Solicitation 1710-194

Neenah Avenue Widening

Bid Designation: Public

Williamson County, Texas

Bid 1710-194
Neenah Avenue Widening

Bid Number	1710-194
Bid Title	Neenah Avenue Widening
Expected Expenditure	**$3,700,000.00** (This price is expected - not guaranteed)
Bid Start Date	In Held
Bid End Date	Nov 15, 2017 3:30:00 PM CST
Question & Answer End Date	Nov 10, 2017 5:00:00 PM CST
Bid Contact	Blake Skiles Purchasing Specialist III 512-**943**-1478 blake.skiles@wilco.org
Contract Duration	**1 year**
Contract Renewal	1 annual renewal
Prices Good for	**30 days**
Pre-Bid Conference	**Nov 1, 2017 3:30:00 PM CDT** **Attendance is optional** **Location: 901 S. Austin Ave. Georgetown, TX 78626**
Bid Comments	**Williamson County is seeking qualified contractors to construct 0.70 miles of roadway widening, pavement markings and signage, shared use paths, drainage improvements including the extension of a bridge class culvert, and expansion of an existing full sedimentation/filtration water quality and detention pond.** **Estimated time of completion is 350 calendar days to substantial completion, and 30 additional calendar days to final completion, with an estimated cost of $3,700,000.** **<u>If entering an electronic bid in BidSync (PREFERRED), the following documents MUST be completed and attached to the First Line Item.</u>** **Completed Bid Form – Enter Total Price in area provided, then download/print/complete bid form and upload to first line item.** **Bid Affidavit - This is a Fill-able form - Complete and Accept.** **Bid Bond - See Details Below.** **<u>The following documents are fillable forms on BidSync - Fill in blanks and accept to apply to the bid.</u>** **Conflict of Interest Form** **References** **Bid Bond - See Details Below.** **If delivering a paper bid instead of electronic, you must provide (2) originals, (1) copy, and (1) USB or CD of all the required documents. All documents must be delivered in a sealed envelope to:** **Williamson County Purchasing** **Attn: Neenah Avenue Widening** **901 South Austin Ave** **Georgetown, TX 78626** **<u>BID BOND REQUIRED</u> : Bidders are not required to use Surety 2000 for your Bid Bond supplier, however;**

when bidding electronically in BidSync and using Surety 2000, you may import your bid bond directly from the Surety 2000 website.
To use a different bond provider, you MUST: Scan the completed Bond; download the completed bond to the first line item of this bid with your other required documents or your bid will be disqualified.

All Bids shall be accompanied by either;
A certified cashier's check: payable without recourse to Williamson County and drawn upon a National or State Bank in the amount not less than five percent (5%) of the total maximum bid price;
A bid bond not less than five percent (5%) of the total maximum bid price, from a surety company authorized to do business in the State of Texas.

For unit price contracts, the total maximum bid price shall be estimated and calculated by multiplying the estimated quantities to the unit bid price.

Bid bonds must be attached to the line item of the electronic bid OR submitted in the same sealed envelope with a paper Bid.

Bids requiring a bid bond and submitted without a cashier's check or a bid bond will not be considered.

If you are awarded the bid, please see reference to new State Requirement for Certificate of Interest in Section 3 Bid Instructions/Requirements: #36: Certificate of Interested Parties.

Bonds
Payment and Performance Bond documents are provided in the Bid documents for completion upon award.
Maintenance Bond documents are provided in the Bid documents for completion upon final completion of the work.

LIQUIDATED DAMAGES for failure to substantially complete the work within the allotted time will be applied.
The road-user cost Liquidated Damages will be in accordance with Special Provision 000-001, and are estimated to be $970 per calendar day.

PLAN HOLDERS LISTS
Please note that a bidder adding their name to the Plan-Holders list is voluntary.
The plan-holder's on construction bids allows Prime and Subcontractors to add their names and information to a list of users that are participating in this bid. To add a company to the Plan holder's list, the user will choose either the Subcontractor or the Prime contractor tabs and then click Add my company to this Plan holder's list. This will add the company's contact information to the Plan holder's list for other suppliers on the list to see.

If the user would like to view the suppliers that have been added to the list, they will need to click on the Subscribe button. This will allow the user to view other suppliers that have added their names to the Plan holder's list. Both actions will require that the vendor agree to the terms for the action

Contract Administrator for this project is Bob Daigh, Senior Director of Infrastructure or designee, and shall be the Contract Administrator with designated responsibility to ensure compliance with contract requirements, such as but not limited to acceptance, inspection, and delivery. The contract administrator will serve as liaison between Williamson County Commissioners Court and the successful bidder or the Construction Inspector.

Item Response Form

Item	**1710-194--01-01 - Please Attach All Documents To This Line**
Quantity	**1 each**

Prices are not requested for this item.

Delivery Location	**Williamson County, Texas**
	No Location Specified

Qty 1

Description
Please Attach All Documents To This Line

PUBLIC ANNOUNCEMENT AND GENERAL INFORMATION

WILLIAMSON COUNTY PURCHASING DEPARTMENT
SOLICITATION 1710-194
Neenah Avenue Widening

BIDS MUST BE RECEIVED ON OR BEFORE:
Nov 15, 2017 3:30:00 PM CST

BIDS WILL BE PUBLICLY OPENED:
Nov 15, 2017 3:30:00 PM CST

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.

Williamson County prefers and requests electronic submittal of this Bid.

All electronic bids must be submitted via: 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.

- 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.

  - The Williamson County Purchasing Department takes no responsibility to ensure any interested Bidder has obtained any outstanding addenda or additional information.

WILLIAMSON COUNTY
1848

WILLIAMSON COUNTY

PROJECT CONSTRUCTION MANUAL

FOR

NEENAH AVE WIDENING

SOLICITATION 1710-194

WILLIAMSON COUNTY, TEXAS
PURCHASING DEPARTMENT
901 SOUTH AUSTIN AVENUE
GEORGETOWN, TEXAS 78626

October 2017

10.9.2017

STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED PROFESSIONAL ENGINEER

Stephanie D Blew

The enclosed Specifications, Special Specifications, Special Provisions, General Notes, and Specification Data in this document have been selected by me, or under my responsible supervision as being applicable to this project. Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act.

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SECTION 1
ADDENDA

ADDENDUM NO. __

Date:

Owner: **Williamson County, Texas**

Project Name:

Project No:

This Addendum forms a part of the Contract and clarifies, corrects or modifies the original Construction Documents, dated _____. Acknowledge receipt of this addendum in space provided on Bid Form. Failure to do so may subject bidder to disqualification.

DESCRIPTION OF ADDITION OR CHANGE:

This addendum consists of __ page(s).

_____
Approved by ENGINEER

END

EXAMPLE

SECTION 2
INVITATION FOR BIDS

PUBLIC NOTICE WILLIAMSON COUNTY
INVITATION FOR BIDS

Williamson County Commissioner's Court invites the submission of sealed bids for:

NEENAH AVENUE WIDENING

Williamson County is seeking qualified contractors to construct 0.70 miles of roadway widening, pavement markings and signage, shared use paths, drainage improvements including the extension of a bridge class culvert, and expansion of an existing full sedimentation/filtration water quality and detention pond. Estimated time of completion is 350 calendar days to substantial completion, and 30 calendar days to final completion, with an estimated cost of $4,200,000.

Sealed bids will be publicly opened and read aloud in the Williamson County Purchasing Department, 901 South Austin Avenue, Georgetown, Texas on November 15th at 3:30 pm.

Bids must be received on or before Wednesday, November 15th at 3:30 pm.

Bid documents and plans may be viewed and responded to by registering with BIDSYNC at www.bidsync.com.

No fee is required to register with Bidsync as a Williamson County Supplier, or to participate in the County's solicitation process. The receipt of electronic bids will be registered in Bidsync.

The Time-Date Stamp Clock located at the Williamson County Purchasing Department will serve as the official clock for the purpose of verifying the date and time of receipt of Paper Bids.

There will be a Non-Mandatory Pre-Bid Conference on November 1st at 3:30 pm at Williamson County Purchasing Department, 901 South Austin Avenue, Georgetown, Texas.

BID BOND REQUIRED
A Cashier's Check, Certified Check, or acceptable Bidder's Bond in the amount of five percent (5%) of the Bid must accompany each Bid. Performance, Payment and Warranty Bonds will be required as designated in the bidding documents.

The Williamson County Commissioners' Court reserves the right to accept the lowest and best Bid as deemed by the Court, or reject any and/or all bids.

Bidder shall use per unit pricing. Payments will be made by check.

The designated Purchasing Agent for this Bid is William Hutchinson, Senior Purchasing Specialist, under the direction of Randy Barker, Purchasing Agent for Williamson County, 512-943-3553.

This notice is issued by order of the Williamson County Commissioners' Court on October 17th; Dan A. Gattis, County Judge.

SECTION 3
BID INSTRUCTIONS/REQUIREMENTS

BID INSTRUCTIONS/REQUIREMENTS

All Bids must be received in the Williamson County Purchasing Department either hardcopy or electronically through BidSync.

Williamson County prefers and requests electronic submittal of this bid.

All electronic bids must be submitted via: www.bidsync.com

All interested Respondents 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 BID.

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.

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.

If mailed or delivered in person, Bids are to be delivered in sealed envelope on or before the submittal deadline to:

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

Respondents should list the Bid Number, Bid Name, Name and Address of Respondent, and the Date of the Bid opening on the outside of the box or envelope.

Respondent should submit one (1) original; **AND** (2) two copies and (1) CD **OR** (1) USB copy of the Bid.

Williamson County will not accept any Bids received after the submittal deadline.
Williamson County will not accept any responsibility for Bids being delivered by third party carriers. Facsimile transmittals will NOT be accepted.

All questions should be submitted on the Bidsync site. Questions with their answers will be posted and updated on www.bidsync.com.

Any addenda and/or other information relevant to the Bid will be posted on: www.bidsync.com.

ALL BIDS MUST BE SUBMITTED ON THE FORMS PROVIDED IN THIS BID DOCUMENT. (May be replaced with a computer generated printout, if submitted in an identical format to the proposal).

FACSIMILE AND ELECTRONIC MAIL TRANSMITTALS SHALL NOT BE ACCEPTED.

1. 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. **This price must be good from the date of Bid opening through the completion of the project. Bids which do not state a fixed price will not be considered.** The Court may award a contract for the period implied or expressly stated in the lowest and best Bid.

2. 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 price, 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 point.

3. 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 materials and/or services covered in this Bid request, and to waive informalities or defects in the Bid or to accept such Bid it shall deem to be in the best interest of Williamson County.

4. Funding: Funds for payment have been provided through the Williamson County budget approved by Commissioners Court for the 2013 Road Bond Program.

5. Late Bid: Bids received after submission deadline will be considered VOID AND UNACCEPTABLE and will be returned to the bidder unopened. Williamson County is

not responsible for lateness or non-delivery of mail, carrier, etc. The date and time stamp of the Williamson County Purchasing Department shall be the official date and time of receipt.

6. Altering Bid: Bidders **cannot alter or amend bid** after submission deadline.

7. Sales Tax: Williamson County is by statute, exempt from the State Sales Tax and Federal Excise Tax.

8. Contract: This Bid, when properly accepted by Williamson County, shall constitute a contract equally binding between the successful bidder and Williamson County. No different or additional terms will become part of this contract.

9. Changes: No oral statement of any person shall modify or otherwise change, or affect the terms, conditions, plans and/or specifications stated in the Bid Package and or Bid Instructions/Requirements.

10. Delivery Times and Locations: The commodity and/or service covered by this Bid shall be as stated in the Bid Package.

11. Payments: The Construction Inspector will manage the Contractor payments. Invoices for the work specified in the Contract Documents will be submitted to the Construction Inspector. Upon satisfactory completion and acceptance of these invoices, the Construction Inspector will forward the invoices to the County via the GEC. County's payment for goods and services shall be governed by Chapter 2251 of the Texas Government Code. An invoice shall be deemed overdue the 31st day after the later of (1) the date County receives the goods under the Contract; (2) the date the performance of the service under the Contract is completed; or (3) the date the Williamson County Auditor receives an invoice for the goods or services. Interest charges for any overdue payments shall be paid by 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 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 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 submitted by Successful Bidder, County shall notify Successful Bidder of the error not later than the twenty first (21st) day after the date County receives the invoice. If the error is resolved in favor of Successful Bidder, Successful Bidder shall be entitled to receive interest on the unpaid balance of the invoice submitted by Successful Bidder beginning on the date that the payment for the invoice became overdue. If the error is resolved in favor of the County, 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 Chapter 2251 of the Texas Government Code if the corrected invoice is not paid by the appropriate date. As a minimum, invoices shall include:

(1) Name, address, and telephone number of Contractor and similar information in the event the payment is to be made to a different address

(2) County contract, Purchase Order, and/or delivery order number

(3) Identification of items or service as outlined in the contract

(4) Quantity or quantities, applicable unit prices, total prices, and total amount

(5) Any additional payment information which may be called for by the Contract

Payment inquiries should be directed to the Williamson County Auditor's Office, Accounts Payable Department:
512-943-1573
accountspayable@wilco.org

12. 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 of January 1, 2006 Vendors are responsible for complying with

Local Government Code Title 5, Subtitle C, Chapter 176. Additional information may be obtained from the County website at the following link: http://www.wilco.org/CountyDepartments/Purchasing/ConflictofInterestDisclosure/tabid/689/language/en-US/Default.aspx. The Williamson County Conflict of Interest Questionnaire is attached as a fillable form. This form must be completed, signed, and submitted with your bid (attached to the first Line Item of this bid) or completed electronically and signed electronically when entering your password in Bidsync.

13. 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 Williamson County.

14. Minimum Standards for Responsible Bidders: A prospective bidder must affirmatively demonstrate bidder's responsibility. A prospective bidder must 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;

    d. be otherwise qualified and eligible to receive an award.

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

15. References: Williamson County **REQUIRES** bidder to supply with this Bid, a list of at least **three (3) references** where like services have been supplied by their firm. The Bidder References Form is attached as a fillable form in this bid document. This form must be completed and attached to the first line item on your bid or included with an all paper bid.

16. Bidder shall provide with this Bid response, all documentation required by this Bid. Failure to provide this information may result in rejection of the Bid.

17. Termination for Default: Williamson County reserves the right to enforce the performance of this contract in any manner prescribed by law or deemed to be in the best interest of the County in the event of breach or default of this contract. Non-Performance of the bidder in terms of specifications shall be a basis for the termination of the contract by the County. The County shall not pay for commodities/services which are unsatisfactory. Contractors will be given a reasonable opportunity before termination to correct the deficiencies. This, however, shall in no way be construed as negating the basis for termination for non-performance.

18. Contract Administration: Under this contract, Robert Daigh, Williamson County Sr. Director of Infrastructure or designee, shall be the contract administrator with designated responsibility to ensure compliance with contract requirements, such as but not limited to, acceptance, inspection and delivery. The contract administrator will serve as liaison between Williamson County Commissioners Court and the successful bidder or the Construction Inspector.

19. Purchase Order: Williamson County may generate a purchase order(s) to the successful bidder as products and/or services are required. The purchase order number must appear on all itemized invoices and/or request for payment.

20. 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.

21. Contract Times and Liquidated Damages - Bidders must agree to commence work on or before a date to be specified in a written “Notice to Proceed” of the County, and to fully complete the project within the specified time stated in the proposal. Bidders must agree to pay liquidated damages in accordance with Special Provision 000-001 per day to County for

every day past the specified completion date stated in the proposal.

22. BIDS MUST BE: legible and of a quality that can be reproduced.

23. Bid forms that are included in the Bid package shall be used. **CHANGES to Bid forms made by bidders shall DISQUALIFY THE BID.** Exceptions to the Bid forms and or specifications shall be made on an **attachment** to the Bid package.

24. Workers Compensation Coverage Requirements: The Texas Labor Code, §406.096, requires workers' compensation insurance coverage for all persons providing services on a building or construction project for a governmental entity. The rule requires a governmental entity 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 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, §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 or proposal 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 South Austin Avenue
Georgetown, Texas 78626

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) 943-1553, or you may call the Texas Workers' Compensation Commission at (512) 804-4000.

A. Definitions: 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.

(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 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, §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, §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.

(5) Duration of the project - includes the time from the beginning of the work on the project until the contractor's/person's work on the project has been completed and accepted by the governmental entity.

(6) Persons providing services on the project ("subcontractor" in §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 Williamson 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 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 coverage to the governmental entity prior to being awarded the contract.

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 the governmental entity showing that coverage has been extended.

E. The contractor shall obtain from each person providing services on a project, and provide to the governmental entity:

(1) a certificate of coverage, prior to that person beginning work on the project, so the governmental entity will have on file certificates of coverage showing coverage for all persons providing services on the project;

(2) no later than seven (7) 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 Williamson 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;

(4) obtain from each other person with whom it contracts, and provide to the contractor:

(a) a certificate of coverage, prior to the other person beginning work on the project; &

(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 governmental entity 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 the governmental entity 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 governmental entity to declare the contract void if the contractor does not remedy the breach within ten (10) days after receipt of notice of breach from Williamson County.

25. **PERFORMANCE AND PAYMENT BONDS:** Chapter 262.032 and Chapter 2253.021 of the Texas Government Code governs the requirements for performance bonds and payment 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. 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 within ten (10) days after receipt of written notification of award of contract prior to beginning work on the project and must be executed by a corporate surety or sureties in accordance with the Texas Insurance Code. In the event the bond exceeds $100,000.00, the surety must also (1) hold a certificate of authority from the United States secretary of the treasury to qualify as a surety on obligations permitted or required under federal law; or (2) have obtained reinsurance for any liability in excess of $100,000.00 from a reinsurer that is authorized and admitted as are insurer in this state and is the holder of a certificate of authority from the United States secretary of the treasury to qualify as a surety or reinsurer on obligations permitted or required under federal law.

In determining whether the surety or reinsurer holds a valid certificate of authority the County may rely on the list of companies holding certificates of authority as published in the Federal Register covering the date on which the bond is to be executed. 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. The purpose of a performance bond is for the protection of the government entity and is conditioned on the faithful performance of the work being done in accordance with the plans, specifications and contract documents. The payment bond is for the protection of persons supplying labor and materials to the contractor to ensure payment.

26. **BIDDERS BOND:** All bids shall be accompanied by a certified cashier's check upon a National or State bank in an amount not less than five percent (5%) of the total maximum bid price, payable without recourse to Williamson 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 performance and payment bonds, as stipulated by item 25 above, within ten (10) days after notice of award of contract to him. Bid guarantees must be submitted in the same sealed envelope with the bid. Bids submitted without check or bid bonds will not be considered.
Bidders are not required to use Surety 2000 for your Bid Bond supplier, however; when bidding electronically in Bidsync and using Surety 2000, you may import your bid bond directly from the Surety 2000 web site. To use a different bond provider you MUST:

    1. Scan the completed bond
    2. Download the completed bond to the line item of this bid with your other required documents.

    Bid bonds must be attached to the line item of the electronic bid OR submitted in the same sealed envelope with a paper Bid.

27. All bid securities will be returned to the respective bidders within twenty-five (25) days after bids are opened, except those which the County elects to hold until the successful bidder has executed the contract. Thereafter, all remaining securities, including security of the successful bidder, will be returned within sixty (60) days.

28. Prior to submitting any bid, bidders are required to read the plans, specifications, bid, contract and bond forms carefully; to inform themselves by their independent research, test and investigation of the difficulties to be encountered and judge for themselves of the accessibility of the work and all attending circumstances affecting the cost of doing the work and the time required for its completion and obtain all information required to make an intelligent bid.

29. Should the bidder find discrepancies in, or omissions from the plans, specifications, or other documents, or should he/she be in doubt as to their meaning, he/she should notify at once the Project Engineer and may obtain clarification or addendum prior to submitting any bid.

30. In case of ambiguity or lack of clarity in the statement of prices in the bids, the county reserves the right to consider the most favorable analysis thereof, or to reject the bid. Unreasonable (or unbalanced) prices submitted in a bid may result in rejection of such bid or other bids.

31. Award of the contract, if awarded, will be made within sixty (60) days after opening of the bids and no bidder may withdraw his bid within said sixty (60) day period of time unless a prior award is made.

32. Within ten (10) days of written notification of award of the contract, the bidder shall execute and furnish to the County the performance bond, or letter of credit if applicable, and payment bond as required by item 25 above; and the Certificate of Insurance showing coverages in accordance with contract documents. Failure to execute contract, Bonds and Certificate of Insurance shall be just cause for the annulment of the award. In case of the annulment of the award, the bid guarantee shall become the property of Williamson County, not as a penalty, but as a liquidated damage.

33. Any quantities given in any portion of the contract documents, including the plans, are estimates only, and the actual amount of work required may differ somewhat from the estimates. The basis for the payment shall be the actual amount of work done and/or material furnished.

34. **THE TEXAS HAZARD COMMUNICATION ACT**, Chapter 502 of the Health and Safety Code, Sec. 502.006, states that a chemical manufacturer or distributor shall provide appropriate Material Safety Data Sheets (MSDS) to employers who acquire hazardous chemicals in this state with each initial shipment and with the first shipment after a MSDS is updated. The MSDS must conform to the most current requirements of the OSHA standard in 29 CFR 1910.1200. By submitting your bid to the County you are acknowledging that this regulation is a part of this bid and that you will provide appropriate MSDS with each initial shipment and with the first shipment after a MSDS is updated.

35. **THE WILLIAMSON COUNTY HAZARD COMMUNICATION PROGRAM POLICY** Under Revised Texas Hazard Communication Act (THCA) of 1993 states that it is the responsibility of all contractor/sub-contractors who bring hazardous chemicals onto county property to provide appropriate MSDS to the county at the work site. When exposure to a hazardous chemical is expected each contractor/sub-contractor shall be responsible for the appropriate training of their employees. For a copy of the Williamson County Hazard Communication Program Policy contact the Williamson County Unified Road & Bridge System Safety/Training Coordinator at 512/930-3330. By submitting your bid to the County you are acknowledging that this policy is a part of this bid and that you will provide appropriate MSDS to the county work site and provide for appropriate training as applicable.

36. **CERTIFICATE OF INTERESTED PARTIES TEXAS ETHICS COMMISSION (FORM 1295)** As of January 1, 2016, 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 to Williamson County.
    On January 1, 2016, the Texas Ethics Commission made 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
    The Low Bidder must:
    1. Use the online application to process the required information on Form 1295
    2. Print a copy of the form which will contain a unique certification number
    3. An authorized agent of the Bidder must sign the printed copy of the form
    4. and have the form notarized
    5. the completed Form 1295 and certification of filing must be filed (scanning and emailing form is sufficient) with Williamson County prior to award of the contract by Commissioners Court.

37. Ambiguity, Conflict, or other Errors in the IFB If Bidder discovers any ambiguity, conflict, discrepancy, omission or other error in this IFB, Bidder shall immediately notify Williamson 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 Williamson County prior to the date and time fixed for submission of Bids of an error or ambiguity in the IFB known to Bidder, or an error or ambiguity that reasonably should have been known to Bidder, then Bidder shall be deemed to have waived the error or ambiguity or its later resolution. Williamson County may also modify the IFB, no later than 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 1.

SECTION 4
BID FORM, BID AFFIDAVIT, BIDDER REFERENCES, & CONFLICT OF INTEREST QUESTIONNAIRE

ALL REQUIRED DOCUMENTS MUST BE FILLED OUT AND SUBMITTED WITH BID

www.bidsync.com

FOLLOWING CONTRACT AWARD REQUIRED DOCUMENTS WILL BE INSERTED IN THIS SECTION

SECTION 5
STANDARD FORM OF AGREEMENT

STANDARD FORM OF AGREEMENT

STATE OF TEXAS

WILLIAMSON COUNTY

THIS STANDARD FORM OF AGREEMENT (the "Agreement") is by and between WILLIAMSON COUNTY, TEXAS, a political subdivision of the State of Texas (hereinafter called "County") and _____ (hereinafter called "Contractor").

The County and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1. Work

Contractor shall complete all Work as specified or indicated in the Contract Documents. The "Project" is generally described as follows:

Project No. **1710-194 – NEENAH AVENUE WIDENING**

Article 2. Engineer of Record

The Project has been designed by **Stantec Consulting Services, Inc.**, who is hereinafter called the "Engineer of Record" and who is to act as the County's design professional.

Article 3. Contract Time

The Work shall be Substantially Completed in **350** calendar days (the "Contract Time"). Following Substantial Completion, the Contractor shall proceed expeditiously with adequate forces and shall achieve Final Completion within the time specified in the Special Conditions.

Article 4. Contract Price

County shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to paragraph 4.1 below (the "Contract Price"):

4.1 For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in the Bid Form, and as totaled below:

TOTAL OF ALL UNIT PRICES_____ $_____(dollars)
(insert words)

As provided in the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classification are to be made by the Engineer of Record.

Article 5. Contractor's Representations

In order to induce County to enter into this Agreement, Contractor makes the following representations:

5.1 Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents including the "technical data".

5.2 Contractor has visited the site and become familiar with and is satisfied as to the general, local and site conditions that may affect cost, progress, performance or furnishing of the Work.

5.3 Contractor is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress, performance and furnishing of the Work.

5.4 Contractor has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site which have been identified. Contractor acknowledges that such reports and drawings are not Contract Documents and may not be complete for Contractor's purposes. Contractor acknowledges that the County and Engineer of Record do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Contract Documents with respect to Underground Facilities at or contiguous to the site.

5.5 Contractor has correlated the information known to Contractor, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.

5.6 Contractor has given Engineer of Record written notice of all conflicts, errors, ambiguities or discrepancies that Contractor has discovered in the Contract Documents and the written resolution thereof by Engineer of Record is acceptable to Contractor, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

5.7 Contractor represents and agrees that there are no obligations, commitments, or impediments of any kind that will limit or prevent performance of its obligations under the Contract Documents.

5.8 Contractor warrants, represents, and agrees that if (i) it is a corporation or limited liability company, then it is a corporation duly organized, validly existing and in good standing under the laws of the State of Texas, or a foreign corporation or limited liability company duly authorized and in good standing to conduct business in the State of Texas, that it has all necessary corporate power and has received all necessary corporate approvals to execute and deliver this Agreement, and the individual executing the Agreement on behalf of Contractor has been duly authorized to act for and bind Contractor; or (ii) if it is a partnership, limited partnership, or limited liability partnership, then it has all necessary partnership power and has secured all necessary approvals to execute and deliver this Agreement and perform all its obligations under the Contract Documents; and the individual executing this Agreement on behalf of Contractor has been duly authorized to act for and bind Contractor.

5.9 Neither the execution and delivery of this Agreement by Contractor nor the performance of its obligations under the Contract Documents will result in the violation of any provision, if a corporation, of its articles of incorporation or by-laws, if a limited liability company, of its articles of organization or regulations, or if a partnership, by any partnership agreement by which Contractor is bound, or any agreement by which Contractor is bound or to the best of the Contractor's knowledge and belief, will conflict with any order or decree of any court or governmental instrumentality relating to Contractor.

5.10 Except for the obligation of the County to pay Contractor the Contract Price pursuant to the terms of the Contract Documents, and to perform certain other obligations pursuant to the terms and conditions explicitly set forth in the Contract Documents, County 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 County to Contractor, no present or future partner or affiliate of County or any agent, officer, director, or employee of County, or of the various departments comprising Williamson County, or anyone claiming under County has or shall have any personal liability to Contractor or to anyone claming through or under Contractor by reason of the execution or performance of this Agreement.

Article 6. Contract Documents

The "Contract Documents," which comprise the entire agreement between the County and Contractor concerning the Work, consist of the following:

6.1 This Standard Form of Agreement

6.2 Performance Bond

6.3 Payment Bond

6.4 Maintenance Bond

6.5 Certificate of Insurance

6.6 Wage Rates

6.7 General Conditions

6.8 Special Conditions

6.9 Technical Specifications

6.10 Plan Drawings

6.11 Addenda numbers _____ to _____, inclusive

6.12 Contractor's Bid Affidavit and Bid Form

6.13 Documentation submitted by Contractor prior to Notice of Award.

6.14 The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All Written Amendments and other documents amending, modifying or supplementing the Contract Documents pursuant to applicable sections in the General Conditions.

The documents listed in paragraphs 6.2 et seq. above are attached to this Agreement (except as expressly noted otherwise above).

There are no Contract Documents other than those listed above in this Article 6. The Contract Documents may only be amended, modified or supplemented as provided in the General Conditions.

Article 7. Miscellaneous

7.1 Terms used in this Agreement, which are defined in the General Conditions, will have the meanings indicated in the General Conditions.

7.2 No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that

may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

7.3 The County and Contractor each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

7.4 Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon the County and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken position.

7.5 Each party to this Agreement hereby agrees and acknowledges that venue and jurisdiction of any suit, right, or cause of action arising out of or in connection with this Agreement shall lie exclusively in Williamson County, Texas. Furthermore, this Agreement shall be governed by and construed in accordance with the laws of the State of Texas, excluding, however, its choice of law rules.

7.6 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.

7.7 This Agreement is for the sole and exclusive benefit of the parties hereto, and nothing in this Agreement, express or implied, is intended to confer or shall be construed as conferring upon any other person any rights, remedies or any other type or types of benefits.

7.8 Each party to this Agreement acknowledges that it and its counsel have reviewed this Agreement and that the normal rules of construction are not applicable and there will be no presumption that any ambiguities will be resolved against the drafting party in the interpretation of this Agreement.

7.9 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.

7.10 Nothing in this Agreement shall be deemed to waive, modify or amend any legal defense available at law or in equity to County, its past or present officers, employees, or agents or employees, nor to create any legal rights or claim on behalf of any third party. 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.

7.11 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 County, 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 County as to whether or not the same are available to the public. It is further understood that County's officers and employees shall have the right to rely on the advice, decisions and opinions of the Attorney General, and that 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 County by a party hereto, in reliance of any advice, decision or opinion of the Attorney General of the State of Texas.

7.12 County and Contractor have signed this Agreement in triplicate. One counterpart each has been delivered to the County, Contractor and Engineer of Record. All portions of the Contract Documents have been signed, initialed or identified by County and Contractor or identified by Engineer of Record on their behalf.

7.13 This Agreement and the Contract Documents represent 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 COUNTY HAS ANY AUTHORITY, EITHER EXPRESS OR IMPLIED, TO AMEND THIS CONTRACT, EXCEPT PURSUANT TO SUCH EXPRESS AUTHORITY AS MAY BE GRANTED BY THE WILLIAMSON COUNTY COMMISSIONERS COURT.

This Agreement will be effective on _____, 20_____ (which is the "Effective Date" of the Agreement).

COUNTY_____	CONTRACTOR_____
By:_____	By: _____
Dan A. Gattis, Williamson County Judge	Title: _____
	[CORPORATE SEAL]
Attest_____	Attest_____

SECTION 6
WAGE RATES

WAGE RATES

Contractor must pay all workers not less than the prevailing wage rate for Williamson County, Texas.

General Decision Number: TX150016 01/02/2015 TX16

Superseded General Decision Number: TX20140016

State: Texas

Construction Types: Heavy and Highway

Counties: Atascosa, Bandera, Bastrop, Bell, Bexar, Brazos, Burleson, Caldwell, Comal, Coryell, Guadalupe, Hays, Kendall, Lampasas, McLennan, Medina, Robertson, Travis, Williamson and Wilson Counties in Texas.

HEAVY (excluding tunnels and dams, not to be used for work on Sewage or Water Treatment Plants or Lift / Pump Stations in Bell, Coryell, McClennon and Williamson Counties) and HIGHWAY Construction Projects

Note: Executive Order (EO) 13658 establishes an hourly minimum wage of $10.10 for 2015 that applies to all contracts subject to the Davis-Bacon Act for which the solicitation is issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.10 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/02/2015

* SUTX2011-006 08/03/2011

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (Paving and Structures)	$ 12.56	
ELECTRICIAN	$ 26.35	
FORM BUILDER/FORM SETTER		
Paving & Curb	$ 12.94	
Structures	$ 12.87	
LABORER		
Asphalt Raker	$ 12.12	
Flagger	$ 9.45	

Laborer, Common.....$ 10.50
Laborer, Utility.....$ 12.27
Pipelayer.....$ 12.79
Work Zone Barricade
Servicer.....$ 11.85
PAINTER (Structures).....$ 18.34

POWER EQUIPMENT OPERATOR:
Agricultural Tractor.....$ 12.69
Asphalt Distributor.....$ 15.55
Asphalt Paving Machine.....$ 14.36
Boom Truck.....$ 18.36
Broom or Sweeper.....$ 11.04
Concrete Pavement
Finishing Machine.....$ 15.48
Crane, Hydraulic 80 tons
or less.....$ 18.36
Crane, Lattice Boom 80
tons or less.....$ 15.87
Crane, Lattice Boom over
80 tons.....$ 19.38
Crawler Tractor.....$ 15.67
Directional Drilling
Locator.....$ 11.67
Directional Drilling
Operator.....$ 17.24
Excavator 50,000 lbs or
Less.....$ 12.88
Excavator over 50,000 lbs...$ 17.71
Foundation Drill, Truck
Mounted.....$ 16.93
Front End Loader, 3 CY or
Less.....$ 13.04
Front End Loader, Over 3 CY.$ 13.21
Loader/Backhoe.....$ 14.12
Mechanic.....$ 17.10
Milling Machine.....$ 14.18
Motor Grader, Fine Grade....$ 18.51
Motor Grader, Rough.....$ 14.63
Pavement Marking Machine....$ 19.17
Reclaimer/Pulverizer.....$ 12.88
Roller, Asphalt.....$ 12.78
Roller, Other.....$ 10.50
Scraper.....$ 12.27
Spreader Box.....$ 14.04
Trenching Machine, Heavy....$ 18.48

Servicer.....$ 14.51

Steel Worker
Reinforcing.....$ 14.00
Structural.....$ 19.29

TRAFFIC SIGNAL INSTALLER

```
     Traffic Signal/Light Pole
     Worker.....................$ 16.00

TRUCK DRIVER
     Lowboy-Float...............$ 15.66
     Off Road Hauler............$ 11.88
     Single Axle................$ 11.79
     Single or Tandem Axle Dump
     Truck......................$ 11.68
     Tandem Axle Tractor w/Semi
     Trailer....................$ 12.81

WELDER.........................$ 15.97
----------------------------------------------------------------

WELDERS - Receive rate prescribed for craft performing operation to which
welding is incidental.

================================================================


Unlisted classifications needed for work not included within the scope of
the classifications listed may be added after award only as provided in
the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).


----------------------------------------------------------------


The body of each wage determination lists the classification and wage
rates that have been found to be prevailing for the cited type(s) of
construction in the area covered by the wage determination. The
classifications are listed in alphabetical order of "identifiers" that
indicate whether the particular rate is a union rate (current union
negotiated rate for local), a survey rate (weighted average rate) or a
union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted
lines beginning with characters other than "SU" or "UAVG" denotes that the
union classification and rate were prevailing for that classification in
the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation
identifier of the union which prevailed in the survey for this
classification, which in this example would be Plumbers. 0198 indicates
the local union number or district council number where applicable, i.e.,
Plumbers Local 0198. The next number, 005 in the example, is an internal
number used in processing the wage determination. 07/01/2014 is the
effective date of the most current negotiated rate, which in this example
is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the
collective bargaining agreement (CBA) governing this classification and
rate.
```

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response

from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

==========

END OF GENERAL DECISION
&#65533;

SECTION 7
PERFORMANCE BOND

PERFORMANCE BOND

STATE OF TEXAS
COUNTY OF _____

KNOW ALL MEN BY THESE PRESENTS: That _____

_____of the City of _____

County of _____, and State of _____, as principal, and

_____

authorized under the laws of the State of Texas to act as surety on bonds for principals, are held and firmly bound unto Williamson County (County), in the penal sum of

_____Dollars

($_____) for the payment whereof, the said Principal and Surety bind themselves, their heirs, administrators, executors, successors, jointly and severally, by these presents:

WHEREAS, the Principal has entered into a certain written Agreement with the County, dated the _____day of _____, 20_____(the "Agreement"), to which the said Agreement, along with the Contract Documents referenced therein are hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully perform said Agreement and shall in all respects duly and faithfully observe and perform all and singular the covenants, conditions and agreements in and by the Agreement agreed and covenanted by the Principal to be observed and performed, and according to the true intent and meaning of said Agreement and the Contract Documents hereto annexed, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code, as amended and all liabilities on this bond shall be determined in accordance with the provisions of said Chapter to the same extent as if it were copied at length herein.

SURETY, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Agreement or to the work performed thereunder, or to the Contract Documents referenced therein, shall in anyway affect the obligations on this bond, and it does hereby waive notice of such change, extension of time, alteration or addition to the terms on the Agreement, or to the work to be performed thereunder.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20___.

_____	_____
PRINCIPAL	SURETY
_____	_____
SIGNATURE	SIGNATURE
_____	_____
NAME & TITLE	NAME & TITLE
_____	_____
ADDRESS	ADDRESS
_____	_____
(_____) _____	(_____) _____
PHONE NUMBER	PHONE NUMBER

The name and address of the Resident Agency of Surety is:

_____

_____

(_____) _____	_____
PHONE NUMBER	SIGNATURE OF LICENSED LOCAL RECORDING AGENT appointed to countersign on behalf of Surety (Required by Art. 21.09 of the Insurance Code)

****

I,_____, having executed Bonds
SIGNATURE

for _____ do hereby affirm I have
NAME OF SURETY

verified that said Surety is now certified with Authority from either: (a) the Secretary of the Treasury of the United States if the project funding includes Federal monies; or (b) the State of Texas if none of the project funding is from Federal sources; and further, said Surety is in no way limited or restricted from furnishing Bond in the State of Texas for the amount and under conditions stated herein.

SECTION 8
PAYMENT BOND

PAYMENT BOND

STATE OF TEXAS
COUNTY OF _____

KNOW ALL MEN BY THESE PRESENTS: That _____

_____of the City of _____

County of _____, and State of _____, as Principal (hereinafter referred to as the "Principal"), and

_____
authorized under the laws of the State of Texas to act as Surety on bonds for principals (hereinafter referred to as the "Surety"), are held and firmly bound unto Williamson County, (hereinafter referred to as the "County"), in the penal sum of

_____Dollars

($_____) for the payment whereof, the said Principal and Surety bind themselves, their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents:

WHEREAS, the Principal has entered into a certain written agreement with the County, dated the _____ day of _____, 20_____, to _____

_____ (hereinafter referred to as the "Agreement"), which said Agreement and the Contract Documents incorporated therein are hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall pay all claimants supplying labor and material to him or a subcontractor in the prosecution of the Work provided for in said Agreement, then, this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code, as amended and all liabilities on this bond shall be determined in accordance with the provisions of said Chapter to the same extent as if it were copied at length herein.

SURETY, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Agreement or to the Work performed thereunder, or to the other Contract Documents accompanying the same, shall in anyway affect its obligation on this bond, and it does hereby waive notice of such change, extension of time, alteration or addition to the terms of the Agreement, or to the work to be performed thereunder or to the other Contract Documents accompanying the same.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20___.

_____	_____
PRINCIPAL	SURETY
_____	_____
SIGNATURE	SIGNATURE
_____	_____
NAME & TITLE	NAME & TITLE
_____	_____
ADDRESS	ADDRESS
_____	_____
(_____) _____	(_____) _____
PHONE NUMBER	PHONE NUMBER

The name and address of the Resident Agency of Surety is:

_____

_____

(_____) _____	_____
PHONE NUMBER	SIGNATURE OF LICENSED LOCAL RECORDING AGENT appointed to countersign on behalf of Surety (Required by Art. 21.09 of the Insurance Code)

SECTION 9
MAINTENANCE BOND

MAINTENANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That _____
(NAME OF CONTRACTOR)

_____

as principal, hereinafter called "CONTRACTOR" and _____

_____
(NAME OF SURETY)

a corporation organized under the laws of _____
as Surety, hereinafter called "SURETY", do hereby expressly acknowledge themselves to be held and bound to pay unto WILLIAMSON COUNTY as Obligee, a political subdivision of the State of Texas, hereinafter called "COUNTY", the sum of (20% of total construction contract amount)

_____
(INSERT WORDS)
_____ Dollars ($_____) for the payment of which sum well and truly to be made unto said COUNTY and its successors, said principal and sureties do hereby bind themselves, their assigns, and successors jointly and severally.

This obligation is conditioned, however, that whereas said CONTRACTOR has by written Agreement dated _____ , 20 _____ , entered into an agreement with said COUNTY to build and construct _____

_____
which said Agreement and the Contract Documents therein mentioned and adopted by the COUNTY are hereby expressly made a part thereof as though the same were written and embodied herein.

WHEREAS, under the terms and conditions of the Agreement, specifications and other Contract Documents, it is provided that the CONTRACTOR shall maintain and keep in good repair the Work constructed and/or equipment furnished by it as contemplated by the plan drawings, specifications, and other Contract Documents, and perform for a period of 2 years from the date of acceptance as shown on the "Certificate of Completion" issued by the ENGINEER, or the date of Final Payment by the COUNTY if a separate Certificate of Completion is not issued, all necessary repairs, reconstruction and renewal of any part of said construction, and to furnish the labor and materials to make good and to repair any defective condition growing out of or on account of the breakage or failure of any substance or the improper function of any part of the construction work. The CONTRACTOR shall reimburse the COUNTY for the costs of all engineering and special services required to be furnished by the COUNTY which are directly attributable to the restoration of the constructed work. Said maintenance contemplates the complete restoration of the constructed work to a functional use during the said period as set forth above. It is the intended purpose of this section to require the correction of all defective conditions resulting from materials furnished or work and labor performed by the CONTRACTOR under the conditions prescribed by the Agreement, plans and specifications and other Contract Documents; and in case the CONTRACTOR shall fail or refuse to commence and actively pursue such corrections within ten (10) days after proper written notifications have been furnished to it by the COUNTY, it is agreed that the COUNTY may do said work and supply such materials and the said CONTRACTOR and SURETY herein shall be liable for the payment of all costs thereby incurred.

NOW THEREFORE, if the said CONTRACTOR shall keep and perform its said agreement to maintain said work and keep the same in good repair for the said maintenance period as provided above, then these presents shall be null and void and have no further effect, but if default shall be made by the

CONTRACTOR in the performance of its Agreement to maintain and repair said work, then these presents shall have full force and effect and the COUNTY shall have and recover from the said CONTRACTOR and its sureties damages in the premises, as provided, and it is further understood and agreed that this obligation shall be a continuing one against the principal and sureties hereon, and that successive recoveries may be had hereon for successive breaches until the full amount shall have been exhausted; and it is further understood that the obligation herein to maintain said work shall continue throughout said maintenance period, and the same shall not be changed, diminished, or in any manner affected from any cause during said time.

IN WITNESS WHEREOF, this instrument is executed this _____ day of _____, 20 ____

_____ _____

PRINCIPAL PHONE NO.

_____

SIGNATURE (SEAL)

_____ _____

NAME & TITLE WITNESS OR ATTEST TO SEAL

_____ _____

SURETY PHONE NO.

_____

SIGNATURE (SEAL)

_____ _____

NAME & TITLE WITNESS OR ATTEST TO SEAL

_____

SIGNATURE OF LICENSED LOCAL RECORDING AGENT
appointed to countersign on behalf of Surety

SECTION 10
CERTIFICATE OF INSURANCE

CERTIFICATE OF INSURANCE

TO: DATE:_____

_____ Project No.:_____
(COUNTY)

_____ Type of _____

_____ Project:_____
(ADDRESS)

THIS IS TO CERTIFY THAT _____
(Name and address of insured)

is, at the date of this certificate, insured by this Company with respect to the business operations hereinafter described for the types of Insurance and in accordance with the provisions of the standard policies used by this Company, and further hereinafter described. Exceptions to the standard policy noted on reverse side hereof.

TYPE OF INSURANCE	POLICY NO.	EFFECTIVE	EXPIRES	LIMITS OF LIABILITY	
Workmen's Compensation					
				1 Person	$
Public Liability				1 Accident	$
Contingent				1 Person	$
Liability				1 Accident	$
Property Damage					
Builder's Risk					
Automobile					
Other					

The foregoing Policies (do) (do not) cover all sub-contractors.

Locations Covered:_____

Descriptions of Operations Covered:_____

The above policies either in the body thereof or by appropriate endorsement provide that they may not be changed or canceled by the insurer in less than five days after the insured has received written notice of such change or cancellation.

Where applicable local laws or regulations require more than five days actual notice of change or cancellation to the assured, the above policies contain such special requirements, either in the body thereof or by appropriate endorsement thereto attached.

_____
(Name of Insurer)

By:_____

Phone No. (___) _____ Title:_____

SECTION 11
GENERAL CONDITIONS OF AGREEMENT

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General Conditions of Agreement

1. Definition of Terms

For purposes of the Contract Documents, the following terms shall have the meanings set forth herein:

1.01 The Agreement

The term the "Agreement" shall mean Standard Form of Agreement by and between County and Contractor relating to the Work and the construction of the Project.

1.02 County

Williamson County, Texas, being a political subdivision of the State of Texas, is the entity identified in the Agreement and hereinafter referred to as the "County." Nothing contained in the Contract Documents shall create any contractual or agency relationship between any parties other than the County and the Contractor.

1.03 Department

The "Department" shall mean the Texas Department of Transportation (TxDOT).

1.04 Contractor

The term the "Contractor" shall mean the successful bidder that enters into the Agreement with the County for the construction of the Work and the Project defined by the Contract Documents.

1.05 Engineer

The term the "Engineer" shall mean the County Engineer or the authorized representative of the County Engineer.

1.06 General Engineering Consultant (GEC)

The term the "General Engineering Consultant" or "GEC" shall mean the consulting engineering firm representing and assisting the County in the design, review, and coordination of the design and construction phases of the Project. The GEC shall be responsible for the construction oversight of the Project.

1.07 Construction Observer

The "Construction Observer" or the "Observer" shall mean the County's employee or a contracted consultant who performs construction engineering and inspection services for the Project.

1.08 Construction Representative

The "Construction Representative" shall mean the GEC's designated field representative

during construction of the Project which shall provide for coordination and assistance of the construction observation effort.

1.09 Engineer of Record

The term "Engineer of Record" shall mean the County's design professional, who shall provide professional engineering design services for the Project.

1.10 Contract Documents

The "Contract Documents" shall consist of the Special Conditions, Notice for Bidders, Proposal, the fully executed Agreement, Performance and Payment Bonds, Maintenance Bond, Special Bonds (when required), General Conditions, Technical Specifications or Specifications, Plans and all modifications thereof incorporated in any such documents before the execution of the Agreement and all modifications that are made, in accordance with the Contract Documents, following the execution of the Agreement.

The Contract Documents are complementary, and what is called for by any one shall be as binding as if called for by all. In case of conflict between any of the Contract Documents, priority of interpretation shall be in the following order: Fully Executed Agreement, Performance and Payment Bonds, Maintenance Bond, Special Bonds (if any), Proposal, General Conditions, Special Conditions, Technical Specifications or Specifications, and Plans.

1.11 Subcontractor

The term "Subcontractor", as employed herein, includes only those having a direct contract with the Contractor. It includes one who furnishes material worked to special design according to the plans or specifications of this work, but does not include one who merely furnishes material not so worked.

1.12 Sub-Subcontractor

The term "Sub-Subcontractor" means one who has a direct or indirect contract with a Subcontractor to perform any of the Work at the site. It includes one who furnishes material worked to a special design according to the plans or specifications of this work, but does not include one who merely furnishes material not so worked.

1.13 Written Notice

Written notice shall be deemed to have been duly served if delivered in person to the individual or to an officer of the entity for whom it is intended, or if delivered to or sent by registered mail to the last business address known to it who gives the notice.

1.14 Work

The Contractor shall provide and pay for all materials, machinery, equipment, tools, superintendence, labor, services, insurance, and all water, light, power, fuel, transportation and other facilities necessary for the execution and completion of the work covered by the Contract Documents (collectively known as the "Work"). Unless otherwise specified, all materials shall be new and both workmanship and materials shall be of a good quality. The

Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials. Materials or work described in words which, when so applied, have a well-known technical or trade meaning shall be held to refer to such recognized standards.

1.15 Extra Work

The term "Extra Work" as used in the Contract Documents shall be understood to mean and include all work that may be required by the County to be done by the Contractor to accomplish any change, alteration or addition to the Work shown upon the plans, or reasonably implied by the specifications, and not covered by the Contractor's Proposal, except as provided under Section 2.13 "Changes and Alterations" herein.

1.16 Working Day

The term "Working Day" is defined as any day not including Saturdays, Sundays or any legal holidays, in which weather or other conditions, not under the control of the Contractor, will permit construction of the principal units of the Work for a period of not less than seven (7) hours between 7:00 a.m. and 6:00 p.m.

1.17 Calendar Day

The term "Calendar Day" is defined as any day of the week or month, no days being excepted.

1.18 Substantially Completed

The term "Substantially Completed" or "Substantial Completion" shall be understood to mean that all Project Work (or the work for a specified phase of the Project) requiring lane or shoulder closures or obstructions is completed, and traffic is following the lane arrangement as shown on the plans for the finished roadway (or the specified phase of work). Additionally, all pavement construction, resurfacing, traffic control devices, and pavement markings shall be in their final position (or as called for on the plans for the specified phase of work) at such time; provided, however, the Engineer may make an exception as to the permanent pavement markings being in their final position provided that, in the Engineer's sole discretion, the lack of markings does not cause a disruption to traffic flow or an unsafe condition for the traveling public, and work zone pavement markings are in place.

1.19 Notice of Substantial Completion

Notice issued to the Contractor by the Observer or County's Representative acknowledging Substantial Completion of the Project, signifying the end of time charges.

1.20 Certificate of Completion

Certificate issued to the Contractor by the Observer acknowledging "Final Completion" of the Project, as determined by completion of the Punch List, from which time the warranty period for the Project shall begin. The issuance of the Certificate of Completion shall serve as evidence of "Final Completion" and such certificate shall relieve the Contractor of ownership responsibilities for the Project, except for repair of damage caused by the Contractor or by the Contractor's operations to existing facilities or completed and substantially accepted work.

1.21 Certificate of Acceptance

Certificate issued to the Contractor by the County acknowledging final acceptance and purchase of the Project.

1.22 Project

The "Project" shall mean and include the Project defined, described and set forth in the Agreement.

1.23 Contract Time

The "Contract Time" shall mean the amount of time in which the Work shall be Substantially Completed. The number of days allotted for the Contract Time shall be specifically set forth in the Agreement.

1.24 Contract Price

The "Contract Price" shall mean the amount that the County shall pay the Contractor for completion of the Work in accordance with the Contract Documents. The specific amount of the Contract Price shall be determined pursuant to the terms of the Contract Documents.

2. Responsibilities of the Engineer and the Contractor

2.01 County-Observer Relationship

The Observer will be the County's contracted consultant during construction. The duties, responsibilities and limitations of authority of the Observer as the County's representative during construction are as set forth in the Contract Documents and/or the Agreement for Construction Engineering and Inspection Services and shall not be extended or limited without written consent of the County or the Observer. The Observer will advise and consult with the County and the GEC, and all of the County's instructions to the Contractor shall be issued through the Observer.

2.02 Professional Observation by the Construction Observer

The Observer shall be on the jobsite when work is being performed to provide construction engineering inspections of the Work performed by the Contractor. In addition to performing material testing on behalf of the County, the Observer shall review the progress of the executed Work and to determine if such Work meets the essential performance and design features and the technical and functional engineering requirements of the Contract Documents; provided and except, however, that the Observer shall not be responsible, directly or indirectly, for the Contractor's construction means, methods, techniques, sequences, quality, procedures, programs, safety precautions or lack of same incident thereto or in connection therewith. Notwithstanding any other provision of the Contract Documents, the Engineer and the Observer shall not be responsible or liable for any acts, errors, omissions or negligence of the Contractor, any Subcontractor or any of the Contractor's or Subcontractor's agents, servants or employees or any other person, firm or corporation performing or attempting to perform any of the Work.

2.03 Payments for Work

The Observer shall review the Contractor's applications for payment and supporting data, determine the amount owed to the Contractor and recommend, in writing to the GEC for review, payment to the Contractor in such amounts; such recommendation of payment to the Contractor constitutes a representation to the County of the Observer's professional judgment that the Work has progressed to the point indicated to the best of its knowledge, information and belief, but such recommendation of an application for payment to the Contractor shall not be deemed as a representation by the Observer that the Observer has made any examination to determine how or for what purpose the Contractor has used the monies paid on account of the Contract Price.

2.04 Initial Determinations

The Observer initially shall determine all claims, disputes and other matters in question between the Contractor and the County relating to execution or progress of the Work or interpretation of the Contract Documents. The Observer's decision shall be rendered in writing to the GEC for review within a reasonable time, which shall not be construed to be less than ten (10) days.

2.05 Objections

In the event the Observer renders any decision which, in the opinion of either party hereto, is not in accordance with the meaning and intent of the Contract Documents, either party may file with the Observer its written objection to the decision within thirty (30) days of such decision by the Observer, and by such action may reserve the right to submit the question so raised to litigation as hereinafter provided.

2.06 Lines and Grades

Unless otherwise specified, all lines and grades shall be furnished by the Contractor at its own expense. Whenever necessary, construction work shall be suspended to permit performance of this work, but such suspension will be as brief as practicable and the Contractor shall be allowed no extra compensation therefore.

2.07 Contractor's Duty and Superintendence

The Contractor shall give adequate attention to the faithful prosecution and completion of the Work subject of the Contract Documents and shall keep on the Project site, at all times during its progress, a competent Superintendent and any necessary assistants to supervise and direct the Work. The Superintendent shall represent the Contractor in its absence and all directions given to the Superintendent shall be as binding as if given to the Contractor.

The Contractor is and at all times shall remain an independent contractor, solely responsible for the manner and method of completing its work under the Contract Documents, with full power and authority to select the means, method and manner of performing such work, so long as such methods do not adversely affect the completed improvements, the County and the Observer being interested only in the result obtained and conformity of such completed improvements with the Contract Documents.

Likewise, the Contractor shall be solely responsible for the safety of itself, its employees and other persons, as well as for the protection and safety of the improvements being erected and its property or any other person's property, as a result of its operations under the Contract Documents. Engineering construction drawings and specifications, as well as any additional information concerning the Work to be performed passing from or through the Observer, shall not be interpreted as requiring or allowing the Contractor to deviate from the Contract documents, the plans and specifications; the intent of such drawings, specifications and any other such information being to define with specificity the agreement of the parties as to the Work the Contractor is to perform.

Any review of work in process, or any visit or observation and inspection during construction, or any clarification of plans and specifications, by the Observer or the County, or any agent, employee, or representative of either of them, whether through personal observation or inspection on the Project site or by means of approval of shop drawings for temporary construction or construction processes, or by other means or methods, is agreed by the Contractor to be for the purpose of observing the extent and nature of work completed or being performed, as measured against the drawings and specifications constituting the Contract Documents, or for the purpose of enabling the Contractor to more fully understand the plans and specifications so that the completed construction work will conform thereto, and shall in no way relieve the Contractor from full and complete responsibility for the proper performance of its work on the Project, including but not limited to the propriety of means and methods of the Contractor in performing in accordance with the Contract Documents, and the adequacy of any designs, plans or other facilities for accomplishing such performance. Deviation by the Contractor from plans and specifications that may have been in evidence during any such visitation or observation by the Observer, the Engineer, or any of their representatives, whether called to the Contractor's attention or not, shall in no way relieve the Contractor from its responsibility to complete all work in accordance with the Contract Documents.

2.08 Contractor's Understanding

It is understood and agreed that the Contractor has, by careful examination, satisfied itself as to the nature and location of the Work, the conformation of the ground, the character, quality and quantity of the materials to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the Work, the general and local conditions, and all other matters which can in any way affect the Work under the Contract Documents.

2.09 Character of Workers

The Contractor agrees to employ only orderly and competent workers, skillful in the performance of the type of work required under the Contract Documents, to do the Work; and agrees that whenever the Observer shall inform it in writing that any workers on the Work are, in its opinion, incompetent, unfaithful or disorderly, or refuse instructions from the Observer in the absence of the Superintendent, such worker shall be discharged from the Work and shall not again be employed on the Work without the Observer's written consent. No illegal alien may be employed by any Contractor for work on this Project, and a penalty

of $500.00 per day will be assessed for each day and for each illegal alien who works for the Contractor at this Project.

2.10 Shop Drawings

The Contractor shall submit to the Observer, with such promptness as to cause no delay in its own work or in that of any other contractor, a minimum of four (4) stamped/reviewed copies, unless otherwise specified, of all shop and/or setting drawings and schedules required for the work of the various trades, and the Engineer of Record shall pass upon them with reasonable promptness, making desired corrections. Note: A single copy of the reviewed drawings shall be retained by the reviewer, the County, and the County's Representative for their records. The Contractor may not submit more than four different shop drawing plans for review in any one week. The Engineer of Record shall return the shop drawings to the Contractor, via the GEC, within three (3) weeks of its having received them, with appropriate comments. The Contractor shall make any corrections required by the Engineer of Record, file with it two (2) corrected copies and furnish such other copies as may be needed. The Engineer of Record's approval of such drawings or schedules shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless the Contractor has in writing called the Engineer of Record's attention to such deviations at the time of submission, nor shall it relieve Contractor from responsibility for errors of any sort in shop drawings or schedules. It shall be the Contractor's responsibility to fully and completely review all shop drawings to ascertain their effect on its ability to perform the required work in accordance with the Contract Documents and within the time for completion thereof. Any shop drawings which are required for temporary supports must be signed and sealed by an Engineer registered in the State of Texas.

Such review by the Engineer of Record shall be for the sole purpose of determining the sufficiency of said shop drawings or schedules to result in finished improvements in conformity with the plans and specifications, and shall not relieve the Contractor of its duties and obligations, as an independent contractor, set forth in the Contract Documents. It is hereby expressly understood and agreed that the Engineer of Record does not assume any duty to pass upon the propriety or adequacy of such drawings or schedules, or any means or methods reflected thereby, in relation to the safety of either person or property during the Contractor's performance hereunder.

2.11 Preliminary Approval

The Observer shall not have the power to waive the obligations of the Contract Documents for the furnishing by the Contractor of good material, and of its performing good work as herein described, and in full accordance with the Contract Documents. No failure or omission of the Observer to discover, object to or condemn any defective work or material shall release the Contractor from the obligations to fully and properly perform in full accordance with the Contract Documents, including without limitation, the obligation to at once tear out, remove and properly replace any defective work or material at any time prior to final acceptance upon the discovery of said defective work or material; provided, however, that the Observer shall, upon request of the Contractor, inspect and accept or reject any material furnished, and in the event the material has been once accepted by the Observer,

such acceptance shall be binding on the County unless it can be clearly shown that such material furnished does not meet the specifications for this work.

Any questioned work may be ordered to be taken up or removed for re-examination by the Observer, prior to final acceptance, and if found not in accordance with the plans and/or specifications for said work, all expenses relating to the removing, re-examination and replacement shall be solely borne by the Contractor. Otherwise, if the questioned work is found to be in accordance with the plans and/or specifications for said work, the expense thus incurred shall be allowed as Extra Work and shall be paid for by the County; provided, however, where inspection or approval is specifically required by the specifications prior to performance of certain work, should the Contractor proceed with such work without requesting prior inspection or approval, the Contractor shall bear all expense of taking up, removing, and replacing this work if so directed by the Observer.

2.12 Defects and Their Remedies

It is further agreed that if the Work or any part thereof, or any material brought on the site of the Work for use in the Work or selected for the same, shall be deemed by the Observer as unsuitable or not in conformity with the Contract Documents, or the intent thereof, the Contractor shall, after receipt of notice thereof from the Observer, forthwith remove such material and rebuild or otherwise remedy such work so that it shall be in full accordance with the Contract Documents.

2.13 Changes and Alterations

The Contractor further agrees that the County may make such changes and alterations as the County may see fit in the line, grade, form, dimensions, plans or materials for the Work herein contemplated, or any part thereof, either before or after the beginning of the construction, without affecting the validity of the Contract Documents.

If such changes or alterations diminish the quantity of the Work to be done, they shall not constitute the basis for a claim for damages or anticipated profits on the Work that may be dispensed with, except as provided for unit price items under Section 5 “Measurement and Payment”. If the amount of work is increased, and the Work can fairly be classified under the specifications, such increase shall be paid for according to the quantity actually done and at the unit price, if any, established for such work under the Contract Documents, except as provided for unit price items under Section 5 “Measurement and Payment”. Otherwise, such additional work shall be paid for as provided under Extra Work. In the event the County makes such changes or alterations as shall make useless any work already done or material already furnished or used in said work, then the County shall compensate the Contractor for any material or labor so used, and for any actual loss occasioned by such change, due to actual expense incurred in preparation for the Work as originally planned.

3. General Obligations and Responsibilities

3.01 Keeping of Plans and Specifications Accessible and Keeping a Superintendent on the Project Site

The Contractor shall keep one (1) copy of the plans and specifications constantly accessible on the Work, with the latest revisions noted thereon. The Contractor shall give the Work its constant attention to facilitate the progress thereof and shall cooperate with the Construction Observer in every way possible. The Contractor shall designate, to the Construction Observer in writing, the name of a Superintendent, employed by the firm, regardless of how much of the Work may be sublet. The Superintendent will be available at all time. In the event a competent superintendent is not available, the Construction Observer may suspend work until one is available.

3.02 Ownership of Documents

All drawings, specifications and copies thereof furnished by the Engineer of Record shall not be reused on other work, and, with the exception of the signed contract sets, are to be returned to the Engineer of Record on request, at the completion of the work. All models, drawings, specifications and copies thereof are the property of the County.

3.03 Adequacy of Design

It is understood that the County believes it has employed competent engineers and designers. It is therefore agreed that the County and Engineer shall be responsible for the adequacy of the design, sufficiency of the Contract Documents, the safety of the structure and the practicability of the operations of the completed project provided that the Contractor has complied with the requirements of the said Contract Documents, all approved modifications thereof, and additions and alterations thereto approved in writing by the County. The burden of proof of such compliance shall be upon the Contractor to show that it has complied with the said requirements of the Contract Documents, approved modifications thereof, and all approved additions and alterations thereto.

The paper copies of the Contract Documents are considered to be the official contract documents. Any request by the Contractor and use thereof of electronic or digital information, including engineering design and survey files, shall be at the sole risk and legal responsibility of the Contractor. Neither the County nor the Engineer of Record makes any warranty or representation as to the compatibility of the files provided with other software programs, nor shall they be held responsible for subsequent uses of the data by the Contractor or anyone who may obtain the data from the Contractor. **THE CONTRACTOR SHALL, TO THE FULLEST EXTENT PERMITTED BY LAW, INDEMNIFY AND HOLD THE COUNTY ITS AGENTS, EMPLOYEES, OR REPRESENTATIVES AND THE ENGINEER OF RECORD HARMLESS FROM ANY AND ALL CLAIMS, SUITS, LIABILITY, DEMANDS OR COSTS ARISING OUT OF OR RESULTING FROM SUCH USE.** Because data stored on electronic media can deteriorate undetected or be modified undetected, neither the County nor the Engineer of Record can be held liable for the completeness or correctness of the electronic data once in possession of the Contractor.

3.04 Contractor's Responsibility for Work

Until the issuance of the Certificate of Completion for the Project, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non execution of the Work.

In case of suspension of work for any cause, the Contractor shall be responsible for the preservation of all materials. The Contractor shall provide suitable drainage of the roadway in good and passable condition until Final Completion, except as outlined below for opening the roadway to traffic.

Whenever, in the opinion of the Observer, any roadway or portion thereof is in suitable condition for travel, it shall be opened to traffic; provided, however, such opening shall not be held to be, in any way, the final acceptance of the roadway or any part thereof or be held as a waiver of any of the provisions of the Contract Documents. Where it is considered by the Observer to be in the public interest and so ordered in writing by the Observer, any Substantially Completed roadway or portion thereof may be opened to traffic as follows:

(1) When both required by plans, job sequence or the approved traffic control plan, and when the County accepts responsibility for maintaining such portion of the roadway opened to traffic.
(2) When work is suspended for a period of time at the convenience of the County, the County will assume the responsibility for maintaining the entire roadway during the period of suspension; or
(3) When the roadway or portion thereof is opened to traffic during construction operations at the convenience of the County, the County will assume responsibility for the maintenance of the traveled way and shoulders during the period in which it is opened to traffic.

The County, in assuming responsibility for maintenance under this provision, may require the Work to be done in accordance with Section 6, "Extra Work and Claims".

Except for damage by the Contractor or damage caused by the Contractor's operations, the Contractor will not be responsible for repair of damage to existing facilities or damage to completed and accepted work such as guard fence, bridge wings, railing, illumination assemblies, underpass structure, traffic barriers, delineator assemblies, signs, sign bridges, changeable message signs, vehicle impact attenuators (crash cushions and guardrail end treatments) and traffic signals, where such damage is caused by (a) motor-vehicle, seacraft or aircraft that are not being operated by Contractor; (b) railroad-train collision (c) vandalism: (d) Acts of God, such as earthquake, tidal wave, tornado, hurricane, or other cataclysmic phenomena of natures: or (e) Acts of Governmental Authorities.

Upon completion of all work provided for in the Contract Documents for any individual limits, control or project, the Observer may make an inspection, and if the Work is found to be satisfactory, the Contractor will be released from further maintenance on that portion of

the Work, except for damage caused by the Contractor or its operations. Such partial acceptance must be made in writing and shall in no way void or alter any terms of the Contract Documents. Other specific units of the Project will be accepted on an individual basis when shown on the plans or as approved, in writing, by the Observer.

3.05 Protection Against Accident to Employees and the Public

The Contractor shall at all times exercise reasonable precautions for the safety of employees and others on or near the Work and shall comply with all applicable provisions of federal, state, and municipal safety laws and building and construction codes. All machinery and equipment and other physical hazards shall, except where incompatible with federal, state, or municipal laws or regulations, be guarded in accordance with the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America. The Contractor shall provide such machinery guards, safe walkways, ladders, bridges, gangplanks, and other safety devices. The safety precautions actually taken and their adequacy shall be the sole responsibility of the Contractor, acting at its discretion as an independent contractor.

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 anyone, 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 the Work, the Contractor shall send a written report of such accident or other event to the County and the Observer, setting forth a full and concise statement of the facts pertaining thereto. Such statement shall include a written recordation of the location of the event and the circumstances surrounding the event through photographs, interviewing witnesses, obtaining of medical reports and other documentation that defines the event. The Contractor shall also provide to the County a copy of any and all accident reports received from safety officials or agencies. Copies of such documentation shall be provided to the County and the Observer for their records. The Contractor shall also immediately send the County and the Observer 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 the Work.

3.06 Performance and Payment Bonds

Unless otherwise specified, it is further agreed by the parties to the Contract Documents that the Contractor will execute separate performance and payment bonds, each in the sum of one hundred (100%) percent of the total Contract Price, on forms acceptable to County, guaranteeing faithful performance of the Work and the fulfillment of any guarantee required, and further guaranteeing payment to all persons supplying labor and materials or furnishing Contractor with any equipment in the execution of the Work subject of the Contract Documents. It is agreed that the Contractor shall have no rights under the Contract Documents until such performance and payment bonds are furnished to and approved by the County.

Unless otherwise specified, the cost of the premium for the performance and payment bonds shall be included in the price bid by the Contractor for the Work subject of the Contract Documents, and no extra payment for such bonds will be made by the County.

Each bond shall be executed by a corporate surety or corporate sureties, with an A.M. Best rating of "B" or better, duly authorized to do business and to issue surety bonds in the State of Texas. If any surety upon any bond furnished in connection herewith becomes insolvent, or otherwise not authorized to do business in this state, the Contractor shall promptly furnish equivalent security to protect the interests of the County and of persons supplying labor, materials and equipment in the prosecution of the Work subject of the Contract Documents. Furthermore, the surety company underwriting the bonds must be acceptable to the County.

Each bond shall be accompanied by a valid Power of Attorney (issued by the surety company and attached, signed and sealed, with the corporate embossed seal, to the bond) authorizing the agent who signs the bond to commit the company to the terms of the bond, and stating on the face of the Power of Attorney the limit, if any, in the total amount for which such agent is empowered to issue a single bond.

3.07 Protection of Adjoining Property

The Contractor shall take proper means to protect the adjacent or adjoining property or properties, in any way encountered, which might be injured or seriously affected by any process of construction to be undertaken pursuant to the Contract Documents, from any damage or injury by reason of said process of construction; and the Contractor shall be liable for any and all claims for such damage on account of its failure to fully protect all adjoining property. **THE CONTRACTOR AGREES TO INDEMNIFY, SAVE AND HOLD HARMLESS THE COUNTY, THE OBSERVER THE GEC AND THE ENGINEER OF RECORD, AS WELL AS ANY OF THEIR AGENTS, REPRESENTATIVES, OFFICERS OR EMPLOYEES AGAINST ANY CLAIM OR CLAIMS FOR DAMAGES DUE TO ANY INJURY TO ANY ADJACENT OR ADJOINING PROPERTY, ARISING OR GROWING OUT OF THE PERFORMANCE OF THE WORK, BUT ANY SUCH INDEMNITY SHALL NOT APPLY TO ANY CLAIM OF ANY KIND ARISING SOLELY OUT OF THE EXISTENCE OR CHARACTER OF THE WORK.**

3.08 Protection Against Claims of Subcontractors, Laborers, Materialmen and Furnishers of Machinery, Equipment and Supplies

THE CONTRACTOR AGREES THAT IT WILL INDEMNIFY, DEFEND AND SAVE HARMLESS THE COUNTY, THE OBSERVER, THE GEC AND THE ENGINEER OF RECORD, AS WELL AS ANY OF THEIR AGENTS, REPRESENTATIVES, OFFICERS OR EMPLOYEES FROM ALL CLAIMS GROWING OUT THE LAWFUL DEMANDS OF SUBCONTRACTORS, LABORERS, WORKERS, MECHANICS, MATERIALMEN AND FURNISHERS OF MACHINERY, MACHINERY PARTS, EQUIPMENT, POWER TOOLS, AND ALL SUPPLIES, INCLUDING COMMISSARY, INCURRED IN THE FURTHERANCE OF THE PERFORMANCE OF THE WORK SUBJECT OF THE CONTRACT DOCUMENTS. When so desired by the County, the Contractor shall furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged or waived. If the Contractor fails to furnish such evidence to County's complete satisfaction, then the County may either pay directly any unpaid bills of which the County has written notice of, or may withhold from

the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to liquidate any and all such lawful claims. When satisfactory evidence is furnished that all liabilities have been fully discharged, payments to the Contractor shall be resumed in full in accordance with the terms of the Contract Documents, but in no event shall the provisions of this sentence be construed to impose any obligation upon the County by either the Contractor or its surety.

3.09 Protection Against Royalties or Patented Invention

The Contractor shall pay all royalties and license fees, and shall provide for the use of any design, device, material or process covered by letter patent or copyright by suitable legal agreement with the patentee or owner. **THE CONTRACTOR SHALL DEFEND ALL SUITS OR CLAIMS FOR INFRINGEMENT OF ANY PATENT OR COPYRIGHT RIGHTS AND SHALL INDEMNIFY AND SAVE HARMLESS THE COUNTY, THE OBSERVER THE GEC AND THE ENGINEER OF RECORD, AS WELL AS ANY OF THEIR AGENTS, REPRESENTATIVES, OFFICERS OR EMPLOYEES FROM ANY LOSS ON ACCOUNT THEREOF, EXCEPT THAT THE COUNTY SHALL DEFEND ALL SUCH SUITS AND CLAIMS AND SHALL BE RESPONSIBLE FOR ALL SUCH LOSS WHEN A PARTICULAR DESIGN, DEVICE, MATERIAL OR PROCESS OR THE PRODUCT OF A PARTICULAR MANUFACTURER OR MANUFACTURERS IS SPECIFIED OR REQUIRED BY THE COUNTY; PROVIDED, HOWEVER, IF CHOICE OF ALTERNATE DESIGN, DEVICE, MATERIAL OR PROCESS IS ALLOWED TO THE CONTRACTOR, THEN THE CONTRACTOR SHALL INDEMNIFY AND SAVE THE COUNTY HARMLESS FORM ANY LOSS ON ACCOUNT THEREOF.** If the material or process specified or required by the County is known by the Contractor to be an infringement, the Contractor shall be responsible for such loss unless it promptly gives such information to the County.

3.10 Laws and Ordinances

The Contractor shall at all times observe and comply with all federal, state and local laws, ordinance and regulations, which in any manner affect the Contract Documents or the Work, and **SHALL INDEMNIFY AND SAVE HARMLESS THE COUNTY, THE OBSERVER THE GEC AND THE ENGINEER OF RECORD, AS WELL AS ANY OF THEIR AGENTS, REPRESENTATIVES, OFFICERS OR EMPLOYEES AGAINST ANY CLAIM ARISING FROM THE VIOLATION OF ANY SUCH LAWS, ORDINANCES, AND REGULATIONS WHETHER BY THE CONTRACTOR OR ITS EMPLOYEES, EXCEPT WHERE SUCH VIOLATIONS ARE CALLED FOR BY THE PROVISIONS OF THE CONTRACT DOCUMENTS.** If the Contractor observes that the plans and specifications are at variance therewith, it shall promptly notify the Observer, in writing, and any necessary changes shall be prepared as provided in the Contract Documents for changes in the Work. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Observer, the Contractor shall bear all costs arising therefrom.

In case the County is a body politic and corporate, the law from which it derives its powers, insofar as the same regulates the objects for which, or the manner in which, or the conditions under which the County may enter into contract, shall be controlling and shall be considered as part of the Contract Documents to the same effect as though embodied herein.

3.11 Assignment and Subletting

The Contractor further agrees that it will retain personal control and will give its personal attention to the fulfillment of the Work strictly in accordance with the Contract Documents and that Contractor will not assign, by Power of Attorney or otherwise, or sublet any right or interest it may have under the Contract Documents without the written consent of the Observer, and that no part or feature of the Work will be sublet to anyone objectionable to the Observer or the County. The Contractor further agrees that the subletting of any portion or feature of the Work, or materials required in the performance of the Work, shall not relieve the Contractor from its full obligations to the County as provided in the Contract Documents.

3.12 Indemnification

THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS THE COUNTY, THE OBSERVER, THE GEC AND THE ENGINEER OF RECORD AND THEIR RESPECTIVE OFFICERS, AGENTS AND EMPLOYEES, FROM AND AGAINST ALL DAMAGES, CLAIMS, LOSSES, DEMANDS, SUITS, JUDGMENTS AND COSTS, INCLUDING REASONABLE ATTORNEYS' FEES AND EXPENSES, ARISING OUT OF OR RESULTING FROM THE PERFORMANCE OF THE WORK, PROVIDED THAT ANY SUCH DAMAGE, CLAIM, LOSS, DEMAND, SUIT, JUDGMENT, COST OR EXPENSE:

(1) IS ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE OR DEATH OF ANY PERSON INCLUDING CONTRACTOR'S EMPLOYEES AND ANY SUBCONTRACTOR'S EMPLOYEES AND ANY SUB-SUBCONTRACTOR'S EMPLOYEES, OR TO INJURY TO OR DESTRUCTION OF TANGIBLE PROPERTY INCLUDING CONTRACTOR'S PROPERTY (OTHER THAN THE WORK ITSELF) AND THE PROPERTY OF ANY SUBCONTRACTOR OF SUB-SUBCONTRACTOR INCLUDING THE LOSS OF USE RESULTING THEREFROM; AND,

(2) IS CAUSED IN WHOLE OR IN PART BY ANY INTENTIONAL OR NEGLIGENT ACT OR OMISSION OF THE CONTRACTOR, ANY SUBCONTRACTOR, ANY SUB-SUBCONTRACTOR OR ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY ANY ONE OF THEM OR ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE.

THE OBLIGATION OF THE CONTRACTOR UNDER THIS PARAGRAPH SHALL NOT EXTEND TO THE LIABILITY OF THE OBSERVER, THE ENGINEER, THE GEC, THE ENGINEER OF RECORD THEIR AGENTS OR EMPLOYEES ARISING OUT OF THE PREPARATION OF MAPS, PLANS, REPORTS, SURVEYS, CHANGE ORDERS, DESIGNS OR SPECIFICATIONS, OR THE APPROVAL OF MAPS, PLANS, REPORTS, SURVEYS, CHANGE ORDERS, DESIGNS OR SPECIFICATIONS OR THE ISSUANCE OF OR THE FAILURE TO GIVE DIRECTIONS OR INSTRUCTIONS BY THE OBSERVER, ITS AGENTS OR EMPLOYEES, PROVIDED SUCH IS THE SOLE CAUSE OF THE INJURY OR DAMAGE.

IN ANY AND ALL CLAIMS AGAINST THE COUNTY, THE OBSERVER THE GEC OR THE ENGINEER OF RECORD OR ANY OF THEIR AGENTS OR EMPLOYEES BY ANY EMPLOYEE OF THE CONTRACTOR, ANY SUBCONTRACTOR, ANY SUB-SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM, OR ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE, THE INDEMNIFICATION OBLIGATION UNDER SECTION 3.12 SHALL NOT BE

LIMITED IN ANY WAY BY ANY LIMITATION ON THE AMOUNT OR TYPE OF DAMAGES, COMPENSATION OR BENEFITS PAYABLE BY OR FOR THE CONTRACTOR OR ANY SUBCONTRACTOR OR SUB-SUBCONTRACTOR UNDER WORKERS' COMPENSATION ACTS, DISABILITY BENEFIT ACTS OR OTHER EMPLOYEE BENEFIT ACTS.

3.13 Insurance

The Contractor at its own expense shall purchase, maintain and keep in force such insurance as will protect Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract Documents, whether such operations be by itself or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable.

(1) Workman's compensation claims, disability benefits and other similar employee benefit acts;

(2) Claims for damages because of body injury, occupational sickness or disease, or death of its employees, and claims insured by usual bodily injury liability coverages;

(3) Claims for damages because of bodily injury, sickness or disease, or death of any person other than its employees, and claims insured by usual bodily injury liability coverages; and

(4) Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

CERTIFICATE OF INSURANCE. Before commencing any of the Work, Contractor shall file with the County valid Certificates of Insurance acceptable to the County and the Observer. Such Certificates shall contain a provision that coverages afforded under the policies will not be canceled until at least thirty (30) days prior written notice has been given to the County.

The Contractor shall also file with the County valid Certificates of Insurance covering all Sub-contractors of the Contractor.

3.14 Final Clean-up

Upon the completion of the Work and before acceptance and Final Payment will be made, the Contractor shall clean and remove from the site of the Work all surplus and discarded materials, temporary structures and debris of every kind. The Contractor shall leave the site of the Work in a neat and orderly condition at least equal to that which originally existed. Surplus and waste materials removed from the site of the Work shall be disposed of at locations that are both satisfactory to the Observer and in accordance with the laws pertaining to the disposal of such surplus, debris and waste materials.

In the event the Contractor fails or refuses to clean and remove surplus materials and debris as provided above, the County or the Observer may do so, or cause same to be done, at the

Contractor's expense, and the reasonable cost thereof shall be deducted from any amounts that are owing to the Contractor.

4. Prosecution and Progress

4.01 Time and Order of Completion

It is the meaning and intent of the Contractor Documents, unless otherwise specifically provided, that the Contractor shall be allowed to prosecute its work at such times and seasons, in such order of precedence, and in such manner as shall be most conducive to the economy of construction; provided, however, that the order and the time of prosecution shall be such that the Work shall be substantially completed, as a whole and in part, in accordance with the Contract Documents and within the time of completion designated in the Contractor's bid or proposal; provided, however, when the County is having other work done on the same Project or an adjoining project, either by contract or by its own force, the Observer may direct the time and manner of constructing the Work done under the Contract Documents, so that conflict will be avoided and the construction of the various works and projects being performed for the County shall be harmonized.

Unless otherwise specified, the Contractor shall plan to begin work 10 calendar days from the authorization date to begin work as designated by the Notice to Proceed.

The Contractor shall submit, at such times as may reasonably be requested by the Observer, schedules which shall show the order in which the Contractor proposes to carry on the Work, the dates at which the Contractor will start the several parts of the Work, and estimated dates of completion of the several parts.

Nighttime work is allowed only when shown on the plans or directed or allowed by the Engineer. Nighttime work is defined as work performed from 30 min. after sunset to 30 min. before sunrise.

4.02 Extension of Time

Should the Contractor be delayed in the completion of the Work by any act or neglect of the County, the Observer or the Engineer of Record, or of any employee of either, or by other contractors employed by the County, or by changes ordered in the Work, or by strikes, lockouts, fires, and unusual delays by common carriers, or unavoidable cause or causes beyond the Contractor's control, or by any cause which the Observer shall decide justifies the delay, then an extension of time shall be allowed for completing the Work, sufficient to compensate for the delay, the amount of the extension to be determined by the Observer; provided, however, before the Observer may decide whether or not to allow such an extension of time, the Contractor must tender a prompt written request for an extension of time wherein the Contractor shall give the Observer a written description of the cause of such delay. Adverse weather conditions will not be justification for extension of time on "Calendar Days" contracts.

4.03 Hindrances and Delays

No claims shall be made by the Contractor for damages resulting from hindrances or delays from any cause (except where the Work is stopped by order of and for the convenience of the County) during the progress of any portion of the Work embraced in the Contract Documents. In case said work shall be stopped by the act of the County, then such expense, as in the sole judgment of the Observer is caused by such stoppage of said work, shall be paid by the County to the Contractor.

5. Measurement and Payment

5.01 Quantities and Measurements

No extra or customary measurements of any kind will be allowed. Rather the actual measured and/or computed length, area, solid contents, number and weight only shall be considered, unless otherwise specifically provided otherwise in the Contract Documents.

5.02 Estimated Quantities

The Contract Documents are intended to show clearly all work to be done and material to be furnished hereunder. Where the estimated quantities are shown for the various classes of work to be done and material to be furnished under the Contract Documents, they are approximate and are to be used only as a basis for estimating the probable cost of the Work and for comparing the proposals offered for the Work. It is understood and agreed that the actual amount of work to be done and material to be furnished under the Contract Documents may differ somewhat from these estimates.

Plans quantities may or may not represent the exact quantity of work performed or material moved, handled, or placed during the execution of the Work. For plans quantity measurement items, the estimated bid quantities are designated as final payment quantities, unless revised by the governing specifications. If the actual quantity measured as outlined under “Measurement” varies by more than 5% (or as stipulated under “Measurement” for specific Items) from the total estimated quantity for an individual Item originally shown in the Contract Documents, an adjustment may be made to the quantity of authorized work done for payment purposes. The party requesting the adjustment will provide field measurements and calculations showing the revised quantity. When approved, this revised quantity will constitute the final quantity for which payment will be made. Payment for revised quantity will be made at the unit price bid for that Item, except as provided for in the Contract Documents. When quantities are revised by a change in design approved by the County, by change order, or to correct an error on the plans, the plans quantity will be increased or decreased by the amount involved in the change, and the 5% variance will apply to the new plans quantity.

Where payment is based on the unit price method, the Contractor agrees that it will make no claim for damages, anticipated profits or otherwise on account of any differences which may be found between the quantities of work actually done, the material actually furnished under the Contract Documents and the estimated quantities contemplated and contained in the proposal; provided, however, that in case the actual quantity of any major item should

become as much as twenty-five percent (25%) more than or twenty-five percent (25%) less than the estimated or contemplated quantity for such items, then either party to the Agreement, upon demand, shall be entitled to revised consideration upon the portion of the Work above or below twenty-five percent (25%) of the estimated quantity.

A "Major Item" shall be construed to be any individual bid item incurred in the proposal that has a total cost equal to or greater that five percent (5%) of the total contract cost, computed on the basis of the proposal quantities and the contract unit prices.

Any revised consideration is to be determined by agreement between the parties, otherwise by the terms of the Contract Documents, as provided under Section 6.03 "Extra Work".

5.03 Price of Work

In consideration of the furnishing of all the necessary labor, equipment and material, and the completion of all of the Work by the Contractor, and on the completion of all of the Work and on the delivery of all material in full conformity with the specifications and stipulations contained in the Contract Documents, the County agrees to pay the Contractor the Contract Price that is set forth in the Agreement. The Contractor hereby agrees to receive such Contract Price in full for furnishing all material and all labor required for the Work, also for all expense incurred by Contractor, and for well and truly performing the same and the whole thereof in the manner with and in accordance to the Contract Documents.

5.04 Partial Payments

On or before the first Wednesday of each month, the Contractor shall submit to the Observer a statement showing the total value of the Work performed up to and including the last day of the preceding month. The statement shall also include the value of all sound materials delivered on the job 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 Observer, is acceptable. The Observer shall either examine and approve by signature or modify and approve such modified statement.

The County shall then pay the Contractor, within 30 days of the statement submittal, the total amount of the approved statement, less ten percent (10%) of the amount thereof, which ten percent (10%) shall be retained until Final Payment, and further less all previous payments and all further sums that may by retained by the County under the terms of the Contract Documents and/or under state or federal law. It is understood, however, that in case the whole work be near to completion and some unexpected and unusual delay occurs due to no fault or neglect on the part of the Contractor, then the County may, upon written recommendation of the Observer, pay a reasonable and equitable portion of the retained percentage to the Contractor; or the Contractor, at the County's option, may be relieved of the obligation to fully complete the Work and, thereupon, the Contractor shall receive payment of the balance due Contractor under the contract subject to the terms and conditions stated in the Contract Documents.

(1) When work progress is fifty percent (50%) complete, as determined by the value of the work completed to date against the original or revised contract amount, whichever is greater, the County may reduce the amount retained to five percent (5%) of the value of all work satisfactorily complete to date, including the value paid for materials on hand, provided, in the sole opinion of the Observer, the Contractor is making satisfactory progress toward completion of the project in a timely manner and there is no other cause to retain a greater percentage.
(2) Upon issuance of the NOTICE OF SUBSTANTIAL COMPLETION and agreement to final project quantities, the percent retained may be further reduced, at the discretion of the Engineer and the Observer, to two percent (2%) of the total value of all work completed to date. This amount shall be retained until Final Payment and close out of the project.

5.05 Punch List

The Contractor shall notify the Observer in writing when, in the Contractor's opinion, the Work has been "Substantially Completed" and when so notifying the Observer, the Contractor shall furnish to the Observer, in writing, a detailed list of unfinished work, also known as the Punch List. The Observer will review the Punch List and will add any items that the Contractor failed to include on said list. The fact that a structure or facility has been "Substantially Completed" shall not excuse the Contractor from performing all of the Work undertaken, whether such work is of a minor or major nature. Furthermore, the Contractor shall remain obligated to fully complete the Work and perform its obligations under the Contract Documents after the Work has been Substantially Completed.

5.06 Final Completion and Acceptance

The Contractor shall have a specified time period for completion of the Punch List items, as set forth in Section XI of the Special Conditions, "Completion of Work on Time." Within ten (10) days after the Contractor has given the Observer written notice that the Punch List has been completed, the Observer shall inspect the Work and within said time, if the Work is found to be completed in accordance with the Contact Documents, the Observer shall issue to the Contractor its Certificate of Completion. In the event the Punch List has not been completed, the Observer shall advise the Contractor, in writing, of the Observer's basis for deeming the Punch List incomplete. Following the Contractor's receipt of the Observer's notice that the Punch List is incomplete, the Contractor shall complete the remaining items prior to the expiration of the above referenced specified time period for completion of the Punch List items. Upon satisfactory completion of the Punch List and the issuance of the Certificate of Completion, it shall be the Contractor's responsibility to submit the contract close-out documents, which shall include the record drawings, maintenance bond and Affidavit of All Bills Paid, and thereupon it shall be the duty of the County to issue a Certificate of Acceptance (Final Acceptance) to the Contractor.

5.07 Final Payment

Upon the issuance of the Notice of Substantial Completion, the Observer shall proceed to make final measurements and prepare final statement for the value of all work performed and materials furnished under the terms of the Contract Documents and shall certify same to the

County, and, then, Final Payment shall be made to the Contractor. At the County's sole discretion, this payment may include payment for work remaining to be performed in association with the removal of temporary erosion controls or the establishment of permanent stabilization measures. On or after the 30th day, and before the 35th day after the date of the Certificate of Acceptance, the balance due the Contractor under the terms of the Contract Documents shall be paid. Neither the Certificate of Acceptance nor the Final Payment, nor any provision in the Contract Documents, shall relieve the Contractor of the obligation for fulfillment of any warranty which may be required.

5.08 Payments Withheld

The County may, on account of subsequently discovered evidence, withhold or nullify the whole or part of any certificate to such extent as may be necessary to protect itself from loss on account of:

(a) Defective work not remedied or other obligations hereunder not completed.
(b) Claims filed or reasonable evidence indicating the probable or potential filing of claims.
(c) Failure of the Contractor to make payments properly to Subcontractors or for material or labor.
(d) Damage to the County or another contractor's work, material or equipment.
(e) Reasonable doubt that the Work can be completed for the unpaid balance of the contract amount or Contract Price.
(f) Reasonable indication that the Work will not be completed within the contract time.
(g) Other causes affecting the performance of the Work subject of the Contract Documents.

When the above grounds are removed or the Contractor provides a surety bond satisfactory to the County, which will protect the County in the amount withheld, payment shall be made for amounts withheld because of them.

5.09 Delayed Payments

Should the County fail to make payment to the Contractor of the sum named in any partial or final statement, when such payment is due, then the County shall pay to the Contractor, in addition to the sum shown as due by such statement, interest thereon 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 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 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. County's payment of the amount due plus said interest shall fully liquidate any injury to the Contractor growing out of such delay in payment. It is expressly agreed that delay by the County in making payment to the Contractor of the sum named in any partial or final statement shall not constitute, on the part of the County, a breach under the Contract Documents, nor shall it serve as an abandonment by the County. Furthermore, any delay by the County in making payment to the Contractor of the sum named in any partial or final statement shall not, to any

extent or for any time, relieve the Contractor of its obligations to fully and completely perform pursuant to the terms of the Contract Documents.

6. Extra Work and Claims

6.01 Change Orders

Without invalidating the Agreement or any terms of the Contract Documents, the County may, at any time or from time to time, order additions, deletions or revisions to the Work. Any such additions, deletions or revisions to the Work may only be effectuated and authorized by written Change Order. The said written Change Order shall be prepared by the GEC for execution by the County and the Contractor. The Change Order shall set forth the basis for any change in Contract Price, as hereinafter set forth in Section 6.03, Extra Work, and for any change in contract time which may result from the change.

In the event the Contractor shall refuse to execute a Change Order which has been prepared by the GEC and executed by the County, the GEC may, in writing, instruct the Contractor to proceed with the Work as set forth in the Change Order and the Contractor shall thereafter proceed with such work. The Contractor may make claim against the County for Extra Work involved under the Change Order, as hereinafter provided.

6.02 Minor Changes

The Observer may authorize minor changes in the Work which are not inconsistent with the overall intent of the Contract Documents and which do not involve an increase in Contract Price. If the Contractor believes that any minor change or alteration authorized by the Observer involves Extra Work which entitles it to an increase in the Contract Price, the Contractor shall make written request to the Observer for a written Field Order. For purposes of this section, a "Field Order" shall mean the Contractor's cost proposal for the Extra Work that the Contractor believes would increase the Contract Price.

In such case, the Contractor, by copy of its communication to the Observer or by separate writing, shall advise the County of its request to the Observer for a written Field Order. The Contractor's notice to the County shall inform the County that the work subject of the written Field Order may result in an increase in the Contract Price.

Any request by the Contractor for a change in Contract Price shall be made prior to commencing the work covered by the proposed change.

6.03 Extra Work

It is agreed that the basis of compensation to the Contractor for work either added or deleted by a change order or for which a claim for Extra Work is made shall be determined by the unit prices upon which the Work and Project was bid to the extent such work can be fairly classified within the various work item descriptions. For work that cannot be fairly classified within the said various work item descriptions, the basis of compensation to the Contractor

for work either added or deleted by a change order or for which a claim for Extra Work is made shall be determined by one or more of the following methods:

Method (A)
By agreed unit prices; or

Method (B)
By agreed lump sum; or

Method (C)
If neither Method (A) nor Method (B) is agreed upon before the Extra Work is commenced, then the Contractor shall be paid the "actual field cost" of the Work, plus fifteen percent (15%).

In the event said Extra Work is performed and paid for under Method (C), then the provisions of this paragraph shall apply and the "actual field cost" is hereby defined to include the cost to the Contractor of all workmen, such as foremen, timekeepers, mechanics and laborers, and materials, supplies, trucks, rentals on machinery and equipment, for the time actually employed or used on such Extra Work, plus actual equipment, for the time actually employed or used on such Extra Work, plus actual transportation charges necessarily incurred, together with all power, fuel, lubricants, water and similar operating expenses, also all necessary incidental expenses incurred directly on account of such Extra Work, including Social Security, Old Age Benefits and other payroll taxes, and a rateable proportion of premiums on performance and payment bonds and maintenance bonds, public liability and property damage and workers' compensation, and all other insurance as may be required by any law or ordinance, or directed or agreed to by the County. The Observer may direct the form in which accounts of the "actual field cost" shall be kept and the records of these accounts shall be made available to the Observer. The Observer or the County may also specify, in writing before the Extra Work commences, the method of doing the Extra Work and the type and kind of machinery and equipment to be used; otherwise these matters shall be determined by the Contractor. Unless otherwise agreed upon, the prices for the use of machinery and equipment shall be determined by using one hundred percent (100%), unless otherwise specified, of the latest schedule of Equipment ownership Expense adopted by the Associated General Contractors of America. Where practicable the terms and prices for the use of machinery and equipment shall be incorporated in the written Extra Work order. The fifteen percent (15%) of the "actual field cost" to be paid the Contractor shall cover and compensate Contractor for its profit, overhead, general superintendence and field office expense, and all other elements of cost and expense not embraced within the "actual field cost" as herein defined, save that where the Contractor's camp or field office must be maintained primarily on account of such Extra Work; then the cost to maintain and operate the same shall be included in the "actual field cost."

No claim for Extra Work of any kind will be allowed unless ordered, in writing, by the Observer. In case any orders or instructions, either oral or written, appear to the Contractor to involve Extra Work for which Contractor should receive compensation or an adjustment in

the construction time, Contractor shall make written request to the Observer for written order authorizing such Extra Work. Should a difference of opinion arise as to what does or does not constitute Extra Work, or as to the payment therefor, and the Observer insists upon its performance, the Contractor shall proceed with the Work after making written request for written order and shall keep an accurate account of the "actual field cost" thereof, as provided under Method (C).

6.04 Time of Filing Claims

The County and Contractor hereby agree and acknowledge that all questions of dispute or adjustment presented by the Contractor shall be in writing and filed with the Observer within thirty (30) days after the Observer has given any directions, order or instruction to which the Contractor desires to take exception. The Observer shall reply within thirty (30) days to such written exceptions by the Contractor and render the Observer's final decision in writing. In case the Contractor should appeal from the Observer's decision, the Contractor may file with the County its objection. It is further agreed that the acceptance by the Contractor of the Final Payment shall serve as a bar to any claims that the Contractor may have for matters arising prior to or after the Contractor's acceptance of the Final Payment.

6.05 Continuing Performance

The Contractor shall continue performance of the Work during all disputes or disagreements with the County. The production or delivery of goods, the furnishing of services and the construction of projects or facilities shall not be delayed, prejudiced or postponed pending resolution of any disputes or disagreements, except as the County may otherwise agree in writing.

7. Abandonment of Contract

7.01 Abandonment by Contractor

In case the Contractor should abandon and fail or refuse to resume work within ten (10) days after written notification from either the County or the Observer, or if the Contractor fails to comply with the orders of the Observer when such orders are consistent with the Contract Documents, then and in such case where performance bonds exist, the appropriate sureties on these bonds shall be provided with a notice of abandonment and notice for completion whereby (i) the sureties are notified of the Contractor's abandonment or Contractor's failure or refusal to resume work; and (ii) the sureties are directed to complete the Work. A copy of the notice of abandonment and notice for completion shall be delivered to the Contractor.

After receiving a copy of the above described notice of abandonment and notice for completion, the Contractor shall not remove from the Project any machinery, equipment, tools, materials or supplies that then currently exist on the Project site, but the same, together with any materials and equipment under contract for the Work, may be held for use on the Project by the County or the surety on the performance bond, or another contractor in completion of the Work; and the Contractor shall not receive any rental or credit therefor (except when used in connection with Extra Work, where credit shall be allowed as provided for under Section 6, Extra Work and Claims, herein), it being understood that the use of such

equipment and materials will ultimately reduce the cost to complete the Work and be reflected in the final settlement.

Where there is no performance bond provided or in case the surety should fail to commence compliance within ten (10) days after service of the herein above provided notice of abandonment and notice for completion, then the County may provide for completion of the Work in either of the following elective manners:

(1) The County may thereupon employ such force of men and use such machinery, equipment, tools, materials and supplies as the County may deem necessary to complete the Work and charge the expense of such labor, machinery, equipment, tools, materials and supplies to the Contractor, and expense so charged shall be deducted and paid by the County out of such monies as may be due, or that may thereafter at any time become due to the Contractor under and by virtue of the Contract Documents. In case such expense is less than the sum which would have been payable under the Contract Documents if the same had been completed by the Contractor, then the Contractor shall receive the difference. In case such expense is greater than the sum which would have been payable under the Contract Documents if the same had been completed by the Contractor, then the Contractor and/or its surety shall pay the amount of such excess to the County, or

(2) The County, under sealed bids, after five (5) days notice published one or more times in a newspaper having general circulation in the area of the location of the Project, may let a contract for the completion of the Work under substantially the same terms and conditions which are provided in the Contract Documents. In case there is any increase in cost to the County under the new contract as compared to what would have been the cost under the Contract Documents, such increase shall be charged to the Contractor and the surety shall be and remain bound therefor. However, should the cost to complete any such contract prove to be less than what would have been the cost to complete under the Contract Documents, the Contractor and/or its surety shall be credited therewith.

When the Work shall have reached Final Completion, the Contractor and its surety shall be so notified and Certificates of Completion and Acceptance, as provided in Section 5.06 herein above, shall be issued. A complete itemized statement of the contract accounts, certified by the Observer as being correct, shall then be prepared and delivered to the Contractor and its surety, whereupon the Contractor and/or its surety, or the County as the case may be, shall pay the balance due as reflected by said statement within fifteen (15) days after the date of such Certificate of Completion.

In the event the statement of accounts shows that the cost to complete the Work is less than that which would have been the cost to the County had the Work been completed by the Contractor under the terms of the Contract Documents, or when the Contractor and/or its surety shall pay the balance shown to be due by them to the County, then all machinery, equipment, tools, materials or supplies left on the site of the Project shall be turned over to the Contractor and/or its surety.

Should the cost to complete the Work exceed the exceed the amount the County would have been obligated to pay the Contractor had the Work been completed by the Contractor under the terms of the Contract Documents, and should the Contractor and/or its surety fail to pay the amount due the County within the time designated hereinabove, and should there remain any machinery, equipment, tools, materials or supplies on the site of the Project, notice thereof, together with an itemized list of such equipment and materials, shall be mailed to the Contractor and its surety at the respective addresses designated in the Contract Documents. After properly tendering such notice, such property shall be held at the risk of the Contractor and its surety subject only to the duty of the County to exercise ordinary care to protect such property. After fifteen (15) days from the date of said notice, the County may sell such machinery, equipment, tools, materials or supplies and apply the net sum derived from such sale to the credit of the Contractor and its surety. Such sale may be made at either public or private sale, with or without notice, as the County may elect. The County shall release, to their proper owners, any machinery, equipment, tools, materials, or supplies, which remain on the Project and which belong to persons other than the Contractor or its surety. The books on all operations provided herein shall be opened to the Contractor and its surety.

7.02 Abandonment by the County

In the event that the County should fail, within ten (10) days after receiving written notification from the Contractor, to comply with the terms of the Contract Documents, then the Contractor may suspend or wholly abandon the Work, and may remove therefrom all machinery, tools and equipment, and all materials on the Project site that have not been included in payments to the Contractor and have not been wrought into the Work. Thereupon, the Observer shall make an estimate of the total amount earned by the Contractor, which estimate shall include the value of all work actually completed by said Contractor (at the prices stated in the Contract Documents), the value of all partially completed work at a fair and equitable price, and the amount of all Extra Work performed at the prices agreed upon, or provided for by the terms of the Contract Documents. The Observer shall then make a final statement of the balance due the Contractor by deducting from the above estimate all previous payments by the County and all other sums that may be retained by the County under the terms of the Agreement and the Contract Documents and the Observer shall certify same to the County who shall pay to the Contractor on or before thirty (30) days after the date of the Observer's certification.

8. Subcontractors

8.01 Award of Subcontracts for Portions of the Work

Unless otherwise specified in the Contract Documents or in the Instructions to Bidders, the Contractor, as soon as practicable after the award of the contract, shall furnish to the Observer, in writing for acceptance by the County, a list of the names of the Subcontractors proposed for the principal portions of the Work. The Observer shall promptly notify the Contractor, in writing, if the County, after due investigation, has objection to any Subcontractor on such list and does not accept such Subcontractor.

The Contractor shall not contract with any Subcontractor or any person or organization (including those who are to furnish materials or equipment fabricated to a special design) proposed for portions of the Work designated in the Contract Documents or in the Instructions to Bidders or, if none is so designated, with any Subcontractor proposed for the principal portions of the Work who has been rejected by the County. The Contractor will not be required to contract with any Subcontractor or person or organization against whom the Contractor has a reasonable objection.

If the County refuses to accept any Subcontractor or person or organization on a list submitted by the Contractor in response to the requirements of the Contract Documents or the Instructions to Bidders, the Contractor shall submit an acceptable substitute and the Contract Price shall be increased or decreased by the difference in cost occasioned by such substitution and an appropriate change order shall be issued; however, no increase in the Contract Price shall be allowed for any such substitution unless the Contractor has acted promptly and responsively in submitting for acceptance any list or lists of names as required by the Contract Documents or the Instructions to Bidders.

If the County requires a change of any proposed Subcontractor or person or organization previously accepted by them, the Contract Price shall be increased or decreased by the difference in cost occasioned by such change and an appropriate change order shall be issued.

The Contractor shall not make any substitution for any Subcontractor or person or organization that has been accepted by the County, unless the substitution is acceptable to the County.

8.02 Subcontractual Relations

All work performed for the Contractor by a Subcontractor shall be pursuant to an appropriate written agreement between the Contractor and the Subcontractor (and where appropriate between Subcontractors and Sub-subcontractors) which shall contain provisions that:

(1) preserve and protect the rights of the County, the Observer, the GEC and the Engineer of Record under the contract with respect to the Work to be performed under the subcontract so that the subcontracting thereof will not prejudice such rights;
(2) require that such work be performed in accordance with the requirements of the Contract Documents;
(3) require submission to the Contractor of the applications for payment under each subcontract to which the Contractor is a party, in reasonable time to enable the Contractor to apply for payment in accordance with the Contract Documents;
(4) require that all claims for additional costs, extensions of time, damages for delays or otherwise with respect to subcontracted portions of the Work shall be submitted to the Contractor (via any Subcontractor or Sub-subcontractor where appropriate) in sufficient time so that the Contractor may comply in the manner provided in the Contract Documents for like claims by the Contractor upon the County;
(5) obligate each subcontractor specifically to consent to the provisions of this section.

A copy of all such signed subcontract agreements shall be filed by the Contractor with the Observer before the Subcontractor shall be allowed to commence work.

8.03 Payments to Subcontractors

The Contractor shall pay each Subcontractor, upon receipt of payment from the County, an amount directly based upon the value of the Work performed and allowed to the Contractor on account of such Subcontractor's work, less the percentage retained from payments to the Contractor. The Contractor shall also require each Subcontractor to make similar payments to its subcontractors.

If the Observer fails to approve a payment for any cause which is the fault of the Contractor and not the fault of a particular Subcontractor, the Contractor shall pay the Subcontractor, on demand made at any time after the Certificate for Payment should otherwise have been issued, for its work to the extent completed, less the retained percentage, if any.

The Observer may, on request and at its discretion, furnish to any Subcontractor, if practicable, information regarding percentages of completion certified to the Contractor on account of work done by such Subcontractors.

Neither the County, the Observer nor the Engineer shall have any obligation to pay or to see to the payment of any monies to such Subcontractor except as may otherwise be required.

9. Protection of Persons and Property

9.01 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work.

9.02 Safety of Persons and Property

The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury, or loss to:

(1) all employees on the Work and all other persons who may be affected thereby:
(2) all the Work and all materials and equipment to be incorporated therein, whether in storage or off the site, under the care, custody or control of the Contractor or any of its Subcontractors or Sub-subcontractors; and
(3) other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, fences, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

The Contractor shall comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. Contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety

and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.

When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

All blasting, including methods of storing and handling explosives and highly inflammable materials, shall conform to federal, state, local laws and ordinances.

The following is a list of requirements in addition to federal, state, and local laws and ordinances:

(1) The Contractor shall furnish the County with a Certificate of Blasting Insurance in the amount of $300,000.00 for each contract, at least twenty-four (24) hours prior to using explosives. A blasting permit must be obtained from the appropriate jurisdictions at least five (5) days prior to use of explosives. If blasting is covered under the Contractor's General Insurance Certificate for each contract, a separate blasting certificate will not be required.
(2) The following public utility companies and departments will be notified by the Contractor, on every occasion, at least twenty-four (24) hours prior to the use of explosives: Water and Wastewater, Electric, Gas, Telephone and the County Engineering Department.
(3) Explosive materials to be used shall be limited to blasting agents and dynamite, unless prior approval of other materials is obtained in writing from the Engineering Department.
(4) During blasting, all reasonable precautions shall be taken to protect pedestrians, passing vehicles, and public or private property. Blasting mats or protective cover shall be used when required by the Observer, the permit, or by safe blasting practices.
(5) All explosives shall be stored in accordance with all applicable laws and codes.
(6) The Engineer or its representative shall have the right to limit the use of explosives and/or blasting methods which in its opinion are dangerous to the public or nearby property of any kind.
(7) The Contractor, at its expense, shall promptly repair or replace all items known to be damaged as a result of blasting. All claims of damage shall be investigated by the County or by consulting firms approved by the County.
(8) The Contractor shall maintain accurate records throughout the blasting operations showing the type explosive used, number of holes, pounds per hole, depth of hole, total pounds per shot, delays used, date and time of blast and initials of the Observer. The Contractor is fully responsible for all claims resulting from its blasting operation.

All damage or loss to any property referred to in this article caused, in whole or in part, by the Contractor, any Subcontractor, any Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, shall be

remedied by the Contractor, except damage or loss attributable solely to faulty drawings or specifications or solely to the acts or omissions of the County its agents, employees, or representatives or anyone employed by either of them, and not attributable in any degree to the fault or negligence of the Contractor.

The Contractor shall designate a responsible member of its organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the County.

9.03 Location and Protection of Utilities

Notwithstanding any other provision of the Contract Documents, the Contractor shall be solely responsible for the location and protection of any and all public utility lines and utility customer service lines in the Project 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 shall provide such information as it has about the location and grade of water, sewer, gas, and telephone and electric lines and other utilities in 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 it shall cause such damage to be repaired at its expense.

10. Termination

10.01 Termination by the County for Cause

Conditions for termination are as follows:

(A) Without prejudice to any other legal or equitable right or remedy which it would otherwise possess hereunder or as a matter of law, the County shall be entitled, by giving Contractor five (5) days prior written notice, to terminate the Agreement in its entirety at any time:

(1) If the Contractor becomes insolvent, voluntarily files for bankruptcy, is the subject of an involuntary petition for bankruptcy commenced by its creditors, makes a general assignment for the benefit of creditors or becomes the subject of any other proceeding commenced under any statute or law for the relief of debtors; or

(2) If a receiver trustee or liquidator of any of the property or income of Contractor shall be appointed; or

(3) If Contractor:

(a) Shall fail to prosecute the Work or any part thereof with diligence necessary to insure its progress and completion as prescribed by the time schedules; and shall fail to take such steps to remedy such default within ten (10) days after written notice thereof from the County; or

(4) If Contractor:

(a) Shall commit a default under any of the terms, provisions, conditions, or covenants contained in the Contract Documents; and

(b) Shall fail to take such steps to remedy such default within ten (10) days after written notice thereof from the County.

(B) In the event of County's termination for cause, Contractor shall only be paid its reimbursable costs incurred prior to the effective date of the termination notice and shall not be entitled to receive any further fixed fee payments hereunder and shall be further subject to any claim the County may have against Contractor under other provisions of the Contract Documents or as a matter of law, including the refund of any overpayment of reimbursable costs and/or fixed fee.

(C) If the Agreement is terminated for cause, the County shall have the right, but shall not be obligated, to complete the Work itself or by others; and to this end, the County shall be entitled to take possession of and use such equipment and materials as may be on the Project site, and to exercise all rights, options, and privileges of Contractor under its subcontracts, purchase orders, or otherwise; and Contractor shall promptly assign such rights, options and privileges to the County. If the County elects to complete the Work itself or by others, pursuant to the foregoing, the Contractor will reimburse the County 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 work by Contractor which fails to meet contract requirements.

Nothing contained in the preceding sections shall require the County to pay for any of the Work which is unsatisfactory, as determined by the Observer or which is not submitted in compliance with the terms of the Contract Documents. The County shall not be required to make any payments to Contractor when Contractor is in default under the Contract Documents.

This Article shall not constitute a waiver of any right, at law or at equity, which the County may have if Contractor is in default, including the right to bring legal action for damages or to force specific performance of the terms and conditions of the Contract Documents.

10.02 Termination for Convenience

In connection with the Work outlined in the Contract Documents, it is agreed and fully understood by Contractor, that the County may cancel or indefinitely suspend further work hereunder or terminate the Agreement for the convenience of the County, upon fifteen (15) days written notice to Contractor. In the event the County terminates the Agreement for convenience, it is hereby understood and acknowledged by the Contractor that immediately upon receipt of the County's notice of termination, all work and labor being performed under the Contract Documents shall cease. Contractor shall invoice the County for all work satisfactorily completed and shall be compensated in accordance with the terms of the Contractor Documents for work accomplished prior to the receipt of said notice. No amount shall be due for lost or anticipated profits. However, no cost incurred after the effective date of the notice of termination shall be treated as reimbursable costs unless it relates to carrying out the un-terminated portion or taking closeout measures.

10.03 Obligations of Contractor Following Termination

After receipt of a notice of termination, whether such termination be for cause or convenience, Contractor shall, in good faith and to the best of its ability, do all things necessary to assure the efficient proper closeout of the terminated work (including the protection of County property). Among other things, the Contractor shall, except as otherwise directed or approved by the County:

(1) Stop the Work on the date and to the extent specified in the notice of termination.
(2) Place no further orders for subcontracts for services, equipment or materials, except as may be necessary for completion of such portion of the Work as is not terminated.
(3) Terminate all orders and subcontracts to the extent that they relate to the performance of the Work terminated by the notice of termination.
(4) Assign to the County, in the manner and to the extent directed by it, all right title, and interest of Contractor under the orders or subcontracts so terminated; in which case, the County shall have the right to settle or pay any or all claims arising out of such termination of such orders and/or subcontracts.
(5) With the approval of the County, settle all outstanding liabilities and all claims arising out of such termination or orders and subcontracts.
(6) Deliver to the County, all documents, property, plans, field surveys, maps, cross sections and other data, designs and work related to the Project, which shall become the property of the County upon termination. The delivery of such items shall be made in a reasonably organized form, without restriction on future use. Should the County subsequently contract with a new contractor for continuation of services on the Project subject of the Contract Documents, Contractor shall cooperate in providing information to the County and the new contractor.

11. Inspection and Audit

Contractor's records shall be subject to audit and such records shall include, but not be limited to accounting records, written policies and procedures; subcontract files (including proposals of successful and unsuccessful bidders, bid recaps, etc.); original estimates; estimating work sheets; correspondence; change order files (including documentation covering negotiated settlements); back charge logs and supporting documentation; general ledger entries detailing cash and trade discounts earned, insurance rebates and dividends; and any other Contractor records which may have a bearing on matters of interest to the County in connection with the contractor's work for the County. All of the foregoing, hereinafter referred to as "records," shall be open to inspection and subject to audit and/or reproduction by County or its authorized representative to the extent necessary to adequately permit evaluation and verification of:

(a) Contractor compliance with the Contract Documents,
(b) compliance with County's business ethics policies,
(c) compliance by other contractors or subcontractors with contracts with County or Contractor, and
(d) compliance with provisions for pricing change orders, invoices or claims submitted by the Contractor or any of its payees.

Other specific records subject to audit include all information, materials and data of every kind and character such as documents, subscriptions, recordings, computerized information, agreements, purchase orders, leases, contracts, commitments, arrangements, notes, daily diaries, superintendent reports, drawings, receipts, vouchers and memoranda, and any and all other agreements, sources of information that may, in County's judgment, have any bearing on or pertain to any matters, rights, duties or obligations under or covered by the Contract Documents. Such records subject to audit shall also include those records necessary to evaluate and verify direct and indirect costs, (including overhead allocations) as they may apply to costs associated with this Project. In those situations where Contractor's records have been generated from computerized data (whether mainframe, mini-computer, or PC based computer systems), Contractor agrees to provide County's representatives with extracts of data files in computer readable format on data disks or suitable alternative computer data exchange formats.

The County or its designee shall be entitled to audit all of the Contractor's records for a period of three (3) years after final payment or a longer period if required by law.

Contractor shall require all payees (including those entering into lump sum subcontracts and lump sum major material purchase orders), to comply with the provisions of this article by insertion of the requirements hereof in a written contract agreement between Contractor and payee. Requirements to include flow-down audit provisions in contracts with payees will apply to Subcontractors, Sub-Subcontractors, material suppliers, etc. when working under any type of contract including lump sum agreement, unit price agreements, time and material agreements, cost plus agreements, or other agreements. Contractor will cooperate fully and will cause all payees to cooperate fully in furnishing or in making available to County from time to time whenever requested in an expeditious manner any and all such information, materials and data required by this section.

County's agent or its authorized representative shall have access to the Contractor's facilities, shall be allowed to interview all current or former employees to discuss matters pertinent to the performance of the Work, shall have access to all necessary records, and shall be provided adequate and appropriate work space, in order to conduct audits in compliance with this section.

SECTION 12
SPECIAL CONDITIONS OF AGREEMENT

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SPECIAL CONDITIONS

I. County

Williamson County, a political subdivision of the State of Texas, acting through its County Judge, or his designee, agents or employees, whom Contractor has entered into the Agreement and for whom the Work is to be performed, is referred to as "County". The County shall be contacted through its Purchasing Department for contract related subjects and through the County Engineer's office for design and construction related subjects:

Purchasing Department	County Engineer
Williamson County	Williamson County
901 South Austin Avenue	3151 SE Inner Loop
Georgetown, TX 78626	Georgetown, TX 78626

II. Program Manager

Prime Strategies, Inc. is the County's Program Manager for the Project. The Program Manager represents the County and oversees the planning, design, review, and coordination of the design and construction phases of the Project.

III. General Engineering Consultant (GEC)

HNTB Corporation is the consulting engineering firm representing and assisting the County in the design, review, and coordination of the design and construction phases of the project, including oversight of the construction engineering and inspection services performed on the Project.

IV. The Construction Observer

Williamson County or Representative is the "Construction Observer" referred to herein and in the Contract Documents. The Construction Observer will be responsible for performing construction observation services on the Project.

V. Engineer of Record

Stantec Consulting Services Inc. is the County's design professional, who shall provide professional engineering services as defined in the Texas Government Code Chapter 2254, Subchapter A, and referred to as the " Engineer of Record" in the "General Conditions of Agreement" contained in the Contract Documents. Nothing contained in the Contract Documents shall create any contractual or agency relationship between the Engineer of Record and the Contractor.

VI. Insurance

The Contractor will carry Workmen's Compensation Insurance, Public Liability and Property Damage Insurance, and Automobile Insurance sufficient to provide adequate protection against damage claims which may arise from operations under the Contract Documents, in compliance with the following:

Contractors Insurance: Without limiting any of the other obligations or liabilities of the Contractor, during the term of the Agreement and prior to Final Completion, the Contractor and each subcontractor, at their own expense, shall purchase and maintain the herein stipulated minimum insurance with companies duly approved to do business in the State of Texas and satisfactory to the County. Certificates of each policy shall be delivered to the County before any work is started, along with a written statement from the issuing company stating that said policy shall not be canceled, non-renewed or materially changed without 30 days advance written notice being given to the County. Prior to the effective date of cancellation, Contractor must deliver to the County a replacement certificate of insurance or proof of reinstatement. A model Certificate of Insurance is illustrated herein. Coverage shall be of the following types and not less than the specified amounts:

(a) workers' compensation as required by Texas law, with the policy endorsed to provide a waiver of subrogation as to the County; employer's liability insurance of not less than $500,000 for each accident, $500,000 disease--each employee, $500,000 disease-policy limit.

(b) commercial general liability insurance, including independent contractor's liability, completed operations and contractual liability covering, but not limited to, the liability assumed under the indemnification provisions of the Contract Documents, fully insuring Contractor's (or subcontractor's) liability for injury to or death of County's employees and third parties, extended to include personal injury liability coverage with damage to property of third parties, with minimum limits as set forth below:

General Aggregate	$1,000,000
Operations Aggregate	$1,000,000
Personal and Advertising Injury	$600,000
Each Occurrence	$600,000
Fire Damage (any one fire)	$50,000
Medical Expense (any one person)	$5,000

The policy shall include coverage extended to apply to completed operations, asbestos hazards (if this project involves work with asbestos) and XCU (explosion, collapse and underground) hazards. The completed operations coverage must be maintained for a minimum of one year after Final Completion and acceptance of the Work, with evidence of same filed with County.

(c) comprehensive automobile and truck liability insurance, covering owned, hired and non-owned vehicles, with a combined bodily injury and property damage minimum limit of $600,000 per occurrence; or separate limits of $250,000 for bodily injury (per person), $500,000 bodily injury (per accident) and $100,000 for property damage. Such insurance shall include coverage for loading and unloading hazards.

"Umbrella" Liability Insurance: The Contractor shall obtain, pay for and maintain umbrella liability insurance during the contract term, insuring Contractor for an amount of not less than $1,000,000 per occurrence combined limit for bodily injury and property damage that follows form and applies in excess of the primary liability coverages required herein above. The policy shall provide "drop down" coverage where underlying primary insurance coverage limits are insufficient or exhausted. County and Project Engineer shall be named as additional insured.

Policy Endorsements and Special Conditions

(a) Each insurance policy to be furnished by Contractor shall include the following conditions by endorsement to the policy:

(1) name the County, the Program Manager, the County's Representatives, the GEC, the Construction Observer and the Engineer of Record as an additional insured as to all applicable coverage;
(2) each policy shall require that 30 days prior to the cancellation, non-renewal or any material change in coverage, a notice thereof shall be given to County by certified mail.
(3) the term "County" shall include all authorities, boards, bureaus, commissions, divisions, departments and offices of the County and individual members, employees and agents thereof in their official capacities, and/or while acting on behalf of the County;
(4) the "Program Manager" represents and assists the County in the planning, design, review, and coordination of the design and construction phases of the project.
(5) the policy phrase "other insurance" shall not apply to the County where the County is an additional insured on the policy; and
(6) all provisions of the Contract Documents concerning liability, duty and standard of care together with the indemnification provision, shall be underwritten by contractual liability coverage sufficient to include such obligations within applicable policies.

(b) Insurance furnished by the Contractor shall also be in accordance with the following requirements:
(1) any policy submitted shall not be subject to limitations, conditions or restrictions deemed inconsistent with the intent of the insurance requirements to be fulfilled by Contractor. The County's decision thereon shall be final;
(2) all policies are to be written through companies duly licensed to transact that class of insurance in the State of Texas; and
(3) all liability policies required herein shall be written with an "occurrence" basis coverage trigger.

(c) Contractor agrees to the following:
(1) Contractor hereby waives subrogation rights for loss or damage to the extent same are covered by insurance. Insurers shall have no right of recovery or subrogation against the County, it being the intention that the insurance policies shall protect all

parties to the Agreement and be primary coverage for all losses covered by the policies;

(2) companies issuing the insurance policies and Contractor shall have no recourse against the County for payment of any premiums or assessments for any deductibles, as all such premiums and deductibles are the sole responsibility and risk of the Contractor;

(3) approval, disapproval or failure to act by the County regarding any insurance supplied by the Contractor (or any subcontractors) shall not relieve the Contractor of full responsibility or liability for damages and accidents as set forth in the contract documents. Neither shall the bankruptcy, insolvency or denial of liability by the insurance company exonerate the Contractor from liability; and

(4) no special payments shall be made for any insurance that the Contractor and subcontractors are required to carry; all are included in the contract price and the contract unit prices.

Any of such insurance policies required under the Contract Documents may be written in combination with any of the others, where legally permitted, but none of the specified limits may be lowered thereby.

The Contractor shall furnish the County with satisfactory proof that it has provided adequate insurance coverage in amounts and by approved carriers as required by the Contract Documents.

VII. Record ("As-Built") Drawings

The Contractor shall mark all changes and revisions on all of its copies of the working drawings during the course of the Project as they occur. Upon completion of the Project and prior to Final Acceptance and Payment, the Contractor shall submit to the Construction Observer one set of its working drawings, dated and signed by the Contractor and its project superintendent and labeled as "As-Built", that shows all changes and revisions outlined above and that shows field locations of all above ground appurtenances including, but not limited to valves, fire hydrants and manholes. These as-built drawings shall be forwarded to the GEC and then to the County and become the property of the County. Each appurtenance shall be located by at least two (2) horizontal distances measured from existing, easily identifiable, immovable appurtenances such as fire hydrants or valves. Property pins can be used for as-builts tie-ins provided no existing utilities as previously described are available. Costs for delivering as-built drawings shall be subsidiary to other bid items.

VIII. Limit of Financial Resources

The County has a limited amount of financial resources committed to this Project; therefore, it shall be understood by Contractor that the County may be required to change and/or delete any items which it may feel is necessary to accomplish all or part of the scope of work within its limit of financial resources. Contractor shall be entitled to no claim for damages or anticipated profits on any portion of work that may be omitted. At any time during the duration of the Project, the County reserves the right to omit any

work from the Contract Documents. Unit prices for all items previously approved in the Contract Documents shall be used to delete or add work per change order.

IX. Limits of Work and Payment

It shall be the obligation of the Contractor to complete all work included in the Contract Documents, so authorized by the County, as described in the Contract Documents and Technical Specifications. Any question arising as to the limits of work shall be left up to the interpretation of the Engineer and/or Observer.

X. State Sales Tax

On a contract awarded by a governmental entity for the construction of a publicly-owned improvement in a street right-of-way or other easement which has been dedicated to the public and to the an Organization which qualifies for exemption pursuant to the provisions of Article 20.04 (F) of the Texas Limited Sales, Excise and Use Tax Act, the Contractor can probably be exempted in the following manner:

> The Contractor may buy tax-free any materials incorporated into the project by issuing a resale certificate in lieu of paying the sales tax at the time of purchase. The Contractor may then accept an exemption certificate from the City for the materials.

Even with a separated contract, the rental of equipment and the purchase of items which do not ultimately become part of the physical structure will still be subject to state and local sales taxes.

XI. Completion of Work on Time

The Contractor agrees that time is of the essence and that the definite value of damages which would result from delay would be incapable of ascertainment and uncertain, so that for each day of delay beyond the number of days herein agreed upon for the Substantial Completion of the Work specified in the Contract Documents and contracted for, after due allowance for such extension of time as is provided for under the provisions of Section 4.02 of the General Conditions, the County may withhold permanently from the Contractor's total compensation, not as penalty but as liquidated damages, the sum as specified in Special Specification 000-001 per calendar day.

Furthermore, it is agreed by the Contractor that the time period between Substantial Completion and Final Completion shall be no longer than **30** calendar days. This separate time period shall be for completion of the Punch List, as set forth in Section 5.06 of the General Conditions, Final Completion and Acceptance. In the event that Contractor fails to attain Final Completion on or before the expiration of the above said time period, the Contractor shall be subject to the remedies set forth in the Contract Documents. More specifically, the Contractor shall be subject to the terms set forth under Section 7.01 of the General Conditions, Abandonment by the Contractor. In addition to exercising its rights and remedies under the Contract Documents, the County may also exercise any remedy that may be available to it under the law or in equity.

XII. Layout and Construction Stakes

All construction staking shall be performed by the Contractor at the Contractor's expense.

XIII. Safety

The Contractor must use methods of construction that meet or exceed Occupational Safety and Health Administration Standards and any other local, state or federal regulations for safety that are in effect. The Contractor will have a trench safety plan prepared and sealed by Contractor's registered professional engineer.

XIV. Maintenance Bond Term & Amount

The required Maintenance Bond amount for this Project shall be twenty percent (20%) of the total amount bid and the bond period shall be two years from date of acceptance of completion, as noted on the Certificate of Completion.

XV. Safety Restrictions - Work Near High Voltage Lines

The following procedures shall be followed for work near high voltage lines on the Project.

(a) A warning sign not less than five (5) inches by seven (7) inches, painted yellow with black letters that are legible at twelve (12) feet shall be placed inside and outside vehicles such as cranes, derricks, power shovels, drilling rigs, pile drivers, hoisting equipment or similar apparatus. The warning sign shall read as follows: "Warning-Unlawful to Operate This Equipment Within Six Feet of High Voltage Lines".

(b) Equipment that may be operated with ten (10) feet of high voltage lines shall have an insulating cage guard around the boom or arm (except backhoes or dippers), and insulator links on the lift hook connections.

(c) When necessary to work within six (6) feet of high voltage electrical lines, notify the power company. The electric company will erect temporary mechanical barriers, de-energize the line, or raise or lower the line. All such work done by the power company shall be at the expense of the contractor. The contractor shall maintain an accurate log of all such calls to the electric company.

(d) No person shall work within six (6) feet of high voltage lines without protection measures having been taken as outlined in Paragraph C.

XVI. Erosion Control

Contractor shall comply with all laws prohibiting the pollution of any lake, stream, river, or wetland by the dumping of any refuse, rubbish, dredge material, or debris therein.

The Contractor will file the Notice of Intent (NOI) and the Notice of Termination (NOT) as the Project's operator. All required Permits and Notices shall be posted by the Contractor at the Project site.

Contractor shall apply temporary and/or permanent erosion and sedimentation controls, as specified in the plans or directed to disturbed roadside areas, fifteen feet and beyond from road pavement, prior to initiating road base operations. Following asphalt paving of road pavement, apply temporary and/or permanent erosion and sedimentation controls to remaining disturbed areas, as specified in the plans or as directed.

Contractor shall be responsible for the maintenance of all temporary and permanent water quality and erosion control measures proposed under the Storm Water Pollution Prevention Plan (SWPPP) or the Water Pollution Abatement Plan (WPAP) for the duration of the Project construction. Upon completion of construction and before the Construction Observer issues the Certificate of Completion, Contractor shall be responsible for the removal of all temporary measures and the cleaning and resetting of all permanent measures. All costs associated with this work shall be considered subsidiary to other bid items and no additional compensation shall be allowed.

Contractor shall take special precautions during all periods of heavy rainfall and at all locations where storm water, groundwater and/or mud and debris may enter the sewer systems. All mud, stones, and debris that enter the sewer systems due to Contractor's operations, or Contractor's neglect, shall be cleaned from the system by Contractor. It shall be Contractor's responsibility to see that such storm water, groundwater and debris do not enter the sewer system. All costs for such work shall be merged in the unit prices bid and no additional compensation shall be allowed.

If it is necessary in the prosecution of the Work to interrupt existing surface drainage, sewers, or under drainage, temporary drainage shall be provided until permanent drainage work is completed. The construction of all temporary drainage installations shall be considered as incidental to the construction of the Work. Drainage ways shall be kept clear or other satisfactory provisions made for drainage.

Contractor shall be responsible for and shall take all reasonable and necessary precautions to preserve and protect all existing tile drains, sewers, and other subsurface drains, or parts thereof, which may be continued in service without

change. Contractor shall repair, at its own expense, any and all damage to such facilities resulting from negligence or carelessness on the part of its operations.

The Construction Observer shall be responsible for the monitoring and inspection of the erosion control measures by completion of the Construction Pollution Prevention Plan Inspection and Maintenance Report, as required for coverage under the Texas Pollutant Discharge Elimination System (TPDES) General Construction Permit (TXR150000).

XVII. Discovery of Hazardous Materials

If, during the course of the Work, the existence of hazardous material, including asbestos containing material, is observed in the work area, the Contractor shall immediately notify the County in writing. The Contractor shall not perform any work pertinent to the hazardous material prior to receipt of special instructions from the County. Asbestos containing material includes transit pipe.

XVIII. Submittals – Certificate of Compliance

The Contractor shall submit to the Construction Observer a Certificate of Compliance from the manufacturer and/or supplier of each and every specified material or manufactured equipment item. The said certificate shall state that the material or the item of equipment to be furnished has been manufactured with materials in accordance with the applicable sections of all required codes, specifications, and standards as required by the specifications.

XIX. Unavailability of Materials

If the Contractor is unable to furnish or use any of the materials or equipment specified because of any order by a governmental agency limiting the manufacture or use, or because of the supply situation in the general market for such material or equipment, the Contractor shall offer substitutes therefor. The substitutes shall be suitable for the purpose, considering the factors of quality, serviceability, appearance, and maintenance. No substitute shall be used until the Engineer has approved it.

No consideration will be given to the use of substitutes on account of market conditions unless the Contractor demonstrates that, for the item in question, the Contractor placed its order without delay, that it has shown due diligence in attempting to locate the item as specified, and that the unavailability is due to market conditions in general throughout the particular industry.

If substitutes are used in the Work, the compensation to be paid to the Contractor shall be subject to review and adjustment. As a general principle, if the Engineer shall determine that the substitute will be less satisfactory, the Contractor shall allow a credit to the County; only under unusual circumstances shall there be an increase in compensation to the Contractor on account of substitution. The basis upon which the amount of price and adjustments will be founded shall be the cost of the appropriate items at the time the bids for the Project were opened.

XX. Traffic Control

Access shall be provided for residents and emergency vehicles at all times. When it becomes necessary to restrict access, the Contractor shall notify all applicable agencies (i.e. Fire Department, E.M.S., Public Works, etc.) a minimum of five (5) working days in advance of the proposed restrictions. At the end of each day, two lanes of traffic shall be opened to the public, unless otherwise stated in the Contract Documents.

XXI. Temporary Traffic Handling Devices

The Contractor shall furnish, erect and maintain all necessary barricades, lights, warning signs and temporary pavement markings as shown on the Plans and/or in accordance with the Texas Manual on Uniform Traffic Control Devices and with the Specifications in the Contract Documents. In addition, the Contractor shall provide flag-persons and take necessary precautionary measures for the protection of persons, property and the Work, when deemed necessary by the County or the Construction Observer.

The Construction Observer shall be responsible for the monitoring and inspection of the traffic control measures by completion of the Traffic Control Devices Inspection Report (TCDIR), and the Contractor shall be responsible for compliance with the terms of the TCDIR procedures.

XXII. Roadway Signs

All permanent and temporary roadway signage designated in the Contract Documents shall be in accordance with the Texas Manual on Uniform Traffic Control Devices.

XXIII. Project Signs

The Contractor shall erect at the site of construction, and maintain during construction, signs satisfactory to the County identifying the Project and indicating that the government is participating in the development of the Project. The project signs must be temporary signs, mounted in such a way that they can be moved and do not pose a safety issue. Two project signs will be required for the Project. The two said signs shall be 8' X 4' and made out of white 10 mm corrugated plastic with pressure sensitive vinyl lettering or approved equivalent to include: Road Bond Program, Your County Tax Dollars at Work!, with the Williamson County Seal, the Project’s name, and a brief description relating to the estimated date of completion, website address and the appropriate Williamson County Commissioner's name and precinct number. Furnishing, installing and maintaining these signs shall be considered subsidiary to Item 502, “Barricades, Signs and Traffic Handling”. The Contractor may use any manufacturer; however, the manufacturer must meet Williamson County standards.

XXIV. Permits

The Contractor shall be responsible for obtaining any and all required construction permits. Contractor agrees to comply with all conditions of the

permits and to maintain copies of the permits at the site at all times while the Work is in progress. The County shall be responsible for obtaining Section 404 permits from the U.S. Army Corps of Engineers as part of the Project design. When Contractor-initiated changes in the construction method changes the impacts to waters of the U.S., Contractor shall be responsible for obtaining new or revised Section 404 permits.

XXV. Landscape Restoration

If not designated as a specific pay item in bid package, the Contractor shall take the means necessary to protect all trees, shrubbery and sod. Protection, removal and replacement of existing landscaping will be in accordance with the Contract Documents.

XXVI. Existing Fencing

All fences encountered during construction within the right-of-way (ROW) shall be removed by the Contractor under "Preparing Right-of-Way." Permanent fencing, designating the ROW, will be provided by others, unless otherwise shown in the Contract Documents. The Contractor will be required to coordinate preparing ROW operations and fence removal and installations with the landowners as needed.

XXVII. Easements

Any easements, both temporary and permanent, required for the Project will be provided by the County as shown in the Contract Documents. Other easements required or desirable by the Contractor shall be arranged by the Contractor at its sole expense. The easements shall be cleaned after use and restored to their original conditions, or better by the Contractor. In the event additional work is required by the Contractor, it shall be the Contractor's responsibility to obtain written permission from the property owners involved for the use of additional property required. No additional payment will be allowed for this item.

XXVIII. Limits of Contractor's Operation

The Contractor shall limit construction operations to within the ROW or the easement unless otherwise directed by the County or its authorized representative.

XXIX. Maintenance of Pedestrian Walkways

The Contractor will be required to maintain clear walkways for pedestrians during construction in a manner to provide access in the most convenient and safest manner consistent with essential construction operations. Specifically, the following will be enforced.

Pedestrian traffic may be blocked at a location where work is actually in progress. Signs, barricades, and warning devices must be placed at nearest crosswalks approaching the construction site from every direction advising pedestrians of the blockage and advising them to use alternate routes.

Access to doorways and pedestrian entrances must be maintained at all times during hours that access is needed by business. Paving by sections or providing temporary access may be required.

No more than one corner of any intersection may be under construction at any one time. Work must be completed and opened for use by pedestrians before starting work on any other corner of an intersection.

The Contractor will be expected to diligently pursue construction from start to completion at every location to avoid prolonged and unnecessary disruptions to pedestrian traffic.

This work shall be considered incidental and not a separate pay item, unless provided otherwise in the Contract Documents.

XXX. Spoil

All excavated material unfit for backfill, waste material accumulated on the job, and any material surplus to that needed in the prosecution of the Work shall be removed from the site by the Contractor and properly and legally disposed of at its expense, unless otherwise directed by the Observer. **THE CONTRACTOR SHALL INDEMNIFY AND SAVE HARMLESS THE COUNTY, ALL OF ITS OFFICERS, AGENTS, AND EMPLOYEES FROM ALL SUITS, ACTIONS, OR CLAIMS OF ANY CHARACTER RESULTING FROM ITS ARRANGEMENTS FOR THE DISPOSAL OF SPOIL.** This shall be incidental and not a separate pay item.

XXXI. Materials Testing

Quality Control testing of all materials, construction items or products incorporated in the work shall be performed by the Contractor at the Contractor's expense, and shall be performed in accordance with the Quality Control (QC) / Quality Assurance (QA) program outlined in Appendix A.

Quality Assurance sampling and testing for acceptance may be required for quality assurance of used materials as directed by the Construction Observer or the County. The cost of such tests will be incurred by the County and coordinated by the Construction Observer through funds made available to the Construction Observer under his/her agreement with the County for the professional services related to construction engineering and inspection on the Project.

The Contractor shall furnish for review by the Construction Observer, not later than 10 days after receipt of notice to proceed, a Quality Control Plan consisting of plans, procedures, and organization necessary to produce an end product which complies with the contract documents. The Contractor will be allowed the latitude to develop standards of control subject to approval by the County. As a minimum, the plan shall include description of the type and frequency of

inspection staffing, materials handling and control, and testing deemed necessary to measure and control quality as specified by the contract documents.

XXXII. Pre-Construction Conference

Before the Project work order is issued, a pre-construction conference shall be held with representatives of the County and the Contractor. The Contractor shall plan to submit a schedule of operations at the pre-construction conference, unless otherwise notified. See Section XXXVI-Prosecution and Progress for additional construction schedule requirements.

XXXIII. Weight Tickets

The Contractor will be responsible for providing asphalt and aggregate tickets for quantity verifications on all asphaltic concrete used for the Project.

XXXIV. Confined Space Entry Program

It shall be the responsibility of the Contractor to implement and maintain a variable "Confined Space Entry Program" which must meet OSHA requirements for all its employees and subcontractors at all times during construction. OSHA defines all active sewer manholes, regardless of depth, as "permit required confined spaces". Contractors shall submit an acceptable "Confined Space Entry Program" for all applicable manholes and maintain an active file for these manholes. The cost of complying with this program shall be subsidiary to the pay items involving work in confined spaces.

XXXV. Tree and Plant Protection

Scope: Provide complete protection and maintenance of existing trees, shrubs, and grass areas designated to remain within construction limits and/or right-of-way.

Coordination: Coordinate protection of existing trees, shrubs and grass areas with other trades so as to prevent damage to these items.

Payment for Damages: If existing trees, shrubs or grass areas are destroyed, killed or badly damaged as a result of construction observations, Contract sum will be reduced by the amount of assessed damages. Damages will be evaluated by the Construction Observer, using the following:

Trees: International Shade Tree Conference Standards and following formula – measurement of a cross section of tree trunk will be made at a point 2 feet above existing grade level to determine cross section area in square inches. Assessment for damage will be $27.00 per square inch.

Shrubs and Grass Areas: An initial fine of $1,000 shall be imposed for any unauthorized disturbance within the boundaries of the shrub and grass areas to remain within the right-of-way and outside the limits of disturbance. This

disturbance includes but is not limited to: parking or intrusion of equipment or vehicles; storage of any materials, and any unauthorized damage and/or removal of vegetation. In addition to the initial fine, a base fine of $8.00 for every square foot of area of damaged vegetation within any areas designated to remain on the plans shall be imposed. The areas covered under this section include but are not limited to: areas designated to remain or no-work areas. In determining the amount of fine, the Construction Observer shall consider the degree and extent of harm caused by the violation, the cost of rectifying the damage, and whether the violation was committed willfully.

Materials: Tree Protection lumber dimensions shall be 4X4 and 2X4 sizes.

Protection: The Contractor shall protect existing trees, shrubs, and grass areas within construction limits from the following damage:

(1) Compaction of root area by equipment, vehicles or material storage;
(2) Trunk damage by moving equipment material storage, nailing or bolting;
(3) Strangling by tying ropes or guy wires to trunks or large branches;
(4) Poisoning by pouring solvents, gas, paint or other chemicals on or around trees and roots;
(5) Cutting of roots by excavating or ditching;
(6) Damage of branches by improper pruning;
(7) Drought from failure to water or by cutting or changing normal drainage pattern past roots;
(8) Changes of soil pH factor by disposal of lime base materials such as concrete or plaster;
(9) Do not cut roots 1-1/2” in diameter or over. Excavation and earthwork within drip line of trees shall be done by hand.

Install barricade protection around trees and shrubs, constructed of 4X4 posts and 2X4 stringers top and bottom. Install protection prior to demolition or excavation operations. Leave protection until construction operations are essentially complete.

Maintenance:

(1) Water trees and shrubs within construction limits as required to maintain their health during course of construction operations.
(2) Pruning will be performed by County.

XXXVI. Prosecution and Progress

At the pre-construction meeting, the Contractor shall submit for acceptance a schedule of all planned work activities and sequences that is intended to be followed in order to both substantially and fully complete the Work within the

allotted time periods (the "Project Schedule"). The purpose of the County requiring the Project Schedule shall be to:

(1) Ensure adequate planning during the prosecution and progress of the work in accordance with the allowable number of working/ calendar days and all milestones;
(2) Assure coordination of the efforts of the Contractor, County, Program Manager, Construction Observer, utilities and others that may be involved in the Project;
(3) Assist the Contractor, County, Program Manager and Construction Observer in monitoring the progress of the Work and evaluating proposed changes to the Contract Documents; and
(4) Assist the County, Program Manager and Construction Observer in administering the time requirements set forth in the Contract Documents.

A Type B Schedule will be required on all projects. Following is the schedule requirements:

Type B Schedule:

The Contractor shall create and maintain a Critical Path Method (CPM) Project Schedule showing the manner of prosecution of work that it intends to follow in order to both substantially and fully complete the Work within the allotted time periods. The Project Schedule shall employ computerized CPM for the planning, scheduling and reporting of the work as described in this specification. The CPM Project Schedule shall be prepared using the Precedence Diagram Method (PDM). No direct compensation will be allowed for fulfilling these requirements, as such work is considered subsidiary to the various bid items of the Project.

(1) Personnel. The Contractor shall provide an individual, referred to hereinafter as the Scheduler, to create and maintain the CPM schedule. He or she shall be proficient in CPM analysis and shall be able to perform required tasks on the software. The Scheduler shall be made available for discussion or meetings when requested by the County, Construction Observer or Program Manager.

(2) Schedule. The Project Schedule shall show the sequence and interdependence of activities required for complete performance of the work. The Contractor shall be responsible for assuring all work sequences are logical and show a coordinated plan of the Work.

Each activity on the schedule shall be described by: An activity number utilizing an alphanumeric designation system tied to the traffic control

plans, and that is agreeable to the County, Program Manager, or Construction Observer; concise description of the Work represented by the activity; and activity durations in whole working days with a maximum of twenty (20) working days. Durations greater than twenty (20) working days may be used for non-construction activities (mobilization, submittal preparation, curing, etc.), and other activities mutually agreeable between the Contractor and County, Program Manager or Construction Observer. The Contractor shall provide a legend for all abbreviations. The activities shall be coded so that organized plots of the schedule may be produced. Typical activity coding includes: Traffic control phase, location and work type.

The activity durations shall be based on the quantity for the individual work activity divided by a production rate. An estimated production rate for each activity shall also be shown.

The Contractor shall plan and incorporate major resources into the schedule. Major resources are defined as crews and equipment that constrain the Contractor from pursuing available work. The resources shall accurately represent the Contractor's planned equipment and manpower to achieve the productivity rates specified above.

Seasonal weather conditions shall be considered and included in the CPM schedule for all work influenced by temperature and/or precipitation. Seasonal weather conditions shall be determined by an assessment of average historical climatic conditions. Average historical weather data is available through the National Oceanic and Atmospheric Administration (NOAA). These effects will be simulated through the use of work calendars for each major work type (i.e., earthwork, concrete paving, structures, asphalt, drainage, etc.) Project and work calendars should be updated each month to show days actually able to work on the various work activities.

“Total float” is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date, for each and every activity in the schedule. Float time in the schedule is a shared commodity between the County and the Contractor.

Only responsible delays in activities that affect milestone dates or the Project’s completion date, as determined by CPM analysis, will be considered for a time extension.

The schedule shall show the sequence and interdependence of activities required for complete performance of the work. The schedule shall be prepared and maintained in accordance with the scheduling requirements stated in this Section and shall include two (2) organized plots with the

activities logically grouped using the activity coding. The Contractor shall also provide an electronic copy of the schedule via e-mail.

The schedule shall encompass the time from the start of the Contract Time to the Project's Final Completion. The longest path through the schedule shall be readily discernable on the plot of the schedule.

(3) Joint Review, Revision and Acceptance. Within twenty (20) calendar days of receipt of the Contractor's proposed schedule, the County or its authorized agents shall evaluate the schedule for compliance with this specification, and notify the Contractor of the findings. If the County or its authorized personnel request a revision or justification, the Contractor shall provide a satisfactory revision or adequate justification to the satisfaction of the Construction Observer or County authorized personnel within seven (7) calendar days.

If the Contractor submits a CPM schedule for acceptance which is based on a sequence of work not in the Contract Documents, then the Contractor shall notify the County or its authorized entities in writing, separate from the schedule submittal.

The County's review and acceptance of the Contractor's Project Schedule is for conformance to the requirements of the Contract Documents only. Review and acceptance by the County or other authorized personnel of the Contractor's Project Schedule does not relieve the Contractor of any of its responsibility for the Project Schedule, or of the Contractor's ability to meet interim milestone dates (if specified) and the Final Completion date, nor does such review and acceptance expressly or by implication warrant, acknowledge or admit the reasonableness of the logic, durations, manpower or equipment loading of the Contractor's Project Schedule. In the event the Contractor fails to define any element of work, activity or logic and the County's review does not detect this omission or error, such omission or error, when discovered by the Contractor or County and its authorized personnel, shall be corrected by the Contractor at the next monthly schedule update and shall not affect the project completion date.

(4) Updates. The Project Schedule shall be updated on a monthly basis and shall be required as a basis for the pay application approval. The Project Schedule update shall be submitted with the pay application. The Contractor shall meet with the Construction Observer or County authorized personnel each month at a scheduled update meeting to review actual progress made through the data date of the schedule update. The review of progress will include dates activities actually started and/or completed, and the percentage of work completed or remaining duration on each activity started and/or completed. The percentage of work complete shall be calculated by utilizing the quantity and productivity rate

information. The Project Schedule update shall include one (1) copy of the following information:

a) Electronic copy of the updated schedule including revisions and changes via e-mail.
b) One (1) logically organized plot of the schedule update if requested by the County or its authorized personnel.

(5) Project Schedule Revisions. If the Contractor desires to make major changes in the Project Schedule, the Contractor shall notify the County or Construction Observer in writing. The written notification shall include the reason for the proposed revision, what the revision is comprised of, and how the revision was incorporated into the schedule. In addition to the written notification of the revision, the Contractor shall provide an electronic copy and one logically organized plot of the schedule including the revision if requested by the County or Construction Observer.

Major changes are hereby defined as those that may affect compliance with the requirements of the Contract Documents or those that change the critical path. All other changes may be accomplished through the monthly updating process.

(6) Time Impact Analysis. The Contractor shall notify the County or Construction Observer when an impact may justify an extension of Contract Time or adjustment of milestone dates. This notice shall be made in writing as soon as possible, but no later than the end of the next estimate period after the commencement of an impact or the notice for a change is given to the Contractor. Not providing notice to the County or Construction Observer by the end of the next estimate period will indicate the Contractor's approval of the time charges as shown on that time statement. Future consideration of that statement will not be permitted and the Contractor forfeits its right to subsequently request a time extension or time suspension unless the circumstances are such that the Contractor could not reasonably have knowledge of the impact by the end of the next estimate period.

When changes are initiated or impacts are experienced, the Contractor shall submit to the County or Construction Observer a written time impact analysis describing the influence of each change or impact.

A time impact analysis is an evaluation of the effects of changes in the construction sequence, contract, plans, or site conditions on the Contractor's plan for constructing the Project, as represented by the Project Schedule. The purpose of the time impact analysis is to determine if the overall Project has been delayed, and if necessary, to provide the Contractor and the County a

basis for making adjustments to the time allotted for Substantial Completion and Final Completion.

A time impact analysis shall consist of one or all of the steps listed below.

Step 1. Establish the status of the Project before the impact using the most recent Project Schedule update prior to the impact occurrence.

Step 2. Predict the effect of the impact on the most recent Project Schedule update prior to the impact occurrence. This requires estimating the duration of the impact and inserting the impact into the schedule update. The Contractor shall demonstrate how the impact was inserted into the schedule showing the added or modified activities and the added or modified relationships. Any other changes made to the schedule including modifications to the calendars or constraints shall be noted.

Step 3. Track the effects of the impact on the schedule during its occurrence. Note any changes in sequencing, and mitigation efforts.

Step 4. Compare the status of the Work prior to the impact (Step 1) to the prediction of the effect of the impact (Step 2), and to the status of the work during and after the effects of the impact are over (Step 3). Note that if an impact causes a lack of access to a portion of the Project, the effects of the impact may extend to include a reasonable period for remobilization.

The time impact analysis shall include an electronic copy of the complete schedule prepared in Step 2. If the Project Schedule is revised after the submittal of a time impact analysis but prior to its approval, the Contractor shall promptly indicate in writing to the County or Construction Observer the need for any modification to its time impact analysis.

Only one (1) copy of each time impact analysis shall be submitted within fourteen (14) calendar days after the completion of an impact. The County or Construction Observer may require Step 1 and Step 2 of the time impact analysis be submitted at the commencement of the impact, if needed to make a decision regarding the suspension of Contract Time.

Approval or rejection of each time impact analysis by the County, Construction Observer or Program Manager shall be made within fourteen (14) calendar days after receipt unless subsequent meetings and negotiations are necessary.

The time impact analysis shall be incorporated into and attached to any relevant change order(s) and/or supplemental agreement(s).

XXXVII. Sanitary Provisions

Provide and maintain adequate, neat, and sanitary toilet accommodations for employees, including County employees and representatives, in compliance with the requirements and regulations of the Texas Department of Health or other authorities having jurisdiction.

XXXVIII. Work Near Railroads

(A) General.

If the work crosses or is in close proximity to a railroad, do not interfere with the use or operation of the railroad company's trains or other property. Assign responsible supervisory personnel to ensure that tracks and adjacent areas are clear of debris, road materials, and equipment. It is the Contractor's responsibility to contact the railroad to determine the railroad's requirements for work within the railroad right of way and to comply with the requirements. The County will not reimburse the Contractor for any cost associated with these requirements. If the work requires construction within 25 ft. horizontally of the near rail or if the tracks may be subject to obstruction due to construction operations, notify the Engineer and the Railroad Company at least 3 days before performing work. The railroad company will provide flaggers during this work. If railroad flaggers will be needed longer than 2 consecutive days, request them at least 30 days before performing work within the railroad right of way. Flaggers provided by the railroad company will be paid for by the County. Do not store material or equipment in the Railroad's right of way within 15 ft. of the centerline of any track. Do not place any forms or temporary falsework within 8.5 ft. horizontally from the centerline or 22 ft. vertically above the top of rails of any track, unless otherwise shown in the Contract Documents.

(B) Temporary Crossings.

If a temporary crossing is needed, obtain permission from the railroad company before crossing the tracks. Execute the "Agreement for Contractor's Temporary Crossing" if required by the Railroad Company. The Contractor shall ensure that the tracks are left clear of equipment and debris that would endanger the safe operation of railroad traffic. Provide a crossing guard on each side of the crossing to direct equipment when hauling across the tracks. The Contractor shall stop construction traffic a safe distance away from the crossing upon the approach of railroad traffic. Work for temporary crossings will not be paid for directly, but shall be subsidiary to items of the Work subject of the Contract Documents. Work performed by the Railroad Company for the temporary crossing, except flaggers, will be at the Contractor's expense.

SECTION 13
TECHNICAL SPECIFICATIONS

Williamson County **Sheet:**
Project: Neenah Avenue Widening

GENERAL CONSTRUCTION NOTES

TCEQ-0592 (rev. 3/15/07)
Texas Commission on Environmental
Quality Water Pollution Abatement Plan

Written construction notification must be given to the appropriate TCEQ regional office no later than 48 hours prior to commencement of the regulated activity. Information must include the date on which the regulated activity will commence, the name of the approved plan for the regulated activity, and the name of the prime contractor and the name and telephone number of the contact person.

All contractors conducting regulated activities associated with this project must be provided with complete copies of the approved water pollution abatement plan and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractors are required to keep on-site copies of the approved plan and approval letter.

If any sensitive feature is discovered during construction, all regulated activities near the sensitive feature must be suspended immediately. The appropriate TCEQ regional office must be immediately notified of any sensitive features encountered during construction. The regulated activities near the sensitive feature may not proceed until the TCEQ has reviewed and approved the methods proposed to protect the sensitive feature and the Edwards aquifer from any potentially adverse impacts to water quality.

No temporary aboveground hydrocarbon and hazardous substance storage tank system is installed within 150 feet of a domestic, industrial, irrigation, or public water supply well, or other sensitive feature.

Prior to commencement of construction, all temporary erosion and sedimentation (E&S) control measures must be properly selected, installed, and maintained in accordance with the manufacturers specifications and good engineering practices. Controls specified in the temporary storm water section of the approved Edwards aquifer protection plan are required during construction. If inspections indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations. The controls must remain in place until disturbed areas are revegetated and the areas have become permanently stabilized.

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

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

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Project: Neenah Avenue Widening

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

All spoils (excavated material) generated from the project site must be stored on-site with proper E&S controls. For storage or disposal of spoils at another site on the Edwards aquifer recharge zone, the owner of the site must receive approval of a water pollution abatement plan for the placement of fill material or mass grading prior to the placement of spoils at the other site.

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

The following records shall be maintained and made available to the TCEQ upon request: the dates when major grading activities occur; the dates when construction activities temporarily or permanently cease on a portion of the site; and the dates when stabilization measures are initiated.

The holder of any approved Edward aquifer protection plan must notify the appropriate regional office in writing and obtain approval from the executive director prior to initiating any of the following:

Any physical or operational modification of any water pollution abatement structure(s), including but not limited to ponds, dams, berms, sewage treatment plants, and diversionary structures;

Any change in the nature or character of the regulated activity from that which was originally approved or a change which would significantly impact the ability of the plan to prevent pollution of the Edwards aquifer.

Any development of land previously identified as undeveloped in the original water pollution abatement plan.

Austin Regional Office
2800 S. IH 35, Suite 100
Austin, Texas 78704-5712
phone (512) 339-2929
fax (512) 339-3795

San Antonio Regional Office
14250 Judson Road
San Antonio, Texas 78233-4480
phone (210) 490-3096
fax (210) 545-4329

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Project: Neenah Avenue Widening

These general construction notes must be included on the construction plans provided to the contractor and all subcontractors.

GENERAL CONSTRUCTION NOTES

1. All responsibility for the adequacy of these plans remains with the engineer who prepared them. In reviewing these plans, the City of Austin must rely on the adequacy of the work of the design engineer.

2. Contractor shall call the one call center (1-800-344-8377) for utility locations prior to any work in city easements or street R.O.W.

3. Contractor shall notify the construction inspection division of the city's one stop shop (oss) at (512-974-6360) or (512-974-7034) at least 24 hours prior to the installation of any drainage facility within a drainage easement or street R.O.W. the method of placement and compaction of backfill in the city's R.O.W. must be approved prior to the start of backfill operations.

4. All construction operations shall be accomplished in accordance with applicable regulations of the u.s. occupational safety and health administration.

5. All site work must also comply with environmental requirements.

6. Upon completion of the proposed site improvements and prior to the following, the engineer shall certify in writing that the proposed drainage, filtration and detention facilities were constructed in conformance with the approved plans.:

- release of the certificate of occupancy by the planning and development review department (inside the city limits); or

- installation of an electric or water meter (in the five-mile ETJ),

AMERICANS WITH DISABILITIES ACT

The City of Austin has reviewed this plan for compliance with city development regulations only. The applicant, property owner, and occupant of the premises are responsible for determining whether the plan complies with all other laws, regulations, and restrictions which may be applicable to the property and its use.

SITE SUMMARY*

Current zoning:	Right-Of-Way drainage & public utility easement
Total site area (LOC):	9.95 acres
Impervious cover (existing):	4.76 acres (47.9%)

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Project: Neenah Avenue Widening

Impervious cover (increase): 0.90 acres (9.0%)
Impervious cover (proposed): 5.66 acres (56.9%)
*site summary for entire limits of construction (LOC)

CITY OF AUSTIN ELECTRIC UTILITY NOTES

1. Austin Energy has the right to prune and/or remove trees, shrubbery, and other obstructions to the extent necessary to keep the easements clear. Austin Energy will perform all tree work in compliance with chapter 25-8, Subchapter B of the City of Austin land development code.

2. The owner/developer of this subdivision/lot shall provide Austin Energy with any easement and/or access required, in addition to those indicated, for the installation and ongoing maintenance of overhead and underground electric facilities. These easements and/or access are required to provide electric service to the to the building(s) and will not be located so as to cause the site to be out of compliance with chapter 25-8 of the City of Austin land development code.

3. The owner shall be responsible for any installation of temporary erosion control, revegetation, and tree protection. In addition, the owner shall be responsible for any tree pruning and tree removal that is within ten feet of the centerline of the overhead electrical facilities designed to provide electric service to this project. The owner shall include Austin Energy's work within the limits of construction for this project.

4. The owner of the property is responsible for maintaining clearances required by the national electric safety code, occupational safety and health administration (OSHA) regulations, City of Austin rules and regulations and Texas state laws pertaining to clearances when working in close proximity to overhead power lines and equipment. Austin Energy will not render electric service unless required clearances are maintained. All costs incurred because of failure to comply with the required clearances will be charged to the owner.

5. A pre-construction safely meeting is required with Austin Energy 48 hours before commencement of construction. Failure to do so will result in the project being shut down. Call Doug Weise at 512-505-7023 to schedule a trail gate safety meeting. Include Chuck Hendry (512-505-7151) in the meeting, if cranes are being used during construction.

6. Barricades must be erected 10 feet from electric transmission structures during construction. Any relocation of electric transmission facilities or outages caused by this project will be charged to the property owner and contractor.

7. Warning signs must be placed under the overhead electric transmission facilities as notification of the electrical hazard.

8. For safety reasons, aerial equipment, dumpsters, staging or spoils areas are restricted to a maximum height of 20 feet in and around the transmission wire and structures.

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9. Prior to mobilizing tall equipment such as cranes, call Doug Weise at 512-505-7023 to coordinate with transmission personnel.

10. 24 hour access to electric facilities shall be maintained.

11. Any temporary or permanent security fence preventing access to the easement shall be coordinated with Austin Energy staff. Ae staff shall install a lock on the gate/fence for access.

12. Property owner and contractor are responsible for dust controls to minimize contamination of wire and insulators caused by dust from this project. Any subsequent cleaning or electrical outages caused by dust from this project will be charged to the property owner and contractor.

13. Fire hydrants are prohibited within 20 feet of transmission poles.

14. Sprinklers are prohibited within 15 feet of transmission poles.

APPENDIX P-1: - EROSION CONTROL NOTES

1. The contractor shall install erosion/sedimentation controls and tree/natural area protective fencing prior to any site preparation work (clearing, grubbing or excavation).

2. The placement of erosion/sedimentation controls shall be in accordance with the environmental criteria manual and the approved erosion and sedimentation control plan. The COA ESC plan shall be consulted and used as the basis for a TPDES required SWPPP. If a SWPPP is required, it shall be available for review by the City of Austin environmental inspector at all times during construction, including at the pre-construction meeting.

3. The placement of tree/natural area protective fencing shall be in accordance with the City of Austin standard notes for tree and natural area protection and the approved grading/tree and natural area plan.

4. A pre-construction conference shall be held on-site with the contractor, design engineer/ permit applicant and environmental inspector after installation of the erosion/sedimentation controls and tree/natural area protection measures and prior to beginning any site preparation work. The owner or owner's representative shall notify the planning and development review department, 974-2278, at least three days prior to the meeting date. COA approved ESC plan and TPDES SWPPP (if required) should be reviewed by COA ev. inspector at this time.

5. Any major variation in materials or locations of controls or fences from those shown on the approved plans will require a revision and must be approved by the reviewing engineer, environmental specialist or city arborist as appropriate. Major revisions must be approved by City of Austin staff. Minor changes to be made as field revisions to the erosion and sedimentation control plan may be required by the environmental inspector during the course of construction to correct control inadequacies.

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6. The contractor is required to provide a certified inspector with either a certified professional in erosion and sediment control (CPESC), certified erosion, sediment and stormwater-inspector (CESSWI) or certified inspector of sedimentation and erosion controls (CISEC) certification to inspect the controls and fences at weekly intervals and after significant rainfall events to insure that they are functioning properly. The person(s) responsible for maintenance of controls and fences shall immediately make any necessary repairs to damaged areas. Silt accumulation at controls must be removed when the depth reaches six (6) inches.

7. Prior to final acceptance by the city, haul roads and waterway crossings constructed for temporary contractor access must be removed, accumulated sediment removed from the waterway and the area restored to the original grade and revegetated. All land clearing debris shall be disposed of in approved spoil disposal sites.

8. All work must stop if a void in the rock substrate is discovered which is; one square foot in total area; blows air from within the substrate and/or consistently receives water during any rain event. At this time it is the responsibility of the project manager to immediately contact a City of Austin environmental inspector for further investigation.

9. Temporary and permanent erosion control: all disturbed areas shall be restored as noted below.

All disturbed areas to be revegetated are required to place a minimum of six (6) inches of topsoil [see standard specification item no. 601S.3(a)]. Do not add topsoil within the critical root zone of existing trees.

Topsoil salvaged from the existing site is encouraged for use, but it should meet the standards set forth in 601S.

An owner/engineer may propose use of onsite salvaged topsoil which does not meet the criteria of standard specification 601S by providing a soil analysis and a written statement from a qualified professional in soils, landscape architecture, or agronomy indicating the onsite topsoil will provide an equivalent growth media and specifying what, if any, soil amendments are required.

Soil amendments shall be worked into the existing onsite topsoil with a disc or tiller create a well-blended material.

The vegetative stabilization of areas disturbed by construction shall be as follows:

Temporary vegetative stabilization: From September 15 to March 1, seeding shall be with or include a cool season cover crops:(western wheatgrass (pascopyrum smithii) at.6 pounds per acre, oats (avena sativa) at 4.0 pounds per acre, cereal rye grain (secale cereale) 45 pounds per acre. Contractor must ensure that any seed application requiring a cool season cover crop does not utilize annual ryegrass (lolium multiflorum) or perennial ryegrass (lolium perenne). Cool season cover crops are not permanent erosion control.

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From March 2 to September 14, seeding shall be with hulled bermuda at a rate of 5 pounds per acre or a native plant seed mix conforming to items 604S or 609S.
Fertilizer shall be applied only if warranted by a soil test and shall conform to item no. 606S, fertilizer. Fertilization should not occur when rainfall is expected or during slow plant growth or dormancy. Chemical fertilizer may not be applied in the critical water quality zone.

Hydromulch shall comply with table1, below.

Temporary erosion control shall be acceptable when the grass has grown at least 1½ inches high with a minimum of 95% total coverage so that all areas of a site that rely on vegetation for temporary stabilization are uniformly vegetated, and provided there are no bare spots larger than 10 square feet.

When required, native plant seeding shall comply with requirements of the City of Austin environmental criteria manual, and standard specifications 604S or 609S.

TABLE 1: HYDROMULCHING FOR TEMPORARY VEGETATIVE STABILIZATION

Material	Description	Longevity	Typical applications	Application rates
100% or any blend of wood, cellulose, straw, and/or cotton plant (except no mulch shall exceed 30% paper)	70% or greater wood/straw 30% or less paper or natural fibers	0-3 months	Moderate slopes; from flat to 3:1	1500 to 2000 lbs/acre

Permanent vegetative stabilization:

From September 15 to March 1, seeding is considered to be temporary stabilization only. If cool season cover crops exist where permanent vegetative stabilization is desired, the grasses shall be mowed to a height of less than one-half (½) inch and the area shall be re-seeded in accordance with table 2 below. Alternatively, the cool season cover crop can be mixed with bermudagrass or native seed and installed together, understanding that germination of warm-season seed typically requires soil temperatures of 60 to 70 degrees.

From March 2 to September 14, seeding shall be with hulled bermuda at a rate of 45 pounds per acre with a purity of 95% and a minimum pure live seed (PLS) of 0.83. Bermuda grass is a warm season grass and is considered permanent erosion control. Permanent vegetative stabilization can also be accomplished with a native plant seed mix conforming to items 604S or 609S.

Fertilizer use shall follow the recommendation of a soil test. See item 606S, Fertilizer. Applications of fertilizer (and pesticide) on city-owned and managed property requires the yearly

submittal of a pesticide and fertilizer application record, along with a current copy of the applicator's license. For current copy of the record template contact the City of Austin's ipm coordinator.

Hydromulch shall comply with table 2, below.

Water the seeded areas immediately after installation to achieve germination and a healthy stand of plants that can ultimately survive without supplemental water. Apply the water uniformly to the planted areas without causing displacement or erosion of the materials or soil. Maintain the seedbed in a moist condition favorable for plant growth. All watering shall comply with city code chapter 6-4 (water conservation), at rates and frequencies determined by a licensed irrigator or other qualified professional, and as allowed by the Austin Water Utility and current water restrictions and water conservation initiatives.

Permanent erosion control shall be acceptable when the grass has grown at least 1½ inches high with a minimum of 95 percent for the non-native mix, and 95 percent coverage for the native mix so that all areas of a site that rely on vegetation for stability must be uniformly vegetated, and provided there are no bare spots larger than 16 square feet.

When required, native plant seeding shall comply with requirements of the City of Austin environmental criteria manual, items # 604S and 609S.

TABLE 2: HYDROMULCHING FOR PERMANENT VEGETATIVE STABILIZATION

Material	Description	Longevity	Typical applications	Application rates
Bonded fiber matrix (BFM)	80% organic defibrated fibers 10%tackifier	6 months	On slopes up to 2:1 and erosive soil conditions	2500 to 4000 lbs/acre
Fiber reinforced matrix (FRM)	65% organic defibrated fibers 25% reinforcing fibers or less 10% tackifier	Up to 12 months	On slopes up to 1:1 and erosive soil conditions	3000 to 4500 lbs/acre

Project contact information:

For questions & plan revisions contact Williamson County HNTB @ 512-744-9082

The contractor shall not dispose of surplus excavated material from the site without notifying the planning and development review department at 974-2278 at least 48 hours prior with the location and a copy of the permit issued to receive the material.

Williamson County **Sheet:**
Project: Neenah Avenue Widening

SPECIAL CONSTRUCTION NOTES

1. The contractor shall furnish, install, and maintain barricades, warning signs, flashers and other devices of the type and size as indicated in the latest edition of the Texas manual on uniform traffic control devices, or as directed by the engineer.

2. The contractor shall maintain at least one dust-free lane for traffic with flagmen during construction activities and two lanes at all other times.

3. The estimated quantity for item no. 110, street excavation, was calculated from the existing ground to established line of the subgrade as shown in the typical roadway sections.

4. All structural concrete shall be Class "C" (5 sack, 25-8-3600 psi @ 28 days) and all reinforcing steel shall be grade sixty, unless otherwise noted.

5. The contractor shall not dispose of surplus excavated material from the site without notifying the environmental inspector, at 974-2278, 48 hours prior to the removal. This notification shall include the disposal location and a copy of the permit issued to receive the material, if applicable.

6. Utilities shown reflect the best information available at the time the project was surveyed. Utility relocation work has been or will be accomplished to clear the work space. These relocations are not reflected on these drawings.

7. All storm sewer pipe shall be RCP, Class III, with Class B bedding, unless otherwise noted.

8. Any utility meters in the way of the construction will be relocated outside the proposed construction area by the utility owner unless such work affecting those meters is included in the contract.

9. Any existing sidewalks, curbs or driveways disturbed by the construction shall be removed and restored with surface materials equal to or better than the original.

10. The rate of lime slurry application used to determine the quantities for this project is percent by weight.

APPENDIX P-2: CITY OF AUSTIN STANDARD NOTES FOR TREE AND NATURAL AREA PROTECTION

1. All trees and natural areas shown on plan to be preserved shall be protected during construction with temporary fencing.
2. Protective fences shall be erected according to City of Austin standards for tree protection.
3. Protective fences shall be installed prior to the start of any site preparation work (clearing, grubbing or grading), and shall be maintained throughout all phases of the construction project.
4. Erosion and sedimentation control barriers shall be installed or maintained in a manner which does not result in soil build-up within tree drip lines.

5. Protective fences shall surround the trees or group of trees, and will be located at the outermost limit of branches (drip line) , for natural areas, protective fences shall follow the limit of construction line, in order to prevent the following:
   a. Soil compaction in the root zone area resulting from vehicular traffic or storage of equipment or materials;
   b. Root zone disturbances due to grade changes (greater than 6 inches cut or fill), or trenching not reviewed and authorized by the city aborist;
   c. Wounds to exposed roots, trunk or limbs by mechanical equipment;
   d. Other activities detrimental to trees such as chemical storage, cement truck cleaning, and fires.
6. Exceptions to installing fences at tree drip lines may be permitted in the following cases:
   a. Where there is to be an approved grade change, impermeable paving surface, tree well, or other such site development, erect the fence approximately 2 to 4 feet beyond the area disturbed;
   b. Where permeable paving is to be installed within a tree's drip line, erect the fence at the outer limits of the permeable paving area (prior to site grading so that this area is graded separately prior to paving installation to minimized root damage);
   c. Where trees are close to proposed buildings, erect the fence to allow 6 to 10 feet of work space between the fence and the building;
   d. Where there are severe space constraints due to tract size, or other special requirements, contact the city arborist at 974-1876 to discuss alternatives.
   special note: for the protection of natural areas, no exceptions to installing fences at the limit of construction line will be permitted.
7. Where any of the above exceptions result in a fence being closer than 4 feet to a tree trunk, protect the trunk with strapped-on planking to a height of 8 ft (or to the limits of lower branching) in addition to the reduced fencing provided.
8. Trees approved for removal shall be removed in a manner which does not impact trees to be preserved.
9. Any roots exposed by construction activity shall be pruned flush with the soil. Backfill root areas with good quality top soil as soon as possible. If exposed root areas are not backfilled within 2 days, cover them with organic material in a manner which reduces soil temperature and minimizes water loss due to evaporation.
10. Any trenching required for the installation of landscape irrigation shall be placed as far from existing tree trunks as possible.
11. No landscape topsoil dressing greater than 4 inches shall be permitted within the drip line of trees. No soil is permitted on the root flare of any tree.
12. Pruning to provide clearance for structures, vehicular traffic and equipment shall take place before damage occurs (ripping of branches, etc.).
13. All finished pruning shall be done according to recognized, approved standards of the industry (reference the national arborist association pruning standards for shade trees available on request from the city arborist).
14. Deviations from the above notes may be considered ordinance violations if there is substantial non-compliance or if a tree sustains damage as a result.
15. Removal of existing sidewalks in the critical root zone of trees to be preserved shall be accomplished by lifting panels and flipping them toward the street to avoid Appendix P-6:

remedial tree care notes aeration and supplemental nutrient requirements for trees within construction areas

As a component of an effective remedial tree care program per environmental criteria manual section 3.5.4, preserved trees within the limits of construction may require soil aeration and supplemental nutrients. Soil and/or foliar analysis should be used to determine the need for supplemental nutrients. The city arborist may require these analyses as part of a comprehensive tree care plan. Soil PH shall be considered when determining the fertilization composition as soil PH influences the tree's ability to uptake nutrients from the soil. If analyses indicate the need for supplemental nutrients, then humate/nutrient solutions with mycorrhizae components are highly recommended. In addition, soil analysis may be needed to determine if organic material or beneficial microorganisms are needed to improve soil health. Materials and methods are to be approved by the city arborist (512-974-1876) prior to application. The owner or general contractor shall select a fertilization contractor and ensure coordination with the city arborist.

Pre-construction treatment should be applied in the appropriate season, ideally the season preceding the proposed construction. Minimally, areas to be treated include the entire critical root zone of trees as depicted on the city approved plans. Treatment should include, but not limited to, fertilization, soil treatment, mulching, and proper pruning.

Post-construction treatment should occur during final revegetation or as determined by a qualified arborist after construction. Construction activities often result in a reduction in soil macro and micro pores and an increase in soil bulk density. To ameliorate the degraded soil conditions, aeration via water and/or air injected into the soil is needed or by other methods as approved by the city arborist. The proposed nutrient mix specifications and soil and/or foliar analysis results need to be provided to and approved by the city arborist prior to application (fax # 512-974-3010). Construction which will be completed in less than 90 days may use materials at ½ recommended rates. Alternative organic fertilizer materials are acceptable when approved by the city arborist. Within 7 days after fertilization is performed, the contractor shall provide documentation of the work performed to the city arborist, planning and development review department. P.O. Box 1088, Austin, TX 78767. This note should be referenced as Item #1 in the sequence of construction disturbance of roots.

SPECIAL CONSTRUCTION TECHNIQUES ECM 3.5.4(D)

Prior to excavation within tree driplines or the removal of trees adjacent to other trees that are to remain, make a clean cut between the disturbed and undisturbed root zones with a rock saw or similar equipment to minimize root damage.

In critical root zone areas that cannot be protected during construction with fencing and where heavy vehicular traffic is anticipated, cover those areas with a minimum of 12 inches of organic mulch to minimize soil compaction. In areas with high soil plasticity geotextile fabric, per standard specification 620S should be placed under the mulch to prevent excessive mixing of the soil and mulch. Additionally, material such as plywood and metal sheets could be required by the city arborist to minimize root impacts from heavy equipment. Once the project is completed, all materials should be removed, and the mulch should be reduced to a depth of 3 inches.

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Project: Neenah Avenue Widening

Perform all grading within critical root zone areas by hand or with small equipment to minimize root damage.

Water all trees most heavily impacted by construction activities deeply once a week during periods of hot, dry weather. Spray tree crowns with water periodically to reduce dust accumulation on the leaves.

When installing concrete adjacent to the root zone of a tree, use a plastic vapor barrier behind the concrete to prohibit leaching of lime into the soil."

APPENDIX Q-2: IMPERVIOUS COVER (R.O.W. ONLY)

Project consists of improvements with existing row

SUBURBAN WATERSHEDS

Note: Q1 tables are not required for suburban watersheds
Impervious cover allowed at 80% x GSA =5.73 acres

Allowable impervious cover:
- Total acreage 15-25% = 0 acres x 10% = 0

Post construction **Existing** **Proposed increase**

R.O.W. Impervious Cover:

R.O.W. impervious cover: = 5.10 Acres = 76.1%

Impervious Cover on Slopes:

Slope Categories	**Building / And Other Impervious Cover**			**Driveways/ Roadways**		**Driveways/ Roadways**		**Driveways/ Roadways**	
	Acres	Ac.	% of category	Ac.	% of category	Ac.	% of category	Ac.	% of category
0-15%	6.70	0	0%	5.10	76.1%	4.10	61.2%	1.00	14.9%
15-25%	0	0	0	0	0	0	0	0	0
25-35%	0	0	0	0	0	0	0	0	0
Over 35%	0	0	0	0	0	0	0	0	0

Total R.O.W. area 6.70 ac

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Project: Neenah Avenue Widening

ENGINEER'S NOTES

1. The basis of bearing of the survey shown hereon is Texas State Plane Coordinate System, Central Zone, NAD 83(96), utilizing Western Data Systems Continually Operating Reference Stations (CORS) network.

2. This is a surface drawing, bearings are based on the Texas state plane coordinate system, NAD 83(96), Central Zone, utilizing western data systems continually operating reference station (CORS) network. And additionally tied LCRA GPS control monuments, coordinate values are project specific surface values. To derive grid values, multiply by a combined scale factor of 0.99988, with an origin point of n 0.0, e 0.0.

3. All trench excavation shall be in accordance with the U.S. Department of Occupational Health and Safety Administration. The contractor is reminded of his responsibility to provide a trench safety protection plan prior to the start of construction. The document shall be submitted to the county for approval prior to beginning any trench excavation.

4. Locations of all underground utilities in the vicinity of construction shall be uncovered to determine exact locations prior to the start of construction. This shall be subsidiary.

5. All joint seals, connections, and modifications necessary for proper installation of storm drainage systems shall be subsidiary to RCP and box culvert bid items.

6. Concrete riprap and energy dissipation blocks shall be included in the price bid for concrete wingwall and are subsidiary.

7. Control points for manholes and junction boxes shall be the center of the structure base.

8. Control points for curb inlets shall be the midpoint of the face of curb for curb inlet only (excluding inlet extensions). Top of curb inlet elevations shall match the existing or proposed top of curb elevations as appropriate.

9. All horizontal bends and pipe to pipe angled connections in RCP pipe shall be constructed using pre-fabricated bends and fittings.

10. The locations of driveways, steps, etc., as shown on these plans are approximate. Accurate locations shall be determined at the time of construction after consultation with the property owners.

11. Contractor shall reconstruct all existing driveways to the limits shown or to the nearest construction joint in the existing driveways as directed by the engineer.

12. It is the responsibility of the contractor to repair and maintain all erosion control facilities before, during, and after all construction activities in accordance with all local, state, and federal regulations.

Williamson County **Sheet:**
Project: Neenah Avenue Widening

13. For pedestrian safety, the contractor shall install orange plastic construction fencing (4 feet tall minimum) around all open excavations or as directed by the engineer. Such fencing shall not obstruct sight lines of the traveling public.

14. The contractor shall cover or temporarily remove existing signs that conflict with the suggested traffic control plans or the intent thereof but do not require relocation due to physical conflicts. Said signs shall not be relocated until temporary sign supports have been installed to allow for the immediate relocation of any such signs. This shall be subsidiary.

15. Contractor shall be responsible for bracing and protection of utility poles during all phases of construction. Contractor shall coordinate with utility company a minimum of 72 hours in advance of construction in the vicinity of their poles so they can verify the poles are being properly braced, protected. Subsidiary.

16. Preparation of ROW shall include all ROW areas within the project, driveway and lead walk penetration areas, within the daylight and project limits. Preparation of ROW shall include removal of existing concrete, retaining walls, concrete columns, bridge class culverts, slope paving, headwalls, wingwalls, flumes, guardrails, and storm drain conduit. Preparation of ROW shall also include any other disturbed areas as required for the diversion and care of water.

17. Contractor shall protect all existing fence and gates along ROW lines unless otherwise noted on plans.

18. Fence and gate items shall include connections to existing fencing not impacted by the project and include replacement of mow strips if present along the existing fence line. Additional corner posts may be required for connection, and are subsidiary. Contractor shall be responsible for the disposal of existing fencing and materials not suitable for reuse or in excess of what is required for relocation. This shall be subsidiary.

19. Contractor shall be responsible for locating irrigation systems in the project area. Adjustments to existing irrigation systems impacted by the project shall be capped at the ROW line. This shall be subsidiary.

20. Contractor shall salvage existing landscaping plants and materials on private property to the maximum extent practicable.

21. Contractor shall ensure fences disturbed by construction are closed at the end of each working day with temporary construction fencing at a minimum. This shall be subsidiary.

22. All radii dimensions are to face of curb.

23. Contractor shall refer to the diversion and care of water specifications for additional requirements related to the management of stormwater during construction.

24. Contractor is responsible for maintaining the appearance of all concrete structures until final acceptance of the project.

Williamson County **Sheet:**
Project: Neenah Avenue Widening

25. All dimensions are taken at the face of curb unless otherwise noted on plans.
26. Call the Texas statewide one call locator number 811, 72 hours prior to the start of excavation.

27. Contractor is solely responsible for protecting existing overhead and underground utilities throughout the duration of construction.

28. Contractor shall maintain an open sidewalk or shared use path ADA compliant route along either the north or the south side of the project at all times in accordance with the TCP plans.

29. Contractor shall restripe fire lanes where noted. Contractor shall restore white arrows, entrance only, and exit only pavement markings on school drives disturbed by construction, this shall be subsidiary.

30. Contractor shall have certified arborist trim up the tree canopy over the shared use path to provide a clear height of 8-feet above the path. This shall be subsidiary.

31. Contractor may encounter existing irrigation, underground electric lines, and PVC conduit sleeves in driveway and lead walk penetration areas. Contractor shall coordinate with property owners prior to work in this areas to identify known private utility crossings. Contractor shall adjust the locations of private utilities in driveway penetration areas as required for the project. This shall be subsidiary.

32. Contractor is made aware this project includes coordination with others during construction to allow the City of Austin to install an irrigation system in the areas shown on the tree mitigation plans prior to top soil and seeding activites. Contractor shall notify City of Austin Public Works Department Rob Grotty 512.974.9540 and Sam West 512.974.8775 four (4) weeks prior to final top soil and seeding activities. Contractor shall coordinate each others as necessary to accommodate access by construction equipment, and schedule flexibility to allow for overlap in work areas. This shall be subsidiary.

33. Irrigation sleeves shall be schedule 40 PVC pipe in the diameter and locations shown on the plans. This shall be subsidiary.

34. Connections to existing inlets shall be subsidiary to inlet bid items, and shall include re-working the invert of the existing inlet if needed.

NEENAH AVENUE WIDENING
WILLIAMSON COUNTY
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: AUSTIN, TEXAS-STANDARD SPECIFICATIONS MANUAL AS CURRENTLY AMENDED INCORPORATED INTO THE CONTRACT BY REFERENCE.

< > REFERNCE ITEMS NOT USED ON THIS CONTRACT
( ) REFERENCE ITEMS USED ON THIS CONTRACT

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

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL TESTING REQUIRED BY THE STANDARD SPECIFICATIONS, INCLUDING THAT WHICH IS ATTRIBUTED TO THE CITY OF AUSTIN AND ITS REPRESENTATIVES.

101S	1/4/11	PREPARING RIGHT OF WAY
102S	8/20/07	CLEARING AND GRUBBING
104S	9/26/12	REMOVING PORTLAND CEMENT CONCRETE
110S	11/18/04	STREET EXCAVATION
120S	9/26/12	CHANNEL EXCAVATION
130S	9/26/12	BORROW
132S	8/20/07	EMBANKMENT
201S	8/20/07	SUBGRADE PREPARATION
202S	8/18/00	HYDRATED LIME AND LIME SLURRY
203S	9/26/12	LIME TREATMENT FOR MATERIALS IN PLACE
210S	2/24/10	FLEXIBLE BASE
236S	8/20/07	ROLLING (PROOF)
301S	8/20/07	ASPHALTS, OILS AND EMULSIONS
302S	9/26/12	AGGREGATES FOR SURFACE TREATMENTS
306S	2/24/10	PRIME COAT
307S	2/24/10	TACK COAT
312S	9/26/12	SEAL COAT
313S	2/24/10	CLEANING AND/OR SEALING JOINTS AND CRACKS (ASPHALTIC CONCRETE)
315S	9/26/12	MILLING ASPHALTIC CONCRETE PAVEMENT AND NON-PORTLAND CEMENT CONCRETE BASES
340S	9/26/12	HOT MIX ASPHALTIC CONC. PAVEMENT
360S	9/26/12	CONCRETE PAVEMENT
401S	9/26/12	STRUCTURAL EXCAVATION AND BACKFILL
402S	11/13/07	CONTROLLED LOW STRENGTH MATERIAL
406S	9/26/12	REINFORCING STEEL
408S	11/13/07	CONCRETE JOINT MATERIALS
409S	11/13/07	MEMBRANE CURING
410S	9/26/12	CONCRETE STRUCTURES
411S	11/13/07	SURFACE FINISHES FOR CONCRETE
414S	11/13/07	CONCRETE RETAINING WALLS

416S	11/13/07	WATERSTOPS
430S	11/15/11	P.C. CONCRETE CURB AND GUTTER
432S	1/4/10	P.C. CONCRETE SIDEWALKS
433S	12/9/08	P.C. CONCRETE DRIVEWAYS
434S	11/13/07	P.C. CONCRETE MEDIANS AND ISLANDS
470S	3/26/08	CURB CUTS FOR SIDEWALK RAMPS AND DRIVEWAYS
485S	11/13/07	CONCRETE PAVING UNITS FOR SIDEWALK RAMPS
503S	2/17/00	FRAMES, GRATES, RINGS AND COVERS
504S	2/24/10	ADJUSTING STRUCTURES
506	3/15/11	MANHOLES
508S	2/24/10	MISCELLANEOUS STRUCTURES AND APPURTENANCES
509S	9/26/12	EXCAVATION SAFETY SYSTEMS
510	10/3/13	PIPE
511S	9/26/12	WATER VALVES
551	11/18/04	PIPE UNDERDRAINS
559S	10/3/13	PORTLAND CONCRETE BOX CULVERTS
591S	12/31/13	RIPRAP FOR SLOPE PROTECTION
601S	9/1/11	SALVAGING AND PLACING TOPSOIL
602S	6/16/08	SODDING FOR EROSION CONTROL
604S	12/30/14	SEEDING FOR EROSION CONTROL
605S	6/21/07	SOIL RETENTION BLANKET
606S	6/21/07	FERTILIZER
609S	8/18/10	NATIVE GRASSLANDS SEEDING AND PLANTING FOR EROSION CONTROL
610S	9/26/12	PRESERVATION OF TREES AND OTHER VEGETATION
620S	5/23/00	FILTER FABRIC
623S	2/24/10	DRY STACK ROCK WALL
628S	12/31/13	SEDIMENT CONTAINMENT DIKE
632S	11/26/01	STORM INLET SEDIMENT TRAP
639S	8/18/10	ROCK BERM
641S	6/21/07	STABILIZED CONSTRUCTION ENTRANCE
642S	9/1/11	SILT FENCE
648S	12/30/14	MULCH SOCK
658S	4/4/12	VOID AND WATER FLOW MITIGATION
703	9/22/88	FENCING FOR EXCAVATIONS
722S	9/26/12	PROTECTIVE COATINGS
723	9/26/12	STRUCTURAL WELDING
803S	11/15/11	BARRICADES, SIGNS, AND TRAFFIC HANDLING
824S	2/24/10	TRAFFIC SIGNS
827S	9/26/12	DESIGNATED BICYCLE LANE SIGNING
829S	8/20/03	DESIGNATED BICYCLE LANE MARKINGS
835S	9/26/12	TRAFFIC SIGNAL CONDUIT
844S	9/26/12	TRENCH EXCAVATION AND BACKFILL FOR TRAFFIC SIGNAL CONDUIT
863S	9/26/12	REFLECTORIZED PAVEMENT MARKERS
870S	11/21/05	WORK ZONE PAVEMENT MARKINGS
871S	6/21/07	REFLECTORIZED PAVEMENT MARKINGS
874S	4/3/09	ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS
16120S	5/23/00	WIRING
16550S	5/23/00	STREET LIGHT STANDARD FOUNDATIONS

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

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 432 RIPRAP <420><421><431><440><247>
ITEM 450 RAILING <421><440><441><442><445>(540) <420><422><424><446><448>
ITEM 466 HEADWALLS AND WINGWALLS <420><421><440><400><432><464>
ITEM 467 SAFETY END TREATMENT<400><420><421>(432)<440><442><445><460><464>
ITEM 500 MOBILIZATION
ITEM 540 METAL BEAM GUARD FENCE <421><441><445><529>
ITEM 544 GUARDRAIL END TREATMENTS
ITEM 550 CHAIN LINK FENCE <421><445>
ITEM 658 DELINEATOR AND OBJECT MARKER ASSEMBLIES <445>

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

SPECIAL PROVISION TO ITEM 000-001 LIQUIDATED DAMAGES
SPECIAL PROVISION TO ITEM 500 (500-WC01) MOBILIZATION
SPECIAL PROVISION TO CITY OF AUSTIN ITEM 504S-GV ADJUSTING STRUCTURES
SPECIAL PROVISION TO CITY OF AUSTIN ITEM 559S CONCRETE BOX CULVERTS
SPECIAL PROVISION TO CITY OF AUSTIN ITEM 641S STABILIZED CONSTRUCTION ENTRANCE

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

ITEM WC9031 DIVERSION AND CARE OF WATER
ITEM WC9032 WATER QUALITY AND DETENTION POND – COMPLETE IN PLACE
ITEM WC9033 CONCRETE WASHOUT AREA

GENERAL: THE ABOVE-LISTED SPECIFICATION ITEMS ARE THOSE UNDER WHICH PAYMENT IS TO BE MADE. THESE, TOGETHER WITH SUCH OTHER PERTINENT ITEMS, IF ANY, AS MAY BE REFERRED TO IN THE ABOVE-LISTED SPECIFICATION ITEMS, AND INCLUDING THE SPECIAL PROVISIONS AND SPECIAL SPECIFICATIONS LISTED ABOVE, CONSTITUTE THE COMPLETE SPECIFICATIONS FOR THIS PROJECT.

Special Provision to Item 000
Schedule of Liquidated Damages

Table1
Schedule of Liquidated Damages

For Dollar Amount of Original Contract		Dollar Amount of Daily Contract Administration Liquidated Damages per Working Day
From More Than	To and Including	
0	100,000	**570**
100,000	500,000	**590**
500,000	1,000,000	**610**
1,000,000	1,500,000	**685**
1,500,000	3,000,000	**785**
3,000,000	5,000,000	**970**
5,000,000	10,000,000	**1125**
10,000,000	20,000,000	**1285**
20,000,000	Over 20,000,000	**2590**

Special Provision to Item 500
Mobilization

Item 500, "Mobilization," 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 500.3., "Payment." The 6th and 7th bullet is deleted and replaced by the following:

- Upon Final Completion, 97% of the mobilization lump sum bid will be paid. Previous payments under this Item will be deducted from this amount, and

- Payment for the remainder of the lump sum bid for "Mobilization" will be made with the Final Payment after all submittals are received, final quantities have been determined, and when any separate vegetative establishment and maintenance, test, and performance periods provided for in the Contract have been successfully completed and the County has issued the Certificate of Acceptance.

Special Provision to
Standard Specification Item 504S (Version 02/24/2010)
Adjusting Structures

For this project, Item No. 504S Adjusting Structures dated 02/24/10, of the City of Austin Standard Technical Specifications is hereby amended with respect to the clauses cited below. No other clauses or requirements of this Section of the City of Austin Standard Specifications are waived or changed.

Add the following to section 504S.6 – Payment:

The work performed, materials furnished and measures as provided above, will be paid by the unit bid price per each. The price shall include full compensation for furnishing all materials, handling, placing, labor, tools, equipment, trench repairs, pavement repairs, concrete structure repair, curb and gutter repair, blind flanges and appurtenances associated with, and incidentals necessary to complete the work.

A.

Pay Item No. SP504S-GV	Remove Valve	Per Each

End

SPECIAL PROVISION To
Standard Specification Item 559S
Concrete Box Culverts
(Version October 3, 2013)

For the project Item No. 559S, Concrete Box Culverts, dated 10/3/2013, of the City of Austin Standard Technical Specifications is hereby amended with respect to the clauses cited below. No other clauses or requirements of this Section of the City of Austin Standard Specifications are waived or changed.

Article 559S.2 Submittals

Replace subparagraph F with the following:

"F. Certification of compliance with HS-20 load design standards;

End

SPECIAL PROVISION To
Standard Specification Item 641S (Version 06/21/07)
Stabilized Construction Entrance

For this project, Item No. **641S Stabilized Construction Entrance dated 06/21/07**, of the City of Austin Standard Technical Specifications is hereby amended with respect to the clauses cited below. No other clauses or requirements of this Section of the City of Austin Standard Specifications are waived or changed.

Paragraph 641S.6 Payment

Delete the first sentence in its entirety and replace with:

"The work performed and materials furnished and measured as provided under "Measurement" will be paid for **per each** "Stabilized Construction Entrance".

End

Special Specification WC 9031
Diversion and Care of Water

1. DESCRIPTION
Furnish, construct, and install water quality management facility.

2. MATERIALS

2.1 General. This specification relates to work conducted at or below the top of bank (TOB) of the unnamed tributary to Davis Spring Branch Creek that requires water to be diverted and removed from the work area. Also included in this specification are those Erosion/Sedimentation/Water Pollution Prevention control devices necessary to prevent water from entering the work area and also causing degradation of conditions downstream of the work area. These measures are in addition to those described in the Erosion and Sedimentation Plan sheets, and include but are not limited to the measures shown on the Dewatering Plan for Culvert A and Swale A.

The Contractor shall furnish all labor, equipment, materials, and services to:

Control and divert water from the work areas at or below the TOB the unnamed tributary to Davis Spring Branch Creek without increasing the risk of flooding to properties adjacent to and upstream of the project area.

Dewater work areas at or below the TOB of the unnamed tributary to Davis Spring Branch Creek due to any source of water, including, but not limited to: groundwater seepage, runoff, precipitation, and performance of diversion and control measures.

Control erosion and sedimentation resulting from construction and dewatering activities.

2.2. Related Sections.

ITEM 120S - CHANNEL EXCAVATION
ITEM 401S – STRUCTURAL EXCAVATION AND BACKFILL
ITEM 414S – CONCRETE RETAINING WALLS
ITEM 466 – HEADWALLS AND WINGWALLS
ITEM 559S – PORTLAND CEMENT CONCRETE BOX CULVERTS
ITEM 591S – RIPRAP FOR SLOPE PROTECTION

2.3. References.

2.3.1 Comply with all governmental, regional, and local standards and permits, including the US Army Corps of Engineers 401 Certification, 404 and 402 Permits, with respect to requirements for care of water discharges to natural streams

2.4. Submittals.

2.4.1 The Contractor shall submit for acceptance, a plan showing the proposed method for diverting the perennial flow of water and storm water runoff from the work area, including dewatering of the Structural and Channel Excavation items and the Portland Concrete Box Culvert item. The plan may be placed in operation upon approval from Williamson County, but nothing in this paragraph shall relieve the Contractor from full responsibility for the adequacy of the method used. Once all measures have been put in place on site, the functionality and success of the plan will be determined

and final approval given to begin operation. However, should the measures fail at any time during operation; implementation of a remedial action plan will be required at no additional charge to the Owner. Three copies of the plan shall be submitted to the County for review at the preconstruction conference.

2.4.2 At a minimum, the Contractor's care of water plan should contain:

1. A list of best management practice (BMP) devices proposed for use and how each will be used.
2. Provide a detailed step-by-step procedure for all activities that will occur at or below the TOB of the unnamed tributary to Davis Spring Branch Creek, including all activities associated with the channel work including structural and channel excavation items, retaining walls, riprap placement, and the Portland Cement Concrete Box Culverts item.
3. Provide a detailed step-by-step procedure for diverting water and establishing, maintaining, and removing the BMPs listed above.
4. A remedial action plan should the plan previously described fails, all or in part

2.5 Groundwater Information.

2.5.1 The geologic descriptions, drawings, logs of subsurface exploration, and water-level elevations, shown on the drawings or given elsewhere in these specifications are presented solely for the information of the bidders and for the contractor in planning the construction operations. The Owner and the Engineer assume no responsibility for any deductions, interpretations, or conclusions which may be made from this information.

2.6 Care of Water.

2.6.1 The Owner shall observe the Contractor's Care of Water, diversion and dewatering facilities, erosion and sediment control measures, and response to performance issues throughout the duration of the Contract. Any deviations from the accepted Care of Water Plan shall be submitted to Williamson County for review and acceptance a minimum of 3 working days prior to installation of controls in the field, unless immediate action is required for the proper care and diversion of storm water flows due to runoff from a precipitation event or the failure of a control.

2.6.2 Adequacy of the Contractor's measures will be determined based upon the avoidance of degradation to the water quality of the pond immediately downstream of the tributary on Davis Spring Branch, and waterways within and immediately downstream of the work area and the avoidance of increased flood risk to properties adjacent to and upstream of the work area. Should degradation occur, the Contractor shall take all reasonable steps consistent with the requirements herein to provide additional facilities to alleviate the cause of degradation and to rehabilitate the affected area(s).

3. PRODUCTS

3.1 Materials.

3.1.1 The Contractor shall supply all labor, equipment, materials, and services required for the appropriate diversion and care of water at or below the TOB of the unnamed tributary to Davis Spring Branch Creek.

3.2 Other Materials.

3.2.1 The contractor shall supply Temporary Erosion, Sedimentation and Water Pollution Prevention Control devices. The following list provides example measures, As this list is not all-inclusive, additional devices may be found at the NPDES Construction Site Stormwater Runoff Control website (http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=4) and/or by researching industry standards for this type of specialized work.

- filter bags

- filter socks
- rock filter dams
- erosion control matting
- floating baffle curtains
- temporary sedimentation basins
- coffer dams

3.2.2 Should an alternate device/measure be required (other than those listed above), the Contractor shall receive approval from Williamson County prior to implementing those devices/measures. The Contractor shall demonstrate that any such substitutions would provide at least the equivalent performance of the measures listed above.

4. EXECUTION

4.1 General.

4.1.1 This Care of Water Specification holds the Contractor responsible for the care of water related to work at or below the TOB of the unnamed tributary to Davis Spring Branch Creek and in no way eliminates or supersedes the Erosion and Sedimentation plans or narrative described in the design plans. The Contractor shall provide, operate, and maintain all ditches, basins, sumps, culverts, cofferdams, site grading, and pumping facilities required to divert, collect, filter, and remove water from the work areas.

4.1.2 All water removed from the work areas, shall be pumped or diverted to settling ponds, or through other erosion and sedimentation controls as appropriate for the flow quantity and velocity, before being allowed to discharge into natural drainage ways at locations approved by the Owner. Water discharged into natural drainage ways or water bodies shall be of equal or better quality than the receiving waters.

4.2 Dewatering.

4.2.1 Groundwater seepage and leaking diversion devices are anticipated to be a source of water into the Contractor's construction work areas. This will be augmented by direct precipitation and resultant runoff from the construction work area, upstream drainage areas, and existing and proposed closed systems which outfall within the project limits.

4.2.2 The Contractor shall be responsible for providing all facilities required to divert, collect, filter, control, and evacuate water from all construction work areas and excavations. Water shall generally be conducted away from all construction work areas or to temporary drainage conveyances within the work areas.

4.2.3 Temporary or natural drainage conveyances shall have sufficient capacity to provide continuous evacuation to avoid prolonged flooding of work areas. Temporary or natural drainage conveyances shall be arranged and altered, with approval from Williamson County, so as to avoid degradation of the water quality of the pond immediately downstream of the unnamed tributary on Davis Spring Branch Creek and waterways within and immediately downstream of the project area.

4.2.4 The Contractor shall utilize all necessary erosion and sedimentation control measures as needed and approved by Williamson County to avoid construction related degradation of the natural water quality.

4.2.5 Excavation dewatering shall be accomplished so as to prevent siltation of land or designated water bodies. Sumps shall be located and shaped so as to minimize entry of silt to dewatering pumps. Settling basins will be provided by the Contractor to receive pumped water when directed by Owner.

4.3 Erosion and Sedimentation Control.

4.3.1 The Contractor shall utilize control devices recommended in Section 2.02a or approved alternative sediment trapping methods and temporary sedimentation basins along the edge of, within, and downstream of the work area to trap sediment and minimize soil erosion in areas affected by construction activities. The Contractor should also employ site management strategies to minimize the potential for erosion. Such strategies shall include the following:

1. Conducting construction operations to minimize the duration of exposure of bare earth surfaces,
2. Prompt stabilization of disturbed areas,
3. Controlling rainfall runoff, and
4. Effective maintenance of erosion and sediment control measures during the construction period.

4.3.2 Methods used for handling, collecting, filtering, and discharging runoff from disturbed areas shall be in accordance with Section 401 (of the Clean Water Act) requirements and will be subject to review by the Owner.

4.3.3 Temporary diversion of drainage conveyances shall be accomplished to avoid erosion at the diversion location. Culverts or channel linings shall be provided where it is not possible to construct stable earth diversion conveyances.

4.3.4 Streams and water bodies in or adjacent to the construction area shall be protected from disturbance by construction operations. Measures to protect streams and water bodies shall include the following:

1. Avoidance by excessive equipment traffic,
2. Preventing siltation of streams or water bodies by construction of water conveyances, diversions, and sedimentation and erosion controls as appropriate, and
3. Cleanout and restoration where sedimentation occurs as a result of construction operations.

4.3.5 Earth moving and land grading shall be conducted in a manner to minimize erosion impact.

4.3.6 Soils and stockpiles shall not be placed in floodplain or in locations where blockage of natural drainage ways can occur.

4.3.7 Sediment depositions resulting from construction operations which are damaging or potentially damaging to the site or land offsite shall be cleaned up and disposed of as directed by the Owner

4.3.8 Haul and access roads shall be wetted with water on a frequent basis as required to prevent excessive dust.

4.3.9 The contractor shall make frequent periodic inspections of the site and installed erosion and sedimentation control measures to check effectiveness of control measures and to determine conditions needing remedial action. Control measures shall be maintained to function at full effectiveness throughout the construction period. The Contractor shall refer to the TPDES General Permit (Part III, Section F, 7(a)) to determine the standard frequency of inspection. However, inspections may be required at more frequent intervals based upon the performance of the control measures.

4.3.10 The Contractor shall submit copies of the inspection reports to the Owner within 2 working days of the inspection.

4.4 Stabilization of Distributed Areas.

4.4.1 Excess excavated material is for the Contractor's use in developing laydown areas, access roads and associated drainage features and may also be used to stabilize disturbed areas. These materials shall be used in conjunction with geotextile stabilization fabric to stabilize disturbed areas as quickly and efficiently as possible to minimize potential further disturbance.

4.5 Flood Control.

4.5.1 The Contractor shall ensure the means and methods of construction, diversion and care of water, and any related activities do not increase the risk of flooding for properties adjacent to the project area. Table 1 below provides flow information for multiple theoretical storm events within the project area. Hydrologic and hydraulic models of the existing site conditions may be made available, upon request, for the Contractor's use.

Table 1 – Unnamed Tributary to Davis Spring Branch Creek

Estimated Storm Event	Flow (cfs)
25 Year	275
100 Year	380

5. MEASUREMENT AND PAYMENT

5.1 The work performed and materials furnished as prescribed by this item, shall be paid for at the contract unit price for "Diversion and Care of Water". Payment will be made on a per month basis prorated for the duration of the project with a total bid not to exceed 2% of the overall construction cost**.** The price shall include all costs to complete the work required for the diversion and care of water including all labor, equipment, materials; and the cost of repair and maintenance of the controls.

5.2 Measures used to complete diversion and care of water tasks must comply with all requirements put forth in this specification and related regulatory documents and meet Williamson County approval before payment will be made. If measures fail or do not comply, payment will be withheld until measures comply with all requirements and are adequate to prevent the degradation of downstream waterways and prevent flooding of adjacent and upstream properties.

Special Specification WC 9032
Water Quality and Detention Pond

1. DESCRIPTION

Furnish, construct, and install proposed improvements to water quality and detention Pond 2 in accordance with City of Austin Environmental Criteria Manual and (ECM) Section 1.6.5., including the removal and disposal of the existing Pond 2 elements required for the proposed expansion, and protection of existing pond elements to remain.

2. MATERIALS

2.1 **General**. Furnish materials in accordance with the details shown on the plans, the requirements of this item, and the pertinent requirements of the following items:

Item 111S, "Excavation"
Item 132S, "Embankment"
Item 401S, "Structural Excavation and Backfill"
Item 508S, "Miscellaneous Structures and Appurtenances"
Item 509S, "Excavation Safety Systems"
Item 511S, "Water Valves"
Item 551, "Pipe Underdrains"
Item 591S, "Riprap"
Item 594S, "Gabions and Revet Mattresses"
Item 620S, "Filter Fabric"
Item 623S, "Dry Stack Rock Wall"

2.2. Filtration Bed.

2.2.1. Filtration Bed Sand. Furnish sand that is 0.02" – 0.04" inch diameter which corresponds with ASTM C-33 Concrete Sand.

2.2.2. Filtration Bed Gravel. Furnish gravel that is ½" – 1½" washed rounded river gravel.

2.3. Underdrain. Furnish and install SCH40 PVC Pipe of the size specified in the plans in accordance with Item 551, "Pipe Underdrains".

2.4. Geotextile Fabric. Furnish and install high flow filter fabric of uniform quality in accordance with City of Austin Specification 620S, "Filter Fabric".

2.5 Sedimentation Basin Outlet Riser with Concrete Pad. Furnish and install SCH40 PVC Riser Pipe with removable solid cap of the size specified in the plans in accordance with Item 551, "Pipe Underdrains". Perforations shall be in accordance with ECM Table 1-8 Perforated Rise Pipe. Outlet Pipe outfall shall include a removable cap with a drilled orifice per the "WQ Outlet PVC Cap" detail in the plans. Furnish and Install 5 ½' x 3 ½' x 4" thick 3500 psi concrete pad. Furnish and Install Galvanized Riser Strap with Anchor Bolts per ECM Appendix V Figure 1-53.

2.6 Trash Rack. Furnish and install a trash rack for the riser. The trash rack should be made out of galvanized welded wire fabric with a maximum opening size of one (1) inch by one (1) inch and made from twelve (12) gauge wire. The wire joints should be joined using galvanized "J" clips. The rack must be removable to facilitate maintenance. The trash rack should be supported by galvanized or rust-proof posts set into four (4) inch thick reinforced concrete base. The base should be square with the length of each side being three (3) feet plus the diameter of the riser pipe with the riser

centered on the base. The height of the trash rack should extend above the maximum water surface elevation or should have a removable galvanized welded wire lid. If the top of the riser pipe is more than three (3) feet high from the base, removable galvanized cross bracing is required for the riser and trash rack. A cone of two (2) to three (3) inch diameter gravel shall be placed around the pipe to enhance settling. The gravel cone must not include any gravel small enough to enter the riser pipe perforations.

2.7. Clay Liner. Furnish and install clay liner material in accordance with the following criteria:

Material Property	Requirement	Testing Standard
Liquid Limit	30	ASTM D 4318
Minimum Plasticity Index	15	ASTM D 4318
Minimum Percent Passing #200 Sieve	30%	ASTM D 422
Maximum Particle Size	< 1 inch	ASTM D 422
Maximum Laboratory Permeability	< 1x10-7 cm/sec	ASTM D

The clay liner material shall be free of organics and debris, such as tree limbs, bark, leaves, trash or other deleterious material. The maximum clay clod size during liner placement and compaction should be approximately one inch. For each potential source of pond liner material, enough material shall be provided by the earthwork contractor to run the tests listed in the table above. During permeability testing, the samples should be compacted in the laboratory to 95% of maximum dry density as determined by the Standard Proctor Test, ASTM D 698 with moisture content at time of compaction at or above optimum moisture content.

2.8. Filtration Basin Inlet Structure and Rock Flow Spreader. Furnish and Install an inlet structure to spread the flow uniformly across the surface of the filter media. See ECM Figure 1.6.5.A for flow spreader design concept. A rock flow spreader shall be provided. The Rock Riprap gradation shall comply with Class II Rock as described in ECM Section 1.4.6.D.5, Stone Riprap. Furnish and install a 3' x 3' x 4" thick 3500 psi concrete splash pad.

2.9 Filtration Basin Outfall. Furnish and Install SCH40 PVC of the pipe size specified in the plans in accordance with Item 551, “Pipe Underdrains”. Furnish and Install concrete headwall per detail 508S-15, including rock riprap.

2.10 Detention Pond Weir Plate. Furnish and Install two (2) 1.38' x 1.29' x ½ inch galvanized weir plates with anchor bolts on the existing overflow spillway.

2.11 Detention Pond Outlet PVC Cap. Furnish and Install SCH40 PVC removable solid end cap with a drilled orifice per the “Detention Outlet PVC Cap” detail in the plans on the existing 8-inch PVC Outlet pipe from the detention pond.

2.12 Dry Stack Rock Wall. Furnish and Install Dry Stack Rock Wall per detail 632S.1.

3. EQUIPMENT

Furnish all equipment necessary to construct water quality and detention pond.

4. CONSTRUCTION

4.1. General. The drawings depict the pond in its final constructed configuration including 6" of top soil and sod. Refer to the General Conditions in the Contract Documents for responsibilities relating to Submittals.

4.1.1. Quality Control Submittals. The Contractor shall submit shop drawings, samples, and product data to the Engineer for review of the following items:

1. Galvanized Riser Strap with Anchor Bolts
2. Trash Rack
3. Geotextile Fabric
4. Clay Liner
5. Gravel and sand media for filtration bed
6. Concrete Pad for Outlet Riser and Concrete Splash Pad
7. Rock for flow spreader
8. Dry Stack Rock Wall Design
9. PVC End Caps
10. Weir Plat with Anchor Bolts
11. Embankment Material
12. Gate Valve

4.2. Embankment.

4.2.1 General. Embankment shall be placed in accordance with Item No.132S, "Embankment".

4.3. Clay Liner.

4.3.1. General. The compacted clay liner placed on the bottom of the entire water quality pond should be a minimum of 12 inches thick. The liner shall be placed in maximum 6-inch thick lifts after compaction.

The clay liner shall extend below and around all concrete ramps, aprons, loose rock riprap and other miscellaneous structures within the sedimentation and filtration pond interior and sides up to an elevation no less than 1 foot above the water quality elevation of the sediment pond, and not less than 2.5 feet above the top of sand elevation of the Filtration Basin.

4.3.2. Liner Construction. The subgrade shall be compacted to at least 95% of the maximum dry density determined by Standard Proctor Test, ASTM D 698. For subgrade soil with a plasticity index (PI) of 25 or higher, the moisture content at time of compaction shall be between optimum and 4% above optimum. If the subgrade soil has a plasticity index (PI) of less than 25, the moisture content at the time of compaction shall be at optimum +/- 3%. Loose material shall be removed from excavated subgrade prior to clay liner construction.

The clay liner is to be constructed monolithically in the bottom and sides of the ponds bays.

Material for clay liner to be placed in maximum 6" lifts after compaction. Compact lifts with appropriately sized motorized compaction equipment. A minimum of 2 passes shall be required for each lift with a pass defined as one trip of compacting equipment over the lift and back to the starting point. This requirement is to provide thorough remolding of the clay. The final 6-inch lift of the clay liner shall be compacted in a manner that provides a relatively smooth finish to the completely clay surface.

Each lift of the clay liner shall be to 95% of the maximum dry density with moisture content at time of compaction at or above optimum before the next lift is placed.

Cracking and/or crusting of each lift surface shall be avoided as much as possible. If cracking and/or crusting of the lift surface occurs before placement of the next lift, this area shall be sprinkled with water, scarified to a depth below the cracking/crusting, and re-compacted as outlined above before the placement of a subsequent lift. During construction, all finished lifts or portions of the liner shall be kept wet enough to prevent drying and cracking of the clay.

Sections of liner that are constructed next to a completed section shall not be constructed by "butting" the entire thickness of the new liner section next to the completed section. Instead, the edge of the complete section of liner shall be benched at mid-depth for a minimum 12-inch width such that the section being constructed and the completed section are offset in a stair-step fashion without a construction joint through the entire liner thickness.

At the end of each day's operation, completed lifts or sections of the compacted clay liner shall be kept wet enough to prevent drying and cracking of the liner prior to the commencement of construction. Any areas of the liner which do not

meet moisture or density requirements during testing shall be reworked and retested until the constructed liner meets the specification.

Following the completion of the final lift, the liner is to be kept wet by watering the liner regularly until the 6" topsoil overlay is in place. Liner must not be allowed to dry out which would cause cracks to form in the liner surface.

4.3.3. Liner Field Testing. The clay liner shall be compacted to at least 95% of the maximum dry density as determined by Standard Proctor Test, ASTM D698. The moisture content of the material at time of compaction shall be at or above the optimum moisture content.

Individual lifts are to be tested for moisture and density upon completion of the compaction (and prior to the subsequent lift) using a nuclear density gauge. The resulting penetration of the driving pin of the density gauge in the material shall be back filled with bentonite powder.

The frequency of testing of the clay liner during construction shall be governed by the following criteria.

Test	Test Requirement	Testing Frequency	Testing Standard
In Place Nuclear Density	Greater than 95%	1 per 5,000 sf per lift (minimum of 3 per lift)	ASTM D 2922
In Place Nuclear Moisture	Greater than optimum	1 per 5,000 sf per lift (minimum of 3 per lift)	ASTM D 3017
Liquid Limit	Greater than 30	At 25%, 50%, 75% and 100% of liner construction	ASTM D 4318
Plasticity Index	Greater than 15**	At 25%, 50%, 75% and 100% of liner construction	ASTM D 4318
% Passing #200 Sieve	Greater than 30%	At 25%, 50%, 75% and 100% of liner construction	ASTM D 422
Maximum Particle Size	Less than 1 inch	At 25%, 50%, 75% and 100% of liner construction	ASTM D 422
Completed Liner Thickness	Surveyed Liner Thickness	At beginning and end of liner construction	Survey by RPLS
Thickness of Topsoil over Liner	Surveyed Topsoil Thickness	At beginning and end of liner cover construction	Survey by RPLS

**The plasticity index (PI) should be within 10 percentage points of the PI determined during lab testing of the proposed liner material.

The as-built thickness of the clay liner and the topsoil protective liner cover shall be determined by survey performed by an RPLS registered in the State of Texas. Prior to the placement of any portion of the clay liner, the subgrade shall be surveyed in a sufficient manner to establish the pond bottom. Upon completion of the line and prior to the placement of any other pond elements, the top of the liner shall be surveyed to verify the specified thickness of the liner has been achieved and the top of the liner is at the Engineer's specified grades and slopes, within a tolerance of +/- 0.2 feet. The same data points should be used for both pre and post liner construction surveys. The same data points should be used to survey the pond upon completion of the topsoil cover layer or sand bed installation.

4.3.4. Liner Repair. Any area of the clay liner that becomes damaged during construction shall be over excavated to at least one foot beyond the extents of the damaged area in all directions. The full depth of the liner shall be reconstructed in the damaged area using the above specifications.

Between the undamaged and damaged portion of the liner, the clay shall be benched at mid-depth such that the area being repaired and the undisturbed section are offset in stair-step fashion with no construction joint allow through the full depth of the liner.

Compaction equipment appropriate to the size of the repair shall be utilized. All repaired areas shall be tested against the project specifications for the moisture and density listed above prior to liner acceptance. All repairs that do not meet the density and moisture specifications shall be reworked and retested.

4.3.5. Liner Documentation. Test reports shall be issued for all tests performed and shall indicate whether the test result is in compliance with the project specifications. The Construction Materials Testing firm shall issue a daily representative's report. This report shall include, at a minimum:

- Date of Testing
- Identification of CMT field technician
- A description of the work performed during the day
- Type(s) of equipment used by the contractor
- Tests performed by the CMT field technician
- Any failed tests or non-compliant areas that require retesting or other corrective action

5. MEASUREMENT

This item will be measured by each water quality and detention pond constructed.

6. PAYMENT

The work performed and the materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Water Quality and Detention Pond." The price is full compensation for all materials, excavation, embankment, outfall structures, sand and gravel media, access drive, clay liner, filter fabric, rock riprap, trickle channels, valves, cleanouts, orifice plates, weir plates, trash rack, concrete pads, dry stack rock wall, PVC caps, outlet and inlet structures, removal and disposal of existing pond elements, and construction survey to provide a complete water quality and detention pond in accordance with the plans. This price shall include all final finishing, and all necessary equipment, labor, tools, and incidentals.

Fencing will be paid for at the unit price bid for Chain Link Fence (Install)(6') per linear foot. Access Gate will be paid for at the unit price bid for Chain Link Fence Gate (Install)(6'x16') per each. Topsoil will be paid for at the unit price bid for Class C (Top Soil), Plan Quantity per Cubic Yard. Gate Valve will be paid for at the unit price bid for gate valve (6") per each. Underdrain piping will be paid for at the unit price bid for Pipe Underdrains (6" PVC) per Linear Foot. Sodding will be paid for at the unit price bid for Bermuda Sodding or St Augustine Sodding per Square Yard.

Special Specification WC 9033
Concrete Washout Area

1. DESCRIPTION

Furnish, construct, and install concrete washout area.

2. MATERIALS

2.1 **General**. Concrete waste management involves designating and properly managing a specific area of the construction site as a concrete washout area. A concrete washout area can be created using one of several approaches designed to receive wash water from washing tools and concrete mixer chutes, liquid concrete waster from dump trucks, mobile batch mixers, or pump trucks. While three basic approaches are available this specification will focus on use of an above ground storage area. Surface discharge of concrete washout water from construction site are prohibited.

2.2. Appropriate Uses.

Concrete washout area must be designated on all sites that will generate concrete wash water or liquid concrete waste from onsite concrete mixing or concrete delivery.

3. CONSTRUCTION

3.1. Installation

3.1.1 Concrete washout activities must be conducted in a manner that does not contribute to pollutants to surface waters or storm water runoff. Concrete washout areas may be aboveground holding areas constructed of berms, sandbags, or straw bales with a plastic liner.

Design details are provided on Erosion Control Details 5 sheet in the plan set. Additional notes are provided below:

1. See plans for location of concrete washout area.
2. The concrete washout area shall be installed prior to concrete placement on site.
3. The concrete washout area shall include an above ground holding area that is 10’ by 10’.
4. Berm surrounding sides and back of the concrete washout area shall be constructed of straw bales and have a minimum height of 1.5’.
5. A construction entrance shall be included at the approach to the concrete washout area, and shall be sloped 2% toward the concrete washout area.
6. Signs shall be placed at the construction entrance, at the concrete washout area, and elsewhere as necessary to clearly indicate the location of the concrete washout area to operators of concrete trucks and pump rigs.

3.2. Maintenance and Removal

3.2.1 A key consideration for concrete washout areas is to ensure adequate signage is in place identifying the location of the washout area. Part of inspecting and maintaining washout areas is ensuring that adequate signage is provided and in good repair and that the washout is being used, as opposed to washout in non-designated areas of the site.

Remove concrete waster in the washout area, as needed to maintain BMP functionality (typically when filled to about two-thirds its capacity). Collect concrete waste and deliver offsite to a designated disposal location.

Concrete Washout Area maintenance activities include the following:

1. The Concrete washout area shall be repaired, cleaned, or enlarged as necessary to maintain capacity for concrete waste.
2. Concrete washout water, wasted pieces of concrete and all other debris shall be transported from the job site in a water-tight container and disposed of properly
3. The concrete washout area shall remain in place until all concrete for the project is placed.
4. When the concrete washout area is removed, cover the disturbed area with top soil, and seed or sod as shown on the drawings.

3.2.2 Upon termination of use of the washout site, accumulated solid waste, including concrete waste and any contaminated soils, must be removed from the site to prevent on-site disposal of solid waste. If the wash water is allowed to evaporate and the concrete hardens, it may be recycled.

4. MEASUREMENT AND PAYMENT

4.1 Measurement shall be made by the EACH for construction, maintenance, and removal of a complete concrete washout area as described in the plans and specifications, constructed in the completed and accepted final position including construction entrance and signage.

4.2 The work performed and materials furnished in accordance with this Item and measured under “Measurement” for the concrete washout area will be paid for at the unit price bid for “concrete washout area” complete and in place. This price is full compensation for (and not limited to) construction, maintenance, and removal of a complete concrete washout area as described in the plans and specifications, constructed in the completed and accepted final position including construction entrance and signage. This price shall include all final finishing, and all necessary equipment, labor, tools, and incidentals.

APPENDIX A

QUALITY CONTROL / QUALITY ASSURANCE PROGRAM

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Appendix A

Quality Control / Quality Assurance Program

Section 1. Overview

Introduction

Williamson County has established the following Quality Control (QC) / Quality Assurance (QA) Program to assure that the materials and workmanship incorporated into any roadway or highway construction project are in reasonable conformity with the requirements of the approved plans and specifications, including any approved changes. It consists of an "Acceptance Program" and a “QA Program" based on test results obtained by qualified persons and equipment.

This QC/QA Program allows for the use of validated contractor-performed QC test results as part of an acceptance decision. It also allows for the use of test results obtained by commercial laboratories in the QA Program in acceptance decisions, as well. The effectiveness of the “Acceptance Program” shall be the responsibility of the Construction Observer.

Definitions

Acceptance Program - All factors that comprise the Williamson County's determination of the quality of the product as specified in the contract requirements. These factors include QC and QA verification sampling and testing, and inspection.

Quality Control Program - The contractor’s systematic program detailing the control measures and reporting requirements necessary to achieve reasonable conformance with the requirements of the approved plans and specifications.

Quality Assurance Program - Activities that are an unbiased and independent evaluation of all the inspection, sampling and testing procedures used in the acceptance program.

Proficiency Samples - Homogenous samples that are distributed and tested by two or more laboratories and/or personnel. The test results are compared to assure that the laboratories and/or personnel are obtaining the same results.

Qualified Laboratories - Laboratories that are capable as defined by appropriate programs established by Williamson County and as indicated in the "Laboratory Qualification Program". As a minimum, the qualification program shall include provisions for checking testing equipment and the laboratory shall keep records of calibration checks.

Qualified Sampling and Testing Personnel - Personnel who are capable as defined by appropriate programs established as stated in Section 6 of this Appendix.

Quality Assurance – All those planned and systematic actions necessary to provide confidence that a product or service will satisfy given requirements for quality.

Quality Control - All contractor/vendor operational techniques and activities that are performed or conducted to fulfill the contract requirements.

Vendor – A supplier of project-produced material that is not the contractor.

Verification Sampling and Testing - Sampling and testing performed to validate the quality of the product, which consists of the QC and QA sampling and testing.

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Section 2. Acceptance Program

Materials incorporated into any roadway or highway construction project shall be subject to verification sampling and testing, and inspection as part of the QC program outlined below:

- Quality Control Inspection

  - Contractor-performed QC Inspection will be required as part of the acceptance decision. Inspection check lists for the following structural items shall be completed and submitted as part of the acceptance program:

    Item 400 – Excavation & Backfill
    Item 416 – Drilled Shaft Foundations
    Item 420 – Concrete Structures
    Item 421 – Hydraulic Cement Concrete
    Item 422 – Bridge Deck
    Item 423 – Retaining Wall
    Item 425 – Precast Pre-stressed Concrete Structural Members
    Item 440 – Reinforcing Steel
    Item 442 – Metal for Structures
    Item 462 – Concrete Box Culverts
    Item 464 – Reinforced Concrete Pipe

    Sample Inspection check lists are included at the end of this Appendix.

  - The contractor shall designate individual(s) responsible for the QC Inspection for the project or each work element thereof. The designated QC individual(s) will maintain responsibility for providing reports detailing the compliance of each work element to the requirements of the approved project plans and specifications.

  - The QC report will detail requirements of the approved project plans and specifications and measures initiated to ensure reasonable conformity.

  - The contactor shall submit the QC Plan for acceptance detailing the individuals & methods(s) intended to be used to obtain reasonable conformance to the approved project plans and specifications.

- Quality Control Sampling, Testing and frequency

  - Contractor-performed QC sampling and testing will be used as part of an acceptance decision.

  - The frequency and location will be according to the “Project Test” frequency as shown in Appendix B. This project has been designed utilizing TxDOT Specifications; therefore, the 2005 TxDOT Guide Schedule for Sampling and Testing has been adopted for the testing program. As a County-developed project, all references to TxDOT in the testing program shall be understood to mean Williamson County, and all references to the Engineer shall be understood to mean the County Engineer or his designated representative(s).

  - These QC sampling and testing personnel, laboratories, and equipment shall be qualified according to the "Sampling and Testing Personnel Qualification Program" and the "Laboratory Qualification Program" and shall be evaluated under the "Quality Assurance Program" contained herein.

- Any equipment used to perform QC sampling and testing shall be subject to an evaluation by QA sampling and testing personnel. This evaluation shall include calibration checks and split or proficiency sample tests. The requirements for, and frequency of, equipment calibration are shown in Appendix B. Acceptable tolerance limits for the comparison of test results from split or proficiency samples are shown in “Acceptable Tolerance Limits for Independent Assurance.”

- Any individual who performs verification or QC sampling and testing shall be evaluated by QA sampling and testing personnel. This evaluation shall include observations and split or proficiency sample testing. Acceptable tolerance limits for the comparison of test results for split or proficiency samples are shown in "Acceptable Tolerance Limits for Quality Assurance."

- Furthermore, these QC test results may be validated by verification test results obtained from independently taken samples at the direction of the Construction Observer or the County.

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Section 3. Quality Assurance Program

This Quality Assurance Program; as deemed necessary by the County or the Construction Observer; shall evaluate all QC inspection, sampling and testing procedures, personnel, and equipment used as part of the acceptance program.

- QA Inspection
    - The Construction Observer will be responsible for QA inspection. The inspection will be performed at periodic intervals to assure compliance with the accepted QC program, as well as to assure reasonable close conformity to the approved project plans and specifications.
- Sampling and Testing Frequency and Location
    - Quality Assurance sampling and testing shall be performed at the same location and frequency established for the Project Tests in the "Guide Schedule of Sampling and Testing" found in Appendix B.
    - The frequency for the “Independent Assurance Tests” shall be as directed by the Construction Observer.
- Testing Equipment
    - Laboratory testing equipment used for QA sampling and testing shall be qualified according to the "Laboratory Qualification Program."
    - All laboratories used for QA sampling and testing must be AASHTO accredited and listed as an accepted Lab by the County.
    - The frequency for qualifying QA sampling and testing equipment shall not exceed one (1) year or as directed by the Construction Observer.
    - Calibration/verification is required whenever the laboratory or equipment is moved.
    - The QA equipment shall be other than that used for performing verification or QC testing.
- Testing Personnel
    - Laboratory personnel who perform QA sampling and testing shall be in accordance with the "Sampling and Testing Personnel Qualification Program" Included herein.
    - The individuals performing QA sampling and testing shall be other than those who perform other verification or QC testing.
- Comparison of QC and QA Test Results
    - Acceptable tolerance limits for the comparison of test results from split and proficiency samples are shown in "Acceptable Tolerance Limits for Independence Assurance."
    - If the comparison of the test results do not comply with the tolerances, an engineering review of the test procedures and equipment shall be performed immediately to determine the source of the discrepancy.
    - Corrective actions must be identified and incorporated as appropriate.

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Test results from all samples involved in the Quality Assurance Program shall be documented and reported in the project files.

- Dispute Resolution System

    - Testing disputes arising between the Construction Observer, or his/her designated agents, and the Contractor shall be resolved in a reliable, unbiased manner. The decision of the County, the Construction Observer, or their authorized representatives will be final.

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Section 4. Materials Certification

The Independent Assurance agency shall submit a "Certificate of Materials" to the Construction Observer indicating the conformity of tested materials to the approved plans and specifications including any exceptions, if applicable.

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Section 5. Conflict of Interest

To avoid an appearance of a conflict of interest, sampling and testing of materials under the QA program shall be performed at a qualified laboratory other than the laboratory used for project testing by the Contractor.

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Section 6. Sampling and Testing Personnel Qualification Program

Purpose

This program provides uniform Countywide procedures for sampling and testing personnel qualification to ensure that tests required by the specifications are performed according to the prescribed sampling and testing methods.

Sampling and Testing Personnel Qualification

Sampling and testing personnel will be qualified to perform tests for the acceptance of materials in the areas of Portland cement concrete, soils and aggregates and bituminous materials. The test methods for which individuals can be qualified include, but are not limited to, the following.
(* Denotes tests on which split or proficiency sample evaluations are required.)

Soils & Aggregates (100-E Series & 400-A Series)
Tex-101-E, Preparing Soil and Flexible Base Materials for Testing

Tex-102-E, Determining Slaking Time

Tex-103-E, Determining Moisture Content in Soil Materials

Tex-104-E, Determining Liquid Limit of Soils*

Tex-105-E, Determining Plastic Limit of Soils*

Tex-106-E, Calculating the Plasticity Index of Soils*

Tex-107-E, Determining the Bar Linear Shrinkage of Soils*

Tex-108-E, Determining the Specific Gravity of Soils

Tex-110-E, Particle Size Analysis of Soils*

Tex-111-E, Determining the Amount of Material in Soils Finer than 75 m (No.200) Sieve

Tex-113-E, Laboratory Compaction Characteristics and Moisture-Density Relationship of Base Materials

Tex-114-E, Laboratory Compaction Characteristics and Moisture-Density Relationship of Subgrade and Embankment Soils

Tex-115-E, Field Method for Determining In-Place Density of Soils and Base Materials

Tex-116-E, Ball Mill Method for Determining the Disintegration of Flexible Base Material

Tex-117-E, Triaxial Compression Tests for Disturbed Soils and Base Materials

Tex-120-E, Soil-Cement Testing

Tex-121-E, Soil-Lime Testing

Tex-126-E, Molding, Testing, and Evaluating Bituminous Black Base Materials*

Tex-127-E, Lime Fly-Ash Compressive Strength Test Methods
Tex-128-E, Determining Soil pH

Tex-129-E, Measuring the Resistivity of Soil Materials

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Tex-140-E, Measuring Thickness of Pavement Layer

Tex-400-A, Sampling Stone, Gravel, Sand, and Mineral Aggregates

Tex-401-A, Sieve Analysis of Fine and Coarse Aggregate*

Tex-402-A, Fineness Modulus of Fine Aggregate

Tex-403-A, Saturated Surface Dry Specific Gravity and Absorption of Aggregates

Tex-404-A, Determining Unit Mass (Weight) of Aggregates

Tex-405-A, Determining Percent Solids and Voids in Concrete Aggregates

Tex-406-A, Material Finer Than 75 m (No. 200) Sieve in Mineral Aggregates (Decantation Test for Concrete Aggregates)

Tex-408-A, Organic Impurities in Fine Aggregate for Concrete

Tex-409-A, Free Moisture and Water Absorption in Aggregate for Concrete

Tex-409-A, Free Moisture and Water Absorption in Aggregate for Concrete

Tex-411-A, Soundness of Aggregate by Using Sodium Sulfate or Magnesium Sulfate

Tex-413-A, Determining Deleterious Materials in Mineral Aggregates

Tex-425-A, Determining Moisture Content in Fine Aggregate by the "Speedy" Moisture Method

Tex-460-A, Determining Crushed Face Particle Count

Bituminous (200-F Series)

Tex-200-F, Sieve Analysis of Fine and Coarse Aggregate*

Tex-201-F, Bulk Specific Gravity and Water Absorption of Aggregate

Tex-202-F, Apparent Specific Gravity of Material Finer than 180 m (No. 80) Sieve

Tex-203-F, Sand Equivalent Test*

Tex-204-F, Design of Bituminous Mixtures

Tex-205-F, Laboratory Method of Mixing Bituminous Mixtures

Tex-206-F, Compacting Test Specimens of Bituminous Mixtures*

Tex-207-F, Determining Density of Compacted Bituminous Mixtures*

Tex-208-F, Test for Stabilometer Value of Bituminous Mixtures*

Tex-210-F, Determining Asphalt Content of Bituminous Mixtures by Extraction*

Tex-211-F, Recovery of Asphalt from Bituminous Mixtures by the Abson Process

Tex-212-F, Determining Moisture Content of Bituminous Mixtures

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Tex-213-F, Determining Hydrocarbon-Volatile Content of Bituminous Mixtures

Tex-217-F, Determining Deleterious Material and Decantation Test for Coarse Aggregates

Tex-221-F, Sampling Aggregate for Bituminous Mixtures, Surface Treatments and Limestone Rock Asphalt

Tex-222-F, Sampling Bituminous Mixtures

Tex-224-F, Determining Flakiness Index

Tex-226-F, Indirect Tensile Strength Test

Tex-227-F, Theoretical Maximum Specific Gravity of Bituminous Mixtures*

Tex-228-F, Determining Asphalt Content of Bituminous Mixtures by the Nuclear Method*

Tex-229-F, Combined HMAC Cold-Belt Sampling and Testing Procedure

Tex-236-F, Determining Asphalt Content from Asphalt Paving Mixtures by the Ignition Method*

Concrete (400-A Series)

Tex-407-A, Sampling Freshly-Mixed Concrete

Tex-414-A, Air Content of Freshly Mixed Concrete by the Volumetric Method*

Tex-415-A, Slump of Portland Cement Concrete*

Tex-416-A, Air Content of Freshly Mixed Concrete by the Pressure Method*

Tex-417-A, Unit Weight, Yield, and Air Content (Gravimetric) of Concrete

Tex-418-A, Compressive Strength of Cylindrical Concrete Specimens*

Tex-419-A, Compressive Strength of Concrete Using Portions of Beams Broken in Flexure

Tex-424-A, Obtaining and Testing Drilled Cores of Concrete

Tex-436-A, Measuring Texture Depth by the Sand Patch Method

Tex-437-A, Test for Flow of Grout Mixtures (Flow Cone Method)

Tex-447-A, Making and Curing Concrete Test Specimens

Tex-448-A, Flexural Strength of Concrete Using Simple Beam Third-Point Loading*

Tex-450-A, Capping Cylindrical Concrete Specimens

Tex-460-A, Determining Crushed Face Particle Count

Asphalt (500-C Series)

Tex-502-C, Penetration of Bituminous Materials (refer to AASHTO T 49)

Tex-530-C, Effect of Water on Bituminous Paving Mixtures

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Tex-531-C, Prediction of Moisture-Induced Damage to Bituminous Paving Materials Using Molded Specimens

Tex-1000-S, Operating Pavement Profilograph and Evaluating Profiles

Who Must Be Qualified?

Any individual who performs tests on materials for acceptance must be qualified.

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Qualification of Sampling and Testing Personnel

All sampling and testing personnel for approved laboratories shall be qualified to do the work in accordance with "Laboratory Qualification Program".

Each laboratory shall maintain a minimum of one (1) qualified individual for each test procedure performed.

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Section 7. Laboratory Qualification Program

Purpose

This program provides uniform countywide procedures to ensure that laboratory facilities and equipment are adequate for the performance of required sampling and testing methods.

Laboratories

All laboratories that perform testing for Williamson County must be accredited under the AASHTO Laboratory Accreditation Program. These include, but are not limited to the following:

- Area/project laboratories (includes field laboratories)
- Commercial laboratories
- Contractor laboratories
- Vendor laboratories (material suppliers).

The most current AASHTO accredited laboratories in the State of Texas can be obtained at http://patapsco.nist.gov/aashto/amrl/services/aap_intro.htm. In addition, Appendix C includes a list of AASHTO accredited laboratories obtained at the time this document was prepared.

Laboratory Qualification Responsibility

The Construction Observer or his/her authorized representatives will be responsible to ensure all QA laboratories used for project and QA testing and sampling are qualified.

Qualification Process

The laboratory qualifying authority will:

- identify the scope of testing to be performed
- verify that manuals and/or test methods used to perform tests are available and up-to-date
- document that the laboratory has the required equipment to perform the tests
- check the calibration/verification records for each piece of equipment, to include:
    - description of equipment
    - identification of any traceable standard used
    - frequency of calibration
    - date of last calibration
    - date of next calibration
    - procedure used to calibrate equipment
    - procedure used to identify equipment not in compliance.

In addition, all equipment may be subjected to calibration verification or other inspection by the qualifying authority.

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Calibration Standards and Frequencies for Laboratory Equipment

The standards for calibration and the frequencies for laboratory equipment calibrations shall be in accordance with appropriate testing equipment measures as indicated in the Texas Department of Transportation Manual of Testing Procedures. 100-E (Soils), 200-F (Bituminous), and 400-A (Concrete) series of TxDOT's *Manual of Testing Procedures*.

Frequency for Laboratory Qualification

Laboratories shall be qualified at an interval not to exceed six (6) months, or as directed by the Construction Observer. Calibration/verification is required whenever the laboratory or equipment is moved.

Non-Compliance

A laboratory that does not meet the above requirements is subject to disqualification. Any equipment in a qualified laboratory failing to meet specified equipment requirements for a specific test method shall not be used for that test method.

Documentation

The Construction Observer will be responsible for verifying that laboratories are qualified to perform material testing. Documentation will be required to be kept by the qualified laboratory. Calibration records will be maintained for three (3) years, unless directed otherwise by the Construction Observer.

Dispute Resolution

The County will have the final decision regarding all disputes of the laboratory qualification and calibration of testing equipment.

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Section 8. Acceptable Tolerance Limits for Quality Assurance

The following tables indicate the acceptable tolerance limits for the specified material.

Embankment

Embankment		
Procedure	**Texas Test Method**	**Tolerance**
In-place Density	"Tex-115-E, Field Method for Determining In-Place Density of Soils and Base Materials"	± 2.5% Field Density

Untreated & Treated Sub-base and Base Courses

Untreated & Treated Sub-base and Base Courses		
Procedure	**Texas Test Method**	**Tolerance**
In-place Density	"Tex-115-E, Field Method for Determining In-Place Density of Soils and Base Materials"	± 2.5% Field Density
Gradation:	"Tex-110-E, Particle Size Analysis of Soils"	-
> No. 4 ≤ No. 4	-	± 5% ± 3%
Liquid Limit	"Tex-104-E, Determining Liquid Limit of Soils"	15% of the mean*
Plasticity Index	"Tex-106-E, Calculating the Plasticity Index of Soils"	20% of the mean*

Asphalt Stabilized Base

Asphalt Stabilized Base		
Procedure	**Texas Test Method**	**Tolerance**
Gradation:	"Tex-200-F, Sieve Analysis of Fine and Coarse Aggregates"	-
> No. 4 ≤ No. 4	-	± 5% ± 3%
Liquid Limit	"Tex-104-E, Determining Liquid Limit of Soils"	15% of the mean*
Plasticity Index	"Tex-106-E, Calculating the Plasticity Index of Soils"	20% of the mean*
Percent Asphalt	"Tex-210-F, Determining Asphalt Content of Bituminous Mixtures by Extraction"	± 0.3%
-	"Tex-228-F, Determining Asphalt Content of Bituminous Mixtures by the Nuclear Method"	± 0.3%

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-	"Tex-126-E, Molding, Testing, and Evaluating Bituminous Black Base Materials"	± 0.3%
-	"Tex-229-F, Combined HMAC Cold-belt Sampling and Testing Procedure"	± 0.3%
-	"Tex-236-F, Determining Asphalt Content from Asphalt Paving Mixtures by the Ignition Method"	± 0.3%
In-place Density (Cores)	"Tex-207-F, Determining Density of Compacted Bituminous Mixtures"	± 1% Field Density

Surface Treatment Aggregates

Surface Treatment Aggregates		
Procedure	**Texas Test Method**	**Tolerance**
Gradation:	"Tex-200-F, Sieve Analysis of Fine and Coarse Aggregates"	-
> No. 4 ≤ No. 4	-	± 5% ± 3%

Portland Cement Concrete Coarse Aggregate

Portland Cement Concrete Coarse Aggregate		
Procedure	**Texas Test Method**	**Tolerance**
Gradation:	"Tex-401-A, Sieve Analysis of Fine and Coarse Aggregate"	-
> No. 4 ≤ No. 4	-	± 5% ± 3%

Portland Cement Concrete Fine Aggregate

Portland Cement Concrete Fine Aggregate		
Procedure	**Texas Test Method**	**Tolerance**
Gradation (3/8" through No. 200)	"Tex-401-A, Sieve Analysis of Fine and Coarse Aggregate"	± 3%
Sand Equivalent	"Tex-203-F, Sand Equivalent Test"	± 10

Portland Cement Concrete Complete Mixture

Portland Cement Concrete Complete Mixture		
Procedure	**Texas Test Method**	**Tolerance**
Flexural Strength Compressive	1. "Tex-448-A, Flexural Strength of Concrete Using Simple Beam Third-Point Loading" 2. "Tex-418-A, Compressive Strength of Cylindrical Concrete Specimens"	20% of the mean*

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Slump	"Tex-415-A, Slump of Portland Cement Concrete"	± 1.0"
Entrained Air	3. "Tex-414-A, Air Content of Freshly Mixed Concrete by the Volumetric Method" 4. "Tex-416-A, Air Content of Freshly Mixed Concrete by the Pressure Method"	± 1%

Asphaltic Concrete Coarse Aggregate

Asphaltic Concrete Coarse Aggregate		
Procedure	**Texas Test Method**	**Tolerance**
Gradation: > No. 10 ≤ No. 10	"Tex-200-F, Sieve Analysis of Fine and Coarse Aggregates" -	- ± 5% ± 3%
Deleterious Material	"Tex-217-F, Determining Deleterious Material and Decantation Test for Coarse Aggregates"	± 0.3 %
Decantation	"Tex-217-F, Determining Deleterious Material and Decantation Test for Coarse Aggregates"	20% of the mean*

Asphaltic Concrete Fine Aggregate

Asphaltic Concrete Fine Aggregate		
Procedure	**Texas Test Method**	**Tolerance**
Gradation (No. 10 through No. 200)	"Tex-200-F, Sieve Analysis of Fine and Coarse Aggregates"	± 3%
Bar Linear Shrinkage	"Tex-107-E, Determining the Bar Linear Shrinkage of Materials"	± 2

Asphaltic Concrete Combined Aggregate

Asphaltic Concrete Combined Aggregate		
Procedure	**Texas Test Method**	**Tolerance**
Gradation: > 5/8" 5/8" through No. 200 Passing No. 200	"Tex-200-F, Sieve Analysis of Fine and Coarse Aggregates" -	- ± 5% ± 3% ± 1.5%
Sand Equivalent	"Tex-203-F, Sand Equivalent Test"	± 10

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Asphaltic Concrete Complete Mixture

Asphaltic Concrete Complete Mixture		
Procedure	**Texas Test Method**	**Tolerance**
Asphalt Content	"Tex-210-F, Determining Asphalt Content of Bituminous Mixtures by Extraction"	± 0.3%
-	"Tex-228-F, Determining Asphalt Content of Bituminous Mixtures by the Nuclear Method"	± 0.3%
-	"Tex-229-F, Combined HMAC Cold-belt Sampling and Testing Procedure"	± 0.3%
-	"Tex-236-F, Determining Asphalt Content from Asphalt Paving Mixtures by the Ignition Method"	± 0.3%
Maximum Theoretical Specific Gravity	"Tex-227-F, Theoretical Maximum Specific Gravity of Bituminous Mixtures"	± 0.020
Laboratory Molded Density	"Tex-207-F, Determining Density of Compacted Bituminous Mixtures"	± 1.0%
Laboratory Molded Bulk Specific Gravity	"Tex-207-F, Determining Density of Compacted Bituminous Mixtures"	± 0.020
Stability	"Tex-208-F, Test for Stabilometer Value of Bituminous Mixtures"	5 points
Moisture	"Tex-212-F, Determining Moisture Content of Bituminous Mixtures"	± 0.2 mL
In-place Air Voids (Core)	"Tex-207-F, Determining Density of Compacted Bituminous Mixtures"	± 1.0%

NOTE: The above tolerances are to be used when comparison of test results is by split samples. A tolerance of plus or minus two (2) standard deviations shall be used when comparison of test results is by proficiency samples.

*The difference between compared test results shall not exceed the indicated percentage of the mean of the compared test results - the mean being the average of the two test results.

EXAMPLE: Plasticity Index	
Job Control test value	18
IA Test value	22
Mean	20
20% difference	4

Both values are within 20% of the mean.

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Williamson County Road Bond Program
Construction Quality Control & Quality Assurance Program

Inspection Check Lists

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item:	400 – Excavation & Backfill for Structures	Report No.:	
Description:		Date:	
Location:		Time:	

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____

Excavation and Backfill for Structures	**Yes**	**No**	**NA**
I. Excavation (400.3)			
1. Whenever excavating for installing structures across private property beyond the limits of the embankment, is the top soil removed prior excavation and kept separate and later replaced, as nearly as feasible, in its original position?	☐	☐	☐
2. If trench excavation deeper than five (5) feet, is trench protection required?	☐	☐	☐

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		Yes	No	NA
3.	When old or abandoned structures or foundations are encountered in the excavation, are they removed for the full width of the excavation and to a depth of one (1) foot below the bottom of the excavation?	☐	☐	☐
4.	During construction, did the contractor receive approval from the Engineer of Record before laying any structures in the presence of water?	☐	☐	☐
5.	If the excavation cannot be dewatered to the point where the subgrade is free of mud, was a concrete mixture with not less than three (3) sacks of cement per cubic yard (or other material approved by the Engineer of Record) placed a minimum of three (3) inches in depth in the bottom of the excavation?	☐	☐	☐
6.	For all culverts where the soil encountered at established footing grade is an unstable or incompressible material is the procedure shown in Item 400.3.A.4 followed unless other methods are called for in the plans?	☐	☐	☐
7.	Unless otherwise shown on the plans, are all sewer pipe structures constructed in an open cut with vertical sides to a point one (1) foot above the pipe?	☐	☐	☐
8.	Are all vertical sides sheeted and braced when necessary to maintain the required vertical excavation throughout the construction?	☐	☐	☐
9.	For pipe to be installed in a fill section was the embankment constructed to one (1) foot above the top of the pipe and then excavated for the pipe?	☐	☐	☐

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	Yes	No	NA
10. Is the trench excavated to the width and elevations as shown in the plans?	☐	☐	☐
11. Is the pipe, culvert, etc., properly centered in the trench?	☐	☐	☐

II. Shaping and Bedding (400.3.B)

1. For precast box sections and pipe, is the bedding in accordance with Item 400.3.B unless otherwise shown on the plans?	☐	☐	☐
2. For precast pipe and box sections where cement stabilized backfill is indicated on the plans, is the excavation undercut a minimum 4 inches and backfilled with stabilized material to support the pipe at the required grade?	☐	☐	☐

III. Backfill – General (400.3.C)

1. Is backfill material free from stones of such size as to interfere with compaction, large or frozen lumps which will not break down readily under compaction; and wood or other extraneous material?	☐	☐	☐
2. a. Is backfill in areas not supporting any portion of the completed roadbed, retaining wall or embankment, placed in layers not more than ten (10) inches in depth (loose measurement)?	☐	☐	☐
b. Is backfill which will support any portion of the roadbed, retaining wall or embankment, placed in uniform layers not to exceed eight (8) inches in depth (loose measurement)?	☐	☐	☐



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	Yes	No	NA
3. Is each layer of backfill material to the moisture content needed to obtain the required density?	☐	☐	☐
4. If a cohesionless material, such as sand, is used, is it compacted with vibratory equipment, water ponding or a combination of both?	☐	☐	☐

IV. Backfill – Bridge Foundations, Retaining Walls and Culverts (400.3.C.2)

1. Is the material used for backfilling free of any appreciable amount of gravel or stone particles more than four (4) inches in greatest dimension and of a gradation that permits thorough compaction?	☐	☐	☐
2. Are mechanical tamps or rammers required when the structure being backfilled could sustain damage from other compacting operations?	☐	☐	☐
3. Are any special density requirements for backfill under or adjacent to structures met?	☐	☐	☐

V. Backfill – Pipe (400.3.C.3)

1. After the bedding and pipes have been installed as required, is the selected backfill materials brought to proper moisture condition, placed along both sides of the pipe equally, in uniform layers not exceeding eight (8) inches in depth (loose measurement), and thoroughly compacted mechanically?	☐	☐	☐

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	Yes	No	NA
2. Is the method of backfill in question 1 above continued in this manner to the top of pipe elevation and compacted in accordance with Item 400.3.C.1?	☐	☐	☐

VI. Cement Stabilized Backfill (400.3.C.4)

	Yes	No	NA
1. When required by plans, is cement stabilized backfill or flowable backfill placed equally along all sides of the structure, so as to prevent strain on or displacement of the structure; and are all voids filled?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item: 416 – Drilled Shaft Foundations
Description: _____
Location: _____
Report No.: _____
Date: _____
Time: _____

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____

416 – Drilled Shaft Foundations	**Yes**	**No**	**NA**
I. Materials (416.2)			
1. Did the Contractor incorporate materials into this project that meet the requirements of referenced items in Section 416.2?	☐	☐	☐
2. Does concrete for Drilled Shafts meet the requirements of Table 1 and Table 2 for concrete class and slump?	☐	☐	☐
3. If drilling slurry is used, does it meet the requirements of Table 3, as determined by Tex-130 E?	☐	☐	☐

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Drilled Shaft Foundations – Item 416

	Yes	No	NA
4. Do Chemical Admixtures meet the requirements of DMS-4620?	☐	☐	☐

_____

_____

II. Construction (416.3)

A. Excavation

1. When excavating, was satisfactory founding material encountered at plan elevation?	☐	☐	☐

_____

_____

If not, was the bottom of the shaft adjusted, or the foundation altered, as determined by the Engineer of Record, to satisfactorily comply with the design requirements?

_____

_____

2. Is the shaft vertical alignment measured and found to be within a tolerance of 1 inch per 10 feet of depth? **(Hold Point)**	☐	☐	☐

_____

_____

3. Is the center of shaft location measured and found to be not more than 1 inch from the horizontal position shown on the plans? **(Hold Point)**	☐	☐	☐

_____

_____

If not, was a structural review performed?

_____

_____

4. Did the Contractor provide suitable access and lighting for proper inspection of the completed excavation?	☐	☐	☐

_____

_____

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Drilled Shaft Foundations – Item 416

	Yes	No	NA
5. For abutment drill shafts, is the embankment at the bridge ends completed to grade and thoroughly compacted prior to drilling?	☐	☐	☐

B. Requirements for Slurry Displacement Method

1. If the slurry method is used to construct drilled shaft, is slurry mixed at the project site or is it premixed in a reservoir adjacent to the excavation (not in the shaft excavation or other hole)?	☐	☐	☐
2. During and after drilling was a head of slurry maintained in the shaft excavation at or near ground level or higher as necessary to counteract ground water pressure?	☐	☐	☐
3. Just prior to placement of reinforcing steel, was an airlift or proper size cleanout bucket used to remove accumulated material on the bottom after the completion of drilling? **(Hold Point)**	☐	☐	☐
4. Was concrete placement started within 4 hours of shaft excavation? If not, was shaft reprocessed?	☐	☐	☐
5. Is the slurry agitated if the placement of concrete is delayed to keep it liquefied?			

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Drilled Shaft Foundations – Item 416

C. Reinforcing Steel	Yes	No	NA
1. Is the cage of reinforcing steel completely assembled according to plans and placed in the drill shaft as a unit immediately prior to concrete placement? **(Hold Point)**	☐	☐	☐
2. Where spiral reinforcement is used, is it tied to longitudinal bars (not welded) at a spacing not to exceed 24 inches?	☐	☐	☐
3. In uncased shafts, are concrete spacer blocks or steel chairs placed at sufficient intervals to insure concentric spacing for the entire length of the cage?	☐	☐	☐
4. In cased shafts, are steel chair spacers or bent pieces of steel bars placed at sufficient intervals to insure concentric spacing inside the casing?	☐	☐	☐
5. Is the cage adequately supported to control vertical displacement and racking and distortion of the steel during concrete placement and/or extraction of the casing?	☐	☐	☐
6. a. Is the elevation of the steel cage checked before and after concrete placement or after casing extraction when casing is used?	☐	☐	☐
b. Did the downward movement of the steel not exceed 6 inches per 20 feet of shaft length?	☐	☐	☐

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Drilled Shaft Foundations – Item 416

	Yes	No	NA
c. Did the upward movement of the steel not exceed 6 inches?	☐	☐	☐
d. Were the dowel bars checked for proper lap length between the shaft and column?	☐	☐	☐

D. Concrete (Perform all work in accordance with the requirements of Item 420, "Concrete Structures".)

1. For dry shafts 24" in diameter or smaller, is concrete placed continuously through the entire length of the shaft through a suitable tube or tremie (limit freefall to 25 feet) to prevent segregation of materials?	☐	☐	☐
2. Does the elapsed time from the beginning of concrete placement into the cased portion of the shaft until the completion of extraction of the casing exceed one hour?	☐	☐	☐
3. At the time the concrete is placed, is the excavated drill shaft free from accumulated seep water?	☐	☐	☐
4. Has all loose material been removed from the bottom of the excavation prior to placing concrete?	☐	☐	☐

(Note: For dry shafts over 24" diameter concrete freefall is unlimited; use 3 foot drop tube.)

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Drilled Shaft Foundations – Item 416

	Yes	No	NA
E. Additional Requirements for Slurry Displacement or Underwater Concrete Placement Methods			
1. Is the concrete placed through a closed tremie or pumped to the bottom of the excavation?	☐	☐	☐
2. If a tremie is used, is it kept full of concrete and well submerged in the previously placed concrete at all times?	☐	☐	☐

How is this determined?

3. During the placement of concrete was the tremie raised, as necessary, to maintain the free flow of concrete and the stability of any casing used?

4. Was additional concrete placed to ensure the removal of any contaminated concrete at the top of the shaft?

5. For pours over water, was a collar used to capture the slurry and the top portion of concrete flushed from the shaft?

6. If the tremie seal (separating layer between the concrete and contaminated bottom hole material) is lost, was the tremie removed, the bottom resealed and the tremie re-inserted at least 5 feet below the new seal before continuing concrete placement?

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Drilled Shaft Foundations – Item 416

	Yes	No	NA
F. Load Testing			
1. If required, were the poured drill shafts load tested after curing in accordance with Item 405, "Foundation Test Load"?	☐	☐	☐

_____

_____

Williamson County Road Bond Program Inspection Check Lists

Drilled Shaft Foundations – Item 416

Drilled Shaft Record
Form No. 416

DRILLED SHAFT				BELL FTG.		Date Drilled	Casing Used	Drilling Mud	Slurry Plmt.	Remarks
No.	Dia. (in)	Top of Shaft Elev.	Length (ft)	Dia. (CY)	Vol. (CY)					
Bent No.	Design Load		Tons per shaft							
Bent No.	Design Load		Tons per shaft							
Bent No.	Design Load		Tons per shaft							
Bent No.	Design Load		Tons per shaft							
Bent No.	Design Load		Tons per shaft							

Summary for Payment				Comments
Total this sheet		Total this structure		
size of shaft	Length (ft.)	size of shaft	Length (ft.)	
Total Vol of Bells		Total Vol of Bells		

Williamson County
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Inspection Check Lists

Drilled Shaft Foundations – Item 416

Signature/Date:_____

Williamson County
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Spec Item: 420 – Concrete Structures
Description: _____
Location: _____

Report No.: _____
Date: _____
Time: _____

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____

Concrete Structures	**Yes**	**No**	**NA**
I. Materials (420.2)	☐	☐	☐
1. Were concrete structures constructed from materials conforming to TxDOT's Department Material Specifications in accordance with Section 420.2?			

II. Construction (420.4)

A. Schedule Restrictions

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Concrete Structures – Item 420

	Yes	No	NA
1. Did the Contractor comply with the schedule restrictions of Section 420.4.A, prior to erecting forms, removing forms, placement of materials, equipment and bridge rail, opening to construction or full traffic, post-tensioning or backfilling, ensure the previously placed concrete attained the minimum compressive strength or curing time?	☐	☐	☐

B. Falsework and Forms

1. Are the working drawings for forms and falsework signed and sealed by a Registered Professional Engineer, licensed in the state of Texas?	☐	☐	☐
2. Were the falsework and forms placed braced and alignments checked to ensure placement in accordance with the plans signed/sealed working drawings?	☐	☐	☐

C. Reinforcement (provided under Item 440)

1. Was reinforcing steel supports welded to I-beams or girders or to reinforcing steel as shown in the plans?	☐	☐	☐
2. Is the installation of dowels and anchor bolts in accordance with Section 420.4.G.10?	☐	☐	☐

D. Placing Concrete - General

1. Is the temperature of structural concrete at the time of placement between 50°and 95° F?	☐	☐	☐

Williamson County
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Concrete Structures – Item 420

	Yes	No	NA
2. Is the temperature of each truck load of concrete for bridge slabs and top slabs of direct traffic culverts being checked and is it between 50° and 85°F?	☐	☐	☐
3. Does the transporting time from the Batching Plant to the placing of concrete in the forms conform to the specification or requirements?	☐	☐	☐
4. If a pump is used to deliver concrete from the truck to the structure, is sampling for testing done at the discharge or was correlation testing performed and documented to ensure that specifications are met at the discharge end?	☐	☐	☐
5. Are all forms, pre-stressed concrete panels, T-beams and concrete box beams wetted thoroughly and remaining puddles of excess water removed prior to concrete placement?	☐	☐	☐
6. Does the method of handling, placing and consolidation of concrete minimize segregation of the concrete and displacement of the reinforcement?	☐	☐	☐
7. Does the concrete have a free fall of five (5) feet or less except in the case of thin walls or as specified otherwise?	☐	☐	☐

Williamson County
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Concrete Structures – Item 420

	Yes	No	NA
8. Is the concrete deposited in the forms in uniform layers not more than thirty-six (36) inches in thickness unless otherwise directed by the Engineer?	☐	☐	☐
9. Is the sequence of successive layers or adjacent portions of concrete such that they can be vibrated into a homogenous mass with the previously placed concrete before it sets?	☐	☐	☐
10. Is the construction sequence arranged so that cold joints in a monolithic placement is avoided?	☐	☐	☐
11. Is the concrete vibrated immediately after placement to consolidate the concrete and have the mortar flushed to the form surfaces?	☐	☐	☐
12. Is at least one stand-by vibrator provided for emergency use in addition to those required for placement?	☐	☐	☐
13. Is the rate of placement and finish satisfactory?	☐	☐	☐
14. Unless otherwise shown on the plans, for monolithic mass placements having a least dimension greater than five (5) feet, did the contractor submit a detailed plan to minimize temperature differential and meet the requirements of the Specification?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Structures – Item 420

	Yes	No	NA
E. Construction Joints			
1. Are all construction joints in bridge slabs of the type and at the locations shown on the plans?	☐	☐	☐
2. Are there additional bridge slab construction joints placed that are not shown on the plans?	☐	☐	☐
3. Was written authorization from the Engineer given for additional joints in these members?	☐	☐	☐
F. Placing Concrete in Cold Weather			
1. Is concrete placed only when the ambient temperature in the shade is 35°F and rising or above 40°F?	☐	☐	☐
2. Is the temperature maintained after placement in accordance with Section 420.4.G.11?	☐	☐	☐
G. Placing Concrete in Hot Weather			
1. Unless otherwise directed by the Engineer, is an approved retarding agent used in all concrete pours for superstructures and top slabs of direct traffic culverts when the air temperature is above 85°F?	☐	☐	☐

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Inspection Check Lists

Concrete Structures – Item 420

	Yes	No	NA
H. Placing Concrete in Water			
1. Are all classes of concrete placed under water, except Class E and Class SS, redesigned to contain an additional sack of cement per cubic yard?	☐	☐	☐
2. Is the concrete placed with a tremie meeting the requirements of Section 420.4.G.13, and is it not permitted to fall freely through the water nor disturbed after being placed?	☐	☐	☐
I. Placing Concrete in Superstructure			
1. For simple span bridge slabs, what type of finishing machine was used?	☐	☐	☐
2. If other than a mechanical longitudinal screed or a self-propelled transverse finishing machine was used, was approval given by the Engineer for small placements or unusual conditions?	☐	☐	☐
J. Finish of Bridge Slabs			
1. Did QC Reviewer witness the dry-run with the Contractor to ensure dead load deflection, screed profile, steel elevation, tying of rebar, armor joint elevation, depth of cover, etc. was checked?	☐	☐	☐
2. Was the concrete worked with a float to ensure a smooth finish?	☐	☐	☐

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Inspection Check Lists

Concrete Structures – Item 420

	Yes	No	NA
3. Did QC Reviewer perform sufficient checks with a 16-ft. straight edge on the plastic concrete to ensure final surface is within specified tolerances?	☐	☐	☐
4. Did QC Reviewer continue checking and floating until the deck surface was true to grade, free of depressions, high spots, voids and rough spots?	☐	☐	☐
5. Was the surface finish achieved by using a carpet drag, burlap drag or broom?	☐	☐	☐
6. Was the finished concrete surface coated within 10 minutes with a single application of evaporation retardant at the rate recommended by the manufacturer?	☐	☐	☐
7. Is the final bridge deck surface given a grooved steel tine finish approximately 1/8 to 3/16 inches deep approximately 1/8 inches wide, randomly spaced approximately ¾ to 1 inch apart?	☐	☐	☐
8. Did the bridge deck finish meet the ride quality tolerance of 1/8 inch in ten (10) feet (10 feet straight edge test)?	☐	☐	☐
9. Was the bridge deck grooved by saw-cutting in accordance with Section 420.4.I?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Structures – Item 420

	Yes	No	NA
K. Curing Concrete			
1. Were the curing requirements of Item 420.4.J met? (Note: See Table 1 – Please note "Exceptions to 4-Day Curing?")	☐	☐	☐
L. Removal of Forms and Falsework			
1. Did the Contractor remove the forms and falsework in accordance with Section 420.4.K?	☐	☐	☐
M. Ordinary Surface Finish			
1. Unless noted otherwise in the plans, did the exposed surfaces for the following items receive an ordinary finish in accordance with Section 420.4.M?			
a. Inside and top of inlets?	☐	☐	☐
b. Inside and top of manholes?	☐	☐	☐
c. Inside of sewer appurtenances?	☐	☐	☐
d. Inside of culvert barrels?	☐	☐	☐
e. Bottom of bridge slab between girders or beams?	☐	☐	☐
f. Vertical and bottom surfaces of interior concrete beams or girders?	☐	☐	☐

Note: Form marks and chamfer edges do not need to be smoothed for inside of culvert barrels and bottom of bridge slabs between girders or beams.

N. Surface Finishes for Concrete (Item 427)			
1. Was the surface cleaned and patched in preparation to receive the finish coating as shown in the plans: was this work performed in accordance with the requirements of Item 427?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Structures – Item 420

_____

_____

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item: 421 – Hydraulic Cement Concrete
Description: _____
Location: _____
Report No.: _____
Date: _____
Time: _____

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____

Portland Cement Concrete	**Yes**	**No**	**NA**
I. Materials (421.2)			
1. Do the materials used in all mixed concrete placed on the job conform to TxDOT's Department Material Specifications and other requirements of Section 421.2?	☐	☐	☐
2. Is the concrete mix visually checked for uniformity from the beginning to the end of each load?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Hydraulic Cement Concrete – Item 421

	Yes	No	NA
II. Construction (421.4)			
A. Classification and Mix Design			
1. Are the requirements for entrained air met as outlined in Section 421.4.A.4 (Table 7)?	☐	☐	☐
2. Are the requirements of Table 8 – "Slump Requirements" being met?	☐	☐	☐
3. Is the maximum water-cement ratio exceeded?	☐	☐	☐
4. If question 3 is "yes", is the ratio regularly exceeded; was a new design performed?	☐	☐	☐
5. Is no water added to the concrete once discharge has begun to ensure that the maximum water-cement ratio is not exceeded?	☐	☐	☐
B. Job Testing and Documentation			
1. Was the concrete checked at the beginning of the load for slump or entrained air to prohibit placement of non-conforming material?	☐	☐	☐
2. Is the required job site testing (strength, clump, entrained air, concrete temperature, etc.) being performed at the required frequency using proper TxDOT testing methods?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Hydraulic Cement Concrete – Item 421

	Yes	No	NA
3. Are the concrete tickets properly completed?	☐	☐	☐
4. Is the amount of water withheld (based on the design water-cement ratio) at the plant shown on the concrete ticket?	☐	☐	☐
5. If concrete is pumped, where is sampling and testing being performed?	☐	☐	☐
6. Were comparison tests recorded between the haul unit and the point of unit discharge after pump?	☐	☐	☐

C. Truck Mounted Paving Mixers and Transit Mix Trucks

1. Is each truck delivered concrete batch mixed not less than 70 nor more than 100 revolutions of the drum at the mixing speed designated by the manufacturer to produce a uniform concrete mix?	☐	☐	☐
2. When water is added at the job site, is the batch mixed a minimum of 25 revolutions at mixing speed?	☐	☐	☐

Concrete Batch Ticket

Ticket No: _____

Date: _____

Material Information

MAT'L	Identification*	Am't Batched
AEA		oz.
RA		oz.
WRA		oz.
		oz.
CA_1		lbs.
CA_2		lbs.
FA_1		lbs.
Cement		lbs.
Fly Ash		lbs.
		lbs.
		lbs.
		lbs.

AT PLANT

Plant | Des. No. | Truck No.

CY | County | Project | CCSJ

Class | Air Temp °F | Mixer Chg'd. ☐ AM ☐ PM | MAX TIME

*%Moist | CA_1 | CA_2 | CA_3 | CA_4 | FA_1 | FA_2

Water: Added (gal). | Ice. (lbs) | Max. (gal)

Rev. Const.: Beg. | End | Mix Rev.

Remarks

Plant Inspector Signature

AT JOBSITE

Structure | Location in Str.

Water Added (gal). | Ice (lbs).

Rev. Constr. Beg. | End. | Mix Rev.

*Slump | *%Air | *Conc. Temp °F | *Unit Weight Lbs/ft^3

*Bm. Or Cyl. Nos | Target Value psi | Mixer Unloaded ☐ AM ☐ PM

Remarks

Plant Inspector Signature

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item: 422 – Reinforced Concrete Slab
Description: _____
Location: _____
Report No.: _____
Date: _____
Time: _____

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____

Reinforced Concrete Slab	**Yes**	**No**	**NA**
I. Materials (422.2)			
1. Are the materials furnished by the Contractor in accordance with the referenced Items of work and meet the requirements of Section 422.2?	☐	☐	☐
II. Construction (422.3)			
A. Pre-placement			
1. Is all placing, finishing and curing equipment in place and operational?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Reinforced Concrete Slab – Item 422

	Yes	No	NA
2. Has a dry runoff the equipment been done?	☐	☐	☐
3. Has the proper clear cover for the rebar been checked?	☐	☐	☐
4. Does screed clear at the armor joints?	☐	☐	☐
5. Are drains and grates at plan location and elevation?	☐	☐	☐
6. Is sufficient plastic and curing blankets available in case of inclement weather after the pour begins?	☐	☐	☐
7. Are forms, deck panels, beams and every element that the fresh concrete will come in contact with properly wetted?	☐	☐	☐

B. During Placement

1. Has placement begun at the low end on spans with a profile grade of 1.5% or more?	☐	☐	☐
2. Are proper clear cover depths being checked at the frequency shown in the Test Guide Schedule?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Reinforced Concrete Slab – Item 422

	Yes	No	NA
3. Is concrete being placed between exterior and adjacent beams prior to placing concrete on overhangs?	☐	☐	☐
4. Is the application of evaporation retardant and curing compound being applies at the times required by specification and at the rates identified by the manufacturer?	☐	☐	☐

C. Post Placement

1. Is the final surface within specification tolerances when checked with a 16-ft straightedge?	☐	☐	☐
2. Has concrete attained a compressive strength in accordance with Section 420.4.A and Table 5 of Section 421.4 prior to removing forms or introducing loads?	☐	☐	☐
3. If deck grooves are saw cut, were they installed in accordance with Section 420.4.I?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item: 423 – Retaining Wall
Description: _____
Location: _____
Report No.: _____
Date: _____
Time: _____

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____

Retaining Wall	**Yes**	**No**	**NA**
I. Materials (432.2)			
1. Do the materials furnished by the Contractor meet the requirements of the referenced Items of work and other requirements of Section 432.2?			
2. For non-reinforced cast-in-place, was “Class A” concrete used?	☐	☐	☐
3. For reinforced cast-in-place, was “Class C” concrete used?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Retaining Wall – Item 423

	Yes	No	NA
4. Are precast panels fabricated with "Class H" concrete with compressive strength breaks of 4,000 psi or greater?	☐	☐	☐
5. If machine-made concrete block units are used, were they cast in accordance with ASTM C-90, Class 1, Type II and meet the 28-day compressive strength of 4,000 psi with maximum moisture absorption of 7%?	☐	☐	☐
6. If machine-made concrete block units are used, were they sampled and tested in accordance with ASTM C-140 and are the molded dimensions within 1/8" tolerance, except where height must be within 1/16"?	☐	☐	☐
7. For filter fabric used in the Retaining Wall System, is it UV-resistant and does the material meet the requirements of DMS-6200?	☐	☐	☐
8. Are approved joint fillers, pads, waterstops, etc. used as shown in the plans?	☐	☐	☐
9. Does the retaining wall design service life meet the requirements of Section 423.3B?	☐	☐	☐
10. Does the backfill material conform to the gradation and other requirements stated in the plans and/or Item 423.C.2: Table 2 and Item 423.3.C.3: Table 3?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Retaining Wall – Item 423

II. Construction (423.2)	Yes	No	NA
1. Is the foundation for the structure graded level and compacted with a roller approved prior to wall construction? (Hold Point)	☐	☐	☐
2. Are any foundation soils found to be unsuitable removed and replaced?	☐	☐	☐
3. Is filter fabric placed behind all wall joints, and at the intersection of retaining walls with other structures, including riprap?	☐	☐	☐
4. Does the filter fabric cover joints a minimum of 6 inches on each side and is it positively held in place?	☐	☐	☐
5. As select fill material is placed behind the wall panels, are the panel alignments maintained by acceptable bracing methods?	☐	☐	☐
6. Do vertical tolerances and horizontal alignment tolerance not exceed ¾" when measured along the wall with a 10-foot straight edge?	☐	☐	☐
7. Is the overall vertical tolerance of the wall (plumbness from top to bottom) within ½" per 10-feet of wall height?	☐	☐	☐
8. Does the backfill placement closely follow the erection of each lift of panels, and is it placed in 8" lifts and compacted to 95% of density?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Retaining Wall – Item 423

	Yes	No	NA
9. At each reinforcement level, is the backfill leveled and compacted before placing the reinforcement?	☐	☐	☐
10. Is adjacent embankment placed to approximately the same level as the backfill material? Note: Do not create a continuous, distinct, vertical joint between the select and embankment backfill.	☐	☐	☐
11. Is compaction in the 3-foot strip adjacent to the backside of the wall accomplished with hand operated or walk-behind compacter?	☐	☐	☐
12. If rock backfill is used as select material, was a filter fabric layer placed before placing the last 2 feet of backfill immediately below the pavement structure or top of wall? Note: Overlap splices by at least 18".	☐	☐	☐
13. Does the upper 2 feet of rock backfill contain no stones larger than 3" in their greatest dimension and is it composed of material with sufficient fines to fill the voids in a compacted state?	☐	☐	☐
14. Is the wall being constructed in accordance with the details shown on the plan sheets and/or construction drawings?	☐	☐	☐
15. If construction drawings are used to show the construction details, does the Reviewer have (or have access to) a copy of these drawings?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Retaining Wall – Item 423

	Yes	No	NA
16. Are proper spacers provided between panels?	☐	☐	☐
17. Is grading and drainage maintained adjacent to the wall during construction?	☐	☐	☐
18. If temporary MSE walls are used, were the walls constructed in accordance with Section 423.3.F requirements?	☐	☐	☐
19. If Concrete Block Retaining Walls are used, were the walls constructed in accordance with Section 423.3.G?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item:	425 – Precast Pre-stressed Concrete Structural Members	Report No.:	
Description:		Date:	
Location:		Time:	

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____

Precast/Pre-stressed Concrete Structural Members	**Yes**	**No**	**NA**
I. Materials (425.2)			
1. Do the materials incorporated in the Precast Pre-stressed Concrete Structural Members conform to the reference items of work, TxDOT's Department Material Specifications and other requirements of Section 425.2?	☐	☐	☐
2. Did the Contractor provide manufacturer's certifications for bedding strips and use adhesives or bonding agents as recommended by the polystyrene manufacturer?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Precast Pre-stressed Concrete Structural Members – Item 425

	Yes	No	NA
II. Construction (425.3)			
1. Are beams, bridge deck panels and bearing pads approved by TxDOT and is the TxDOT stamp on them?	☐	☐	☐
2. Do beams have any signs of damage such as cracks, spalling and/or "honeycombs"?	☐	☐	☐
3. Are dimensions correct?	☐	☐	☐
4. During erection of beams, did the Contractor securely tie or brace all beams in accordance with minimum erection and bracing standards?	☐	☐	☐
5. Are any safety hazards apparent (power lines, traffic hazards or other construction activities)?	☐	☐	☐
6. Have beams been erected to proper alignment as shown on the plans?	☐	☐	☐
7. Are beams positioned with the proper clearance from the abutment back-wall and adjacent beam?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item:	440 – Reinforcing Steel	Report No.:	
Description:		Date:	
Location:		Time:	

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____

Reinforcing Steel	**Yes**	**No**	**NA**
I. Materials (440.2)			
1. Does the reinforcing steel to be welded comply with ASTM A706 or have a carbon equivalency of not more than 0.55%?	☐	☐	☐
2. Do the electrodes used for welding conform to the requirements of Item 448.2 for the type of reinforcing steel used?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Reinforcing Steel – Item 440

		Yes	No	NA
3.	Does the person performing the welding operation have welder certification paper issued by TxDOT that covers the type of work he/she is performing? (448.4)	☐	☐	☐
4.	Is an oven used to dry and store electrodes with low hydrogen coverings for the times and at the temperatures required? (448.4.C)	☐	☐	☐
5.	Is the rebar used on the job from an approved Mill as required by Section 440.2.A?	☐	☐	☐
6.	Unless otherwise shown on the plans, is the deformed rebar Grade 60 as required by Section 440.2.B?	☐	☐	☐
7.	For Epoxy Coated Rebar, is the coated reinforcing steel in accordance with Table 3 (440.2.F)?	☐	☐	☐
8.	Are mechanical couplers used when reinforcing steel is spliced?	☐	☐	☐
9.	Are all couplers furnished by the Contractor produced by a pre-qualified manufacturer? (DMS-4510)	☐	☐	☐
10.	Before being used, are the couplers sampled and tested as required in Item 440.2.G and do they meet all requirements? (DMS-4510)	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Reinforcing Steel – Item 440

	Yes	No	NA

II. Construction (440.3.C)

1. Is steel reinforcement adequately stored above the surface of the ground upon platforms, skids or other supports and protected from damage and deterioration? ☐ ☐ ☐

_____

_____

2. In final placement, is the reinforcement free from dirt, paint, grease, oil or other foreign materials and from defects such as cracks and delaminations? ☐ ☐ ☐

_____

_____

3. Are lap-splice, wield-splice, or mechanically spliced bars placed as shown on the plans and meet the requirements of Section 440.3.D and Table 5 “Minimum Lap Requirements by Bar Size”? ☐ ☐ ☐

_____

_____

If not, was written approval given by the Engineer for additional splices?

_____

_____

4. In the plane of the steel parallel to the nearest surface of concrete, do the bars vary from plan placement by not more than 1/12 of the spacing between bars? ☐ ☐ ☐

_____

_____

5. In the plane of the steel perpendicular to the nearest surface of concrete, do the bars vary from plan placement by not more than 1/4”? ☐ ☐ ☐

_____

_____

6. Is the depth of cover (concrete) to the nearest surface of steel at least 1” unless otherwise shown on the plans? ☐ ☐ ☐

_____

_____

Williamson County
Road Bond Program
Inspection Check Lists

Reinforcing Steel – Item 440

		Yes	No	NA
7.	For bridge slabs, is the clear cover tolerance for the top mat of reinforcement 0" to ½"?	☐	☐	☐
	_____			
	_____			
8.	Are bars of the proper size, location and quantity as shown on the plans?	☐	☐	☐
	_____			
	_____			
9.	a. What type of bar supports are used?	☐	☐	☐
	_____			
	_____			
	b. Are the bar supports adequate in strength and number to hold the reinforcement in place, before and during concrete placement?	☐	☐	☐
	_____			
	_____			
	If not, is concrete placement halted until corrective measures are taken?			
	_____			
	_____			
	c. If individual bar supports are used, are they placed in rows at 4 ft. maximum spacing?	☐	☐	☐
	_____			
	_____			
	d. If continuous type bar supports are used, are they placed in rows at 4 ft. maximum spacing?	☐	☐	☐
	_____			
	_____			
	e. Are continuous type bar supports used when permanent metal deck forms are used?	☐	☐	☐
	_____			
	_____			

Williamson County
Road Bond Program
Inspection Check Lists

Reinforcing Steel – Item 440

	Yes	No	NA
10. Are all accessories used with epoxy coated reinforcement such as tie wires, bar chairs, supports or clips made of steel, fully coated with epoxy or plastic?	☐	☐	☐
11. Has all visible damage to the coating been repaired in accordance with Section 440.3.F.3 before the reinforcement is used?	☐	☐	☐
12. Is any cutting of coated reinforcement done only by sawing or shear cutting with permission of the Engineer?	☐	☐	☐
13. Have all cut ends been coated before the reinforcement is used?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item: 442 – Metal for Structures
Description: _____
Location: _____
Report No.: _____
Date: _____
Time: _____

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____

Metal for Structures	**Yes**	**No**	**NA**
I. Materials (442.2)			
A. Non-Bridge Structures:			
1. Was the structural steel delivered and used within the project tested in accordance with ASTM A370?	☐	☐	☐
2. Does the type and grades of steel used by the Contractor in accordance with the listing in Section 442.2.2.A or as shown on the plans?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Metal for Structures – Item 442

	Yes	No	NA
3. Have tension members and other components listed in Section 442.2.2.B been impact tested and do the test results conform with the Charpy V-notch (CVN) requirements of Table 1 within the above stated section?	☐	☐	☐

B. Other Components such as Shear Connectors, Anchors, Fasteners, Slip-resistant Deck Plates and Rail Posts:

1. Do the materials supplied to the project under this section have a certification of material properties from the manufacturer?	☐	☐	☐
2. Do the materials meet the ASTM requirements as shown in Section 442.2.3 per category description and tested in accordance with section requirements?	☐	☐	☐

C. Forgings, Castings and Extrusions (442.2.B, C, D, E, F, G):

1. Do the components under this category meet the ASTM, class, grade and/or alloy-temper as required in accordance by Section 442.2.B, C, D, E, F, G?	☐	☐	☐

II. Construction Methods (442.3)

1. Was the structural metal fabricated, welded and erected in accordance with Item 441, “Steel Structures”; Item 447, “Structural Bolting; Item 448, “Structural Field Welding”; and applicable AWS welding codes?	☐	☐	☐
2. Were the fabricated and erected structural metal members painted in accordance with Item 446, “Cleaning and Painting Steel”?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Metal for Structures – Item 442

		Yes	No	NA
3.	When specified in the plans, was the fabricated steel items galvanized in accordance with Item 445, “Galvanizing”?	☐	☐	☐
4.	Were field repairs to the painting or galvanizing of fabricated and erected steel items performed in accordance with Item 446, “Cleaning and Painting” or Item 445, “Galvanizing”?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item:	462 – Concrete Box Culverts & Storm Drains 464 – Reinforced Concrete Pipe	Report No.:	
Description:		Date:	
Location:		Time:	

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____ :

Concrete Box Culverts & Storm Drains/Reinforced Concrete Pipe	**Yes**	**No**	**NA**
I. Materials (462.2 and 464.2)			
A. Reinforced Concrete Pipe, Concrete Box Culverts and Strom Drains	☐	☐	☐
1. Were the individual sections of pipe or pre-cast boxes inspected and rejected if they do not have the Division of Materials and Tests monogram on them?	☐	☐	☐
2. For cast-in-place or pre-cast box culverts and storm drains, do the materials and method of fabrication comply with the requirements of Section 462.2.A, B?			

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Box Culverts & Storm Drains – Item 462
Reinforced Concrete Pipe – Item 464

	Yes	No	NA
3. For cast-in-place box culverts and storm drains, during fabrication, did test specimens meet the requirements of Item 421, "Hydraulic Cement Concrete"; Item 440, "Reinforcing Steel" and conform to the requirements of Item 420, "Concrete Structures"?	☐	☐	☐
4. Were the individual sections of pipe or pre-cast boxes inspected at the project site and repaired or rejected if any of the defects are found?	☐	☐	☐
5. Were pre-cast sections inspected to ensure they meet the tolerance in accordance with Section 462.2.F?	☐	☐	☐
6. Are cracks which extend into the plane of the reinforcing steel repaired in an approved manner?	☐	☐	☐
7. Are small damaged or honeycombed areas which are purely surface in nature repaired to the satisfaction of the Engineer?	☐	☐	☐
8. Are precast sections stored on level blocking in a manner acceptable to the Engineer?	☐	☐	☐
9. Are lifting holes larger than 3" diameter?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Box Culverts & Storm Drains – Item 462
Reinforced Concrete Pipe – Item 464

	Yes	No	NA
B. Jointing Materials			
1. For all jointing materials except mortar, has the Contractor furnished the Engineer the Manufacturer's Certificate of Compliance that complies with the requirements in Section 464.2.I?	☐	☐	☐

II. Construction (462.3 and 464.3)

A. Laying Pipe and Pre-cast Boxes

1. Unless otherwise authorized by the Engineer, did the Contractor start the laying of pipe or present boxes on the bedding at the outlet end with the spigot or tongue pointing downstream and proceed toward the inlet end with the abutting sections properly matched, true to the established lines and grade?	☐	☐	☐
2. Is proper equipment provided for hoisting and lowering the sections of pipe or pre-cast boxes into the trench without disturbing the bedding and the sides of the trench?	☐	☐	☐
3. Are the ends of the pipe or precast boxes carefully cleaned, if necessary?	☐	☐	☐
4. Is the pipe or pre-cast boxes fitted and matched so that when laid in the bed, it forms a smooth uniform conduit?	☐	☐	☐
5. Are multiple installations of reinforced concrete pipe (RCP) laid with the center lines of individual barrels parallel?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Box Culverts & Storm Drains – Item 462
Reinforced Concrete Pipe – Item 464

	Yes	No	NA
6. Unless otherwise shown on the plans for multiple installations for RCP, are the clear distances between outer surfaces of adjacent pipes as shown in Item 464.3.B (Table 5)?	☐	☐	☐
7. Is the area for placement of structures excavated, shaped and the structures bedded and backfilled in accordance with Item 400, "Excavation and Backfill Structures"?	☐	☐	☐
8. Unless otherwise shown on the plans or permitted in writing by the Engineer, did heavy earth moving equipment haul over the structure before a minimum of 4-feet of compacted fill was placed over the top of the structure?	☐	☐	☐
9. Is pipe or pre-cast boxes damaged by the Contractor's equipment removed and replaced or repaired by an approved method by the Engineer?	☐	☐	☐

B. Jointing for Pipes, Concrete Box Culverts and Storm Drains

1. Does the mortar consist of one part cement, two parts sand, and sufficient water to make a plastic mix?	☐	☐	☐
2. Are the structure ends cleaned and wetted before making the joint?	☐	☐	☐
3. After the structures are tightly jointed, is the mortar packed into the joint from both inside and outside the structure, and then the inside finished smooth and flush with adjacent joints of structure?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Box Culverts & Storm Drains – Item 462
Reinforced Concrete Pipe – Item 464

	Yes	No	NA
4. Are mortar joints cured by keeping the joints wet for at least 48 hours or until the backfill operation begins after the mortar joint has cured for at least 6 hours?	☐	☐	☐
5. Is no mortar jointing done when the atmospheric temperature is at or below 40°F?	☐	☐	☐
6. Are mortared joints protected against freezing by backfilling or other approved methods for at least 24 hours?	☐	☐	☐

C. Joints using Cold-Applied, Plastic Asphalt Sewer Joint Compound

1. Are both ends of the structure clean and dry at the time the joint is made?	☐	☐	☐
2. Was a ½" thick layer of the compound troweled or otherwise placed in the groove end of the structure covering not less than two-thirds of the joint face around the entire circumference before the tongue end of the next structure is shoved home with sufficient pressure to make a tight joint?	☐	☐	☐
3. After the joint is made, is any excess mastic projecting into the structure removed?	☐	☐	☐

D. Joints Using Rubber Gasket

1. Where rubber gasket joints are required by the plans, is the joint assembly made according to the recommendations of the gasket manufacturer?	☐	☐	☐

Williamson County
Road Bond Program
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Concrete Box Culverts & Storm Drains – Item 462
Reinforced Concrete Pipe – Item 464

	Yes	No	NA
2. When using rubber gaskets, are the joints water tight?	☐	☐	☐

E. Joints Using Pre-formed Flexible Joint Sealants

1. Are the joints placed according to the procedure shown in Article 464.3.C.4 and the manufacturer's recommendations?	☐	☐	☐
2. Is the joint sealer placed in such manner that no dirt or other deleterious materials will come in contact with the joint sealing material?	☐	☐	☐
3. When the atmospheric temperature is below 60°F, are plastic joint seal gaskets either stored in an area warmed to above 70°F or artificially warmed to this temperature in a manner satisfactory to the Engineer?	☐	☐	☐

F. Connections and Stub Ends for Pipes, Concrete Box Culverts and Storm Drains

1. Is the bottom of existing structures mortared or concreted if necessary to eliminate any drainage pockets created by the connections?	☐	☐	☐
2. Is any damage to the existing structure resulting form making the connection satisfactorily repaired by the Contractor?	☐	☐	☐
3. Unless otherwise shown on the plans, are the connections between concrete pipe and corrugated metal pipe made with a suitable concrete collar having a minimum thickness of 4"?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Box Culverts & Storm Drains – Item 462
Reinforced Concrete Pipe – Item 464

	Yes	No	NA
4. Are stub ends, for connections to future work not shown on the plans, finished by installing watertight plugs into the free end of the pipe?	☐	☐	☐
5. For precast boxes, fill lifting holes with mortar or concrete and cure or precast concrete mortar plugs may be used. Have the holes been filled accordingly prior to backfill?	☐	☐	☐

APPENDIX B

GUIDE SCHEDULE OF SAMPLING AND TESTING

GUIDE SCHEDULE OF SAMPLING & TESTING

MAY 2016



Using the Guide Schedule

Research of sampling and testing rates listed for project tests in the following Guide Schedule show that the Department's and the Contractor's risk of either rejecting "good" material or accepting "bad" material range from 20% to 40%.

To reduce this risk, we recommend that the sampling rate be increased during initial production. A four-fold increase in testing frequency will generally reduce risk to approximately 5%. The intent of increasing testing at the start of production is to insure that the Contractor's processes are in control and to establish acceptability requirements early.

There is a need to increase the frequency of testing for high-variability materials and when testing results do not meet specifications. The Engineer may require the Contractor to reimburse the Department for costs resulting from failing test results, in accordance with the specifications.

Materials incorporated in TxDOT projects are subjected to various quality assurance procedures such as testing (as outlined in this document), certification, quality monitoring, approved lists, etc. The Engineer and testing staff should familiarize themselves with materials to be used before work begins by reviewing the specifications and this document. Discuss material testing requirements with the Contractor.

Other testing required by the specifications, but not shown in the Guide Schedule, should be performed at a frequency necessary to provide adequate confidence that materials meet specifications.

NOTE: For projects subject to FHWA construction oversight activities, use the "Letter of Certification of Materials Used" to document reasons for material acceptance when a test fails. For all other projects, document the justification and explanation for acceptance of materials that fail project tests in the project file.

Assuring the quality of the product and proper incorporation of materials into the project begins with proper sampling practices. Sampling, testing, and construction inspection must be performed collaboratively to assure the specific attributes of the finished product reflect quality workmanship. Sampling guidance for hot-mixed asphalt is contained in Tex-225-F, "Random Selection of Bituminous Mixture Samples," and the respective specification for that material. All remaining materials are covered by method and materials specifications, to which the following applies.

For acceptance testing, especially that which directly determines payment for the Contractor, sampling personnel should provide randomness in sampling by avoiding patterned sampling routines. Examples of such sampling practices are as follows:

- Soils/flexible base: Vary sampling between stockpiling operations, completed stockpile, windrow, and project site. Vary the time of day sampling is performed.
- Aggregates: Sample aggregates nearest the point of incorporation into the work. Vary sampling between stockpiling operations, completed stockpile, belt sampling, and if deemed necessary, railroad cars/trucks. Vary the time of day sampling is performed.
- Concrete (structural and miscellaneous: Always sample as near as practicable to the point of placement. For strength testing, vary the time of day or the number of truck from which the concrete is sampled. Tests for slump, air, and temperature should be done often to ensure the consistent control of the concrete production (not applicable to miscellaneous concrete).

This Guide Schedule is applicable to all contracts associated with the 2014 Standard Specifications.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE I – EMBANKMENTS, SUBGRADES, BACKFILL, AND BASE COURSES

			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (F)	REMARKS
EMBANKMENT (CUTS & FILLS)	Liquid Limit **(A)**	Tex-104-E	During stockpiling operations, from completed stockpile, or project site **(B)**	Materials with PI ≤ 15: 10,000 CY	For Type A embankment or when required by the plans. This test may be waived for embankment cuts as directed by the Engineer. Determine a new liquid limit and plasticity index for each different material or notable change in material. Sample in accordance with Tex-100-E.
	Plasticity Index **(A)**	Tex-106-E		Materials with PI > 15: 5,000 CY	
	Gradation	Tex-110-E		Each 10,000 CY	When shown on plans. This test may be waived for embankment cuts, as directed by the Engineer. Sample in accordance with Tex-100-E.
	Moisture/Density	Tex-114-E		As directed by the Engineer	Not required for ordinary compaction. Determine a new optimum moisture and maximum density for each different material or notable change in material. Sample in accordance with Tex-100-E.
	In-place Density **(A)**	Tex-115-E	As designated by the Engineer	Fill: each 5,000 CY min. 1 per lift.	Not required for ordinary compaction. Determine a new optimum moisture and maximum density according to Tex-114-E for each different material or notable change in material. Correct the moisture contents measured by nuclear density gauge in Tex-115-E with the moisture contents determined in accordance with Tex-103-E, as necessary for control, for each different material or notable change in material and adjust the density accordingly. Materials such as RAP, gypsum, lime, cement, and iron ore tend to bias the counts for nuclear density gauges.
				Cut: each 6,000 LF	
RETAINING WALL (NON-SELECT BACKFILL)	As shown above for Embankment (Cuts and Fills)		As shown above for Embankment (Cuts and Fills)	As shown above for Embankment (Cuts and Fills)	Sample in accordance with Tex-100-E.
RETAINING WALL (SELECT BACKFILL)	Gradation	Tex-110-E	During stockpiling operations, from completed stockpile, or project site **(B)**	Each 5,000 CY	Sample in accordance with Tex-400-A.
	Resistivity **(A)**	Tex-129-E	During stockpiling operations, from completed stockpile, or project site **(B)**	Each 5,000 CY	For material with resistivity between 1,500 and 3,000 ohm-cm, determine chloride and sulfate content, as specified in Item 423. Sample in accordance with Tex-400-A.
	pH **(A)**	Tex-128-E	During stockpiling operations, from completed stockpile, or project site **(B)**	Each 5,000 CY	Sample in accordance with Tex-400-A.

This is a guide for minimum sampling and testing.
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TABLE I – EMBANKMENTS, SUBGRADES, BACKFILL, AND BASE COURSES

			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (F)	REMARKS
RETAINING WALL (SELECT BACKFILL) (continued)	Soundness	Tex-411-A	During stockpiling operations, or from completed stockpile	1 per source, per project	Test when backfill sources appear to contain particles such as shale, caliche, or other soft, poor-durability particles. Sample in accordance with Tex-400-A.
	In-place Density **(A)**	Tex-115-E	As designated by the Engineer.	1 per backfill lift, per wall	Not required for rock backfill. For walls greater than 500 ft. in length, perform one test per lift for every 500 ft. in length. **(F)** Correct the moisture contents measured by nuclear density gauge in Tex-115-E with the moisture contents determined in accordance with Tex-103-E for each different material or notable change in material and adjust the density accordingly.
UNTREATED BASE COURSES	Liquid Limit **(A)**	Tex-104-E	During stockpiling operations, from completed stockpile, or windrow **(B)**	Each 5,000 CY	Sample in accordance with Tex-400-A.
	Plasticity Index **(A)**	Tex-106-E	During stockpiling operations, from completed stockpile, or windrow **(B)**	Each 5,000 CY	
	Gradation **(A)**	Tex-110-E	During stockpiling operations, from completed stockpile, or windrow **(B)**	Each 5,000 CY	Sample in accordance with Tex-400-A.
	Moisture/Density	Tex-113-E	From completed stockpile at the source **(E)**	Each 20,000 CY	Not required for ordinary compaction. Sample in accordance with Tex-400-A.
	Wet Ball Mill **(A)**	Tex-116-E	From completed stockpile at the source **(E)**	Each 20,000 CY	As required by the plans. Sample in accordance with Tex-400-A.
	Strength **(A)**	Tex-117-E	From completed stockpile at the source **(E)**	Each 20,000 CY	As required by the plans. When base material is from a source where the District has a record of satisfactory triaxial results, the frequency of testing may be reduced to one per 30,000 CY. If any one test falls below the minimum value required, the frequency of testing will return to the original frequency of 20,000 CY. Sample in accordance with Tex-400-A.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE I – EMBANKMENTS, SUBGRADES, BACKFILL, AND BASE COURSES

				PROJECT TESTS		
MATERIAL OR PRODUCT		TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (F)	REMARKS
UNTREATED BASE COURSES		In-place Density **(A)**	Tex-115-E	As designated by the Engineer	Each 3,000 CY, min. 1 per lift	Correct the moisture contents measured by nuclear density gauge in Tex-115-E with the moisture contents determined in accordance with Tex-103-E, as necessary for control, for each different material or notable change in material and adjust the density accordingly. Materials such as RAP, gypsum, lime, cement, and iron ore tend to bias the counts for nuclear density gauges.
		Thickness **(A)**	Tex-140-E	As designated by the Engineer	Each 3,000 CY	Not required where survey grade control documents compliance.
TREATED SUBGRADE AND BASE COURSES	SUBGRADE BEFORE TREATMENT	Organic Content	Tex-148-E	As designated by the Engineer	1 per 500 linear feet or 5,000 CY	Required for existing subgrade material and material imported from a borrow source. Soil survey and geologic maps may be used to determine sampling locations. Sample in accordance with Tex-100-E.
		Sulfate Content	Tex-145-E	As designated by the Engineer	1 per 500 linear feet or 5,000 CY	Required for existing subgrade material and material imported from a borrow source. Soil survey and geologic maps may be used to determine sampling locations. Sample in accordance with Tex-100-E.
	NEW BASE MATERIAL	Liquid Limit **(A)**	Tex-104-E	During stockpiling operations, from completed stockpile, or windrow **(B)**	Each 5,000 CY	When central mix site or plant is used, windrow sampling may be waived. Sample in accordance with Tex-400-A.
		Plasticity Index **(A)**	Tex-106-E	During stockpiling operations, from completed stockpile, or windrow **(B)**	Each 5,000 CY	
		Gradation **(A)**	Tex-110-E	During stockpiling operations, from completed stockpile, or windrow **(B)**	Each 5,000 CY	Sample in accordance with Tex-400-A.
		Wet Ball Mill **(A)**	Tex-116-E	From completed stockpile at the source **(E)**	Each 20,000 CY	As required by the plans. Sample in accordance with Tex-400-A.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE I – EMBANKMENTS, SUBGRADES, BACKFILL, AND BASE COURSES

MATERIAL OR PRODUCT		TEST FOR	TEST NUMBER	PROJECT TESTS		REMARKS
				LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (F)	
TREATED SUBGRADE AND BASE COURSES	NEW BASE MATERIAL	Strength **(A)**	Tex-117-E	From completed stockpile at the source **(E)**	Each 20,000 CY	As required by the plans. When base material is from a source where the District has a record of satisfactory triaxial results, the frequency of testing may be reduced to one per 30,000 CY. If any one test falls below the minimum value required, the frequency of testing will return to the original frequency of 20,000 CY.
	LIME	Compliance with DMS-6350	Tex-600-J	During delivery to project	Commercial Lime Slurry: each 200 tons of lime Carbide Lime Slurry: each 100 tons of lime	Sample in accordance with Tex-400-A.Verify the source is listed on the current Material Producer List for Lime. Only materials appearing on the Material Producer List will be accepted. Sample frequency for Carbide Lime Slurry may be increased as directed by the Engineer. For Hydrated Lime and Quick Lime project testing is not required but it is encouraged to sample and test the material at a rate of 1 per project as a best practice.
	CEMENT	Compliance with DMS-4600		Railroad car, truck, or cement bins		Verify the source is listed on the current Material Producer List for Cement. If not, sample and test in accordance with DMS-4600. **(C)**
	FLY ASH MATERIAL	Compliance with DMS-4615		Project samples at location designated by the Engineer		Verify the source is listed on the current Material Producer List for Fly Ash. Only materials from CST/M&P approved sources appearing on the Material Producer List for Fly Ash will be accepted. Project testing is not required but it is encouraged to sample and test the material at a rate of 1 per project as a best practice. **(C)**
	COMPLETE MIXTURE	Pulverization Gradation	Tex-101-E Part III	Roadway, after pulverization and mixing	As necessary for control	At the beginning of the project, one test must be made for each 4,500 CY or 6,000 tons until the Engineer is satisfied that acceptable pulverization results are being obtained. Sample in accordance with Tex-100-E.
		Soil-Cement Testing Soil-Lime Testing	Tex-120-E, Part II, or Tex-121-E, Part II	From roadway windrow after treatment **(E)**	Each 20,000 CY	Not required for ordinary compaction. Determine a new moisture/density curve for each different or notable change in material. Perform Tex-120-E, Part II, for Cement Treated Material, and Tex-121-E, Part II, for Lime, Lime-Fly Ash, or Fly Ash Treated Material. If Tex-120-E, Part I, Tex-121-E, Part I, or Tex-127-E is performed prior to the project, this test may be waived. Sample in accordance with Tex-100-E.

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TABLE I – EMBANKMENTS, SUBGRADES, BACKFILL, AND BASE COURSES

MATERIAL OR PRODUCT		TEST FOR	TEST NUMBER	PROJECT TESTS: LOCATION OR TIME OF SAMPLING (D)	PROJECT TESTS: FREQUENCY OF SAMPLING (F)	REMARKS
TREATED SUBGRADE AND BASE COURSES	COMPLETE MIXTURE	Soil-Cement Testing Soil-Lime Testing	Tex-120-E, Part I, Tex-121-E, Part I, or Tex-127-E	From roadway windrow after treatment	As necessary for control	Perform Tex-120-E, Part I, on cement treated material, and Tex-121-E, Part I, for lime-fly ash or fly ash treated material. Verifies the field strength by comparing results from the mix design. Performed at the discretion of Engineer. Sample in accordance with Tex-100-E.
		In-place Density **(A)**	Tex-115-E	As designated by the Engineer	Each 3,000 CY, min 1 per lift	Determine the appropriate moisture/density curve for each different material or notable change in material. Correct the moisture contents measured by nuclear density gauge in Tex-115-E with the moisture contents determined in accordance with Tex-103-E, as necessary for control, for each different material or notable change in material and adjust the density accordingly. Stabilizers and materials such as RAP, gypsum, and iron ore tend to bias the counts for nuclear density gauges.
		Thickness **(A)**	Tex-140-E	As designated by the Engineer	Each 3,000 CY	Not required where survey grade control documents are used for compliance
RECLAIMED ASPHALT PAVEMENT (RAP), CRUSHED CONCRETE, and RECYCLED MATERIALS		Sulfate Content	Tex-145-E	During stockpiling operations, from completed stockpile, or windrow	Each 5,000 CY	Required only for contractor furnished recycled material, including crushed concrete. Not required for RAP. Sample in accordance with Tex-400-A.
		Deleterious Material	Tex-413-A		Each 5,000 CY	Required only for contractor furnished recycled material, including crushed concrete. Sample in accordance with Tex-400-A.
		Decantation	Tex-406-A	During stockpiling operations, from completed stockpile, or windrow	Each 5,000 CY	Required only for contractor furnished RAP. Sample in accordance with Tex-400-A.

TABLE I – FOOTNOTES

A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field.
B	Engineer will select any of these locations or any combinations thereof with the provision that the initial sample will be obtained from the completed stockpile at the source and at least one out of ten consecutive samples will be taken at the project site (from the windrow for treated and untreated bases and embankments when possible).
C	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

D	For acceptance testing, especially that which directly determines payment for the Contractor, sampling personnel should provide randomness in sampling by avoiding patterned sampling routines. Examples of such sampling practices are as follows: • Soils/Flexible Base: For gradation, liquid limit, and plastic limit, vary sampling between stockpiling operations, completed stockpile, windrow, and project site. Vary the time of day sampling is performed. • Aggregates: Sample aggregates nearest the point of incorporation into the work. Vary sampling between stockpiling operations, completed stockpile, belt sampling, and if deemed necessary, railroad cars/trucks. Vary the time of day sampling is performed.
E	The Engineer will sample from the completed stockpile at the source and test prior to placement.
F	Each test performed that is based on a quantity of material is considered “or fraction thereof” for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE IA – ASPHALT STABILIZED BASE (Plant Mix)

			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (C)	FREQUENCY OF SAMPLING (D)	REMARKS
AGGREGATE	Gradation **(A)**	Tex-200-F, Part I	During stockpiling operations, from completed stockpile, or prior to mixing	Each 5,000 CY	Sample in accordance with Tex-400-A.
	Liquid Limit **(A)**	Tex-104-E	During stockpiling operations, from completed stockpile, or prior to mixing	Each 5,000 CY	Sample in accordance with Tex-400-A.
	Plasticity Index **(A)**	Tex-106-E	During stockpiling operations, from completed stockpile, or prior to mixing	Each 5,000 CY	
	Wet Ball Mill or L. A. Abrasion **(A)**	Tex-116-E or Tex-410-A	During stockpiling operations, from completed stockpile, or prior to mixing	Each 20,000 CY	When L. A. Abrasion is specified, tests are not required when the published value of the source, as listed on the current Material Producer List for BRSQC, meets the project specifications. Sample in accordance with Tex-400-A. **(B)**
	Coarse Aggregate Angularity **(A)**	Tex-460-A, Part I	During stockpiling operations, from completed stockpile, or prior to mixing	1 per project, per source	Not required for crushed stone sources. Sample in accordance with Tex-400-A.
	Sand Equivalent	Tex-203-F	Hot aggregate bins, feeder belt, or stockpile	1 per project, per source	When designated by the Engineer, test may be run on combined aggregates when multiple sources are used. Sample in accordance with Tex-400-A.
LIME	Compliance with DMS-6350		During delivery to the project	Hydrated Lime: 1 per project Commercial Lime Slurry: each 200 tons of lime **(D)** Carbide Lime Slurry: each 100 tons of lime **(D)** Quick Lime: 1 per project	On projects requiring less than 50 tons, material from CST/M&P approved sources may be accepted on the basis of Producer's Certification without sampling.
RECLAIMED ASPHALT PAVEMENT (RAP), and RECYCLED AGGREGATE	Decantation	Tex-217-F, Part II	During stockpiling operations, from completed stockpile, or prior to mixing	Each 10,000 CY	Sample in accordance with Tex-400-A.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE IA – ASPHALT STABILIZED BASE (Plant Mix)

			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (C)	FREQUENCY OF SAMPLING (D)	REMARKS
RECYCLED ASPHALT SHINGLES (RAS)	Decantation	Tex-217-F, Part III	During stockpiling operations, from completed stockpile, or prior to mixing	Each 10,000 CY	Sample in accordance with Tex-400-A.
ASPHALT BINDER	Compliance with Item 300 – Binder and Tack Coat		Sampled, tested and preapproved by CST/M&P. Take project samples when designated by the Engineer.	1 each for binder and tack coat per project, per grade, per source	Test at least one sample taken from the project. Sample tack coat at the distributor on the roadway in accordance with Tex-500-C, Part III. Sample binder at hot mix plant in accordance with Tex-500-C, Part II. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.
COMPLETE MIXTURE	Laboratory Density **(A)**	Tex-126-E	Plant Mix **(C)**	20,000 CY (25,000 tons)	Sample in accordance with Tex-222-F.
	Percent Asphalt **(A)**	Tex-236-F	Plant Mix **(C)**	Each 1,500 CY (2,000 tons) or days production	Determine asphalt content correlation factors for ignition oven at a minimum of one per project. Sample in accordance with Tex-222-F.
	Indirect Tensile Strength – Dry	Tex-226-F	Plant Mix	1 per project, per design	Sample in accordance with Tex-222-F.
	Moisture Susceptibility	Tex-530-C	As designated by the Engineer	1 per project, per design	This test may be waived, when shown on the plans. Sample in accordance with Tex-222-F.
ROADWAY	In-Place Air Voids **(A)**	Tex-207-F	Roadway cores, as designated by the Engineer **(C, D)**	Each 2,500 CY (3,000 tons) or days production	Not required for ordinary compaction or when air void requirements are waived. Sample in accordance with Tex-222-F.

TABLE IA – FOOTNOTES

A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field.
B	Engineer will select any of these locations or any combinations thereof with the provision that at least one out of ten consecutive samples will be taken at the project site (from the windrow for treated and untreated bases and embankments when possible).
C	For acceptance testing, especially that which directly determines payment for the Contractor, sampling personnel should provide randomness in sampling by avoiding patterned sampling routines. Examples of such sampling practices are as follows: • Soils/flexible base: Vary sampling between stockpiling operations, completed stockpile, windrow, and project site. Vary the time of day sampling is performed. • Aggregates: Sample aggregates nearest the point of incorporation into the work. Vary sampling between stockpiling operations, completed stockpile, belt sampling, and if deemed necessary, railroad cars/trucks. Vary the time of day sampling is performed.
D	Each test performed that is based on a quantity of material is considered “or fraction thereof” for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE II – SEAL COAT

			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (C)	FREQUENCY OF SAMPLING (D)	REMARKS
AGGREGATE	Gradation **(A)**	Tex-200-F, Part I	Stockpile (At source or at point of delivery)	One each 1,000 CY	Rate may be reduced to one each 2,000 CY if the Engineer approves a contractor quality control plan. Sample in accordance with Tex-221-F.
	L. A. Abrasion **(A)**	Tex-410-A	Stockpile	1 per 20,000 CY	Verify the published value of the source, as listed on the current Material Producer List for BRSQC, meets the project specifications. If not, sample and test at 1 per 20,000 CY prior to use. Sample in accordance with Tex-221-F. **(B)**
	Magnesium Soundness **(A)**	Tex-411-A	Stockpile	1 per 20,000 CY	Verify the published value of the source, as listed on the current Material Producer List for BRSQC, meets the project specifications. If not, sample and test at 1 per 20,000 CY prior to use. Sample in accordance with Tex-221-F. **(B)**
	Surface Aggregate Classification **(A)**	Tex-612-J, Tex-411-A	Stockpile	1 per 20,000 CY	Verify the published value of the source, as listed on the current Material Producer List for BRSQC, meets the project specifications. If not, sample and test at 1 per 20,000 CY prior to use. Sample in accordance with Tex-221-F. **(B)**
	Pressure Slake **(A)**	Tex-431-A	Stockpile	1 per 20,000 CY	Same as above. Required only for lightweight aggregate. Sample in accordance with Tex-221-F.
	Freeze Thaw **(A)**	Tex-432-A	Stockpile	1 per 20,000 CY	Same as above. Required only for lightweight aggregate. Sample in accordance with Tex-221-F.
	Unit Weight	Tex-404-A	Stockpile	1 per 20,000 CY	Same as above. Required only for lightweight aggregate. Sample in accordance with Tex-221-F.
	24 hr Water Absorption **(A)**	Tex-433-A	Stockpile	1 per 20,000 CY	Same as above. Required only for lightweight aggregate. Sample in accordance with Tex-221-F.
	Coarse Aggregate Angularity	Tex-460-A	Stockpile	1 per 20,000 CY	Only required for crushed gravel. Sample in accordance with Tex-221-F.
	Deleterious Material **(A)**	Tex-217-F, Part I	Stockpile	1 per 10,000 CY	Not required for lightweight aggregate. Sample in accordance with Tex-221-F.
	Decantation **(A)**	Tex-406-A	Stockpile	1 per 10,000 CY	Sample in accordance with Tex-221-F.
	Flakiness Index	Tex-224-F	Stockpile	Frequency as directed by the Engineer	Sample in accordance with Tex-221-F.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE IA – ASPHALT STABILIZED BASE (Plant Mix)

			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (C)	FREQUENCY OF SAMPLING (D)	REMARKS
	Micro Deval	Tex-461-A	Stockpile	1 per project or as necessary for control	Compare result to published value listed on the current Material Producer List for BRSQC. Submit sample to CST/M&P for Soundness and L.A. Abrasion testing when results differ by more than 3% points, unless otherwise directed by the Engineer. Sample in accordance with Tex-221-F.
	White Rock Count	Tex-220-F	Stockpile		Required only for Limestone Rock Asphalt. Not required when CST/M&P provides inspection at the plant. Sample in accordance with Tex-221-F.
	Naturally Impregnated Bitumen Content	Tex-236-F	Stockpile		Required only for Limestone Rock Asphalt. Not required when CST/M&P provides inspection at the plant. Sample in accordance with Tex-221-F.
PRECOATED AGGREGATE	Asphalt Content	Tex-236-F	Stockpile	Frequency as directed by the Engineer when a target value is specified	Sample in accordance with Tex-221-F.
ASPHALT	Compliance with Item 300		Sampled, tested, and preapproved by CST/M&P. Take project samples when designated by the Engineer from the distributor or transport.	1 per project, per grade, per source	Sample in accordance with Tex-500-C. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.

TABLE II – FOOTNOTES

A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field.
B	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
C	For acceptance testing, especially that which directly determines payment for the Contractor, sampling personnel should provide randomness in sampling by avoiding patterned sampling routines. Examples of such sampling practices are as follows: • Aggregates: Sample aggregates nearest the point of incorporation into the work. Vary sampling between stockpiling operations, completed stockpile, belt sampling, and if deemed necessary, railroad cars/trucks. Vary the time of day sampling is performed.
D	Each test performed that is based on a quantity of material is considered “or fraction thereof” for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE III – HYDRAULIC CEMENT CONCRETE – STRUCTURAL (Classes: C, F, H, S, CO, K, LMC, or SS)

				PROJECT TESTS		
MATERIAL OR PRODUCT		TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (E)	REMARKS
MINERAL AGGREGATE	COARSE AGGREGATE	Decantation **(B)**	Tex-406-A	From stockpile at concrete plant	Each 20,000 CY of concrete (each source)	Sample in accordance with Tex-400-A.
		Sieve Analysis **(A) (B)**	Tex-401-A		Each 1,000 CY of concrete (each source)	Sample in accordance with Tex-400-A. Test combined aggregate when used.
		Deleterious Materials **(B)**	Tex-413-A		1 per project or as necessary for control	Sample in accordance with Tex-400-A.
		Los Angeles Abrasion **(A) (B)**	Tex-410-A		Two, each source	Verify the value of the source, as listed on the current Material Producer list for CRSQC, meets the project specifications. If not, sample and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. Sample in accordance with Tex-400-A. **(C)**
		5-cycle Magnesium Sulfate Soundness **(A) (B)**	Tex-411-A		Two, each source	Verify the value of the source, as listed on the current CRSQC, meets the project specifications. **(C)**
	FINE AGGREGATE	Sand Equivalent **(B)**	Tex-203-F	From stockpile at concrete plant	1 per project or as necessary for control	Sample in accordance with Tex-400-A. Test combined aggregate when used.
		Organic Impurities **(B)**	Tex-408-A		1 per project, per source	Sample in accordance with Tex-400-A.
		Sieve Analysis **(A) (B)**	Tex-401-A		Each 1,000 CY of concrete (each source)	Sample in accordance with Tex-400-A.
		Fineness Modulus **(B)**	Tex-402-A		1 per project or as necessary for control	Sample in accordance with Tex-400-A. Test combined aggregate when used. Test to confirm material variability when strength values are in question.
		Deleterious Material **(B)**	Tex-413-A		1 per project or as necessary for control	Sample in accordance with Tex-400-A. Test to confirm material variability when strength values are in question.
		Acid Insoluble Residue **(A) (B)**	Tex-612-J		Two, each source	Only for concrete subject to direct traffic. Verify the value of the source, as listed on the current CRSQC, meets the project specifications. If not, sample and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. Sample in accordance with Tex-400-A. **(C)**
SILICA FUME		Compliance with DMS-4630 **(A)**		Railroad car, truck, bags or silos	1 per project, per class of concrete (For each type and brand)	Sample in accordance with Tex-320-D.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE III – HYDRAULIC CEMENT CONCRETE – STRUCTURAL (Classes: C, F, H, S, CO, K, LMC, or SS)					
			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (E)	REMARKS
METAKAOLIN	Compliance with DMS-4635 **(A)**		Railroad car, truck or silos	1 per project, per class of concrete (For each type and brand)	
MIX DESIGN	Compliance with Standard Specification Item 421.4.A		At source (if not approved)	Min. 1 design per class, per source	Verify if cement, fly ash, slag cement, and chemical admixture sources are listed on the Material Producer Lists. If not, sample and submit to CST/M&P for testing. Water testing is contracted by the concrete supplier (commercial lab report to be reviewed by TxDOT). Sample in accordance with Tex-300-D for cement and in accordance with Tex-733-I for fly ash.
JOINT MATERIAL	Compliance with DMS-6300				Sample in accordance with Tex-500-C. Verify the source is listed on the Material Producer List for Joint Sealers. If not, sample and test prior to use in accordance with DMS-6310. **(C)**
CURING COMPOUND	Compliance with DMS-4650		Sampled at jobsite; tested by CST/M&P. See remarks.	When requested by CST	Only products listed on the Material Producer List for Concrete Curing Compounds will be allowed. When sample is requested by CST, sample in accordance with Tex-718-I. Ensure container has been agitated and mixed prior to sampling. **(C)**
EVAPORATION RETARDANTS	Compliance with DMS-4650				Only products listed on the Material Producer list for Evaporation Retardants will be allowed. **(C)**
REINFORCING STEEL	Compliance with the Std. Specifications & Spec. Provisions	As Specified			Only materials from CST/M&P approved sources listed on the Material Producer Lists for Reinforcing Steel Mills and Seven Wire Steel Strand will be allowed. **(C)**
MECHANICAL COUPLERS	Compliance with DMS-4510	Tex-743-I	Sampled at jobsite; Tested by CST/M&P	3 couplers per lot (500 couplers) for each type, model, bar size and grade	Only materials from CST/M&P approved sources listed on the Material Producer List for Mechanical Couplers will be allowed. **(C)**
LATEX	Compliance with DMS-4640 for concrete chemical admixtures		Sampled at jobsite.	Min. of 1 test per project	Sample in accordance with Tex-321-E.
EPOXY	Compliance with DMS-6100, unless otherwise specified		Sampled at jobsite if not pre-approved by CST/M&P.	1 per batch or shipment	Verify the source is listed on the Material Producer List for Epoxies and Adhesives. If not, sample and test prior to use in accordance with DMS-6100. Sample in accordance with Tex-734-I. **(C)**

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE III – HYDRAULIC CEMENT CONCRETE – STRUCTURAL (Classes: C, F, H, S, CO, K, LMC, or SS)					
			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (E)	REMARKS
CONCRETE	Compressive Strength **(A)**	Tex-418-A	At point of concrete placement	4 cylinders for each 60 CY per class, per day (For bridge railing and traffic railing, testing may be reduced to 4 cylinders per 180 CY per class regardless of days)	Sampling must be in accordance with Tex-407-A. Test two cylinders at 7 days, and if the average value is below the design strength as defined in Item 421 Table 8, test the remaining 2 cylinders at 28 days. If the average value of the 2 cylinders tested at 7 days meets the minimum design strength listed in Item 421 Table 8, the 2 remaining cylinders are not required to be tested.
CONCRETE	Slump	Tex-415-A		1 test per 4 strength specimens	Sample in accordance with Tex-407-A. Perform slump and temperature tests on the same load from which strength test specimens are made. Perform entrained air test only when entrained air concrete is specified in the plans. Check temperature of every load for bridge slabs and mass concrete placements. Contractor's required testing will be in accordance with specification requirements for the appropriate specification Item #.
	Entrained Air **(A)**	Tex-416-A or Tex-414-A			
	Temperature of Concrete **(A)**	Tex-422-A			
	Slab Thickness and Depth of Reinforcement	Tex-423-A, Part II	During dry run and during concrete placement (Bridge decks and direct traffic culverts)	1 per span	Min 6–Max 18 locations per span

TABLE III – FOOTNOTES	
A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field.
B	These Project Tests may be used for one or more projects being furnished concrete from the same plant during the same period.
C	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
D	For acceptance testing, especially that which directly determines payment for the Contractor, sampling personnel should provide randomness in sampling by avoiding patterned sampling routines. Examples of such sampling practices are as follows: • Aggregates: Sample aggregates nearest the point of incorporation into the work. Vary sampling between stockpiling operations, completed stockpile, and if deemed necessary, railroad cars/trucks. Vary the time of day sampling is performed. • Concrete (structural): Always sample as near as practicable to the point of placement. For strength testing, vary the time of day or the number of truck from which the concrete is sampled. Test often for slump, air, and temperature to ensure the consistent control of the concrete production.
E	Each test performed that is based on a quantity of material is considered "or fraction thereof" for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE IV – HYDRAULIC CEMENT CONCRETE – NON-STRUCTURAL CONCRETE (Classes: A, B, or E)					
			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (B)	FREQUENCY OF SAMPLING (C)	REMARKS
CONCRETE	Compressive Strength (A)	Tex-418-A	At point of concrete placement	2 cylinders per 180 CY, per class	Sampling must be in accordance with Tex-407-A. Strength will be determined by 7-day specimens.
MIX DESIGN	Compliance with the Standard Specification		At source if not approved.	Min. 1 design per class, per source	Verify if cement, fly ash, slag cement, and chemical admixture sources are listed on the Material Producer Lists. If not, sample and submit to CST/M&P for testing. Sample in accordance with Tex-300-D for cement and in accordance with Tex-733-I for fly ash. Water testing is contracted by the concrete supplier (commercial lab report to be reviewed by TxDOT).
SILICA FUME	Compliance with DMS-4630		Railroad car, truck, bags or silos	1 test per project, per class (for each type and brand)	Sample in accordance with Tex-320-D.
METAKAOLIN	Compliance with DMS-4635		Railroad car, truck or silos	1 test per project, per class (for each type and brand)	

TABLE IV – FOOTNOTES	
A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field.
B	For acceptance testing, especially that which directly determines payment for the Contractor, sampling personnel should provide randomness in sampling by avoiding patterned sampling routines. Examples of such sampling practices are as follows: • Concrete (miscellaneous): Always sample as near as practicable to the point of placement. For strength testing, vary the time of day or the number of truck from which the concrete is sampled.
C	Each test performed that is based on a quantity of material is considered “or fraction thereof” for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE V – HYDRAULIC CEMENT CONCRETE PAVEMENT (Classes: P or HES)

MATERIAL OR PRODUCT		TEST FOR	TEST NUMBER	PROJECT TESTS: LOCATION OR TIME OF SAMPLING	PROJECT TESTS: FREQUENCY OF SAMPLING (D)	REMARKS
MINERAL AGGREGATE	COARSE AGGREGATE	Decantation	Tex-406-A	From stockpile at concrete plant	Each 20,000 CY of concrete (each source)	Sample in accordance with Tex-400-A.
		Sieve Analysis **(A)**	Tex-401-A		As necessary for control	Sample in accordance with Tex-400-A. Test combined aggregate when used.
		Deleterious Materials	Tex-413-A		Each 20,000 CY of concrete (each source)	Sample in accordance with Tex-400-A.
		L.A. Abrasion **(A)**	Tex-410-A		Two, each source	Verify the value of the source, as listed on the current CRSQC, meets the project specifications. If not, sample and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. Sample in accordance with Tex-400-A. **(C)**
		5-Cycle Magnesium Sulfate Soundness **(A)**	Tex-411-A			
	FINE AGGREGATE	Sand Equivalent	Tex-203-F	From stockpile at concrete plant	Each 3,000 CY of concrete (Each source or combination of sources)	Sample in accordance with Tex-400-A. Test combined aggregate when used. No less than one per week's production.
		Organic Impurities	Tex-408-A		1 per project, per source	Sample in accordance with Tex-400-A.
		Sieve Analysis **(A)**	Tex-401-A		As necessary for control	Sample in accordance with Tex-400-A. Test combined aggregate when used.
		Fineness Modulus **(B)**	Tex-402-A			
		Deleterious Material **(B)**	Tex-413-A		Each 20,000 CY of concrete (each source)	Sample in accordance with Tex-400-A.
		Acid Insoluble **(A)**	Tex-612-J		1 per project, per source	Verify the value of the source, as listed on the current CRSQC, meets the project specifications. If not, sample and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. Sample in accordance with Tex-400-A. **(C)**
MIX DESIGN		Compliance with the Standard Specifications Item 421.4.A		At source, if not approved	Min. 1 design, per class, per source	Verify if cement, fly ash, ground granulated blast furnace slag, and admixture sources are listed on the Material Producer List. If not, sample and submit to CST/M&P for testing. Sample in accordance with Tex-300-D for cement and in accordance with Tex-733-I for fly ash. Water testing is contracted by the concrete supplier (commercial lab report to be reviewed by TxDOT).

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE V – HYDRAULIC CEMENT CONCRETE PAVEMENT (Classes: P or HES)					
			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING	FREQUENCY OF SAMPLING (D)	REMARKS
SILICA FUME	Compliance with DMS-4630		Railroad car, truck, bags or silos	1 per project per class of concrete (For each type and brand)	Sample in accordance with Tex-320-D.
METAKAOLIN	Compliance with DMS-4635		Railroad car, truck or silos	1 per project per class of concrete (For each type and brand)	Sample in accordance with Tex-320-D.
JOINT MATERIAL	Compliance with DMS-6310		Sampled at jobsite if not sampled at source by CST/M&P; tested by CST/M&P. See remarks.	1 per batch or shipment	Sample in accordance with Tex-500-C. Sampling may be waived when the source is listed on the Material Producer List for Joint Sealers. **(C)**
CURING COMPOUND	Compliance with DMS-4650		Sampled at jobsite; tested by CST/M&P. See remarks.	When requested by CST	Only products listed on the Material Producer List for Concrete Curing Compounds will be allowed. When sample is requested by CST, sample in accordance with Tex-718-I. Ensure container has been agitated and mixed prior to sampling. **(C)**
EVAPORATION RETARDANTS	Compliance with DMS-4650				Only products listed on the Material Producer List for Evaporation Retardants will be allowed. **(C)**
REINFORCING STEEL	Compliance with the Std. Specifications & Spec. Provisions	As Specified			Only materials from CST/M&P approved sources listed on the Material Producer List for Reinforcing Steel Mills and Seven Wire Steel Strand will be accepted. **(C)**
MULTIPLE PIECE TIE BARS	Compliance with DMS-4515	Tex-712-I	Sampled at jobsite if not sampled at source by CST/M&P; tested by CST/M&P. See remarks.	Refer to Tex-711-I for sampling rates	Only materials from CST/M&P approved sources listed on the Material Producer List for Multiple Piece Tie-bars for Concrete Pavements will be allowed. Sample in accordance with Tex-734-I.
EPOXY	Compliance with DMS-6100		Sampled at jobsite if not pre-approved by CST/M&P. See remarks.	1 batch per shipment	Verify the source is listed on the Material Producer List for Epoxies and Adhesives. If not, sample and test prior to use in accordance with DMS-6100. Sample in accordance with Tex-734-I. **(C)**

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE V – HYDRAULIC CEMENT CONCRETE PAVEMENT (Classes: P or HES)					
			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING	FREQUENCY OF SAMPLING (D)	REMARKS
CONCRETE	Strength **(A) (B)**	Tex-448-A or Tex-418-A	At point of concrete placement	2 cylinders for every 10 contractor job control tests	Sample in accordance with Tex-407-A. When the contract requires the project testing to be by the Engineer, the frequency and job control testing will be in accordance with the item of work. Split sample verification testing used when contractor performs job control testing. When job control testing by the contractor is waived by the plans, the frequency of sampling will be one test (2 specimens) for each 3,000 SY of concrete or fraction thereof or per day and split sample verification testing will be waived. Contractor's required testing will be in accordance with specification requirements for the appropriate specification Item #.
	Slump	Tex-415-A	At time and location strength specimens are made	1 test for every 10 contractor job control tests.	Sample in accordance with Tex-407-A. Slump is not required for slip-formed pavement. Perform slump and temperature tests on the same load from which the strength specimens are made. Perform entrained air test only when entrained air concrete is specified in the plans. Contractor's required testing will be in accordance with specification requirements for the appropriate specification Item #.
	Entrained Air **(A)**	Tex-416-A or Tex-414-A			
	Temperature	Tex-422-A			
	Thickness	Tex-423-A	Center of paving machine	Every 500 feet	Methods other than Tex-423-A may be shown on the plans.
	Ride Quality Surface Test Type B **(A)**	Tex-1001-S	Final riding surface of travel lanes		Engineer may verify contractor's results for surface test Type B. For traditional design-bid-build TxDOT projects, CST has contracted with TTI to perform random ride verification at 10% frequency. Results from surface test Type A are not required to be reported.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE V – FOOTNOTES	
A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field.
B	When a project test does not meet the specified strength requirements and a reduced pay factor is assigned, document the analysis on the Letter of Certification of Materials Used.
C	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
D	Each test performed that is based on a quantity of material is considered “or fraction thereof” for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE VI – ASPHALT CONCRETE PAVEMENT (Items 341, 342, 344, 346, 347 and 348)

(All testing as noted in Table VI may be waived for exempt production as defined by specification.)

			PROJECT TESTS		
MATERIAL OR PRODUCT	**TEST FOR**	**TEST NUMBER**	**LOCATION (Per Design)**	**FREQUENCY OF SAMPLING (E)**	**REMARKS**
COARSE AGGREGATE	L. A. Abrasion **(A)**	Tex-410-A	Stockpile **(B)**	1 per project, per source	Verify the published value of the source, as listed on the current Material Producer list for BRSQC, meets the project specifications. If not, sample in accordance with Tex-221-F and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. **(C)**
	Magnesium Sulfate Soundness **(A)**	Tex-411-A			
	Surface Aggregate Classification **(A)**	Tex-499-A		1 per project, per source	
	Micro Deval	Tex-461-A		1 per project, per aggregate source	Not required when the Rated Source Soundness Magnesium loss is 15 or less as listed on the current published BRSQC. If testing is required, sample in accordance with Tex-221-F.
COMBINED AGGREGATE	Sand Equivalent	Tex-203-F	Stockpiles, hot bins or feeder belts	1 per project, per source, per design	Does not apply to Item 342. Sample in accordance with Tex-221-F. The timing of when the test is performed is at the discretion of the Engineer.
ASPHALT BINDER	Compliance with Item 300 Binder & Tack Coat **(A)**		Sampled, tested and pre-approved by CST/M&P. Project test sampled at the Plant for Binder & Road for Tack Coat	1 each for binder and tack coat per project, per grade, per source	Test a minimum of one sample taken from the project. Sample tack coat at the distributor on the roadway in accordance with Tex-500C, Part III. Sample binder at hot mix plant in accordance with Tex-500-C, Part II. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.
MIX DESIGN	Compliance with applicable specification	Tex-204-F	At source (if not approved)	Min 1 design per Mix Type and Asphalt Grade	Verify that aggregates, recycled asphalt pavement, recycled asphalt shingles, mineral filler, asphalt binder, anti-stripping additives, and warm mix systems are on the Material Producer List where applicable and that they meet project specification requirements. Project sampling and testing may be conducted on individual materials as necessary for control.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE VI – ASPHALT CONCRETE PAVEMENT (Items 341, 342, 344, 346, 347 and 348)

(All testing as noted in Table VI may be waived for exempt production as defined by specification.)

			PROJECT TESTS		PROJECT INDEPENDENT ASSURANCE TESTS		
MATERIAL OR PRODUCT	**TEST FOR**	**TEST NUMBER**	**LOCATION**	**FREQUENCY (Per Design)**	**LOCATION**	**FREQUENCY**	**REMARKS**
COMPLETE MIXTURE	Asphalt Content (%) **(A)**	Tex-236-F	Engineer Truck Sample **(D)**	Minimum 1 per Lot			Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven using Tex-236-F at a minimum of one per project.
	Voids in Mineral Aggregates (VMA)	Tex-207-F	Truck Sample Plant Produced **(D)**	1 per Sublot	Truck	1 per 10 Lots only if compactor is shared by Contractor and State	Sample in accordance with Tex-222-F. Does not apply to Item 342, "Permeable Friction Course." Contractor's required testing will be in accordance with specification requirements for the appropriate specification Item #.
	Gradation **(A)**	Tex-236-F	Engineer Truck Sample **(D)**	Minimum 1 per 12 Sublots **(E)**			Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven using Tex-236-F at a minimum of one per project.
	Boil Test	Tex-530-C	Truck Sample	1 per project			Sample in accordance with Tex-222-F. Unless waived by the Engineer.
	Indirect Tensile Strength – Dry	Tex-226-F					Sample in accordance with Tex-222-F. Unless waived by the Engineer. Does not apply to Items 342, 346, and 348.
	Moisture Content	Tex-212-F, Part II	Engineer Truck Sample				Sample in accordance with Tex-222-F.
	Lab Molded Density **(A)**	Tex-207-F	Truck Sample **(D)**	1 per Sublot 1 per Lot for Item 347	Truck	1 per 10 Lots only if compactor is shared by Contractor and State	Sample in accordance with Tex-222-F. Contractor's required testing will be in accordance with specification requirements for the appropriate specification Item #.
	Drain Down Test **(A)**	Tex-235-F	Engineer Truck Sample	1 per project 1 per Lot for Item 342			Sample in accordance with Tex-222-F. Not required for Item 341 and Item 344.
	Hamburg Wheel Test **(A)**	Tex-242-F	Engineer Truck Sample	1 per project			Sample in accordance with Tex-222-F. Sample during production. Does not apply to Item 348.
	Overlay Test	Tex-248-F	Engineer Truck Sample	1 per project			Sample in accordance with Tex-222-F. Does not apply to Items 341, 344, and 348.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE VI – ASPHALT CONCRETE PAVEMENT (Items 341, 342, 344, 346, 347, and 348)

(All testing as noted in Table VI may be waived for exempt production as defined by specification.)

			PROJECT TESTS		
MATERIAL OR PRODUCT	**TEST FOR**	**TEST NUMBER**	**LOCATION**	**FREQUENCY (Per Design)**	**REMARKS**
ROADWAY	In-Place Air Voids **(A)**	Tex-207-F	Roadway **(D)**	2 cores per Sublot	Two cores taken per Sublot and averaged. Sample in accordance with Tex-222-F. Does not apply to Items 342, 347, and 348.
ROADWAY	Segregation Profile **(A)**	Tex-207-F, Part V	Roadway	1 per project	Not required when Contractor uses thermal imaging system. Does not apply to Items 342, 347, and 348.
	Joint Density **(A)**	Tex-207-F, Part VII	Roadway	1 per project	
	Thermal Profile	Tex-244-F	Immediately behind paver	1 per project	Not required when Contractor uses thermal imaging system.
	Ride Quality Test Type B **(A)**	Tex-1001-S	Final riding surface of travel lanes	1 per project	Engineer may verify Contractor's results for surface test Type B. For traditional design-bid-build TxDOT projects, CST has contracted with TTI to perform random ride verification at 10% frequency. Results for surface test Type A are not required to be reported.
	Permeability	Tex-246-F	Roadway	1 per project	Only applies to Items 342, 347, and 348.
FABRIC UNDERSEAL	Compliance with DMS-6220		Sampled, tested, and approved by CST/M&P		Sampling must be in accordance with Tex-735-I. Verify the source is listed on the current Material Producer List for Silt Fence, Filter Fabric, and Fabric Underseals. If not, sample and test prior to use in accordance with DMS-6220.

TABLE VI – FOOTNOTES

A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field. This letter is required only for Asphalt Content and/or Gradation when production of complete mixture is suspended as required by QC/QA specifications.
B	Sampling may be performed at the plant, quarry, or both. Aggregate properties may be re-tested at any time during the project. These project tests may be used for one or more projects furnishing hot mix with the same aggregate source.
C	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
D	Perform random sampling as specified in Tex-225-F, "Random Selection of Bituminous Mixture Samples."
E	Each test performed that is based on a quantity of material is considered "or fraction thereof" for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE VII – ASPHALT CONCRETE PAVEMENT (Items 334)
(Refer to DMS-9210, "Limestone Rock Asphalt (LRA)," for testing requirements for Item 330.)

			PROJECT TESTS		
MATERIAL OR PRODUCT	**TEST FOR**	**TEST NUMBER**	**LOCATION**	**FREQUENCY (Per Design) (F)**	**REMARKS**
COARSE AGGREGATE	L. A. Abrasion **(A)**	Tex-410-A	Stockpile **(B)**	1 per project, per source	Verify the published value of the source, as listed on the current Material Producer List for BRSQC, meets the project specifications. If not, sample in accordance with Tex-221-F and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. **(D)**
	Magnesium Sulfate Soundness **(A)**	Tex-411-A			
	Micro Deval	Tex-461-A			Sample in accordance with Tex-221-F. Testing frequency may be reduced or eliminated based on a satisfactory test history.
	Surface Aggregate Classification **(A)**	Tex-499-A	Stockpile **(B)**	1 per project, per source	Verify the published value of the source, as listed on the current Material Producer List for BRSQC, meets the project specifications. If not, sample in accordance with Tex-221-F and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. SiteManager Quality Monitoring test documentation is accomplished by attaching an approved mix design.
COMBINED AGGREGATE	Sand Equivalent	Tex-203-F	Stockpiles, hot bins or feeder belts	1 per project, per source	Sample in accordance with Tex-221-F. The timing of when the test is performed is at the discretion of the Engineer.
ASPHALT BINDER	Compliance with Item 300 Binder & Tack Coat **(A) (C)**		Sampled, tested and pre-approved by CST/M&P. Project test sampled at the Plant for Binder & Road for Tack Coat	1 each for binder and tack coat per project, per grade, per source	Test a minimum of one sample from production. Sample tack coat at the distributor on the roadway in accordance with Tex-500-C, Part III. Sample binder at hot mix plant in accordance with Tex-500-C, Part II. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.
MIX DESIGN	Compliance with applicable specification	Tex-204-F	At source (if not approved)	Min 1 design per Mix Type and Asphalt Grade	Verify that aggregates, recycled asphalt pavement, recycled asphalt shingles, mineral filler, asphalt binder, anti-stripping additives, and warm mix systems are on the Material Producer List where applicable and that they meet project specification requirements. Project sampling and testing may be conducted in individual materials as necessary for control.
COMPLETE MIXTURE	Asphalt Content (%) **(A)**	Tex-236-F	Engineer Truck Sample **(E)**	Minimum of 1 per 5,000 tons	Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven using Tex-236-F at a minimum of one per project.
	Voids in Mineral Aggregates (VMA)	Tex-207-F	Truck Sample Plant Produced **(E)**	1 per 5,000 tons	Sample in accordance with Tex-222-F.
	Gradation **(A)**	Tex-236-F	Truck Sample	Minimum 1 per 5,000 tons	Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven using Tex-236-F at a minimum of one per project.
	Boil Test	Tex-530-C		1 per project	Sample in accordance with Tex-222-F. The timing of when the test is performed is at the discretion of the Engineer.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE VII – ASPHALT CONCRETE PAVEMENT (Items 334)
(Refer to DMS-9210, "Limestone Rock Asphalt (LRA)," for testing requirements for Item 330.)

			PROJECT TESTS		
MATERIAL OR PRODUCT	**TEST FOR**	**TEST NUMBER**	**LOCATION**	**FREQUENCY (Per Design) (F)**	**REMARKS**
COMPLETE MIXTURE	Moisture Content	Tex-212-F, Part II	Truck Sample	1 per 5,000 tons	Sample in accordance with Tex-222-F. Performed by CST/M&P at the point of production for payment calculations.
	Hydrocarbon-Volatile Content	Tex-213-F		1 per 5,000 tons	Sample in accordance with Tex-222-F. The timing of when the test is performed is at the discretion of the Engineer.
	Lab Molded Density **(A)**	Tex-207-F		1 per 5,000 tons	Sample in accordance with Tex-222-F.
	Hveem Stability **(A)**	Tex-208-F		1 per 5,000 tons	Sample in accordance with Tex-222-F. The timing of when the test is performed is at the discretion of the Engineer.
ROADWAY	Ride Quality Test Type B **(A)**	Tex-1001-S	Final riding surface of travel lanes		Engineer may verify Contractor's results for surface test Type B. For traditional design-bid-build TxDOT projects, CST has contracted with TTI to perform random ride verification at 10% frequency. Results from surface test Type A are not required to be reported.

TABLE VII – FOOTNOTES

A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field.
B	Sampling may be performed at the plant, quarry, or both. Aggregate properties may be re-tested at any time during the project.
C	Or as called for in the Specifications.
D	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
E	Perform random sampling as specified in Tex-225-F, "Random Selection of Bituminous Mixture Samples."
F	Each test performed that is based on a quantity of material is considered "or fraction thereof" for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE VIII – ASPHALT CONCRETE PAVEMENT (Item 340)

			PROJECT TESTS		
MATERIAL OR PRODUCT	**TEST FOR**	**TEST NUMBER**	**LOCATION**	**FREQUENCY**	**REMARKS**
COARSE AGGREGATE	L. A. Abrasion **(A)**	Tex-410-A	Stockpile **(B)**	1 per project, per source	Verify the published value of the source, as listed on the current Material Producer List for BRSQC, meets the project specifications. If not, sample in accordance with Tex-221-F and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. **(C)**
	Magnesium Sulfate Soundness **(A)**	Tex-411-A			
	Micro Deval	Tex-461-A	Stockpile **(B)**	1 per project, per source	Sample in accordance with Tex-221-F. Testing frequency may be reduced or eliminated based on a satisfactory test history.
	Surface Aggregate Classification **(A)**	Tex-499-A	Stockpile **(B)**	1 per project, per source	Verify the published value of the source, as listed on the current Material Producer list for BRSQC, meets the project specifications. If not, sample in accordance with Tex-221-F and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. **(C)**
COMBINED AGGREGATE	Sand Equivalent	Tex-203-F	Stockpiles, hot bins or feeder belts	1 per project, per design	Sample in accordance with Tex-221-F.
ASPHALT BINDER	Compliance with Item 300 Binder & Tack Coat **(A)**		Sampled, tested and pre-approved by CST/M&P. Plant for Binder & Road for Tack Coat	1 each for binder and tack coat per project, per grade, per source	Test a minimum of 1 sample taken from the project. Sample tack coat at the distributor on the roadway in accordance with Tex-500-C, Part III. Sample binder at hot mix plant in accordance with Tex-500-C, Part II. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.
MIX DESIGN	Compliance with applicable specification	Tex-204-F	At source (if not approved)	Min. 1 design per Mix Type and Asphalt Grade	Verify that aggregates, recycled asphalt pavement, recycled asphalt shingles, mineral filler, asphalt binder, anti-stripping additives, and warm mix systems are on the Material Producer List where applicable and that they meet project specification requirements. Project sampling and testing may be conducted in individual materials as necessary for control.
COMPLETE MIXTURE	Asphalt Content (%)	Tex-236-F	Truck Sample **(D)**	Minimum of 1 per day	Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven using Tex-236-F at a minimum of one per project.
	Voids in Mineral Aggregates (VMA)	Tex-207-F	Truck Sample Plant Produced **(D)**	1 per day	Sample in accordance with Tex-222-F.
	Gradation **(A)**	Tex-236-F	Truck Sample	Minimum 1 per day	Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven using Tex-236-F at a minimum of one per project.
	Boil Test	Tex-530-C		1 per project	Sample in accordance with Tex-222-F. Unless waived by the Engineer.
	Indirect Tensile Strength – Dry	Tex-226-F		1 per project, per design	Sample in accordance with Tex-222-F. Unless waived by the Engineer.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE VIII – ASPHALT CONCRETE PAVEMENT (Item 340)

			PROJECT TESTS		
MATERIAL OR PRODUCT	**TEST FOR**	**TEST NUMBER**	**LOCATION**	**FREQUENCY**	**REMARKS**
COMPLETE MIXTURE	Lab Molded Density **(A)**	Tex-207-F	Truck Sample	1 per day	Sample in accordance with Tex-222-F.
	Hamburg Wheel Tracker **(A)**	Tex-242-F		1 per project	Sample in accordance with Tex-222-F. Sample during production.
ROADWAY	Air Voids **(A)**	Tex-207-F	Selected by the Engineer **(D)**	1 per day (2 Cores)	Sample in accordance with Tex-222-F.
	Ride Quality Test Type B **(A)**	Tex-1001-S	Final riding surface of travel lanes		Engineer may verify Contractor's results for surface test Type B. For traditional design-bid-build TxDOT projects, CST has contracted with TTI to perform random ride verification at 10% frequency. Results from surface test Type A are not required to be reported.
FABRIC UNDERSEAL	Compliance with DMS-6220		Sampled, tested, and approved by CST/M&P		Sample in accordance with Tex-735-I. Verify the source is listed on the current Material Producer List for Silt Fence, Filter Fabric, and Fabric Underseals. If not sample and submit to CST/M&P for testing prior to use in accordance with DMS-6220.

TABLE VIII – FOOTNOTES

A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field. This letter is required only for Asphalt Content and/or Gradation when production of complete mixture is suspended as required by QC/QA specifications.
B	Sampling may be performed at the plant, quarry, or both. Aggregate properties may be re-tested at any time during the project. These project tests may be used for one or more projects furnishing hot mix with the same aggregate source.
C	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
D	Perform random sampling as specified in Tex-225-F, "Random Selection of Bituminous Mixture Samples."

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE IX – MICROSURFACING (Item 350)

			PROJECT TESTS		
MATERIAL OR PRODUCT	**TEST FOR**	**TEST NUMBER**	**LOCATION OF SAMPLING**	**FREQUENCY (Per Design)**	**REMARKS**
AGGREGATE	5-Cycle Magnesium Sulfate Soundness **(A)**	Tex-411-A	Stockpile **(B)**	1 per project, per source	Verify the published value of the source, as listed on the current Material Producer list for BRSQC meets the project specifications. If not, sample in accordance with Tex-221-F and submit to CST/M&P for testing at 1 per project, per source. **(C)**
	Gradation	Tex-200-F, Part II		1 per project, per source	Sample in accordance with Tex-221-F.
	Crushed Face Count	Tex-460-A		1 per project, per source	Sample in accordance with Tex-221-F.
	Acid Insoluble **(A)**	Tex-612-J		1 per project, per source	Verify the value of the source, as listed on the current BRSQC, meets the project specifications. If not, sample and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. Sample in accordance with Tex-221-F. **(C)**
	Surface Aggregate Classification	Tex-499-A	Stockpile, or BRSQC **(B)**	1 per project, per source	Verify the published value of the source, as listed on the current Material Producer list for BRSQC meets the project specifications. If not, sample in accordance with Tex-221-F and submit to CST/M&P for testing at 1 per project, per source. **(C)**
COMBINED BLEND	Sand Equivalent	Tex-203-F	Stockpile **(B)**	1 per project, per source	Sample in accordance with Tex-221-F.
ASPHALT BINDER	Compliance with Item 300 Binder & Tack Coat **(A)**		Sampled, tested, and pre-approved by CST/M&P. Project test sampled at the Plant for Binder & Road for Tack Coat	1 each for binder and tack coat per project, per grade, per source	Test a minimum of one sample during production. Sample tack coat at the distributor on the roadway in accordance with Tex-500-C, Part III. Sample binder at microsurfacing machine in accordance with Tex-500-C, Part III. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.
CEMENT	Compliance with DMS-4600				Verify the source is listed on the current Material Producer List for Cement. If not, sample and submit to CST/M&P for testing prior to use in accordance with DMS-4600.
COMPLETE MIX	Asphalt Content	Tex-236-F	During production	1 per day	Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven using Tex-236-F at a minimum of one per project.
	Gradation	Tex-200-F, Part II Tex-236-F			Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven use at a minimum of one per project.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE IX – FOOTNOTES	
A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field. This letter is required only for Asphalt Content and/or Gradation when production of complete mixture is suspended as required by QC/QA specifications.
B	Sampling may be performed at the plant, quarry, or both. Aggregate properties may be re-tested at any time during the project. These project tests may be used for one or more projects furnishing hot mix with the same aggregate source.
C	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
D	Each test performed that is based on a quantity of material is considered “or fraction thereof” for calculating number of tests.

APPENDIX C

AASHTO ACCREDITED LABORATORIES

AASHTO Accredited CMT Laboratories in Texas

* Directory of accredited laboratories and scope of testing is maintained on the AASHTO Materials Reference Laboratory website at: http://www.amrl.net. Laboratory must be accredited for each specific test performed.

INDEX: SEE NEXT SHEET

OWNER: CITY OF AUSTIN

DEVELOPER: WILLIAMSON COUNTY

ENGINEER/SURVEYOR: BURY
221 WEST 6th STREET
SUITE 600
AUSTIN TX, 78701
P: (512) 328-0011
F: (512) 328-0325

ROAD CLASSIFICATION: MAD4
DESIGN SPEED: 35 MPH
EXISTING ADT: 9500 (2015)
DESIGN ATD: 25,500 (2035) VPD
PERCENT TRUCKS: 10.9
SHARED USE PATH DESIGN SPEED: 20 MPH
AREA OF DISTURBED SOIL = 4.25 ACRES

ZONING: N/A- MOST OF THE PROJECT IS LOCATED WITHIN EXISTING ROW. POND 2 IMPROVEMENTS ARE LOCATED WITHIN SF-3 ZONING IN DRAINAGE EASEMENTS. SWALE A IMPROVEMENTS ARE LOCATED WITHIN GO-CO AND SF-2 ZONING IN DRAINAGE EASEMENTS.

EDWARDS RECHARGE ZONE: THIS PROJECT IS LOCATED OVER THE EDWARDS AQUIFER RECHARGE ZONE. THIS PROJECT IS SUBJECT TO THE VOID ANO WATER FLOW MITIGATION RULE (COA ECM 1.12.0 AND COA ITEM NO. 6585 OF THE SSM) PROVISION THAT ALL TRENCHING GREATER THEN 5 FEET DEEP MUST BE INSPECTED BY A GEOLOGIST (TEXAS P.G) OR A GEOLOGIST'S REPRESENTATIVE.

WATERSHED STATUS: THE PROJECT IS LOCATED WITHIN THE LAKE CREEK WATERSHED, WHICH IS CLASSIFIED AS A SUBURBAN WATERSHED BY THE CITY OF AUSTIN AND SHALL BE DEVELOPED, CONSTRUCTED, AND MAINTAINED IN ACCORDANCE WITH CHAPTER 25 OF THE CODE OF THE CITY OF AUSTIN.

WATERSHED RELATED CASES: ZONING: C14-2008-0045, ANNEXATION: C7A-08-008, SITEPLAN: SP-2008-0095C
SUBDIVISION: C8J-2008-0065.0B
C8J-2008-0056.3B
C8-85-29.010.4A
C8-85-029.08.2C
C8-85-029.012.3B

FLOODPLAIN: NO PORTION OF THE PROJECT IS LOCATED WITHIN THE BOUNDARIES OF THE 100 YEAR FLOODPLAIN AS SHOWN ON THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL No. 48491C0610E DATED SEPTEMBER 26, 2008 FOR WILLIAMSON COUNTY, TEXAS.

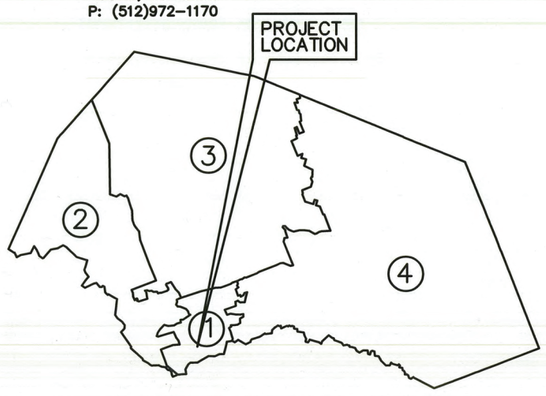
PRESSURE ZONE: H41- NORTHWEST B REDUCED (NWB9) 80 PSI TYPICAL

NET LENGTH OF ROADWAY = 2948.11 FT (0.558 MI)
NET LENGTH OF PROJECT = 2948.11 FT (0.558 MI)

SPECIFICATIONS: CITY OF AUSTIN
STANDARD SPECIFICATIONS

REGISTERED ACCESSIBILITY SPECIALIST (RAS)
INSPECTION REQUIRED
TDLR OR EABPRJ _____

PRESSURE ZONE: H-41-NORTHWEST B REDUCED
(NWB9)-80 PSI TYPICAL
AWU PROJECT SPONSOR: DUSTIN RHODES
625 E. 10TH ST
SUITE 400
AUSTIN, TX 78701
P: (512)972-1170



WILLIAMSON COUNTY, TX.

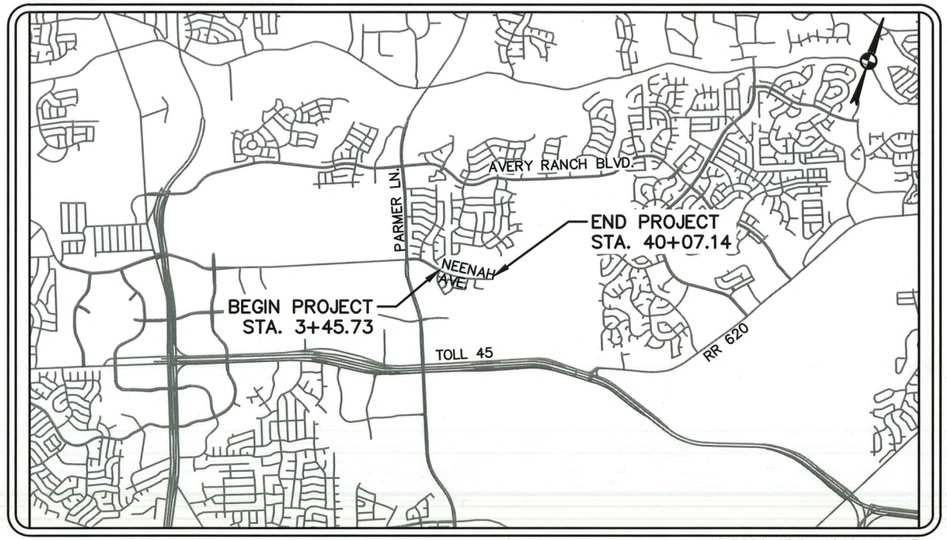
WILLIAMSON COUNTY

NEENAH AVENUE WIDENING

WIDENING OF AN EXISTING ASPHALT CONCRETE PAVEMENT, CONSISTING OF GRADING, STORM DRAIN CULVERTS, DRIVEWAYS, ASPHALT CONCRETE PAVEMENT, DETENTION, WATER QUALITY, RETAINING WALL, CONCRETE DRIVEWAYS, PAVEMENT MARKINGS AND SIGNING.

LIMITS: FROM OLIVE HILL DR. TO EAST END OF ROADWAY
WILLIAMSON COUNTY PROJECT NO. **1710-194**

AWU PROJECT NO. W-2016-3212.144



EXCEPTIONS: NONE
RAILROADS: NONE
STATION EQUATIONS: NONE

MAPSCO GRID: 404Q & 404R
AWU GRID: H41

LOCATION MAP

NTS

Stantec
221 West Sixth Street, Suite 600
Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
TBPE # F-1048 TBPLS # F-10107500
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WILLIAMSON COUNTY 1848

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APPROVED BY:

Dan A Gattis 09-19-2017
JUDGE DAN A. GATTIS DATE
WILLIAMSON COUNTY JUDGE

APPROVED BY:

Terry Cook 9/19/17
TERRY COOK DATE
WILLIAMSON COUNTY COMMISSIONER
PRECINCT NO. 1

APPROVED BY:

Richard Ridings 9/19/2017
RICHARD RIDINGS, P.E. DATE
HNTB CORPORATION
ROAD BOND MANAGEMENT TEAM

DIRECTOR, DATE
DEVELOPMENT SERVICES DEPARTMENT

SITE PLAN/DEVELOPMENT PERMIT NUMBER DATE

AWU PIPELINE ENGINEER DATE
AWU PROJECT: #W-2016-3212.144

REVISIONS/CORRECTIONS							
NUMBER:	DESCRIPTION:	REVISED (R) ADD (A) VOID (V) SHEET No.'s	TOTAL# SHEETS IN PLAN SET	NET CHANGE IMP. COVER (SQ.FT)	TOTAL SITE IMP. COVER (SQ.FT.)/%	CITY OF AUSTIN APPROVAL DATE	DATE IMAGED

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED PROFESSIONAL ENGINEER
Stephanie D Blew

SUBMITTAL DATE 4/19/2016

FOR CITY USE ONLY:

SITE PLAN APPROVAL Sheet 1 of 273
FILE NUMBER: SP-2016-0186D APPLICATION DATE: _____
APPROVED BY COMMISSION ON: _____ UNDER SECTION _____ OF
CHAPTER _____ OF THE CITY OF AUSTIN CODE.
EXPIRATION DATE (25-5-81,LDC) _____ CASE MANAGER _____
PROJECT EXPIRATION DATE (ORD.#970905-A) _____ DWPZ ____ DDZ ____

Director, Planning and Development Review Department

RELEASED FOR GENERAL COMPLIANCE: _____ ZONING: _____
Rev. 1 _____ Correction 1 _____
Rev. 2 _____ Correction 2 _____
Rev. 3 _____ Correction 3 _____

FINAL PLAT MUST BE RECORDED BY THE PROJECT EXPIRATION DATE, IF APPLICABLE. SUBSEQUENT SITE PLANS WHICH DO NOT COMPLY WITH THE CODE CURRENT AT THE TIME OF FILING, AND ALL REQUIRED BUILDING PERMITS AND/OR A NOTICE OF CONSTRUCTION (IF A BUILDING PERMIT IS NOT REQUIRED), MUST ALSO BE APPROVED PRIOR TO THE PROJECT EXPIRATION DATE.

NOTES:
1. RELEASE OF THIS APPLICATION DOES NOT CONSTITUTE VERIFICATION OF ALL DATA, INFORMATION, AND CALCULATIONS SUPPLIED BY THE APPLICANT. THE ENGINEER OF RECORD IS SOLELY RESPONSIBLE FOR THE COMPLETENESS, ACCURACY AND ADEQUACY OF HIS/HER SUBMITTAL, WHETHER OR NOT THE APPLICATION IS REVIEWED FOR CODE COMPLIANCE BY CITY ENGINEERS.
2. RESTRICTIVE COVENANT, DOCUMENT NUMBER 2008076297, SHOWS THAT THE PRIVATELY MAINTAINED POND IS PROVIDING WATER QUALITY CONTROL FOR A PORTION OF THIS PROJECT.
3. PRIOR TO FINAL ACCEPTANCE OF THIS PROJECT, POND 2'S SEDIMENTATION BASIN SHALL BE MOWED. POND 2 IS A COA-MAINTAINED POND CONSTRUCTED UNDER COA CASE #C8J-85-029.010.4B.
4. AN ADMINISTRATIVE VARIANCE HAS BEEN GRANTED IN ACCORDANCE WITH LDC 25-8-42 (B)(6) TO ALLOW FOR CUT AND FILL GREATER THAN 4 FEET FOR CONSTRUCTION OF A WATER QUALITY/DETENTION POND.
5. THIS PROJECT IS SUBJECT TO AN INTERLOCAL COOPERATION AGREEMENT BETWEEN THE CITY OF AUSTIN AND WILLIAMSON COUNTY IN A ACCORDANCE WITH THE INTERLOCAL COOPERATION ACT, TEXAS GOVERNMENT CODE SECTION 791.001 et seq.

SP-2016-0186D

V:\2220\active\222012028\civil\civilCD Sheets\General\104023006CRV01.dwg modified by rgflores on Aug 3, 17 3:29 PM

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4	PROJECT CONTROL DATA SHEET 1
5	PROJECT CONTROL LAYOUT SHEET 2
6	PROJECT CONTROL DATA SHEET 2
7	PROJECT CONTROL DATA SHEET 3
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9	EXISTING TYPICAL SECTIONS NEENAH AVE.
10	EXISTING TYPICAL SECTIONS NEENAH AVE.
11	EXISTING TYPICAL SECTIONS ALTONA WAY AND SOLERA DR.
12	PROPOSED TYPICAL SECTIONS NEENAH AVE
13	PROPOSED TYPICAL SECTIONS NEENAH AVE.
14	PROPOSED TYPICAL SECTIONS NEENAH AVE.
15	PROPOSED TYPICAL SECTIONS NEENAH AVE.
16	PROPOSED TYPICAL SECTIONS ALTONA WAY & SOLERA DR.
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80	SHARED USE PATH (N) PLAN AND PROFILE STA. 7+00 TO STA. 11+00
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83	SHARED USE PATH (N) PLAN AND PROFILE STA. 19+00 TO STA. 23+00
84	SHARED USE PATH (N) PLAN AND PROFILE STA. 23+00 TO STA. 27+00
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141	DRAINAGE DETAILS 17 *
142	DRAINAGE DETAILS 18 *
143	DRAINAGE DETAILS 19 *
144	DRAINAGE DETAILS 20 *
145	DRAINAGE DETAILS 21 *
146	DRAINAGE DETAILS 22 *
147	DRAINAGE DETAILS 23 *
148	DRAINAGE DETAILS 24 *

SHEET NO.	DESCRIPTION
RETAINING WALL	
149	RETAINING WALL (N) PLAN AND PROFILE
150	RETAINING WALL (S) PLAN AND PROFILE
151	RETAINING WALL (P) PLAN AND PROFILE
152	RETAINING WALL (S) PANEL #4 (LB–8–10) DETAIL
153	RETAINING WALL DETAIL 1 *
154	RETAINING WALL DETAIL 2 *
155	RETAINING WALL DETAILS 3
156	RETAINING WALL DETAILS 4
SIGNAGE AND PAVEMENT MARKINGS	
157	SIGNAGE AND PAVEMENT MARKINGS STA. 1+00 TO STA. 5+00
158	SIGNAGE AND PAVEMENT MARKINGS STA. 5+00 TO STA. 13+00
159	SIGNAGE AND PAVEMENT MARKINGS STA. 13+00 TO STA. 21+00
160	SIGNAGE AND PAVEMENT MARKINGS STA. 21+00 TO STA. 29+00
161	SIGNAGE AND PAVEMENT MARKINGS STA. 29+00 TO 33+00
162	SIGNAGE AND PAVEMENT MARKINGS STA. 33+00 TO END
163	PAVEMENT MARKING GORE DETAILS
164	PAVEMENT MARKING GORE DETAILS
165	TXDOT DETAIL 4 *
166	TXDOT DETAIL 5 *
167	TXDOT DETAIL 6 *
168	TXDOT DETAIL 7 *
169	TXDOT DETAIL 8 *
170	TXDOT DETAIL 9 *
171	TXDOT DETAIL 10 *
172	TXDOT DETAIL 11 *
173	TXDOT DETAIL 12 *
174	TXDOT DETAIL 13 *
175	TXDOT DETAIL 14 *
176	TXDOT DETAIL 15 *
177	TXDOT DETAIL 16 *
178	TXDOT DETAIL 17 *
179	TXDOT DETAIL 18 *
180	TXDOT DETAIL 19 *
181	TXDOT DETAIL 21 *
182	TXDOT DETAIL 20 *
183	TXDOT DETAIL 22 *
184	TXDOT DETAIL 23 *
EROSION CONTROL	
185	SW3P NOTES
186	EROSION AND SEDIMENTATION PLAN STA. 1+00 TO STA.5+00
187	EROSION AND SEDIMENTATION PLAN STA. 5+00 TO STA.13+00
188	EROSION AND SEDIMENTATION PLAN STA 13+00 TO STA. 21+00
189	EROSION AND SEDIMENTATION PLAN STA. 21+00 TO STA. 29+00
190	EROSION AND SEDIMENTATION PLAN STA. 29+00 TO END
191	EROSION AND SEDIMENTATION PLAN STA.37+00 TO END
192	EROSION AND SEDIMENTATION PLAN WATER QUALITY & DETENTION POND 2
193	DEWATERING PLAN CULVERT A
194	DEWATERING PLAN SWALE A
195	EROSION CONTROL DETAILS 1
196	EROSION CONTROL DETAILS 2
197	EROSION CONTROL DETAILS 3
198	EROSION CONTROL DETAILS 4 *
199	EROSION CONTROL DETAILS 5
TREES	
200	TREE LISTS
201	TREE PRESERVATION PLAN STA. 5+00 TO STA. 13+00
202	TREE PRESERVATION PLAN STA. 13+00 TO STA. 21+00
203	TREE PRESERVATION PLAN STA. 21+00 TO STA. 29+00
204	TREE PRESERVATION PLAN STA. 29+00 TO 37+00
205	TREE PRESERVATION PLAN STA. 37+00 TO END
206	TREE PRESERVATION PLAN WATER QUALITY & DETENTION POND 2
207	TREE PRESERVATION DETAILS 1
208	TREE PRESERVATION DETAILS 2
209	TREE PRESERVATION DETAILS 3
210	TREE PRESERVATION DETAILS 4
211	TREE MITIGATION PLAN STA. 5+00 TO 13+00
212	TREE MITIGATION PLAN STA. 13+00 TO 21+00
213	TREE MITIGATION PLAN STA. 21+00 TO 29+00
214	TREE MITIGATION PLAN STA. 29+00 TO 37+00
215	TREE MITIGATION PLAN STA. 37+00 TO END
216	TREE MITIGATION PLAN POND 2
217	TREE MITIGATION LEGEND & SUMMARY TABLE
EXISTING UTLITY	
218	EXISTING UTILITY LAYOUT STA. 5+00 TO STA. 13+00
219	EXISTING UTILITY LAYOUT STA. 13+00 TO STA. 21+00
220	EXISTING UTILITY LAYOUT STA. 21+00 TO STA. 29+00
221	EXISTING UTILITY LAYOUT STA. 29+00 TO 37+00
222	EXISTING UTILITY LAYOUT STA. 37+00 TO END
223	ILLUMINATION PLAN SOLERA DR.

SHEET NO.	DESCRIPTION
CROSS SECTIONS	
224	NEENAH. AVE CROSS SECTIONS STA 5+00 – 5+50
225	NEENAH AVE. CROSS SECTIONS STA 6+00 – 6+50
226	NEENAH AVE. CROSS SECTIONS STA 7+00 – 7+50
227	NEENAH AVE. CROSS SECTIONS STA 8+00 – 8+50
228	NEENAH AVE. CROSS SECTIONS STA 8+79 – 9+00
229	NEENAH AVE. CROSS SECTIONS STA 9+50 – 10+00
230	NEENAH AVE. CROSS SECTIONS STA 10+50 – 11+00
231	NEENAH AVE. CROSS SECTIONS STA 11+50 – 12+00
232	NEENAH AVE. CROSS SECTIONS STA 12+50 – 13+00
233	NEENAH AVE. CROSS SECTIONS STA 13+50 – 14+00
234	NEENAH AVE. CROSS SECTIONS STA 14+32
235	NEENAH AVE. CROSS SECTIONS STA 14+50 – 15+00
236	NEENAH AVE. CROSS SECTIONS STA 15+50 – 16+00
237	NEENAH AVE. CROSS SECTIONS STA 16+50 – 17+00
238	NEENAH AVE. CROSS SECTIONS STA 17+48 – 17+50
239	NEENAH AVE. CROSS SECTIONS STA 18+00 – 18+50
240	NEENAH AVE. CROSS SECTIONS STA 19+00 – 19+50
241	NEENAH AVE. CROSS SECTIONS STA 20+00 – 20+50
242	NEENAH AVE. CROSS SECTIONS STA 20+74 – 21+00
243	NEENAH AVE. CROSS SECTIONS STA 21+27
244	NEENAH AVE. CROSS SECTIONS STA 21+50 – 22+00
245	NEENAH AVE. CROSS SECTIONS STA 22+50 – 23+00
246	NEENAH AVE. CROSS SECTIONS STA 23+50 – 24+00
247	NEENAH AVE. CROSS SECTIONS STA 24+50 – 25+00
248	NEENAH AVE. CROSS SECTIONS STA 25+50 – 26+00
249	NEENAH AVE. CROSS SECTIONS STA 26+50 – 26+69
250	NEENAH AVE. CROSS SECTIONS STA 26+80 – 27+00
251	NEENAH AVE. CROSS SECTIONS STA 27+50 – 28+00
252	NEENAH AVE. CROSS SECTIONS STA 28+50 – 29+00
253	NEENAH AVE. CROSS SECTIONS STA 29+50 – 29+58
254	NEENAH AVE. CROSS SECTIONS STA 30+00 – 30+03
255	NEENAH AVE. CROSS SECTIONS STA 30+50 – 31+00
256	NEENAH AVE. CROSS SECTIONS STA 31+50 – 32+00
257	NEENAH AVE. CROSS SECTIONS STA 32+50 – 33+00
258	NEENAH AVE. CROSS SECTIONS STA 33+50 – 34+00
259	NEENAH AVE. CROSS SECTIONS STA 34+50 – 34+66
260	NEENAH AVE. CROSS SECTIONS STA 35+00
261	ALTONA WAY CROSS SECTION 10+50
262	SOLERA DR. CROSS SECTIONS 10+50 – 11+00
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263	C–001 GENERAL NOTES
264	C–101 WATERLINE LAYOUT & RELOCATION SHEET I
265	C–102 WATERLINE LAYOUT & RELOCATION SHEET II
266	C–103 WATERLINE LAYOUT & RELOCATION SHEET I
267	C–104 WATERLINE LAYOUT & RELOCATION SHEET II
268	C–105 WATERLINE "A" PLAN & PROFILE
269	C–106 WATERLINE "B" PLAN & PROFILE
270	C–501 STANDARD WATER DETAILS
271	C–502 STANDARD WATER CONCRETE & STRUCTURE DETAILS
272	C–503 STANDARD WATER CONCRETE & STRUCTURE DETAILS
273	C–504 STANDARD WATER CONCRETE & STRUCTURE DETAILS

TREE MITIGATION TO BE DONE BY OTHERS

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE BY A (*) HAVE BEEN SELECTED BY ME OR UNDER MY SUPERVISION AND ARE APPLICABLE TO THE PROJECT.

Stephanie D Blew
STEPHANIE D. BLEW, P.E.

8.4.2017
DATE

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

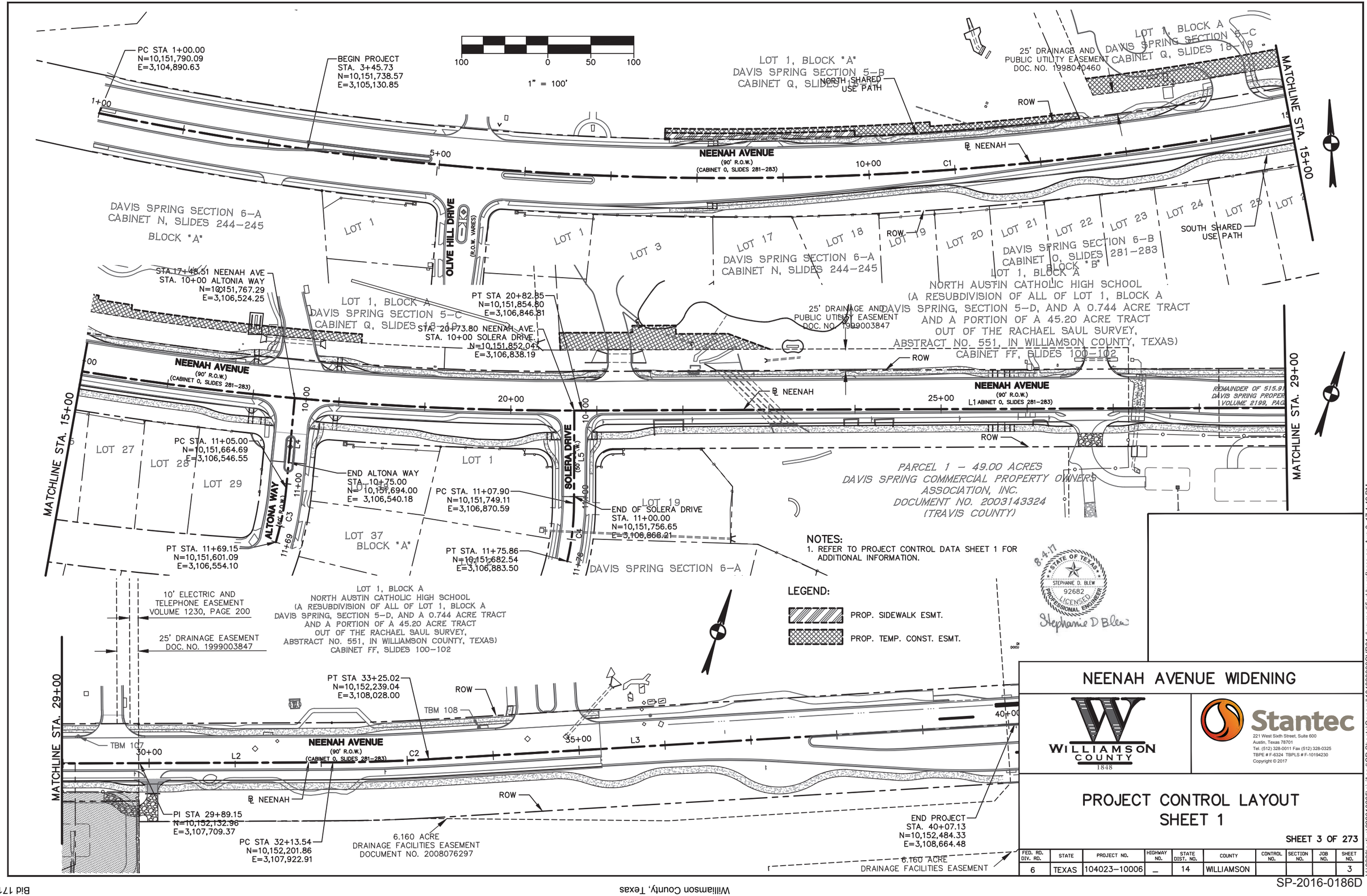
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SHEET INDEX

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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
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NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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PROJECT CONTROL LAYOUT SHEET 1

SHEET 3 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				3

SP-2016-0186D

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BENCHMARK INFORMATION=

ELEVATIONS HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) UTILIZING WESTERN DATA SYSTEMS CONTINUALLY OPERATING REFERENCE STATION (CORS) NETWORK AND ADDITIONALLY REFERENCED TO CITY OF AUSTIN AND LCRA GPS CONTROL MONUMENTATION.

THE BASIS OF BEARING OF THE SURVEY SHOWN HEREON IS TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, NAD 83(96), UTILIZING WESTERN DATA SYSTEMS CONTINUALLY OPERATING REFERENCE STATIONS (CORS) NETWORK.

THIS IS A SURFACE DRAWING, BEARINGS ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NAD 83(96), CENTRAL ZONE, UTILIZING WESTERN DATA SYSTEMS CONTINUALLY OPERATING REFERENCE STATION (CORS) NETWORK. AND ADDITIONALLY TIED LCRA GPS CONTROL MONUMENTS, COORDINATE VALUES ARE PROJECT SPECIFIC SURFACE VALUES. TO DERIVE GRID VALUES, MULTIPLY BY A COMBINED SCALE FACTOR OF 0.99988, WITH AN ORIGIN POINT OF N 0.0, E 0.0.

BENCHMARK 1: 3 INCH BRASS CAP FOUND IN CONCRETE (LCRA GPS STATION EUD107), FROM INTERSECTION OF RR 620 AND LAKE CREEK PARKWAY, 0.5 MILE ON LAKE CREEK TO INTERSECTION WITH ACORN CREEK TRAIL, MONUMENT IS NORTH OF LAKE CREEK PARKWAY NEAR THE SOUTHWEST CORNER OF FOOTBRIDGE.
PUBLISHED ELEVATION = 959.30'
FOUND ELEVATION = 959.32'
N = 10,140,481.87
E = 3,091,950.36

BENCHMARK 2: 3 INCH BRASS DISC FOUND AT SOUTH END OF INLET (COA GPS STATION F-37-2002), AT THE NORTHEAST CORNER OF THE INTERSECTION OF SWAN DRIVE AND LIRIOPE COVE.
PUBLISHED ELEVATION = 983.89'
FOUND ELEVATION = 984.05'
N = 10,135,924.99
E = 3,094,773.11

TBM 100: PK NAIL AND WASHER SET ON SOUTH SIDE OF NEENAH AVENUE, ±175 FEET WEST OF THE CENTERLINE OF OLIVE HILL DRIVE.
N = 10,151,752.95
E = 3,104,883.40
ELEVATION = 884.62'

TBM 101: PK NAIL AND WASHER SET ON TOP OF NORTH CURBLINE OF NEENAH AVENUE, EAST SIDE OF RAMP, ±40 FEET WEST OF THE CENTERLINE OF OLIVE HILL DRIVE.
N = 10,151,749.19
E = 3,105,291.27
ELEVATION = 887.05'

TBM 102: PK NAIL AND WASHER SET ON TOP OF SOUTH CURBLINE OF NEENAH AVENUE, ±475 FEET EAST OF THE CENTERLINE OF OLIVE HILL DRIVE.
N = 10,151,667.16
E = 3,105,791.52
ELEVATION = 878.88'

TBM 103: PK NAIL AND WASHER SET ON TOP OF NORTH CURBLINE OF NEENAH AVENUE NEAR FIRE HYDRANT, ±375 FEET WEST OF THE CENTERLINE OF ALTONA WAY.
N = 10,151,741.65
E = 3,106,157.10
ELEVATION = 869.19'

TBM 104: PK NAIL AND WASHER SET ON TOP OF NORTH CURBLINE OF NEENAH AVENUE, WEST SIDE OF RAMP, ±30 FEET EAST OF THE CENTERLINE OF ALTONA WAY.
N = 10,151,809.74
E = 3,106,550.62
ELEVATION = 864.11'

TBM 105: PK NAIL AND WASHER SET ON THE TOP OF NORTH CURBLINE OF NEENAH AVENUE, AT THE CENTERLINE OF SOLERA DRIVE.
N = 10,151,885.02
E = 3,106,824.93
ELEVATION = 862.44'

TBM 106: PK NAIL AND WASHER SET ON THE TOP OF NORTH CURBLINE OF NEENAH AVENUE NEAR A FIRE HYDRANT, ±330 FEET EAST OF THE CENTERLINE OF SOLERA DRIVE.
N = 10,151,986,83
E = 3,107,139.01
ELEVATION = 860.91'

TBM 107: PK NAIL AND WASHER SET ON THE TOP OF NORTH CURBLINE OF NEENAH AVENUE, ±825 FEET EAST OF THE CENTERLINE OF SOLERA DRIVE.
N = 10,152,140.90
E = 3,107,631.68
ELEVATION = 858.33'

TBM 108: PK NAIL AND WASHER SET IN THE SOUTHWEST CORNER OF INLET AT NORTH CURBLINE OF NEENAH AVENUE, ±1300 FEET EAST OF THE CENTERLINE OF SOLERA DRIVE.
N = 10,152,291.83
E = 3,108,072.31
ELEVATION = 858.47'

TBM 109: PK NAIL AND WASHER SET AT THE "Y" INTERSECTION OF A TRICKLE CHANNEL, ON THE SOUTH SIDE OF NEENAH AVENUE NEAR THE END OF EXISTING PAVEMENT.
N = 10,152,146.50
E = 3,108,311.25
ELEVATION = 848.54'

℄ NEENAH CURVE TABLE								
NO.	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH	PC STA.	PC NORTHING	PC EASTING
C1	1982.85'	3555.00'	001°36'42"	N88°06'19"E	1957.25'	STA. 1+00.00	N= 10,151,790.09	E= 3,104,890.63
C2	111.48'	1999.91'	002°51'55"	N70°31'13"E	111.47'	STA. 32+13.54	N= 10,152,201.86	E= 3,107,922.91

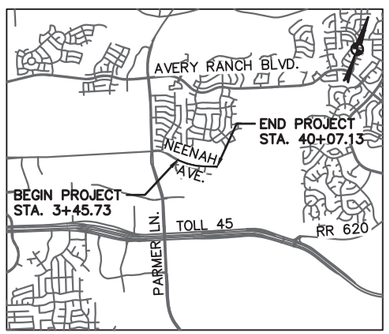
NEENAH LINE TABLE					
NO.	BEARING	DISTANCE	START STA.	START NORTHING	START EASTING
L1	N72°07'35.32"E	906.30'	STA. 20+82.85	N= 10,151,854.80	E= 3,106,846.81
L2	N72°07'02.32"E	224.39'	STA. 29+89.15	N= 10,152,132.96	E= 3,107,709.37
L3	N68°55'24.32"E	708.30'	STA. 33+25.02	N= 10,152,239.04	E= 3,108,028.00

℄ ALTONA CURVE TABLE								
NO.	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH	PC STA.	PC NORTHING	PC EASTING
C3	64.15'	316.27'	018°11'34"	S6°46'07"E	64.04'	STA. 11+05.00	N= 10,151,664.69	E= 3,106,546.55

℄ ALTONA LINE TABLE					
NO.	BEARING	DISTANCE	START STA.	START NORTHING	START EASTING
L4	S12°15'44.77"E	105.00'	STA. 10+00.00	N= 10,151,767.29	E= 3,106,524.25

℄ SOLERA CURVE TABLE								
NO.	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH	PC STA.	PC NORTHING	PC EASTING
C4	67.96'	300.00'	019°11'18"	S10°58'53"E	67.81'	STA. 11+07.90	N= 10,151,749.11	E= 3,106,870.59

℄ SOLERA LINE TABLE					
NO.	BEARING	DISTANCE	START STA.	START NORTHING	START EASTING
L5	S17°28'15.26"E	107.90'	STA. 10+00.00	N= 10,151,852.04	E= 3,106,838.19



STREET MAP
NTS

8.4.17
STATE OF TEXAS
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PROJECT CONTROL DATA
SHEET 1

SHEET 4 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				4

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LEGEND:

PROP. SIDEWALK ESMT.

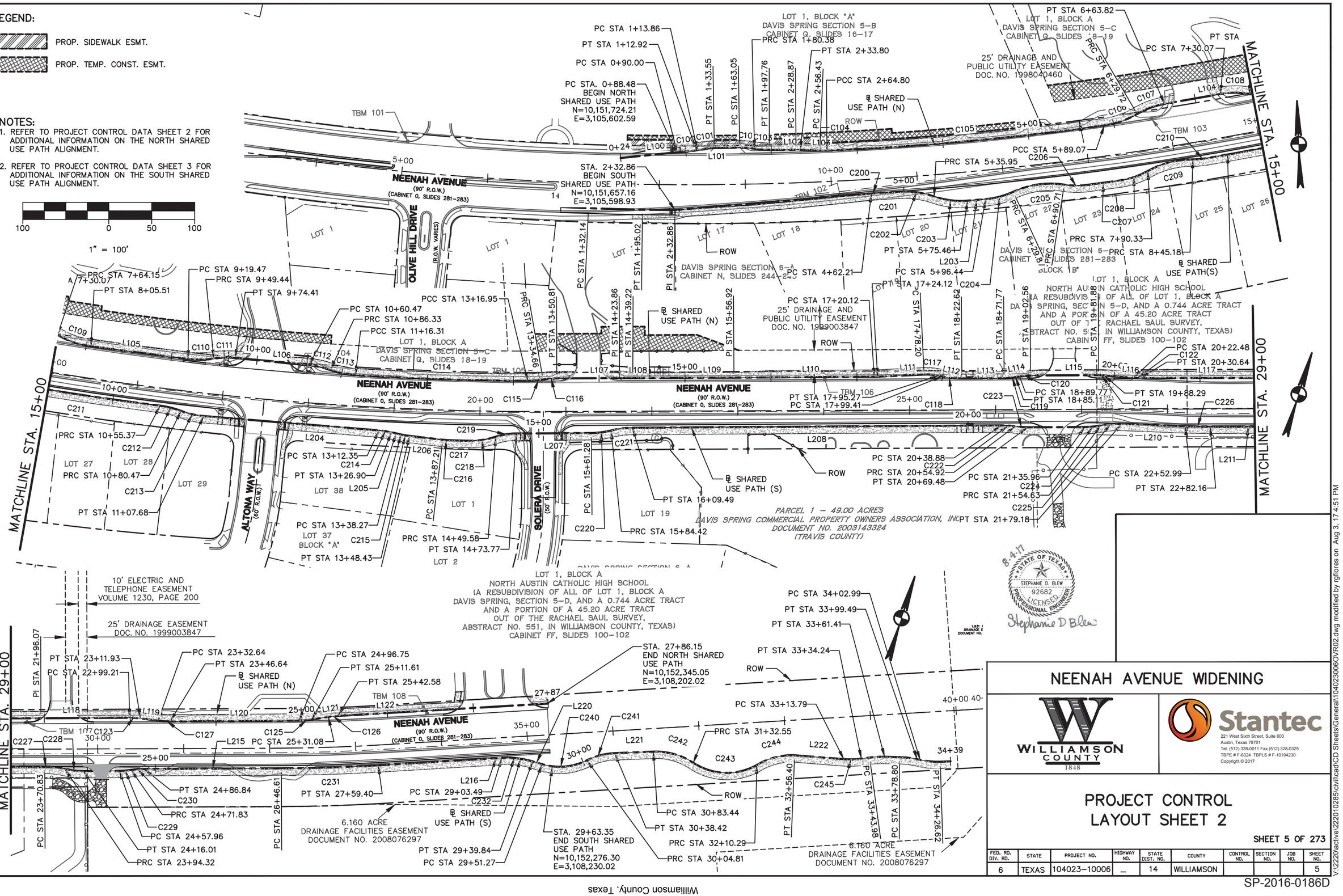
PROP. TEMP. CONST. ESMT.

NOTES:

1. REFER TO PROJECT CONTROL DATA SHEET 2 FOR ADDITIONAL INFORMATION ON THE NORTH SHARED USE PATH ALIGNMENT.
2. REFER TO PROJECT CONTROL DATA SHEET 3 FOR ADDITIONAL INFORMATION ON THE SOUTH SHARED USE PATH ALIGNMENT.

100 0 50 100

1" = 100'



8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
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PROJECT CONTROL LAYOUT SHEET 2

SHEET 5 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				5

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℄ SHARED USE PATH (N) CURVE TABLE								
NO.	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH	PC STA.	PC NORTHING	PC EASTING
C100	22.92'	104.00'	057°28'17"	N85°57'40"E	22.88'	STA. 0+90.00	N= 10,151,724.15	E= 3,105,604.11
C101	19.69'	96.00'	062°46'35"	N85°31'18"E	19.65'	STA. 1+13.86	N= 10,151,725.93	E= 3,105,627.85
C102	17.33'	96.00'	062°46'35"	S83°25'56"E	17.30'	STA. 1+63.05	N= 10,151,726.75	E= 3,105,676.95
C103	17.37'	104.30'	057°17'37"	S83°02'27"E	17.35'	STA. 1+80.38	N= 10,151,724.77	E= 3,105,694.14
C104	8.37'	100.00'	060°00'00"	S87°45'26"E	8.37'	STA. 2+56.43	N= 10,151,719.57	E= 3,105,769.94
C105	324.27'	3342.53'	001°42'51"	N87°04'03"E	324.15'	STA. 2+64.80	N= 10,151,719.25	E= 3,105,778.30
C106	40.64'	104.00'	057°28'17"	N73°03'40"E	40.39'	STA. 5+89.07	N= 10,151,735.83	E= 3,106,102.02
C107	34.10'	96.00'	062°46'35"	N72°02'32"E	33.92'	STA. 6+29.72	N= 10,151,747.60	E= 3,106,140.66
C108	34.08'	96.00'	062°46'35"	S87°36'34"E	33.91'	STA. 7+30.07	N= 10,151,767.02	E= 3,106,238.56
C109	41.36'	104.00'	057°28'17"	S88°49'51"E	41.09'	STA. 7+64.15	N= 10,151,765.61	E= 3,106,272.44
C110	29.97'	104.00'	057°28'17"	N71°28'17"E	29.87'	STA. 9+19.47	N= 10,151,785.00	E= 3,106,425.67
C111	24.97'	96.00'	062°46'35"	N70°39'58"E	24.90'	STA. 9+49.44	N= 10,151,794.49	E= 3,106,453.99
C112	25.86'	96.00'	062°46'35"	N84°37'30"E	25.79'	STA. 10+60.47	N= 10,151,820.53	E= 3,106,561.68
C113	29.98'	104.00'	057°28'16"	N84°04'16"E	29.87'	STA. 10+86.33	N= 10,151,822.94	E= 3,106,587.35
C114	200.64'	3589.70'	001°35'46"	N74°12'45"E	200.62'	STA. 11+16.31	N= 10,151,826.03	E= 3,106,617.06
C115	17.71'	100.00'	060°00'00"	N67°32'14"E	17.69'	STA. 13+16.95	N= 10,151,880.61	E= 3,106,810.11
C116	16.15'	96.00'	062°46'35"	N67°16'59"E	16.13'	STA. 13+34.66	N= 10,151,887.37	E= 3,106,826.46
C117	17.06'	67.00'	096°32'11"	N77°00'47"E	17.02'	STA. 17+78.20	N= 10,152,027.39	E= 3,107,247.20
C118	23.22'	108.00'	055°09'25"	N78°09'04"E	23.17'	STA. 17+99.41	N= 10,152,031.63	E= 3,107,267.91
C119	13.35'	79.00'	078°31'50"	N67°09'13"E	13.33'	STA. 18+71.77	N= 10,152,051.58	E= 3,107,337.32
C120	12.79'	75.00'	083°37'14"	N67°12'04"E	12.78'	STA. 18+89.77	N= 10,152,058.92	E= 3,107,353.73
C121	6.40'	72.00'	087°57'57"	N74°38'10"E	6.40'	STA. 19+81.88	N= 10,152,088.26	E= 3,107,440.98
C122	8.16'	104.00'	057°28'17"	N74°27'56"E	8.16'	STA. 20+22.48	N= 10,152,097.55	E= 3,107,480.50
C123	12.72'	96.00'	062°46'35"	N75°59'10"E	12.71'	STA. 22+99.21	N= 10,152,182.16	E= 3,107,743.97
C125	14.87'	104.00'	057°28'17"	N67°12'43"E	14.86'	STA. 24+96.75	N= 10,152,238.64	E= 3,107,933.03
C126	11.50'	96.00'	062°46'35"	N66°32'51"E	11.49'	STA. 25+31.08	N= 10,152,253.20	E= 3,107,964.08

℄ SHARED USE PATH (N) LINE TABLE					
NO.	BEARING	DISTANCE	START STA.	START NORTHING	START EASTING
L100	N86°36'07.87"E	66.13'	STA. 0+23.87	N= 10,151,720.23	E= 3,105,538.10
L102	S88°11'10.90"E	31.11'	STA. 1+97.76	N= 10,151,722.67	E= 3,105,711.36
L103	S85°21'35.84"E	22.63'	STA. 2+33.80	N= 10,151,721.40	E= 3,105,747.38
L104	N82°13'09.55"E	66.24'	STA. 6+63.82	N= 10,151,758.06	E= 3,106,172.93
L105	N79°46'35.67"E	113.96'	STA. 8+05.51	N= 10,151,764.77	E= 3,106,313.52
L106	N78°03'56.49"E	86.06'	STA. 9+74.41	N= 10,151,802.73	E= 3,106,477.48
L107	N72°05'34.84"E	73.04'	STA. 13+50.81	N= 10,151,893.60	E= 3,106,841.34
L108	N72°33'31.46"E	15.36'	STA. 14+23.86	N= 10,151,916.06	E= 3,106,910.85
L109	N72°03'19.44"E	117.70'	STA. 14+39.22	N= 10,151,920.66	E= 3,106,925.50
L110	N72°00'27.45"E	163.21'	STA. 15+56.92	N= 10,151,956.92	E= 3,107,037.48
L111	N69°43'01.28"E	54.08'	STA. 17+24.12	N= 10,152,008.65	E= 3,107,196.48
L112	N84°18'32.87"E	4.14'	STA. 17+95.27	N= 10,152,031.22	E= 3,107,263.79
L113	N71°59'35.33"E	49.14'	STA. 18+22.62	N= 10,152,036.39	E= 3,107,290.59
L114	N62°18'51.05"E	4.65'	STA. 18+85.11	N= 10,152,056.75	E= 3,107,349.61
L115	N72°05'16.98"E	79.32'	STA. 19+02.56	N= 10,152,063.87	E= 3,107,365.51
L118	N71°58'56.71"E	103.14'	STA. 21+96.07	N= 10,152,150.25	E= 3,107,645.89
L119	N79°46'50.53"E	20.71'	STA. 23+11.93	N= 10,152,185.23	E= 3,107,756.30
L120	N72°01'14.89"E	150.11'	STA. 23+46.64	N= 10,152,192.31	E= 3,107,790.25
L121	N63°06'58.58"E	19.47'	STA. 25+11.61	N= 10,152,244.40	E= 3,107,946.72
L122	S69°00'08.78"W	244.57'	STA. 25+42.58	N= 10,152,257.77	E= 3,107,974.63

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED PROFESSIONAL ENGINEER
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NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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PROJECT CONTROL DATA
SHEET 2

SHEET 6 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				6

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SP-2016-0186D

SHARED USE PATH (S) CURVE TABLE								
NO.	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH	PC STA.	PC NORTHING	PC EASTING
C200	4.23'	104.00'	057°28'17"	N87°36'21"E	4.23'	STA. 4+62.21	N= 10,151,667.37	E= 3,105,828.05
C201	27.43'	19796.45'	000°17'22"	N88°40'08"E	27.43'	STA. 4+66.44	N= 10,151,667.55	E= 3,105,832.28
C202	42.08'	102.53'	058°22'19"	S80°09'07"E	41.78'	STA. 4+93.87	N= 10,151,668.18	E= 3,105,859.70
C203	39.51'	94.00'	064°16'12"	S80°31'37"E	39.22'	STA. 5+35.95	N= 10,151,661.04	E= 3,105,900.87
C204	33.43'	96.00'	062°46'38"	N77°27'13"E	33.26'	STA. 5+96.44	N= 10,151,655.52	E= 3,105,960.51
C205	60.84'	104.00'	057°28'17"	N84°14'06"E	59.97'	STA. 6+29.87	N= 10,151,662.75	E= 3,105,992.98
C206	27.11'	96.01'	062°46'11"	S87°05'45"E	27.02'	STA. 6+90.71	N= 10,151,668.77	E= 3,106,052.65
C207	37.33'	3435.10'	001°40'05"	N84°32'35"E	37.33'	STA. 7+17.81	N= 10,151,667.40	E= 3,106,079.63
C208	35.18'	96.00'	062°46'35"	N73°43'57"E	34.99'	STA. 7+55.14	N= 10,151,670.95	E= 3,106,116.79
C209	54.85'	108.00'	055°09'25"	N77°46'58"E	54.26'	STA. 7+90.33	N= 10,151,680.75	E= 3,106,150.38
C210	16.40'	96.00'	062°46'35"	N87°26'14"E	16.38'	STA. 8+45.18	N= 10,151,692.24	E= 3,106,203.41
C211	193.79'	3575.50'	001°36'09"	N80°59'24"E	193.76'	STA. 8+61.58	N= 10,151,692.97	E= 3,106,219.78
C212	25.10'	104.00'	057°28'17"	N86°21'08"E	25.04'	STA. 10+55.37	N= 10,151,723.31	E= 3,106,411.15
C213	27.21'	96.00'	062°46'35"	N85°08'49"E	27.12'	STA. 10+80.47	N= 10,151,724.91	E= 3,106,436.14
C214	14.56'	104.00'	057°28'17"	N81°02'11"E	14.54'	STA. 13+12.35	N= 10,151,773.15	E= 3,106,662.61
C215	10.17'	96.00'	062°46'35"	N82°00'45"E	10.16'	STA. 13+38.27	N= 10,151,776.40	E= 3,106,688.30
C216	8.31'	96.00'	062°46'35"	N76°29'55"E	8.31'	STA. 13+87.21	N= 10,151,785.22	E= 3,106,736.42
C217	21.83'	3590.00'	001°35'46"	N73°50'40"E	21.83'	STA. 13+95.52	N= 10,151,787.16	E= 3,106,744.50
C218	32.22'	96.00'	062°46'35"	N64°03'16"E	32.07'	STA. 14+17.36	N= 10,151,793.24	E= 3,106,765.47
C219	24.19'	79.00'	078°31'50"	N63°12'40"E	24.10'	STA. 14+49.58	N= 10,151,807.27	E= 3,106,794.31
C220	23.14'	96.00'	062°46'35"	N65°04'44"E	23.08'	STA. 15+61.28	N= 10,151,845.20	E= 3,106,899.05
C221	25.06'	104.00'	057°28'17"	N65°04'44"E	25.00'	STA. 15+84.42	N= 10,151,854.92	E= 3,106,919.98
C222	16.04'	104.00'	057°28'17"	N76°24'05"E	16.02'	STA. 20+38.88	N= 10,151,998.27	E= 3,107,350.99
C223	14.57'	96.00'	062°46'35"	N76°28'23"E	14.55'	STA. 20+54.92	N= 10,152,002.03	E= 3,107,366.56
C224	18.67'	96.00'	062°46'35"	N66°33'19"E	18.64'	STA. 21+35.96	N= 10,152,025.84	E= 3,107,443.98
C225	24.56'	104.00'	057°28'17"	N67°44'54"E	24.50'	STA. 21+54.63	N= 10,152,033.26	E= 3,107,461.08
C226	29.17'	700.50'	008°11'10"	N73°19'10"E	29.17'	STA. 22+52.99	N= 10,152,062.24	E= 3,107,554.88
C227	23.49'	104.00'	057°28'17"	N78°35'46"E	23.44'	STA. 23+70.83	N= 10,152,097.83	E= 3,107,667.22
C228	21.69'	96.00'	062°46'35"	N78°35'37"E	21.64'	STA. 23+94.32	N= 10,152,102.46	E= 3,107,690.19
C229	13.87'	96.00'	062°46'35"	N67°59'02"E	13.85'	STA. 24+57.96	N= 10,152,119.62	E= 3,107,751.33
C230	15.01'	104.00'	057°28'17"	N67°58'54"E	15.00'	STA. 24+71.83	N= 10,152,124.82	E= 3,107,764.18
C231	112.79'	2023.41'	002°49'55"	N70°31'13"E	112.78'	STA. 26+46.61	N= 10,152,179.50	E= 3,107,930.13
C232	36.35'	104.00'	057°28'17"	N78°56'16"E	36.17'	STA. 29+03.49	N= 10,152,268.92	E= 3,108,170.90
C240	53.55'	71.00'	089°32'02"	N67°20'47"E	52.29'	STA. 29+51.27	N= 10,152,276.07	E= 3,108,217.82
C241	33.61'	79.00'	078°31'50"	N57°55'45"E	33.36'	STA. 30+04.81	N= 10,152,296.21	E= 3,108,266.07
C242	49.11'	79.00'	078°31'50"	N87°55'30"E	48.32'	STA. 30+83.44	N= 10,152,329.23	E= 3,108,336.68
C243	77.74'	71.00'	089°32'02"	N74°21'54"E	73.91'	STA. 31+32.55	N= 10,152,330.98	E= 3,108,384.96
C244	46.11'	78.94'	078°36'15"	N57°54'19"E	45.46'	STA. 32+10.29	N= 10,152,350.90	E= 3,108,456.14
C245	20.45'	96.00'	062°46'35"	N70°45'59"E	20.41'	STA. 33+13.79	N= 10,152,388.09	E= 3,108,550.54

℄ SHARED USE PATH (S) LINE TABLE					
NO.	BEARING	DISTANCE	START STA.	START NORTHING	START EASTING
L203	N87°25'49.74"E	20.97'	STA. 5+75.46	N= 10,151,654.58	E= 3,105,939.56
L204	N77°01'35.51"E	204.66'	STA. 11+07.68	N= 10,151,727.20	E= 3,106,463.17
L205	N85°02'46.03"E	11.37'	STA. 13+26.90	N= 10,151,775.41	E= 3,106,676.98
L206	N78°58'43.70"E	38.78'	STA. 13+48.43	N= 10,151,777.81	E= 3,106,698.36
L207	N71°58'59.66"E	87.52'	STA. 14+73.77	N= 10,151,818.13	E= 3,106,815.82
L208	N71°58'59.66"E	429.39'	STA. 16+09.49	N= 10,151,865.46	E= 3,106,942.65
L209	N72°07'35.32"E	66.48'	STA. 20+69.48	N= 10,152,005.44	E= 3,107,380.71
L210	N74°30'44.72"E	73.80'	STA. 21+79.18	N= 10,152,042.53	E= 3,107,483.76
L211	N72°07'35.32"E	88.68'	STA. 22+82.16	N= 10,152,070.61	E= 3,107,582.82
L215	N72°07'02.32"E	159.76'	STA. 24+86.84	N= 10,152,130.44	E= 3,107,778.08
L216	N68°55'24.32"E	144.09'	STA. 27+59.40	N= 10,152,217.11	E= 3,108,036.45
L220	N88°57'07.65"E	11.42'	STA. 29+39.84	N= 10,152,275.86	E= 3,108,206.40
L221	N70°07'02.67"E	45.02'	STA. 30+38.42	N= 10,152,313.92	E= 3,108,294.34
L222	N76°52'07.14"E	57.39'	STA. 32+56.40	N= 10,152,375.06	E= 3,108,494.65

8-4-17

STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER

Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

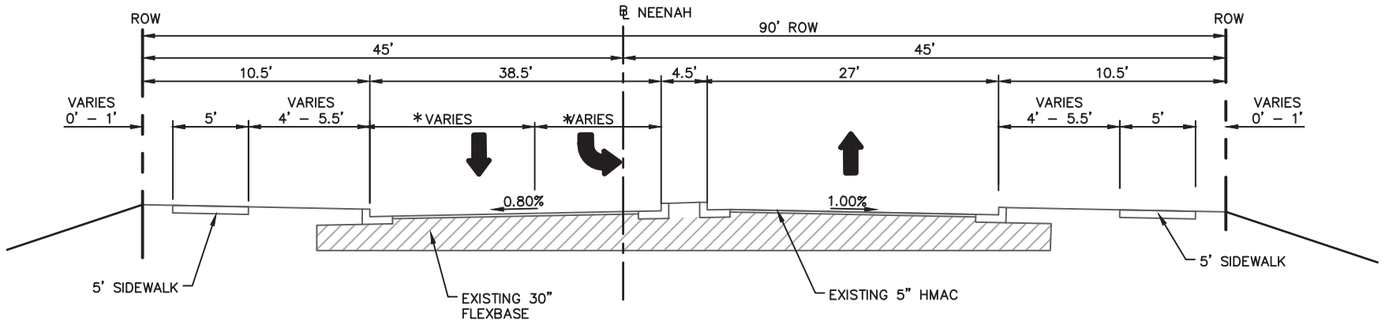
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Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
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PROJECT CONTROL DATA
SHEET 3

SHEET 7 OF 273

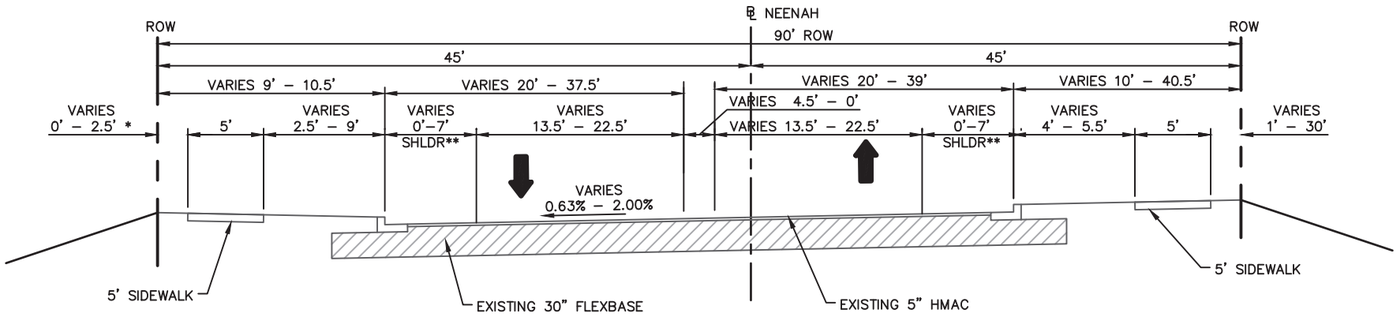
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				7

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*NO PAVEMENT MARKINGS ARE PRESENT IN THE FIELD FOR THE DEDICATED LEFT TURN LANE.

NEENAH AVENUE
STA. 5+75.16 TO STA. 6+76.40
EXISTING TYPICAL SECTION
N.T.S.



* SIDEWALK MEANDERS OUTSIDE OF ROW IN SOME AREAS
** SHOULDER BEGINS AT STA 9+08.21 AND TRANSITIONS TO 7' WIDTH AT STA 11+00

NEENAH AVENUE
STA. 6+76.40 TO STA. 12+32.69
EXISTING TYPICAL SECTION
N.T.S.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
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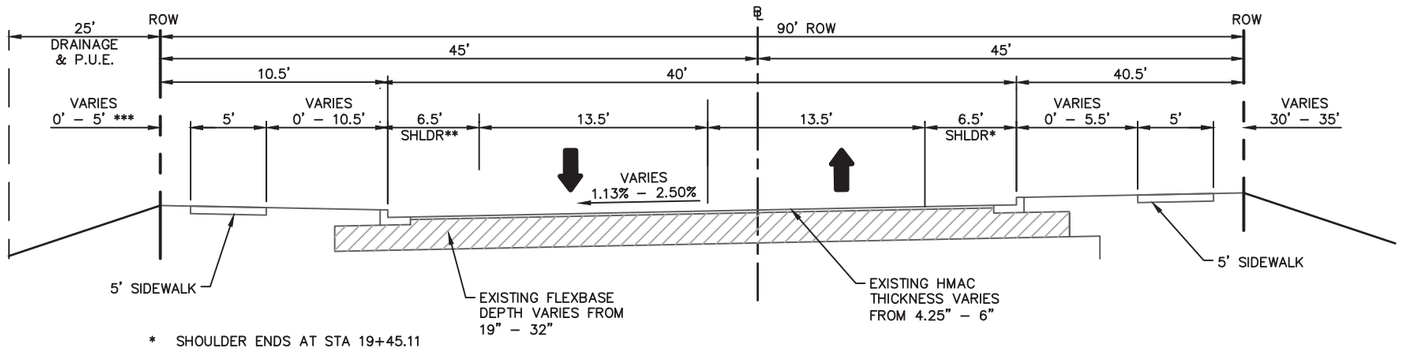
EXISTING TYPICAL SECTIONS
NEENAH AVE.

SHEET 8 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				8

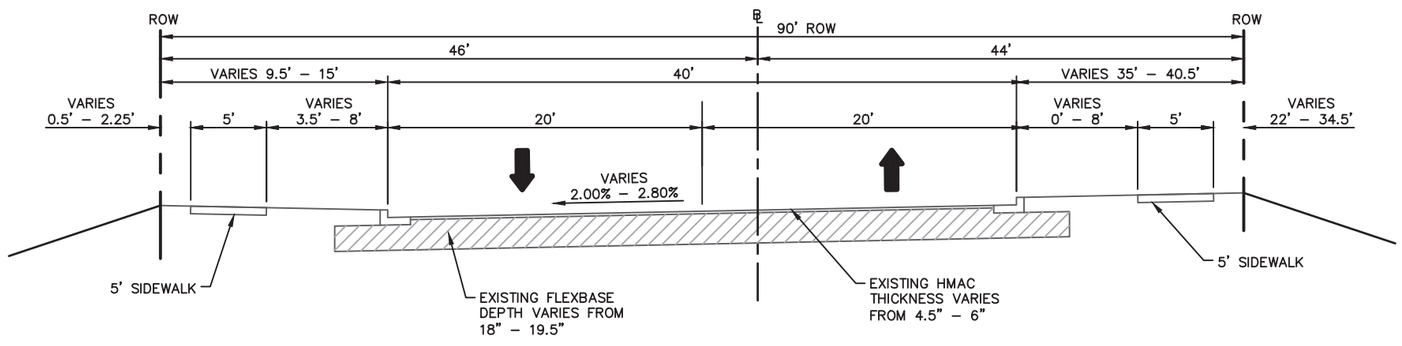
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* SHOULDER ENDS AT STA 19+45.11
** SHOULDER ENDS AT STA 20+38.22
*** SIDEWALK MEANDERS OUTSIDE OF ROW IN SOME AREAS

NEENAH AVENUE
STA. 12+32.69 TO STA. 27+37.01
EXISTING TYPICAL SECTION
N.T.S.



NEENAH AVENUE
STA. 27+37.01 TO STA. 28+80.35
EXISTING TYPICAL SECTION
N.T.S.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
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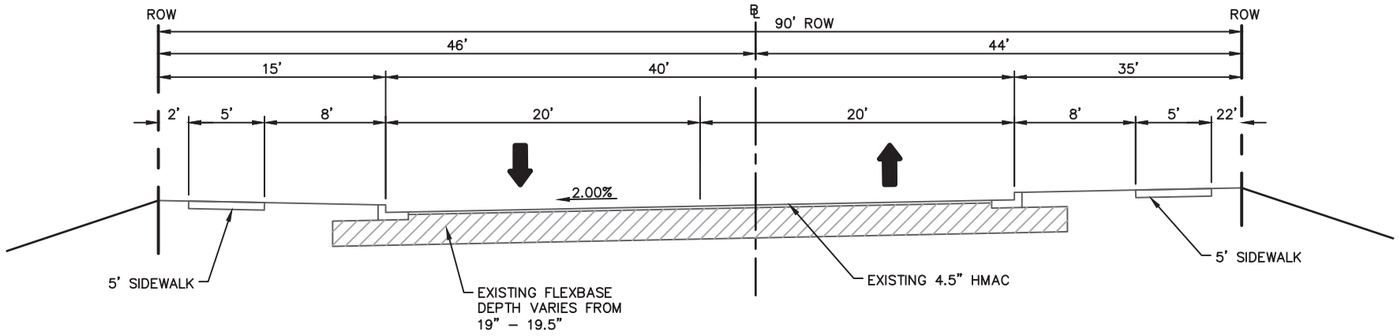
EXISTING TYPICAL SECTIONS
NEENAH AVE.

SHEET 9 OF 273

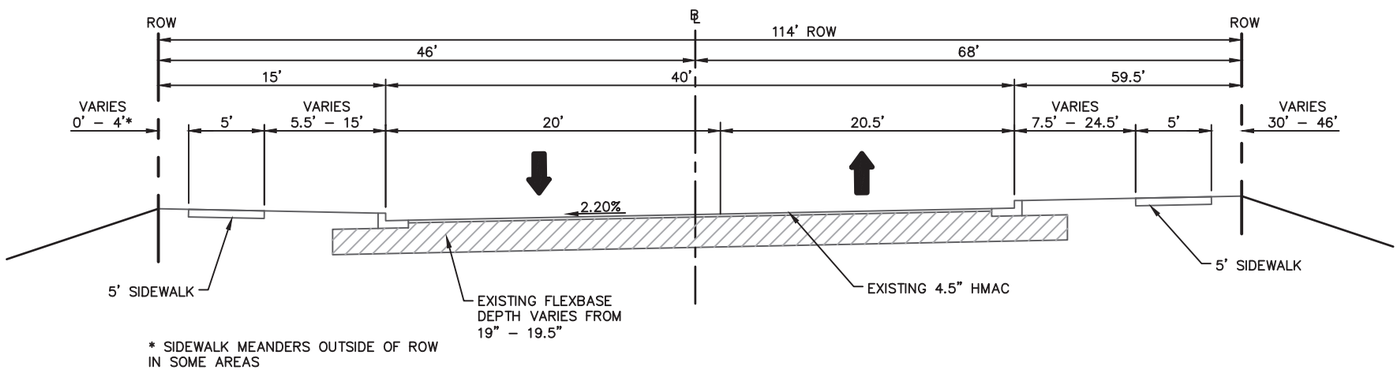
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				9

SP-2016-0186D

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NEENAH AVENUE
STA. 28+80.35 TO STA. 29+88.07
EXISTING TYPICAL SECTION
N.T.S.



* SIDEWALK MEANDERS OUTSIDE OF ROW IN SOME AREAS

NEENAH AVENUE
STA. 29+88.07 TO STA. 35+25.47
EXISTING TYPICAL SECTION
N.T.S.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
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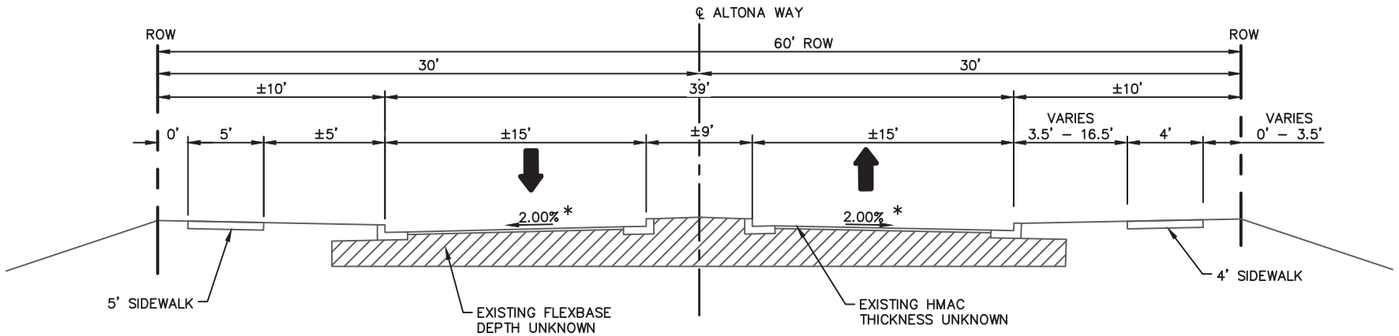
EXISTING TYPICAL SECTIONS
NEENAH AVE.

SHEET 10 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				10

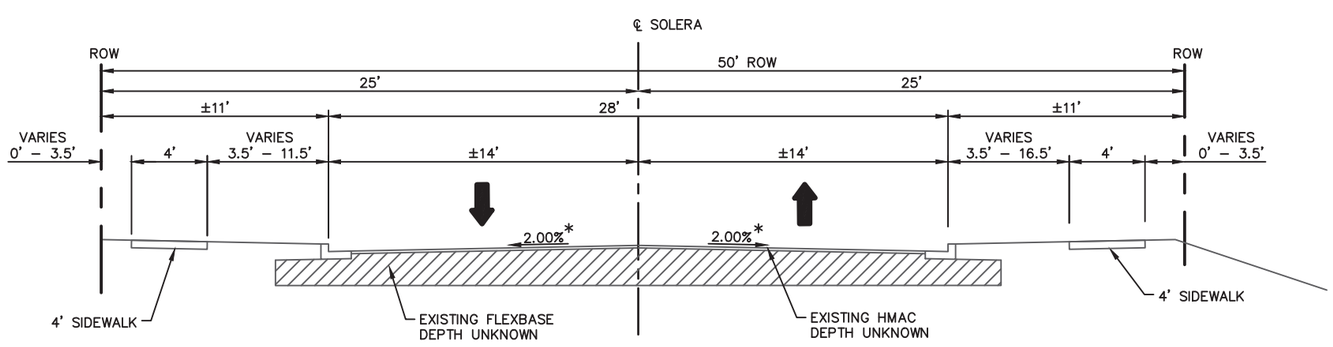
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* CROSS SLOPE VARIES

ALTONA WAY
STA. 10+41.13 TO STA. 10+75
EXISTING TYPICAL SECTION
N.T.S.



* CROSS SLOPE VARIES

SOLERA DRIVE
STA. 10+00.00 TO STA. 11+00.00
EXISTING TYPICAL SECTION
N.T.S.

8.4.17
STATE OF TEXAS
STEPHANE D. BLEW
92682
LICENSED
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Stephanie D Blew

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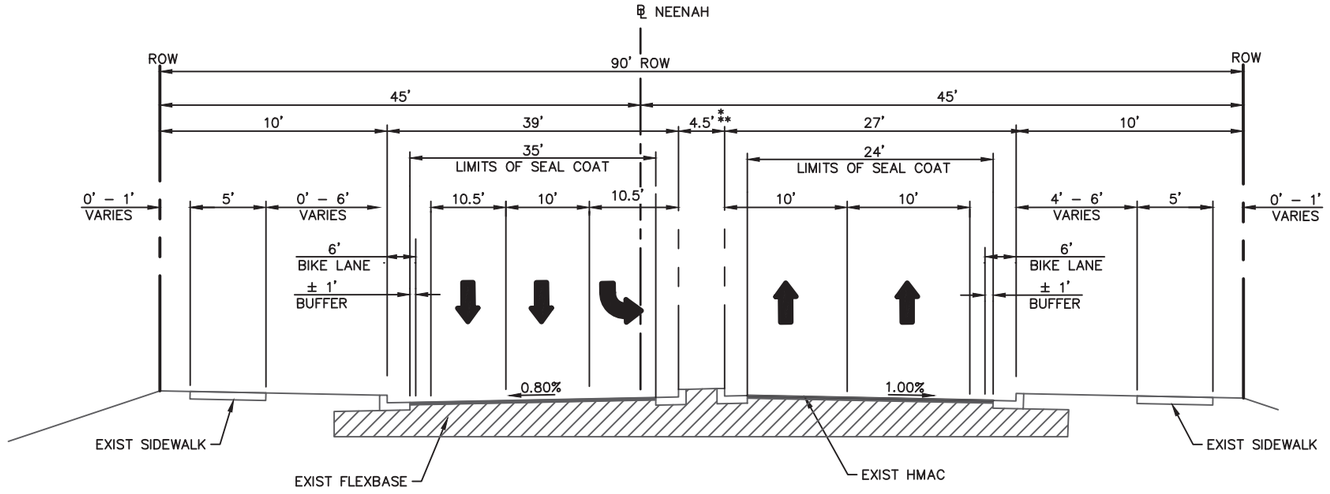
EXISTING TYPICAL SECTIONS
ALTONA WAY AND SOLERA DR.

SHEET 11 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				11

SP-2016-0186D

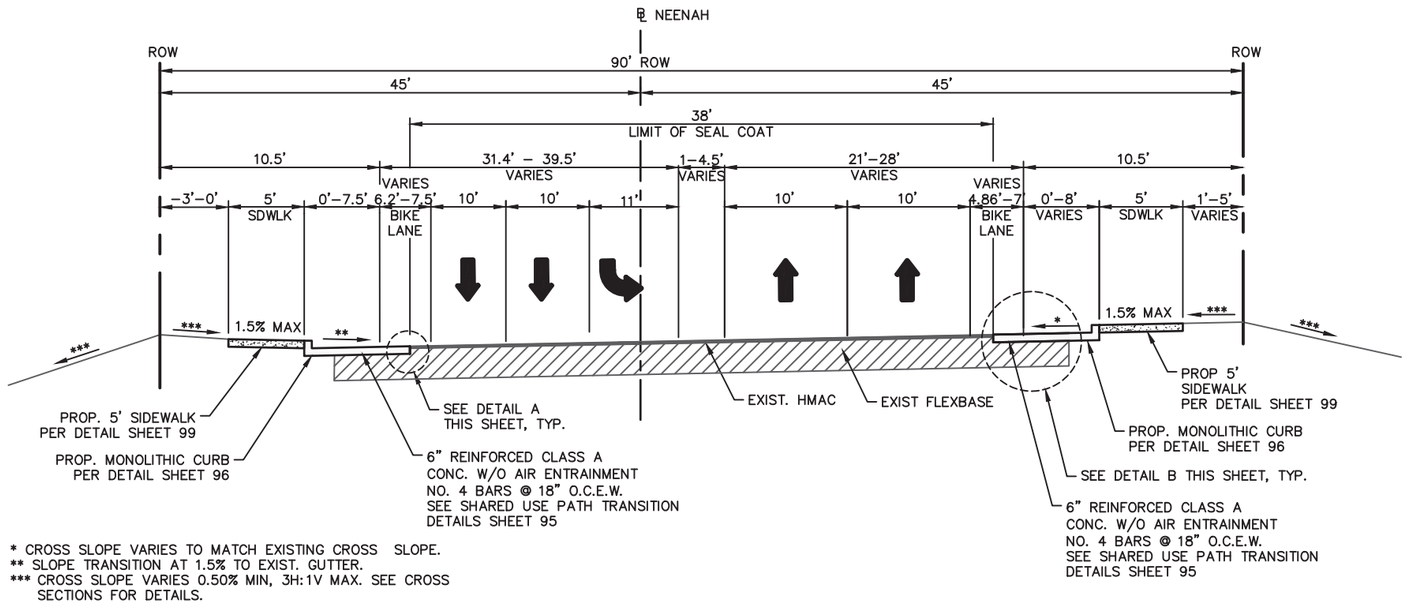
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NOTE:
1. ONLY SEAL COAT, AND PAVEMENT MARKINGS ARE PROPOSED IN THIS STATION RANGE.

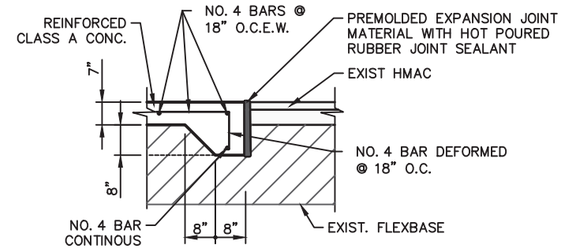
* STA 6+76.40 END RAISED MEDIAN.
** STA 6+76.40–STA 6+86.53 GORE VARIES FROM 4.5'–0.8'.

NEENAH AVENUE
STA. 5+76.89 TO STA. 6+86.53
PROPOSED TYPICAL SECTION
N.T.S.

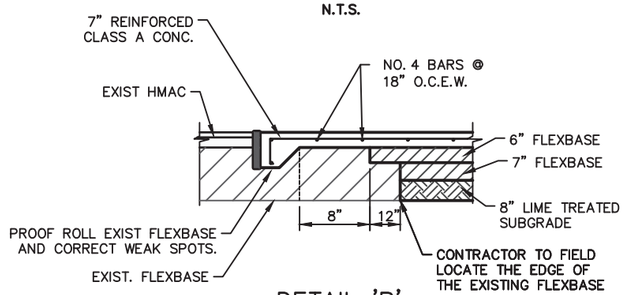


* CROSS SLOPE VARIES TO MATCH EXISTING CROSS SLOPE.
** SLOPE TRANSITION AT 1.5% TO EXIST. GUTTER.
*** CROSS SLOPE VARIES 0.50% MIN, 3H:1V MAX. SEE CROSS SECTIONS FOR DETAILS.

NEENAH AVENUE
STA. 6+86.53 TO STA. 8+19.04
PROPOSED TYPICAL SECTION
N.T.S.



DETAIL 'A'
N.T.S.



DETAIL 'B'
N.T.S.

NOTES:
1. REFER TO GEOTECHNICAL ENGINEERING REPORT, NEENAH AVENUE WIDENING FROM OLIVE HILL ROAD TO END OF EXISTING NEENAH AVE. PREPARED BY TERRACON CONSULTANTS, INC. ON AUGUST 10, 2015 FOR TESTING REQUIREMENTS TO DETERMINE ACTUAL LIME CONTENT FOR THE LIME TREATED SUBGRADE. FOR BIDDING PURPOSES CONTRACTOR SHALL ASSUME 7% LIME BY DRY WEIGHT.
2. SEE DETAILS A & B FOR PROPOSED PAVEMENT SECTION INFORMATION AND CONNECTION TO THE EXISTING EDGE OF PAVEMENT.
3. ONCE FIRST LIFT OF FLEXBASE IS PLACED PROOF ROLL ALL EXPOSED FLEXBASE PRIOR TO PLACEMENT OF SECOND LIFT.
4. CONTRACTOR SHAL PLACE TACK COAT BETWEEN LIFTS OF HMAC, AND BETWEEN EXISTING AND PROPOSED LAYERS OF HMAC.
5. CONTRACTOR SHALL SEAL COAT FULL WIDTH (LIP OF GUTTER TO LIP OF GUTTER) OF NEENAH AVE. FROM STA 3+44.23 TO STA 35+25.47.
6. SHARED USE PATH MEANDERS OUTSIDE OF ROW ALONG THE NORTH SIDE OF THE PROJECT.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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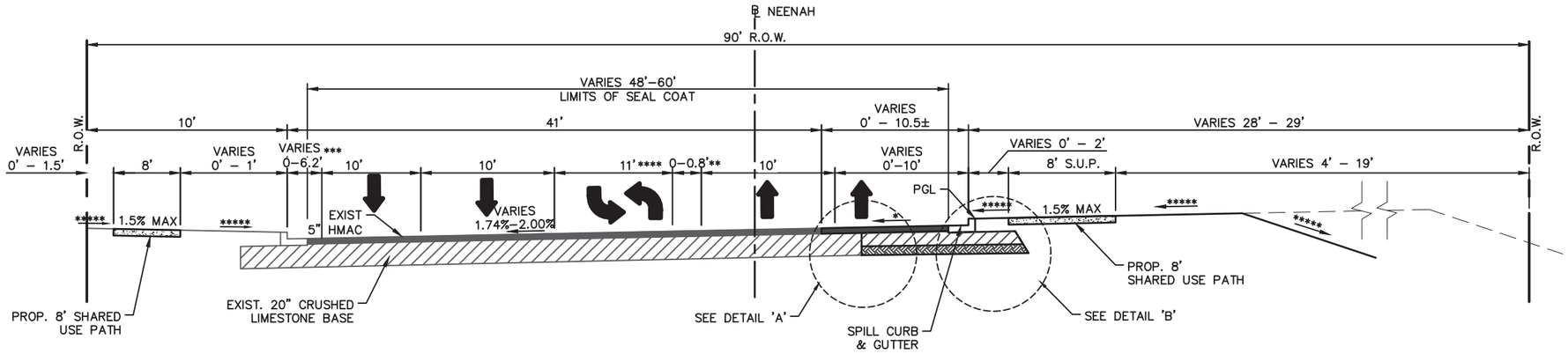
PROPOSED TYPICAL SECTIONS
NEENAH AVE

SHEET 12 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				12

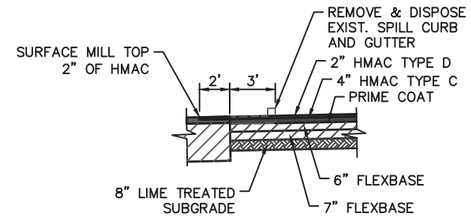
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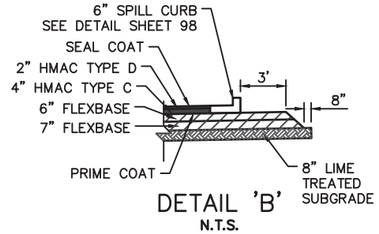


NEENAH AVENUE WIDENING
STA. 8+19.04 TO STA. 10+04.97
PROPOSED TYPICAL SECTION
N.T.S.

* CROSS SLOPE VARIES TO MATCH EXISTING CROSS SLOPE.
** STA 8+76.22 END GORE CENTER
*** STA 9+46.20 END GORE LEFT
**** STA 8+27.83 END DEDICATED LEFT TURN LANE, BEGIN TWO WAY LEFT TURN LANE.
***** CROSS SLOPE VARIES, 0.50% MIN., 3H:1V MAX. SEE CROSS SECTIONS FOR DETAILS. THE FIRST TWO FEET ADJACENT TO THE SHARED USE PATH SHOULD NOT EXCEED 6H:1V.

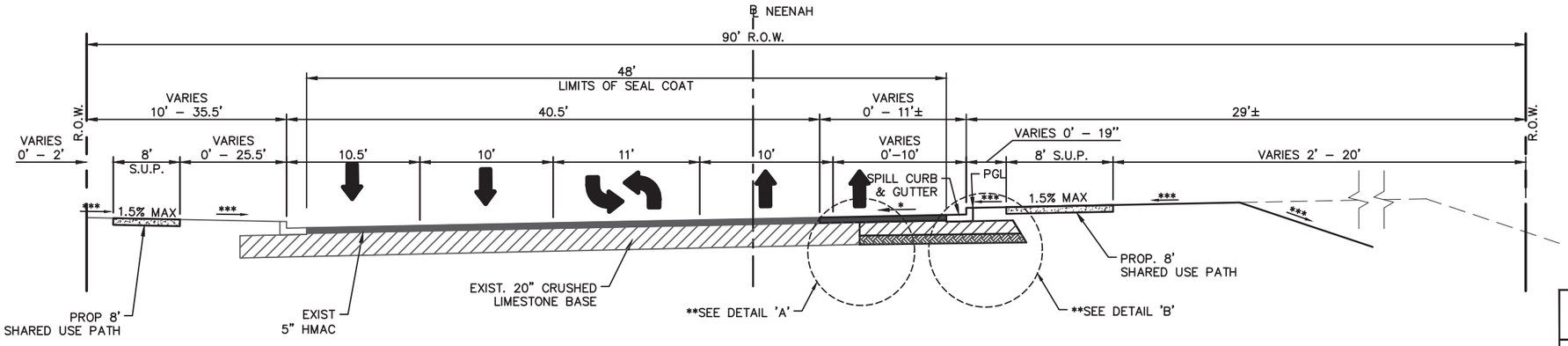


DETAIL 'A'
N.T.S.



DETAIL 'B'
N.T.S.

NOTES:
1. REFER TO GEOTECHNICAL ENGINEERING REPORT, NEENAH AVENUE WIDENING FROM OLIVE HILL ROAD TO END OF EXISTING NEENAH AVE. PREPARED BY TERRACON CONSULTANTS, INC. ON AUGUST 10, 2015 FOR TESTING REQUIREMENTS TO DETERMINE ACTUAL LIME CONTENT FOR THE LIME TREATED SUBGRADE. FOR BIDDING PURPOSES CONTRACTOR SHALL ASSUME 7% LIME BY DRY WEIGHT.
2. SEE DETAILS A & B FOR PROPOSED PAVEMENT SECTION INFORMATION AND CONNECTION TO THE EXISTING EDGE OF PAVEMENT.
3. ONCE FIRST LIFT OF FLEXBASE IS PLACED PROOF ROLL ALL EXPOSED FLEXBASE PRIOR TO PLACEMENT OF SECOND LIFT.
4. CONTRACTOR SHAL PLACE TACK COAT BETWEEN LIFTS OF HMAC, AND BETWEEN EXISTING AND PROPOSED LAYERS OF HMAC.
5. CONTRACTOR SHALL SEAL COAT FULL WIDTH (LIP OF GUTTER TO LIP OF GUTTER) OF NEENAH AVE. FROM STA 3+44.23 TO STA 35+25.47.
6. SHARED USE PATH MEANDERS OUTSIDE OF ROW ALONG THE NORTH SIDE OF THE PROJECT.



NEENAH AVENUE WIDENING
STA. 10+04.97 TO STA. 24+98.75
PROPOSED TYPICAL SECTION
N.T.S.

* CROSS SLOPE VARIES TO MATCH EXISTING CROSS SLOPE.
** STA. 17+03.97 TO STA. 17+92.28 (ALTONA WAY INTERSECTION) AND STA. 20+34.52 TO STA. 21+12.92 (SOLERA DR. INTERSECTION) CONTRACTOR SHALL PLACE BLACK BASE IN LIEU OF FLEX BASE.
*** CROSS SLOPE VARIES, 0.50% MIN., 3H:1V MAX. SEE CROSS SECTIONS FOR DETAILS. THE FIRST TWO FEET ADJACENT TO THE SHARED USE PATH SHOULD NOT EXCEED 6H:1V.



NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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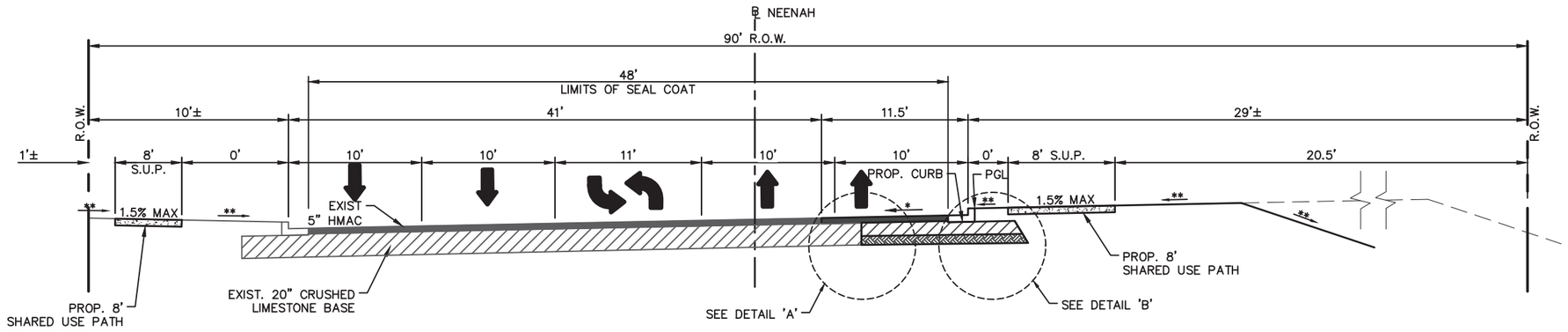
PROPOSED TYPICAL SECTIONS
NEENAH AVE.

SHEET 13 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				13

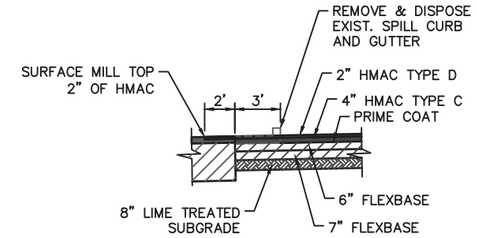
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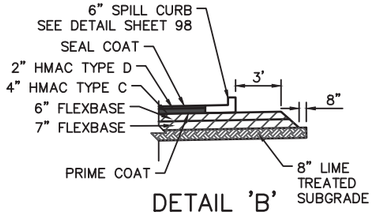


* CROSS SLOPE VARIES TO MATCH EXISTING CROSS SLOPE.
** CROSS SLOPE VARIES, 0.50% MIN., 3H:1V MAX. SEE CROSS SECTIONS FOR DETAILS. THE FIRST TWO FEET ADJACENT TO THE SHARED USE PATH SHOULD NOT EXCEED 6H:1V.

NEENAH AVENUE WIDENING
STA. 24+98.75 TO STA. 25+01.24
PROPOSED TYPICAL SECTION
N.T.S.

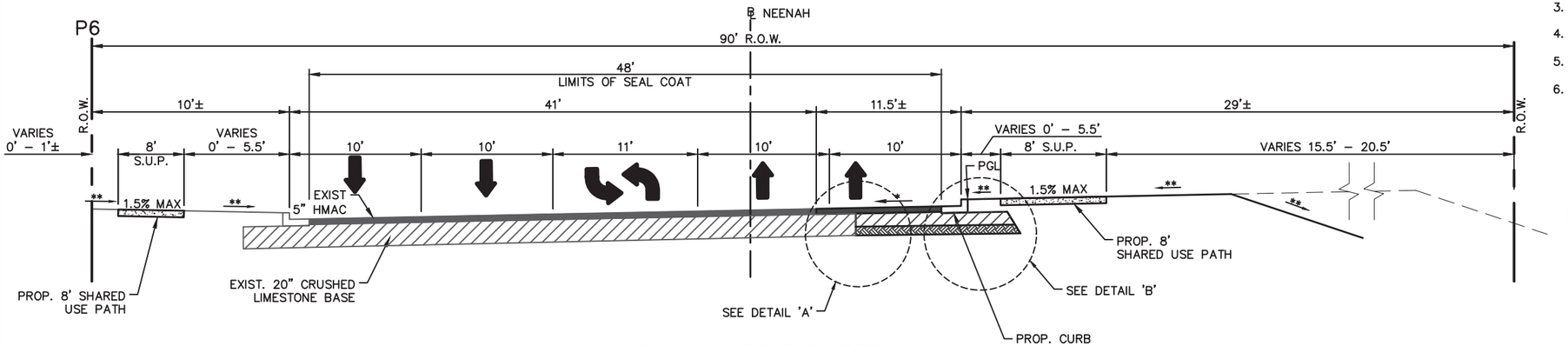


DETAIL 'A'
N.T.S.



DETAIL 'B'
N.T.S.

NOTES:
1. REFER TO GEOTECHNICAL ENGINEERING REPORT, NEENAH AVENUE WIDENING FROM OLIVE HILL ROAD TO END OF EXISTING NEENAH AVE. PREPARED BY TERRACON CONSULTANTS, INC. ON AUGUST 10, 2015 FOR TESTING REQUIREMENTS TO DETERMINE ACTUAL LIME CONTENT FOR THE LIME TREATED SUBGRADE. FOR BIDDING PURPOSES CONTRACTOR SHALL ASSUME 7% LIME BY DRY WEIGHT.
2. SEE DETAILS A & B FOR PROPOSED PAVEMENT SECTION INFORMATION AND CONNECTION TO THE EXISTING EDGE OF PAVEMENT.
3. ONCE FIRST LIFT OF FLEXBASE IS PLACED PROOF ROLL ALL EXPOSED FLEXBASE PRIOR TO PLACEMENT OF SECOND LIFT.
4. CONTRACTOR SHAL PLACE TACK COAT BETWEEN LIFTS OF HMAC, AND BETWEEN EXISTING AND PROPOSED LAYERS OF HMAC.
5. CONTRACTOR SHALL SEAL COAT FULL WIDTH (LIP OF GUTTER TO LIP OF GUTTER) OF NEENAH AVE. FROM STA 3+44.23 TO STA 35+25.47.
6. SHARED USE PATH MEANDERS OUTSIDE OF ROW ALONG THE NORTH SIDE OF THE PROJECT.



* CROSS SLOPE VARIES TO MATCH EXISTING CROSS SLOPE.
** CROSS SLOPE VARIES, 0.50% MIN., 3H:1V MAX. SEE CROSS SECTIONS FOR DETAILS. THE FIRST TWO FEET ADJACENT TO THE SHARED USE PATH SHOULD NOT EXCEED 6H:1V.

NEENAH AVENUE WIDENING
STA. 25+01.24 TO STA. 27+00.41
PROPOSED TYPICAL SECTION
N.T.S.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
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Stephanie D Blew

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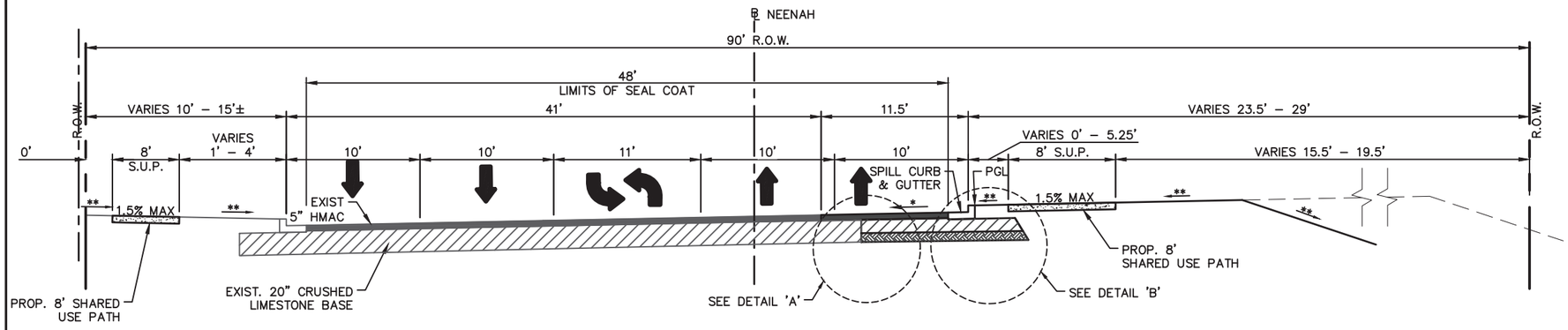
PROPOSED TYPICAL SECTIONS
NEENAH AVE.

SHEET 14 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				14

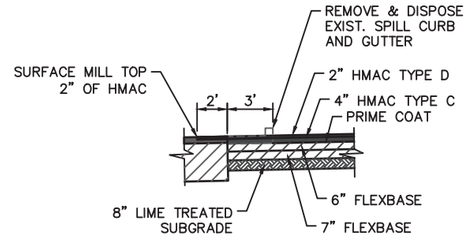
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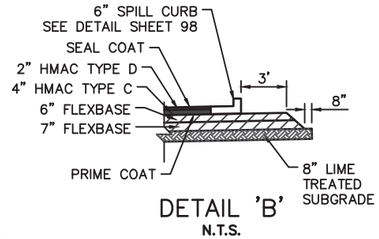


NEENAH AVENUE WIDENING
STA. 27+00.41 TO STA. 28+49.58
PROPOSED TYPICAL SECTION
N.T.S.

* CROSS SLOPE VARIES TO MATCH EXISTING CROSS SLOPE.
** CROSS SLOPE VARIES, 0.50% MIN., 3H:1V MAX. SEE CROSS SECTIONS FOR DETAILS. THE FIRST TWO FEET ADJACENT TO THE SHARED USE PATH SHOULD NOT EXCEED 6H:1V.

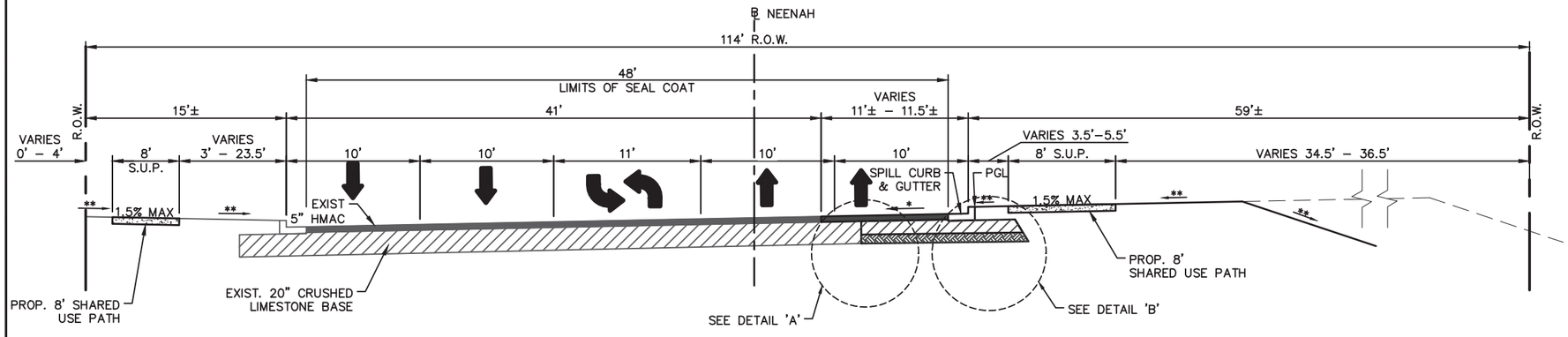


DETAIL 'A'
N.T.S.



DETAIL 'B'
N.T.S.

NOTES:
1. REFER TO GEOTECHNICAL ENGINEERING REPORT, NEENAH AVENUE WIDENING FROM OLIVE HILL ROAD TO END OF EXISTING NEENAH AVE. PREPARED BY TERRACON CONSULTANTS, INC. ON AUGUST 10, 2015 FOR TESTING REQUIREMENTS TO DETERMINE ACTUAL LIME CONTENT FOR THE LIME TREATED SUBGRADE. FOR BIDDING PURPOSES CONTRACTOR SHALL ASSUME 7% LIME BY DRY WEIGHT.
2. SEE DETAILS A & B FOR PROPOSED PAVEMENT SECTION INFORMATION AND CONNECTION TO THE EXISTING EDGE OF PAVEMENT.
3. ONCE FIRST LIFT OF FLEXBASE IS PLACED PROOF ROLL ALL EXPOSED FLEXBASE PRIOR TO PLACEMENT OF SECOND LIFT.
4. CONTRACTOR SHAL PLACE TACK COAT BETWEEN LIFTS OF HMAC, AND BETWEEN EXISTING AND PROPOSED LAYERS OF HMAC.
5. CONTRACTOR SHALL SEAL COAT FULL WIDTH (LIP OF GUTTER TO LIP OF GUTTER) OF NEENAH AVE. FROM STA 3+44.23 TO STA 35+25.47.
6. SHARED USE PATH MEANDERS OUTSIDE OF ROW ALONG THE NORTH SIDE OF THE PROJECT.



NEENAH AVENUE WIDENING
STA. 28+49.58 TO STA. 35+25.00
PROPOSED TYPICAL SECTION
N.T.S.

* CROSS SLOPE VARIES TO MATCH EXISTING CROSS SLOPE.
** CROSS SLOPE VARIES, 0.50% MIN., 3H:1V MAX. SEE CROSS SECTIONS FOR DETAILS. THE FIRST TWO FEET ADJACENT TO THE SHARED USE PATH SHOULD NOT EXCEED 6H:1V.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
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Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
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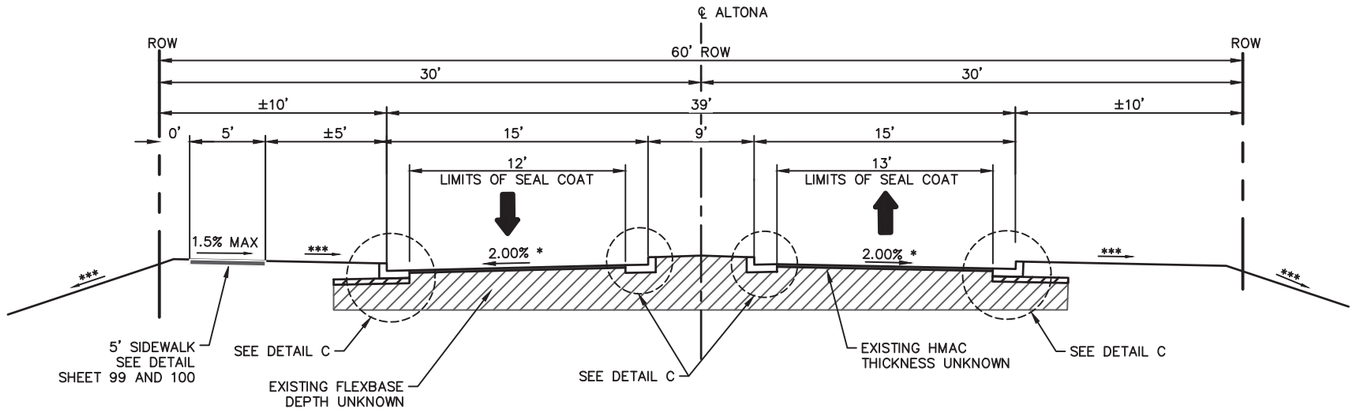
PROPOSED TYPICAL SECTIONS
NEENAH AVE.

SHEET 15 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				15

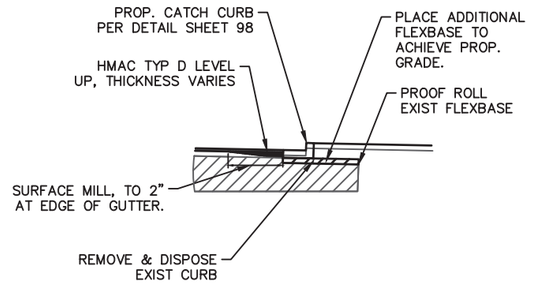
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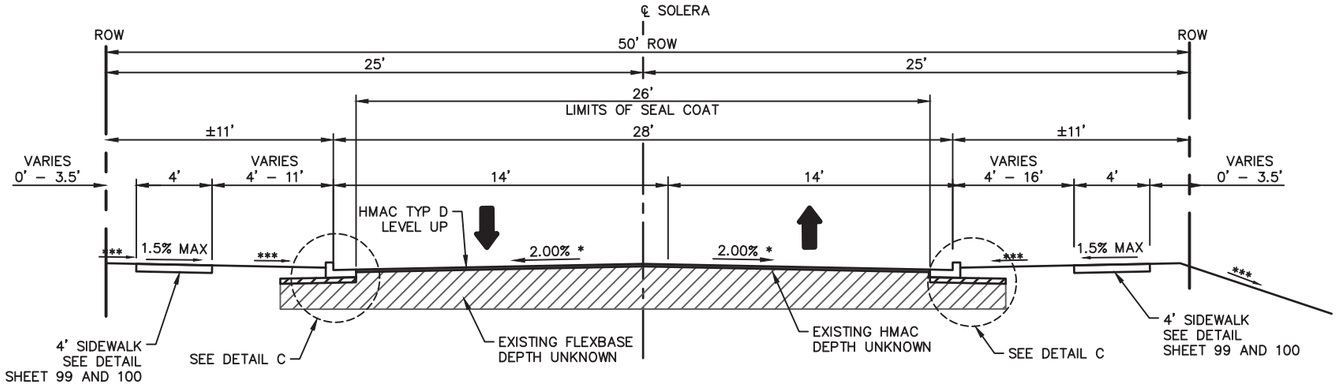
* CROSS SLOPE VARIES TO MATCH EXISTING CROSS SLOPE.
** CONTRACTOR TO MILL EXISTING HMAC AT TIE IN TO MAINTAIN A MINIMUM LIFT THICKNESS OF 1.5 INCHES.
*** CROSS SLOPE VARIES 0.50% MIN., 3H:1V MAX. SEE CROSS SECTIONS FOR DETAILS.

ALTONA WAY
STA. 10+41.13 TO STA. 10+75.00 **
PROPOSED TYPICAL SECTION
N.T.S.



DETAIL C
N.T.S.

NOTES:
1. CONTRACTOR SHALL PLACE SEAL COAT BETWEEN FLEXBASE AND HMAC.
2. CONTRACTOR SHALL PLACE TACK COAT BETWEEN LIFTS OF HMAC AND BETWEEN EXISTING AND PROPOSED LAYERS OF HMAC.
3. MEDIAN CURB & GUTTER SHALL BE SPILL TYPE. OUTSIDE CURB AND GUTTER SHALL BE CATCH TYPE.
4. REFER TO ALTONA WAY PLAN AND PROFILE (SHEET 74) AND INTERSECTION PLAN (SHEET 76) FOR ADDITIONAL DETAILS.
5. REFER TO SOLERA DR. PLAN AND PROFILE (SHEET 75) AND INTERSECTION PLAN (SHEET 77) FOR ADDITIONAL DETAILS.



* CROSS SLOPE VARIES TO MATCH EXISTING CROSS SLOPE.
** CONTRACTOR TO MILL EXISTING HMAC AT TIE IN TO MAINTAIN A MINIMUM LIFT THICKNESS OF 1.5 INCHES.
*** CROSS SLOPE VARIES 0.50% MIN., 3H:1V MAX. SEE CROSS SECTIONS FOR DETAILS.

SOLERA DR.
STA. 10+40.37 TO STA. 11+00.00 **
PROPOSED TYPICAL SECTION
N.T.S.

8.4.17
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NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
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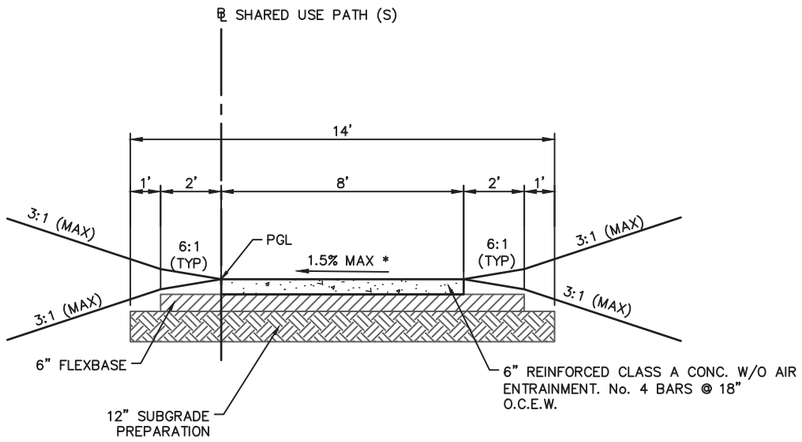
PROPOSED TYPICAL SECTIONS
ALTONA WAY & SOLERA DR.

SHEET 16 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				16

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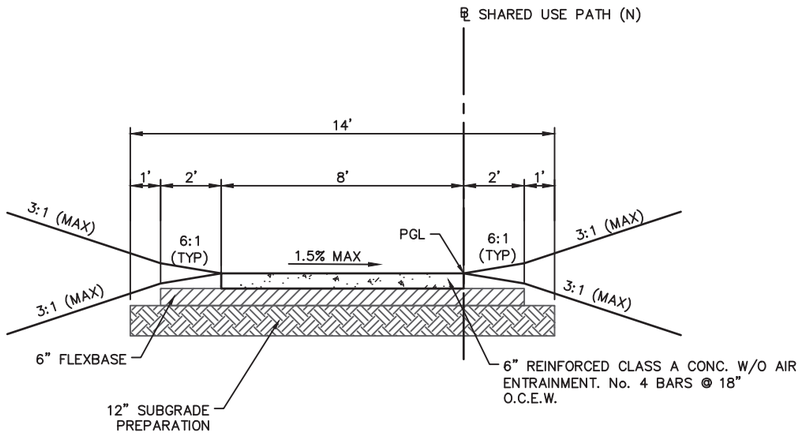


* SLOPE DIRECTION VARIES SEE SHARED USE PATH PLAN AND PROFILE SHEETS, AND CROSS SECTIONS FOR ADDITIONAL INFORMATION.

SHARED USE PATH (S)
N.T.S.

SOUTH SHARED USE PATH 1/2 CRZ AREAS:

STA 2+67.00 TO STA 3+65.00
STA 7+13.00 TO STA 7+27.00
STA 11+05.00 TO STA 11+34.00
STA 33+60.00 TO STA 33+84.00

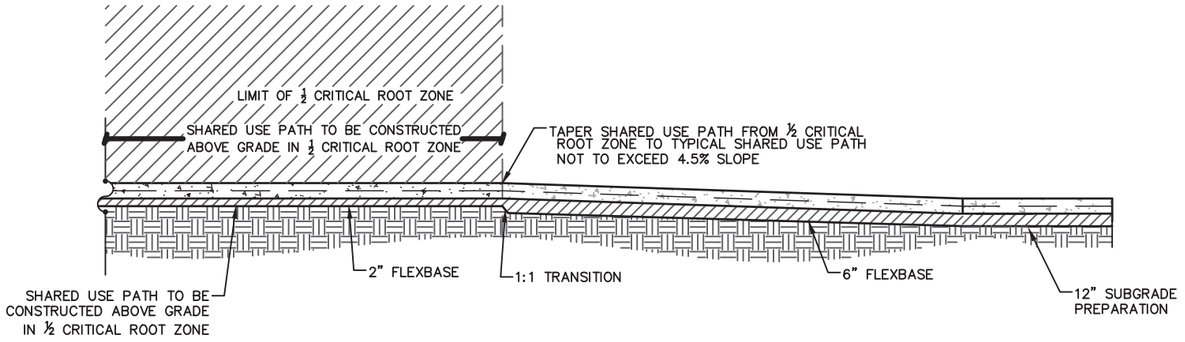


SHARED USE PATH (N)
N.T.S.

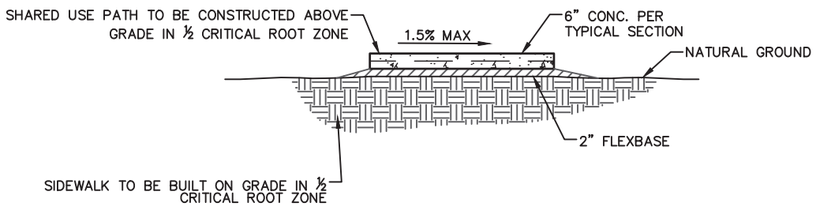
NORTH SHARED USE PATH 1/2 CRZ AREAS:

STA 20+50.00 TO STA 20+85.00
STA 22+42.48 TO STA 22+55.50
STA 23+50.00 TO STA 23+60.00
STA 24+50.00 TO STA 25+00.00

NOTES:
1. SHARED USE PATH MEANDERS OUTSIDE THE ROW ALONG THE NORTH SIDE OF THE PROJECT.
2. CONTROL JOINTS SHALL BE SPACED @ 15' USING PREFORMED CONTROL JOINT MATERIAL, ZIP STRIP, OR EQUIVALENT WITH HOT POURED RUBBER JOINT SEALANT.
3. WHERE SHARED USE PATH ABUTS AN EXISTING OR PROPOSED CURB, A CONTROL JOINT SHALL BE CONSTRUCTED BETWEEN THE SHARED USE PATH AND THE CURB USING PREFORMED CONTROL JOINT MATERIAL, ZIP STRIP, OR EQUIVALENT WITH HOT POURED RUBBER JOINT SEALANT.
4. REMOVAL OF EXISTING SIDEWALKS IN THE CRITICAL ROOT ZONE OF TREES TO BE PRESERVED SHALL BE ACCOMPLISHED BY LIFTING PANELS AND FLIPPING THEM TOWARD THE STREET TO AVOID DISTURBANCE OF ROOTS.



SHARED USE PATH WITHIN ½ CRZ
N.T.S.



8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
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Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
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PROPOSED TYPICAL SECTIONS SHARED USE PATH

SHEET 17 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				17

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LEGEND

EXISTING	PROPOSED	
		PROPERTY (ROW) LINE
(XXX)		RECORD INFORMATION
P.O.B.		POINT OF BEGINNING
		BENCHMARK
		1/2" IRON ROD FOUND (UNLESS NOTED)
		1/2" IRON ROD SET
		IRON PIPE FOUND
		NAIL FOUND
		COMPUTED POINT
		MONUMENT FOUND
		MONUMENT SET
		CUT "X"
		LIGHT POLE
		POWER POLE
		DOWN GUY
		TRANSFORMER (SIZE VARIES)
		FIRE HYDRANT
		WATER VALVE
		WATER METER
		WATER METER VAULT
		TELEPHONE RISER
		CABLE TV RISER
		ELECTRIC BOX
		ELECTRIC METER
		GAS METER
		GAS VALVE
		SIGN
		BOLLARD
		GRATE INLET
		CURB INLET (SIZE VARIES)
		WOOD FENCE
		STORMSEWER LINE
WW		WASTEWATER LINE
WW(P)		PRIVATE WASTEWATER LINE
UE		UNDERGROUND ELECTRIC
OE		OVERHEAD ELECTRIC
UT		UNDERGROUND TELEPHONE
G		GAS LINE
		CONDUIT
EMH		ELECTRIC MANHOLE (SIZE VARIES)
WWMH		WASTEWATER MANHOLE (SIZE VARIES)
SSMH		STORMSEWER MANHOLE (SIZE VARIES)
TMH		TELEPHONE MANHOLE (SIZE VARIES)
CO		WASTEWATER CLEANOUT
		EASEMENT
		HANDRAIL (TX DOT PRD-13 TYPE E)

EXISTING	PROPOSED	
		CURB & GUTTER
		CONCRETE SIDEWALKS
		HANDICAP ACCESSIBLE ROUTE
	TP TP	TREE PROTECTION
	S	SILT FENCE
		LIMITS OF CONSTRUCTION
		ROCK BERM
		STABILIZED CONSTRUCTION ENTRANCE
	TFD	TRIANGULAR SEDIMENT FILTER DIKE
	RFD3	ROCK FILTER DAM TYPE 3
		DITCH FLOW ARROW
		DIRECTION OF FLOW
678	678	CONTOUR
1170		TREE TO REMAIN
1111		TREE TO BE REMOVED
		TREE WELL
		METAL BEAM GUARD FENCE W/ CONC. MOW STRIP
		HANDRAIL
		GRAVEL ACCESS ROAD
		HMAC PAVEMENT
		HMAC LEVEL UP
		CONCRETE PAVEMENT
		NATIVE VEGETATION
		IRRIGATION SLEEVES

8.4.17

STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER

Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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LEGEND

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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				18

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TCEQ–0592 (REV. 3/15/07)

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

1. WRITTEN CONSTRUCTION NOTIFICATION MUST BE GIVEN TO THE APPROPRIATE TCEQ REGIONAL OFFICE NO LATER THAN 48 HOURS PRIOR TO COMMENCEMENT OF THE REGULATED ACTIVITY. INFORMATION MUST INCLUDE THE DATE ON WHICH THE REGULATED ACTIVITY WILL COMMENCE, THE NAME OF THE APPROVED PLAN FOR THE REGULATED ACTIVITY, AND THE NAME OF THE PRIME CONTRACTOR AND THE NAME AND TELEPHONE NUMBER OF THE CONTACT PERSON.

2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT MUST BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED WATER POLLUTION ABATEMENT PLAN AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS ARE REQUIRED TO KEEP ON–SITE COPIES OF THE APPROVED PLAN AND APPROVAL LETTER.

3. IF ANY SENSITIVE FEATURE IS DISCOVERED DURING CONSTRUCTION, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPROPRIATE TCEQ REGIONAL OFFICE MUST BE IMMEDIATELY NOTIFIED OF ANY SENSITIVE FEATURES ENCOUNTERED DURING CONSTRUCTION. THE REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MAY NOT PROCEED UNTIL THE TCEQ HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT THE SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM ANY POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY.

4. NO TEMPORARY ABOVEGROUND HYDROCARBON AND HAZARDOUS SUBSTANCE STORAGE TANK SYSTEM IS INSTALLED WITHIN 150 FEET OF A DOMESTIC, INDUSTRIAL, IRRIGATION, OR PUBLIC WATER SUPPLY WELL, OR OTHER SENSITIVE FEATURE.

5. PRIOR TO COMMENCEMENT OF CONSTRUCTION, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY SELECTED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS AND GOOD ENGINEERING PRACTICES. CONTROLS SPECIFIED IN THE TEMPORARY STORM WATER SECTION OF THE APPROVED EDWARDS AQUIFER PROTECTION PLAN ARE REQUIRED DURING CONSTRUCTION. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THE CONTROLS MUST REMAIN IN PLACE UNTIL DISTURBED AREAS ARE REVEGETATED AND THE AREAS HAVE BECOME PERMANENTLY STABILIZED.

6. IF SEDIMENT ESCAPES THE CONSTRUCTION SITE, OFF–SITE ACCUMULATIONS OF SEDIMENT MUST BE REMOVED AT A FREQUENCY SUFFICIENT TO MINIMIZE OFFSITE IMPACTS TO WATER QUALITY (E.G., FUGITIVE SEDIMENT IN STREET BEING WASHED INTO SURFACE STREAMS OR SENSITIVE FEATURES BY THE NEXT RAIN).

7. SEDIMENT MUST BE REMOVED FROM SEDIMENT TRAPS OR SEDIMENTATION PONDS NOT LATER THAN WHEN DESIGN CAPACITY HAS BEEN REDUCED BY 50%. A PERMANENT STAKE MUST BE PROVIDED THAT CAN INDICATE WHEN THE SEDIMENT OCCUPIES 50% OF THE BASIN VOLUME.

8. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS EXPOSED TO STORMWATER SHALL BE PREVENTED FROM BECOMING A POLLUTANT SOURCE FOR STORMWATER DISCHARGES (E.G., SCREENING OUTFALLS, PICKED UP DAILY).

9. ALL SPOILS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE MUST BE STORED ON–SITE WITH PROPER E&S CONTROLS. FOR STORAGE OR DISPOSAL OF SPOILS AT ANOTHER SITE ON THE EDWARDS AQUIFER RECHARGE ZONE, THE OWNER OF THE SITE MUST RECEIVE APPROVAL OF A WATER POLLUTION ABATEMENT PLAN FOR THE PLACEMENT OF FILL MATERIAL OR MASS GRADING PRIOR TO THE PLACEMENT OF SPOILS AT THE OTHER SITE.

10. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY TEMPORARY OR PERMANENTLY CEASE IS PRECLUDED BY WEATHER CONDITIONS, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE. WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH DISTURBING ACTIVITIES WILL BE RESUMED WITHIN 21 DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF SITE. IN AREAS EXPERIENCING DROUGHTS WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY HAS TEMPORARILY OR PERMANENTLY CEASED IS PRECLUDED BY SEASONAL ARID CONDITIONS, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE.

11. THE FOLLOWING RECORDS SHALL BE MAINTAINED AND MADE AVAILABLE TO THE TCEQ UPON REQUEST: THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR; THE DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE; AND THE DATES WHEN STABILIZATION MEASURES ARE INITIATED.

12. THE HOLDER OF ANY APPROVED EDWARD AQUIFER PROTECTION PLAN MUST NOTIFY THE APPROPRIATE REGIONAL OFFICE IN WRITING AND OBTAIN APPROVAL FROM THE EXECUTIVE DIRECTOR PRIOR TO INITIATING ANY OF THE FOLLOWING:

   A. ANY PHYSICAL OR OPERATIONAL MODIFICATION OF ANY WATER POLLUTION ABATEMENT STRUCTURE(S), INCLUDING BUT NOT LIMITED TO PONDS, DAMS, BERMS, SEWAGE TREATMENT PLANTS, AND DIVERSIONARY STRUCTURES;

   B. ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FROM THAT WHICH WAS ORIGINALLY APPROVED OR A CHANGE WHICH WOULD SIGNIFICANTLY IMPACT THE ABILITY OF THE PLAN TO PREVENT POLLUTION OF THE EDWARDS AQUIFER.

   C. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED AS UNDEVELOPED IN THE ORIGINAL WATER POLLUTION ABATEMENT PLAN.

AUSTIN REGIONAL OFFICE
2800 S. IH 35, SUITE 100
AUSTIN, TEXAS 78704–5712
PHONE (512) 339–2929
FAX (512) 339–3795

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

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

GENERAL CONSTRUCTION NOTES

1. ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED THEM. IN REVIEWING THESE PLANS, THE CITY OF AUSTIN MUST RELY ON THE ADEQUACY OF THE WORK OF THE DESIGN ENGINEER.

2. CONTRACTOR SHALL CALL THE ONE CALL CENTER (1–800–344–8377) FOR UTILITY LOCATIONS PRIOR TO ANY WORK IN CITY EASEMENTS OR STREET R.O.W.

3. CONTRACTOR SHALL NOTIFY THE CONSTRUCTION INSPECTION DIVISION OF THE CITY'S ONE STOP SHOP (OSS) AT (512–974–6360) OR (512–974–7034) AT LEAST 24 HOURS PRIOR TO THE INSTALLATION OF ANY DRAINAGE FACILITY WITHIN A DRAINAGE EASEMENT OR STREET R.O.W. THE METHOD OF PLACEMENT AND COMPACTION OF BACKFILL IN THE CITY'S R.O.W. MUST BE APPROVED PRIOR TO THE START OF BACKFILL OPERATIONS.

4. ALL CONSTRUCTION OPERATIONS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH APPLICABLE REGULATIONS OF THE U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION.

5. ALL SITE WORK MUST ALSO COMPLY WITH ENVIRONMENTAL REQUIREMENTS.

6. UPON COMPLETION OF THE PROPOSED SITE IMPROVEMENTS AND PRIOR TO THE FOLLOWING, THE ENGINEER SHALL CERTIFY IN WRITING THAT THE PROPOSED DRAINAGE, FILTRATION AND DETENTION FACILITIES WERE CONSTRUCTED IN CONFORMANCE WITH THE APPROVED PLANS.:

– RELEASE OF THE CERTIFICATE OF OCCUPANCY BY THE PLANNING AND DEVELOPMENT REVIEW DEPARTMENT (INSIDE THE CITY LIMITS); OR

– INSTALLATION OF AN ELECTRIC OR WATER METER (IN THE FIVE–MILE ETJ),

AMERICANS WITH DISABILITIES ACT

1. THE CITY OF AUSTIN HAS REVIEWED THIS PLAN FOR COMPLIANCE WITH CITY DEVELOPMENT REGULATIONS ONLY. THE APPLICANT, PROPERTY OWNER, AND OCCUPANT OF THE PREMISES ARE RESPONSIBLE FOR DETERMINING WHETHER THE PLAN COMPLIES WITH ALL OTHER LAWS, REGULATIONS, AND RESTRICTIONS WHICH MAY BE APPLICABLE TO THE PROPERTY AND ITS USE.

CITY OF AUSTIN ELECTRIC UTILITY NOTES

1. AUSTIN ENERGY HAS THE RIGHT TO PRUNE AND/OR REMOVE TREES, SHRUBBERY, AND OTHER OBSTRUCTIONS TO THE EXTENT NECESSARY TO KEEP THE EASEMENTS CLEAR. AUSTIN ENERGY WILL PERFORM ALL TREE WORK IN COMPLIANCE WITH CHAPTER 25–8, SUBCHAPTER B OF THE CITY OF AUSTIN LAND DEVELOPMENT CODE.

2. THE OWNER/DEVELOPER OF THIS SUBDIVISION/LOT SHALL PROVIDE AUSTIN ENERGY WITH ANY EASEMENT AND/OR ACCESS REQUIRED, IN ADDITION TO THOSE INDICATED, FOR THE INSTALLATION AND ONGOING MAINTENANCE OF OVERHEAD AND UNDERGROUND ELECTRIC FACILITIES. THESE EASEMENTS AND/OR ACCESS ARE REQUIRED TO PROVIDE ELECTRIC SERVICE TO THE TO THE BUILDING(S) AND WILL NOT BE LOCATED SO AS TO CAUSE THE SITE TO BE OUT OF COMPLIANCE WITH CHAPTER 25–8 OF THE CITY OF AUSTIN LAND DEVELOPMENT CODE.

3. THE OWNER SHALL BE RESPONSIBLE FOR ANY INSTALLATION OF TEMPORARY EROSION CONTROL, REVEGETATION, AND TREE PROTECTION. IN ADDITION, THE OWNER SHALL BE RESPONSIBLE FOR ANY TREE PRUNING AND TREE REMOVAL THAT IS WITHIN TEN FEET OF THE CENTERLINE OF THE OVERHEAD ELECTRICAL FACILITIES DESIGNED TO PROVIDE ELECTRIC SERVICE TO THIS PROJECT. THE OWNER SHALL INCLUDE AUSTIN ENERGY'S WORK WITHIN THE LIMITS OF CONSTRUCTION FOR THIS PROJECT.

4. THE OWNER OF THE PROPERTY IS RESPONSIBLE FOR MAINTAINING CLEARANCES REQUIRED BY THE NATIONAL ELECTRIC SAFETY CODE, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) REGULATIONS, CITY OF AUSTIN RULES AND REGULATIONS AND TEXAS STATE LAWS PERTAINING TO CLEARANCES WHEN WORKING IN CLOSE PROXIMITY TO OVERHEAD POWER LINES AND EQUIPMENT. AUSTIN ENERGY WILL NOT RENDER ELECTRIC SERVICE UNLESS REQUIRED CLEARANCES ARE MAINTAINED. ALL COSTS INCURRED BECAUSE OF FAILURE TO COMPLY WITH THE REQUIRED CLEARANCES WILL BE CHARGED TO THE OWNER.

5. A PRE–CONSTRUCTION SAFELY MEETING IS REQUIRED WITH AUSTIN ENERGY 48 HOURS BEFORE COMMENCEMENT OF CONSTRUCTION. FAILURE TO DO SO WILL RESULT IN THE PROJECT BEING SHUT DOWN. CALL DOUG WEISE AT 512–505–7023 TO SCHEDULE A TRAIL GATE SAFETY MEETING. INCLUDE CHUCK HENDRY (512–505–7151) IN THE MEETING, IF CRANES ARE BEING USED DURING CONSTRUCTION.

6. BARRICADES MUST BE ERECTED 10 FEET FROM ELECTRIC TRANSMISSION STRUCTURES DURING CONSTRUCTION. ANY RELOCATION OF ELECTRIC TRANSMISSION FACILITIES OR OUTAGES CAUSED BY THIS PROJECT WILL BE CHARGED TO THE PROPERTY OWNER AND CONTRACTOR.

7. WARNING SIGNS MUST BE PLACED UNDER THE OVERHEAD ELECTRIC TRANSMISSION FACILITIES AS NOTIFICATION OF THE ELECTRICAL HAZARD.

8. FOR SAFETY REASONS, AERIAL EQUIPMENT, DUMPSTERS, STAGING OR SPOILS AREAS ARE RESTRICTED TO A MAXIMUM HEIGHT OF 20 FEET IN AND AROUND THE TRANSMISSION WIRE AND STRUCTURES.

9. PRIOR TO MOBILIZING TALL EQUIPMENT SUCH AS CRANES, CALL DOUG WEISE AT 512–505–7023 TO COORDINATE WITH TRANSMISSION PERSONNEL.

10. 24 HOUR ACCESS TO ELECTRIC FACILITIES SHALL BE MAINTAINED.

11. ANY TEMPORARY OR PERMANENT SECURITY FENCE PREVENTING ACCESS TO THE EASEMENT SHALL BE COORDINATED WITH AUSTIN ENERGY STAFF. AE STAFF SHALL INSTALL A LOCK ON THE GATE/FENCE FOR ACCESS.

12. PROPERTY OWNER AND CONTRACTOR ARE RESPONSIBLE FOR DUST CONTROLS TO MINIMIZE CONTAMINATION OF WIRE AND INSULATORS CAUSED BY DUST FROM THIS PROJECT. ANY SUBSEQUENT CLEANING OR ELECTRICAL OUTAGES CAUSED BY DUST FROM THIS PROJECT WILL BE CHARGED TO THE PROPERTY OWNER AND CONTRACTOR.

13. FIRE HYDRANTS ARE PROHIBITED WITHIN 20 FEET OF TRANSMISSION POLES.

14. SPRINKLERS ARE PROHIBITED WITHIN 15 FEET OF TRANSMISSION POLES.

SITE SUMMARY*

CURRENT ZONING:	RIGHT–OF–WAY DRAINAGE & PUBLIC UTILITY EASEMENT
TOTAL SITE AREA (LOC):	9.95 ACRES
IMPERVIOUS COVER (EXISTING):	4.76 ACRES (47.9%)
IMPERVIOUS COVER (INCREASE):	0.90 ACRES (9.0%)
IMPERVIOUS COVER (PROPOSED):	5.66 ACRES (56.9%)

***SITE SUMMARY FOR ENTIRE LIMITS OF CONSTRUCTION (LOC)**

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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TBPE # F-6324 TBPLS # F-10194230
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GENERAL NOTES

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FED. RD. DIV. NO.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
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APPENDIX P–1: – EROSION CONTROL NOTES

1. THE CONTRACTOR SHALL INSTALL EROSION/SEDIMENTATION CONTROLS AND TREE/NATURAL AREA PROTECTIVE FENCING PRIOR TO ANY SITE PREPARATION WORK (CLEARING, GRUBBING OR EXCAVATION).
2. THE PLACEMENT OF EROSION/SEDIMENTATION CONTROLS SHALL BE IN ACCORDANCE WITH THE ENVIRONMENTAL CRITERIA MANUAL AND THE APPROVED EROSION AND SEDIMENTATION CONTROL PLAN. THE COA ESC PLAN SHALL BE CONSULTED AND USED AS THE BASIS FOR A TPDES REQUIRED SWPPP. IF A SWPPP IS REQUIRED, IT SHALL BE AVAILABLE FOR REVIEW BY THE CITY OF AUSTIN ENVIRONMENTAL INSPECTOR AT ALL TIMES DURING CONSTRUCTION, INCLUDING AT THE PRE–CONSTRUCTION MEETING.
3. THE PLACEMENT OF TREE/NATURAL AREA PROTECTIVE FENCING SHALL BE IN ACCORDANCE WITH THE CITY OF AUSTIN STANDARD NOTES FOR TREE AND NATURAL AREA PROTECTION AND THE APPROVED GRADING/TREE AND NATURAL AREA PLAN.
4. A PRE–CONSTRUCTION CONFERENCE SHALL BE HELD ON–SITE WITH THE CONTRACTOR, DESIGN ENGINEER/PERMIT APPLICANT AND ENVIRONMENTAL INSPECTOR AFTER INSTALLATION OF THE EROSION/SEDIMENTATION CONTROLS AND TREE/NATURAL AREA PROTECTION MEASURES AND PRIOR TO BEGINNING ANY SITE PREPARATION WORK. THE OWNER OR OWNER'S REPRESENTATIVE SHALL NOTIFY THE PLANNING AND DEVELOPMENT REVIEW DEPARTMENT, 974–2278, AT LEAST THREE DAYS PRIOR TO THE MEETING DATE. COA APPROVED ESC PLAN AND TPDES SWPPP (IF REQUIRED) SHOULD BE REVIEWED BY COA EV INSPECTOR AT THIS TIME.
5. ANY MAJOR VARIATION IN MATERIALS OR LOCATIONS OF CONTROLS OR FENCES FROM THOSE SHOWN ON THE APPROVED PLANS WILL REQUIRE A REVISION AND MUST BE APPROVED BY THE REVIEWING ENGINEER, ENVIRONMENTAL SPECIALIST OR CITY ARBORIST AS APPROPRIATE. MAJOR REVISIONS MUST BE APPROVED BY CITY OF AUSTIN STAFF. MINOR CHANGES TO BE MADE AS FIELD REVISIONS TO THE EROSION AND SEDIMENTATION CONTROL PLAN MAY BE REQUIRED BY THE ENVIRONMENTAL INSPECTOR DURING THE COURSE OF CONSTRUCTION TO CORRECT CONTROL INADEQUACIES.
6. THE CONTRACTOR IS REQUIRED TO PROVIDE A CERTIFIED INSPECTOR WITH EITHER A CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC), CERTIFIED EROSION, SEDIMENT AND STORMWATER– INSPECTOR (CESSWI) OR CERTIFIED INSPECTOR OF SEDIMENTATION AND EROSION CONTROLS (CISEC) CERTIFICATION TO INSPECT THE CONTROLS AND FENCES AT WEEKLY INTERVALS AND AFTER SIGNIFICANT RAINFALL EVENTS TO INSURE THAT THEY ARE FUNCTIONING PROPERLY. THE PERSON(S) RESPONSIBLE FOR MAINTENANCE OF CONTROLS AND FENCES SHALL IMMEDIATELY MAKE ANY NECESSARY REPAIRS TO DAMAGED AREAS. SILT ACCUMULATION AT CONTROLS MUST BE REMOVED WHEN THE DEPTH REACHES SIX (6) INCHES.
7. PRIOR TO FINAL ACCEPTANCE BY THE CITY, HAUL ROADS AND WATERWAY CROSSINGS CONSTRUCTED FOR TEMPORARY CONTRACTOR ACCESS MUST BE REMOVED, ACCUMULATED SEDIMENT REMOVED FROM THE WATERWAY AND THE AREA RESTORED TO THE ORIGINAL GRADE AND REVEGETATED. ALL LAND CLEARING DEBRIS SHALL BE DISPOSED OF IN APPROVED SPOIL DISPOSAL SITES.
8. ALL WORK MUST STOP IF A VOID IN THE ROCK SUBSTRATE IS DISCOVERED WHICH IS; ONE SQUARE FOOT IN TOTAL AREA; BLOWS AIR FROM WITHIN THE SUBSTRATE AND/OR CONSISTENTLY RECEIVES WATER DURING ANY RAIN EVENT. AT THIS TIME IT IS THE RESPONSIBILITY OF THE PROJECT MANAGER TO IMMEDIATELY CONTACT A CITY OF AUSTIN ENVIRONMENTAL INSPECTOR FOR FURTHER INVESTIGATION.
9. TEMPORARY AND PERMANENT EROSION CONTROL: ALL DISTURBED AREAS SHALL BE RESTORED AS NOTED BELOW.

A. ALL DISTURBED AREAS TO BE REVEGETATED ARE REQUIRED TO PLACE A MINIMUM OF SIX (6) INCHES OF TOPSOIL [SEE STANDARD SPECIFICATION ITEM NO. 601S.3(A)]. DO NOT ADD TOPSOIL WITHIN THE CRITICAL ROOT ZONE OF EXISTING TREES.

- TOPSOIL SALVAGED FROM THE EXISTING SITE IS ENCOURAGED FOR USE, BUT IT SHOULD MEET THE STANDARDS SET FORTH IN 601S.

  AN OWNER/ENGINEER MAY PROPOSE USE OF ONSITE SALVAGED TOPSOIL WHICH DOES NOT MEET THE CRITERIA OF STANDARD SPECIFICATION 601S BY PROVIDING A SOIL ANALYSIS AND A WRITTEN STATEMENT FROM A QUALIFIED PROFESSIONAL IN SOILS, LANDSCAPE ARCHITECTURE, OR AGRONOMY INDICATING THE ONSITE TOPSOIL WILL PROVIDE AN EQUIVALENT GROWTH MEDIA AND SPECIFYING WHAT, IF ANY, SOIL AMENDMENTS ARE REQUIRED.

- SOIL AMENDMENTS SHALL BE WORKED INTO THE EXISTING ONSITE TOPSOIL WITH A DISC OR TILLER CREATE

  A WELL–BLENDED MATERIAL.

THE VEGETATIVE STABILIZATION OF AREAS DISTURBED BY CONSTRUCTION SHALL BE AS FOLLOWS:

TEMPORARY VEGETATIVE STABILIZATION:

1. FROM SEPTEMBER 15 TO MARCH 1, SEEDING SHALL BE WITH OR INCLUDE A COOL SEASON COVER CROPS: (WESTERN WHEATGRASS (PASCOPYRUM SMITHII) AT.6 POUNDS PER ACRE, OATS (AVENA SATIVA) AT 4.0 POUNDS PER ACRE, CEREAL RYE GRAIN (SECALE CEREALE) 45 POUNDS PER ACRE. CONTRACTOR MUST ENSURE THAT ANY SEED APPLICATION REQUIRING A COOL SEASON COVER CROP DOES NOT UTILIZE ANNUAL RYEGRASS (LOLIUM MULTIFLORUM) OR PERENNIAL RYEGRASS (LOLIUM PERENNE). COOL SEASON COVER CROPS ARE NOT PERMANENT EROSION CONTROL.

APPENDIX P–1: – EROSION CONTROL NOTES

2. FROM MARCH 2 TO SEPTEMBER 14, SEEDING SHALL BE WITH HULLED BERMUDA AT A RATE OF 5 POUNDS PER ACRE OR A NATIVE PLANT SEED MIX CONFORMING TO ITEMS 604S OR 609S.

A. FERTILIZER SHALL BE APPLIED ONLY IF WARRANTED BY A SOIL TEST AND SHALL .CONFORM TO ITEM NO. 606S, FERTILIZER. FERTILIZATION SHOULD NOT OCCUR WHEN RAINFALL IS EXPECTED OR DURING SLOW PLANT GROWTH OR DORMANCY. CHEMICAL FERTILIZER MAY NOT BE APPLIED IN THE CRITICAL WATER QUALITY ZONE.

B. HYDROMULCH SHALL COMPLY WITH TABLE1, BELOW.

C. TEMPORARY EROSION CONTROL SHALL BE ACCEPTABLE WHEN THE GRASS HAS GROWN AT LEAST 1½ INCHES HIGH WITH A MINIMUM OF 95% TOTAL COVERAGE SO THAT ALL AREAS OF A SITE THAT RELY ON VEGETATION FOR TEMPORARY STABILIZATION ARE UNIFORMLY VEGETATED, AND PROVIDED THERE ARE NO BARE SPOTS LARGER THAN 10 SQUARE FEET.

D. WHEN REQUIRED, NATIVE PLANT SEEDING SHALL COMPLY WITH REQUIREMENTS OF THE CITY OF AUSTIN ENVIRONMENTAL CRITERIA MANUAL, AND STANDARD SPECIFICATIONS 604S OR 609S.

TABLE 1: HYDROMULCHING FOR TEMPORARY VEGETATIVE STABILIZATION

MATERIAL	DESCRIPTION	LONGEVITY	TYPICAL APPLICATIONS	APPLICATION RATES
100% OR ANY BLEND OF WOOD, CELLULOSE, STRAW, AND/OR COTTON PLANT (EXCEPT NO MULCH SHALL EXCEED 30% PAPER)	70% OR GREATER WOOD/STRAW 30% OR LESS PAPER OR NATURAL FIBERS	0–3 MONTHS	MODERATE SLOPES; FROM FLAT TO 3:1	1500 TO 2000 LBS/ACRE

PERMANENT VEGETATIVE STABILIZATION:

1. FROM SEPTEMBER 15 TO MARCH 1, SEEDING IS CONSIDERED TO BE TEMPORARY STABILIZATION ONLY. IF COOL SEASON COVER CROPS EXIST WHERE PERMANENT VEGETATIVE STABILIZATION IS DESIRED, THE GRASSES SHALL BE MOWED TO A HEIGHT OF LESS THAN ONE–HALF (½) INCH AND THE AREA SHALL BE RE–SEEDED IN ACCORDANCE WITH TABLE 2 BELOW. ALTERNATIVELY, THE COOL SEASON COVER CROP CAN BE MIXED WITH BERMUDAGRASS OR NATIVE SEED AND INSTALLED TOGETHER, UNDERSTANDING THAT GERMINATION OF WARM–SEASON SEED TYPICALLY REQUIRES SOIL TEMPERATURES OF 60 TO 70 DEGREES.
2. FROM MARCH 2 TO SEPTEMBER 14, SEEDING SHALL BE WITH HULLED BERMUDA AT A RATE OF –45 POUNDS PER ACRE WITH A PURITY OF 95% AND A MINIMUM PURE LIVE SEED (PLS) OF 0.83. BERMUDA GRASS IS A WARM SEASON GRASS AND IS CONSIDERED PERMANENT EROSION CONTROL. PERMANENT VEGETATIVE STABILIZATION CAN ALSO BE ACCOMPLISHED WITH A NATIVE PLANT SEED MIX CONFORMING TO ITEMS 604S OR 609S.

A. FERTILIZER USE SHALL FOLLOW THE RECOMMENDATION OF A SOIL TEST. SEE ITEM 606S, FERTILIZER. APPLICATIONS OF FERTILIZER (AND PESTICIDE) ON CITY–OWNED AND MANAGED PROPERTY REQUIRES THE YEARLY SUBMITTAL OF A PESTICIDE AND FERTILIZER APPLICATION RECORD, ALONG WITH A CURRENT COPY OF THE APPLICATOR'S LICENSE. FOR CURRENT COPY OF THE RECORD TEMPLATE CONTACT THE CITY OF AUSTIN'S IPM COORDINATOR. HYDROMULCH SHALL COMPLY WITH TABLE 2, BELOW.

C. WATER THE SEEDED AREAS IMMEDIATELY AFTER INSTALLATION TO ACHIEVE GERMINATION AND A HEALTHY STAND OF PLANTS THAT CAN ULTIMATELY SURVIVE WITHOUT SUPPLEMENTAL WATER. APPLY THE WATER UNIFORMLY TO THE PLANTED AREAS WITHOUT CAUSING DISPLACEMENT OR EROSION OF THE MATERIALS OR SOIL. MAINTAIN THE SEEDBED IN A MOIST CONDITION FAVORABLE FOR PLANT GROWTH. ALL WATERING SHALL COMPLY WITH CITY CODE CHAPTER 6–4 (WATER CONSERVATION), AT RATES AND FREQUENCIES DETERMINED BY A LICENSED IRRIGATOR OR OTHER QUALIFIED PROFESSIONAL, AND AS ALLOWED BY THE AUSTIN WATER UTILITY AND CURRENT WATER RESTRICTIONS AND WATER CONSERVATION INITIATIVES.

D. PERMANENT EROSION CONTROL SHALL BE ACCEPTABLE WHEN THE GRASS HAS GROWN AT LEAST 1½ INCHES HIGH WITH A MINIMUM OF 95 PERCENT FOR THE NON–NATIVE MIX, AND 95 PERCENT COVERAGE FOR THE NATIVE MIX SO THAT ALL AREAS OF A SITE THAT RELY ON VEGETATION FOR STABILITY MUST BE UNIFORMLY VEGETATED, AND PROVIDED THERE ARE NO BARE SPOTS LARGER THAN 16 SQUARE FEET.

E. WHEN REQUIRED, NATIVE PLANT SEEDING SHALL COMPLY WITH REQUIREMENTS OF THE CITY OF AUSTIN ENVIRONMENTAL CRITERIA MANUAL, ITEMS # 604S AND 609S.

TABLE 2: HYDROMULCHING FOR PERMANENT VEGETATIVE STABILIZATION

MATERIAL	DESCRIPTION	LONGEVITY	TYPICAL APPLICATIONS	APPLICATION RATES
BONDED FIBER MATRIX (BFM)	80% ORGANIC DEFIBRATED FIBERS 10%TACKIFIER	6 MONTHS	ON SLOPES UP TO 2:1 AND EROSIVE SOIL CONDITIONS	2500 TO 4000 LBS/ACRE
FIBER REINFORCED MATRIX (FRM)	65% ORGANIC DEFIBRATED FIBERS 25% REINFORCING FIBERS OR LESS 10% TACKIFIER	UP TO 12 MONTHS	ON SLOPES UP TO 1:1 AND EROSIVE SOIL CONDITIONS	3000 TO 4500 LBS/ACRE

10. PROJECT CONTACT INFORMATION:

    FOR QUESTIONS & PLAN REVISIONS
    CONTACT WILLIAMSON COUNTY GEC
    HNTB @ 512–744–9082

11. THE CONTRACTOR SHALL NOT DISPOSE OF SURPLUS EXCAVATED MATERIAL FROM THE SITE WITHOUT NOTIFYING THE PLANNING AND DEVELOPMENT REVIEW DEPARTMENT AT 974–2278 AT LEAST 48 HOURS PRIOR WITH THE LOCATION AND A COPY OF THE PERMIT ISSUED TO RECEIVE THE MATERIAL.

SPECIAL CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL FURNISH, INSTALL AND MAINTAIN BARRICADES, WARNING SIGNS, FLASHERS AND OTHER DEVICES OF THE TYPE AND SIZE AS INDICATED IN THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, OR AS DIRECTED BY THE ENGINEER.
2. THE CONTRACTOR SHALL MAINTAIN AT LEAST ONE DUST–FREE LANE FOR TRAFFIC WITH FLAGMEN DURING CONSTRUCTION ACTIVITIES AND TWO LANES AT ALL OTHER TIMES.
3. THE ESTIMATED QUANTITY FOR ITEM NO. 110, STREET EXCAVATION, WAS CALCULATED FROM THE EXISTING GROUND TO ESTABLISHED LINE OF THE SUBGRADE AS SHOWN IN THE TYPICAL ROADWAY SECTIONS.
4. ALL STRUCTURAL CONCRETE SHALL BE CLASS "C" (5 SACK, 25–8–3600 PSI @ 28 DAYS) AND ALL REINFORCING STEEL SHALL BE GRADE SIXTY, UNLESS OTHERWISE NOTED.
5. THE CONTRACTOR SHALL NOT DISPOSE OF SURPLUS EXCAVATED MATERIAL FROM THE SITE WITHOUT NOTIFYING THE ENVIRONMENTAL INSPECTOR, AT 974–2278, 48 HOURS PRIOR TO THE REMOVAL. THIS NOTIFICATION SHALL INCLUDE THE DISPOSAL LOCATION AND A COPY OF THE PERMIT ISSUED TO RECEIVE THE MATERIAL, IF APPLICABLE.
6. UTILITIES SHOWN REFLECT THE BEST INFORMATION AVAILABLE AT THE TIME THE PROJECT WAS SURVEYED. UTILITY RELOCATION WORK HAS BEEN OR WILL BE ACCOMPLISHED TO CLEAR THE WORK SPACE. THESE RELOCATIONS ARE NOT REFLECTED ON THESE DRAWINGS.
7. ALL STORM SEWER PIPE SHALL BE RCP, CLASS III, WITH CLASS B BEDDING, UNLESS OTHERWISE NOTED.
8. ANY UTILITY METERS IN THE WAY OF THE CONSTRUCTION WILL BE RELOCATED OUTSIDE THE PROPOSED CONSTRUCTION AREA BY THE UTILITY OWNER UNLESS SUCH WORK AFFECTING THOSE METERS IS INCLUDED IN THE CONTRACT.
9. ANY EXISTING SIDEWALKS, CURBS OR DRIVEWAYS DISTURBED BY THE CONSTRUCTION SHALL BE REMOVED AND RESTORED WITH SURFACE MATERIALS EQUAL TO OR BETTER THAN THE ORIGINAL.
10. THE RATE OF LIME SLURRY APPLICATION USED TO DETERMINE THE QUANTITIES FOR THIS PROJECT IS PERCENT BY WEIGHT.

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
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NEENAH AVENUE WIDENING

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GENERAL NOTES

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APPENDIX P–2: CITY OF AUSTIN STANDARD NOTES FOR TREE AND NATURAL AREA PROTECTION

1. 1. ALL TREES AND NATURAL AREAS SHOWN ON PLAN TO BE PRESERVED SHALL BE PROTECTED DURING CONSTRUCTION WITH TEMPORARY FENCING.
2. 2. PROTECTIVE FENCES SHALL BE ERECTED ACCORDING TO CITY OF AUSTIN STANDARDS FOR TREE PROTECTION.
3. 3. PROTECTIVE FENCES SHALL BE INSTALLED PRIOR TO THE START OF ANY SITE PREPARATION WORK (CLEARING, GRUBBING OR GRADING), AND SHALL BE MAINTAINED THROUGHOUT ALL PHASES OF THE CONSTRUCTION PROJECT.
4. EROSION AND SEDIMENTATION CONTROL BARRIERS SHALL BE INSTALLED OR MAINTAINED IN A MANNER WHICH DOES NOT RESULT IN SOIL BUILD–UP WITHIN TREE DRIP LINES.
5. PROTECTIVE FENCES SHALL SURROUND THE TREES OR GROUP OF TREES, AND WILL BE LOCATED AT THE OUTERMOST LIMIT OF BRANCHES (DRIP LINE) , FOR NATURAL AREAS, PROTECTIVE FENCES SHALL FOLLOW THE LIMIT OF CONSTRUCTION LINE, IN ORDER TO PREVENT THE FOLLOWING:
   A. SOIL COMPACTION IN THE ROOT ZONE AREA RESULTING FROM VEHICULAR TRAFFIC OR STORAGE OF EQUIPMENT OR MATERIALS;
   B. ROOT ZONE DISTURBANCES DUE TO GRADE CHANGES (GREATER THAN 6 INCHES CUT OR FILL), OR TRENCHING NOT REVIEWED AND AUTHORIZED BY THE CITY ABORIST;
   C. WOUNDS TO EXPOSED ROOTS, TRUNK OR LIMBS BY MECHANICAL EQUIPMENT;
   D. OTHER ACTIVITIES DETRIMENTAL TO TREES SUCH AS CHEMICAL STORAGE, CEMENT TRUCK CLEANING, AND FIRES.
6. EXCEPTIONS TO INSTALLING FENCES AT TREE DRIP LINES MAY BE PERMITTED IN THE FOLLOWING CASES:
   A. WHERE THERE IS TO BE AN APPROVED GRADE CHANGE, IMPERMEABLE PAVING SURFACE, TREE WELL, OR OTHER SUCH SITE DEVELOPMENT, ERECT THE FENCE APPROXIMATELY 2 TO 4 FEET BEYOND THE AREA DISTURBED;
   B. WHERE PERMEABLE PAVING IS TO BE INSTALLED WITHIN A TREE'S DRIP LINE, ERECT THE FENCE AT THE OUTER LIMITS OF THE PERMEABLE PAVING AREA (PRIOR TO SITE GRADING SO THAT THIS AREA IS GRADED SEPARATELY PRIOR TO PAVING INSTALLATION TO MINIMIZED ROOT DAMAGE);
   C. WHERE TREES ARE CLOSE TO PROPOSED BUILDINGS, ERECT THE FENCE TO ALLOW 6 TO 10 FEET OF WORK SPACE BETWEEN THE FENCE AND THE BUILDING;
   D. WHERE THERE ARE SEVERE SPACE CONSTRAINTS DUE TO TRACT SIZE, OR OTHER SPECIAL REQUIREMENTS, CONTACT THE CITY ARBORIST AT 974–1876 TO DISCUSS ALTERNATIVES.

   SPECIAL NOTE: FOR THE PROTECTION OF NATURAL AREAS, NO EXCEPTIONS TO INSTALLING FENCES AT THE LIMIT OF CONSTRUCTION LINE WILL BE PERMITTED.
7. WHERE ANY OF THE ABOVE EXCEPTIONS RESULT IN A FENCE BEING CLOSER THAN 4 FEET TO A TREE TRUNK, PROTECT THE TRUNK WITH STRAPPED–ON PLANKING TO A HEIGHT OF 8 FT (OR TO THE LIMITS OF LOWER BRANCHING) IN ADDITION TO THE REDUCED FENCING PROVIDED.
8. TREES APPROVED FOR REMOVAL SHALL BE REMOVED IN A MANNER WHICH DOES NOT IMPACT TREES TO BE PRESERVED.
9. ANY ROOTS EXPOSED BY CONSTRUCTION ACTIVITY SHALL BE PRUNED FLUSH WITH THE SOIL. BACKFILL ROOT AREAS WITH GOOD QUALITY TOP SOIL AS SOON AS POSSIBLE. IF EXPOSED ROOT AREAS ARE NOT BACKFILLED WITHIN 2 DAYS, COVER THEM WITH ORGANIC MATERIAL IN A MANNER WHICH REDUCES SOIL TEMPERATURE AND MINIMIZES WATER LOSS DUE TO EVAPORATION.
10. ANY TRENCHING REQUIRED FOR THE INSTALLATION OF LANDSCAPE IRRIGATION SHALL BE PLACED AS FAR FROM EXISTING TREE TRUNKS AS POSSIBLE.
11. NO LANDSCAPE TOPSOIL DRESSING GREATER THAN 4 INCHES SHALL BE PERMITTED WITHIN THE DRIP LINE OF TREES. NO SOIL IS PERMITTED ON THE ROOT FLARE OF ANY TREE.
12. PRUNING TO PROVIDE CLEARANCE FOR STRUCTURES, VEHICULAR TRAFFIC AND EQUIPMENT SHALL TAKE PLACE BEFORE DAMAGE OCCURS (RIPPING OF BRANCHES, ETC.).
13. ALL FINISHED PRUNING SHALL BE DONE ACCORDING TO RECOGNIZED, APPROVED STANDARDS OF THE INDUSTRY (REFERENCE THE NATIONAL ARBORIST ASSOCIATION PRUNING STANDARDS FOR SHADE TREES AVAILABLE ON REQUEST FROM THE CITY ARBORIST).
14. DEVIATIONS FROM THE ABOVE NOTES MAY BE CONSIDERED ORDINANCE VIOLATIONS IF THERE IS SUBSTANTIAL NON–COMPLIANCE OR IF A TREE SUSTAINS DAMAGE AS A RESULT.
15. REMOVAL OF EXISTING SIDEWALKS IN THE CRITICAL ROOT ZONE OF TREES TO BE PRESERVED SHALL BE ACCOMPLISHED BY LIFTING PANELS AND FLIPPING THEM TOWARD THE STREET TO AVOID DISTURBANCE OF ROOTS.

APPENDIX P–6: REMEDIAL TREE CARE NOTES AERATION AND SUPPLEMENTAL NUTRIENT REQUIREMENTS FOR TREES WITHIN CONSTRUCTION AREAS

AS A COMPONENT OF AN EFFECTIVE REMEDIAL TREE CARE PROGRAM PER ENVIRONMENTAL CRITERIA MANUAL SECTION 3.5.4, PRESERVED TREES WITHIN THE LIMITS OF CONSTRUCTION MAY REQUIRE SOIL AERATION AND SUPPLEMENTAL NUTRIENTS. SOIL AND/OR FOLIAR ANALYSIS SHOULD BE USED TO DETERMINE THE NEED FOR SUPPLEMENTAL NUTRIENTS. THE CITY ARBORIST MAY REQUIRE THESE ANALYSES AS PART OF A COMPREHENSIVE TREE CARE PLAN. SOIL PH SHALL BE CONSIDERED WHEN DETERMINING THE FERTILIZATION COMPOSITION AS SOIL PH INFLUENCES THE TREE'S ABILITY TO UPTAKE NUTRIENTS FROM THE SOIL. IF ANALYSES INDICATE THE NEED FOR SUPPLEMENTAL NUTRIENTS, THEN HUMATE/NUTRIENT SOLUTIONS WITH MYCORRHIZAE COMPONENTS ARE HIGHLY RECOMMENDED. IN ADDITION, SOIL ANALYSIS MAY BE NEEDED TO DETERMINE IF ORGANIC MATERIAL OR BENEFICIAL MICROORGANISMS ARE NEEDED TO IMPROVE SOIL HEALTH. MATERIALS AND METHODS ARE TO BE APPROVED BY THE CITY ARBORIST (512–974–1876) PRIOR TO APPLICATION. THE OWNER OR GENERAL CONTRACTOR SHALL SELECT A FERTILIZATION CONTRACTOR AND IENSURE COORDINATION WITH THE CITY ARBORIST.

PRE–CONSTRUCTION TREATMENT SHOULD BE APPLIED IN THE APPROPRIATE SEASON, IDEALLY THE SEASON PRECEDING THE PROPOSED CONSTRUCTION. MINIMALLY, AREAS TO BE TREATED INCLUDE THE ENTIRE CRITICAL ROOT ZONE OF TREES AS DEPICTED ON THE CITY APPROVED PLANS. TREATMENT SHOULD INCLUDE, BUT NOT LIMITED TO, FERTILIZATION, SOIL TREATMENT, MULCHING, AND PROPER PRUNING.

POST–CONSTRUCTION TREATMENT SHOULD OCCUR DURING FINAL REVEGETATION OR AS DETERMINED BY A QUALIFIED ARBORIST AFTER CONSTRUCTION. CONSTRUCTION ACTIVITIES OFTEN RESULT IN A REDUCTION IN SOIL MACRO AND MICRO PORES AND AN INCREASE IN SOIL BULK DENSITY. TO AMELIORATE THE DEGRADED SOIL CONDITIONS, AERATION VIA WATER AND/OR AIR INJECTED INTO THE SOIL IS NEEDED OR BY OTHER METHODS AS APPROVED BY THE CITY ARBORIST. THE PROPOSED NUTRIENT MIX SPECIFICATIONS AND SOIL AND/OR FOLIAR ANALYSIS RESULTS NEED TO BE PROVIDED TO AND APPROVED BY THE CITY ARBORIST PRIOR TO APPLICATION (FAX # 512–974–3010). CONSTRUCTION WHICH WILL BE COMPLETED IN LESS THAN 90 DAYS MAY USE MATERIALS AT ½ RECOMMENDED RATES. ALTERNATIVE ORGANIC FERTILIZER MATERIALS ARE ACCEPTABLE WHEN APPROVED BY THE CITY ARBORIST. WITHIN 7 DAYS AFTER FERTILIZATION IS PERFORMED, THE CONTRACTOR SHALL PROVIDE DOCUMENTATION OF THE WORK PERFORMED TO THE CITY ARBORIST, PLANNING AND DEVELOPMENT REVIEW DEPARTMENT. P.O. BOX 1088, AUSTIN, TX 78767. THIS NOTE SHOULD BE REFERENCED AS ITEM #1 IN THE SEQUENCE OF CONSTRUCTION.

SPECIAL CONSTRUCTION TECHNIQUES ECM 3.5.4(D)

PRIOR TO EXCAVATION WITHIN TREE DRIPLINES OR THE REMOVAL OF TREES ADJACENT TO OTHER TREES THAT ARE TO REMAIN, MAKE A CLEAN CUT BETWEEN THE DISTURBED AND UNDISTURBED ROOT ZONES WITH A ROCK SAW OR SIMILAR EQUIPMENT TO MINIMIZE ROOT DAMAGE.

IN CRITICAL ROOT ZONE AREAS THAT CANNOT BE PROTECTED DURING CONSTRUCTION WITH FENCING AND WHERE HEAVY VEHICULAR TRAFFIC IS ANTICIPATED, COVER THOSE AREAS WITH A MINIMUM OF 12 INCHES OF ORGANIC MULCH TO MINIMIZE SOIL COMPACTION. IN AREAS WITH HIGH SOIL PLASTICITY GEOTEXTILE FABRIC, PER STANDARD SPECIFICATION 620S SHOULD BE PLACED UNDER THE MULCH TO PREVENT EXCESSIVE MIXING OF THE SOIL AND MULCH. ADDITIONALLY, MATERIAL SUCH AS PLYWOOD AND METAL SHEETS COULD BE REQUIRED BY THE CITY ARBORIST TO MINIMIZE ROOT IMPACTS FROM HEAVY EQUIPMENT. ONCE THE PROJECT IS COMPLETED, ALL MATERIALS SHOULD BE REMOVED, AND THE MULCH SHOULD BE REDUCED TO A DEPTH OF 3 INCHES.

PERFORM ALL GRADING WITHIN CRITICAL ROOT ZONE AREAS BY HAND OR WITH SMALL EQUIPMENT TO MINIMIZE ROOT DAMAGE.

WATER ALL TREES MOST HEAVILY IMPACTED BY CONSTRUCTION ACTIVITIES DEEPLY ONCE A WEEK DURING PERIODS OF HOT, DRY WEATHER. SPRAY TREE CROWNS WITH WATER PERIODICALLY TO REDUCE DUST ACCUMULATION ON THE LEAVES.

WHEN INSTALLING CONCRETE ADJACENT TO THE ROOT ZONE OF A TREE, USE A PLASTIC VAPOR BARRIER BEHIND THE CONCRETE TO PROHIBIT LEACHING OF LIME INTO THE SOIL."

APPENDIX Q–2: IMPERVIOUS COVER (R.O.W. ONLY)

PROJECT CONSISTS OF IMPROVEMENTS WITH EXISTING ROW

SUBURBAN WATERSHEDS

NOTE: Q1 TABLES ARE NOT REQUIRED FOR SUBURBAN WATERSHEDS

IMPERVIOUS COVER ALLOWED AT 80 % X GSA = 5.37 ACRES

ALLOWABLE IMPERVIOUS COVER:

TOTAL ACREAGE 15–25% = 0 ACRES X 10% = 0

	POST CONSTRUCTION					EXISTING		PROPOSED INCREASE	
R.O.W. IMPERVIOUS COVER:									
R.O.W. IMPERVIOUS COVER	= 5.10 ACRES = 76.1 %					= 4.10 ACRES = 61.2 %		= 1.00 ACRES = 14.9 %	
IMPERVIOUS COVER ON SLOPES:									
SLOPE CATEGORIES		BUILDING / AND OTHER IMPERVIOUS COVER		DRIVEWAYS / ROADWAYS		DRIVEWAYS / ROADWAYS		DRIVEWAYS / ROADWAYS	
	ACRES	AC.	% OF CATEGORY	AC.	% OF CATEGORY	AC.	% OF CATEGORY	AC.	% OF CATEGORY
0–15%	6.70	0	0%	5.10	76.1%	4.10	61.2%	1.00	14.9%
15–25%	0	0	0	0	0	0	0	0	0
25–35%	0	0	0	0	0	0	0	0	0
OVER 35%	0	0	0	0	0	0	0	0	0
TOTAL R.O.W. AREA	6.70 AC								

8-4-17
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ENGINEER'S NOTES

1. THE BASIS OF BEARING OF THE SURVEY SHOWN HEREON IS TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, NAD 83(96), UTILIZING WESTERN DATA SYSTEMS CONTINUALLY OPERATING REFERENCE STATIONS (CORS) NETWORK.
2. THIS IS A SURFACE DRAWING, BEARINGS ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NAD 83(96), CENTRAL ZONE, UTILIZING WESTERN DATA SYSTEMS CONTINUALLY OPERATING REFERENCE STATION (CORS) NETWORK. AND ADDITIONALLY TIED LCRA GPS CONTROL MONUMENTS, COORDINATE VALUES ARE PROJECT SPECIFIC SURFACE VALUES. TO DERIVE GRID VALUES, MULTIPLY BY A COMBINED SCALE FACTOR OF 0.99988, WITH AN ORIGIN POINT OF N 0.0, E 0.0.
3. ALL TRENCH EXCAVATION SHALL BE IN ACCORDANCE WITH THE U.S. DEPARTMENT OF OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION. THE CONTRACTOR IS REMINDED OF HIS RESPONSIBILITY TO PROVIDE A TRENCH SAFETY PROTECTION PLAN PRIOR TO THE START OF CONSTRUCTION. THE DOCUMENT SHALL BE SUBMITTED TO THE COUNTY FOR APPROVAL PRIOR TO BEGINNING ANY TRENCH EXCAVATION.
4. LOCATIONS OF ALL UNDERGROUND UTILITIES IN THE VICINITY OF CONSTRUCTION SHALL BE UNCOVERED TO DETERMINE EXACT LOCATIONS PRIOR TO THE START OF CONSTRUCTION. THIS SHALL BE SUBSIDIARY.
5. ALL JOINT SEALS, CONNECTIONS, AND MODIFICATIONS NECESSARY FOR PROPER INSTALLATION OF STORM DRAINAGE SYSTEMS SHALL BE SUBSIDIARY TO RCP AND BOX CULVERT BID ITEMS.
6. CONCRETE RIPRAP AND ENERGY DISSIPATION BLOCKS SHALL BE INCLUDED IN THE PRICE BID FOR CONCRETE WINGWALL AND ARE SUBSIDIARY.
7. CONTROL POINTS FOR MANHOLES AND JUNCTION BOXES SHALL BE THE CENTER OF THE STRUCTURE BASE.
8. CONTROL POINTS FOR CURB INLETS SHALL BE THE MIDPOINT OF THE FACE OF CURB FOR CURB INLET ONLY (EXCLUDING INLET EXTENSIONS). TOP OF CURB INLET ELEVATIONS SHALL MATCH THE EXISTING OR PROPOSED TOP OF CURB ELEVATIONS AS APPROPRIATE.
9. ALL HORIZONTAL BENDS AND PIPE TO PIPE ANGLED CONNECTIONS IN RCP PIPE SHALL BE CONSTRUCTED USING PRE-FABRICATED BENDS AND FITTINGS.
10. THE LOCATIONS OF DRIVEWAYS, STEPS, ETC., AS SHOWN ON THESE PLANS ARE APPROXIMATE. ACCURATE LOCATIONS SHALL BE DETERMINED AT THE TIME OF CONSTRUCTION AFTER CONSULTATION WITH THE PROPERTY OWNERS.
11. CONTRACTOR SHALL RECONSTRUCT ALL EXISTING DRIVEWAYS TO THE LIMITS SHOWN OR TO THE NEAREST CONSTRUCTION JOINT IN THE EXISTING DRIVEWAYS AS DIRECTED BY THE ENGINEER.
12. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR AND MAINTAIN ALL EROSION CONTROL FACILITIES BEFORE, DURING, AND AFTER ALL CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS.
13. FOR PEDESTRIAN SAFETY, THE CONTRACTOR SHALL INSTALL ORANGE PLASTIC CONSTRUCTION FENCING (4 FEET TALL MINIMUM) AROUND ALL OPEN EXCAVATIONS OR AS DIRECTED BY THE ENGINEER. SUCH FENCING SHALL NOT OBSTRUCT SIGHT LINES OF THE TRAVELING PUBLIC.
14. THE CONTRACTOR SHALL COVER OR TEMPORARILY REMOVE EXISTING SIGNS THAT CONFLICT WITH THE SUGGESTED TRAFFIC CONTROL PLANS OR THE INTENT THEREOF BUT DO NOT REQUIRE RELOCATION DUE TO PHYSICAL CONFLICTS. SAID SIGNS SHALL NOT BE RELOCATED UNTIL TEMPORARY SIGN SUPPORTS HAVE BEEN INSTALLED TO ALLOW FOR THE IMMEDIATE RELOCATION OF ANY SUCH SIGNS. THIS SHALL BE SUBSIDIARY.
15. CONTRACTOR SHALL BE RESPONSIBLE FOR BRACING AND PROTECTION OF UTILITY POLES DURING ALL PHASES OF CONSTRUCTION. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANY A MINIMUM OF 72 HOURS IN ADVANCE OF CONSTRUCTION IN THE VICINITY OF THEIR POLES SO THEY CAN VERIFY THE POLES ARE BEING PROPERLY BRACED, PROTECTED. SUBSIDIARY.
16. PREPARATION OF ROW SHALL INCLUDE ALL ROW AREAS WITHIN THE PROJECT, DRIVEWAY AND LEAD WALK PENETRATION AREAS, WITHIN THE DAYLIGHT AND PROJECT LIMITS. PREPARATION OF ROW SHALL INCLUDE REMOVAL OF EXISTING CONCRETE, RETAINING WALLS, CONCRETE COLUMNS, BRIDGE CLASS CULVERTS, SLOPE PAVING, HEADWALLS, WINGWALLS, FLUMES, GUARDRAILS, AND STORM DRAIN CONDUIT. PREPARATION OF ROW SHALL ALSO INCLUDE ANY OTHER DISTURBED AREAS AS REQUIRED FOR THE DIVERSION AND CARE OF WATER.
17. CONTRACTOR SHALL PROTECT ALL EXISTING FENCE AND GATES ALONG ROW LINES UNLESS OTHERWISE NOTED ON PLANS.
18. FENCE AND GATE ITEMS SHALL INCLUDE CONNECTIONS TO EXISTING FENCING NOT IMPACTED BY THE PROJECT AND INCLUDE REPLACEMENT OF MOW STRIPS IF PRESENT ALONG THE EXISTING FENCE LINE. ADDITIONAL CORNER POSTS MAY BE REQUIRED FOR CONNECTION, AND ARE SUBSIDIARY. CONTRACTOR SHALL BE RESPONSIBLE FOR THE DISPOSAL OF EXISTING FENCING AND MATERIALS NOT SUITABLE FOR REUSE OR IN EXCESS OF WHAT IS REQUIRED FOR RELOCATION. THIS SHALL BE SUBSIDIARY.
19. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING IRRIGATION SYSTEMS IN THE PROJECT AREA. ADJUSTMENTS TO EXISTING IRRIGATION SYSTEMS IMPACTED BY THE PROJECT SHALL BE CAPPED AT THE ROW LINE. THIS SHALL BE SUBSIDIARY.
20. CONTRACTOR SHALL SALVAGE EXISTING LANDSCAPING PLANTS AND MATERIALS ON PRIVATE PROPERTY TO THE MAXIMUM EXTENT PRACTICABLE.
21. CONTRACTOR SHALL ENSURE FENCES DISTURBED BY CONSTRUCTION ARE CLOSED AT THE END OF EACH WORKING DAY WITH TEMPORARY CONSTRUCTION FENCING AT A MINIMUM. THIS SHALL BE SUBSIDIARY.
22. ALL RADII DIMENSIONS ARE TO FACE OF CURB.
23. CONTRACTOR SHALL REFER TO THE DIVERSION AND CARE OF WATER SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS RELATED TO THE MANAGEMENT OF STORMWATER DURING CONSTRUCTION.
24. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE APPEARANCE OF ALL CONCRETE STRUCTURES UNTIL FINAL ACCEPTANCE OF THE PROJECT.
25. ALL DIMENSIONS ARE TAKEN AT THE FACE OF CURB UNLESS OTHERWISE NOTED ON PLANS.
26. CALL THE TEXAS STATEWIDE ONE CALL LOCATOR NUMBER 811, 72 HOURS PRIOR TO THE START OF EXCAVATION.
27. CONTRACTOR IS SOLELY RESPONSIBLE FOR PROTECTING EXISTING OVERHEAD AND UNDERGROUND UTILITIES THROUGHOUT THE DURATION OF CONSTRUCTION.
28. CONTRACTOR SHALL MAINTAIN AN OPEN SIDEWALK OR SHARED USE PATH ADA COMPLIANT ROUTE ALONG EITHER THE NORTH OR THE SOUTH SIDE OF THE PROJECT AT ALL TIMES IN ACCORDANCE WITH THE TCP PLANS.
29. CONTRACTOR SHALL RESTRIPE FIRE LANES WHERE NOTED. CONTRACTOR SHALL RESTORE WHITE ARROWS, ENTRANCE ONLY, AND EXIT ONLY PAVEMENT MARKINGS ON SCHOOL DRIVES DISTURBED BY CONSTRUCTION, THIS SHALL BE SUBSIDIARY.
30. CONTRACTOR SHALL HAVE CERTIFIED ARBORIST TRIM UP THE TREE CANOPY OVER THE SHARED USE PATH TO PROVIDE A CLEAR HEIGHT OF 8-FEET ABOVE THE PATH. THIS SHALL BE SUBSIDIARY.
31. CONTRACTOR MAY ENCOUNTER EXISTING IRRIGATION, UNDERGROUND ELECTRIC LINES, AND PVC CONDUIT SLEEVES IN DRIVEWAY AND LEAD WALK PENETRATION AREAS. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNERS PRIOR TO WORK IN THIS AREAS TO IDENTIFY KNOWN PRIVATE UTILITY CROSSINGS. CONTRACTOR SHALL ADJUST THE LOCATIONS OF PRIVATE UTILITIES IN DRIVEWAY PENETRATION AREAS AS REQUIRED FOR THE PROJECT. THIS SHALL BE SUBSIDIARY.
32. CONTRACTOR IS MADE AWARE THIS PROJECT INCLUDES COORDINATION WITH OTHERS DURING CONSTRUCTION TO ALLOW THE CITY OF AUSTIN TO INSTALL AN IRRIGATION SYSTEM IN THE AREAS SHOWN ON THE TREE MITIGATION PLANS PRIOR TO TOP SOIL AND SEEDING ACTIVITES. CONTRACTOR SHALL NOTIFY CITY OF AUSTIN PUBLIC WORKS DEPARTMENT ROB GROTTY 512.974.9540 AND SAM WEST 512.974.8775 FOUR (4) WEEKS PRIOR TO FINAL TOP SOIL AND SEEDING ACTIVITIES. CONTRACTOR SHALL COORDINATE EACH OTHERS AS NECESSARY TO ACCOMMODATE ACCESS BY CONSTRUCTION EQUIPMENT, AND SCHEDULE FLEXIBILITY TO ALLOW FOR OVERLAP IN WORK AREAS. THIS SHALL BE SUBSIDIARY.
33. IRRIGATION SLEEVES SHALL BE SCHEDULE 40 PVC PIPE IN THE DIAMETER AND LOCATIONS SHOWN ON THE PLANS. THIS SHALL BE SUBSIDIARY.
34. CONNECTIONS TO EXISTING INLETS SHALL BE SUBSIDIARY TO INLET BID ITEMS, AND SHALL INCLUDE RE-WORKING THE INVERT OF THE EXISTING INLET IF NEEDED.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

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GENERAL NOTES

SHEET 22 OF 273

FED. RD. DIV. NO.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				22

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TRAFFIC CONTROL PLAN

ITEM #	DESCRIPTION	UNIT	SHEET 32	SHEET 33	SHEET 36	SHEET 39	SHEET 40	SHEET 41	SHEET 42	SHEET 44	TOTAL
803S-MO	BARRICADES, SIGNS, AND TRAFFIC HANDLING	MO									**12**
870S-A24W	WORK ZONE PAVEMENT MARKINGS (REMOVABLE), 24 INCHES IN WIDTH, WHITE IN COLOR	LF	60	60	70	160	160	60	80	160	**810**
870S-B4Y	WORK ZONE PAVEMENT MARKINGS (NON-REMOVABLE), 4 INCHES IN WIDTH, YELLOW IN COLOR	LF				3114		2880	2408		**8402**
874S-B4	ELIMINATE EXISTING PAVEMENT MARKINGS: 4 INCHES IN WIDTH	LF				2000	1200	1600	1700		**6500**

ROADWAY

ITEM #	DESCRIPTION	UNIT	SHEET 66	SHEET 67	SHEET 68	SHEET 69	SHEET 70	SHEET 71	SHEET 72	SHEET 73	SHEET 74	SHEET 75	TOTAL
101S-C	PREPARING RIGHT-OF-WAY	LS											**1**
102S-C	CLEARING AND GRUBBING	LS											**1**
110S-B	STREET EXCAVATION, PLAN QUANTITY	CY	8	50	68	68	89	91	110	45	7	8	**544**
132S-A	EMBANKMENT	CY	1	136	348	409	1611	548	79	17	36	30	**3215**
201S	SUBGRADE PREPERATION	SY	102	493	1023	1044	938	956	797	453	310	360	**6476**
203S-A	LIME TREATED SUBGRADE, (8 IN THICK), (SLURRY)	SY	49	445	762	775	764	757	750	425	140	100	**4967**
210S-A	FLEXIBLE BASE	CY	20	152	263	273	257	261	304	145	305	345	**2325**
306S	PRIME COAT	GAL		58	110	132	107	109	105	68			**689**
307S	TACK COAT	GAL		38	43	75	59	60	60	33	25	28	**421**
312S-D	SEAL COAT, COMPLETE IN PLACE	SY	2272	2180	2139	2400	2138	2148	2164	1200	244	271	**17156**
313S-B	RUBBER ASPHALT JOINT AND CRACK SEALER	LF	525	1120	1400	1400	1400	1400	1400	787.5	227.5	227.5	**9888**
315S-A	SURFACE MILLING	SY		71	90	93	89	93	95	50	135	104	**820**
340S-B2D	HOT MIX ASPHALTIC CONCRETE PAVEMENT, 2 INCHES, TYPE D	SY		315	586	839	580	592	592	330			**3834**
340S-B4C	HOT MIX ASPHALTIC CONCRETE PAVEMENT, 4 INCHES, TYPE C	SY		239	486	749	491	499	490	277			**3231**
340S-B3C	HOT MIX ASPHALTIC CONCRETE PAVEMENT, 3 INCHES, TYPC C	SY							26				**26**
340S-L	HOT MIX ASPHALTIC CONCRETE PAVEMENT, HEIGHT VARIES, TYPE D LEVEL-UP COURSE	LS									0.5	0.5	**1**
360S-A	7 IN. CONCRETE PAVEMENT	SY	101										**101**
360S-B	MONOLITHIC CURB	LF			85	84	100	120	86	38			**513**
401S-A	UNCLASSIFIED STRUCTURAL EXCAVATION, PLAN QUANTITY	CY				14							**14**
430S-B	P.C. CONCRETE CURB & GUTTER (FINE GRADING)	LF	177	322	405	400	410	360	402	225	140	180	**3021**
432S-4	NEW P.C. CONCRETE SIDEWALK, 4 INCH THICKNESS	SF			60	87				76	130	320	**673**
432S-RP-1	P.C. SIDEWALK CURB RAMP WITH PAVERS (TYPE 1)	EA				4							**4**
432S-RP-1B	P.C. SIDEWALK CURB RAMP WITH PAVERS (TYPE 1B)	EA	2			4							**6**
433S-C	TYPE II P.C. CONCRETE DRIVEWAYS	SF			1912	1772	1215	1613	1088	1476			**9076**
433S-GRAVEL	8" THICK COMPACTED GRAVEL DRIVEWAY (3"-5" STONE)	SF						1484	1096				**2580**
434S	6 INCH P.C. CONCRETE MEDIANS AND ISLANDS	SF	1200										**1200**
470S-R	CURB CUTS FOR SIDEWALK RAMPS	LF	173		34	30		45	30				**312**
620S-A	FILTER FABRIC	SY						165	122				**287**
500-6001	MOBILIZATION PAYMENT	LS											**1**

DRAINAGE

ITEM #	DESCRIPTION	UNIT	SHEET 113	SHEET 114	SHEET 115	SHEET 116	SHEET 118	TOTAL
120S-B	CHANNEL EXCAVATION, PLAN QUANTITY	CY	23	500	297	162		**982**
130S-T	CLASS C (TOP SOIL), PLAN QUANTITY	CY	15	127	44	60	314	**560**
132S-A	EMBANKMENT	CY	25			66		**91**
201S	SUBGRADE PREPARATION	SY			182	308		**490**
401S-A	UNCLASSIFIED STRUCTURAL EXCAVATION, PLAN QUANTITY	CY	16	60	655	23		**754**
508S-I47	4-SIDED AREA INLET (7'X7')	EA	1					**1**
508S-I10S	INLET, STANDARD (10')	EA					2	**2**
508S-I15S	INLET, STANDARD (15')	EA		1				**1**
509S-1	TRENCH SAFETY PROTECTIVE SYSTEMS (ALL DEPTHS)	LF	205	67	155	23	6	**456**
510-ASD18	PIPE, 18-INCH DIA. RCP CLASS III (ALL DEPTHS), INCLUDING EXCAVATION & BACKFILL COMPLETE IN PLACE AS DETAILED AND SPECIFIED	LF		3	15		6	**24**
510-ASD36	PIPE, 36-INCH DIA. RCP CLASS III (ALL DEPTHS), INCLUDING EXCAVATION & BACKFILL COMPLETE IN PLACE AS DETAILED AND SPECIFIED	LF	205					**205**
511S-A	GATE VALVE (6")	EA					1	**1**
551	PIPE UNDERDRAINS (6" PVC)	LF					97	**97**
559S-5X3	PRECAST CONCRETE BOX CULVERTS, 5 FT.X 3 FT.	LF		64				**64**
559S-12X4	PRECAST CONCRETE BOX CULVERTS, 12 FT.X 4 FT.	LF			30			**30**
559S-A	CAST IN PLACE CONCRETE BOX CULVERTS	CY				23		**23**
591S-A	DRY ROCK RIPRAP	SY			182	308		**490**
591S-F-5	5" CONCRETE RIPRAP (HEADWALLS) COMPLETE IN PLACE AS DETAILED AND SPECIFIED	SY			50	124		**174**
602S-A	BERMUDA SODDING	SY	43	380	134	180	941	**1678**
602S-B	ST AUGUSTINE SODDING	SY	43	380	134	180	941	**1678**
605S-A	SOIL RETENTION BLANKET, CLASS 1, TYPE C	SY	39		839	355		**1233**
WC 9031	DIVERSION AND CARE OF WATER	MO						**12**
WC 9032	WATER QUALITY AND DETENTION POND, COMPLETE IN PLACE	EA					1	**1**
450-6051	PEDESTRIAN RAILING (TXDOT PRD-13 TYPE E)	LF			75	100		**175**
466-6154	WINGWALL (FW-0)(HW=7 FT), COMPLETE IN PLACE AS DETAILED AND SPECIFIED	EA			1			**1**
466-6169	WINGWALL (FW-S)(HW=8 FT), COMPLETE IN PLACE AS DETAILED AND SPECIFIED	EA				2		**2**
466-6210	WINGWALL (SW-0)(HW=7 FT), COMPLETE IN PLACE AS DETAILED AND SPECIFIED	EA			1			**1**
467-6175	SET (TY I)(S= 5 FT)(HW= 3 FT)(3:1) (C), COMPLETE IN PLACE AS DETAILED AND SPECIFIED	EA		2				**2**
467-6448	SET (TY II)(36 IN)(RCP)(3:1)(C), COMPLETE IN PLACE AS DETAILED AND SPECIFIED	EA	1					**1**
550-6001	CHAIN LINK FENCE (INSTALL)(6')	LF					275	**275**
550-6012	CHAIN LINK FENCE GATE (INSTALL)(6'X16')	EA					1	**1**

RETAINING WALL

ITEM #	DESCRIPTION	UNIT	SHEET 149	SHEET 150	SHEET 151	TOTAL
401S-A	UNCLASSIFIED STRUCTURAL EXCAVATION, PLAN QUANTITY	CY	102	296	33	**431**
414S-C-N	CAST-IN-PLACE PORTLAND CEMENT CONCRETE RETAINING WALL (RET. WALL N), INCLUDING REINFORCEMENT, COMPLETE IN PLACE AS DETAILED AND SPECIFIED	CY	50			**50**
414S-C-S	CAST-IN-PLACE PORTLAND CEMENT CONCRETE RETAINING WALL (RET. WALL S), INCLUDING REINFORCEMENT, COMPLETE IN PLACE AS DETAILED AND SPECIFIED	CY		100		**100**
414S-C-P	CAST-IN-PLACE PORTLAND CEMENT CONCRETE RETAINING WALL FOOTING (RET. WALL P), INCLUDING REINFORCEMENT, COMPLETE IN PLACE AS DETAILED AND SPECIFIED	CY			10	**10**
450-6051	PEDESTRIAN RAILING (TXDOT PRD-13 TYPE E)	LF	129	163	126	**418**
623S	DRY STACK ROCK WALL (RET. WALL P)	SF			500	**500**
722S-A	PROTECTIVE COATING (NEW STRUCTURES) - TO COVER EXPOSED CONC. OR ROCK SURFACES	LS				**1**

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QUANTITY SUMMARY SHEET
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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				23

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SHARED USE PATH

ITEM #	DESCRIPTION	UNIT	SHEET 78	SHEET 79	SHEET 80	SHEET 81	SHEET 82	SHEET 83	SHEET 84	SHEET 85	SHEET 86	SHEET 87	SHEET 88	SHEET 89	SHEET 90	SHHET 91	SHEET 92	SHEET 93	SHEET 94	TOTAL
102S-C	CLEARING AND GRUBBING	LS																		1
201S	SUBGRADE PREPERATION	SY	430	602	506	584	623	483	599	25	422	623	545	550	623	623	623	623	214	7666
210S-A	FLEXIBLE BASE	CY	62	86	73	84	89	69	86	4	61	89	78	79	89	89	89	89	31	1099
401S-A	UNCLASSIFIED STRUCTURAL EXCAVATION, PLAN QUANTITY	CY			27	7														34
414S-C-SUP	CAST-IN-PLACE PORTLAND CEMENT CONCRETE RETAINING WALL, INCLUDING REINFORCING STEEL	CY			9	3														12
432S-6	NEW P.C. CONCRETE SHARED USE PATH, 6 INCH THICKNESS	SF	2019	3007	2599	3000	3200	2468	3051	123	1956	3295	2800	2824	3200	3200	3200	3200	1096	39212
432S-RP-1	P.C. SIDEWALK CURB RAMP WITH PAVERS (TYPE 1)	EA					1								1					2

SIGNAGE AND PAVEMENT MARKINGS

ITEM #	DESCRIPTION	UNIT	SHEET 157	SHEET 158	SHEET 159	SHEET 160	SHEET 161	SHEET 162	TOTAL
824S	TRAFFIC SIGNS	EA	3	4	10	12	3	2	34
827S-A	BICYCLE LANE AHEAD SIGN	EA	1						1
827S-B	BICYCLE LANE ENDS SIGN	EA		1					1
829S-A	TYPE I BICYCLE LANE MARKINGS 6 INCHES IN WIDTH, WHITE IN COLOR	LF		1125				569	1694
829S-B	TYPE I BICYCLE LANE PREFERENTIAL (DIRECTIONAL ARROW) SYMBOLS, WHITE IN COLOR	EA		2					2
829S-C	TYPE I BICYCLE LANE (BIKE RIDER) SYMBOL, WHITE IN COLOR	EA		4					4
829S-E	TYPE II BICYCLE LANE MARKINGS 6 INCHES IN WIDTH, WHITE IN COLOR	LF		1125				569	1694
829S-F	TYPE II BICYCLE LANE PREFERENTIAL (DIRECTIONAL ARROW) SYMBOLS, WHITE IN COLOR	EA		2					2
829S-G	TYPE II BICYCLE LANE (BIKE RIDER) SYMBOL, WHITE IN COLOR	EA		4					4
863S-2	REFLECTORIZED PAVEMENT MARKERS (TYPE I-C)	EA		37	32	40	40	15	164
863S-3	REFLECTORIZED PAVEMENT MARKERS (TYPE II A-A)	EA		23	32	40	40		135
871S-A4YB	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS 4 INCHES IN WIDTH, YELLOW IN COLOR (SOLID)	LF		1286	1258	1446	1430	290	5710
871S-A4YS	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS 4 INCHES IN WIDTH, YELLOW IN COLOR (BROKEN)	LF		897	320	400	400		2017
871S-A4WB	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS 4 INCHES IN WIDTH, WHITE IN COLOR (BROKEN)	LF		1450	320	400	400	150	2720
871S-A8WS	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS 8 INCHES IN WIDTH, WHITE IN COLOR (SOLID)	LF	87	153					240
871S-A12YS	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS 12 INCHES IN WIDTH, YELLOW IN COLOR (SOLID)	LF		65			84	210	359
871S-A12WS	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS 12 INCHES IN WIDTH, WHITE IN COLOR (SOLID)	LF		303	216	64		296	879
871S-A24WS	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS 24 INCHES IN WIDTH, WHITE IN COLOR (SOLID)	LF			24				24
871S-C	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS, LEFT ARROW, WHITE IN COLOR	EA	1	1					2
871S-C	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS, LEFT ARROW, YELLOW IN COLOR	EA		2	4	2	4		12
871S-B	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS, 'ONLY', WHITE IN COLOR	EA	1						1
871S-E4YB	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS 4 INCHES IN WIDTH, YELLOW IN COLOR (SOLID)	LF		1286	1258	1446	1430	290	5710
871S-E4YS	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS 4 INCHES IN WIDTH, YELLOW IN COLOR (BROKEN)	LF		897	320	400	400		2017
871S-E4WB	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS 4 INCHES IN WIDTH, WHITE IN COLOR (BROKEN)	LF		1450	320	400	400	150	2720
871S-E8WS	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS 8 INCHES IN WIDTH, WHITE IN COLOR (SOLID)	LF	87	153					240
871S-E12YS	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS 12 INCHES IN WIDTH, YELLOW IN COLOR (SOLID)	LF		65			84	210	359
871S-E12WS	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS 12 INCHES IN WIDTH, WHITE IN COLOR (SOLID)	LF		303	216	64		296	879
871S-E24WS	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS 24 INCHES IN WIDTH, WHITE IN COLOR (SOLID)	LF			24				24
871S-G	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS, LEFT ARROW, WHITE IN COLOR	EA	1	1					2
871S-G	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS, LEFT ARROW, YELLOW IN COLOR	EA		2	4	2	4		12
871S-F	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS, 'ONLY', WHITE IN COLOR	EA	1						1
874S-A4	ELMININATING EXISTING PAVEMENT MARKINGS; 4 INCHES IN WIDTH	LF					655	1535	2190
874S-A12	ELMININATING EXISTING PAVEMENT MARKINGS; 12 INCHES IN WIDTH	LF					66	255	321
432 6045	RIPRAP (MOW STRIP)(4 IN)	CY				24.8			24.8
540 6001	MTL W-BEAM GD FEN (TIM POST)	LF				788			788
540 6016	DOWNSTREAM TERMINAL ANCHOR SECTION	EA				2			2
540 6020	MTL W-BEAM GD FEN (LOW FILL CULVERT)	LF				50			50
544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA				2			2
658 6047	INSTL OM ASSM (OM-2Y)(WC)GND	EA				4			4
658 6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	EA				16			16
658 6048	INSTL OM ASSM (OM-2Z)(FLX)GND	EA				3		1	4

UTILITY ADJUSTMENTS

ITEM #	DESCRIPTION	UNIT	SHEET 264	SHEET 265	SHEET 266	SHEET 267	SHEET 268	SHEET 269	SHEET 223	TOTAL
432S-A	P.C. CONCRETE CURB AND GUTTER (INCLUDING REMOVAL AND REPLACEMENT)	LF	20	20			20	10	70	140
504S-1WM	REPOSITIONING & ADJUST WATER METER BOX TO GRADE	EA						1	1	2
506S-4WW	MAJOR MANHOLE HEIGHT ADJUSTMENT	EA				2			2	4
506S-4WW	MINOR MANHOLE HEIGHT ADJUSTMENT	EA			1				1	2
509S-1	TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS (ALL DEPTHS)	LF	20	30			72	49	171	342
510-AW1.5-K	PIPE, 1.5" DIAMETER, COPPER TYPE K (ALL DEPTHS) INCLUDES EXCAVATION AND BACKFILL	LF					42	8	50	100
510-AWRJ-6 DIA	FACTORY RESTRAINED JOINT PIPE, 6" DIAMETER, DI CL 350 (ALL DEPTHS) INCLUDES EXCAVATION AND BACKFILL	LF	20	15					35	70
510-AWRJ-8 DIA	FACTORY RESTRAINED JOINT PIPE, 8" DIAMETER, DI CL 350 (ALL DEPTHS) INCLUDES EXCAVATION AND BACKFILL	LF					30	25	55	110
510-AWRJ-12 DIA	FACTORY RESTRAINED JOINT PIPE, 12" DIAMETER, DI CL 350 (ALL DEPTHS) INCLUDES EXCAVATION AND BACKFILL	LF		15				16	31	62
510-BW-8	CONNECTION NEW 8" SERVICE TO EXISTING 8" WATER VAULT, WITH FOSTER ADAPTOR	EA					1	1	2	4
510-BW-2x2	CONNECTING NEW SINGLE 1.5" SERVICE TO EXISTING PRIVATE SERVICE	EA					1	1	2	4.0
510-JW 12x6	WET CONNECTIONS, 12" DIA. x 6" DIA.	EA	2	1					3	6
510-JW 12x8	WET CONNECTIONS, 12" DIA. x 8" DIA.	EA					1		1	2
510-JW 12x12	WET CONNECTIONS, 12" DIA. x 12" DIA.	EA		1				1	2	4
510-KW	DUCTILE IRON FITTINGS	TON	0.1				0.15	0.15	0.4	
511S-A-6	VALVES, GATE VALVE, 6" DIAMETER	EA	2	1					3	
511S-A-12	VALVES, GATE VALVE, 12" DIAMETER	EA		1					1	

TREE PRESERVATION PLAN

ITEM #	DESCRIPTION	UNIT	SHEET 201	SHEET 202	SHEET 203	SHEET 204	SHEET 205	SHEET 206	TOTAL
610S-A	PROTECTIVE FENCING TYPE A CHAIN LINK FENCE	LF	529	549	987	511	80	630	3286
610S-D	TREE WELL (TREE PROTECTION)	EA	1	1	5				7
610S-R	REMOVAL OF EXISTING TREE	EA	19	16	16	8		6	65
703S	SAFETY FENCE	LF			275				275

EROSION AND SEDIMENTATION CONTROLS

ITEM #	DESCRIPTION	UNIT	SHEET 187	SHEET 188	SHEET 189	SHEET 190	SHEET 191	SHEET 192	TOTAL
605S-A	SOIL RETENTION BLANKET CLASS 1, TYPE A	SY	1802	4343	7650	4431			18226
604S-D	SEEDING FOR EROSION CONTROL	SY	1802	3470	231	1950			7453
609S-A	TOPSOIL AND SEEDBED PREP	SY		873	7419	2481			10773
609S-C	NATIVE GRASSLANDS FOR EROSION CONTROL	SY		873	7419	2481			10773
609S-F	WATERING	KGAL		4	32	11			47
609S-G	MANAGEMENT PRACTICES	SY		873	7419	2481			10773
628S-B	SEDIMENT CONTAINMENT DIKES WITH FILTER FABRIC	LF		149	47	74			270
639S	ROCK BERM	LF		199	27			18	244
WC 9033	CONCRETE WASHOUT AREA	EA				1			1
641S	STABILIZED CONSTRUCTION ENTRANCE	EA			1	1			2
642S	SILT FENCE FOR EROSION CONTROL	LF	686	1180	1400	1130	57	304	4757
648S	MULCH SOCK	LF	128	134	73	149	25		509
632S	STORM INLET SEDIMENT TRAP	CF			108	135			243
506 6003	ROCK FILTER DAM (INSTALL) (TY 3)	LF		39	100			50	189
506 6011	ROCK FILTER DAM (REMOVE)	LF		39	100			50	189

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				24

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SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN TEXT	DIMENSIONS	ALUMINUM TYPE A	ALUMINUM TYPE G	Post Type: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	Posts (1 or 2)	Anchor Type: UA=Univer-Conc, UB=Univer-Bolt, SA=Slip-Conc, SB=Slip-Bolt, WS=Wedge Steel, WP=Wedge Plastic	Mounting Designation: P = Prefab. "Plain", T = Prefab. "T", U = Prefab. "U"	Mounting Designation: 1EXT or 2EXT = # of Ext., BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Chan., EXAL= Extruded Aluminum
157	1	R3-17	BIKE LANE	24" x 18"	X		10BWG	1	SA	P	
		R3-17aP	AHEAD	24" x 8"	X						
157	2	W11-1	BIKE WARNING	24" x 24"	X		10BWG	1	SA	P	
		W16-1P	SHARE THE ROAD	18" x 24"	X						
158	3	R3-17	BIKE LANE	24" x 18"	X		10BWG	1	SA	P	
		R3-17bP	ENDS	24" x 8"	X						
158	4	R7-9a	NO PARKING BIKE LANE	12" x 18"	X		10BWG	1	SA	P	
158	5	R7-9a	NO PARKING BIKE LANE	12" x 18"	X		10BWG	1	SA	P	
158	6	R3-9b	TWO-WAY LEFT TURN ONLY	24" x 36"	X		10BWG	1	SA	P	
		R3-9dP	END	30" x 12"	X						
158	7	R3-9b	TWO-WAY LEFT TURN ONLY	24" x 36"	X		10BWG	1	SA	P	
		R3-9cP	BEGIN	30" x 12"	X						
159	8	R3-9b	TWO-WAY LEFT TURN ONLY	24" x 36"	X		10BWG	1	SA	P	
159	9	R1-1	STOP	30" x 30"	X		10BWG	1	SA	P	
159	10	R1-1	STOP	30" x 30"	X		10BWG	1	SA	P	
159	11	S1-1	SCHOOL	36" x 36"	X		10BWG	1	SA	P	
		SW16-7P	DIAGONAL ARROW	24" x 12"	X						
159	12	S1-1	SCHOOL	36" x 36"	X		10BWG	1	SA	P	
		SW16-7P	DIAGONAL ARROW	24" x 12"	X						
159	13	S1-1	SCHOOL	36" x 36"	X		10BWG	1	SA	P	
		SW16-9P	AHEAD	24" x 12"	X						
159	14	S1-1	SCHOOL	36" x 36"	X		10BWG	1	SA	P	
		SW16-9P	AHEAD	24" x 12"	X						
159	15	S1-1	SCHOOL	36" x 36"	X		10BWG	1	SA	P	
		SW16-9P	AHEAD	24" x 12"	X						
160	16	R3-9b	TWO WAY LEFT TURN ONLY	24" x 36"	X		10BWG	1	SA	P	
160	17	R3-9b	TWO WAY LEFT TURN ONLY	24" x 36"	X		10BWG	1	SA	P	
160	18	S1-1	SCHOOL	36" x 36"	X		10BWG	1	SA	P	
		SW16-7P	DIAGONAL ARROW	24" x 12"	X						
160	19	S1-1	SCHOOL	36" x 36"	X		10BWG	1	SA	P	
		SW16-7P	DIAGONAL ARROW	24" x 12"	X						
160	20	S1-1	SCHOOL	36" x 36"	X		10BWG	1	SA	P	
		SW16-9P	AHEAD	24" x 12"	X						
160	21	S1-1	SCHOOL	36" x 36"	X		10BWG	1	SA	P	
		SW16-9P	AHEAD	24" x 12"	X						
160	22		ENTRANCE ONLY	18" x 12"	X		10BWG	1	SA	P	
160	23		ENTRANCE ONLY	18" x 12"	X		10BWG	1	SA	P	
160	24	R1-1	STOP	30" x 30"	X		10BWG	1	SA	P	
		R5-1a	WRONG WAY	30" x 18"	X						
160	25	R1-1	STOP	30" x 30"	X		10BWG	1	SA	P	
		R5-1a	WRONG WAY	30" x 18"	X						
		R5-1	DO NOT ENTER	30" x 30"	X						
161	26	R1-1	STOP	30" x 30"	X		10BWG	1	SA	P	
		R5-1	DO NOT ENTER	30" x 30"	X						
161	27	R3-9dp	END	30" x 12"	X						
		R3-9b	TWO WAY LEFT TURN ONLY	24" x 36"	X		10BWG	1	SA	P	
161	28	R3-9b	TWO WAY LEFT TURN ONLY	24" x 36"	X		10BWG	1	SA	P	
		R3-9cP	BEGIN	30" x 12"	X						
162	29	R4-7	KEEP RIGHT	24" x 30"	X		10BWG	1	SA	P	
162	30	W5-4a	PATH NARROWS	18" x 18"	X		10BWG	1	SA	P	
160	31	W5-4a	PATH NARROWS	18" x 18"	X		10BWG	1	SA	P	
160	32	W5-4a	PATH NARROWS	18" x 18"	X		10BWG	1	SA	P	
159	33	W5-4a	PATH NARROWS	18" x 18"	X		10BWG	1	SA	P	
159	34	W5-4a	PATH NARROWS	18" x 18"	X		10BWG	1	SA	P	

ALUMINUM SIGN BLANKS (TYPE A)

Square Ft.	Min. Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.

SHEET 26 OF 273

SUMMARY OF SMALL SIGNS
SOSS

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REVISIONS	
DN:-TxDOT	11-93 7-02
CK:-TxDOT	8-95 2-07
DW:-TxDOT	1-02 9-08
CK:-TxDOT	

DIST	COUNTY	SECT	JOB	HIGHWAY
		CONT		
SHEET NO.				
26				

SP-2016-0186D

Williamson County, Texas

10/10/2017 6:54 AM

CITY OF AUSTIN RIGHT OF WAY MANAGEMENT STANDARD NOTES (11–13–2015)

1. FOR RIGHT OF WAY VIOLATIONS INCLUDING BUT NOT LIMITED TO WORKING WITHOUT A PERMIT OR AN EXPIRED PERMIT WITHIN THE CITY OF AUSTIN ROW AN INVESTIGATION FEE WILL BE ASSESSED FOR EACH OFFENSE UNTIL THE VIOLATION IS CORRECTED. FOLLOWING IS THE INVESTIGATION FEE SCHEDULE FOR VIOLATIONS OF PUBLIC SAFETY:

   a. NO OR EXPIRED PERMIT = EQUAL TO THE COST OF THE PERMIT
   b. VIOLATION OF PERMIT CONDITIONS, RESTRICTION LIMITS, TIMES AND LOCATIONS ON ROW PERMIT = $250
   c. IMPROPER ADVANCE WARNING SIGN = $250
   d. IMPROPER USE OF DEVICE = $250
   e. FAILURE TO CORRECT DEFICIENCY = $500
   f. RESTRICTING TRAFFIC DURING PEAK HOURS = EQUAL TO THE COST OF THE PERMIT
   g. MULTIPLE VIOLATIONS = UP TO A 4 DAY SUSPENSION OF WORK

2. CONTRACTORS AND THEIR SUBCONTRACTORS MUST BE LICENSED BY THE CITY OF AUSTIN FOR CONDUCTING WORK WITHIN THE RIGHT OF WAY.
3. CONTRACTOR MUST OBTAIN RIGHT OF WAY EXCAVATION PERMITS FROM RIGHT OF WAY MANAGEMENT DIVISION, FOR EACH STREET PRIOR TO COMMENCEMENT OF WORK. PLEASE CALL (512) 974–1150 FOR ADDITIONAL INFORMATION REGARDING PERMITTING PROCESS AND THE MOST CURRENT RIGHT OF WAY PERMITTING FEE SCHEDULE.
4. FOR WORK AT SIGNALIZED INTERSECTIONS CONTRACTOR MUST DIAL 311 OR (512) 974–2000 TO INITIATE A CITIZENS SERVICE REQUEST (CSR) FOR THE TRAFFIC SIGNALS GROUP; TO COORDINATE AND GAIN APPROVAL A MINIMUM OF 1 WEEK PRIOR TO CHANGE OF PROJECT LOCATION OR PHASE.
5. CONTRACTOR SHALL HAVE AN APPROVED RIGHT OF WAY PERMIT ON SITE AT ALL TIMES WHEN WORKING IN THE ROW.
6. CONTRACTOR MUST DIAL 311 OR (512) 974–2000 TO INITIATE A CITIZENS SERVICE REQUEST (CSR) FOR RIGHT OF WAY MANAGEMENT A MINIMUM OF 1 WEEK PRIOR TO START OF WORK.
7. CONTRACTOR MUST PROVIDE TRAINING CERTIFICATION OF COMPETENT PERSON THAT WILL BE RESPONSIBLE FOR THE TRAFFIC CONTROL PLACEMENT, TO RIGHT OF WAY INSPECTOR, PRIOR TO START OF WORK.
8. STORAGE OF EQUIPMENT AND/OR MATERIAL WITHIN THE ROW.

   a. STORAGE OF EQUIPMENT IN THE ROW IS PERMISSIBLE ONLY WITHIN THE CURRENT LIMITS OF LONG–TERM OR INTERMEDIATE–TERM CLOSURES AND SHALL BE LIMITED TO THE EQUIPMENT REQUIRED FOR THE CURRENT WORK ACTIVITY. THIS EQUIPMENT SHALL BE PROTECTED BEHIND BARRICADES.
   b. STORAGE OF MATERIAL IN THE ROW IS PERMISSIBLE ONLY WITHIN THE CURRENT LIMITS OF LONG–TERM OR INTERMEDIATE–TERM CLOSURES AND SHALL BE LIMITED TO NO MORE THAN THE MATERIAL REQUIRED FOR THREE DAYS OF PRODUCTION. THIS MATERIAL SHALL BE PROTECTED BEHIND WATER–FILLED BARRIER.
   c. EQUIPMENT OR MATERIAL STORED IN THE ROW SHALL NOT CREATE A VISUAL BARRIER TO TRAFFIC.

9. NO MORE THAN ONE WORK ZONE LOCATION MAY BE SET AT ONE TIME.
10. PEAK HOURS FOR ARTERIAL AND COLLECTOR STREETS ARE 6AM TO 9AM AND 4PM TO 6 PM, MONDAY THROUGH FRIDAY. NO DISRUPTION OR REDUCTION OF ACTIVE ROADWAY OR PEDESTRIAN ROUTE CAPACITY SHALL OCCUR DURING THESE TIMES, UNLESS ALLOWED BY TRAFFIC CONTROL PLAN.
11. EXCAVATIONS SHALL BE BACKFILLED OR PLATED WHEN REQUIRED TO OPEN IMPACTED TRAFFIC LANES. FOR EXCAVATIONS EXCEEDING A TRANSVERSE WIDTH OF 6 FEET, THE CONTRACTOR SHALL PROVIDE AN ENGINEERED PLATING PLAN TO THE OWNER'S REPRESENTATIVE FOR REVIEW BY RIGHT OF WAY MANAGEMENT DIVISION. PER 804S–4, 5 OF 9
12. EXISTING SIDEWALKS AND BEATEN PATHS SHALL BE MAINTAINED AS ADA COMPLIANT THROUGHOUT THE PROJECT DURATION WITH THE EXCEPTION OF FINAL FLATWORK AND UTILITY TIE– INS. ANY WORK OVERHEAD WITHIN 25 FEET OF EXISTING PEDESTRIAN PATHWAYS WILL REQUIRE PEDESTRIAN COVERED WALKWAYS. SIDEWALK CLOSURES FOR MAJOR SIDEWALK IMPROVEMENTS HAVE A 14–DAY MAXIMUM PERIOD AND SHALL BE COMPLETED IN PHASES AS TO NOT CLOSE MORE THAN ONE BLOCK AT A TIME.
13. ROAD WORK AHEAD" AND "CONSTRUCTION ENTRANCE AHEAD" SIGNS MUST BE PLACED AT ALL APPROACHES TO STABILIZED CONSTRUCTION ENTRANCE. SEE THE CITY OF AUSTIN STANDARD DETAILS FOR SIGN SPACING.
14. DRIVEWAYS SHALL NOT BE CLOSED FOR MORE THAN 3 CONSECUTIVE CALENDAR DAYS
15. ADA COMPLIANCE SHALL BE MAINTAINED THROUGH STABILIZED CONSTRUCTION ENTRANCE.
16. BARRIER SHALL BE PLACED WITHIN GUIDELINES SET FORTH BY THE TMUTCD CRASH TESTING REQUIREMENTS (NCHRP REPORT 350) FOR THAT PARTICULAR BARRIER USED. ANY MODIFICATIONS TO THAT TESTING APPLICATION SHALL BE APPROVED BY THE ENGINEER OF RECORD.
17. FOR OVERNIGHT PROTECTION OF WORK ZONES WITHIN THE ROW, REFER TO CITY OF AUSTIN STANDARD 804S–4 SERIES DETAILS.
18. ALL TEMPORARY PAVING SHALL CONFORM TO CITY OF AUSTIN STANDARD DETAIL 1100S–4.
19. INITIAL AND PHASE CHANGE TRAFFIC CONTROL CHANGES SHALL BE INSTALLED ON THE WEEKENDS.
20. THE NAME AND TELEPHONE NUMBER OF THE CONTRACTOR OR SUPPLIER SHALL BE SHOWN ON THE NON–REFLECTIVE SURFACE OF ALL CHANNELIZING DEVICES IN ACCORDANCE WITH THE CITY OF AUSTIN STANDARD 800 SERIES DETAILS.

COA STANDARD CONSTRUCTION SEQUENCE NOTES

THE FOLLOWING SEQUENCE OF CONSTRUCTION SHALL BE USED FOR ALL DEVELOPMENT. THE APPLICANT IS ENCOURAGED TO PROVIDE ANY ADDITIONAL DETAILS APPROPRIATE FOR THE PARTICULAR DEVELOPMENT.

1. TEMPORARY EROSION AND SEDIMENTATION CONTROLS ARE TO BE INSTALLED AS INDICATED ON THE APPROVED SITE PLAN OR SUBDIVISION CONSTRUCTION PLAN AND IN ACCORDANCE WITH THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) THAT IS REQUIRED TO BE POSTED ON THE SITE. INSTALL TREE PROTECTION AND INITIATE TREE MITIGATION MEASURES.
2. THE ENVIRONMENTAL PROJECT MANAGER OR SITE SUPERVISOR MUST CONTACT THE WATERSHED PROTECTION DEPARTMENT, ENVIRONMENTAL INSPECTION, AT 512–974–2278, 72 HOURS PRIOR TO THE SCHEDULED DATE OF THE REQUIRED ON–SITE PRECONSTRUCTION MEETING.
3. THE ENVIRONMENTAL PROJECT MANAGER, AND/OR SITE SUPERVISOR, AND/OR DESIGNATED RESPONSIBLE PARTY, AND THE GENERAL CONTRACTOR WILL FOLLOW THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) POSTED ON THE SITE. TEMPORARY EROSION AND SEDIMENTATION CONTROLS WILL BE REVISED, IF NEEDED, TO COMPLY WITH CITY INSPECTORS' DIRECTIVES, AND REVISED CONSTRUCTION SCHEDULE RELATIVE TO THE WATER QUALITY PLAN REQUIREMENTS AND THE EROSION PLAN.
4. ROUGH GRADE THE POND(S) AT 100% PROPOSED CAPACITY. EITHER THE PERMANENT OUTLET STRUCTURE OR A TEMPORARY OUTLET MUST BE CONSTRUCTED PRIOR TO DEVELOPMENT OF EMBANKMENT OR EXCAVATION THAT LEADS TO PONDING CONDITIONS. THE OUTLET SYSTEM MUST CONSIST OF A SUMP PIT OUTLET AND AN EMERGENCY SPILLWAY MEETING THE REQUIREMENTS OF THE DRAINAGE CRITERIA MANUAL AND/OR THE ENVIRONMENTAL CRITERIA MANUAL, AS REQUIRED. THE OUTLET SYSTEM SHALL BE PROTECTED FROM EROSION AND SHALL BE MAINTAINED THROUGHOUT THE COURSE OF CONSTRUCTION UNTIL INSTALLATION OF THE PERMANENT WATER QUALITY POND(S).
5. TEMPORARY EROSION AND SEDIMENTATION CONTROLS WILL BE INSPECTED AND MAINTAINED IN ACCORDANCE WITH THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) POSTED ON THE SITE.
6. BEGIN SITE CLEARING/CONSTRUCTION (OR DEMOLITION) ACTIVITIES.*
7. IN THE BARTON SPRINGS ZONE, THE ENVIRONMENTAL PROJECT MANAGER OR SITE SUPERVISOR WILL SCHEDULE A MID–CONSTRUCTION CONFERENCE TO COORDINATE CHANGES IN THE CONSTRUCTION SCHEDULE AND EVALUATE EFFECTIVENESS OF THE EROSION CONTROL PLAN AFTER POSSIBLE CONSTRUCTION ALTERATIONS TO THE SITE. PARTICIPANTS SHALL INCLUDE THE CITY INSPECTOR, PROJECT ENGINEER, GENERAL CONTRACTOR AND ENVIRONMENTAL PROJECT MANAGER OR SITE SUPERVISOR. THE ANTICIPATED COMPLETION DATE AND FINAL CONSTRUCTION SEQUENCE AND INSPECTION SCHEDULE WILL BE COORDINATED WITH THE APPROPRIATE CITY INSPECTOR.
8. PERMANENT WATER QUALITY PONDS OR CONTROLS WILL BE CLEANED OUT AND FILTER MEDIA WILL BE INSTALLED PRIOR TO/CONCURRENTLY WITH REVEGETATION OF SITE.
9. COMPLETE CONSTRUCTION AND START REVEGETATION OF THE SITE AND INSTALLATION OF LANDSCAPING.
10. UPON COMPLETION OF THE SITE CONSTRUCTION AND REVEGETATION OF A PROJECT SITE, THE DESIGN ENGINEER SHALL SUBMIT AN ENGINEER'S LETTER OF CONCURRENCE TO THE WATERSHED PROTECTION AND DEVELOPMENT REVIEW DEPARTMENT INDICATING THAT CONSTRUCTION, INCLUDING REVEGETATION, IS COMPLETE AND IN SUBSTANTIAL CONFORMITY WITH THE APPROVED PLANS. AFTER RECEIVING THIS LETTER, A FINAL INSPECTION WILL BE SCHEDULED BY THE APPROPRIATE CITY INSPECTOR.
11. UPON COMPLETION OF LANDSCAPE INSTALLATION OF A PROJECT SITE, THE LANDSCAPE ARCHITECT SHALL SUBMIT A LETTER OF CONCURRENCE TO THE WATERSHED PROTECTION AND DEVELOPMENT REVIEW DEPARTMENT INDICATING THAT THE REQUIRED LANDSCAPING IS COMPLETE AND IN SUBSTANTIAL CONFORMITY WITH THE APPROVED PLANS. AFTER RECEIVING THIS LETTER, A FINAL INSPECTION WILL BE SCHEDULED BY THE APPROPRIATE CITY INSPECTOR.
12. AFTER A FINAL INSPECTION HAS BEEN CONDUCTED BY THE CITY INSPECTOR AND WITH APPROVAL FROM THE CITY INSPECTOR, REMOVE THE TEMPORARY EROSION AND SEDIMENTATION CONTROLS AND COMPLETE ANY NECESSARY FINAL REVEGETATION RESULTING FROM REMOVAL OF THE CONTROLS. CONDUCT ANY MAINTENANCE AND REHABILITATION OF THE WATER QUALITY PONDS OR CONTROLS.

NOTES

***SEE CONSTRUCTION SEQUENCING THIS SHEET.**

CONSTRUCTION SEQUENCING

1. CALL ONE STOP SHOP, CONSTRUCTION INSPECTION, 48 HOURS PRIOR TO BEGINNING ANY WORK. CALL THE ONE CALL CENTER AT 472–2822, FOR UTILITY LOCATIONS AND OBTAIN PERMIT FOR ANY WORK WITHIN CITY OF AUSTIN R.O.W.
2. INSTALL TEMPORARY EROSION CONTROLS AND TREE PROTECTION FENCING PRIOR TO ANY CLEARING AND GRUBBING. NOTIFY DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION (DPWT), CONSTRUCTION INSPECTION DIVISION, WHEN INSTALLED.
3. ROUGH–CUT ALL REQUIRED OR NECESSARY PONDS. EITHER THE PERMANENT OUTLET STRUCTURE OR A TEMPORARY OUTLET MUST BE CONSTRUCTED PRIOR TO DEVELOPMENT OF ANY EMBANKMENT OR EXCAVATION THAT LEADS TO PONDING CONDITIONS. THE OUTLET SYSTEM MUST CONSIST OF A LOW–LEVEL OUTLET AND AN EMERGENCY OVERFLOW MEETING THE REQUIREMENTS OF THE DRAINAGE CRITERIA MANUAL (SECTION 8.3) AND/OR THE ENVIRONMENTAL CRITERIA MANUAL (SECTION 1.4.2.K) AS REQUIRED. THE OUTLET SYSTEM SHALL BE PROTECTED FROM EROSION AND SHALL BE MAINTAINED THROUGHOUT THE COURSE OF CONSTRUCTION UNTIL FINAL RESTORATION IS ACHIEVED.
4. DELIVER APPROVED ROUGH CUT SHEETS TO THE CONSTRUCTION INSPECTION DIVISION PRIOR TO CLEARING AND GRUBBING.
5. ROUGH GRADE STREETS. NO DEVELOPMENT OF EMBANKMENT WILL BE PERMITTED AT THIS TIME.
6. INSTALL ALL UTILITIES TO BE LOCATED UNDER THE PROPOSED PAVEMENT.
7. DELIVER STORM SEWER CUT SHEETS TO THE CONSTRUCTION INSPECTION DIVISION.
8. BEGIN INSTALLATION OF STORM SEWER LINES. UPON COMPLETION, RESTORE AS MUCH DISTURBED AREA AS POSSIBLE, PARTICULARLY CHANNELS AND LARGE OPEN AREAS.
9. DELIVER FINAL GRADE CUT SHEETS TO THE CONSTRUCTION INSPECTION DIVISION.
10. RE–GRADE STREETS TO SUB–GRADE.
11. LIME TREAT SUBGRADE.
12. ENSURE THAT ALL UNDERGROUND UTILITY CROSSINGS ARE COMPLETED. LAY FIRST COURSE BASE MATERIAL ON ALL STREETS.
13. LAY FINAL COURSE BASE MATERIAL ON ALL STREETS.
14. INSTALL CURB AND GUTTER.
15. LAY ASPHALT.
16. PLACE SEAL COAT.
17. INSTALL PERMANENT PAVEMENT MARKINGS AND MARKERS.
18. COMPLETE ALL UNDERGROUND INSTALLATIONS WITHIN THE R.O.W.
19. COMPLETE FINAL GRADING AND RESTORATION OF DETENTION, SEDIMENTATION / FILTRATION PONDS.
20. COMPLETE PERMANENT EROSION CONTROL AND RESTORATION OF SITE VEGETATION.
21. REMOVE AND DISPOSE OF TEMPORARY EROSION CONTROLS.
22. COMPLETE ANY NECESSARY FINAL DRESS UP OF AREAS DISTURBED BY ITEM 18.

STATE OF TEXAS
ADITYA W. JATAR
117288
LICENSED
PROFESSIONAL ENGINEER
8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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TBPE # F-6324 TBPLS # F-10194230
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TCP – CONSTRUCTION NOTES I

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				26

SP-2016-0186D

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TRAFFIC CONTROL NARRATIVE

ALL TRAFFIC CONTROL SHALL FOLLOW CITY OF AUSTIN STANDARDS 804S1–S5 AND SHALL BE IN PLACE PRIOR TO BEGINNING OF WORK.

PHASE I:

TRAFFIC CONTROL FOR PHASE I ASSOCIATED WITH THE BUILDING OF NEW CURB INLETS AT STA. 17+00 AND STA. 27+00, EXTENDING MULTIPLE BARREL BOX CULVERT AT STA. 23+00, PERFORMING UTILITY ADJUSTMENTS, CONSTRUCTING WATER QUALITY POND/DETENTION POND IMPROVEMENTS, SHARED USE PATH AND DITCH ALONG NORTH SIDE OF NEENAH AVENUE FROM STA. 7+60 TO STA. 17+40 AND SHARED USE PATH ALONG SOUTH SIDE OF NEENAH AVENUE FROM STA. 17+70 TO STA. 30+00 IS DESCRIBED BELOW:

1. DELINEATE & INSTALL BARRIERS/CHANNELIZING DEVICES TO ISOLATE THE INLET WORK AREAS ALONG NEENAH AVENUE TO MAINTAIN ONE 10'–12' FOOT TRAVEL LANE FOR VEHICULAR TRAFFIC IN BOTH DIRECTIONS.
2. PROVIDE ADVANCE WARNING ALONG TRAVEL LANES PRIOR TO SHIFTING VEHICULAR TRAFFIC AROUND WORK AREA.
3. EXISTING WESTBOUND SHOULDER WILL BE CLOSED AND ADVANCE WARNING SHALL BE PROVIDED INFORMING CLOSURE OF SHOULDER.
4. TCP 1 PHASE I ADVANCE WARNING SIGNS SHALL REMAIN IN PLACE UNTIL COMPLETION OF WORK. (ALL PHASES). REMOVE TCP 2 PHASE I & TCP 3 PHASE I DEVICES BEFORE INSTALLATION OF PHASE II TRAFFIC CONTROL

PHASE II:

TRAFFIC CONTROL FOR PHASE I TO REMAIN FOR SHORT TERM WORK RELATED TO INSTALLATION OF CURB RAMPS AND TIE–IN TO NEW SHARED USE PATH AT SOUTHEAST CORNER OF ALTONA WAY, AND SOUTHEAST AND SOUTHWEST CORNERS OF SOLERA DRIVE.

1. PROVIDE ADVANCED WARNING SIGNS AND BARRIERS FOR PEDESTRIANS.

PHASE III:

TRAFFIC CONTROL FOR PHASE III ASSOCIATED WITH THE WORK RELATED TO THE INSTALLATION OF THE SHARED USE PATH AND DRAINAGE DITCH GRADING ALONG THE NORTH SIDE OF NEENAH AVENUE FROM STA. 17+70 TO STA. 26+00, ALONG THE SOUTH SIDE OF NEENAH AVENUE FROM STA. 26+40 TO STA. 40+00, AND TEMPORARY SIDEWALK CONNECTIONS AND CURB RAMPS AT STA. 35+30.

1. PROVIDE ADVANCED WARNING & DIRECTIONAL SIGNS AS WELL AS BARRIERS FOR PEDESTRIANS.

PHASE IV:

TRAFFIC CONTROL FOR PHASE IV ASSOCIATED WITH THE WORK PERFORMED DURING EXPANSION AND WIDENING OF THE SOUTH SEGMENT AND SHARED USE PATH OF FROM STA. 7+00 TO ALTONA WAY AND NORTH SHARED USE PATH FROM STA 26+00 TO END IS DESCRIBED BELOW:

145 FOOT OF MEDIAN SHALL BE REMOVED BETWEEN STA. 3+50 AND STA. 5+00 AND 10 INCHES TYPE B HMAC PLACED IN REMOVAL AREA TO ALLOW VEHICULAR TRAFFIC TRANSITION AND SHIFT TO NORTH HALF OF NEENAH AVENUE PRIOR TO BEGINNING PHASE IV. MEDIAN SHALL BE REINSTALLED AFTER PHASE VIII AND BEFORE FINAL WORK FOR NEENAH AVENUE WIDENING IS COMPLETED.

1. DELINEATE & INSTALL BARRIERS/CHANNELIZING DEVICES ALONG THE ENTIRE NORTHERN EDGE OF THE WORK AREA ESTABLISHED ALONG NEENAH AVENUE STARTING EAST OF THE INTERSECTION OF OLIVE HILL DRIVE/NEENAH AVENUE AND EXTENDING UP TO ALTONA WAY.
2. THE DELINEATION WILL BE LOCATED AT A DISTANCE OF 28 FEET FROM THE EDGE OF THE EXISTING NORTH CURB LINE ALONG NEENAH AVENUE TO MAINTAIN ONE 14 FOOT TRAVEL LANE FOR VEHICULAR TRAFFIC IN BOTH THE EASTBOUND AND WESTBOUND DIRECTIONS. CONTRACTOR SHALL COORDINATE WITH ADJACENT PROJECT FOR TRAFFIC LOCATION AT TIE–IN.
3. PROVIDE ADVANCE WARNING ALONG TRAVEL LANES PRIOR TO SHIFTING VEHICULAR TRAFFIC WITHIN WORK AREA. PROVIDE TEMPORARY STRIPING ALONG TRAVEL LANES TO MATCH NEW TEMPORARY LANE ALIGNMENT. CONTRACTOR TO COVER EXISTING PAVEMENT STRIPING BEFORE INSTALLING TEMPORARY STRIPING.
4. DURING PHASE IV, COMPLETE ACCESS FOR DRIVEWAY AT ALTONA WAY WILL BE MAINTAINED. DUE TO THE SHIFTING OF THE EASTBOUND TRAFFIC, THE STOP BAR AND STOP SIGN AT ALTONA WAY WILL BE TEMPORARILY RELOCATED UPSTREAM TO STOP VEHICLES EXITING DRIVEWAYS AT ALTONA WAY BEFORE THE SHIFTED EASTBOUND TRAFFIC FLOW.
5. PHASE IV SETUP SHALL BE IN PLACE FOR THE ENTIRE DURATION OF NEENAH AVENUE WIDENING BEGINNING APPROX BEFORE STA. 7+00. THE SHIFTING OF TRAFFIC WILL BE IN PLACE UNTIL THE WIDENING OF NEENAH AVENUE TO ALTONA WAY IS COMPLETED.

PHASE V:

TRAFFIC CONTROL FOR PHASE V ASSOCIATED WITH THE WORK PERFORMED DURING EXPANSION AND WIDENING OF THE SOUTH SEGMENT AND SHARED USE PATH OF NEENAH AVENUE FROM ALTONA WAY TO THE END OF NEENAH AVENUE IS DESCRIBED BELOW:

1. DELINEATE & INSTALL BARRIERS/CHANNELIZING DEVICES ALONG THE NORTHERN EDGE OF THE WORK AREA ESTABLISHED ALONG NEENAH AVENUE STARTING EAST OF THE INTERSECTION OF ALTONA WAY/NEENAH AVENUE AND EXTENDING ALL THE WAY TO THE CURRENT PROJECT OF NEENAH AVENUE.
2. THE DELINEATION WILL BE LOCATED AT A DISTANCE OF 28 FEET FROM THE EDGE OF THE EXISTING NORTH CURB LINE ALONG NEENAH AVENUE TO MAINTAIN ONE 14 FOOT TRAVEL LANE FOR VEHICULAR TRAFFIC IN BOTH THE EASTBOUND AND WESTBOUND DIRECTIONS. CONTRACTOR SHALL COORDINATE WITH ADJACENT PROJECT FOR TRAFFIC LOCATION AT TIE–IN.
3. PROVIDE ADVANCE WARNING ALONG TRAVEL LANES PRIOR TO SHIFTING VEHICULAR TRAFFIC WITHIN WORK AREA. PROVIDE TEMPORARY STRIPING ALONG TRAVEL LANES TO MATCH NEW TEMPORARY LANE ALIGNMENT. CONTRACTOR TO COVER EXISTING PAVEMENT STRIPING BEFORE INSTALLING TEMPORARY STRIPING.
4. DURING PHASE V, COMPLETE ACCESS FOR DRIVEWAYS AT ALTONA WAY AND SOLERA DRIVE WILL BE MAINATINED. DUE TO THE SHFTING OF THE EASTBOUND TRAFFIC, THE STOP BAR AND STOP SIGN AT ALTONA WAY AND SOLERA DRIVE WILL BE TEMPORARILY RELOCATED UPSTREAM TO STOP VEHICLES EXISTING DRIVEWAYS AT ALTONA WAY AND SOLERA DRIVE BEFORE THE SHIFTED EASTBOUND TRAFFIC FLOW.
5. PHASE V SETUP SHALL BE IN PLACE FOR THE ENTIRE DURATION OF NEENAH AVENUE WIDENING BEGINNING APPROX BEFORE STA. 17+00. THE SHIFTING OF TRAFFIC WILL BE PLACE UNTIL THE WIDENING OF NEENAH AVENUE WIDENING IS COMPLETED.

TRAFFIC CONTROL NARRATIVE (CONTINUED)

PHASE VI:

TRAFFIC CONTROL FOR PHASE VI ASSOCIATED WITH THE FULL DEPTH CONSTRUCTION AND MILL AND OVERLAY WORK REQUIRED TO BE DONE AT THE INTERSECTION OF ALTONA WAY/NEENAH AVENUE IS DESCRIBED BELOW:

1. CLOSE THE INTERSECTION AT ALTONA WAY/NEENAH AVENUE.
2. DETOUR TRAFFIC ENTERING THIS INTERSECTION TO PREVIOUS INTERSECTION OF OLIVE HILL DRIVE/NEENAH AVENUE.
3. PROVIDE ADVANCE WARNING TO RESIDENTIAL TRAFFIC ACCESSING THIS INTERSECTION ABOUT CLOSURE AT THE INTERSECTION AND RELATED DETOUR.
4. REMOVE PHASE VI TCP DEVICES BEFORE INSTALLATION OF PHASE VII TRAFFIC CONTROL.

PHASE VII:

TRAFFIC CONTROL FOR PHASE VII IS ASSOCIATED WITH THE FULL DEPTH CONSTRUCTION, AND MILL AND OVERLAY WORK REQUIRED TO BE DONE AT THE INTERSECTION OF SOLERA DRIVE/NEENAH AVENUE IS DESCRIBED BELOW:

1. CLOSE WEST HALF OF THE INTERSECTION AT SOLERA DRIVE/NEENAH AVENUE.
2. SET–UP 3–WAY FLAGGING OPERATION AT THE EAST END OF THE INTERSECTION THAT REMAINS OPEN TO ALLOW INGRESS/EGRESS OF VEHICULAR TRAFFIC NEEDING ACCESS TO SOLERA DRIVE DAYTIME OPERATION ONLY.
3. PROVIDE ADVANCE WARNING TO RESIDENTIAL TRAFFIC ACCESSING THIS INTERSECTION ABOUT CLOSURE AT THE INTERSECTION AND RELATED FLAGGING OPERATION.
4. REMOVE PHASE VII TCP DEVICES AND INSTALL PHASE VIII DEVICES.

PHASE VIII:

TRAFFIC CONTROL FOR PHASE VIII IS ASSOCIATED WITH THE THE FULL DEPTH CONSTRUCTION, AND MILL AND OVERLAY WORK REQUIRED TO BE DONE AT THE INTERSECTION OF SOLERA DRIVE/NEENAH AVENUE IS DESCRIBED BELOW:

1. CLOSE WEST HALF OF THE INTERSECTION AT SOLERA DRIVE/NEENAH AVENUE.
2. SET–UP 3–WAY FLAGGING OPERATION AT THE WEST END OF THE INTERSECTION THAT REMAINS OPEN TO ALLOW INGRESS/EGRESS OF VEHICULAR TRAFFIC NEEDING ACCESS TO SOLERA DRIVE DAYTIME OPERATION ONLY.
3. PROVIDE ADVANCE WARNING TO RESIDENTIAL TRAFFIC ACCESSING THIS INTERSECTION ABOUT CLOSURE AT THE INTERSECTION AND RELATED FLAGGING OPERATION.
4. REMOVE PHASE VIII TCP DEVICES.

DRIVEWAY NOTES (REFER TO SHEETS 32 & 35)

1. CONTRACTOR TO COORDINATE WITH ST. VINCENT DE PAUL CATHOLIC CHURCH MANAGEMENT TO ENSURE THAT BOTH DRIVEWAYS TO THE CHURCH REMAIN OPEN DURING MAJOR CHURCH SERVICE HOURS ON WEEKENDS. DURING WEEKDAYS; CONTRACTOR TO COORDINATE WITH CHURCH MANAGEMENT TO ENSURE THAT ONE OF THE TWO CHURCH DRIVEWAYS REMAIN OPEN TO PROVIDE ACCESS.
2. CONTRACTOR TO COORDINATE WITH HOLY FAMILY CATHOLIC SCHOOL AND ST. DOMINIC CATHOLIC HIGH SCHOOL TO ENSURE THAT SCHOOL DRIVEWAYS TO REMAIN OPEN BETWEEN THE HOURS OF 5:00AM–8:00AM AND 3:00PM – 5:00PM DURING WEEKDAYS ALLOWING PICK UP AND DROP–OFF OF SCHOOL STUDENTS AND STAFF ENTRY–EXIT.

PEDESTRIAN NOTES

DURING EACH PHASE OF CONSTRUCTION PEDESTRIANS WILL UTILIZE THE EXISTING SIDEWALKS, PROPOSED SHARED USE PATHS, OR A COMBINATION OF BOTH AND EXISTING AND TEMPORARY CROSSWALKS TO NAVIGATE NEENAH AVENUE AS OUTLINED BELOW BY PHASE. CONTRACTOR SHALL INSTALL PEDESTRIAN TRAFFIC CONTROL DEVICES PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES.

PHASE I:

DURING CONSTRUCTION OF THE NORTH SHARED USE PATH FROM STA. 7+70 TO STA. 17+20, THE EXISTING NORTH SIDEWALK WILL BE CLOSED FROM STA. 7+00 AND 17+20.

1. PEDESTRIANS HEADING EAST ALONG THE NORTH EXISTING SIDEWALK WILL BE DETOURED TO THE SOUTH EXISTING SIDEWALK UTILIZING A TEMPORARY CROSSWALK WEST OF OLIVE HILL DRIVE.
2. PEDESTRIANS HEADING WEST ALONG THE NORTH EXISTING SIDEWALK WILL BE DETOURED TO THE SOUTH EXISTING SIDEWALK UTILIZING A TEMPORARY CROSSWALK EAST OF THE ST. VINCENT DE PAUL CATHOLIC CHURCH DRIVEWAY.

DURING CONSTRUCTION OF THE SOUTH SHARED USE PATH FROM STA. 17+80 TO STA. 20+50 AND STA. 21+00 TO STA. 26+50, PEDESTRIANS WILL UTILIZE THE EXISTING SOUTH SIDEWALK.

PHASE II:

DURING CONSTRUCTION OF TEMPORARY SIDEWALK CONNECTIONS BETWEEN THE SOUTH EXISTING SIDEWALK AND PROPOSED SHARED USE PATH AT STA. 18+00, STA. 20+50, STA. 21+00, AND STA. 26+00, THE EXISTING SOUTH SIDEWALK WILL BE CLOSED FROM STA. 17+90 TO STA. 25+90.

1. PEDESTRIANS HEADING EAST ALONG THE SOUTH EXISTING SIDEWALK WILL BE DETOURED TO THE NORTH EXISTING SIDEWALK UTILIZING A TEMPORARY CROSSWALK AT STA. 17+00.
2. PEDESTRIANS HEADING WEST ALONG THE SOUTH EXISTING SIDEWALK WILL BE DETOURED TO THE NORTH EXISTING SIDEWALK UTILIZING THE EXISTING CROSSWALK AT STA. 26+00.

PEDESTRIAN NOTES (CONTINUED)

PHASE III:

DURING CONSTRUCTION OF THE NORTH SHARED USE PATH FROM STA. 17+80 TO STA. 25+90 AND THE SOUTH SHARED USE PATH FROM STA. 26+50 TO STA. 40+00, THE EXISTING NORTH SIDEWALK WILL BE CLOSED FROM STA. 17+10 TO STA. 26+20 AND THE EXISTING SOUTH SIDEWALK WILL BE CLOSED FROM STA. 26+25 TO STA. 35+00.

1. PEDESTRIANS HEADING EAST ALONG THE NORTH EXISTING SIDEWALK WILL BE DETOURED TO THE PROPOSED SOUTH SHARED USE PATH (CONSTRUCTED IN PHASE I) UTILIZING A TEMPORARY CROSSWALK AT STA. 17+00.
2. PEDESTRIANS HEADING WEST ALONG THE NORTH EXISTING SIDEWALK WILL BE DETOURED TO THE PROPOSED SOUTH SHARED USE PATH (CONSTRUCTED IN PHASE I) UTILIZING A TEMPORARY CROSSWALK AT STA. 26+00.
3. PEDESTRIANS HEADING EAST ALONG THE NORTH EXISTING SIDEWALK WILL BE DETOURED TO THE NORTH EXISTING SIDEWALK UTILIZING A TEMPORARY CROSSWALK AT STA. 26+00.

PEDESTRIAN NOTES (CONTINUED)

PHASE IV:

DURING THE CONSTRUCTION OF THE NEENAH AVENUE WIDENING AND THE SOUTH SHARED USE PATH FROM STA. 6+90 TO STA. 17+20 AND THE NORTH SHARED USE PATH FROM STA. 25+90 TO STA. 35+20, THE EXISTING SOUTH SIDEWALK WILL BE CLOSED FROM STA. 5+90 TO STA. 17+90 AND THE NORTH EXISTING SIDEWALK WILL BE CLOSED FROM STA. 25+90 TO STA. 35+20..

1. PEDESTRIANS HEADING EAST ALONG THE SOUTH EXISTING SIDEWALK WILL BE DETOURED TO THE NORTH EXISTING SIDEWALK AND PROPOSED NORTH SHARED USE PATH (CONSTRUCTED IN PHASE I) UTILIZING A TEMPORARY CROSSWALK AT STA. 5+00.
2. PEDESTRIANS HEADING WEST ALONG THE SOUTH PROPOSED SHARED USE PATH (CONSTRUCTED IN PHASE I) WILL BE DETOURED TO THE NORHT PROPOSED SHARED USE PATH (CONSTRUCTED IN PHASE I) UTILIZING A TEMPORARY CROSSWALK AT STA. 18+00.
3. PEDESTRIANS HEADING EAST ALONG THE NORTH PROPOSED SHARED USE PATH (CONSTRUCTED IN PHASE III) WILL BE DETOURED TO THE SOUTH PROPOSED SHARED USE PATH (CONSTRUCTED IN PHASES I & III) UTILIZING A TEMPORARY CROSSWALK AT STA. 25+90.
4. PEDESTRIANS HEADING WEST ALONG THE EXISTING NORTH SIDEWALK WILL BE DETOURED TO THE PROPOSED SOUTH SHARED USE PATH (CONSTRUCTED IN PHASE III) UTILIZING A TEMPORARY CROSSWALK AT STA. 35+30.

PHASE V:

DURING CONSTRUCTION OF THE NEENAH AVENUE WIDENING FROM STA. 17+80 TO STA. 35+20 THE EXISTING SOUTH SIDEWALK AND PROPOSED SOUTH SHARED USE PATH (CONSTRUCTED IN PHASES I & III) WILL BE CLOSED FROM STA. 17+10 TO STA. 35+20.

1. PEDESTRIANS HEADING EAST ALONG THE SOUTH PROPOSED SHARED USE PATH (CONSTRUCTED IN PHASE IV) WILL BE DETOURED TO THE NORTH PROPOSED SHARED USE PATH (CONSTRUCTED IN PHASES III & IV) UTILIZING A TEMPORARY CROSSWALK AT STA. 17+00.
2. PEDESTRIANS HEADING WEST ALONG SOUTH PROPOSED SHARED USE PATH (CONSTRUCTED IN PHASES I & III) WILL BE DETOURED TO THE NORTH PROPOSED SHARED USE PATH (CONSTRUCTED IN PHASES III & IV) UTILIZING A TEMPORARY CROSSALK AT STA. 35+30.

PHASE VI:

DURING THE CONSTRUCTION OF THE ALTONA WAY INTERSECTION PEDESTRIANS ON THE SOUTH PROPOSED SHARED USE PATH WILL UTILIZE TEMPORARY CROSSWALKS AT STA. 17+00 AND STA. 18+00 TO CROSS NEENAH AVENUE AND THE ST. VINCENT DE PAUL CATHOLIC CHURCH DRIVEWAY.

PHASE VII:

DURING THE CONSTRUCTION OF THE EASTERN HALF OF THE SOLERA DRIVE INTERSECTION PEDESTRIANS ON THE SOUTH PROPOSED SHARED USE PATH WILL UTILIZE TEMPORARY CROSSWALKS AT STA. 18+00 AND STA. 26+00 TO CROSS NEENAH AVENUE CONTINUE ALONG THE NORTH PROPOSED SHARED USE PATH.

PHASE VIII:

DURING THE CONSTRUCTION OF THE WESTERN HALF OF THE SOLERA DRIVE INTERSECTION PEDESTRIANS ON THE SOUTH PROPOSED SHARED USE PATH WILL UTILIZE TEMPORARY CROSSWALKS AT STA. 18+00 AND STA. 26+00 TO CROSS NEENAH AVENUE CONTINUE ALONG THE NORTH PROPOSED SHARED USE PATH.

GENERAL NOTES:

1. PAVEMENT MARKING FOR PROPOSED NEENAH AVE. EXTENSION APPROXIMATELY EAST OF STATION 36+00 SHALL BE DONE DURING OFF–PEAK HOURS BETWEEN 10:00 AM–3:00 PM DURING WEEKDAYS OR DURING NIGHT TIME HOURS FROM 10:00 PM–5:00 AM WEEKDAYS. APPROPRIATE FLASHER VEHICLES, ADVANCE WARNING NOTIFICATION AND SUITABLE TRAFFIC CONTROL DEVICES SHALL BE USED BY CONTRACTOR WHEN INSTALLING PROPOSED PAVEMENT MARKINGS. CONTRACTOR TO ENSURE THAT ALL APPROPRIATE SAFETY MEASURES ARE PUT IN PLACE DURING PROPOSED MARKING INSTALLATION TO MINIMIZE INCONVENIENCE TO NEIGHBORHOOD VEHICULAR TRAFFIC.

STATE OF TEXAS
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8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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TCP – CONSTRUCTION NOTES II

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6	TEXAS	104023–10006	_	14	WILLIAMSON				27

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BARRICADING SUMMARY (STREETS)									
STREET	**CLASSIFICATION**	PROTECTION	FROM STREET	TO STREET	PLANNED IMPROVEMENTS	TRAFFIC CONTROL PLAN SHEET/DETAIL	ALLOWED BARRICADING TIMES	DURATION OF CLOSURE	COMMENTS
Neenah Avenue	Collector	10 YEAR	Calaveras Drive	Pearson Ranch Road	Shared Use Path (SUP) Work	PHASE I	9am–4pm Mon–Fri; 7am–7pm Weekends	LONG TERM	NA
Neenah Avenue	Collector	10 YEAR	Calaveras Drive	Pearson Ranch Road	Curb Ramp Connection to SUP	PHASE II	9am–4pm Mon–Fri; 7am–7pm Weekends	LONG TERM	NA
Neenah Avenue	Collector	10 YEAR	Calaveras Drive	Pearson Ranch Road	SUP Work + Ditch	PHASE III	9am–4pm Mon–Fri; 7am–7pm Weekends	LONG TERM	NA
Neenah Avenue	Collector	10 YEAR	Calaveras Drive	Pearson Ranch Road	Roadway Widening + North SUP	PHASE IV	9am–4pm Mon–Fri; 7am–7pm Weekends	LONG TERM	NA
Neenah Avenue	Collector	10 YEAR	Calaveras Drive	Pearson Ranch Road	Roadway Widening	PHASE V	9am–4pm Mon–Fri; 7am–7pm Weekends	LONG TERM	NA

BARRICADING SUMMARY (INTERSECTIONS)					
M	PLANNED IMPROVEMENTS	TRAFFIC CONTROL PLAN SHEET/DETAIL	ALLOWED BARRICADING TIMES	DURATION OF CLOSURE	COMMENTS
Neenah Ave/Altona Way	Phase VI (Driveway Work)	PHASE VI	9am–4pm Mon–Fri; 7am–7pm Weekends	LONG TERM	NA
Neenah Ave/Solera Drive	Phase VII & VIII Construction (Driveway Work)	PHASE VIi/VIII	9am–4pm Mon–Fri; 7am–7pm Weekends	LONG TERM	NA

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NEENAH AVENUE WIDENING

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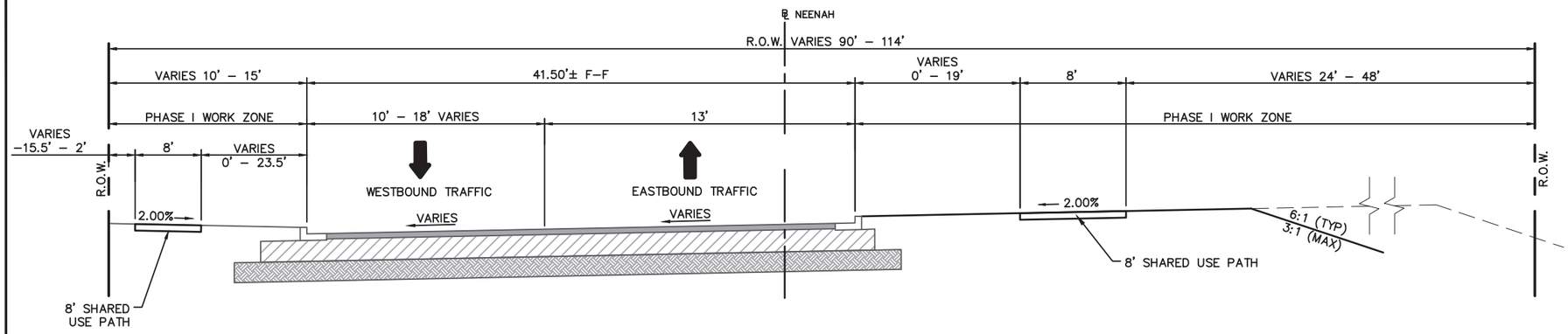
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TCP – CONSTRUCTION NOTES III

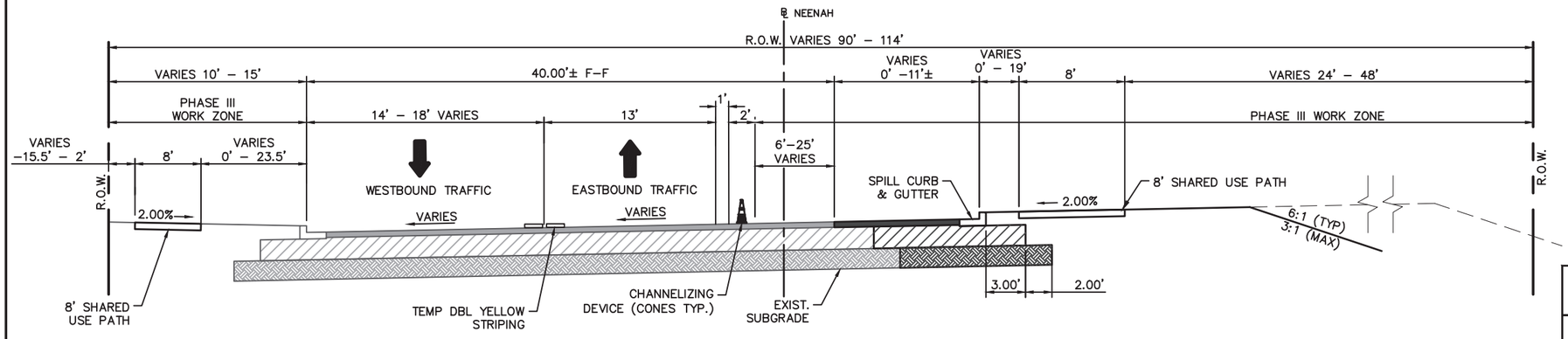
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6	TEXAS	104023–10006	_	14	WILLIAMSON				28

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NEENAH AVENUE WIDENING
TRAFFIC CONTROL PLAN
TYPICAL SECTION PHASE I
STA. 17+70 TO STA. 30+00 (RT)
STA. 7+60 TO STA. 30+00 (LT)
N.T.S.



NEENAH AVENUE WIDENING
TRAFFIC CONTROL PLAN
TYPICAL SECTION PHASE III
STA. 26+00 TO STA. 40+00 (RT)
STA. 17+70 TO STA. 26+00 (LT)
N.T.S.

NOTES

1. SEE CITY OF AUSTIN STANDARD NO 804S–3 FOR TEMPORARY PAVEMENT MARKING DETAILS.
2. SEE TRAFFIC CONTROL NARRATIVE (SHEET 27) FOR ADDITIONAL INFORMATION.
3. SEE PEDESTRIAN NOTES (SHEET 27) FOR ADDITIONAL INFORMATION.

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NEENAH AVENUE WIDENING

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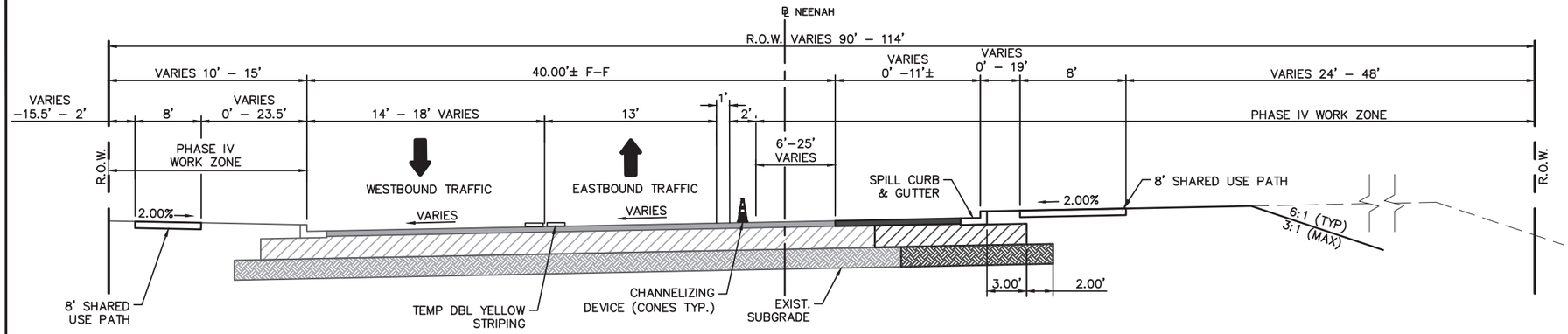
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TCP–TYPICAL SECTIONS
PHASE I & PHASE III

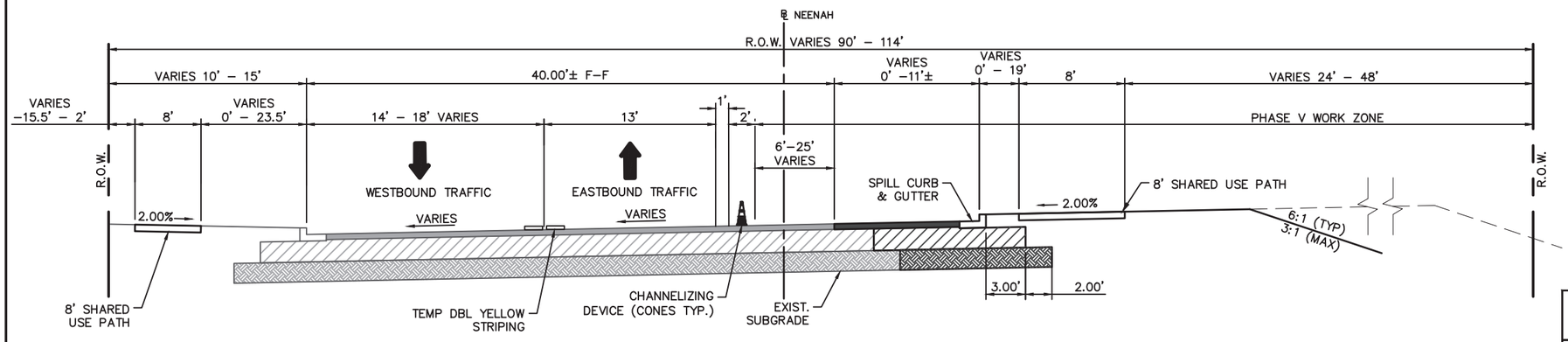
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NEENAH AVENUE WIDENING
TRAFFIC CONTROL PLAN
TYPICAL SECTION PHASE IV
STA. 6+90 TO STA. 17+20 (RT)
STA. 26+00 TO STA. 34+30 (LT)
N.T.S.



NEENAH AVENUE WIDENING
TRAFFIC CONTROL PLAN
TYPICAL SECTION PHASE V
STA. 17+20 TO STA. 35+30 (RT)
N.T.S.

NOTES

1. SEE CITY OF AUSTIN STANDARD NO 804S–3 FOR TEMPORARY PAVEMENT MARKING DETAILS.
2. SEE TRAFFIC CONTROL NARRATIVE (SHEET 27) FOR ADDITIONAL INFORMATION.
3. SEE PEDESTRIAN NOTES (SHEET 27) FOR ADDITIONAL INFORMATION.

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NEENAH AVENUE WIDENING

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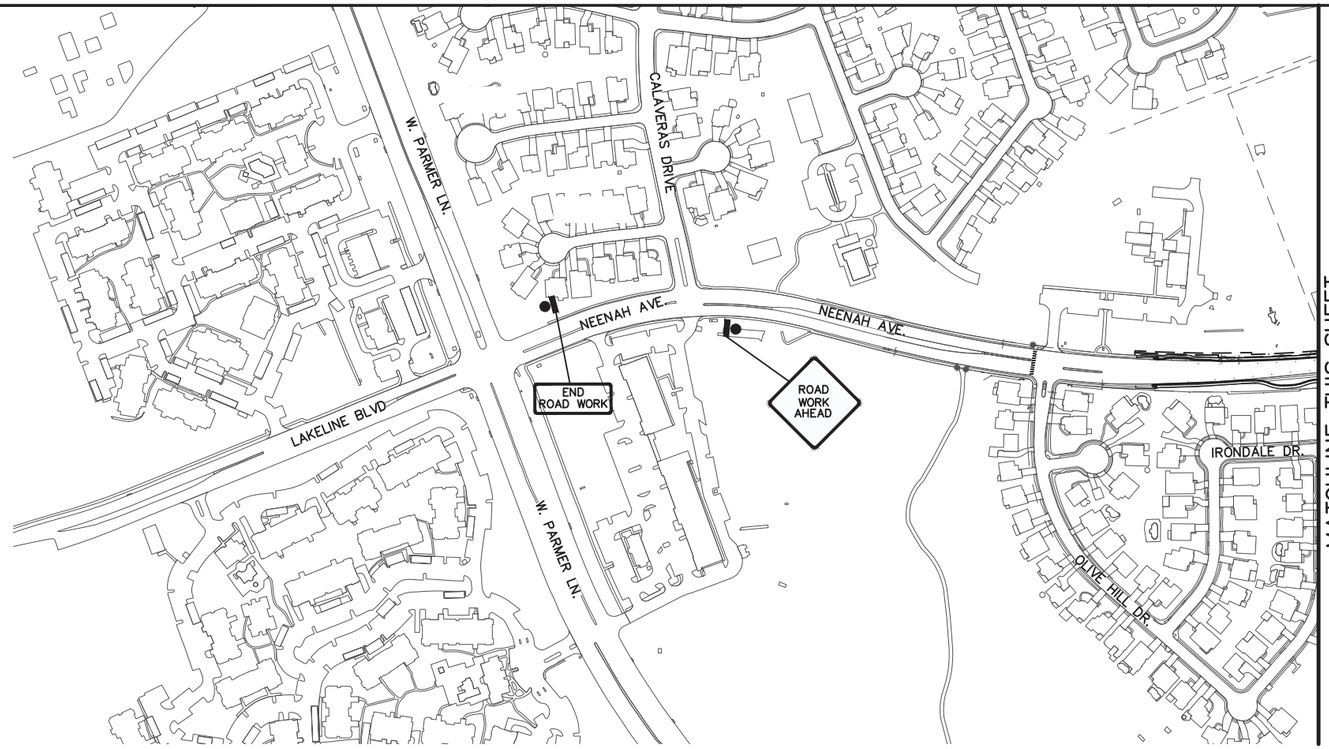
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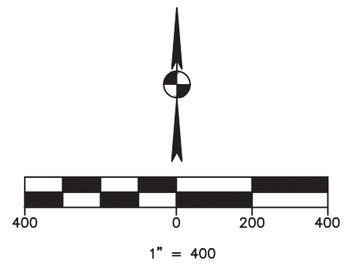
TCP–TYPICAL SECTIONS PHASE IV & PHASE V

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6	TEXAS	104023–10006	_	14	WILLIAMSON				30

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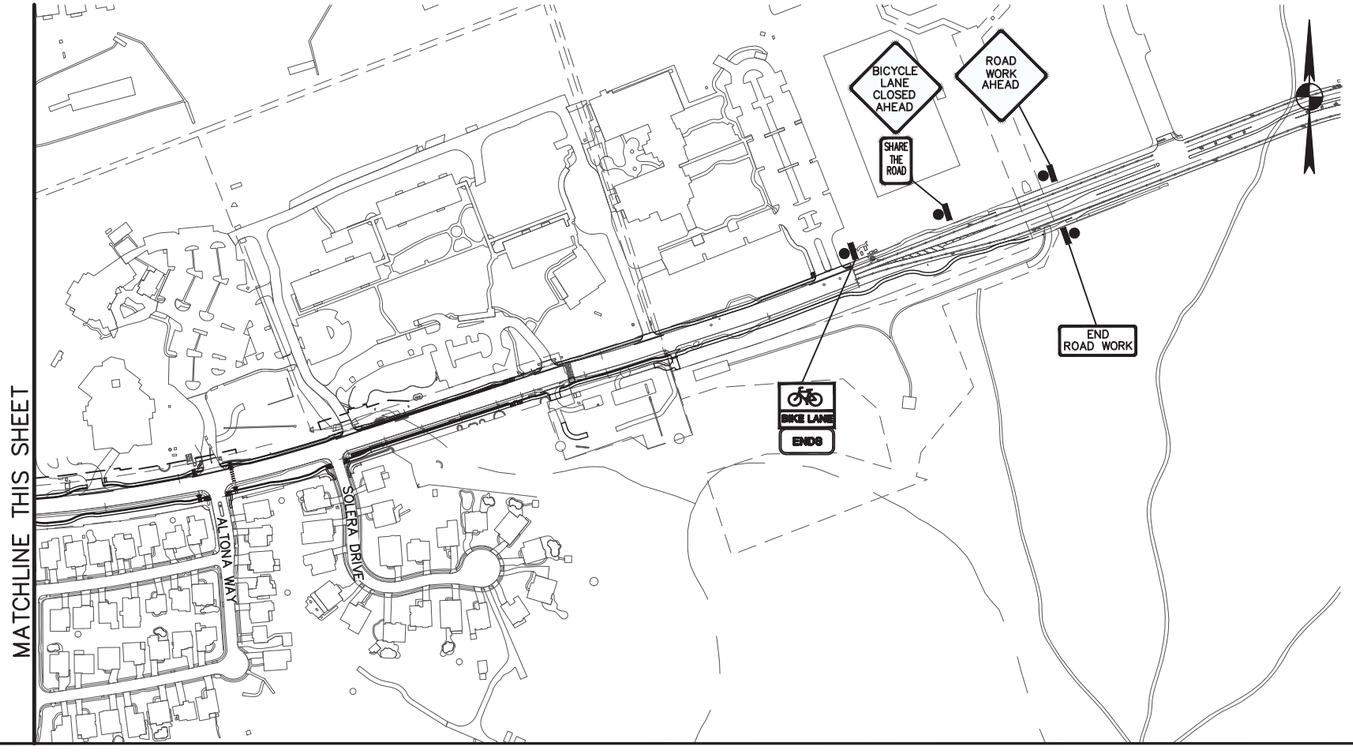


LEGEND

SIGNS

NOTES:

1. FOR WORK IN COA ROW, SEE DETAIL 804S–1, 9 OF 9, FOR TRANSITION LENGTHS AND DEVICE SPACING. SEE DETAIL 804S–5, 11 OF 13, FOR CROSSROAD SIGNING.
2. TRAVEL LANES MUST BE MAINTAINED AT A MINIMUM OF 10 FEET IN WIDTH.
3. SAND BAGS MUST BE USED TO SUPPORT ALL SIGNS AND BARRICADES.



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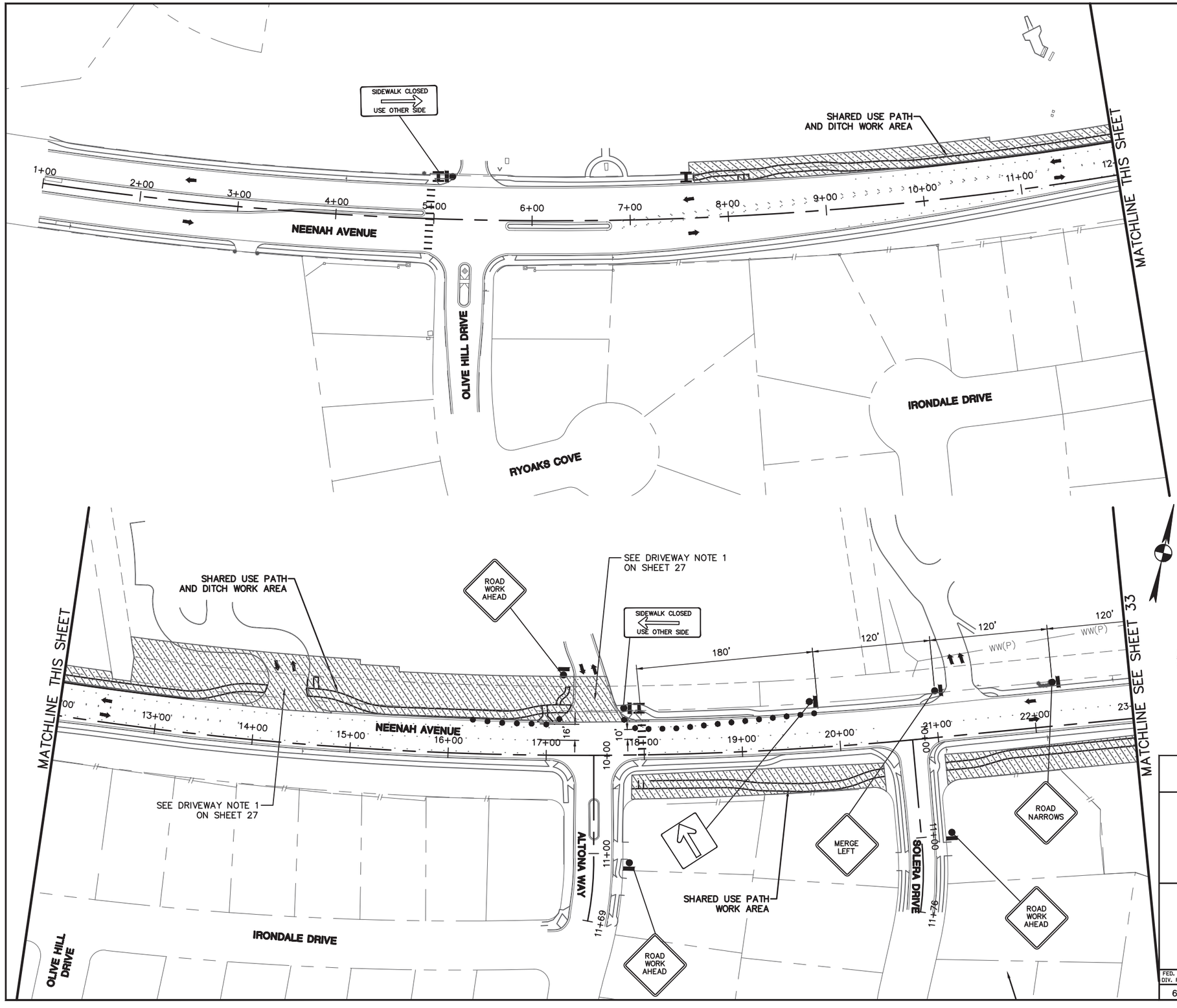
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TCP 1 PHASE I ADVANCE WARNING SIGNS

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6	TEXAS	104023–10006	_	14	WILLIAMSON				31

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LEGEND

- SIGNS
- TYP II BARRICADE
- CHANNELIZING DEVICE (CONES TYP.)
- EXISTING STRIPING
- SHARED USE PATH & DITCH WORK AREA (PHASE I)
- TEMPORARY CROSSWALK

NOTES:

1. FOR WORK IN COA ROW, SEE DETAIL 804S-1, 9 OF 9, FOR TRANSITION LENGTHS AND DEVICE SPACING. SEE DETAIL 804S-5, 11 OF 13, FOR CROSSROAD SIGNING.
2. TRAFFIC CONTROL SETUP FOR NEENAH AVENUE IS PER POSTED SPEED LIMIT OF 30 MPH.
3. TRAVEL LANES MUST BE MAINTAINED AT A MINIMUM OF 10 FEET IN WIDTH.
4. SAND BAGS MUST BE USED TO SUPPORT ALL SIGNS AND BARRICADES.
5. CONTRACTOR TO INSTALL TEMPORARY CROSSWALKS AS SHOWN ON PLANS IN ACCORDANCE WITH RESPECTIVE PHASE.

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NEENAH AVENUE WIDENING

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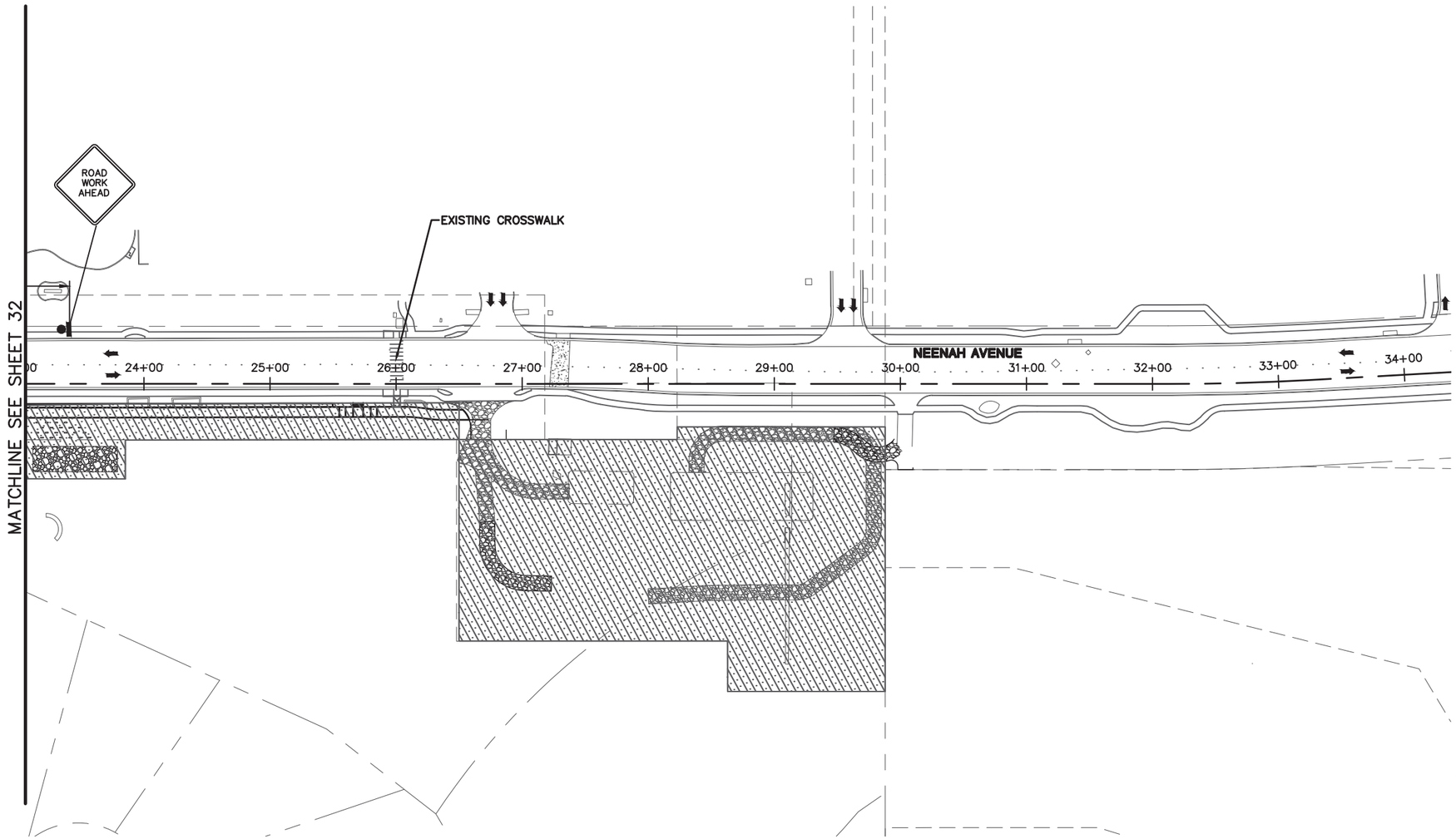
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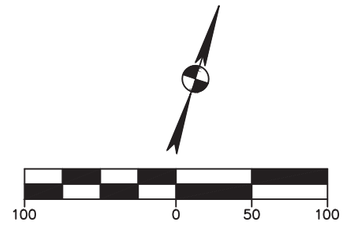
TCP 2 PHASE I

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				32

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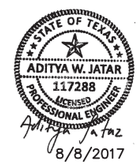


LEGEND

- SIGNS
- TYP II BARRICADE
- CHANNELIZING DEVICE (CONES TYP.)
- EXISTING STRIPING
- SHARED USE PATH DITCH WORK AREA (PHASE I)
- TEMPORARY CROSSWALK

NOTES:

1. FOR WORK IN COA ROW, SEE DETAIL 804S–1, 9 OF 9, FOR TRANSITION LENGTHS AND DEVICE SPACING. SEE DETAIL 804S–5, 11 OF 13, FOR CROSSROAD SIGNING.
2. TRAFFIC CONTROL SETUP FOR NEENAH AVENUE IS PER POSTED SPEED LIMIT OF 30 MPH.
3. TRAVEL LANES MUST BE MAINTAINED AT A MINIMUM OF 10 FEET IN WIDTH.
4. SAND BAGS MUST BE USED TO SUPPORT ALL SIGNS AND BARRICADES.



NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

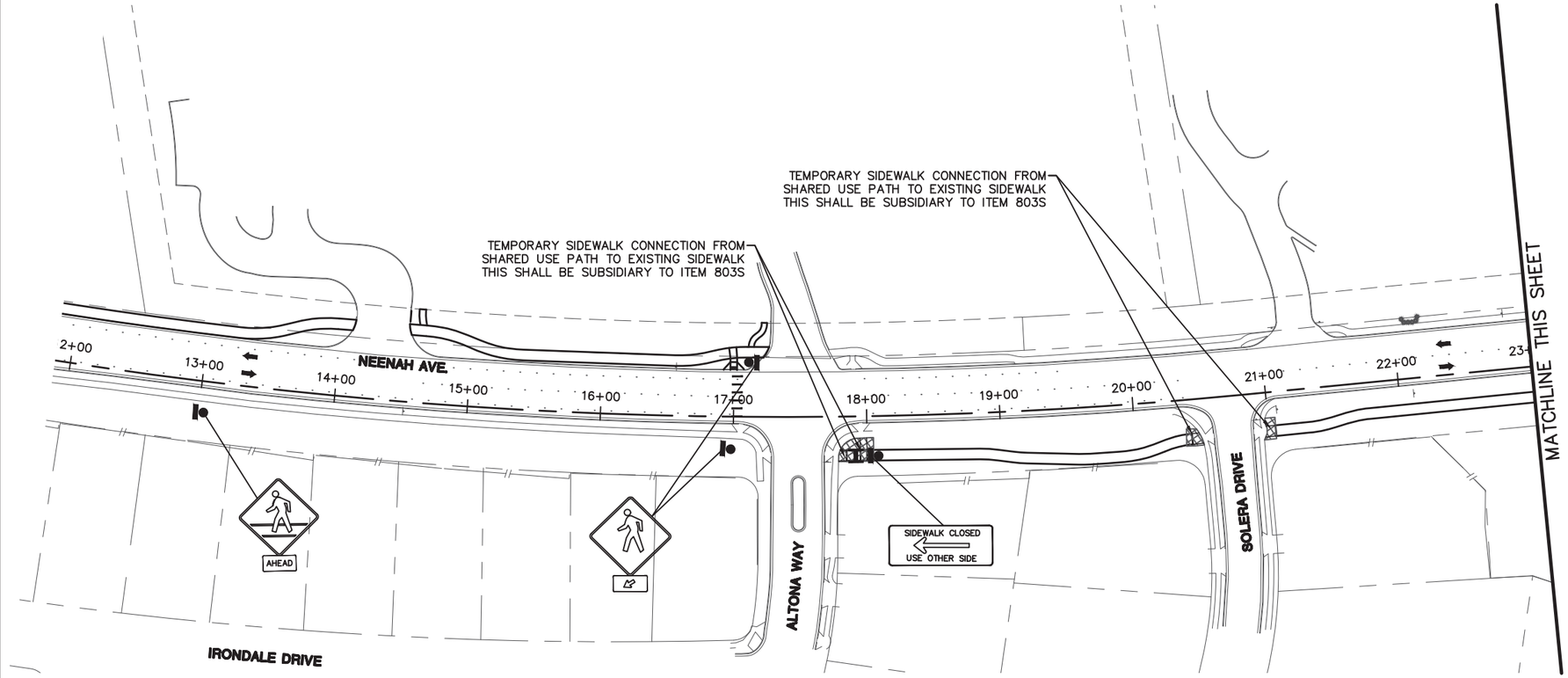
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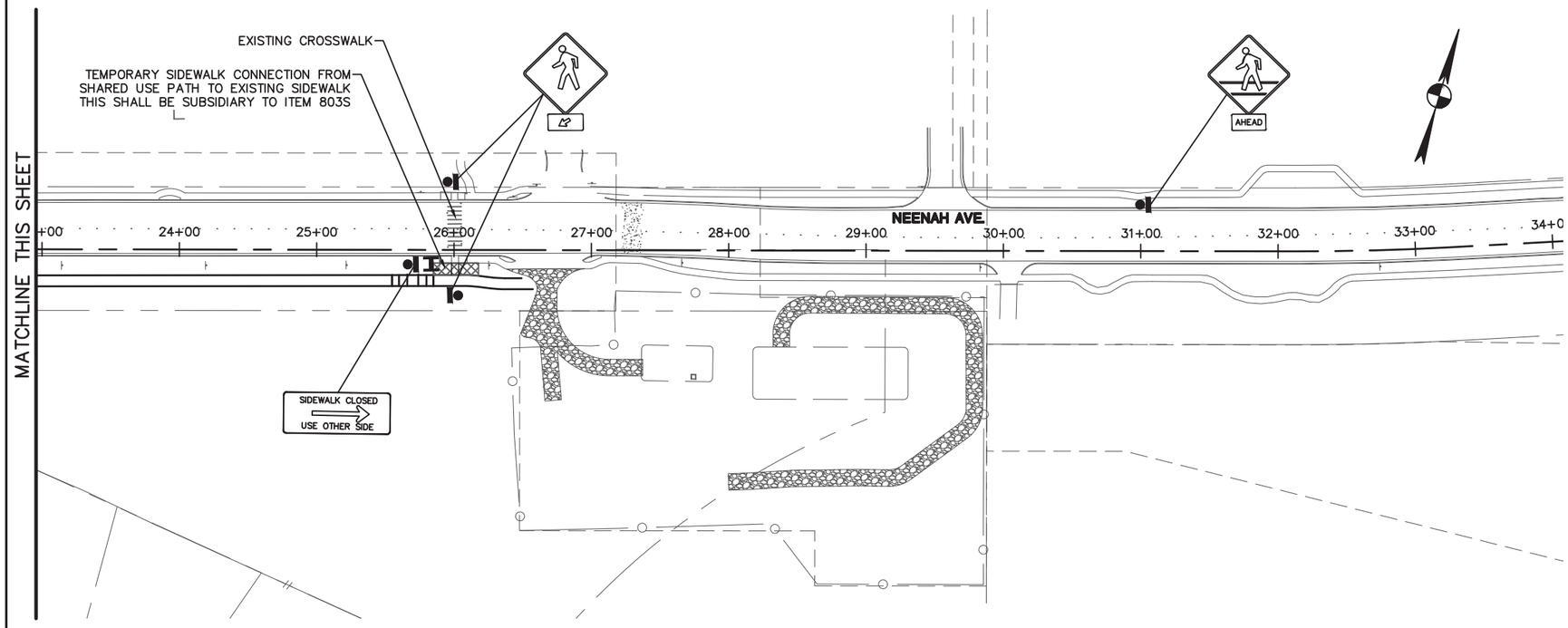
TCP 3 PHASE I

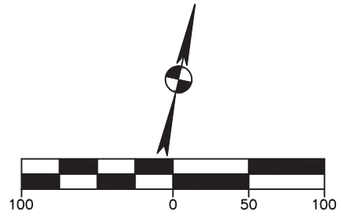
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				33

SP-2016-0186D

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1" = 100'

LEGEND

- SIGNS
- TYP II BARRICADE
- CHANNELIZING DEVICE (CONES TYP.)
- EXISTING STRIPING
- PROPOSED TEMPORARY STRIPING
- TEMPORARY SIDEWALK CONNECTION (PHASE II)
- TEMPORARY CROSSWALK

NOTES:

1. FOR WORK IN COA ROW, SEE DETAIL 804S–1, 9 OF 9, FOR TRANSITION LENGTHS AND DEVICE SPACING. SEE DETAIL 804S–5, 11 OF 13, FOR CROSSROAD SIGNING.
2. TRAFFIC CONTROL SETUP FOR NEENAH AVENUE IS PER POSTED SPEED LIMIT OF 30 MPH
3. TRAVEL LANES MUST BE MAINTAINED AT A MINIMUM OF 10 FEET IN WIDTH.
4. SAND BAGS MUST BE USED TO SUPPORT ALL SIGNS AND BARRICADES.
5. TEMPORARY SIDEWALK CONNECTION SHALL BE A MAXIMUM OF 4.5% RUNNNG SLOPE AND 1.5% CROSS SLOPE.
5. CONTRACTOR TO INSTALL TEMPORARY CROSSWALKS AS SHOWN ON PLANS IN ACCORDANCE WITH RESPECTIVE PHASE.

STATE OF TEXAS
ADITYA W. JATAR
117288
LICENSED PROFESSIONAL ENGINEER
8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

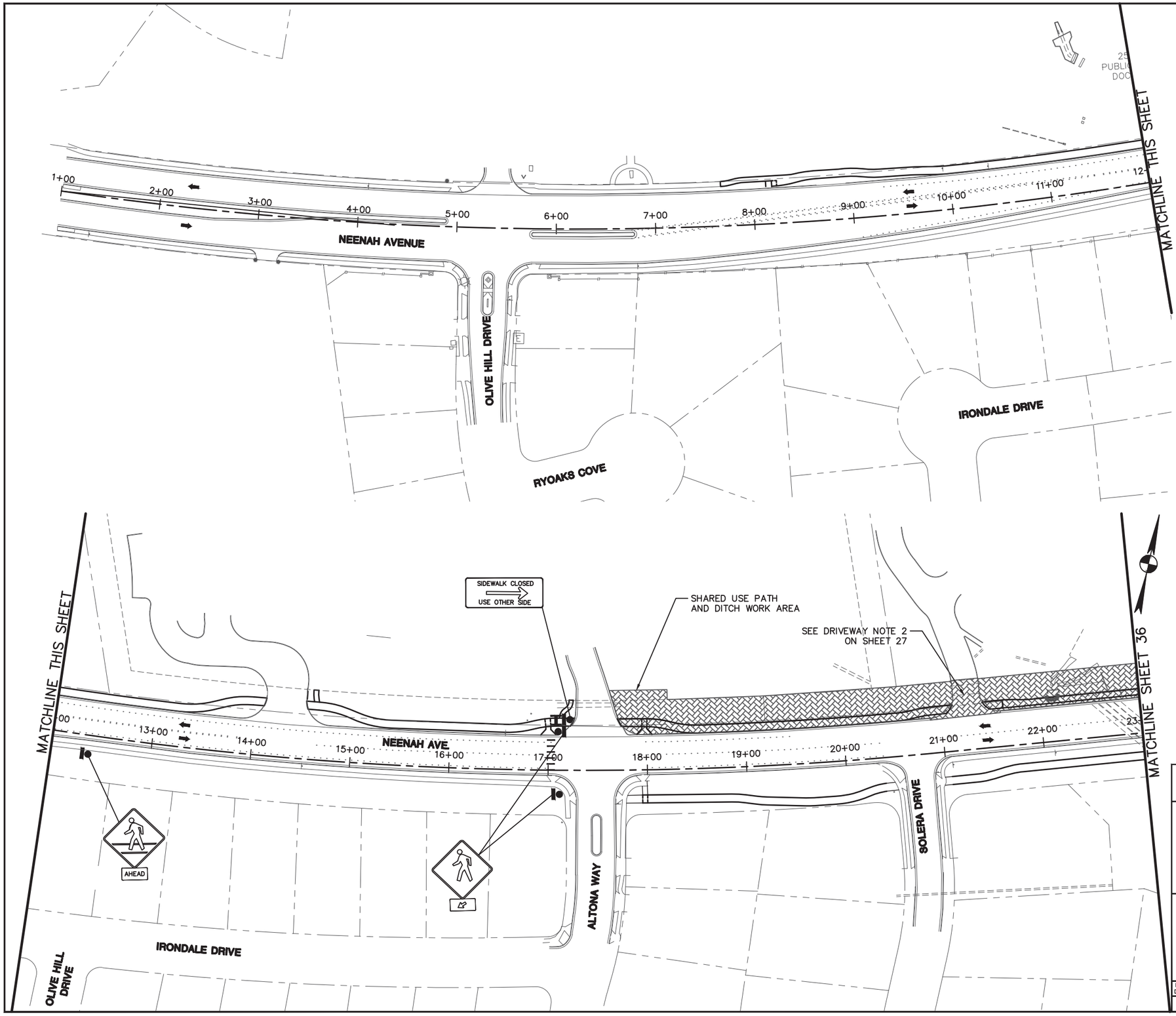
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TCP 4 PHASE II

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6	TEXAS	104023–10006	_	14	WILLIAMSON				34

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100 0 50 100

1" = 100'

LEGEND

- SIGNS
- TYP II BARRICADE
- CHANNELIZING DEVICE (CONES TYP.)
- EXISTING STRIPING
- SHARED USE PATH DITCH WORK AREA (PHASE III)
- TEMPORARY CROSSWALK

NOTES:

1. FOR WORK IN COA ROW, SEE DETAIL 804S–1, 9 OF 9, FOR TRANSITION LENGTHS AND DEVICE SPACING. SEE DETAIL 804S–5, 11 OF 13, FOR CROSSROAD SIGNING.
2. TRAFFIC CONTROL SETUP FOR NEENAH AVENUE IS PER POSTED SPEED LIMIT OF 30 MPH
3. TRAVEL LANES MUST BE MAINTAINED AT A MINIMUM OF 10 FEET IN WIDTH.
4. SAND BAGS MUST BE USED TO SUPPORT ALL SIGNS AND BARRICADES.
5. CONTRACTOR TO INSTALL TEMPORARY CROSSWALKS AS SHOWN ON PLANS IN ACCORDANCE WITH RESPECTIVE PHASE.

STATE OF TEXAS
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8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

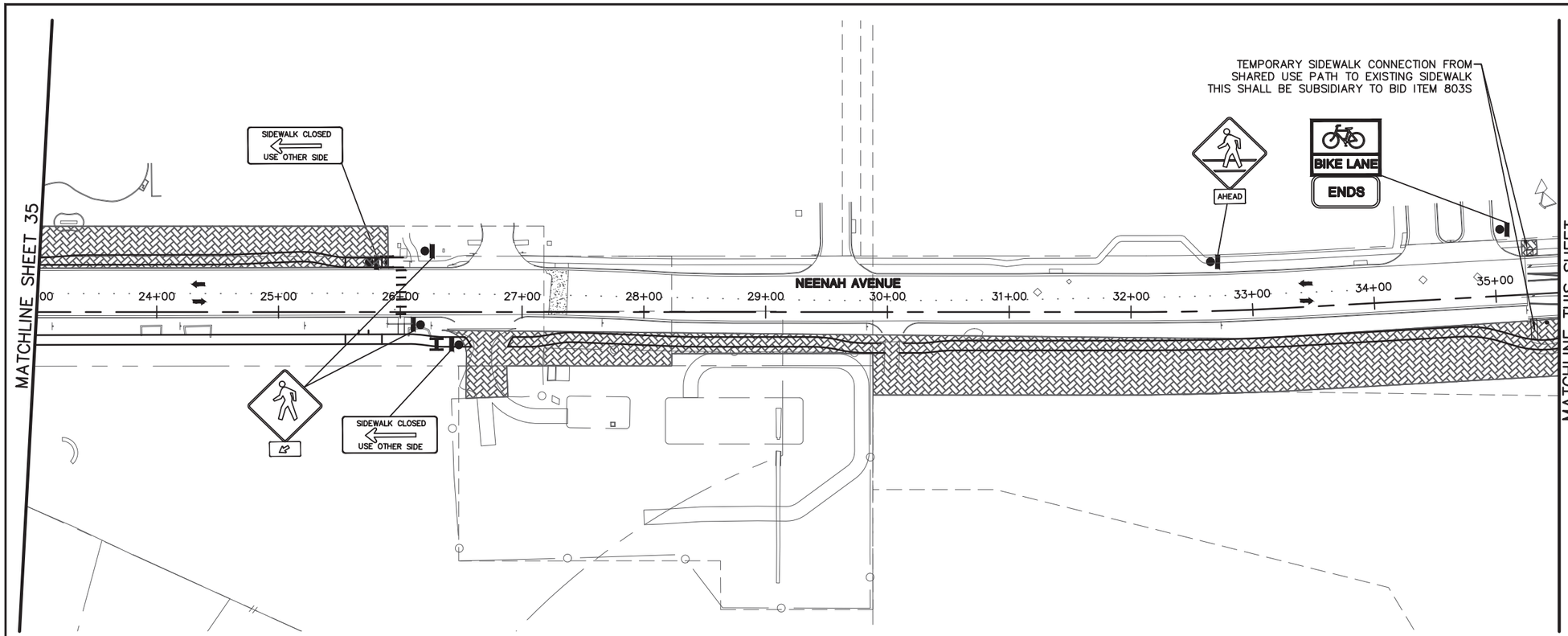
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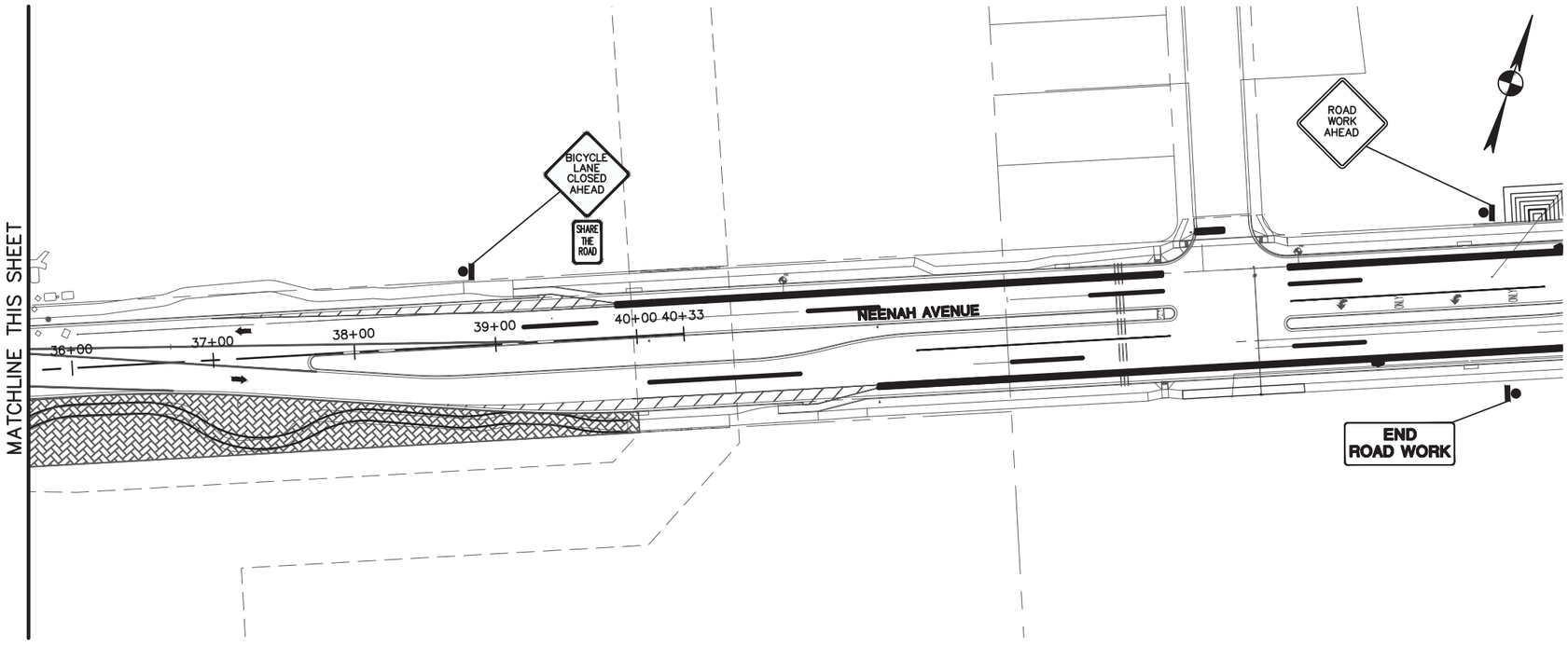
TCP 5 PHASE III

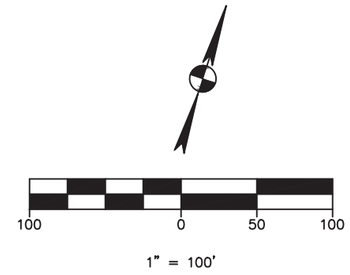
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				35

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LEGEND

- SIGNS
- TYP II BARRICADE
- CHANNELIZING DEVICE (CONES TYP.)
- EXISTING STRIPING
- SHARED USE PATH DITCH WORK AREA (PHASE III)
- TEMPORARY CROSSWALK

NOTES:

1. FOR WORK IN COA ROW, SEE DETAIL 804S–1, 9 OF 9, FOR TRANSITION LENGTHS AND DEVICE SPACING. SEE DETAIL 804S–5, 11 OF 13, FOR CROSSROAD SIGNING.
2. TRAFFIC CONTROL SETUP FOR NEENAH AVENUE IS PER POSTED SPEED LIMIT OF 30 MPH
3. TRAVEL LANES MUST BE MAINTAINED AT A MINIMUM OF 10 FEET IN WIDTH.
4. SAND BAGS MUST BE USED TO SUPPORT ALL SIGNS AND BARRICADES.
5. CONTRACTOR TO INSTALL CROSSWALKS AS SHOWN ON PLANS IN ACCORDANCE WITH RESPECTIVE PHASE.

STATE OF TEXAS
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8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

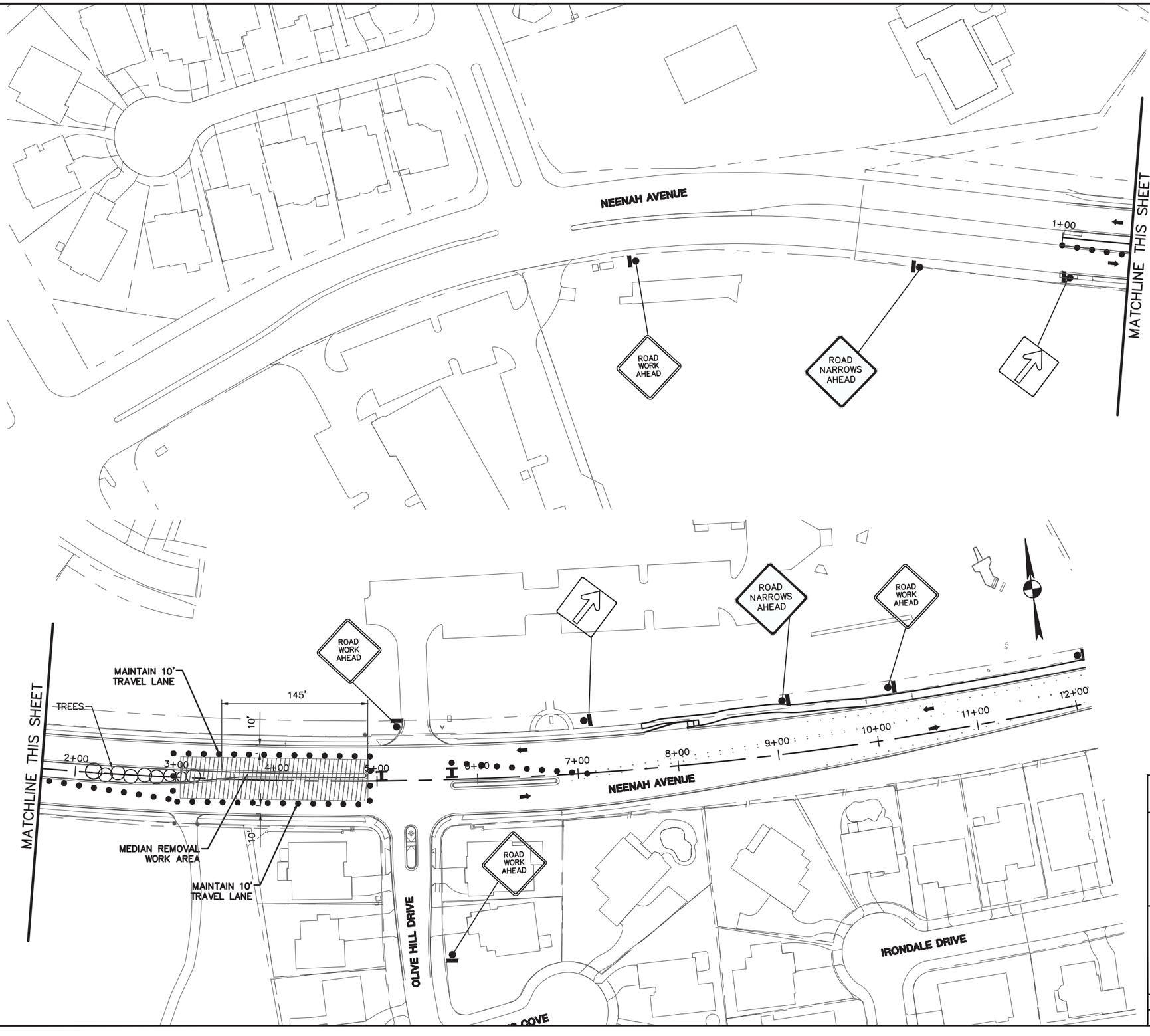
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TCP 6 PHASE III

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6	TEXAS	104023–10006	_	14	WILLIAMSON				36

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100 0 50 100

1" = 100'

LEGEND

- SIGNS
- TYP II BARRICADE
- CHANNELIZING DEVICE (CONES TYP.)
- EXISTING STRIPING
- MEDIAN REMOVAL AND INSTALL
- TEMPORARY CROSSWALK

NOTES:

1. FOR WORK IN COA ROW, SEE DETAIL 804S-1, 9 OF 9, FOR TRANSITION LENGTHS AND DEVICE SPACING. SEE DETAIL 804S-5, 11 OF 13, FOR CROSSROAD SIGNING.
2. TRAFFIC CONTROL SETUP FOR NEENAH AVENUE IS PER POSTED SPEED LIMIT OF 30 MPH.
3. TRAVEL LANES MUST BE MAINTAINED AT A MINIMUM OF 10 FEET IN WIDTH.
4. SAND BAGS MUST BE USED TO SUPPORT ALL SIGNS AND BARRICADES.
5. CONTRACTOR TO INSTALL TEMPORARY CROSSWALKS AS SHOWN ON PLANS IN ACCORDANCE WITH RESPECTIVE PHASE.

STATE OF TEXAS
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NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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TCP 7 PHASE IV (MEDIAN REMOVAL & INSTALL)

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6	TEXAS	104023-10006	_	14	WILLIAMSON				37

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400 0 200 400

1" = 400

LEGEND

- EXISTING SIGNS
- SIGNS
- TYP II BARRICADE
- CHANNELIZING DEVICE (CONES TYP.)
- EXISTING STRIPING
- PROPOSED TEMPORARY STRIPING
- TEMPORARY CROSSWALK

NOTES:

1. FOR WORK IN COA ROW, SEE DETAIL 804S–1, 9 OF 9, FOR TRANSITION LENGTHS AND DEVICE SPACING. SEE DETAIL 804S–5, 11 OF 13, FOR CROSSROAD SIGNING.
2. TRAVEL LANES MUST BE MAINTAINED AT A MINIMUM OF 10 FEET IN WIDTH.
3. SAND BAGS MUST BE USED TO SUPPORT ALL SIGNS AND BARRICADES.

STATE OF TEXAS
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8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

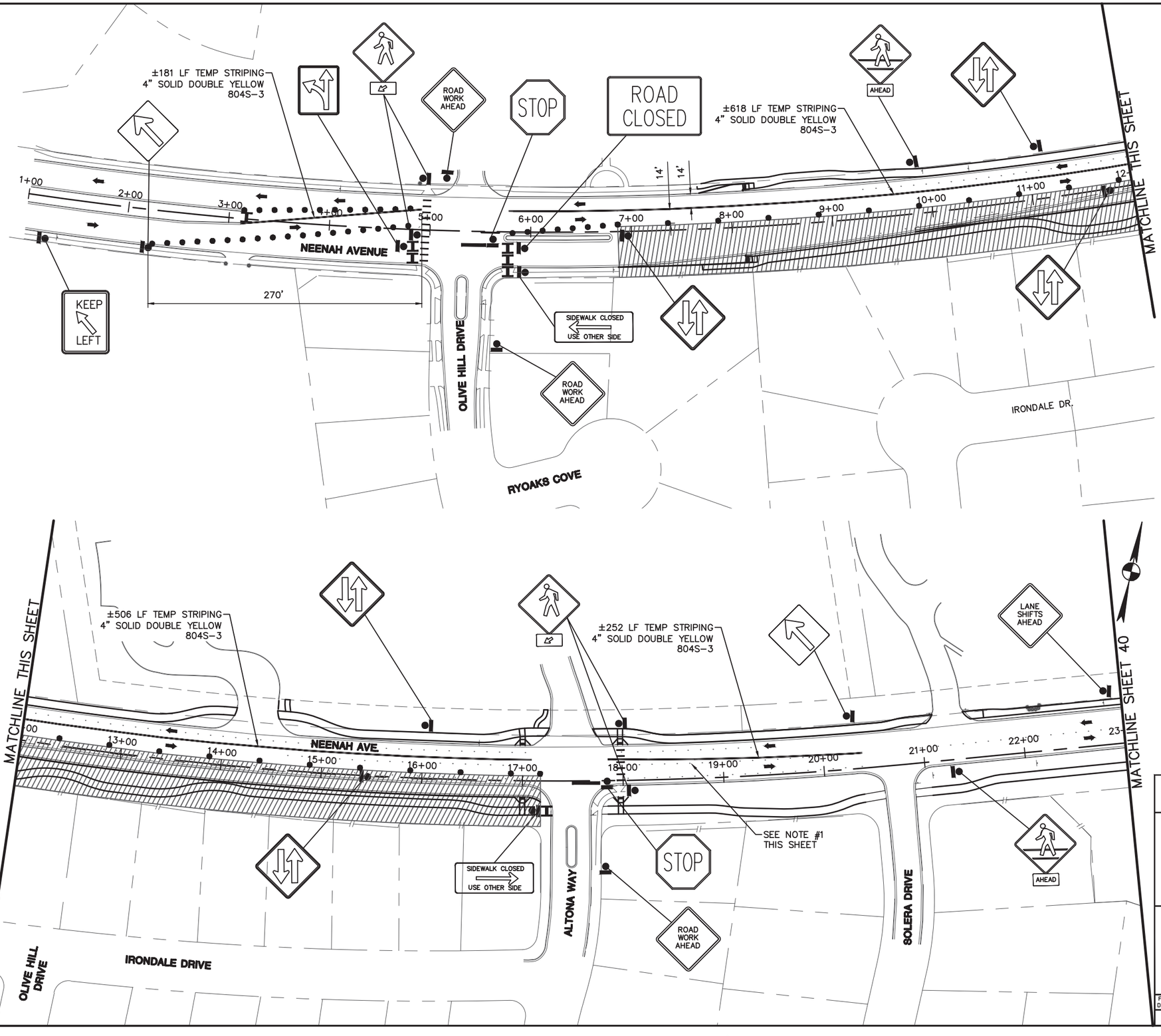
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TCP 8 PHASE IV

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				38

SP-2016-0186D

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100 0 50 100

1" = 100'

LEGEND

- SIGNS
- TYP II BARRICADE
- CHANNELIZING DEVICE (CONES TYP.)
- EXISTING STRIPING
- PROPOSED TEMPORARY STRIPING
- NEENAH AVE. WIDENING AND SHARED USE PATH (PHSAE IV)
- TEMPORARY CROSSWALK

NOTES:

1. FOR WORK IN COA ROW, SEE DETAIL 804S-1, 9 OF 9, FOR TRANSITION LENGTHS AND DEVICE SPACING. SEE DETAIL 804S-5, 11 OF 13, FOR CROSSROAD SIGNING.
2. TRAFFIC CONTROL SETUP FOR NEENAH AVENUE IS PER POSTED SPEED LIMIT OF 30MPH
3. TRAVEL LANES MUST BE MAINTAINED AT A MINIMUM OF 10 FEET IN WIDTH.
4. SAND BAGS MUST BE USED TO SUPPORT ALL SIGNS AND BARRICADES.
5. CONTRACTOR TO INSTALL TEMPORARY CROSSWALKS AS SHOWN ON PLANS IN ACCORDANCE WITH RESPECTIVE PHASE.

NOTES THIS SHEET:

1. CONTRACTOR SHALL COVER EXISTING STRIPING IN AREA SHOWN IN WHICH CONSTRUCTION RELATED TEMPORARY STRIPING IS PROPOSED WITH APPROPRIATE MATERIAL (BLACK TAPE). CONTRACTOR TO RESTORE STRIPING AFTER WORK IS COMPLETED.

STATE OF TEXAS
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PROFESSIONAL ENGINEER
8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

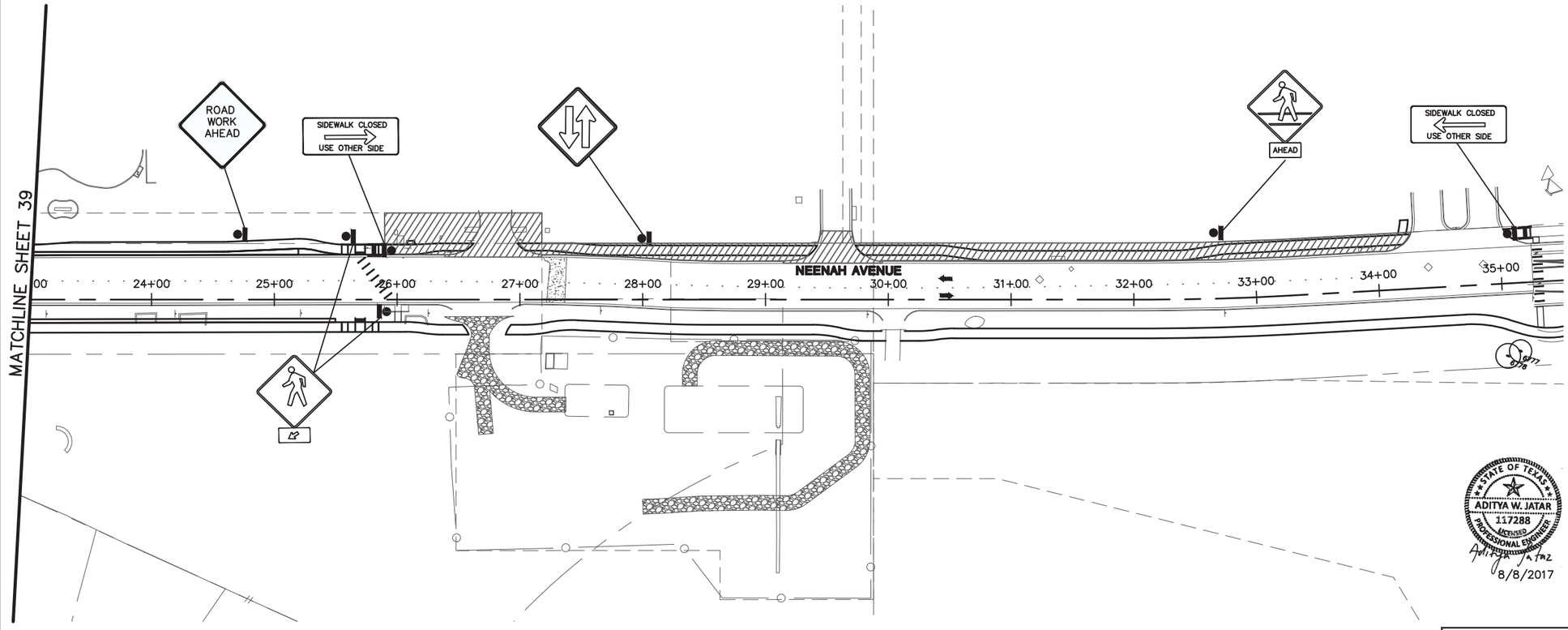
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TCP 9 PHASE IV

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				39

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SP-2016-0186D



100 0 50 100

1" = 100'

LEGEND

- SIGNS
- TYP II BARRICADE
- CHANNELIZING DEVICE (CONES TYP.)
- EXISTING STRIPING
- PROPOSED TEMPORARY STRIPING
- NEENAH AVE. WIDENING AND SHARED USE PATH (PHASE IV)
- TEMPORARY CROSSWALK

NOTES:

1. FOR WORK IN COA ROW, SEE DETAIL 804S-1, 9 OF 9, FOR TRANSITION LENGTHS AND DEVICE SPACING. SEE DETAIL 804S-5, 11 OF 13, FOR CROSSROAD SIGNING.
2. TRAFFIC CONTROL SETUP FOR NEENAH AVENUE IS PER POSTED SPEED LIMIT OF 30 MPH.
3. TRAVEL LANES MUST BE MAINTAINED AT A MINIMUM OF 10 FEET IN WIDTH.
4. SAND BAGS MUST BE USED TO SUPPORT ALL SIGNS AND BARRICADES.
5. CONTRACTOR TO INSTALL TEMPORARY CROSSWALKS AS SHOWN ON PLANS IN ACCORDANCE WITH RESPECTIVE PHASE.

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER
8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

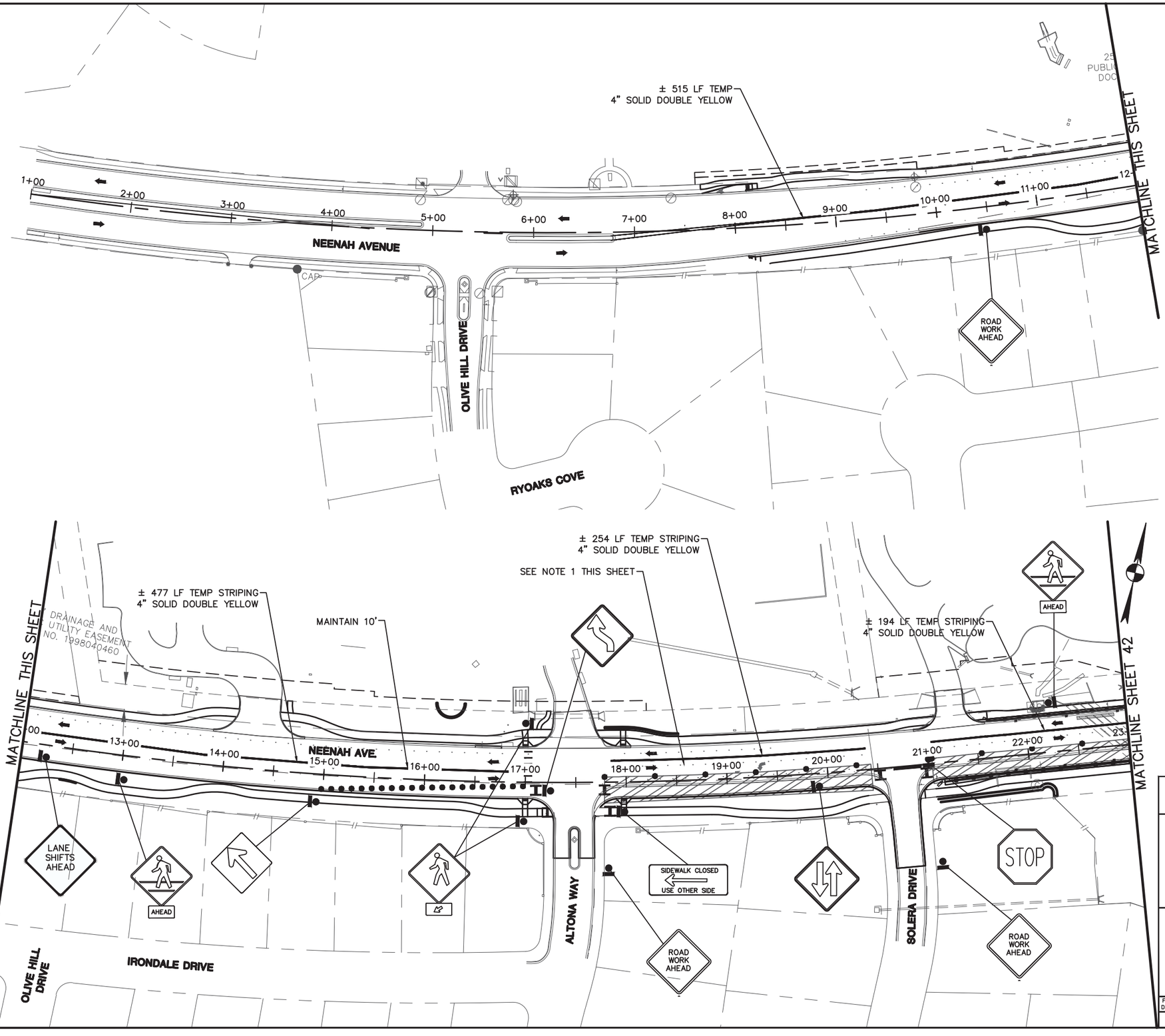
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TCP 10 PHASE IV

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				40

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100 0 50 100

1" = 100'

LEGEND

- SIGNS
- TYP II BARRICADE
- CHANNELIZING DEVICE (CONES TYP.)
- EXISTING STRIPING
- PROPOSED TEMPORARY STRIPING
- NEENAH AVE WIDENING AND SHARED USE PATH (PHASE V)
- TEMPORARY CROSSWALK

NOTES:

1. FOR WORK IN COA ROW, SEE DETAIL 804S–1, 9 OF 9, FOR TRANSITION LENGTHS AND DEVICE SPACING. SEE DETAIL 804S–5, 11 OF 13, FOR CROSSROAD SIGNING.
2. TRAFFIC CONTROL SETUP FOR NEENAH AVENUE IS PER POSTED SPEED LIMIT OF 30 MPH
3. TRAVEL LANES MUST BE MAINTAINED AT A MINIMUM OF 10 FEET IN WIDTH.
4. SAND BAGS MUST BE USED TO SUPPORT ALL SIGNS AND BARRICADES.

NOTES THIS SHEET:

1. CONTRACTOR SHALL COVER EXISTING STRIPING IN AREA SHOWN IN WHICH CONSTRUCTION RELATED TEMPORARY STRIPING IS PROPOSED WITH APPROPRIATE MATERIAL (BLACK TAPE). CONTRACTOR TO RESTORE STRIPING AFTER WORK IS COMPLETED.

STATE OF TEXAS
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8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

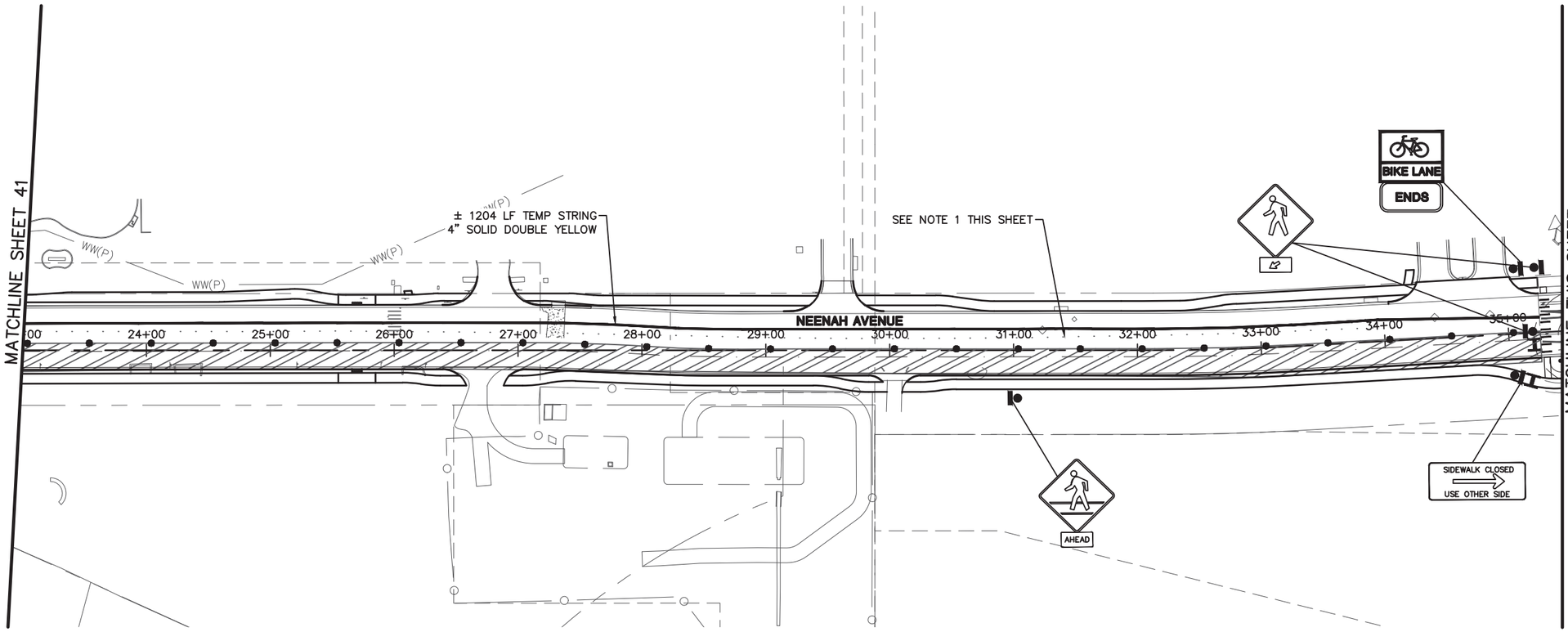
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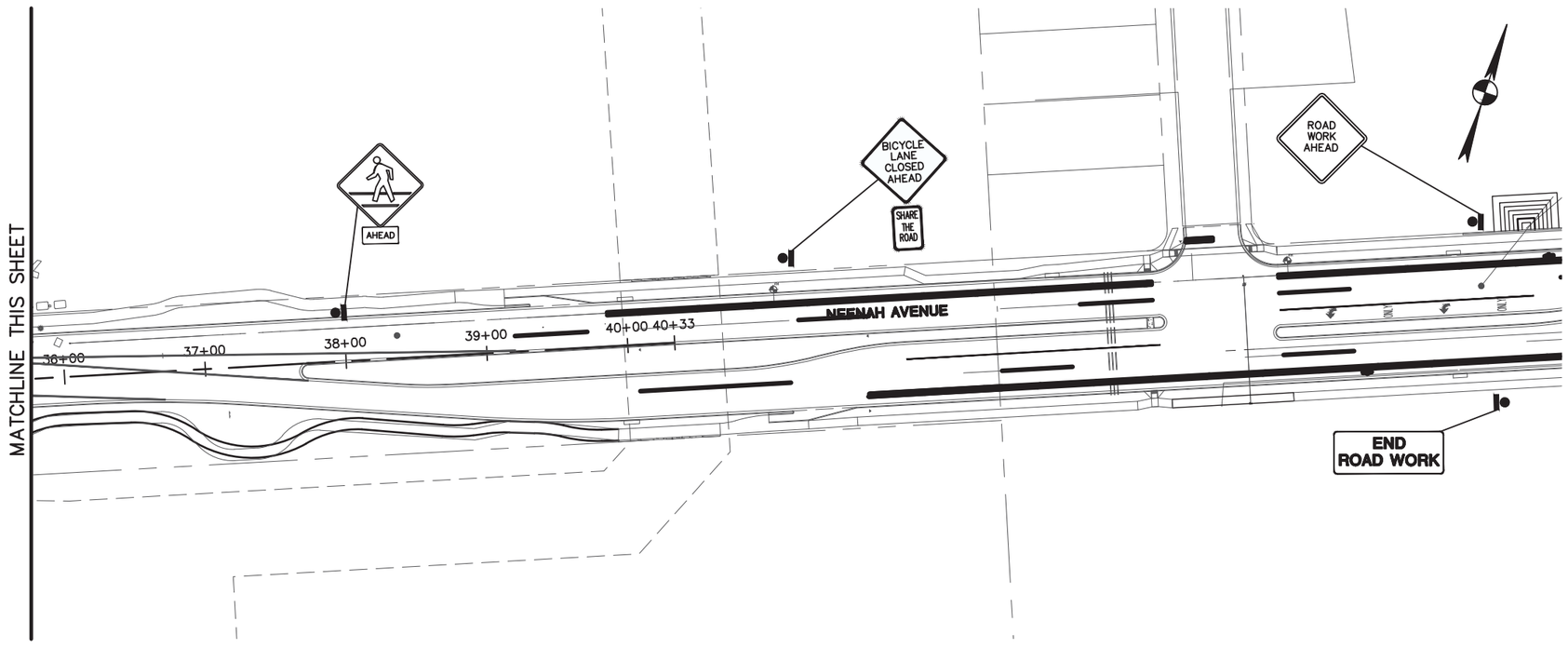
TCP 11 PHASE V

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				41

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100 0 50 100

1" = 100'

LEGEND

- SIGNS
- TYP II BARRICADE
- CHANNELIZING DEVICE (CONES TYP.)
- EXISTING STRIPING
- PROPOSED TEMPORARY STRIPING
- NEENAH AVE WIDENING AND SHARED USE PATH (PHASE V)
- TEMPORARY CROSSWALK

NOTES:

1. FOR WORK IN COA ROW, SEE DETAIL 804S–1, 9 OF 9, FOR TRANSITION LENGTHS AND DEVICE SPACING. SEE DETAIL 804S–5, 11 OF 13, FOR CROSSROAD SIGNING.
2. TRAFFIC CONTROL SETUP FOR NEENAH AVENUE IS PER POSTED SPEED LIMIT OF 30 MPH.
3. TRAVEL LANES MUST BE MAINTAINED AT A MINIMUM OF 10 FEET IN WIDTH.
4. SAND BAGS MUST BE USED TO SUPPORT ALL SIGNS AND BARRICADES.

NOTES THIS SHEET:

1. CONTRACTOR SHALL COVER EXISTING STRIPING IN AREA SHOWN IN WHICH CONSTRUCTION RELATED TEMPORARY STRIPING IS PROPOSED WITH APPROPRIATE MATERIAL (BLACK TAPE). CONTRACTOR TO RESTORE STRIPING AFTER WORK IS COMPLETED.

STATE OF TEXAS
ADITYA W. JATAR
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LICENSED PROFESSIONAL ENGINEER
8/14/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

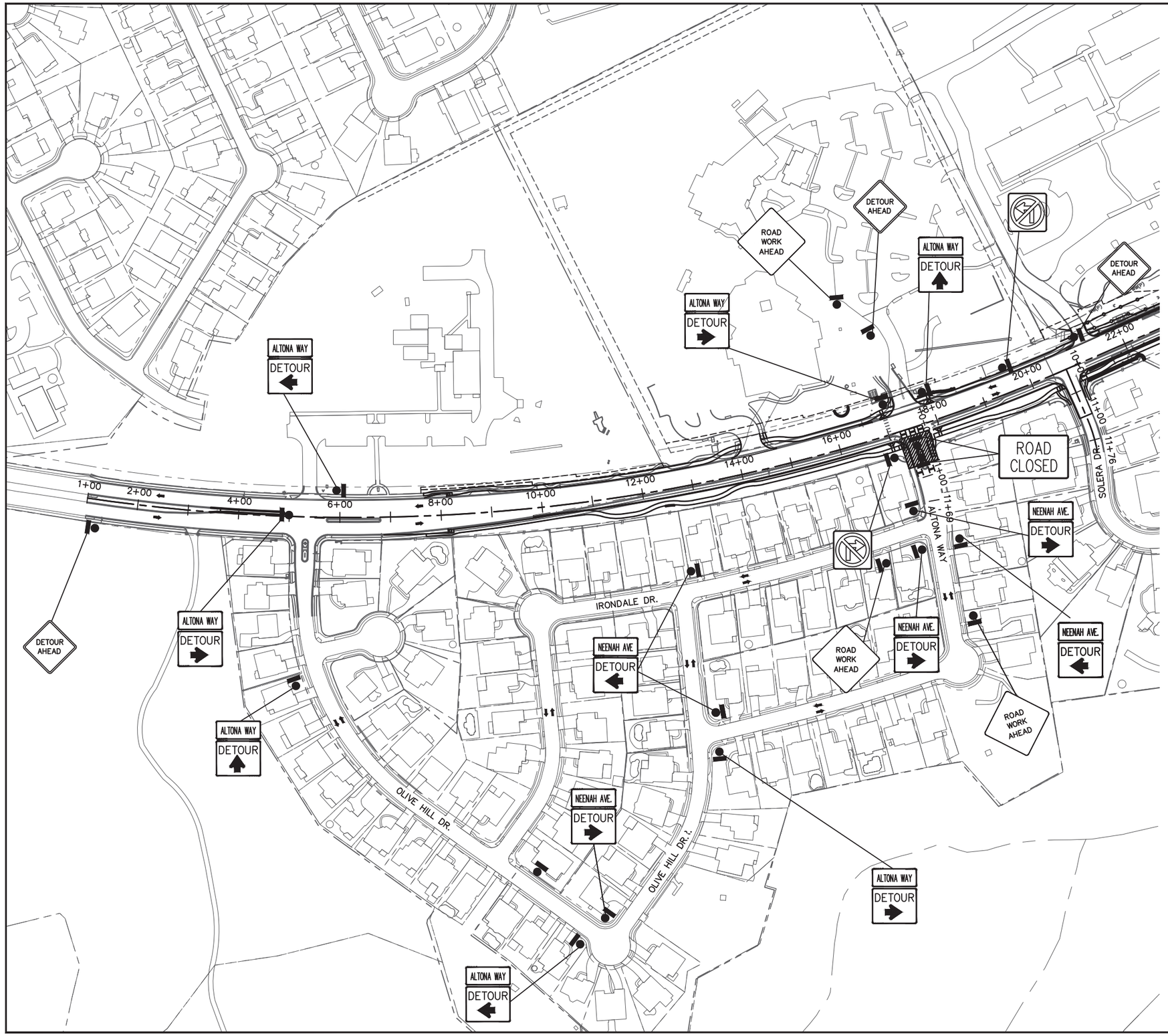
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TCP 12 PHASE V

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				42

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200 0 100 200

1" = 200'

LEGEND

- SIGNS
- TYP II BARRICADE
- CHANNELIZING DEVICE (CONES TYP.)
- PROPOSED TEMPORARY STRIPING
- INTERSECTION WORK AREA (PHASE VI)
- TEMPORARY CROSSWALK

NOTES:

1. FOR WORK IN COA ROW, SEE DETAIL 804S-1, 9 OF 9, FOR TRANSITION LENGTHS AND DEVICE SPACING. SEE DETAIL 804S-5, 11 OF 13, FOR CROSSROAD SIGNING.
2. TRAFFIC CONTROL SETUP FOR NEENAH AVENUE IS PER POSTED SPEED LIMIT OF 30 MPH
3. TRAVEL LANES MUST BE MAINTAINED AT A MINIMUM OF 10 FEET IN WIDTH.
4. SAND BAGS MUST BE USED TO SUPPORT ALL SIGNS AND BARRICADES.

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8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

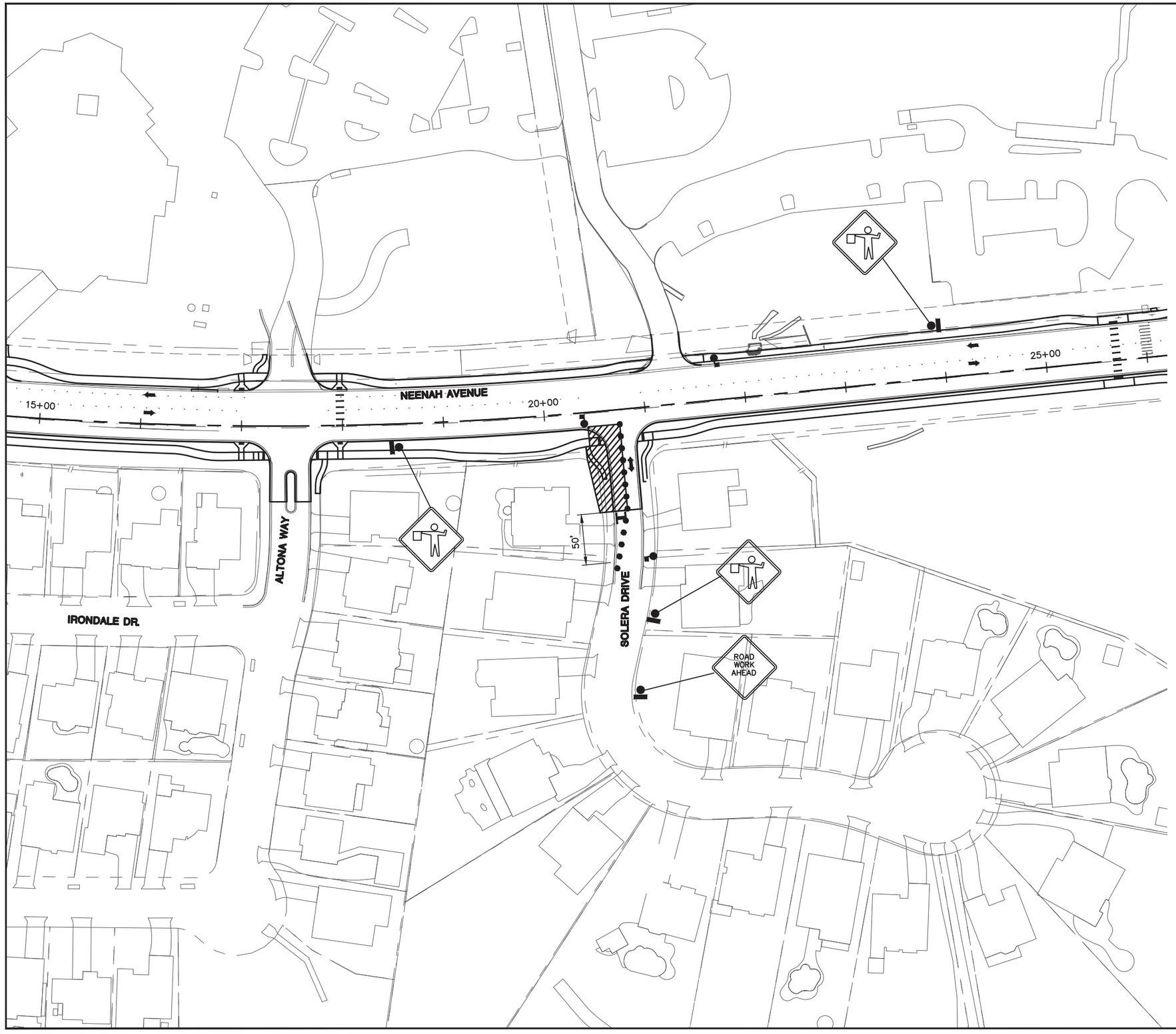
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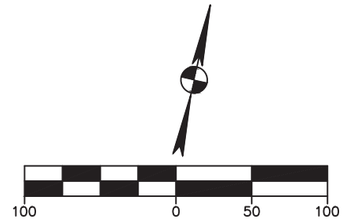
TCP 13 PHASE VI

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				43

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1" = 100'

LEGEND

- SIGNS
- TYP II BARRICADE
- CHANNELIZING DEVICE (CONES TYP.)
- EXISTING STRIPING
- PROPOSED TEMPORARY STRIPING
- INTERSECTION WORK AREA (PHASE VII)
- TEMPORARY CROSSWALK

NOTES:

1. FOR WORK IN COA ROW, SEE DETAIL 804S-1, 9 OF 9, FOR TRANSITION LENGTHS AND DEVICE SPACING. SEE DETAIL 804S-5, 11 OF 13, FOR CROSSROAD SIGNING.
2. TRAFFIC CONTROL SETUP FOR NEENAH AVENUE IS PER POSTED SPEED LIMIT OF 30MPH
3. TRAVEL LANES MUST BE MAINTAINED AT A MINIMUM OF 10 FEET IN WIDTH.
4. SAND BAGS MUST BE USED TO SUPPORT ALL SIGNS AND BARRICADES.
5. RESIDENTS TO BE INFORMED OF CLOSURE OF SOLERA DRIVE.
6. DAYTIME CLOSURE. CONTRACTOR SHALL OPEN TO SOLERA DRIVE TO TWO-WAY TRAFFIC AT THE END OF EACH DAYS WORK AND INSTALL 3:1 SAFETY SLOPE FOR DROP OFF CONDITIONS GREATER THAN 2 INCHES. CONSIDER SUBSIDIARY TO PERTINENT BID ITEMS.



NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

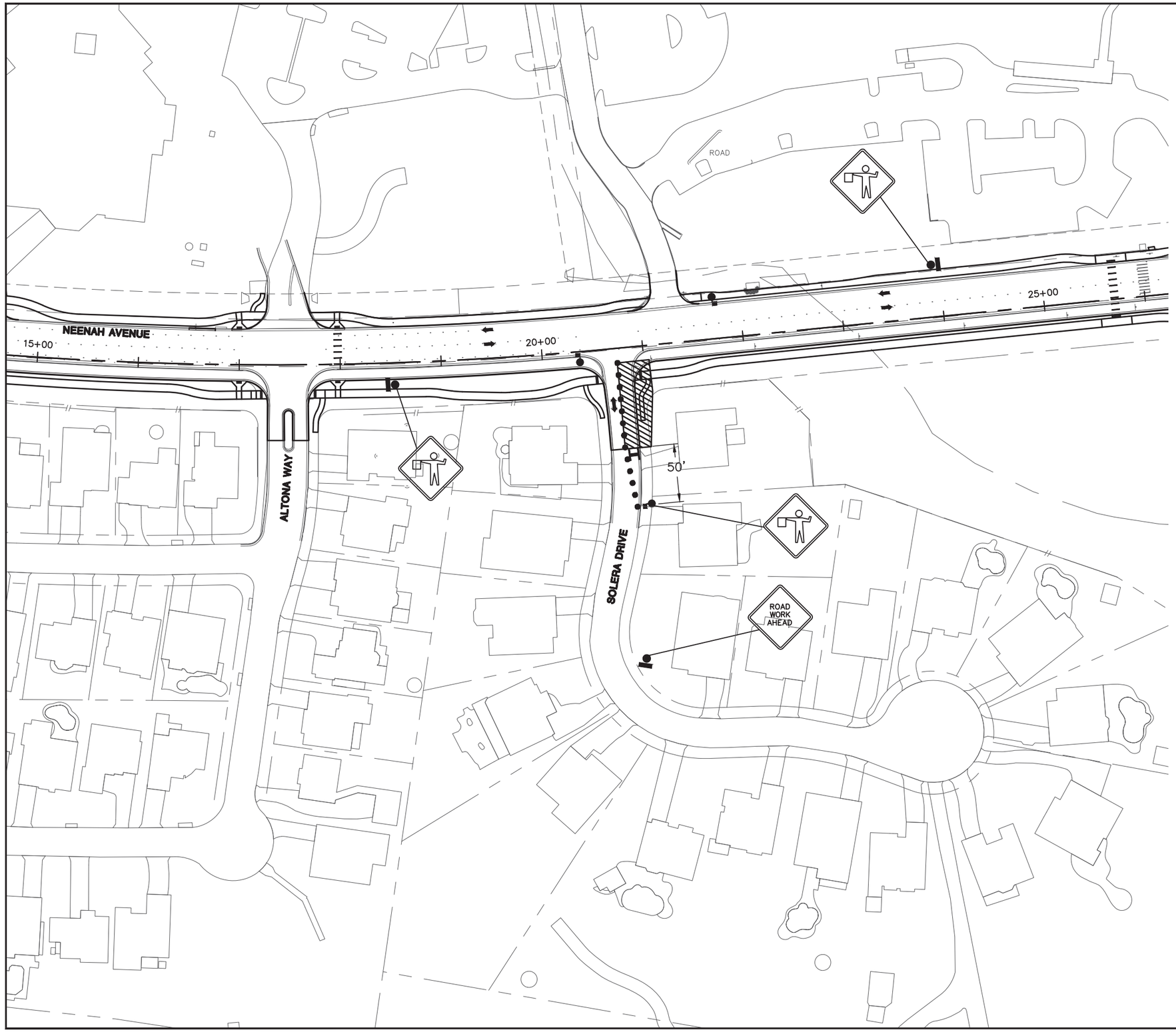
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TCP 14 PHASE VII

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				44

SP-2016-0186D

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100 0 50 100

1" = 100'

LEGEND

- SIGNS
- TYP II BARRICADE
- CHANNELIZING DEVICE (CONES TYP.)
- EXISTING STRIPING
- PROPOSED TEMPORARY STRIPING
- INTERSECTION WORK AREA (PHASE VIII)
- TEMPORARY CROSSWALK

NOTES:

1. FOR WORK IN COA ROW, SEE DETAIL 804S-1, 9 OF 9, FOR TRANSITION LENGTHS AND DEVICE SPACING. SEE DETAIL 804S-5, 11 OF 13, FOR CROSSROAD SIGNING.
2. TRAFFIC CONTROL SETUP FOR NEENAH AVENUE IS PER POSTED SPEED LIMIT OF 30 MPH.
3. TRAVEL LANES MUST BE MAINTAINED AT A MINIMUM OF 10 FEET IN WIDTH.
4. SAND BAGS MUST BE USED TO SUPPORT ALL SIGNS AND BARRICADES.
5. RESIDENTS TO BE INFORMED OF CLOSURE OF SOLERA DRIVE.
6. DAYTIME CLOSURE. CONTRACTOR SHALL OPEN SOLERA DRIVE TO TWO-WAY TRAFFIC AT THE END OF EACH DAYS WORK AND INSTALL 3:1 SAFETY SLOPE FOR DROP OFF CONDITIONS GREATER THAN 2 INCHES. THIS SHALL BE A NON SEPERATE PAY ITEM.

STATE OF TEXAS
ADITYA W. JATAR
117288
LICENSED
PROFESSIONAL ENGINEER
8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

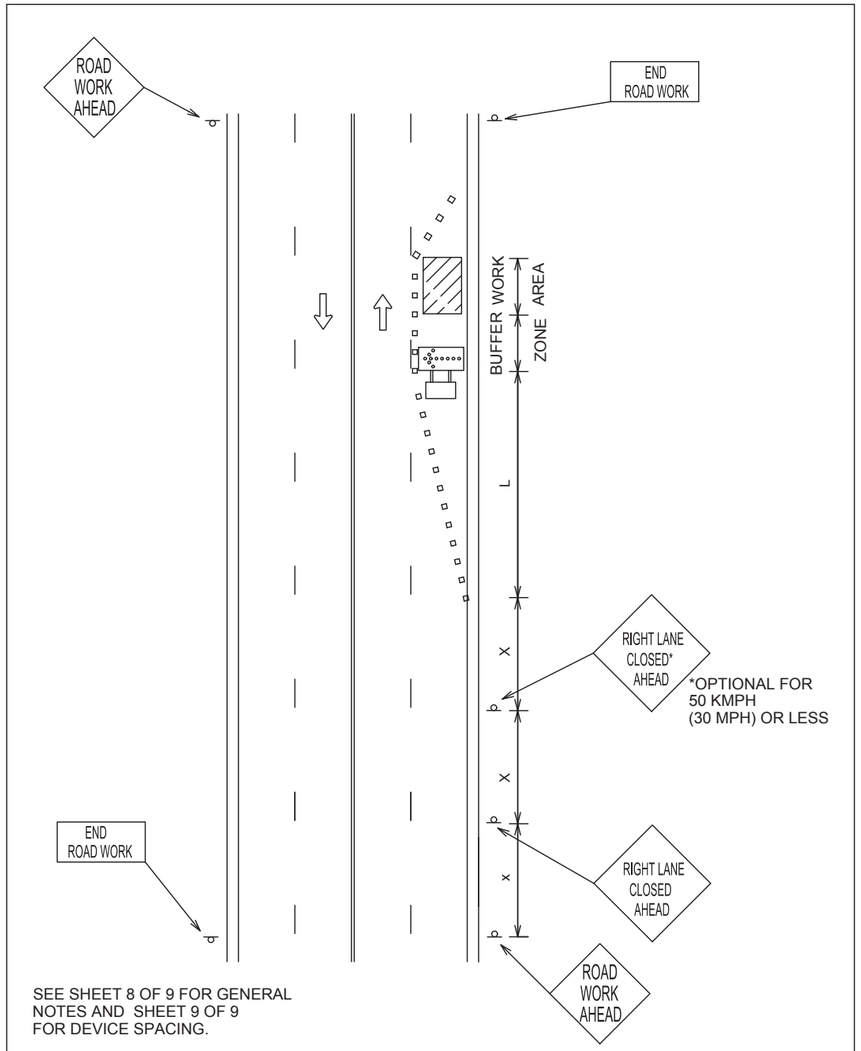
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TCP 15 PHASE VIII

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				45

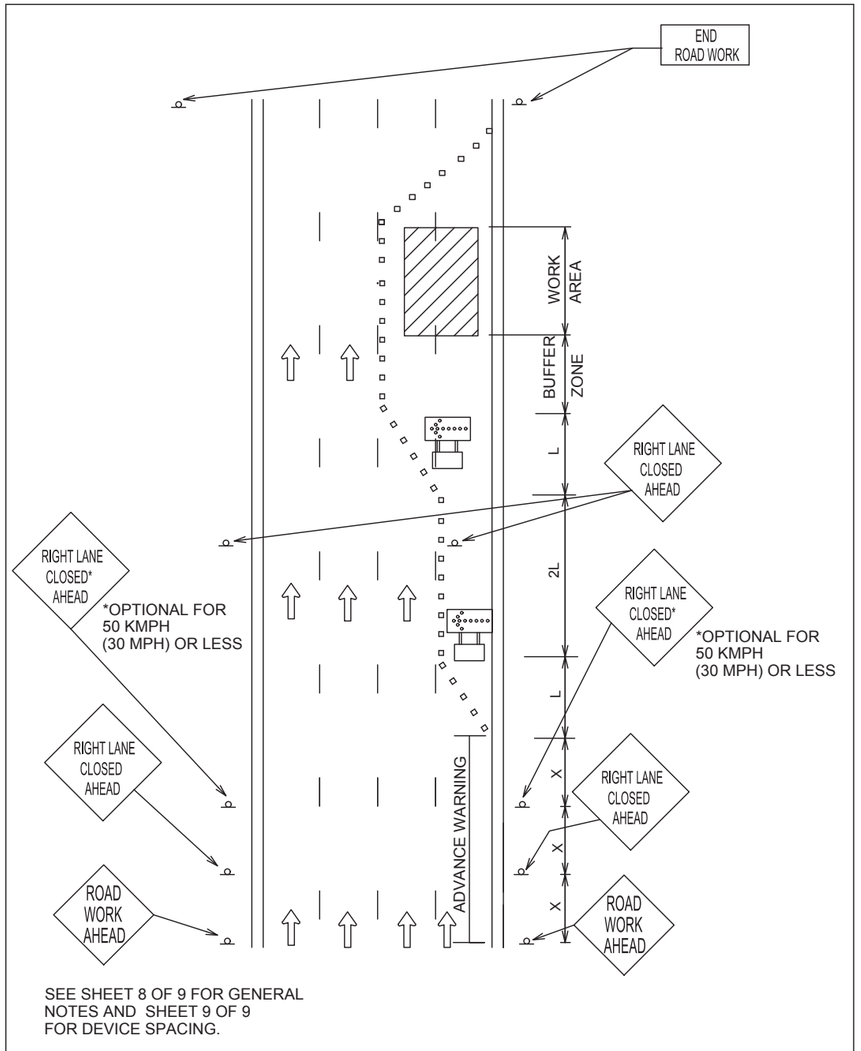
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SEE SHEET 8 OF 9 FOR GENERAL NOTES AND SHEET 9 OF 9 FOR DEVICE SPACING.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		ARTERIAL ONE LANE CLOSURE	
RECORD COPY SIGNED BY KERI JUAREZ	01/04/11 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-1 1 OF 9



SEE SHEET 8 OF 9 FOR GENERAL NOTES AND SHEET 9 OF 9 FOR DEVICE SPACING.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		ONE WAY ARTERIAL TWO-LANE CLOSURE	
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117288
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8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

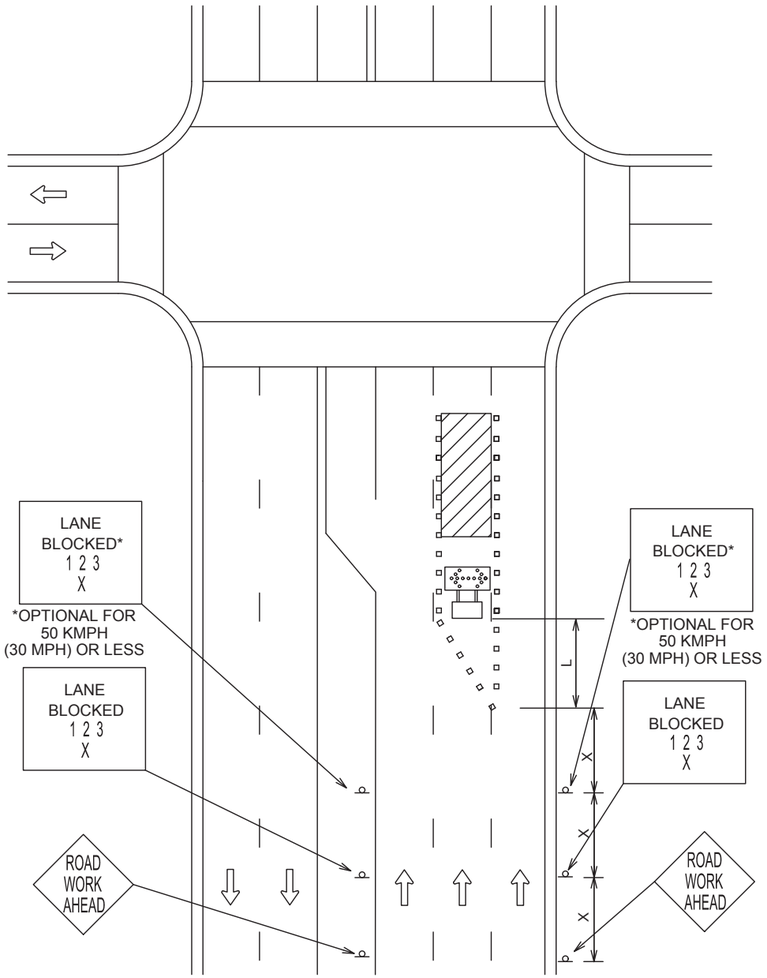
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TCP DETAIL 1

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6	TEXAS	104023–10006	_	14	WILLIAMSON				46

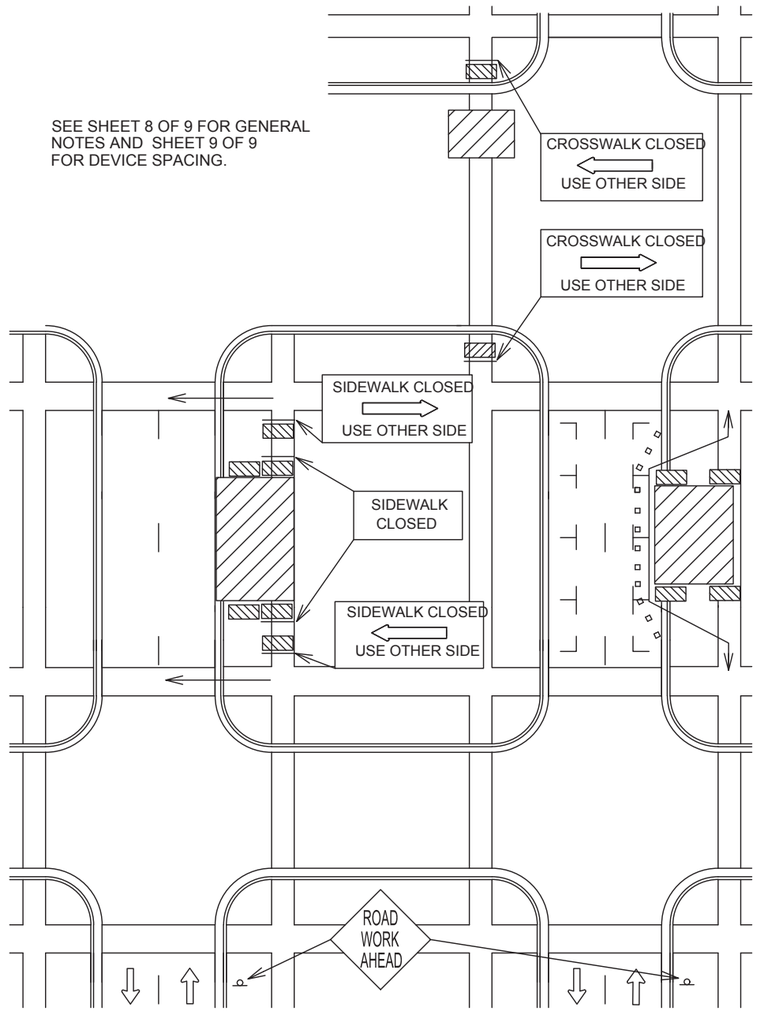
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SEE SHEET 8 OF 9 FOR GENERAL NOTES AND SHEET 9 OF 9 FOR DEVICE SPACING.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	TWO WAY, DIVIDED ARTERIAL ONE LANE CLOSURE	
RECORD COPY SIGNED BY KERI JUAREZ — 01/04/11 — ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-1 3 OF 9



CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	BYPASS WALKWAY, SIDEWALK AND CROSSWALK CLOSURES	
RECORD COPY SIGNED BY KERI JUAREZ — 01/04/11 — ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-1 4 OF 9

STATE OF TEXAS
ADITYA W. JATAR
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8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

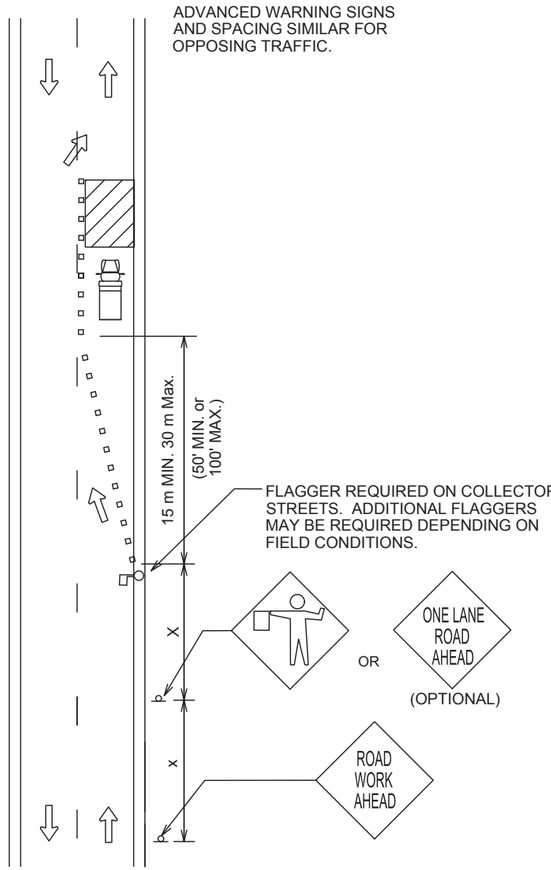
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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				47

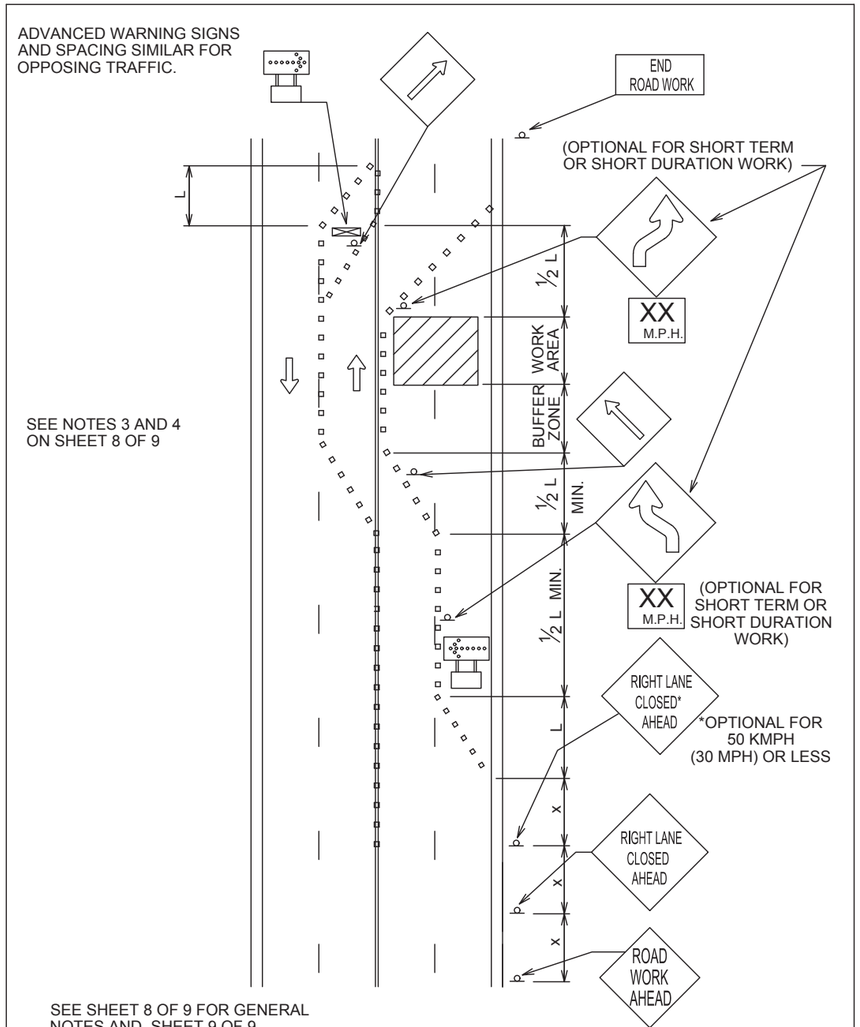
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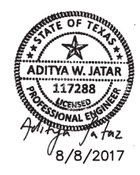
SEE SHEET 8 OF 9 FOR GENERAL NOTES AND SHEET 9 OF 9 FOR DEVICE SPACING.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		COLLECTOR/RESIDENTIAL LANE CLOSURES	
RECORD COPY SIGNED BY KERI JUAREZ	01/04/11	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-1
ADOPTED			5 OF 9



SEE SHEET 8 OF 9 FOR GENERAL NOTES AND SHEET 9 OF 9 FOR DEVICE SPACING.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		TYPICAL TRAFFIC CONTROL PLAN FOR SHIFTING TRAFFIC	
RECORD COPY SIGNED BY KERI JUAREZ	01/04/11	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-1
ADOPTED			6 OF 9



NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

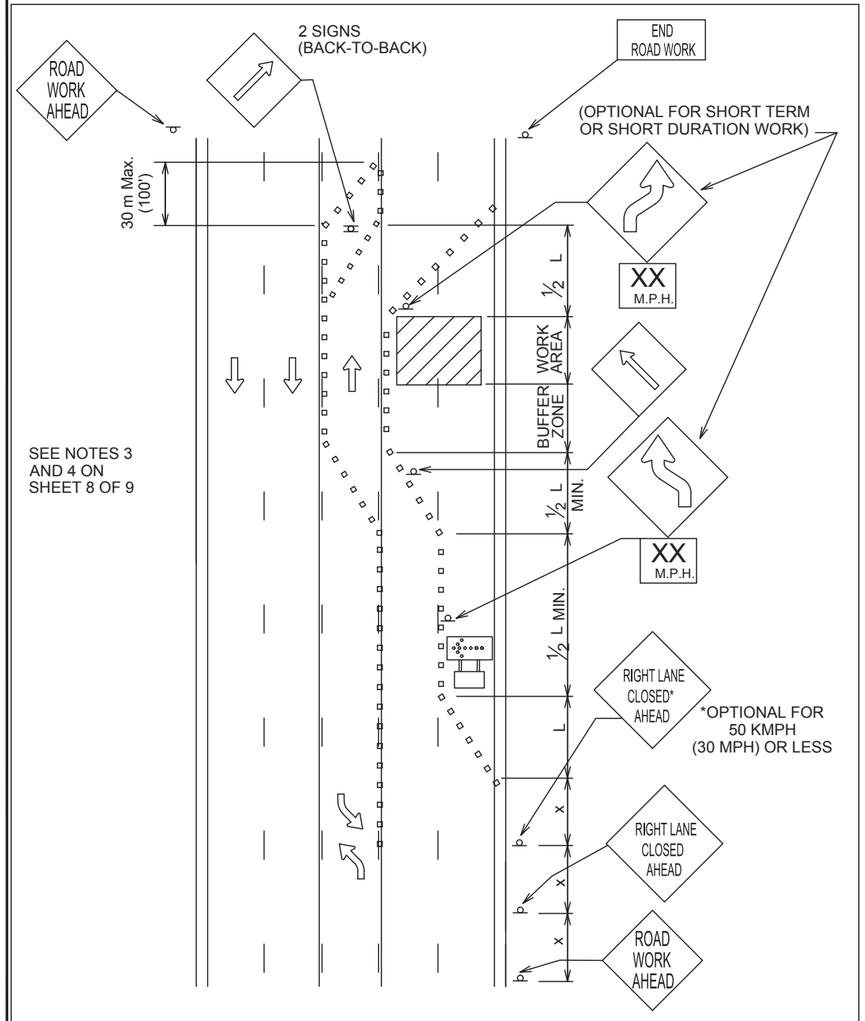
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TCP DETAIL 3

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				48

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CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		TYPICAL TRAFFIC CONTROL PLAN FOR SHIFTING TRAFFIC	
RECORD COPY SIGNED BY KERI JUAREZ	*01/04/11* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-1 7 OF 9

1. ALL SETUPS SHALL BE IN ACCORDANCE WITH THE CURRENT ADDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THE CITY OF AUSTIN TRANSPORTATION CRITERIA MANUAL.
2. TO DETERMINE APPROPRIATE DEVICES AND SIGN SIZES TO BE USED, REFER TO STANDARD 804S-5. SHEETS 5, 6 AND 7 OF 11.
3. FOR INTERMEDIATE-TERM SITUATIONS, WHEN IT IS NOT FEASIBLE TO REMOVE AND RESTORE PAVEMENT MARKINGS, THE CHANNELIZATION MUST BE MADE DOMINANT BY USING A VERY CLOSE DEVICE SPACING. THIS IS ESPECIALLY IMPORTANT IN LOCATIONS OF CONFLICTING INFORMATION, SUCH AS WHERE TRAFFIC IS DIRECTED OVER A DOUBLE YELLOW CENTERLINE. IN SUCH LOCATIONS, A MAXIMUM CHANNELIZING DEVICE SPACING OF 3 m (10') IS REQUIRED.
4. FOR LONG TERM STATIONARY WORK, ALL CONFLICTING PAVEMENT MARKINGS MUST BE REMOVED AND CENTERLINE STRIPING PROVIDED WHERE TWO WAY TRAFFIC IS IN ADJACENT LANES.
5. FOR TEMPORARY PAVEMENT MARKING REQUIREMENTS SEE STANDARD 804S-3.
6. FOR ONE-WAY AND MULTI-LANE ROADWAYS THE "LANE BLOCKED" SIGN MAY BE USED IN LIEU OF THE "LANE CLOSED AHEAD" SIGN. THE NUMBER OF DIGITS ON THE SIGN SHALL NOT BE GREATER THAN THE NUMBER OF LANES PRESENT ON THE ROADWAY. THE "X" SHALL BE PLACED UNDER THE NUMBER OF LANE(S) BLOCKED.
7. FOR FLAGGING OPERATION REQUIREMENTS SEE STANDARD 804S-2.
8. CONTRACTOR SHALL PROVIDE SIDEWALK CLOSURES, CROSSWALK CLOSURES OR WALKWAY BYPASS WHEREVER PEDESTRIAN MOVEMENTS ARE AFFECTED BY CONSTRUCTION ACTIVITIES. ALL SIDEWALKS AND CROSSWALKS SHALL BE ACCESSIBLE WHEN CONTRACTOR IS NOT WORKING UNLESS APPROVED BY THE TRANSPORTATION DIVISION.
9. FOR EXCAVATION PROTECTION AND SAFETY FENCE REQUIREMENTS SEE STANDARD 804S-4.
10. THE USE OF ARROW DISPLAYS ARE REQUIRED ON ALL LANE CLOSURES. THE CONTRACTOR SHALL PROVIDE ONE (1) STAND-BY UNIT IN GOOD WORKING CONDITION AT THE JOB SITE, READY FOR USE IF THE OPERATION REQUIRES 24-HOUR A DAY LANE CLOSURE SET-UPS.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		GENERAL NOTES	
RECORD COPY SIGNED BY KERI JUAREZ	*01/04/11* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-1 8 OF 9

STATE OF TEXAS
ADITYA W. JATAR
117288
LICENSED PROFESSIONAL ENGINEER
8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				49

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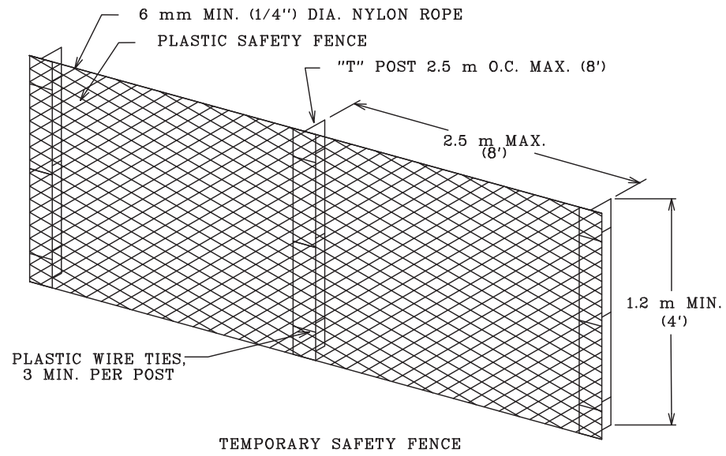
Typical Transition Lengths and Suggested Maximum Spacing of Devices

Speed KMPH	Posted Speed MPH	Formula	Minimum Desirable Taper Lengths (L) Meters (Feet) 3.0(10) Offset Meters (feet)	3.3(11) Offset Meters (feet)	3.6(12) Offset Meters (feet)	Suggested Max. Device Spacing On a taper Meters (feet)	On a tangent Meters (feet)	Suggested Sign Spacing Meters (Feet) "X" Dimension
50	30	$L=\frac{WS^2}{60}$	45 (150)	50 (165)	55 (180)	9 (30)	15-20 (60-75)	40 (120)
55	35		65 (205)	70 (225)	75 (245)	10 (35)	25-25 (70-90)	50 (160)
65	40		80 (265)	90 (295)	100 (320)	12 (40)	25-30 (80-100)	75 (240)
70	45	L=WS	135 (450)	150 (495)	165 (540)	13 (45)	25-30 (90-110)	100 (320)
80	50		150 (500)	165 (550)	180 (600)	15 (50)	30-35 (100-125)	120 (400)
90	55		165 (550)	185 (605)	200 (660)	16 (55)	35-40 (110-140)	150 (500)
95	60		180 (600)	200 (660)	220 (720)	18 (60)	40-45 (120-150)	180 (600)
105	65		195 (650)	215 (715)	235 (780)	19 (65)	40-50 (130-165)	210 (700)
115	70		215 (700)	235 (770)	255 (840)	21 (70)	45-55 (140-175)	240 (800)

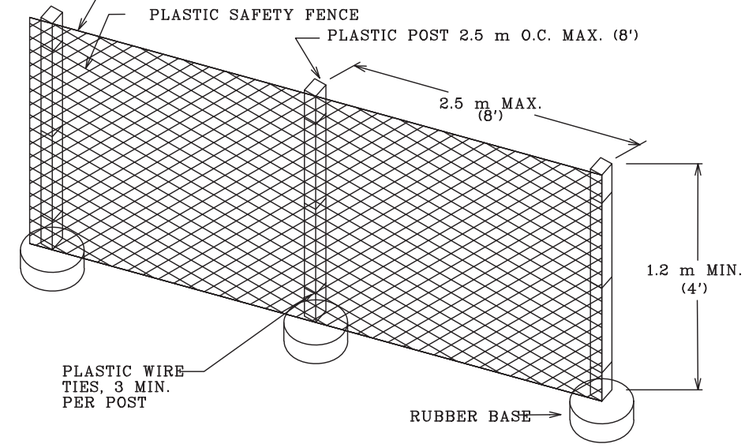
LEGEND

- Channelizing devices
- Trailer mounted flashing arrow board
- Flagger

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		DEVICE SPACING	
RECORD COPY SIGNED BY KERI JUAREZ	01/04/11 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-1 9 OF 9



TEMPORARY SAFETY FENCE



PORTABLE SAFETY FENCE

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		SAFETY FENCE	
RECORD COPY SIGNED BY SAM ANGOORI	04/03/09 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-4 1 OF 9

STATE OF TEXAS
ADITYA W. JATAR
117288
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PROFESSIONAL ENGINEER
8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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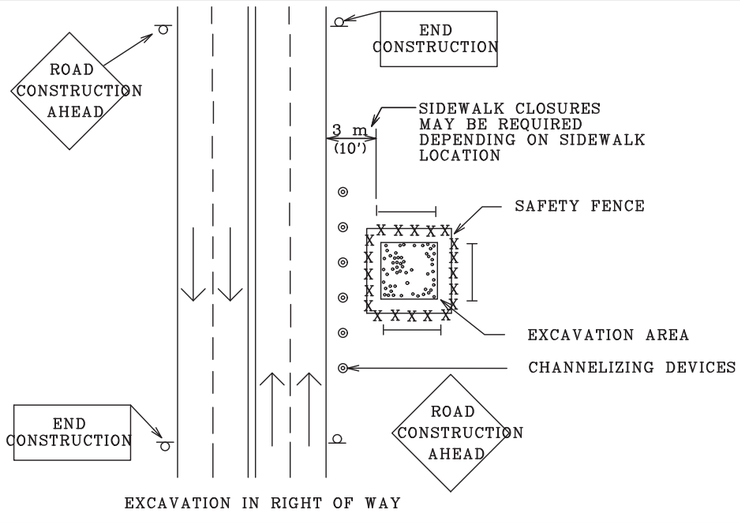
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				50

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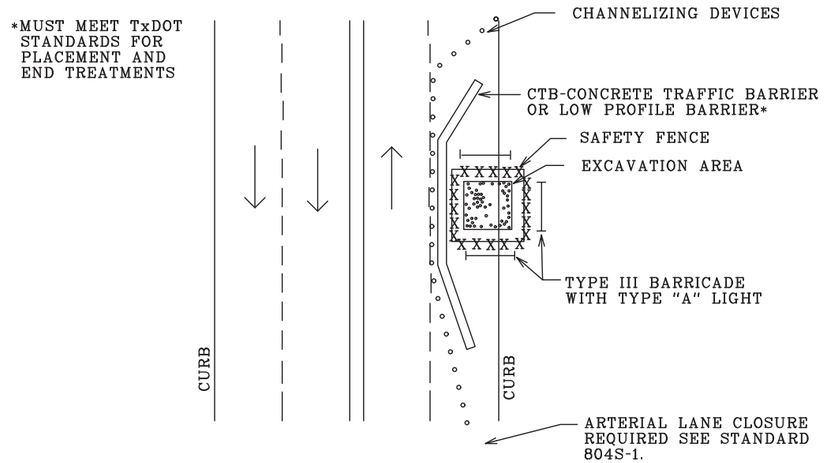
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1. SAFETY FENCE SHALL BE USED TO PROTECT ALL EXCAVATIONS IN THE RIGHT-OF-WAY.
2. SAFETY FENCES SHALL BE USED TO SEPARATE CONSTRUCTION ACTIVITIES FROM PEDESTRIAN.
3. ALL SAFETY FENCING SHALL BE PLASTIC, 1,200 mm (48") MINIMUM HEIGHT AND ORANGE IN COLOR.
4. SAFETY FENCE USED WITHIN THE ROADWAY SHALL BE REFLECTORIZED WITH A MINIMUM OF TWO (2) STRIPS OF RETROREFLECTIVE MATERIAL, A MINIMUM OF 25 mm (1") WIDE, THE LENGTH OF THE FENCE OR DELINEATED BY CHANNELIZING DEVICES.
5. SAFETY FENCE USED TO SEPARATE SIDEWALKS FROM CONSTRUCTION ACTIVITIES SHALL HAVE MINIMUM ENCROACHMENT TO THE SIDEWALK.
6. AS A MINIMUM, SAFETY FENCING IS REQUIRED IN AREAS ADJACENT TO EXCAVATIONS GREATER THAN OR EQUAL TO 150 mm (6").
7. SAFETY FENCING SHALL BE PAID FOR UNDER ITEM 803S, "BARRICADES, SIGNS AND TRAFFIC HANDLING", PAY ITEM NO. 803S-SF.
8. PORTABLE SAFETY FENCE MOUNTS SHALL BE APPROVED BY THE TRANSPORTATION DIVISION PRIOR TO CONSTRUCTION.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	SAFETY FENCE	
RECORD COPY SIGNED BY SAM ANGOORI 04/03/09 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-4 2 OF 9



EXCAVATION IN RIGHT OF WAY



EXCAVATION IN ROADWAY

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	LARGE EXCAVATION	
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STATE OF TEXAS
ADITYA W. JATAR
117288
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PROFESSIONAL ENGINEER
8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

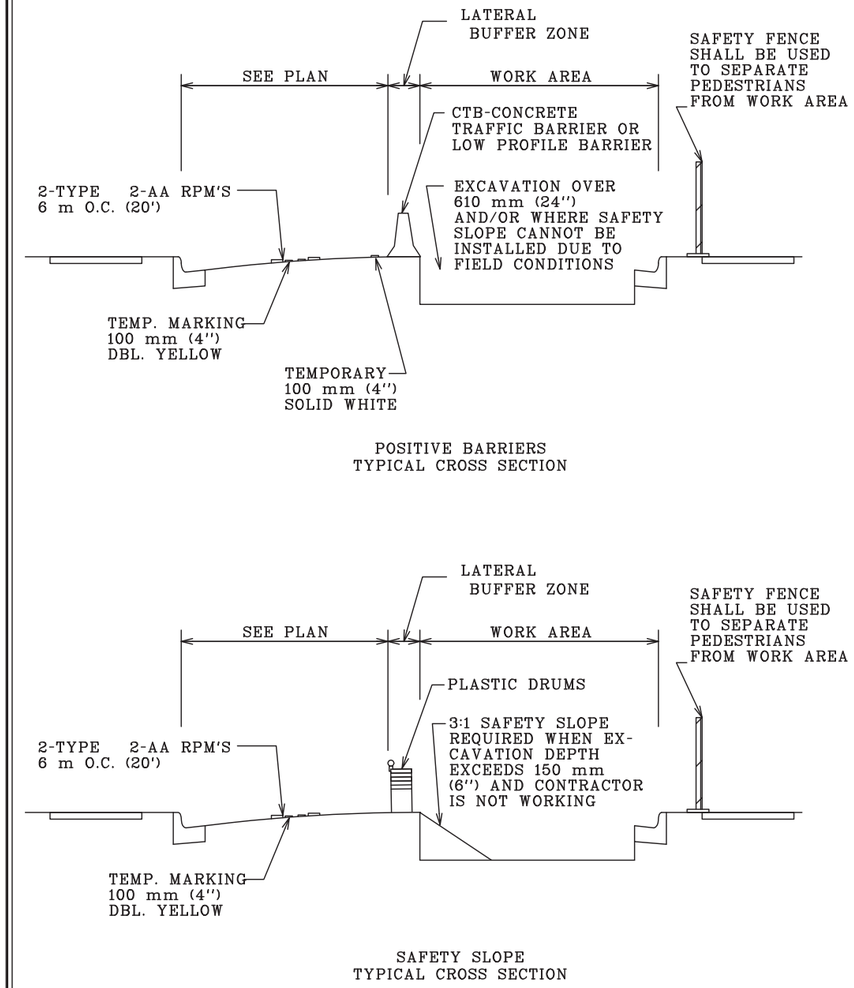
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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				51

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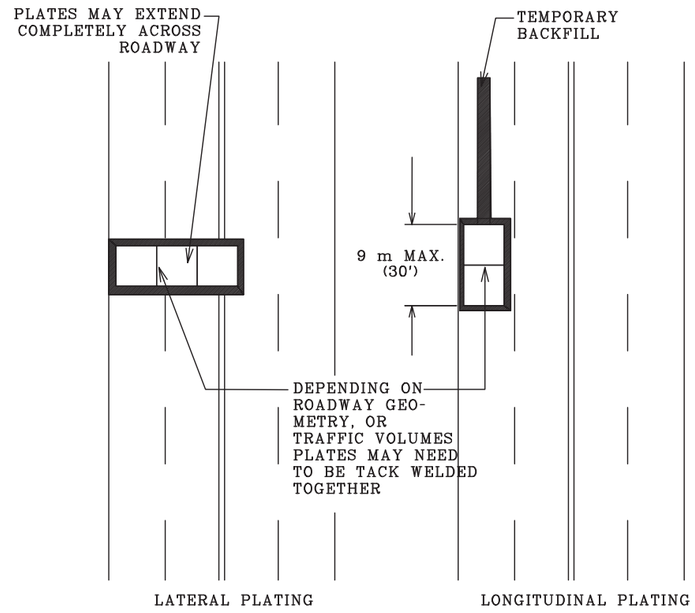
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POSITIVE BARRIERS
TYPICAL CROSS SECTION

SAFETY SLOPE
TYPICAL CROSS SECTION

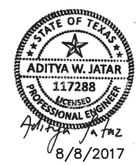
CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		WORK AREA PROTECTION	
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LATERAL PLATING

LONGITUDINAL PLATING

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		STEEL PLATING	
RECORD COPY SIGNED BY SAM ANGOORI ADOPTED	04/03/09	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-4 5 OF 9



NEENAH AVENUE WIDENING

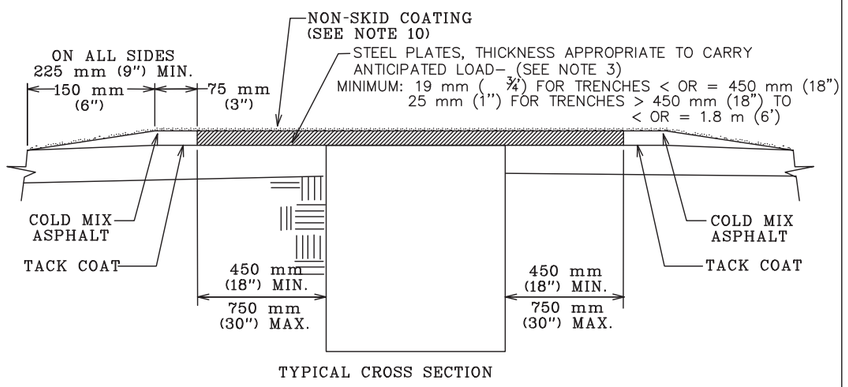
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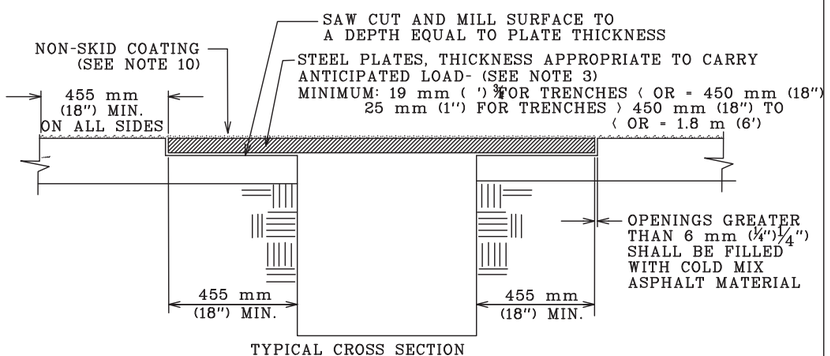
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6	TEXAS	104023–10006	_	14	WILLIAMSON				52

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TYPICAL CROSS SECTION

CASE I- LOW TRAFFIC VOLUME/LIMITED IN-SERVICE TIME

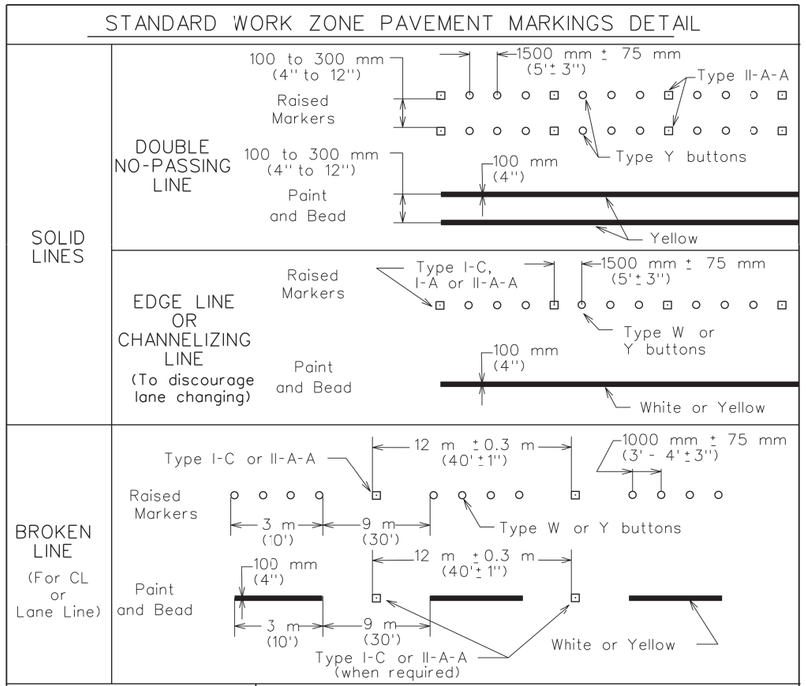


TYPICAL CROSS SECTION

CASE II- EXTENDED IN-SERVICE PLATING AND/OR
HEAVILY-TRAFFICKED ROADS/STREETS
(HMAC PAVEMENTS ONLY)

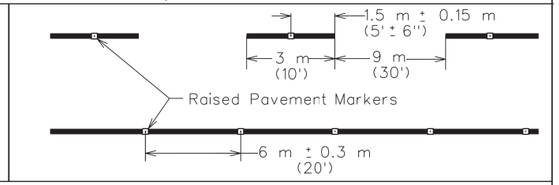
CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		STEEL PLATING	
RECORD COPY SIGNED BY SAM ANGOORI	*04/03/09* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-4 6 OF 9

STANDARD WORK ZONE PAVEMENT MARKINGS DETAIL



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

SEE STANDARD 804S-3 SHEET 5 OF 5 FOR GENERAL NOTES.



NOTE: IF RAISED PAVEMENT MARKERS ARE USED TO SUPPLEMENT REMOVABLE MARKINGS, THE MARKERS SHALL BE APPLIED TO THE TOP OF THE TAPE AT THE APPROXIMATE MID-LENGTH OF TAPE BROKEN LINES AND AT APPROXIMATE 6 m (20') SPACING FOR SOLID LINES. THIS ALLOWS AN EASIER REMOVAL OF RAISED MARKERS AND TAPE.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		TEMPORARY TRAFFIC CONTROL PAVEMENT MARKINGS	
RECORD COPY SIGNED BY BILL GARDNER	*03/13/06* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-3 1 OF 5

STATE OF TEXAS
ADITYA W. JATAR
117288
LICENSED
PROFESSIONAL ENGINEER
8/8/2017

NEENAH AVENUE WIDENING

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NOTES:

1. WHERE TRAFFIC MUST CROSS TRENCHES, THE CONTRACTOR SHALL PROVIDE SUITABLE BRIDGES.

2. THE USE OF STEEL PLATES SHALL BE APPROVED BY THE RIGHT OF WAY MANAGEMENT DIVISION OF WATERSHED PROTECTION AND DEVLOPMENT DEPARTMENT PRIOR TO INITIATION OF CONSTRUCTION.

3. THE THICKNESS OF PLATES FOR TRENCH WIDTHS EXCEEDING 1.8 m (6') SHALL BE ESTABLISHED IN AN ANALYSIS COMPLETED BY A LICENSED PROFESSIONAL ENGINEER, REGISTERED IN THE STATE OF TEXAS. THE ANALYSIS SHALL BE BASED ON HS–20 TRAFFIC LOADING WITH A MAXIMUM PLATE DEFLECTION OF 50 mm (½") WHEN EXPERIENCING SAID LOADING. FOR SITUATIONS WHERE MULTIPLE LAYERS OF PLATES (OR STACKED PLATES) ARE TO BE EMPLOYED, THE SEAMS (IE. THE INTER–FACE BETWEEN PLACED SIDE–BY–SIDE) OF THE UPPER LAYER SHALL BE PLACED PERPENDICULAR TO THE SEAMS OF THE UNDERLYING PLATES.

4. WHEN APPROVED, THE TYPE OF PLATE INSTALLATION SHALL BE BASED ON THE ANTICIPATED LENGTH OF TIME THE PLATE WILL BE IN SERVICE:
CASE I: A CASE I INSTALLATION SHALL APPLY FOR NO LONGER THAN A 2 WEEK PERIOD.
CASE II: A CASE II INSTALLATION SHALL APPLY FOR NO LONGER THAN 2 WEEK PERIOD.

5. THE TOPSIDE OF THE STEEL PLATE SHALL BE FLAT AND FREE OF ANY CLIPS, CHAINS, ATTACHMENTS, WELDMENTS OR SURFACE IRREGULARITIES.

6. PLATES WITH A PERMANENT DISPLACEMENT (I.E. DISPLACEMENT ANYWHERE ON THE SURFACE OF THE PLATE WITH RESPECT TO A PLANE FORMED BY THE OUTSIDE EDGES) THAT EXCEEDS 12 mm (½") SHALL NOT BE USED FOR PLATING PURPOSES. PLATES THAT DEVELOP A PERMANENT DISPLACEMENT EXCEEDING 12 mm (½") DURING SERVICE SHALL BE REMOVED AND REPLACED.

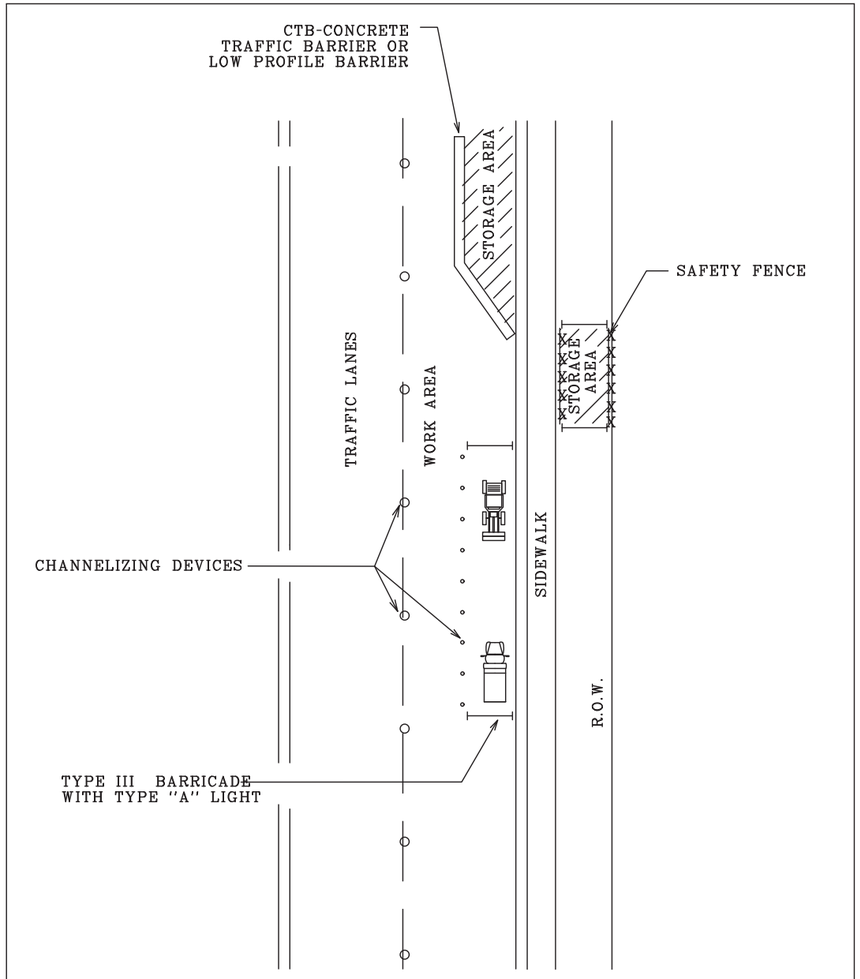
7. THE PLATES SHALL BE PROVIDED WITH APPROPRIATE NUMBER OF KEYHOLE SLOTS OR CIRCULAR HOLES FOR HANDLING, LIFTING, INSTALLATION AND REMOVAL PURPOSES.

8. THE CONTRACTOR SHOULD AVOID USING A LONG SERIES OF PLATES THAT RUN PARALLEL TO VEHICULAR TRAFFIC WHEELS PATHS.

9. ADDITIONAL METHODS OF SECURING PLATES MAY BE REQUIRED DEPENDING ON FIELD CONDITIONS.

10. FOR PLATES 1.8 M (6') OR GREATER IN DIRECTION OF TRAFFIC, A NON–SKID COATING SHOULD BE APPLIED TO THE ENTIRE SURFACE AREA OF ALL PLATES, AS WELL AS ADJACENT AREAS. THE NON–SKID COATING SHALL BE TCA (TEXTURED COATING OF AMERICA, INC.) STRATA–GRIP DECK COATING SYSTEM; SLIPFIX, INC. SPS (SLIP PROTECTION SURFACE) OR AN EQUIVALENT PRODUCT APPROVED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	STEEL PLATING	
RECORD COPY SIGNED BY SAM ANGOORI *04/03/09* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-4 7 OF 9



CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	MATERIAL AND EQUIPMENT STORAGE	
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STATE OF TEXAS
ADITYA W. JATAR
117288
LICENSED
PROFESSIONAL ENGINEER
8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
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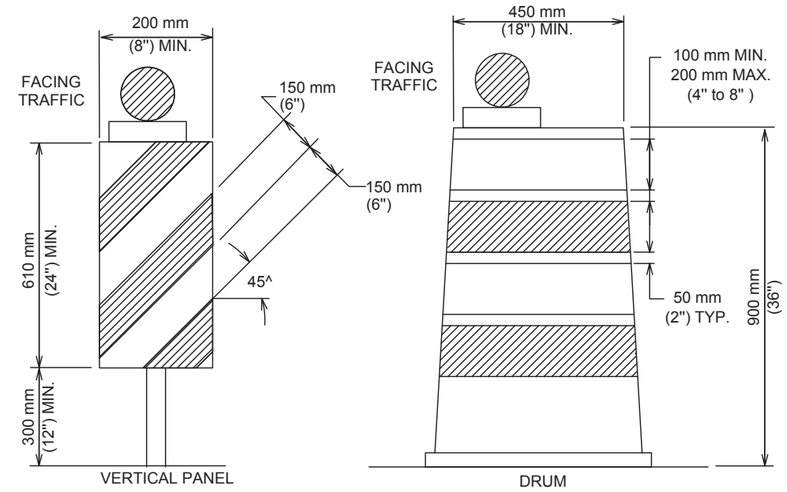
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				54

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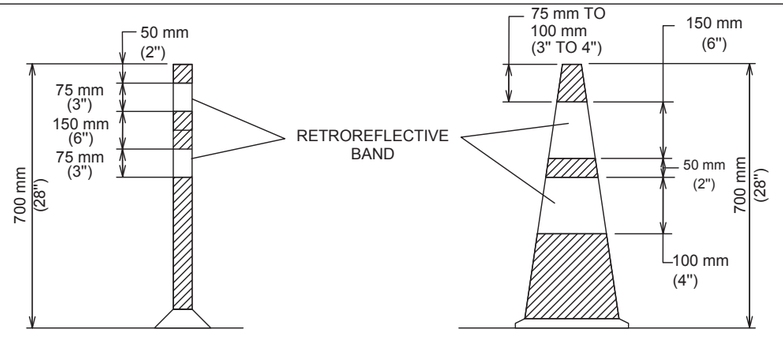
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1. STORAGE OF EQUIPMENT AND MATERIALS SHALL BE RESTRICTED TO LOCATIONS WHERE DRIVER SIGHT DISTANCES TO TRAFFIC, PEDESTRIANS, BUSINESSES AND SIDE STREET INTERSECTIONS ARE NOT OBSTRUCTED OR WHERE AN UNSIGHTLY APPEARANCE. AS DETERMINED BY THE ENGINEER, WILL NOT EXIST.
2. EQUIPMENT MUST BE PARKED AS FAR AWAY FROM THE TRAVELWAYS AS PRACTICAL.
3. TOTAL AREA USED FOR EQUIPMENT STORAGE SHALL BE KEPT TO A MINIMUM.
4. ALL MATERIALS STORED IN THE RIGHT-OF-WAY MUST BE MAINTAINED IN A NEAT AND ORGANIZED MANNER.
5. MATERIALS STORED MAY NOT BE MORE THAN 915 mm (36'') IN HEIGHT.
6. ALL MATERIALS STORED MUST BE USED WITHIN THREE (3) DAYS.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		MATERIAL AND EQUIPMENT STORAGE	
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LONG TERM AND INTERMEDIATE TERM STATIONARY WORK



TUBULAR MARKERS CONES

SHORT TERM AND SHORT DURATION WORK

SEE STANDARD 804S-5
SHEET 12 OF 13 AND SHEET 13 OF 13
FOR GENERAL NOTES AND DEVICE SPACING.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		CHANNELIZING DEVICES	
RECORD COPY SIGNED BY SAM ANGOORI	01/04/10 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-5 1 OF 13

STATE OF TEXAS
ADITYA W. JATAR
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8/8/2017

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CHANNELIZING DEVICES

1.ALL CHANNELIZING DEVICES SHALL HAVE WARNING LIGHTS OR LARGE REFLECTORS WHEN USED AT NIGHT. FLASHING WARNING LIGHTS MAY BE PLACED ON CHANNELIZING DEVICES USED SINGULARLY OR IN GROUPS TO MARK A SPOT CONDITION. WARNING LIGHTS ON CHANNELIZING DEVICES USED IN A SERIES SHALL BE STEADY-BURN. CHANNELIZING DEVICES IN TAPERS AT NIGHT SHALL HAVE TYPE C WARNING LIGHTS.

2.THE RETROREFLECTIVE MATERIAL USED ON CHANNELIZING DEVICES SHALL HAVE A SMOOTH, SEALED OUTER SURFACE.

3.THE NAME AND TELEPHONE NUMBER OF THE AGENCY, CONTRACTOR OR SUPPLIER SHALL BE SHOWN ON THE NON-RETROREFLECTIVE SURFACE OF ALL CHANNELIZING DEVICES. THE LETTERS AND NUMBERS SHALL BE A NON-RETROREFLECTIVE COLOR AND NOT OVER 50 mm (2") IN HEIGHT.

4.PARTICULAR ATTENTION SHOULD BE GIVEN TO ASSURE THAT CHANNELIZING DEVICES ARE MAINTAINED AND KEPT CLEAN, VISIBLE AND PROPERLY POSTITIONED AT ALL TIMES. DEVICES SHALL BE REPLACED THAT ARE DAMAGED AND HAVE LOST A SIGNIFICANT AMOUNT OF THEIR RETROREFLECTIVITY AND EFFECTIVENESS.

CONES

CONES SHALL PREDOMINANTLY BE ORANGE, FLUORESCENT RED-ORANGE, OR FLUORESCENT YELLOW-ORANGE IN COLOR, NOT LESS THAN 70 mm (28") IN HEIGHT, AND SHALL BE MADE OF A MATERIAL THAT CAN BE STRUCK WITHOUT DAMAGING VEHICLES ON IMPACT. FOR NIGHT TIME USE, CONES SHALL BE RETROREFLECTIVE OR EQUIPPED WITH LIGHTING DEVICES FOR MAXIMUM VISIBLITY. RETROREFLECTION OF CONES SHALL BE PROVIDED BY A WHITE BOND 150 mm (6") WIDE, NO MORE THAN 75 TO 100 mm (3 TO 4") FROM THE TOP OF THE CONE, AND AN ADDITIONAL 100 mm (4") WHITE BAND A MINIMUM OF 50 mm (2") BELOW THE 150 mm (6") BAND. TRAFFIC CONES ARE NORMALLY USED FOR SHORT-TERM STATIONARY AND SHORT DURATION WORK. HOWEVER, CONES MAY BE USED FOR INTERMEDIATE-TERM STATIONARY WORK AT NIGHT, IF THE SITE IS CONTINUOUSLY MANNED.

TUBULAR MARKERS

TUBULAR MARKERS SHALL PREDOMINANTLY BE ORANGE IN COLOR, NOT LESS THAN 700 mm (28") IN HEIGHT , A MINIMUM 50 mm (2") WIDE WHEN FACING TRAFFIC AND MADE OF A MATERIAL THAT CAN BE STRUCK WITHOUT DAMAGING VEHICLES. FOR NIGHT TIME USE, TUBLULAR MARKERS SHALL BE RETROREFLECTIVE PROVIDED BY TWO (2) 75 mm (3") WIDE WHITE BANDS PLACED A MAXIMUM OF 50 mm (2") FROM THE TOP, WITH A MAXIMUM OF 150 mm (6") BETWEEN BANDS. TUBULAR MARKERS ARE NORMALLY USED FOR SHORT-TERM STATIONARY AND SHORT DURATION WORK. HOWEVER, TUBULAR MARKERS MAY BE USED FOR INTERMEDIATE-TERM STATIONARY WORK AT NIGHT, IF THE SITE IS CONTINUOUSLY MANNED.

VERTICAL PANELS

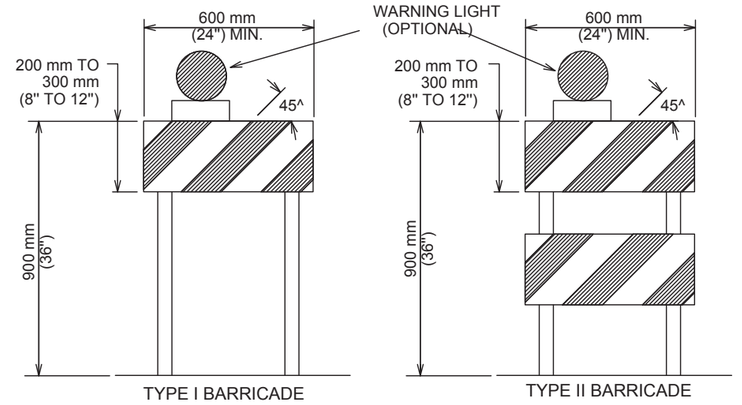
VERTICAL PANELS SHALL BE 200 TO 300 mm (8 TO 12") WIDE AND AT LEAST 600 mm (24") IN HEIGHT. THEY SHALL HAVE ORANGE AND WHITE STRIPES, AND BE RETROREFLECTIVE. PANEL STRIPE WIDTHS SHALL BE 150 mm (6") EXCEPT WHERE PANEL HEIGHTS ARE LESS THAN 900 mm (36"), WHEN 100 mm (4") STRIPES MAY BE USED. IF USED FOR TWO-WAY TRAFFIC, BACK-TO-BACK PANELS SHALL BE USED.

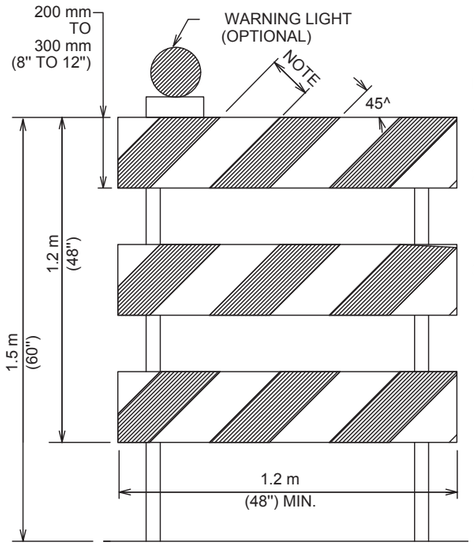
DRUMS

1. DRUMS USED FOR TRAFFIC WARNING OR CHANNELIZATION SHALL BE CONSTRUCTED OF LIGHT-WEIGHT FLEXIBLE AND DEFORMABLE MATERIALS AND BE A MINIMUM OF 900 mm (36") IN HEIGHT, AND HAVE AT LEAST 450 mm (18") MINIMUM WIDTH, REGARDLESS OF OREINTATION. STEEL DRUMS SHALL NOT BE USED. THE MARKINGS ON DRUMS SHALL BE HORIZONTAL, CIRCUNFERENTIAL, ALTERNATING ORANGE AND WHITE RETROREFLECTIVE STRIPES 100 TO 200 mm (4 TO 8") WIDE. EACH DRUM SHALL HAVE A MINIMUM OF TWO (2) ORANGE AND TWO (2) WHITE STRIPES. ANY NON-RETROREFLECTIVE SPACES BETWEEN THE HORIZONTAL ORANGE AND WHITE STRIPES, SHALL NOT EXCEED 50 mm (2") WIDE. DRUMS SHALL HAVE CLOSED TOPS THAT WILL NOT ALLOW COLLECTION OF ROADWORK OR OTHER DEBRIS.

2. DRUMS SHOULD NOT BE WEIGHTED WITH SAND, WATER OR ANY MATERIAL TO AN EXTENT THAT WOULD MAKE THE HAZARDOUS TO MOTORISTS, PEDESTRIANS OR WORKERS. WHEN THEY ARE USED IN REGIONS SUSCEPTIBLE TO FREEZING, THEY SHOULD HAVE DRAINAGE HOLES IN THE BOTTOM SO WATER WILL NOT ACCUMULATE AND FREEZE,CAUSING A HAZARD IF STRUCK BY A MOTORIST. BALLAST SHALL NOT BE PLACED ON TOP OF THE DRUM.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		CHANNELIZING DEVICES	
RECORD COPY SIGNED BY SAM ANGOORI	*01/04/10*	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-5
ADOPTED			2 OF 13





TYPE III BARRICADE

NOTES:

1. NOMINAL LUMBER DIMENSIONS ARE SATISFACTORY FOR BARRICADE RAIL WIDTH DIMENSIONS.
2. RAIL STRIPE WIDTHS SHALL BE 150 mm (6") EXCEPT WHERE RAIL LEGNTHS ARE LESS THAN 900 mm (36"), THEN 100 mm (4") WIDE STRIPES MAY BE USED.
3. THE SIDE OF BARRICADES FACING TRAFFIC SHALL HAVE RETRO-REFLECTIVE RAIL FACES.

SEE STANDARD 804S-5
SHEET 12 OF 13 AND SHEET 13 OF 13
FOR GENERAL NOTES AND DEVICE SPACING.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		BARRICADES	
RECORD COPY SIGNED BY SAM ANGOORI	*01/04/10*	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-5
ADOPTED			3 OF 13

STATE OF TEXAS
ADITYA W. JATAR
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LICENSED
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8/8/2017

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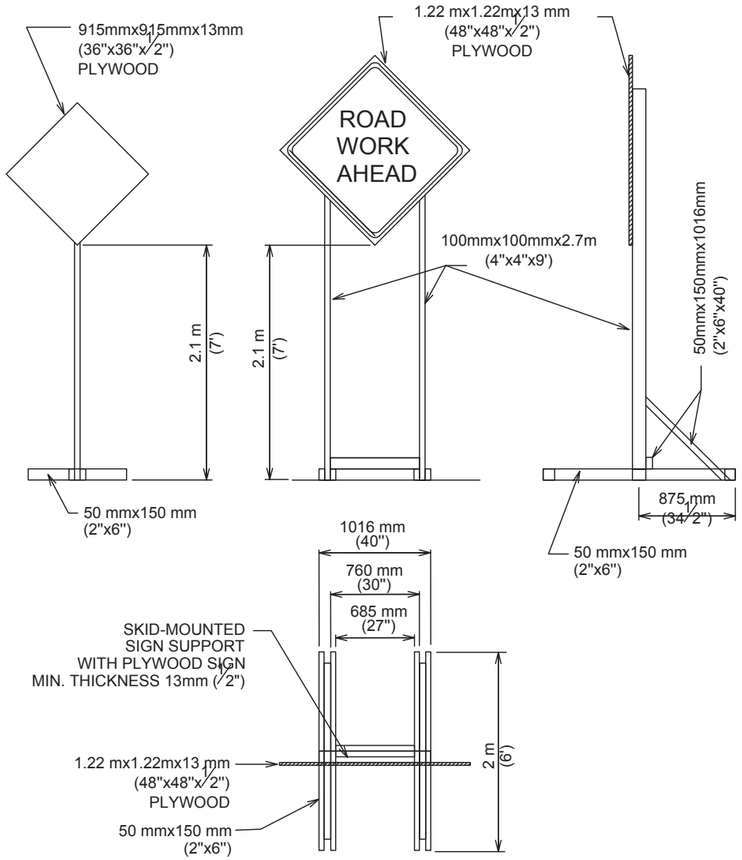
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BARRICADES

1. BARRICADES SHALL BE OF THREE TYPES: TYPE I, TYPE II OR TYPE III.
2. STRIPES ON BARRICADE RAILS SHALL BE ALTERNATING ORANGE AND WHITE RETRO-REFLECTIVE STRIPES (SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION TRAFFIC IS TO PASS). THE STRIPES SHALL BE 150 mm (6") WIDE, EXCEPT WHERE RAIL LENGTHS ARE LESS THAN 900 mm (36"), WHEN 100 mm (4") WIDE STRIPES MAY BE USED.
3. WHERE A BARRICADE EXTENDS ENTIRELY ACROSS A ROADWAY, THE SURFACE STRIPES SHOULD SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN. WHERE BOTH RIGHT AND LEFT TURNS ARE PROVIDED, THE STRIPES MAY SLOPE DOWNWARD IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE OR BARRICADES. WHERE NO TURNS ARE INTENDED, THE STRIPES SHOULD SLOPE DOWNWARD TOWARD THE CENTER OF THE BARRICADE OR BARRICADES.
4. BARRICADE RAILS SHOULD BE SUPPORTED IN A MANNER THAT WILL ALLOW THEM TO BE SEEN BY THE MOTORIST AND PROVIDE A STABLE SUPPORT NOT EASILY BLOWN OVER BY THE WIND OR TRAFFIC. FOR TYPE I BARRICADES, THE SUPPORT MAY INCLUDE OTHER UNSTRIPED HORIZONTAL PANELS NECESSARY TO PROVIDE STABILITY.
5. BARRICADES ARE LOCATED ADJACENT TO TRAFFIC AND ARE THEREFORE SUBJECT TO IMPACT WITH ERRANT VEHICLES. BECAUSE OF THEIR VULNERABLE POSITION AND THE HAZARD THEY COULD CREATE, THEY SHOULD BE CONSTRUCTED OF LIGHTWEIGHT MATERIALS AND HAVE NO RIGID STAY BRACING FOR A-FRAME DESIGNS. ALL BARRICADE SYSTEMS SHOULD BE CRASHWORTHY.
6. ON HIGH-SPEED EXPRESSWAYS OR IN OTHER SITUATION WHERE BARRICADES MAY BE SUSCEPTIBLE TO OVERTURING IN THE WIND, SANDBAGS SHOULD BE USED FOR BALLASTING. SANDBAGS MAY BE PLACED ON PARTS OF THE FRAME OR STAYS TO PROVIDE THE REQUIRED BALLAST BUT SHALL NOT BE PLACED ON TOP OF ANY STRIPED RAIL. BARRICADES SHALL NOT BE BALLASTED BY HEAVY OBJECTS SUCH AS ROCKS OR CHUNKS OF CONCRETE.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		BARRICADES	
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(LONG TERM AND INTERMEDIATE-TERM STATIONARY WORK)

TEMPORARY SIGN SUPPORT

SEE STANDARD 804S-5
SHEET 12 OF 13 AND SHEET 13 OF 13
FOR GENERAL NOTES AND DEVICE SPACING.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		TRAFFIC CONTROL SIGNS	
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STATE OF TEXAS
ADITYA W. JATAR
117288
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PROFESSIONAL ENGINEER
8/8/2017

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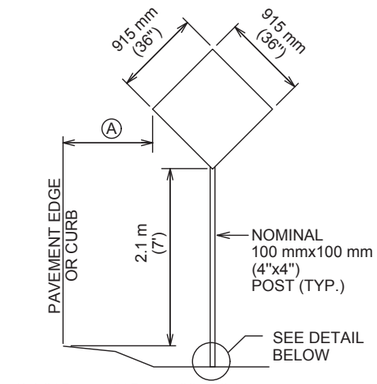
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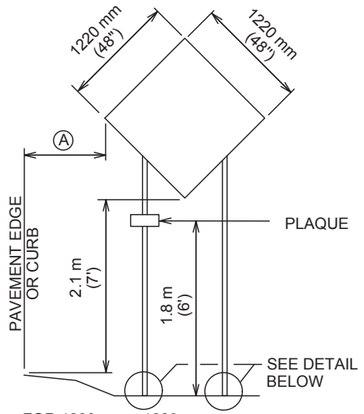
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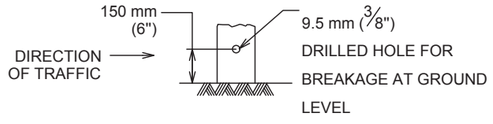


FOR 915 mmx 915 mm (36"x36") AND SMALLER WARNING SIGNS & OTHER SIGNS HAVING AN AREA NOT EXCEEDING 1 sm (10.7 sf).

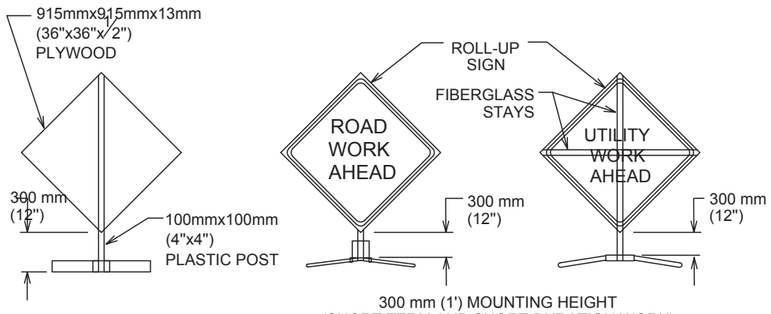
Ⓐ 610 mm (2') MINIMUM (REFER TO TMUTCD)



FOR 1220 mm x 1220 mm (48"x48") WARNING SIGNS.



WOOD POST SIGN SUPPORT USED AS FIXED SIGN SUPPORTS



300 mm (1') MOUNTING HEIGHT (SHORT TERM AND SHORT DURATION WORK)

PORTABLE SIGN SUPPORT

SEE STANDARD 804S-5
SHEET 12 OF 13 AND
SHEET 13 OF 13 FOR
GENERAL NOTES AND DEVICE SPACING.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	TRAFFIC CONTROL SIGNS	
RECORD COPY SIGNED BY SAM ANGOORI 01/04/10 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-5 6 OF 13

1. WARNING SIGNS SHALL BE ORANGE, FLUORESCENT RED-ORANGE OR FLUORESCENT YELLOW-ORANGE IN COLOR. THE FLUORESCENT VERSIONS OF ORANGE PROVIDE HIGHER CONSPICUITY THAN STANDARD ORANGE, ESPECIALLY DURING TWILGHT. ALL SIGNS USED AT NIGHT SHALL BE EITHER RETRORE-FLECTIVE, WITH A MATERIAL THAT HAS A SMOOTH, SEALED OUTER SURFACE, OR ILLUMINATED TO SHOW SIMILAR SHAPE AND COLOR BOTH DAY AND NIGHT. SIGN ILLUMINATION MAY BE EITHER IN-TERNAL OR EXTERNAL. ROADWAY LIGHTING DOES NOT MEET THE REQUIREMENTS FOR SIGN ILLUMINATION.
2. TYPE A FLASHING WARNING LIGHTS MAY BE USED IN CONJUNCTION WITH SIGNS AT NIGHT. STANDARD ORANGE FLAGS MAY BE USED FOR DAY TIME OPERATIONS. HOWEVER, NEITHER LIGHTS NOR FLAGS MAY BLOCK THE SIGN LEGEND.
3. SIGNS SHOULD BE LOCATED ON THE RIGHT-HAND SIDE OF THE ROADWAY. WHEN SPECIAL EMPHASIS IS NEEDED, SIGNS MAY BE PLACE ON BOTH THE LEFT AND RIGHT SIDES OF ROADWAY. SIGNS SHALL BE PLACED ON BOTH THE LEFT AND RIGHT SIDES OF ONE-WAY OR DIVIDED ROADWAYS. SIGNS USED FOR LONG-TERM STATIONARY AND INTERMEDIATE-TERM STATIONARY WORK SHALL BE MOUNTED AT A HEIGHT OF AT LEAST 2.1 m (7'), MEASURED FROM THE BOTTOM OF THE SIGN. THE HEIGHT TO THE BOTTOM OF A SECONDARY SIGN MOUNTED BELOW ANOTHER SIGN MAY BE O.3 m (1') LESS THAN THE APPROPRIATE HEIGHT ABOVE.
4. SIGNS MAY BE MOUNTED ON PORTABLE SUPPORTS FOR SHORT-TERM, SHORT DURATION, MOBILE CON-DITIONS AND EMERGENCIES. SIGNS MOUNTED ON PORTABLE SUPPORTS SHALL BE AT A HEIGHT OF AT LEAST 0.3 m (1'), MEASURED FROM THE BOTTOM OF THE SIGN.
5. ALL SIGN SYSTEMS SHOULD BE CRASHWORTHY. NO SIGN MOUNTS SHALL BLOCK OR IMPEDE SIDEALKS UNLESS NO OTHER OPTION IS AVAILABLE. ONLY SANDBAGS SHOULD BE USED FOR BALLASTING SIGN MOUNTS.

TABLE VI-3 TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING

Roadway Classification	Posted Speed	Sign Spacing ☆	Long-term Stationary Or Intermediate-term Stationary Approaching Warning Signs CW20 Series And CW22-1 Sign		Short-term Stationary Or Short Duration Approach Warning Signs CW22 Series		Other Warning Signs
			Standard	Minimum[4]	Standard	Minimum[4]	Standard
Conven.	KPH (MPH)	meter (feet)	mm (inches)	mm (inches)	mm (inches)	mm (inches)	mm (inches)
	50 (30)	40 (120)	1220x1220 (48x48)	915x915 (36x36)			
	55 (35)	50 (160)	↓	↓	915x915 (36x36)		915x915 (36x36)
	65 (40)	75 (240)	↓	↓	↓		↓
	70 (45)	100 (320)	↓	Use Standard Size	↓	Use Standard Size	↓
	80 (50)	120 (400)	↓	↓	↓	↓	↓
	90 (55)	150 (500) [2]	↓	↓	↓	↓	↓
	100 (60)	180 (600) [2]	↓	↓	1220x1220 (48x48)	↓	1220x1220 (48x48)
	105 (65)	210 (700) [2]	↓	↓	↓	↓	↓
	115 (70)	240 (800) [2]	↓	↓	↓	↓	↓
Exp. or Fwy	☆☆	☆☆ [3]	↓	↓	☆☆☆	☆☆☆	☆☆☆

☆ MINIMUM DISTANCE FROM WORK TO 1st ADVANCE WARNING SIGN AND/OR DISTANCE BETWEEN EACH ADDITIONAL SIGN.

☆☆ FOR TYPICAL SIGN SPACINGS ON EXPRESSWAYS AND FREEWAYS, REFER TO THE CURRENT ADDITION OF TMUTCD.

☆☆☆ SMALLER SIGN SIZES MAY BE USED WHERE SIGN DESIGNS HAVE NOT BEEN INCLUDED IN THE "STANDARD HIGHWAY SIGNS DESIGN MANUAL".

1. SPECIAL OR LARGER SIZE SIGNS MAY BE USED AS NECESSARY.
2. DISTANCE BETWEEN SIGNS SHOULD BE INCREASED AS REQUIRED TO HAVE 450 m (1500') OR MORE ADVANCE WARNING.
3. DISTANCE BETWEEN SIGNS SHOULD BE INCREASED AS REQUIRED TO HAVE A 0.8 km (1/2 MILE) OR MORE ADVANCE WARNING.
4. FOR USE ONLY ON SECONDARY ROADS OR CITY STREETS WHERE SPEEDS ARE LOW.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	TRAFFIC CONTROL SIGNS	
RECORD COPY SIGNED BY SAM ANGOORI 01/04/10 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-5 7 OF 13

STATE OF TEXAS
ADITYA W. JATAR
117288
LICENSED
PROFESSIONAL ENGINEER
8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

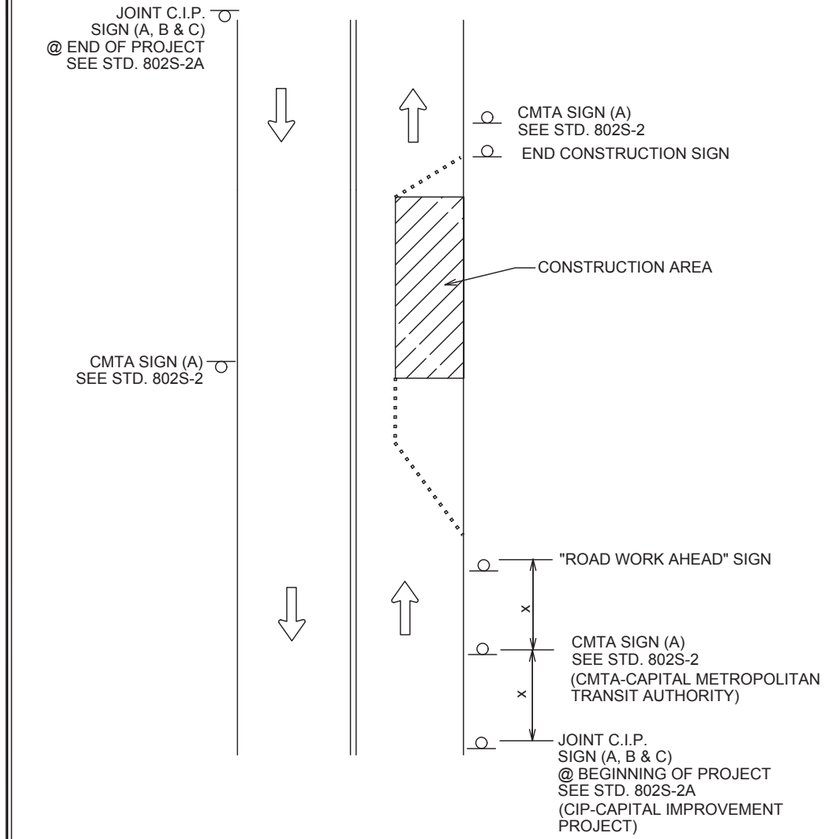
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TCP DETAIL 13

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				58

SP-2016-0186D

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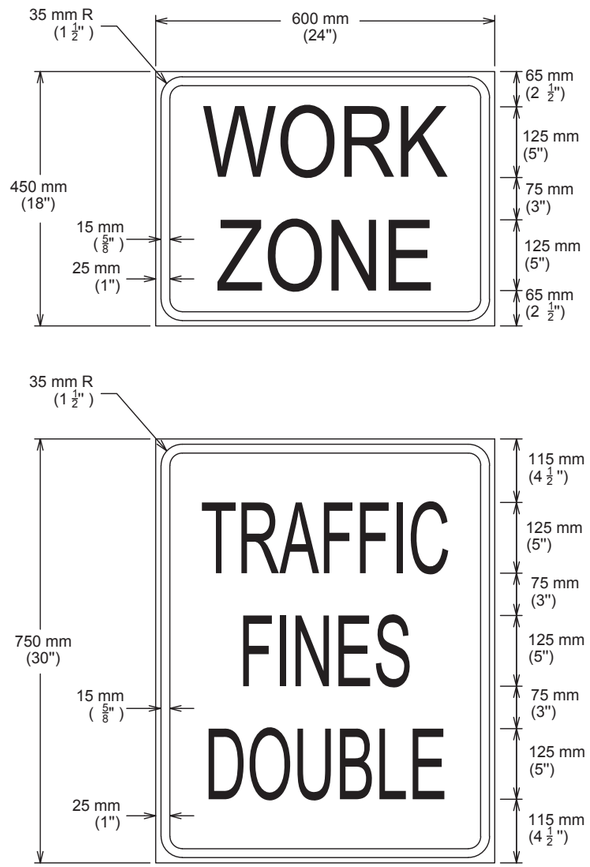


NOTES:

1. OTHER REQUIRED SIGNS NOT SHOWN FOR CLARITY.
2. "X" DISTANCES SAME AS STANDARD TABLE SHOWN ON SHEET 13 OF 13.

SEE STANDARD 804S-5
SHEET 12 OF 13 AND SHEET 13 OF 13
FOR GENERAL NOTES AND DEVICE SPACING.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		TYPICAL CMTA/C.I.P. SIGN LOCATIONS	STANDARD NO.
RECORD COPY SIGNED BY SAM ANGOORI	*01/04/10*	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	804S-5
	ADOPTED		8 OF 13



LETTERS - BLACK
BORDER - BLACK
BACKGROUND - ORANGE
REFL.

LETTERS - BLACK
BORDER - BLACK
BACKGROUND - WHITE
REFL.

SEE STANDARD DETAIL 804S-5
SHEET 5 OF 13 FOR SKID-
MOUNTED SIGN SUPPORT.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		SPECIAL WORK ZONE SIGNS	STANDARD NO.
RECORD COPY SIGNED BY SAM ANGOORI	*01/04/10*	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	804S-5
	ADOPTED		9 OF 13

STATE OF TEXAS
ADITYA W. JATAR
117288
LICENSED
PROFESSIONAL ENGINEER
8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

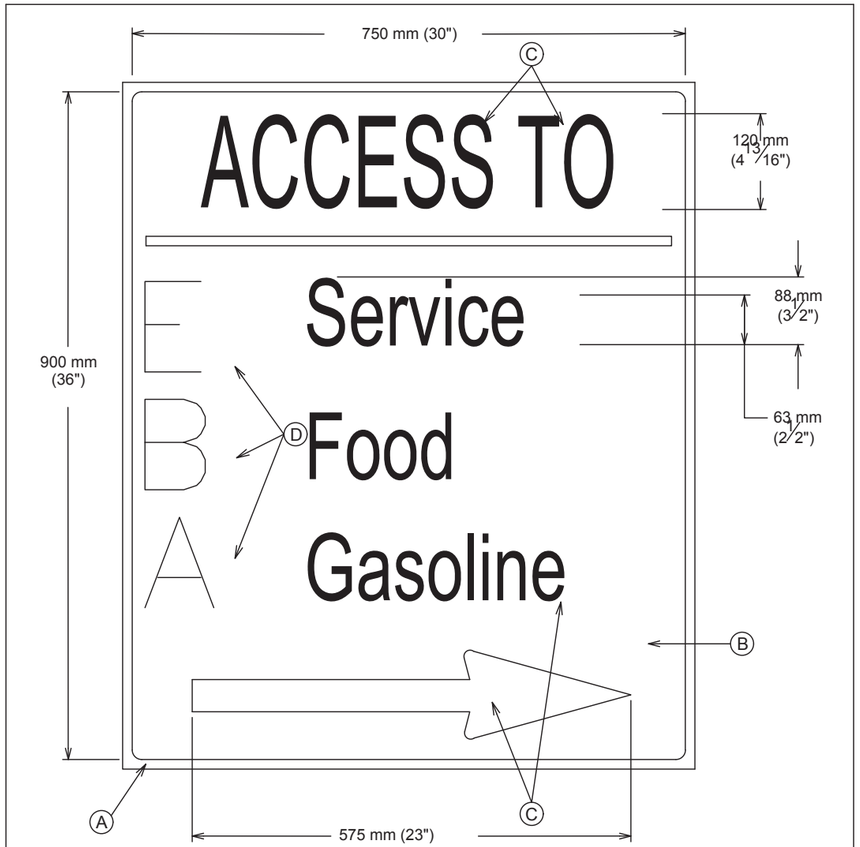
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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				59

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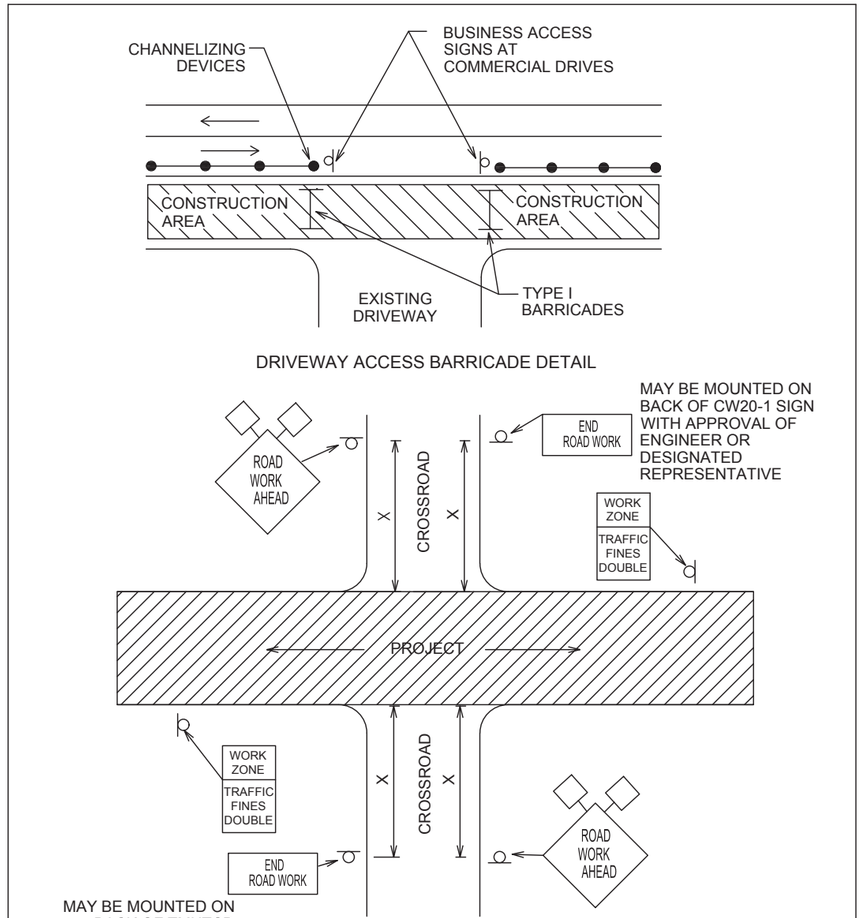
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(A) 50 mm (1/2") WHITE RETROREFLECTIVE BORDER
(B) BLUE RETROFEFLECTIVE BACKGROUND
(C) WHITE RETROREFLECTIVE ARROW AND LETTERS
(D) WHITE RETROREFELCTIVE BUSINESS LOGO

NOTES:
1. CONTRACTORS CAN MAKE BUSINESS NAMES REMOVABLE/CHANGEABLE AS AN OPTION.
2. BUSINESS LOGO ARE OPTIONAL. IF USED LETTERING MUST BE MINIMIZED.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		SPECIAL WORK ZONE SIGNS	
RECORD COPY SIGNED BY SAM ANGOORI	*01/04/10* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-5 10 OF 13



DRIVEWAY ACCESS BARRICADE DETAIL

MAY BE MOUNTED ON BACK OF TMUTCD CW20-1 SIGN WITH APPROVAL OF ENGINEER OR DESIGNATED REPRESENTATIVE (TMUTCD-TEXAS MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES)

CROSSROAD SIGNING AND BARRICADING

SEE STANDARD 804S-5
SHEET 12 OF 13 AND SHEET 13 OF 13
FOR GENERAL NOTES AND DEVICE SPACING.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		SIGNING AND BARRICADING CROSSROAD & DRIVEWAY	
RECORD COPY SIGNED BY SAM ANGOORI	*01/04/10* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-5 11 OF 13

STATE OF TEXAS
ADITYA W. JATAR
117288
LICENSED
PROFESSIONAL ENGINEER
8/8/2017

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WILLIAMSON COUNTY
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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				60

SP-2016-0186D

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1. ALL TRAFFIC CONTROL DEVICES, SIGNS, BARRICADES AND WARNING SIGNS SHALL BE FURNISHED, PLACED, CONSTRUCTED AND MAINTAINED IN THE APPROPRIATE TYPES AND SIZES AND FLAGGER OPERATIONS EXECUTED IN ACCORDANCE WITH THE CURRENT EDITION OF THE TEXAS MANUAL ON UNIFORM CONTROL DEVICES (TMUTCD), THE CITY OF AUSTIN STANDARD SPECIFICATIONS SERIES 800 AND THE CITY OF AUSTIN TRANS-PORTATION CRITERIA MANUAL, OR AS DIRECTED BY THE ENGINEER OR DESIGNATED RE-PRESENTATIVE. IF A CONFLICT ARISES THEN THE CITY OF AUSTIN TRANSPORTATION CRITERIA MANUAL SHALL CONTROL UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.
2. THE CONTRACTOR SHALL NOTIFY THE TRANSPORTATION DIVISION OF THE DEPARTMENT OF PUBLIC WORKS AT 974-7024 NO LATER THAN THE MONDAY OF THE WEEK DURING WHICH THE CONTRACTOR INTENDS TO SET UP BARRICADES TO START CONSTRUCTION.
3. PROPOSED CONSTRUCTION TRAFFIC MOVEMENTS MAY REQUIRE EXISTING SIGNAL HEADS TO BE RELOCATED. THE CITY OF AUSTIN WILL REVIEW SIGNAL HEAD LOCATIONS DURING CONSTRUCTION AND PERFORM THE REQUIRED ADJUSTMENTS. THE CONTRACTOR SHALL CONTACT THE TRANSPORTATION DIVISION OF THE DEPARTMENT OF PUBLIC WORKS AT 974-7024, THREE (3) DAYS PRIOR TO PLACMENT ANY TRAFFIC CONTROLS WHICH MAY REQUIRE SIGNAL HEAD ADJUSTMENTS/RELOCATION.
4. THE CONTRACTOR SHALL PROVIDE ONE (1) FULL-TIME OFF-DUTY, UNIFORMED AUSTIN POLICE DEPARTMENT CERTIFIED PEACE OFFICER AND ONE (1) VEHICLE OF THE TYPE APPROVED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE FOR TEMPORARY LANE CLOSURES WHEN UNDERSEALING, MILLING, PAVING AND WHEN WORKING IN INTERSECTIONS AS PART OF THE TRAFFIC CONTROL OPERATIONS. THE PEACE OFFICER SHALL BE ABLE TO SHOW PROOF OF CERTIFICATION BY THE TEXAS COMMISSION ON LAW ENFORCEMENT OFFICER STANDARDS.
5. THE CONTRACTOR SHALL NOTIFY ALL OTHER GOVERNMENTAL AGENCIES WHOSE RIGHTS-OF-WAY ARE AFFECTED BY HIS WORK ACTIVITIES. THE CONTRACTOR SHALL PROVIDE ANY ADDITIONAL TRAFFIC CONTROL DEVICES THAT THEY MAY NEED.
6. THE CONTRACTOR SHALL MAINTAIN ONE (1) DUST-FREE LANE OF TRAFFIC IN EACH DIRECTION AT ALL TIMES, UNLESS OTHERWISE NOTED IN THE DRAWINGS OR APPROVED THE ENGINEER OR DESIGNATED REPRESENTATIVE.
7. THERE SHALL BE A MINIMUM OF THREE (3) METERS (10 FEET) CLEAR WIDTH FOR EACH LANE OF TRAFFIC IN CHANNELIZED AREAS, UNLESS OTHERWISE NOTED ON THE DRAWINGS OR APPROVED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.
8. THE CONTRACTOR SHALL MAINTAIN DRIVEWAY ACCESS AT ALL TIMES. IF ACCESS CANNOT BE MAINTAINED, THE CONTRACTOR WITH THE APPROVAL OF THE ENGINEER OR DESIGNATED REPRESENTATIVE SHALL PROVIDE AT LEAST 24 HOUR WRITTEN NOTICE OF LIMITED ACCESS TO AFFECTED PROPERTY OWNERS. THE CONTRACTOR SHALL PROVIDE BUSINESS ACCESS SIGNS AS NEEDED TO NFORM DRIVERS OF THE LOCATIONS OF ALL DRIVEWAYS.
9. TEMPORARY LANE CLOSURES IN THE CENTRAL BUSINESS DISTRICT (CBD) OR ON ARTERIAL STREETS SHALL NOT BE PERMITTED DURING THE HOURS OF 7 AM TO 9 AM AND 4 PM TO 6PM MONDAY THROUGH FRIDAY UNLESS PRIOR APPROVAL HAS BEEN OBTAINED FROM THE TRANSPORTATION DIVISION.
10. TRAFFIC CONTROL SHOWN ON STANDARD DETAILS IS TYPICAL. ADDITIONAL SIGNING AND/OR BARRICADING, AS WELL AS TEMPORARY PAVEMENT MARKINGS AND OBLITERATION/RESTORATION OF EXISTING PAVEMENT MARKINGS, MAY BE REQUIRED DEPENDING ON FIELD CONDITIONS. FIELD ADJUSTMENTS TO TRAFFIC CONTROLS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM NO. 803S "BARRICADES, SIGNS AND TRAFFIC HANDLING".
11. THE CONTRACTOR SHALL DESIGNATE A COMPETENT PERSON FOR TRAFFIC CONTROL. THE COMPETENT PERSON SHALL MAKE INSPECTIONS OF THE TRAFFIC CONTROL DEVICES AT LEAST TWO (2) TIMES A DAY (ONCE AT THE BEGINNING OF THE DAY AND ONCE AT THE END OF THE DAY), INCLUDING NON-WORKING DAYS, ENSURING THAT ALL DEVICES ARE IN THEIR PROPER PLACE AND ARE IN WORKING ORDER.
12. ALL DEVICES SHALL BE MADE USING MATERIALS LISTED ON THE TxDOT APPROVED PRODUCTS LIST.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		GENERAL TRAFFIC CONTROL NOTES	
RECORD COPY SIGNED BY SAM ANGOORI	*01/04/10* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-5 12 OF 13

13. ALL PERSONS WORKING WITHIN THE RIGHT-OF-WAY SHALL WEAR A BRIGHTLY COLORED SAFETY VEST. FOR NIGHTTIME WORK THE VEST SHALL BE RETROREFLECTIVE,
14. WHEN AN INTERSECTION IS CLOSED FOR CONSTRUCTION, THE CONTRACTOR SHALL PROCEED WITH CONSTRUCTION IN SUCH A MANNER THAT THE CLOSURE TIME IS MINIMIZED.
15. THE CONTRACTOR SHALL NOTIFY THE CAPITAL METRO DISPATCHER AT 385-4295 ONE (1) WEEK PRIOR TO LANE CLOSURES ADJACENT TO BUS STOPS.

DURATION OF WORK

WORK DURATION IS A MAJOR FACTOR IN DETERMINING THE NUMBER AND TYPES OF DEVICES USED IN TEMPORARY TRAFFIC ZONES. THE FIVE (5) CATEGORIES OF WORK DURATION AND THEIR TIME AT A LOCATION ARE AS FOLLOWS:

- LONG-TERM STATIONARY-WORK THAT OCCUPIES A LOCATION FOR MORE THAN 3 DAYS.
- INTERMEDIATE-TERM STATIONARY-WORK THAT OCCUPIES A LOCATION FROM OVERNIGHT TO 3 DAYS.
- SHORT-TERM STATIONARY-DAYTIME WORK THAT OCCUPIES A LOCATION FROM 1 TO 12 HOURS.
- SHORT-DURATION WORK THAT OCCUPIES A LOCATION UP TO 1 HOUR.
- MOBILE-WORK THAT MOVES INTERMITTENTLY OR CONTINUOUSLY.

Typical Transition Lengths and Suggested Maximum Spacing of Devices

Posted Speed KPH (MPH)	Formula	Minimum Desirable Taper Lengths (L) Meters (Feet) 3.0(10) Offset Meters (feet)	3.3(11) Offset Meters (feet)	3.6(12) Offset Meters (feet)	Suggested Max. Device Spacing On a taper Meters (feet)	On a tangent Meters (feet)	Suggested Sign Spacing Meters (Feet) "X" Dimension
50 (30)	$L=\frac{WS^2}{60}$	45 (150)	50 (165)	55 (180)	9 (30)	15-20 (60-75)	40 (120)
55 (35)		65 (205)	70 (225)	75 (245)	10 (35)	25-25 (70-90)	50 (160)
65 (40)		80 (265)	90 (295)	100 (320)	12 (40)	25-30 (80-100)	75 (240)
70 (45)	L=WS	135 (450)	(495)	165 (540)	13 (45)	25-30 (90-110)	100 (320)
80 (50)		150 (500)	165 (550)	180 (600)	15 (50)	30-35 (100-125)	120 (400)
90 (55)		165 (550)	185 (605)	200 (660)	16 (55)	35-40 (110-140)	150 (500)
100 (60)		180 (600)	200 (660)	220 (720)	18 (60)	40-45 (120-150)	180 (600)
105 (65)		195 (650)	215 (715)	235 (780)	19 (65)	40-50 (130-165)	210 (700)
115 (70)		215 (700)	235 (770)	255 (840)	21 (70)	45-55 (140-175)	240 (800)

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		GENERAL TRAFFIC CONTROL NOTES	
RECORD COPY SIGNED BY SAM ANGOORI	*01/04/10* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 804S-5 13 OF 13

NOTES:

1. ANY DETAILS WHICH ARE NOT CITY OF AUSTIN STANDARDS HAVE BEEN PROVIDED BY THE ENGINEER AND ARE SIGNED AND SEALED BY ENGINEER FOR USE ON THIS PROJECT.

STATE OF TEXAS
ADITYA W. JATAR
117288
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PROFESSIONAL ENGINEER
8/8/2017

NEENAH AVENUE WIDENING

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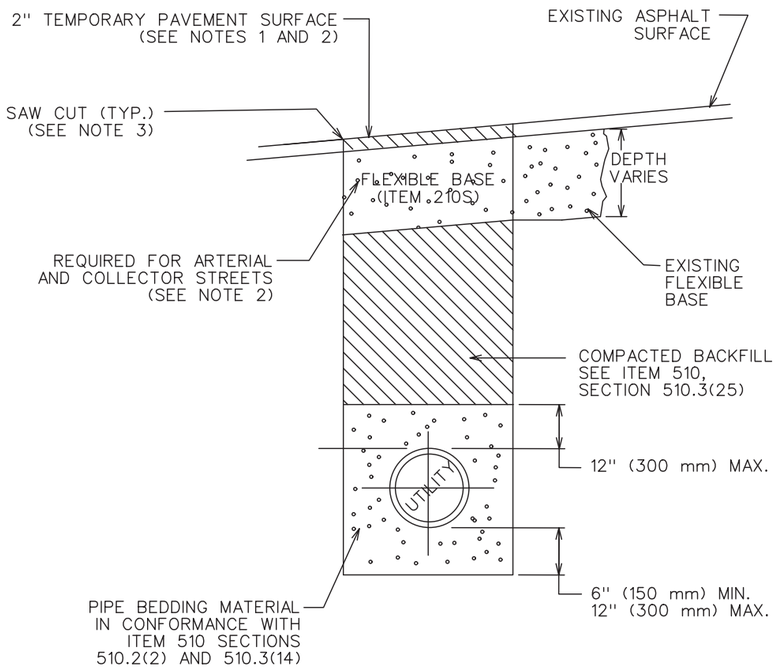
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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				61

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SP-2016-0186D

TEMPORARY TRENCH REPAIR IN ASPHALTIC SURFACE
ITEM 510 SECTION 510.3 (25)(h)



1. TEMPORARY PAVEMENT REPAIRS SHALL BE ALLOWED NO LONGER THAN 90 DAYS AFTER PASSING THE WATER PRESSURE AND/OR WASTEWATER MANDREL TESTS. IF TEMPORARY PAVEMENT REPAIRS ARE TO REMAIN IN PLACE FOR A PERIOD EXCEEDING 90 DAYS, ON ANY SINGLE TRENCH LINE OR INDIVIDUAL STREET, SUCH TEMPORARY PAVEMENT SHALL BE HMAC, PLACED AND COMPACTED SUFFICENTLY TO WITHSTAND THE ANTICIPATED TRAFFIC LOADS OVER THE DURATION OF THE TEMPORARY REPAIR.
2. IF EXCAVATION AREA IS OPEN FOR TEMPORARY PUBLIC USE, THE SURFACE SHALL BE MAINTAINED LEVEL WITH ADJACENT RIDING SURFACE USING COLD MIX AC IN ACCORDANCE WITH TxDOT "DMS-9203, RAPID CURING ASPHALT CONCRETE PATCHING MATERIAL" OR TEMPORARY HMAC PER COA ITEM "340S HOT MIX ASPHALTIC CONCRETE PAVEMENT". A MINIMUM OF TWO INCHES (2") OF TEMPORARY COLD MIX OR HMAC SHALL BE PLACED OVER COMPACTED BACKFILL. FLEXIBLE BASE SHALL ALSO BE REQUIRED, FOR ALL COLLECTOR OR ARTERIAL STREETS.
3. THE EXISTING CONCRETE OR ASPHALT PAVING SURFACE SHALL BE SAW CUT. SAW CUTS SHALL BE IN A STRAIGHT LINE, ALONG THE SIDES OF THE TRENCH (OR MANHOLE EXCAVATION) AND SYMMETRICAL ABOUT THE CENTER LINE OF THE EXCAVATION. ANY DAMAGED EDGES SHALL BE RE-SAW CUT IF REQUIRED BY THE OWNER.
4. HMAC OR COLD MIX SHALL BE FREE OF CONTAMINATION, AS DETERMINED BY A VISUAL INSPECTION BY THE OWNER'S REPRESENTATIVE, REFERENCE ITEM 340S SECTION 340S.10 A.
5. TEMPORARY PAVING MATERIAL MUST BE COMPACTED WITH A SMOOTH DRUM VIBRATORY ROLLER.
6. THE FINISHED SURFACE SHALL BE MAINTAINED DUST FREE AND PROVIDE A SMOOTH AND SAFE RIDING SURFACE FOR ALL VEHICLES ALONG THE ROUTE, INCLUDING, BUT NOT LIMITED TO SMALL CARS, MOTORCYCLES, MOPEDS AND BICYCLES. THE TEMPORARY SURFACE SHALL BE MAINTAINED BY THE CONTRACTOR THE ENTIRE TIME THE TEMPORARY SURFACE IS IN PLACE. DAILY MAINTENANCE SHALL BE PERFORMED BASED ON FIELD CONDITIONS AND AT THE DIRECTION OF THE OWNER'S REPRESENTATIVE, UNTIL THE FINAL PAVEMENT SURFACE IS PLACED.
7. THE TEMPORARY PAVEMENT SURFACE SHALL HAVE A MAXIMUM ALLOWABLE DEVIATION OF ¼" ABOVE OR BELOW THE EXISTING PAVEMENT SURFACE DIRECTLY ADJACENT TO THE PATCH.
8. ANY PORTIONS OF THE TEMPORARY PAVEMENT SURFACE THAT HAVE SETTLED, BECOME DAMAGED, OR DETERIORATED MUST BE REPAIRED BY REMOVING THE EXISTING TEMPORARY SURFACE MATERIAL TO A MINIMUM DEPTH OF 2" BELOW THE SURFACE ELEVATION PRIOR TO REPLACING AND RECOMPACTING NEW COLD MIX/HOT MIX IN THE EXCAVATION AREA.
9. IF IT IS DETERMINED DURING CORRECTIVE ACTION THAT SOFT, SATURATED AND/OR UNSTABLE SUBSURFACE SOILS ARE CONTRIBUTING TO THE FAILURE OF THE TEMPORARY PAVEMENT SECTION, THE UNSUITABLE MATERIALS MUST BE REMOVED AND REPLACED WITH BACKFILL SOILS FREE OF ORGANICS, STONES OR ROCKS OVER 8 INCHES, AND HAVING A PLASTICITY INDEX OF 20 OR LESS, AND SHALL HAVE A MC WITHIN 2% OF OPTIMUM, PRIOR TO REPLACING THE TEMPORARY PAVEMENT SURFACE.
10. CLASS "J" PC CONCRETE (ITEM 403S) OR CONTROLLED LOW STRENGTH MATERIAL (CLSM) MAY BE SUBSTITUTED IN THESE REPAIRS FOR THE FLEXIBLE BASE AND COMPACTED BACKFILL. PC CONCRETE GREATER THAN A 2 SACK MIX WILL NOT BE ALLOWED.
11. ALL EXISTING ROADWAY STRIPING AND PAVEMENT MARKINGS REMOVED OR DAMAGED BY THE CONTRACTOR'S WORK SHALL BE RESTORED PRIOR TO OPENING THE STREET TO TRAFFIC.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		TEMPORARY TRENCH REPAIR- ASPHALT SURFACE	
RECORD COPY SIGNED BY BILL GARDNER	*12/09/08* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 1100S-4 1 OF 2

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		TEMPORARY TRENCH REPAIR- ASPHALT SURFACE	
RECORD COPY SIGNED BY BILL GARDNER	*12/09/08* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 1100S-4 2 OF 2

NOTES:

1. ANY DETAILS WHICH ARE NOT CITY OF AUSTIN STANDARDS HAVE BEEN PROVIDED BY THE ENGINEER AND ARE SIGNED AND SEALED BY ENGINEER FOR USE ON THIS PROJECT.

STATE OF TEXAS
ADITYA W. JATAR
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LICENSED
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8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
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TCP DETAIL 17

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				62

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Lane Channelizing

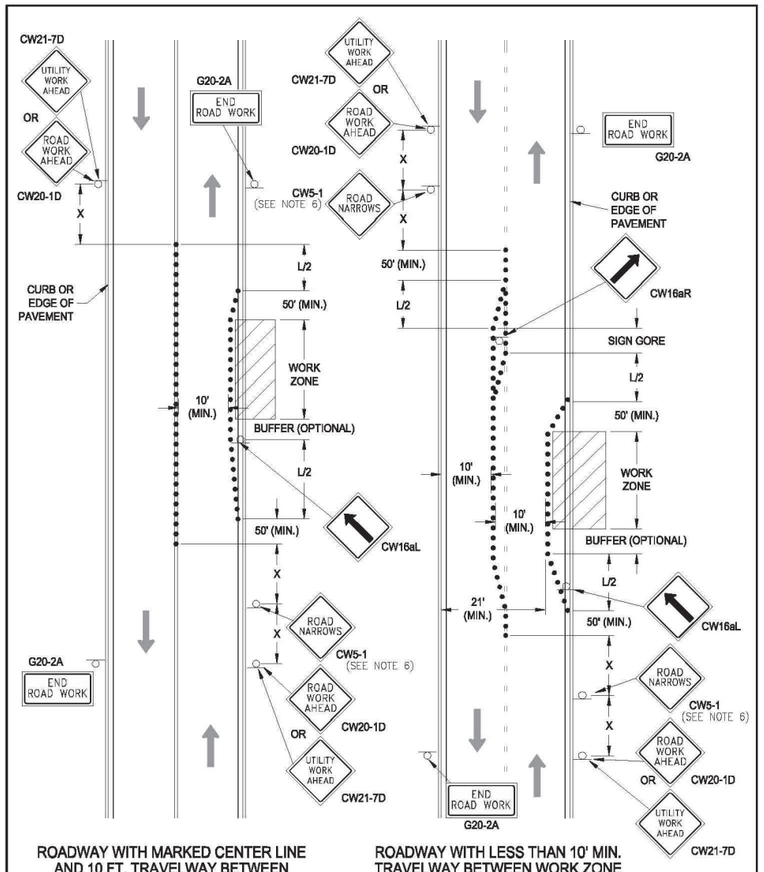
Standard:

1. **All traffic control devices shall be installed by a person trained in work zone traffic control. If requested, this person shall show proof of training certification. Training re-certification shall be required every four (4) years.**
2. **To maintain two way traffic, the total usable roadway surface shall not be less than 21 ft. in width at any time.**
3. **A minimum usable lane width of 10 ft. in each direction shall be provided at all times.**
4. **Conflicting pavement markings shall be covered, removed or obliterated for any work zone lasting 72 hours (3 days) or longer (Long-term stationary duration). See 804S-3.**
5. **For roadways with a posted speed limit of 35 mph or higher, a second ROAD NARROWS (CW5-1) sign shall be added to the advance warning sign string.**

Guidance:

6. Where bike lanes are present, see standard detail 804S-1, 7 of 16 for closure requirements.
7. Curve warning signs may be required depending on field conditions.

LANE CHANNELIZING



ROADWAY WITH MARKED CENTER LINE AND 10 FT. TRAVELWAY BETWEEN WORK ZONE AND CENTER LINE.

ROADWAY WITH LESS THAN 10' MIN. TRAVELWAY BETWEEN WORK ZONE AND CENTER LINE. CENTER LINE PAVEMENT MARKINGS MAY OR MAYNOT BE PRESENT.

LANE CHANNELIZING

NOTES:

1. ANY DETAILS WHICH ARE NOT CITY OF AUSTIN STANDARDS HAVE BEEN PROVIDED BY THE ENGINEER AND ARE SIGNED AND SEALED BY ENGINEER FOR USE ON THIS PROJECT.

STATE OF TEXAS
ADITYA W. JATAR
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PROFESSIONAL ENGINEER
8/8/2017

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

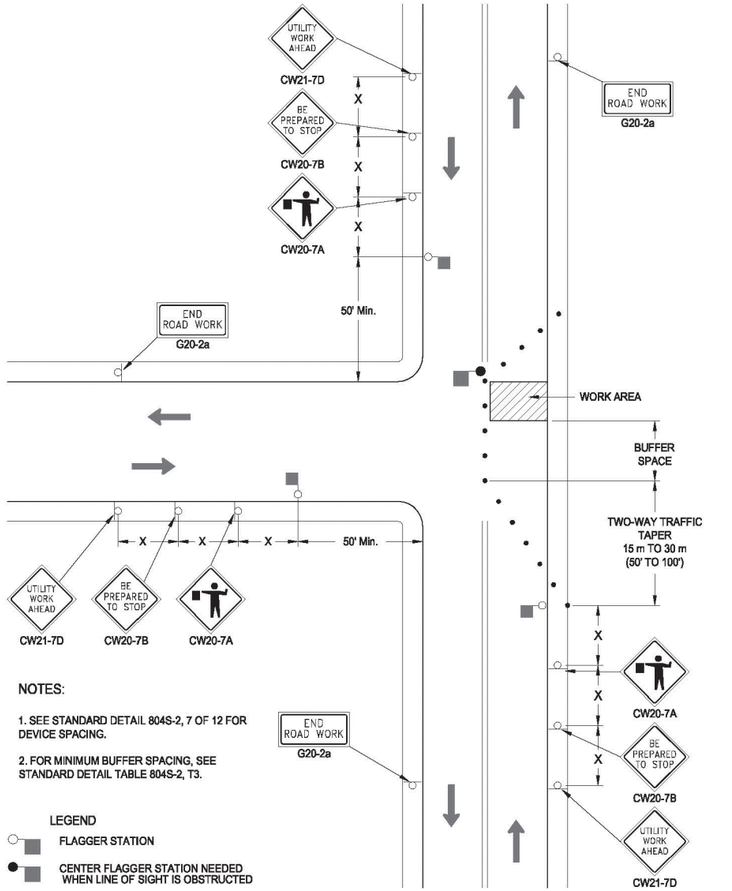
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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				63

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3 APPROACH INTERSECTION FLAGGING OPERATIONS

3 Approach Intersection Flagging Operations

Standard:

1. **Flagger stations shall be located such that approaching road users will have sufficient distance to stop at the intended stopping point.**
2. **All flagger personnel shall follow standard detail 804S-2, 1 & 2 of 11 when conducting flagging operations.**
3. **All flaggers shall have good visual contact or two-way radio contact with each other.**
4. **Flagger stations shall be located far enough in advance of the work space so that approaching road users will have sufficient distance to stop before entering the work space.**

Guidance:

5. Floodlights should be provided as needed to mark flagger stations at night.
6. Table 804S-2, T3:

MINIMUM FLAGGER STATION BUFFER

Speed (mph)	Distance (ft.)
20	35
25	55
30	85
35	120
40	170
45	220
50	280
55	335

Standard:

7. **An Austin Police Officer shall be present for flagging operations performed at a traffic signal controlled intersection.**

3 APPROACH INTERSECTION FLAGGING OPERATIONS

NOTES:

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6	TEXAS	104023–10006	_	14	WILLIAMSON				64

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Bike Lane Closure

Definitions:

Bicycle Lane A portion of a roadway that has been designated by signs and pavement markings for preferential or exclusive use by bicycles.

Bicycle Lane Transition, (L_b) The bicycle lane transition length based on a 7 ft. wide bike lane and an assumed bicycle speed of 10mph.

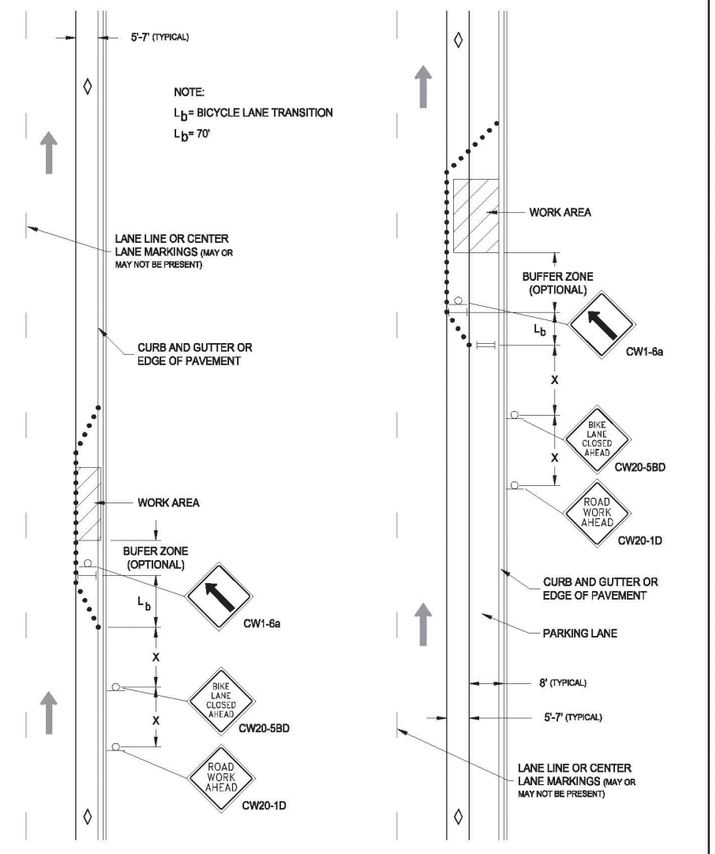
Standard:

1. **A bike lane closure shall be used anytime work activity encroaches into a portion of or closes a bicycle lane.**
2. **Advance warning signs for a bicycle lane closure shall consist of a Road Work/Utility Work Ahead sign and a Bike Lane Closed sign.**
3. **Where signs serve both bicyclists and other road users, vertical mounting height and lateral placement shall be as specified in 804S-5, 6 & 7 of 13.**
4. **If a sign applies to motorists and bicyclists, then the size shall be as shown for conventional roads in 804S-5, 6 & 7 of 13.**
5. **A type-I barricade shall be set at the end of the bike lane transition area to physically close the bike lane to prevent bicyclist's entry into the work zone.**
6. **A CW1-6a (Slant Arrow) sign shall be placed behind the type-I barricade to inform road users of the shared pathway around the work area.**

Guidance:

7. Where work activity is expected to block a traffic lane of a roadway with a bicycle lane, a Bike Lane Closure should be set prior to the traffic lane closure.

BIKE LANE CLOSURE



BIKE LANE CLOSURE

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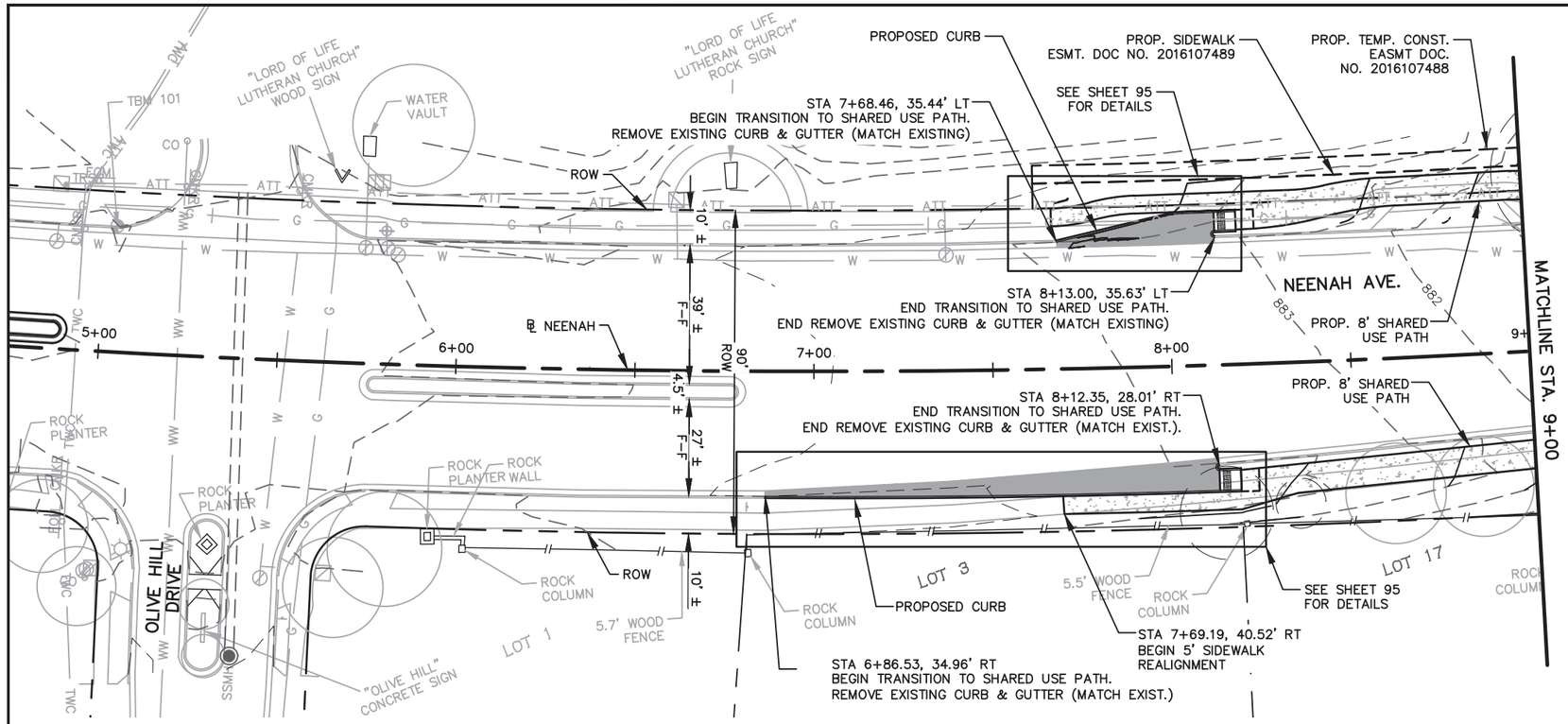
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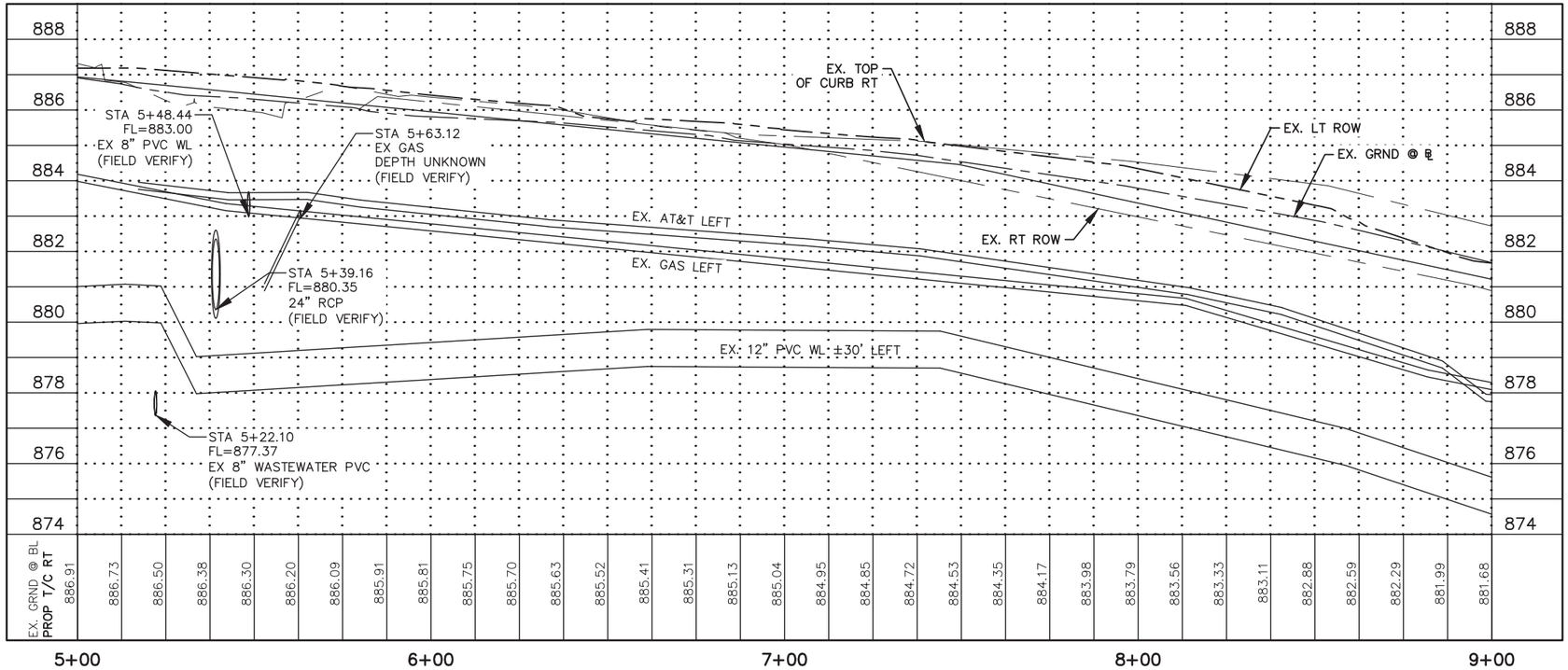
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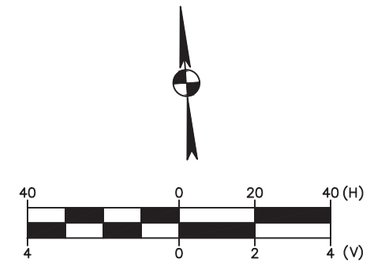
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				65

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12. REFER TO PROJECT CONTROL LAYOUT SHEET 2 FOR HORIZONTAL ALIGNMENT OF SHARED USE PATHS.

8-4-17
STATE OF TEXAS
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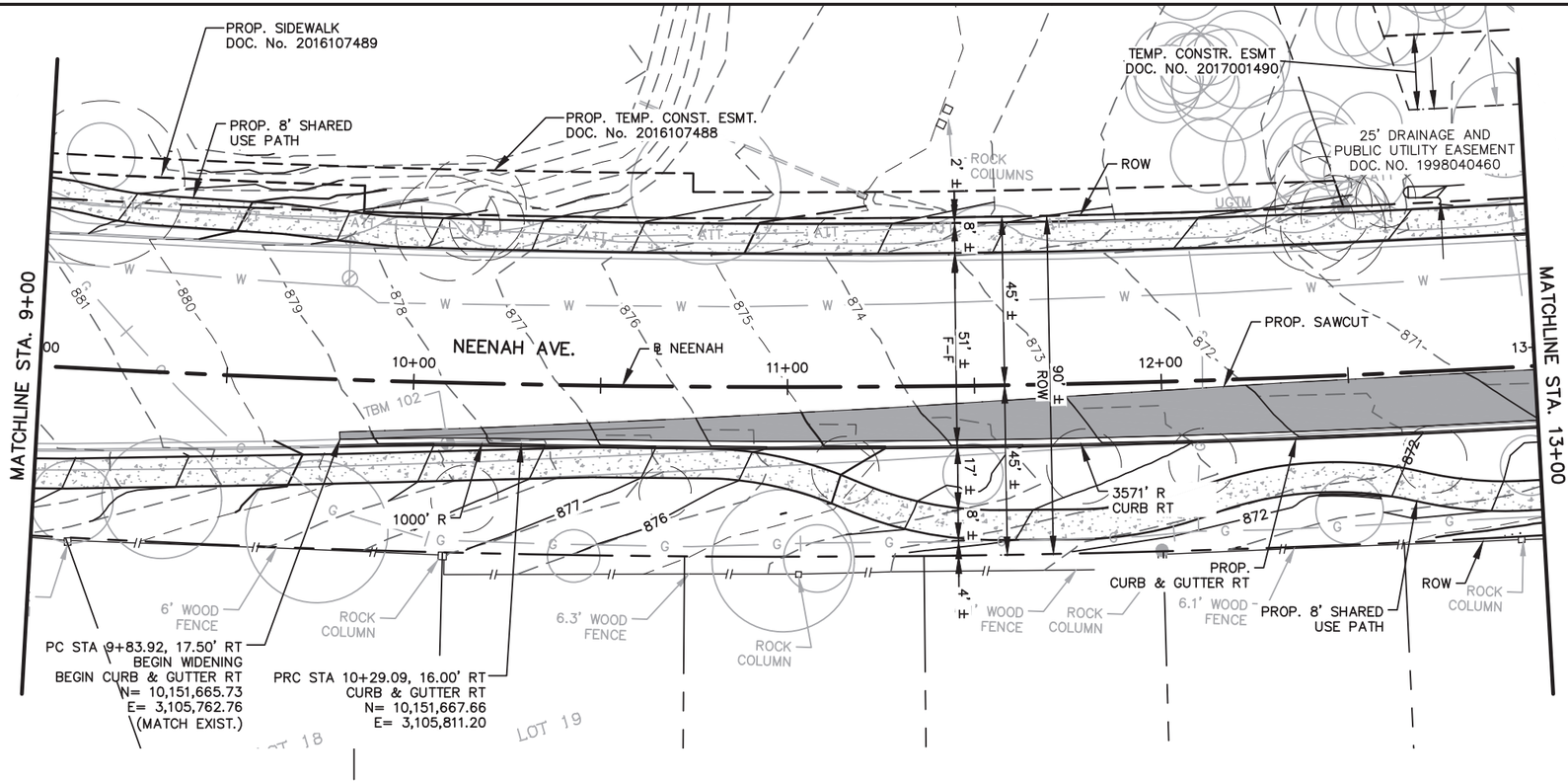
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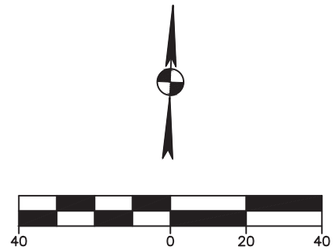
SHEET 66 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				66

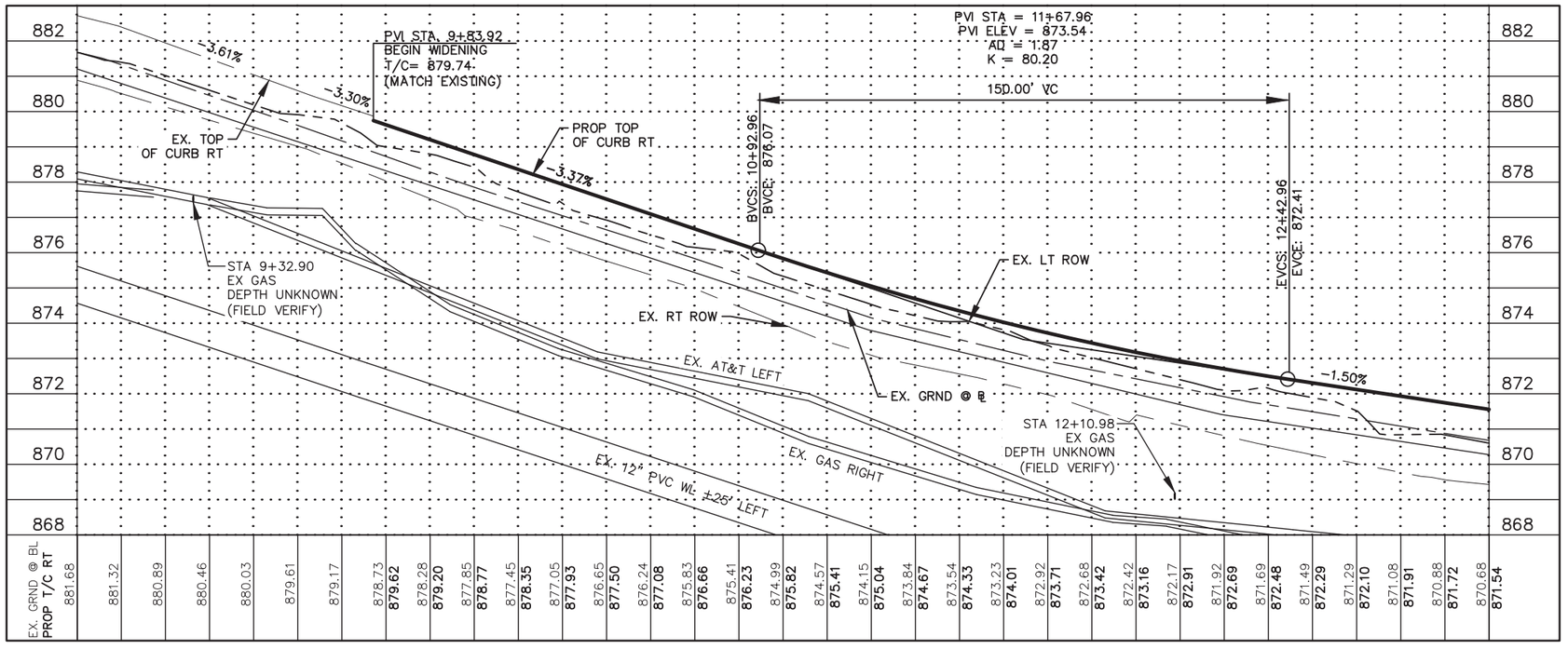
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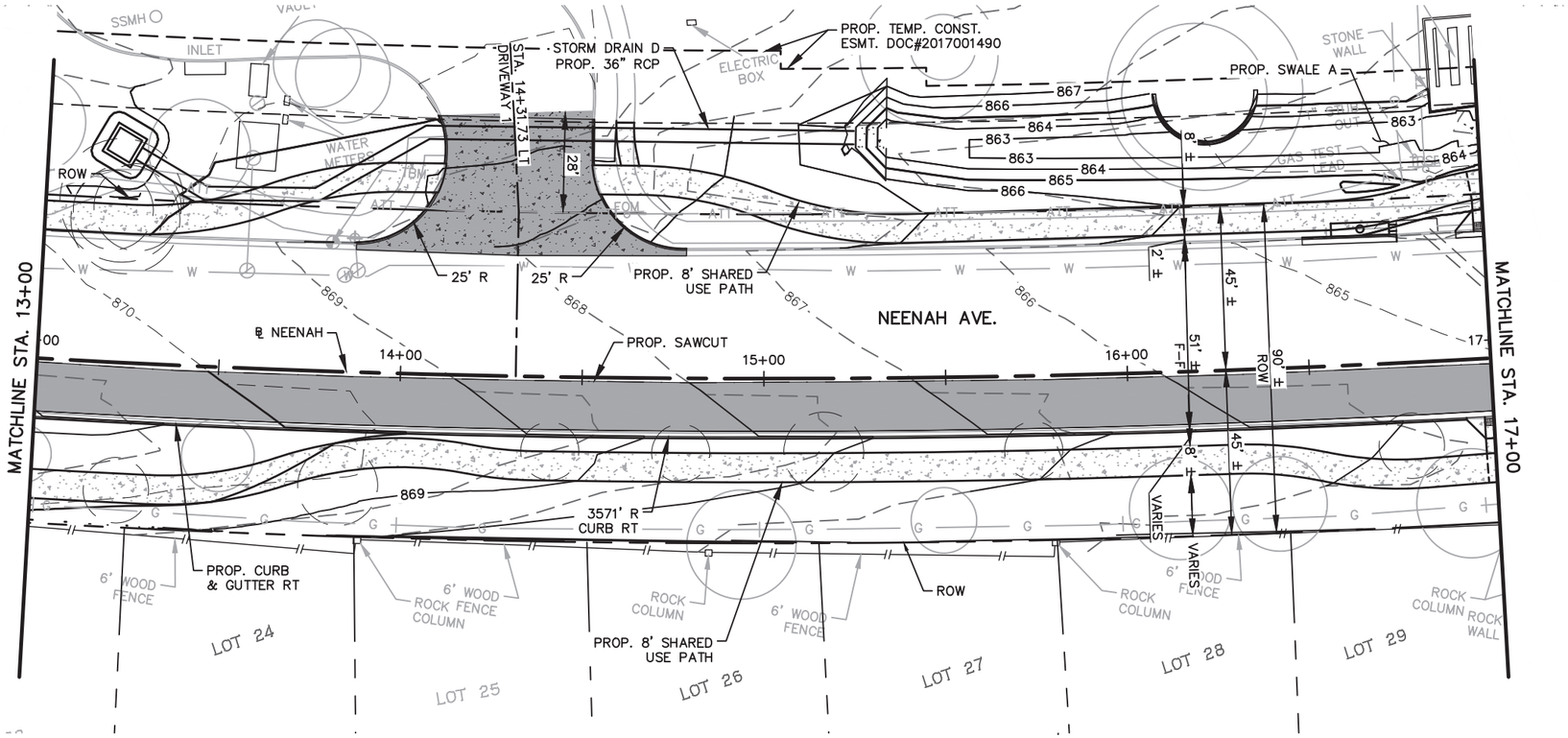
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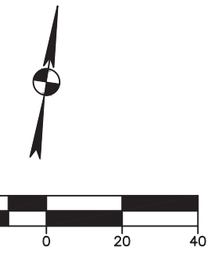
SHEET 67 OF 273

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6	TEXAS	104023–10006	_	14	WILLIAMSON				67

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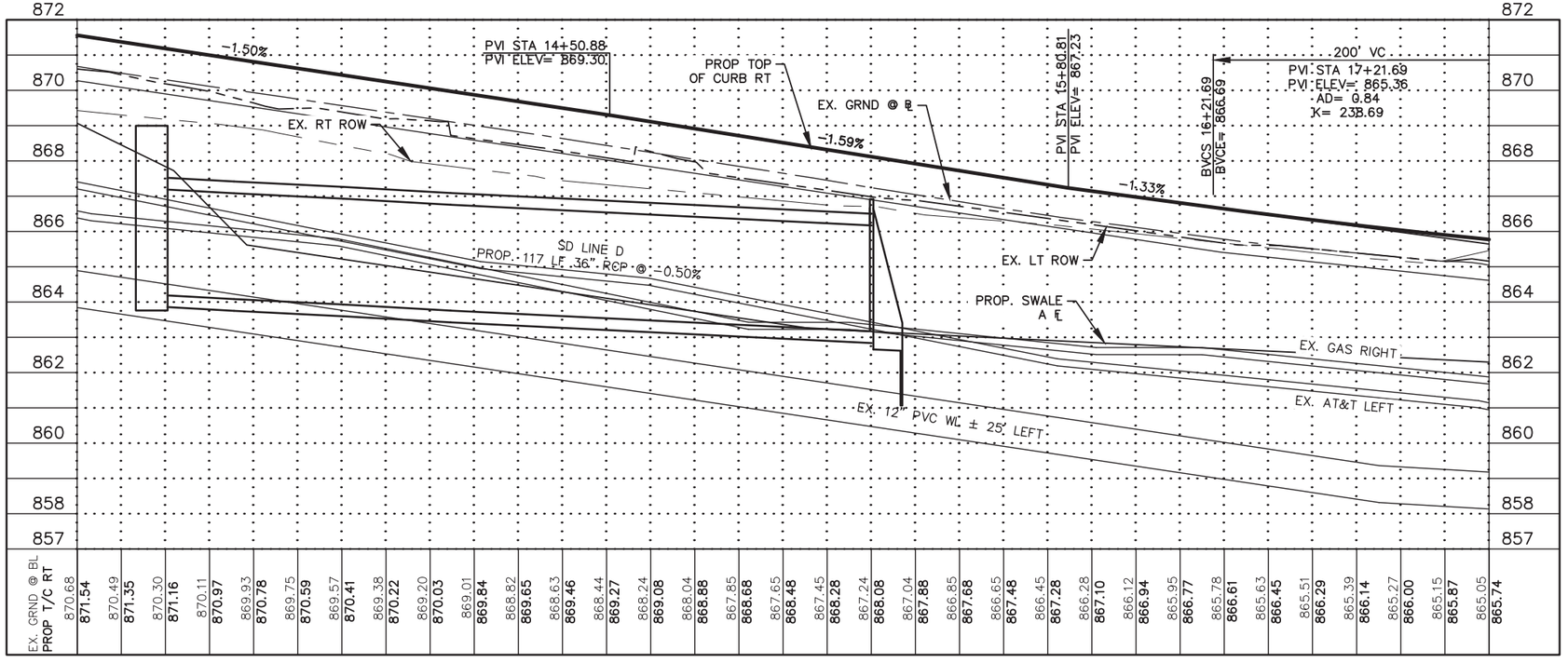
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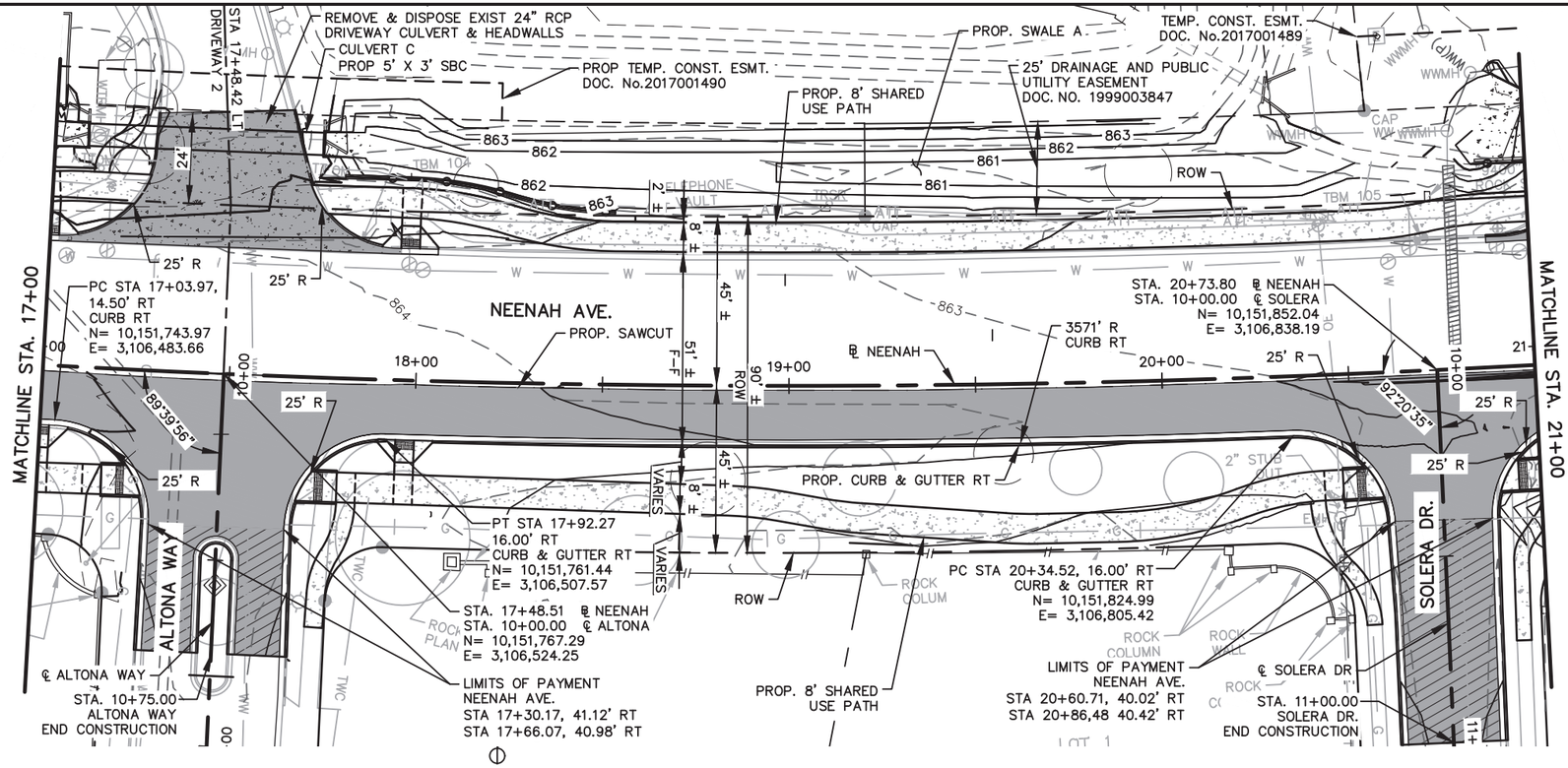
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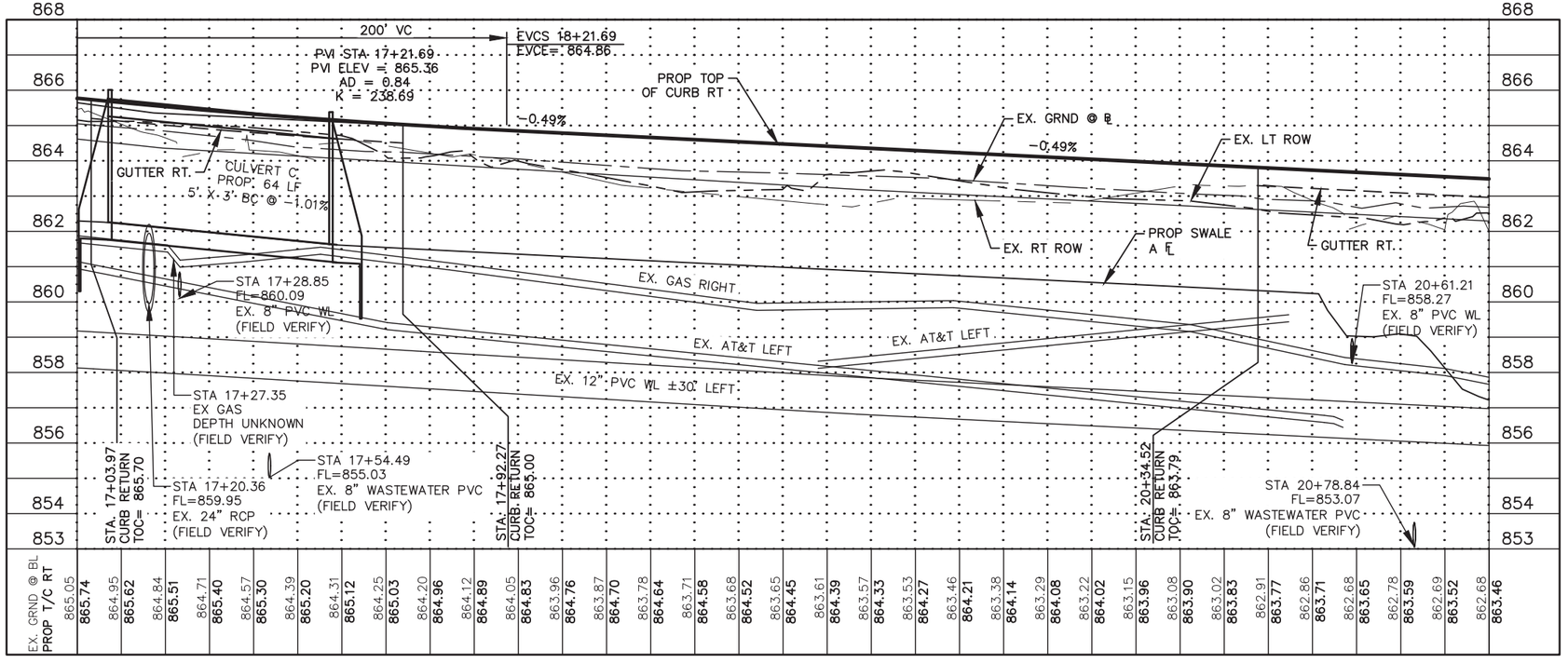
SHEET 68 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				68

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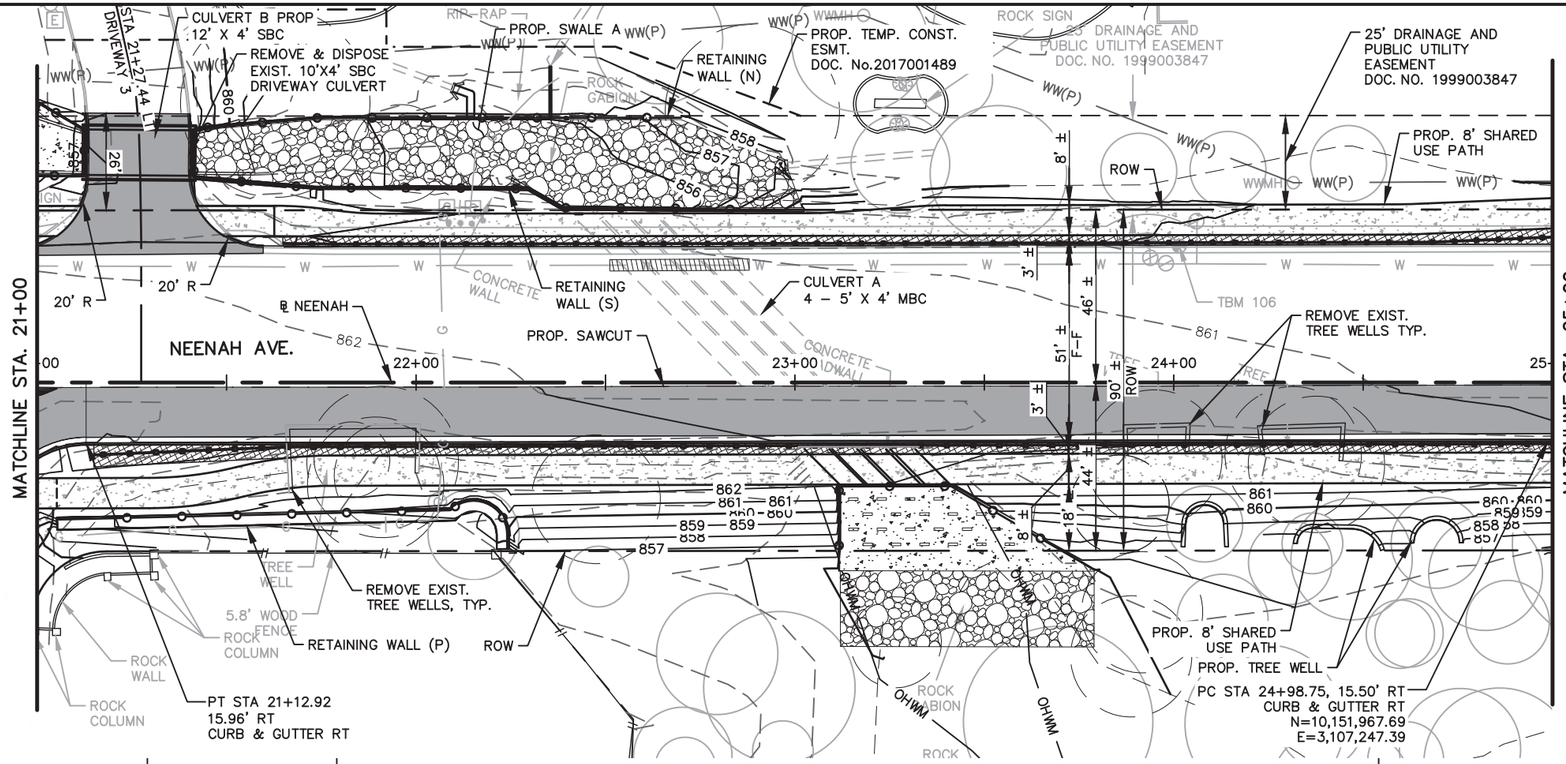
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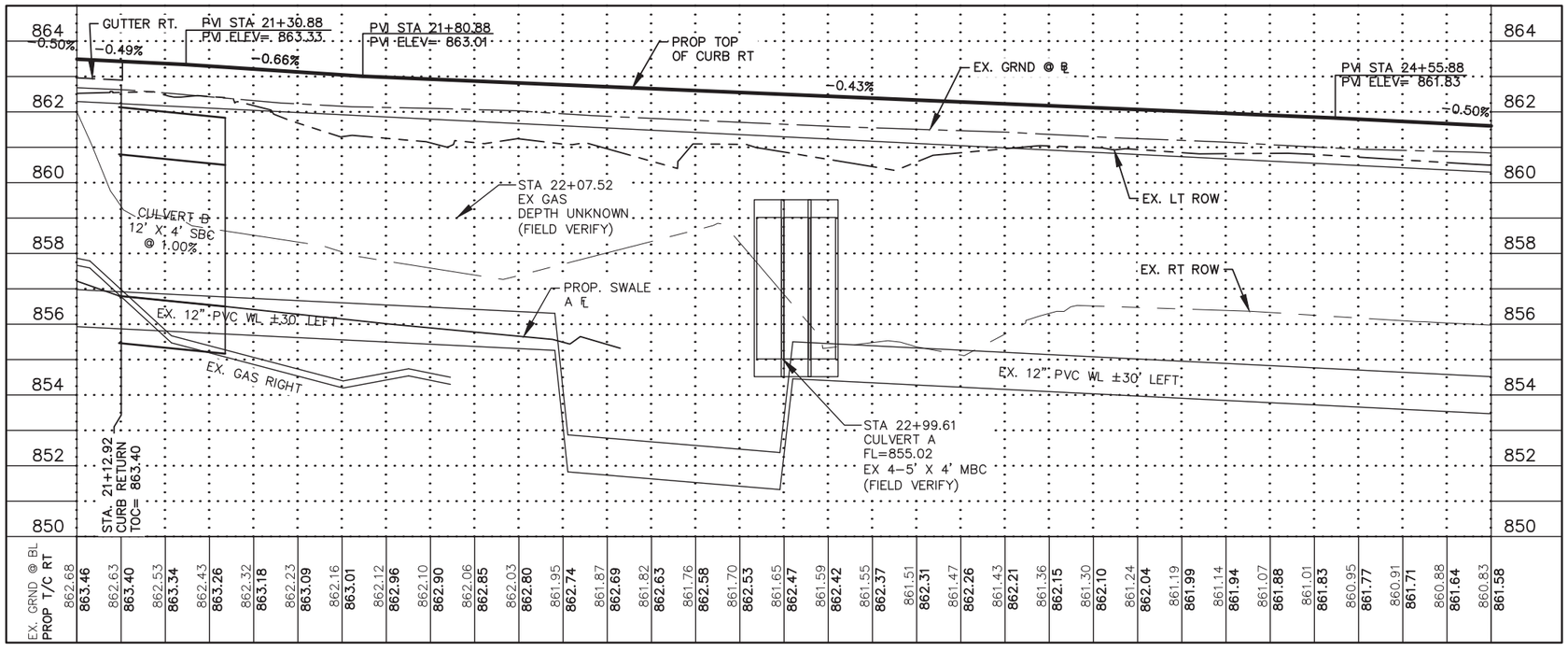
SHEET 69 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				69

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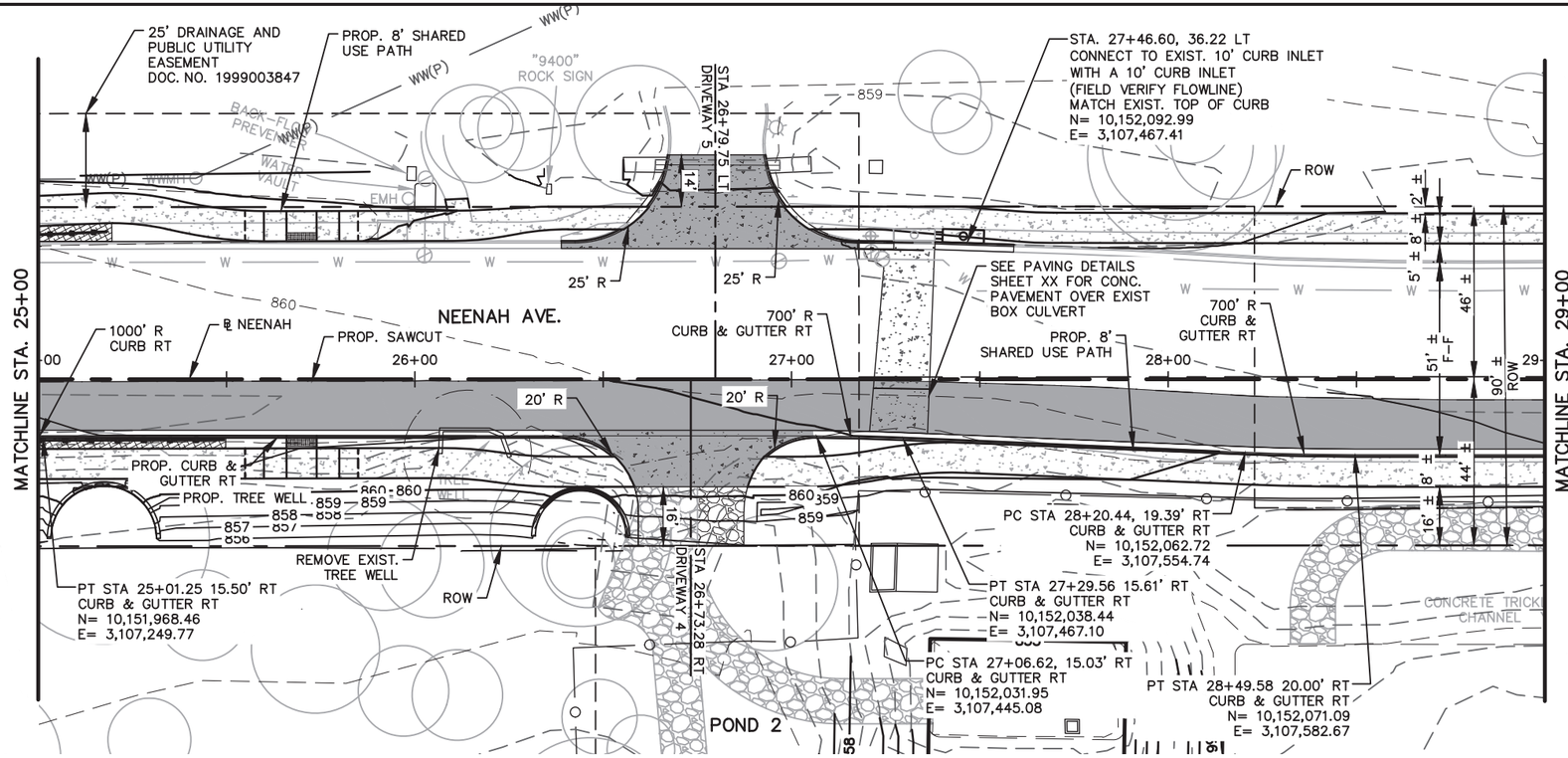
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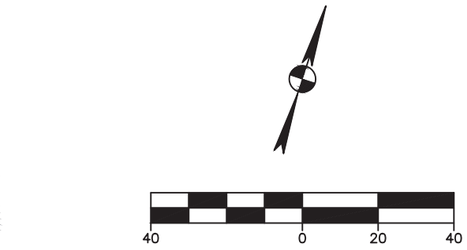
NEENAH AVE. PLAN AND PROFILE
STA. 21+00 TO STA. 25+00

SHEET 70 OF 273

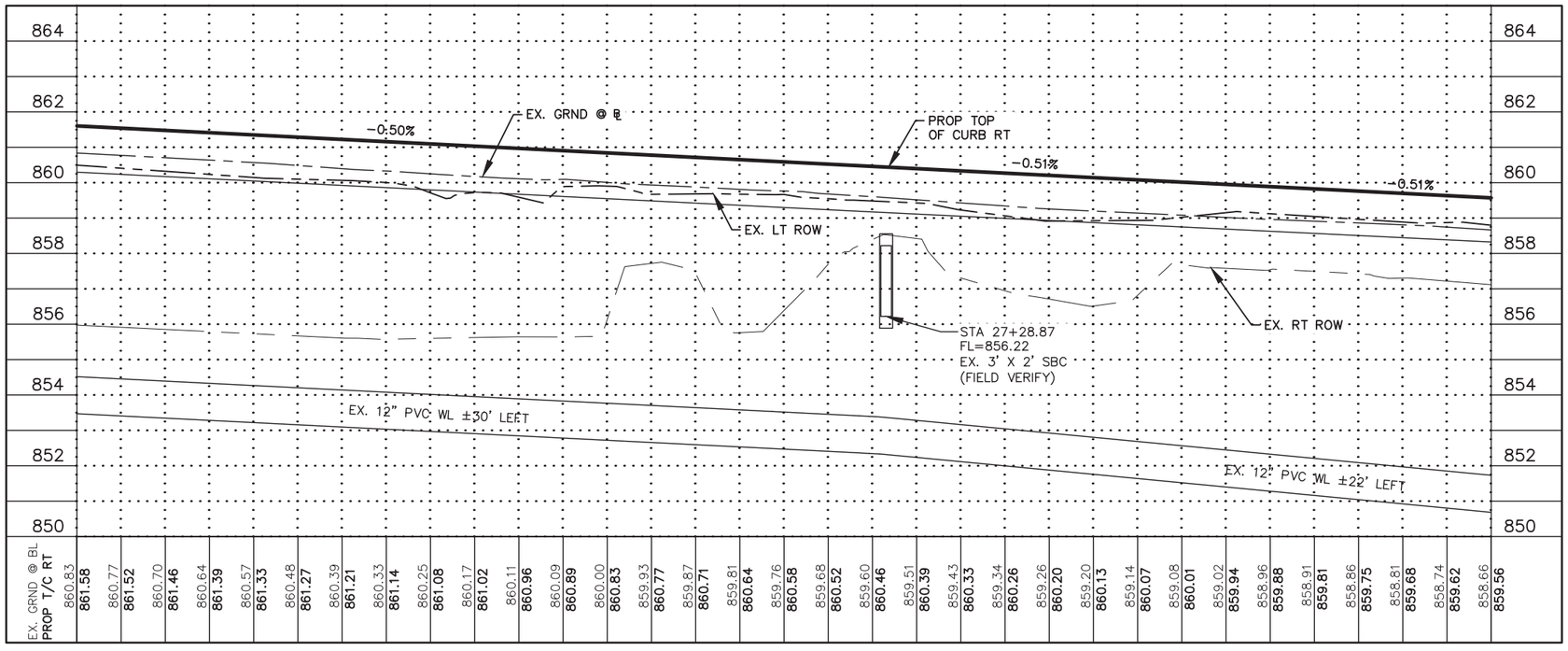
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6	TEXAS	104023–10006	_	14	WILLIAMSON				70

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10. THE WIDTH OF PROPOSED PAVEMENT VARIES ALONG THE LENGTH OF THE PROJECT.
11. ALL EXISTING STORM DRAIN IS TO REMAIN, UNLESS OTHERWISE NOTED.
12. REFER TO PROJECT CONTROL LAYOUT SHEET 2 FOR HORIZONTAL ALIGNMENT OF SHARED USE PATHS.



8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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NEENAH AVE. PLAN AND PROFILE STA. 25+00 TO STA. 29+00

SHEET 71 OF 273

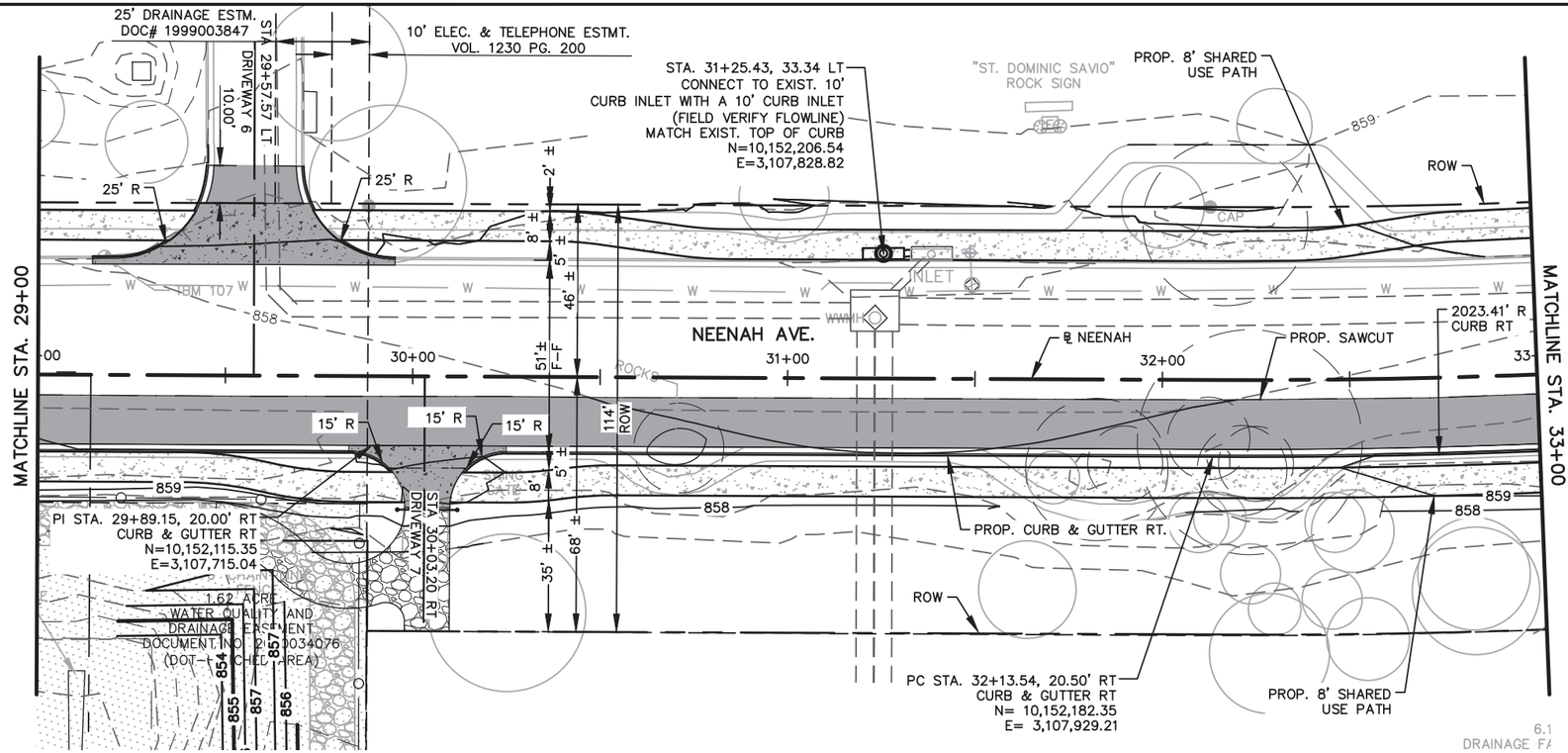
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				71

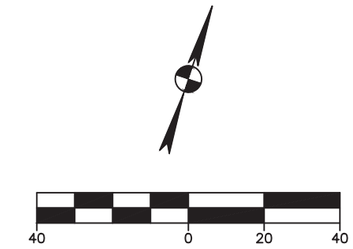
SP-2016-0186D

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Williamson County, Texas

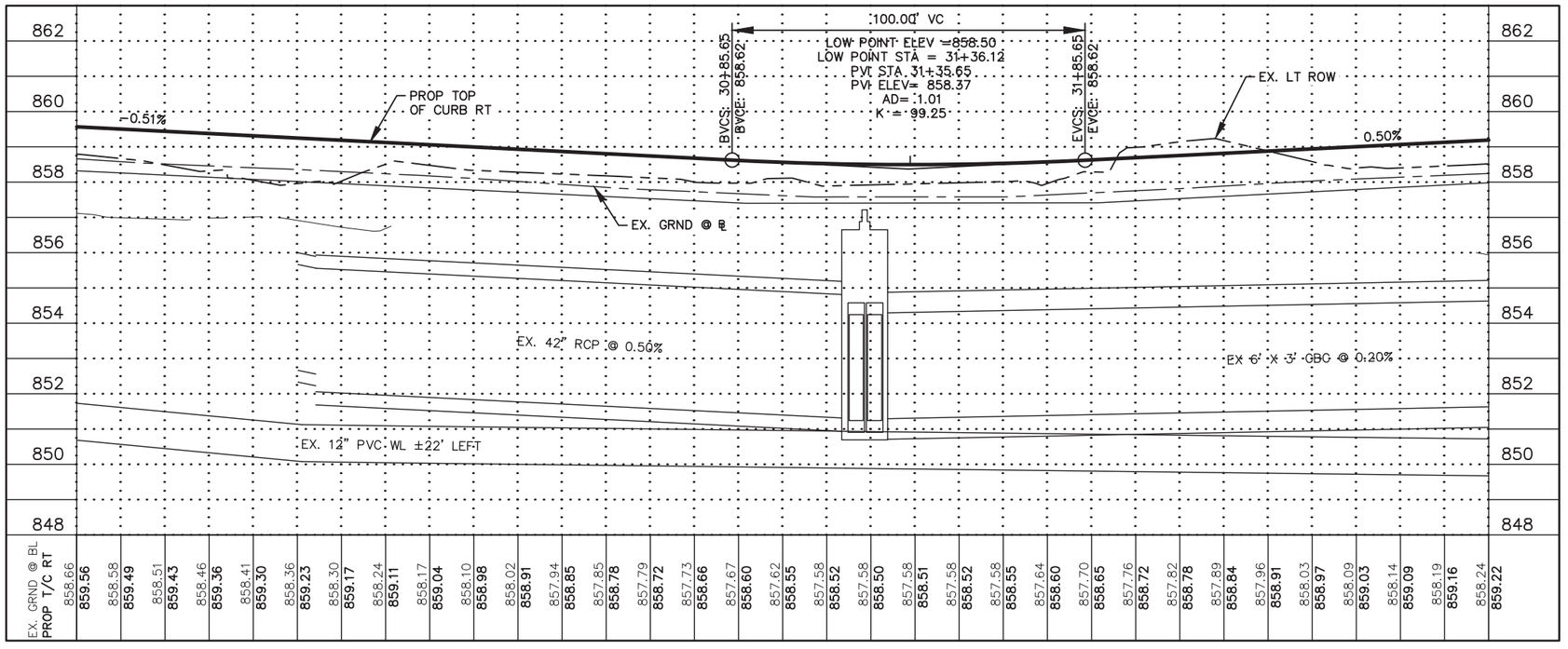
Bid 1710-194





NOTES:

1. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
2. REFER TO INTERSECTION LAYOUT SHEETS FOR MORE INFORMATION.
3. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
4. REFER TO SIGNING AND PAVEMENT MARKING LAYOUT SHEETS FOR MORE INFORMATION AND GUARD FENCE PLACEMENT.
5. REFER TO DRAINAGE SHEETS FOR MORE INFORMATION.
6. MATCH EXIST X-SLOPES AT TIE-IN LOCATIONS.
7. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
8. SAWCUT, REMOVE AND DISPOSE EXISTING PAVEMENT EDGE AND SOUTH CURB & GUTTER.
9. REMOVE AND DISPOSE EXISTING SIDEWALKS AND CURB RAMPS WITHIN SHARED USE PATH LIMITS.
10. THE WIDTH OF PROPOSED PAVEMENT VARIES ALONG THE LENGTH OF THE PROJECT.
11. ALL EXISTING STORM DRAIN IS TO REMAIN, UNLESS OTHERWISE NOTED.
12. REFER TO PROJECT CONTROL LAYOUT SHEET 2 FOR HORIZONTAL ALIGNMENT OF SHARED USE PATHS.



8.4.17
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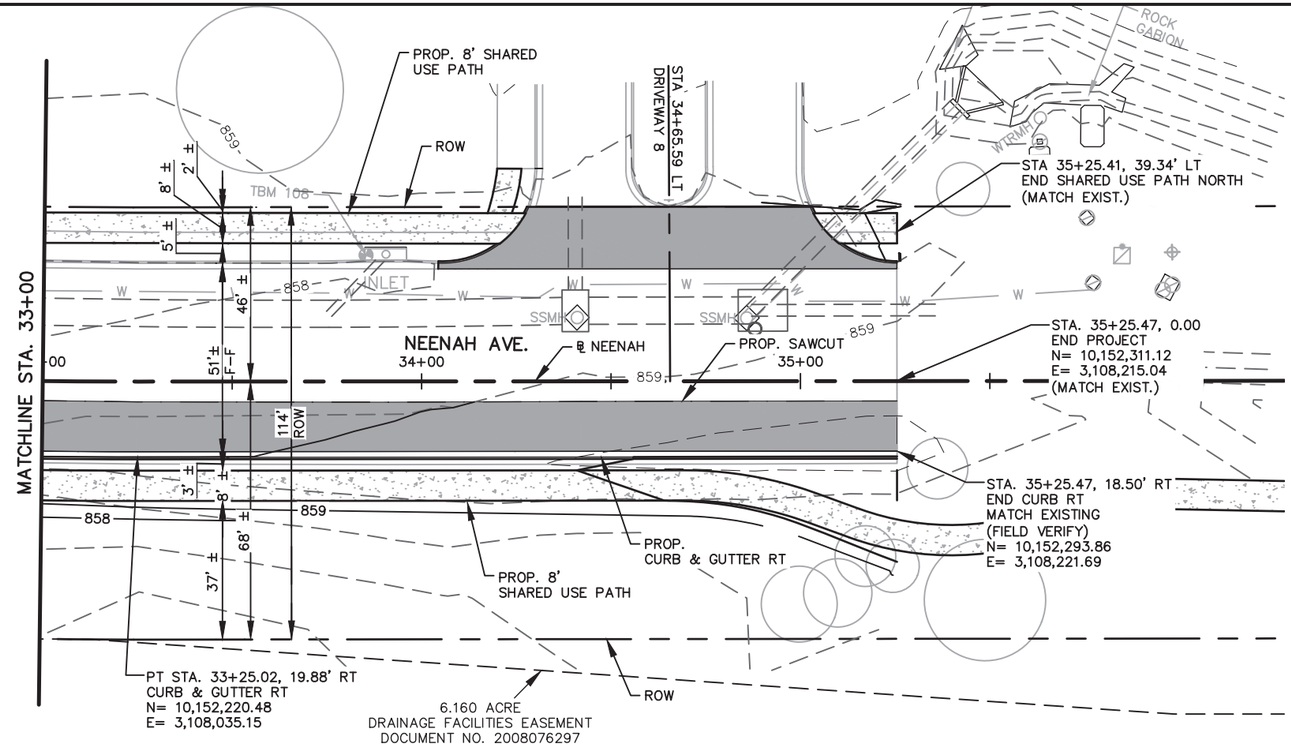
NEENAH AVE. PLAN AND PROFILE
STA. 29+00 TO STA. 33+00

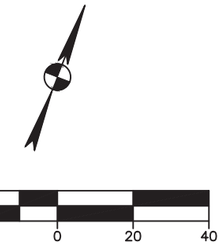
SHEET 72 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				72

SP-2016-0186D

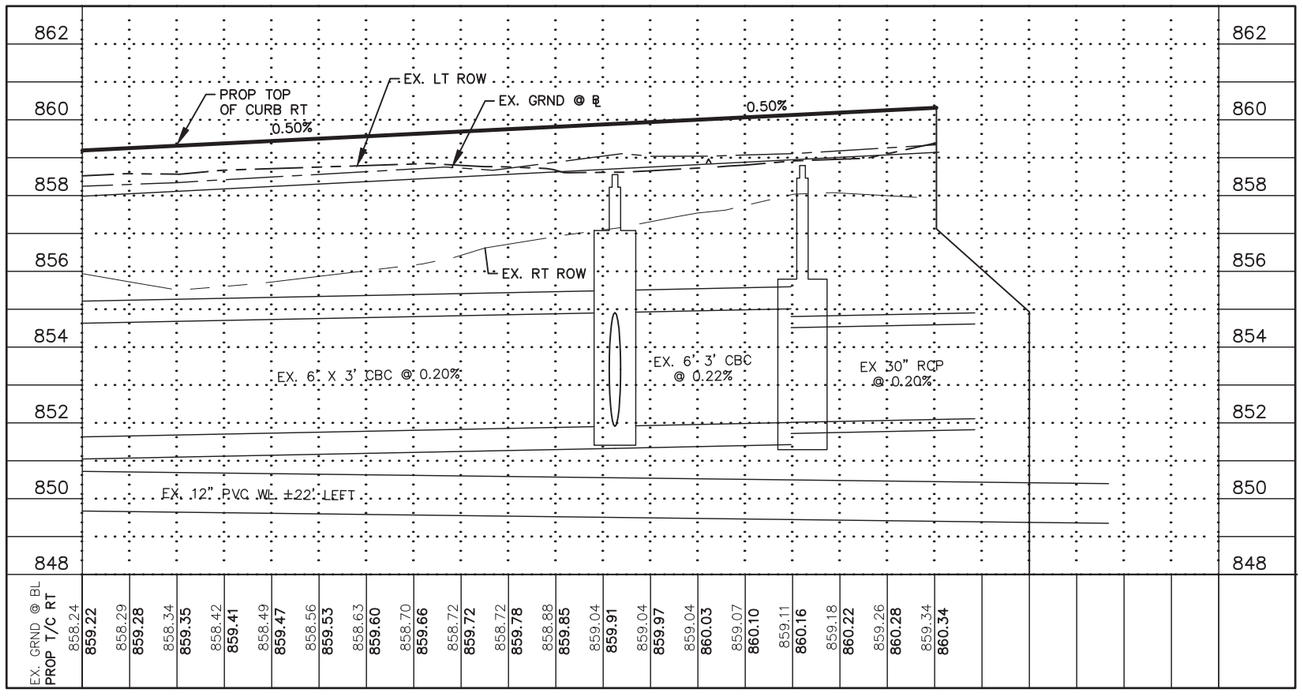
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NOTES:

1. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
2. REFER TO INTERSECTION LAYOUT SHEETS FOR MORE INFORMATION.
3. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
4. REFER TO SIGNING AND PAVEMENT MARKING LAYOUT SHEETS FOR MORE INFORMATION AND GUARD FENCE PLACEMENT.
5. REFER TO DRAINAGE SHEETS FOR MORE INFORMATION.
6. MATCH EXIST X-SLOPES AT TIE-IN LOCATIONS.
7. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
8. SAWCUT, REMOVE AND DISPOSE EXISTING PAVEMENT EDGE AND SOUTH CURB & GUTTER.
9. REMOVE AND DISPOSE EXISTING SIDEWALKS AND CURB RAMPS WITHIN SHARED USE PATH LIMITS.
10. THE WIDTH OF PROPOSED PAVEMENT VARIES ALONG THE LENGTH OF THE PROJECT.
11. ALL EXISTING STORM DRAIN IS TO REMAIN, UNLESS OTHERWISE NOTED.
12. REFER TO PROJECT CONTROL LAYOUT SHEET 2 FOR HORIZONTAL ALIGNMENT OF SHARED USE PATHS.
13. THE EXTENSION OF NEENAH AVE IS UNDER CONSTRUCTION. CONTRACTOR TO VERIFY ELEVATIONS AT PROJECT END AND MATCH EXISTING PAVEMENT.



8.4.17
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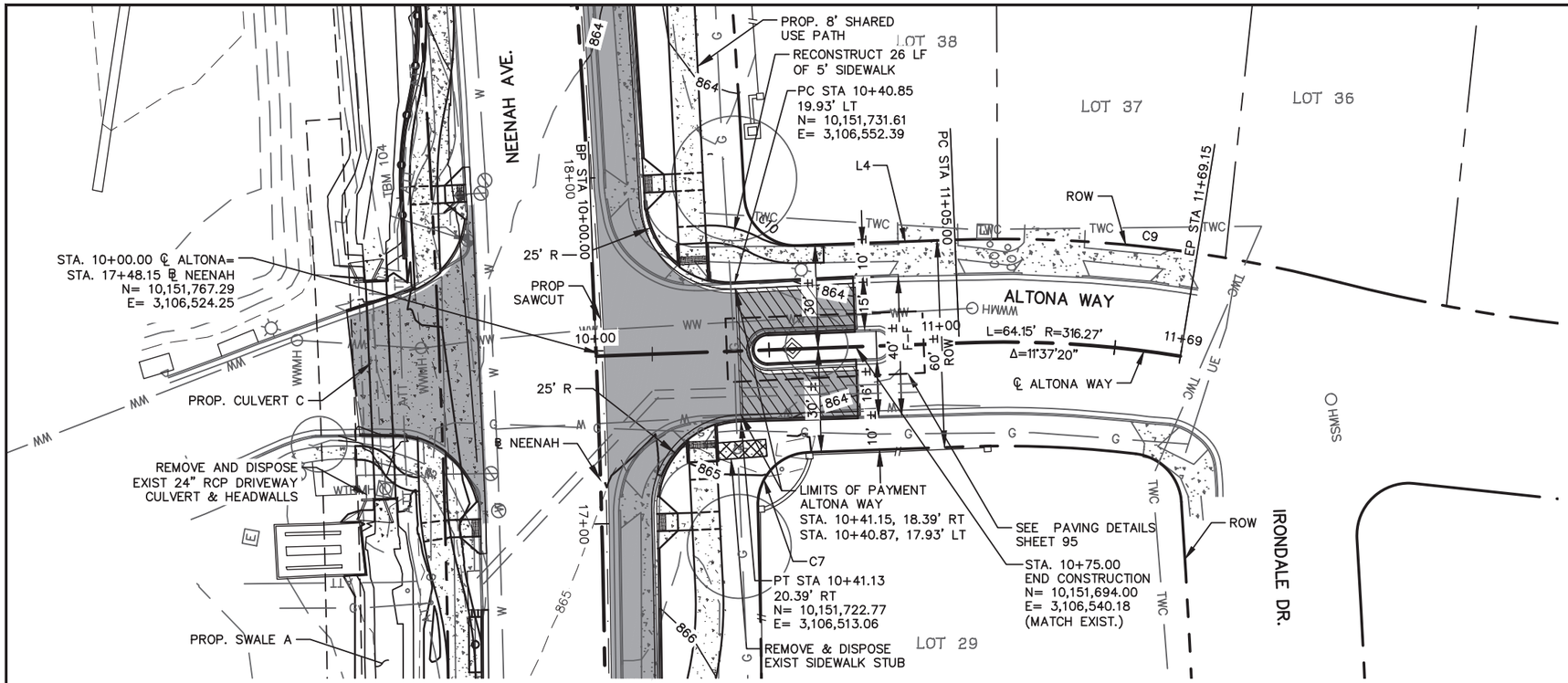
NEENAH AVE. PLAN AND PROFILE STA. 33+00 TO END

SHEET 73 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				73

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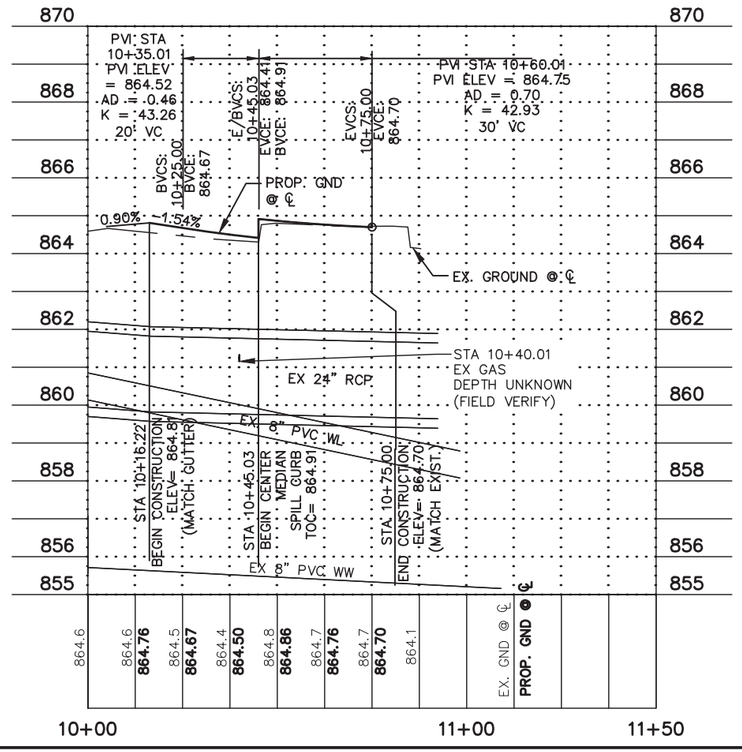
1" = 40'

NOTES:

1. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED ALTONA CENTERLINE, UNLESS OTHERWISE NOTED IN THE PLANS.
2. REFER TO INTERSECTION LAYOUT SHEETS FOR MORE INFORMATION.
3. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
4. REFER TO SIGNING AND PAVEMENT MARKING LAYOUT SHEETS FOR MORE INFORMATION AND GUARD FENCE PLACEMENT.
5. REFER TO DRAINAGE SHEETS FOR MORE INFORMATION.
6. MATCH EXIST X–SLOPES AT TIE–IN LOCATIONS.
7. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
8. SAWCUT, REMOVE AND DISPOSE EXISTING PAVEMENT EDGE AND SOUTH CURB & GUTTER.
9. REMOVE AND DISPOSE EXISTING SIDEWALKS AND CURB RAMPS WITHIN SHARED USE PATH LIMITS.
10. ALL EXISTING STORM DRAIN IS TO REMAIN, UNLESS OTHERWISE NOTED.
11. CONTRACTOR SHALL PROTECT EXISTING SIDEWALKS NOT SHOWN FOR RECONSTRUCTION.
12. CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS WITHIN CENTER MEDIAN.
13. REFER TO INTERSECTION PLANS FOR CURB RAMP AND SIDEWALK INFORMATION.
14. MILL BUTT JOINT AT 1"(V): 40'(H) TAPER TO ACHIEVE MINIMUM LEVEL–UP THICKNESS OF 1.5" AT STA. 10+75.00.

LEGEND:

MILL & LEVEL UP



8.4.17

STATE OF TEXAS
STEPHANIE D. BLEW
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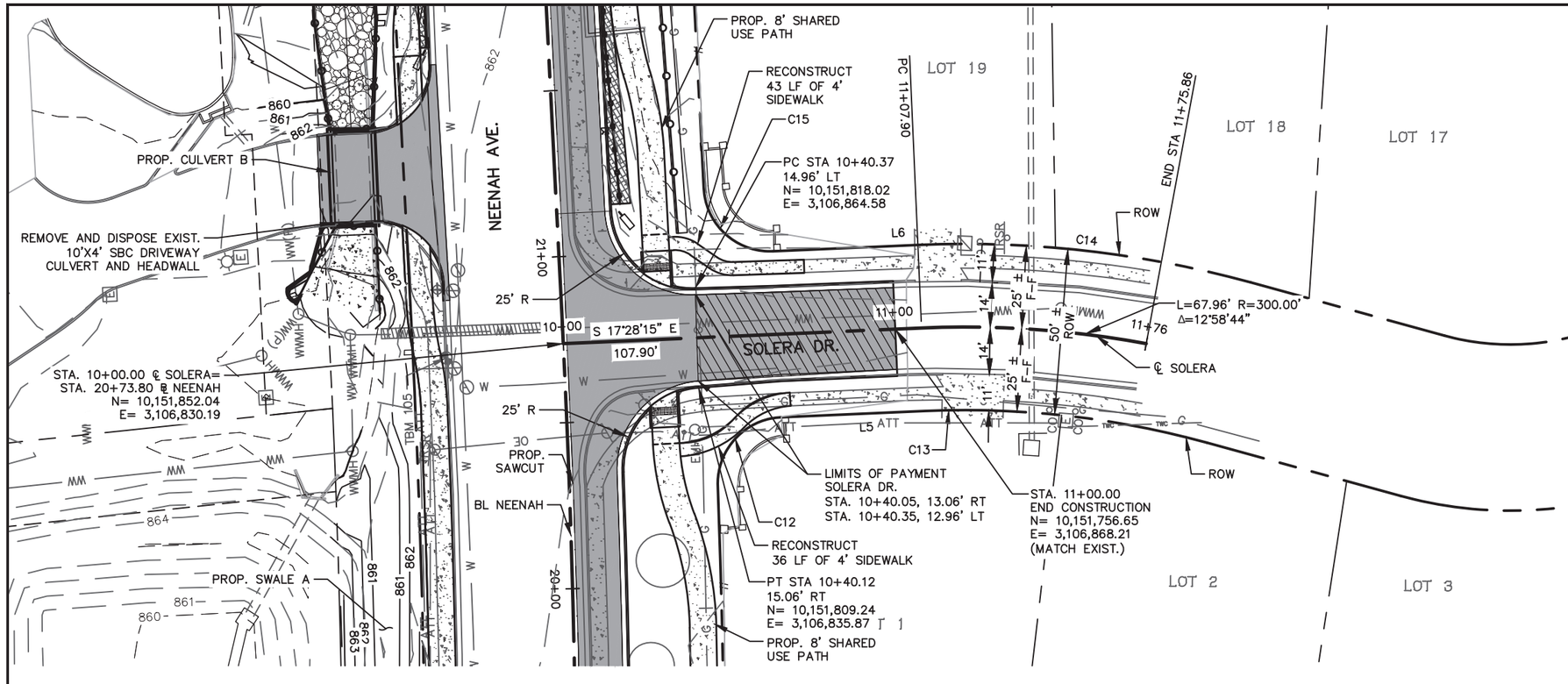
ALTONA WAY PLAN AND PROFILE
STA. 10+00 TO STA. 12+00

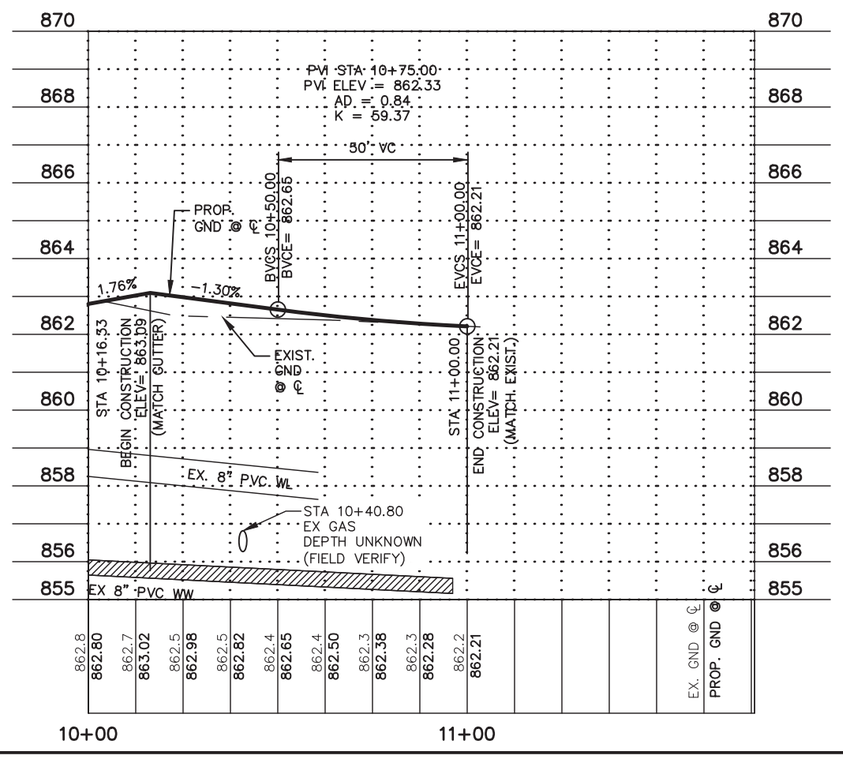
SHEET 74 OF 273

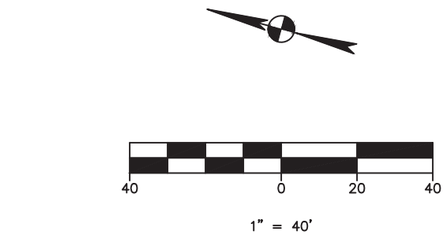
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				74

SP-2016-0186D

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NOTES:

1. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED SOLERA CENTERLINE, UNLESS OTHERWISE NOTED IN THE PLANS.
2. REFER TO INTERSECTION LAYOUT SHEETS FOR MORE INFORMATION.
3. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
4. REFER TO SIGNING AND PAVEMENT MARKING LAYOUT SHEETS FOR MORE INFORMATION AND GUARD FENCE PLACEMENT.
5. REFER TO DRAINAGE SHEETS FOR MORE INFORMATION.
6. MATCH EXIST X-SLOPES AT TIE-IN LOCATIONS.
7. REFER TO UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
8. SAWCUT, REMOVE AND DISPOSE EXISTING PAVEMENT EDGE AND SOUTH CURB & GUTTER.
9. REMOVE AND DISPOSE EXISTING SIDEWALKS AND CURB RAMPS WITHIN SHARED USE PATH LIMITS.
10. ALL EXISTING STORM DRAIN IS TO REMAIN UNLESS OTHERWISE NOTED.
11. CONTRACTOR SHALL PROTECT EXISTING SIDEWALKS NOT SHOWN FOR RECONSTRUCTION.
12. REFER TO INTERSECTION PLANS FOR CURB RAMP AND SIDEWALK INFORMATION.
13. MILL BUTT JOINT AT 1"(V):40'(H) TAPER TO ACHIEVE MINIMUM LEVEL-UP THICKNESS OF 1.5" AT STA. 11+00.00.

LEGEND:

MILL & LEVEL UP

8.4.17

STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER

Stephanie D Blew

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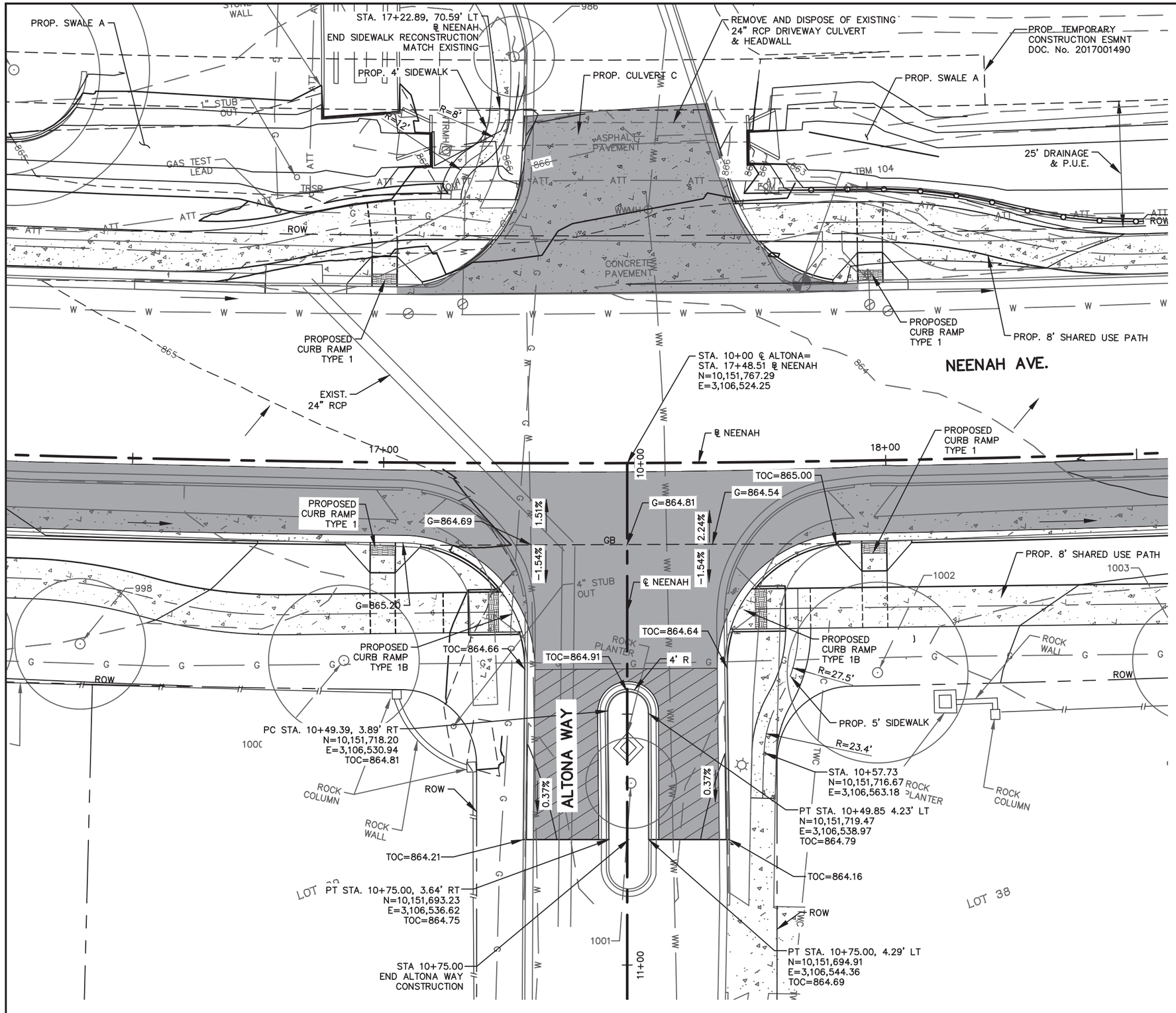
SOLERA DR. PLAN AND PROFILE
STA. 10+00 TO STA. 12+00

SHEET 75 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				75

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20 0 10 20

1" = 20'

NOTES:
1. REFER TO ROADWAY PLAN AND PROFILE SHEETS FOR MORE INFORMATION.
2. REFER TO SIGNAGE AND PAVEMENT MARKING LAYOUT SHEETS FOR MORE INFORMATION AND GUARD FENCE.
3. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED ALTONA CENTERLINE UNLESS OTHERWISE NOTED.
4. MILL BUTT JOINT USING 1"(V):40'(H) TAPER TO ACHIEVE MINIMUM LEVEL-UP THICKNESS OF 1.5" AT STA. 10+75.00.
5. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.

LEGEND

→	FLOW ARROW
ROW	ROW
859	PROP. CONTOURS
860	EXIST. CONTOURS
	EXIST. WOOD FENCE
GB	GRADE BREAK
TOC =	PROP. TOP OF CURB ELEV.
G =	PROP. GUTTER ELEV.
TOP =	PROP. TOP OF PAVEMENT ELEV.
	MILL & LEVEL UP

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
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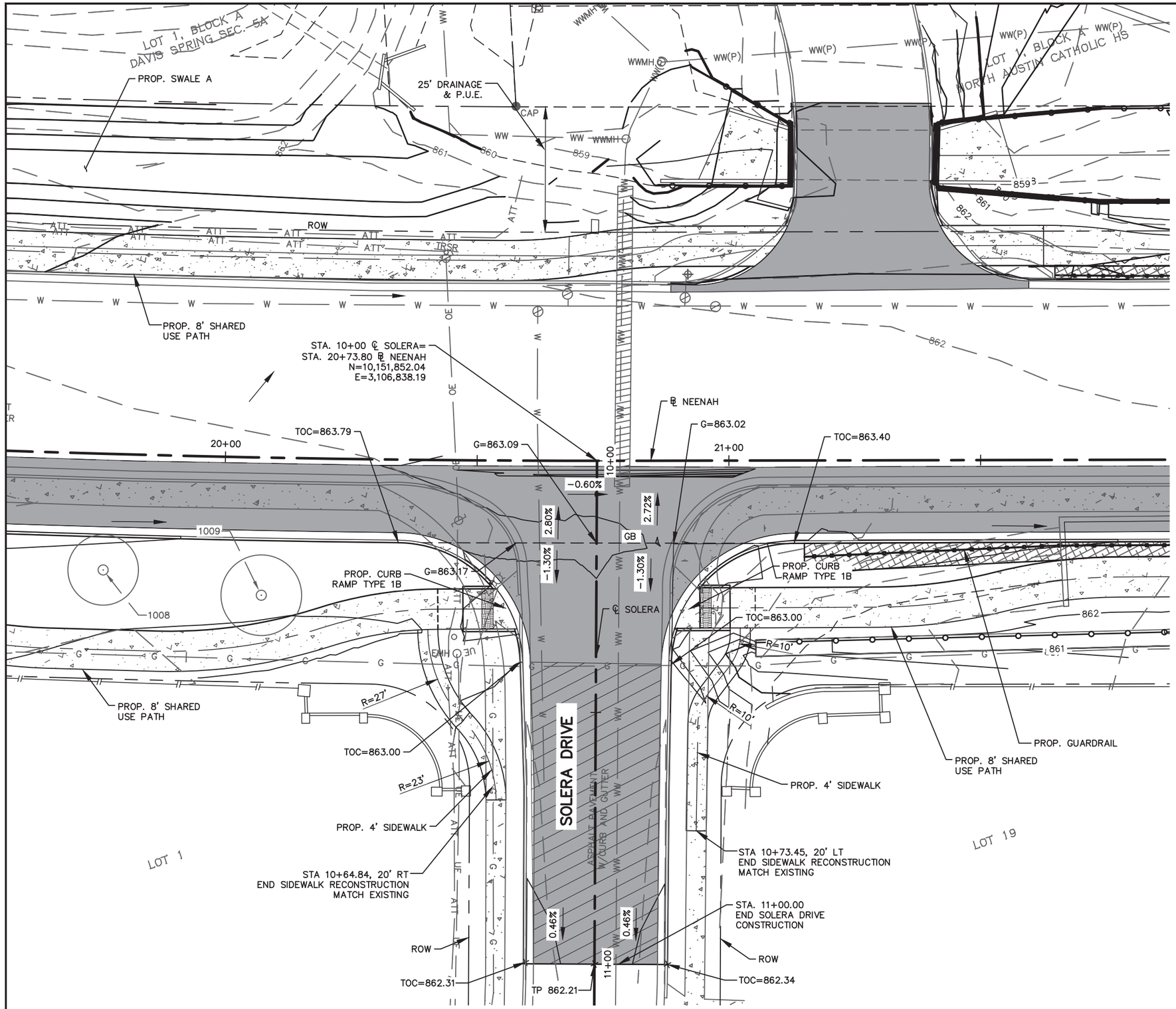
INTERSECTION PLAN
ALTONA WAY

SHEET 76 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				76

SP-2016-0186D

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20 0 10 20

1" = 20'

NOTES:

1. REFER TO ROADWAY PLAN AND PROFILE SHEETS FOR MORE INFORMATION.
2. REFER TO SIGNAGE AND PAVEMENT MARKING LAYOUT SHEETS FOR MORE INFORMATION AND GUARD FENCE.
3. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED SOLERA CENTERLINE UNLESS OTHERWISE NOTED.
4. MILL BUTT JOINT USING 1"(V): 40'(H) TAPER TO ACHIEVE MINIMUM LEVEL-UP THICKNESS OF 1.5" AT STA. 11+00.00.
5. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.

LEGEND

→	FLOW ARROW
———	ROW
859	PROP. CONTOURS
860	EXIST. CONTOURS
———	EXIST. WOOD FENCE
GB	GRADE BREAK
TOC =	PROP. TOP OF CURB ELEV.
G =	PROP. GUTTER ELEV.
TOP =	PROP. TOP OF PAVEMENT ELEV.
▨	MILL & LEVEL UP

8-4-17

STATE OF TEXAS
STEPHANIE D. BLEW
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Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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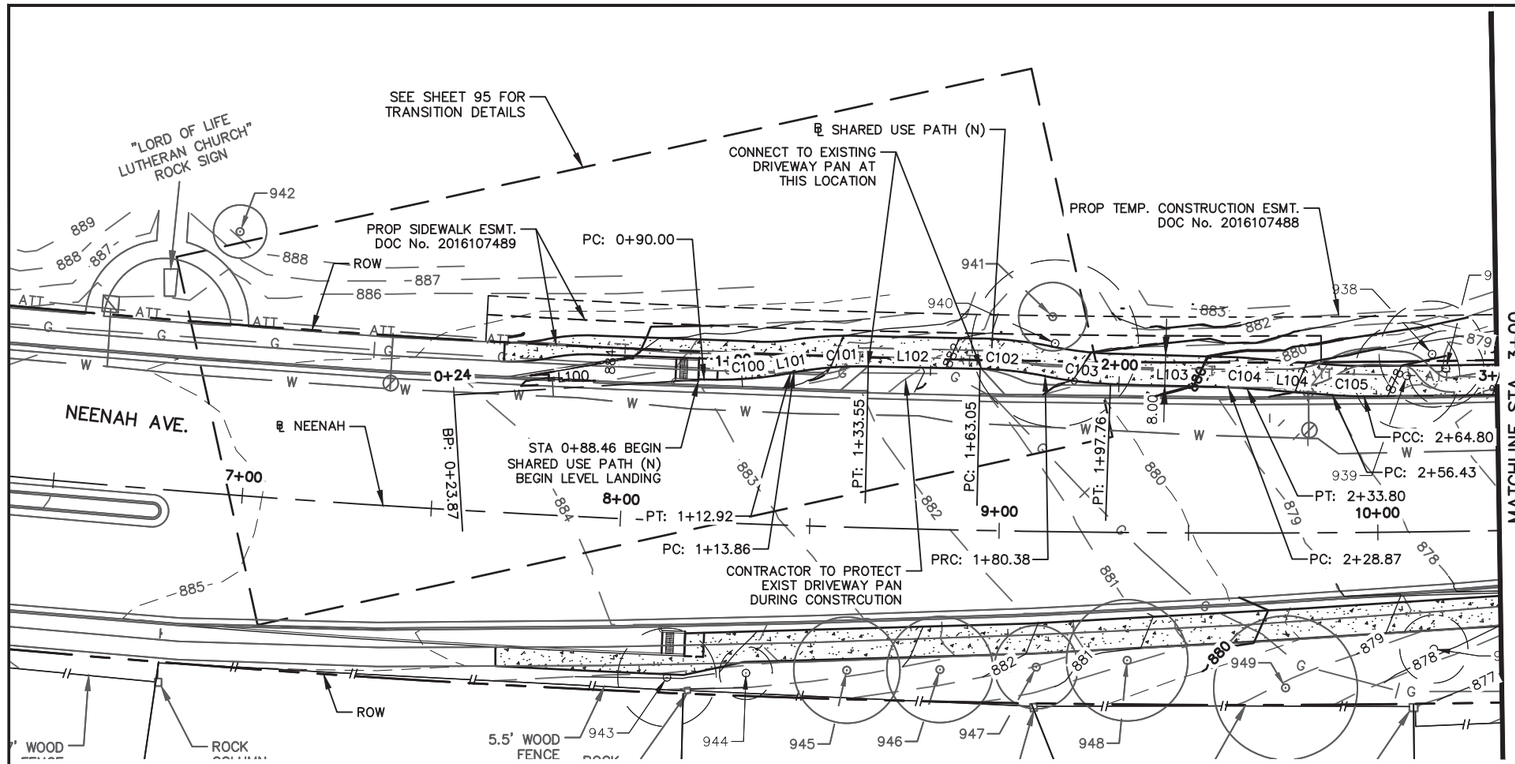
INTERSECTION PLAN
SOLERA DR.

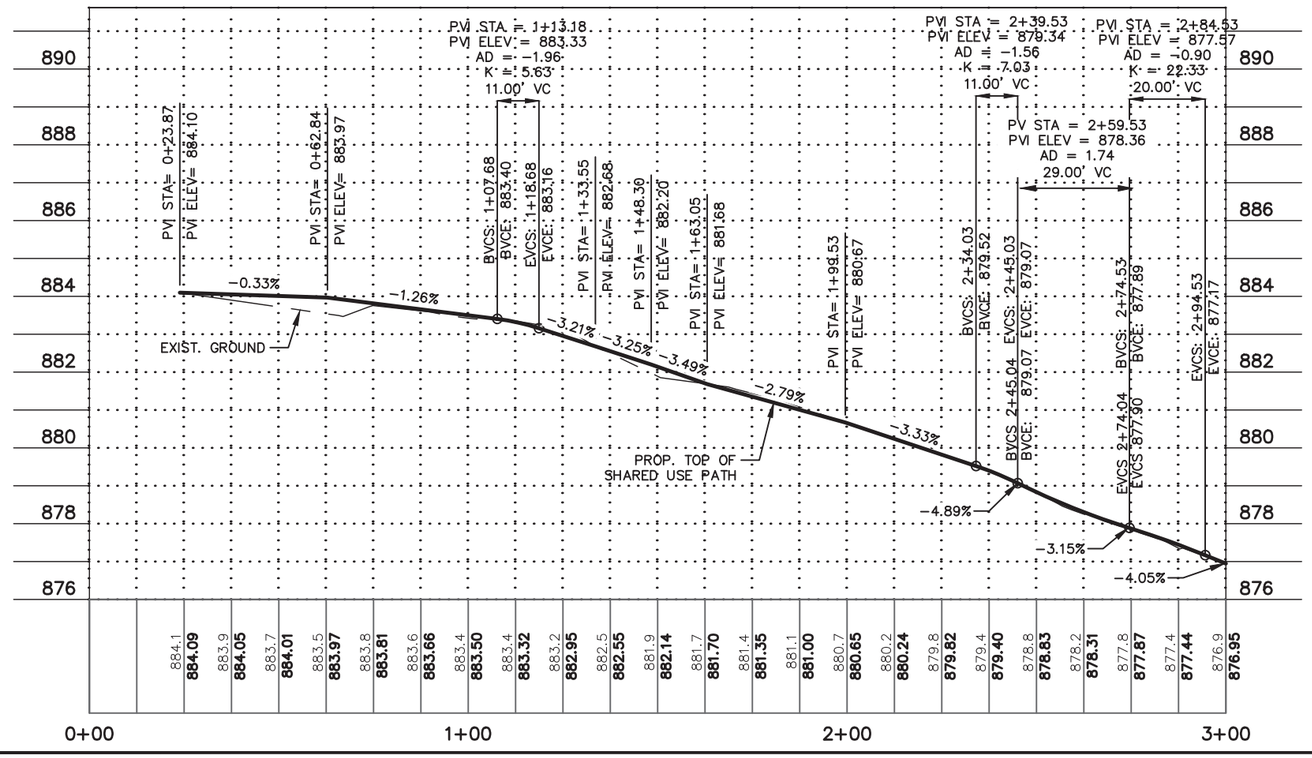
SHEET 77 OF 273

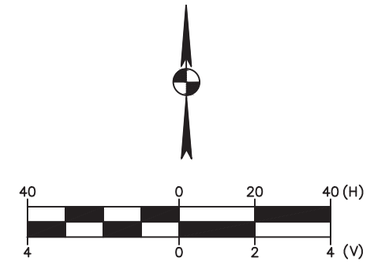
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				77

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NOTES:
1. REFER TO PROJECT CONTROL DATA SHEET 2 FOR LINE AND CURVE TABLE DATA FOR THE NORTH SHARED USE PATH.
2. SEE DETAIL SHEET 95 FOR SHARED USE PATH TRANSITION DETAILS.
3. SEE CROSS SECTIONS FOR ADDITIONAL INFORMATION.
4. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
5. CROSS SLOPE SHALL BE 1.5% FOR THE SHARED USE PATH AND SIDEWALKS.
6. REFER TO PROPOSED TYPICAL SECTIONS SHARED USE PATH FOR ADDITIONAL INFORMATION INCLUDING LIMITS OF CONSTRUCTION WITHIN ½ CRZ.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
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Stephanie D Blew

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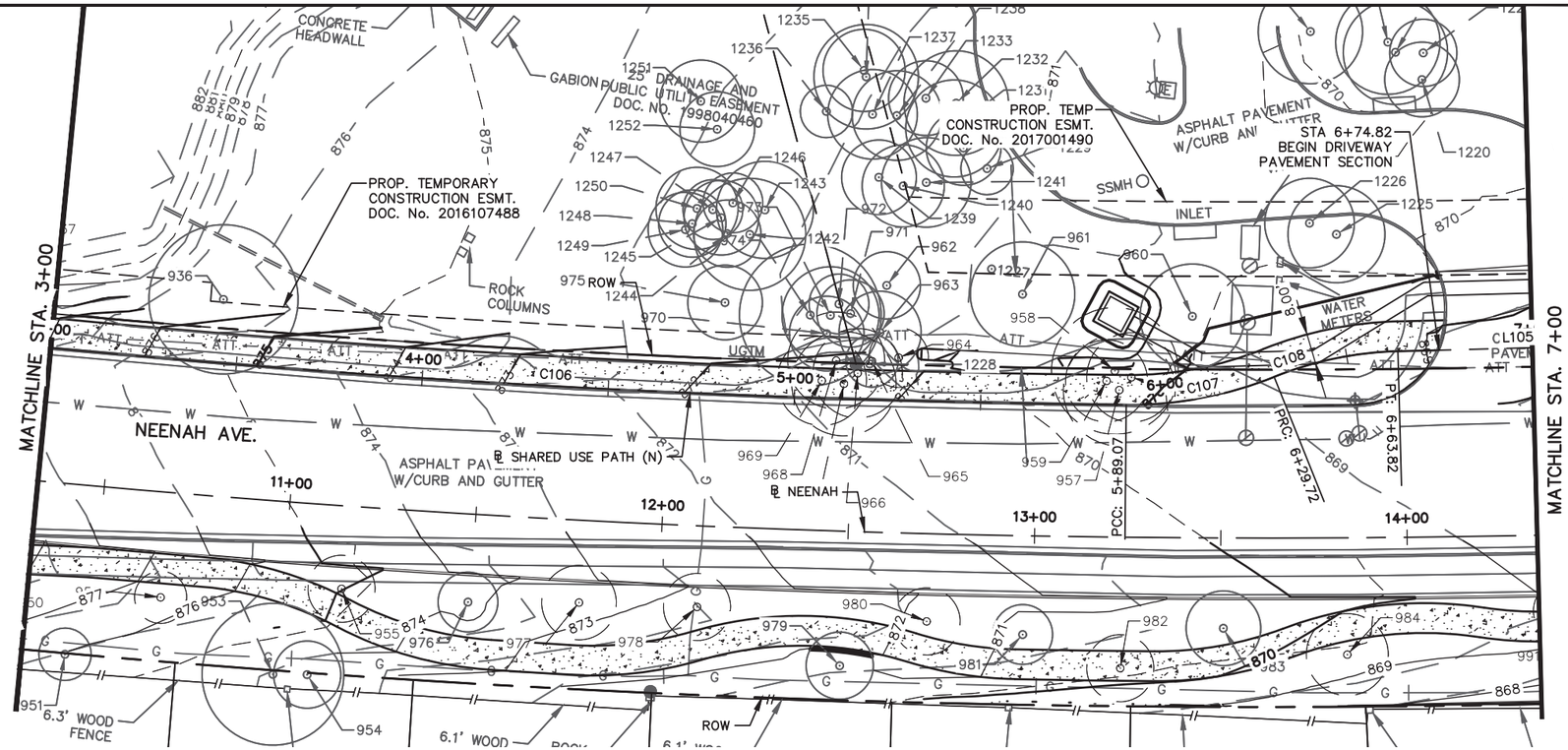
SHARED USE PATH (N) PLAN AND PROFILE STA. 1+00 TO STA. 3+00

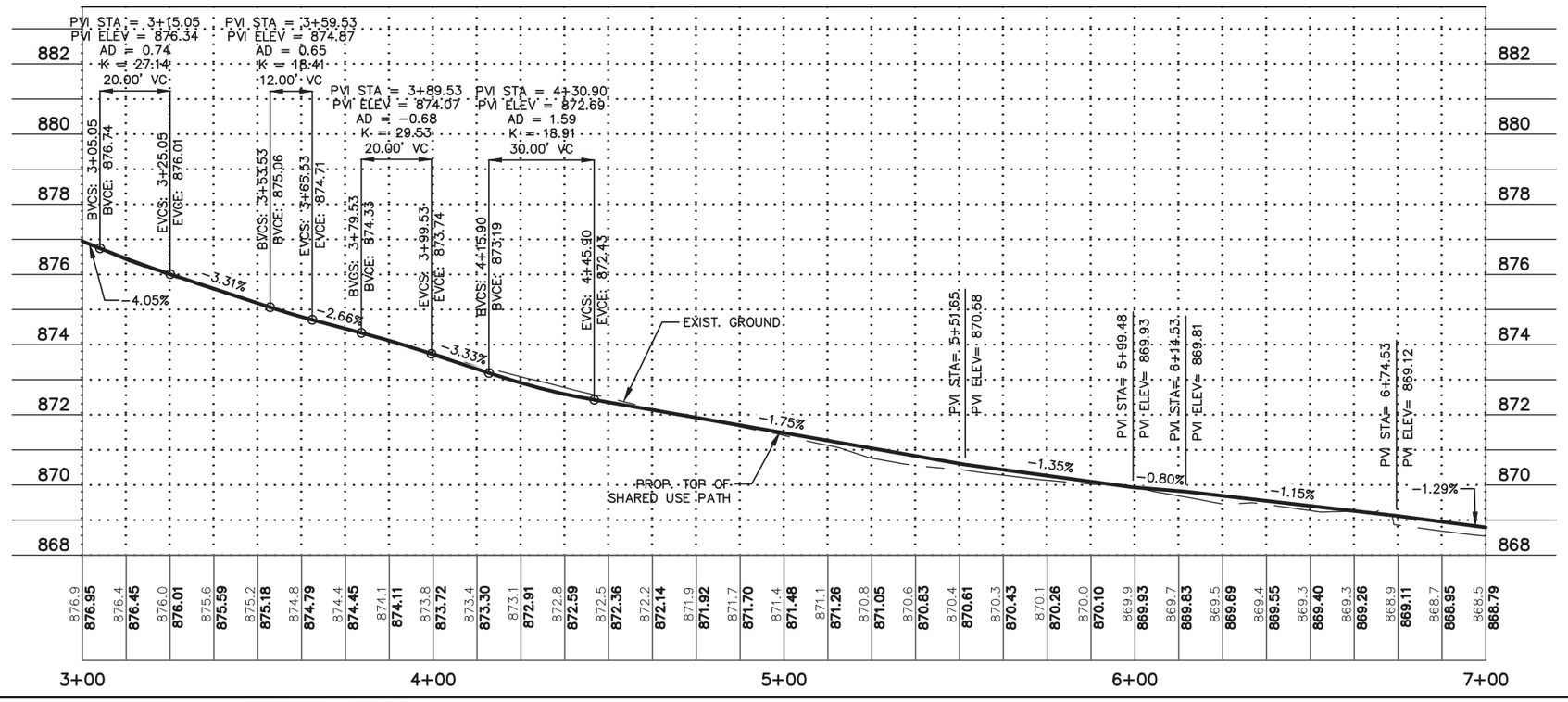
SHEET 78 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				78

SP-2016-0186D

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NOTES:
1. REFER TO PROJECT CONTROL DATA SHEET 2 FOR LINE AND CURVE TABLE DATA FOR THE NORTH SHARED USE PATH.
2. SEE DETAIL SHEET 95 FOR SHARED USE PATH TRANSITION DETAILS.
3. SEE CROSS SECTIONS FOR ADDITIONAL INFORMATION.
4. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
5. CROSS SLOPE SHALL BE 1.5% FOR THE SHARED USE PATH AND SIDEWALKS.
6. REFER TO PROPOSED TYPICAL SECTIONS SHARED USE PATH FOR ADDITIONAL INFORMATION INCLUDING LIMITS OF CONSTRUCTION WITHIN ½ CRZ.

8.4.17
STATE OF TEXAS
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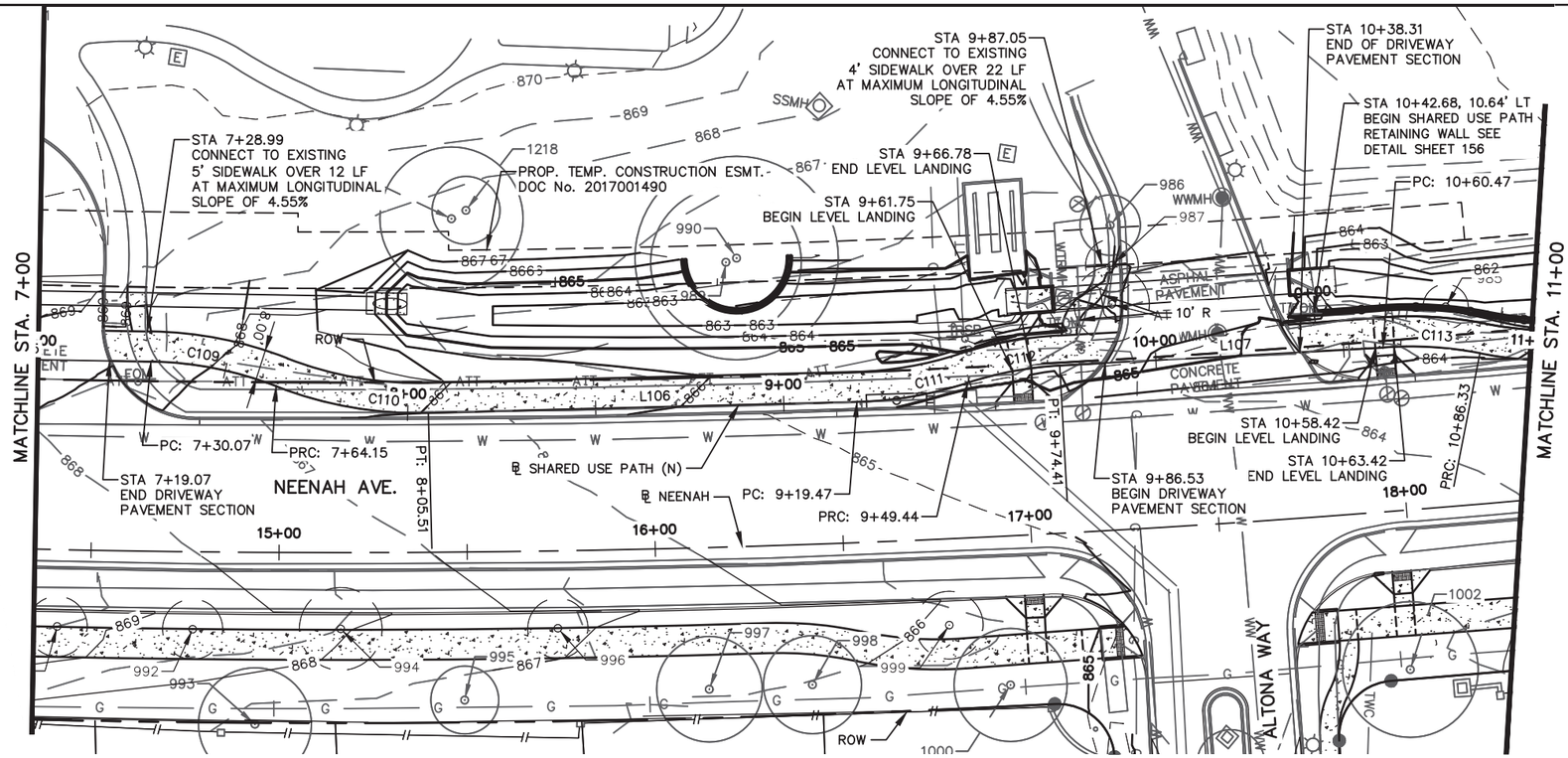
SHARED USE PATH (N) PLAN AND PROFILE STA. 3+00 TO STA. 7+00

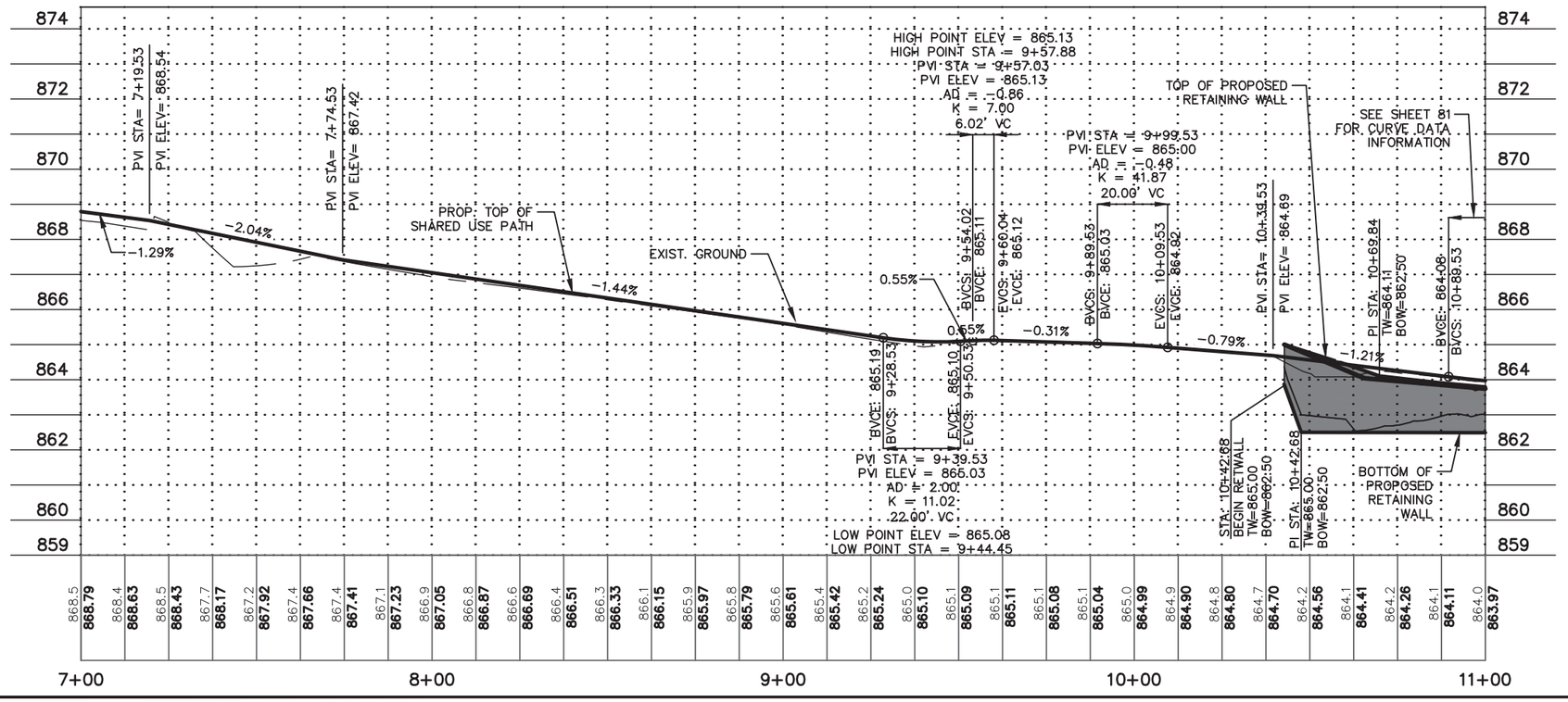
SHEET 79 OF 273

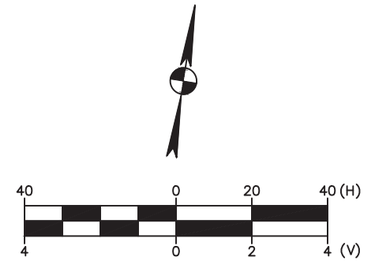
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				79

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NOTES:
1. REFER TO PROJECT CONTROL DATA SHEET 2 FOR LINE AND CURVE TABLE DATA FOR THE NORTH SHARED USE PATH.
2. SEE DETAIL SHEET 95 FOR SHARED USE PATH TRANSITION DETAILS.
3. SEE CROSS SECTIONS FOR ADDITIONAL INFORMATION.
4. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
5. CROSS SLOPE SHALL BE 1.5% FOR THE SHARED USE PATH AND SIDEWALKS.
6. REFER TO PROPOSED TYPICAL SECTIONS SHARED USE PATH FOR ADDITIONAL INFORMATION INCLUDING LIMITS OF CONSTRUCTION WITHIN ½ CRZ.

8.4.17
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WILLIAMSON COUNTY
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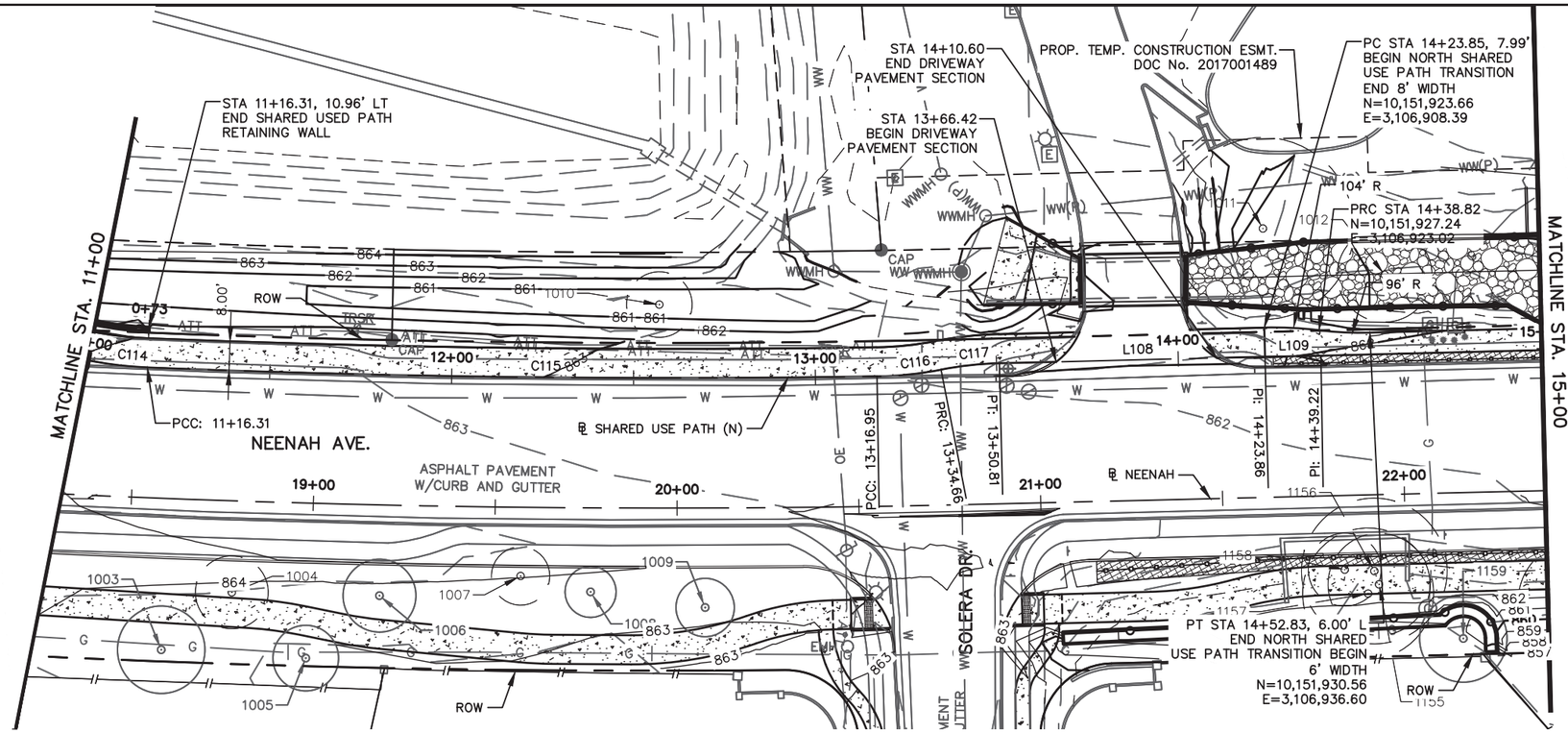
SHARED USE PATH (N) PLAN AND PROFILE STA. 7+00 TO STA. 11+00

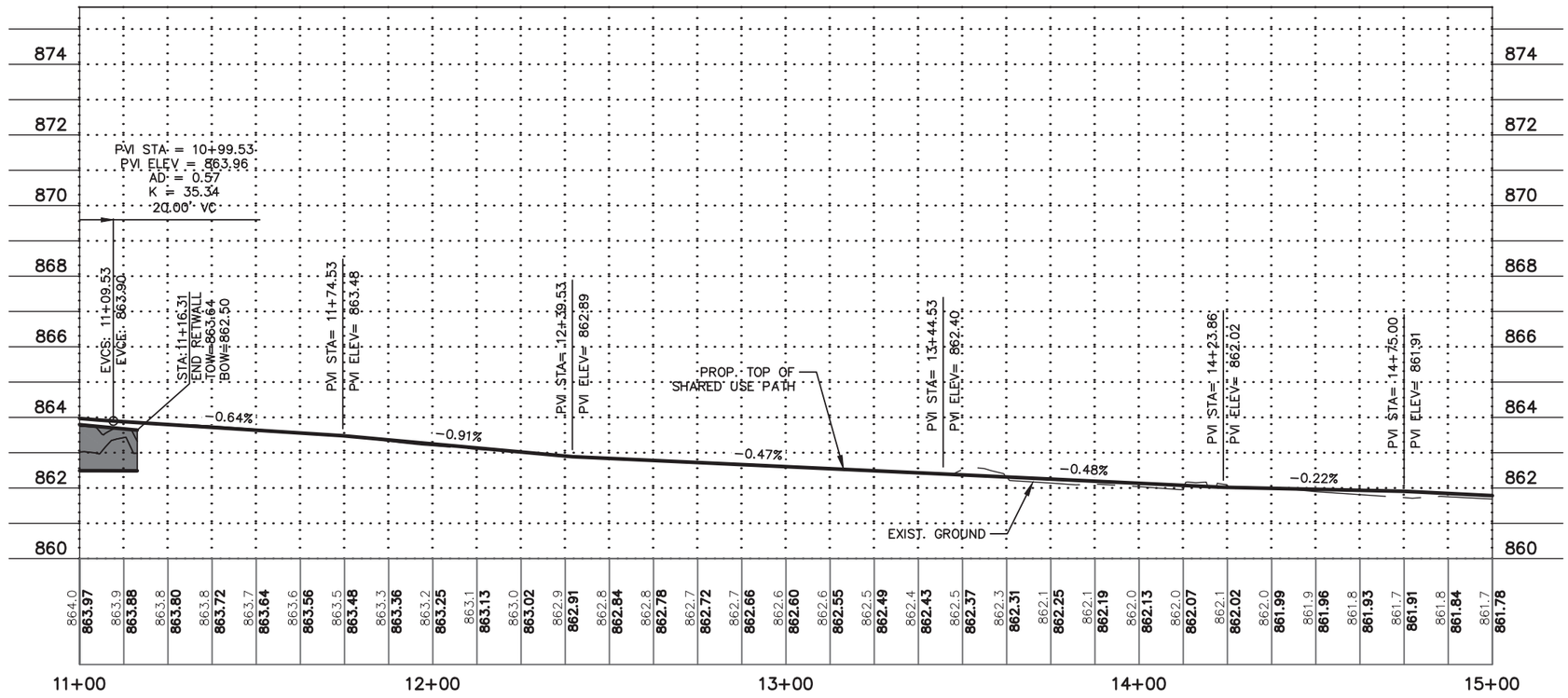
SHEET 80 OF 273

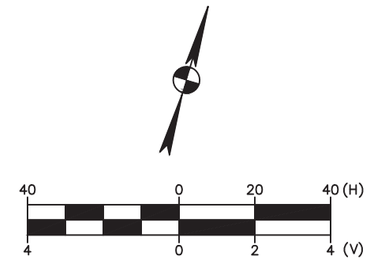
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				80

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NOTES:

1. REFER TO PROJECT CONTROL DATA SHEET 2 FOR LINE AND CURVE TABLE DATA FOR THE NORTH SHARED USE PATH.
2. SEE DETAIL SHEET 95 FOR SHARED USE PATH TRANSITION DETAILS.
3. SEE CROSS SECTIONS FOR ADDITIONAL INFORMATION.
4. SEE SIGNAGE AND PAVEMENT MARKING SHEETS FOR GUARDRAIL INFORMATION.
5. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
6. CROSS SLOPE SHALL BE 1.5% FOR THE SHARED USE PATH AND SIDEWALKS.
7. REFER TO PROPOSED TYPICAL SECTIONS SHARED USE PATH FOR ADDITIONAL INFORMATION INCLUDING LIMITS OF CONSTRUCTION WITHIN ½ CRZ.

8.4.17

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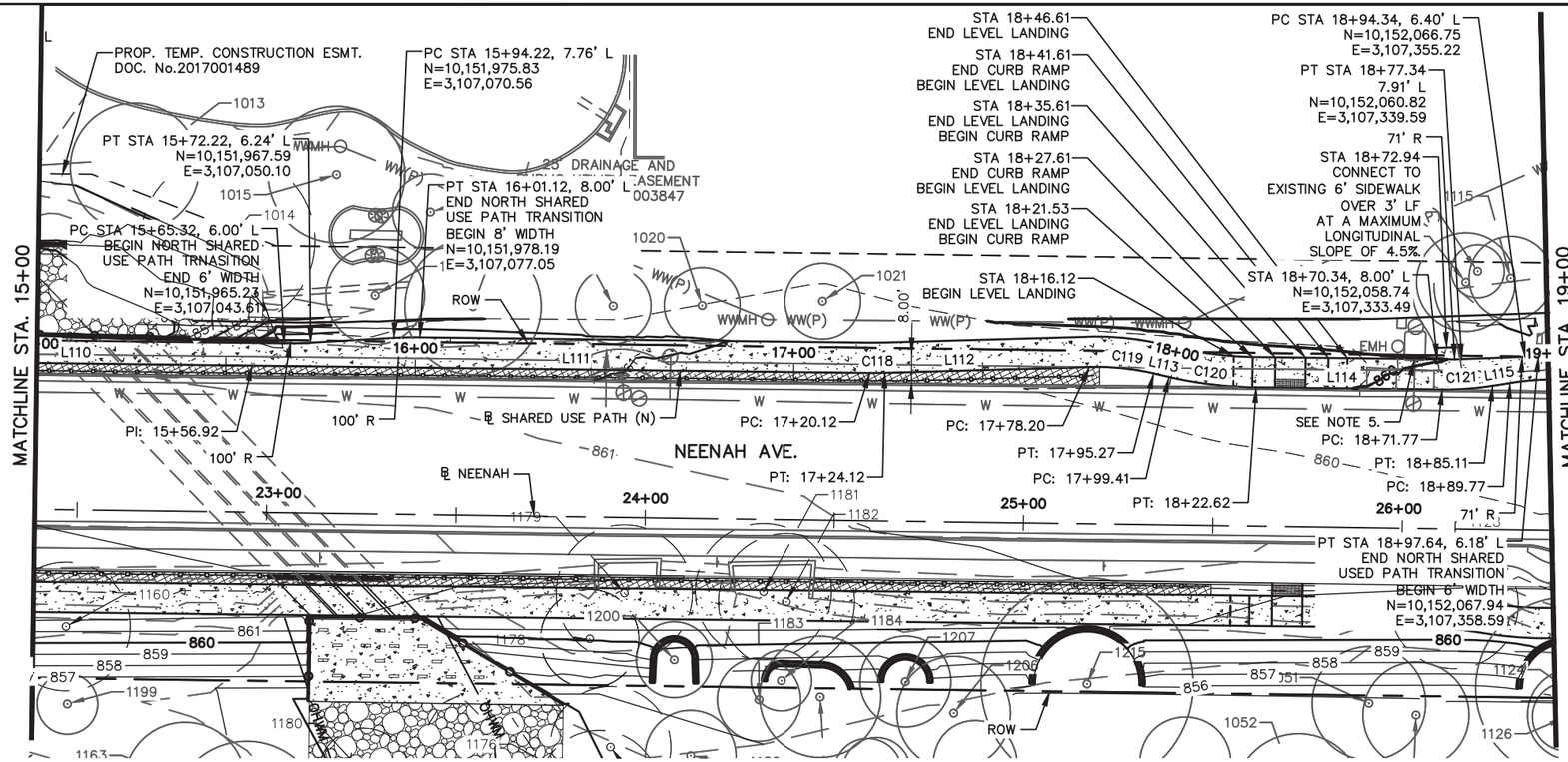
SHARED USE PATH (N) PLAN AND PROFILE STA. 11+00 TO STA. 15+00

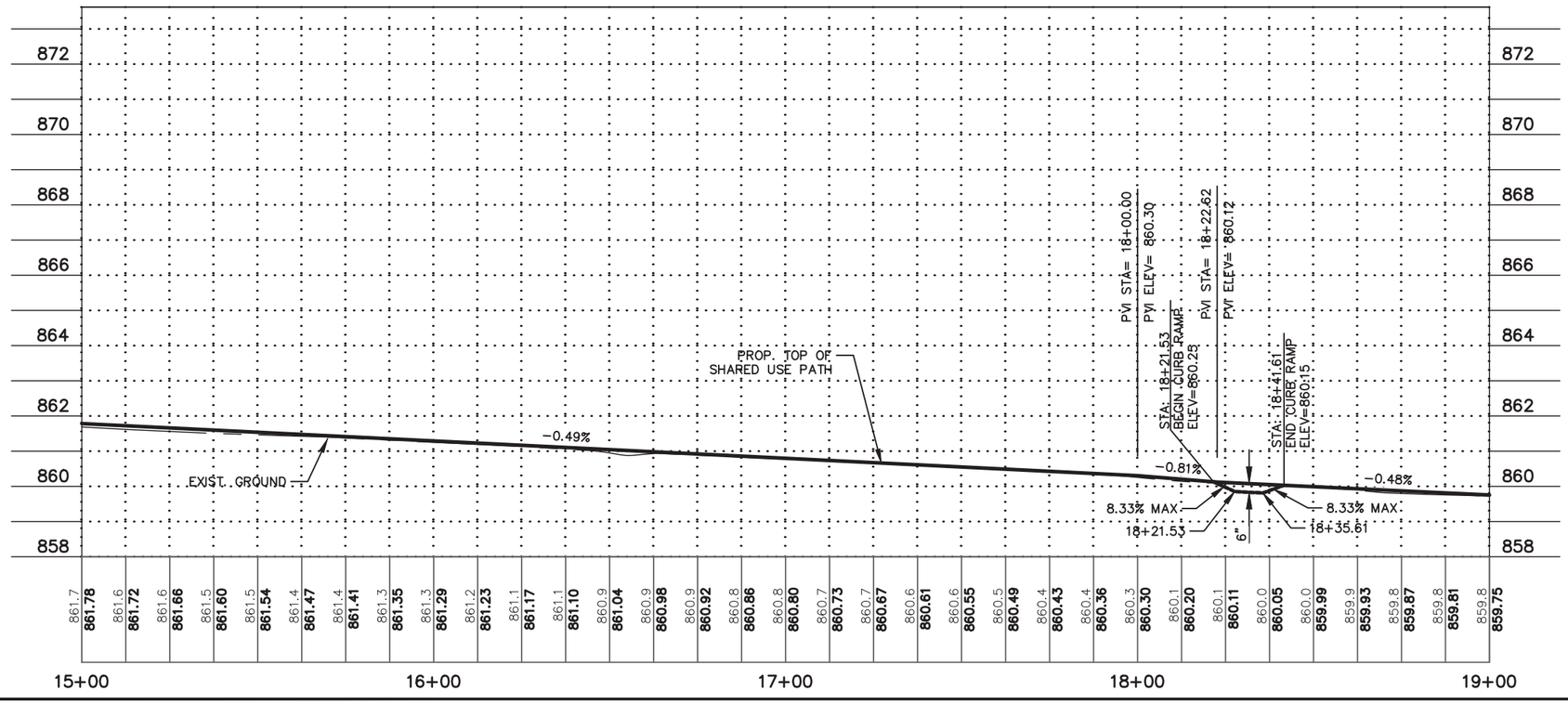
SHEET 81 OF 273

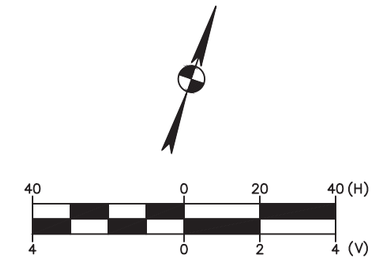
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				81

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NOTES:

1. REFER TO PROJECT CONTROL DATA SHEET 2 FOR LINE AND CURVE TABLE DATA FOR THE NORTH SHARED USE PATH.
2. SEE DETAIL SHEET 95 FOR SHARED USE PATH TRANSITION DETAILS.
3. SEE CROSS SECTIONS FOR ADDITIONAL INFORMATION.
4. SEE SIGNAGE AND PAVEMENT MARKING SHEETS FOR GUARDRAIL INFORMATION.
5. CONTRACTOR TO PROTECT EXISTING WATER VAULT DURING CONSTRUCTION. ADJUST SHARED USE PATH WIDTH AND ELEVATION IN THE FIELD. CROSS SLOPE SHALL NOT EXCEED 1.5% AND ELEVATION DIFFERENCE BETWEEN THE TOP OF PATH AND TOP OF VAULT SHALL NOT EXCEED TWO INCHES.
6. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
7. CROSS SLOPE SHALL BE 1.5% FOR THE SHARED USE PATH AND SIDEWALKS.
8. REFER TO PROPOSED TYPICAL SECTIONS SHARED USE PATH FOR ADDITIONAL INFORMATION INCLUDING LIMITS OF CONSTRUCTION WITHIN ½ CRZ.

8.4.17
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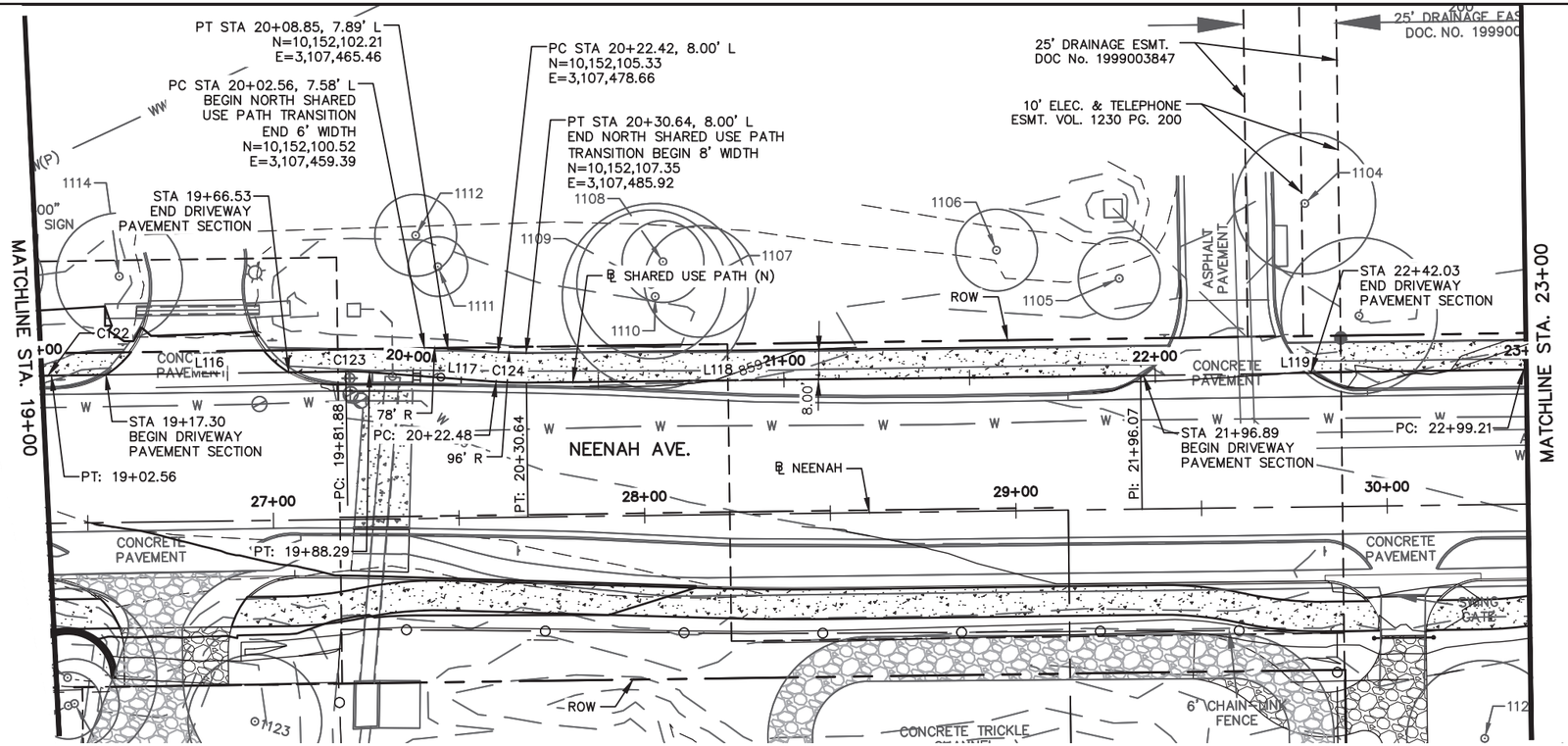
SHARED USE PATH (N) PLAN AND PROFILE STA. 15+00 TO STA. 19+00

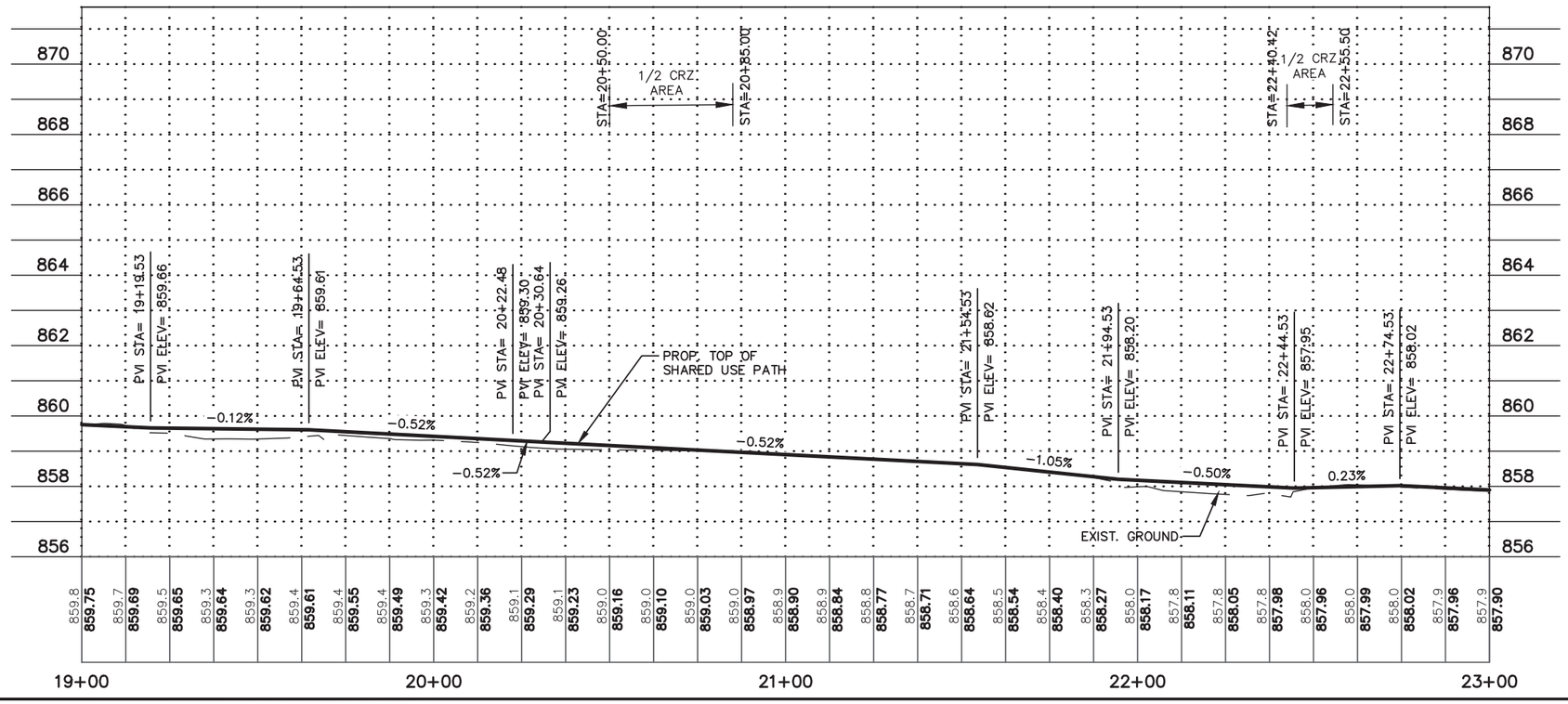
SHEET 82 OF 273

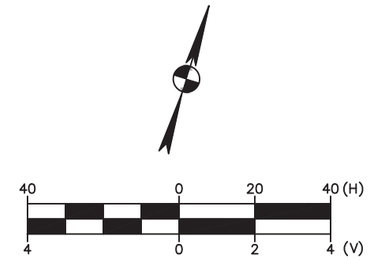
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				82

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NOTES:

1. REFER TO PROJECT CONTROL DATA SHEET 2 FOR LINE AND CURVE TABLE DATA FOR THE NORTH SHARED USE PATH.
2. SEE DETAIL SHEET 95 FOR SHARED USE PATH TRANSITION DETAILS.
3. SEE CROSS SECTIONS FOR ADDITIONAL INFORMATION.
4. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
5. CROSS SLOPE SHALL BE 1.5% FOR THE SHARED USE PATH AND SIDEWALKS.
6. REFER TO PROPOSED TYPICAL SECTIONS SHARED USE PATH FOR ADDITIONAL INFORMATION INCLUDING LIMITS OF CONSTRUCTION WITHIN ½ CRZ.

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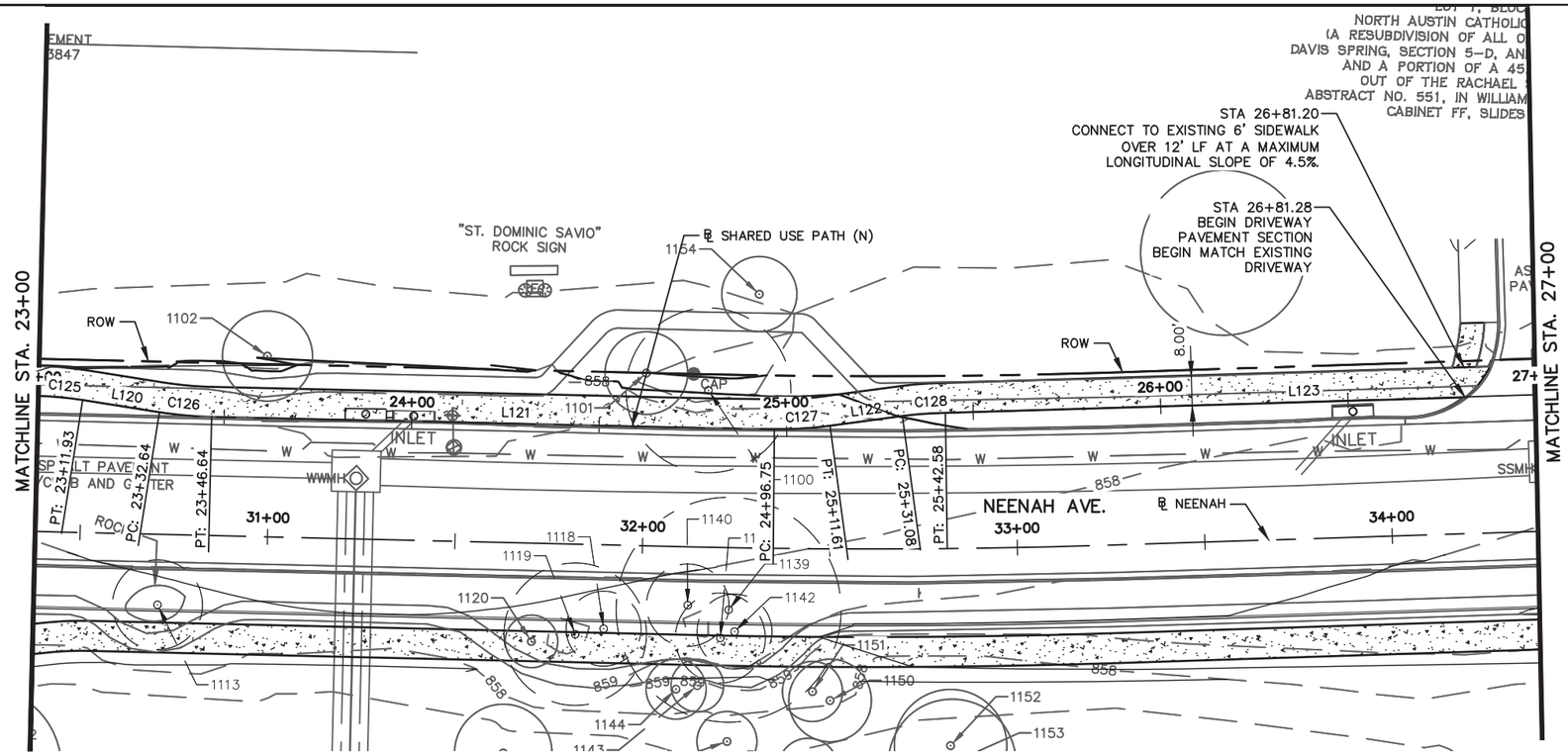
SHARED USE PATH (N) PLAN AND PROFILE STA. 19+00 TO STA. 23+00

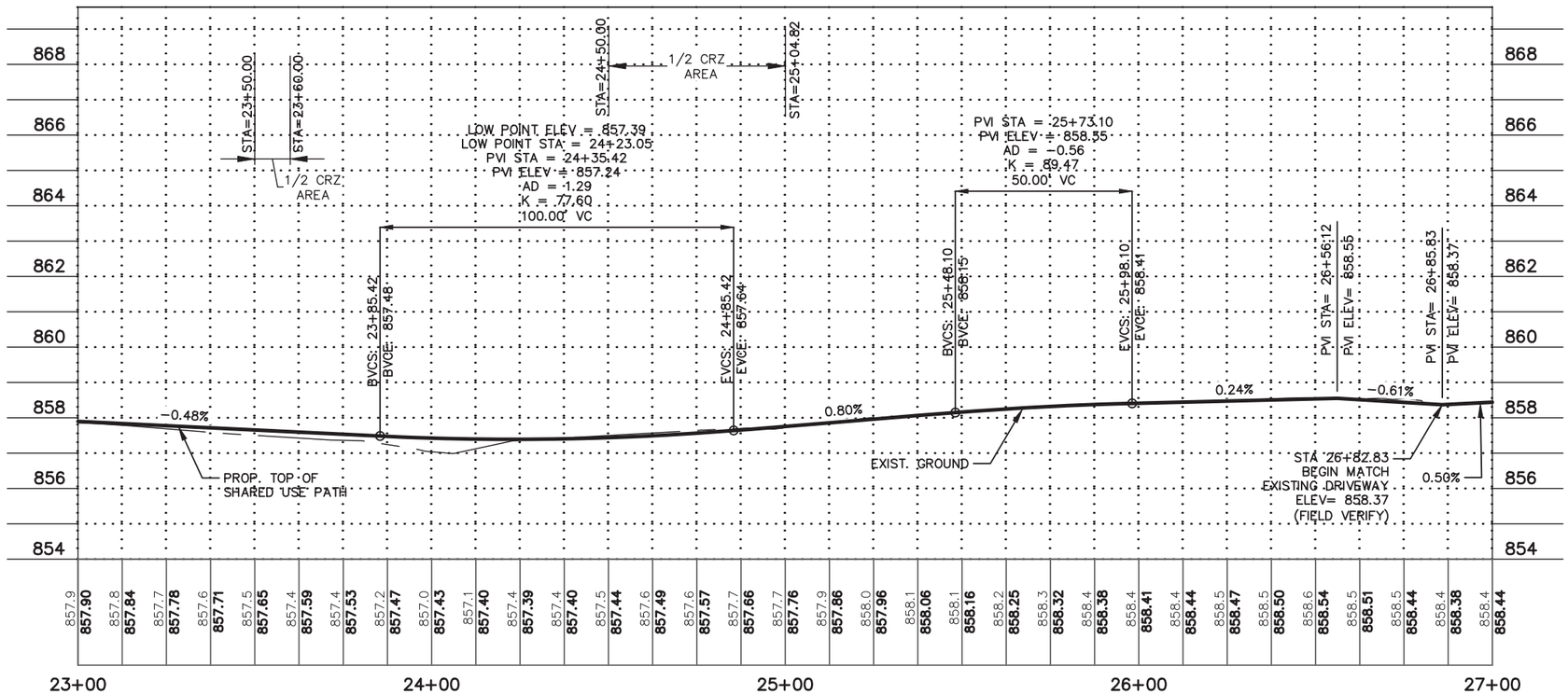
SHEET 83 OF 273

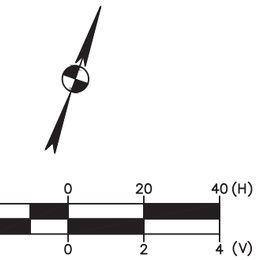
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				83

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NOTES:
1. REFER TO PROJECT CONTROL DATA SHEET 2 FOR LINE AND CURVE TABLE DATA FOR THE NORTH SHARED USE PATH.
2. SEE DETAIL SHEET 95 FOR SHARED USE PATH TRANSITION DETAILS.
3. SEE CROSS SECTIONS FOR ADDITIONAL INFORMATION.
4. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
5. CROSS SLOPE SHALL BE 1.5% FOR THE SHARED USE PATH AND SIDEWALKS.
6. REFER TO PROPOSED TYPICAL SECTIONS SHARED USE PATH FOR ADDITIONAL INFORMATION INCLUDING LIMITS OF CONSTRUCTION WITHIN ½ CRZ.

8.4.17
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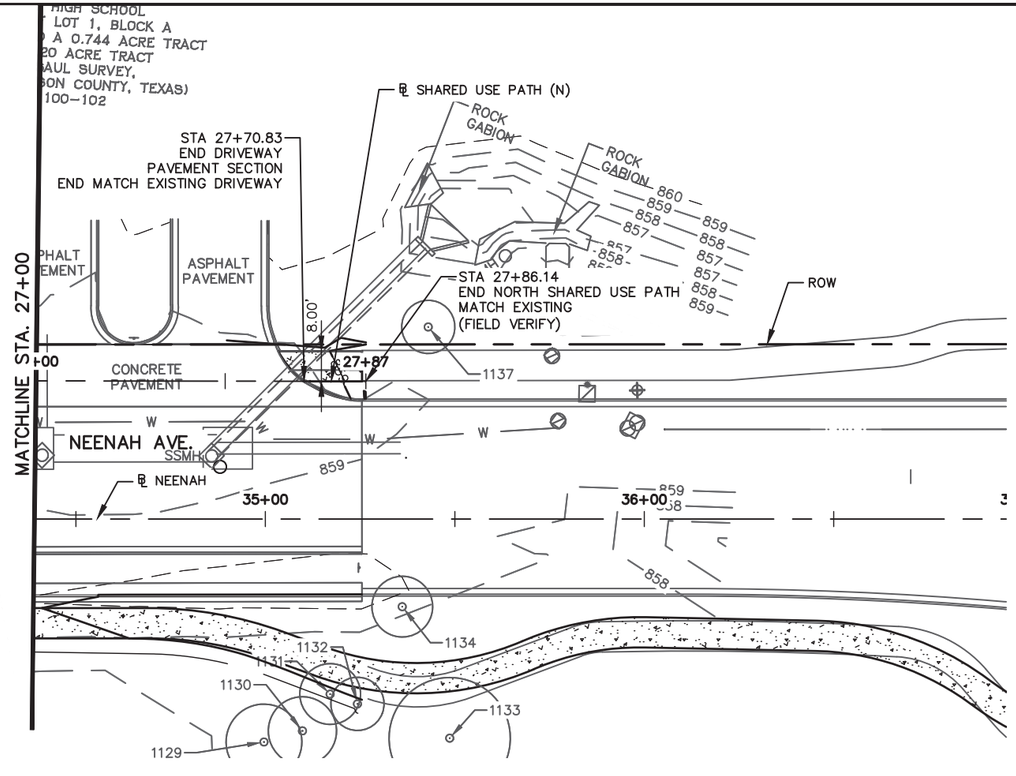
SHARED USE PATH (N) PLAN AND PROFILE STA. 23+00 TO STA. 27+00

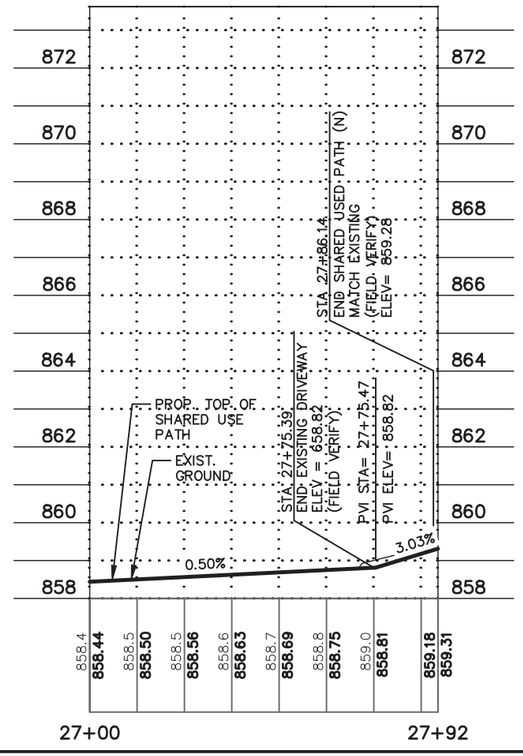
SHEET 84 OF 273

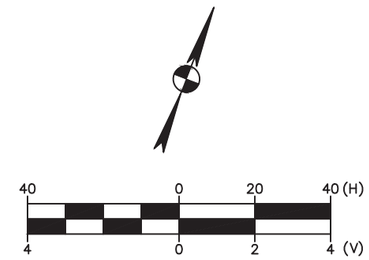
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6	TEXAS	104023-10006	_	14	WILLIAMSON				84

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NOTES:
1. REFER TO PROJECT CONTROL DATA SHEET 2 FOR LINE AND CURVE TABLE DATA FOR THE NORTH SHARED USE PATH.
2. SEE DETAIL SHEET 95 FOR SHARED USE PATH TRANSITION DETAILS.
3. SEE CROSS SECTIONS FOR ADDITIONAL INFORMATION.
4. THE NEENAH AVE. EXTENSION PROJECT WAS CONSTRUCTED AFTER SURVEY WAS PERFORMED ON THIS PROJECT. CONTRACTOR TO PROTECT ALL EXISTING INFRASTRUCTURE.
5. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
6. CROSS SLOPE SHALL BE 1.5% FOR THE SHARED USE PATH AND SIDEWALKS.
7. REFER TO PROPOSED TYPICAL SECTIONS SHARED USE PATH FOR ADDITIONAL INFORMATION INCLUDING LIMITS OF CONSTRUCTION WITHIN ½ CRZ.



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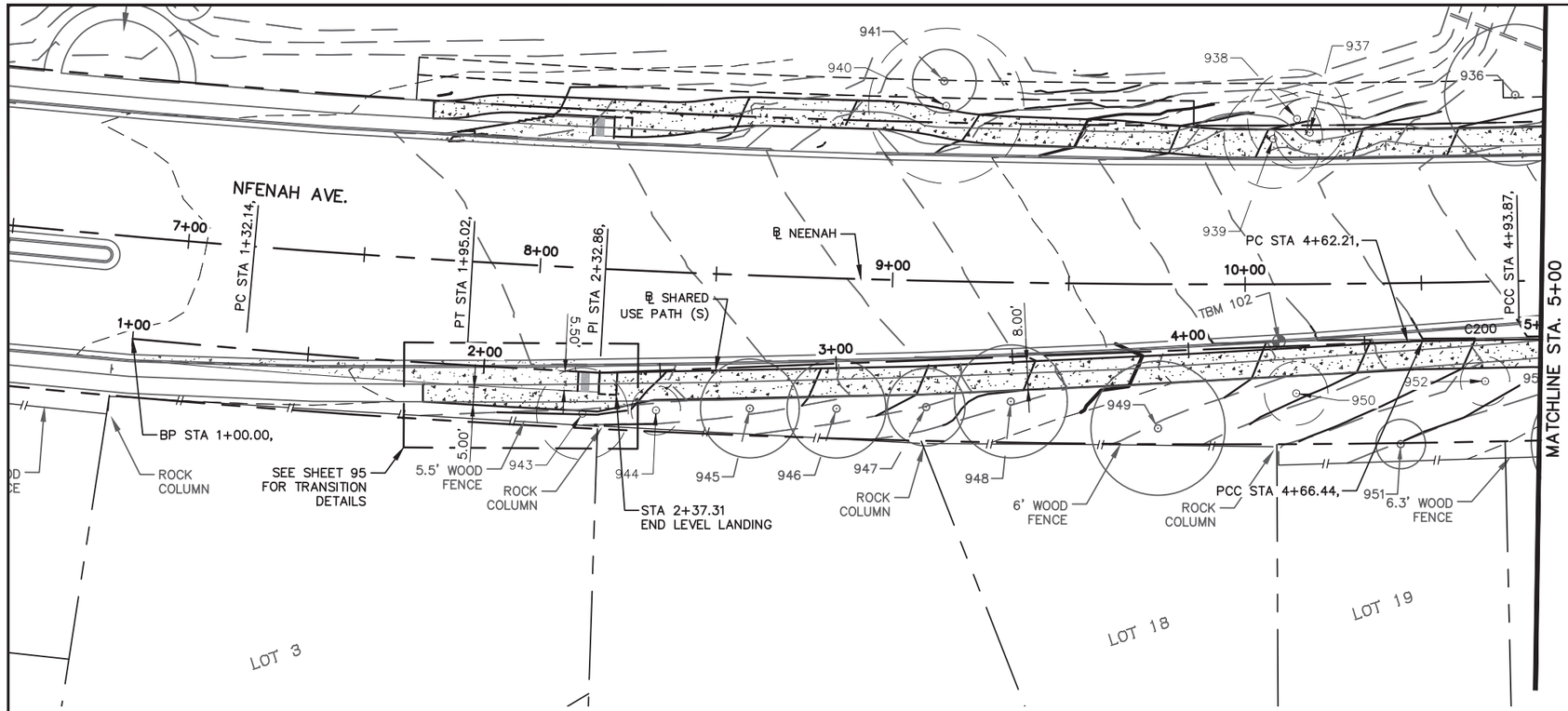
SHARED USE PATH (N) PLAN AND PROFILE STA. 27+00 TO END

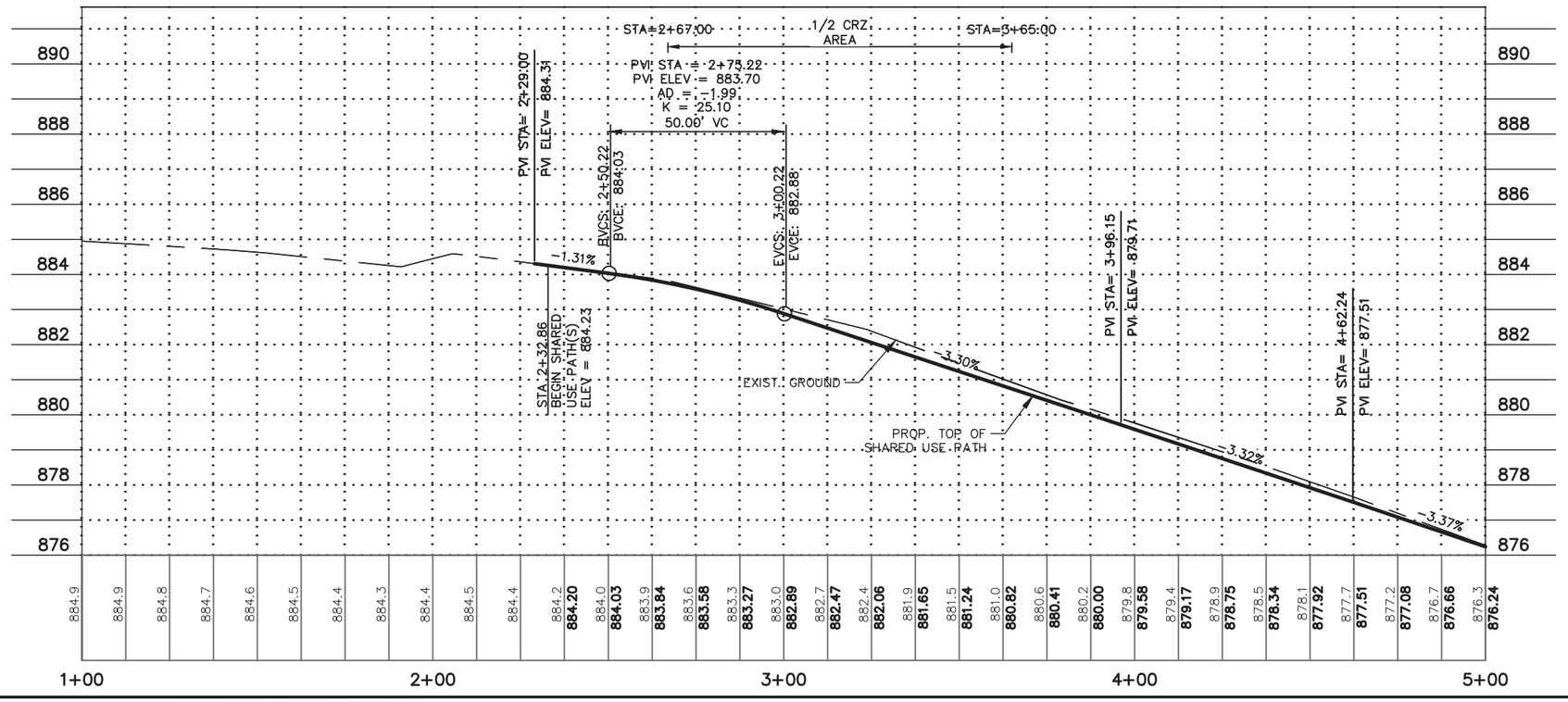
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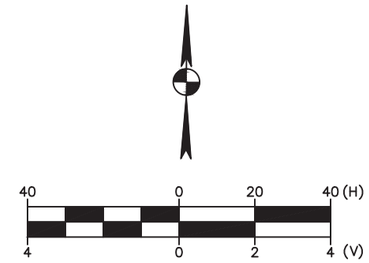
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				85

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NOTES:
1. REFER TO PROJECT CONTROL DATA SHEET 3 FOR LINE AND CURVE TABLE DATE FOR THE SOUTH SHARED USE PATH.
2. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.

8.4.17
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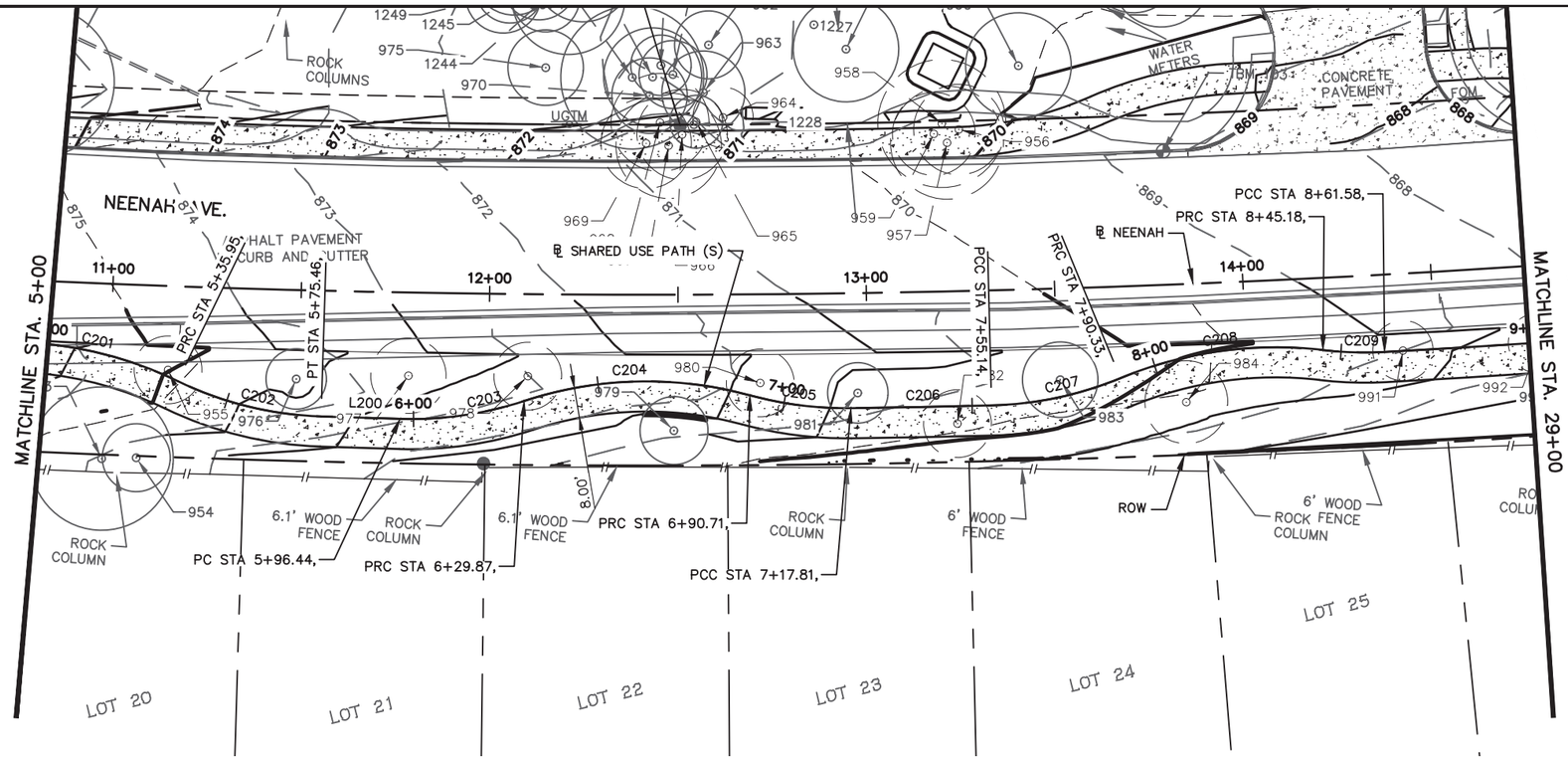
SHARED USE PATH (S) PLAN AND PROFILE STA. 1+00 TO STA. 5+00

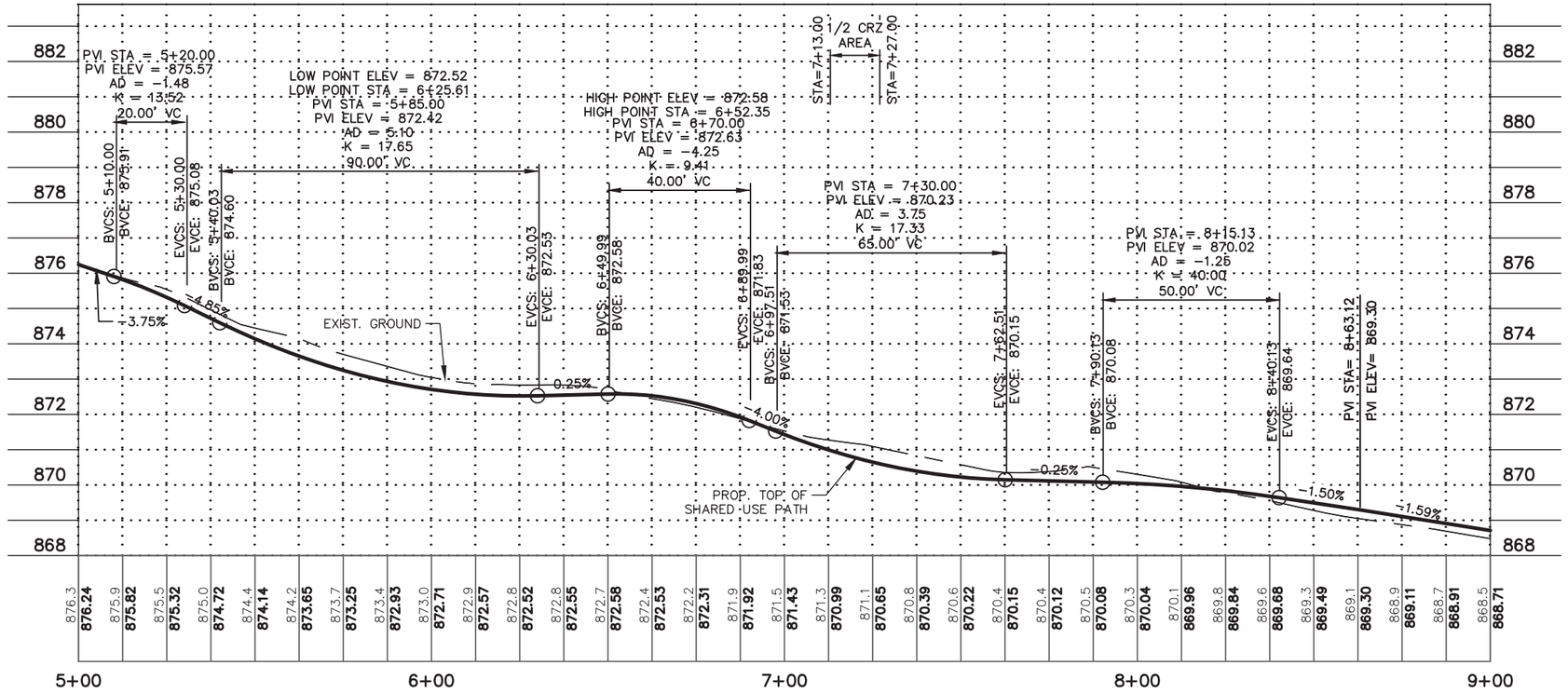
SHEET 86 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				86

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NOTES:
1. REFER TO PROJECT CONTROL DATA SHEET 3 FOR LINE AND CURVE TABLE DATE FOR THE SOUTH SHARED USE PATH.
2. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.

8.4.17
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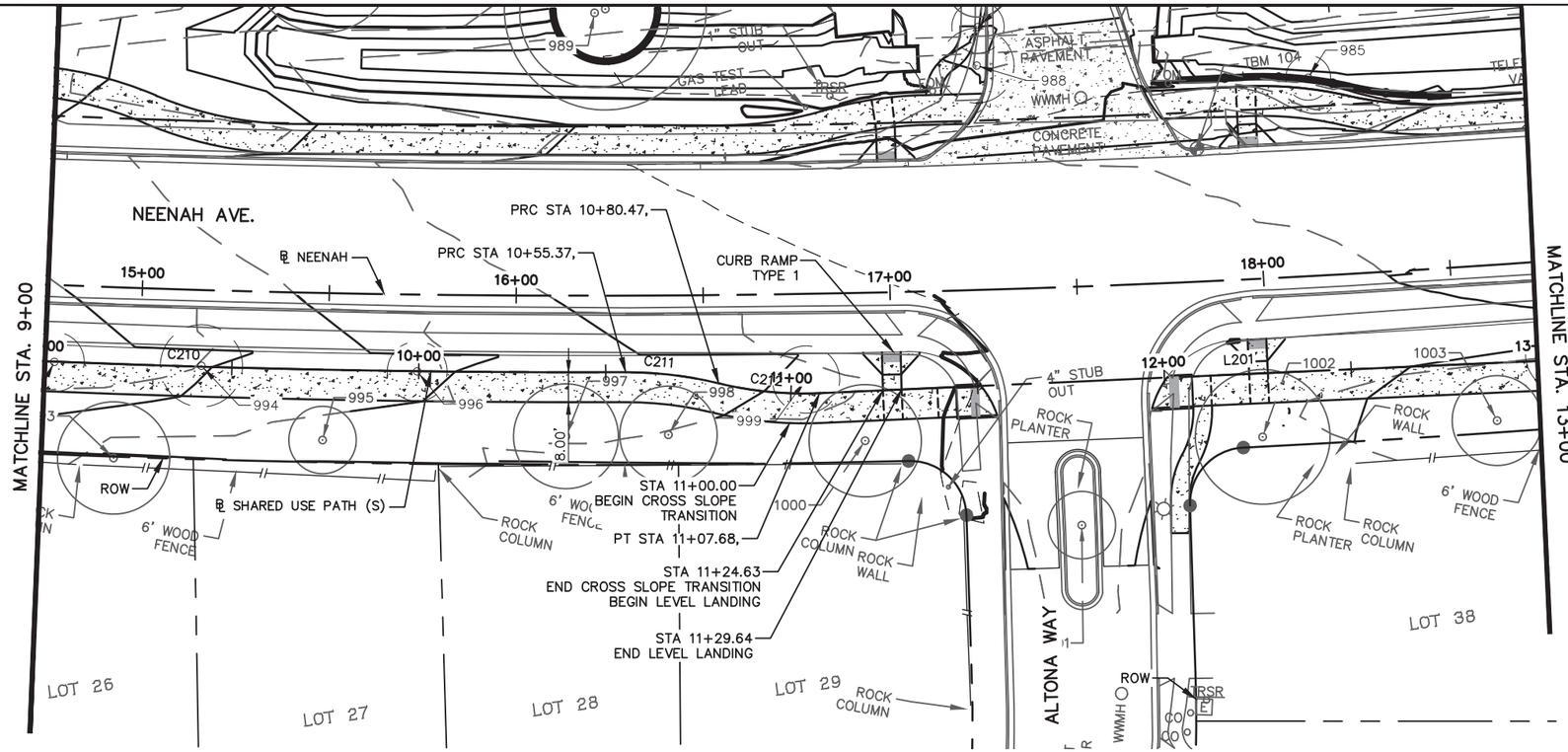
SHARED USE PATH (S) PLAN AND PROFILE STA. 5+00 TO STA. 9+00

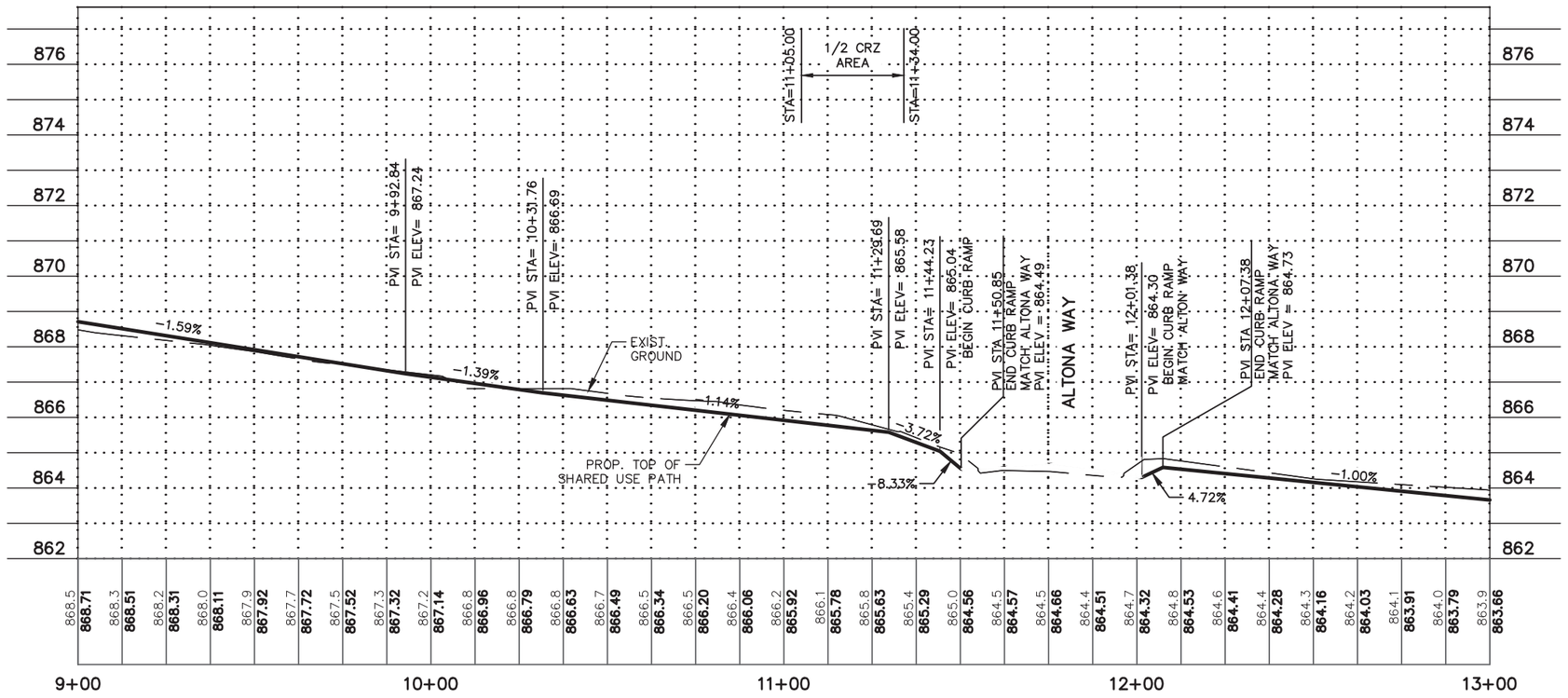
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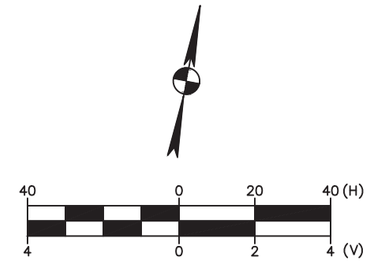
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6	TEXAS	104023-10006	_	14	WILLIAMSON				87

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NOTES:
1. REFER TO PROJECT CONTROL DATA SHEET 3 FOR LINE AND CURVE TABLE DATE FOR THE SOUTH SHARED USE PATH.
2. REFER TO ALTONA WAY PLAN AND PROFILE SHEET FOR SIDEWALK INFORMATION.
3. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.

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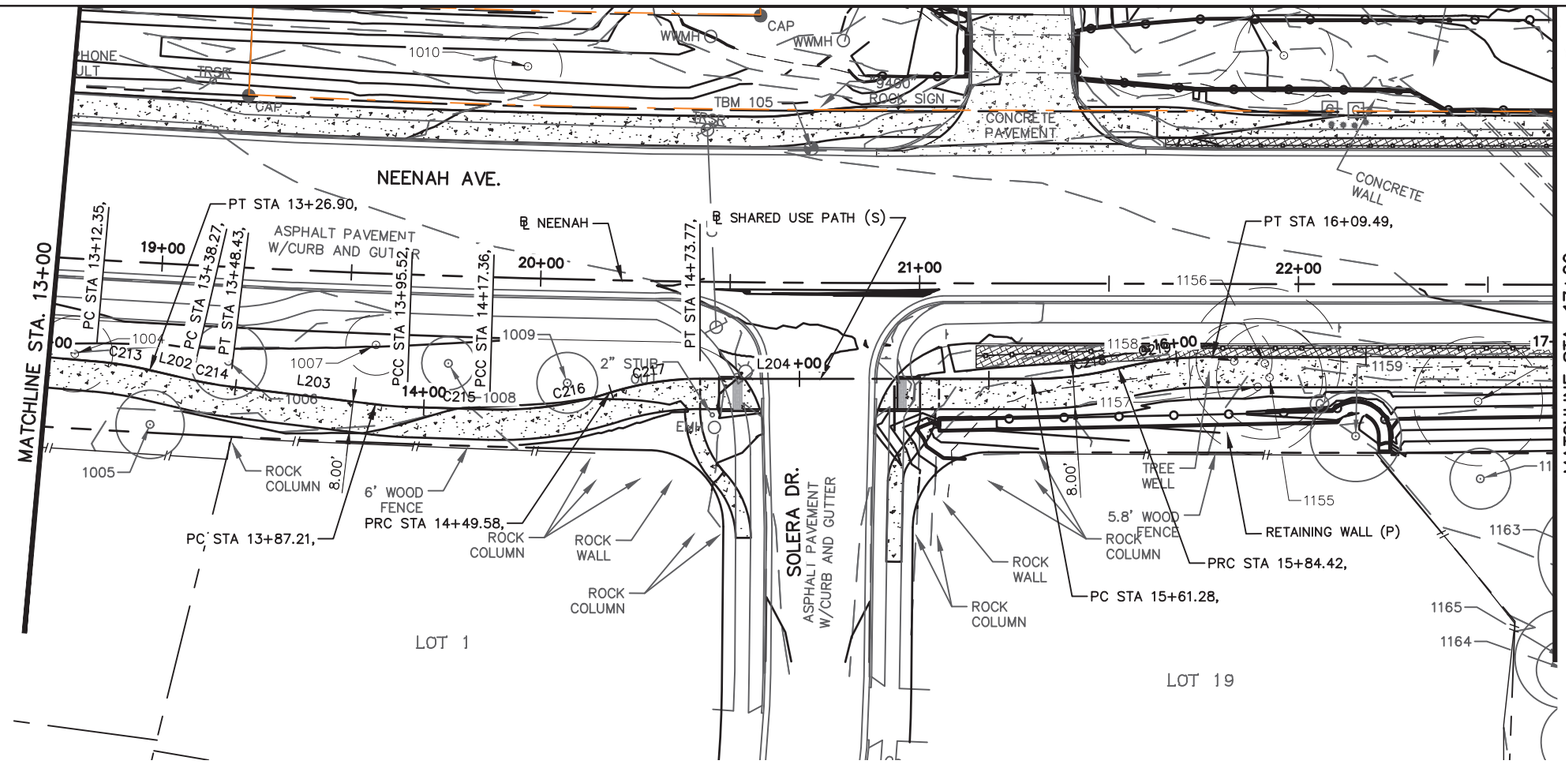
SHARED USE PATH (S) PLAN AND PROFILE STA. 9+00 TO STA. 13+00

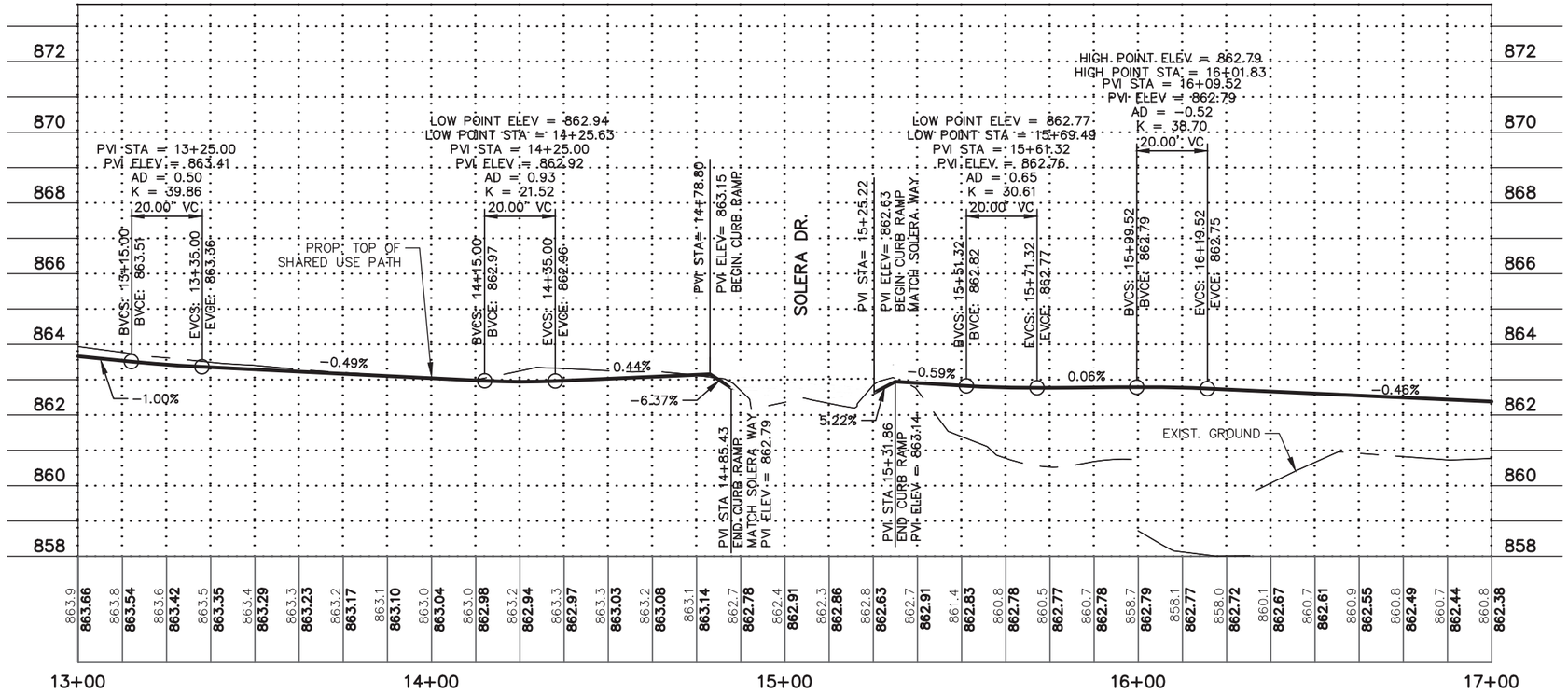
SHEET 88 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				88

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NOTES:
1. REFER TO PROJECT CONTROL DATA SHEET 3 FOR LINE AND CURVE TABLE DATE FOR THE SOUTH SHARED USE PATH.
2. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.

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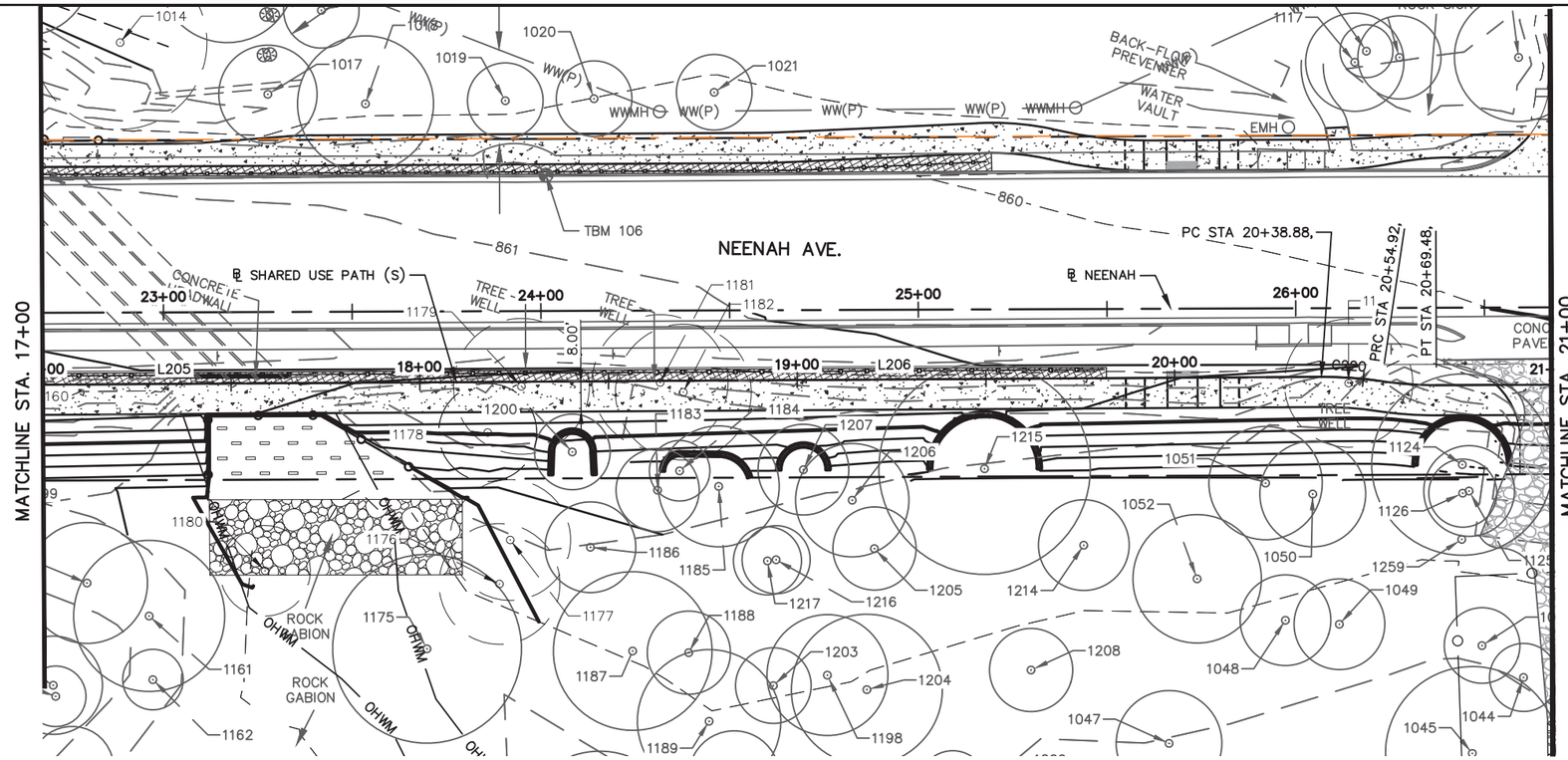
SHARED USE PATH (S) PLAN AND PROFILE STA. 13+00 TO STA. 17+00

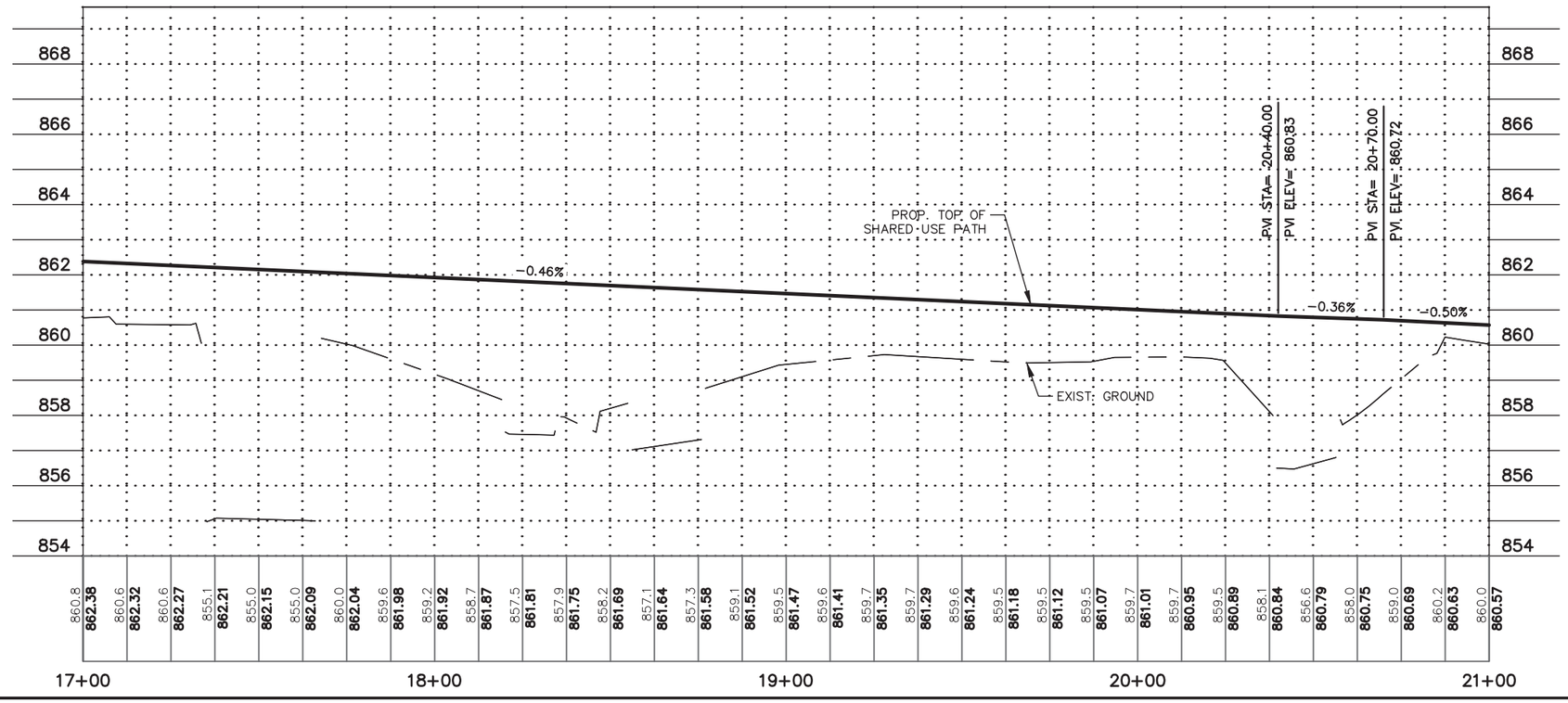
SHEET 89 OF 273

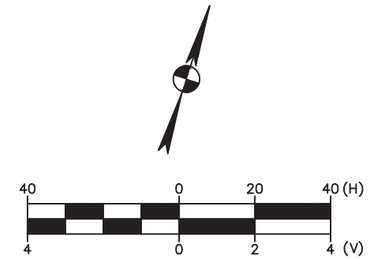
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				89

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SP-2016-0186D







NOTES:
1. REFER TO PROJECT CONTROL DATA SHEET 3 FOR LINE AND CURVE TABLE DATE FOR THE SOUTH SHARED USE PATH.
2. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
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NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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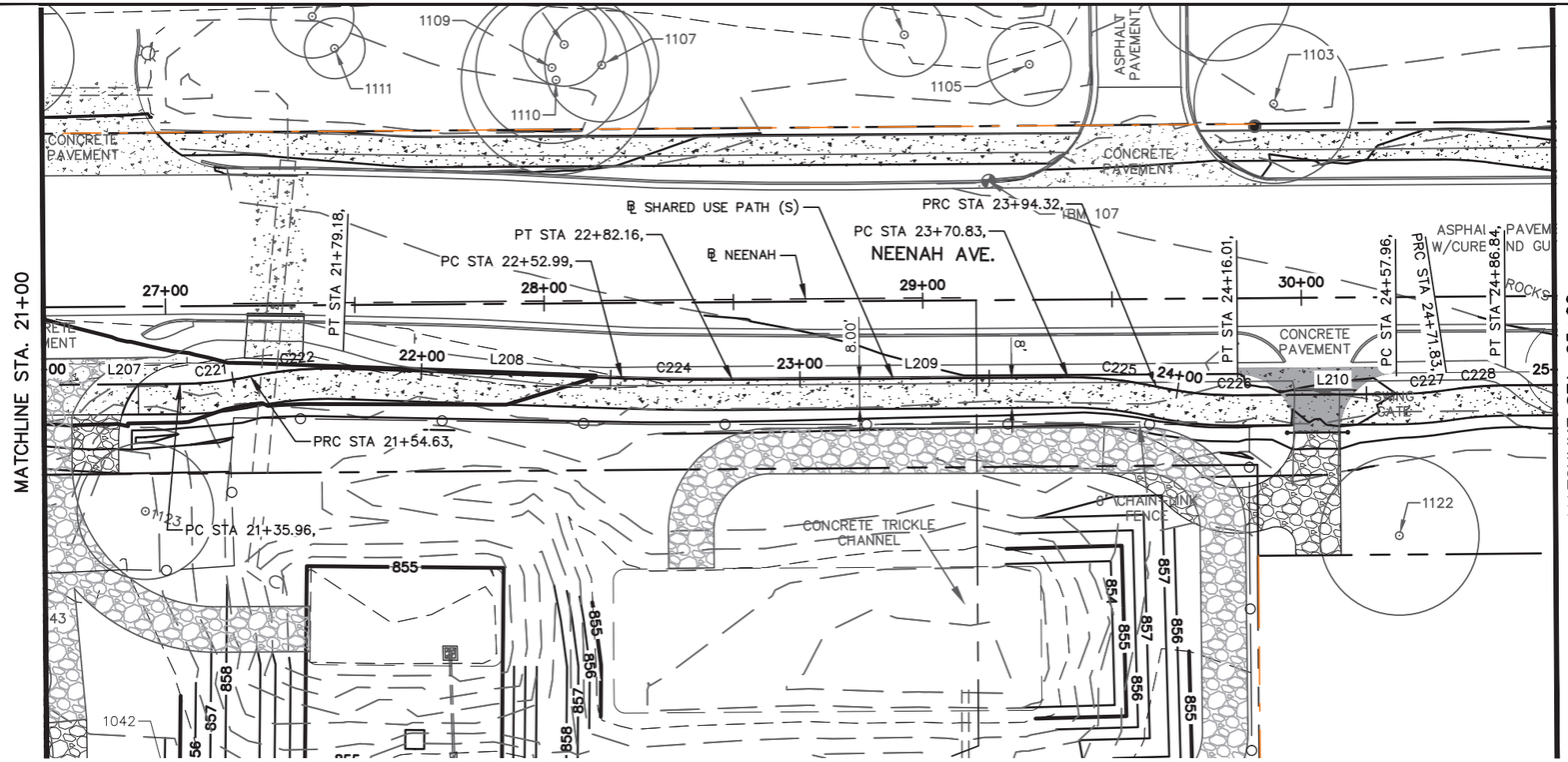
SHARED USE PATH (S) PLAN AND PROFILE STA. 17+00 TO STA. 21+00

SHEET 90 OF 273

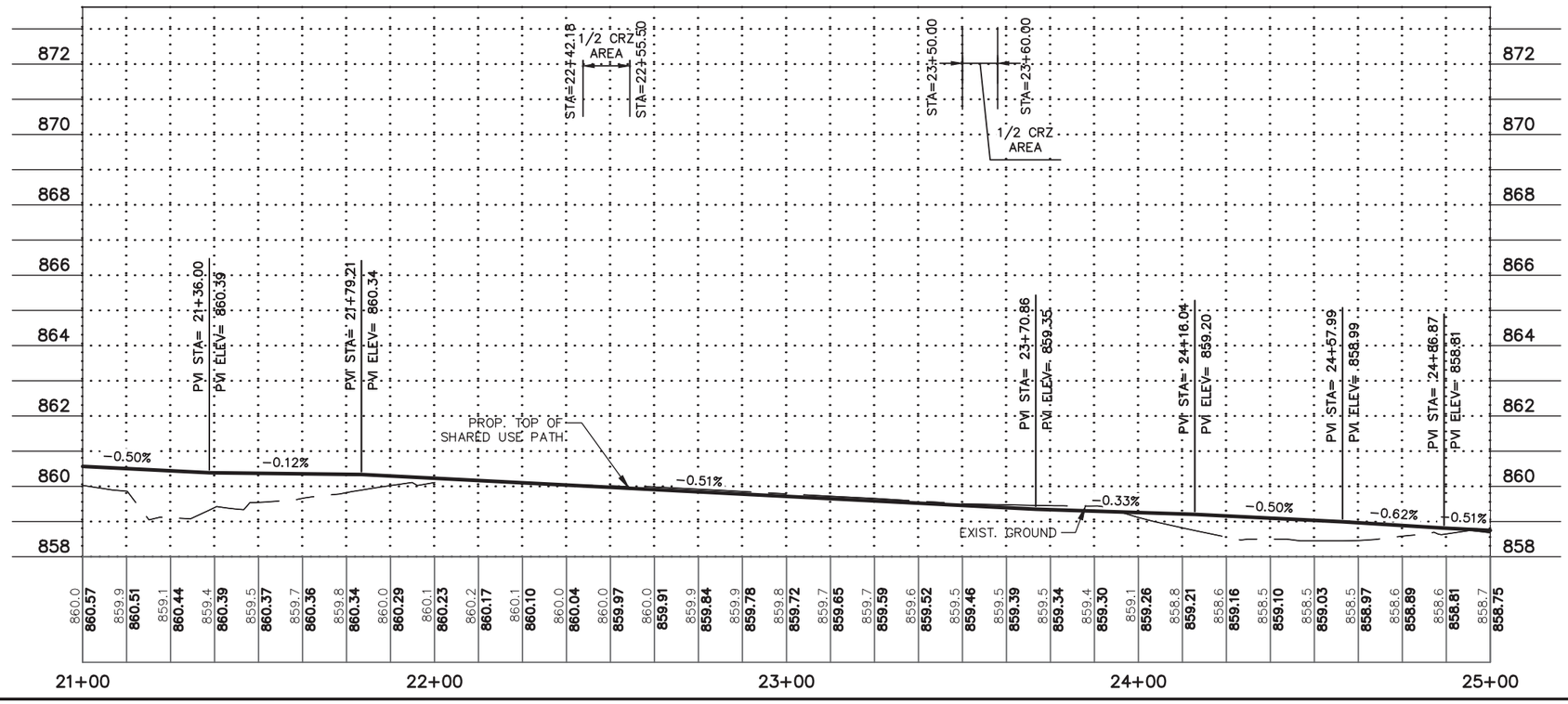
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				90

SP-2016-0186D

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NOTES:
1. REFER TO PROJECT CONTROL DATA SHEET 3 FOR LINE AND CURVE TABLE DATE FOR THE SOUTH SHARED USE PATH.
2. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.





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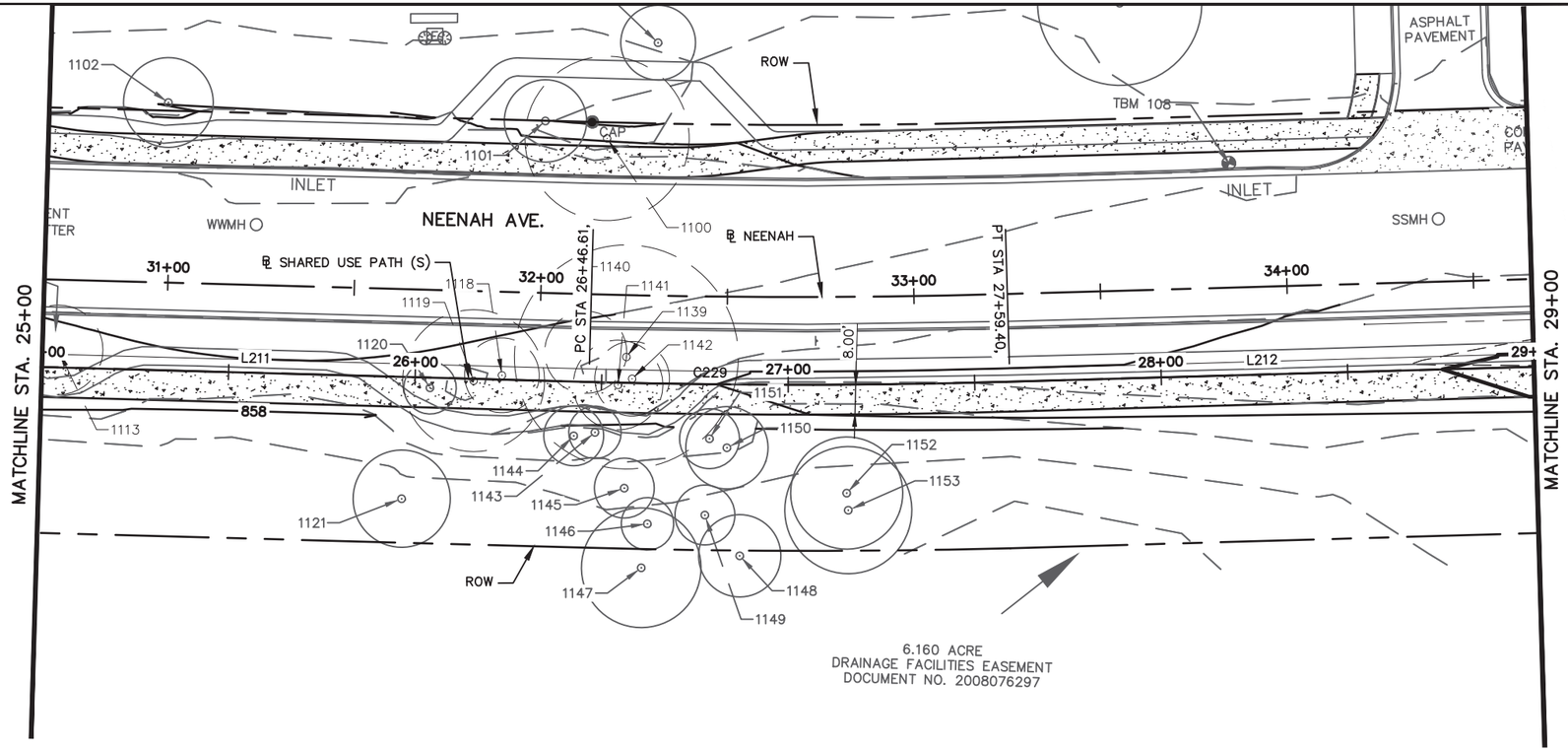
SHARED USE PATH (S) PLAN AND PROFILE STA. 21+00 TO STA. 25+00

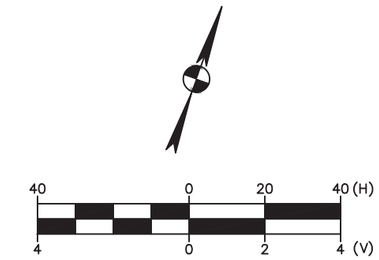
SHEET 91 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				91

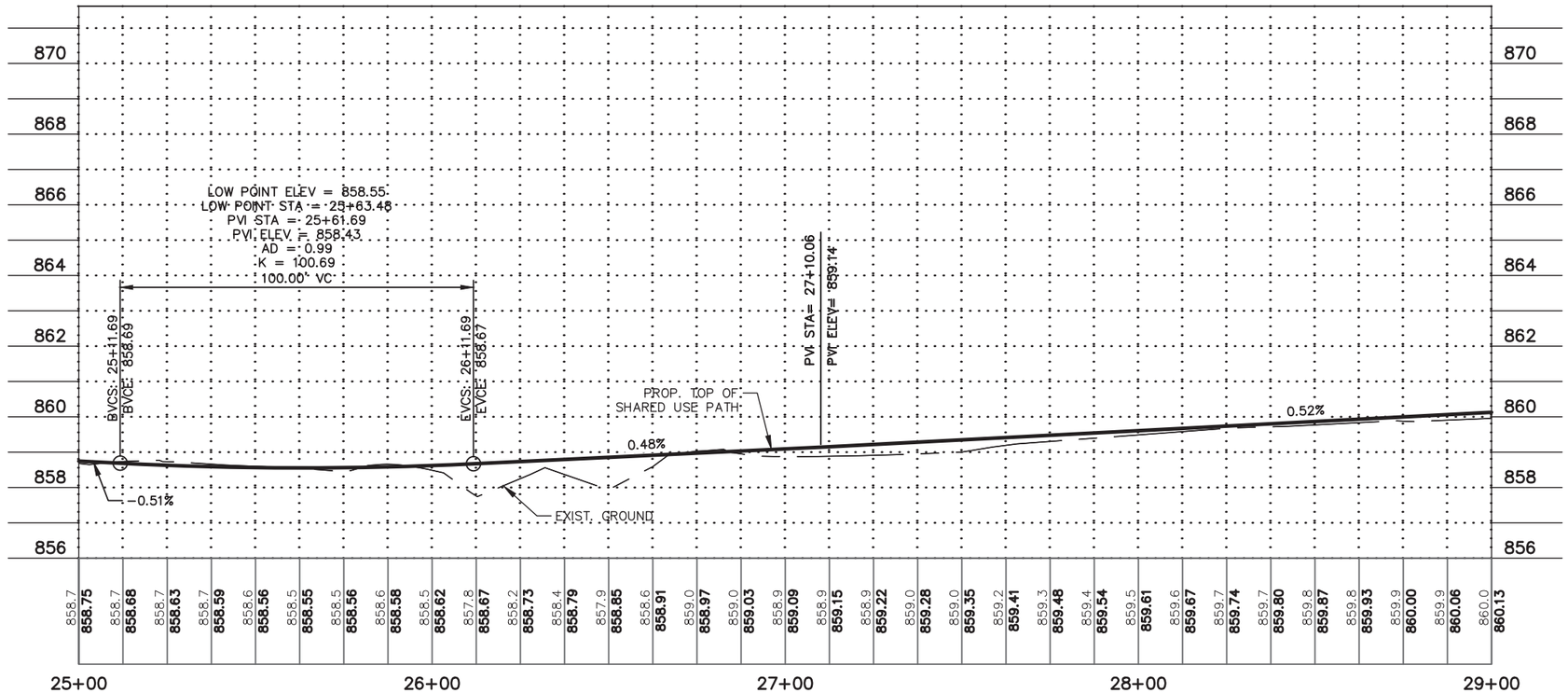
SP-2016-0186D

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NOTES:
1. REFER TO PROJECT CONTROL DATA SHEET 3 FOR LINE AND CURVE TABLE DATE FOR THE SOUTH SHARED USE PATH.
2. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.





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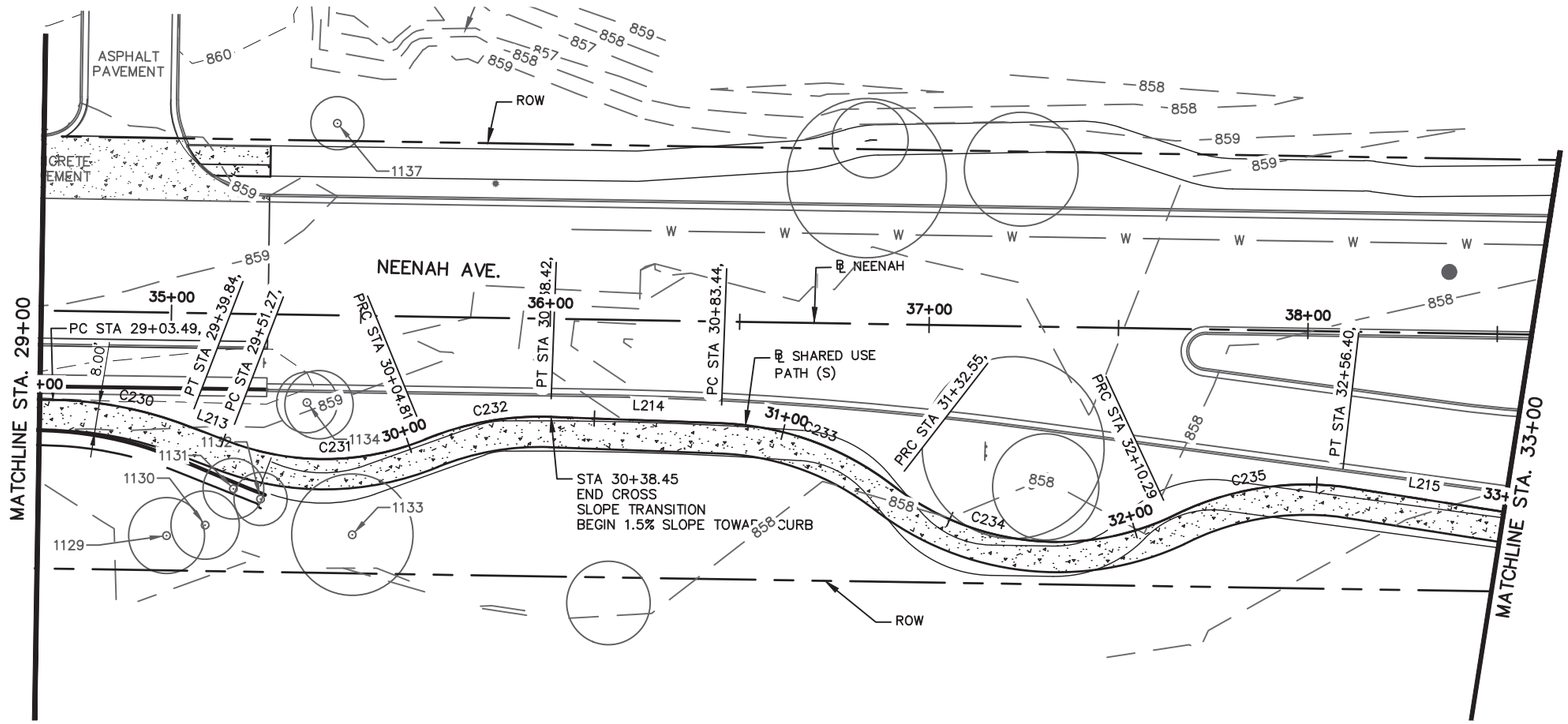
SHARED USE PATH (S) PLAN AND PROFILE STA. 25+00 TO STA. 29+00

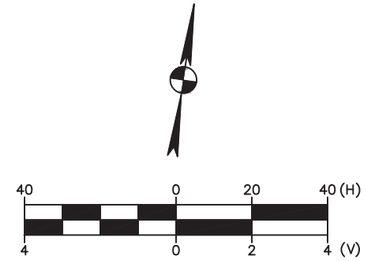
SHEET 92 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				92

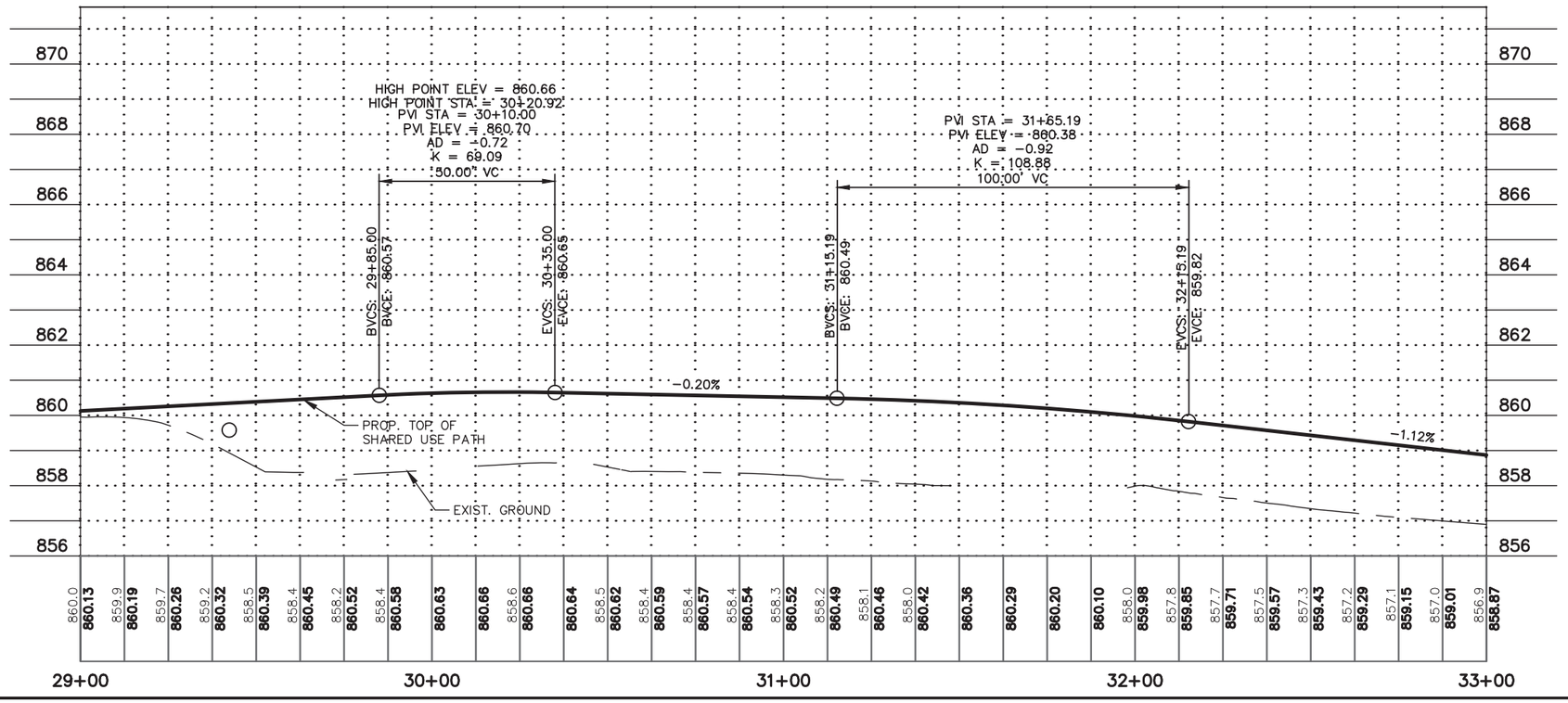
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SP-2016-0186D





NOTES:
1. REFER TO PROJECT CONTROL DATA SHEET 3 FOR LINE AND CURVE TABLE DATE FOR THE SOUTH SHARED USE PATH.
2. THE NEENAH AVE. EXTENSION PROJECT INFORMATION SHOWN WAS TAKEN FROM PLANS PROVIDED BY OTHERS. CONTRACTOR TO FIELD VERIFY HORIZONTAL AND VERTICAL INFORMATION AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT ALL EXISTING INFRASTRUCTURE.
3. TOPOGRAPHICAL INFORMATION SHOWN EAST OF NEENAH BASELINE STATION 35+25.47 DOES NOT REFLECT CURRENT GROUND INFORMATION. CONTRACTOR TO FIELD VERIFY PROPOSED GRADES CLOSELY MATCH EXISTING GROUND.





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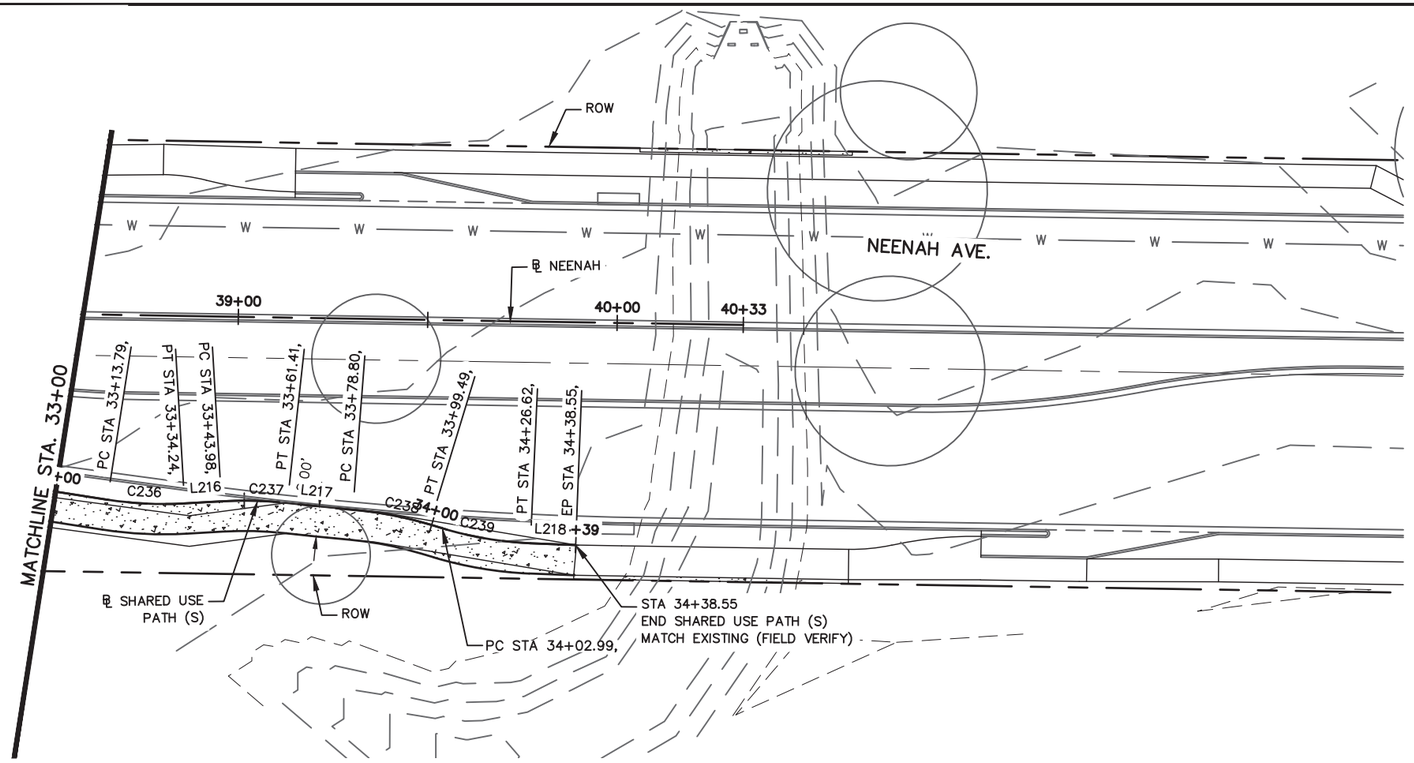
SHARED USE PATH (S) PLAN AND PROFILE STA. 29+00 TO 33+00

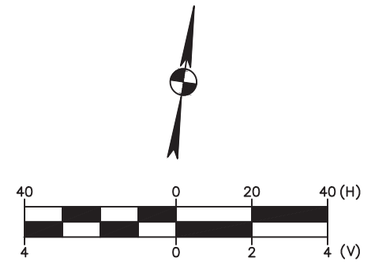
SHEET 93 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				93

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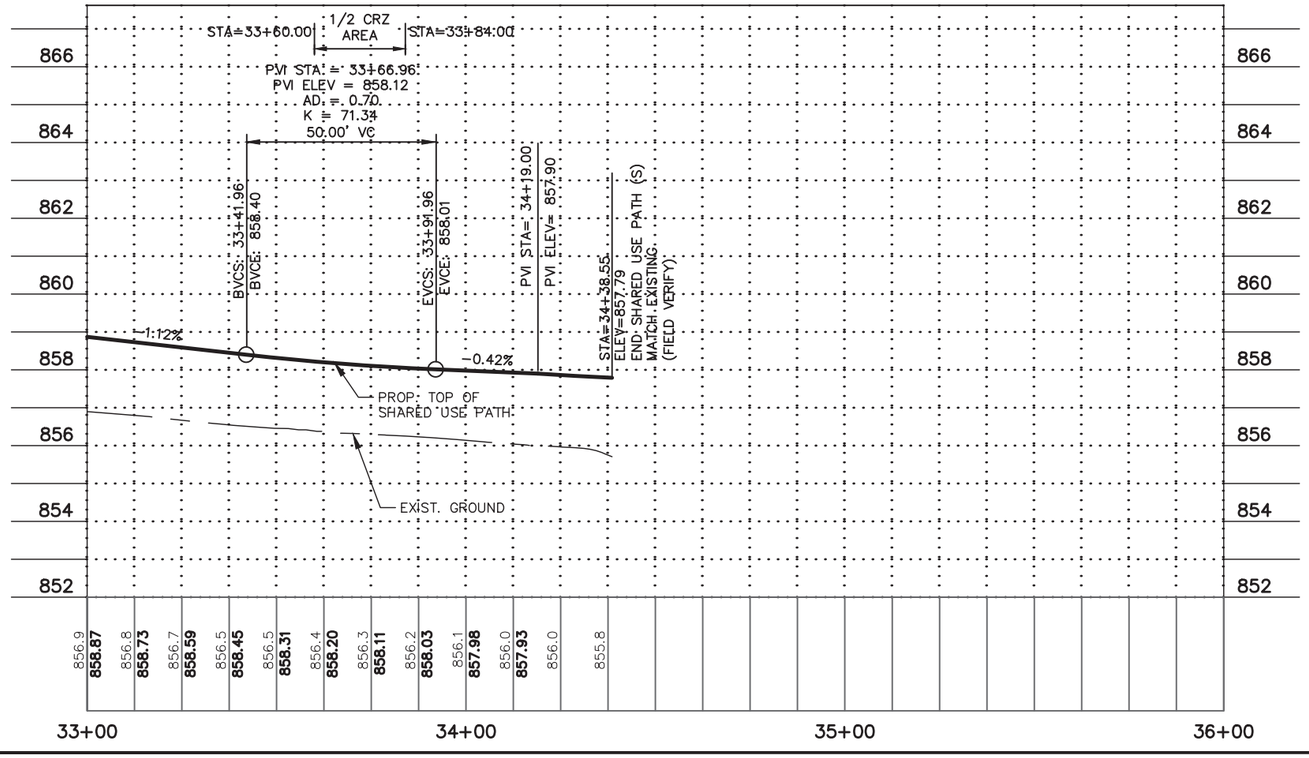
SP-2016-0186D





NOTES:

1. REFER TO PROJECT CONTROL DATA SHEET 3 FOR LINE AND CURVE TABLE DATE FOR THE SOUTH SHARED USE PATH.
2. THE NEENAH AVE. EXTENSION PROJECT INFORMATION SHOWN WAS TAKEN FROM PLANS PROVIDED BY OTHERS. CONTRACTOR TO FIELD VERIFY HORIZONTAL AND VERTICAL INFORMATION AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT ALL EXISTING INFRASTRUCTURE.
3. TOPOGRAPHICAL INFORMATION SHOWN EAST OF NEENAH BASELINE STATION 35+25.47 DOES NOT REFLECT CURRENT GROUND INFORMATION. CONTRACTOR TO FIELD VERIFY PROPOSED GRADES CLOSELY MATCH EXISTING GROUND.



8.4.17
STATE OF TEXAS
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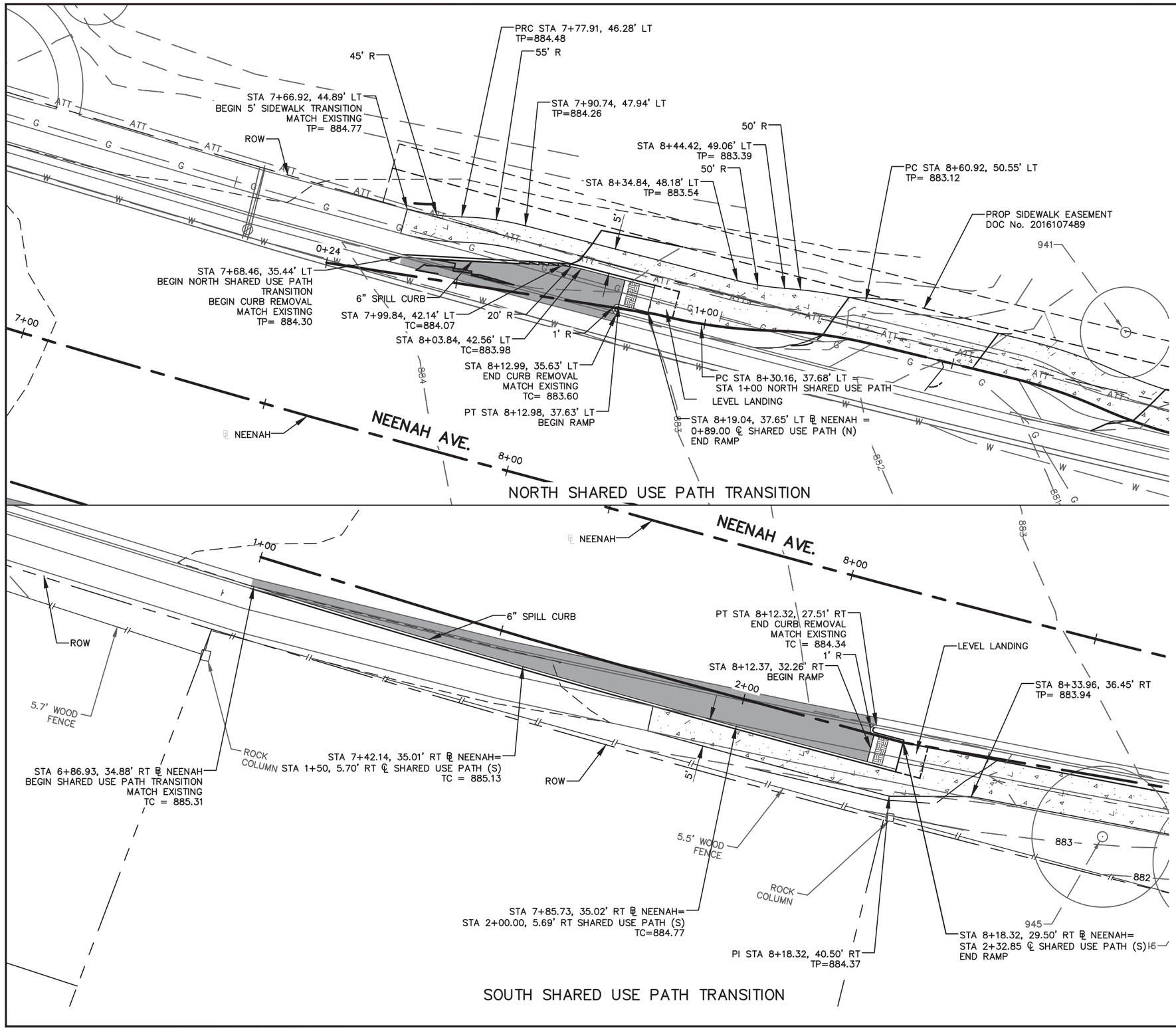
SHARED USE PATH (S) PLAN AND PROFILE STA. 33+00 TO END

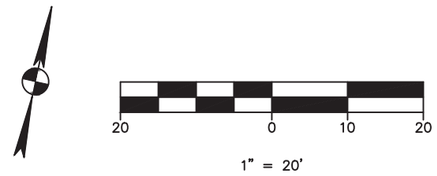
SHEET 94 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				94

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NOTES:
1. REFER TO ROADWAY PLAN AND PROFILE SHEETS FOR MORE INFORMATION.
2. REFER TO SIGNAGE AND PAVEMENT MARKING LAYOUT SHEETS FOR MORE INFORMATION AND GUARD FENCE.

LEGEND

- ROW
- 859 — PROP. CONTOURS
- 860 — EXIST. CONTOURS
- CONCRETE PAVEMENT
- SHARED USE PATH

8.4.17
STATE OF TEXAS
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SHARED USE PATH TRANSITION DETAILS

SHEET 95 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				95

SP-2016-0186D

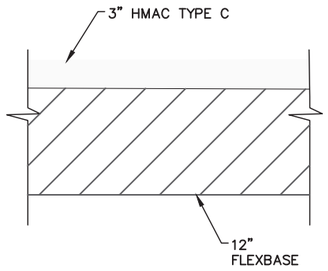
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NO.	SHEET	STATION	EXIST. DRIVEWAY WIDTH AT ROW (F-F)	PROP. DRIVEWAY WIDTH AT ROW (F-F)	SEE DIAGRAM BELOW													QUANTITIES			
					L1	S1	L2	S2	L3	S3	L4	S4	L5	S5	L6	S6	R1	D1	CONCRETE DRIVE (SF)(TYPII)	HMAC DRIVE (SY)	GRAVEL (SF)	CURB *** (LF)
1	68	14+31.73 LT.	50.28	50.28	2	-1.77	15.06	5.64	8.02	1.58*	13.44	3.09	--	--	--	--	25	24.68	1912			32
2	69	17+48.42 LT.	51.35	50.11	9.29	10.33	8.05	1.55*	5.76	9.82	6.20	7.26	5.81	-1.16	--	--	25	23.93	1772			39
3	70	21+27.44 LT.	34.53	31.51	3.65	8.71	8.26	1.5*	9.38	4.80	4.36	2.18	5.96	0.0	4.58	-6.82	20	25.47	1215			50
4	71	26+69.18 RT.	48.88	44.48	4.99	6.41	8.00	-1.5*	17.50	-16.54**	12.58	-8.87**	--	--	--	--	20	1.79	637		1484	
5	71	26+79.75 LT.	39.97	35.76	3.57	9.00	9.73	1.5*	6.42	9.12	4.21	4.90	--	--	--	--	25	13.5	976			31
6	72	29+57.57 LT.	29.17	29.29	4.55	9.87	8.68	1.52*	16.99	1.76	--	--	--	--	--	--	25	8.95	748	26		21
7	72	30+03.20 RT.	18.19	18.65	5.29	7.69	8.00	-1.5*	12.15	-15.30**	--	--	--	--	--	--	15	--	340		1096	
8	73	34+65.59 LT.	73.96	74.25	3.88	4.67	11.05	1.5*	--	--	--	--	--	--	--	--	25	--	1476			

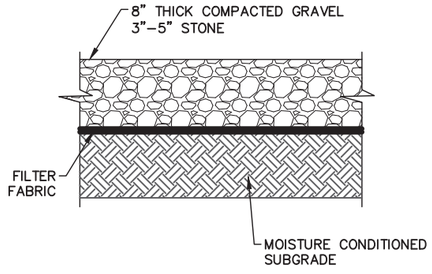
* SLOPE AT SHARED USE PATH.

** MAINTENANCE ACCESS RAMPS FOR WATER QUALITY & DETENTION POND 2.

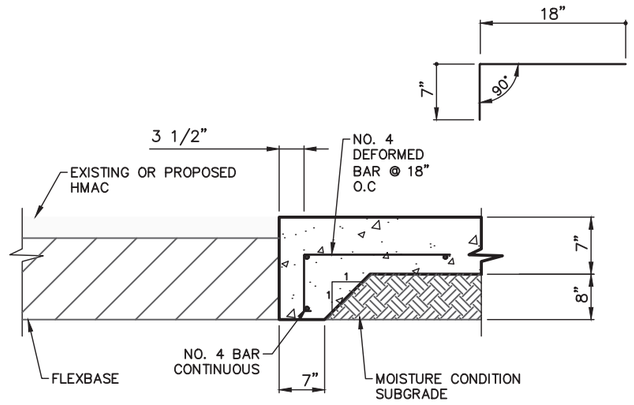
***CURBS HAVE BEEN QUANTIFIED INSIDE THE PROPERTY LINES ONLY.



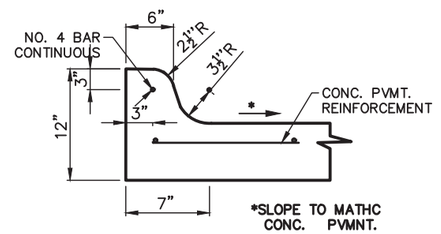
HMAC DRIVEWAY SECTION
N.T.S.



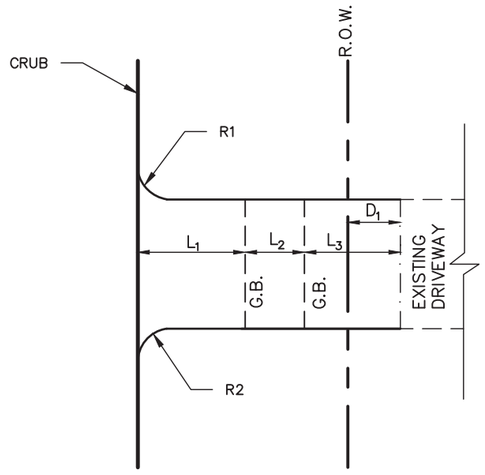
GRAVEL DRIVEWAY SECTION
N.T.S.



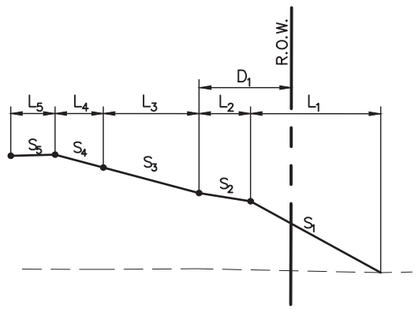
CONCRETE DRIVEWAY HEADER
N.T.S.



MONOLITHIC CURB DETAIL
N.T.S.



DRIVEWAY PLAN
N.T.S.



DRIVEWAY PROFILE
N.T.S.

NOTES:
S_1 , S_2 , S_3 = SLOPE IN %
L_1 , L_2 , L_3 , D_1 = LENGTH IN FEET
G.B. = GRADE BREAK
R1 = RADIUS IN FEET

SEE DRIVEWAY DETAILS FOR PAVEMENT SECTIONS UNLESS NOTED OTHERWISE.



NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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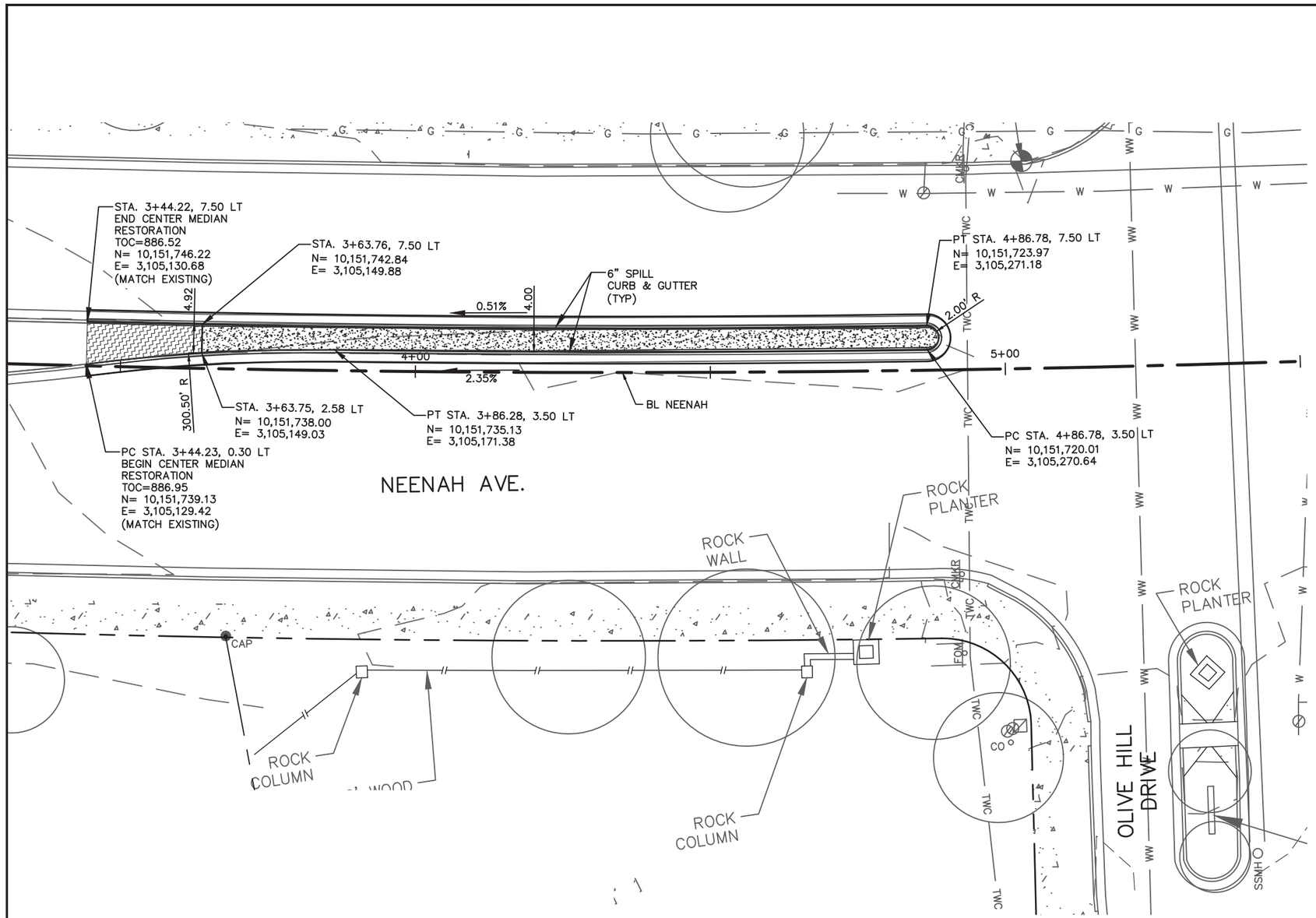
DRIVEWAY TABLE AND DETAILS

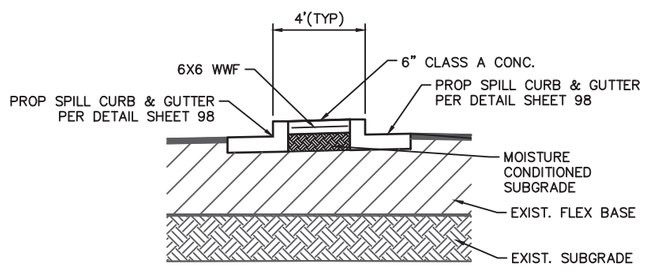
SHEET 96 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				96

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MEDIAN DETAIL
NTS

20 0 10 20

1" = 20'

LEGEND

PROP. CONC. MEDIAN

RESTORE TOPSOIL AND VEGETATION

NOTES:
1. CONTRACTOR TO SAWCUT AND REMOVE TEMPORARY PAVING.
2. MATCH EXISTING EDGE OF PAVEMENT.
3. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
4. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
5. REFER TO SIGNING AND PAVEMENT MARKING LAYOUT SHEETS FOR MORE INFORMATION.
6. MATCH EXIST X-SLOPES AT TIE-IN LOCATIONS.
7. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
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LICENSED PROFESSIONAL ENGINEER
Stephanie D Blew

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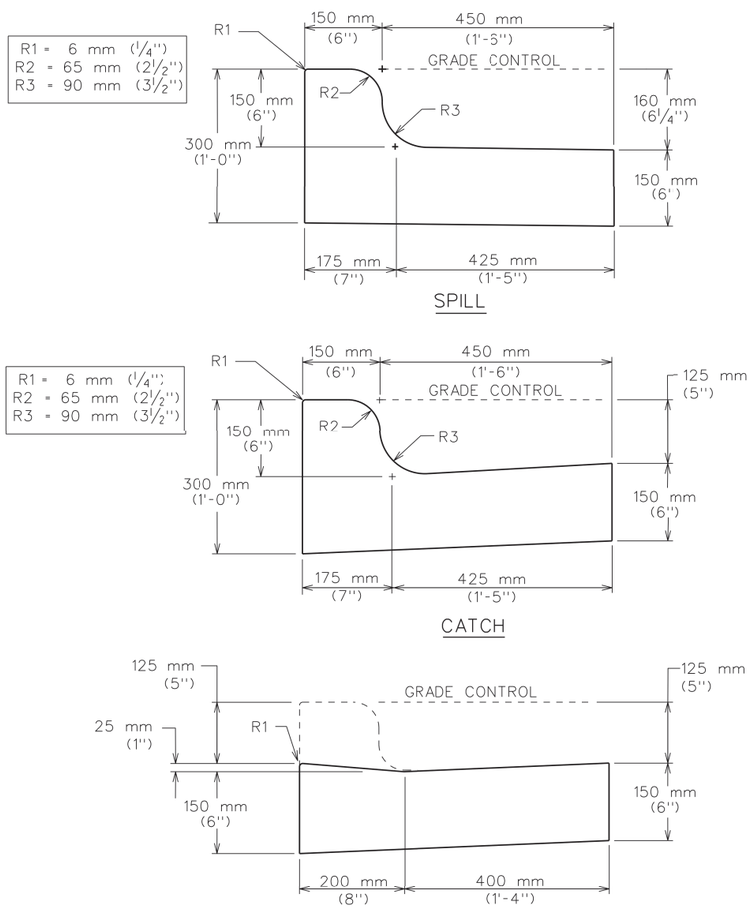
MEDIAN REBUILD DETAIL

SHEET 97 OF 273

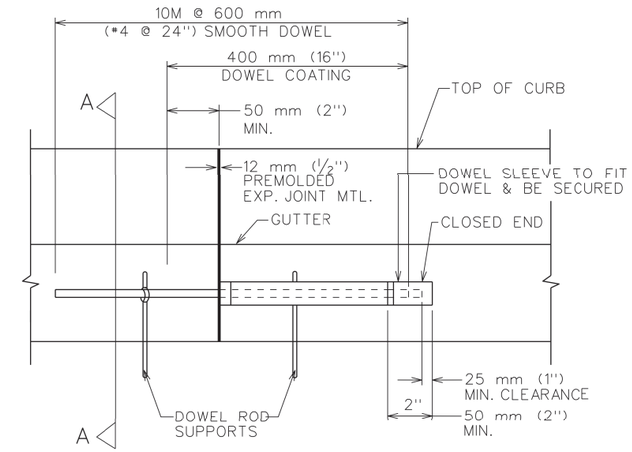
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				97

SP-2016-0186D

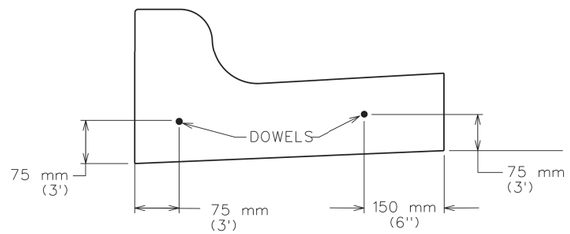
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CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		CURB AND GUTTER SECTION	
RECORD COPY SIGNED BY LINO RIVERA	*9/29/99* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 430S-1



CURB EXPANSION JOINT DOWEL DETAIL



SECTION A-A

SEE STANDARD 430S-1 FOR TYPICAL CURB AND GUTTER SECTIONS.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		CURB EXPANSION JOINT DOWEL DETAIL	
RECORD COPY SIGNED BY LINO RIVERA	*9/29/99* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 430S-3

8-4-17
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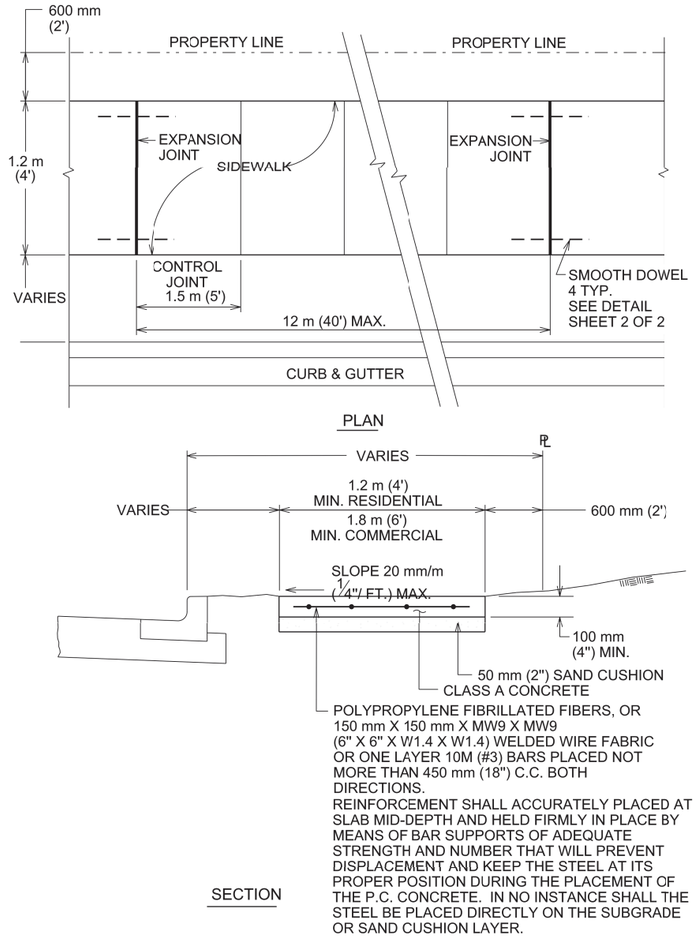
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SHEET 98 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				98

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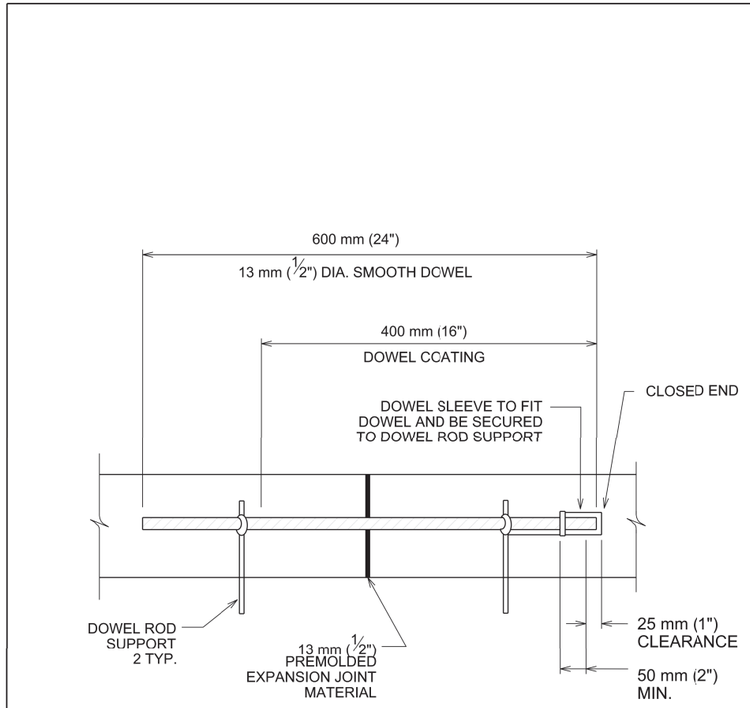
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PLAN

SECTION

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		SIDEWALK	
RECORD COPY SIGNED BY BILL GARDNER	03/26/08 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 432S-1 1 OF 3



DOWEL DETAIL

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		SIDEWALK	
RECORD COPY SIGNED BY BILL GARDNER	03/26/08 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 432S-1 2 OF 3

8.4.17
STATE OF TEXAS
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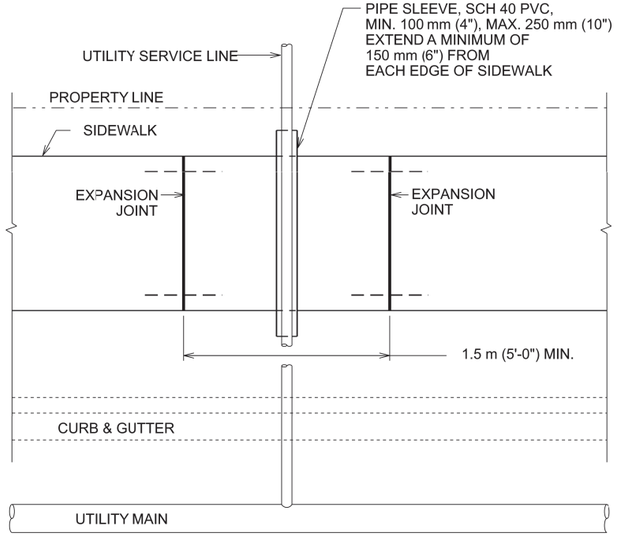
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SHEET 99 OF 273

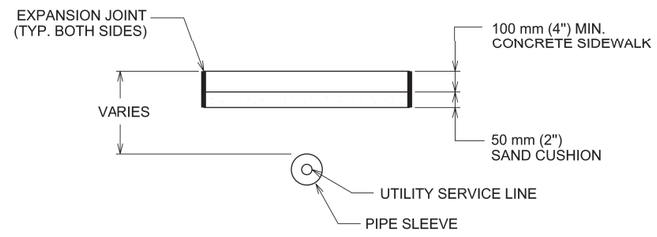
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6	TEXAS	104023–10006	_	14	WILLIAMSON				99

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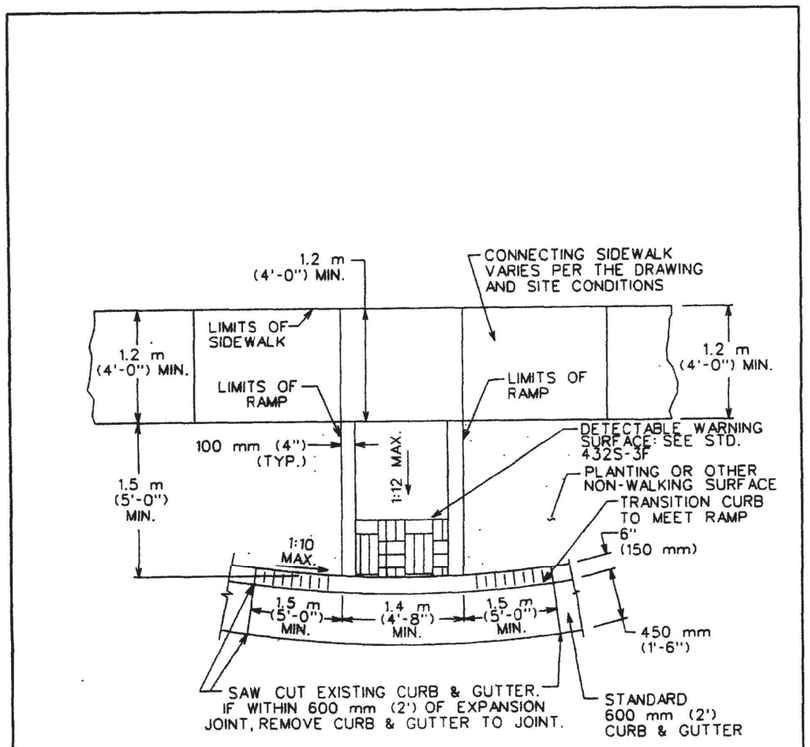
SIDEWALK OVER UTILITY SERVICE LINE PLAN



SECTION OF SIDEWALK OVER
UTILITY SERVICE LINES

NOTES:
1. THIS STANDARD APPLIES TO THE INSTALLATION OF NEW UTILITIES OR UTILITIES BEING REPLACED BY A NEW LINE.
2. NO JOINTS IN UTILITY SERVICE PIPE TO BE LOCATED INSIDE PVC PIPE SLEEVE.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		SIDEWALK	
RECORD COPY SIGNED BY BILL GARDNER	03/26/08 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 432S-1 3 OF 3



CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		TYPE 1B SIDEWALK CURB RAMP	
Bill Gardner	9/14/05 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 432S-5B

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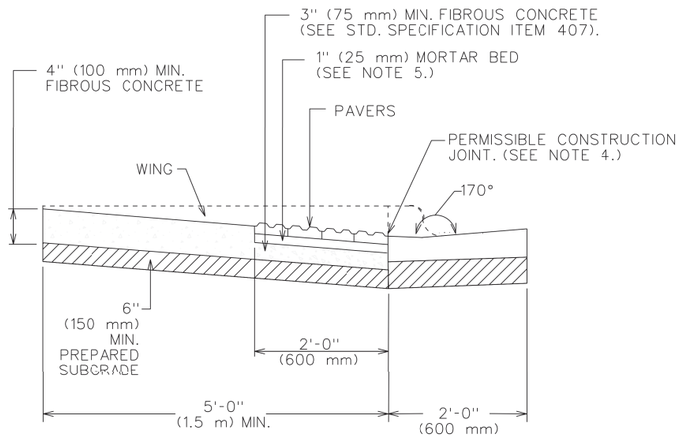
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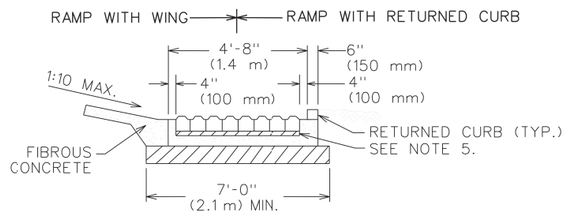
SHEET 100 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				100

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CROSS SECTION



FRONT END VIEW

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		DETECTABLE WARNING-PAVER (CITY PROPERTY/EASEMENTS)	STANDARD NO.
RECORD COPY SIGNED BY BILL GARDNER	*06/21/07* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	432S-2A 1 OF 2

GENERAL NOTES:

1. THIS STANDARD IS APPLICABLE FOR RAMP CONSTRUCTION ON CITY PROPERTY AND EASEMENT AREAS ONLY.
2. PAVERS ARE REQUIRED FOR ALL CURB RAMP INSTALLATIONS.
3. PAVERS WILL HAVE DETECTABLE WARNING THAT CONSISTS OF RAISED TRUNCATED DOMES WITH A DIAMETER OF 0.9" (23 mm), A NOMINAL HEIGHT OF 0.2" (5 mm) AND A NOMINAL CENTER TO CENTER SPACING OF 2.35" (60 mm) AND SHALL CONSTRAST VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT (Re: ADAAG SECTION 4.29.2). MATERIAL USED TO PROVIDE CONTRAST SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE. PAVER PATTERN SHALL BE BASKET WEAVE UNLESS DIRECTED OTHERWISE BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.
4. TYPICAL SIDEWALK WIDTHS AND CURB RADII ARE SHOWN FOR ILLUSTRATION ONLY. REFER TO THE TRANSPORTATION CRITERIA MANUAL FOR SIDEWALK WIDTHS, CURB RADII AND CURB BASIS.
5. THE PERMISSIBLE CONSTRUCTION JOINT BETWEEN THE PAVERS AND THE ADJOINING SURFACE SHALL BE LIMITED TO 1/4" (6 mm) JOINT SIZE. GAPS LARGER THAN 1/4" (6 mm) MUST BE APPROVED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. ALL JOINTS BETWEEN BRICKS AND ADJOINING SURFACE SHALL BE MORTAR FILLED UNLESS DIRECTED OTHERWISE BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.
6. MORTAR SHALL CONFORM TO STD. SPECIFICATION ITEM SECTION 403S.3.5, MORTAR AND GROUT. ALL OTHER CONCRETE SHALL CONFORM TO STD. SPECIFICATION ITEM 403S, CONCRETE FOR STRUCTURES, UNLESS OTHERWISE NOTED.
7. CURB RAMPS WITH RETURNED CURB MAY ONLY BE USED WHERE PEDESTRIANS WOULD NOT NORMALLY WALK DIAGONALLY ACROSS THE RAMP.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		DETECTABLE WARNING-PAVER (CITY PROPERTY/EASMENTS)	STANDARD NO.
RECORD COPY SIGNED BY BILL GARDNER	*06/21/07* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	432S-2A 2 OF 2

8.4.17

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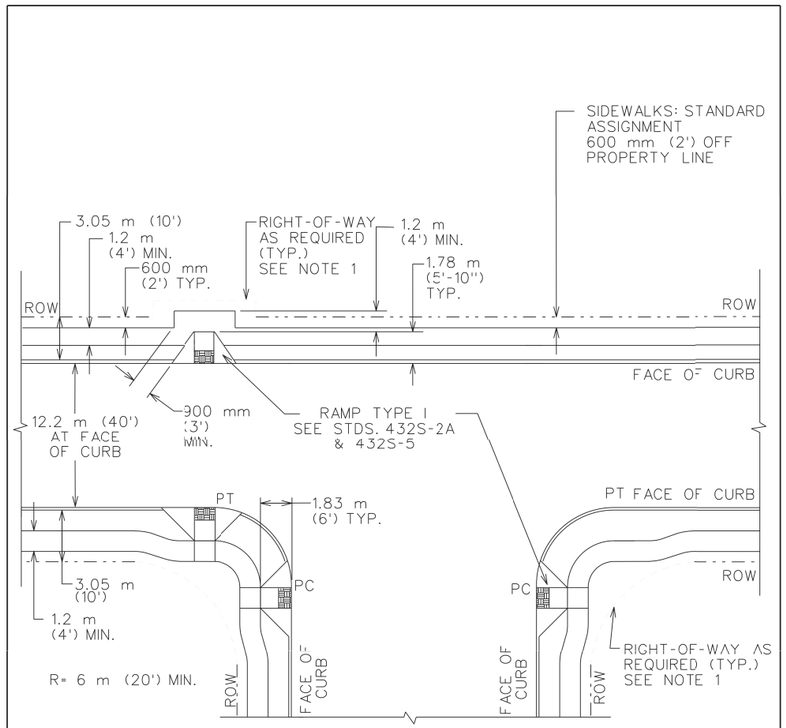
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SHEET 101 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				101

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TYPICAL PLAN

GENERAL NOTES:

1. THIS STANDARD IS APPLICABLE FOR RAMP CONSTRUCTION WITHIN RIGHT-OF-WAY OR EASEMENT ONLY.
2. THIS STANDARD REPRESENTS A TYPICAL CURB RAMP DESIGN FOR A NEWLY CONSTRUCTED INTERSECTION WITH A 6 m (20') RADIUS. LARGER RADII, STREET GRADES, LIMITED SIGHT DISTANCES, STREET CLASSIFICATION, SIGNALIZATION AND OTHER FACTORS MAY REQUIRE THE ENGINEER OR DESIGNATED REPRESENTATIVE TO MODIFY THIS STANDARD. SUFFICIENT RIGHT-OF-WAY SHALL BE DEDICATED SUCH THAT THE ENTIRE CURB RAMP, INCLUDING LANDING, AND THE INTER-CONNECTING SIDEWALK ARE CONTAINED WITHIN THE RIGHT-OF-WAY.
3. THE CURB, GUTTER AND RAMP SYSTEM SHALL BE CONFIGURED TO MAINTAIN ALL RUNOFF FROM A 25 YEAR FREQUENCY STORM WITHIN THE RIGHT-OF-WAY (DRAINAGE CRITERIA MANUAL SECTION 1.2.2.B). WHEN THERE IS AN ELEVATION DIFFERENCE BETWEEN THE BOTTOM OF RAMPS (IE. ELEVATION AT THE GUTTER) WITHIN A QUADRANT OF AN INTERSECTION, THE LOWER ELEVATION RAMP SHALL BE CONSTRUCTED WITH A POSITIVE RAMP SLOPE OF 1:12 IN ACCORDANCE WITH STANDARDS 432S-5, 432S-5A AND 432S-5B.
4. STANDARD ASSIGNMENT OF SIDEWALKS IS 600 mm (2') OFF PROPERTY LINE, EXCEPT AS INDICATED ON THE DRAWINGS.
5. ALTHOUGH CURB RAMPS MAY BE PLACED WITHIN THE RADIUS, PLACING THE RAMP OUTSIDE OF THE RADIUS WILL ALLOW FOR THE GREATEST DIFFERENCE IN ELEVATION BETWEEN THE RAMPS.
6. WINGS ARE REQUIRED ONLY IF PEDESTRIANS WOULD NORMALLY CROSS THE RAMP.
7. LANDINGS SHALL BE FLAT AND MATCH PT, PC OR TOP OF CURB ELEVATION.
8. CURB RAMPS WILL BE PERPENDICULAR TO ROADWAY CENTERLINES AND SHALL ALIGN WITH EACH OTHER.
9. GRADES ON SIDEWALKS LEADING TO OR FROM THE RAMPS SHALL FOLLOW CURB GRADES.
10. THE SLOPE OF THE SIDEWALK WHICH IS LOCATED WITHIN THE RADIUS AND CONNECTS TWO CURB RAMPS SHALL NOT EXCEED 1:20. THE DEVELOPER, AS PART OF THE CURB RAMP INSTALLATION, SHALL CONSTRUCT THIS CONNECTING SIDEWALK.
11. STRIPING AND SIGNAGE NOT REQUIRED IN ALL INSTANCES. STOP BARS, IF REQUIRED, SHALL BE LOCATED 1.2 m (4') FROM CROSSWALK.
12. IF A MEDIAN EXTENDS INTO THE CROSSWALK AREA, AN OPENING SHALL BE PROVIDED IN THE MEDIAN THE SAME WIDTH AS THE CURB RAMP.
13. CURB INLETS SHALL NOT BE LOCATED WITHIN 3.0 m (10') OF A CURB RAMP.
14. GUTTER SHALL PROVIDE SMOOTH TRANSITION TO RAMPS.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		TYPE 1 CURB RAMPS - "T" INTERSECTION	
RECORD COPY SIGNED BY BILL GARDNER	*03/13/06* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 432S-3A 1 OF 2

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		TYPE 1 CURB RAMPS - "T" INTERSECTION	
RECORD COPY SIGNED BY BILL GARDNER	*03/13/06* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 432S-3A 2 OF 2

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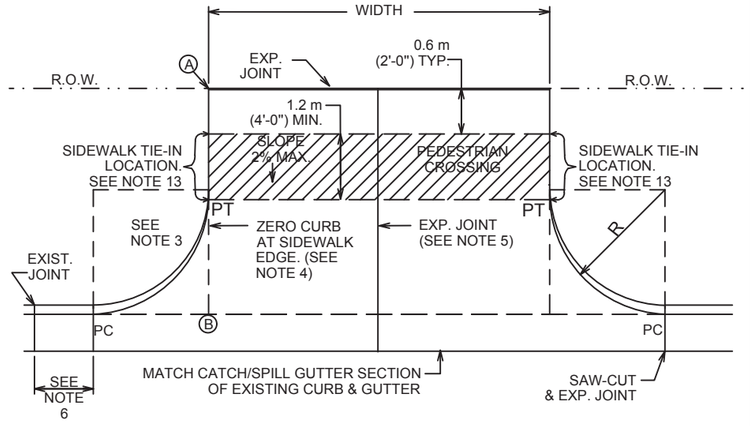
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SHEET 102 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				102

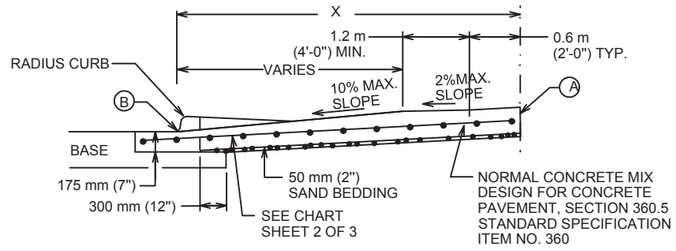
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PLAN

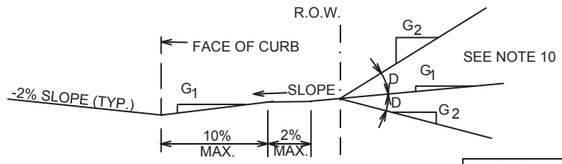
NOTE: ALL DRIVEWAYS SHALL BE SLOPED TOWARDS THE STREET FROM THE R.O.W. LINE. ELEVATION OF POINT (A) ABOVE POINT (B) IS, TYPICALLY A MINIMUM OF 150 mm (6") PLUS 20 mm/m ($\frac{1}{4}$" RISE/FOOT) OVER DISTANCE "X" IN METERS (FEET).



CROSS SECTION

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		TYPE II DRIVEWAY	
RECORD COPY SIGNED BY CUONG TRAN	*02/24/10*	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 433S-2
ADOPTED			1 OF 2

USE	THICKNESS	REINFORCEMENT
DRIVEWAYS FOR PASSENGER VEHICLE PARKING LOTS	150 mm (6") MIN.	125 mm (5") MIN. CONCRETE WITH ONE LAYER OF13M (#4) BARS PLACED ON CHAIRS AT MIDDEPTH OF SLAB AT NO MORE THAN 450 mm (18") O.C. BOTH DIRECTIONS
ALL OTHERS	175 mm (7") MIN.	125 mm (5") MIN. CONCRETE WITH ONE LAYER OF13M (#4) BARS PLACED ON CHAIRS AT MIDDEPTH OF SLAB AT NO MORE THAN 450 mm (18") O.C. BOTH DIRECTIONS



ALLOWABLE GRADES

DRIVEWAY VOLUME (ADT)	D=GRADE CHANGE	
	STD.	MAX
>1500	0%	3%
500-1500	3%	6%
< 500	6%	15%

NOTES:

1. ALL TYPE II DRIVEWAYS SHALL HAVE RADIUS ENDS.
2. DRIVEWAY WIDTHS AND RADII DIMENSIONS, ONE/TWO WAY TRAVEL REQUIREMENTS, AND GEOMETRIC LAY-OUT ARE HIGHLY VARIABLE, SUBJECT TO SITE SPECIFIC CONDITIONS AND REQUIREMENTS. SEE TRANSPORTATION CRITERIA MANUAL. SECTION 5 "DRIVEWAYS".
3. THE DRIVEWAY EDGE SHALL BE SMOOTHLY TRANSITITIONED INTO THE SIDEWALK TIE-IN LOCATION BEGINNING AT THE RADIUS PC LINE.
4. "ZERO" CURB AT PT OR SIDEWALK EDGE, WHICHEVER IS ENCOUNTERED FIRST.
5. PLACE AN EXPANSION JOINT DOWN THE CENTER OF DRIVEWAY ALL DRIVEWAYS.
6. IF DIMENSION IS LESS THAN 1.5 METERS (5 FEET), REMOVE CURB AND GUTTER TO EXISTING JOINT AND POUR MONOLITHICALLY WITH DRIVEWAY.
7. IF THE BASE IS OVER-EXCAVATED WHERE THE CURB AND GUTTER WERE REMOVED, BACKFILL WITH CONCRETE MONOLITHICALLY WITH THE DRIVEWAY.
8. TYPE II DRIVEWAYS ARE TO BE LOCATED NO CLOSER TO THE CORNER OF INTERSECTING RIGHT OF WAY THAN 60% OF PARCEL FRONTAGE AT 30 METERS (100 FEET): WHICHEVER IS LESS.
9. DRIVEWAY SHALL NOT BE CONSTRUCTED WITHIN THE CURB RETURN OF A STREET INTERSECTION.
10. WHILE THE PROPERTY OWNER REMAINS RESPONSIBLE FOR GRADE BREAKS WITHIN PRIVATE PROPERTY, THE FIRE DEPARTMENT SHALL BE CONSULTED WHERE THE DRIVEWAY IS ESSENTIAL TO EMERGENCY VEHICLE ACCESS AND "G2 IS GREATER THAN 15%.
11. USE 12 MM (1/2") ASPHALT BOARD OR OTHER APPROVED MATERIAL FOR CURB AND GUTTER EXPANSION JOINTS. SIDEWALK, AT THE R.O.W. LINE AND AT MIDWIDTH, SEE NOTE 5.
12. SEE TRANSPORTATION CRITERIA MANUAL, SECTION 5 FOR OTHER DRIVEWAY REQUIREMENTS.
13. THE SIDEWALK, REGARDLESS OF ITS LOCATION WITH RESPECT TO THE CURB OR PROPERTY LINE, SHALL BE CONNECTED TO THE DRIVEWAY AT THESE LOCATIONS.
14. WATER METER BOXES AND WASTEWATER CLEAN OUTS ARE PROHIBITED FROM BEING LOCATED IN DRIVEWAY AREAS.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		TYPE II DRIVEWAY	
RECORD COPY SIGNED BY CUONG TRAN	*02/24/10*	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 433S-2
ADOPTED			2 OF 2

8.4.17
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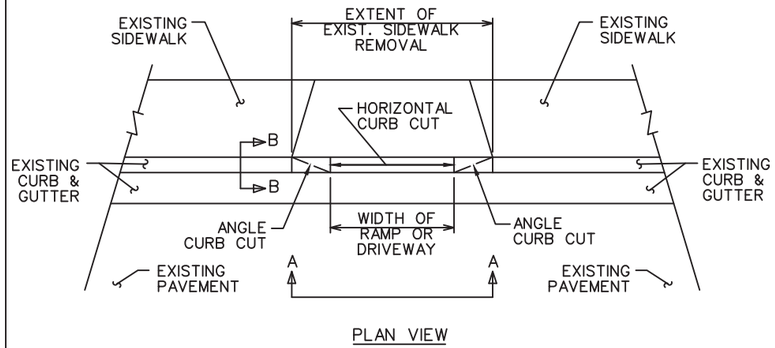
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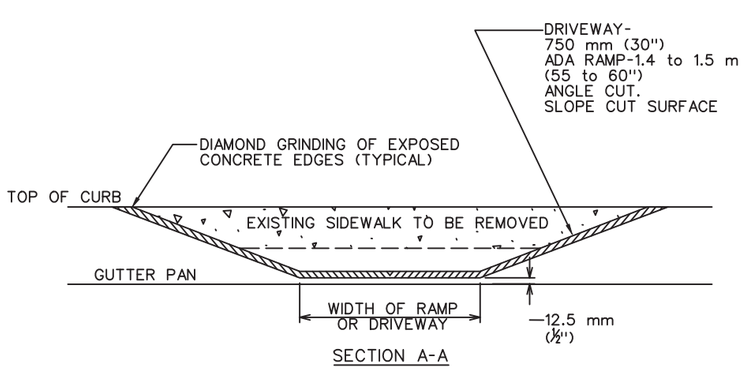
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6	TEXAS	104023–10006	_	14	WILLIAMSON				103

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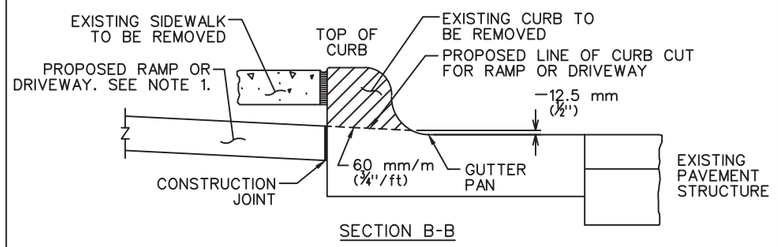


PLAN VIEW



SECTION A-A

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		CURB CUT FOR RAMP OR DRIVEWAY (OPTIONAL)	STANDARD NO.
RECORD COPY SIGNED BY BILL GARDNER	*03/26/08*	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	470S-1
ADOPTED			1 OF 2



SECTION B-B

NOTES:

1. SEE RAMP STANDARDS 432S-5, 432S-5A AND 532S-5B OR DRIVEWAY STANDARDS 433S-1, 433S-1A AND 433S-2.
2. THIS METHOD CANNOT BE USED IF THE EXISTING CURB AND GUTTER ARE CRACKED. REMOVAL OF THE ENTIRE CURB AND GUTTER IS REQUIRED IN THOSE CASES. (SEE STANDARDS 432S AND 433S SERIES.)
3. CURB CUTS SHOULD NOT EXCEED 9 m (30') FROM WING TIPS.
4. CURB CUTS MAY ONLY BE USED WITH TYPE 1, FLARED DRIVEWAYS, SEE STANDARD 433S-1A.
5. IF CURB CUT IS FOUND NOT STANDARD, ENTIRE CURB AND GUTTER MUST BE REMOVED TO THE NEXT NEAREST JOINT.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		CURB CUT FOR RAMP OR DRIVEWAY (OPTIONAL)	STANDARD NO.
RECORD COPY SIGNED BY BILL GARDNER	*03/26/08*	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	470S-1
ADOPTED			2 OF 2

8.4.17
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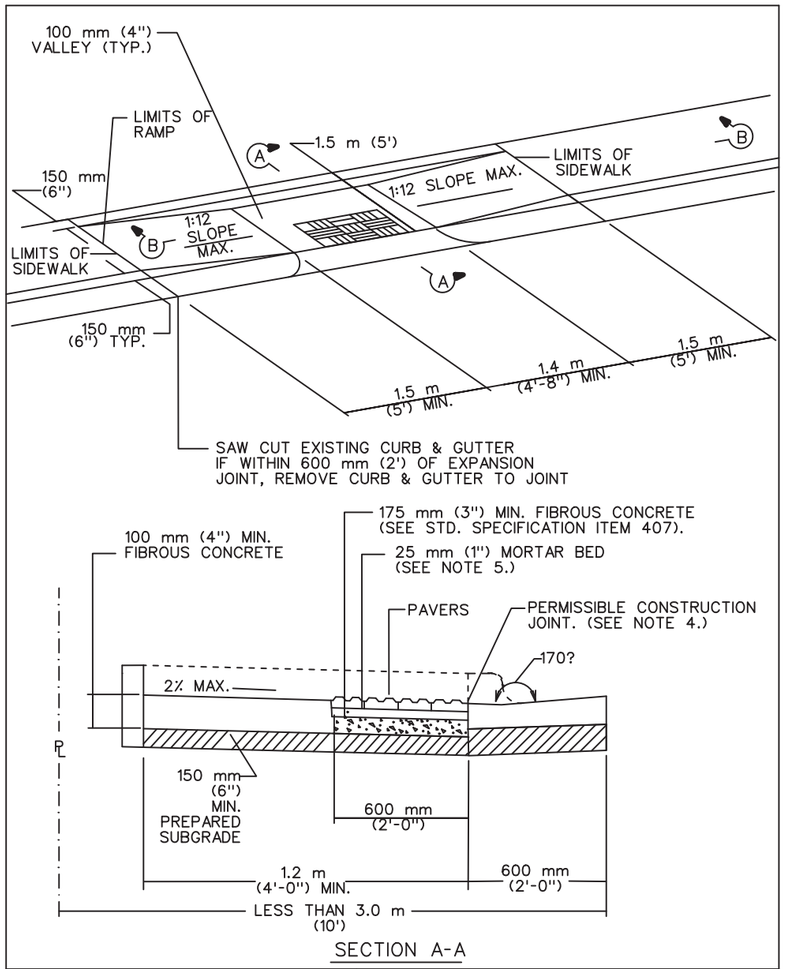
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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				104

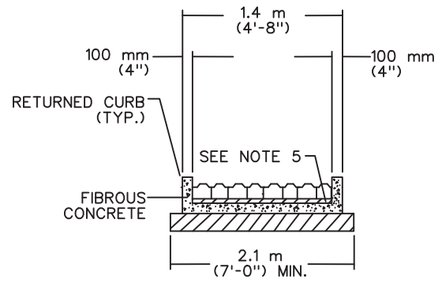
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SECTION A-A

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		COMBINED SIDEWALK CURB RAMP WITH PAVERS WITHIN LIMITED ROW ONLY	
RECORD COPY SIGNED BY BILL GARDNER	*06/21/07* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 432S-3G 1 OF 2



SECTION B-B

GENERAL NOTES:

1. THIS STANDARD IS APPLICABLE FOR RAMP CONSTRUCTION WITHIN RIGHT-OF-WAY OR EASEMENT ONLY.
2. PAVERS WILL HAVE DETECTABLE WARNING THAT CONSISTS OF RAISED TRUNCATED DOMES WITH A DIAMETER OF 23 mm (0.9"), A NOMINAL HEIGHT OF 5 mm (0.2") AND A NOMINAL CENTER TO CENTER SPACING OF 60 mm (2.35") AND SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT (Re: ADAAG SECTION 4.29.2). MATERIAL USED TO PROVIDE CONTRAST SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE. A BASKET WEAVE PAVER PATTERN SHALL BE USED UNLESS DIRECTED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. PAVER PATTERN VARIES PER MANUFACTURER'S RECOMMENDATIONS. REFER TO STANDARD DETAIL 432S-5 FOR PAVER BASE PREPARATION DETAILS.
3. THE CURB, GUTTER AND RAMP SYSTEM SHALL BE CONFIGURED TO MAINTAIN ALL RUNOFF FROM A 25 YEAR FREQUENCY STORM WITHIN THE RIGHT-OF-WAY (DRAINAGE CRITERIA MANUAL SECTION 1.2.2.B).
4. TYPICAL SIDEWALK WIDTHS AND CURB RADII ARE SHOWN FOR ILLUSTRATION ONLY. REFER TO THE TRANSPORTATION CRITERIA MANUAL FOR SIDEWALK WIDTHS, CURB RADII AND CURB BASIC REQUIREMENTS.
5. THE PERMISSIBLE CONSTRUCTION JOINT BETWEEN THE PAVERS AND THE ADJOINING SURFACE SHALL BE LIMITED TO 6 mm (¼") JOINT SIZE. GAPS LARGER THAN 6 mm (¼") MUST BE APPROVED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. ALL JOINTS BETWEEN BRICKS AND ADJOINING SURFACE SHALL BE MORTAR FILLED UNLESS DIRECTED OTHERWISE BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.
6. MORTAR SHALL CONFORM TO STD. SPECIFICATION ITEM SECTION 403S.3.5, MORTAR AND GROUT. ALL OTHER CONCRETE SHALL CONFORM TO STD. SPECIFICATION ITEM 403S, CONCRETE FOR STRUCTURES, UNLESS OTHERWISE NOTED.
7. CURB RAMPS WITH 100 mm (4") CONCRETE VALLEY MAY ONLY BE USED WHERE PEDESTRIANS WOULD NOT NORMALLY WALK DIAGONALLY ACROSS THE RAMP.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		COMBINED SIDEWALK CURB RAMP WITH PAVERS WITHIN LIMITED ROW ONLY	
RECORD COPY SIGNED BY BILL GARDNER	*06/21/07* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 432S-3G 2 OF 2

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

Stantec
221 West Sixth Street, Suite 600
Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
TBPE # F-6324 TBPLS # F-10194230
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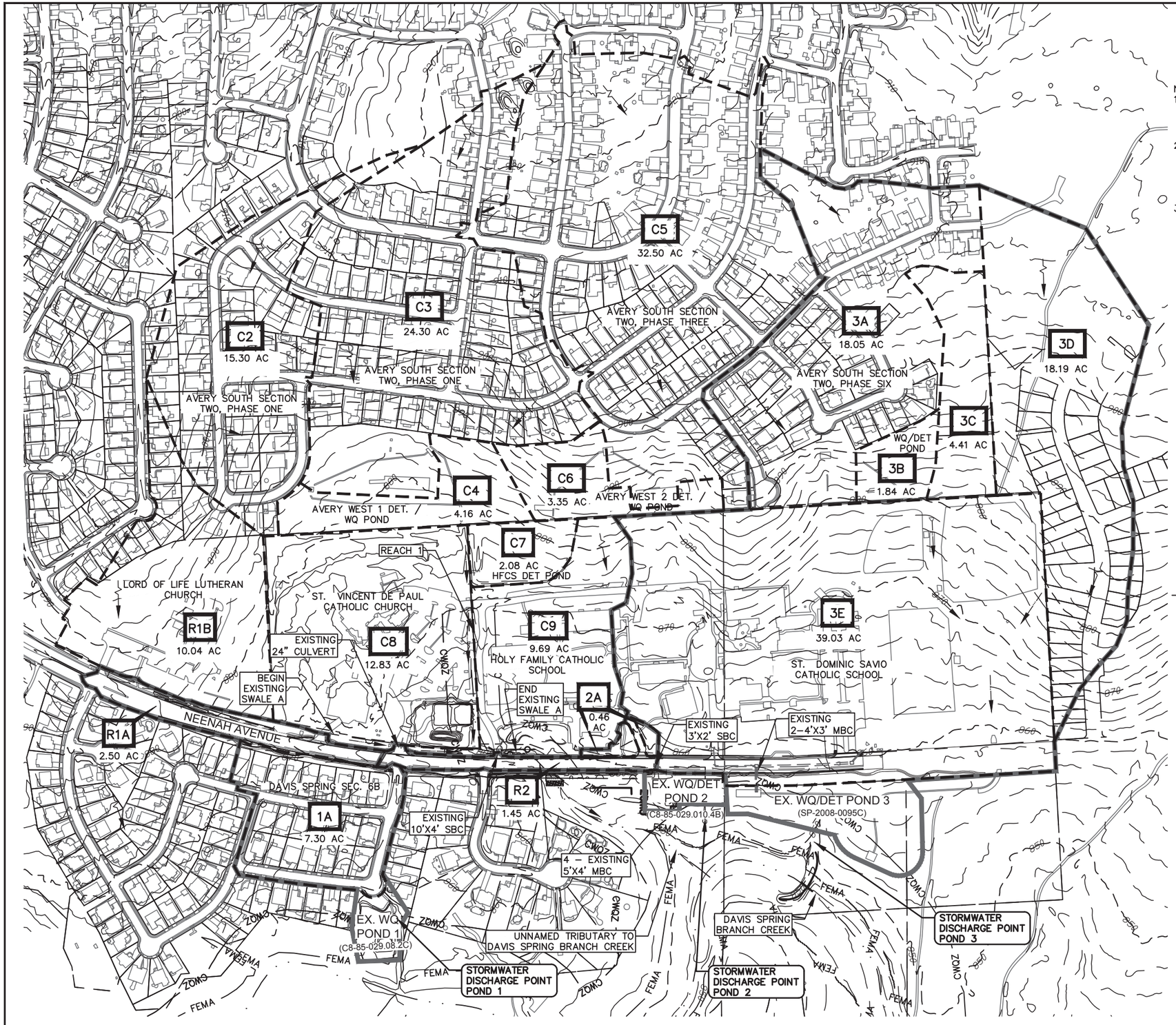
PAVING DETAILS 8

SHEET 105 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				105

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NOTES:

1. DRAINAGE AREAS NAMES BEGINNING WITH A NUMBER REFER TO THE EXISTING NEENAH POND NUMBER TO WHICH THEY DRAIN. DRAINAGE AREAS BEGINNING WITH A "C" DRAIN TO THE EXISTING 4-5'X4' MBC CROSSING NEENAH AVENUE. DRAINAGE AREAS BEGINNING WITH A "R" DRAIN TO NEENAH AVENUE.
2. EXISTING WATER QUALITY POND 1 AND EXISTING WATER QUALITY/DETENTION POND 3 PROVIDE ADEQUATE WATER QUALITY CONTROL FOR THE INCREASE IN IMPERVIOUS COVER ASSOCIATED WITH THE PROPOSED WIDENING OF NEENAH AVENUE. AS A RESULT, THERE ARE NO PLANNED IMPROVEMENTS FOR EXISTING WQ POND 1 OR EXISTING WQ/DETENTION POND 3. FOR ADDITIONAL DRAINAGE AND WATER QUALITY DETAILS, PLEASE REFER TO THE BURY DRAINAGE REPORT SUBMITTED WITH THESE PLANS.
3. DRAINAGE AREAS WERE TAKEN FROM RECORD DRAWINGS FROM THE FOLLOWING PLAN SETS:
   A. DAVIS SPRING SECTION 6B STREET AND DRAINAGE WATER AND WASTEWATER IMPROVEMENTS (C8-85-029.08.2C)
   B. DAVIS SPRING SECTION 5D-OFF-SITE NEENAH AVENUE EXTENSION (C8-85-029.010.4B)
   C. NEW CATHOLIC HIGH SCHOOL ST. DOMINIC SAVIO CATHOLIC SCHOOL (SP-2008-0095C)
   D. NEENAH AVENUE EXTENSION PAVING DRAINAGE AND WATER IMPROVEMENTS (C8J-2008-0065.0B)
   E. SITE DEVELOPMENT IMPROVEMENTS FOR ST VINCENT DE PAUL CATHOLIC CHURCH PARKING EXPANSION AND WATER QUALITY AND DETENTION TRANSFER PLANS (SP-2008-0522D)
   F. ST VINCENT DE PAUL (SP-2010-0315C)
   G. HOLY FAMILY CATHOLIC SCHOOL (SP-00-2214C)
   H. LORD OF LIFE LUTHERAN CHURCH (SP-00-2511C)
   I. PAVING, DRAINAGE, WATER & WASTEWATER IMPROVEMENTS FOR AVERY SOUTH SECTION TWO, PHASE ONE (C8J-02-0189.2A)
   J. PAVING, DRAINAGE, WATER & WASTEWATER IMPROVEMENTS FOR AVERY SOUTH SECTION TWO, PHASE THREE (C8J-02-0189.01.2B)
   K. PAVING, DRAINAGE, WATER & WASTEWATER IMPROVEMENTS FOR AVERY SOUTH SECTION TWO, PHASE SIX (C8J-02-0189.01.5B)
   L. PAVING, DRAINAGE, WATER & WASTEWATER IMPROVEMENTS FOR NEENAH AVE. EXTENSION PEARSON PLACE, C8J-2008-0056.3B

LEGEND

R2 — DRAINAGE AREA ID	DITCH/CHANNEL FLOW
DRAINAGE AREA BOUNDARY	FLOW ARROW
DRAINAGE AREA TO POND	FEMA — FEMA 100YR FLOODPLAIN
CREEK CL	CWQZ — CRITICAL WATER QUALITY ZONE
STORMWATER DISCHARGE POINT	STORMWATER DISCHARGE POINT

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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OVERALL EXISTING DRAINAGE AREA MAP

SHEET 106 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				106

SP-2016-0186D

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EXISTING DRAINAGE SUMMARY

Outfall	Drainage Area ID	Area (ac)	Imp. Cover (%)	CN	Tc (mins)	Tlag (mins)	Peak Flow (cfs)			
							2	10	25	100
EX. 4-5'X4' MBC	C2	15.30	48.6	80.0	15.0	9.0	30.3	59.6	76.6	104.9
	C3	24.30	48.6	80.0	15.0	9.0	48.1	94.6	121.7	166.6
	C4	4.16	0.0	80.0	5.0	3.0	8.0	17.9	23.6	33.1
	C5	32.50	49.6	80.0	15.0	9.0	64.6	126.8	163.0	223.1
	C6	3.35	0.0	80.0	5.0	3.0	6.5	14.4	19.0	26.7
	C7	2.08	0.0	80.0	5.0	3.0	2.8	6.2	8.2	11.6
	C8	12.83	51.0	80.0	13.3	8.0	29.1	54.1	68.6	92.7
	C9	9.69	28.2	80.0	20.0	12.0	19.8	36.6	46.3	62.3
EX. WQD POND 1	1A	7.30	46.5	80.0	10.0	6.0	14.0	28.6	37.3	51.7
	R1A*	2.50	72.0	80.0	11.5	6.9	6.5	10.8	13.8	19.7
	R1B**	10.04	45.0	80.0	12.6	7.6	20.3	39.6	51.0	70.1
EX. WQD POND 2	R2*	1.45	97.0	80.0	13.5	8.1	4.2	7.0	8.9	12.6
	2A*	0.46	4.0	80.0	13.9	8.3	0.4	0.8	1.1	1.7
EX. WQD POND 3	3A	18.05	47.2	80.0	20.3	12.2	35.6	66.7	84.7	114.6
	3B	1.84	0.0	80.0	5.0	3.0	3.5	7.6	10.1	14.2
	3C	4.41	0.0	80.0	21.0	12.6	6.2	13.5	17.9	25.2
	3D	18.19	60.0	80.0	6.6	4.0	48.7	89.1	112.5	151.2
	3E	39.03	50.63	80.0	18.0	10.8	88.6	164.9	209.0	282.1

* Onsite Drainage Areas. Calculations based on Rational Method

**Existing Offsite Drainage Area drains to Neenah Ave. Proposed rerout of runoff to Swale A.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
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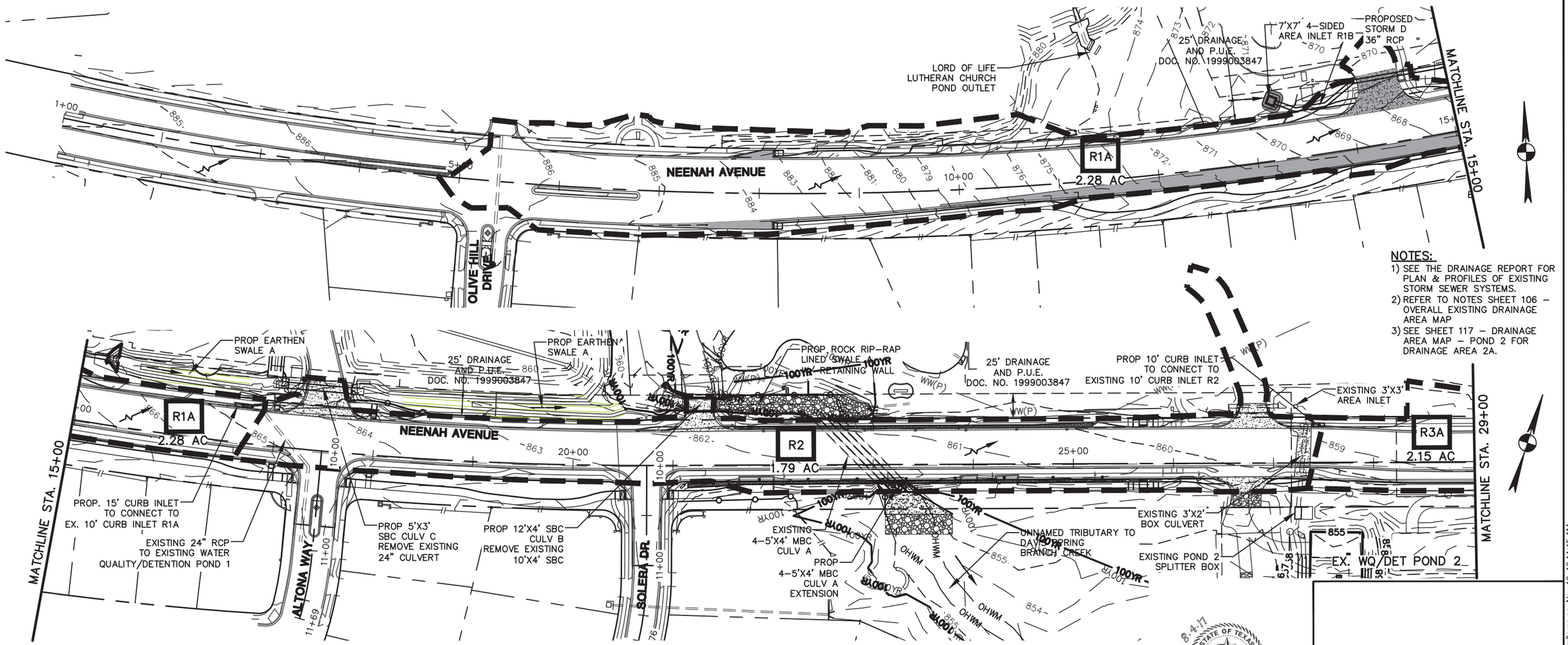
EXISTING DRAINAGE AREA CALCULATIONS

SHEET 107 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				107

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NOTES:

1) SEE THE DRAINAGE REPORT FOR PLAN & PROFILES OF EXISTING STORM SEWER SYSTEMS.
2) REFER TO NOTES SHEET 106 – OVERALL EXISTING DRAINAGE AREA MAP
3) SEE SHEET 117 – DRAINAGE AREA MAP – POND 2 FOR DRAINAGE AREA 2A.

LEGEND

- PROPOSED ROADWAY WIDENING
- DRAINAGE AREA BOUNDARY
- R2 — DRAINAGE AREA ID
- OHWM — ORDINARY HIGH WATER MARK
- 100YR — EXISTING 100 YR WSEL
- **100YR** — PROPOSED 100 YR WSEL
- DITCH/CHANNEL FLOW
- FLOW ARROW

100 0 50 100

1" = 100'

8-4-17

STATE OF TEXAS
STEPHANIE D. BLEW
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LICENSED PROFESSIONAL ENGINEER

Stephanie D Blew

NEENAH AVENUE WIDENING

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PROPOSED ROADWAY DRAINAGE AREA MAP

SHEET 108 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				108

SP-2016-0186D

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Neenah Avenue - Existing Conditions

Roadway Drainage - Rational Method Calculations

STORM FREQUENCY	a	b	c	i=a/(t+b)^c
2	54.767	11.051	0.8116	Q=CiA
10	70.82	10.396	0.7725	
25	82.936	10.746	0.7634	Legend
100	118.3	13.185	0.7736	

City of Austin **Date : 8/3/2015** **Project No. 104023-10006**

R1A

AREA				R1A
Event	2-yr	10-yr	25-yr	100-yr
Acres	2.50	2.50	2.50	2.50
C	0.59	0.65	0.70	0.79
Tc	11.46	11.46	11.46	11.46
I	4.37	6.54	7.78	9.91
Q	**6.41**	**10.70**	**13.65**	**19.50**

Acres			2	10	25	100
2.50						
Area	**%**					
0.00	**0**	Pasture 2-7%	0.33	0.38	0.42	0.49
0.69	**28**	Grass	0.21	0.25	0.29	0.36
0.00	**0**	Concrete	0.75	0.83	0.88	0.97
1.81	**72**	Asphalt	0.73	0.81	0.86	0.95
	100					

	SHEET Unpaved	SHEET Paved	SHALLOW CON Unpaved	SHALLOW CON Paved	CHANNEL	
	0.007(nL)0.8/($P_2^{0.5}s^{0.4}$)	**Ln/42(s)^0.5**	**L/(60*16.1345*$s^{0.5}$)**	**L/(60*20.3282*$s^{0.5}$)**	**Dist/velocity**	**Sum**
Length	**28**	**72**	**0**	**1100 Length**	**0**	
n	0.15	0.016	**0.2**	0.016		
Slope(s)=e/l	0.0100	0.0200	0.0100	0.0190 Velocity	6	
Tc	4.50	0.42	0.00	6.54	0.00	11.46

R2

AREA				R2
Event	2-yr	10-yr	25-yr	100-yr
Acres	1.45	1.45	1.45	1.45
C	0.71	0.79	0.84	0.93
Tc	13.49	13.49	13.49	13.49
I	4.08	6.10	7.28	9.33
Q	**4.22**	**7.01**	**8.88**	**12.59**

Acres			2	10	25	100
1.45						
Area	**%**					
0.00	**0**	Pasture 2-7%	0.33	0.38	0.42	0.49
0.05	**3**	Grass	0.21	0.25	0.29	0.36
0.00	**0**	Concrete	0.75	0.83	0.88	0.97
1.40	**97**	Asphalt	0.73	0.81	0.86	0.95
	100					

	SHEET Unpaved	SHEET Paved	SHALLOW CON Unpaved	SHALLOW CON Paved	CHANNEL	
	0.007(nL)0.8/($P_2^{0.5}s^{0.4}$)	**Ln/42(s)^0.5**	**L/(60*16.1345*$s^{0.5}$)**	**L/(60*20.3282*$s^{0.5}$)**	**Dist/velocity**	**Sum**
Length	**10**	**0**	**0**	**1100 Length**	**0**	
n	0.15	0.016	0.2	0.016		
Slope(s)=e/l	0.0300	0.0055	0.0055	0.0055 Velocity	6	
Tc	1.27	0.00	0.00	12.22	0.00	13.49

2A*

AREA				2A
Event	2-yr	10-yr	25-yr	100-yr
Acres	0.46	0.46	0.46	0.46
C	0.23	0.27	0.31	0.39
Tc	13.90	13.90	13.90	13.90
I	4.02	6.02	7.18	9.22
Q	**0.43**	**0.76**	**1.04**	**1.64**

*Drainage Area bypasses Neenah Ave. Stormsewer Collection System

Acres			2	10	25	100
0.46						
Area	**%**					
0.00	**0**	Pasture 2-7%	0.33	0.38	0.42	0.49
0.44	**96**	Grass	0.21	0.25	0.29	0.36
0.02	**4**	Concrete	0.75	0.83	0.88	0.97
0.00	**0**	Asphalt	0.73	0.81	0.86	0.95
	100					

	SHEET Unpaved	SHEET Paved	SHALLOW CON Unpaved	SHALLOW CON Paved	CHANNEL	
	0.007(nL)0.8/($P_2^{0.5}s^{0.4}$)	**Ln/42(s)^0.5**	**L/(60*16.1345*$s^{0.5}$)**	**L/(60*20.3282*$s^{0.5}$)**	**Dist/velocity**	**Sum**
Length	**100**	**90**	**75**	**0 Length**	**50**	
n	0.15	0.016	0.2	0.016		
Slope(s)=e/l	0.0100	0.0200	0.0100	0.0400 Velocity	6	
Tc	12.47	0.52	0.77	0.00	0.14	13.90

R3A

AREA				R3A
Event	2-yr	10-yr	25-yr	100-yr
Acres	2.25	2.25	2.25	2.25
C	0.40	0.45	0.49	0.57
Tc	9.18	9.18	9.18	9.18
I	4.77	7.12	8.45	10.69
Q	**4.24**	**7.20**	**9.38**	**13.72**

Acres			2	10	25	100
2.25						
Area	**%**					
0.00	**0**	Pasture 2-7%	0.33	0.38	0.42	0.49
1.45	**64**	Grass	0.21	0.25	0.29	0.36
0.00	**0**	Concrete	0.75	0.83	0.88	0.97
0.80	**36**	Asphalt	0.73	0.81	0.86	0.95
	100					

	SHEET Unpaved	SHEET Paved	SHALLOW CON Unpaved	SHALLOW CON Paved	CHANNEL	
	0.007(nL)0.8/($P_2^{0.5}s^{0.4}$)	**Ln/42(s)^0.5**	**L/(60*16.1345*$s^{0.5}$)**	**L/(60*20.3282*$s^{0.5}$)**	**Dist/velocity**	**Sum**
Length	**100**	**0**	**60**	**150 Length**	**0**	
n	0.15	0.016	0.2	0.016		
Slope(s)=e/l	0.0400	0.0050	0.0500	0.0050 Velocity	6	
Tc	7.16	0.00	0.28	1.74	0.00	9.18

R3B

AREA				R3B
Event	2-yr	10-yr	25-yr	100-yr
Acres	1.06	1.06	1.06	1.06
C	0.59	0.61	0.63	0.66
Tc	11.15	11.15	11.15	11.15
I	4.42	6.61	7.86	10.01
Q	**2.75**	**4.25**	**5.22**	**7.01**

Acres			2	10	25	100
1.06						
Area	**%**					
0.00	**0**	Pasture 2-7%	0.33	0.38	0.42	0.49
0.52	**49**	Grass	0.21	0.25	0.29	0.36
0.00	**0**	Concrete	0.97	0.97	0.97	0.97
0.54	**51**	Asphalt	0.95	0.95	0.95	0.95
	100					

	SHEET Unpaved	SHEET Paved	SHALLOW CON Unpaved	SHALLOW CON Paved	CHANNEL	
	0.007(nL)0.8/($P_2^{0.5}s^{0.4}$)	**Ln/42(s)^0.5**	**L/(60*16.1345*$s^{0.5}$)**	**L/(60*20.3282*$s^{0.5}$)**	**Dist/velocity**	**Sum**
Length	**100**	**0**	**0**	**294 Length**	**0**	
n	0.15	0.016	0.2	0.016		
Slope(s)=e/l	0.0200	0.0200	0.0100	0.0200 Velocity	6	
Tc	9.45	0.00	0.00	1.70	0.00	11.15

Neenah Avenue - Proposed Conditions

Roadway Drainage - Rational Method Calculations

STORM FREQUENCY	a	b	c	i=a/(t+b)^c
2	54.767	11.051	0.8116	Q=CiA
10	70.82	10.396	0.7725	
25	82.936	10.746	0.7634	Legend
100	118.3	13.185	0.7736	

City of Austin **Date : 8/3/2015** **Project No. 104023-10006**

R1A

AREA				R1A
Event	2-yr	10-yr	25-yr	100-yr
Acres	2.28	2.28	2.28	2.28
C	0.60	0.67	0.72	0.80
Tc	11.30	11.30	11.30	11.30
I	4.40	6.57	7.82	9.97
Q	**6.02**	**10.05**	**12.80**	**18.24**

Acres			2	10	25	100
2.28						
Area	**%**					
0.00	**0**	Pasture 2-7%	0.33	0.38	0.42	0.49
0.57	**25**	Grass	0.21	0.25	0.29	0.36
0.00	**0**	Concrete	0.75	0.83	0.88	0.97
1.71	**75**	Asphalt	0.73	0.81	0.86	0.95
	100					

	SHEET Unpaved	SHEET Paved	SHALLOW CONCENTRATED Unpaved	SHALLOW CONCENTRATED Paved	CHANNEL	
	0.007(nL)0.8/($P_2^{0.5}s^{0.4}$)	**Ln/42(s)^0.5**	**L/(60*16.1345*$s^{0.5}$)**	**L/(60*20.3282*$s^{0.5}$)**	**Dist/velocity**	**Sum**
Length	**28**	**72**	**0**	**1100 Length**	**0**	
n	0.15	0.016	**0.2**	0.016		
Slope(s)=e/l	0.0100	0.0200	0.0100	0.0200 Velocity	6	
Tc	4.50	0.42	0.00	6.38	0.00	11.30

R2

AREA				R2
Event	2-yr	10-yr	25-yr	100-yr
Acres	1.79	1.79	1.79	1.79
C	0.72	0.80	0.85	0.93
Tc	13.41	13.41	13.41	13.41
I	4.09	6.12	7.29	9.35
Q	**5.24**	**8.71**	**11.03**	**15.64**

Acres			2	10	25	100
1.79						
Area	**%**					
0.00	**0**	Pasture 2-7%	0.33	0.38	0.42	0.49
0.05	**3**	Grass	0.21	0.25	0.29	0.36
0.00	**0**	Concrete	0.75	0.83	0.88	0.97
1.74	**97**	Asphalt	0.73	0.81	0.86	0.95
	100					

	SHEET Unpaved	SHEET Paved	SHALLOW CONCENTRATED Unpaved	SHALLOW CONCENTRATED Paved	CHANNEL	
	0.007(nL)0.8/($P_2^{0.5}s^{0.4}$)	**Ln/42(s)^0.5**	**L/(60*16.1345*$s^{0.5}$)**	**L/(60*20.3282*$s^{0.5}$)**	**Dist/velocity**	**Sum**
Length	**10**	**90**	**0**	**1100 Length**	**0**	
n	0.02	0.016	0.2	0.016		
Slope(s)=e/l	0.0300	0.0055	0.0100	0.0055 Velocity	6	
Tc	0.20	0.99	0.00	12.22	0.00	13.41

2A

AREA				2A
Event	2-yr	10-yr	25-yr	100-yr
Acres	0.57	0.57	0.57	0.57
C	0.25	0.29	0.33	0.40
Tc	13.38	13.38	13.38	13.38
I	4.09	6.12	7.30	9.36
Q	**0.58**	**1.01**	**1.37**	**2.14**

*Drainage Area bypasses Neenah Ave. Stormsewer Collection System. See Sheet 106 Drainage Area Map - Pond 2

Acres			2	10	25	100
0.57						
Area	**%**					
0.00	**0**	Pasture 2-7%	0.33	0.38	0.42	0.49
0.53	**93**	Grass	0.21	0.25	0.29	0.36
0.00	**0**	Concrete	0.75	0.83	0.88	0.97
0.04	**7**	Asphalt	0.73	0.81	0.86	0.95
	100					

	SHEET Unpaved	SHEET Paved	SHALLOW CONCENTRATED Unpaved	SHALLOW CONCENTRATED Paved	CHANNEL	
	0.007(nL)0.8/($P_2^{0.5}s^{0.4}$)	**Ln/42(s)^0.5**	**L/(60*16.1345*$s^{0.5}$)**	**L/(60*20.3282*$s^{0.5}$)**	**Dist/velocity**	**Sum**
Length	**100**	**0**	**75**	**0 Length**	**50**	
n	0.15	0.016	0.2	0.016		
Slope(s)=e/l	0.0100	0.0200	0.0100	0.0400 Velocity	6	
Tc	12.47	0.00	0.77	0.00	0.14	13.38

R3A

AREA				R3A
Event	2-yr	10-yr	25-yr	100-yr
Acres	2.15	2.15	2.15	2.15
C	0.51	0.57	0.62	0.70
Tc	9.18	9.18	9.18	9.18
I	4.77	7.12	8.45	10.69
Q	**5.22**	**8.75**	**11.22**	**16.07**

Acres			2	10	25	100
2.15						
Area	**%**					
0.00	**0**	Pasture 2-7%	0.33	0.38	0.42	0.49
0.92	**43**	Grass	0.21	0.25	0.29	0.36
0.00	**0**	Concrete	0.75	0.83	0.88	0.97
1.23	**57**	Asphalt	0.73	0.81	0.86	0.95
	100					

	SHEET Unpaved	SHEET Paved	SHALLOW CONCENTRATED Unpaved	SHALLOW CONCENTRATED Paved	CHANNEL	
	0.007(nL)0.8/($P_2^{0.5}s^{0.4}$)	**Ln/42(s)^0.5**	**L/(60*16.1345*$s^{0.5}$)**	**L/(60*20.3282*$s^{0.5}$)**	**Dist/velocity**	**Sum**
Length	**100**	**0**	**60**	**150 Length**	**0**	
n	0.15	0.016	0.2	0.016		
Slope(s)=e/l	0.0400	0.0050	0.0500	0.0050 Velocity	6	
Tc	7.16	0.00	0.28	1.74	0.00	9.18

R3B

AREA				R3B
Event	2-yr	10-yr	25-yr	100-yr
Acres	1.06	1.06	1.06	1.06
C	0.62	0.64	0.66	0.69
Tc	11.15	11.15	11.15	11.15
I	4.42	6.61	7.86	10.01
Q	**2.91**	**4.47**	**5.47**	**7.29**

Acres			2	10	25	100
1.06						
Area	**%**					
0.00	**0**	Pasture 2-7%	0.33	0.38	0.42	0.49
0.47	**45**	Grass	0.21	0.25	0.29	0.36
0.00	**0**	Concrete	0.97	0.97	0.97	0.97
0.59	**55**	Asphalt	0.95	0.95	0.95	0.95
	100					

	SHEET Unpaved	SHEET Paved	SHALLOW CONCENTRATED Unpaved	SHALLOW CONCENTRATED Paved	CHANNEL	
	0.007(nL)0.8/($P_2^{0.5}s^{0.4}$)	**Ln/42(s)^0.5**	**L/(60*16.1345*$s^{0.5}$)**	**L/(60*20.3282*$s^{0.5}$)**	**Dist/velocity**	**Sum**
Length	**100**	**0**	**0**	**294 Length**	**0**	
n	0.15	0.016	0.2	0.016		
Slope(s)=e/l	0.0200	0.0200	0.0100	0.0200 Velocity	6	
Tc	9.45	0.00	0.00	1.70	0.00	11.15

* DRAINAGE AREA BYPASSES NEENAH AVE. STORMSEWER COLLECTION SYSTEM.

**DRAINAGE AREAS NOT DESIGNATED ON SHEET 106 – OVERALL EXISTING DRAINAGE AREA MAP BUT ARE CONTAINED WITHIN DRAINAGE AREA ID "3E"

8.4.17

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EXISTING AND PROPOSED ROADWAY DRAINAGE CALCULATIONS

SHEET 109 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				109

SP-2016-0186D

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Neenah Avenue - Existing Conditions
25-Year Inlet Flow Calculations
Curb Inlets
Date: 08/04/15

CURB INLET I.D.	DRAINAGE AREA NO.	Q	Q_{by}	Q_{total}	SLOPE	CROSS SLOPE	MANNINGS n	a	Yo	STREET WIDTH	PONDED WIDTH	R.F.(%)	Qa/La	La(ft.)	LENGTH	L/La	a/yo	Q/Qa	Q	Q_{PASS}	INLET TYPE	ADEQUATE CAPACITY?
R1A	R1A	13.65	0.00	13.65	0.0200	0.0200	0.0130	0.420	0.312	40.00	15.60	0	0.77	17.68	10	0.57	1.346	0.57	7.72	5.93	GRADE	NO
R2	R2	8.88	5.93	14.81	0.0050	0.0200	0.0130	0.420	0.417	40.00	20.87	0	0.88	16.75	10	0.60	1.006	0.60	8.84	5.97	GRADE	NO
R3A	R3A	4.69	5.97	10.65	0.0050	0.0200	0.0130	0.420	0.369	40.00	18.44	10	N/A	N/A	10	N/A	N/A	N/A	N/A	N/A	SUMP	N/A
R3A	R3A	4.69	0.00	4.69	0.0050	0.0200	0.0130	0.420	0.271	40.00	13.55	10	N/A	8.90	10	1.12	1.549	1.00	15.34	0.00	SUMP	YES
R3B	R3B	5.22	0.00	5.22	0.0070	0.0200	0.0130	0.420	0.265	40.00	13.25	0	0.72	7.21	10	1.39	1.585	1.00	5.22	0.00	GRADE	YES

Input Cells
Calculated Cells

Un-submerged curb opening inlets use the rectangular weir equation:

$Q = 3.0h^{\wedge}1.5L$

Q = capacity of curb opening (cfs)
h = Head at inlet (ft) (= a + Y_o)
L = Length of curb opening (ft)

Note: Because the depth, Yo, is not 1.4 times greater than the curb opening height, a, the sump curb inlet operates as a weir

Neenah Avenue - Existing Conditions
100-Year Inlet Flow Calculations
Curb Inlets
Date: 08/04/15

CUBR INLET I.D.	DRAINAGE AREA NO.	Q	Q_{by}	Q_{total}	SLOPE	CROSS SLOPE	MANNINGS n	a	Yo	STREET WIDTH	PONDED WIDTH	R.F.(%)	Qa/La	La(ft.)	LENGTH	L/La	a/yo	Q/Qa	Q	Q_{PASS}	INLET TYPE	ADEQUATE CAPACITY?
R1A	R1A	19.50	0.00	19.50	0.0200	0.0200	0.0130	0.420	0.357	40.00	17.84	0	0.82	23.81	10	0.42	1.177	0.42	8.19	11.31	GRADE	NO
R2	R2	12.59	11.3	23.90	0.0050	0.0200	0.0130	0.420	0.499	40.00	24.97	0	0.98	24.50	10	0.41	0.841	0.41	9.76	14.14	GRADE	NO
R3A	R3A	6.86	14.14	21.00	0.0050	0.0200	0.0130	0.420	0.476	40.00	23.79	10	N/A	N/A	10	N/A	N/A	N/A	N/A	N/A	SUMP	NO
R3A	R3A	6.86	0.00	6.86	0.0050	0.0200	0.0130	0.420	0.313	40.00	15.63	10	N/A	14.81	10	0.68	1.343	#VALUE!	#VALUE!	#VALUE!	SUMP	NO
R3B	R3B	7.01	0.00	7.01	0.0070	0.0200	0.0130	0.420	0.296	40.00	14.80	0	0.76	9.28	10	1.08	1.419	1.00	7.01	0.00	GRADE	YES

Input Cells
Calculated Cells

Un-submerged curb opening inlets use the rectangular weir equation:

$Q = 3.0h^{\wedge}1.5L$

Q = capacity of curb opening (cfs)
h = Head at inlet (ft) (= a + Y_o)
L = Length of curb opening (ft)

Note: Because the depth, Yo, is not 1.4 times greater than the curb opening height, a, the sump curb inlet operates as a weir

NOTE: Any cells which return the error message "#VALUE!" indicate an under-capacity inlet

Neenah Avenue - Proposed Conditions
25-Year Inlet Flow Calculations
Curb Inlets
Date: 08/04/15

CURB INLET I.D.	DRAINAGE AREA NO.	Q	Q_{by}	Q_{total}	SLOPE	CROSS SLOPE	MANNINGS n	a	Yo	STREET WIDTH	PONDED WIDTH	R.F.(%)	Qa/La	La(ft.)	LENGTH	L/La	a/yo	Q/Qa	Q	Q_{PASS}	INLET TYPE	ADEQUATE CAPACITY?
R1A	R1A	12.80	0.00	12.80	0.0200	0.0200	0.0130	0.420	0.305	52.00	15.23	0	0.76	16.74	25	1.49	1.379	1.00	12.80	0.00	GRADE	YES
R2	R2	11.03	0.00	11.03	0.0050	0.0200	0.0130	0.420	0.374	52.00	18.69	0	0.84	13.18	20	1.52	1.124	1.00	11.03	0.00	GRADE	YES
R3A	R3A	5.61	0.00	5.61	0.0050	0.0200	0.0130	0.420	0.290	52.00	14.50	10	N/A	N/A	10	N/A	N/A	N/A	N/A	N/A	SUMP	N/A
R3A	R3A	5.61	0.00	5.61	0.0050	0.0200	0.0130	0.420	0.290	52.00	14.50	10	N/A	6.25	10	1.60	1.448	1.00	11.22	0.00	SUMP	YES
R3B	R3B	5.47	0.00	5.47	0.0070	0.0200	0.0130	0.420	0.270	52.00	13.48	0	0.73	7.50	10	1.33	1.558	1.00	5.47	0.00	GRADE	YES

Input Cells
Calculated Cells

Un-submerged curb opening inlets use the rectangular weir equation:

$Q = 3.0h^{\wedge}1.5L$

Q = capacity of curb opening (cfs)
h = Head at inlet (ft) (= a + Y_o)
L = Length of curb opening (ft)

Note: Because the depth, Yo, is not 1.4 times greater than the curb opening height, a, the sump curb inlet operates as a weir

Neenah Avenue - Proposed Conditions
100-Year Inlet Flow Calculations
Curb Inlets
Date: 08/04/15

CURB INLET I.D.	DRAINAGE AREA NO.	Q	Q_{by}	Q_{total}	SLOPE	CROSS SLOPE	MANNINGS n	a	Yo	STREET WIDTH	PONDED WIDTH	R.F.(%)	Qa/La	La(ft.)	LENGTH	L/La	a/yo	Q/Qa	Q	Q_{PASS}	INLET TYPE	ADEQUATE CAPACITY?
R1A	R1A	18.24	0.00	18.24	0.0200	0.0200	0.0130	0.420	0.348	52.00	17.40	0	0.81	22.53	25	1.11	1.207	1.00	18.24	0.00	GRADE	YES
R2	R2	15.64	0.00	15.64	0.0050	0.0200	0.0130	0.420	0.426	52.00	21.30	0	0.89	17.50	20	1.14	0.986	1.00	15.64	0.00	GRADE	YES
R3A	R3A	8.04	0.00	8.04	0.0050	0.0200	0.0130	0.420	0.332	52.00	16.59	10	N/A	N/A	10	N/A	N/A	N/A	N/A	N/A	SUMP	N/A
R3A	R3A	8.04	0.00	8.04	0.0050	0.0200	0.0130	0.420	0.332	52.00	16.59	10	N/A	8.22	10	1.22	1.266	1.00	16.07	0.00	SUMP	YES
R3B	R3B	7.29	0.00	7.29	0.0070	0.0200	0.0130	0.420	0.300	52.00	15.02	0	0.76	9.60	10	1.04	1.398	1.00	7.29	0.00	GRADE	YES

Input Cells
Calculated Cells

Un-submerged curb opening inlets use the rectangular weir equation:

$Q = 3.0h^{\wedge}1.5L$

Q = capacity of curb opening (cfs)
h = Head at inlet (ft) (= a + Y_o)
L = Length of curb opening (ft)

Note: Because the depth, Yo, is not 1.4 times greater than the curb opening height, a, the sump curb inlet operates as a weir

Neenah Avenue - Proposed Conditions
25-Year Inlet Flow Calculations (Flowmaster)
7'x7' 4-Sided Area Inlet Calculations
Date: 08/04/15

CURB INLET I.D.	DRAINAGE AREA NO.	Q (cfs)	CROSS SLOPE (ft/ft)	OPENING LENGTH (ft)	OPENING HEIGHT (ft)	THROAT TYPE	THROAT INCLINE ANGLE (°)	SPREAD	DEPTH
R1B	R1B	36.00	0.33	24.0	0.5	Inclined	45	1.980	0.65

Neenah Avenue - Proposed Conditions
100-Year Inlet Flow Calculations (Flowmaster)
7'x7' 4-Sided Area Inlet Calculations
Date: 08/04/15

CURB INLET I.D.	DRAINAGE AREA NO.	Q (cfs)	CROSS SLOPE (ft/ft)	OPENING LENGTH (ft)	OPENING HEIGHT (ft)	THROAT TYPE	THROAT INCLINE ANGLE (°)	SPREAD	DEPTH
R1B	R1B	56.00	0.33	24.0	0.5	Inclined	45	2.820	0.93

Input Cells
Calculated Cells

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
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NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

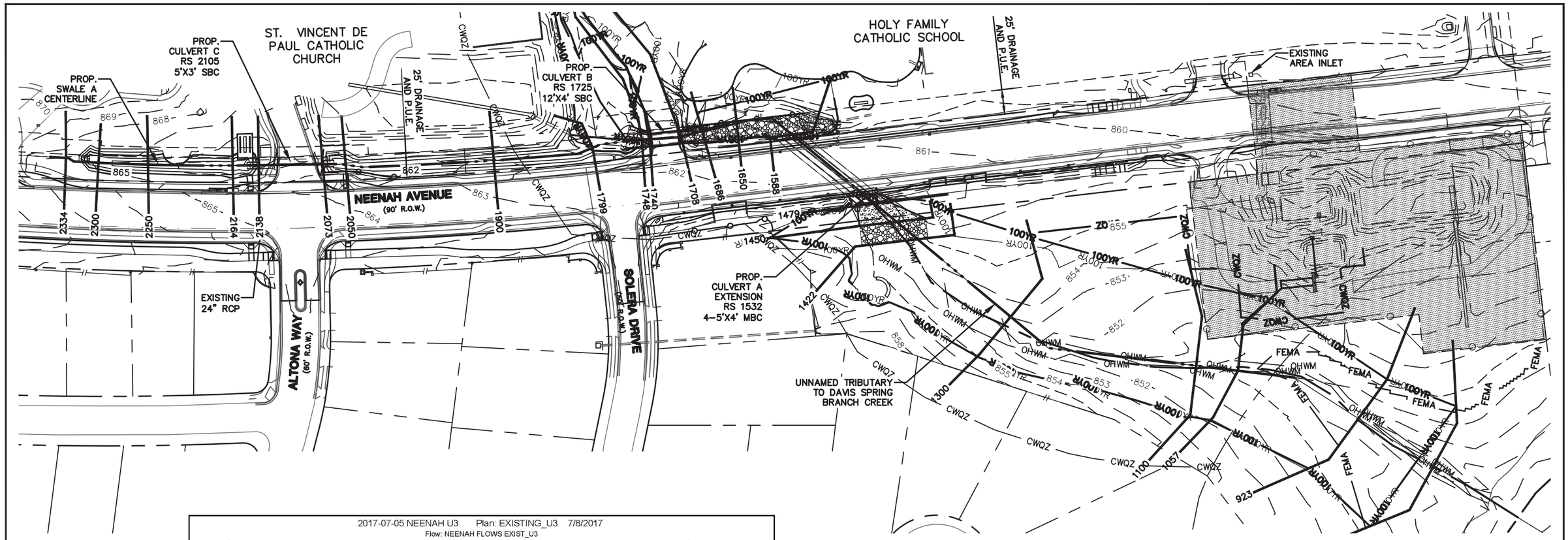
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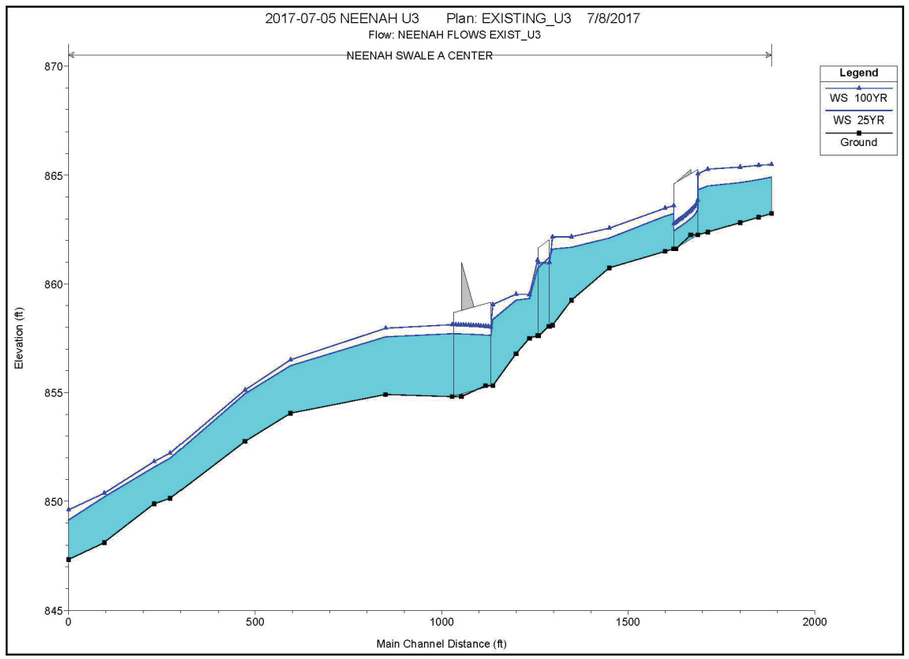
INLET CALCULATIONS

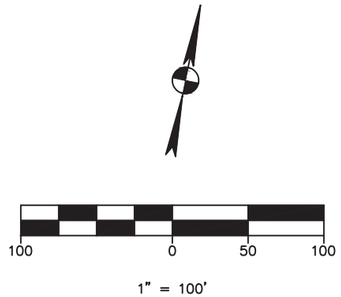
SHEET 110 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				110

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LEGEND

- RAS REACH CL
- CREEK CL
- 100YR — EXISTING 100 YR WSEL
- **100YR** — PROPOSED 100 YR WSEL
- OHWM — ORDINARY HIGH WATER MARK
- **FEMA** — FEMA 100YR FLOODPLAIN
- CWQZ — AVERAGED CRITICAL WATER QUALITY ZONE

8-4-17

STATE OF TEXAS
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HYDRAULIC DATA SHEET 1

SHEET 111 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				111

SP-2016-0186D

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HEC-RAS River: NEENAH Reach: SWALE A CENTER

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SWALE A CENTER	2333.89	25YR	PROP_U3	36.7	863.24	864.9	864.3	865.10	0.009361	3.5	10.6	6.6	0.48
SWALE A CENTER	2333.89	25YR	EXIST_U3	36.7	863.24	864.9	864.3	865.10	0.009361	3.5	10.6	6.6	0.48
SWALE A CENTER	2333.89	100YR	PROP_U3	57.7	863.24	865.5	864.6	865.74	0.009499	4.0	14.6	6.8	0.48
SWALE A CENTER	2333.89	100YR	EXIST_U3	57.7	863.24	865.5	864.6	865.74	0.009507	4.0	14.6	6.8	0.48
SWALE A CENTER	2300	25YR	PROP_U3	36.7	863.07	864.8		864.86	0.003260	2.0	18.1	15.6	0.33
SWALE A CENTER	2300	25YR	EXIST_U3	36.7	863.07	864.8		864.86	0.003260	2.0	18.1	15.6	0.33
SWALE A CENTER	2300	100YR	PROP_U3	57.7	863.07	865.5		865.52	0.002097	1.9	29.7	19.6	0.28
SWALE A CENTER	2300	100YR	EXIST_U3	57.7	863.07	865.5		865.52	0.002100	1.9	29.7	19.6	0.28
SWALE A CENTER	2250	25YR	PROP_U3	36.7	862.82	864.7		864.72	0.002598	1.9	19.7	16.4	0.30
SWALE A CENTER	2250	25YR	EXIST_U3	36.7	862.82	864.7		864.72	0.002598	1.9	19.7	16.4	0.30
SWALE A CENTER	2250	100YR	PROP_U3	57.7	862.82	865.4		865.42	0.001532	1.7	33.1	20.8	0.24
SWALE A CENTER	2250	100YR	EXIST_U3	57.7	862.82	865.4		865.42	0.001535	1.7	33.0	20.8	0.24
SWALE A CENTER	2164.33	25YR	PROP_U3	36.7	862.39	864.5		864.54	0.001513	1.5	23.9	17.5	0.23
SWALE A CENTER	2164.33	25YR	EXIST_U3	36.7	862.39	864.5		864.54	0.001513	1.5	23.9	17.5	0.23
SWALE A CENTER	2164.33	100YR	PROP_U3	57.7	862.39	865.3		865.31	0.001026	1.4	40.2	27.0	0.20
SWALE A CENTER	2164.33	100YR	EXIST_U3	57.7	862.39	865.3		865.31	0.001022	1.4	41.7	63.3	0.20
SWALE A CENTER	2138.1	25YR	PROP_U3	36.7	862.26	864.3	863.3	864.45	0.005173	2.8	13.1	6.6	0.35
SWALE A CENTER	2138.1	25YR	EXIST_U3	36.7	862.26	864.3	863.3	864.45	0.005172	2.8	13.1	6.6	0.35
SWALE A CENTER	2138.1	100YR	PROP_U3	57.7	862.26	865.1	863.7	865.22	0.005264	3.2	18.0	6.8	0.35
SWALE A CENTER	2138.1	100YR	EXIST_U3	57.7	862.26	865.1	863.7	865.22	0.005268	3.2	18.0	6.8	0.35
SWALE A CENTER	2105.86			Culvert									
SWALE A CENTER	2073.29	25YR	PROP_U3	36.7	861.62	863.1		863.36	0.012933	3.9	9.5	6.5	0.56
SWALE A CENTER	2073.29	25YR	EXIST_U3	36.7	861.62	863.2	862.7	863.44	0.010661	3.6	10.2	6.5	0.51
SWALE A CENTER	2073.29	100YR	PROP_U3	57.7	861.62	863.5		863.84	0.017871	5.0	11.6	6.6	0.66
SWALE A CENTER	2073.29	100YR	EXIST_U3	57.7	861.62	863.6	863.0	863.93	0.014240	4.6	12.6	6.6	0.58
SWALE A CENTER	2050	25YR	PROP_U3	36.7	861.50	863.1		863.14	0.003636	2.2	16.9	14.0	0.35
SWALE A CENTER	2050	25YR	EXIST_U3	36.7	861.50	863.1	862.5	863.23	0.004989	2.7	13.7	15.8	0.42
SWALE A CENTER	2050	100YR	PROP_U3	57.7	861.50	863.4		863.52	0.004246	2.6	22.0	15.3	0.39
SWALE A CENTER	2050	100YR	EXIST_U3	57.7	861.50	863.5	862.8	863.65	0.005709	3.2	18.0	17.9	0.46
SWALE A CENTER	1900	25YR	PROP_U3	36.7	860.74	862.7		862.71	0.002239	1.8	20.7	16.5	0.28
SWALE A CENTER	1900	25YR	EXIST_U3	36.7	860.74	862.1		862.24	0.008921	2.9	12.5	13.2	0.53
SWALE A CENTER	1900	100YR	PROP_U3	57.7	860.74	862.8		862.89	0.004185	2.5	23.0	17.3	0.38
SWALE A CENTER	1900	100YR	EXIST_U3	57.7	860.74	862.6		862.71	0.006883	3.0	19.1	16.0	0.49
SWALE A CENTER	1798.65	25YR	PROP_U3	243.9	859.25	860.7	860.7	861.24	0.023451	5.8	43.3	36.5	0.92
SWALE A CENTER	1798.65	25YR	EXIST_U3	243.9	859.25	861.7		861.83	0.003720	3.1	80.7	43.3	0.39
SWALE A CENTER	1798.65	100YR	PROP_U3	326.6	859.25	861.2		861.65	0.015380	5.5	60.7	39.8	0.77
SWALE A CENTER	1798.65	100YR	EXIST_U3	326.6	859.25	862.2		862.33	0.003371	3.2	103.0	47.7	0.38
SWALE A CENTER	1747.85	25YR	PROP_U3	243.9	856.87	860.7		861.03	0.001221	4.7	52.0	19.4	0.45
SWALE A CENTER	1747.85	25YR	EXIST_U3	243.9	858.10	861.6		861.74	0.000962	3.4	130.4	142.6	0.42
SWALE A CENTER	1747.85	100YR	PROP_U3	326.6	856.87	860.9	859.6	861.44	0.001788	5.8	64.1	80.8	0.55
SWALE A CENTER	1747.85	100YR	EXIST_U3	326.6	858.10	862.2	861.3	862.25	0.000576	2.9	218.6	173.0	0.34
SWALE A CENTER	1739.93	25YR	PROP_U3	243.9	856.80	860.7	859.1	861.01	0.001108	4.6	53.5	21.5	0.44
SWALE A CENTER	1739.93	25YR	EXIST_U3	243.9	858.05	861.2	860.3	861.65	0.001775	5.3	61.4	77.5	0.56
SWALE A CENTER	1739.93	100YR	PROP_U3	326.6	856.80	860.9	859.5	861.42	0.001645	5.8	60.5	43.4	0.53
SWALE A CENTER	1739.93	100YR	EXIST_U3	326.6	858.05	861.0	861.0	861.97	0.004352	8.0	46.6	49.0	0.87
SWALE A CENTER	1724.13			Culvert									
SWALE A CENTER	1707.89	25YR	PROP_U3	243.9	856.50	858.7	858.7	859.75	0.008986	8.1	30.1	14.9	1.00
SWALE A CENTER	1707.89	25YR	EXIST_U3	243.9	857.62	860.7	860.7	861.32	0.003060	6.6	59.9	77.5	0.68
SWALE A CENTER	1707.89	100YR	PROP_U3	326.6	856.50	859.2	859.2	860.40	0.008738	8.8	37.1	15.5	1.00
SWALE A CENTER	1707.89	100YR	EXIST_U3	326.6	857.62	861.1	861.1	861.66	0.002939	6.8	93.5	101.4	0.67
SWALE A CENTER	1686.03	25YR	PROP_U3	243.9	856.27	857.5	858.0	859.23	0.026679	10.5	23.3	18.7	1.66
SWALE A CENTER	1686.03	25YR	EXIST_U3	243.9	857.50	859.3	859.9	860.85	0.114560	9.9	25.6	42.0	1.88
SWALE A CENTER	1686.03	100YR	PROP_U3	326.6	856.27	859.2	858.4	859.71	0.003335	5.9	58.8	38.5	0.62
SWALE A CENTER	1686.03	100YR	EXIST_U3	326.6	857.50	859.5	860.0	861.14	0.102019	10.5	33.4	42.9	1.83
SWALE A CENTER	1650	25YR	PROP_U3	275.0	855.92	858.1	857.8	858.83	0.005822	6.8	40.9	21.8	0.81
SWALE A CENTER	1650	25YR	EXIST_U3	275.0	856.79	859.3	859.3	859.73	0.022365	5.9	52.5	54.2	0.90
SWALE A CENTER	1650	100YR	PROP_U3	378.4	855.92	858.9	858.3	859.56	0.004166	6.8	60.9	33.2	0.71
SWALE A CENTER	1650	100YR	EXIST_U3	378.4	856.79	859.5	859.5	860.06	0.020567	6.2	67.5	55.3	0.88
SWALE A CENTER	1587.68	25YR	PROP_U3	275.0	855.32	858.4	856.6	858.46	0.000459	2.5	109.6	64.1	0.26
SWALE A CENTER	1587.68	25YR	EXIST_U3	275.0	855.32	858.4	856.6	858.45	0.001431	2.5	116.3	49.2	0.25
SWALE A CENTER	1587.68	100YR	PROP_U3	378.4	855.32	859.1	856.8	859.20	0.000435	2.8	135.9	105.1	0.26
SWALE A CENTER	1587.68	100YR	EXIST_U3	378.4	855.32	859.1	856.9	859.16	0.001335	2.7	154.2	84.3	0.25
SWALE A CENTER	1532.28			Culvert									
SWALE A CENTER	1478.73	25YR	PROP_U3	275.0	854.81	856.8		857.08	0.001577	4.6	60.0	35.2	0.58
SWALE A CENTER	1478.73	25YR	EXIST_U3	275.0	854.81	857.7		857.82	0.000383	2.7	100.0	36.1	0.29
SWALE A CENTER	1478.73	100YR	PROP_U3	378.4	854.81	857.0		857.48	0.002047	5.6	67.2	35.4	0.67
SWALE A CENTER	1478.73	100YR	EXIST_U3	378.4	854.81	858.1		858.29	0.000466	3.3	114.8	36.6	0.32
SWALE A CENTER	1450.06	25YR	PROP_U3	275.0	854.91	856.7		856.91	0.002197	3.4	85.3	168.1	0.52
SWALE A CENTER	1450.06	25YR	EXIST_U3	275.0	854.91	857.6		857.65	0.004078	2.3	118.9	182.8	0.27
SWALE A CENTER	1450.06	100YR	PROP_U3	378.4	854.91	857.0		857.24	0.002195	3.9	105.7	173.7	0.53
SWALE A CENTER	1450.06	100YR	EXIST_U3	378.4	854.91	858.0		858.07	0.004482	2.7	139.9	188.3	0.29

HEC-RAS River: NEENAH Reach: SWALE A CENTER (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SWALE A CENTER	1422.41	25YR	PROP_U3	275.0	854.05	856.2		856.33	0.006496	2.6	120.7	124.9	0.33
SWALE A CENTER	1422.41	25YR	EXIST_U3	275.0	854.05	856.2		856.33	0.006522	2.6	120.5	124.8	0.33
SWALE A CENTER	1422.41	100YR	PROP_U3	378.4	854.05	856.5		856.63	0.006936	2.9	148.2	141.3	0.35
SWALE A CENTER	1422.41	100YR	EXIST_U3	378.4	854.05	856.5		856.63	0.007008	2.9	147.6	141.1	0.35
SWALE A CENTER	1300	25YR	PROP_U3	275.0	852.75	854.9		855.05	0.018512	2.7	102.3	121.4	0.50
SWALE A CENTER	1300	25YR	EXIST_U3	275.0	852.75	854.9		855.06	0.018184	2.7	102.9	122.0	0.50
SWALE A CENTER	1300	100YR	PROP_U3	378.4	852.75	855.1		855.25	0.020077	3.1	123.3	136.3	0.54
SWALE A CENTER	1300	100YR	EXIST_U3	378.4	852.75	855.1		855.26	0.019082	3.1	125.4	137.2	0.52
SWALE A CENTER	1100	25YR	PROP_U3	275.0	850.13	852.0		852.07	0.012181	2.5	115.8	125.1	0.42
SWALE A CENTER	1100	25YR	EXIST_U3	275.0	850.13	852.0		852.07	0.012430	2.5	115.0	124.8	0.42
SWALE A CENTER	1100	100YR	PROP_U3	378.4	850.13	852.2		852.34	0.010956	2.7	148.9	138.0	0.41
SWALE A CENTER	1100	100YR	EXIST_U3	378.4	850.13	852.2		852.32	0.011553	2.7	146.2	137.0	0.42
SWALE A CENTER	1057.44	25YR	EXIST_U3	275.0	849.88	851.6		851.64	0.008062	2.2	132.3	121.0	0.35
SWALE A CENTER	1057.44	100YR	EXIST_U3	378.4	849.88	851.8		851.91	0.007957	2.4	165.0	131.8	0.35
SWALE A CENTER	1057.34	25YR	PROP_U3	275.0	849.68	851.6		851.64	0.008499	2.3	121.4	100.3	0.36
SWALE A CENTER	1057.34	100YR	PROP_U3	378.4	849.68	851.8		851.93	0.008361	2.5	150.1	108.2	0.37
SWALE A CENTER	923.04	25YR	PROP_U3	275.0	848.11	850.1		850.24	0.013280	2.7	105.7	113.2	0.44
SWALE A CENTER	923.04	25YR	EXIST_U3	275.0	848.11	850.2		850.29	0.012865	2.4	114.4	117.2	0.42
SWALE A CENTER	923.04	100YR	PROP_U3	378.4	848.11	850.3		850.44	0.015485	3.2	125.4	122.0	0.49
SWALE A CENTER	923.04	100YR	EXIST_U3	378.4	848.11	850.4		850.49	0.014809	2.8	134.5	126.0	0.47
SWALE A CENTER	835.28	25YR	PROP_U3	277.9	847.34	849.1	848.6	849.19	0.010013	2.3	124.7	130.7	0.38
SWALE A CENTER	835.28	100YR	PROP_U3	383.4	847.34	849.6	848.7	849.67	0.005240	2.1	196.1	160.8	0.29
SWALE A CENTER	833.28	25YR	EXIST_U3	277.9	847.34	849.1	848.6	849.21	0.010014	2.3	127.4	132.0	0.38
SWALE A CENTER	833.28	100YR	EXIST_U3	384.1	847.34	849.6	848.7	849.66	0.005389	2.1	196.1	160.8	0.30

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
TBPE # F-6324 TBPLS # F-10194230
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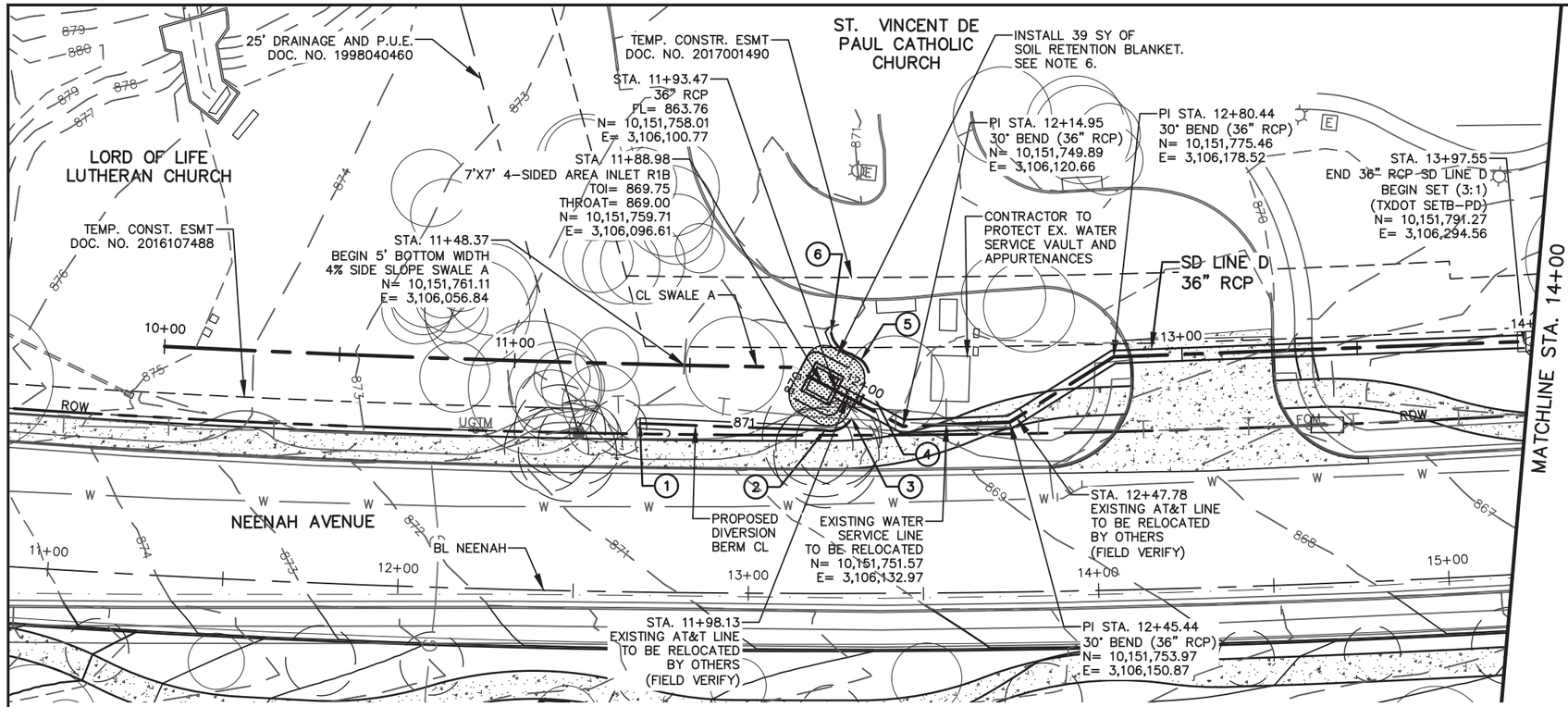
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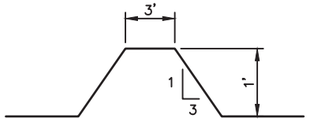
SHEET 112 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				112

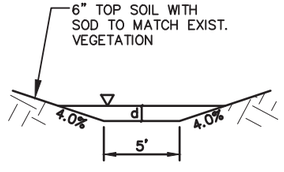
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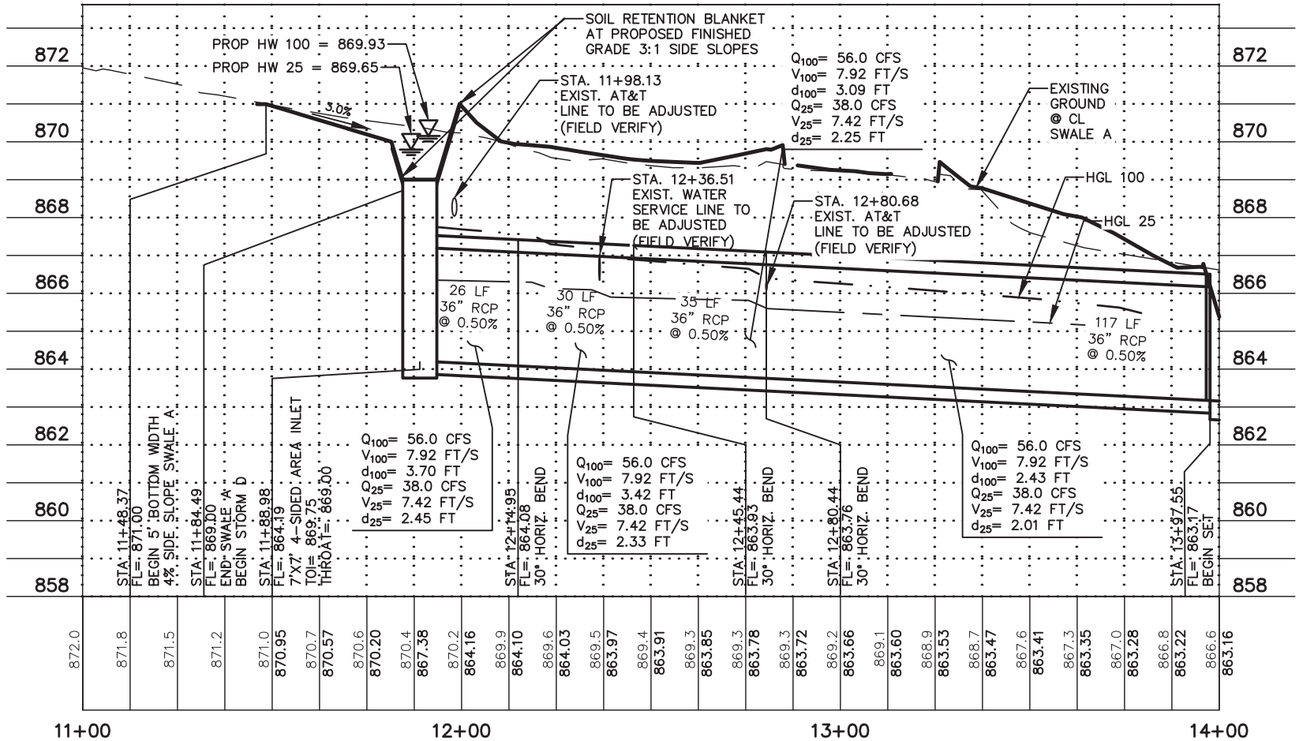


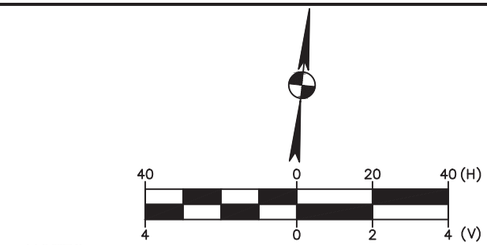


DIVERSION BERM
N.T.S.



SWALE A – EARTHEN TYPICAL SECTION
(SCALE 1" = 10')





NOTES:
1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED SWALE A BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
3. REFER TO THE UTILITY SHEETS FOR MORE INFORMATION.
4. REFER TO RETAINING WALL SHEETS FOR MORE INFORMATION.
5. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
6. SOIL RETENTION BLANKET TO BE TENSAR ROLLMAX SC250 OR APPROVED EQUAL.

POINT TABLE – DIVERSION BERM CL		
NO.	START NORTHING	START EASTING
1	N= 10,151,743.37	E= 3,106,045.91
2	N= 10,151,746.54	E= 3,106,098.70
3	N= 10,151,750.81	E= 3,106,105.85
4	N= 10,151,760.45	E= 3,106,109.77
5	N= 10,151,767.55	E= 3,106,106.94
6	N= 10,151,774.35	E= 3,106,097.67

PROFILE LEGEND:
- EXISTING GND
- PROPOSED GND
- PROPOSED PIPE
- 100YR HGL
- 25YR HGL

ELEVATION EXISTING GND 669.7 | 671.59 ELEVATION PROPOSED GND @ SWALE BOTTOM

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
TBPE # F-8324 TBPLS # F-10194230
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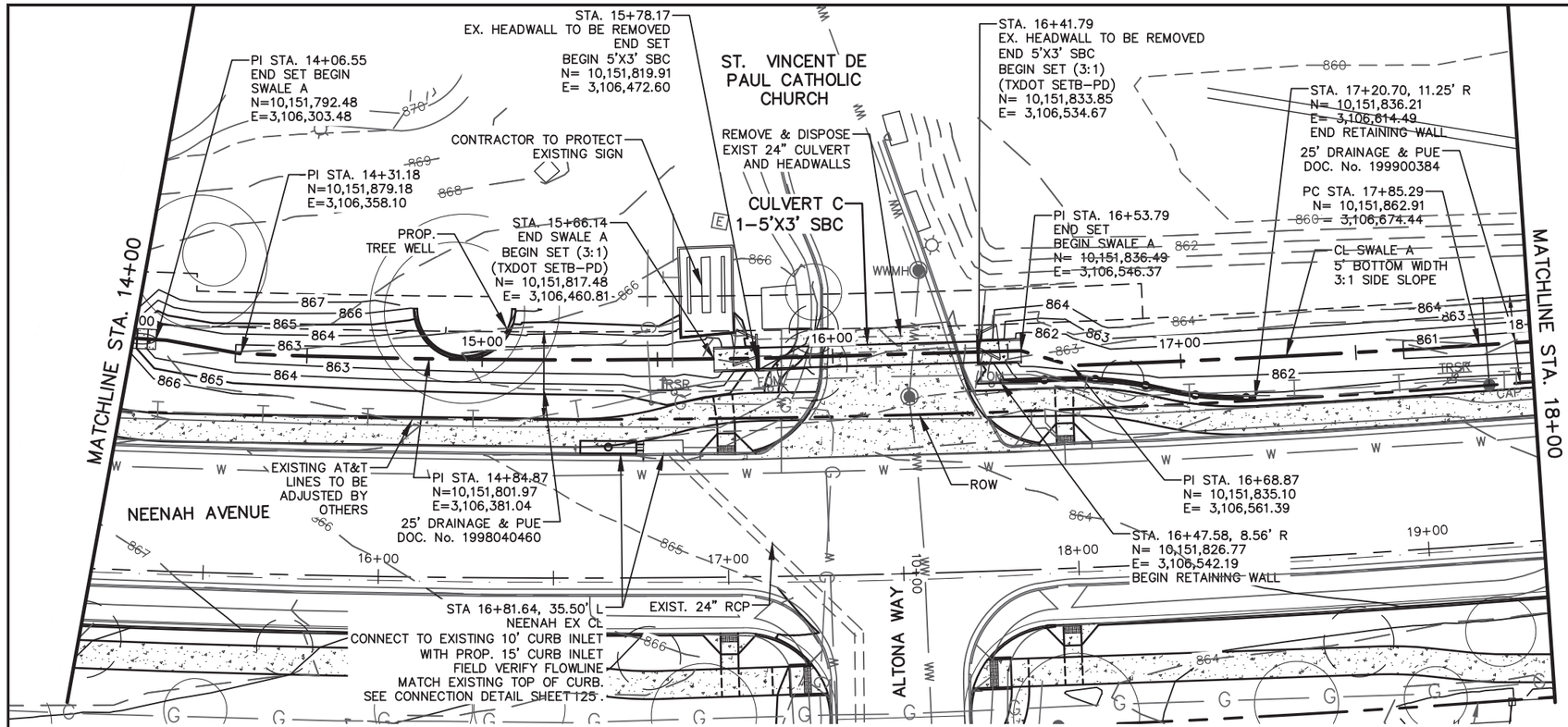
DRAINAGE SWALE A STA. 10+00 TO STA. 14+00

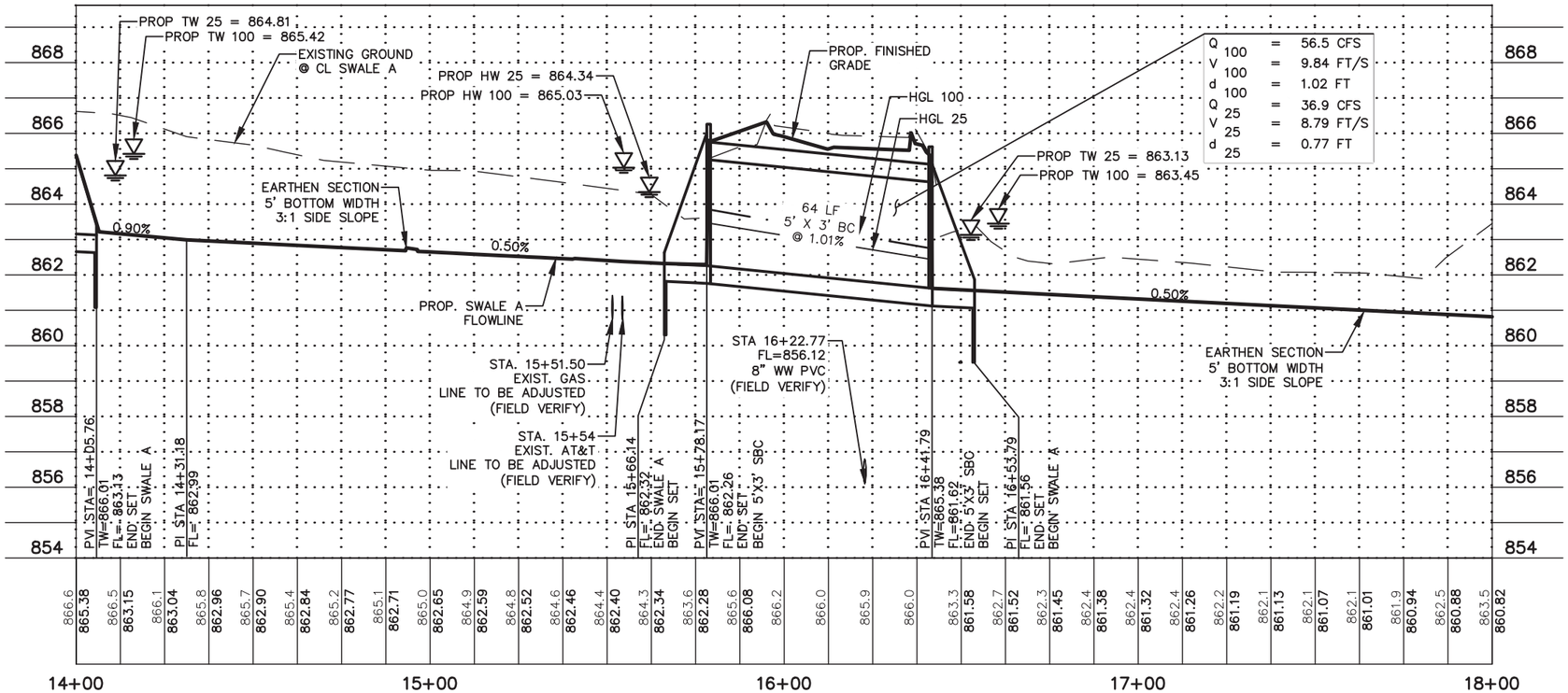
SHEET 113 OF 273

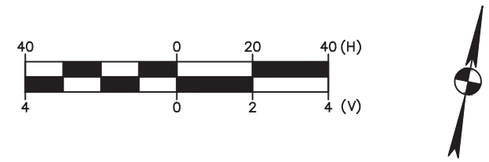
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				113

SP-2016-0186D

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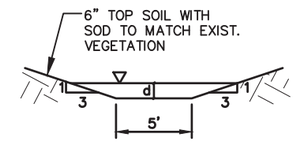






NOTES:

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED SWALE A BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
3. REFER TO THE UTILITY SHEETS FOR MORE INFORMATION.
4. 5'X3' SBC PER TXDOT STANDARDS FOR LESS THAN 2' OF FILL.
5. REFER TO RETAINING WALL SHEETS FOR MORE INFORMATION.
6. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.



SWALE A – EARTHEN TYPICAL SECTION
(SCALE 1" = 10')

PROFILE LEGEND:

EXISTING GND	
PROPOSED GND	
PROPOSED PIPE	
100YR HGL	
25YR HGL	
ELEVATION EXISTING GND 669.7	ELEVATION PROPOSED GND @ SWALE BOTTOM 671.59

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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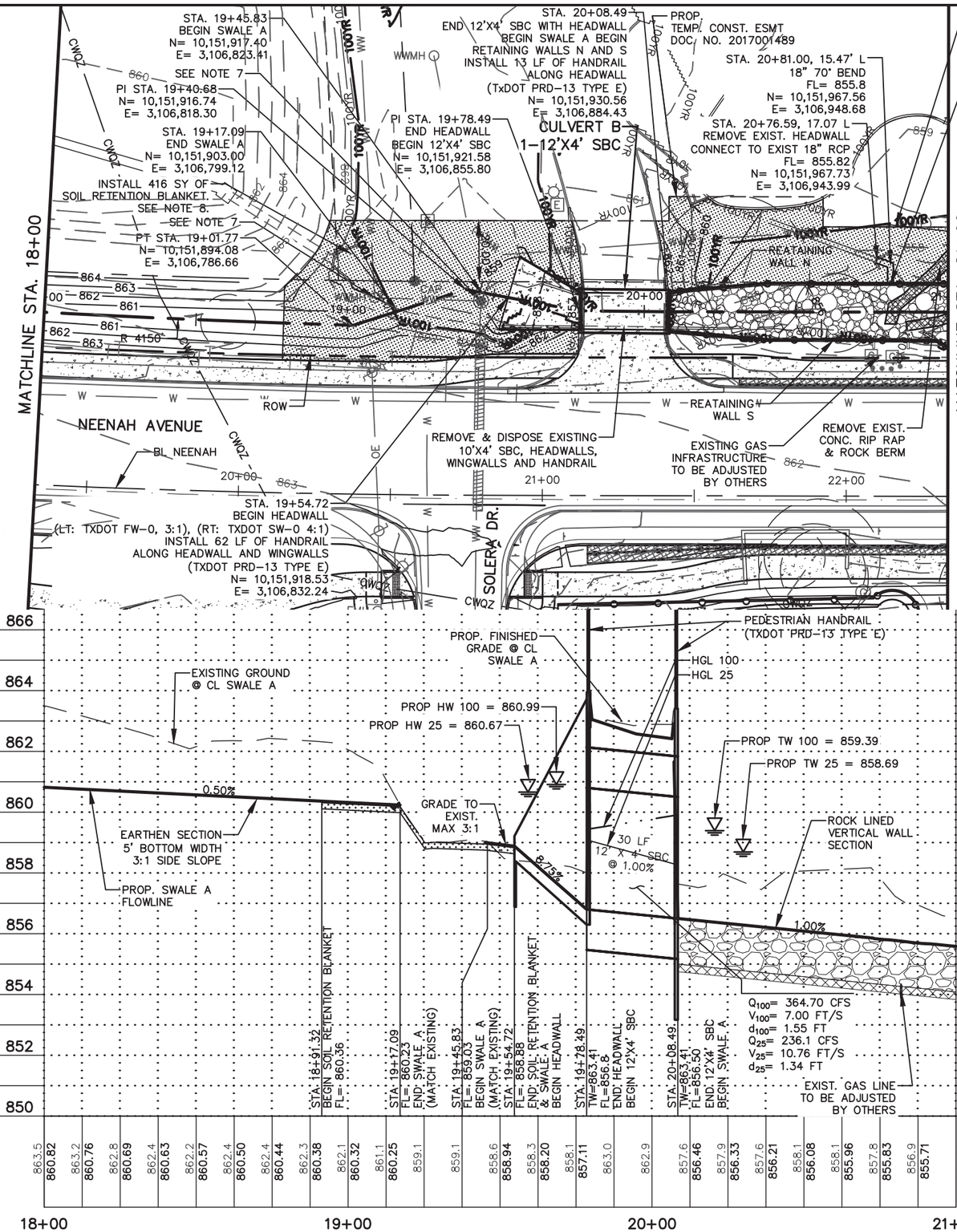
DRAINAGE SWALE A STA. 14+00 TO STA. 18+00

SHEET 114 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				114

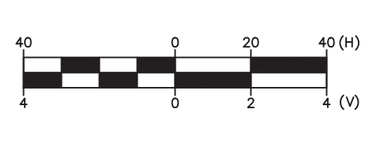
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INSTALL 423 SY OF
SOIL RETENTION BLANKET.
SEE NOTE 8.

STA. 20+80.97
EXTEND 18" RCP TO
RET. WALL N
@ 0.5% SLOPE
FL= 855.77
N= 10,151,961.48
E= 3,106,950.61

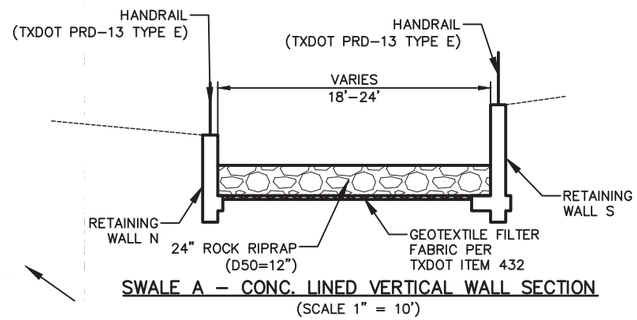


LEGEND

100YR	EXISTING 100 YR WSEL
100YR	PROPOSED 100 YR WSEL
CWQZ	CRITICAL WATER QUALITY ZONE

NOTES:

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED SWALE A BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
3. REFER TO THE UTILITY SHEETS FOR MORE INFORMATION.
4. 12'X4' SBC PER TXDOT STANDARDS FOR LESS THAN 2' OF FILL.
5. REFER TO RETAINING WALL SHEETS FOR MORE INFORMATION.
6. REFER TO SIGNAGE AND PAVEMENT MARKING SHEETS FOR METAL BEAM GUARD FENCE INFORMATION.
7. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
8. SOIL RETENTION BLANKET TO BE TENSAR ROLLMAX SC250 OR APPROVED EQUAL.



SWALE A – CONC. LINED VERTICAL WALL SECTION
(SCALE 1" = 10')

PROFILE LEGEND:

EXISTING GND	
PROPOSED GND	
PROPOSED PIPE	
100YR HGL	
25YR HGL	

ELEVATION EXISTING GND	669.7	671.59	ELEVATION PROPOSED GND @ SWALE BOTTOM

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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Tel. (512) 328-0011 Fax (512) 328-0325
TBPE # F-6324 TBPLS # F-10194230
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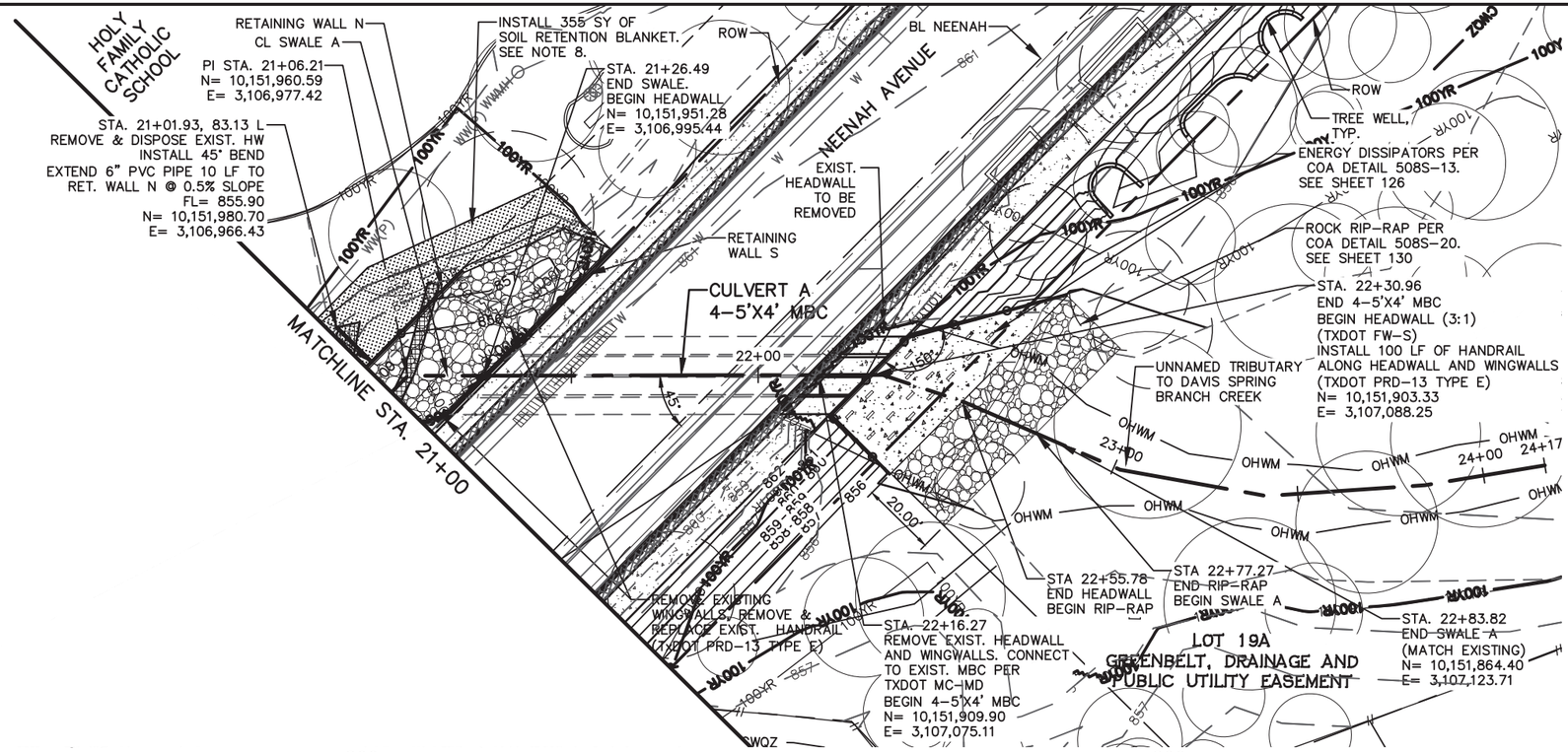
DRAWING TITLE
DRAINAGE SWALE A
STA. 18+00 TO 21+00

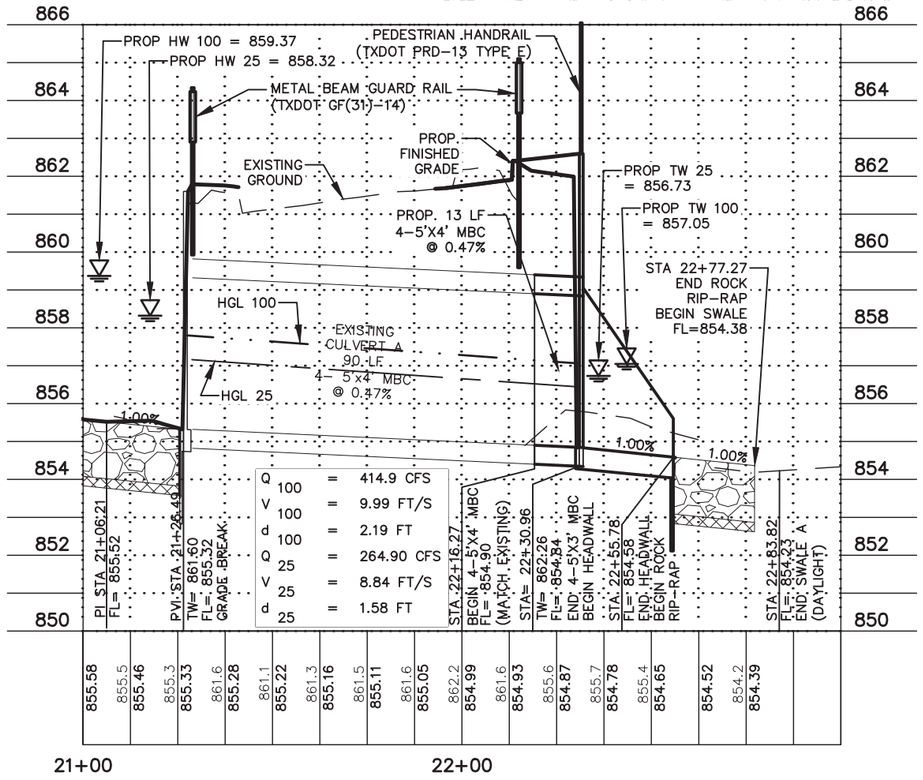
SHEET 115 OF 273

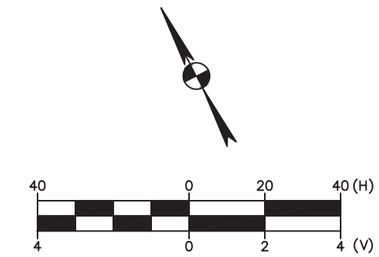
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				115

SP-2016-0186D

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NOTES:

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED SWALE A BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
3. REFER TO THE UTILITY SHEETS FOR MORE INFORMATION.
4. REFER TO RETAINING WALL SHEETS FOR MORE INFORMATION.
5. REFER TO SIGNAGE AND PAVEMENT MARKING SHEETS FOR METAL BEAM GUARD FENCE INFORMATION.
6. 5'X4' MBC SHALL BE CAST IN PLACE. CONTRACTOR TO FIELD VERIFY ACTUAL CULVERT DIMENSIONS FOR EACH BARREL AND MATCH EXISTING AT CONNECTION.
7. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
8. SOIL RETENTION BLANKET TO BE TENSAR ROLLMAX SC250 OR APPROVED EQUAL.

LEGEND

100YR	EXISTING 100 YR WSEL
100YR	PROPOSED 100 YR WSEL
OHWM	ORDINARY HIGH WATER MARK
CWQZ	CRITICAL WATER QUALITY ZONE

PROFILE LEGEND:

EXISTING GND	
PROPOSED GND	
PROPOSED PIPE	
100YR HGL	
25YR HGL	

ELEVATION EXISTING GND	669.7
ELEVATION PROPOSED GND @ SWALE BOTTOM	671.59

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

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1848

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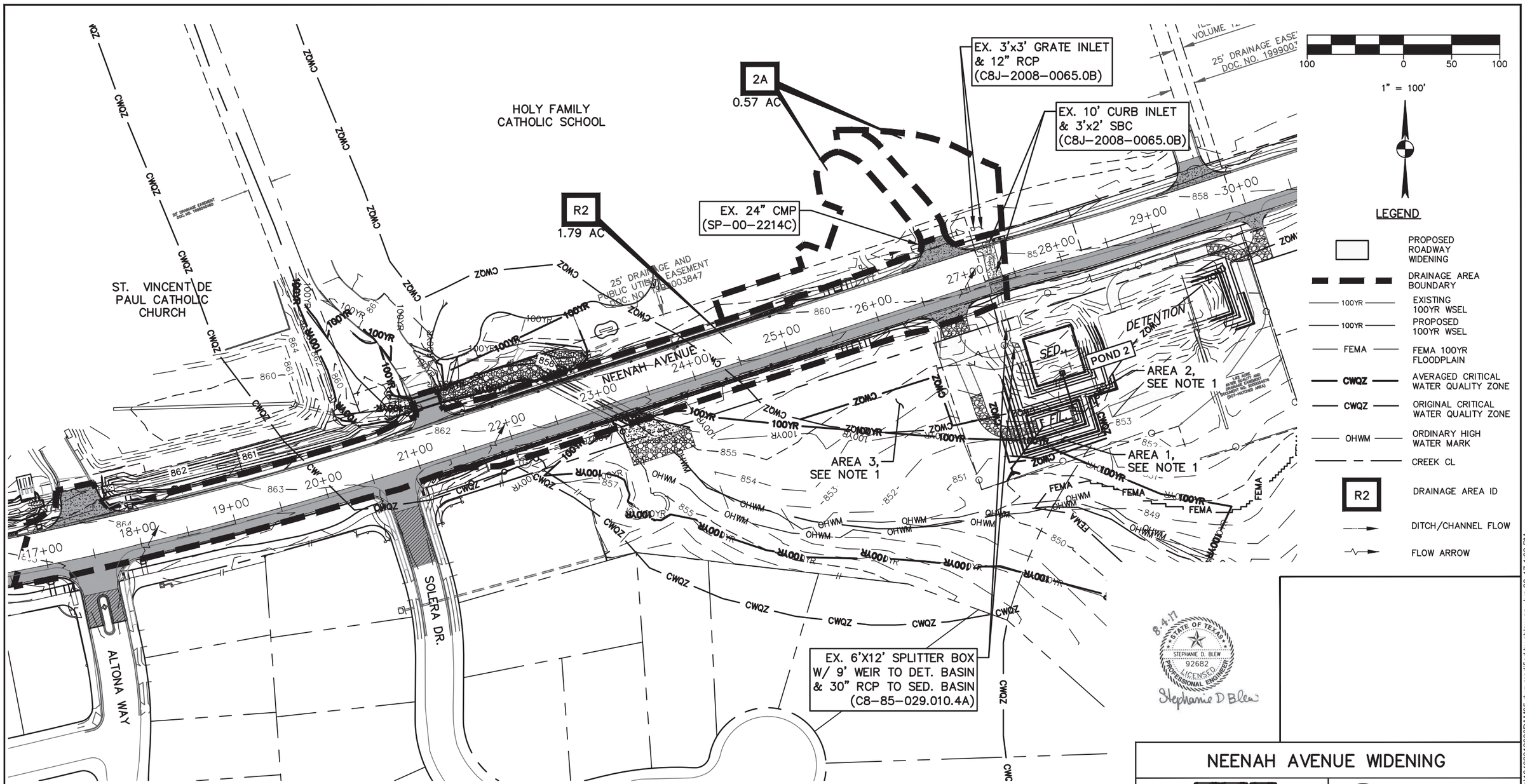
DRAINAGE SWALE A
STA. 21+00 TO END

SHEET 116 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				116

SP-2016-0186D

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NOTES:
1. THE OUTER HALF OF THE CRITICAL WATER QUALITY ZONE HAS BEEN BUFFERED IN THE VICINITY OF POND 2. AREA 1 (4,754.15 SF) AND AREA 2 (192.76 SF) HAVE BEEN REMOVED FOR A TOTAL OF 4,946.91 SF. AREA 3 (4,950.00 SF) HAS BEEN ADDED, FOR A NET GAIN OF 3.09 SF OF CRITICAL WATER QUALITY ZONE ON THE PROJECT.

8-4-17
STATE OF TEXAS
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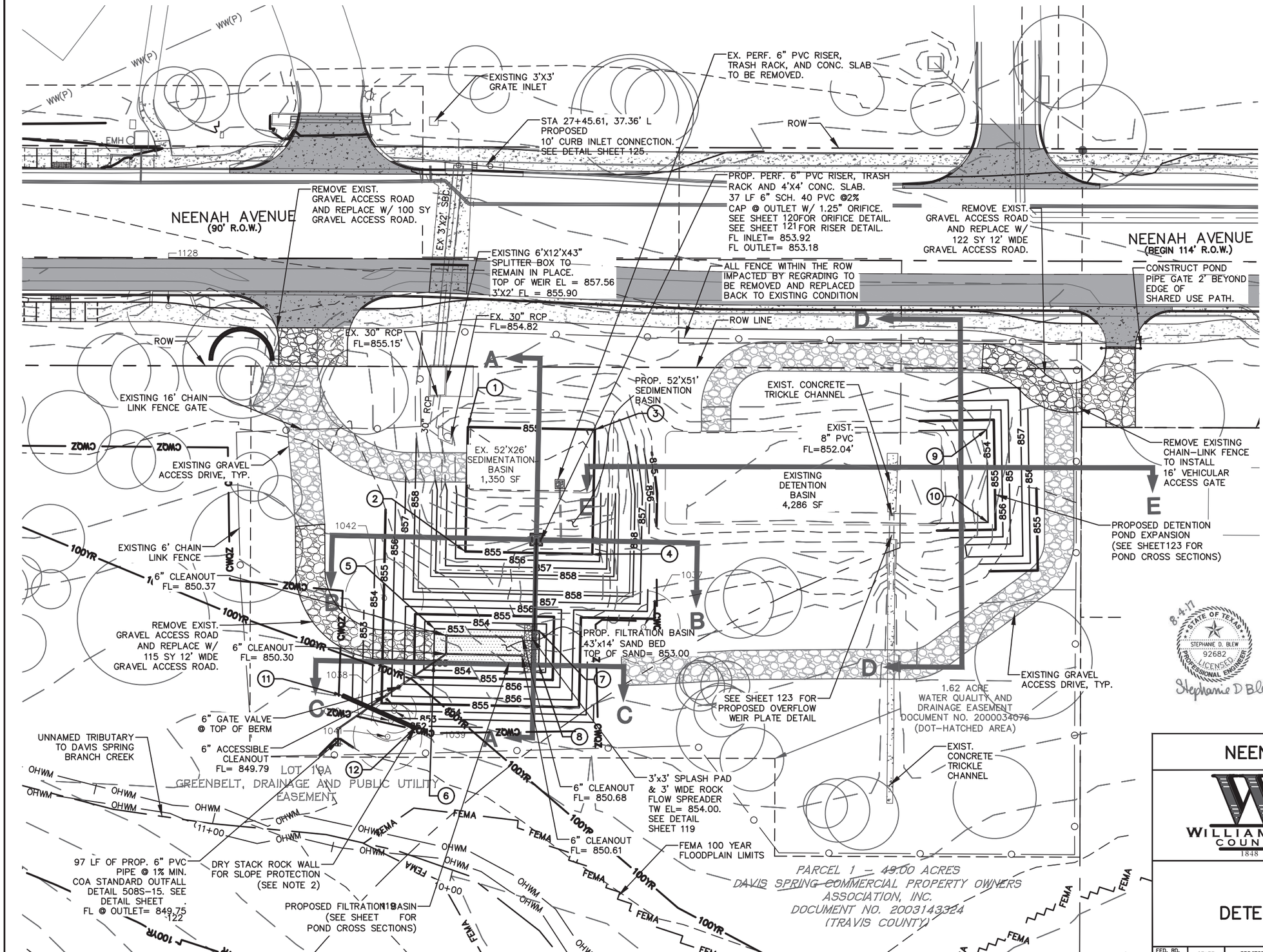
DRAINAGE AREA MAP – POND 2

SHEET 117 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				117

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NOTES:

1. SEE TxDOT DETAIL CLF-10 FOR ADDITIONAL DETAILS.
2. CONTRACTOR SHALL PREPARE AND SUBMIT A RETAINING WALL DETAIL SIGNED AND SEALED BY A TEXAS PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION. THE STANDARD PROVIDED (623S-1) SHOULD BE USED AS AN EXAMPLE OF THE TYPE OF WALL DESIRED AT THIS LOCATION.
3. CONTRACTOR SHALL COMPLY WITH CITY OF AUSTIN ENVIRONMENTAL CRITERIA MANUAL SECTION 1.6.5. A GUIDELINES FOR SEDIMENTATION/FILTRATION SYSTEMS FOR ALL ELEMENTS OF POND2 WHICH IS A CITY OF AUSTIN MAINTAINED POND.
4. CONTRACTOR SHALL PROVIDE A SUBMITTAL FOR THE TRASH RACK.
5. CONTRACTOR SHALL PROVIDE A POST CONSTRUCTION SURVEY SEALED BY AN RPLS FOR THE AS-BUILT CONDITION OF THE POND.

CONTROL POINTS		
POINT #	NORTHING	EASTING
1	10151989.99	3107490.33
2	10151941.2	3107505.16
3	10152005.12	3107540.08
4	10151956.32	3107554.91
5	10151907.24	3107502.94
6	10151893.84	3107507.01
7	10151919.74	3107544.08
8	10151906.35	3107548.15
9	10152054.91	3107692.54
10	10152018.98	3107704.91
11	10151869.52	3107475.89
12	10151866.18	3107508.06

8.4.17
STATE OF TEXAS
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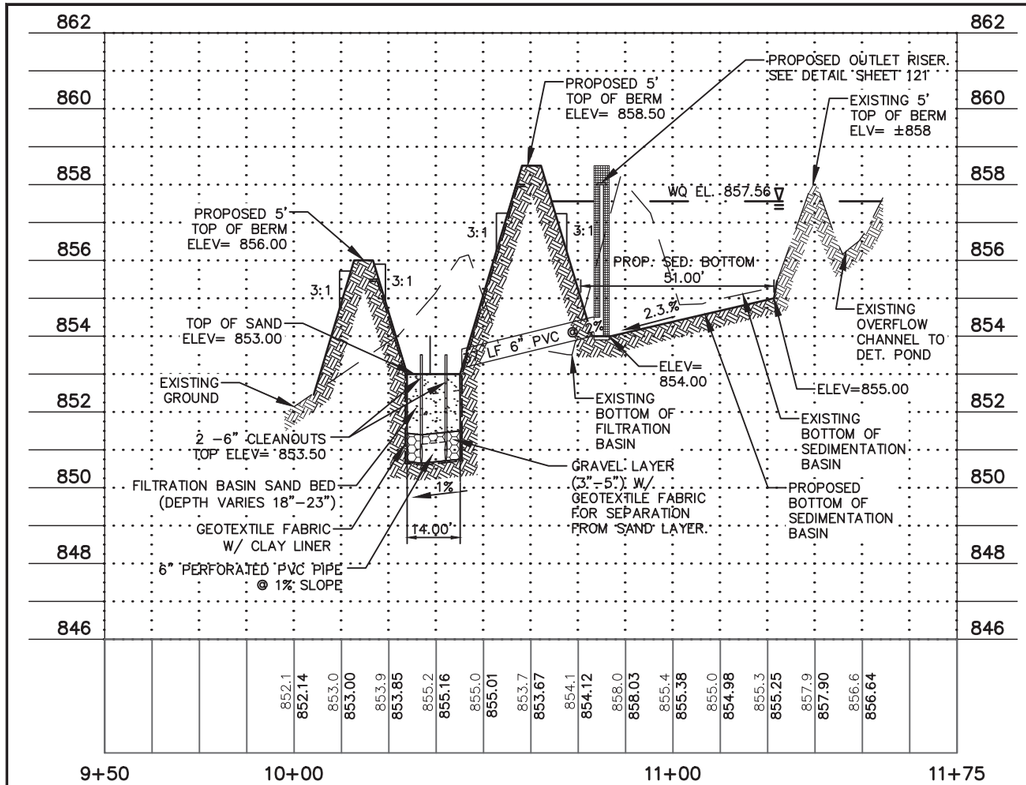
WATER QUALITY & DETENTION PLAN – POND 2

SHEET 118 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	–	14	WILLIAMSON				118

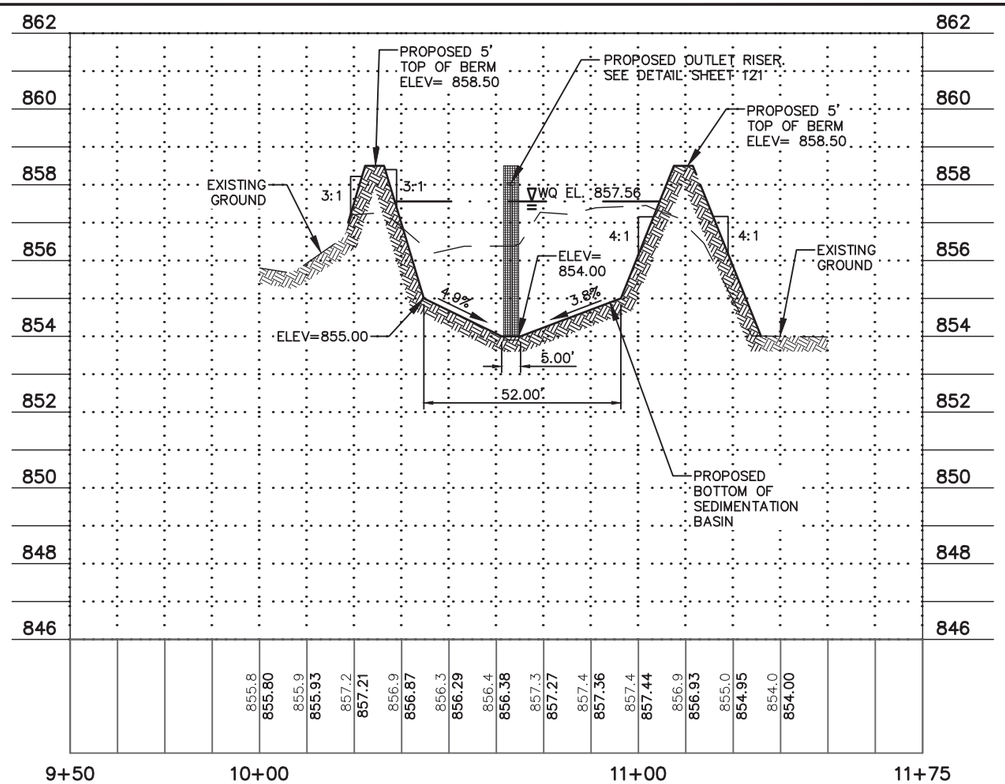
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SED/FIL CROSS SECTION A-A

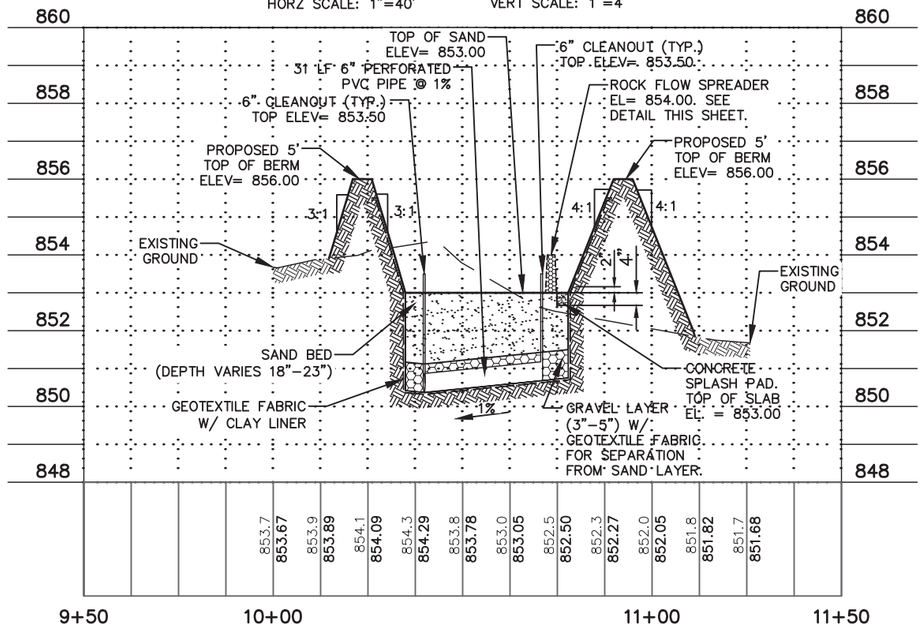
HORZ SCALE: 1"=40' VERT SCALE: 1"=4'



SEDIMENTATION BASIN CROSS SECTION B-B

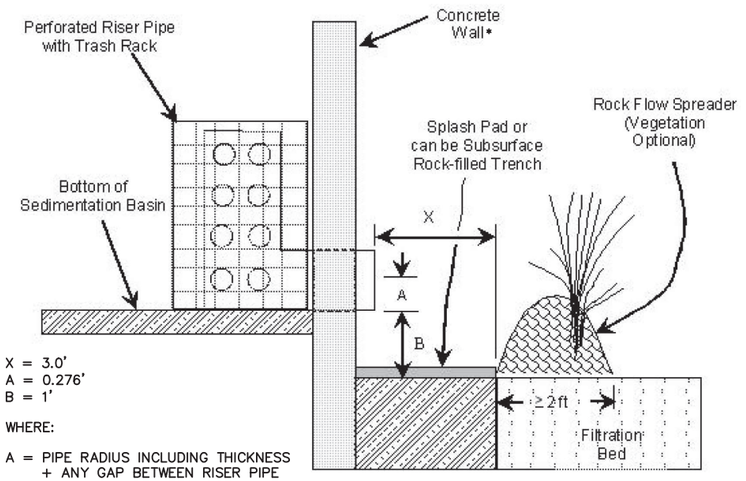
HORZ SCALE: 1"=40'

VERT SCALE: 1"=4'



FILTRATION BASIN CROSS SECTION C-C

HORZ SCALE: 1"=40' VERT SCALE: 1"=4'



X = 3.0'
A = 0.276'
B = 1'

WHERE:

A = PIPE RADIUS INCLUDING THICKNESS + ANY GAP BETWEEN RISER PIPE AND POND BOTTOM (FT).

B = ELEVATION DIFFERENCE BETWEEN BOTTOM OF SEDIMENTATION BASIN TOP OF FILTER (FT).

FILTRATION BASIN ROCK FLOW SPREADER DETAIL

N.T.S.

*NOTE: AN EARTHEN BERM IS PROPOSED IN LIEU OF A CONCRETE WALL

NOTES:
1. THE WATER QUALITY ELEVATION IS 857.56
2. SEE SHEET 120 FOR LINER AND SAND BED CONFIGURATION SPECIFICATION AND DETAILS.
3. CONTRACTOR SHALL COMPLY WITH CITY OF AUSTIN ENVIRONMENTAL CRITERIA MANUAL SECTION 1.6.5. A GUIDELINES FOR SEDIMENTATION/FILTRATION SYSTEMS FOR ALL ELEMENTS OF POND2 WHICH IS A CITY OF AUSTIN MAINTAINED POND.
4. CONTRACTOR SHALL PROVIDE A SUBMITTAL FOR THE TRASH RACK.



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WILLIAMSON COUNTY 1848

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WATER QUALITY SECTIONS – POND 2

SHEET 119 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				119

SP-2016-0186D

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APPENDIX R-2: FULL SED/FIL POND

FULL SEDIMENTATION/FILTRATION POND CALCULATIONS

FOR DEVELOPMENT PERMITS

Neenah Avenue,

PROPOSED POND 2

Legend
Not In Compliance
Do Not Modify Values

DRAINAGE AREA DATA:

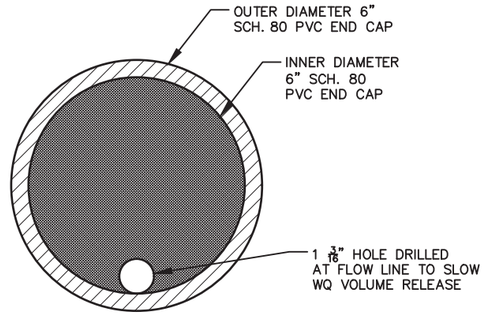
Drainage Area to Control (DA)		2.360	ac					
Drainage Area Impervious Cover		75.60%						
Capture Depth (CD) = (0.5+(IC-20)/100)		1.056	in					
WATER QUALITY CONTROL CALCULATIONS		Required			Provided			
25-year peak flow rate to control (Q25)		12.00	cfs		12.05	cfs		
100-year peak flow rate to control (Q100)		16.30	cfs					
The Water Quality Control is to be **FULL SEDIMENTATION FILTRATION**								
Water Qualtiy Volume (WQV=CD*DA*3630)	≥	9047	cf		10271	cf		
Maximum Ponding Depth in Sedimentation Pond (H) (above sand bed)					4.56	ft		
Sedimentation Pond Area (WQV/10)	≥	1027	sf		2652	sf		
Sedimentation Pond Volume (minimum=WQV)	≥	10271	cf		10271	cf		
Filtration Pond Area (WQV/(7+2.33*H)	≥	583	sf		602	sf		
Filtration Pond Volume (minimum 20% of WQV)	≥	2054	cf		3857	cf		
Full Sedimentation/Filtration Pond Drawdown Time (min 48)	≥	48	hrs		53	hrs		
Riser Orifice Diameter (D)					1.19	in		
Riser Orifice Area					1.108	sq in		
Water Quality Elevation					857.56			
Elevation of Splitter/Overflow Weir (min=WQV elevation)	≥	857.56	ft msl		857.56	ft msl		
Length of Splitter Weir					9.00	ft		
Required Head to Pass Q_{100} (maximum 1.0 ft)	≤	1.00	ft		0.66	ft		
Pond Freeboard Provided to Pass Q_{100} (minimum 0.25 ft)	≥	0.261	ft		0.278	ft		

Sedimentation pond

Stage (ft msl) (Elevation)	Area (sf)	Storage Volume (cf)
854.00	73.00	0
855.00	2,652.00	1,055
856.00	3,363.00	4,055
857.00	4,158.00	7,809
857.56	4,639.00	10,271

Filtration Pond

Stage (ft msl) (Elevation)	Area (sf)	Storage Volume (cf)
853.00	602.00	0
854.00	1,010.00	797
855.00	1,517.00	2,052
856.00	2,109.00	3,857



WQ OUTLET PVC CAP
(SCALE 1" = 4")

NOTES:
1. CONTRACTOR SHALL COMPLY WITH CITY OF AUSTIN ENVIRONMENTAL CRITERIA MANUAL SECTION 1.6.5. A GUIDELINES FOR SEDIMENTATION/FILTRATION SYSTEMS FOR ALL ELEMENTS OF POND2 WHICH IS A CITY OF AUSTIN MAINTAINED POND.
2. CONTRACTOR SHALL PROVIDE A SUBMITTAL FOR THE TRASH RACK.

8.4.17
STATE OF TEXAS
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WILLIAMSON COUNTY 1848

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WATER QUALITY CALCULATIONS & DETAILS – POND 2

SHEET 120 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	–	14	WILLIAMSON				120

SP-2016-0186D

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Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Pond 2 - Neenah Avenue Project
Date Prepared: 8/7/2016

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

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

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

County =	Williamson	
Total project area included in plan * =	2.36	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	1.76	acres
Total post-development impervious cover fraction * =	0.75	
P =	32	inches
$L_{M\ TOTAL\ PROJECT}$ =	1532	lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 1

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

Drainage Basin/Outfall Area No. = 1

Total drainage basin/outfall area =	2.36	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	1.76	acres
Post-development impervious fraction within drainage basin/outfall area =	0.75	
$L_{M\ THIS\ BASIN}$ =	1532	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Sand Filter
Removal efficiency = 89 percent

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

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

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

where:
A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	2.36	acres
A_I =	1.76	acres
A_P =	0.60	acres
L_R =	1744	lbs

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

Desired $L_{M\ THIS\ BASIN}$ = 1532 lbs.

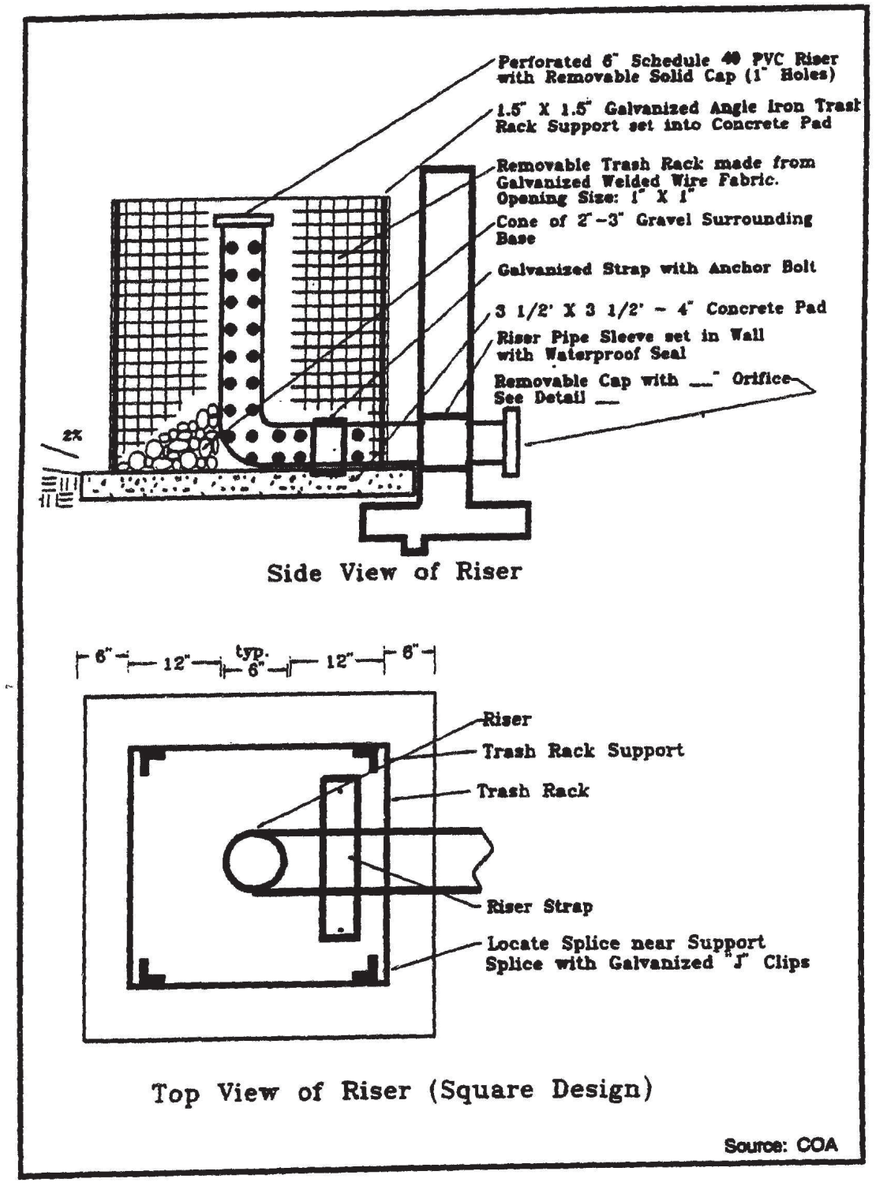
F = 0.88

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	1.50	inches
Post Development Runoff Coefficient =	0.56	
On-site Water Quality Volume =	7132	cubic feet

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

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	1426	
Total Capture Volume (required water quality volume(s) x 1.20) =	8559	cubic feet



NOTES:
1. CONTRACTOR SHALL COMPLY WITH CITY OF AUSTIN ENVIRONMENTAL CRITERIA MANUAL SECTION 1.6.5. A GUIDELINES FOR SEDIMENTATION/FILTRATION SYSTEMS FOR ALL ELEMENTS OF POND2 WHICH IS A CITY OF AUSTIN MAINTAINED POND.
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WATER QUALITY CALCULATIONS & DETAILS – POND 2

SHEET 121 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				121

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SP-2016-0186D

FOR SEDIMENTATION AND FILTRATION PONDS

A CLAY LINER SHALL BE USED TO LINE THE FILTRATION BASIN.
THE CLAY LINER SHALL MEET THE FOLLOWING SPECIFICATIONS:

PROPERTY	TEST METHOD	UNIT	SPECS.
PERMEABILITY	ASTM D-2434	Cm/Sec	1×10^{-7}
PLASTICITY INDEX OF CLAY	ASTM D-423 & D-424	UNITLESS	NOT LESS THAN 15
LIQUID LIMIT OF CLAY	ASTM D-2216	UNITLESS	NOT LESS THAN 30
CLAY PARTICLES PASSING	ASTM D-422	%	NOT LESS THAN 30
CLAY COMPACTION	ASTM D-2216	%	95% OF STANDARD PROCTOR DENSITY

THE CLAY LINER SHALL HAVE A MINIMUM THICKNESS OF 12 INCHES.

THE GEOTEXTILE FABRIC SHALL MEET THE FOLLOWING SPECIFICATIONS:

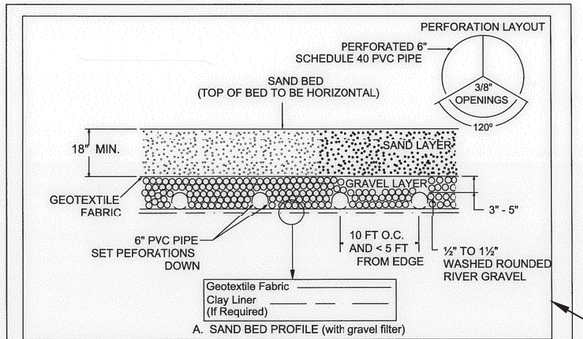
SAND BED AND GEOTEXTILE FABRIC

FIRST (TOP) LAYER– FINE SAND, 0.02–0.04 INCH 18 INCH DEPTH

SECOND LAYER– GRAVEL, 1/2–1 INCH, AT LEAST 1 INCH DEPTH TO 2 INCH DEPTH SURROUNDING UNDERDRAIN PIPING

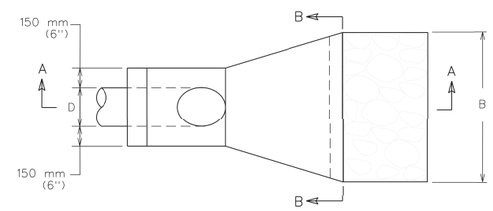
THE TWO LAYERS MUST BE SEPARATED FROM EACH OTHER USING SUITABLE GEOTEXTILE FABRIC MEETING THE FOLLOWING SPECIFICATIONS:

PROPERTY	TEST METHOD	UNIT	SPECS.
FABRIC WEIGHT	ASTM D-3376	OZ/SQ.YD.	≥3
UV RADIATION STABILITY	ASTM D-4355	--	70% STRENGTH RETAINED MIN., AFTER 500 HRS IN XENON ARC DEVICE
MULLEN BURST STRENGTH	ASTM D-3786	PSI.	≥120
WATER FLOW RATE	ASTM D-4491	GPM/FT	≥275

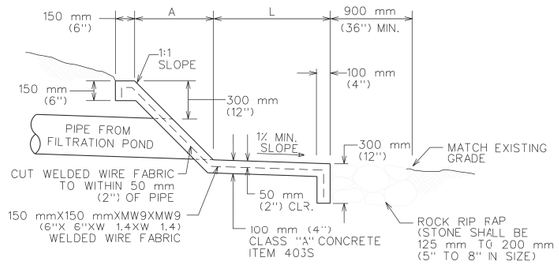


USE CONFIGURATION A

CITY OF AUSTIN, WATERSHED PROTECTION DEPARTMENT	SAND BED FILTRATION CONFIGURATIONS USING CLAY LINER / NO LINER REQUIRED	
[signature] P.E. 12/30/14 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 661-2

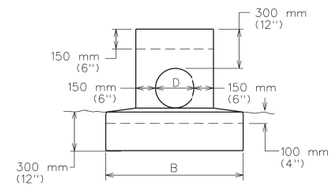


PLAN



SECTION A - A

CITY OF AUSTIN, DEPARTMENT OF WATERSHED PROTECTION AND DEVELOPMENT REVIEW	HEADWALL FOR FILTRATION PONDS W/OUTFALL PIPE 150 mm (6") TO 375 mm (15") DIA.	
RECORD COPY SIGNED BY GEORGE E. OSWALD 3/15/05 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 508S-15 1 OF 2



SECTION B - B

A	450 mm (18")	500 mm (20")	550 mm (22")	600 mm (24")	675 mm (27")
B	750 mm (30")	800 mm (32")	850 mm (34")	1.05 m (42")	1.27 m (51")
D	150 mm (6")	200 mm (8")	250 mm (10")	300 mm (12")	375 mm (15")
L	600 mm (24")	600 mm (24")	750 mm (30")	900 mm (36")	1.2 m (48")

CITY OF AUSTIN, DEPARTMENT OF WATERSHED PROTECTION AND DEVELOPMENT REVIEW	HEADWALL FOR FILTRATION PONDS W/OUTFALL PIPE 150 mm (6") TO 375 mm (15") DIA.	
RECORD COPY SIGNED BY GEORGE E. OSWALD 3/15/05 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 508S-15 2 OF 2

NOTES:
1. CONTRACTOR SHALL COMPLY WITH CITY OF AUSTIN ENVIRONMENTAL CRITERIA MANUAL SECTION 1.6.5. A GUIDELINES FOR SEDIMENTATION/FILTRATION SYSTEMS FOR ALL ELEMENTS OF POND2 WHICH IS A CITY OF AUSTIN MAINTAINED POND.
2. CONTRACTOR SHALL PROVIDE A SUBMITTAL FOR THE TRASH RACK.

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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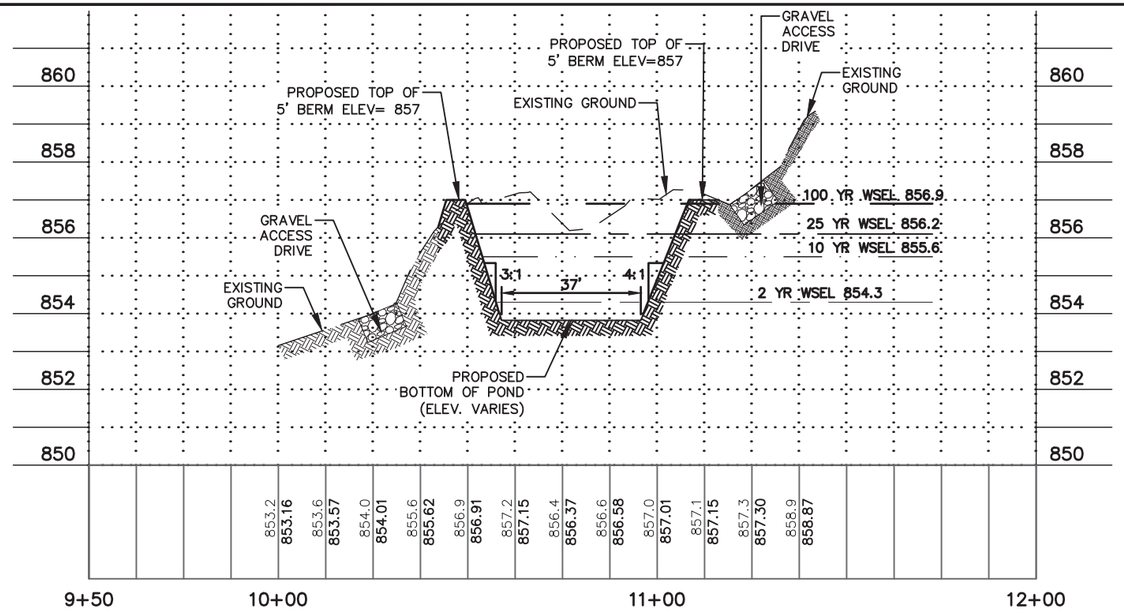
WATER QUALITY DETAILS – POND 2

SHEET 122 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				122

SP-2016-0186D

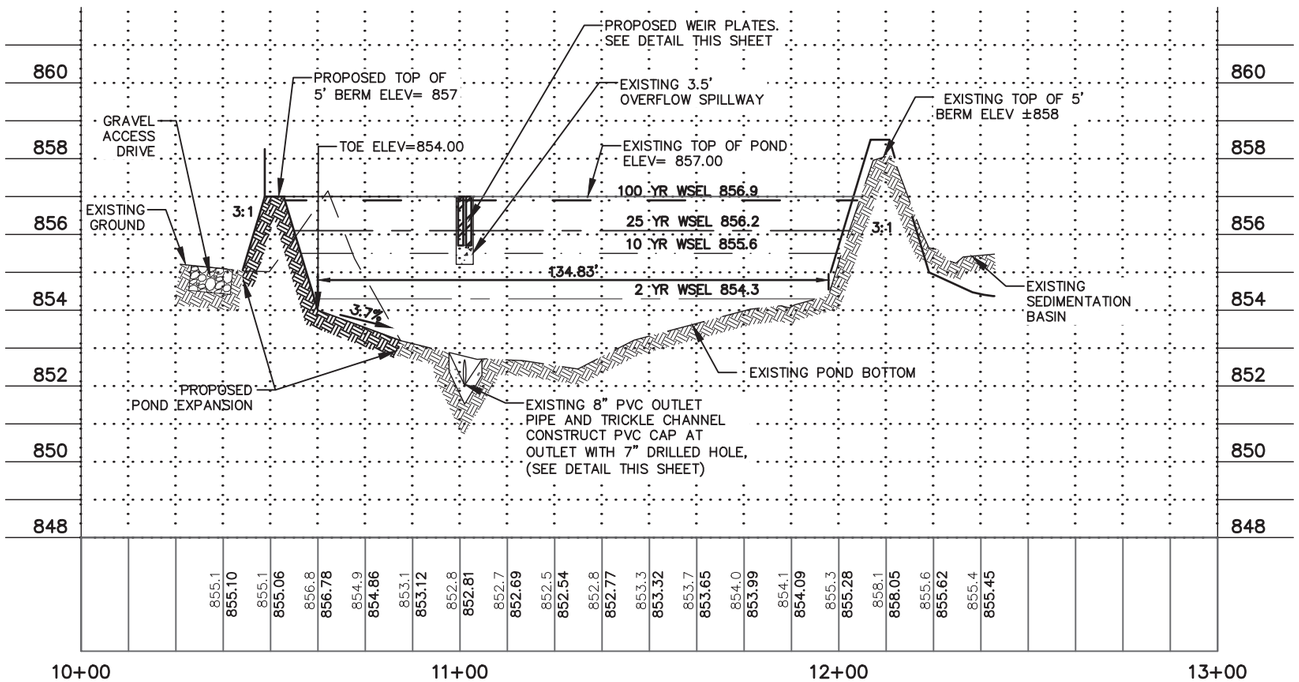
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DETENTION POND CROSS SECTION D–D

HORZ SCALE: 1"=40'

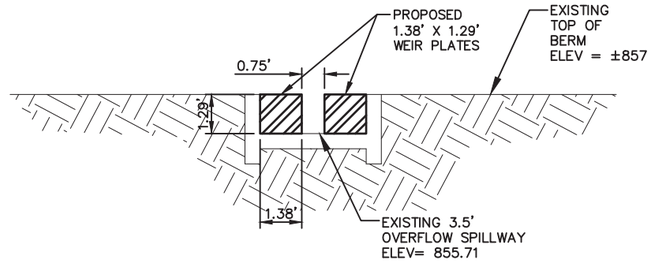
VERT SCALE: 1"=4'



DETENTION POND CROSS SECTION E–E

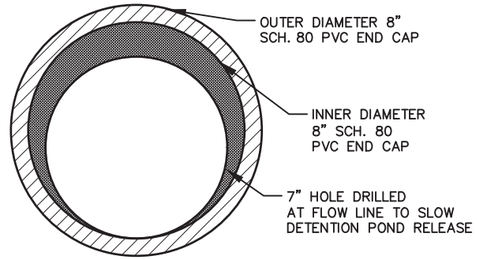
HORZ SCALE: 1"=40'

VERT SCALE: 1"=4'



PROPOSED WEIR PLATES

(SCALE 1" = 5')



DETENTION OUTLET PVC CAP

(N.T.S.)

NOTES:
1. CONTRACTOR TO SUBMIT PLANS FOR ATTACHING WEIR PLATES TO EXISTING CONCRETE STRUCTURE FOR REVIEW PRIOR TO CONSTRUCTION.
2. CONTRACTOR SHALL COMPLY WITH CITY OF AUSTIN ENVIRONMENTAL CRITERIA MANUAL SECTION 1.6.5. A GUIDELINES FOR SEDIMENTATION/FILTRATION SYSTEMS FOR ALL ELEMENTS OF POND2 WHICH IS A CITY OF AUSTIN MAINTAINED POND.
3. CONTRACTOR SHALL PROVIDE A SUBMITTAL FOR THE TRASH RACK.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
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DETENTION SECTIONS – POND 2

SHEET 123 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				123

SP-2016-0186D

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Detention Summary

Storm Event (Year)	Allowable Peak Outflow* (cfs)	Existing Peak Inflow (cfs)	Existing Peak Outflow (cfs)	Existing Peak WSEL (ft)	Proposed Peak Inflow (cfs)	Proposed Peak Outflow (cfs)	Proposed Peak WSEL (ft)
2	1.9	4.0	1.9	853.7	5.6	1.8	854.3
10	3.1	8.0	2.7	854.9	10.5	2.3	855.6
25	4.0	10.3	3.0	855.5	13.3	3.3	856.2
100	5.9	14.2	6.4	856.2	18.1	5.8	856.9

*Results obtained from Davis Spring Section 5D-Offsite Neenah Avenue Extension (SP-85-029.010.4B)

Pond 2 Stage-Storage Table

Stage			Storage		Discharge		
Elevation (ft)	Depth (ft)	Area (sf)	Inc. Volume (cf)	Cum.Volume (cf)	Elevation (ft)	Flow (cfs)	Storm Event (year)
852	0	99	0	0			
853	1	1930	1014.5	1014.5			
854	1	5027	3478.5	4493	854.3	1.8	2 yr
855	1	6349	5688	10181	855.6	2.3	10 yr
856	1	7799	7074	17255	856.2	3.3	25 yr
857	1	9343	8571	25826	856.9	5.8	100 yr

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
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WILLIAMSON COUNTY 1848

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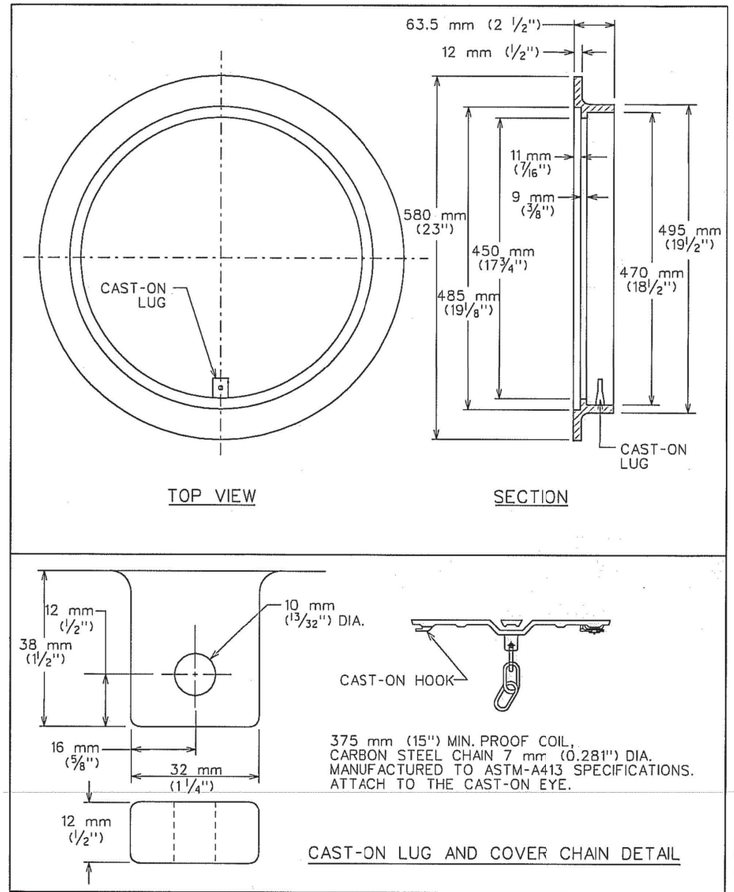
DETENTION CALCULATIONS – POND 2

SHEET 124 OF 273

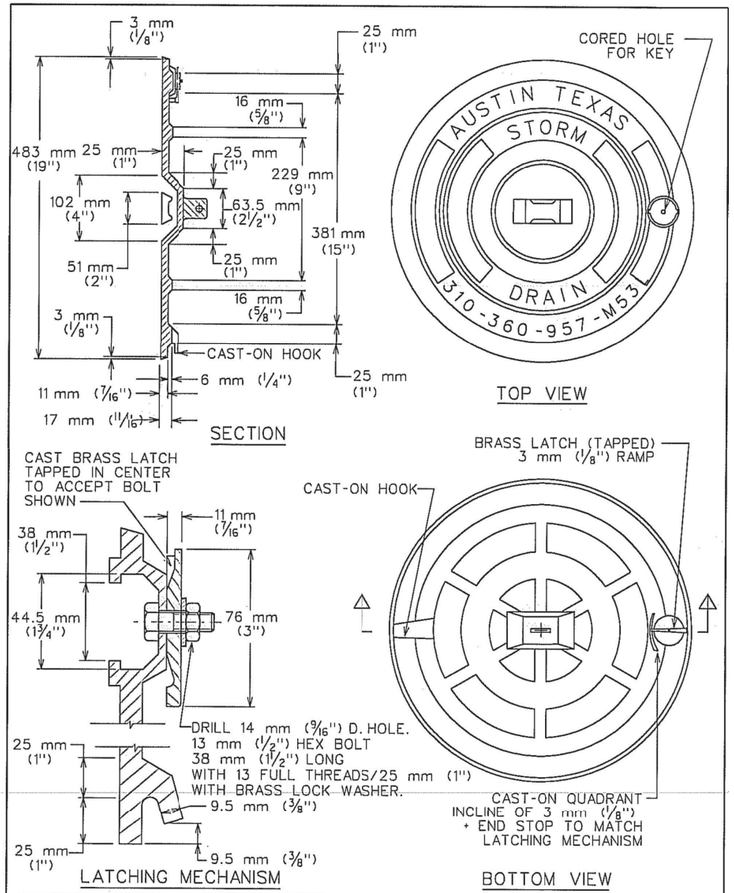
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				124

SP-2016-0186D

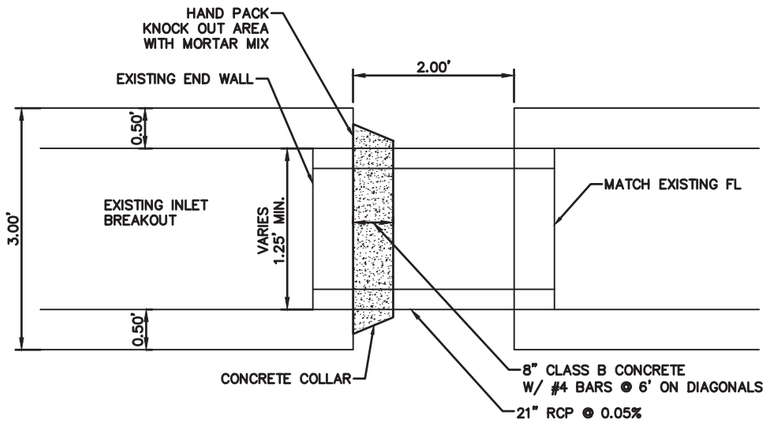
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CITY OF AUSTIN DEPARTMENT OF WATERSHED PROTECTION AND DEVELOPMENT REVIEW	457 mm (18") COVER AND FRAME	
George E. Oswald 2/14/02 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 503S-1 1 OF 2



CITY OF AUSTIN DEPARTMENT OF WATERSHED PROTECTION AND DEVELOPMENT REVIEW	457 mm (18") COVER AND FRAME	
George E. Oswald 2/14/02 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 503S-1 2 OF 2



CURB INLET CONNECTION DETAIL
NTS

NOTES:
1. CONNECTION TO EXISTING INLET SHALL BE CONSIDERED SUBSIDIARY TO THE CONSTRUCTION OF THE PROPOSED CURB INLET.
2. REWORKING THE INVERT OF THE EXISTING INLET SHALL BE CONSIDERED SUBSIDIARY TO THE CONSTRUCTION OF THE PROPOSED CURB INLET.

8.4.17
STATE OF TEXAS
STEPHANE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephane D Blew

NEENAH AVENUE WIDENING

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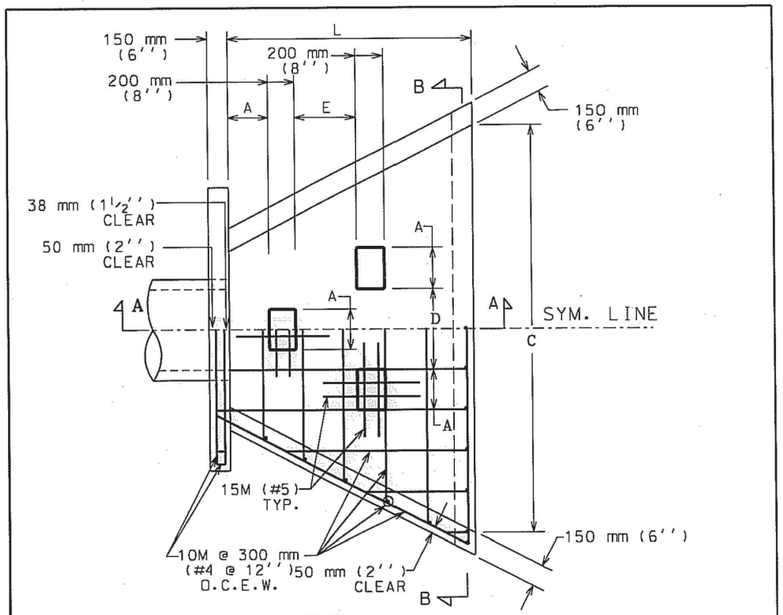
DRAINAGE DETAILS 1

SHEET 125 OF 273

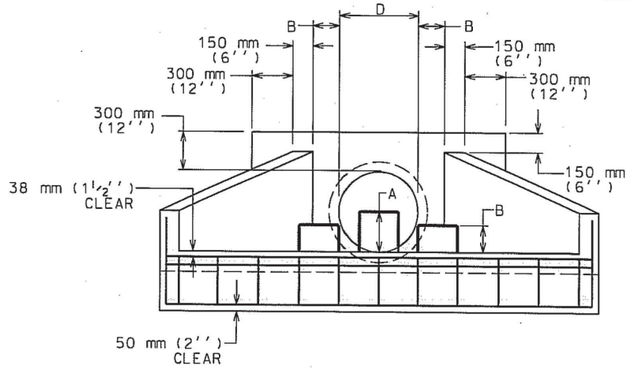
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				125

SP-2016-0186D

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CITY OF AUSTIN DEPARTMENT OF WATERSHED PROTECTION AND DEVELOPMENT REVIEW	STANDARD HEADWALL AND ENERGY DISSIPATORS	
Bill Gardner 8/20/07 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 508S-13 1 OF 2



SECTION B-B

NOTES:

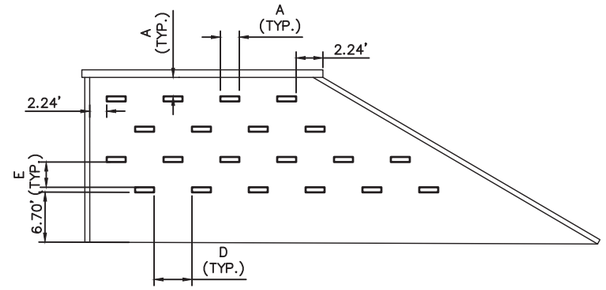
1. ALL CONCRETE SHALL BE TYPE "C" AS PER SPEC. 403S. CONCRETE FOR STURCTURES.
2. CHAMFER ALL EXTERNAL VISIBLE CORNERS.
3. DISSIPATOR BLOCKS REQUIRED ON DISCHARGE HEADWALLS ONLY.

D	457 mm (18'')	533 mm (21'')	610 mm (24'')	685 mm (27'')	765 mm (30'')	838 mm (33'')	914 mm (36'')	1.067 m (42'')	1.219 m (48'')	1.372 m (54'')	.524 m (60'')
A	225 mm (9'')	250 mm (10'')	300 mm (12'')	350 mm (14'')	375 mm (15'')	400 mm (16'')	450 mm (18'')	525 mm (21'')	600 mm (24'')	675 mm (27'')	750 mm (30'')
B	150 mm (6'')	175 mm (7'')	200 mm (8'')	225 mm (9'')	250 mm (10'')	275 mm (11'')	300 mm (12'')	350 mm (14'')	400 mm (16'')	450 mm (18'')	500 mm (20'')
C	2.29 m (90'')	2.67 m (105'')	3.05 m (120'')	343 m (135'')	3.81 m (150'')	4.19 m (165'')	4.57 m (180'')	5.33 m (210'')	6.10 m (240'')	6.86 m (270'')	7.62 m (300'')
L	1.37 m (54'')	1.60 m (63'')	1.83 m (72'')	2.06 m (81'')	2.29 m (90'')	2.51 m (99'')	2.74 m (108'')	3.20 m (126'')	3.66 m (144'')	4.11 m (162'')	4.57 m (180'')
E	300 mm (12'')	350 mm (14'')	400 mm (16'')	450 mm (18'')	500 mm (20'')	550 mm (22'')	600 mm (24'')	700 mm (28'')	800m (32'')	900 mm (36'')	1000 mm (40'')

DIMENSIONS IN MILLIMETERS, METERS AND (INCHES).

DISCHARGE VELOCITIES GREATER THAN 3 METERS/SECOND (10 fps) REQUIRE ROCK OUTLET PROTECTION.

CITY OF AUSTIN DEPARTMENT OF WATERSHED PROTECTION AND DEVELOPMENT REVIEW	STANDARD HEADWALL AND ENERGY DISSIPATORS	
Bill Gardner 8/20/07 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 508S-13 2 OF 2



ENERGY DISSIPATORS DETAIL
NTS

NOTE: DIMENSION AND SPACING OF ENERGY DISSIPATORS TO FOLLOW COA DETAIL 508S-13 FOR A 60" PIPE DIAMETER.

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
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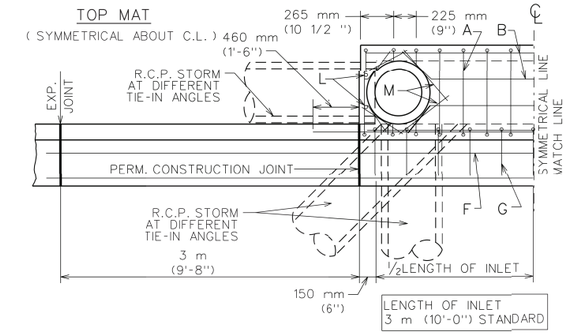
DRAINAGE DETAILS 2

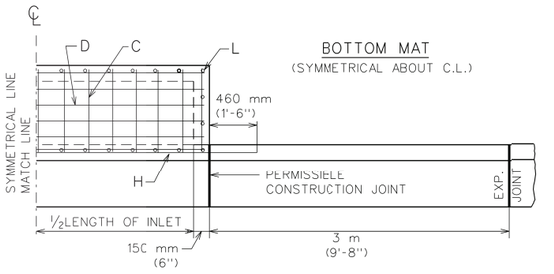
SHEET 126 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				126

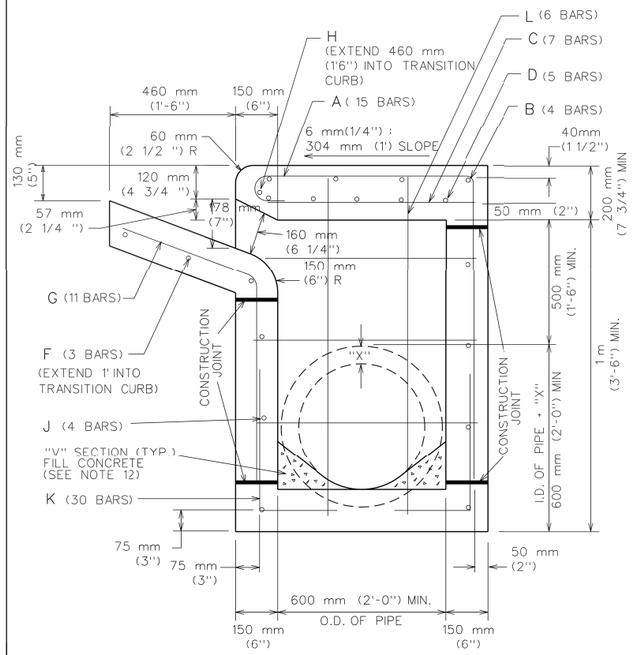
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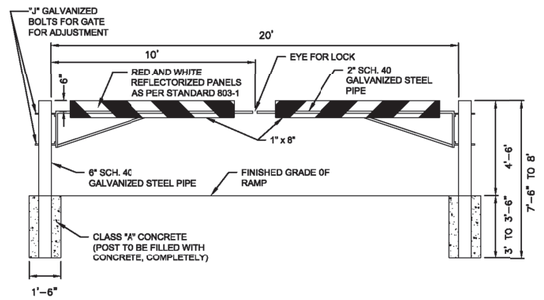


CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	TYPICAL DETAILS FOR CURB INLET	
RECORD COPY SIGNED BY BILL GARDNER 12/09/08 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 508S-3 1 OF 4



ELEVATION - SECTION

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	TYPICAL DETAILS FOR CURB INLET	
RECORD COPY SIGNED BY BILL GARDNER 12/09/08 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 508S-3 2 OF 4



NOTE:
RAMP BARRICADE SUBSIDIARY TO ITEM 403-G CONCRETE STRUCTURES

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	POND PIPE GATE AT RAMP DETAIL	
ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 662S-1

8.4.17
STATE OF TEXAS
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DRAINAGE DETAILS 3

SHEET 127 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				127

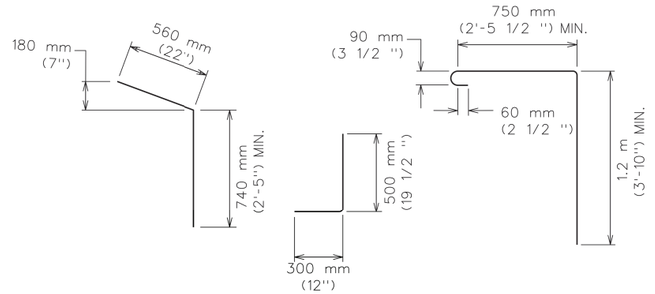
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TABLE OF QUANTITIES
FOR 18" OUTLET PIPE
REINFORCING STEEL QUANTITIES

BARS	SIZE	SPACING	NUMBER	LENGTH	WEIGHT
A	4	230mm (9")×	15	2 m (7'-0")	73
B	4	250 mm (10")	4	3.25 m (10'-8")	29
C	4	460 mm (18")	7	760 mm (2'-6")	12
D	6	150 mm (6")	5	3.25 m (10'-8")	80
E	4	300 mm (12")	6	760 mm (2'-6")	10
F	4	250 mm (10")	3	4 m (13'-0")	35
G	4	300 mm (12")	11	1.25 m (4'-3")	31
H	6	-	1	4.25 m (14'-0")	20
J	4	300 mm (12")	7	3.25 m (10'-8")	50
K	4	230 mm (9")×	30	800 mm (2'-7 1/2")	52
L	4	300 mm (12")×	6	1.3 m (4'-4")	17
M	4	-	4	500 mm (1'-8") AVG	4
TOTAL STEEL, LB.					413
TOTAL CONCRETE, C.Y.					4.06

× EXCEPT AS SHOWN ON PLAN



BAR G BAR K BAR A

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	TYPICAL DETAILS FOR CURB INLET	
RECORD COPY SIGNED BY BILL GARDNER *12/09/08* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 508S-3 3 OF 4

NOTES:
1. ALL CONCRETE SHALL BE CLASS "A"
2. ALL REINFORCING STEEL SHALL BE GRADE 60
3. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS.
4. VERTICAL STEEL MAY BE SPLICED (380 mm or 15" MIN. LAP) IN THE LOWER ONE-HALF OF ALL INLET WALLS.5. IN AREAS OF CONFLICT BETWEEN REINFORCING STEEL, PIPES AND MANHOLE FRAME, THE REINFORCEMENT SHALL BE BENT OR ADJUSTED TO CLEAR AS DIRECTED BY THE ENGINEER.
6. QUANTITIES SHOWN HEREON ARE FOR THE CONTRACTOR'S INFORMATION ONLY. PAYMENT WILL BE MADE FOR EACH INLET OF THE TYPE SPECIFIED, COMPLETE IN PLACE INCLUDING MANHOLE FRAME AND OVER.
7. CHAMFER ALL EXPOSED EDGES 20 mm (3/4 ").
8. MANHOLE FRAME AND COVER SHALL BE IN ACCORDANCE WITH CITY OF AUSTIN STANDARD 503S-1.
9. THE CONTRACTOR MAY PROPOSE ALTERNATE PROCEDURES FOR THE CONSTRUCTION OF INLETS, INCLUDING PRECAST UNITS. PLANS FOR SUCH PROPOSED ALTERNATES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL BEFORE CONSTRUCTION.
10. ALL INLET WALLS SHALL BE FORMED EXCEPT WHERE THE NATURE OF THE SURROUNDING MATERIAL IS SUCH THAT IT CAN BE TRIMMED TO A SMOOTH VERTICAL FACE. WHEN INLET WALLS ARE PLACED TO NEAT EXCAVATION LINES THE WALL THICKNESS SHALL NOT EXCEED 10 INCHES.
11. PAYMENT FOR INLET AT THE CONTRACT PRICE SHALL INCLUDE THE TRANSITION CURB.
12. INVERT OF INLET SHALL BE SLOPED 1:20 WITH FILL CONCRETE, SHAPED AS "V" SECTION
13. NO SPLICING OF REINFORCING STEEL SHALL BE PERMITTED UNLESS OTHERWISE NOTED ON THE PLANS OR PERMITTED IN WRITING BY THE ENGINEER.

REFERENCES:

FOR EXPANSION JOINT DOWEL AND DOWEL LOCATION DETAILS
SEE STD. 430S-3, "CURB EXPANSION JOINT DOWEL DETAIL".

FOR 18" MANHOLE FRAME AND COVER DETAILS
SEE STD. 503S-1, "18" COVER AND FRAME".

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	TYPICAL DETAILS FOR CURB INLET	
RECORD COPY SIGNED BY BILL GARDNER *12/09/08* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 508S-3 4 OF 4

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
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NEENAH AVENUE WIDENING

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DRAINAGE DETAILS 4

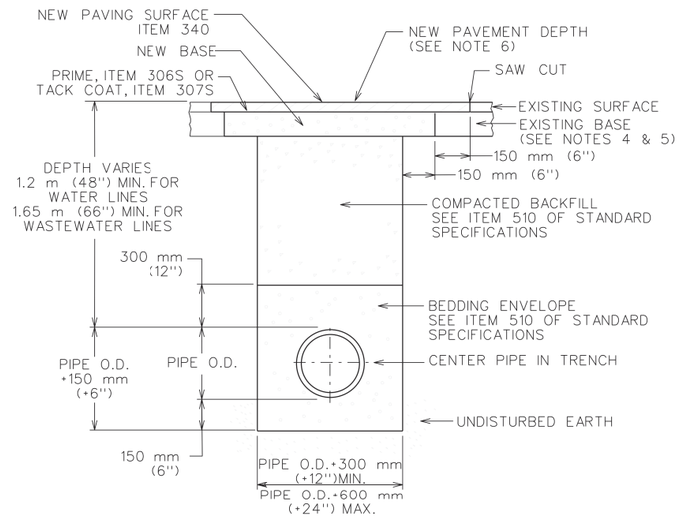
SHEET 128 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				128

SP-2016-0186D

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THIS DETAIL FOR USE ONLY ON CITY OF AUSTIN C.I.P. PROJECTS.



NOTES:

1. THE EXISTING PAVING SURFACE SHALL BE SAW CUT IN A STRAIGHT LINE A MINIMUM OF 300 mm (12") WIDER THAN THE UNDISTURBED SIDES OF THE TRENCH, SYMETRICAL ABOUT THE CENTER LINE OF THE EXCAVATION.
2. ANY CONCRETE PAVING SHALL BE SAW CUT 150 mm (6") WIDER THAN UNDISTURBED SIDES OF EXCAVATION.
3. IF EXCAVATION AREA IS OPEN FOR TEMPORARY PUBLIC USE, THE SURFACE SHALL BE MAINTAINED LEVEL WITH ADJACENT RIDING SURFACE WITH COLD MIX OR TEMPORARY HOT MIX ASPHALTIC CONCRETE.
4. ROAD BASE AND SURFACE MATERIALS IN THE TRENCH CUT SHALL BE REPLACED IN KIND OR EQUAL THICKNESS, OR MINIMUM BASE THICKNESS OF 250 mm (10"), WHICHEVER IS GREATER.
5. ALL DAMAGED AREAS OF PAVEMENT OUTSIDE THE TRENCH CUT SHALL BE REMOVED AND REPLACED WITH MINIMUM OF 200 mm (8") OF BASE OR MATCH EXISTING THICKNESS, WHICHEVER IS GREATER.
6. SURFACE PAVEMENT SHALL BE OF THE KIND AND THICKNESS AS EXISTING, OR MINIMUM 50 mm (2"), WHICHEVER IS GREATER.

CITY OF AUSTIN WATER AND WASTEWATER UTILITY		TYPICAL TRENCH WITH PAVED SURFACE	
RECORD COPY SIGNED BY KATHI L.FLOWERS	8/19/02 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 510S-3

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

Stantec
221 West Sixth Street, Suite 600
Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
TBPE # F-6324 TBPLS # F-10194230
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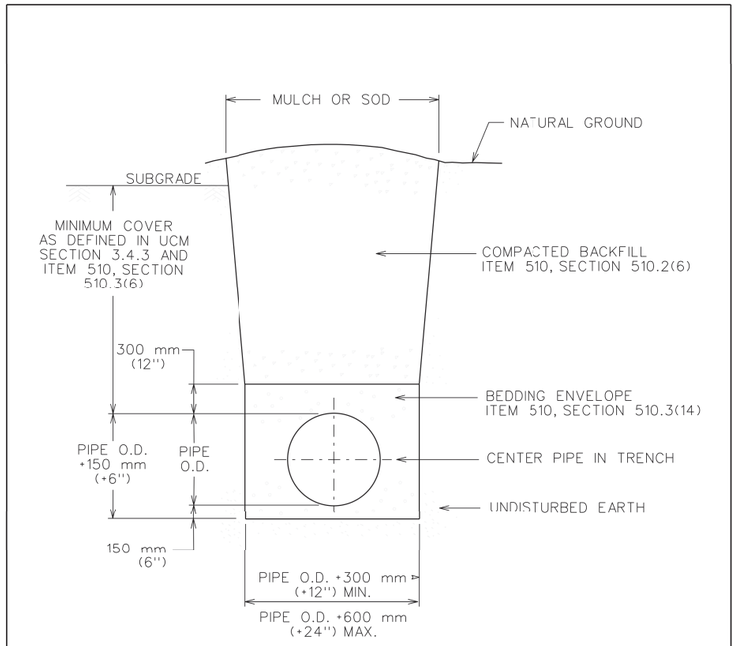
DRAINAGE DETAILS 5

SHEET 129 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				129

SP-2016-0186D

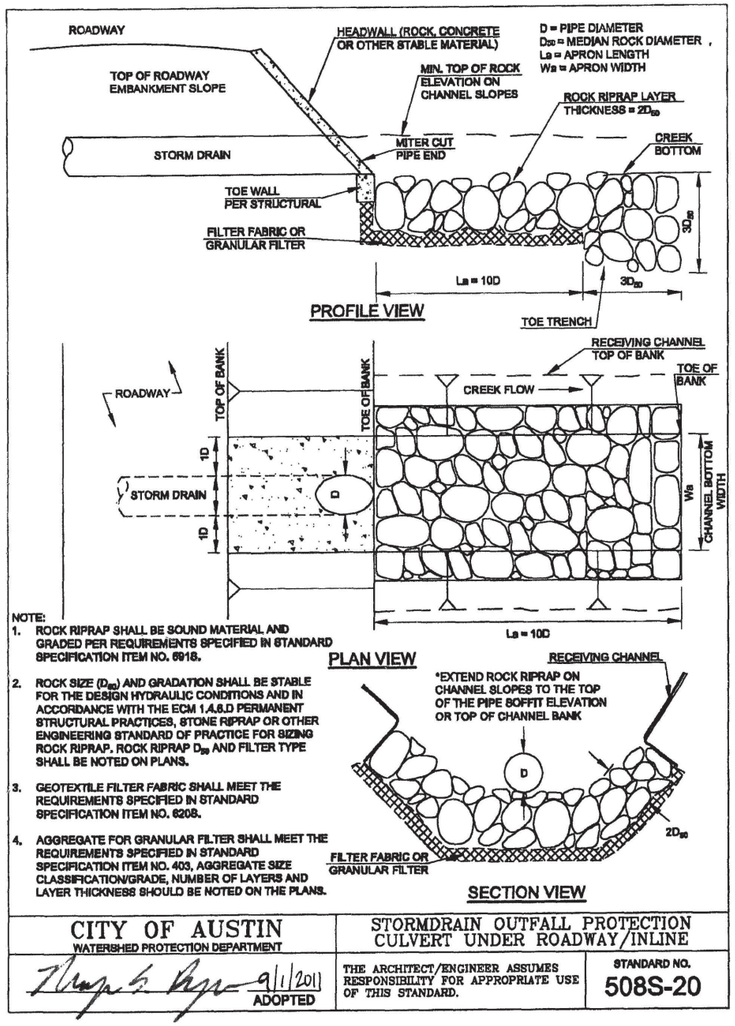
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REFERENCES:

1. UTILITY CRITERIA MANUAL SECTION 3.4.3, "FINAL DESIGN"
2. STANDARD SPECIFICATION MANUAL ITEM 510,
   SECTION 510.2(6), "SELECT BACKFILL OR BORROW";
   SECTION 510.3(6), "TRENCH DEPTH AND DEPTH OF COVER";
   SECTION 510.3(14), "PIPE BEDDING ENVELOPE"

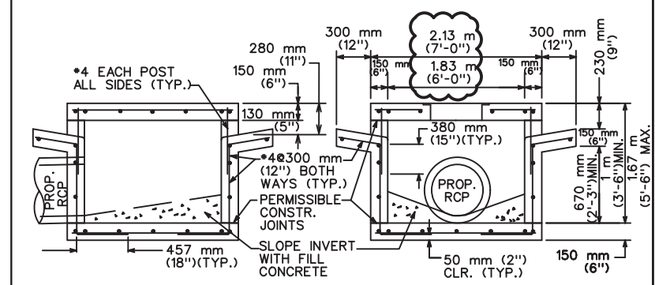
CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		TYPICAL TRENCH DETAIL WITH UNFINISHED SURFACE	
RECORD COPY SIGNED BY BILL GARDNER	*03/13/06* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 510S-5

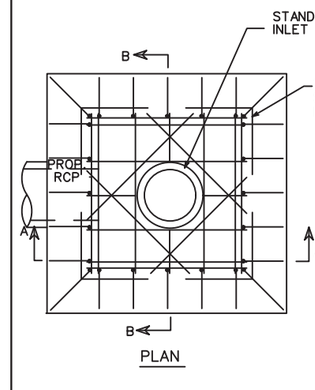


NOTE:
1. ROCK RIPRAP SHALL BE SOUND MATERIAL AND GRADED PER REQUIREMENTS SPECIFIED IN STANDARD SPECIFICATION ITEM NO. 6916.
2. ROCK SIZE (D_{50}) AND GRADATION SHALL BE STABLE FOR THE DESIGN HYDRAULIC CONDITIONS AND IN ACCORDANCE WITH THE ECM 1.4.6.D PERMANENT STRUCTURAL PRACTICES, STONE RIPRAP OR OTHER ENGINEERING STANDARD OF PRACTICE FOR SIZING ROCK RIPRAP. ROCK RIPRAP D_{50} AND FILTER TYPE SHALL BE NOTED ON PLANS.
3. GEOTEXTILE FILTER FABRIC SHALL MEET THE REQUIREMENTS SPECIFIED IN STANDARD SPECIFICATION ITEM NO. 6208.
4. AGGREGATE FOR GRANULAR FILTER SHALL MEET THE REQUIREMENTS SPECIFIED IN STANDARD SPECIFICATION ITEM NO. 403, AGGREGATE SIZE CLASSIFICATION/GRADE, NUMBER OF LAYERS AND LAYER THICKNESS SHOULD BE NOTED ON THE PLANS.

CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT		STORMDRAIN OUTFALL PROTECTION CULVERT UNDER ROADWAY/INLINE	
Stephanie D Blew 9/1/2011	ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 508S-20

NOTE: USE 60" PIPE INNER DIAMETER FOR ROCK SIZE.





NOTES:

1. CHAMFER ALL EXPOSED EDGES 20 mm (3/4").
2. REINFORCING STEEL SHALL BE CUT OR FIELD-BENT AS REQUIRED TO CLEAR PIPE AND INLET FRAME OPENING. ALL CUT STEEL SHALL BE REPLACED WITH ADDITIONAL DIAGONAL BARS OF THE SAME DIAMETER.
3. INLET FRAME AND COVER SHALL BE IN ACCORDANCE WITH CITY OF AUSTIN STANDARD 503S-1.
4. CONCRETE COVERAGE OF STEEL SHALL BE 50 mm (2") MIN. AT ALL SURFACES.

CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT		4-SIDED AREA INLET MODIFIED	
RECORD COPY SIGNED BY ARTHUR C. ROMERO 08/18/2010	ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 508S-9

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

Stantec
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Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
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DRAINAGE DETAILS 6

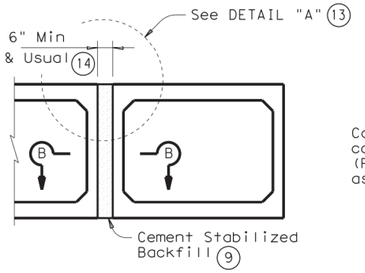
SHEET 130 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				130

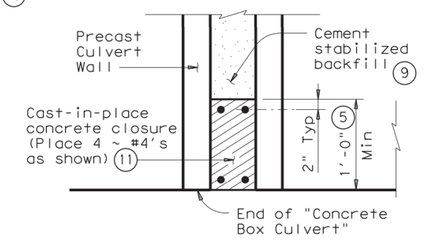
SP-2016-0186D

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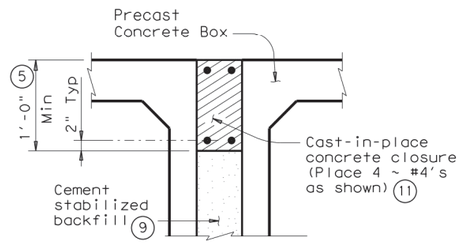
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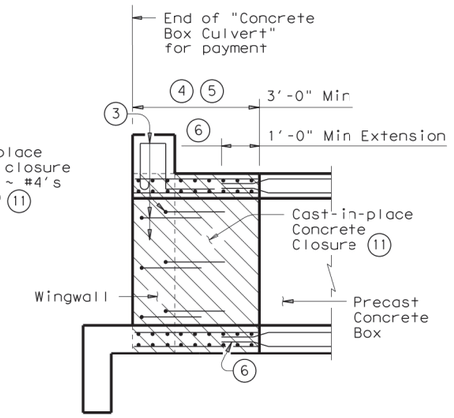
MULTIPLE UNIT PLACEMENT



SECTION B-B

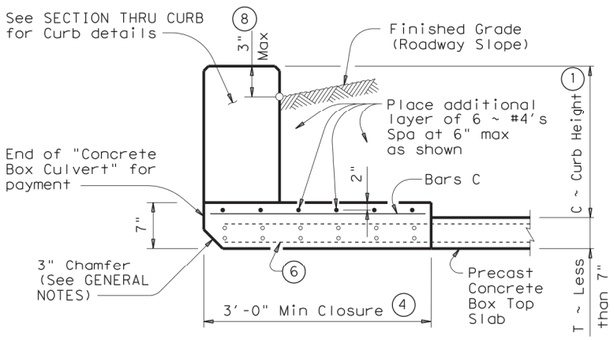


DETAIL "A" (13)

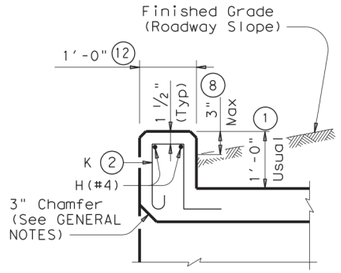


WINGWALL CONNECTION

(Also applies to Safety End Treatment)

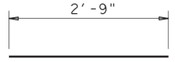


SECTION THRU TOP SLABS LESS THAN 7"

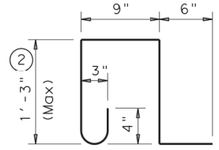


SECTION THRU CURB

(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")

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.

GENERAL NOTES:

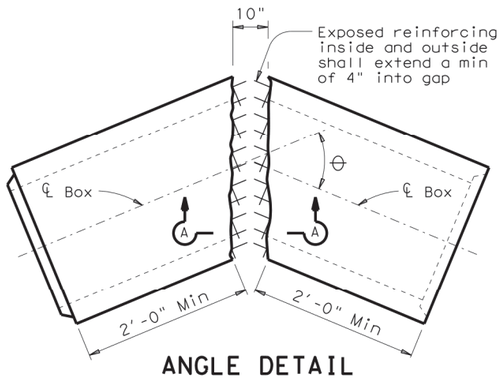
Designed according to AASHTO LRFD Specifications.

All closure concrete shall be Class "C" with a minimum compressive strength of 3600 psi and shall be placed according to the Item, "Concrete Structures".

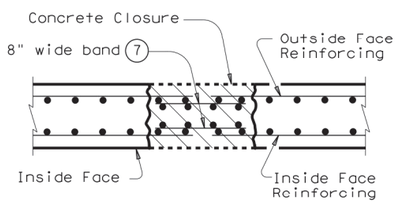
Any additional concrete required for the closures shall be considered as subsidiary to the Concrete Box Culvert.

Refer to the Single Box Culverts Precast standard for details not shown.

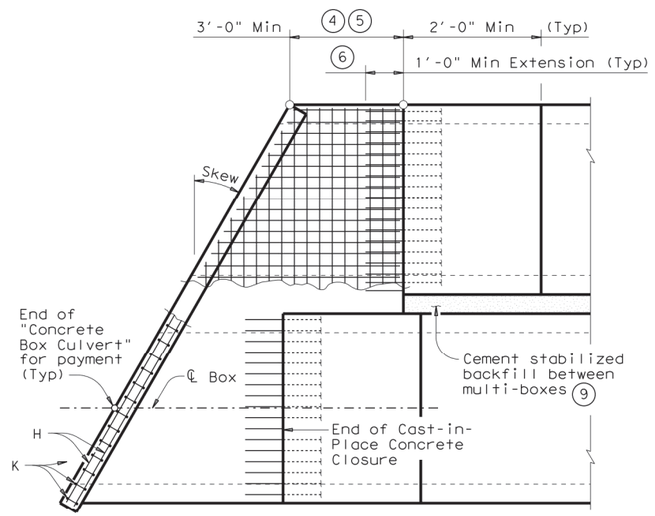
The bottom edge of the top slab closure shall be chamfered 3 inches at the entrance.



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi-box placement)

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

FILE: scpmdste.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				131

DATE:
FILE:

Bid 1710-194

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DATE:
FILE: bid1710-194

BOX DATA

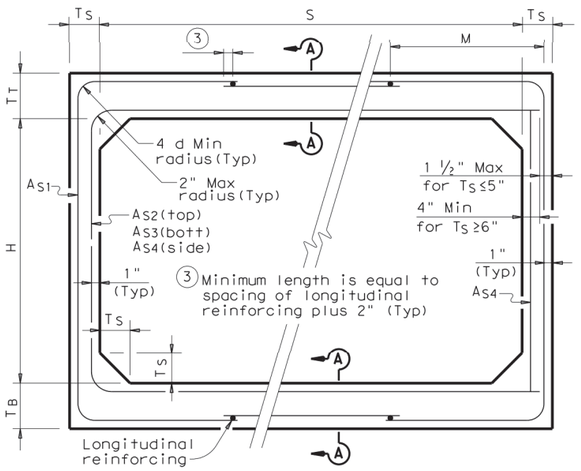
SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (in²/ft) ②								Liff Weight ① (Tons)
S (ft)	H (ft)	T_T (in)	T_B (in)	T_S (in)	(ft)	(in)	A_{S1}	A_{S2}	A_{S3}	A_{S4}	A_{S5}	A_{S6}	A_{S7}	A_{S8}	
5	3	8	7	6	<2	-	0.19	0.31	0.21	0.14	0.19	0.19	0.19	0.17	6.6
5	3	6	6	6	2<3	45	0.18	0.24	0.19	0.14	-	-	-	-	5.7
5	3	6	6	6	3-5	36	0.14	0.17	0.16	0.14	-	-	-	-	5.7
5	3	6	6	6	10	36	0.14	0.16	0.17	0.14	-	-	-	-	5.7
5	3	6	6	6	15	35	0.16	0.21	0.22	0.14	-	-	-	-	5.7
5	3	6	6	6	20	35	0.21	0.27	0.28	0.14	-	-	-	-	5.7
5	3	6	6	6	25	35	0.26	0.34	0.34	0.14	-	-	-	-	5.7
5	3	6	6	6	30	35	0.31	0.41	0.41	0.14	-	-	-	-	5.7
5	4	8	7	6	<2	-	0.19	0.33	0.24	0.14	0.19	0.19	0.19	0.17	7.2
5	4	6	6	6	2<3	45	0.16	0.27	0.22	0.14	-	-	-	-	6.3
5	4	6	6	6	3-5	45	0.14	0.19	0.18	0.14	-	-	-	-	6.3
5	4	6	6	6	10	36	0.14	0.18	0.18	0.14	-	-	-	-	6.3
5	4	6	6	6	15	35	0.14	0.23	0.24	0.14	-	-	-	-	6.3
5	4	6	6	6	20	35	0.17	0.30	0.31	0.14	-	-	-	-	6.3
5	4	6	6	6	25	35	0.21	0.37	0.38	0.14	-	-	-	-	6.3
5	4	6	6	6	30	35	0.25	0.44	0.45	0.14	-	-	-	-	6.3
5	5	8	7	6	<2	-	0.19	0.35	0.26	0.14	0.19	0.19	0.19	0.17	7.8
5	5	6	6	6	2<3	45	0.14	0.29	0.24	0.14	-	-	-	-	6.9
5	5	6	6	6	3-5	45	0.14	0.21	0.20	0.14	-	-	-	-	6.9
5	5	6	6	6	10	45	0.14	0.19	0.20	0.14	-	-	-	-	6.9
5	5	6	6	6	15	36	0.14	0.24	0.25	0.14	-	-	-	-	6.9
5	5	6	6	6	20	35	0.15	0.31	0.32	0.14	-	-	-	-	6.9
5	5	6	6	6	25	35	0.18	0.38	0.39	0.14	-	-	-	-	6.9
5	5	6	6	6	30	35	0.21	0.46	0.47	0.14	-	-	-	-	6.9
5	2	8	7	6	<2	-	0.20	0.31	0.20	0.14	0.22	0.19	0.19	0.17	6.0
5	2	6	6	6	30	44	0.39	0.33	0.34	0.14	-	-	-	-	5.1

⑤

① For Box Length = 8'-0"

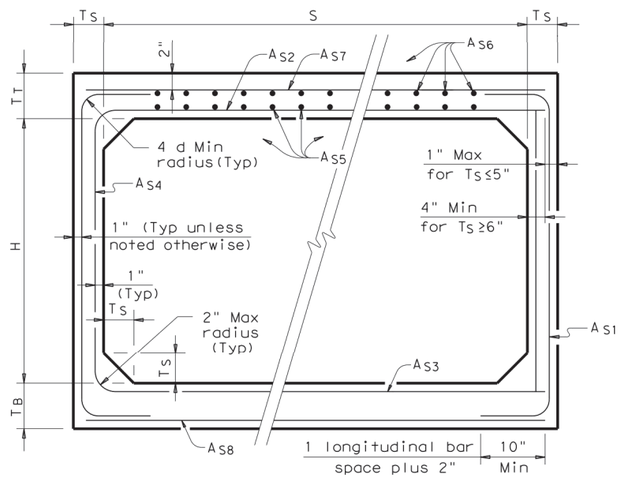
② A_{S1} thru A_{S4}, A_{S7} and A_{S8} are minimum required areas of reinforcement per linear foot of box length. A_{S6} and A_{S5} are minimum required areas of reinforcement per linear foot of box width.

⑤ These designs were created by TxDOT and are not shown in the ASTM Specifications.



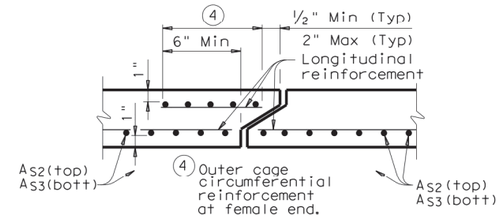
CORNER OPTION "A" CORNER OPTION "B"

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 Structures".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

5'-0" SPAN

SCP-5

FILE: scp05ste.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				132

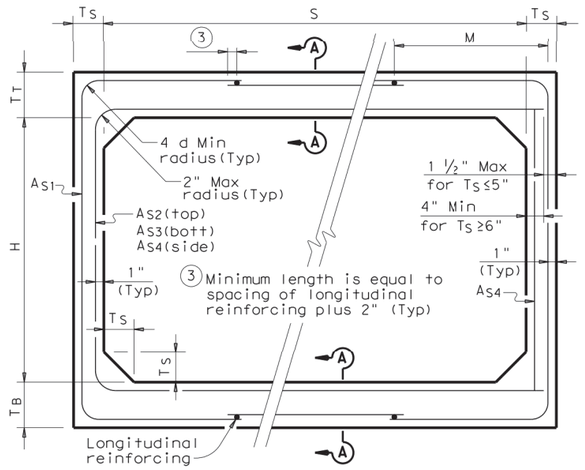
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BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (in²/ft) ②								① Lift Weight (Tons)
S (ft)	H (ft)	T_T (in)	T_B (in)	T_S (in)	(ft)	(in)	A_{S1}	A_{S2}	A_{S3}	A_{S4}	A_{S5}	A_{S6}	A_{S7}	A_{S8}	
12	4	12	12	12	<2	-	0.38	0.31	0.29	0.29	0.29	0.29	0.29	0.29	22.8
12	4	12	12	12	2<3	73	0.44	0.37	0.30	0.29	-	-	-	-	22.8
12	4	12	12	12	3-5	66	0.37	0.30	0.29	0.29	-	-	-	-	22.8
12	4	12	12	12	10	66	0.44	0.34	0.35	0.29	-	-	-	-	22.8
12	4	12	12	12	15	59	0.60	0.46	0.48	0.29	-	-	-	-	22.8
12	4	12	12	12	20	59	0.78	0.60	0.61	0.29	-	-	-	-	22.8
12	4	12	12	12	25	59	0.97	0.74	0.75	0.29	-	-	-	-	22.8
12	6	12	12	12	<2	-	0.32	0.36	0.32	0.29	0.29	0.29	0.29	0.29	25.2
12	6	12	12	12	2<3	66	0.38	0.43	0.36	0.29	-	-	-	-	25.2
12	6	12	12	12	3-5	59	0.32	0.36	0.33	0.29	-	-	-	-	25.2
12	6	12	12	12	10	59	0.38	0.41	0.42	0.29	-	-	-	-	25.2
12	6	12	12	12	15	53	0.51	0.55	0.57	0.29	-	-	-	-	25.2
12	6	12	12	12	20	53	0.65	0.71	0.72	0.29	-	-	-	-	25.2
12	6	12	12	12	25	53	0.81	0.87	0.89	0.29	-	-	-	-	25.2
12	8	12	12	12	<2	-	0.29	0.41	0.38	0.29	0.29	0.29	0.29	0.29	27.6
12	8	12	12	12	2<3	66	0.33	0.49	0.42	0.29	-	-	-	-	27.6
12	8	12	12	12	3-5	59	0.29	0.41	0.38	0.29	-	-	-	-	27.6
12	8	12	12	12	10	59	0.34	0.46	0.48	0.29	-	-	-	-	27.6
12	8	12	12	12	15	53	0.44	0.61	0.64	0.29	-	-	-	-	27.6
12	8	12	12	12	20	53	0.57	0.78	0.81	0.29	-	-	-	-	27.6
12	8	12	12	12	25	53	0.69	0.96	0.99	0.29	-	-	-	-	27.6
12	10	12	12	12	<2		0.29	0.45	0.43	0.29	0.29	0.29	0.29	0.29	30.0
12	10	12	12	12	2<3	73	0.29	0.54	0.48	0.29	-	-	-	-	30.0
12	10	12	12	12	3-5	66	0.29	0.45	0.43	0.29	-	-	-	-	30.0
12	10	12	12	12	10	59	0.31	0.49	0.53	0.29	-	-	-	-	30.0
12	10	12	12	12	15	53	0.40	0.65	0.70	0.29	-	-	-	-	30.0
12	10	12	12	12	20	53	0.51	0.84	0.88	0.29	-	-	-	-	30.0
12	10	12	12	12	25	53	0.62	1.03	1.07	0.29	-	-	-	-	30.0
12	12	12	12	12	<2	-	0.29	0.49	0.48	0.33	0.29	0.29	0.29	0.29	32.4
12	12	12	12	12	2<3	93	0.29	0.59	0.53	0.29	-	-	-	-	32.4
12	12	12	12	12	3-5	80	0.29	0.49	0.48	0.29	-	-	-	-	32.4
12	12	12	12	12	10	73	0.29	0.52	0.58	0.29	-	-	-	-	32.4
12	12	12	12	12	15	59	0.37	0.69	0.74	0.29	-	-	-	-	32.4
12	12	12	12	12	20	59	0.46	0.87	0.93	0.29	-	-	-	-	32.4

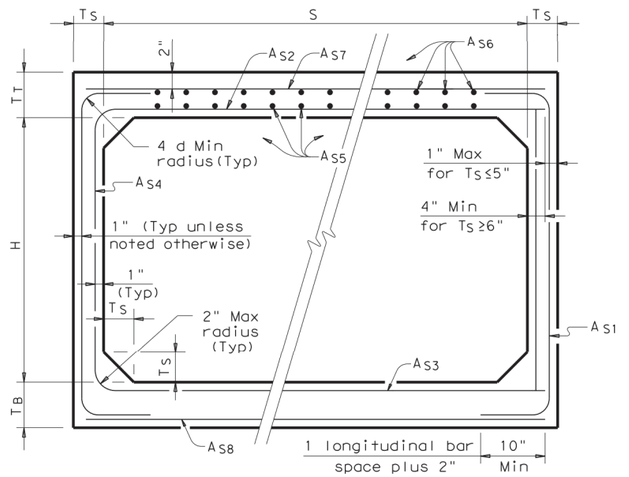
① For Box Length = 8'-0"

② A_{S1} thru A_{S4}, A_{S7} and A_{S8} are minimum required areas of reinforcement per linear foot of box length. A_{S6} and A_{S5} are minimum required areas of reinforcement per linear foot of box width.



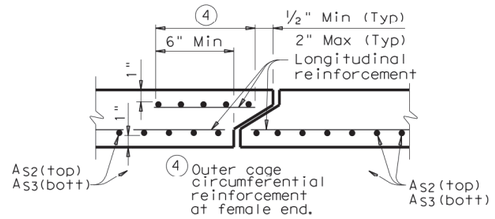
CORNER OPTION "A" CORNER OPTION "B"

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 Structures".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

12'-0" SPAN

SCP-12

FILE: scp12ste.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2010 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO. 133

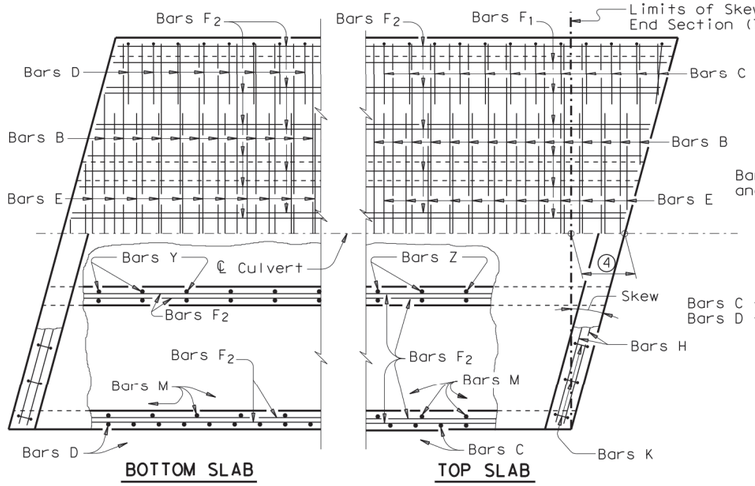
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Bid 1710-194

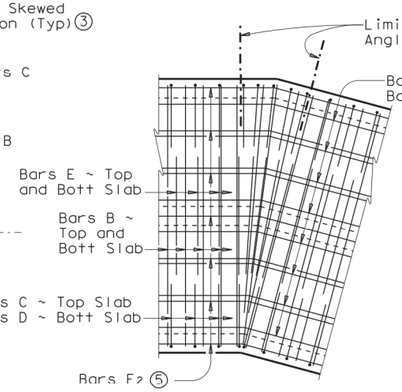
Williamson County, Texas

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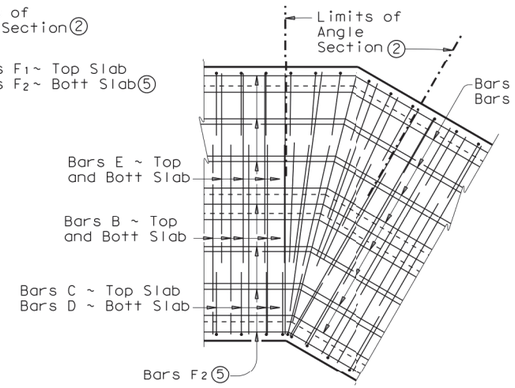
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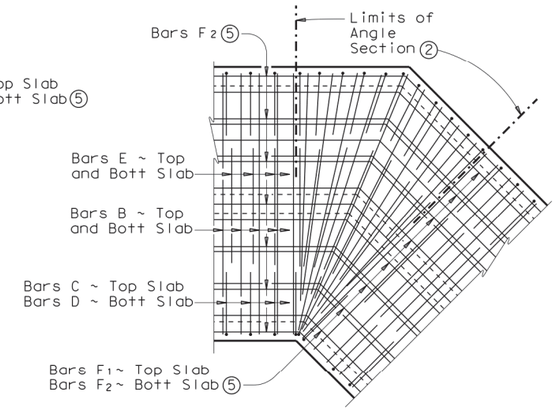
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° ⑦



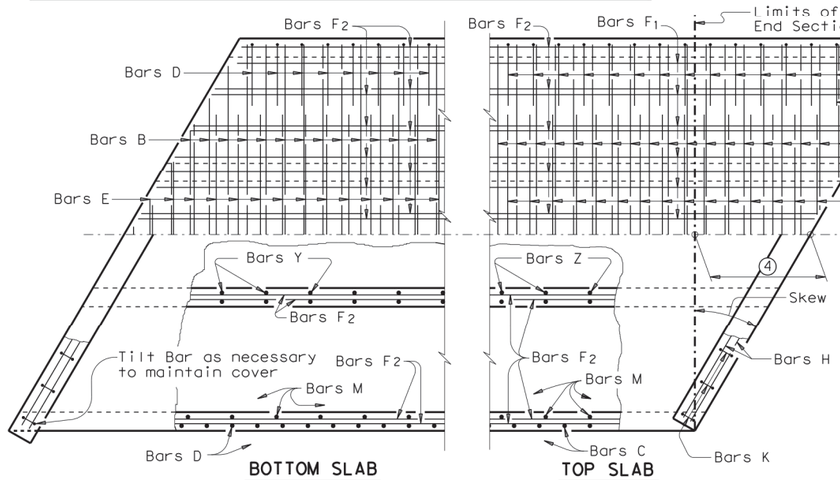
PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



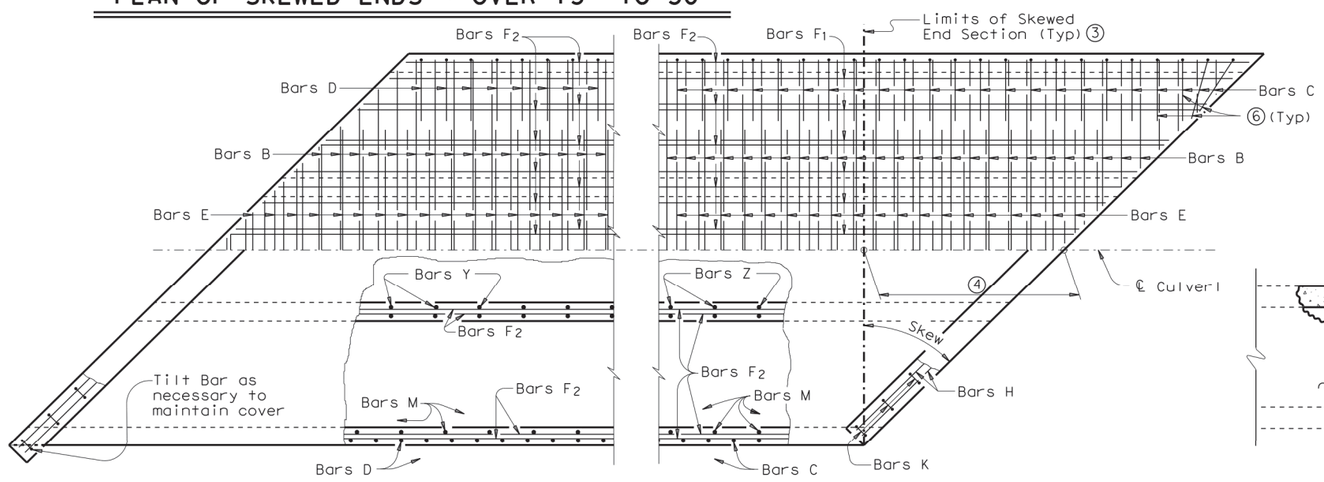
PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°



PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



PLAN OF SKEWED ENDS ~ OVER 30° TO 45°

GENERAL NOTES:

Designed according to AASHTO LRFD Specificatns.

All reinforcing steel shall be Grade 60.

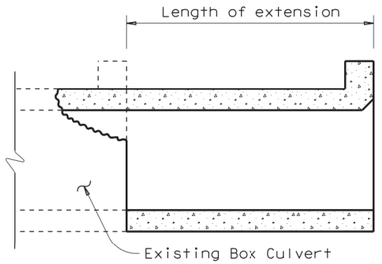
All concrete shall be Class "C" with these exceptions: use Class "S" for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.

Class "C" concrete shall have a minimum compressive strength of 3,600 psi. Class "S" concrete shall have a minimum compressive strength of 4,000 psi.

Refer to Multiple Box Culverts Cast-in-Place standard for details of straight sections of culvert. For skewed sections and angle sections refer to Multiple Box Culverts Cast-in-Place standard for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown. For Skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume and reinforcing steel weight by dividing the values shown on the culvert standards by the cosine of the skew angle.

The use of permanent forms is not allowed.

Laps for Bars H, when required, shall be 1'-9" for uncoated bars and 2'-7" for epoxy coated.



LENGTHENING DETAIL ①

① For box culverts with less than 2'-0" of fill, the top slab shall be broken back to provide a minimum 1'-10" lap of the existing longitudinal bars with the longitudinal bars in the extension. If the depth of fill is 2'-0" or greater, the top slab shall be broken back to provide a 1'-0" minimum embedment of existing longitudinal reinforcing into the extension. Alternatively, if the fill height is greater than 2'-0", the existing curb may be left in place and 2'-0" long #6 bars shall be drilled and grouted 1'-0" into the existing top slab at 1'-6" center to center spacing. Wings and apron shall be broken back as necessary to install the extension. Exposed wingwall and apron reinforcing may be removed or cleaned and included in the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, horizontal and vertical transitions shall be formed as directed by the Engineer. Bottom slabs shall match to maintain an uninterrupted flow line. Existing and new reinforcing shall be field bent into transition maintaining specified cover requirements. For top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface, the "H" dimension may be adjusted to provide a smooth riding surface.

② When the spacing between Bars B or Bars E becomes less than half of the normal spacing, bars shall be cut to avoid fouling

③ The length of Bars B and E will vary in the skewed end sections

④ [One half of overall width] x [Tan of the skew angle]

⑤ Bars F1 and F2 shall be continuous through the angle section. They shall be bent to remain parallel to the walls of the Box Culvert.

⑥ When necessary to avoid fouling in acute corners, the slab extension leg of Bars C and Bars D may be shortened to a minimum of 1'-6" for skews of 30° and 45°.

⑦ For skews of 15° or less, the contractor has the option of placing Bars B, C, D and E parallel to the skewed end while maintaining spacing along centerline box. Lengths of Bars B and E shown on the standards shall be increased to accommodate the skew.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

MC-MD

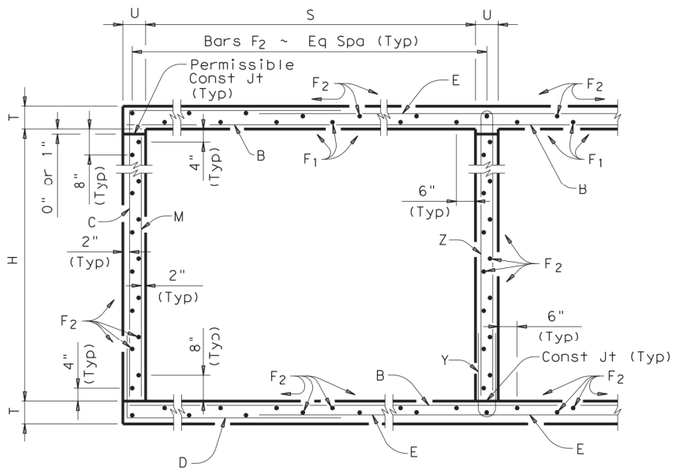
FILE: mc-mdste.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				134

Bid 1710-194

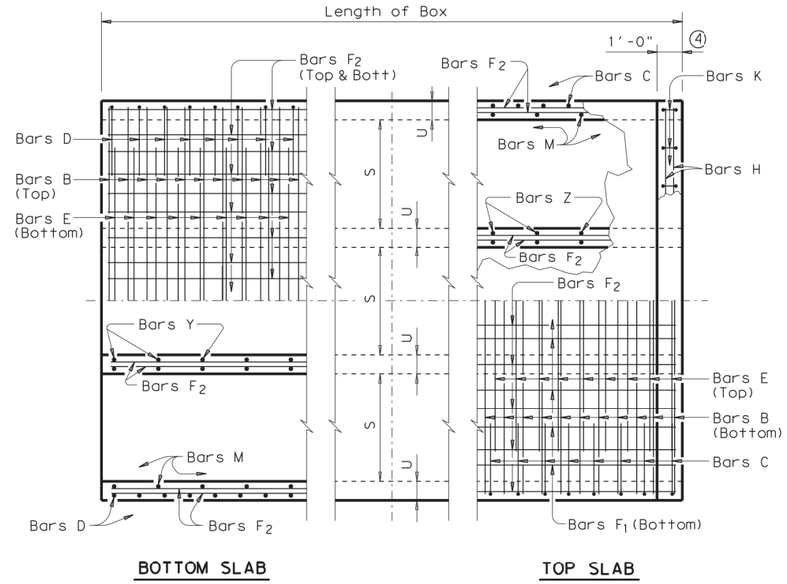
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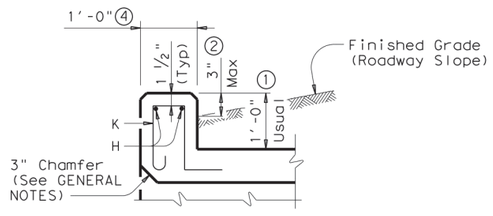
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TYPICAL SECTION

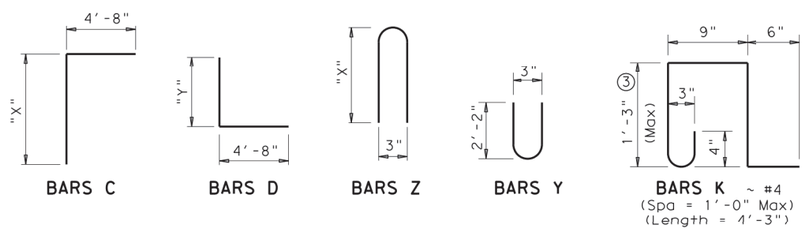


PART PLANS



SECTION THRU CURB

H	Bar Dimensions	
	"X"	"Y"
2'-0"	2'-5"	2'-2"
3'-0"	3'-5"	2'-2"
4'-0"	4'-5"	2'-2"
5'-0"	5'-5"	2'-2"



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 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.

② 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.

③ 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.

④ 1'-0" typical. 2'-0" when RAC standard is referred to elsewhere in the plans.

Deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064 may be used to replace conventional reinforcement shown at the Contractor's option. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes.

Example Conversion: Replacement of No. 6 Gr 60 at 6" Spacing with WWR.
WWR required = (0.44 sq in/ 0.5') x (60 ksi/70 ksi) = 0.754 sq in/ft.
If D30.6 wire is used to meet the 0.754 sq in/ft requirement in this example, the required spacing = (0.306 sq in/ 0.754 sq in/ft) x 12 in/ft = 4.87" Max spacing.
Required lap length for the provided D30.6 wire is 2'-2" (Lap required for uncoated No. 5 bars, as shown in Item 440).

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.
Designed to the maximum fill height shown.
All reinforcing steel shall be Grade 60.
All concrete shall be Class "C" with these exceptions: use Class "S" for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.
Class "C" concrete shall have a minimum compressive strength of 3,600 psi. Class "S" concrete shall have a minimum compressive strength of 4,000 psi.
The use of permanent forms is not allowed.
The bottom edge of the top slab shall be chamfered 3" at the entrance.
Reinforcing bars shall be adjusted to provide a minimum of 1 ¼" clear cover.
Construction joints shown at the flow line may be raised a maximum of 6" at the Contractor's option. If this option is used, Bars M may be cut off or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed.
See standard MC-MD for skewed ends, angle sections and lengthening details.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE
5'-0" SPAN
0' TO 20' FILL

MC-5-20

FILE: mc520ste.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
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REVISIONS				
10-12: Added WWR	DIST	COUNTY		SHEET NO.
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BILLS OF REINFORCING STEEL (For Box Length = 40 feet)

NUMBER OF SPANS	SECTION DIMENSIONS				Bars B					Bars C & D							Bars E					Bars F_1 ~#4				Bars F_2 ~#4 at 1'-6" Max			Bars M~#4 at 1'-6" Max			Bars Y & Z~#4 at 1'-0" Max					Bars H 4~#4		Bars K	
													Bar C		Bar D																										
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Length	Wt	Length	Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Length	Wt	No.	Length	Wt	No.	Bar Y Length	Bar Y Wt	Bar Z Length	Bar Z Wt	Length	Weight	No.	Weight
2	5'-0"	2'-0"	7"	7"	194	#4	5"	11'- 6"	1,490	162	#4	6"	7'- 1"	767	6'-10"	739	162	#5	6"	5'- 8"	957	14	8"	39'-9"	372	38	39'-9"	1,009	56	2'- 0"	75	41	4'- 6"	123	5'- 0"	137	11'- 6"	31	26	74
3	5'-0"	2'-0"	7"	7"	194	#4	5"	17'- 1"	2,214	162	#4	6"	7'- 1"	767	6'-10"	739	162	#5	6"	11'- 3"	1,901	21	8"	39'-9"	558	54	39'-9"	1,434	56	2'- 0"	75	82	4'- 6"	246	5'- 0"	274	17'- 1"	46	36	102
4	5'-0"	2'-0"	7"	7"	194	#4	5"	22'- 8"	2,937	162	#4	6"	7'- 1"	767	6'-10"	739	162	#5	6"	16'-10"	2,844	28	8"	39'-9"	743	70	39'-9"	1,859	56	2'- 0"	75	123	4'- 6"	370	5'- 0"	411	22'- 8"	61	48	136
5	5'-0"	2'-0"	7"	7"	194	#4	5"	28'- 3"	3,661	162	#4	6"	7'- 1"	767	6'-10"	739	162	#5	6"	22'- 5"	3,788	35	8"	39'-9"	929	86	39'-9"	2,284	56	2'- 0"	75	164	4'- 6"	493	5'- 0"	548	28'- 3"	75	60	170
6	5'-0"	2'-0"	7"	7"	194	#4	5"	33'-10"	4,385	162	#4	6"	7'- 1"	767	6'-10"	739	162	#5	6"	28'- 0"	4,731	42	8"	39'-9"	1,115	102	39'-9"	2,708	56	2'- 0"	75	205	4'- 6"	616	5'- 0"	685	33'-10"	90	70	199
2	5'-0"	3'-0"	7"	7"	194	#4	5"	11'- 6"	1,490	138	#4	7"	8'- 1"	745	6'-10"	630	162	#5	6"	5'- 8"	957	14	8"	39'-9"	372	44	39'-9"	1,168	56	3'- 0"	1'2	41	4'- 6"	123	7'- 0"	192	11'- 6"	31	26	74
3	5'-0"	3'-0"	7"	7"	194	#4	5"	17'- 1"	2,214	138	#4	7"	8'- 1"	745	6'-10"	630	162	#5	6"	11'- 3"	1,901	21	8"	39'-9"	558	62	39'-9"	1,646	56	3'- 0"	1'2	82	4'- 6"	246	7'- 0"	383	17'- 1"	46	36	102
4	5'-0"	3'-0"	7"	7"	194	#4	5"	22'- 8"	2,937	138	#4	7"	8'- 1"	745	6'-10"	630	162	#5	6"	16'-10"	2,844	28	8"	39'-9"	743	80	39'-9"	2,124	56	3'- 0"	1'2	123	4'- 6"	370	7'- 0"	575	22'- 8"	61	48	136
5	5'-0"	3'-0"	7"	7"	194	#4	5"	28'- 3"	3,661	138	#4	7"	8'- 1"	745	6'-10"	630	162	#5	6"	22'- 5"	3,788	35	8"	39'-9"	929	98	39'-9"	2,602	56	3'- 0"	1'2	164	4'- 6"	493	7'- 0"	767	28'- 3"	75	60	170
6	5'-0"	3'-0"	7"	7"	194	#4	5"	33'-10"	4,385	138	#4	7"	8'- 1"	745	6'-10"	630	162	#5	6"	28'- 0"	4,731	42	8"	39'-9"	1,115	116	39'-9"	3,080	56	3'- 0"	1'2	205	4'- 6"	616	7'- 0"	959	33'-10"	90	70	199
2	5'-0"	4'-0"	7"	7"	194	#4	5"	11'- 6"	1,490	138	#4	7"	9'- 1"	837	6'-10"	630	162	#5	6"	5'- 8"	957	14	8"	39'-9"	372	44	39'-9"	1,168	56	4'- 0"	150	41	4'- 6"	123	9'- 0"	246	11'- 6"	31	26	74
3	5'-0"	4'-0"	7"	7"	194	#4	5"	17'- 1"	2,214	138	#4	7"	9'- 1"	837	6'-10"	630	162	#5	6"	11'- 3"	1,901	21	8"	39'-9"	558	62	39'-9"	1,646	56	4'- 0"	150	82	4'- 6"	246	9'- 0"	493	17'- 1"	46	36	102
4	5'-0"	4'-0"	7"	7"	194	#4	5"	22'- 8"	2,937	138	#4	7"	9'- 1"	837	6'-10"	630	162	#5	6"	16'-10"	2,844	28	8"	39'-9"	743	80	39'-9"	2,124	56	4'- 0"	150	123	4'- 6"	370	9'- 0"	739	22'- 8"	61	48	136
5	5'-0"	4'-0"	7"	7"	194	#4	5"	28'- 3"	3,661	138	#4	7"	9'- 1"	837	6'-10"	630	162	#5	6"	22'- 5"	3,788	35	8"	39'-9"	929	98	39'-9"	2,602	56	4'- 0"	150	164	4'- 6"	493	9'- 0"	986	28'- 3"	75	60	170
6	5'-0"	4'-0"	7"	7"	194	#4	5"	33'-10"	4,385	138	#4	7"	9'- 1"	837	6'-10"	630	162	#5	6"	28'- 0"	4,731	42	8"	39'-9"	1,115	116	39'-9"	3,080	56	4'- 0"	150	205	4'- 6"	616	9'- 0"	1,232	33'-10"	90	70	199
2	5'-0"	5'-0"	7"	7"	194	#4	5"	11'- 6"	1,490	138	#4	7"	10'- 1"	930	6'-10"	630	162	#5	6"	5'- 8"	957	14	8"	39'-9"	372	50	39'-9"	1,328	56	5'- 0"	187	41	4'- 6"	123	11'- 0"	301	11'- 6"	31	26	74
3	5'-0"	5'-0"	7"	7"	194	#4	5"	17'- 1"	2,214	138	#4	7"	10'- 1"	930	6'-10"	630	162	#5	6"	11'- 3"	1,901	21	8"	39'-9"	558	70	39'-9"	1,859	56	5'- 0"	187	82	4'- 6"	246	11'- 0"	603	17'- 1"	46	36	102
4	5'-0"	5'-0"	7"	7"	194	#4	5"	22'- 8"	2,937	138	#4	7"	10'- 1"	930	6'-10"	630	162	#5	6"	16'-10"	2,844	28	8"	39'-9"	743	90	39'-9"	2,390	56	5'- 0"	187	123	4'- 6"	370	11'- 0"	904	22'- 8"	61	48	136
5	5'-0"	5'-0"	7"	7"	194	#4	5"	28'- 3"	3,661	138	#4	7"	10'- 1"	930	6'-10"	630	162	#5	6"	22'- 5"	3,788	35	8"	39'-9"	929	110	39'-9"	2,921	56	5'- 0"	187	164	4'- 6"	493	11'- 0"	1,205	28'- 3"	75	60	170
6	5'-0"	5'-0"	7"	7"	194	#4	5"	33'-10"	4,385	138	#4	7"	10'- 1"	930	6'-10"	630	162	#5	6"	28'- 0"	4,731	42	8"	39'-9"	1,115	130	39'-9"	3,452	56	5'- 0"	187	205	4'- 6"	616	11'- 0"	1,506	33'-10"	90	70	199

QUANTITIES

Per foot of Barrel		Curb		Total	
Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
0.637	141.7	0.9	105	26.4	5,774
0.922	205.2	1.3	148	38.2	8,356
1.206	268.6	1.7	197	49.9	10,942
1.491	332.1	2.1	245	61.7	13,529
1.775	395.5	2.5	289	73.5	16,110
0.702	144.7	0.9	105	29.0	5,894
1.008	210.9	1.3	148	41.6	8,583
1.314	277.0	1.7	197	54.3	11,277
1.620	343.2	2.1	245	66.9	13,972
1.926	409.3	2.5	289	79.5	16,662
0.767	149.3	0.9	105	31.6	6,078
1.095	216.9	1.3	148	45.1	8,823
1.422	284.4	1.7	197	58.6	11,571
1.750	351.9	2.1	245	72.1	14,321
2.078	419.4	2.5	289	85.6	17,065
0.832	158.0	0.9	105	34.2	6,423
1.181	228.2	1.3	148	48.5	9,276
1.530	298.4	1.7	197	62.9	12,132
1.880	368.6	2.1	245	77.3	14,989
2.229	438.8	2.5	289	91.7	17,841

Deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064 may be used to replace conventional reinforcement shown at the Contractor's option. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes.

Example Conversion: Replacement of No. 6 Gr 60 at 6" Spacing with WWR.
WWR required = (0.44 sq in/ 0.5') x (60 ksi/70 ksi) = 0.754 sq in/ft.
If D30.6 wire is used to meet the 0.754 sq in/ft requirement in this example, the required spacing = (0.306 sq in/ 0.754 sq in/ft) x 12 in/ft = 4.87" Max spacing.
Required lap length for the provided D30.6 wire is 2'-2" (Lap required for uncoated No. 5 bars, as shown in Item 440).

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE
5'-0" SPAN
0' TO 20' FILL

MC-5-20

FILE: mc520ste.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
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REVISIONS				
10-12: Added WWR	DIST	COUNTY		SHEET NO.
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BID 1710-194

Williamson County, Texas

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Culvert Station and/or Creek name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°, 15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (C.Y.)	Class "C" Conc (Curb) (2) (C.Y.)	Class "C" Conc (Wingwall) (3) (C.Y.)	Total Wingwall Area (S.F.)
STA. 15+66.14, SWALE A (BOTH)	1–5' X 3'	1.5	SCP–5	SETB–PD	0°	3:1	8	6	0.5	3.833	N/A	N/A	10.75	N/A	6	0.0	0.22	2.5	N/A
STA. 16+53.79, SWALE A (BOTH)	1–5' X 3'	1.5	SCP–5	SETB–PD	0°	3:1	8	6	0.5	3.833	N/A	N/A	10.75	N/A	6	0.0	0.22	2.5	N/A
STA. 19+78.5, SWALE A (LT)	1–12' X 4'	1.5	SCP–12	FW–0	0°	3:1	12	12	2.15	6.9	19.7	11.37	22.75	14.0	N/A	6.58	0.26	4.71	82.28
STA. 19+78.5, SWALE A (RT)	1–12' X 4'	1.5	SCP–12	SW–0	0°	4:1	12	12	2.15	6.9	N/A	N/A	26.27	14.0	N/A	0.0	0.26	5.44	95.0
STA. 22+30.07, SWALE A (BOTH)	4–5' X 4'	1.5	MC–5–20	FW–S	45°	3:1	7	7	3.17	7.50	21.50	37.24	43.0	32.4	N/A	16.25	1.7	15.67	252.61

NOTES:

Skew Angle = 0° for SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standards.
30° Maximum for Safety End Treatment

SL:1 = Horizontal:1 Vertical
Side Slope at culvert for Flared or Straight Wingwalls. Channel Slope for Parallel Wingwalls.
Slope shall be 3:1 or flatter for Safety End Treatments.

T = Box Culvert Top Slab Thickness. Dimension can be found on the applicable Box Culvert Standard.

U = Box Culvert Wall Thickness. Dimension can be found on the applicable Box Culvert Standard.

C = Curb Height.

See applicable wing or end treatment standards for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.
Hw = Height of Wingwall.
A = Distance from Face of Curb to End of Wingwall (Not applicable to Parallel or Straight Wingwalls).
B = Offset of End of Wingwall (Not applicable to Parallel or Straight Wingwalls).
Lw = Length of Longest Wingwall.
Ltw = Length of Culvert Toewall (Not applicable when using Riprap Apron).
Atw = Length of Anchor Toewall (Applicable to Safety End Treatment only).
Total Wingwall Area = Wingwall area in S.F. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

(1) The wall heights shown will be rounded to the nearest Foot for bidding purposes.

(2) Concrete volume shown is for box culvert curb only. For curbs using the RAC standard, quantities shown must be increased by a factor of 2. If Class "S" concrete is required for the top slab of the culvert, the curb concrete shall also be Class "S". Curb concrete is considered part of the Box Culvert for payment.

(3) Concrete volume shown is total of wing, footing, culvert toewall (if any), anchor toewall (if any) and wingwall toewall. Riprap apron, culvert and curb quantities are not included.

(4) Regardless of the type of culvert shown on this sheet, the Contractor shall have the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it shall be the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

SPECIAL NOTE:

This sheet is a supplement to the Box Culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the Box Culvert Wingwalls and Safety End Treatments.

An Excel 97 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet shall be signed, sealed, and dated by a licensed Professional Engineer.

Texas Department of Transportation

Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

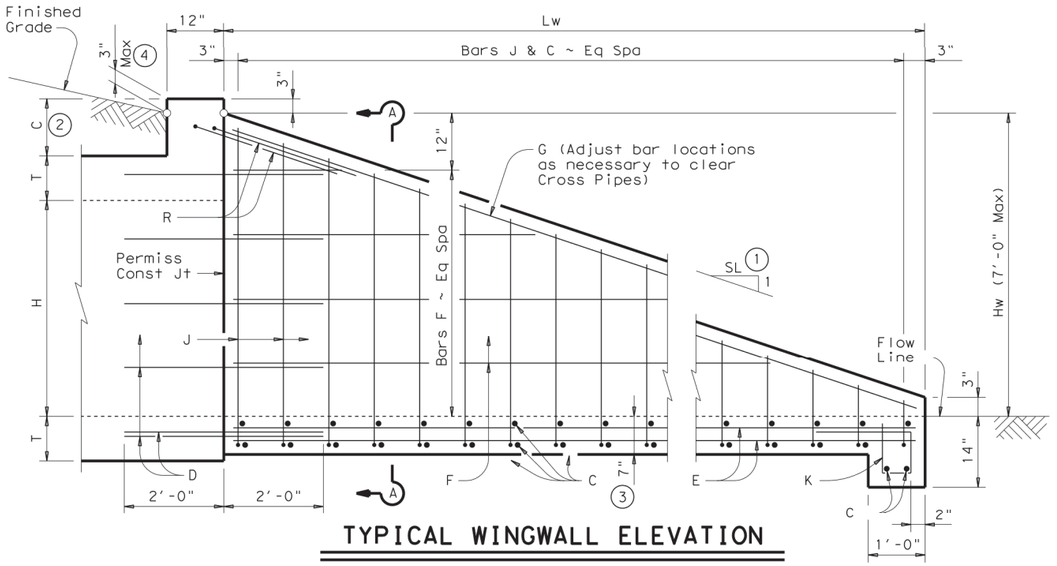
BCS

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REVISIONS				
	DIST	COUNTY		SHEET NO.
				137

DATE:
FILE: bid 1710-194

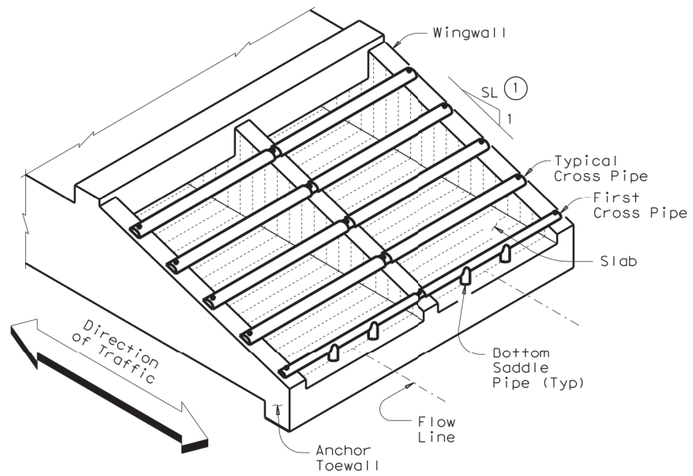
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TYPICAL WINGWALL ELEVATION

(Cross Pipes not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing Bolted Anchor Option)

Formulas: (All values are in Feet)

Hw = H + T + C - 0.250'

Lw = (Hw - 0.250') (SL)

For Cast-in-place culverts:

Atw = (N) (S) + (N + 1) (U)

For Precast culverts:

Atw = (N) (2U + S) + (N - 1) (0.500')

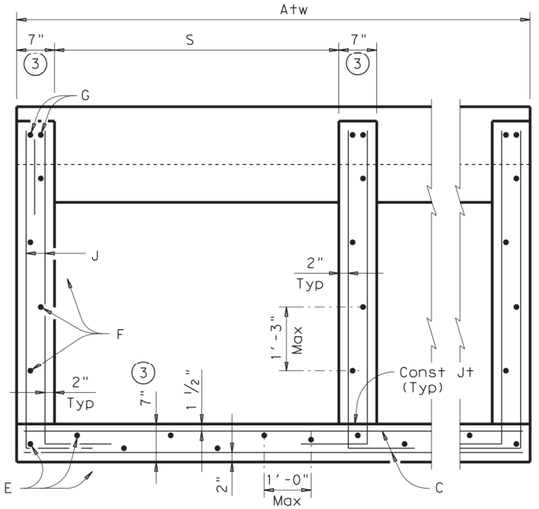
Total Wingwall Area (S.F.)
= (0.5) (Hw + 0.250') (Lw) (N + 1)

Total Concrete Volume (C.Y.)
= [(Wingwall Area) (0.583') +
(Lw) (Atw) (0.583') +
(Atw) (1.000') (1.167' - 0.583')] ÷ (27)

Total Reinforcing (Lbs)
= (1.55) (Lw) (Atw) +
(4.43) (Atw) +
(K) (Hw) (N + 1) $(\sqrt{Lw})$

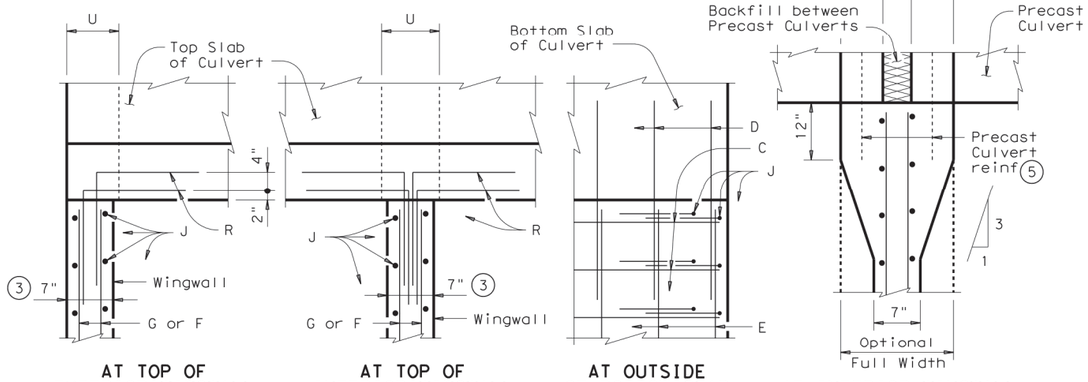
C = Height of Curb above top of Top Slab
Hw = Height of Wingwall
K = Constant Value for use in formulas
Slope SL:1 K
6:1 ~ 10.41
Atw = Anchor Toewall Length
Lw = Length of Wingwall
N = Number of Culvert Barrels
S = Clear Span of each Barrel
SL:1 = Side Slope Ratio (Horizontal : 1 Vertical)

See applicable box culvert standard for H, S, T, and U values.



SECTION A-A

(Showing typical Wingwall and Wing Slab reinforcing)
(Pipe Runners not shown for clarity)



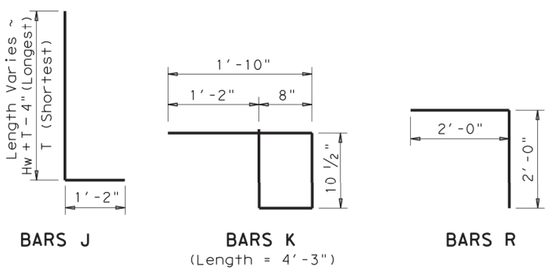
AT TOP OF EXTERIOR WINGWALL (Cast-in-Place Culvert)

AT TOP OF INTERIOR WINGWALL (Cast-in-Place Culvert)

AT OUTSIDE OF BOTTOM SLAB (Cast-in-Place Culvert)

AT INTERIOR WINGWALL (Precast Culvert)

PLAN VIEWS OF CORNER DETAILS



BARS J

BARS K (Length = 4'-3")

BARS R

TABLE OF REINFORCING BAR SIZES & SPACING		
Bar	Size	Spacing
C	#4	10" Max
D	#4	match F & E
E	#4	1'- 0" Max
F	#4	1'- 3" Max
G	#6	Shown
J	#4	10" Max
K	#4	1'- 0" Max
R	#4	Shown

(1) Slope will be 6:1 or flatter.

(2) 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to ECD standard.

(3) Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" Minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.

(4) 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.

(5) For Culverts with C = 0", the precast culvert reinforcing may extend 1'-0" minimum into Wingwall. Wingwall Bars D and R may be omitted. Otherwise, refer to the "Wingwall Connection Detail" on the SCP-MD standard.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

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 Cross Pipes.

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.

All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.

All reinforcing steel shall be Grade 60. All reinforcing shall be adjusted as necessary to provide a minimum clear cover of 1 ¼".

The quantities for concrete, reinforcing steel, and Cross Pipes resulting from the formulas given herein are for Contractor's information only.

Cross Pipes, Sleeve Pipes, and Saddle 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 the concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

See BCS standard sheet for additional dimensions and information.

Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the Safety End Treatments.

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ PARALLEL DRAINAGE

SETB-PD

FILE: setbpdse.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
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	DIST	COUNTY		SHEET NO. 138

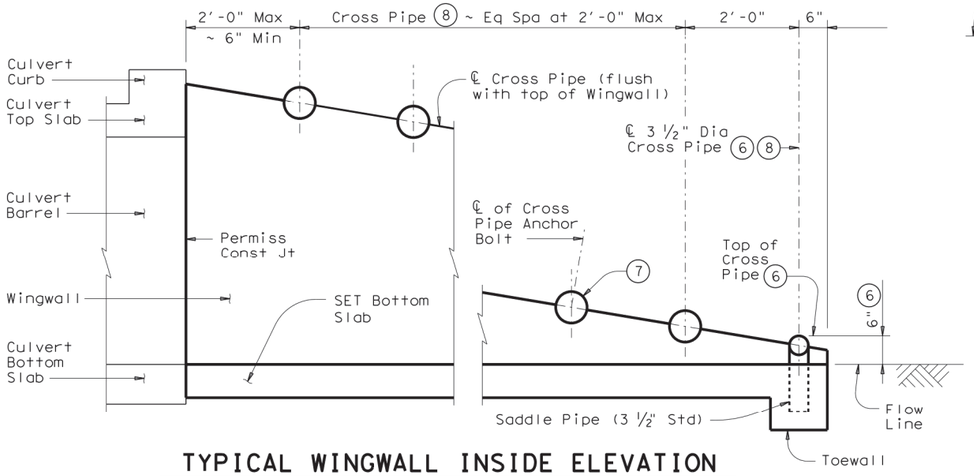
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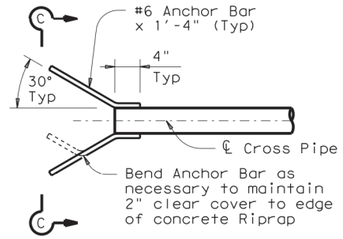
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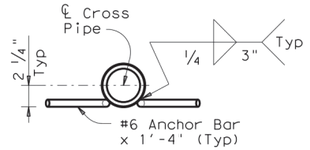


TYPICAL WINGWALL INSIDE ELEVATION

(Showing installation of Cross Pipes)

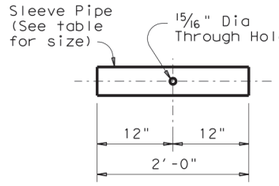


PART PLAN



SECTION C-C

OPTIONAL ANCHOR BAR DETAILS



SLEEVE PIPE DETAILS (9)

REQUIRED PIPE SIZES (8)		
Culvert Span Sizes	Cross Pipe Size	Sleeve Pipe Size (9)
First Pipe	3 ½" STD	2 ½" STD
30" to 42"	4" STD	3" STD
48" to 72"	5" STD	4" STD
78" to 120"	6" STD	5" STD

STANDARD PIPE SIZES		
Pipe Size	Pipe O.D.	Pipe I.D.
2 ½" STD	2.875"	2.469"
3" STD	3.500"	3.068"
3 ½" STD	4.000"	3.548"
4" STD	4.500"	4.026"
5" STD	5.563"	5.047"
6" STD	6.625"	6.065"

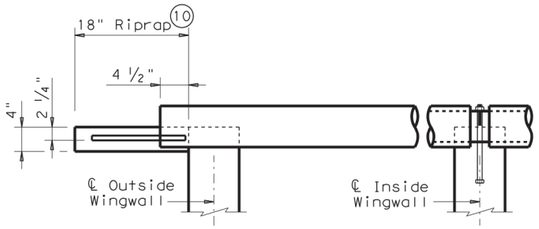
(6) The proper installation of the first Cross Pipe is critical for vehicle safety. The top of the first Cross Pipe must be placed at no more than 6" above the flow line.

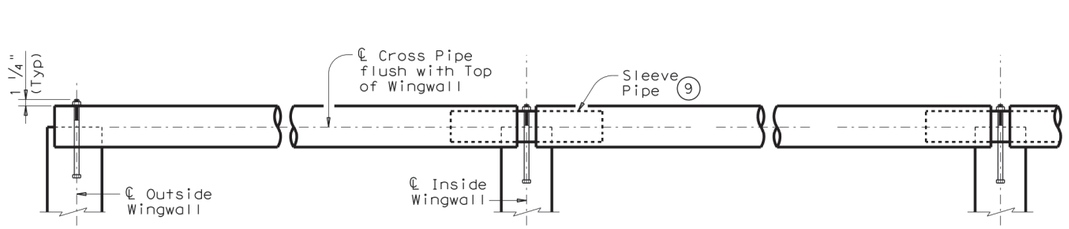
(7) The third Cross Pipe from the bottom of the Culvert shall always be installed using a bolted connection. Care shall be taken to ensure that concrete does not flow into this Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(8) Cross Pipes and Sleeve Pipes (if required) shall be as shown in the REQUIRED PIPE SIZES table. Saddle Pipes for the 3 ½" first Cross Pipe shall also be 3 ½".

(9) At Contractor's option, the Cross Pipe may be continuous across the Inside Wingwalls. If such option is selected, the Sleeve Pipe shall be omitted and a 15/16" diameter through hole made in the Cross Pipe to accept the anchor bolt at the centerline of each Interior Wingwall.

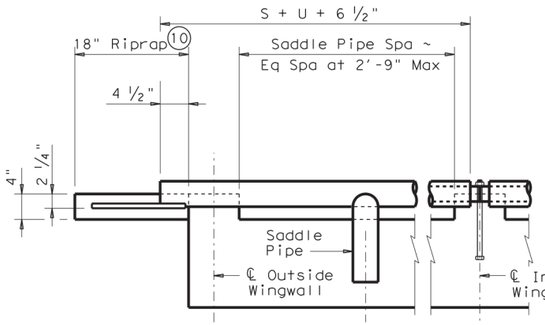
(10) Riprap will be required when using the optional Anchor Bar details and shall be included in the Price Bid for Safety End Treatment. Such Riprap shall be concrete Riprap in accordance with Item 432, "Riprap".

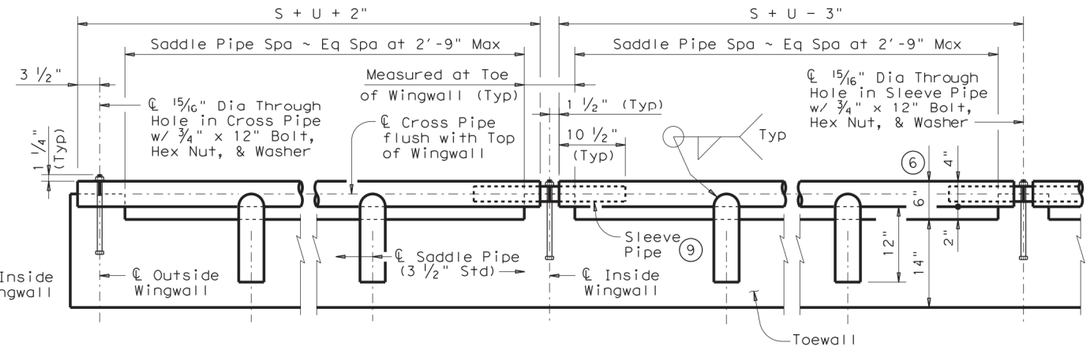




SECTION THROUGH INSTALLATION OF TYPICAL FULL CROSS PIPE

(Anchor details and dimensions are similar to those shown below in SECTION THROUGH INSTALLATION OF 3 ½" FIRST CROSS PIPE detail.)





SECTION THROUGH INSTALLATION OF 3 ½" FIRST CROSS PIPE

OUTSIDE CULVERT BARREL WITH OPTIONAL ANCHOR BARS & RIPRAP

OUTSIDE CULVERT BARREL WITH BOLTED ANCHOR

INSIDE CULVERT BARREL

CROSS PIPE INSTALLATION DETAILS

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ PARALLEL DRAINAGE

SETB-PD

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	DIST	COUNTY		SHEET NO.
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TABLE OF DIMENSIONS & REINFORCING STEEL
(Wings for One Structure End)

Dimensions					Variable Reinforcing				Estimated ③ Quantities per ft of wing length (2~Wings)	
					Bars J1		Bars J2			
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	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

WING DIMENSION CALCULATIONS:

Formulas: (All values are in Feet)

Hw = H + T + C − 0.250'
A = (Hw − 0.333') (SL)
B = (A) Tangent (30°)
Lw = (A) ÷ Cosine (30°)

For Cast-in-place culverts:

Ltw = (N) (S) + (N + 1) (U)

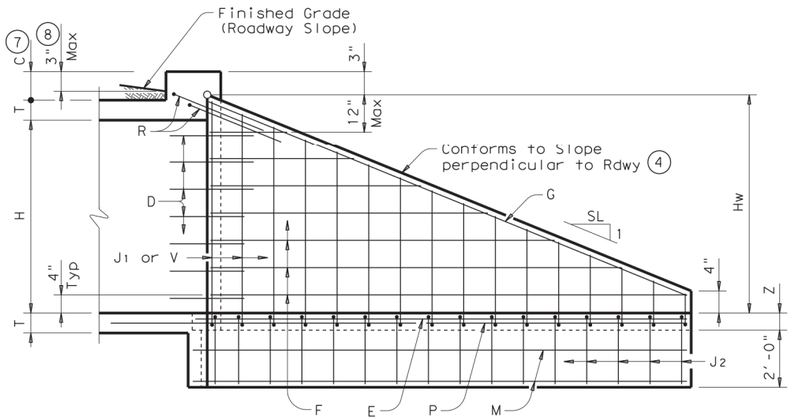
For Precast culverts:

Ltw = (N) (2U + S) + (N − 1) (0.500')

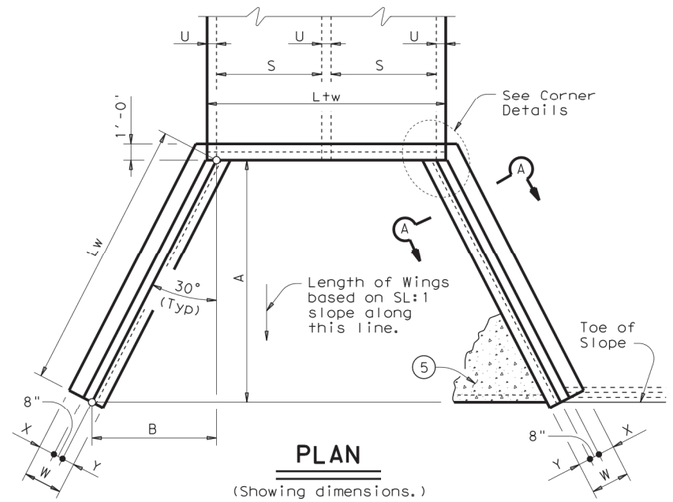
Total Wingwall Area (Two Wings ~ S.F.) = (Hw + 0.333') (Lw)

Hw = Height of Wingwall
SL:1 = Side Slope Ratio (Horizontal:1 Vertical)
Lw = Length of Wingwall
Ltw = Culvert Toewall Length
N = Number of Culvert Spans

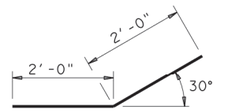
See applicable box culvert standard for H, S, T, and U values.



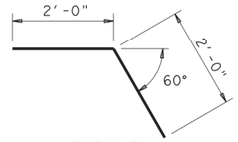
INSIDE ELEVATION
(Showing reinforcing. Culvert and Culvert Toewall reinforcing not shown for clarity.)



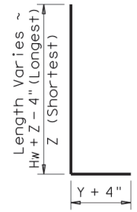
PLAN
(Showing dimensions.)



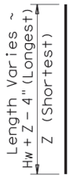
BARS D



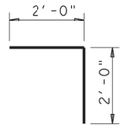
BARS R



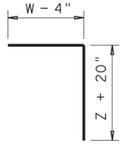
BARS J1



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 ¼" clear cover and 4" minimum between bars.
3. Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings multiply the tabulated values by Lw.
4. Recommended values of 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.

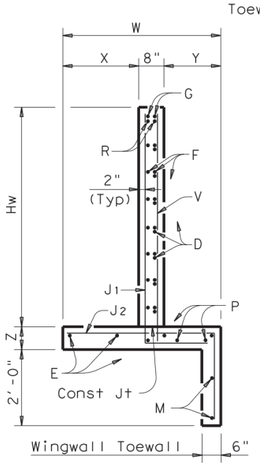
All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.

All reinforcing bars shall be adjusted to provide a minimum of 1 ¼" clear cover.

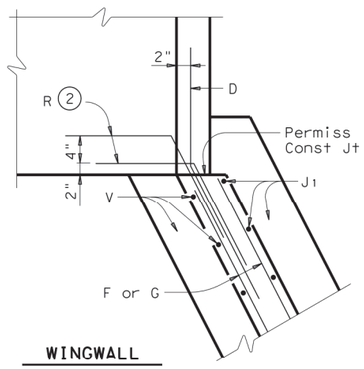
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.

See BCS sheet for additional dimensions and information.

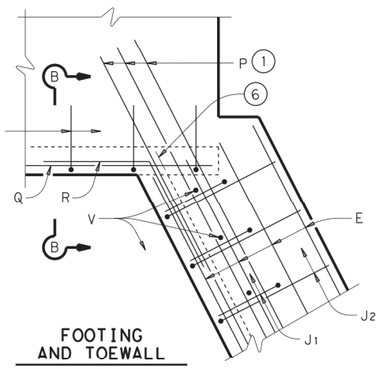
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.



SECTION A-A

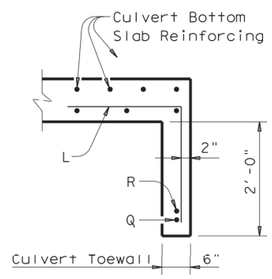


WINGWALL



FOOTING AND TOEWALL

CORNER DETAILS
(Culvert and Culvert Toewall reinforcing not shown for clarity.)



SECTION B-B ⑤

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	CK: CAT	DW: TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
11-10: Add note for synthetic fibers.	DIST	COUNTY		SHEET NO. 140

DATE:
FILE:

Bid 1710-194

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TABLE OF DIMENSIONS & REINFORCING STEEL
(Wings for One Structure End)

Dimensions					Variable Reinforcing				Estimated (3) Quantities per ft of wing length (2~Wings)	
					Bars J1		Bars J2			
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	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

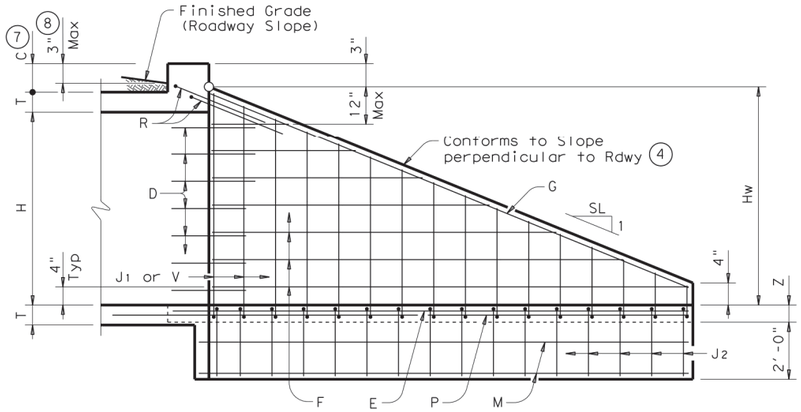
Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

WING DIMENSION CALCULATIONS:

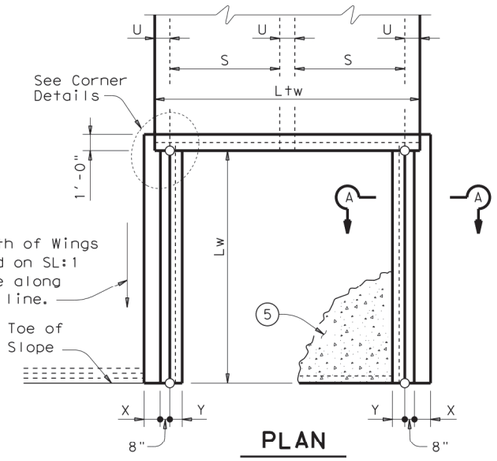
Formulas: (All values are in Feet)
Hw = H + T + C - 0.250'
Lw = (Hw - 0.333') (SL)
For Cast-in-place culverts:
Ltw = (N) (S) + (N+1) (U)
For Precast culverts:
Ltw = (N) (2U + S) + (N - 1) (0.5')
Total Wingwall Area (Two Wings ~ S.F.)=(Hw + 0.333') (Lw)

Hw = Height of Wingwall
SL:1 = Side Slope Ratio (Horizontal:1 Vertical)
Lw = Length of Wingwall
Ltw = Culvert Toewall Length
N = Number of Culvert Spans

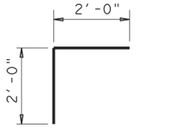
See applicable box culvert standard for H, S, T, and U values.



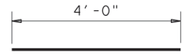
INSIDE ELEVATION
(Showing reinforcing. Culvert and Culvert Toewall reinforcing not shown for clarity.)



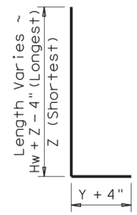
PLAN
(Showing Dimensions)



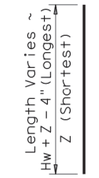
BARS R



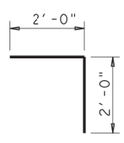
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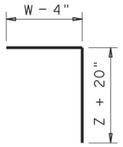
BARS J1



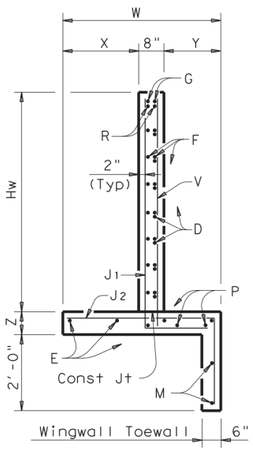
BARS V



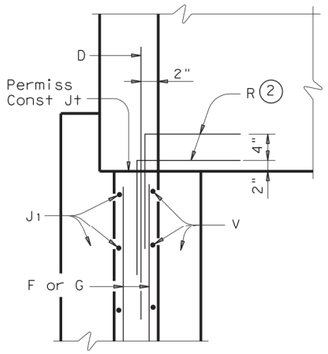
BARS L



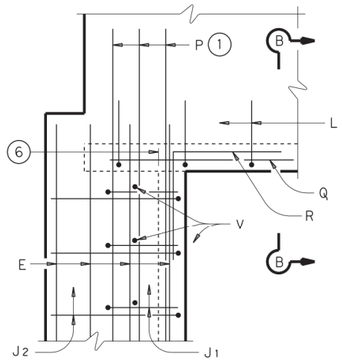
BARS J2



SECTION A-A

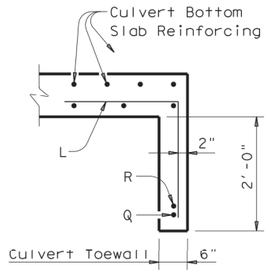


WINGWALL



FOOTING AND TOEWALL

CORNER DETAILS



SECTION B-B (5)

1. Extend Bars P 3'-0" minimum into bottom slab of Box Culvert.
2. Adjust to fit as necessary to maintain 1 ¼" clear cover and 4" minimum between bars.
3. Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings multiply the tabulated values by Lw.
4. Recommended values of 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 ½" 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.

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS
WITH STRAIGHT WINGS FOR 0° SKEW BOX CULVERTS

SW-O

FILE: sw-0stde.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
11-10: Add note for synthetic fibers.	DIST	COUNTY		SHEET NO.
				141

DATE:
FILE:

Bid 1710-194

Williamson County, Texas

10/10/2017 6:54 AM

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TABLE OF DIMENSIONS & REINFORCING STEEL
(Wings for One Structure End)

Maximum Wingwall Height Hw	W	X	Y	Z	Variable Reinforcing Bars J1 Size	Bars J1 Spa	Bars J2 Size	Bars J2 Spa	Estimated Quantities (3) per ft of wing length (2~Wings) 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
DL	#5	~	1'-0"
DS	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
RS	#5	3	~
RL	#5	3	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

WING DIMENSION CALCULATIONS:

Formulas: (All values are in Feet)

Hw = H + T + C − 0.250′

A = (Hw − 0.333′) (SL)

B = (A) [Tangent (θ + 15°)]

Lw = (A) ÷ [Cosine (θ + 15°)]

For Cast-in-place culverts:

Ltw = [(N) (S) + (N+1) (U)] ÷ (Cosine θ)

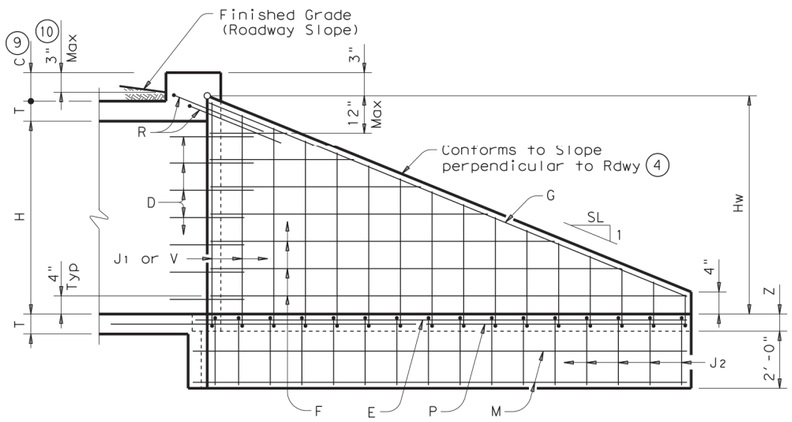
For Precast culverts:

Ltw = [(N) (2U+S) + (N−1) (0.500′)] ÷ (Cosine θ)

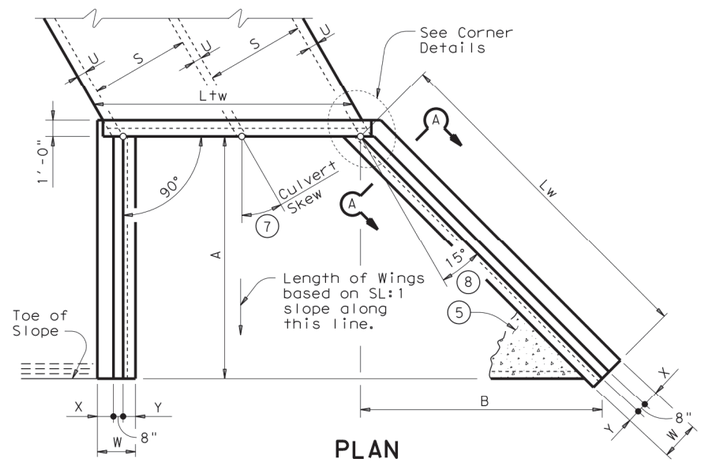
Total Wingwall Area (Two Wings ~ S.F.) = (0.5) (Hw + 0.333′) (Lw + A)

Hw = Height of Wingwall
SL:1 = Side Slope Ratio (Horizontal:1 Vertical)
A = Length of Short Wingwall
Lw = Length of Long Wingwall
Ltw = Culvert Toewall Length
N = Number of Culvert Spans
θ = Culvert Skew

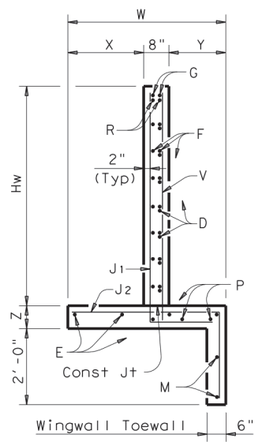
See applicable box culvert standard for H, S, T, and U values.



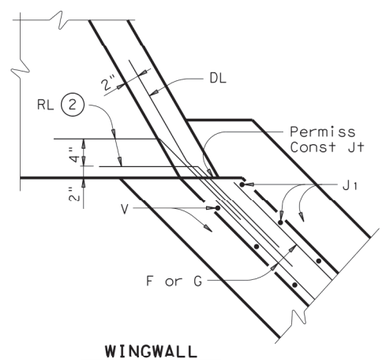
INSIDE ELEVATION
(Showing reinforcing. Culvert and Culvert Toewall reinforcing not shown for clarity.)



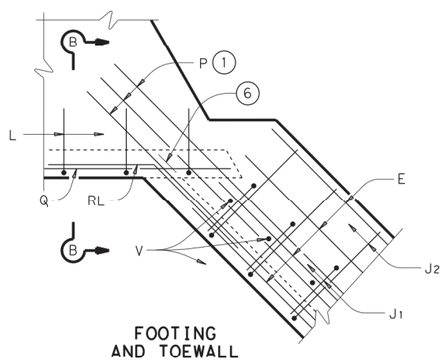
PLAN
(Showing dimensions and 30° Skew.)



SECTION A-A

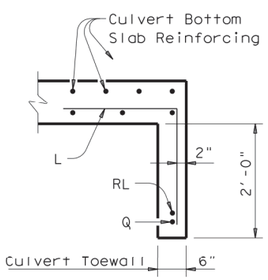


WINGWALL

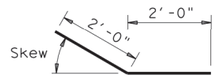


FOOTING AND TOEWALL

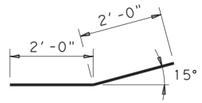
CORNER DETAILS
(Culvert and Culvert Toewall reinforcing not shown for clarity.)



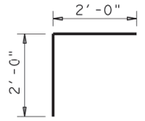
SECTION B-B (5)



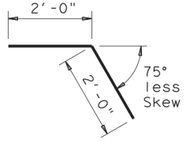
BARS DS
(Short Wing)



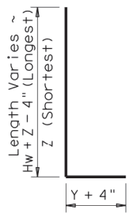
BARS DL
(Long Wing)



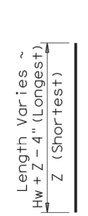
BARS RS
(Short Wing)



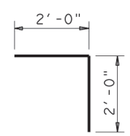
BARS RL
(Long Wing)



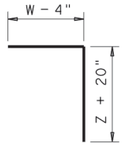
BARS J1



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 ¼" 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 0.5 x (A+Lw).
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. Applicable values of of Skew are: 15°, 30°, and 45°.
8. Typical wingwall angle for all skews.
9. 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.
10. 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 ¼" 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.

Texas Department of Transportation — Bridge Division Standard

CONCRETE WINGWALLS
WITH FLARED WINGS FOR SKEWED BOX CULVERTS

FW-S

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11-10: Add note for synthetic fibers.	DIST	COUNTY		SHEET NO.
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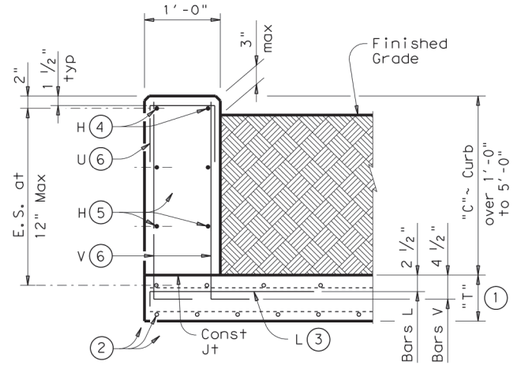
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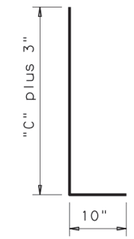
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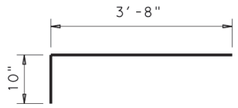


TYPICAL SECTION

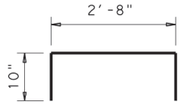
Used for Curbs over 1'-0" to 5'-0"



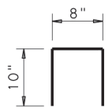
BARS V (#5) (6)
Spaced at 12" max



BARS L (#5) (3)
Spaced at 12" max



OPTIONAL BARS L (#5) (3)(7)
Spaced at 12" max



BARS U (#4) (6)
Spaced at 12" max

(1) "T" is equal to the culvert top slab thickness. For Precast Boxes with slabs less than 7", see SCP-MD Standard for additional details.

(2) Normal culvert slab bars adjusted as necessary to clear obstructions.

(3) Place bars L as shown. Tilt hook as necessary to maintain cover.

(4) Place normal culvert curb bars H (#4) as shown. Adjust as necessary to clear obstructions.

(5) Additional bars H (#4) as required to maintain 12" max spa.

(6) Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" max. Adjust length of bars V as necessary to maintain clear cover.

(7) Optional bars L are to be used only for precast box culverts with 3'-0" closure pour.

(8) Quantities shown are for contractor's information only. Quantities are per linear foot of curb length. The values for each section type in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES (8)

Curb Height "C"	Conc (CY/LF)	Reinf Steel (Lb/LF)
1'-0"	0.037	8.9
1'-6"	0.056	14.3
2'-0"	0.074	15.4
2'-6"	0.093	17.7
3'-0"	0.111	18.8
3'-6"	0.130	21.2
4'-0"	0.148	22.2
4'-6"	0.167	24.6
5'-0"	0.185	25.6

GENERAL NOTES:

Designed according to current AASHTO LRFD Specifications.

These extended curb details have sufficient strength to allow for future retrofit of Type T6 railing. These details are suitable for use with PR1, PR2 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T6 railing, use the T6-CM standards.

All reinforcing shall be Grade 60. Adjust reinforcing as necessary to provide 1 ¼" cover.

All concrete for curbs shall be Class "C" with a minimum compressive strength of 3600 psi.

This Curb shall be considered as part of the Box Culvert for payment.

For vehicle safety, the top of the curb shall project no more than 3" above the finished grade.

Texas Department of Transportation

Bridge Division Standard

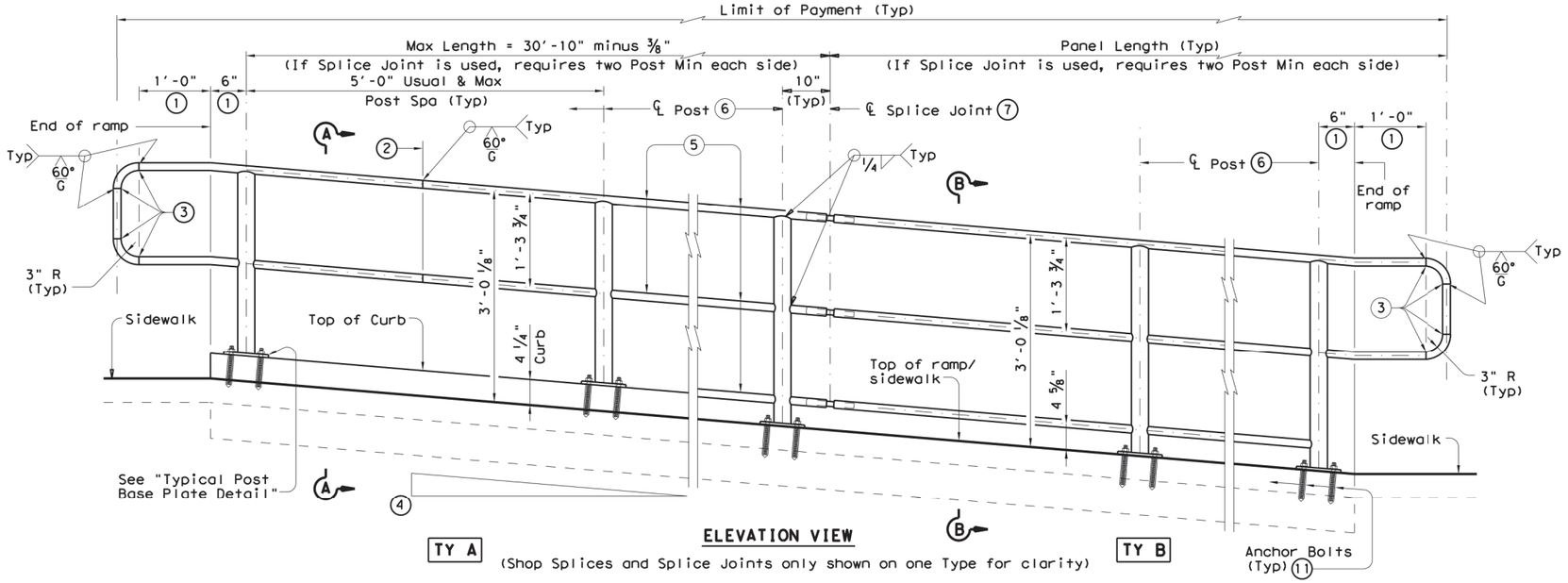
EXTENDED CURB DETAILS

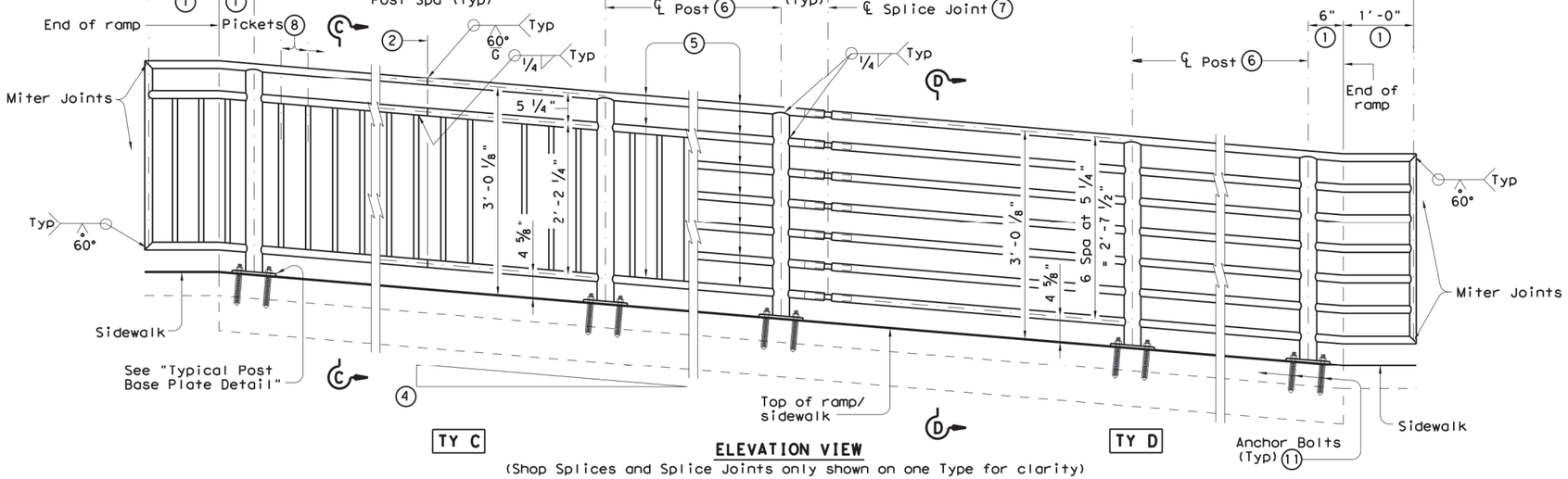
FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 5'-0" TALL

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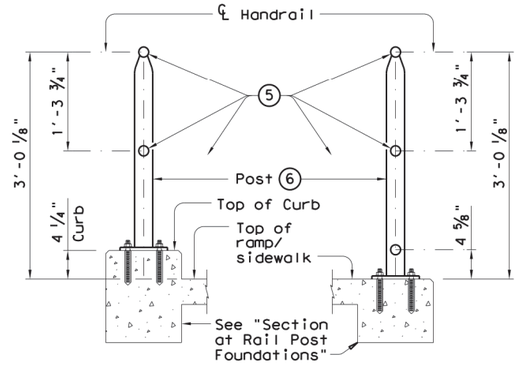
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	DIST	COUNTY		SHEET NO.
				143

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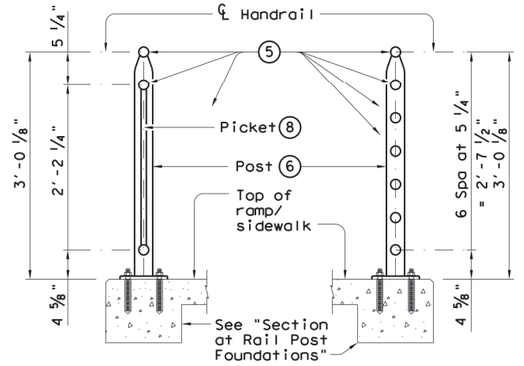


RECOMMENDED USAGE ⑨⑩	
Dropoff Height/ Condition	Recommended Rail Options
<30" dropoff	TY A, TY B, TY C, or TY D
≥ 30" dropoff, or along Bike Path	TY E or TY F



SECTION A-A
(Showing Handrail **TY A**)

SECTION B-B
(Showing Handrail **TY B**)



SECTION C-C
(Showing Handrail **TY C**)

SECTION D-D
(Showing Handrail **TY D**)

1. Parallel to ground.
2. One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
3. Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
4. See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.
5. 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.
6. 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.
7. See "Handrail Fabrication Details" for Splice Joints.
8. ℄ ⅝" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.
9. When needed for accessibility (grade > 5 percent) or as needed for pedestrian safety.
10. Not to be used on bridges.
11. See "General Notes" for anchor bolt information.

SHEET 1 OF 3

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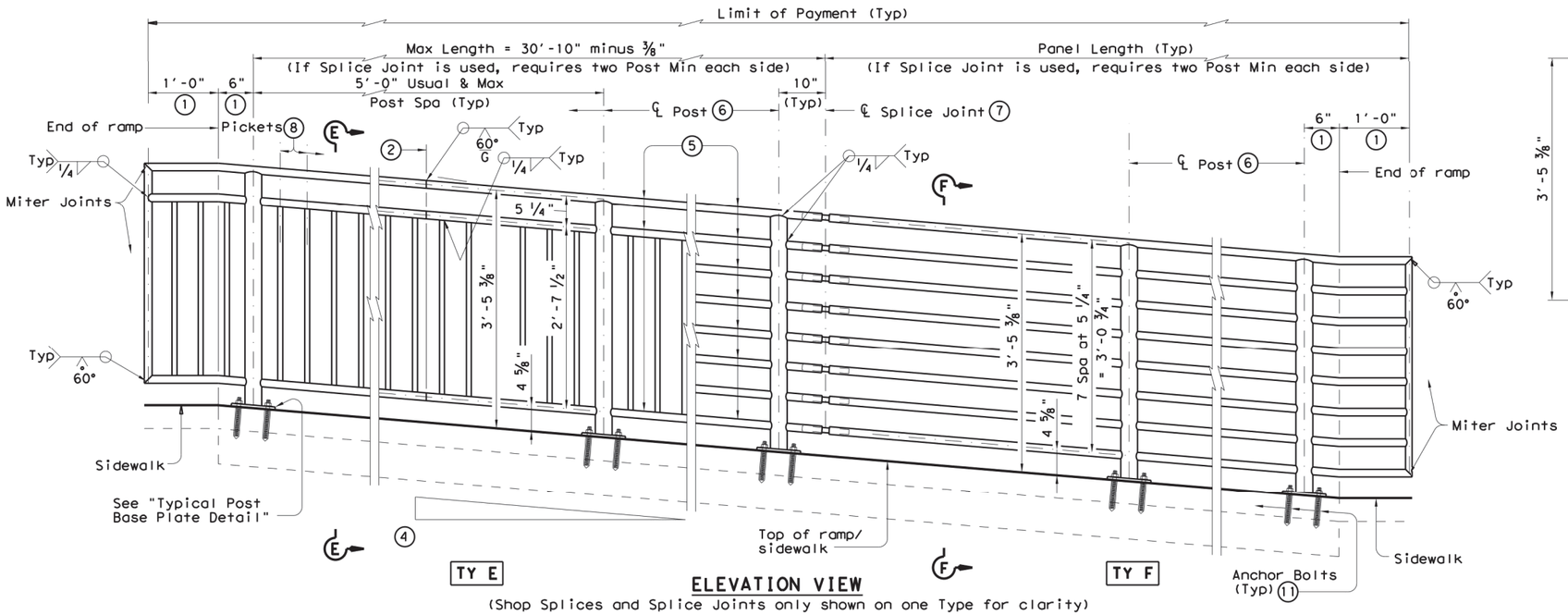
PEDESTRIAN HANDRAIL DETAILS

PRD-13

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REVISIONS REVISED MAY, 2013 (VP)	DIST	COUNTY		SHEET NO.
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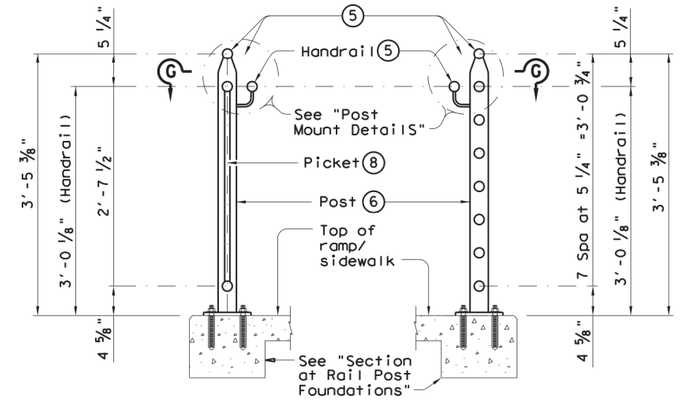
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ELEVATION VIEW

(Shop Splices and Splice Joints only shown on one Type for clarity)

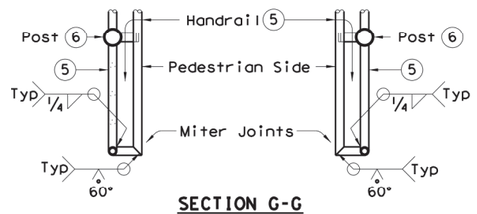


SECTION E-E

(Showing Handrail **TY E**)

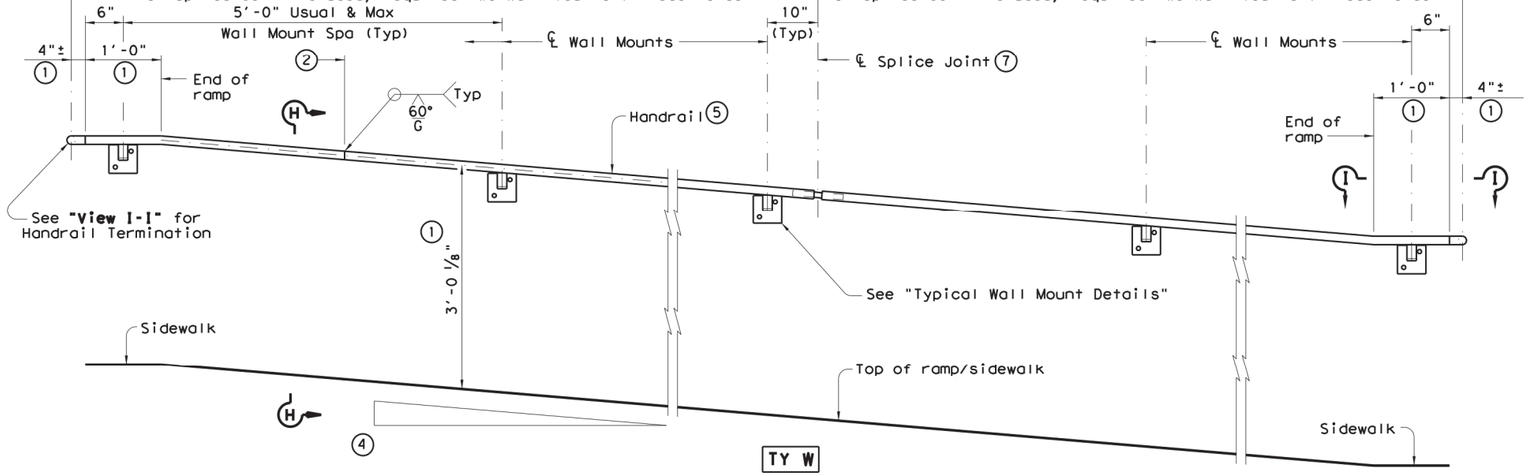
SECTION F-F

(Showing Handrail **TY F**)

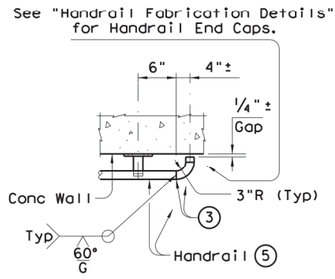


SECTION G-G

(Showing Handrail Termination)

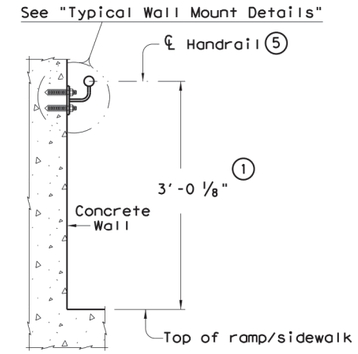


ELEVATION VIEW



VIEW I-I

(Showing Handrail Termination)



SECTION H-H

(Showing Handrail **TY W**)

(1) Parallel to ground.

(2) One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

(3) Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

(4) See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.

(5) 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.

(6) 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.

(7) See "Handrail Fabrication Details" for Splice Joints.

(8) ℄ ⅝" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.

(11) See "General Notes" for anchor bolt information.

SHEET 2 OF 3

Texas Department of Transportation — Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

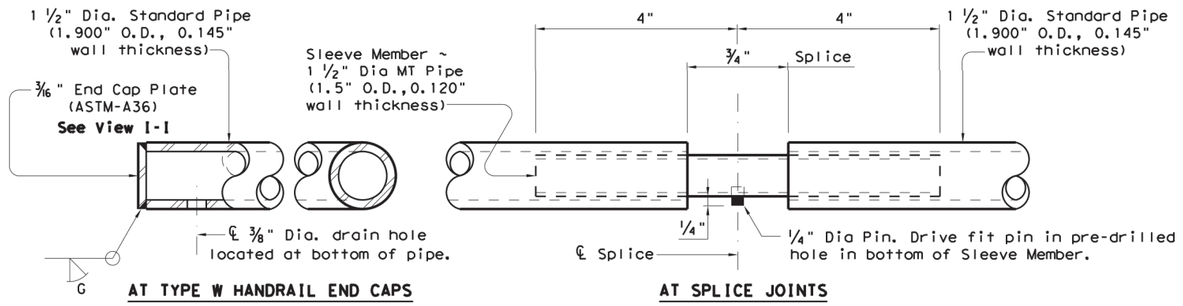
PRD-13

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©TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED MAY, 2013 (VP)	DIST	COUNTY		SHEET NO. 145

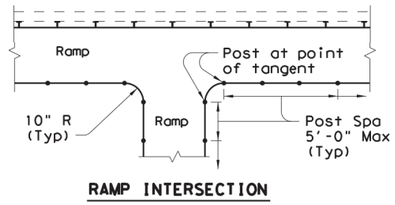
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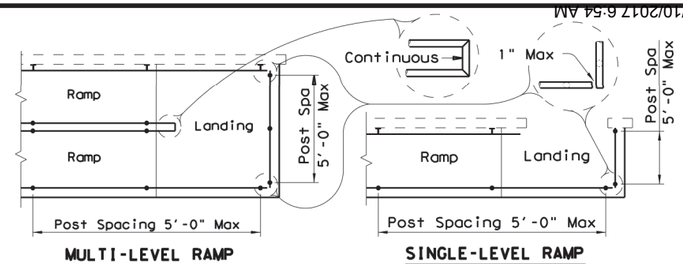
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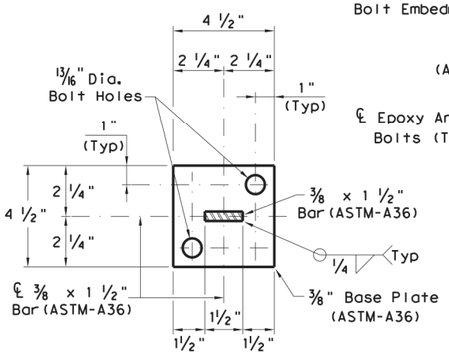
HANDRAIL FABRICATION DETAILS



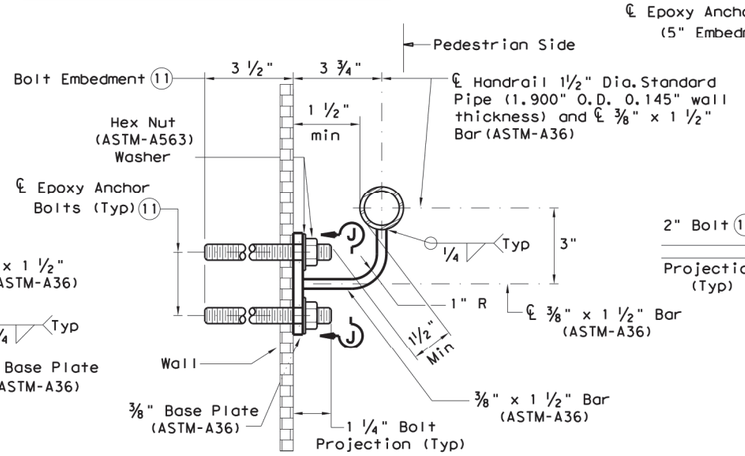
RAMP INTERSECTION



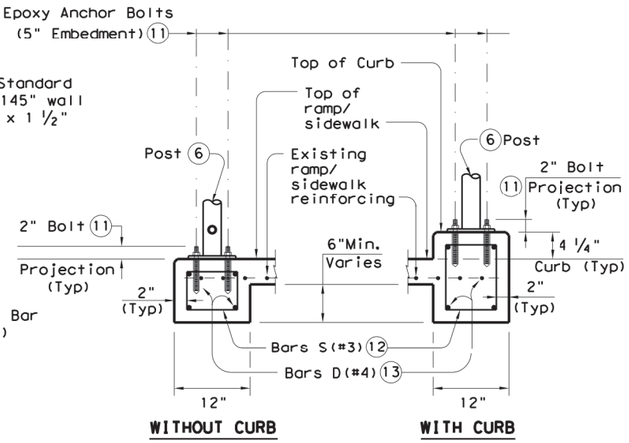
PLAN SHOWING RAIL AT RAMP CONDITIONS



SECTION J-J
(Anchor Bolts not shown for clarity)



SECTION AT WALL MOUNT



SECTION AT RAIL POST FOUNDATIONS

TYPICAL WALL MOUNT DETAILS

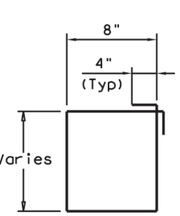
(5) 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp/sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.

(6) 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). Plumb all posts. See "Post Mount Detail" for crimping and trimming post to fit the diamenter of top rail. Provide holes as needed in post for galvanizing drainage and venting.

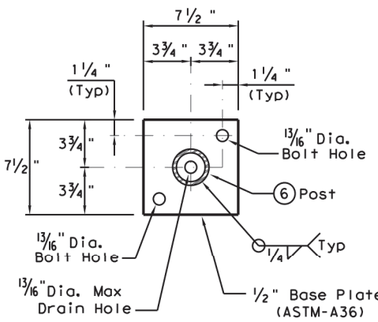
(11) See "General Notes" for anchor bolt information.

(12) Bars S(#3) spaced at 12" Max (Spaced 3" from outside edge of overall length of Ramp/Sidewalk).

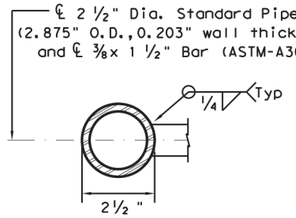
(13) Provide 1 ½" end cover to Bars D(#4) from outside edge of overall length of Ramp/Sidewalk.



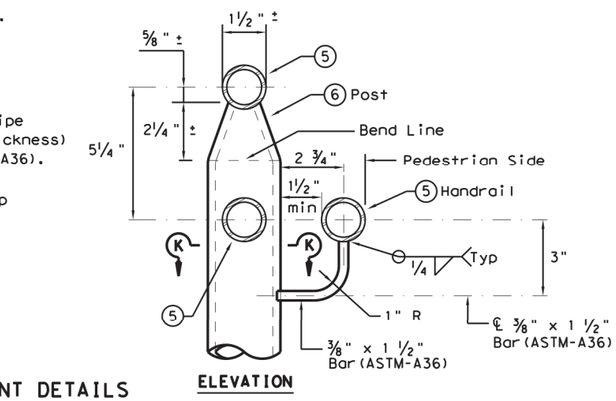
BARS S (#3)



TYPICAL POST BASE PLATE DETAIL



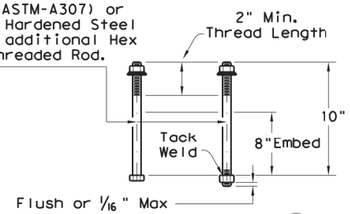
SECTION K-K



ELEVATION

POST MOUNT DETAILS

℄ ⅝" Dia. Hex Head Anchor Bolt (ASTM-A307) or Threaded Rod (ASTM-A36) with one Hardened Steel Washer placed under Hex Nut. One additional Hex Nut will be furnished for each Threaded Rod.



CAST-IN-PLACE ANCHOR BOLT OPTIONS (11)
(Used for Post Base Plate only)

GENERAL NOTES

Designed according to ADAAG, Texas Accessibility Standards, Uniform Building Code, and AASHTO LRFD Specifications.

Handrail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Pipe will conform to ASTM-A53 Grade B or A500 Grade B. Steel plates and steel bars will conform to ASTM-A36. Mechanical tubing (MT) will conform to ASTM A513 Grade 1015 or higher. Galvanize all steel components except reinforcing steel unless noted otherwise.

Concrete for foundations will be in accordance with Item 531 "Sidewalks". All reinforcing steel must be Grade 60. Bar laps, where required, will be as follows: Uncoated ~ #4 = 1'-5" Epoxy coated ~ #4 = 2'-1"

When the plans require painted steel, follow the requirements for painting galvanized steel in Item 446, "Cleaning and Painting Steel". Sleeve Members will receive galvanization and only get field painted after installation unless directed otherwise by Engineer.

Epoxy Anchor bolts for wall mount and post base plate will be ⅝" Dia. ASTM A36 threaded rods with one hex nut and one hardened steel washer at each bolt. ⅝" Dia. threaded rod embedment depth for wall mounts is 3 ½" and embedment depth for post base plate is 5".

Embed threaded rods into concrete with a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the manufacturer's static mixing nozzle/dual cartridge system. Core drill holes (percussion drilling not permitted).

At the contractor's option the post base plate anchor bolts may be cast with the Ramp/Sidewalk (See Cast-in-Place Anchor Bolt Options).

Optional cast-in-place anchor bolts will be ⅝" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer at each bolt. Embedment depth of cast-in-place bolt will be 8" for post base plate.

Handrails and any wall or other surface adjacent to them will be free of any sharp or abrasive elements.

Submit shop drawings to the Engineer unless otherwise noted. For curved handrail applications, fabricate the handrail to the curve if radius is less than 600 ft. Shop drawings are required when rail is fabricated to the curve.

For all handrails, erection drawings will be submitted to the Engineer for approval to ensure proper installation.

Drawings will show handrail mount locations with bolts setting, spacing, ramp slope, and/or splice joint locations, and handrail lengths with identification showing where each handrail goes on the layout.

Payment for concrete sidewalks or curb ramps will be paid for in accordance with Item 531 "Sidewalks".

Payment for all items shown is to be included in unit price bid in accordance with Item 450 "Railing" of the type specified.

All exposed edges will be rounded or chamfered to approximately ⅛" by grinding.

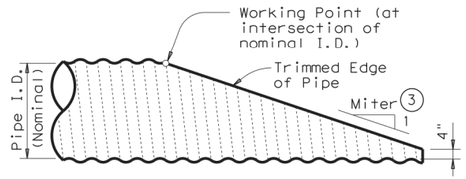
Texas Department of Transportation

Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13

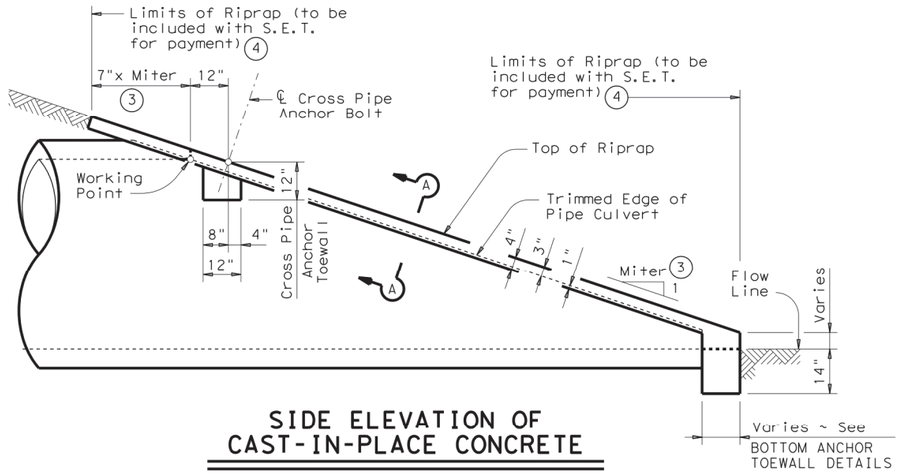
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REVISIONS REVISED MAY, 2013 (VP)	DIST	COUNTY		SHEET NO. 146



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.

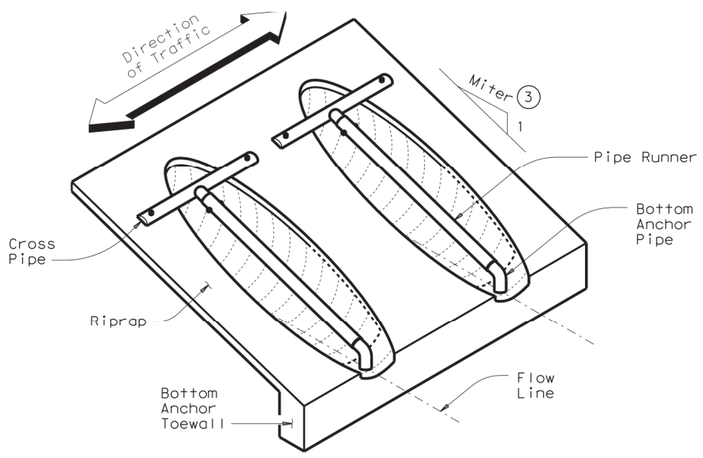
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(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.)

CROSS PIPE LENGTHS & PIPE RUNNER LENGTHS (1) (2)

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

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

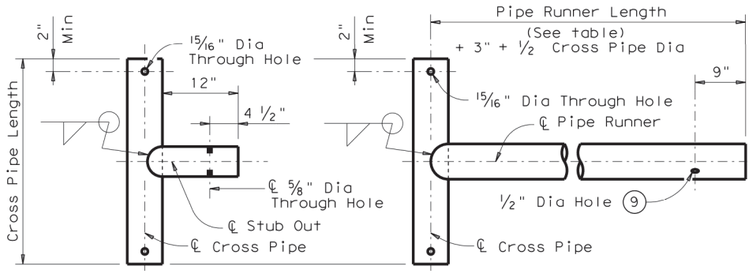
SETP-CD

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REVISIONS				
11-10: Add note for synthetic fibers.	DIST	COUNTY		SHEET NO.
				147

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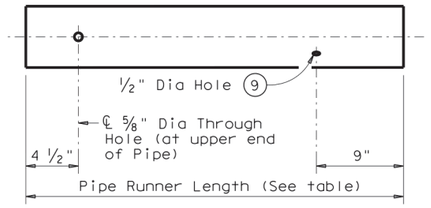
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OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS

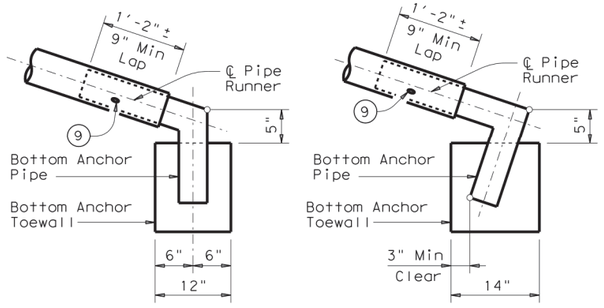


NOTE: The separate Pipe Runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

OPTION B1 OPTION B2

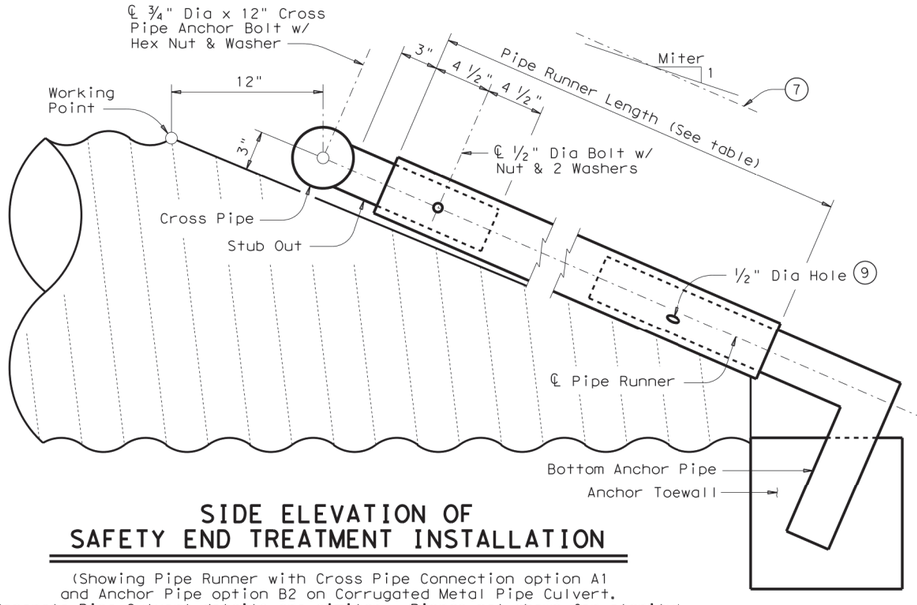
BOTTOM ANCHOR PIPE DETAILS (10)



OPTION B1 OPTION B2

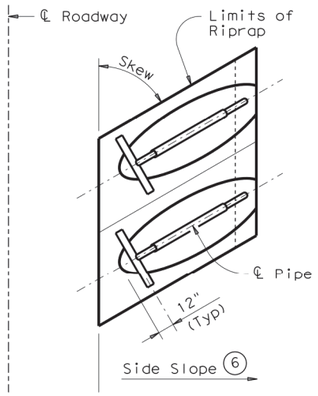
BOTTOM ANCHOR TOEWALL DETAILS

(Culvert & Riprap not shown for clarity)

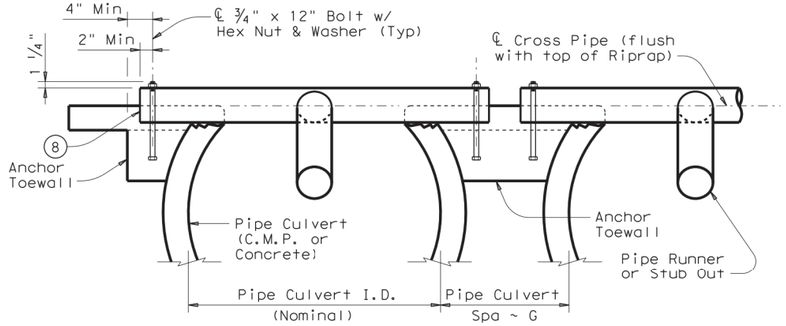


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(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)

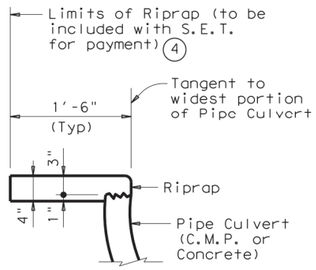


PLAN OF SKEWED INSTALLATION



SHOWING CROSS PIPE & ANCHOR TOEWALL

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" 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.

Texas Department of Transportation

Bridge Division Standard

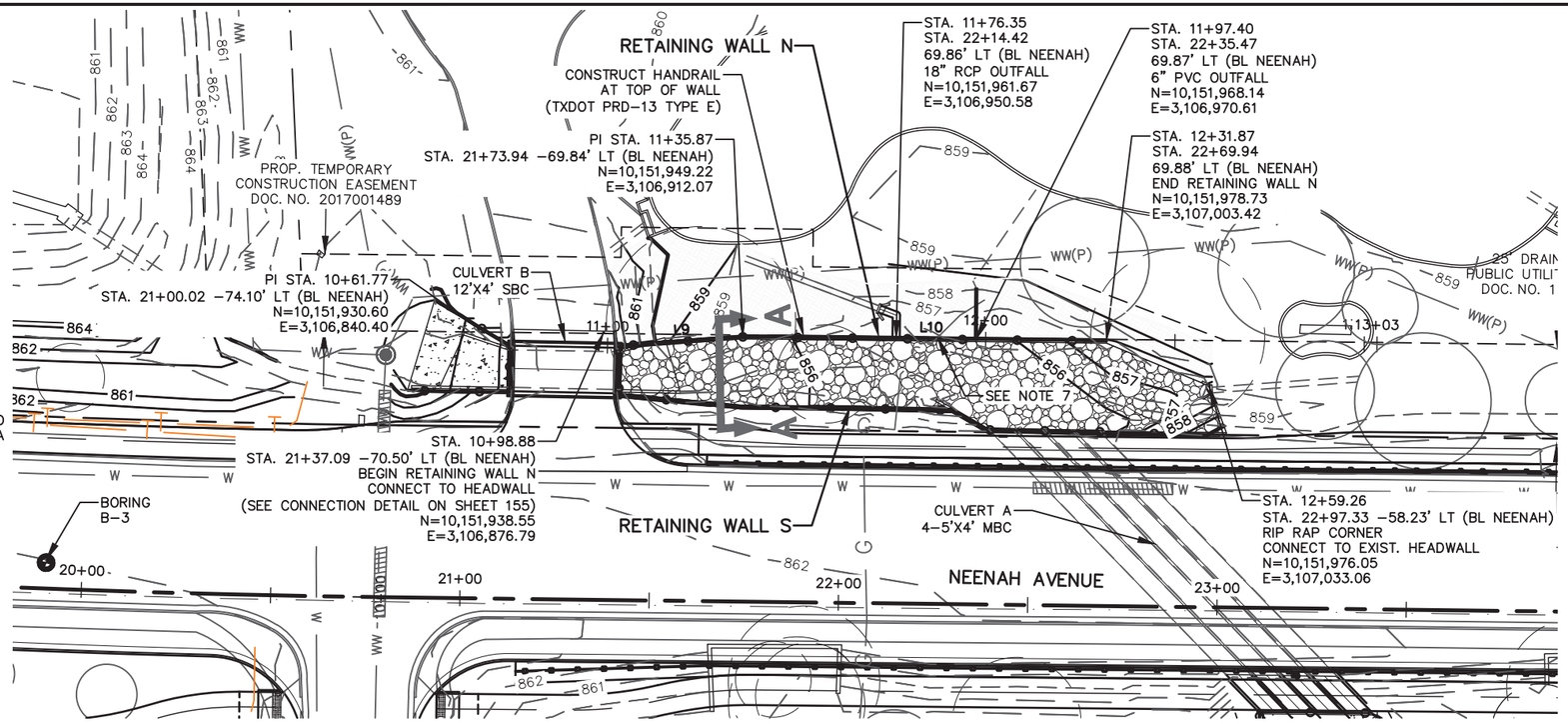
SAFETY END TREATMENT

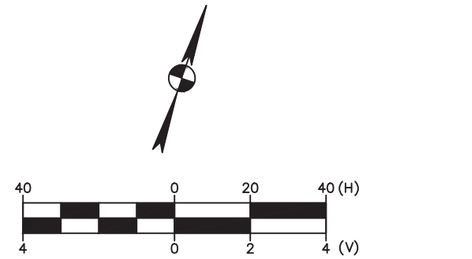
FOR 12" DIA TO 60" DIA PIPE CULVERTS TYPE II ~ CROSS DRAINAGE

SETP-CD

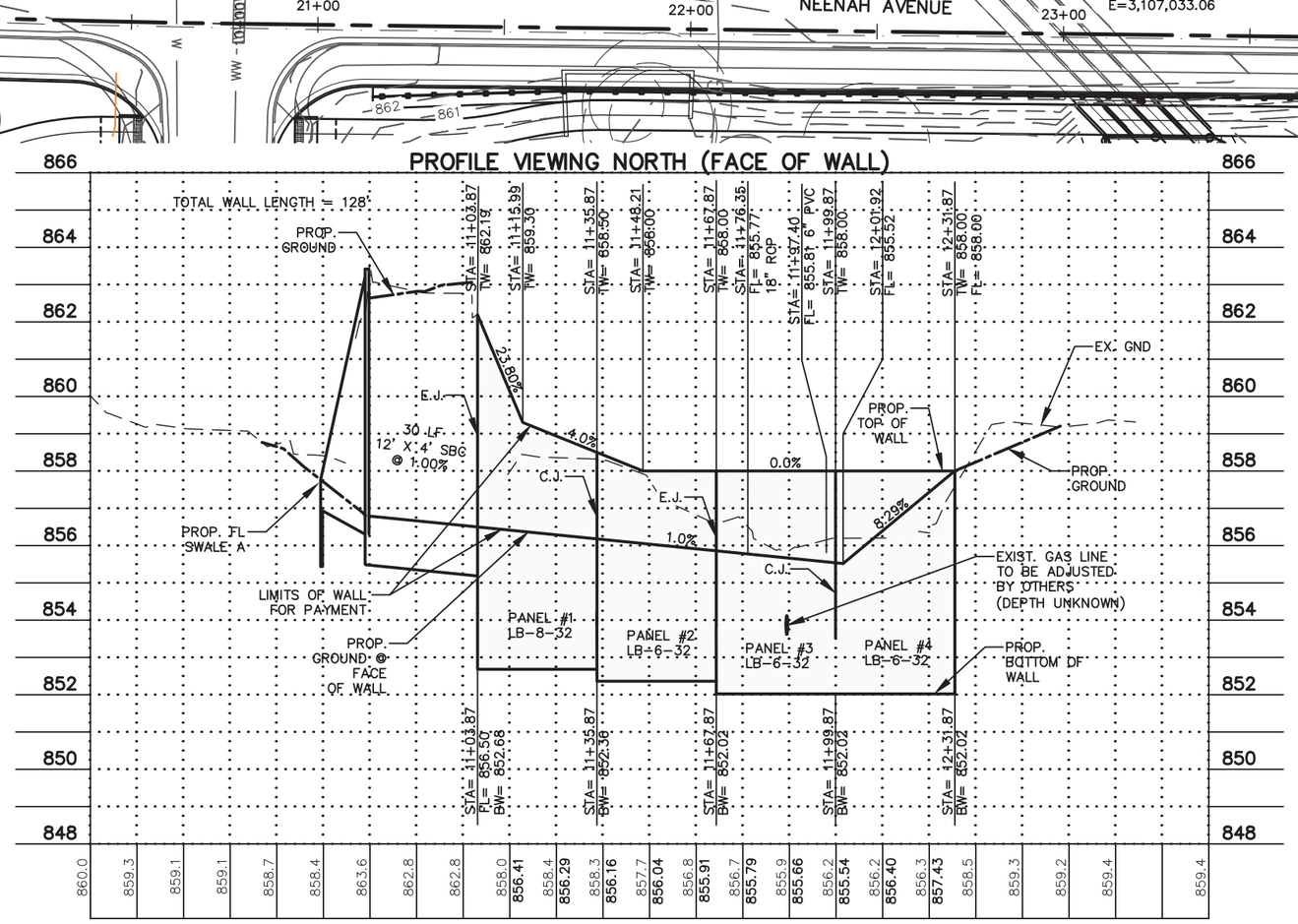
FILE: setpcdse.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
11-10: Add note for synthetic fibers.	DIST	COUNTY		SHEET NO.
				148

DATE:
FILE:





SECTION A-A
NTS



NOTES:
1. SEE SHEETS 153 – 154 FOR RETAINING WALL STANDARDS.
2. SEE SHEET 155 FOR RETAINING WALL DETAILS.
3. IMMEDIATELY BACKFILL THE FACE OF WALL AFTER THE WALL IS CONSTRUCTED ABOVE THE FINAL GRADE IN FRONT OF THE WALL.
4. RETAINING WALL SHALL INCLUDE WEEP HOLES. UNDERDRAINS ARE NOT REQUIRED.
5. SPECIAL SHORING REQUIRED WHEN CUT EXCEEDS 5 FEET. CONTRACTOR SHALL PREPARE AND SUBMIT A SPECIAL SHORING PLAN SIGNED BY A TEXAS PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.
6. SEE GEOTECHNICAL REPORT FOR SOIL INFORMATION. WALL IS LOCATED BETWEEN BROINGS B-3 AND B-4.
7. CONTRACTOR TO VERIFY ATMOS GAS LINE HAS BEEN ADJUSTED BY OTHERS PRIOR TO THE WALL CONSTRUCTION.

PROFILE LEGEND:

EXISTING GND

PROPOSED PIPE

ELEVATION EXISTING GND	669.7	671.59	ELEVATION PROPOSED GND @ FACE OF WALL

LINE TABLE – RW N				
NO.	BEARING	DISTANCE	START NORTHING	START EASTING
L9	N67°09'36.67"E	32.00'	N= 10,151,936.80	E= 3,106,882.57
L10	N72°05'53.13"E	96.00'	N= 10,151,949.22	E= 3,106,912.07

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED PROFESSIONAL ENGINEER
Stephanie D Blew

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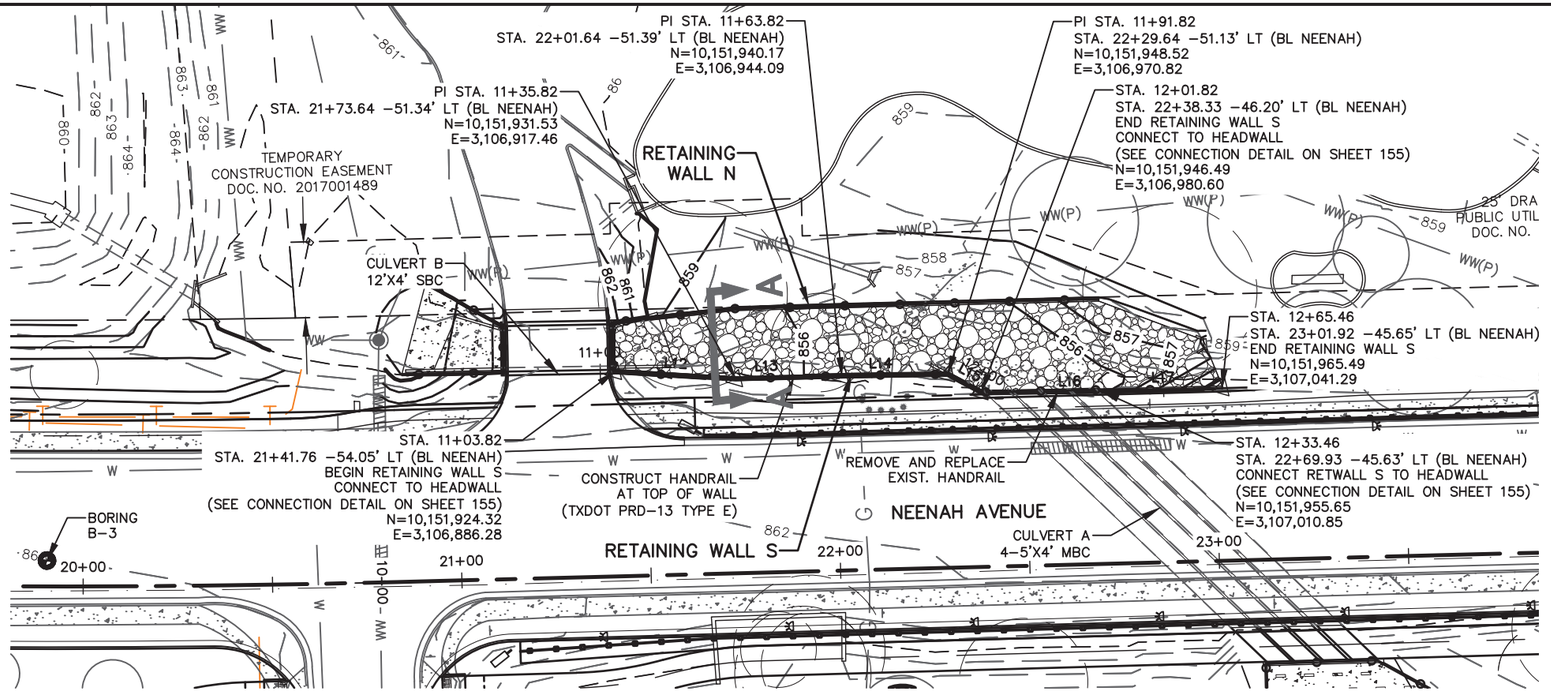
RETAINING WALL (N) PLAN AND PROFILE

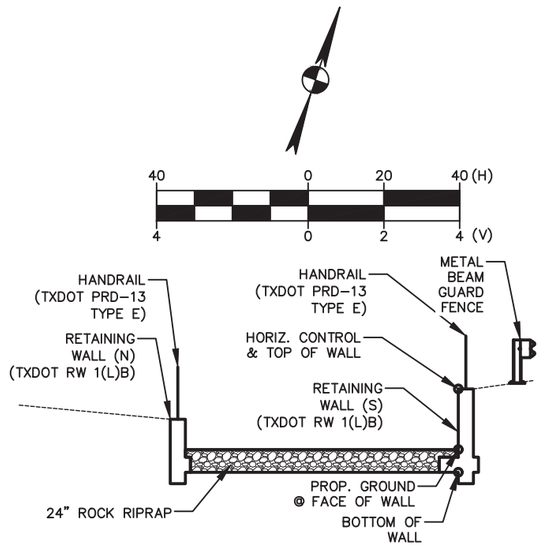
SHEET 149 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				149

SP-2016-0186D

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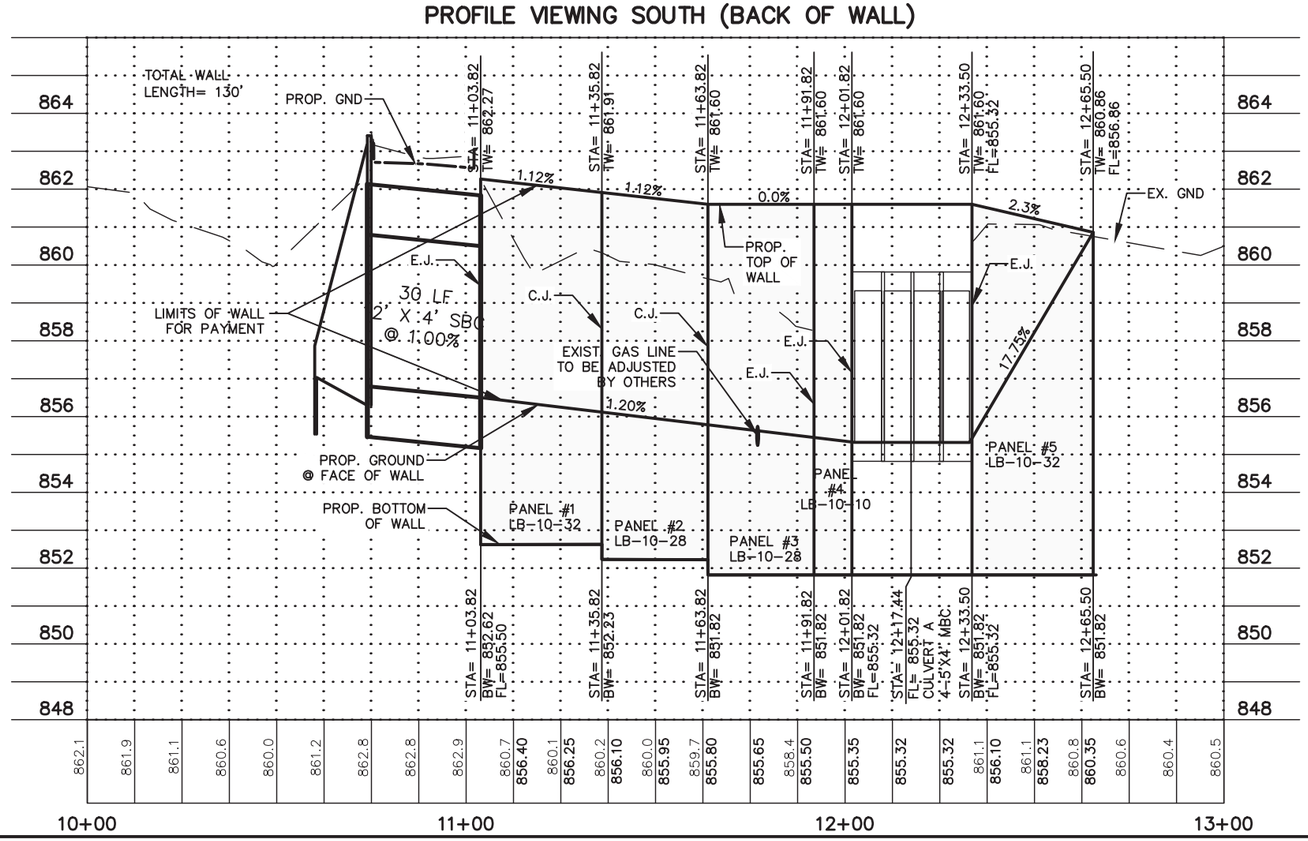




RW S
SECTION A
NTS

LINE TABLE − RW S				
NO.	BEARING	DISTANCE	START NORTHING	START EASTING
L12	N76°58'39.39"E	32.00'	N= 10,151,924.32	E= 3,106,886.28
L13	N72°02'20.37"E	28.00'	N= 10,151,931.53	E= 3,106,917.46
L14	N72°38'49.79"E	28.00'	N= 10,151,940.17	E= 3,106,944.09
L15	N78°16'37.00"E	10.00'	N= 10,151,947.48	E= 3,106,975.83
L16	N72°20'46.00"E	30.81'	N= 10,151,951.11	E= 3,106,995.52
L17	N72°19'16.25"E	32.0'	N= 10,151,955.65	E= 3,107,010.85

PROFILE VIEWING SOUTH (BACK OF WALL)



NOTES:
1. SEE SHEETS 153 − 154 FOR RETAINING WALL STANDARDS.
2. SEE SHEET 155 FOR RETAINING WALL DETAILS.
3. IMMEDIATELY BACKFILL THE FACE OF WALL AFTER THE WALL IS CONSTRUCTED ABOVE THE FINAL GRADE IN FRONT OF THE WALL.
4. RETAINING WALL SHALL INCLUDE WEEP HOLES. UNDERDRAINS ARE NOT REQUIRED.
5. SPECIAL SHORING REQUIRED WHEN CUT EXCEEDS 5 FEET. CONTRACTOR SHALL PREPARE AND SUBMIT A SPECIAL SHORING PLAN SIGNED BY A TEXAS PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.
6. SEE GEOTECHNICAL REPORT FOR SOIL INFORMATION. WALL IS LOCATED BETWEEN BROINGS B−3 AND B−4.
7. CONTRACTOR TO ADJUST ATMOS GAS LINE.

PROFILE LEGEND:

EXISTING GND

PROPOSED PIPE

ELEVATION EXISTING GND	669.7	671.59	ELEVATION PROPOSED GND @ FACE OF WALL

8.4.17
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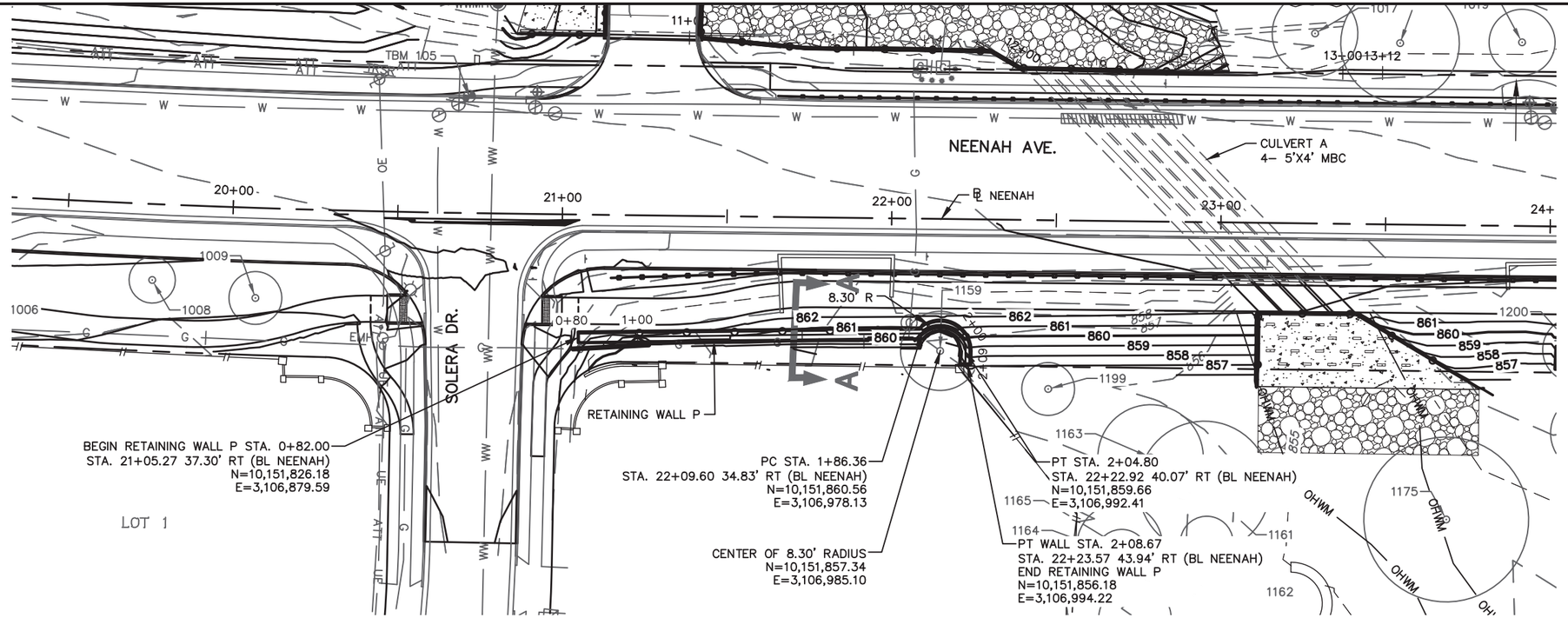
RETAINING WALL (S) PLAN AND PROFILE

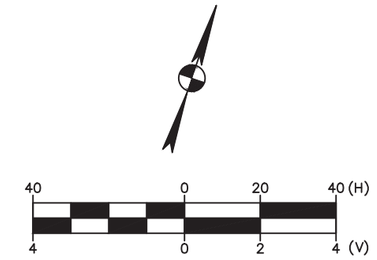
SHEET 150 OF 273

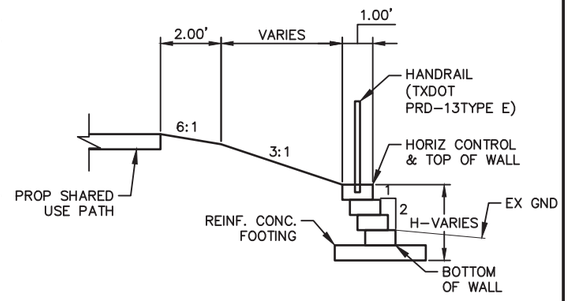
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023−10006	_	14	WILLIAMSON				150

SP-2016-0186D

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SECTION A–A
NTS

NOTES:

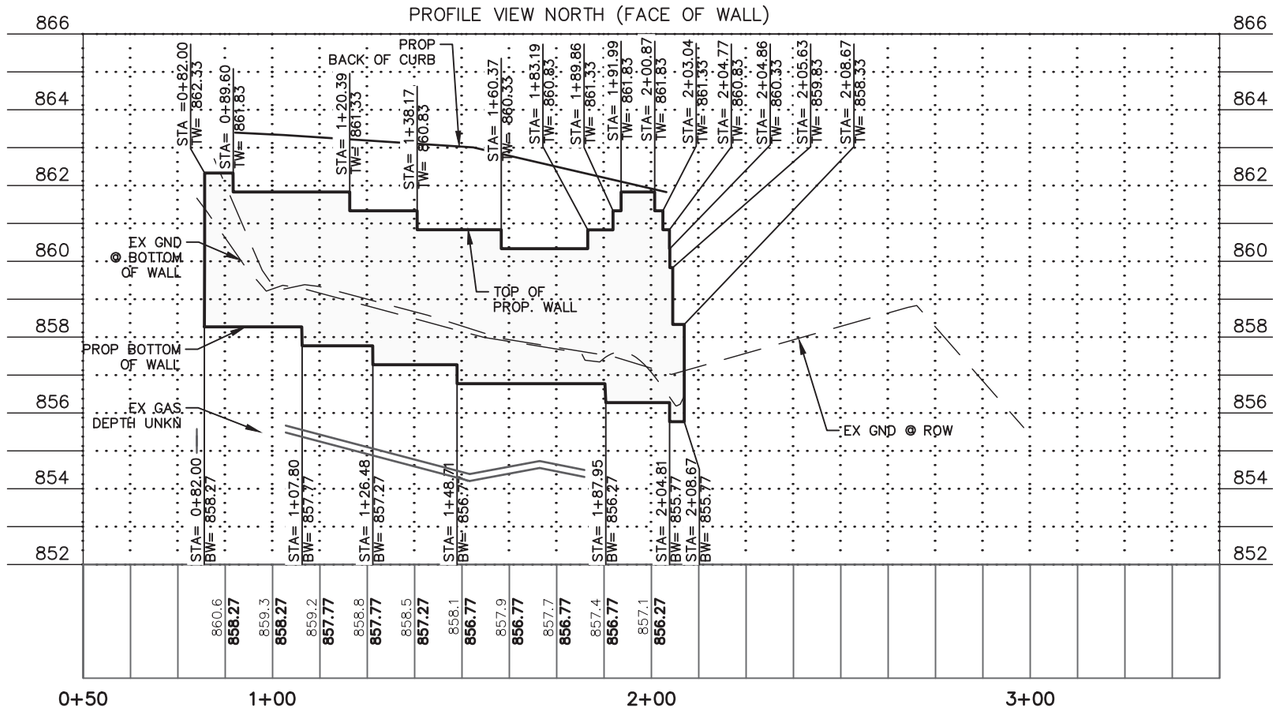
1. SEE SHEET 156 FOR RETAINING WALL DETAILS.
2. IMMEDIATELY BACKFILL THE FACE OF WALL AFTER THE WALL IS CONSTRUCTED ABOVE THE FINAL GRADE IN FRONT OF THE WALL.
3. CONTRACTOR SHALL PREPARE AND SUBMIT A RETAINING WALL DETAIL SIGNED AND SEALED BY A TEXAS PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION. THE STANDARD PROVIDED SHOULD BE USED AS AN EXAMPLE OF THE TYPE OF WALL DESIRED AT THIS LOCATION. THE DETAIL SHALL INCLUDE THE PROPOSED HANDRAIL.
4. SPECIAL SHORING REQUIRED WHEN CUT EXCEEDS 5 FEET. CONTRACTOR SHALL PREPARE AND SUBMIT A SPECIAL SHORING PLAN SIGNED BY A TEXAS PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.
5. SEE GEOTECHNICAL REPORT FOR SOIL INFORMATION. WALL IS LOCATED BETWEEN BORINGS B–3 AND B–4.
6. PEDESTRIAN RAIL IS REQUIRED ALONG THE ENTIRE TOP LENGTH OF THE WALL.
7. CONTRACTOR TO FIELD VERIFY LOCATION OF GAS LINE PRIOR TO CONSTRUCTION.

PROFILE LEGEND:

EX GND

PROP WALL

ELEVATION EX. GND	669.7	**671.59**	ELEVATION BOTTOM OF WALL



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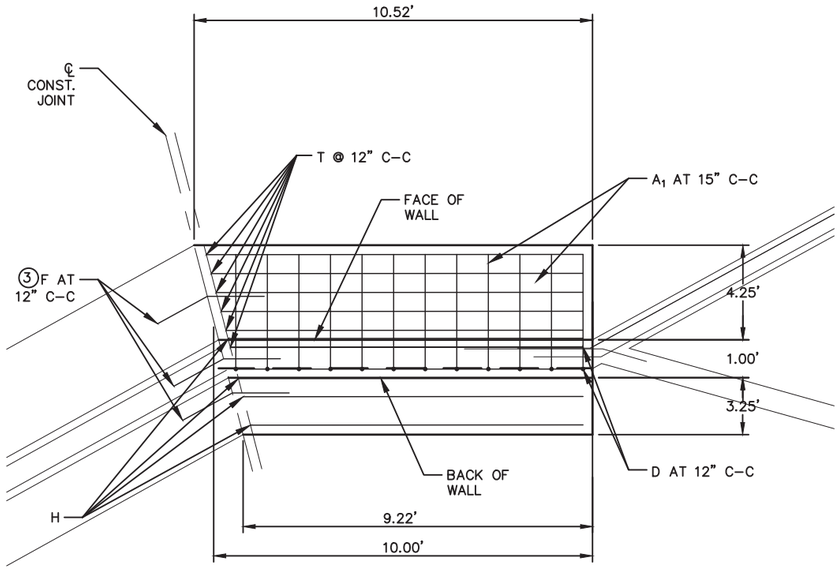
RETAINING WALL (P) PLAN AND PROFILE

SHEET 151 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				151

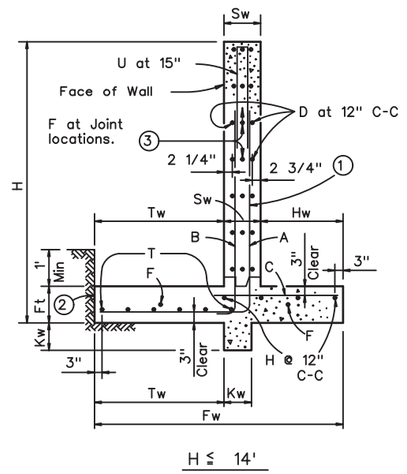
SP-2016-0186D

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PLAN

NTS

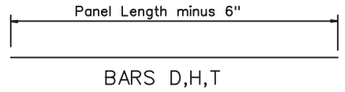


H ≤ 14'

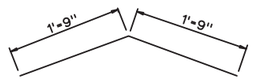
1. Place vertical bars inside of horizontal bars (Typ both faces).
2. Place footing toe against undisturbed soil.
3. See standard RW 2 for size.

SECTION

NTS



BARS D,H,T



BARS F 3

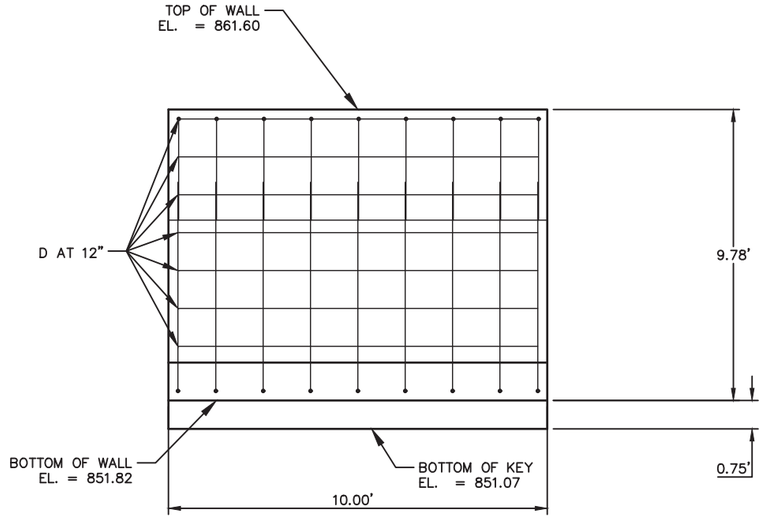
REINFORCING STEEL FOR ONE 10' PANEL				
BAR	TYPE	SIZE	NO.	WEIGHT
A1	Bt.	#5	9	120
A2	Bt.	#6	9	89
B	Bt.	#5	9	89
C	St.	#6	9	64
D	St.	#5	20	206
F	Bt.	#8	13	104
H	St.	#5	4	41
T	St.	#5	5	52
U	Bt.	#5	9	78
TOTAL			LB	843
CLASS C CONC.			CY	6.68
RET. WALL			SF	97.8

GENERAL NOTES:

All concrete to be Class "C".
All reinforcing steel to be Grade 60.
For notes and details not shown on this sheet see sheet RW2.
Quantities are based on "H" being average height of panel.
All reinforcing steel spacing is 15" c-c unless noted otherwise
Retaining Walls are designed to be coded as follows on Retaining Wall Layout Sheets.

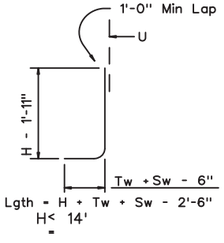
LB - 10 - 10

LA - 28 - 32
- Panel Length ~ 32' is standard; 28' requires special quantities
- Average Height "H" of panel
- Design - A = no surcharge or slope above wall; B = slopes up to 4:1; C = traffic surcharge and/or slopes up to 2.5:1
- Footing pressure design ~ L = low, H = high

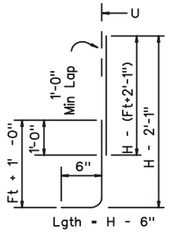


FRONT ELEVATION

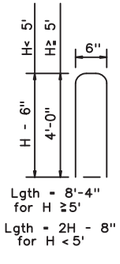
NTS



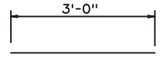
BARS A_1 (#5)



BARS B (#5)



BARS U (#5)



BARS C (#6)

FOR CITY USE ONLY:

SITE PLAN APPROVAL Sheet ___ of ___
FILE NUMBER: SP-2016-0186D APPLICATION DATE: 6/19/2016
APPROVED BY COMMISSION ON: _____ UNDER SECTION _____ OF CHAPTER _____ OF THE CITY OF AUSTIN CODE.
EXPIRATION DATE (25-5-81,LDC)_____ CASE MANAGER _____
PROJECT EXPIRATION DATE (ORD.#970905-A)_____ DWPZ ___ DDZ ___

Director, Planning and Development Review Department
RELEASED FOR GENERAL COMPLIANCE:_____ ZONING: _____
Rev. 1 _____ Correction 1 _____
Rev. 2 _____ Correction 2 _____
Rev. 3 _____ Correction 3 _____

FINAL PLAT MUST BE RECORDED BY THE PROJECT EXPIRATION DATE, IF APPLICABLE. SUBSEQUENT SITE PLANS WHICH DO NOT COMPLY WITH THE CODE CURRENT AT THE TIME OF FILING, AND ALL REQUIRED BUILDING PERMITS AND/OR A NOTICE OF CONSTRUCTION (IF A BUILDING PERMIT IS NOT REQUIRED), MUST ALSO BE APPROVED PRIOR TO THE PROJECT EXPIRATION DATE.

8.4.17
STATE OF TEXAS
STEPHANE D. BLEW
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Stephane D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
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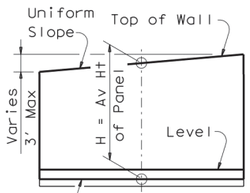
RETAINING WALL (S) PANEL #4 (LB–10–10) DETAIL

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				152

SP-2016-0186D

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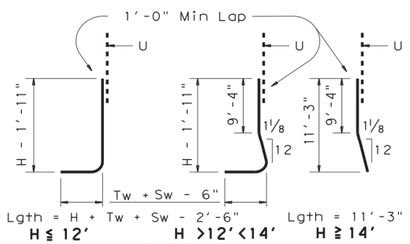


H DEFINITION

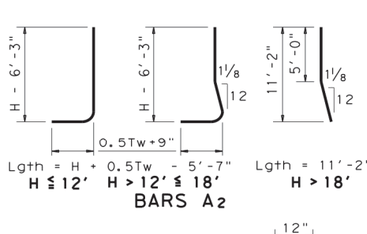
Wall Height "H"	PROPERTIES						
	WALL DIMENSIONS						Max Soil Press
(Ft)	Fw	Tw	Sw	Hw	Ft	Kw	T/SF
2	2'-8"	1'-4"	1'-0"	4"	1'-0"	9"	0.15
3	3'-6"	1'-9"	1'-0"	9"	1'-0"	9"	0.18
4	4'-3"	2'-2"	1'-0"	1'-1"	1'-0"	9"	0.21
5	5'-0"	2'-6"	1'-0"	1'-6"	1'-0"	9"	0.24
6	5'-8"	2'-10"	1'-0"	1'-10"	1'-0"	9"	0.28
7	6'-4"	3'-2"	1'-0"	2'-2"	1'-0"	9"	0.31
8	7'-0"	3'-6"	1'-0"	2'-6"	1'-0"	9"	0.35
9	7'-9"	3'-10"	1'-0"	2'-11"	1'-0"	9"	0.38
10	8'-6"	4'-3"	1'-0"	3'-3"	1'-0"	9"	0.40
11	9'-2"	4'-7"	1'-0"	3'-7"	1'-0"	9"	0.43
12	9'-10"	4'-11"	1'-0"	3'-11"	1'-0"	1'-0"	0.46
13	10'-6"	5'-3"	1'-1 1/8"	4'-1 7/8"	1'-0"	1'-0"	0.50
14	11'-2"	5'-7"	1'-2"	4'-5"	1'-3"	1'-3"	0.55
15	11'-10"	5'-11"	1'-3 1/8"	4'-7 7/8"	1'-3"	1'-3"	0.59
16	12'-6"	6'-3"	1'-4"	4'-11"	1'-6"	1'-3"	0.64
17	13'-3"	6'-7"	1'-5"	5'-3"	1'-6"	1'-6"	0.67
18	13'-10"	6'-11"	1'-6 1/4"	5'-4 3/4"	1'-6"	1'-6"	0.71
19	14'-6"	7'-3"	1'-7"	5'-8"	1'-9"	1'-6"	0.76
20	15'-2"	7'-7"	1'-8 1/8"	5'-10 5/8"	1'-9"	1'-6"	0.80
21	16'-0"	8'-0"	1'-9 1/4"	6'-2 3/4"	1'-9"	1'-6"	0.81
22	16'-6"	8'-3"	1'-10 1/8"	6'-4 7/8"	2'-0"	1'-6"	0.88
23	17'-3"	8'-7"	1'-11 1/4"	6'-8 3/4"	2'-0"	1'-6"	0.91
24	18'-0"	9'-0"	2'-0 1/8"	6'-11 7/8"	2'-3"	1'-6"	0.95
25	18'-6"	9'-4"	2'-1 1/4"	7'-0 3/4"	2'-3"	1'-6"	0.99
26	19'-3"	9'-7"	2'-2 3/8"	7'-5 5/8"	2'-3"	1'-9"	1.03
27	20'-0"	10'-0"	2'-3 1/2"	7'-8 1/2"	2'-3"	1'-9"	1.05
28	20'-6"	10'-4"	2'-4 5/8"	7'-9 3/8"	2'-3"	1'-9"	1.09
29	21'-3"	10'-7"	2'-5 3/4"	8'-2 1/4"	2'-3"	1'-9"	1.12
30	22'-0"	11'-0"	2'-6 1/2"	8'-5 1/2"	2'-6"	1'-9"	1.16

REINFORCING STEEL FOR ONE 32' PANEL (DESIGN B)

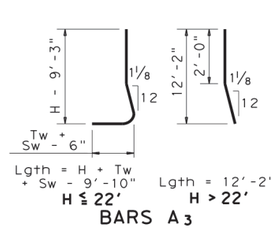
Wall Height "H"	A1 ~ 26 #5 at 15" c-c		A2 ~ 25 #6 at 15" c-c		A3 ~ 25 #7 at 15" c-c		A4 ~ 26 #8 at 15" c-c		A5 ~ 25 #9 at 15" c-c		A6 ~ 25 #11 at 15" c-c		A7 ~ 26 #11 at 15" c-c		B ~ 26 #5 at 15" c-c		C					D (#5) at 12" c-c		Dowel F at 12" c-c		H (#5) at 12" c-c		T (#5) at 12" c-c		U ~ 26 #5 at 15" c-c		QUANTITY FOR ONE 32' PANEL		Wall Height "H"
	Lgth	Wt	Lgth	Wt	Lgth	Wt	Lgth	Wt	Lgth	Wt	Lgth	Wt	Lgth	Wt	Lgth	Wt	Size	No	Spa	Lgth	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	Lgth	Wt	CONC (CY)	REINF (LB)	
(Ft)																																				(Ft)
2																	#4	26	15"	1'-10"	32	4	131	4	32	2	66	2	66	3'-4"	90	5.0	418	2
3																	#4	26	15"	2'-3"	39	6	197	5	40	2	66	3	99	5'-4"	145	7.2	586	3
4	4'-8"	127													3'-6"	95	#4	26	15"	2'-8"	46	8	263	6	48	3	99	3	99	7'-4"	199	9.3	976	4
5	6'-0"	163													4'-6"	122	#4	26	15"	3'-0"	52	10	329	7	56	3	99	3	99	8'-4"	226	11.3	1146	5
6	7'-4"	199													5'-6"	149	#4	26	15"	3'-4"	58	12	394	8	64	3	99	4	131	8'-4"	226	13.3	1321	6
7	8'-8"	235													6'-6"	176	#4	26	15"	3'-8"	64	14	460	9	72	3	99	4	131	8'-4"	226	15.3	1463	7
8	10'-0"	271	4'-2"	156											7'-6"	203	#4	38	10"	4'-0"	102	16	526	10	80	4	131	4	131	8'-4"	226	17.3	1825	8
9	11'-4"	307	5'-4"	200											8'-6"	231	#6	38	10"	4'-4"	247	18	591	11	88	4	131	5	164	8'-4"	226	19.3	2185	9
10	12'-9"	346	6'-7"	247											9'-6"	258	#6	38	10"	4'-9"	271	20	657	12	96	4	131	5	164	8'-4"	226	21.4	2396	10
11	14'-1"	382	7'-8"	288	6'-9"	345									10'-6"	285	#7	38	10"	5'-1"	395	22	723	13	104	5	164	6	197	8'-4"	226	23.4	3103	11
12	15'-5"	418	8'-11"	335	8'-1"	413									11'-6"	312	#8	38	10"	5'-5"	550	24	789	14	112	5	164	6	197	8'-4"	226	25.9	3515	12
13	16'-10"	456	10'-1"	379	9'-6"	485									12'-6"	339	#9	38	10"	5'-9"	743	26	854	15	120	6	197	6	197	8'-4"	226	27.9	3996	13
14	11'-3"	307	11'-2"	419	10'-11"	558	8'-5"	584							13'-6"	366	#9	38	10"	6'-1"	786	28	920	16	128	6	197	7	230	8'-4"	226	33.7	4721	14
15	11'-3"	307	12'-5"	466	12'-4"	630	9'-10"	683							14'-6"	393	#9	38	10"	6'-5"	829	30	986	17	136	7	230	7	230	8'-4"	226	36.1	5116	15
16	11'-3"	307	13'-7"	510	13'-9"	703	11'-2"	775							15'-6"	420	#9	38	10"	6'-9"	872	30	986	17	136	7	230	8	263	8'-4"	226	41.9	5427	16
17	11'-3"	307	14'-9"	554	15'-2"	775	12'-8"	879							16'-6"	447	#9	38	10"	7'-2"	926	32	1051	18	144	7	230	8	263	8'-4"	226	45.7	5802	17
18	11'-3"	307	15'-11"	598	16'-7"	847	14'-1	978							17'-6"	475	#10	38	10"	7'-5"	1213	34	1117	19	152	8	263	8	263	8'-4"	226	48.5	6439	18
19	11'-3"	307	11'-2"	419	18'-0"	920	15'-5"	1070	9'-7"	815					18'-6"	502	#10	38	10"	7'-9"	1267	36	1183	20	160	8	263	9	296	8'-4"	226	55.4	7428	19
20	11'-3"	307	11'-2"	419	19'-5"	992	16'-11"	1174	10'-11"	928					19'-6"	529	#10	38	10"	8'-1"	1322	38	1248	21	168	8	263	9	296	8'-4"	226	58.7	7872	20
21	11'-3"	307	11'-2"	419	20'-11"	1069	18'-5"	1278	12'-4"	1048					20'-6"	556	#8	76	5"	8'-6"	1725	40	1314	22	176	9	296	10	329	8'-4"	226	62.4	8743	21
22	11'-3"	307	11'-2"	419	22'-3"	1137	19'-9"	1371	13'-7"	1155					21'-6"	583	#8	76	5"	8'-9"	1776	42	1380	23	184	9	296	10	329	8'-4"	226	70.0	9163	22
23	11'-3"	307	11'-2"	419	12'-2"	622	21'-2"	1469	15'-0"	1275	6'-1"	808			22'-6"	610	#8	76	5"	9'-2"	1860	44	1446	24	192	9	296	10	329	8'-4"	226	74.0	9859	23
24	11'-3"	307	11'-2"	419	12'-2"	622	22'-8"	1574	16'-4"	1388	7'-1"	941			23'-6"	637	#8	76	5"	9'-6"	1928	46	1511	25	200	10	329	11	361	8'-4"	226	82.9	10443	24
25	11'-3"	307	11'-2"	419	12'-2"	622	24'-1"	1672	17'-8"	1502	8'-1"	1074			24'-6"	664	#9	76	5"	9'-10"	2541	48	1577	26	208	10	329	11	361	8'-4"	226	86.6	11502	25
26	11'-3"	307	11'-2"	419	12'-2"	622	25'-5"	1764	19'-0"	1615	9'-1"	1206			25'-6"	692	#9	76	5"	10'-1"	2606	50	1643	27	217	10	329	12	394	8'-4"	226	92.1	12040	26
27	11'-3"	307	11'-2"	419	12'-2"	622	27'-0"	1874	20'-5"	1735	10'-1"	1339			26'-6"	719	#9	76	5"	10'-5"	2692	52	1708	28	225	11	361	12	394	8'-4"	226	96.8	12601	27
28	11'-3"	307	11'-2"	419	12'-2"	622	14'-4"	995	21'-9"	1849	11'-1"	1472	17'-0"	2348	27'-6"	746	#10	76	5"	10'-9"	3516	54	1774	29	233	11	361	12	394	8'-4"	226	100.9	15261	28
29	11'-3"	307	11'-2"	419	12'-2"	622	14'-4"	995	23'-0"	1955	12'-1"	1605	18'-4"	2533	28'-6"	773	#10	76	5"	11'-2"	3652	56	1840	30	241	11	361	13	427	8'-4"	226	105.8	15955	29
30	11'-3"	307	11'-2"	419	12'-2"	622	14'-4"	995	24'-5"	2075	13'-1"	1738	19'-10"	2740	29'-6"	800	#10	76	5"	11'-6"	3761	56	1840	30	241	12	394	13	427	8'-4"	226	116.5	16584	30



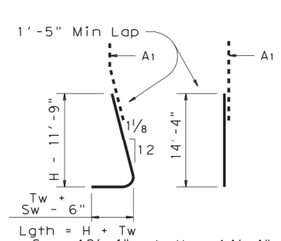
BARS A1



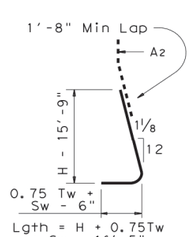
BARS A2



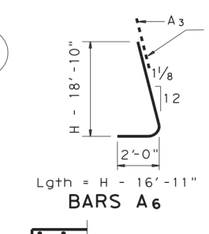
BARS A3



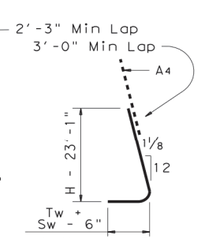
BARS A4



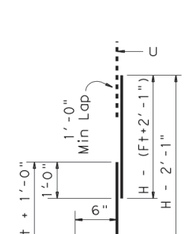
BARS A5



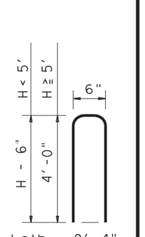
BARS A6



BARS A7

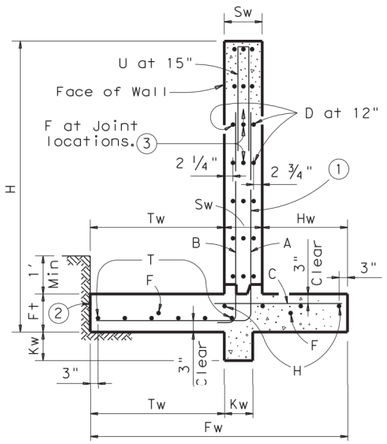


BARS B

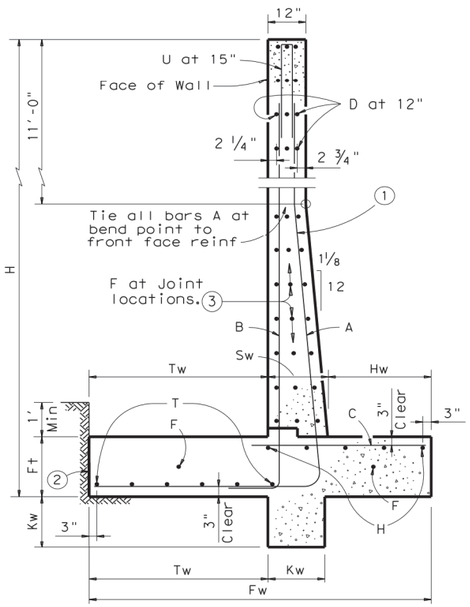


BARS U

1. Place vertical bars inside of horizontal bars (Typ both faces).
2. Place footing toe against undisturbed soil.
3. See standard RW 2 for size.



H ≤ 12'



H > 12'

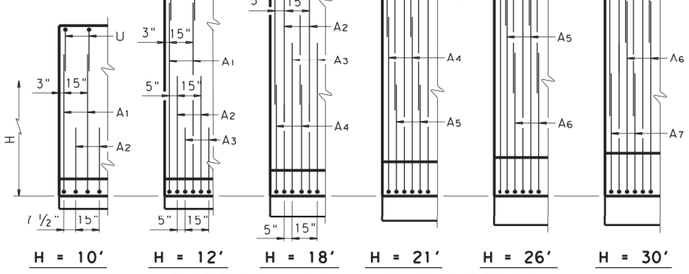
SECTIONS

31'-6"

BARS D, H, T

3'-0"

BARS F ③



PARTIAL WALL ELEVATIONS

(Showing vertical reinforcing pattern in back face)

GENERAL NOTES:

All concrete to be Class "C".
All reinforcing steel to be Grade 60.
For notes and details not shown on this sheet see sheet RW2.
Quantities are based on "H" being average height of panel.
Retaining Walls are designed to be coded as follows on Retaining Wall Layout Sheets.

HC - 21 - 28
LA - 28 - 32

- Panel Length ~ 32' is standard; 28' requires special quantities
- Average Height "H" of panel
- Design - A = no surcharge or slope above wall; B = slopes up to 4:1; C = traffic surcharge and/or slopes up to 2.5:1
- Footing pressure design ~ L = low, H = high

Texas Department of Transportation

Bridge Division Standard

RETAINING WALLS

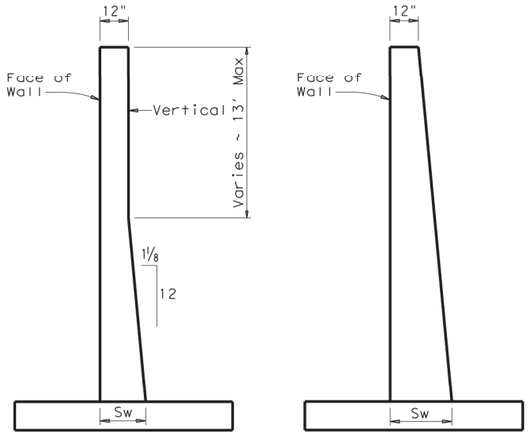
RW 1(L)B

FILE:	rwstde06.dgn	DN: TxDOT	CK: TxDOT	DW: GHO	CK: MPM
©TxDOT	March 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS		DIST	COUNTY		SHEET NO.
					153

DATE: 10/10/2013 4:16:56 PM
FILE: Bid 1710-194

Williamson County, Texas

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

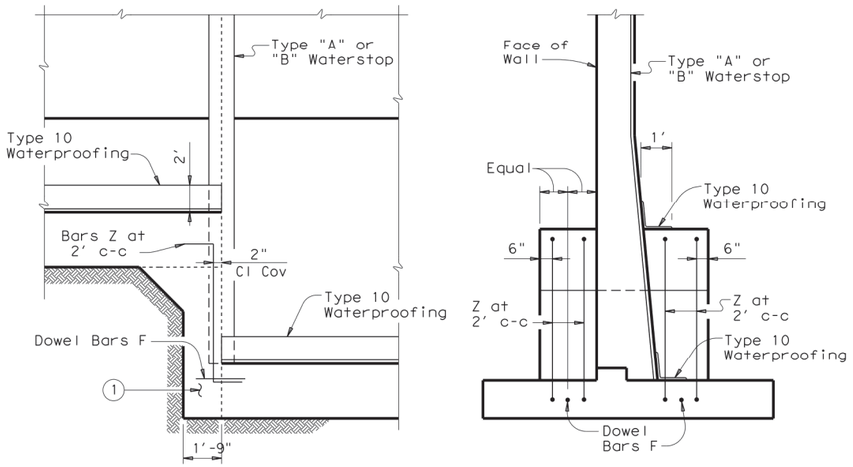


AS DETAILED ALL HEIGHTS
(Basis for payment)

FRONT FACE VERTICAL BACK FACE SLOPED

ALTERNATE STEM SLOPE DETAILS

Walls with slopes other than those shown may be used after approval by the Engineer. Sw shall not be less than shown in Table on Sheet 1. No payment will be made for excess concrete due to changing of slope of wall stem.

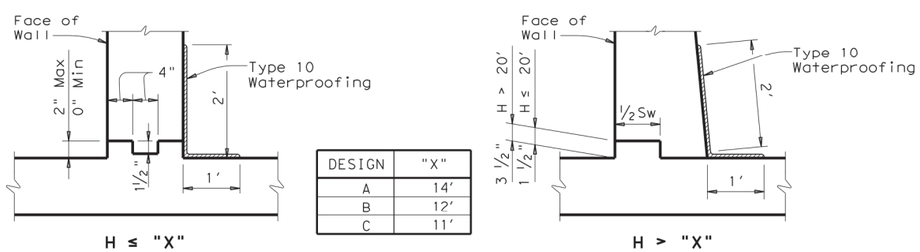


PARTIAL ELEVATION

PARTIAL SECTION

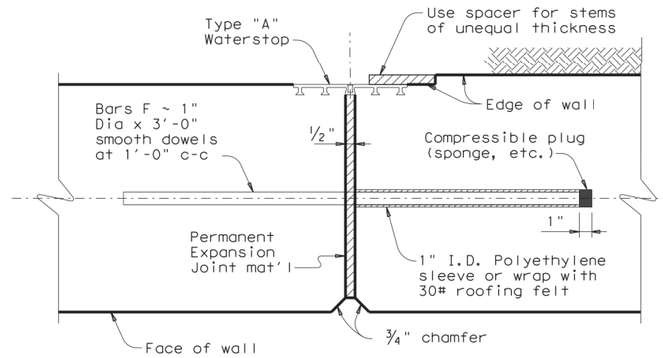
SHOWING WATERSTOP AT FOOTING JOINT

1 Unreinforced Class "C" Concrete when difference in top of footing elevations is less than 6'. Omit when Dowel Bars F can be placed between adjacent footings with 4" cover top and bottom.

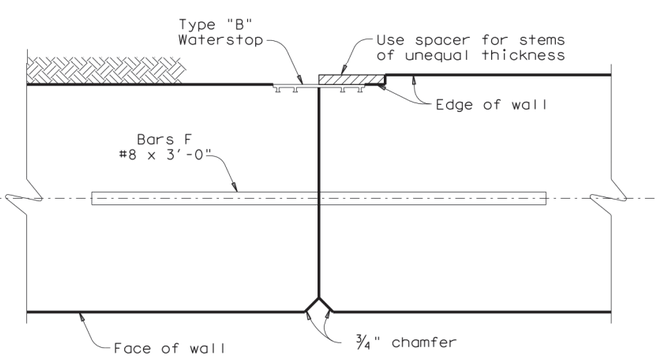


DESIGN	"X"
A	14'
B	12'
C	11'

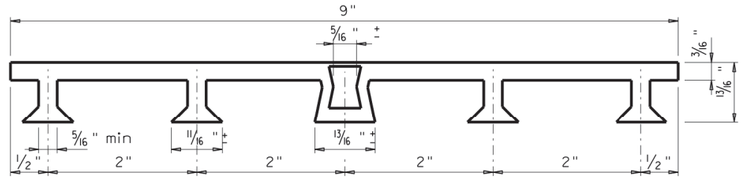
JOINT AND WATERSTOP DETAILS



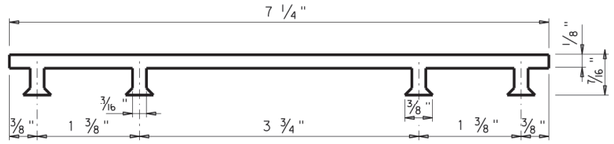
EXPANSION JOINT



CONSTRUCTION JOINT

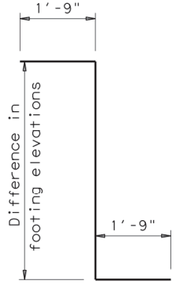


PVC WATERSTOP TYPE "A"



PVC WATERSTOP TYPE "B"

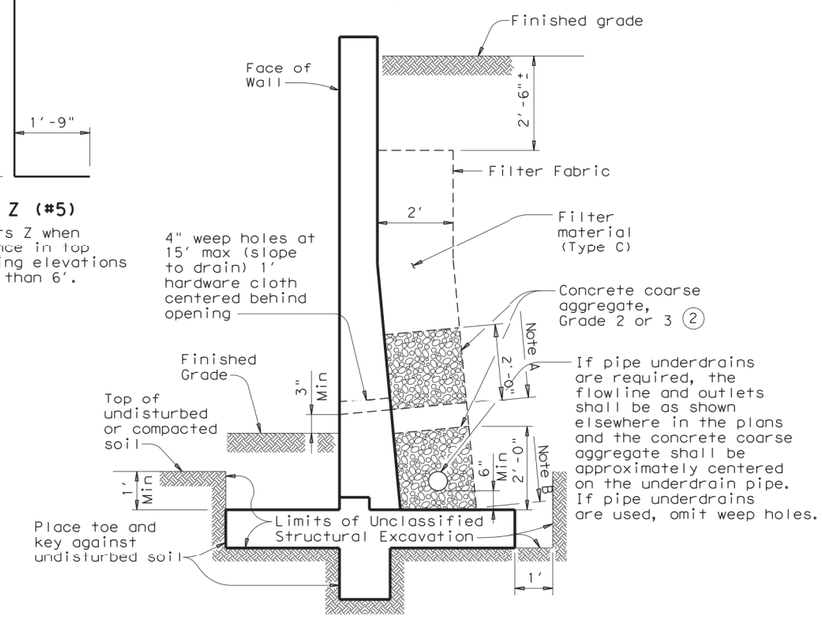
Note: Dimensions and shapes may vary slightly depending on manufacturer.



BARS Z (#5)

Omit Bars Z when difference in top of footing elevations is less than 6'.

2 Crushed blast furnace slag, recycled crushed hydraulic cement concrete or combination there of may not be used.



DRAINAGE DETAILS AND EXCAVATION DIAGRAM

Note A: Stop coarse aggregate at this level when weep holes are used.

Note B: Use coarse aggregate to here with filter material above when underdrains are used.

GENERAL NOTES:

Walls are designed assuming unit weight of soil = 120 pcf, and coefficient of horizontal earth pressure = 0.33.

Walls are designed to provide a minimum factor of safety against sliding of 1.5. The undisturbed or compacted soil depth in front of walls, from bottom of Key up, shall not be less than Kw + Ft + 1'.

Retaining walls are detailed to be placed on grades up thru 10% with footing level, with no changes in reinforcing steel. Steeper grades can be accommodated by shortening Bars A1 and B and increasing length of legs of Bars U by the same amount. No change in Quantities will be involved

Retaining walls may be placed on Horizontal Curves by adjusting lengths of footing Bars T and H. Minor revisions of Concrete Quantities may be required.

Designed in accordance with current AASHTO Standard and Interim Specifications.

All concrete to be Class "C".

All reinforcing steel to be Grade 60.

Texas Department of Transportation

Bridge Division Standard

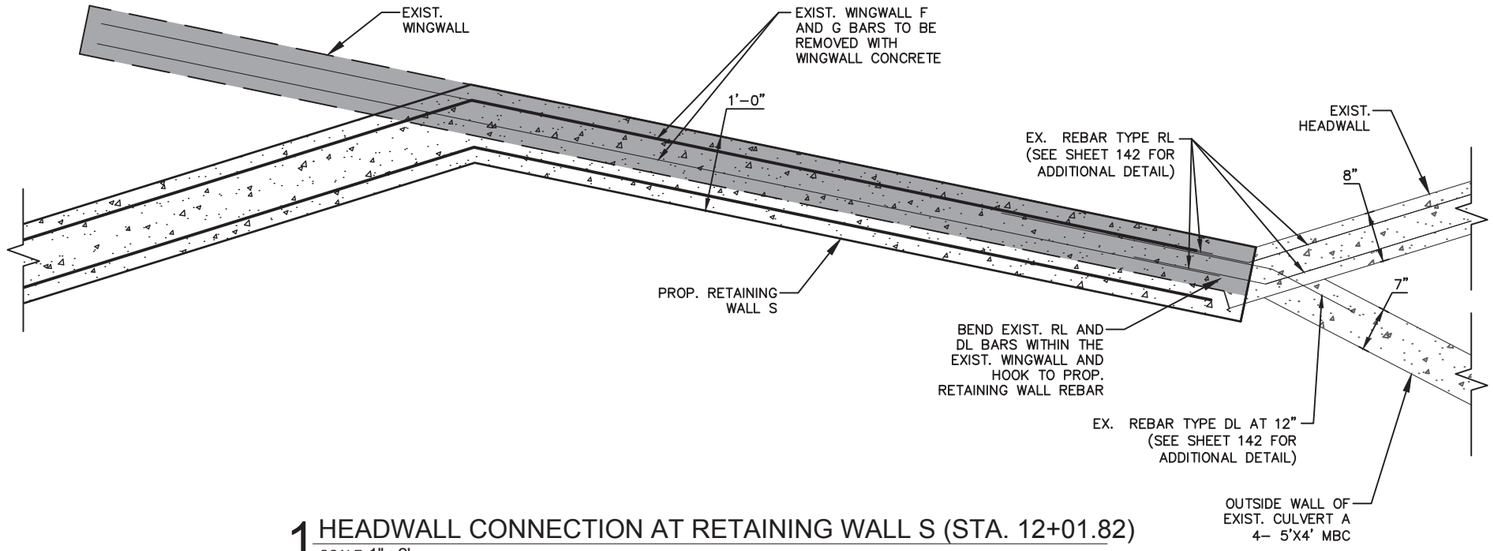
RETAINING WALL MISCELLANEOUS DETAILS

RW 2

FILE: rwstde11.dgn	DN: TxDOT	CK: TxDOT	DW: JGD	CK: MJG
©TxDOT March 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
04-11: Added Note 2.	DIST	COUNTY		SHEET NO.
				154

DATE:
FILE:

Bid 1710-194



1 HEADWALL CONNECTION AT RETAINING WALL S (STA. 12+01.82)

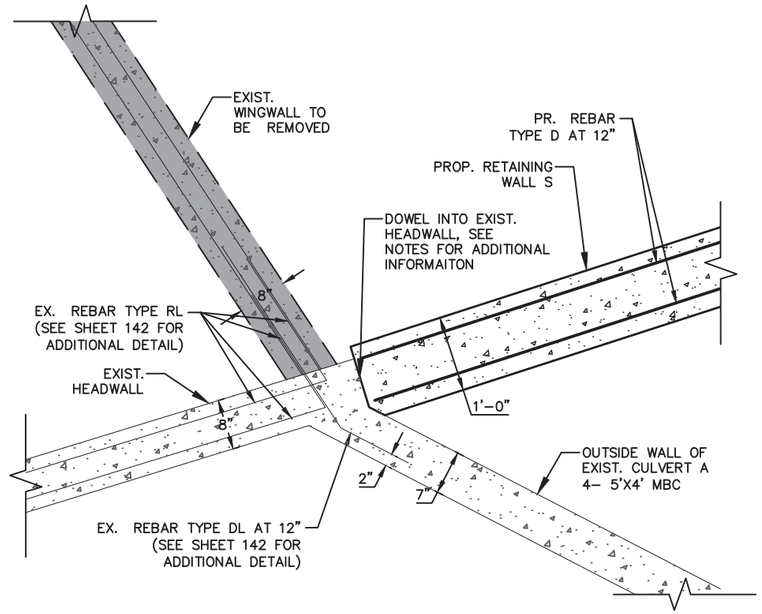
SCALE: 1" : 2'

NOTES:

1. EXISTING WINGWALL CONCRETE TO BE REMOVED.

LEGEND

CONCRETE TO BE REMOVED



2 HEADWALL CONNECTION AT RETAINING WALL S (STA. 12+33.46)

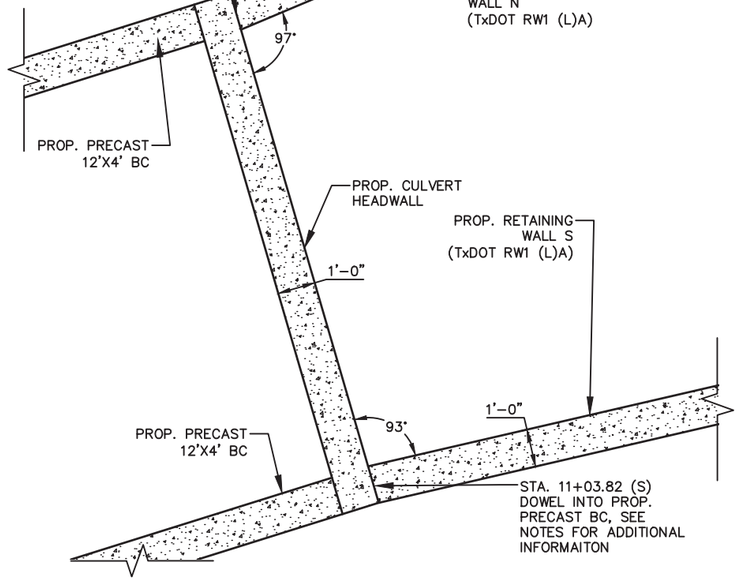
SCALE: 1" : 2'

NOTES:

1. EXISTING WINGWALL CONCRETE AND REINFORCING STEEL TO BE REMOVED.
2. USE #4 DOWELS, CONNECT, DRILL AND SET W/ HILTI HIT–RE 500, 12" MIN. EMBED AT CURB, TOP SLAB AND BOTTOM SLAB, 6" MIN. EMBED AT MBC OPENING.
3. DOWELL SPACING SHALL MATCH RETAINING WALL REINFORCING STEEL SPACING.

LEGEND

CONCRETE TO BE REMOVED

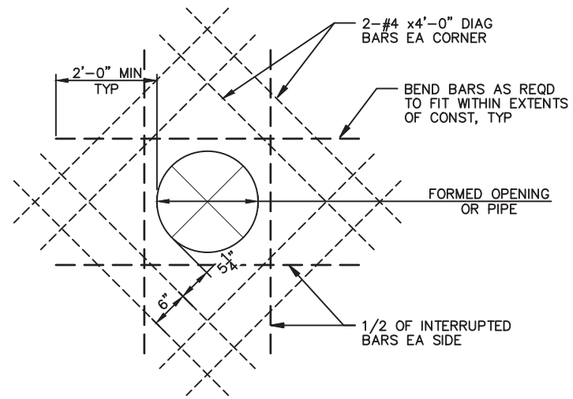


3 HEADWALL CONNECTION AT RET. WALLS N (STA. 11+03.87) & S (STA. 11+03.82)

SCALE: 1" : 4'

NOTES:

1. USE #4 DOWELS, CONNECT, DRILL AND SET W/ HILTI HIT–RE 500, 12" MIN. EMBED.
2. DOWELL SPACING SHALL MATCH RETAINING WALL REINFORCING STEEL SPACING.



NOTES:

1. CUT REINFORCEMENT INTERRUPTED BY OPENING AND ADD ADDITIONAL QUANTITY AND SIZE OF REINFORCING BARS TO MATCH CUT BARS EACH SIDE OF OPENING, TYPICAL (INTERRUPTED BARS).
2. ADD DIAGONAL BARS AS SHOWN IN DETAIL.

4 TYPICAL WALL PENETRATION

SCALE: 1" : 2'

8.4.17

STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER

Stephanie D Blew

FOR CITY USE ONLY:

SITE PLAN APPROVAL Sheet 155of 273
FILE NUMBER: SP–2016–0186D APPLICATION DATE: 4/19/2016
APPROVED BY COMMISSION ON: _____ UNDER SECTION _____ OF CHAPTER _____ OF THE CITY OF AUSTIN CODE.
EXPIRATION DATE (25–5–81,LDC)_____ CASE MANAGER _____
PROJECT EXPIRATION DATE (ORD.#970905–A)_____ DWPZ ___ DDZ ___

Director, Planning and Development Review Department
RELEASED FOR GENERAL COMPLIANCE: _____ ZONING: _____
Rev. 1 _____ Correction 1 _____
Rev. 2 _____ Correction 2 _____
Rev. 3 _____ Correction 3 _____

FINAL PLAT MUST BE RECORDED BY THE PROJECT EXPIRATION DATE, IF APPLICABLE. SUBSEQUENT SITE PLANS WHICH DO NOT COMPLY WITH THE CODE CURRENT AT THE TIME OF FILING, AND ALL REQUIRED BUILDING PERMITS AND/OR A NOTICE OF CONSTRUCTION (IF A BUILDING PERMIT IS NOT REQUIRED), MUST ALSO BE APPROVED PRIOR TO THE PROJECT EXPIRATION DATE.

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

Stantec
221 West Sixth Street, Suite 600
Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
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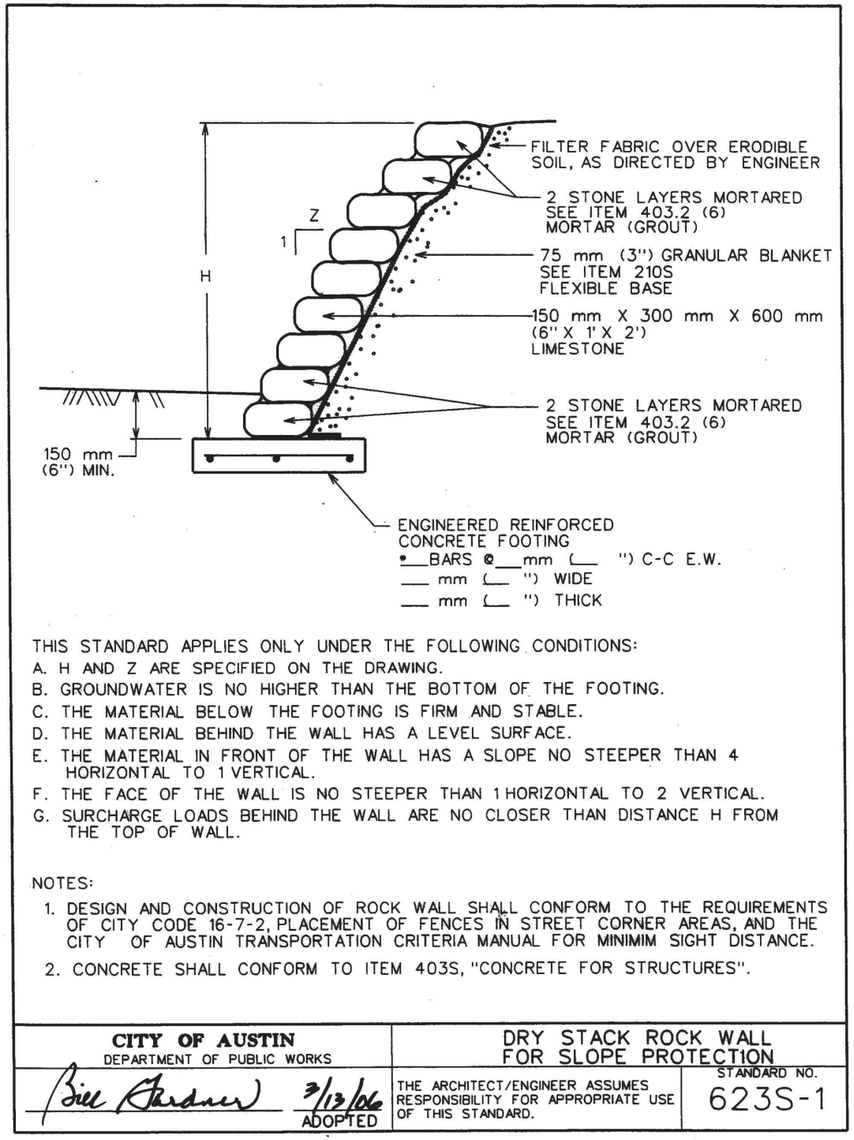
RETAINING WALL DETAILS 3

SHEET 155 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				155

SP-2016-0186D

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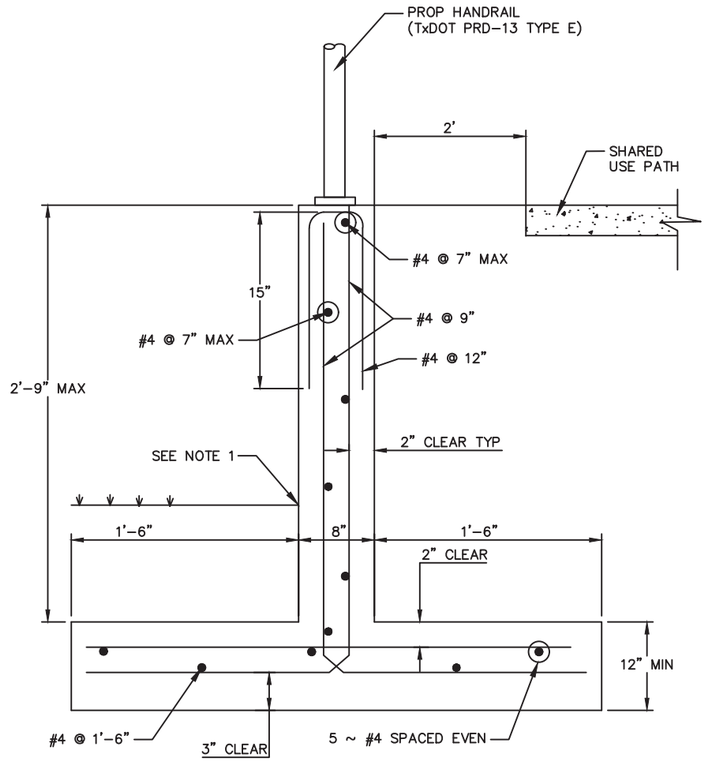
THIS STANDARD APPLIES ONLY UNDER THE FOLLOWING CONDITIONS:

A. H AND Z ARE SPECIFIED ON THE DRAWING.
B. GROUNDWATER IS NO HIGHER THAN THE BOTTOM OF THE FOOTING.
C. THE MATERIAL BELOW THE FOOTING IS FIRM AND STABLE.
D. THE MATERIAL BEHIND THE WALL HAS A LEVEL SURFACE.
E. THE MATERIAL IN FRONT OF THE WALL HAS A SLOPE NO STEEPER THAN 4 HORIZONTAL TO 1 VERTICAL.
F. THE FACE OF THE WALL IS NO STEEPER THAN 1 HORIZONTAL TO 2 VERTICAL.
G. SURCHARGE LOADS BEHIND THE WALL ARE NO CLOSER THAN DISTANCE H FROM THE TOP OF WALL.

NOTES:

1. DESIGN AND CONSTRUCTION OF ROCK WALL SHALL CONFORM TO THE REQUIREMENTS OF CITY CODE 16-7-2, PLACEMENT OF FENCES IN STREET CORNER AREAS, AND THE CITY OF AUSTIN TRANSPORTATION CRITERIA MANUAL FOR MINIMIM SIGHT DISTANCE.
2. CONCRETE SHALL CONFORM TO ITEM 403S, "CONCRETE FOR STRUCTURES".

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	DRY STACK ROCK WALL FOR SLOPE PROTECTION	
Bill Gardner 3/13/06 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 623S-1



NOTES:
1. BOTTOM OF WALL ELEVATIONS SHOWN ON PLANS INDICATE THE LOWEST EXPOSED ELEVATION FOR THE FACE OF WALL.

SHARED USE PATH RETAINING WALL DETAIL

NTS

8.4.17 STATE OF TEXAS STEPHANIE D. BLEW 92682 LICENSED PROFESSIONAL ENGINEER
Stephanie D Blew

FOR CITY USE ONLY:

SITE PLAN APPROVAL Sheet 156 of 273
FILE NUMBER: SP-2016-0186D APPLICATION DATE: 4/19/2016
APPROVED BY COMMISSION ON: _____ UNDER SECTION _____ OF CHAPTER _____ OF THE CITY OF AUSTIN CODE.
EXPIRATION DATE (25-5-81,LDC)_____ CASE MANAGER _____
PROJECT EXPIRATION DATE (ORD.#970905-A)_____ DWPZ ___ DDZ ___

Director, Planning and Development Review Department
RELEASED FOR GENERAL COMPLIANCE:_____ ZONING: _____
Rev. 1 _____ Correction 1 _____
Rev. 2 _____ Correction 2 _____
Rev. 3 _____ Correction 3 _____

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NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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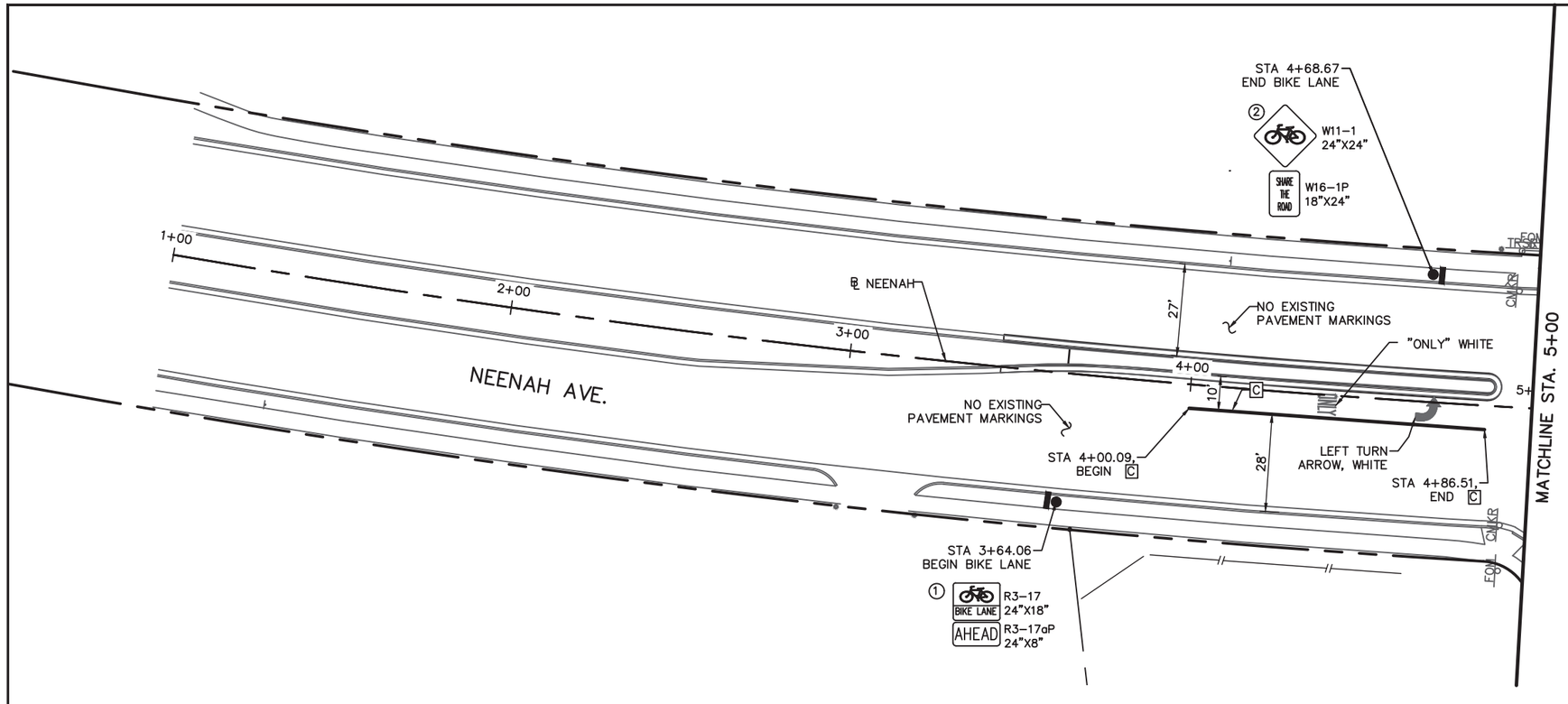
RETAINING WALL DETAILS 4

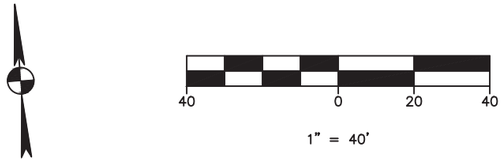
SHEET 156 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				156

SP-2016-0186D

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LEGEND

- A 4" WHITE BROKEN W/RAIS PAV MRKR TYPE I-C @40' C-C
- B 4" WHITE SOLID
- C 8" WHITE SOLID
- D 4" YELLOW SOLID
- E 12" YELLOW SOLID
- F 12" WHITE SOLID
- G 4" YELLOW BROKEN W/RAIS PAV MRKR TYPE II-A-A @ 40' C-C
- H 24" WHITE SOLID
- I CROSSWALK STRIPING
- J 6" WHITE DASHED
- K 6" WHITE SOLID
- RAISED PAVEMENT MARKER
- PROPOSED SIGN
- METAL BEAM GUARD FENCE

NOTES:

1. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
2. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
3. REFER TO INTERSECTION LAYOUT SHEETS FOR MORE INFORMATION.
4. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
5. CONTRACTOR TO REMOVE TEMPORARY AND EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS SHOWN.
6. REFER TO SIGNAGE AND PAVEMENT MARKINGS DETAILS FOR ADDITIONAL INFORMATION.
7. ALL PAVEMENT TO RECEIVE A SEAL COAT PRIOR TO PERMANENT PAVEMENT MARKINGS SHOWN BEING INSTALLED.
8. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
9. CONTRACTOR SHALL PROTECT EXISTING PAVEMENT MARKINGS NOT SHOWN FOR REMOVAL. RESTORATION OF MARKINGS TO REMAIN SHALL BE AT THE EXPENSES OF THE CONTRACTOR.



NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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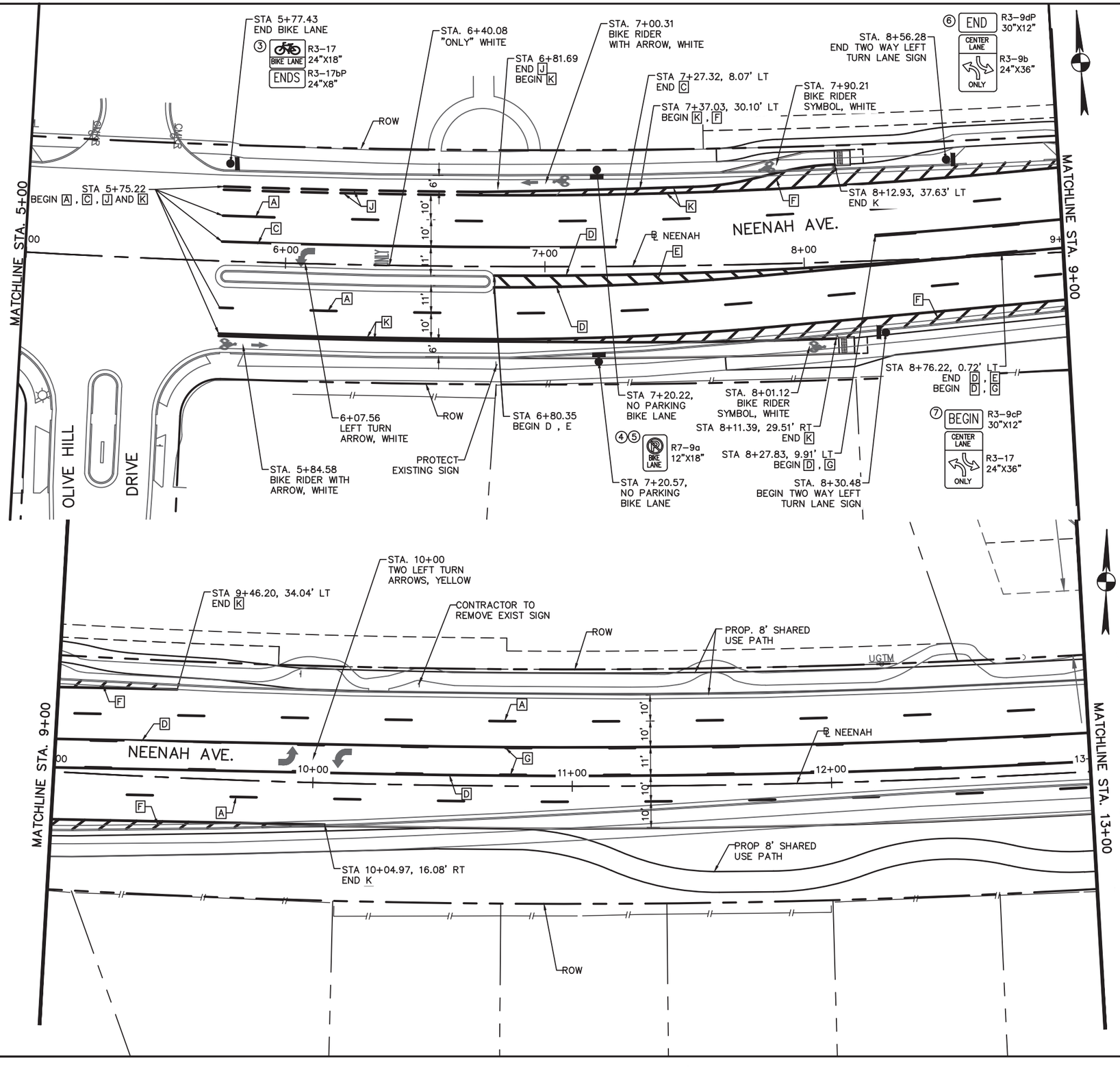
SIGNAGE AND PAVEMENT MARKINGS
STA. 1+00 TO STA. 5+00

SHEET 157 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				157

SP-2016-0186D

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40 0 20 40

1" = 40'

LEGEND

- A 4" WHITE BROKEN W/RAIS PAV MRKR TYPE I-C @ 40' C-C
- B 4" WHITE SOLID
- C 8" WHITE SOLID
- D 4" YELLOW SOLID
- E 12" YELLOW SOLID
- F 12" WHITE SOLID
- G 4" YELLOW BROKEN W/RAIS PAV MRKR TYPE II-A-A @ 40' C-C
- H 24" WHITE SOLID
- I CROSSWALK STRIPING
- J 6" WHITE DASHED
- K 6" WHITE SOLID
- RAISED PAVEMENT MARKER
- PROPOSED SIGN
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8. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
9. CONTRACTOR SHALL PROTECT EXISTING PAVEMENT MARKINGS NOT SHOWN FOR REMOVAL. RESTORATION OF MARKINGS TO REMAIN SHALL BE AT THE EXPENSES OF THE CONTRACTOR.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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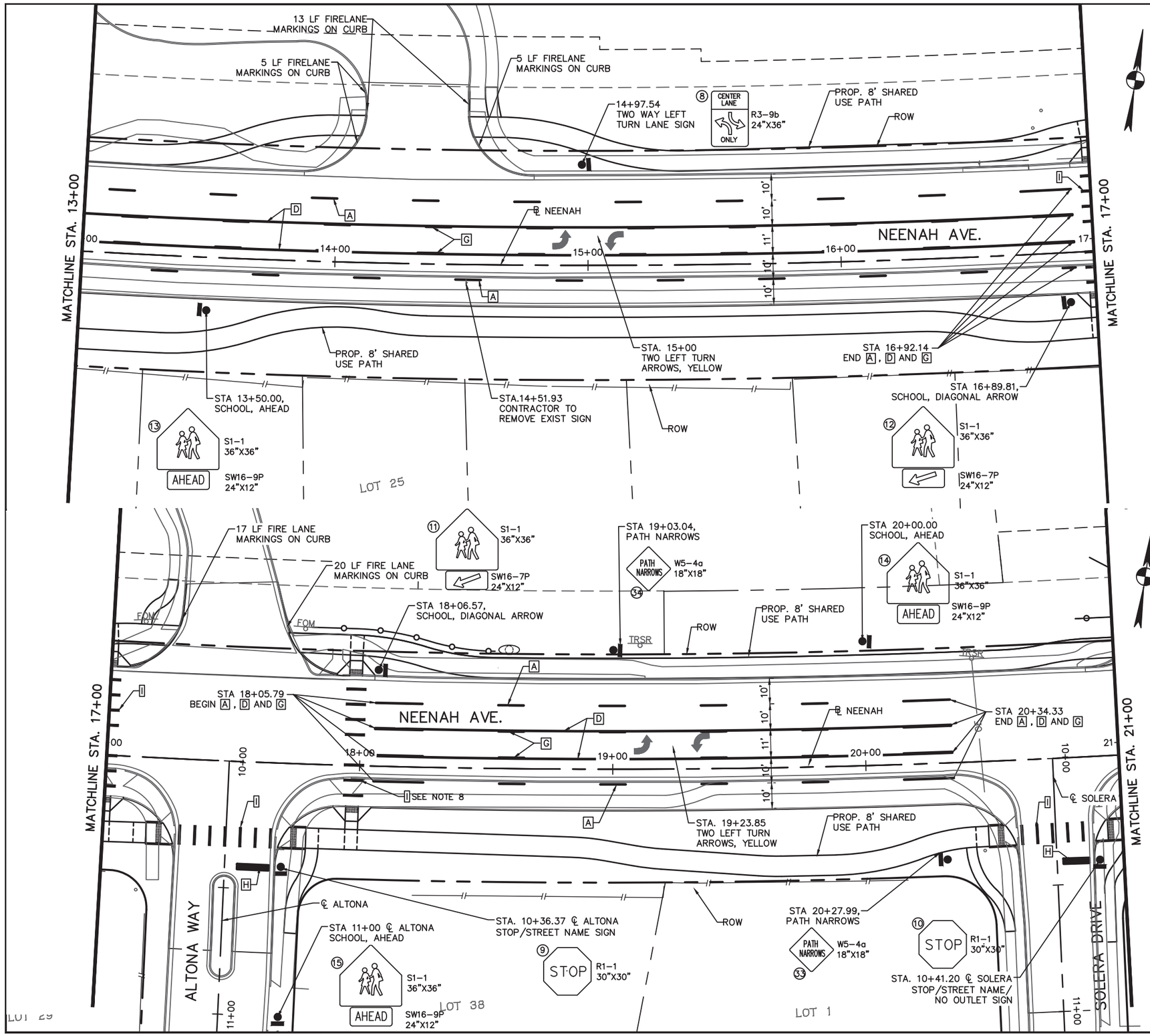
SIGNAGE AND PAVEMENT MARKINGS STA. 5+00 TO STA. 13+00

SHEET 158 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				158

SP-2016-0186D

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LEGEND

- A 4" WHITE BROKEN W/RAIS PAV MRKR TYPE I-C @ 40' C-C
- B 4" WHITE SOLID
- C 8" WHITE SOLID
- D 4" YELLOW SOLID
- E 12" YELLOW SOLID
- F 12" WHITE SOLID
- G 4" YELLOW BROKEN W/RAIS PAV MRKR TYPE II-A-A @ 40' C-C
- H 24" WHITE SOLID
- I CROSSWALK STRIPING
- J 6" WHITE DASHED
- K 6" WHITE SOLID
- RAISED PAVEMENT MARKER
- PROPOSED SIGN
- METAL BEAM GUARD FENCE
- OM ASSM (OM-2Z) FLX (GND)

NOTES:

1. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
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6. REFER TO SIGNAGE AND PAVEMENT MARKINGS DETAILS FOR ADDITIONAL INFORMATION.
7. ALL PAVEMENT TO RECEIVE A SEAL COAT PRIOR TO PERMANENT PAVEMENT MARKINGS SHOWN BEING INSTALLED.
8. THE CONTRACTOR SHALL COORDINATE LOCATION OF CROSSWALK WITH SCHOOL OFFICIALS.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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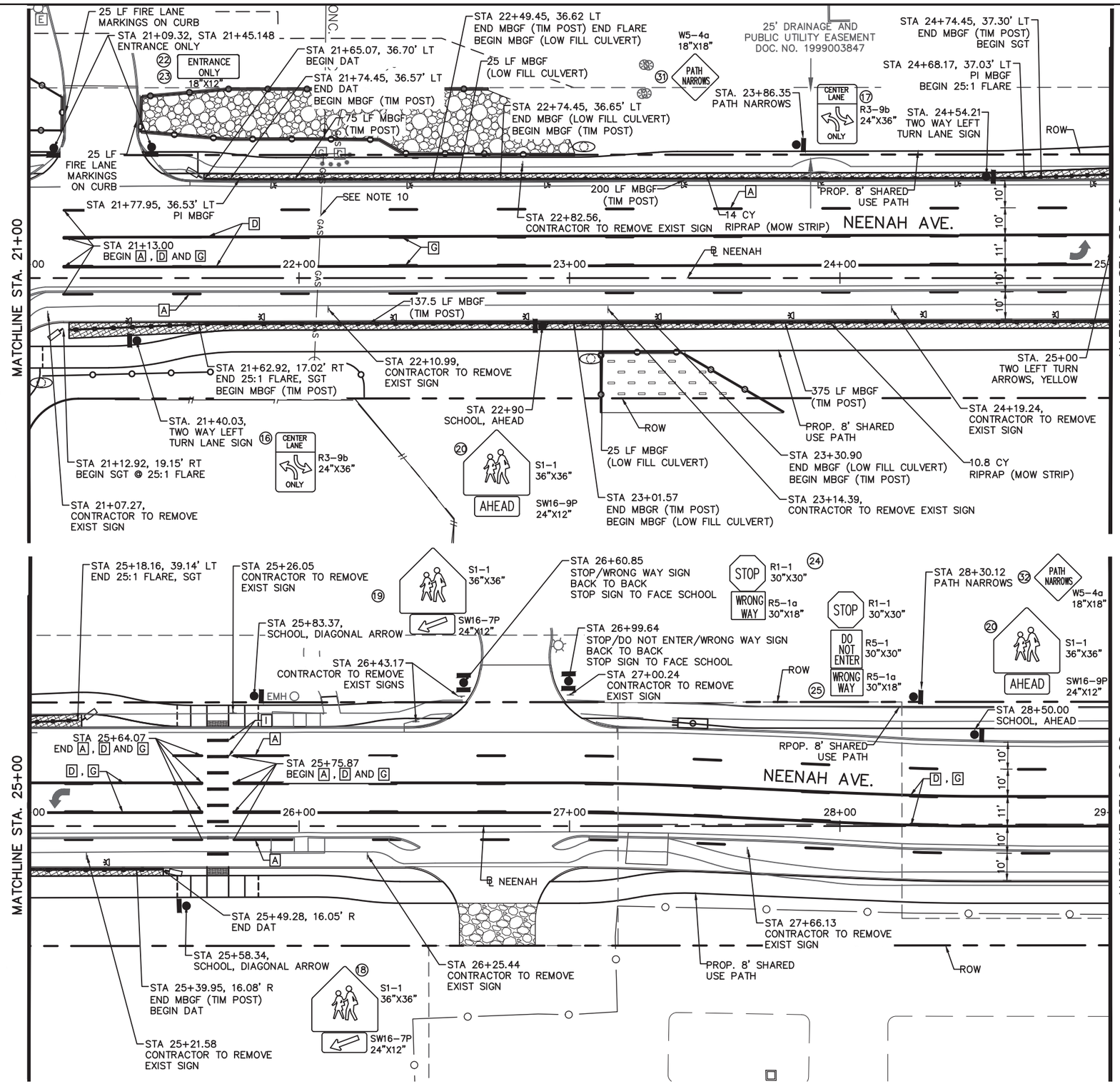
SIGNAGE AND PAVEMENT MARKINGS STA. 13+00 TO STA. 21+00

SHEET 159 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				159

SP-2016-0186D

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40 0 20 40

1" = 40'

LEGEND

- A — 4" WHITE BROKEN W/RAIS PAV MRKR TYPE I–C @ 40' C–C
- B — 4" WHITE SOLID
- C — 8" WHITE SOLID
- D — 4" YELLOW SOLID
- E — 12" YELLOW SOLID
- F — 12" WHITE SOLID
- G — 4" YELLOW BROKEN W/RAIS PAV MRKR TYPE II–A–A @ 40' C–C
- H — 24" WHITE SOLID
- I — CROSSWALK STRIPING
- J — 6" WHITE DASHED
- K — 6" WHITE SOLID
- RAISED PAVEMENT MARKER
- PROPOSED SIGN
- OM ASSM (OM–2Y) WC (GND)
- DELIN ASSM (D–SW)SZ 1(BRF)GF2
- METAL BEAM GUARD FENCE
- MOW STRIP
- OM ASSM (OM–2Z) FLX (GND)

NOTES:

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6. ALL PAVEMENT TO RECEIVE A SEAL COAT PRIOR TO PERMANENT PAVEMENT MARKINGS SHOWN BEING INSTALLED.
7. REFER TO DRAINAGE SHEETS FOR ADDITIONAL INFORMATION.
8. REFER TO RETAINING WALL SHEETS FOR ADDITIONAL INFORMATION.
9. SEE SHEETS 165 TO 184 FOR TXDOT METAL BEAM GUARD FENCE, PAVEMENT MARKINGS, AND SIGN DETAILS.
10. THE CONTRACTOR'S ATTENTION IS CALLED TO EXISTING GAS LINE IN VICINITY OF METAL BEAM GUARD FENCE. CONTRACTOR TO LOCATE GAS LINE AND ADJUST MBGF POST LOCATIONS TO AVOID CONFLICT WITH GAS LINE.
11. NORTH GUARDRAIL SHALL INCLUDE A DOUBLE–NESTED RAIL ELEMENT WITH REDUCED POST SPACING AT 3' – 1½".
12. SOUTH GUARDRAIL SHALL INCLUDE WOODEN BLOCKOUTS WITH A REDUCED POST SPACING AT 3' – 1½".
13. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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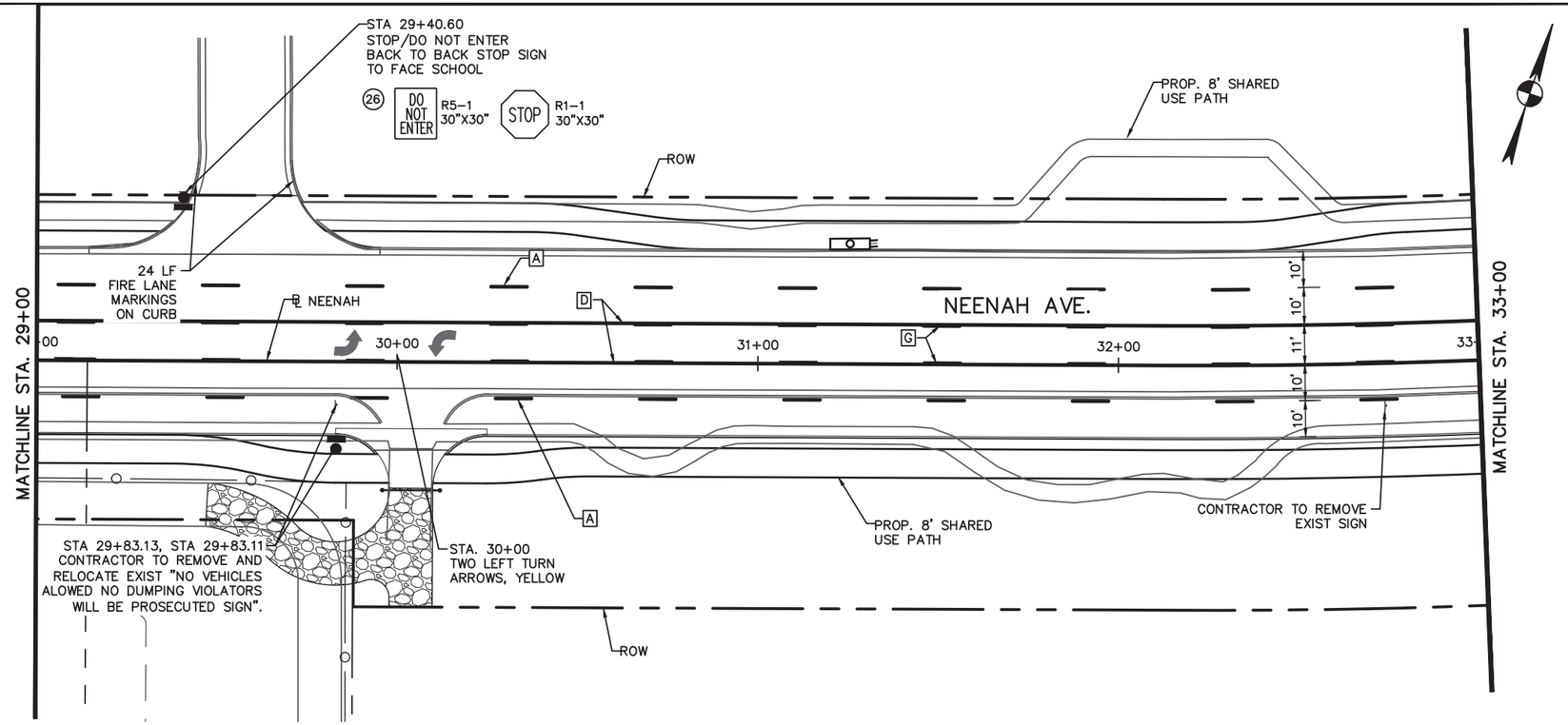
SIGNAGE AND PAVEMENT MARKINGS STA. 21+00 TO STA. 29+00

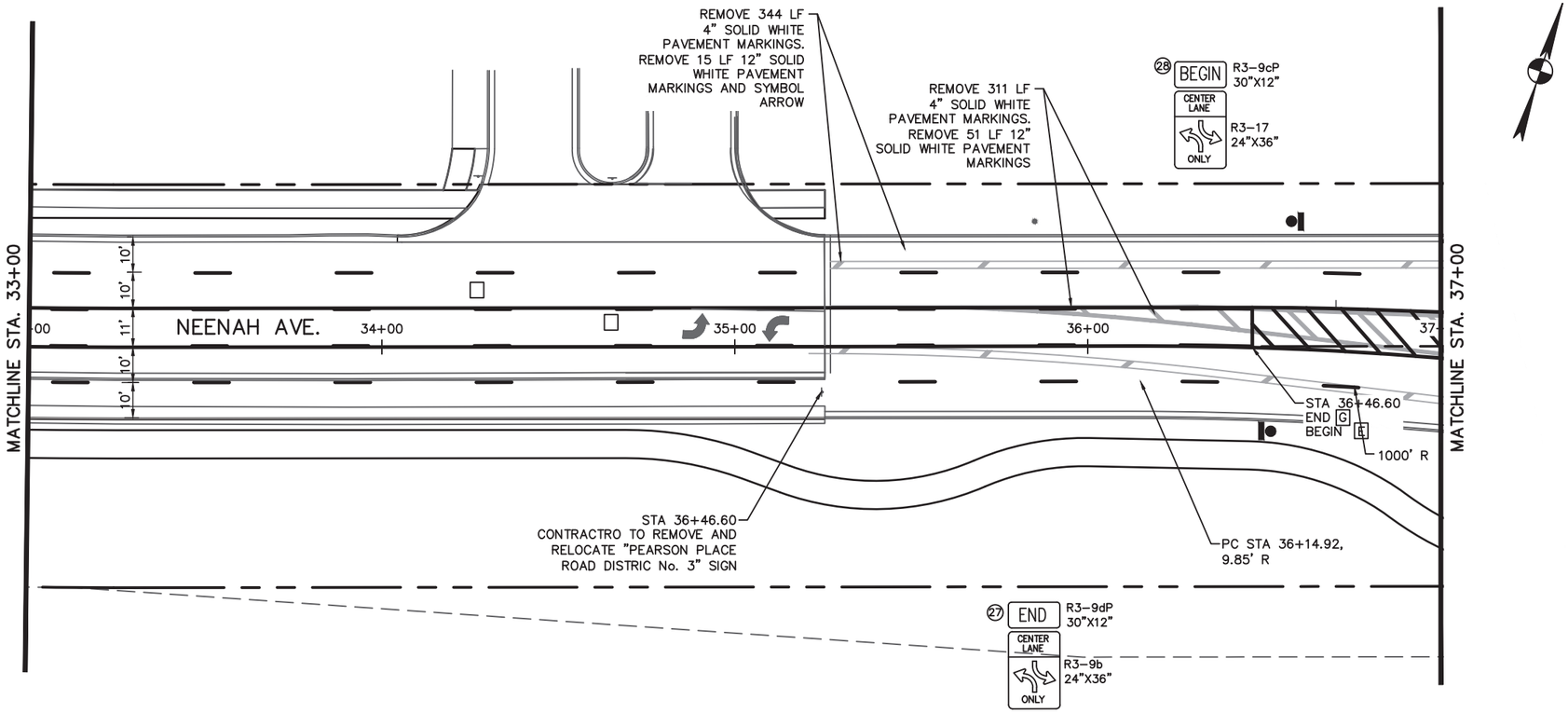
SHEET 160 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	–	14	WILLIAMSON				160

SP-2016-0186D

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LEGEND

- A 4" WHITE BROKEN W/RAIS PAV MRKR TYPE I-C @ 40' C-C
- B 4" WHITE SOLID
- C 8" WHITE SOLID
- D 4" YELLOW SOLID
- E 12" YELLOW SOLID
- F 12" WHITE SOLID
- G 4" YELLOW BROKEN W/RAIS PAV MRKR TYPE II-A-A @ 40' C-C
- H 24" WHITE SOLID
- I CROSSWALK STRIPING
- J 6" WHITE DASHED
- K 6" WHITE SOLID
- RAISED PAVEMENT MARKER
- PROPOSED SIGN
- METAL BEAM GUARD FENCE

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NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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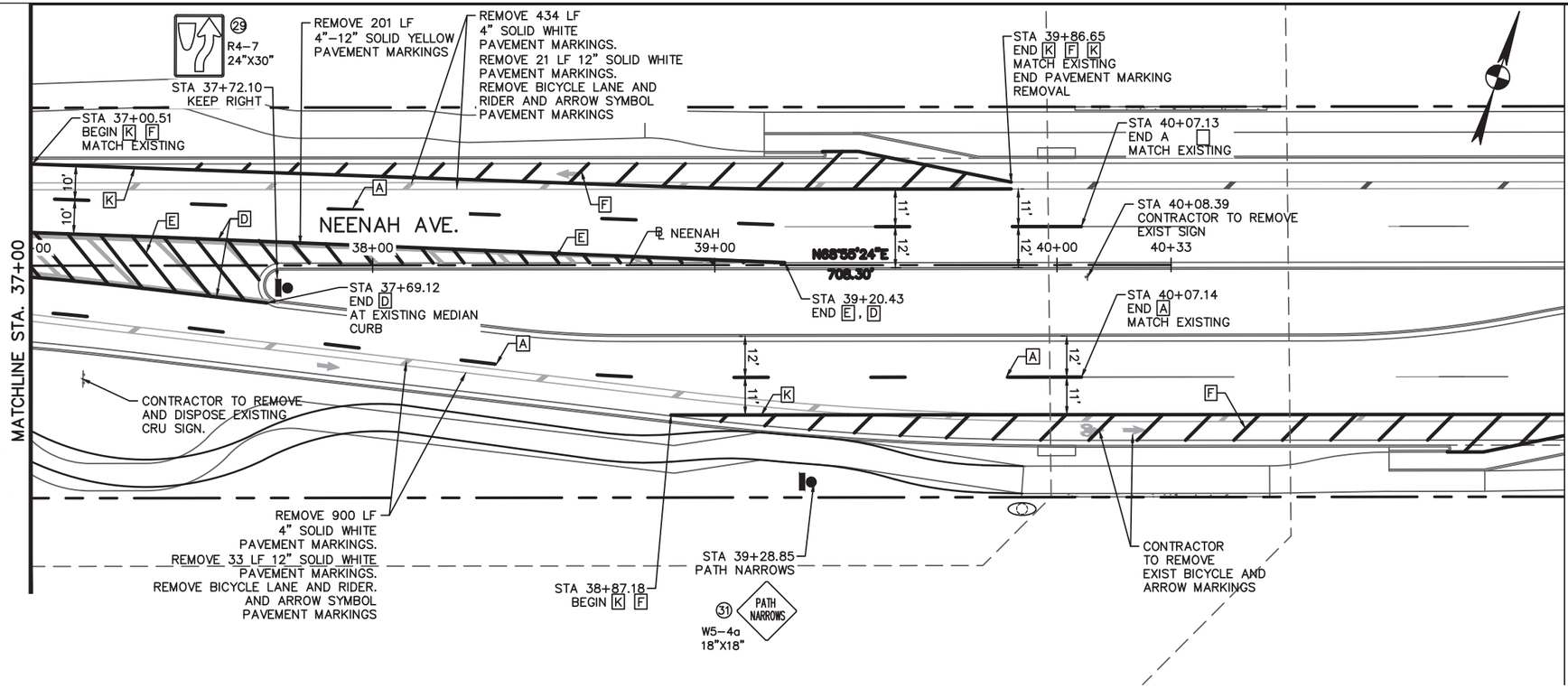
SIGNAGE AND PAVEMENT MARKINGS STA. 29+00 TO 37+00

SHEET 161 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				161

SP-2016-0186D

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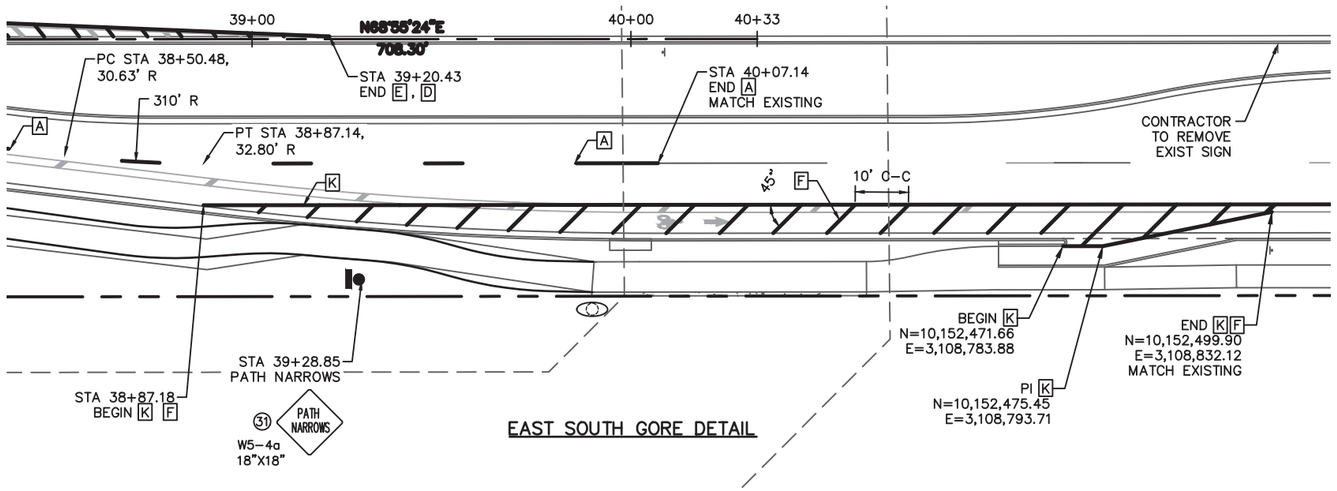
1" = 40'

LEGEND

- A 4" WHITE BROKEN W/RAIS PAV MRKR TYPE I-C @ 40' C-C
- B 4" WHITE SOLID
- C 8" WHITE SOLID
- D 4" YELLOW SOLID
- E 12" YELLOW SOLID
- F 12" WHITE SOLID
- G 4" YELLOW BROKEN W/RAIS PAV MRKR TYPE II-A-A @ 40' C-C
- H 24" WHITE SOLID
- I CROSSWALK STRIPING
- J 6" WHITE DASHED
- K 6" WHITE SOLID
- RAISED PAVEMENT MARKER
- PROPOSED SIGN
- METAL BEAM GUARD FENCE
- OM ASSM (OM-2Z) FLX (GND)

NOTES:

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4. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
5. CONTRACTOR TO REMOVE TEMPORARY AND EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS SHOWN.
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EAST SOUTH GORE DETAIL

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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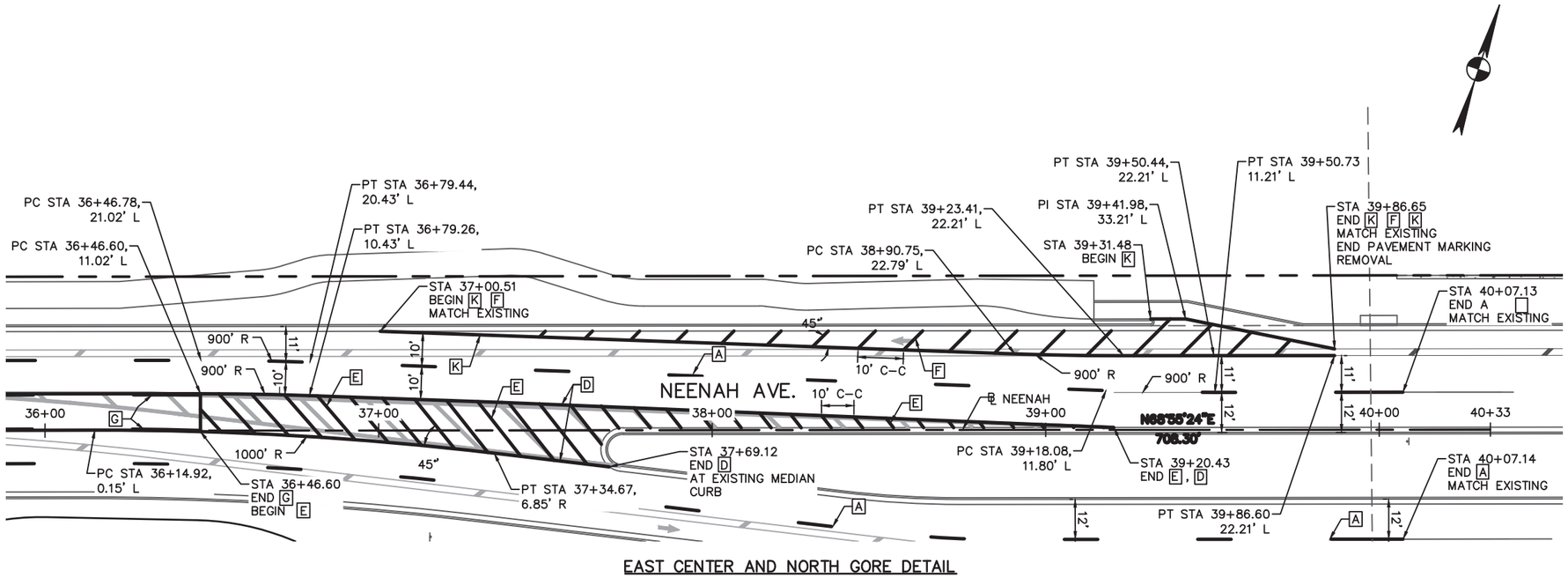
SIGNAGE AND PAVEMENT MARKINGS STA. 37+00 TO END

SHEET 162 OF 273

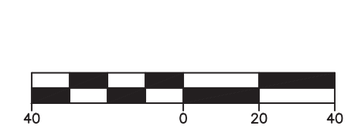
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				162

SP-2016-0186D

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EAST CENTER AND NORTH GORE DETAIL



1" = 40'

LEGEND

- A 4" WHITE SOLID
- B 4" WHITE BROKEN W/RAIS PAV MRKR TYPE I-C @ 40' C-C
- C 8" WHITE SOLID
- D 4" YELLOW SOLID
- E 12" YELLOW SOLID
- F 12" WHITE SOLID
- G 24" WHITE SOLID
- H 4" YELLOW BROKEN W/RAIS PAV MRKR TYPE II-A-A @ 40' C-C
- I CROSSWALK STRIPING
- J 6" WHITE DASHED
- K 6" WHITE SOLID
- RAISED PAVEMENT MARKER
- PROPOSED SIGN
- METAL BEAM GUARD FENCE
- OM ASSM (OM-2Z) FLX (GND)

NOTES:

1. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
2. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
3. REFER TO INTERSECTION LAYOUT SHEETS FOR MORE INFORMATION.
4. REFER TO HORIZONTAL ALIGNMENT DATA SHEET FOR MORE INFORMATION.
5. CONTRACTOR TO REMOVE TEMPORARY AND EXISTING PAVEMENT MARKINGS IN CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS SHOWN.
6. REFER TO SIGNAGE AND PAVEMENT MARKINGS DETAILS FOR ADDITIONAL INFORMATION.
7. ALL PAVEMENT TO RECEIVE A SEAL COAT PRIOR TO PERMANENT PAVEMENT MARKINGS SHOWN BEING INSTALLED.
8. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
9. CONTRACTOR SHALL PROTECT EXISTING PAVEMENT MARKINGS NOT SHOWN FOR REMOVAL. RESTORATION OF MARKINGS TO REMAIN SHALL BE AT THE EXPENSES OF THE CONTRACTOR.



NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

Stantec
221 West Sixth Street, Suite 600
Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
TBPE # F-6324 TBPLS # F-10194230
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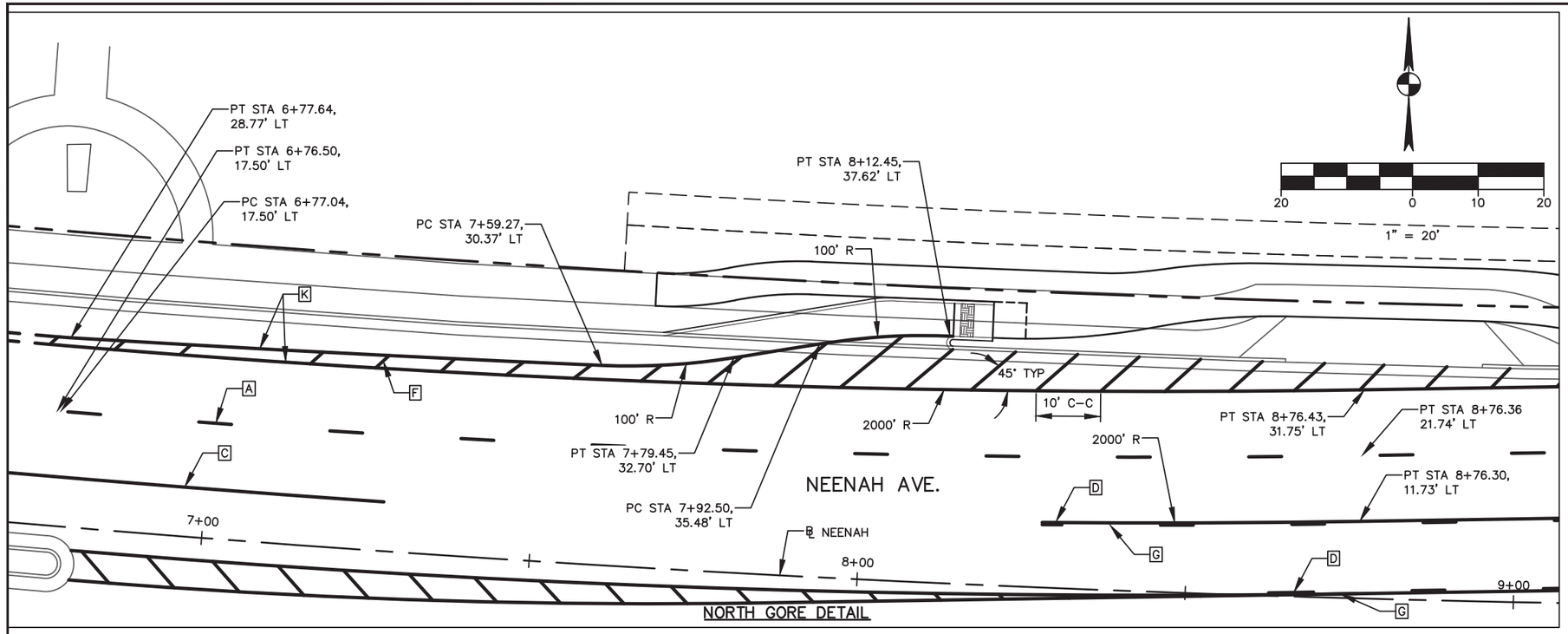
PAVEMENT MARKING GORE DETAILS

SHEET 163 OF 273

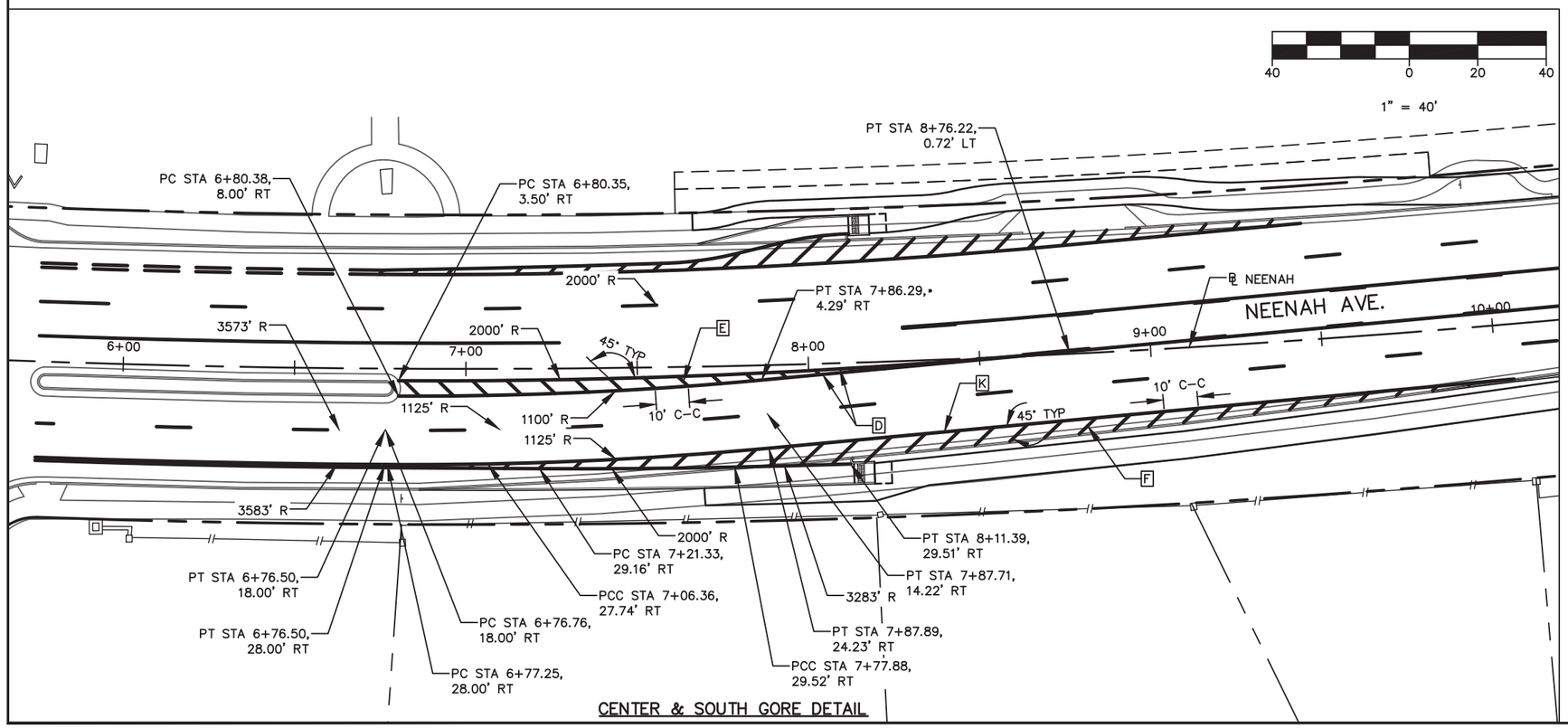
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6	TEXAS	104023-10006	_	14	WILLIAMSON				163

SP-2016-0186D

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NORTH GORE DETAIL



CENTER & SOUTH GORE DETAIL

LEGEND

- A 4" WHITE BROKEN W/RAIS PAV MRKR TYPE I–C @ 40' C–C
- B 4" WHITE SOLID
- C 8" WHITE SOLID
- D 4" YELLOW SOLID
- E 12" YELLOW SOLID
- F 12" WHITE SOLID
- G 4" YELLOW BROKEN W/RAIS PAV MRKR TYPE II–A–A @ 40' C–C
- H 24" WHITE SOLID
- I CROSSWALK STRIPING
- J 6" WHITE DASHED
- K 6" WHITE SOLID
- • RAISED PAVEMENT MARKER
- PROPOSED SIGN
- METAL BEAM GUARD FENCE

NOTES:

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8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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PAVEMENT MARKING GORE DETAILS

SHEET 164 OF 273

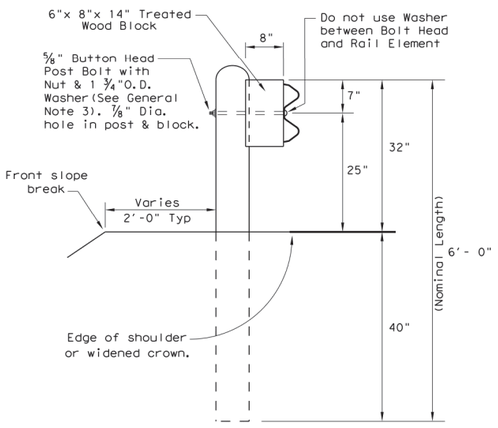
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				164

SP-2016-0186D

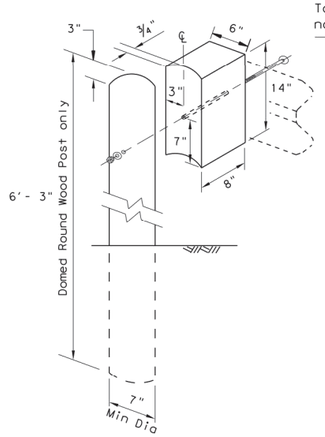
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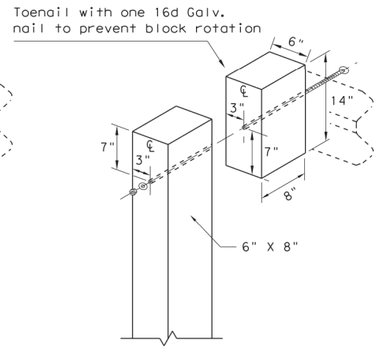
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FILE:



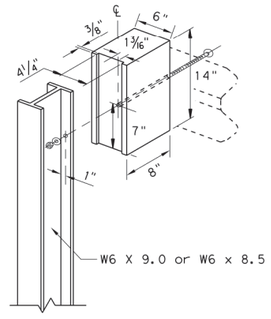
TYPICAL POST



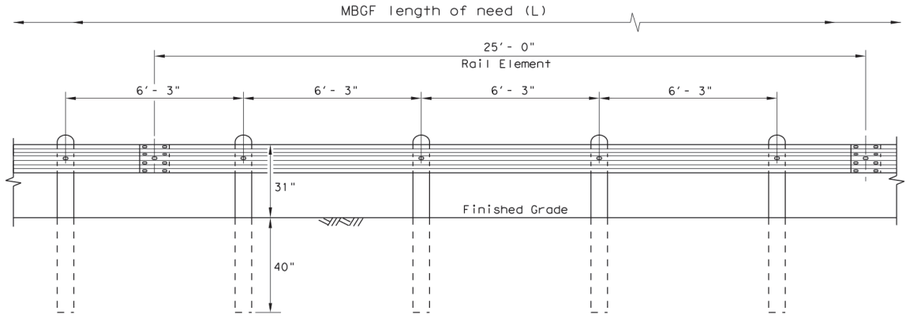
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST

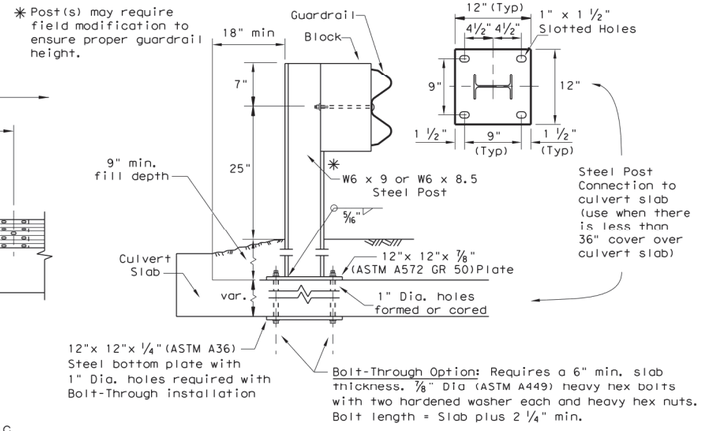


WOOD BLOCK TO STEEL POST



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)



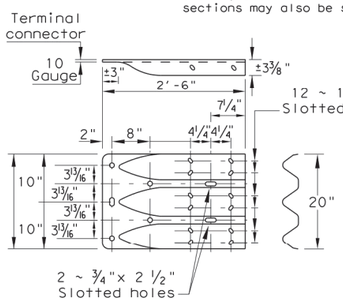
LOW FILL CULVERT POST

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 ⅞" 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, "Epoxies 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 ¼" min. beyond nut.

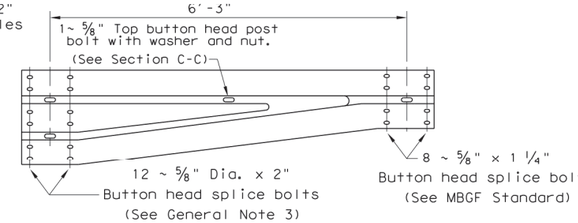
GENERAL NOTES

1. 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."
2. 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'-1½" 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.
3. 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 ¾" O.D.)washer and not more than 1" beyond it. Button head "splice" bolts (ASTM A307) are ⅝" x 1 ¼" (or 2" long at triple rail splices) with a ⅝" double recessed nut (ASTM A563). Thrie beam "connection" ⅞" dia. (ASTM A325) hex bolts shall be of sufficient length to extend through the full thickness of the rail, washers, and nuts.
4. Fittings (bolts, nuts, and washers) shall be galvanized in accordance with Item 445, "Galvanizing." Fittings shall be subsidiary to the bid item.
5. Crown shall be widened to accommodate the Metal Beam Guard Fence.
6. The lateral approach to the guard fence, shall have a maximum slope of 1V:10H.
7. 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.
8. 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.
9. 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 maybe less. Any excess post length, after meeting these depths, may be field cut to ensure proper guardrail mounting height. Backfill with a cohesionless material.
10. Posts shall not be set in concrete, of any depth.
11. Special fabrication will be required at installations having a curvature of less than 150 ft. radius.
12. 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.
13. 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.

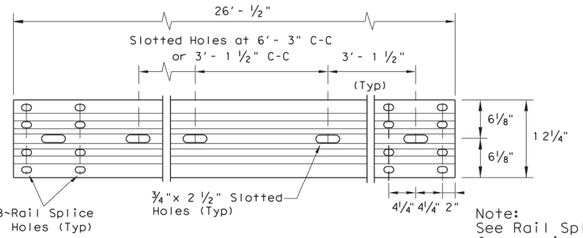


THRIE-BEAM TERMINAL CONNECTION

(See General Notes 3 & 4 for required hardware)



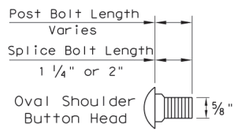
NON-SYMMETRICAL TRANSITION TO W-BEAM (10 Gauge)



Note:
See Rail Splice Detail for required hardware.

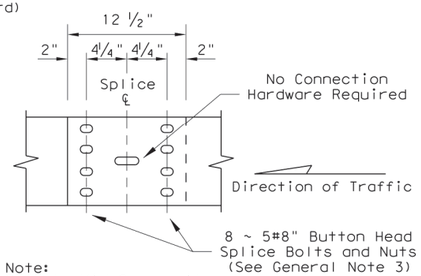
ELEVATION 25'- 0"(NOM.) W-BEAM SECTION

12'- 6" rail sections may also be supplied (See General Note 2)



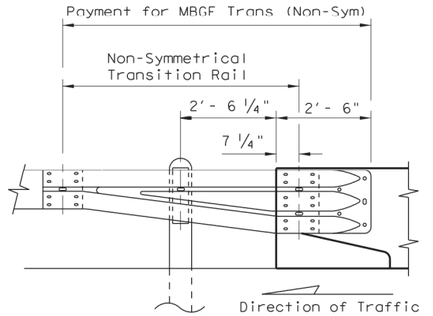
BUTTON HEAD BOLT

Post and Splice Bolts (See General Note 3)



Note:
GF(31), Mid-Span rail splices are required with 6'-3" post spacings.

MID-SPAN RAIL SPLICE DETAIL



Note:
All rail elements shall be lapped in the direction of adjacent traffic.

DOWNSTREAM RAIL ATTACHMENT

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE

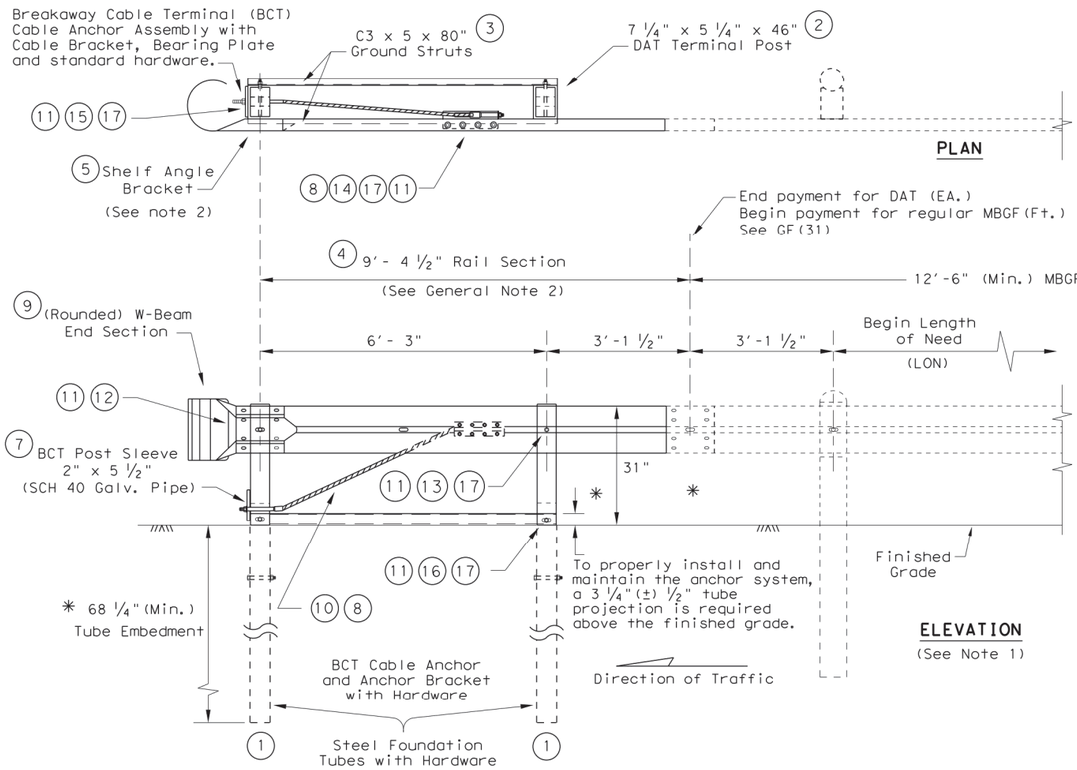
GF(31)-14

FILE: gf3114.dgn	DN: TxDOT	CK: AM	DW: VP	CK: CGL
©TxDOT: December 2011 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO. 165

BID 1710-194

Williamson County, Texas

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GENERAL NOTES

1. The detail shown is the minimum Length of Need (LON) for a DAT connected to a concrete rail.
2. The rail section at the end post is supported by the Shelf Angle Bracket. The rail element is not attached to the end post.
3. The foundation tubes shall not project more than 3 3/4" above the finished grade.
4. All hardware for DAT shall be ASTM A307 unless otherwise shown.
5. Refer to GF(31) sheet for terminal connection details.

MOW STRIP INSTALLATION

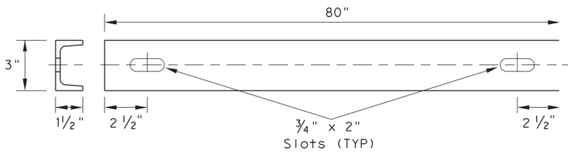
If a mow strip is required with the DAT installation the leave-out area around the steel foundation tubes and the two channel struts may be omitted. This will require a full pour at the foundation tubes.

DOWNSTREAM ANCHOR TERMINAL (DAT)

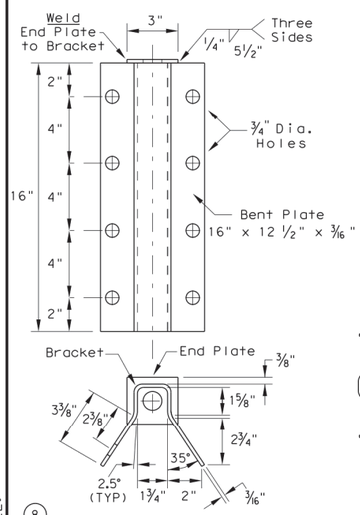
Only for downstream use, when located outside the horizontal clearance area of opposing traffic.

#	(DAT) PARTS LIST	QTY
(1)	Steel Foundation Tube	2
(2)	DAT Terminal Post	2
(3)	Channel Strut	2
(4)	Terminal Rail Element	1
(5)	Shelf Angle Bracket	1
(6)	BCT Bearing Plate	1
(7)	BCT Post Sleeve	1
(8)	Guardrail Anchor Bracket	1
(9)	(Rounded) W-Beam End Section	1
(10)	BCT Cable Anchor	1
(11)	Recessed Nut, Guardrail	20
(12)	1 1/4" Button Head Bolt	4
(13)	10" Button Head Bolt	2
(14)	5/8" x 2" Hex Head Bolt	8
(15)	5/8" x 8" Hex Head Bolt	4
(16)	5/8" x 10" Hex Head Bolt	2
(17)	5/8" Flat Washer	18

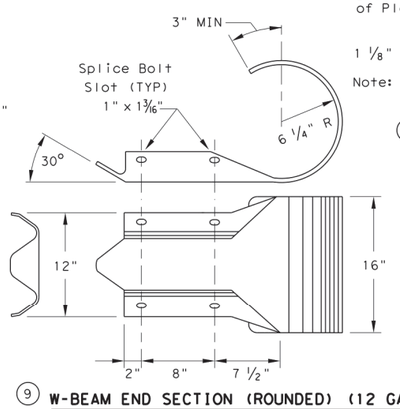
(4) TERMINAL RAIL ELEMENT FOR DAT



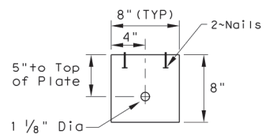
(3) CHANNEL STRUT
C3 x 5 x 80", Grade A36



(8) GUARDRAIL ANCHOR BRACKET

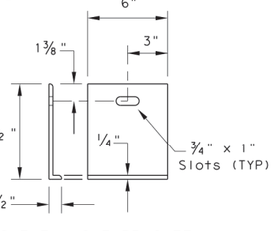


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

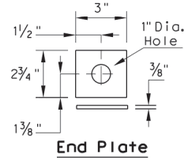


Note: Drive nails and bend over to prevent plate rotation

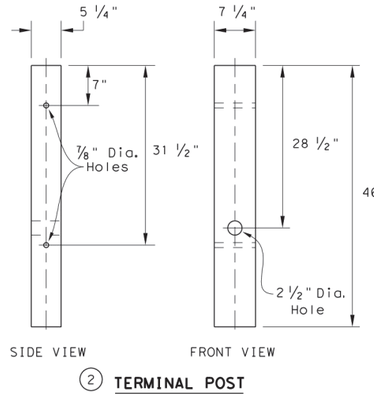
(6) BEARING PLATE
8"x 8"x 5/8" ℄



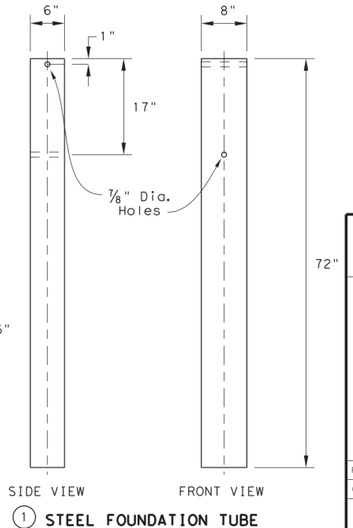
(5) SHELF ANGLE BRACKET



End Plate



(2) TERMINAL POST
7 1/4"x 5 1/4"x 46" Wood Post



(1) STEEL FOUNDATION TUBE
6"x 8"x 1/8" x 72" Steel Tube

SHEET 166 OF 273

Texas Department of Transportation

Design Division Standard

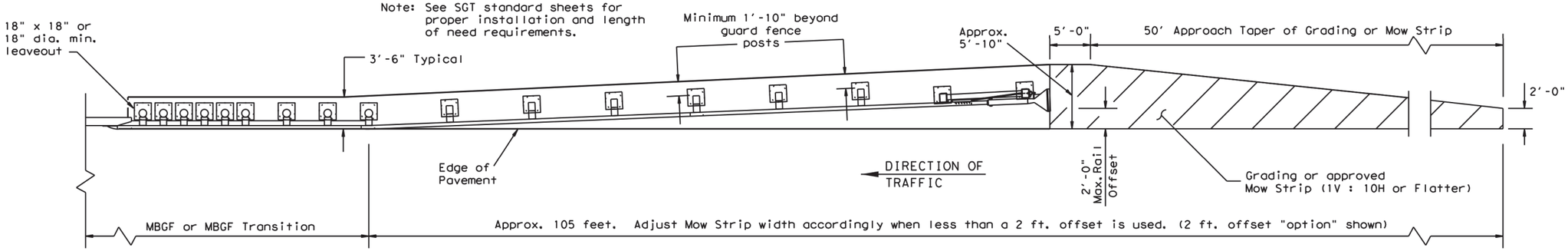
METAL BEAM GUARD FENCE
(Downstream Anchor Terminal)

GF(31)DAT-14

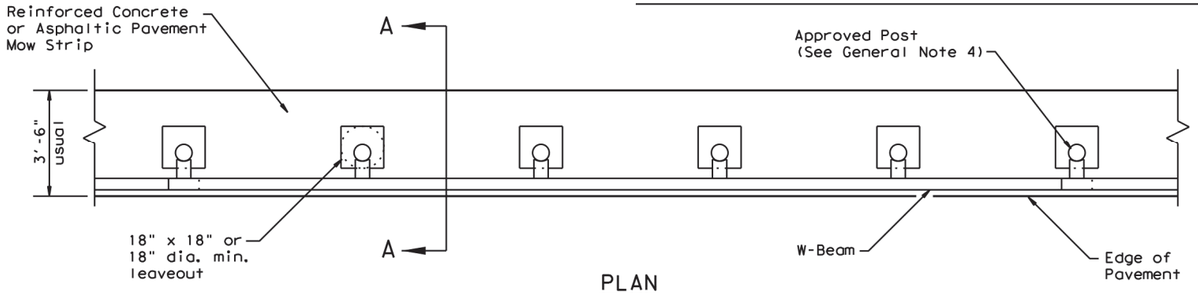
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©TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				166

DATE:
FILE: Bid1710-194

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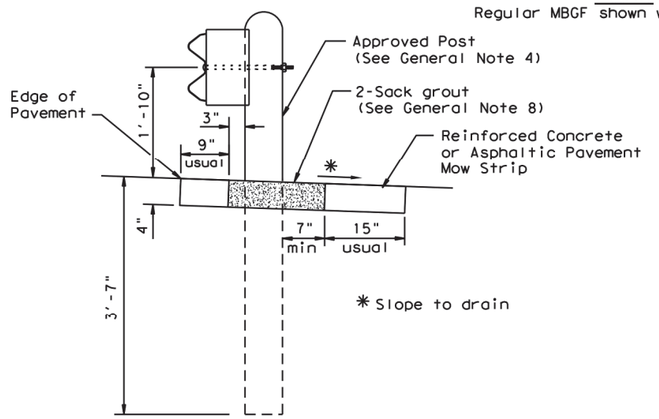


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



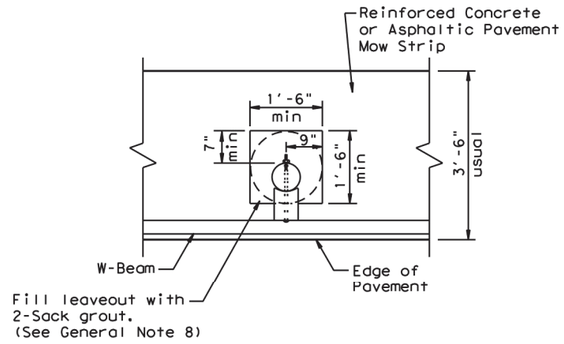
PLAN

Regular MBGF shown with Mow Strip



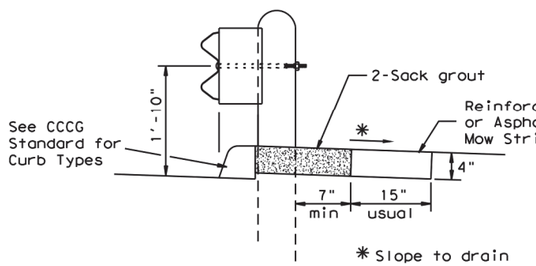
SECTION A-A

Typical



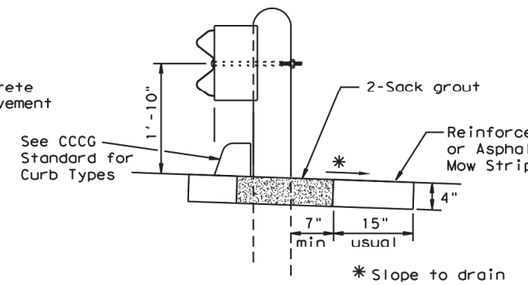
MOW STRIP DETAIL

Reinforced Concrete or Asphaltic Pavement Mow Strip with 18" x 18" or 18" dia. minimum leaveout.



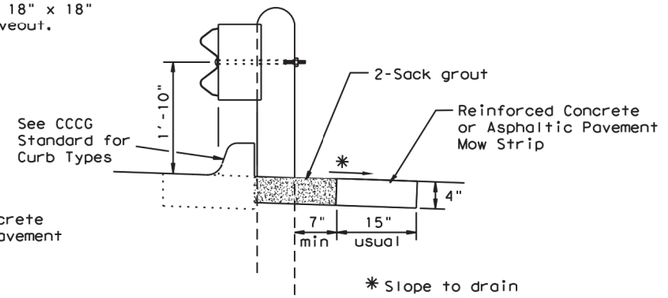
CURB OPTION (1)

This option will increase the post embedment through out the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

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 of work. Asphaltic pavement shall meet the requirements of the item, and be placed in accordance with the pertinent bid item as shown on 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 leaveout behind the post shall be a minimum of 7".
4. The type of approved post will be shown elsewhere 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. Depth of mow strip will be 4".
7. The limits of payment for asphaltic pavement or reinforced concrete will include leaveouts for post.
8. The leaveouts 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 considered subsidiary to the pay item of asphaltic pavement or reinforced concrete.

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE

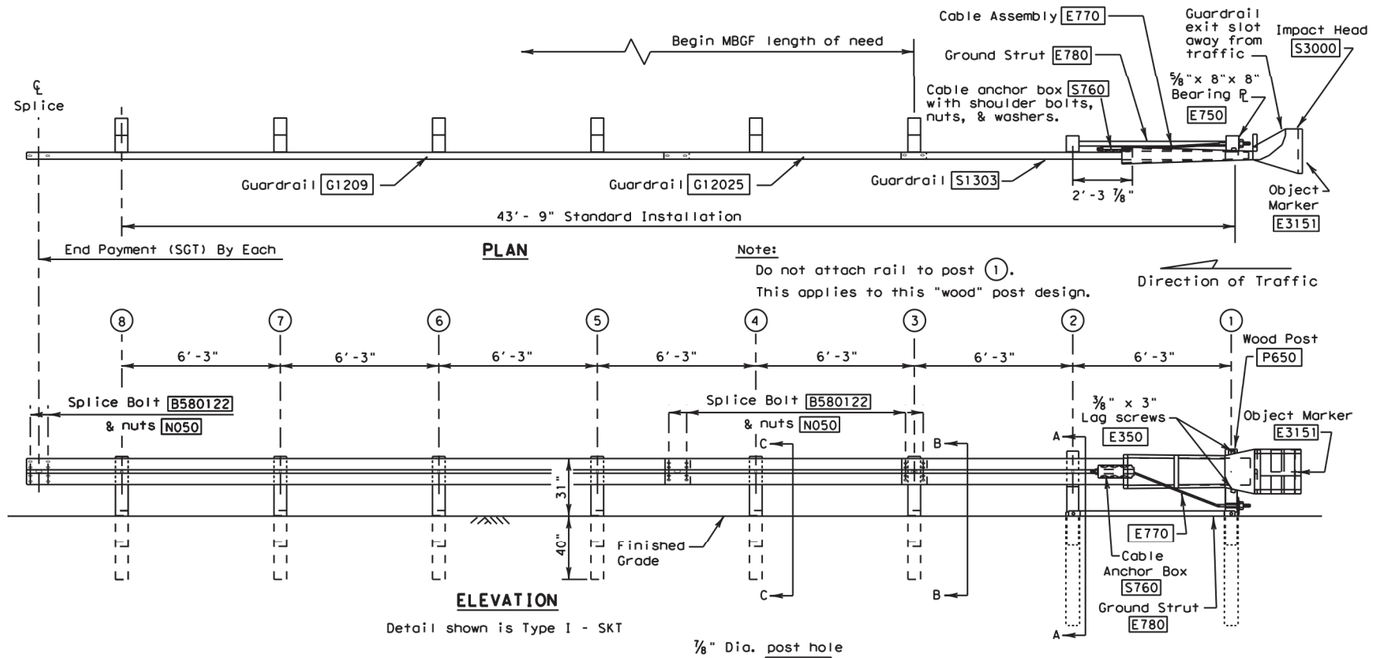
(MOW STRIP)

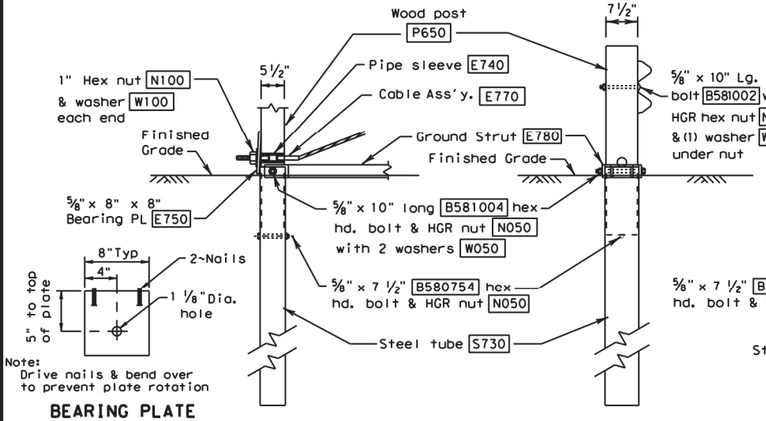
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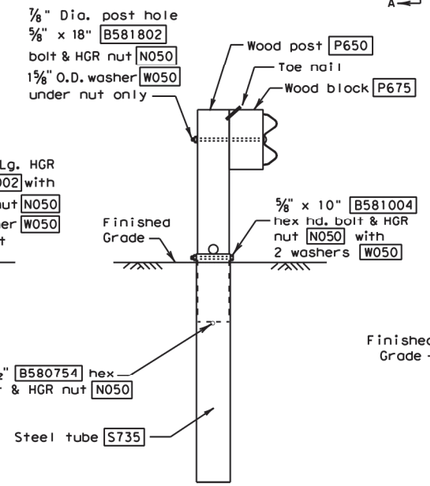
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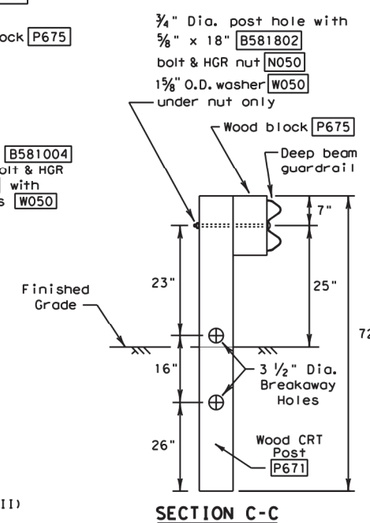
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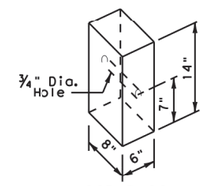
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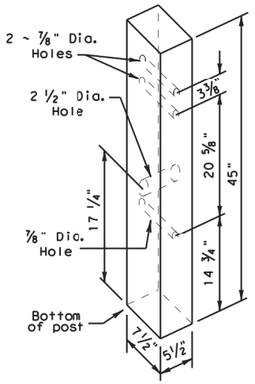


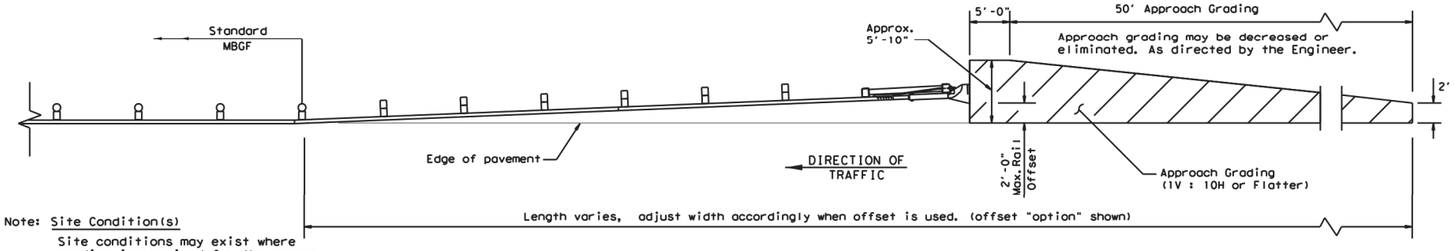












GENERAL NOTES

1. For additional information contact: Interstate Steel Inc. (432) 263-3725
2. 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

3. 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.
4. All bolts, nuts cable assemblies, cable anchors, steel tubes & bearing plates shall be galvanized.
5. 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.
6. The steel tubes shall not protrude more than 4 inches above ground. Site grading may be necessary to meet this requirement.
7. 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.
8. If solid rock is encountered. See the Manufacturer's installation manual for the proper installation guidance.
9. 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.
10. 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.
11. 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.
12. An object marker shall be installed on the front of the impact head as detailed on D&OM(VIA).

BILL OF MATERIAL

Item #	POST & TUBE OPTIONS Type I	Type II	Type III	DESCRIPTION
S1303	1	1	1	Guardrail (12 Ga.) 12'- 6" SKT
G12025	1	1	1	Guardrail (12 Ga.) 9'- 4 ½"
G1209	1	1	1	Guardrail (12 Ga.) 25'- 0"
S730	2	2	2	Steel Tube - 6" x 8" x 72" x ⅛" min. or ⅜"
S735	0	2	6	Steel Tube - 6" x 8" x 54" x ⅛" min. or ⅜"
P650	2	4	8	Wood Posts - 5 ½" x 7 ½" 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 ½"
E750	1	1	1	Bearing Plate - ⅝" 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	⅝" x 7 ½" Hex Hd. Bolt
B581004	2	4	8	⅝" x 10" Hex Hd. Bolt (Top of Tubes)
W050	11	15	23	⅝" Washers
B581002	1	1	1	⅝" x 10" HGR Post Bolt (Post 2)
B580122	16	16	16	⅝" x 1 ¼" HGR Splice Bolt
B581802	6	6	6	⅝" x 18" HGR Post Bolt (Posts ③ thru ⑧)
N050	35	39	47	⅝" HGR Nut (24-Spl, Varies-Posts, 2-Strut)
E350	2	2	2	⅜" 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	½" Structural Nut
W012A	8	8	8	½" Structural Washer
E3151	1	1	1	Object Marker - (18" x 18")

POST & TUBE OPTIONS	
Type I	post ① thru ②
Type II	post ① thru ④
Type III	post ① thru ⑧

Texas Department of Transportation — Design Division Standard

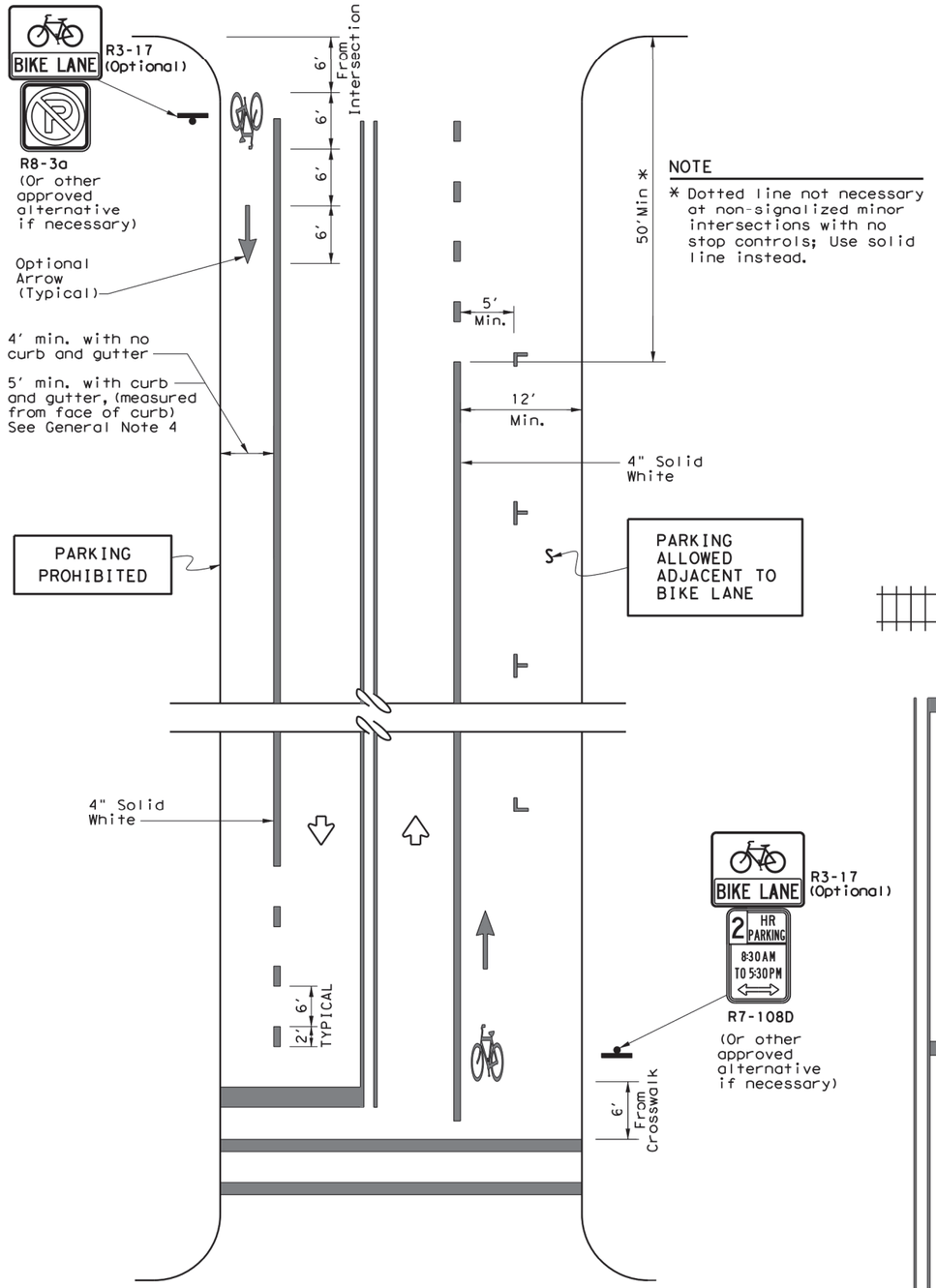
SINGLE GUARDRAIL TERMINAL (SKT-31) (WOOD POST)

SGT(8)31-14

FILE: sgt83114.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: VP
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NOTE

* Dotted line not necessary at non-signalized minor intersections with no stop controls; Use solid line instead.

NOTES

1. Bicycle lane pavement markings typically repeated after each intersection or signalized driveway.
2. On uninterrupted sections of roadway, bicycle lane pavement markings typically repeated as follows:

   -1200' for 45 MPH or less roads
   -2500' for 50 MPH and greater roads.

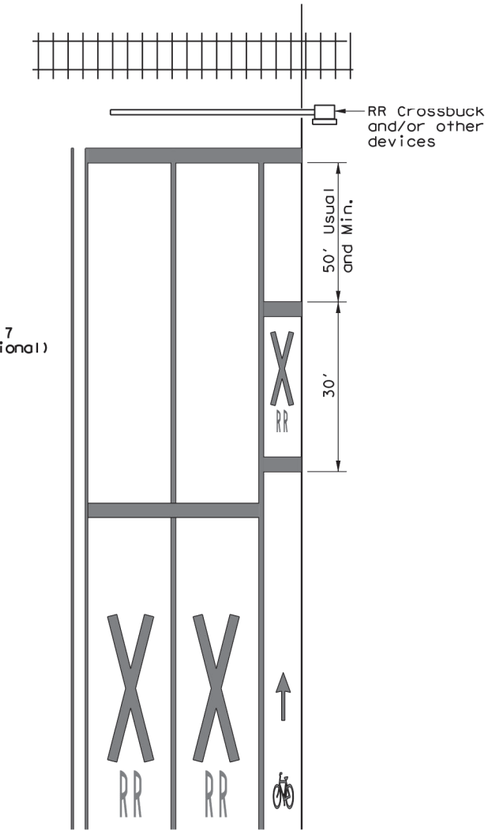
TWO-WAY STREET

GENERAL NOTES

1. All bicycle lane pavement markings shall be white unless otherwise noted.
2. All pavement marking materials shall meet the required Department Material Specifications as specified by the plans.
3. Exact sign placement and details are shown elsewhere in the plans.
4. The current edition of AASHTO'S Guide for the Development of Bicycle Facilities should be referenced for variations in design, other geometric conditions, and lane width options.
5. Other bicycle lane symbol or word markings as shown in the Texas Manual on Uniform Traffic Control Devices may be used. Details for words, arrows and symbols as shown in the Standard Highway Sign Designs for Texas.
6. The "BIKE LANE" (R3-17) sign with the "AHEAD" (R3-17a) sign mounted directly below should be installed in advance of the beginning of a marked bike lane.
7. The "BIKE LANE" (R3-17) sign with the "END" (R3-17b) sign mounted directly below should be installed at the end of marked bicycle lane.

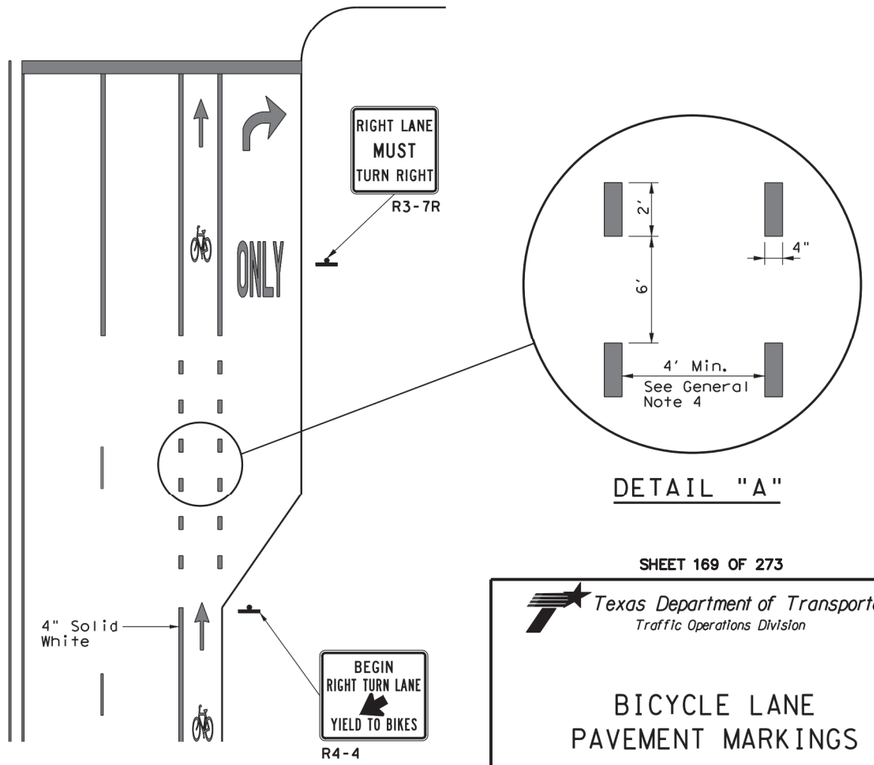
LEGEND	
	Sign
	Traffic Flow

SPECIFICATION REFERENCE TABLE	
Traffic Paint	DMS-8200
Hot Applied Thermoplastic	DMS-8220
Permanent Prefabricated Pavement Markings	DMS-8240
Glass Traffic Beads	DMS-8290



(See RCPM Standard for travel lane details)

RAILROAD CROSSING APPROACH



RIGHT TURN ONLY LANE

DETAIL "A"

SHEET 169 OF 273

Texas Department of Transportation
Traffic Operations Division

BICYCLE LANE PAVEMENT MARKINGS

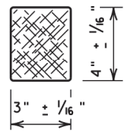
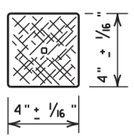
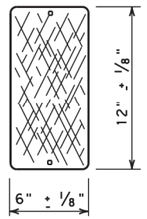
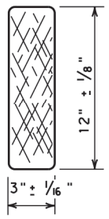
BLPM-10

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	DIST	COUNTY		SHEET NO.
				169

DATE:
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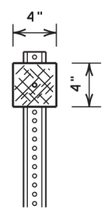
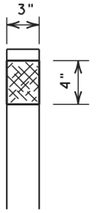
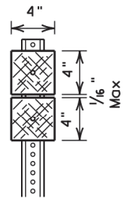
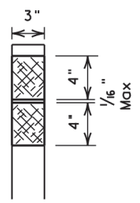
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			

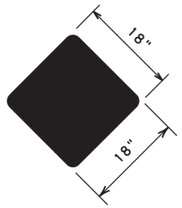
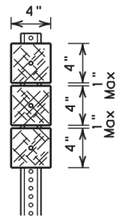
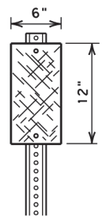
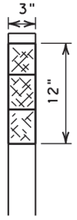
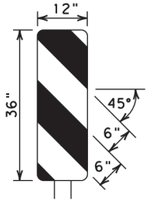
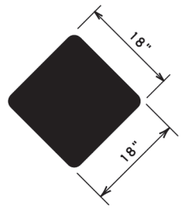
NOTE

1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx).
2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	FLX	WC	FLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	FLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			

1. Barrier reflectors shall meet the requirements of DMS 8600.
2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.

SHEETING	Yellow, White, Red
NOTE	1. Minimum 9 square inches of reflective sheeting surface area.

CHEVRONS

DEVICE	 W1-8
SIZE (W x L)	18"x 24" (Conventional) / 24"x 30" (Conventional Oversize) / 30"x 36" (Expressway) / 36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0" / 7'-0" Only
NOTE	1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. The Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTIONAL LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE	 W1-6
SIZE (W x L)	48" x 24" (Conventional) / 60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXX)XXX(XX)

NUMBER OF REFLECTORS
- S = Single
- D = Double

COLOR OF REFLECTORS
- W = White
- Y = Yellow
- R = Red

REFLECTOR UNIT SIZE
- 1 or 2

TYPE OF POST OR DELINEATOR
- WC = Wing Channel Post
- FLX = Flexible Post
- BRF = Barrier Reflector

TYPE OF MOUNT
- GND = Embedded (drivable or set in concrete)
- CTB = Concrete Barrier Mount
- GF1 or GF2 = Guard Fence Attachment
- SRF = Surface Mount

DIRECTION
- If Required
- BI = Bi-Directional
- BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXX)XXX(XX)

TYPE OF OBJECT MARKER
- 1, 2, 3, or 4

NUMBER OF REFLECTORS OR DIRECTION
- X = 3-Size 2 reflector units (Type 2 only)
- Y = 1-Size 3 reflector unit (Type 2 only)
- Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only)
- L = Left Side (Type 3 Object Marker only)
- R = Right Side (Type 3 Object Marker only)
- C = Center (Type 3 Object Marker only)

TYPE OF POST
- WC = Wing Channel Post
- FLX = Flexible Post
- TWT = Thin Walled Tubing

TYPE OF MOUNT
- GND = Embedded (drivable)
- SRF = Surface Mount
- WAS = Wedge Anchor Steel
- WAP = Wedge Anchor Plastic

DIRECTION
- If Required
- BI = Bi-Directional

DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

NOTE:

Delineator and object marker backplates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

SHEET 170 OF 273

Texas Department of Transportation

Traffic Operations Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION D & OM(1)-15

FILE: dom1-15.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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4-10				170
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FILE: Bid 1710-194

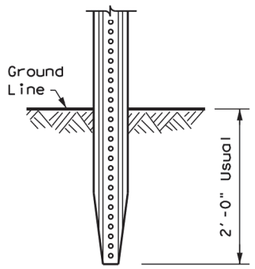
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Williamson County, Texas

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POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

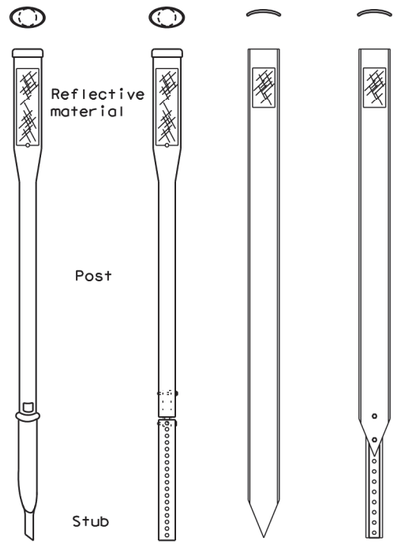


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

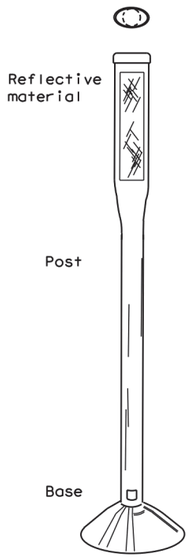
FLEXIBLE POSTS (FLX)

GND



EMBEDDED

SRF



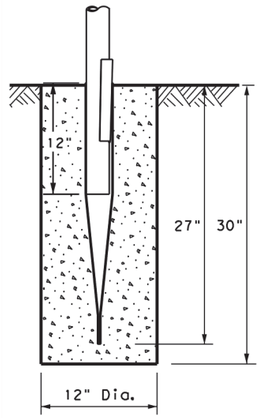
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.

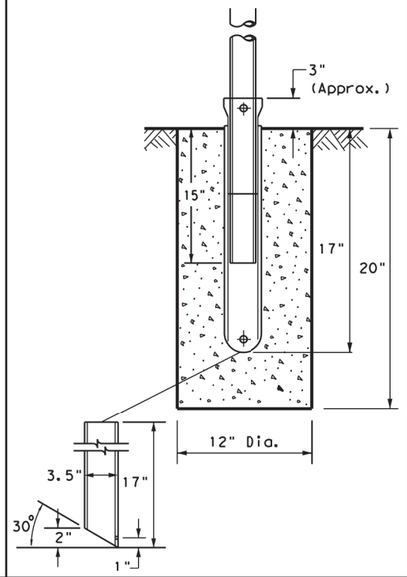
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

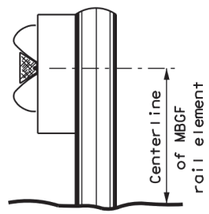
NOTE

1. Install per manufacturer's recommendations.

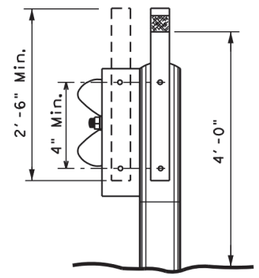
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

GF1

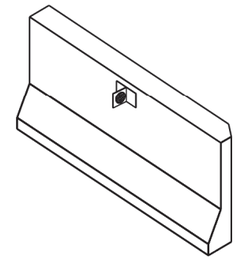


GF2



CONCRETE BARRIER / BRIDGE RAIL

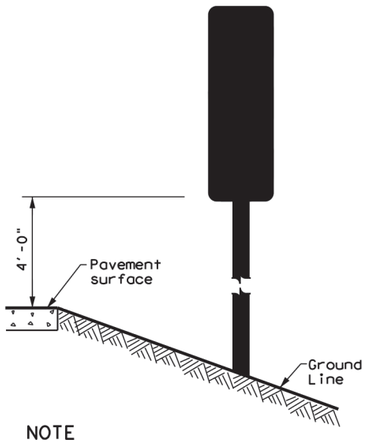
CTB



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.

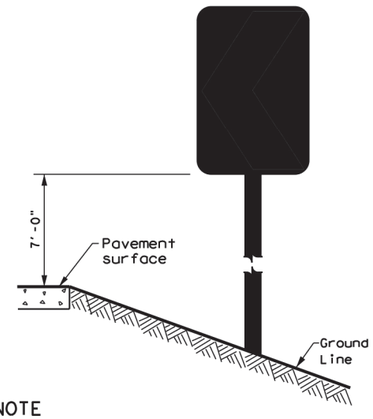
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

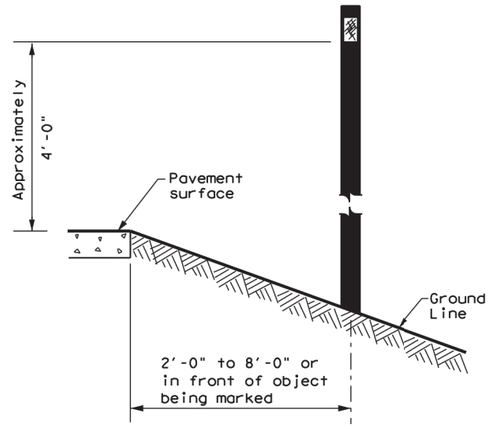
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTIONAL LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Operations Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-15

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REVISIONS				
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10				171

SHEET 171 OF 273

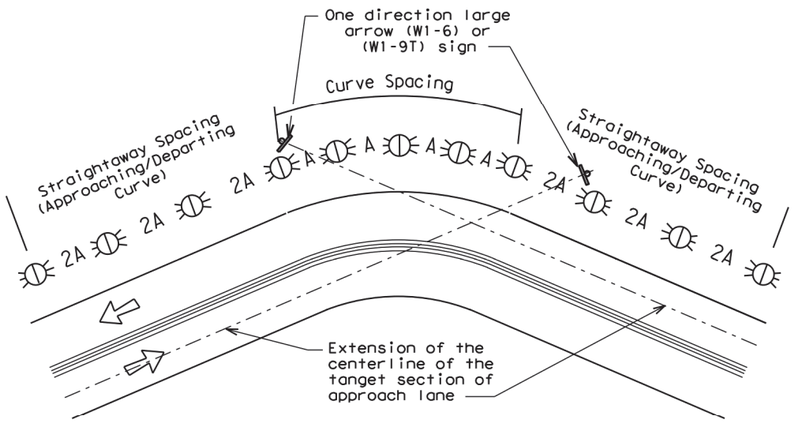
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FILE:
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p. 415

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USE OF WARNING DEVICES AT CURVES WITH ADVISORY SPEED LIMITS

Amount by which Advisory Speed Is less than Posted Speed	Warning Devices Needed
5 MPH & 10 MPH	RPMs
15 MPH & 20 MPH	RPMs, and Delineators or RPMs and ONE DIRECTION LARGE ARROW (W1-6) or (W1-9T) sign
25 MPH & Greater	RPMs and Chevrons

SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES

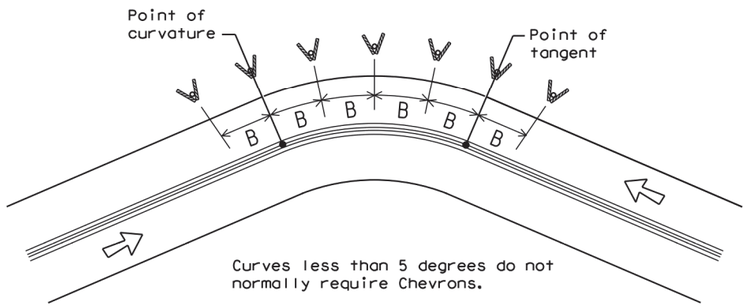


Curves less than 1 degree do not normally require delineators.

NOTE

ONE DIRECTIONAL LARGE ARROW (W1-6) or(W1-9T) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



Curves less than 5 degrees do not normally require Chevrons.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve[1]	Single delineators on right side	See delineator spacing table
FRWY/EXP. Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 4 on D&OM(4))	100 feet on ramp tangents. Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves).
Acceleration/Deceleration Lane	Double delineators (see Detail 4 on D&OM(4))	100 feet (See Detail 4 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence or CTB	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end. Undivided 2-lane highways - Object marker on approach and departure end.	Requires Type 3 Object Marker or reflective sheeting provided by manufacturer per D & OM(VIA).
Bridges with no Approach Rail	Type 3 Object Marker at end of rail and 3 single delineators approaching rail.	See Detail 2 on D & OM(4)
Reduced Width Approaches to Bridge Rail	Type 2 Object Markers and 3 single delineators approaching bridge.	See Detail 1 on D & OM(4)
Culverts without MBGF	Type 2 Object Markers	See Detail 3 on D & OM(4)
Crossovers	Double yellow delineators or RPM's	See Detail 5 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Delineators not required in urban areas with continuous illumination.
2. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
3. Barrier reflectors may be used to replace required delineators.
4. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

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Texas Department of Transportation

Traffic Operations Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-15B

FILE: dom3-15b.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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8-15				172

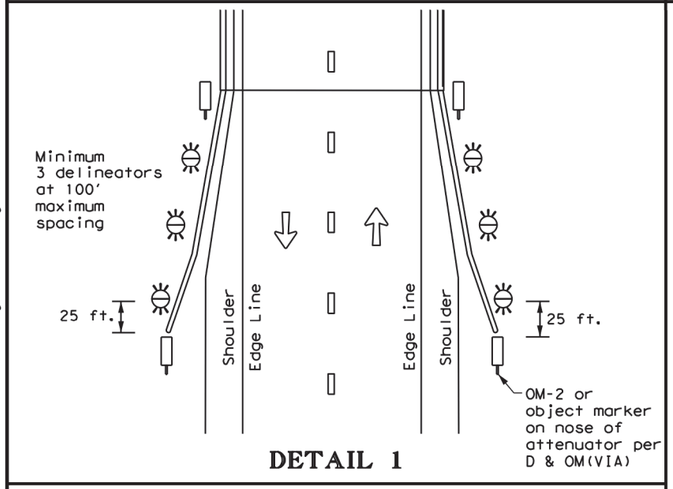
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FILE:

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Williamson County, Texas

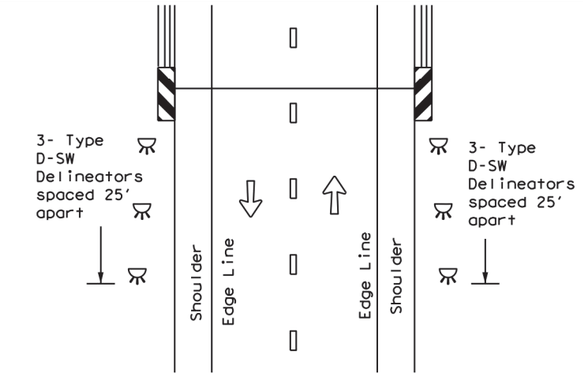
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TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH



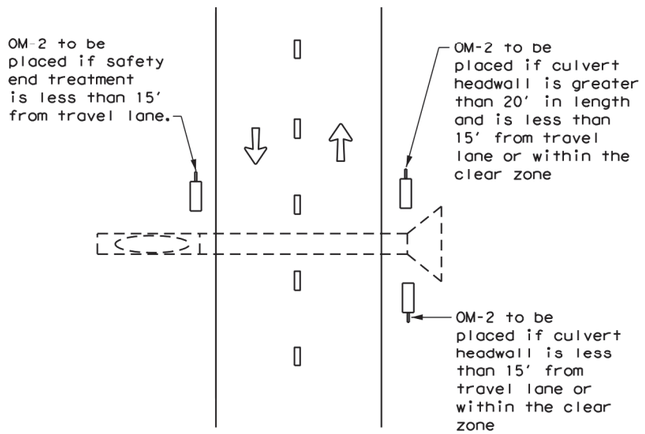
DETAIL 1

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



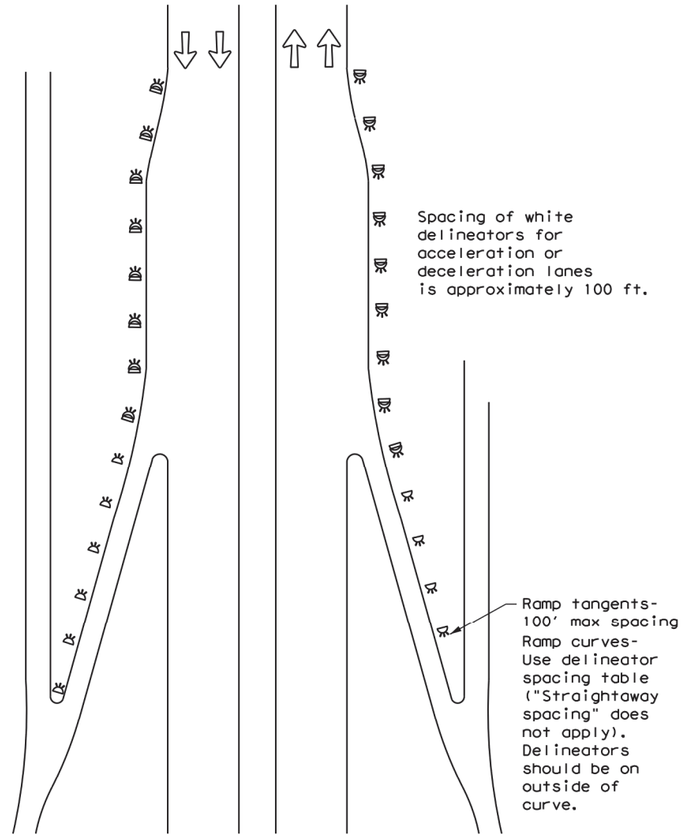
DETAIL 2

FOR CULVERTS WITHOUT MBGF



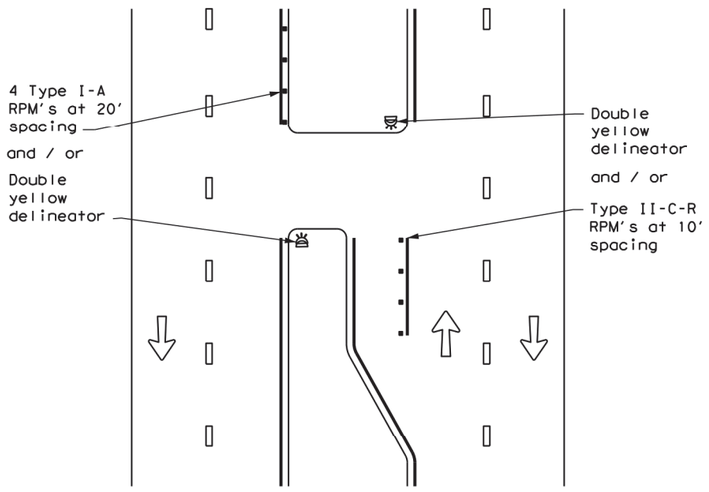
DETAIL 3

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



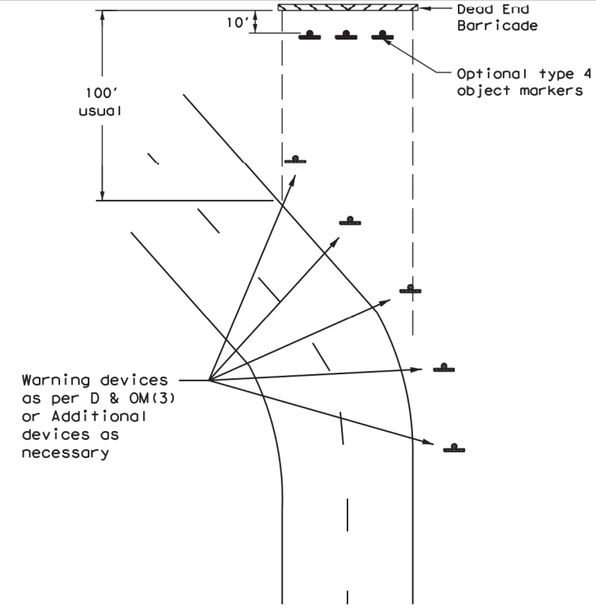
DETAIL 4

CROSSOVERS



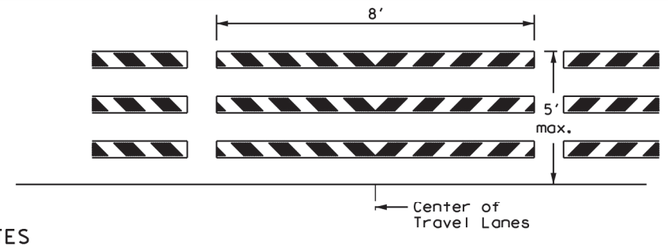
DETAIL 5

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 6

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 7

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

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Texas Department of Transportation

Traffic Operations Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-15

FILE: dom4-15.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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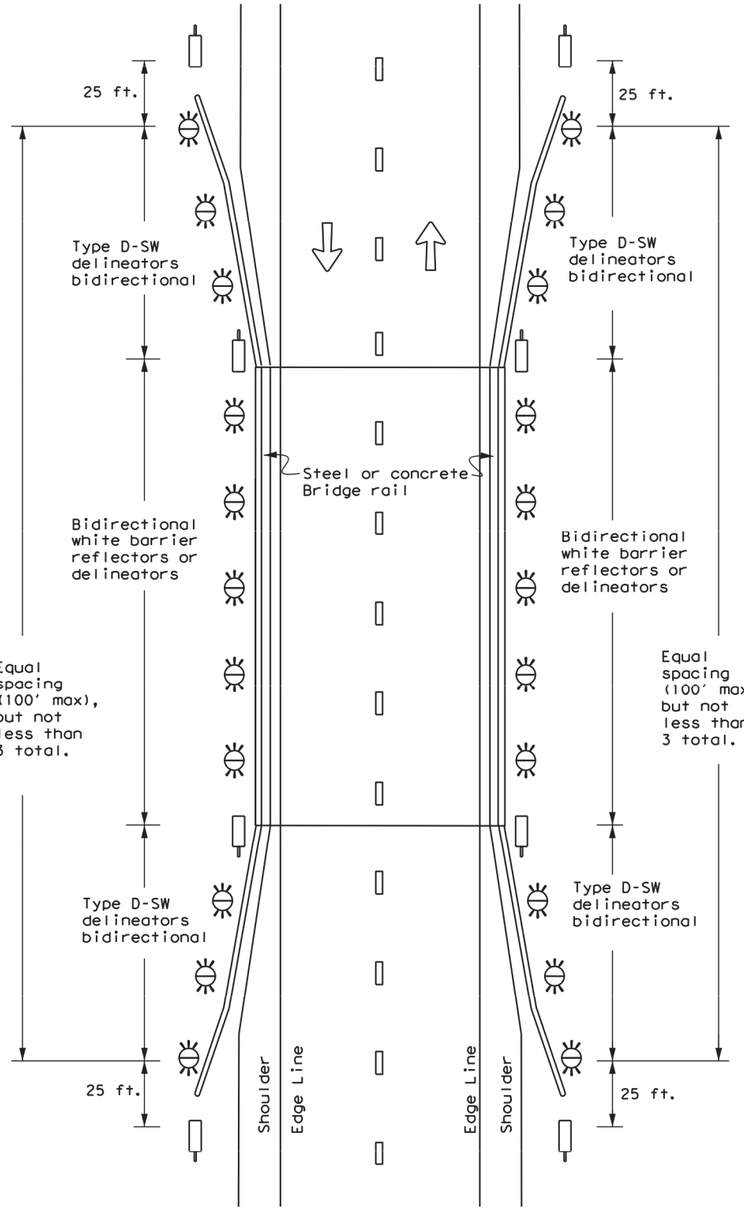
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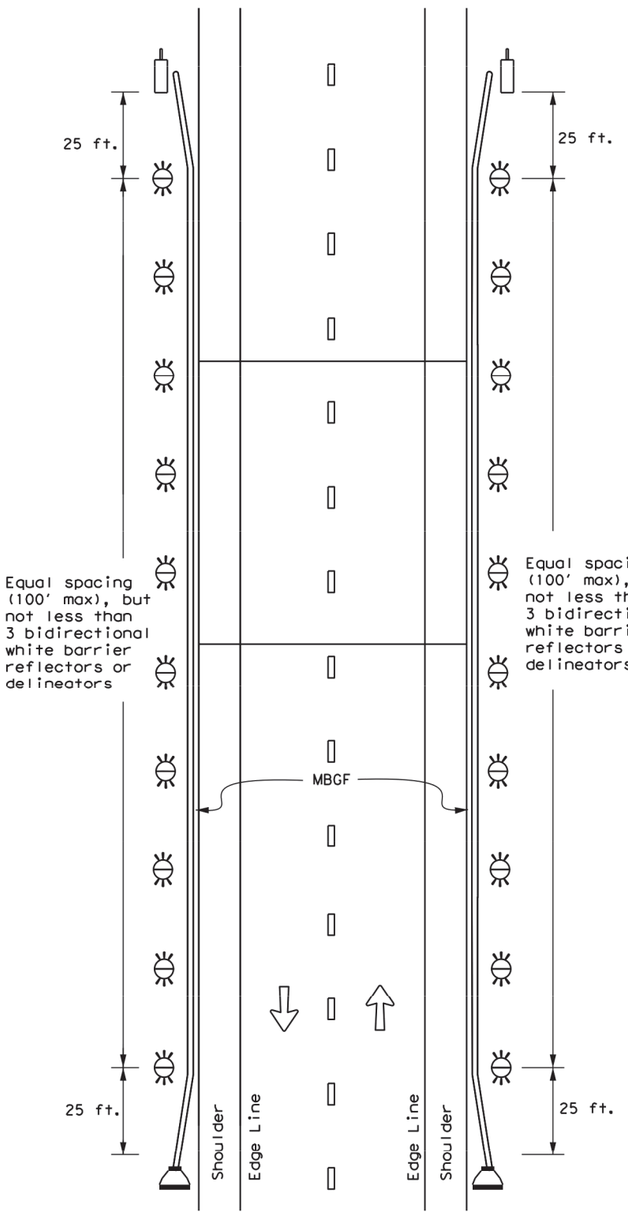
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TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



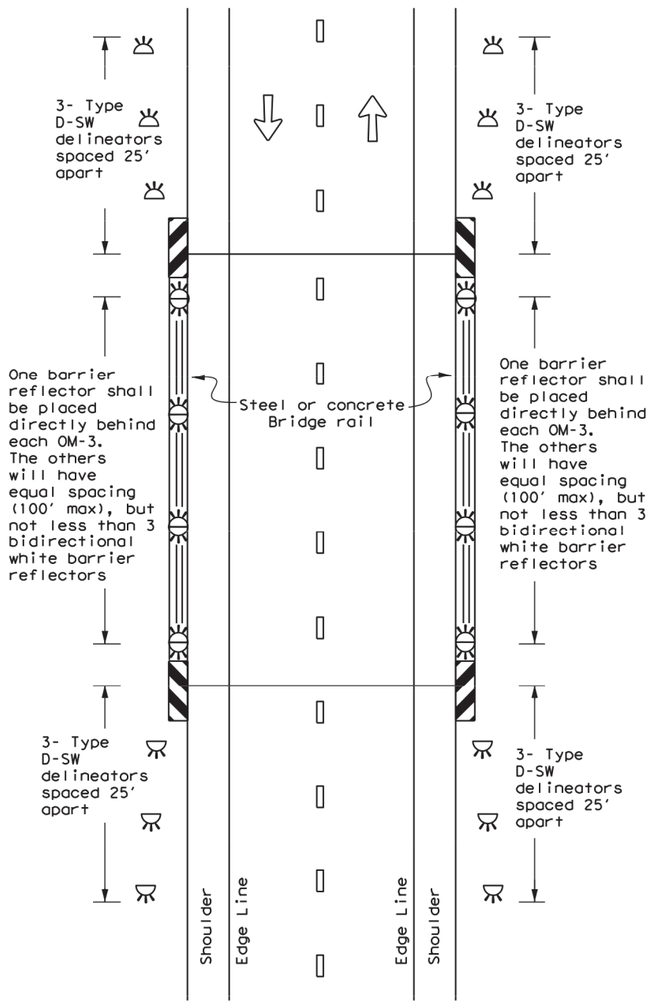
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

If terminal ends include an object marker, there is no need to install an OM-2 in front of terminal.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



SHEET 174 OF 273

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	TRAFFIC FLOW

Texas Department of Transportation

Traffic Operations Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-15

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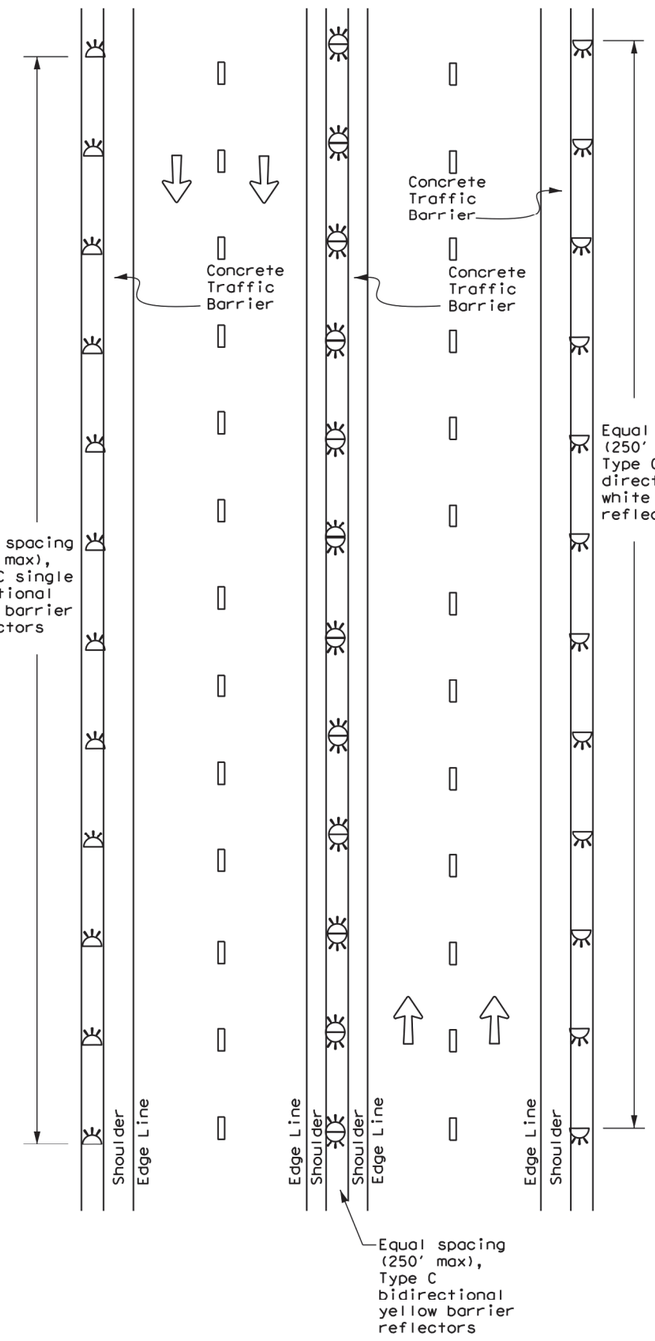
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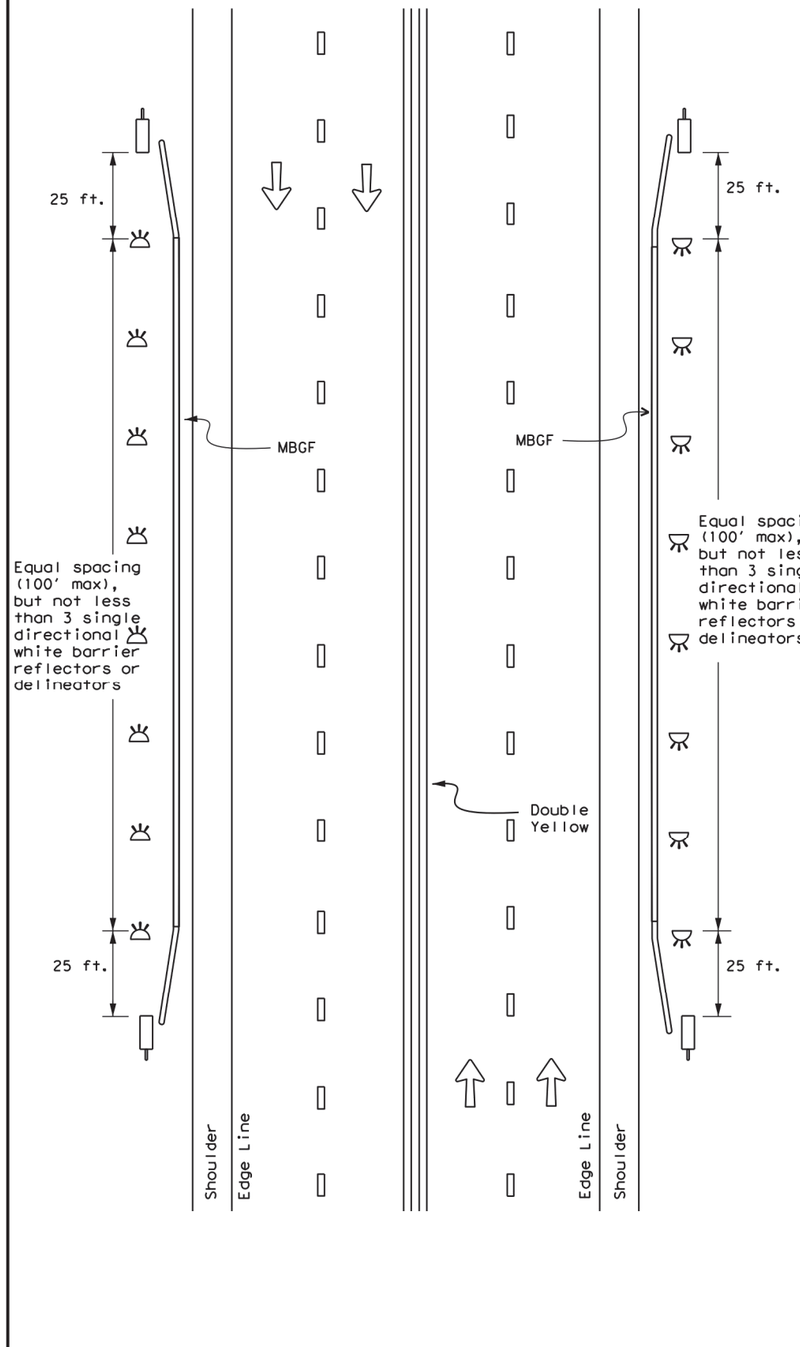
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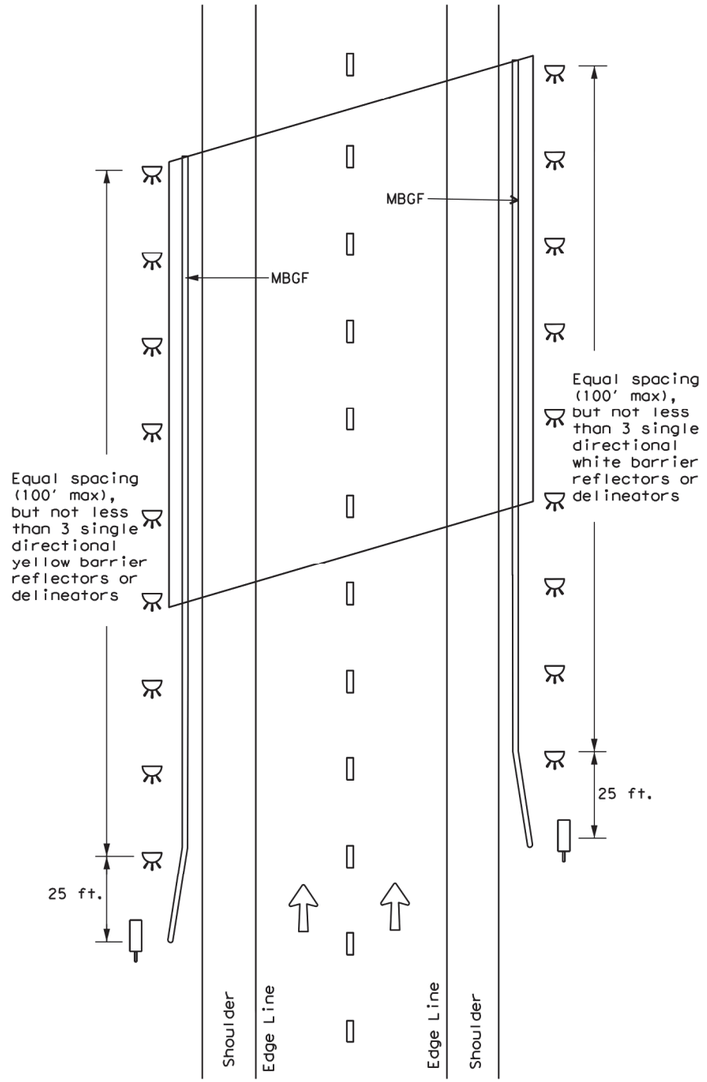
CONTINUOUS CONCRETE BARRIER



MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE



SHEET 175 OF 273

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	TRAFFIC FLOW

Texas Department of Transportation

Traffic Operations Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

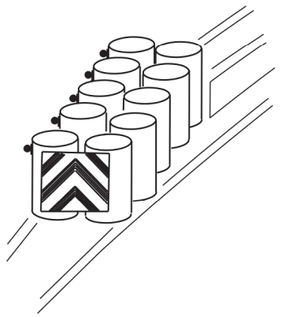
D & OM(6)-15

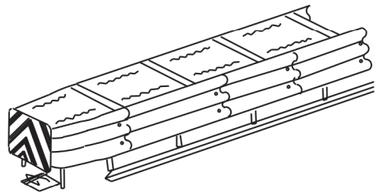
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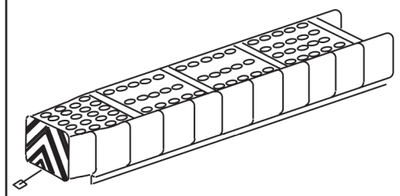
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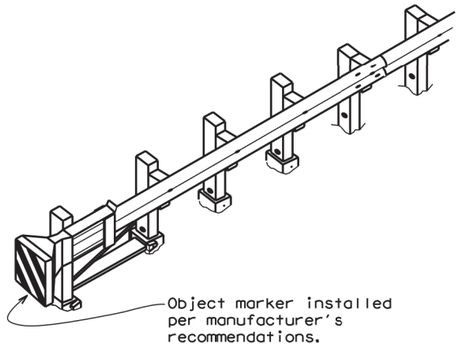
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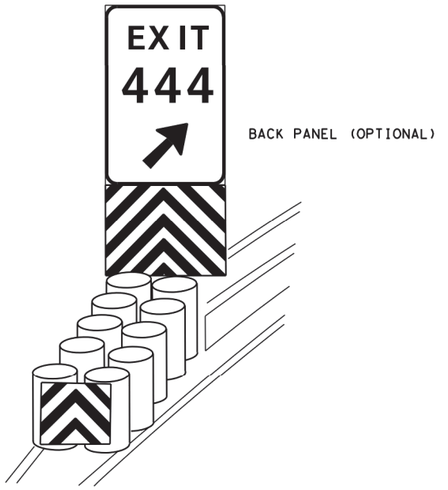
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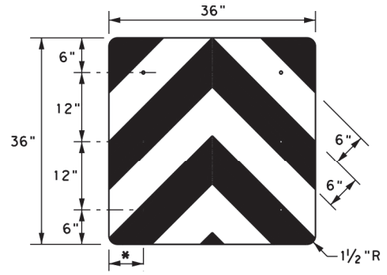


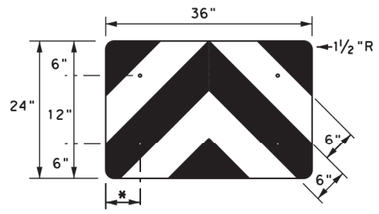




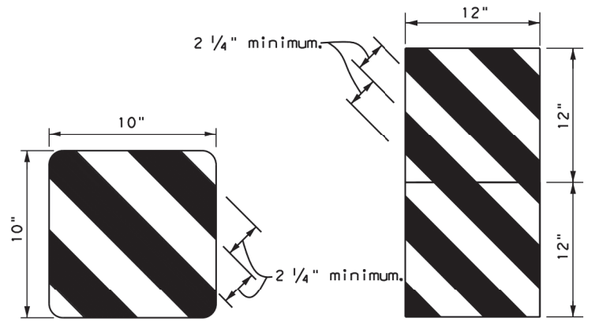




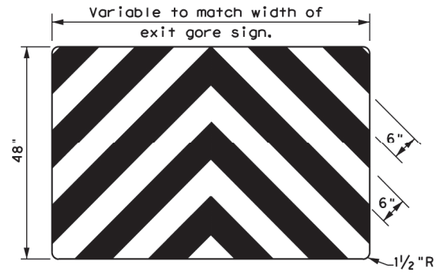


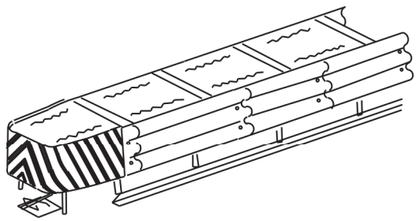


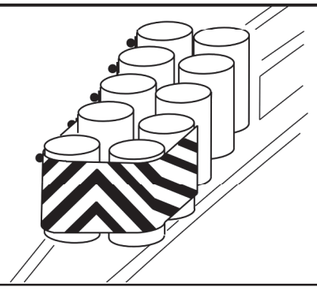
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

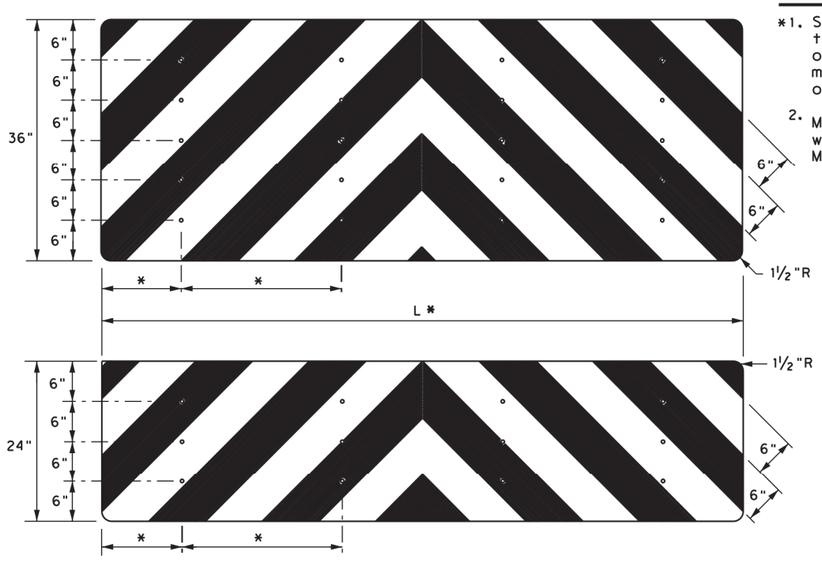


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

Traffic Operations Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

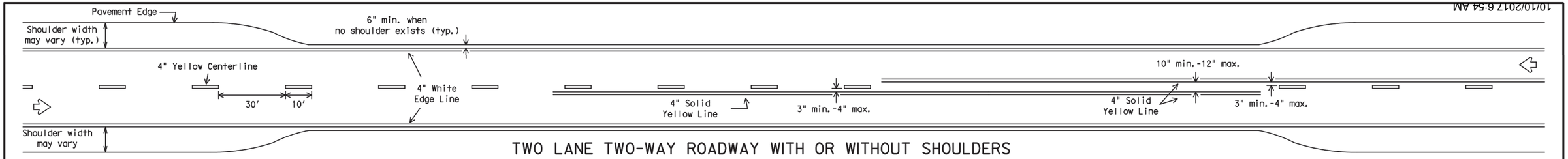
D & OM(VIA)-15

FILE: domvia15.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
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8-95 3-15				176
4-98				

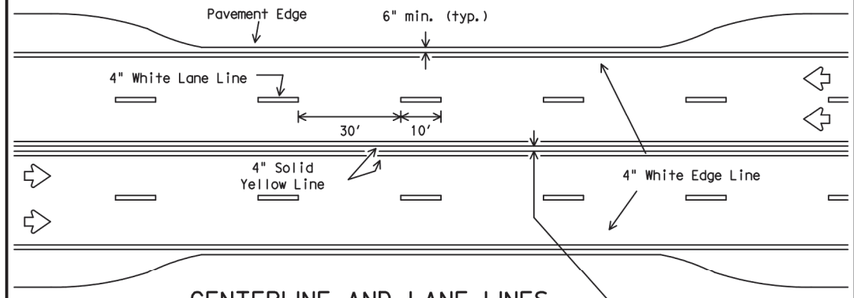
20G

DATE:
FILE:
RID 1710-194

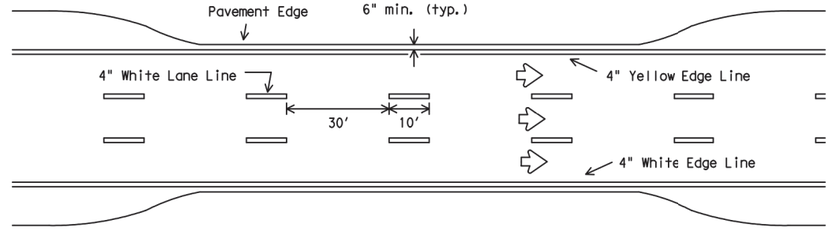
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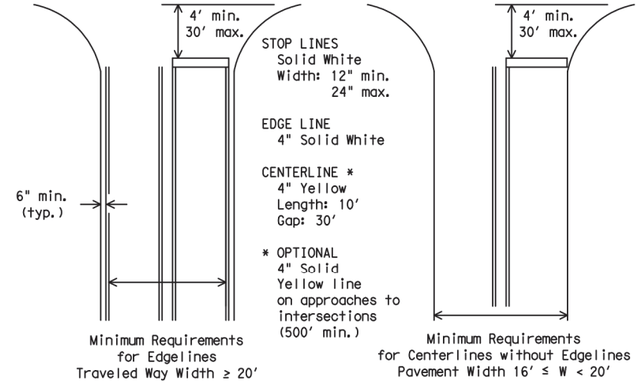
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

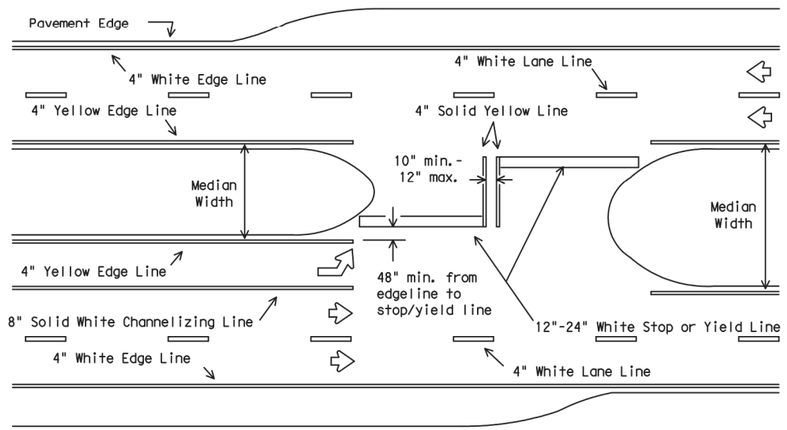


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



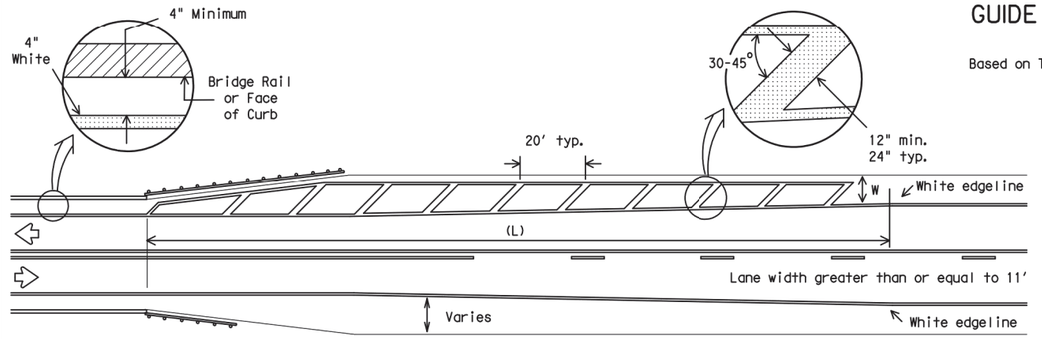
GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways



All medians shall be field measured to determine the location of necessary striping. Stop/Yield bars and centerlines shall be placed when the median width is greater than 30 ft. The median width is defined as the area between two roadways of a divided highway measured from edge of traveled way to edge of traveled way. The median excludes turn lanes. The median width might be different between intersections, interchanges and of opposite approaches of the same intersection. The narrow median width will be the controlling width to determine if markings are required.

FOUR LANE DIVIDED ROADWAY INTERSECTIONS



NOTES:

1. No-passing zone on bridge approach is optional but if used, it shall be a minimum 500 feet long.
2. For crosshatching length (L) see Table 1.
3. The width of the offset (W) and the required crosshatching width is the full shoulder width in advance of the bridge.
4. The crosshatching is not required if delineators or barrier reflectors are used along the structure.
5. For guard fence details, refer elsewhere in the plans.

ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT

TABLE 1 - TYPICAL LENGTH (L)

Posted Speed *	Formula
≤ 40	$L = \frac{WS^2}{60}$
≥ 45	L=WS

* 85th Percentile Speed may be used on roads where traffic speeds normally exceed the posted speed limit. Crosshatching length should be rounded up to nearest 5 foot increment.

L=Length of Crosshatching (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

EXAMPLES:

An 8 foot shoulder in advance of a bridge reduces to 4 feet on a 70 MPH roadway. The length of the crosshatching should be:

$L = 8 \times 70 = 560$ ft.

A 4 foot shoulder in advance of a bridge reduces to 2 feet on a 40 MPH roadway. The length of the crosshatching should be:

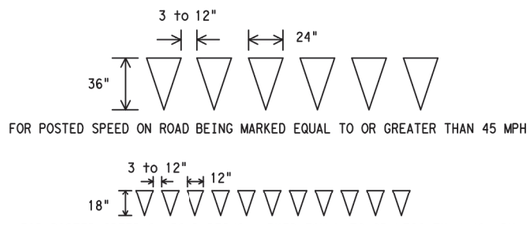
$L = 4(40)^2 / 60 = 106.67$ ft. rounded to 110 ft.

GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should typically be placed a minimum of 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel and not the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to inside of edgeline of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



YIELD LINES

SHEET 177 OF 273

Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-12

© TxDOT November 1978	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
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5-00				
8-00	DIST	COUNTY		SHEET NO.
3-03				177

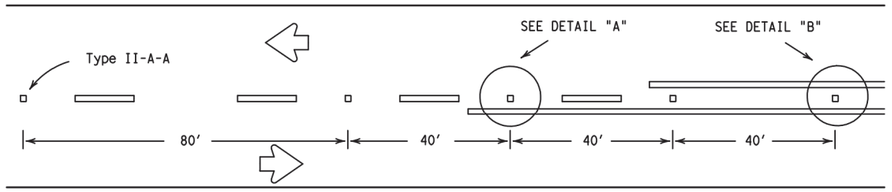
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DATE:
FILE: pm1710-194

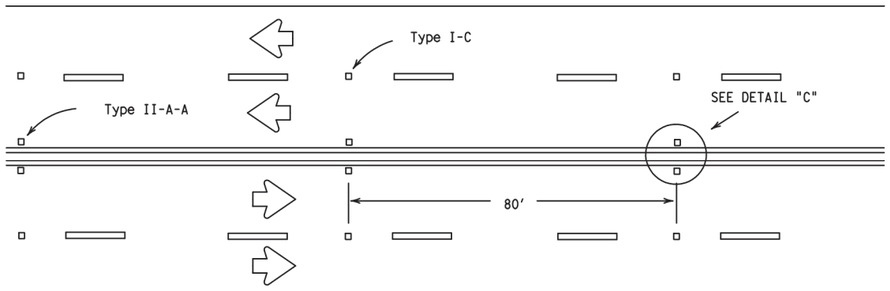
Williamson County, Texas

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REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

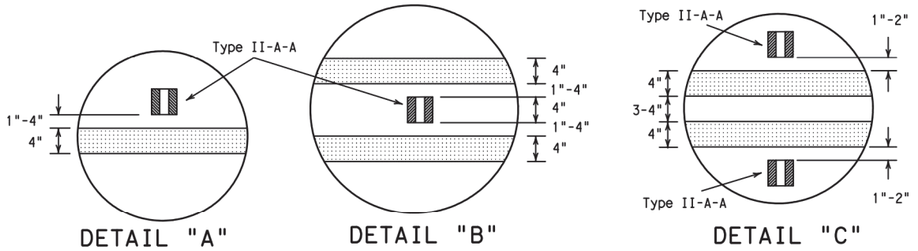


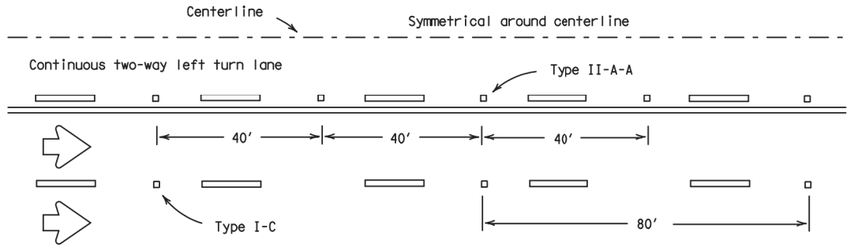
CENTERLINE FOR ALL TWO LANE ROADWAYS



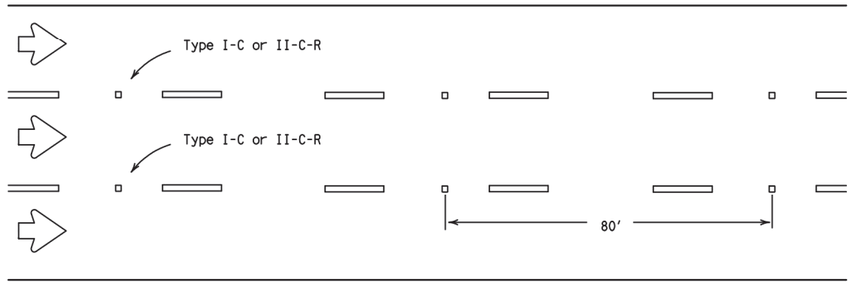
CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY HIGHWAYS

Raised pavement marker Type I-C, clear face toward normal traffic, shall be placed on 80-foot centers.



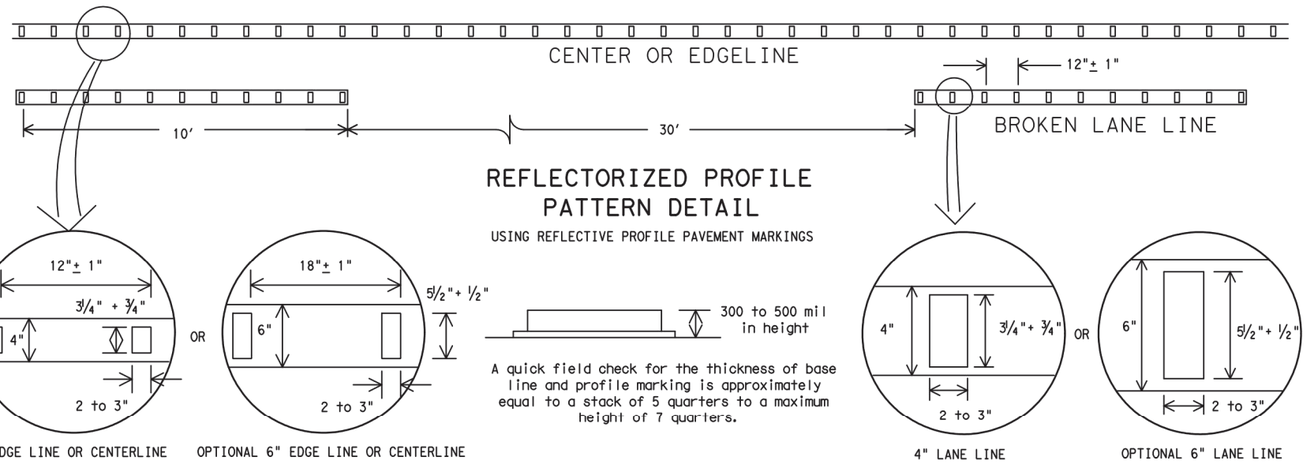


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.



4" EDGE LINE OR CENTERLINE — OPTIONAL 6" EDGE LINE OR CENTERLINE — 4" LANE LINE — OPTIONAL 6" LANE LINE

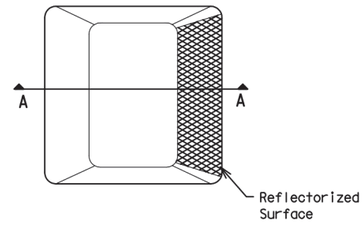
NOTE:
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

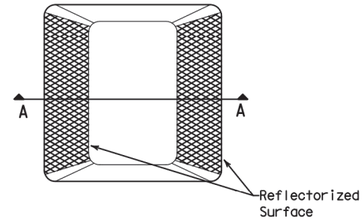
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

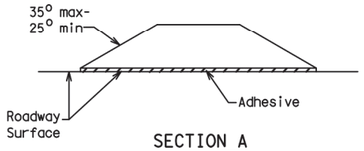
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation
Traffic Operations Division

POSITION GUIDANCE USING RAISED MARKERS
REFLECTORIZED PROFILE MARKINGS
PM(2)-12

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
			178

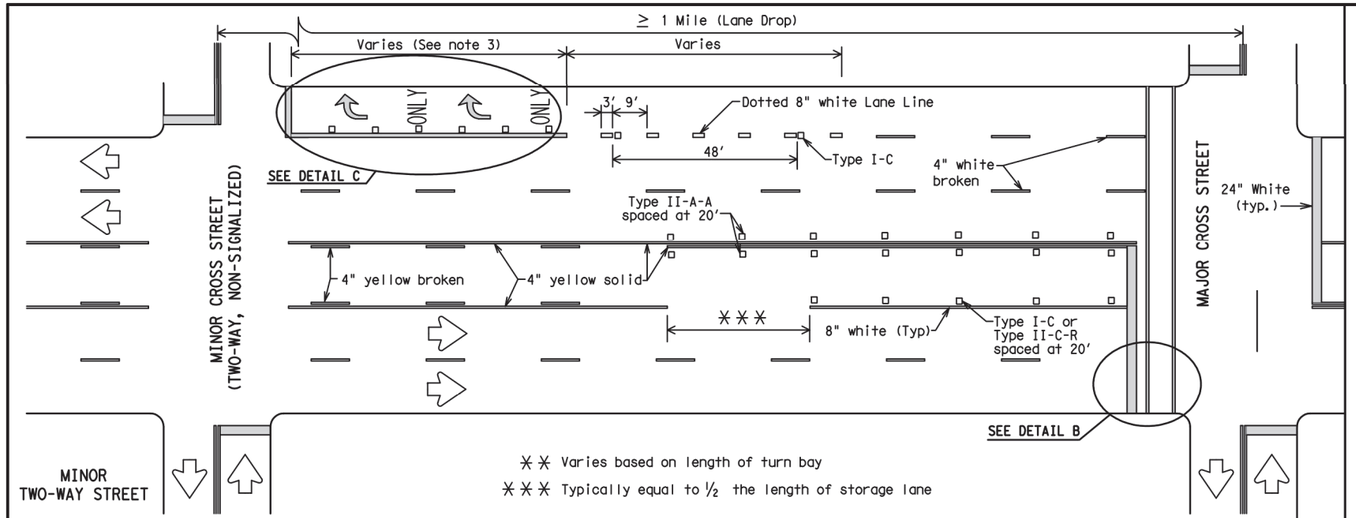
REVISIONS
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8-00
2-08

22B

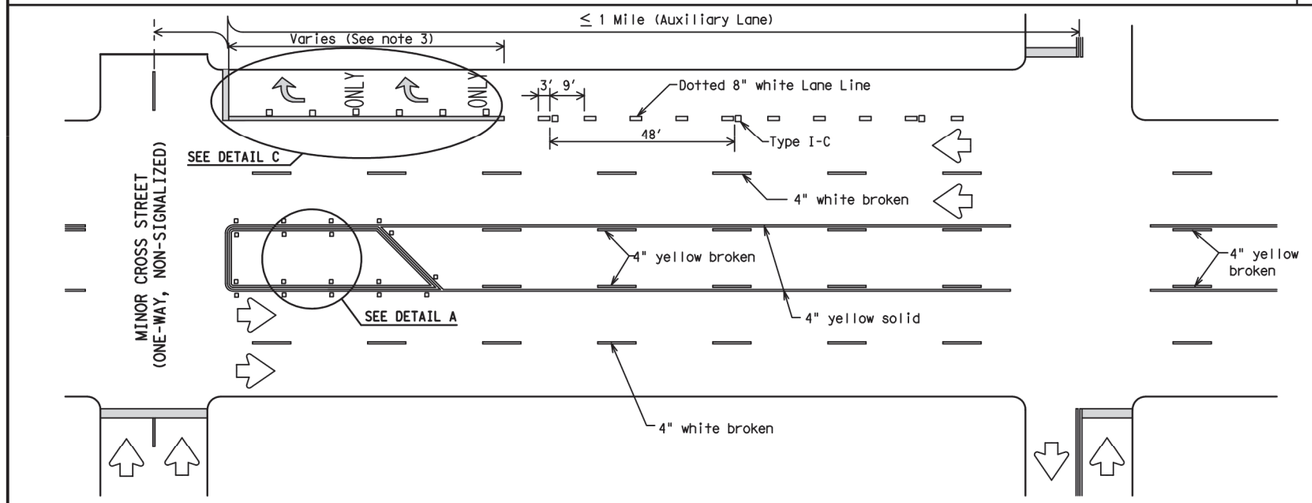
SHEET 178 OF 273

DATE:
FILE: pm1710-194

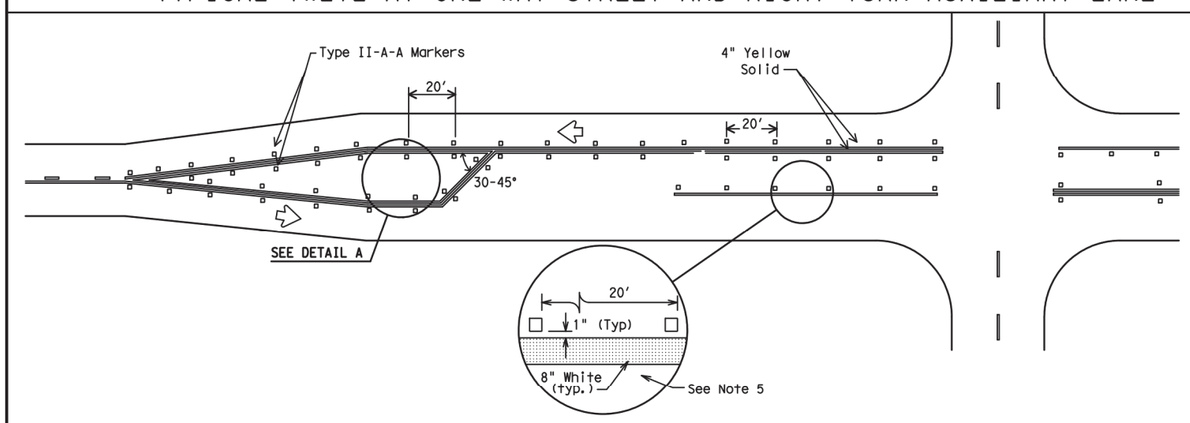
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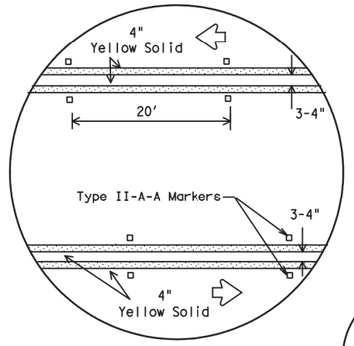
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



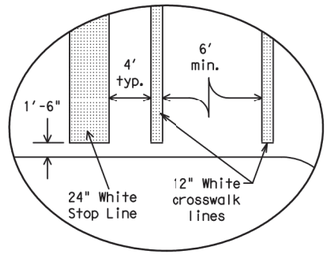
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS

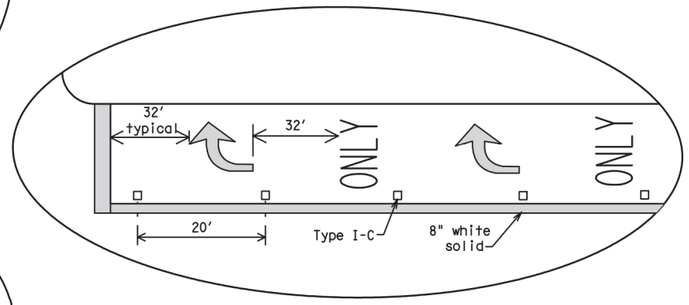


DETAIL A



Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

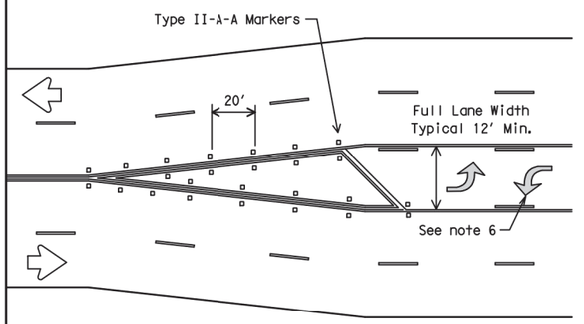
DETAIL B



DETAIL C

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

SHEET 179 OF 273

GENERAL NOTES

1. Refer elsewhere in plans for additional RPM placement and details.
2. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows as shown in the Standard Highway Sign Designs for Texas.
3. When lane used word and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
4. Other crosswalk paterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used.
5. Raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Raised pavement marker Type II-C-R with divided highways and raised medians.
6. A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

Texas Department of Transportation
Traffic Operations Division

PAVEMENT MARKINGS FOR TWO-WAY LEFT TURN LANES DIVIDED HIGHWAYS AND RURAL LEFT TURN BAYS

PM(3)-12

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REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
5-00 2-12	CONT	SECT	JOB	HIGHWAY
8-00				
3-03	DIST	COUNTY		SHEET NO.
2-10				179

22C

DATE:
FILE: pm1710-194

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

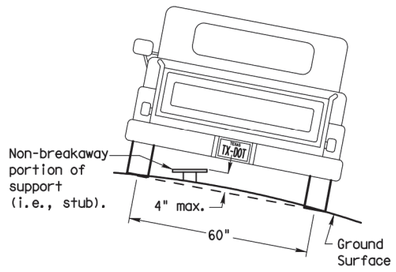
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

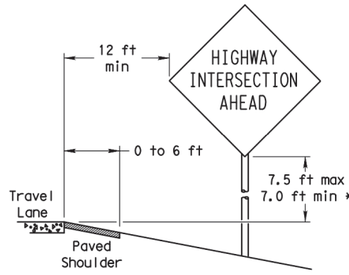
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

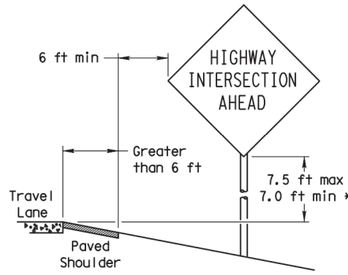
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

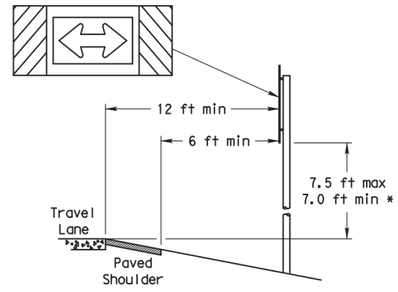
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



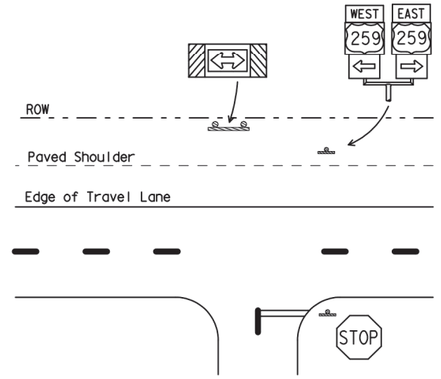
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

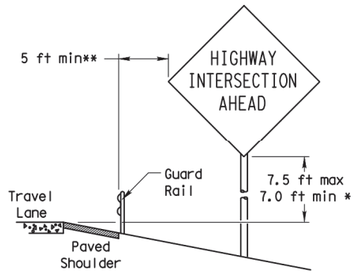
T-INTERSECTION



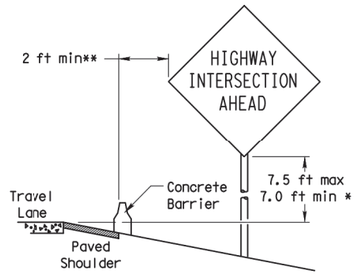
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

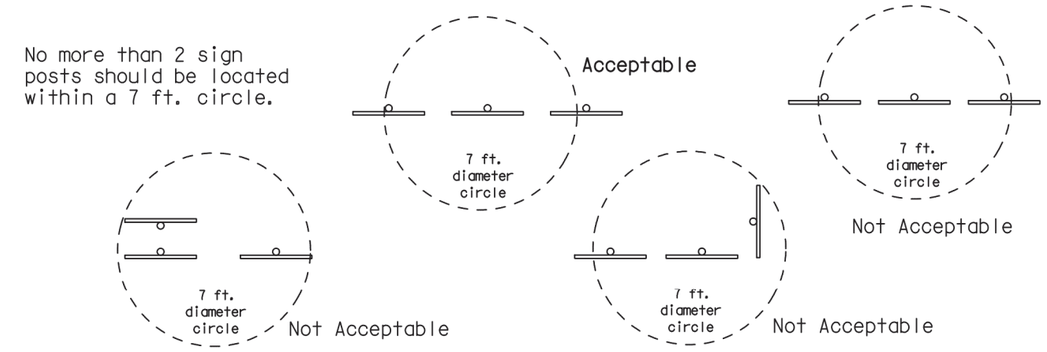
(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

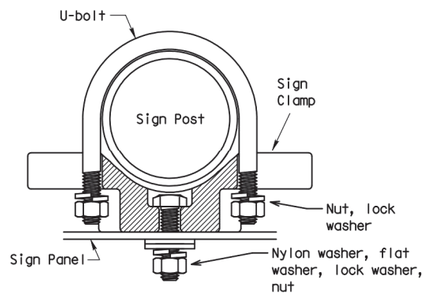
See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

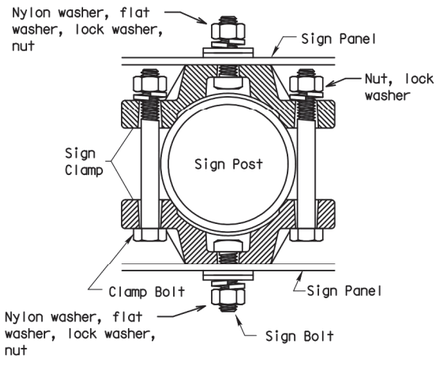


TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



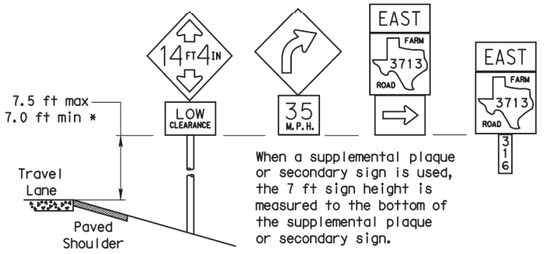
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

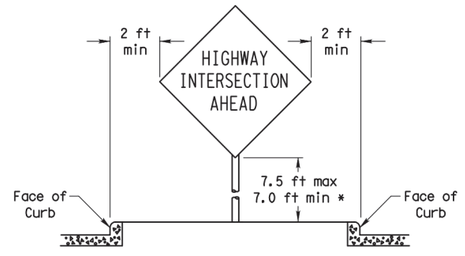
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



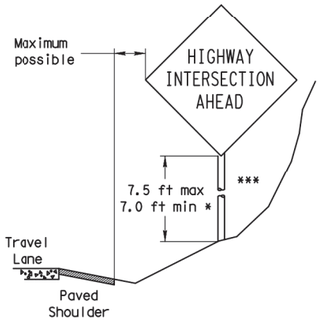
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

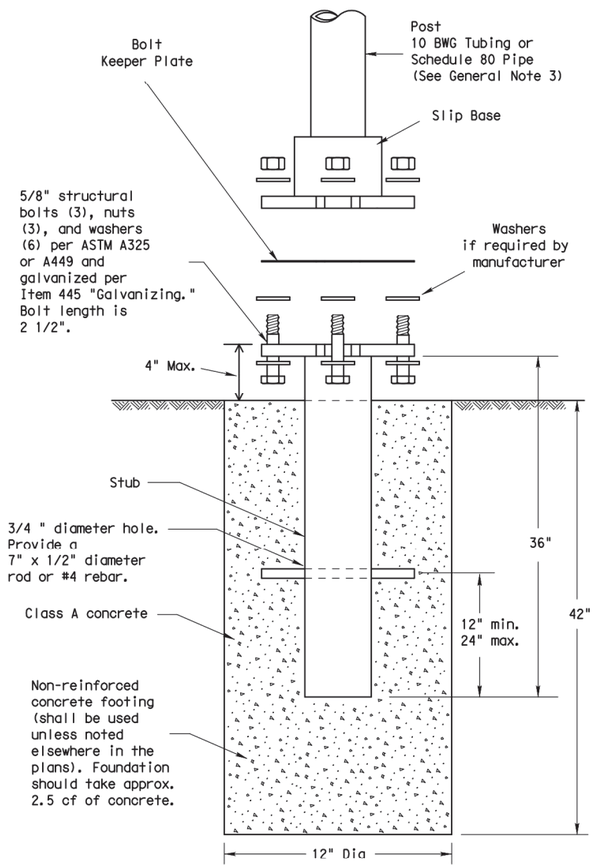
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9-08 REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
	COUNT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
				180

DATE:
FILE: bc-17l0-194

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TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

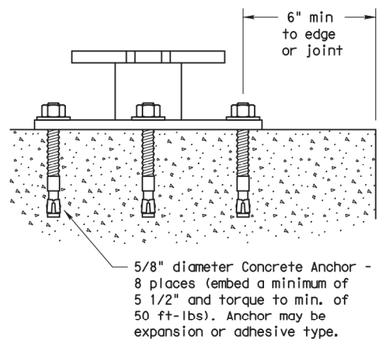
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	COUNT	SECT	JOB	HIGHWAY
9-08				
DIST	COUNTY		SHEET NO.
			181

SHEET 181 OF 273

26B

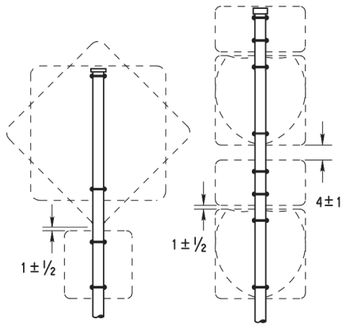
DATE:
FILE: Bc1710-194

Williamson County, Texas

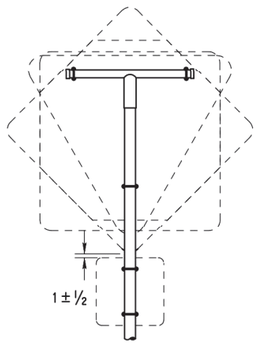
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p. 425

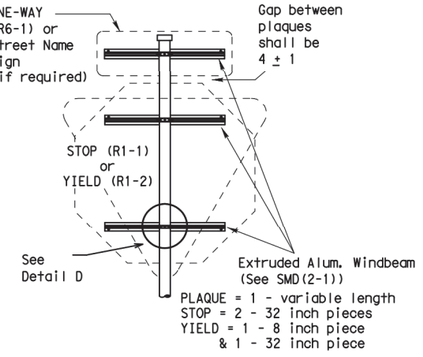
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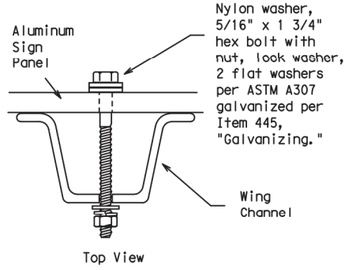
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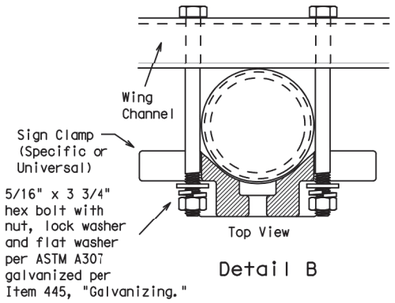
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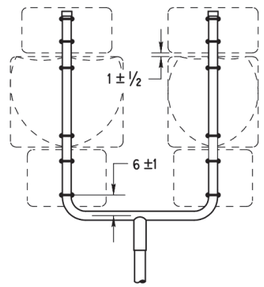
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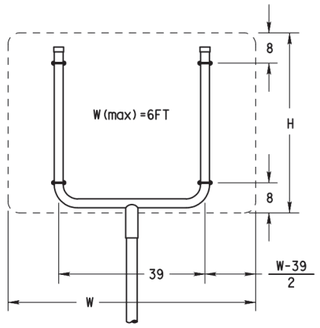
Detail A



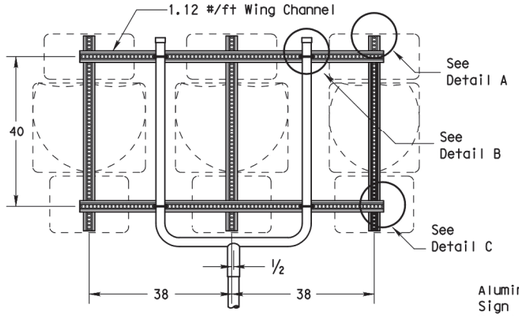
Detail B



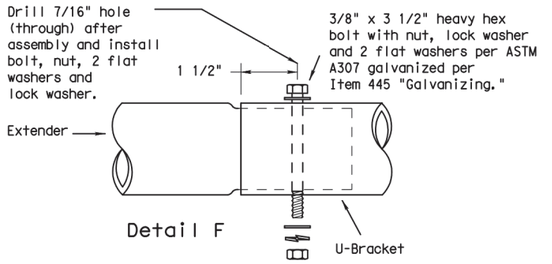
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

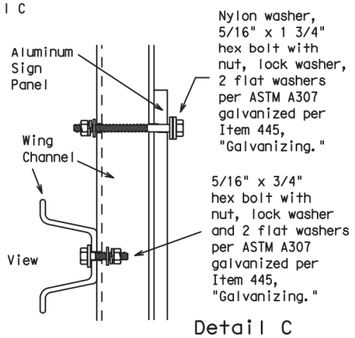


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

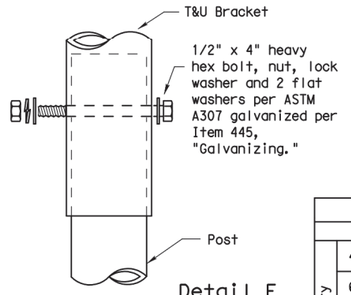


Detail F

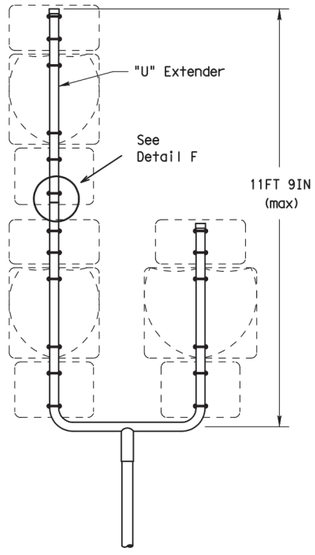
Splices shall only be allowed behind the sign substrate.



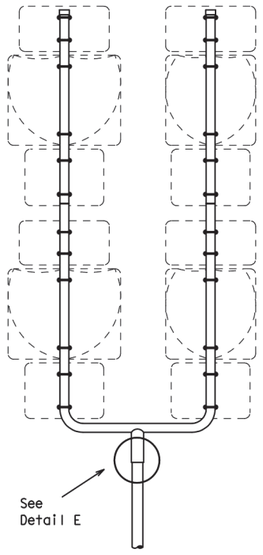
Detail C



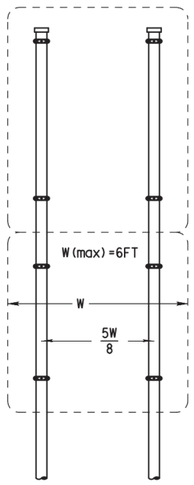
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

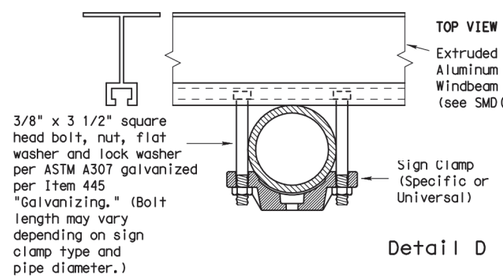


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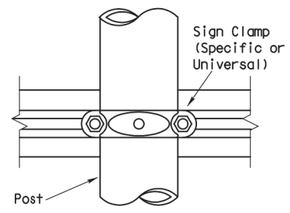


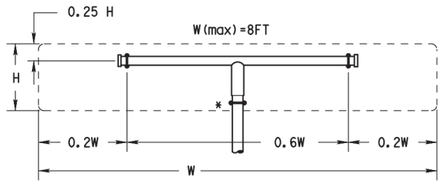
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

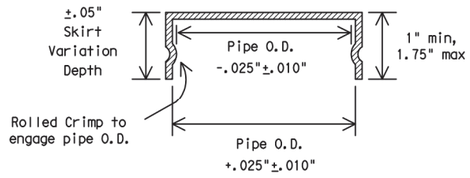




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

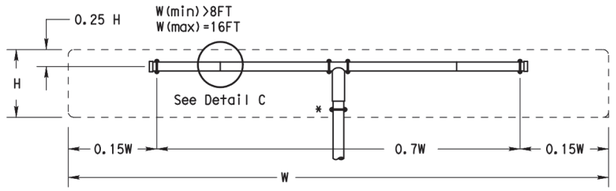
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REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08				
	DIST	COUNTY		SHEET NO.
				182

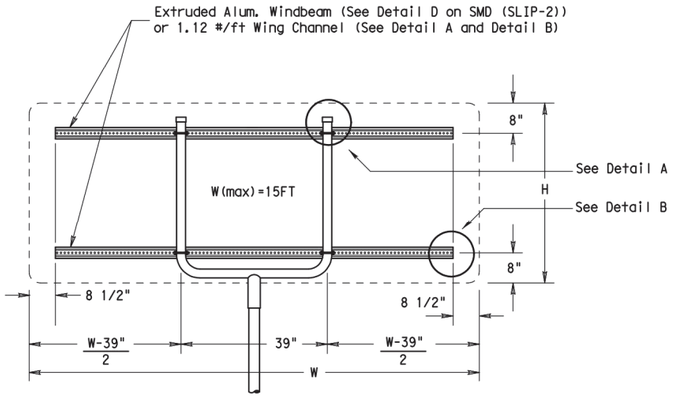
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SHEET 182 OF 273

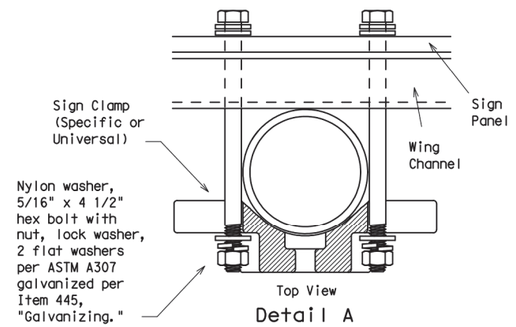
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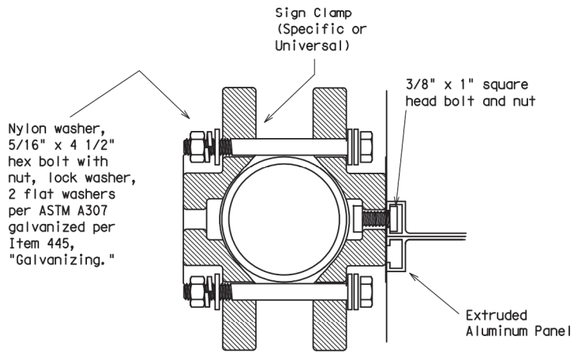
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



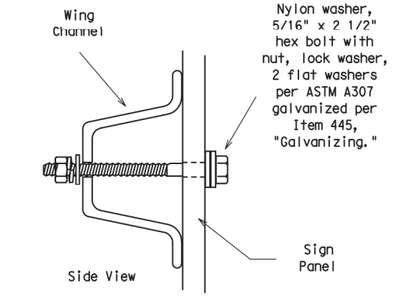
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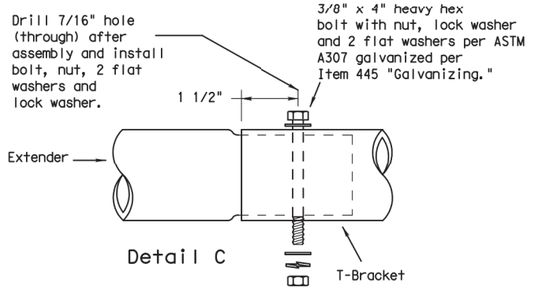
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

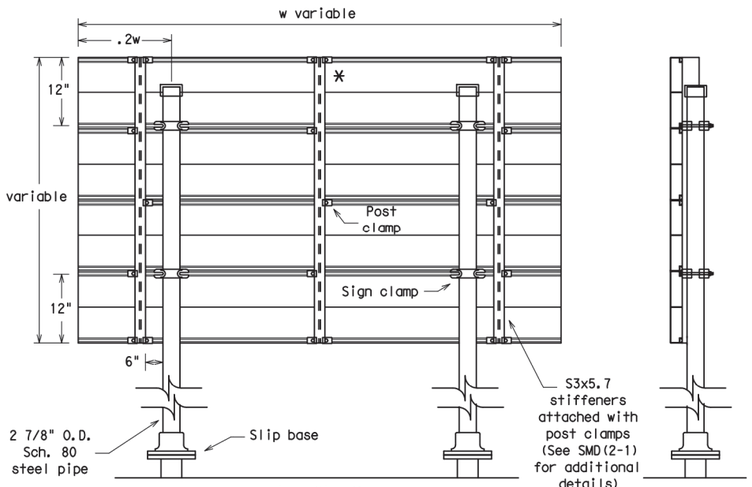


Detail B



Detail C

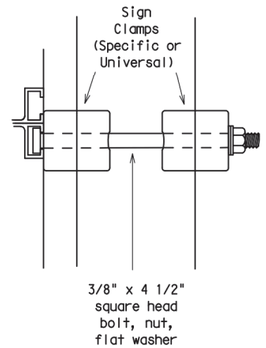
Splices shall only be allowed behind the sign substrate.



Typical Sign Mount

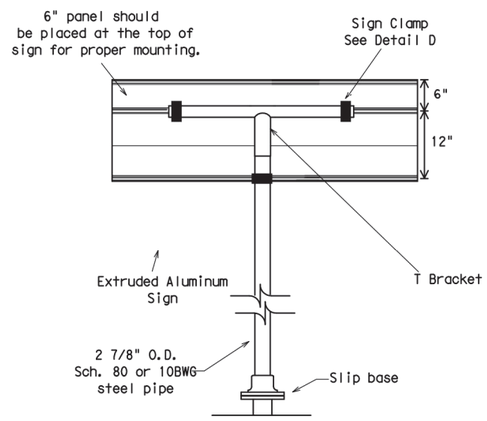
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

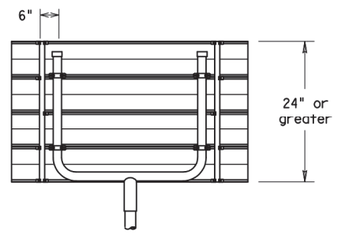


Detail E

See Detail E
for clamp installation



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
6. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
11. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

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REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

SHEET 183 OF 273

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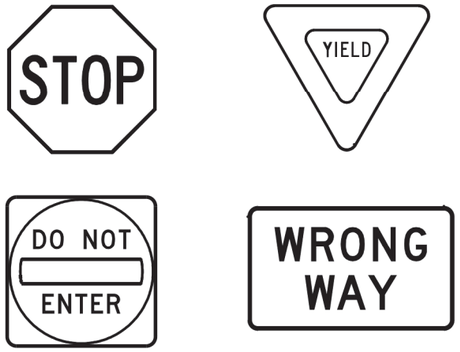
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Williamson County, Texas

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DATE:
FILE:

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS
(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

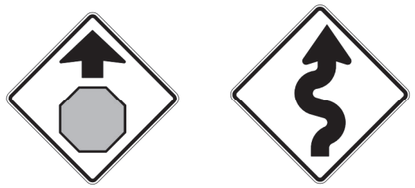
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS
(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

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Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08				

4

A. GENERAL SITE DATA

1. PROJECT LIMITS: From OLIVE HILL DR. TO ±3,000' EAST

2. PROJECT SITE MAPS:
   * Project Latitude 30.488070 N Project Longitude 97.762358 W
   * Project Location Map: Shown on Title Sheet
   * Drainage Patterns: Shown on Drainage and Erosion and Sedimentation Plans
   * Approx. Slopes Anticipated After Major Gradings and Areas of Soil Disturbance: Shown on Typical Sections
   * Major Controls and Locations of Stabilization Practices: Shown on Erosion and Sedimentation Plans
   * Project Specific Locations: Off–site waste, borrow, or storage areas are not part of this SW3P.
   * Surface Waters and Discharge Locations: Shown on Drainage Plans.

3. PROJECT DESCRIPTION:
   1. Widening of Neenah Ave. to a 51 foot wide roadway. Project also includes removal of the existing sidewalks and construction of 8 foot wide shared use paths on both sides of the roadway. The project includes clearing, grading, ditch, culverts, driveway reconstruction, roadway widening, guardrails, handrails, tree wells, and water quality/ detention pond improvements.

4. FOR MAJOR SOIL DISTURBING ACTIVITIES SEQUENCE OF EVENTS:
   1. Install controls down–slope of work area and initiate inspection and maintenance activities.
   2. Begin phased construction with interim stabilization practices. Adjust erosion and sedimentation controls during construction to meet requirements and changing conditions and as directed/ approved by the Engineer.
   3. Major soil disturbing activities may include but are not limited to: right–of–way preparation, cut and/or fill to improve roadway profile, final grading and placement of topsoil and the following (if marked):

   _X_ Demolition of existing pavement
   _X_ Placement of road base
   _X_ Exstensive ditch grading
   _X_ Extension of a multiple barrel box culvert
   ___ Temporary detour pavement
   ___ Other:
   _X_ Ditch and water quality/ detention pond improvements

5. EXISTING AND PROPOSED CONDITIONS:

   Description of existing vegetative cover: Lawns and maintained grasses
   Percentage of existing vegetative cover: 80%
   Existing vegetative cover: (mark one) _X_ Thick or uniformly established
   ___ Thin and Patchy
   ___ None or minimal cover
   Description of soils: Limestone of the Edwards Formation of Lower Cretaceous Age
   Site Acreage: 9.95 ac Acreage disturbed: 5.25 ac
   Site runoff coefficient (pre–construction): 0.72 Site runoff coefficient (post–construction): 0.75

6. RECEIVING WATERS: *(Mark all that apply)*

   _X_ A classified stream does not pass through project.
   ___ A classified stream passes through project. Name Segment Number
   Name of receiving waters that will receive discharges from disturbed areas of the project: *Davis Spring Branch*

   ___ USACE Wetlands are not located on project.
   ___ USACE Wetlands are present. Contractor shall not disturb without specific authorization.
   Location/Plan Sheet Info.:

   ___ Project is not on Edwards Aquifer Recharge Zone or Contributing Zone.
   _X_ Project is on Edwards Aquifer Recharge Zone.
   ___ Project is on Edwards Aquifer Contributing Zone.

   ___ No Water Pollution Abatement Plan or Contributing Zone Plan required.
   _X_ A Water Pollution Abatement Plan or Contributing Zone Plan applies to project.

B. BEST MANAGEMENT PRACTICES

General timing or sequence for implementation of BMPs shall be as required and/or as directed/approved by the Engineer to provide adequate controls. BMPs shown on plan sheets are to be considered "proposed" unless/until install date is shown. BMPs are to reduce sediments from road construction activities.

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

   _P_ SEEDING
   _T,P_ MULCHING (Hay or Straw)
   _T,P_ BUFFER ZONES
   _P_ PLANTING
   _T_ COMPOST/MULCH FILTER BERM
   _P_ SODDING
   _P_ PRESERVATION OF NATURAL RESOURCES
   _P_ FLEXIBLE CHANNEL LINER
   _P_ RIGID CHANNEL LINER
   _T_ SOIL RETENTION BLANKET
   _P_ COMPOST MANUFACTURED TOPSOIL
   ___ OTHER:

2. STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

   _T_ SILT FENCES
   ___ HAY BALES
   _T_ ROCK FILTER DAMS
   ___ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
   ___ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
   ___ DIVERSION DIKE AND SWALE COMBINATIONS
   ___ PIPE SLOPE DRAINS
   ___ PAVED FLUMES
   _T_ ROCK BEDDING AT CONSTRUCTION EXIT
   ___ TIMBER MATTING AT CONSTRUCTION EXIT
   ___ CHANNEL LINERS
   ___ SEDIMENT TRAPS
   _P_ SEDIMENT BASINS
   _T_ STORM INLET SEDIMENT TRAP
   ___ STONE OUTLET STRUCTURES
   _P_ CURBS AND GUTTERS
   _P_ STORM SEWERS
   _P_ VELOCITY CONTROL DEVICES
   _X_ OTHER:(Specify Practice)
   _P_ WATER QUALITY PONDS
   ___ VEGETATIVE FILTER STRIPS

3. STORM WATER MANAGEMENT:

   The proposed facility was designed in consideration of hydraulic design standards to convey stormwater in a manner that is protective of public safety and property. The control of erosion from the facility is inherent to the design. Additional factors affecting post–construction stormwater at the project location include: (mark all that apply)

   _X_ Existing or new vegetation provides natural filtration.
   _X_ The design includes provisions for permanent erosion controls provided by strategically placed pervious and impervious surfaces.
   ___ Project includes permanent sedimentation controls (other than grass).
   ___ Velocities do not require dissipation devices.
   _X_ Velocity–dissipation devices included in the design.
   ___ Other :

4. NON–STORM WATER DISCHARGES:

   Off–site discharges are prohibited except as follows:
   1. Discharges from fire fighting activities and/or fire hydrant flushings.
   2. Vehicle, external building, and pavement wash water where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed).
   3. Plain water used to control dust.
   4. Plain water originating from potable water sources.
   5. Uncontaminated groundwater, spring water or accumulated stormwater.
   6. Foundation or footing drains where flows are not contaminated with process materials such as solvents.
   7. Other:

   Concrete truck wash water discharges on the site should be prohibited or minimized. If allowed by the Engineer, they must be managed in a manner so as not to contaminate surface water. They must not be located in areas of concentrated flow. Concrete truck wash–out locations must be shown on the SW3P Layout and included in the inspections.

   Hazardous material spill/leak discharges of hazardous substances shall be prevented or minimized. At a minimum, this includes asphalt products, fuels, oils, lubricants, solvents, paints, acids, concrete curing compounds and additives and chemical additives for soil stabilization. BMPs shall be implemented to the storage areas of these products. All spills must be cleaned up by the Contractor, disposed properly and reported to the Engineer. The Contractor is to immediately report any release at or above the reportable quantity during a 24 hour period to the National Response Center at 1–800–424–8802.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:
   All erosion and sediment controls shall be maintained in good working order. If a repair is necessary, it shall be performed before the next anticipated storm event but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from equipment. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable. Disturbed areas on which construction activities have ceased, temporarily or permanently, shall be stabilized within 14 calendar days unless they are scheduled to and do resume within 21 calendar days. The areas adjacent to creeks and drainageways shall have priority followed by devices protecting storm sewer inlets.

2. INSPECTION:
   For areas of the construction site that have not been finally stabilized, areas used for storage of materials, structural control measures, and locations where vehicles enter or exit the site, personnel provided by the permittee and familiar with the SW3P must inspect disturbed areas at least once every fourteen (14) calendar days and within twenty four (24) hours of the end of a storm event of 0.5 inches or greater. *As an alternative to the above-described inspection schedule of once every fourteen (14) calendar days and within twenty four (24) hours of a storm event of 0.5 inches or greater, the SW3P may be developed to require that these inspections will occur at least once every seven (7) calendar days. If this alternative schedule is developed, the inspection must occur on a specifically defined day, regardless of whether or not there has been rainfall event since the previous inspection.* An Inspection and Maintenance Report shall be prepared for each inspection and the controls shall be revised on the SW3P within seven (7) calendar days following the inspection.

3. WASTE MATERIALS:
   All non–hazardous municipal waste materials such as litter, rubbish, trash and garbage located on or originating from the project shall be collected and stored in a securely lidded metal dumpster, provided by the Contractor. The dumpster shall be emptied as necessary or as required by local regulation and the trash shall be hauled to an appropriately permitted disposal facility. The burying of non–hazardous municipal waste on the project shall not be permitted. Construction material waste sites, stockpiles and haul roads shall be constructed to will minimize and control the amount of sediment that may enter receiving waters. Construction material waste sites shall not be located in any wetland, water body or stream bed. Construction staging areas and vehicle maintenance areas shall be constructed in a manner to minimize the runoff of pollutants.

4. OFFSITE VEHICLE TRACKING:
   Off–site vehicle tracking of sediments and the generation of dust must be minimized. Excess sediments on road shall be removed on a regular basis as directed/approved by the Engineer.

5. PERMITS:
   No solid material shall be discharged to US Army Corps of Engineers (USACE) jurisdictional waters without a Section 404 Permit. When the placement of such materials is not avoidable, they shall be cleared from waterways as soon as practicable. Jurisdictional waters and Section 404 Permits on the project are as follows:

Water	Sta. No.	Section 404 Permit
unnamed tributary to Davis Spring Branch	23+10	N/A–below notification threshold

6. KARST FEATURES:
   If karst features such as caves, sinkholes and/or solution cavities are found during construction,cease work immediately and contact TCEQ, Williamson County and the Engineer.

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

Stantec
221 West Sixth Street, Suite 600
Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
TBPE # F-6324 TBPLS # F-10194230
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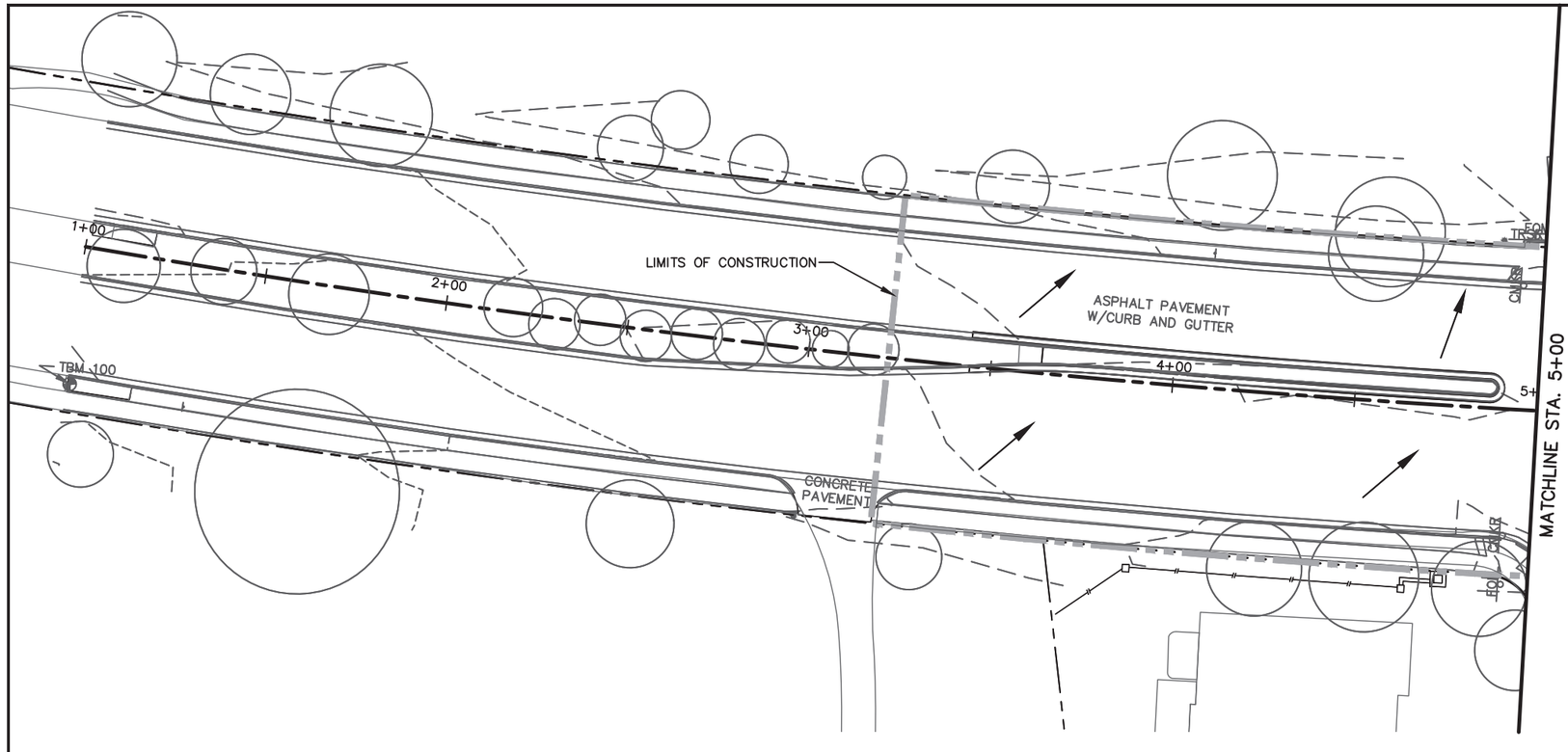
SW3P NOTES

SHEET 185 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				185

SP-2016-0186D

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LEGEND

- DITCH FLOW ARROW
- FLOW ARROW
- CONSTRUCTION LIMITS
- EXIST. WOOD FENCE
- CONSTRUCTION ENTRANCE
- NATIVE SEEDING PER SPEC 604S
- NATIVE SEEDING PER SPEC 609S
- RFD3 — ROCK FILTER DAM TYPE 3
- TFD — TRIANGULAR SEDIMENT FILTER DIKE
- ROW
- ROCK BERM
- 859 — PROP. CONTOURS
- 860 — EXIST. CONTOURS
- S — SILT FENCE
- TP — TREE PROTECTION
- MS — MULCH SOCK

EROSION AND SEDIMENTATION PLAN NOTES

APPLICABLE TO SHEETS 186 TO 198

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
3. PROPOSED FENCING SHOWN OFFSET FROM ROW FOR VISUAL REFERENCES. FENCE TO BE CONSTRUCTED ALONG ROW.
4. REFER TO DRAINAGE SHEETS FOR MORE INFORMATION.
5. IF DISTURBED AREA IS NOT TO BE WORKED ON FOR MORE THAN 14 DAYS, DISTURBED AREA NEEDS TO BE STABILIZED BY REVEGETATION, MULCH TRAP OR REVEGEATION MAT. ENVIRONMENTAL INSPECTOR HAS THE AUTHORITY TO ADD AND/OR MODIFY EROSION/SEDIMENTATION CONTROLS ON SITE TO KEEP PROJECT IN-COMPLIANCE WITH THE CITY OF AUSTIN RULES AND REGULATIONS. CONTRACTOR SHALL UTILIZE DUST CONTROL MEASURES DURING CONSTRUCTION SUCH AS IRRIGATION TRUCKS, AND MULCHING AS PER ECM 1.45(A), OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR. THE CONTRACTOR WILL CLEAN UP SPOILS THAT MIGRATE ONTO THE ROADS A MINIMUM OF ONCE DAILY. [ECM 1.4.4 D4]
6. CONTRACTOR IS RESPONSIBLE FOR REMOVING AND DISPOSING OF SEDIMENT TRANSPORTED FROM THE LIMITS OF CONSTRUCTION TO THE OFFSITE DETENTION/WATER QUALITY PONDS. THIS SHALL BE A NON SEPARATE PAY ITEM
7. REFER TO SHEETS 193 TO 194 FOR THE DEWATERING PLAN.
8. REFER TO SHEET 117 FOR COMPLETE LIMITS OF CRITICAL WATER QUALITY ZONE BUFFERING AREA 1, 2 AND 3.

8.4.17
STATE OF TEXAS
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LICENSED
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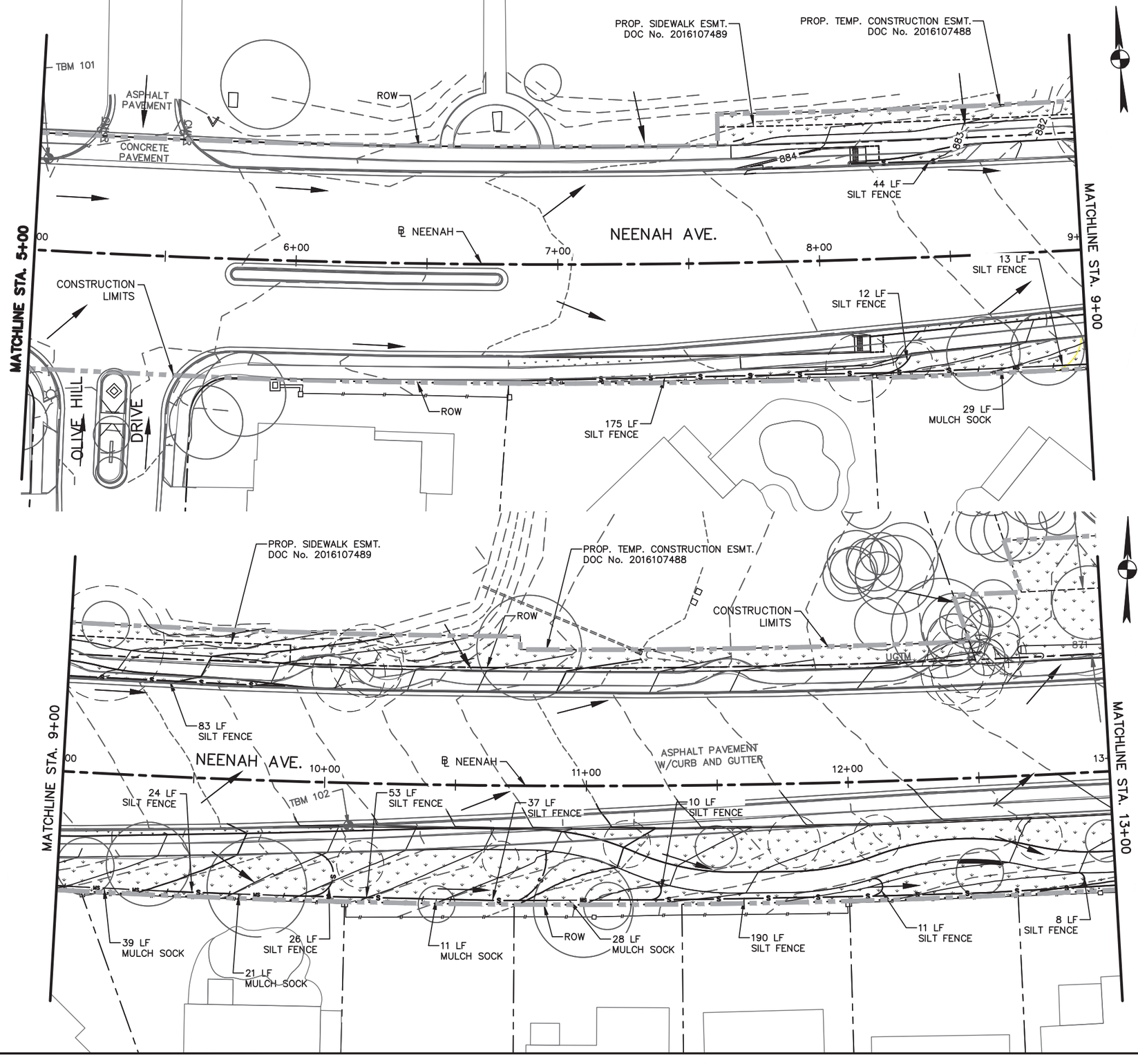
EROSION AND SEDIMENTATION PLAN STA. 1+00 TO STA.5+00

SHEET 186 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				186

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40 0 20 40

1" = 40'

LEGEND

- DITCH FLOW ARROW
- FLOW ARROW
- CONSTRUCTION LIMITS
- EXIST. WOOD FENCE
- CONSTRUCTION ENTRANCE
- NATIVE SEEDING PER SPEC 604S
- NATIVE SEEDING PER SPEC 609S
- RFD3 — ROCK FILTER DAM TYPE 3
- TFD — TRIANGULAR SEDIMENT FILTER DIKE
- ROW
- ROCK BERM
- 859 — PROP. CONTOURS
- 860 — EXIST. CONTOURS
- S — SILT FENCE
- TP — TREE PROTECTION
- MS — MULCH SOCK

8.4.17

STATE OF TEXAS
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Stephanie D Blew

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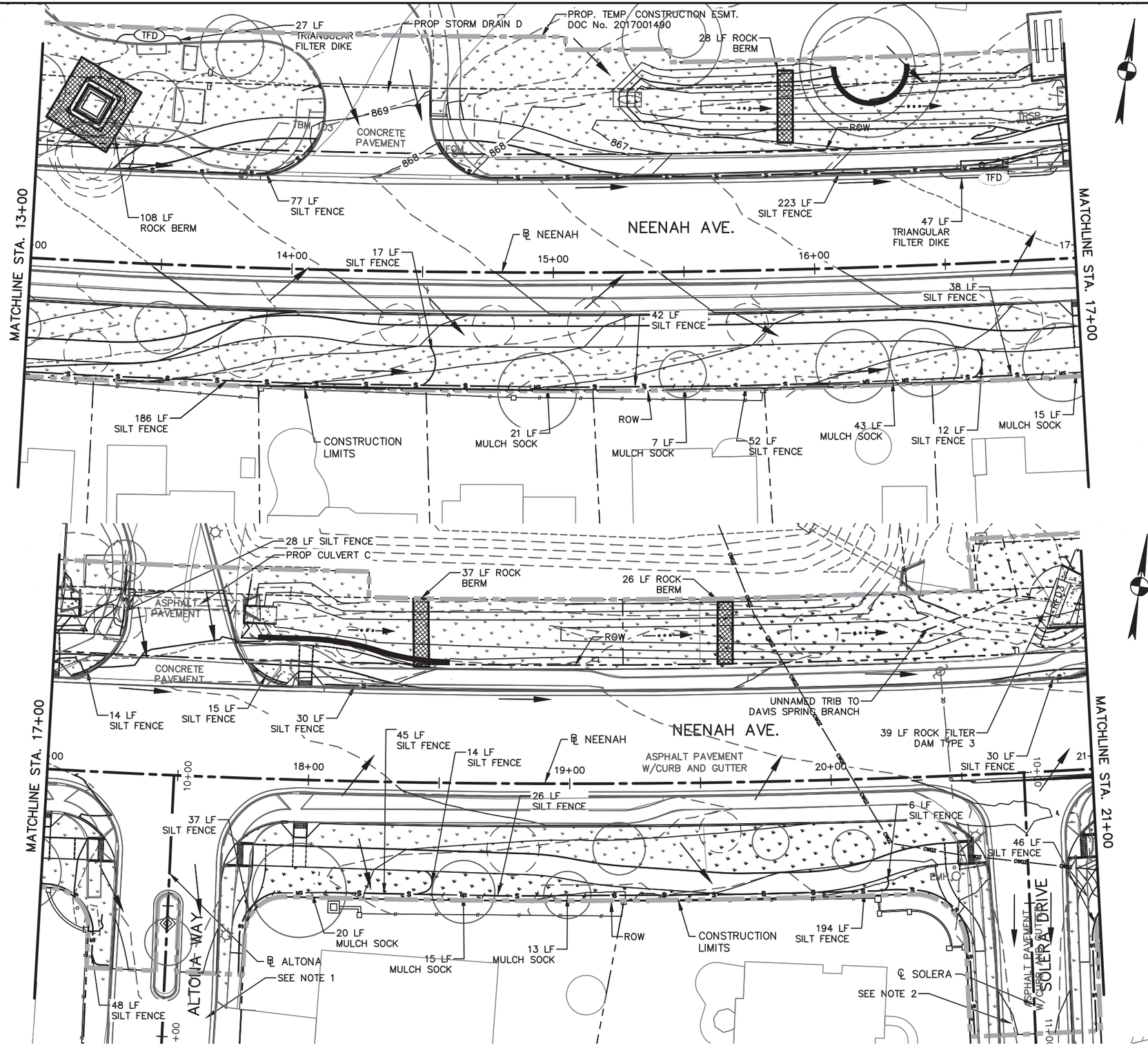
EROSION AND SEDIMENTATION PLAN STA. 5+00 TO STA.13+00

SHEET 187 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				187

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NOTES:

1. INSTALL 60 LF TRIANGULAR SEDIMENT FILTER DIKE AT THE CURB INLET ON ALTONA WAY SOUTH OF IRONDALE DRIVE, AND AT THE CURB OPENING TO THE WATER QUALITY POND AT THE ALTONA WAY CUL-DE-SAC.
2. INSTALL 15 LF TRIANGULAR SEDIMENT FILTER DIKE AT THE FLUME TO THE WATER QUALITY POND AT THE SOLERA DRIVE CUL-DE-SAC.
3. THIS AREA REQUIRES NATIVE GRASSLAND SEEDING AND PLANTING PER SPECIFICATION 609S.6, INCLUDING TOP SOIL AND SEED BED PREPARATION, TEMPORARY IRRIGATION, AND WEED MAINTENANCE.

LEGEND

- DITCH FLOW ARROW
- FLOW ARROW
- CONSTRUCTION LIMITS
- EXIST. WOOD FENCE
- CONSTRUCTION ENTRANCE
- NATIVE SEEDING PER SPEC 604S
- NATIVE SEEDING PER SPEC 609S (SEE NOTE 3)
- RFD3 — ROCK FILTER DAM TYPE 3
- TFD — TRIANGULAR SEDIMENT FILTER DIKE
- ROW
- ROCK BERM
- 859 — PROP. CONTOURS
- 860 — EXIST. CONTOURS
- S — SILT FENCE
- TP — TREE PROTECTION
- MS — MULCH SOCK

8-4-17
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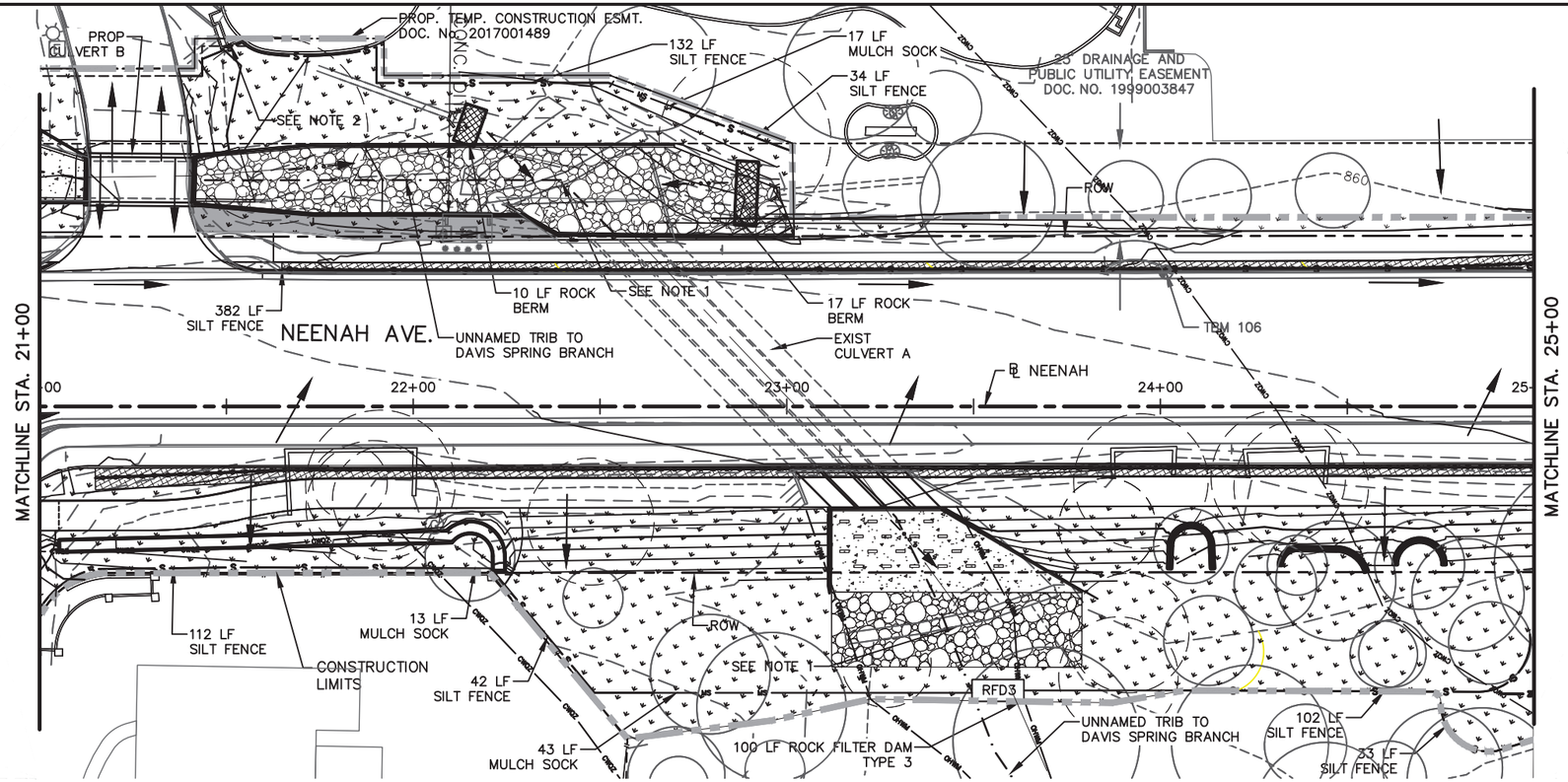
EROSION AND SEDIMENTATION PLAN STA 13+00 TO STA. 21+00

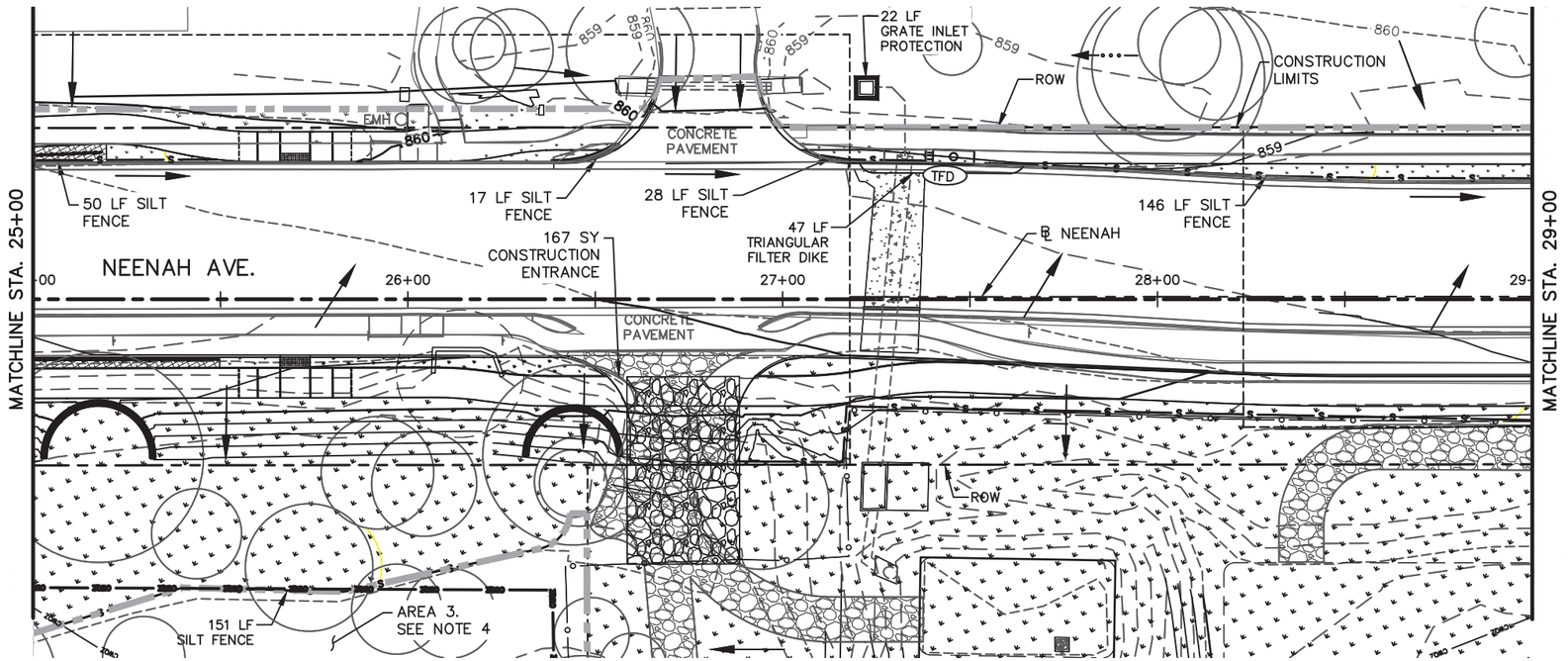
SHEET 188 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				188

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40 0 20 40

1" = 40'

NOTES:

1. CONTRACTOR SHALL REMOVE AND DISPOSE EXIST. ROCK GABION, AND ACCUMULATED SEDIMENT UPSTREAM OF ROCK GABION INCLUDING SEDIMENT WITH IN EXIST. MBC.
2. CONTRACTOR TO PLACE 170 LF OF SILT FENCE ALONG THE EDGE OF THE POND.
3. THIS AREA REQUIRES NATIVE GRASSLAND SEEDING AND PLANTING PER SPECIFICATION 609S.6, INCLUDING TOP SOIL AND SEED BED PREPARATION, TEMPORARY IRRIGATION, AND WEED MAINTENANCE.
4. THE OUTER HALF OF THE CRITICAL WATER QUALITY ZONE HAS BEEN BUFFERED IN THE VICINITY OF POND 2. AREA 1 (4,754.15 SF) AND AREA 2 (192.76 SF) HAVE BEEN REMOVED FOR A TOTAL OF 4,946.91 SF. AREA 3 (4,950.00 SF) HAS BEEN ADDED, FOR A NET GAIN OF 3.09 SF OF CRITICAL WATER QUALITY ZONE ON THE PROJECT.

LEGEND

- DITCH FLOW ARROW
- FLOW ARROW
- CONSTRUCTION LIMITS
- EXIST. WOOD FENCE
- CONSTRUCTION ENTRANCE
- NATIVE SEEDING PER SPEC 604S
- NATIVE SEEDING PER SPEC 609S (SEE NOTE 3)
- RFD3 — ROCK FILTER DAM TYPE 3
- TFD — TRIANGULAR SEDIMENT FILTER DIKE
- CWQZ — AVERAGED CRITICAL WATER QUALITY ZONE
- CWQZ — ORIGINAL CRITICAL WATER QUALITY ZONE
- ROW
- ROCK BERM
- 859 — PROP. CONTOURS
- 860 — EXIST. CONTOURS
- S — SILT FENCE
- TP — TREE PROTECTION
- MS — MULCH SOCK

8.4.17
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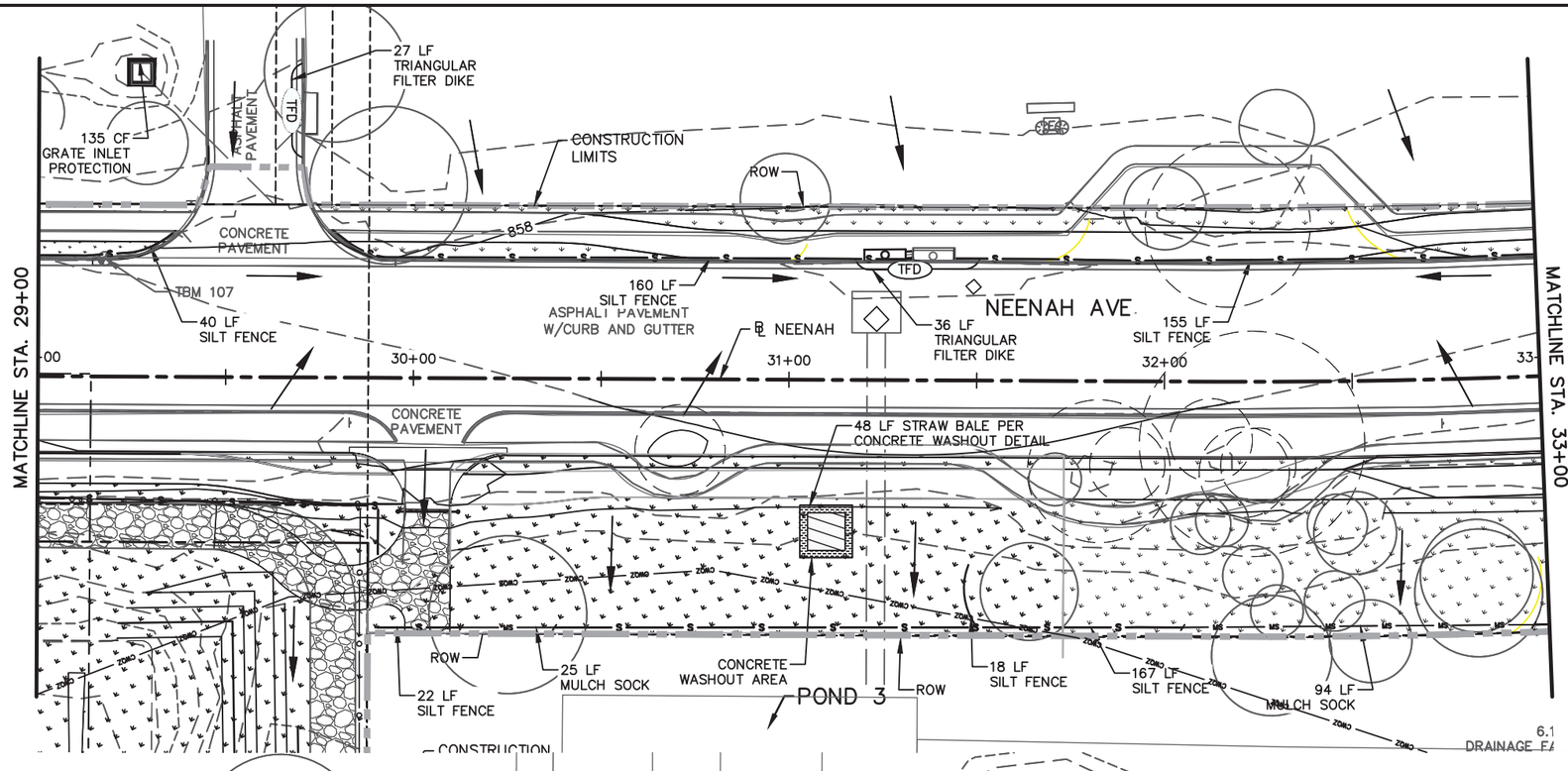
EROSION AND SEDIMENTATION PLAN STA. 21+00 TO STA. 29+00

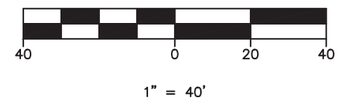
SHEET 189 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				189

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NOTES:

1. THIS AREA REQUIRES NATIVE GRASSLAND SEEDING AND PLANTING PER SPECIFICATION 609S.6, INCLUDING TOP SOIL AND SEED BED PREPARATION, TEMPORARY IRRIGATION, AND WEED MAINTENANCE.

LEGEND

- DITCH FLOW ARROW
- FLOW ARROW
- CONSTRUCTION LIMITS
- EXIST. WOOD FENCE
- CONSTRUCTION ENTRANCE
- NATIVE SEEDING PER SPEC 604S
- NATIVE SEEDING PER SPEC 609S (SEE NOTE 1)
- RFD3 — ROCK FILTER DAM TYPE 3
- TFD — TRIANGULAR SEDIMENT FILTER DIKE
- ROW
- ROCK BERM
- 859 — PROP. CONTOURS
- 860 — EXIST. CONTOURS
- S — SILT FENCE
- TP — TREE PROTECTION
- MS — MULCH SOCK
- CONSTRUCTION STAGING AND SPOIL AREA

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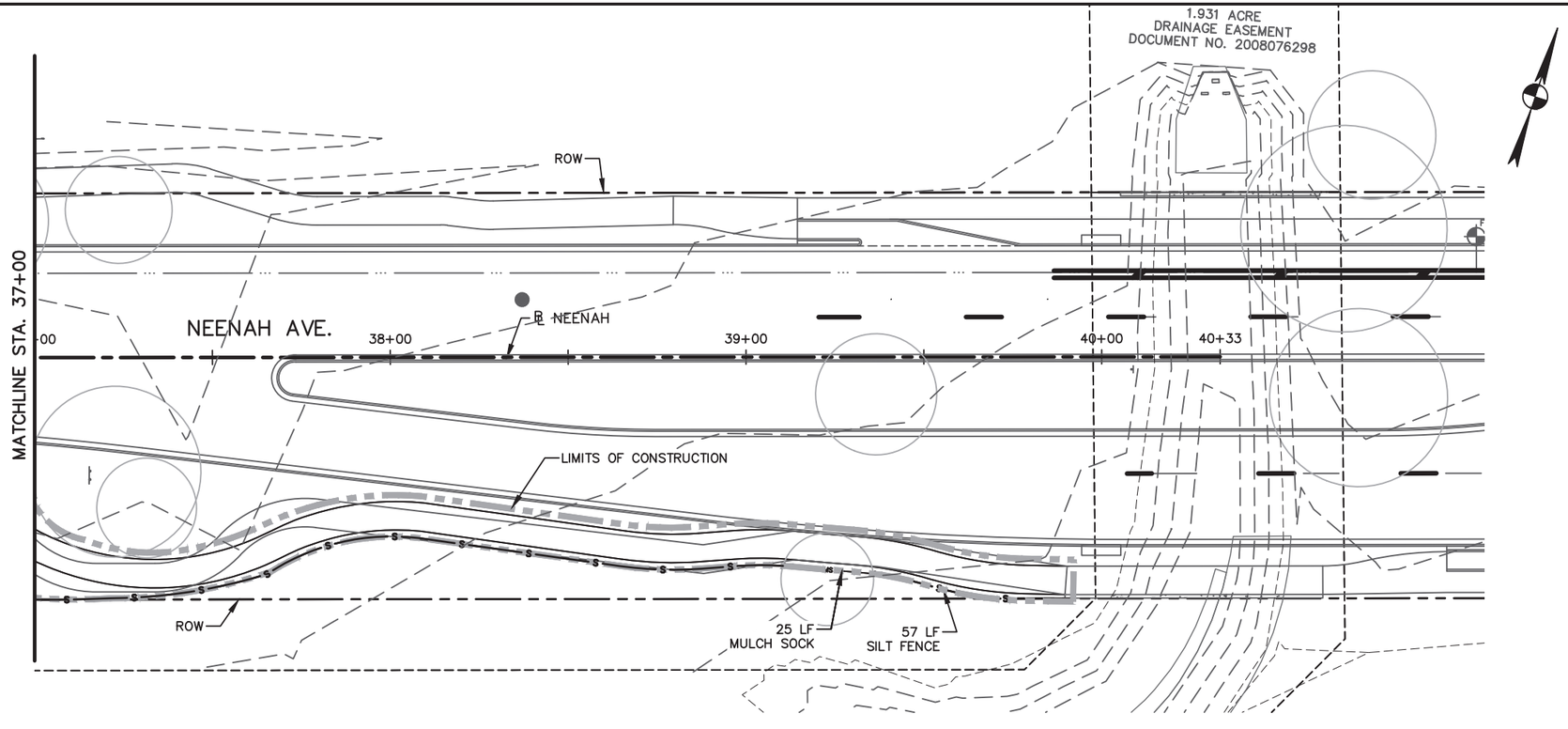
EROSION AND SEDIMENTATION PLAN STA. 29+00 TO 37+00

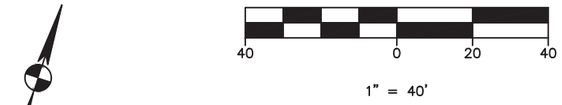
SHEET 190 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				190

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LEGEND

- DITCH FLOW ARROW
- FLOW ARROW
- CONSTRUCTION LIMITS
- EXIST. WOOD FENCE
- CONSTRUCTION ENTRANCE
- NATIVE SEEDING PER SPEC 604S
- NATIVE SEEDING PER SPEC 609S
- RFD3 — ROCK FILTER DAM TYPE 3
- TFD — TRIANGULAR SEDIMENT FILTER DIKE
- ROW
- ROCK BERM
- 859 — PROP. CONTOURS
- 860 — EXIST. CONTOURS
- S — SILT FENCE
- TP — TREE PROTECTION
- MS — MULCH SOCK

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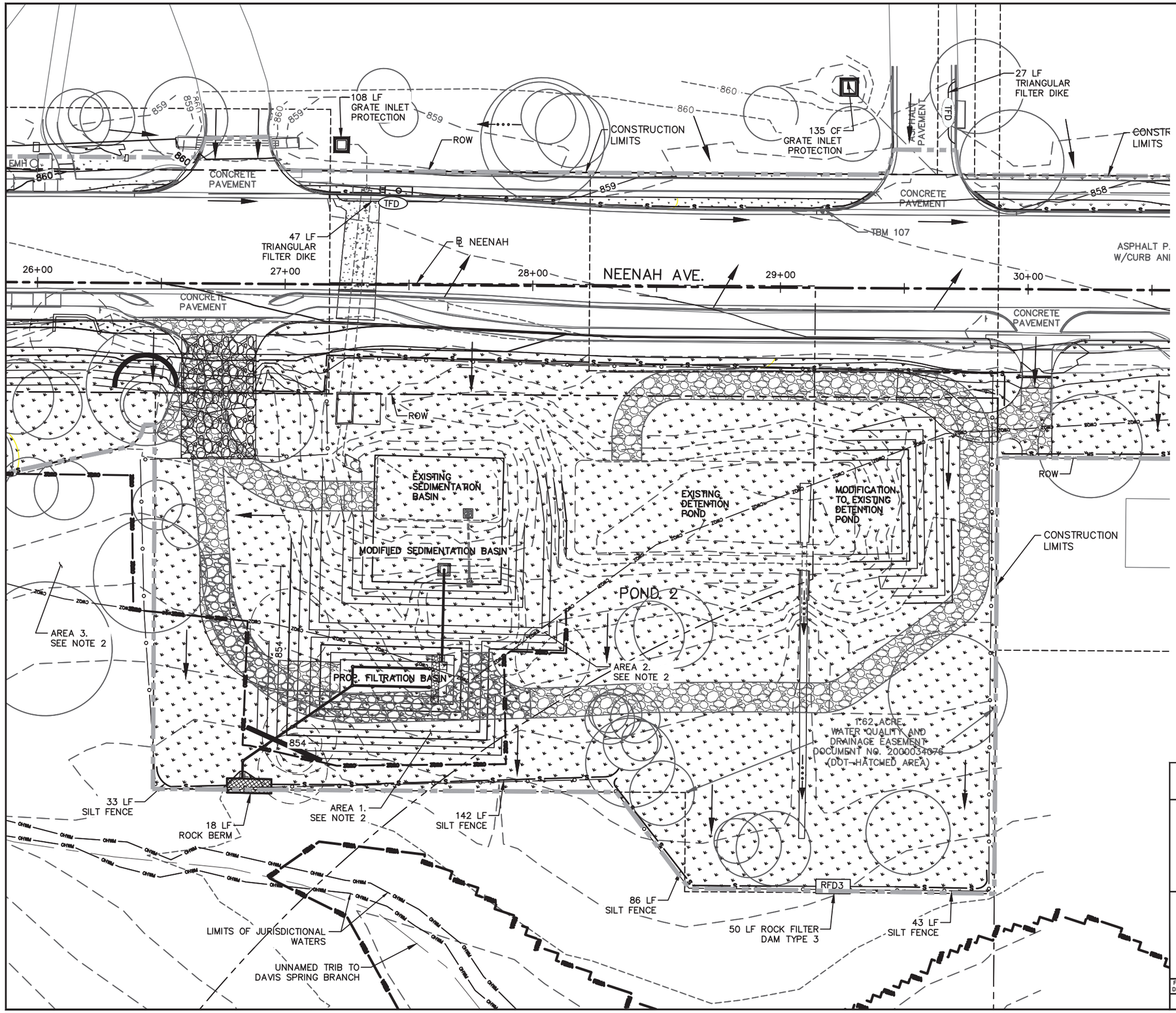
EROSION AND SEDIMENTATION PLAN
STA.37+00 TO END

SHEET 191 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				191

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NOTES:

1. THIS AREA REQUIRES NATIVE GRASSLAND SEEDING AND PLANTING PER SPECIFICATION 609S.6, INCLUDING TOP SOIL AND SEED BED PREPARATION, TEMPORARY IRRIGATION, AND WEED MAINTENANCE.
2. THE OUTER HALF OF THE CRITICAL WATER QUALITY ZONE HAS BEEN BUFFERED IN THE VICINITY OF POND 2. AREA 1 (4,754.15 SF) AND AREA 2 (192.76 SF) HAVE BEEN REMOVED FOR A TOTAL OF 4,946.91 SF. AREA 3 (4,950.00 SF) HAS BEEN ADDED, FOR A NET GAIN OF 3.09 SF OF CRITICAL WATER QUALITY ZONE ON THE PROJECT.

LEGEND

- DITCH FLOW ARROW
- FLOW ARROW
- CONSTRUCTION LIMITS
- EXIST. WOOD FENCE
- CONSTRUCTION ENTRANCE
- NATIVE SEEDING PER SPEC 604S
- NATIVE SEEDING PER SPEC 609S (SEE NOTE 1)
- RFD3 — ROCK FILTER DAM TYPE 3
- TFD — TRIANGULAR SEDIMENT FILTER DIKE
- AVERAGED CRITICAL WATER QUALITY ZONE
- CWQZ — ORIGINAL CRITICAL WATER QUALITY ZONE
- ROW
- ROCK BERM
- 859 — PROP. CONTOURS
- 860 — EXIST. CONTOURS
- S — SILT FENCE
- TP — TREE PROTECTION
- MS — MULCH SOCK

8-4-17
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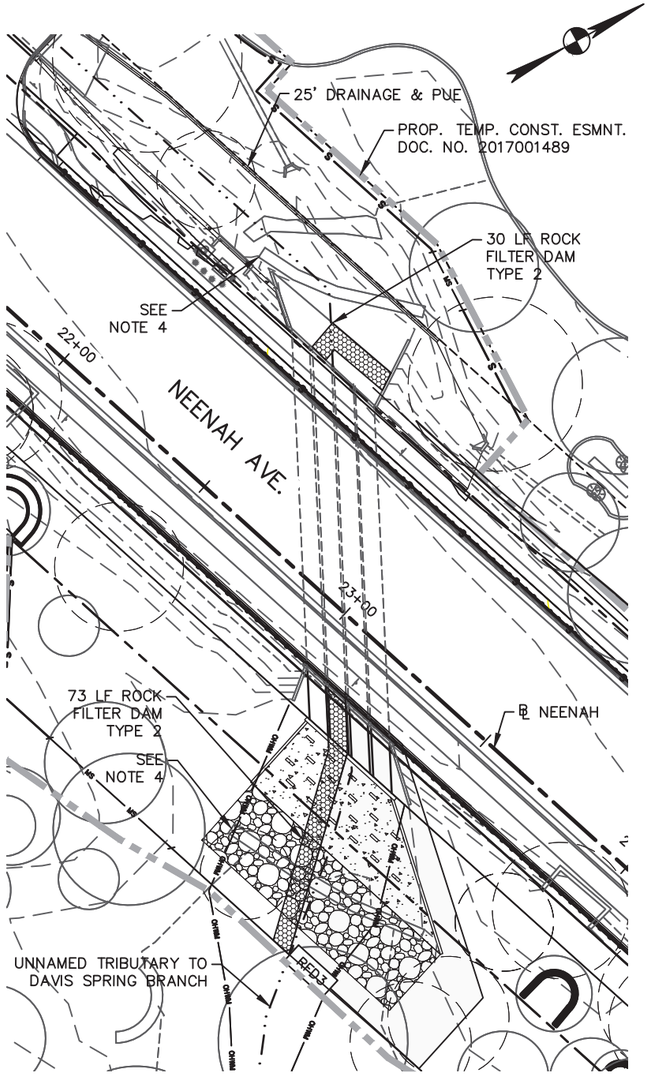
EROSION AND SEDIMENTATION PLAN WATER QUALITY & DETENTION POND 2

SHEET 192 OF 273

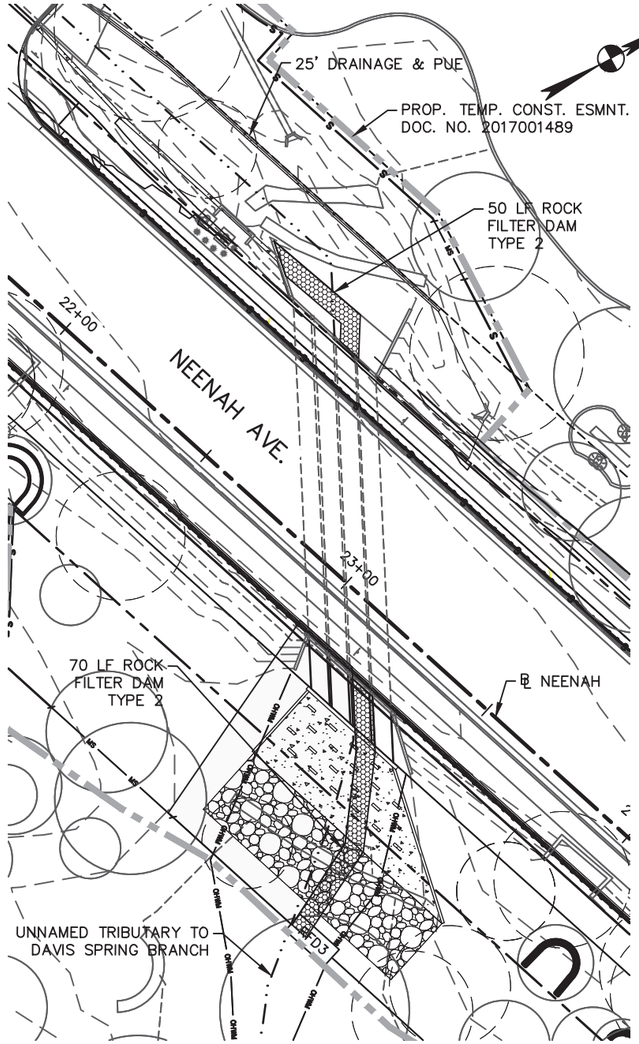
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				192

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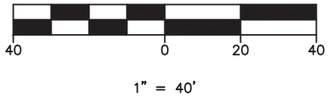
SP-2016-0186D



PHASE A



PHASE B



CONSTRUCTION LIMITS
RFD3 — ROCK FILTER DAM TYPE 3
ROW
ROCK BERM
859 — PROP. CONTOURS
860 — EXIST. CONTOURS
S — SILT FENCE
MS — MULCH SOCK
ROCK FILTER DAM TYPE 2 WITH FILTER FABRIC OVERLAY
WORK AREA

PHASE A NOTES::
1. CONTRACTOR TO INSTALL EROSION AND SEDIMENT CONTROLS DOWNSTREAM OF WORK AREA AS SHOWN ON EROSION AND SEDIMENTATION PLANS.
2. CONTRACTOR TO INSTALL TREE PROTECTION FENCING AS SHOWN ON TREE PRESERVATION PLANS.
3. CONTRACTOR TO REFER TO THE TRAFFIC CONTROL PLANS FOR OVERALL PROJECT CONSTRUCTION PHASING INFORMATION.
4. CONTRACTOR SHALL REMOVE AND DISPOSE OF EXIST. ROCK GABION, AND ACCUMULATED SEDIMENT UPSTREAM OF ROCK GABION INCLUDING SEDIMENT WITH IN EXIST. MBC.
5. CONTRACTOR TO INSTALL ROCK FILTER DAM TYPE 2 WITH FILTER FABRIC OVERLAY IN AREAS SHOWN.
6. PERFORM CONSTRUCTION ACTIVITIES FOR THE EASTERN END OF THE MULTIPLE BARREL BOX CULVERT EXTENSION, HEADWALL, WINGWALL, AND RIPRAP.

PHASE B NOTES::
1. CONTRACTOR TO MAINTAIN EROSION AND SEDIMENT CONTROLS DOWNSTREAM OF WORK AREA AS SHOWN ON EROSION AND SEDIMENTATION PLANS.
2. CONTRACTOR TO MAINTAIN TREE PROTECTION FENCING AS SHOWN ON TREE PRESERVATION PLANS.
3. CONTRACTOR TO REFER TO THE TRAFFIC CONTROL PLANS FOR OVERALL PROJECT CONSTRUCTION PHASING INFORMATION.
4. CONTRACTOR SHALL REMOVE AND DISPOSE OF ROCK FILTER DAM TYPE 2 WITH FILTER FABRIC OVERLAY FROM PHASE A, AND ACCUMULATED SEDIMENT UPSTREAM OF ROCK GABION INCLUDING SEDIMENT WITH IN EXIST. MBC.
5. CONTRACTOR TO INSTALL ROCK FILTER DAM TYPE 2 WITH FILTER FABRIC OVERLAY IN AREAS SHOWN.
6. PERFORM CONSTRUCTION ACTIVITIES FOR THE WESTERN END OF THE MULTIPLE BARREL BOX CULVERT EXTENSION, HEADWALL, WINGWALL, AND RIPRAP.

8-4-17
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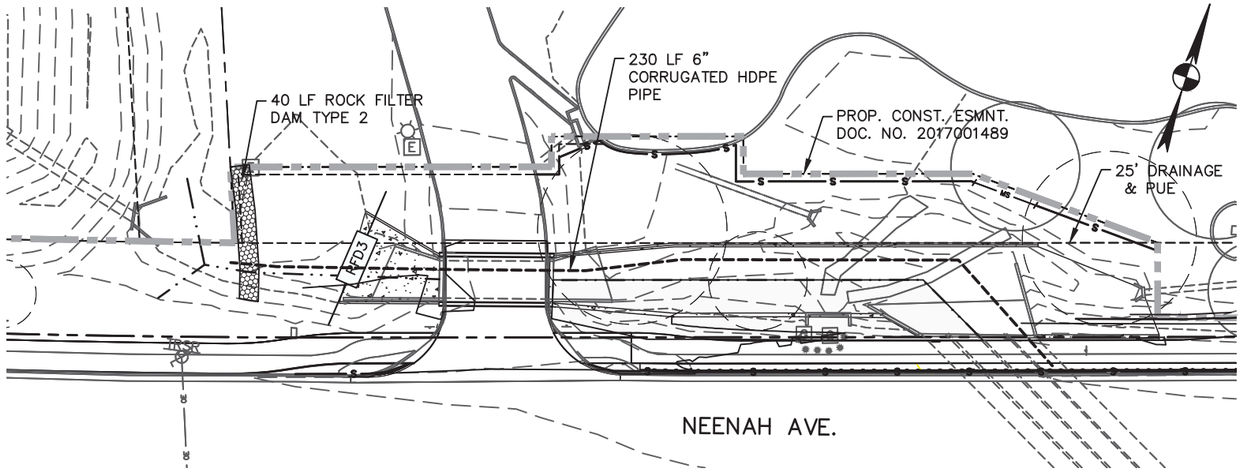
DEWATERING PLAN CULVERT A

SHEET 193 OF 273

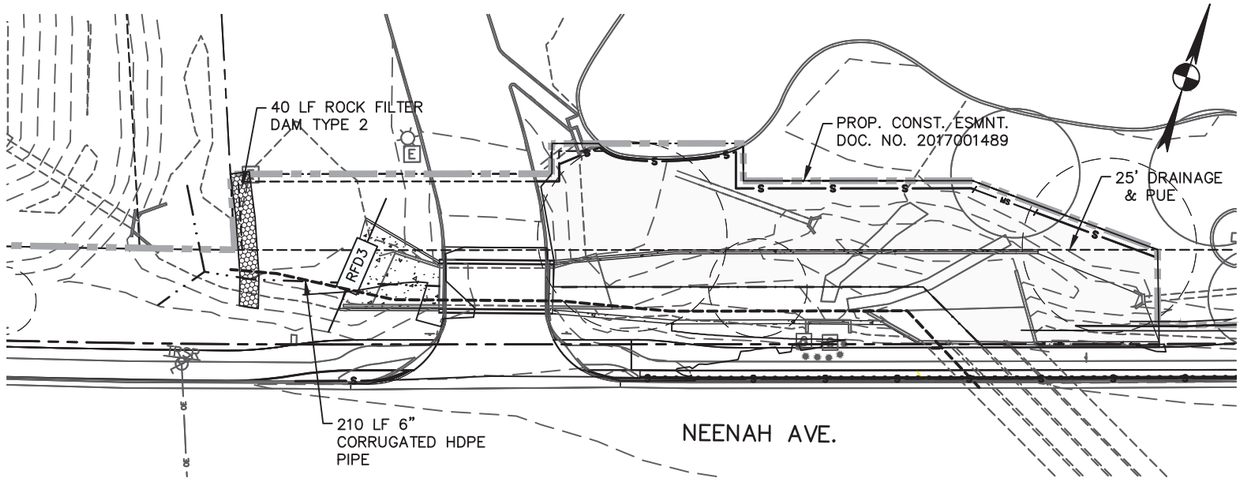
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				193

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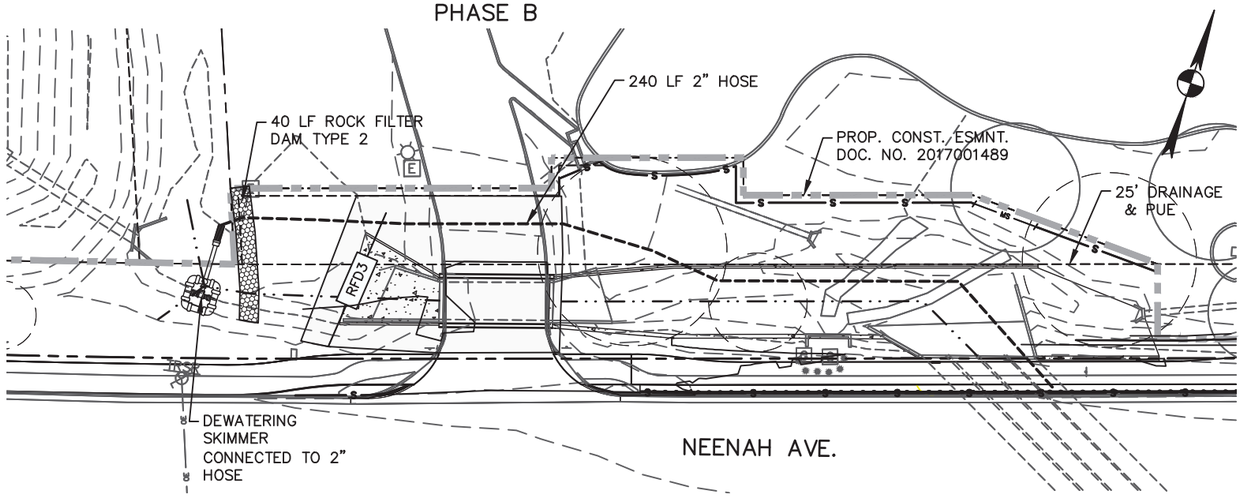
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PHASE A



PHASE B



PHASE C



1" = 40'

PHASE A NOTES:

1. CONTRACTOR TO INSTALL EROSION AND SEDIMENT CONTROLS DOWNSTREAM OF WORK AREA AS SHOWN ON EROSION AND SEDIMENTATION PLANS.
2. CONTRACTOR TO INSTALL TREE PROTECTION FENCING AS SHOWN ON TREE PRESERVATION PLANS.
3. CONTRACTOR TO REFER TO THE TRAFFIC CONTROL PLANS FOR OVERALL PROJECT CONSTRUCTION PHASING INFORMATION.
4. CONTRACTOR TO INSTALL ROCK FILTER DAM TYPE 2 WITH FILTER FABRIC OVERLAY IN AREA SHOWN.
5. PERFORM CONSTRUCTION ACTIVITIES FOR THE SOUTH RETAINING WALL AND CHANNEL LINING.

PHASE B NOTES:

1. CONTRACTOR TO MAINTAIN EROSION AND SEDIMENT CONTROLS DOWNSTREAM OF WORK AREA AS SHOWN ON EROSION AND SEDIMENTATION PLANS.
2. CONTRACTOR TO MAINTAIN TREE PROTECTION FENCING AS SHOWN ON TREE PRESERVATION PLANS.
3. CONTRACTOR TO REFER TO THE TRAFFIC CONTROL PLANS FOR OVERALL PROJECT CONSTRUCTION PHASING INFORMATION.
4. CONTRACTOR TO INSTALL ROCK FILTER DAM TYPE 2 WITH FILTER FABRIC OVERLAY IN AREA SHOWN.
5. PERFORM CONSTRUCTION ACTIVITIES FOR THE NORTH RETAINING WALL AND CHANNEL LINING.

PHASE C NOTES:

1. CONTRACTOR TO MAINTAIN EROSION AND SEDIMENT CONTROLS DOWNSTREAM OF WORK AREA AS SHOWN ON EROSION AND SEDIMENTATION PLANS.
2. CONTRACTOR TO MAINTAIN TREE PROTECTION FENCING AS SHOWN ON TREE PRESERVATION PLANS.
3. CONTRACTOR TO REFER TO THE TRAFFIC CONTROL PLANS FOR OVERALL PROJECT CONSTRUCTION PHASING INFORMATION.
4. CONTRACTOR TO INSTALL ROCK FILTER DAM TYPE 2 WITH FILTER FABRIC OVERLAY IN AREA SHOWN.
5. PERFORM CONSTRUCTION ACTIVITIES FOR THE HOLY FAMILY CATHOLIC SCHOOL DRIVEWAY. WORK TO BE PERFORMED ON NON-SCHOOL DAYS.

- CONSTRUCTION LIMITS
- RFD3 — ROCK FILTER DAM TYPE 3
- ROW
- ROCK BERM
- 859 — PROP. CONTOURS
- 860 — EXIST. CONTOURS
- S — SILT FENCE
- MS — MULCH SOCK
- ROCK FILTER DAM TYPE 2 WITH FILTER FABRIC OVERLAY
- WORK AREA
- DISCHARGE PIPE

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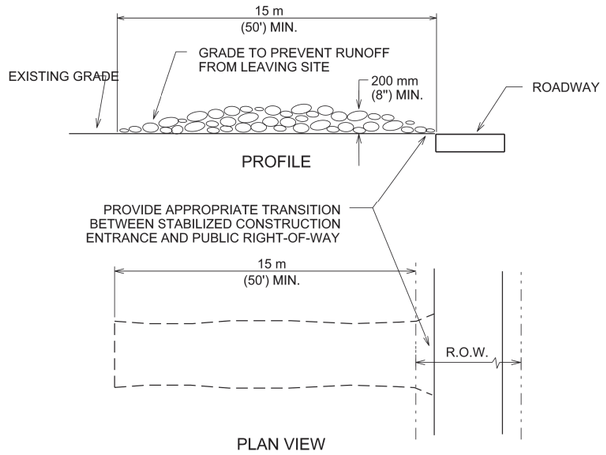
DEWATERING PLAN SWALE A

SHEET 194 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				194

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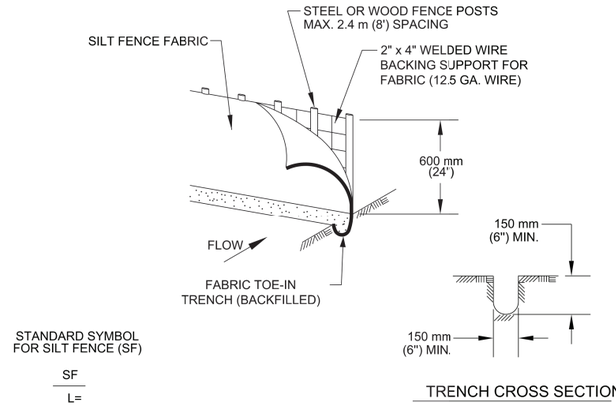
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NOTES:

1. STONE SIZE: 75-125 mm (3-5") OPEN GRADED ROCK.
2. LENGTH: AS EFFECTIVE BUT NOT LESS THAN 15 m (50').
3. THICKNESS: NOT LESS THAN 200 mm (8").
4. WIDTH: NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS/EGRESS.
5. WASHING: WHEN NECESSARY, VEHICLE WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE AND DRAINS INTO AN APPROVED TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.
6. MAINTENANCE: THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADWAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AS WELL AS REPAIR AND CLEAN OUT OF ANY MEASURE DEVICES USED TO TRAP SEDIMENT. ALL SEDIMENTS THAT IS SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC ROADWAY MUST BE REMOVED IMMEDIATELY.
7. DRAINAGE: ENTRANCE MUST BE PROPERLY GRADED OR INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT		STABILIZED CONSTRUCTION ENTRANCE	
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1. STEEL OR WOOD POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 300 mm (12 INCHES). IF WOOD POSTS CANNOT ACHIEVE 300 mm (12 inches) DEPTH, USE STEEL POSTS.

2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW.

3. THE TRENCH MUST BE A MINIMUM OF 150 mm (6 inches) DEEP AND 150 mm (6 inches) WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.

4. SILT FENCE FABRIC SHOULD BE SECURELY FASTENED TO EACH STEEL OR WOOD SUPPORT POST OR TO WOVEN WIRE , WHICH IS IN TURN ATTACHED TO THE STEEL OR WOOD FENCE POST.

5. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTY AS NEEDED.

6. SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 150 mm (6 inches). THE SILT SHALL BE DISPOSED OF ON AN APPROVED SITE AND IN SUCH A MANNER THAT WILL NOT CONTRIBUTE TO ADDITIONAL SILTATION.

CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT		SILT FENCE	
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8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

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FILE NUMBER: SP-2016-0186D APPLICATION DATE: 4/19/2016
APPROVED BY COMMISSION ON: _____ UNDER SECTION _____ OF CHAPTER _____ OF THE CITY OF AUSTIN CODE.
EXPIRATION DATE (25-5-81,LDC)_____ CASE MANAGER _____
PROJECT EXPIRATION DATE (ORD.#970905-A)_____ DWPZ ___ DDZ ___

Director, Planning and Development Review Department
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Rev. 1 _____ Correction 1 _____
Rev. 2 _____ Correction 2 _____
Rev. 3 _____ Correction 3 _____

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NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

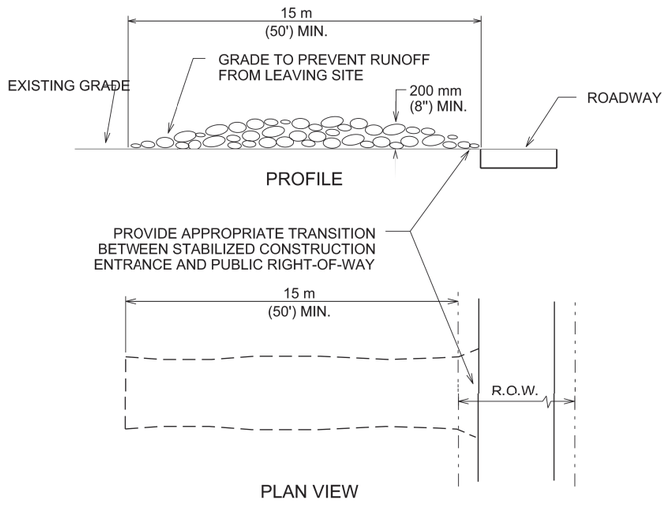
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EROSION CONTROL DETAILS 1

SHEET 195 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				195

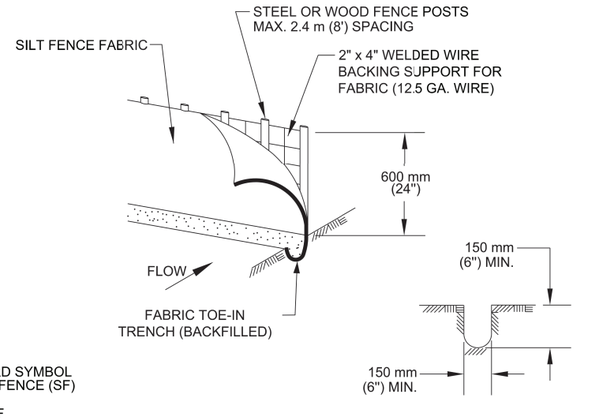
SP-2016-0186D



NOTES:

1. STONE SIZE: 75-125 mm (3-5") OPEN GRADED ROCK.
2. LENGTH: AS EFFECTIVE BUT NOT LESS THAN 15 m (50').
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CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT		STABILIZED CONSTRUCTION ENTRANCE	
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STANDARD SYMBOL
FOR SILT FENCE (SF)

SF
L=

1. STEEL OR WOOD POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 300 mm (12 INCHES). IF WOOD POSTS CANNOT ACHIEVE 300 mm (12 inches) DEPTH, USE STEEL POSTS.

2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW.

3. THE TRENCH MUST BE A MINIMUM OF 150 mm (6 inches) DEEP AND 150 mm (6 inches) WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.

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CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT		SILT FENCE	
RECORD COPY SIGNED BY MORGAN BYARS	*09/01/2011* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 642S-1

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
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NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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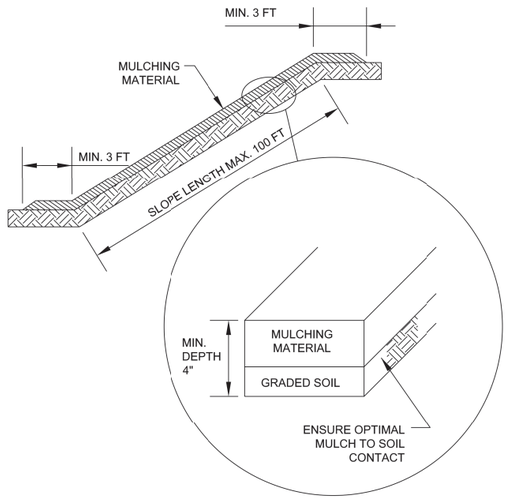
EROSION CONTROL DETAILS 2

SHEET 196 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				196

SP-2016-0186D

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MULCHING MATERIAL

USE UNTREATED WOOD CHIPS PRODUCED FROM A 3 (THREE) INCH MINUS SCREENING PROCESS (EQUIVALENT TO TXDOT ITEM 161, COMPOST, SECTION 1.6.2.B, WOOD CHIP REQUIREMENTS).

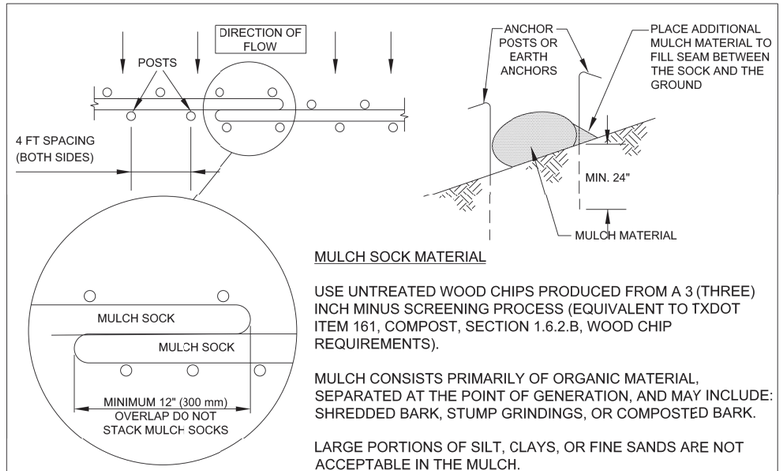
MULCH CONSISTS PRIMARILY OF ORGANIC MATERIAL, SEPARATED AT THE POINT OF GENERATION, AND MAY INCLUDE: SHREDDED BARK, STUMP GRINDINGS, OR COMPOSTED BARK.

LARGE PORTIONS OF SILT, CLAYS, OR FINE SANDS ARE NOT ACCEPTABLE IN THE MULCH.

NOTES:

1. MULCHING ON SLOPES OF 3:1 OR FLATTER USE A MINIMUM DEPTH OF FOUR (4) INCHES.
2. MULCHING IS PERFORMED AFTER GRADING AND SOIL SURFACE PREPARATION IS COMPLETED. THE EFFECTIVENESS OF THE MULCHING MATERIAL DEPENDS ON GOOD CONTACT BETWEEN THE SOIL AND MULCHING MATERIAL. PROVIDE A SMOOTH MULCHING APPLICATION SURFACE BY TRACKING, ROLLING, RAKING, ETC. TO ENSURE OPTIMAL MULCH TO SOIL CONTACT.
3. APPLY MULCHING MATERIAL A MINIMUM OF THREE (3) FEET OVER THE SHOULDER AND BEYOND THE BASE OF THE SLOPE OR INTO EXISTING VEGETATION WHERE POSSIBLE TO PREVENT RILL FORMATION AND TRANSPORT OF THE MATERIAL. THE MULCHING MATERIAL SHALL BE PLACED EVENLY AND UNIFORMLY TO PROVIDE 100% COVERAGE.
4. MULCH MATERIAL MUST BE FREE OF REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH; IT IS NOT ACCEPTABLE FOR THE MULCH MATERIAL TO CONTAIN GROUND CONSTRUCTION DEBRIS, BIOSOLIDS, OR MANURE.
5. THE MULCHED AREA SHALL BE INSPECTED REGULARLY AND AFTER EACH LARGE RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE INMMEDIATELY, WITH ADDITONAL MULCHING MATERIAL PLACED ON TOP OF THE MULCH TO REACH THE RECOMMENDED THICKNESS.
6. WHEN THE MULCH IS DECOMPOSED, CLOGGED WITH SEDIMENT, ERODED OR INEFFECTIVE, IT MUST BE REPLACED OR REPAIRED.

CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT	MULCHING	
RECORD COPY SIGNED BY MORGAN BYARS 08/24/2010 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 645S-1



MULCH SOCK MATERIAL

USE UNTREATED WOOD CHIPS PRODUCED FROM A 3 (THREE) INCH MINUS SCREENING PROCESS (EQUIVALENT TO TXDOT ITEM 161, COMPOST, SECTION 1.6.2.B, WOOD CHIP REQUIREMENTS).

MULCH CONSISTS PRIMARILY OF ORGANIC MATERIAL, SEPARATED AT THE POINT OF GENERATION, AND MAY INCLUDE: SHREDDED BARK, STUMP GRINDINGS, OR COMPOSTED BARK.

LARGE PORTIONS OF SILT, CLAYS, OR FINE SANDS ARE NOT ACCEPTABLE IN THE MULCH.

NOTES:

1. STEEL OR WOOD POSTS WHICH SUPPORT THE MULCH SOCK SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 600mm (24 inches). IF WOOD POSTS CANNOT ACHIEVE 600mm (24 inches) DEPTH, USE STEEL POSTS. EARTH ANCHORS ARE ALSO ACCEPTABLE.
2. THE TOE OF THE MULCH SOCK SHALL BE PLACED SO THAT THE MULCH SOCK IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. IN ORDER TO PREVENT WATER FROM FLOWING BETWEEN THE JOINTS OF ADJACENT ENDS OFMULCH SOCKS, LAP THE ENDS OF ADJACENT MULCH SOCKS A MINIMUM OF 300mm (12 inches).
3. MULCH MATERIAL MUST BE FREE OF REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH; IT IS NOT ACCEPTABLE FOR THE MULCH MATERIAL TO CONTAIN GROUND CONSTRUCTION DEBRIS, BIOSOLIDS, OR MANURE.
4. SOCK MATERIAL WILL BE 100% BIODEGRADABLE, PHOTODEGRADABLE, OR RECYCLABLE SUCH AS BURLAP, TWINE, UV PHOTOBIODEGRADABLE PLASTIC, POLYESTER, OR ANY OTHER ACCEPTABLE MATERIAL.
5. MULCH SOCKS SHOULD BE USED AT THE BASE OF SLOPES NO STEEPER THAN 2:1 AND SHOULD NOT EXCEED THE MAXIMUM SPACING CRITERIA PROVIDED IN CITY OF AUSTIN ENVIRONMENTAL CRITERIA MANUAL TABLE 1.4.5.F.1 FOR A GIVEN SLOPE CATEGORY.
6. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 150mm (6 inches). THE SILT SHALL BE DISPOSED OF ON AN APPROVED SITE AND IN SUCH A MANNER THAT WILL NOT CONTRIBUTE TO ADDITIONAL SILTATION.

CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT	MULCH SOCK	
RECORD COPY SIGNED BY MORGAN BYARS 08/24/2010 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 648S-1

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

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SITE PLAN APPROVAL Sheet 197 of 273
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NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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EROSION CONTROL DETAILS 3

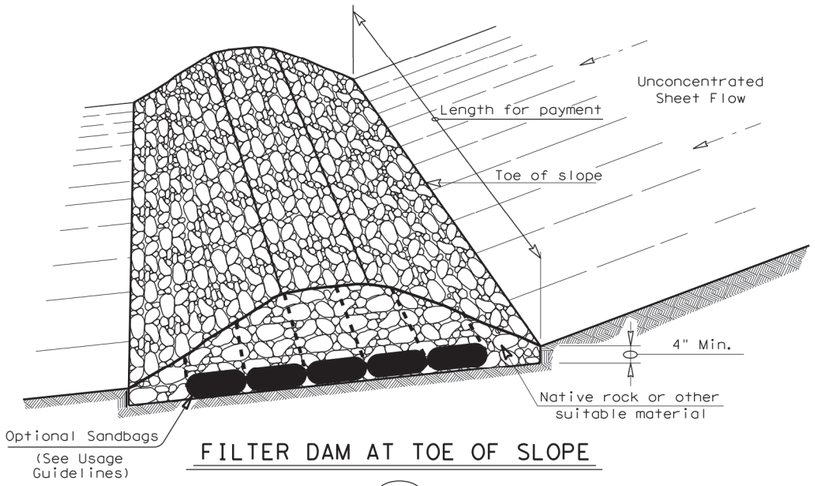
SHEET 197 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				197

SP-2016-0186D

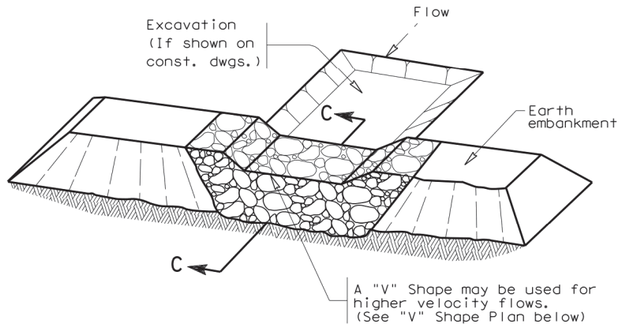
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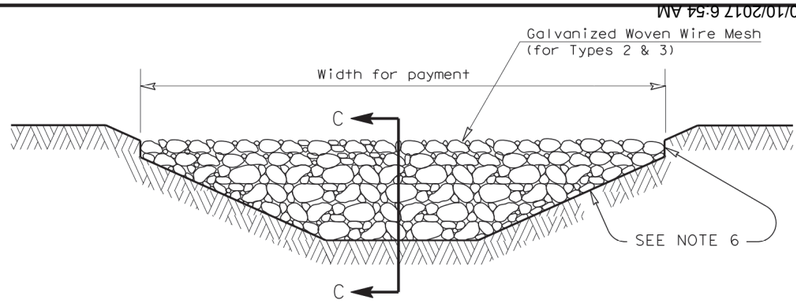
FILTER DAM AT TOE OF SLOPE

RFD1
TYPE 1



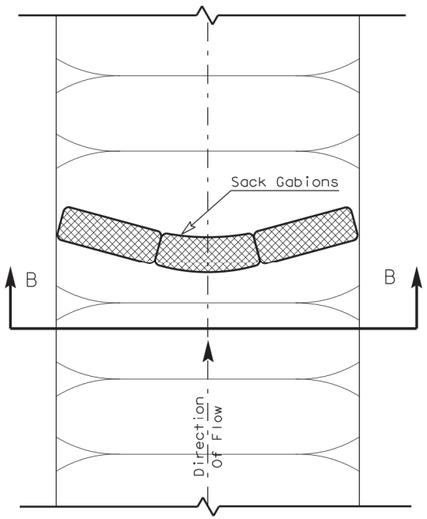
FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2
TYPE 1 OR TYPE 2

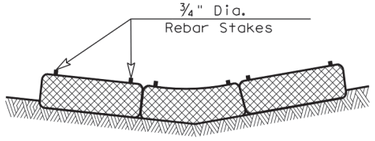


FILTER DAM AT CHANNEL SECTIONS

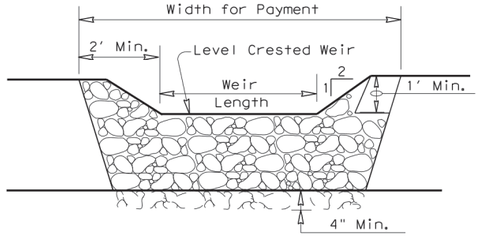
RFD1 OR RFD2 OR RFD3
TYPE 1 OR TYPE 2



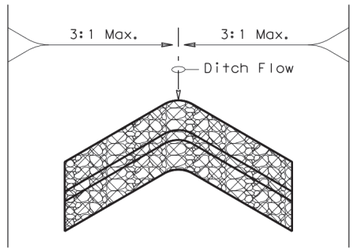
PLAN VIEW



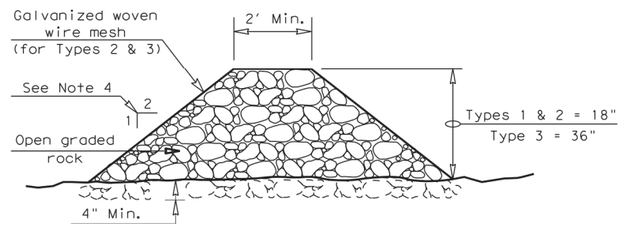
SECTION B-B



PROFILE



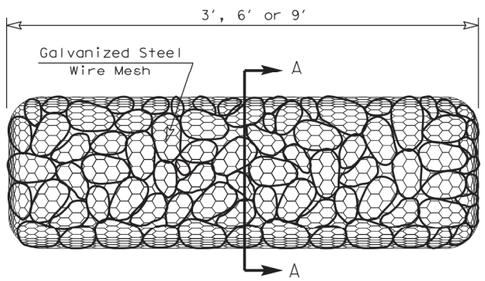
"V" SHAPE
(Plan View)



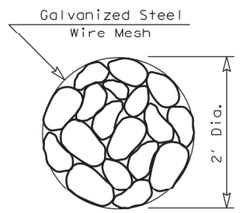
SECTION C-C

PLANS SHEET LEGEND

Type 1 Rock Filter Dam — RFD1
Type 2 Rock Filter Dam — RFD2
Type 3 Rock Filter Dam — RFD3



TYPE 4 (SACK GABIONS)



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^2 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): 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 (approx. 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): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

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. 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 ¾" dia. rebar stakes.
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.

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-93

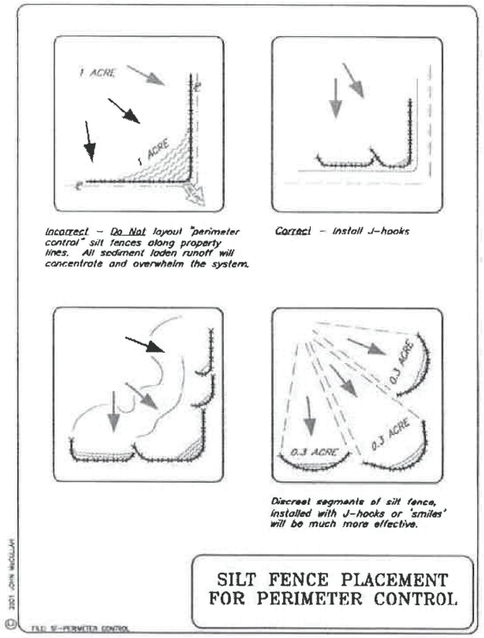
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© TxDOT June 1993	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				198

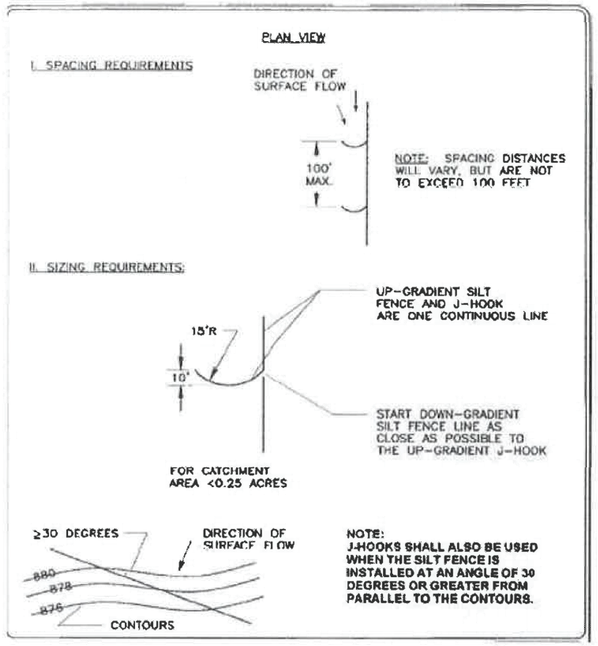
SHEET 198 OF 273

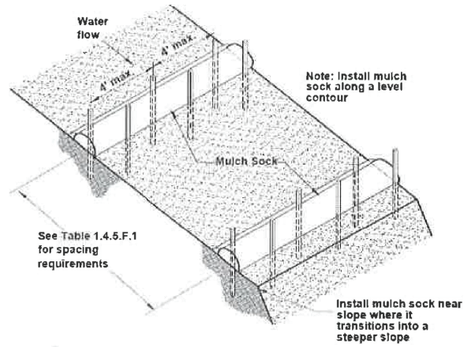
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Bid 1710-1944

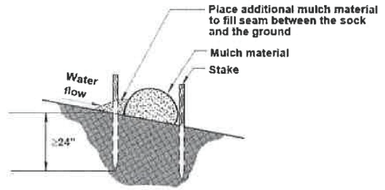
Williamson County, Texas



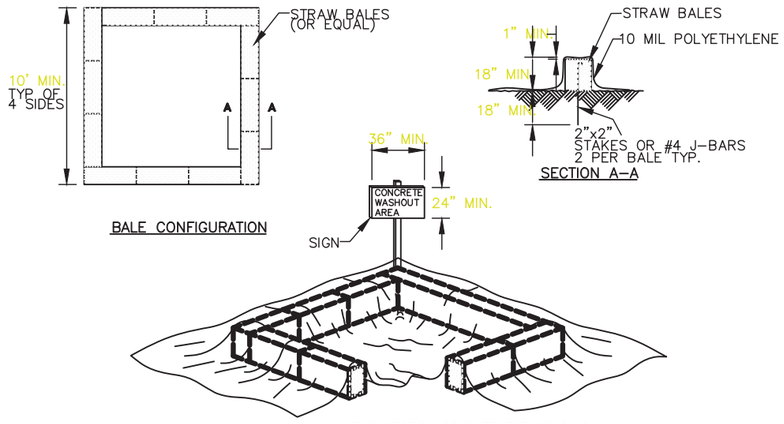




TYPICAL MULCH SOCK INSTALLATION
N.T.S.



MULCH SOCK
N.T.S.



NOTES:
1. FACE SIGN TOWARD NEAREST STREET OR ACCESS POINT
2. CONCRETE WASHOUT SHALL BE LOCATED BEHIND CURB AND 50 FT. MINIMUM FROM DRAINAGE INLETS OR WATERCOURSES

CONCRETE WASHOUT AREA
N.T.S.

1 OF 2

FOR CITY USE ONLY:

SITE PLAN APPROVAL Sheet 199 of 273
FILE NUMBER: SP-2016-01860 APPLICATION DATE: 4/19/2016
APPROVED BY COMMISSION ON: _____ UNDER SECTION _____ OF CHAPTER _____ OF THE CITY OF AUSTIN CODE.
EXPIRATION DATE (25-5-81,LDC)_____ CASE MANAGER _____
PROJECT EXPIRATION DATE (ORD.#970905-A)_____ DWPZ ____ DDZ ____

Director, Planning and Development Review Department
RELEASED FOR GENERAL COMPLIANCE:_____ ZONING: _____
Rev. 1._____ Correction 1._____
Rev. 2._____ Correction 2._____
Rev. 3._____ Correction 3._____

FINAL PLAT MUST BE RECORDED BY THE PROJECT EXPIRATION DATE. IF APPLICABLE, SUBSEQUENT SITE PLANS WHICH DO NOT COMPLY WITH THE CODE CURRENT AT THE TIME OF FILING, AND ALL REQUIRED BUILDING PERMITS AND/OR A NOTICE OF CONSTRUCTION (IF A BUILDING PERMIT IS NOT REQUIRED), MUST ALSO BE APPROVED PRIOR TO THE PROJECT EXPIRATION DATE.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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TBPE # F-6324 TBPLS # F-10194230
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EROSION CONTROL DETAILS 5

SHEET 199 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				199

SP-2016-0186D

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TREE NO.	DESCRIPTION	IS REMOVED?	ON APPENDIX F 8"–18"	NOT ON APPENDIX F 8"–18"	ON APPENDIX F 19" +	NOT ON APPENDIX F 19" +	HERITAGE 24" +	NOTES
R 934	13" LIVE OAK							
936 – (M)	20" LIVE OAK							
R 937	10" LIVE OAK	Y	10.00					
938	14" LIVE OAK	Y	14.00					
R 939	14" LIVE OAK	Y	14.00					
940 – (M)	20" CEDAR ELM	Y			20.00			
941	9" CEDAR ELM							
R 943	13" REDBUD	Y	13.00					
R 944	7" REDBUD	Y						
R 945	14" LIVE OAK							
R 946	14" LIVE OAK							
R 947	11" LIVE OAK							
R 948	16" LIVE OAK							
R 949	19" LIVE OAK							
R 950	9" LIVE OAK	Y	9.00					
R 951	7" LIVE OAK							
R 952	7" LIVE OAK	Y						
R 953	19" LIVE OAK							
R 954	9" LIVE OAK							
R 955	9" BURR OAK	Y	9.00					
R 956	12" LIVE OAK	Y	12.00					
R 957	15" LIVE OAK	Y	15.00					
958	17" LIVE OAK	Y	17.00					
R 959	11" LIVE OAK	Y	11.00					
960 – (M)	13.5" CEDAR ELM							
R 961	14" CEDAR							
R 962	9" CEDAR							
R 963	11" LIVE OAK							
R 964	8" LIVE OAK	Y	8.00					
R 965	7" LIVE OAK	Y						
R 966	12" LIVE OAK	Y	12.00					
R 967 – (M)	14" LIVE OAK	Y	14.00					
R 968 – (M)	12.5" LIVE OAK	Y	12.5					
R 969	12" LIVE OAK	Y	12.00					
R 970	10" LIVE OAK	Y	10.00					
R 971	9" LIVE OAK							
R 972	8" LIVE OAK							
R 976	8" BURR OAK							
R 977 – (M)	12" BURR OAK	Y	12.00					
R 978 – (M)	15" BURR OAK	Y	15.00					
R 979 – (M)	13.5" BURR OAK							
R 980 – (M)	13.5" BURR OAK	Y	13.5					
R 981 – (M)	12" BURR OAK							
R 982 – (M)	13.5" BURR OAK	Y	13.50					
R 983 – (M)	15" BURR OAK							
R 984 – (M)	16.5" BURR OAK	Y	16.50					
985 – (M)	9" BURR OAK	Y	9.00					
986 – (M)	12" BURR OAK							
987 – (M)	10.5" BURR OAK	Y	10.50					
988 – (M)	15" BURR OAK	Y	15.00					
989 – (M)	19.5" BURR OAK							
990 H – (M)	26.5" BURR OAK							
R 991	8" BURR OAK	Y	8.00					
R 992	8" BURR OAK	Y	8.00					
R 993	15" PECAN							
R 994	11" BURR OAK	Y	11.00					
R 995	9" BURR OAK							
R 996	8" BURR OAK	Y	8.00					
R 997	14" REDBUD							
R 998	13" REDBUD							
R 999	9" BURR OAK	Y	9.00					
R 1000	15" REDBUD							
R 1002	18" REDBUD							
R 1003	12" REDBUD							
R 1004	10" REDBUD	Y	10.00					
R 1005	9" REDBUD							
R 1006	10" REDBUD							
R 1007	8" CEDAR ELM	Y	8.00					
R 1008	7" REDBUD							
R 1009	8" LIVE OAK							
1010	9" CEDAR ELM	Y	9.00					
1011 H	25" LIVE OAK	Y					25.00	
1012	13" CEDAR ELM	Y	13.00					
1014	23" POST OAK	Y			23.00			
1022 H	24" LIVE OAK							
1023	17" LIVE OAK							
1024 – (M)	15" CEDAR ELM							
1025	13" CEDAR ELM							
1026	9" CEDAR ELM							
1027 – (M)	18" CEDAR ELM							
1028	18" POST OAK							
1029	11" CEDAR ELM							
1030	8" CEDAR ELM							
1031	10" CEDAR ELM							
1032	10" LIVE OAK							ILL
1033	10" LIVE OAK							ILL
1034	8" CEDAR ELM							
1035	16" LIVE OAK							
1036	14" CEDAR ELM							

TREE NO.	DESCRIPTION	IS REMOVED?	ON APPENDIX F 8"–18"	NOT ON APPENDIX F 8"–18"	ON APPENDIX F 19" +	NOT ON APPENDIX F 19" +	HERITAGE 24" +	NOTES
1036	14" CEDAR ELM							
1037	15" LIVE OAK	Y	15.00					
1038	15" LIVE OAK	Y	15.00					
1039	9" CEDAR ELM	Y	9.00					
1040	8" CEDAR ELM	Y	8.00					
1041	14" LIVE OAK	Y	14.00					
1042	16" CEDAR ELM	Y	16.00					
1043	10" CEDAR ELM							
1044	9" CEDAR ELM							
1050 – (M)	13.5" CEDAR ELM							
1051	15" CEDAR ELM							
1052 – (M)	16.5" CEDAR ELM							
R 1100 – (M)	22" PECAN							
R 1101	11" CEDAR ELM							
R 1113	12" CEDAR ELM	Y	12.00					
R 1118 – (M)	9.5" CEDAR ELM	Y	9.50					
R 1119 – (M)	18" CEDAR ELM	Y	18.00					
R 1120	7" CEDAR ELM	Y						
R 1121 – (M)	12.5" CEDAR ELM							
R 1122 – (M)	21" CEDAR ELM							
R 1123	18" CEDAR ELM		18.00					
R 1124 – (M)	23.5" POST OAK							
1125	12" POST OAK							
1126	9" CEDAR ELM							
R 1128	17" POST OAK	Y	17.00					
R 1129	10" MESQUITE							
R 1130	9" CEDAR ELM							
R 1131	6" CEDAR ELM							
R 1132	7" CEDAR ELM							
R 1134	8" CEDAR ELM							
RH 1139– (M)	29.5" LIVE OAK	Y					29.50	
R 1140 – (M)	11" CEDAR ELM	Y	11.00					
R 1141	12" LIVE OAK	Y	12.00					
R 1142	10" LIVE OAK	Y	10.00					
R 1143	7" CEDAR ELM							
R 1144	8" LIVE OAK							
R 1145	8" CEDAR ELM							
R 1146	7" CEDAR ELM							
R 1149	8" CEDAR ELM							
R 1150	11" CEDAR ELM							
R 1151	8" CEDAR ELM							
R 1152	15" CEDAR ELM							
R 1153	17" CEDAR ELM							
R 1155	14" LIVE OAK	Y	14.00					
R 1156 – (M)	20" LIVE OAK	Y			20.00			
R 1157	18" LIVE OAK	Y	18.00					
R 1158	10" LIVE OAK	Y	10.00					
R 1159 – (M)	12" LIVE OAK							
R 1160	17" POST OAK	Y	17.00					
R 1161	20" LIVE OAK							
1162	8" CEDAR ELM							
R 1163 – (M)	15" CEDAR ELM							
1176 – (M)	16" CEDAR ELM	Y	16.00					
1177 – (M)	15" CEDAR ELM	Y	15.00					
R 1178 – (M)	13" CEDAR ELM	Y	13.00					
R 1179 – (M)	17" CEDAR ELM	Y	17.00					
1180 – (M)	12" CEDAR ELM	Y	12.00					
R 1181 – (M)	17.5" CEDAR ELM	Y	17.50					
R 1182 – (M)	17.5" CEDAR ELM	Y	17.50					
1183	11" CEDAR ELM							
R 1184	8" CEDAR ELM							
1185 – (M)	14" CEDAR ELM							
1186 – (M)	11.5" CEDAR ELM							
1188 – (M)	10.5" CEDAR ELM							
R 1200	10" CEDAR ELM							
1205	11" CEDAR ELM							
1206 – (M)	15" CEDAR ELM							
1207 – (M)	12" CEDAR ELM							
1214 – (M)	12" CEDAR ELM							
R 1215 H – (M)	25.5" CEDAR ELM							
1216 – (M)	8.5" CEDAR ELM							
1217 – (M)	9" CEDAR ELM							

R DENOTES TREES LOCATED WITHIN THE RIGHT–OF–WAY
(M) DENOTES MULTI–TRUNK TREES
H DENOTES HERITAGE TREES

TREE SURVEY WAS PERFORMED DURING THE MONTH OF MARCH 2015

URBAN FORESTRY SUMMARY	
TOTAL TREE INCHES SURVEYED WITHIN LIMITS OF CONSTRUCTION	2048.5 "
TOTAL TREE INCHES REMOVED, 8"–18" ON APPENDIX F	715"
TOTAL TREE INCHES REMOVED, 8"–18" NOT ON APPENDIX F	0"
TOTAL TREE INCHES REMOVED, 19"+ ON APPENDIX F	63"
TOTAL TREE INCHES REMOVED, 19"+ NOT ON APPENDIX F	0"
TOTAL TREE INCHES REMOVED 24" AND GREATER	54.5"

MITIGATION PERCENTAGE TABLE

CATERGORY		ON APPENDIX F 8"–18"	NOT ON APPENDIX F 8"–18"	ON APPENDIX F 19" +	NOT ON APPENDIX F 19" +	HERITAGE
STANDARD MITIGATION FOR ALL TREES	TOTAL INCHES	715.00	0.00	63.00	0.00	54.50
	MITIGATION PERCENTAGE	50%	25%	100%	50%	300%
	INCHES TO BE REPLACED	357.50	0.0	63.00	0.0	163.50
ADDITIONAL MITIGATION FOR ROW TREES	TOTAL INCHES	507.5	0	20	0	29.5
	ADDITIONAL MITIGATION	50%	75%	0%	50%	0%
	INCHES TO BE REPLACED	253.75	0.00	0.00	0.00	0.00
TOTAL CALIPER INCHES REMOVED						832.50
TOTAL CALIPER INCHES REQUIRED TO BE MITIGATED						837.75

GENERAL TREE NOTES

1. ALL AREAS OF NATIVE VEGETATION BEYOND THE LIMITS OF CONSTRUCTION SHALL BE LEFT UNDISTURBED.
2. EXISTING TREES TO REMAIN SHALL BE PROTECTED BY TREE PROTECTIVE FENCING BEFORE CONSTRUCTION BEGINS. NO EQUIPMENT OR MATERIALS SHALL BE STORED, OPERATED OR MAINTAINED WITHIN THE FENCE AREA. FENCES SHALL BE AT THE DRIPLINE AND COMPLETELY SURROUND THE TREE OR CLUSTERS OF TREES. NO FIRES OR CLEANING OF EQUIPMENT TRUCKS WILL BE ALLOWED IN THESE AREAS.
3. ALL DISTURBED AREAS SHALL BE REVEGETATED AND WATERED PER SPECIFICATION.
4. TREE SURVEY WAS PERFORMED DURING THE MONTH OF MARCH 2015.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

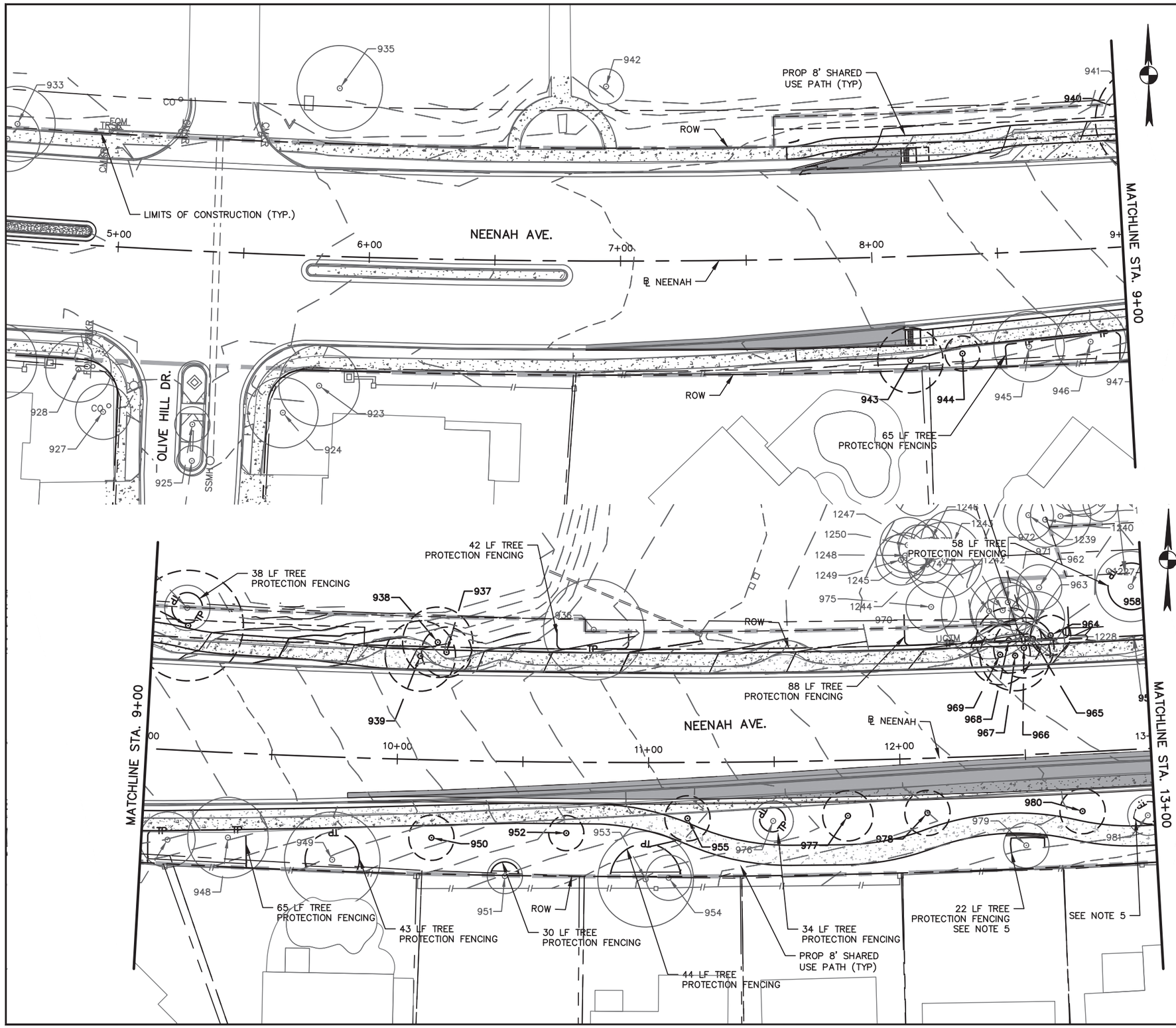
Stantec
221 West Sixth Street, Suite 600
Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
TBPE # F-6324 TBPLS # F-10194230
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TREE LISTS

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				200

SP-2016-0186D

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40 0 20 40

1" = 40'

NOTES:
1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
3. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
4. REFER TO TREE PRESERVATION DETAILS FOR MORE INFORMATION.
5. CONTRACTOR SHALL PERFORM GRADING BY HAND WITHIN CRITICAL ROOT ZONES.

LEGEND

- TREE TO BE REMOVED
- TREE TO REMAIN
- TP — TREE PROTECTION FENCING
- PROPOSED TREE WELL
- PROPOSED ROADWAY WIDENING
- LIMITS OF CONSTRUCTION

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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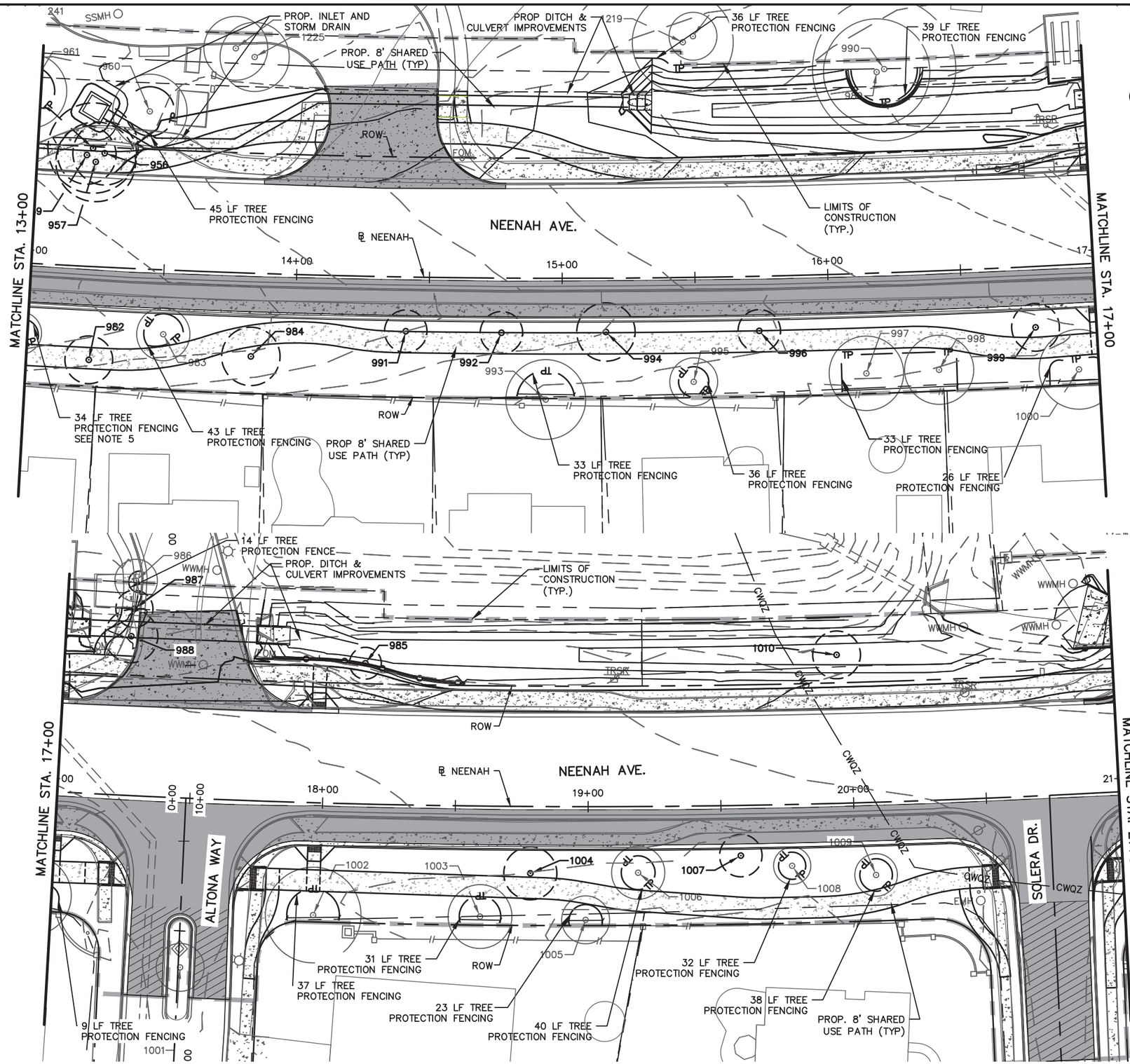
TREE PRESERVATION PLAN
STA. 5+00 TO STA. 13+00

SHEET 201 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				201

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SP-2016-0186D



40 0 20 40

1" = 40'

NOTES:

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
3. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
4. REFER TO TREE PRESERVATION DETAILS FOR MORE INFORMATION.
5. CONTRACTOR SHALL PERFORM GRADING BY HAND WITHIN CRITICAL ROOT ZONES.

LEGEND

- TREE TO BE REMOVED
- TREE TO REMAIN
- TP — TREE PROTECTION FENCING
- PROPOSED TREE WELL
- PROPOSED ROADWAY WIDENING
- LIMITS OF CONSTRUCTION

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
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LICENSED PROFESSIONAL ENGINEER
Stephanie D Blew

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WILLIAMSON COUNTY 1848

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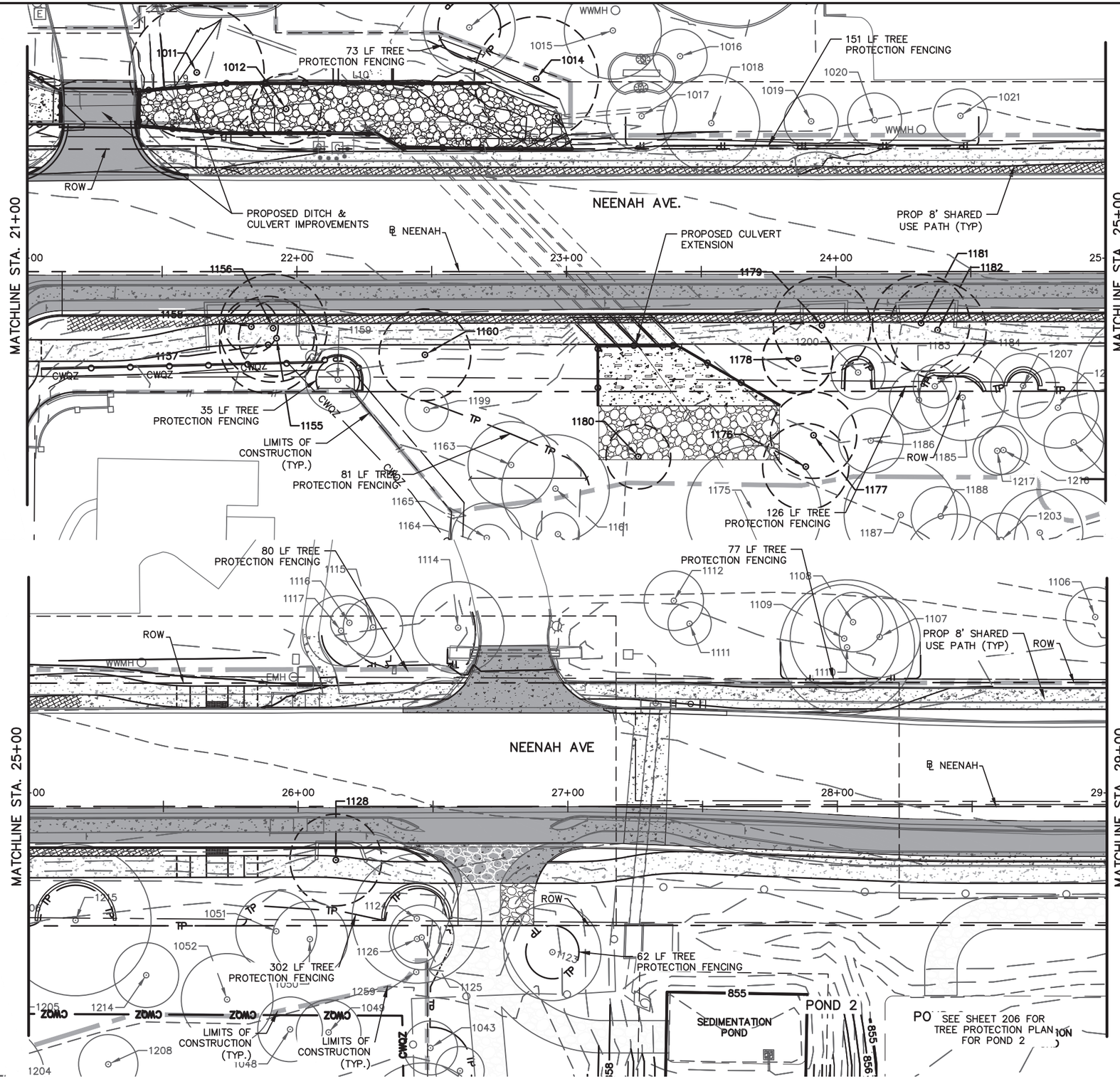
TREE PRESERVATION PLAN STA. 13+00 TO STA. 21+00

SHEET 202 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				202

SP-2016-0186D

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40 0 20 40

1" = 40'

NOTES:

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
3. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
4. REFER TO TREE PRESERVATION DETAILS FOR MORE INFORMATION.
5. CONTRACTOR SHALL PERFORM GRADING BY HAND WITHIN CRITICAL ROOT ZONES.

LEGEND

- TREE TO BE REMOVED
- TREE TO REMAIN
- TP — TREE PROTECTION FENCING
- PROPOSED TREE WELL
- PROPOSED ROADWAY WIDENING
- LIMITS OF CONSTRUCTION

8.4.17

STATE OF TEXAS
STEPHANIE D. BLEW
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LICENSED PROFESSIONAL ENGINEER

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WILLIAMSON COUNTY 1848

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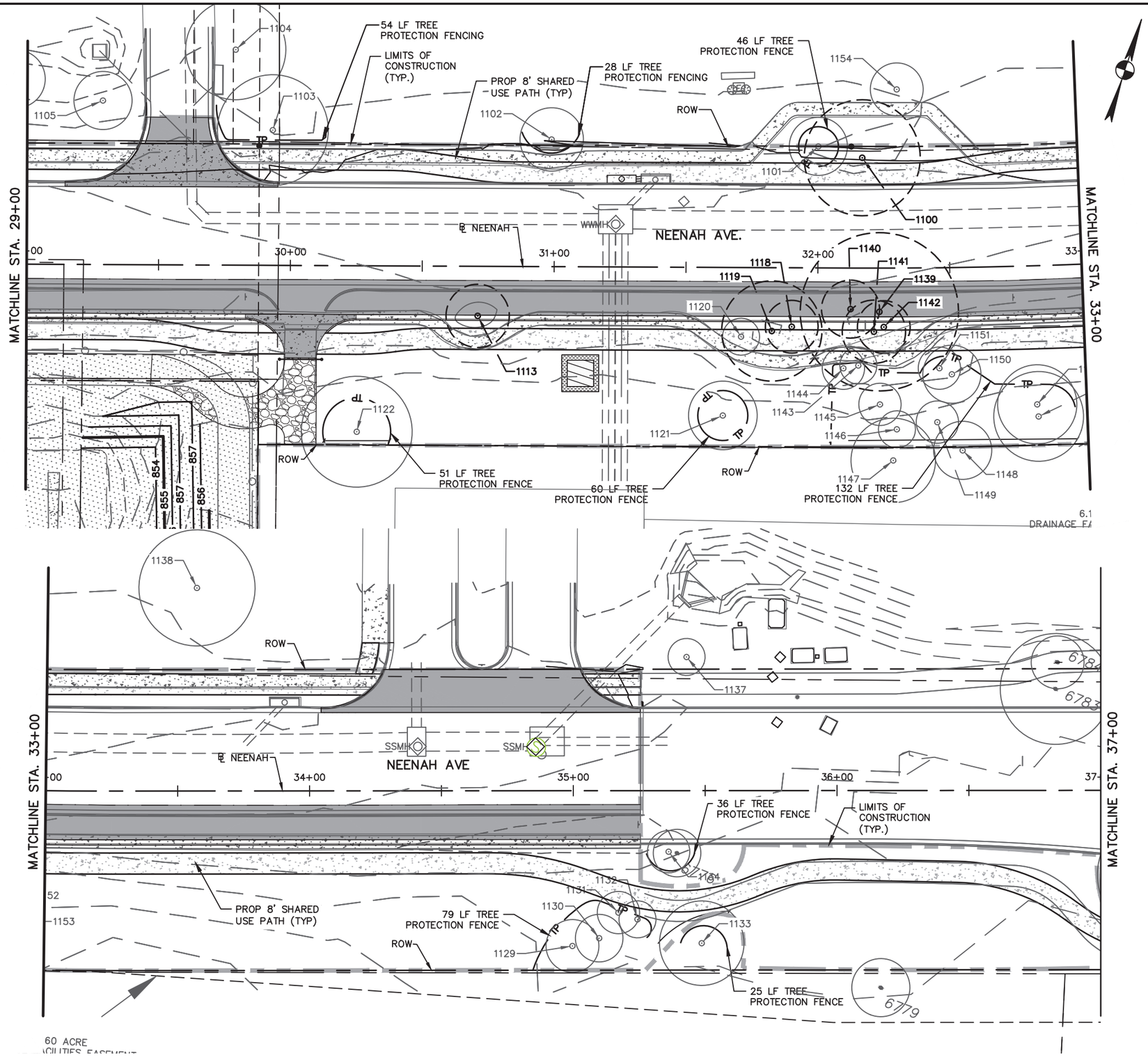
TREE PRESERVATION PLAN
STA. 21+00 TO STA. 29+00

SHEET 203 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				203

SP-2016-0186D

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40 0 20 40

1" = 40'

NOTES:

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
3. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
4. REFER TO TREE PRESERVATION DETAILS FOR MORE INFORMATION.
5. CONTRACTOR SHALL PERFORM GRADING BY HAND WITHIN CRITICAL ROOT ZONES.
6. CONTOURS EAST OF NEENAH ℄ STA. 35+25.47 WERE PROVIDED BY OTHERS AND REFLECT PRE ROADWAY EXTENSION CONTOURS AND VEGETATION. CONTRACTOR TO FIELD VERIFY ACTUAL CONDITIONS AND NOTIFY ENGINEER IF ADDITIONAL TREES ARE PRESENT WITHIN LIMITS OF CONSTRUCTION.

LEGEND

- TREE TO BE REMOVED
- TREE TO REMAIN
- TP — TREE PROTECTION FENCING
- PROPOSED TREE WELL
- PROPOSED ROADWAY WIDENING
- LIMITS OF CONSTRUCTION

8.4.17
STATE OF TEXAS
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221 West Sixth Street, Suite 600
Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
TBPE # F-8324 TBPLS # F-10194230
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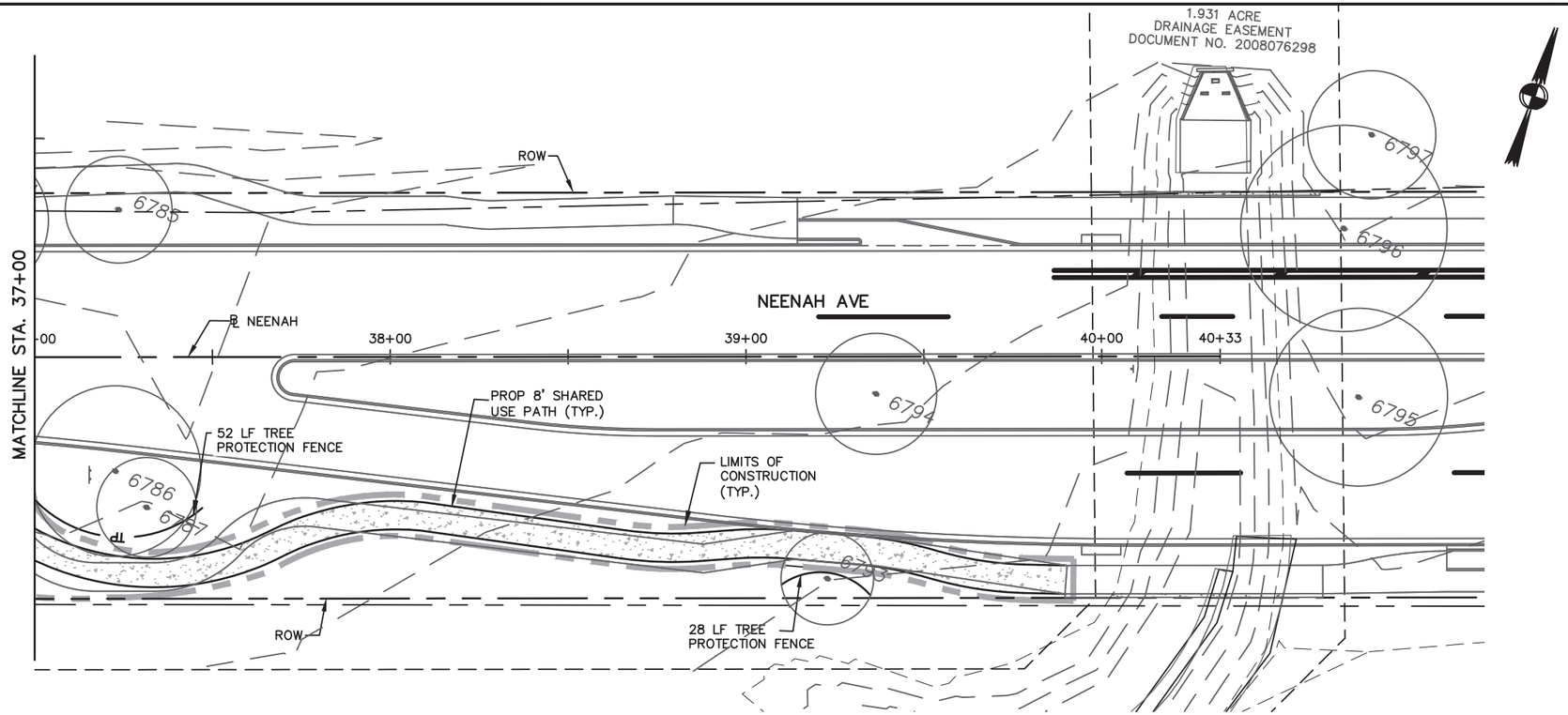
TREE PRESERVATION PLAN
STA. 29+00 TO 37+00

SHEET 204 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				204

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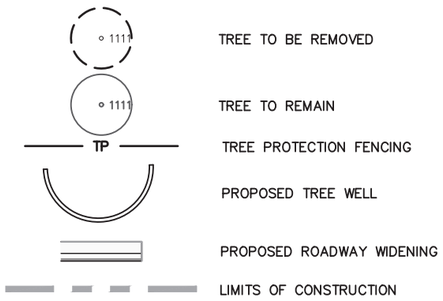




NOTES:

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
3. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
4. REFER TO TREE PRESERVATION DETAILS FOR MORE INFORMATION.
5. CONTRACTOR SHALL PERFORM GRADING BY HAND WITHIN CRITICAL ROOT ZONES.
6. CONTOURS EAST OF NEENAH ℄ STA. 35+25.47 WERE PROVIDED BY OTHERS AND REFLECT PER ROADWAY EXTENSION CONTOURS AND VEGETATION. CONTRACTOR TO FIELD VERIFY ACTUAL CONDITIONS AND NOTIFY ENGINEER IS ADDITIONAL TREES ARE PRESENT WITHIN LIMITS OF CONSTRUCTION.

LEGEND



8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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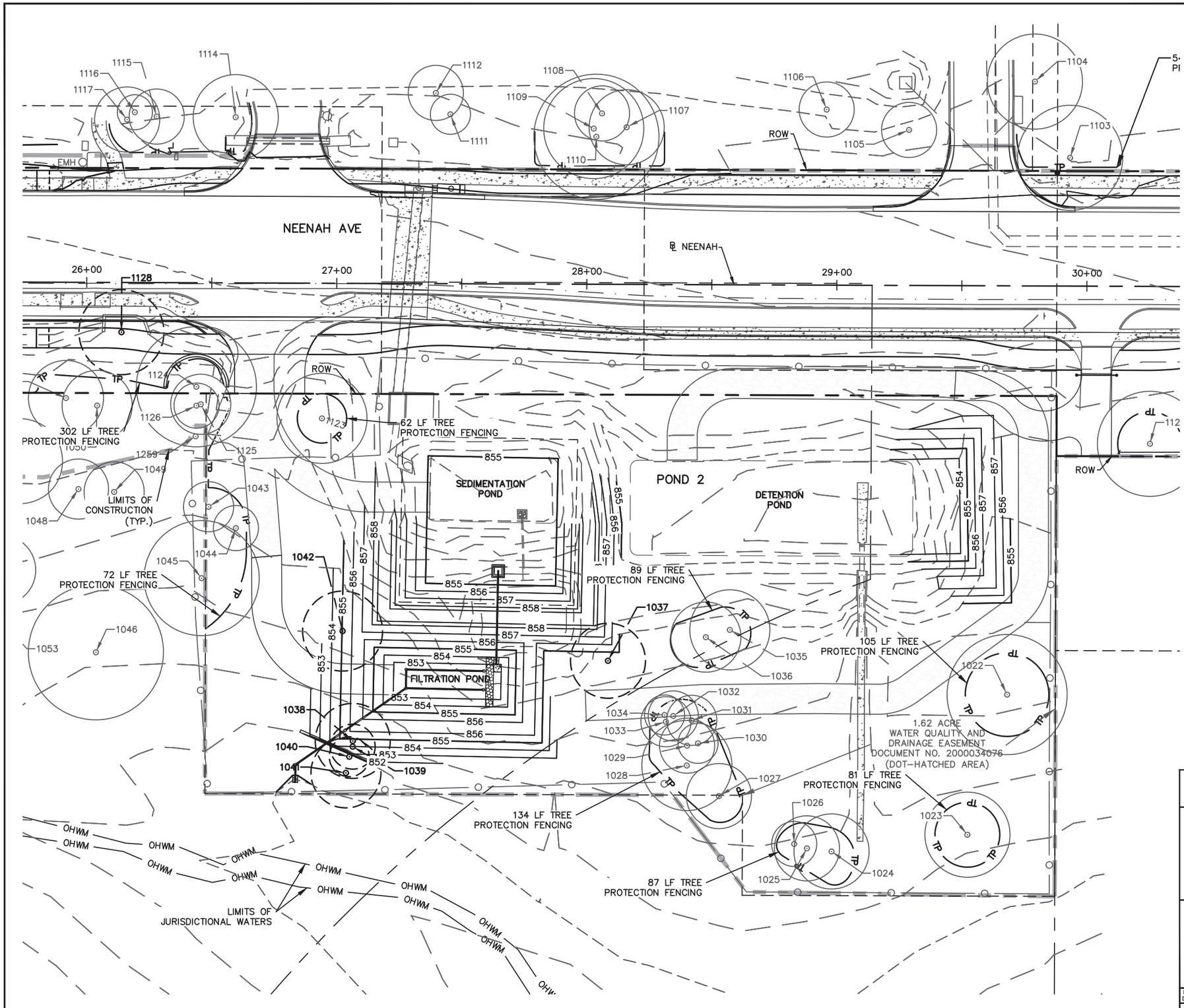
TREE PRESERVATION PLAN STA. 37+00 TO END

SHEET 205 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				205

SP-2016-0186D

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40 0 20 40

1" = 40'

NOTES:

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
3. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
4. REFER TO TREE PRESERVATION DETAILS FOR MORE INFORMATION.
5. CONTRACTOR SHALL PERFORM GRADING BY HAND WITHIN CRITICAL ROOT ZONES.

LEGEND

- TREE TO BE REMOVED
- TREE TO REMAIN
- TP — TREE PROTECTION FENCING
- PROPOSED TREE WELL
- PROPOSED ROADWAY WIDENING
- FEMA — FEMA 100 YR FLOODPLAIN
- OHWM — ORDINARY HIGH WATER MARK
- LIMITS OF CONSTRUCTION

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

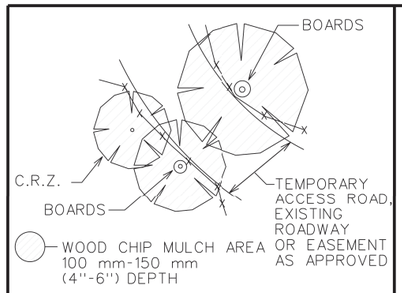
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TREE PRESERVATION PLAN WATER QUALITY & DETENTION POND 2

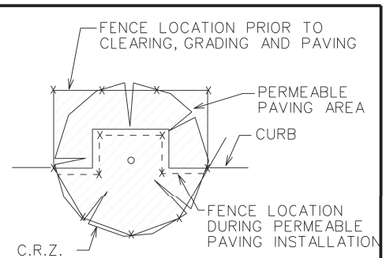
SHEET 206 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				206

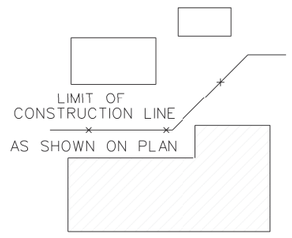
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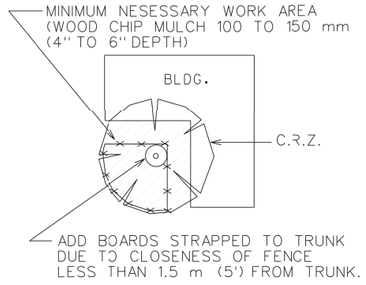
LINEAR CONSTRUCTION THROUGH TREES



TREES IN PAVING AREA

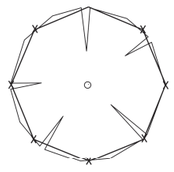


NATURAL AREAS

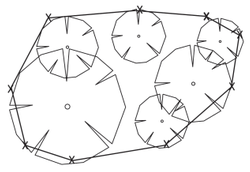


TREES NEAR CONSTRUCTION ACTIVITY

CRITICAL ROOT ZONE (C.R.Z.)
RADIUS = 12 mm PER mm
(1 FT. PER INCH)
OF TRUNK DIAMETER

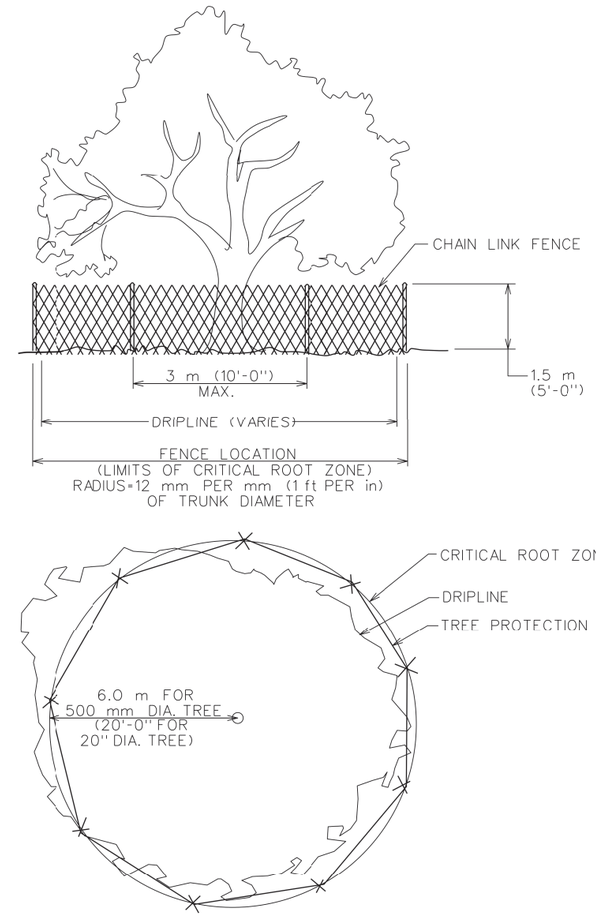


INDIVIDUAL TREE



GROUP OF TREES

CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT		TREE PROTECTION FENCE LOCATIONS	
RECORD COPY SIGNED BY J. PATRICK MURPHY	*11/15/99* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 610S-1



CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT		TREE PROPTECTION FENCE TYPE A - CHAIN LINK	
RECORD COPY SIGNED BY J. PATRICK MURPHY	*11/15/99* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 610S-2

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

FOR CITY USE ONLY:

SITE PLAN APPROVAL Sheet 207of 273
FILE NUMBER: SP-2016-0186D APPLICATION DATE: 4/19/2016
APPROVED BY COMMISSION ON: _____ UNDER SECTION _____ OF
CHAPTER _____ OF THE CITY OF AUSTIN CODE.
EXPIRATION DATE (25-5-81,LDC)_____ CASE MANAGER _____
PROJECT EXPIRATION DATE (ORD.#970905-A)_____ DWPZ ___ DDZ ___

Director, Planning and Development Review Department
RELEASED FOR GENERAL COMPLIANCE:_____ ZONING: _____
Rev. 1._____ Correction 1._____
Rev. 2._____ Correction 2._____
Rev. 3._____ Correction 3._____

FINAL PLAT MUST BE RECORDED BY THE PROJECT EXPIRATION DATE, IF APPLICABLE. SUBSEQUENT SITE PLANS WHICH DO NOT COMPLY WITH THE CODE CURRENT AT THE TIME OF FILING, AND ALL REQUIRED BUILDING PERMITS AND/OR A NOTICE OF CONSTRUCTION (IF A BUILDING PERMIT IS NOT REQUIRED), MUST ALSO BE APPROVED PRIOR TO THE PROJECT EXPIRATION DATE.

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
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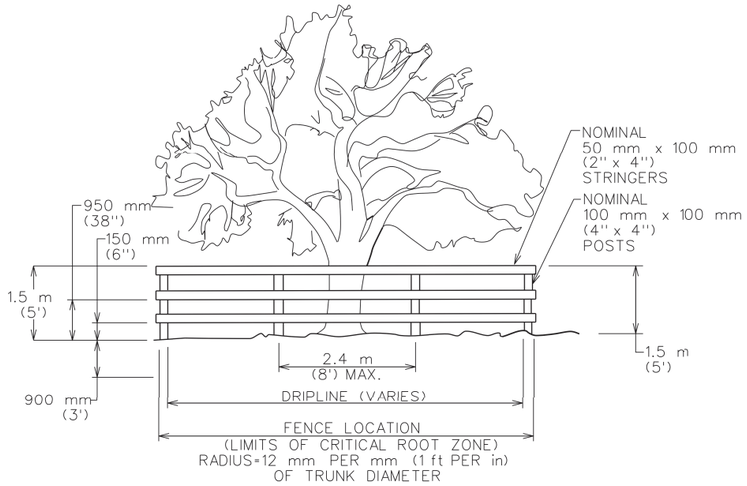
TREE PRESERVATION DETAILS 1

SHEET 207 OF 273

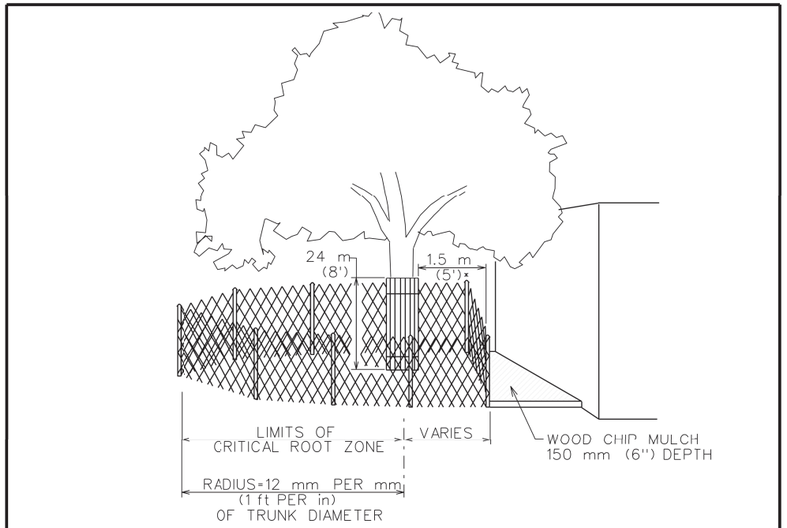
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				207

SP-2016-0186D

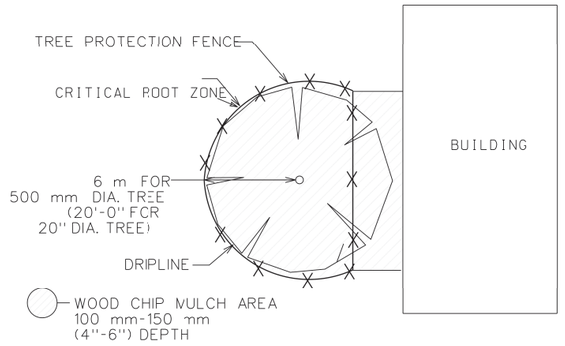
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CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT		TREE PROTECTION FENCE TYPE B - WOOD	STANDARD NO.
RECORD COPY SIGNED BY J. PATRICK MURPHY	*11/15/99* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	610S-3



*AS NEEDED TO PROVIDE MINIMUM NECESSARY WORK SPACE.
IF LESS THAN 1.5 m (5'), THEN ADD BOARDS STRAPPED TO TRUNK.



CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT		TREE PROTECTION FENCE MODIFIED TYPE A - CHAIN LINK	STANDARD NO.
RECORD COPY SIGNED BY J. PATRICK MURPHY	*11/15/99* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	610S-4

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

FOR CITY USE ONLY:

SITE PLAN APPROVAL Sheet 208 of 273
FILE NUMBER: SP-2016-0186D APPLICATION DATE: 4/19/2016
APPROVED BY COMMISSION ON: _____ UNDER SECTION _____ OF CHAPTER _____ OF THE CITY OF AUSTIN CODE.
EXPIRATION DATE (25-5-81,LDC) _____ CASE MANAGER _____
PROJECT EXPIRATION DATE (ORD.#970905-A) _____ DWPZ ___ DDZ ___

Director, Planning and Development Review Department
RELEASED FOR GENERAL COMPLIANCE: _____ ZONING: _____
Rev. 1 _____ Correction 1 _____
Rev. 2 _____ Correction 2 _____
Rev. 3 _____ Correction 3 _____

FINAL PLAT MUST BE RECORDED BY THE PROJECT EXPIRATION DATE. IF APPLICABLE, SUBSEQUENT SITE PLANS WHICH DO NOT COMPLY WITH THE CODE CURRENT AT THE TIME OF FILING, AND ALL REQUIRED BUILDING PERMITS AND/OR A NOTICE OF CONSTRUCTION (IF A BUILDING PERMIT IS NOT REQUIRED), MUST ALSO BE APPROVED PRIOR TO THE PROJECT EXPIRATION DATE.

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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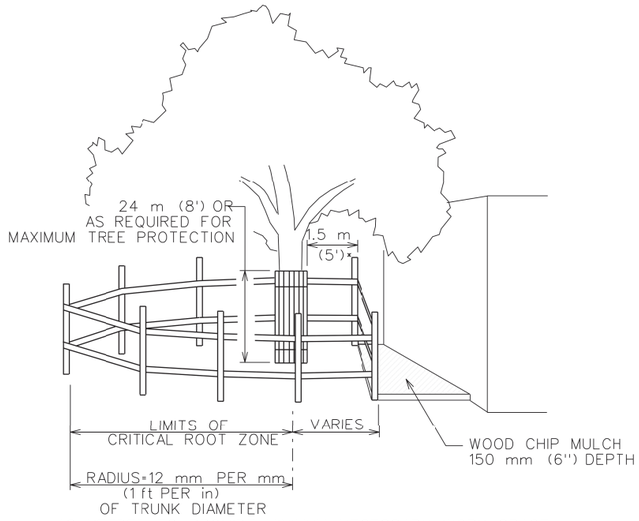
TREE PRESERVATION DETAILS 2

SHEET 208 OF 273

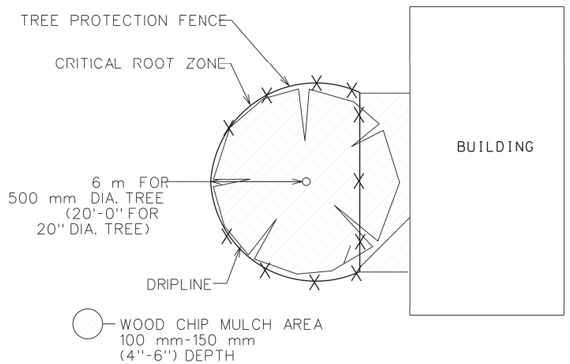
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				208

SP-2016-0186D

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*AS NEEDED TO PROVIDE MINIMUM NECESSARY WORK SPACE.
IF LESS THAN 1.5 m (5'), THEN ADD BOARDS STRAPPED TO TRUNK.



CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT		TREE PROTECTION FENCE MODIFIED TYPE B - WOOD	
RECORD COPY SIGNED BY J. PATRICK MURPHY	*11/15/99* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 610S-5

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

FOR CITY USE ONLY:

SITE PLAN APPROVAL Sheet 209of 273
FILE NUMBER: SP-2016-0186D APPLICATION DATE: 4/19/2016
APPROVED BY COMMISSION ON: _____ UNDER SECTION _____ OF CHAPTER _____ OF THE CITY OF AUSTIN CODE.
EXPIRATION DATE (25-5-81,LDC) _____ CASE MANAGER _____
PROJECT EXPIRATION DATE (ORD.#970905-A)_____DWPZ ___DDZ___

Director, Planning and Development Review Department
RELEASED FOR GENERAL COMPLIANCE: _____ ZONING: _____
Rev. 1 _____ Correction 1 _____
Rev. 2 _____ Correction 2 _____
Rev. 3 _____ Correction 3 _____

FINAL PLAT MUST BE RECORDED BY THE PROJECT EXPIRATION DATE, IF APPLICABLE. SUBSEQUENT SITE PLANS WHICH DO NOT COMPLY WITH THE CODE CURRENT AT THE TIME OF FILING, AND ALL REQUIRED BUILDING PERMITS AND/OR A NOTICE OF CONSTRUCTION (IF A BUILDING PERMIT IS NOT REQUIRED), MUST ALSO BE APPROVED PRIOR TO THE PROJECT EXPIRATION DATE.

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
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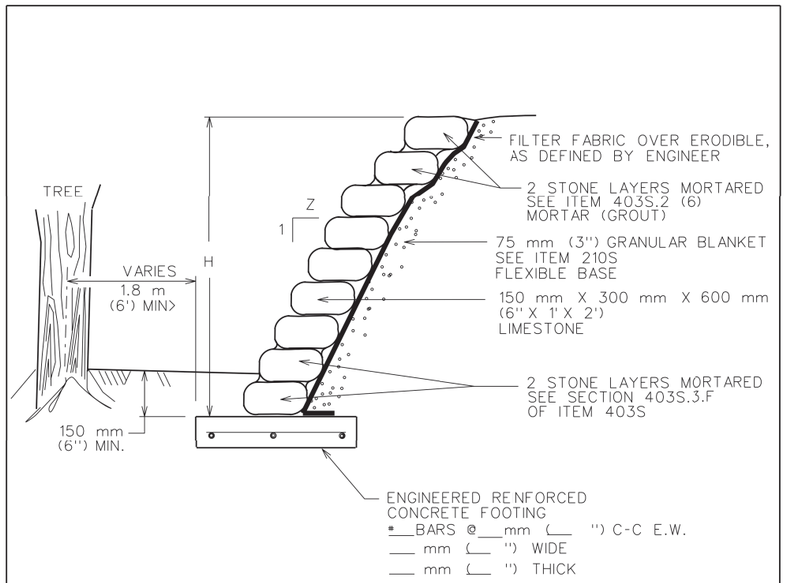
TREE PRESERVATION DETAILS 3

SHEET 209 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				209

SP-2016-0186D

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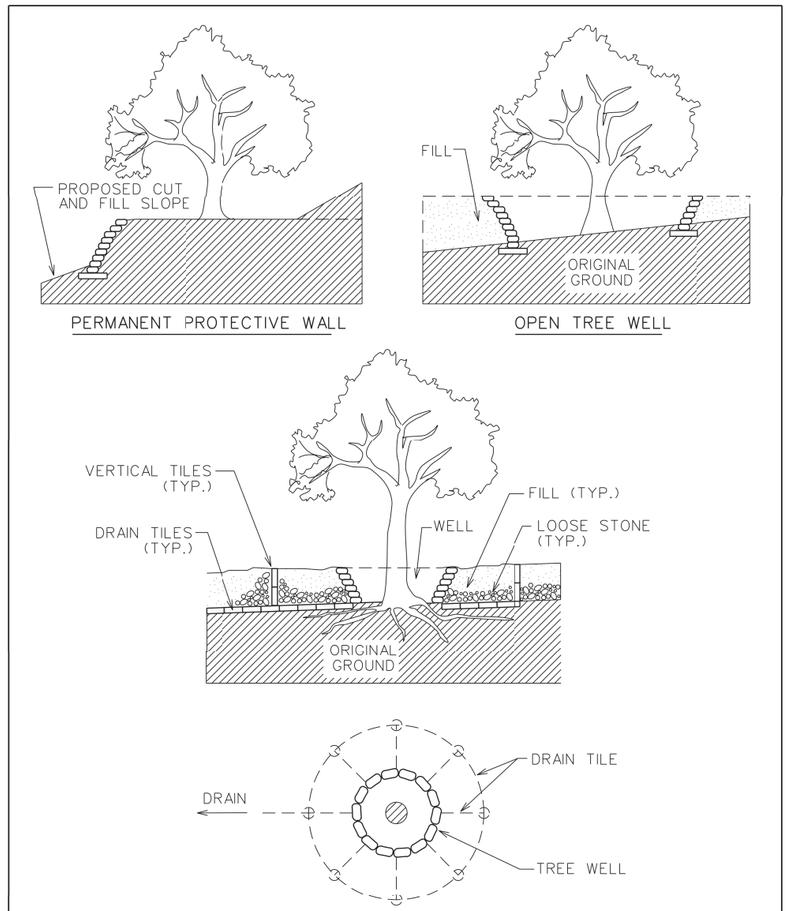
THIS STANDARD APPLIES ONLY UNDER THE FOLLOWING CONDITIONS:

A. H AND Z ARE SPECIFIED ON THE DRAWING.
B. GROUNDWATER IS NO HIGHER THAN THE BOTTOM OF THE FOOTING.
C. THE MATERIAL BELOW THE FOOTING IS FIRM AND STABLE.
D. THE MATERIAL BEHIND THE WALL HAS A LEVEL SURFACE.
E. THE MATERIAL IN FRONT OF THE WALL HAS A SLOPE NO STEEPER THAN 4 HORIZONTAL TO 1 VERTICAL.
F. THE FACE OF THE WALL IS NO STEEPER THAN 1 HORIZONTAL TO 2 VERTICAL.
G. SURCHARGE LOADS BEHIND THE WALL ARE NO CLOSER THAN DISTANCE H FROM THE TOP OF WALL.

NOTES:

1. DESIGN AND CONSTRUCTION OF ROCK WALL SHALL CONFORM TO THE REQUIREMENTS OF CITY CODE 16-7-2, PLACEMENT OF FENCES IN STREET CORNER AREAS, AND THE CITY OF AUSTIN TRANSPORTATION CRITERIA MANUAL FOR MINIMIM SIGHT DISTANCE.
2. CONCRETE SHALL CONFORM TO ITEM 403S, "CONCRETE FOR STRUCTURES".

CITY OF AUSTIN DEPARTMENT OF WATERSHED PROTECTION AND DEVELOPMENT REVIEW		SLOPE PROTECTION AND TREE WELLS	
RECORD COPY SIGNED BY J. PATRICK MURPHY	*03/13/06* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 610S-6 1 OF 2



TREE WELL WITH RAISED GRADE

CITY OF AUSTIN DEPARTMENT OF WATERSHED PROTECTION AND DEVELOPMENT REVIEW		SLOPE PROTECTION AND TREE WELLS	
RECORD COPY SIGNED BY J. PATRICK MURPHY	*03/13/06* ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 610S-6 2 OF 2

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

FOR CITY USE ONLY:

SITE PLAN APPROVAL Sheet 210 of 273
FILE NUMBER: SP-2016-0186D APPLICATION DATE: 4/19/2016
APPROVED BY COMMISSION ON: _____ UNDER SECTION _____ OF CHAPTER _____ OF THE CITY OF AUSTIN CODE.
EXPIRATION DATE (25-5-81,LDC)_____ CASE MANAGER_____
PROJECT EXPIRATION DATE (ORD.#970905-A)_____ DWPZ ___ DDZ ___

Director, Planning and Development Review Department
RELEASED FOR GENERAL COMPLIANCE:_____ ZONING: _____
Rev. 1 _____ Correction 1 _____
Rev. 2 _____ Correction 2 _____
Rev. 3 _____ Correction 3 _____

FINAL PLAT MUST BE RECORDED BY THE PROJECT EXPIRATION DATE, IF APPLICABLE. SUBSEQUENT SITE PLANS WHICH DO NOT COMPLY WITH THE CODE CURRENT AT THE TIME OF FILING, AND ALL REQUIRED BUILDING PERMITS AND/OR A NOTICE OF CONSTRUCTION (IF A BUILDING PERMIT IS NOT REQUIRED), MUST ALSO BE APPROVED PRIOR TO THE PROJECT EXPIRATION DATE.

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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221 West Sixth Street, Suite 600
Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
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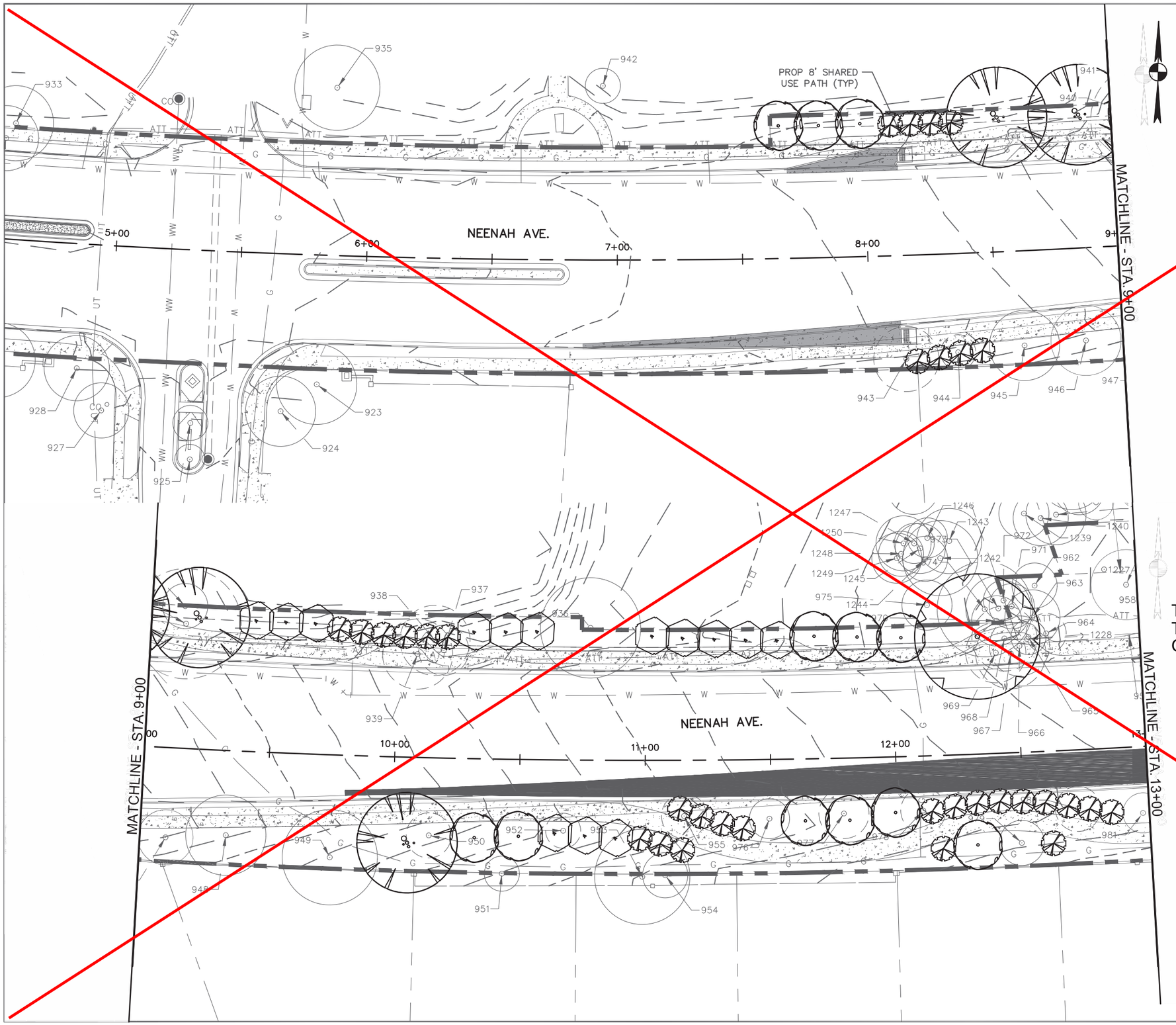
TREE PRESERVATION DETAILS 4

SHEET 210 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				210

SP-2016-0186D

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40 0 20 40

1" = 40'

TREE SYMBOLS & COUNT FOR THIS SHEET

- BALD CYPRESS (0)
- CEDAR ELM (12)
- CHINQUAPIN OAK (4)
- LIVE OAK (1)
- MOUNTAIN LAUREL (32)
- TEXAS REDBUD (14)

LEGEND

- 1111 — TREE TO REMAIN
- PROPOSED TREE WELL
- PROPOSED ROADWAY WIDENING
- LIMITS OF CONSTRUCTION

TREE MITIGATION TO BE DONE BY OTHERS

STATE OF TEXAS
KEVIN SWEAT
92023
LICENSED
PROFESSIONAL ENGINEER
AUGUST 15 2017
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY KEVIN SWEAT LIC. # 92023

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

CITY OF AUSTIN FOUNDED 1839 — ESD — ENGINEERING SERVICES DIVISION

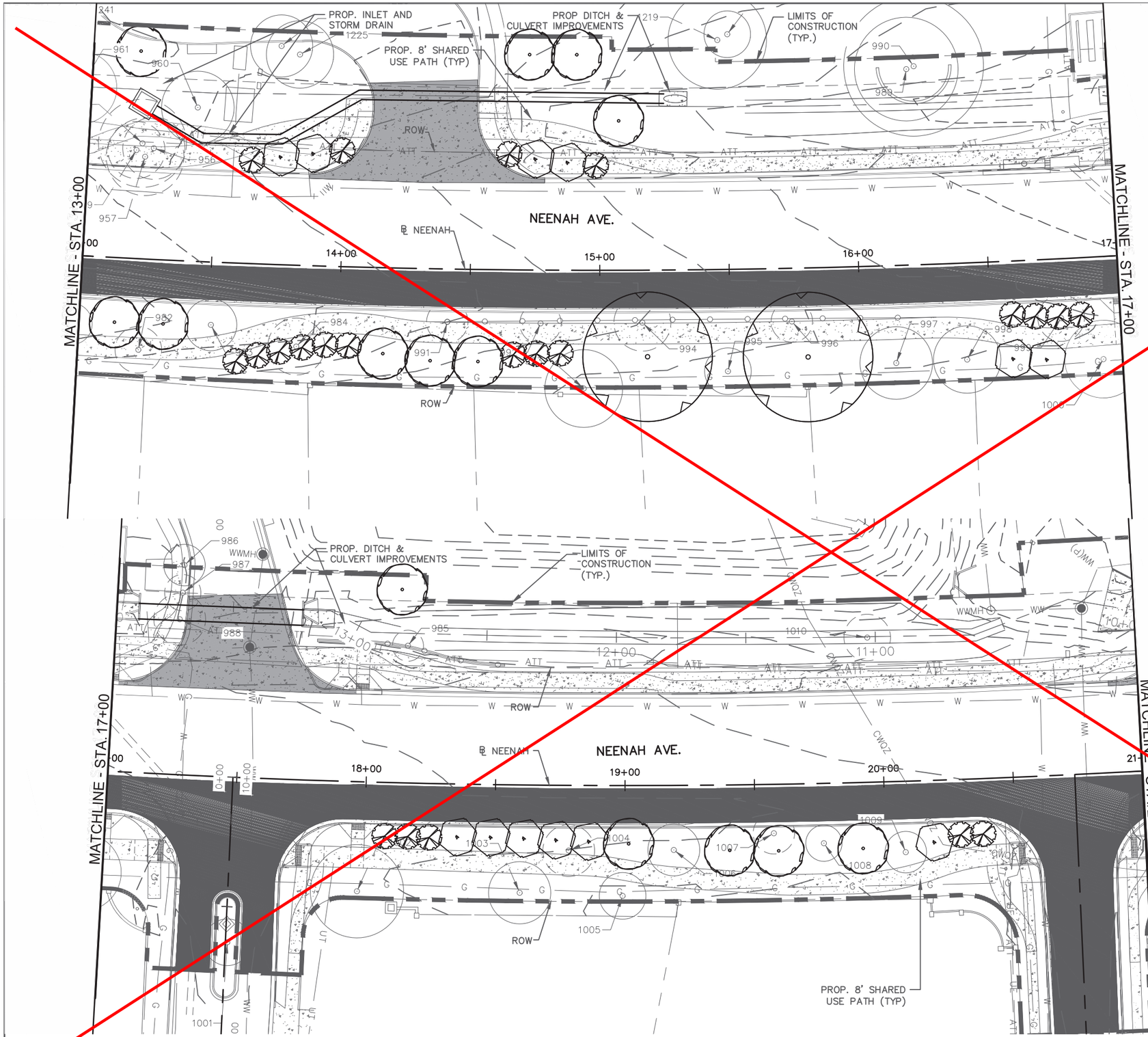
TREE MITIGATION PLANS
STA 5+00 TO STA 13+00

SHEET 211 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				---

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SP-2016-0186D



40 0 20 40

1" = 40'

TREE SYMBOLS & COUNT FOR THIS SHEET

- BALD CYPRESS (0)
- CEDAR ELM (14)
- CHINQUAPIN OAK (0)
- LIVE OAK (2)
- MOUNTAIN LAUREL (22)
- TEXAS REDBUD (12)

LEGEND

- 1111 — TREE TO REMAIN
- PROPOSED TREE WELL
- PROPOSED ROADWAY WIDENING
- LIMITS OF CONSTRUCTION

TREE MITIGATION TO BE DONE BY OTHERS

STATE OF TEXAS
KEVIN SWEAT
92023
LICENSED
PROFESSIONAL ENGINEER
AUGUST 15 2017
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY KEVIN SWEAT LIC. # 92023

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

CITY OF AUSTIN FOUNDED 1839 — ESD ENGINEERING SERVICES DIVISION

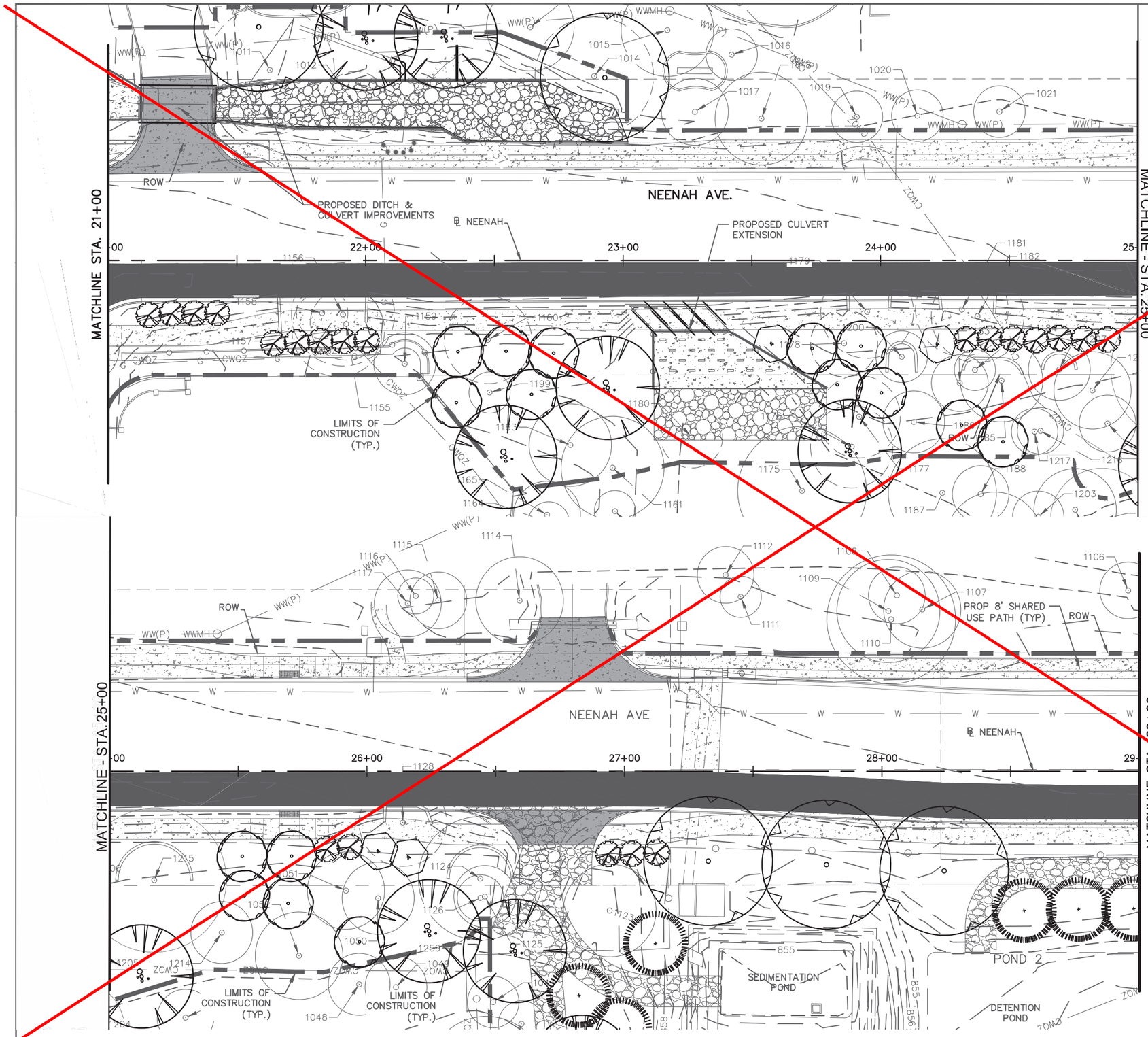
TREE MITIGATION PLANS STA 13+00 TO STA 21+00

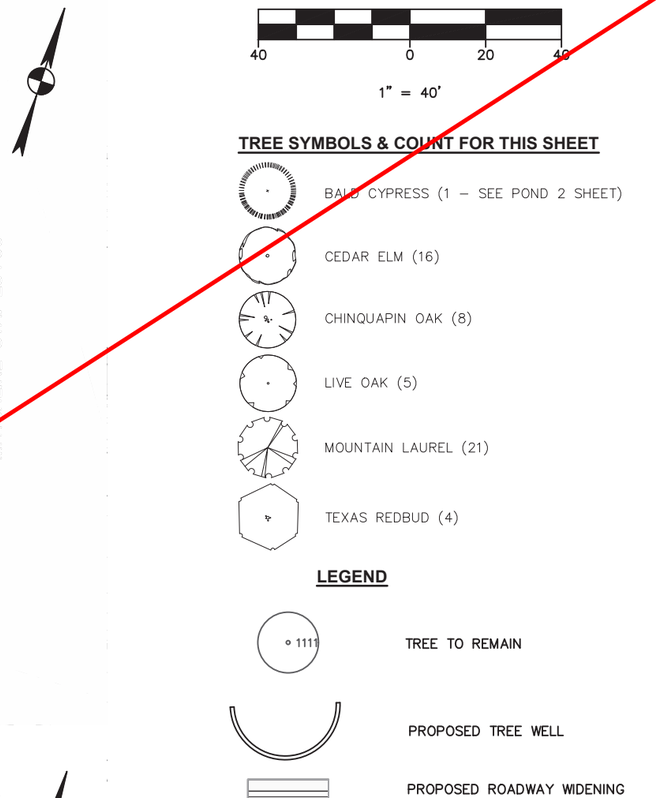
SHEET 212 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				----

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SP-2016-0186D





40 0 20 40

1" = 40'

TREE SYMBOLS & COUNT FOR THIS SHEET

- BALD CYPRESS (1 – SEE POND 2 SHEET)
- CEDAR ELM (16)
- CHINQUAPIN OAK (8)
- LIVE OAK (5)
- MOUNTAIN LAUREL (21)
- TEXAS REDBUD (4)

LEGEND

- 1111 — TREE TO REMAIN
- PROPOSED TREE WELL
- PROPOSED ROADWAY WIDENING
- LIMITS OF CONSTRUCTION

TREE MITIGATION TO BE DONE BY OTHERS

STATE OF TEXAS
KEVIN SWEAT
92023
LICENSED PROFESSIONAL ENGINEER
AUGUST 15 2017
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NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

CITY OF AUSTIN FOUNDED 1839 — ESD — ENGINEERING SERVICES DIVISION

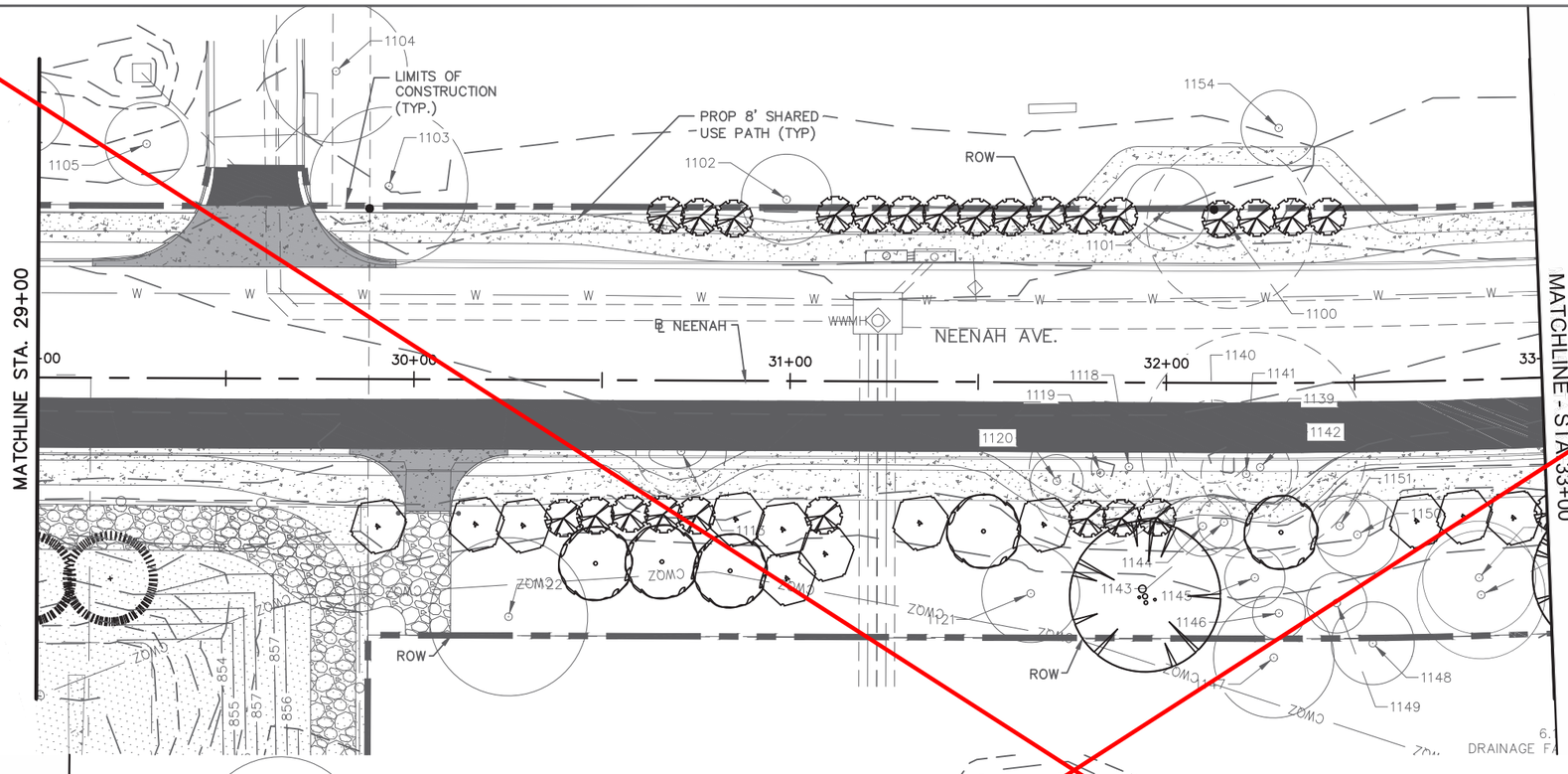
TREE MITIGATION PLANS STA 21+00 TO STA 29+00

SHEET 213 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				

SP-2016-0186D

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40 0 20 40

1" = 40'

TREE SYMBOLS & COUNT FOR THIS SHEET

- BALD CYPRESS (0 – SEE POND 2 SHEET)
- CEDAR ELM (20)
- CHINQUAPIN OAK (4)
- LIVE OAK (1)
- MOUNTAIN LAUREL (48)
- TEXAS REDBUD (20)

LEGEND

- 1111 — TREE TO REMAIN
- PROPOSED TREE WELL
- PROPOSED ROADWAY WIDENING
- LIMITS OF CONSTRUCTION

TREE MITIGATION TO BE DONE BY OTHERS

STATE OF TEXAS
KEVIN SWEAT
92023
LICENSED PROFESSIONAL ENGINEER
AUGUST 15 2017
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NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

CITY OF AUSTIN FOUNDED 1839 — ESD — ENGINEERING SERVICES DIVISION

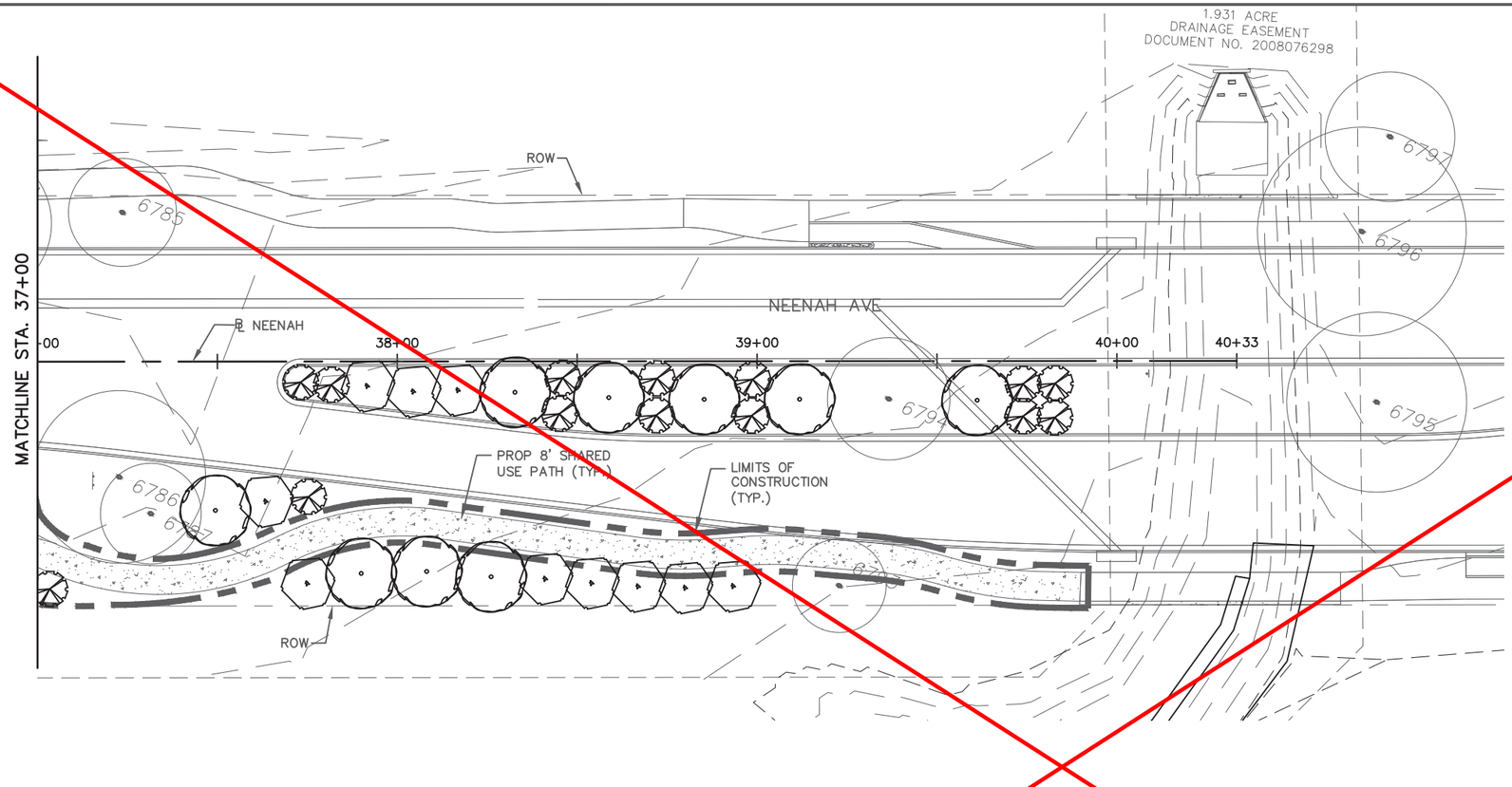
TREE MITIGATION PLANS
STA 29+00 TO STA 37+00

SHEET 214 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				

SP-2016-0186D

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40 0 20 40

1" = 40'

TREE SYMBOLS & COUNT FOR THIS SHEET

- BALD CYPRESS (0)
- CEDAR ELM (9)
- CHINQUAPIN OAK (0)
- LIVE OAK (0)
- MOUNTAIN LAUREL (14)
- TEXAS REDBUD (10)

LEGEND

- 1111 — TREE TO REMAIN
- PROPOSED TREE WELL
- PROPOSED ROADWAY WIDENING
- LIMITS OF CONSTRUCTION

TREE MITIGATION TO BE DONE BY OTHERS

STATE OF TEXAS
KEVIN SWEAT
92023
LICENSED
PROFESSIONAL ENGINEER
AUGUST 15 2017
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY KEVIN SWEAT LIC. # 92023

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

CITY OF AUSTIN FOUNDED 1839 — ESD — ENGINEERING SERVICES DIVISION

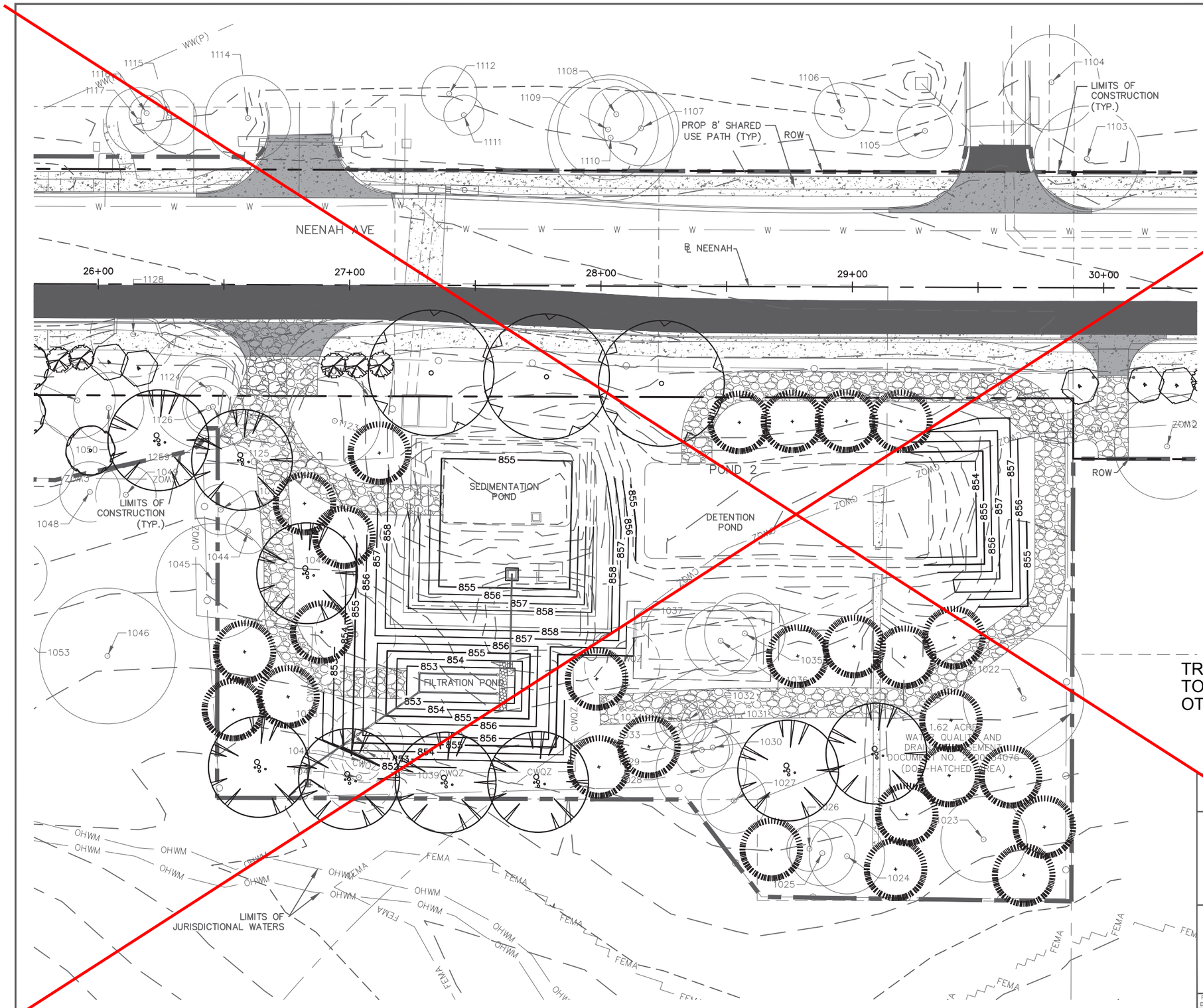
TREE MITIGATION PLANS
STA 37+00 TO STA 40+33

SHEET 215 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				----

SP-2016-0186D

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1" = 40'

TREE SYMBOLS & COUNT FOR THIS SHEET

- BALD CYPRESS (25)
- CEDAR ELM (0 – ON PREVIOUS SHEET)
- CHINQUAPIN OAK (7)
- LIVE OAK (0 – ON PREVIOUS SHEET)
- MOUNTAIN LAUREL (0 – ON PREVIOUS SHEET)
- TEXAS REDBUD (0 – ON PREVIOUS SHEET)

LEGEND

- 1111 — TREE TO REMAIN
- PROPOSED TREE WELL
- PROPOSED ROADWAY WIDENING
- LIMITS OF CONSTRUCTION

TREE MITIGATION TO BE DONE BY OTHERS

STATE OF TEXAS
KEVIN SWEAT
92023
LICENSED PROFESSIONAL ENGINEER
AUGUST 15 2017
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY KEVIN SWEAT LIC. # 92023

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

CITY OF AUSTIN FOUNDED 1839 — ESD — ENGINEERING SERVICES DIVISION

TREE MITIGATION PLANS POND 2

SHEET 216 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				216

SP-2016-0186D

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TREE SPECIES					
SYMBOL	COMMON NAME	SCIENTIFIC NAME	COUNT	SIZE	TOTAL
	BALD CYPRESS	Taxodium distichum	26	3"	78"
	CEDAR ELM	Ulmus crassifolia	71	3"	213"
	CHINQUAPIN OAK	Quercus Muhlenbergii	23	3"	69"
	LIVE OAK	Quercus virginiana	9	3"	27"
	MOUNTAIN LAUREL	Sophora secundiflora	137	1"	137
	TEXAS REDBUD	Cercis canadensis var. 'texensis'	60	1"	60"
TOTALS			326		584"

	CATEGORY	ON APPENDIX F 8"-18"	NOT ON APPENDIX F 8"-18"	ON APPENDIX F 19" +	NOT ON APPENDIX F 19" +	HERITAGE
STANDARD MITIGATION FOR ALL TREES	TOTAL INCHES	715	0	63	0	54.5
	MITIGATION PERCENTAGE	50%	25%	100%	50%	300%
	INCHES TO BE REPLACED	357.5	0	63	0	163.5
TOTAL CALIPER INCHES REMOVED						832.5
TOTAL CALIPER INCHES REQUIRED TO BE MITIGATED						**584**

NOTES:
1. THE CITY OF AUSTIN PUBLIC WORKS DEPARTMENT IS RESPONSIBLE FOR THE TREE MITIGATION COMPONENT OF THIS PROJECT. TREE PLANTINGS WILL OCCUR WITHIN ONE YEAR OF PROJECT COMPLETION.

TREE MITIGATION TO BE DONE BY OTHERS

STATE OF TEXAS
KEVIN SWEAT
92023
LICENSED
PROFESSIONAL ENGINEER
AUGUST 15 2017
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY KEVIN SWEAT LIC. # 92023

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

CITY OF AUSTIN FOUNDED 1839 — ESD ENGINEERING SERVICES DIVISION

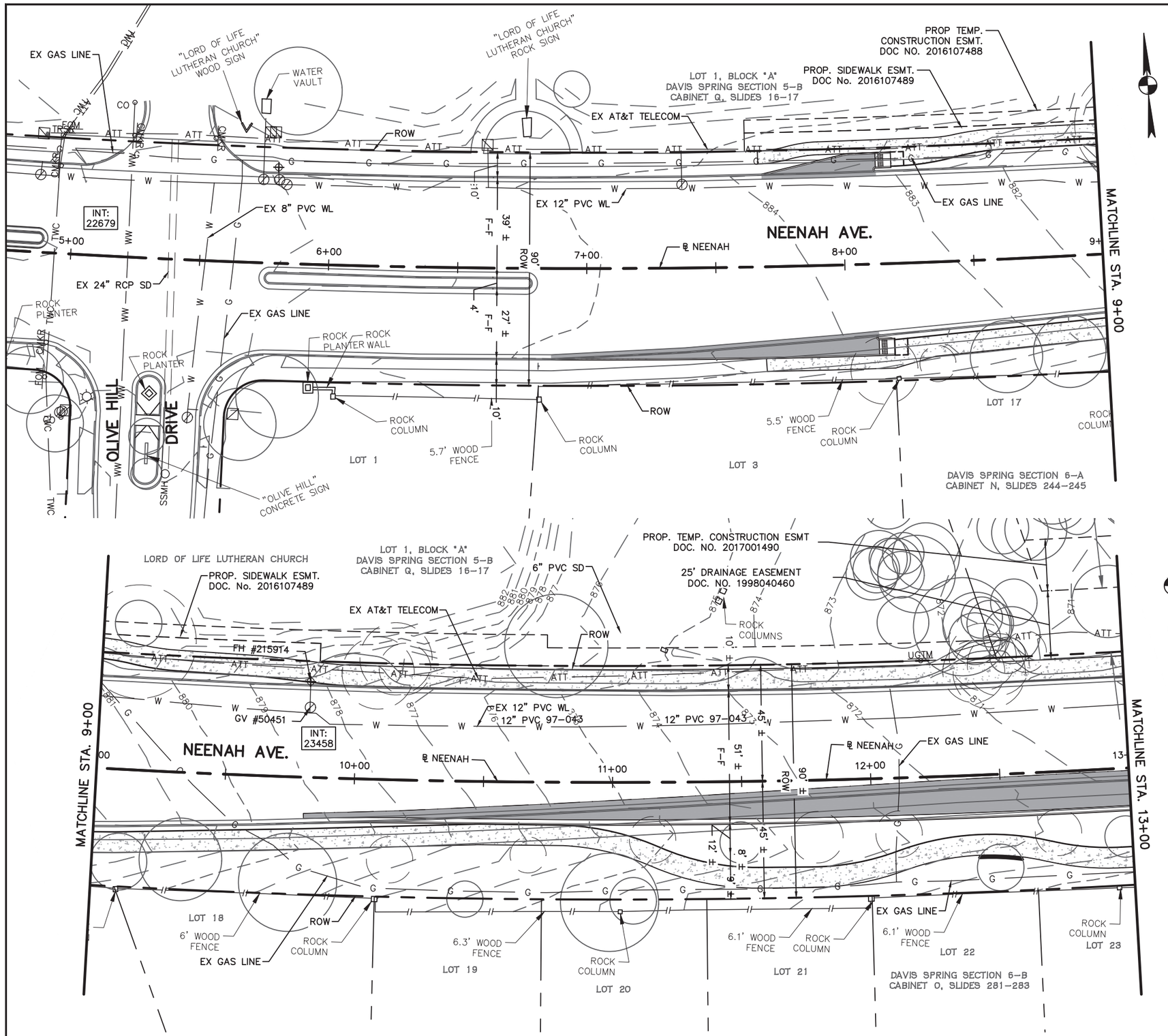
TREE MITIGATION LEGEND & SUMMARY TABLES

SHEET 217 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				216

SP-2016-0186D

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1" = 40'

NOTES:

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
3. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH AVE. BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
4. ALL UTILITIES NOT IDENTIFIED FOR REMOVAL ARE TO REMAIN.
5. REFER TO DRAINAGE SHEETS FOR MORE INFORMATION.
6. UTILITY INFORMATION SHOWN WAS TAKEN FROM RECORD DRAWINGS AND SURFACE FEATURES LOCATED WITH SURVEY.
7. CONTRACTOR TO MAKE HIS OWN DETERMINATIONS AS TO ACTUAL LOCATIONS IN THE FIELD PRIOR TO CONSTRUCTION.
8. TWC HAS AN EMPTY CONDUIT WITHIN THE PROJECT LIMITS.
9. TWC CONDUIT WITHIN ROW THAT CONFLICTS WITH PROPOSED CONSTRUCTION TO BE REMOVED.
10. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.

8-4-17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

Stantec
221 West Sixth Street, Suite 600
Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
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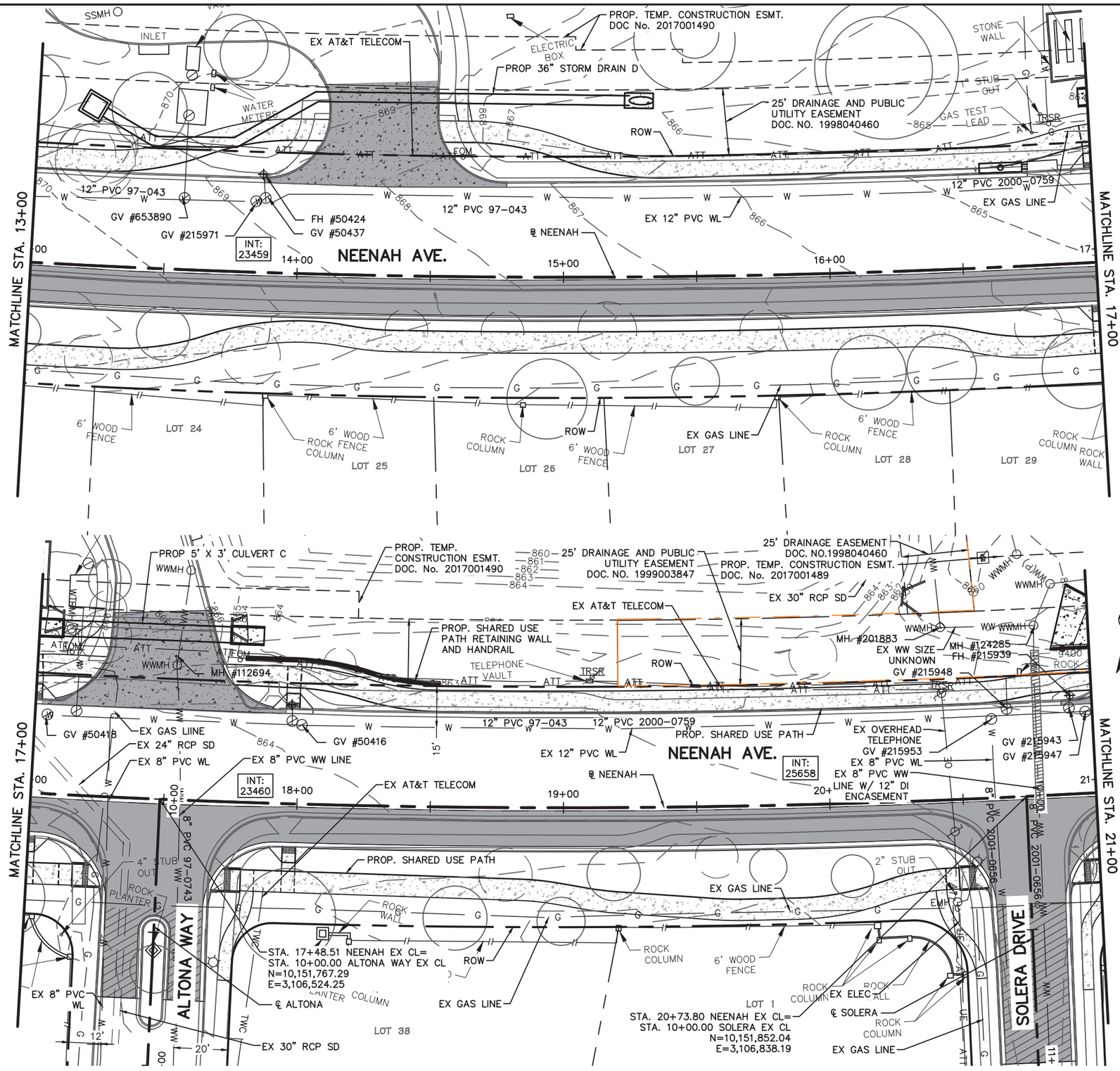
EXISTING UTILITY LAYOUT
STA. 5+00 TO STA. 13+00

SHEET 218 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				218

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SP-2016-0186D



NOTES:

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
3. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH AVE. BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
4. ALL UTILITIES NOT IDENTIFIED FOR REMOVAL ARE TO REMAIN.
5. REFER TO DRAINAGE SHEETS FOR MORE INFORMATION.
6. TWC HAS AN EMPTY CONDUIT WITHIN THE PROJECT LIMITS.
7. TWC CONDUIT WITHIN ROW THAT CONFLICTS WITH PROPOSED CONSTRUCTION TO BE REMOVED.
8. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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Austin, Texas 78701
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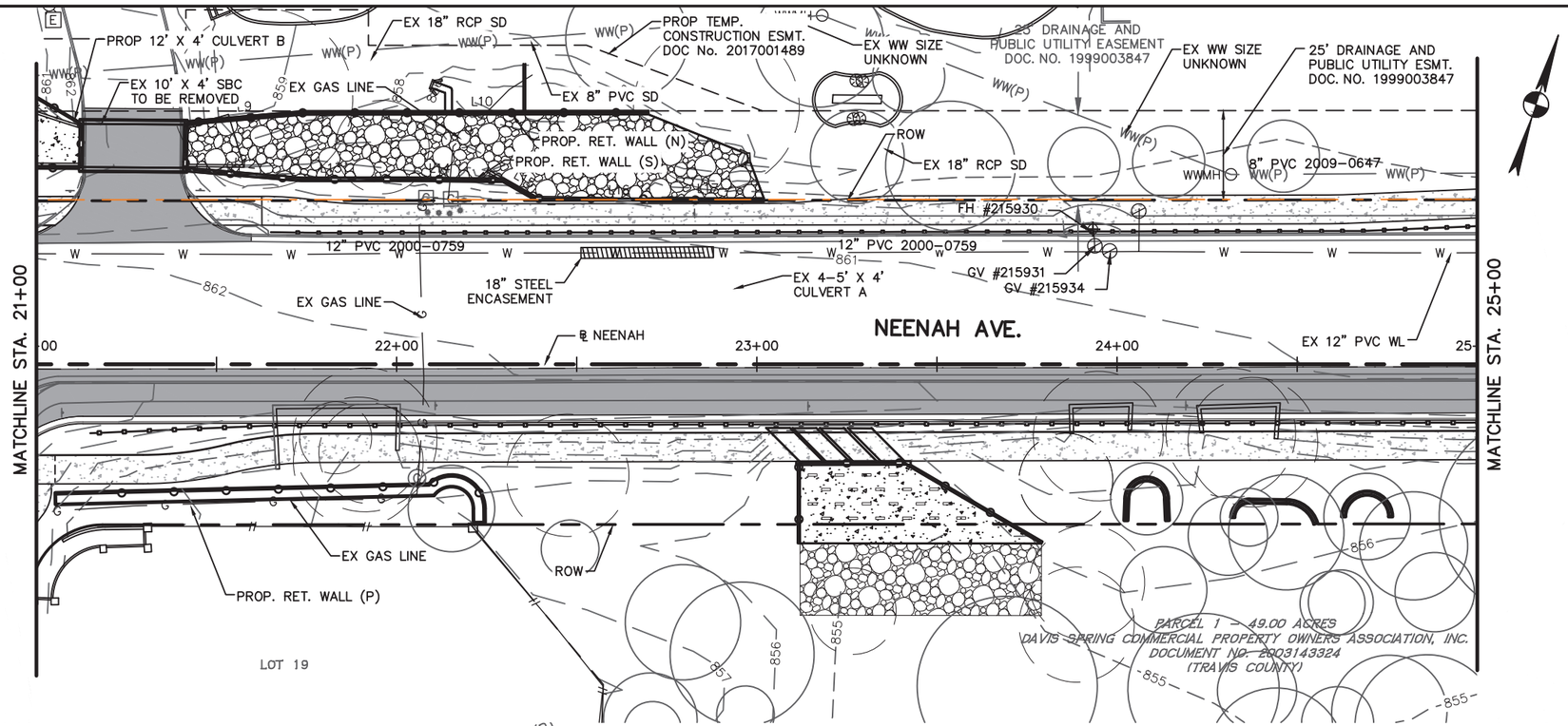
EXISTING UTILITY LAYOUT
STA. 13+00 TO STA. 21+00

SHEET 219 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				219

SP-2016-0186D

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40 0 20 40

1" = 40'

NOTES:

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
3. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH AVE. BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
4. ALL UTILITIES NOT IDENTIFIED FOR REMOVAL ARE TO REMAIN.
5. REFER TO DRAINAGE SHEETS FOR MORE INFORMATION.
6. TWC HAS AN EMPTY CONDUIT WITHIN THE PROJECT LIMITS.
7. TWC CONDUIT WITHIN ROW THAT CONFLICTS WITH PROPOSED CONSTRUCTION TO BE REMOVED.
8. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.

8.4.17
STATE OF TEXAS
STEPHANE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephane D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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Tel. (512) 328-0011 Fax (512) 328-0325
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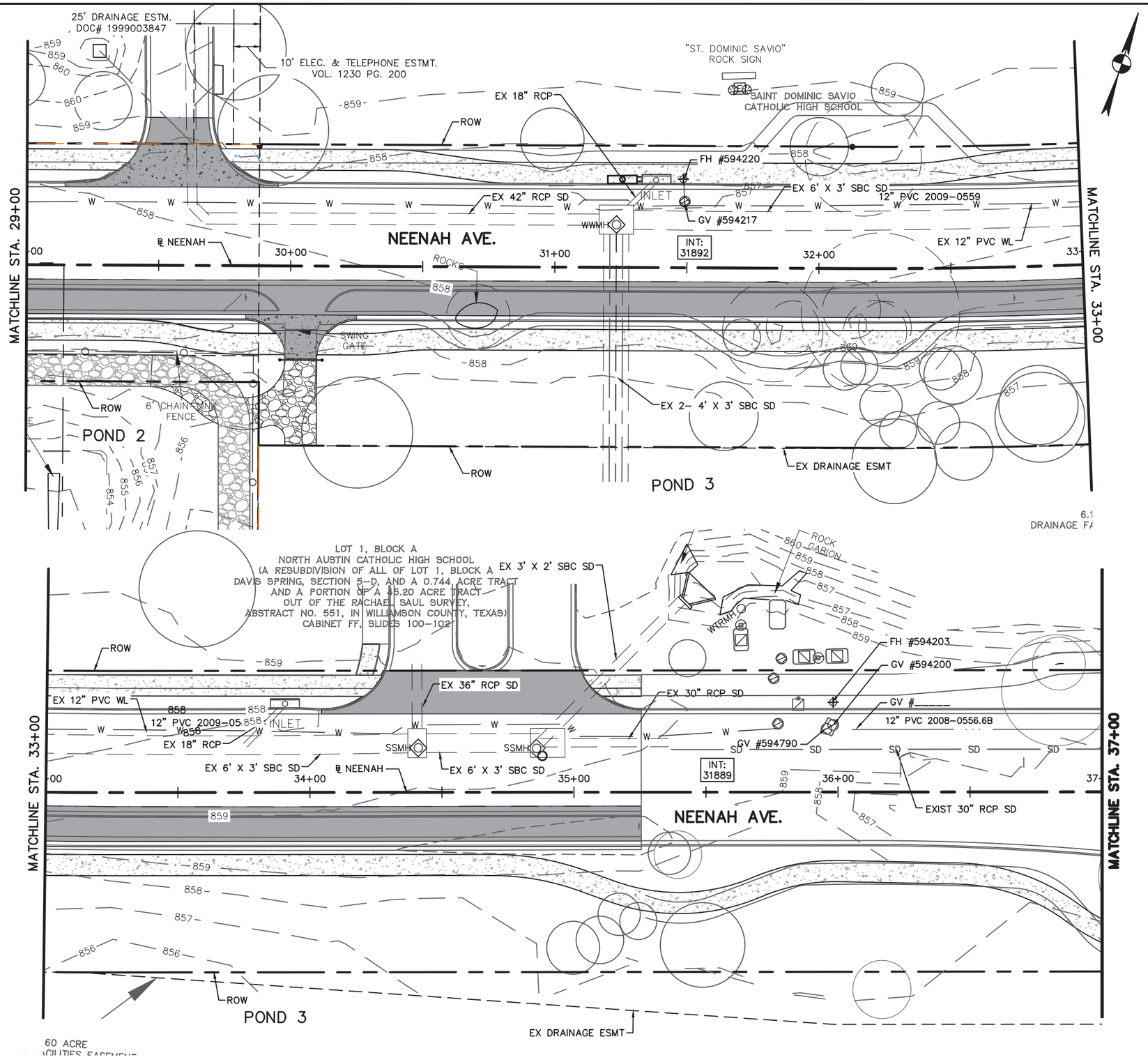
EXISTING UTILITY LAYOUT
STA. 21+00 TO STA. 29+00

SHEET 220 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				220

SP-2016-0186D

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40 0 20 40

1" = 40'

NOTES:

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
3. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH AVE. BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
4. ALL UTILITIES NOT IDENTIFIED FOR REMOVAL ARE TO REMAIN.
5. REFER TO DRAINAGE SHEETS FOR MORE INFORMATION.
6. TWC HAS AN EMPTY CONDUIT WITHIN THE PROJECT LIMITS.
7. TWC CONDUIT WITHIN ROW THAT CONFLICTS WITH PROPOSED CONSTRUCTION TO BE REMOVED.
8. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
9. INFORMATION SHOWN TO THE EAST OF STATION 35+25.47 WAS PROVIDED BY OTHERS. CONTRACTOR TO FIELD VERIFY. CONTOURS SHOWN REFLECT CONDITIONS PRIOR TO CONSTRUCTION OF NEENAH AVE EXTENSION (C8J-2008-0056.6B).
10. DRY UTILITIES ARE NOT SHOWN EAST OF STA 35+25.47. CONTRACTOR SHALL LOCATE PRIOR TO CONSTRUCTION OF SOUTH SHARED USE PATH.

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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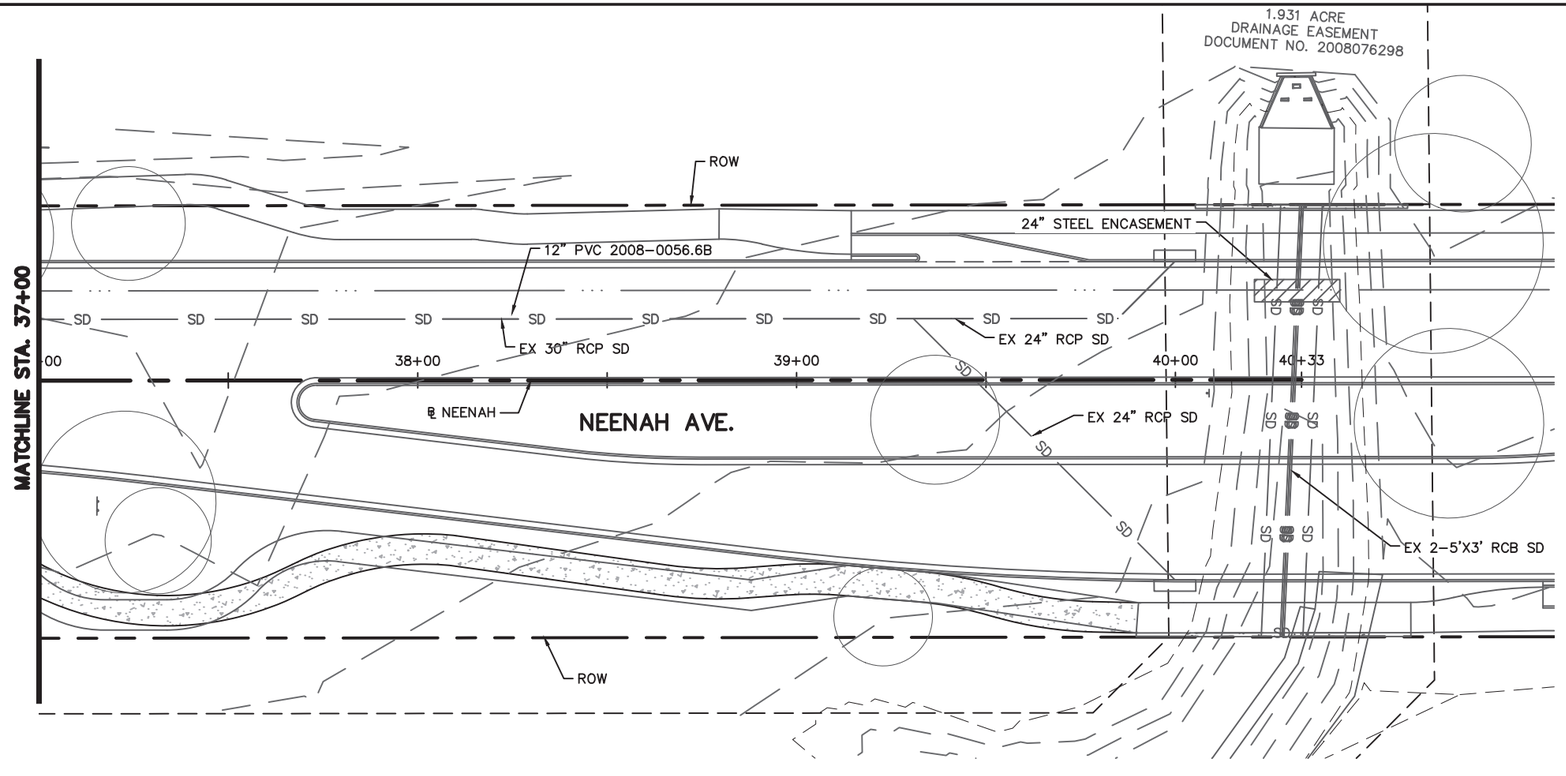
EXISTING UTILITY LAYOUT
STA. 29+00 TO 37+00

SHEET 221 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				221

SP-2016-0186D

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NOTES:

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
3. ALL STATIONS AND OFFSETS REFERENCE THE PROPOSED NEENAH AVE. BASELINE, UNLESS OTHERWISE NOTED IN THE PLANS.
4. ALL UTILITIES NOT IDENTIFIED FOR REMOVAL ARE TO REMAIN.
5. REFER TO DRAINAGE SHEETS FOR MORE INFORMATION.
6. TWC HAS AN EMPTY CONDUIT WITHIN THE PROJECT LIMITS.
7. TWC CONDUIT WITHIN ROW THAT CONFLICTS WITH PROPOSED CONSTRUCTION TO BE REMOVED.
8. REFER TO THE UTILITY PLAN SHEETS FOR WATER AND WASTEWATER ADJUSTMENTS.
9. INFORMATION SHOWN TO THE EAST OF STATION 35+25.47 WAS PROVIDED BY OTHERS. CONTRACTOR TO FIELD VERIFY. CONTOURS SHOWN REFLECT CONDITIONS PRIOR TO CONSTRUCTION OF NEENAH AVE EXTENSION (C8J-2008-0056.6B).
10. DRY UTILITIES ARE NOT SHOWN EAST OF STA 35+25.47. CONTRACTOR SHALL LOCATE PRIOR TO CONSTRUCTION OF SOUTH SHARED USE PATH.



NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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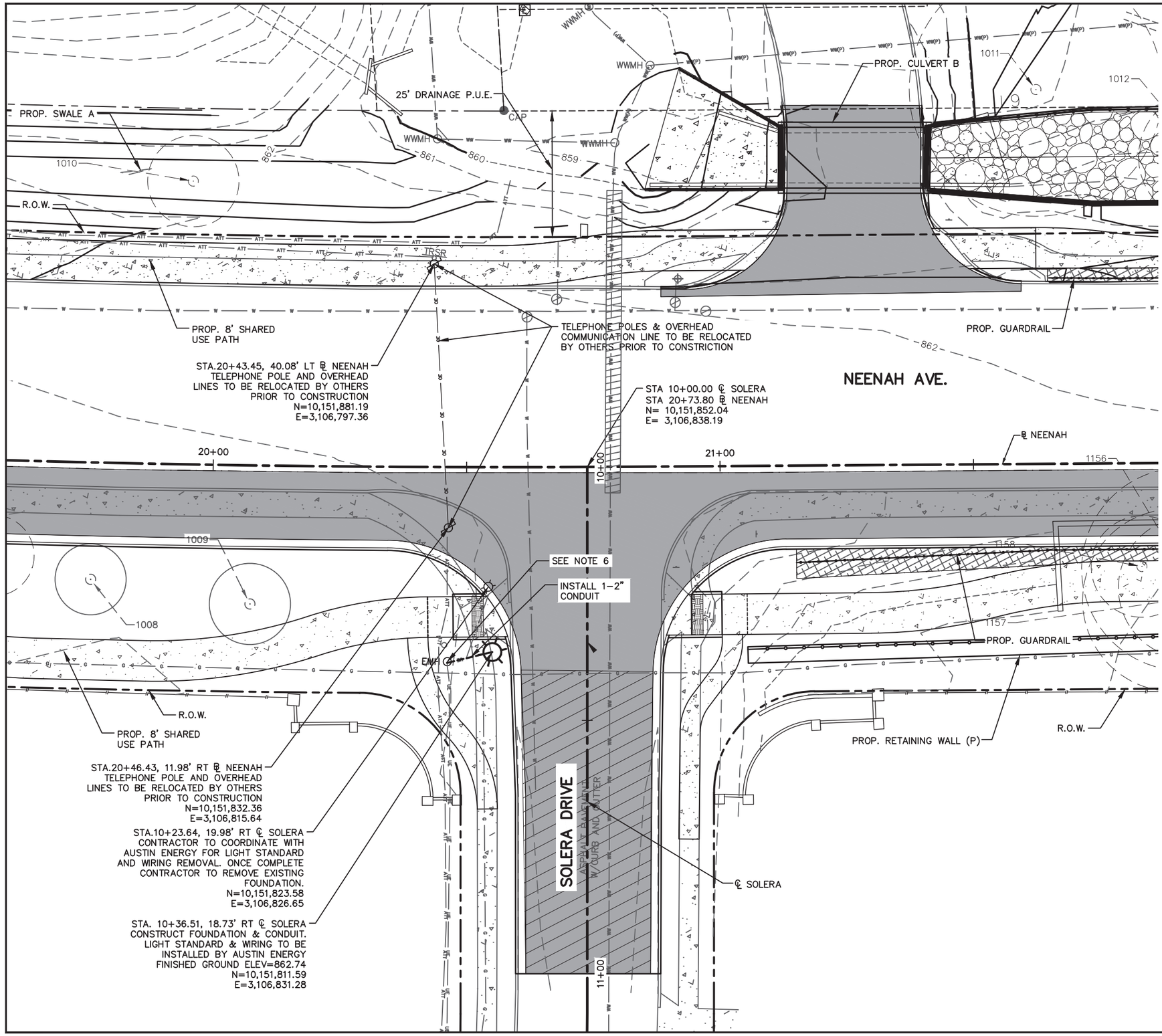
EXISTING UTILITY LAYOUT
STA. 37+00 TO END

SHEET 222 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023-10006	_	14	WILLIAMSON				222

SP-2016-0186D

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20 0 10 20

1" = 20'

NOTES:

1. CALL THE TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 811, 48 HOURS BEFORE BEGINNING ANY EXCAVATION.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING OVERHEAD AND UNDERGROUND FACILITIES ADJACENT TO WORK AREA.
3. REFER TO DRAINAGE SHEETS FOR MORE INFORMATION.
4. CONTRACTOR TO LOCATE EXISTING UNDERGROUND ELECTRIC LINES PRIOR TO CONSTRICTION.
5. PROPOSED POWER POLE & OVERHEAD ELECTRIC LINES ARE SUGGESTED LOCATIONS ONLY. AUSTIN ENERGY TO DETERMINE ACTUAL LOCATIONS & DESIGN ALL ADJUSTMENTS TO ELECTRIC FACILITIES. SEE ADDITIONAL INFORMATION IN PROJECT MANUAL.
6. CONTRACTOR TO ADJUST EXISTING ELECTRIC MANHOLE RIM TO PROPOSED GROUND ELEVATION.
7. REFER TO UTILITY LAYOUT SHEET FOR ADDITIONAL INFORMATION.

LEGEND

- ROW
- PROP. LIGHT STANDARD
- 859 — PROP. CONTOURS
- 860 — EXIST. CONTOURS
- EXIST. WOOD FENCE

8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY 1848

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Tel. (512) 328-0011 Fax (512) 328-0325
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ILLUMINATION PLAN
SOLERA DR.

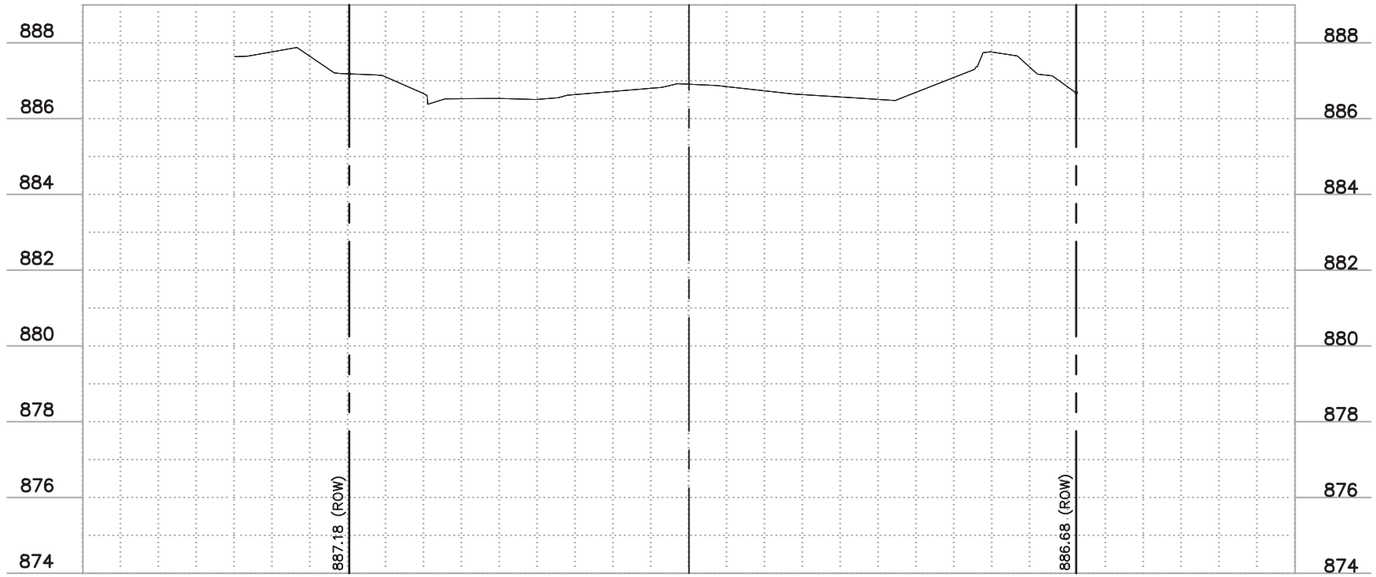
SHEET 223 OF 273

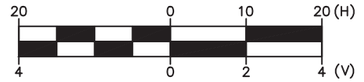
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				223

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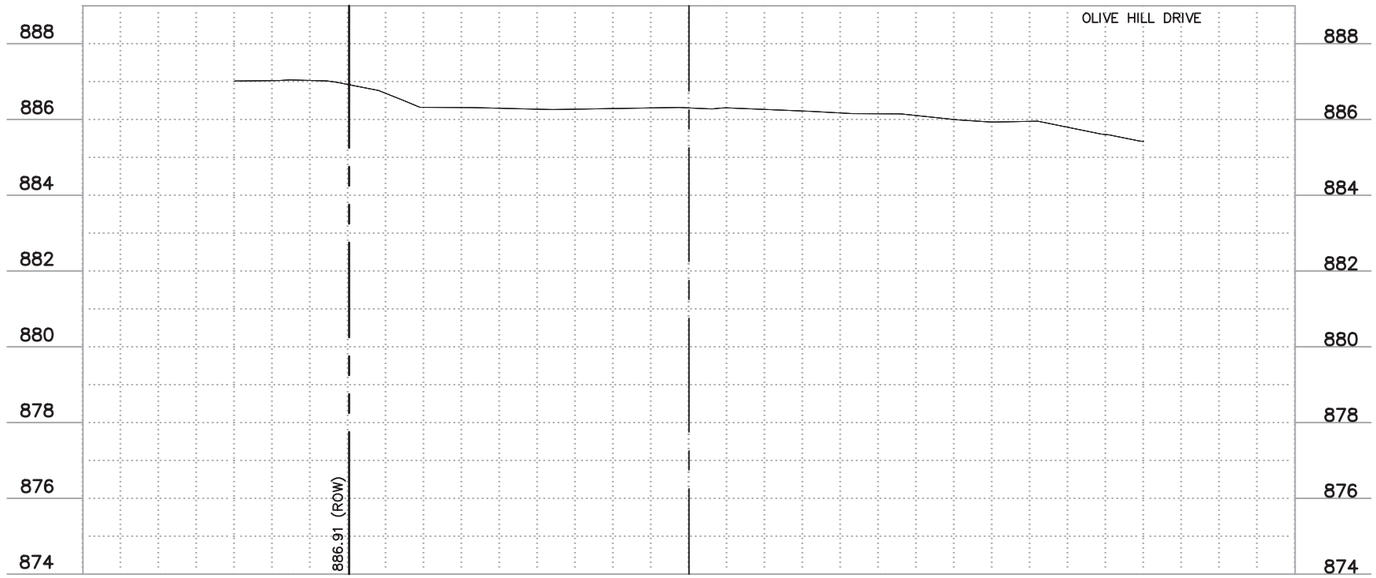
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5+00





5+50



8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

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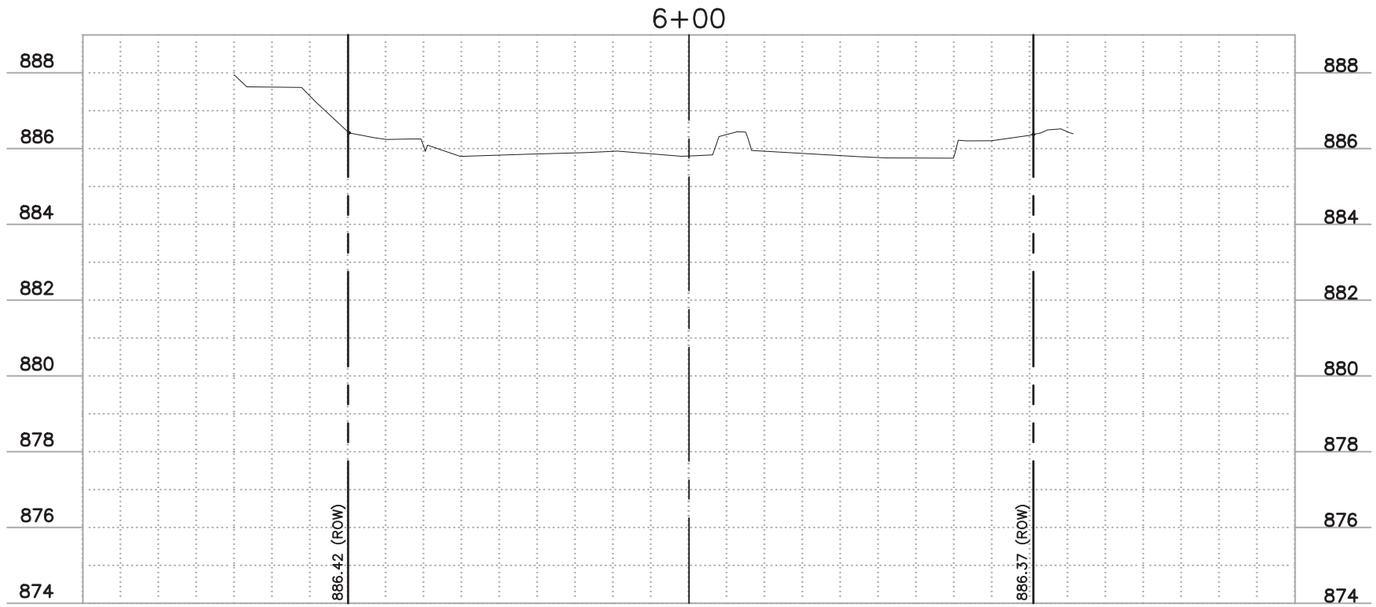
NEENAH. AVE CROSS SECTIONS
STA 5+00 – 5+50

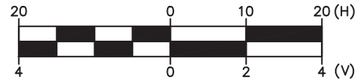
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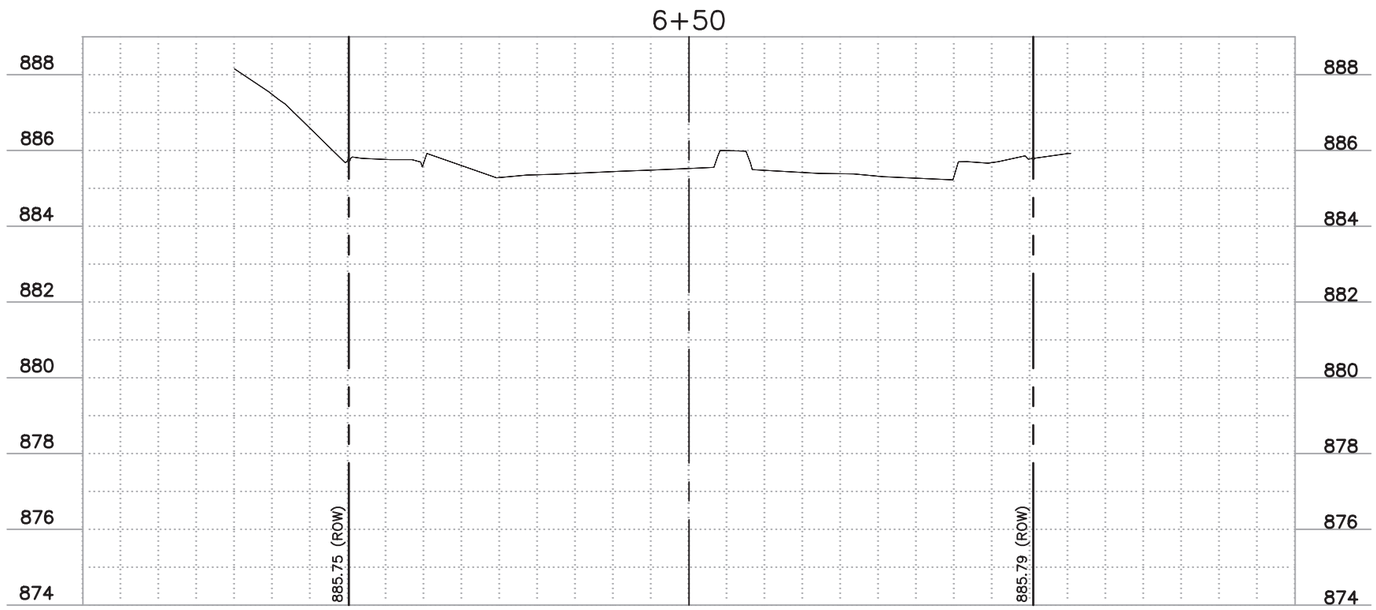
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6	TEXAS	104023–10006	_	14	WILLIAMSON				224

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8.4.17

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NEENAH AVE. CROSS SECTIONS
STA 6+00 – 6+50

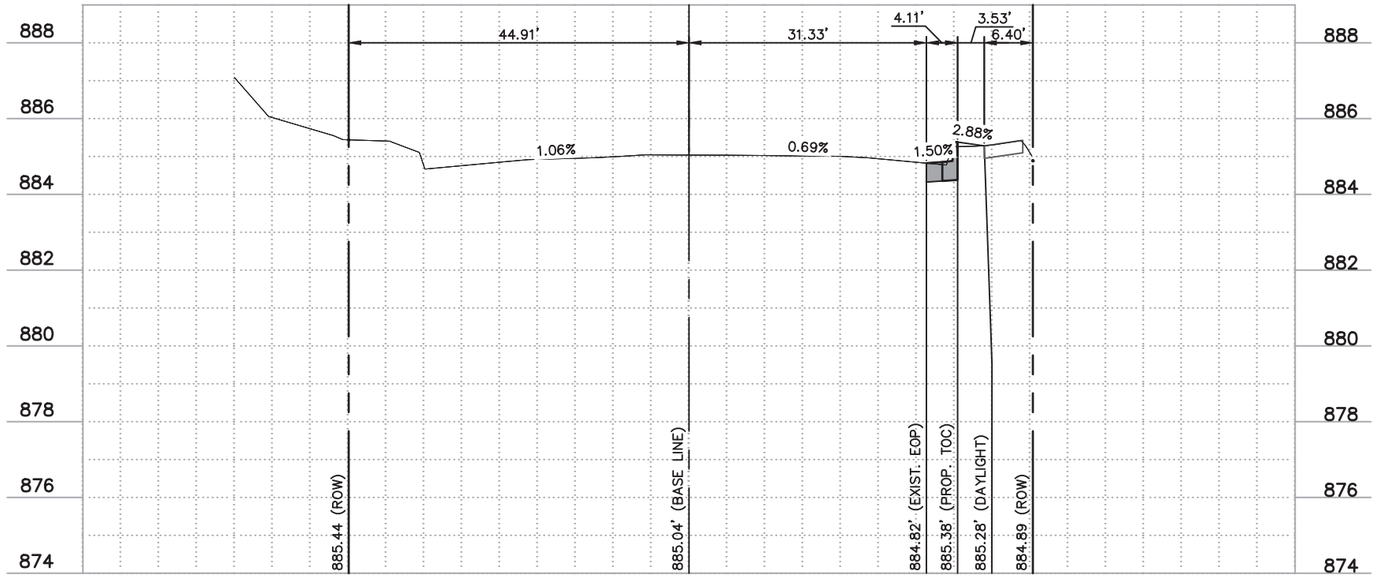
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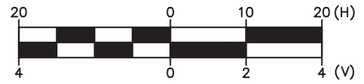
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SP-2016-0186D

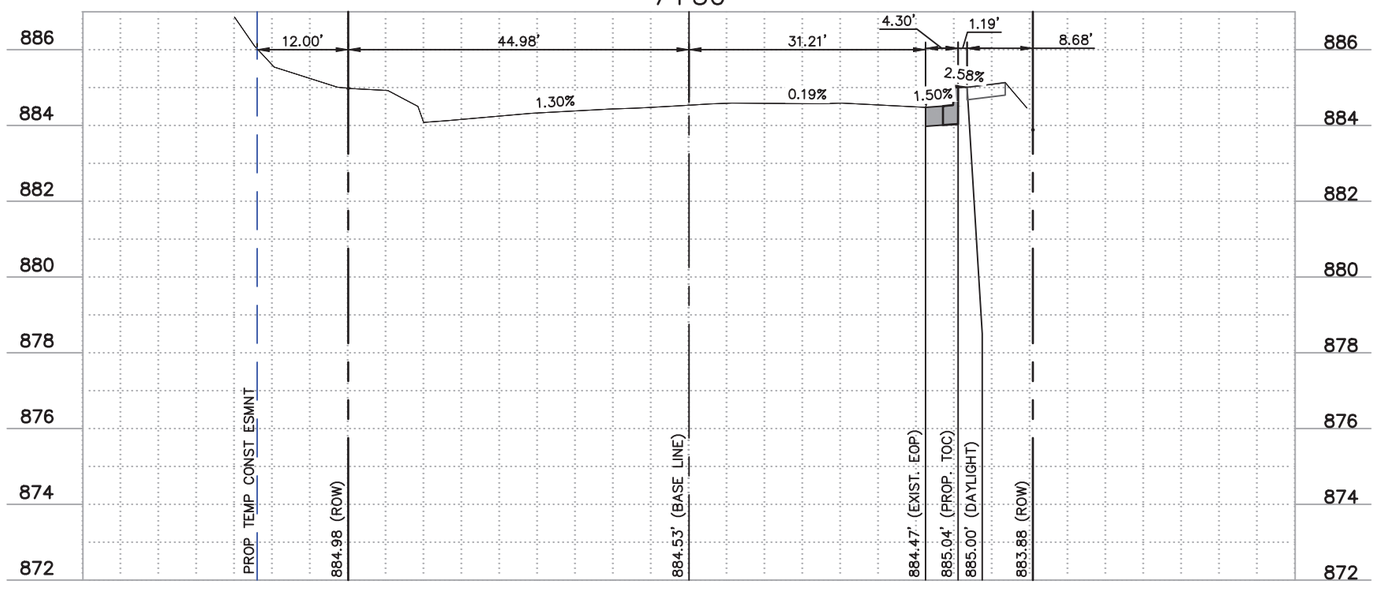
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7+00





7+50



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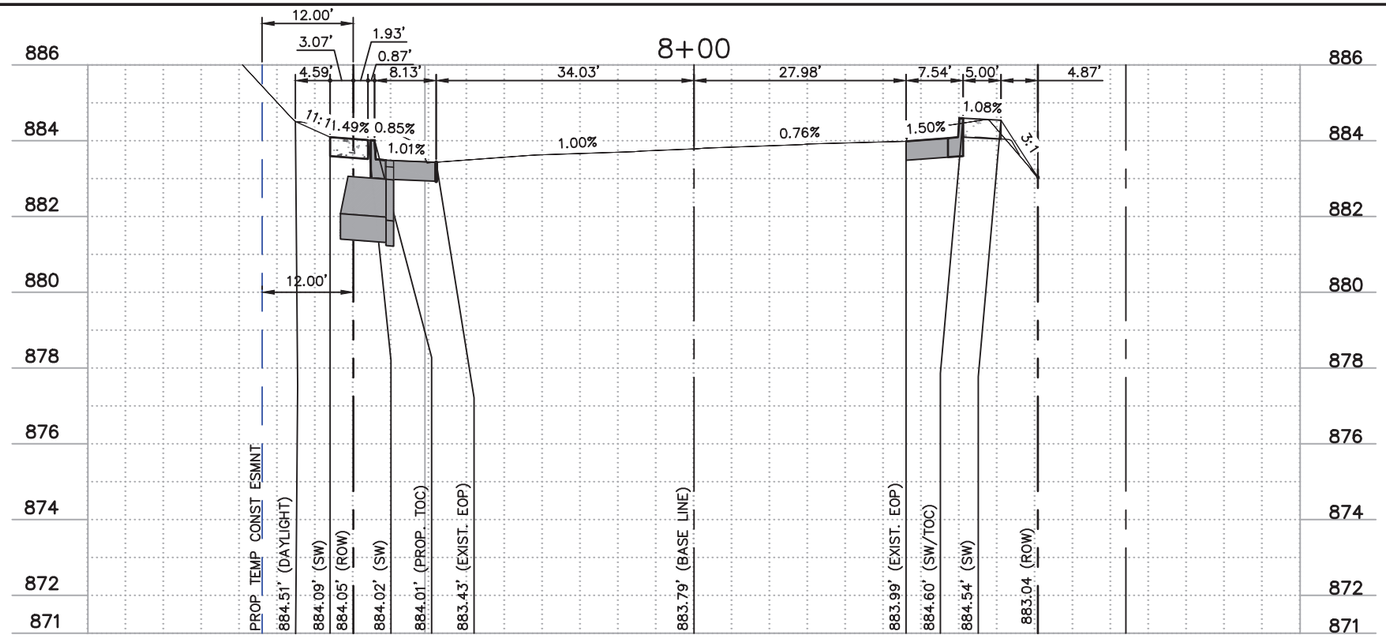
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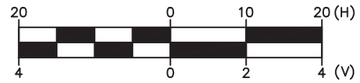
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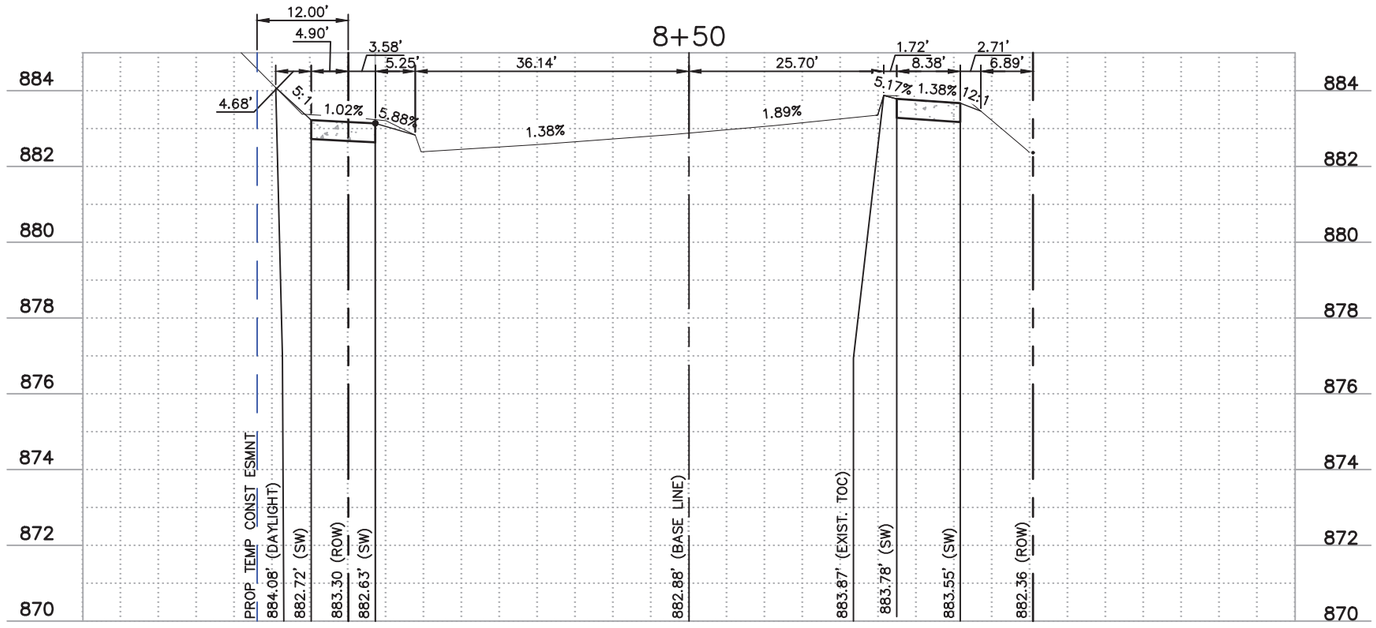
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NEENAH AVE. CROSS SECTIONS
STA 8+00 – 8+50

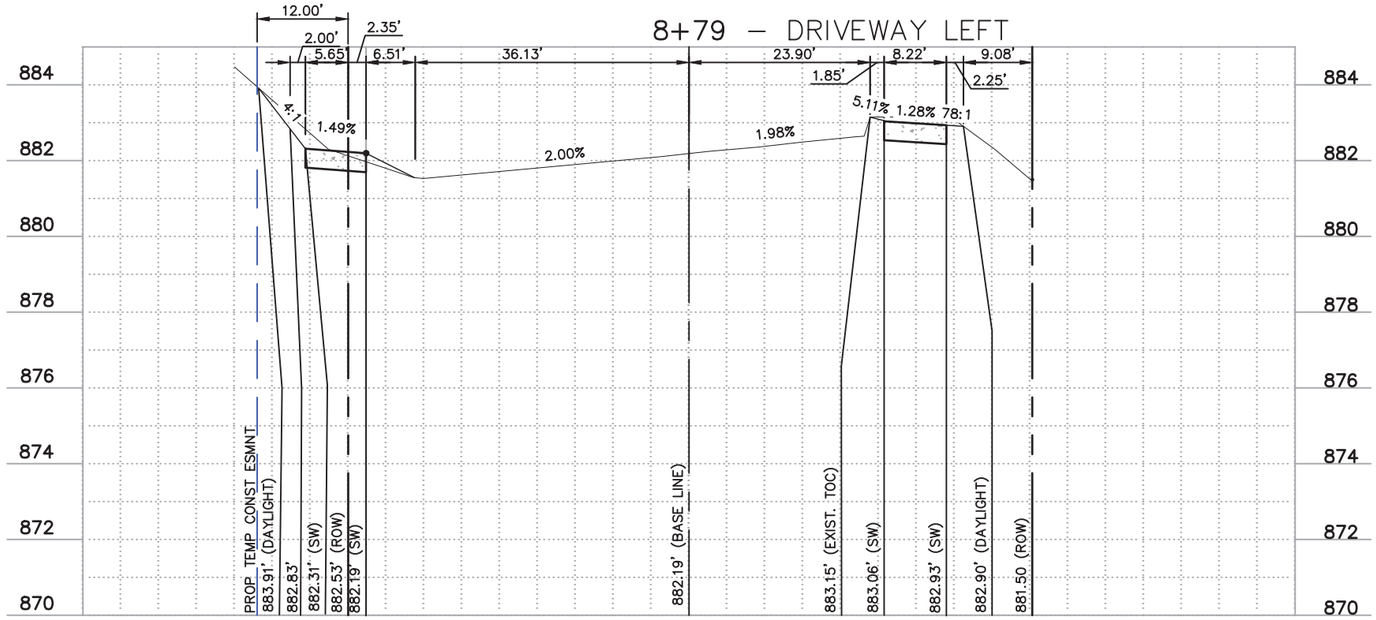
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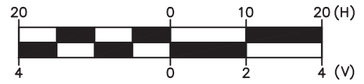
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SP-2016-0186D

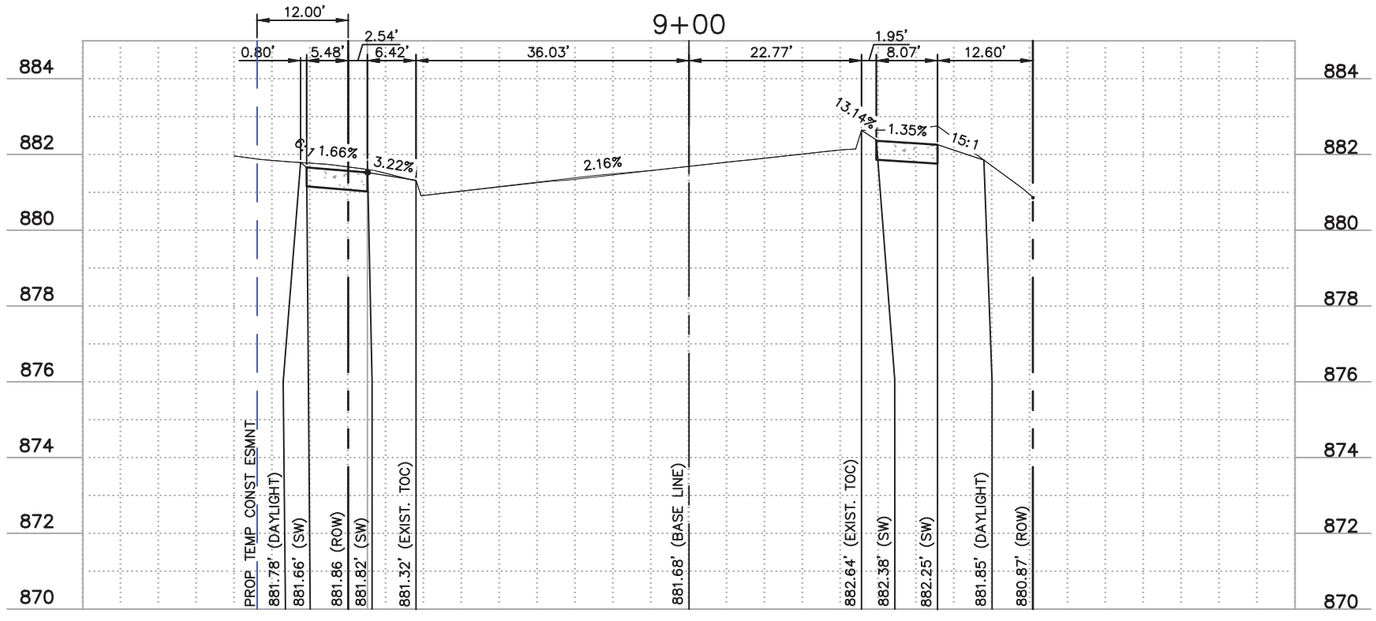
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8+79 – DRIVEWAY LEFT





9+00



8.4.17

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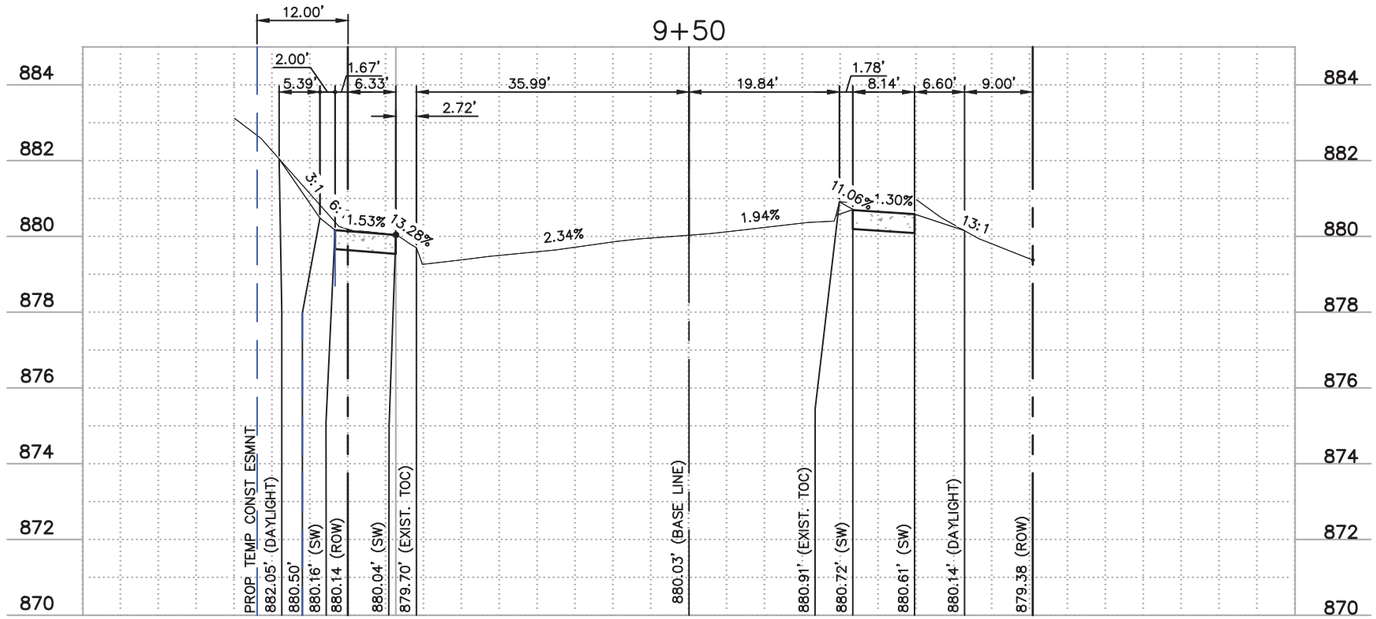
NEENAH AVE. CROSS SECTIONS
STA 8+79 – 9+00

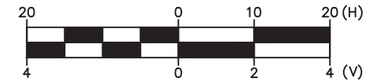
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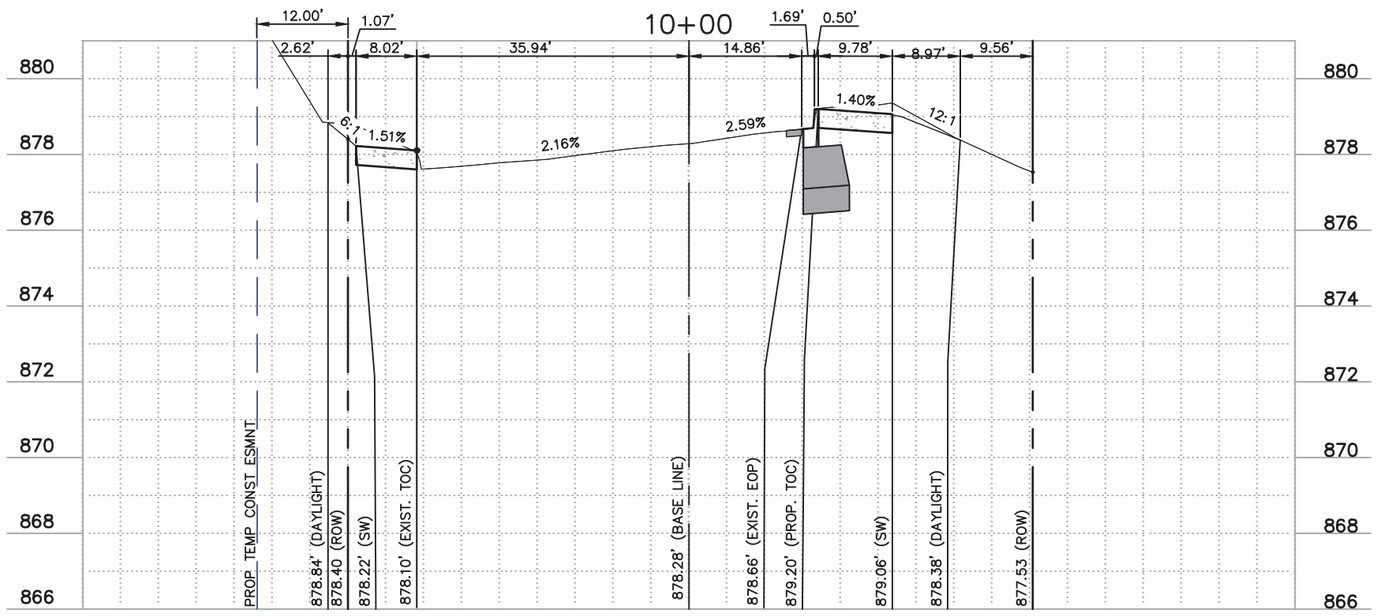
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6	TEXAS	104023–10006	_	14	WILLIAMSON				228

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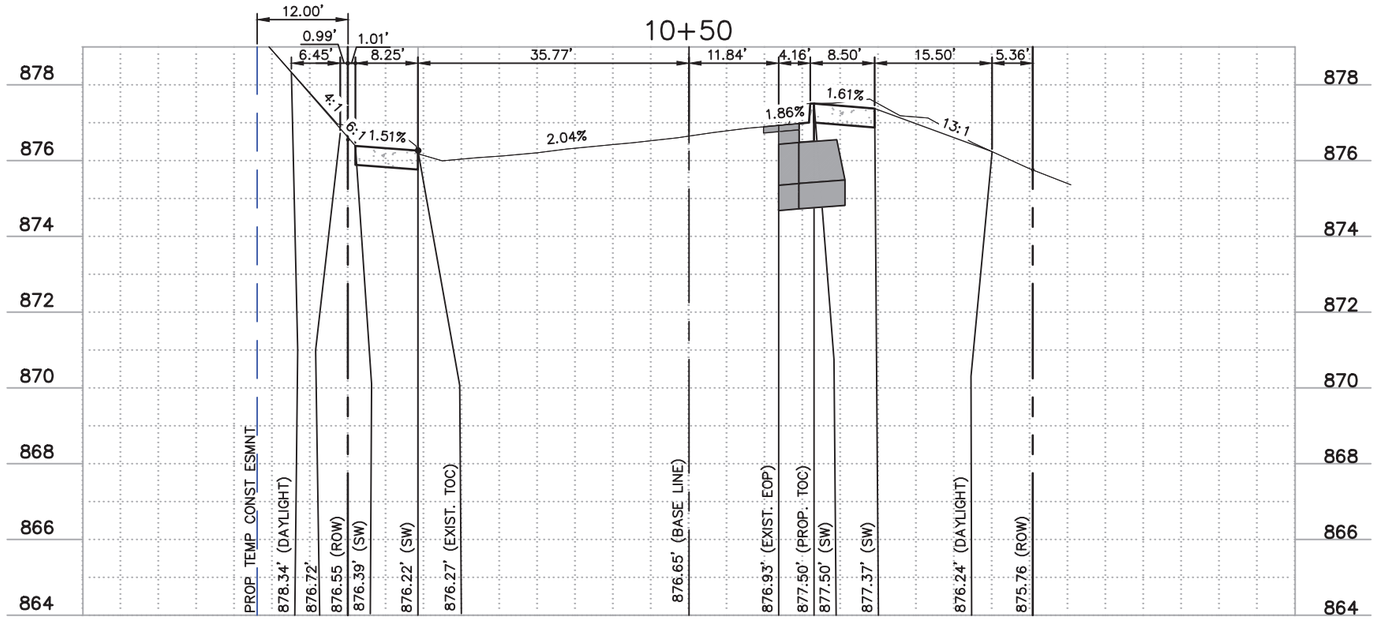
NEENAH AVE. CROSS SECTIONS
STA 9+50 – 10+00

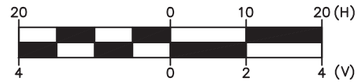
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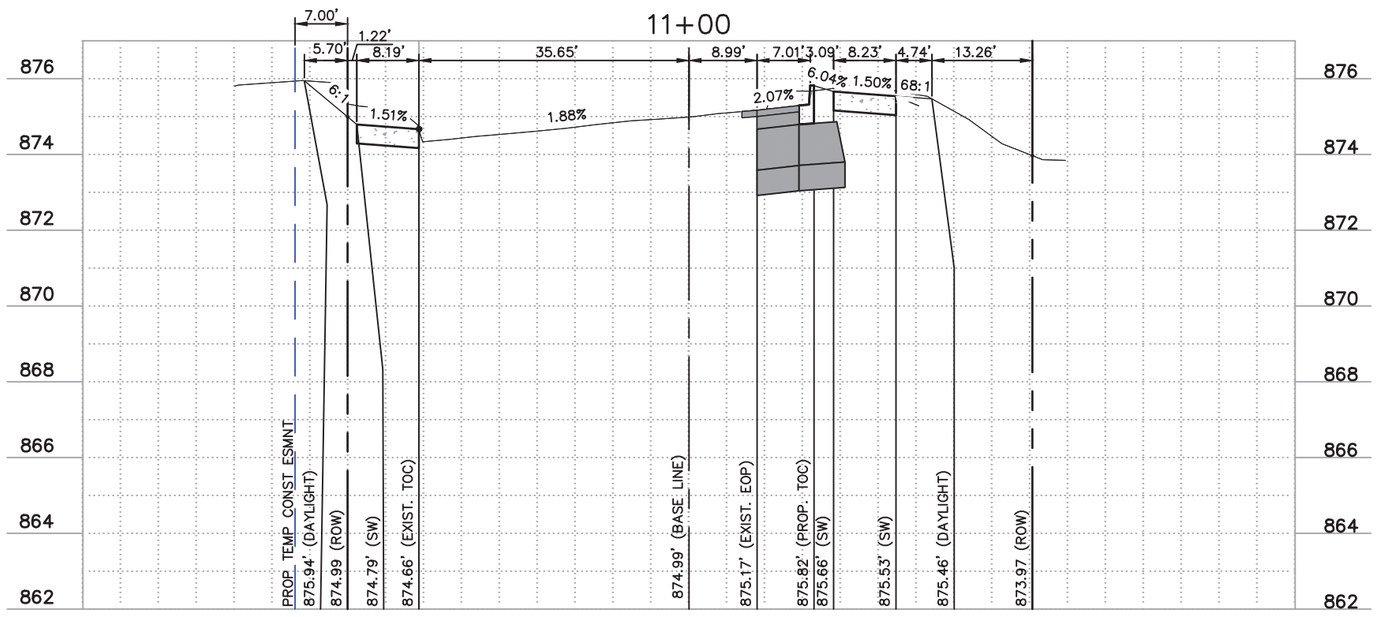
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6	TEXAS	104023–10006	_	14	WILLIAMSON				229

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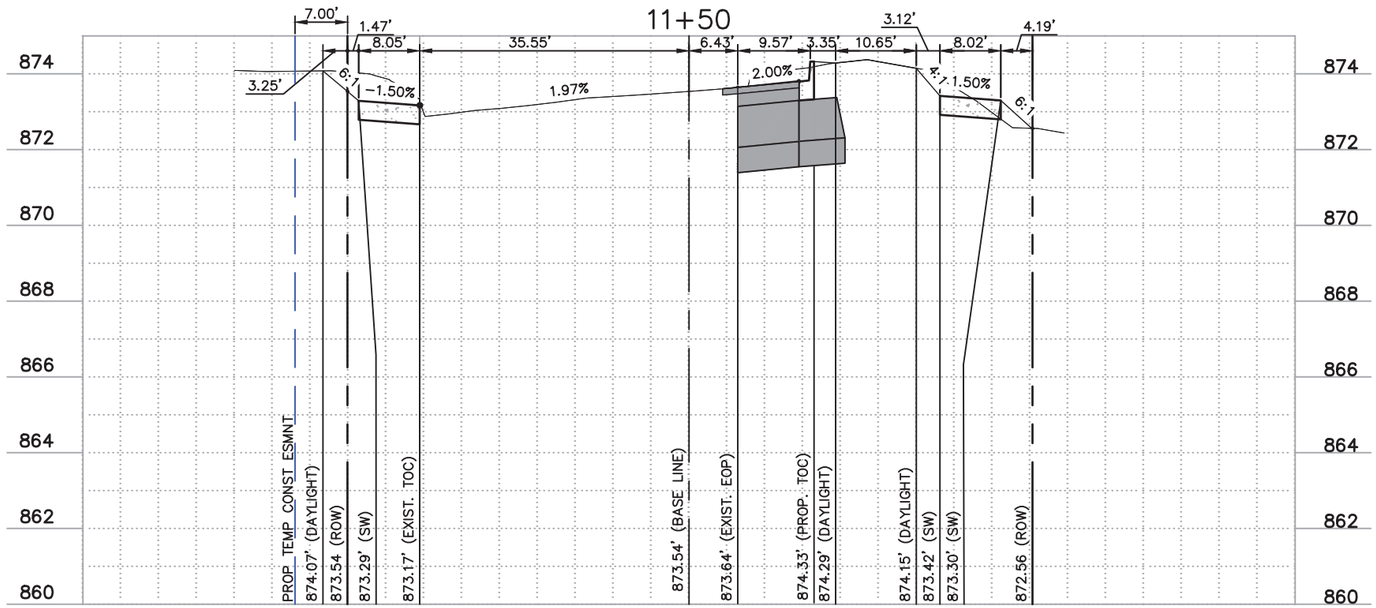
NEENAH AVE. CROSS SECTIONS
STA 10+50 – 11+00

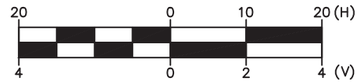
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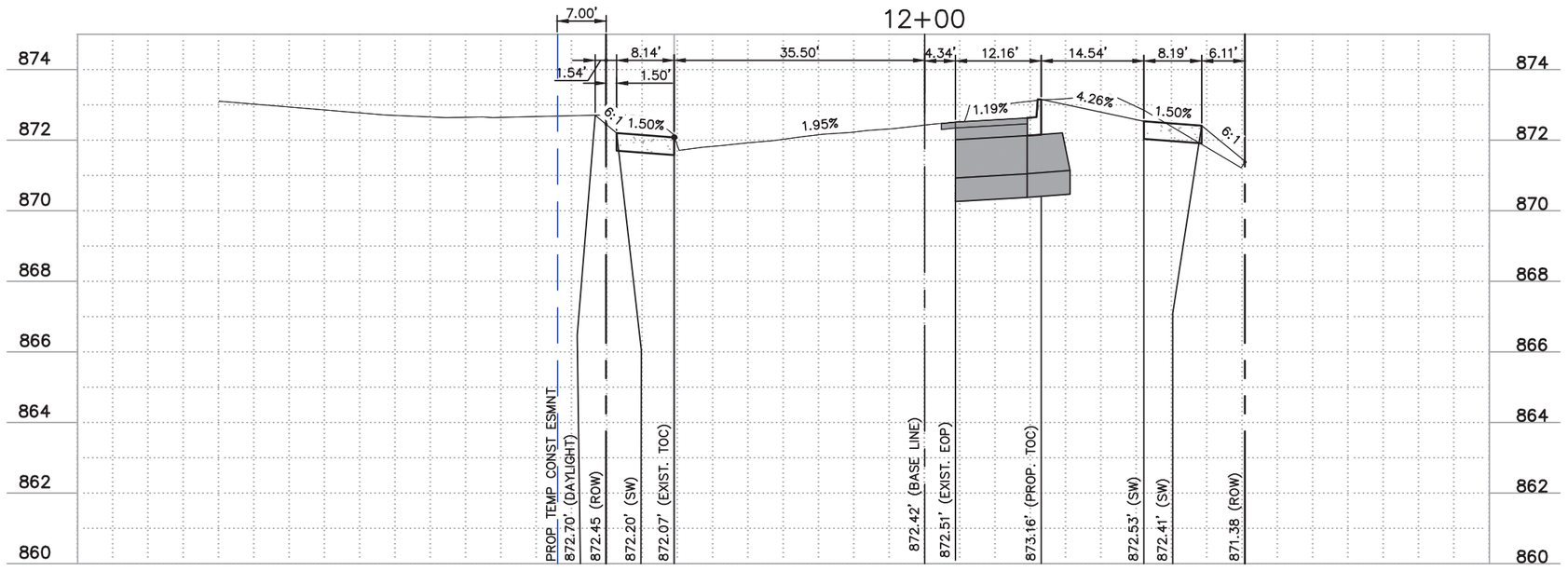
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6	TEXAS	104023–10006	_	14	WILLIAMSON				230

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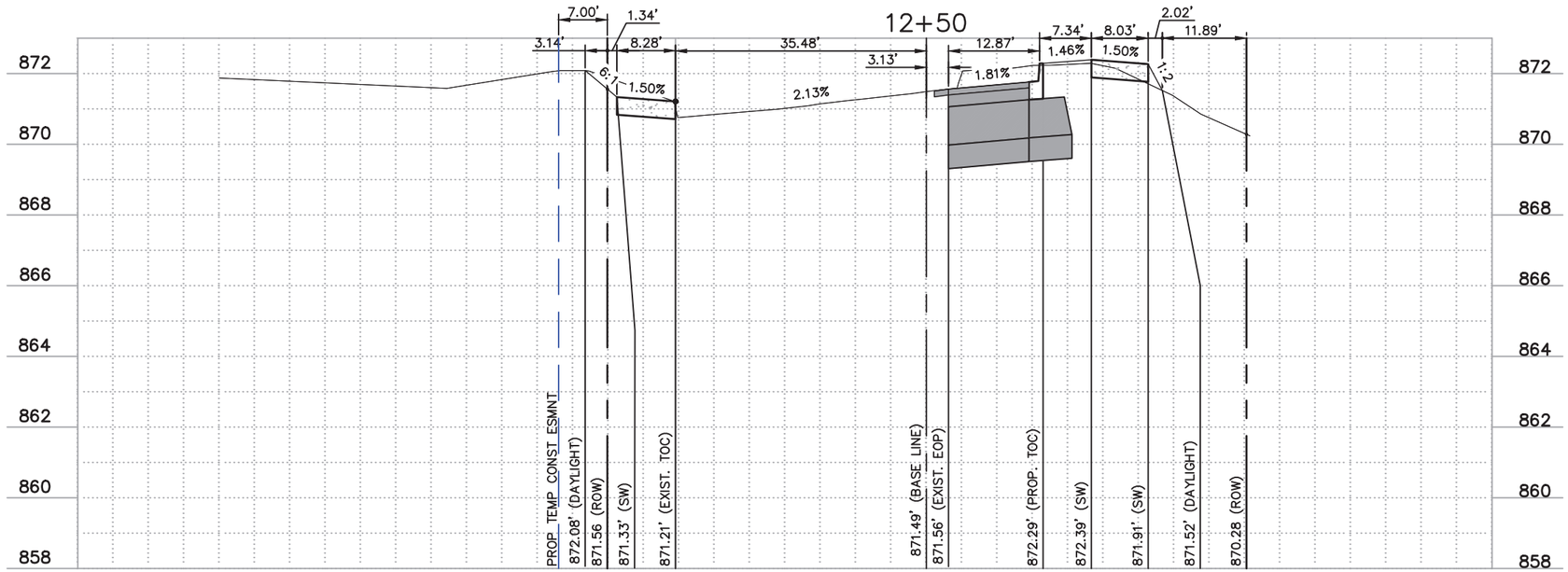
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STA 11+50 – 12+00

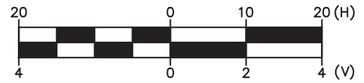
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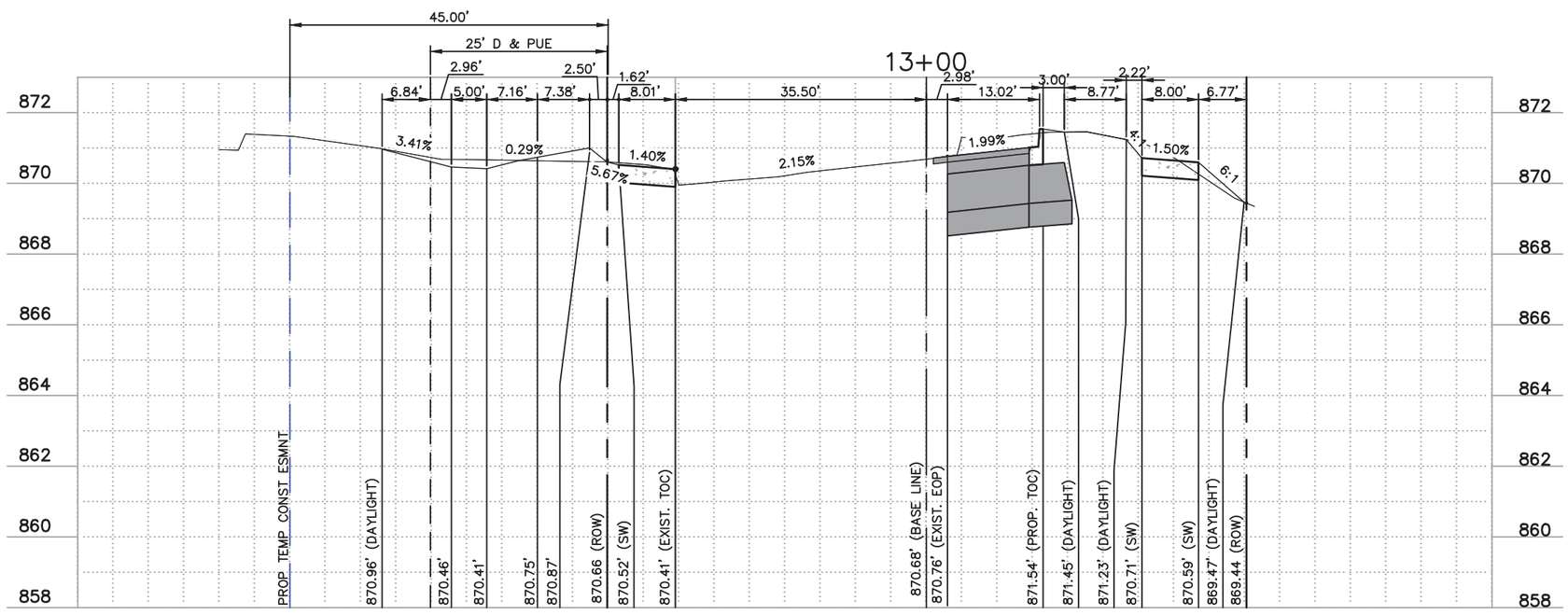
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6	TEXAS	104023–10006	_	14	WILLIAMSON				231

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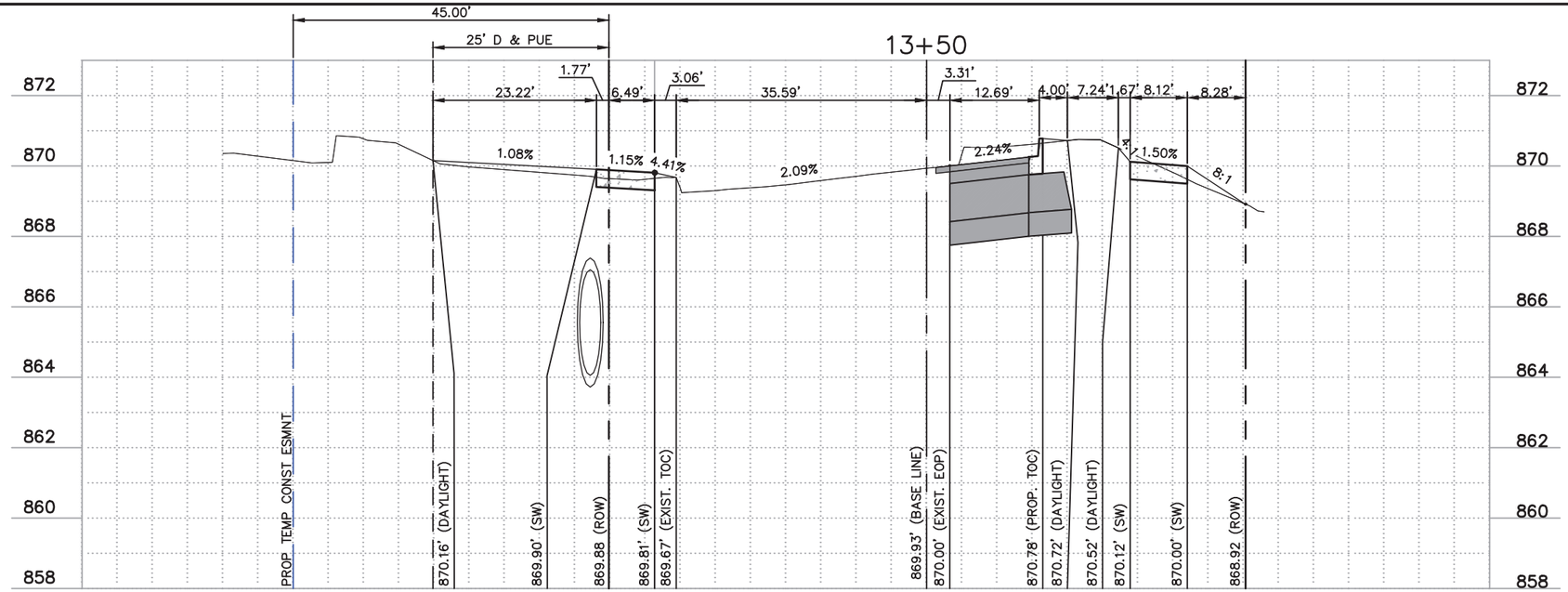
NEENAH AVE. CROSS SECTIONS
STA 12+50 – 13+00

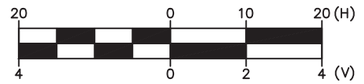
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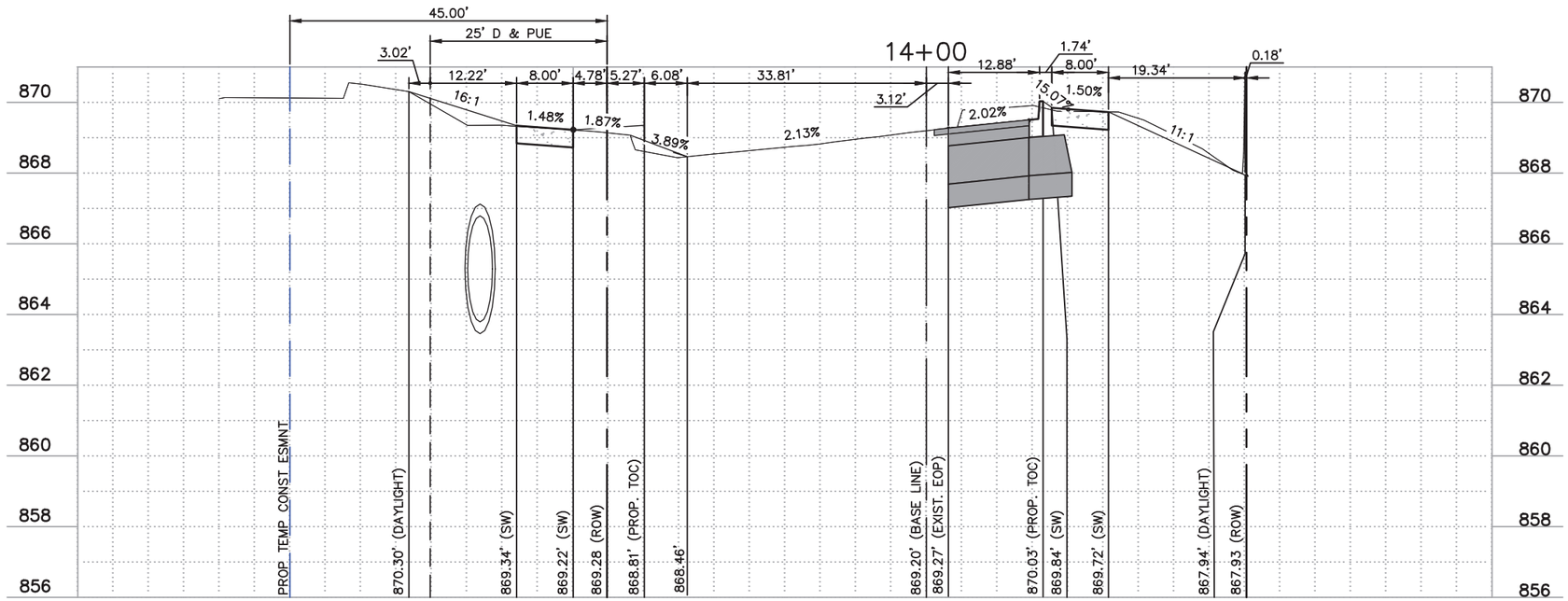
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6	TEXAS	104023–10006	_	14	WILLIAMSON				232

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NEENAH AVE. CROSS SECTIONS
STA 13+50 – 14+00

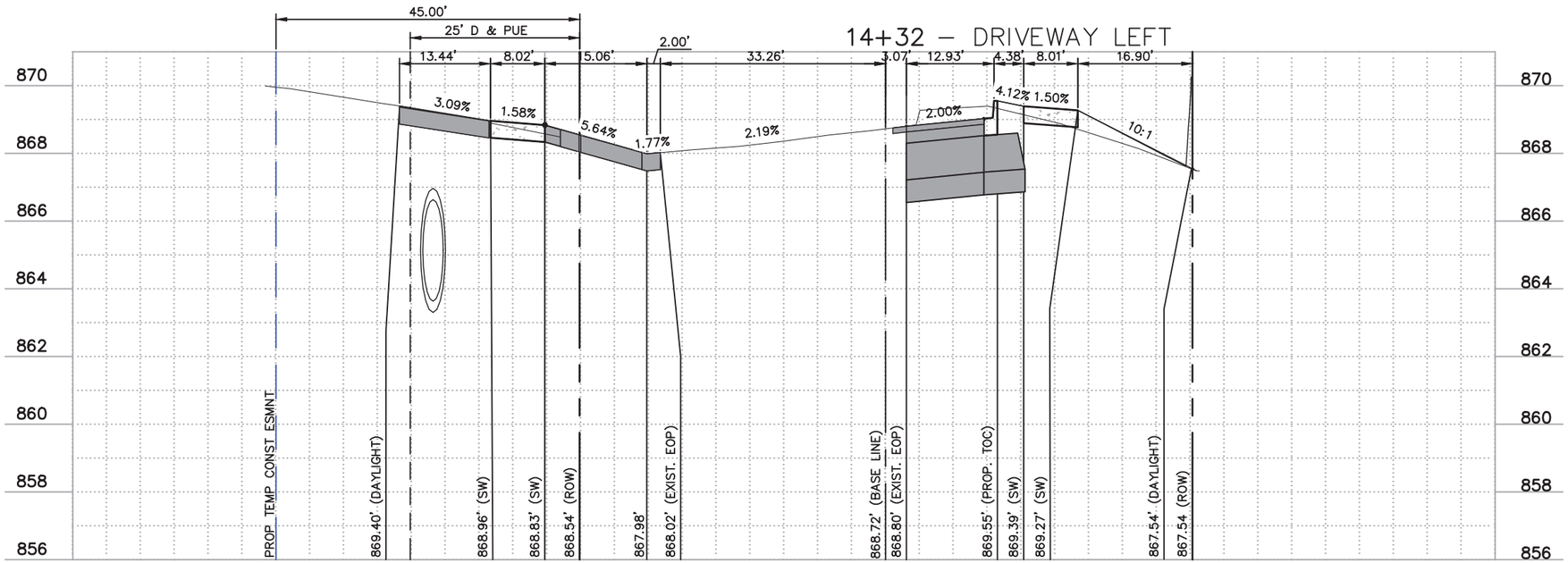
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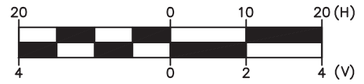
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14+32 – DRIVEWAY LEFT





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WILLIAMSON COUNTY
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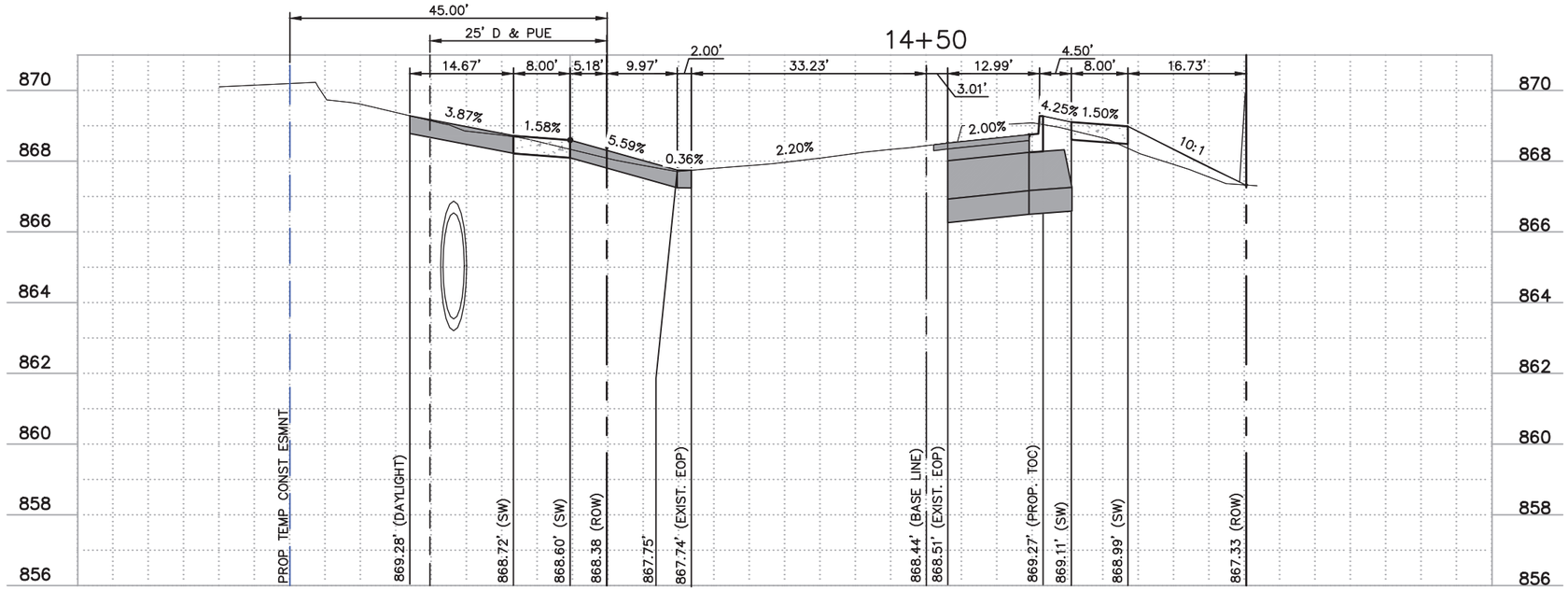
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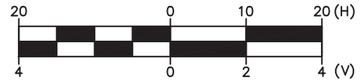
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STA 14+32

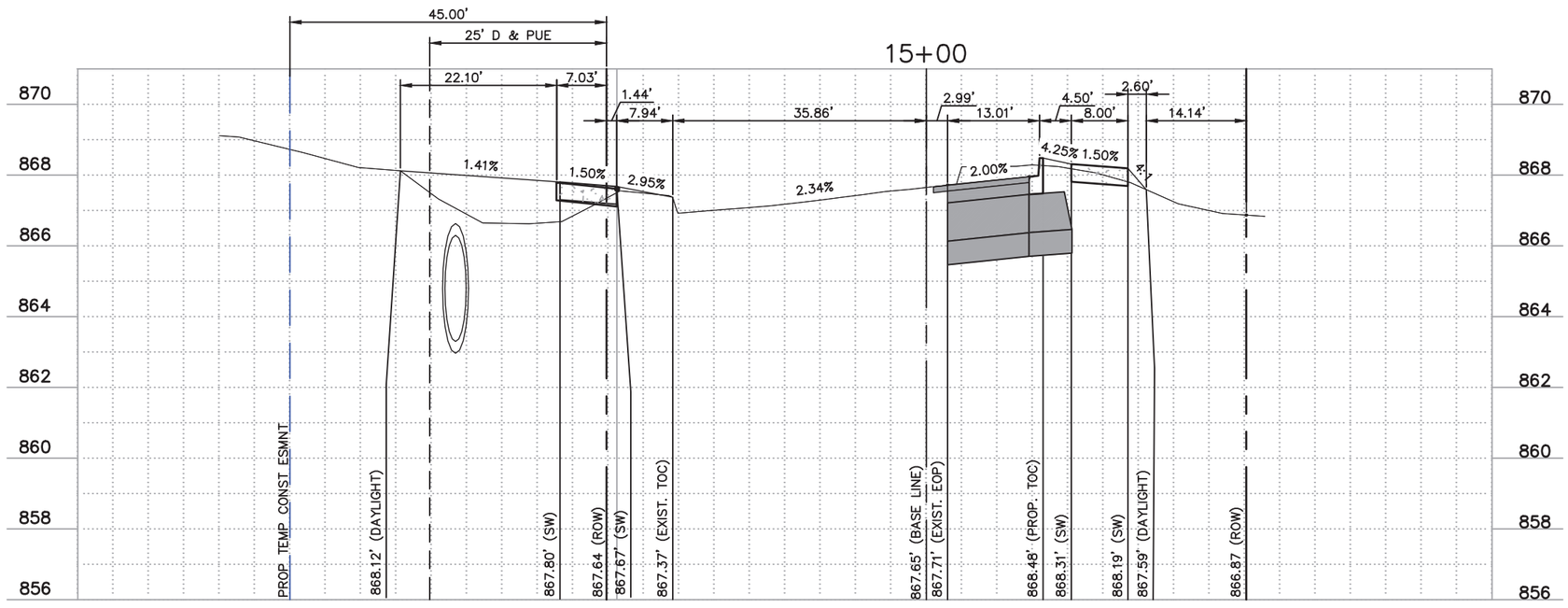
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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				234

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Stephanie D Blew

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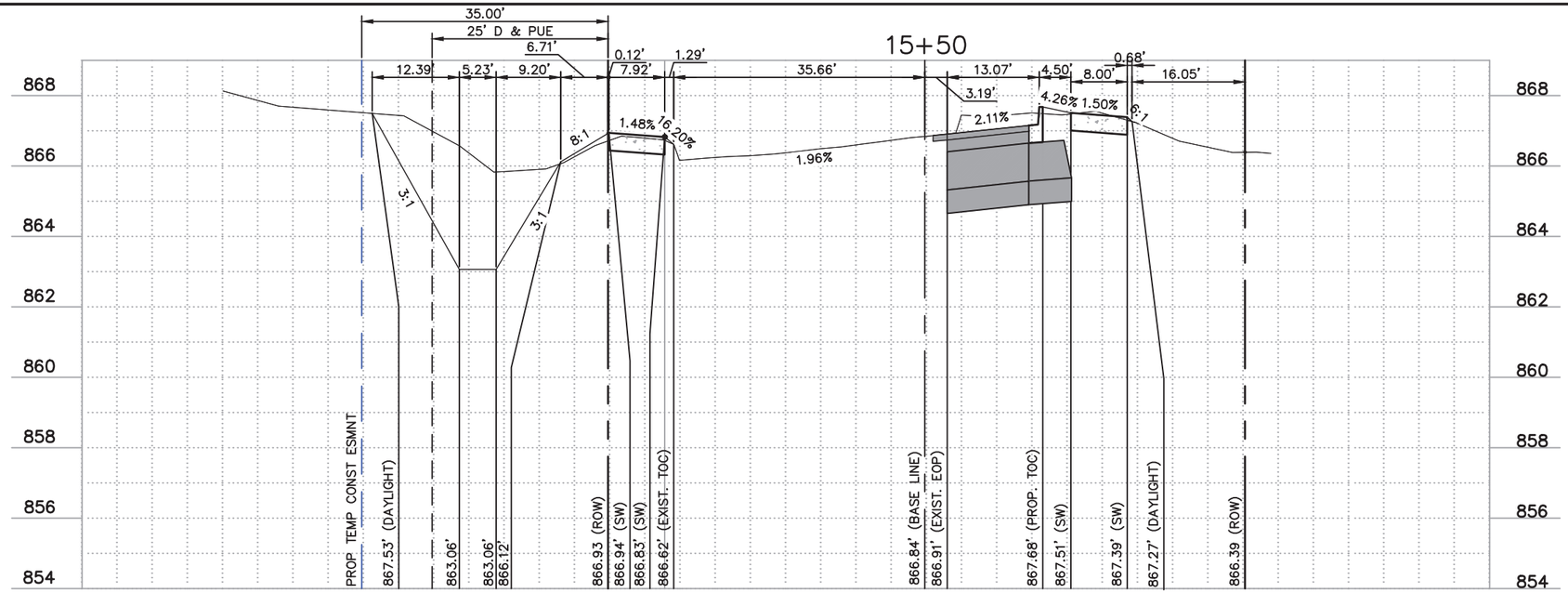
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STA 14+50 – 15+00

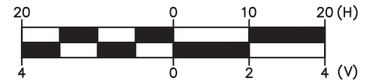
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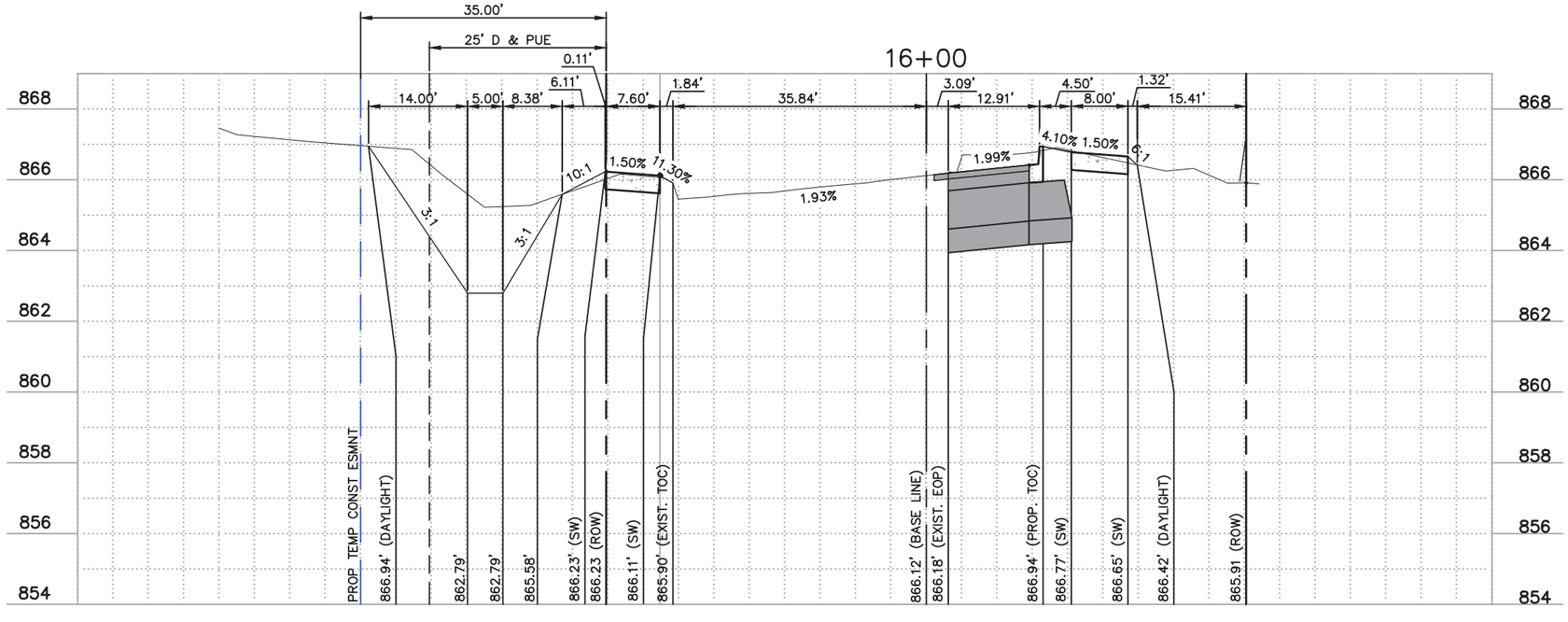
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6	TEXAS	104023–10006	–	14	WILLIAMSON				235

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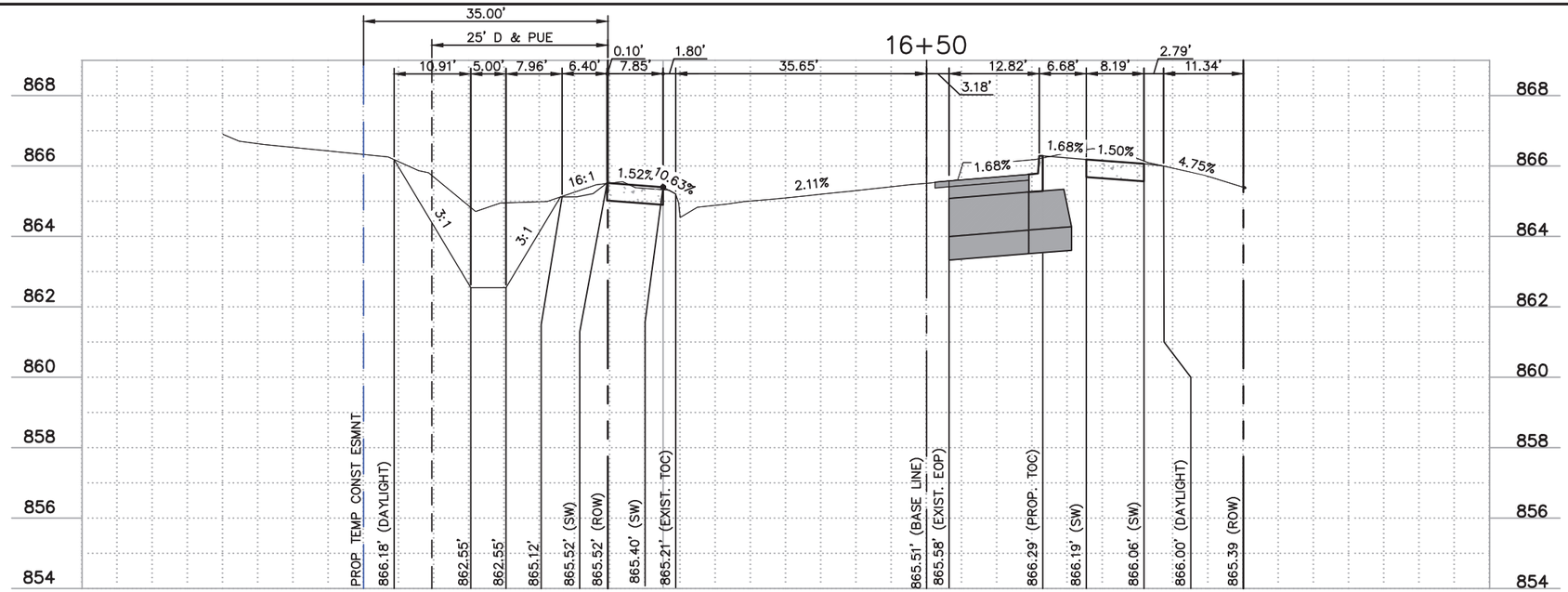
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STA 15+50 – 16+00

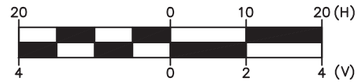
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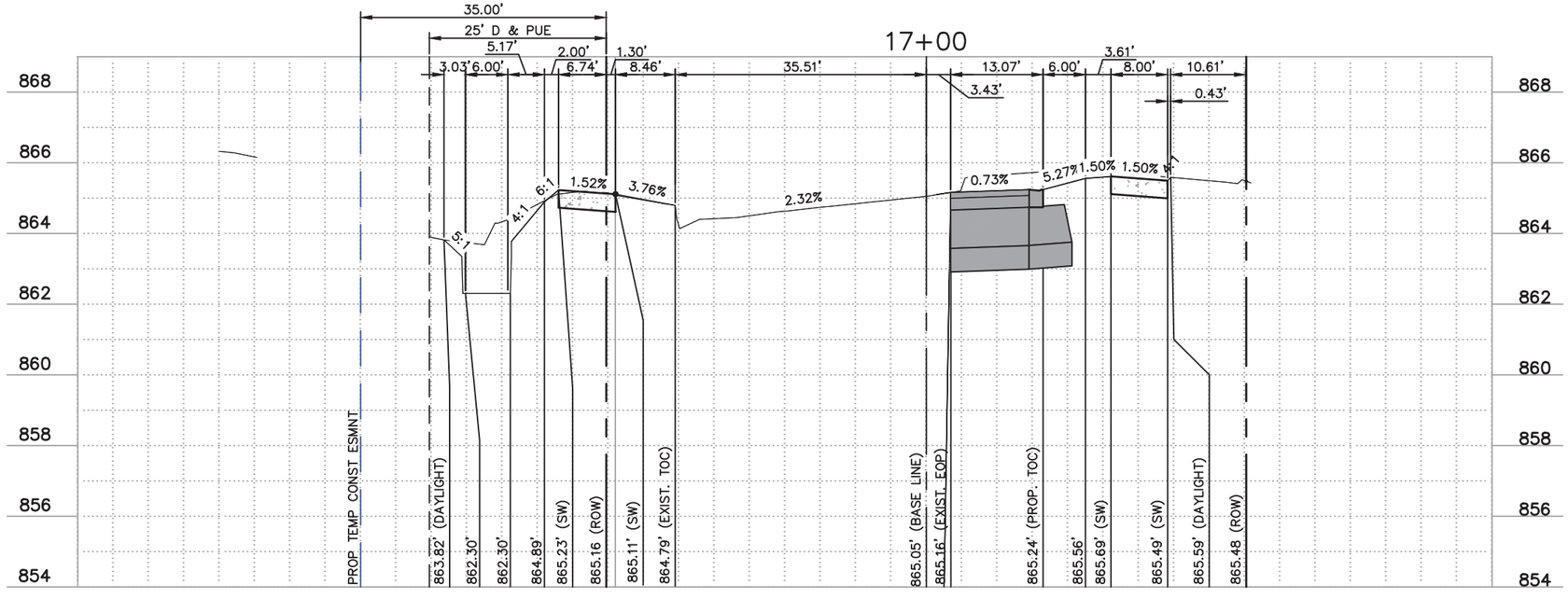
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				236

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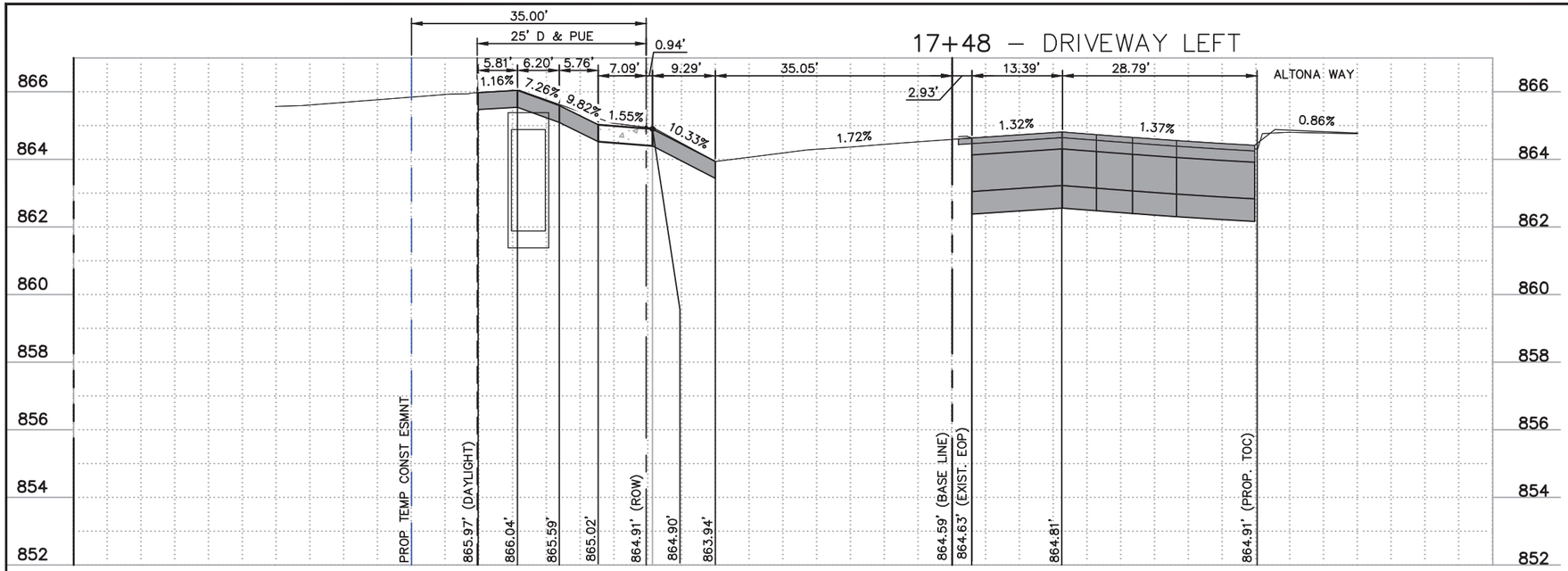
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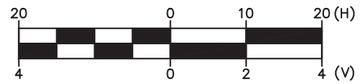
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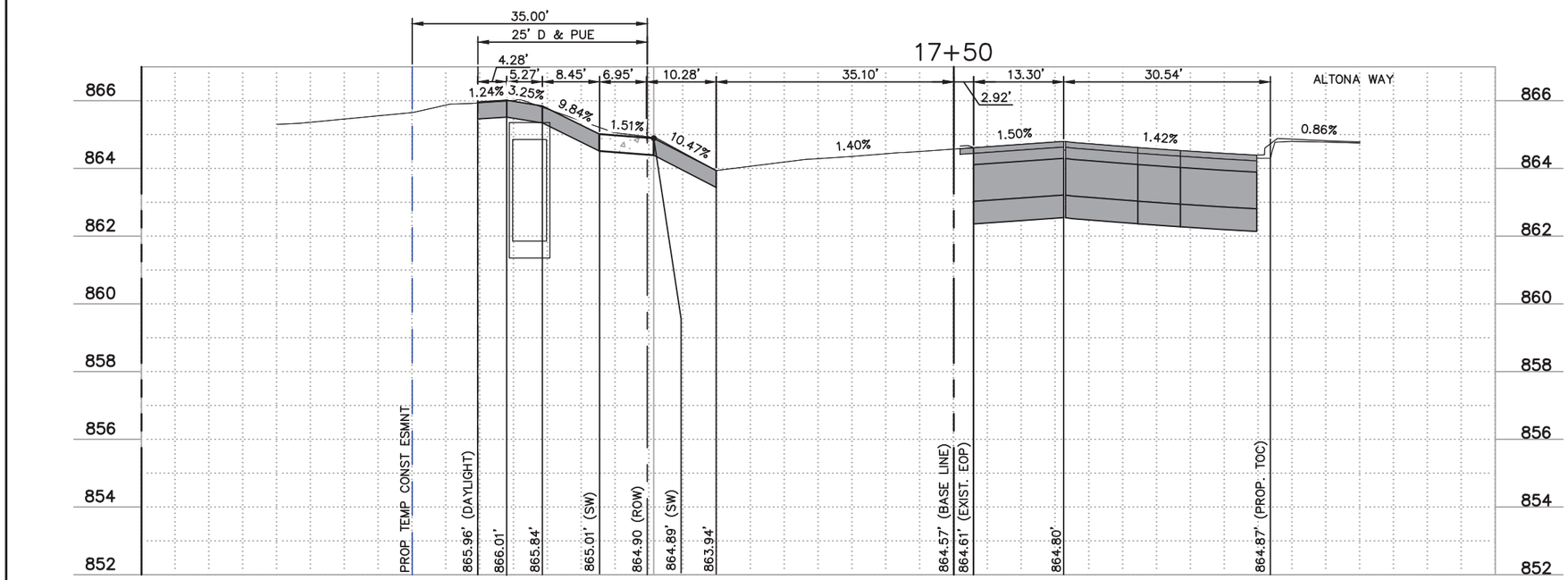
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6	TEXAS	104023–10006	_	14	WILLIAMSON				237

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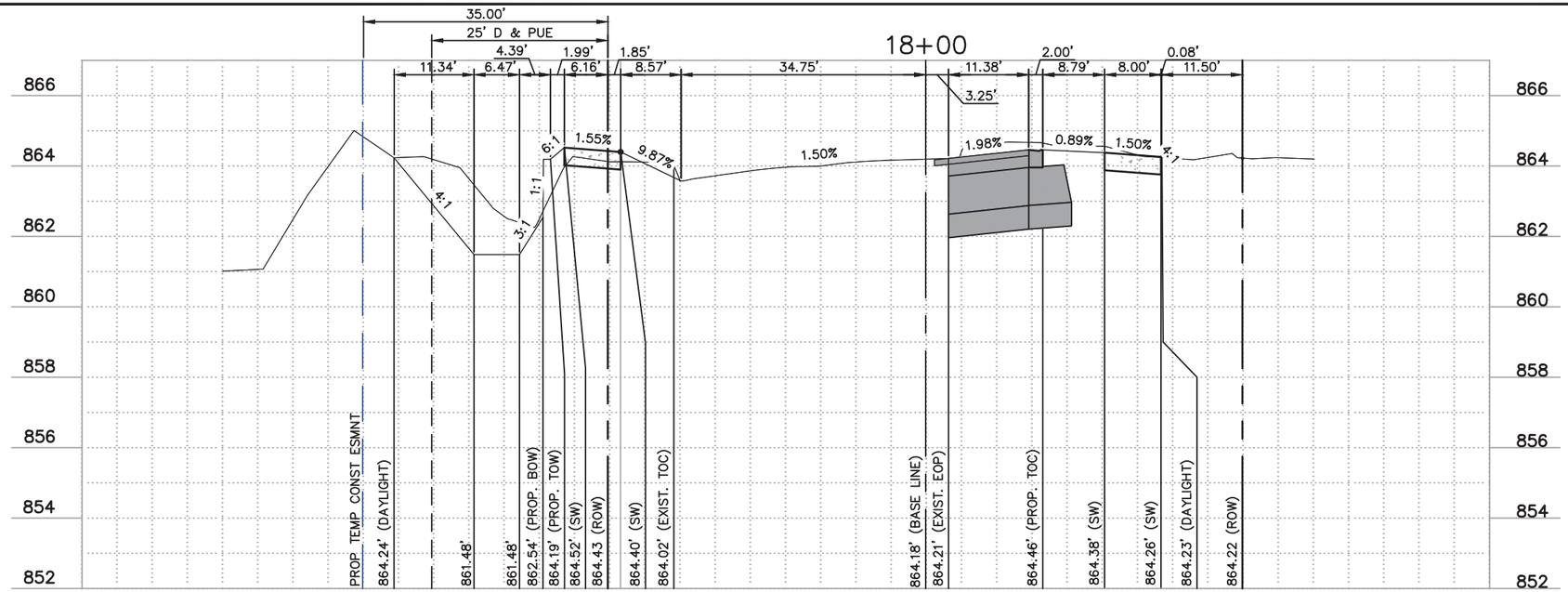
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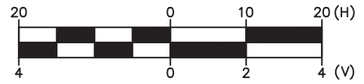
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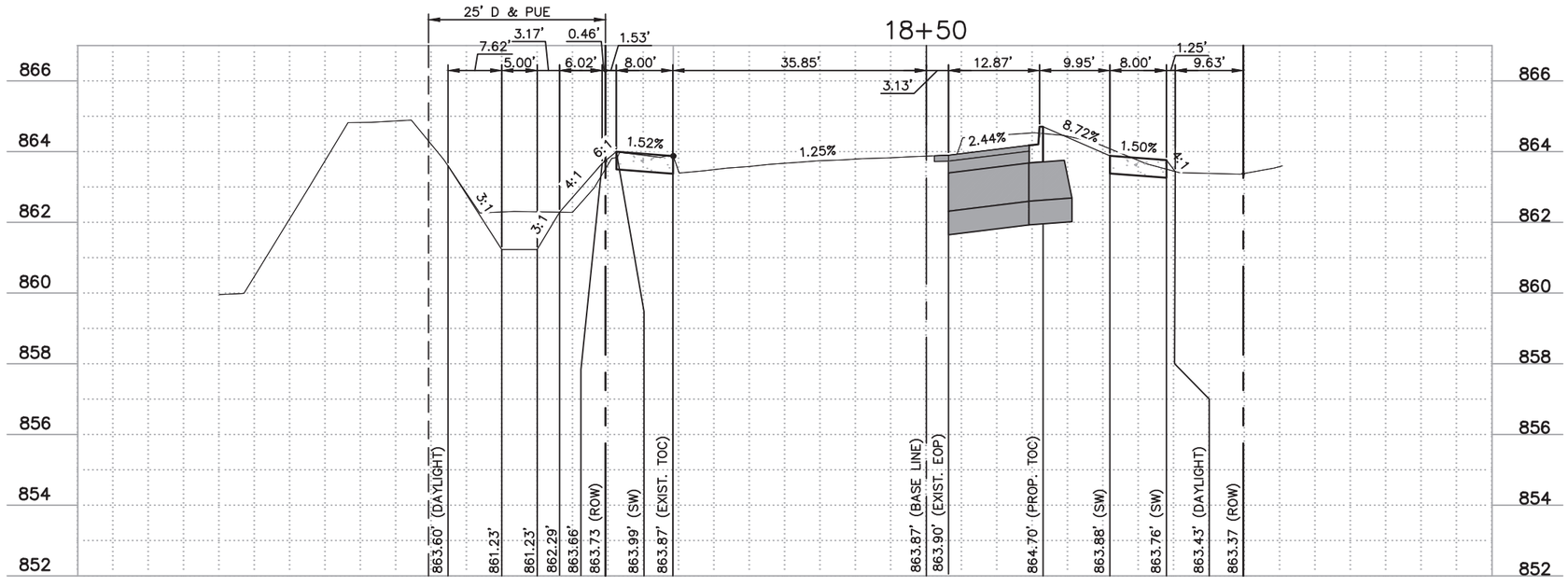
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6	TEXAS	104023–10006	–	14	WILLIAMSON				238

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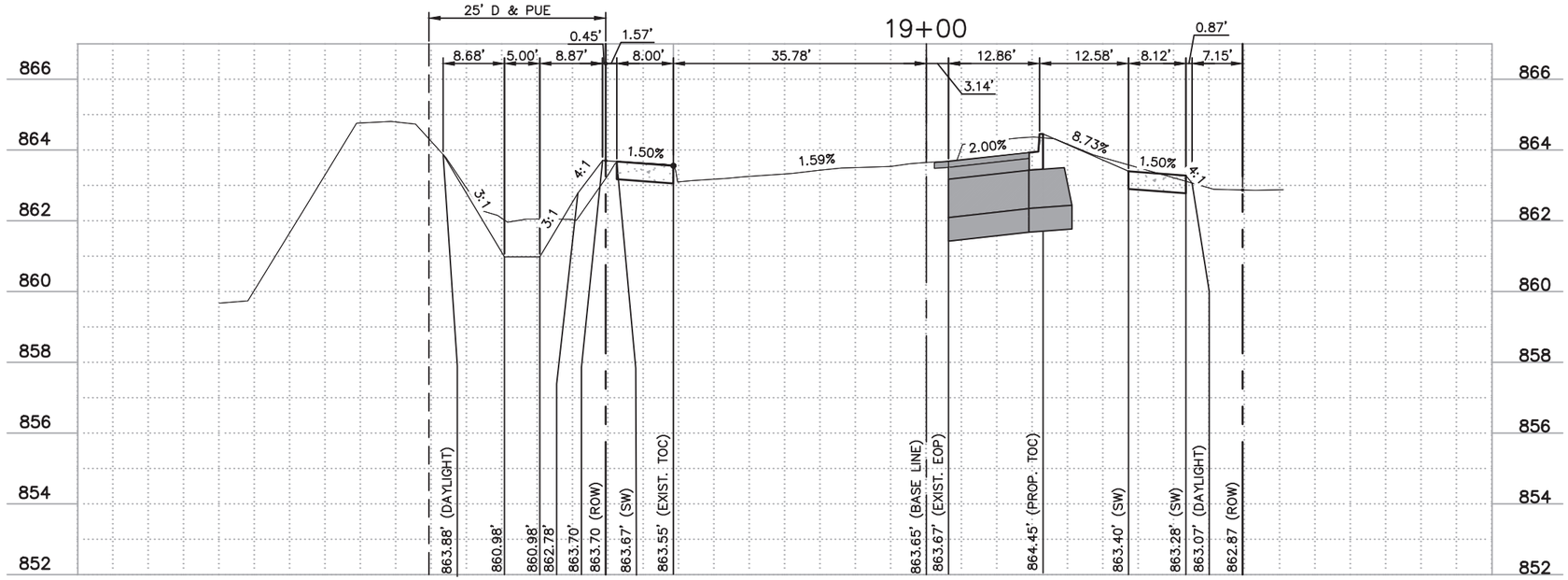
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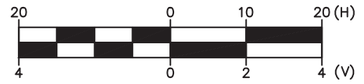
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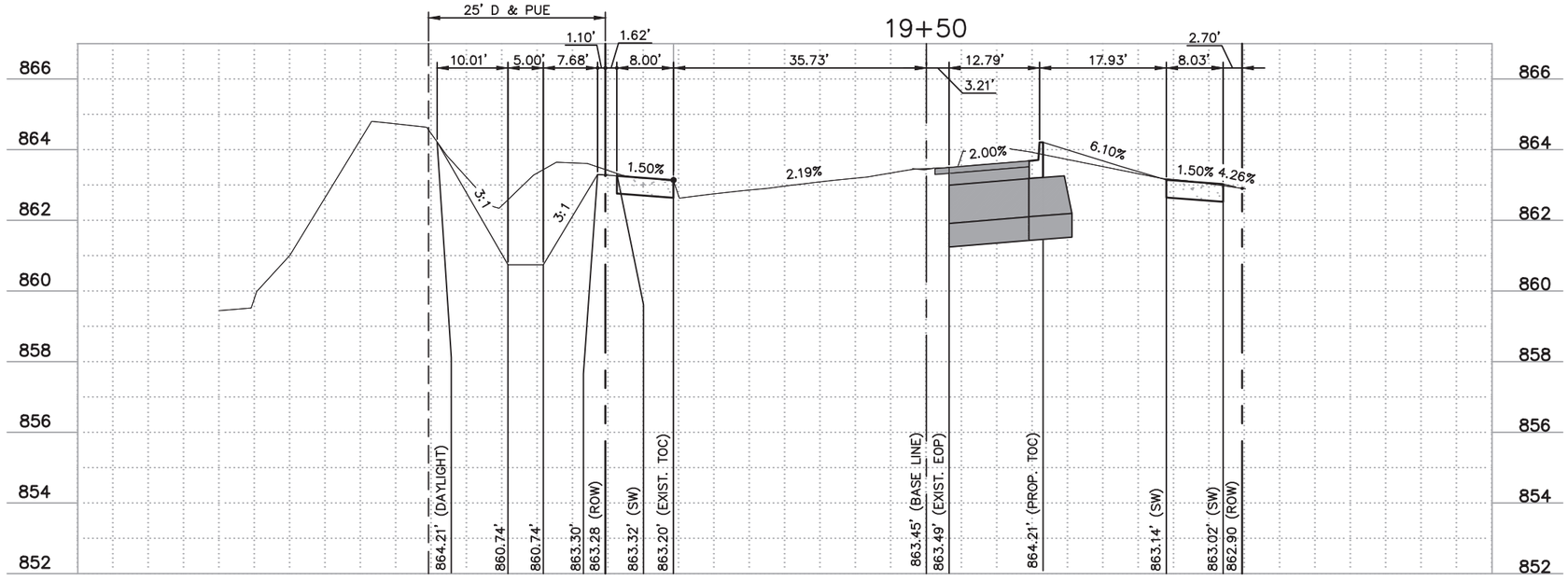
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6	TEXAS	104023–10006	_	14	WILLIAMSON				239

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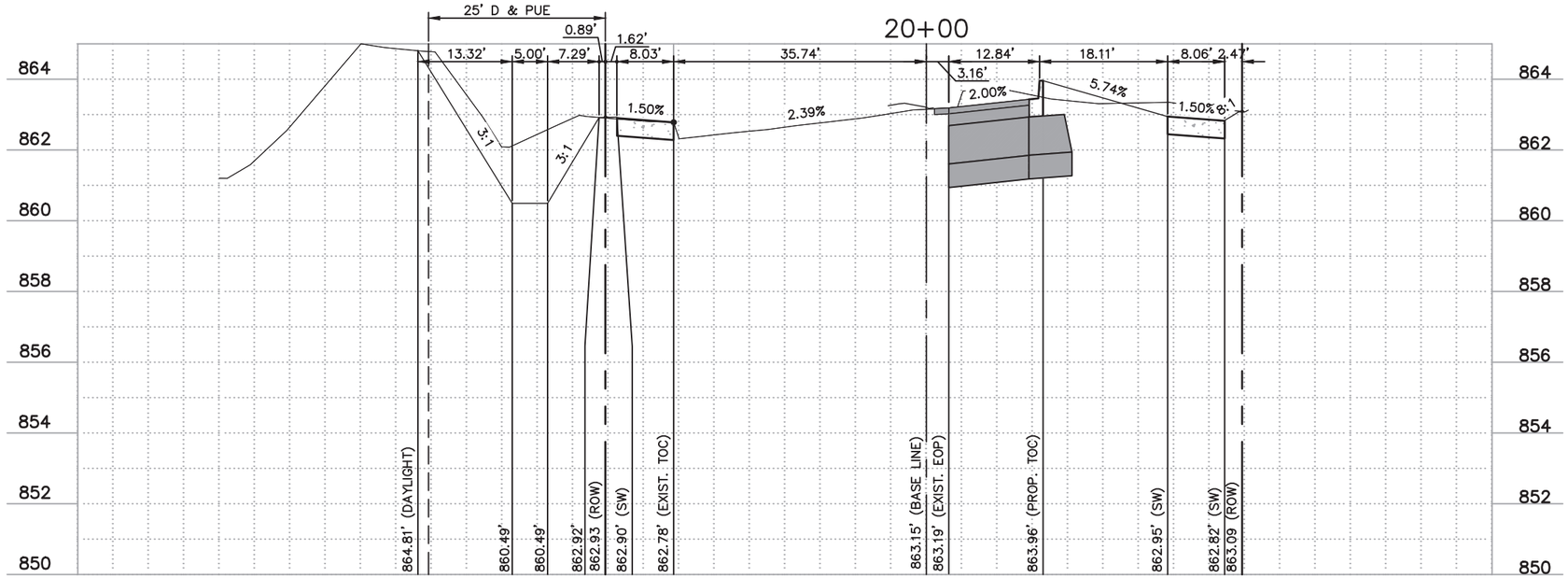
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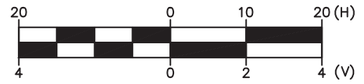
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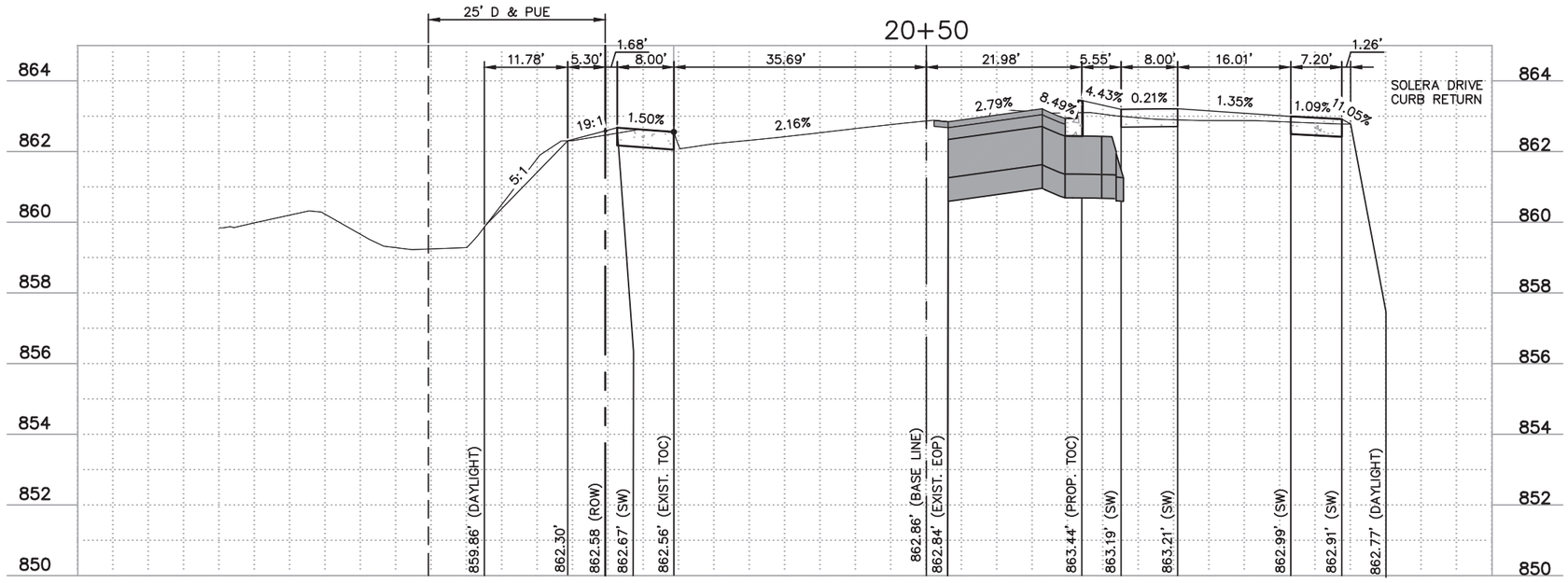
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				240

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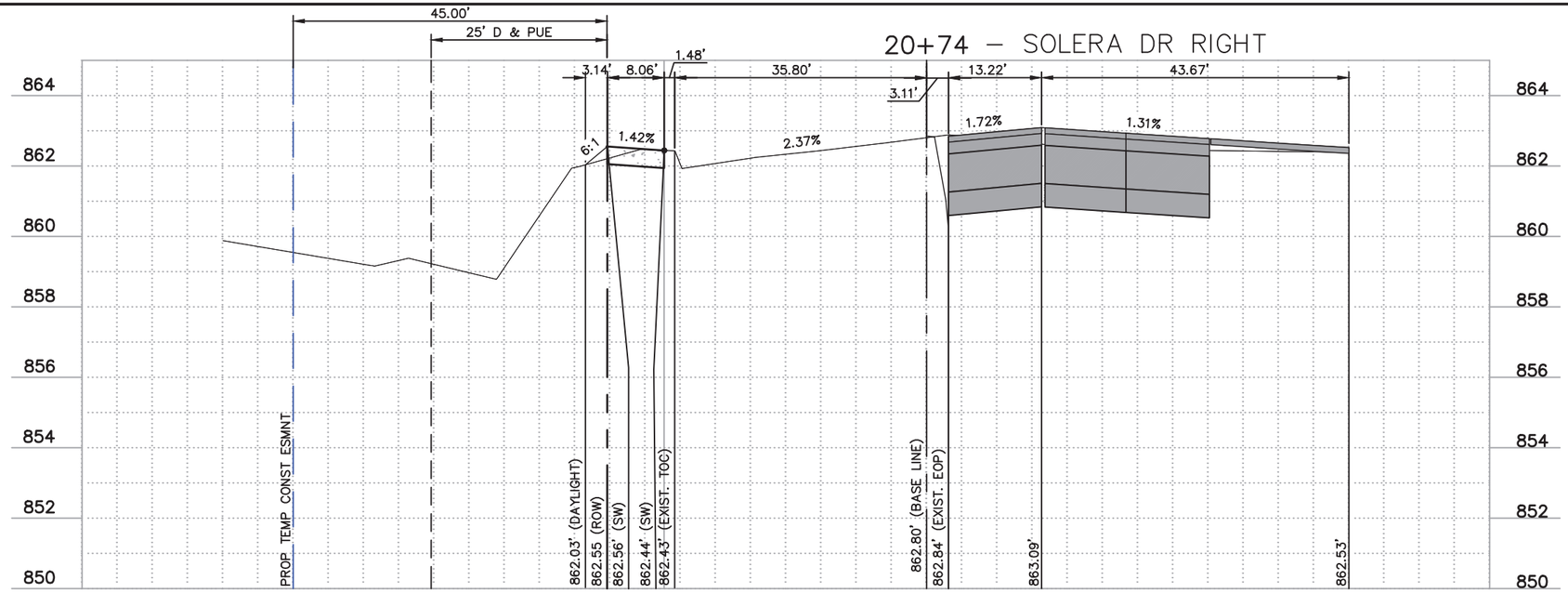
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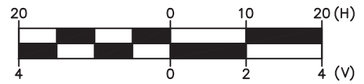
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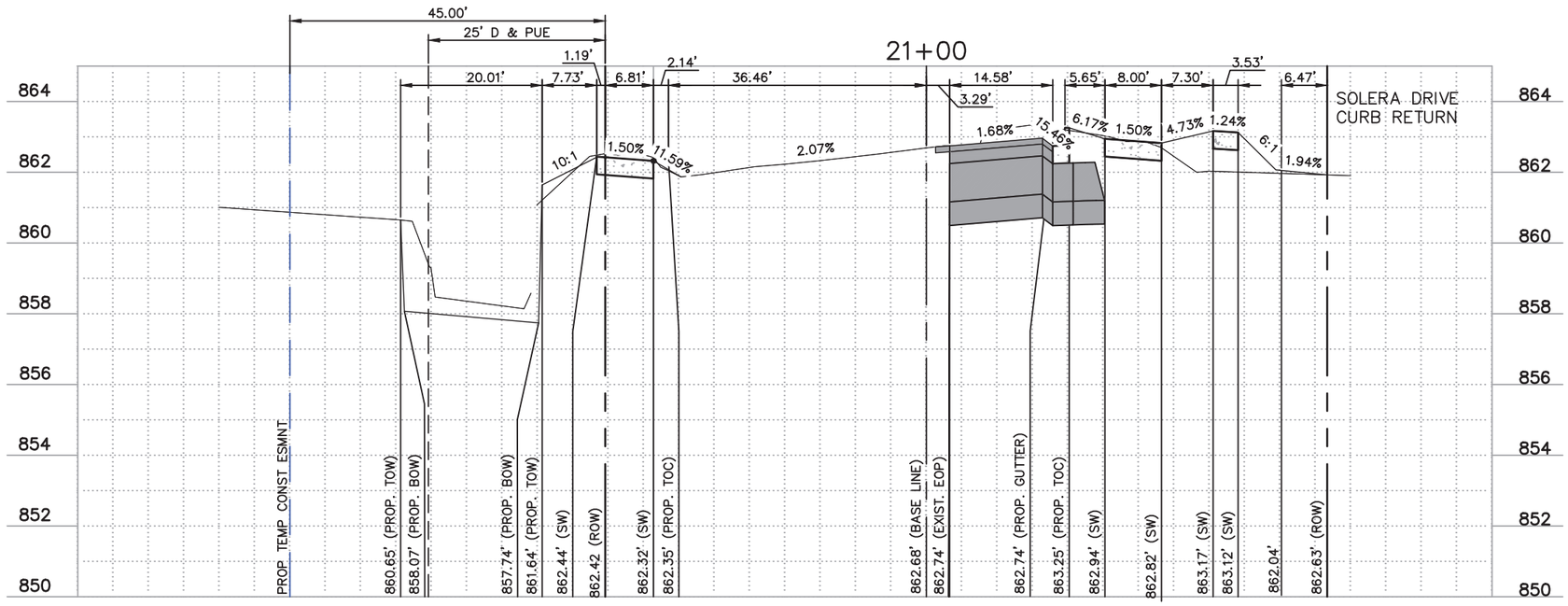
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6	TEXAS	104023–10006	_	14	WILLIAMSON				241

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STA 20+74 – 21+00

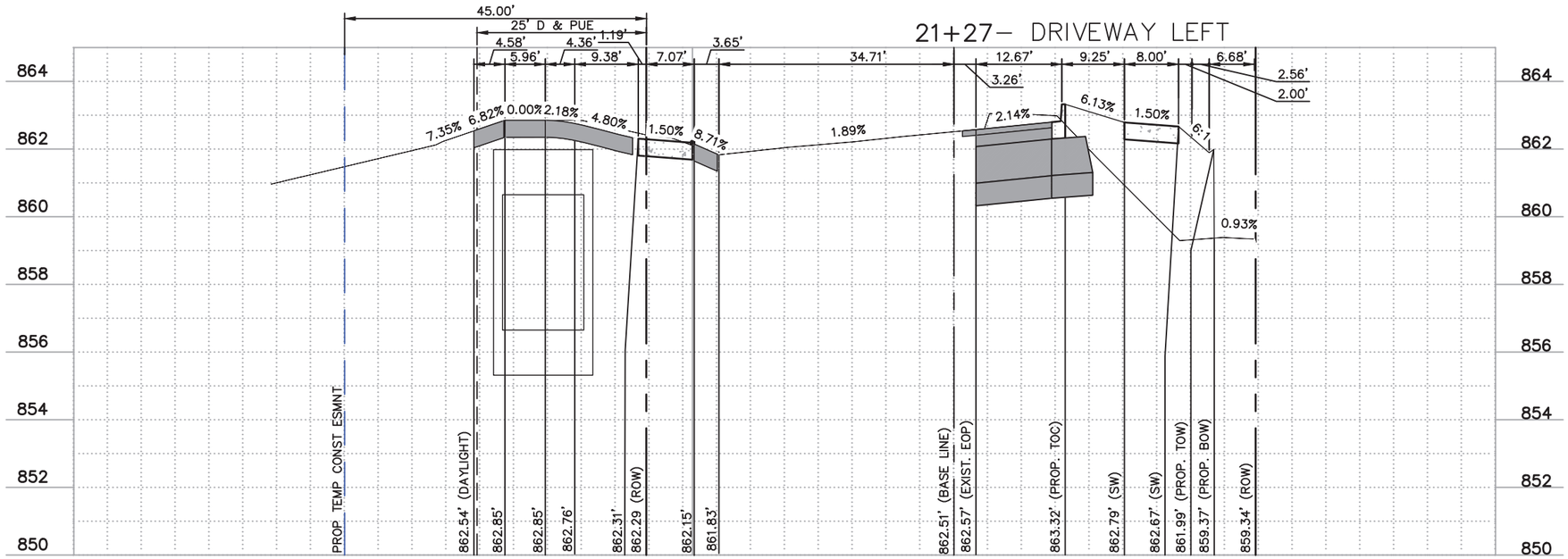
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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	–	14	WILLIAMSON				242

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4 0 2 4 (V)



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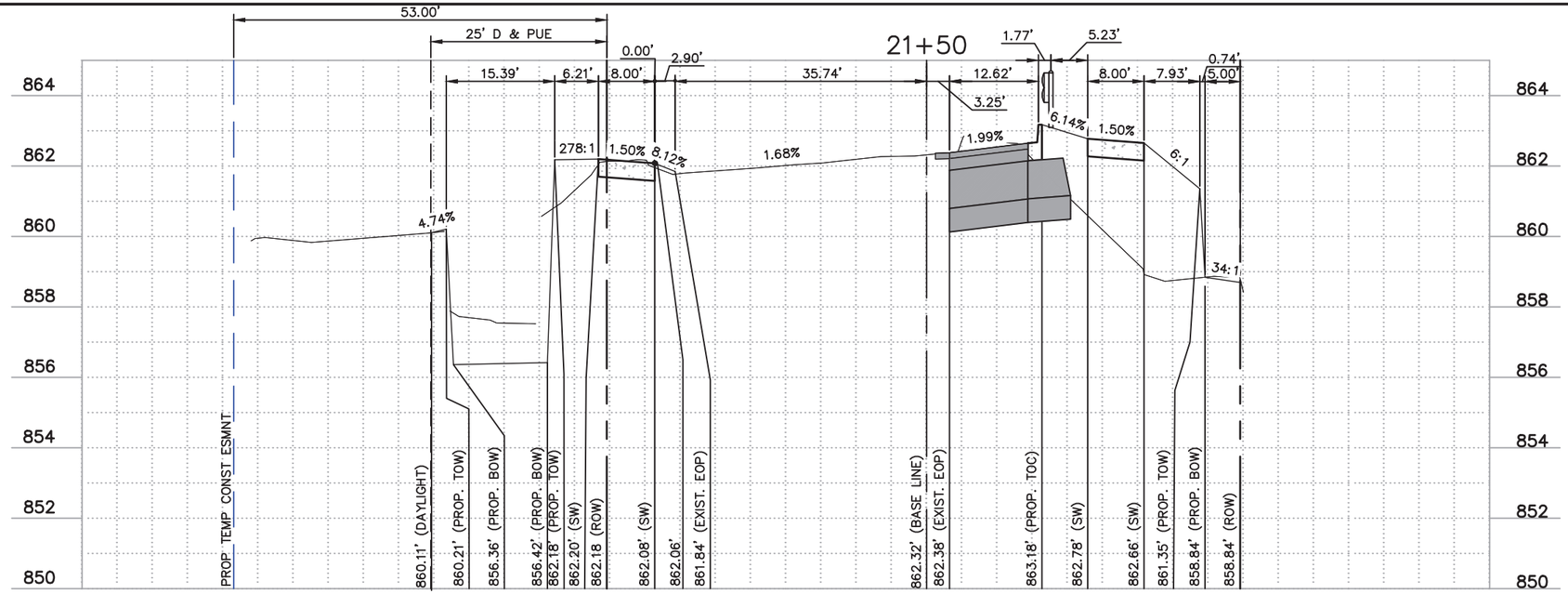
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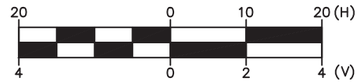
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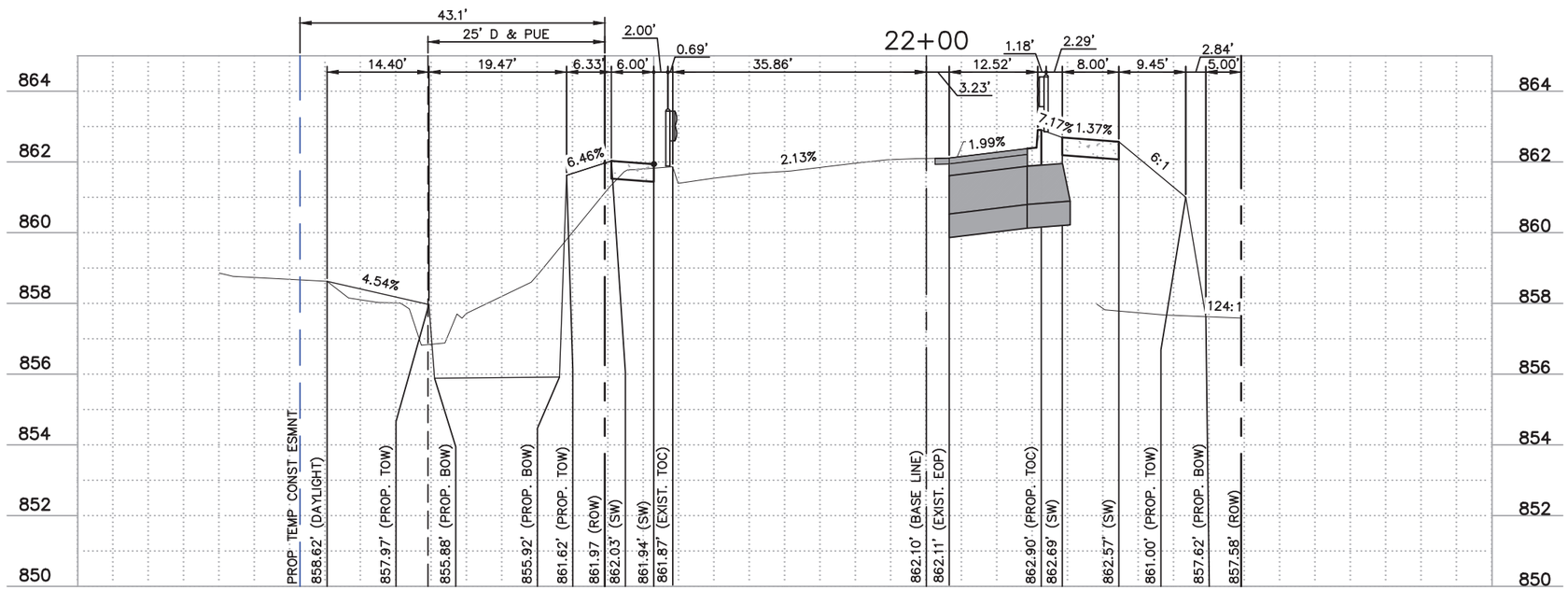
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				243

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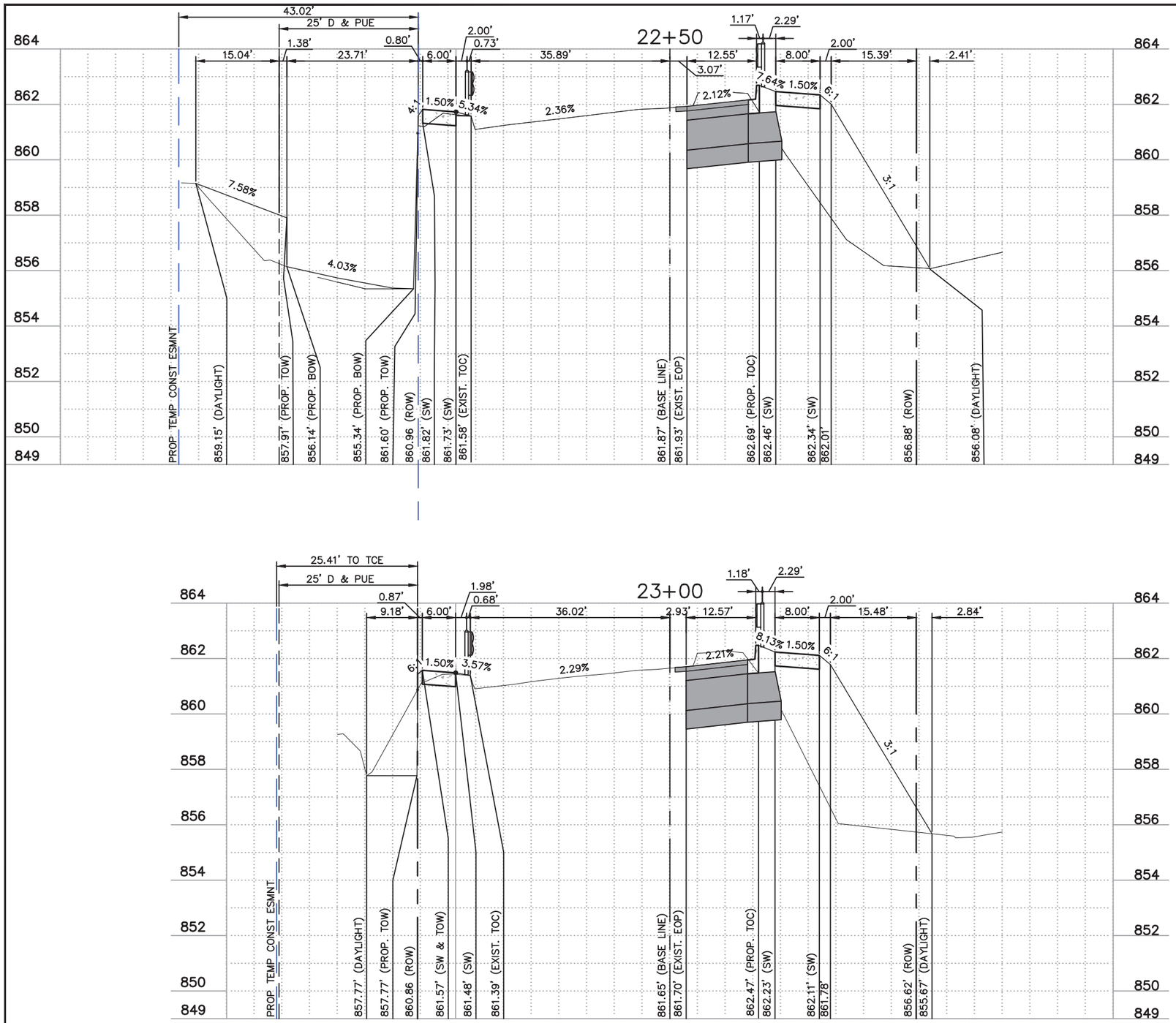
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STA 21+50 – 22+00

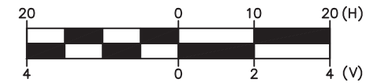
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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				244

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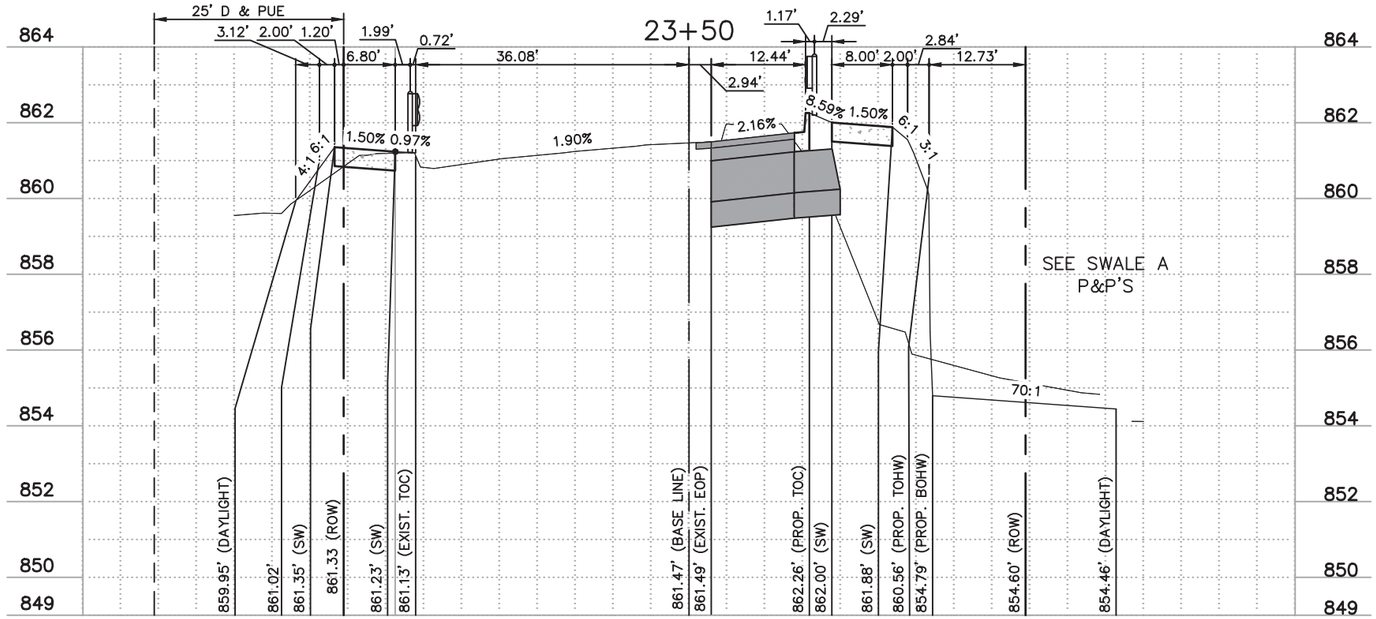
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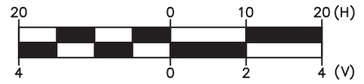
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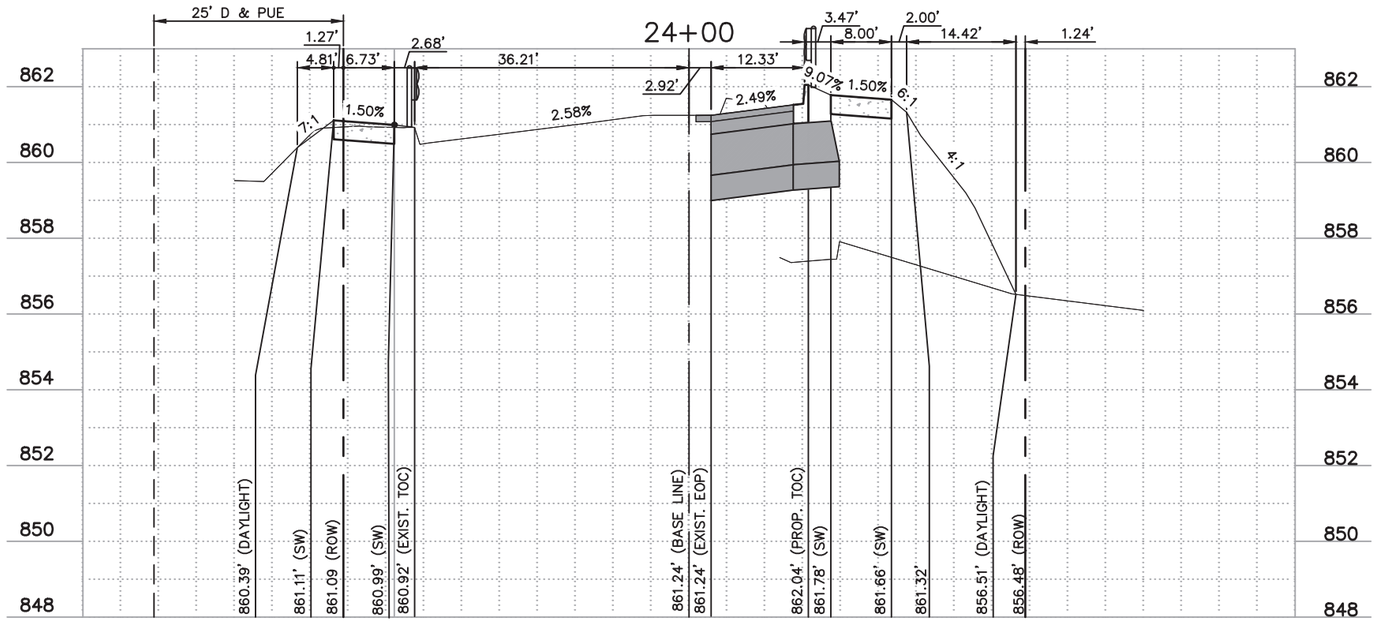
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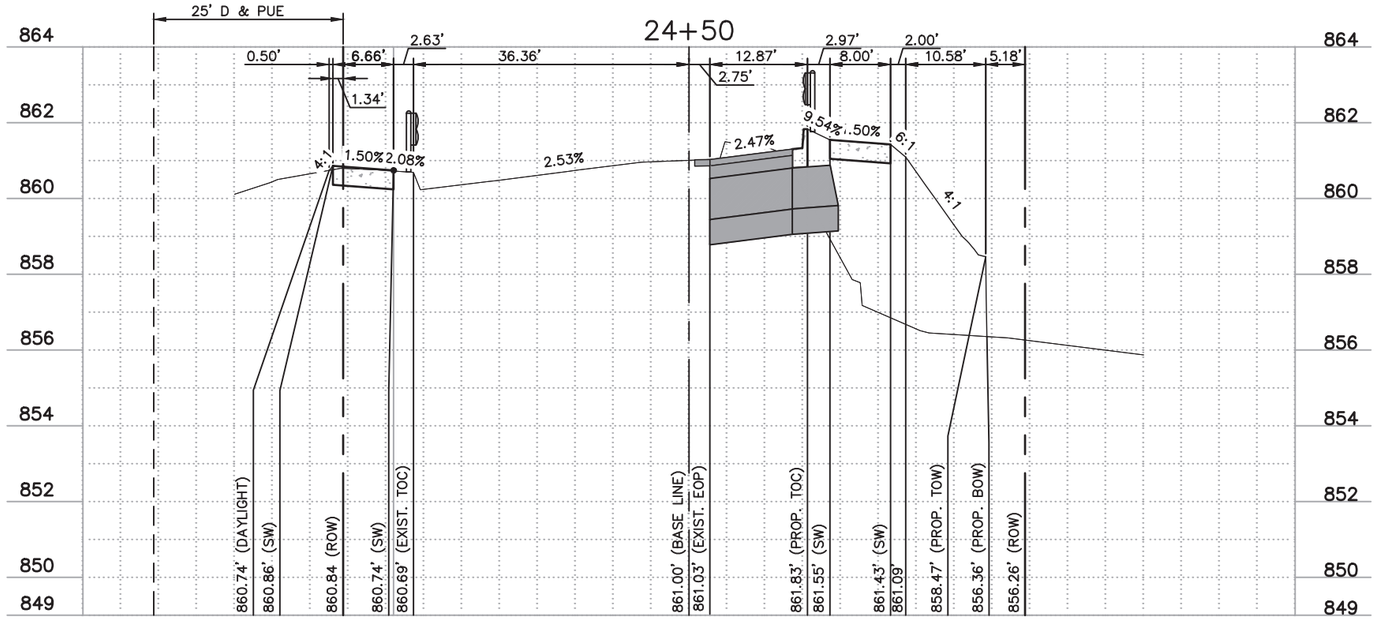
NEENAH AVE. CROSS SECTIONS
STA 23+50 – 24+00

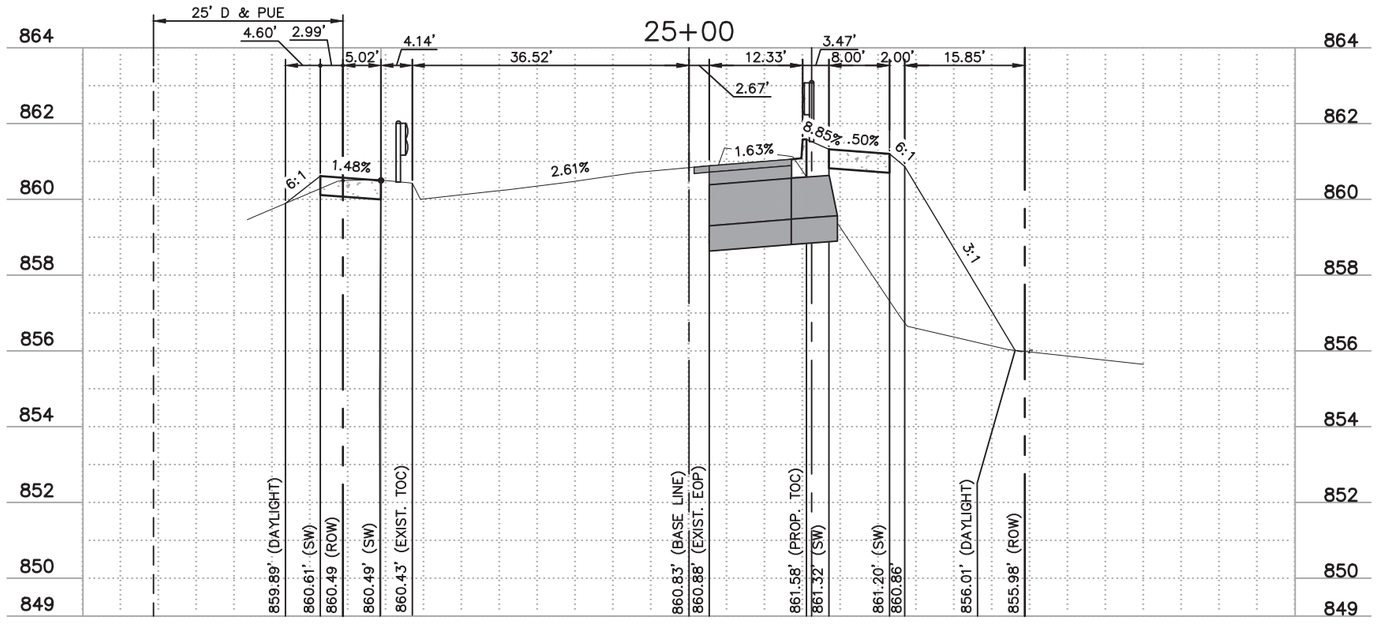
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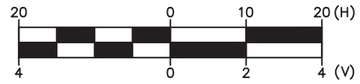
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6	TEXAS	104023–10006	_	14	WILLIAMSON				246

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STEPHANIE D. BLEW
92682
LICENSED
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Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
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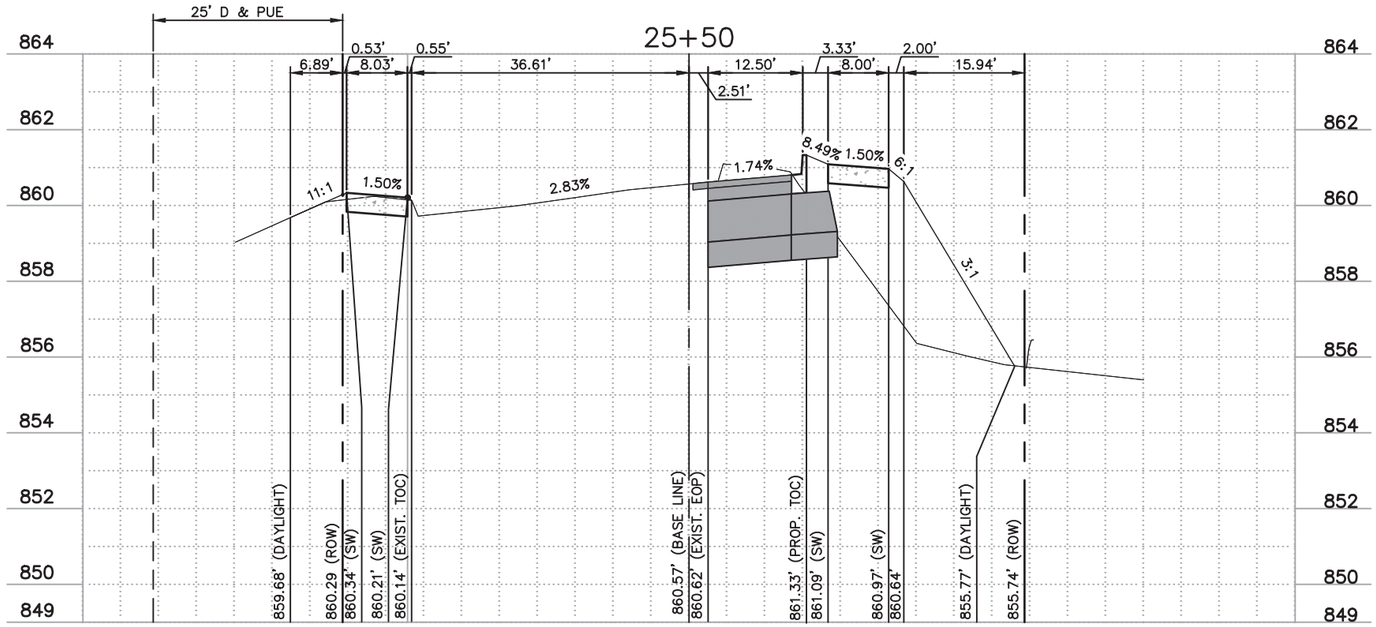
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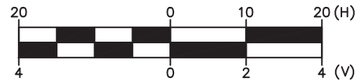
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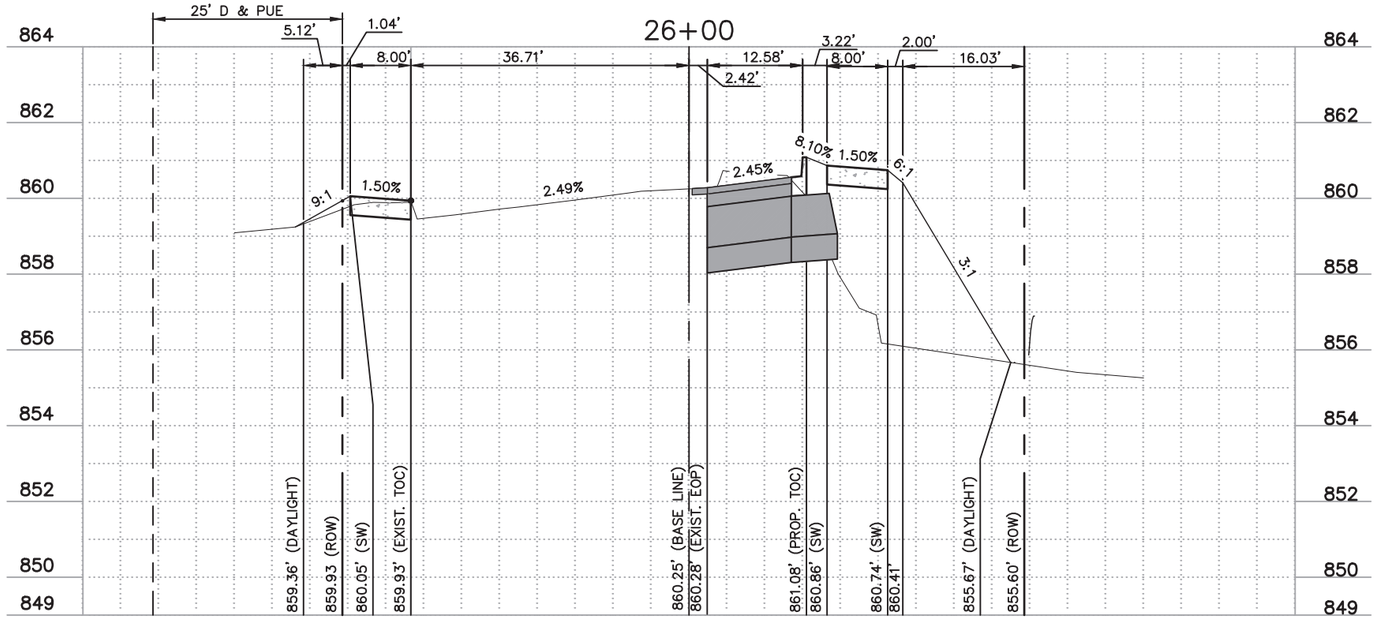
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6	TEXAS	104023–10006	_	14	WILLIAMSON				247

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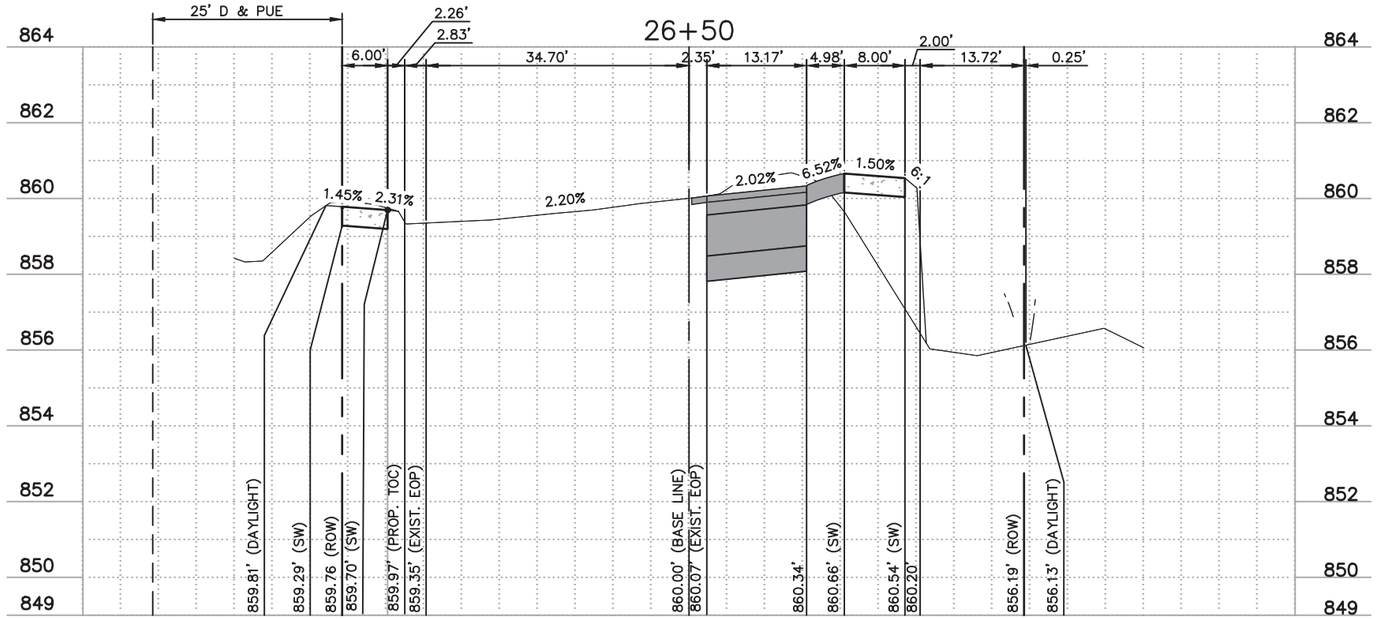
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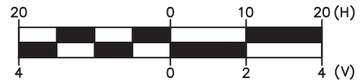
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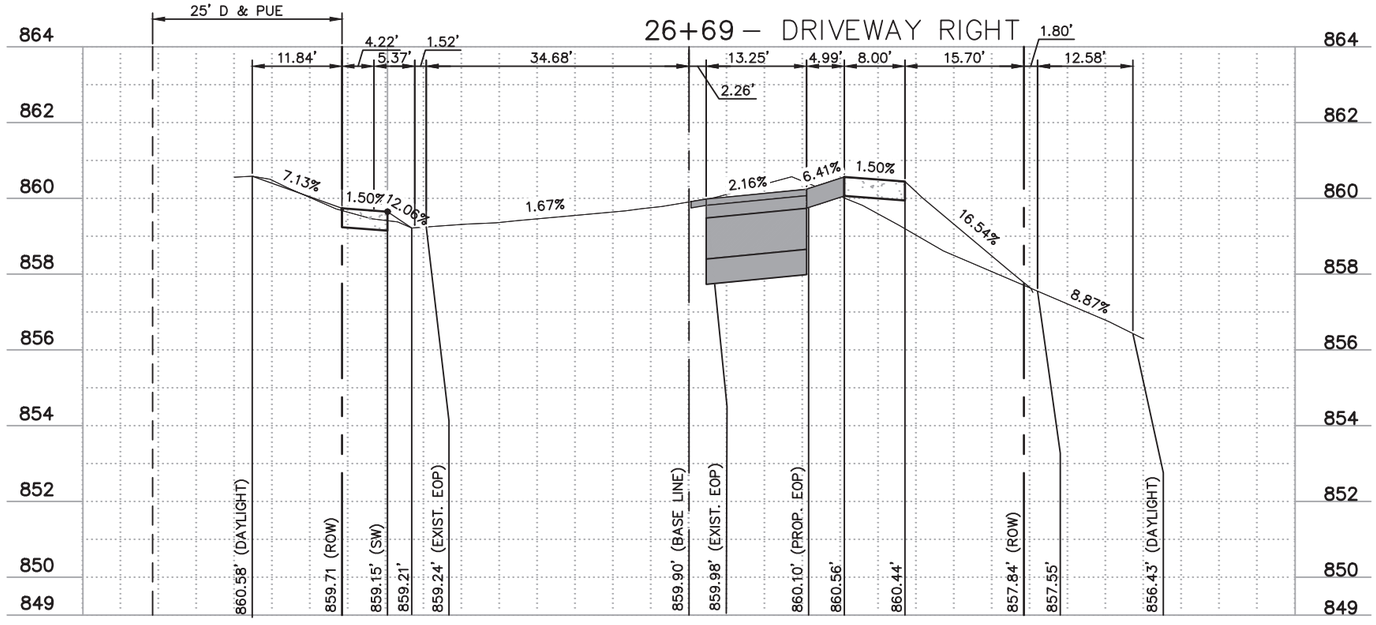
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6	TEXAS	104023–10006	_	14	WILLIAMSON				248

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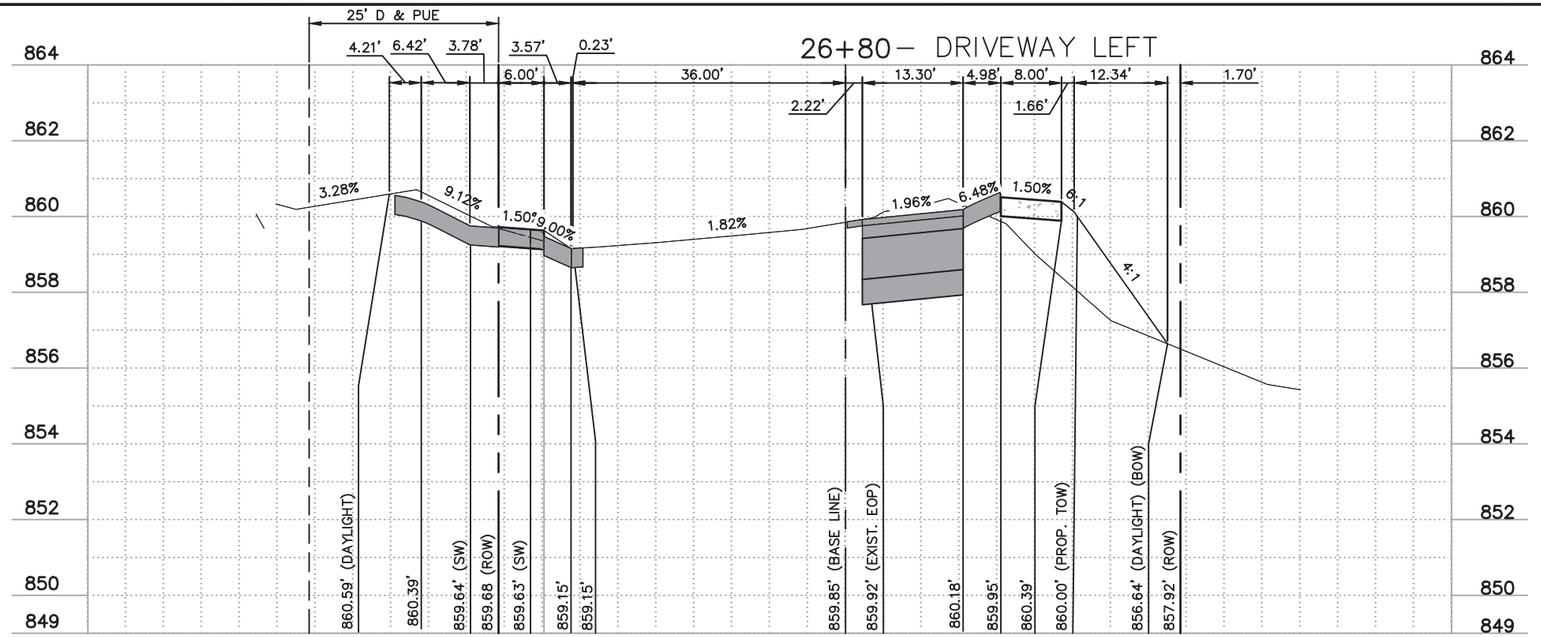
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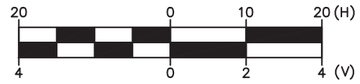
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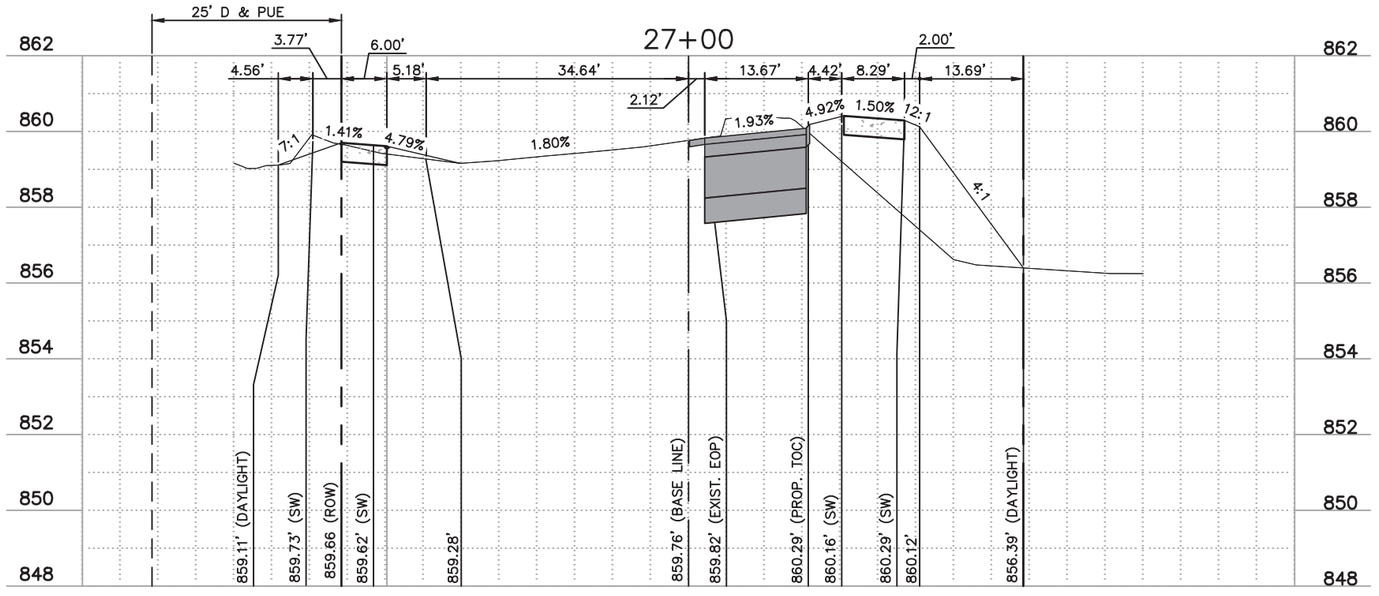
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6	TEXAS	104023–10006	_	14	WILLIAMSON				249

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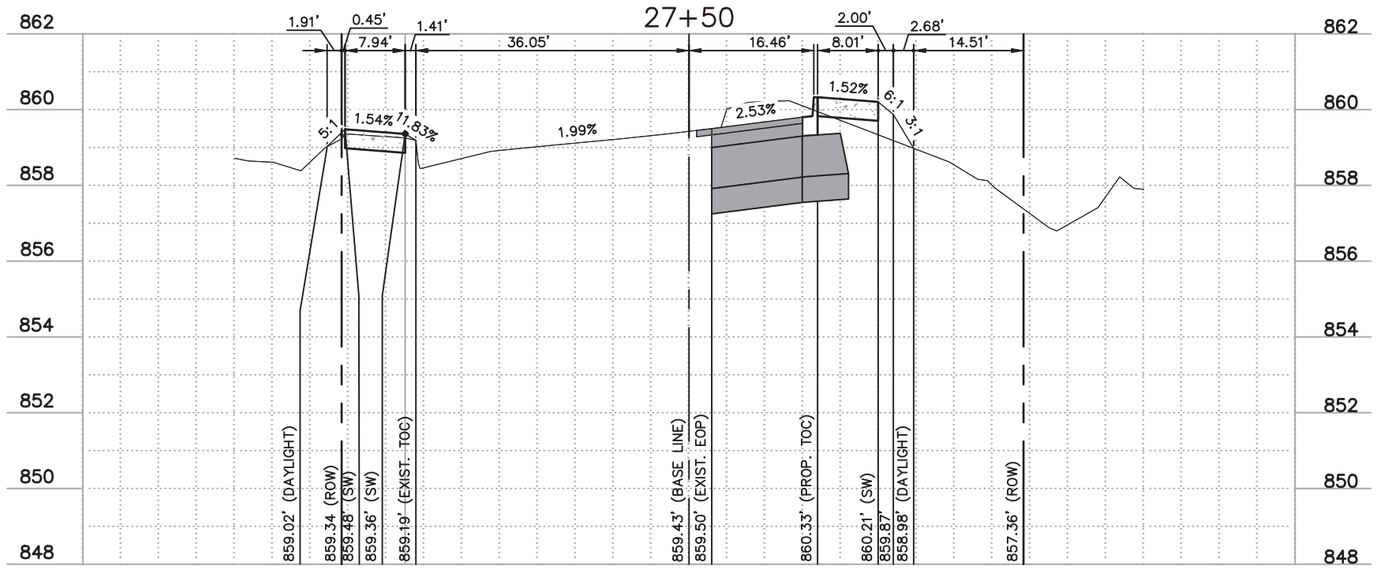
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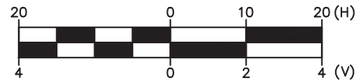
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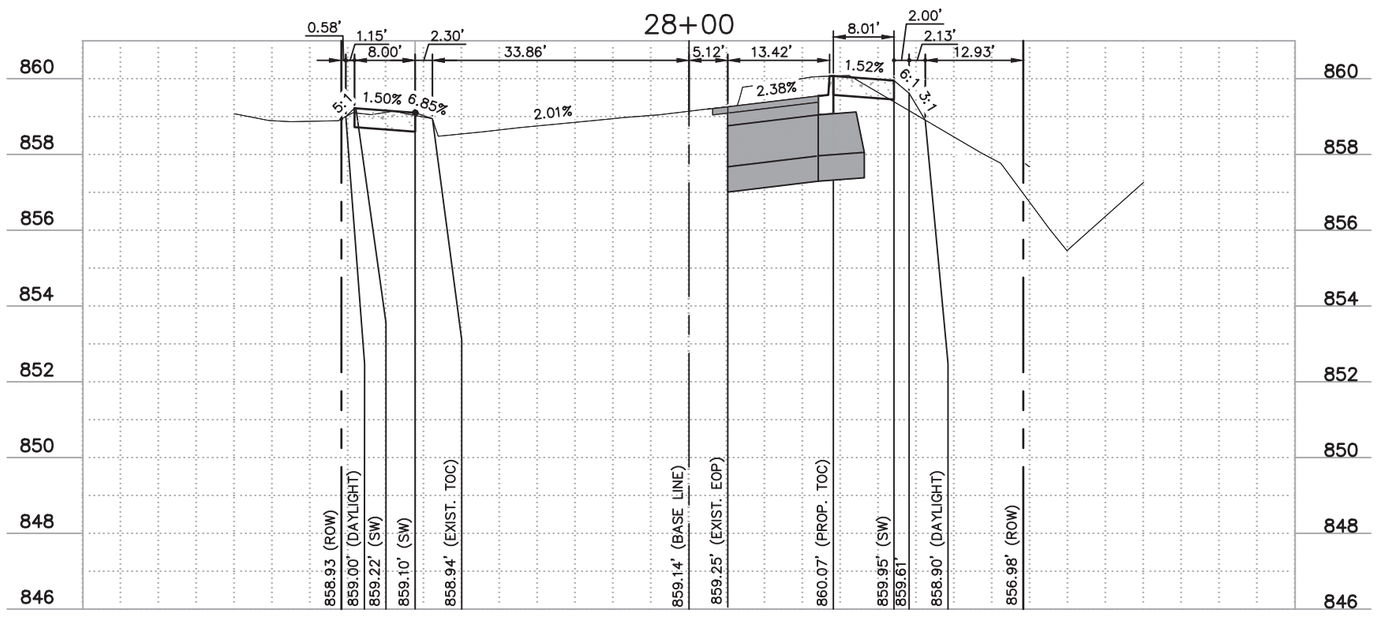
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6	TEXAS	104023–10006	_	14	WILLIAMSON				250

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STA 27+50 – 28+00

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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				251

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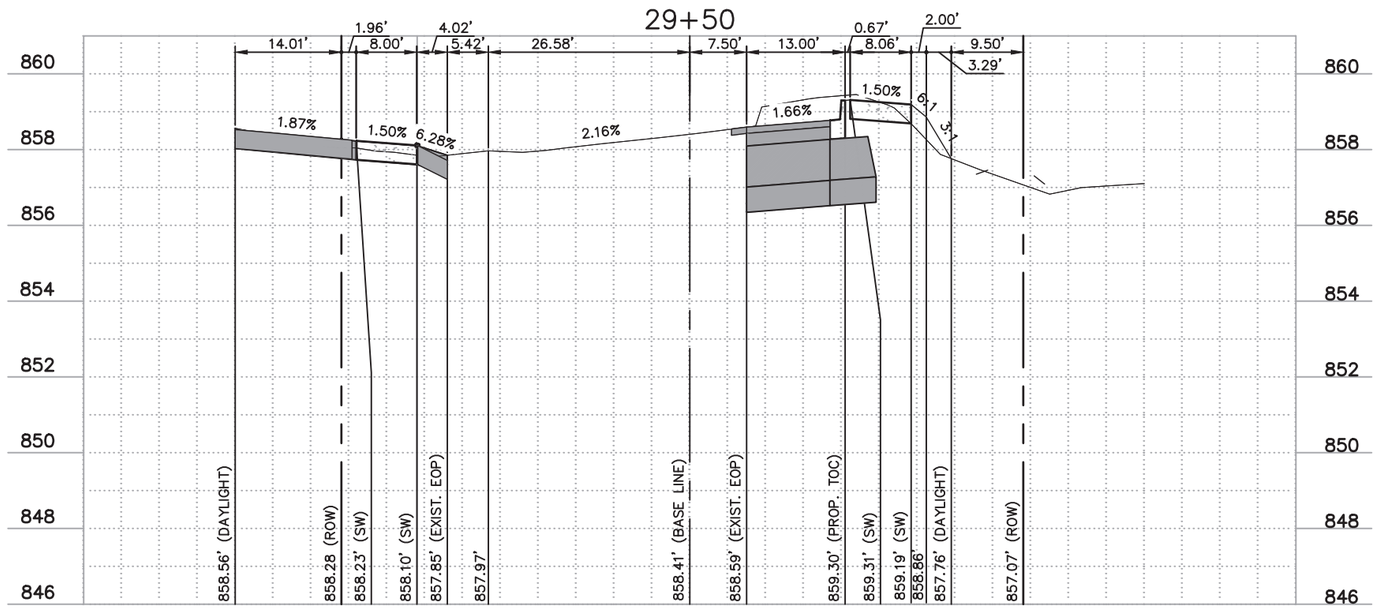
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STA 28+50 – 29+00

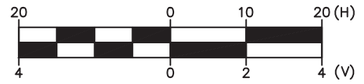
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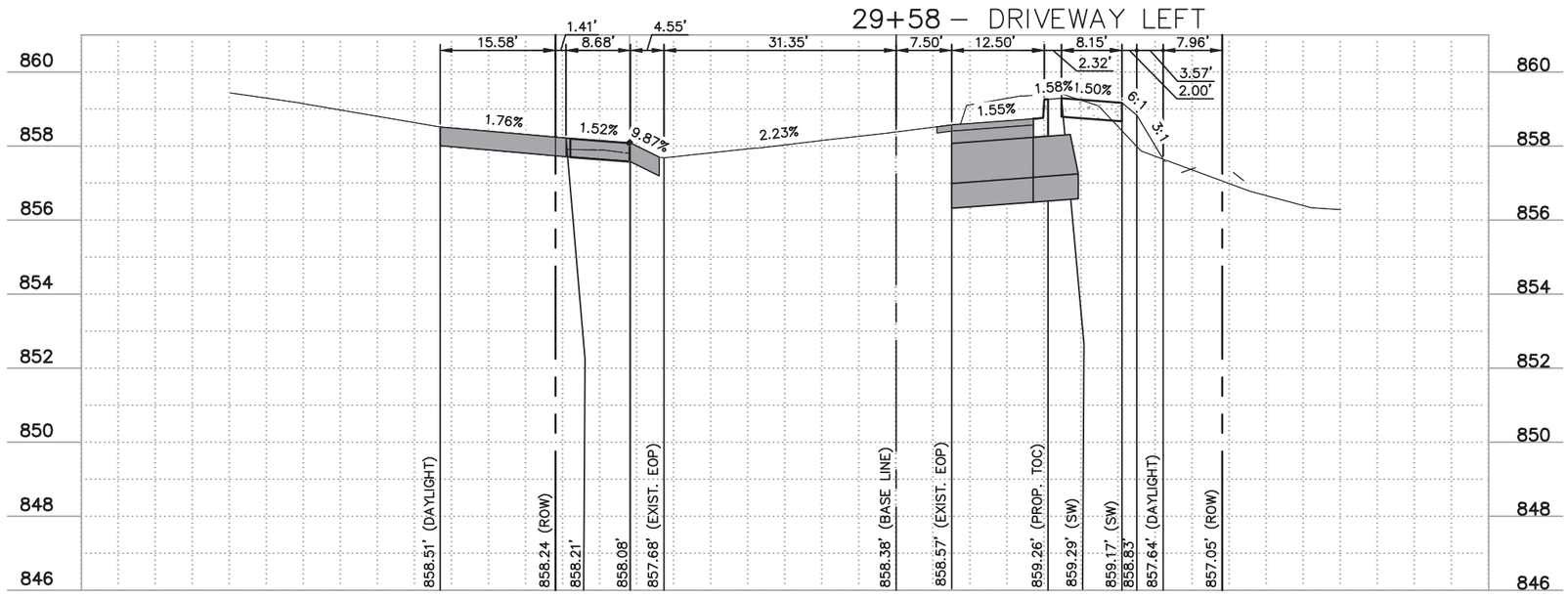
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6	TEXAS	104023–10006	_	14	WILLIAMSON				252

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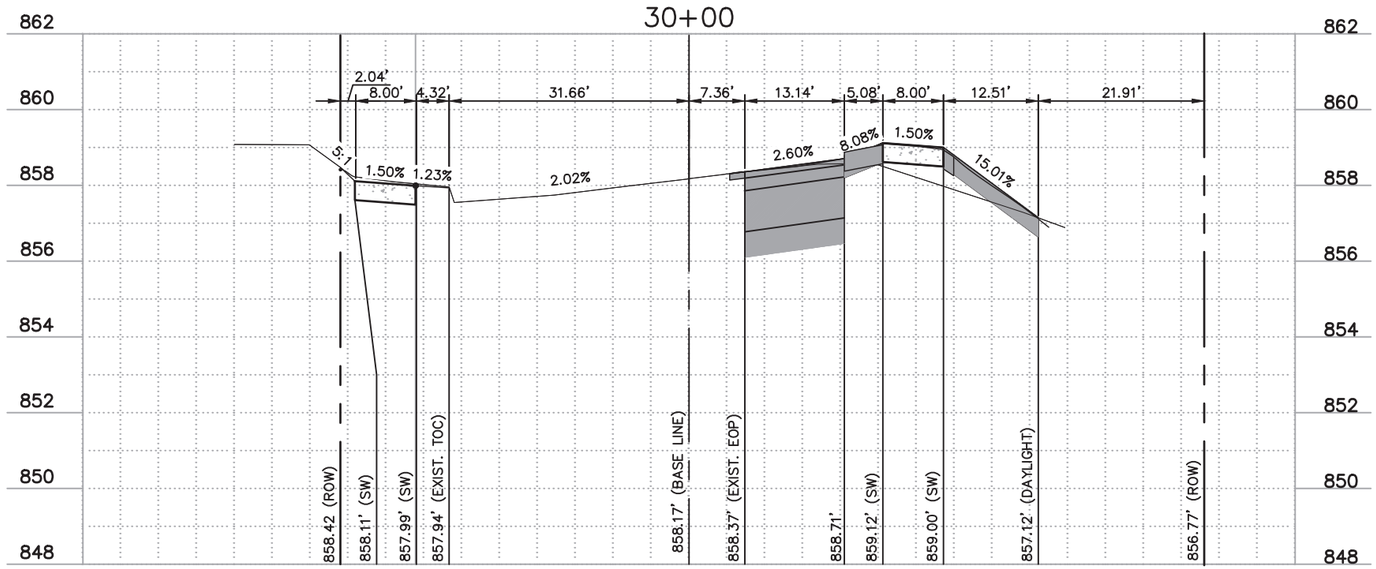
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STA 29+50 – 29+58

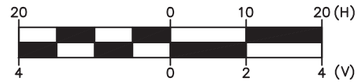
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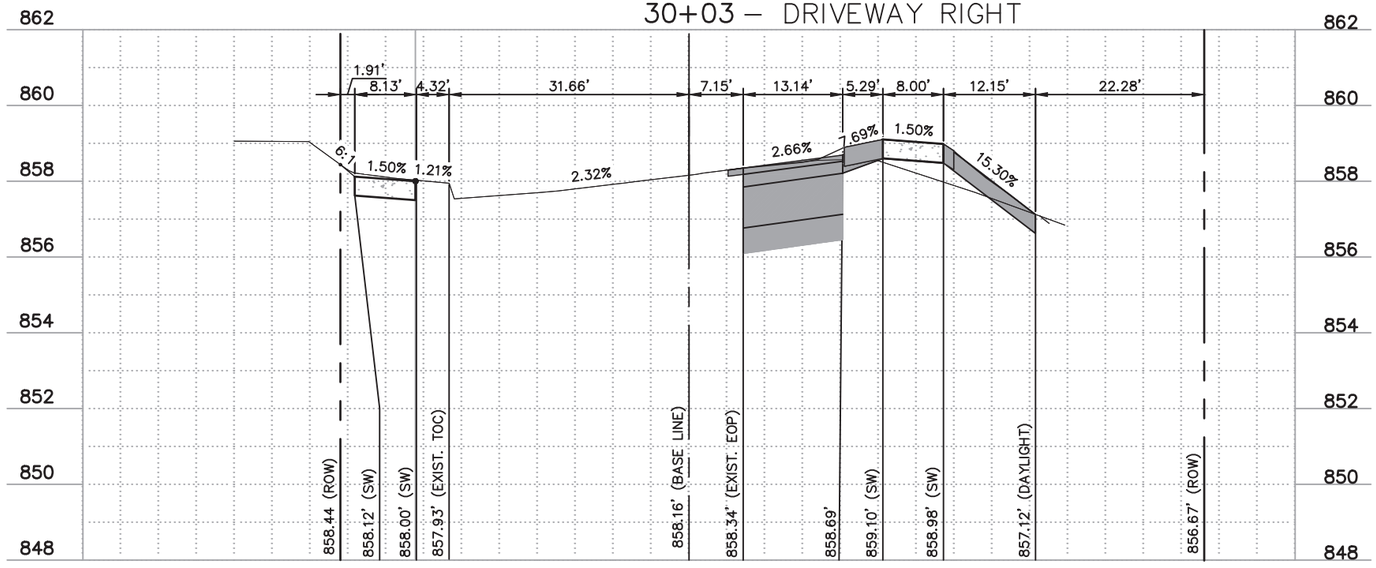
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6	TEXAS	104023–10006	_	14	WILLIAMSON				253

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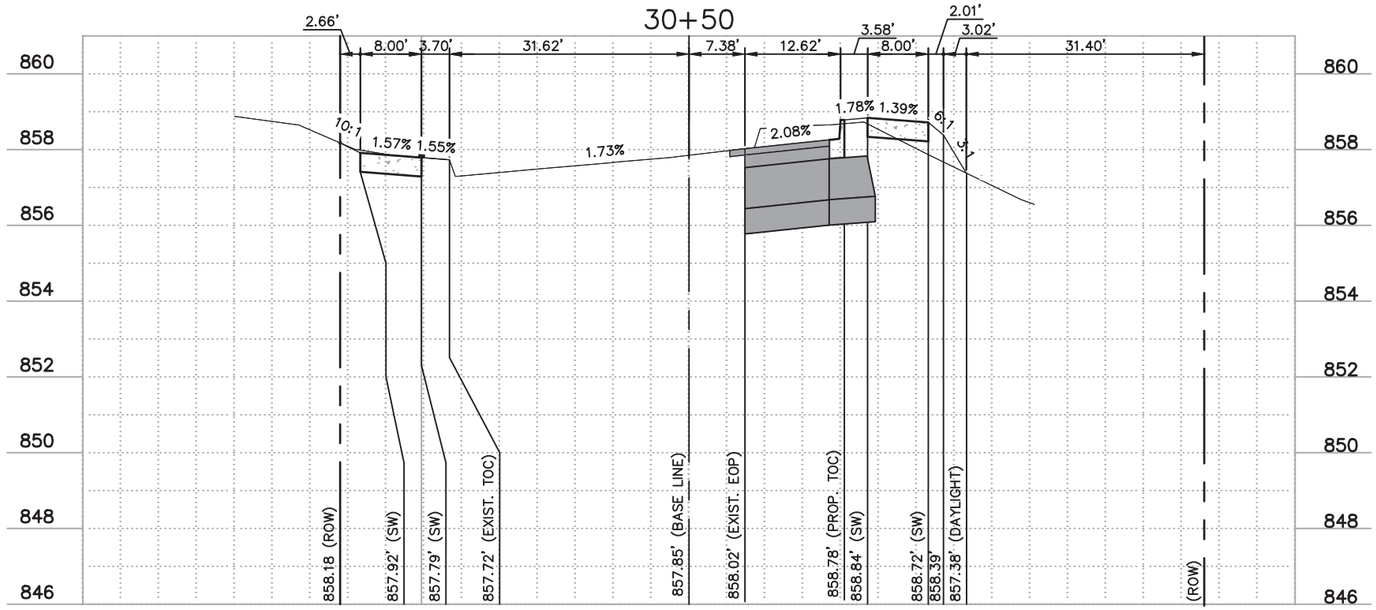
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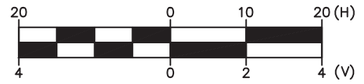
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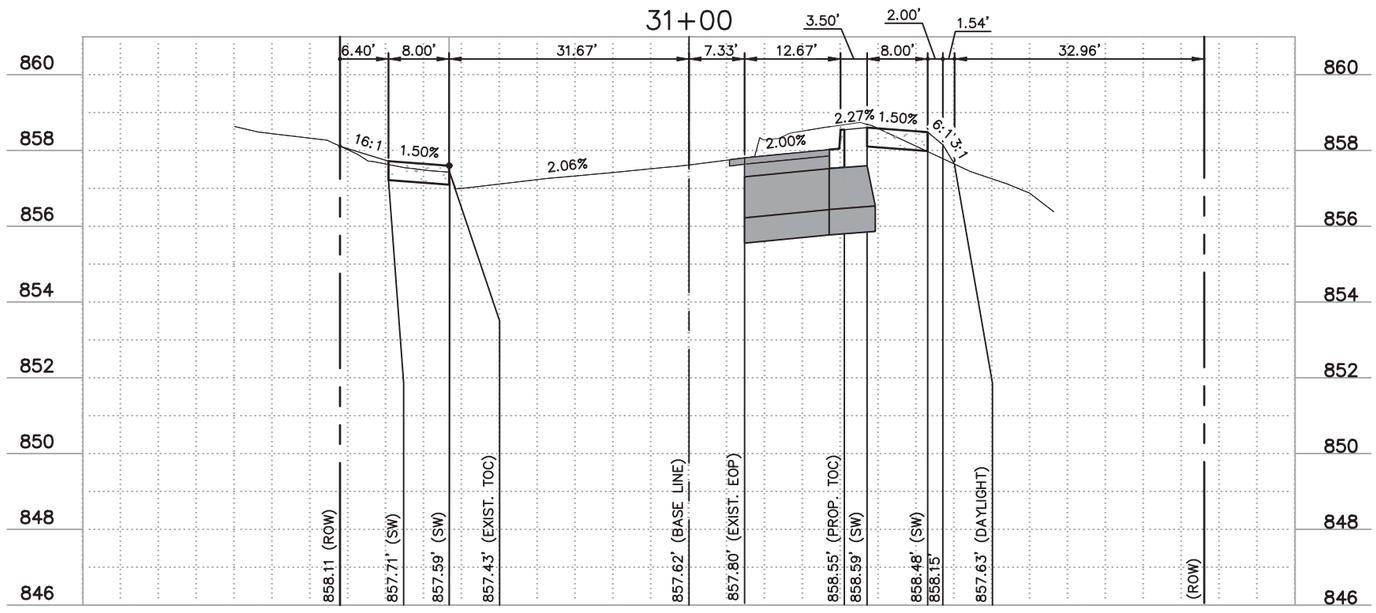
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6	TEXAS	104023–10006	_	14	WILLIAMSON				254

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STA 30+50 – 31+00

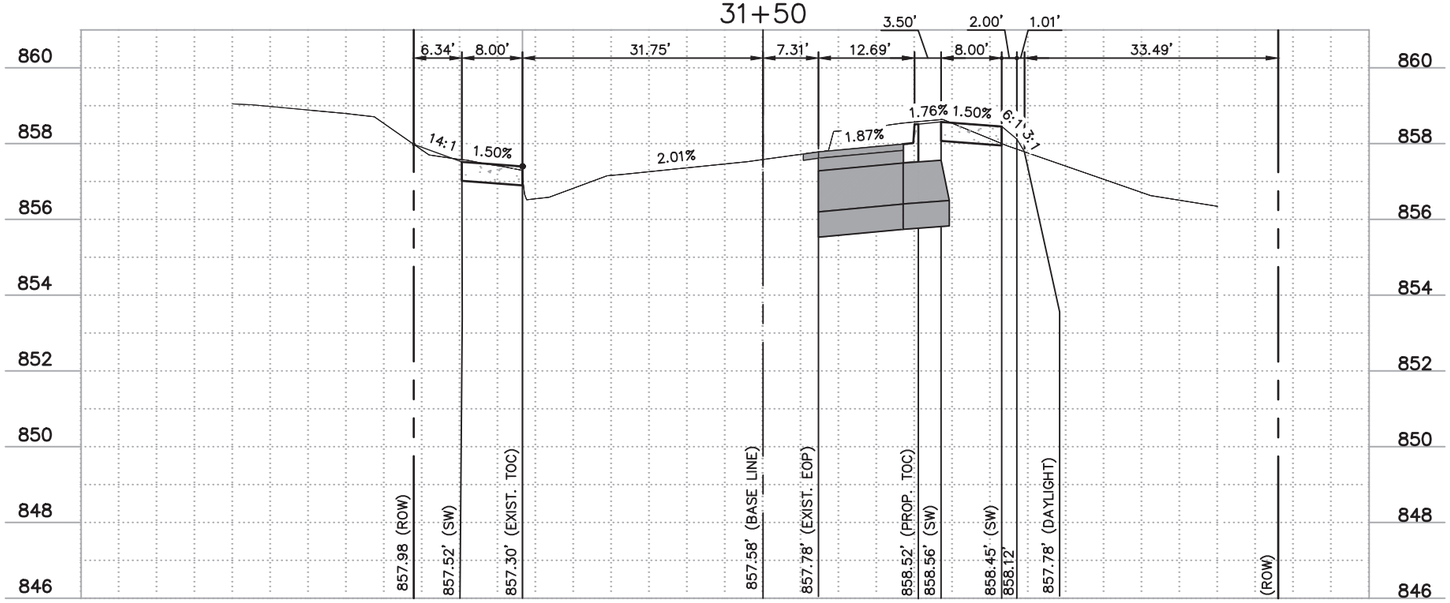
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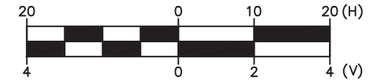
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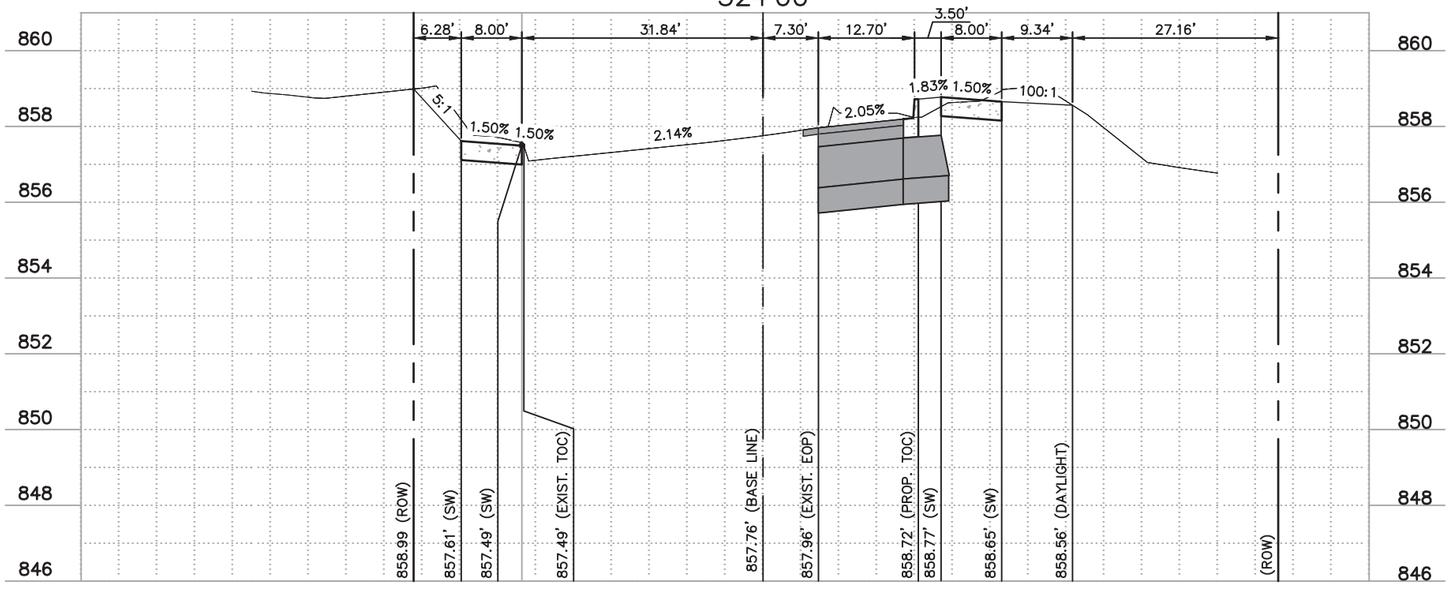
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31+50





32+00



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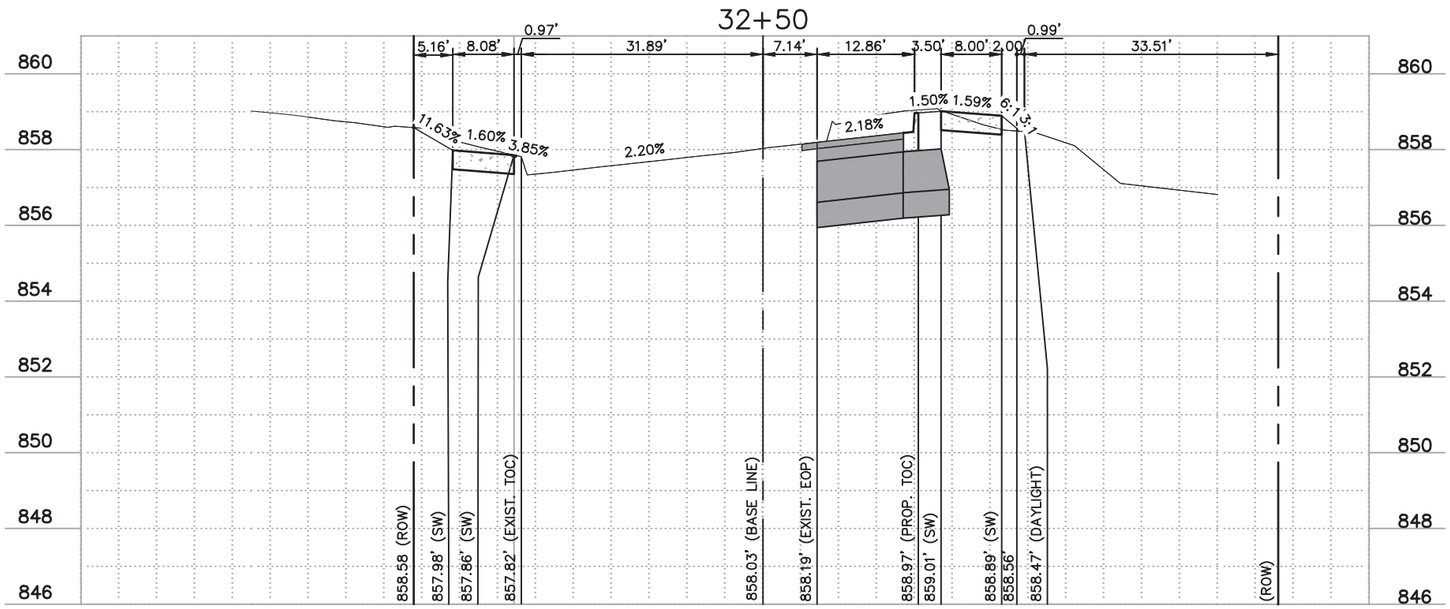
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STA 31+50 – 32+00

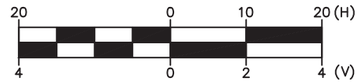
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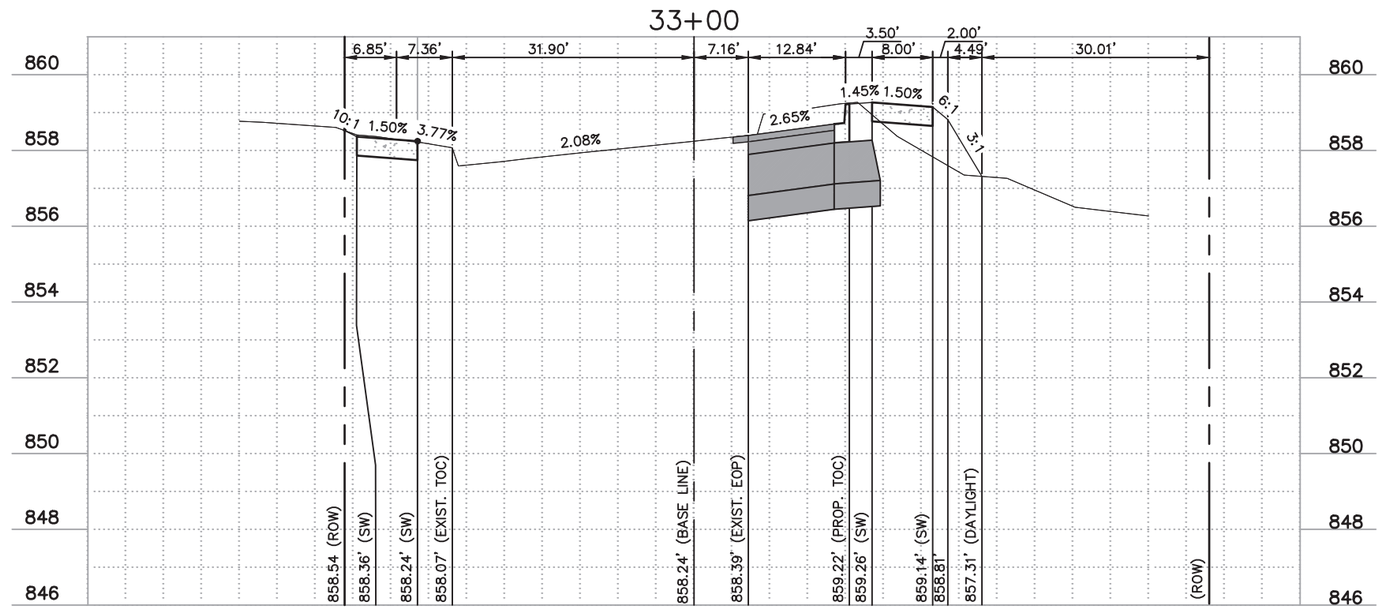
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6	TEXAS	104023–10006	_	14	WILLIAMSON				256

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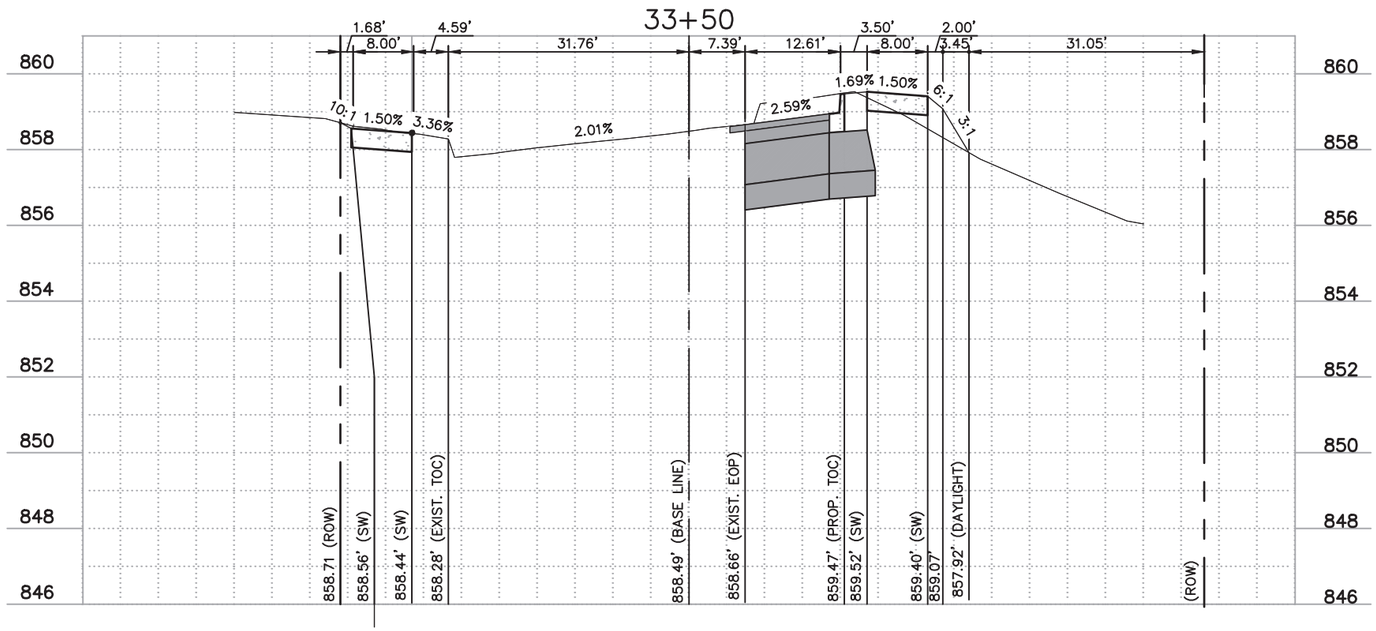
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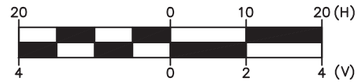
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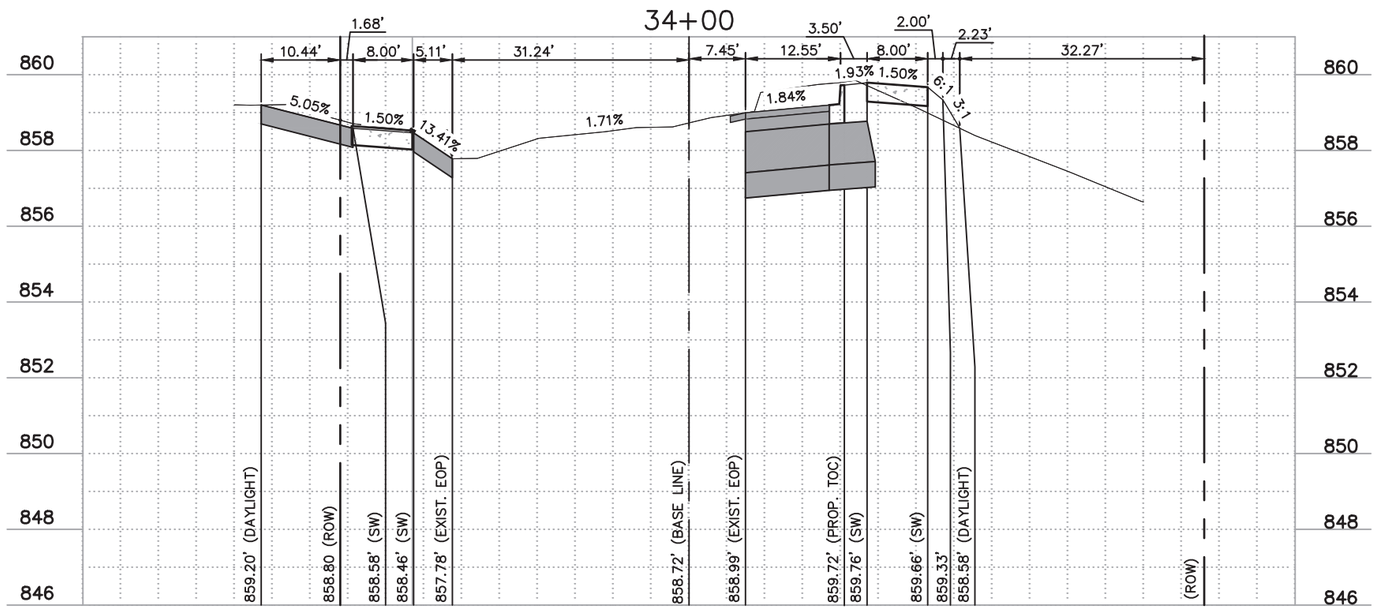
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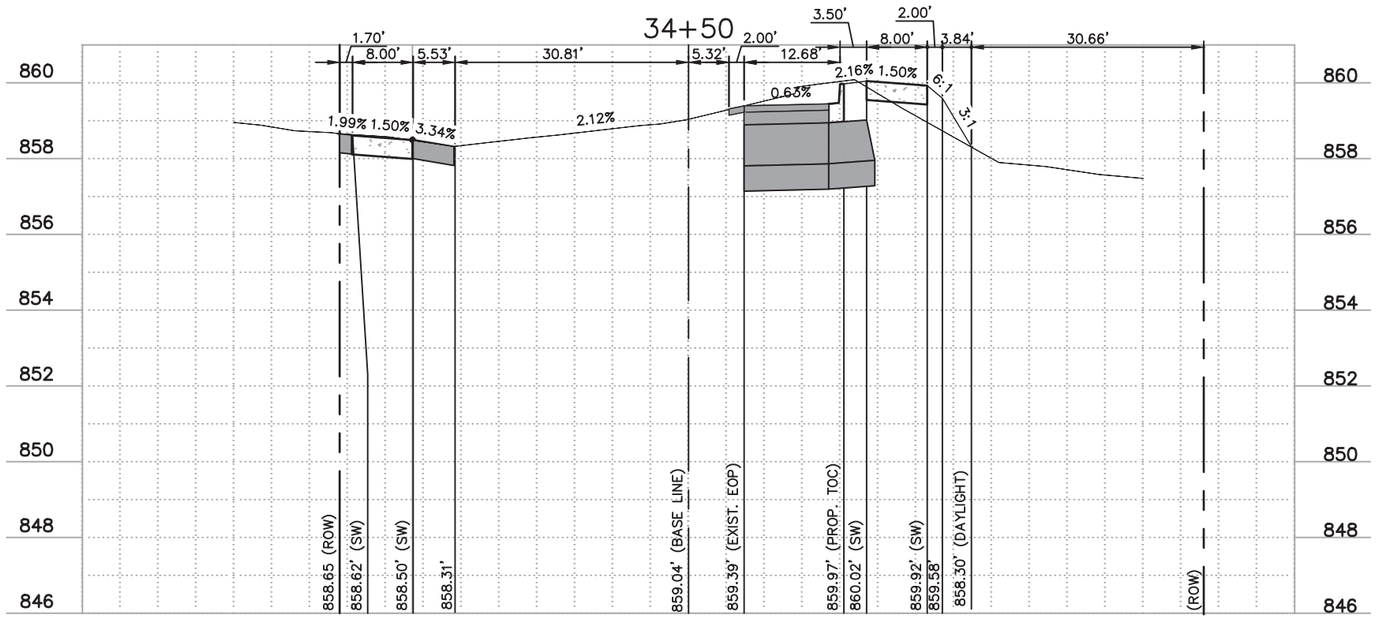
NEENAH AVE. CROSS SECTIONS
STA 33+50 – 34+00

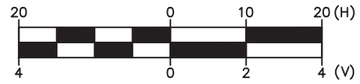
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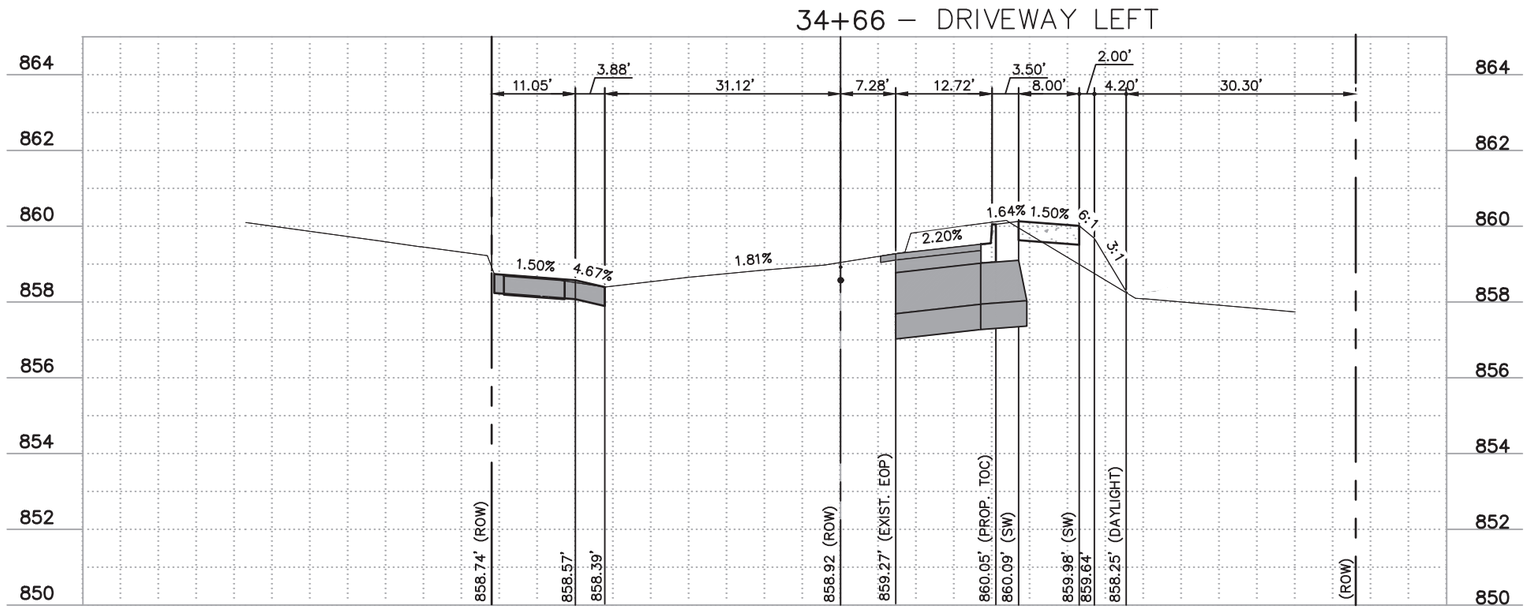
FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				258

SP-2016-0186D

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8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
1848

Stantec
221 West Sixth Street, Suite 600
Austin, Texas 78701
Tel. (512) 328-0011 Fax (512) 328-0325
TBPE # F-6324 TBPLS # F-10194230
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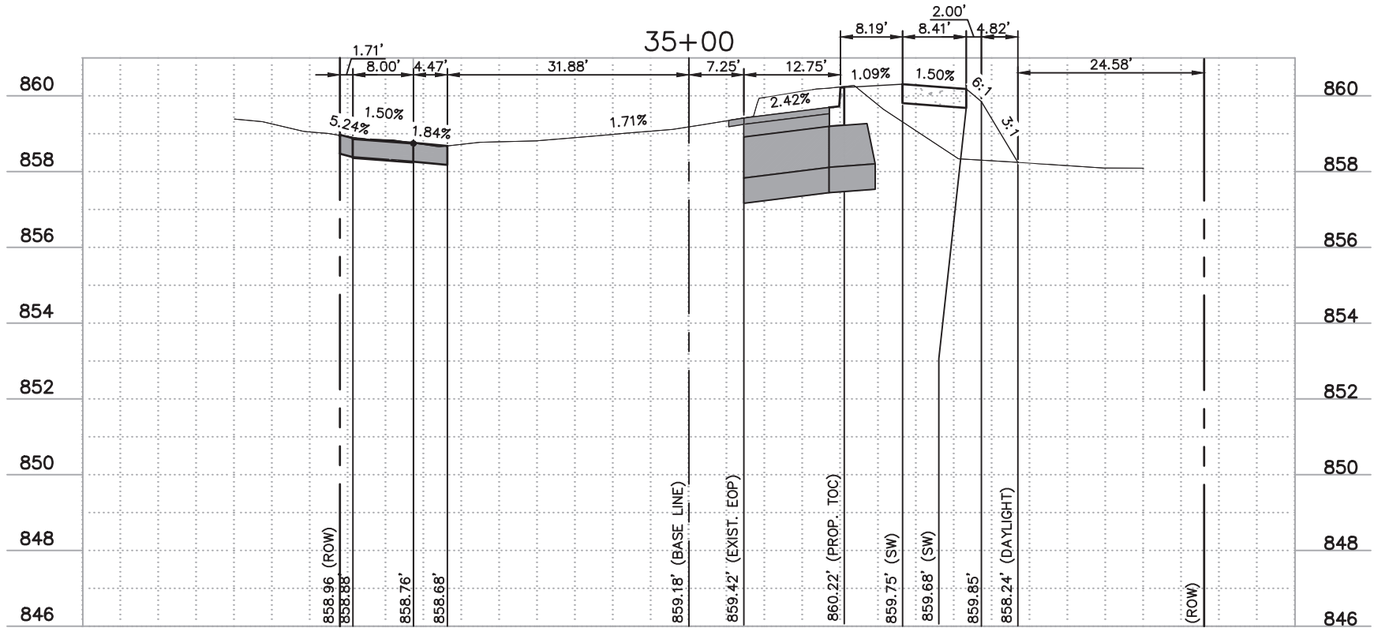
NEENAH AVE. CROSS SECTIONS
STA 34+50 – 34+66

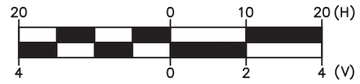
SHEET 259 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				259

SP-2016-0186D

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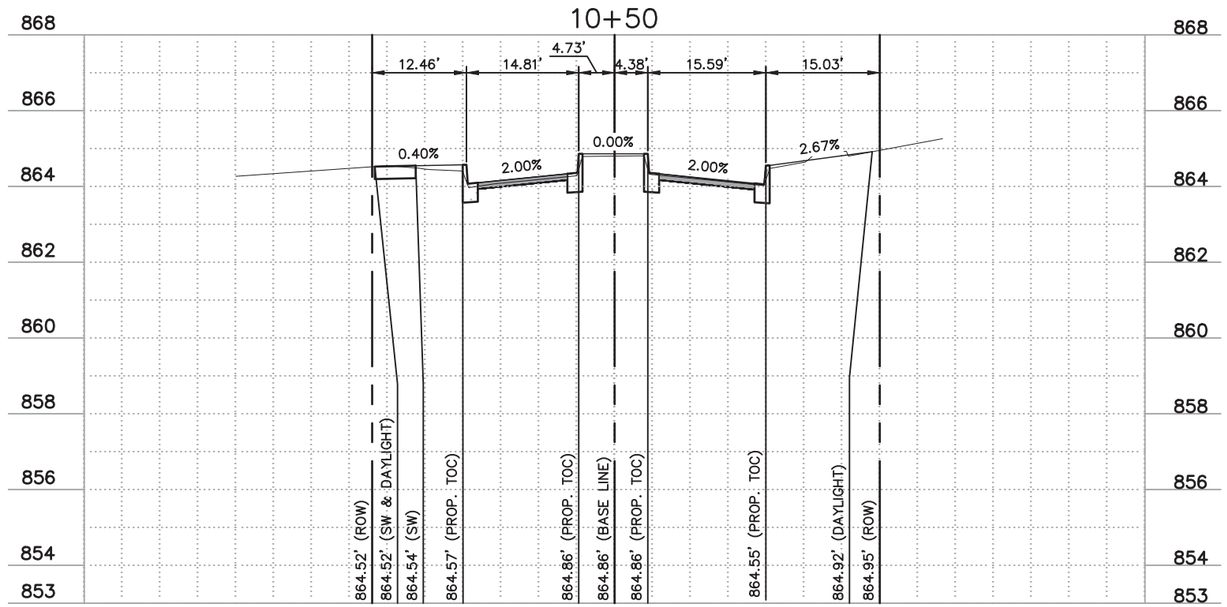
NEENAH AVE. CROSS SECTIONS
STA 35+00

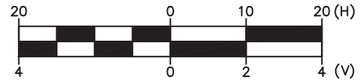
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FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				260

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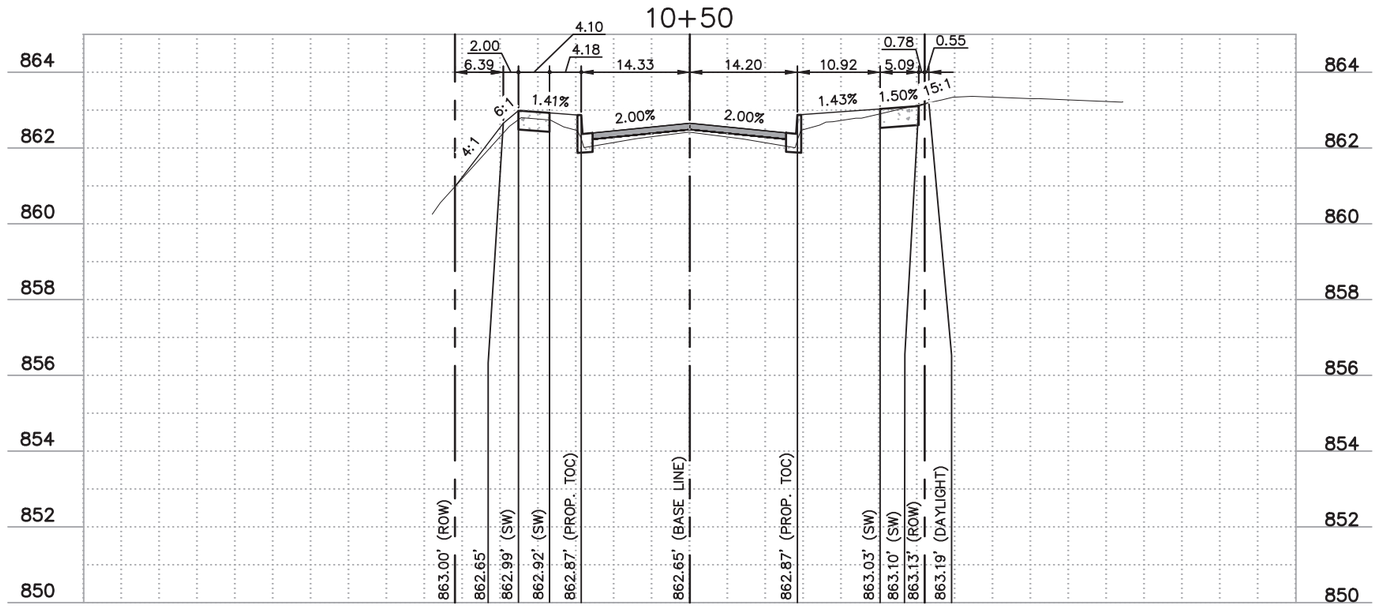
ALTONA WAY CROSS SECTION
10+50

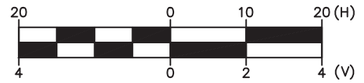
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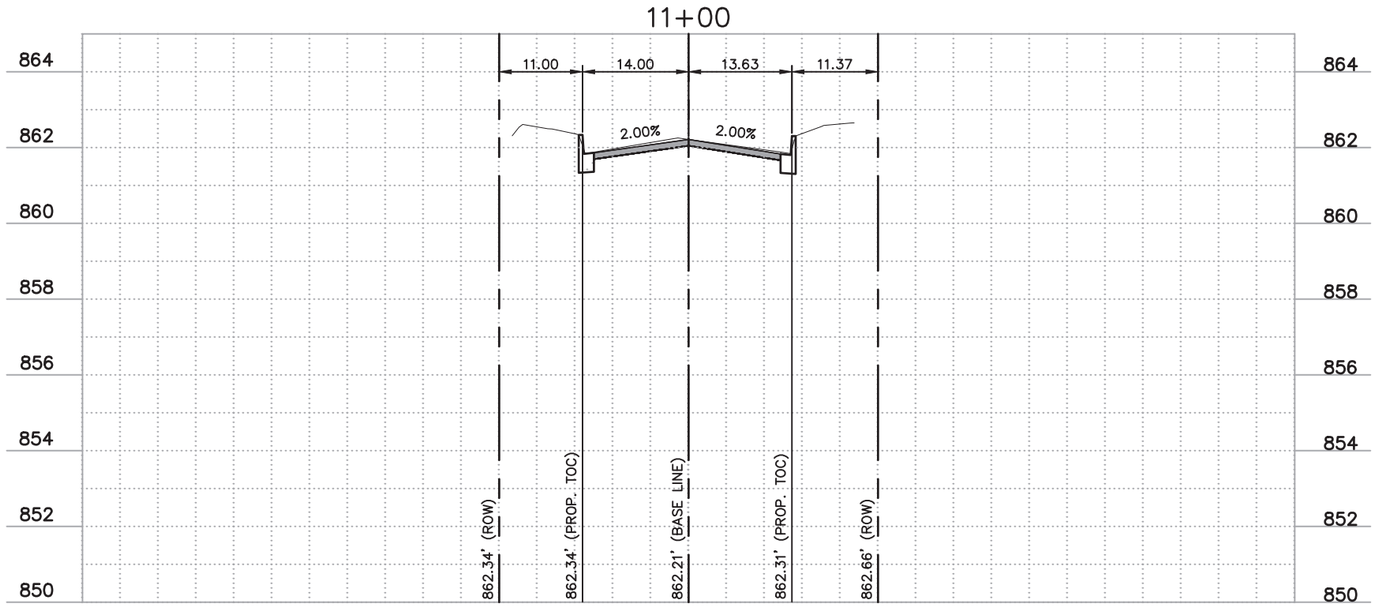
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6	TEXAS	104023–10006	_	14	WILLIAMSON				261

SP-2016-0186D

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8.4.17
STATE OF TEXAS
STEPHANIE D. BLEW
92682
LICENSED
PROFESSIONAL ENGINEER
Stephanie D Blew

NEENAH AVENUE WIDENING

WILLIAMSON COUNTY
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SOLERA DR. CROSS SECTIONS
10+50 – 11+00

SHEET 262 OF 273

FED. RD. DIV. RD.	STATE	PROJECT NO.	HIGHWAY NO.	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
6	TEXAS	104023–10006	_	14	WILLIAMSON				262

SP-2016-0186D

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AUSTIN WATER UTILITY GENERAL CONSTRUCTION NOTES

UPDATED: October 26, 2016

1. THE CITY STANDARD CONSTRUCTION SPECIFICATIONS CURRENT AT THE TIME OF BIDDING SHALL COVER MATERIAL AND METHODS USED TO DO THIS WORK.
2. CONTRACTOR MUST OBTAIN A STREET CUT PERMIT FROM WATERSHED PROTECTION AND DEVELOPMENT REVIEW DEPARTMENT, RIGHT OF WAY MANAGEMENT DIVISION BEFORE BEGINNING CONSTRUCTION WITHIN THE RIGHT-OF-WAY OF A PUBLIC STREET OR ALLEY.
3. AT LEAST 48 HOURS BEFORE BEGINNING ANY WATER AND WASTEWATER CONSTRUCTION IN PUBLIC R.O.W. OR PUBLIC EASEMENT, THE CONTRACTOR SHALL NOTIFY WATERSHED PROTECTION AND DEVELOPMENT REVIEW INSPECTION OR WATER AND WASTEWATER UTILITY TAPS INSPECTION AT THE NUMBER INDICATED ON THE PLANS BY THE AWU PLAN REVIEWER.
4. THE CONTRACTOR SHALL CONTACT THE AUSTIN AREA "ONE CALL" SYSTEM AT 1-800-344-8377 FOR EXISTING UTILITY LOCATIONS PRIOR TO ANY EXCAVATION IN ADVANCE OF CONSTRUCTION. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL UTILITIES TO BE EXTENDED, TIED TO, OR ALTERED, OR SUBJECT TO DAMAGE/INCONVENIENCE BY THE CONSTRUCTION OPERATIONS. THE CITY OF AUSTIN WATER AND WASTEWATER MAINTENANCE RESPONSIBILITY ENDS AT R.O.W./EASEMENT LINES.
5. NO OTHER UTILITY SERVICE/APPURTENANCES SHALL BE PLACED NEAR THE PROPERTY LINE, OR OTHER ASSIGNED LOCATION DESIGNATED FOR WATER AND WASTEWATER UTILITY SERVICE THAT WOULD INTERFERE WITH THE WATER AND WASTEWATER SERVICES.
6. THE CITY SPECIFICATION ITEM 509S WILL BE REQUIRED AS A MINIMUM TRENCH SAFETY MEASURE.
7. ALL MATERIALS TESTS, INCLUDING SOIL DENSITY TESTS AND DETAILED SOIL ANALYSES, SHALL BE CONDUCTED BY AN INDEPENDENT LABORATORY AND FUNDED BY THE OWNER IN ACCORDANCE WITH CITY STANDARD SPECIFICATION ITEM 1804S.04.
8. PRESSURE TAPS SHALL BE IN ACCORDANCE WITH CITY STANDARD SPECIFICATION ITEM 510.3(24). THE CONTRACTOR SHALL PERFORM EXCAVATION ETC., AND SHALL FURNISH, INSTALL AND AIR TEST THE SLEEVE AND VALVE. WHEN CONTRACTORS MAKE THE TAP A CITY INSPECTOR MUST BE PRESENT AND 2 WORKING DAYS (MIN.) NOTICE MUST BE GIVEN. "SIZE ON SIZE" TAPS WILL NOT BE PERMITTED, UNLESS, IT HAS BEEN DEMONSTRATED THAT A MORE ACCEPTABLE CONNECTION WOULD INVOLVE CONSIDERABLE HARDSHIP TO THE UTILITY SYSTEM. ALL TAPS SHALL BE MADE BY USE OF AN APPROVED FULL CIRCLE GASKETED CAST IRON OR DUCTILE IRON TAPPING SLEEVE. CONCRETE BLOCKING SHALL BE PLACED UNDER ALL TAP SLEEVES PRIOR TO MAKING THE PRESSURE TAP AND THE USE OF PRECAST BLOCKS MAY BE USED TO HOLD THE TAP IN ITS CORRECT POSITION PRIOR TO BLOCKING. THE BLOCKING BEHIND AND UNDER THE TAP SHALL HAVE A MINIMUM OF 24 HOURS CURING TIME BEFORE THE VALVE CAN BE REOPENED FOR SERVICE FROM THAT TAP.
9. THRUST RESTRAINT SHALL BE IN ACCORDANCE WITH CITY STANDARD SPECIFICATION ITEM 510.3 (22).
10. ALL BRANCH CONNECTIONS SHALL HAVE THE VALVE BOLTED TO THE MAIN BY METHODS OF FLANGE OR SWIVEL TEES. FOSTER ADAPTORS MAY BE USED IN LIEU OF FLANGE OR SWIVEL TEES WHEN CALLED OUT ON THE PLANS BY THE DESIGN ENGINEER.
11. A). FIRE HYDRANTS SHALL BE SET IN ACCORDANCE WITH CITY STANDARD SPECIFICATION ITEM 511S.4 B). FIRE HYDRANTS SHALL BE PAINTED FLYNT ALUMINUM OR EQUAL.
12. WATER LINE TESTING AND STERILIZATION SHALL BE PERFORMED IN ACCORDANCE WITH CITY STANDARD SPECIFICATION ITEMS 510.3 (27)-(29). FORCE MAIN PRESSURE TESTING SHALL BE CONDUCTED AND FALL UNDER THE SPECIFICATIONS AS WATER LINES (PRESSURE PIPE) OR AT THE PRESSURES SHOWN ON THE APPROVED PLANS.
13. ALL MATERIAL USED ON THIS PROJECT MUST BE LISTED ON THE STANDARD PRODUCTS LISTING. ANY MATERIAL NOT LISTED HAS TO GO THROUGH THE REVIEW OF THE STANDARDS COMMITTEE FOR REVIEW AND APPROVAL PRIOR TO START OF PROJECT. TESTING AND EVALUATION OF PRODUCTS ARE REQUIRED BEFORE APPROVAL WILL BE GIVEN ANY CONSIDERATION.
14. WHEN WATER SERVICES ARE DAMAGED AND THE SERVICE MATERIAL IS PE, THE LINE SHALL BE REPAIRED ONLY BY HEAT FUSION WELD OR REPLACED THE FULL LENGTH WITH TYPE K COPPER MATERIAL. ANY TIME PB IS DAMAGED OR TAMPERED WITH IN ANY WAY, THE SERVICE LINE SHALL BE REPLACED FULL LENGTH WITH TYPE K COPPER MATERIAL. NOTE: FULL LENGTH IS FROM CORPORATION STOP TO METER.
15. WHEN AN EXISTING WATERLINE SHUT OUT IS NECESSARY AND POSSIBLE, THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION INSPECTOR WHO WILL THEN NOTIFY THE AUSTIN WATER UTILITY DISPATCH AND THE AFFECTED CUSTOMERS A MINIMUM OF SEVENTY-TWO (72) HOURS IN ADVANCE.
16. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION INSPECTOR SO THAT HE CAN NOTIFY THE AUSTIN WATER UTILITY AT 972-0000 AT A MINIMUM OF 72 HOURS PRIOR TO RELOCATING ANY DOMESTIC OR FIRE DEMAND WATER METERS. THE CONTRACTOR SHALL CAREFULLY REMOVE ALL METERS AND METERS BOXES THAT ARE INDICATED TO BE RELOCATED OR SALVAGED. THE CONTRACTOR SHALL INSTALL THE REMOVED METER OR CITY PROVIDED METER AT THE NEW LOCATION INDICATED ON THE CONSTRUCTION PLANS.
17. ALL MANHOLES IN UNPAVED AREAS PROVIDING DIRECT ACCESS TO A WASTEWATER LINE SHALL BE WATERTIGHT AND BEAR THE WORDING AND INSIGNIA FOR THE CITY OF AUSTIN.
18. THE CONTRACTOR SHALL VERIFY ALL VERTICAL AND HORIZONTAL LOCATIONS OF EXISTING UTILITIES PRIOR TO STARTING ONSITE UTILITY WORK.
19. ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED THEM. APPROVAL OF THESE PLANS BY THE CITY OF AUSTIN DOES NOT REMOVE THESE RESPONSIBILITIES.
20. REVIEW BY THE AUSTIN WATER UTILITY APPLIES ONLY TO FACILITIES WITHIN PUBLIC STREETS OR PUBLIC UTILITY EASEMENTS. ALL OTHER WATER AND WASTEWATER FACILITIES INSIDE PRIVATE PROPERTY ARE UNDER THE JURISDICTION OF BUILDING INSPECTION.
21. ALL WATER AND WASTEWATER MAINS SHALL BE INSTALLED IN ACCORDANCE WITH THE SEPARATION DISTANCES INDICATED IN CHAPTER 290 - DRINKING WATER STANDARDS, AND CHAPTER 217 - DESIGN CRITERIA FOR SEWERAGE SYSTEMS, OF TCEQ RULES.
22. CONTRACTOR'S PERSONNEL THAT PERFORM BUTT FUSION AND ELECTROFUSION ON ON OR TO HDPE PIPE AND FITTINGS MUST HAVE CURRENT QUALIFICATION TRAINING CERTIFICATE ISSUED BY MCELROY OR COMPARABLE TRAINING PROGRAM.
23. SHOP DRAWINGS SHALL BE SUBMITTED FOR AWU APPROVAL FOR LARGE DIAMETER PRE-CAST MANHOLES, JUNCTION BOXES, WET WELLS, AND SIMILAR STRUCTURES. THE SHOP DRAWINGS SHALL INCLUDE FLOWLINE ELEVATIONS OF ALL INCOMING AND OUTGOING PIPES, ELEVATION OF TRANSITION FROM LARGE DIAMETER SECTIONS TO 48" ID SECTION, TOP OF MANHOLE ELEVATION, SURROUNDING GROUND ELEVATION, AS WELL AS SPECIAL CONSTRUCTION CONSIDERATIONS THAT ARE SPECIFIED IN THE CONTRACT DRAWINGS.
24. VALVE STEM EXTENSIONS SHALL CONSIST OF A SINGLE PIECE OF IRON ROD OF THE REQUIRED LENGTH WITH A SOCKET ON ONE END AND NUT ON THE OTHER.
25. ASBESTOS CONCRETE PIPE (AC PIPE) HAS BEEN INSTALLED IN THE PAST AS PART OF AUSTIN WATER UTILITY'S WATER DISTRIBUTION AND WASTEWATER COLLECTION SYSTEMS. AUSTIN WATER UTILITY'S INFRASTRUCTURE INCLUDES AC PIPE THAT IS CURRENTLY IN SERVICE AS WELL AS AC PIPE THAT HAS BEEN ABANDONED AND IS NO LONGER IN SERVICE. RECORD INFORMATION MAY NOT BE COMPLETE FOR THE PROJECT. CONTRACTORS AND SUBCONTRACTORS MUST BE ALERT TO THE POSSIBLE PRESENCE OF AC PIPE WITHIN THE LIMITS OF THE PROJECT AND BE KNOWLEDGEABLE OF HOW TO IDENTIFY IT. DISTURBANCE, REMOVAL OR CUTTING OF ASBESTOS CONTAINING PIPE IS TO BE CONDUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF TEXAS ADMINISTRATIVE CODE 25, SECTION 15, ARTICLE 4477-3A AND 29 CFR 1926.1101. CONTACT THE CITY OF AUSTIN ASBESTOS MANAGER AT 512-974-7154 THIRTY (30) DAYS PRIOR TO THE PLANNED DISTURBANCE OF THE AC PIPE. ONLY STATE LICENSED PERSONNEL ARE PERMITTED TO DISTURB, REMOVE, TRANSPORT AND DISPOSE OF AC PIPE.

WATER METER REMOVAL AND RELOCATION REQUIREMENTS

1. ALL EXISTING WATER METER, RECOGNIZED TO BE RELOCATED OR ABANDONED AT RESIDENTIAL AND/OR COMMERCIAL DEVLOPMENTS BY THE ENGINEER OF RECORD, SHALL BE REMOVED FROM THE METER BOX(ES) PRIOR TO CONSTRUCTION AND GIVEN IMMEDIATELY TO THE UTILITY INSPECTOR. THE UTILITY INSPECTOR WILL THEN TURN IN THE WATER METER(S) TO AWU CONSUMER SERVICES TAPS OFFICE FOR CREDIT WITHIN FIVE (5) BUSINESS DAYS OF RECEIPT OF THE WATER METER(S). BEFORE ANY LARGE (3" AND ABOVE) METER(S) ARE REVOCED, THE UTILITY INSPECTOR WILL SCHEDULE THE TIME AND PLACE OF THE METER DELIVERY WITH THE AWU TAPS OFFICE AND METER SHOP, AND PROVIDE THE CONTRCTOR WITH THAT INFORMATION. AT THE PRE-CONSTRUCTION MEETING THE CITY INSPECTOR SHALL VERIFY THAT THE METER NUMBER DISPLAYED ON THE METER COVER AT ITS PHYSICAL LOCATION IS THE SAME METER NUMBER LISTED ON THE APPROVED ENGINEERING DRAWINGS. THE CORRECT METER NUMBER(S) AT THE SITE ADDRESS SHALL BE INCLUDED ON THE PLANS AND PHYSICALLY VERIFIED BY THE ENGINEER OF RECORD. THE ENGINEER OF RECORD SHALL CONTACT AN AWU TAPS CUSTOMER SERVICE REPRESENTATIVE TO CONFIRM THE METER INFORMATION ON THE PLAN MATCHES UTILITY RECORDS.
2. IF WATER SERVICE IS REQUIRED DURING CONSTRUCTION, THE CONTRACTOR WILL CALL CITY OF AUSTIN UTILITIES TO ESTABLISH AN ACTIVE UTILITY ACCOUNT. ONCE SERVICE IS AVAILABLE TO THE SITE, AND ALL APPLICABLE TAP FEES HAVE BEEN PAID, A NEW WATER METER SHALL BE ISSUED TO BE INSTALLED IN ORDER TO ENSURE ACCURATE CALIBRATION OF THE WATER METER(S) TO BE USED FOR THE SITE. UNDER NO CIRCUMSTANCES SHALL AN EXISTING WATER METER BE USED DURING CONSTRUCTION OR RELOCATED TO ANOTHER LOCATION AND/OR ADDRESS WITHOUT PRIOR SUBMITTAL OF A WRITTEN REQUEST FOR EXCEPTION AND SUBSEQUENT WRITTEN APPROVAL FROM THE TAPS OFFICE.

SP-2016-0186D

REV. NO.	REVISION DESCRIPTION	APPROVED BY:	DATE

CobbFendley
TBPE No. F-2165 TBPLS No. 10194381
1100 NORTHWEST LOOP 410, SUITE 580
SAN ANTONIO, TEXAS 78752
210.826.4611 | FAX 210.826.4906
WWW.COBBFENDLEY.COM

GENERAL NOTES

NEENAH AVE. WIDENING
AUSTIN, TEXAS

WILLIAMSON COUNTY 1848

PROJ. NO. 1403-088-02
DESIGN: G. LITTLEFIELD
DRAWN: G. LITTLEFIELD
CHECK: J. HASTINGS
APPR: L. PARISHER
DATE: JULY 18, 2017

STATE OF TEXAS
JAMES LANCE PARISHER
106221
LICENSED
PROFESSIONAL ENGINEER
July 18, 2017

THESE DESIGN DOCUMENTS ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO REGULATORY SIGNATURE AND PERMIT

SHEET
C-001
263 of 273

Dwg Info: g:\CFA\2014\0308801_williamson_county_2013_road_bond\MUN\34 neenah\DESIGN\GEN NOTES.dwg - Tab: C-100 - Plotted: 8/8/2017 9:11 AM By: HEATHER BYRNE

9+11.01 NEENAH AVE.
OFFSET LT. -39.56'
PROP. FIRE HYDRANT TO REPLACE FIRE HYDRANT #50433.
CONNECT TO EXIST. 12" PVC WL.
INSTALL:
1 - CUT-IN 12"X6" TEE, M.J.
1 - 6" GATE VALVE
10 LF 6" D.I. PIPE W/ RESTRAINED JOINTS
1 - FIRE HYDRANT ASSEMBLY
REMOVE & REPLACE 10 LF CURB & GUTTER
INTERSECTION #23458

PROP. SIDEWALK

25' DRAINAGE & PUBLIC UTILITY EASEMENT DOC. NO. 1998010160

CAUTION! EXISTING GAS LINE

FH #50433 TO BE REMOVED

12" PVC 97-043

NEENAH AVENUE
(90' R.O.W.)
(CABINET O, SLIDES 281-283)

REMOVE GV #50451 AND INSTALL BLIND FLANGE

PROP. ROADWAY BASELINE

MATCH LINE 13+00

AWU GRID# H41-4
AWU INT. #23458, 23459, 23460

N

0 40' 80'

SCALE: 1" = 40'

GENERAL NOTES:

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES THAT MIGHT BE OCCASIONED BY THE FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES. WHEN THE CONTRACTOR IS USING TRENCHLESS INSTALLATION METHODS, THE CONTRACTOR SHALL LOCATE ALL UTILITIES FOR THE ENTIRE LENGTH OF THE INSTALLATION PRIOR TO ANY ACTIVITIES.
2. CONTRACTOR TO MAINTAIN 48" MINIMUM COVER OVER PROPOSED WATER LINE. CONTRACTOR TO MAINTAIN MINIMUM 18" VERTICAL AND 5' HORIZONTAL CLEARANCE BETWEEN PROPOSED AND EXISTING UTILITIES UNLESS OTHERWISE SHOWN ON THE PLANS.
3. ANY DISCREPANCIES FROM WHAT IS SHOWN SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO BEGINNING WORK.
4. ALL WATER LINES SHALL BE DUCTILE IRON CLASS 350 AS DEFINED BY AWWA C151 AND DUCTILE IRON FITTINGS COMPLYING WITH AWWA C153 UNLESS OTHERWISE NOTED ON PLANS.
5. RESTRAIN ALL PIPE JOINTS AND FITTINGS PER SPL WW-27A.
6. IF A FIRE HYDRANT IS MORE THAN 9 YEARS OLD, REMOVE AND SALVAGE. ALL FIRE HYDRANTS AND VALVES THAT ARE TO BE ABANDONED SHALL BE REMOVED, SALVAGED AND RETURNED TO THE AUSTIN WATER UTILITY. NOTICE MUST BE GIVEN 48 HOURS PRIOR TO RETURN TO: PIPELINE OPERATIONS DISTRIBUTION SYSTEM MAINT. - VALVE AND HYDRANT SERVICES, SUPERVISING AWU PIPELINE TECHNICIAN AT 512-972-1133.
7. CONTRACTOR TO VERIFY SHUT OUT ON FIRE LINES PRIOR TO EXCAVATION TO ENSURE VALVES TO REMAIN IN PLACE.

LEGEND

- WATER VALVE
- FIRE HYDRANT
- WATER METER
- WASTE WATER MANHOLE

3' MIN.

18+07.68 NEENAH AVE.
OFFSET LT. 41.13'
PROP. FIRE HYDRANT TO REPLACE FIRE HYDRANT #234494
INSTALL:
10 LF 6" D.I. PIPE
1 - 6" GATE VALVE
1 - FIRE HYDRANT ASSY.
REMOVE & REPLACE 10 LF CURB & GUTTER
INTERSECTION #23460

PROP. 36" RCP STORM DRAIN (BY OTHERS)

WATER LINE "A" SEE SHT. C-105 INTERSECTION #23459

WATER LINE "B" SEE SHT. C-106 INTERSECTION #23460

PROP. SIDEWALK (BY OTHERS)

MH #112694

25' DRAINAGE & PUBLIC UTILITY EASEMENT DOC. NO. 1998010160

12" PVC 97-043

FIRE HYDRANT TO BE REPLACED

GV #653890

GV #215971

FH #50424

GV #50437

GV #50418

GV #50416

PROP. 3'X5' BOX CULVERT (BY OTHERS)

NEENAH AVENUE
(90' R.O.W.)
(CABINET O, SLIDES 281-283)

PROP. ROADWAY BASELINE

8" PVC 97-043

ALTONA WAY

MATCH LINE 13+00

MATCH LINE 18+50

SP-2016-0186D

REV. NO.	REVISION DESCRIPTION	APPROVED BY:	DATE
			Bid 11-10-194

CobbFendley
TBPE NO. 274 / TBPLS NO. 10193991
1100 NORTHWEST LOOP 410, SUITE 350
SAN ANTONIO, TEXAS 78213
210.824.4011 | FAX 210.828.4506
WWW.COBBFENDLEY.COM

WATER LINE LAYOUT & RELOCATION SHEET I

NEENAH AVE. WIDENING
AUSTIN, TEXAS

WILLIAMSON COUNTY 1848

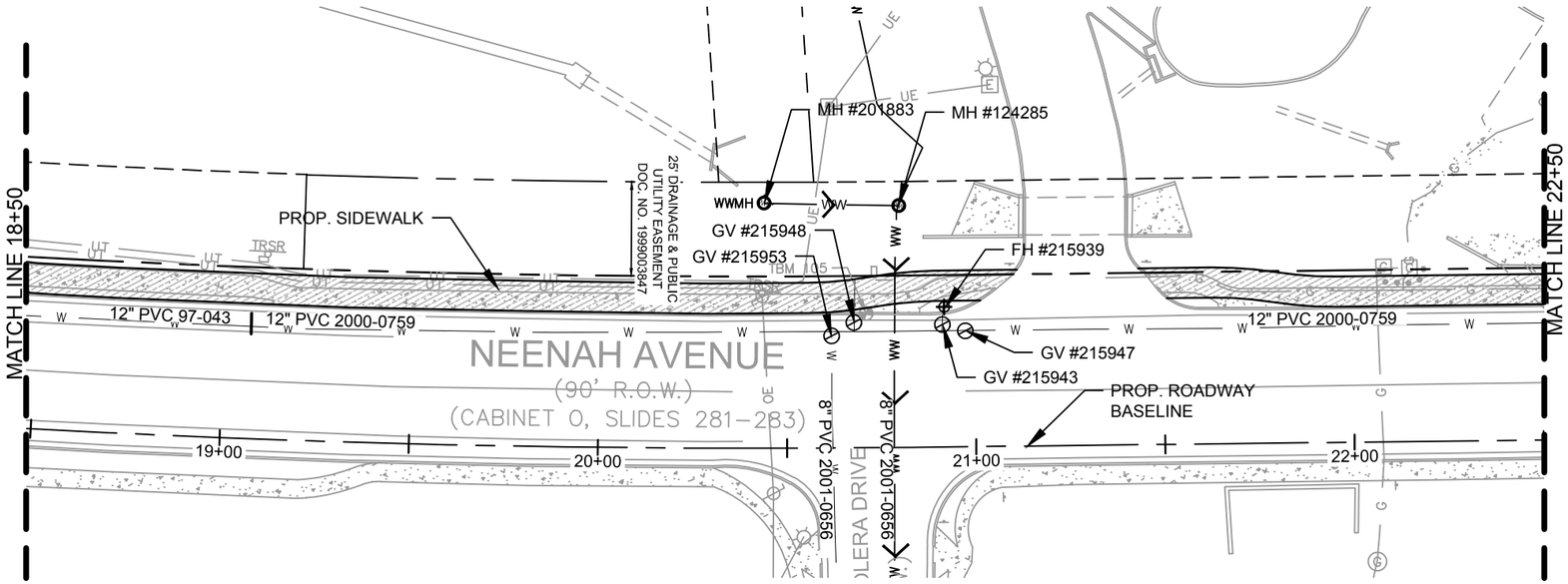
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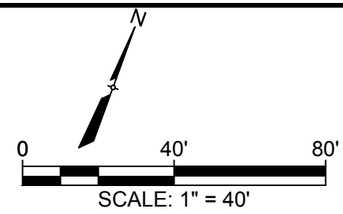
STATE OF TEXAS
JAMES LANCE PARISHER
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LICENSED
PROFESSIONAL ENGINEER
July 18, 2017

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SHEET
C-101
264 of 273

Dwg. Info: g:\CFA\2014\0308801_williamson_county_2013_road_bond\MUN\34_neenah\DESIGN\CFA-NEENAH.dwg -- Tab: C-101 -- Plotted: 8/8/2017 9:11 AM By: HEATHER BYRNE





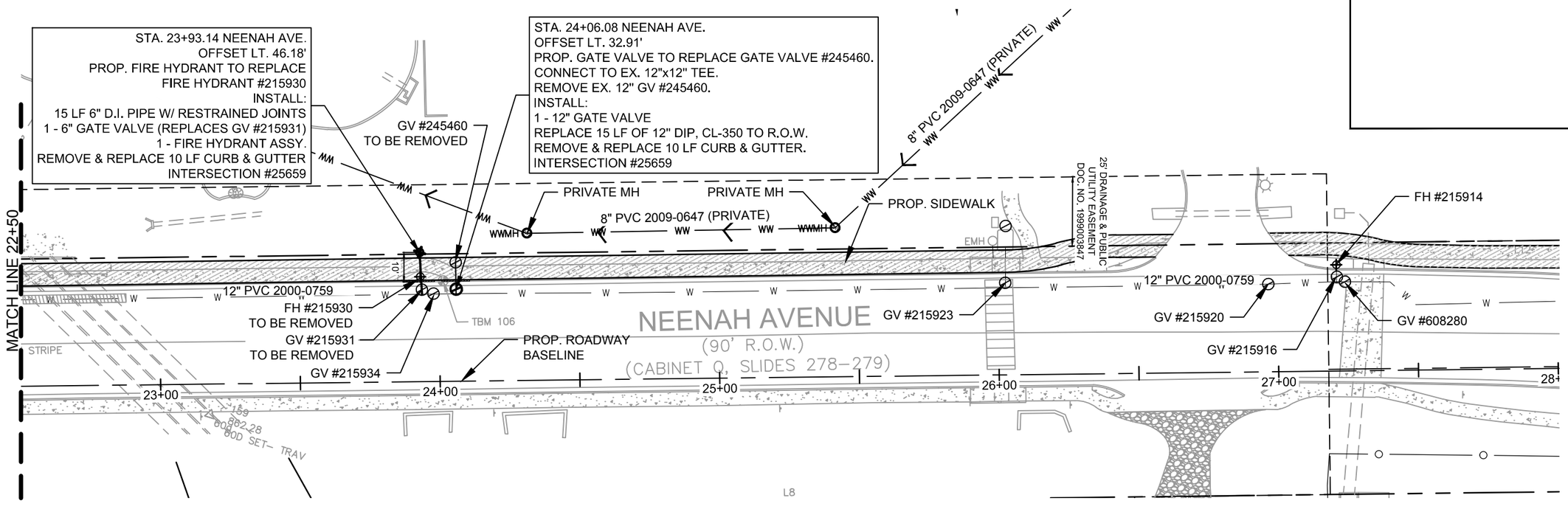
AWU GRID# H41-4
AWU GRID# H41-3
AWU INT. #25658, 25659, 25660

GENERAL NOTES:

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES THAT MIGHT BE OCCASIONED BY THE FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES. WHEN THE CONTRACTOR IS USING TRENCHLESS INSTALLATION METHODS, THE CONTRACTOR SHALL LOCATE ALL UTILITIES FOR THE ENTIRE LENGTH OF THE INSTALLATION PRIOR TO ANY ACTIVITIES.
2. CONTRACTOR TO MAINTAIN 48" MINIMUM COVER OVER PROPOSED WATER LINE. CONTRACTOR TO MAINTAIN MINIMUM 18" VERTICAL AND 5' HORIZONTAL CLEARANCE BETWEEN PROPOSED AND EXISTING UTILITIES UNLESS OTHERWISE SHOWN ON THE PLANS.
3. ANY DISCREPANCIES FROM WHAT IS SHOWN SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO BEGINNING WORK.
4. ALL WATER LINES SHALL BE DUCTILE IRON CLASS 350 AS DEFINED BY AWWA C151 AND DUCTILE IRON FITTINGS COMPLYING WITH AWWA C153 UNLESS OTHERWISE NOTED ON PLANS.
5. RESTRAIN ALL PIPE JOINTS AND FITTINGS PER SPL WW-27A.
6. IF A FIRE HYDRANT IS MORE THAN 9 YEARS OLD, REMOVE AND SALVAGE. ALL FIRE HYDRANTS AND VALVES THAT ARE TO BE ABANDONED SHALL BE REMOVED, SALVAGED AND RETURNED TO THE AUSTIN WATER UTILITY. NOTICE MUST BE GIVEN 48 HOURS PRIOR TO RETURN TO: PIPELINE OPERATIONS DISTRIBUTION SYSTEM MAINT. - VALVE AND HYDRANT SERVICES, SUPERVISING AWU PIPELINE TECHNICIAN AT 512-972-1133.
7. CONTRACTOR TO VERIFY SHUT OUT ON FIRE LINES PRIOR TO EXCAVATION TO ENSURE VALVES TO REMAIN IN PLACE.

LEGEND

- WATER VALVE
- FIRE HYDRANT
- WATER METER
- WASTE WATER MANHOLE



REV. NO.	REVISION DESCRIPTION	APPROVED BY:	DATE
			Bid 11-10-194

CobbFendley
TBPE NO. 274 / TBPLS NO. 10193891
1100 NORTHWEST LOOP 410, SUITE 350
SAN ANTONIO, TEXAS 78213
210.824.4011 | FAX 210.824.4026
WWW.COBBFENDLEY.COM

WATER LINE LAYOUT & RELOCATION SHEET II

NEENAH AVE. WIDENING AUSTIN, TEXAS

WILLIAMSON COUNTY 1848

PROJ. NO. 1403-088-02
DESIGN: G. LITTLEFIELD
DRAWN: G. LITTLEFIELD
CHECK: J. HASTINGS
APPR: L. PARISHER
DATE: SEPTEMBER 14, 2017

STATE OF TEXAS
JAMES LANCE PARISHER
106221
LICENSED
PROFESSIONAL ENGINEER
9/14/17

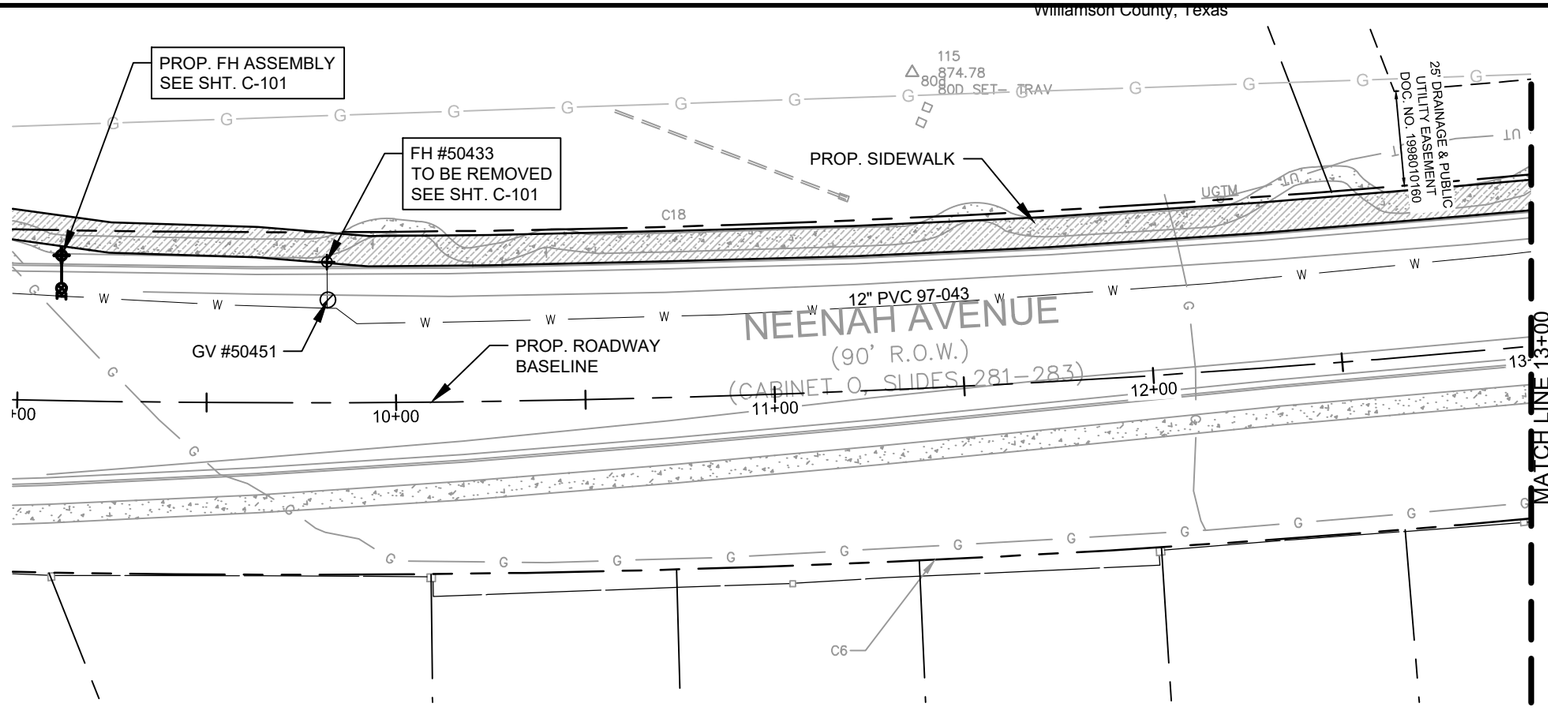
THESE DESIGN DOCUMENTS ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO THE REGULATORY SIGNATURE AND PERMIT.

SHEET
C-102
265 of 273

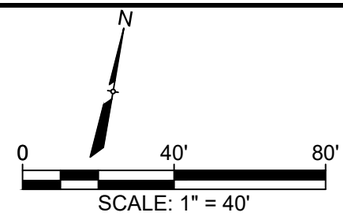
SP-2016-0186D

Dwg Info: G:\CFA\2014\0308801_williamson_county_2013_road_bond\MUN\34 neenah\DESIGN\CFA-NEENAH.dwg -- Tab: C-102 -- Plotted: 9/14/2017 4:27 PM By: KRISTEN VAN HOOSIER

Williamson County, Texas



AWU GRID# H41-4
AWU INT. #23458, 23459, 23460



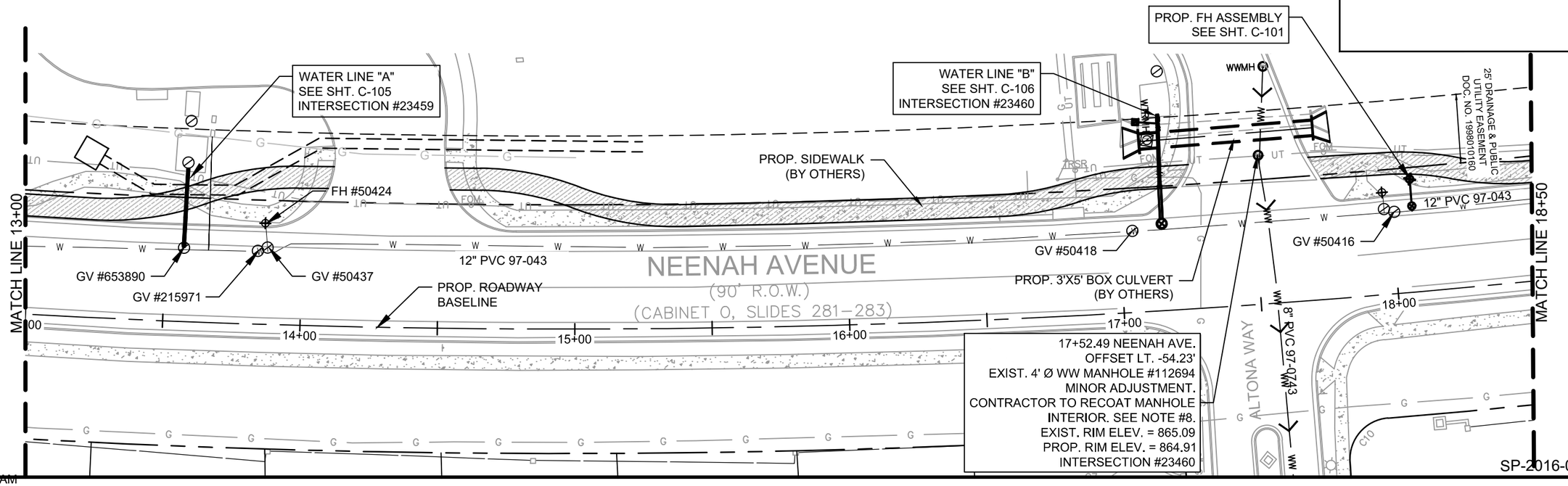
GENERAL NOTES:

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES THAT MIGHT BE OCCASIONED BY THE FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES. WHEN THE CONTRACTOR IS USING TRENCHLESS INSTALLATION METHODS, THE CONTRACTOR SHALL LOCATE ALL UTILITIES FOR THE ENTIRE LENGTH OF THE INSTALLATION PRIOR TO ANY ACTIVITIES.
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3. ANY DISCREPANCIES FROM WHAT IS SHOWN SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO BEGINNING WORK.
4. ALL WATER LINES SHALL BE DUCTILE IRON CLASS 350 AS DEFINED BY AWWA C151 AND DUCTILE IRON FITTINGS COMPLYING WITH AWWA C153 UNLESS OTHERWISE NOTED ON PLANS.
5. RESTRAIN ALL PIPE JOINTS AND FITTINGS PER SPL WW-27A.
6. IF A FIRE HYDRANT IS MORE THAN 9 YEARS OLD, REMOVE AND SALVAGE. ALL FIRE HYDRANTS AND VALVES THAT ARE TO BE ABANDONED SHALL BE REMOVED, SALVAGED AND RETURNED TO THE AUSTIN WATER UTILITY. NOTICE MUST BE GIVEN 48 HOURS PRIOR TO RETURN TO: PIPELINE OPERATIONS DISTRIBUTION SYSTEM MAINT. - VALVE AND HYDRANT SERVICES, SUPERVISING AWU PIPELINE TECHNICIAN AT 512-972-1133.
7. CONTRACTOR TO VERIFY SHUT OUT ON FIRE LINES PRIOR TO EXCAVATION TO ENSURE VALVES TO REMAIN IN PLACE.
8. PER RECORD DRAWINGS C-97-743, EXISTING INTERIOR MANHOLE COATING IS RAVEN COATING. CONTRACTOR TO VERIFY THE EXISTING COATING TYPE AND MATCH IT FOR ADJUSTMENTS. PAYMENT IS SUBSIDIARY TO COST OF MANHOLE ADJUSTMENT.

NOTE: COBBFENDLEY CONDUCTED MANHOLE INSPECTIONS ON 03/24/2016. PER AWU'S MANHOLE INSPECTION REPORT, ALL MANHOLES ARE IN WORKING CONDITION AND WILL NOT REQUIRE REPAIRS OR REPLACEMENTS. MANHOLE INSPECTION REPORTS AND FIELD PHOTOS HAVE BEEN PROVIDED IN ADDITION TO THESE PLANS.

LEGEND

- WATER VALVE
- FIRE HYDRANT
- WATER METER
- WASTE WATER MANHOLE



17+52.49 NEENAH AVE.
OFFSET LT. -54.23'
EXIST. 4' Ø WW MANHOLE #112694
MINOR ADJUSTMENT.
CONTRACTOR TO RECOAT MANHOLE INTERIOR. SEE NOTE #8.
EXIST. RIM ELEV. = 865.09
PROP. RIM ELEV. = 864.91
INTERSECTION #23460

REV. NO.	REVISION DESCRIPTION	APPROVED BY:	DATE

CobbFendley
TBPE NO. 274 / TBPLS NO. 10193891
1100 NORTHWEST LOOP 410, SUITE 350
SAN ANTONIO, TEXAS 78213
210.824.4011 | FAX 210.824.4026
WWW.COBBFENDLEY.COM

WASTEWATER LINE LAYOUT & RELOCATION SHEET I

NEENAH AVE. WIDENING
AUSTIN, TEXAS

WILLIAMSON COUNTY 1848

PROJ. NO. 1403-088-02
DESIGN: G. LITTLEFIELD
DRAWN: G. LITTLEFIELD
CHECK: J. HASTINGS
APPR: L. PARISHER
DATE: JULY 18, 2017

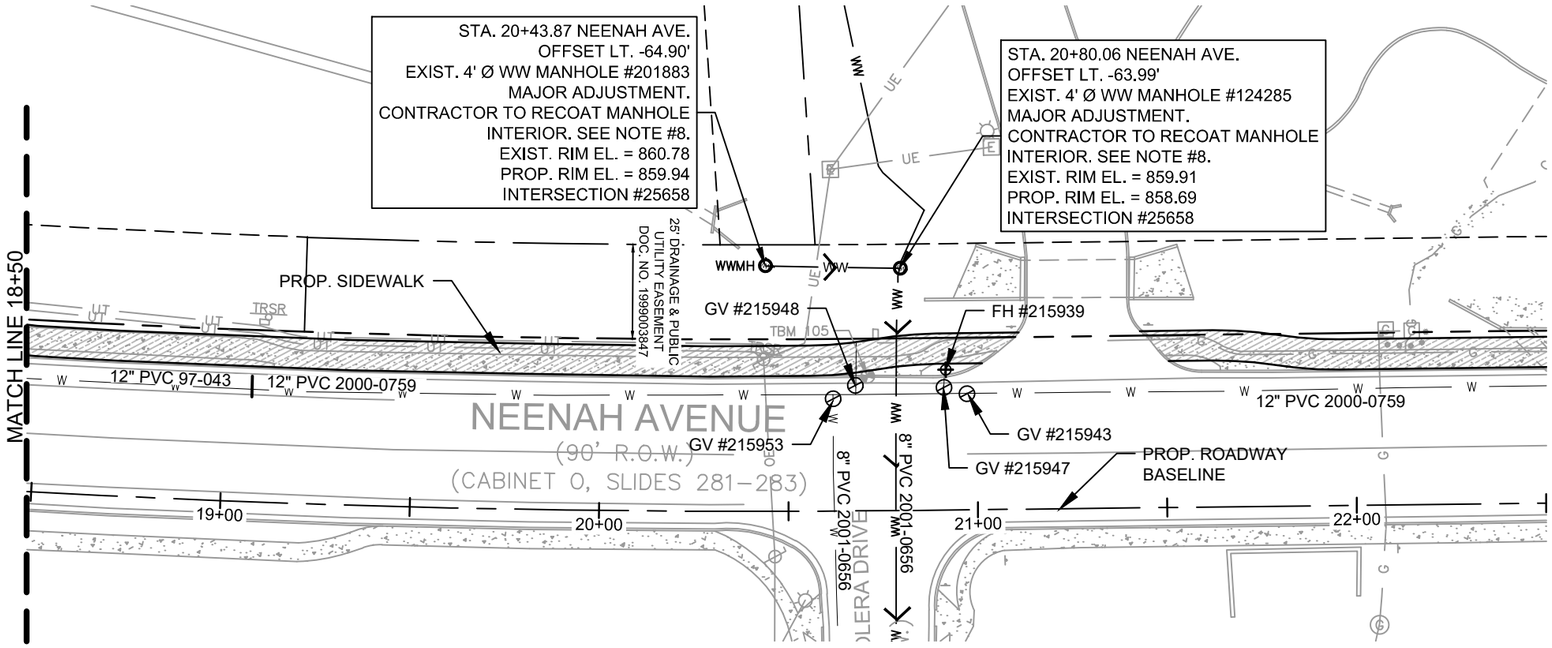
STATE OF TEXAS
JAMES LANCE PARISHER
106221
LICENSED
PROFESSIONAL ENGINEER
July 18, 2017

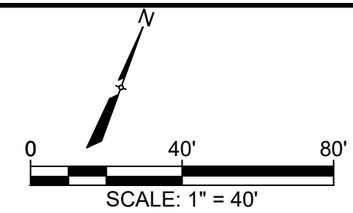
THESE DESIGN DOCUMENTS ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO REGULATORY SIGNATURE AND PERMIT.

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SP-2016-0186D

Dwg Info: g:\CFA\2014\0308801_williamson_county_2013_road_bond\MUN\34 neenah\DESIGN\CFA-NEENAH.dwg — Tab: C-103 — Plotted: 8/8/2017 9:11 AM By: HEATHER BYRNE





AWU GRID# H41-4
AWU GRID# H41-3
AWU INT. #25658

GENERAL NOTES:

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES THAT MIGHT BE OCCASIONED BY THE FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES. WHEN THE CONTRACTOR IS USING TRENCHLESS INSTALLATION METHODS, THE CONTRACTOR SHALL LOCATE ALL UTILITIES FOR THE ENTIRE LENGTH OF THE INSTALLATION PRIOR TO ANY ACTIVITIES.
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6. IF A FIRE HYDRANT IS MORE THAN 9 YEARS OLD, REMOVE AND SALVAGE. ALL FIRE HYDRANTS AND VALVES THAT ARE TO BE ABANDONED SHALL BE REMOVED, SALVAGED AND RETURNED TO THE AUSTIN WATER UTILITY. NOTICE MUST BE GIVEN 48 HOURS PRIOR TO RETURN TO: PIPELINE OPERATIONS DISTRIBUTION SYSTEM MAINT. - VALVE AND HYDRANT SERVICES, SUPERVISING AWU PIPELINE TECHNICIAN AT 512-972-1133.
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LEGEND

- WATER VALVE
- FIRE HYDRANT
- WATER METER
- WASTE WATER MANHOLE

REV. NO.	REVISION DESCRIPTION	APPROVED BY:	DATE

CobbFendley
TBPE NO. 274 / TBPLS NO. 10193891
1100 NORTHWEST LOOP 410, SUITE 350
SAN ANTONIO, TEXAS 78213
210.824.4011 | FAX 210.824.2626
WWW.COBBFENDLEY.COM

WASTEWATER LINE LAYOUT & RELOCATION SHEET II

NEENAH AVE. WIDENING
AUSTIN, TEXAS

WILLIAMSON COUNTY 1848

PROJ. NO. 1403-088-02
DESIGN: G. LITTLEFIELD
DRAWN: G. LITTLEFIELD
CHECK: J. HASTINGS
APPR: L. PARISHER
DATE: JULY 18, 2017

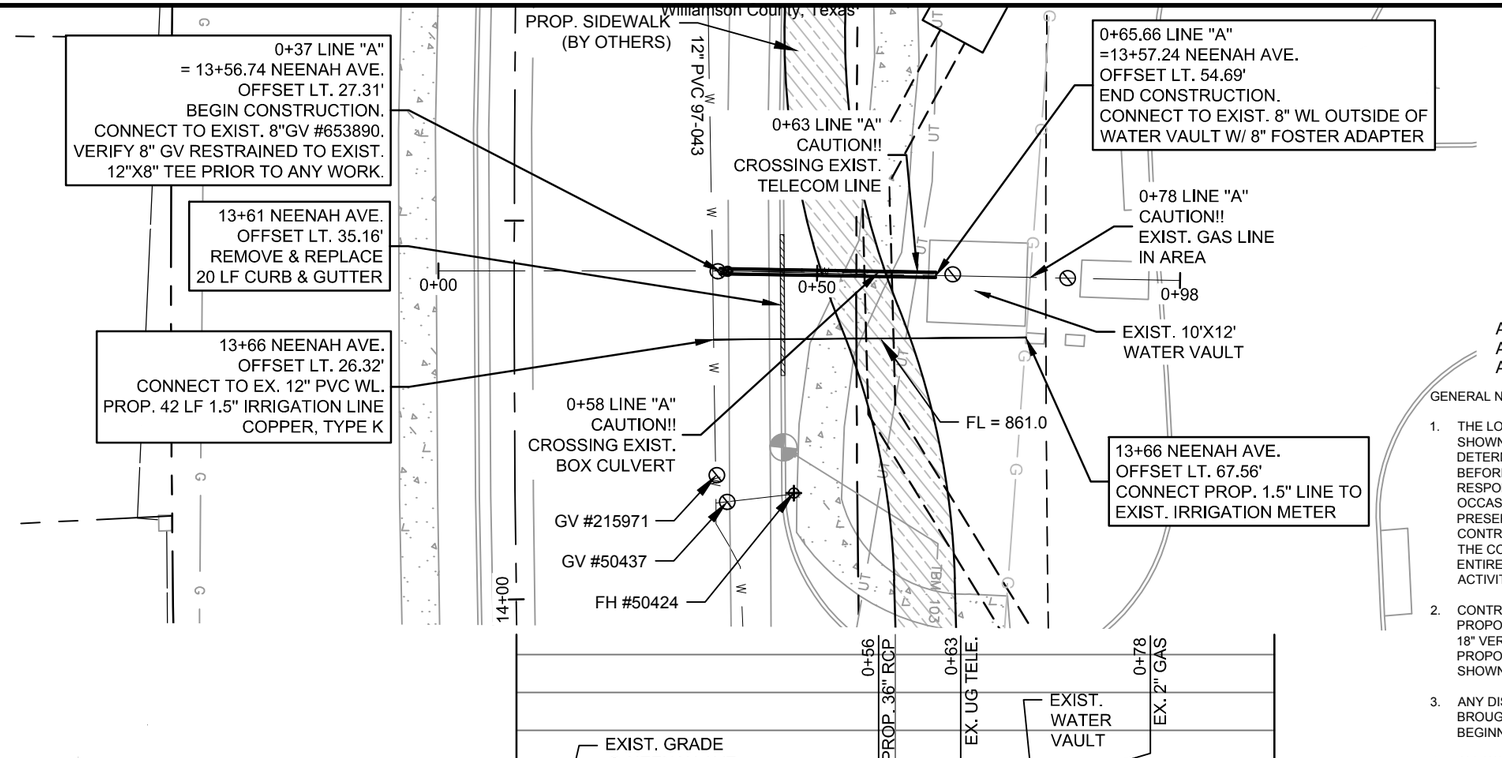
STATE OF TEXAS
JAMES LANCE PARISHER
106221
LICENSED
PROFESSIONAL ENGINEER
July 18, 2017

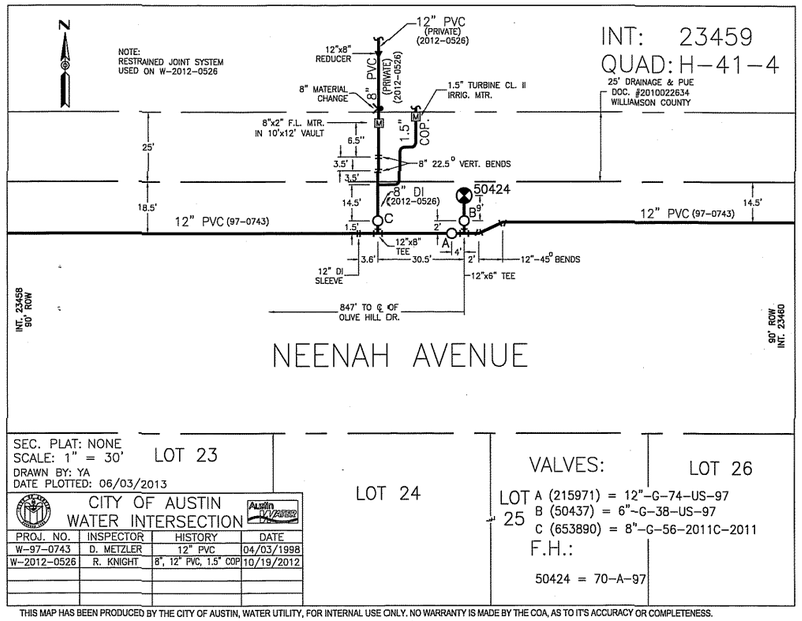
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SHEET
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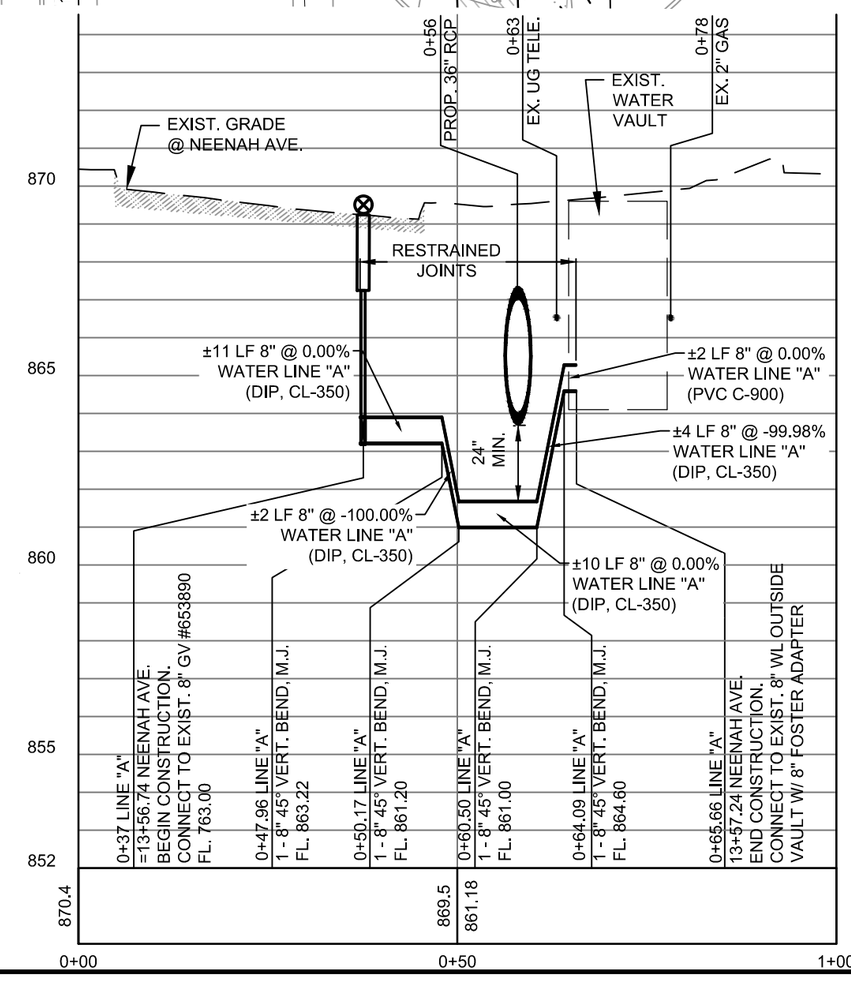
SP-2016-0186D

Dwg Info: g:\CFA\2014\0308801_williamson_county_2013_road_bond\MUN\34 neenah\DESIGN\CFA-NEENAH.dwg -- Tab: C-104 -- Plotted: 8/8/2017 9:12 AM By: HEATHER BYRNE





AWU INT. #23459



AWU GRID #H41-4
AWU INT. #23459
AWU PLAN #2012-0526

GENERAL NOTES:

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES THAT MIGHT BE OCCASIONED BY THE FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES. WHEN THE CONTRACTOR IS USING TRENCHLESS INSTALLATION METHODS, THE CONTRACTOR SHALL LOCATE ALL UTILITIES FOR THE ENTIRE LENGTH OF THE INSTALLATION PRIOR TO ANY ACTIVITIES.
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4. ALL WATER LINES SHALL BE DUCTILE IRON CLASS 350 AS DEFINED BY AWWA C151 AND DUCTILE IRON FITTINGS COMPLYING WITH AWWA C153 UNLESS OTHERWISE NOTED ON PLANS.
5. RESTRAIN ALL PIPE JOINTS AND FITTINGS PER SPL WW-27A.
6. IF A FIRE HYDRANT IS MORE THAN 9 YEARS OLD, REMOVE AND SALVAGE. ALL FIRE HYDRANTS AND VALVES THAT ARE TO BE ABANDONED SHALL BE REMOVED, SALVAGED AND RETURNED TO THE AUSTIN WATER UTILITY. NOTICE MUST BE GIVEN 48 HOURS PRIOR TO RETURN TO: PIPELINE OPERATIONS DISTRIBUTION SYSTEM MAINT. - VALVE AND HYDRANT SERVICES, SUPERVISING AWU PIPELINE TECHNICIAN AT 512-972-1133.
7. CONTRACTOR TO VERIFY SHUT OUT ON FIRE LINES PRIOR TO EXCAVATION TO ENSURE VALVES TO REMAIN IN PLACE.

LEGEND

- WATER VALVE
- FIRE HYDRANT
- WATER METER
- WASTE WATER MANHOLE

REV. NO.	REVISION DESCRIPTION	APPROVED BY:	DATE
			Bid 11-10-194

CobbFendley
TBPE NO. 274 / TBPLS NO. 10193891
1100 NORTHWEST LOOP 410, SUITE 350
SAN ANTONIO, TEXAS 78213
210.824.4011 | FAX 210.824.8206
WWW.COBBFENDLEY.COM

WATER LINE "A"
PLAN & PROFILE
NEENAH AVE. WIDENING
AUSTIN, TEXAS

WILLIAMSON COUNTY 1848

PROJ. NO. 1403-088-02
DESIGN: G. LITTLEFIELD
DRAWN: G. LITTLEFIELD
CHECK: J. HASTINGS
APPR: L. PARISHER
DATE: SEPTEMBER 14, 2017

STATE OF TEXAS
JAMES LANCE PARISHER
106221
LICENSED
PROFESSIONAL ENGINEER
9/14/17

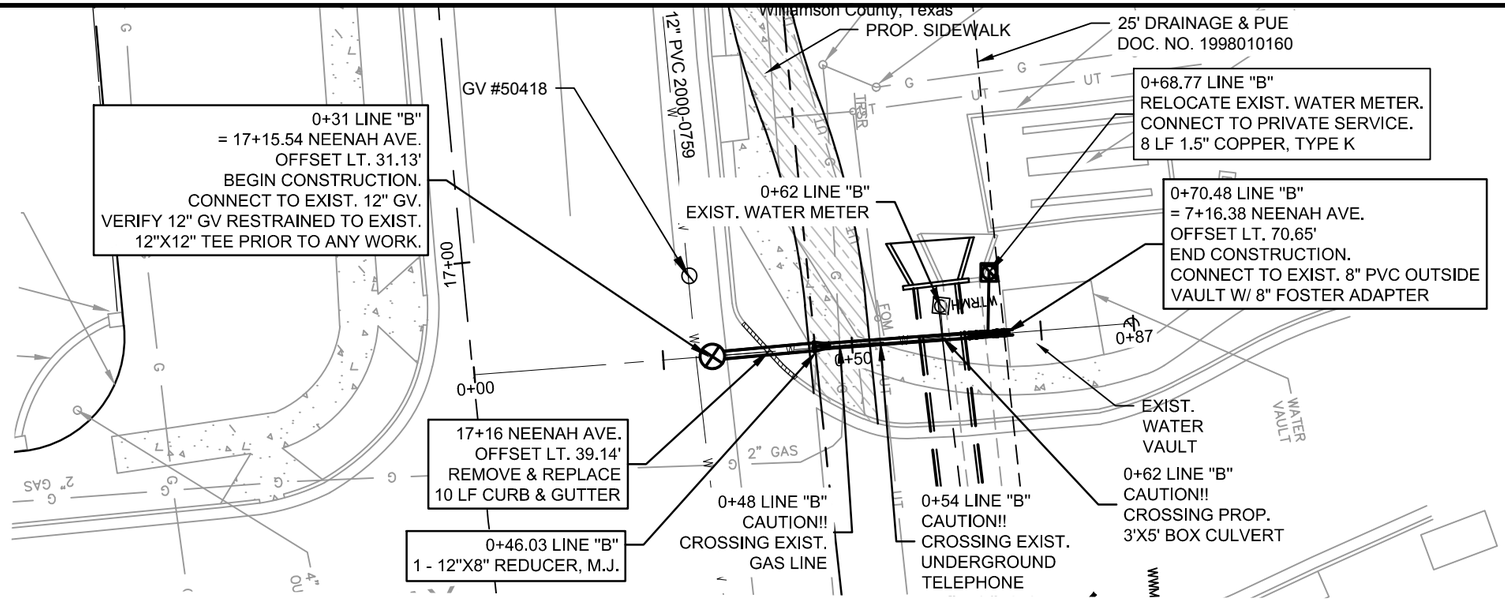
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SP-2016-0186D

Dwg Info: G:\CFA\2014\0308801_williamson_county_2013_road_bond\MUN\34 neenah\DESIGN\CFA-NEENAH.dwg -- Tab: C-105 -- Plotted: 9/14/2017 4:27 PM By: KRISTEN VAN HOOSIER

Dwg Info: G:\CFA\2014\0308801_williamson_county_2013_road_bond\MUN\34 neenah\DESIGN\CFA-NEENAH.dwg – Tab: C-106 – Plotted: 9/14/2017 4:27 PM By: KRISTEN VAN HOOSIER



0 20' 40'

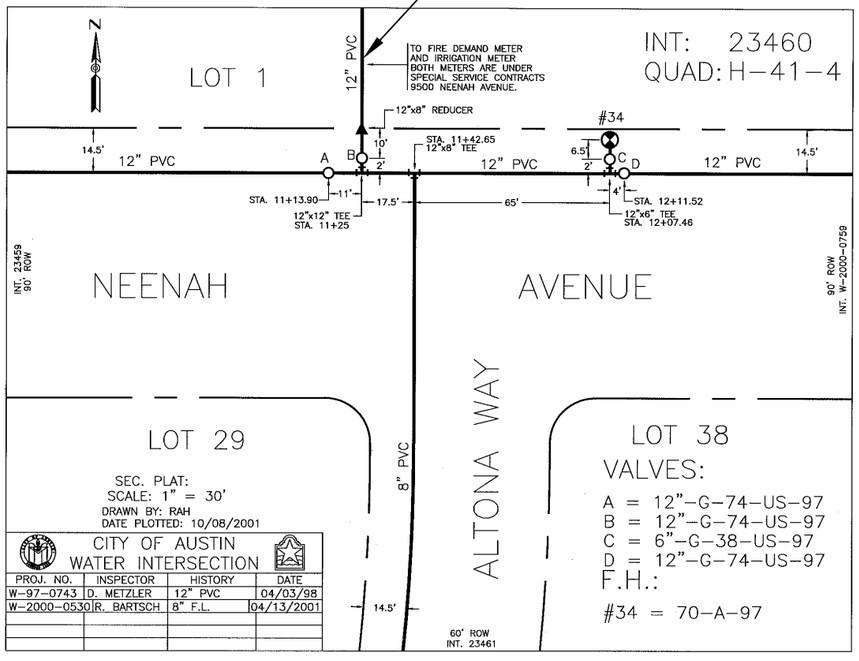
SCALE: 1" = 20'

AWU GRID #H41-4
AWU INT. #23460

GENERAL NOTES:

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES THAT MIGHT BE OCCASIONED BY THE FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES. WHEN THE CONTRACTOR IS USING TRENCHLESS INSTALLATION METHODS, THE CONTRACTOR SHALL LOCATE ALL UTILITIES FOR THE ENTIRE LENGTH OF THE INSTALLATION PRIOR TO ANY ACTIVITIES.
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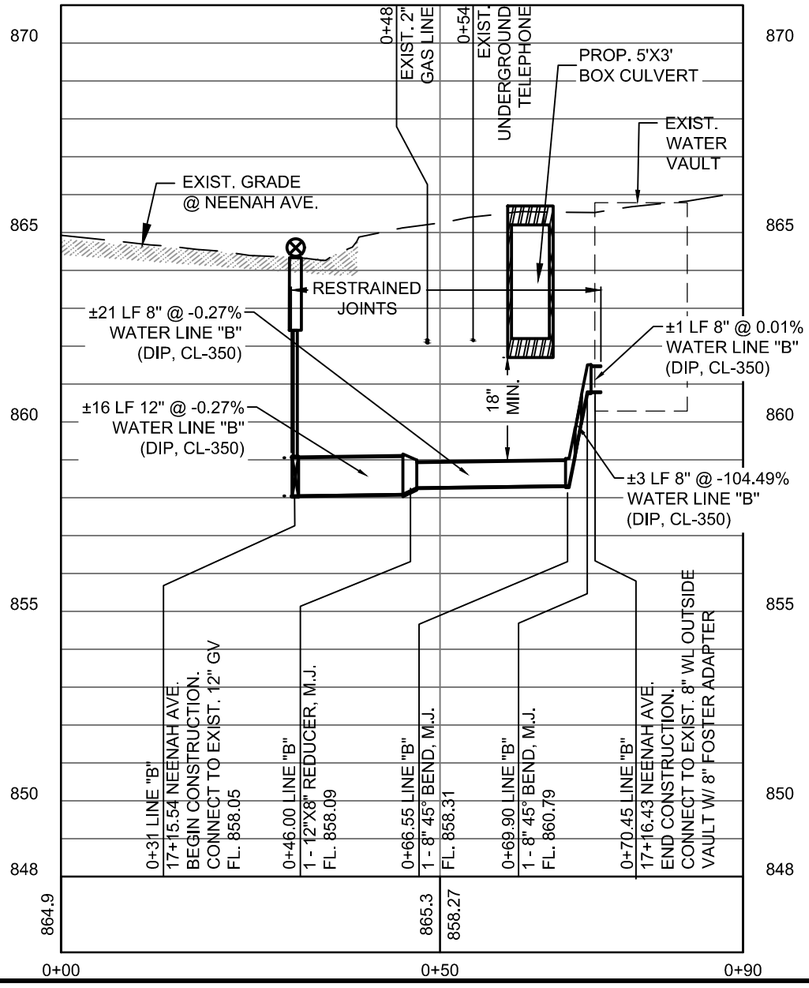
NOTE!
ACCORDING TO INT. #23460, PER THE 12"X8" REDUCER, WE ASSUME WE ARE CONNECTING TO 8" PVC, NOT 12" PVC.



CITY OF AUSTIN
WATER INTERSECTION

PROJ. NO.	INSPECTOR	HISTORY	DATE
W-97-0743	D. METZLER	12" PVC	04/03/98
W-2000-0530	R. BARTSCH	8" F.L.	04/13/2001

AWU INT. #23460



EXISTING GRADE
FLOW LINE OF PIPE
1281.7
1258.79

PROFILE SCALE
1"=20' HORIZ.
1"=4' VERT.

LEGEND
- WATER VALVE
- FIRE HYDRANT
- WATER METER
- WASTE WATER MANHOLE

SP-2016-0186D

REV. NO.	REVISION DESCRIPTION	APPROVED BY:	DATE
			Bid 11/10-194

CobbFendley
TBPE NO. 274 / TBPLS NO. 10193891
1100 NORTHWEST LOOP 410, SUITE 350
SAN ANTONIO, TEXAS 78213
210.824.4011 / FAX 210.828.2648
WWW.COBBFENDLEY.COM

WATER LINE "B"
PLAN & PROFILE
NEENAH AVE. WIDENING
AUSTIN, TEXAS

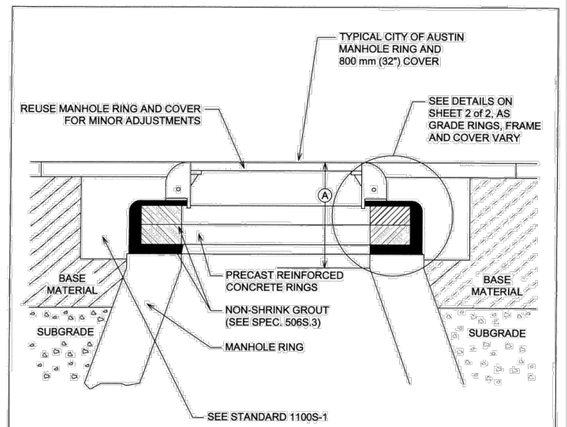
WILLIAMSON COUNTY 1848

PROJ. NO. 1403-088-02
DESIGN: G. LITTLEFIELD
DRAWN: G. LITTLEFIELD
CHECK: J. HASTINGS
APPR: L. PARISHER
DATE: SEPTEMBER 14, 2017

STATE OF TEXAS
JAMES LANCE PARISHER
106221
LICENSED
PROFESSIONAL ENGINEER
9/14/17

THESE DESIGN DOCUMENTS ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO REGULATORY SIGNATURE AND PERMIT.

SHEET
C-106
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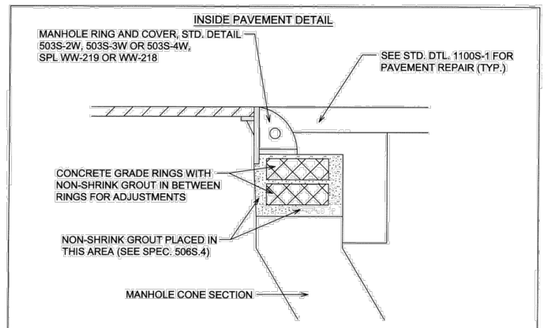


Ⓐ VERTICAL FACE = ALLOWABLE THROAT OR CHIMNEY HEIGHT
= NEW CONSTRUCTION = 525mm = (21") Max.
= EXISTING CONSTRUCTION = 675mm (27") Max.

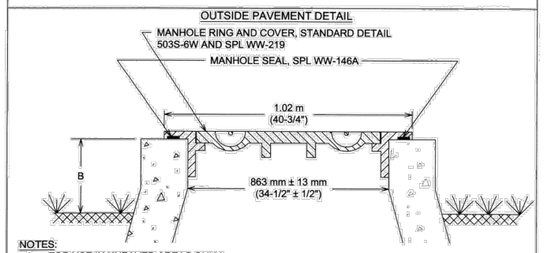
NOTES:
1. NON-SHRINK GROUT SHALL NOT EXCEED 25 mm (1") IN ANY DIMENSION.
2. SUB-GRADE AND BASE MATERIALS SHALL BE COMPACTED ACCORDING TO ITEMS 201S AND 210S, RESPECTIVELY, OF THE CITY OF AUSTIN STANDARD SPECIFICATIONS.
3. REFER TO STANDARD 1100S-1 FOR REPAIRS AROUND MANHOLES.
4. SEE STANDARD 506S-4A FOR HDPE RING INSTALLATION (FOR USE IN PAVED AREAS ONLY).

CITY OF AUSTIN AUSTIN WATER UTILITY	MINOR MANHOLE ADJUSTMENT & NEW MANHOLE CONSTRUCTION	
Kathi L. Flowers 8/31/2011	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 506S-4 1 OF 2

INSIDE PAVEMENT DETAIL



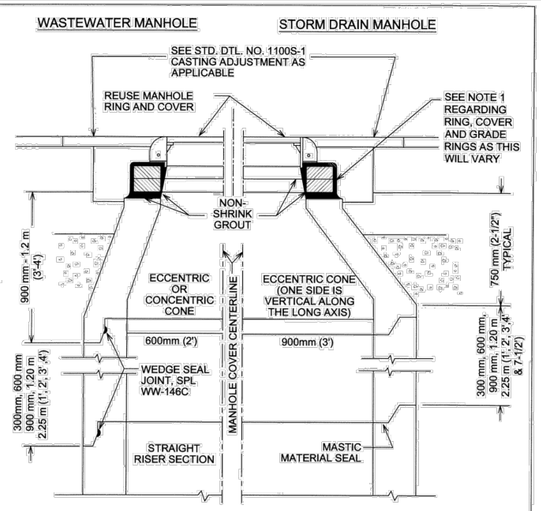
OUTSIDE PAVEMENT DETAIL



NOTES:
1. FOR USE IN UNPAVED AREAS ONLY
2. WHEN USED WITHIN 100-YEAR FLOODPLAIN, SEE DTL. 506S-6 FOR ADDITIONAL M.H. REQUIREMENTS.
3. DIMENSION B=150-300 mm (6"-12") FOR M.H. LOCATED IN 100-YR FLOOD PLAN. =50-300 mm (2"-12") FOR M.H. OUTSIDE 100-YR FLOOD PLAN.

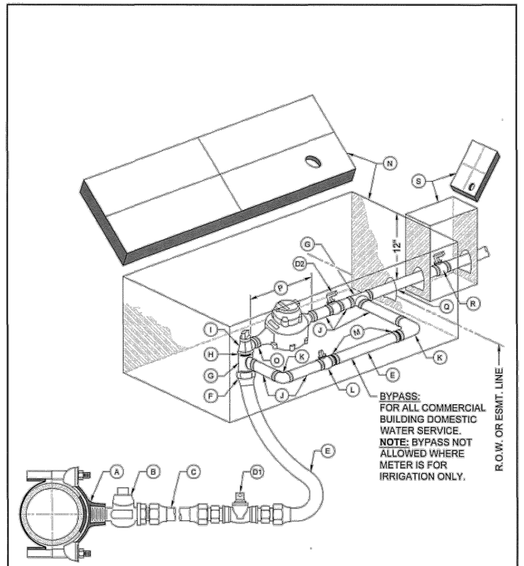
CITY OF AUSTIN AUSTIN WATER UTILITY	MINOR MANHOLE ADJUSTMENT & NEW MANHOLE CONSTRUCTION	
Kathi L. Flowers 8/31/2011	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 506S-4 2 OF 2

WASTEWATER MANHOLE STORM DRAIN MANHOLE



1. SEE "MINOR MANHOLE HEIGHT ADJUSTMENT" STANDARDS 506S-4 AND 506S-4A FOR ADDITIONAL INFORMATION.
2. MANHOLE SECTIONS TEMPORARILY REMOVED FOR ROADWAY CONSTRUCTION MAY BE REUSED ONLY WITH WRITTEN APPROVAL OF THE INSPECTOR. WEDGE SEALS SHALL NOT BE REUSED.
3. ANY COMBINATION OF REMOVING THE GRADE RINGS, AND/OR THE MANHOLE CONE, AND/OR THE STRAIGHT RISER SECTION OF THE MANHOLE SHALL BE ACCEPTABLE TO TEMPORARILY LOWER THE MANHOLE GRADE FOR RECONSTRUCTION.
4. WHILE THE MANHOLE IS TEMPORARILY LOWERED, A SHEET OF STEEL SUITABLE TO SUPPORT ALL IMPOSED LOADS SHALL BE USED TO COVER THE OPENING. STEEL SHALL BE PLACED SO THE SHEET WILL NOT MOVE UNDER ANY & ALL TRAFFIC CONDITIONS.
5. SUB-GRADE AND BASE MATERIALS SHALL BE COMPACTED TO 95% AND 100% DENSITIES, RESPECTIVELY, COMPACTION SHALL BE BY MECHANICAL TAMPING TO THE DENSITIES SPECIFIED, SEE STD. DTL. NO .1100S-1.

CITY OF AUSTIN AUSTIN WATER UTILITY	MAJOR MANHOLE ADJUSTMENT	
Kathi L. Flowers 8-31-2011	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 506S-2



CITY OF AUSTIN AUSTIN WATER	1 ½" - 2" METER INSTALLATION SHOWING OPTIONAL BYPASS	
Kathi L. Flowers 05/18/2016 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 520-AW-04 1 OF 2

MATERIALS LIST:

A. 2" SERVICE CLAMP
B. 2" CORPORATION STOP MALE THREAD INLET BY COMPRESSION OUTLET
C. 2" COPPER WATER SERVICE TUBING EXTENDED BEYOND PAVEMENT
D1. 2" BALL VALVE, SPL WW-275
D2. 2" BALL VALVE, SPL WW-275
E. 2" COPPER SERVICE TUBING
F. 2" BRASS COUPLING - COMPRESSION TO MALE IPT
G. 2" BRASS TEE
H. 2" BRASS CLOSE-NIPPLE
I. 2" ANGLE METER STOP; SERVICE TUBING INLET x FLANGED OUTLET
J. 2" BRASS NIPPLE
K. 2" BRASS ELBOW
L. 2" LOCKABLE CURB STOP - FEMALE IPT INLET BY COMPRESSION OUTLET
M. 2" BRASS COUPLING - SERVICE TUBING TO MALE IPT
N. RECTANGULAR METER BOX AND COVER, SPL WW-145A
O. BRASS ADAPTER (2" x 1½") FOR 1½" METER ONLY
P. WATER METER, LENGTH 13", (PURCHASED FROM AUSTIN WATER)
Q. 2" COPPER SERVICE TUBING (PRIVATE PLUMBING PER CODE)
R. CUSTOMER CUT-OFF VALVE
S. CUSTOMER VALVE BOX AND LID

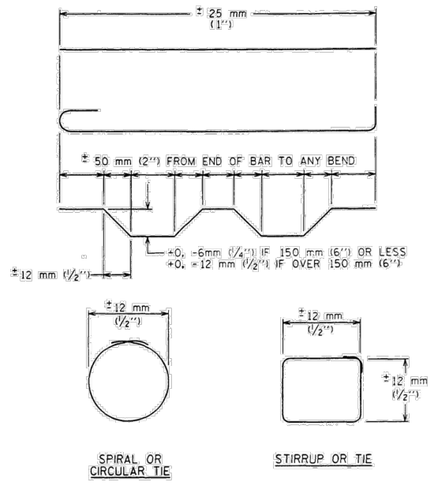
NOTES:

1. SERVICE CLAMP SHALL BE WRAPPED COMPLETELY WITH 8 MIL. POLYETHYLENE FILM.
2. BRANCH CONNECTIONS AND ALL ANGLE METER STOPS MUST BE INSTALLED PRIOR TO ANY METER INSTALLATION.
3. TOP OF BOXES SHOULD BE 1" ABOVE GROUND.
4. PIPING AND TUBING IN STREET RIGHT-OF-WAY SHALL BE BEDDED IN GRANULAR MATERIALS AS REQUIRED BY SECTION 510.3 (14) OF THE CITY OF AUSTIN STANDARD SPECIFICATIONS; BACKFILL ABOVE GRANULAR BEDDING AS REQUIRED BY SECTION 510.3 (25).
5. BOX MUST BE BEHIND CURB NEXT TO PROPERTY LINE OR EASEMENT AND OUT OF VEHICULAR TRAFFIC AREA AND SIDEWALK.
6. BALL VALVE "D1" SHALL NOT BE LOCATED UNDER SIDEWALK, CURB, OR PAVEMENT, AND NOT BE LOCATED MORE THAN 24" HORIZONTALLY FROM METER BOX OR 36" BELOW FINAL GRADE.
7. COPPER SERVICE SHALL BE COPPER TUBING SIZE ANNEALED SEAMLESS TYPE "K" MEETING ASTM B88 WITH NO SWEAT OR SOLDERED JOINTS.

RECLAIMED WATER:

FOR RECLAIMED WATER SERVICES AND METERS, ALL RECLAIMED TUBING SHALL BE MANUFACTURED PURPLE TUBING. ALL OTHER TUBING AND APPURTENANCES SHALL BE MANUFACTURED PURPLE IF AVAILABLE. ALL TUBING AND FITTINGS THAT ARE NOT AVAILABLE FROM THE MANUFACTURER IN PURPLE SHALL BE PAINTED PURPLE PER SPL WW-3C. ALL BURIED DI AND CI PIPE AND FITTINGS SHALL ALSO BE WRAPPED IN PURPLE POLYETHYLENE PER SPL WW-27D. ALL COVERS SHALL HAVE "RECLAIMED WATER" CAST INTO THEM.

CITY OF AUSTIN AUSTIN WATER	1 ½" - 2" METER INSTALLATION SHOWING OPTIONAL BYPASS	
Kathi L. Flowers 05/18/2016 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 520-AW-04 2 OF 2



NOTE:

FABRICATING TOLERANCES FOR BARS, FROM PLAN CENTERLINE DIMENSIONS SHALL NOT BE GREATER THAN SHOWN.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	REINFORCED STEEL TOLERANCES	
Lisa Rivera 9/29/99 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 406S-1

REV. NO.	REVISION DESCRIPTION	APPROVED BY:	DATE

CobbFendley
TBPE No. F-2165 | TBPLS No. 10194381
1100 NORTHWEST LOOP 410, SUITE 580
SAN ANTONIO, TEXAS 78752
210.826.4611 | FAX 210.826.4906
WWW.COBBFENDLEY.COM

STANDARD WATER DETAILS

NEENAH AVE. WIDENING
AUSTIN, TEXAS

WILLIAMSON COUNTY 1848

PROJ. NO. 1403-088-02
DESIGN: G. LITTLEFIELD
DRAWN: G. LITTLEFIELD
CHECK: J. HASTINGS
APPR: L. PARISHER
DATE: JULY 18, 2017

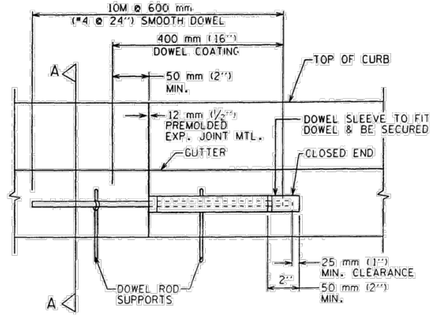
STATE OF TEXAS
JAMES LANCE PARISHER
106221
LICENSED
PROFESSIONAL ENGINEER
July 18, 2017

THESE DESIGN DOCUMENTS ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO REGULATORY SIGNATURE AND PERMIT

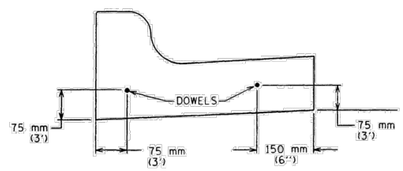
SHEET
C-501
270 of 273

SP-2016-0186D

Dwg Info: g:\CFA\2014\0308801_williamson_county_2013_road_bond\MUN\34 neenah\DESIGN\DETAILS.dwg -- Tab: C-501 -- Plotted: 8/8/2017 9:12 AM By: HEATHER BYRNE



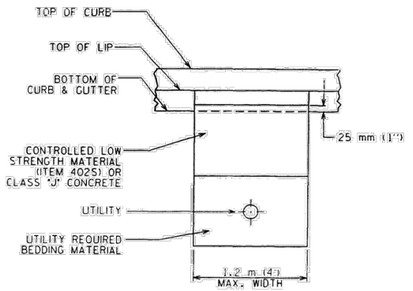
CURB EXPANSION JOINT DOWEL DETAIL

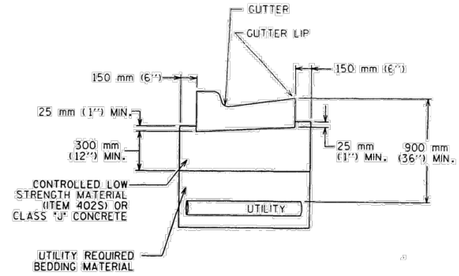


SECTION A-A

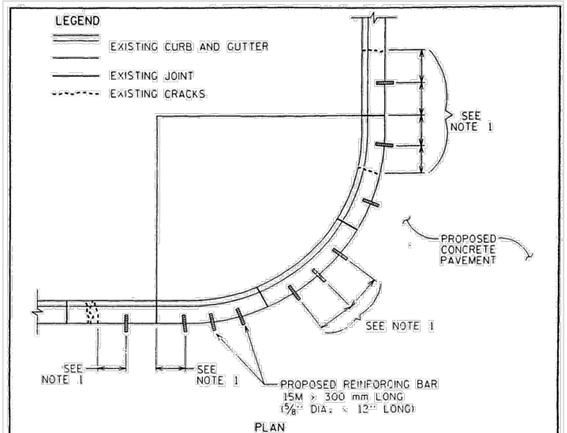
SEE STANDARD 430S-1 FOR TYPICAL CURB AND GUTTER SECTIONS.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	CURB EXPANSION JOINT DOWEL DETAIL	
Lino Rivera 9/29/99 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 430S-3

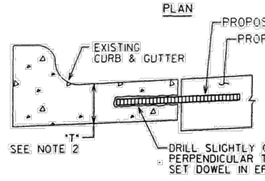




CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	CONCRETE BACKFILL UNDER CURB & GUTTER	
Lino Rivera 9/29/99 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 430S-4



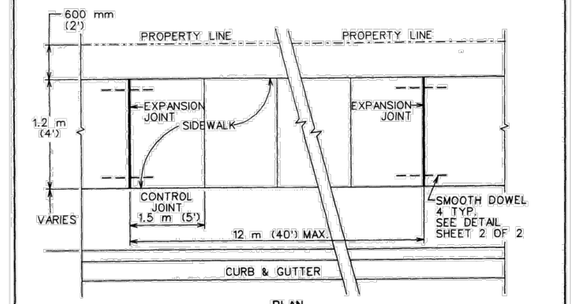
PLAN



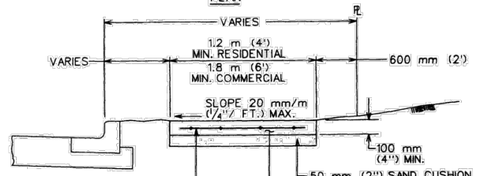
NOTES:

1. NORMAL SPACING OF REINFORCING BARS SHALL BE NOT LESS THAN 600 mm (24") AND NOT MORE THAN 900 mm (36") HOWEVER, REINFORCING BARS SHALL BE AT LEAST 300 mm (12") FROM EXISTING CRACKS OR JOINTS IN THE CURB AND GUTTER UNIT.
2. DO NOT ATTEMPT TO DRILL A HOLE IF "T" IS LESS THAN 100 mm (4").

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	REINFORCING BAR DETAIL AT EXISTING CURB AND GUTTER	
Lino Rivera 4/15/99 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 430S-5



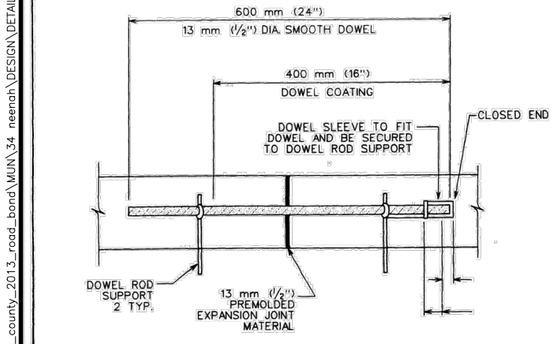
PLAN



POLYPROPYLENE FIBRILLATED FIBERS, OR 150 mm x 150 mm x MW9 x MW9 (6" X 6" X W1.4 X W1.4) WELDED WIRE FABRIC OR ONE LAYER 10M (#3) BARS PLACED NOT MORE THAN 450 mm (18") C.C. BOTH DIRECTIONS.
REINFORCEMENT SHALL ACCURATELY PLACED AT SLAB MID-DEPTH AND HELD FIRMLY IN PLACE BY MEANS OF BAR SUPPORTS OF ADEQUATE STRENGTH AND NUMBER THAT WILL PREVENT DISPLACEMENT AND KEEP THE STEEL AT ITS PROPER POSITION DURING THE PLACEMENT OF THE P.C. CONCRETE. IN NO INSTANCE SHALL THE STEEL BE PLACED DIRECTLY ON THE SUBGRADE OR SAND CUSHION LAYER.

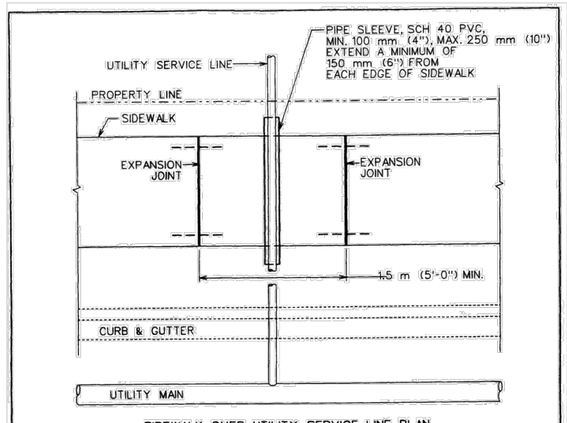
SECTION

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	SIDEWALK	
Bill Gardner 3/26/08 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 432S-1 1 OF 3

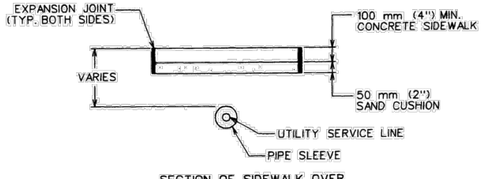


DOWEL DETAIL

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	SIDEWALK	
Bill Gardner 3/26/08 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 432S-1 2 OF 3



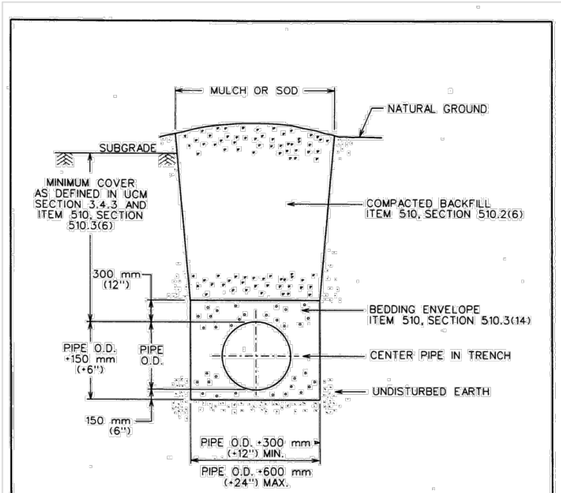
SIDEWALK OVER UTILITY SERVICE LINE PLAN



SECTION OF SIDEWALK OVER UTILITY SERVICE LINES

NOTES:
1. THIS STANDARD APPLIES TO THE INSTALLATION OF NEW UTILITIES OR UTILITIES BEING REPLACED BY A NEW LINE.
2. NO JOINTS IN UTILITY SERVICE PIPE TO BE LOCATED INSIDE PVC PIPE SLEEVE.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	SIDEWALK	
Bill Gardner 3/26/08 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 432S-1 3 OF 3



REFERENCES:

1. UTILITY CRITERIA MANUAL SECTION 3.4.3, "FINAL DESIGN"
2. STANDARD SPECIFICATION MANUAL ITEM 510,
   SECTION 510.2(6), "SELECT BACKFILL OR BORROW";
   SECTION 510.3(6), "TRENCH DEPTH AND DEPTH OF COVER";
   SECTION 510.3(14), "PIPE BEDDING ENVELOPE"

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	TYPICAL TRENCH DETAIL WITH UNFINISHED SURFACE	
Bill Gardner 3/13/06 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 510S-5

SP-2016-0186D

REV. NO.	REVISION DESCRIPTION	APPROVED BY:	DATE

CobbFendley
TBPE No. F-2165 | TBPLS No. 10194381
1100 NORTHWEST LOOP 410, SUITE 580
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210.826.4611 | FAX 210.826.4906
WWW.COBBFENDLEY.COM

STANDARD WATER, CONCRETE & STRUCTURE DETAILS

NEENAH AVE. WIDENING
AUSTIN, TEXAS

WILLIAMSON COUNTY 1848

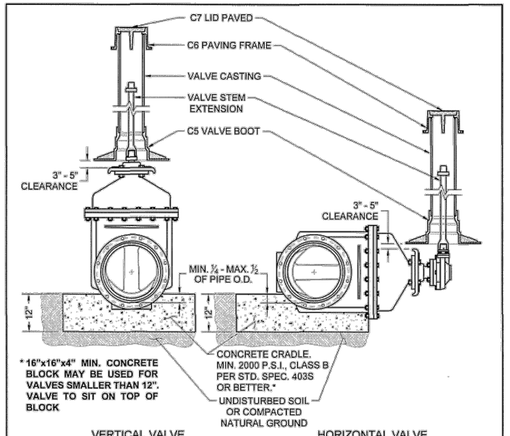
PROJ. NO. 1403-088-02
DESIGN: G. LITTLEFIELD
DRAWN: G. LITTLEFIELD
CHECK: L. PARISHER
APPR: L. PARISHER
DATE: JULY 18, 2017

STATE OF TEXAS
JAMES LANCE PARISHER
106221
LICENSED
PROFESSIONAL ENGINEER
July 18, 2017

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Dwg Info: g:\CFA\2014\0308801_williamson_county_2013_road_bond\MUN\34 neenah\DESIGN\DETAILS.dwg — Tab: C-502 — Plotted: 8/8/2017 9:12 AM By: HEATHER BYRNE



* 16"x16"x4" MIN. CONCRETE BLOCK MAY BE USED FOR VALVES SMALLER THAN 12". VALVE TO SIT ON TOP OF BLOCK

VERTICAL VALVE

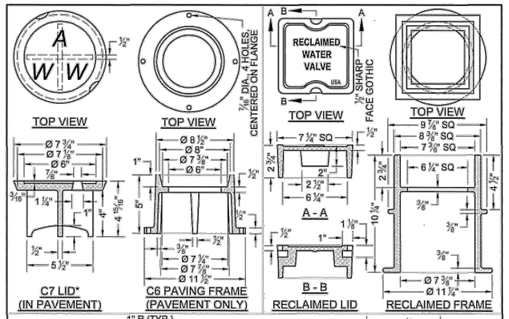
HORIZONTAL VALVE
ONLY TO BE USED WHEN CALLED OUT ON THE DRAWINGS.

NOTES:

1. WELD SOCKET 2⅝" x 2" DEEP TO 1" SCH. 40 CARBON STEEL ROUND STEM EXTENSION, FITTED ON OPERATING NUT, [SCH. 80 FOR LENGTHS OVER 10'.]
2. VALVE CASTING SHALL BE 6" DI PIPE WITH BELL OR COLLAR CENTERED OVER VALVE BOOT.
3. NUT AT TOP OF VALVE EXTENSION ROD SHALL BE SQUARE 2" LONG WELDED TO TOP OF ROD.
4. VALVE STEM EXTENSIONS ARE REQUIRED ON ALL VALVES THAT EXCEED 3' DEEP FROM FINISHED GRADE. VALVE EXTENSIONS SHALL BE PLACED SUCH THAT THE EXTENSION NUT IS BETWEEN 12" AND 18" FROM FINISHED GRADE.

RECLAIMED WATER: ALL RECLAIMED PVC PIPE SHALL BE MANUFACTURED PURPLE PIPE. HDPE PIPE SHALL BE MANUFACTURED WITH PURPLE STRIPES. ALL OTHER PIPE AND APPURTENANCES SHALL BE MANUFACTURED PURPLE IF AVAILABLE. ALL PIPE AND FITTINGS THAT ARE NOT AVAILABLE FROM THE MANUFACTURER IN PURPLE SHALL BE PAINTED PURPLE PER SPL WW-3C. ALL BURIED DI AND CI PIPE AND FITTINGS SHALL ALSO BE WRAPPED IN PURPLE POLYETHYLENE PER SPL WW-27D. ALL COVERS SHALL HAVE "RECLAIMED WATER" CAST INTO THEM.

CITY OF AUSTIN AUSTIN WATER	TYPICAL GATE VALVE 4" - 16"	
Kathi L. Flowers 05/18/2016 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 511-AW-01 1 OF 4



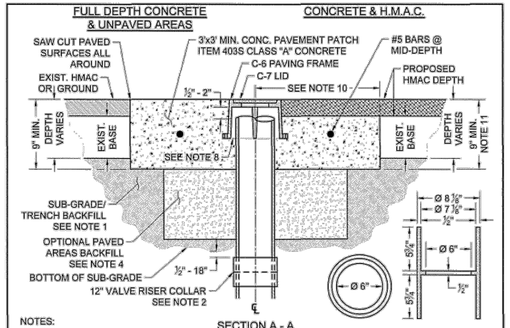
NOTES:

1. MATERIAL SHALL BE GRAY CAST IRON, ASTM A48, GRADE 30B.
2. THE MANUFACTURER'S IDENTIFICATION AND CASTING NUMBER, AND THE COUNTRY WHERE CAST, SHALL BE DISTINCTLY CAST ONTO EACH LID, FRAME, COLLAR AND BASE.
3. DRAFT AND SHRINKAGE ALLOWANCE SHALL BE IN ACCORDANCE WITH NORMAL FOUNDRY PRACTICE.
4. CASTING FINISH BY MANUFACTURER SHALL INCLUDE REMOVAL OF FINS AND FLASHING, AND PAINT WITH BLACK ASPHALT COATING.

WEIGHTS:
C7 LID: 13 LBS
RECLAIMED LID: 15 LBS
C6 FRAME: 23 LBS
RECLAIMED FRAME: 33 LBS
C5 BASE: 78 LBS

* LETTERING SHALL BE 1 ½" 2 PICK BAR SLOTS REQUIRED

CITY OF AUSTIN AUSTIN WATER	TYPICAL GATE VALVE 4" - 16"	
Kathi L. Flowers 05/18/2016 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 511-AW-01 2 OF 4



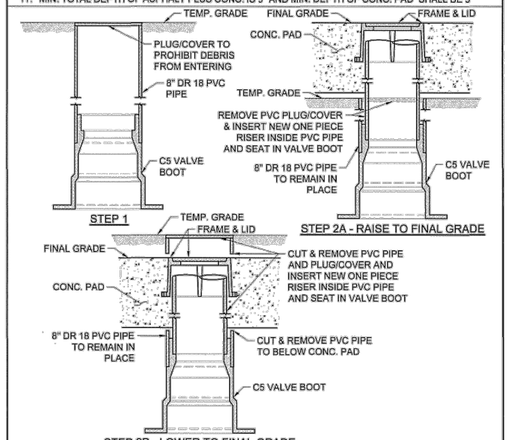
NOTES:

1. SUB-GRADE/TRENCH BACKFILL SHALL BE COMPACTED AS PER ITEM 201S, SUB-GRADE PREPARATION.
2. TO ADJUST VALVE CASTINGS TO FINAL GRADE, REMOVE RISER PIPE BELOW SUB-GRADE AND INSTALL APPROPRIATE LENGTH OF NEW RISER PIPE TO ACHIEVE FINAL GRADE. CONNECT THE TWO PIECES OF RISER PIPE WITH A 6" COLLAR MIN. 12" LENGTH APPROXIMATELY CENTERED ON THE JOINT WITH THE TOP OF SLEEVE LOCATED ½" - 18" BELOW SUB-GRADE. THE INSIDE "LIP" OF COLLAR TO BE PAINTED WITH FLUORESCENT WHITE PAINT OR COVERED WITH FLUORESCENT WHITE TAPE. ALTERNATE: FOR OPTIONAL SINGLE PIECE RISER INSTALLATION SEE SHEET 4 OF 4.
3. CLEAN VALVE BOX OF ALL DEBRIS DOWN TO THE NUT OF THE VALVE; NUT SHALL OPERATE WITH NO OBSTRUCTION.
4. WHERE CASTINGS TO BE REMOVED REQUIRE EXCAVATION GREATER THAN 20" DEEP, CONTRACTOR MAY ELECT TO FILL EXCAVATION WITH CONTROLLED LOW STRENGTH MATERIAL (SPEC. ITEM 402S) TO THE UNDERSIDE OF THE CONCRETE. PAVEMENT PATCH IN LIEU OF COMPACTED BACKFILL.
5. REINFORCING STEEL SHALL MEET SPEC. ITEM 406S.7.
6. NO MORE THAN 2 SECTIONS OF PIPE SHALL BE USED FROM VALVE TO FINAL GRADE.
7. BELL AND SPIGOT IS ACCEPTABLE FOR DEPTH OVER 18'.

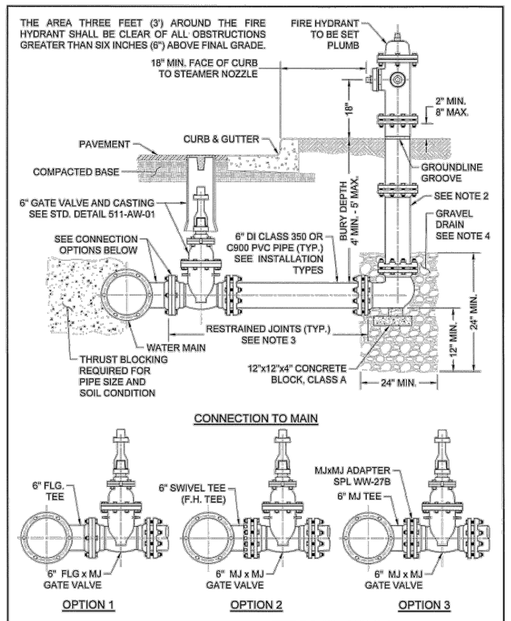
CITY OF AUSTIN AUSTIN WATER	TYPICAL GATE VALVE 4" - 16"	
Kathi L. Flowers 05/18/2016 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 511-AW-01 3 OF 4

NOTES (CONT):

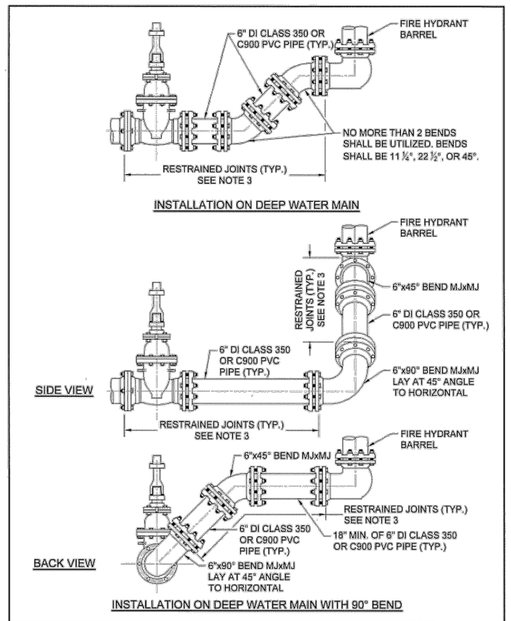
8. PAVING FRAME SHALL BE FLUSH WITH THE CONC. PAD AND PLACED ½" - 2" ABOVE RISER PIPE (FRAME SHALL NOT REST ON RISER.)
9. IN UNPAVED AREAS, INSTALL ONE DELINEATOR STAKE IMMEDIATELY ADJACENT TO THE EDGE OF THE CONCRETE PAD. DELINEATOR SHALL BE BLUE FOR POTABLE WATER AND PURPLE FOR RECLAIMED WATER AND SHALL EXTEND AT LEAST 60" ABOVE GROUND. DELINEATORS SHALL HAVE 2" WIDE, WHITE IN COLOR, TYPE I REFLECTIVE TAPE MOUNTED DIAGONALLY AT 12" SPACING ON BOTH SIDES.
10. VALVE SHALL TYPICALLY BE CENTERED IN CONCRETE DIAMOND BUT MAY BE OFFSET WITH A MIN. OF 12" FROM CENTER OF VALVE LID TO EDGE OF CONCRETE IN ALL DIRECTIONS.
11. MIN. TOTAL DEPTH OF ASPHALT PLUS CONC. IS 9" AND MIN. DEPTH OF CONC. PAD SHALL BE 5"



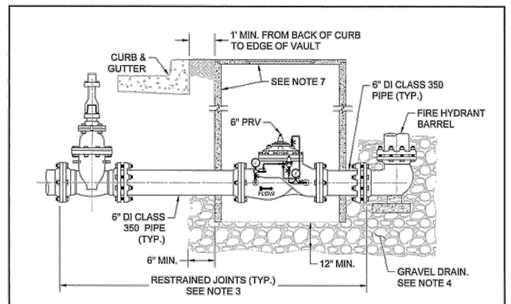
CITY OF AUSTIN AUSTIN WATER	TYPICAL GATE VALVE 4" - 16"	
Kathi L. Flowers 05/18/2016 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 511-AW-01 4 OF 4



CITY OF AUSTIN AUSTIN WATER	FIRE HYDRANT	
Kathi L. Flowers 05/18/2016 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 511-AW-02 1 OF 3



CITY OF AUSTIN AUSTIN WATER	FIRE HYDRANT	
Kathi L. Flowers 05/18/2016 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 511-AW-02 2 OF 3



NOTES: APPLICABLE TO ALL INSTALLATION TYPES.

1. NO PART OF A HYDRANT OR ITS NOZZLE CAPS SHALL BE WITHIN 6" OF ANY SIDEWALK OR PEDESTRIAN RAMP. ANY FIRE HYDRANT PLACED NEAR A STREET CORNER SHALL BE LOCATED OUTSIDE THE CURVE RADIUS AND A MINIMUM OF 4' FROM RAMPS.
2. ONE BARREL EXTENSION NOT EXCEEDING 2' LENGTH MAY BE INSTALLED DIRECTLY BELOW THE FIRE HYDRANT IN ORDER TO MEET THE REQUIRED BURY DEPTH OF 4' - 5'. BREAK AWAY BOLTS (SHOE TYPES) SHALL BE PROPERLY SPACED AND PLACED.
3. FIRE LINE SHALL HAVE ALL JOINTS RESTRAINED FROM MAIN TO FIRE HYDRANT. JOINTS SHOWN MAY VARY. SEE SPL WW-27, WW-27A, AND WW-27B FOR RESTRAINT OPTIONS.
4. BELOW EACH HYDRANT, A DRAINAGE PIT 24" IN DIAMETER AND 12" DEEP SHALL BE EXCAVATED AND FILLED WITH COMPACTED COARSE GRAVEL OR BROKEN STONE MIXED WITH COARSE SAND UNDER AND AROUND THE BOWL OF THE HYDRANT, AND TO A LEVEL 12" ABOVE THE HYDRANT DRAIN OPENING (SEE STD. SPEC. 510). THE HYDRANT DRAINAGE PIT SHALL NOT BE CONNECTED TO A SANITARY SEWER. THE DRAIN GRAVEL SHALL BE COVERED WITH FILTER FABRIC PER STD. SPEC. 620S. FOR PRV, GRAVEL SHALL EXTEND UNDER THE PRV VAULT 12" MIN. DEPTH UNDER THE VAULT AND 6" MIN. BEYOND VAULT.
5. FOR FIRE HYDRANT LEADS AT A MAIN OUTLET LARGER THAN 6" DIAMETER, OUTLET SHALL BE FLANGED AND A FLG x FLG REDUCER SHALL BE INSTALLED DIRECTLY ON THE OUTLET.
6. WRAP 8 MIL. POLY-FILM WRAP ON ALL BURIED PIPE AND FITTINGS.
7. FOR HYDRANTS WITH PRV: CLASS III RCP VAULT 60" MIN. I.D. WITH REINFORCED PRECAST CONCRETE LID (AASHTO H-20 LOADING) WITH COA FRAME AND 32" COVER WITH LETTERING MODIFIED FOR WATER.

CITY OF AUSTIN AUSTIN WATER	FIRE HYDRANT	
Kathi L. Flowers 05/18/2016 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 511-AW-02 3 OF 3

REV. NO.	REVISION DESCRIPTION	APPROVED BY:	DATE

STANDARD WATER, CONCRETE & STRUCTURE DETAILS

NEENAH AVE. WIDENING
AUSTIN, TEXAS

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WILLIAMSON COUNTY 1848

PROJ. NO. 1403-088-02
DESIGN: G. LITTLEFIELD
DRAWN: G. LITTLEFIELD
CHECK: L. PARISHER
APPR: L. PARISHER
DATE: JULY 18, 2017

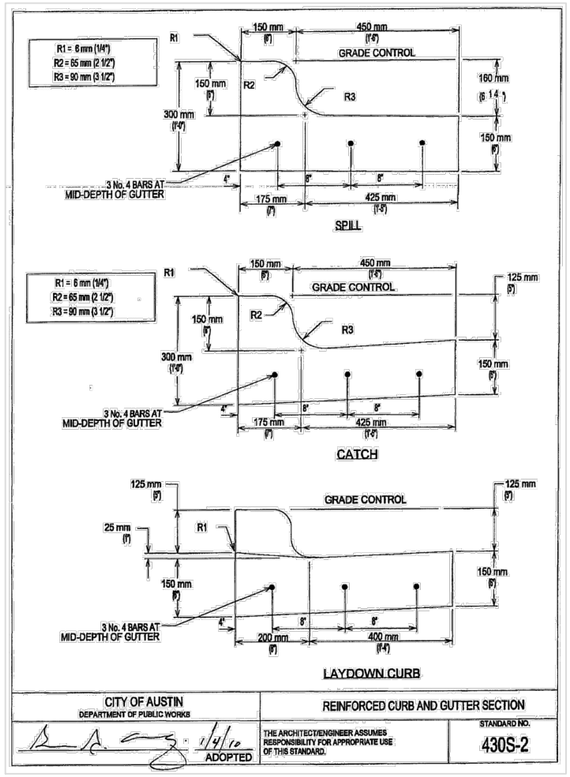
STATE OF TEXAS
JAMES LANCE PARISHER
106221
LICENSED
PROFESSIONAL ENGINEER
July 18, 2017

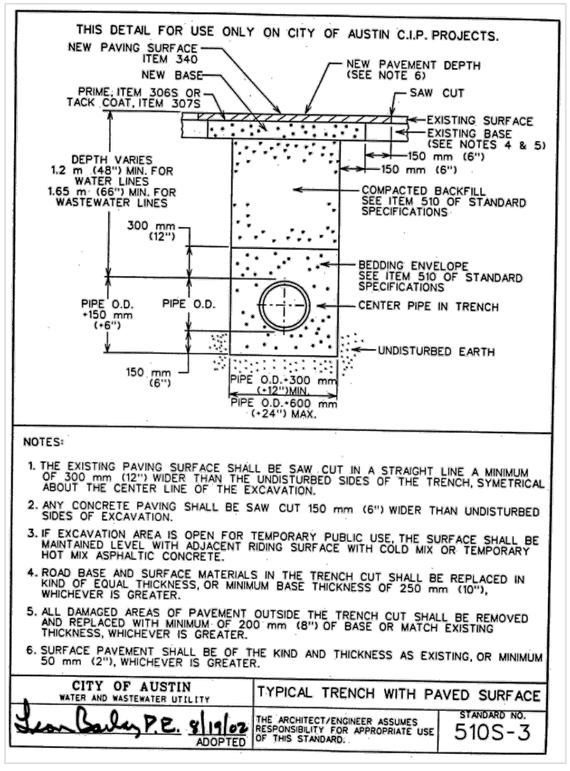
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SP-2016-0186D

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SP-2016-0186D

REV. NO.	REVISION DESCRIPTION	APPROVED BY:	DATE

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STANDARD WATER, CONCRETE & STRUCTURE DETAILS

NEENAH AVE. WIDENING
AUSTIN, TEXAS

WILLIAMSON COUNTY 1848

PROJ. NO. 1403-088-02
DESIGN: G. LITTLEFIELD
DRAWN: G. LITTLEFIELD
CHECK: L. PARISHER
APPR: L. PARISHER
DATE: JULY 18, 2017

STATE OF TEXAS
JAMES LANCE PARISHER
106221
LICENSED
PROFESSIONAL ENGINEER
July 18, 2017

THESE DESIGN DOCUMENTS ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO REGULATORY SIGNATURE AND PERMIT

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273 of 273

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Geotechnical Engineering Report

Neenah Avenue Widening

From Olive Hill Road to End of Existing Neenah Avenue

Austin, Texas

August 10, 2015

Terracon Project No. 96155065



Prepared for:

Williamson County
c/o Bury, Inc.
Austin, Texas

Prepared by:

Terracon Consultants, Inc.
Austin, Texas

terracon.com

Terracon

Environmental ■ Facilities ■ Geotechnical ■ Materials

August 10, 2015

Terracon

Williamson County
c/o Bury, Inc.
221 West 6th Street, Suite 600
Austin, Texas 78701

Attention Ms. Stephanie Blew, Sr. Project Manager
P: (512) 328-0011
F: (512) 328-0325
E: sblew@buryinc.com

Regarding: Geotechnical Engineering Report
Neenah Avenue Widening
From Olive Hill Road to End of Existing Neenah Avenue
Austin, Texas
Terracon Project No. 96155065

Dear Ms. Blew:

Terracon Consultants, Inc. (Terracon) is pleased to submit our Geotechnical Engineering Report for the Neenah Avenue Widening project to be located between Olive Hill road and the end of the existing Neenah Avenue, in Austin, Texas. We trust that this report is responsive to your project needs. Please contact us if you have any questions or if we can be of further assistance.

We appreciate the opportunity to work with you on this project and look forward to providing additional Geotechnical Engineering and Construction Materials Testing services in the future.

Sincerely,
Terracon Consultants, Inc.
(TBPE Firm Registration: TX F3272)

Alexander D. Krumenacher, E.I.T.
Staff Geotechnical Engineer

Bryan S. Moulin, P.E. 08/10/2015
Principal, Geotechnical Department Manager

STATE OF TEXAS
BRYAN S. MOULIN
91084
LICENSED
PROFESSIONAL ENGINEER

Copies Submitted: (1) Electronic

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Terracon

GEOTECHNICAL ENGINEERING REPORT
NEENAH AVENUE WIDENING
FROM OLIVE HILL ROAD TO END OF EXISTING NEENAH AVENUE
AUSTIN, TEXAS

Terracon Project No. 96155065
August 10, 2015

1.0 INTRODUCTION

Terracon is pleased to submit our Geotechnical Engineering Report for the Neenah Avenue Widening project to be located between Olive Hill road and the end of the existing Neenah Avenue, in Austin, Texas. This project was authorized through signature of Bury's "Agreement between Engineer and Consultant" on March 2, 2015. The project scope was performed in general accordance with Terracon Proposal No. P96150166, Revision 1 dated May 20, 2011.

The purpose of this report is to describe the subsurface conditions observed at the borings drilled for this project, analyze and evaluate the test data, and provide recommendations with respect to:

- Pavement design and construction;
- Site, subgrade, and fill preparation; and
- Lateral earth pressure and drainage for site retaining walls.

2.0 PROJECT INFORMATION

2.1 Site Location and Description

Item	Description
Location	This project site is located on the south side of the existing Neenah Avenue from its intersection with Olive Hill Road on the west to the end of the currently existing Neenah Avenue on the east. The site is located within the City of Austin's Extra-Territorial Jurisdiction (ETJ), not the City limits. All funding for the project is through Williamson County.
Existing Improvements	Two-lane asphaltic concrete roadway with concrete curbs, bordered by concrete sidewalks and grassy landscaped areas.
Existing Ground Cover	On the south side of the existing Neenah Avenue (where the widening is planned), the ground appears to be covered by concrete sidewalks, grass, and scattered trees.

Item	Description
Existing Topography	Exact elevations have not been provided to us at this time, but it appears that the adjacent ground to the south of the roadway is relatively level to sloping downhill away from the roadway.

2.2 Project Description

Item	Description
Site layout	See Exhibit A-2, Boring Location Aerial, in Appendix A.
Proposed Roadway Widening	Approximately 3,000 linear feet of Neenah Avenue will be widened to the south to create a 4-lane Minor Arterial, Divided public roadway. Bury would like to consider the following three options for the thickness design: 1) Full-depth asphalt; 2) Asphalt over base over lime-treated clay; and 3) Asphalt over base over geogrid over compacted clay. The pavement thickness design will be based upon current Williamson County and City of Austin standards and guidelines.
Ancillary Improvements	■ 8-foot wide reinforced concrete sidewalks on the north and south sides of the roadway, per City of Austin standards. ■ Numerous improvements to Drainage Swale A, including an extension of the existing box culvert under the roadway at STA 23+00. All of the planned improvements are discussed in detail in **Section 4.8.** ■ Multiple tree-well walls ranging up to 8 feet tall.
Grading	Exact grading is unknown at this time, but we understand that the roadway will be cross-sloped (not crowned in the center) to promote sheet-flow from the widened southern side to the existing northern side where runoff will collect into the storm inlets. We anticipate that fills could range from less than one foot to as much as eight feet.
Adjacent Fill Slopes	Assumed to be no steeper than 3H:1V (Horizontal to Vertical).
Free-Standing Retaining Walls	Walls up to 8 feet tall are planned.
Below-Grade Excavations	Only for the new stormwater line and the culvert headwall extension.

3.0 SUBSURFACE CONDITIONS

3.1 Geology

Based on our review of available geologic information[1] and the samples obtained from the test borings, the study area appears to lie within an area characterized by limestone of the Edwards Formation of Lower Cretaceous Age. The Edwards Formation limestone is typically comprised of limestone and dolomitic limestone. Characteristics of the Edwards which are of engineering importance include karst features such as sinkholes, solution cavities and channels, collapse breccia, and vugular zones. In addition, clay seams and layers are present in the Edwards Formation limestone.

3.2 Typical Profile

Based on the results of the borings, subsurface conditions on the project can be generalized as below. Due to utility concerns in the proposed widening area of Neenah Avenue, all 6 of the borings were drilled in the roadway through the existing pavement section. The existing pavement section was observed to consist of between about 4 and 6 inches of asphalt overlying about 1 to 2½ feet of base material. Note, that it was difficult to accurately determine the thickness of the base section due to the presence of gravelly fill soils beneath the base material, the relatively deep thicknesses of the apparent base sections in some borings, and the limitations of augering through the base.

Description	Approximate Depth Range of Stratum, feet	Material Encountered
Stratum I	0 to >10	Fill and Possible Fill: Fat Clay (CH) to Fat Clay with Sand (CH) to Fat Clay with Gravel (CH) to Gravelly Fat Clay with Sand (CH) to Clayey Sand with Gravel (SC) to Silty Sand with Gravel (SM) to Clayey Gravel with Sand (GC)
Stratum II	3½ to >10	Limestone – Edwards Formation

The Stratum I fill and possible fill (and possibly natural) soils encountered in the borings generally exhibited a variable to very high shrink/swell potential as indicated by the following measured liquid limits, plastic limits, and fines contents (percent passing the No. 200 sieve):

1 *Garner, L.E. and Young, K.P., "Environmental Geology of the Austin Area: An Aid to Urban Planning", Bureau of Economic Geology, The University of Texas at Austin, 1976.*

Sample Location	Depth (feet)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Fines (%)
Boring B-1	½ – 1	19	16	3	33
Boring B-1	3 – 3½	57	21	36	-
Boring B-2	3 – 4	-	-	-	22
Boring B-3	½ – 2	18	16	2	29
Boring B-3	2 – 3½	85	27	58	-
Boring B-3	6 – 7½	-	-	-	34
Boring B-4	2 – 3½	70	20	50	-
Boring B-4	4 – 5½	53	21	32	95
Boring B-4	6 – 7	-	-	-	47
Boring B-5	½ – 2	103	27	76	43
Boring B-5	2 – 3½	100	25	75	62
Boring B-5	4 – 5½	-	-	-	45
Boring B-5	6 – 7½	71	21	50	30
Boring B-6	½ – 2	99	30	69	64
Boring B-6	4 – 5½	86	25	61	18
Average	**-**	**69**	**23**	**47**	**44**

The in-situ moisture content of the Stratum I soils ranged from 20 percent dry of, to 6 percent wet of corresponding plastic limits. A hand penetrometer reading of 3.0 tsf was recorded for a sample of the Stratum I soil at boring B-1. Standard penetration test (SPT) blow counts (N-values) for the Stratum I soils were found to vary from 10 blows per foot (bpf) to 50 blows per 3 inches of penetration. The higher blow counts are likely due to the presence of larger gravel, cobbles, and possible boulders within the fill soils. Portions of these soils are the completely weathered to residual soils of the underlying Edwards limestone.

The Stratum II light gray to light brownish-gray to gray Edwards Formation limestone was encountered at depths ranging from about 3½ to 8½ feet below the existing road surface. SPT N-values in the upper portions of the Stratum II limestone varied from 50 blows per 4 inches, to 50 blows per 2 inches of penetration.

Conditions encountered at the boring locations are indicated on each individual boring log. Stratification boundaries on the boring logs represent the approximate location of changes in subsurface material types; in-situ, the transition between materials may be gradual. Details for the borings can be found on the boring logs on Exhibits A-4 through A-9 of Appendix A.

3.3 Groundwater

The borings were dry augered to completion depths of about 10 feet below existing grade. Groundwater was not observed during dry augering of the borings.

Although not observed during our field exploration, groundwater seepage is possible at the site, particularly in the form of seepage traveling along pervious seams/fissures in the gravelly fill soils, along the soil/limestone interface, and/or in fissures/fractures in the limestone. During periods of wet weather, zones of seepage may appear and isolated zones of "perched water" may become trapped (or confined) by zones possessing a low permeability. Groundwater conditions at the site could fluctuate as a result of seasonal and climatic variations. Please note that it often takes several hours/days for water to accumulate in a borehole and geotechnical borings are relatively fast, short-term, boreholes that are backfilled the same day. Long-term groundwater readings can more accurately be achieved using monitoring wells. Please contact us if this is desired. Groundwater conditions should be evaluated immediately prior to construction.

3.4 Discussion of Lime Treatment of On-Site Clayey Soils

Lime treatment of clay subgrade typically enhances the workability and support characteristics of the subgrade, as well as provides a barrier to reduce moisture infiltration into the underlying clay subgrade. Lime treatment also typically helps to reduce the shrink/swell potential of the lime-treated layer. However, excessive concentrations of sulfates in the soils can result in poor performance of lime treated subgrade. Initial sulfate testing is currently in progress.

To assist in this determination, we subcontracted with an analytical laboratory to perform four (4) sulfate/chloride tests on representative samples of the soils at this site. The test results are presented below.

Boring	Sample Depth, feet	Stratum & Soil Description	Chloride Content, ppm-dry	Sulfate Content, ppm-dry
B-1	3 – 3½	Stratum I Fat Clay with Sand (CH)	40	248
B-4	½ – 2	Stratum I Silty Sand with Gravel (SM)	39	52
B-5	0 – 1½	Stratum I Variable Fill (CH to GC)	39	669
B-6	2 – 3½	Stratum I Gravelly Fat Clay with Sand (CH)	38	951

Based on numerous research studies performed by educational institutions, regulatory agencies, and both public and private entities, soils that contain significant amounts of soluble sulfates are not optimal candidates for lime treatment and may result in excessive heave and subsequent distress to the pavements. Soluble sulfate levels of up to 3,000 ppm or less are generally considered to be acceptable for lime treatment. Soluble sulfate levels between 3,000 ppm and 10,000 ppm in clay soils are generally considered to be moderate to high and pose a greater risk

to successful traditional lime treatment. As can be seen above, lime treatment of the Stratum I soils generally appears to be feasible.

Once final pavement subgrades are established, additional sulfate content testing should be performed to ensure that the soils to be lime-treated do not contain high sulfates. We suggest testing via TEX-620-J on an approximate frequency of one test per 10,000 square feet of paving subgrade. In addition before imported paving fill is hauled to the jobsite, it should be tested for sulfate contents also.

In conjunction with the sulfate content tests, a soil-lime relationship test was also conducted on a bulk sample of the Stratum I fat clay. A potential optimum percentage of lime to be added to the soils was evaluated based on plasticity index tests conducted on the subgrade soils treated with various percentages (by dry soil weight) of lime. However, this should only be taken into consideration after further testing of subgrade soils for sulfates as specified above. Results of the lime-series test are presented in the following table.

Percent Lime Added by Soil Dry Weight (%)	Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI	pH
0	46	22	24	7.2
4	46	36	10	12.5
6	46	36	10	12.5
8	45	36	9	12.5
10	45	36	9	12.5

Based on the above information, we recommend at least 7 percent lime as measured by dry soil weight to a depth of 8 inches below the base material be used for planning and budgetary purposes. We strongly suggest that additional lime-series testing be performed once the final roadway subgrade is exposed. At least one sample from each paving subgrade type should be tested for pH (minimum pH of 12.3 to 12.4) per TEX-112-E and for plasticity index (PI≤20) per ASTM D6276.

Note, that the on-site soils contain significant amounts of gravel. Locally, lime treatment is usually not performed on soils with significant gravel content as it can cause damage to the mixing equipment and slow production. However, it can still be done.

There is some concern when deciding to use lime. Dry hydrated lime should not be used as dust clouds can occur. Lime slurry should be used but the area can become very wet, soft, and muddy. However, slurry is the typical form of application.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

Based on our test borings, expansive soils that exhibit a variable to very high potential for volumetric change during moisture variations are present at the site. The soils along the roadway exhibit a Potential Vertical Rise (PVR) of up to about 2½ inches, as estimated by the Texas Department of Transportation (TxDOT) Method TEX-124-E, if present in a dry condition. After construction of the roadway widening, we expect the PVR to be on the order of about 1½ to 1¾ inches.

The following recommendations are based upon the data obtained in our field and laboratory programs, project information provided to us, and on our experience with similar subsurface and site conditions. Throughout this report, references are made to TxDOT and/or COA construction specifications, standards, and/or test methods. All of these references are intended to imply the most current versions of published specifications, standards, and/or test methods.

4.1 Earthwork

Construction areas should be stripped of existing asphaltic pavements, base material, concrete curbs, any organics, debris, and other unsuitable material. All utilities and associated bedding materials that are planned to be abandoned/demolished should be completely removed from within the proposed pavement area. If it's not possible to completely remove them, the abandoned utility lines should be thoroughly grouted and plugged with flowable fill (per TxDOT Item 401 or COA Item 402S) such that they do not become a conduit for water flow beneath the proposed roadways or utility installations. Roots of trees to be removed within construction areas should be grubbed to full depths, including the dry soil around the roots. Site stripping/excavation operations in cut areas could loosen limestone rocks/boulders which should be either properly broken down or removed from the site. We recommend that Terracon be retained to assist in evaluating exposed subgrades during earthwork so that unsuitable materials, if any, are removed at the time of construction.

Once final subgrade elevations have been achieved, the exposed subgrade (and subsequent crushed limestone base material lifts) should be carefully proofrolled per TxDOT Item 216 or COA Item 236S to detect weak zones in the subgrade and/or base. Weak areas detected during proofrolling should be removed and replaced with soils exhibiting similar classification, moisture content, and density as the adjacent in-situ soils. Proper site drainage should be maintained during construction so that ponding of surface runoff does not occur and causes construction delays and/or inhibit site access.

4.1.1 Compaction Requirements

Recommended compaction and moisture content criteria for engineered fill materials are as follows:

Fill Type [1]	TxDOT or USCS Classification	Acceptable Location For Placement [2]
Flexible Base [3]	TxDOT Item 247, Grade 1-2 or COA Item 210S	Pavement Base
Imported Type C Earthen Embankment Fill [3, 4]	TxDOT Item 132, Type C (6≤PI≤30)	Within roadway limits, including embankments
General Fill [5]	On-site excavated soils	For site grading within roadway limits, including embankments.
Bedding Material [6]	TxDOT Item 556, Type C Bedding	Under, beside, and above new utility lines and box culverts, or as specified by the designer and/or manufacturer.
Utility Backfill [7]	CH, CL, SC, GC	Above bedding material, up to final grades.
Alternative Backfill [8]	–	Flowable Backfill per TxDOT Item 401, or Controlled Low Strength Material (CLSM) per COA Item 402S

1. Prior to any filling operations, samples of proposed borrow and/or on-site materials should be obtained for laboratory testing. The tests will provide a basis for evaluation of fill compaction by in-place density testing. A qualified soil technician should perform sufficient in-place density tests during the filling operations to evaluate that proper levels of compaction, including dry unit weight and moisture content, are being attained.
2. All fill should be placed in maximum loose lift thicknesses of 8 inches with compacted lift thicknesses of no more than 6 inches. All lifts should be tested for density and moisture control, as well as proofrolling.
3. Imported flexible base and Type C embankment fill should meet the requirements of the Texas Department of Transportation (TxDOT) 2014 Standard Specifications mentioned above. Type C embankment fill should not include any rocks larger than 4 inches, prior to spreading and compaction.
4. The use of imported “crusher fines” to meet the Type C embankment fill specifications is prohibited due to their susceptibility to poor support characteristics upon exposure to excessive moisture/wet weather.
5. Excavated on-site soils, if free of organics, debris, and rocks larger than 4 inches, may be considered for use as fill as pavement subgrade and paving/embankment fill. Wet and/or organic-laden clays from utility excavation on box culvert areas should not be used as general fill.
6. Bedding material to be specified by pipe manufacturer and/or design engineer.
7. Excavated on-site soils and processed rock, if free of organics, debris, and rocks larger than 4 inches, may be considered for use as backfill in utility trenches and around manholes. Wet and/or organic-laden clays from utility excavation on box culvert areas should not be used as utility backfill.
8. May be used in any areas if preferred over the placement and compaction of soil backfill. This may be most advantageous around manholes where soil compaction is often difficult. Undercompaction of soil backfill can lead to future settlement and radial cracking in pavements adjacent to manholes.

Fill Type		Percent Compaction	Water Content
Flexible Base		100% TEX-113-E	-3% to +3% of optimum
Type C Earthen Embankment Fill	PI≤20	■ All fill less than 5 feet: ≥ 95 percent of the TEX-113-E or TEX-114-E (depending upon soil type) ■ For fills greater than 5 feet in depth: ≥ 100 percent of the TEX-113-E or TEX-114-E (depending upon soil type)	-3% to +3% of optimum
	20<PI≤30		Optimum to +4% of optimum
General Fill (On-Site Soils with PI≥20)		■ All fill less than 5 feet: ≥ 95 percent of the TEX-113-E or TEX-114-E (depending upon soil type) ■ For fills greater than 5 feet in depth: ≥100 percent of the TEX-113-E or TEX-114-E (depending upon soil type)	Optimum to +4% of optimum
General Fill (On-Site Soils with PI≤20) and Bedding Material			-3% to +3% of optimum

Engineered fill materials should be placed in horizontal, loose lifts not exceeding 8 inches in thickness and should be thoroughly compacted. Where light compaction equipment is used, as is customary adjacent to manholes and in utility trenches, the lift thickness may need to be reduced to achieve the desired degree of compaction.

We recommend that engineered fill be tested for moisture content and compaction during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved.

4.1.2 Watering and Establishment of Vegetation along Pavement Edges

Although methods can be undertaken to reduce the possibility of cracking in the pavement, cracking may still occur. Most pavement cracking over expansive clay soils begins longitudinally within a few feet roughly parallel to the pavement edges and then progresses inward. This is due to an edge drying or wetting process in which the soils adjacent to the pavement subgrade either wick moisture away from the subgrade or provide excess moisture into the subgrade. Either process typically leads to subgrade shrinking or swelling, which then results in cracks propagating upward through the subgrade, base, and into the surficial asphalt. Treating the subgrade soils with lime and/or using geogrid can help to reduce the effects of edge drying/wetting and crack propagation, but neither method will completely mitigate the potential for this occurrence.

The primary goal when attempting to reduce the potential for edge cracking is to maintain relatively consistent moisture levels in the subgrade and the adjacent soils throughout the entire construction process and afterwards throughout the pavement life.

Terracon recommends that a provision be added to the plans and specifications to require the Contractor to water the subgrade and adjacent soils daily at a minimum (possibly twice per day may be needed) to reduce drying and desiccation cracks from developing in the soils. As soon as the initial subgrade is placed and/or lime-treated and until final paving acceptance, the Contractor should begin the process of daily watering to establish and maintain healthy grassed vegetation along the pavement edges, as grass reduces the underlying soil temperature and evapotranspiration of moisture from the soil. This watering process to establish vegetation should not be left until the end of construction. Overwatering or saturating the soils is not the intent. The intent is to provide only sufficient water to promote grass growth and establishment.

4.1.3 Horizontal Moisture Barriers

If the daily watering discussed in **Section 4.1.2** above cannot be performed due to drought-driven watering restrictions, then another option is to use horizontal moisture barriers. The barrier should consist of a minimum 30-mil moisture barrier (polyethylene, EPDM, or HDPE are all acceptable). Adjoining sheets should be overlapped by at least 18 inches and taped/sealed if necessary to prevent slippage and loss-of-overlap during subsequent fill placement and earthwork. At a minimum, the barriers should be covered with at least 12 inches of topsoil (or more to reduce accidental puncturing).

The barrier should be installed to a distance of at least 6 feet (or further if possible) beyond paved edges and at least 3 feet (or further if possible) beyond the flexible base, geogrid, and lime-treated subgrade. Where sidewalks are present near the roadway, the moisture barrier should extend from the roadway to at least 12 inches into the sidewalk limits (the concrete sidewalk will act as a type of horizontal barrier also, provided all joints/cracks are sealed and maintained).

4.2 Pavement Design Recommendations

Based on information provided to us by Bury, Neenah Avenue should be designed to meet City of Austin (COA) guidelines which includes the use of the guidelines and procedures outlined in the COA Transportation Criteria Manual (TCM), particularly Section 3 of the TCM which outlines the computerized pavement design software known as MFPS-1.

For the roadway design, we understand that the proposed roadways are to be designed using the “4 Lane Divided Minor Arterial” street classification. If the above street classifications change, please notify us to revise our pavement design analyses.

We also understand that Bury would like to consider the following three options for the pavement thickness design:

- Asphalt over base over lime-treated or moisture conditioned subgrade (options 1 and 2);
- Full-depth asphalt (options 3 and 4); and
- Asphalt over base over geogrid over compacted clay (options 5 and 6).

4.2.1 Traffic Data

Asphaltic concrete pavement thickness for the proposed roadway for this project was evaluated using the COA computerized pavement design program MFPS-1 in accordance with the guidelines outlined in the COA TCM. Traffic-related design parameters are tabulated below. If any of the parameters in the tables below are known to be inaccurate, please notify us to revise our pavement design analyses.

Traffic-Related Design Parameter	4 Lane Divided Minor Arterial
Initial Average Daily Traffic, ADT (vehicles per day)	9,000
Percent Trucks in Average Daily Traffic, %	10.9
18-kip Equivalency Factor for Standard City Truck	0.62
Total Equivalent 18-kip Single Axle Load Applications, based on Theoretical 20-year Pavement Life	3,020,000
Yearly Percent Growth, %	4.0
Initial Serviceability Index	4.2
Terminal Serviceability Index	2.5

4.2.2 Recommended Pavement Thicknesses

In the tables below, pavement component thickness recommendations are provided for an approximate 20-year traffic design under the traffic loading given above. As with all pavements, periodic maintenance is expected in the form of crack sealing. A surface coating or overlay would be expected after about 10 years of service under the design traffic.

FLEXIBLE PAVEMENT SECTIONS

Component	Material Thickness (Inches)					
	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Asphaltic Concrete (HMAC Type D)	2.0 (all options)					
Asphaltic Concrete (HMAC Type C)	4.0		2.0	2.0	4.0	
Asphalt Stabilized Base (ASB) (HMAC Type B)	-		11.5	9.5	-	
Crushed Limestone Base (CLB)	18.0	13.0	-		16.0	14.0
Geogrid between Base & Subgrade	-				Type II per TxDOT DMS 6240[1]	Tensar® TX-5
Lime-Treated Subgrade (LTS)	-	8.0	-	8.0	-	
Moisture Conditioned Subgrade (MCS)	6.0	-	6.0	-	6.0	
Total Thickness (including LTS/MCS)	**30.0**	**26.0**	**20.5**		**28.0**	**26.0**

1. For Option 5, the Type II geogrid should be placed at a depth of 6 inches beneath the bottom of the asphalt layer, within the CLB section. In other words, there should be 6 inches of CLB above, and 10 inches of CLB beneath the geogrid.

4.2.3 Pavement Materials

Presented below are our recommended material requirements for the various pavement components mentioned previously in this report.

Hot Mix Asphaltic Concrete (HMAC) – As tabulated above, the asphaltic concrete should be plant mixed, hot laid Type D (Fine-Graded Surface Course) and hot laid Type C (Coarse-Graded Surface Course) meeting the master specification requirements in COA Item 340S or TxDOT Item 340. Asphalt stabilized base (ASB) should be Type B HMAC per COA Item 340S or TxDOT Item 340. In accordance with TxDOT Item 340, compacted lift thicknesses should be between 1.5 and 3 inches for Type D HMAC, 2 and 4 inches for Type C HMAC, and 3 to 6 inches for Type B HMAC (ASB). The mixes should be designed for stability and compacted as outlined in COA Item 340S.4.D. Acceptance and payment criteria are outlined in COA Item 340S.12.

Crushed Limestone Base (CLB) – Base material should be composed of crushed limestone meeting the requirements of TxDOT Item 247, Type A, Grade 1-2 or COA Item 210S. The CLB should be compacted to a minimum of 100 percent of the TEX-113-E maximum dry density at -3 to +3 percent of optimum moisture content. Each lift of CLB should be thoroughly proofrolled just prior to placement of subsequent lifts and/or asphalt.

Particular attention should be paid to areas along curbs, above utility trenches, and adjacent to landscape areas, manholes, and storm drain inlets. Placement and compaction of CLB should extend at least 36 inches behind curbs.

Lime-Treated Subgrade (LTS) – If lime-treated subgrade is used, the subgrade should be treated with lime meeting the requirements of COA Item 203S. Lime treatment may be accomplished by either the dry placement or slurry placement process.

We suggest that 7% lime be used for bidding purposes with add/deduct line items for 1 to 2% lime above or below the base bid item. Prior to the application of lime to the subgrade, the optimum percentage of lime to be added should be determined based on Plasticity Index (TEX-112-E) and/or pH (ASTM D 6276) laboratory tests conducted on mixtures of the actual pavement subgrade soils with lime. Subgrade soil samples should be obtained from the pavement area at the proposed final subgrade elevation. Please note these tests require up to 5 business days to complete.

The lime should initially be blended with a mixing device such as a pulvermixer, sufficient water added, and allowed to cure for at least 48 hours. After curing, mixing should continue until the gradation requirements of COA Item 203S.5.E are met. The mixture should then be moisture adjusted and compacted to a minimum of 95 percent of the maximum dry density as determined by TEX-114-E. Placement of the lime-treated subgrade should extend at least 36 inches behind curbs.

Geogrid Reinforcement – Depending upon bid option, the geogrid should be Type II per TxDOT DMS-6240 or Tensar® TX5. The Tensar TX-5 geogrid should be placed above the moisture conditioned subgrade and below the flexible base material. The Type II geogrid should be placed within the base at a depth of 6 inches below the asphalt. Adjacent geogrid sections should be overlapped a minimum of 1-foot. If the geogrid overlap cannot be maintained during the subsequent construction process, the Contractor should use staples or clips to tie the adjacent sections together. Prior to placing base over the grid, the geogrid should be laid flat and stretched taut, to reduce excessive undulations, creases, folds, or slack in the sections. Placement of geogrid should extend at least 36 inches behind curbs.

Moisture Conditioned Subgrade (MCS) – If lime-treated subgrade is not used, the soil subgrade should be scarified to a depth of 6 inches, moisture conditioned, and recompacted to at least 95 percent of the maximum dry density as determined by TEX-114-E. Clay soils with PI≥30 should be moisture conditioned to between optimum and +4 percent of optimum. Clay soils with PI<30 should be moisture conditioned to between -3 and +3 percent of optimum. Moisture conditioning is not necessary in intact limestone subgrade areas, if any. Care should be taken such that the subgrade does not dry out or become saturated prior to pavement construction. The pavement subgrade should be

thoroughly proofrolled with a rubber-tired vehicle (fully loaded water or dump truck) immediately prior to placement of base material. Particular attention should be paid to areas along curbs, above utility trenches, and adjacent to landscape areas, manholes, and storm drain inlets. Placement and compaction of MCS should extend at least 36 inches behind curbs.

On most projects, rough site grading is accomplished relatively early in the construction phase. Fills are placed and compacted in a uniform manner. However, as construction proceeds, excavations are made into these areas; dry weather may desiccate some areas; rainfall and surface water saturates some areas; heavy traffic from concrete and other delivery vehicles disturbs the subgrade; and many surface irregularities are filled in with loose soils to temporarily improve subgrade conditions. As a result, the pavement subgrade should be carefully evaluated as the time for pavement construction approaches. This is particularly important in and around utility trench cuts, manholes, and storm drain inlets, as well as any adjacent landscaped and irrigated areas. All pavement areas should be moisture conditioned and properly compacted to the recommendations in this report immediately prior to paving. Thorough proofrolling of pavement areas should be performed no more than 24 hours prior to surface paving. Any problematic areas should be reworked and compacted at that time. Proofrolling should be re-performed if the subgrade and/or base are exposed to rainfall prior to subsequent construction activities, after replacement of the wet materials or reworking of the wet materials.

4.2.4 Sidewalks

In addition to the pavement sections presented previously, we understand that recommendations for sidewalks regarding concrete strength and expansion/contraction joint spacing are required. Sidewalks are planned to handle pedestrian and/or bicycle traffic, not vehicular loadings.

In accordance with COA Standard 432S-1, the sidewalk should consist of at least 4 inches of concrete reinforced with welded fire fabric (6”×6”×W1.4×W1.4) or #3 bars spaced at 18 inches on centers in both directions. The concrete should be designed to exhibit a minimum 28-day compressive strength of 3,600 psi. Per COA Item 432S.4, control joint and expansion joint spacing should be maximum of 5 feet and 40 feet, respectively. Other sidewalk-related items should be as outlined in COA Item 432S.

Sidewalks constructed directly above the on-site clay soils will be subject to potential shrink/swell movements of about 2 inches. It has been our experience that sidewalks are generally constructed above on-site soils without significant subgrade preparation and that the County and/or Ownership Entity simply accepts the associated movement risks and future repair/replacement costs. If the County desires to perform subgrade preparation to reduce the shrink/swell movements to on the order of about 1-inch, then at least 2 feet of low-expansive potential fill material (such as crushed limestone base or Type A Earthen Embankment Fill with PI≤15) should be placed below the sidewalks. Prior to constructing sidewalks, the subgrade should be scarified to a depth of 6 inches, moisture conditioned and compacted as per **Section**

4.1.1. We recommend a 12-inch thick clay layer (and at least 18 inches wide) of compacted soils adjacent to sidewalks, behind curbs, and between sidewalks and curbs. The on-site soils should be moisture conditioned and compacted as per **Section 4.1.1**.

4.2.5 Expansive Soils and Edge Moisture Considerations

Pavements constructed over highly expansive fat clay soils are susceptible to the cyclic shrink/swell movements of the clay soils. These cyclical movements are caused by the weather patterns varying between dry and wet seasons, which can be very drastic variations in Central Texas. Most commonly, the movements are initially observed in the form of longitudinal cracking approximately parallel to the pavement edge. These edge cracks are due to cyclic movements related to either drying or wetting along the pavement edges. To reduce or slow down the occurrence of edge cracking, the soils along the pavement edges should be sloped properly such that water does not pond directly adjacent to or near the pavement edges and the ground surface should be vegetated and lightly irrigated (enough to promote healthy growth, but not too much to completely saturate the soils). The goal is to maintain relatively consistent moisture profiles in the soils and to avoid significant variations throughout the wet/dry seasons. During construction, this watering should occur on a regular daily basis from the time of subgrade preparation through roadway acceptance.

When edge cracks do develop, the cracks should be sealed as quickly as possible and regular maintenance should be performed such that cracks do not remain open and become direct sources for moisture migration.

In addition, slopes and/or drainage swales should not be placed directly next to the pavement edges. At a minimum, the adjacent ground surface beyond the pavement edges should be gently sloped (no more than 2 percent) downhill and away from the pavement edges for at least 3 feet, prior to sloping steeper downhill for drainage swales or other reasons.

4.2.6 Pavement Maintenance Considerations

Long-term pavement performance will be dependent upon several factors, including maintaining subgrade moisture levels and providing for preventive maintenance. The following recommendations should be considered at a minimum:

- Adjacent site grading at a minimum 2% grade away from the pavements;
- A minimum ¼ inch per foot slope on the pavement surface to promote proper surface drainage;
- Install joint sealant and seal cracks immediately; and
- Placing compacted, low permeability clay backfill against the pavement edges, covering the more pervious flexible base material.

Preventive maintenance should be planned and provided for through an on-going pavement management program. These activities are intended to slow the rate of pavement deterioration

and to preserve the pavement investment. Preventive maintenance consists of both localized maintenance (e.g. crack and joint sealing and patching) and global maintenance (overlays). This is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements.

4.2.7 Connection between Existing and New Pavements

To avoid having a vertical joint between the existing and new pavements, Terracon recommends that the existing asphalt and base be carefully excavated to a depth equivalent to 6 inches below the bottom of the new Type C asphalt layer. This excavation should extend 12 inches laterally into the existing pavement section. If the adjacent existing asphalt is cracked or distressed, this excavation should extend further to 12 inches beyond distressed asphalt portions.

Once the existing asphalt/base is excavated and the adjacent new pavement section has been constructed to the same elevation, the entirety of the exposed base material should be proofrolled. Once the exposed base passes the proofrolling inspections, the final 6 inches of base material should be placed over new and existing pavement areas, compacted, tested for moisture/density, and proofrolled. Once the final lift of base material passes proofroll, then asphalt placement and compaction may begin. The above method also applies if one of the full-depth asphalt sections is selected; except the new “base” would be the asphaltic black base (Type B HMAC).

4.3 Lateral Earth Pressures

The following earth pressures may be used for site retaining wall design, including those associated with box culverts and tree wells. Presented below are at-rest, active, and passive earth pressure coefficients for various backfill types adjacent to below-grade walls or site retaining walls. At-rest earth pressures are recommended in cases where little wall yield is expected (such as structural below-grade walls). Active earth pressures may be used in cases where the walls can exhibit a certain degree of horizontal movement (such as cantilevered retaining walls). The recommendations in this section apply to those walls which are installed in open cut or embankment fill areas such that the backfill extends out from the base of the wall at an angle of at least 45 degrees from vertical for the entire height and length of the wall.

Backfill Type	Estimated Total Unit Weight (pcf)	Lateral Earth Pressure Coefficients[1]		
		At Rest (K_O)	Active (K_A)	Passive (K_P)
Crushed Limestone (TxDOT Item 247, Type A, Grade 1-2)	140	0.45	0.3	3.5
Clean Gravel (TxDOT Item 423, Type DS)	120	0.45	0.3	3.5
On-site Soils	125	0.58	0.41	2.5

1. Coefficients represent ultimate values. Appropriate safety factors should be applied.

The above values do not include a hydrostatic or ground-level surcharge component. To prevent hydrostatic pressure build-up, retaining walls and wingwalls should incorporate functional drainage (via free-draining aggregate or manufactured drainage mats) within the backfill zone. In addition, backflow prevention should be provided for any weep holes where there is a potential for the weep holes to be inundated during a flood, such as might occur along Retaining Walls N and S.

We understand that Retaining Walls N and S are designed for TxDOT Type B loading, which includes surcharge loads from slopes of up to 4(H):1(V) behind the retaining wall. The effect of surcharge loads, where applicable, should be incorporated into wall pressure diagrams by adding a uniform horizontal pressure component equal to the applicable lateral earth pressure coefficient times the surcharge load, applied to the full height of the wall.

The compactive effort should be controlled during backfill operations adjacent to walls. Overcompaction can produce lateral earth pressures in excess of at-rest magnitudes. Compaction levels adjacent to walls should be maintained between 95 and 100 percent of TEX-114-E maximum dry density.

For retaining walls bearing at least 2 feet below existing grades on on-site Stratum I fat clay soils, we recommend a coefficient of sliding resistance of 0.25 (maximum allowable sliding resistance of 500 psf) and a maximum footing bearing capacity of 2,000 psf. For retaining walls bearing at least 2 feet below existing grades on all other on-site Stratum I soils or Type C Earthen Embankment Fill (PI≤30), we recommend a coefficient of sliding resistance of 0.35 (maximum allowable sliding resistance of 500 psf) and a maximum footing bearing capacity of 2,500 psf. For retaining walls bearing at least 2 feet below existing grades on crushed limestone base, we recommend a coefficient of sliding resistance of 0.4 (maximum allowable sliding resistance of 500 psf) and a maximum footing bearing capacity of 3,000 psf. All retaining walls should be checked against failure due to overturning, sliding, and overall slope stability. Such an analysis can only be performed once the dimensions of the wall and cut/fill scenarios are known.

We recommend that a buffer area of at least 5 feet for all pavement areas be placed between retaining walls (with a minimum height of 4 feet or more), and the adjacent construction. These recommended buffer zones are to reduce the potential of distress from any long-term (“creep”) movements of the wall and backfill. Pedestrian sidewalks may be exempted from the above criteria; however, some distress could still be observed in the sidewalks due to movements of the retaining walls and backfill.

As shown in Exhibit C-4 (modified slightly from TxDOT Standard Sheet RW 2) in Appendix C, a wall drain (consisting of freely-draining aggregate or manufactured drainage mat, along with outlet piping) is recommended for collection and removal of surface water percolation behind the walls. Proper control of surface water percolation will help to prevent buildup of higher wall pressures.

In unpaved areas, the final 12 inches of backfill should preferably consist of clayey soils to help to reduce percolation of surface water into the backfill.

4.4 Embankment Fill Slopes

The following embankment construction recommendations apply to those constructed in association with pavement and/or general site improvements. We recommend that fill embankments (and/or berms) be constructed such that the final embankment sides are sloped at 3(H):1(V), or flatter. Typically, mower and maintenance equipment access is easier at 4(H):1(V) or flatter. For embankments constructed at this inclination or flatter, fill placement for the embankments can proceed as outlined in **Section 4.1**. Please note that the compaction requirements indicated in **Section 4.1.1** apply to all portions of the embankment slopes.

Embankments which are constructed on natural subgrade sloping steeper than 5(H):1(V) should be “keyed” into the subgrade at the toe of the embankment. The keyed-in toe should consist of a 12-foot wide section which is excavated no more than 2 feet into the subgrade such that a horizontal working surface is attained for compaction of the first embankment lift. Successive lifts should remain horizontal and should not tend to follow the slope of the natural subgrade.

The crest of embankment slopes should not be placed directly next to the pavement edges. At a minimum, the adjacent ground surface beyond the pavement edges should be gently sloped (no more than 2 percent) downhill and away from the pavement edges for at least 3 feet, prior to sloping steeper downhill for the embankments.

The embankment slopes should be properly protected from erosion (the use of erosion control fabrics and/or vegetation is common). In addition to initial erosion control measures, the embankments should be periodically checked for erosion (particularly after heavy rainfall events) and should have maintenance performed on areas exhibiting erosion.

The edges of fill embankments are often undercompacted in the field due to loose material being pushed off the edges as the embankment lifts are compacted. To reduce the possibility of this impacting the stability of the embankment fill, the embankments should be overbuilt and compacted to the specifications given above. Then the embankment fill should be cut back to the slopes recommended above.

4.5 Below-Grade Construction for Utility Lines

Presented below are comments addressing below-grade construction considerations for the proposed utility lines.

For construction of the utility lines, the excavations may be performed as open cuts, if sufficient space allows. Due to the primarily high plasticity of the on-site soils, we recommend sideslopes

no steeper than 1½(H):1(V) for temporary excavation in soil subgrade areas and ½(H):1(V) for temporary excavations in Stratum II rock. If groundwater seepage is observed in the soils during construction, we recommed sideslopes no steeper than 2(H):1(V) in the soils. In our opinion, temporary sideslopes at the inclinations discussed above should be stable against a large-scale slide, although the potential for sloughing of loose soil/rock zones exists. The areas generally susceptible to sloughing are soil layers/zones and rock zones that are severely weathered, highly fractured, or intermixed with significant amounts of soil. Excavation methods which fracture the rock significantly could also result in decreased slope stability.

Backfilling of the excavations around the utility lines should be completed with properly compacted on-site soils and bedding material, as outlined in **Section 4.1**. As an alternative, flowable backfill may be used as per TxDOT Item 401or COA Item 402S.

A buffer area at least 10 feet wide should be maintained adjacent to streets, utilities, or other facilities to accommodate localized sloughing. Subgrade loading from material spoil piles, traffic, or equipment loading closer than 6 feet from the crest of the slope should be avoided. In soil subgrade areas, the exposed slopes should be covered with plastic or other suitable protection to minimize erosion and drying out of surface soils. Any utilities or other critical facilities should be locally shored such that any sloughing of slopes will not undermine them.

If it is not possible to slope (or bench) portions of the excavations due to limited space restrictions, the excavation should be properly shored or braced. If temporary excavation retention systems are planned, the retention system should be designed by a registered Professional Engineer specialized in such design and should also comply with the applicable OSHA requirements.

In regards to worker safety, Occupational Safety and Health Administration (OSHA) Safety and Health Standards require the protection of workers from excavation instability in trench and “non-trench” situations. The OSHA guidelines and directives should be followed by the Contractor during construction to insure a safe working environment.

4.6 Excavation Into Stratum II Limestone

Excavation operations at the site for the proposed utility lines will require cuts of up to approximately 6.7 feet, which will penetrate into and possibly through the Stratum I soils and into the Stratum II Edwards Formation limestone, which was encountered in the borings at depths of 3½ to 8½ feet below the existing pavement surface. The data obtained during our field and laboratory programs, indicates that the rock will require sawcutting, jackhammering, hoe-ramming, or similar techniques to excavate. This rock formation is generally hard and considered as “non-rippable” by most local earthwork contractors. The overlying soils do contain limestone fragments and cobbles/boulders and could present excavation challenges as well. The weathering profile of bedrock is hard to predict and it is generally in an undulating pattern, not flat

or uniformly sloped. Thus, the Contractor should be prepared to excavate surficial limestone anywhere on this site.

Our comments on excavation are based on our experience with the rock formation and the data obtained during our field exploration. Rock excavation depends on not only the rock hardness, weathering, and fracture frequency, but also the contractor's equipment, capabilities, and experience. Therefore, it should be the contractor's responsibility to determine the most effective methods for excavation. The above comments are intended for informational purposes for the design team only and may be used for planning purposes.

4.7 Drainage/Groundwater Control

Surface drainage must be developed so that ponding of surface runoff near the excavations does not occur. Zones of groundwater seepage may be encountered within the trench sidewalls during excavation operations for the proposed utility lines. Although groundwater control is the responsibility of the contractor, we anticipate that the use of sumps and sump pumps would be an effective means of dewatering the excavation should this occur. Provisions should be included in the plans and specifications to control groundwater seepage during construction should it occur.

4.8 Drainage Swale A Design Considerations

Based on the Drainage Swale A plan sheets provided to us by Bury, the following drainage improvements are planned between Swale A STA's 11+88 and 23+00 (approximate roadway STA's 13+00 and 23+50):

- A new 6' x 6' area inlet will be constructed at Swale A STA 11+88. The inlet will have an invert elevation of 863.76 feet, which will require cuts of approximately 6.7 feet.
- The area inlet will divert water into a new 36" reinforced concrete pipe (RCP), which will carry water approximately 204 feet downstream to Swale A STA 13+97. The new storm drain line is denoted as SD Line D. Construction of the new pipe will require cuts of about 3.9 to 6.4 feet below existing grade.
- The existing 24" RCP culvert at Swale A STA 16+00 is planned to be demolished and replaced with a new precast 5' x 3' single-cell box culvert (SBC), denoted as Culvert C. The base of the new culvert will be positioned approximately 1.3 to 1.4 feet below the existing ground at the centerline of Swale A.
- The existing 10' x 4' SBC at Swale A STA 19+78 is planned to be demolished and replaced with a new precast 12' x 4' SBC, denoted as Culvert B. The base of the new culvert will be positioned approximately 1.2 to 1.3 feet below the existing ground at the centerline of Swale A. The existing headwall and wingwalls on the west side of the culvert will be removed and replaced with new structures.
- The portion of Swale A between Swale A STA's 20+08 and 21+26, which links Culvert B to the existing downstream multi-cell box culvert (MBC) Culvert A, is planned to be

improved as shown in the Figure 1. The planned improvements include the construction of retaining walls on both the north and south sides of the drainage channel, Retaining Wall N and Retaining Wall S, respectively. Between the two retaining walls, the base of the drainage channel will be shielded from erosion with 6 inches of reinforced concrete riprap. The base of the drainage channel is planned to be constructed with finished elevations ranging from 856.5 to 855.3, which will require cuts of approximately 1 to 2½ feet below the existing ground surface.

- The existing MBC Culvert A will be extended to the south between Swale A STA's 21+16 and 22+30 to accommodate the proposed roadway expansion. The additional MBC will be cast-in-place. The existing headwall and wingwalls will be removed and replaced with new structures.

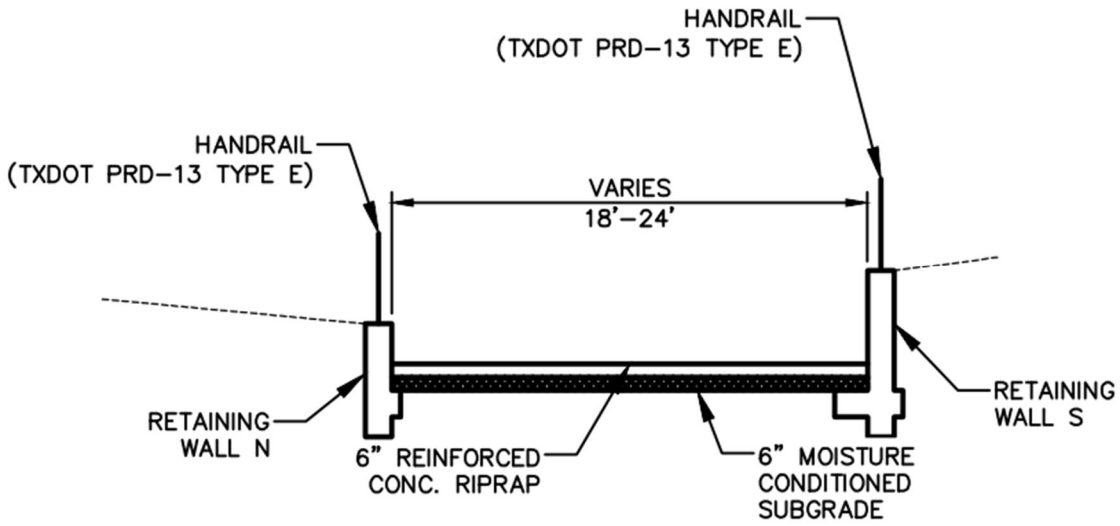


Figure 1. Cross-Section of Swale A Improvements Between STA's 20+08 and 21+26 (Detail by Bury).

Based on the information in borings B-2 through B-4, which are the closest borings to this area, we anticipate that the soils along the drainage channel will consist of variable Stratum I fill soils and possibly Stratum II limestone.

4.8.1 Box Culvert Subgrade Preparation

The box culvert construction areas should be stripped of existing rock rip rap, organics, existing utilities, concrete, soft/wet soils, and other unsuitable material. The upper 2 feet of the resulting subgrade soils should then be stripped, moisture adjusted and recompacted as described in **Section 4.1.1** to provide uniform support for the culvert. If limestone is encountered within the 2-foot overexcavation, excavation may be ceased as it is not necessary to excavate further into the limestone, provided the following requirement is satisfied.

If limestone is present within 6 inches of the final grade beneath the culvert, the limestone should be excavated such that at minimum of 6 inches of properly compacted select fill can be placed between the limestone and culvert. At a minimum, the upper 2 inches of fill should consist of

TxDOT Item 556, Type C Bedding material. As mentioned in **Section 4.6**, the Contractor should be prepared to excavate surficial limestone to achieve the design subgrade elevations if it is encountered.

4.8.2 Drainage Channel Subgrade Preparation

The drainage channel construction area should be stripped of existing rock rip rap, organics, existing utilities, concrete, soft/wet soils, and other unsuitable material. Roots of trees to be removed within construction areas should be grubbed to full depths, including the dry soil around the roots. The upper 6 inches of the resulting subgrade soils should then be stripped, moisture adjusted and recompacted as described in **Section 4.1.1** to provide uniform support for the drainage channel. As mentioned in **Section 4.6**, the Contractor should be prepared to excavate surficial limestone to achieve the design subgrade elevations if it is encountered.

4.9 Comments on Excavation and/or Trench Safety

The following subsections present comments pertaining to the subsurface conditions encountered in the test borings drilled at the site and the effects these conditions may have upon excavation and/or trench safety. Our comments are based on the data obtained from the field and laboratory test programs, geologic conditions, and our experience with similar projects. We are providing general comments for the most common methods of excavation and/or trench safety, including sloping, benching, shoring, bracing, etc. The Owner, design engineer, and/or Contractor should decide which method is the most feasible for this site depending on space limitations, construction budget, construction schedule, etc.

4.9.1 General

OSHA Safety and Health Standards (29 CFR Part 1926) require that all trenches in excess of 5 feet deep be shored or appropriately sloped unless the sidewalls are comprised of “stable” rock. State of Texas legislation requires detailed plans and specifications for retention systems that meet OSHA standards for a safe construction environment during utilities installation. The following sections provide general information to aid in designing an excavation retention system for this project based on the subsurface conditions observed at our test boring locations. These comments are intended for use in conjunction with OSHA safety regulations and not in lieu of those regulations. Prior to utility line construction, an excavation/trench safety plan, which is designed by a registered Professional Engineer, should be completed.

4.9.2 Construction

Currently available and practiced methods for achieving slope and/or sidewall stability includes sloping, benching, combinations of sloping and benching, and installation of shoring systems (hydraulic, timber, etc.). Trench shields may also be considered for use. However, trench shields only provide protection to workers; they are not means for providing slope or sidewall stability.

4.9.3 Sloping and Benching

If right-of-way is available, sloping, benching, or a combination thereof could be considered. The slope angle and/or vertical height of the bench section will be dependent on the subsurface conditions. In general, temporary excavations may be cut at the slopes indicated previously in **Section 4.5**. We recommend that all sloping/benching be performed as directed by OSHA in 29 CFR, Part 1926.

During excavation, slopes or benches should be observed for possible signs of failure such as bulging of the vertical face of the bench, tension cracks at the slope crest and/or raveling of material down the slope. If precariously positioned boulders or rock fragments are encountered, they should be removed. Surcharge loading from spoil piles, traffic, or equipment loading closer than 6 feet from the crest of the slope, which might alter the stability of the slope, should be avoided. If such conditions are observed, workmen should not be permitted in the excavation until the conditions noted are corrected by the contractor. If such conditions cannot be avoided, further flattening of the slope may be required. Flattening of the slope may also be necessary if excess amounts of groundwater influx are observed.

Surface water runoff which flows down the slopes or benches and ponds at the toe or crest of an excavation may be detrimental to stability. The excavation slopes should be thoroughly evaluated following a rainfall event and prior to workmen entering the excavation.

4.9.4 Shoring

Where open cuts are not possible, shoring may be used for excavation safety. Earth pressures for design of shoring should be based on a “worst case” condition from an earth pressure standpoint. The appropriate earth pressures to be used should be evaluated by the excavation safety system designer. Each strut or brace should be proportioned as if it would be subjected to the maximum lateral load.

Excavation safety systems may be subjected to surcharge loads in the form of construction equipment and/or spoil piles. Surcharge loads from soil surcharge should be considered when calculating earth pressures for the shoring systems. Equipment such as backhoes, front-end loaders, etc., should not operate within a distance of 6 feet from the excavation sidewall (and no vibrating equipment should be used) while workers are in the excavation. The excavation safety system designer should review the surcharge loads imposed on the excavation safety system.

4.9.5 Trench Shields

If sloping, benching, or shoring is not selected, trench shields may be considered to protect the workers from slope instability. As for shoring, the design of the trench shields should be based on a “worst case” earth pressure standpoint, with the appropriate earth pressures properly evaluated by the excavation safety system designer. We should note that trench shields only serve as a means for worker protection; they are not a means of excavation retention. Potential effects of sidewall caving and corresponding damage to adjacent property and personnel should be taken

into account when considering the use of trench shields. As stated above for shoring, hydrostatic pressures and effects of spoil, equipment, and other surcharge loading should be considered.

4.9.6 Alternate Sidewall Protection Methods

Other equivalent methods of slope protection or shoring may be considered for this project. However, any excavation safety system to be used should fully comply with OSHA regulations.

4.9.7 Inspection of Excavation Safety System

Inspections of the excavations should be performed by a competent person to: (1) confirm that actual conditions are as anticipated from analysis of the borings; (2) examine for the presence of faults or other geologic features that might be an indication of sidewall instability; (3) observe the presence of spoil piles or equipment which could cause surcharge loading; and (4) help ensure that the excavation safety system design is properly interpreted and incorporated into construction. The construction sequence should be planned so that an adequate inspection can be performed prior to personnel entering the excavation.

In addition, OSHA regulations require that inspections be made daily by a competent person for situations which could result in a possible cave-in, indications of failure of the protective systems, hazardous atmospheres, or other hazardous conditions. Workmen should not be permitted in the excavation until these conditions have been reviewed by a competent person on a daily basis. A competent person is defined within the OSHA Safety and Health Standards and Interpretations Part 1926 of 29 CFR, amended 2989, Subpart P - Excavations, as one who is capable of identifying existing and predictable hazards in the surrounding or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide testing and observation during excavation, grading, pavement installation, and other construction phases of the project.

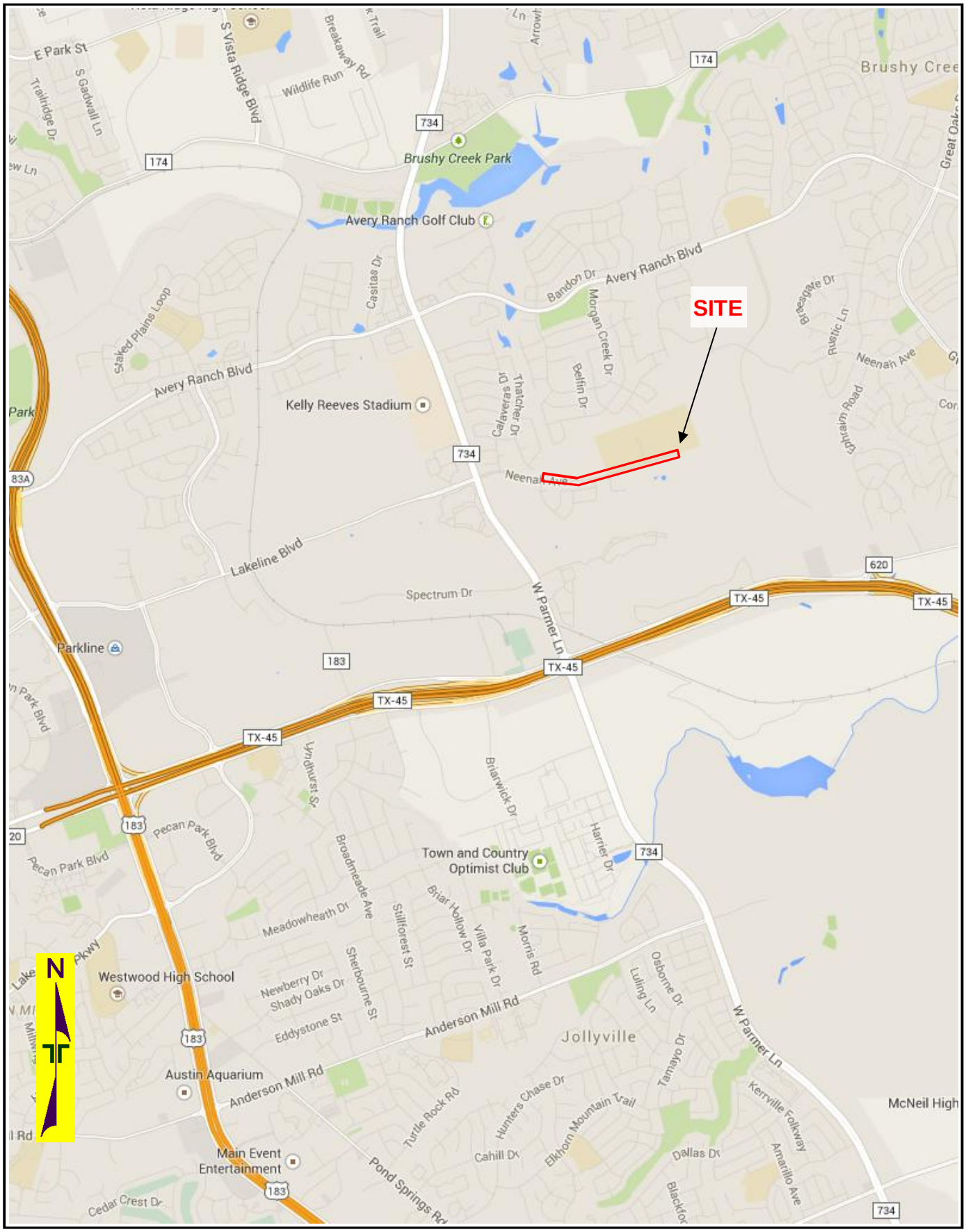
The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include, either specifically or by implication, any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials, or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

For any excavation construction activities at this site, all Occupational Safety and Health Administration (OSHA) guidelines and directives should be followed by the Contractor during construction to provide a safe working environment. In regards to worker safety, OSHA Safety and Health Standards require the protection of workers from excavation instability in trench situations.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A
FIELD EXPLORATION



Project Manager: ADK	Project No. 96145065	Terracon Consulting Engineers & Scientists 5307 Industrial Oaks Blvd, Suite 160 Austin, Texas 78735 PH. (512) 442-1122 FAX. (512) 442-1181	SITE VICINITY MAP NEENAH AVENUE WIDENING FROM OLIVE HILL ROAD TO END OF EXISTING NEENAH AVENUE AUSTIN, TEXAS
Drawn By: ADK	Scale: N.T.S.		
Checked By: ADK	File Name: 96145065		
Approved By: ADK	Date: 4/10/2015		EXHIBIT A-1

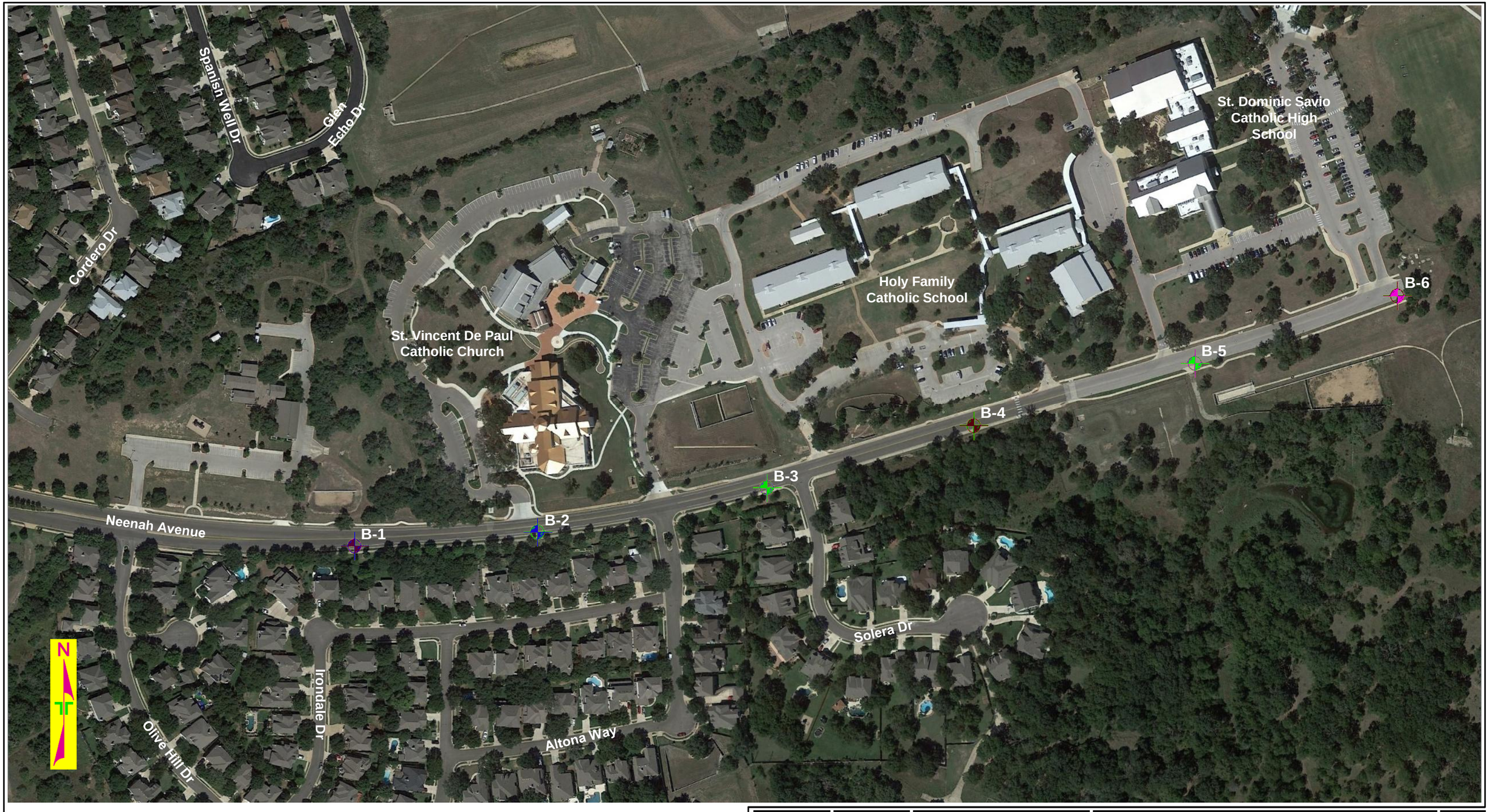


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES. SCALE IS APPROXIMATE. THE GOOGLE EARTH PRO AERIAL IMAGE SHOWS THE SITE CONDITIONS AS OF OCTOBER 2, 2014. SITE CONDITIONS MAY HAVE CHANGED SINCE THAT TIME.

Project Manager:	ADK
Drawn by:	ADK
Checked by:	ADK
Approved by:	ADK

Project No.	96155068
Scale:	AS SHOWN
File Name:	96155068
Date:	4/10/2015

Terracon
Consulting Engineers & Scientists
5307 Industrial Oaks Blvd, Suite 160 Austin, Texas 78735
PH. (512) 442-1122 FAX. (512) 442-1181

BORING LOCATION AERIAL

NEENAH AVENUE WIDENING
OLIVE HILL ROAD TO END OF EXISTING NEENAH AVENUE
AUSTIN, TEXAS

Exhibit A-2

Field Exploration Description

Subsurface conditions were evaluated by drilling six borings to depths of about 10 feet within the existing roadway. The borings were drilled with truck-mounted rotary drilling equipment at the approximate locations shown on Exhibit A-2 of Appendix A. Boring depths were measured from the existing ground surface at the time of our field activities. The boring coordinates were located in the field through the use of a Garmin handheld GPS unit. The coordinates are presented on the top of the boring logs.

The boring logs, which include the subsurface descriptions, types of sampling used, and additional field data for this study, are presented on the boring logs in Appendix A. Criteria defining terms, abbreviations and descriptions used on the boring logs are presented in Appendix C.

When possible, cohesive soil samples were recovered using thin-walled, open-tube samplers (Shelby tubes). A pocket penetrometer test was performed on each sample of cohesive soil in the field to serve as a general measure of consistency.

Soils for which good quality tube samples could not be obtained and weathered rock were sampled by means of the Standard Penetration Test (SPT). This test consists of measuring the number of blows required for a 140-pound hammer free falling 30 inches to drive a standard split-spoon sampler 12 inches into the subsurface material after being seated 6 inches. This blow count or SPT “N” value is used to estimate the engineering properties of the stratum. A CME automatic SPT hammer was used to advance the split-barrel sampler in the borings performed on this site. A greater efficiency is typically achieved with the automatic hammer compared to the conventional safety hammer operated with a cathead and rope. Published correlations between the SPT values and soil properties are based on the lower efficiency cathead and rope method. This higher efficiency affects the standard penetration resistance blow count (N) value by increasing the penetration per hammer blow over what would be obtained using the cathead and rope method. The effect of the automatic hammer's efficiency has been considered in the interpretation and analysis of the subsurface information for this report.

Samples were removed from the samplers in the field, visually classified, and appropriately sealed in sample containers to preserve the in-situ moisture contents. Samples were then placed in core boxes for transportation to our laboratory in Austin, Texas.

BORING LOG NO. B-1

PROJECT: Neenah Avenue Widening

CLIENT: Bury, Inc.
Austin, Texas

SITE: Olive Hill Rd to End of Existing Neenah Ave
Austin, Texas

LOCATION See Exhibit A-2

Latitude: 30.487678° Longitude: -97.765063°

DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0.4		**PAVEMENT**, ~5" asphalt						
		FILL - SILTY SAND WITH GRAVEL (SM), light gray to light brownish-gray to pale brown, very dense, flexible base material		50/5"	8		19-16-3	33
3.0		**FILL - FAT CLAY WITH SAND (CH)**, dark brown, very stiff		3.0 tsf (HP)	19		57-21-36	
3.5		**SILTY CLAY WITH GRAVEL (CL-ML)**, pale brown to light yellowish-brown to tan, very stiff to hard, possible fill in the upper portion, with limestone fragments and seams in the lower portion			6			
5								
6.0		**LIMESTONE (EDWARDS FORMATION)**, light gray to light brownish-gray		50/3"	4			
				50/4"	3			
10.0		***Boring Terminated at 10 Feet***						
10								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Dry Augered 0 to 10 feet

Abandonment Method:
Backfilled with Auger Cuttings and/or Bentonite
Surface Capped with Asphalt

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
5307 Industrial Oaks Blvd., Suite 160
Austin, Texas

Boring Started: 3/30/2015 Boring Completed: 3/30/2015

Drill Rig: CME 55 Driller: Austin Geo-Logic

Project No.: 96155065 Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 96155065 NEENAH AVENUE WIDENING BORING LOGS.GPJ

BORING LOG NO. B-2

PROJECT: Neenah Avenue Widening

CLIENT: Bury, Inc.
Austin, Texas

SITE: Olive Hill Rd to End of Existing Neenah Ave
Austin, Texas

LOCATION See Exhibit A-2

Latitude: 30.487765° Longitude: -97.763702°

DEPTH	GRAPHIC LOG	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0.4		**PAVEMENT**, ~4¼" asphalt								
		FILL - SILTY SAND WITH GRAVEL (SM), light gray to light brownish-gray to pale brown, very dense, flexible base material								
3.0										
3.5		**FILL - CLAYEY SAND WITH GRAVEL (SC)**, dark brown to grayish-brown to pale brown, very dense				7-50/4"	6			22
		LIMESTONE (EDWARDS FORMATION), light gray to light brownish-gray, with reddish-brown clay seams, cherty	5			50/3"	4			
						50/2"	4			
10.0			10							
		Boring Terminated at 10 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Dry Augered 0 to 10 feet

Abandonment Method:
Backfilled with Auger Cuttings and/or Bentonite
Surface Capped with Asphalt

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
5307 Industrial Oaks Blvd., Suite 160
Austin, Texas

Boring Started: 3/30/2015 Boring Completed: 3/30/2015

Drill Rig: CME 55 Driller: Austin Geo-Logic

Project No.: 96155065 Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 96155065 NEENAH AVENUE WIDENING BORING LOGS.GPJ

BORING LOG NO. B-3

PROJECT: Neenah Avenue Widening

CLIENT: Bury, Inc.
Austin, Texas

SITE: Olive Hill Rd to End of Existing Neenah Ave
Austin, Texas

LOCATION See Exhibit A-2

Latitude: 30.488046° Longitude: -97.762047°

DEPTH	Description	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0.5	**PAVEMENT**, ~6" asphalt					
2.0	**FILL - SILTY SAND WITH GRAVEL (SM)**, tan to light brown, very dense, flexible base material	34-37-14 N=51	6		18-16-2	29
3.5	**FILL - FAT CLAY (CH)**, trace gravel, dark brown, stiff to very stiff	5-5-10 N=15	25		85-27-58	
10.0	**CLAYEY GRAVEL WITH SAND (GC)**, reddish-brown to light gray to light brownish-gray, very dense, with cobbles, possible fill	20-24-26 N=50	16			
		27-41-50/5"	13			34
		50/5"	6			
	Boring Terminated at 10 Feet					

5

10

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Dry Augered 0 to 10 feet

Abandonment Method:
Backfilled with Auger Cuttings and/or Bentonite
Surface Capped with Asphalt

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
5307 Industrial Oaks Blvd., Suite 160
Austin, Texas

Boring Started: 3/31/2015 Boring Completed: 3/31/2015

Drill Rig: CME 45 Driller: Austin Geo-Logic

Project No.: 96155065 Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 96155065 NEENAH AVENUE WIDENING BORING LOGS.GPJ

BORING LOG NO. B-4

PROJECT: Neenah Avenue Widening

CLIENT: Bury, Inc.
Austin, Texas

SITE: Olive Hill Rd to End of Existing Neenah Ave
Austin, Texas

LOCATION See Exhibit A-2

Latitude: 30.488482° Longitude: -97.760548°

DEPTH	GRAPHIC LOG	DESCRIPTION	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0.4		**PAVEMENT**, ~4½" asphalt					
2.0		**FILL - SILTY SAND WITH GRAVEL (SM)**, tan to light brown, medium dense, flexible base material	25-17-5 N=22	9			
3.5		**FILL - FAT CLAY WITH GRAVEL (CH)**, dark brown, very stiff	5-7-11 N=18	22		70-20-50	
6.5		**FAT CLAY (CH)**, trace sand, dark brown, stiff, possible fill	3-4-8 N=12	27		53-21-32	95
8.5		**CLAYEY SAND WITH GRAVEL (SC)**, reddish-brown to brown to light gray, very dense, possible fill	8-12-50/2"	15			47
10.0		**LIMESTONE (EDWARDS FORMATION)**, gray	50/2"	6			
		Boring Terminated at 10 Feet					

DEPTH (Ft.): 5, 10

WATER LEVEL OBSERVATIONS: SAMPLE TYPE

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Dry Augered 0 to 10 feet

Abandonment Method:
Backfilled with Auger Cuttings and/or Bentonite
Surface Capped with Asphalt

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
5307 Industrial Oaks Blvd., Suite 160
Austin, Texas

Boring Started: 3/31/2015 Boring Completed: 3/31/2015

Drill Rig: CME 45 Driller: Austin Geo-Logic

Project No.: 96155065 Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 96155065 NEENAH AVENUE WIDENING BORING LOGS.GPJ

BORING LOG NO. B-5

PROJECT: Neenah Avenue Widening

CLIENT: Bury, Inc.
Austin, Texas

SITE: Olive Hill Rd to End of Existing Neenah Ave
Austin, Texas

LOCATION See Exhibit A-2

Latitude: 30.488822° Longitude: -97.758912°

DEPTH	GRAPHIC LOG		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0.4		**PAVEMENT**, ~4½" asphalt								
1.1		**FILL - SILTY SAND WITH GRAVEL (SM)**, light gray to light grayish-brown, medium dense, flexible base material				19-22-10 N=32	13		103-27-76	43
2.0		**FILL**, mottled light gray to light grayish-brown to dark brown to reddish-brown, dense, varies from fat clay (CH) to clayey gravel with sand (GC)				6-12-18 N=30	25		100-25-75	62
4.0		**FILL - GRAVELLY FAT CLAY WITH SAND (CH)**, reddish-brown with light gray gravel, very stiff to hard	5			19-27-32 N=59	19			45
10.0		**FILL - CLAYEY GRAVEL WITH SAND (GC)**, reddish-brown with light gray gravel, very dense, with limestone fragments				15-23-38 N=61	10		71-21-50	30
						50/3½"	10			
		Boring Terminated at 10 Feet	10							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Dry Augered 0 to 10 feet

Abandonment Method:
Backfilled with Auger Cuttings and/or Bentonite
Surface Capped with Asphalt

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
5307 Industrial Oaks Blvd., Suite 160
Austin, Texas

Boring Started: 3/31/2015 Boring Completed: 3/31/2015

Drill Rig: CME 45 Driller: Austin Geo-Logic

Project No.: 96155065 Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 96155065 NEENAH AVENUE WIDENING BORING LOGS.GPJ

BORING LOG NO. B-6

PROJECT: Neenah Avenue Widening

CLIENT: Bury, Inc.
Austin, Texas

SITE: Olive Hill Rd to End of Existing Neenah Ave
Austin, Texas

LOCATION See Exhibit A-2

Latitude: 30.489277° Longitude: -97.757439°

DEPTH	GRAPHIC LOG	DESCRIPTION	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0.3		**PAVEMENT**, ~4" asphalt					
		FILL - CLAYEY GRAVEL WITH SAND (GC), gray to grayish-brown, medium dense, flexible base material	15-5-5 N=10	21		99-30-69	64
1.7		**FILL - GRAVELLY FAT CLAY WITH SAND (CH)**, dark brown with gray to grayish-brown gravel, stiff to very stiff	3-6-35 N=41	33			
3.0		**FILL - CLAYEY GRAVEL WITH SAND (GC)**, reddish-brown with light gray to pale brown gravel, dense to very dense, with limestone fragments	9-18-13 N=31	5		86-25-61	18
5			34-50/4"	19			
			50/3"	3			
10.0							
10		***Boring Terminated at 10 Feet***					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Dry Augered 0 to 10 feet

Abandonment Method:
Backfilled with Auger Cuttings and/or Bentonite
Surface Capped with Asphalt

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
5307 Industrial Oaks Blvd., Suite 160
Austin, Texas

Boring Started: 4/1/2015 Boring Completed: 4/1/2015

Drill Rig: CME 45 Driller: Austin Geo-Logic

Project No.: 96155065 Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 96155065 NEENAH AVENUE WIDENING BORING LOGS.GPJ

APPENDIX B

LABORATORY TESTING

Laboratory Testing

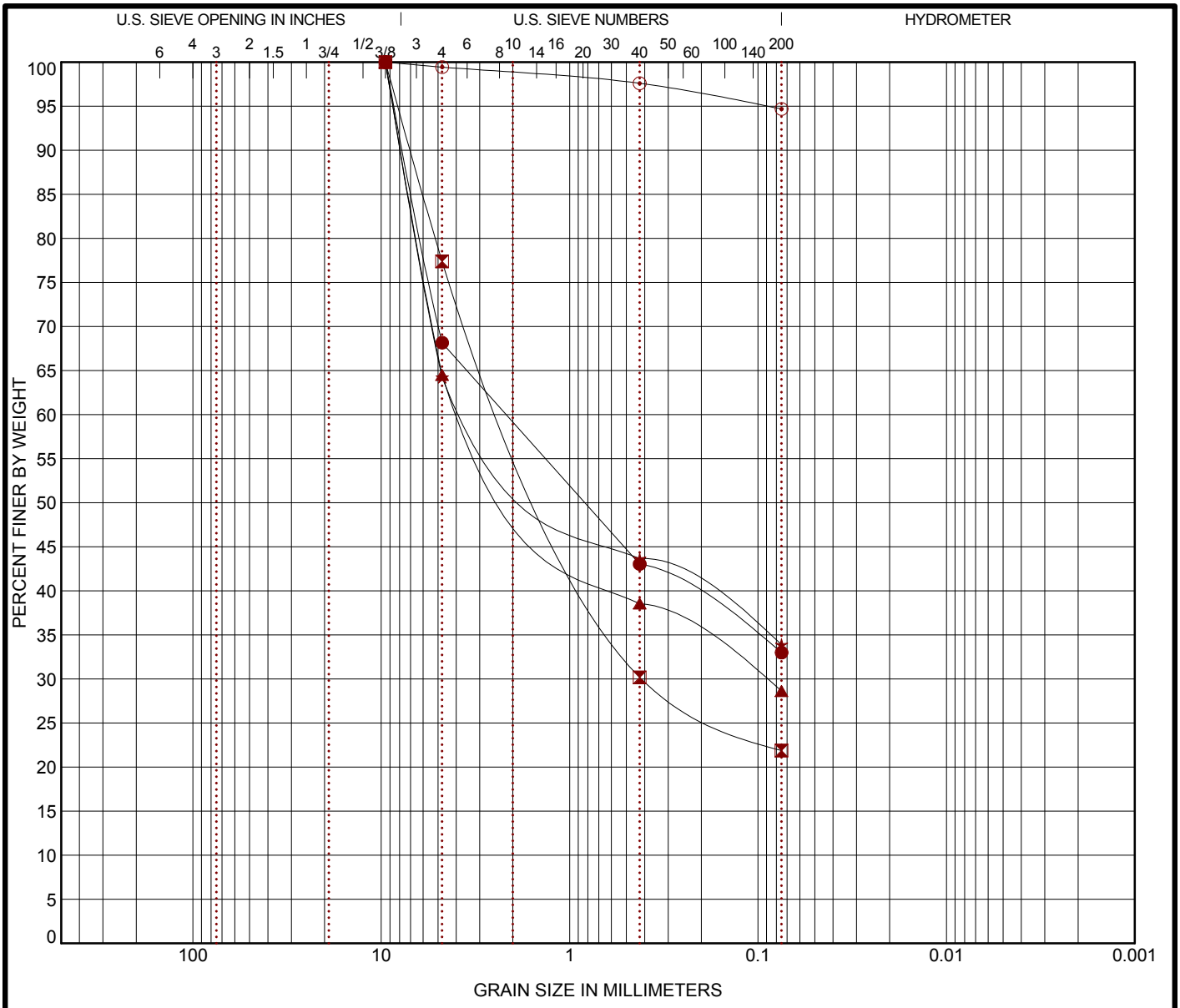
Samples obtained during the field program were visually classified in the laboratory by a geotechnical engineer. A testing program was conducted on selected samples, as directed by the geotechnical engineer, to aid in classification and evaluation of engineering properties required for analyses.

Results of the laboratory tests are presented on the boring logs located in Appendix A and/or are discussed in **Section 3.0 – Subsurface Conditions** of the report. Laboratory test results were used to classify the soils encountered as generally outlined by the Unified Soil Classification System.

Samples not tested in the laboratory will be stored for a period of 30 days subsequent to submittal of this report and will be discarded after this period, unless we are notified otherwise.

GRAIN SIZE DISTRIBUTION

ASTM D422



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	LL	PL	PI	Cc	Cu
●	B-1	0.5 - 0.9167	SILTY SAND with GRAVEL(SM)	19	16	3		
⊠	B-2	3 - 3.833						
▲	B-3	0.5 - 2	SILTY SAND with GRAVEL(SM)	18	16	2		
★	B-3	6 - 7.417						
⊙	B-4	4 - 5.5	FAT CLAY(CH)	53	21	32		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Fines
●	B-1	0.5 - 0.9167	9.5	2.169			31.8	35.2	33.0
⊠	B-2	3 - 3.833	9.5	1.952	0.409		22.6	55.5	21.9
▲	B-3	0.5 - 2	9.5	3.123	0.095		35.5	35.9	28.6
★	B-3	6 - 7.417	9.5	2.89			35.8	30.3	33.9
⊙	B-4	4 - 5.5	9.5				0.6	4.7	94.7

PROJECT: Neenah Avenue Widening

SITE: Olive Hill Rd to End of Existing Neenah Ave
Austin, Texas

Terracon
5307 Industrial Oaks Blvd., Suite 160
Austin, Texas

PROJECT NUMBER: 96155065

CLIENT: Bury, Inc.
Austin, Texas

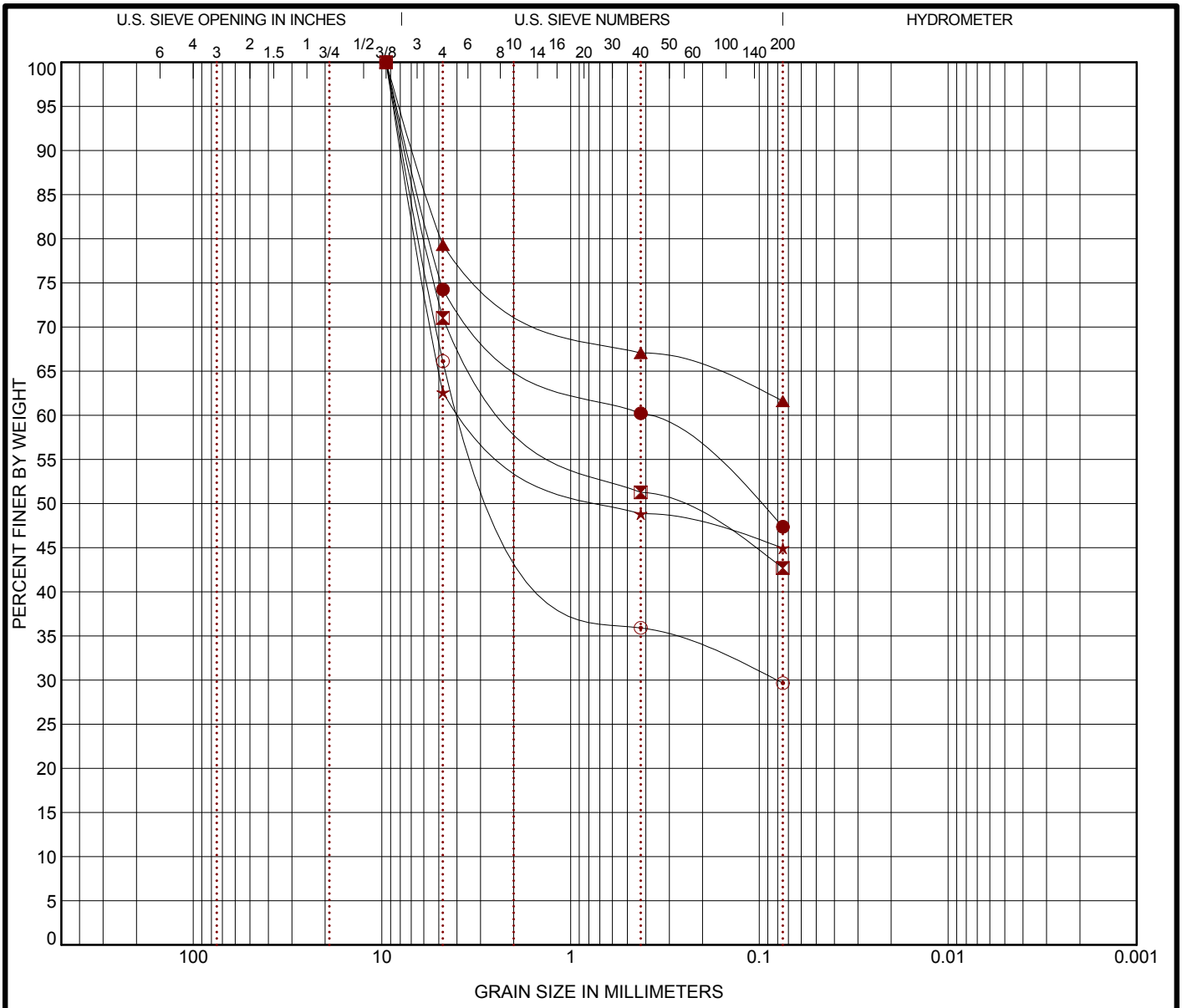
EXHIBIT: B-2

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 96155065 NEENAH AVENUE WIDENING BORING LOGS.GPJ TERRACON2012.GDT 8/7/15

Williamson County, Texas

GRAIN SIZE DISTRIBUTION

ASTM D422



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	LL	PL	PI	Cc	Cu
●	B-4	6 - 7.167						
⊠	B-5	0.5 - 2	CLAYEY GRAVEL with SAND(GC)	103	27	76		
▲	B-5	2 - 3.5	GRAVELLY FAT CLAY with SAND(CH)	100	25	75		
★	B-5	4 - 5.5						
⊙	B-5	6 - 7.5	CLAYEY SAND with GRAVEL(SC)	71	21	50		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Fines
●	B-4	6 - 7.167	9.5	0.412			25.7	26.9	47.4
⊠	B-5	0.5 - 2	9.5	1.235			29.0	28.3	42.7
▲	B-5	2 - 3.5	9.5				20.7	17.7	61.6
★	B-5	4 - 5.5	9.5	3.012			37.4	17.6	45.0
⊙	B-5	6 - 7.5	9.5	2.911	0.082		33.9	36.5	29.7

PROJECT: Neenah Avenue Widening

SITE: Olive Hill Rd to End of Existing Neenah Ave
Austin, Texas

Terracon
5307 Industrial Oaks Blvd., Suite 160
Austin, Texas

PROJECT NUMBER: 96155065

CLIENT: Bury, Inc.
Austin, Texas

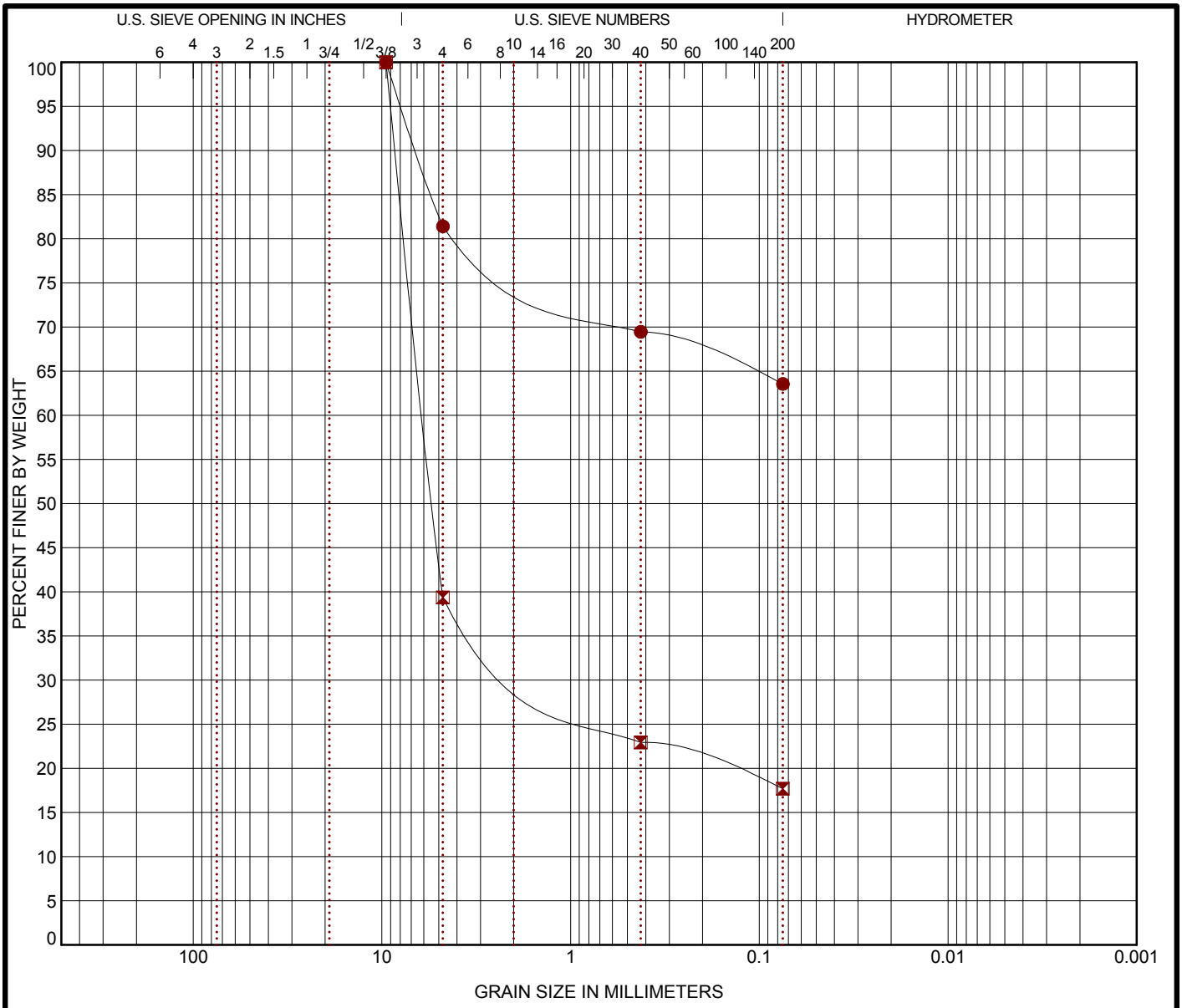
EXHIBIT: B-3

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 96155065 NEENAH AVENUE WIDENING BORING LOGS.GPJ TERRACON2012.GDT 8/7/15

GRAIN SIZE DISTRIBUTION

Williamson County, Texas

ASTM D422



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	LL	PL	PI	Cc	Cu
●	B-6	0.5 - 2	GRAVELLY FAT CLAY with SAND(CH)	99	30	69		
⊠	B-6	4 - 5.5	CLAYEY GRAVEL with SAND(GC)	86	25	61		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Fines
●	B-6	0.5 - 2	9.5				18.6	17.9	63.5
⊠	B-6	4 - 5.5	9.5	6.013	1.198		60.6	21.7	17.7

PROJECT: Neenah Avenue Widening

SITE: Olive Hill Rd to End of Existing Neenah Ave
Austin, Texas

Terracon
5307 Industrial Oaks Blvd., Suite 160
Austin, Texas

PROJECT NUMBER: 96155065

CLIENT: Bury, Inc.
Austin, Texas

EXHIBIT: B-4

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 96155065 NEENAH AVENUE WIDENING BORING LOGS.GPJ TERRACON2012.GDT 8/7/15

APPENDIX C
SUPPORTING DOCUMENTS

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING

- Auger Cuttings
- Grab Sample
- Shelby Tube
- Standard Penetration Test

WATER LEVEL

- **Water Initially Encountered**
- **Water Level After a Specified Period of Time**
- **Water Level After a Specified Period of Time**

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

N	**Standard Penetration Test Resistance (Blows/Ft.)**
(TC)	**TxDOT Cone Penetration Test (blows per Foot)**
(HP)	**Hand Penetrometer**
(T)	**Torvane**
(DCP)	**Dynamic Cone Penetrometer**
(PID)	**Photo-Ionization Detector**
(OVA)	**Organic Vapor Analyzer**

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (tsf)**	**Standard Penetration or N-Value Blows/Ft.**
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

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Exhibit: C-1

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F,G,H]
			Fines classify as CL or CH		GC	Clayey gravel [F,G,H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G,H,I]
			Fines classify as CL or CH		SC	Clayey sand [G,H,I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A" line [J]		CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K,L,M,N]
			Liquid limit - not dried			Organic silt [K,L,M,O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K,L,M]
			PI plots below "A" line		MH	Elastic Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K,L,M,P]
			Liquid limit - not dried			Organic silt [K,L,M,Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles and/or boulders" (or both) to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

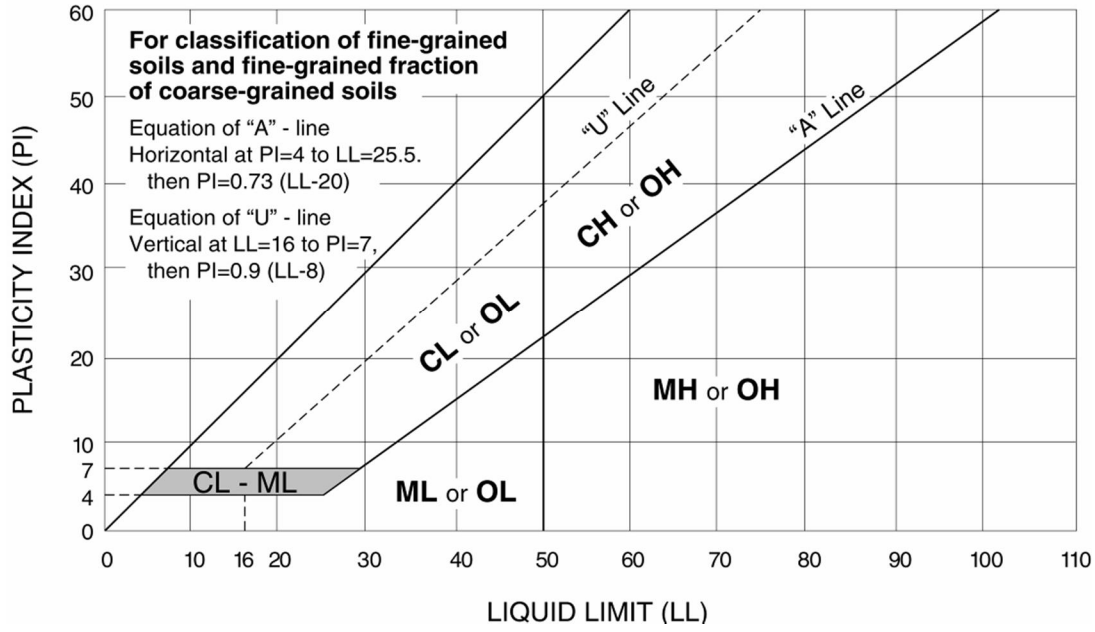
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



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Exhibit C-2

DESCRIPTION OF ROCK PROPERTIES

WEATHERING	
Term	**Description**
Unweathered	No visible sign of rock material weathering, perhaps slight discoloration on major discontinuity surfaces.
Slightly weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than in its fresh condition.
Moderately weathered	Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or as corestones.
Highly weathered	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones.
Completely weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.
Residual soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.

STRENGTH OR HARDNESS		
Description	**Field Identification**	**Uniaxial Compressive Strength, PSI (TSF)**
Extremely weak	Indented by thumbnail	40-150 (2.9 – 10.8)
Very weak	Crumbles under firm blows with point of geological hammer, can be peeled by a pocket knife	150-700 (10.8 – 50.4)
Weak rock	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer	700-4,000 (50.4 – 288)
Medium strong	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer	4,000-7,000 (288 – 504)
Strong rock	Specimen requires more than one blow of geological hammer to fracture it	7,000-15,000 (504 – 1,080)
Very strong	Specimen requires many blows of geological hammer to fracture it	15,000-36,000 (1,080 – 2,592)
Extremely strong	Specimen can only be chipped with geological hammer	> 36,000 (> 2,592)

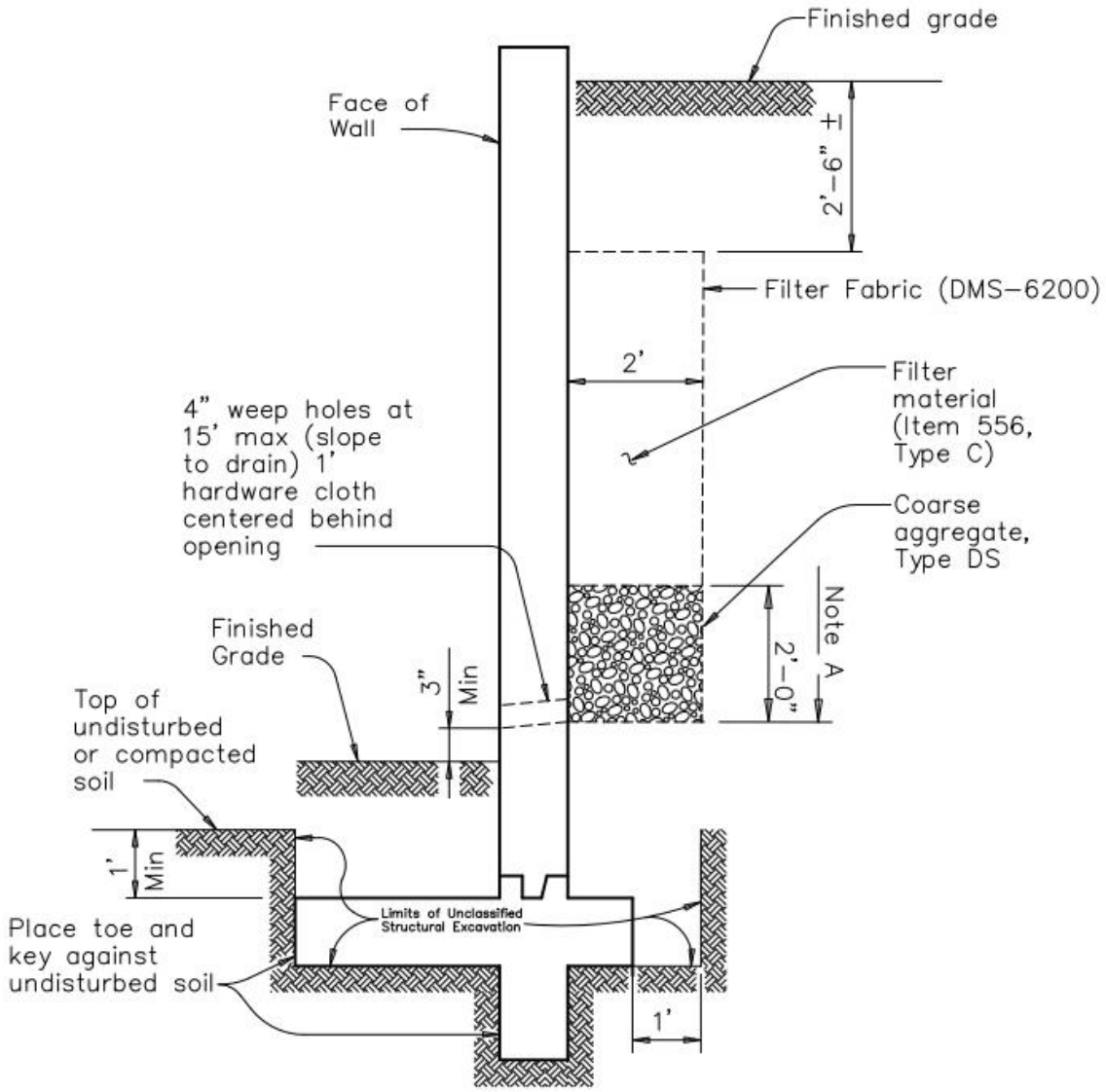
DISCONTINUITY DESCRIPTION			
Fracture Spacing (Joints, Faults, Other Fractures)		**Bedding Spacing (May Include Foliation or Banding)**	
Description	**Spacing**	**Description**	**Spacing**
Extremely close	< ¾ in (< 19 mm)	**Laminated**	< ½ in (< 12 mm)
Very close	¾ in – 2½ in (19 – 60 mm)	**Very thin**	½ in – 2 in (12 – 50 mm)
Close	2½ in – 8 in (60 – 200 mm)	**Thin**	2 in – 1 ft (50 – 300 mm)
Moderate	8 in – 2 ft (200 – 600 mm)	**Medium**	1 ft – 3 ft (300 – 900 mm)
Wide	2 ft – 6 ft (600 mm – 2 m)	**Thick**	3 ft – 10 ft (900 mm – 3 m)
Very Wide	6 ft – 20 ft (2 – 6 m)	**Massive**	> 10 ft (3 m)

Discontinuity Orientation (Angle): Measure the angle of discontinuity relative to a plane perpendicular to the longitudinal axis of the core. (For most cases, the core axis is vertical; therefore, the plane perpendicular to the core axis is horizontal.) For example, a horizontal bedding plane would have a 0 degree angle.

ROCK QUALITY DESIGNATION (RQD*)	
Description	**RQD Value (%)**
Very Poor	0 – 25
Poor	25 – 50
Fair	50 – 75
Good	75 – 90
Excellent	90 – 100

*The combined length of all sound and intact core segments equal to or greater than 4 inches in length, expressed as a percentage of the total core run length.

Reference: U.S. Department of Transportation, Federal Highway Administration, Publication No FHWA-NHI-10-034, December 2009 Technical Manual for Design and Construction of Road Tunnels – Civil Elements



DRAINAGE DETAILS AND EXCAVATION DIAGRAM

Note A: Stop coarse aggregate at this level when weep holes are used.

Project Manager: ADK	Project No. 96145065	Terracon Consulting Engineers & Scientists 5307 Industrial Oaks Blvd, Suite 160 Austin, Texas 78735 PH. (512) 442-1122 FAX. (512) 442-1181	DRAINAGE DETAILS AND EXCAVATION DIAGRAM NEENAH AVENUE WIDENING FROM OLIVE HILL ROAD TO END OF EXISTING NEENAH AVENUE AUSTIN, TEXAS	EXHIBIT C-4
Drawn By: ADK	Scale: N.T.S.			
Checked By: ADK	File Name: 96145065			
Approved By: ADK	Date: 8/7/2015			

APPENDIX D

PAVEMENT DESIGN OUTPUT FILES

LTS.OUT

1

```
 MM     MM  FFFFFFFFF  PPPPPPPP     SSSSS      11
 MMM   MMM  FFFFFFFFF  PPPPPPPPP   SSSSSSS    111
 MMMM MMMM  FF         PP     PP  SS     SS  1111
 MMMMMMMMM  FF         PP     PP  SS           11
 MM MMM MM  FFFFFFF    PPPPPPPPP   SSSSSS      11
 MM  M  MM  FFFFFFF    PPPPPPPP     SSSSSS     11
 MM     MM  FF         PP                SS    11
 MM     MM  FF         PP          SS    SS    11
 MM     MM  FF         PP           SSSSSSS   111111
 MM     MM  FF         PP             SSSSS   111111
```

MUNICIPAL FLEXIBLE PAVEMENT DESIGN SYSTEM
VERSION 1.0, SEPTEMBER 1983
MOVED TO MICROCOMPUTER OCTOBER 1985 (P.J.- BRE)

NOTICE --

THIS COMPUTER PROGRAM REPRESENTS AN ADAPTATION OF THE ORIGINAL TEXAS STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION FLEXIBLE PAVEMENT DESIGN SYSTEM (FPS-11) FOR THE DESIGN AND CONSIDERATION OF LIFE-CYCLE COSTS OF MUNICIPAL STREETS AND THOROUGHFARES IN AUSTIN, TEXAS. THIS PROGRAM WAS DEVELOPED BY ARE, INC (512/327-3520) FOR SOLE USE BY THE CITY OF AUSTIN. BECAUSE OF THE NATURE OF THE DEVELOPMENT OF THE MFPS-1 PROGRAM AND CERTAIN BUILT-IN REGIONAL FACTORS, USE BY ANY OTHER CITY OR AGENCY REQUIRES A THOROUGH UNDESTANDING OF THE PROGRAM OPERATION AND ITS INHERENT ASSUMPTIONS.

CAUTION IS RECOMMENDED IN APPLYING THIS FIRST VERSION OF THE MUNICIPAL FLEXIBLE PAVEMENT DESIGN SYSTEM. THE USER SHOULD ACCEPT ULTIMATE RESPONSIBILITY FOR THE ACCURACY OF THE INPUTS AND THE VALIDITY OF THE RESULTS.

1

MFPS-1 MUNICIPAL FLEXIBLE PAVEMENT DESIGN SYSTEM, VERSION 1.0, 8/83
ADAPTED FROM TEXAS SDHPT FPS-11 PROGRAM FOR CITY OF AUSTIN
BY ARE INC, CONSULTING ENGINEERS, AUSTIN, TEXAS

PROBLEM TITLE (DESCRIPTION)
NEENAH AVE WIDENING (PROJECT NO. 96155065) - MINOR ARTERIAL, 4-LANE DIVIDED MINOR ARTERIAL
PAVEMENT DESIGN OPTIONS 1 AND 2

LTS.OUT

***** PAVEMENT *****

TOTAL NUMBER OF LANES IN FACILITY	4
TOTAL NUMBER OF CURBS IN FACILITY	4
NUMBER OF LAYERS CONSIDERED IN THIS PROBLEM	3
LANE WIDTH (FEET)	12.00
CURB HEIGHT (INCHES)	6.00
CONCRETE CURB CONSTRUCTION COST ($/LF)	15.00
THICKENED EDGE FIXED COST ($/LF)	.00
THICKENED EDGE INCREMENTAL COST ($/IN/LF)	.00

***** LAYER *****

LAYER NO.	LAYER CODE	LAYER DESCRIPTION	MIN. DEPTH (IN.)	MAX. DEPTH (IN.)	THICK. INCR. (IN.)	COST ($/CY)	SALV. COST ($/SY)	SALV. VALUE (%)	STIFF. COEF.
1	A	HMAC	6.00	8.00	.50	90.00	.00	30.0	.960
2	F	FLEX BASE	12.00	36.00	1.00	20.00	.00	20.0	.500
3	L	LIME STAB.	8.00	8.00	1.00	10.00	.00	20.0	.320

***** SUBGRADE *****

SWELLING PROBABILITY	1.00
SWELLING RATE CONSTANT	.12
POTENTIAL VERTICAL RISE (INCHES)	1.50
SUBGRADE EXCAVATION COST ($/CY)	5.50
SUBGRADE COST ($/SY)	.00
SUBGRADE STIFFNESS COEFFICIENT	.180

***** AC OVERLAY *****

MINIMUM AC OVERLAY THICKNESS (INCHES)	1.50
MAXIMUM ACCUMULATED OVERLAY THICKNESS (INCHES)	4.00
AVERAGE LEVEL-UP THICKNESS (INCHES)	.50
OVERLAY COST ($/CY)	65.00
OVERLAY COST ($/SY)	.00
OVERLAY SALVAGE VALUE (%)	15.00
AC OVERLAY STIFFNESS COEFFICIENT	1.000
OVERLAY EDGE TAPERING COST ($/LF)	.00
OVERLAY EDGE MILLING COST ($/LF)	12.00
AC OVERLAY PRODUCTION RATE (CY/HR)	40.0

LTS.OUT

1

MFPS-1 MUNICIPAL FLEXIBLE PAVEMENT DESIGN SYSTEM, VERSION 1.0, 8/83
ADAPTED FROM TEXAS SDHPT FPS-11 PROGRAM FOR CITY OF AUSTIN
BY ARE INC, CONSULTING ENGINEERS, AUSTIN, TEXAS

PROBLEM TITLE (DESCRIPTION)
NEENAH AVE WIDENING (PROJECT NO. 96155065) - MINOR ARTERIAL, 4-LANE DIVIDED MINOR ARTERIAL
PAVEMENT DESIGN OPTIONS 1 AND 2

***** DESIGN CONSTRAINTS *****

CONFIDENCE LEVEL (%).	90.00
LENGTH OF ANALYSIS PERIOD (YEARS)	20.0
MINIMUM TIME TO FIRST OVERLAY (YEARS)	20.0
MINIMUM TIME BETWEEN OVERLAYS (YEARS)	10.0
MAXIMUM THICKNESS OF INITIAL CONSTR. (INCHES) . .	30.00
MAXIMUM FUNDS AVAILABLE FOR INITIAL CONSTR. ($) .	50.00
DISCOUNT RATE (%)	5.00

***** PERFORMANCE *****

SERVICEABILITY INDEX AFTER INITIAL CONSTRUCTION .	4.20
TERMINAL SERVICEABILITY INDEX	2.50
SERVICEABILITY INDEX AFTER OVERLAY CONSTRUCTION .	4.00

***** MAINTENANCE *****

FIRST YEAR COST OF ROUTINE MAINTENANCE.	.00
ANNUAL INCREMENTAL INCREASE IN MAINTENANCE COST .	150.00

***** TRAFFIC *****

AVERAGE DAILY TRAFFIC GROWTH RATE (%)	4.00
DIRECTIONAL DISTRIBUTION FACTOR (%)	50.00
LANE DISTRIBUTION FACTOR (%).	90.00
PERCENT TRUCKS IN AVERAGE DAILY TRAFFIC	10.90
18-KIP EQUIVALENCY FACTOR FOR STD. CITY TRUCK . .	.62
INITIAL ADT ON FACILITY (VPD)	9000.

***** TRAFFIC DELAY *****

INDEX TO DETOUR MODEL	4
NO. OF OPEN LANES THROUGH OVERLAY ZONE IN OVERLAY DIRECTION	1

LTS.OUT

```
          IN NON-OVERLAY DIRECTION . . . . . .  2
     AVERAGE APPROACH SPEED TO OVERLAY ZONE (MPH). . .    40.
     AVERAGE SPEED THROUGH OVERLAY ZONE (MPH)
          IN OVERLAY DIRECTION . . . . . .    15.
          IN NON-OVERLAY DIRECTION . . . . . .    40.
     DISTANCE OVER WHICH TRAFFIC IS SLOWED (MILES)
          IN OVERLAY DIRECTION . . . . . .    .50
          IN NON-OVERLAY DIRECTION . . . . . .    .00
     DETOUR DISTANCE (MILES) . . . . . .   1.00
     NO. OF HOURS PER DAY OVERLAY CONSTRUCTION OCCURS.   7.00
     ADT ARRIVING EACH HOUR OF CONSTRUCTION (%). . . .   6.00


1
     MFPS-1  MUNICIPAL FLEXIBLE PAVEMENT DESIGN SYSTEM, VERSION 1.0, 8/83
             ADAPTED FROM TEXAS SDHPT FPS-11 PROGRAM FOR CITY OF AUSTIN
             BY ARE INC, CONSULTING ENGINEERS, AUSTIN, TEXAS

     PROBLEM        TITLE (DESCRIPTION)
     NEENAH AVE WIDENING (PROJECT NO. 96155065) - MINOR ARTERIAL, 4-LANE DIVIDED
MINOR ARTERIAL
     PAVEMENT DESIGN OPTIONS 1 AND 2

     SUMMARY OF THE BEST DESIGN STRATEGIES
     IN ORDER OF INCREASING TOTAL COST

                              1      2      3      4      5      6      7
     ************************************************************************
     MATERIAL ARRANGEMENT    AFL    AF     AFL    AF     AF     AF     AF
     ************************************************************************
     SUBGRADE EXC. COST     4.13   3.67   4.05   3.59   3.51   3.44   3.36
     CURB CONSTR. COST     11.25  11.25  11.25  11.25  11.25  11.25  11.25
     THICKENED EDGE COST     .00    .00    .00    .00    .00    .00    .00
     ************************************************************************
     TAPERING COSTS          .00    .00    .00    .00    .00    .00    .00
     MILLING COSTS           .00    .00    .00    .00    .00    .00    .00
     ************************************************************************
     INIT. CONST. COST     39.82  39.92  40.44  40.53  41.15  41.77  42.39
     OVERLAY CONST. COST     .00    .00    .00    .00    .00    .00    .00
     USER COST               .00    .00    .00    .00    .00    .00    .00
     ROUTINE MAINT. COST    2.20   2.20   2.20   2.20   2.20   2.20   2.20
     SALVAGE VALUE         -2.41  -2.45  -2.51  -2.55  -2.65  -2.75  -2.85
     ************************************************************************
     TOTAL COST            39.61  39.67  40.13  40.19  40.71  41.23  41.74
     ************************************************************************
     LAYER DEPTH (INCHES)
         D(1)               6.00   6.00   6.50   6.50   7.00   7.50   8.00
         D(2)              13.00  18.00  12.00  17.00  16.00  15.00  14.00
         D(3)               8.00    .00   8.00    .00    .00    .00    .00
```

LTS.OUT

```
**************************************************************************
OVERLAY POLICY(INCH)
(INCLUDING LEVEL-UP)
**************************************************************************
PERF. TIME (YEARS)
    T(1)             20.00  20.94  20.41  21.50  21.87  22.20  22.45
**************************************************************************
SWELLING CLAY LOSS
 (SERVICEABILITY)
   SC(1)               .46    .46    .46    .46    .47    .47    .47
**************************************************************************

THE TOTAL NUMBER OF FEASIBLE DESIGNS ENCOUNTERED WAS        51
```

LTSBB.OUT

1

```
 MM     MM  FFFFFFFFF  PPPPPPPP     SSSSS      11
 MMM   MMM  FFFFFFFFF  PPPPPPPPP   SSSSSSS    111
 MMMM MMMM  FF         PP     PP  SS     SS  1111
 MMMMMMMMM  FF         PP     PP  SS           11
 MM MMM MM  FFFFFFF    PPPPPPPPP   SSSSSS      11
 MM  M  MM  FFFFFFF    PPPPPPPP     SSSSSS     11
 MM     MM  FF         PP                SS    11
 MM     MM  FF         PP          SS    SS    11
 MM     MM  FF         PP           SSSSSSS   111111
 MM     MM  FF         PP             SSSSS   111111
```

MUNICIPAL FLEXIBLE PAVEMENT DESIGN SYSTEM
VERSION 1.0, SEPTEMBER 1983
MOVED TO MICROCOMPUTER OCTOBER 1985 (P.J.- BRE)

NOTICE --

THIS COMPUTER PROGRAM REPRESENTS AN ADAPTATION OF THE ORIGINAL TEXAS STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION FLEXIBLE PAVEMENT DESIGN SYSTEM (FPS-11) FOR THE DESIGN AND CONSIDERATION OF LIFE-CYCLE COSTS OF MUNICIPAL STREETS AND THOROUGHFARES IN AUSTIN, TEXAS. THIS PROGRAM WAS DEVELOPED BY ARE, INC (512/327-3520) FOR SOLE USE BY THE CITY OF AUSTIN. BECAUSE OF THE NATURE OF THE DEVELOPMENT OF THE MFPS-1 PROGRAM AND CERTAIN BUILT-IN REGIONAL FACTORS, USE BY ANY OTHER CITY OR AGENCY REQUIRES A THOROUGH UNDESTANDING OF THE PROGRAM OPERATION AND ITS INHERENT ASSUMPTIONS.

CAUTION IS RECOMMENDED IN APPLYING THIS FIRST VERSION OF THE MUNICIPAL FLEXIBLE PAVEMENT DESIGN SYSTEM. THE USER SHOULD ACCEPT ULTIMATE RESPONSIBILITY FOR THE ACCURACY OF THE INPUTS AND THE VALIDITY OF THE RESULTS.

1

MFPS-1 MUNICIPAL FLEXIBLE PAVEMENT DESIGN SYSTEM, VERSION 1.0, 8/83
ADAPTED FROM TEXAS SDHPT FPS-11 PROGRAM FOR CITY OF AUSTIN
BY ARE INC, CONSULTING ENGINEERS, AUSTIN, TEXAS

PROBLEM TITLE (DESCRIPTION)
NEENAH AVE WIDENING (PROJECT NO. 96155065) - MINOR ARTERIAL, 4-LANE DIVIDED MINOR ARTERIAL
PAVEMENT DESIGN OPTIONS 3 AND 4

LTSBB.OUT

***** PAVEMENT *****

TOTAL NUMBER OF LANES IN FACILITY 4
TOTAL NUMBER OF CURBS IN FACILITY 4
NUMBER OF LAYERS CONSIDERED IN THIS PROBLEM . . . 3
LANE WIDTH (FEET) 12.00
CURB HEIGHT (INCHES). 6.00
CONCRETE CURB CONSTRUCTION COST ($/LF). 15.00
THICKENED EDGE FIXED COST ($/LF). 00
THICKENED EDGE INCREMENTAL COST ($/IN/LF) 00

***** LAYER *****

LAYER NO.	LAYER CODE	LAYER DESCRIPTION	MIN. DEPTH (IN.)	MAX. DEPTH (IN.)	THICK. INCR. (IN.)	COST ($/CY)	COST ($/SY)	SALV. VALUE (%)	STIFF. COEF.
1	A	HMAC	4.00	8.00	.50	90.00	.00	30.0	.960
2	B	ASPH. STAB.	4.00	20.00	.50	20.00	.00	20.0	.900
3	L	LIME STAB.	8.00	8.00	1.00	10.00	.00	20.0	.300

***** SUBGRADE *****

SWELLING PROBABILITY. 1.00
SWELLING RATE CONSTANT. 12
POTENTIAL VERTICAL RISE (INCHES). 1.50
SUBGRADE EXCAVATION COST ($/CY) 5.50
SUBGRADE COST ($/SY). 00
SUBGRADE STIFFNESS COEFFICIENT. 180

***** AC OVERLAY *****

MINIMUM AC OVERLAY THICKNESS (INCHES) 1.50
MAXIMUM ACCUMULATED OVERLAY THICKNESS (INCHES). . 4.00
AVERAGE LEVEL-UP THICKNESS (INCHES) 50
OVERLAY COST ($/CY) 65.00
OVERLAY COST ($/SY) 00
OVERLAY SALVAGE VALUE (%) 15.00
AC OVERLAY STIFFNESS COEFFICIENT. 1.000
OVERLAY EDGE TAPERING COST ($/LF) 00
OVERLAY EDGE MILLING COST ($/LF). 12.00
AC OVERLAY PRODUCTION RATE (CY/HR). 40.0

1

LTSBB.OUT

MFPS-1 MUNICIPAL FLEXIBLE PAVEMENT DESIGN SYSTEM, VERSION 1.0, 8/83
ADAPTED FROM TEXAS SDHPT FPS-11 PROGRAM FOR CITY OF AUSTIN
BY ARE INC, CONSULTING ENGINEERS, AUSTIN, TEXAS

PROBLEM TITLE (DESCRIPTION)
NEENAH AVE WIDENING (PROJECT NO. 96155065) - MINOR ARTERIAL, 4-LANE DIVIDED MINOR ARTERIAL
PAVEMENT DESIGN OPTIONS 3 AND 4

***** DESIGN CONSTRAINTS *****

CONFIDENCE LEVEL (%).	90.00
LENGTH OF ANALYSIS PERIOD (YEARS)	20.0
MINIMUM TIME TO FIRST OVERLAY (YEARS)	20.0
MINIMUM TIME BETWEEN OVERLAYS (YEARS)	10.0
MAXIMUM THICKNESS OF INITIAL CONSTR. (INCHES) . .	30.00
MAXIMUM FUNDS AVAILABLE FOR INITIAL CONSTR. ($) .	50.00
DISCOUNT RATE (%)	5.00

***** PERFORMANCE *****

SERVICEABILITY INDEX AFTER INITIAL CONSTRUCTION .	4.20
TERMINAL SERVICEABILITY INDEX	2.50
SERVICEABILITY INDEX AFTER OVERLAY CONSTRUCTION .	4.00

***** MAINTENANCE *****

FIRST YEAR COST OF ROUTINE MAINTENANCE.	.00
ANNUAL INCREMENTAL INCREASE IN MAINTENANCE COST .	150.00

***** TRAFFIC *****

AVERAGE DAILY TRAFFIC GROWTH RATE (%)	4.00
DIRECTIONAL DISTRIBUTION FACTOR (%)	50.00
LANE DISTRIBUTION FACTOR (%).	90.00
PERCENT TRUCKS IN AVERAGE DAILY TRAFFIC	10.90
18-KIP EQUIVALENCY FACTOR FOR STD. CITY TRUCK . .	.62
INITIAL ADT ON FACILITY (VPD)	9000.

***** TRAFFIC DELAY *****

INDEX TO DETOUR MODEL	4
NO. OF OPEN LANES THROUGH OVERLAY ZONE	
IN OVERLAY DIRECTION	1
IN NON-OVERLAY DIRECTION	2

LTSBB.OUT

AVERAGE APPROACH SPEED TO OVERLAY ZONE (MPH). . .	40.
AVERAGE SPEED THROUGH OVERLAY ZONE (MPH)	
IN OVERLAY DIRECTION	15.
IN NON-OVERLAY DIRECTION	40.
DISTANCE OVER WHICH TRAFFIC IS SLOWED (MILES)	
IN OVERLAY DIRECTION	.50
IN NON-OVERLAY DIRECTION	.00
DETOUR DISTANCE (MILES)	1.00
NO. OF HOURS PER DAY OVERLAY CONSTRUCTION OCCURS.	7.00
ADT ARRIVING EACH HOUR OF CONSTRUCTION (%). . . .	6.00

1

MFPS-1 MUNICIPAL FLEXIBLE PAVEMENT DESIGN SYSTEM, VERSION 1.0, 8/83
ADAPTED FROM TEXAS SDHPT FPS-11 PROGRAM FOR CITY OF AUSTIN
BY ARE INC, CONSULTING ENGINEERS, AUSTIN, TEXAS

PROBLEM TITLE (DESCRIPTION)
NEENAH AVE WIDENING (PROJECT NO. 96155065) - MINOR ARTERIAL, 4-LANE DIVIDED MINOR ARTERIAL
PAVEMENT DESIGN OPTIONS 3 AND 4

SUMMARY OF THE BEST DESIGN STRATEGIES
IN ORDER OF INCREASING TOTAL COST

	1	2	3	4	5	6	7
MATERIAL ARRANGEMENT	AB	AB	AB	ABL	AB	ABL	ABL
SUBGRADE EXC. COST	2.37	2.37	2.37	3.28	2.37	3.28	3.21
CURB CONSTR. COST	11.25	11.25	11.25	11.25	11.25	11.25	11.25
THICKENED EDGE COST	.00	.00	.00	.00	.00	.00	.00
TAPERING COSTS	.00	.00	.00	.00	.00	.00	.00
MILLING COSTS	.00	.00	.00	.00	.00	.00	.00
INIT. CONST. COST	30.01	30.98	31.95	32.03	32.92	33.01	33.63
OVERLAY CONST. COST	.00	.00	.00	.00	.00	.00	.00
USER COST	.00	.00	.00	.00	.00	.00	.00
ROUTINE MAINT. COST	2.20	2.20	2.20	2.20	2.20	2.20	2.20
SALVAGE VALUE	-1.61	-1.73	-1.85	-1.70	-1.97	-1.82	-1.92
TOTAL COST	30.60	31.45	32.30	32.54	33.15	33.39	33.91
LAYER DEPTH (INCHES)							
D(1)	4.00	4.50	5.00	4.00	5.50	4.50	5.00
D(2)	11.50	11.00	10.50	9.50	10.00	9.00	8.00
D(3)	.00	.00	.00	8.00	.00	8.00	8.00

LTSBB.OUT

```
     OVERLAY POLICY(INCH)
     (INCLUDING LEVEL-UP)
     ************************************************************************
     PERF. TIME (YEARS)
         T(1)            20.83  21.07  21.30  22.55  21.53  22.78  20.00
     ************************************************************************
     SWELLING CLAY LOSS
      (SERVICEABILITY)
        SC(1)              .46    .46    .46    .47    .46    .47    .46
     ************************************************************************

1
     MFPS-1  MUNICIPAL FLEXIBLE PAVEMENT DESIGN SYSTEM, VERSION 1.0, 8/83
             ADAPTED FROM TEXAS SDHPT FPS-11 PROGRAM FOR CITY OF AUSTIN
             BY ARE INC, CONSULTING ENGINEERS, AUSTIN, TEXAS

     PROBLEM        TITLE (DESCRIPTION)
      NEENAH AVE WIDENING (PROJECT NO. 96155065) - MINOR ARTERIAL, 4-LANE DIVIDED
MINOR ARTERIAL
      PAVEMENT DESIGN OPTIONS 3 AND 4

     SUMMARY OF THE BEST DESIGN STRATEGIES
     IN ORDER OF INCREASING TOTAL COST

                               8      9     10     11     12     13     14
     ************************************************************************
     MATERIAL ARRANGEMENT    AB     ABL    AB     ABL    AB     ABL    AB
     ************************************************************************
     SUBGRADE EXC. COST     2.37   3.21   2.37   3.21   2.37   3.21   2.37
     CURB CONSTR. COST     11.25  11.25  11.25  11.25  11.25  11.25  11.25
     THICKENED EDGE COST     .00    .00    .00    .00    .00    .00    .00
     ************************************************************************
     TAPERING COSTS          .00    .00    .00    .00    .00    .00    .00
     MILLING COSTS           .00    .00    .00    .00    .00    .00    .00
     ************************************************************************
     INIT. CONST. COST     33.90  34.60  34.87  35.57  35.84  36.54  36.81
     OVERLAY CONST. COST     .00    .00    .00    .00    .00    .00    .00
     USER COST               .00    .00    .00    .00    .00    .00    .00
     ROUTINE MAINT. COST    2.20   2.20   2.20   2.20   2.20   2.20   2.20
     SALVAGE VALUE         -2.09  -2.04  -2.21  -2.16  -2.33  -2.28  -2.46
     ************************************************************************
     TOTAL COST            34.01  34.76  34.86  35.62  35.71  36.47  36.56
     ************************************************************************
     LAYER DEPTH (INCHES)
         D(1)              6.00   5.50   6.50   6.00   7.00   6.50   7.50
         D(2)              9.50   7.50   9.00   7.00   8.50   6.50   8.00
         D(3)               .00   8.00    .00   8.00    .00   8.00    .00
     ************************************************************************
     OVERLAY POLICY(INCH)
     (INCLUDING LEVEL-UP)
```

LTSBB.OUT

PERF. TIME (YEARS)							
T(1)	21.76	20.25	21.89	20.46	22.10	20.67	22.31
SWELLING CLAY LOSS (SERVICEABILITY)							
SC(1)	.47	.46	.47	.46	.47	.46	.47

1

MFPS-1 MUNICIPAL FLEXIBLE PAVEMENT DESIGN SYSTEM, VERSION 1.0, 8/83
ADAPTED FROM TEXAS SDHPT FPS-11 PROGRAM FOR CITY OF AUSTIN
BY ARE INC, CONSULTING ENGINEERS, AUSTIN, TEXAS

PROBLEM TITLE (DESCRIPTION)
NEENAH AVE WIDENING (PROJECT NO. 96155065) - MINOR ARTERIAL, 4-LANE DIVIDED MINOR ARTERIAL
PAVEMENT DESIGN OPTIONS 3 AND 4

SUMMARY OF THE BEST DESIGN STRATEGIES
IN ORDER OF INCREASING TOTAL COST

	15	16	17	18
MATERIAL ARRANGEMENT	ABL	AB	ABL	ABL
SUBGRADE EXC. COST	3.21	2.37	3.21	3.21
CURB CONSTR. COST	11.25	11.25	11.25	11.25
THICKENED EDGE COST	.00	.00	.00	.00
TAPERING COSTS	.00	.00	.00	.00
MILLING COSTS	.00	.00	.00	.00
INIT. CONST. COST	37.51	37.78	38.49	39.46
OVERLAY CONST. COST	.00	.00	.00	.00
USER COST	.00	.00	.00	.00
ROUTINE MAINT. COST	2.20	2.20	2.20	2.20
SALVAGE VALUE	-2.40	-2.58	-2.52	-2.64
TOTAL COST	37.32	37.41	38.17	39.02
LAYER DEPTH (INCHES)				
D(1)	7.00	8.00	7.50	8.00
D(2)	6.00	7.50	5.50	5.00
D(3)	8.00	.00	8.00	8.00
OVERLAY POLICY(INCH) (INCLUDING LEVEL-UP)				
PERF. TIME (YEARS)				

LTSBB.OUT

```
    T(1)             20.89  22.52  21.10  21.32
**************************************************
SWELLING CLAY LOSS
 (SERVICEABILITY)
   SC(1)               .46    .47    .46    .46
**************************************************

THE TOTAL NUMBER OF FEASIBLE DESIGNS ENCOUNTERED WAS       358
```

Standard Asphalt Pavement - TWH Edition - 20150207

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 95	Initial Serviceability	= 4.2
Standard Normal Deviate	= -1.645	Terminal Serviceability	= 2.5
Standard Deviation	= 0.49	Change in Serviceability	= 1.7

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

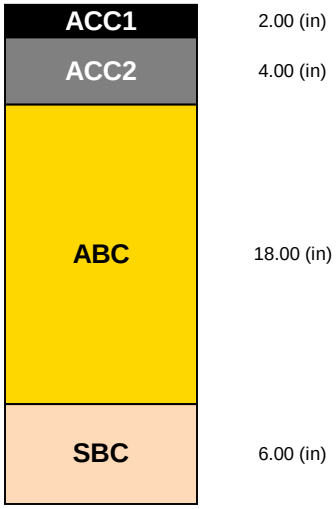
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
ACC2	Dense-graded Asphalt Course	70	0.400	N/A
ABC	Aggregate Base Course	20	0.140	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

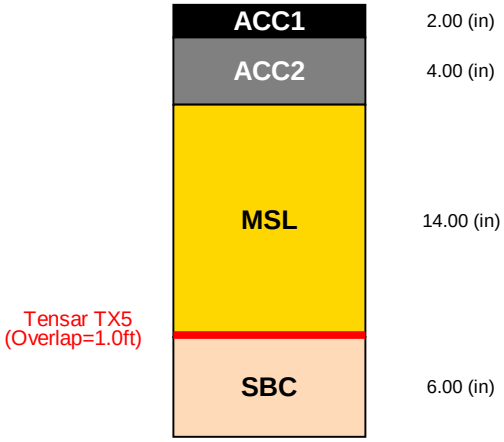
Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
ACC2	Dense-graded Asphalt Course	70	0.400	N/A
MSL	Mechanically Stabilized Base Cour	20	0.199	1.0
SBC	Subbase Course	16	0.080	1.0

Unstabilized Pavement



Subgrade Modulus = 5,000 (psi)
Structural Number = 5.440
Calculated Traffic (ESALs) = 4,454,000

Stabilized Pavement



Subgrade Modulus = 5,000 (psi)
Structural Number = 5.706
Calculated Traffic (ESALs) = 6,323,000

LIMITATIONS OF THE REPORT

The designs, illustrations, information and other content included in this report are necessarily general and conceptual in nature, and do not constitute engineering advice or any design intended for actual construction. Specific design recommendations can be provided as the project develops.

Project Name	Neenah Avenue Widening		
Company Name	Tensar		
Designer	ADK	Date	7/31/2015

Printed on 07-31-2015 N:\Projects\2015\96155065\Working Files\Calculations-Analyses\Spectrapave design.sp4p

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Developed by Tensar International Corporation
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Standard Asphalt Pavement - TWH Edition - 20150207

Flexible Pavement Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 95	Initial Serviceability	= 4.2
Standard Normal Deviate	= -1.645	Terminal Serviceability	= 2.5
Standard Deviation	= 0.49	Change in Serviceability	= 1.7

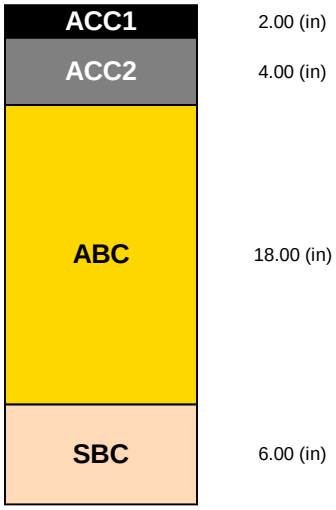
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
ACC2	Dense-graded Asphalt Course	70	0.400	N/A
ABC	Aggregate Base Course	20	0.140	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

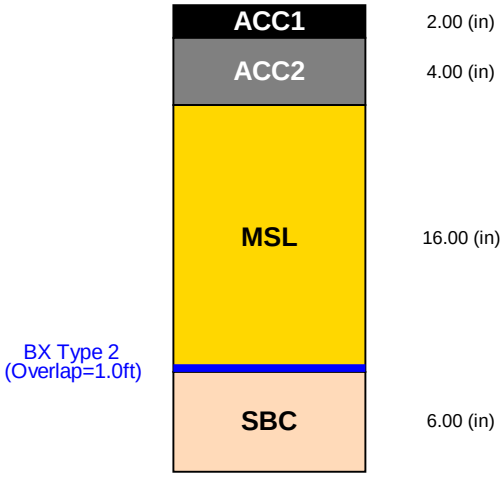
Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
ACC2	Dense-graded Asphalt Course	70	0.400	N/A
MSL	Mechanically Stabilized Base Cour	20	0.177	1.0
SBC	Subbase Course	16	0.080	1.0

Unstabilized Pavement



Subgrade Modulus = 5,000 (psi)
Structural Number = 5.440
Calculated Traffic (ESALs) = 4,454,000

Stabilized Pavement



Subgrade Modulus = 5,000 (psi)
Structural Number = 5.752
Calculated Traffic (ESALs) = 6,711,000

LIMITATIONS OF THE REPORT

The designs, illustrations, information and other content included in this report are necessarily general and conceptual in nature, and do not constitute engineering advice or any design intended for actual construction. Specific design recommendations can be provided as the project develops. **This report is for use of a generic biaxial geogrid ONLY where the specific product has been substantiated by full scale in-ground testing. The user is encouraged to refer to the analysis of the Performance Verified TriAx geogrids in addition to the section shown in this report.**

Project Name	Neenah Avenue Widening		
Company Name	Tensar		
Designer	ADK	Date	7/31/2015

Printed on 07-31-2015 N:\Projects\2015\96155065\Working Files\Calculations-Analyses\Spectrapave design.sp4p

This document was prepared using SpectraPave4 PRO™ Software Version 4.6.1
Developed by Tensar International Corporation
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PROJECT: **1710-194 Neenah Ave Widening** **BIDDER:** _____

Full compensation for compliance with each and every provision of the Request for Bids, the Bid, the Specifications, and the Contract will be considered as included in the unit prices for the work set forth below, and no separate payment will be made for compliance with each and every provision of the Request for Bids, the Bid, the Specifications, and the Contract, unless separate payment is expressly provided for therein.

BID ITEM	TECH SPEC1	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
1	500-WC01	MOBILIZATION	1	LS		$ -
2	101S-C	PREPARING RIGHT-OF-WAY	1	LS		$ -
3	102S-C	CLEARING AND GRUBBING	1	LS		$ -
4	104S-A	REMOVE P.C. CONCRETE CURB	50	LF		$ -
5	110S-B	STREET EXCAVATION, PLAN QUANTITY	544	CY		$ -
6	120S-B	CHANNEL EXCAVATION, PLAN QUANTITY	982	CY		$ -
7	130S-T	CLASS C (TOP SOIL), PLAN QUANTITY	560	CY		$ -
8	132S-A	EMBANKMENT	3306	CY		$ -
9	201S	SUBGRADE PREPERATION	14632	SY		$ -
10	203S-A	LIME TREATED SUBGRADE, (8 IN THICK), (SLURRY)	4967	SY		$ -
11	210S-A	FLEXIBLE BASE	3424	CY		$ -
12	306S	PRIME COAT	689	GAL		$ -
13	307S	TACK COAT	421	GAL		$ -
14	312S-D	SEAL COAT, COMPLETE IN PLACE	17156	SY		$ -
15	313S-B	RUBBER ASPHALT JOINT AND CRACK SEALER	9888	LF		$ -
16	315S-A	SURFACE MILLING	820	SY		$ -

PROJECT: **1710-194 Neenah Ave Widening** **BIDDER:** _____

Full compensation for compliance with each and every provision of the Request for Bids, the Bid, the Specifications, and the Contract will be considered as included in the unit prices for the work set forth below, and no separate payment will be made for compliance with each and every provision of the Request for Bids, the Bid, the Specifications, and the Contract, unless separate payment is expressly provided for therein.

BID ITEM	TECH SPEC1	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
17	340S-B2D	HOT MIX ASPHALTIC CONCRETE PAVEMENT, 2 INCHES, TYPE D	3834	SY		$ -
18	340S-B4C	HOT MIX ASPHALTIC CONCRETE PAVEMENT, 4 INCHES, TYPE C	3231	SY		$ -
19	340S-B3C	HOT MIX ASPHALTIC CONCRETE PAVEMENT, 3 INCHES, TYPC C	26	SY		$ -
20	340S-L	HOT MIX ASPHALTIC CONCRETE PAVEMENT, HEIGHT VARIES, TYPE D LEVEL-UP COURSE	1	LS		$ -
21	360S-A	7 IN. CONCRETE PAVEMENT	101	SY		$ -
22	360S-B	MONOLITHIC CURB	513	LF		$ -
23	401S-A	UNCLASSIFIED STRUCTURAL EXCAVATION, PLAN QUANTITY	1233	CY		$ -
24	414S-C-N	CAST-IN-PLACE PORTLAND CEMENT CONCRETE RETAINING WALL (RET. WALL N), INCLUDING REINFORCEMENT, COMPLETE IN PLACE AS DETAILED AND SPECIFIED	50	CY		$ -
25	414S-C-S	CAST-IN-PLACE PORTLAND CEMENT CONCRETE RETAINING WALL (RET. WALL S), INCLUDING REINFORCEMENT, COMPLETE IN PLACE AS DETAILED AND SPECIFIED	100	CY		$ -
26	414S-C-P	CAST-IN-PLACE PORTLAND CEMENT CONCRETE RETAINING WALL FOOTING (RET. WALL P), INCLUDING REINFORCEMENT, COMPLETE IN PLACE AS DETAILED AND SPECIFIED	10	CY		$ -
27	414S-C-SUP	CAST-IN-PLACE PORTLAND CEMENT CONCRETE RETAINING WALL, INCLUDING REINFORCING STEEL	12	CY		$ -
28	430S-B	P.C. CONCRETE CURB & GUTTER (FINE GRADING)	3091	LF		$ -
29	432S-4	NEW P.C. CONCRETE SIDEWALK, 4 INCH THICKNESS	673	SF		$ -
30	432S-6	NEW P.C. CONCRETE SHARED USE PATH, 6 INCH THICKNESS	39212	SF		$ -
31	432S-RP-1	P.C. SIDEWALK CURB RAMP WITH PAVERS (TYPE 1)	6	EA		$ -
32	432S-RP-1B	P.C. SIDEWALK CURB RAMP WITH PAVERS (TYPE 1B)	6	EA		$ -

PROJECT: **1710-194 Neenah Ave Widening** **BIDDER:** _____

Full compensation for compliance with each and every provision of the Request for Bids, the Bid, the Specifications, and the Contract will be considered as included in the unit prices for the work set forth below, and no separate payment will be made for compliance with each and every provision of the Request for Bids, the Bid, the Specifications, and the Contract, unless separate payment is expressly provided for therein.

BID ITEM	TECH SPEC1	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
33	433S-C	TYPE II P.C. CONCRETE DRIVEWAYS	9076	SF		$ -
34	433S-GRAVEL	8" THICK COMPACTED GRAVEL DRIVEWAY (3"-5" STONE)	2580	SF		$ -
35	434S	6 INCH P.C. CONCRETE MEDIANS AND ISLANDS	1200	SF		$ -
36	470S-R	CURB CUTS FOR SIDEWALK RAMPS	312	LF		$ -
37	504S-1RM	REPOSITIONING & ADJUSTING WATER METERS	1	EA		$ -
38	506S 4-4	MINOR MANHOLE HEIGHT ADJUSTMENT, 4 FOOT DIA.	1	EA		$ -
39	506S 2-4	MAJOR MANHOLE HEIGHT ADJUSTMENT, 4 FOOT DIA.	2	EA		$ -
40	508S-I47	4-SIDED AREA INLET (7'X7')	1	EA		$ -
41	508S-I10S	INLET, STANDARD (10')	2	EA		$ -
42	508S-I15S	INLET, STANDARD (15')	1	EA		$ -
43	509S-1	TRENCH SAFETY PROTECTIVE SYSTEMS (ALL DEPTHS)	456	LF		$ -
44	510-ASD18	PIPE, 18-INCH DIA. RCP CLASS III (ALL DEPTHS), INCLUDING EXCAVATION & BACKFILL COMPLETE IN PLACE AS DETAILED AND SPECIFIED	24	LF		$ -
45	510-ASD36	PIPE, 36-INCH DIA. RCP CLASS III (ALL DEPTHS), INCLUDING EXCAVATION & BACKFILL COMPLETE IN PLACE AS DETAILED AND SPECIFIED	205	LF		$ -
46	551	PIPE UNDERDRAINS (6" PVC)	97	LF		$ -
47	559S-5X3	PRECAST CONCRETE BOX CULVERTS, 5 FT.X 3 FT.	64	LF		$ -
48	559S-12X4	PRECAST CONCRETE BOX CULVERTS, 12 FT.X 4 FT.	30	LF		$ -

PROJECT: **1710-194 Neenah Ave Widening** **BIDDER:** _____

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BID ITEM	TECH SPEC1	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
49	559S-A	CAST IN PLACE CONCRETE BOX CULVERTS	23	CY		$ -
50	591S-A	DRY ROCK RIPRAP	490	SY		$ -
51	591S-F-5	5" CONCRETE RIPRAP (HEADWALLS) COMPLETE IN PLACE AS DETAILED AND SPECIFIED	174	SY		$ -
52	602S-A	BERMUDA SODDING	1678	SY		$ -
53	602S-B	ST AUGUSTINE SODDING	1678	SY		$ -
54	604S-D	SEEDING FOR EROSION CONTROL	7453	SY		$ -
55	605S-A	SOIL RETENTION BLANKET, CLASS 1, TYPE C	19459	SY		$ -
56	609S-A	TOPSOIL AND SEEDBED PREP	10773	SY		$ -
57	609S-C	NATIVE GRASSLANDS FOR EROSION CONTROL	10773	SY		$ -
58	609S-F	WATERING	47	KGAL		$ -
59	609S-G	MANAGEMENT PRACTICES	10773	SY		$ -
60	610S-A	PROTECTIVE FENCING TYPE A CHAIN LINK FENCE	3286	LF		$ -
61	610S-D	TREE WELL (TREE PROTECTION)	7	EA		$ -
62	610S-R	REMOVAL OF EXISTING TREE	65	EA		$ -
63	620S-A	FILTER FABRIC	287	SY		$ -
64	623S	DRY STACK ROCK WALL (RET. WALL P)	500	SF		$ -

PROJECT: **1710-194 Neenah Ave Widening** **BIDDER:** _____

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BID ITEM	TECH SPEC1	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
65	628S-B	SEDIMENT CONTAINMENT DIKES WITH FILTER FABRIC	270	LF		$ -
66	632S	STORM INLET SEDIMENT TRAP	243	CF		$ -
67	639S	ROCK BERM	244	LF		$ -
68	641S	STABILIZED CONSTRUCTION ENTRANCE	2	EA		$ -
69	642S	SILT FENCE FOR EROSION CONTROL	4757	LF		$ -
70	648S	MULCH SOCK	509	LF		$ -
71	703S	SAFETY FENCE	275	LF		$ -
72	722S-A	PROTECTIVE COATING (NEW STRUCTURES) - TO COVER EXPOSED CONC. OR ROCK SURFACES	1	LS		$ -
73	803S-MO	BARRICADES, SIGNS, AND TRAFFIC HANDLING	12	MO		$ -
74	824S	TRAFFIC SIGNS	34	EA		$ -
75	827S-A	BICYCLE LANE AHEAD SIGN	1	EA		$ -
76	827S-B	BICYCLE LANE ENDS SIGN	1	EA		$ -
77	829S-A	TYPE I BICYCLE LANE MARKINGS 6 INCHES IN WIDTH, WHITE IN COLOR	1694	LF		$ -
78	829S-B	TYPE I BICYCLE LANE PREFERENTIAL (DIRECTIONAL ARROW) SYMBOLS, WHITE IN COLOR	2	EA		$ -
79	829S-C	TYPE I BICYCLE LANE (BIKE RIDER) SYMBOL, WHITE IN COLOR	4	EA		$ -
80	829S-E	TYPE II BICYCLE LANE MARKINGS 6 INCHES IN WIDTH, WHITE IN COLOR	1694	LF		$ -

PROJECT: **1710-194 Neenah Ave Widening** **BIDDER:** _____

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BID ITEM	TECH SPEC1	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
81	829S-F	TYPE II BICYCLE LANE PREFERENTIAL (DIRECTIONAL ARROW) SYMBOLS, WHITE IN COLOR	2	EA		$ -
82	829S-G	TYPE II BICYCLE LANE (BIKE RIDER) SYMBOL, WHITE IN COLOR	4	EA		$ -
83	835S-LT2	INSTALLING TRAFFIC SIGNAL CONDUIT WITH CONDUIT 2 INCH IN DIA.	10	LF		$ -
84	844S-1	CLASS 1 TRENCHING FOR TRAFFIC SIGNAL CONDUIT	10	LF		$ -
85	863S-2	REFLECTORIZED PAVEMENT MARKERS (TYPE I-C)	164	EA		$ -
86	863S-3	REFLECTORIZED PAVEMENT MARKERS (TYPE II A-A)	135	EA		$ -
87	870S-A24W	WORK ZONE PAVEMENT MARKINGS (REMOVABLE), 24 INCHES IN WIDTH, WHITE IN COLOR	810	LF		$ -
88	870S-B4Y	WORK ZONE PAVEMENT MARKINGS (NON-REMOVABLE), 4 INCHES IN WIDTH, YELLOW IN COLOR	8402	LF		$ -
89	871S-A4YB	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS 4 INCHES IN WIDTH, YELLOW IN COLOR (SOLID)	5710	LF		$ -
90	871S-A4YS	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS 4 INCHES IN WIDTH, YELLOW IN COLOR (BROKEN)	2017	LF		$ -
91	871S-A4WB	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS 4 INCHES IN WIDTH, WHITE IN COLOR (BROKEN)	2720	LF		$ -
92	871S-A8WS	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS 8 INCHES IN WIDTH, WHITE IN COLOR (SOLID)	240	LF		$ -
93	871S-A12YS	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS 12 INCHES IN WIDTH, YELLOW IN COLOR (SOLID)	359	LF		$ -
94	871S-A12WS	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS 12 INCHES IN WIDTH, WHITE IN COLOR (SOLID)	879	LF		$ -
95	871S-A24WS	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS 24 INCHES IN WIDTH, WHITE IN COLOR (SOLID)	24	LF		$ -
96	871S-C	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS, LEFT ARROW, WHITE IN COLOR	2	EA		$ -

PROJECT: **1710-194 Neenah Ave Widening** **BIDDER:** _____

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BID ITEM	TECH SPEC1	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
97	871S-C	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS, LEFT ARROW, YELLOW IN COLOR	12	EA		$ -
98	871S-B	REFLECTORIZED TYPE I THERMOPLASTIC PAVEMENT MARKINGS, 'ONLY', WHITE IN COLOR	1	EA		$ -
99	871S-E4YB	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS 4 INCHES IN WIDTH, YELLOW IN COLOR (SOLID)	5710	LF		$ -
100	871S-E4YS	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS 4 INCHES IN WIDTH, YELLOW IN COLOR (BROKEN)	2017	LF		$ -
101	871S-E4WB	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS 4 INCHES IN WIDTH, WHITE IN COLOR (BROKEN)	2720	LF		$ -
102	871S-E8WS	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS 8 INCHES IN WIDTH, WHITE IN COLOR (SOLID)	240	LF		$ -
103	871S-E12YS	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS 12 INCHES IN WIDTH, YELLOW IN COLOR (SOLID)	359	LF		$ -
104	871S-E12WS	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS 12 INCHES IN WIDTH, WHITE IN COLOR (SOLID)	879	LF		$ -
105	871S-E24WS	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS 24 INCHES IN WIDTH, WHITE IN COLOR (SOLID)	24	LF		$ -
106	871S-G	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS, LEFT ARROW, WHITE IN COLOR	2	EA		$ -
107	871S-G	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS, LEFT ARROW, YELLOW IN COLOR	12	EA		$ -
108	871S-F	REFLECTORIZED TYPE II THERMOPLASTIC PAVEMENT MARKINGS, 'ONLY', WHITE IN COLOR	1	EA		$ -
109	874S-A4	ELMININATING EXISTING PAVEMENT MARKINGS; 4 INCHES IN WIDTH	8690	LF		$ -
110	874S-A12	ELMININATING EXISTING PAVEMENT MARKINGS; 12 INCHES IN WIDTH	321	LF		$ -
111	16550S	STREET LIGHT STANDARD FOUNDATION	1	EA		$ -
112	432-6045	RIPRAP (MOW STRIP)(4 IN)	24.8	CY		$ -

PROJECT: **1710-194 Neenah Ave Widening** **BIDDER:** _____

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BID ITEM	TECH SPEC1	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
113	450-6051	PEDESTRIAN RAILING (TXDOT PRD-13 TYPE E)	593	LF		$ -
114	466-6154	WINGWALL (FW-0)(HW=7 FT), COMPLETE IN PLACE AS DETAILED AND SPECIFIED	1	EA		$ -
115	466-6169	WINGWALL (FW-S)(HW=8 FT), COMPLETE IN PLACE AS DETAILED AND SPECIFIED	2	EA		$ -
116	466-6210	WINGWALL (SW-0)(HW=7 FT), COMPLETE IN PLACE AS DETAILED AND SPECIFIED	1	EA		$ -
117	467-6175	SET (TY I)(S= 5 FT)(HW= 3 FT)(3:1) (C), COMPLETE IN PLACE AS DETAILED AND SPECIFIED	2	EA		$ -
118	467-6448	SET (TY II)(36 IN)(RCP)(3:1)(C), COMPLETE IN PLACE AS DETAILED AND SPECIFIED	1	EA		$ -
119	506-6003	ROCK FILTER DAM (INSTALL) (TY 3)	189	LF		$ -
120	506-6011	ROCK FILTER DAM (REMOVE)	189	LF		$ -
121	540-6001	MTL W-BEAM GD FEN (TIM POST)	788	LF		$ -
122	540-6016	DOWNSTREAM TERMINAL ANCHOR SECTION	2	EA		$ -
123	540-6020	MTL W-BEAM GD FEN (LOW FILL CULVERT)	50	LF		$ -
124	544-6001	GUARDRAIL END TREATMENT (INSTALL)	2	EA		$ -
125	550-6001	CHAIN LINK FENCE (INSTALL)(6')	275	LF		$ -
126	550-6012	CHAIN LINK FENCE GATE (INSTALL)(6'X16')	1	EA		$ -
127	658-6047	INSTL OM ASSM (OM-2Y)(WC)GND	4	EA		$ -
128	658-6048	INSTL OM ASSM (OM-2Z)(FLX)GND	4	EA		$ -

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BID ITEM	TECH SPEC1	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
129	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	16	EA		$ -
130	WC9031	DIVERSION AND CARE OF WATER	12	MO		$ -
131	WC9032	WATER QUALITY AND DETENTION POND	1	EA		$ -
132	WC9033	CONCRETE WASHOUT AREA	1	EA		$ -
133	432S-A	P.C. CONCRETE CURB AND GUTTER (INCLUDING REMOVAL AND REPLACEMENT)	70	LF		$ -
134	504S-1WM	REPOSITIONING & ADJUST WATER METER BOX TO GRADE	1	EA		$ -
135	506S-4WW	MAJOR MANHOLE HEIGHT ADJUSTMENT	2	EA		$ -
136	506S-4WW	MINOR MANHOLE HEIGHT ADJUSTMENT	1	EA		$ -
137	509S-1	TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS (ALL DEPTHS)	171	LF		$ -
138	510-AW1.5K	PIPE, 1.5" DIAMETER, COPPER TYPE K (ALL DEPTHS) INCLUDES EXCAVATION AND BACKFILL	50	LF		$ -
139	510-AWRJ6	FACTORY RESTRAINED JOINT PIPE, 6" DIAMETER, DI CL 350 (ALL DEPTHS) INCLUDES EXCAVATION AND BACKFILL	35	LF		$ -
140	510-AWRJ8	FACTORY RESTRAINED JOINT PIPE, 8" DIAMETER, DI CL 350 (ALL DEPTHS) INCLUDES EXCAVATION AND BACKFILL	55	LF		$ -
141	510-AWRJ12	FACTORY RESTRAINED JOINT PIPE, 12" DIAMETER, DI CL 350 (ALL DEPTHS) INCLUDES EXCAVATION AND BACKFILL	31	LF		$ -
142	510-BW-8	CONNECTION NEW 8" SERVICE TO EXISTING 8" WATER VAULT, WITH FOSTER ADAPTOR	2	EA		$ -
143	510-BW 2x2	CONNECTING NEW SINGLE 1.5" SERVICE TO EXISTING PRIVATE SERVICE	2	EA		$ -
144	510-JW 12x6	WET CONNECTIONS, 12" DIA. x 6" DIA.	3	EA		$ -

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BID ITEM	TECH SPEC1	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
145	510-JW 12x8	WET CONNECTIONS, 12" DIA. x 8" DIA.	1	EA		$ -
146	510-JW 12x12	WET CONNECTIONS, 12" DIA. x 12" DIA.	2	EA		$ -
147	510-KW	DUCTILE IRON FITTINGS	0	TON		$ -
148	511S-A6	VALVES, GATE VALVE, 6" DIAMETER	4	EA		$ -
149	511S-A12	VALVES, GATE VALVE, 12" DIAMETER	1	EA		$ -
150	511S-B	FIRE HYDRANT (511S-17)	3	EA		$ -
151	SP504S-GV6	REMOVE VALVE, 6"	1	EA		$ -
NON-BID ITEMS TO BE INCLUDED IN BID AND CONTRACT AMOUNT. DO NOT MAKE CHANGES TO THIS SECTION.						
152	999-WC01	FORCE ACCOUNT	15000	DOL	$ 1.00	$ 15,000.00
153	999-WC02	FORCE ACCOUNT (CAVE/VOID MITIGATION)	50000	DOL	$ 1.00	$ 50,000.00

TOTAL AMOUNT OF BID

$ 65,000.00

_____ **Dollars and** _____ **Cents**

NOTE: THE COURT MAY EITHER REJECT ALL BIDS OR AWARD A CONTRACT TO THE LOWEST AND BEST BID.

BID AFFIDAVIT

This form must be completed, signed, notarized and returned with Bid package

The undersigned attests that the company named below, under the provisions of Subtitle F, Title 10, Texas Government Code Chapter 2270:

1. Does not boycott Israel currently; and
2. Will not boycott Israel during the term of the contract.

Pursuant to Section 2270.001, Texas Government Code:

1. "Boycott Israel" means refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes; and
2. "Company" means a for-profit sole proprietorship, organization, association, corporation, partnership, joint venture, limited partnership, or any limited liability company, including a wholly owned subsidiary, majority-owned subsidiary, parent company or affiliate of those entities or business associations that exist to make a profit.

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."

Name of Bidder:	
Address of Bidder:	
Email:	
Telephone:	
Printed Name of Person Submitting Affidavit:	
Signature of Person Submitting Affidavit:	

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.

☐	I will offer the quoted prices to all authorized entities during the term of the County's Contract.
☐	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 BIDSYNC ELECTRONICALLY.

CONFLICT OF INTEREST QUESTIONNAIRE

For vendor or other person doing business with local governmental entity

Form CIQ

This questionnaire is being filed in accordance with chapter 176 of the Local Government Code by a person doing business with the governmental entity.

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.

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.

OFFICE USE ONLY

Date Received

1 **Name of person doing business with local governmental entity.**

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.**

(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.)

3 **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.**

4 **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.**

CONFLICT OF INTEREST QUESTIONNAIRE

For vendor or other person doing business with local governmental entity

Form CIQ
Page 2

5 **Name of local government officer with whom filer has affiliation or business relationship.**
(Complete this section only if the answer to A, B, or C is YES.)

This section, item 5 including subparts A, B, C & 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.

A. Is the local government officer named in this section receiving or likely to receive taxable income from the filer of the questionnaire?

☐ Yes ☐ No

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?

☐ Yes ☐ No

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?

☐ Yes ☐ No

D. Describe each affiliation or business relationship.

6. Describe any other affiliation or business relationship that might cause conflict of interest:

7

Signature of person doing business with the governmental entity	Date

Signature not required if completing in BIDSYNC electronically.

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 #1710-194 - Neenah Avenue Widening

Overall Bid Questions
There are no questions associated with this bid.