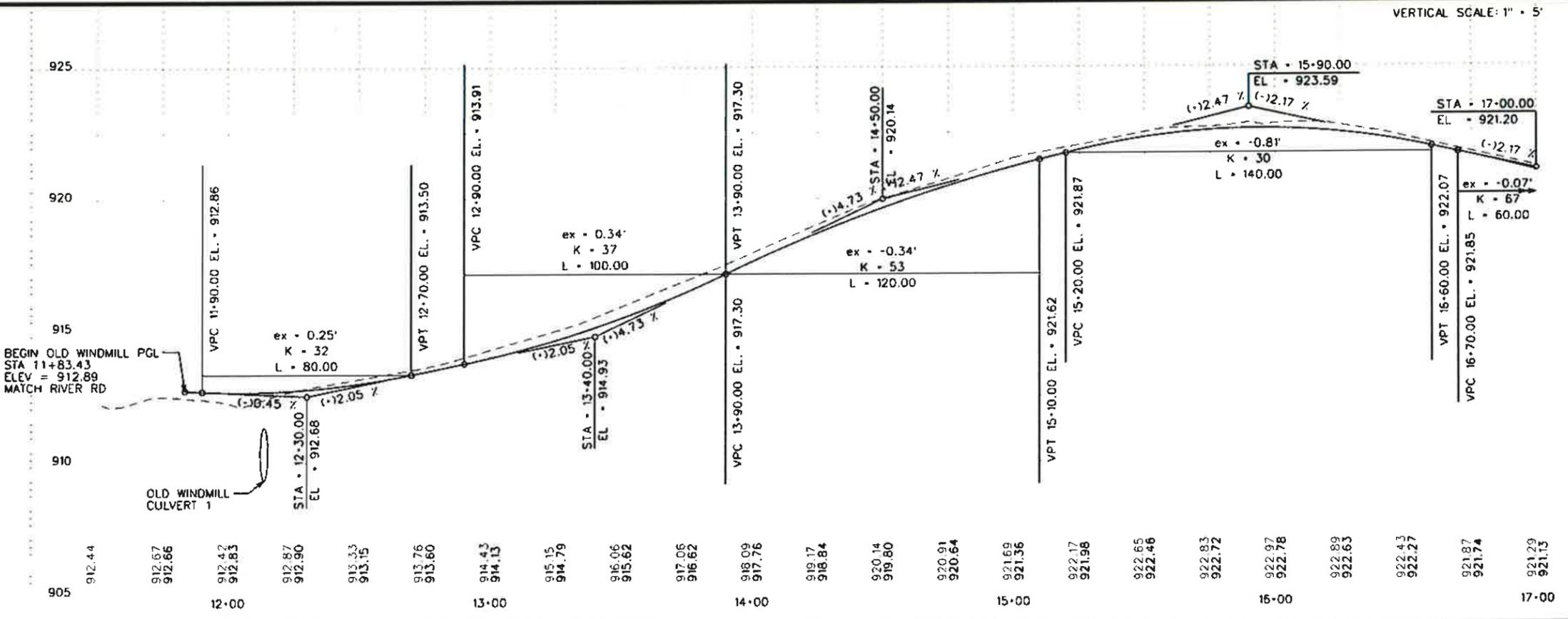
*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE

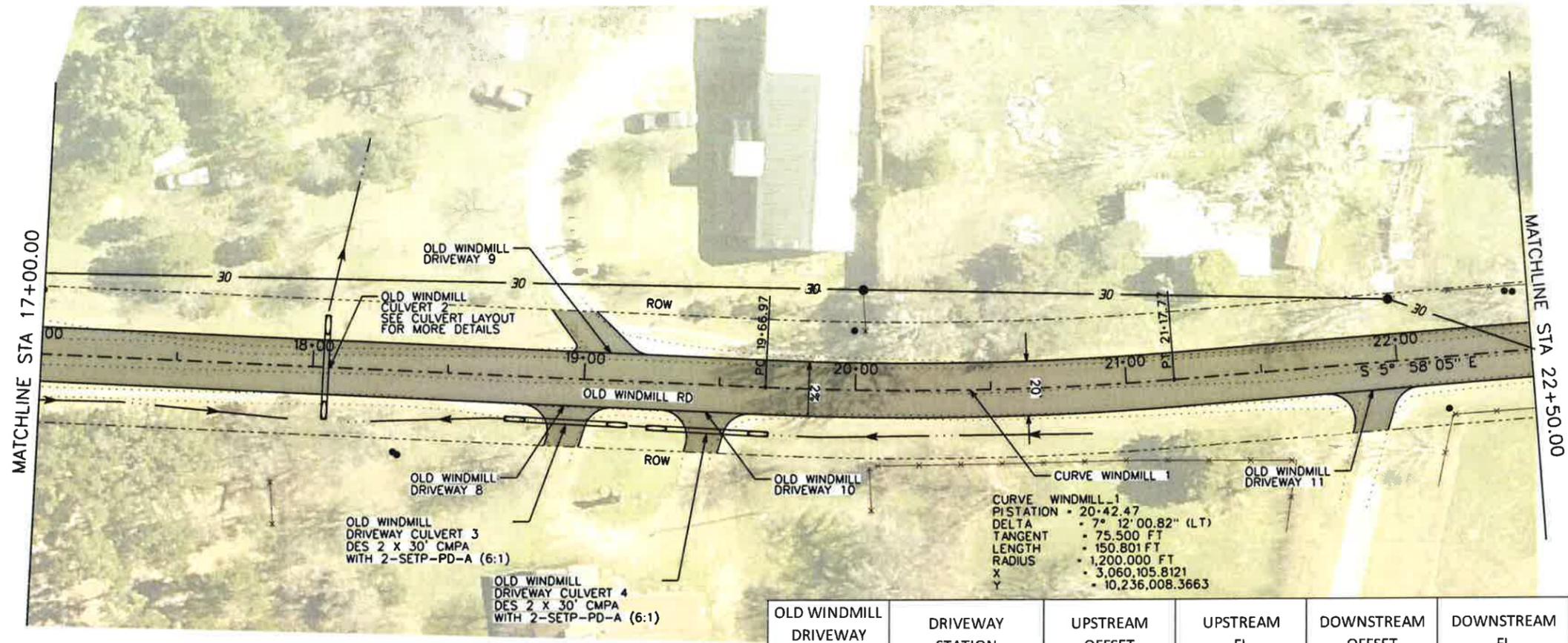


**OLD WINDMILL RD  
PLAN AND PROFILE**

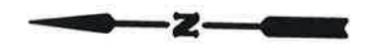
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Checked:	KOK		
Drawn:	KGM		
Checked:	KOK		



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OLD WINDMILL DRIVEWAY CULVERT	DRIVEWAY STATION	UPSTREAM OFFSET	UPSTREAM FL	DOWNSTREAM OFFSET	DOWNSTREAM FL
3	18+94.08	16.19' RT	919.09'	15.77' RT	917.95'
4	19+45.38	16.41' RT	920.67'	16.32' RT	919.26'



- LEGEND**
- TWO COURSE SEAL COAT
  - EXIST WATER LINE
  - EXIST FENCE
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*Kelly G. Morrelli*  
8/7/17

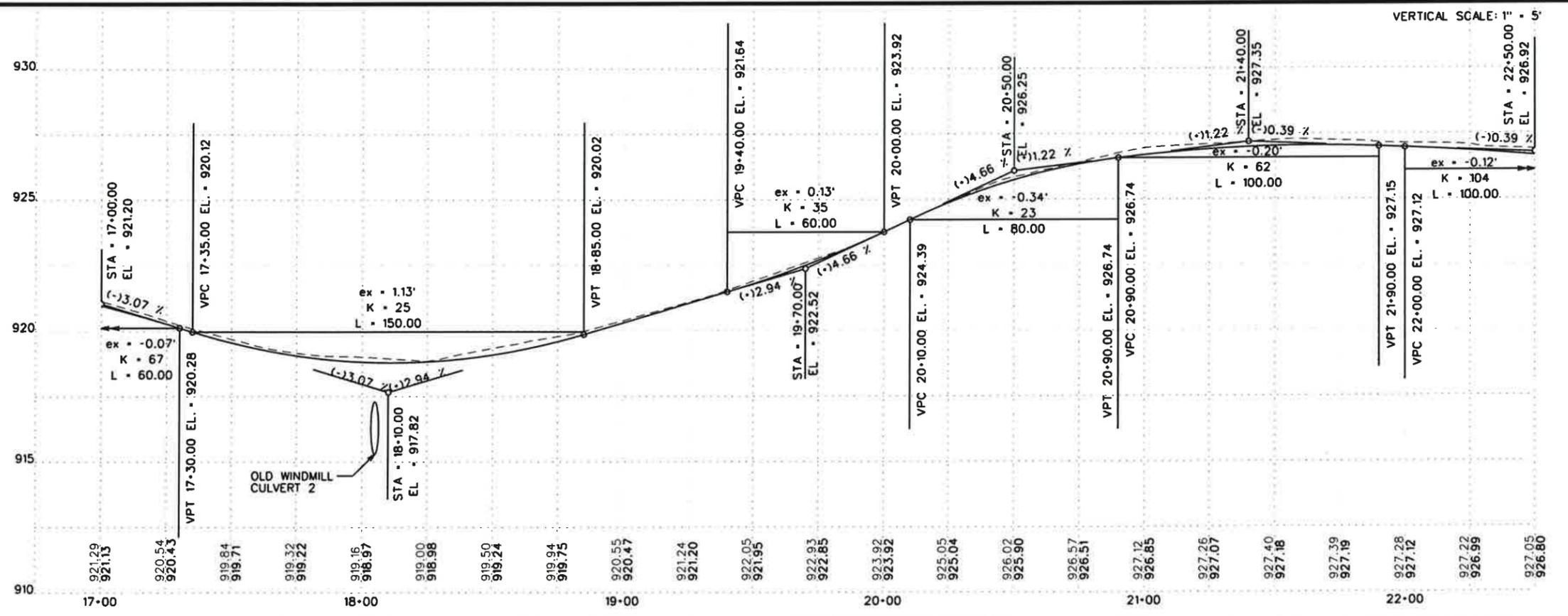
NO.	REVISION	BY	DATE

**WILLIAMSON COUNTY**  
1848

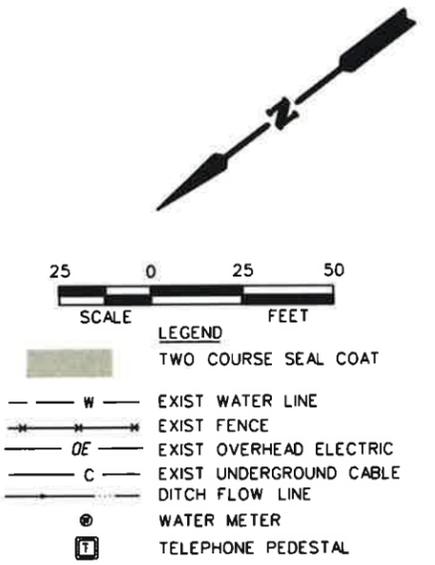
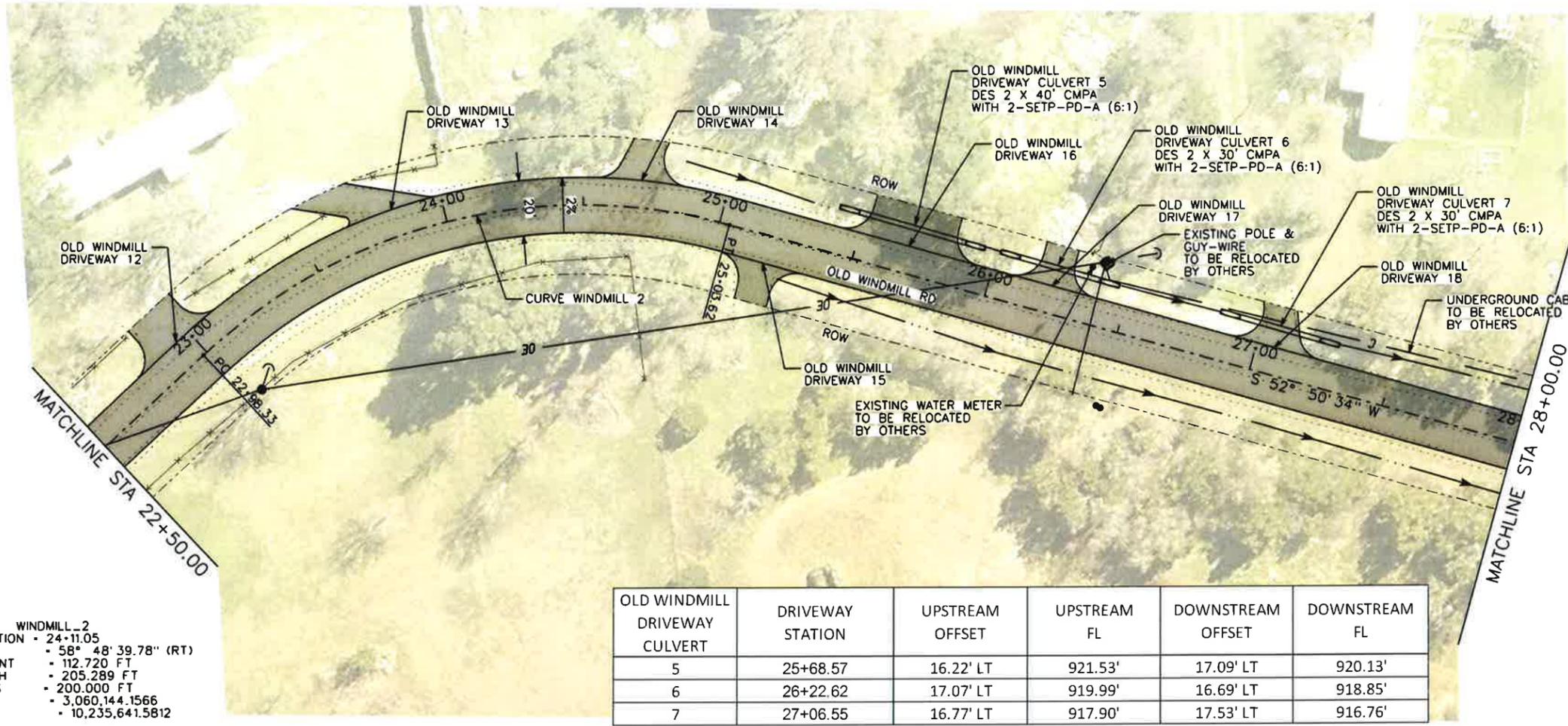
**WILLIAMSON COUNTY**  
DEPT. OF INFRASTRUCTURE

**OLD WINDMILL RD  
PLAN AND PROFILE**

Designed:	KGM	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>41</b>
Checked:	KQK		
Drawn:	KGM		
Checked:	KQK		



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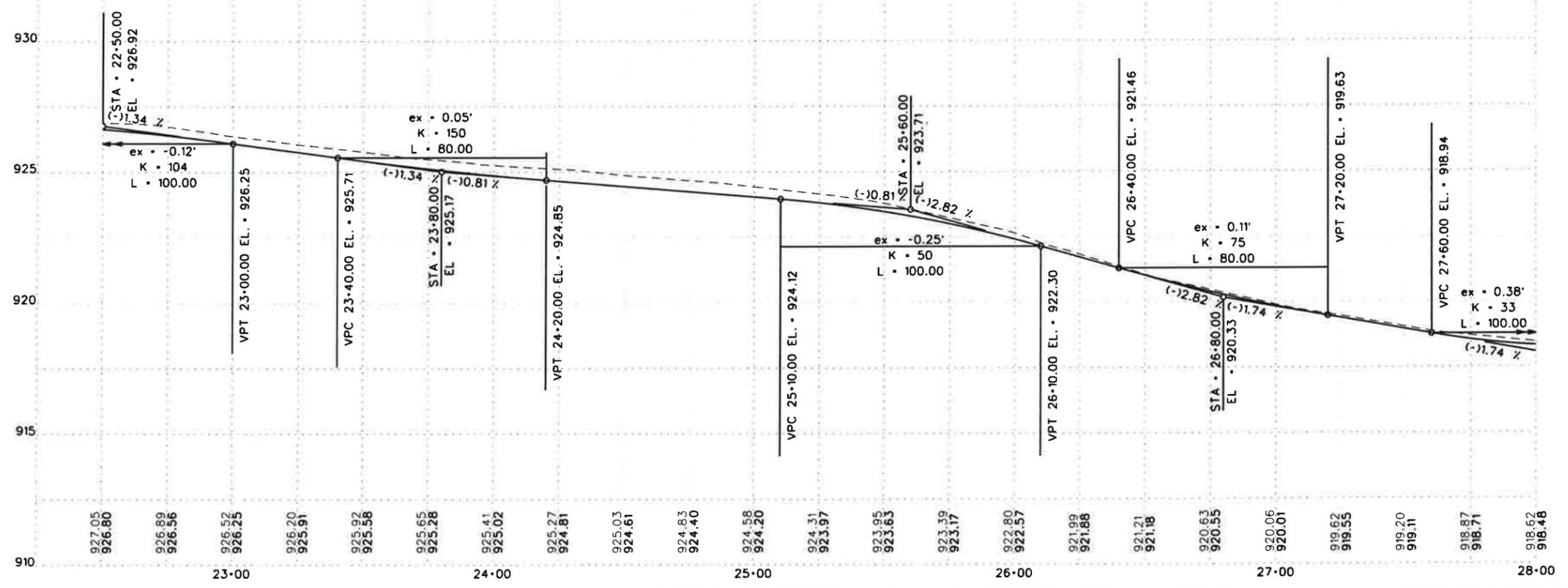


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CURVE WINDMILL\_2  
 PISTATION • 24+11.05  
 DELTA • 58° 48' 39.78" (RT)  
 TANGENT • 112.720 FT  
 LENGTH • 205.289 FT  
 RADIUS • 200.000 FT  
 X • 3,060.144.1566  
 Y • 10,235.641.5812

OLD WINDMILL DRIVEWAY CULVERT	DRIVEWAY STATION	UPSTREAM OFFSET	UPSTREAM FL	DOWNSTREAM OFFSET	DOWNSTREAM FL
5	25+68.57	16.22' LT	921.53'	17.09' LT	920.13'
6	26+22.62	17.07' LT	919.99'	16.69' LT	918.85'
7	27+06.55	16.77' LT	917.90'	17.53' LT	916.76'

VERTICAL SCALE: 1" = 5'



*Kelly G. Morrelli*  
 8/7/17

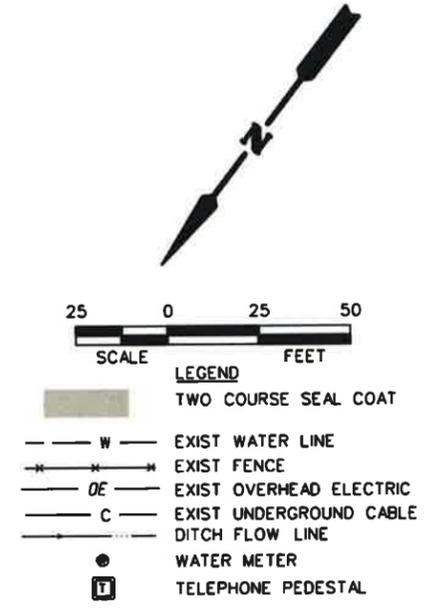
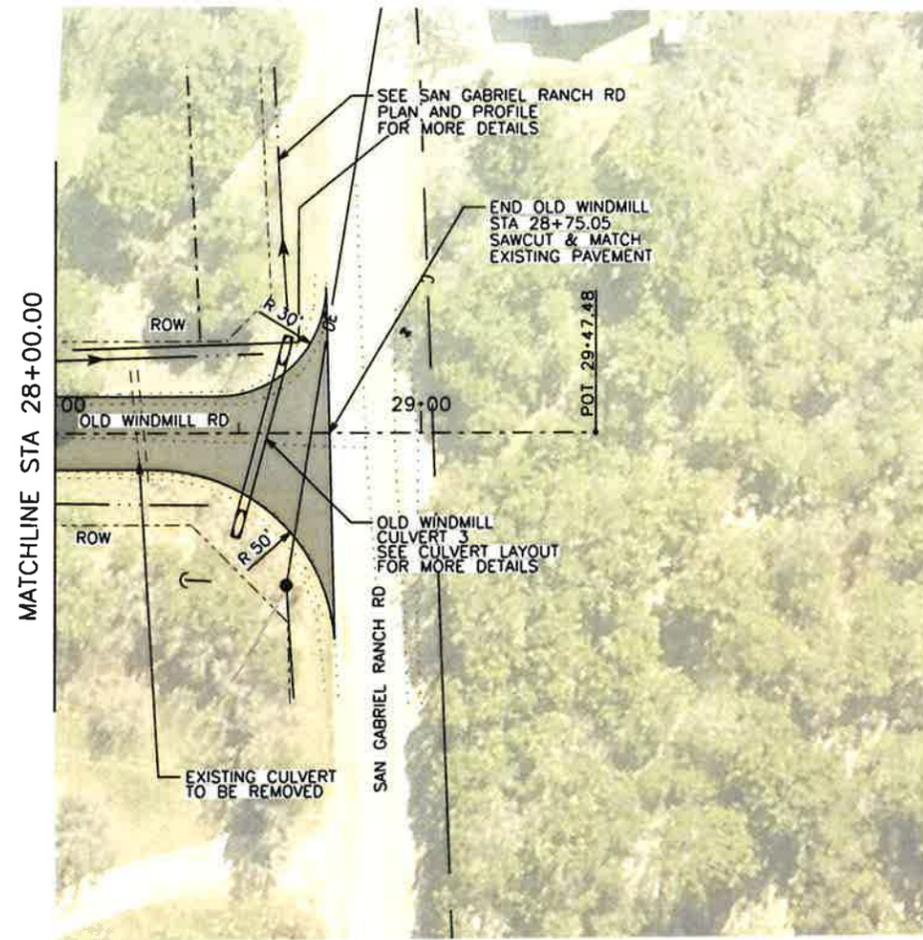
NO.	REVISION	BY	DATE

**WILLIAMSON COUNTY**  
 DEPT. OF INFRASTRUCTURE  
 1848

**OLD WINDMILL RD  
 PLAN AND PROFILE**

Designed: KGM	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>42</b>
Checked: KOK		
Drawn: KGM		
Checked: KOK		

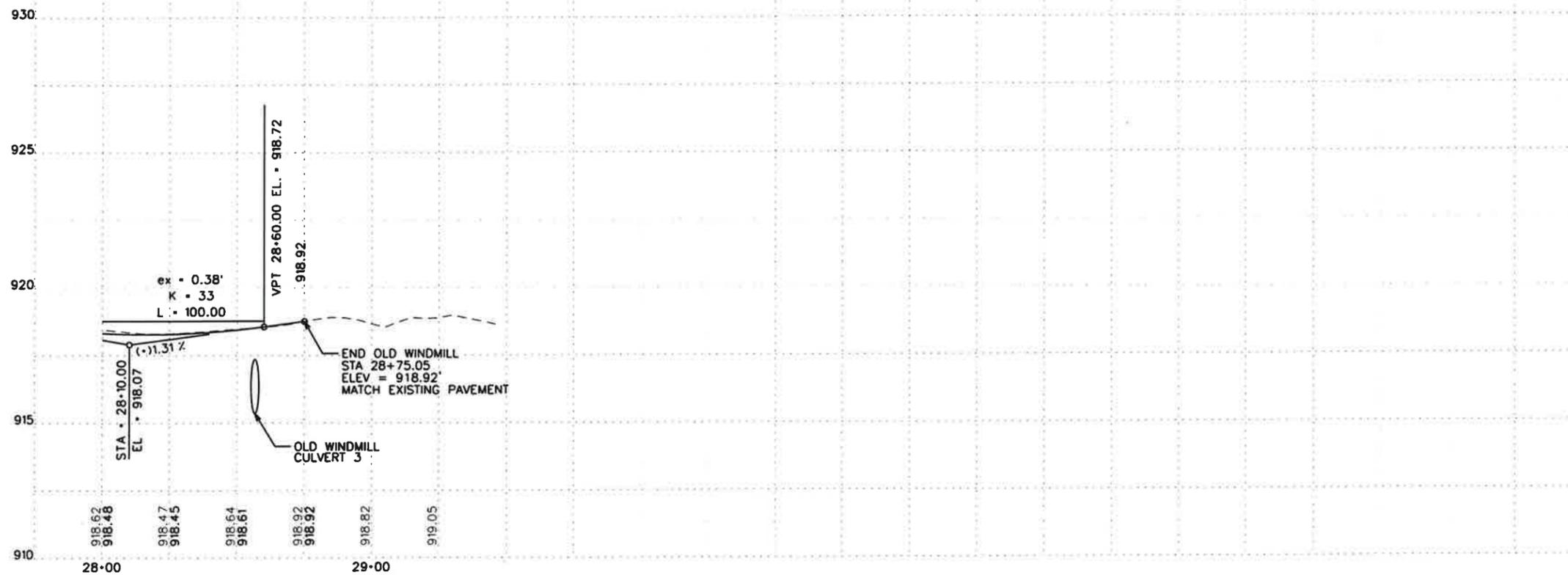
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  6. SEE DRIVEWAY DETAILS FOR MORE INFORMATION.



VERTICAL SCALE: 1" = 5'



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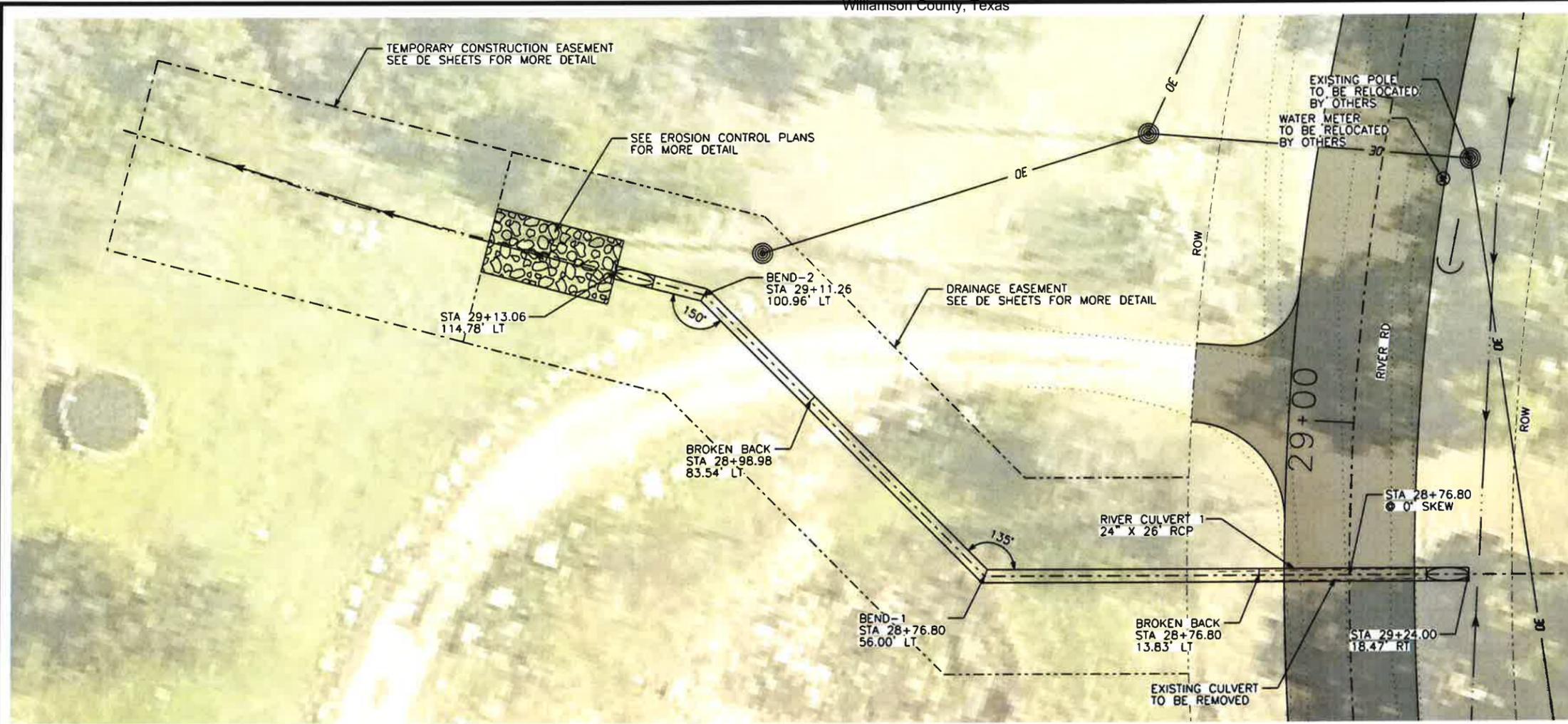
NO.	REVISION	BY	DATE

**WILLIAMSON COUNTY**  
1848

**WILLIAMSON COUNTY**  
DEPT. OF  
INFRASTRUCTURE

**OLD WINDMILL RD  
PLAN AND PROFILE**

Designed:	KGM	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>43</b>
Checked:	KOK		
Drawn:	KGM		
Checked:	KOK		



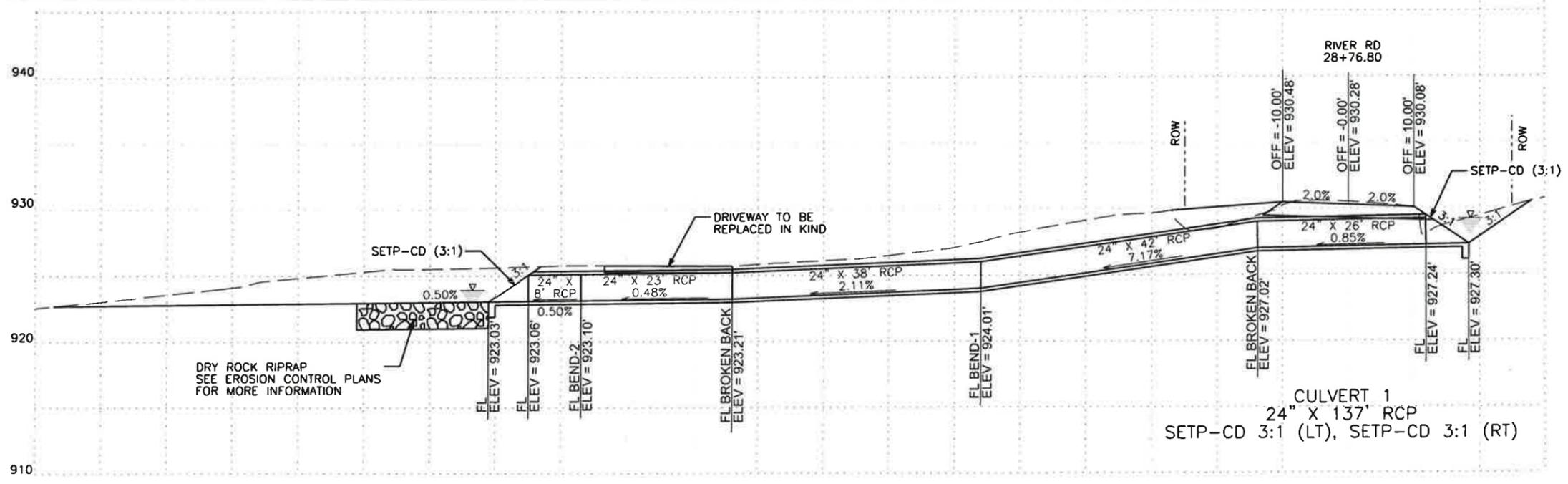
- LEGEND**
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  - EXIST WATER LINE
  - EXIST FENCE
  - EXIST OVERHEAD ELECTRIC
  - EXIST UNDERGROUND CABLE
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  - WATER METER
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  - SEE EROSION CONTROL PLANS FOR MORE INFORMATION ON RIPRAP LIMITS.

RIVER CULVERT	RIVER STATION	FREQ YEAR	Q cfs	Ke	EXIST CULVERT			PROP CULVERT			REMARKS	
					DESCRIPTION	HW ELEV	TW DEPTH	DESCRIPTION	HW ELEV	TW DEPTH		V-OUT ft/s
1	28+76.80	25	12	0.7	18" CMP	930.57	2.24	24" RCP	929.19	0.88	9.87	PROPOSED DESIGN FREQUENCY
		100	15			930.64	2.31		929.53	0.96	10.63	PROPOSED CHECK FREQUENCY

VERTICAL SCALE: 1" = 10'

NOTE: CULVERT ANALYSIS BASED ON HY8 VERSION 8.7.3



*Kelly G. Morrelli*  
8/7/17

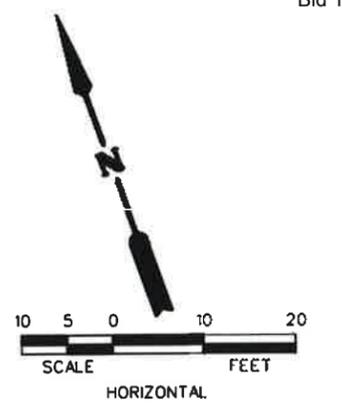
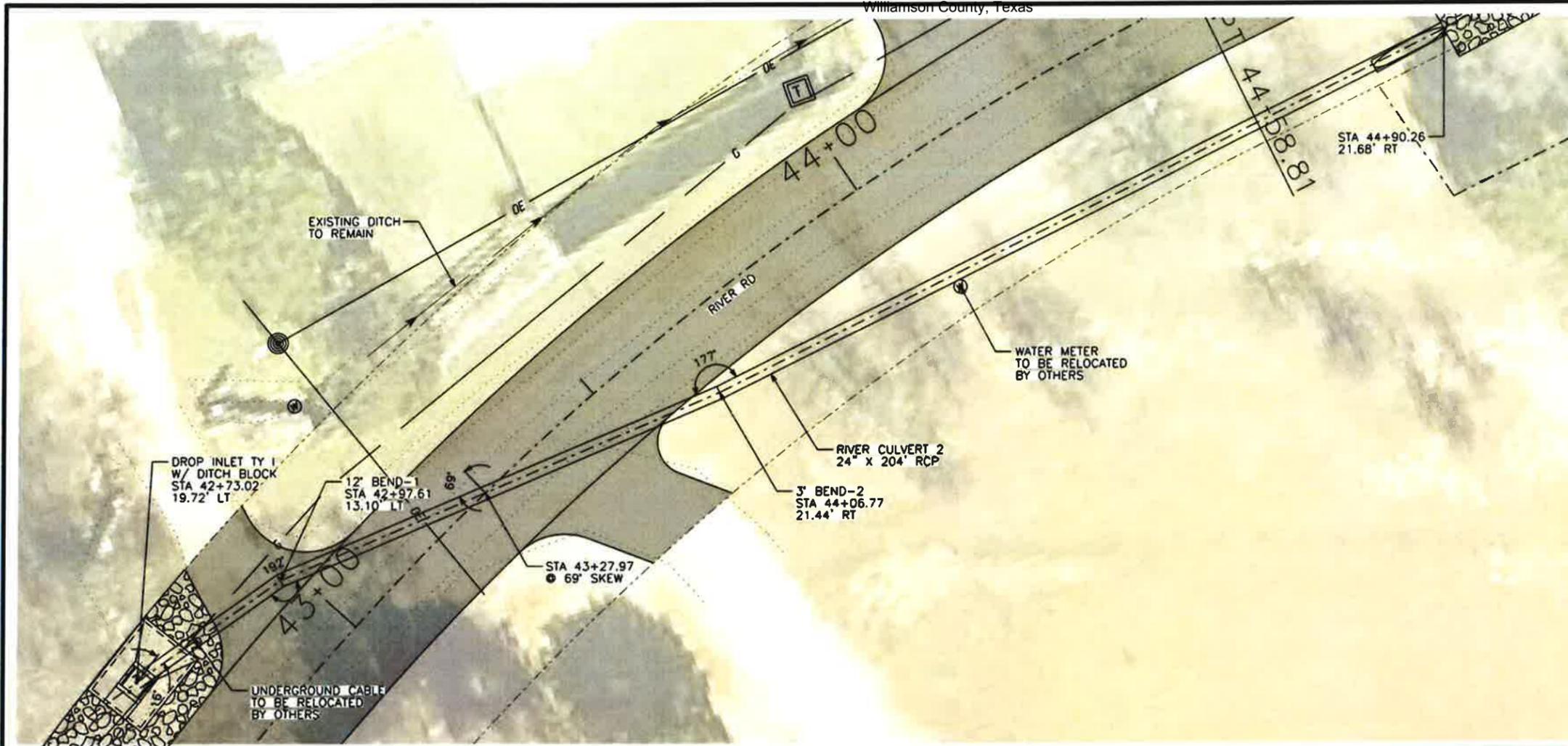
NO.	REVISION	BY	DATE



**RIVER RD CULVERT 1 LAYOUT**

Designed: KGM	3151 S.E. INNER LOOP, SUITE B	SHEET NO.
Checked: KQK	GEORGETOWN, TEXAS 78626	44
Drawn: KGM	943-3330	
Checked: KQK	www.wilco.org	

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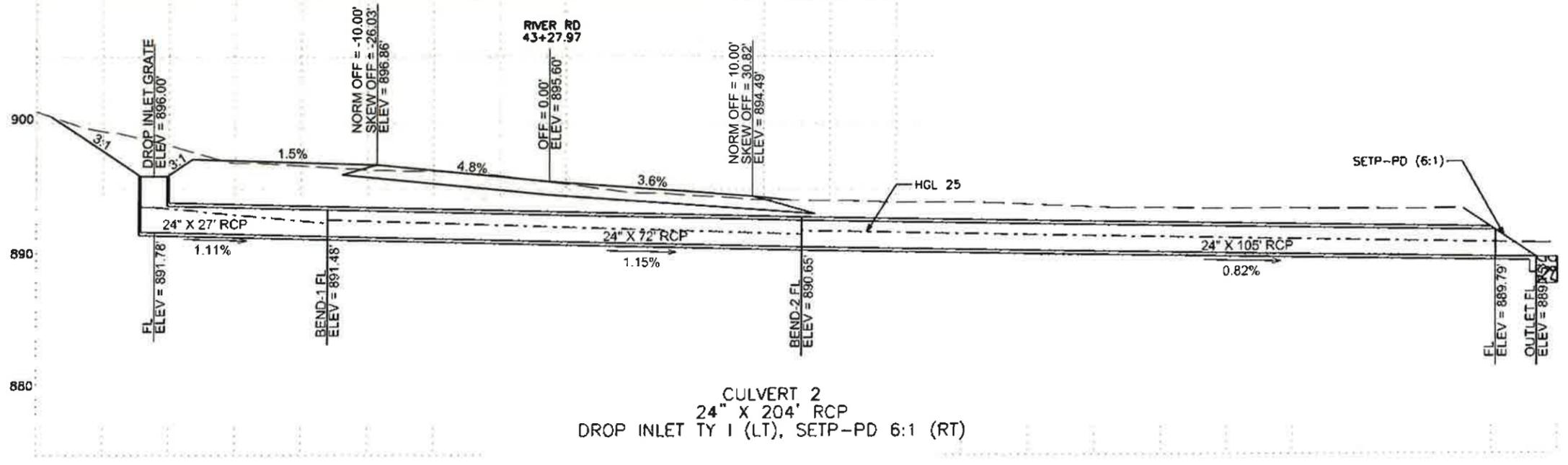
- LEGEND**
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RIVER CULVERT	RIVER STATION	ID	ID	HGL	HGL	Q 25 (CFS)	VELOCITY (FT/S)	DEPTH (FT)
2	43+27.97	DROP INLET	TO BEND 1	893.68	892.50	12	7.36	1.02
		BEND 1	TO BEND 2	892.71	891.61	12	7.78	0.97
		BEND 2	TO OUTLET	891.88	890.82	12	6.66	1.10

NOTE: ANALYSIS BASED ON BENTLEY GEOPAK DRAINAGE (08.11.09.878)  
 DROP INLET PONDED DEPTH = 0.51'

VERTICAL SCALE: 1" = 10'



CULVERT 2  
 24" X 204' RCP  
 DROP INLET TY I (LT), SETP-PD 6:1 (RT)



*Kelly G. Morrelli*  
 8/7/17

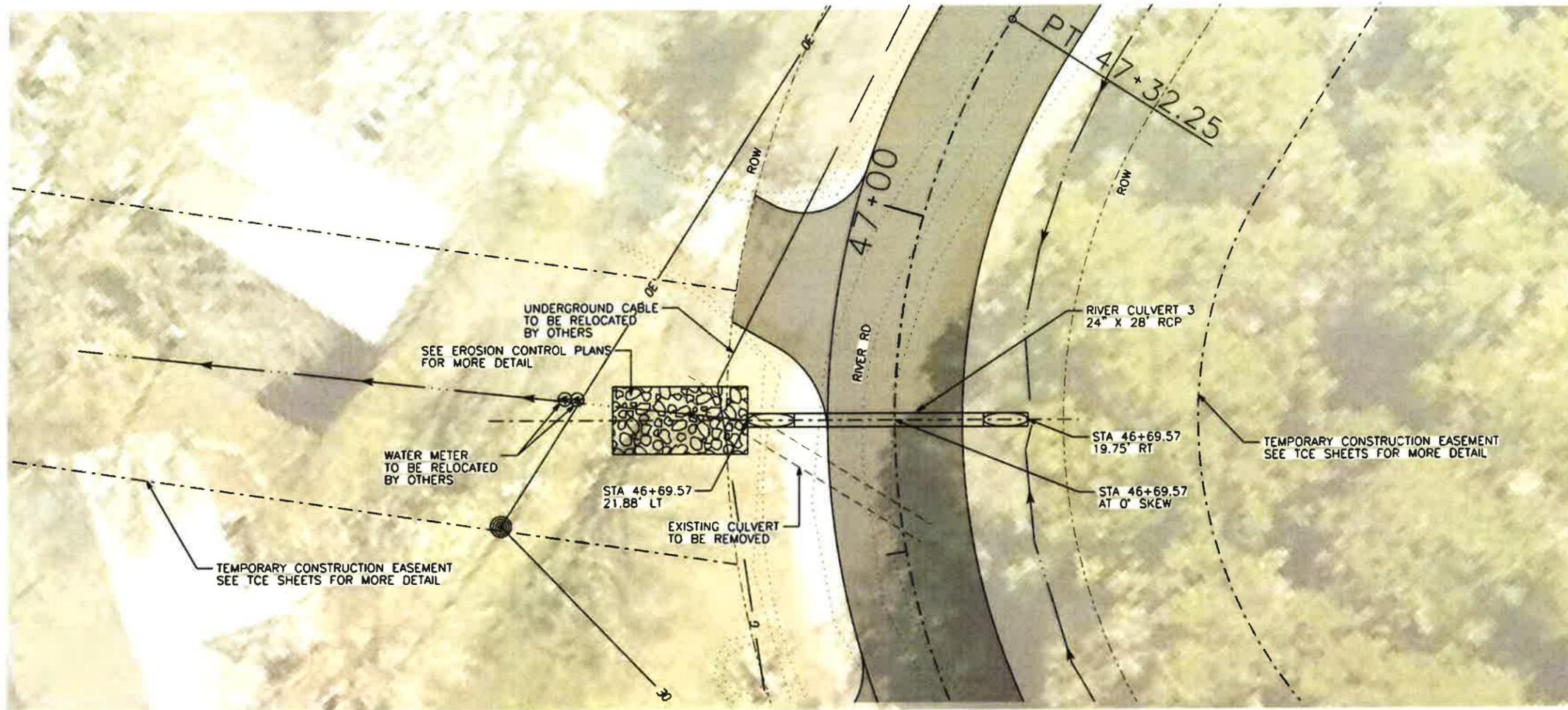
NO.	REVISION	BY	DATE



RIVER RD  
 CULVERT 2 LAYOUT

Designed: KGM	3151 S E INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO.
Checked: KQK		45
Drawn: KGM		
Checked: KQK		

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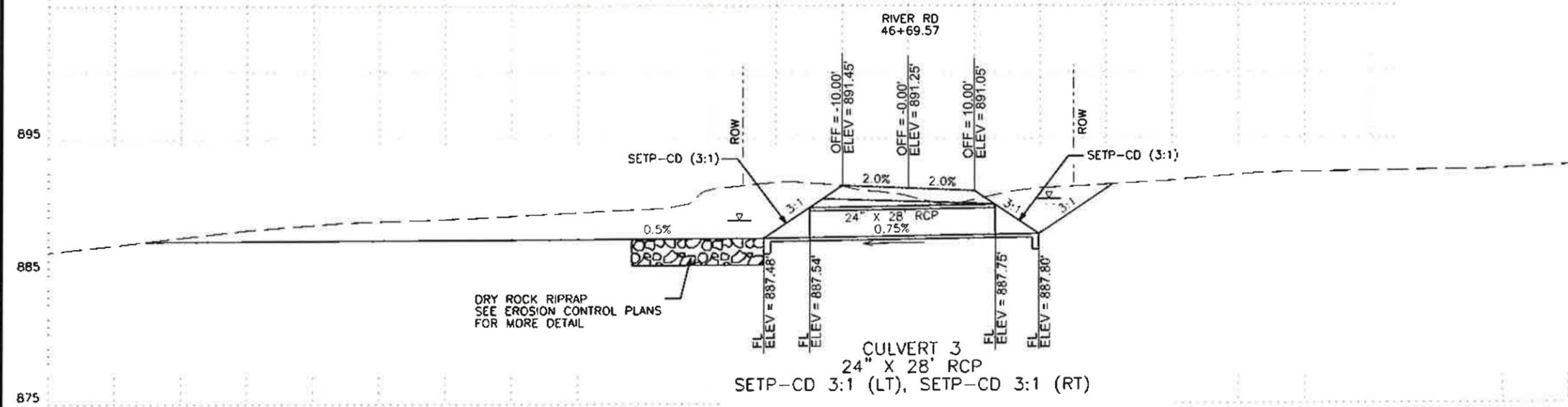
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					DESCRIPTION	HW ELEV	TW DEPTH	DESCRIPTION	HW ELEV		TW DEPTH	V-OUT ft/s
3	46+69.57	25	18	0.7	36" CMP	891.38	0.83	24" RCP	890.44	1.36	7.57	PROPOSED DESIGN FREQUENCY
		100	23			891.38	0.89		891.17	1.50	7.96	PROPOSED CHECK FREQUENCY

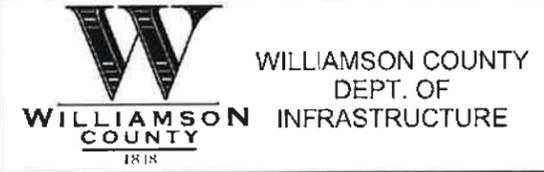
VERTICAL SCALE: 1" = 10'

NOTE: CULVERT ANALYSIS BASED ON HY8 VERSION 8.7.3



*Kelly G. Morrelli*  
8/7/17

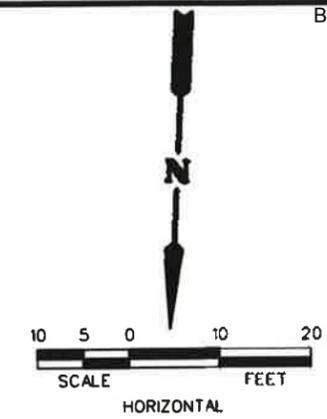
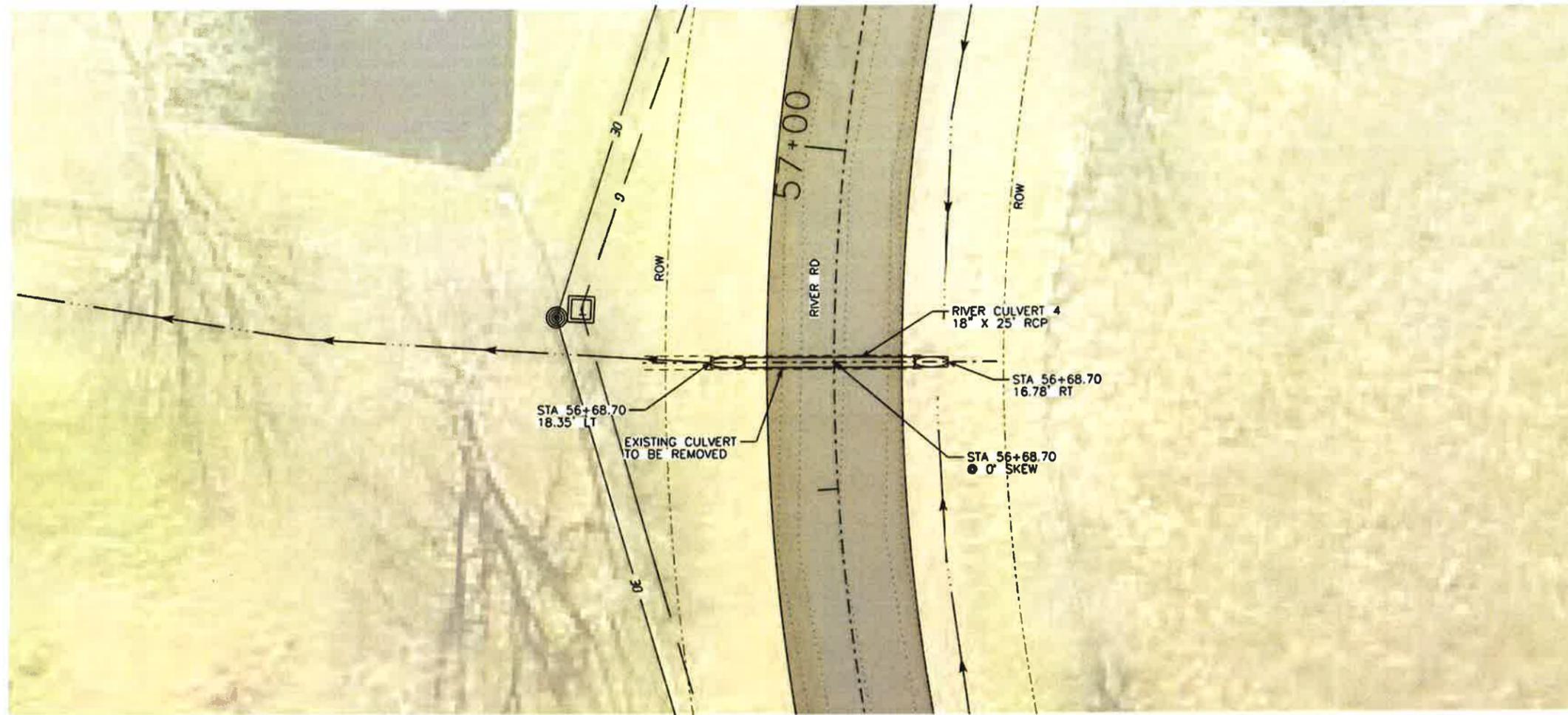
NO.	REVISION	BY	DATE



**RIVER RD CULVERT 3 LAYOUT**

Designed: KGM	3151 S E INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>46</b>
Checked: KQK		
Drawn: KGM		
Checked: KQK		

RIVER\_CULV\_03.dgn 10:06:48 AM 8/10/2017 9:17 AM



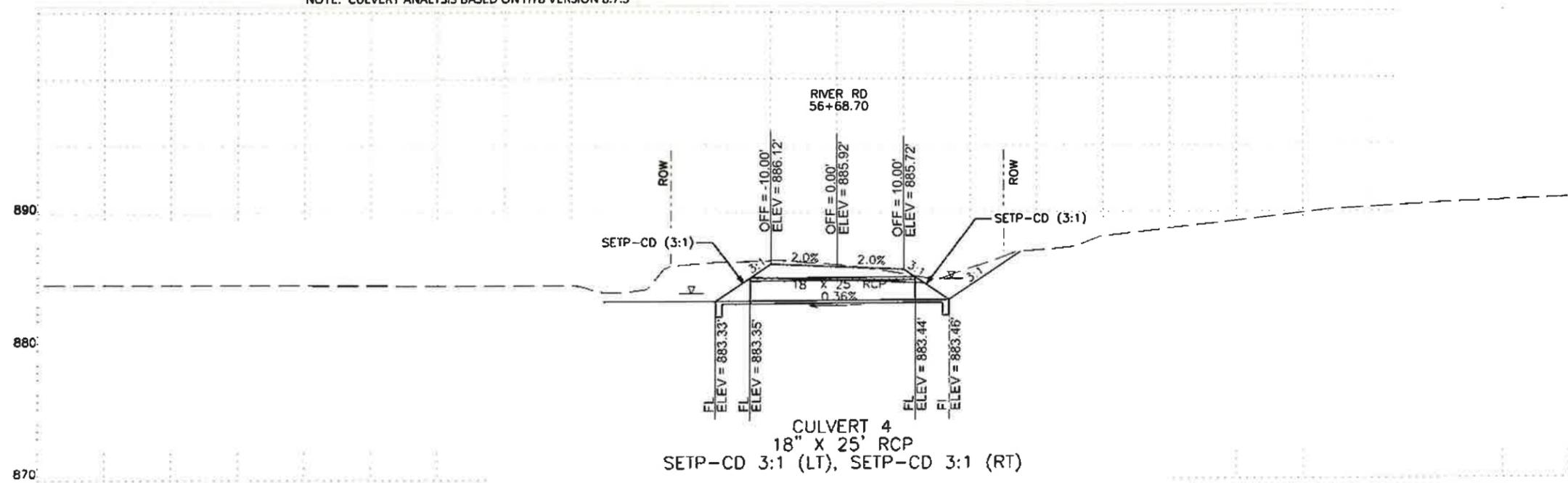
- LEGEND**
- ONE COURSE SEAL COAT
  - W — EXIST WATER LINE
  - X — EXIST FENCE
  - OE — EXIST OVERHEAD ELECTRIC
  - C — EXIST UNDERGROUND CABLE
  - D — DITCH FLOW LINE
  - WATER METER
  - ⊞ TELEPHONE PEDESTAL

- NOTES:**
1. CONTRACTOR SHALL RETURN THE GROUND AREA DISTURBED BY CONSTRUCTION ACTIVITY TO EQUAL OR BETTER CONDITION IN SUCH A MANNER AS NOT TO CHANGE THE ROUTE OF STORM WATER FLOW.
  2. SEE EROSION CONTROL PLANS FOR MORE INFORMATION ON RIPRAP LIMITS.

RIVER CULVERT	RIVER STATION	FREQ YEAR	Q cfs	Ke	EXIST CULVERT		PROP CULVERT			REMARKS		
					DESCRIPTION	HW ELEV	TW DEPTH	DESCRIPTION	HW ELEV		TW DEPTH	V-OUT ft/s
4	56+68.70	25	6	0.7	24" CMP	886.07	0.62	18" RCP	885.04	0.62	3.70	PROPOSED DESIGN FREQUENCY
		100	7			886.07	0.73		885.20	0.66	4.22	PROPOSED CHECK FREQUENCY

VERTICAL SCALE: 1" = 10'

NOTE: CULVERT ANALYSIS BASED ON HY8 VERSION 8.7.3



*Kelly G. Morrelli*  
8/7/17

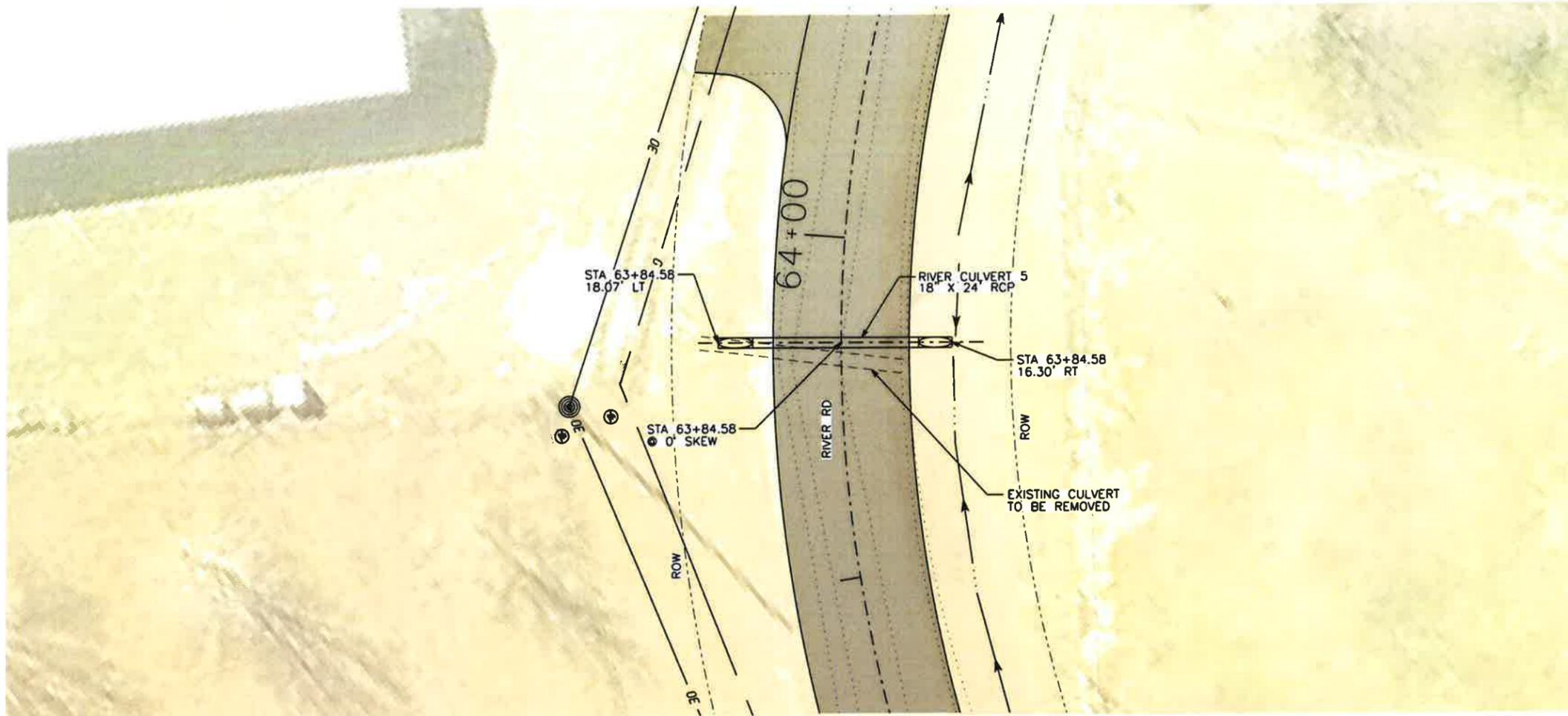
NO.	REVISION	BY	DATE



**RIVER RD CULVERT 4 LAYOUT**

Designed:	KGM	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>47</b>
Checked:	KOK		
Drawn:	KGM		
Checked:	KOK		

RIVER\_CULV\_04.dgn 10:07:00 AM 8/10/2017 9:17 AM



**LEGEND**

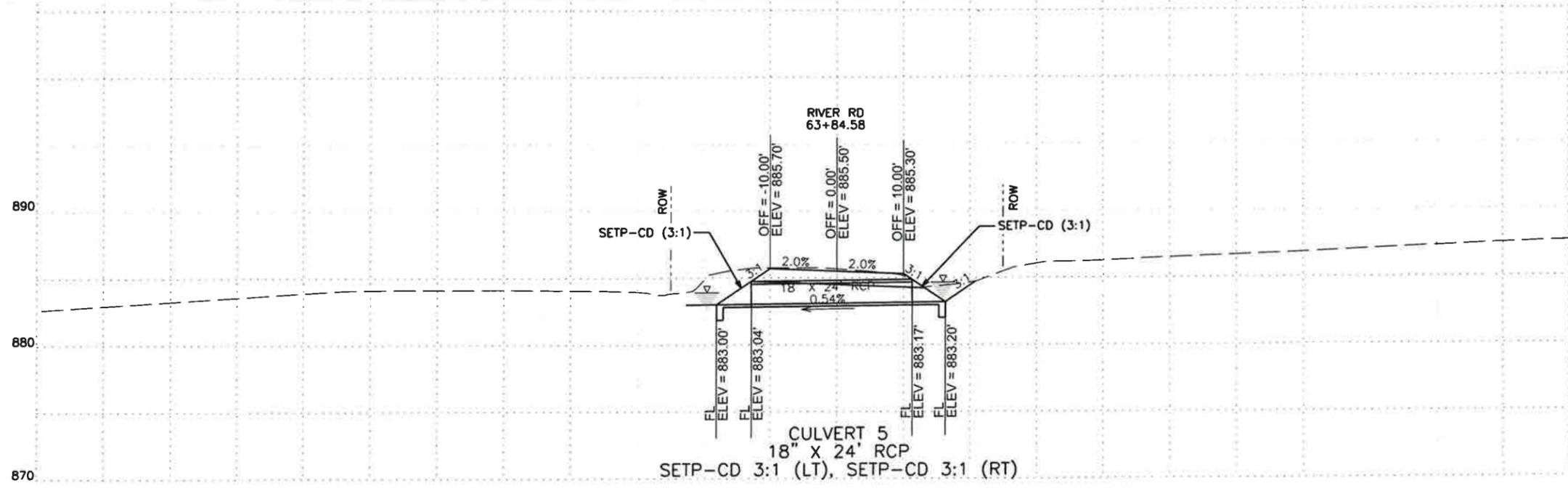
- ONE COURSE SEAL COAT
- EXIST WATER LINE
- EXIST FENCE
- EXIST OVERHEAD ELECTRIC
- EXIST UNDERGROUND CABLE
- DITCH FLOW LINE
- WATER METER
- TELEPHONE PEDESTAL

- NOTES:**
- CONTRACTOR SHALL RETURN THE GROUND AREA DISTURBED BY CONSTRUCTION ACTIVITY TO EQUAL OR BETTER CONDITION IN SUCH A MANNER AS NOT TO CHANGE THE ROUTE OF STORM WATER FLOW.
  - SEE EROSION CONTROL PLANS FOR MORE INFORMATION ON RIPRAP LIMITS.

RIVER CULVERT	RIVER STATION	FREQ YEAR	Q cfs	Ke	EXIST CULVERT			PROP CULVERT			REMARKS	
					DESCRIPTION	HW ELEV	TW DEPTH	DESCRIPTION	HW ELEV	TW DEPTH		V-OUT ft/s
5	63+84.58	25	6	0.7	24" CMP	884.65	0.47	18" RCP	884.66	0.47	5.23	PROPOSED DESIGN FREQUENCY
		100	7			884.79	0.50		884.91	0.50	5.46	PROPOSED CHECK FREQUENCY

VERTICAL SCALE: 1" = 10'

NOTE: CULVERT ANALYSIS BASED ON HY8 VERSION 8.7.3



*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE

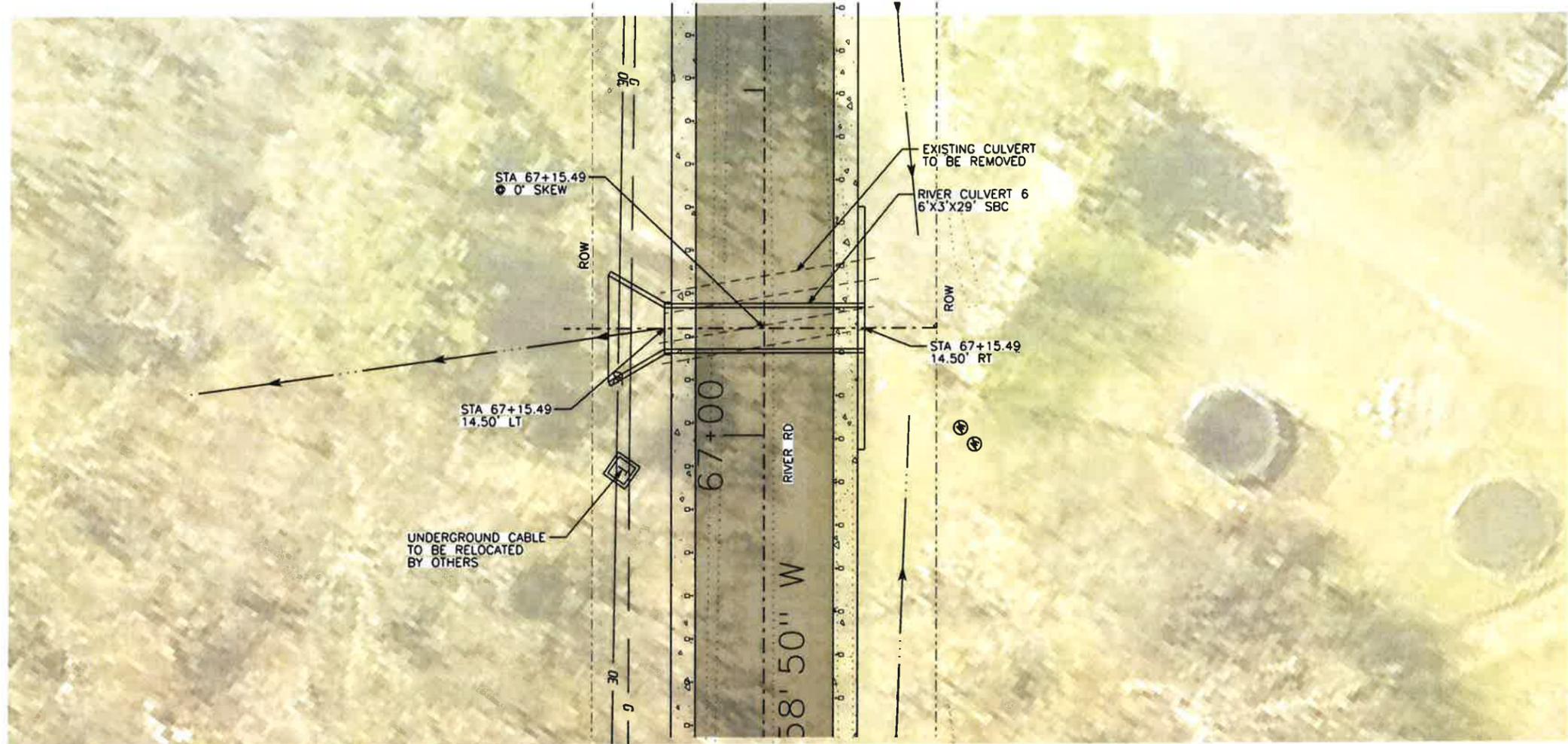
**WILLIAMSON COUNTY**  
1848

**WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE**

**RIVER RD CULVERT 5 LAYOUT**

Designed: <b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>48</b>
Checked: <b>KOK</b>		
Drawn: <b>KGM</b>		
Checked: <b>KOK</b>		

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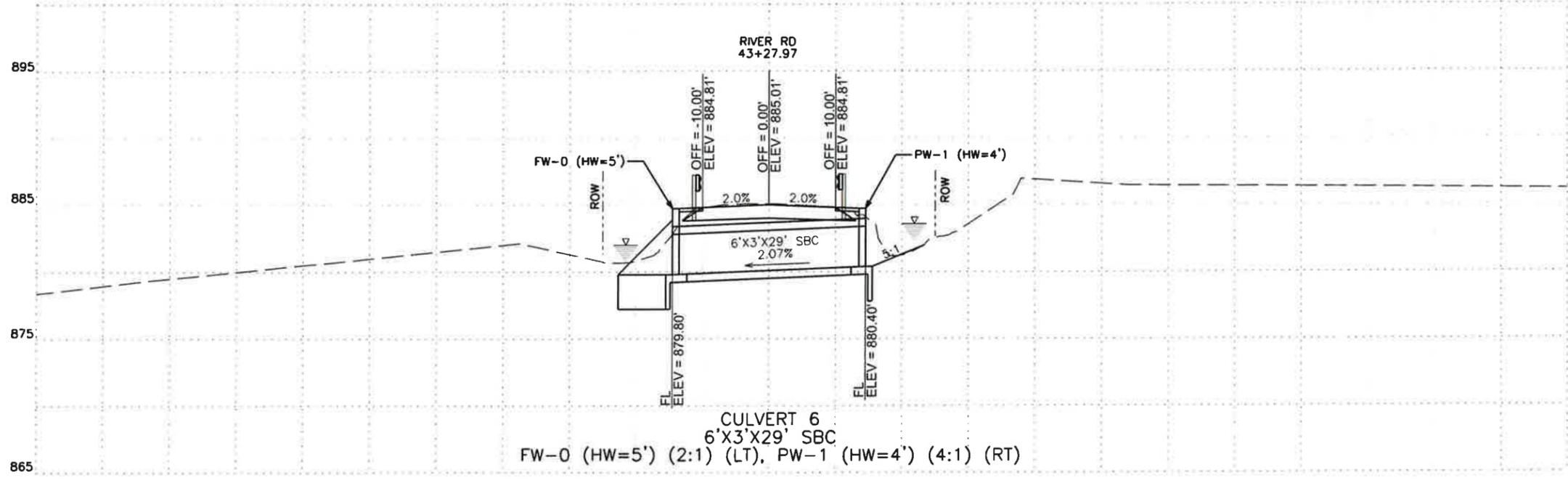
- LEGEND**
- ONE COURSE SEAL COAT
  - W — EXIST WATER LINE
  - X — EXIST FENCE
  - OE — EXIST OVERHEAD ELECTRIC
  - C — EXIST UNDERGROUND CABLE
  - D — DITCH FLOW LINE
  - ⊙ WATER METER
  - ⊠ TELEPHONE PEDESTAL

- NOTES:**
- CONTRACTOR SHALL RETURN THE GROUND AREA DISTURBED BY CONSTRUCTION ACTIVITY TO EQUAL OR BETTER CONDITION IN SUCH A MANNER AS NOT TO CHANGE THE ROUTE OF STORM WATER FLOW.
  - SEE EROSION CONTROL PLANS FOR MORE INFORMATION ON RIPRAP LIMITS.

RIVER CULVERT	RIVER STATION	FREQ YEAR	Q cfs	Ke	EXIST CULVERT			PROP CULVERT			REMARKS	
					DESCRIPTION	HW ELEV	TW DEPTH	DESCRIPTION	HW ELEV	TW DEPTH		V-OUT ft/s
6	67+15.49	25	88	0.7	2-36" CMP	883.94	2.20	6X3 SBC	883.58	2.20	5.01	PROPOSED DESIGN FREQUENCY
		100	112			884.05	2.33		883.91	2.33	5.55	PROPOSED CHECK FREQUENCY

VERTICAL SCALE: 1" = 10'

NOTE: CULVERT ANALYSIS BASED ON HY8 VERSION 8.7.3



*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE

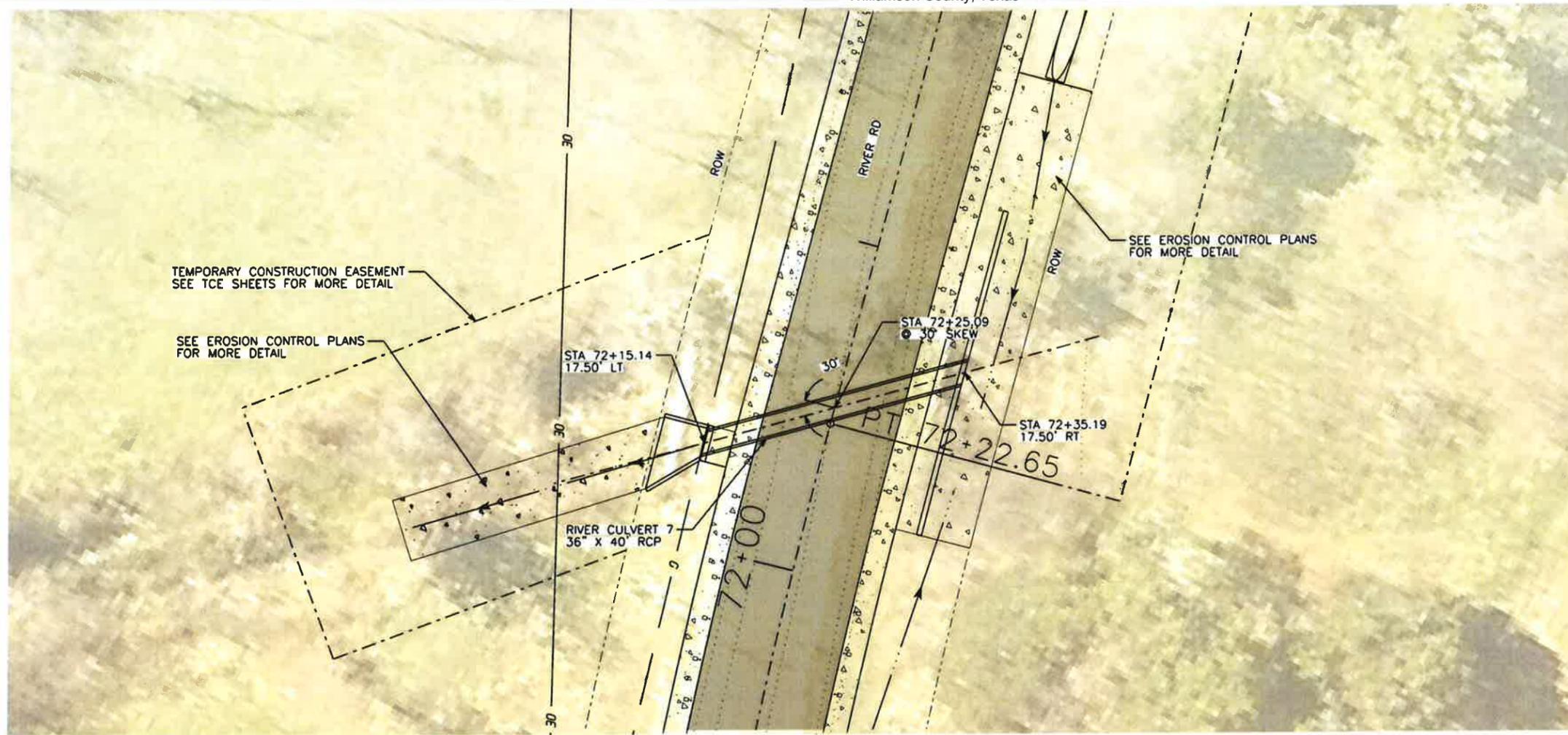
**WILLIAMSON COUNTY**  
1848

**WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE**

**RIVER RD CULVERT 6 LAYOUT**

Designed: <b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>49</b>
Checked: <b>KQK</b>		
Drawn: <b>KGM</b>		
Checked: <b>KQK</b>		

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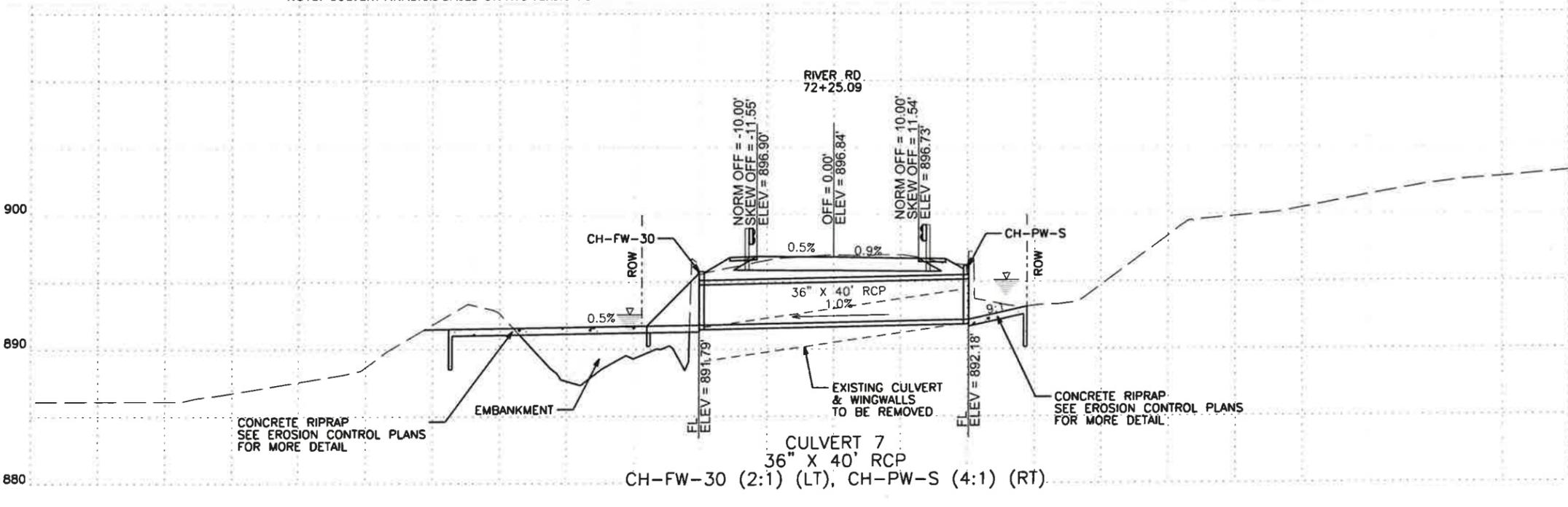
- LEGEND**
- ONE COURSE SEAL COAT
  - W — EXIST WATER LINE
  - X — EXIST FENCE
  - OE — EXIST OVERHEAD ELECTRIC
  - C — EXIST UNDERGROUND CABLE
  - D — DITCH FLOW LINE
  - ⊙ WATER METER
  - ⊠ TELEPHONE PEDESTAL

- NOTES:**
- CONTRACTOR SHALL RETURN THE GROUND AREA DISTURBED BY CONSTRUCTION ACTIVITY TO EQUAL OR BETTER CONDITION IN SUCH A MANNER AS NOT TO CHANGE THE ROUTE OF STORM WATER FLOW.
  - SEE EROSION CONTROL PLANS FOR MORE INFORMATION ON RIPRAP LIMITS.

RIVER CULVERT	RIVER STATION	FREQ YEAR	Q cfs	Ke	EXIST CULVERT		PROP CULVERT			REMARKS		
					DESCRIPTION	HW ELEV	TW DEPTH	DESCRIPTION	HW ELEV		TW DEPTH	V-OUT ft/s
7	72+25.09	25	35	0.7	30" CMP	896.02	5.02	36" RCP	895.16	0.76	9.07	PROPOSED DESIGN FREQUENCY
		100	44			896.65	5.47		895.73	0.85	9.66	PROPOSED CHECK FREQUENCY

VERTICAL SCALE: 1" = 10'

NOTE: CULVERT ANALYSIS BASED ON HY8 VERSION 8.7.3



*Kelly G. Morrelli*  
8/7/17

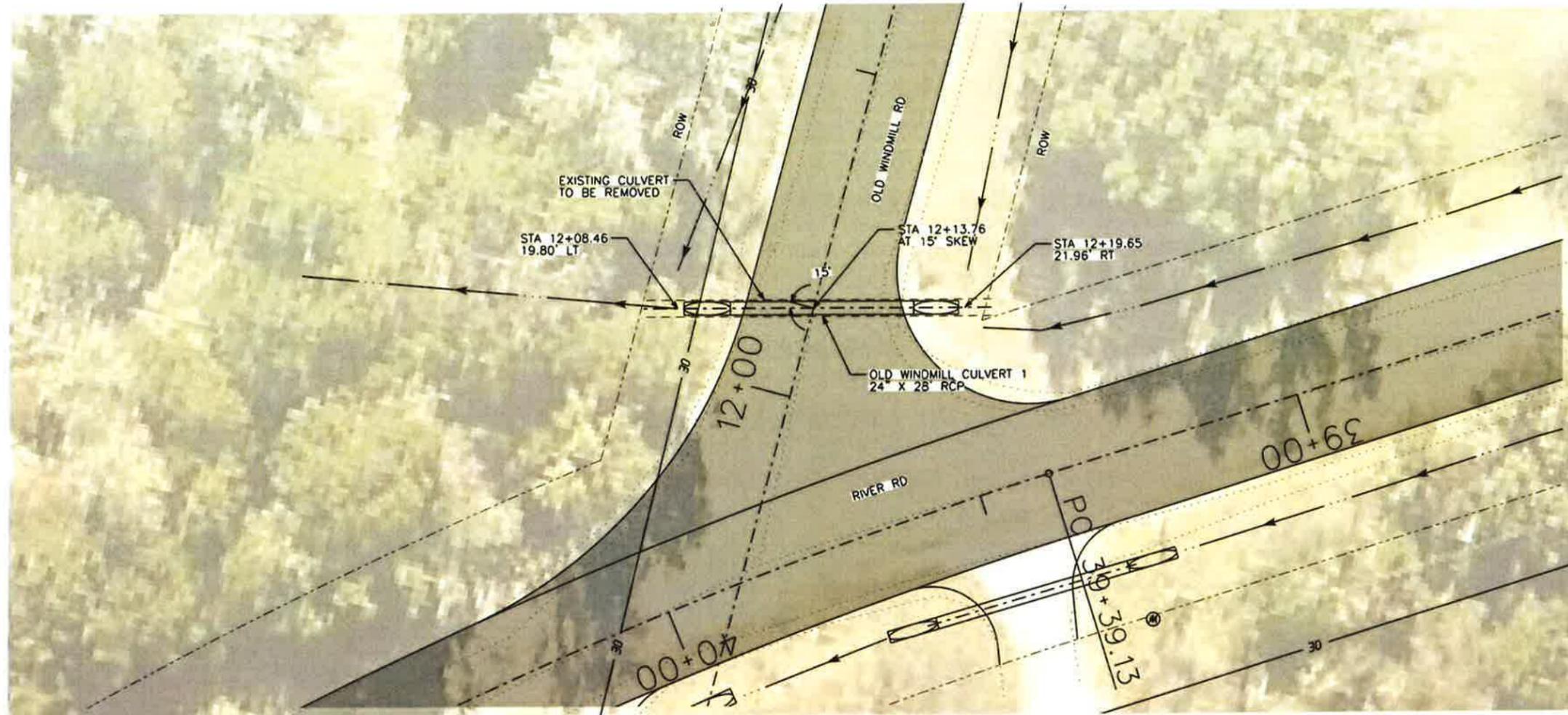
NO.	REVISION	BY	DATE



**RIVER RD CULVERT 7 LAYOUT**

Designed:	KGM	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>50</b>
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Drawn:	KGM		
Checked:	KOK		

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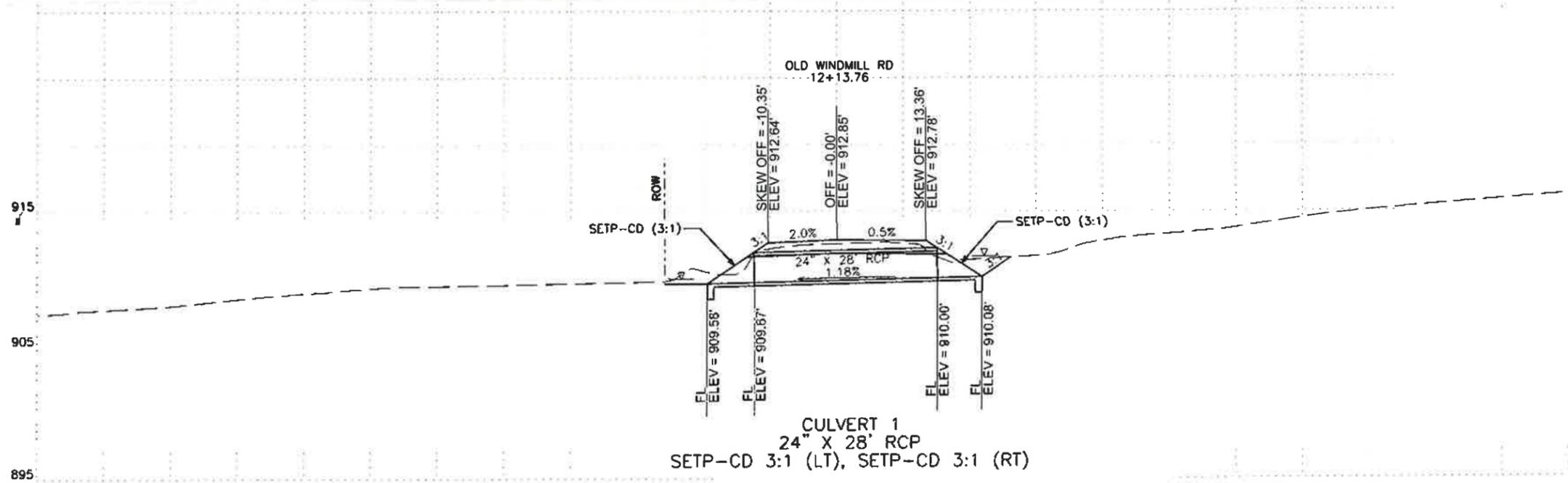
- LEGEND**
- ONE COURSE SEAL COAT
  - W — EXIST WATER LINE
  - X — EXIST FENCE
  - OE — EXIST OVERHEAD ELECTRIC
  - C — EXIST UNDERGROUND CABLE
  - D — DITCH FLOW LINE
  - ⊙ WATER METER
  - ⊞ TELEPHONE PEDESTAL

- NOTES:**
1. CONTRACTOR SHALL RETURN THE GROUND AREA DISTURBED BY CONSTRUCTION ACTIVITY TO EQUAL OR BETTER CONDITION IN SUCH A MANNER AS NOT TO CHANGE THE ROUTE OF STORM WATER FLOW.
  2. SEE EROSION CONTROL PLANS FOR MORE INFORMATION ON RIPRAP LIMITS.

OLD WINDMILL CULVERT	RIVER STATION	FREQ YEAR	Q cfs	Ke	EXIST CULVERT			PROP CULVERT			REMARKS	
					DESCRIPTION	HW ELEV	TW DEPTH	DESCRIPTION	HW ELEV	TW DEPTH		V-OUT ft/s
1	12+13.76	25	13	0.7	30" CMP	911.65	0.68	24" RCP	912.12	0.68	8.00	PROPOSED DESIGN FREQUENCY
		100	16			911.92	0.74		912.47	0.74	8.13	PROPOSED CHECK FREQUENCY

VERTICAL SCALE: 1" = 10'

NOTE: CULVERT ANALYSIS BASED ON HY8 VERSION 8.7.3



*Kelly G. Morrelli*  
8/7/17

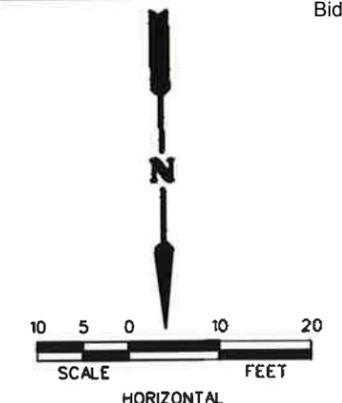
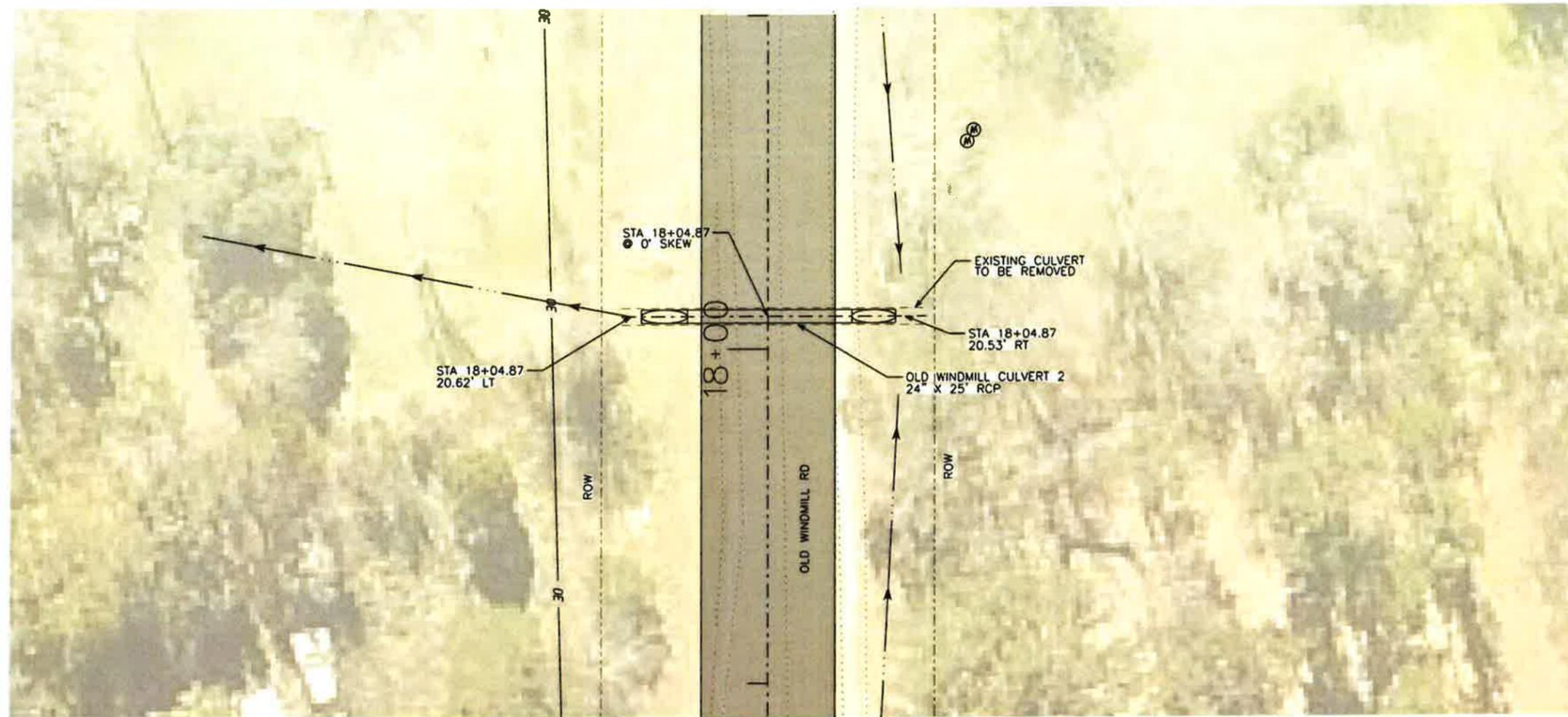
NO.	REVISION	BY	DATE



**OLD WINDMILL RD  
CULVERT 1 LAYOUT**

Designed: KGM	3151 S E INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>51</b>
Checked: KOK		
Drawn: KGM		
Checked: KOK		

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 7/12/2017



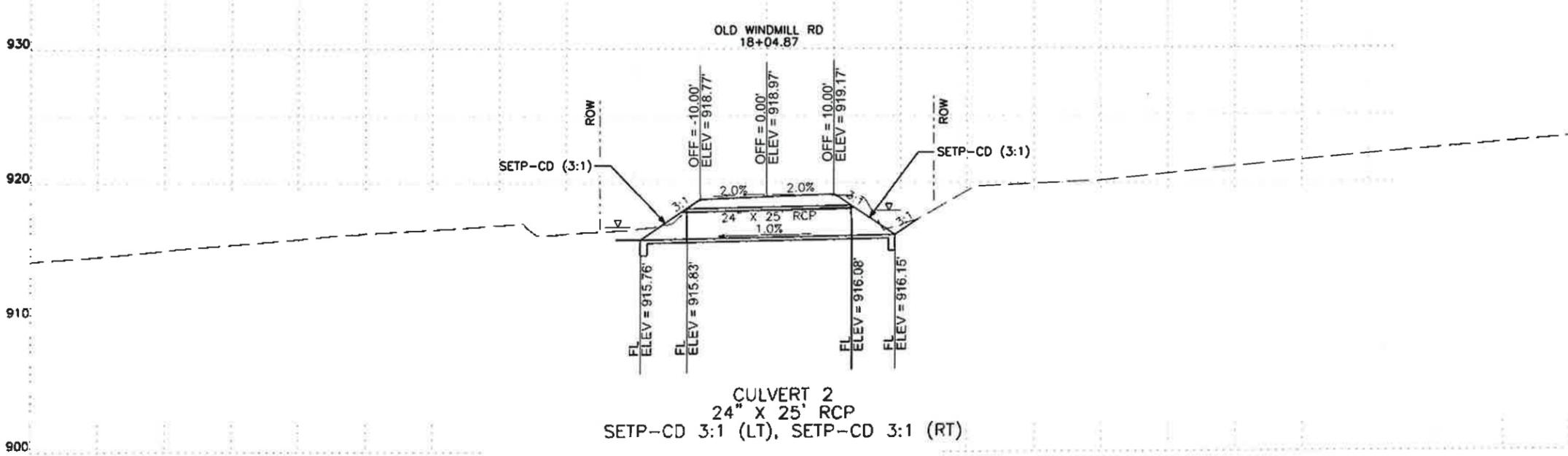
- LEGEND**
- ONE COURSE SEAL COAT
  - W — EXIST WATER LINE
  - X — EXIST FENCE
  - OE — EXIST OVERHEAD ELECTRIC
  - C — EXIST UNDERGROUND CABLE
  - D — DITCH FLOW LINE
  - ⊙ WATER METER
  - ⊞ TELEPHONE PEDESTAL

- NOTES:**
- CONTRACTOR SHALL RETURN THE GROUND AREA DISTURBED BY CONSTRUCTION ACTIVITY TO EQUAL OR BETTER CONDITION IN SUCH A MANNER AS NOT TO CHANGE THE ROUTE OF STORM WATER FLOW.
  - SEE EROSION CONTROL PLANS FOR MORE INFORMATION ON RIPRAP LIMITS.

OLD WINDMILL CULVERT	RIVER STATION	FREQ YEAR	Q cfs	Ke	EXIST CULVERT			PROP CULVERT			REMARKS	
					DESCRIPTION	HW ELEV	TW DEPTH	DESCRIPTION	HW ELEV	TW DEPTH		V-OUT ft/s
2	18+04.87	25	17	0.7	30" CMP	918.12	1.52	24" RCP	918.65	1.52	8.09	PROPOSED DESIGN FREQUENCY
		100	21			918.47	1.65		919.09	1.65	4.48	PROPOSED CHECK FREQUENCY

NOTE: CULVERT ANALYSIS BASED ON HY8 VERSION 8.7.3

VERTICAL SCALE: 1" = 10'



*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE

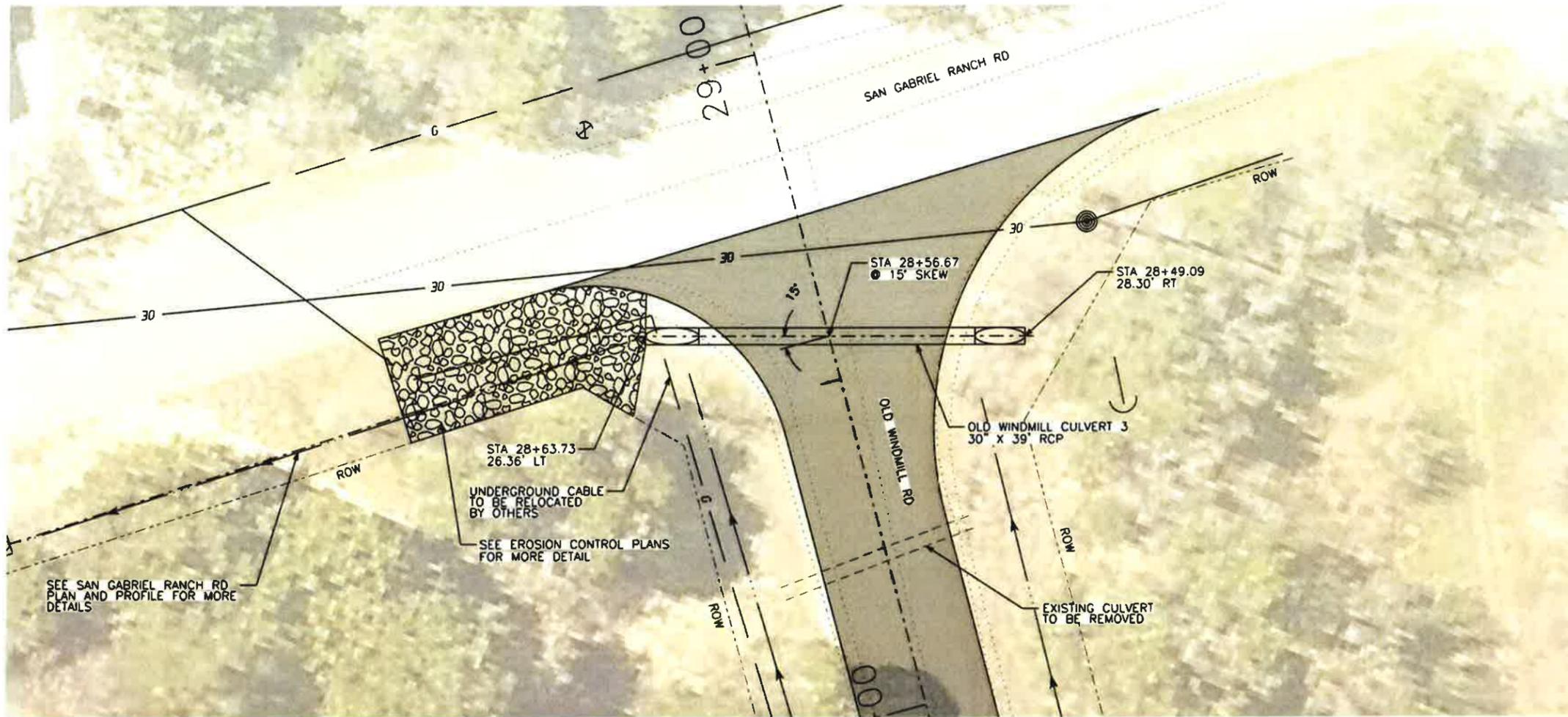
**WILLIAMSON COUNTY**  
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**WILLIAMSON COUNTY**  
DEPT. OF INFRASTRUCTURE

**OLD WINDMILL RD  
CULVERT 2 LAYOUT**

Designed:	KGM	3151 S E INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>52</b>
Checked:	KQK		
Drawn:	KGM		
Checked:	KQK		

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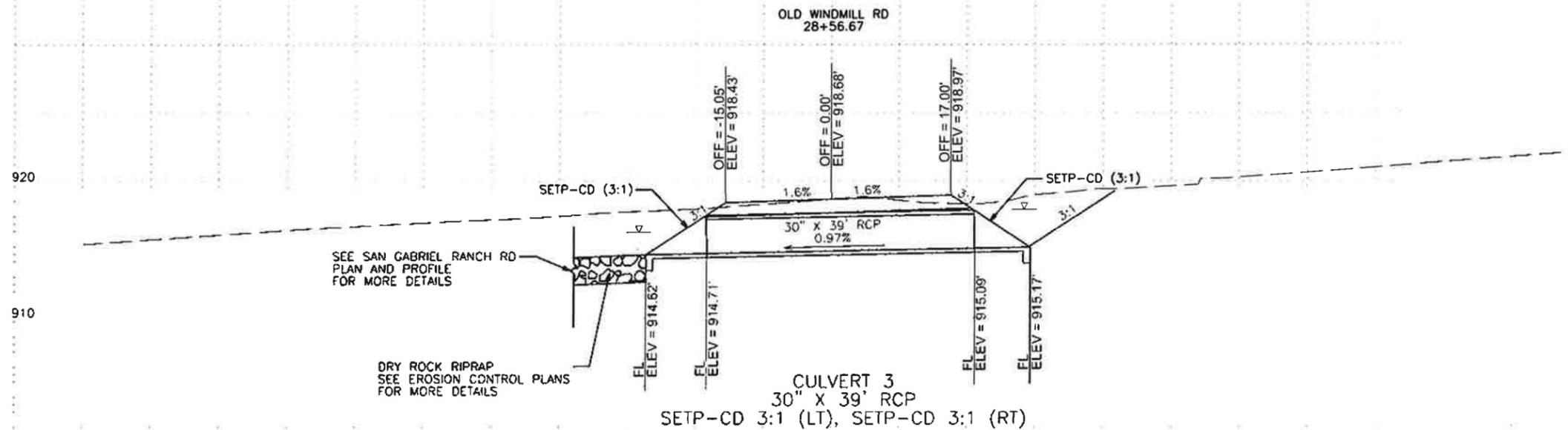
- LEGEND**
- ONE COURSE SEAL COAT
  - W — EXIST WATER LINE
  - X — EXIST FENCE
  - OE — EXIST OVERHEAD ELECTRIC
  - C — EXIST UNDERGROUND CABLE
  - D — DITCH FLOW LINE
  - ⊙ WATER METER
  - ⊠ TELEPHONE PEDESTAL

- NOTES:**
- CONTRACTOR SHALL RETURN THE GROUND AREA DISTURBED BY CONSTRUCTION ACTIVITY TO EQUAL OR BETTER CONDITION IN SUCH A MANNER AS NOT TO CHANGE THE ROUTE OF STORM WATER FLOW.
  - SEE EROSION CONTROL PLANS FOR MORE INFORMATION ON RIPRAP LIMITS.

OLD WINDMILL CULVERT	RIVER STATION	FREQ YEAR	Q cfs	Ke	EXIST CULVERT		PROP CULVERT			REMARKS		
					DESCRIPTION	HW ELEV	TW DEPTH	DESCRIPTION	HW ELEV		TW DEPTH	V-OUT ft/s
3	28+56.67	25	24	0.7	24" CMP	918.63	1.85	30" RCP	917.80	1.06	8.64	PROPOSED DESIGN FREQUENCY
		100	30			918.68	1.99		918.33	1.15	9.15	PROPOSED CHECK FREQUENCY

VERTICAL SCALE: 1" = 10'

NOTE: CULVERT ANALYSIS BASED ON HY8 VERSION 8.7.3



*Kelly G. Morrelli*  
8/7/17

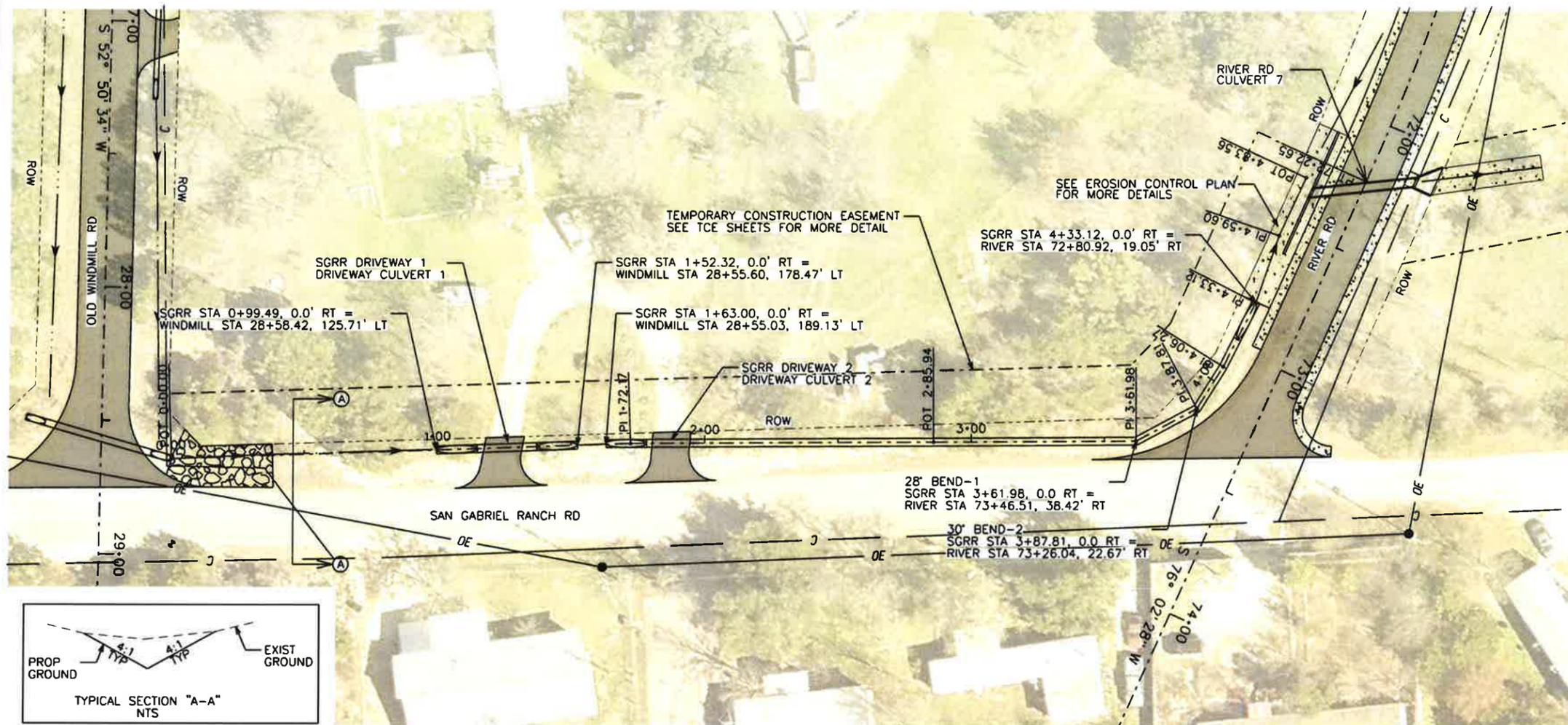
NO.	REVISION	BY	DATE



**OLD WINDMILL RD  
CULVERT 3 LAYOUT**

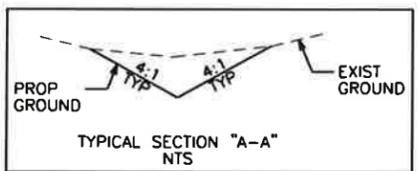
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Checked:	KQK		
Drawn:	KGM		
Checked:	KQK		

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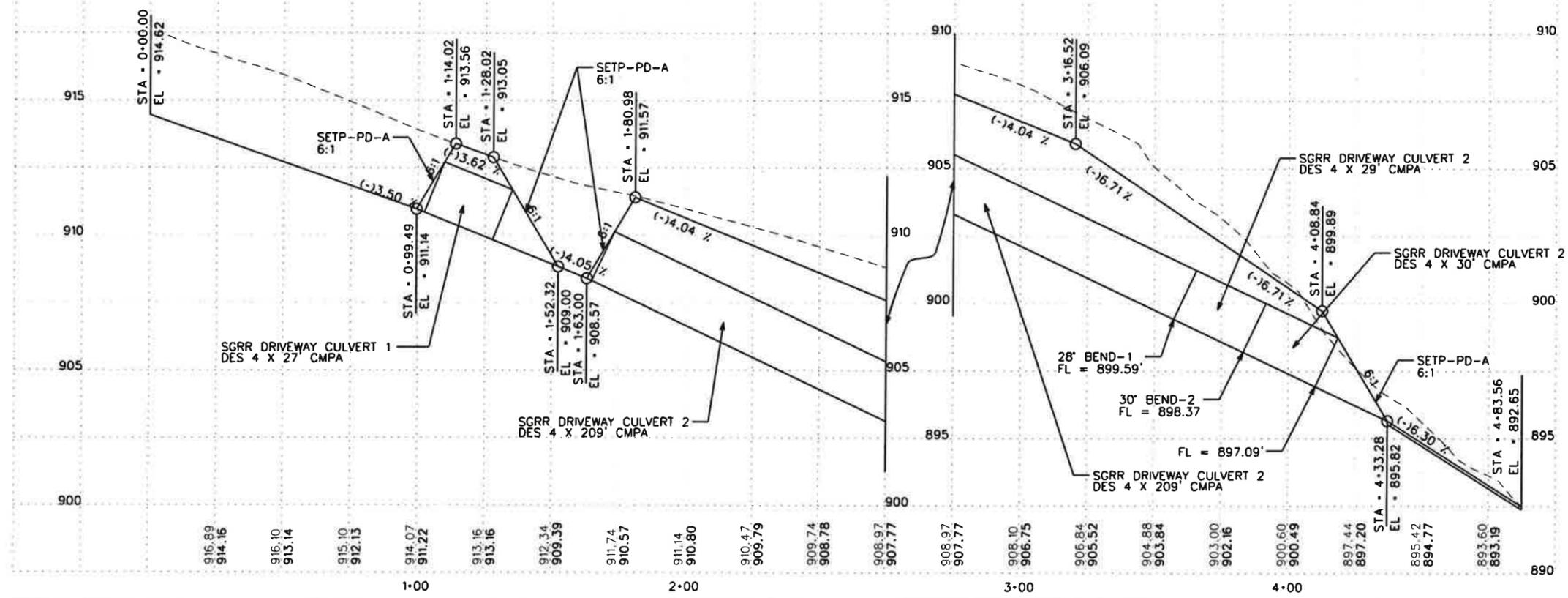


- LEGEND
- TWO COURSE SEAL COAT
  - W EXIST WATER LINE
  - F EXIST FENCE
  - OE EXIST OVERHEAD ELECTRIC
  - C EXIST UNDERGROUND CABLE
  - D DITCH FLOW LINE
  - WATER METER
  - TELEPHONE PEDESTAL

- NOTES:
- ALL UTILITIES SHOWN ARE BY APPROXIMATE LOCATION ONLY AND ARE TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO BEGINNING CONSTRUCTION.
  - CONTRACTOR SHALL REPAIR / RECONNECT EXISTING UTILITIES DISCONNECTED OR DAMAGED DURING CONSTRUCTION.
  - THE "ONE CALL" SYSTEM WILL BE USED TO LOCATE EXISTING UNDERGROUND UTILITIES.
  - CONTRACTOR SHALL RETURN THE GROUND AREA DISTURBED BY CONSTRUCTION ACTIVITY TO EQUAL OR BETTER CONDITION IN SUCH A MANNER AS NOT TO CHANGE THE ROUTE OF STORM WATER FLOW.
  - EXIST. MAILBOXES TO BE RELOCATED TO EDGE OF PROPOSED SHOULDER AS REQUIRED.
  - SEE DRIVEWAY DETAILS FOR MORE INFORMATION.



VERTICAL SCALE: 1" = 5'



*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE

WILLIAMSON COUNTY  
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INFRASTRUCTURE  
1848

SAN GABRIEL RANCH RD  
DRIVEWAY CULVERT PLAN AND PROFILE

Designed: KGM	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>54</b>
Checked: KOK		
Drawn: KGM		
Checked: KOK		

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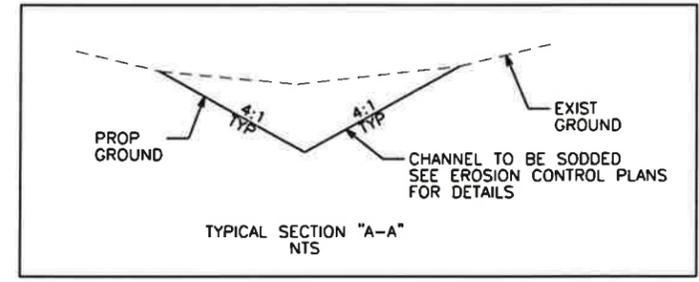
BOBBY MATHEW & MELISSA D TIPSWORD  
233 RIVER RD  
LIBERTY HILL, TX 78642  
512-284-0691



LEGEND

- ROW
- DRAINAGE EASEMENT
- TEMPORARY CONSTRUCTION EASEMENT
- CHANNEL GRADING

NOTES:  
SEE EROSION CONTROL PLANS  
FOR GRADING DETAILS



NOTE: HEAVY EQUIPMENT PROHIBITED  
IN THIS AREA DUE TO EXISTING SEPTIC  
TANK LOCATION. GRADING SHALL AVOID  
SEPTIC TANK

TEMPORARY CONSTRUCTION  
EASEMENT

DRAINAGE EASEMENT

EXISTING RIVER RD  
CULVERT 1  
TO BE REMOVED

PROPOSED RIVER RD  
CULVERT 1  
SEE CULVERT 1 LAYOUT SHEET  
FOR MORE DETAIL

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8/10/2017 9:17 AM

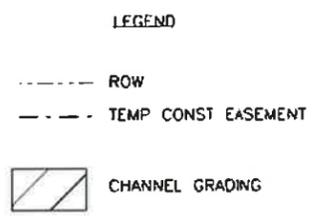
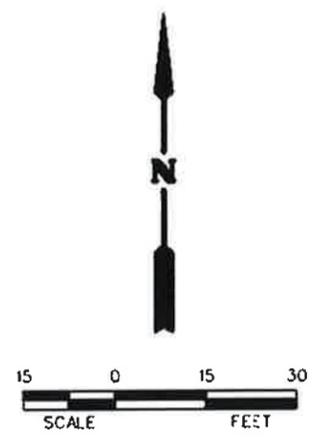
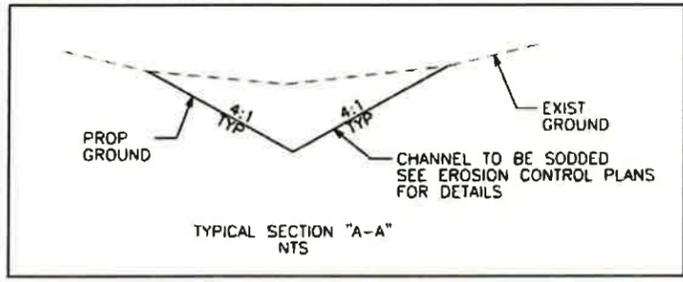
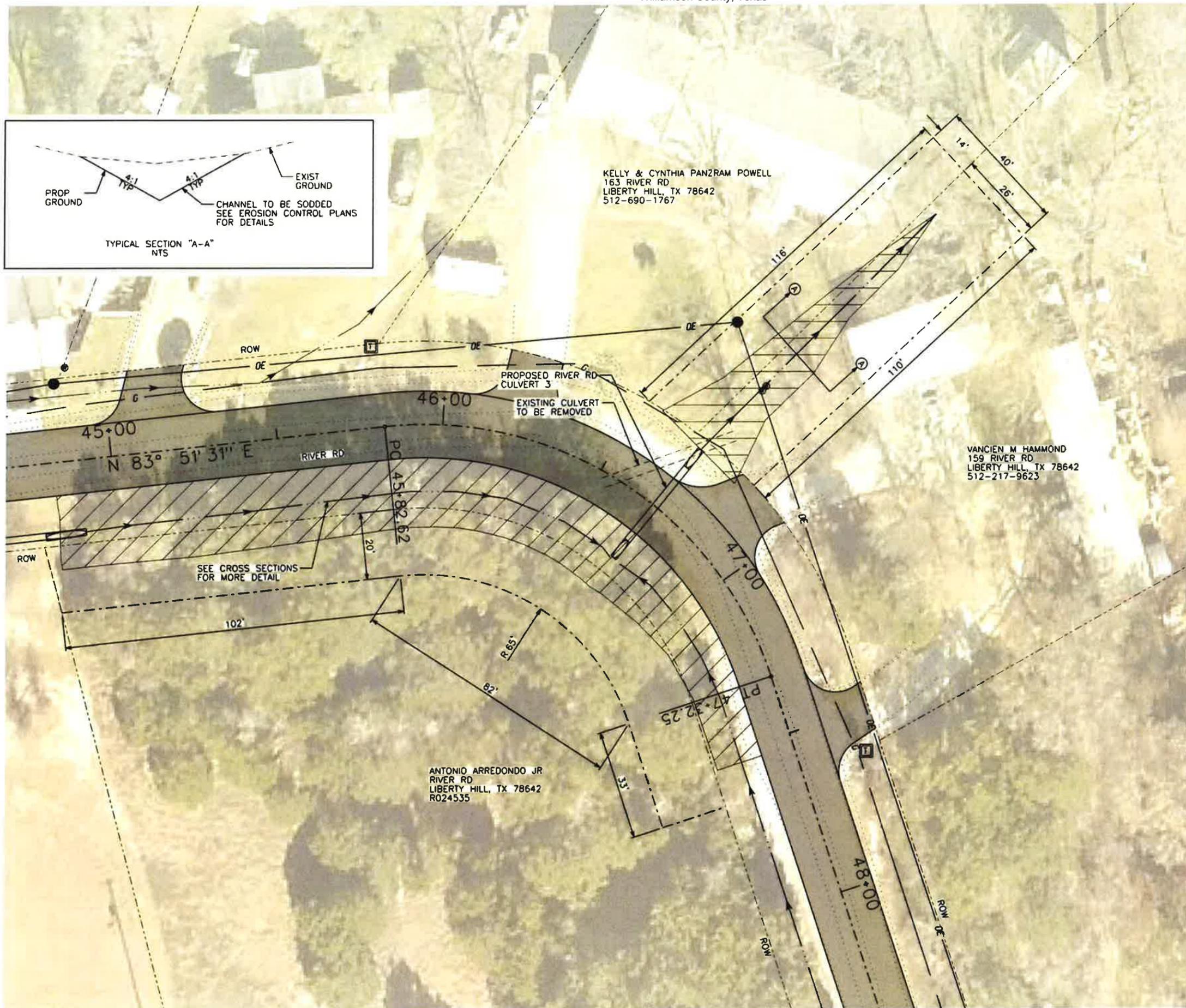


NO.	REVISION	BY	DATE

WILLIAMSON COUNTY  
DEPT. OF  
INFRASTRUCTURE

RIVER RD  
CULVERT 1 CHANNEL DE / TCE

Designed:	KGM	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>55</b>
Checked:	KQK		
Drawn:	KGM		
Checked:	KQK		



NOTES:  
SEE EROSION CONTROL PLANS  
FOR GRADING DETAILS



*Kelly G. Morrelli*  
8/7/17

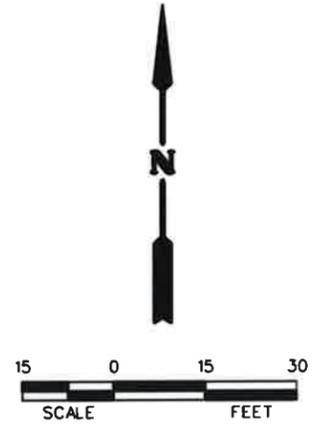
NO.	REVISION	BY	DATE

**WILLIAMSON COUNTY**  
DEPT. OF INFRASTRUCTURE

**RIVER RD  
CULVERT 3 CHANNEL TCE**

Designed: KGM	3151 S E INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	<b>56</b>
Checked: KQK		
Drawn: KGM		
Checked: KQK		

RIVER\_CULV\_2-3\_CHANNEL\_TCE.dgn  
7/12/2017 10:09:00 AM



LEGEND

- ROW
- - - TEMP CONST EASEMENT
- CHANNEL GRADING

NOTE:  
SEE EROSION CONTROL PLANS  
FOR GRADING DETAILS

ROBIE LYNN REHSE  
 101 RIVER RD  
 LIBERTY HILL, TX 78642  
 512-415-6398



*Kelly G. Morrelli*  
 8/7/17

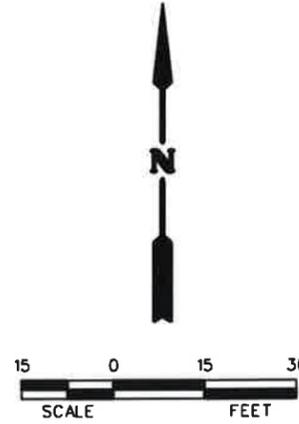
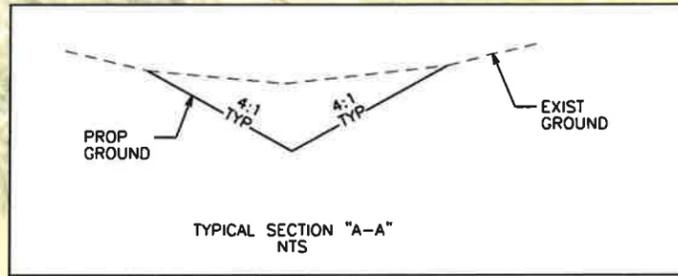
NO.	REVISION	BY	DATE

**W** WILLIAMSON COUNTY  
 DEPT. OF INFRASTRUCTURE  
 1848

RIVER RD  
 CULVERT 7 CHANNEL TCE

Designed: <u>KGM</u>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>57</b>
Checked: <u>KQK</u>		
Drawn: <u>KGM</u>		
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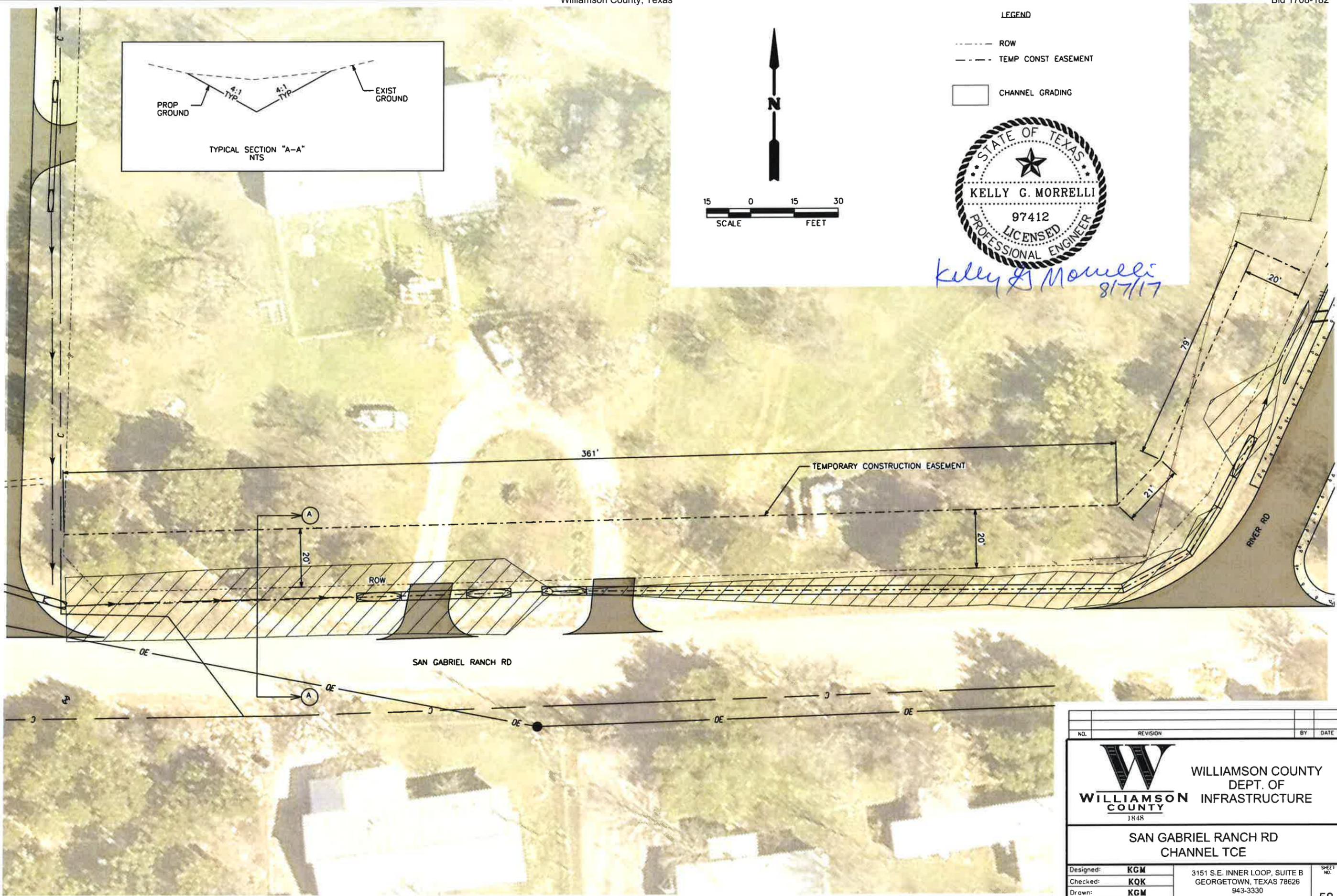
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- LEGEND
- ROW
  - - - TEMP CONST EASEMENT
  - CHANNEL GRADING

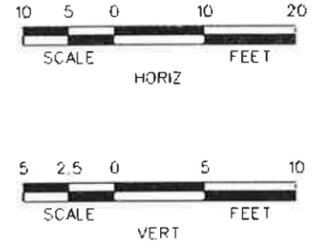
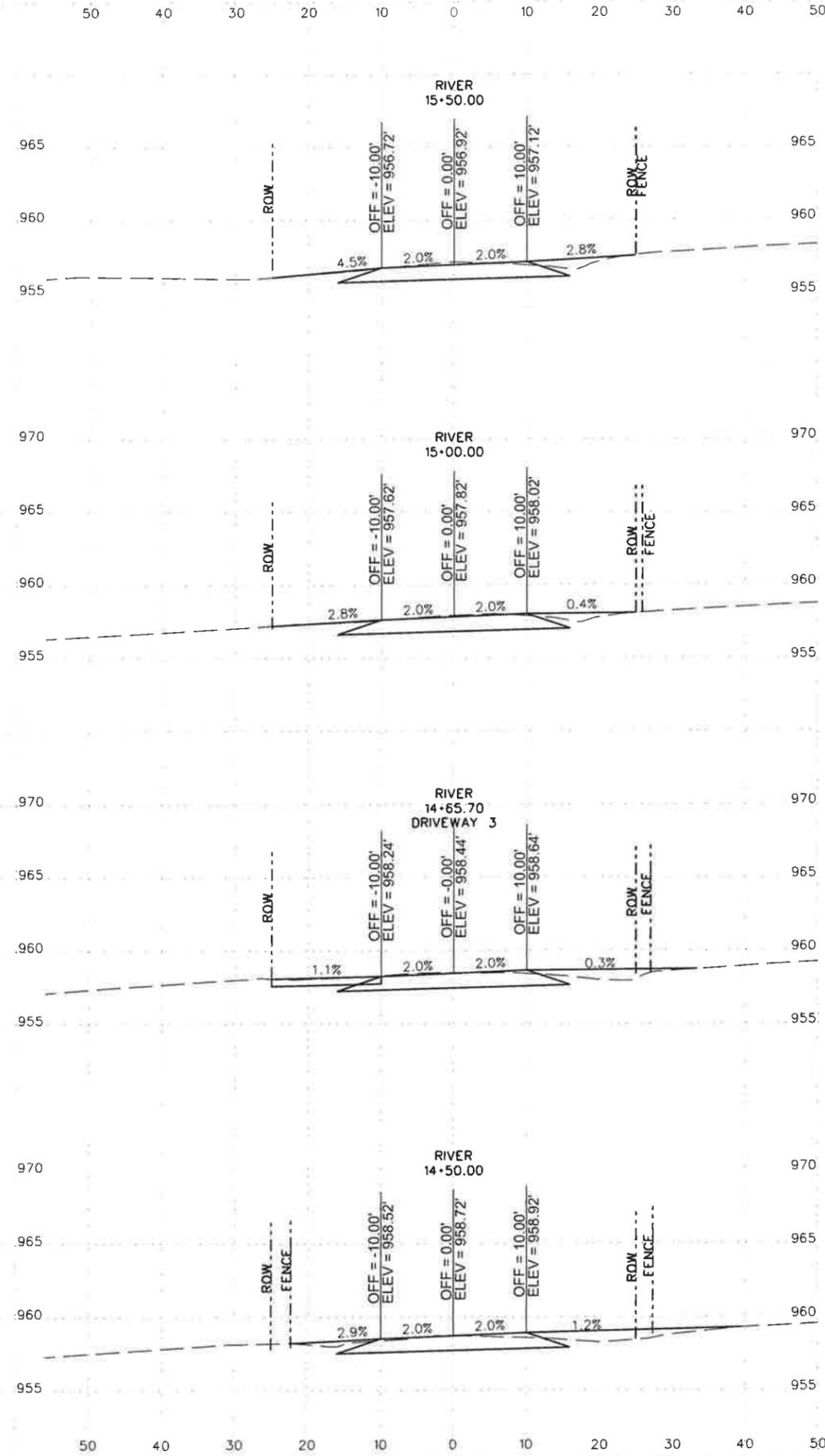
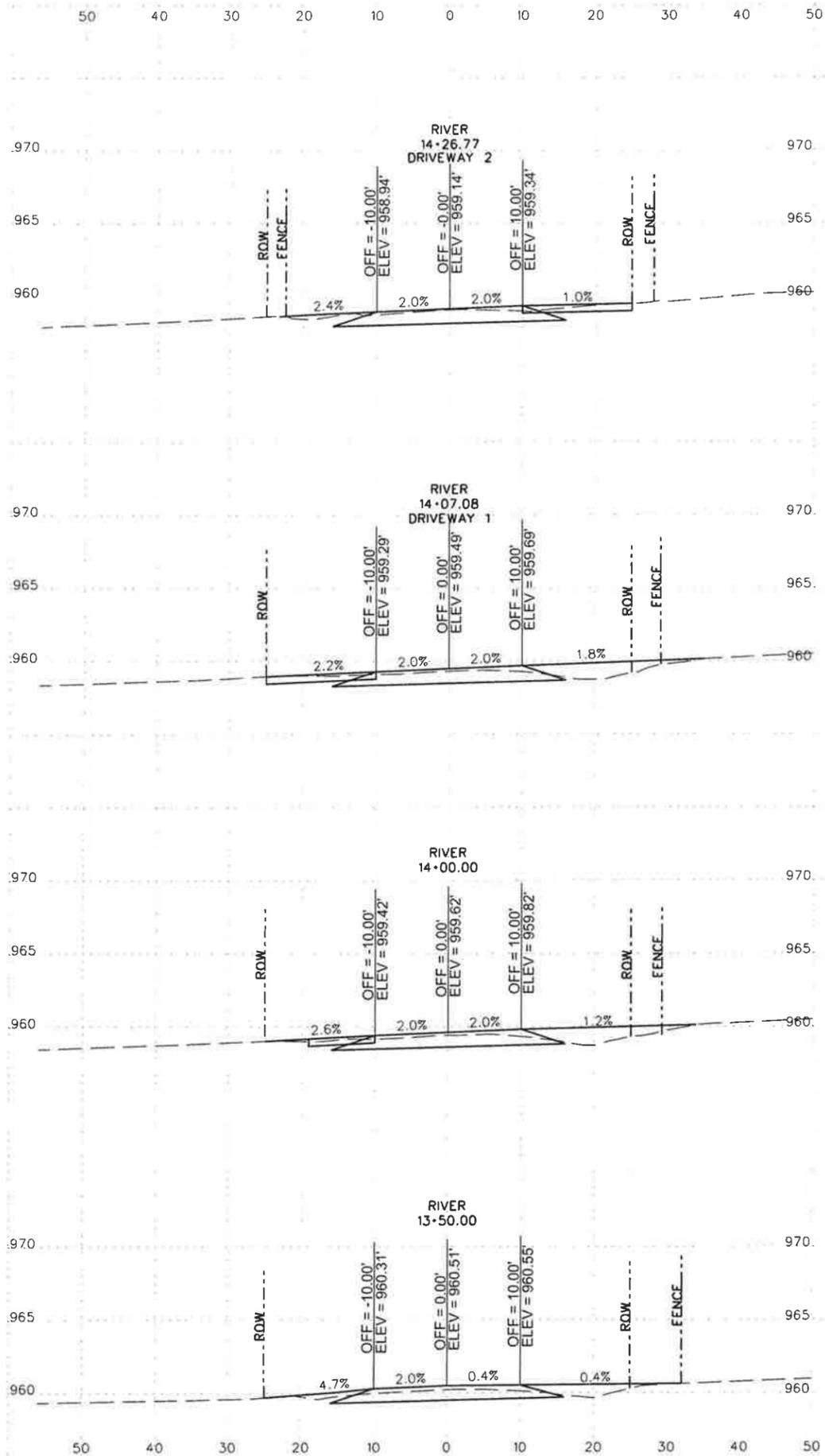


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8/7/17



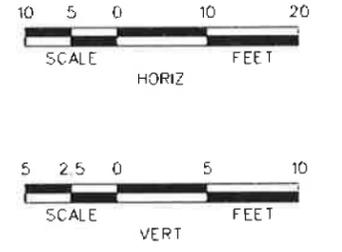
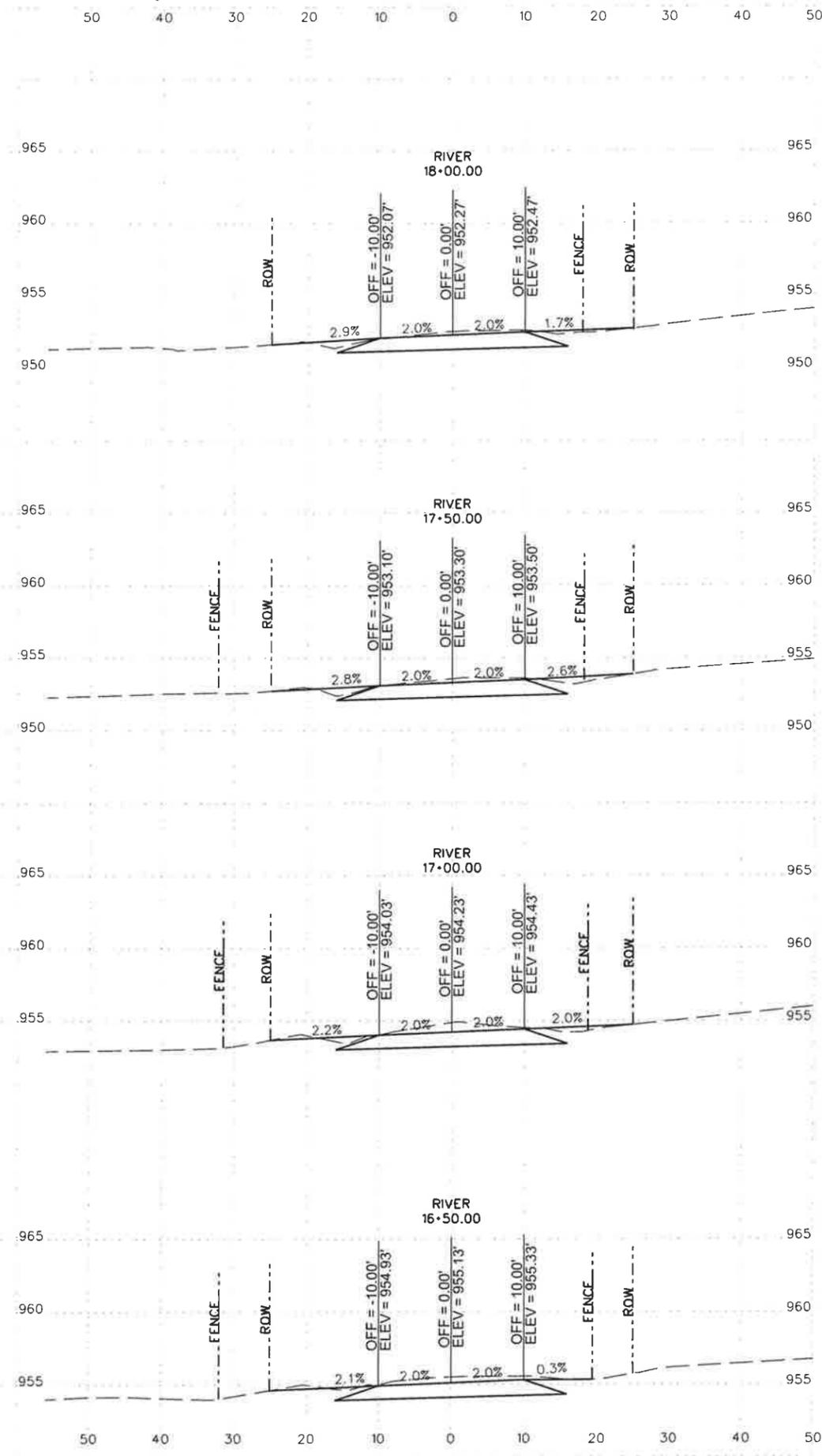
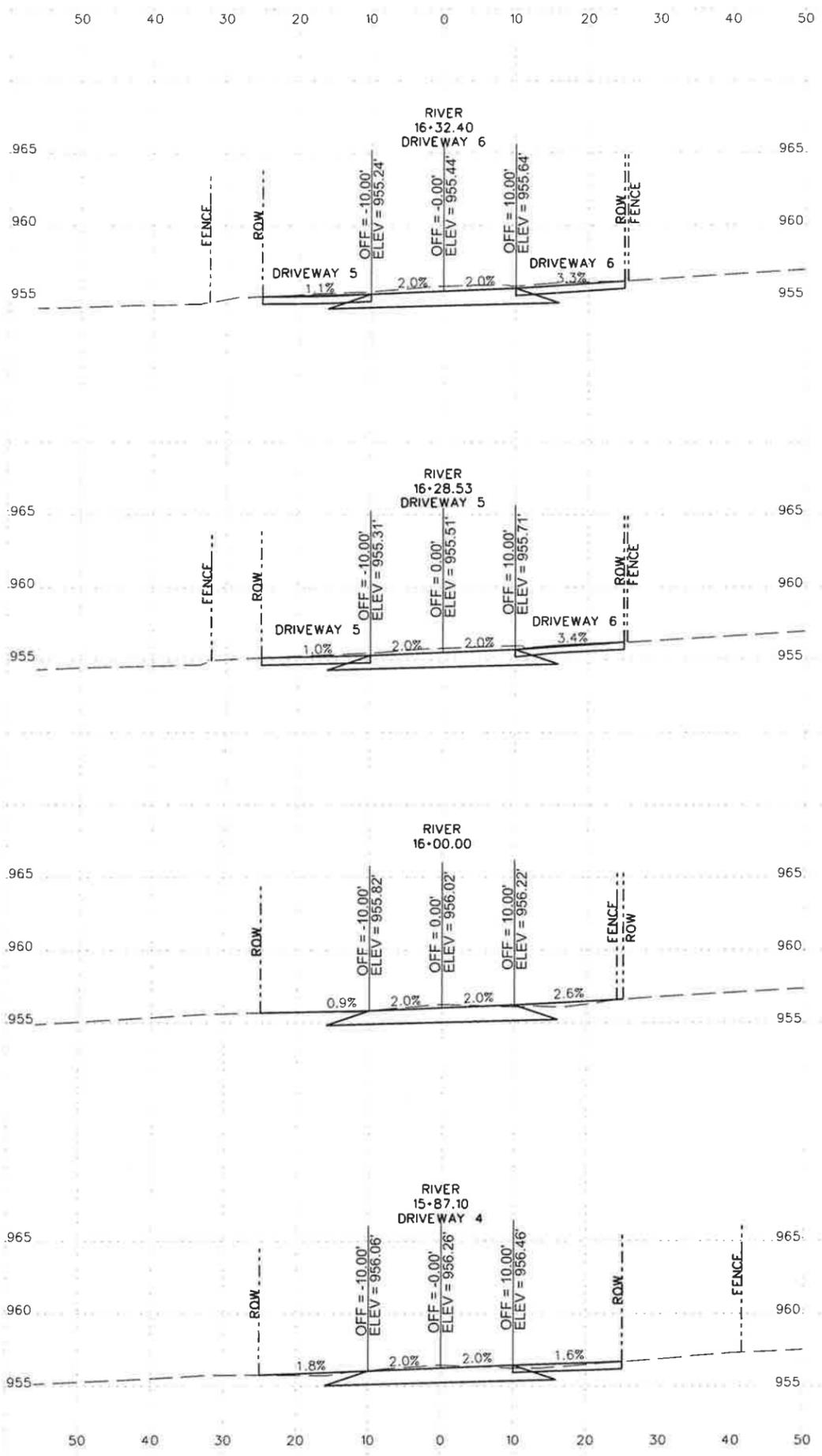
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NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> 1848			
<b>WILLIAMSON COUNTY</b> DEPT. OF INFRASTRUCTURE			
<b>SAN GABRIEL RANCH RD</b> <b>CHANNEL TCE</b>			
Designed:	<b>KGM</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org	SHEET NO. <b>58</b>
Checked:	<b>KQK</b>		
Drawn:	<b>KGM</b>		
Checked:	<b>KQK</b>		



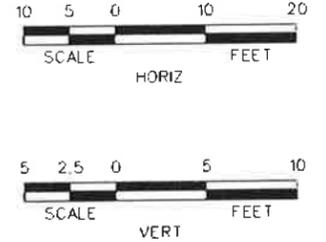
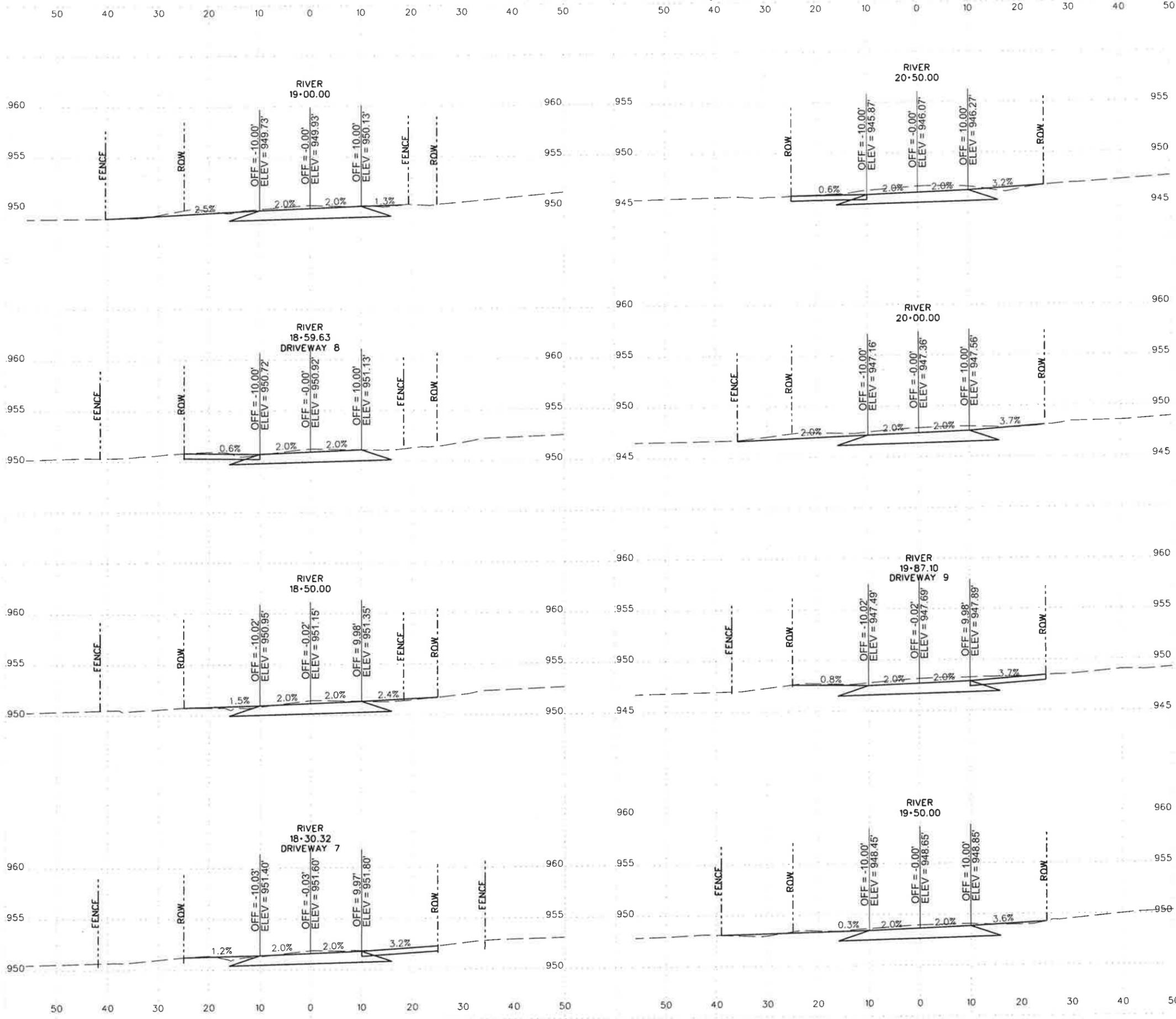
*Kelly G. Morrelli*  
 8/7/17

NO.	REVISION	BY	DATE
 WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE 1818			
RIVER RD CROSS SECTIONS STA 13-50.00 TO STA 15-50.00			
Designed:	KGM	3151 S E INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626	
Checked:	KOK	943-3330	
Drawn:	KGM	www.wilco.org	
Checked:	KOK		



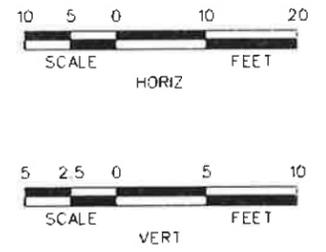
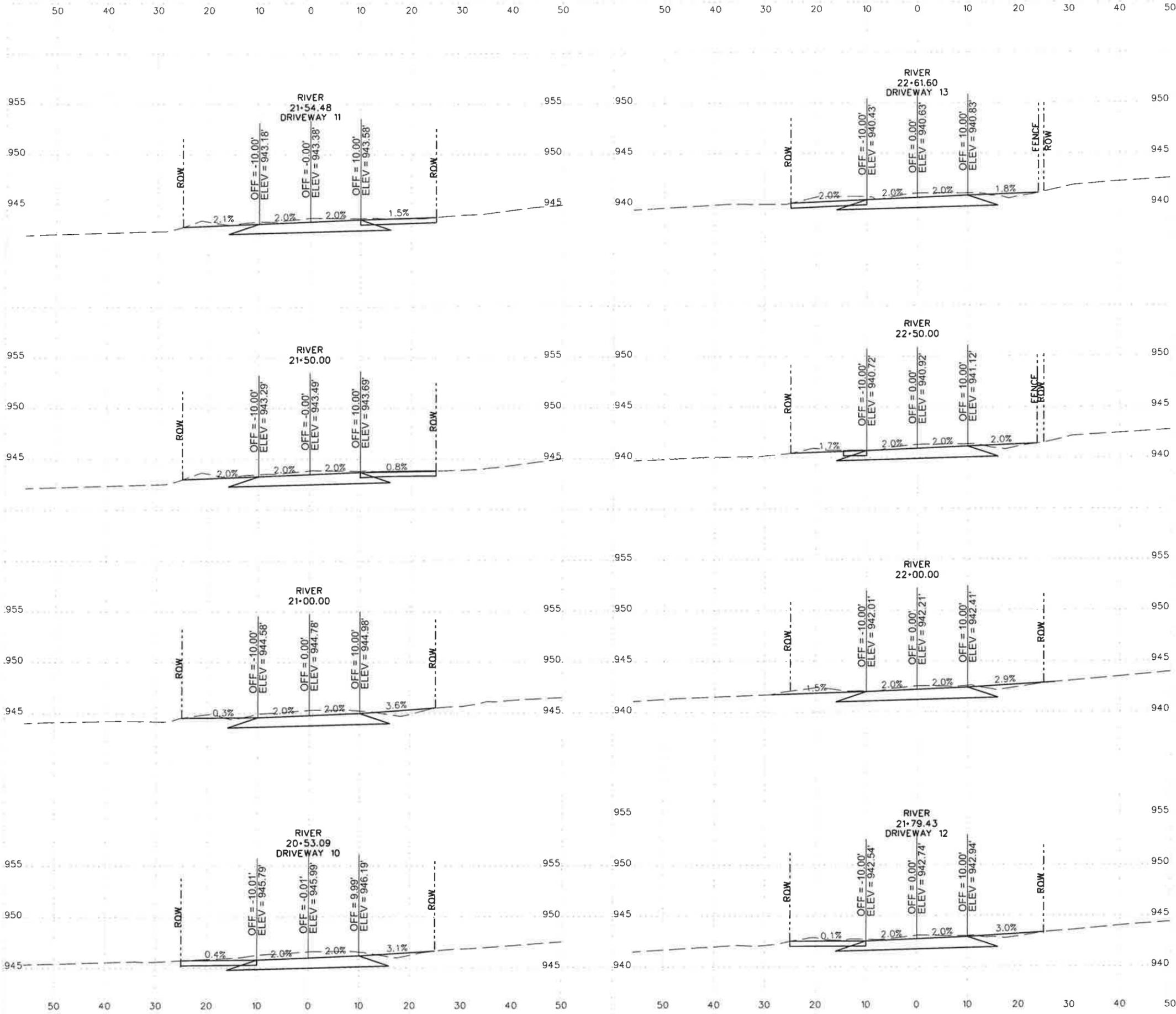
*Kelly G. Morrelli*  
 8/7/17

NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> 1818			
WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE RIVER RD CROSS SECTIONS STA 15+87.10 TO STA 18+00.00			
Designed:	KGM	3151 S E INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626	
Checked:	KQK	943-3330	
Drawn:	KGM	www.wilco.org	
Checked:	KQK		



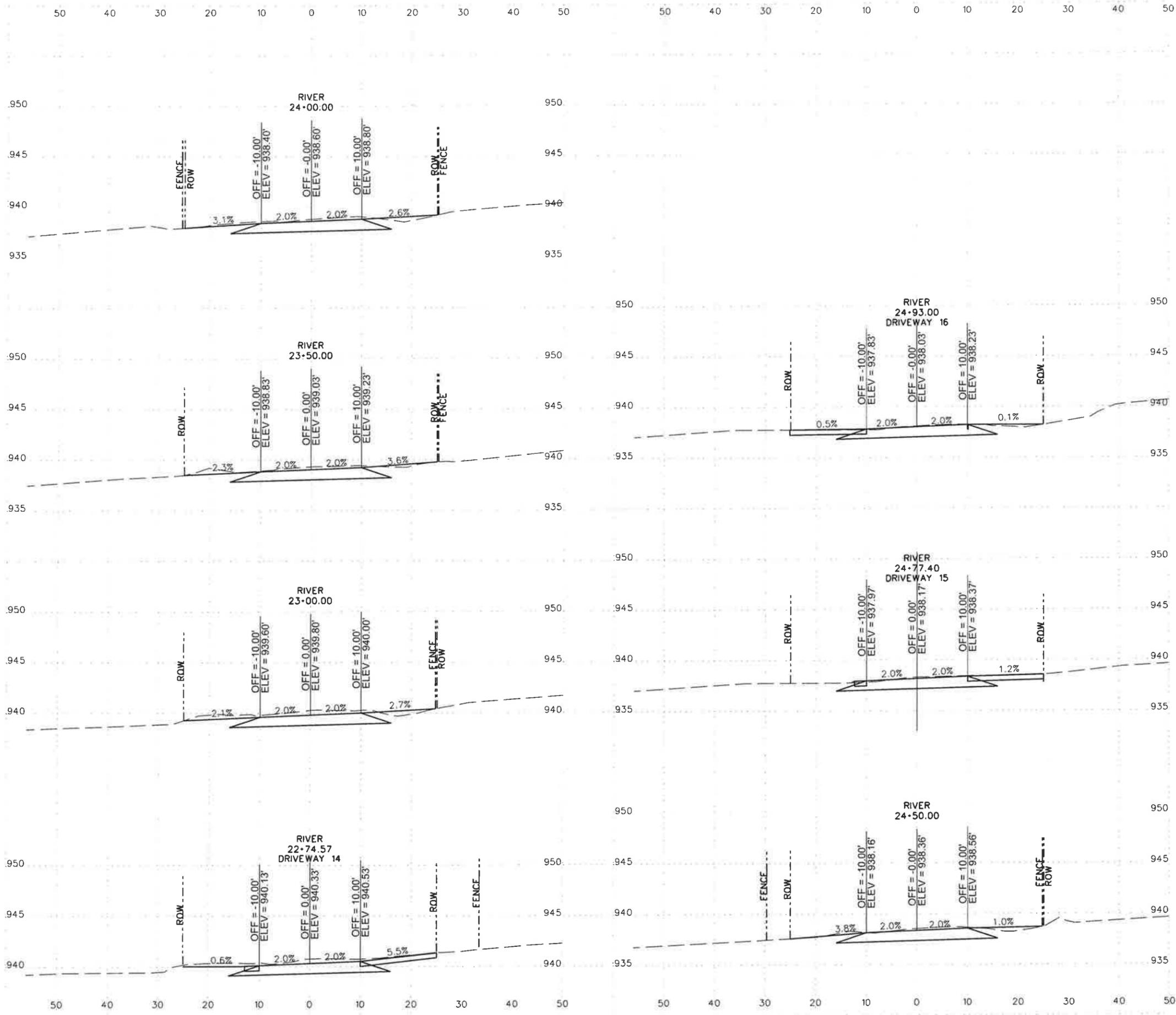
*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> DEPT. OF INFRASTRUCTURE			
RIVER RD CROSS SECTIONS STA 18-30.32 TO STA 20-50.00			
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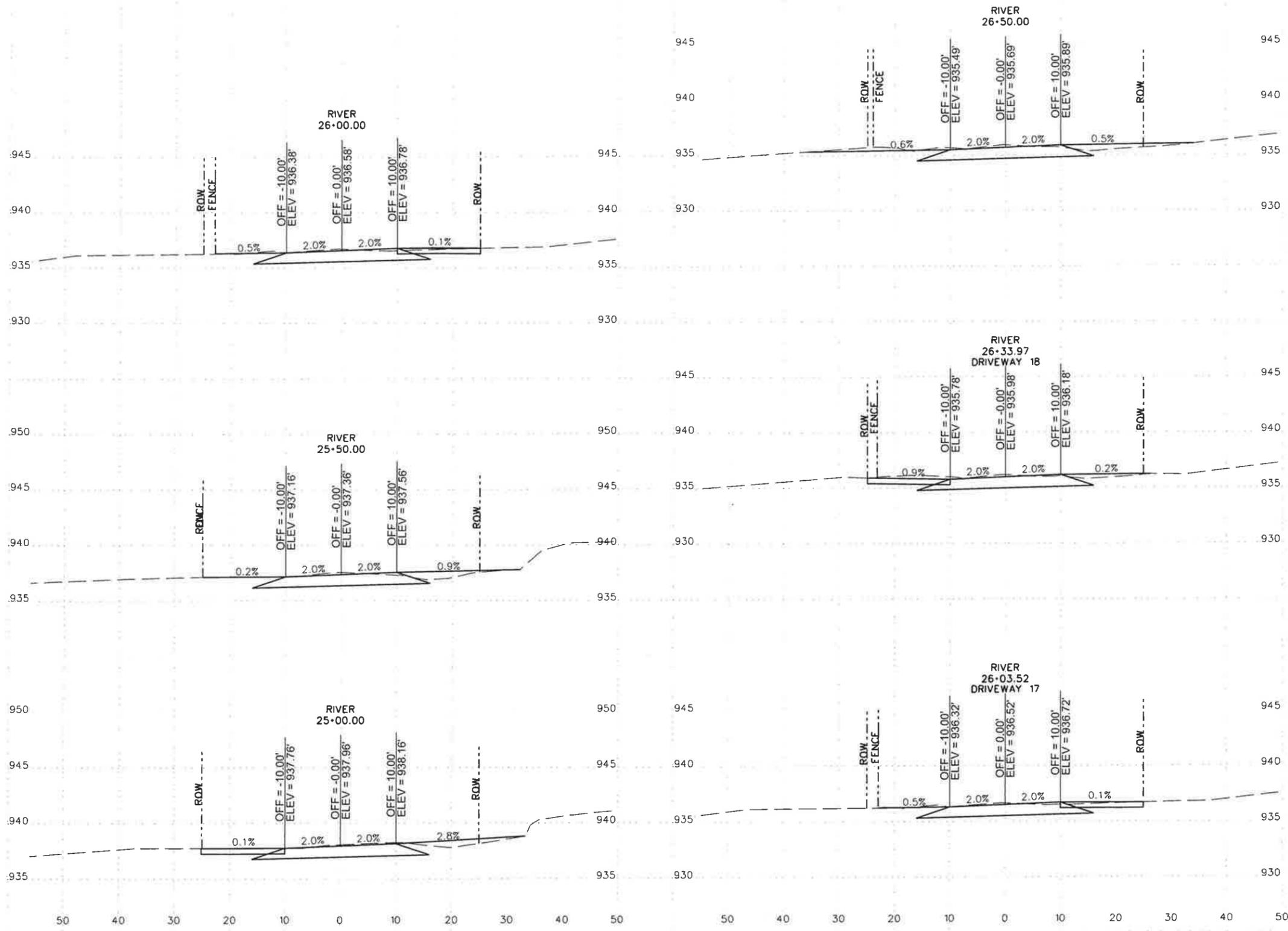
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 WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE 1818			
RIVER RD CROSS SECTIONS STA 20+53.09 TO STA 22+61.60			
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Drawn:	KGM	www.wilco.org	
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8/7/17

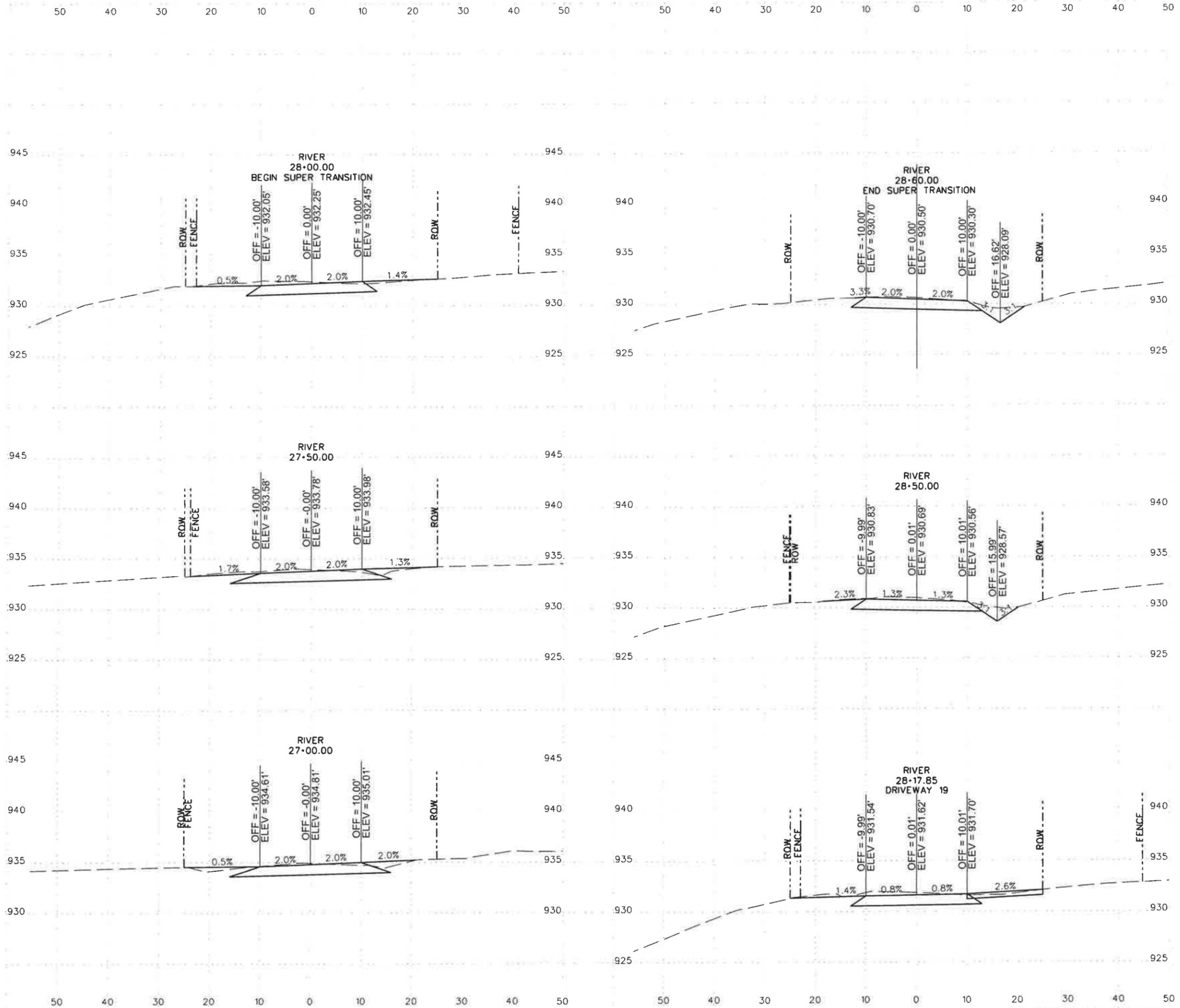
NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> IRIN			
<b>WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE</b>			
RIVER RD CROSS SECTIONS STA 22-74.57 TO STA 24-93.00			
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Checked:	KQK	GEORGETOWN, TEXAS 78626	
Drawn:	KCM	943-3330	
Checked:	KQK	www.wilco.org	

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8/7/17

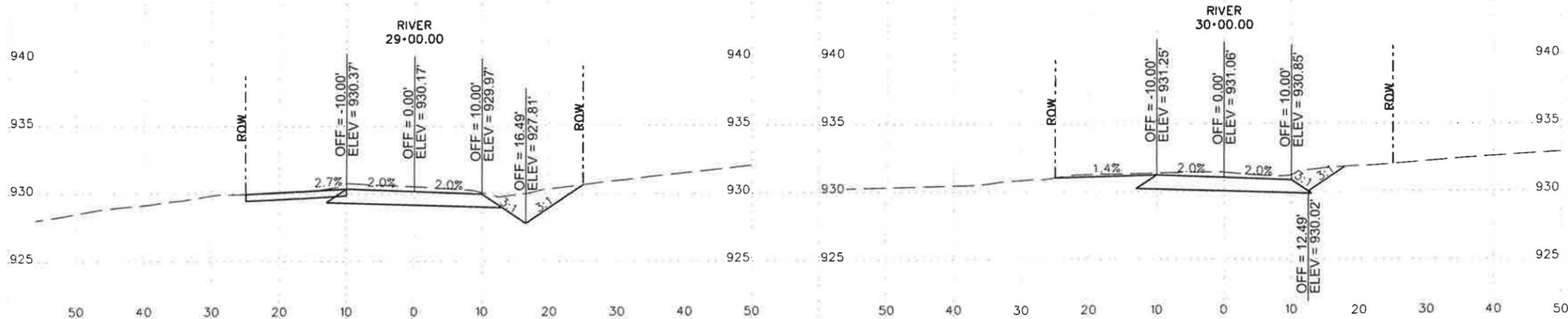
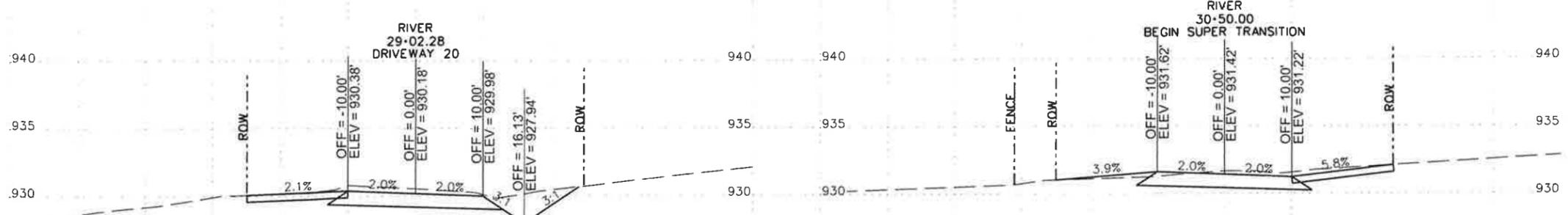
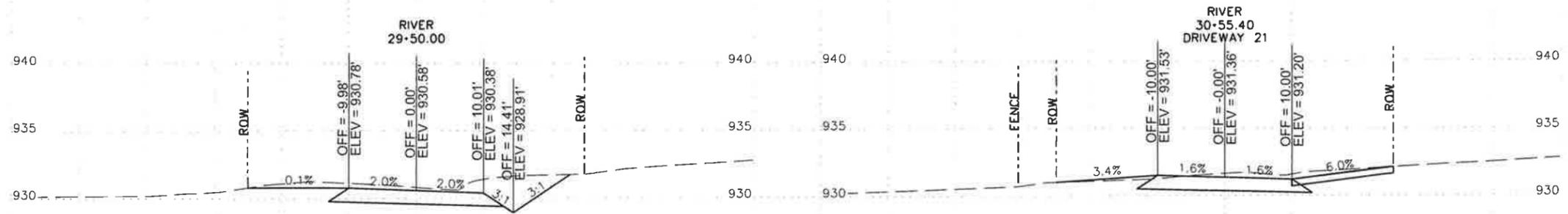
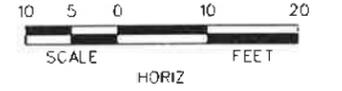
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 <b>WILLIAMSON COUNTY</b> 1818			
WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE			
RIVER RD CROSS SECTIONS STA 25+00.00 TO STA 26+50.00			
Designed:	KGM	3151 S E INNER LOOP, SUITE B	
Checked:	KJK	GEORGETOWN, TEXAS 78626	
Drawn:	KCM	943-3330	
Checked:	KJK	www.wilco.org	



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8/7/17

NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> 1818			
<b>WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE</b>			
RIVER RD CROSS SECTIONS STA 27+00.00 TO STA 28+60.00			
Designed:	KGM	3151 S E INNER LOOP, SUITE B	
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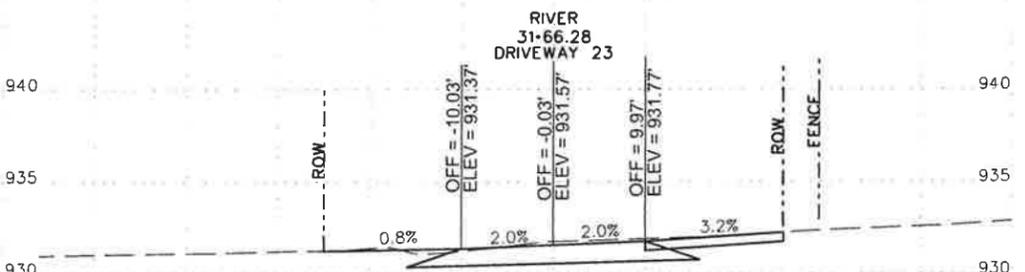
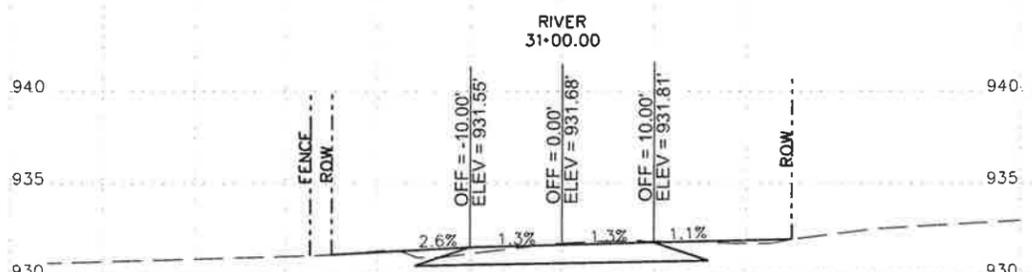
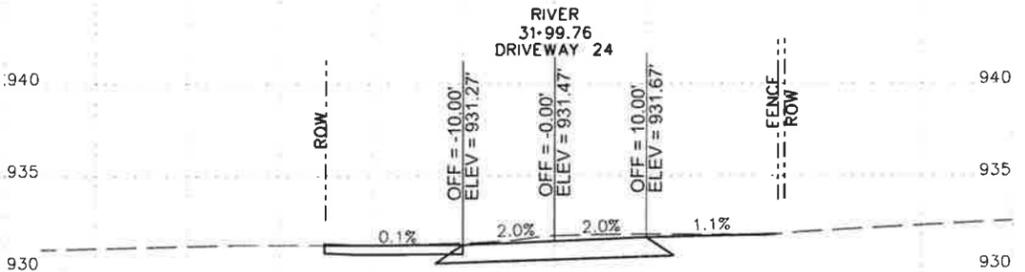
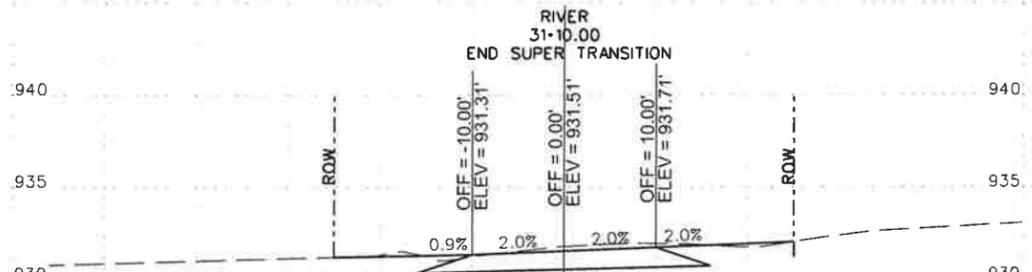
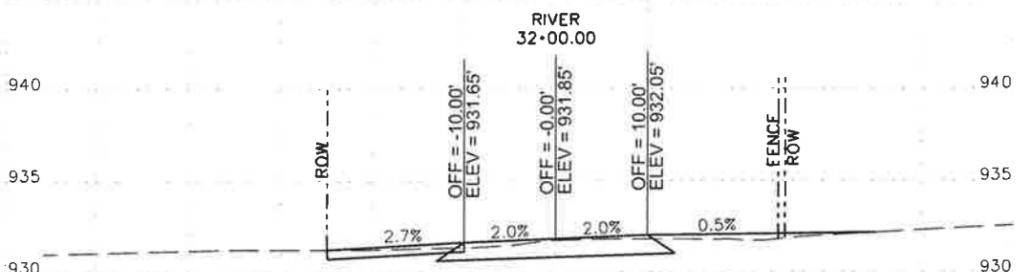
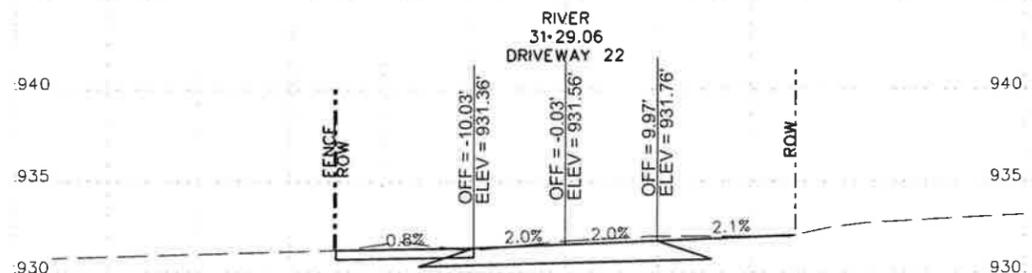
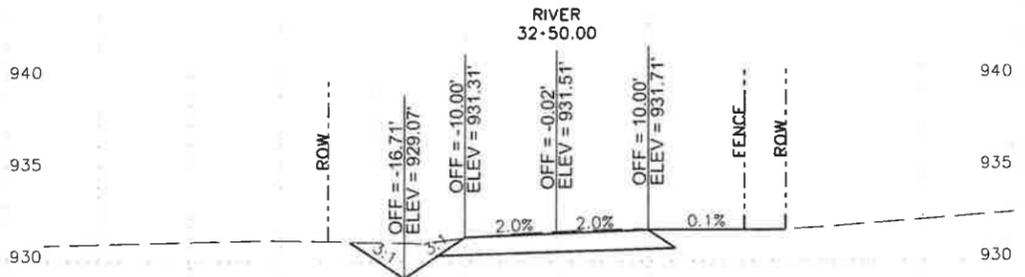
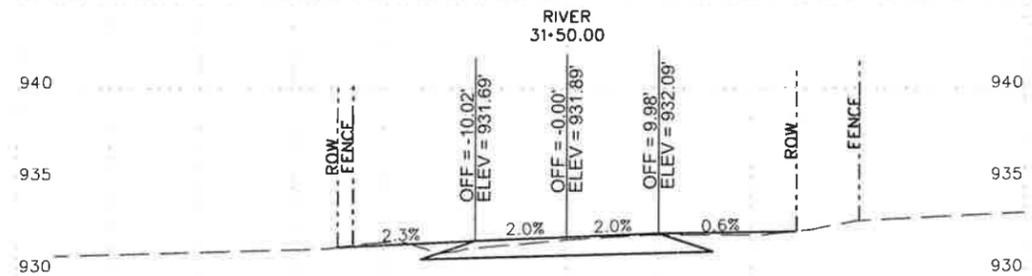
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8/7/17

NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> DEPT. OF INFRASTRUCTURE			
RIVER RD CROSS SECTIONS STA 29+00.00 TO STA 30+55.40			
Designed:	KGM	3151 S E INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626	
Checked:	KQK	943-3330	
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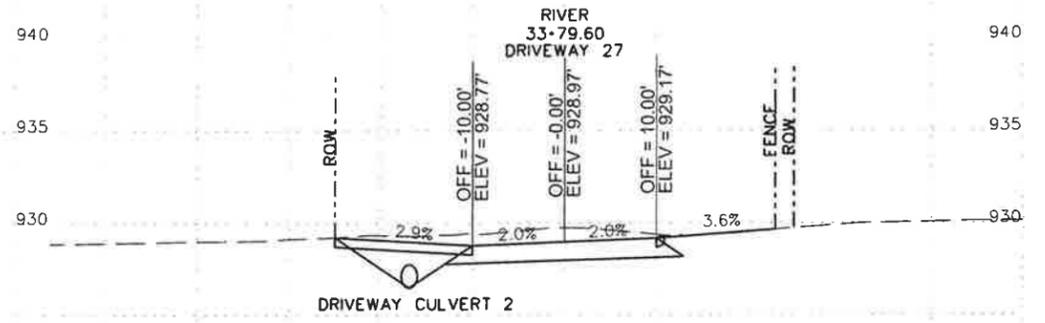
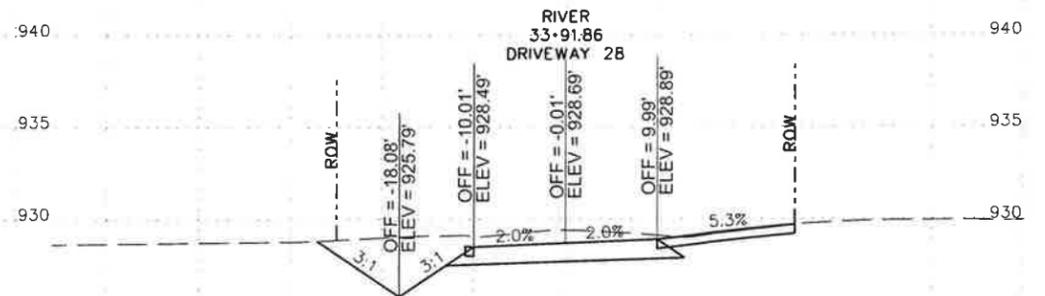
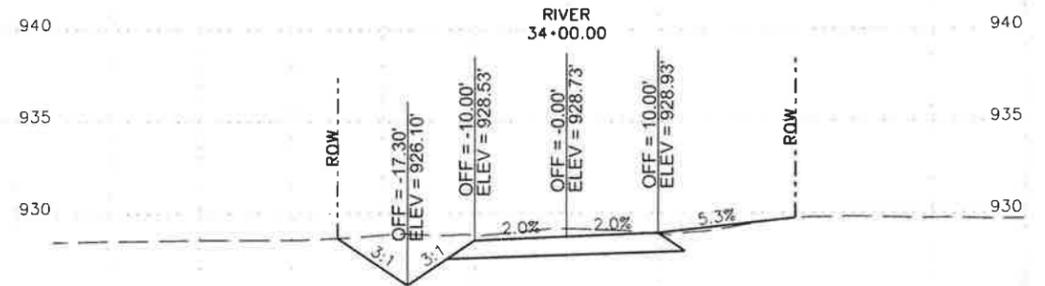
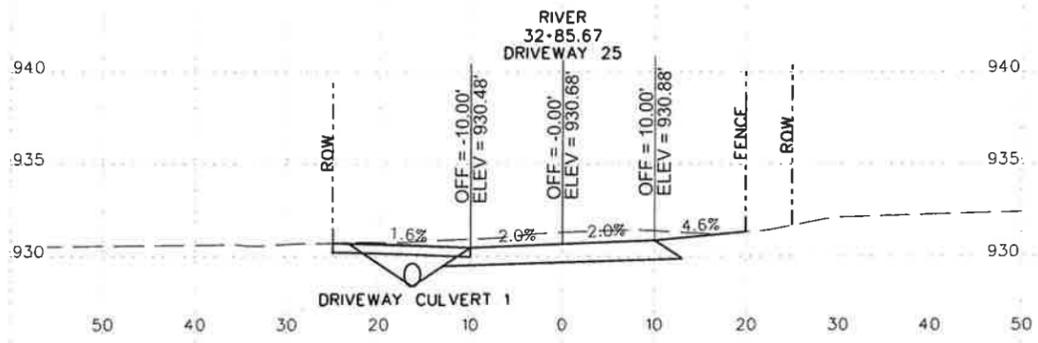
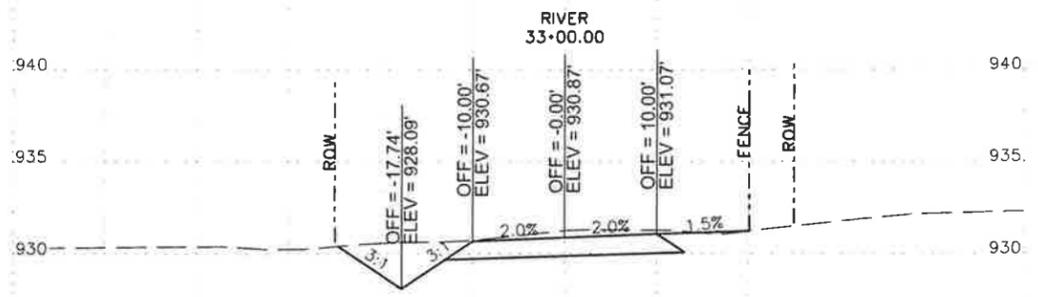
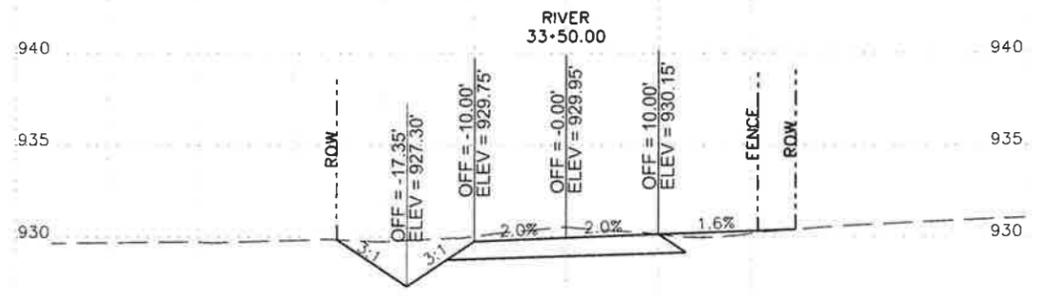
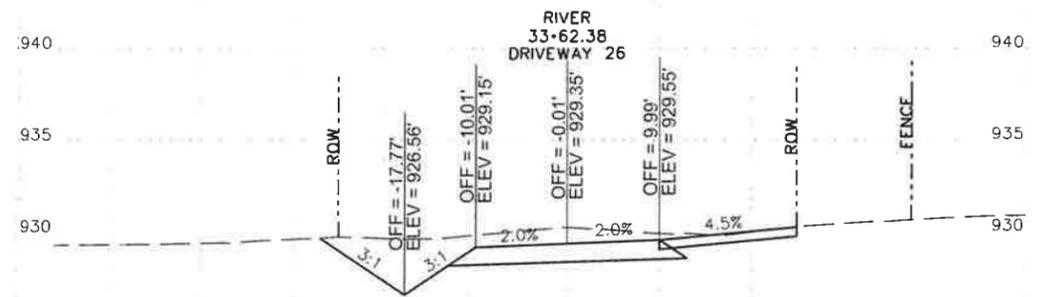
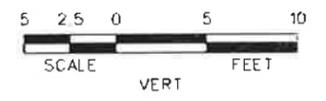


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8/7/17

NO.	REVISION	BY:	DATE
 WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE 1818			
RIVER RD CROSS SECTIONS STA 31-00.00 TO STA 32+50.00			
Designed:	KGM	3151 S.E. INNER LOOP, SUITE B	
Checked:	KOK	GEORGETOWN, TEXAS 78626	
Drawn:	KGM	943-3330	
Checked:	KOK	www.wilco.org	

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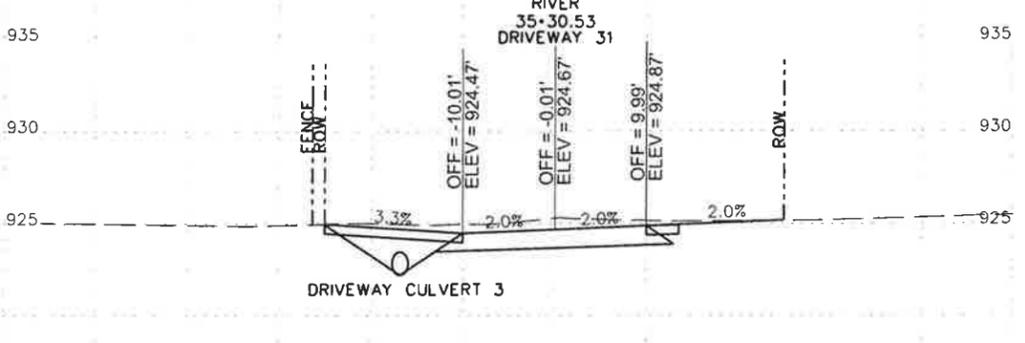
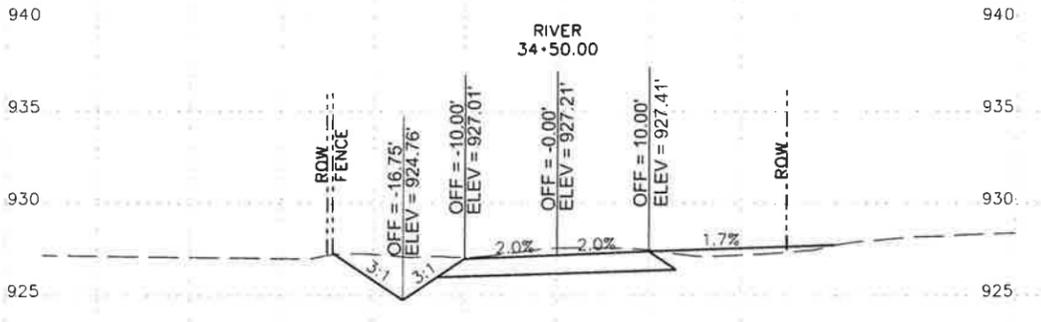
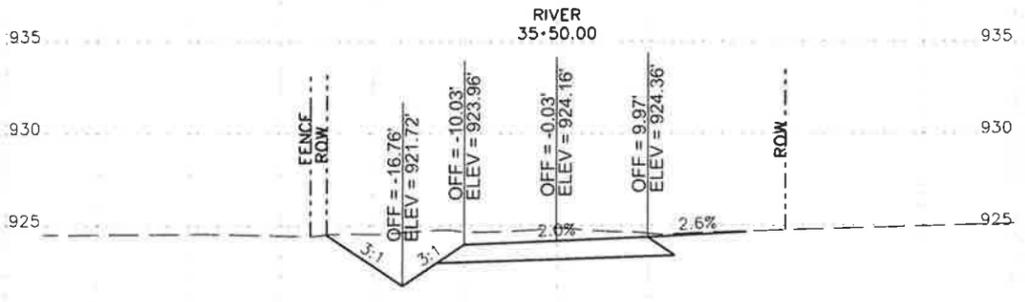
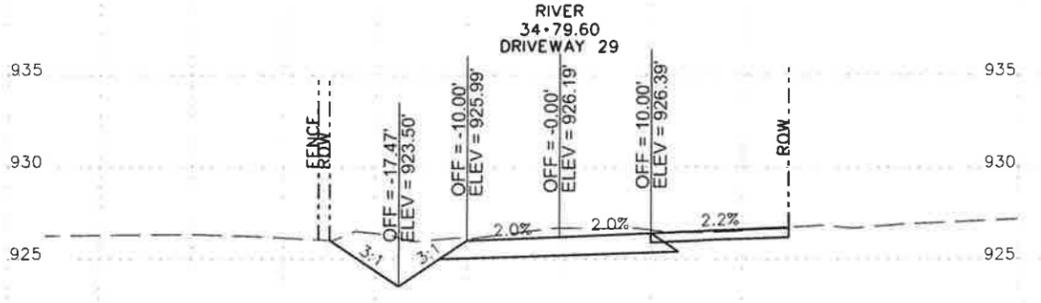
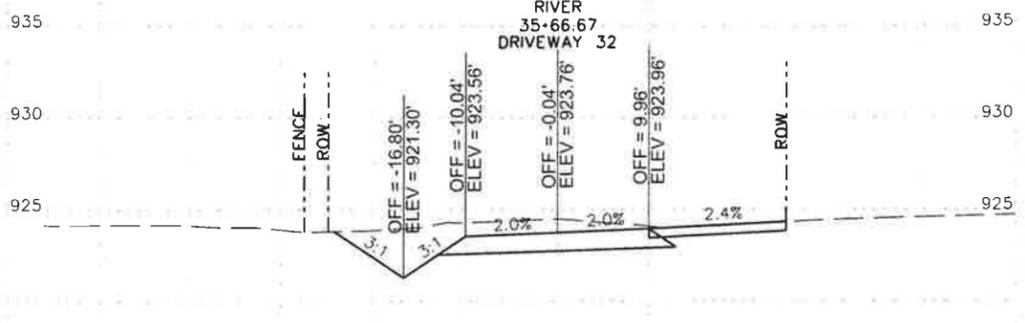
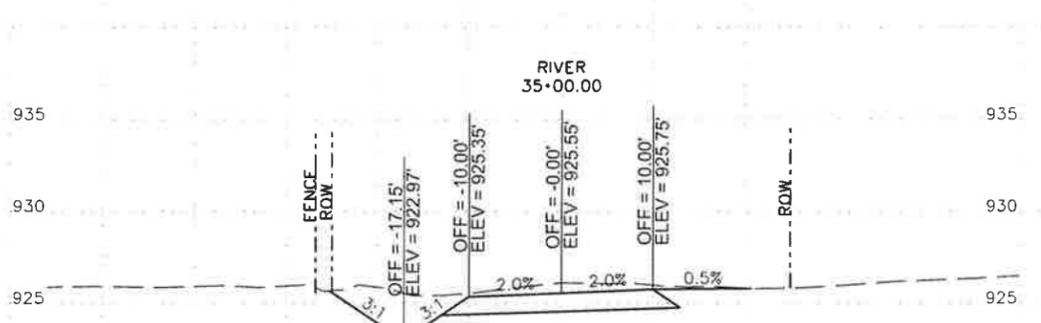
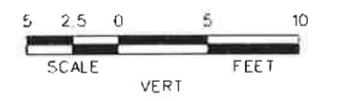
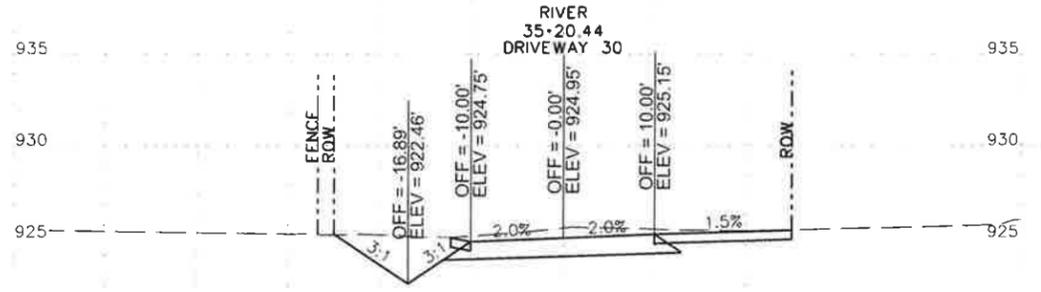


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8/7/17

NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> 1818			
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Designed:	KGM	3151 S E INNER LOOP, SUITE B	
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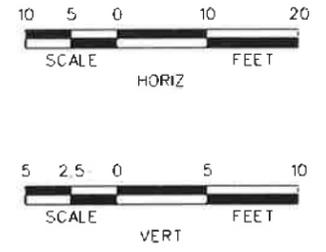
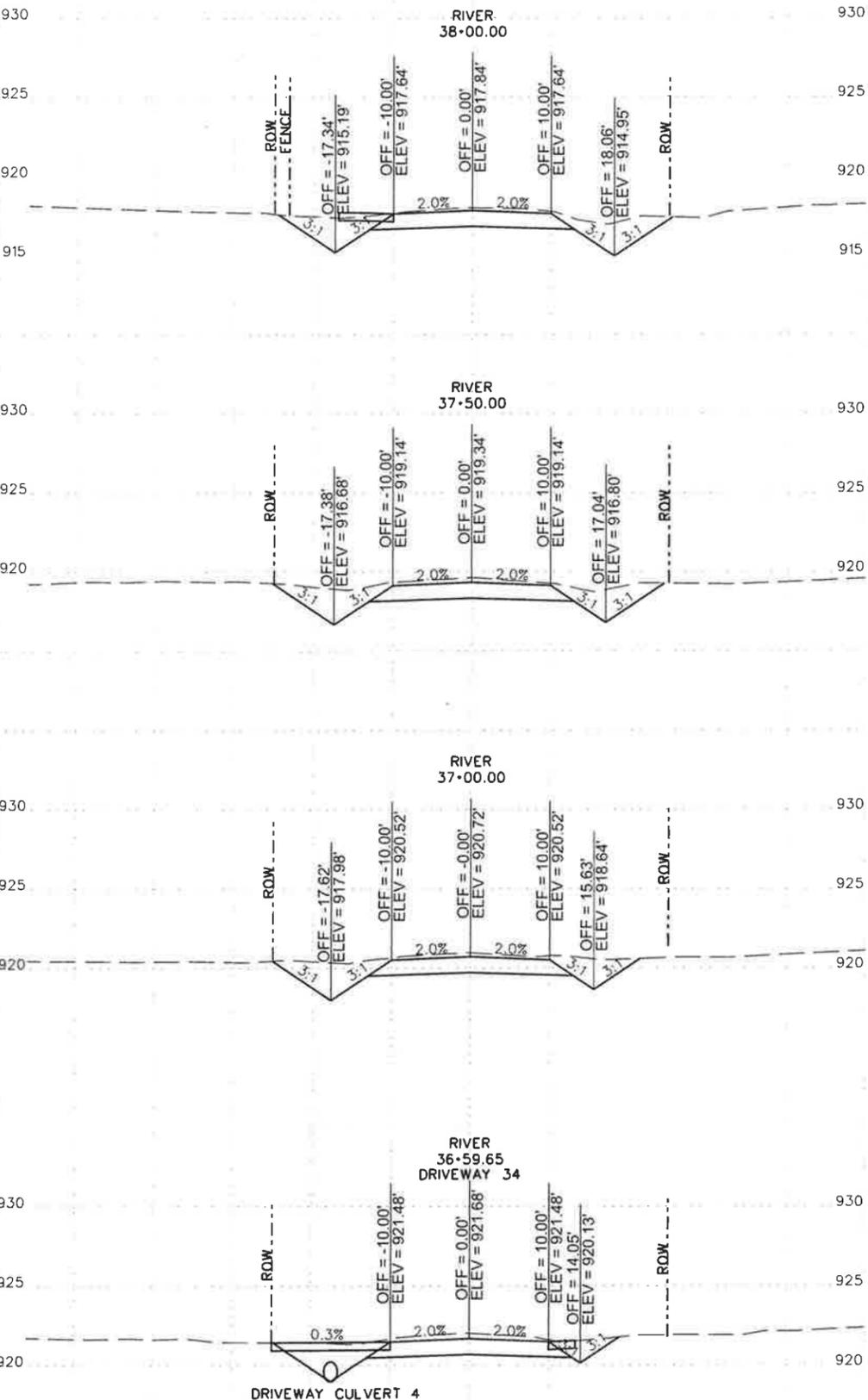
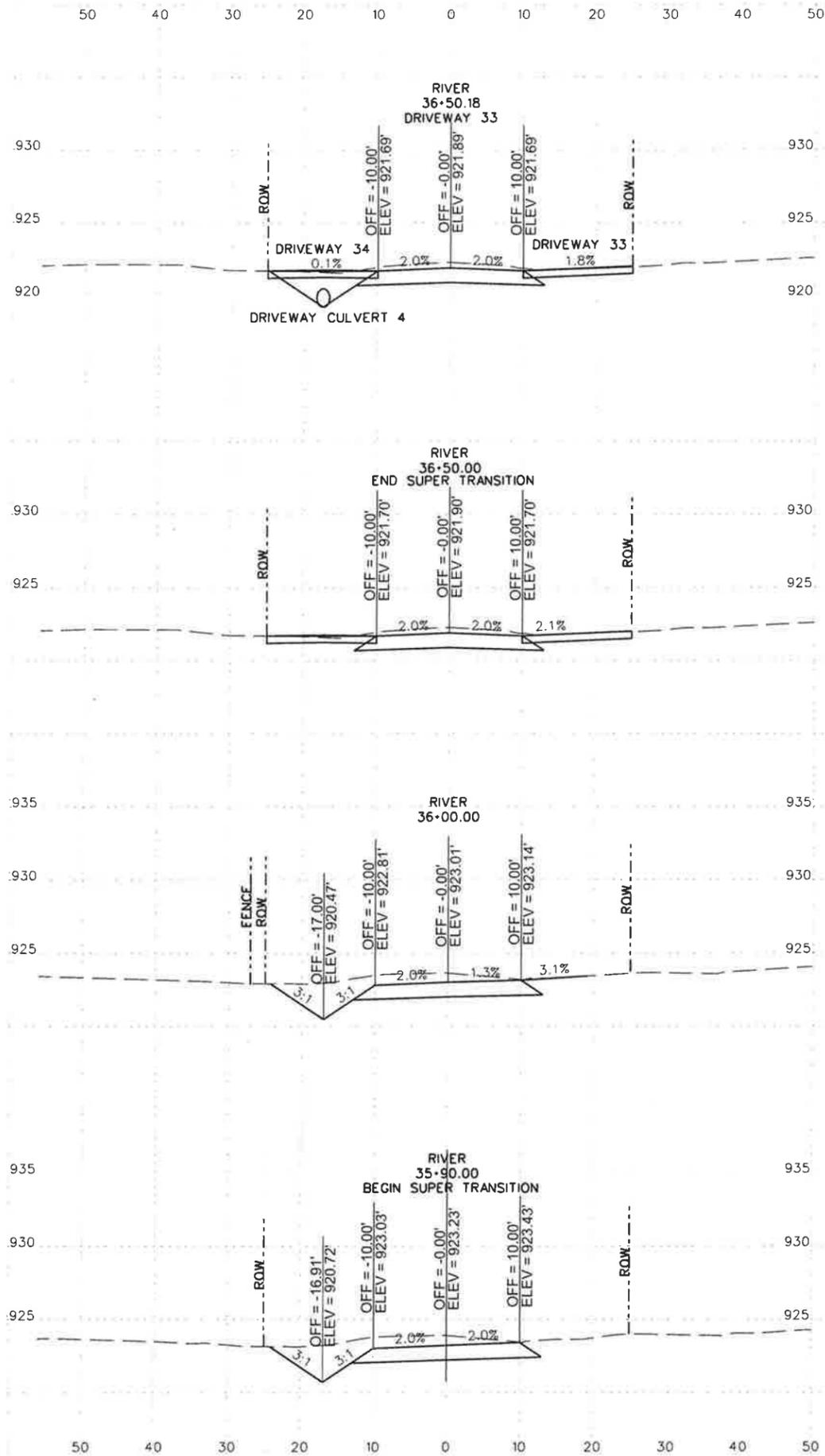
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8/7/17

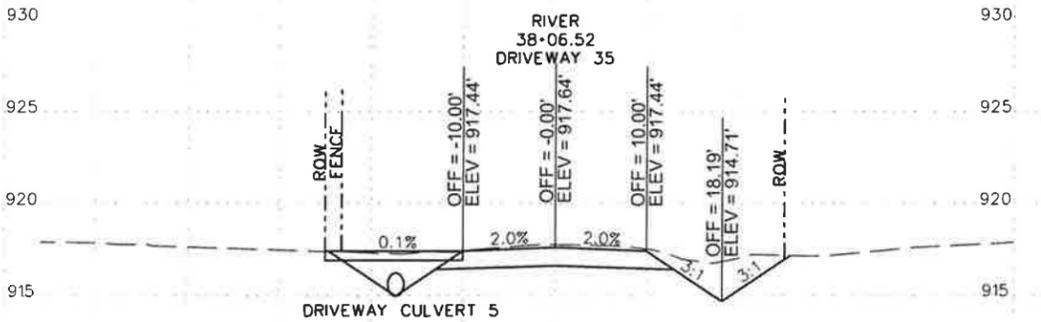
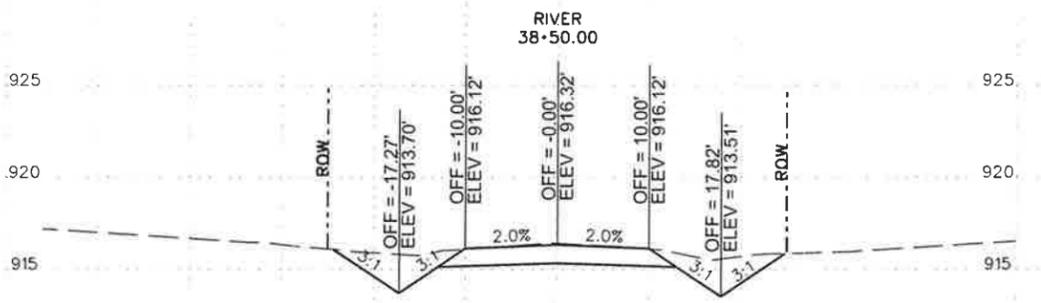
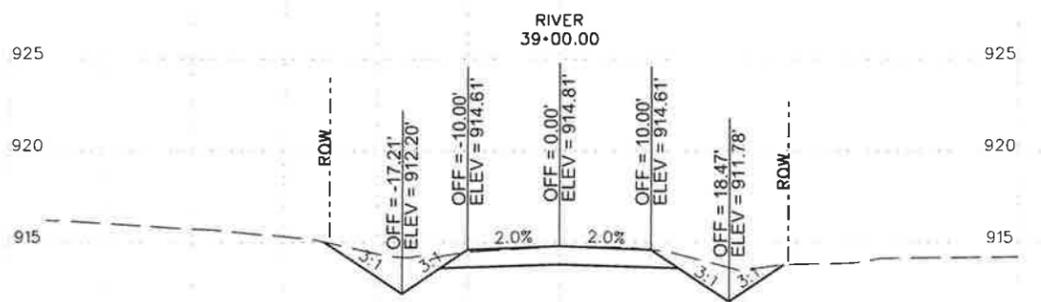
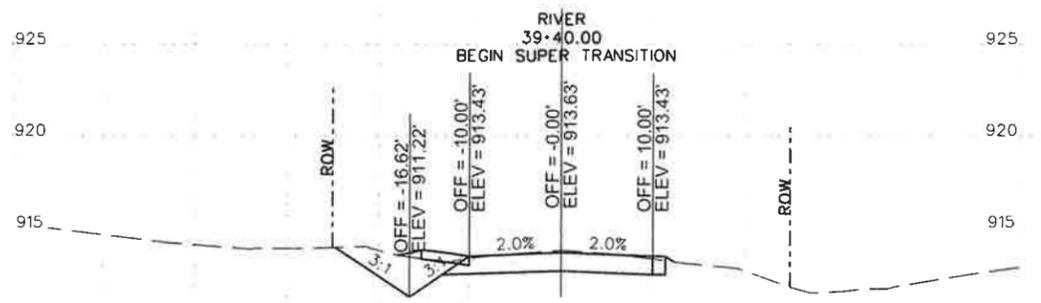
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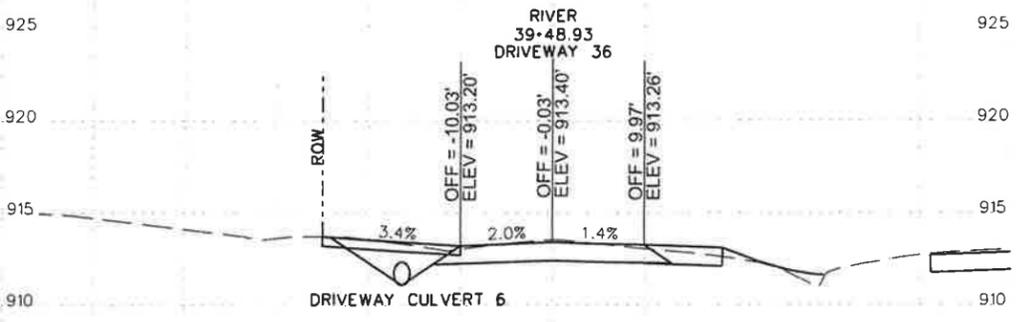
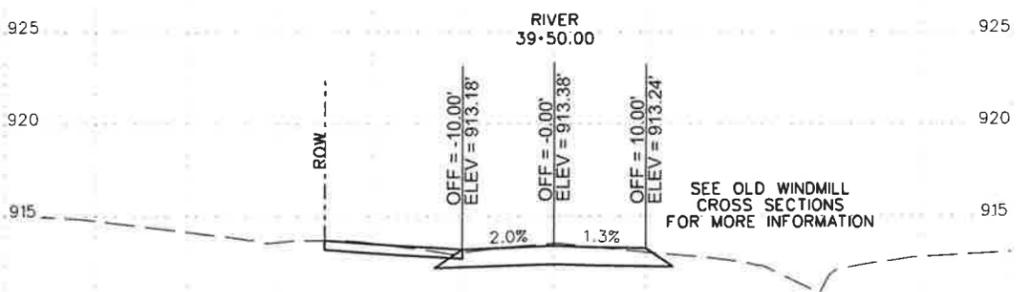
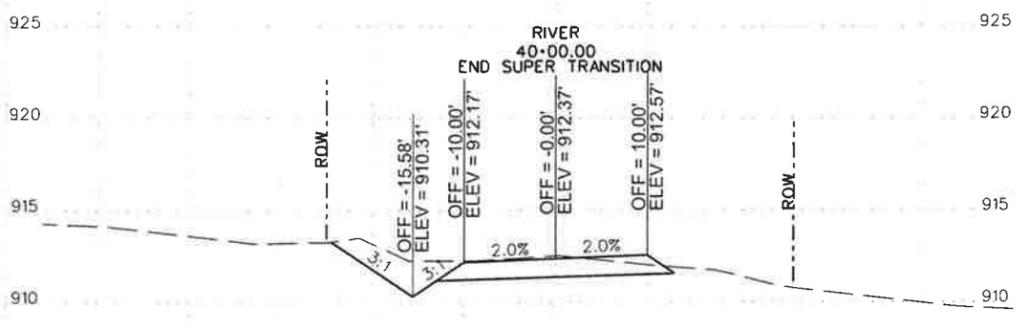
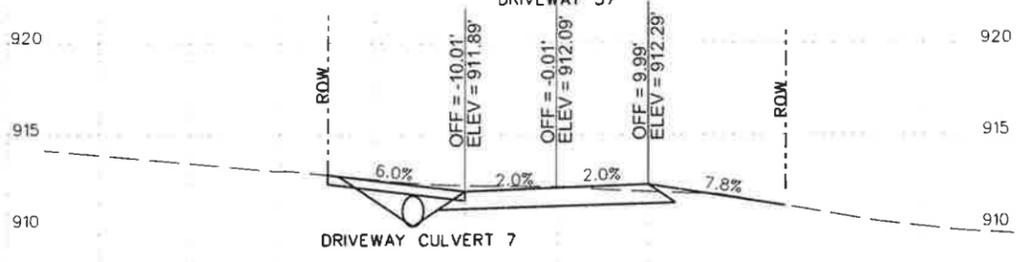
*Kelly G. Morrelli*  
 8/7/17

NO.	REVISION	BY	DATE
 WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE 1818			
RIVER RD CROSS SECTIONS STA 35+90.00 TO STA 38+00.00			
Designed:	KGM	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626	
Checked:	KOK	943-3330	
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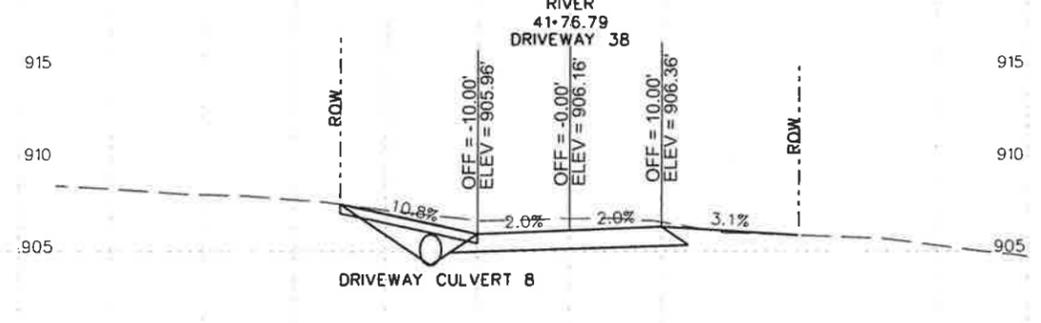
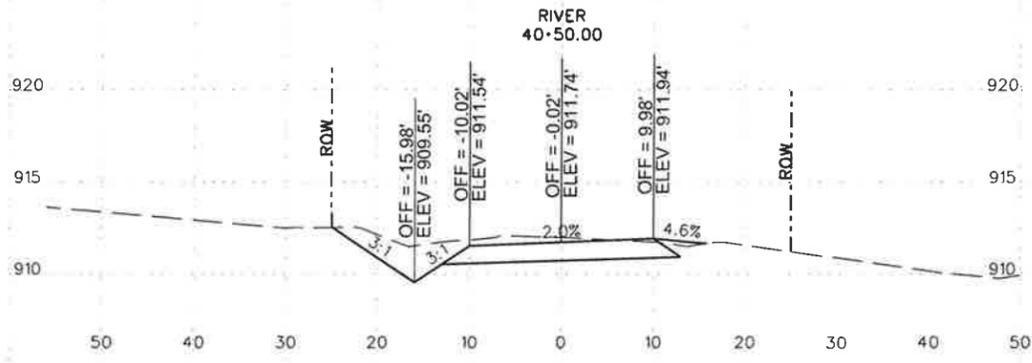
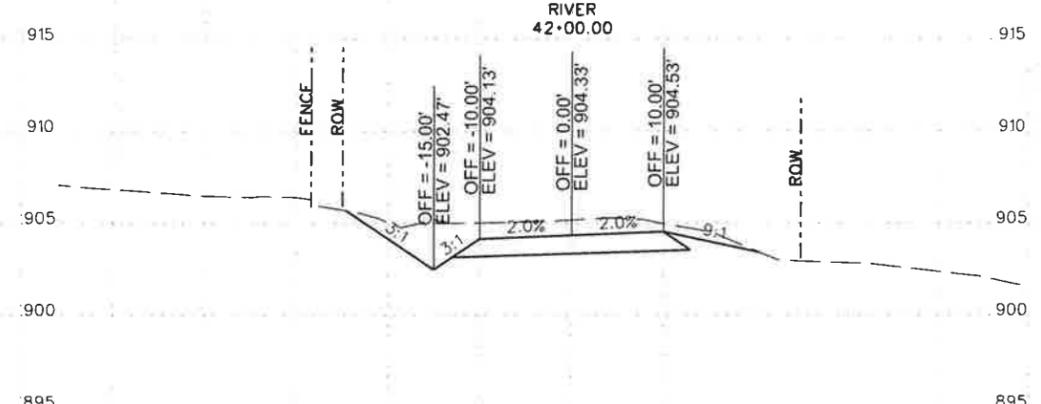
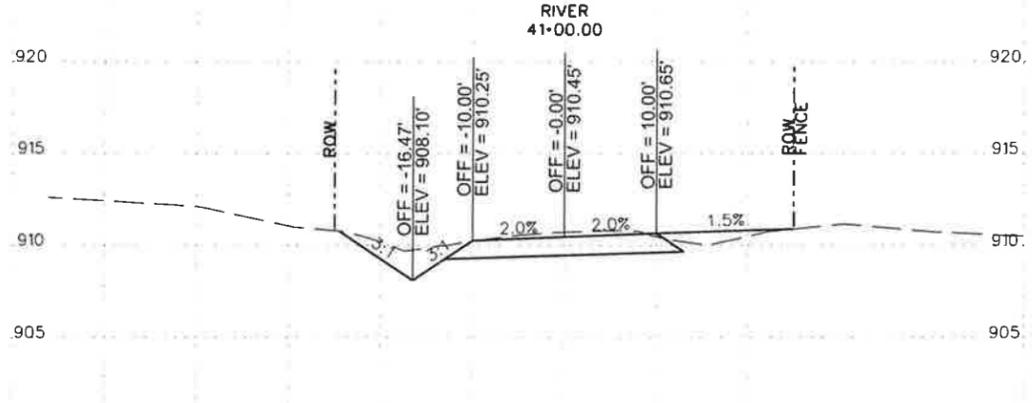
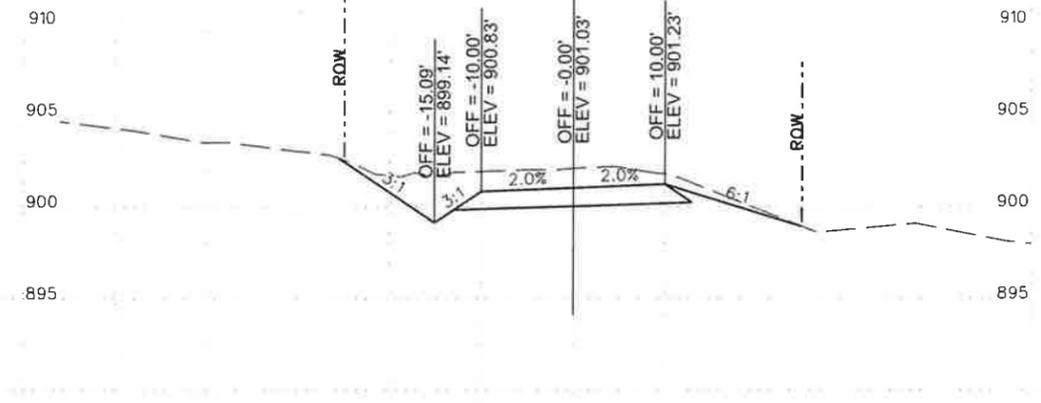
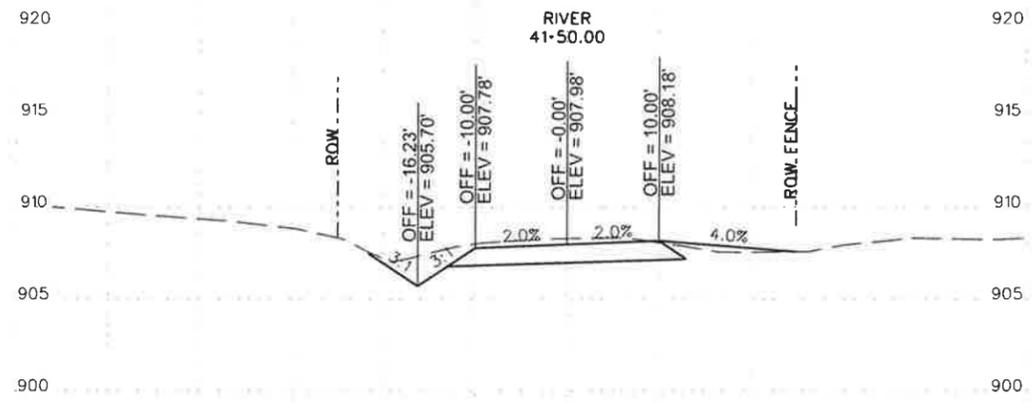
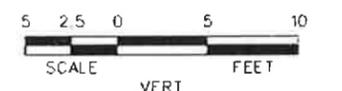
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8/7/17

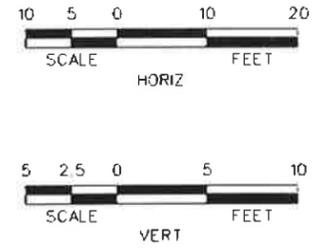
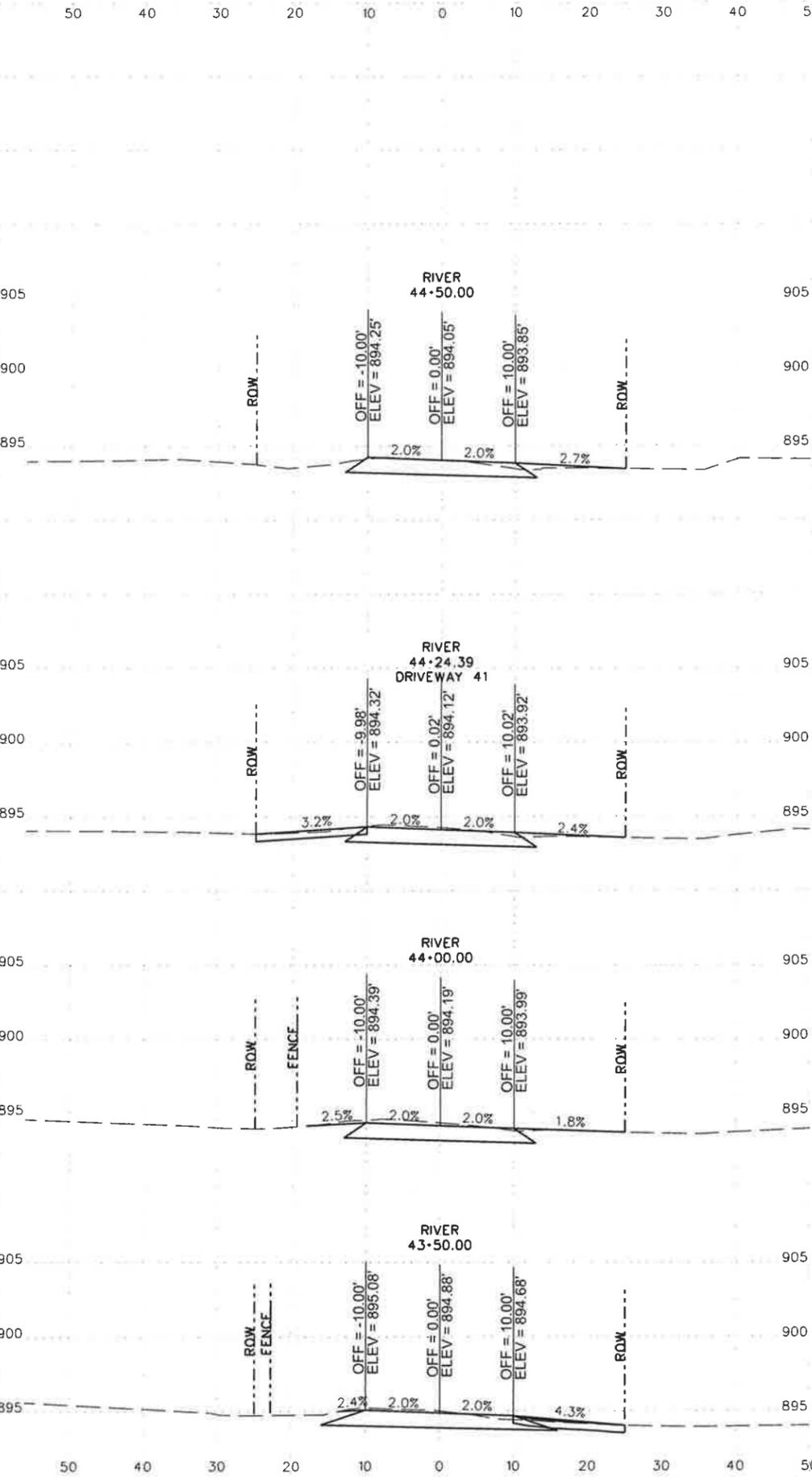
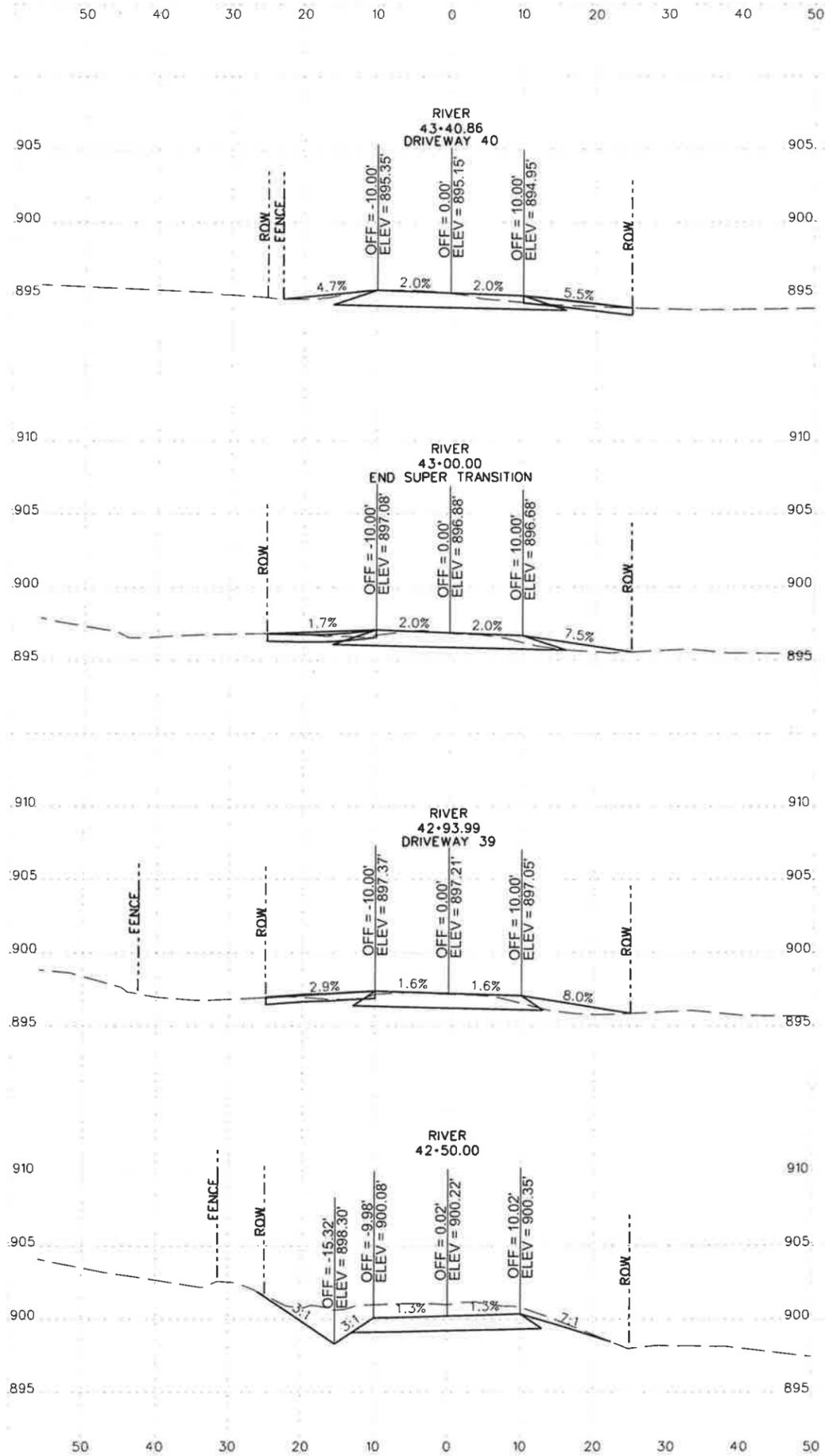
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<b>WILLIAMSON COUNTY</b> 1818 DEPT. OF INFRASTRUCTURE			
RIVER RD CROSS SECTIONS STA 38+06.52 TO STA 40+21.06			
Designed:	KGM	3151 S E INNER LOOP, SUITE B	
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Drawn:	KGM	943-3330	
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8/7/17

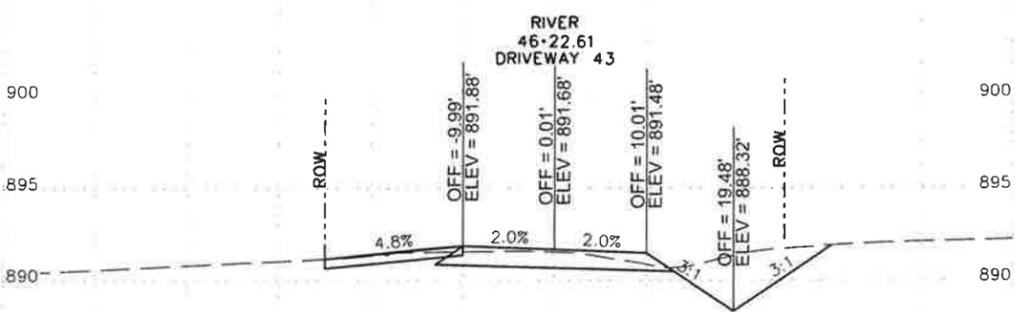
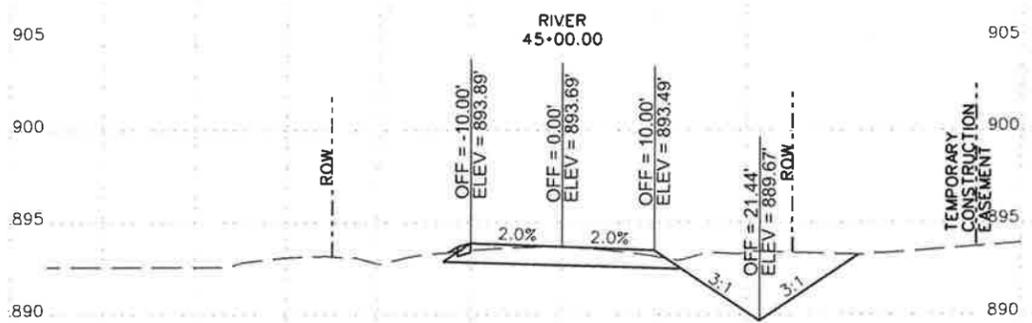
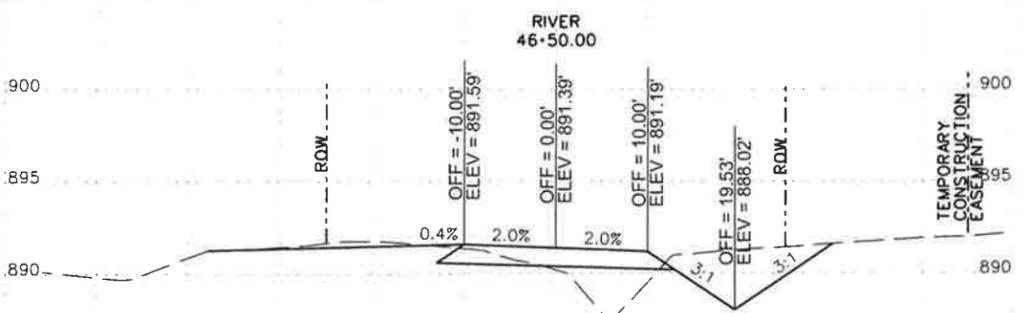
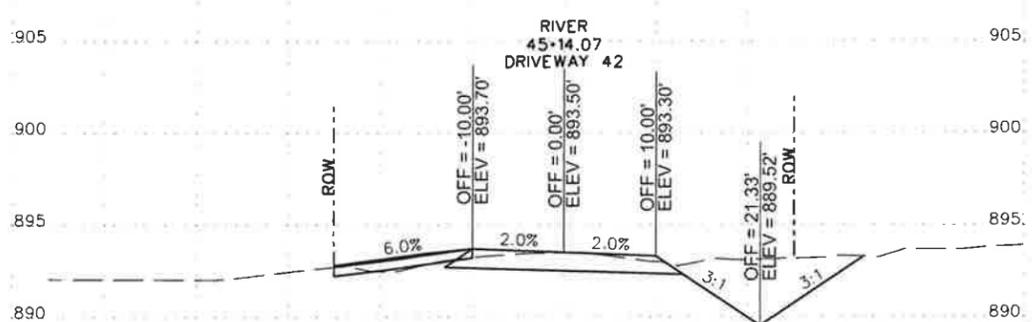
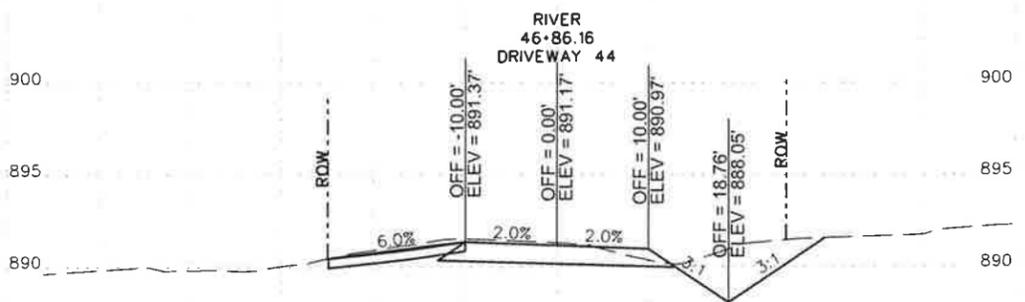
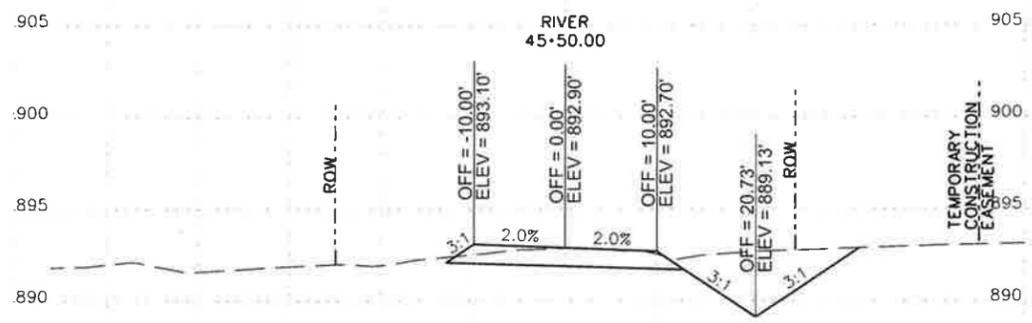
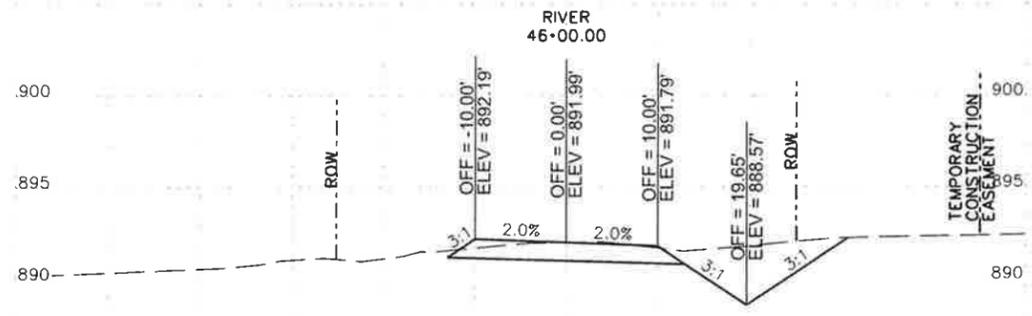
NO.	REVISION	BY	DATE
 WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE 1818			
RIVER RD CROSS SECTIONS STA 40-50.00 TO STA 42-40.00			
Designed:	KGM	3151 S E INNER LOOP, SUITE B	
Checked:	KOK	GEORGETOWN, TEXAS 78628	
Drawn:	KGM	943-3330	
Checked:	KOK	www.wilco.org	



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8/7/17

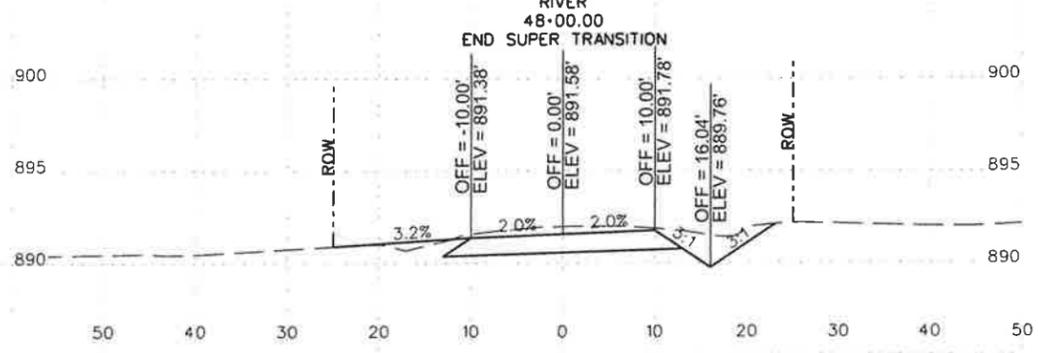
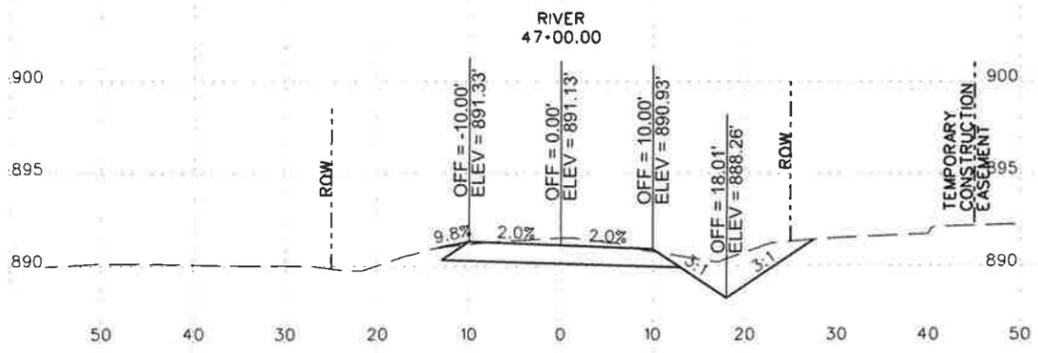
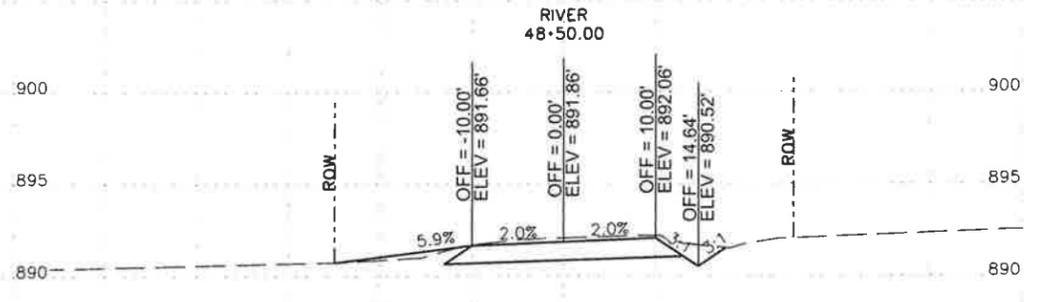
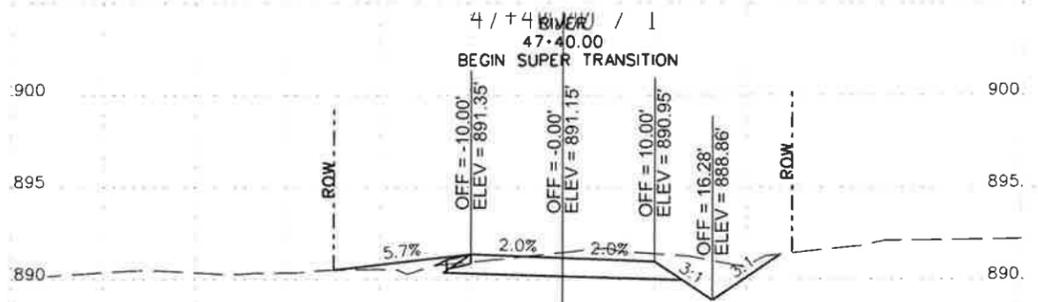
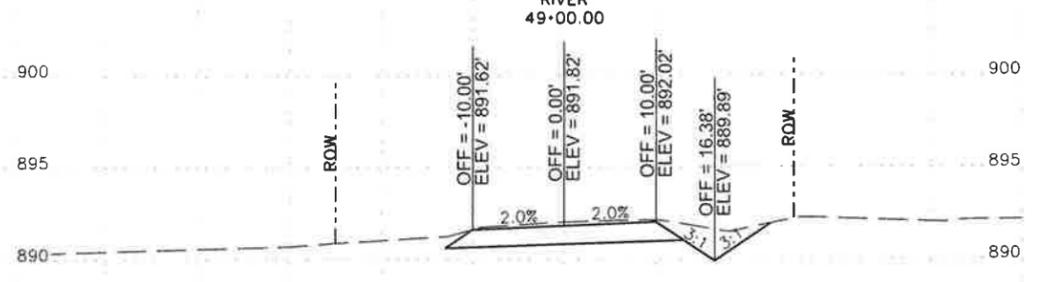
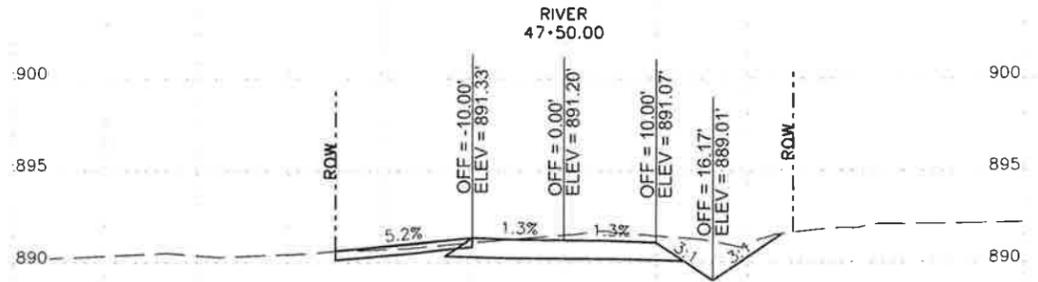
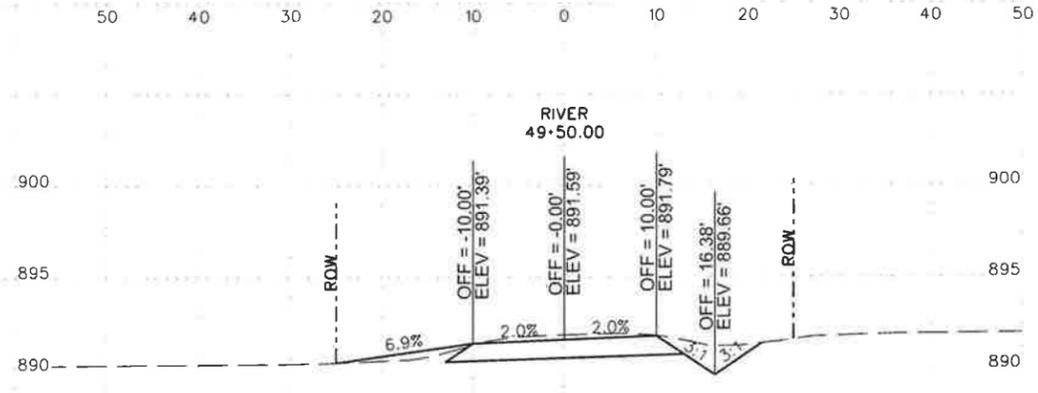
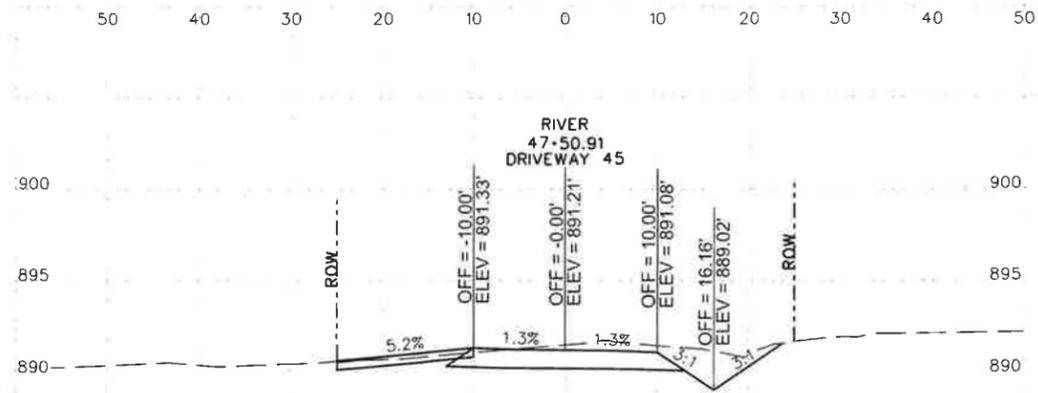
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 <b>WILLIAMSON COUNTY</b> DEPT. OF INFRASTRUCTURE 1818			
RIVER RD CROSS SECTIONS STA 42+50.00 TO STA 44+50.00			
Designed:	KGM	3151 S.E. INNER LOOP, SUITE B	
Checked:	KOK	GEORGETOWN, TEXAS 78626	
Drawn:	KGM	943-3330	
Checked:	KOK	www.wilco.org	

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*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> 1818			
WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE RIVER RD CROSS SECTIONS STA 45+00.00 TO STA 46+86.16			
Designed:	KGM	3151 S.E. INNER LOOP, SUITE B	
Checked:	KOK	GEORGETOWN, TEXAS 78626	
Drawn:	KGM	943-3330	
Checked:	KOK	www.wilco.org	

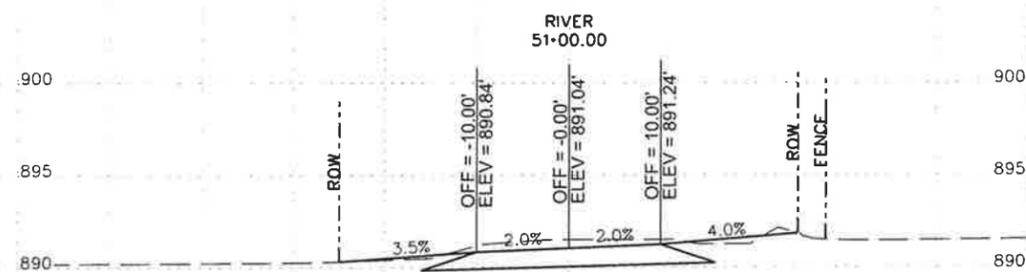
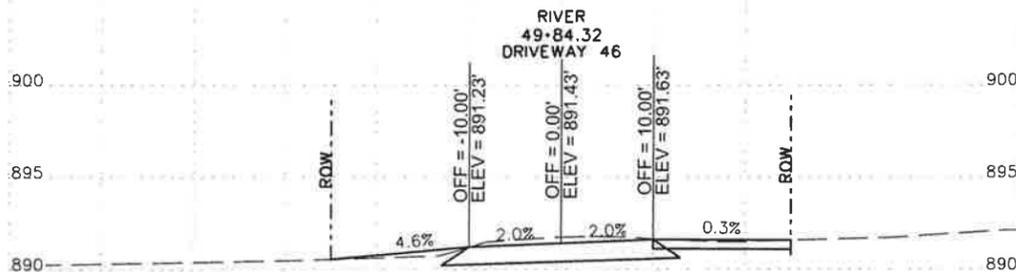
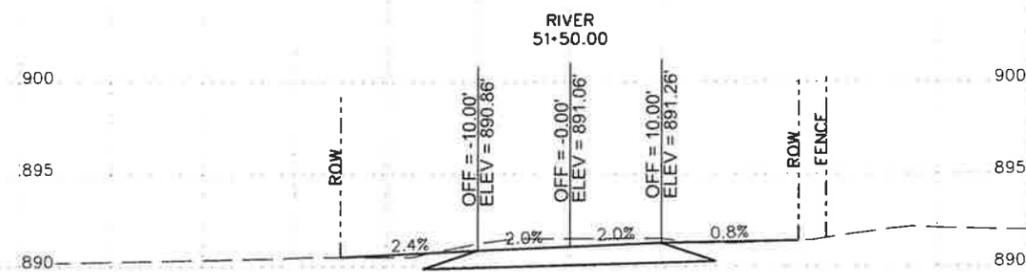
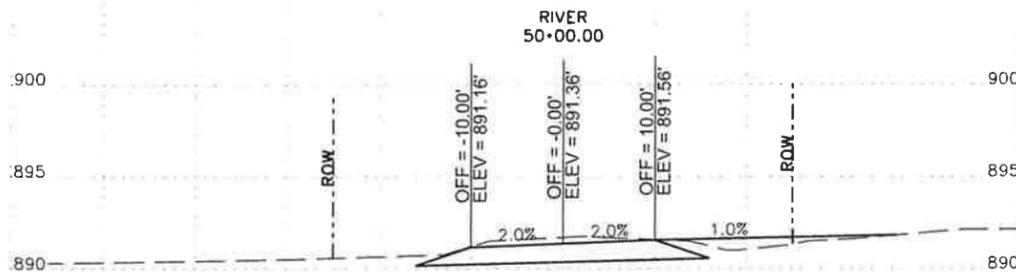
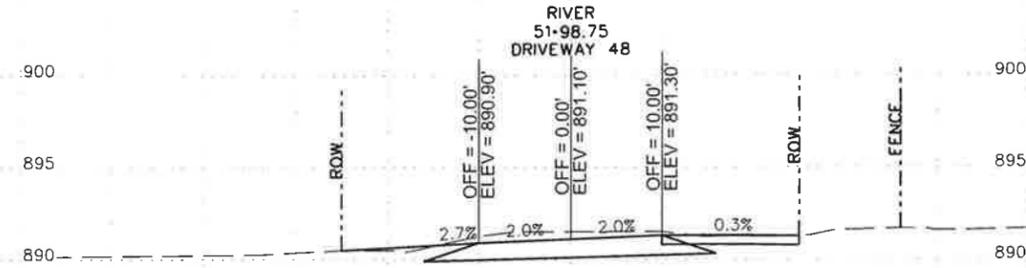
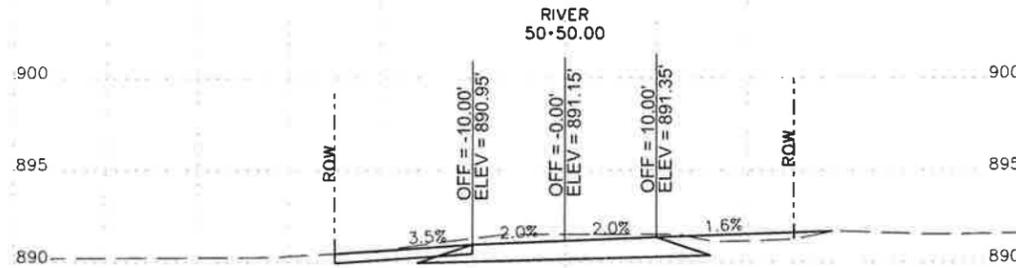
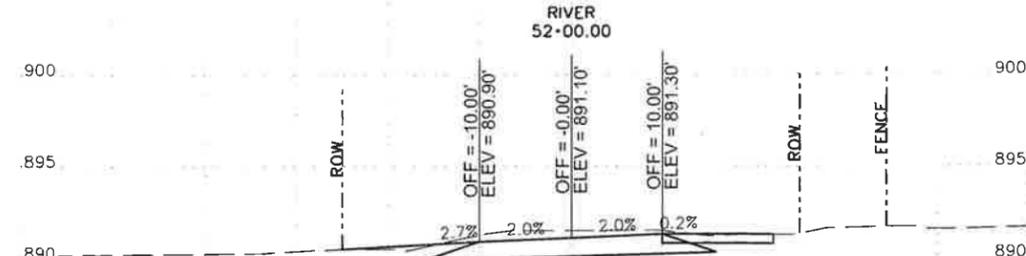
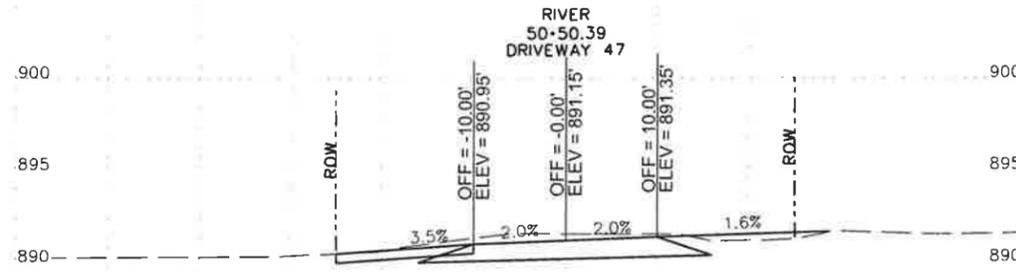


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NO.	REVISION	BY	DATE
 WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE 1818			
RIVER RD CROSS SECTIONS STA 47+00.00 TO STA 49+50.00			
Designed:	KGM	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626	
Checked:	KQK	943-3330	
Drawn:	KGM	www.wilco.org	
Checked:	KQK		

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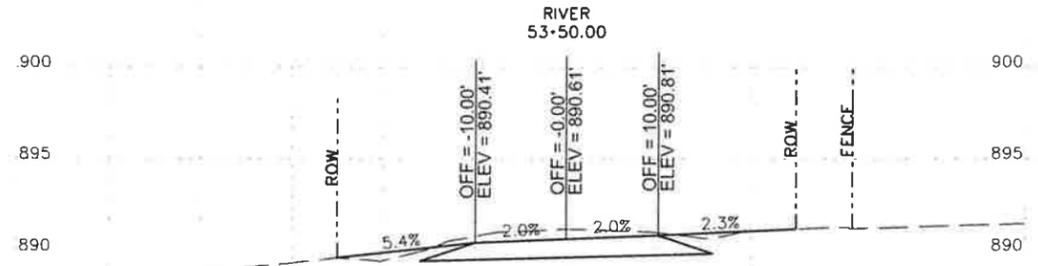
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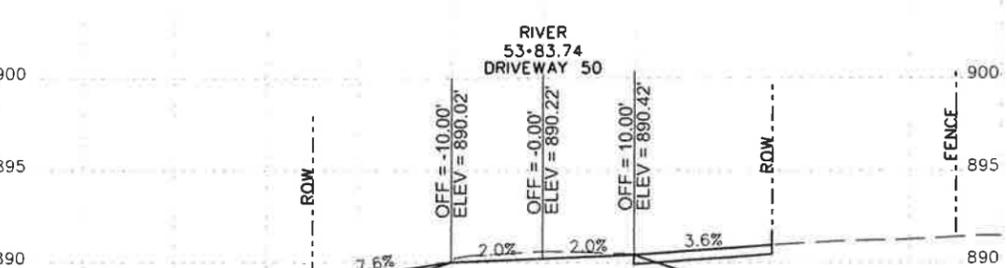
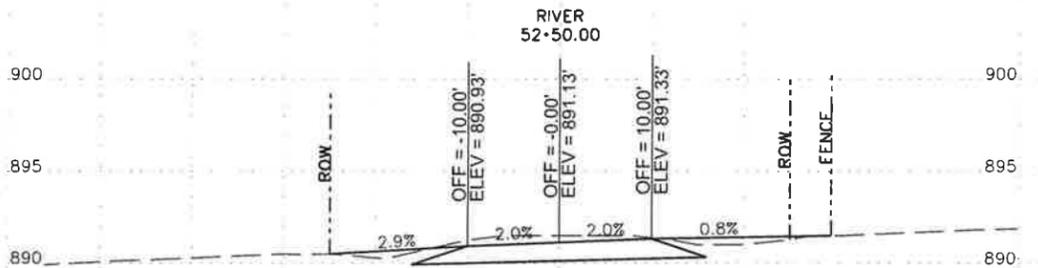
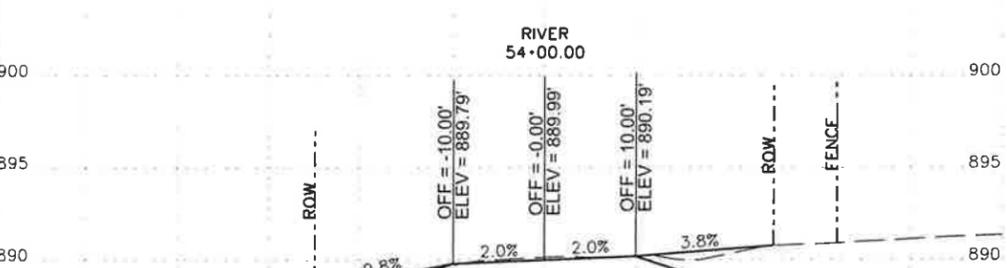
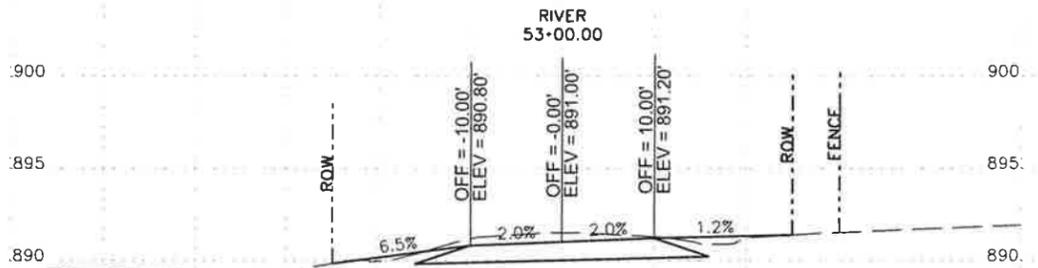
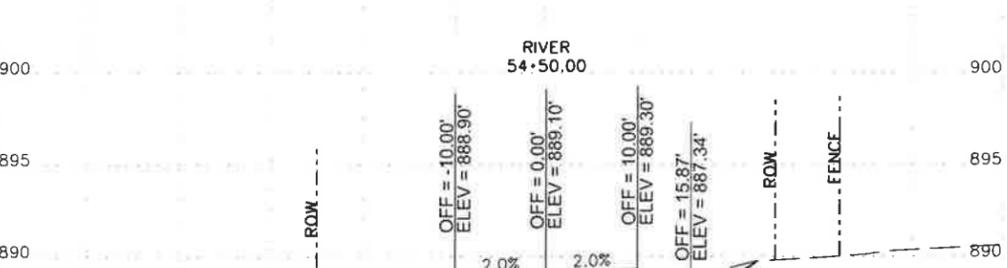
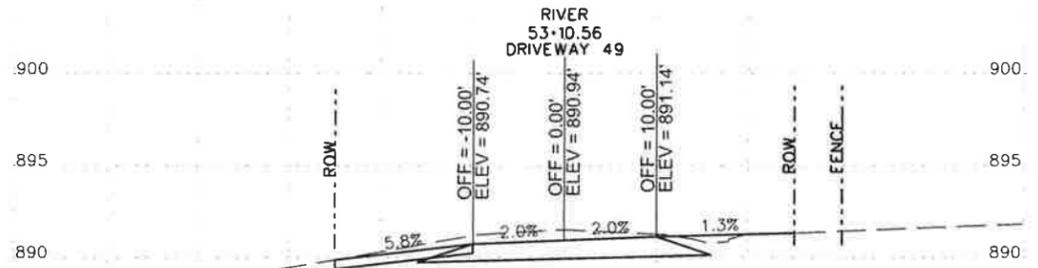
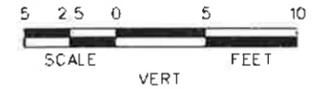
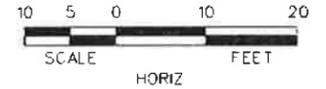
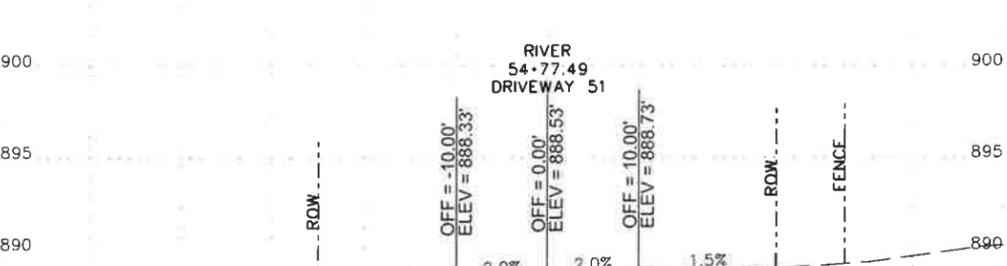
*Kelly G. Morrelli*  
8/7/17

NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> 1818			
WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE RIVER RD CROSS SECTIONS STA 49+84.32 TO STA 52+00.00			
Designed:	KGM	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626	
Checked:	KQK	943-3330	
Drawn:	KGM	www.wilco.org	
Checked:	KQK		

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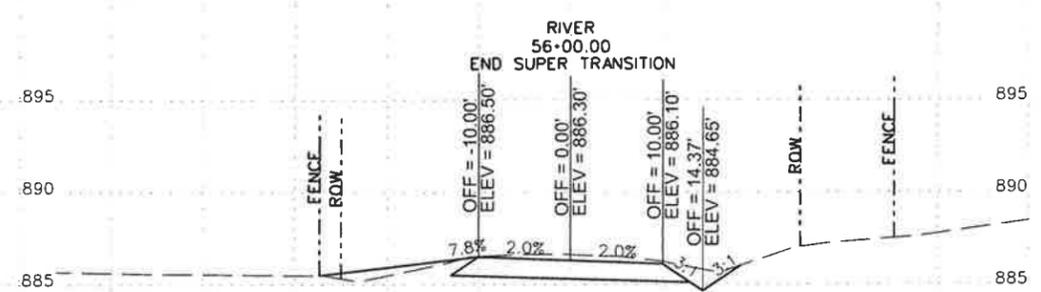
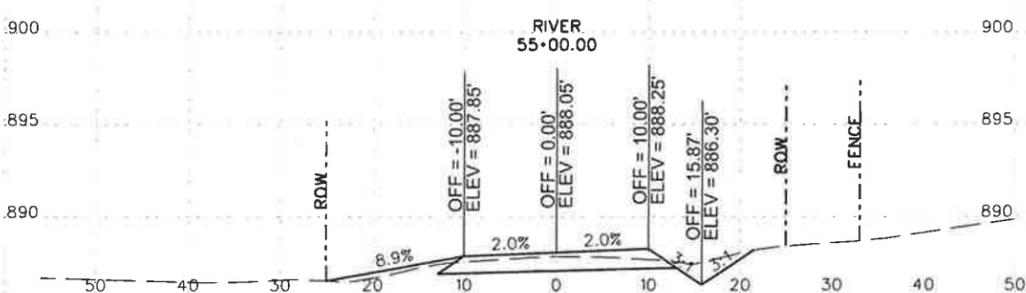
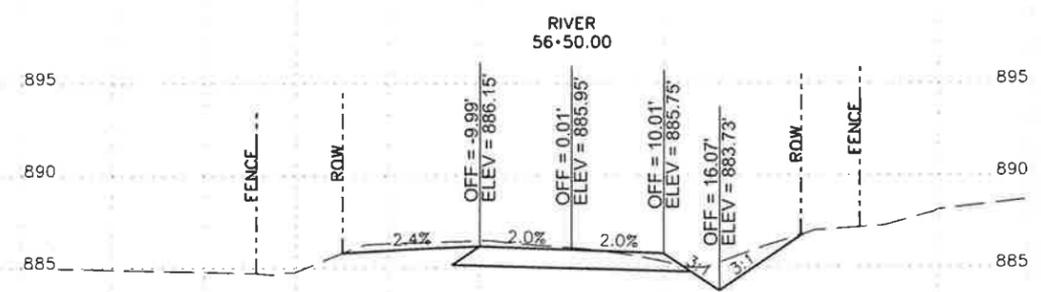
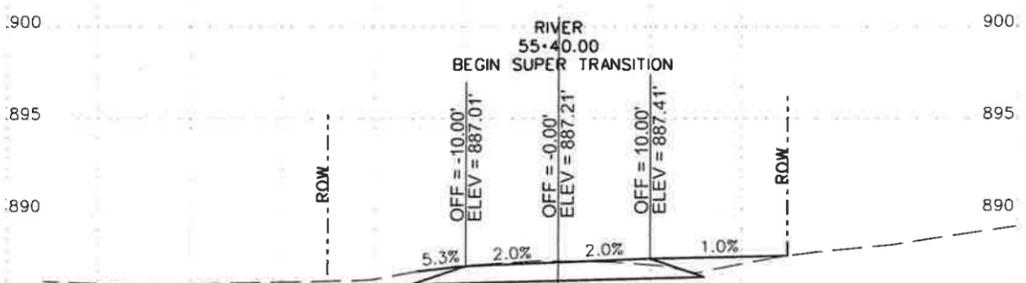
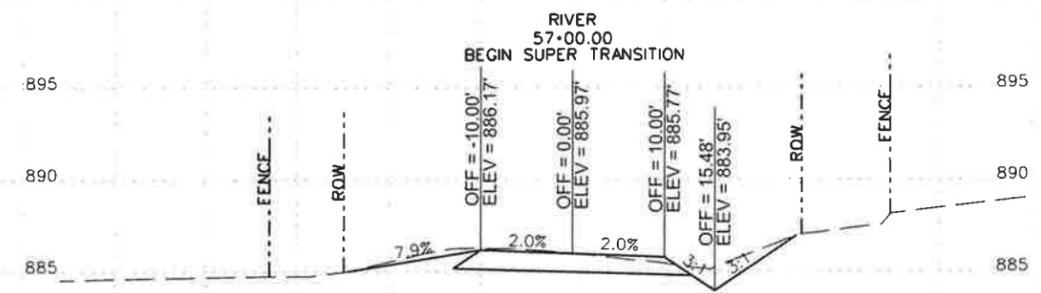
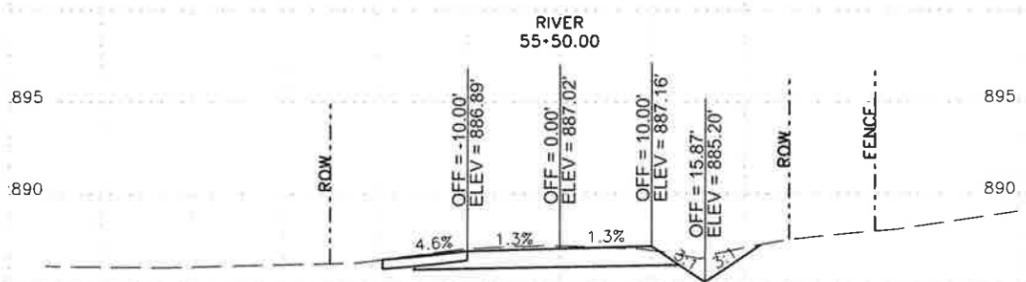
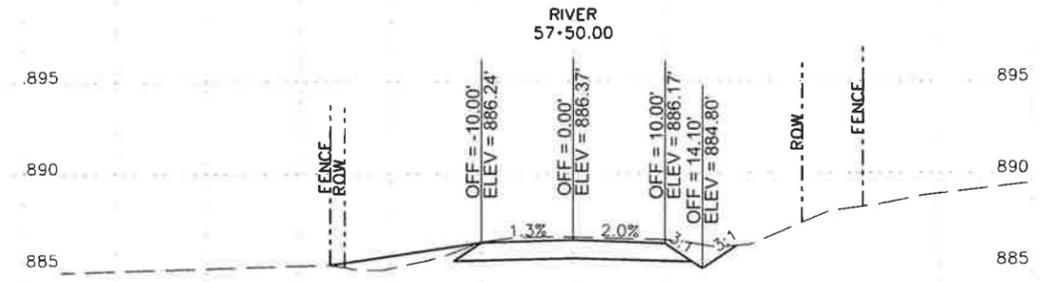
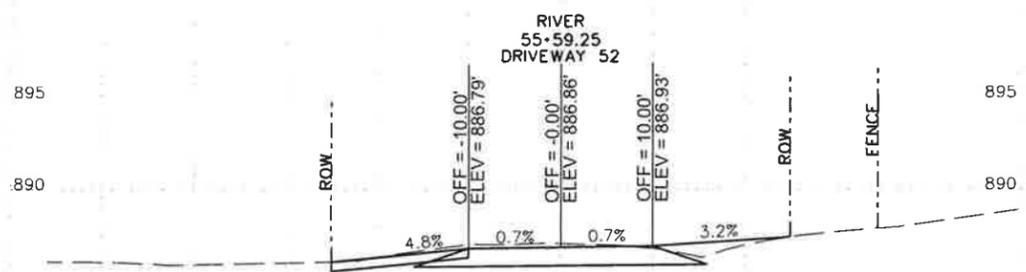
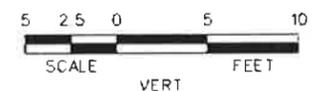
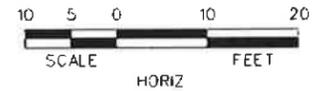


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NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> 1818			
WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE			
RIVER RD CROSS SECTIONS STA 52+50.00 TO STA 54+77.49			
Designed:	KGM	3151 S E INNER LOOP, SUITE B	
Checked:	KOK	GEORGETOWN, TEXAS 78626	
Drawn:	KGM	943-3330	
Checked:	KOK	www.wilco.org	

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*Kelly G. Morrelli*  
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NO.	REVISION	BY	DATE
 WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE 1818			
RIVER RD CROSS SECTIONS STA 55+00.00 TO STA 57+50.00			
Designed:	KGM	3151 S E INNER LOOP, SUITE B	
Checked:	KOK	GEORGETOWN, TEXAS 78626	
Drawn:	KGM	943-3330	
Checked:	KOK	www.wilco.org	

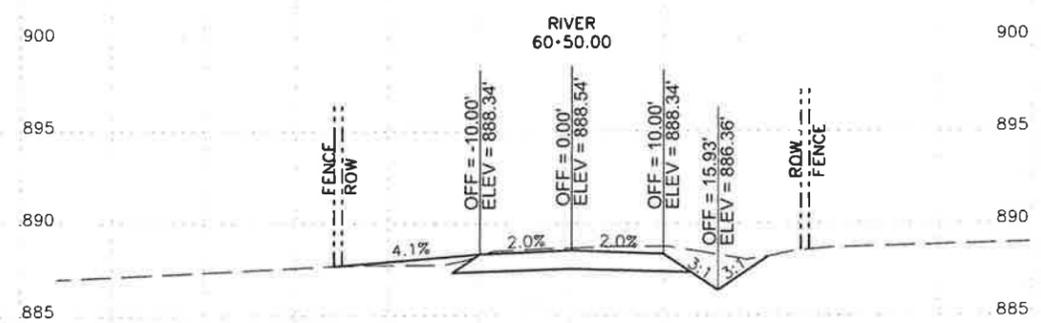
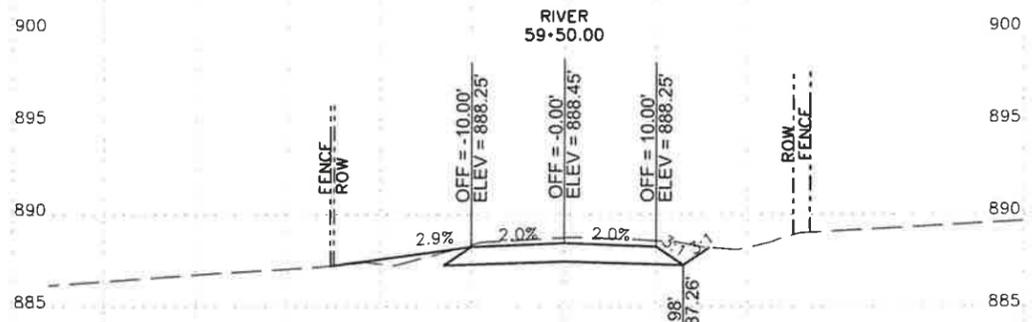
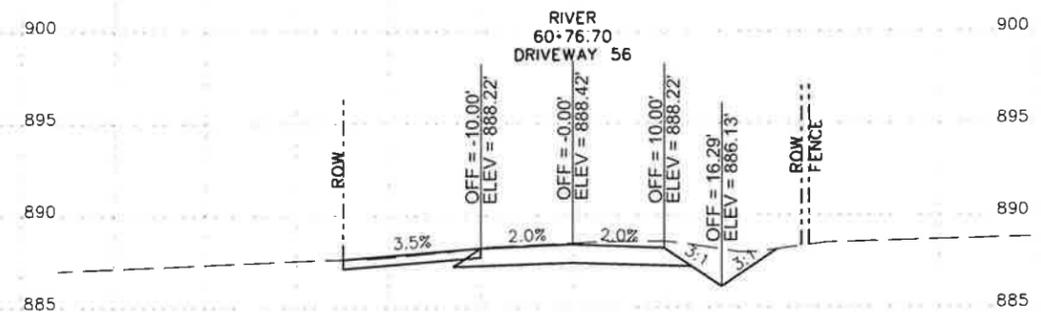
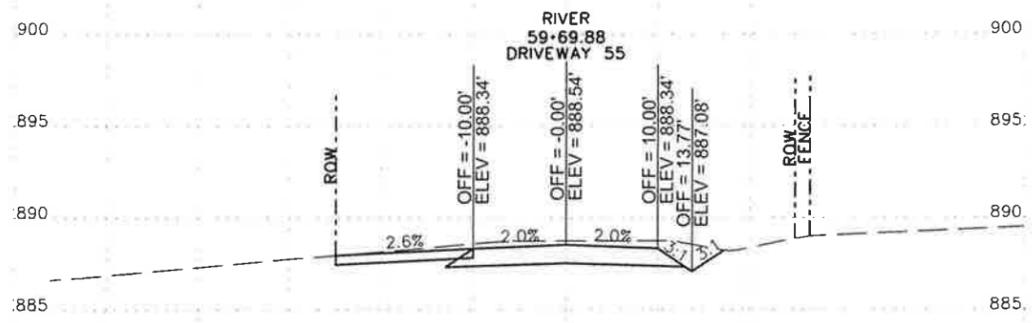
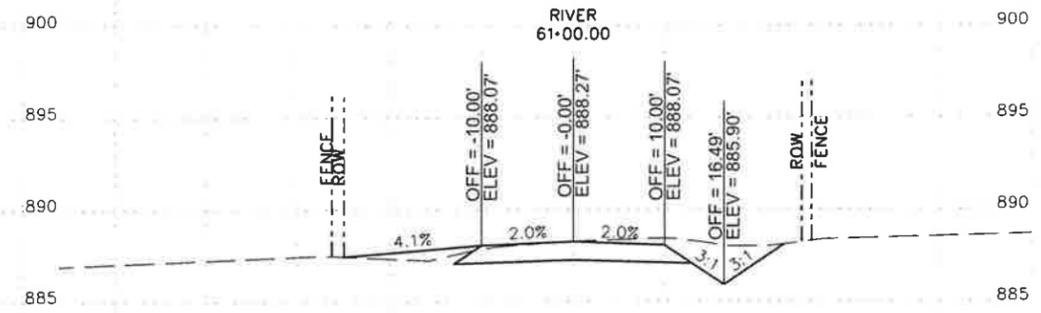
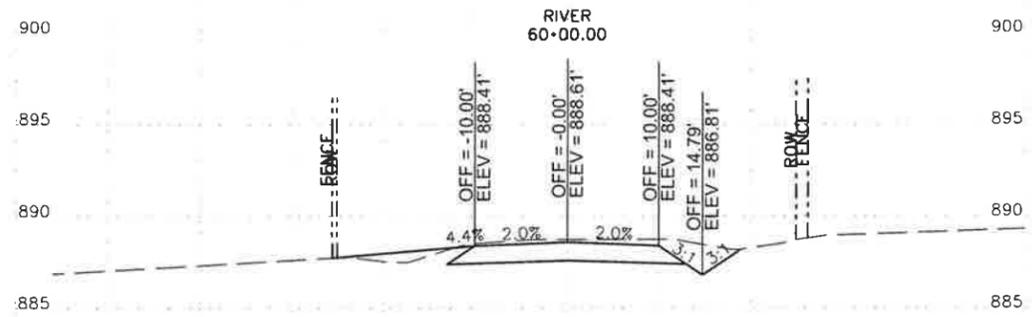
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*Kelly G. Morrelli*  
8/7/17

 <b>WILLIAMSON COUNTY</b> 1818		<b>WILLIAMSON COUNTY</b> DEPT. OF INFRASTRUCTURE	
RIVER RD CROSS SECTIONS STA 57+60.00 TO STA 59+15.23			
Designed: <b>KGM</b> Checked: <b>KOK</b> Drawn: <b>KGM</b> Checked: <b>KOK</b>	3151 S.E. INNER LOOP, SUITE B GEORGETOWN, TEXAS 78626 943-3330 www.wilco.org		
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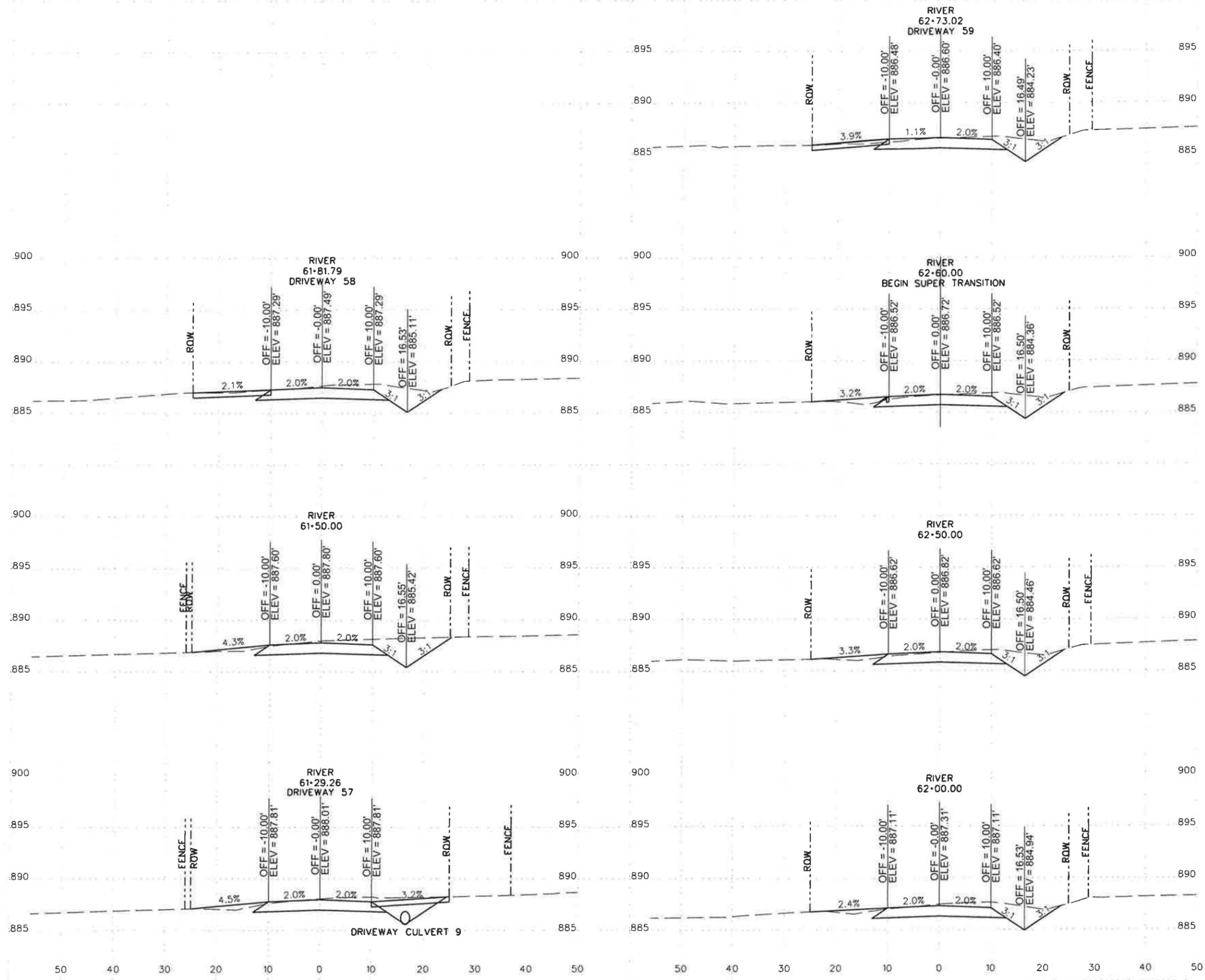
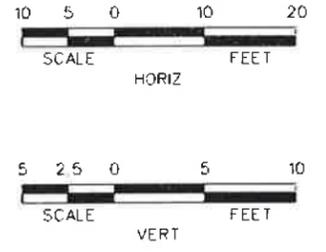
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8/7/17

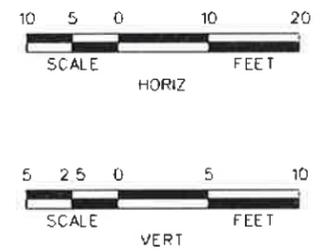
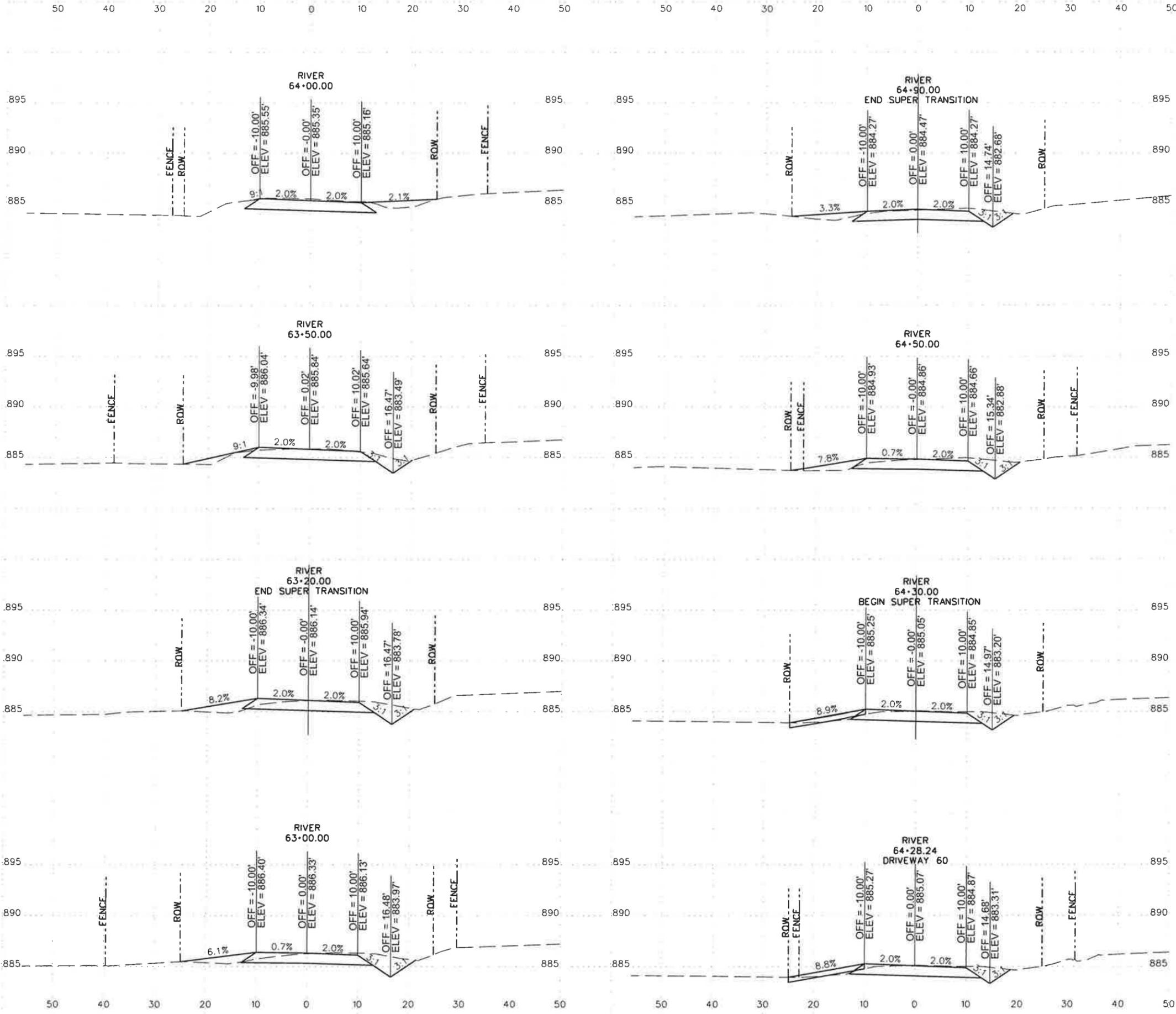
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 WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE 1818			
RIVER RD CROSS SECTIONS STA 59+50.00 TO STA 61+00.00			
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Checked:	KOK	943-3330	
Drawn:	KCM	www.wilco.org	
Checked:	KOK		

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*Kelly G. Morrelli*  
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NO.	REVISION	BY	DATE
 <b>WILLIAMSON COUNTY</b> 1818			
WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE			
RIVER RD CROSS SECTIONS STA 61+29.26 TO STA 62+73.02			
Designed:	KGM	3151 S E INNER LOOP, SUITE B	
Checked:	KOK	GEORGETOWN, TEXAS 78626	
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Checked:	KOK	www.wilco.org	

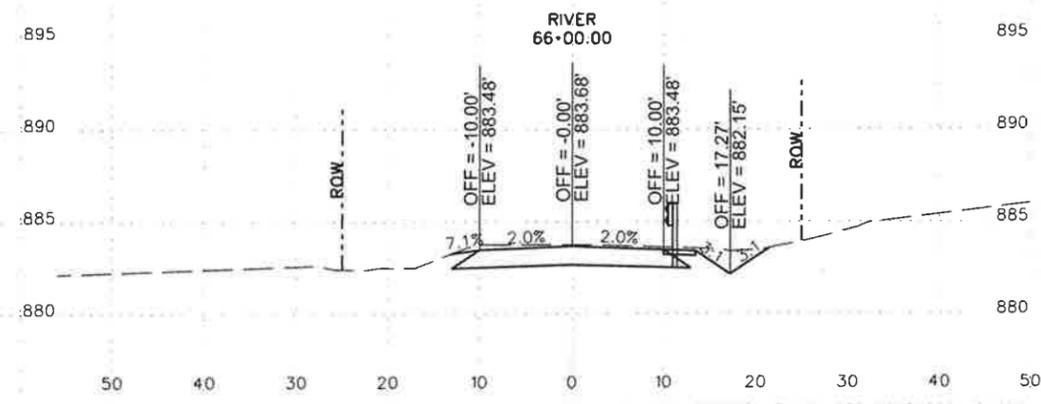
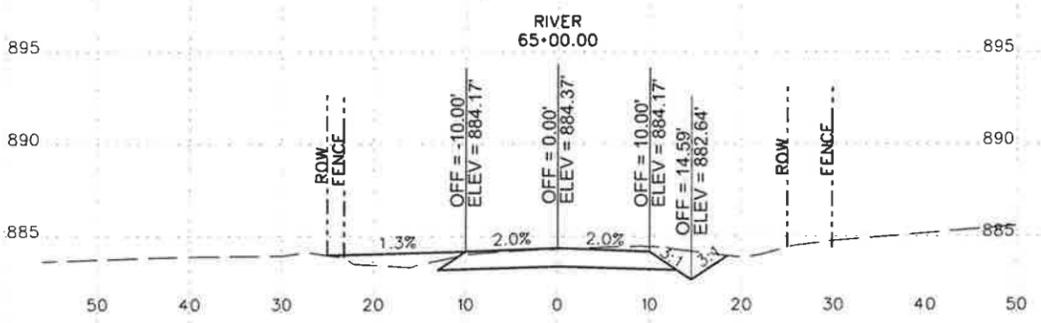
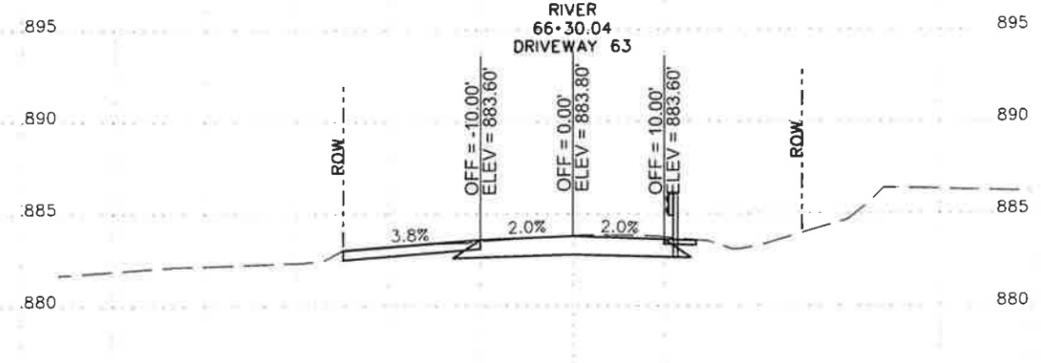
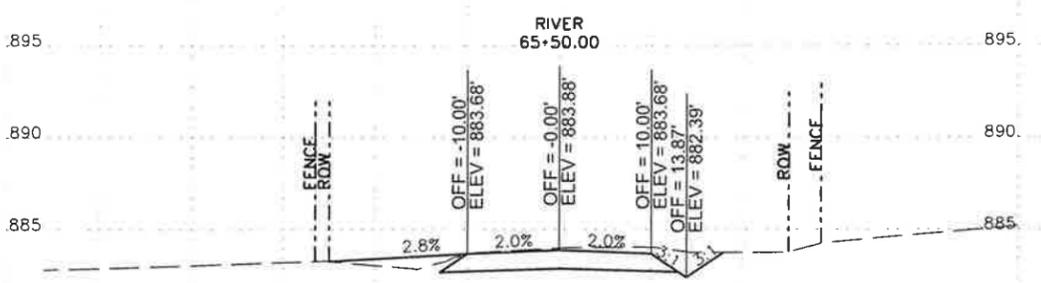
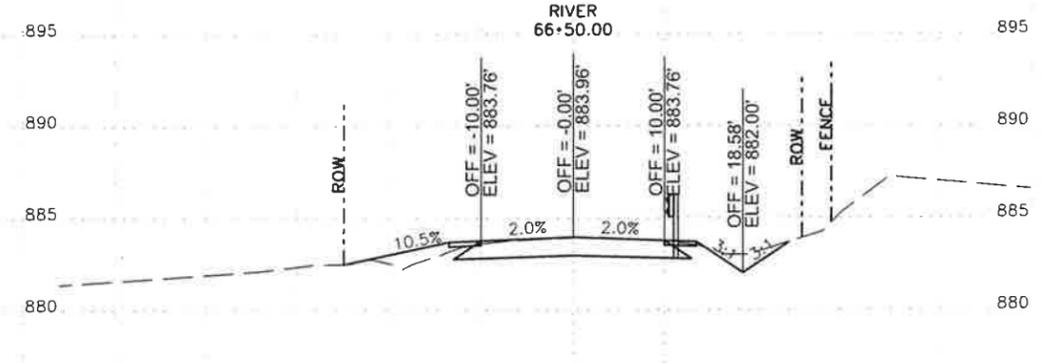
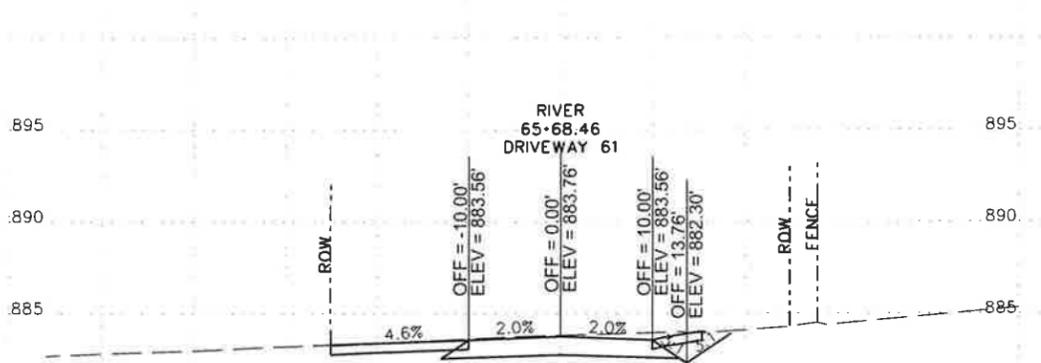
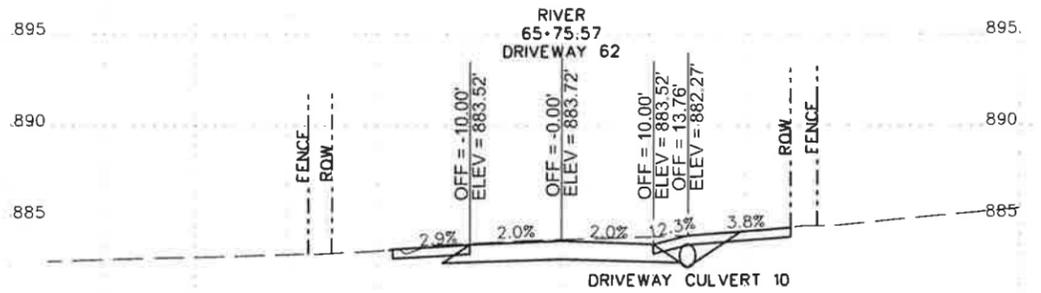
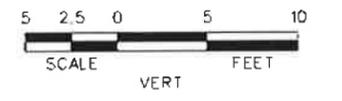


*Kelly G. Morrelli*  
8/17/17

NO.	REVISION	BY	DATE
 WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE 1818			
RIVER RD CROSS SECTIONS STA 63+00.00 TO STA 64+90.00			
Designed:	KGM	3151 S E INNER LOOP, SUITE B	
Checked:	KQK	GEORGETOWN, TEXAS 78626	
Drawn:	KGM	943-3330	
Checked:	KQK	www.wilco.org	

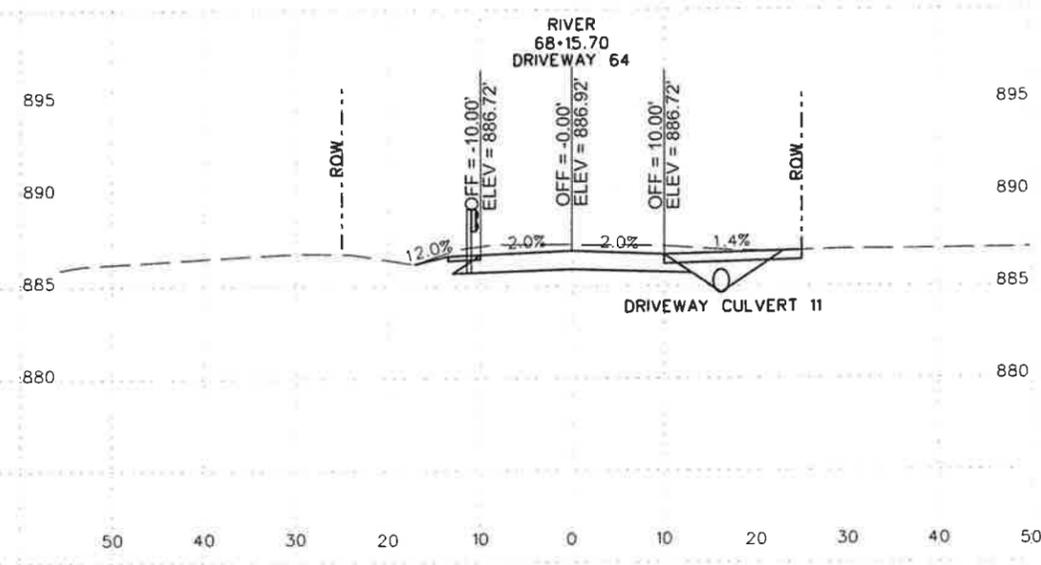
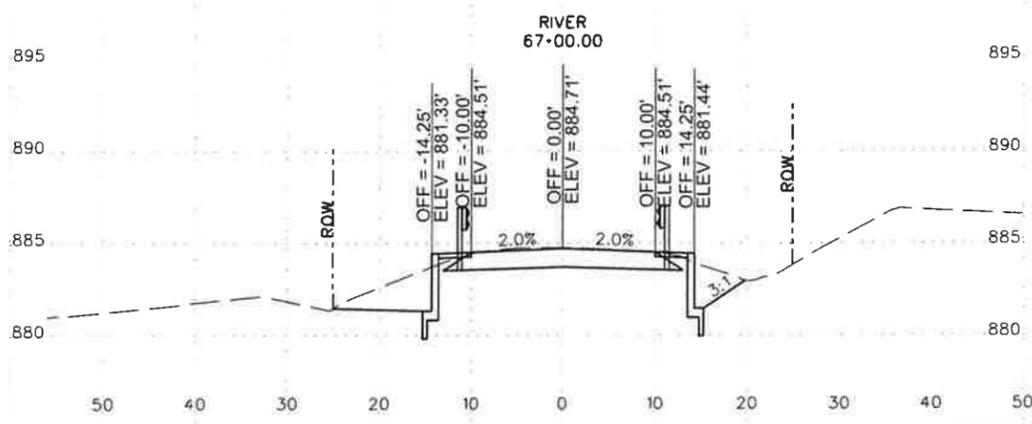
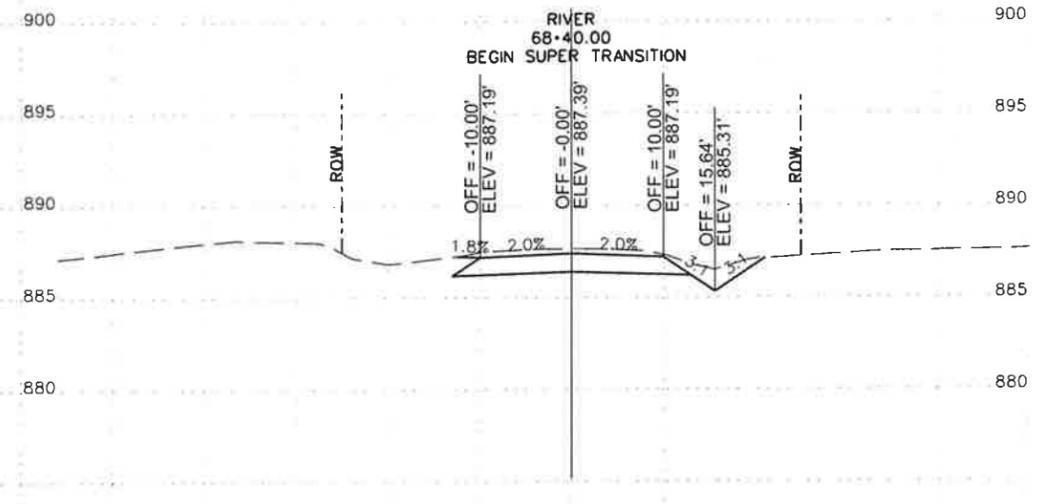
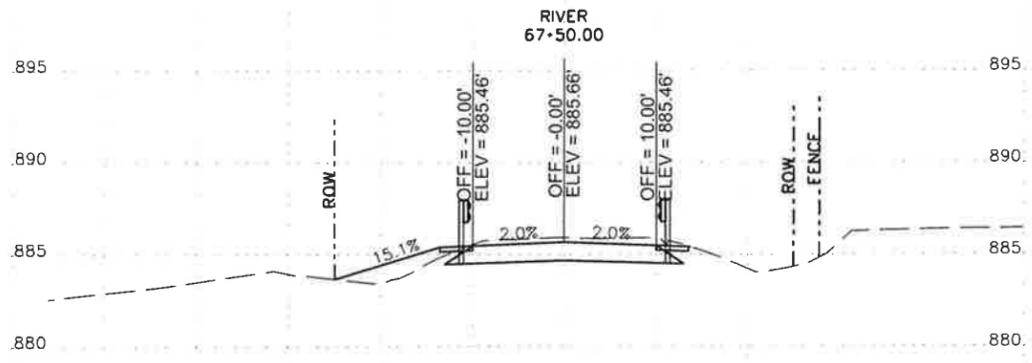
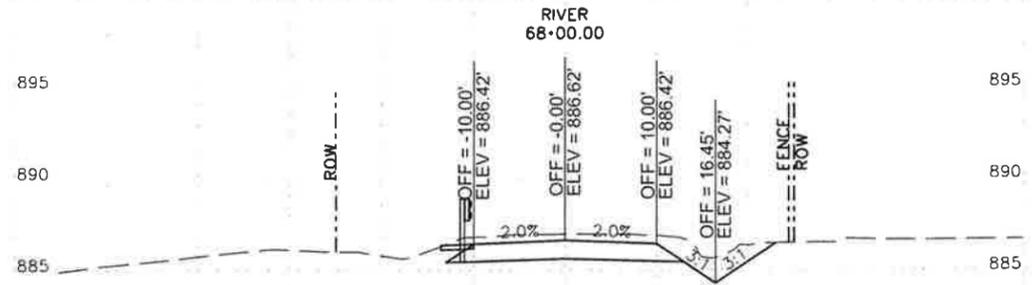
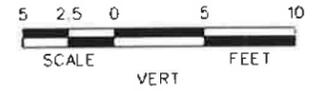
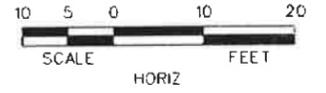
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*Kelly G. Morrelli*  
8/7/17

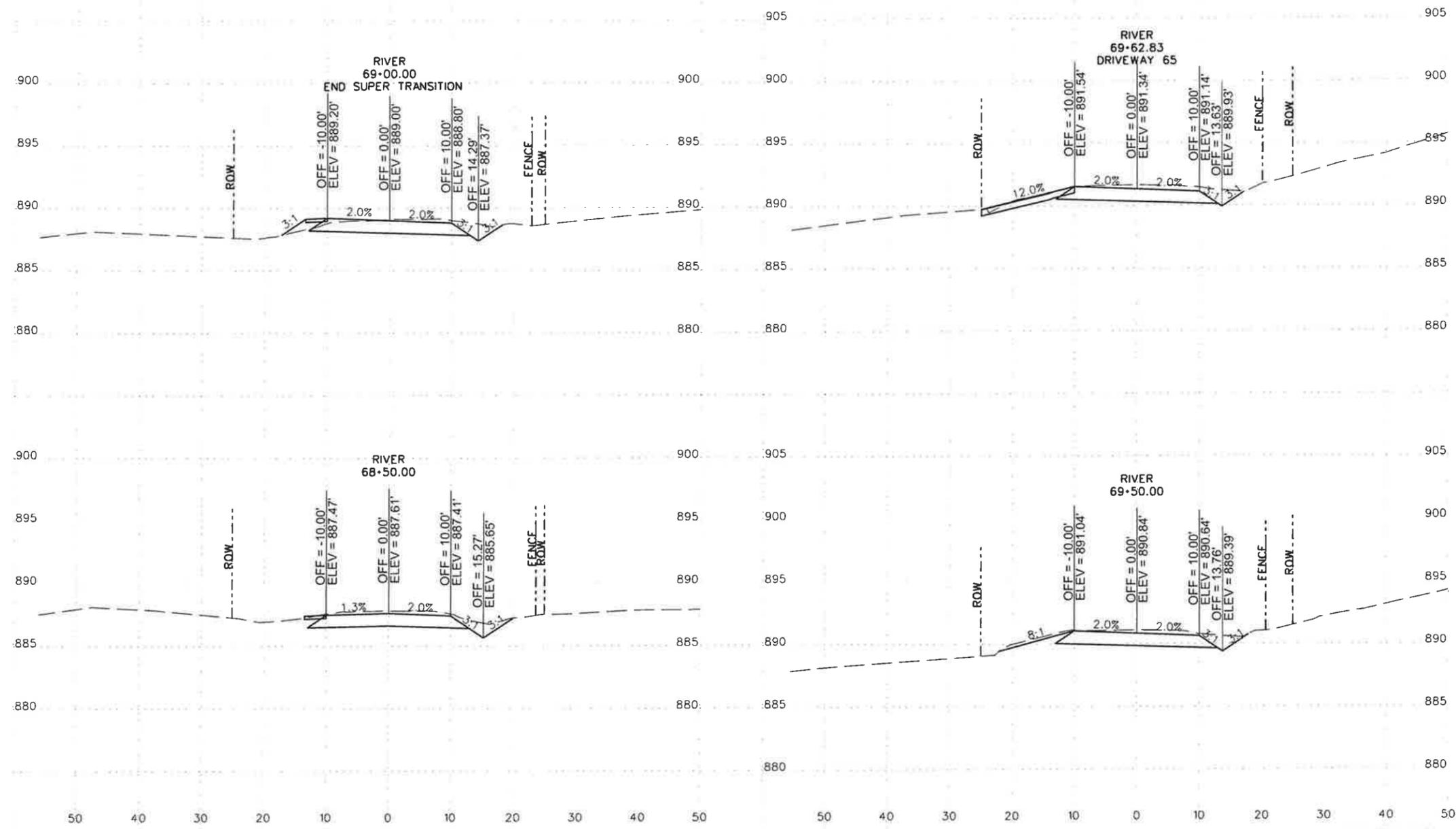
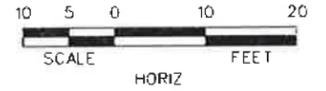
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Checked:	KQK	GEORGETOWN, TEXAS 78626	
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Checked:	KQK	www.wilco.org	



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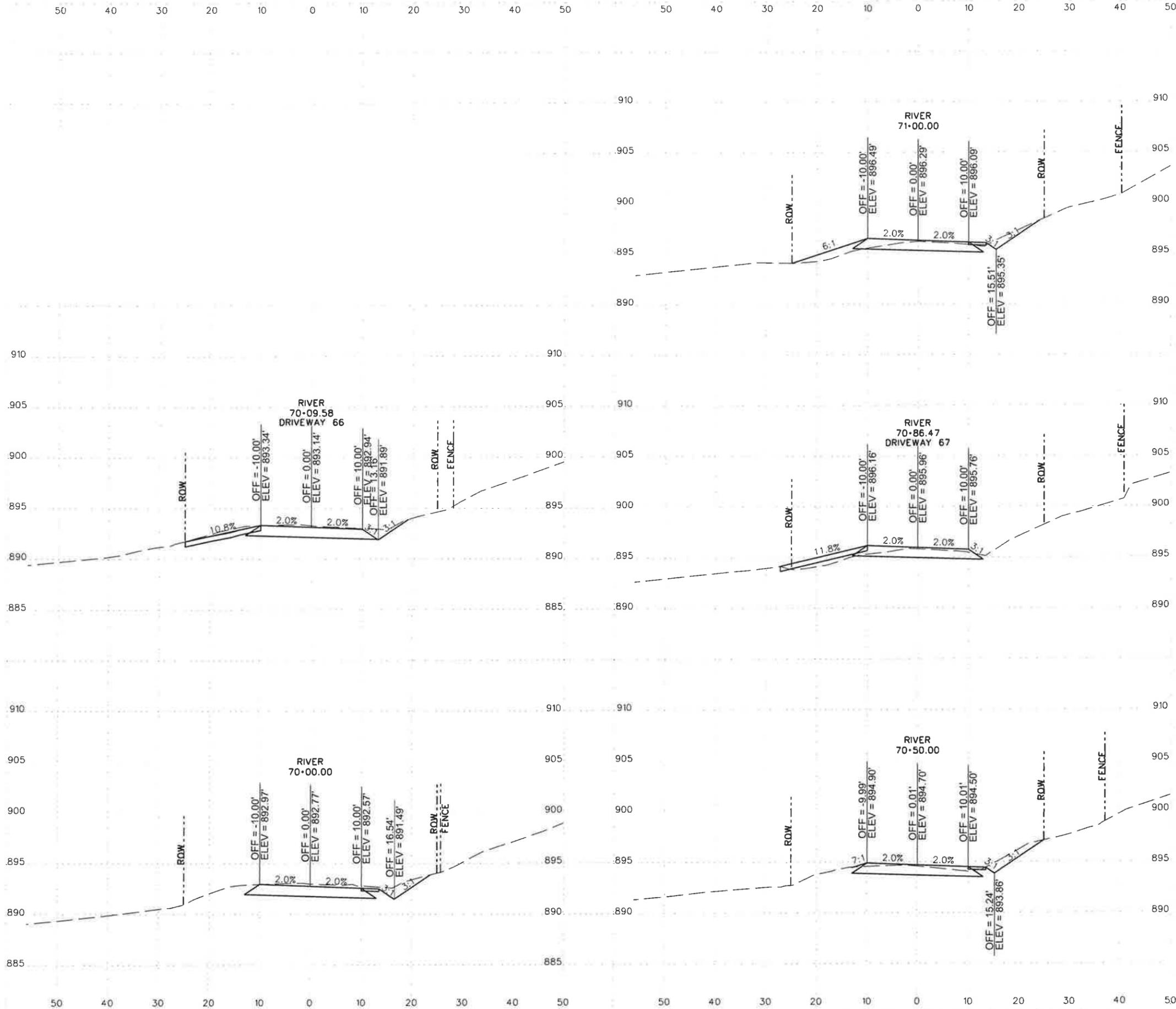
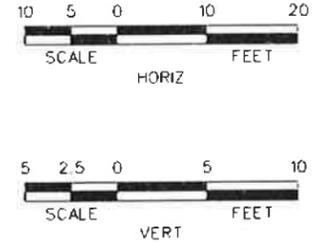
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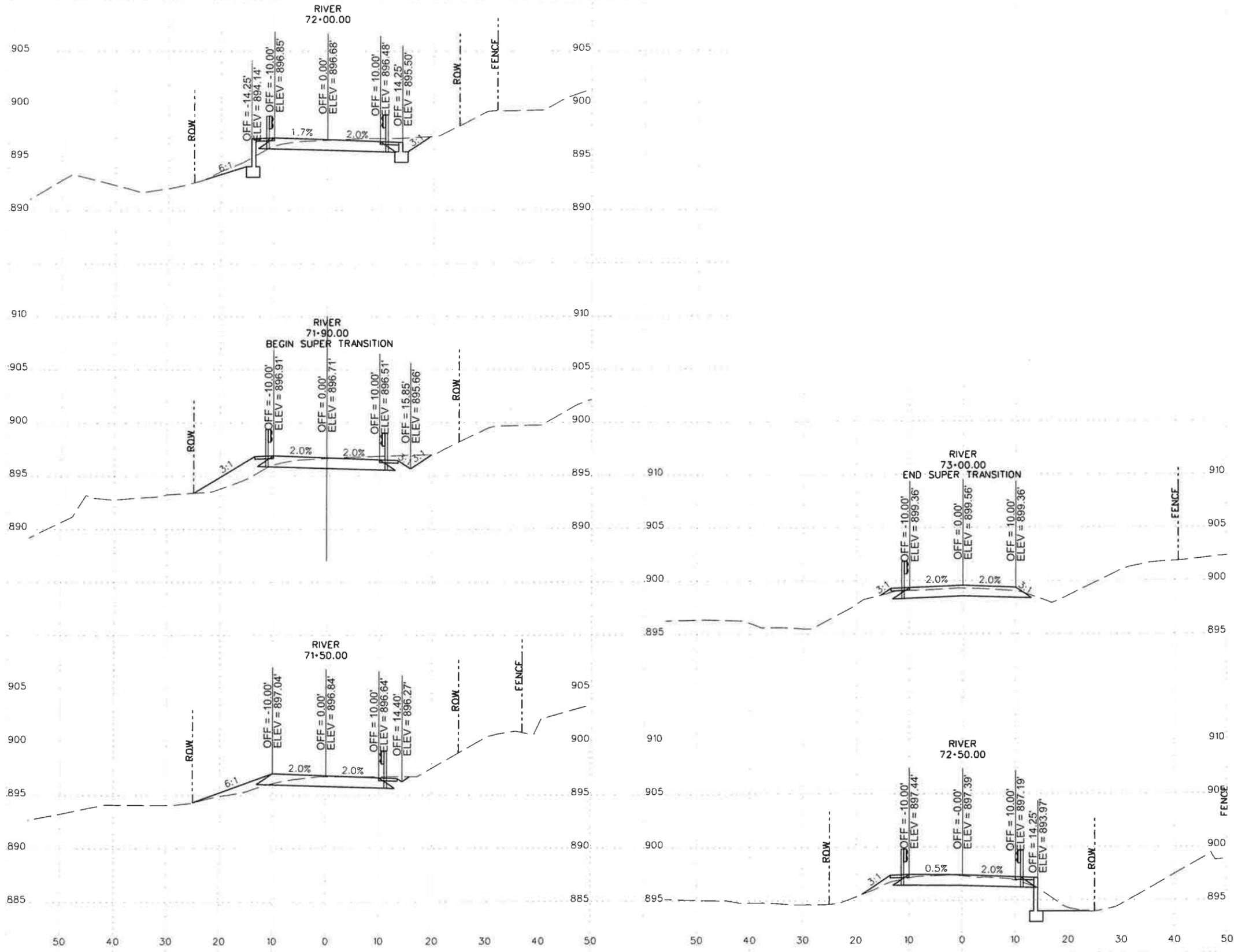
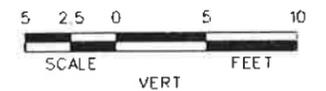
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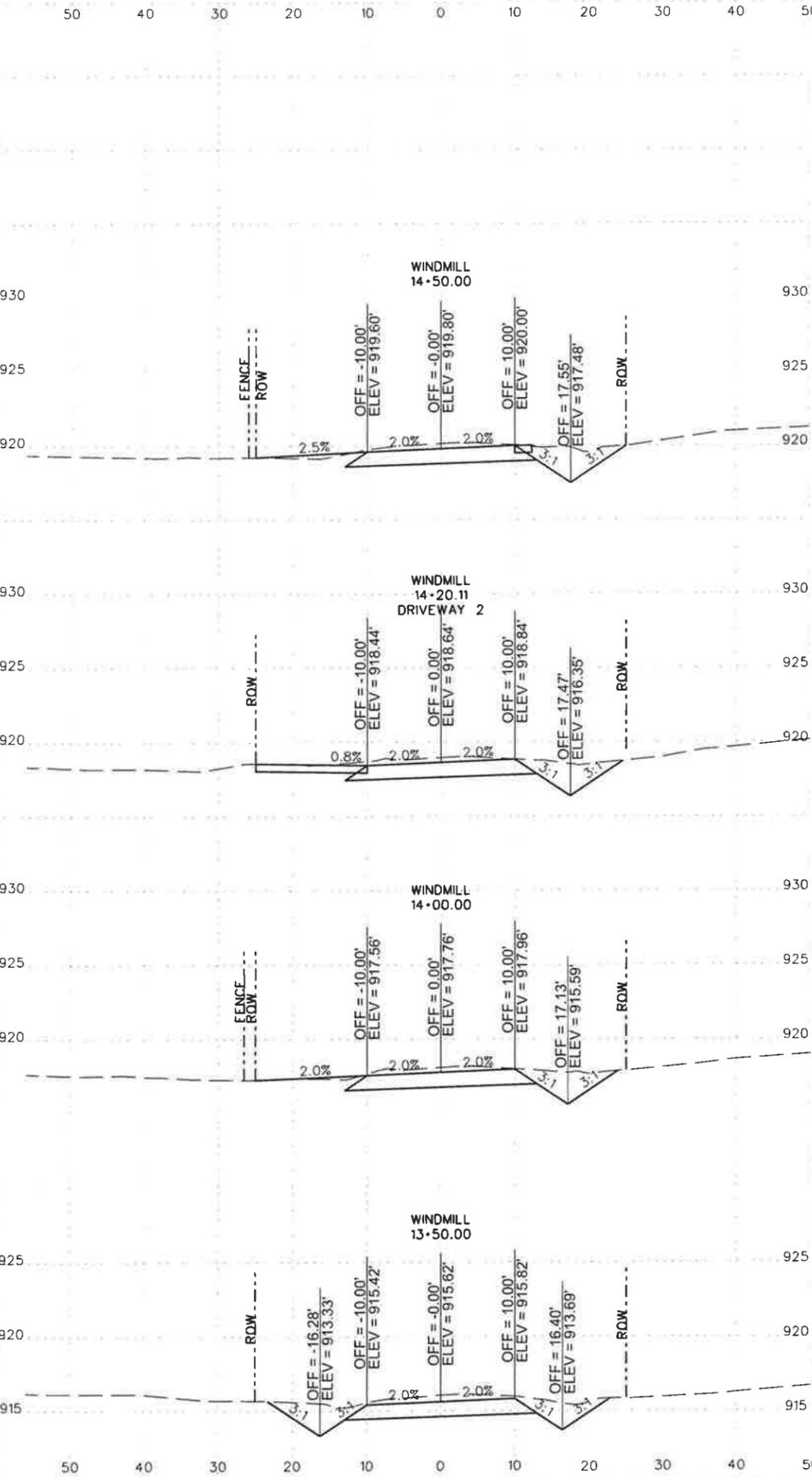
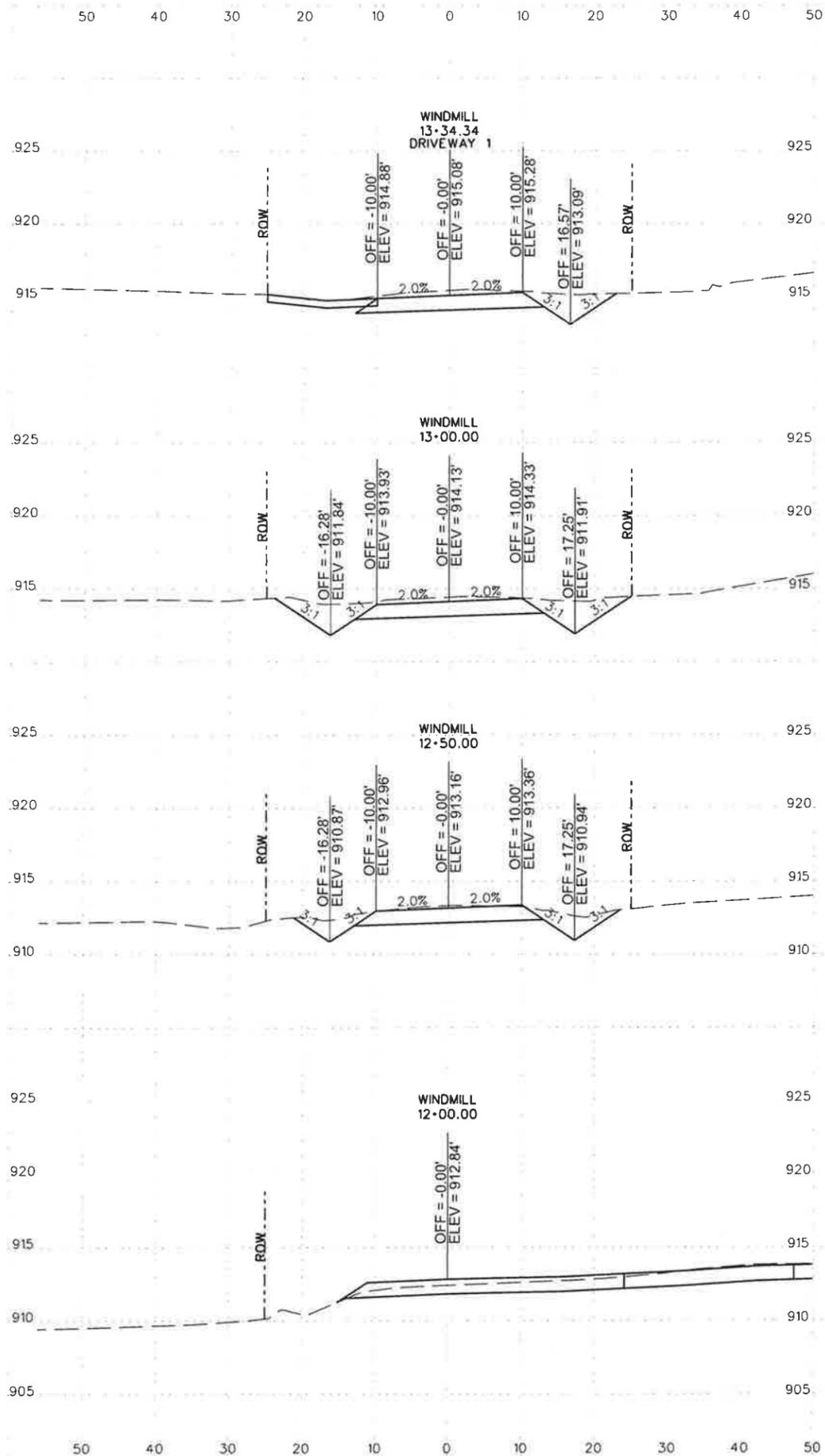
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8/7/17

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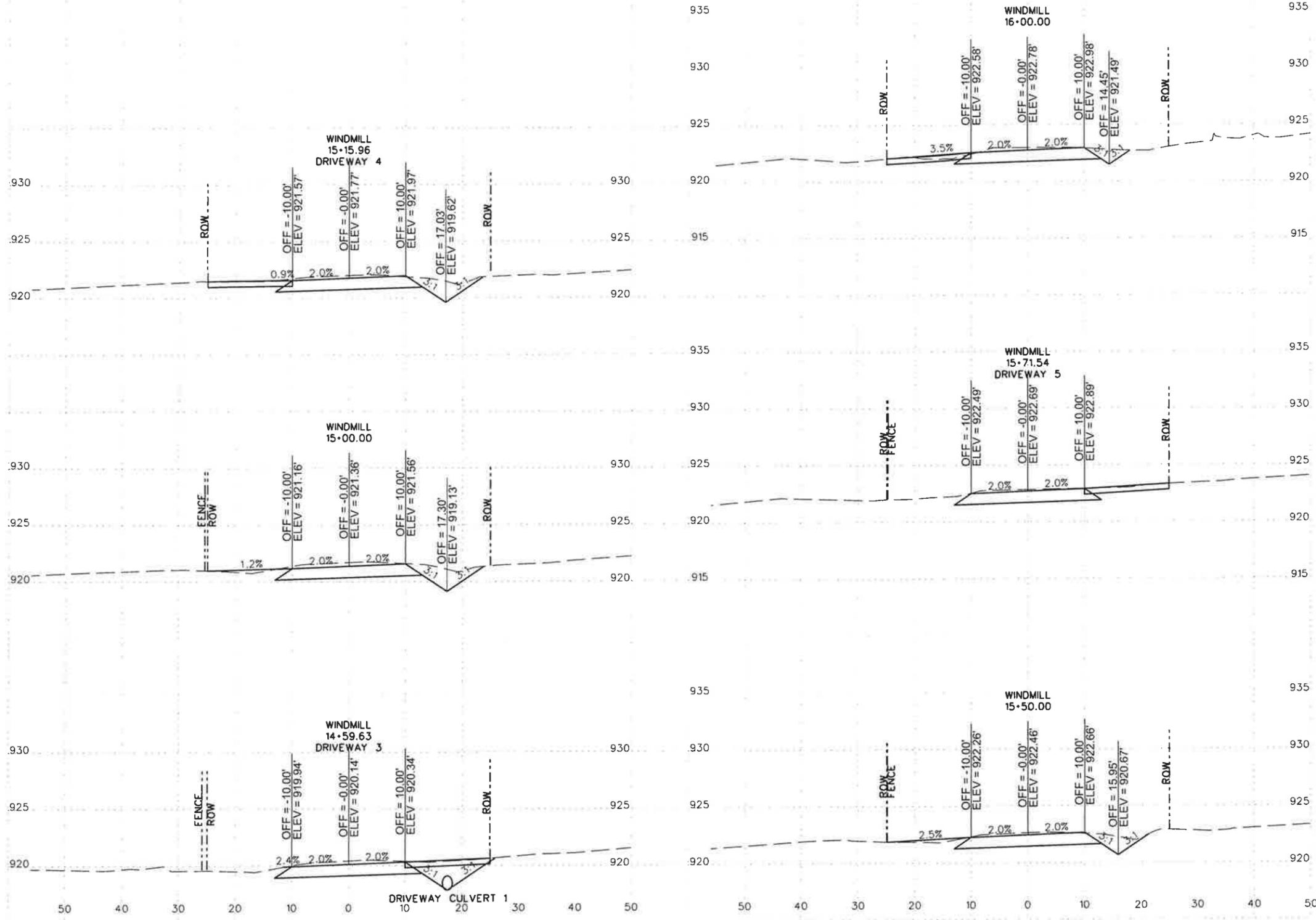
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NO.	REVISION	BY	DATE
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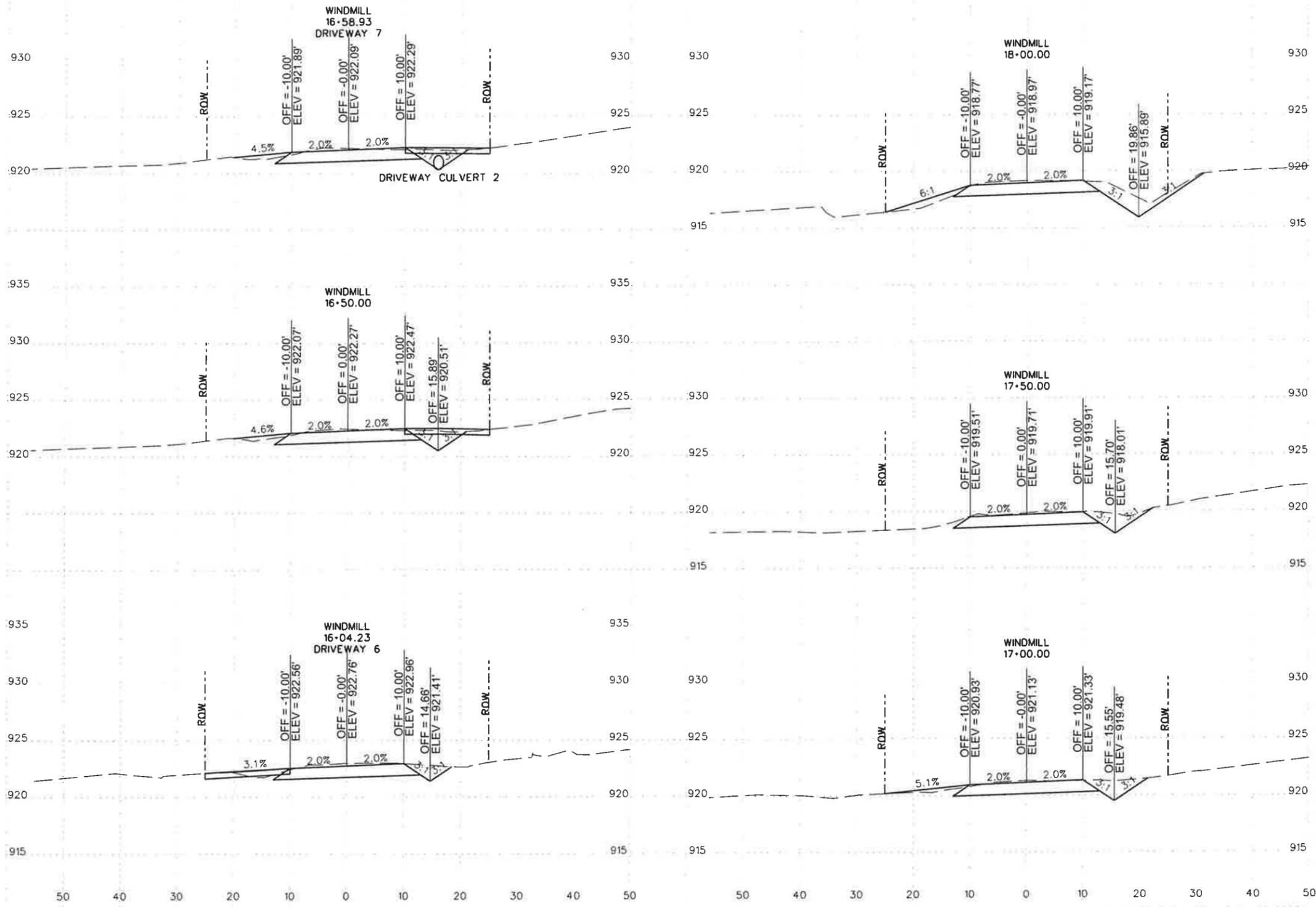
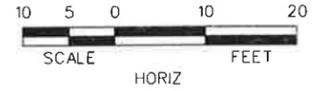
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8/7/17

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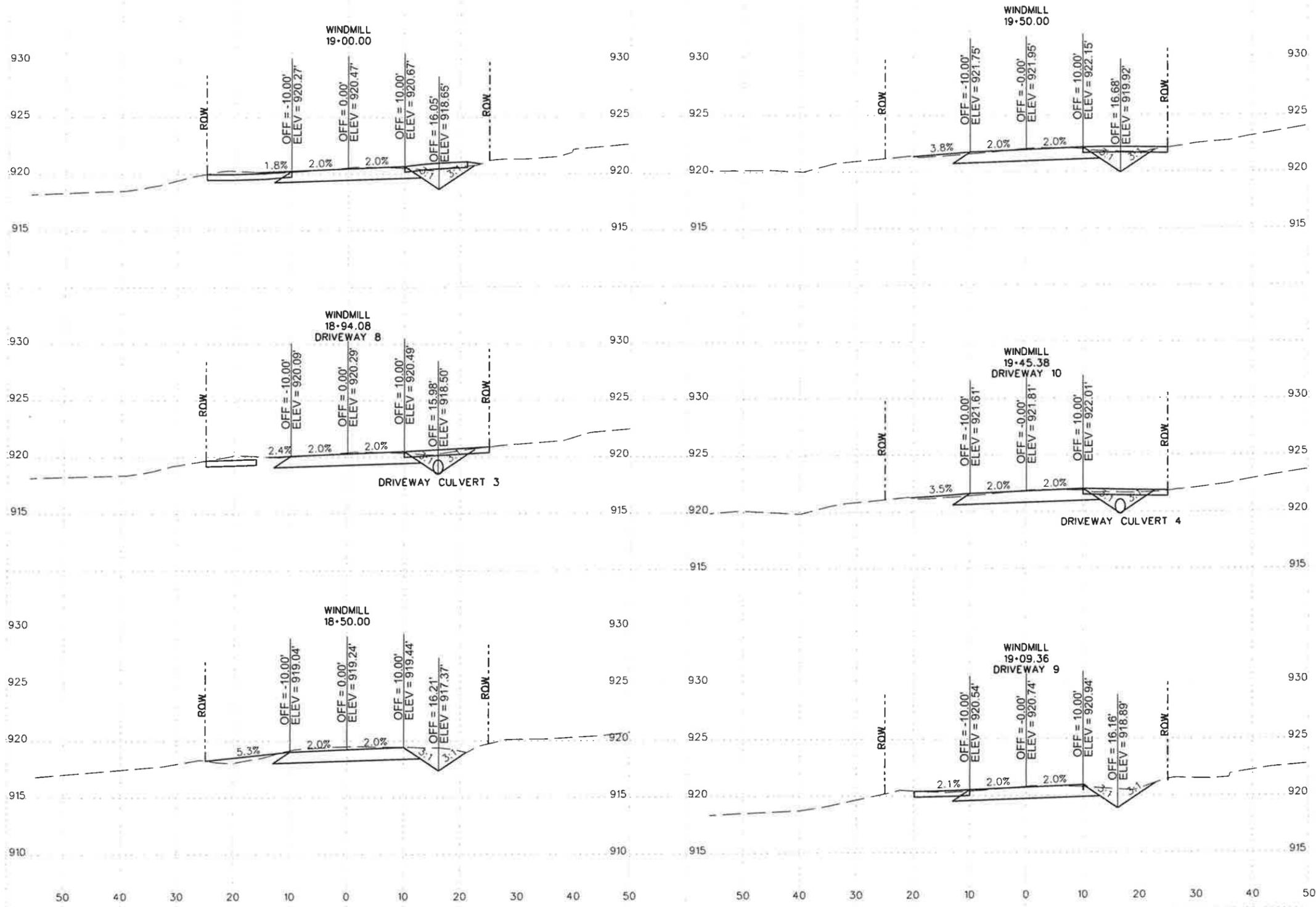
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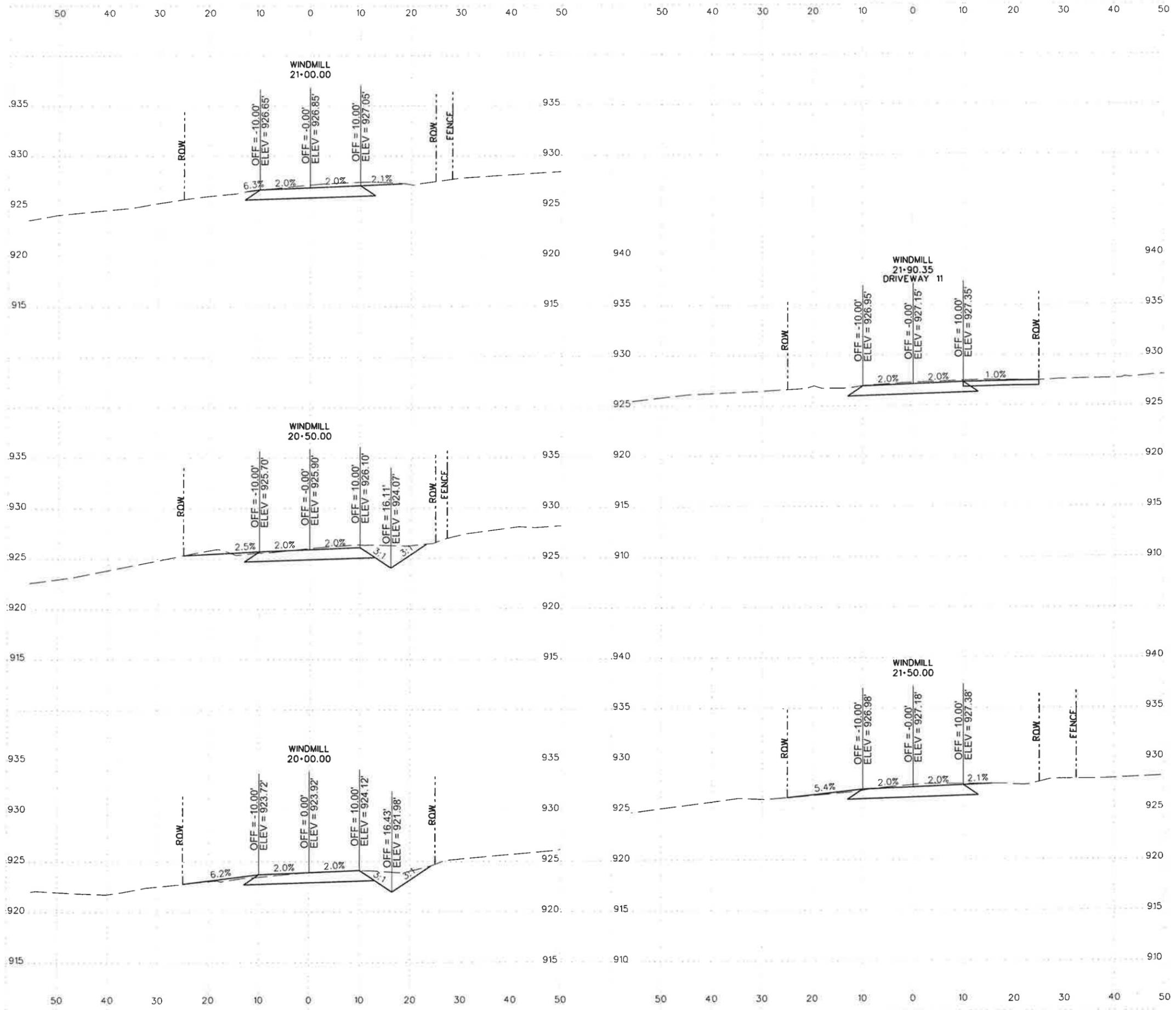
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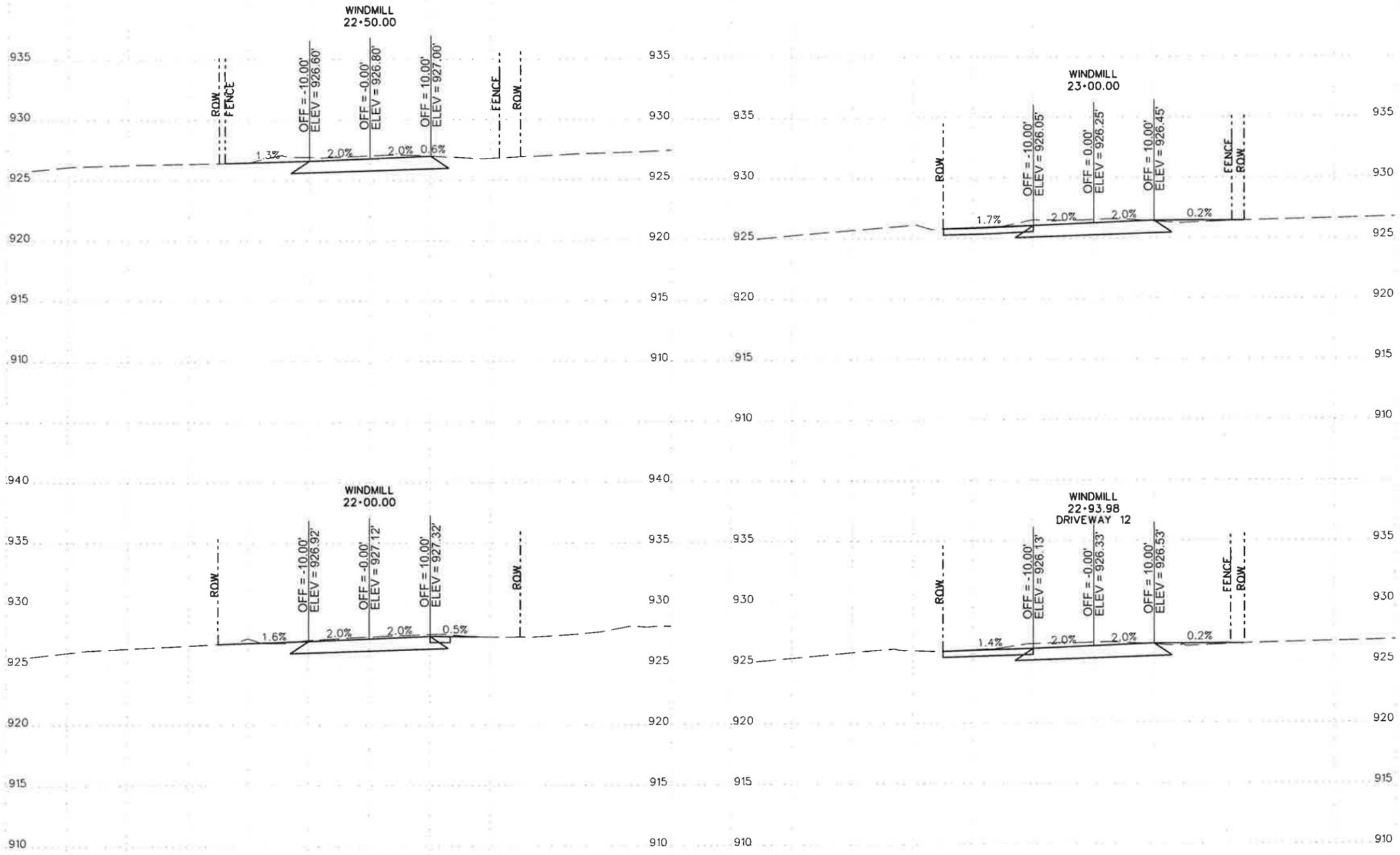
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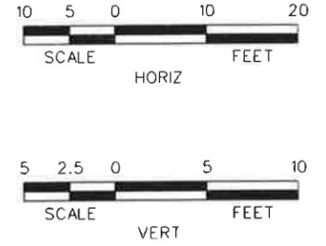
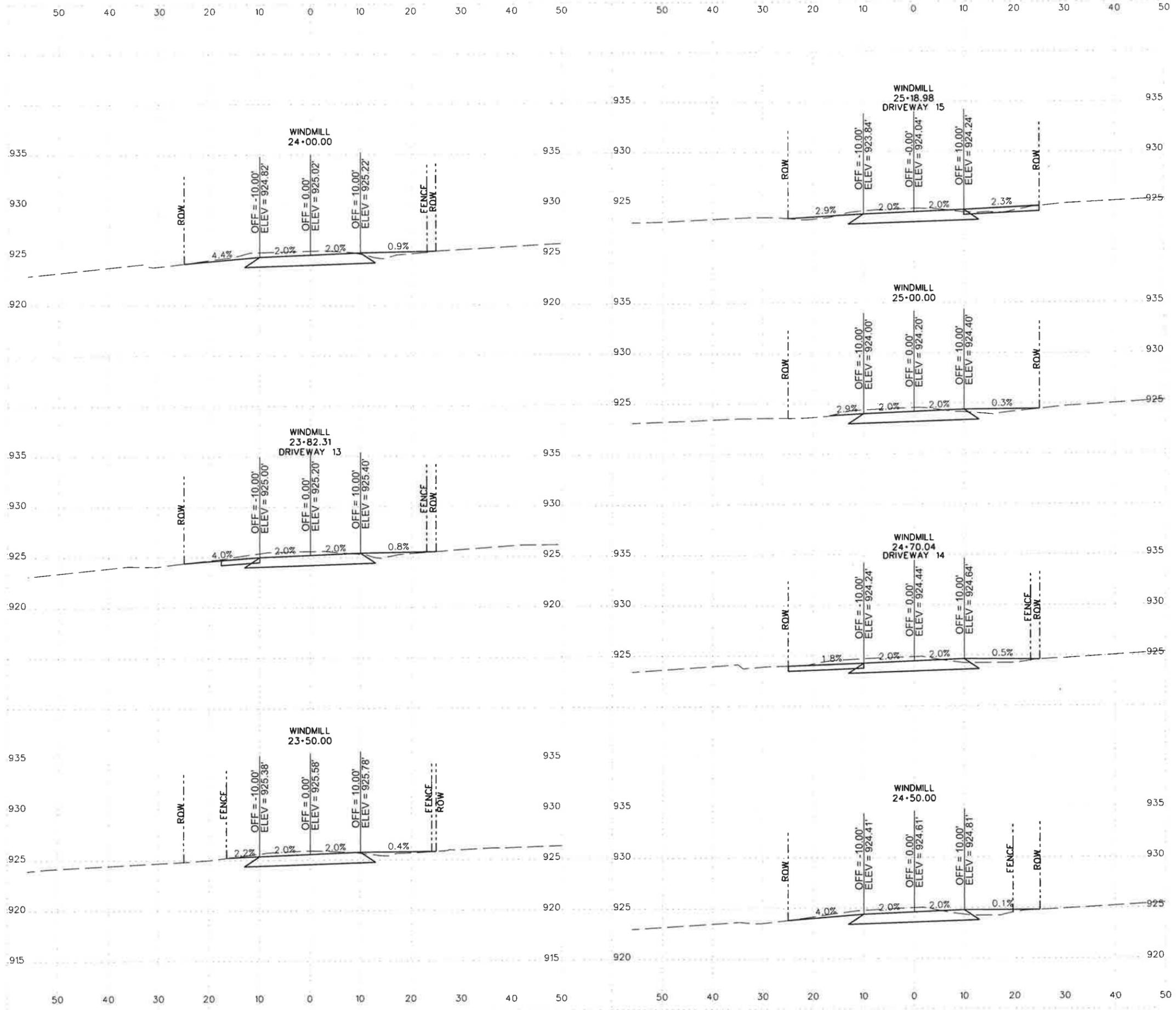


**WILLIAMSON COUNTY**  
1848

**WILLIAMSON COUNTY**  
DEPT. OF INFRASTRUCTURE

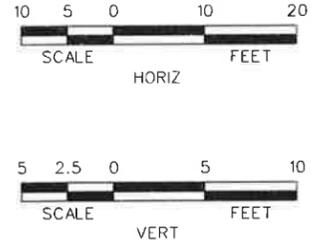
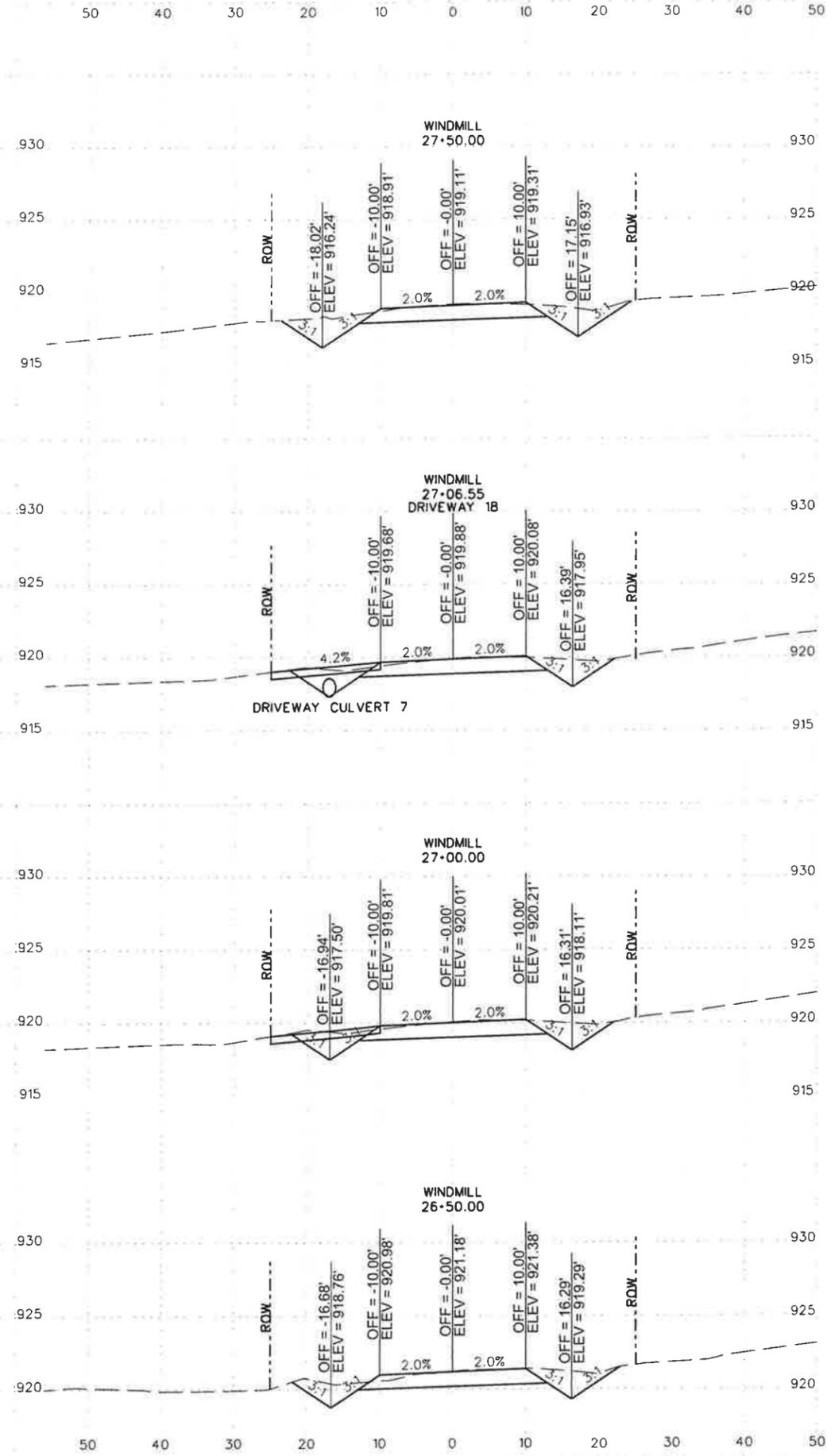
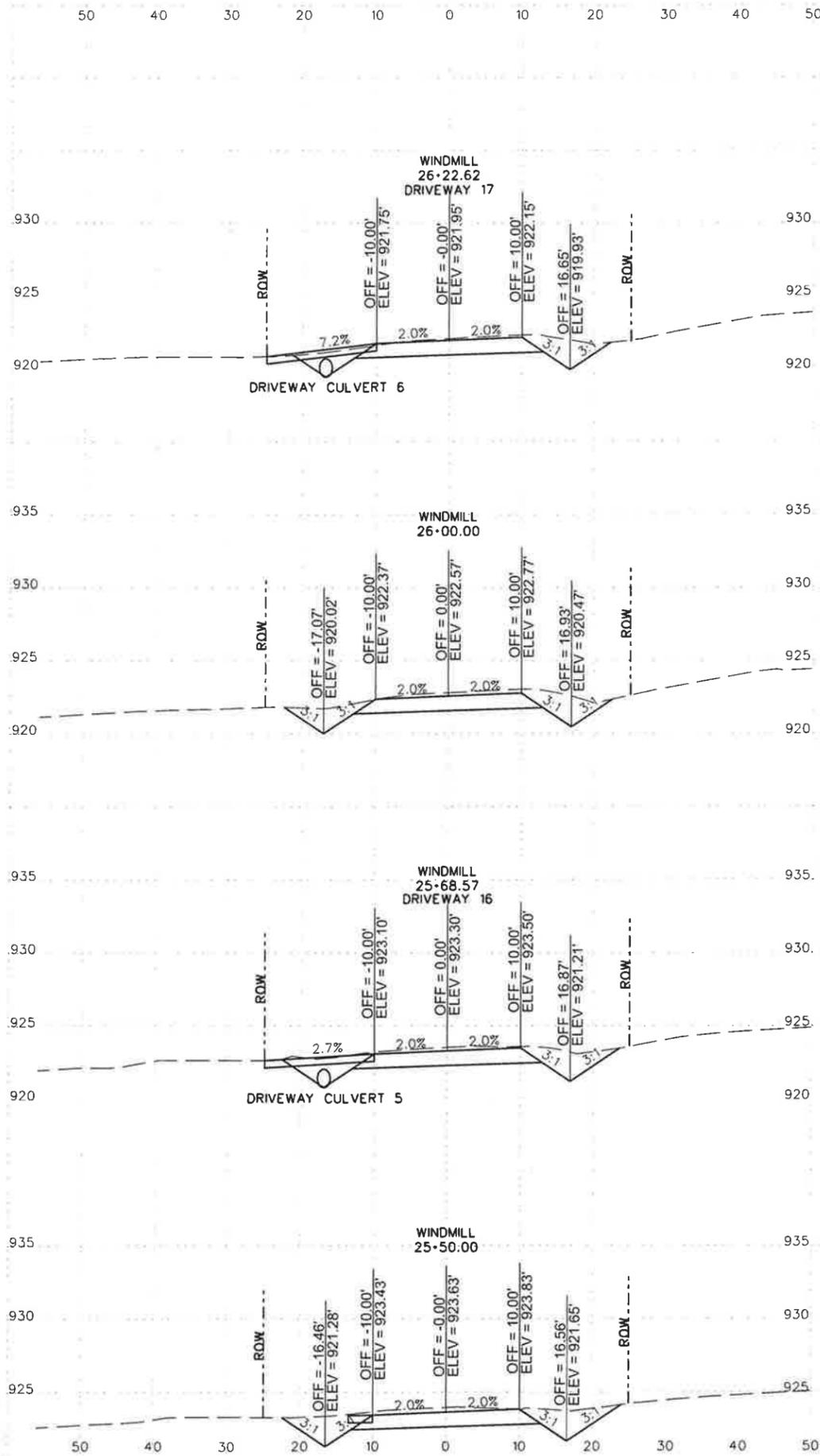
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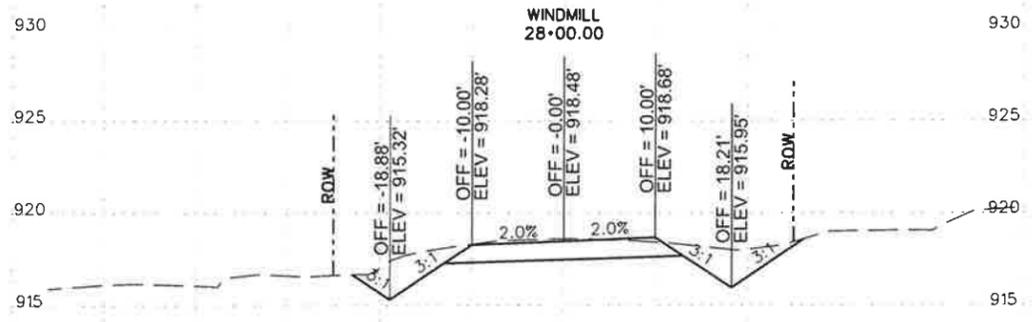
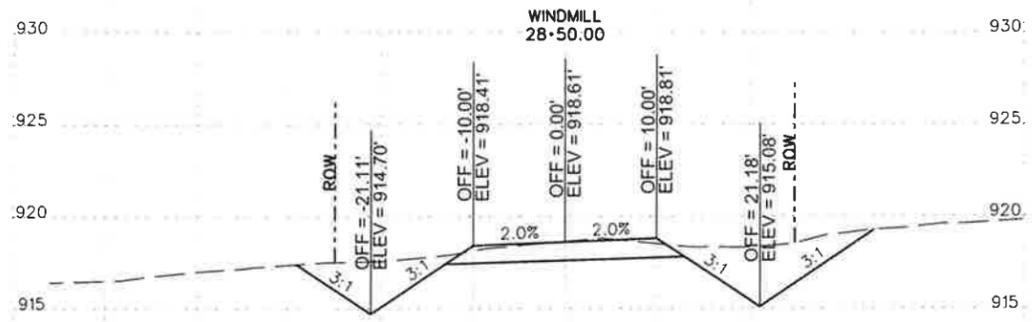
**WILLIAMSON COUNTY**  
1818

**WILLIAMSON COUNTY DEPT. OF INFRASTRUCTURE**

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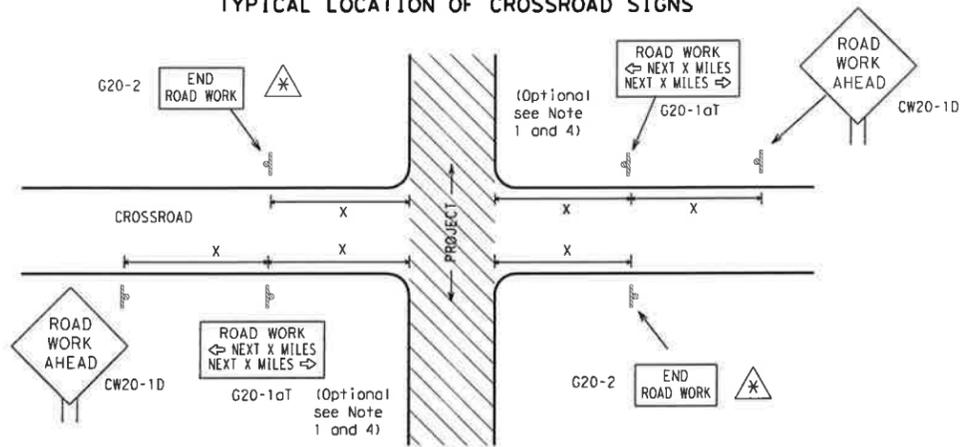
*Kelly G. Morrelli*  
8/7/17

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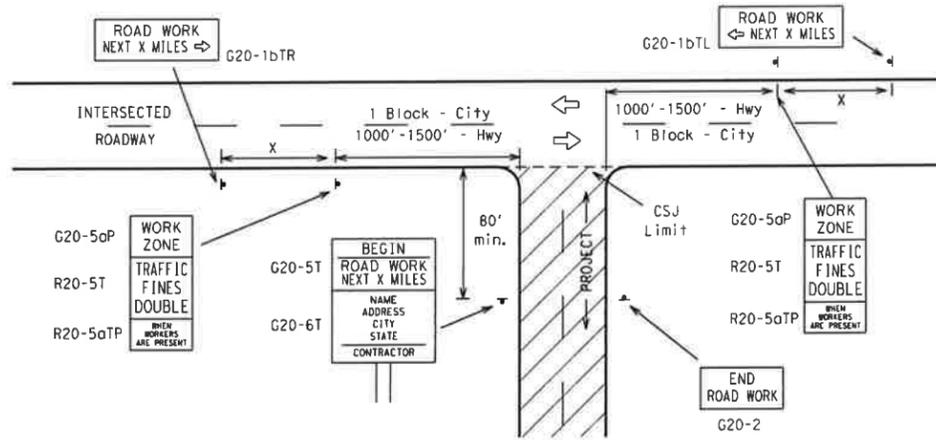
**TYPICAL LOCATION OF CROSSROAD SIGNS**



△ May be mounted on back of "ROAD WORK AHEAD" (CW20-1D) sign with approval of Engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D) sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 18" "END ROAD WORK" (G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES" (G20-1aT) sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

**Williamson County, Texas T-INTERSECTION**



**CSJ LIMITS AT T-INTERSECTION**

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection the Contractor shall place the "CONTRACTOR NAME" (G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow (G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR) signs shall be replaced by the detour signing called for in the plans.

**TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING**

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed	Sign Spacing "X"
CW20 <sup>4</sup>	48" x 48"	48" x 48"	MPH	Feet (Apprx.)
CW21			30	120
CW22			35	160
CW23			40	240
CW25			45	320
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	50	400
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	55	500 <sup>2</sup>
			60	600 <sup>2</sup>
			65	700 <sup>2</sup>
			70	800 <sup>2</sup>
			75	900 <sup>2</sup>
			80	1000 <sup>2</sup>
			*	* <sup>3</sup>

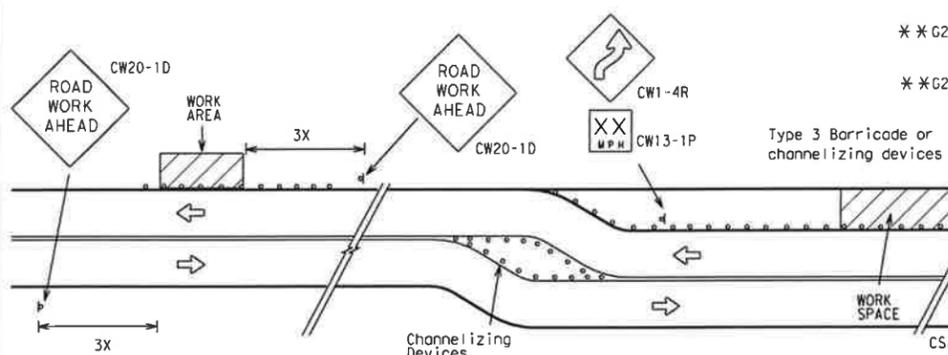
\* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

**GENERAL NOTES**

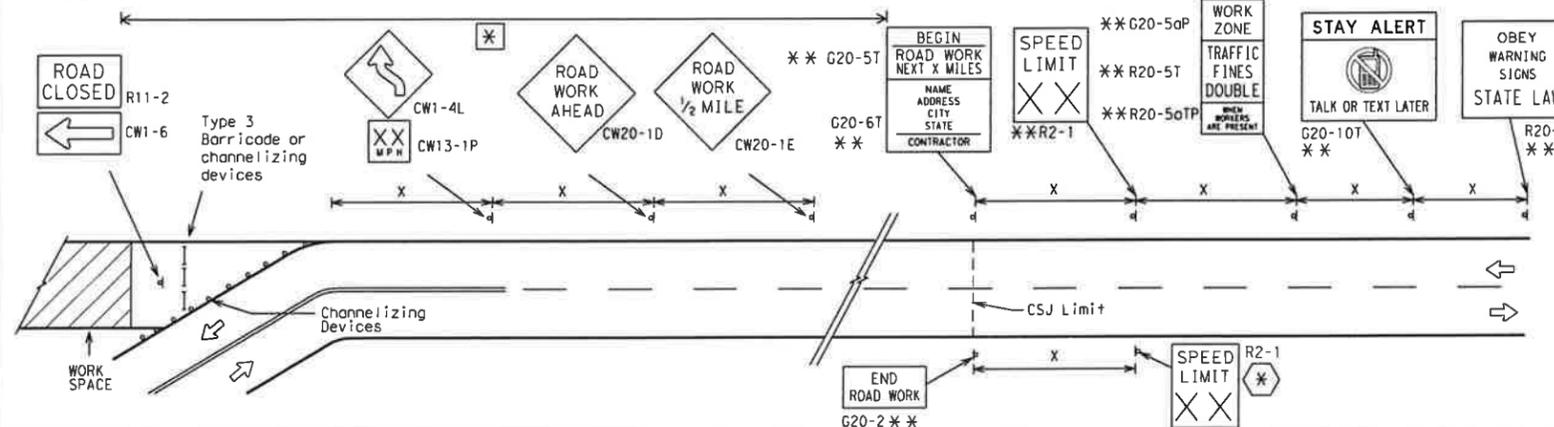
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be used on low volume crossroads at the discretion of the Engineer. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

**WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS**

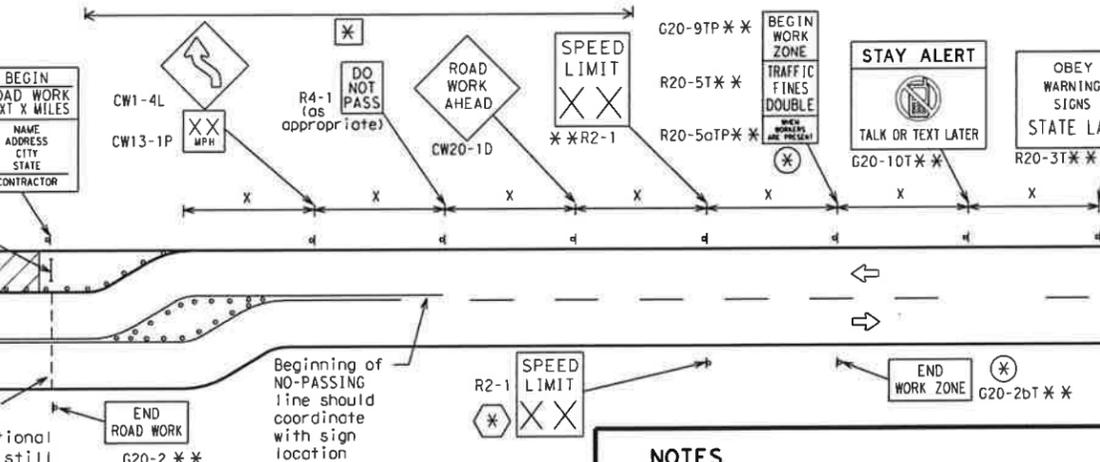


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

**SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS**



**SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS**



**NOTES**

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

⊗ The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

\*\* Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

⊠ Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.

⊙ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND	
—	Type 3 Barricade
○ ○ ○	Channelizing Devices
⊠	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

SHEET 2 OF 12



**BARRICADE AND CONSTRUCTION PROJECT LIMIT**

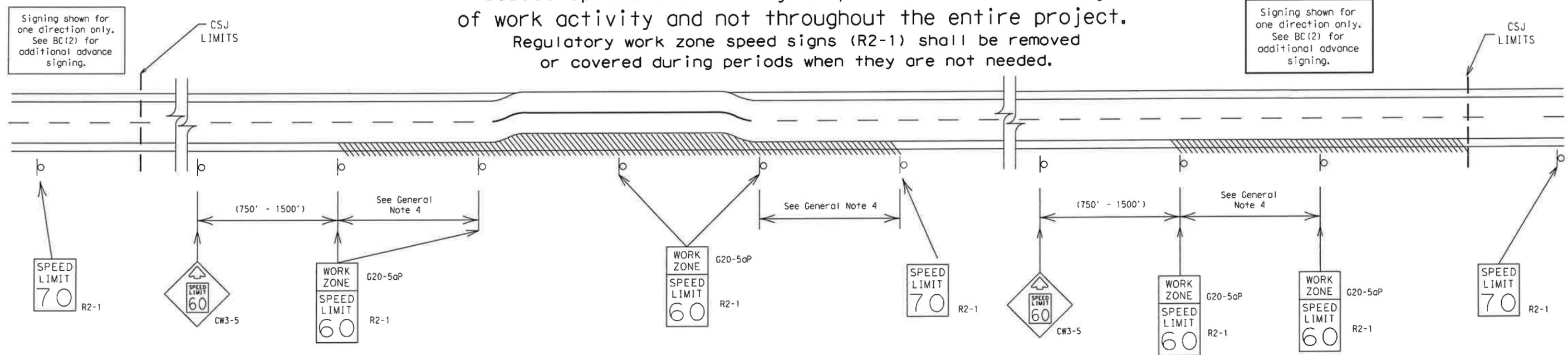
**BC(2)-14**

FILE: bc-14.dgn	DW: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
9-07	8-14	DIST	COUNTY	SHEET NO.
7-13				98

# TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



## GUIDANCE FOR USE:

### LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

- a) rough road or damaged pavement surface
- b) substantial alteration of roadway geometrics (diversions)
- c) construction detours
- d) grade
- e) width
- f) other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

### SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the travelled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered. (See Removing or Covering on BC(4)).

## GENERAL NOTES

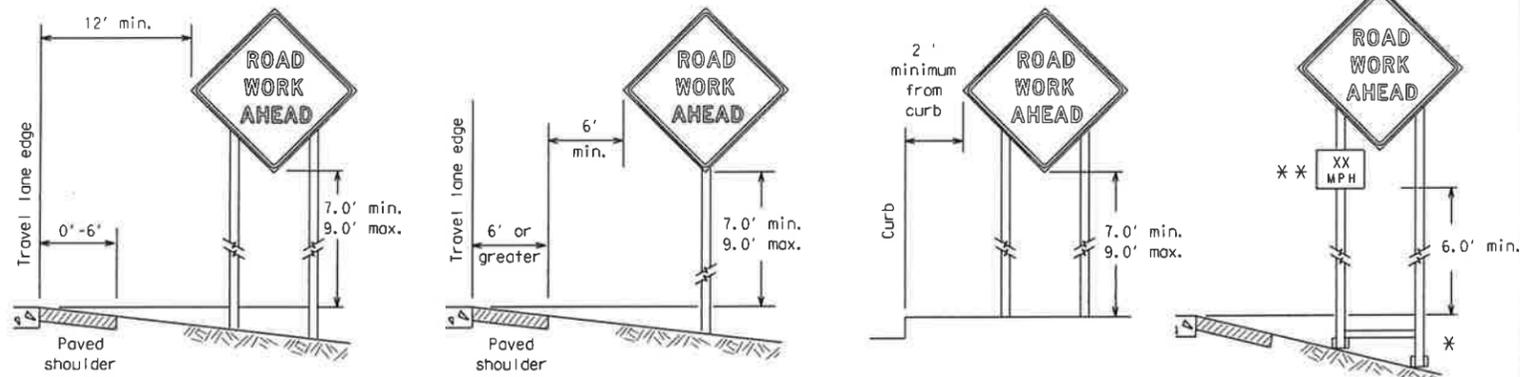
1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
  - 40 mph and greater 0.2 to 2 miles
  - 35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the "ADVANCE SPEED LIMIT" (CW3-5) sign, "WORK ZONE" (G20-5aP) plaque and the "SPEED LIMIT" (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
  - A. Law enforcement.
  - B. Flagger stationed next to sign.
  - C. Portable changeable message sign (PCMS).
  - D. Low-power (drone) radar transmitter.
  - E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

SHEET 3 OF 12

		Traffic Operations Division Standard	
<h2>BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT</h2>			
<h3>BC (3) - 14</h3>			
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT November 2002	CONT	SECT	JOB
REVISIONS			
9-07	8-14	DIST	COUNTY
7-13			SHEET NO. 99

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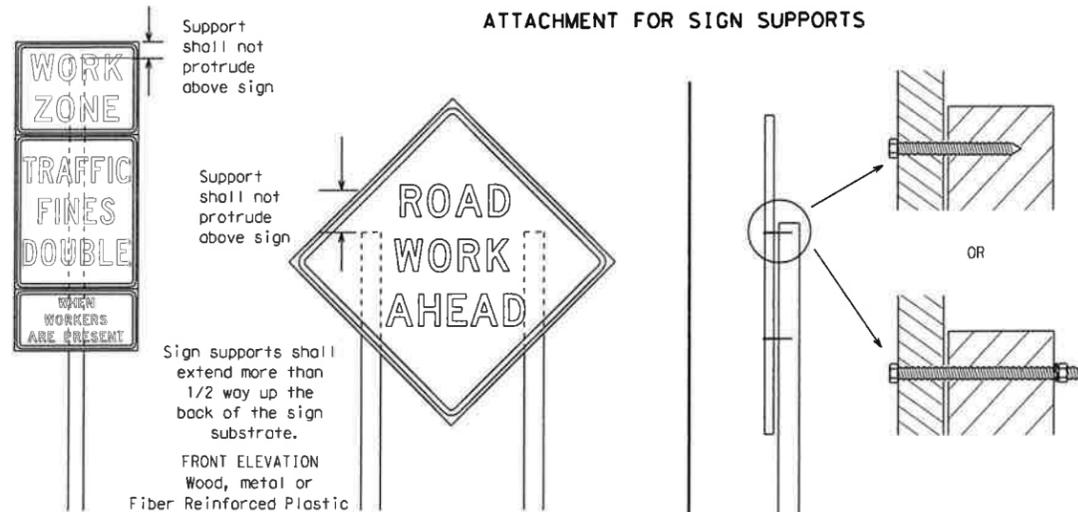
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



\* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

\* \* When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



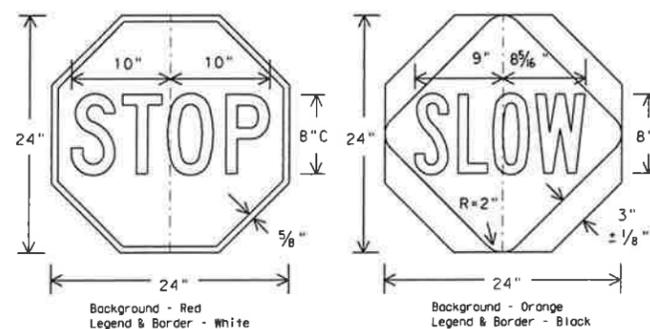
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

**Nails shall NOT be allowed.**  
Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the splice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

- STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24" as detailed below.
- When used at night, the STOP/SLOW paddle shall be retroreflectORIZED.
- STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
- Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

- Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
- When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
- If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
- Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
- The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
- The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD). The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
- The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
- Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
- The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

- The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
  - Long-term stationary - work that occupies a location more than 3 days.
  - Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
  - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
  - Short, duration - work that occupies a location up to 1 hour.
  - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

- The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
- The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
- Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
- Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate-term sign height.
- Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

- The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

- The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

- All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
- Orange sheeting, meeting the requirements of DMS-8300 Type B<sub>FL</sub> or Type C<sub>FL</sub>, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

- All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
- Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
- When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
- Burlap shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
- Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
- Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
- Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

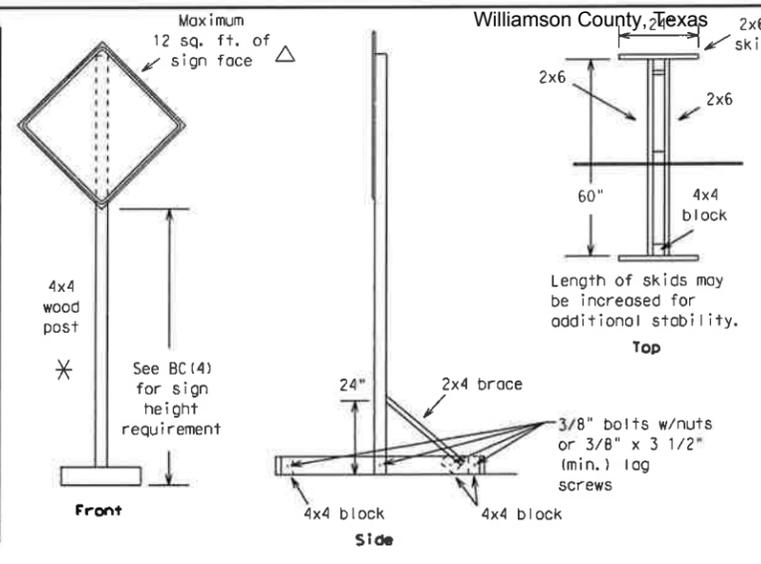
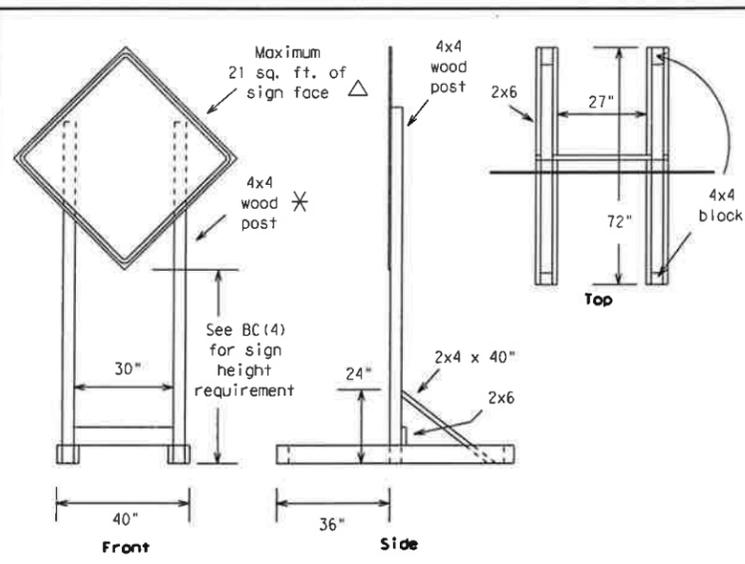
FLAGS ON SIGNS

- Flags may be used to draw attention to warning signs. When used the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

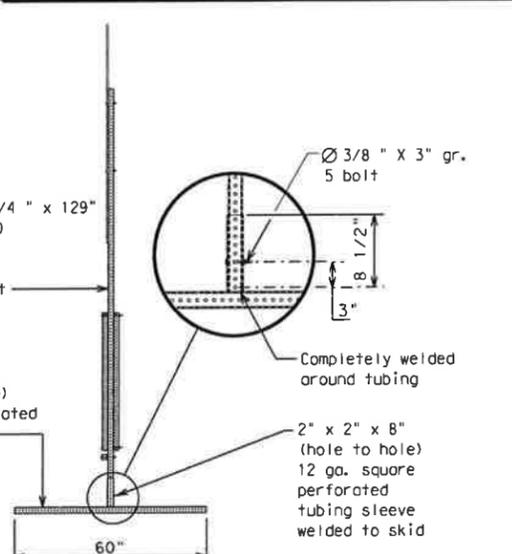
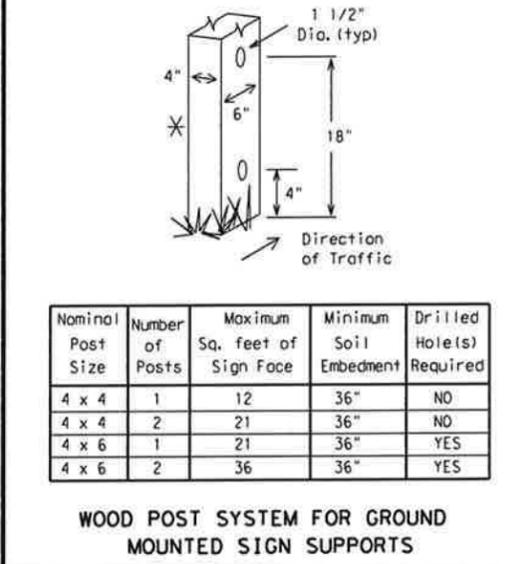
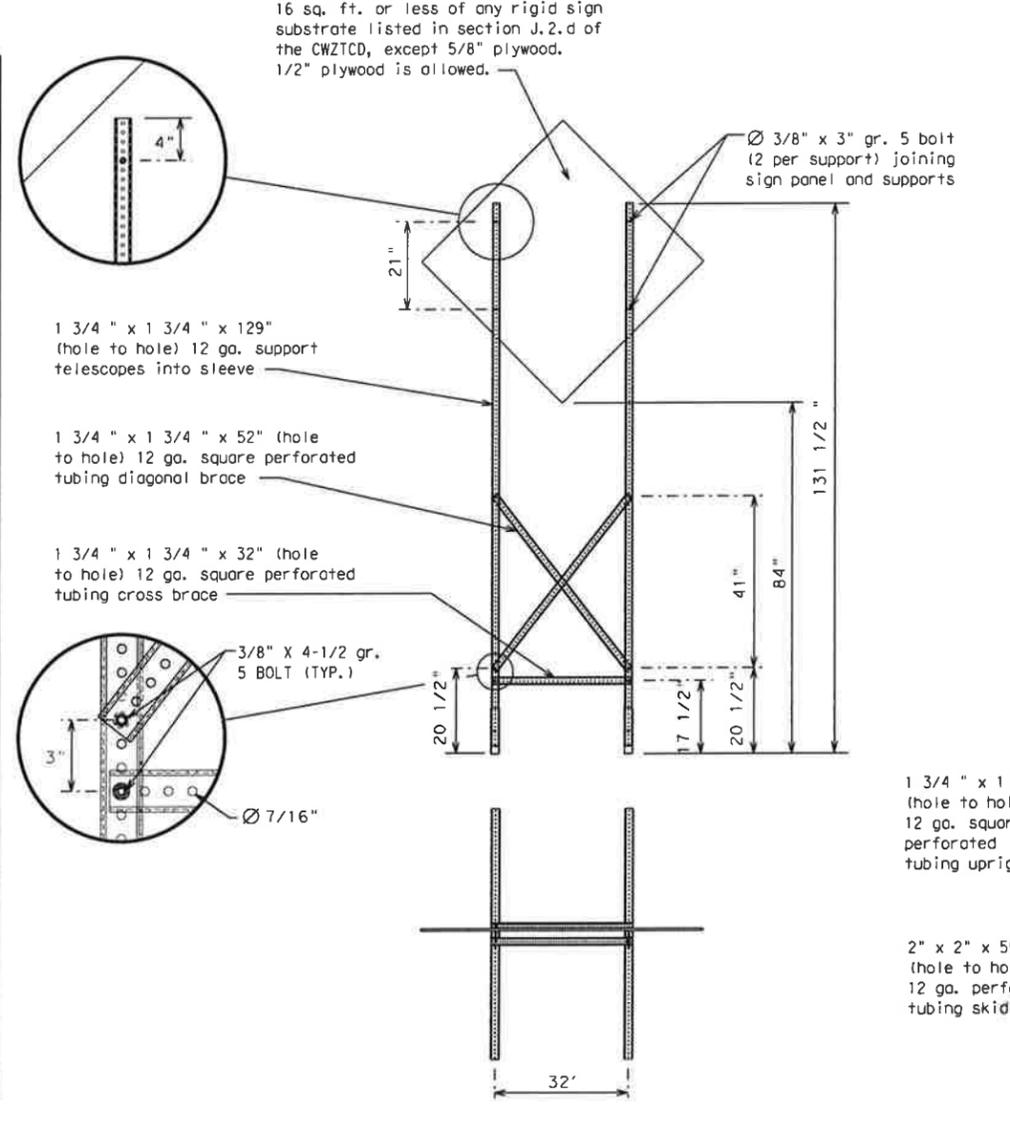
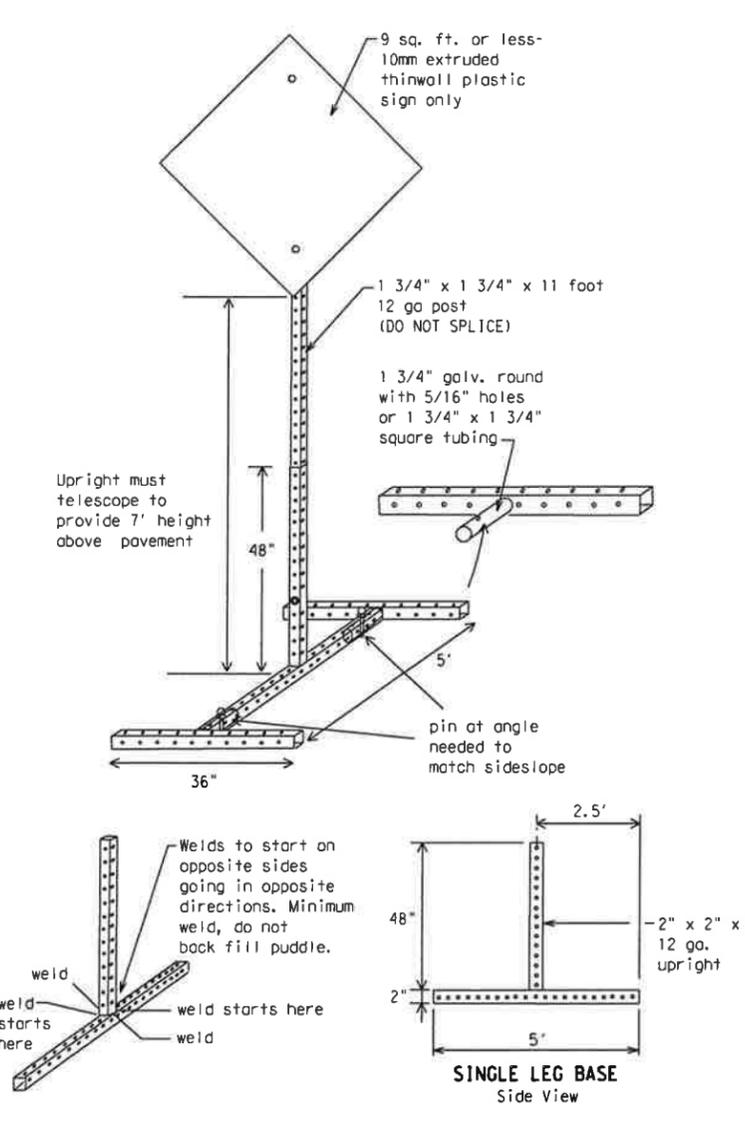
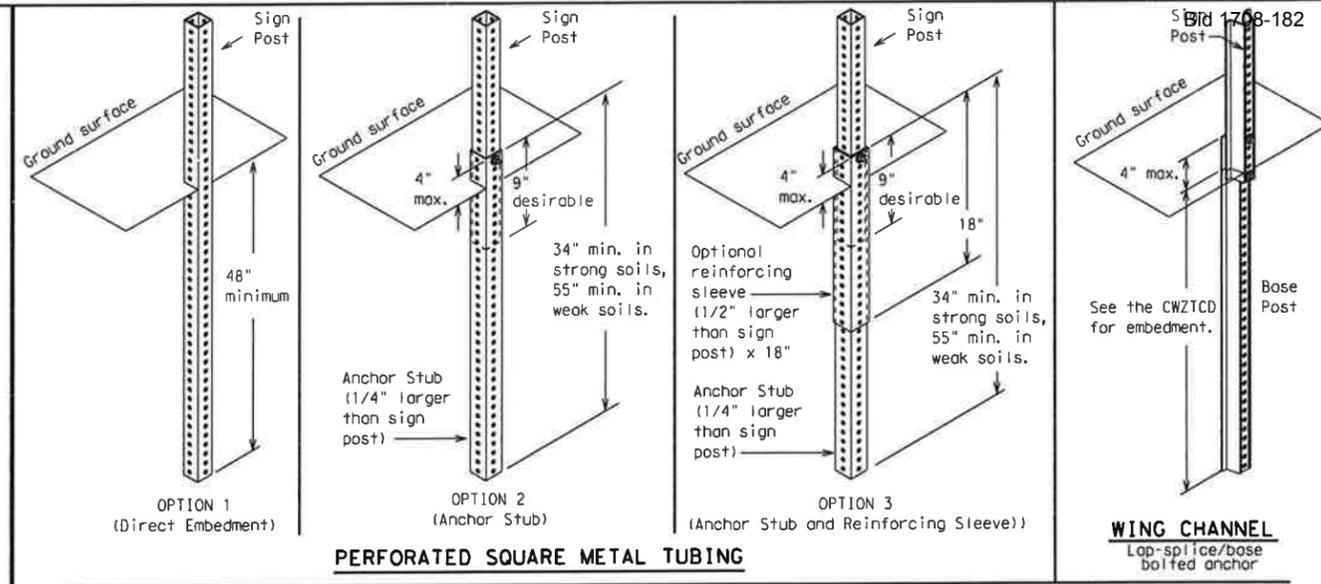
SHEET 4 OF 12

		Traffic Operations Division Standard	
<h2>BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES</h2>			
<h3>BC (4) - 14</h3>			
FILE:	bc-14.dgn	DW:	TxDOT
REVISED:	November 2002	CK:	TxDOT
DATE:	9-07	DR:	TxDOT
TIME:	8-14	CR:	TxDOT
	7-13	CON:	SECT:
		JOB:	HIGHWAY:
		DIST:	COUNTY:
		SHEET NO.:	100

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**SKID MOUNTED WOOD SIGN SUPPORTS**  
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS  $\square$



**SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS**

**WEDGE ANCHORS**  
Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

**OTHER DESIGNS**  
MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

- GENERAL NOTES**
- Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
  - No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
  - When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

- See BC(4) for definition of "Work Duration."
- $\times$  Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
- $\triangle$  See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

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Texas Department of Transportation

Traffic Operations Division Standard

**BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT**

**BC(5) - 14**

FILE: bc-14.dgn	DW: TxDOT	CK: TxDOT	DR: TxDOT	CR: TxDOT
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9-07	B-14	DIST	COUNTY	SHEET NO.
7-13				101

# RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

## PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
- Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
- The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
- PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
- Each line of text should be centered on the message board rather than left or right justified.
- If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

## Phase 1: Condition Lists

### Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT
RIGHT X LANES CLOSED	RIGHT X LANES OPEN
CENTER LANE CLOSED	DAYTIME LANE CLOSURES
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE
EXIT CLOSED	RIGHT LN TO BE CLOSED
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI
XXXXXXXXX BLVD CLOSED	

### Other Condition List

ROADWORK XXX FT	ROAD REPAIRS XXXX FT
FLAGGER XXXX FT	LANE NARROWS XXXX FT
RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
DETOUR X MILE	ROUGH ROAD XXXX FT
ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
BUMP XXXX FT	US XXX EXIT X MILES
TRAFFIC SIGNAL XXXX FT	LANES SHIFT *

\* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

## Phase 2: Possible Component Lists

### Action to Take/Effect on Travel List

MERGE RIGHT	FORM X LINES RIGHT
DETOUR NEXT X EXITS	USE XXXXX RD EXIT
USE EXIT XXX	USE EXIT I-XX NORTH
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N
TRUCKS USE US XXX N	WATCH FOR TRUCKS
WATCH FOR TRUCKS	EXPECT DELAYS
EXPECT DELAYS	PREPARE TO STOP
REDUCE SPEED XXX FT	END SHOULDER USE
USE OTHER ROUTES	WATCH FOR WORKERS
STAY IN LANE *	

### Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXXXX TO XXXXXXXX
US XXX TO FM XXXX

### Warning List

SPEED LIMIT XX MPH
MAXIMUM SPEED XX MPH
MINIMUM SPEED XX MPH
ADVISORY SPEED XX MPH
RIGHT LANE EXIT
USE CAUTION
DRIVE SAFELY
DRIVE WITH CARE

### \*\* Advance Notice List

TUE-FRI XX AM-X PM
APR XX-XX X PM-X AM
BEGINS MONDAY
BEGINS MAY XX
MAY X-X XX PM - XX AM
NEXT FRI-SUN
XX AM TO XX PM
NEXT TUE AUG XX
TONIGHT XX PM-XX AM

\*\* See Application Guidelines Note 6.

## APPLICATION GUIDELINES

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
- For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

## WORDING ALTERNATIVES

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

## FULL MATRIX PCMS SIGNS

- When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
- When symbol signs, such as the "Flagger Symbol" (CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
- When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
- A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

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WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Canot	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	E	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound	(route) S
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DWNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLR
High-Occupancy	HOV	Tuesday	TUES
Vehicle	HV	Time Minutes	TIME MIN
Highway	Hwy	Upper Level	UPR LEVEL
Hour(s)	HR, HRS	Vehicles (s)	VEH, VEHS
Information	INFO	Warning	WARN
It Is	ITS	Wednesday	WED
Junction	JCT	Weight Limit	WT LIMIT
Left	LFT	West	W
Left Lane	LFT LN	Westbound	(route) W
Lane Closed	LN CLOSED	Wet Pavement	WET PVMT
Lower Level	LWR LEVEL	Will Not	WONT
Maintenance	MAINT		

Roadway designation # IH-number, US-number, SH-number, FM-number

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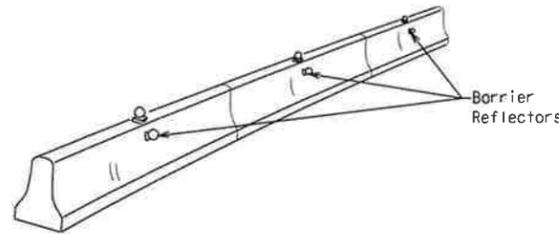
## BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC (6) - 14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DN: TxDOT	CK: TxDOT
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9-07	8-14	DIST	COUNTY	SHEET NO.
7-13				102

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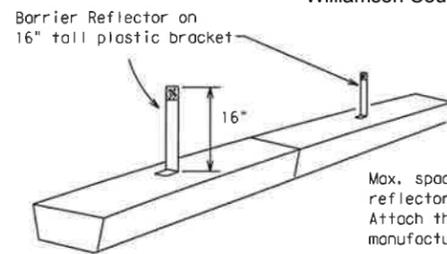
- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



**CONCRETE TRAFFIC BARRIER (CTB)**

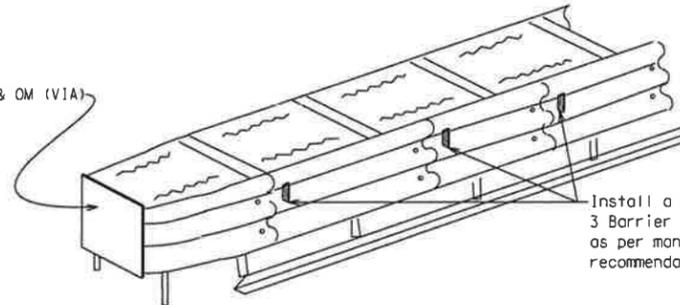
- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
- Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional) while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.

**Williamson County, Texas**



**LOW PROFILE CONCRETE BARRIER (LPCB)**

Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.



**DELINEATION OF END TREATMENTS**

**END TREATMENTS FOR CTB'S USED IN WORK ZONES**

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

**BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS**

**WARNING LIGHTS**

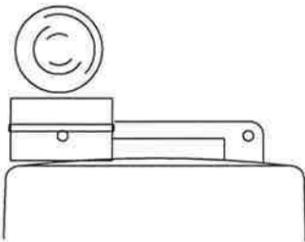
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B<sub>FL</sub> or C<sub>FL</sub> Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
- Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
- When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

**WARNING LIGHTS MOUNTED ON PLASTIC DRUMS**

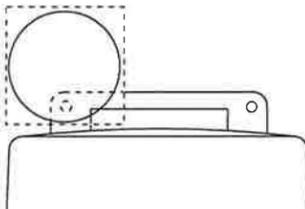
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
- Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

**WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS**

- A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
- The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
- The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.



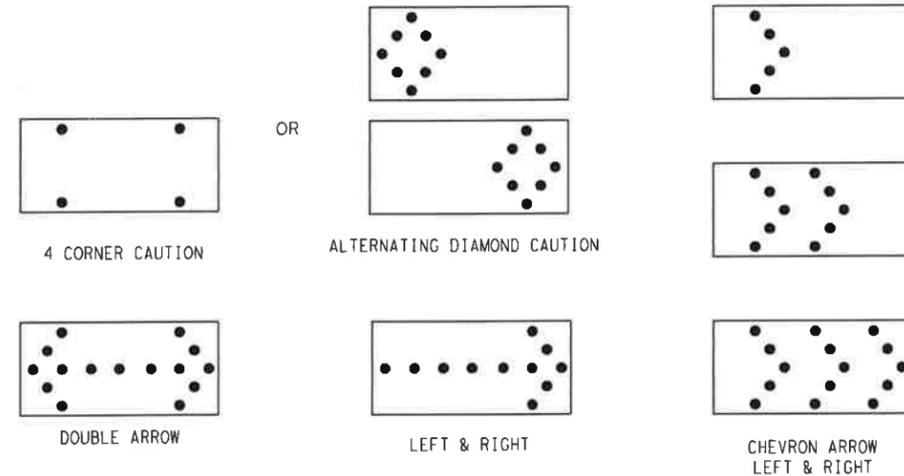
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

- The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
- Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
- The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
- The Flashing Arrow Board should be able to display the following symbols:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
- Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential Chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
- Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

**ATTENTION**  
Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

**FLASHING ARROW BOARDS**

SHEET 7 OF 12

**TRUCK-MOUNTED ATTENUATORS**

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
- The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.



**BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR**

**BC (7) - 14**

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**GENERAL NOTES**

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
- For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
- Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
- The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

**GENERAL DESIGN REQUIREMENTS**

Pre-qualified plastic drums shall meet the following requirements:

- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
- Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
- Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
- The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
- The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectORIZED space between any two adjacent stripes shall not exceed 2 inches in width.
- Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
- Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- Drum body shall have a maximum unballasted weight of 11 lbs.
- Drum and base shall be marked with manufacturer's name and model number.

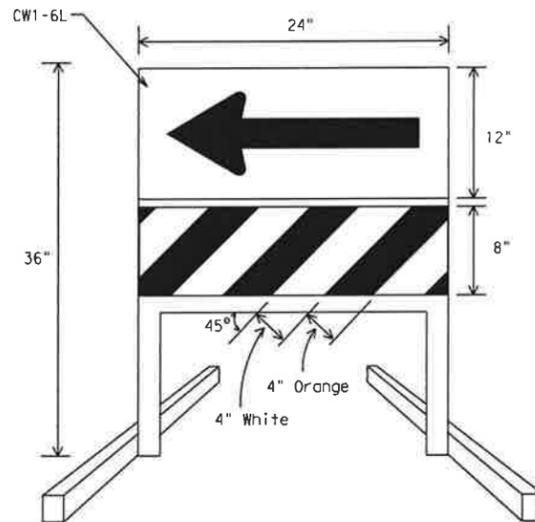
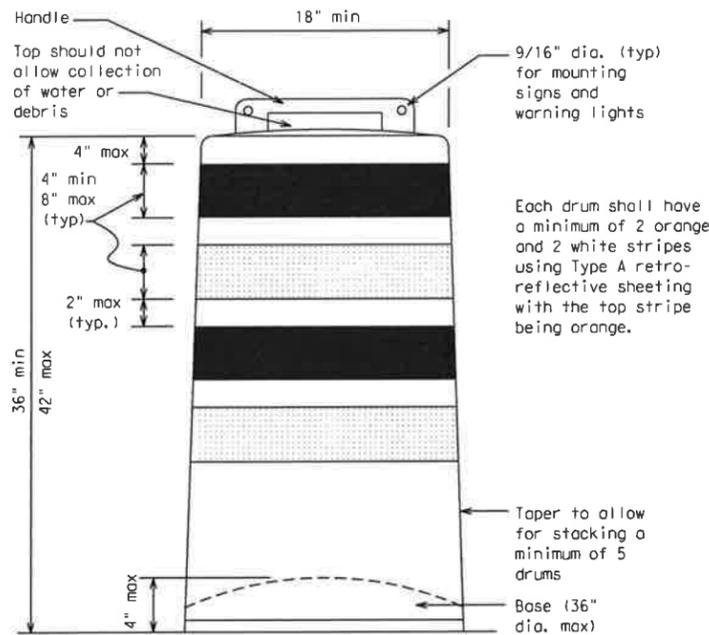
**RETROREFLECTIVE SHEETING**

- The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A reflective sheeting shall be supplied unless otherwise specified in the plans.
- The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

**BALLAST**

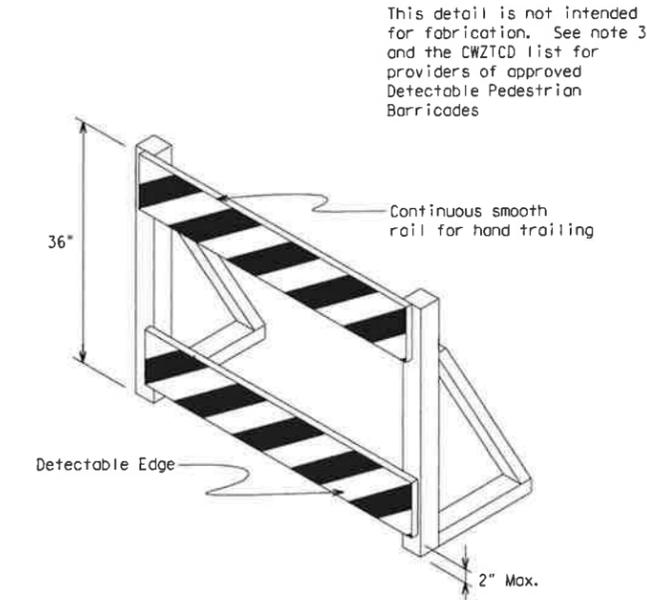
- Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
- Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
- Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
- The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
- When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
- Ballast shall not be placed on top of drums.
- Adhesives may be used to secure base of drums to pavement.

Williamson County, Texas



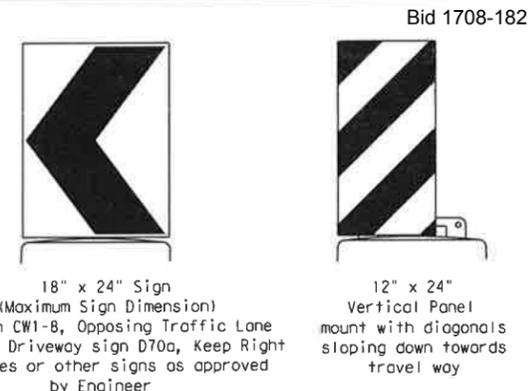
**DIRECTION INDICATOR BARRICADE**

- The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
- If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
- The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B<sub>FL</sub> or Type C<sub>FL</sub> Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
- Double arrows on the Direction Indicator Barricade will not be allowed.
- Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.



**DETECTABLE PEDESTRIAN BARRICADES**

- When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.
- Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
- Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
- Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" and should not be used as a control for pedestrian movements.
- Warning lights shall not be attached to detectable pedestrian barricades.
- Detectable pedestrian barricades may use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

**SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS**

- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- Chevrons and other work zone signs with an orange background shall be manufactured with Type B<sub>FL</sub> or Type C<sub>FL</sub> Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
- Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
- Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
- Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
- Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
- Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
- R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

SHEET 8 OF 12

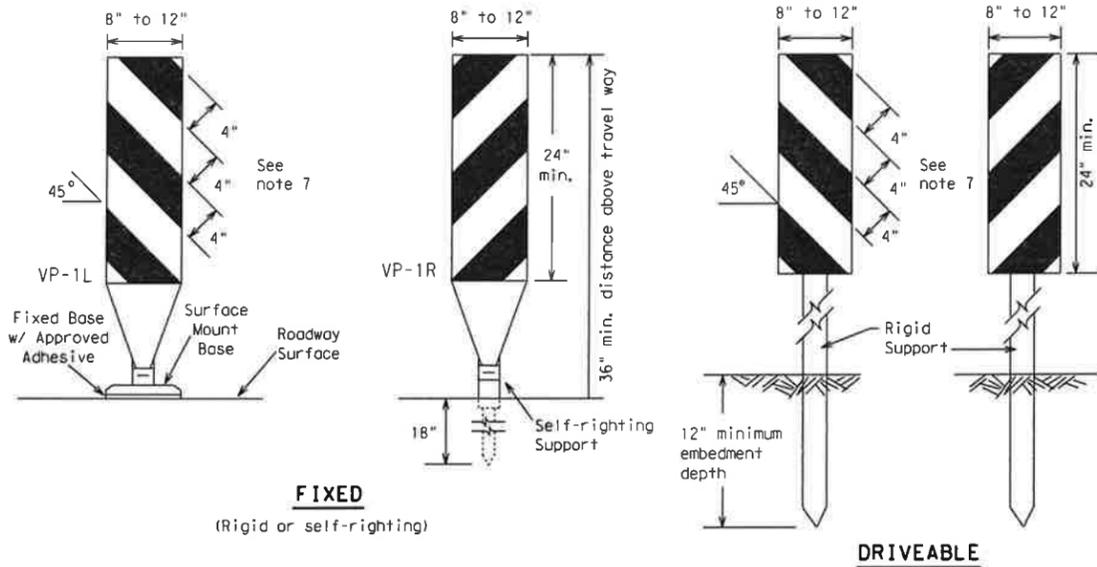
Texas Department of Transportation  
Traffic Operations Division Standard

**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (8) - 14**

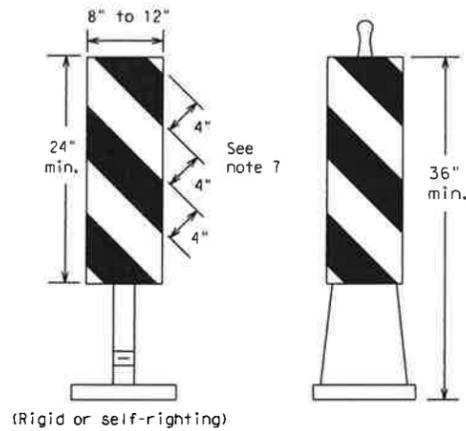
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**FIXED**  
(Rigid or self-righting)

**DRIVEABLE**

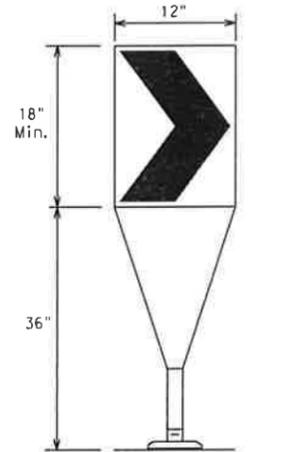


**PORTABLE**

**VERTICAL PANELS (VPs)**

- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of VP's for drop-offs.
- VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
- VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
- Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Sheeting for the VP's shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
- Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

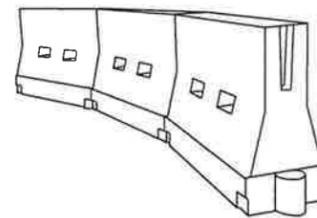
**Williamson County, Texas**



Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
- Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
- To be effective, the chevron should be visible for at least 500 feet.
- Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B<sub>FL</sub> or Type C<sub>FL</sub> conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- For Long Term Stationary use on tapers or transitions on freeways and divided highways self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

**CHEVRONS**



**LONGITUDINAL CHANNELIZING DEVICES (LCD)**

- LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10) placed near the top of the LCD along the full length of the device.

**WATER BALLASTED SYSTEMS USED AS BARRIERS**

- Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
- Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
- Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
- When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long cones and the top of the unit shall not be less than 32 inches in height.

**HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS**

**GENERAL NOTES**

- Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
- Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
- The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = WS <sup>2</sup> / 60	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

\*\*Taper lengths have been rounded off.  
L=Length of Taper (FT.) W=Width of Offset (FT.)  
S=Posted Speed (MPH)

**SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS**

SHEET 9 OF 12



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

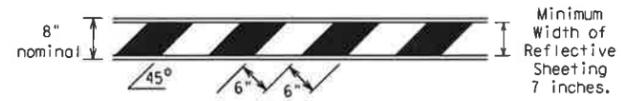
**BC (9) - 14**

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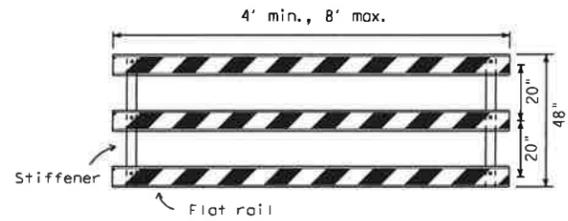
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



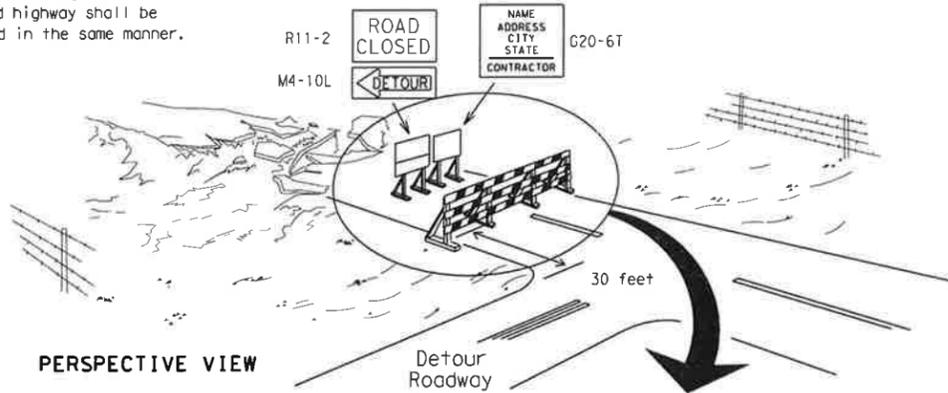
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

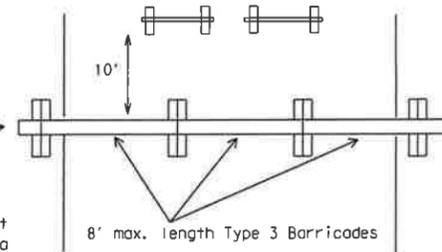
Each roadway of a divided highway shall be barricaded in the same manner.

Williamson County, Texas



PERSPECTIVE VIEW

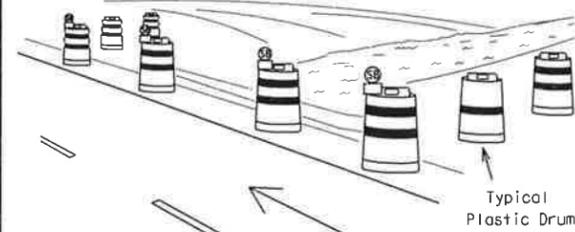
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



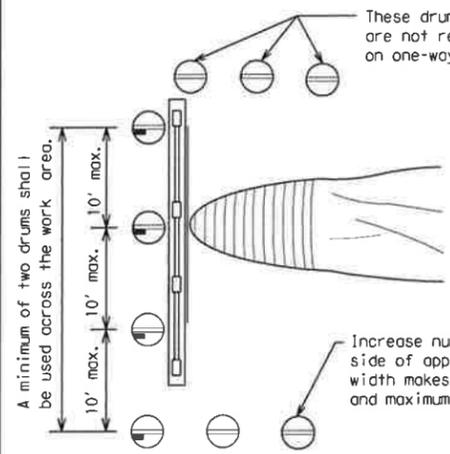
PLAN VIEW

1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

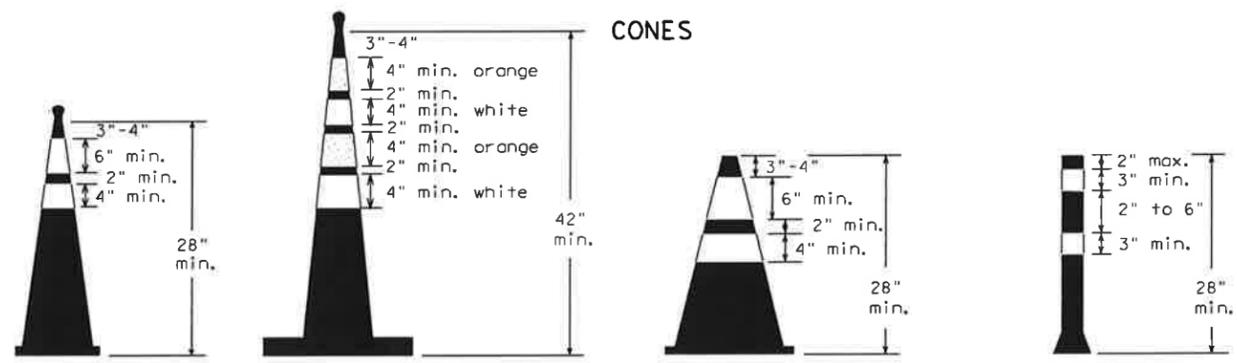


PLAN VIEW

1. Where positive redirection capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
	Steady burn warning light or yellow warning reflector

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



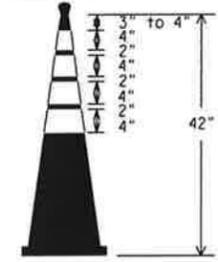
Two-Piece cones

One-Piece cones

Tubular Marker

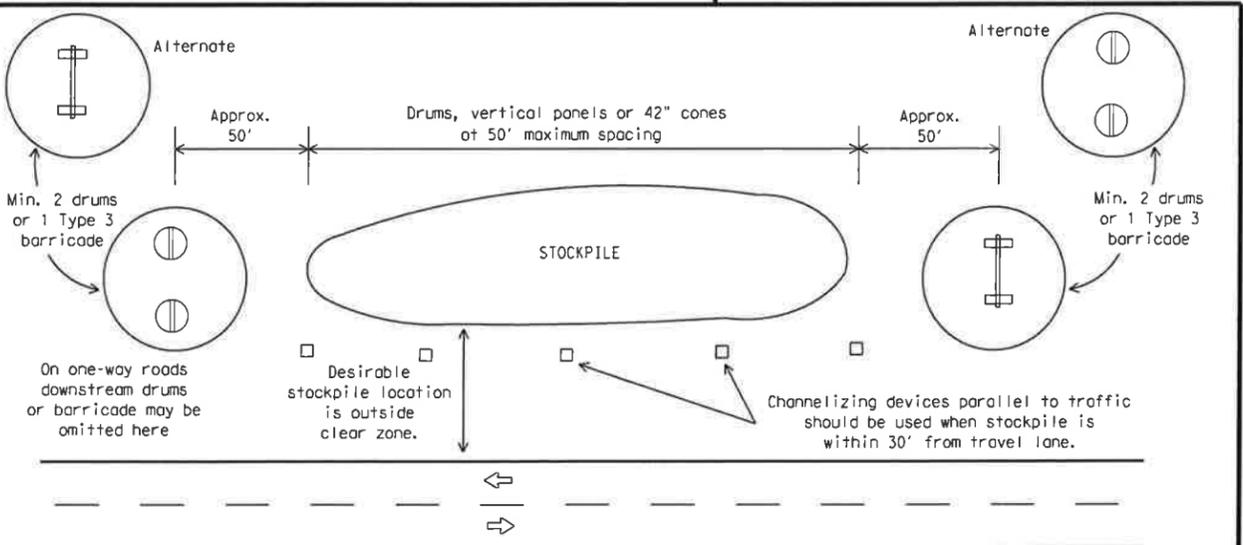
28" Cones shall have a minimum weight of 9 1/2 lbs.  
 42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



EDGE LINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or topers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers used at night shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.

SHEET 10 OF 12



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 14

FILE: bc-14.dgn	DWG: TxDOT	EKT: TxDOT	DW: TxDOT	EKH: TxDOT
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REVISIONS				
9-07	8-14			
7-13				
	DIST	COUNTY		SHEET NO.
				106

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 DATE: 8/10/2017 9:17 AM  
 FILE:

**WORK ZONE PAVEMENT MARKINGS**

**GENERAL**

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

**RAISED PAVEMENT MARKERS**

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

**PREFABRICATED PAVEMENT MARKINGS**

1. Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

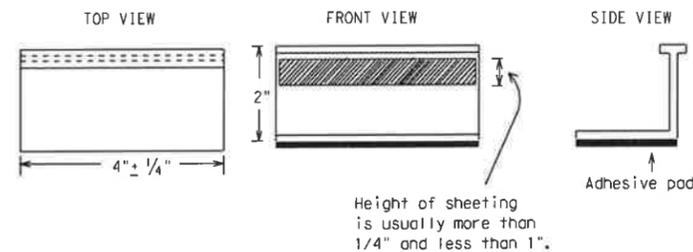
**MAINTAINING WORK ZONE PAVEMENT MARKINGS**

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

**REMOVAL OF PAVEMENT MARKINGS**

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-pointing of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

**Temporary Flexible-Reflective Roadway Marker Tabs**



**STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE**

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
  - A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
  - B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

**RAISED PAVEMENT MARKERS USED AS GUIDEMARKS**

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
  2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
  3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.
- Guidemarks shall be designated as:  
 YELLOW - (two amber reflective surfaces with yellow body).  
 WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

SHEET 11 OF 12



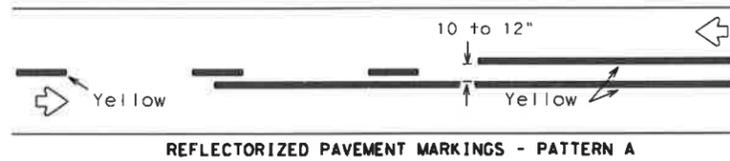
**BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS**

**BC(11)-14**

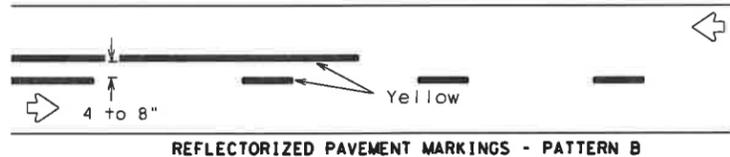
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DR: TxDOT	CR: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS				
2-98 9-07				
1-02 7-13				
11-02 8-14				
	DIST	COUNTY	SHEET NO. 107	

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**PAVEMENT MARKING PATTERNS**

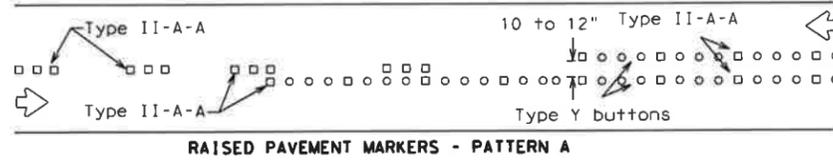


**REFLECTORIZED PAVEMENT MARKINGS - PATTERN A**

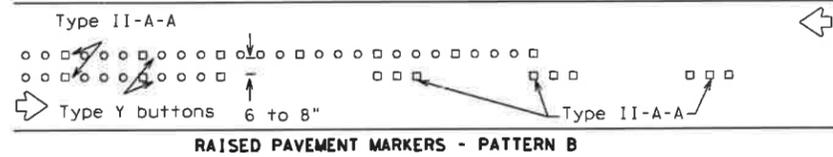


**REFLECTORIZED PAVEMENT MARKINGS - PATTERN B**

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectORIZED pavement markings.

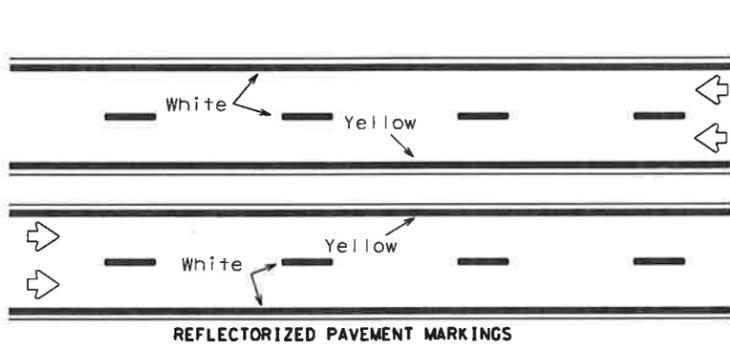


**RAISED PAVEMENT MARKERS - PATTERN A**



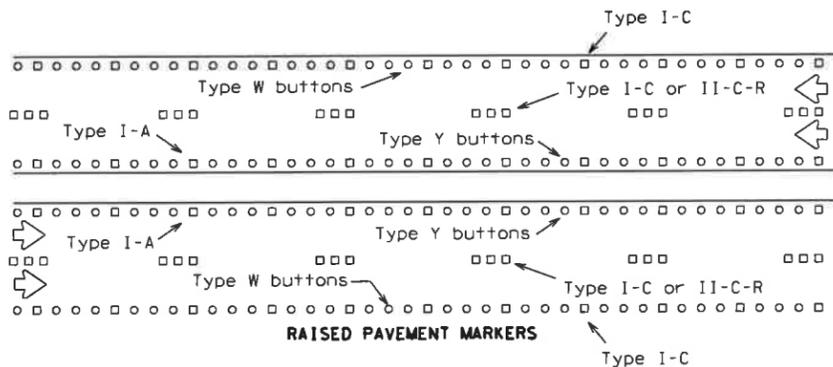
**RAISED PAVEMENT MARKERS - PATTERN B**

**CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS**



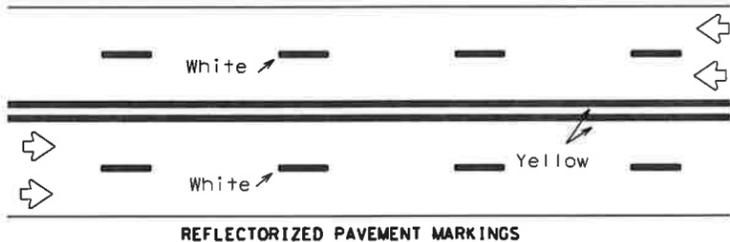
**REFLECTORIZED PAVEMENT MARKINGS**

Prefabricated markings may be substituted for reflectORIZED pavement markings.



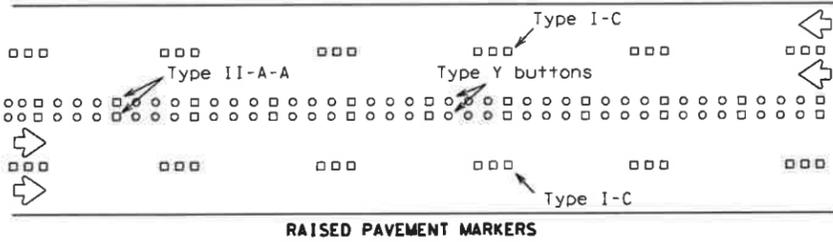
**RAISED PAVEMENT MARKERS**

**EDGE & LANE LINES FOR DIVIDED HIGHWAY**



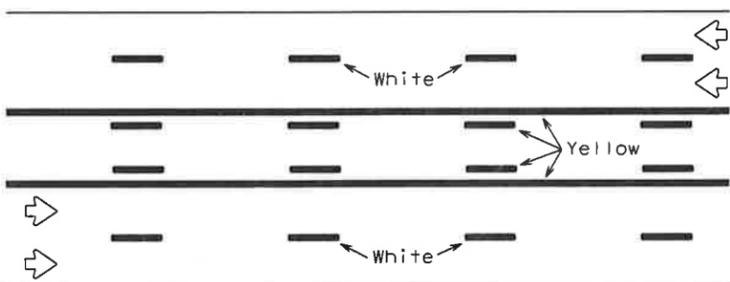
**REFLECTORIZED PAVEMENT MARKINGS**

Prefabricated markings may be substituted for reflectORIZED pavement markings.



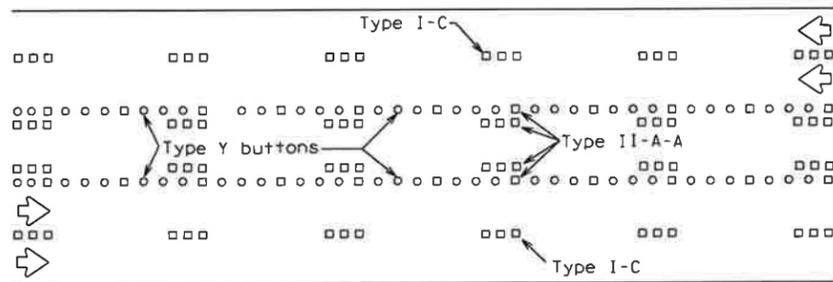
**RAISED PAVEMENT MARKERS**

**LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS**



**REFLECTORIZED PAVEMENT MARKINGS**

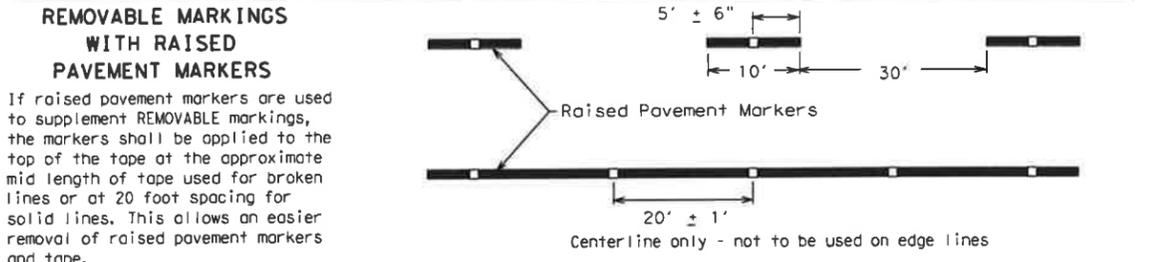
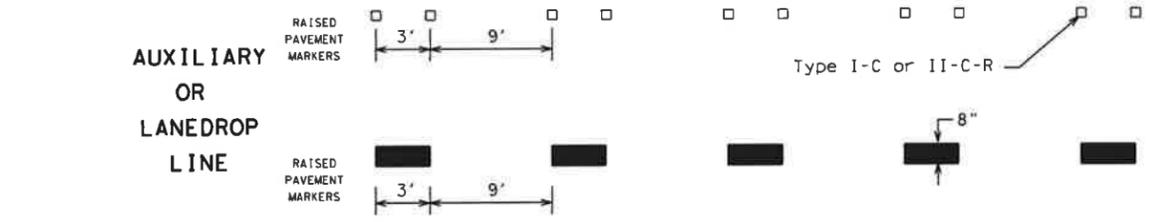
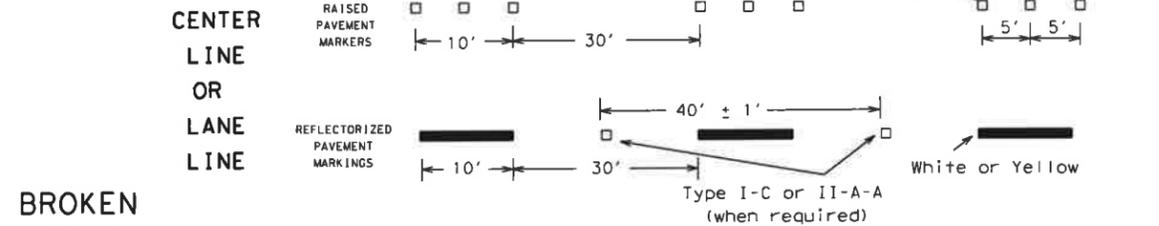
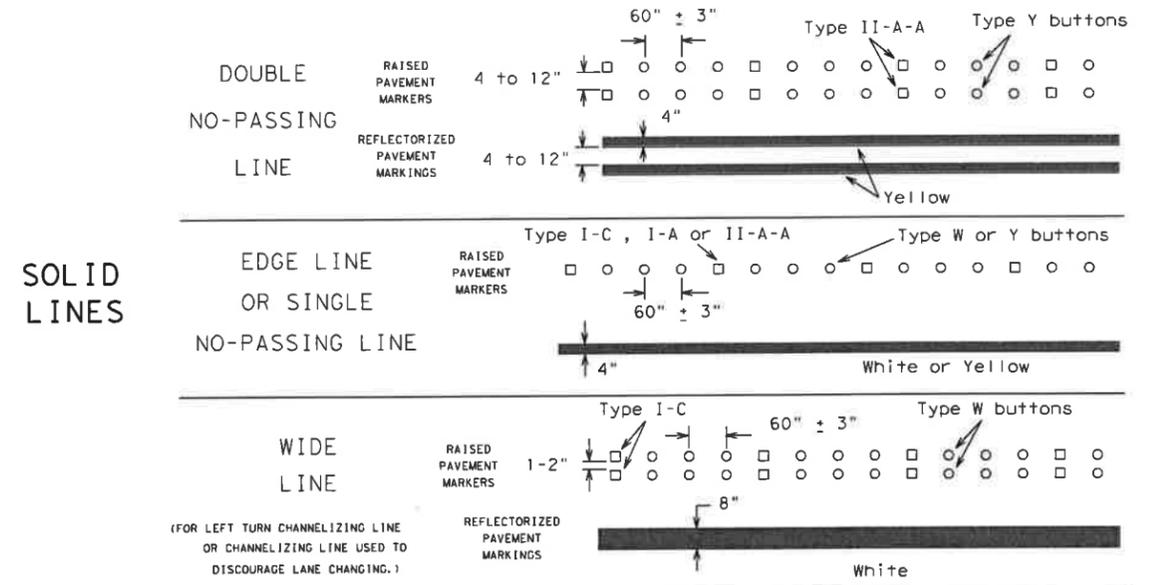
Prefabricated markings may be substituted for reflectORIZED pavement markings.



**RAISED PAVEMENT MARKERS**

**TWO-WAY LEFT TURN LANE**

**STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS**



SHEET 12 OF 12



**BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS**

**BC (12) - 14**

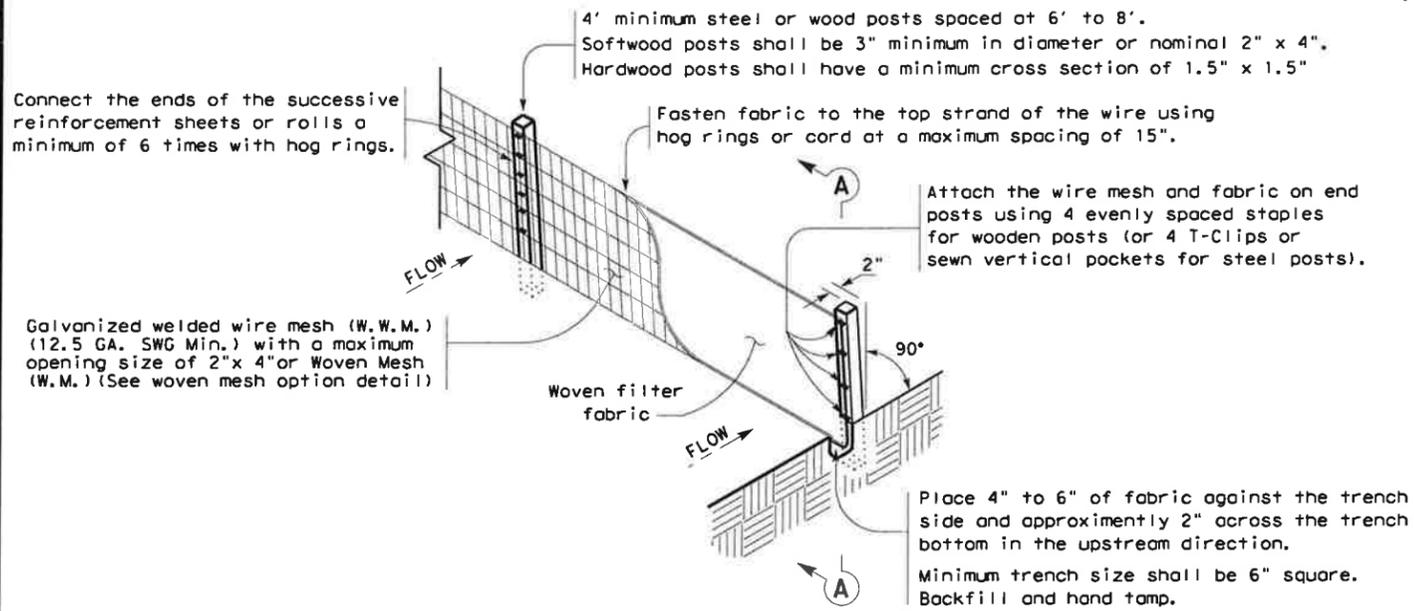
Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

FILE: bc-14.dgn	DW: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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2-98	7-13			
11-02	8-14			
	DIST	COUNTY	SHEET NO.	
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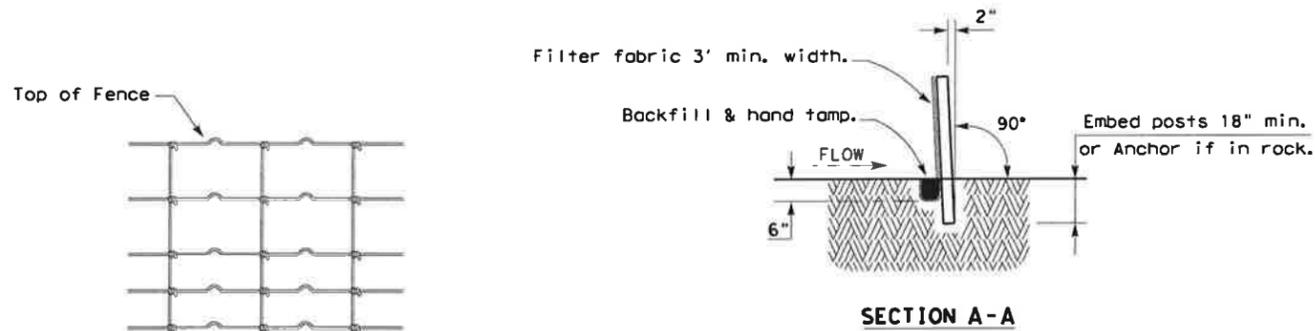


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**TEMPORARY SEDIMENT CONTROL FENCE**

SCF



**HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL**

Galvanized hinge joint knot woven mesh (12.5 GA. SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

**SEDIMENT CONTROL FENCE USAGE GUIDELINES**

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT<sup>2</sup>. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

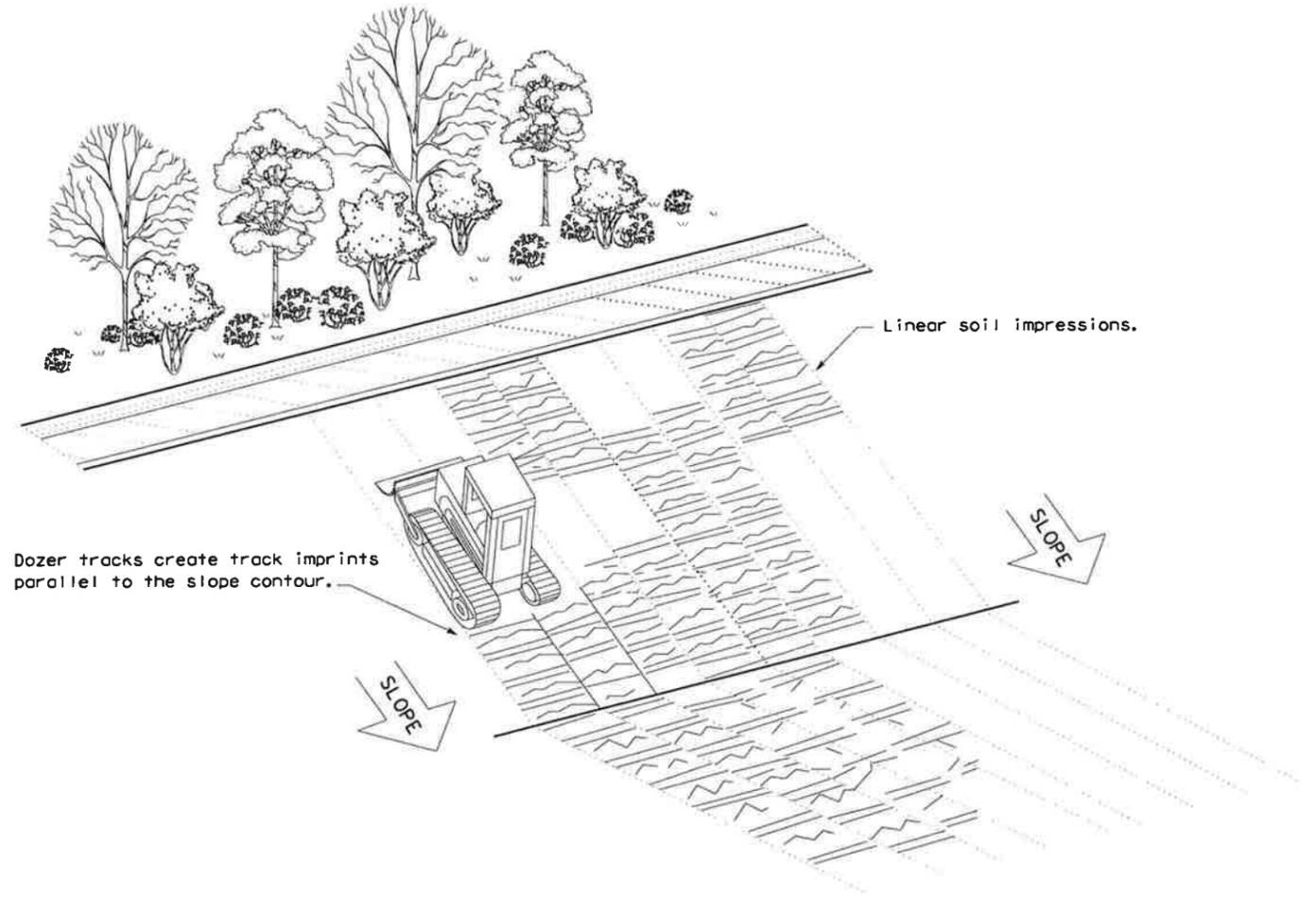
**LEGEND**

Sediment Control Fence

SCF

**GENERAL NOTES**

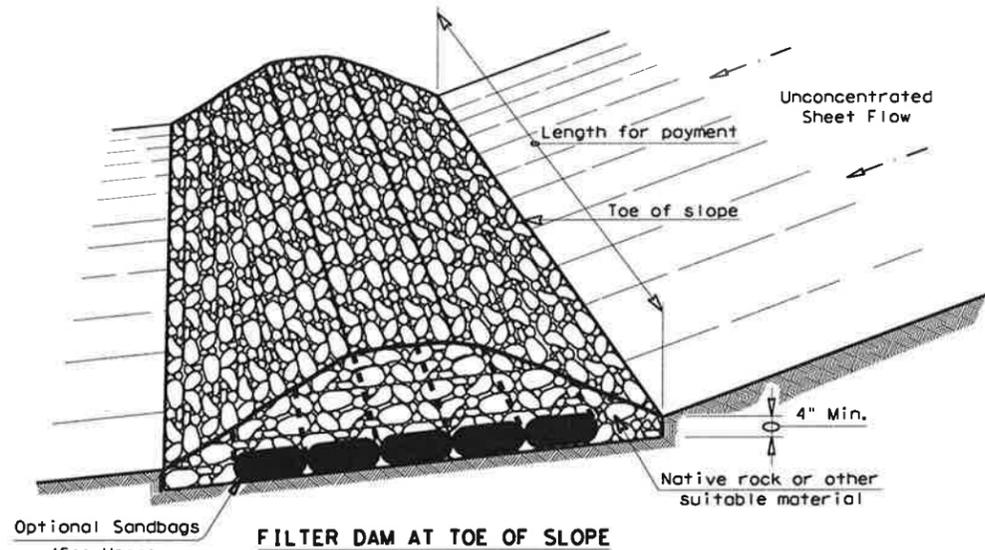
1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continuous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



**VERTICAL TRACKING**

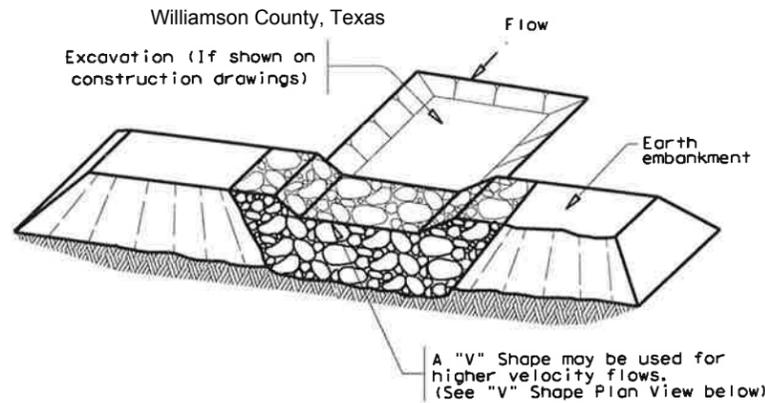
		Design Division Standard	
<b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE &amp; VERTICAL TRACKING EC(1)-16</b>			
FILE: ec116	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2016	CONT	SECT	JOB
REVISIONS		HIGHWAY	
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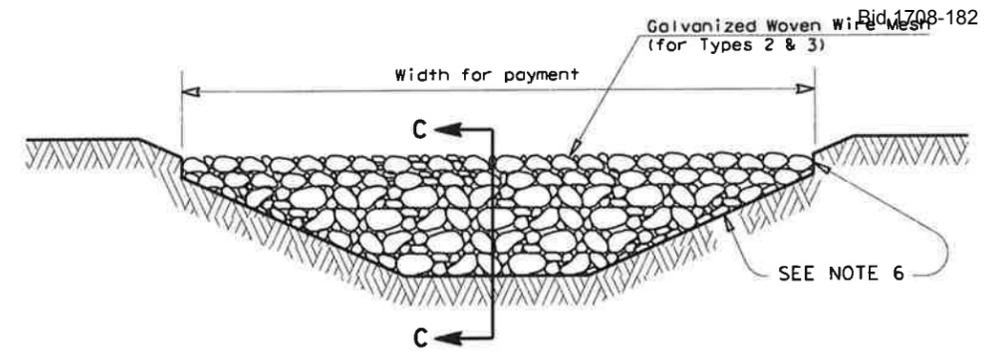
**FILTER DAM AT TOE OF SLOPE**

RFD1



**FILTER DAM AT SEDIMENT TRAP**

RFD1 OR RFD2

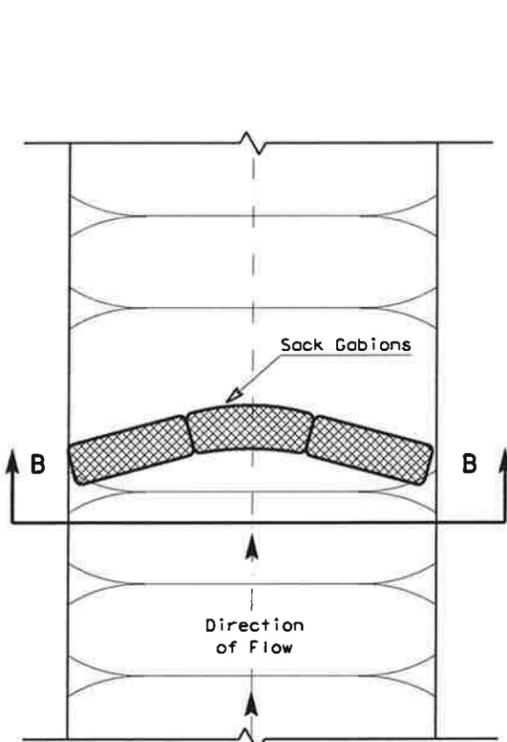


**FILTER DAM AT CHANNEL SECTIONS**

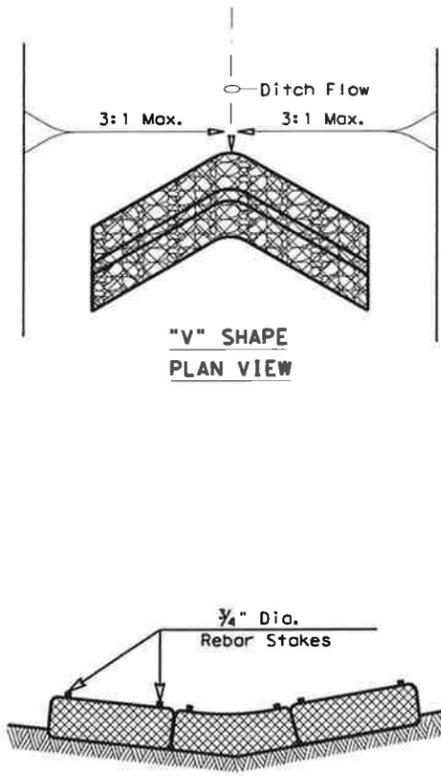
RFD1 OR RFD2 OR RFD3

**GENERAL NOTES**

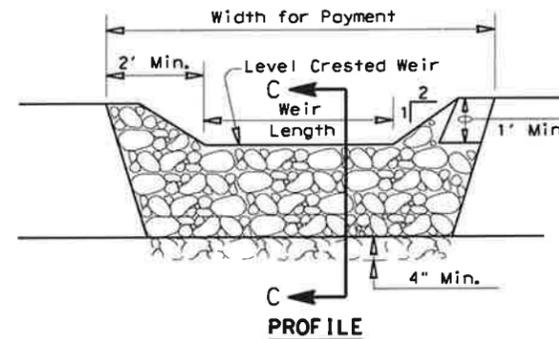
1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with 3/4" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 1/2" x 3 1/4".
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.



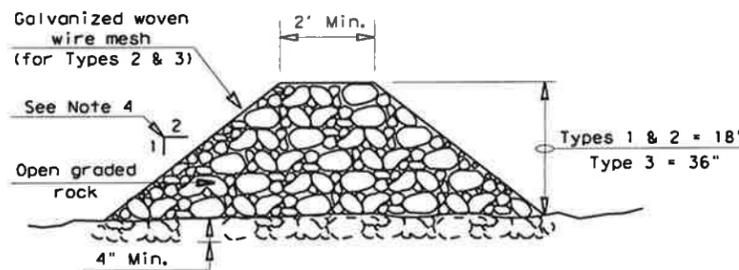
**PLAN VIEW**



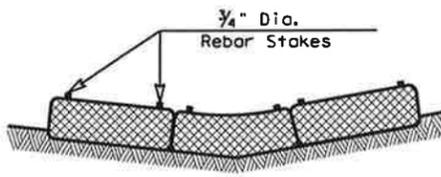
**"V" SHAPE PLAN VIEW**



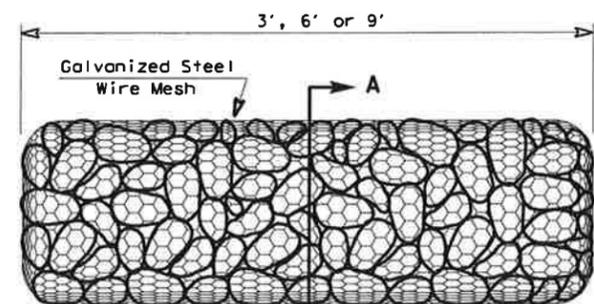
**PROFILE**



**SECTION C-C**

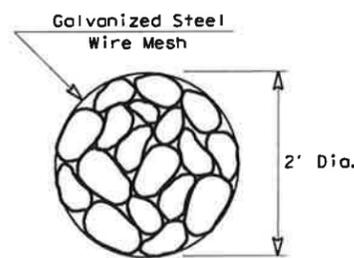


**SECTION B-B**



**TYPE 4 (SACK GABIONS)**

RFD4



**SECTION A-A**

**ROCK FILTER DAM USAGE GUIDELINES**

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT<sup>2</sup> of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

**Type 1 (18" high with no wire mesh) (3" to 6" aggregate):** Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximately 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

**Type 2 (18" high with wire mesh) (3" to 6" aggregate):** Type 2 may be used in ditches and at dike or swale outlets.

**Type 3 (36" high with wire mesh) (4" to 8" aggregate):** Type 3 may be used in stream flow and should be secured to the stream bed.

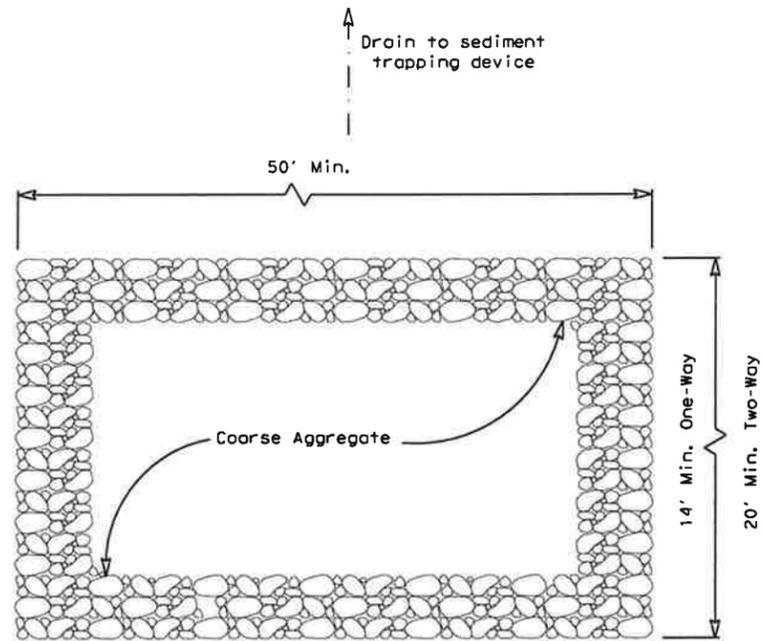
**Type 4 (Sack gabions) (3" to 6" aggregate):** Type 4 May be used in ditches and smaller channels to form an erosion control dam.

**Type 5:** Provide rock filter dams as shown on plans.

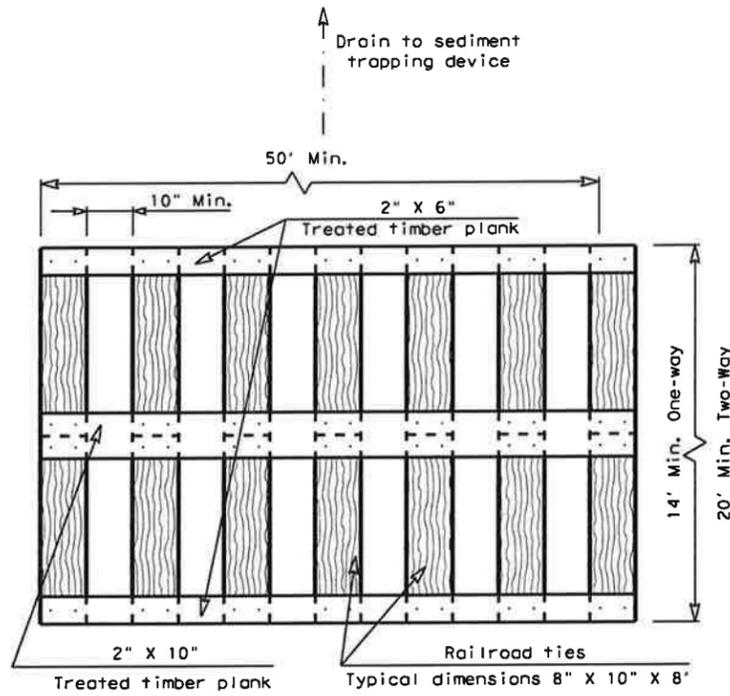
**PLAN SHEET LEGEND**

- Type 1 Rock Filter Dam — RFD1
- Type 2 Rock Filter Dam — RFD2
- Type 3 Rock Filter Dam — RFD3
- Type 4 Rock Filter Dam — RFD4

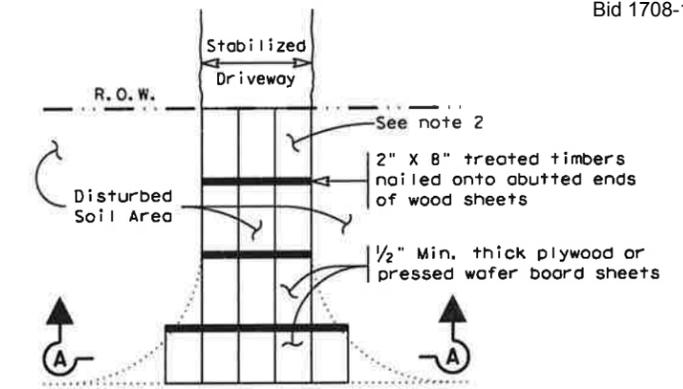
		Design Division Standard	
<b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</b> <b>ROCK FILTER DAMS</b> <b>EC(2)-16</b>			
FILE: ec216	DW: TxDOT	CK: KM	DW: VP
CONT: JULY 2016	SECT:	JOB:	HIGHWAY:
REVISIONS		DIST:	COUNTY:
		SHEET NO. 111	



PLAN VIEW

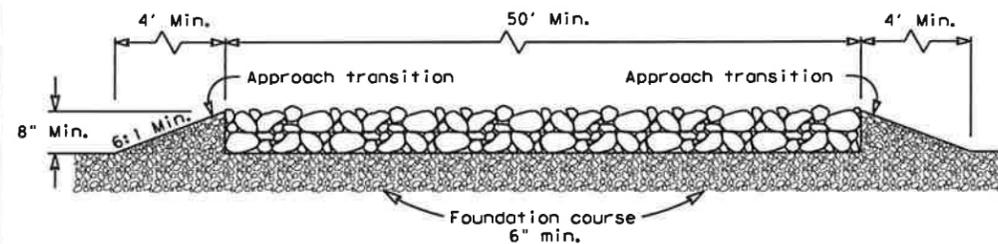


PLAN VIEW



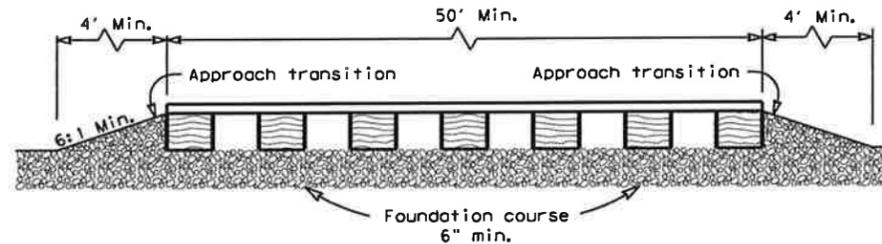
Paved Roadway

PLAN VIEW



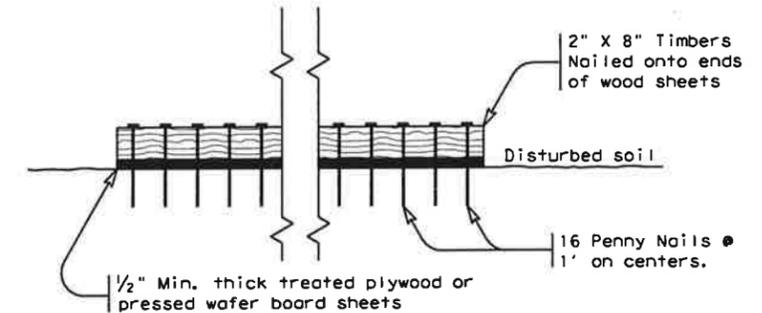
ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)  
ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)  
TIMBER CONSTRUCTION (LONG TERM)



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)  
SHORT TERM

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materials approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with 1/2"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

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DATE: \$DATE\$  
FILE: \$FILES

		Design Division Standard	
<h3>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</h3> <h3>CONSTRUCTION EXITS</h3> <h3>EC(3)-16</h3>			
FILE: ec316	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2016	CONT: SCS	SECT: SSS	JOB: SHWYS
REVISIONS	SDST	COUNTY: SCTYS	SHEET NO. SEC 3A216

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. WILLIAMSON COUNTY

2. [X] No Action Required [ ] Required Action

Action No.

- 1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

- [X] No Permit Required
[ ] Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
[ ] Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
[ ] Individual 404 Permit Required
[ ] Other Nationwide Permit Required: NWP\*

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

- 1.
2.
3.
4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Table with 3 columns: Erosion, Sedimentation, Post-Construction TSS. Lists various practices like Temporary Vegetation, Silt Fence, Vegetative Filter Strips, etc.

III. CULTURAL RESOURCES Williamson County, Texas

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

[X] No Action Required [ ] Required Action

Action No.

- 1.
2.
3.
4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

[X] No Action Required [ ] Required Action

Action No.

- 1.
2.
3.
4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

[X] No Action Required [ ] Required Action

Action No.

- 1.
2.
3.
4.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

Table listing abbreviations: BMP: Best Management Practice, CGP: Construction General Permit, DSHS: Texas Department of State Health Services, FHWA: Federal Highway Administration, MOA: Memorandum of Agreement, MOU: Memorandum of Understanding, MS4: Municipal Separate Stormwater Sewer System, MBTA: Migratory Bird Treaty Act, NOT: Notice of Termination, NWP: Nationwide Permit, NOI: Notice of Intent, SPCC: Spill Prevention Control and Countermeasure, SW3P: Storm Water Pollution Prevention Plan, PCN: Pre-Construction Notification, PSL: Project Specific Location, TCEQ: Texas Commission on Environmental Quality, TPDES: Texas Pollutant Discharge Elimination System, TPWD: Texas Parks and Wildlife Department, TxDOT: Texas Department of Transportation, T&E: Threatened and Endangered Species, USACE: U.S. Army Corps of Engineers, USFWS: U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used. Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act. Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

- Dead or distressed vegetation (not identified as normal)
Trash piles, drums, canister, barrels, etc.
Undesirable smells or odors
Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

[ ] Yes [X] No

If "No", then no further action is required.

If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

[ ] Yes [ ] No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the details for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

[X] No Action Required [ ] Required Action

Action No.

- 1.
2.
3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

[X] No Action Required [ ] Required Action

Action No.

- 1.
2.
3.

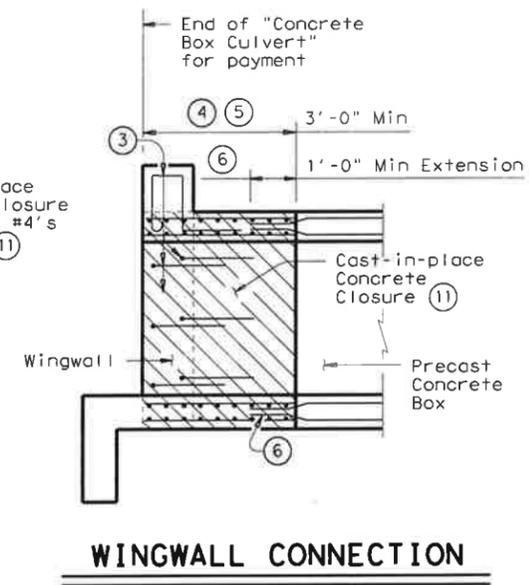
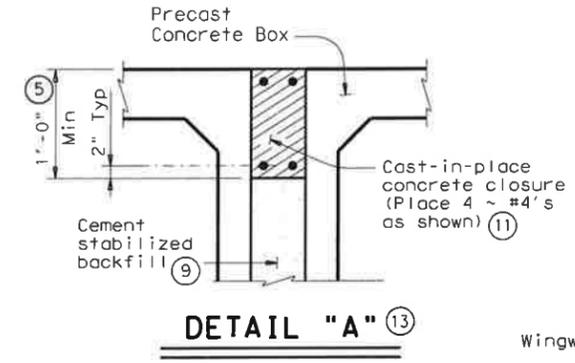
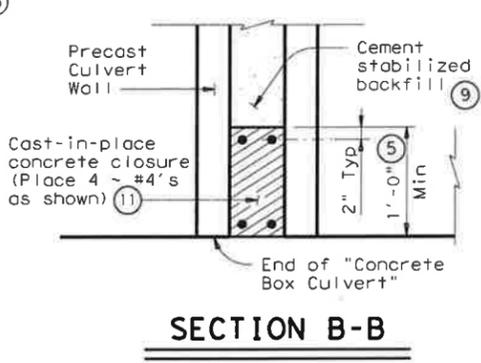
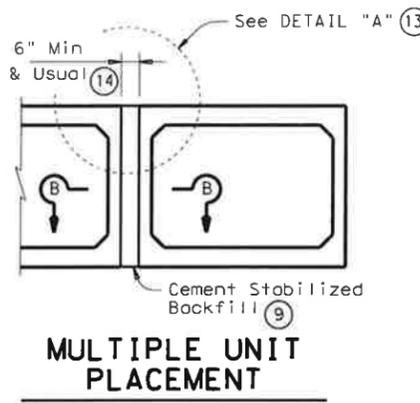


ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

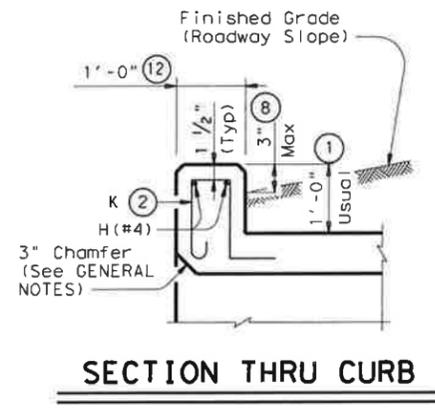
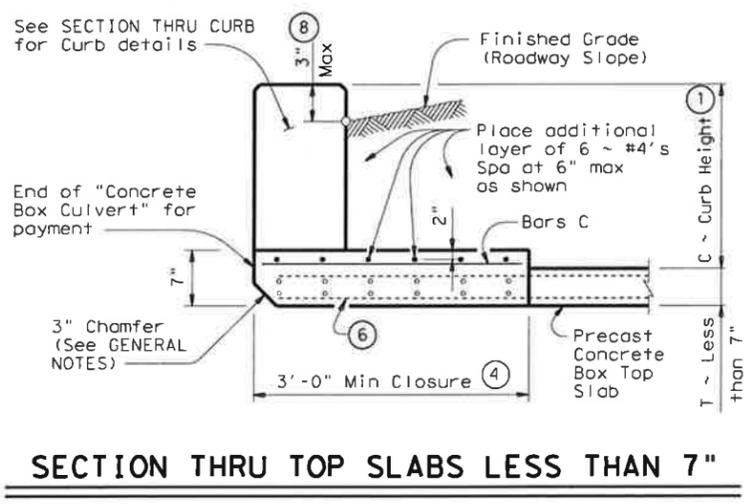
EPIC

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- ① 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 traffic rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.
- ② For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
- ③ Curb, Wingwall or Safety End Treatment reinforcing shall extend into concrete closure. Any reinforcing that does not fit into the closure shall be bent or trimmed as necessary.
- ④ Cast-in-place concrete closure shall be 3'-0" min. Boxes shall be cast short or broken back in the field. All reinforcing in the closure shall be the same size and spacing as in the precast box section. Except where shown otherwise, the cast-in-place closure shall be flush with the inside and outside faces of the precast box section.
- ⑤ For multiple unit placements the length of the closure for the interior walls may be adjusted as necessary. The length of the top slab, bottom slab, and exterior wall closure shall not be less than 3'-0". See Section B-B detail when interior walls are cast full length.
- ⑥ Precast box reinforcing shall extend a minimum of 1'-0" into concrete closure (Typ).
- ⑦ Bands of reinforcing matching the inside and outside face reinforcing shall be placed in the gaps of the top and bottom slabs. A band matching the outside face reinforcing of the wall shall be placed in the gaps of the walls (placed in the outside face only). The bands shall be tack welded to the exposed reinforcing at each point of contact.
- ⑧ For vehicle safety, the following requirements must be met:
  - For structures without bridge rail, curbs shall project no more than 3" above finished grade.
  - For structures with bridge rail, curbs shall be flush with finished grade.
 Curb heights shall be reduced, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- ⑨ Cement Stabilized Backfill between boxes is considered part of the Box Culvert for payment.
- ⑩ All curb concrete and reinforcing is considered part of the Box Culvert for payment.
- ⑪ Any additional concrete and reinforcing required for the closures shall be considered as subsidiary to the Concrete Box Culvert.
- ⑫ 1'-0" typical. 2'-0" when RAC standard is referred to elsewhere in the plans.
- ⑬ For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in DETAIL "A".
- ⑭ This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

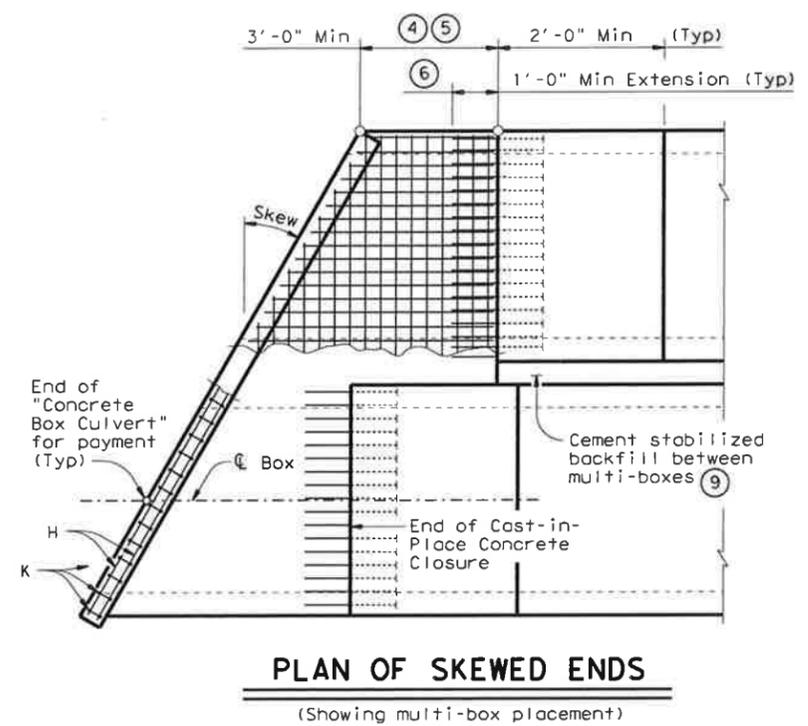
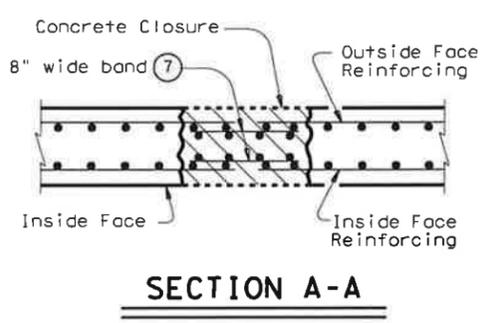
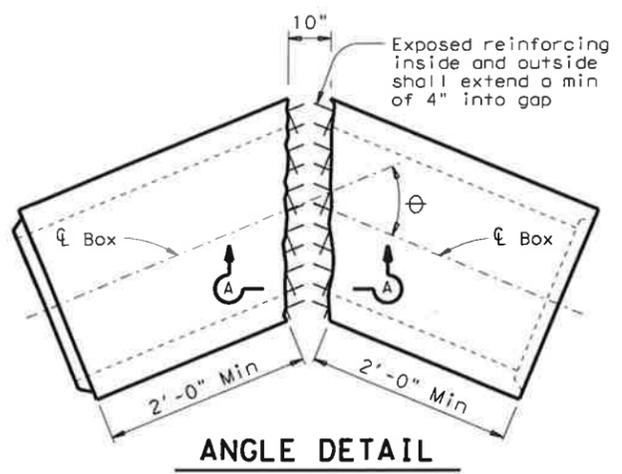


⑩ QUANTITIES PER FOOT OF CURB

Reinforcing Steel	4.18 Lb
Concrete	0.037 CY

**BARS C** ~ #4  
(Spa = 1'-0" Max)

**BARS K** ~ #4  
(Spa = 1'-0" Max)  
(Length = 4'-3")



**GENERAL NOTES:**  
 Designed according to AASHTO LRFD Specifications.  
 All closure concrete shall be Class "C" with a minimum compressive strength of 3600 psi and shall be placed according to the Item, "Concrete Substructures".  
 Any additional concrete required for the closures shall be considered as subsidiary to the Concrete Box Culvert.  
 Refer to the Single Box Culverts Precast standard for details not shown.  
 The bottom edge of the top slab closure shall be chamfered 3 inches at the entrance.

**HL93 LOADING**

**Texas Department of Transportation**  
 Bridge Division Standard

**BOX CULVERTS  
 PRECAST  
 MISCELLANEOUS DETAILS**

**SCP-MD**

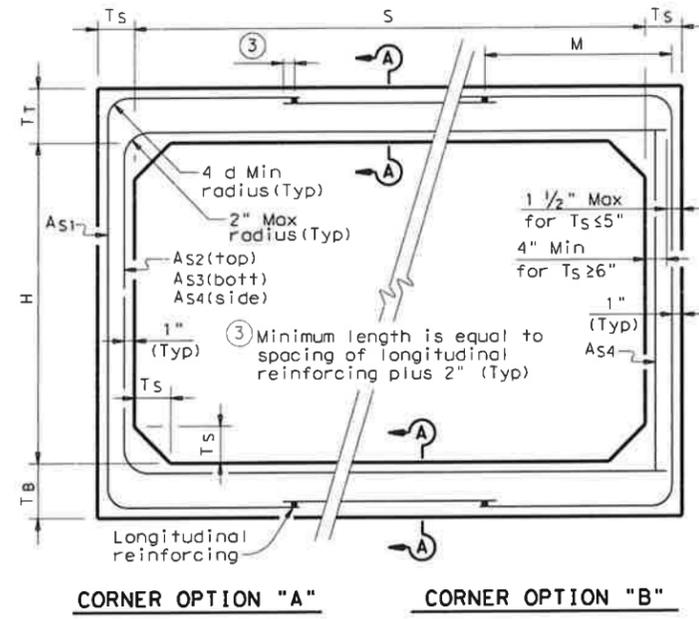
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DATE	February 2010	CONT	SPEC	JOB	HIGHWAY
REV					
DIST		COUNTY		SHEET NO.	114

p. 214

**BOX DATA**

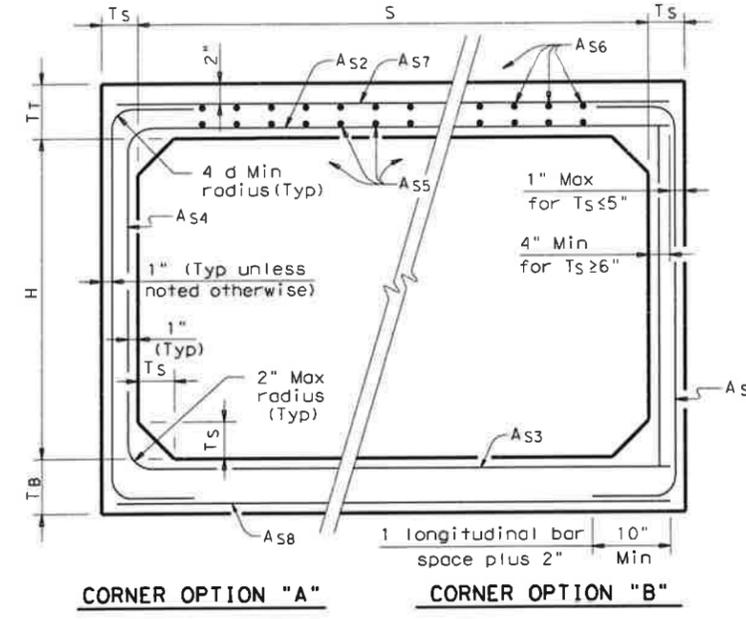
SECTION DIMENSIONS					Fill Height (ft)	M (Min) (in)	REINFORCING (in <sup>2</sup> /ft) ②								Lift Weight (Tons) ①
S (ft)	H (ft)	T <sub>T</sub> (in)	T <sub>B</sub> (in)	T <sub>S</sub> (in)			A <sub>S1</sub>	A <sub>S2</sub>	A <sub>S3</sub>	A <sub>S4</sub>	A <sub>S5</sub>	A <sub>S6</sub>	A <sub>S7</sub>	A <sub>S8</sub>	
6	3	8	7	7	<2	-	0.20	0.31	0.22	0.17	0.19	0.19	0.19	0.17	7.9
6	3	7	7	7	2<3	43	0.21	0.24	0.19	0.17	-	-	-	-	7.5
6	3	7	7	7	3-5	39	0.17	0.18	0.17	0.17	-	-	-	-	7.5
6	3	7	7	7	10	39	0.17	0.18	0.19	0.17	-	-	-	-	7.5
6	3	7	7	7	15	38	0.22	0.24	0.24	0.17	-	-	-	-	7.5
6	3	7	7	7	20	38	0.28	0.31	0.31	0.17	-	-	-	-	7.5
6	3	7	7	7	25	38	0.35	0.38	0.39	0.17	-	-	-	-	7.5
6	3	7	7	7	30	38	0.42	0.46	0.46	0.17	-	-	-	-	7.5
6	4	8	7	7	<2	-	0.19	0.34	0.25	0.17	0.19	0.19	0.19	0.17	8.6
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6	5	7	7	7	15	38	0.17	0.28	0.29	0.17	-	-	-	-	8.9
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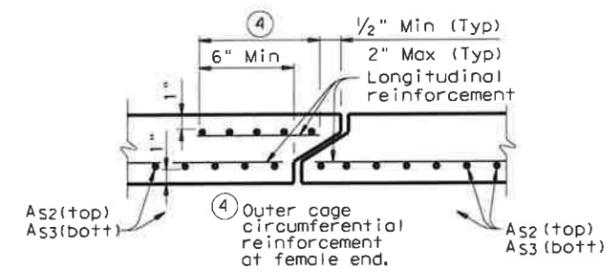
**CORNER OPTION "A"      CORNER OPTION "B"**

**FILL HEIGHT 2 FT AND GREATER**



**CORNER OPTION "A"      CORNER OPTION "B"**

**FILL HEIGHT LESS THAN 2 FT**



**SECTION A-A**  
(TOP AND BOTTOM SLAB JOINT REINFORCEMENT)

**GENERAL NOTES:**  
 Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.  
 All concrete shall be Class "H" Concrete with a minimum compressive strength of 5,000 psi.  
 See SCP-MD standard sheet for miscellaneous 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. Shop plans for alternate designs shall be submitted in accordance with Item "Precast Concrete Structural Members (Fabrication)".

① For Box Length = 8'-0"  
 ② As<sub>1</sub> thru As<sub>4</sub>, As<sub>7</sub> and As<sub>8</sub> are minimum required areas of reinforcement per linear foot of box length. As<sub>6</sub> and As<sub>5</sub> are minimum required areas of reinforcement per linear foot of box width.

**HL93 LOADING**

**Texas Department of Transportation**  
 Bridge Division Standard

**SINGLE BOX CULVERTS  
 PRECAST  
 6'-0" SPAN**

**SCP-6**

FILE	SCP06sts.dwg	DRW	GAF	CR	LMW	DN	BWH/TxDOT	CK	GAF
DATE	February 2010	CONTR	SCCT	JOB	HIGHWAY				
REVISIONS									
DIST	COUNTY		SHEET NO						
			<b>115</b>						



**TABLE OF DIMENSIONS & REINFORCING STEEL**  
(Wings for One Structure End)

Maximum Wingwall Height Hw	Dimensions				Variable Reinforcing				Estimated Quantities per ft of wing (2-Wings)		Estimated Quantities per ft of Toewall (1-Toewall)	
	W	X	Y	Z	Bars J1	Bars J2	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

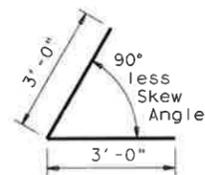
**TABLE OF WINGWALL REINFORCING (2-Wings)**

Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

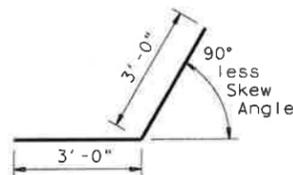
**TABLE OF TOEWALL REINFORCING**

Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"

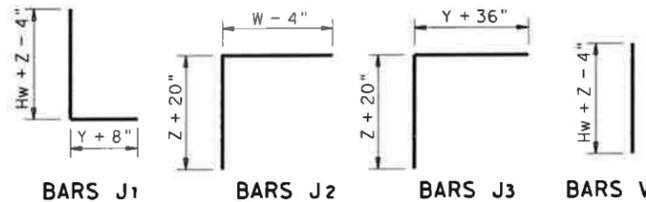
Williamson County, Texas



**BARS D1**



**BARS D2**



**BARS J1**

**BARS J2**

**BARS J3**

**BARS V**

**WING DIMENSION CALCULATIONS:**

Formulas: (All values are in Feet)

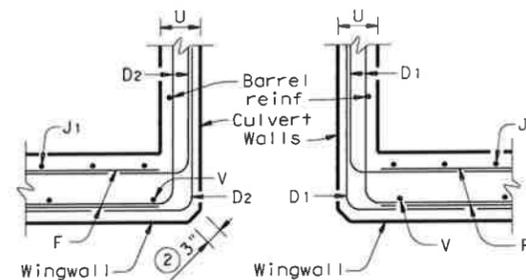
$H_w = H + T + C$   
 $L_w = (H_w) (SL) \div \text{Cosine } \theta$  for Ty PW-1  
 $= (H_w - 1') (SL) \div \text{Cosine } \theta$  for Ty PW-2 and  $H_w \geq 4'$   
 $= (H_w - 0.5') (SL) \div \text{Cosine } \theta$  for Ty PW-2 and  $H_w < 4'$

For Cast-in-place culverts:  
 $L_{tw} = [(N) (S) + (N + 1) (U)] \div \text{Cosine } \theta$

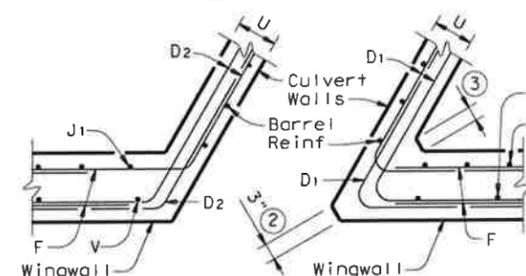
For Precast culverts:  
 $L_{tw} = [(N) (2U + S) + (N - 1) (0.5')] \div \text{Cosine } \theta$   
 Total Wingwall Area (Two Wings ~ SF)  
 $= (2) (H_w) (L_w)$  for Ty PW-1  
 $= (2) (H_w) (L_w) - 6 \text{ SF}$  for Ty PW-2 and  $H_w \geq 4'$   
 $= (2) (H_w) (L_w) - 1.5 \text{ SF}$  for Ty PW-2 and  $H_w < 4'$

$H_w$  = Height of Wingwall  
 $L_w$  = Length of Wingwall  
 $L_{tw}$  = Culvert Toewall Length  
 $N$  = Number of Culvert Spans  
 $SL:1$  = Channel Slope ratio. (Horizontal: 1 Vertical, Usual value is 2:1)  
 $\theta$  = Culvert Skew

See applicable box culvert standard for S, H, T and U values.



**SECTION C-C**



**SECTION C-C**

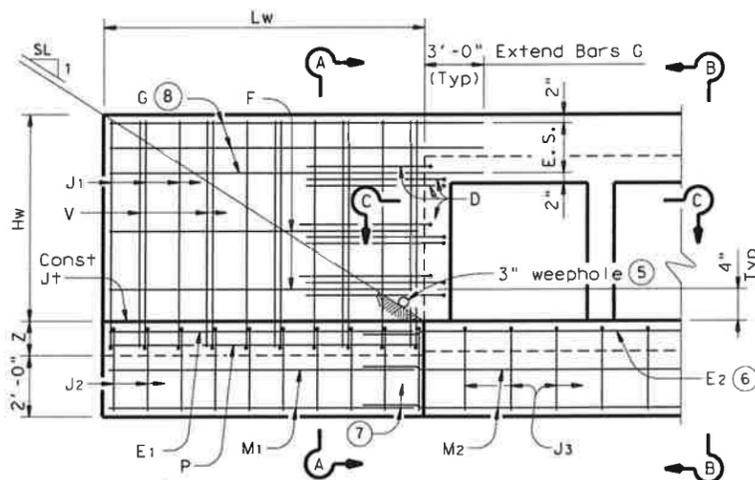
- Skew Angle = 0°
- At discharge end, chamfer may be 3/4".
- For 15° Skew ~ 1"  
For 30° Skew ~ 2"  
For 45° Skew ~ 3"
- Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by  $L_w$ . Quantities shown do not include weight of Bars D.
- Provide weepholes for  $H_w = 5'-0"$  and greater. Fill around weepholes with coarse gravel.
- Extend Bars E2 1'-6" minimum into the wingwall footing.
- Lap Bars M1 1'-6" minimum with Bars M2.
- Bars G equally spaced at 8" maximum, place as shown. Provide at least two pair Bars G per wing.
- 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.
- For vehicle safety, the following requirements must be met:  
 - For structures without bridge rail, curbs cannot project more than 3" above finished grade.  
 - For structures with bridge rail, build 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.
- 1'-0" typical. 2'-0" typical when RAC standard is referenced elsewhere in the plans.
- 3'-0" for  $H_w < 4'$ .
- 6" for  $H_w < 4'$ .

**GENERAL NOTES:**

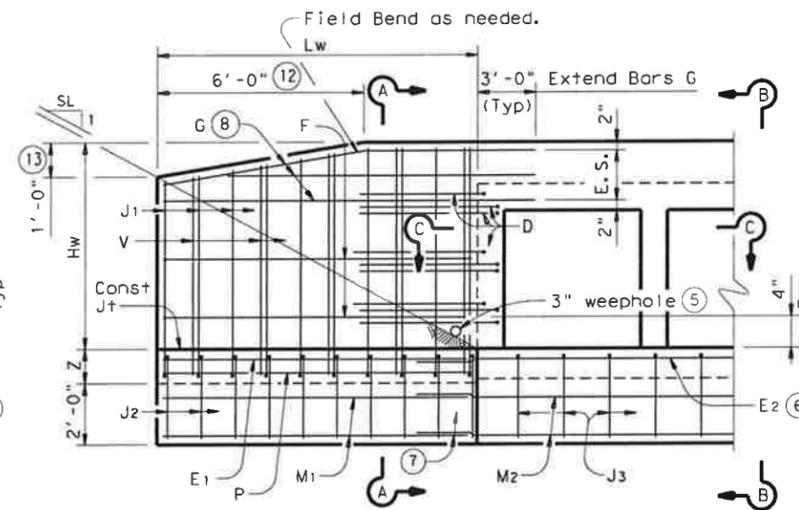
Designed in accordance with AASHTO LRFD Bridge Design Specifications.  
 Provide Class "C" Concrete ( $f'c = 3,600 \text{ psi Min}$ ) and Grade 60 reinforcing steel.  
 Provide 1/4" Min clear cover to reinforcing steel.  
 Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.  
 See BCS sheet for wingwall type and additional dimensions and information.  
 The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

**DESIGNER NOTES:**

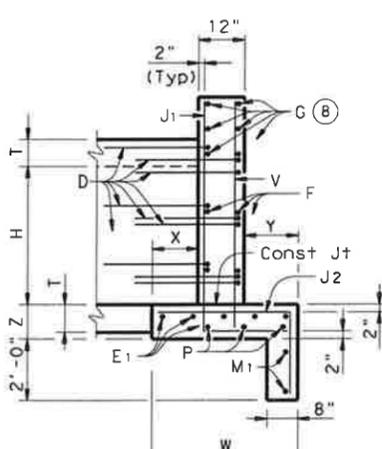
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.  
 Type PW-2 can only be used for applications without a railing mounted to the wingwall.



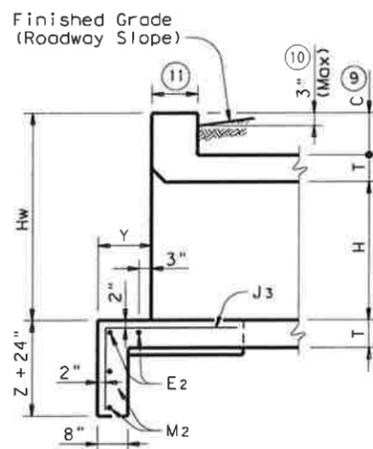
**PARTIAL ELEVATION - PW-1**



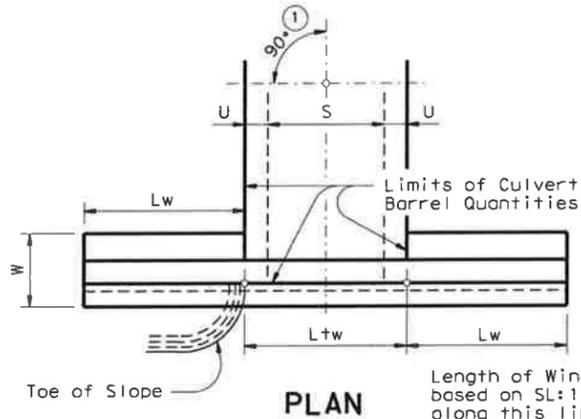
**PARTIAL ELEVATION - PW-2**



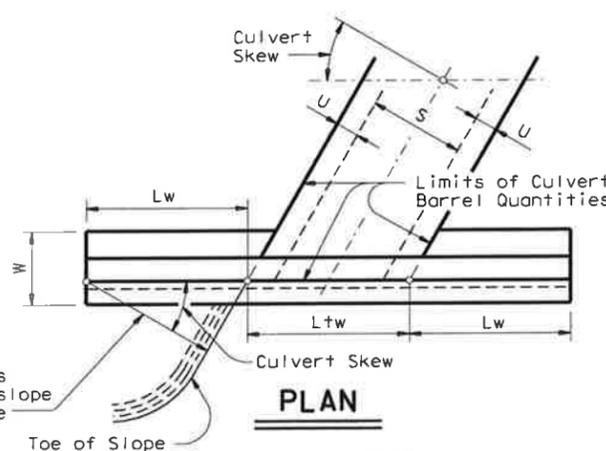
**SECTION A-A**  
(Showing Wing Reinf)



**SECTION B-B**  
(Showing Wing Reinf)



**DETAILS FOR NON-SKEWED BOX CULVERTS**



**DETAILS FOR SKEWED BOX CULVERTS**  
(Showing 30° Skew)

Texas Department of Transportation  
 Bridge Division Standard

**CONCRETE WINGWALLS WITH PARALLEL WINGS FOR BOX CULVERTS TYPES PW-1 AND PW-2**

PW

PNP	pasde01.dgn	DN: GAF	CA: CAT	NO: TXDOT	CK: GAF
TXDOT	February 2010	CON: SPECT	JCB	HIGHWAY	
11-10	Reinforcing quantities				
01-12	PNP & PW-2				

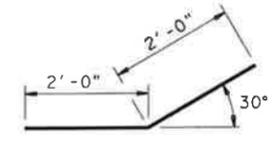
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Williamson County, Texas  
WING DIMENSION CALCULATIONS:

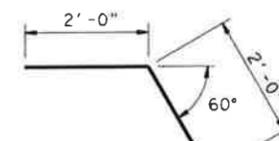
Formulas: (All values are in Feet)  
 $H_w = H + T + C - 0.250'$   
 $A = (H_w - 0.333') (SL)$   
 $B = (A) \text{ Tangent } (30^\circ)$   
 $L_w = (A) \div \text{Cosine } (30^\circ)$   
 For Cast-in-place culverts:  
 $L_{tw} = (N) (S) + (N+1) (U)$   
 For Precast culverts:  
 $L_{tw} = (N) (2U+S) + (N-1) (0.500')$   
 Total Wingwall Area (Two Wings ~ S.F.) =  $(H_w + 0.333') (L_w)$

$H_w$  = Height of Wingwall  
 $SL:1$  = Side Slope Ratio (Horizontal:1 Vertical)  
 $L_w$  = Length of Wingwall  
 $L_{tw}$  = Culvert Toewall Length  
 $N$  = Number of Culvert Spans

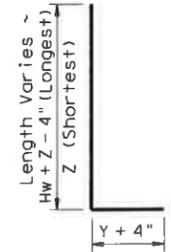
See applicable box culvert standard for H, S, T, and U values.



BARS D



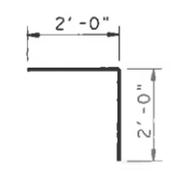
BARS R



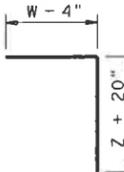
BARS J1



BARS V



BARS L



BARS J2

- 1 Extend Bars P 3'-0" minimum into bottom slab of Box Culvert.
- 2 Adjust to fit as necessary to maintain 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  $L_w$ .
- 4 Recommended values of Slope are: 2:1, 3:1, 4:1, & 6:1.
- 5 When shown elsewhere on the plans, a 5" deep concrete riprap shall be constructed. Payment for riprap shall be as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, the riprap shall have a 6" wide by 1'-6" deep reinforced concrete toewall along all edges adjacent to natural ground; the toewall shall be reinforced by extending typical riprap reinforcing into the toewall; construction joints or grooved joints, oriented in the direction of flow, shall extend 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 from that shown as necessary.
- 7 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.
- 8 For vehicle safety, curb heights and wall heights shall be reduced, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications. All reinforcing steel shall be Grade 60. Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise. All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi. All reinforcing bars shall be adjusted to provide a minimum of 1/4" clear cover. 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 BCS 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.

TABLE OF DIMENSIONS & REINFORCING STEEL (Wings for One Structure End)

Maximum Wingwall Height $H_w$	Dimensions				Variable Reinforcing				Estimated Quantities per ft of wing length (2-Wings)	
	W	X	Y	Z	Bars J1		Bars J2		Reinf (Lb/Ft)	Conc (CY/Ft)
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

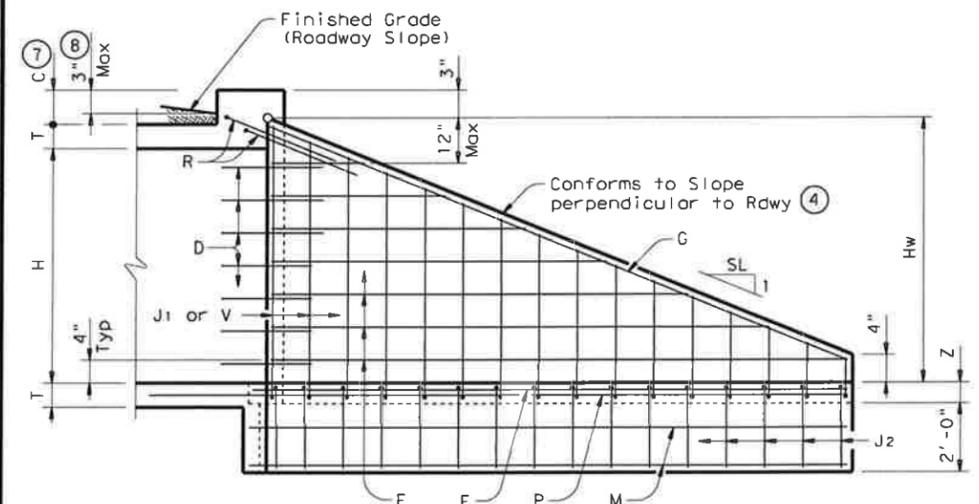
TABLE OF WINGWALL REINFORCING (2-Wings)

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

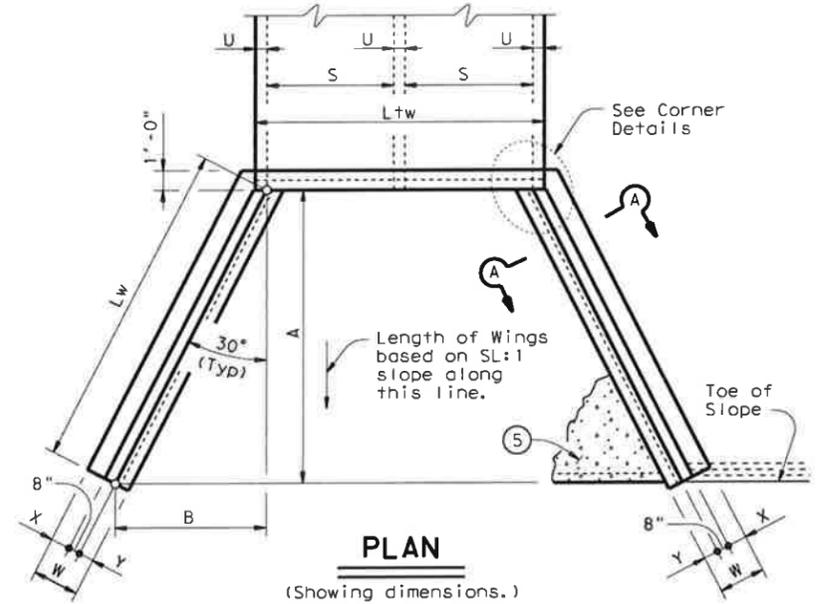
Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

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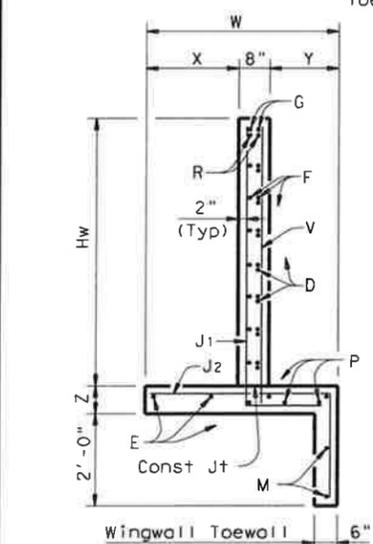
INSIDE ELEVATION

(Showing reinforcing. Culvert and Culvert Toewall reinforcing not shown for clarity.)

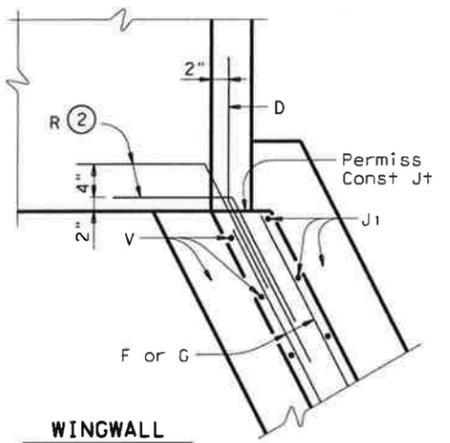


PLAN

(Showing dimensions.)

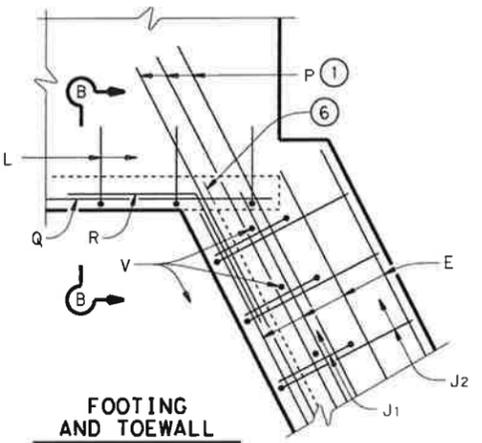


SECTION A-A

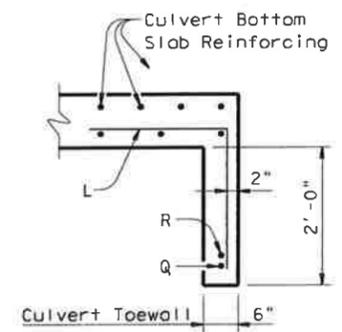


CORNER DETAILS

(Culvert and Culvert Toewall reinforcing not shown for clarity.)



FOOTING AND TOEWALL



SECTION B-B

Texas Department of Transportation  
 Bridge Division Standard  
**CONCRETE WINGWALLS WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS**  
**FW-0**

FILE: fw-0std.dgn	DN: GAF	CA: CAF	DR: T&DOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
11-10 Add note for synthetic fibers			COUNT	SHEET 66

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p. 218

**TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL** (4)

Williamson County, Texas

SLOPE	DIA OF PIPE, D	15 Degrees						30 Degrees						45 Degrees					
		Values for one Pipe			Values to be added for each add'l Pipe			Values for one Pipe			Values to be added for each add'l Pipe			Values for one Pipe			Values to be added for each add'l Pipe		
		W	Reinf (Lbs)	Conc (CY)	W	Reinf (Lbs)	Conc (CY)	W	Reinf (Lbs)	Conc (CY)	W	Reinf (Lbs)	Conc (CY)	W	Reinf (Lbs)	Conc (CY)	W	Reinf (Lbs)	Conc (CY)
2:1	12"	9'-4"	124	1.1	1'-9 3/4"	15	0.2	10'-5"	130	1.2	2'-0"	16	0.2	12'-9"	159	1.5	2'-5 3/4"	17	0.3
2:1	15"	10'-7"	136	1.3	2'-3"	17	0.2	11'-10"	159	1.5	2'-6"	18	0.2	14'-6"	191	1.8	3'-0 3/4"	20	0.3
2:1	18"	11'-11"	165	1.5	2'-9"	19	0.3	13'-3"	174	1.7	3'-1"	29	0.3	16'-3"	207	2.1	3'-9 1/4"	33	0.4
2:1	21"	13'-2"	203	1.9	3'-2 1/4"	31	0.4	14'-9"	233	2.1	3'-6 3/4"	33	0.4	18'-0"	276	2.6	4'-4 1/4"	36	0.5
2:1	24"	14'-6"	240	2.1	3'-8 1/4"	34	0.4	16'-2"	251	2.4	4'-1 3/4"	36	0.5	19'-10"	318	2.9	5'-0 3/4"	39	0.6
2:1	27"	15'-9"	258	2.5	4'-0 3/4"	38	0.5	17'-7"	292	2.8	4'-6 1/4"	39	0.6	21'-7"	342	3.4	5'-6 1/4"	44	0.7
2:1	30"	17'-1"	297	2.8	4'-5 3/4"	40	0.6	19'-1"	311	3.1	5'-0"	42	0.6	23'-4"	388	3.8	6'-1 3/4"	47	0.8
2:1	33"	18'-5"	320	3.3	4'-9 3/4"	43	0.6	20'-6"	358	3.6	5'-4 3/4"	46	0.7	25'-1"	439	4.4	6'-7 1/4"	51	0.9
2:1	36"	19'-8"	401	4.0	5'-3"	47	0.9	21'-11"	422	4.5	5'-10 3/4"	50	0.9	26'-10"	517	5.5	7'-2 1/4"	55	1.2
2:1	42"	22'-3"	476	5.0	6'-0 3/4"	53	1.1	24'-10"	528	5.6	6'-8 3/4"	56	1.2	30'-5"	634	6.9	8'-3"	76	1.4
2:1	48"	25'-11"	577	6.6	6'-9 3/4"	60	1.3	28'-10"	637	7.3	7'-7 1/4"	79	1.5	35'-4"	791	9.0	9'-3 3/4"	88	1.8
2:1	54"	28'-6"	711	7.8	7'-9"	83	1.6	31'-9"	781	8.7	8'-8"	87	1.8	38'-11"	958	10.7	10'-7 1/4"	97	2.2
2:1	60"	31'-1"	805	9.2	8'-6 1/4"	91	1.9	34'-8"	881	10.2	9'-6 1/4"	97	2.1	42'-5"	1113	12.5	11'-8"	124	2.6
2:1	66"	33'-8"	907	10.6	9'-0 3/4"	98	2.1	37'-6"	1028	11.8	10'-1 1/4"	102	2.4	46'-0"	1235	14.5	12'-4 1/4"	132	2.9
2:1	72"	36'-3"	1071	12.1	9'-8"	105	2.4	40'-5"	1207	13.5	10'-9 1/4"	110	2.6	49'-6"	1446	16.6	13'-2 1/4"	141	3.2
3:1	12"	13'-6"	178	1.6	1'-9 3/4"	15	0.2	15'-0"	189	1.8	2'-0"	15	0.2	18'-5"	237	2.2	2'-5 3/4"	17	0.2
3:1	15"	15'-3"	212	1.9	2'-3"	17	0.2	17'-0"	223	2.1	2'-6"	17	0.3	20'-10"	276	2.6	3'-0 3/4"	20	0.3
3:1	18"	17'-1"	231	2.3	2'-9"	19	0.3	19'-1"	259	2.5	3'-1"	29	0.3	23'-4"	318	3.1	3'-9 1/4"	32	0.4
3:1	21"	18'-11"	306	2.7	3'-2 1/4"	31	0.4	21'-1"	339	3.0	3'-6 3/4"	33	0.4	25'-10"	413	3.7	4'-4 1/4"	36	0.5
3:1	24"	20'-8"	345	3.1	3'-8 3/4"	35	0.4	23'-1"	384	3.5	4'-1 3/4"	36	0.5	28'-3"	462	4.2	5'-0 3/4"	40	0.6
3:1	27"	22'-6"	376	3.7	4'-0 3/4"	38	0.5	25'-1"	438	4.1	4'-6 1/4"	39	0.6	30'-9"	522	5.0	5'-6 1/4"	44	0.7
3:1	30"	24'-4"	422	4.1	4'-5 3/4"	40	0.6	27'-2"	466	4.6	5'-0"	42	0.6	33'-3"	578	5.6	6'-1 3/4"	47	0.8
3:1	33"	26'-2"	476	4.8	4'-10"	43	0.6	29'-2"	522	5.3	5'-4 3/4"	46	0.7	35'-9"	644	6.5	6'-7 1/4"	51	0.9
3:1	36"	27'-11"	590	5.9	5'-3 1/4"	47	0.8	31'-2"	645	6.6	5'-10 3/4"	50	0.9	38'-2"	787	8.0	7'-2 1/4"	56	1.2
3:1	42"	31'-7"	684	7.3	6'-0 1/4"	53	1.1	35'-3"	776	8.2	6'-8 3/4"	56	1.2	43'-2"	933	10.0	8'-3"	79	1.4
3:1	48"	36'-9"	880	9.6	6'-9 3/4"	61	1.3	41'-0"	953	10.7	7'-7 1/4"	81	1.5	50'-2"	1166	13.1	9'-3 3/4"	88	1.8
3:1	54"	40'-5"	1065	11.4	7'-9"	85	1.6	45'-0"	1185	12.7	8'-8"	89	1.8	55'-2"	1435	15.5	10'-7 1/4"	97	2.2
3:1	60"	44'-0"	1224	13.3	8'-6 1/4"	93	1.9	49'-1"	1356	14.8	9'-6 1/4"	96	2.1	60'-1"	1627	18.2	11'-8"	124	2.6
3:1	66"	47'-7"	1357	15.4	9'-1"	98	2.1	53'-1"	1497	17.2	10'-1 1/4"	103	2.3	65'-1"	1834	21.1	12'-4 1/4"	130	2.9
3:1	72"	51'-3"	1624	17.7	9'-8"	105	2.3	57'-2"	1787	19.7	10'-9 1/4"	109	2.6	70'-0"	2210	24.1	13'-2 1/4"	139	3.2
4:1	12"	17'-7"	232	2.1	1'-9 3/4"	15	0.2	19'-8"	259	2.4	2'-0"	16	0.2	24'-0"	314	2.9	2'-5 3/4"	18	0.2
4:1	15"	19'-11"	272	2.5	2'-3"	17	0.2	22'-3"	301	2.8	2'-6"	18	0.3	27'-3"	361	3.5	3'-0 3/4"	21	0.3
4:1	18"	22'-3"	313	3.0	2'-9"	19	0.3	24'-10"	344	3.3	3'-1"	29	0.3	30'-5"	427	4.0	3'-9 1/4"	32	0.4
4:1	21"	24'-7"	407	3.6	3'-2 1/4"	31	0.4	27'-5"	446	4.0	3'-6 3/4"	33	0.4	33'-7"	549	4.9	4'-4 1/4"	36	0.5
4:1	24"	26'-11"	455	4.1	3'-8 3/4"	35	0.4	30'-0"	499	4.5	4'-1 3/4"	36	0.5	36'-9"	609	5.6	5'-0 3/4"	40	0.6
4:1	27"	29'-3"	514	4.8	4'-0 3/4"	38	0.5	32'-7"	562	5.4	4'-6 1/4"	40	0.6	39'-11"	703	6.6	5'-6 1/4"	43	0.7
4:1	30"	31'-7"	568	5.4	4'-5 3/4"	40	0.6	35'-3"	620	6.0	5'-0"	42	0.6	43'-2"	768	7.4	6'-1 3/4"	49	0.8
4:1	33"	33'-11"	634	6.2	4'-10"	43	0.7	37'-10"	710	7.0	5'-4 3/4"	46	0.7	46'-4"	848	8.5	6'-7 1/4"	52	0.9
4:1	36"	36'-3"	776	7.7	5'-3"	48	0.9	40'-5"	868	8.6	5'-10 3/4"	49	0.9	49'-6"	1058	10.6	7'-2 1/4"	56	1.1
4:1	42"	40'-11"	921	9.6	6'-0 1/4"	53	1.0	45'-7"	1022	10.7	6'-8 3/4"	57	1.2	55'-10"	1262	13.1	8'-3"	78	1.4
4:1	48"	47'-7"	1152	12.6	6'-10"	61	1.3	53'-1"	1268	14.0	7'-7 1/4"	80	1.5	65'-1"	1579	17.2	9'-3 3/4"	86	1.8
4:1	54"	52'-3"	1416	14.9	7'-9 1/4"	86	1.6	58'-4"	1589	16.6	8'-8"	89	1.8	71'-5"	1916	20.4	10'-7 1/4"	95	2.2
4:1	60"	56'-11"	1606	17.5	8'-6 3/4"	92	1.9	63'-6"	1798	19.5	9'-6 1/4"	95	2.1	77'-9"	2184	23.9	11'-8"	122	2.6
4:1	66"	61'-7"	1811	20.2	9'-0 3/4"	97	2.1	68'-8"	2011	22.5	10'-1 1/4"	101	2.4	84'-2"	2464	27.6	12'-4 1/4"	131	2.9
4:1	72"	66'-3"	2142	23.2	9'-8"	104	2.4	73'-11"	2371	25.9	10'-9 1/4"	108	2.6	90'-6"	2929	31.7	13'-2 1/4"	138	3.2
6:1	12"	25'-11"	342	3.1	1'-9 3/4"	15	0.2	28'-10"	374	3.5	2'-0"	16	0.2	35'-4"	456	4.3	2'-5 3/4"	17	0.2
6:1	15"	29'-3"	390	3.7	2'-3"	17	0.2	32'-7"	442	4.2	2'-6"	18	0.2	39'-11"	549	5.1	3'-0 3/4"	20	0.3
6:1	18"	32'-7"	459	4.4	2'-9"	20	0.3	36'-4"	515	4.9	3'-1"	29	0.3	44'-7"	629	6.0	3'-9 1/4"	33	0.4
6:1	21"	36'-0"	608	5.3	3'-2 1/4"	31	0.4	40'-2"	660	5.9	3'-6 3/4"	33	0.4	49'-2"	823	7.2	4'-4 1/4"	38	0.5
6:1	24"	39'-4"	672	6.0	3'-8 3/4"	35	0.4	43'-11"	748	6.7	4'-1 3/4"	36	0.5	53'-9"	920	8.2	5'-0 3/4"	42	0.6
6:1	27"	42'-8"	770	7.1	4'-0 3/4"	38	0.5	47'-8"	852	8.0	4'-6 1/4"	41	0.5	58'-4"	1039	9.7	5'-6 1/4"	45	0.7
6:1	30"	46'-1"	839	8.0	4'-5 3/4"	40	0.6	51'-5"	949	8.9	5'-0"	44	0.6	62'-11"	1154	10.9	6'-1 3/4"	48	0.8
6:1	33"	49'-5"	947	9.2	4'-10"	45	0.7	55'-2"	1040	10.3	5'-4 3/4"	48	0.7	67'-6"	1284	12.6	6'-7 1/4"	50	0.9
6:1	36"	52'-10"	1151	11.4	5'-3"	49	0.8	58'-11"	1287	12.7	5'-10 3/4"	51	1.0	72'-1"	1575	15.6	7'-2 1/4"	55	1.1
6:1	42"	59'-6"	1365	14.2	6'-0 1/4"	55	1.0	66'-5"	1522	15.8	6'-8 3/4"	57	1.2	81'-4"	1867	19.4	8'-3"	76	1.4
6:1	48"	69'-4"	1729	18.5	6'-10"	59	1.3	77'-4"	1934	20.7	7'-7 1/4"	79	1.5	94'-9"	2360	25.3	9'-3 3/4"	86	1.8
6:1	54"	76'-1"	2130	22.0	7'-9 1/4"	83	1.6	84'-10"	2370	24.6	8'-8"	87	1.8	103'-11"	2904	30.1	10'-7 1/4"	95	2.2
6:1	60"	82'-10"	2414	25.8	8'-6 3/4"	90	1.9	92'-5"	2673	28.8	9'-6 1/4"	94	2.1	113'-2"	3286	35.3	11'-8"	122	2.6
6:1	66"	89'-7"	2712	29.9	9'-0 3/4"	96	2.1	99'-11"	3030	33.3	10'-1 1/4"	101	2.4	122'-4"	3689	40.8	12'-4 1/4"	130	2.9
6:1	72"	96'-3"	3210	34.2	9'-8"	102	2.4	107'-5"	3572	38.2	10'-9 1/4"	108	2.6	131'-6"	4364	46.8	13'-2 1/4"	139	3.2

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DATE: FILE:

**TABLE OF Bid 1708-182 CONSTANT DIMENSIONS**

DIA OF PIPE, D	G	K	H	T	E
12"	9"	1'-0"	2'-8"	9"	1'-9"
15"	11"	1'-0"	2'-11"	9"	1'-9"
18"	1'-2"	1'-0"	3'-2"	9"	1'-9"
21"	1'-4"	1'-0"	3'-5"	9"	2'-0"
24"	1'-7"	1'-0"	3'-8"	9"	2'-0"
27"	1'-8"	1'-0"	3'-11"	9"	2'-3"
30"	1'-10"	1'-0"	4'-2"	9"	2'-3"
33"	1'-11"	1'-0"	4'-5"	9"	2'-6"
36"	2'-1"	1'-0"	4'-8"	1'-0"	2'-6"
42"	2'-4"	1'-0"	5'-2"	1'-0"	2'-9"
48"	2'-7"	1'-3"	5'-11"	1'-0"	3'-0"
54"	3'-0"	1'-3"	6'-5"	1'-0"	3'-3"
60"	3'-3"	1'-3"	6'-11"	1'-0"	3'-6"
66"	3'-3"	1'-3"	7'-5"	1'-0"	3'-9"
72"	3'-4"	1'-3"	7'-11"	1'-0"	4'-0"

**TABLE OF REINFORCING STEEL** (4)

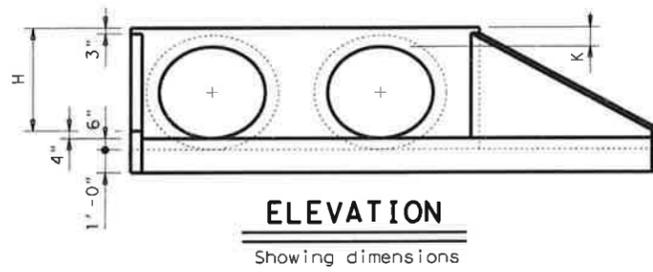
Bar	Size	Spo	No.
A1	#5	~	2
A2	#5	1'-6"	~
E	#5	~	2
F	#5	1'-0"	~

**TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL** ④

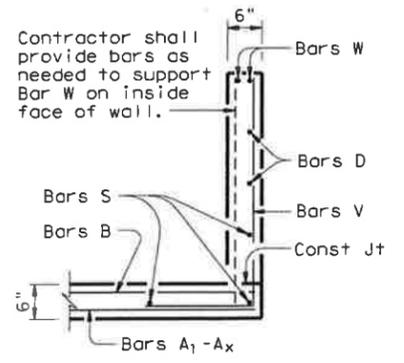
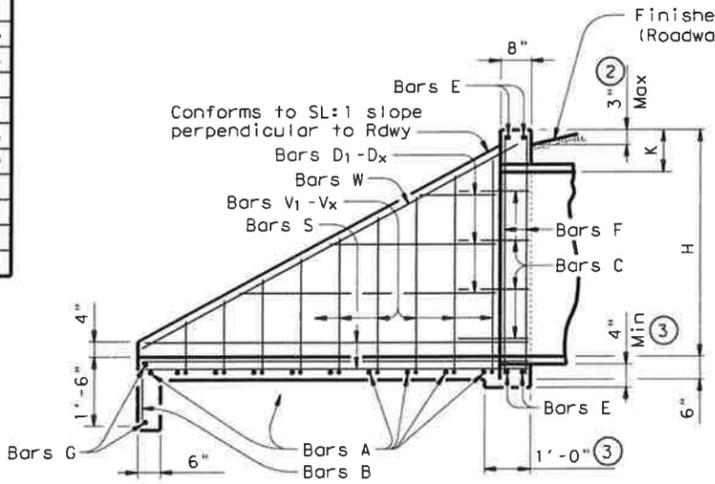
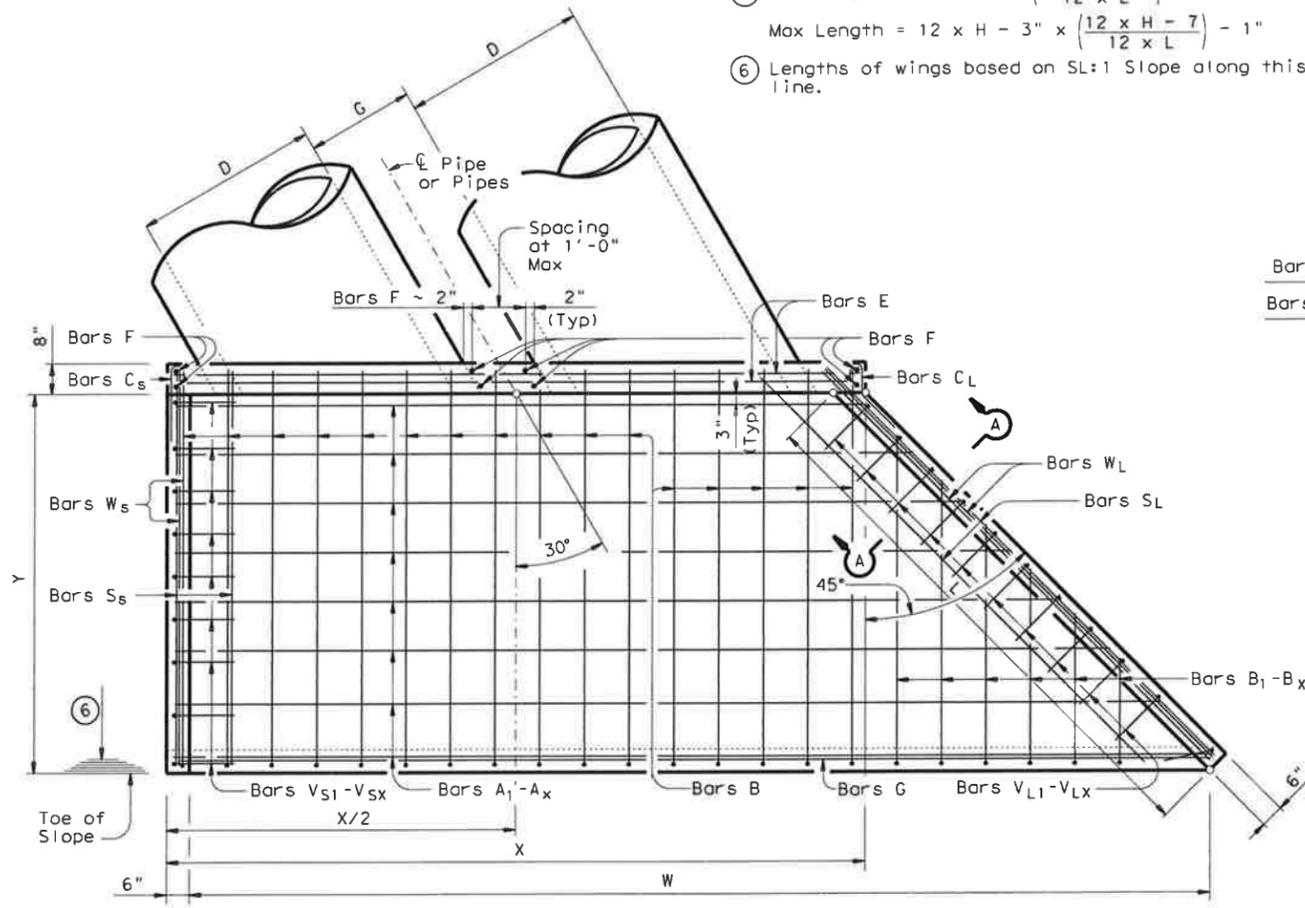
SLOPE	DIA OF PIPE, D	Values for one Pipe				Values to be added for each add'l Pipe				
		W	X	Y	L	Reinf (Lbs)	Conc (CY)	X and W	Reinf (Lbs)	Conc (CY)
2:1	12"	4'-9"	3'-1 1/2"	2'-10"	4'-0"	90	0.6	2'-0 1/4"	22	0.2
	15"	5'-6 3/4"	3'-5 1/4"	3'-4"	4'-8 1/2"	102	0.8	2'-6"	28	0.3
	18"	6'-4 3/4"	3'-9 1/4"	3'-10"	5'-5"	129	0.9	3'-1"	41	0.4
	21"	7'-2 3/4"	4'-1 1/4"	4'-4"	6'-1 1/2"	144	1.1	3'-6 3/4"	47	0.5
	24"	8'-2 1/2"	4'-7"	4'-10"	6'-10"	164	1.4	4'-1 3/4"	57	0.6
	27"	9'-0 1/2"	4'-11"	5'-4"	7'-6 1/2"	178	1.6	4'-6 1/4"	62	0.7
	30"	9'-10 1/2"	5'-3"	5'-10"	8'-3"	212	1.8	5'-0"	72	0.9
	33"	10'-8 3/4"	5'-7"	6'-4"	8'-11 1/2"	225	2.1	5'-4 3/4"	79	1.0
	36"	11'-6 3/4"	5'-11 1/4"	6'-10"	9'-8"	250	2.4	5'-10 1/2"	90	1.2
	42"	13'-2 3/4"	6'-7 1/4"	7'-10"	11'-1"	304	3.0	6'-8 3/4"	109	1.5
	48"	15'-4 3/4"	7'-3 1/4"	9'-4"	13'-2 1/2"	369	4.0	7'-7 1/4"	142	2.0
	54"	17'-1"	7'-11 1/2"	10'-4"	14'-7 1/4"	429	4.7	8'-8"	170	2.5
3:1	12"	6'-2"	3'-1 1/2"	4'-3"	6'-0"	118	0.9	2'-0 1/4"	24	0.3
	15"	7'-2 3/4"	3'-5 1/4"	5'-0"	7'-0 3/4"	142	1.1	2'-6"	31	0.4
	18"	8'-3 3/4"	3'-9 1/4"	5'-9"	8'-1 1/2"	179	1.4	3'-1"	46	0.5
	21"	9'-4 3/4"	4'-1 1/4"	6'-6"	9'-2 1/4"	197	1.7	3'-6 3/4"	53	0.7
	24"	10'-7 1/2"	4'-7"	7'-3"	10'-3"	227	2.1	4'-1 3/4"	65	0.8
	27"	11'-8 1/2"	4'-11"	8'-0"	11'-3 3/4"	255	2.4	4'-6 1/4"	75	1.0
	30"	12'-9 1/2"	5'-3"	8'-9"	12'-4 1/2"	298	2.8	5'-0"	86	1.2
	33"	13'-10 3/4"	5'-7"	9'-6"	13'-5 1/4"	322	3.2	5'-4 3/4"	94	1.3
	36"	14'-11 3/4"	5'-11 1/4"	10'-3"	14'-6"	355	3.7	5'-10 1/2"	108	1.5
	42"	17'-1 3/4"	6'-7 1/4"	11'-9"	16'-7 1/2"	441	4.6	6'-8 3/4"	133	2.0
	48"	20'-0 3/4"	7'-3 1/4"	14'-0"	19'-9 1/2"	542	6.2	7'-7 1/4"	176	2.7
	54"	22'-3"	7'-11 1/2"	15'-6"	21'-11"	626	7.5	8'-8"	211	3.3
4:1	12"	7'-7"	3'-1 1/2"	5'-8"	8'-0 1/4"	156	1.2	2'-0 1/4"	28	0.3
	15"	8'-10 3/4"	3'-5 1/4"	6'-8"	9'-5 1/4"	183	1.5	2'-6"	36	0.5
	18"	10'-2 3/4"	3'-9 1/4"	7'-8"	10'-10"	228	1.9	3'-1"	52	0.6
	21"	11'-6 3/4"	4'-1 1/4"	8'-8"	12'-3"	264	2.3	3'-6 3/4"	63	0.8
	24"	13'-0 1/2"	4'-7"	9'-8"	13'-8"	301	2.8	4'-1 3/4"	75	1.0
	27"	14'-4 1/2"	4'-11"	10'-8"	15'-1"	339	3.4	4'-6 1/4"	87	1.2
	30"	15'-8 1/2"	5'-3"	11'-8"	16'-6"	394	3.9	5'-0"	99	1.4
	33"	17'-0 3/4"	5'-7"	12'-8"	17'-11"	432	4.5	5'-4 3/4"	112	1.7
	36"	18'-4 3/4"	5'-11 1/4"	13'-8"	19'-4"	479	5.2	5'-10 1/2"	128	1.9
	42"	21'-0 3/4"	6'-7 1/4"	15'-8"	22'-1 3/4"	587	6.6	6'-8 3/4"	158	2.5
	48"	24'-8 3/4"	7'-3 1/4"	18'-8"	26'-4 3/4"	738	8.9	7'-7 1/4"	211	3.3
	54"	27'-5"	7'-11 1/2"	20'-8"	29'-2 3/4"	871	10.8	8'-8"	257	4.1
6:1	12"	10'-5"	3'-1 1/2"	8'-6"	12'-0 1/4"	223	1.9	2'-0 1/4"	32	0.4
	15"	12'-2 3/4"	3'-5 1/4"	10'-0"	14'-1 3/4"	273	2.5	2'-6"	43	0.6
	18"	14'-0 3/4"	3'-9 1/4"	11'-6"	16'-3 1/4"	336	3.2	3'-1"	61	0.8
	21"	15'-10 3/4"	4'-1 1/4"	13'-0"	18'-4 1/2"	396	3.9	3'-6 3/4"	76	1.1
	24"	17'-10 1/2"	4'-7"	14'-6"	20'-6"	450	4.8	4'-1 3/4"	91	1.4
	27"	19'-8 1/2"	4'-11"	16'-0"	22'-7 1/2"	519	5.7	4'-6 1/4"	108	1.6
	30"	21'-6 1/2"	5'-3"	17'-6"	24'-9"	595	6.6	5'-0"	124	2.0
	33"	23'-4 3/4"	5'-7"	19'-0"	26'-10 1/2"	674	7.7	5'-4 3/4"	143	2.3
	36"	25'-2 3/4"	5'-11 1/4"	20'-6"	29'-0"	737	8.8	5'-10 1/2"	162	2.7
	42"	28'-10 3/4"	6'-7 1/4"	23'-6"	33'-2 3/4"	920	11.3	6'-8 3/4"	202	3.5
	48"	34'-0 3/4"	7'-3 1/4"	28'-0"	39'-7 1/4"	1189	15.5	7'-7 1/4"	274	4.6

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Williamson County, Texas



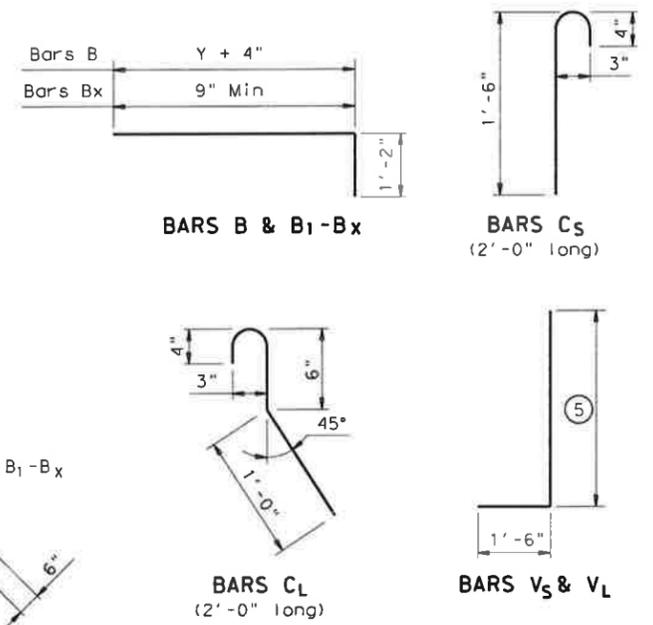
- Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.
- For vehicle safety, curbs shall project no more than 3" above finished grade. Curb heights shall be reduced, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- Provide a 1'-0" footing as shown where required to maintain 4" Min cover for pipes.
- Quantities shown are for one structure end only (one headwall).
- Min Length =  $6" + 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right)$   
Max Length =  $12 \times H - 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right) - 1"$
- Lengths of wings based on SL:1 Slope along this line.



Bar	Size	Spa	No.
A	# 4	1'-0"	~
B	# 3	1'-6"	~
CL	# 4	1'-0"	~
CS	# 4	1'-0"	~
D	# 3	1'-0"	~
E	# 5	~	4
F	# 5	~	~
G	# 3	~	2
SL	# 4	~	3
SS	# 4	~	3
V	# 4	1'-0"	~
WL	# 5	~	2
WS	# 5	~	2

DIA OF PIPE, D	G	K	H
12"	9"	1'-0"	2'-0"
15"	11"	1'-0"	2'-3"
18"	1'-2"	1'-0"	2'-6"
21"	1'-4"	1'-0"	2'-9"
24"	1'-7"	1'-0"	3'-0"
27"	1'-8"	1'-0"	3'-3"
30"	1'-10"	1'-0"	3'-6"
33"	1'-11"	1'-0"	3'-9"
36"	2'-1"	1'-0"	4'-0"
42"	2'-4"	1'-0"	4'-6"
48"	2'-7"	1'-3"	5'-3"
54"	3'-0"	1'-3"	5'-9"
60"	3'-3"	1'-3"	6'-3"
66"	3'-3"	1'-3"	6'-9"
72"	3'-4"	1'-3"	7'-3"



**GENERAL NOTES:**  
Designed according to AASHTO LRFD Specifications.  
Reinforcing steel shall be placed with the center of the outside layer of bars 2" from the surface of the concrete.  
All reinforcing steel shall be Grade 60.  
All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.  
No bridge rails of any type may be mounted directly to these culvert headwalls.

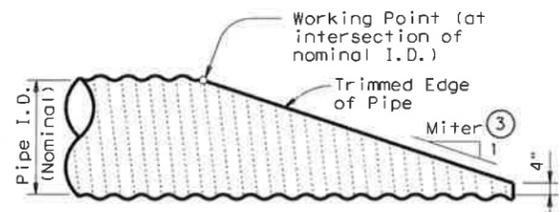
Texas Department of Transportation  
Bridge Division Standard

**CONCRETE HEADWALLS WITH FLARED WINGS FOR 30° SKEW PIPE CULVERTS**

**CH-FW-30**

FILE: chfw30.dgn	BY: TxDOT	CA: TxDOT	DR: TxDOT	CK: GAF
COPY: TxDOT	February 2010	REV: SFCT	JOB	HIGHWAY
REVISIONS				
DIST:	COUNTY:			SHEET NO.
				<b>120</b>

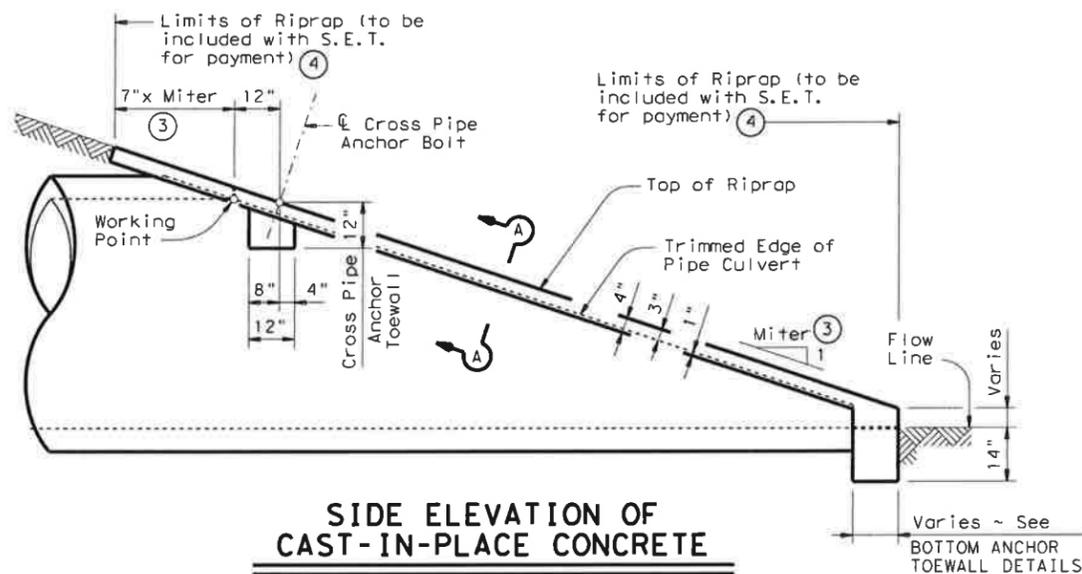
p. 220



NOTE: All Pipe Runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

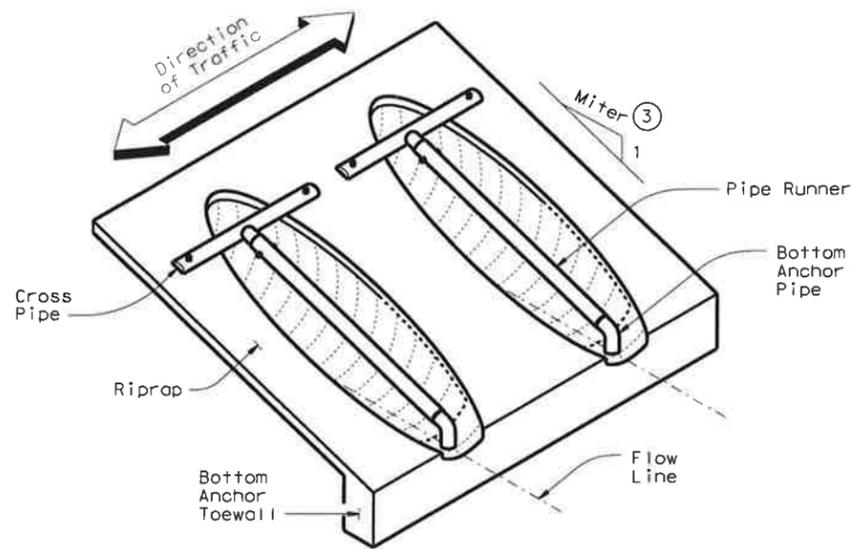
**SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER**

(Showing Corrugated Metal Pipe Culvert. Details of Concrete Pipe Culvert are similar.)



**SIDE ELEVATION OF CAST-IN-PLACE CONCRETE**

(Showing Concrete Pipe Culvert. Details of Corrugated Metal Pipe Culvert are similar. Pipe Runners not shown for clarity)



**ISOMETRIC VIEW OF TYPICAL INSTALLATION**

(Showing installation with no skew.)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1'- 7"	3'- 5"	N/A	N/A	N/A	5'-10"	N/A	N/A	N/A	8'- 1"	N/A	N/A	N/A	12'- 9"
27"	1'- 8"	3'- 8"	N/A	N/A	5'- 5"	6'-11"	N/A	N/A	7'- 7"	9'- 7"	N/A	N/A	11'-11"	14'-11"
30"	1'-10"	3'-11"	N/A	N/A	6'- 4"	8'- 0"	N/A	N/A	8'- 9"	11'- 0"	N/A	N/A	13'- 8"	17'- 0"
33"	1'-11"	4'- 2"	6'- 2"	6'- 5"	7'- 3"	9'- 1"	8'- 6"	8'-10"	10'- 0"	12'- 5"	13'- 3"	13'- 9"	15'- 5"	19'- 2"
36"	2'- 1"	4'- 5"	6'-11"	7'- 3"	8'- 2"	10'- 2"	9'- 6"	9'-11"	11'- 2"	13'-10"	14'- 9"	15'- 3"	17'- 2"	21'- 3"
42"	2'- 4"	4'-11"	8'- 6"	8'-10"	9'-11"	12'- 4"	11'- 7"	12'- 0"	13'- 6"	16'- 8"	17'- 9"	18'- 5"	20'- 8"	25'- 7"
48"	2'- 7"	5'- 5"	10'- 1"	10'- 5"	11'- 9"	N/A	13'- 7"	14'- 2"	15'-10"	N/A	20'- 9"	21'- 6"	24'- 2"	N/A
54"	3'- 0"	5'-11"	11'- 8"	12'- 1"	N/A	N/A	15'- 8"	16'- 3"	N/A	N/A	23'-10"	24'- 8"	N/A	N/A
60"	3'- 3"	6'- 5"	13'- 3"	N/A	N/A	N/A	17'- 9"	N/A	N/A	N/A	26'-10"	N/A	N/A	N/A

**TYPICAL PIPE CULVERT MITERS ③**

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

**CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED ②**

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (No Skew)	Always required
42" to 60"	Always required	Always required

**STANDARD PIPE SIZES & MAX PIPE RUNNER LENGTHS ①**

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10'- 0"
4" STD	4.500"	4.026"	19'- 8"
5" STD	5.563"	5.047"	34'- 2"

**ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) ⑤**

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

- ① Size of Pipe Runner shall be as shown in the tables. Cross Pipe shall be the same size as the Pipe Runner. Cross Pipe Stub Out and Bottom Anchor Pipe shall be the next smaller size pipe as shown in the STANDARD PIPE SIZES table.
- ② This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:  
 For 60" culvert pipes, the skew must not exceed 0°.  
 For 54" culvert pipes, the skew must not exceed 15°.  
 For 48" culvert pipes, the skew must not exceed 30°.  
 For all culvert pipe sizes 42" and less, the skew must not exceed 45°.  
 If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT "Roadway Design Manual".
- ③ Miter = Slope of Mitered Pipe Culvert End
- ④ Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".
- ⑤ Quantities shown are for one end of one reinforced Concrete Pipe Culvert. For multiple Pipe Culverts or for Corrugated Metal Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

SHEET 1 OF 2

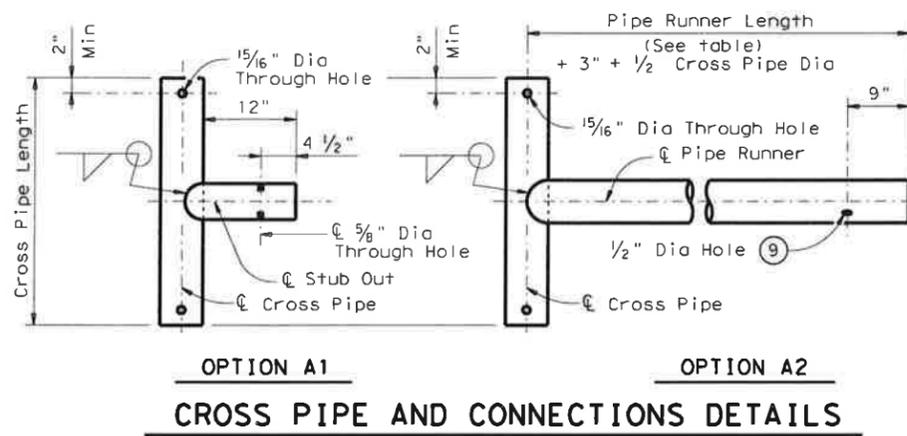
**SAFETY END TREATMENT FOR 12" DIA TO 60" DIA PIPE CULVERTS TYPE II ~ CROSS DRAINAGE**

**SETP-CD**

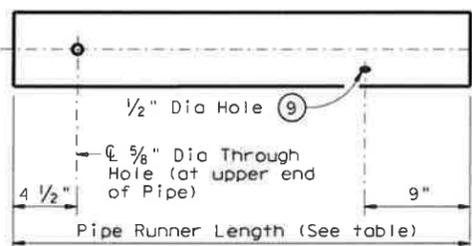
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©TxDOT February 2010	COST: SHEET	JOB:	HIGHWAY:	
REVISED:	DIST:	COUNTY:	SHEET NO:	121

1 1/2" = 10' AND NOT FOR CONCRETE FIBERS

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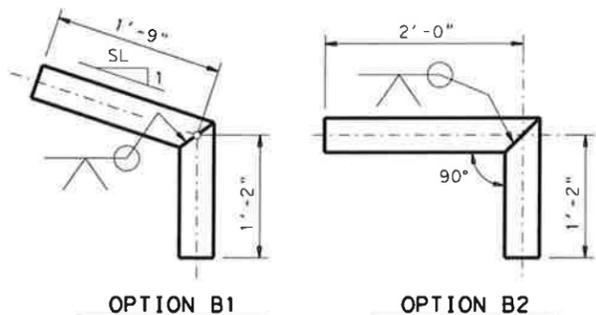


**CROSS PIPE AND CONNECTIONS DETAILS**

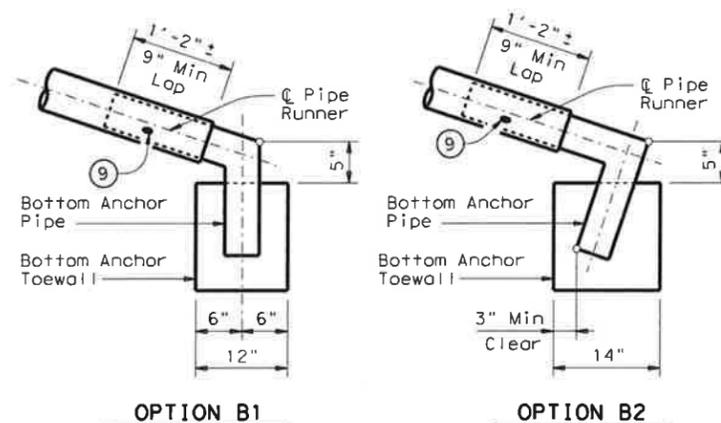


NOTE: The separate Pipe Runner shown is required when Cross Pipe Connection Option A1 is used.

**PIPE RUNNER DETAILS**

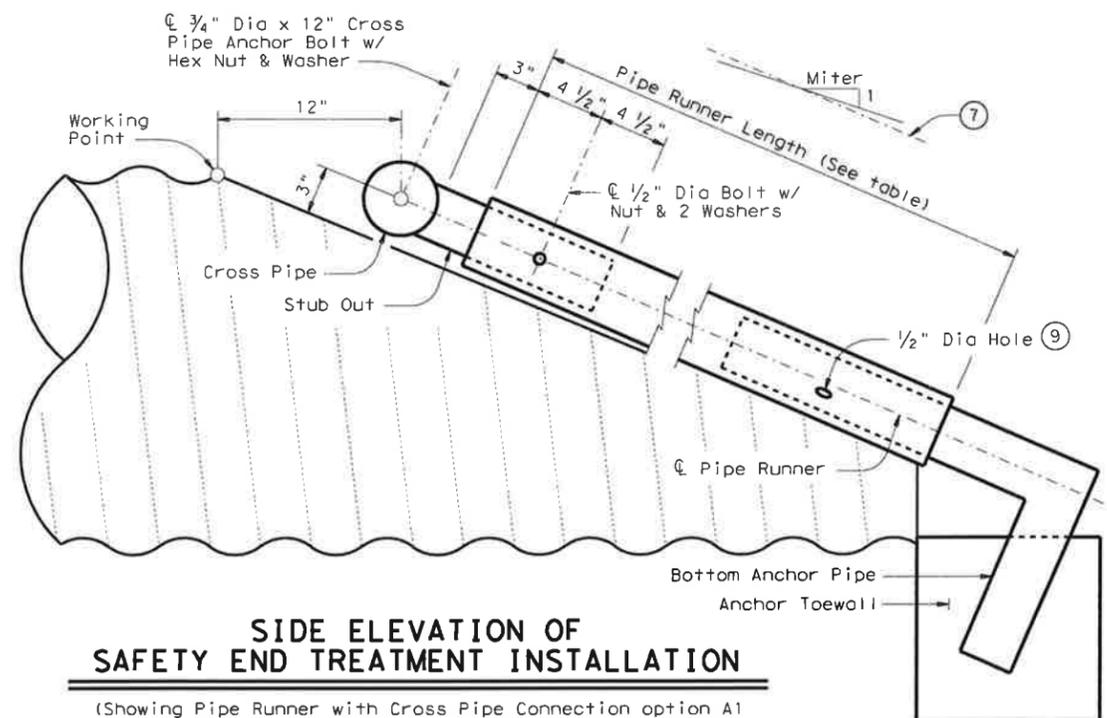


**BOTTOM ANCHOR PIPE DETAILS**



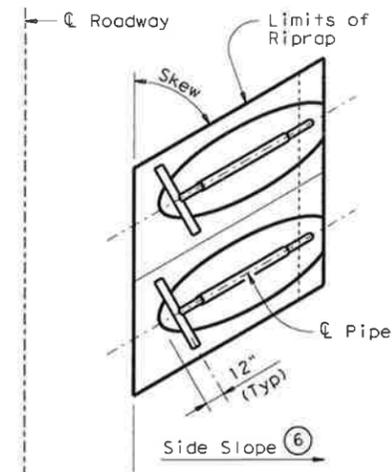
**BOTTOM ANCHOR TOEWALL DETAILS**

(Culvert & Riprap not shown for clarity)

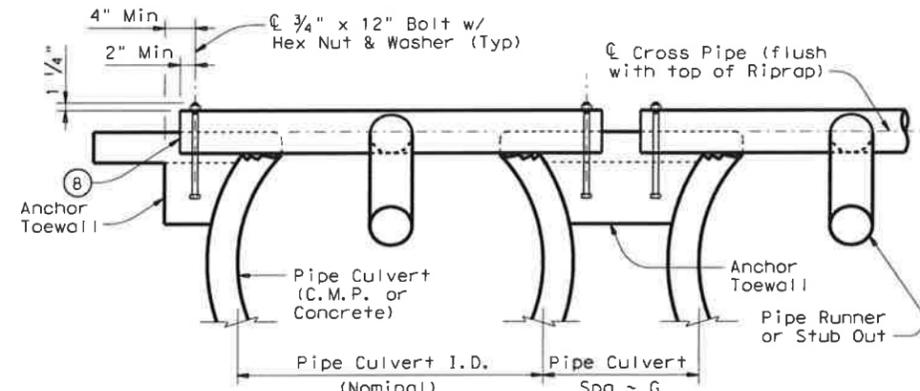


**SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION**

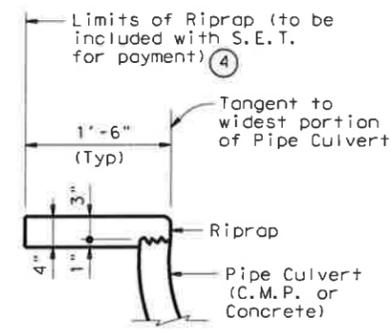
(Showing Pipe Runner with Cross Pipe Connection option A1 and Anchor Pipe option B2 on Corrugated Metal Pipe Culvert. Concrete Pipe Culvert details are similar. Riprap not shown for clarity)



**PLAN OF SKEWED INSTALLATION**



**SECTION A-A**



**SHOWING TYPICAL PIPE CULVERT & RIPRAP**

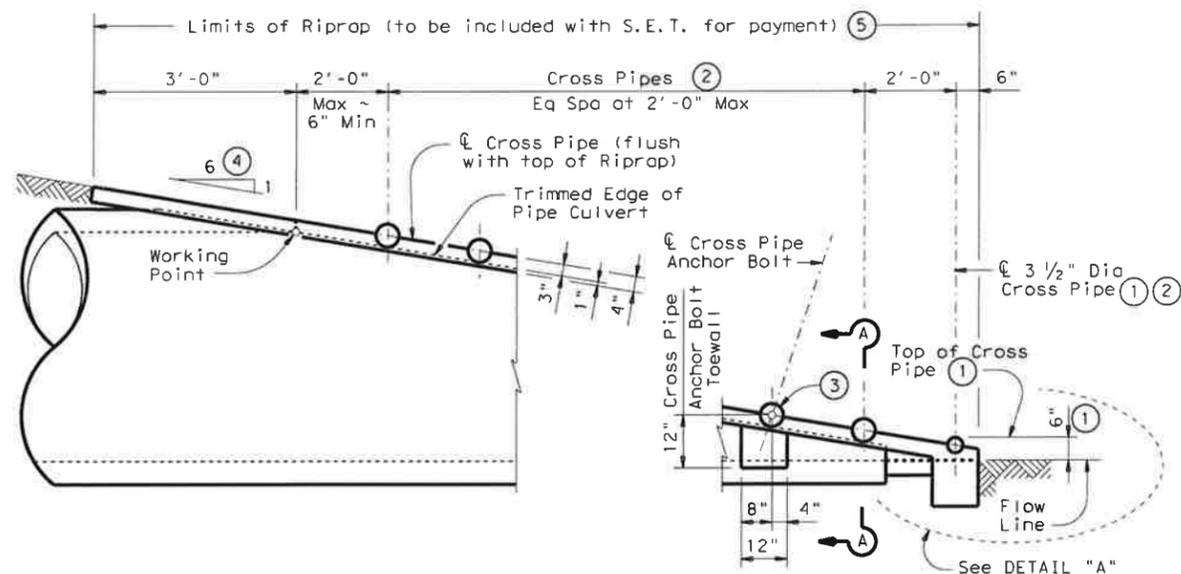
- ④ Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".
- ⑥ Recommended values of side slope are 3:1, 4:1, & 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.
- ⑦ Note that actual slope of Pipe Runner may vary slightly from Side Slope of Riprap and trimmed Culvert Pipe edge.
- ⑧ Care shall be taken to ensure that Riprap concrete does not flow into the Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access.
- ⑨ After installation, the 1/2 inch hole shall be inspected to ensure that the lap of the Pipe Runner with the Bottom Anchor Pipe is adequate.
- ⑩ At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the Runner) may be substituted for the mitered and welded joint in the Bottom Anchor Pipe.

**GENERAL NOTES:**

Pipe Runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981. The Safety End Treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Pipe Runners. Riprap and all necessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap". Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise. Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment. Pipe Runners, Cross Pipes, and Anchor Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52. Bolts and nuts shall conform to ASTM A307. All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

SHEET 2 OF 2

		Bridge Division Standard	
<b>SAFETY END TREATMENT</b> FOR 12" DIA TO 60" DIA PIPE CULVERTS TYPE II ~ CROSS DRAINAGE			
<b>SETP-CD</b>			
TxDOT February 2010 REVISIONS	GAF SFC	CAT JOB	JRP HICHAJ
11-10 Add hole for 5/8" dia. fiber	DIST	COUNTY	SHEET NO 122



**SIDE ELEVATION OF CAST-IN-PLACE CONCRETE**

(Showing Concrete Pipe Culvert.)  
(Details at Corrugated Metal Pipe Culvert are similar.)

CORRUGATED METAL PIPE CULVERTS										
Design	Conc Riprap (CY) ⑥	Pipe Culvert Span	Pipe Culvert Rise	Pipe Culvert Spo ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for use of Cross Pipes	Cross Pipe Size	
1	0.6	17"	13"	1'- 0"	N/A	2'- 8"	2'- 5"	3 or more Pipe Culverts	3" Std (3.500" O.D.)	
2	0.7	21"	15"	1'- 2"	N/A	3'- 1"	2'-11"		3 1/2" Std (4.000" O.D.)	
3	0.9	28"	20"	1'- 5"	N/A	3'- 9"	3'- 9"		All Pipe Culverts	4" Std (4.500" O.D.)
4	1.0	35"	24"	1'- 8"	4'- 4"	4'- 6"	4'- 7"	All Pipe Culverts		5" Std (5.563" O.D.)
5	1.2	42"	29"	1'-11"	4'-11"	5'- 2"	5'- 5"			All Pipe Culverts
6	1.4	49"	33"	2'- 2"	5'- 6"	5'-11"	6'- 3"		All Pipe Culverts	
7	1.6	57"	38"	2'- 5"	6'- 2"	6'- 8"	7'- 2"	All Pipe Culverts		
8	1.8	64"	43"	2'-10"	6'- 9"	7'- 6"	8'- 2"			All Pipe Culverts
9	1.9	71"	47"	3'- 2"	7'- 4"	8'- 3"	9'- 1"		All Pipe Culverts	

CONCRETE PIPE CULVERTS										
Design	Conc Riprap (CY) ⑥	Pipe Culvert Span	Pipe Culvert Rise	Pipe Culvert Spo ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for use of Cross Pipes	Cross Pipe Size	
1	0.6	22"	13 1/2"	1'- 0"	N/A	3'- 1"	2'-10"	3 or more Pipe Culverts	3" Std (3.500" O.D.)	
2	0.7	26"	15 1/2"	1'- 2"	N/A	3'- 6"	3'- 4"		3 or more Pipe Culverts	3 1/2" Std (4.000" O.D.)
3	0.9	28 1/2"	18"	1'- 5"	N/A	3'-10"	3'-9 1/2"			All Pipe Culverts
4	1.0	36 1/4"	22 1/2"	1'- 8"	4'- 5"	4'- 7"	4'-8 1/4"	All Pipe Culverts		
5	1.2	43 3/4"	26 5/8"	1'-11"	5'- 1"	5'- 4"	5'-6 3/4"		All Pipe Culverts	
6	1.4	51 1/8"	31 5/16"	2'- 2"	5'- 8"	6'- 1"	6'-5 1/4"			All Pipe Culverts
7	1.6	58 1/2"	36"	2'- 5"	6'- 4"	6'-10"	7'-3 1/2"	All Pipe Culverts		
8	1.8	65"	40"	2'-10"	6'-10"	7'- 7"	8'- 3"		All Pipe Culverts	
9	1.9	73"	45"	3'- 2"	7'- 6"	8'- 5"	9'- 3"			All Pipe Culverts

- ① The proper installation of the first Cross Pipe is critical for vehicle safety. The top of the first Cross Pipe must be placed at no more than 6" above the flow line.
- ② Size of Cross Pipes, except the first bottom pipe, shall be as shown in the PIPE SIZE table. The first bottom pipe shall be 3 1/2" Standard Pipe (4" O.D.).
- ③ The third Cross Pipe from the bottom of the Culvert shall always be installed using a bolted connection. Care shall be taken to ensure that Riprap concrete does not flow into the Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, all other Cross Pipes may also be installed using the bolted connection details.
- ④ Match Cross Slope as shown elsewhere in the plans. Cross Slope of 6:1 or flatter is required for vehicle safety.
- ⑤ Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".
- ⑥ Quantities shown are for one end of one Pipe Culvert. For multiple Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

**GENERAL NOTES:**

Cross Pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety End Treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Cross Pipes.

Riprap and all necessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap".

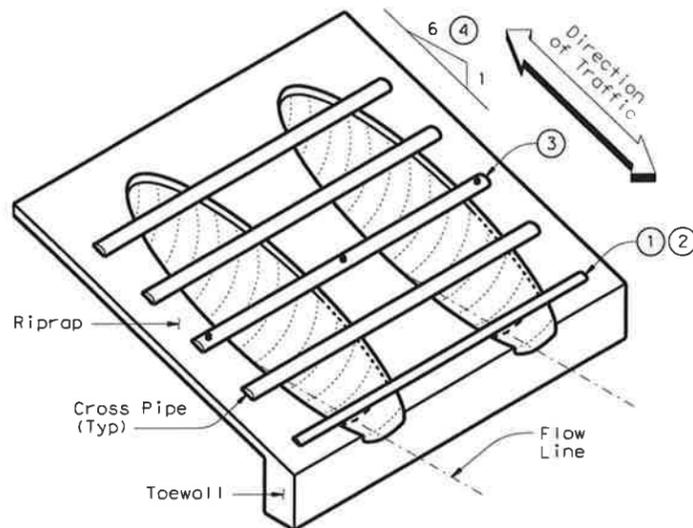
Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

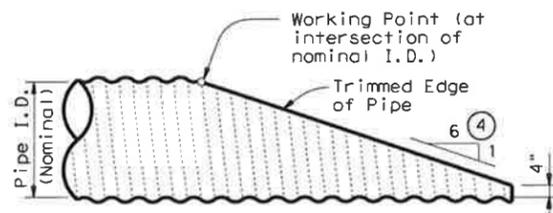
Cross Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Bolts and nuts shall conform to ASTM A307.

All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.



**ISOMETRIC VIEW OF TYPICAL INSTALLATION**



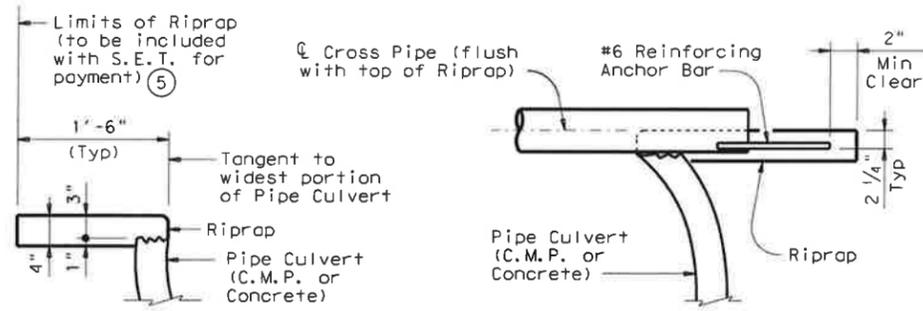
NOTE: All Cross Pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

**SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER**

(Showing Corrugated Metal Pipe Culvert.)  
(Details at Concrete Pipe Culvert are similar.)

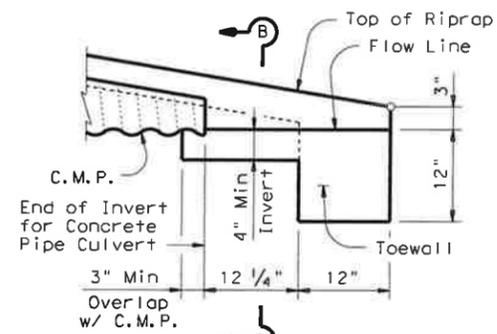
<p><b>SAFETY END TREATMENT</b> FOR DESIGN 1 TO 9 ARCH PIPE CULVERTS TYPE II ~ PARALLEL DRAINAGE</p>			
<p><b>SETP-PD-A</b></p>			
#/P: setpase.dgn DATE: February 2010 REVISIONS:	BY: GAF CHK: SEC DIST:	CD: TxDOT JOB:	CR: JRP CK: GAF HIGHWAY:
11-10 Add note for synthetic fibers		COUNTY:	SHEET NO: <b>123</b>

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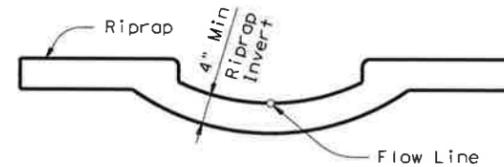
SHOWING TYPICAL PIPE CULVERT & RIPRAP

SHOWING CROSS PIPE WITH ANCHOR BAR



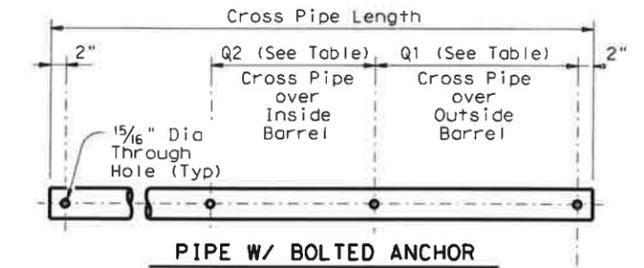
DETAIL "A"

(Showing Invert with Corrugated Metal Pipe Culvert. Concrete Pipe Culvert details are similar. Cross Pipes not shown for clarity.)

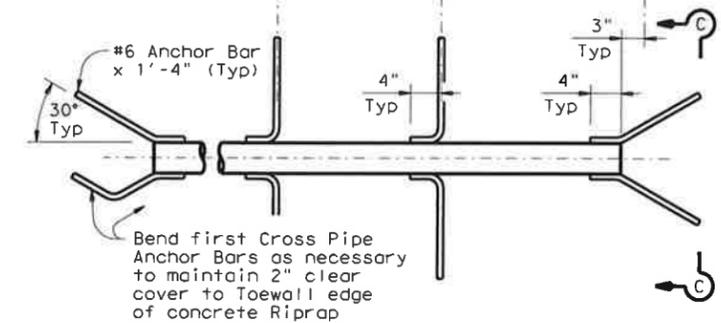


SECTION B-B

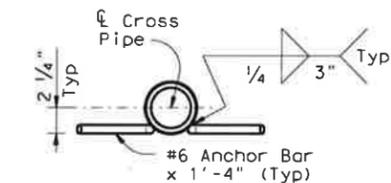
(Cross Pipes not shown for clarity.)



PIPE W/ BOLTED ANCHOR

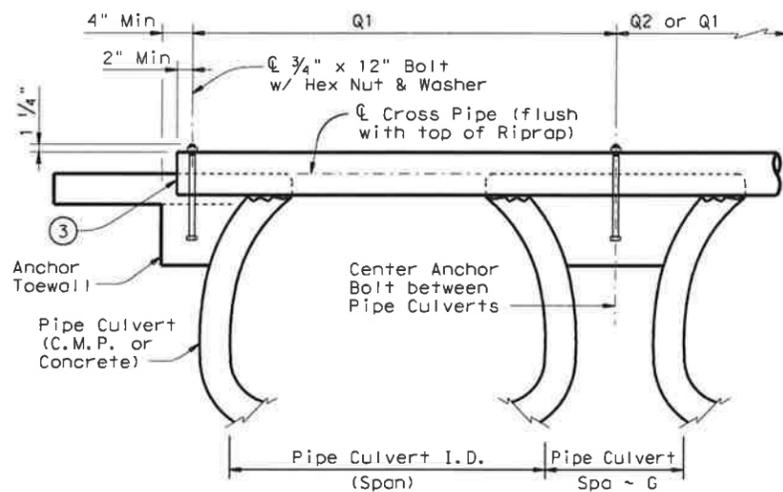


PIPE W/ ANCHOR BARS



SECTION C-C

CROSS PIPE DETAILS



SHOWING CROSS PIPE WITH BOLTED ANCHOR

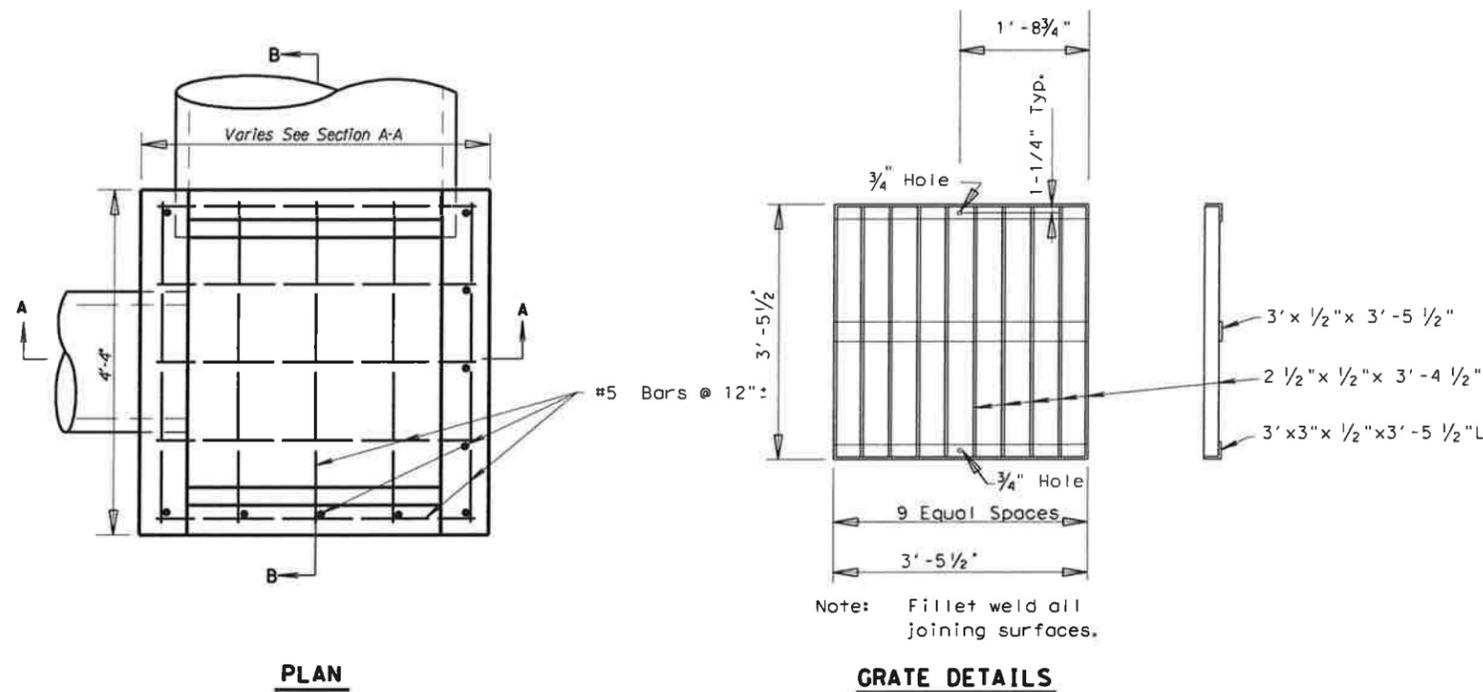
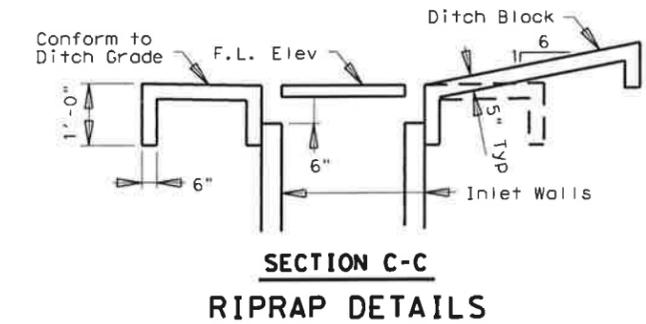
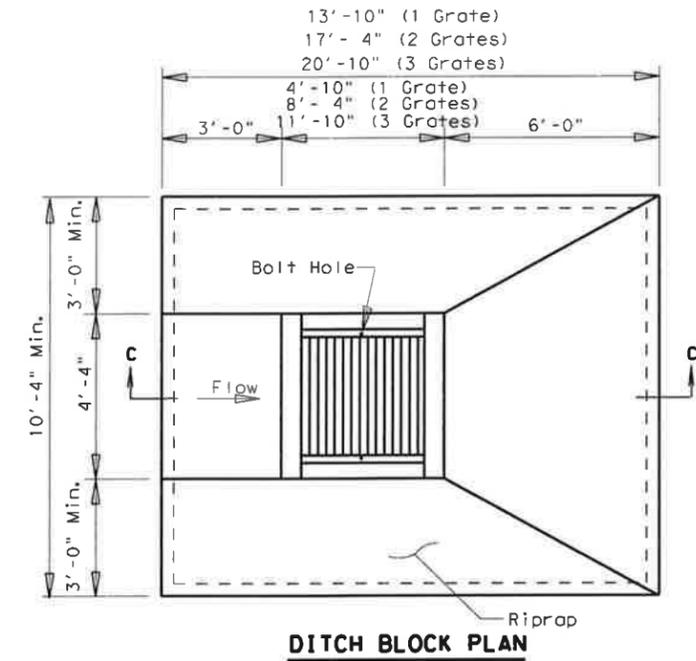
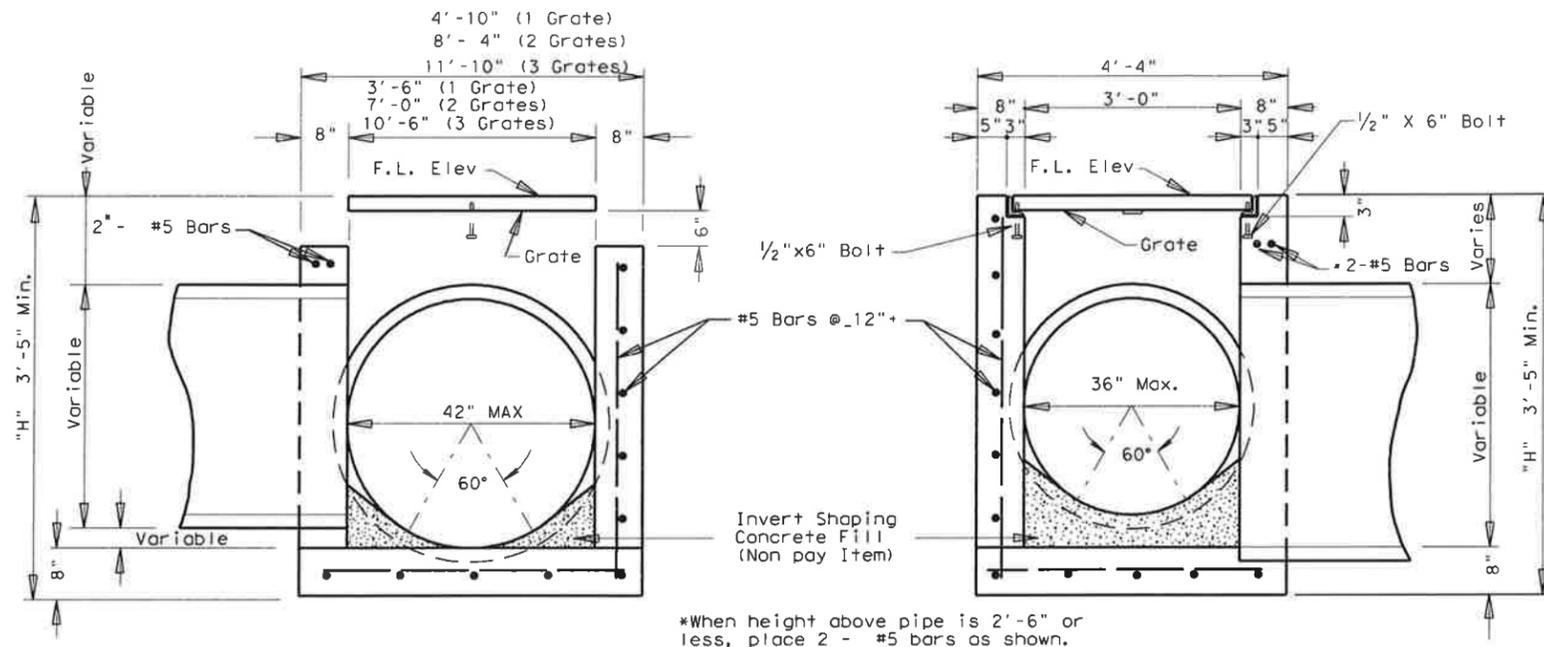
SECTION A-A

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DATE: 8/10/2017 9:17 AM  
FILE:

SHEET 2 OF 2

		Bridge Division Standard	
<b>SAFETY END TREATMENT</b> FOR DESIGN 1 TO 9 ARCH PIPE CULVERTS TYPE II ~ PARALLEL DRAINAGE			
<b>SETP-PD-A</b>			
FILE: setppase.dgn	DR: GAF	CA: TxDOT	DC: JRP
CON: February 2010	SFCT:	JRB	HIGHWAY:
REVISIONS			
11-10 Add note for synthetic fibers	DIST:	COUNTY:	SHEET NO: 124



GENERAL NOTES:

Use Class "A" Concrete for Drop Inlets.  
Install Mounting Bolts as directed.  
Use galvanized Bolts, Nuts and Washers.

Place Riprap Concrete Class "B" and Grates in accordance with Item 432, "Riprap" and Item 471, "Frames, Grates, Rings and Covers." Consider these items subsidiary to pertinent items.

For installation on Box Culverts, adjustments may be made by the Engineer to fit unusual conditions.

Place Riprap Concrete Class "B" as soon as practical to minimize erosion.

Use WWF 6X6-W2.9X2.9 Reinforcement for Riprap.

Ensure connecting pipes enters within 10 degrees of normal to inlet wall. Use pipe elbow or curved approach alignment as necessary to meet this requirement.

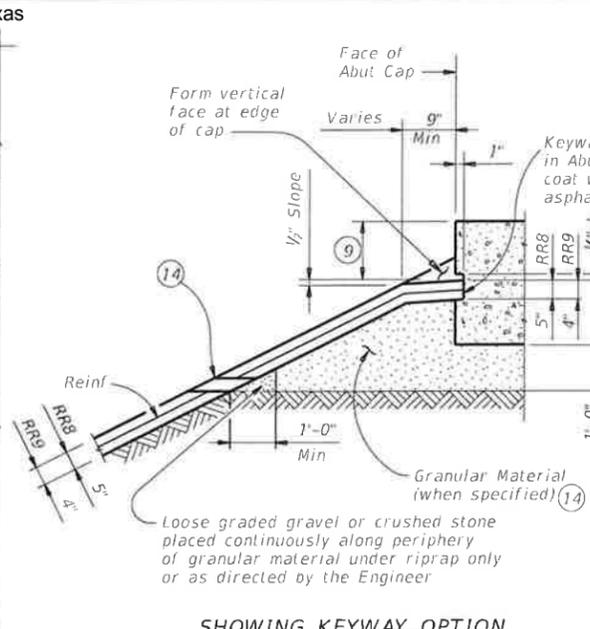
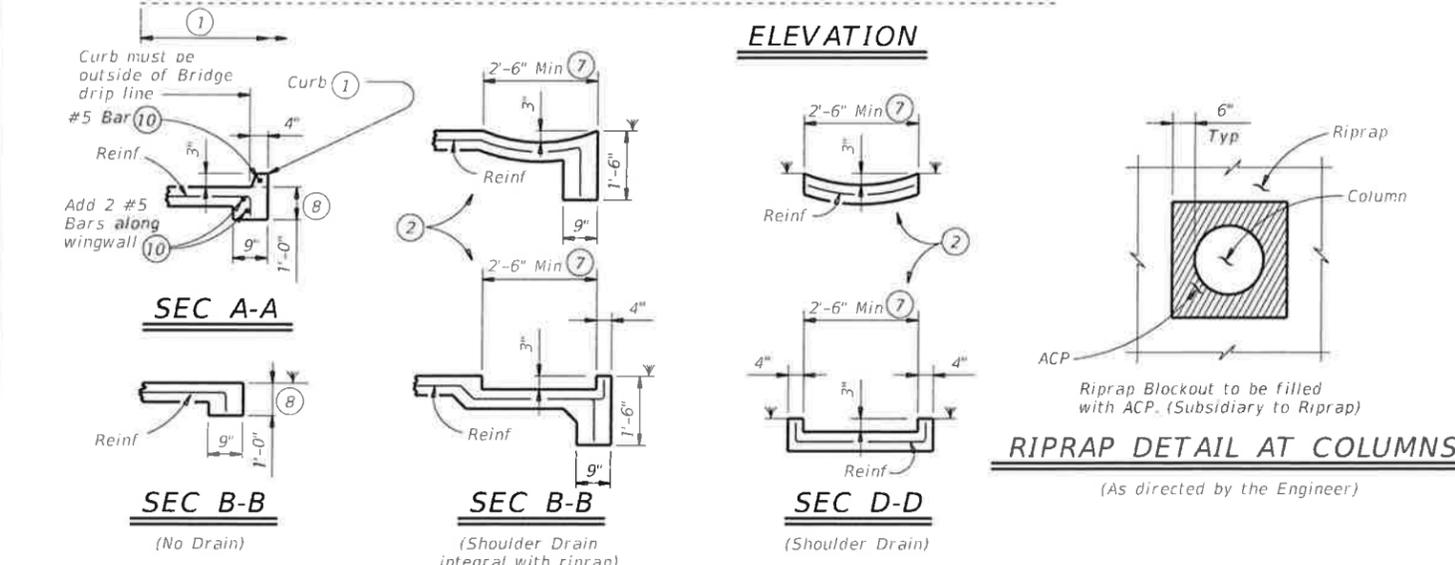
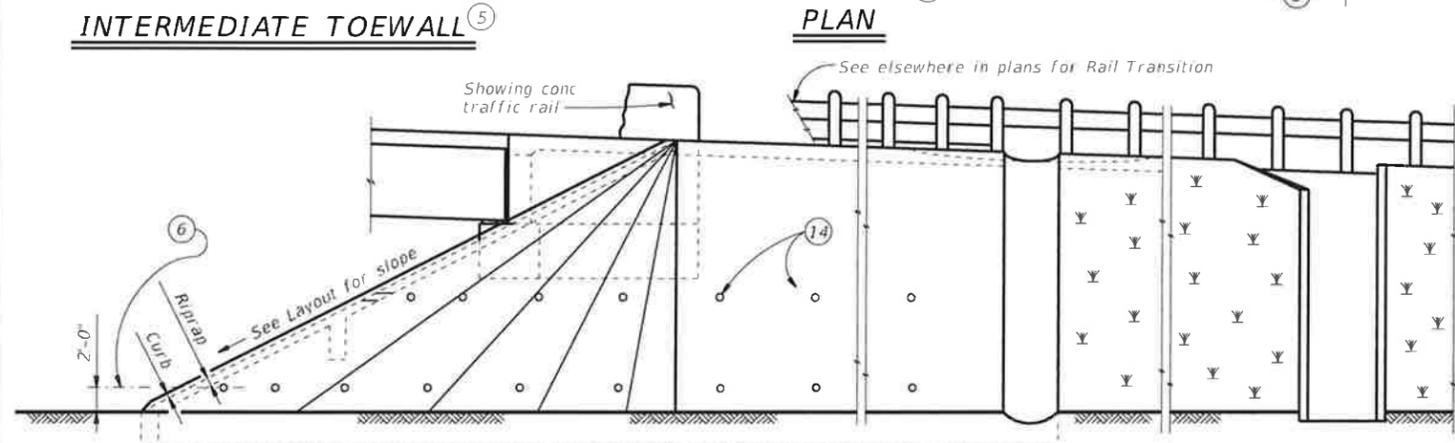
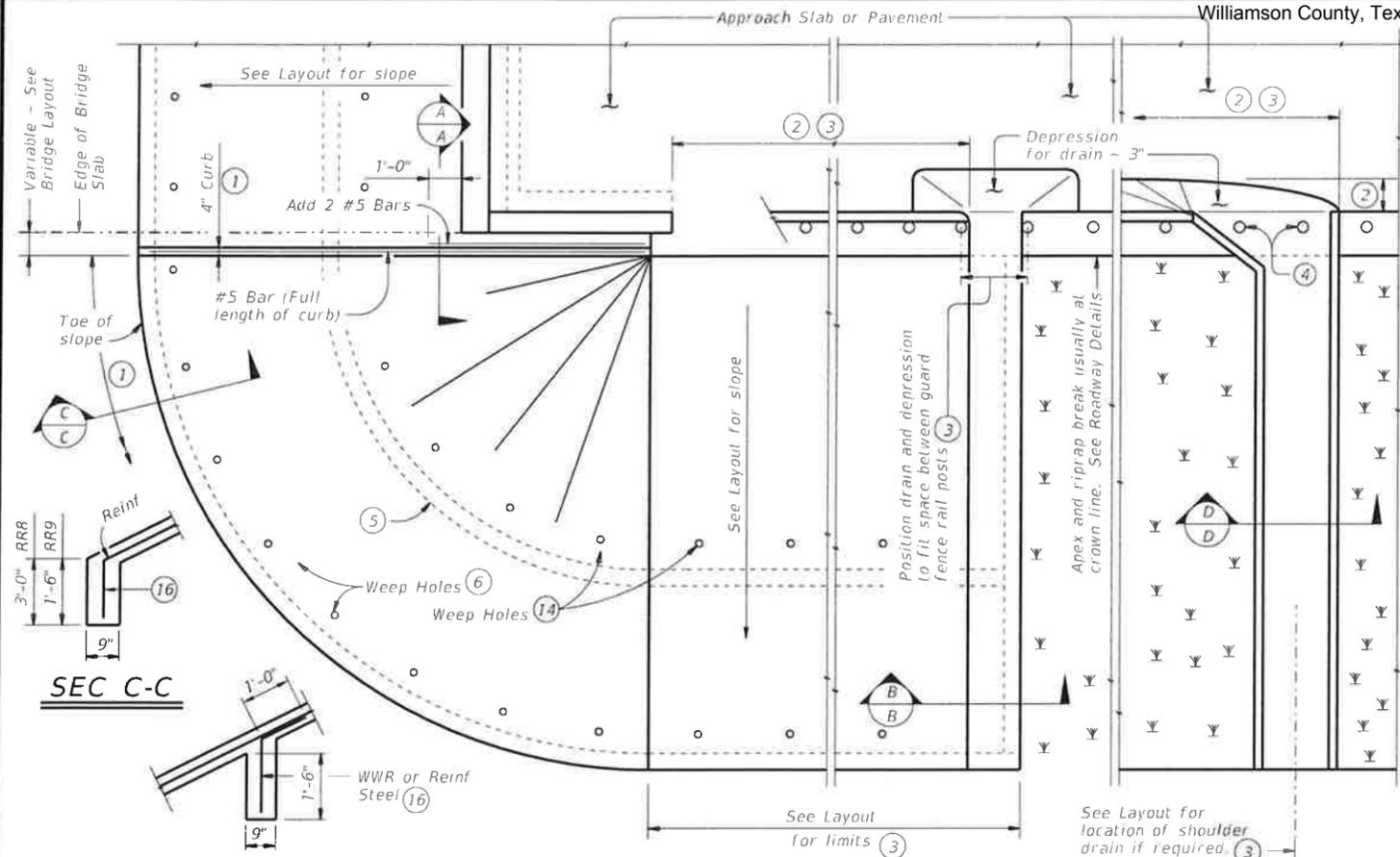
Consider Excavation and Backfill subsidiary to pertinent item.

**Texas Department of Transportation**  
Austin District Design

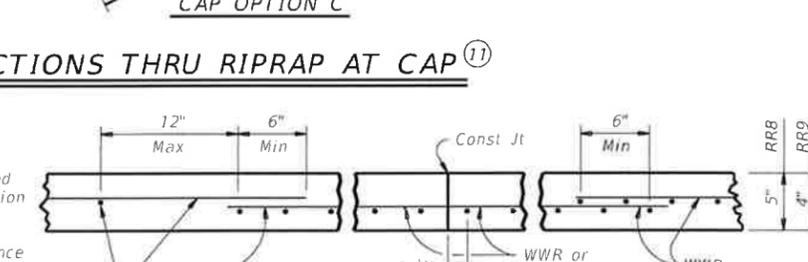
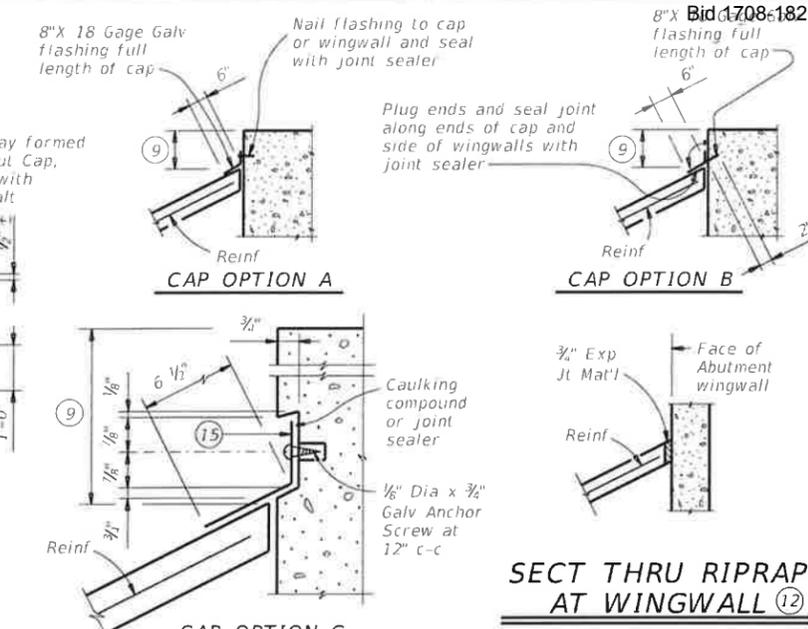
## DROP INLET DETAILS TYPE I

Austin District Standard

© TxDOT 2003	DIST	FED REG	FEDERAL AID PROJECT	SHEET
REVISIONS	AUS	6		
3/03 District Update	COUNTY	CONTROL	SECT	JOB HIGHWAY
9/04 2004 Update				125



- SHOWING KEYWAY OPTION**
- When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
  - Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
  - Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
  - See details elsewhere in plans for installation of guard fence posts through concrete riprap.
  - Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.

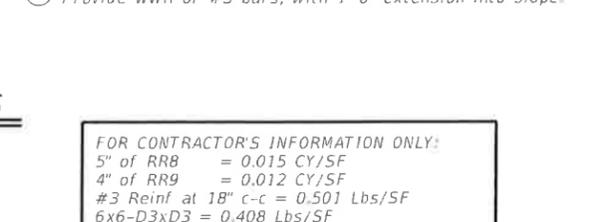


- REINFORCEMENT DETAILS (13)**
- See General Notes for optional synthetic fiber reinforcement.

**GENERAL NOTES:**

- Provide Class "B" concrete with a minimum compressive strength of 2,000 psi unless noted elsewhere in plans.
- Provide Grade 60 reinforcing steel.
- Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete unless noted otherwise.
- Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.
- Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".
- Use reinforcing bars, deformed Welded Wire Reinforcement (WWR), or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.
- See Layout for limits of riprap.
- RR8 is to be used on stream crossings.
- RR9 is to be used on other embankments.

- Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
- Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
- Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
- Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
- #5 bars shown are required even when synthetic fiber reinforcing option is selected.
- Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
- Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
- Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
- If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
- 8" x 18 Gage Galv Sheet Metal
- Provide WWR or #3 bars, with 1'-0" extension into slope.



**RIPRAP DETAIL AT COLUMNS**  
(As directed by the Engineer)

**FOR CONTRACTOR'S INFORMATION ONLY:**

5' of RR8	= 0.015 CY/SF
4' of RR9	= 0.012 CY/SF
#3 Reinf at 18" c-c	= 0.501 Lbs/SF
6x6-D3xD3	= 0.408 Lbs/SF

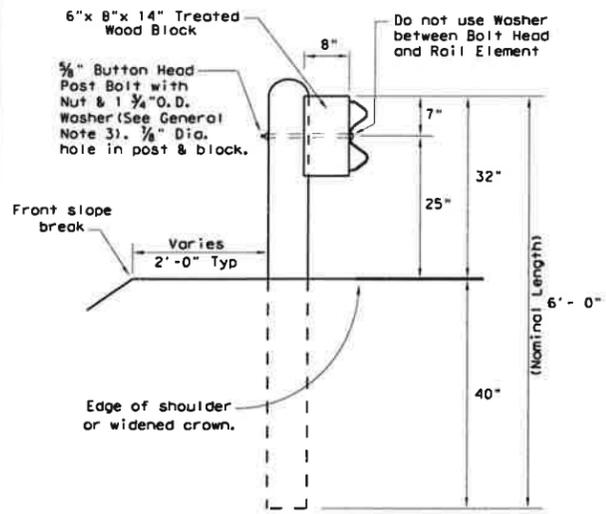
**Texas Department of Transportation** Bridge Division Standard

**CONCRETE RIPRAP AND SHOULDER DRAINS EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)**

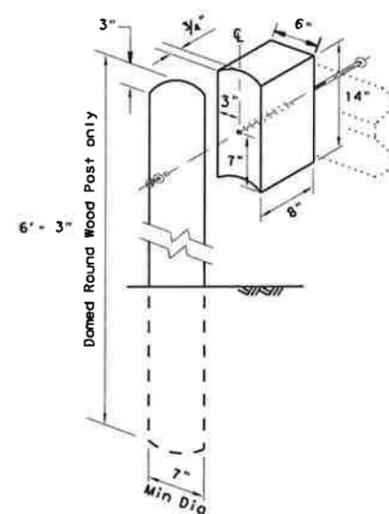
**CRR**

FILE	CRFSTRE:dg9	DATE	TxDOT	DATE	TxDOT	DATE	TxDOT
REVISED		DATE	TxDOT	DATE	TxDOT	DATE	TxDOT
DIST		COUNTY					

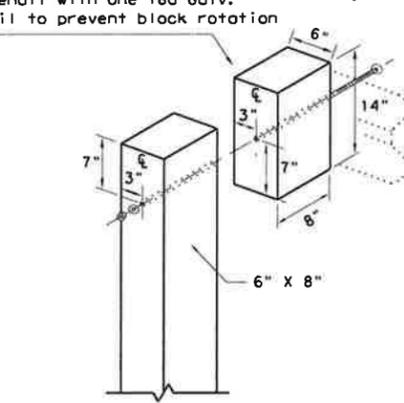
126  
p. 226



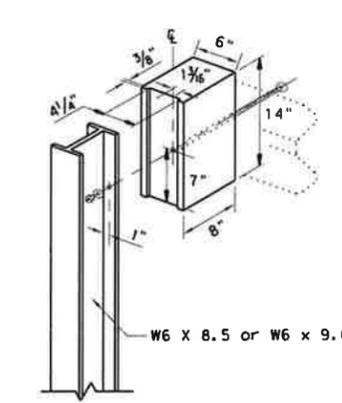
TYPICAL POST



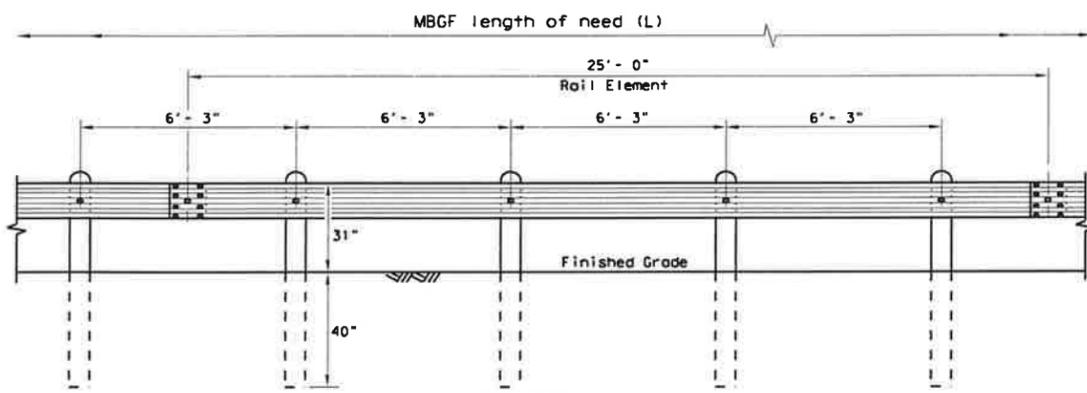
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST



WOOD BLOCK TO STEEL POST

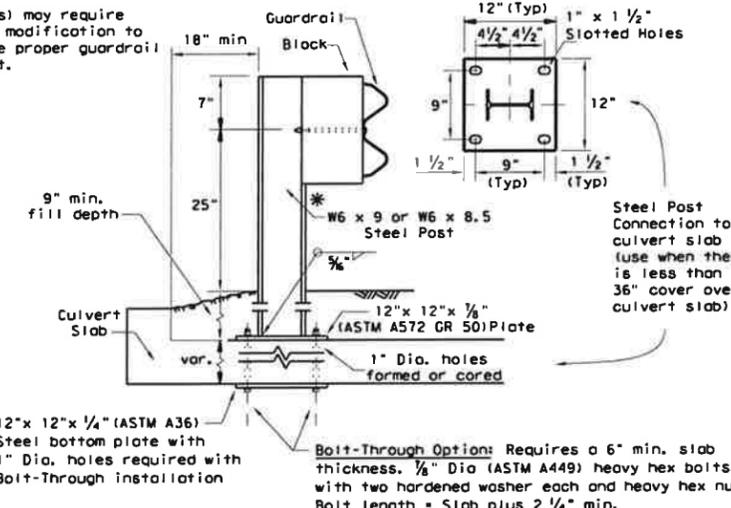


ELEVATION MID-SPAN RAIL SPLICE

Showing a 25'-0" section of W-Beam rail, 12'-6" rail sections may also be supplied (See General Note 2)

Direction of Traffic

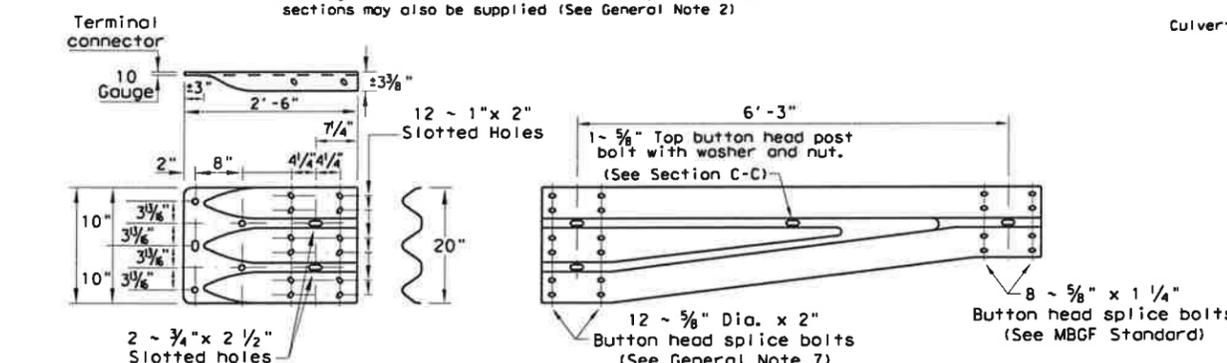
\* Post(s) may require field modification to ensure proper guardrail height.



LOW FILL CULVERT POST

Culverts of 25 ft. or less, see GF(31)LS standard for "Long Span" option.

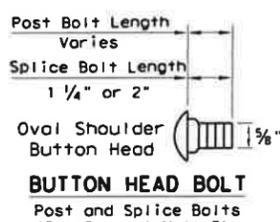
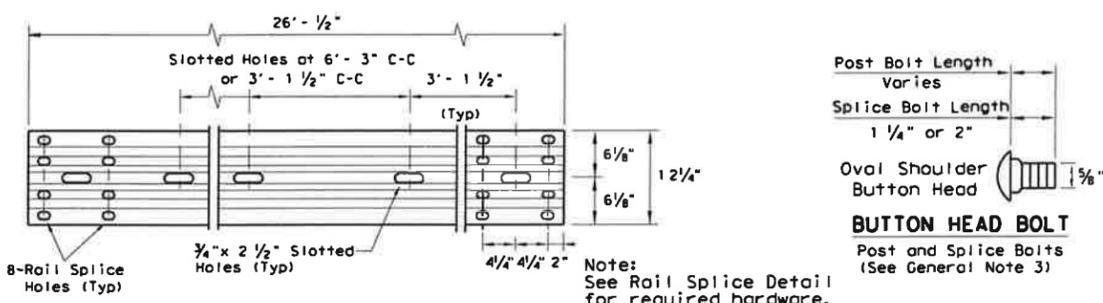
**Epoxy Note:**  
**Epoxy Anchor Option:** This option may only be used if the culvert slab is 8" min. thick. Threaded anchor rods must be 1/2" Dia. ASTM A449 or A193 Grade B7 with heavy hex nut, and one hardened washer each. Embed anchor rods 6" with Hilti HIT RE 500 epoxy adhesive. Other Type III Class C epoxy adhesives meeting the requirements of DMS-6100, "Epoxy and Adhesives", may be used if it can be demonstrated that they meet or exceed the strength of Hilti HIT RE 500 with the same embedment depth and threaded rod dia. Follow the manufacturer's requirements for installing epoxied threaded rods. Extend rods 1/4" min. beyond nut.



THREE-BEAM TERMINAL CONNECTION

(SEE GENERAL NOTES 6 & 7 FOR REQUIRED HARDWARE)

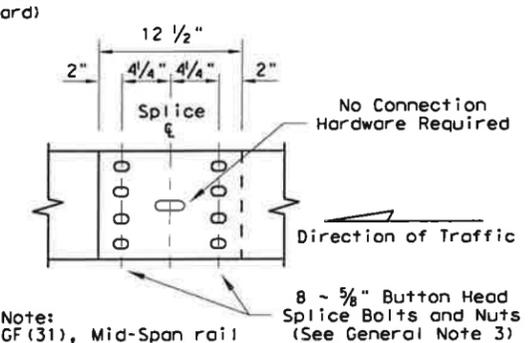
NON-SYMMETRICAL TRANSITION TO W-BEAM (10 GAUGE)



BUTTON HEAD BOLT

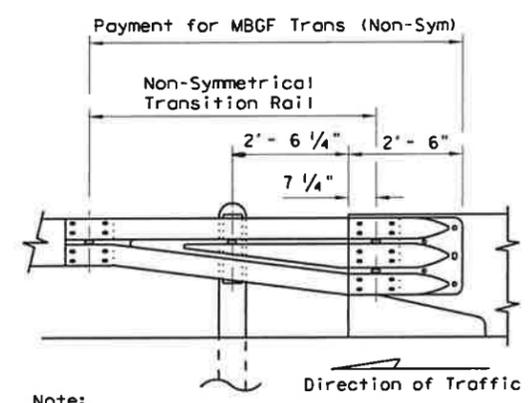
Post and Splice Bolts (See General Note 3)

Note: See Rail Splice Detail for required hardware.



MID-SPAN RAIL SPLICE DETAIL

Note: GF(31), Mid-Span rail splices are required with 6'-3" post spacings.



DOWNSTREAM RAIL ATTACHMENT

Note: All rail elements shall be lapped in the direction of adjacent traffic.

- The type of post (round wood post, rectangular wood post, or steel post) will be as shown in the plans. The exact position of MBGF shall be shown in the plans or as directed by the Engineer. Steel posts to be galvanized in accordance with Item 445, "Galvanizing."
- Rail element shall meet the requirements of Item 540, "Metal Beam Guard Fence" except as modified in the plans. The Contractor may furnish rail elements of 25'-0", or 12'-6" (nom.) lengths. Rail elements may have slotted holes at 3'-1 1/2" C-C or 6'-3" C-C. A special length of rail may be manufactured to accommodate the downstream anchor terminal (DAT) and the transition sections of guardrail.
- Button head "post" bolts (ASTM A307) shall be of sufficient length to extend through the full thickness of the nut (ASTM A563) and Type A (1 3/4" O.D.) washer and not more than 1" beyond it. Button head "splice" bolts (ASTM A307) are 5/8" x 1 1/4" (or 2" long at triple rail splices) with a 5/8" double recessed nut (ASTM A563). Triple beam "connection" 7/8" dia. (ASTM A325) hex bolts shall be of sufficient length to extend through the full thickness of the rail, washers, and nuts.
- Fittings (bolts, nuts, and washers) shall be galvanized in accordance with Item 445, "Galvanizing." Fittings shall be subsidiary to the bid item.
- Crown shall be widened to accommodate the Metal Beam Guard Fence.
- The lateral approach to the guard fence, shall have a maximum slope of 1V:10H.
- If shown elsewhere in the plans or as directed by the Engineer, the guard fence may be flared at a rate of 25:1 or flatter.
- Unless otherwise shown in the plans, guard fence placed in the vicinity of curbs shall be positioned so that the face of curb is located directly below or behind the face of the rail. Rail placed over curbs shall be installed so that the post bolt is located approximately 25 inches above the gutter pan or edge of shoulder.
- If solid rock is encountered within 0 to 18" of the finished grade, drill a 22" dia. hole, or drill two 12" dia. front to back overlapping holes, 24" into the rock. If solid rock is encountered below 18", drill a 12" dia. hole, 12" into the rock or to the standard embedment depth, whichever may be less. Any excess post length, after meeting these depths, may be field cut to ensure proper guardrail mounting height. Backfill with a cohesionless material.
- Posts shall not be set in concrete, of any depth.
- Special fabrication will be required at installations having a curvature of less than 150 ft. radius.
- Unless otherwise shown in the plans, a composite material post and/or block that meets the requirements of DMS-7210, "Composite Material Posts and Blocks for Metal Beam Guard Fence" may be substituted for posts and/or blocks of similar dimensions. The Construction Division, TxDOT maintains a Material Producer List (MPL) for producers of materials conforming to DMS-7210. Only producers on the MPL may furnish composite material posts and/or blocks.
- For posts located partially or wholly between precast box culvert units, the use of a cast-in-place concrete closure between boxes is required. See Detail "A" on Bridge Standard SCP-MD.

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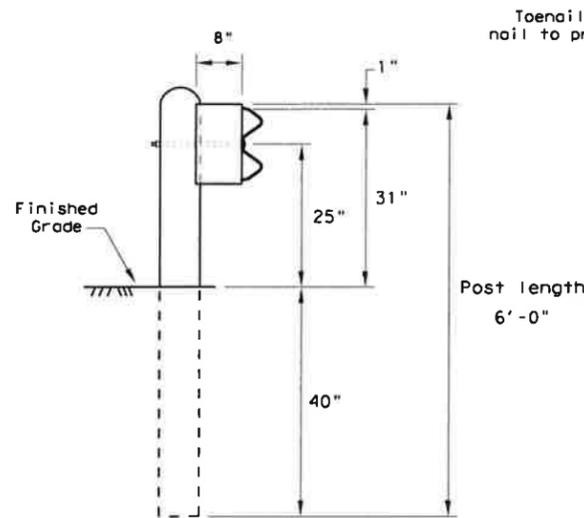
		Design Division Standard	
<h1>METAL BEAM GUARD FENCE</h1> <h2>GF (31) - 14</h2>			
FILE: gf3114.dgn	DWG: TxDOT	CHK: AM	DWG: VP
© TxDOT: December 2011	CONT: SECT	JOB:	HIGHWAY:
REVISIONS:	DIST:	COUNTY:	SHEET NO. 127

**GENERAL NOTES**

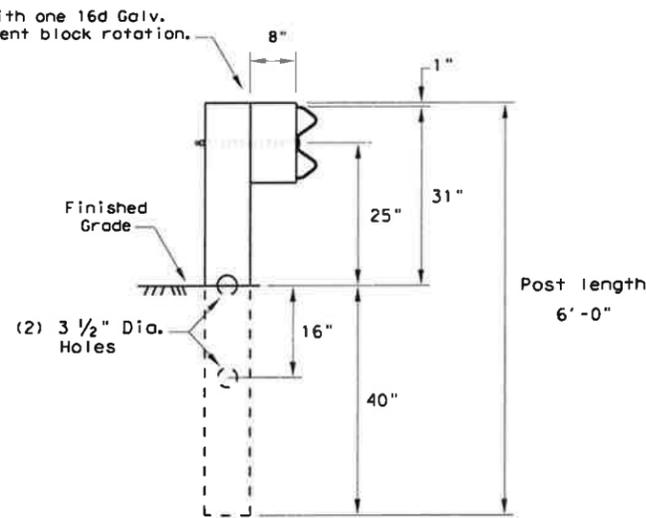
1. The type of line post (round wood post, rectangular wood post, or steel post) will be as shown in the plans. The exact position of the transitions shall be as shown in the plans or as directed by the Engineer. Steel posts to be galvanized in accordance with Item 445, "Galvanizing."
2. Rail element shall meet all requirements of Item 540, "Metal Beam Guard Fence" except as modified on the plans. The Contractor may furnish rail elements of 12 1/2 or 25 foot nominal lengths.
3. Rail post holes are offset 3'- 1 1/2" from standard guardrail to accommodate the midspan splicing.
4. Button head post bolts (ASTM A307) shall be of sufficient length to extend through the full thickness of the nut (ASTM A563) and no more than 3/4" beyond it. Button head splice bolts (ASTM A307) are 5/8" x 1 1/4" with a 5/8" double recessed nut (ASTM A563). Galvanized fittings (bolts, nuts, and washers) shall be in accordance with Item, "Metal For Structures". Fittings shall be subsidiary to the bid item requiring construction of transition.
5. Where solid rock is encountered or where shown on the plans, the diameter of the holes shall be approximately 12 inches, the backfilling shall be with a cohesionless material, and embedment depth shall be 1' - 6" or more as directed by the Engineer.
6. Posts shall not be set in concrete, of any depth.
7. Refer to GF(31) Standard Sheet for additional details.

NOTE: Field drilled holes shall be repaired in accordance with Item 445, "Galvanizing". Flame cutting of holes in guardrail shall not be permitted.

**Standard Line Post Installation**

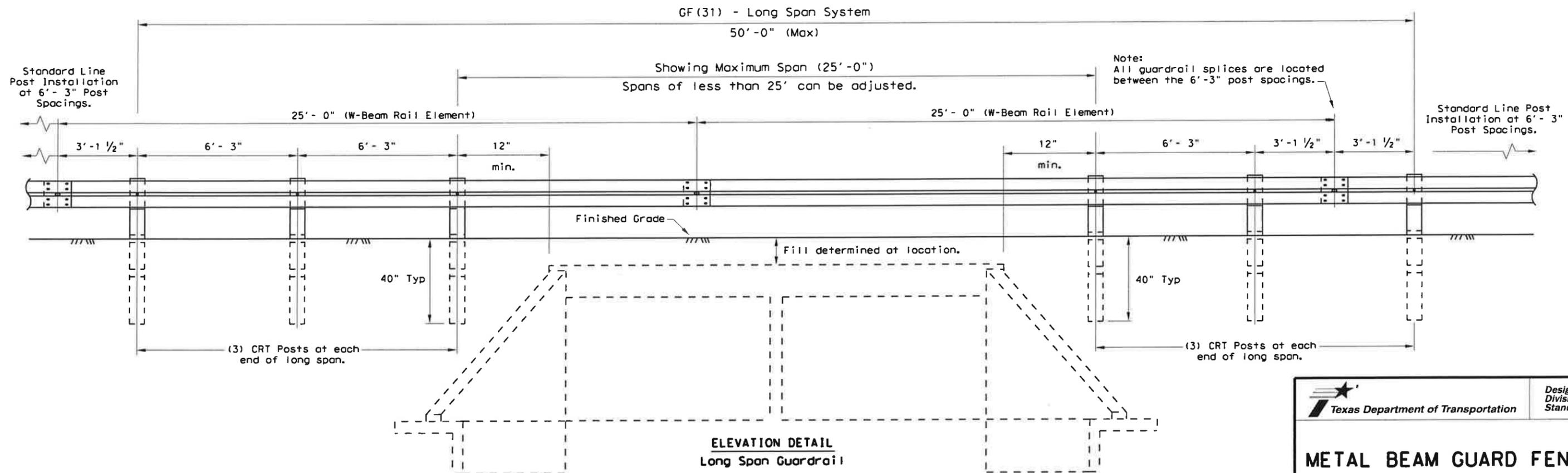
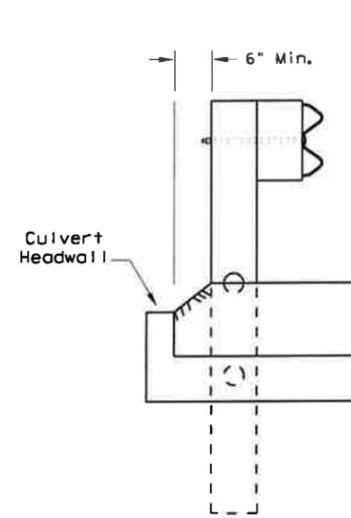


**Rectangular CRT Post (6"x 8" x 6' Long)**



(6) CRT required.  
See Elevation Detail for locations.

**Lateral Offset Between the Guardrail and the Culvert Headwall**



**ELEVATION DETAIL  
Long Span Guardrail**

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		Design Division Standard	
<b>METAL BEAM GUARD FENCE (LONG SPAN)</b>			
<b>GF (31) LS-14</b>			
FILE: gf31ls14.dgn	DW: TxDOT	CK: AM	DW: VP
© TxDOT: December 2011	CONT	SECT	JOB
REVISIONS		HIGHWAY	
DIST	COUNTY	SHEET NO.	
		<b>128</b>	

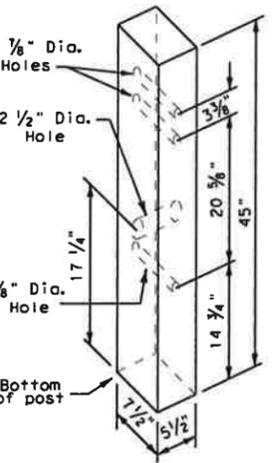
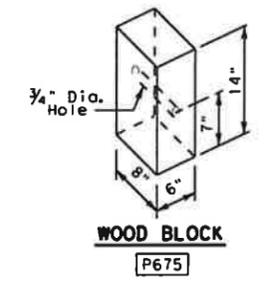
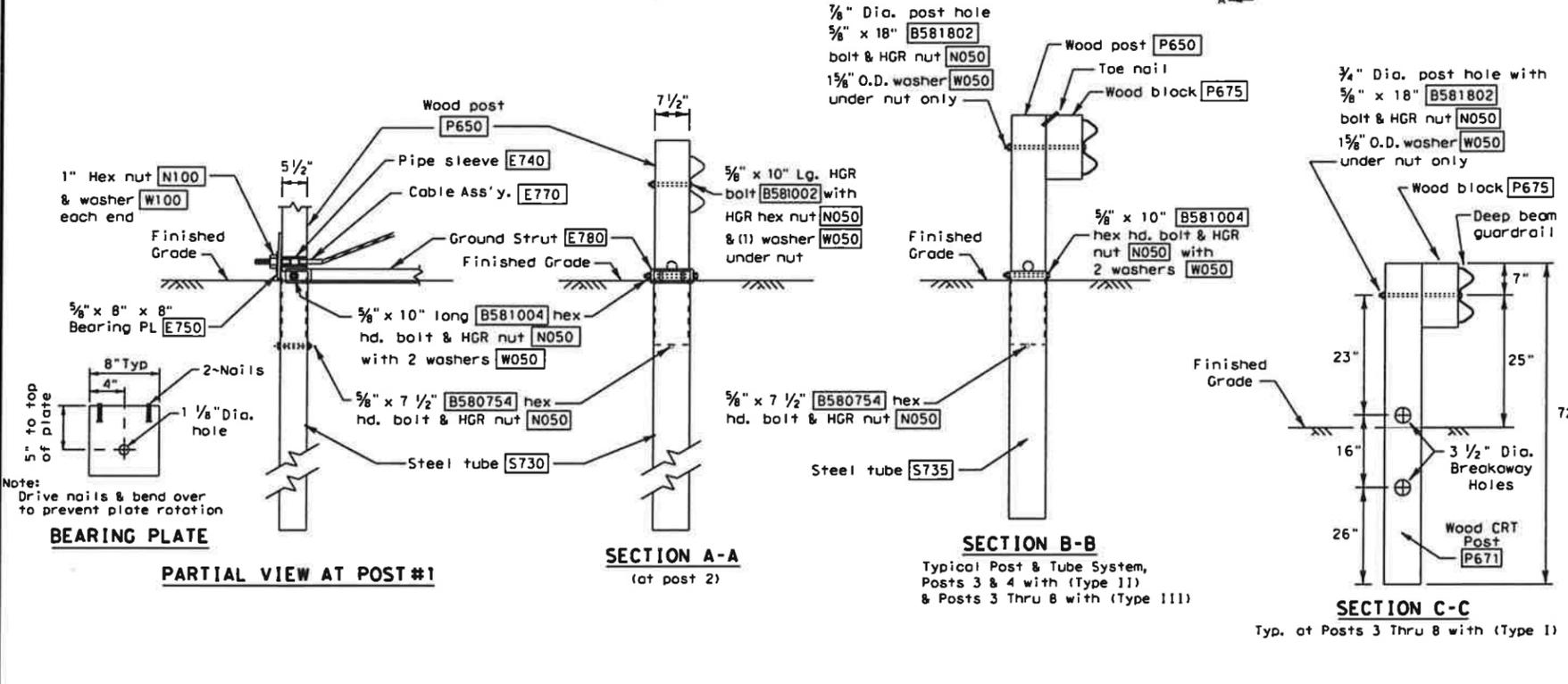
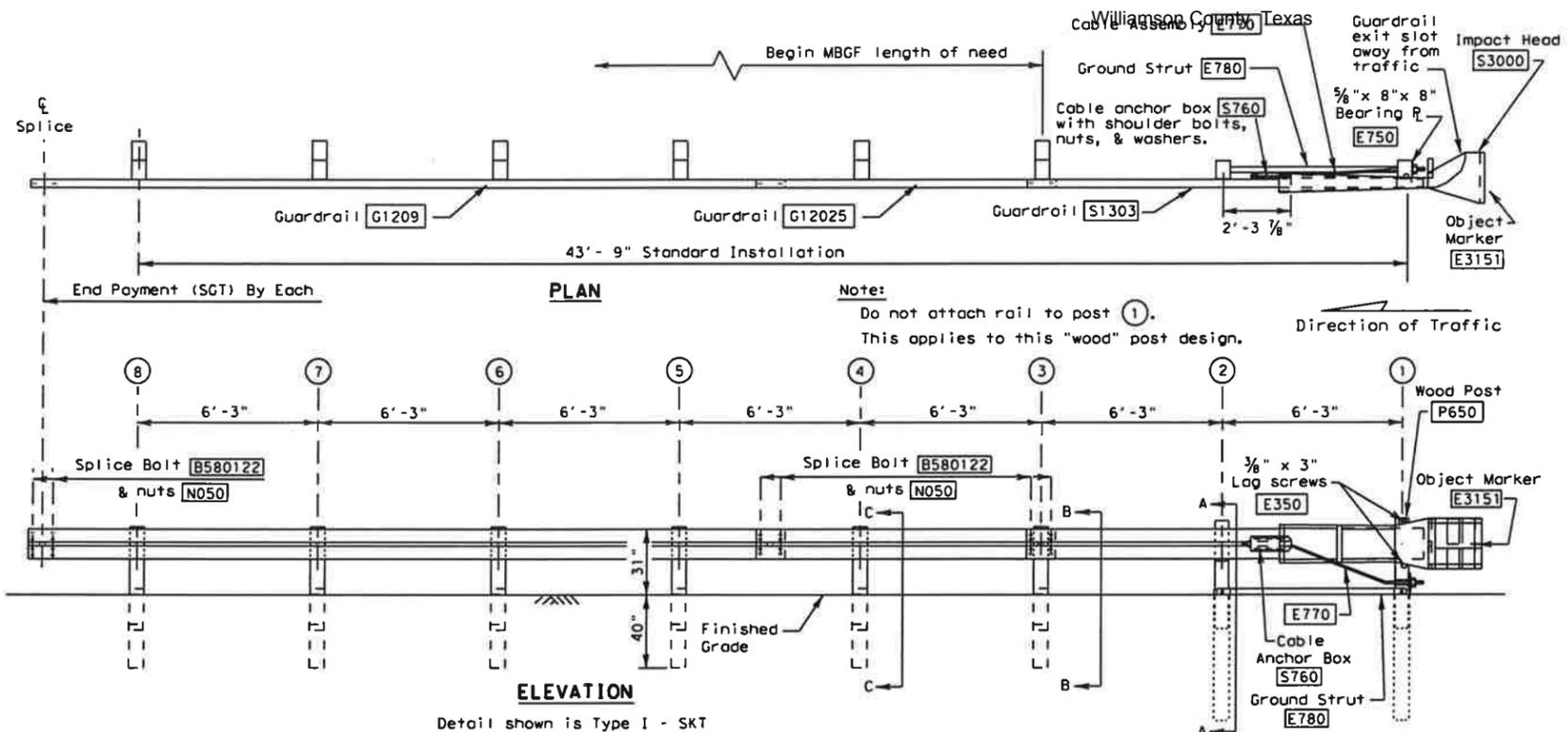


**GENERAL NOTES**

- For additional information contact: Interstate Steel Inc. (432) 263-3725
- The Type of SGT unit will be specified elsewhere in the plans. The numbers in the circles indicate post position. The Type of SGT unit chosen is a maintenance consideration and does not affect the systems performance.
 

Post & Tube Options		Post Only	
Type I Posts	① thru ②	Posts ③ thru ⑧	
Type II Posts	① thru ④	Posts ⑤ thru ⑧	
Type III Posts	① thru ⑧	None	
- SGT's placed within the "minimum" 150 ft. radius, shall be installed straight. Standard rail elements may be installed within the radius, without special fabrication.
- All bolts, nuts cable assemblies, cable anchors, steel tubes & bearing plates shall be galvanized.
- A flare rate of 25:1 may be used over the first 50 ft. of the system to prevent the terminal head from encroaching the shoulder. The flare may be decreased or eliminated for specific installations, if directed by the Engineer.
- The steel tubes shall not protrude more than 4 inches above ground. Site grading may be necessary to meet this requirement.
- The steel tubes may be driven with an approved driving head. They shall not be driven with the wood post in the tube. If the steel tubes are placed in drilled holes, the backfill material must be satisfactorily compacted to prevent tube settlement.
- If solid rock is encountered. See the Manufacturer's installation manual for the proper installation guidance.
- The breakaway cable assembly must be taut. A locking device, (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening the nuts.
- The wood blocks shall be "toe nailed" to the rectangular wood posts to prevent them from turning when the wood shrinks. The bearing plate on the front post shall also be "toe nailed" to prevent rotation.
- For curb installations, the soil tubes and posts shall be installed at the proper ground elevation behind the curb. The posts will then require field drilling new holes to accommodate the rail to post connection bolt to maintain the proper height of the rail above the gutter pan. The excess post length above the rail will be removed if directed by the Engineer.
- An object marker shall be installed on the front of the impact head as detailed on D&M(VIA).

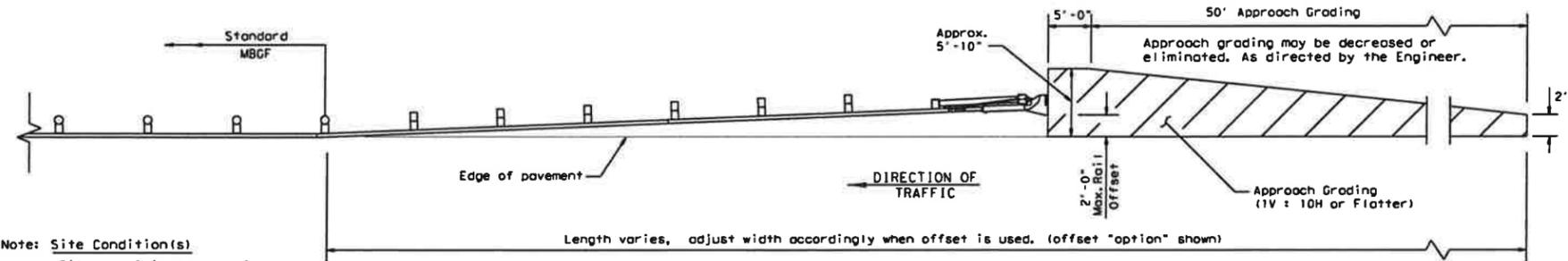
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All measurements should be taken from bottom of posts.  
**UNIVERSAL WOOD POST**  
P650

POST & TUBE OPTIONS		
Type I post	① thru ②	
Type II post	① thru ④	
Type III post	① thru ⑧	

POST & TUBE OPTIONS		BILL OF MATERIAL		
Item #	Type	Type	DESCRIPTION	
S1303	1	1	1	Guardrail (12 Ga.) 12' - 6" SKT
G12025	1	1	1	Guardrail (12 Ga.) 9' - 4 1/2"
G1209	1	1	1	Guardrail (12 Ga.) 25' - 0"
S730	2	2	2	Steel Tube - 6" x 8" x 72" x 1/8" min. or 3/16"
S735	0	2	6	Steel Tube - 6" x 8" x 54" x 1/8" min. or 3/16"
P650	2	4	8	Wood Posts - 5 1/2" x 7 1/2" x 45"
P671	6	4	0	Wood CRT Posts - 6" x 8" x 72"
P675	6	6	6	Wood Block - 6" x 8" x 14"
E740	1	1	1	Pipe Sleeve - 2" Std. Pipe x 5 1/2"
E750	1	1	1	Bearing Plate - 5/8" x 8" x 8"
S760	1	1	1	Cable Anchor Box
E770	1	1	1	Cable Assembly
E780	1	1	1	Ground Strut
S3000	1	1	1	Impact Head
HARDWARE				
B580754	2	4	8	5/8" x 7 1/2" Hex Hd. Bolt
B581004	2	4	8	5/8" x 10" Hex Hd. Bolt (Top of Tubes)
W050	11	15	23	3/8" Washers
B581002	1	1	1	5/8" x 10" HGR Post Bolt (Post 2)
B580122	16	16	16	5/8" x 1 1/4" HGR Splice Bolt
B581802	6	6	6	5/8" x 18" HGR Post Bolt (Posts ③ thru ⑧)
N050	35	39	47	5/8" HGR Nut (24-Spl, Varies-Posts, 2-Strut)
E350	2	2	2	3/8" x 3" Lag Screw
N100	2	2	2	1" Hex Nut (Anchor Cable)
W100	2	2	2	1" Washer (Anchor Cable)
SB12A	8	8	8	Cable Anchor Box Shoulder Bolts
N012A	8	8	8	1/2" Structural Nut
W012A	8	8	8	1/2" Structural Washer
E3151	1	1	1	Object Marker - (18" x 18")



Note: Site Conditions) Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.

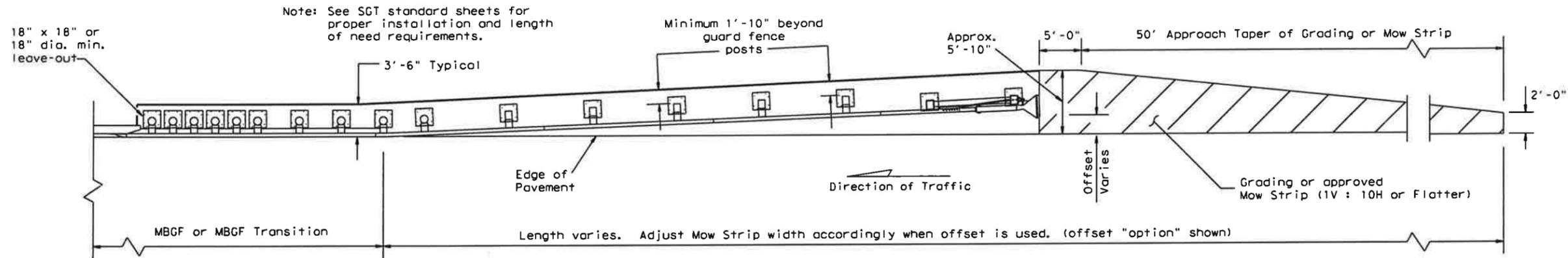
**APPROACH GRADING AT GUARDRAIL END TREATMENTS**

**Texas Department of Transportation**  
Design Division Standard

**SINGLE GUARDRAIL TERMINAL (SKT-31) (WOOD POST) SGT (8) 31-14**

FILE: sg183114.dgn	DW: TxDOT	CK: AM	DW: BD/VP	CK: VP
© TxDOT December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS				
DIST	COUNTY			SHEET NO.

130  
p. 230

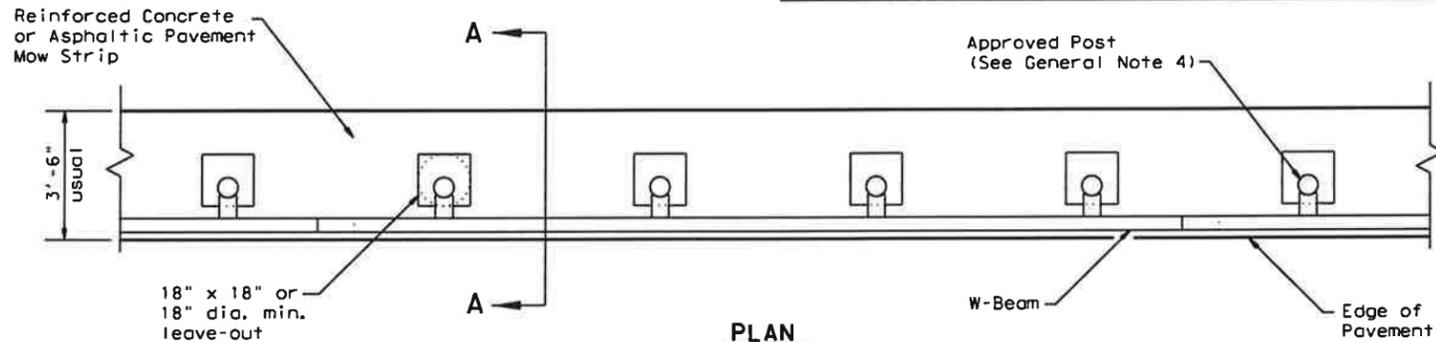


**GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS**

Note: Site Condition(s)  
 Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.  
 Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

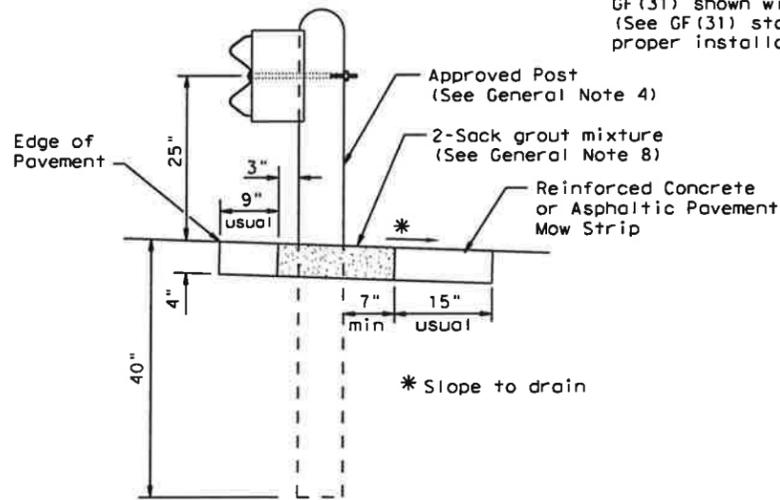
**GENERAL NOTES**

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments (See SGT standards for proper SGT installation).
2. Mow strips shall be asphaltic pavement or reinforced concrete (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Asphaltic pavement shall meet the requirements of the item, and be placed in accordance with the pertinent bid item as shown in the plans. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. The type of approved post will be as shown in the plans. See the applicable standard sheets for additional details and information.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for asphaltic pavement or reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with no more than a 2-sack grout mixture and placed in accordance with Section 421.2.F, "Mortar and Grout." Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of asphaltic pavement or reinforced concrete.

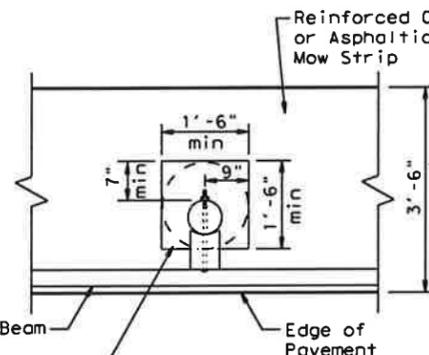


**PLAN**

GF (31) shown with Mow Strip (See GF (31) standard sheet for proper installation)



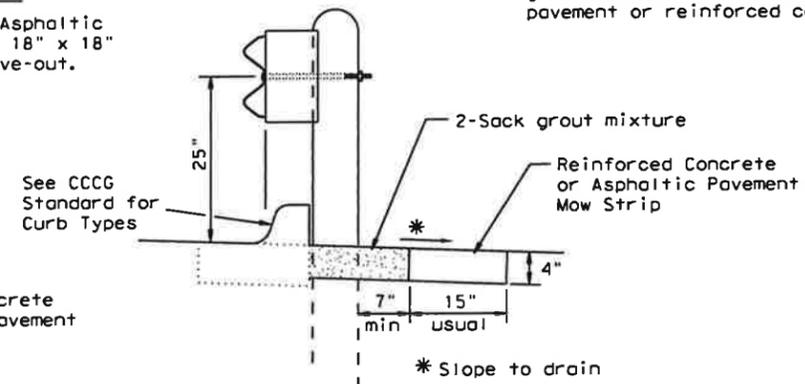
**SECTION A-A**  
Typical



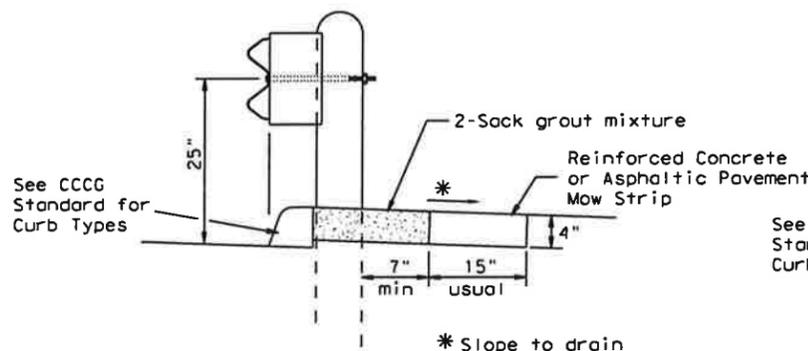
**MOW STRIP DETAIL**

Reinforced Concrete or Asphaltic Pavement Mow Strip with 18" x 18" or 18" dia. minimum leave-out.

Fill leave-out with 2-Sack grout mixture (See General Note 8)

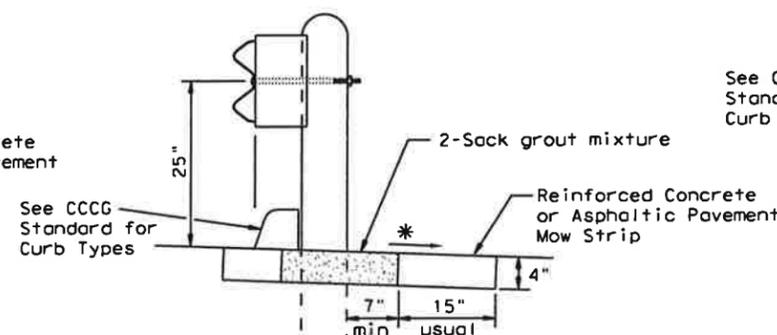


**CURB OPTION (3)**



**CURB OPTION (1)**

This option will increase the post embedment through out the system.



**CURB OPTION (2)**

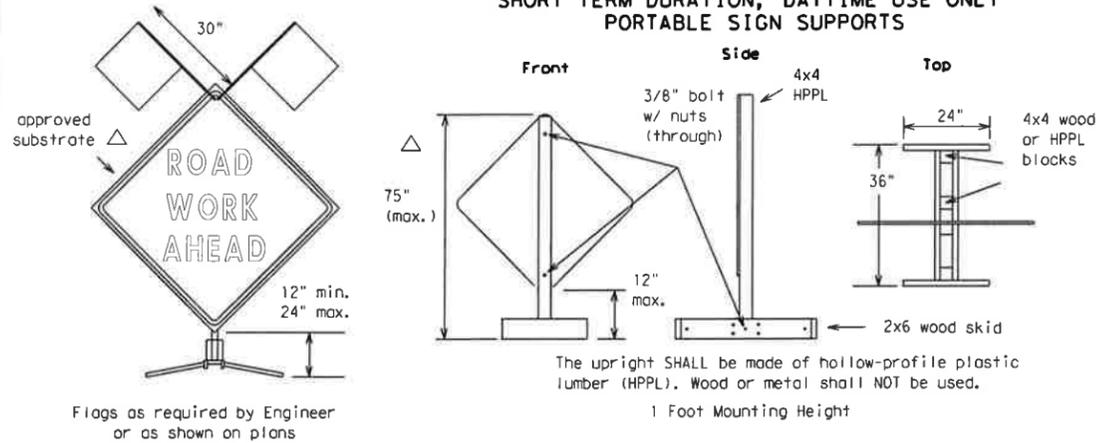
Curb shown on top of mow strip

		Design Division Standard	
<b>METAL BEAM GUARD FENCE (MOW STRIP)</b>			
<b>GF (31)MS-11</b>			
FILE: gf31ms11.dgn	DN: TxDOT	CK: AM	DW: BD
© TxDOT December 2011	CONT	SECT	JOB
REVISIONS		DIST	COUNTY
		SHEET NO. 131	

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EXAMPLES OF SIGN SUPPORTS

△ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.



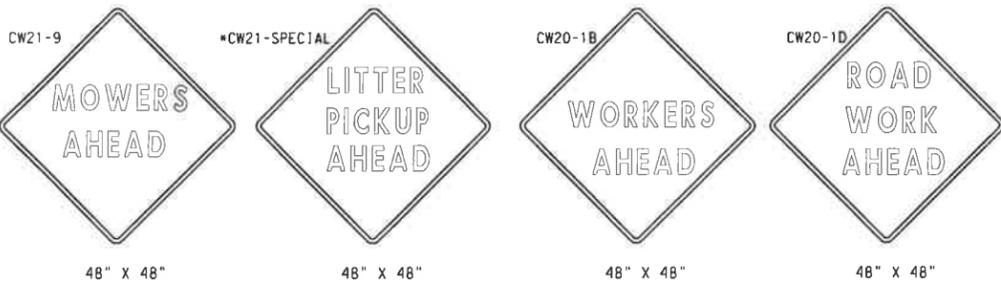
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports.

Nails will NOT be allowed.

SHORT TERM DURATION, DAYTIME USE ONLY PORTABLE SIGN SUPPORTS

The upright SHALL be made of hollow-profile plastic lumber (HPPL). Wood or metal shall NOT be used.

1 Foot Mounting Height



SIGN IN ACCORDANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS

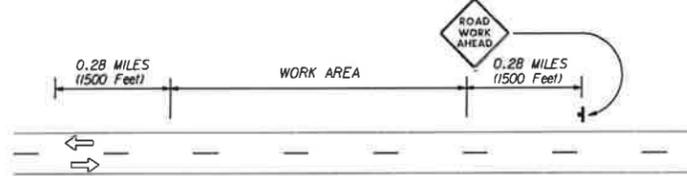
MOWERS AHEAD SIGNS ARE USED FOR MOWING OPERATIONS.

LITTER PICKUP AHEAD, ROAD WORK AHEAD AND WORKER AHEAD SIGNS ARE USED AS DIRECTED FOR OTHER MAINTENANCE OPERATIONS WHEN ALL WORK OCCURS OFF OF THE PAVED HIGHWAY SURFACE.

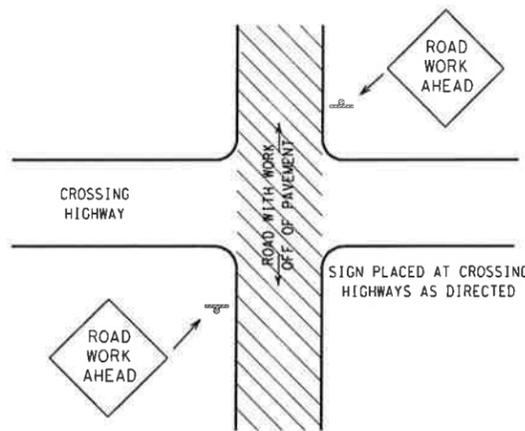
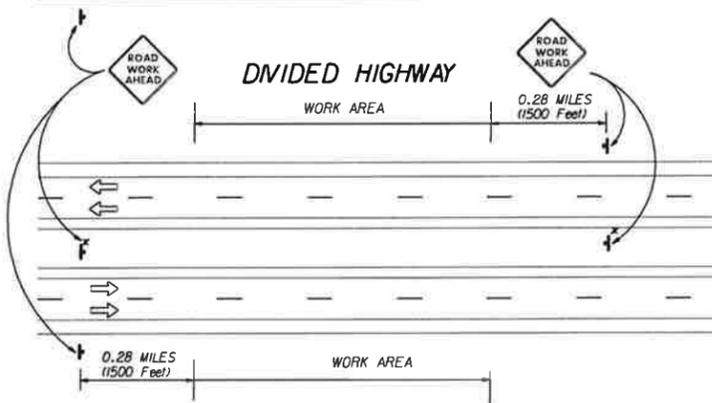
ROLL-UP SIGNS CONFORMING TO DMS-8310 AND THE CWZTCD ALLOWED

\*Letter dimensions and spacing for "CW21-SPECIAL" is the same as C20-1D

UNDIVIDED HIGHWAY OR FRONTAGE ROAD



DIVIDED HIGHWAY



TYPICAL LOCATION OF SIGNS AT HIGHWAY CROSSING

WORK AREA IS A MAXIMUM OF 2.0 MILES UNLESS OTHERWISE DIRECTED. SIGNS MAY REMAIN IN PLACE ONLY DURING DAYLIGHT HOURS. SIGNS ARE TO BE PLACED 6' TO 12' OFF OF THE PAVED SURFACE UNLESS OTHERWISE DIRECTED. ROAD WORK AHEAD SIGNS SHOWN AS EXAMPLES, ONE OF THE FOUR TYPE SIGNS WILL BE USED AS DIRECTED.

\* SIGNS IN THE MEDIAN ARE REQUIRED WHEN WORK OCCURS IN MEDIAN

TRAFFIC CONTROL PLAN FOR WORK OFF OF THE PAVED SURFACE.

GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- Nails shall NOT be used to attach signs to any support.
- All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
- The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes. The additional signs requested by the Engineer/Inspector shall not be subsidiary.
- The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD). The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so that the Engineer can verify the correct procedures are being followed.
- The Contractor is responsible for sign installations and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
- Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1".
- The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

Duration of Work (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part VII)

- The Contractor is responsible for ensuring the sign support and substrate meets crashworthiness. For mowing operation all signs and supports are Short-term Duration for daytime work.
- The Contractor shall furnish the sign sizes shown on this sheet or as directed by the Engineer.

SIGN SUBSTRATES

- The Contractor shall ensure that the sign substrate is allowed for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
- "Mesh" type materials are NOT an approved sign substrate.
- All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign faces.

REFLECTIVE SHEETING

- ReflectORIZED signs shall be constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 or DMS-8310. The DMS specifications can be accessed from the following web address: <http://manuals.dot.state.tx.us/80/dynaweb/colmatex/@GenericCollectionView;cs=default;ts=default>
- White sheeting, meeting the requirements of DMS-8300 Type C (High Specific Intensity), shall be used for signs with white background and channelizing devices.
- Orange sheeting, meeting the requirements of DMS-8300 Type E (Fluorescent Prismatic), shall be used for signs with orange backgrounds.

SIGN LETTERS

- All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

- Signs should be removed or completely covered when not mowing.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and supports shall be removed by the end of the day.

SIGN SUPPORT WEIGHTS

- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry cohesionless sand is recommended.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support weights.
- Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
- Sandbags shall be made of a durable material that tears upon vehicular impact.
- Rubber (such as tire inner tubes) shall NOT be used for sandbags.
- Rubber ballasts (such as those used with cones or edgeline channelizers) shall NOT be used as sign support weights.
- Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign supports.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

Any sign, sign support or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced or repaired as soon as possible by the Contractor at the Contractor's expense.

Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be obtained by contacting:

Standards Engineer  
Traffic Operations Division - TE  
Texas Department of Transportation  
125 East 11th Street  
Austin, Texas 78701-2483  
Phone (512) 416-3120  
Fax (512) 416-3299

Instructions to locate the "CWZTCD" on TxDOT website are:

Start at website - [www.dot.state.tx.us](http://www.dot.state.tx.us)  
Click on "About TxDOT",  
Click on "Organizational Chart",  
Click on Traffic Operations Box,  
Click on "Compliant Work Zone Traffic Control Devices",  
Click on "View PDF".  
This site is printable.



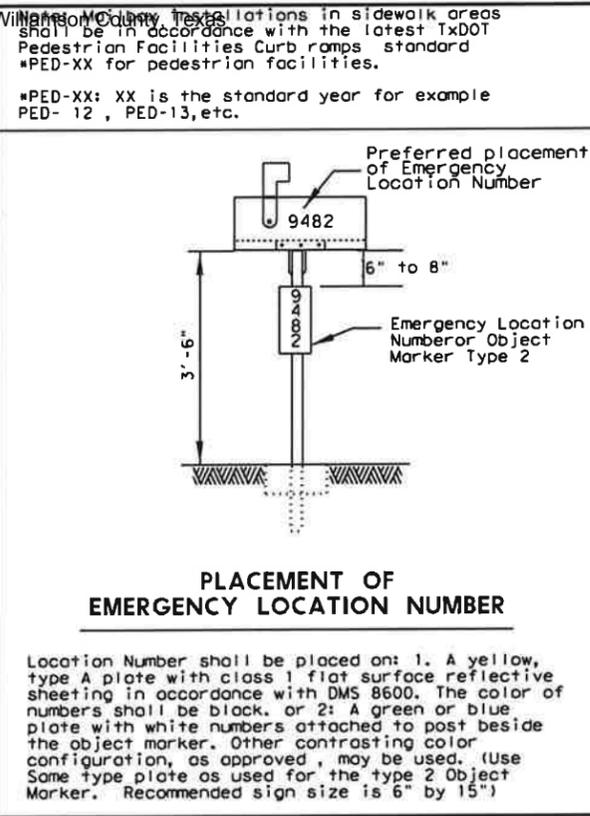
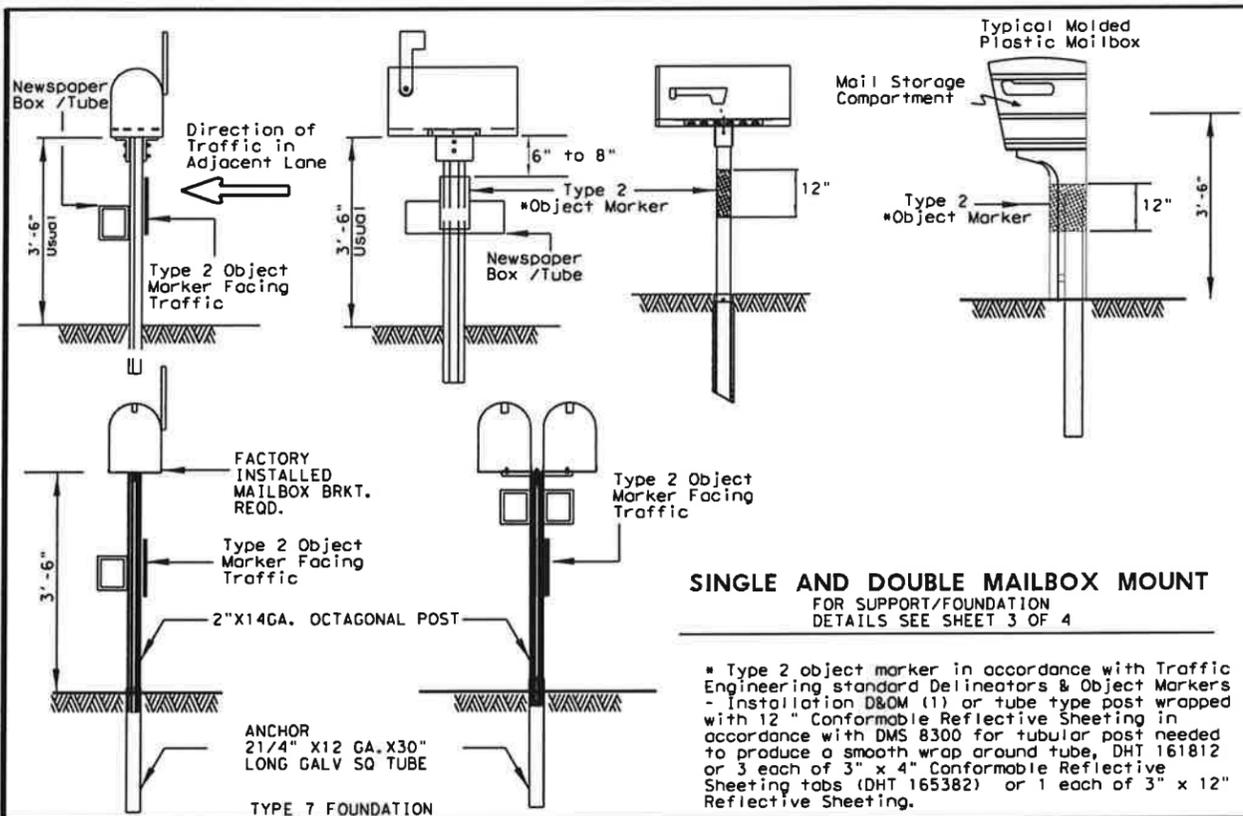
ROADSIDE TRAFFIC CONTROL PLAN

SHEET 1 OF 1		RS-TCP-05		NOT TO SCALE	
FILE: RSTCP05.DGN	DN: LJB	EX: JG	DR: -	EX: -	NEG NO: -
© TxDOT FEBRUARY 2005		STATE DISTRICT: N/A	FEDERAL REGION: N/A	FEDERAL AID PROJECT: N/A	
REVISED: September 17, 2004					SHEET 1
REVISED: FEBRUARY 2, 2005		COUNTY: N/A	CONTROL SECTION: N/A	JOB: N/A	HIGHWAY: N/A
REVISED: Sign placement in TCP					

DISCLAIMER

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	

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**TYPICAL MAILBOX SIZE**

SIZE	LENGTH	WIDTH	HEIGHT	LIGHT WEIGHT MATERIAL	
				SHEET METAL	PLASTIC
SMALL	19 1/2	6	7	5	5
MEDIUM	22 1/2	8	11 1/2	7	7
LARGE	23 1/2*	11 1/2*	13 1/2*	10	10

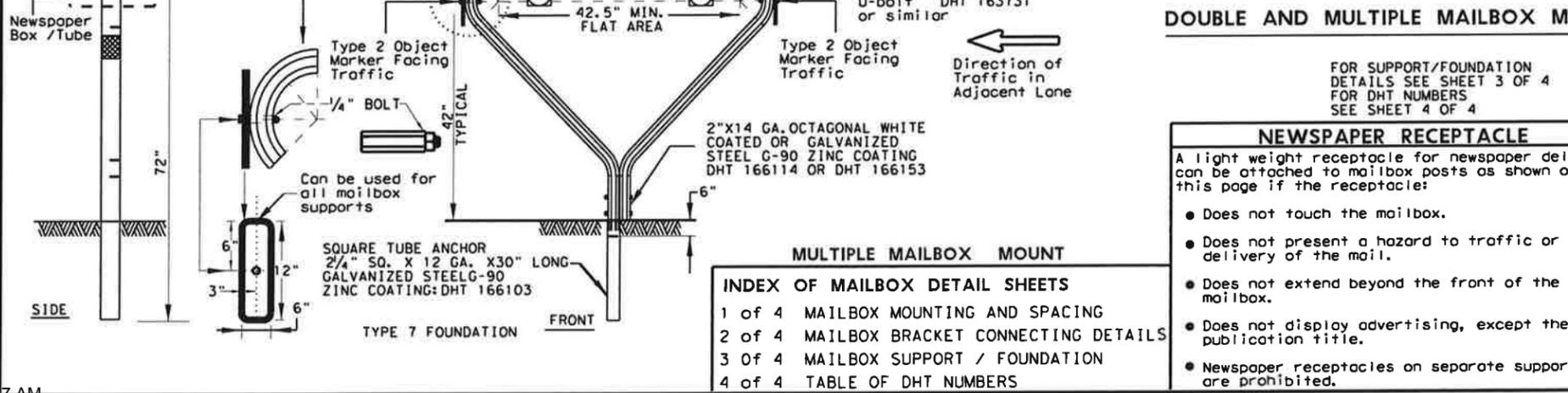
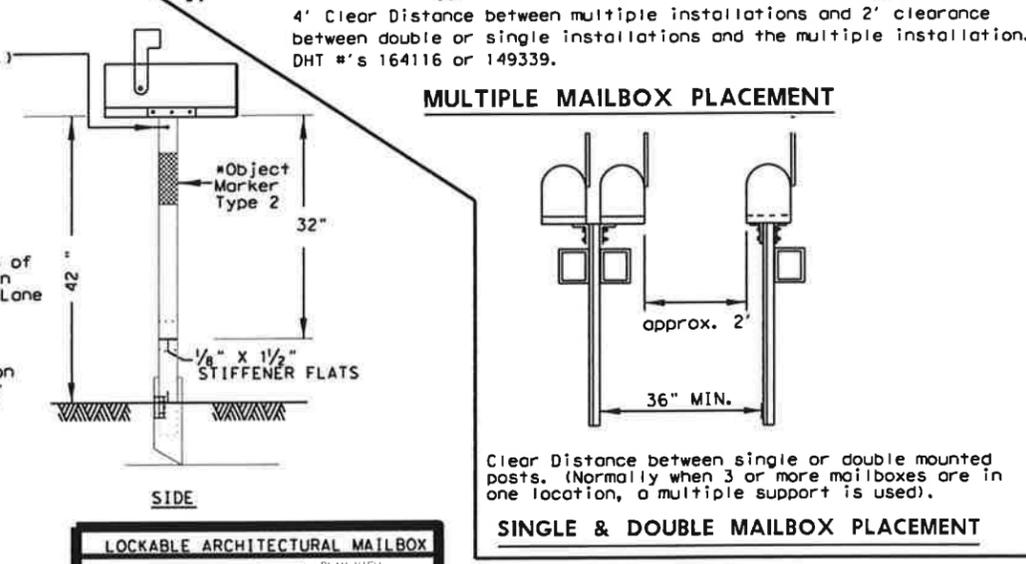
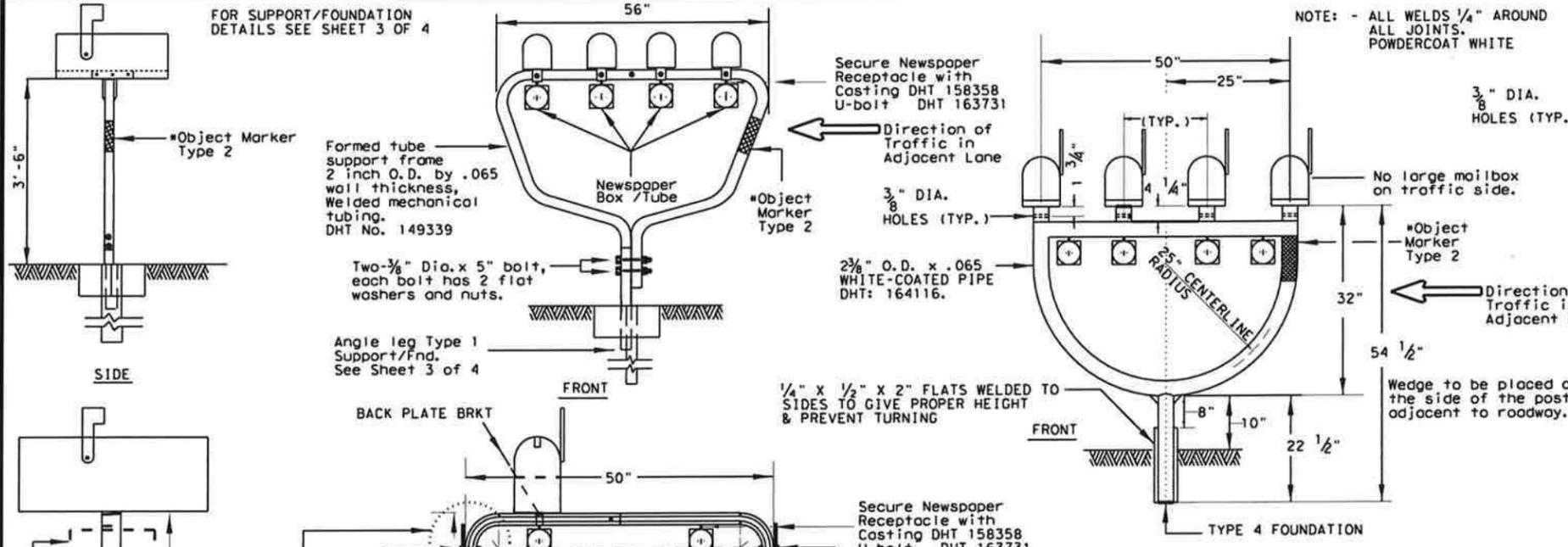
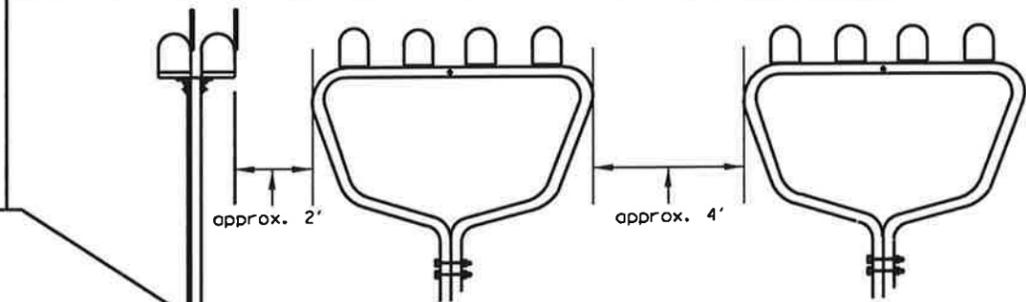
\* Maximum allowed dimensions for mailbox  
\*\* Excluding Molded Plastic on 4 X 4 Post

**LOCKABLE ARCHITECTURAL MAILBOX SIZE (INCHES)**

VIEW	TOP	BOTTOM	FRONT SIDE	BACK SIDE	WEIGHT (POUNDS)
SIDE	18	15	18.3	15	
BACK	11 1/2	11 1/2		15	22.4

Mailboxes shall be made of light weight sheet metal or light weight plastic. Lockable architectural mailboxes shall meet the requirements of the above table.

Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.



**INDEX OF MAILBOX DETAIL SHEETS**

1 of 4	MAILBOX MOUNTING AND SPACING
2 of 4	MAILBOX BRACKET CONNECTING DETAILS
3 of 4	MAILBOX SUPPORT / FOUNDATION
4 of 4	TABLE OF DHT NUMBERS

**NEWSPAPER RECEPTACLE**

A light weight receptacle for newspaper delivery can be attached to mailbox posts as shown on this page if the receptacle:

- Does not touch the mailbox.
- Does not present a hazard to traffic or delivery of the mail.
- Does not extend beyond the front of the mailbox.
- Does not display advertising, except the publication title.
- Newspaper receptacles on separate supports are prohibited.

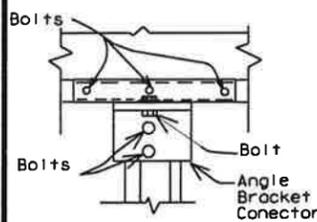
SHEET 1 OF 4

Maintenance Division Standard

**MAILBOX MOUNTING AND SPACING**  
**MB-15(1)**

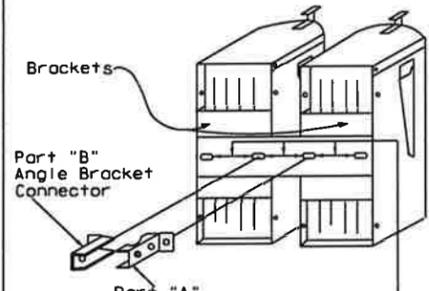
FILE: MB14111.DGN	DW: JED	EKI: JED	DW:	EKI:
© TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS:				
Added additional newspaper receptacle for double mailbox support.	DIST	COUNTY	SHEET NO.	
			133	

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For bolt sizes see details below for "SMALL MAILBOX" and "MEDIUM AND LARGE MAILBOXES"

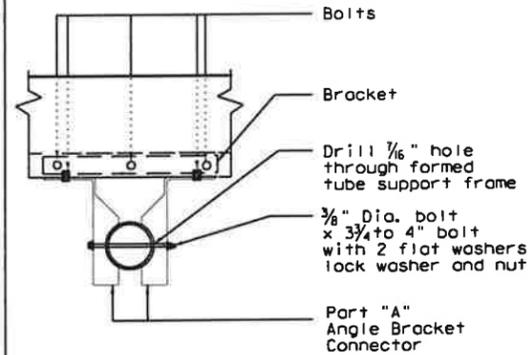
**SINGLE MAILBOX**



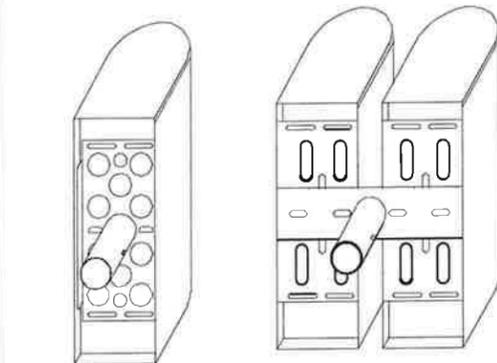
Adapter Plate to Bracket Attachment, 4 - 3/8" Dia. x 3/4" bolt; each bolt has 2 flat washers, lock washer and nut per each bolt

(Not permitted for Large Mailboxes)

**DOUBLE MAILBOX**

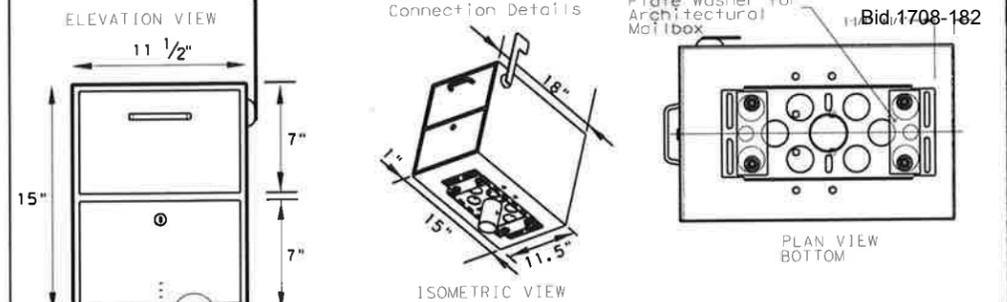


**MULTIPLE MAILBOX**



To be used with 2 3/8" OD RR or thinwall Steel posts. To be used with thinwall Steel posts. Not to be used with RR posts.

**WELDED SINGLE MAILBOX BRACKET** **WELDED DOUBLE MAILBOX BRACKET WITH ADAPTER PLATE**



Preferred placement of Emergency Location Number  
X-5.25" min; Y-5.75" min

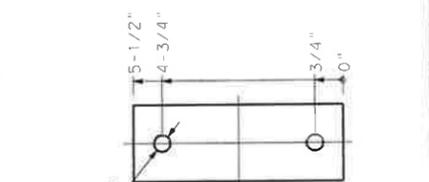
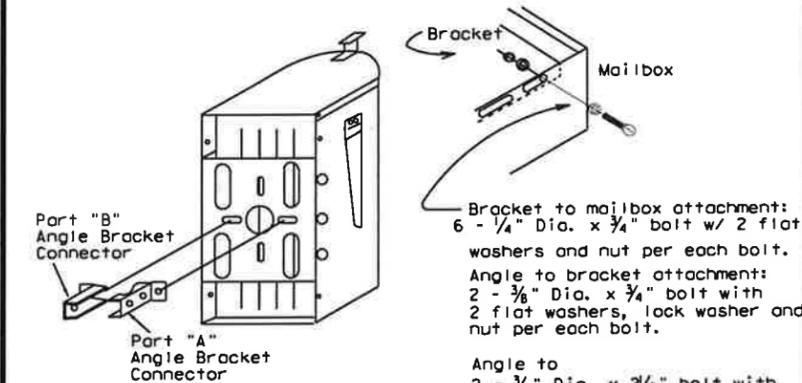
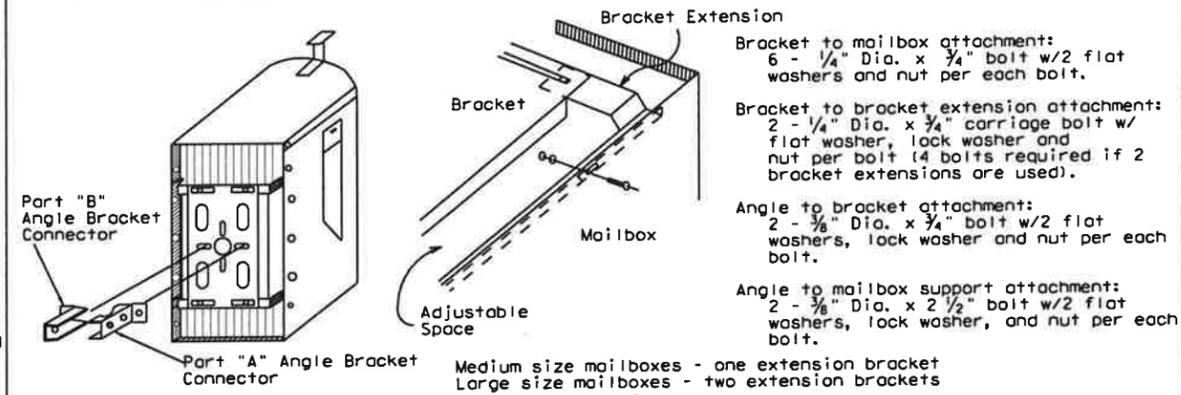


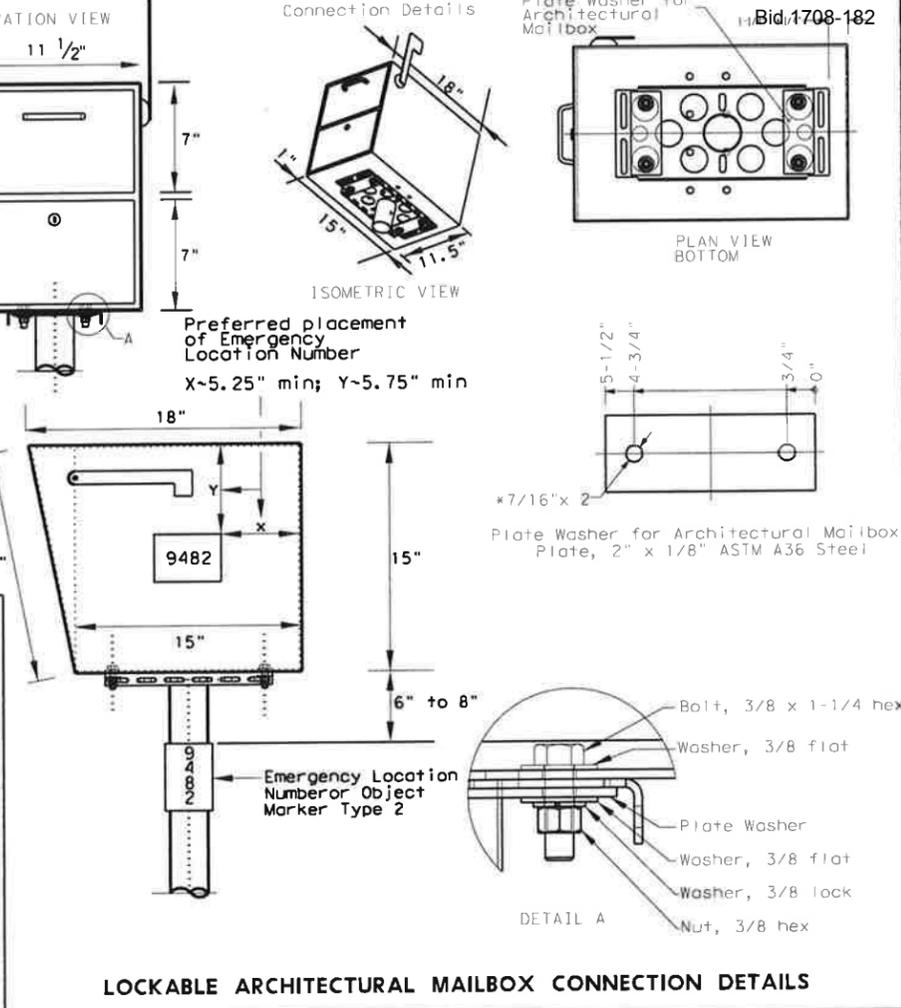
Plate Washer for Architectural Mailbox Plate, 2" x 1/8" ASTM A36 Steel



**SMALL MAILBOX**



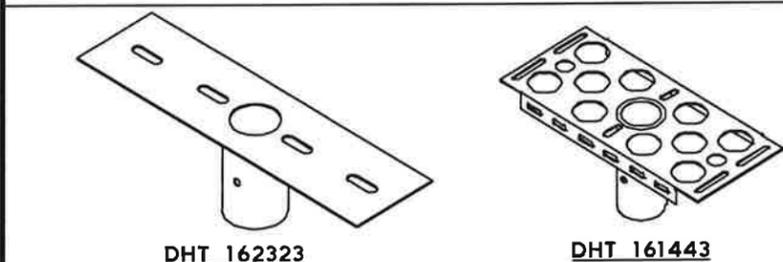
**MEDIUM AND LARGE MAILBOXES**



**LOCKABLE ARCHITECTURAL MAILBOX CONNECTION DETAILS**

**GENERAL NOTES**

1. Connecting hardware detailed on this sheet is for the hardware that the Department stocks at the Regional Warehouses. This hardware is available to the contractor only when so stated elsewhere in the plans or specification.
2. Hardware for mounting mailboxes to the support/foundation furnished by industry should be used when shown on the Maintenance Divisions "Approved Products List." Only mailbox hardware that have been crash tested in accordance with NCHRP Report 350, will be on the approved list.
3. Hardware furnished by industry shall be erected in accordance with the manufacturer's recommendation.
4. Bracket and bracket extension shall be constructed of 14 gauge galvanized steel sheet metal.
5. The angles, brackets and adapter plates shall be constructed of 12 gauge galvanized steel sheet metal.
6. Items with evidence of damage to the galvanized coating or wet storage stains (white rust) will not be accepted.

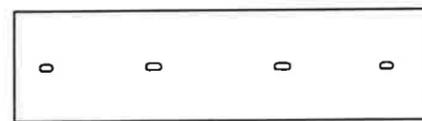


**DHT 162323**

**DHT 161443**

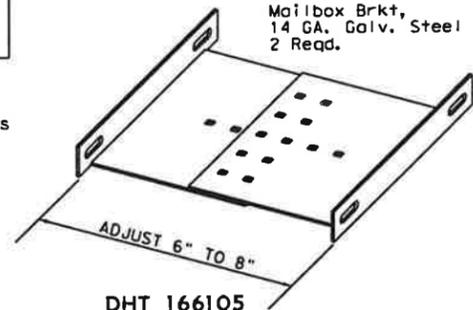
For use with galvanized thinwall steel posts DHT # 143426 or powder-coated thinwall steel post DHT # 162911.

For use with RCR post DHT # 161442 or galvanized thinwall steel post DHT # 143426 or powder-coated thinwall steel post. DHT # 162911.

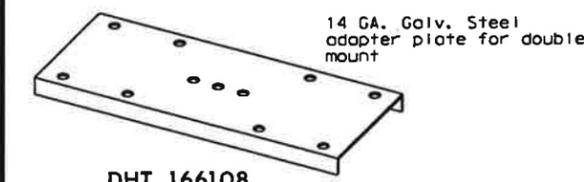


**DHT #3789**

Used for mounting two Mailboxes on the same post.

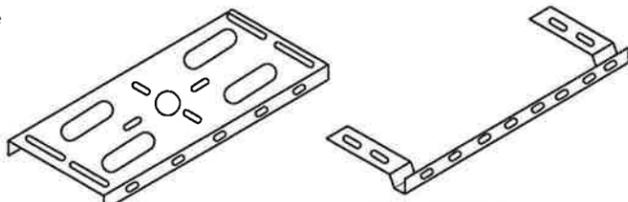


**DHT 166105**



**DHT 166108**

14 GA. Galv. Steel adapter plate for double mount



**DHT 148939**

Mailbox Bracket

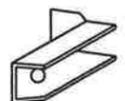
**DHT 148938**

Used for extending 6" wide bracket to attach larger mailboxes.  
Bracket Extension



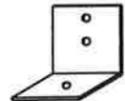
**DHT 159489**

Part "A" Angle Bracket Connector



**DHT 159490**

Part "B" Angle Bracket Connector



**DHT 2917**

Angle Bracket For Temporary Mailbox

**HARDWARE AT TXDOT REGIONAL WAREHOUSES**

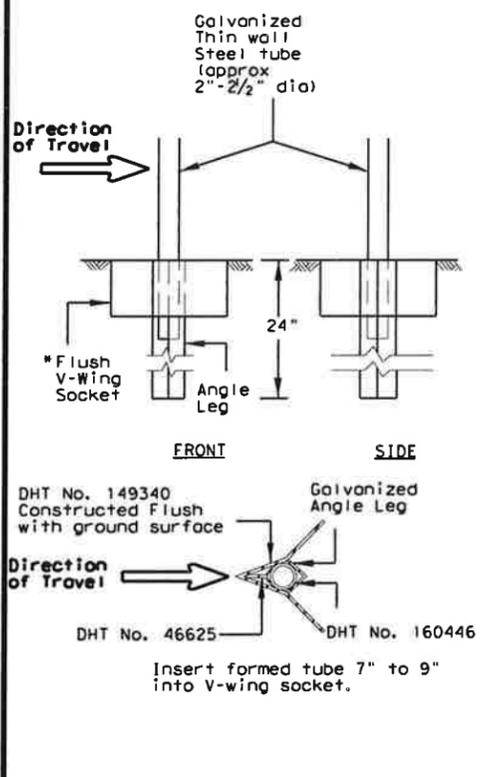
Brackets and adapter plate shown in this section should be available to the Contractor when stated elsewhere in plans or specifications.

See Table of Applicable DHT Numbers on sheet 4 of 4 for DHT description and unit of measure.

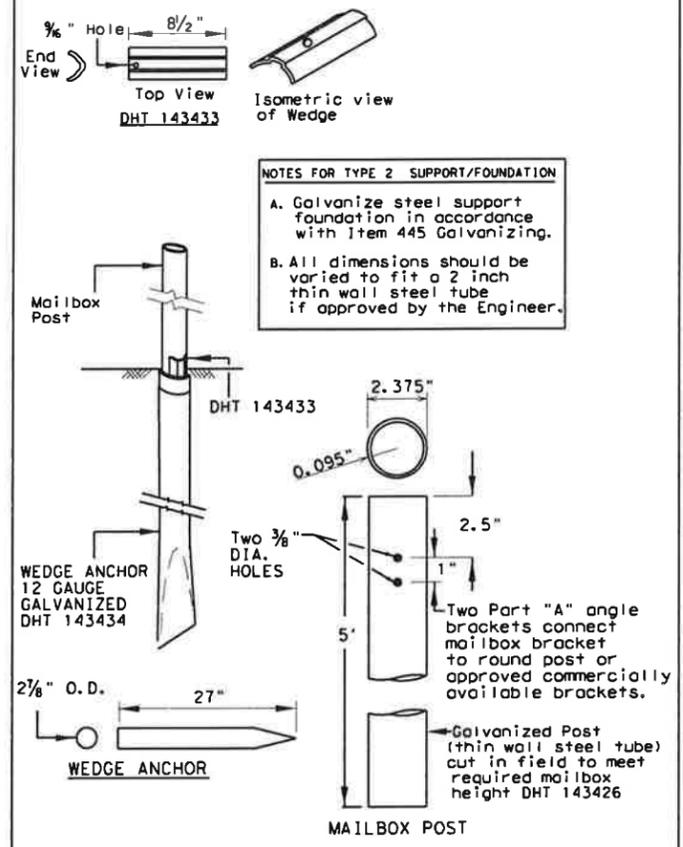
**MAILBOX BRACKET CONNECTING DETAILS MB-15(1)**

FILE: MB14111.DGN	DN: JEO	CR:	DW: JEO	EK:
© TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
ADDED DHT 163730	DIST	COUNTY	SHEET NO. 134	

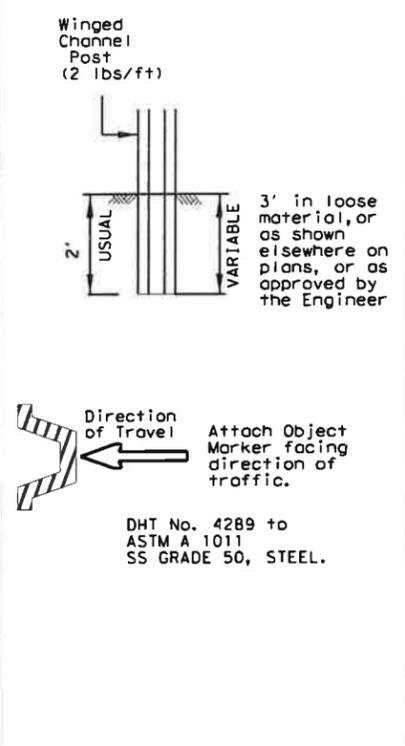
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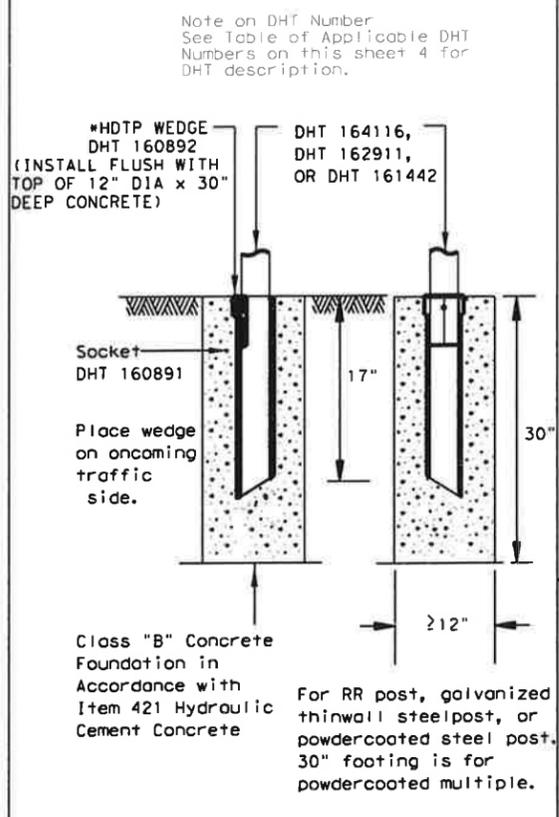
**TYPE 1 SUPPORT/FOUNDATION**  
THIN WALL STEEL TUBE w/ V-LOC ANCHORAGE



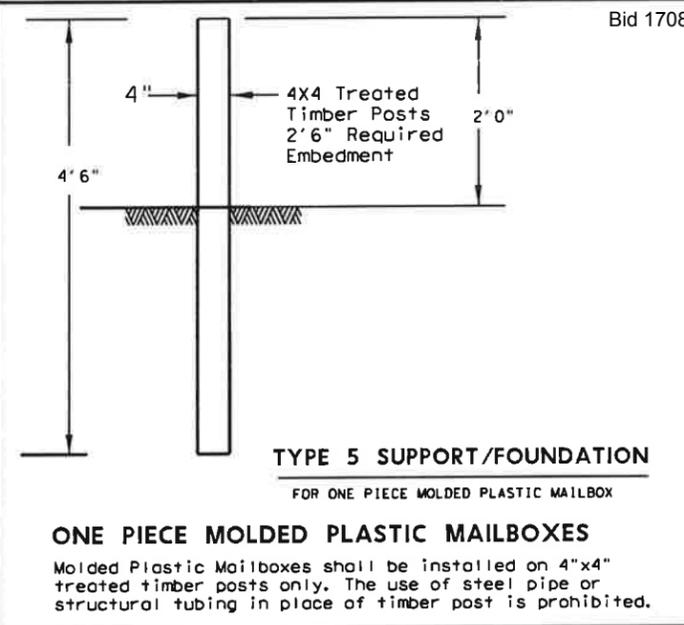
**TYPE 2 SUPPORT/FOUNDATION**  
THIN WALL STEEL TUBE w/ WEDGE ANCHOR SYSTEM



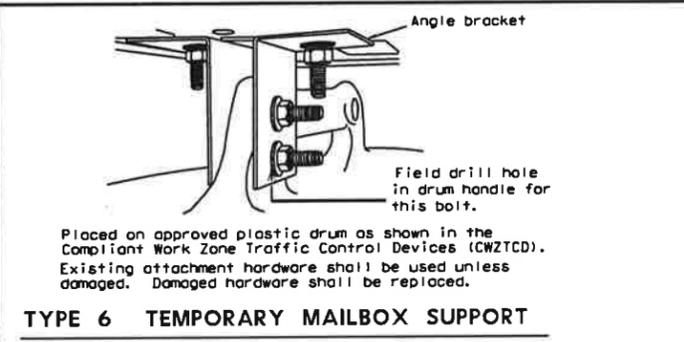
**TYPE 3 SUPPORT/FOUNDATION**  
WINGED CHANNEL POST



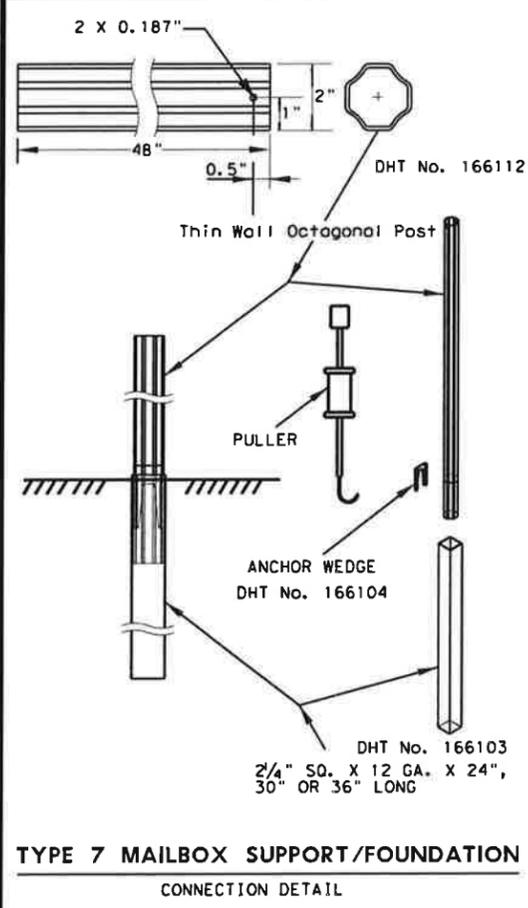
**TYPE 4 SUPPORT/FOUNDATION**  
FOR WHITECOATED STEEL POST, MULTIPLE POST, AND RECYCLED RUBBER.



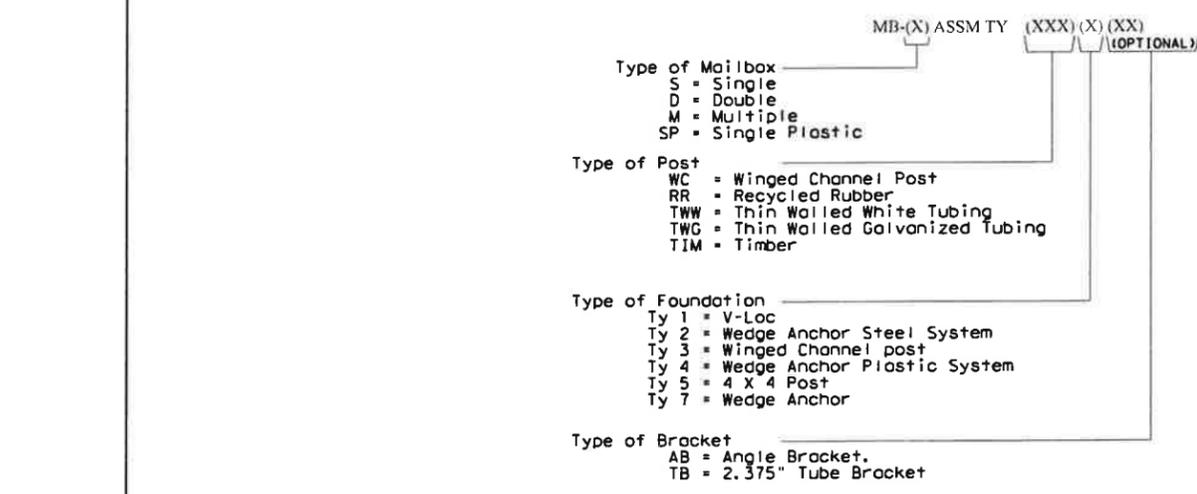
**TYPE 5 SUPPORT/FOUNDATION**  
FOR ONE PIECE MOLDED PLASTIC MAILBOX  
**ONE PIECE MOLDED PLASTIC MAILBOXES**  
Molded Plastic Mailboxes shall be installed on 4"x4" treated timber posts only. The use of steel pipe or structural tubing in place of timber post is prohibited.



**TYPE 6 TEMPORARY MAILBOX SUPPORT**  
CONNECTION DETAIL



**TYPE 7 MAILBOX SUPPORT/FOUNDATION**  
CONNECTION DETAIL



- GENERAL NOTES**
- Erect post plumb or vertical.
  - When galvanized part is required galvanize in accordance with Item 445.
  - Type 1, 2, 3, 4 or 7 supports or foundation can be used for single or double mailbox installations. The RCR post should be used only for a single installation with a small mailbox. The Type 5 support/foundation is used for the single molded plastic mailbox. The Type 4 support/foundation is used for the 2.375" O.D. RR post, thin wall steel post, and white multiple mailbox post.
  - The Type 1 or type 7 support/foundation can be used for a multiple mailbox mount.
  - The Type 4 support should be used with thin wall steel pipe for the medium, large and double mailbox installations.
  - Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition.

SHEET 3 OF 4

Maintenance Division Standard

**MAILBOX SUPPORT AND FOUNDATION**  
**MB-15(1)**

FILE: MB1411.DGN	DN: JED	CK: JED	DW: JED	CK: JED
© TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS:				
DIST	COUNTY			SHEET NO.

DOUBLE AND LARGE MAILBOXES MUST BE ON STEEL POST. \*HOTP: High density thermoplastic polyesters

LOCKABLE ARCHITECTURAL MAILBOX

SINGLE-MOUNT INSTALLATION PARTS			
#	PART NAME	PART/DHT #	QTY
1	SOCKET, TYPE 4 FOUNDATION	160891	1
2	WEDGE FOR TYPE 4 FOUNDATION	160892	1
3	THIN-WALL WHITE STEEL TUBE 2.375 OD	162911	1
4	BRACKET FOR ATTACHING MAILBOX	161443	1
5	ARCHITECTURAL MAILBOX	SEE NOTE	1
6	NUT, 5/16" HEX	NUT, 5/16" HEX	1
7	BOLT, 5/16 X 3 HEX	GRADE 5	1
8	PLATE WASHER FOR ARCHITECTURAL MAILBOX	SEE SEE SHEET 2	2
9	WASHER, 3/8 FLAT		8
10	WASHER, 3/8 LOCK		4
11	NUT, 3/8 HEX		4
12	BOLT, 3/8 X 1-1/4 HEX	GRADE 5	4
13	CONCRETE, CLASS B (2000 PSI)		1

LOCKABLE ARCHITECTURAL MAILBOX DETAILS

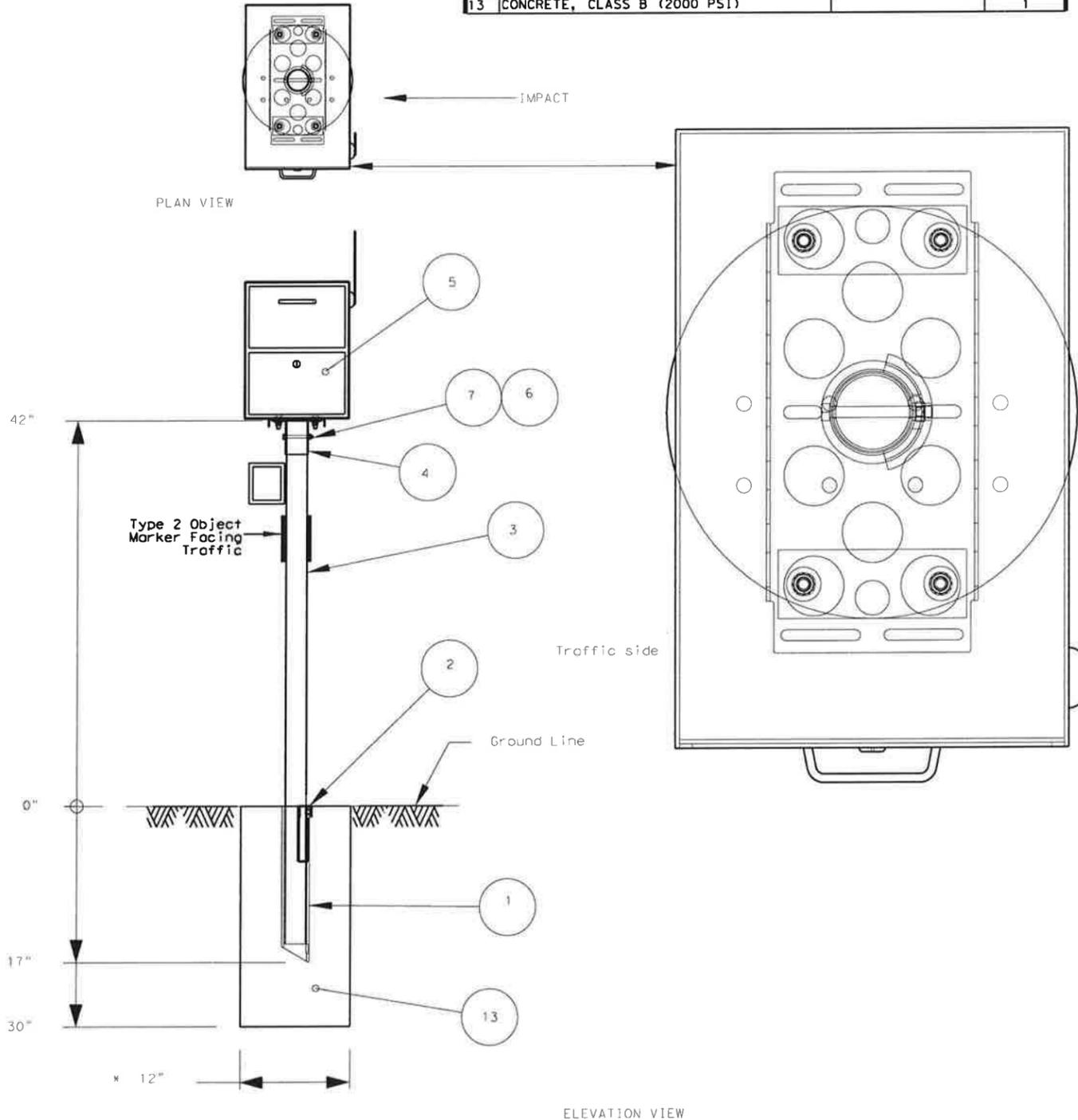


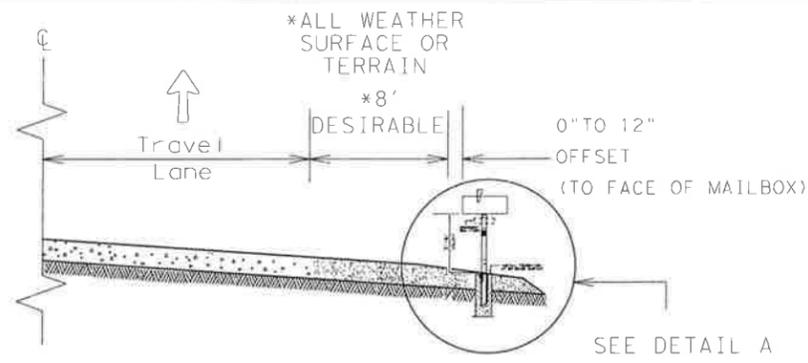
TABLE OF APPLICABLE DHT NUMBERS	
DHT NUMBER	DESCRIPTION
FOUNDATIONS	
46625	WEDGE FOR V-WING SOCKET FOR TYPE 1 FOUNDATION
149340	V-WING SOCKET FOR TYPE 1 FOUNDATION
143433	WEDGE FOR TYPE 2 FOUNDATION
143434	ANCHOR FOR TYPE 2 FOUNDATION
166103	ANCHOR FOR TYPE 7 FOUNDATION
160891	SOCKET FOR TYPE 4 FOUNDATION
160892	WEDGE FOR TYPE 4 FOUNDATION
166104	WEDGE FOR TYPE 7 FOUNDATION
POSTS	
4289	WINGED CHANNEL MAILBOX POST
149339	MULTIPLE MAILBOX POST (GALVANIZED TUBING)
164116	MULTIPLE MAILBOX POST (WHITE COATED)
166114	MULTIPLE MAILBOX POST (WHITE COATED OCTAGONAL)
166153	MULTIPLE MAILBOX POST (GALVANIZED OCTAGONAL)
161442	RECYCLED RUBBER POST, FOR SMALL MAILBOX ONLY
143426	THIN-WALL GALVANIZED STEEL TUBE 2.375" OUTER DIAMETER
162911	THINWALL WHITE STEEL TUBE 2.375" OUTER DIAMETER
	SINGLE OR DOUBLE THIN-WALL MAILBOX POST GALVANIZED
166152	2" OCTAGONAL
	SINGLE OR DOUBLE THIN-WALL MAILBOX POST WHITECOATED
166112	2" OCTAGONAL
REFLECTIVE SHEETING	
161812	REFLECTIVE SHEETING FOR EMERGENCY LOCATION NUMBER PANEL
CONNECTING HARDWARE	
2917	ANGLE BRACKET USED FOR TEMPORARY MAILBOX SUPPORT
166105	BRACKET FOR SINGLE MOUNTING OF MAILBOXES (MOUNTING KIT)
3789	PLATE FOR DOUBLE MOUNTING OF MAILBOXES
166108	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES (MOUNTING KIT)
166111	BRACKET FOR MULTIPLE MOUNTING OF MAILBOXES (MOUNTING KIT)
148939	BRACKET FOR ATTACHING SMALL OR MEDIUM SIZE MAIL BOX
148938	EXTENDER TO BRACKET FOR ATTACHING LARGE MAILBOX
159489	ANGLE BRACKET PART A
159490	ANGLE BRACKET PART B
	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES ON THINWALL
162323	STEEL POST, GALVANIZED OR POWDERCOATED.
	BRACKET FOR ATTACHING MAILBOX TO RECYCLED RUBBER POST
161443	AND TO MULTIPLE WHITE MAILBOX POST
158358	CASTING (NEWSPAPER RECEPTACLE BRACKET)
163731	U-BOLT (NEWSPAPER RECEPTACLE BRACKET)
160698	BOLT;HEX HEAD, GALV;3/8"DIA X 3/4"L HD, W/2-FLAT WASHERS
163750	BOLT;HEX HEAD, GALV;3/8" X 1-1/2, 16 NC, W/WASHERS
160701	BOLT;HEX HEAD, GALV;3/8"DIA X 2-1/2"L, HD, W/2-FLAT WASHERS
163730	BOLT;HEX HEAD, GALV;3/8" X 3-1/2", NC, W/NUT, 2 FLAT WASHERS
160699	BOLT;HEX HEAD, GALV;3/8"DIA X 3-3/4"L HD, W/2-FLAT WASHERS
160700	BOLT;HEX HEAD, GALV;3/8"DIA X 4"L HD, W/2-FLAT WASHERS

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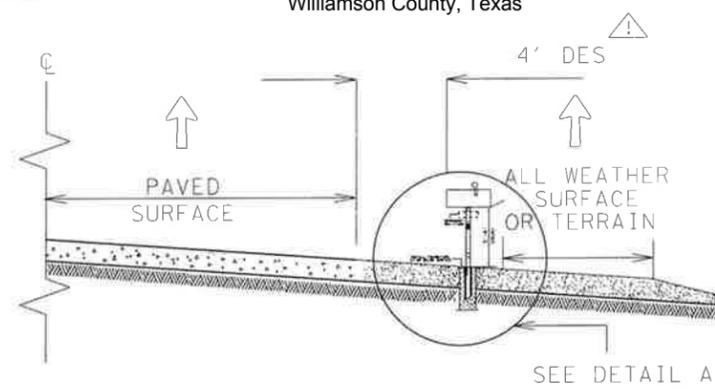
SHEET 4 OF 4

 Texas Department of Transportation		Maintenance Division Standard	
<h3>DHT NUMBERS TABLE</h3> <h2>MB-15(1)</h2>			
FILE: MB14(1).DGN	DN:	CK:	DW:
© TxDOT APRIL 2015	CONT	SECT	JOB
REVISIONS			HIGHWAY
	DIST	COUNTY	SHEET NO.
			136

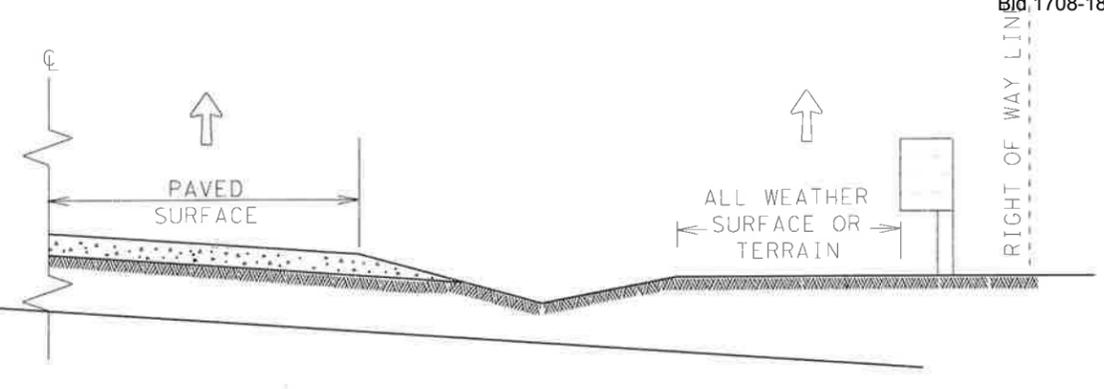
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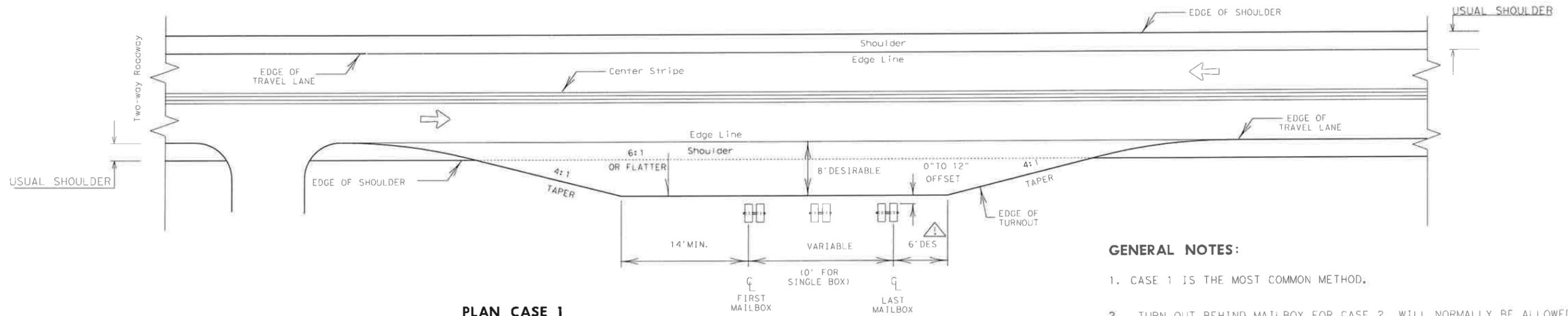
**CASE 1. OFF TRAVEL WAY DELIVERY**



**CASE 2. BACK SIDE DELIVERY**



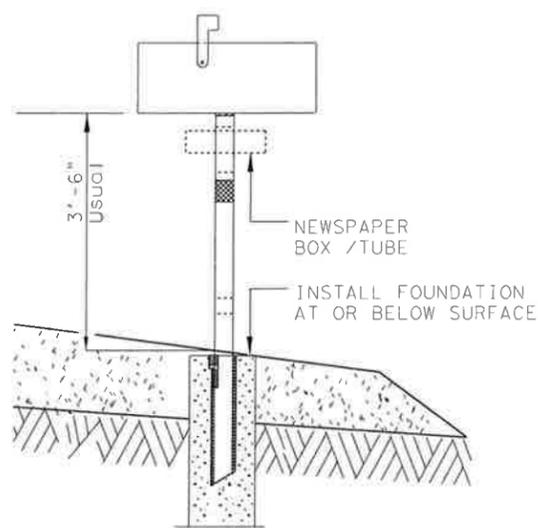
**CASE 3. DELIVERY NEAR RIGHT OF WAY LINE**



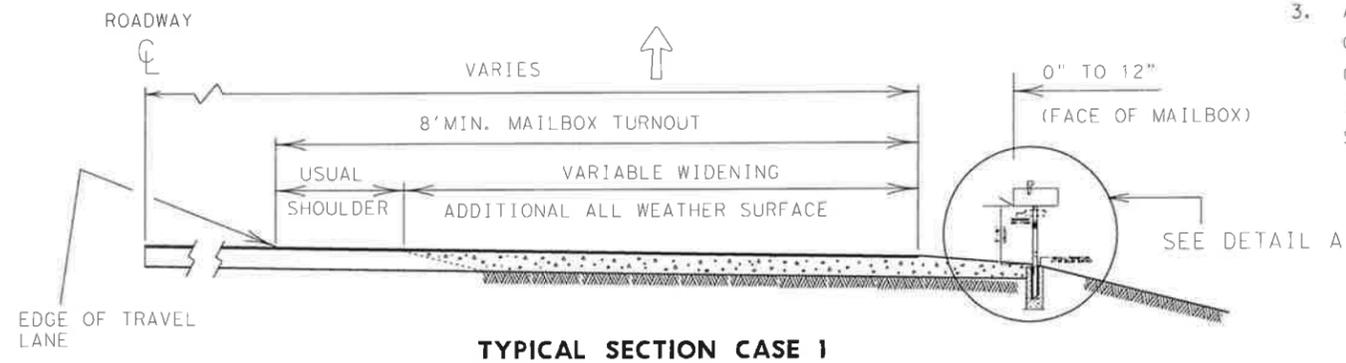
**PLAN CASE 1**

**GENERAL NOTES:**

1. CASE 1 IS THE MOST COMMON METHOD.
2. TURN OUT BEHIND MAILBOX FOR CASE 2 WILL NORMALLY BE ALLOWED FOR NATURAL TERRAIN THAT WILL SERVE AS AN ALL WEATHER SURFACE.
3. ALL WEATHER DRIVEWAYS FOR CASE 3 MAILBOXES LOCATED AT THE RIGHT OF WAY LINE SHOULD NORMALLY BE PLACED IN CONJUNCTION WITH COUNTY ROADS OR OTHER CONNECTING COMMUNITY ROADS OR STREETS. IF THE NUMBER OF MAILBOXES EXCEEDS FOUR, A COMMUNITY MAIL BOX SHOULD BE ENCOURAGED AT THESE LOCATIONS.



**DETAIL A**



**TYPICAL SECTION CASE 1**

↑  
**MAIL DELIVERY VEHICLE TRAVEL DIRECTION**

SHEET 1 OF 3

Maintenance Division Standard

Guideline

MAILBOX SIDE ROAD PLACEMENT AND TURNOUTS  
MB-14(2)

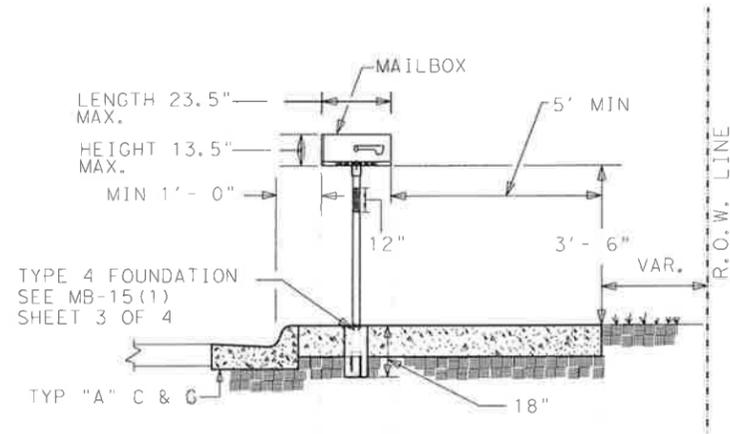
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© TxDOT MAY 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS				
DECEMBER 2012-NEW TxDOT TITLE BLOCK	DIST	COUNTY		SHEET NO.

137

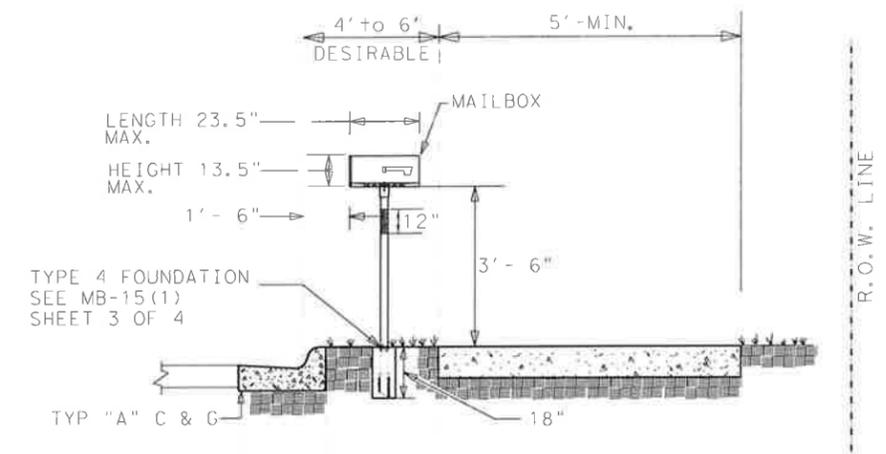
p. 237



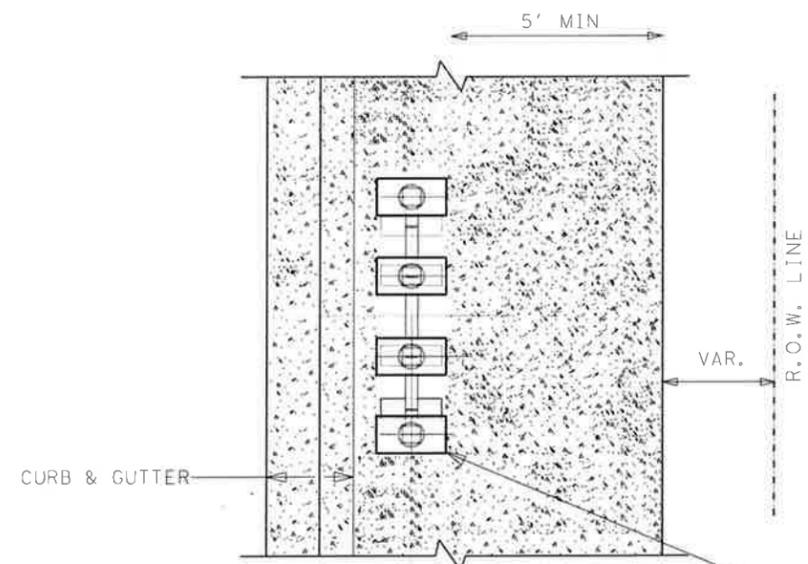
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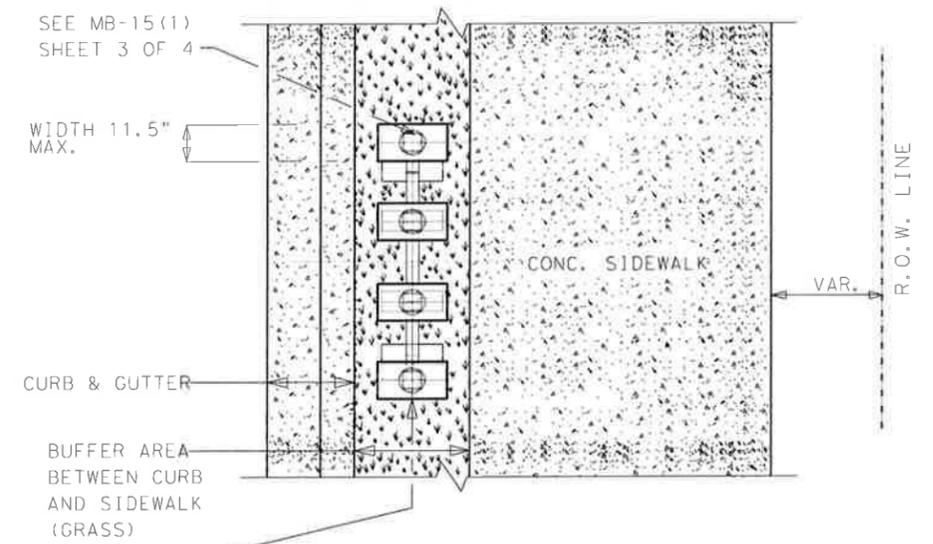
MAILBOX SIDEWALK INSTALLATION RELATIVE TO ANY OTHER OBSTRUCTION SUCH AS A SIGN (MINIMUM BORDER DISTANCE)



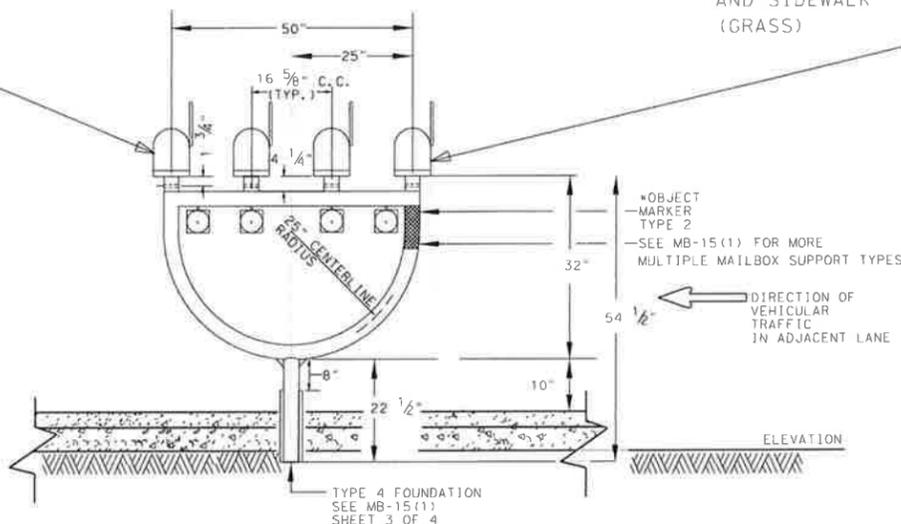
MAILBOX SIDEWALK INSTALLATION (DESIRABLE BORDER DISTANCE)



PLAN VIEW



PLAN VIEW



TYPE 4 FOUNDATION SEE MB-15(1) SHEET 3 OF 4

\*OBJECT MARKER TYPE 2  
SEE MB-15(1) FOR MORE MULTIPLE MAILBOX SUPPORT TYPES  
DIRECTION OF VEHICULAR TRAFFIC IN ADJACENT LANE

SHEET 3 OF 3

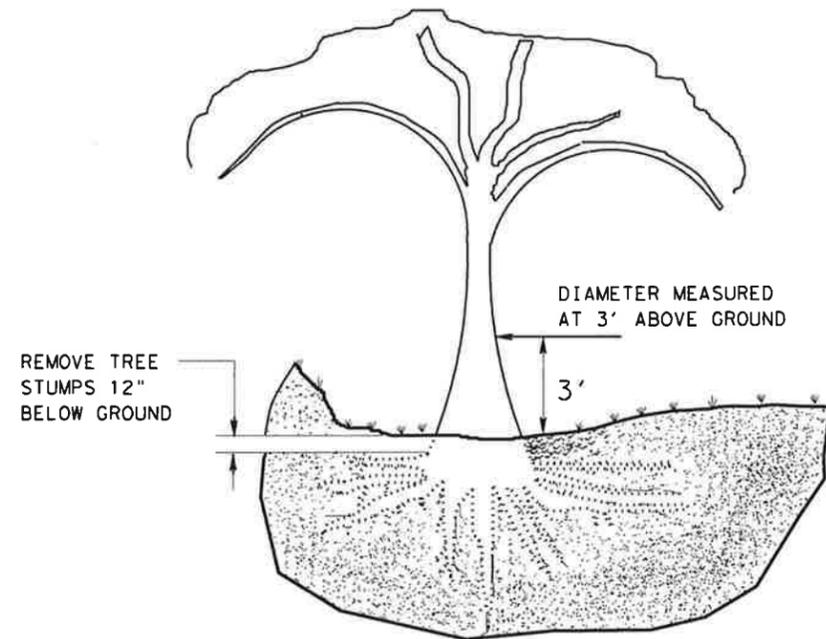


MULTIPLE MAILBOX PLACEMENT BEHIND CURBS WITH OR WITHOUT SIDEWALKS

MB-14(2B)

FILE: MB-14(2A)	DN:	CK:	DW:	CK:
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REVISIONS	DIST	COUNTY	SHEET NO.	

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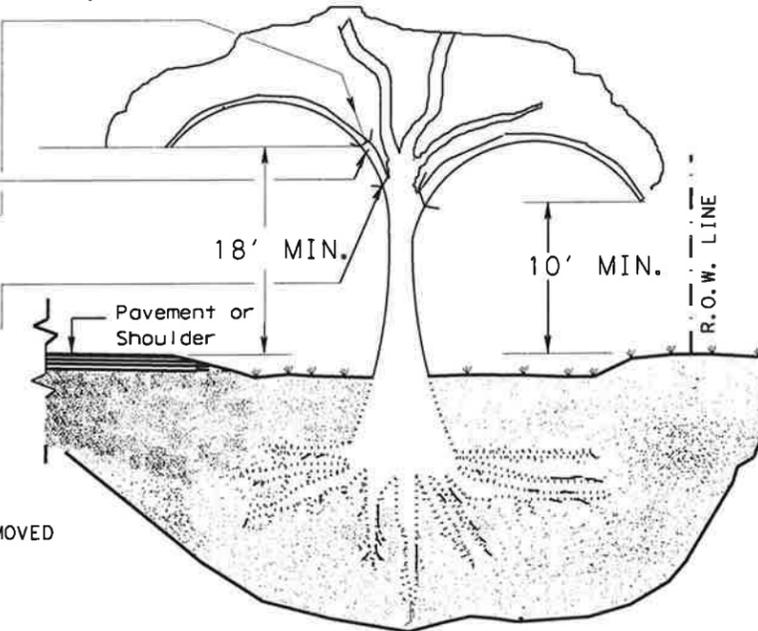
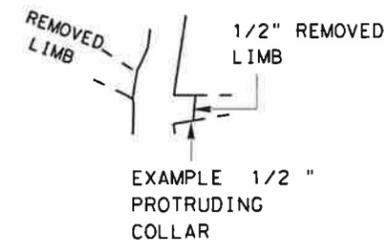


TREE REMOVAL

**STEP 1:**  
CUT 1/3 WAY THROUGH BOTTOM OF LIMB 8" TO 12" ABOVE MAIN STEM (OR TRUNK).

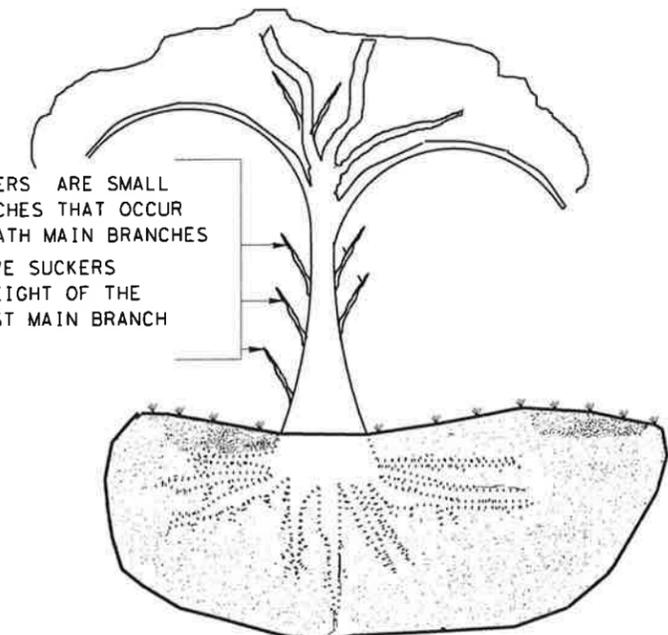
**STEP 2:**  
REMOVE LIMB 4" TO 6" BEYOND THE FIRST CUT

**STEP 3:**  
REMOVE STUB WITH A SMOOTH CUT SO THAT TRACE COLLAR OF THE REMOVED LIMB PROTRUDES APPROXIMATELY 1/2" FROM THE MAIN STEM

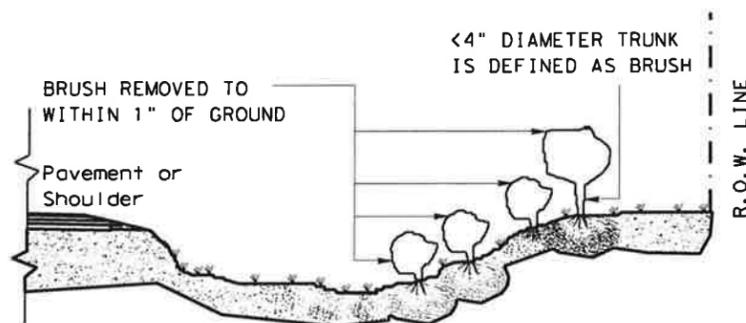


TREE TRIMMING

SUCKERS ARE SMALL BRANCHES THAT OCCUR BENEATH MAIN BRANCHES. REMOVE SUCKERS TO HEIGHT OF THE LOWEST MAIN BRANCH



STEPS 1, 2 AND 3 APPLY WHEN REMOVING LIMBS 2" IN DIAMETER OR LARGER.



BRUSH REMOVAL

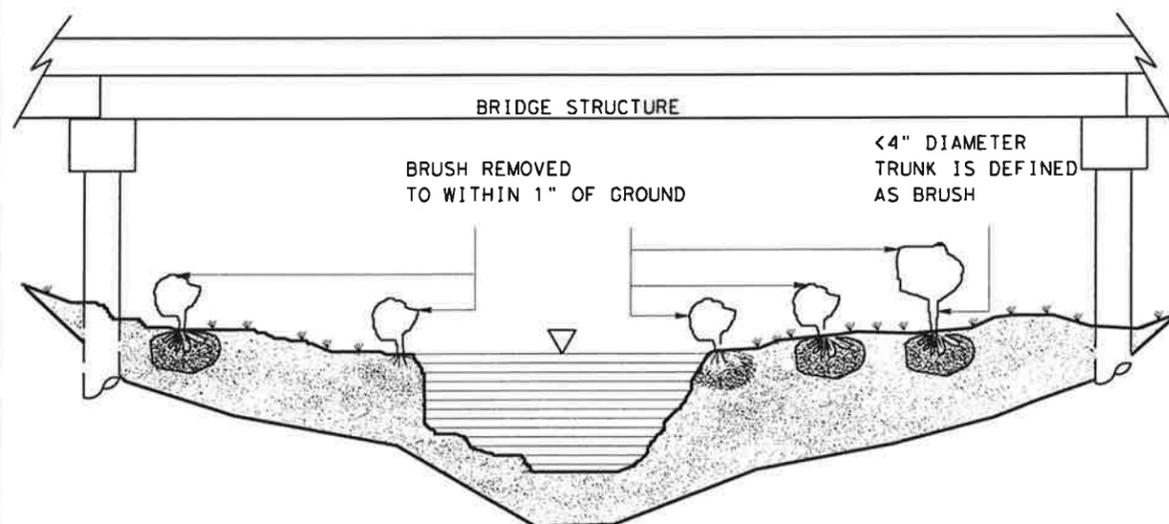
GENERAL NOTES:

TREE TRIMMING

1. TRIM AND REMOVE ALL TREE LIMBS ON THE PAVEMENT SIDE OF THE TRUNK 18' ABOVE THE PAVEMENT OR BRIDGE DECK ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.
2. TRIM AND REMOVE ALL TREE LIMBS BETWEEN THE TRUNK AND R.O.W. LINE 10' ABOVE NATURAL GROUND, TERRAIN OR OTHER STRUCTURE ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.

TREE REMOVAL

3. FOR TREES MARKED FOR REMOVAL, THE DIAMETER OF TREES ARE DETERMINED BY MEASUREMENT OF THE TRUNK CIRCUMFERENCE 3' ABOVE THE GROUND. TREES WITH TRUNKS OF LESS THAN 4" DIAMETER ARE CONSIDERED TO BE BRUSH. TREES WITH MULTIPLE TRUNKS AT THE POINT OF MEASUREMENT ARE MEASURED AND PAID FOR SEPARATELY.
4. MEASUREMENTS FOR PAYMENT OF TREE DIAMETERS ARE DIVIDED INTO THE RANGES SHOWN IN TABLE 1.



BRUSH REMOVAL UNDER BRIDGE AND IN CHANNEL

TABLE 1 TREE TRUNK SIZE FOR TREE REMOVAL PAYMENT				
PAY ITEM	RANGE FOR PAY ITEMS			
	TRUNK DIAMETER *		TRUNK CIRCUMFERENCE	
	LOWER LIMIT IS GREATER THAN	UPPER LIMIT IS LESS THAN OR EQUAL TO	LOWER LIMIT IS GREATER THAN	UPPER LIMIT IS LESS THAN OR EQUAL TO
752 6005	4	12	12 1/2	37 1/2
752 6006	12	18	37 1/2	56 1/2
752 6007	18	24	56 1/2	75 1/2
752 6008	24	30	75 1/2	94
752 6009	30	36	94	113
752 6010	36	42	113	132
752 6011	42	48	132	151
752 6012	48	60	151	188 1/2
752 6013	60	72	188 1/2	226
752 6019	72	84	226	264
	84	GREATER THAN 84	264	NOT APPLICABLE

\*SEE GENERAL NOTE #3.

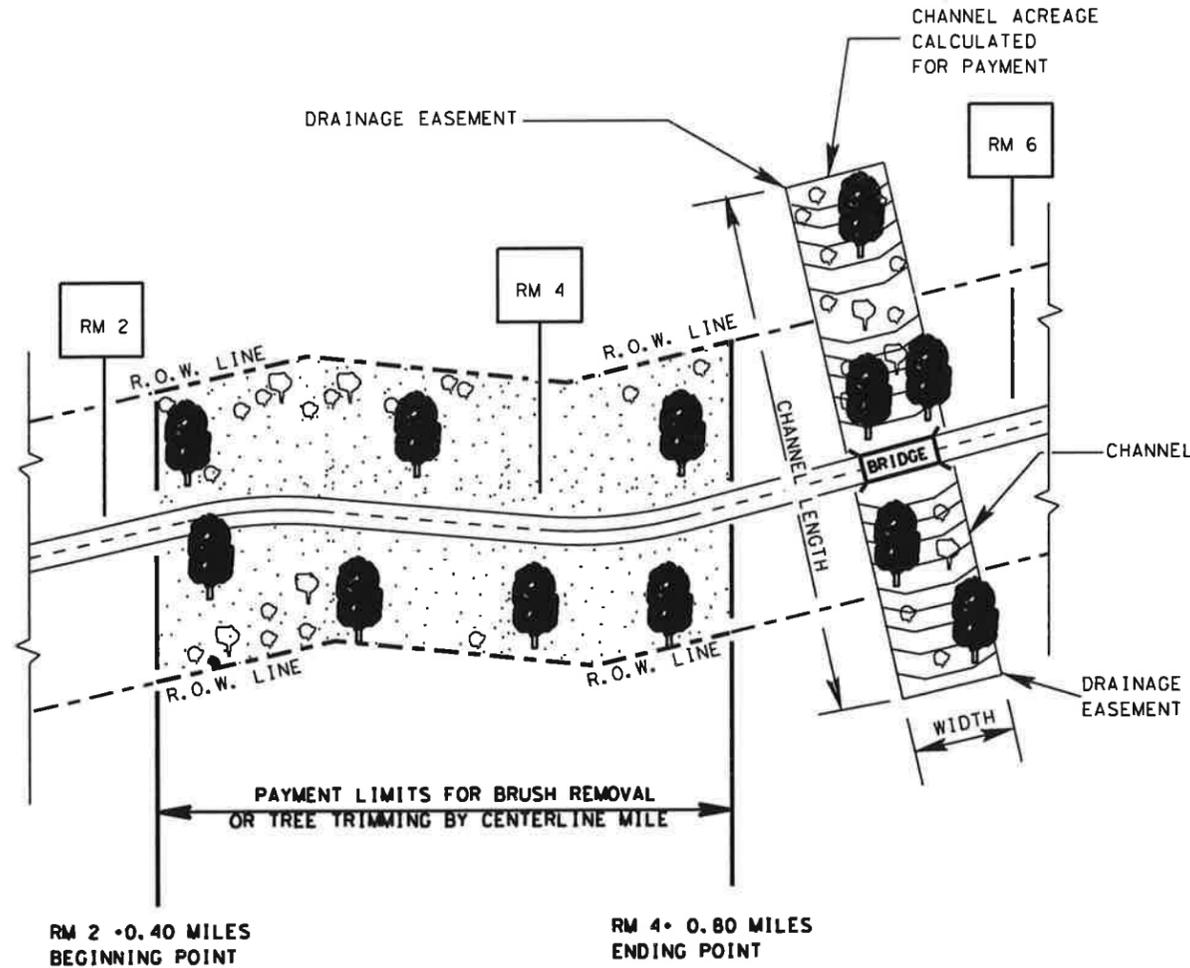
Maintenance Division Standard

## TREE AND BRUSH REMOVAL

### TRB-15(1)

FILE:	DW: JED	CK: LJB	DW: JED	CK:
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REVISIONS				
Revised table 1 to 2014 Specification	DIST	COUNTY	SHEET NO. 140	

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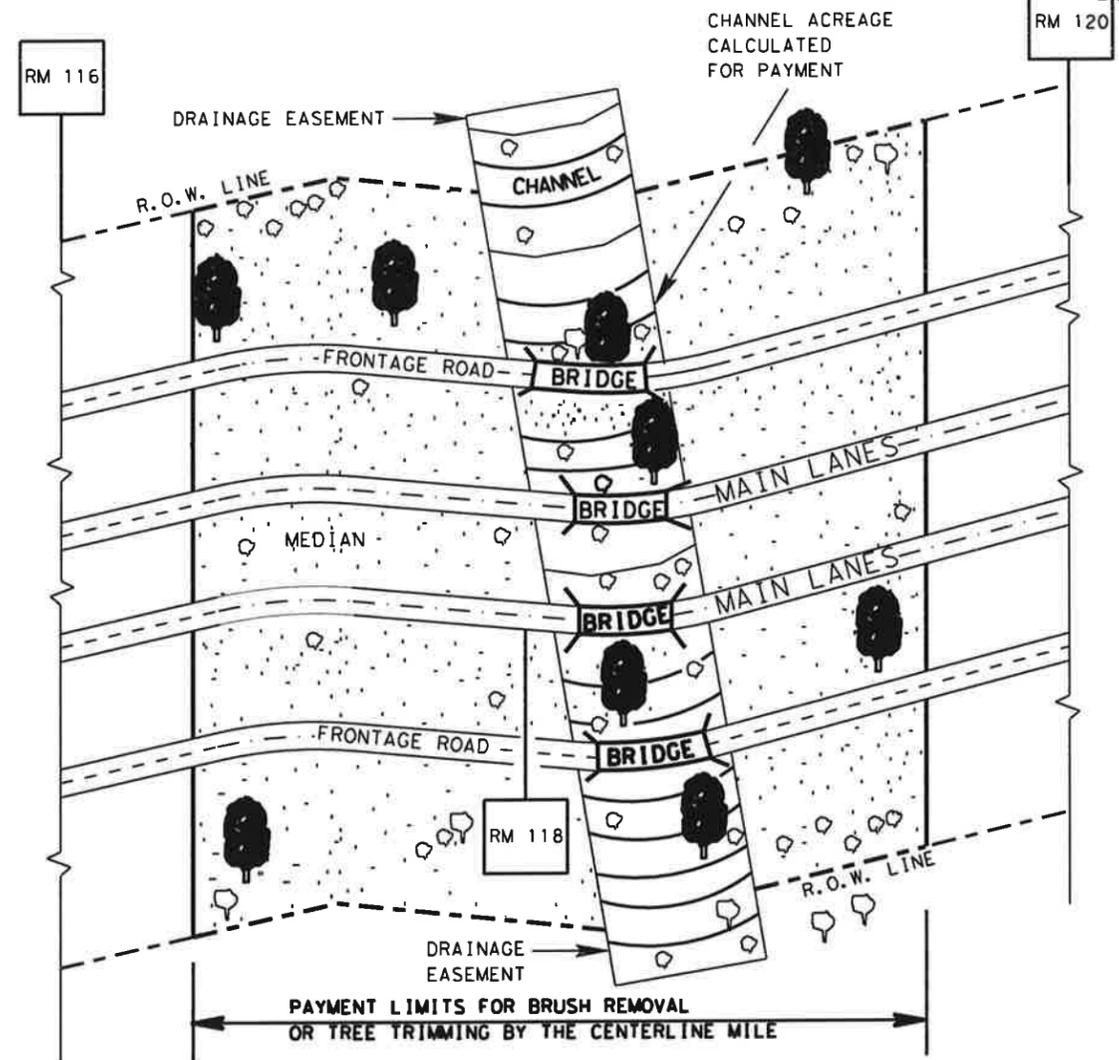


RM 2 + 0.40 MILES  
BEGINNING POINT

RM 4 + 0.80 MILES  
ENDING POINT

BRUSH REMOVED TO  
WITHIN 1" OF GROUND  
<4" DIAMETER TRUNK  
IS DEFINED AS BRUSH  
UNLESS OTHERWISE DIRECTED

EXAMPLE: UNDIVIDED HIGHWAY



RM 116 + 0.40 MILES  
BEGINNING POINT

BRUSH REMOVED TO  
WITHIN 1" OF GROUND  
<4" DIAMETER TRUNK  
IS DEFINED AS BRUSH  
UNLESS OTHERWISE DIRECTED

RM 118 + 1.50 MILES  
ENDING POINT

EXAMPLE: DIVIDED HIGHWAY WITH FRONTAGE ROADS

GENERAL NOTES:

TREE TRIMMING AND BRUSH REMOVAL

1. PAYMENT BY THE CENTERLINE MILE IS MADE TO THE NEAREST 1/100 (0.01) MILE.
2. LIMITS OF WORK ARE SHOWN AS DISTANCES FROM REFERENCE MARKERS (RM).
3. PAY ITEMS BY THE CENTERLINE MILE INCLUDE ALL TREE TRIMMING OR BRUSH REMOVAL IN THE RIGHT OF WAY ON BOTH SIDES OF THE HIGHWAY. FOR DIVIDED HIGHWAYS, THE MEDIAN IS INCLUDED. FOR HIGHWAYS WITH FRONTAGE ROADS, THE AREAS BETWEEN THE FRONTAGE ROADS AND MAIN LANES, AND THE AREAS OUTSIDE OF THE FRONTAGE ROADS ARE INCLUDED.
4. BRUSH REMOVAL AND TREE TRIMMING UNDER BRIDGES, IN AND ALONG CHANNELS AND EASEMENTS ARE PAID FOR BY THE ACRE FOR AREAS DESIGNATED ON THE PLANS.

**Texas Department of Transportation**  
Maintenance Division  
Standard Plans

TREE AND BRUSH REMOVAL

TRB-15(2)

NOT TO SCALE		SHEET 2 OF 2	
FILE: TRB-15(2).DGN	DRAWN: JEO	CHECKED: BHL/JJB	DATE: -
© TxDOT APRIL 2015	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT
REVISED: 5/13/2004	LJB		
REVISED: 9/24/2004	LJB	COUNTY	CONTROL SECTION JOB HIGHWAY
REVISED: APRIL 2015	JEO		

**RIVER RD & OLD WINDMILL RD - BID FORM**  
**Williamson County, TX**

ITEM	NO	DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	COST
100	6002	PREPARING ROW	STA	80		
100	6017	PREP ROW (TREE) (GREATER THAN 8 IN DIA)	EA	20		
110	6001	EXCAVATION (ROADWAY)	CY	3741		
110	6002	EXCAVATION (CHANNEL)	CY	226		
132	6001	EMBANKMENT (FINAL)(ORD COMP)(TY A)	CY	821		
160	6003	FURNISHING AND PLACING TOPSOIL (4")	SY	24626		
162	6002	BLOCK SODDING	SY	379		
164	6033	DRILL SEEDING (PERM) (RURAL) (SANDY)	SY	24626		
166	6001	FERTILIZER	AC	5		
168	6001	VEGETATIVE WATERING	MG	959		
169	6001	SOIL RETENTION BLANKETS (CL I) (TY A)	SY	7587		
247	6041	FL BS (CMP IN PLC)(TYA GR1-2)(FNAL POS	CY	2626		
260	6079	LIME TRT (SUBGRADE) (6")	SY	18905		
310	6027	PRIME COAT (MC-30 OR AE-P)	GAL	3437		
316	6175	AGGR (TY-B GR-4 SAC-B)	CY	300		
316	6466	ASPH (CHFRS-2P OR CRS-2P)	GAL	12032		
354	6100	PLANE ASPH CONC PAV (5")	SY	18905		
432	6002	RIPRAP (CONC)(5 IN)	CY	18		
432	6035	RIPRAP (STONE PROTECTION) (24 IN)	CY	350		
432	6045	RIPRAP (MOW STRIP) (4 IN)	CY	49		
460	6009	CMP AR (GAL STL DES 2)	LF	490		
460	6010	CMP AR (GAL STL DES 3)	LF	60		
460	6011	CMP AR (GAL STL DES 4)	LF	295		
462	6010	CONC BOX CULV (6 FT X 3 FT)	LF	29		
464	6017	RC PIPE (CL IV)(18 IN)	LF	49		
464	6018	RC PIPE (CL IV)(24 IN)	LF	422		
464	6019	RC PIPE (CL IV)(30 IN)	LF	39		
464	6020	RC PIPE (CL IV)(36 IN)	LF	40		
465	6187	INLET(COMPL)(DROP)(TY 1)(1 GRATE)	EA	1		
466	6039	HEADWALL (CH - FW - 30) (DIA= 36 IN)	EA	1		
466	6134	HEADWALL (CH - PW - S) (DIA= 36 IN)	EA	1		
466	6152	WINGWALL (FW - 0) (HW=5 FT)	EA	1		
466	6179	WINGWALL (PW - 1) (HW=4 FT)	EA	1		
467	6356	SET (TY II) (18 IN) (RCP) (3: 1) ( C)	EA	4		
467	6388	SET (TY II) (24 IN) (RCP) (3: 1) ( C)	EA	8		
467	6395	SET (TY II) (24 IN) (RCP) (6: 1) ( P)	EA	1		
467	6417	SET (TY II) (30 IN) (RCP) (3: 1) ( C)	EA	2		
467	6525	SET (TY II) (DES 2) (CMP) (6: 1) ( P)	EA	32		
467	6537	SET (TY II) (DES 3) (CMP) (6: 1) ( P)	EA	4		
467	6551	SET (TY II) (DES 4) (CMP) (6: 1) ( P)	EA	4		
496	6006	REMOV STR (HEADWALL)	EA	2		

496	6007	REMOV STR (PIPE)	LF	300		
496	6050	REMOV STR (DRIVEWAY CULVERT)	EA	12		
500	6001	MOBILIZATION	LS	1		
502	6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3		
506	6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	245		
506	6011	ROCK FILTER DAMS (REMOVE) (TY 2)	LF	245		
506	6020	CONSTRUCTION EXISTS (INSTALL) (TY 1)	SY	333		
506	6024	CONSTRUCTION EXISTS (REMOVE)	SY	333		
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	6729		
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	6729		
530	6006	DRIVEWAYS (SURF TREAT)	SY	2690		
540	6001	MTL W-BEAM GD FEN (TIM POST)	LF	1000		
540	6014	SHORT RADIUS	LF	25		
540	2005	TERMINAL ANCHOR SECTION	EA	8		
560	6001	MAILBOX INSTALL-S (TWG-POST) TY 1	EA	57		
UNFORSEEN WATER LINE ITEMS (from Cobb Fendley)						
W2.10.A.6"	Pipe, 6" Dia. PVC Water, Complete in Place, Including Excavation and Backfill		LF	800		
W2.10.AR.6"	Pipe, 6" Dia. PVC Water (Restrained), Complete in Place, Including Excavation and Backfill		LF	200		
W1.17.A	Ductile Iron Fittings		TON	2		
W1.17.B6x6	Wet Connection, 6"x6" Dia.		EA	6		
CIP11.06.B	Trench Excavation Safety Protection System (All Depths)		LF	1200		
W2.10.A2	Pipe, 2" Dia. SDR-9 PE, New Service Line		LF	100		
W3.21.A6	Valves, Gate 6" Dia.		EA	3		
W3.21.AR.2	Air Release Valve, 2"		EA	2		
W3.21.B	Fire Hydrant Assembly		EA	2		
W-04	Reconnect single service connections, incl. new meters per detail W-04		EA	10		
<b>PROJECT TOTAL COST</b>						



## Agreement for Construction Services

This Agreement (“Agreement”) between Williamson County, Texas, a political subdivision of the State of Texas (“Owner”) and \_\_\_\_\_ (“Contractor”) is entered into in accordance with the following terms and conditions:

**ARTICLE 1 SCOPE OF WORK:** The Owner desires to retain Contractor to provide the construction services described herein. The Contractor shall have the overall responsibility for and shall provide complete construction services and furnish all materials, equipment, tools and labor as necessary or reasonably inferable to complete the following described construction services, or any phase of such services, in accordance with the Owner’s requirements and the terms of this Agreement (hereinafter collectively referred to as the “Work”):

**As described in the IFB Solicitation # \_\_\_\_\_, \_\_\_\_\_; including the specifications set forth therein, which is incorporated herein as if copied in full.**

**ARTICLE 2 CONTRACT PRICE:** Owner agrees to pay to the Contractor, for the satisfactory performance of the Work, the not-to-exceed amount of \_\_\_\_\_ (\$\_\_\_\_\_) in accordance with the terms and conditions of this Agreement.

**ARTICLE 3 PLANS AND SPECIFICATIONS:** The Work shall be performed pursuant to and in accordance with the following described plans and specifications, as well as any revisions made thereto:

**As described in the IFB Solicitation # \_\_\_\_\_, including the specifications set forth therein, which is incorporated herein as if copied in full.**

**Additional Work:** Should Owner choose to add additional work, such additional work shall be described in a separate written amendment to this Agreement wherein the additional work shall be described and the parties shall set forth the amount of compensation to be paid by Owner for the additional work. Contractor shall not begin any additional work and Owner shall not be obligated to pay for any additional work unless a written amendment to this Agreement has been signed by both parties.

**ARTICLE 4 SUBSTANTIAL AND FINAL COMPLETION:**

**4.1 Commencement of Work.** Contractor shall commence the Work upon instruction to do so from the Owner and Construction shall be deemed to have commenced on the date of such instruction.

**4.2 Substantial Completion.** “Substantial Completion” means the stage in the progress of the Work when the Work, or designated portions thereof, may still require minor modifications or adjustments but, in the Owner’s opinion, the Work has progressed to the point such that all parts of the Work under consideration are fully operational and usable for intended purposes, as evidenced by a Certificate of Substantial Completion approved by the Owner. If a Certificate of Occupancy is required by public authorities having jurisdiction over the Work, said certificate shall be issued before the Work or any portion thereof is considered substantially complete. When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify Owner’s Designated Representative (sometimes referred to as the “ODR”) and request a determination as to whether the Work or designated portion thereof is substantially complete. If the ODR does not consider the Work substantially complete, the ODR will notify the Contractor giving reasons therefore. Failure on the Owner’s part to list a reason does not alter the responsibility of the Contractor to complete all Work in accordance with the terms of this Agreement. After satisfactorily completing items identified by Owner’s Designated Representative, the Contractor shall then submit another request for the ODR to determine Substantial Completion. If The ODR considers the Work substantially complete, The ODR will prepare and deliver a certificate of Substantial Completion which shall establish the date of Substantial Completion, shall include a punch list of items to be completed or corrected before final completion and final payment, shall establish the time within which the Contractor shall finish the punch list, and shall establish responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the Work, warranty and insurance. Failure to include an item on the punch list does not alter the responsibility of the Contractor to complete all Work in accordance with the terms and conditions of this Agreement. The certificate of Substantial Completion shall be signed by the Owner and the Contractor to evidence acceptance of the responsibilities assigned to them in such certificate.

Substantial Completion (as defined in this agreement) for all stages of the Work shall be achieved on or before the following Substantial Completion date:

DATE FOR SUBSTANTIAL COMPLETION: TBD

Under no circumstances will the time for Substantial Completion exceed this date without a written amendment to this Agreement. **THE TIMES SET FORTH IN THE CONSTRUCTION DOCUMENTS ARE AN ESSENTIAL ELEMENT OF THE AGREEMENT. TIME LIMITS STATED IN THE CONTRACT DOCUMENTS ARE OF THE ESSENCE OF THIS AGREEMENT.**

**4.3 Final Completion.** The Work shall be fully and finally completed **on or before TBD**; provided, however, Owner may extend said time period in the event bad weather affects the progress of the Work. Owner shall, at its sole discretion, determine when the Work has been fully and finally completed to its satisfaction.

**4.4 Liquidated Damages.** For each consecutive calendar day after the date of Substantial Completion that the Work is not Substantially Complete, the Owner may deduct the amount of **Two Hundred Dollars per day (\$200/day)** from any money due or that becomes due the Contractor, not as a penalty but as liquidated damages representing the parties' estimate at the time of contract execution of the damages that the Owner will sustain for late completion. The parties stipulate and agree that calculating Owner’s actual damages for late completion of the Work would be impractical, unduly burdensome, and cause unnecessary delay and that the amount of daily liquidated damages set forth is reasonable.

**ARTICLE 5 PAYMENT:**

Contractor shall have a duty to submit to the ODR by the end of each month a statement showing the total value of the Work performed during such month. The statement shall also include the value of all sound materials delivered on the Work site and to be included in the Work and all partially completed Work, whether bid as a lump sum or a unit item, which in the opinion of the ODR is acceptable. The ODR shall examine and approve or modify and approve such statement. The Owner shall then pay the Contractor pursuant to Chapter 2251 of the Texas Government Code ("Texas Prompt Payment Act"), as set forth in Article 11.1 of this Agreement, the total amount of the approved statement less all previous payments and all further sums that may be retained by the Owner under the terms of this Agreement or under the law. **Statements are not considered "received" until reviewed by the ODR and an approved statement is submitted to the Williamson County Auditor's Office; therefore, Contractor must ensure timely delivery of statements for review and processing.**

At any time following the completion of all Work, including all punch list items, cleanup, and the delivery of record documents, the Contractor shall submit a certified application for final payment, including all sums held as retainage if any, to the ODR for its review and approval. Contractor shall submit, prior to or with the application for final payment, final copies of all close out documents, including maintenance and operating instructions, guarantees and warranties, certificates, and all other items required by this Agreement. Contractor shall also submit consent of surety to final payment, an affidavit that all payrolls, bills for materials and equipment, subcontracted work and other indebtedness connected with the Work, except as specifically noted, have been paid or will be paid or otherwise satisfied within the period of time required by Chapter 2251, Texas Government Code. Contractor shall furnish documentation establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of claims arising out of the Agreement. Owner is entitled to rely upon this affidavit and the Contractor may not submit a claim on behalf of a subcontractor or vendor if that claim has not been noted as an exception in the affidavit.

Owner may deduct from the final payment all sums due from Contractor for any reason, Liquidated Damages and all other deductions authorized by this Agreement.

Final payment shall constitute a waiver of all claims by the Contractor except those specifically identified in writing and submitted to the ODR prior to the application for final payment. Provided, however, that the Work shall not be deemed fully performed by the Contractor and closed until the expiration of all warranty periods.

**ARTICLE 6 CONTRACTOR'S GENERAL RESPONSIBILITIES AND COVENANTS:**

**6.1** Contractor shall perform all services specifically allocated to it hereunder, as well as those services reasonably inferable and necessary for completion of the Work. The Contractor shall keep the Owner informed of the progress and quality of the Work. Contractor agrees and acknowledges that Owner is entering into this Agreement in reliance on Contractor's represented expertise and ability to provide the Work described in this Agreement. Contractor agrees to use its best efforts, skill, judgment, and abilities to perform its obligations in accordance with the highest standards used in the profession and to further the interests of Owner in accordance with Owner's requirements and procedures.

**6.2** Contractor's duties as set forth herein shall at no time be in any way diminished by reason of any approval by the Owner nor shall the Contractor be released from any liability by reason of such approval by the Owner, it being understood that the Owner at all times is ultimately relying upon the Contractor's skill and knowledge in performing the services required hereunder.

**6.3** Contractor is responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. The safety program shall comply with all applicable requirements of the current federal Occupational Safety and Health Act and all other applicable federal, state and local laws and regulations.

**6.4** Contractor shall be an independent contractor under this Agreement and shall assume all of the rights, obligations, liabilities, applicable to it as such independent contractor hereunder and any provisions in this agreement which may appear to give Owner the right to direct Contractor as to details of doing the Work herein covered or to exercise a measure of control over the Work shall be deemed to mean that Contractor shall follow the desires of Owner in the results of the Work only. Owner shall not retain or have the right to control the Contractor's means, methods or details pertaining to the Contractor's performance of the Work described herein, nor shall Owner have the power to direct the order in which Contractor's Work is performed under this agreement. Owner and Contractor hereby agree and declare that Contractor is an Independent Contractor and as such meets the qualifications of an Independent Contractor under Texas Worker's Compensation Act, Texas Labor Code, Section 406.141, that the Contractor is not an employee of Owner for purposes of this Agreement, and that the Contractor and its employees, agents and sub-subcontractors shall not be entitled to worker's compensation coverage or any other type of insurance coverage held by Owner.

**6.5** As part of Contractor obligation to coordinate the Work, Contract shall:

- a. cooperate with the ODR and endeavor to further the interests of the Owner and the Work;
- b. provide an on-site, full-time superintendent for the duration of the Work;
- c. visit the Work site and inspect the existing facilities, systems and conditions to insure an accurate understanding of the existing conditions as required;
- d. at Owner's request, attend public meetings and hearings concerning the development of the Work;
- e. review all drawings, specifications, and other plans as they are developed by the Owner and/or its architect and advise Owner of any error, inconsistency or omission discovered in the drawings, specifications, and other plans;
- f. review the drawings, specifications, and other plans for compliance with all applicable laws and code requirements;
- g. advise Owner of any tests that should be performed;
- h. organize and maintain a competent, full-time staff at the Work site with clearly defined lines of authority and communication as necessary to coordinate construction activities, monitor and direct progress of the Work;
- i. attend Owner's regularly scheduled Work progress meetings and fully advise the ODR of the Work status including schedule, costs, quality and changes;
- j. assist Owner in obtaining building permits and obtain special permits for permanent improvements as required by law; and
- k. shall coordinate, monitor and inspect the Work of subcontractors to ensure conformance with the drawings, specifications, other plans and with the terms of this Agreement.

**6.6** Contractor shall identify every subcontractor it intends to use for the Work to the Owner in writing at least ten (10) days before entering into any subcontract. Contractor shall not use any subcontractor to which Owner has a reasonable objection. If Owner does not object to a particular subcontractor with said ten (10) days, such subcontract may be considered acceptable to Owner. Following Owner's acceptance of a subcontractor, that subcontractor shall not be changed without Owner's written consent, which shall not be unreasonably withheld.

**6.7** Contractor's designated representative, which is set forth below Contractor's signature herein below, shall be responsible for the day-to-day management of the Work on behalf of Contractor. The designated representative shall be the Owner's primary contact during the Work and shall be available as required for the benefit of the Work and the Owner. The contractor's designated representative shall be authorized to act on behalf of and bind the Contractor in all matters related to the Work including, but not limited to, execution of Change Orders.

**6.8 NO ALTERATIONS OR CHANGES SHALL BE MADE, HOWEVER, EXCEPT UPON THE WRITTEN ORDER OF THE OWNER, OR THE ODR.**

**6.9** Contractor shall promptly correct any defective Work at Contractor's sole expense, unless the Owner specifically agrees, in writing, to accept the Work.

**6.10** Contractor shall maintain and deliver the close out documents that describe changes or deviations from the original drawings, specifications and plans that occurred during construction and that reflect the actual "As Built" conditions of the completed Work.

#### **COMMISSIONING AND WARRANTY RESPONSIBILITIES**

**6.11** Contractor shall provide commissioning, starting and check-out services for the systems installed as a part of the Work prior to completion and acceptance. Operation manuals and instructions will be provided to the Owner, the systems will be demonstrated and training provided to Williamson County's operators upon completion and prior to acceptance.

**6.12** Contractor hereby warrants that the materials and equipment provided for the Work will be of good quality and new unless otherwise required or permitted by the Owner; that the construction will be free from faults and defects; and that the construction will conform with the requirements of the plans, specifications, drawings and the terms of this Agreement.

**6.13** Contractor shall provide warranty services for the Work for a full **12 months** (30 months for Work involving mechanical services, if any) following Final Completion and final payment. Just before the warranty period expires, Contractor shall attend an on-site meeting with the Owner to ensure that all warranty issues have been identified and properly remedied.

#### **ARTICLE 7 OWNER'S RESPONSIBILITIES**

**7.1** The Owner shall:

- a. provide the general schedule for the Work provided Owner is of the opinion such schedule is necessary. The general schedule will set forth the Owner's plan for milestone dates and completion of the Work;
- b. identify a person as its ODR who is authorized to act in the Owner's behalf with respect to the Work. The ODR shall examine the documents submitted by the Contractor and shall render decisions on behalf of the Owner to the extent allowed by Texas law;

- c. at Owner's cost, will secure the services of surveyors, soils engineers, existing facility surveys, testing and balancing, environmental surveys or other special consultants to develop such additional information as may be necessary for the design or construction of the Work;
- d. furnish required information and services and shall render approvals and decisions as expeditiously as is consistent with reasonable skill and care and the orderly progress of the Contractor's services and of the Work;
- e. shall have the right to reject any defective Work. Should Contractor refuse or neglect to correct any such Work within a reasonable time after notice, Owner may have the Work corrected and recover all expenses incurred from Contractor on demand; and
- f. Owner shall furnish to the Contractor a sufficient number of plans, drawings and specifications sets.

## ARTICLE 8 INSURANCE AND INDEMNITY

**8.1 Insurance.** The Contractor shall carry insurance in the types and amounts indicated below for the duration of the Agreement, which shall include items owned by Owner in the care, custody and control of Contractor prior to and during construction. Contractor must also complete and file the declaration pages from the insurance policies with Owner whenever a previously identified policy period expires during the term of the Agreement, as proof of continuing coverage. Contractor shall update all expired policies prior to submission of any payment requests hereunder. Failure to update policies shall be reason for payment to be withheld until evidence for renewal is provided to the Owner.

**8.1.1** The Contractor shall provide and maintain, until the Work covered in this Agreement is completed and accepted by the Owner, the minimum insurance coverage in the minimum amounts as described below. Coverage shall be written on an occurrence basis by companies authorized and admitted to do business in the State of Texas and rated A- or better by A.M. Best Company or otherwise acceptable to Owner.

Type of Coverage	Limits of Liability	
a. Worker's Compensation	Statutory	
b. Employer's Liability		
Bodily Injury by Accident	\$500,000 Ea. Accident	
Bodily Injury by Disease	\$500,000 Ea. Employee	
Bodily Injury by Disease	\$500,000 Policy Limit	
c. Comprehensive general liability including completed operations and contractual liability insurance for bodily injury, death, or property damages in the following amounts:		
	PER PERSON	PER OCCURRENCE
Comprehensive General Liability (including premises, completed operations and contractual)	\$ 1,000,000	\$ 1,000,000
Aggregate policy limits:	\$1,000,000	

- d. Comprehensive automobile and auto liability insurance (covering owned, hired, leased and non-owned vehicles):

COVERAGE	PER PERSON	PER OCCURRENCE
Bodily injury (including death)	\$1,000,000	\$1,000,000
Property damage	\$1,000,000	\$1,000,000
Aggregate policy limits	No aggregate limit	

- e. Builder's Risk Insurance  
(*all risks*)

An all risks policy shall be in the amount equal at all times to 100% of the Contract Sum. The policy shall include coverage for loss or damage caused by certified acts of terrorism as defined in the Terrorism Risk Insurance Act. The policy shall be issued in the name of the Contractor and shall name his Subcontractors as additional insureds. The Owner shall be named as a loss payee on the policy. The builders risk policy shall have endorsements as follow:

1. This insurance shall be specific as to coverage and not considered as contributing insurance with any permanent insurance maintained on the present premises. If off-site storage is permitted, coverage shall include transit and storage in an amount sufficient to protect property being transported or stored.
2. For renovation projects and or portions of work contained within an existing structure, the Owner waives subrogation for damage by fire to existing building structure(s), if the Builder's Risk Policy has been endorsed to include coverage for existing building structure(s) in the amount described in the Special Conditions. However, Contractor shall not be required to obtain such an endorsement unless specifically required by the Special Conditions., in this Agreement. The aforementioned waiver of subrogation shall not be effective unless such endorsement is obtained.

- f. Umbrella coverage in the amount of not less than \$1,000,000.

**8.1.2** The above insurance requirements are not intended to be compounded with the Contractor's standing insurance policies. If the Contractor already has in force insurance policies which provide the required coverage, there is no need to purchase duplicate coverage for this Work.

**8.1.3** Policies must include the following clauses, as applicable.

- a. "This insurance shall not be canceled, limited in scope or coverage, or non-renewed until after thirty (30) days prior written notice, or ten (10) days for non-payment of premium, has been given to Williamson County."
- b. "It is agreed that the Contractor's insurance shall be deemed primary with respect to any insurance or self insurance carried by Williamson County for liability arising out of operations under the Agreement with Williamson County."
- c. "Williamson County, its officials, directors, employees, representatives, and volunteers are added as additional insured as respects operations and activities of, or on behalf of the named insured performed under Agreement with the Owner." This is not applicable to the workers' compensation policy.
- d. "The workers' compensation and employers' liability policy will provide a waiver of subrogation in favor of Williamson County."

**8.1.4** Workers' Compensation Insurance Coverage:

In the event that Contractor employs any individual to perform any portion of the Work, Contractor shall comply with Texas Labor Code, §406.096, which requires workers' compensation insurance coverage for all employees providing services on a building or construction project for a governmental entity.

a. Definitions:

- (1) Certificate of Coverage ("certificate") - A copy of a certificate of insurance, a certificate of authority to self-insure issued by the Texas Workers' Compensation Commission, or a coverage agreement (TWCC-81, TWCC-82, TWCC-83, or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project, for the Duration of the Work.
- (2) Duration of the Work - includes the time from the beginning of the Work until the Work has been completed and accepted by the Owner.
- (3) Coverage – Workers' compensation insurance meeting the statutory requirements of the Texas Labor Code, §401.011(44).
- (4) Persons providing services relating to the Work ("subcontractor") - includes all persons or entities performing all or part of the services the Contractor has undertaken to perform the Work, regardless of whether that person contracted directly with the Contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services in relation to the Work. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the Work, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

b. The Contractor shall provide Coverage, based on proper reporting of classification codes and payroll amounts and filing of any Coverage agreements, which meets the statutory requirements of Texas labor Code, §401.011(44) for all employees of the Contractor providing services in relation to the Work, for the Duration of the Work.

c. The Contractor must provide a Certificate of Coverage to the Owner prior to or contemporaneously with the execution of this Agreement.

- d. If the Coverage period shown on the Contractor's current Certificate of Coverage ends during the Duration of the Work, the Contractor must, prior to the end of the Coverage period, file a new Certificate of Coverage with the Owner showing that Coverage has been extended.
- e. The Contractor shall obtain from each person providing services in relation to the Work, and provide to the Owner:
- (1) a Certificate of Coverage, prior to that person beginning any of the Work, so the Owner will have on file Certificates of Coverage showing Coverage for all persons providing services in relation to the Work; and
  - (2) no later than seven days after receipt by the Contractor, a new Certificate of Coverage showing extension of Coverage, if the Coverage period shown on the current Certificate of Coverage ends during the Duration of the Work.
- f. The Contractor shall retain all required Certificates of Coverage for the Duration of the Work and for one year thereafter.
- g. The Contractor shall notify the Owner in writing by certified mail or personal delivery, within 10 days after the Contractor knew or should have known, of any change that materially affects the provision of Coverage of any person providing services in relation to the Work.
- h. The Contractor shall post on the Work site a notice, in the text, form and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services in relation to the Work that they are required to be covered, and stating how a person may verify Coverage and report lack of Coverage.
- i. By signing this Agreement or providing or causing to be provided a Certificate of Coverage, the Contractor is representing to the Owner that all employees of the Contractor who will provide services in relation to the Work and all persons providing services in relation to the Work will be covered by workers' compensation coverage for the Duration of the Work, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the Contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.
- j. The Contractor's failure to comply with any of these provisions is a breach of Agreement by the Contractor which entitles the Owner to declare the Agreement void if the Contractor does not remedy the breach within ten (10) days after receipt of notice of breach from the Owner.

**8.1.5** The furnishing of the above listed insurance coverage must be tendered prior to execution of the Agreement, and in no event later than ten (10) calendar days from Notice of Award. Failure to provide the insurance in a timely fashion may result in loss of Contractor's bid bond.

**8.1.6** The Contractor shall not cause or allow any of its required insurance to be canceled, nor permit any insurance to lapse during the term of the Agreement or as required in the Agreement. If the Contractor fails to obtain, maintain or renew any insurance required by this Agreement, the Owner may, among other remedies available hereunder or at law, obtain insurance coverage directly and recover the cost of that insurance from the Contractor or declare this Agreement void if the Contractor does not remedy the breach within ten (10) days after receipt of notice of breach from the Owner.

**8.1.7** The Owner reserves the right to review the insurance requirements set forth in this Article during the effective period of the Agreement and to make reasonable adjustments to the insurance coverage and their limits when deemed necessary and prudent by the Owner based upon changes in statutory law, court decisions, or the claims history of the industry as well as the Contractor.

**8.1.8** The Owner shall be entitled, upon request, and without expense, to receive complete copies of the policies with all endorsements and may make any reasonable requests for deletion, or revision or modification of particular policy terms, conditions, limitations, or exclusions, except where policy provisions are established by law or regulation binding upon the Parties or the underwriter of any of such policies. Damages caused by the Contractor and not covered by insurance shall be paid by the Contractor.

**8.1.9** Contractor shall be responsible for payment of premiums for all of the insurance coverages required under this Agreement. Contractor further agrees that for each claim, suit or action made against insurance provided hereunder, with respect to all matters for which the Contractor is responsible hereunder, Contractor shall be solely responsible for all deductibles and self-insured retentions. **Any deductibles or self-insured retentions over \$50,000 in the Contractor's insurance must be declared and approved in writing by Owner in advance.**

**8.1.10** The Contractor shall contractually require each person or entity with whom it contracts to provide services in relation to the Work, to comply with each and every insurance requirement that Contractor must comply with hereunder. More specifically, each person or entity with whom Contractor contracts to provide services on the in relation to the Work must comply with each insurance requirement under this Article 8 just as if such person or entity was the Contractor. Thus, every reference to Contractor under each insurance requirement of this Article 8 shall mean and include each person or entity with whom Contractor contracts to provide services in relation to the Work. If any such person or entity with whom Contractor contracts to provide services in relation to the Work fails to obtain, maintain or renew any insurance required by this Agreement, the Owner may, among other remedies available hereunder or at law, obtain insurance coverage directly and recover the cost of that insurance from the Contractor or declare this Agreement void if the Contractor does not remedy the breach within ten (10) days after receipt of notice of breach from the Owner.

## 8.2 INDEMNITY.

**8.2.1 INDEMNIFICATION - EMPLOYEE PERSONAL INJURY CLAIMS.** TO THE FULLEST EXTENT PERMITTED BY LAW, THE CONTRACTOR SHALL INDEMNIFY, DEFEND (WITH COUNSEL OF OWNER'S CHOOSING), AND HOLD HARMLESS OWNER, AND OWNER'S EMPLOYEES, AGENTS, REPRESENTATIVES, PARTNERS, OFFICERS, AND DIRECTORS (COLLECTIVELY, THE "INDEMNITEES") AND SHALL ASSUME ENTIRE RESPONSIBILITY AND LIABILITY (OTHER THAN AS A RESULT OF INDEMNITEES' GROSS NEGLIGENCE) FOR ANY CLAIM OR ACTION BASED ON OR ARISING OUT OF THE PERSONAL INJURY, OR DEATH, OF ANY EMPLOYEE OF THE CONTRACTOR, OR OF ANY SUBCONTRACTOR, OR OF ANY OTHER ENTITY FOR WHOSE ACTS THEY MAY BE LIABLE, WHICH OCCURRED OR WAS ALLEGED TO HAVE OCCURRED ON THE WORK SITE OR IN CONNECTION WITH THE PERFORMANCE OF THE WORK. CONTRACTOR HEREBY INDEMNIFIES THE INDEMNITEES EVEN TO THE EXTENT THAT SUCH PERSONAL INJURY WAS CAUSED OR ALLEGED TO HAVE BEEN CAUSED BY THE SOLE, COMPARATIVE OR CONCURRENT NEGLIGENCE OF THE STRICT LIABILITY OF ANY INDEMNIFIED PARTY. THIS INDEMNIFICATION SHALL NOT BE LIMITED TO DAMAGES, COMPENSATION, OR BENEFITS PAYABLE UNDER INSURANCE POLICIES, WORKERS COMPENSATION ACTS, DISABILITY BENEFITS ACTS, OR OTHER EMPLOYEES BENEFIT ACTS.

**8.2.2 INDEMNIFICATION - OTHER THAN EMPLOYEE PERSONAL INJURY CLAIMS.** TO THE FULLEST EXTENT PERMITTED BY LAW, CONTRACTOR SHALL INDEMNIFY, DEFEND (WITH COUNSEL OF OWNER'S CHOOSING), AND HOLD HARMLESS OWNER, AND OWNER'S EMPLOYEES, AGENTS, REPRESENTATIVES, PARTNERS, OFFICERS, AND DIRECTORS (COLLECTIVELY, THE "INDEMNITEES") FROM AND AGAINST CLAIMS, DAMAGES, LOSSES AND EXPENSES, INCLUDING BUT NOT LIMITED TO ATTORNEYS' FEES, ARISING OUT OF OR ALLEGED TO BE RESULTING FROM THE PERFORMANCE OF THIS AGREEMENT OR THE WORK DESCRIBED HEREIN, TO THE EXTENT CAUSED BY THE NEGLIGENCE, ACTS, ERRORS, OR OMISSIONS OF CONTRACTOR OR ITS SUBCONTRACTORS, ANYONE EMPLOYED BY THEM OR ANYONE FOR WHOSE ACTS THEY MAY BE LIABLE, REGARDLESS OF WHETHER OR NOT SUCH CLAIM, DAMAGE, LOSS OR EXPENSE IS CAUSED IN WHOLE OR IN PART BY A PARTY INDEMNIFIED HEREUNDER.

**8.3** Except for the obligation of Owner to pay Contractor the Contract Price pursuant to the terms of this Agreement, and to perform certain other obligations pursuant to the terms and conditions explicitly set forth herein, Owner shall have no liability to Contractor or to anyone claiming through or under Contractor by reason of the execution or performance of this Agreement. Notwithstanding any obligation or liability of Owner to Contractor, no present or future partner or affiliate of Owner or any agent, officer, director, or employee of Owner, Williamson County, or of the various departments comprising Williamson County, or anyone claiming under Owner has or shall have any personal liability to Contractor or to anyone claiming through or under Contractor by reason of the execution or performance of this Agreement.

## ARTICLE 9 BONDS

**9.1 Performance Bond.** Upon execution of this Agreement, Contractor shall provide a Performance Bond in the amount of 100% of the Contract Price. The surety for a Performance Bond shall meet the requirements of Texas law.

**9.2 Payment Bond.** Upon execution of this Agreement, Contractor shall provide a Payment Bond in the amount of 100% of the Contract Price, as security for the true and faithful payment in full of all subcontractors and persons performing labor, services, materials, machinery, and fixtures in connection with the Work. The surety for a Payment Bond shall meet the requirements of Texas law.

**9.3 Warranty Bond.** Upon execution of this Agreement, Contractor shall provide a Warranty Bond in the amount of 20% of the Contract Price, as security for the true and faithful performance of all warranties set forth in Bid Documents and this Agreement.

## **ARTICLE 10 TERMINATION**

**10.1 Termination for Cause.** If either party commits an Event of Breach (a breach of any of the covenants, terms and/or conditions of this Agreement), the non-breaching party shall deliver written notice of such Event of Breach to the breaching party. Such notice must specify the nature of the Event of Breach and inform the breaching party that unless the Event of Breach is cured within three (3) business days of receipt of the notice, additional steps may be taken to terminate this Agreement. If the breaching party begins a good faith attempt to cure the Event of Breach within three (3) business days, then and in that instance, the three (3) business day period may be extended by the non-breaching party, so long as the breaching party continues to prosecute a cure diligently to completion and continues to make a good faith attempt to cure the Event of Breach. If, in the opinion of the non-breaching party, the breaching party does not cure the breach within three (3) business days or otherwise fails to make any diligent attempt to correct the Event of Breach, the breaching party shall be deemed to be in breach and the non-breaching party may, in addition to seeking the remedies available hereunder and under the law, terminate this Agreement.

**10.2 Termination for Convenience.** The Owner may terminate this Agreement for convenience and without cause or further liability upon thirty (30) days written notice to Contractor. In the event of such termination, it is understood and agreed that only the amounts due to Contractor for goods, commodities and/or services provided and expenses incurred to and including the date of termination, will be due and payable. No penalty will be assessed for Owner's termination of this Agreement for convenience.

## **ARTICLE 11 MISCELLANEOUS PROVISIONS**

**11.1 Interest and Late Payments.** Except as otherwise specifically set forth herein, Owner's payment for goods and services shall be governed by Chapter 2251 of the Texas Government Code. Interest charges for any overdue payments shall be paid by Owner in accordance with Texas Government Code Section 2251.025. More specifically, the rate of interest that shall accrue on a late payment is the rate in effect on September 1 of Owner's fiscal year in which the payment becomes due. The said rate in effect on September 1 shall be equal to the sum of one percent (1%); and (2) the prime rate published in the Wall Street Journal on the first day of July of the preceding fiscal year that does not fall on a Saturday or Sunday.

In the event that an error appears in an invoice/application for payment submitted by Contractor, Owner shall notify Contractor of the error not later than the twenty first (21<sup>st</sup>) day after the date Owner receives the invoice/application for payment. If the error is resolved in favor of Contractor, Contractor shall be entitled to receive interest on the unpaid balance of the invoice/application for payment submitted by Contractor beginning on the date that the payment for the invoice/application for payment became overdue. If the error is resolved in favor of the Owner, Contractor shall submit a corrected invoice/application for payment that must be paid in accordance within the time set forth above. The unpaid balance accrues interest as provided by Chapter 2251 of the Texas Government Code if the corrected invoice/application for payment is not paid by the appropriate date.

**11.2 Assignment; Successors and Assigns.** This Agreement is a personal service contract for the services of Contractor, and Contractor's interest in this Agreement, duties hereunder and/or fees due hereunder may not be assigned or delegated to a third party. This Agreement shall be binding upon and inure to the benefit of parties hereto and their respective successors and assigns.

**11.3 Captions.** The captions of paragraphs in this Agreement are for convenience only and shall not be considered or referred to in resolving questions of interpretation or construction.

**11.4 Governing Law and Venue.** This Agreement and all of the rights and obligations of the parties and all of the terms and conditions shall be construed, interpreted and applied in accordance with and governed by and enforced under the laws of the State of Texas without reference to its conflicts of law provisions. Williamson County where the Work site is located shall be the sole place of venue for any legal action arising from or related to this Agreement or the project in which the Owner is a party.

**11.5 Waivers.** No delay or omission by either party in exercising any right or power arising from non-compliance or failure of performance by the other party with any of the provisions of this Agreement shall impair or constitute a waiver of any such right or power. A waiver by either party of any covenant or condition of this Agreement shall not be construed as a waiver of any subsequent breach of that or of any other covenant or condition of the Agreement.

**11.6 Interpretation.** In the event of any dispute over the meaning or application of any provision of the Contract Documents, the Contract Documents shall be interpreted fairly and reasonably, and neither more strongly for or against any party, regardless of the actual drafter of the Contract Documents.

**11.7 Binding Effect.** This Agreement shall be binding upon and inure to the benefit of the parties and their respective permitted assigns and successors.

**11.8 Appointment.** Owner hereby expressly reserves the right from time to time to designate by notice to Contractor a representative(s) to act partially or wholly for Owner in connection with the performance of Owner's obligations. Contractor shall act only upon instructions from the designated representative(s) unless otherwise specifically notified to the contrary.

**11.9 Audits.** Contractor agrees that Owner or its duly authorized representatives shall, until the expiration of three (3) years after final payment under this Agreement, have access to and the right to examine and photocopy any and all books, documents, papers and records of Contractor which are directly pertinent to the services to be performed under this Agreement for the purposes of making audits, examinations, excerpts, and transcriptions. Contractor agrees that Owner shall have access during normal working hours to all necessary Contractor facilities and shall be provided adequate and appropriate work space in order to conduct audits in compliance with the provisions of this section. Owner shall give Contractor reasonable advance notice of intended audits.

**11.10 Severability.** Should any term or provision of this Agreement be held invalid or unenforceable in any respect, the remaining terms and provisions shall not be affected and this Agreement shall be construed as if the invalid or unenforceable term or provision had never been included.

**11.11 No Waiver of Immunities.** Nothing in this Agreement shall be deemed to waive, modify or amend any legal defense available at law or in equity to Owner, its past or present officers, employees, or agents, nor to create any legal rights or claim on behalf of any third party. Owner does not waive, modify, or alter to any extent whatsoever the availability of the defense of governmental immunity under the laws of the State of Texas and of the United States.

**11.12 Current Revenues.** Under Texas law, a contract with a governmental entity that contains a claim against future revenues is void; therefore, each party paying for the performance of governmental functions or services must make those payments from current revenues available to the paying party.

**11.13 Compliance with Laws.** Contractor shall comply with all federal, state, and local laws, statutes, ordinances, rules and regulations, and the orders and decrees of any courts or administrative bodies or tribunals in any matter affecting the performance of this Agreement, including, without limitation, Worker's Compensation laws, minimum and maximum salary and wage statutes and regulations, licensing laws and regulations. When required, Contractor shall furnish the County with certification of compliance with said laws, statutes, ordinances, rules, regulations, orders, and decrees above specified.

**11.14 Sales and Use Tax Exemption.** Owner is a body corporate and politic under the laws of the State of Texas and claims exemption from sales and use taxes under Texas Tax Code Ann. § 151.309, as amended.

**11.15 Texas Public Information Act.** To the extent, if any, that any provision in this Agreement is in conflict with Tex. Gov't Code 552.001 *et seq.*, as amended (the "Public Information Act"), the same shall be of no force or effect. Furthermore, it is expressly understood and agreed that Owner, its officers and employees may request advice, decisions and opinions of the Attorney General of the State of Texas in regard to the application of the Public Information Act to any information or data furnished to Owner whether or not the same are available to the public. It is further understood that Owner, its officers and employees shall have the right to rely on the advice, decisions and opinions of the Attorney General, and that Owner, its officers and employees shall have no liability or obligation to Contractor for the disclosure to the public, or to any person or persons, of any software or a part thereof, or other items or data furnished to Owner by Contractor in reliance of any advice, decision or opinion of the Attorney General of the State of Texas.

**11.16 Force Majeure.** If the party obligated to perform is prevented from performance by an act of war, order of legal authority, act of God, or other unavoidable cause not attributable to the fault or negligence of said party, the other party shall grant such party relief from the performance of this Agreement. The burden of proof for the need of such relief shall rest upon the party obligated to perform. To obtain release based on force majeure, the party obligated to perform shall file a written request with the other party.

**11.17 Equal Opportunity in Employment.** The parties to this Agreement agree that during the performance of the services under this Agreement they will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The parties to this Agreement will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; termination; rates of pay or other forms of compensation, and selection for training, including apprenticeship.

**11.18 Reports of Accidents.** Within 24 hours after Contractor becomes aware of the occurrence of any accident or other event which results in, or might result in, injury to the person or property of any third person (other than an employee of the Contractor), whether or not it results from or involves any action or failure to act by the Contractor or any employee or agent of the Contractor and which arises in any manner from the performance of this Agreement, the Contractor shall send a written report of such accident or other event to the County, setting forth a full and concise statement of the facts pertaining thereto. The Contractor shall also immediately send the County a copy of any summons, subpoena, notice, or other documents served upon the Contractor, its agents, employees, or representatives, or received by it or them, in connection with any matter before any court arising in any manner from the Contractor's performance of work under this Agreement.

**11.19 Relationship of the Parties.** Each party to this Agreement, in the performance of this Agreement, shall act in an individual capacity and not as agents, employees, partners, joint ventures or associates of one another. The employees or agents of one party shall not be deemed or construed to be the employees or agents of the other party for any purposes whatsoever.

**11.20 Appropriation of Funds by Owner.** Owner believes it has sufficient funds currently available and authorized for expenditure to finance the costs of this Agreement. Contractor understands and agrees that the Owner's payment of amounts under this Agreement is contingent on the Owner receiving appropriations or other expenditure authority sufficient to allow the Owner, in the exercise of reasonable administrative discretion, to continue to make payments under this Agreement.

**11.21 Execution in Counterparts.** This Agreement may be executed in counterparts, each of which, when executed and delivered, shall be deemed to be an original and all of which together shall constitute one and the same document.

**11.22 Entire Agreement.** This Agreement represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either oral or written. This Agreement may be amended only by written instrument signed by each party to this Agreement. NO OFFICIAL, EMPLOYEE, AGENT, OR REPRESENTATIVE OF THE OWNER HAS ANY AUTHORITY, EITHER EXPRESS OR IMPLIED, TO AMEND THIS AGREEMENT, EXCEPT PURSUANT TO SUCH EXPRESS AUTHORITY AS MAY BE GRANTED BY THE WILLIAMSON COUNTY COMMISSIONERS COURT.

BY SIGNING BELOW, the Parties have executed and bound themselves to this Agreement to be effective as of the date of the last party's execution hereof (Effective Date).

**OWNER:**

**CONTRACTOR:**

WILLIAMSON COUNTY, TEXAS,  
a political subdivision of the state of Texas

By: \_\_\_\_\_

By: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**Party Representatives**

Owner's Designated Representative ("ODR"):

Contractor's Designated Representative:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Phone \_\_\_\_\_

Phone \_\_\_\_\_

Fax \_\_\_\_\_

Fax \_\_\_\_\_

## BID AFFIDAVIT

**This form must be completed, signed, notarized and returned with Bid package**

The undersigned certifies that the IFB and the Bidder's Bid have been carefully reviewed and are submitted as correct and final. Bidder further certifies and agrees to furnish any and/or all goods and/or services upon which prices are extended at the price Bid, and upon the conditions contained in the IFB.

I hereby certify that the foregoing Bid has not been prepared in collusion with any other Bidder or other person or persons engaged in the same line of business prior to the official opening of this Bid. Further, I certify that the Bidder is not now, nor has been for the past six (6) months, directly or indirectly concerned in any pool or agreement or combination, to control the price of services/commodities Bid on, or to influence any person or persons to submit a Bid or not to submit a Bid thereon."

<b>Name of Bidder:</b>	<input style="width: 95%;" type="text"/>
<b>Address of Bidder:</b>	<input style="width: 95%;" type="text"/>
<b>Email:</b>	<input style="width: 95%;" type="text"/>
<b>Telephone:</b>	<input style="width: 95%;" type="text"/>
<b>Printed Name of Person Submitting Affidavit:</b>	<input style="width: 95%;" type="text"/>
<b>Signature of Person Submitting Affidavit:</b>	<input style="width: 95%;" type="text"/>

**Cooperative Purchasing Program**

**Check one of the following options below.** A non-affirmative Bid will in no way have a negative impact on the County's evaluation of the Bid.

<input type="checkbox"/>	I will offer the quoted prices to all authorized entities during the term of the County's Contract.
<input type="checkbox"/>	I will not offer the quoted prices to all authorized entities.

**\*If no box is checked, the Bidder agrees to make best efforts in good faith to offer the quoted prices to all authorized entities.\***

BEFORE ME, the undersigned authority, a Notary Public, personally appeared   
 (*Name of Signer*), who after being by me duly sworn, did depose and say: "I, ,  
 (*Name of Signer*) am a duly authorized officer of/agent for  (*Name of Bidder*) and  
 have been duly authorized to execute the foregoing on behalf of the said  (*Name of Bidder*).

SUBSCRIBED AND SWORN to before me by the above-named   
 on this the  day of , 20.

Notary Public in and for  
 The State of   
 The County of

**SIGNATURE AND NOTARY NOT REQUIRED IF COMPLETING IN BIDSYNCH ELECTRONICALLY.**

<b>CONFLICT OF INTEREST QUESTIONNAIRE</b>		<b>Form CIQ</b>
<b>For vendor or other person doing business with local governmental entity</b>		
<p>This questionnaire is being filed in accordance with chapter 176 of the Local Government Code by a person doing business with the governmental entity.</p> <p>By law this questionnaire must be filed with the records administrator of the local government not later than the 7th business day after the date the person becomes aware of facts that require the statement to be filed. See Section 176.006, Local Government Code.</p> <p>A person commits an offense if the person violates Section 176.006, Local Government Code. An offense under this section is a Class C misdemeanor.</p>		<p><b>OFFICE USE ONLY</b></p> <p>Date Received</p> <div style="border: 1px solid black; width: 100px; height: 20px; margin: 0 auto;"></div>
1	<p><b>Name of person doing business with local governmental entity.</b></p> <div style="border: 1px solid black; width: 100%; height: 20px; margin-top: 5px;"></div>	
2	<p style="text-align: center;"><b>Check this box if you are filing an update to a previously filed questionnaire.</b></p> <p><input type="checkbox"/></p> <p style="font-size: small;">(The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than September 1 of the year for which an activity described in Section 176.006(a), Local Government Code, is pending and not later than the 7th business day after the date the originally filed questionnaire becomes incomplete or inaccurate.)</p>	
3	<p><b>Describe each affiliation or business relationship with an employee or contractor of the local governmental entity who makes recommendations to a local government officer of the local governmental entity with respect to expenditure of money.</b></p> <div style="border: 1px solid black; width: 100%; height: 60px; margin-top: 10px;"></div>	
4	<p><b>Describe each affiliation or business relationship with a person who is a local government officer and who appoints or employs a local government officer of the local governmental entity that is the subject of this questionnaire.</b></p> <div style="border: 1px solid black; width: 100%; height: 60px; margin-top: 10px;"></div>	

<b>CONFLICT OF INTEREST QUESTIONNAIRE</b> <b>For vendor or other person doing business with local governmental entity</b>		<b>Form</b> <b>CIQ</b> <b>Page 2</b>
5	<p style="text-align: center;"><b>Name of local government officer with whom filer has affiliation or business relationship.</b> (Complete this section only if the answer to A, B, or C is YES.)</p> <p>This section, item 5 including subparts A, B, C &amp; D, must be completed for each officer with whom the filer has affiliation or other relationship. Attach additional pages to this Form CIQ as necessary.</p> <p>A. Is the local government officer named in this section receiving or likely to receive taxable income from the filer of the questionnaire?  <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>B. Is the filer of the questionnaire receiving or likely to receive taxable income from or at the direction of the local government officer named in this section AND the taxable income is not from the local governmental entity?  <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>C. Is the filer of this questionnaire affiliated with a corporation or other business entity that the local government officer serves as an officer or director, or holds an ownership of 10 percent or more?  <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>D. Describe each affiliation or business relationship.</p> <div style="border: 1px solid black; height: 40px; margin-top: 5px;"></div>	
	<p><b>6. Describe any other affiliation or business relationship that might cause conflict of interest:</b></p> <div style="border: 1px solid black; height: 40px; margin-top: 5px;"></div>	
7	<div style="border: 1px solid black; height: 20px; margin-bottom: 5px;"></div>	<div style="border: 1px solid black; height: 20px; margin-bottom: 5px;"></div>
	Signature of person doing business with the governmental entity	Date
<b>Signature not required if completing in BIDSYNC electronically.</b>		

# Bidder References

List the last (3) companies or governmental agencies, where the same or similar goods and/or services as contained in this IFB package, were recently provided by Bidder.

## Reference 1

Client Name:

Location:

Contact Name:

Title:

Phone:

E-mail

Contract Date To:

Contract Date From:

Contract Value: \$

Scope of Work:

## Reference 2

Client Name:

Location:

Contact Name:

Title:

Phone:

E-mail

Contract Date To:

Contract Date From:

Contract Value: \$

Scope of Work:

**Reference 3**

Client Name:

Location:

Contact Name:

Title:

Phone:

E-mail

Contract Date To:

Contract Date From:

Contract Value: \$

Scope of Work:

## Question and Answers for Bid #1708-182 - River Rd & Old Windmill Rd

### Overall Bid Questions

There are no questions associated with this bid.