



PUBLIC ANNOUNCEMENT AND GENERAL INFORMATION

## **WILLIAMSON COUNTY PURCHASING DEPARTMENT SOLICITATION**

Multi-Site Traffic Signals

**BIDS MUST BE RECEIVED ON OR BEFORE:**

**Feb 3, 2016 3:30:00 PM CST**

**BIDS WILL BE PUBLICLY OPENED:**

**Feb 3, 2016 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](http://www.bidsync.com).

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

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

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.

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

**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 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: **IFB 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; **AND** one (1) CD **OR** (1) USB copy of the Bid.
- ✓ **Williamson County will not accept any Bids received after the submittal deadline, and shall return such Bids unopened to the Bidder.**
- ✓ Williamson County will not accept any responsibility for Bids being delivered by third party carriers.
- ✓ Facsimile transmittals will NOT be accepted.
- ✓ Bids will be publicly opened and read aloud in the Williamson Purchasing Department at the time and date indicated above.
- ✓ All submitted questions with their answers will be posted and updated on [www.bidsync.com](http://www.bidsync.com).
- ✓ It is the Bidder's responsibility to review all documents in BidSync including any addenda that may have been added after the document packet was originally released and posted.
- ✓ Any addenda and/or other information relevant to the IFB will be posted on [www.bidsync.com](http://www.bidsync.com).
- ✓ The Williamson County Purchasing Department takes no responsibility to ensure any interested Respondent has obtained any outstanding addenda or additional information.
- ✓ Williamson County will NOT be responsible for unmarked or improperly marked envelopes.

## Bid 1512-036 Multi-Site Traffic Signals

Bid Number **1512-036**  
 Bid Title **Multi-Site Traffic Signals**  
 Expected Expenditure **\$574,632.00** (This price is expected - not guaranteed)

Bid Start Date **In Held**  
 Bid End Date **Feb 3, 2016 3:30:00 PM CST**  
 Question & Answer End Date **Jan 25, 2016 5:00:00 PM CST**

Bid Contact **Connie Singleton**  
**512-943-1553**  
**csingleton@wilco.org**

Contract Duration **One Time Purchase**  
 Contract Renewal **Not Applicable**  
 Prices Good for **Not Applicable**  
 Pre-Bid Conference **Jan 20, 2016 3:30:00 PM CST**  
**Attendance is optional**  
**Location: Purchasing Office**  
**901 S Austin Avenue**  
**Georgetown, TX 78626**

Bid Comments **Williamson County is seeking qualified contractors to construct two traffic signals, including replacement of an existing flashing beacon system with a new span-wire pole based traffic signal, construction of a new mast-arm pole based traffic signal, video detection, illumination, and pavement markings. Estimated time of completion is 90 calendar days to substantial completion, and 30 calendar days to final completion, with an estimated cost of \$574,632.**

### **BID REQUIREMENTS**

**Multi-Site Traffic Signals**  
**CR 110 and University - Traffic Signal**  
**Gattis School at Winterfield Traffic Signal**  
**1512-036**

### **BID CHECK LIST**

**If bidding electronically in Bidsync, the following documents MUST be completed and attached to the FIRST LINE ITEM. If delivering a paper bid the documents must be completed and added with the price sheet in a sealed, labeled envelope.**

**If entering an electronic bid in BIDSYNC (PREFERRED), the following documents MUST be completed and attached to FIRST LINE ITEM.**

**Completed Bid Form**  
**Bid Affidavit**  
**Conflict of Interest Form**  
**Disclosure of Lobbying Activities**  
**References**  
**Bid Bond**

**If delivering a paper bid instead of electronic; the above listed documents must be completed and added with the completed price sheet and delivered to:  
 Williamson County Purchasing, 901 South Austin Ave, Georgetown, TX 78626.**

**BID BOND REQUIRED**

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**:

Scan the completed bond, download the completed bond to the first line item of this bid with your other required documents.

On all bids requiring a bid bond – you **MUST** supply the bond according to the instructions below or your bid will be disqualified.

All Bids shall be accompanied by either:

a. A certified cashier's check: payable without recourse to Williamson County and drawn upon a National or State bank in an amount not less than five percent (5%) of the total maximum bid price;

**OR**

b. 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.

**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 000-2332, and are estimated to be \$610 per calendar day.

**BONDS**

Bid Bond is due at receipt of bid.

Payment, 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.

**Item Response Form**

Item 1512-036--01-01 · ATTACH ALL DOCUMENTS HERE

Quantity 1 each

Unit Price

Delivery Location

**Williamson County, Texas**

Purchasing Department

901 S. Austin Avenue

Georgetown TX 78626

**Qty 1**

**Description**

ADD BID TOTAL IN "PRICE" (your total of all items, plus 'non-bid items of \$15,000)

**Unit prices must be good from the date of the bid opening through completion of the project.**

COMPLETE BID FORM AND ATTACH HERE with other required documents:

Bid Form

Bid Affidavit

Conflict of Interest Form

Disclosure of Lobbying Activities

Bidder References

Bid Bond





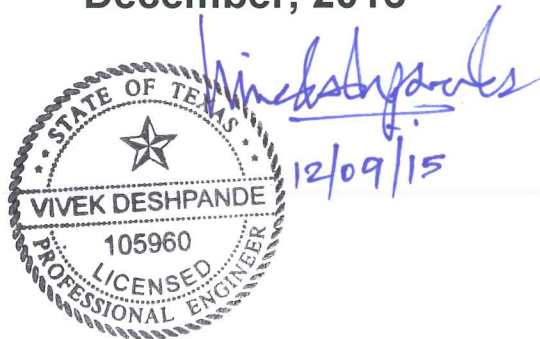
**WILLIAMSON COUNTY**  
**PROJECT CONSTRUCTION MANUAL**  
**FOR**

**CR 110 and University Blvd. Traffic Signal**  
**Gattis School at Winterfield Traffic Signal**

**SOLICITATION 1512 – 036**

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

**December, 2015**



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.

## **TABLE OF CONTENTS**

<b><u>CONTENTS</u></b>	<b><u>SECTION</u></b>
Addenda	1
Invitation for Bids	2
Bid Instructions/Requirements	3
Bid Form, Bid Affidavit, Bidder References, Disclosure of Lobbying Activities, & Conflict of Interest Questionnaire	4
Standard Form of Agreement	5
Wage Rates	6
Performance Bond	7
Payment Bond	8
Maintenance Bond	9
Certificate of Insurance	10
General Conditions of Agreement	11
Special Conditions of Agreement	12
Technical Specifications	13
Plan Drawings	(Bound Separately)
Geotechnical Report	(If Applicable)

### **Appendices**

- Appendix A – Quality Control/Quality Assurance Program
- Appendix B – Guide Schedule of Sampling and Testing
- Appendix C – AASHTO Accredited Laboratories

**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**

**SECTION 2**  
**INVITATION FOR BIDS**

## **PUBLIC NOTICE WILLIAMSON COUNTY INVITATION FOR BIDS**

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

### **MULTI-SITE SIGNAL CONTRACT**

**Williamson County is seeking qualified contractors to construct two (2) traffic signals. Estimated time of completion is 90 calendar days to substantial completion, and 30 calendar days to final completion, with an estimated cost of \$574,632.**

**Sealed bids will be publicly opened and read aloud in the Williamson County Purchasing Department, 901 South Austin Avenue, Georgetown, Texas on Wednesday, February 3, 2016 at 3:30 PM.**

**Bids must be received on or before Wednesday, February 3, 2016 at 3:30 PM.**

**Bid documents and plans may be viewed and responded to by registering with BIDSYNC at [www.bidsync.com](http://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 Wednesday, January 20, 2016 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 Connie Singleton, Senior Purchasing Specialist, under the direction of Max Bricka, Purchasing Agent for Williamson County, 512-943-3553.**

**This notice is issued by order of the Williamson County Commissioners' Court on Tuesday, January 5, 2016; Dan A. Gattis, County Judge.**

**SECTION 3**  
**BID INSTRUCTIONS/REQUIREMENTS**

Modified October 2015

Bid Instructions

**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](http://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](http://www.bidsync.com).

Any addenda and/or other information relevant to the Bid will be posted on: [www.bidsync.com](http://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 2006 Road Bond Program.



Modified October 2015

Bid Instructions

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](mailto: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 000-2332 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.

Modified October 2015

Bid Instructions

(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.

and provide for appropriate training as applicable.

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

**SECTION 4**  
**BID FORM, BID AFFIDAVIT, BIDDER REFERENCES,**  
**DISCLOSURE OF LOBBYING ACTIVITIES**  
**& CONFLICT OF INTEREST QUESTIONNAIRE**



**ALL REQUIRED DOCUMENTS MUST BE  
FILLED OUT AND SUBMITTED WITH BID**  
**[www.bidsync.com](http://www.bidsync.com)**

**FOLLOWING CONTRACT AWARD  
REQUIRED DOCUMENTS WILL BE  
INSERTED IN THIS SECTION**

**SECTION 5**  
**STANDARD FORM OF AGREEMENT**

Approved December 2007

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. **1512-036 – MULTI-SITE SIGNAL CONTRACT**

#### **Article 2. Engineer of Record**

The Project has been designed by **Kimley-Horn and Associates, Inc.** and **Alliance Transportation Group**, 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 **90** 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:

Approved December 2007

Agreement

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 claiming 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:

Approved December 2007

Agreement

- 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.



Approved December 2007

Agreement

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

COUNTY\_\_\_\_\_

CONTRACTOR\_\_\_\_\_

By:\_\_\_\_\_

Dan A. Gattis,  
Williamson County Judge

By: \_\_\_\_\_

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, McClellan 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](http://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**



Approved\_December 2007

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.

Approved\_December 2007

Performance Bond

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**

Approved\_December 2007

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.

Approved\_December 2007

Payment Bond

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**

Approved\_December 2007

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

Approved\_December 2007

Maintenance Bond

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**

Approved\_December 2007

Insurance

**CERTIFICATE OF INSURANCE**

TO:

\_\_\_\_\_  
(COUNTY)

\_\_\_\_\_

\_\_\_\_\_  
(ADDRESS)

DATE: \_\_\_\_\_

Project No.: \_\_\_\_\_

Type of \_\_\_\_\_

Project: \_\_\_\_\_

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.

POLICY NO.	TYPE OF INSURANCE		LIMITS OF LIABILITY
	EFFECTIVE	EXPIRES	
Workmen's Compensation		1 Person	\$ _____
Public Liability		1 Accident	\$ _____
Contingent Liability		1 Person	\$ _____
Property Damage		1 Accident	\$ _____
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**

## Table of Contents

### **1. Definition of Terms**

- 1.01 The Agreement
- 1.02 County
- 1.03 Department
- 1.04 Contractor
- 1.05 Engineer
- 1.06 General Engineering Consultant (GEC)
- 1.07 Construction Observer
- 1.08 Construction Representative
- 1.09 Engineer of Record
- 1.10 Contract Documents
- 1.11 Subcontractor
- 1.12 Sub-Subcontractor
- 1.13 Written Notice
- 1.14 Work
- 1.15 Extra Work
- 1.16 Working Day
- 1.17 Calendar Day
- 1.18 Substantially Completed
- 1.19 Notice of Substantial Completion
- 1.20 Certificate of Completion
- 1.21 Certificate of Acceptance
- 1.22 Project
- 1.23 Contract Time
- 1.24 Contract Price

### **2. Responsibilities of the Engineer and the Contractor**

- 2.01 County-Observer Relationship
- 2.02 Professional Observation by the Construction Observer
- 2.03 Payments for Work
- 2.04 Initial Determinations
- 2.05 Objections
- 2.06 Lines and Grades
- 2.07 Contractor's Duty and Superintendence
- 2.08 Contractor's Understanding
- 2.09 Character of Workers
- 2.10 Shop Drawings
- 2.11 Preliminary Approval
- 2.12 Defects and Their Remedies
- 2.13 Changes and Alterations

**3. General Obligations and Responsibilities**

- 3.01 Keeping of Plans and Specifications Accessible and Keeping a Superintendent on the Project Site
- 3.02 Ownership of Documents
- 3.03 Adequacy of Design
- 3.04 Contractor's Responsibility for Work
- 3.05 Protection Against Accident to Employees and the Public
- 3.06 Performance and Payment Bonds
- 3.07 Protection of Adjoining Property
- 3.08 Protection Against Claims of Subcontractors, Laborers, Materialmen and Furnishers of Machinery, Equipment and Supplies
- 3.09 Protection Against Royalties or Patented Invention
- 3.10 Laws and Ordinances
- 3.11 Assignment and Subletting
- 3.12 Indemnification
- 3.13 Insurance
- 3.14 Final Clean-up

**4. Prosecution and Progress**

- 4.01 Time and Order of Completion
- 4.02 Extension of Time
- 4.03 Hindrances and Delays

**5. Measurement and Payment**

- 5.01 Quantities and Measurements
- 5.02 Estimated Quantities
- 5.03 Price of Work
- 5.04 Partial Payments
- 5.05 Punch List
- 5.06 Final Completion and Acceptance
- 5.07 Final Payment
- 5.08 Payments Withheld
- 5.09 Delayed Payments

**6. Extra Work and Claims**

- 6.01 Change Orders
- 6.02 Minor Changes
- 6.03 Extra Work
- 6.04 Time of Filing Claims
- 6.05 Continuing Performance

**7. Abandonment of Contract**

- 7.01 Abandonment by Contractor
- 7.02 Abandonment by the County

**8. Subcontractors**

- 8.01 Award of Subcontracts for Portions of the Work
- 8.02 Subcontractual Relations
- 8.03 Payments to Subcontractors

**9. Protection of Persons and Property**

- 9.01 Safety Precautions and Programs
- 9.02 Safety of Persons and Property
- 9.03 Location and Protection of Utilities

**10. Termination**

- 10.01 Termination by the County for Cause
- 10.02 Termination for Convenience
- 10.03 Obligations of Contractor Following Termination

**11. Inspection and Audit**

## **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 than 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 be 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 Contract 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 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**

## Table of Contents

<b>I.</b>	<b>County</b>
<b>II.</b>	<b>Program Manager</b>
<b>III.</b>	<b>General Engineering Consultant (GEC)</b>
<b>IV.</b>	<b>The Construction Observer</b>
<b>V.</b>	<b>Engineer of Record</b>
<b>VI.</b>	<b>Insurance</b>
<b>VII.</b>	<b>Record ("As-Built") Drawings</b>
<b>VIII.</b>	<b>Limit of Financial Resources</b>
<b>IX.</b>	<b>Limits of Work and Payment</b>
<b>X.</b>	<b>State Sales Tax</b>
<b>XI.</b>	<b>Completion of Work on Time</b>
<b>XII.</b>	<b>Layout and Construction Stakes</b>
<b>XIII.</b>	<b>Safety</b>
<b>XIV.</b>	<b>Maintenance Bond Term &amp; Amount</b>
<b>XV.</b>	<b>Safety Restrictions - Work Near High Voltage Lines</b>
<b>XVI.</b>	<b>Erosion Control</b>
<b>XVII.</b>	<b>Discovery of Hazardous Materials</b>
<b>XVIII.</b>	<b>Submittals – Certificate of Compliance</b>
<b>XIX.</b>	<b>Unavailability of Materials</b>
<b>XX.</b>	<b>Traffic Control</b>
<b>XXI.</b>	<b>Temporary Traffic Handling Devices</b>
<b>XXII.</b>	<b>Roadway Signs</b>
<b>XXIII.</b>	<b>Project Signs</b>
<b>XXIV.</b>	<b>Permits</b>
<b>XXV.</b>	<b>Landscape Restoration</b>
<b>XXVI.</b>	<b>Existing Fencing</b>
<b>XXVII.</b>	<b>Easements</b>
<b>XXVIII.</b>	<b>Limits of Contractor's Operation</b>
<b>XXIX.</b>	<b>Maintenance of Pedestrian Walkways</b>
<b>XXX.</b>	<b>Spoil</b>
<b>XXXI.</b>	<b>Materials Testing</b>
<b>XXXII.</b>	<b>Pre-Construction Conference</b>
<b>XXXIII.</b>	<b>Weight Tickets</b>
<b>XXXIV.</b>	<b>Confined Space Entry Program</b>
<b>XXXV.</b>	<b>Tree and Plant Protection</b>
<b>XXXVI.</b>	<b>Prosecution and Progress</b>
<b>XXXVII.</b>	<b>Sanitary Provisions</b>
<b>XXXVIII.</b>	<b>Work Near Railroads</b>



Modified December 2013

Special Conditions

## **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  
Williamson County  
901 South Austin Avenue  
Georgetown, TX 78626

County Engineer  
Williamson County  
3151 SE Inner Loop  
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)**

**HTNB 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**

**Kimley-Horn and Associates, Inc.** and **Alliance Transportation Group** 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:

Modified December 2013

Special Conditions

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.

Modified December 2013

Special Conditions

"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 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

Modified December 2013

Special Conditions

- 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

Modified December 2013

Special Conditions

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 000-2332 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 **15** 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.

Modified December 2013

Special Conditions

**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. 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 to include: Williamson County Road Bond Program, 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, contact phone number, website address and the appropriate Williamson County Commissioner's name and precinct number. For more information, contact "Quick Signs" at (512) 251-5517. Furnishing, installing and maintaining these signs shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling".

**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). The Contractor shall create and maintain the schedule using the latest version, at the time of the award of the Project, of Primavera System, Inc. Primavera Project Planner or Suretrak Project Scheduler computer scheduling software, except when a general note requires otherwise. Microsoft Project will not be acceptable. 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 specified 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. If allowed and if the Contractor chooses to use Suretrak Project Manager to create the schedule, the Contractor shall not use the independent activity type. This would cause the schedule to be incompatible with Primavera Project Planner.

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 on diskette or CD-ROM.

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 on the first working day of each month. 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 on diskette or CD-ROM.
  - 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**  
**Project: CR 110-University Signal**  
**Gattis School-Winterfield Signal**

**Sheet:**

**GENERAL NOTES: Revised October 23, 2015**

**MODIFIED STANDARDS**

The following standard detail sheet or sheets have been modified:

SP-80(1-2)-12
TS-FD-12

**GENERAL**

References to manufacturer's trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved.

If work is performed at Contractor's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the Contractor is responsible for all costs associated with replacing the work, if required.

Equip all construction equipment used in roadway work with highly visible omnidirectional flashing warning lights.

Supply litter barrels in enough numbers at locations as directed to control litter within the project. Consider subsidiary to pertinent Items.

Protect all areas of the right of way, which are not included in the actual limits of the proposed construction areas, from disturbance. Restore any area disturbed because of the Contractor's operations to a condition as good as, or better than, before the beginning of work at no cost to the state.

Damage to existing pipes and SET's due to Contractor operations shall be repaired at Contractor's expense.

All locations used for storing construction equipment, materials, and stockpiles of any type, within the right of way, will be as directed. Use of right of way for these purposes will be restricted to those locations where driver sight distance to businesses and side street intersections is not obstructed and at other locations where an unsightly appearance will not exist. The Contractor will not have exclusive use of right of way but will cooperate in the use of the right of way with the city/county and various public utility companies as required.

The Project Superintendent will be capable of speaking English and will be available at all times when work is being performed, including subcontractor work. The Superintendent will be available and on-call 24 hours a day.

Coordinate and obtain approval from the Construction Observer for all bridgework over existing roadways.

**Williamson County**  
**Project: CR 110-University Signal**  
**Gattis School-Winterfield Signal**

**Sheet:**

Measure all minimum vertical clearances for all structures (including, but not limited to, signal mast arms, span wires, and overhead sign bridge structures) within the limits of the project for all roadway alignments in all directions of travel. Coordinate with the Construction Observer to take these measurements and obtain prior to opening roadways to traffic unless otherwise approved. The Construction Observer will report all minimum vertical clearance information on State maintained roadways to the Austin District Permit Office.

**ITEM 416 - DRILLED SHAFT FOUNDATIONS**

Stake all Foundations, for approval, before beginning drilling operations, as directed. Examples of types of foundations are Bridge Supports, Traffic Signal Pole Foundation, Roadway Illumination Assembly Foundations, Sign Support Locations, etc.

Calculate the vertical signal head clearance before placing any Traffic Signal Pole Foundation.

Obtain approval before placing additional exposed Traffic Pole Foundation.

Set anchor bolts for and Strain Signal Poles. Set two in tension and two in compression. Obtain approval of anchor bolt placement as directed before placing concrete.

Field cut holes for anchor bolts only as directed.

Class "C" concrete will be required for drilled shaft foundations involving overhead sign structures.

Remove spoils, daily, out of flood plain, or as directed.

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

Unless otherwise approved, 1 lane in each direction shall remain open at all times.

Nighttime lane closures will be allowed from 8:00 PM to 5:00 AM, unless otherwise shown on the plans.

No Daytime Lane Closures will be allowed, unless otherwise shown on the plans or as directed by the GEC.

The GEC is the authority to approve additional lane closures, prior to any work.

Maintain a written record of documentation of "The Additional Approved Lane Closures."

Submit and secure concurrence, prior to the publication of any notices or placement of any traffic control devices for implementation of the traffic control plan, hereinafter called a Lane Closure Notice (LCN).

**Williamson County****Sheet:****Project: CR 110-University Signal  
Gattis School-Winterfield Signal**

Present to GEC, an LCN for traffic control, which is proposed for implementation, a minimum of four (4) full working days preceding any proposed implementation date. Indicate the estimated date, time, duration, and location for the proposed work. As a part of the LCN submit a written description of the lane closure(s) depicting the proposed traffic control devices used, based on the appropriate plan sheet, TxDOT or TMUTCD standards, and an operational description of the work to be performed.

Present to GEC, LCN's proposed to detour traffic, a minimum of **seven (7)** full calendar days preceding any proposed implementation date.

Present to GEC, LCN's proposed for night work, a minimum of **seven (7)** full calendar days preceding any proposed implementation date.

Receive concurrence prior to LCN implementation.

Meet with the Construction Observer prior to roadway and lane closures to ensure that sufficient equipment, materials, devices, and workers will be used. Discuss contingency plans at that time. Consider inclement weather prior to implementing the lane closures.

Submit a cancellation of any lane closures, no later than noon on the day preceding the proposed work.

Coordinate Main Lane closures with adjacent projects.

Take immediate action to modify Closures / Traffic Control, if at any time backup (roadway queuing) becomes unreasonable (greater than 20 minutes). Have in place, a contingency plan of how this will occur.

Utilize Shadow Vehicle with Truck Mounted Attenuator for setup and removal of each lane closure.

Do not set up any Lane Closure / TCP when the pavement is wet prior to the "setup," unless otherwise directed. Revise Traffic Control, when inclement weather is imminent, as directed.

Within the limits of the project, provide standard barricades, warning signs, delineators, lights, 28-inch cones, and flaggers in enough numbers and combinations, as directed.

No closures will be allowed on the weekends, which include the following holidays: January 1, the last Monday in May, July 4, the first Monday in September, the fourth Thursday in November, December 25, Easter weekend, and the working day prior to or immediately after any of the aforementioned holidays. Unless otherwise approved, no closures will be allowed on the weekends of special events that could be impacted by the construction. Ensure all equipment, vehicles, workers, etc., associated with these closures are off the roadways and all lanes re-opened, at least, by noon of the Friday before these holidays and special events.

Maintain a minimum of **1** through lane(s) in each direction, during the daylight hours, as directed.



**Williamson County**  
**Project: CR 110-University Signal**  
**Gattis School-Winterfield Signal**

**Sheet:**

**ITEMS 618, 620, 624, 684 & 686**

Use materials from prequalified material producers list as shown on the Texas Department of Transportation (TxDOT) ----- Construction Division's (CST) materials producers list. See TxDOT website ([www.txdot.gov](http://www.txdot.gov)) – Business with TxDOT > Resources > Material Producer List - for list of pre-qualified manufacturers. No substitutions will be allowed for materials found on the list.

**ITEM 618 - CONDUIT**

Use materials from prequalified material producers list as shown on the Texas Department of Transportation (TxDOT) - Construction Division's (CST) materials producers list. Category is "Roadway Illumination and Electrical Supplies."

Consider the polymer concrete barrier boxes subsidiary to ITEM 618, "CONDUIT."

Refer to plans and specifications for type of conduit. Waterproof and tighten all couplings and connections. Bring all proposed and existing conduit into a ground box and 'elbow' it unless otherwise shown on the plans. Provide a bushing to protect the wire from abrasion when a conduit run terminates.

Replace sections of conduit with the size and type shown on the plans in the event the existing conduit proves unusable due to location or damage.

Secure permission from the proper authority, as directed, before cutting into or removing any sidewalks or curbs for installation of this Item.

Saw cut and replace any riprap, which must be removed to install the conduit. Replace riprap with material and texture as directed.

The locations of conduit and ground boxes are diagrammatic and so shift, as directed, to accommodate field conditions.

Install conduit in an area not exceeding 2 feet in any direction from a straight line with the depth of the conduit at least 2 feet, unless otherwise shown on the plans. Installation of the conduit by jacking or boring method will be at a depth of at least 1 foot below the bottom of the base material of the roadway. Evidence of damage to the roadway during the jacking or boring operation will be enough grounds to stop the method being used.

Install conduit on a 2-inch sand cushion and backfill with at least 6 inches of sand. Backfill the remainder of the trench with flexible base, soil or two-sack concrete as required by the location of the conduit or as directed.

Consider all conduit elbows and rigid metal extensions required to be installed on PVC conduit systems subsidiary.

**Williamson County****Sheet:****Project: CR 110-University Signal  
Gattis School-Winterfield Signal**

Install a high tension, non-metallic pull rope in all conduit runs. The pull ropes are for future use. Cap all empty conduit runs using standard weather tight conduit caps as directed. Consider this work subsidiary to the pertinent Item.

Install a continuous bare or green insulated copper wire No. 8 AWG or larger in every conduit throughout the electrical system including installed loop detectors and traffic signal cables which are in conformance with the Electrical Detail Standard Sheets and the latest edition of the National Electrical Code (NEC).

Placement of conduit under the existing pavement using the open trench method will not be allowed without prior approval.

Seal all conduit ends with a permanently soft, non-toxic duct seal. The dust seal must not adversely affect plastic materials or corrode metals.

Use a coring device when drilling holes through concrete structures. Do not use masonry or concrete drills, unless otherwise approved.

Structurally mounted junction boxes shall be as shown on the plans. When used for traffic signal installations, these boxes shall be 12" x 12" x 8", and shall be approved. Consider these boxes subsidiary to this Item.

Use conduit hangers for 3 inch and larger conduit when hanging conduit from structures.

Place conduit a minimum depth of 42 inches below the bottom of ties.

Existing conduit may be proposed for reuse in this project. If the existing conduit cannot be used to place or add new electrical conductors, repair or replace this conduit, as directed. Repair of the conduit will be paid as "Extra Work" on a "Force Account" basis. Probe the existing conduit when locating drill shafts so that the existing conduit's location will be known before it is needed.

When using existing conduit, ensure that all conduits have bushings and are cleaned of dirt, mud, grease, and other debris. Restrap conduit that is being relocated to new timber poles as if it were a new installation. Consider this work subsidiary to this Item.

Consider all fittings, brackets, and junction boxes necessary to complete the installations subsidiary to the pertinent Items.

All conduit shall be Schedule 80.

**ITEM 620 - ELECTRICAL CONDUCTORS**

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holder from manufacturers pre-qualified by the Traffic Operations Division. Fuse holder is shown on the producer list under Items 610 & 620.

Provide and install approved 10 amp time delay fuses.

**Williamson County****Sheet:****Project: CR 110-University Signal  
Gattis School-Winterfield Signal**

Provide breakaway disconnects in all breakaway poles. For Flashing Beacons (Item 685) and Pedestal Poles (Item 687) within the project provide single-pole breakaway disconnects. Use Bussman HEBW, Littelfuse LEB, Ferraz-Shawmut FEB, or equal on ungrounded conductors. For all grounded conductors use Bussman HET, Littelfuse LET, Ferraz-Shawmut FEBN, or equal. These breakaway connectors have a white colored marking and a permanently installed solid neutral.

Clearly and permanently, mark "Illumination" on the Illumination Conductors installed in a Signal Strain Pole. Make the marks easily visible from the hand hole.

Identify the conductors as shown on the Electrical Details Standard Sheets when two or more conductors are present in one conduit or enclosure. Use identification tag with two plastic straps. Each tag will indicate circuit number, letter, or other identification as shown on the plans.

Bond grounding conductors, which share the same conduit, junction box or structures, together at every accessible point, in accordance with the Electrical Detail Standard Sheets and the latest edition of the National Electrical Code (NEC).

All wiring will be in accordance with the National Electrical Code (NEC) and the appropriate Department standard sheets.

**ITEM 628 – ELECTRICAL SERVICES**

The service enclosure provided in this contract will have provisions for pad locking the enclosure shut.

The traffic signal system will require 120/240-Volt Power Service provided by the Local Electric Utility Company. Contractor shall make all arrangements for power.

**ITEM 644 - SMALL ROADSIDE SIGN ASSEMBLIES**

Fabricate all small signs not detailed on the plans in conformance with the latest edition of the "Standard Highway Sign Designs for Texas."

<http://www.txdot.gov/business/resources/signage.html>

**ITEM 666 - RETROREFLECTORIZED PAVEMENT MARKINGS**

Reference existing channel islands, gores, and lane striping before commencing work. Provide referencing that will include a sketch of the layout to the Construction Observer. Obtain approval for placement of guidemarks from the Construction Observer before installing any permanent pavement markings. Consider subsidiary to the pertinent Items.

**ITEM 672 - RAISED PAVEMENT MARKERS**

Place the bituminous adhesive at a temperature range of 380°F to 390°F. Place the pavement marker on the bituminous adhesive within approximately 20 seconds after the adhesive is placed on the pavement. Ensure the pavement marker rests solely on the adhesive and not the pavement surface. Ensure that a minimum of 1/8 in. layer of bituminous adhesive remains between the pavement marker and the pavement surface.

**Williamson County****Sheet:****Project: CR 110-University Signal  
Gattis School-Winterfield Signal****ITEM 677 - ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS**

Remove and dispose of, off the right of way, any existing raised pavement markings before beginning surfacing operations. Remove the existing traffic buttons and pavement markers, daily, as work progresses and as directed. Consider subsidiary to the pertinent Items.

Grinding is not an acceptable method of stripe removal.

Blast cleaning is required for the removal of existing pavement markings.

Black paint will not be allowed, unless otherwise directed. Acceptable methods will be sand blasting (Blasting Method) or strip sealing (Surface Treatment Method).

**ITEM 680 - HIGHWAY TRAFFIC SIGNALS**

Install all of the materials necessary for a complete signal system as follows:

Furnish all other materials, tools, and labor required to provide a completed installation in accordance with the plans and specifications. Furnished materials provided by the Contractor will be new undepreciated stock.

Place the traffic signal into operation after the entire traffic signal has been completed, all required striping is complete, and all conflicting signing is removed. The responsible Signal Shop will be present to program the controller and assist with detection setup.

All illumination fixtures will be 250-watt Equivalent LED fixtures.

Furnish and install all permanent signs mounted on the traffic signal wires and traffic signal poles, which include pedestal pole assemblies. Furnish all hardware for installation. Consider all costs associated with the furnishing and installation of the permanent signs and the necessary hardware subsidiary to the pertinent Items.

Use a Vulcan swinger sign mounting bracket or equivalent for all signs mounted on span wires.

After the completion of the entire signal installation (including striping), a thirty-day (30-day) test period begins. After it has been determined, by the County, that the field wiring and controller operation are satisfactory after this test period, and all other requirements of the project have been met, the County will relieve the Contractor of any other responsibilities for the operation of the signal.

Use qualified personnel to respond to and diagnose all trouble calls during the thirty-day test period. Repair any malfunction to Contractor-supplied signal equipment. Provide to the Construction Observer a local telephone number, not subject to frequent changes and available on a 24-hour basis, for reporting trouble calls. Response time to reported calls must be less than 2 hours. Make appropriate repairs within 24 hours. Place a logbook in the controller cabinet and keep a record of each trouble call reported. Notify the Construction Observer of each trouble call.

**Williamson County**  
**Project: CR 110-University Signal**  
**Gattis School-Winterfield Signal**

**Sheet:**

Do not clear the error log in the conflict monitor during the thirty-day test period without the approval of the Construction Observer.

Remove the existing stop sign panels (or assemblies) after the traffic signals are in operation.

**ITEM 682 – VEHICLE AND PEDESTRIAN SIGNAL HEADS**

Install signal head attachments so the wiring to each passes from the signal pole through the attachment hardware to the signal head. Refer to District Standard for more conductor attachment information. Attachment methods not shown on the district standard are to be approved by the Construction Observer before work begins. Use UV rated tie wraps.

Ensure the signal heads are made of aluminum and are hooded and covered until the signal system is put into operation.

Each signal head will be one way with the proper number of sections shown on the plans. Each head color will be bright yellow (Federal Yellow #13538 of Federal Standard 595). The inside of the visors will have a flat black finish.

Installed traffic signal heads within the project will have backplates unless otherwise shown on the plans. Backplates will be black aluminum.

Provide pedestrian signal head assemblies, which have a flush “egg-crated” or “Z” pattern visor for all lamps, and a one-piece reflector assembly for incandescent lamps only.

Provide louvers, which have five (5) vanes with a black finish on inside surfaces when required within the project. Fasten a hardware cloth screen, securely, with  $\frac{5}{8}$ " or smaller mesh size to the front face of each louver to prevent entry by birds.

Mount signal heads level and plumb as directed.

Replace, at Contractor's expense, all burned out or defective lamps for a period of 4 weeks from the date of the initial turn on. At the end of this 4-week period, the Construction Observer will relieve the Contractor of any maintenance of this portion of the signal system.

Use the four point mounting system (TY A) for signal heads, except in cases of skewed or vertical heads when (TY B) will be used.

Place LED's at the proper angle with the ground. The wording “top” or the “up arrow” indicates the proper fixed alignment within the signal head. Hang the head parallel to the ground once attached and not angled down as with incandescent heads. Ensure the signal head to be level and within tolerances. LED's are designed to direct the indication towards the roadway surface. Variance in head leveling will cause the LED indication to appear dim during slight movement. Ensure each LED head to be properly leveled and sight tested before final acceptance.

**ITEM 684 – TRAFFIC SIGNAL CABLES**

Leave at least 2 feet for each cable run in each pull box and leave at least 2 feet in each steel pole in addition to the required length for each separate cable. Provide an extra 5 feet of each conductor

**Williamson County****Sheet:****Project: CR 110-University Signal****Gattis School-Winterfield Signal**

terminating in the controller cabinet. Ensure conductors are continuous without splice from terminal point to terminal point or as directed. Do not use wire nuts.

**ITEM 686 - TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)**

Provide and install damping plates on all mast arms of 40 feet and over. For mast arms under 40 feet, refer to SMA and DMA Vibration Notes for guidance. Consider the cost for the provision and installation of damping plates as subsidiary to the various bid Items found within this project.

Provide double nuts on top and bottom of the base plate as shown on the standards.

Provide signal pole assemblies as shown on plans. Luminaire lamps and the installation of the arms and lamps are considered subsidiary to the pertinent items.

When luminaires are to be installed on mast arm poles, provide a separate terminal strip in the signal pole access compartment. The terminal strip shall be a 4-circuit Buchanan-Type 104SN, Kulka-Type 985-GP-4 CU, or equivalent.

Provide a 10-amp time-delay fuse for traffic signal poles onto which luminaires are to be installed. Place the fuse in the fuse block indicated within note #4 found on State standard MA-D-12.

**ITEM 687 - PEDESTAL POLE ASSEMBLIES**

Furnish and install pedestal pole assemblies as shown on plans. Furnish all other materials, tools, and labor required to provide a completed installation in accordance with the plans and specifications. Furnished materials provided by the Contractor will be new undepreciated stock.

**ITEM 688 - PEDESTRIAN DETECTORS AND VEHICLE LOOP DETECTORS**

Pedestrian push buttons will be mounted at a height of 3'-6" (42") above the sidewalk or landing and will be of the type that have permanent-type signs within the detector unit (9" x 12" sign & push button station on Signal Poles and 5" x 7" sign & push button station on Pedestrian Poles), which explains their purpose and indicates which crosswalk signal is actuated.

Repair or replace any push button detector, which proves to be inoperable for a period of 4 weeks from the initial flash turn on date. At the end of this 4-week period, the Construction Observer will relieve the Contractor of any maintenance of this portion of the signal system.

Pedestrian Push buttons will be of substantial tamper proof construction. The push button will be ADA and TS 2 compliant. The push button will have a powder coated aluminum bezel with stainless steel actuator. The push button will utilize a momentary contact solid-state switching mechanism. The push button will provide visual and audible feedback to the pedestrian. The low movement push button will be functional in icing conditions. All fastening hardware will be stainless steel.

Provide the traffic signal cable (TY C) (2 Cndr) (12 AWG) necessary to install the push buttons.

**Williamson County**  
**Project: CR 110-University Signal**  
**Gattis School-Winterfield Signal**

**Sheet:**

The audible feedback will be solely a confirmation chirp, be able to be turned on and off, and not conflict with any ADA issues.

**ITEM 6001 – PORTABLE CHANGEABLE MESSAGE SIGN**

Provide 2 “Electronic” Portable Changeable Message Sign(s) (EPCMS) as part of the traffic control operations and provide another one that is available to utilize when a backup is needed. Consider the one designated for backup as subsidiary to the various Items of the project. All EPCMS will be exclusive to this project, unless otherwise approved. Placement location and message as directed.

Place appropriate number of “Electronic” Portable Changeable Message Signs (EPCMS) at locations requiring lane closures for one-week prior to the closures, or as directed. Obtain approval for the actual message that will appear on the boards. If more than two phases of a message are required per board, provide additional EPCMS’s to meet the two-phases-per-board requirement.

**ITEM 6002 - VIDEO IMAGING VEHICLE DETECTION SYSTEM (VIVDS)**

Install the VIVDS cameras onto the mast arms with the attachment mechanisms provided with the camera system. Place the traffic signal cable (TY A) (3-conductor) (16 AWG) and the VIVDS communication cable coaxial in continuous and separate runs from each VIVDS camera to the controller. Consider the costs associated with the above work subsidiary to the pertinent Items.

Aim and adjust the cameras, install the cables and VIVDS cards into the controller cabinet and complete any other necessary work to bring the traffic signal into operation.

Provide the traffic signal cable and coaxial cable above and any incidentals necessary to install them.

Provide a Video Processor System (VPS) that can provide up to thirty-two (32) detector outputs to the controller from up to eight (8) camera/video processor units (C/VPU). Route the detector outputs through the Bus Interface Unit (BIU) or approved product, which replaces the functions of the BIU. Field of view for each C/VPU shall provide a minimum of thirty-two (32) virtual detection zones for vehicle detection.

Provide 6 cameras for this project.

Provide a set-up system. Load required set-up software onto all of the District Signal Shop’s notebook computers and provide all necessary licensing. Computers shall not be provided by the Contractor as part of the set-up system.

Provide and install all cables necessary to provide complete VIVDS operation. Provide a minimum of 10 cables to direct connect the notebook to the VIVDS port.

Phase red and green load switch outputs from up to sixteen (16) phases of a NEMA TS2 Type 2 controller shall be provided as inputs to the VPU for use with internal detector extend/delay timing functions. The C/VPU shall be able to condition the detector outputs and detection zones based on the state of the associated phase number and color.

**Williamson County****Sheet:****Project: CR 110-University Signal****Gattis School-Winterfield Signal**

The serial communication port on the front of the VPU shall be a DB-9 RS-232 connector. Supply a package that will operate with Windows XP and NT and provide the functionality defined in both sections 7.0 and 8.0 in both a direct connect and remote communications mode. The software resident in the VPU and the personal computer shall be capable of transmitting and receiving all information needed for zone set up, monitoring vehicle detection by viewing flashing detection zone overlays, and uploading/downloading and interrogating all stored data within the VPU. Remote communications with the VCU shall be possible with the addition of external communication devices (modem, Codec, etc.) using the RS-232 and video output ports on the front of the VPU.

The VPU operational software shall be stored internally in flash memory and be capable of being updated without the removal and replacement of memory devices.

Provide surge protection in the controller cabinet protecting the camera video and power inputs/outputs. All surge protection shall be dinrail mounted.

Install the VIVDS detection zones as directed. Have qualified personnel on site at the time of the signal turn-on to assist with the installation of detection zones.

If the camera locations shown in the plans do not allow for proper sight of the proposed detection zones, relocate the cameras as needed and as directed. This labor and material cost will not be paid separately, but is subsidiary to this Item.

The video output from the C/VPU shall be in color or black/white with active detection zones overlaid on full motion video.



**Williamson County****Sheet:****Project: CR 110-University Signal****Gattis School-Winterfield Signal****Required Items for ITEM 6002 - VIDEO IMAGING VEHICLE DETECTION SYSTEM:**

<u>Spec.</u> <u>Item</u>	<u>Description</u>	<u>Not</u> <u>Required</u>	<u>Required</u>	<u>State</u> <u>Supplied</u>
2.F	REMOTE COMMUNICATIONS LINK		<b>X</b>	
5.0	VIVDS PROCESSOR UNIT		<b>2</b>	
6.A	CAMERA ASSEMBLY		<b>10</b>	
7.0	FIELD COMMUNICATIONS LINK			
	6 Twisted-Pair Cable / 18 AWG	<b>X</b>		
	Coaxial Cable w/Three (3) 16 AWG CNDRS		<b>X</b>	
	Fiber Optic Cable	<b>X</b>		
8.0	VIVDS SET-UP SYSTEM			
	Field PC	<b>X</b>		
	Field Software for District Shop laptops		<b>X</b>	
	Field Video Monitor /Ea. Inter.		<b>X</b>	
9.0	TEMPORARY USE AND RETESTING	<b>X</b>		
10.0	OPERATION FROM CENTRAL			
	Workstation Computer & Peripherals	<b>X</b>		
	Central Control Software		<b>X</b>	
11.0	INSTALLATION AND TRAINING			
	Eight (8) Hours	<b>X</b>		
	Sixteen (16) Hours	<b>X</b>		

**Williamson County****Sheet:****Project: CR 110-University Signal****Gattis School-Winterfield Signal**

The list of material below is for the Contractor's information only.  
It is the responsibility of the Contractor to verify  
all items and quantities listed below.

**LIST OF MATERIAL/LABOR  
SUBSIDIARY TO ITEM 680**

<u>DESCRIPTION</u>	<u>UNIT</u>	<u>QUANTITY</u>
8 FT LUMINAIRE ARM	EA	6
250W EQUIVALENT LED LUMINAIRE	EA	4
250W HPS LUMINAIRE	EA	2
8 PHASE NEMA CONTROLLER COMPLETE W/ CABINET AND ACCESSORIES	EA	2
INSTALL OPTICOM EQUIPMENT (INTERSECTION)	LS	2
REGULATORY SIGN PANEL (R10-12, ETC)	EA	2
REMOVE EXISTING STOP SIGN PANEL	EA	4
CONCRETE PAD (8' X 9' X 6", Class B)	SF	144

**CR 110 and University Blvd. Traffic Signal  
Gattis School at Winterfield Traffic Signal  
WILLIAMSON COUNTY**

**GOVERNING SPECIFICATIONS**

(STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND SPECIAL SPECIFICATIONS)

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

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

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

< > REFERENCE ITEMS NOT USED ON THIS CONTRACT

( ) REFERENCE ITEMS USED ON THIS CONTRACT

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

ITEM 416	DRILLED SHAFT FOUNDATIONS (405)(420)(421)(423)(440)(448)
ITEM 500	MOBILIZATION
ITEM 502	BARRICADES, SIGNS AND TRAFFIC HANDLING
ITEM 618	CONDUIT <400>(476)
ITEM 620	ELECTRICAL CONDUCTORS <610>(628)
ITEM 624	GROUND BOXES (420)(421)(432)(440)(618)(620)
ITEM 625	ZINC COATED STEEL WIRE STRAND
ITEM 628	ELECTRICAL SERVICES <441><445>(449)(618)(620)<627><656>
ITEM 636	SIGNS <643>
ITEM 644	SMALL ROADSIDE SIGN ASSEMBLIES (421)(440)<441>(442)<445> (636)<643> (656)
ITEM 666	REFLECTORIZED PAVEMENT MARKINGS (316)(502)(662)(677)(678)
ITEM 668	PREFABRICATED PAVEMENT MARKINGS (678)
ITEM 672	RAISED PAVEMENT MARKERS (677)(678)
ITEM 677	ELIMINATE EXISTING PAVEMENT MARKINGS AND MARKERS (316)
ITEM 678	PAVEMENT SURFACE PREPARATION FOR MARKINGS (677)
ITEM 680	INSTALLATION OF HIGHWAY TRAFFIC SIGNALS (416)(610)(618)(624)(625)(627)(628) (636)(656)(682)(684)(686)(688)
ITEM 682	VEHICLE AND PEDESTRIAN SIGNAL HEADS
ITEM 684	TRAFFIC SIGNAL CABLES
ITEM 686	TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL) (416)(421)<441>(442)<445>(449)
ITEM 687	PED POLE ASSEMBLY <445>(449)(656)(682)
ITEM 688	PEDESTRIAN DETECTORS AND VEHICLE LOOP DETECTORS <324>(618)(624)(682)(684)

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

SPECIAL PROVISION TO ITEM 000	(000-2332)
SPECIAL PROVISION TO ITEM 002	(002-WC2)
SPECIAL PROVISION TO ITEM 500	(500-WC1)
SPECIAL PROVISION TO ITEM 502	(502-WC1)

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

ITEM 6001	PORTABLE CHANGEABLE MESSAGE SIGN
ITEM 6002	VIVDS COMMUNICATION CABLE (COAXIAL)
ITEM 6089	ETHERNET CABLE AND CONNECTORS
ITEM 6090	LED INTERNALLY ILLUMINATED STREET NAME SIGNS
ITEM 6525	EMERGENCY PREEMPTION DETECTOR SYSTEM

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.

002—WC2

## Special Provision 002—WC2

### Utilities Important Notice to Contractors



The contractor's attention is directed to the fact that there may be some outstanding utility adjustments as of December 2015 required for the construction of this project. The County anticipates that these utility adjustments will be completed as shown.

The contractor is invited to review the outstanding utility adjustments with the engineer assigned to this project and listed in the "notice to contractors." an extension of work time may be granted, as necessary, for delays caused by utility interference with this work.

The following utilities are to be adjusted by their owners and are to be completed as shown. The approximate location is based on the project centerline/baseline stationing.

OWNER	APPROX. LOCATION	DATE OF RELOCATION
Oncor	CR 110 and University: Sta.289+91 RT 21' to Sta. 293+01 RT 32'	March 31, 2016
MCI	CR 110 and University: Sta.289+91 RT 21' to Sta. 293+01 RT 32', Sta. 289+91 RT 22' Crossing	April 30, 2016
SuddenLink	CR 110 and University: Sta.289+91 RT 21' to Sta. 293+01 RT 32'	April 30, 2016

\* Estimated

000-2332

# Special Provision 000-2332

## Schedule of Liquidated Damages



Table1  
Schedule of Liquidated Damages

For Dollar Amount of Original Contract		Dollar Amount of Daily Contract
From More Than	To and Including	Administration Liquidated Damages per Working Day
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

500—WC01

---

## 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 bullet is deleted and replaced by: 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

**Article 500.3 "Payment".** The 7th bullet is deleted and replaced by: 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.

502-WC01

---

## Special Provision to Item 502

### Barricades, Signs, and Traffic Handling

---



For this project, Item 502, "Barricades, Signs, and Traffic Handling," 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 502.4.1.3., "Maximum Total Payment Prior to Acceptance" is voided and replaced by the following:

**Maximum Total Payment Prior to Completion.** The total payment for this Item will not exceed 10% of the total Contract amount before final completion in accordance with General Conditions of Agreement Section 5.06, "Final Completion and Acceptance." The remaining balance will be paid in accordance with Section 502.4.1.5, "Balance Due."

Article 502.4.1.5., "Balance Due" is voided and replaced by the following:

**Balance Due.** If all work is complete in accordance with General Conditions of Agreement Section 5.06, "Final Completion and Acceptance," before payment of the amount allowed by this Article, the balance due will be paid with the Final Payment.



6001

# Special Specification 6001

## Portable Changeable Message Sign



### 1. DESCRIPTION

Furnish, operate, and maintain portable trailer mounted changeable message sign (PCMS) units.

### 2. MATERIALS

Furnish new or used material in accordance with the requirements of this Item and the details shown on the plans. Provide a self-contained PCMS unit with the following:

- Sign controller
- Changeable Message Sign
- Trailer
- Power source

Paint the exterior surfaces of the power supply housing, supports, trailer, and sign with Federal Orange No. 22246 or Federal Yellow No. 13538 of Federal Standard 595C, except paint the sign face assembly flat black.

2.1. **Sign Controller.** Provide a controller with permanent storage of a minimum of 75 pre-programmed messages. Provide an external input device for random programming and storage of a minimum of 75 additional messages. Provide a controller capable of displaying up to 3 messages sequentially. Provide a controller with adjustable display rates. Enclose sign controller equipment in a lockable enclosure.

2.2. **Changeable Message Sign.** Provide a sign capable of being elevated to at least 7 ft. above the roadway surface from the bottom of the sign. Provide a sign capable of being rotated 360° and secured against movement in any position.

Provide a sign with 3 separate lines of text and 8 characters per line minimum. Provide a minimum 18 in. character height. Provide a 5 × 7 character pixel matrix. Provide a message legibility distance of 600 ft. for nighttime conditions and 800 ft. for normal daylight conditions. Provide for manual and automatic dimming light sources.

The following are descriptions for 3 screen types of PCMS:

- **Character Modular Matrix.** This screen type comprises of character blocks.
- **Continuous Line Matrix.** This screen type uses proportionally spaced fonts for each line of text.
- **Full Matrix.** This screen type uses proportionally spaced fonts, varies the height of characters, and displays simple graphics on the entire sign.

2.3. **Trailer.** Provide a 2 wheel trailer with square top fenders, 4 leveling jacks, and trailer lights. Do not exceed an overall trailer width of 96 in. Shock mount the electronics and sign assembly.

2.4. **Power Source.** Provide a diesel generator, solar powered power source, or both. Provide a backup power source as necessary.

2.5. **Cellular Telephone.** When shown on the plans, provide a cellular telephone connection to communicate with the PCMS unit remotely.

6001

---

**3. CONSTRUCTION**

Place or relocate PCMS units as shown on the plans or as directed. The plans will show the number of PCMS units needed, for how many days, and for which construction phases.

Maintain the PCMS units in good working condition. Repair damaged or malfunctioning PCMS units as soon as possible. PCMS units will remain the property of the Contractor.

---

**4. MEASUREMENT**

This Item will be measured by each PCMS or by the day used. All PCMS units must be set up on a work area and operational before a calendar day can be considered measurable. When measurement by the day is specified, a day will be measured for each PCMS set up and operational on the worksite.

---

**5. PAYMENT**

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Portable Changeable Message Sign." This price is full compensation for PCMS units; set up; relocating; removing; replacement parts; batteries (when required); fuel, oil, and oil filters (when required); cellular telephone charges (when required); software; and equipment, materials, tools, labor, and incidentals.

# Special Specification 6002

## Video Imaging Vehicle Detection System



### 1. DESCRIPTION

Install a Video Imaging Vehicle Detection System (VIVDS) that monitors vehicles on a roadway via processing of video images and provides detector outputs to a traffic controller or similar device.

A VIVDS configuration for a single intersection will consist of variable focal length cameras, VIVDS card rack processor system, and all associated equipment required to setup and operate in a field environment, including a video monitor and laptop (if required), connectors, and camera mounting hardware.

The system is composed of these principal items: the cameras, the field communications link between the camera and the VIVDS processor unit, and the VIVDS processor unit along with a PC, video monitor, or associated equipment required to setup the VIVDS and central control software to communicate to the VIVDS processor.

The VIVDS Card Rack Processor must be either NEMA TS 2 TYPE 1 or TYPE 2. TYPE 2 must have RS 485 SDLC.

### 2. DEFINITIONS

- 2.1. **VIVDS Processor Unit.** The electronic unit that converts the video image provided by the cameras, generates vehicle detections for defined zones, and collects vehicular data as specified.
- 2.2. **VIVDS Processor System.** One or more VIVDS processor modular units required to handle the number of camera inputs.
- 2.3. **Central Control.** A remotely located control center, which communicates with the VIVDS. The VIVDS operator at the central control has the ability to monitor the operation and modify detector placement and configuration parameters. The equipment that constitutes central control is comprised of a workstation microcomputer along with the associated peripherals as described in this Special Specification.
- 2.4. **Field Setup Computer.** A portable microcomputer used to set up and monitor the operation of the VIVDS processor unit. If required to interface with the VIVDS processor unit, the field setup computer with the associated peripherals described in this Special Specification and a video monitor, also described in this Special Specification, must be supplied as part of the VIVDS.
- 2.5. **Field Communications Link.** The communications connection between the camera and the VIVDS processor unit. The primary communications link media may be coaxial cable or fiber optic cable.
- 2.6. **Remote Communications Link.** The communications connection between the VIVDS processor unit and the central control.
- 2.7. **Camera Assembly.** The complete camera or optical device assembly used to collect the visual image. The camera assembly consists of a charged coupled device (CCD) camera, environmental enclosure, sun shield, temperature control mechanism, and all necessary mounting hardware.
- 2.8. **Occlusion.** The phenomenon when a vehicle passes through the detection zone but the view from the sensor is obstructed by another vehicle. This type of occlusion results in the vehicle not being detected by the sensor or when a vehicle in one lane passes through the detection zone of an adjacent lane. This type of occlusion can result in the same vehicle being counted in more than one lane.

6002

- 2.9. **Detection Zone.** The detection zone is a line or area selected through the VIVDS processor unit that when occupied by a vehicle, sends a vehicle detection to the traffic controller or freeway management system.
- 2.10. **Detection Accuracy.** The measure of the basic operation of a detection system (shows detection when a vehicle is in the detection zone and shows no detection when there is not a vehicle in the detection zone).
- 2.11. **Live Video.** Video being viewed or processed at 30 frames per second.
- 2.12. **Lux.** The measure of light intensity at which a camera may operate. A unit of illumination equal to one lumen per square meter or to the illumination of a surface uniformly one meter distant from a point source of one candle.
- 2.13. **Video Monitor.** As a minimum must be a 9-in. black and white monitor with BNC connectors for video in and out.

---

### 3. FUNCTIONAL CAPABILITIES

The system software must be able to detect either approaching or departing vehicles in multiple traffic lanes. A minimum of 4 detector outputs per video processor module card and each card must have a minimum of 24 detection zones. Each zone and output must be user definable through interactive graphics by placing lines or boxes in an image on a video or VGA monitor. The user must be able to redefine previously defined detection zones.

The VIVDS must provide real time vehicle detection (within 112 milliseconds (ms) of vehicle arrival).

The VIVDS processor unit must be capable of simultaneously processing information from various video sources, including CCTV video image sensors and video tape players. The video sources may be, but are not required to be, synchronized or line-locked. The video must be processed at a rate of 30 times per second by the VIVDS processor unit.

The system must be able to detect the presence of vehicles in a minimum of 12 detection zones within the combined field of view of all cameras (a minimum of 12 detection zones per camera input to the VIVDS processor unit).

Provide detection zones that are sensitive to the direction of vehicle travel. The direction to be detected by each detection zone must be user programmable.

The VIVDS processor unit must compensate for minor camera movement (up to 2% of the field of view at 400 ft.) without falsely detecting vehicles. The camera movement must be measured on the unprocessed video input to the VIVDS processor unit.

The camera must operate while directly connected to VIVDS Processor Unit.

Once the detector configuration has been downloaded or saved into the VIVDS processor unit, the video detection system must operate with the monitoring equipment (monitor or laptop) disconnected or online.

When the monitoring equipment is directly connected to the VIVDS processor unit, it must be possible to view vehicle detections in real time as they occur on the field setup computer's color VGA display or the video monitor.

---

### 4. VEHICLE DETECTION

- 4.1. **Detection Zone Placement.** The video detection system must provide flexible detection zone placement anywhere within the combined field of view of the image sensors. Preferred presence detector configurations must be lines or boxes placed across lanes of traffic or lines placed in line with lanes of traffic. A single detector must be able to replace one or more conventional detector loops. Detection zones must be able to

6002

be fully overlapped. In addition, detection zones must have the capability of implementing “AND” and “OR” logical functions including presence, extension and delay timing. These logical functions may be excluded if provisions are made to bring each detector separately into the controller and the controller can provide these functions.

- 4.2. **Detection Zone Programming.** Placement of detection zones must be by means of a graphical interface using the video image of the roadway. The monitor must show images of the detection zones superimposed on the video image of traffic while the VIVDS processor is running.

The detection zones must be created by using the mouse or keypad to draw detection zones on the monitor. The detection zones must be capable of being sized, shaped and overlapped to provide optimal road coverage and detection. It must be possible to upload detector configurations to the VIVDS processor unit and to retrieve the detector configuration that is currently running in the VIVDS processor unit.

The mouse or keypad must be used to edit previously defined detector configurations so as to fine tune the detection zone placement size and shape. Once a detection configuration has been created, the system must provide a graphic display of the new configuration on its monitor. While this fine-tuning is being done, the detection must continue to operate from the detector configuration that is currently called.

When a vehicle occupies a detection zone, the detection zone on the live video must indicate the presence of a vehicle, thereby verifying proper operation of the detection system. With the absence of video, the card must have an LED that will indicate proper operation of the detection zones.

Provide detection zones that are sensitive to the direction of vehicle travel. The direction to be detected by each detection zone must be user programmable. The vehicle detection zone should not activate if a vehicle traveling any direction other than the one specified for detection occupies the detection zone. Cross-street and wrong way traffic should not cause a detection.

- 4.3. **Design Field of View.** The video detection system must reliably detect vehicle presence in the design field of view. The design field of view must be defined as the sensor view when the image sensor is mounted 24 ft. or higher above the roadway, when the camera is adjacent (within 15 ft.) to the edge of the nearest vehicle travel lane, and when the length of the detection area is not greater than 10 times the mounting height of the image sensor. Within this design field of view, the VIVDS processor unit must be capable of setting up a single detection zone for point detection (equivalent to the operation of a 6 ft. x 6 ft. inductive loop). A single camera, placed at the proper mounting height with the proper lens, must be able to monitor up to and including 5 traffic lanes simultaneously.

- 4.4. **Detection Performance.** Detection accuracy of the video detection system must be comparable to properly operating inductive loops. Detection accuracy must include the presence of any vehicle in the defined detection zone regardless of the lane, which the vehicle is occupying. Occlusion produced by vehicles in the same or adjacent lanes must not be considered a failure of the VIVDS processor unit, but a limitation of the camera placement. Detection accuracy (a minimum of 95%) must be enforced for the entire design field of view on a lane by lane and on a time period basis. When specified on the plans, furnish up to 24 continuous hours of recorded video of all installed intersection cameras within the 30 day test period for verification of proper camera placement, field of view, focus, detection zone placement, processor setup and operation. The video from each camera must show vehicle detections for all zones.

- 4.5. **Equipment Failure.** Either camera or VIVDS processor unit must result in constant vehicle detection on affected detection zones.

---

## 5. VIVDS PROCESSOR UNIT

- 5.1. **Cabinet Mounting.** The VIVDS processor unit must be rack mountable.
- 5.2. **Environmental Requirements.** The VIVDS processor unit must be designed to operate reliably in the adverse environment found in the typical roadside traffic cabinet. It must meet the environmental

6002

requirements set forth by the latest NEMA (National Electrical Manufacturers Association) TS1 and TS2 standards as well as the environmental requirements for Type 170, Type 179 and 2070 controllers. Operating temperature must be from -30°F to +165°F at 0% to 95% relative humidity, non-condensing.

5.3. **Electrical.** The VIVDS must have a modular electrical design.

The VIVDS must operate within a range of 89 to 135 VAC, 60 Hz single phase. Power to the VIVDS must be from the transient protected side of the AC power distribution system in the traffic control cabinet in which the VIVDS is installed.

Serial communications to the field setup computer must be through an RS 232, USB or Ethernet port. This port must be able to download the real time detection information needed to show detector actuations. A connector on the front of the VIVDS processor unit must be used for serial communications.

The unit must be equipped with RS 170 (monochrome) or RS170A (color) composite video inputs video inputs, so that signals from image sensors or other synchronous or asynchronous video sources can be processed in real time. BNC connectors on the front of the VIVDS processor unit or video patch panel must be used for all video inputs.

The unit must be equipped with a single RS 170 composite video output. This output must be capable of corresponding to any one of the video inputs, as selected remotely via the field setup computer or front panel switch. Multiple video outputs requiring external cable connections to create a combined single video output must not be acceptable. A BNC or RCA connector must be used for video output on the front of the processor unit. Any other video formats must be approved by a Department TRF Signal Operation Engineer before use.

Software upgrades or changes must be presented to and approved by the Department's TRF-TM Division before use. Failure to do so will be grounds for termination of contract and probation for responsible parties.

The unit software and the supervisor software must include diagnostic software to allow testing the VIVDS functions. This must include the capability to set and clear individual detector outputs and display the status of inputs to enable setup and troubleshooting in the field.

---

6. **CAMERA ASSEMBLY**

6.1. **Camera.** The video detection system must use medium resolution, monochrome image sensors as the video source for real time vehicle detection. The cameras must be approved for use with the VIVDS processor unit by the supplier of the VIVDS. As a minimum, each camera must provide the following capabilities:

- Images must be produced with a Charge Coupled Device (CCD) sensing element with horizontal resolution of at least 480 lines for black and white or 470 lines for color and vertical resolution of at least 350 lines for black and white or color. Images must be output as a video signal conforming to RS170.
- Useable video and resolvable features in the video image must be produced when those features have luminance levels as low as 0.1 lux for black and white, and as low as 1.0 lux for color, for night use.
- Useable video and resolvable features in the video image must be produced when those features have luminance levels as high as 10,000 lux during the day.
- The camera must include an electronic shutter or auto-iris control based upon average scene luminance and must be equipped with an electronic shutter or auto-iris lens with variable focal length and variable focus that can be adjusted without opening up the camera housing to suit the site geometry. The variable focal length must be adjustable from 6 mm to 34 mm.

6.2. **Camera and Lens Assembly.** The camera and lens assembly must be housed in an environmental enclosure that provides the following capabilities:

- The enclosure must be waterproof and dust tight to the latest NEMA 4 specifications.

6002

- The enclosure must allow the camera to operate satisfactorily over an ambient temperature range from -30°F to +140°F while exposed to precipitation as well as direct sunlight.
- The enclosure must allow the camera horizon to be rotated in the field during installation.
- The enclosure must include a provision at the rear of the enclosure for connection of power and video signal cables fabricated at the factory. Input power to the environmental enclosure must be nominally 115 VAC 60 Hz.
- A thermostatically controlled heater must be at the front of the enclosure to prevent the formation of ice and condensation, as well as to assure proper operation of the lens's iris mechanism. The heater must not interfere with the operation of the camera electronics, and it must not cause interference with the video signal.
- The enclosure must be light colored or unfinished and must include a sun shield to minimize solar heating. The front edge of the sunshield must protrude beyond the front edge of the environmental enclosure and must include provision to divert water flow to the sides of the sunshield. The amount of overhang of the sun shield must be adjustable to block the view of the horizon to prevent direct sunlight from entering the lens. Any plastics used in the enclosure must include ultra violet inhibitors.
- The total weight of the image sensor in the environmental enclosure with sunshield must be less than 10 lb.
- When operating in the environmental enclosure with power and video signal cables connected, the image sensor must meet FCC class B requirements for electromagnetic interference emissions.

The video output of the cameras must be isolated from earth ground. All video connections for the cameras to the video interface panel must also be isolated from earth ground.

Use waterproof, quick disconnect connectors to the image sensor for both video and power.

Provide a camera interface panel capable of being mounted to sidewalls of a controller cabinet for protection of the VIVDS processor unit, camera video and power inputs/outputs. The panel must consist of, as a minimum, 4 Edco CX06 coax protectors, an Edco ACP-340 for the cameras and VIVDS processor unit power, a 10 amp breaker, a convenience outlet protected the ACP-340 and a terminal strip with a minimum of sixteen 8-32 binder head screws. The terminal strip must be protected by a piece of 1/8 in. Plexiglas.

When the connection between the image sensor and the VIVDS processor unit is coaxial cable, the coaxial cable used must be a low loss, 75 ohm, precision video cable suited for outdoor installation, such as Belden 8281 or a Department-approved equal.

Camera mounting hardware must allow for vertical or horizontal mounting to the camera enclosure. Pelco AS-0166-4-62 or equivalent is acceptable.

---

## 7. FIELD COMMUNICATION LINK

The field communications link must be a one way communications connection from the camera to the equipment cabinet. The primary communications link media may be coaxial cable or fiber optic cable accompanied by a 3 conductor minimum 18 AWG, 24 VDC or 115 VAC camera power cable, or appropriate cable as approved.

The following requirements must govern for the various types of field communications link media described on the plans:

- 7.1. **Coaxial Cable.** In locations where the plans indicate coaxial cable is required as the primary communications link, this cable must be of the RG 59 type with a nominal impedance of 75 ohms. All cable must have a polyethylene dielectric with copper braid shield having a minimum of 98% shield coverage and not greater than 0.78 dB attenuation per 100 feet at 10 MHz with a minimum 18 AWG external 3 conductor power cable or approved equivalent as directed.

6002

- 7.2. **Fiber Optic Cable.** If shown on the plans, furnish fiber optic cable in accordance with the Special Specification for fiber optic cable.
- 7.3. **Twisted Wire Pairs.** Must be Belden 9556 or equivalent 18 AWG TWP control cable.

All connection cables must be continuous from the equipment cabinet to the camera. No splices of any type will be permitted.

Install lightning and transient surge suppression devices on the processor side of the field communications link to protect the peripheral devices. The suppression devices must be all solid state. Lightning protection is not required for fiber optic communication lines. The devices must present high impedance to, and must not interfere with, the communications lines during normal operation. The suppression devices must not allow the peak voltage on any line to exceed 300% of the normal operating peak voltage at any time. The response time of the devices must not exceed 5 nanoseconds.

---

## 8. VIVDS SET-UP SYSTEM

The minimum VIVDS set-up system, as needed for detector setup and viewing of vehicle detections, must consist of a field setup computer and Windows based interface software (if required) or a video monitor with interface software built-in to the VIVDS processor unit. Live video (30 frames per second) must be available on the field setup computer to determine proper operation of detectors. The field set-up computer as a minimum, must have an NTSC video input port or equivalent.

If a field setup computer is required for system set-up, it must be supplied by the supplier of the VIVDS.

The field setup computer must include all necessary cabling and a Windows based program to interface with the VIVDS processor unit. This software must provide an easy to use graphical user interface and support all models/versions of the supplied VIVDS.

Live video with the detection overlaid is required for field verification of the system.

---

## 9. TEMPORARY USE AND RETESTING

- 9.1. **Temporary Use.** When shown on the plans, the VIVDS equipment must be used to provide vehicle detection on a temporary basis. When the permanent vehicle detection system and related equipment are installed and made operational, the VIVDS equipment must be carefully removed and delivered to the location shown on the plans.
- 9.2. **State Retesting and Acceptance.** Before acceptance, all VIVDS equipment may be retested by the Department, even if the system was operating properly before removal. Repair or replace any equipment damaged during removal or transport and any equipment that does not meet the various test requirements.

---

## 10. OPERATION FROM CENTRAL CONTROL

The central control must transmit and receive all information needed for detector setup, monitor the vehicle detection, view the vehicle traffic flow at a rate of 2 frames per second or greater for telephone, or 5 frames per second or greater for ISDN lines (as specified by the plans), and interrogate all required stored data. The remote communications link between the VIVDS processor unit and central control may be dial-up (telephone or ISDN lines) or dedicated twisted wire pair communications cable which may be accompanied with coaxial cable or fiber-optic cable, as shown on the plans. Communications with the central control must not interfere with the on-street detection of the VIVDS processor. Quality of the video at 2 frames per second rate must be such that the view with the traffic flow is clear and in focus.



---

**11. INSTALLATION AND TRAINING**

The supplier of the video detection system must supervise the installation and testing of the video and computer equipment. A factory certified representative from the supplier must be on site during installation.

If the field setup computer is furnished by the Department, such installation and testing must be done at the time that training is conducted.

Provide up to 2 days of training to personnel of the Department in the operation, setup and maintenance of the video detection system. Provide instruction and materials for a maximum of 20 persons and conduct at a location selected by the Department. The Department will be responsible for any travel and room and board expenses for its own personnel.

Instruction personnel are required to be certified by the equipment manufacturer. The User's Guide is not an adequate substitute for practical, classroom training and formal certification by an approved agency.

Formal levels of factory authorized training are required for installers, contractors, and system operators. All training must be certified by the manufacturer.

---

**12. WARRANTY, MAINTENANCE, AND SUPPORT**

The video detection system must be warranted to be free of defects in material and workmanship for a period of 5 yr. from date of shipment from the supplier's facility. During the warranty period, the supplier must repair with new or refurbished materials, or replace at no charge, any product containing a warranty defect provided the product is returned FOB to the supplier's factory or authorized repair site. Return product repair or replaced under warranty by the supplier with transportation prepaid. This warranty does not apply to products damaged by accident, improperly operated, abused, serviced by unauthorized personnel or unauthorized modification.

During the warranty period, technical support must be available from the supplier via telephone within 4 hr. of the time a call is made by a user, and this support must be available from factory certified personnel or factory certified installers.

Ongoing software support by the supplier must include updates of the VIVDS processor unit and supervisor software (if a field setup computer is required for set up). Provide these updates free of charge during the warranty period. The update of the VIVDS software to be NTCIP compliant must be included.

The supplier must maintain a program for technical support and software updates following expiration of the warranty period. Make this program available to the Department in the form of a separate agreement for continuing support.

The supplier must maintain an ongoing program of technical support for the wireless camera system. This technical support must be available via telephone or personnel sent to the installation site.

The supplier must maintain an adequate inventory of parts to support maintenance and repair of the camera system.

---

**13. MEASUREMENT**

The VIVDS will be measured as each major system component furnished, installed, made fully operational, and tested in accordance with this Special Specification or as directed.

The VIVDS communication cable will be measured by the foot of the appropriate media type furnished, installed, made fully operational, and tested in accordance with this Specification, other referenced Special Specifications or as directed.

6002

When the VIVDS is used on a temporary basis, the VIVDS will be measured as each system furnished, installed, made fully operational, including reconfiguration and removal if required by the plans, and tested in accordance with this Special Specification or as directed.

This is a plans quantity measurement item. The quantity to be paid is the quantity shown in the proposal unless modified by Article 9.2., "Plans Quantity Measurement." Additional measurements or calculations will be made if adjustments of quantities are required.

When recorded video is required by the plans it will be paid for by each camera recorded.

---

**14. PAYMENT**

The work performed, materials, and all accompanying software furnished in accordance with this item and measured as provided under "Measurement" will be paid for at the unit price bid for "VIVDS Processor System," "VIVDS Camera Assembly," "VIVDS Central Control," "VIVDS Set-up System," "VIVDS Temporary," "VIVDS Communication Cable (Coaxial)," "VIVDS Communication Cable (Fiber Optic)," and "VIVDS Video Recording." These prices are full compensation for furnishing, placing, and testing all materials and equipment, and for all tools, labor, equipment, hardware, operational software packages, supplies, support, personnel training, shop drawings, documentation, and incidentals. A 3-conductor power cable must be included with the communication cable.

These prices also include any and all interfaces required for the field and remote communications links along with any associated peripheral equipment, including cables; all associated mounting hardware and associated field equipment; required for a complete and fully functional visual image vehicle detection system component.

# Special Specification 6089

## Ethernet Cable and Connectors



### 1. DESCRIPTION

Furnish, install, test, document, and warranty network cable and connectors as shown on the plans and as detailed in the Special Specifications.

### 2. MATERIALS

2.1. **Cable Type.** Unshielded Twisted Pair (UTP) Category 5e.

2.2. **Electrical Requirements.**

2.2.1. **Cable Standard.** Meets TIA/EIA 568-C.2 cable standards. Must be industrial outdoor and UV rated.

2.2.2. **Maximum Frequency.** Maximum frequency shall be 100 MHz +/- 15%.

2.2.3. **Attenuation.** Cable must not exceed an attenuation of 22 dB per 300 ft. of cable at 100 MHz.

2.2.4. **Velocity Factor.** Velocity factor, reference to the free space electromagnetic wave propagation speed, must not be less than 74% of the free space velocity.

2.2.5. **Impedance.** Nominal impedance of the cable and connector must be 100 ohms.

2.2.6. **Capacitance.** Capacitance of the cable must not exceed 14 picofarads per foot of cable.

2.2.7. **Power Sum Equal-Level Far End Crosstalk (PS-ELFEXT)** 20.8 dB min at 100 MHz.

2.2.8. **Near-End Crosstalk (NEXT)** 35 dB min at 100 MHz.

2.2.9. **Return Loss.** 20.1 dB at 100 MHz.

2.3. **Connectors.**

2.3.1. **Type and Manufacturer.** Connectors must be of the model designated by the cable manufacturer for the cable supplied and provided by the same manufacturer.

2.3.2. **Electrical.** Termination connectors must be male RJ 45. Provide connectors and the cable supplied by the same manufacturer. Connectors must be a constant impedance type. Connectors must not contain any ferrous or other materials or design features which may lead to the generation of intermodulation products.

2.3.3. **Mechanical.** Connectors must be constructed to maintain the mechanical integrity of the cable within the nominal load limits of the cable. Connectors must prevent the entry and collection of moisture to the cable and electrical connection point.

### 3. CONSTRUCTION

3.1. **Installation.** Install cable with the proper connectors, jumper cable and miscellaneous hardware where indicated on the plans, necessary to make the site ready for testing and functional operation. Cable installation must be in accordance with the cable manufacturer's installation instructions.

6089

- 3.2. **Testing.** Terminate cable into a load impedance equal to the nominal impedance of the cable and a sweep return loss measurement must be made after installation at the site. Frequency range must be from 25 MHz to 100 MHz. Terminated cable must present a return loss of not less than (20 dB + 2 times the cable loss) at any frequency within the test range.
- 3.3. **Documentation.** Provide 2 copies of the certification sweep measurement of the cable.
- 3.4. **Warranty.** Cable and connector's warranty must be in accordance with the Special Specification 6005, "Testing, Training, Documentation, Final Acceptance, and Warranty."

---

4. **MEASUREMENT**

This item will be measured by the foot of cable furnished, installed, spliced, connected, and tested.

---

5. **PAYMENT**

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" and will be paid for at the unit price bid for "Ethernet Cable Cat 5." This price will be full compensation for furnishing and installing all cable and connectors, for pulling through conduit or duct, testing, splicing, connecting, tagging and labeling, and for all materials, labor, tools, equipment, documentation, and incidentals.

6090

# Special Specification 6090

## LED Internally Illuminated Street Name Signs



### 1. DESCRIPTION

Furnish, fabricate, and install light emitting diode (LED) internally illuminated street name (IISN) signs attached to traffic signal poles as shown on the plans.

### 2. MATERIALS

Provide new materials that comply with the details shown on the plans, the requirements of this Item, and the pertinent requirements of the following Items:

- Item 445, "Galvanizing"
- Item 446, "Field Cleaning and Painting Steel"
- Item 620, "Electrical Conductors"
- Item 621, "Tray Cable"

Furnish and fabricate LED IISN sign assemblies and associated mounting hardware from new materials that comply with this specification. Provide single side message or double side message signs as shown on the plans.

Furnish 6 sets of submittals, of the LED IISN and mounting hardware, to the Engineer at the project address. Do not begin work or purchase materials before the submittals are approved by the Engineer.

- 2.1. **General Requirements.** Ensure sign assembly standard lengths are between 4 ft. and 10 ft. Ensure standard viewable heights are between 15 in. and 30 in. Use single or double faced signs as required by plans. Ensure maximum weight of the sign does not exceed maximum capacity of IISN support arms.

Construct sign fixture housing from 5000 or 6000 series aluminum. Powder-coat paint all exterior fixture housing glossy black or as shown on the plans. Ensure paint exceeds 1000-hr. salt-spray test in accordance with ASTM B117. IISN housing must be rated as NEMA type 3R. Use stainless steel screws and hardware.

Ensure sign panels, light sources, light engines, and power supplies can be replaced without sign removal. The sign shall be capable of continuous operation over a range in temperatures from -10°F to +140°F.

- 2.2. **LED Requirements.** Provide high flux LED's that are rated to maintain a minimum 70% of their initial lumens after 60,000 hr. according to IESNA LM-80-08. Ensure the LED arrays or modules will continue to operate if one LED goes out. Provide light engine and LED arrays or modules that are replaceable without removing the sign.

- 2.3. **Sign Panel Requirements.** Ensure the front panel of the sign is ultraviolet, weather, abrasion and impact resistant high impact strength polycarbonate, acrylic or a glass-fiber reinforced polyester fluoride. The front panel will be replaceable for future maintenance purposes. Provide translucent reflective type D sheeting and colored transparent acrylic film as per TxDOT DMS - 8300, "Sign Face Material."

As per Texas Manual on Uniform Traffic Control Devices Section 2D.38, street name signs will have a white legend on a green background. A border, if used, will be the same color as the legend. The lettering should be at least 8 inch capital letters, or upper/lower case letters. Supplementary lettering to indicate the type of street (such as Street, Avenue, or Road) or the section of the City (such as SE) may be in smaller lettering, at least 3 in. high. Ensure letter font type is Clearview - 2W as shown on *Standard Highway Sign Designs for Texas*, D3-1 Overhead Mount.

6090

- 2.4. **Electrical and Illumination Requirements.** Provide IISN that will operate at 120 VAC. Ensure product meets standard for electric signs UL 48. The on-board circuitry of an IISN shall include voltage surge protection, to withstand high-repetition noise transients and low-repetition high-energy transients as stated in Section 2.1.8, NEMA Standard TS 2-2003. The power supply shall be housed inside the sign enclosure. Power supply shall be UL Class 2 limited output voltage and current plus isolation for safe operation, and UL rated for outdoor damp locations. Power supply shall be IP 64 Outdoor Rated. The light source shall evenly illuminate the sign panel. The average luminance over the entire panel surface will be uniform.

- 2.5. **Support Requirements.** The sign shall be designed and constructed to withstand 110 mph wind loads in conformance with the requirements of the AASHTO publication *Standard Specifications for Structural Supports of Highway Signs, Luminaires and Traffic Signals* (5th Edition 2009).

The sign must be supplied with mounting brackets from the manufacturer (swinging or rigid mounting) as shown on the plans.

- 2.6. **Color.** The color of the legend, symbols, and background must fall within the CIE (The International Commission on Illumination) color coordinates and reflectance values listed in Table 1.

**Table 1**  
**CIE Chromaticity Coordinates and Reflectance Values**

White			Green		
x	y	Reflectance	x	y	Reflectance
0.300	0.290	40 Min	0.255	0.330	3.5-10
280	0.310		0.255	0.520	
0.360	0.360		0.020	0.540	

- 2.7. **Workmanship.** The panels must exhibit good workmanship and must be free from objectionable marks or defects that would adversely affect appearance or serviceability.
- 2.8. **Warranty.** The manufacturer will replace failed IISNs, when non-operable due to defect in material or workmanship, within five years of installation with a new IISN that passes all testing, delivered and installed at the project location.

---

### 3. CONSTRUCTION

Fabricate and install internally illuminated street name signs in accordance with the details and dimensions shown on the plans, specified, or as approved by the Engineer. Install in accordance with the latest Electrical Detail Standards. Install signs level and plumb brackets or clamps. Attach IISN to traffic signal poles as per manufacturer's instructions or as shown on the plans.

Use established industry and utility safety practices when installing IISNs located near overhead or underground utilities. Consult with the appropriate utility company before beginning work.

Prevent scarring or marring of the poles, mast arms, and IISNs. Replace damaged components. Repair damaged galvanizing in accordance with Section 445.3.5, "Repairs." Repair damaged painted areas of a roadway illumination assembly in accordance with Item 446, "Field Cleaning and Painting Steel."

---

### 4. MEASUREMENT

This Item will be measured as each LED IISN sign installed.

---

### 5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement," will be paid for at the unit bid price for "LED Internally Illuminated Street Name Signs" of the

**6090**

sizes and types specified. This price is full compensation for furnishing, fabricating and installing the signs; support arm clamp assembly; liquidtight flexible metal conduit; and equipment, labor, tools, and incidentals.

New conduit will be paid for under Item 618, "Conduit." New conductors, except the conductors internal to the pole, will be paid for under Item 620, "Electrical Conductors." New tray cable, except the tray cable internal to the pole, will be paid for under Item 621, "Tray Cable."

2004 Specifications

CSJ 0922-33-098, 1378-02-040 &amp; 3409-01-004

**SPECIAL SPECIFICATION****6525****Emergency Vehicle Traffic Signal Priority Control System**

- 1. Description.** This Item governs the furnishing and installation of emergency vehicle traffic signal priority control system in field location(s) as shown on the plans and as detailed in the Special Specifications. This system shall enable designated vehicles to remotely cause the traffic signal controller to advance to and/or hold a desired traffic signal display by using existing controller functions.

The system shall consist of the following components:

- (1) Emergency Preemption Emitter:** This shall be mounted on the emergency vehicle and shall transmit optical energy signals only in the forward direction.
  - (2) Emergency Preemption Phase Selector:** This shall cause the signal controller to advance to and/or hold the desired traffic signal display for the emergency vehicle.
  - (3) Emergency Preemption Detector:** This shall be mounted on or near a traffic signal and shall receive the optical energy signals generated by the vehicle emitter.
  - (4) Emergency Preemption Detector cable:** This is used for communication between Emergency Preemption Detector and Emergency Preemption Phase Selector.
- 2. Materials.** Provide new, corrosion resistance materials for all items furnished, assembled, fabricated or installed under this Item, in strict accordance with the details shown on the plans and in the specifications.
- 3. Equipment.**

- (1) Emergency Preemption Emitter.**

- (a) Functional Requirements.**



Provide a compact, single source Emergency Preemption Emitter that shall consist of a high priority emitter and is compatible with all other equipment used for this project.

The Emergency Preemption Emitter shall have isolated power supply and emitter for positive or negative ground vehicle power system.

The Emergency Preemption Emitter shall have discrete, penetrating infrared communication that is directional, consistent day and night transmission, and all weather performance.

The Emergency Preemption Emitter shall also consist of power supply and an Emitter Control Switch assembly. The Emitter assembly will be mounted on a vehicle and shall produce a flashing optical signal with a controlled repetition rate and shall have the capability for adjusting intensity.

The Emergency Preemption Emitter shall comprise of a flash-tube/reflector and housing assembly with an integral power supply and the required cables.

The Emergency Preemption Emitter shall have the capability to be customized through its interface software.

The Emergency Preemption Emitter shall be controlled by a single on/off switch that requires no other adjustments by the operator. The on/off condition shall be indicated by a light located adjacent to the switch.

The Emergency Preemption Emitter shall have a command (high) and advantage (low) priority operation as well as probe frequency capability selected by model and switch combination.

The Emergency Preemption Emitter shall have a remote range setting capability, meet FCC part 15, subpart J, Class A regulations for electromagnetic interference, RS-485, and J1708 serial interface.

The Emergency Preemption Emitter shall be automatically disabled or de-activated by one or a combination of the following: seat switch, emergency brake switch, door switch, and transmission safety switch, and is indicated by slow flashing of the emitter switch indicator light.

The Emergency Preemption Emitter shall separate timed pulses of high intensity light in the infrared and visible wavelengths at the base flash rate of approximately 10, 12, or 14 Hz. It shall also interleave programmed encoded pulses that carry the vehicle class and ID number information.

The Emergency Preemption Emitter shall have a cumulative flash counts available through the interface software.

The Emergency Preemption Emitter shall be configured with a grating for precise directionality control.

The Emergency Preemption Emitter shall have an optional light-blocking filter.

The Emergency Preemption Emitter shall produce optical energy in a cone of not more than 90 degrees horizontal and not more than 30 degrees vertical. The detectors and/or phase selector shall not sense a pre-emption signal from an emitter outside this cone.

The Emergency Preemption Emitter shall have a transmission range up to 2,500 ft. with clear lens and up to 1,800 ft. with visible light filter.

Contractor shall supply switches as approved by the engineer and shall be subsidiary to this pay item.

Contractor shall supply the interface software kit including but not limited to instructions manual, cables, interface software, and storage container and shall be subsidiary to this item.

Contractor shall install the software on the workstation at STRATIS. This work shall be subsidiary to this item.

**(b) Electrical Requirements.**

The Emergency Preemption Emitter shall operate on ten to 15 volts DC input voltage, but shall not be damaged by input voltage surges up to 25 volts DC.

The Emergency Preemption Emitter shall not generate voltage transients on the battery input line which exceed battery voltage by more than four volts.

The Emergency Preemption Emitter shall convert 12 Volt DC vehicle battery power to the high voltage required for operation of the unit.

The Emergency Preemption Emitter shall draw less than 5 amps peak current.

**(c) Mechanical Requirements.**

The Emergency Preemption Emitter shall be a compact, lightweight, weather resistant encoded signal device intended for use on priority and probe vehicles.

The Emergency Preemption Emitter shall have the installation flexibility to mount directly on vehicle or ability to be installed into most lightbars.

The Emergency Preemption Emitter shall operate over an ambient temperature range of minus 30°F. to plus 140°F.

The Emergency Preemption Emitter shall operate in 0 to 95% humidity.

**(2) Emergency Preemption Phase Selector.****(a) Functional Requirements.**

Provide Emergency Preemption Phase Selector that shall be compatible with all other equipment used for this project.

The Emergency Preemption Phase Selector shall be a plug-in two channel, dual priority, encoded signal device. It shall have the capability to be installed directly into the input file of Type 170 traffic controllers equipped with priority phase selection software and in virtually any other traffic controller equipped with priority phase selection inputs and related software.

The Emergency Preemption Phase Selector shall recognize and discriminate among three distinct emitter frequency rates via Emergency Preemption Detectors: Command priority, Advantage priority and probe vehicles. Within each of these three frequency rates, the Emergency Preemption Phase Selector shall further discriminate among 10 classes of vehicle identification codes, with 1000 individual vehicle codes per class — 10,000 total per frequency rate.

When Emergency Preemption Detector signals are recognized as a valid call, the Emergency Preemption Phase Selector shall cause the signal controller to advance to and/or hold the desired traffic signal display. This is accomplished by utilizing Emergency Preemption Phase Selector circuitry in conjunction with normal internal controller functions.

The Emergency Preemption Phase Selector shall be capable of assigning priority traffic movement to one of two channels on a first-come, first-serve basis. Each channel shall be connected to select a particular traffic movement from those normally available within the controller.

Once a call is recognized, "commit to green" circuitry in the Emergency Preemption Phase Selector shall function so that the desired green indication will be obtained even if optical communication is lost. After serving a priority traffic demand, the Emergency Preemption Phase Selector shall release the controller to follow normal sequence operation.

The phase selector shall not change the timing of the following intervals for any normal controller phase:

Minimum green

WALK

Pedestrian clearance

Yellow change

Red clearance

The Emergency Preemption Phase Selector shall also have the following features:

Two auxiliary detectors per channel

Compatible with encoded signal and non-encoded emitters

Computer-based interface

RS232 communications front port, and rear backplane

User-selected communications baud rate 1200 to 9600 bits per second

Customizable ID code validation

Erasable write-on pads for phase or movement labeling

Unit can be operated without computer configuration

Crystal controlled circuitry

Accurate optical signal recognition circuitry

Precise output pulse

Definitive call verification

Optically isolated outputs

Front panel switches and diagnostic indicators for testing

Multi-function test switch

High and low test calls

Reset to default parameters

Range setting

Diagnostic test

Internally record each activation of the system. Each entry shall contain the:

Intersection name

Date and time of the activity

Vehicle class code of the activating vehicle

Activating vehicle's ID number

Channel called

Priority of the activity

Final green signal indications displayed at the end of the call

Time spent in the final greens

Duration of the activation

Near intersection location information

**(b) Electrical Requirements.**

The Emergency Preemption Phase Selector shall be powered from AC mains and shall provide 24-volt DC output for its associated Emergency Preemption Detectors.

The Emergency Preemption Phase Selector shall utilize solid state and relay circuitry to interface between the Emergency Preemption Detector and the traffic signal controller.

The Emergency Preemption Phase Selector shall supply power to and receive electrical signals from the Emergency Preemption Detector.

The Emergency Preemption Phase Selector shall be tested to NEMA electrical test specifications.

The Emergency Preemption Phase Selector shall operate at a voltage range of 89 to 135 VAC +10% and 60Hz + 3Hz.

Provide equipment that is not affected by the transient voltages, surges and sags normally experienced on commercial power lines. It is the Contractor's responsibility to check the local power service to determine if any special design is needed for the equipment. Any extra cost, if required, is subsidiary to this Item.

Install appropriate surge protectors in the cabinet for the Emergency Preemption Phase Selector and Emergency Preemption Detector.

6-12

6525

11-14

Provide equipment that meets the requirements of Sec. 2.1.6, "Transients, Power Service" of the NEMA Standard TS2-1992, and/or the latest revision.

Provide all wiring to the requirements of the National Electric Code. Cut all wires to proper length. Provide cable slacks to facilitate removal and replacement of assemblies, panels, and modules. Do not double back any wires to take up slack. Neatly lace wires into cable with nylon lacing or plastic straps. Secure cables with clamps.

Provide diodes or other protective devices across the coils of all DC relays, solenoids, and holding coils for transient suppression.

Furnish equipment with readily accessible, manually re-settable or replaceable circuit protection devices (such as circuit breakers or fuses) for equipment and power source protection.

Design the equipment such that the failures of the equipment shall not cause the failure of any other unit of equipment.

**(c) Mechanical Requirements.**

Furnish equipment that is modular in design to allow major portions to be readily replaced in the field.

The Emergency Preemption Phase Selector shall have mechanically key modules of unlike functions to prevent insertion into the wrong socket or connector.

Clearly identify all modules and assemblies with name, model number, serial number, and any other pertinent information required to facilitate equipment maintenance.

Make all external connections by means of connectors. Key the connectors to preclude improper hookups. Color code and/or appropriately mark all wires to and from the connectors.

Pleat every conductive contact surface or pin with no less than 20 microns of gold.

Provide equipment that meets all its specified requirements during and after being subjected to any combination of the following requirements:

Ambient temperature range of -35°F to +165°F.

Relative humidity from 0% to 95%.

A card rack shall be supplied with every Emergency Preemption Phase Selector.

The card rack shall be a metallic enclosure with a dedicated card slot for one phase selector with either two or four channel units.

The front panel of the card rack shall include a terminal strip for connecting the detectors, as well as a 9-pin circular connector and harness to connect the phase selector's inputs and outputs.

The card rack shall be subsidiary to the Emergency Preemption Phase Selector.

### **(3) Emergency Preemption Detector.**

#### **(a) Functional Requirements.**

Provide Emergency Preemption Detector that is compatible with all other equipment used for this project. Furnish Emergency Preemption Detector that shall seamlessly operate with the vehicle emitters used in the project area.

The Emergency Preemption Detector shall transform the optical energy detected from an approaching, vehicle mounted emitter to an electrical signal. The electrical signal shall be transmitted along an Emergency Preemption Detector Cable to the Emergency Preemption Phase Selector for processing.

The Emergency Preemption Detectors shall permit a direct, unobstructed line-of-sight to vehicle approaches. The Emergency Preemption Detector shall be designed for two direction - the single channel configuration.

The Emergency Preemption Detector shall have a cone of detection of not more than 13 degrees. The Emergency Preemption Detector and/or Emergency Preemption Phase Selector shall not sense a pre-emption signal from an emitter outside this cone.

The Emergency Preemption Detector shall also have the following features:

Solid state circuitry

Advanced electrical transient immunity

The Emergency Preemption Detector shall have a reception range of 200 ft. and is adjustable up to 2500 ft.

**(b) Electrical Requirements.** The Emergency Preemption Detector shall operate at an electrical voltage of 24 to 28 VDC, 50 MA minimum.

**(c) Mechanical Requirements.**

The Emergency Preemption Detector shall operate at a temperature range of -30°F to 165°F.

The Emergency Preemption Detector shall include mounting hardware, as specified, for mast arm mounting, span wire mounting, pole-side mounting, mounting on top of a signal head, or mounting on top of a pipe or pedestal.

The Emergency Preemption Detector shall have an adjustable turret configuration to accommodate skewed approaches.

The Emergency Preemption Detector housing shall be of light weight, durable, high-impact polycarbonate material having stainless steel and brass fittings.

The Emergency Preemption Detector shall operate at a humidity of 5% to 95% relative.

**(4) Emergency Preemption Detector Cable.**

**(a) Functional Requirements.**

Provide Emergency Preemption Detector Cable that shall be compatible with all other equipment used for this project.

The Emergency Preemption Detector Cable shall be individually tinned copper strand three-conductor cable with yellow, orange, and blue conductor wires. It shall also have a bare shield drain wire.

**(b) Electrical Requirements.**

The Emergency Preemption Detector Cable shall be AWG #20 (7x28), stranded with conductor insulation of 600 volt, 75°C (167°F).

The Emergency Preemption Detector Cable shall have a DC resistance not to exceed 11.0 ohms per 1000 ft.

The capacitance from one conductor to other 2 conductors and shield shall not exceed 48 pf./ft..



- (c) **Mechanical Requirements.** The Emergency Preemption Detector Cable shall also have the following features:

Jacket: 600 volts, 80°C (176°F), minimum average wall thickness - 0.045 in.

Finished O.D.: 0.3 in. max.

#### **4. Construction.**

##### **(1) General.**

- (a) Utilize the latest available techniques with a minimum number of parts, subassemblies, circuits, cards, and modules to maximize standardization and commonality for equipment construction.
- (b) Design the equipment for ease of maintenance, with all component parts readily accessible for inspection and maintenance. Provide test points for checking essential voltages and waveforms.

- (2) **Electronic Components.** Furnish all electronic components in compliance with Special Specification, "Electronic Components".

##### **(3) Mechanical Components.**

- (a) Use stainless steel for all external screws, nuts, and locking washers; do not use any self-tapping screws unless approved by the Engineer.
- (b) Fabricate all parts of corrosion resistant material, such as plastic, stainless steel, anodized aluminum, or brass.
- (c) Protect all materials used in construction from fungus growth and moisture deterioration.
- (d) Separate all dissimilar metals with an inert dielectric material.
- (e) All equipment shall be installed and wired in a neat and orderly manner in conformance with the manufacturers' instructions.
- (f) Emergency Preemption Detector Cables shall be installed continuous with no splices between the Emergency Preemption Detector and the cabinet.
- (g) Emergency Preemption Detector locations shown on the plan are for illustration purposes only. Exact location shall be determined by the manufacturer or the designated representative or the site engineer for the best possible line of sight.

- (h) All connections from the Emergency Preemption Phase Selector to the cabinet wiring shall be made at the termination panel. The termination panel shall have AC+ Lights, AC-, and a switched logic ground. The switched logic ground feeds all the pre-empt inputs to the Emergency Preemption Phase Selector. When switched off by the pre-emption disconnect switch, the traffic controller shall not be affected by pre-empt calls from the optical pre-emption system. A minimum of two test buttons shall be provided. If there are more than two pre-empt runs, a button for each shall be installed. A chart or print out, indicating the program steps and settings shall be provided along with the revised cabinet wiring diagrams.

**(4) Testing**

- (a) Conduct testing in accordance with the Special Specification, “Testing, Training, Documentation, Final Acceptance and Warranty”, Sections 2. - 2.(F).
- (b) Contractor shall notify and provide copies of test plans to the state 2 weeks prior to the scheduled test date.
- (c) If a malfunction is found or the system needs adjustment (such as range, emitter intensity, or detector location), schedule a follow-up test.
- (d) All adjustments such as Emergency Preemption Phase Selector range, sensitivity, detector placement, shall be made at the intersection, by the contractor so that the optical pre-emption operates correctly with other major manufacturers' equipment currently owned by the agencies in the project area.

**(5) Training.**

- (a) Provide training in accordance with Special Specification, “Testing, Training, Documentation, Final Acceptance and Warranty”, Article 3.
  - (b) Contractor shall provide one eight-hour emergency preemption software training session for 10 people at the state specified facility. The contractor shall pay for all expenses incurred during the training. This work shall be subsidiary to various bid items under this special specification.
- (6) Documentation Requirements.** Provide documentation in accordance with the Special Specification, “Testing, Training, Documentation, Final Acceptance and Warranty”, Article 4.
- (7) Warranty.** Provide a warranty accordance with the Special Specification, “Testing, Training, Documentation, Final Acceptance and Warranty”, Article 6.

**5. Measurement.** This Item will be measured as follows:

- (1) "Emergency Preemption Emitter" shall be measured as each unit furnished in accordance with these Special Specifications or as directed by the Engineer.
  - (2) "Emergency Preemption Phase Selector" shall be measured as each unit furnished, installed, made fully operational and tested in accordance with these Special Specifications or as directed by the Engineer.
  - (3) "Emergency Preemption Detector" shall be measured as each unit furnished, installed, made fully operational and tested in accordance with these Special Specifications or as directed by the Engineer.
  - (4) "Emergency Preemption Detector Cable" shall be measured in foot of cable furnished, installed, made fully operational and tested in accordance with these Special Specifications or as directed by the Engineer.
- 6. Payment.** The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Emergency Preemption Emitter", "Emergency Preemption Phase Selector", "Emergency Preemption Detector", and "Emergency Preemption Detector Cable". This price will include all equipment described under this Item with all cables and connectors, all documentation and testing; and includes the cost of furnishing all labor, materials, training, warranty, equipment, and incidentals.

**APPENDIX A**  
**QUALITY CONTROL / QUALITY ASSURANCE PROGRAM**

Approved December 2007

## **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.

Approved December 2007

## 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 contractor 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.

Approved December 2007

- ◆ 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.

Approved December 2007

### 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.



Approved December 2007

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.

Approved December 2007

#### **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.

Approved December 2007

**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.

Approved December 2007

## **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  $\mu$ 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

Approved December 2007

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  $\mu$ 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  $\mu$ 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

Approved December 2007

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

Approved December 2007

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.

.

**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.

Approved December 2007

## **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](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.



Approved December 2007

### **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.

Approved December 2007

**Section 8. Acceptable Tolerance Limits for Quality Assurance**

The following tables indicate the acceptable tolerance limits for the specified material.

**Embankment**

<b>Embankment</b>		
<b>Procedure</b>	<b>Texas Test Method</b>	<b>Tolerance</b>
In-place Density	" <u>Tex-115-E</u> , Field Method for Determining In-Place Density of Soils and Base Materials"	± 2.5% Field Density

**Untreated & Treated Sub-base and Base Courses**

<b>Untreated &amp; Treated Sub-base and Base Courses</b>		
<b>Procedure</b>	<b>Texas Test Method</b>	<b>Tolerance</b>
In-place Density	" <u>Tex-115-E</u> , Field Method for Determining In-Place Density of Soils and Base Materials"	± 2.5% Field Density
Gradation:	" <u>Tex-110-E</u> , Particle Size Analysis of Soils"	-
> No. 4 ≤ No. 4	-	± 5% ± 3%
Liquid Limit	" <u>Tex-104-E</u> , Determining Liquid Limit of Soils"	15% of the mean*
Plasticity Index	" <u>Tex-106-E</u> , Calculating the Plasticity Index of Soils"	20% of the mean*

**Asphalt Stabilized Base**

<b>Asphalt Stabilized Base</b>		
<b>Procedure</b>	<b>Texas Test Method</b>	<b>Tolerance</b>
Gradation:	" <u>Tex-200-F</u> , Sieve Analysis of Fine and Coarse Aggregates"	-
> No. 4 ≤ No. 4	-	± 5% ± 3%
Liquid Limit	" <u>Tex-104-E</u> , Determining Liquid Limit of Soils"	15% of the mean*
Plasticity Index	" <u>Tex-106-E</u> , Calculating the Plasticity Index of Soils"	20% of the mean*
Percent Asphalt	" <u>Tex-210-F</u> , Determining Asphalt Content of Bituminous Mixtures by Extraction"	± 0.3%
-	" <u>Tex-228-F</u> , Determining Asphalt Content of Bituminous Mixtures by the Nuclear Method"	± 0.3%

Approved December 2007

-	"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*

Approved December 2007

Slump	" <u>Tex-415-A</u> , Slump of Portland Cement Concrete"	± 1.0"
Entrained Air	3. " <u>Tex-414-A</u> , Air Content of Freshly Mixed Concrete by the Volumetric Method" 4. " <u>Tex-416-A</u> , 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:	" <u>Tex-200-F</u> , Sieve Analysis of Fine and Coarse Aggregates"	-
> No. 10 ≤ No. 10	-	± 5% ± 3%
Deleterious Material	" <u>Tex-217-F</u> , Determining Deleterious Material and Decantation Test for Coarse Aggregates"	± 0.3 %
Decantation	" <u>Tex-217-F</u> , 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)	" <u>Tex-200-F</u> , Sieve Analysis of Fine and Coarse Aggregates"	± 3%
Bar Linear Shrinkage	" <u>Tex-107-E</u> , Determining the Bar Linear Shrinkage of Materials"	± 2

## Asphaltic Concrete Combined Aggregate

Asphaltic Concrete Combined Aggregate		
Procedure	Texas Test Method	Tolerance
Gradation:	" <u>Tex-200-F</u> , Sieve Analysis of Fine and Coarse Aggregates"	-
> 5/8" 5/8" through No. 200 Passing No. 200	-	± 5% ± 3% ± 1.5%
Sand Equivalent	" <u>Tex-203-F</u> , Sand Equivalent Test"	± 10

Approved December 2007

## Asphaltic Concrete Complete Mixture

<b>Asphaltic Concrete Complete Mixture</b>		
<b>Procedure</b>	<b>Texas Test Method</b>	<b>Tolerance</b>
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.

<b>EXAMPLE: Plasticity Index</b>	
Job Control test value	18
IA Test value	22
Mean	20
20% difference	4

Both values are within 20% of the mean.

Approved December 2007



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? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|

\_\_\_\_\_  
 \_\_\_\_\_

- |   |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|
| 2. If trench excavation deeper than five (5) feet, is trench protection required? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|

\_\_\_\_\_  
 \_\_\_\_\_



## Williamson County Road Bond Program Inspection Check Lists

	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? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. During construction, did the contractor receive approval from the Engineer of Record before laying any structures in the presence of water? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Are all vertical sides sheeted and braced when necessary to maintain the required vertical excavation throughout the construction? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





## Williamson County Road Bond Program Inspection Check Lists

	Yes	No	NA
10. Is the trench excavated to the width and elevations as shown in the plans? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Is the pipe, culvert, etc., properly centered in the trench? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 <b>II. Shaping and Bedding (400.3.B)</b>			
1. For precast box sections and pipe, is the bedding in accordance with Item 400.3.B unless otherwise shown on the plans? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 <b>III. Backfill – General (400.3.C)</b>			
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? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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)? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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)? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Williamson County Road Bond Program Inspection Check Lists

**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?

☐      ☐      ☐

\_\_\_\_\_

\_\_\_\_\_



## Williamson County Road Bond Program Inspection Check Lists

**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)

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	Report No.:	
Description:		Date:	
Location:		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? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| _____  |                          |                          |                          |
| _____  |                          |                          |                          |
| 2. Does concrete for Drilled Shafts meet the requirements of Table 1 and Table 2 for concrete class and slump?                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| _____  |                          |                          |                          |
| _____  |                          |                          |                          |
| 3. If drilling slurry is used, does it meet the requirements of Table 3, as determined by Tex-130 E?                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| _____  |                          |                          |                          |
| _____  |                          |                          |                          |



## Williamson County Road Bond Program Inspection Check Lists

### 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?

☐      ☐      ☐

---



---



## Williamson County Road Bond Program Inspection Check Lists

### 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
 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)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
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? <b>(Hold Point)</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
4. Was concrete placement started within 4 hours of shaft excavation? If not, was shaft reprocessed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
5. Is the slurry agitated if the placement of concrete is delayed to keep it liquefied?			
_____			
_____			



## Williamson County Road Bond Program Inspection Check Lists

### 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?<br><b>(Hold Point)</b><br><hr/> <hr/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Where spiral reinforcement is used, is it tied to longitudinal bars (not welded) at a spacing not to exceed 24 inches?<br><hr/> <hr/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 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?<br><hr/> <hr/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 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?<br><hr/> <hr/>                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 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?<br><hr/> <hr/>             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. a. Is the elevation of the steel cage checked before and after concrete placement or after casing extraction when casing is used?<br><hr/> <hr/>  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Did the downward movement of the steel not exceed 6 inches per 20 feet of shaft length?<br><hr/> <hr/>  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |



## Williamson County Road Bond Program Inspection Check Lists

### Drilled Shaft Foundations – Item 416

	Yes	No	NA
c. Did the upward movement of the steel not exceed 6 inches? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Were the dowel bars checked for proper lap length between the shaft and column? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 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?  (Note: For dry shafts over 24” diameter concrete freefall is unlimited; use 3 foot drop tube.) _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. At the time the concrete is placed, is the excavated drill shaft free from accumulated seep water? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Has all loose material been removed from the bottom of the excavation prior to placing concrete? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





## Williamson County Road Bond Program Inspection Check Lists

### 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
2. If a tremie is used, is it kept full of concrete and well submerged in the previously placed concrete at all times?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
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?			
_____			
_____			



Williamson County  
Road Bond Program  
Inspection Check Lists

**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”?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

---

---



# 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 Road Bond Program Inspection Check Lists

## **Drilled Shaft Foundations – Item 416**

Signature/Date: \_\_\_\_\_



## Williamson County Road Bond Program Inspection Check Lists

Spec Item: 420 – Concrete Structures	Report No.: _____
Description: _____	Date: _____
Location: _____	Time: _____

QC Reviewer: \_\_\_\_\_

Results: ☐ Accepted ☐ Not Accepted

Remarks: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

QC Reviewer Signature: \_\_\_\_\_

### Concrete Structures

**Yes   No   NA**

- |   |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|
| I. Materials (420.2)  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1. Were concrete structures constructed from materials conforming to<br>TxDOT's Department Material Specifications in accordance with Section<br>420.2? |                          |                          |                          |

\_\_\_\_\_

\_\_\_\_\_

### II. Construction (420.4)

#### A. Schedule Restrictions



## Williamson County Road Bond Program Inspection Check Lists

### 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? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>B. Falsework and Forms</b>			
1. Are the working drawings for forms and falsework signed and sealed by a Registered Professional Engineer, licensed in the state of Texas? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the falsework and forms placed braced and alignments checked to ensure placement in accordance with the plans signed/sealed working drawings? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>C. Reinforcement (provided under Item 440)</b>			
1. Was reinforcing steel supports welded to I-beams or girders or to reinforcing steel as shown in the plans? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Is the installation of dowels and anchor bolts in accordance with Section 420.4.G.10? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>D. Placing Concrete - General</b>			
1. Is the temperature of structural concrete at the time of placement between 50° and 95° F? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Williamson County Road Bond Program Inspection Check Lists

### 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?  <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Does the transporting time from the Batching Plant to the placing of concrete in the forms conform to the specification or requirements?  <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?  <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?  <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Does the method of handling, placing and consolidation of concrete minimize segregation of the concrete and displacement of the reinforcement?  <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?  <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Williamson County Road Bond Program Inspection Check Lists

### 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			
10. Is the construction sequence arranged so that cold joints in a monolithic placement is avoided?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			
11. Is the concrete vibrated immediately after placement to consolidate the concrete and have the mortar flushed to the form surfaces?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			
12. Is at least one stand-by vibrator provided for emergency use in addition to those required for placement?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			
13. Is the rate of placement and finish satisfactory?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			





# Williamson County Road Bond Program Inspection Check Lists

## Concrete Structures – Item 420

	Yes	No	NA
<b>E. Construction Joints</b>			
1. Are all construction joints in bridge slabs of the type and at the locations shown on the plans?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
2. Are there additional bridge slab construction joints placed that are not shown on the plans?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
3. Was written authorization from the Engineer given for additional joints in these members?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<b>F. Placing Concrete in Cold Weather</b>			
1. Is concrete placed only when the ambient temperature in the shade is 35°F and rising or above 40°F?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
2. Is the temperature maintained after placement in accordance with Section 420.4.G.11?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
<b>G. Placing Concrete in Hot Weather</b>			
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			



# Williamson County Road Bond Program 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?

☐ ☐ ☐

---



---



## Williamson County Road Bond Program 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			
5. Was the surface finish achieved by using a carpet drag, burlap drag or broom?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			
6. Was the finished concrete surface coated within 10 minutes with a single application of evaporation retardant at the rate recommended by the manufacturer?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			
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 3/4 to 1 inch apart?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			
8. Did the bridge deck finish meet the ride quality tolerance of 1/8 inch in ten (10) feet (10 feet straight edge test)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			
9. Was the bridge deck grooved by saw-cutting in accordance with Section 420.4.I?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			



# Williamson County Road Bond Program Inspection Check Lists

## Concrete Structures – Item 420

	Yes	No	NA
<b>K. Curing Concrete</b>			
1. Were the curing requirements of Item 420.4.J met? (Note: See Table 1 – Please note “Exceptions to 4-Day Curing?”)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			
<b>L. Removal of Forms and Falsework</b>			
1. Did the Contractor remove the forms and falsework in accordance with Section 420.4.K?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>			
<hr/>			
<b>M. Ordinary Surface Finish</b>			
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Inside and top of manholes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Inside of sewer appurtenances?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Inside of culvert barrels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Bottom of bridge slab between girders or beams?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Vertical and bottom surfaces of interior concrete beams or girders?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>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.</p>			
<b>N. Surface Finishes for Concrete (Item 427)</b>			
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# 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	Report No.: _____
Description: _____	Date: _____
Location: _____	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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
---	--------------------------	--------------------------	--------------------------

\_\_\_\_\_

2. Is the concrete mix visually checked for uniformity from the beginning to the end of each load?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------	--------------------------

\_\_\_\_\_



# 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)?                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| _____  |                          |                          |                          |
| _____  |                          |                          |                          |
| 2. Are the requirements of Table 8 – “Slump Requirements” being met?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| _____  |                          |                          |                          |
| _____  |                          |                          |                          |
| 3. Is the maximum water-cement ratio exceeded?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| _____  |                          |                          |                          |
| _____  |                          |                          |                          |
| 4. If question 3 is “yes”, is the ratio regularly exceeded; was a new design performed?                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| _____  |                          |                          |                          |
| _____  |                          |                          |                          |
| 5. Is no water added to the concrete once discharge has begun to ensure that the maximum water-cement ratio is not exceeded? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| _____  |                          |                          |                          |
| _____  |                          |                          |                          |

#### 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?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| _____  |                          |                          |                          |
| _____  |                          |                          |                          |
| 2. Is the required job site testing (strength, slump, entrained air, concrete temperature, etc.) being performed at the required frequency using proper TxDOT testing methods? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| _____  |                          |                          |                          |
| _____  |                          |                          |                          |



## Williamson County Road Bond Program Inspection Check Lists

### Hydraulic Cement Concrete – Item 421

	Yes	No	NA
3. Are the concrete tickets properly completed? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Is the amount of water withheld (based on the design water-cement ratio) at the plant shown on the concrete ticket? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. If concrete is pumped, where is sampling and testing being performed? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Were comparison tests recorded between the haul unit and the point of unit discharge after pump? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 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? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. When water is added at the job site, is the batch mixed a minimum of 25 revolutions at mixing speed? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





Concrete Batch Ticket

Ticket No:

Date:

Material Information

MAT'L	Identification*	Am't Batched
AEA		oz.
RA		oz.
WRA		oz.
		oz.
CA <sub>1</sub>		lbs.
CA <sub>2</sub>		lbs.
FA <sub>1</sub>		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.	<input type="checkbox"/> AM <input type="checkbox"/> PM	MAX TIME				
*%Moist	CA <sub>1</sub>	CA <sub>2</sub>	CA <sub>3</sub>	CA <sub>4</sub>	FA <sub>1</sub>	FA <sub>2</sub>			
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 <sup>3</sup>		
*Bm. Or Cyl. Nos	Target Value		psi	Mixer Unloaded		<input type="checkbox"/> AM <input type="checkbox"/> PM			
Remarks									
Plant Inspector Signature									



## Williamson County Road Bond Program Inspection Check Lists

Spec Item: <u>422 – Reinforced Concrete Slab</u>	Report No.: _____
Description: _____	Date: _____
Location: _____	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? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Has the proper clear cover for the rebar been checked? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Does screed clear at the armor joints? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Are drains and grates at plan location and elevation? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Is sufficient plastic and curing blankets available in case of inclement weather after the pour begins? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Are forms, deck panels, beams and every element that the fresh concrete will come in contact with properly wetted? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 <b>B. During Placement</b>			
1. Has placement begun at the low end on spans with a profile grade of 1.5% or more? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Are proper clear cover depths being checked at the frequency shown in the Test Guide Schedule? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## 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? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>C. Post Placement</b>			
1. Is the final surface within specification tolerances when checked with a 16-ft straightedge? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. If deck grooves are saw cut, were they installed in accordance with Section 420.4.I? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Williamson County Road Bond Program Inspection Check Lists

Spec Item:	423 – Retaining Wall	Report No.:	
Description:		Date:	
Location:		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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
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%?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
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”?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
7. For filter fabric used in the Retaining Wall System, is it UV-resistant and does the material meet the requirements of DMS-6200?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
8. Are approved joint fillers, pads, waterstops, etc. used as shown in the plans?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
9. Does the retaining wall design service life meet the requirements of Section 423.3B?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			



## 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  $\frac{3}{4}$ " 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  $\frac{1}{2}$ " 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?  _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.  _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Is compaction in the 3-foot strip adjacent to the backside of the wall accomplished with hand operated or walk-behind compacter?  _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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".  _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?  _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Is the wall being constructed in accordance with the details shown on the plan sheets and/or construction drawings?  _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. If construction drawings are used to show the construction details, does the Reviewer have (or have access to) a copy of these drawings?  _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





# Williamson County Road Bond Program Inspection Check Lists

## Retaining Wall – Item 423

	Yes	No	NA
16. Are proper spacers provided between panels? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Is grading and drainage maintained adjacent to the wall during construction? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. If temporary MSE walls are used, were the walls constructed in accordance with Section 423.3.F requirements? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. If Concrete Block Retaining Walls are used, were the walls constructed in accordance with Section 423.3.G? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## 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:	<input type="checkbox"/> Accepted	<input type="checkbox"/> 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?<br><br>_____<br>_____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Did the Contractor provide manufacturer's certifications for bedding strips and use adhesives or bonding agents as recommended by the polystyrene manufacturer?<br><br>_____<br>_____   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |



## Williamson County Road Bond Program Inspection Check Lists

### Precast Pre-stressed Concrete Structural Members – Item 425

	Yes	No	NA
<b>II. Construction (425.3)</b>			
1. Are beams, bridge deck panels and bearing pads approved by TxDOT and is the TxDOT stamp on them?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
2. Do beams have any signs of damage such as cracks, spalling and/or “honeycombs”?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
3. Are dimensions correct?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
4. During erection of beams, did the Contractor securely tie or brace all beams in accordance with minimum erection and bracing standards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
5. Are any safety hazards apparent (power lines, traffic hazards or other construction activities)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
6. Have beams been erected to proper alignment as shown on the plans?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
7. Are beams positioned with the proper clearance from the abutment back-wall and adjacent beam?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			



## 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%? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|

\_\_\_\_\_  
 \_\_\_\_\_

- |   |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|
| 2. Do the electrodes used for welding conform to the requirements of Item 448.2 for the type of reinforcing steel used? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|

\_\_\_\_\_  
 \_\_\_\_\_



## 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) <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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) <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Is the rebar used on the job from an approved Mill as required by Section 440.2.A? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Unless otherwise shown on the plans, is the deformed rebar Grade 60 as required by Section 440.2.B? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. For Epoxy Coated Rebar, is the coated reinforcing steel in accordance with Table 3 (440.2.F)? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Are mechanical couplers used when reinforcing steel is spliced? <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Are all couplers furnished by the Contractor produced by a pre-qualified manufacturer? (DMS-4510) <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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) <hr/> <hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Williamson County Road Bond Program Inspection Check Lists

### Reinforcing Steel – Item 440

	Yes	No	NA
<b>II. Construction (440.3.C)</b>			
1. Is steel reinforcement adequately stored above the surface of the ground upon platforms, skids or other supports and protected from damage and deterioration?  _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?  _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Are lap-splice, weld-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”?  _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?  _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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”?  _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Is the depth of cover (concrete) to the nearest surface of steel at least 1” unless otherwise shown on the plans?  _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## 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 1/2"?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
8. Are bars of the proper size, location and quantity as shown on the plans?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
9. a. What type of bar supports are used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
b. Are the bar supports adequate in strength and number to hold the reinforcement in place, before and during concrete placement?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
d. If continuous type bar supports are used, are they placed in rows at 4 ft. maximum spacing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			
e. Are continuous type bar supports used when permanent metal deck forms are used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____			
_____			



## 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? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Has all visible damage to the coating been repaired in accordance with Section 440.3.F.3 before the reinforcement is used? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Is any cutting of coated reinforcement done only by sawing or shear cutting with permission of the Engineer? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Have all cut ends been coated before the reinforcement is used? _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





## Williamson County Road Bond Program Inspection Check Lists

Spec Item:	442 – Metal for Structures	Report No.:	
Description:		Date:	
Location:		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	Report No.:
	464 – Reinforced Concrete Pipe	
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 Storm 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”?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
5. Were pre-cast sections inspected to ensure they meet the tolerance in accordance with Section 462.2.F?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
6. Are cracks which extend into the plane of the reinforcing steel repaired in an approved manner?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
7. Are small damaged or honeycombed areas which are purely surface in nature repaired to the satisfaction of the Engineer?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
8. Are precast sections stored on level blocking in a manner acceptable to the Engineer?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			
9. Are lifting holes larger than 3” diameter?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/> <hr/>			



## Williamson County Road Bond Program Inspection Check Lists

### Concrete Box Culverts & Storm Drains – Item 462 Reinforced Concrete Pipe – Item 464

#### B. Jointing Materials

**Yes    No    NA**

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 Inspection Check Lists

### 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 from 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?  _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?  _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**APPENDIX B**  
**GUIDE SCHEDULE OF SAMPLING AND TESTING**



# GUIDE SCHEDULE OF SAMPLING AND TESTING

AUGUST 2010

## 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, the "Materials Directory" and SiteManager's "Assistant," 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 non-exempt federal-aid (Federal Letter of Authority [FLOA]) projects, 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.

Since the Department performs all project acceptance testing, Contractor test results are not used in the acceptance decision. As such, the Department is verifying the quality of the product as opposed to the quality of the Contractor's test result.

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, effective August 2010, is applicable to all contracts associated with the 2004 Standard Specifications.***

## GUIDE SCHEDULE OF SAMPLING AND TESTING (Per Contract)

**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)	
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 (F)	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.
	Plasticity Index (A)	Tex-106-E		Materials with PI > 15: 5,000 CY (F)	
	Gradation	Tex-110-E	During stockpiling operations, from completed stockpile, or project site (B)	Each 10,000 CY (F)	When shown on plans. This test may be waived for embankment cuts, as directed by the Engineer.
	Moisture/Density	Tex-114-E	During stockpiling operations, from completed stockpile, or project site (B)		Not required for ordinary compaction. Determine a new optimum moisture and maximum density for each different material or notable change in material.
	In-place Density (A)	Tex-115-E	As designated by the Engineer	Fill: each 5,000 CY min. 1 per lift. (F)	Not required for ordinary compaction. Determine a new optimum moisture and maximum density 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 (F)	
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)	
RETAINING WALL (SELECT BACKFILL)	Gradation	Tex-110-E	During stockpiling operations, from completed stockpile, or project site (B)	Each 5,000 CY (F)	
	Resistivity (A)	Tex-129-E	During stockpiling operations, from completed stockpile, or project site (B)	Each 5,000 CY (F)	For material with resistivity between 1,500 and 3,000 ohm-cm, determine chloride and sulfate content, as specified in Item 423.
	pH (A)	Tex-128-E	During stockpiling operations, from completed stockpile, or project site (B)	Each 5,000 CY (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 I – EMBANKMENTS, SUBGRADES, BACKFILL, AND BASE COURSES**

MATERIAL OR PRODUCT	PROJECT TESTS			REMARKS
	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (F)
RETAINING WALL (SELECT BACKFILL) (continued)	Soundness	Tex-411-A	During stockpiling operations, or from completed stockpile	As directed by the Engineer
	In-place Density (A)	Tex-115-E	As designated by the Engineer.	One 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 (F)
	Plasticity Index (A)	Tex-106-E	During stockpiling operations, from completed stockpile, or windrow (B)	Each 5,000 CY (F)
	Gradation (A)	Tex-110-E	During stockpiling operations, from completed stockpile, or windrow (B)	Each 5,000 CY (F)
	Moisture/Density	Tex-113-E	From completed stockpile at the source (E)	Each 20,000 CY (F)
	Wet Ball Mill (A)	Tex-116-E	From completed stockpile at the source (E)	Each 20,000 CY (F)
	Strength (A)	Tex-117-E	From completed stockpile at the source (E)	Each 20,000 CY (F)
	In-place Density (A)	Tex-115-E	As designated by the Engineer	Each 3,000 CY, min. 1 per lift (F)
	Thickness (A)	Tex-140-E	As designated by the Engineer	Each 3,000 CY (F)
				Not required where survey grade control documents compliance.

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	PROJECT TESTS			REMARKS
	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (F)
NEW BASE MATERIAL	Liquid Limit (A)	Tex-104-E	During stockpiling operations, from completed stockpile, or windrow (B)	Each 5,000 CY (F)  When central mix site or plant is used, windrow sampling may be waived.
	Plasticity Index (A)	Tex-106-E	During stockpiling operations, from completed stockpile, or windrow (B)	Each 5,000 CY (F)
	Gradation (A)	Tex-110-E	During stockpiling operations, from completed stockpile, or windrow (B)	Each 5,000 CY (F)
	Wet Ball Mill (A)	Tex-116-E	From completed stockpile at the source (E)	Each 20,000 CY (F)  As required by the plans.
	Strength (A)	Tex-117-E	From completed stockpile at the source (E)	Each 20,000 CY (F)  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.
TREATED SUBGRADE AND BASE COURSES	In-place Density (A)	Tex-115-E	As designated by the Engineer	Each 3,000 CY, min. 1 per lift (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. Materials such as RAP, gypsum and iron ore tend to bias the counts for nuclear density gauges.
	Compliance with DMS-6350		During delivery to project	Hydrated Lime: 1 Per Project Commercial Lime Slurry: each 200 tons of lime (F) Carbide Lime Slurry: each 100 tons of lime (F) Quick Lime: 1 Per Project  All lime sources must be on TxDOT's Lime Quality Monitoring Program as described in DMS-6330. Sample frequency for Carbide Lime Slurry may be increased as directed by the Engineer.
	Compliance with DMS-4600		Railroad car, truck, or cement bins	Each 2,000 bbls. for each type and brand (F)  Sampling and testing may be waived when the source is listed in the current Material Producer List for Cement. (C)
	Compliance with DMS-4615		Project samples at location designated by the Engineer	1 per Project  Only materials from CSTM&P approved sources listed in the Material Producer List for Fly Ash will be accepted. (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 I – EMBANKMENTS, SUBGRADES, BACKFILL, AND BASE COURSES**

MATERIAL OR PRODUCT		PROJECT TESTS			REMARKS
		TEST NUMBER	LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (F)	
TREATED SUBGRADE AND BASE COURSES (continued)	COMPLETE MIXTURE	Pulverization Gradation	Tex-101-E Part III	Roadway, after pulverization and mixing	As necessary for control
		Moisture-Density	Tex-120/121-E (Part I), or Tex-127-E	Completed stockpile or roadway prior to placement (E)	Each 20,000 CY (F)
		Soil-Cement Testing Soil-Lime Testing	Tex-120-E (Part II) Tex-121-E (Part II)	From roadway windrow after treatment	As necessary for control
		In-place Density (A)	Tex-115-E	As designated by the Engineer	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	Not required where survey grade control documents are used for compliance

**TABLE I – FOOTNOTES**

<b>A -</b> 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>B -</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).
<b>C -</b> Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
<b>D -</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: <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul>
<b>E -</b> The Engineer will sample from the completed stockpile at the source and test prior to placement.
<b>F -</b> 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)				
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	PROJECT TESTS	
			LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (E)
AGGREGATE	Gradation (A)	Tex-200-F Part I	During stockpiling operations, from completed stockpile, or prior to mixing	Each 5,000 CY (E)
	Liquid Limit (A)	Tex-104-E	During stockpiling operations, from completed stockpile, or prior to mixing	Each 5,000 CY (E)
	Plasticity Index (A)	Tex-106-E	During stockpiling operations, from completed stockpile, or prior to mixing	Each 5,000 CY (E)
	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 (E)
	Coarse Aggregate Angularity (A)	Tex-460-A Part I	During stockpiling operations, from completed stockpile, or prior to mixing	1 per project per source
	Sand Equivalent	Tex-203-F	Hot aggregate bins, feeder belt, or stockpile	1 per project per source
	Decantation	Tex-217-F Part II	During stockpiling operations, from completed stockpile, or prior to mixing	Each 10,000 CY (E)
	Compliance with DMS-6350		During delivery to project	Hydrated Lime: 1 Per Project. Commercial Lime Slurry: each 200 tons of lime (E) Carbide Lime Slurry: each 100 tons of lime (E) Quick Lime: 1 Per Project (C)
ASPHALT BINDER	Compliance with Item 300 – Binder and Tack Coat		Sampled, tested and preapproved by CSTM&P. Take project samples when designated by the Engineer.	One 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. Sample binder at hot mix plant. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.
				When L. A. Abrasion is specified, tests are not required when the published value of the source, as listed in the current Material Producer list for <b>CRSQC</b> , meets the project specifications. (B)
				Not required for crushed stone sources.
				When designated by the Engineer, test may be run on combined aggregates when multiple sources are used.
				Required only for RAP and recycled aggregate.
				On projects requiring less than 50 tons, material from CSTM&P approved sources may be accepted on the basis of Producer's Certification without sampling.

## TABLE IA – FOOTNOTES

<b>A -</b>	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>B -</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).
<b>C -</b>	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
<b>D -</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: <ul style="list-style-type: none"> <li>• Soils/flexible base: Vary sampling between stockpiling operations, completed stockpile, windrow, and project site. Vary the time of day sampling is performed.</li> <li>• 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.</li> </ul>
<b>E -</b>	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 – SURFACE TREATMENTS				
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	PROJECT TESTS	
			LOCATION OR TIME OF SAMPLING (C)	FREQUENCY OF SAMPLING (D)
AGGREGATE	Gradation (A)	Tex-200-F, Part I	At source or at point of delivery	One each 1,000 CY (D)
	L. A. Abrasion (A)	Tex-410-A	Stockpile	1 per 20,000 CY (D)
	Magnesium Soundness (A)	Tex-411-A	Stockpile	1 per 20,000 CY (D)
	Surface Aggregate Classification (A)	Tex-612-J Tex-411-A	Stockpile	1 per 20,000 CY (D)
	Pressure Slake (A)	Tex-431-A	Stockpile	1 per 20,000 CY (D)
	Freeze Thaw (A)	Tex-432-A	Stockpile	1 per 20,000 CY (D)
	Unit Weight	Tex-404-A	Stockpile	1 per 20,000 CY (D)
	24 hr Water Absorption (A)	Tex-433-A	Stockpile	1 per 20,000 CY (D)
	Coarse Aggregate Angularity	Tex-460-A	Stockpile	1 per 20,000 CY (D)
	Deleterious Material (A)	Tex-217-F Part II	Stockpile	1 per 10,000 CY (D)
	Decantation (A)	Tex-406-A	Stockpile	1 per 10,000 CY (D)
	Flakiness Index	Tex-224-F	Stockpile	Frequency as directed by the Engineer.
	Micro Deval	Tex-461-A	Stockpile	1 per project
	White Rock Count	Tex-220-F	Stockpile	
	Naturally Impregnated Bitumen Content	Tex-236-F	Stockpile	
REMARKS Rate may be reduced to one each 2,000 CY if the Engineer approves a contractor quality control plan. Sampling and testing are not required when the published value of the source, as listed in the current Material Producer list for <b>BRSQC</b> , meets the project specifications. (B) Sampling and testing are not required when the published value of the source, as listed in the current Material Producer list for <b>BRSQC</b> , meets the project specifications. (B) Sampling and testing are not required when the published value of the source, as listed in the current Material Producer list for <b>BRSQC</b> , meets the project specifications. (B) Same as above. Required only for lightweight aggregate. Same as above. Required only for lightweight aggregate. Same as above. Required only for lightweight aggregate. Same as above. Required only for lightweight aggregate. Only required for crushed gravel. Test not used for acceptance. Compare result to published value listed in the current Material Producer List for <b>BRSQC</b> . Submit sample to CSTM&P for Soundness and LA Abrasion testing when results differ by more than 3% points. Required only for Limestone Rock Asphalt. Not required when CSTM&P provides inspection at the plant. Required only for Limestone Rock Asphalt. Not required when CSTM&P provides inspection at the plant.				

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 – SURFACE TREATMENTS				
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	PROJECT TESTS	
			LOCATION OR TIME OF SAMPLING (C)	FREQUENCY OF SAMPLING (D)
PRECOATED AGGREGATE	Asphalt Content	Tex-236-F	Stockpile	Frequency as directed by the Engineer when a target value is specified.
ASPHALT	Compliance with Item 300		Sampled, tested and preapproved by CSTM&P. Take project samples when designated by the Engineer from the distributor or transport.	1 per project, per grade, per source
				Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.

TABLE II – FOOTNOTES	
<b>A -</b>	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>B -</b>	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
<b>C -</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: <ul style="list-style-type: none"> <li>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.</li> </ul>
<b>D -</b>	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, DC, CO, K, LMC, or SS)**

MATERIAL OR PRODUCT		TEST FOR	TEST NUMBER	PROJECT TESTS		REMARKS
				LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (E)	
COARSE AGGREGATE		Decantation (B)	Tex-406-A	From stockpile at concrete plant	Each 20,000 CY of concrete (each source) (E)	Test combined aggregate when used. At the beginning of the project, one test will be made for each 500 CY of concrete until three consecutive passing tests are obtained. The first test must be performed at the beginning of project production. Then frequency of testing can be reduced to one test per 1,000 CY of concrete.
		Sieve Analysis (A) (B)	Tex-401-A		Each 1,000 CY of concrete (each source) (E)	
		Deleterious Materials (B)	Tex-413-A		1 per project or as necessary for control	
		Los Angeles Abrasion (A) (B)	Tex-410-A		Two, each source	Sampling and testing are not required when the published value of the source, as listed in the current Material Producer list for CRSQC, meets the project specifications. (C)
		5-cycle Magnesium Sulfate Soundness (A) (B)	Tex-411-A		Two, each source	Sampling and testing are not required when the published value of the source, as listed in the current Material Producer list for CRSQC, meets the project specifications. (C)
MINERAL AGGREGATE		Sand Equivalent (B)	Tex-203-F	From stockpile at concrete plant	1 per project or as necessary for control	Test combined aggregate when used.
		Organic Impurities (B)	Tex-408-A		1 per project, per source	
		Sieve Analysis (A) (B)	Tex-401-A		Each 1,000 CY of concrete (each source) (E)	At the beginning of the project, one test will be made for each 500 CY of concrete until three consecutive passing tests are obtained. The first test must be performed at the beginning of project production. Then frequency of testing can be reduced to one test per 1,000 CY of concrete.
		Fineness Modulus (B)	Tex-402-A		1 per project or as necessary for control	For Fineness Modulus, 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	Test to confirm material variability when strength values are in question.
MINERAL FILLER		Acid Insoluble Residue (A) (B)	Tex-612-J	From stockpile or silo at concrete plant	Two, each source	Only for concrete subject to direct traffic. Sampling and testing are not required when the published value of the source, as listed in the current Material Producer list for CRSQC, meets the project specifications. (C)
		Sieve Analysis (A)	Tex-401-A		Two, each source	
		Compliance with DMS-4630 (A)			Each 1,000 bbls. (For each type and brand) (E)	
SILICA FUME				Railroad car, truck, bags or silos		



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, DC, CO, K, LMC, or SS)					
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	PROJECT TESTS		REMARKS
			LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (E)	
METAKAOLIN	Compliance with DMS-4635 (A)		Railroad car, truck or silos	Each 1,000 bbls. (For each type and brand) (E)	
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, ground granulated blast furnace slag, and admixture sources are listed in the Material Producer List. If not, sample and submit to CSTM&P for testing. Water testing is contracted by the concrete supplier (commercial lab report to be reviewed by TxDOT).
JOINT MATERIAL	Compliance with DMS-6300		Sampled at jobsite if not sampled at source by CSTM&P; tested by CSTM&P. See remarks.	1 per batch or shipment	Sampling may be waived when the source is listed in the Material Producer List for <b>Joint Sealers. (C)</b>
CURING COMPOUND	Compliance with DMS-4650		Sampled at jobsite if not sampled at source by CSTM&P; tested by CSTM&P. See remarks.	1 per batch or shipment	Sampling may be waived when the source is listed in the Material Producer List for <b>Concrete Curing Compounds. (C)</b>
	% Solids	ASTM D 2369	Sampled at jobsite	1 per project	Sample from spray nozzle or from storage container. Ensure container has been agitated and mixed prior to sampling.
EVAPORATION RETARDANTS	Compliance with DMS-4650		Sampled at jobsite if not sampled at source by CSTM&P; tested by CSTM&P. See remarks.	1 per batch or shipment	Sampling may be waived when the source is listed in the Material Producer list for <b>Evaporation Retardants. (C)</b>
REINFORCING STEEL	Compliance with the Std. Specifications & Spec. Provisions	As Specified	Sampled at jobsite if not sampled at source by CSTM&P; tested by CSTM&P. See remarks.		Only materials from CSTM&P approved sources listed in the Material Producer List for <b>Reinforcing Steel Mills and Seven Wire Steel Strand</b> will be accepted. <b>(C)</b>
MECHANICAL COUPLERS	Compliance with DMS-4510	Tex-743-I	Sampled at jobsite; Tested by CSTM&P	3 couplers per lot (500 couplers) for each type, model, bar size and grade	Only materials from CSTM&P approved sources listed in the Material Producer List for <b>Mechanical Couplers</b> will be accepted. <b>(C)</b>
LATEX	Compliance with DMS-4640 for concrete chemical admixtures		Sampled at jobsite.	Min. of 1 test per project	
WATERSTOP	Compliance with DMS-6160, unless otherwise shown on plans				This material is approved at the job site by the Engineer on a basis of certification. No testing is required.
EPOXY	Compliance with DMS-6100, unless otherwise specified		Sampled at jobsite if not pre-approved by CSTM&P.	1 per batch or shipment	Sampling may be waived when the source is listed in the Material Producer List for <b>Epoxies and Adhesives. (C)</b>

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, DC, CO, K, LMC, or SS)				
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	PROJECT TESTS	
			LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (E)
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) (E)
	Slump	Tex-415-A		1 test per 4 strength specimens
	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		1 per span
			During dry run and during concrete placement (Bridge decks and direct traffic culverts)	Min. 6 – Max. 18 per span, as per test method. Record locations and dimensions and place in project records.
			Sampling must be in accordance with Tex-407-A. Two cylinders shall be tested at 7 days and if the average value is below the target value as defined in 421.4.B, the remaining 2 cylinders shall be tested at 28 days. If the average value of the 2 cylinders tested at 7 days meets or exceeds the target value, but is below the minimum design strength listed in Item 421 Table 5, every third sampling frequency shall be tested 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 5, the two remaining cylinders are not required to be tested. However, testing and recording the 28 day strengths would be helpful when adjusting the required strength overdesign.	
			Sampling must be in accordance with Tex-407-A. For Class S, F and H ready mix concrete for bridge slab only, air, slump, and temperature must be checked as necessary to obtain a desired consistency with a minimum of the first three loads being tested. Thereafter, test each third load for both slump and air content. Perform slump and air content tests on the same load from which strength test specimens are made. Check temperature of every load for bridge slabs and mass concrete placements. When air-entrainment requirements have been waived by the plans but the concrete mix still includes an air-entrainment agent, continue to test for air at the listed frequency.	

TABLE III – FOOTNOTES	
<b>A -</b>	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>B -</b>	These Project Tests may be used for one or more projects being furnished concrete from the same plant during the same period.
<b>C -</b>	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
<b>D -</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: <ul style="list-style-type: none"> <li>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.</li> <li>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. Tests for slump, air, and temperature should be done often to ensure the consistent control of the concrete production.</li> </ul>
<b>E -</b>	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, D, or E)				
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	PROJECT TESTS	
			LOCATION OR TIME OF SAMPLING (C)	FREQUENCY OF SAMPLING (D)
CONCRETE	Compressive Strength (A)	Tex-418-A	At point of concrete placement	2 cylinders per 180 CY, per class (D)
	Entrained Air (A)	Tex-416-A or Tex-414-A		1 test per 2 strength 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, ground granulated blast furnace slag, and admixture sources are listed in the Material Producer List. If not, sample and submit to CSTM&P for testing. 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)
METAKAOLIN	Compliance with DMS-4635		Railroad car, truck or silos	1 test per project, per class (for each type and brand)

TABLE IV – FOOTNOTES

<b>A -</b> 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>B -</b> Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
<b>C -</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: <ul style="list-style-type: none"> <li>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.</li> </ul>
<b>D -</b> Each test performed that is based on a quantity of material is considered "or fraction thereof" for calculating number of tests.

TABLE V – HYDRAULIC CEMENT CONCRETE PAVEMENT (Classes: P, DC, CO, LMC, K, or HES)					
MATERIAL OR PRODUCT		PROJECT TESTS		REMARKS	
		TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING	FREQUENCY OF SAMPLING (D)
COARSE AGGREGATE		Decantation	Tex-406-A	From stockpile at concrete plant	Each 20,000 CY of concrete (each source) (D)
		Sieve Analysis (A)	Tex-401-A		As necessary for control
		Deleterious Materials	Tex-413-A		Each 20,000 CY of concrete (each source) (D)
		L.A Abrasion (A)	Tex-410-A		Two, each source
		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) (D)
		Organic Impurities	Tex-408-A		1 per project, per source
		Sieve Analysis (A)	Tex-401-A		As necessary for control
		Fineness Modulus (B)	Tex-402-A		
		Deleterious Material (B)	Tex-413-A		Each 20,000 CY of concrete (each source) (D)
		Acid Insoluble (A)	Tex-612-J		1 per project, per source
		Sieve Analysis	Tex-401-A		3,000 CY of concrete (D)
MINERAL FILLER		Compliance with the Standard Specifications Item 421.4.A		At source, if not approved	Min. 1 design, per class, per source
MIX DESIGN					

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, DC, CO, LMC, K, or HES)**

MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	PROJECT TESTS		REMARKS
			LOCATION OR TIME OF SAMPLING	FREQUENCY OF SAMPLING (D)	
SILICA FUME	Compliance with DMS-4630		Railroad car, truck, bags or silos	Each 1,000 bbls. (For each type and brand) (D)	
METAKAOLIN	Compliance with DMS-4635		Railroad car, truck or silos	Each 1,000 bbls. (For each type and brand) (D)	
JOINT MATERIAL	Compliance with DMS-6310		Sampled at jobsite if not sampled at source by CSTM&P; tested by CSTM&P. See remarks.	1 per batch or shipment	Sampling may be waived when the source is listed in the Material Producer List for <b>Joint Sealers. (C)</b>
CURING COMPOUND	Compliance with DMS-4650		Sampled at jobsite if not sampled at source by CSTM&P; tested by CSTM&P. See remarks.	1 per batch or shipment	Sampling may be waived when the source is listed in the Material Producer List for <b>Concrete Curing Compounds. (C)</b>
	% Solids	ASTM D 2369	At point of concrete placement – spray nozzle	2 per project	Sample from spray nozzle or from storage container. Ensure container has been agitated and mixed prior to sampling.
EVAPORATION RETARDANTS	Compliance with DMS-4650		Sampled at jobsite if not sampled at source by CSTM&P; tested by CSTM&P. See remarks.	1 per batch or shipment	Sampling may be waived when the source is listed in the Material Producer list for <b>Evaporation Retardants. (C)</b>
REINFORCING STEEL	Compliance with the Std. Specifications & Spec. Provisions	As Specified	Sampled at jobsite if not sampled at source by CSTM&P; tested by CSTM&P. See remarks.		Only materials from CSTM&P approved sources listed in the Material Producer List for <b>Reinforcing Steel Mills and Seven Wire Steel Strand</b> will be accepted. <b>(C)</b>
MULTIPLE PIECE TIE BARS				Refer to Tex-711-I for sampling rates if not CSTM&P approved.	Sampling may be waived when the source is listed in the Material Producer List for <b>Multiple Piece Tie Bar Producers. (C)</b>
EPOXY	Compliance with DMS-6100		Sampled at jobsite if not pre-approved by CSTM&P. See remarks.	One batch per shipment	Sampling may be waived when the source is listed in the Material Producer List for <b>Epoxies and Adhesives. (C)</b>

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, DC, CO, LMC, K, or HES)					
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	PROJECT TESTS		REMARKS
			LOCATION OR TIME OF SAMPLING	FREQUENCY OF SAMPLING (D)	
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	Sampling shall be 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 shall be one test (2 specimens) for each 3,000 SY of concrete or fraction thereof or per day and split sample verification testing shall be waived.
	Slump	Tex-415-A	At time and location strength specimens are made	1 test for every 10 contractor job control tests	Slump is not required for slip-formed pavement. Sampling shall be 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.
	Entrained Air (A)	Tex-416-A or Tex-414-A		1 test for every 10 contractor job control tests	When air-entrainment requirements have been waived by the plans but the concrete mix still includes an air-entrainment agent, continue to test for air at the listed frequency.
	Temperature	Tex-422-A			
	Thickness	Tex-423-A	Center of each lane	Every 500 feet (D)	Methods other than Tex-423-A may be shown on the plans.

TABLE V – FOOTNOTES

<b>A -</b> 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>B -</b> When a project test does not meet the specified strength requirements and a reduced pay factor is assigned, the analysis shall be documented on the Letter of Certification of Materials Used.
<b>C -</b> Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
<b>D -</b> 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, and 346)**

MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	PROJECT TESTS		REMARKS
			LOCATION (Per Design)	FREQUENCY OF SAMPLING	
COARSE AGGREGATE	L. A. Abrasion (A)	Tex-410-A	Stockpile (B)	1 per project, per source	Sampling and testing are not required when the published value of the source, as listed in the current Material Producer list for <b>BRSQC</b> , meets the project specifications. (C)
	Magnesium Sulfate Soundness (A)	Tex-411-A		Approximately 1 per every 12 Sublots	Testing frequency may be reduced or eliminated based on a satisfactory test history.
	Micro Deval	Tex-461-A		As directed by the Engineer	Gradation used to determine that no more than 20% passes a #8 sieve. The Engineer may perform tests on independent or split samples to verify Contractor test results.
	Gradation	Tex-200-F			
	Deleterious Material & Decant	Tex-217-F			
	Flat and Elongated Particles	Tex-280-F			
	Coarse Aggregate Angularity	Tex-460-A Part I		1 per project, per source	The timing of when the test is performed is at the discretion of the Engineer.
RAP	Decant	Tex-217-F Part II	Stockpile (B)	As directed by the Engineer	RAP not allowed in Item 342. Plasticity Index only required when the Decant exceeds 5%.
	Plasticity Index	Tex-106-E			
FINE AGGREGATE	Bar Linear Shrinkage	Tex-107-E	Stockpile (B)	As directed by the Engineer	Does not apply to Item 342. The Engineer may perform tests on independent or split samples to verify Contractor test results. Gradation used to determine if the material meets gradation requirements of fine aggregates.
	Organic Impurities	Tex-408-A			
	Gradation	Tex-200-F			
MINERAL FILLER	Bar Linear Shrinkage	Tex-107-E	Bin or Silo	As directed by the Engineer	The Engineer may perform tests on independent or split samples to verify Contractor test results.
	Gradation	Tex-200-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. 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 VI – ASPHALT CONCRETE PAVEMENT (Items 341, 342, 344, and 346)**

MATERIAL OR PRODUCT		PROJECT TESTS			REMARKS
		TEST FOR	TEST NUMBER	LOCATION (Per Design)	FREQUENCY OF SAMPLING
ASPHALT BINDER		Compliance with Item 300 Binder & Tack Coat (A)		Sampled, tested and pre-approved by CSTM&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. Sample binder at hot mix plant. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.

MATERIAL OR PRODUCT		PROJECT TESTS			PROJECT INDEPENDENT ASSURANCE TESTS		REMARKS
		TEST FOR	TEST NUMBER	LOCATION	FREQUENCY (Per Design)	LOCATION	FREQUENCY
COMPLETE MIXTURE	Asphalt Content (%) (A)		Tex-236-F	Engineer Truck Sample (D)	Minimum 1 per Lot		
	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
	Gradation (A)		Tex-236-F	Engineer Truck Sample (D)	Minimum 1 per 12 Sublots (E)		
	Boil Test		Tex-530-C	Truck Sample	1 per project		
	Indirect Tensile – Dry		Tex-226-F				
	Moisture Content		Tex-212-F Part II	Engineer Truck Sample			
	Lab Molded Density (A)		Tex-207-F	Truck Sample (D)	1 per Sublot 1 per Lot for Item 342	Truck	1 per 10 Lots only if compactor is shared by Contractor and State
	Drain Down Test (A)		Tex-235-F	Engineer Truck Sample	1 per project 1 per Lot for Item 342		
	Hamburg Wheel Tracker (A)		Tex-242-F	Engineer Truck Sample	1 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 VI – ASPHALT CONCRETE PAVEMENT (Items 341, 342, 344, and 346)**

MATERIAL OR PRODUCT		PROJECT TESTS			REMARKS
		TEST FOR	TEST NUMBER	LOCATION	FREQUENCY (Per Design)
ROADWAY	In-Place Air Voids (A)	Tex-207-F	Roadway (D)	2 cores per Sublot	Two cores taken per Sublot and averaged. Does not apply to Item 342.
	Segregation Profile (A)	Tex-207-F Part V	Roadway	1 per project	Does not apply to Item 342.
	Joint Density (A)	Tex-207-F Part VII			
	Tack Coat Adhesion	Tex-243-F			
	Thermal Profile	Tex-244-F	Immediately behind paver		
	Ride Quality Type A Type B (A)	Tex-1001-S	Travel Lanes	As per Specification	
FABRIC UNDERSEAL	Permeability	Tex-246-F Part I	Roadway	1 per project	Only applies to Item 342.
	Compliance with DMS-6220		Sampled, tested, and approved by CSTM&P		Collect invoices and manufacturer's certification for material delivered and ensure the material is on the approved Material Producer List. Verify approved test stamp.

**TABLE VI – FOOTNOTES**

<b>A -</b>	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>B -</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.
<b>C -</b>	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
<b>D -</b>	Perform random sampling as specified in Tex-225-F, Random Selection of Bituminous Mixture Samples.
<b>E -</b>	Each test performed that is based on a quantity of material is considered "or fraction thereof" for calculating number of tests.



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	Sampling and testing are not required when the published value of the source, as listed in the current Material Producer list for <b>BRSQC</b> , meets the project specifications. <b>(D)</b>
	Magnesium Sulfate Soundness (A)	Tex-411-A			
	Gradation	Tex-200-F			
	Micro Deval	Tex-461-A			
	Flat and Elongated Particles	Tex-280-F			
	Coarse Aggregate Angularity	Tex-460-A Part I			
	Deleterious Material and Decant	Tex-217-F			
FINE AGGREGATE	Bar Linear Shrinkage	Tex-107-E	Stockpile (B)	1 per project, per source	The timing of when the test is performed is at the discretion of the Engineer.
	Organic Impurities	Tex-408-A			The timing of when the test is performed is at the discretion of the Engineer.
	Gradation	Tex-200-F			Not required for Item 330. Used to determine if the material meets gradation requirements of fine aggregates.
MINERAL FILLER	Bar Linear Shrinkage	Tex-107-E	Bin or Silo	1 per project, per source	The timing of when the test is performed is at the discretion of the Engineer.
	Gradation	Tex-200-F			
COMBINED AGGREGATE	Sand Equivalent	Tex-203-F	Stockpiles, hot bins or feeder belts	1 per project, per source	
ASPHALT BINDER	Compliance with Item 300 Binder & Tack Coat (A) (C)		Sampled, tested and pre-approved by CSTM&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. Sample binder at hot mix plant. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.



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.)				
MATERIAL OR PRODUCT	PROJECT TESTS			REMARKS
	TEST FOR	TEST NUMBER	LOCATION	FREQUENCY (Per Design) (F)
COMPLETE MIXTURE	Asphalt Content (%) (A)	Tex-236-F	Engineer Truck Sample (E)	Minimum of 1 per 5,000 tons (F)
	Voids in Mineral Aggregates (VMA)	Tex-207-F	Truck Sample Plant Produced (E)	1 per 5,000 tons (F)
	Gradation (A)	Tex-236-F	Truck Sample	Minimum 1 per 5,000 tons (F)
	Boil Test	Tex-530-C		1 per project
	Moisture Content	Tex-212-F Part II	Truck Sample	1 per 5,000 tons (F)
	Hydrocarbon-Volatile Content	Tex-213-F		1 per 5,000 tons (F)
	Lab Molded Density (A)	Tex-207-F		1 per 5,000 tons (F)
	Hveem Stability (A)	Tex-208-F		1 per 5,000 tons (F)
	Tack Coat Adhesion	Tex-243-F	Roadway	1 per project
	Ride Quality Type A Type B (A)	Tex-1001-S	Travel Lanes	As per Specification
ROADWAY				Engineer may verify Contractor's results.

TABLE VII – FOOTNOTES

<b>A -</b> 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>B -</b> Sampling may be performed at the plant, quarry, or both. Aggregate properties may be re-tested at any time during the project.
<b>C -</b> Or as called for in the Specifications.
<b>D -</b> Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
<b>E -</b> Perform random sampling as specified in Tex-225-F, Random Selection of Bituminous Mixture Samples.
<b>F -</b> 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 (E)	REMARKS
COARSE AGGREGATE	L. A. Abrasion (A)	Tex-410-A	Stockpile (B)	1 per project, per source	Sampling and testing are not required when the published value of the source, as listed in the current Material Producer list for <b>BRSQC</b> , meets the project specifications. (C)
	Magnesium Sulfate Soundness (A)	Tex-411-A		Approximately one every 5,000 tons of production (E)	Testing frequency may be reduced or eliminated based on a satisfactory test history.
	Micro Deval	Tex 461-A		As directed by the Engineer	Gradation to determine that no more than 20% passes a #8 sieve. The Engineer may perform tests on independent or split samples to verify Contractor test results.
	Gradation	Tex-200-F		1 per project, per source	The timing of when the test is performed is at the discretion of the Engineer.
	Deleterious Material & Decant	Tex-217-F			
	Flat and Elongated Particles	Tex 280-F			
	Coarse Aggregate Angularity	Tex-460-A Part I			
RAP	Decant	Tex-217-F	Stockpile (B)	As directed by the Engineer	The Engineer may perform tests on independent or split samples to verify Contractor test results.
	Plasticity Index	Tex 106-E			Plasticity Index only required when the Decant exceeds 5%.
FINE AGGREGATE	Bar Linear Shrinkage	Tex-107-E	Stockpile (B)	As directed by the Engineer	The Engineer may perform tests on independent or split samples to verify Contractor test results.
	Organic Impurities	Tex-408-A			Gradation used to determine if the material meets gradation requirements of fine aggregates.
	Gradation	Tex-200-F			
MINERAL FILLER	Bar Linear Shrinkage	Tex-107-E	Bin or Silo	As directed by the Engineer	The Engineer may perform tests on independent or split samples to verify Contractor test results.
	Gradation	Tex-200-F			
COMBINED AGGREGATE	Sand Equivalent	Tex-203-F	Stockpiles, hot bins or feeder belts	1 per project, per source	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 CSTM&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. Sample binder at hot mix asphalt. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.

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)				
MATERIAL OR PRODUCT	PROJECT TESTS			REMARKS
	TEST FOR	TEST NUMBER	LOCATION	FREQUENCY (E)
COMPLETE MIXTURE	Asphalt Content (%)	Tex-236-F	Truck Sample (D)	Minimum of 1 per day
	Voids in Mineral Aggregates (VMA)	Tex-207-F	Truck Sample Plant Produced (D)	1 per day
	Gradation (A)	Tex-236-F	Truck Sample	Minimum 1 per day
	Boil Test	Tex-530-C		1 per project
	Indirect Tensile – Dry	Tex-226-F		1 per project, per design
	Lab Molded Density (A)	Tex-207-F	Truck Sample	1 per day
	Hamburg Wheel Tracker (A)	Tex-242-F		1 per project
ROADWAY	Tack Coat Adhesion	Tex-243-F	Roadway	1 per project
	Air Voids (A)	Tex-207-F	Selected by the Engineer (D)	1 per day (2 Cores)
	Ride Quality Type A Type B (A)	Tex 1001-S	Travel Lanes	As per Specification
	Compliance with DMS-6220		Sampled, tested, and approved by CSTM&P	Collect invoices and manufacturer's certification for material delivered and ensure the material is on the approved Material Producer List. Verify approved test stamp.

TABLE VIII – FOOTNOTES

<b>A -</b>	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>B -</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.
<b>C -</b>	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
<b>D -</b>	Perform random sampling as specified in Tex-225-F, Random Selection of Bituminous Mixture Samples.
<b>E -</b>	Each test performed that is based on a quantity of material is considered "or fraction thereof" for calculating number of tests.

**TABLE IX – MICROSURFACING (Item 350)**

MATERIAL OR PRODUCT		PROJECT TESTS			REMARKS
		TEST FOR	TEST NUMBER	LOCATION OF SAMPLING (B)	
AGGREGATE	5-Cycle Magnesium Sulfate Soundness (A)		Tex-411-A	Stockpile (B)	Sampling and testing are not required when the published value of the source, as listed in the current Material Producer list for BRSQC meets the project specifications. (C)
	Gradation		Tex-200-F Part II		
COMBINED BLEND	Sand Equivalent		Tex-203-F	Stockpile (B)	1 per project, per source
ASPHALT BINDER	Compliance with Item 300 Binder & Tack Coat (A)			Sampled, tested, and pre-approved by CSTM&P. Project test sampled at the Plant for Binder & Road for Tack Coat	1 per project, per source
CEMENT	Compliance with DMS-4600			Railroad car, truck or cement bins	1 each for binder and tack coat per project, per grade, per source
HYDRATED LIME	Compliance with DMS-6350			During delivery to project	Each 2,000 bbls. For each type and brand (D)
COMPLETE MIX	Asphalt Content		Tex-236-F	During production	1 per project, per source
	Gradation		Tex-200-F Part II Tex-236-F		1 per day
Determine correlation factors for ignition oven use at a minimum of one per project.					

**TABLE IX – FOOTNOTES**

<b>A -</b>	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>B -</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.
<b>C -</b>	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
<b>D -</b>	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 OF SHEETS

SHEET NO. DESCRIPTION

CR 110 AND UNIVERSITY BLVD TRAFFIC SIGNAL

PLAN SET 1 OF 2

I. GENERAL

1 TITLE SHEET  
2A -- 2G GENERAL NOTES  
3 ITEM SUMMARY

II. SIGNAL DESIGN SHEETS

4 EXISTING CONDITIONS  
5 PROPOSED SIGNAL LAYOUT  
6 SIGNAL ELEVATION  
7 CONDUITS AND WIRING  
8 PHASING AND SIGNS  
9 DETECTION LAYOUT SHEET  
10 PAVEMENT MARKINGS AND SIGNING

III. STANDARD DETAIL SHEETS

11 -- 16 \* BC(1)-14 THRU BC(12)-14  
17 -- 18 \* WZ(BTS-1) - (BTS-2)-03  
19 \* TCP(2-1)-12  
20 \* TCP(2-4)-13  
21 -- 23 \* PM(1-3)-12  
24 -- 25 \* SP-80(1-2)-12  
26 \* TS-CF-04  
27 \* TS-FD-12  
28 -- 35 \* ED(1-8)-03  
36 \* ED(13)-03

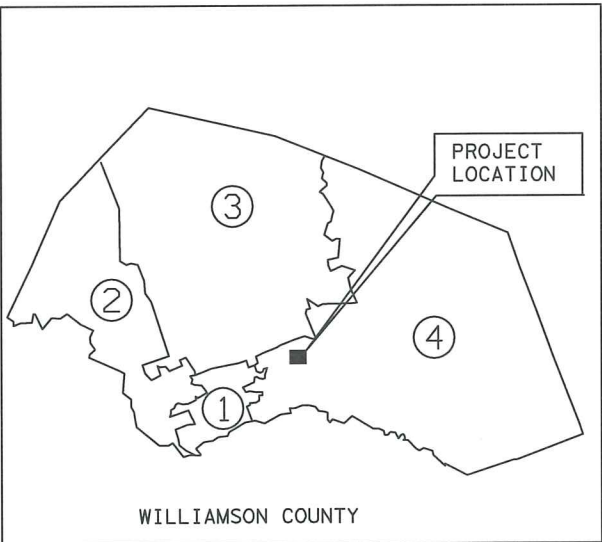
GATTIS SCHOOL AT WINTERFIELD TRAFFIC SIGNAL

SEE PLAN SET 2 OF 2

THE STANDARD DRAWINGS SHOWN IN THE INDEX OF SHEETS ABOVE AND IDENTIFIED HEREIN BY THE SYMBOL \* HAVE BEEN SELECTED BY VIVEK DESHPANDE, P.E. 105960 OR UNDER HIS DIRECT SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

REGISTERED ACCESSIBILITY SPECIALIST (RAS) INSPECTION NOT REQUIRED

REQUIRED SIGNS SHALL BE PLACED IN ACCORDANCE WITH STANDARD SHEETS BC(1)-14 THRU BC(12)-14 AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.:



TxDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES ADOPTED ON NOVEMBER 1, 2014 AND ALL APPLICABLE SPECIAL PROVISIONS AND SPECIAL SPECIFICATIONS AS INDICATED IN THE BID DOCUMENTS SHALL GOVERN ON THIS PROJECT.

WILLIAMSON COUNTY

CR 110 AND UNIVERSITY BLVD TRAFFIC SIGNAL

PRECINCT NUMBER 4

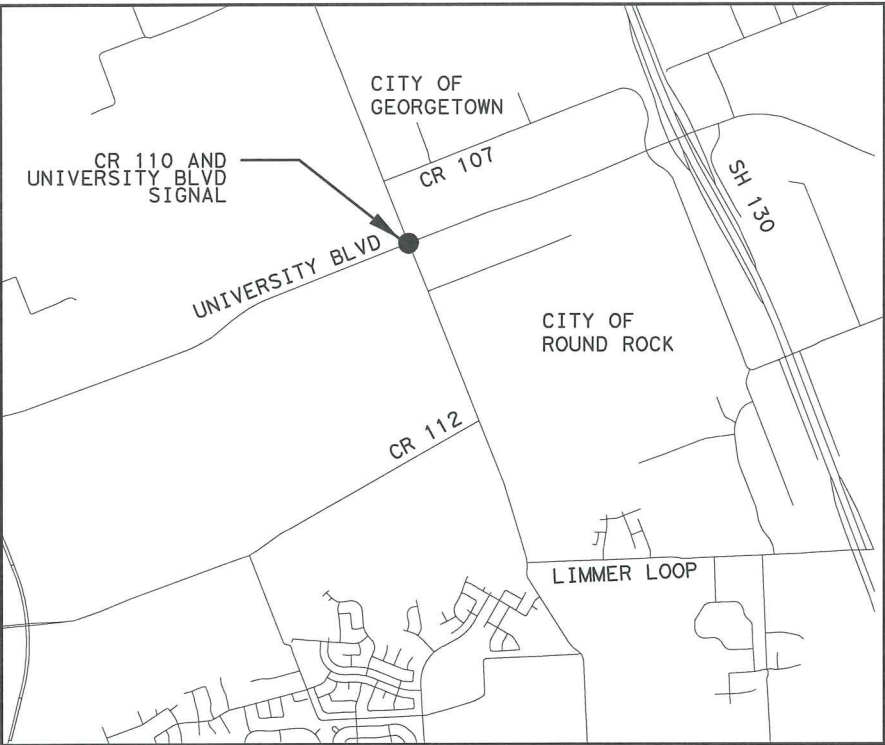
PLAN SET 1 OF 2

GATTIS SCHOOL AT WINTERFIELD TRAFFIC SIGNAL

SEE PLAN SET 2 OF 2

LIMITS: CR 110 AND UNIVERSITY BLVD INTERSECTION

FOR THE CONSTRUCTION OF THE TRAFFIC SIGNAL INSTALLATION AT THE INTERSECTION OF CR110 AND UNIVERSITY BLVD



VICINITY MAP  
N. T. S.

EXCEPTIONS: NONE  
EQUATIONS: NONE  
RAILROAD CROSSINGS: NONE  
WATERSHEAD: MCNUTT CREEK  
AREA OF DISTURBANCE: 0.058 ACRES

Kimley»Horn  
F-928

PREPARED BY:  
KIMLEY-HORN

VIVEK DESHPANDE, P.E. 12/04/15  
DATE



CLASSIFICATION: URBAN ARTERIAL DESIGN SPEED: 45 MPH  
CR 110: ADT (2010): 3000 ADT (2035): 28200  
UNIVERSITY: ADT (2017): 21000



RECOMMENDED BY:  
WILLIAMSON COUNTY

DAN A GATTIS  
WILLIAMSON COUNTY JUDGE

DATE

RECOMMENDED BY:  
WILLIAMSON COUNTY

RON MORRISON  
WILLIAMSON COUNTY COMMISSIONER, PRECINCT 4

DATE

RECOMMENDED BY:  
CITY OF ROUND ROCK

GARY HUDDER  
DIRECTOR OF TRANSPORTATION

DATE

RECOMMENDED BY:  
HNTB CORPORATION

RICHARD L RIDINGS, PE  
ROAD BOND MANAGER

DATE

GENERAL NOTES: Revised October 23, 2015

MODIFIED STANDARDS

The following standard detail sheet or sheets have been modified:

SP-80(1-2)-12
TS-FD-12

GENERAL

References to manufacturer’s trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved.

If work is performed at Contractor’s option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the Contractor is responsible for all costs associated with replacing the work, if required.

Equip all construction equipment used in roadway work with highly visible omnidirectional flashing warning lights.

Supply litter barrels in enough numbers at locations as directed to control litter within the project. Consider subsidiary to pertinent Items.

Protect all areas of the right of way, which are not included in the actual limits of the proposed construction areas, from disturbance. Restore any area disturbed because of the Contractor’s operations to a condition as good as, or better than, before the beginning of work at no cost to the state.

Damage to existing pipes and SET’s due to Contractor operations shall be repaired at Contractor’s expense.

All locations used for storing construction equipment, materials, and stockpiles of any type, within the right of way, will be as directed. Use of right of way for these purposes will be restricted to those locations where driver sight distance to businesses and side street intersections is not obstructed and at other locations where an unsightly appearance will not exist. The Contractor will not have exclusive use of right of way but will cooperate in the use of the right of way with the city/county and various public utility companies as required.

The Project Superintendent will be capable of speaking English and will be available at all times when work is being performed, including subcontractor work. The Superintendent will be available and on-call 24 hours a day.

Coordinate and obtain approval from the Construction Observer for all bridgework over existing roadways.

Measure all minimum vertical clearances for all structures (including, but not limited to, signal mast arms, span wires, and overhead sign bridge structures) within the limits of the project for all roadway alignments in all directions of travel. Coordinate with the Construction Observer to take these measurements and obtain

prior to opening roadways to traffic unless otherwise approved. The Construction Observer will report all minimum vertical clearance information on State maintained roadways to the Austin District Permit Office.

ITEM 416 - DRILLED SHAFT FOUNDATIONS

Stake all Foundations, for approval, before beginning drilling operations, as directed. Examples of types of foundations are Bridge Supports, Traffic Signal Pole Foundation, Roadway Illumination Assembly Foundations, Sign Support Locations, etc.

Calculate the vertical signal head clearance before placing any Traffic Signal Pole Foundation.

Obtain approval before placing additional exposed Traffic Pole Foundation.

Set anchor bolts for Strain Poles. Set two in tension and two in compression. Obtain approval of anchor bolt placement as directed before placing concrete.

Field cut holes for anchor bolts only as directed.

Class “C” concrete will be required for drilled shaft foundations involving overhead sign structures.

Remove spoils, daily, out of flood plain, or as directed.

ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING

Unless otherwise approved, 1 lane in each direction shall remain open at all times.

Nighttime lane closures will be allowed from 8:00 PM to 5:00 AM, unless otherwise shown on the plans.

No Daytime Lane Closures will be allowed, unless otherwise shown on the plans or as directed by the GEC.

The GEC is the authority to approve additional lane closures, prior to any work.

Maintain a written record of documentation of “The Additional Approved Lane Closures.”

Submit and secure concurrence, prior to the publication of any notices or placement of any traffic control devices for implementation of the traffic control plan, hereinafter called a Lane Closure Notice (LCN).

Present to GEC, an LCN for traffic control, which is proposed for implementation, a minimum of four (4) full working days preceding any proposed implementation date. Indicate the estimated date, time, duration, and location for the proposed work. As a part of the LCN submit a written description of the lane closure(s) depicting the proposed traffic control devices used, based on the appropriate plan sheet, TxDOT or TMUTCD standards, and an operational description of the work to be performed.

Present to GEC, LCN’s proposed to detour traffic, a minimum of *seven (7)* full calendar days preceding any proposed implementation date.



Williamson County  
Project: CR 110 at University Blvd. Traffic Signal

Sheet: 2B

Present to GEC, LCN’s proposed for night work, a minimum of *seven (7)* full calendar days preceding any proposed implementation date.

Receive concurrence prior to LCN implementation.

Meet with the Construction Observer prior to roadway and lane closures to ensure that sufficient equipment, materials, devices, and workers will be used. Discuss contingency plans at that time. Consider inclement weather prior to implementing the lane closures.

Submit a cancellation of any lane closures, no later than noon on the day preceding the proposed work.

Coordinate Main Lane closures with adjacent projects.

Take immediate action to modify Closures / Traffic Control, if at any time backup (roadway queuing) becomes unreasonable (greater than 20 minutes). Have in place, a contingency plan of how this will occur.

Utilize Shadow Vehicle with Truck Mounted Attenuator for setup and removal of each lane closure.

Do not set up any Lane Closure / TCP when the pavement is wet prior to the “setup,” unless otherwise directed. Revise Traffic Control, when inclement weather is imminent, as directed.

Within the limits of the project, provide standard barricades, warning signs, delineators, lights, 28-inch cones, and flaggers in enough numbers and combinations, as directed.

No closures will be allowed on the weekends, which include the following holidays: January 1, the last Monday in May, July 4, the first Monday in September, the fourth Thursday in November, December 25, Easter weekend, and the working day prior to or immediately after any of the aforementioned holidays. Unless otherwise approved, no closures will be allowed on the weekends of special events that could be impacted by the construction. Ensure all equipment, vehicles, workers, etc., associated with these closures are off the roadways and all lanes re-opened, at least, by noon of the Friday before these holidays and special events.

Maintain a minimum of 1 through lane(s) in each direction, during the daylight hours, as directed.  
**ITEMS 618, 620, 624, 684 & 686**  
Use materials from prequalified material producers list as shown on the Texas Department of Transportation (TxDOT) ----- Construction Division’s (CST) materials producers list. See TxDOT website ([www.txdot.gov](http://www.txdot.gov)) – Business with TxDOT > Resources > Material Producer List - for list of pre-qualified manufacturers. No substitutions will be allowed for materials found on the list.

**ITEM 618 - CONDUIT**  
Use materials from prequalified material producers list as shown on the Texas Department of Transportation (TxDOT) - Construction Division’s (CST) materials producers list. Category is “Roadway Illumination and Electrical Supplies.”

Consider the polymer concrete barrier boxes subsidiary to ITEM 618, “CONDUIT.”

Refer to plans and specifications for type of conduit. Waterproof and tighten all couplings and connections. Bring all proposed and existing conduit into a ground box and ‘elbow’ it unless otherwise shown on the plans. Provide a bushing to protect the wire from abrasion when a conduit run terminates.

Replace sections of conduit with the size and type shown on the plans in the event the existing conduit proves unusable due to location or damage.

Secure permission from the proper authority, as directed, before cutting into or removing any sidewalks or curbs for installation of this Item.

Saw cut and replace any riprap, which must be removed to install the conduit. Replace riprap with material and texture as directed.

The locations of conduit and ground boxes are diagrammatic and so shift, as directed, to accommodate field conditions.

Install conduit in an area not exceeding 2 feet in any direction from a straight line with the depth of the conduit at least 2 feet, unless otherwise shown on the plans. Installation of the conduit by jacking or boring method will be at a depth of at least 1 foot below the bottom of the base material of the roadway. Evidence of damage to the roadway during the jacking or boring operation will be enough grounds to stop the method being used.

Install conduit on a 2-inch sand cushion and backfill with at least 6 inches of sand. Backfill the remainder of the trench with flexible base, soil or two-sack concrete as required by the location of the conduit or as directed.

Consider all conduit elbows and rigid metal extensions required to be installed on PVC conduit systems subsidiary.

Install a high tension, non-metallic pull rope in all conduit runs. The pull ropes are for future use. Cap all empty conduit runs using standard weather tight conduit caps as directed. Consider this work subsidiary to the pertinent Item.

Install a continuous bare or green insulated copper wire No. 8 AWG or larger in every conduit throughout the electrical system including installed loop detectors and traffic signal cables which are in conformance with the Electrical Detail Standard Sheets and the latest edition of the National Electrical Code (NEC).

Placement of conduit under the existing pavement using the open trench method will not be allowed without prior approval.

Seal all conduit ends with a permanently soft, non-toxic duct seal. The dust seal must not adversely affect plastic materials or corrode metals.

Use a coring device when drilling holes through concrete structures. Do not use masonry or concrete drills, unless otherwise approved.

Structurally mounted junction boxes shall be as shown on the plans. When used for traffic signal installations, these boxes shall be 12" x 12" x 8", and shall be approved. Consider these boxes subsidiary to this Item.

Williamson County  
Project: CR 110 at University Blvd. Traffic Signal

Sheet: 2C

Use conduit hangers for 3 inch and larger conduit when hanging conduit from structures.

Place conduit a minimum depth of 42 inches below the bottom of ties.

Existing conduit may be proposed for reuse in this project. If the existing conduit cannot be used to place or add new electrical conductors, repair or replace this conduit, as directed. Repair of the conduit will be paid as “Extra Work” on a “Force Account” basis. Probe the existing conduit when locating drill shafts so that the existing conduit’s location will be known before it is needed.

When using existing conduit, ensure that all conduits have bushings and are cleaned of dirt, mud, grease, and other debris. Restrap conduit that is being relocated to new timber poles as if it were a new installation. Consider this work subsidiary to this Item.

Consider all fittings, brackets, and junction boxes necessary to complete the installations subsidiary to the pertinent Items.

All conduit shall be Schedule 80.

ITEM 620 - ELECTRICAL CONDUCTORS

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holder from manufacturers pre-qualified by the Traffic Operations Division. Fuse holder is shown on the producer list under Items 610 & 620.

Provide and install approved 10 amp time delay fuses.

Provide breakaway disconnects in all breakaway poles. For Flashing Beacons (Item 685) and Pedestal Poles (Item 687) within the project provide single-pole breakaway disconnects. Use Bussman HEBW, Littelfuse LEB, Ferraz-Shawmut FEB, or equal on ungrounded conductors. For all grounded conductors use Bussman HET, Littelfuse LET, Ferraz-Shawmut FEBN, or equal. These breakaway connectors have a white colored marking and a permanently installed solid neutral.

Clearly and permanently, mark “Illumination” on the Illumination Conductors installed in the Signal Strain Pole. Make the marks easily visible from the hand hole.

Identify the conductors as shown on the Electrical Details Standard Sheets when two or more conductors are present in one conduit or enclosure. Use identification tag with two plastic straps. Each tag will indicate circuit number, letter, or other identification as shown on the plans.

Bond grounding conductors, which share the same conduit, junction box or structures, together at every accessible point, in accordance with the Electrical Detail Standard Sheets and the latest edition of the National Electrical Code (NEC).

All wiring will be in accordance with the National Electrical Code (NEC) and the appropriate Department standard sheets.

General Notes

ITEM 644 - SMALL ROADSIDE SIGN ASSEMBLIES

Fabricate all small signs not detailed on the plans in conformance with the latest edition of the “Standard Highway Sign Designs for Texas.”  
<http://www.txdot.gov/business/resources/signage.html>

ITEM 666 - RETROREFLECTORIZED PAVEMENT MARKINGS

Reference existing channel islands, gores, and lane striping before commencing work. Provide referencing that will include a sketch of the layout to the Construction Observer. Obtain approval for placement of guidemarks from the Construction Observer before installing any permanent pavement markings. Consider subsidiary to the pertinent Items.

ITEM 672 - RAISED PAVEMENT MARKERS

Place the bituminous adhesive at a temperature range of 380°F to 390°F. Place the pavement marker on the bituminous adhesive within approximately 20 seconds after the adhesive is placed on the pavement. Ensure the pavement marker rests solely on the adhesive and not the pavement surface. Ensure that a minimum of 1/8 in. layer of bituminous adhesive remains between the pavement marker and the pavement surface.

ITEM 677 - ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS

Remove and dispose of, off the right of way, any existing raised pavement markings before beginning surfacing operations. Remove the existing traffic buttons and pavement markers, daily, as work progresses and as directed. Consider subsidiary to the pertinent Items.

Grinding is not an acceptable method of stripe removal.

Blast cleaning is required for the removal of existing pavement markings.

Black paint will not be allowed, unless otherwise directed. Acceptable methods will be sand blasting (Blasting Method) or strip sealing (Surface Treatment Method).

ITEM 680 - HIGHWAY TRAFFIC SIGNALS

Install all of the materials necessary for a complete signal system as follows:

Furnish all other materials, tools, and labor required to provide a completed installation in accordance with the plans and specifications. Furnished materials provided by the Contractor will be new undepreciated stock.

Place the traffic signal into operation after the entire traffic signal has been completed, all required striping is complete, and all conflicting signing is removed. The responsible Signal Shop will be present to program the controller and assist with detection setup.

All illumination fixtures will be 250-watt Equivalent LED fixtures.

Furnish and install all permanent signs mounted on the traffic signal wires and traffic signal poles, which include pedestal pole assemblies. Furnish all hardware for installation. Consider all costs associated with the furnishing and installation of the permanent signs and the necessary hardware subsidiary to the pertinent Items.

Use a Vulcan swinger sign mounting bracket or equivalent for all signs mounted on span wires.

Williamson County  
Project: CR 110 at University Blvd. Traffic Signal

Sheet: 2D

After the completion of the entire signal installation (including striping), a thirty-day (30-day) test period begins. After it has been determined, by the County, that the field wiring and controller operation are satisfactory after this test period, and all other requirements of the project have been met, the County will relieve the Contractor of any other responsibilities for the operation of the signal.

Use qualified personnel to respond to and diagnose all trouble calls during the thirty-day test period. Repair any malfunction to Contractor-supplied signal equipment. Provide to the Construction Observer a local telephone number, not subject to frequent changes and available on a 24-hour basis, for reporting trouble calls. Response time to reported calls must be less than 2 hours. Make appropriate repairs within 24 hours. Place a logbook in the controller cabinet and keep a record of each trouble call reported. Notify the Construction Observer of each trouble call. Do not clear the error log in the conflict monitor during the thirty-day test period without the approval of the Construction Observer.

Remove the existing stop sign panels (or assemblies) after the traffic signals are in operation.

ITEM 682 – VEHICLE AND PEDESTRIAN SIGNAL HEADS

Install signal head attachments so the wiring to each passes from the signal pole through the attachment hardware to the signal head. Refer to District Standard for more conductor attachment information. Attachment methods not shown on the district standard are to be approved by the Construction Observer before work begins. Use UV rated tie wraps.

Ensure the signal heads are made of aluminum and are hooded and covered until the signal system is put into operation.

Each signal head will be one way with the proper number of sections shown on the plans. Each head color will be bright yellow (Federal Yellow #13538 of Federal Standard 595). The inside of the visors will have a flat black finish.

Installed traffic signal heads within the project will have backplates unless otherwise shown on the plans. Backplates will be black aluminum.

Provide pedestrian signal head assemblies, which have a flush “egg-crated” or “Z” pattern visor for all lamps, and a one-piece reflector assembly for incandescent lamps only.

Provide louvers, which have five (5) vanes with a black finish on inside surfaces when required within the project. Fasten a hardware cloth screen, securely, with  $\frac{5}{8}$ " or smaller mesh size to the front face of each louver to prevent entry by birds.

Mount signal heads level and plumb as directed.

Replace, at Contractor’s expense, all burned out or defective lamps for a period of 4 weeks from the date of the initial turn on. At the end of this 4-week period, the Construction Observer will relieve the Contractor of any maintenance of this portion of the signal system.

Use the four point mounting system (TY A) for signal heads, except in cases of skewed or vertical heads when (TY B) will be used.

Place LED’s at the proper angle with the ground. The wording “top” or the “up arrow” indicates the proper fixed alignment within the signal head. Hang the head parallel to the ground once attached and not angled down as with incandescent heads. Ensure the signal head to be level and within tolerances. LED’s are designed to direct the indication towards the roadway surface. Variance in head leveling will cause the LED indication to appear dim during slight movement. Ensure each LED head to be properly leveled and sight tested before final acceptance.

ITEM 684 – TRAFFIC SIGNAL CABLES

Leave at least 2 feet for each cable run in each pull box and leave at least 2 feet in each steel pole in addition to the required length for each separate cable. Provide an extra 5 feet of each conductor terminating in the controller cabinet. Ensure conductors are continuous without splice from terminal point to terminal point or as directed. Do not use wire nuts.

ITEM 686 - TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)

Provide double nuts on top and bottom of the base plate as shown on the standards.

Provide signal pole assemblies as shown on plans. Luminaire lamps and the installation of the arms and lamps are considered subsidiary to the pertinent items.

When luminaires are to be installed on strain poles, provide a separate terminal strip in the signal pole access compartment. The terminal strip shall be a 4-circuit Buchanan-Type 104SN, Kulka-Type 985-GP-4 CU, or equivalent.

Provide a 10-amp time-delay fuse for traffic signal poles onto which luminaires are to be installed. Place the fuse in the fuse block indicated within note #4 found on State standard MA-D-12.

ITEM 6001 – PORTABLE CHANGEABLE MESSAGE SIGN

Provide [2](#) “Electronic” Portable Changeable Message Sign(s) (EPCMS) as part of the traffic control operations and provide another one that is available to utilize when a backup is needed. Consider the one designated for backup as subsidiary to the various Items of the project. All EPCMS will be exclusive to this project, unless otherwise approved. Placement location and message as directed.

Place appropriate number of “Electronic” Portable Changeable Message Signs (EPCMS) at locations requiring lane closures for one-week prior to the closures, or as directed. Obtain approval for the actual message that will appear on the boards. If more than two phases of a message are required per board, provide additional EPCMS’s to meet the two-phases-per-board requirement.

ITEM 6002 - VIDEO IMAGING VEHICLE DETECTION SYSTEM (VIVDS)

Install the VIVDS cameras onto the mast arms with the attachment mechanisms provided with the camera system. Place the traffic signal cable (TY A) (3-conductor) (16 AWG) and the VIVDS communication cable coaxial in continuous and separate runs from each VIVDS camera to the controller. Consider the costs associated with the above work subsidiary to the pertinent Items.

Williamson County  
Project: CR 110 at University Blvd. Traffic Signal

Sheet: 2E

Aim and adjust the cameras, install the cables and VIVDS cards into the controller cabinet and complete any other necessary work to bring the traffic signal into operation.

Provide the traffic signal cable and coaxial cable above and any incidentals necessary to install them.

Provide a Video Processor System (VPS) that can provide up to thirty-two (32) detector outputs to the controller from up to eight (8) camera/video processor units (C/VPU). Route the detector outputs through the Bus Interface Unit (BIU) or approved product, which replaces the functions of the BIU. Field of view for each C/VPU shall provide a minimum of thirty-two (32) virtual detection zones for vehicle detection.

Provide 6 cameras for this project.

Provide a set-up system. Load required set-up software onto all of the District Signal Shop’s notebook computers and provide all necessary licensing. Computers shall not be provided by the Contractor as part of the set-up system.

Provide and install all cables necessary to provide complete VIVDS operation. Provide a minimum of 10 cables to direct connect the notebook to the VIVDS port.

Phase red and green load switch outputs from up to sixteen (16) phases of a NEMA TS2 Type 2 controller shall be provided as inputs to the VPU for use with internal detector extend/delay timing functions. The C/VPU shall be able to condition the detector outputs and detection zones based on the state of the associated phase number and color.

The serial communication port on the front of the VPU shall be a DB-9 RS-232 connector. Supply a package that will operate with Windows XP and NT and provide the functionality defined in both sections 7.0 and 8.0 in both a direct connect and remote communications mode. The software resident in the VPU and the personal computer shall be capable of transmitting and receiving all information needed for zone set up, monitoring vehicle detection by viewing flashing detection zone overlays, and uploading/downloading and interrogating all stored data within the VPU. Remote communications with the VCU shall be possible with the addition of external communication devices (modem, Codec, etc.) using the RS-232 and video output ports on the front of the VPU.

The VPU operational software shall be stored internally in flash memory and be capable of being updated without the removal and replacement of memory devices.

Provide surge protection in the controller cabinet protecting the camera video and power inputs/outputs. All surge protection shall be dinrail mounted.

Install the VIVDS detection zones as directed. Have qualified personnel on site at the time of the signal turn-on to assist with the installation of detection zones.

If the camera locations shown in the plans do not allow for proper sight of the proposed detection zones, relocate the cameras as needed and as directed. This labor and material cost will not be paid separately, but is subsidiary to this Item.

General Notes

The video output from the C/VPU shall be in color or black/white with active detection zones overlaid on full motion video.

**Required Items for ITEM 6002 - VIDEO IMAGING VEHICLE DETECTION SYSTEM:**

Spec. Item	Description	Not Required	State Required	Supplied
2.F	REMOTE COMMUNICATIONS LINK		X	
5.0	VIVDS PROCESSOR UNIT		1	
6.A	CAMERA ASSEMBLY		6	
7.0	FIELD COMMUNICATIONS LINK			
	6 Twisted-Pair Cable / 18 AWG	X		
	Coaxial Cable w/Three (3) 16 AWG CNDRS		X	
	Fiber Optic Cable	X		
8.0	VIVDS SET-UP SYSTEM			
	Field PC	X		
	Field Software for District Shop laptops		X	
	Field Video Monitor /Ea. Inter.		X	
9.0	TEMPORARY USE AND RETESTING	X		
10.0	OPERATION FROM CENTRAL			
	Workstation Computer & Peripherals	X		
	Central Control Software		X	
11.0	INSTALLATION AND TRAINING			
	Eight (8) Hours	X		
	Sixteen (16) Hours	X		

The list of material below is for the Contractor’s information only.  
It is the responsibility of the Contractor to verify  
all items and quantities listed below.

LIST OF MATERIAL/LABOR  
SUBSIDIARY TO ITEM 680



<u>DESCRIPTION</u>	<u>UNIT</u>	<u>QUANTITY</u>
8 FT LUMINAIRE ARM	EA	4
250W EQUIVALENT LED LUMINAIRE	EA	4
8 PHASE NEMA CONTROLLER COMPLETE W/ CABINET AND ACCESSORIES	EA	1
INSTALL OPTICOM EQUIPMENT (INTERSECTION)	LS	1
REGULATORY SIGN PANEL (R10-12, ETC)	EA	2
REMOVE EXISTING STOP SIGN PANEL	EA	2
CONCRETE PAD (8' X 9' X 6", Class B)	SF	72



GENERAL NOTES


1. IT IS THE INTENTION OF THESE PLANS TO PROVIDE A FULLY OPERATIONAL TRAFFIC SIGNAL. ANY ITEMS REQUIRED BUT OMITTED ARE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE SUBSIDIARY TO THE APPROPRIATE BID ITEM.
2. ANY EXISTING PAVEMENT, CURBS, SIDEWALKS, AND DRIVEWAYS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPAIRED TO CITY OF ROUND ROCK STANDARDS.
3. ALL CONSTRUCTION SIGNS AND BARRICADES SHALL CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND BE CONSISTENT WITH TX DOT BARRICADE, CONSTRUCTION, AND TRAFFIC CONTROL PLAN STANDARDS.
4. CONTRACTOR SHALL EXERCISE CAUTION WHEN EXCAVATING IN THE VICINITY OF UNDERGROUND UTILITIES. IF A UTILITY THAT WAS PROPERLY MARKED IS DAMAGED BY THE CONTRACTOR, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF THAT UTILITY.
5. CONTRACTOR SHALL RESTORE THE CONSTRUCTION AREA TO ORIGINAL OR BETTER CONDITION PRIOR TO FINAL INSPECTION.
6. EXACT LOCATION OF POLES, CONTROLLER, SIGNAL HEADS, GROUND BOXES, ANTENNAS, OPTICOM DETECTORS, AND VIVDS CAMERAS SHALL BE DETERMINED IN THE FIELD AND SUBJECT TO FINAL APPROVAL BY ENGINEER IN THE FIELD. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXACT LOCATIONS FROM THE ENGINEER, PRIOR TO CONSTRUCTION.
7. ALL CONDUITS UNDER PAVED SHOULDERS OR NATURAL GROUND SHALL BE TRENCHED AND BURIED A MINIMUM OF 18 INCHES, AS PER TXDOT STANDARD ED(7)-14, EXCEPT WHERE NOTED OTHERWISE IN PLANS. THE CONTRACTOR SHALL BACKFILL, COMPACT, AND RESTORE THE TRENCHED AREA TO ORIGINAL CONDITIONS AND MATCH EXISTING SURFACE CONDITIONS TO THE DENSITY OF ADJACENT AREA.
8. ALL CONDUIT UNDER ROADWAYS SHALL BE BORED, UNLESS SPECIFICALLY NOTED OTHERWISE.
9. EXISTING ELECTRIC SERVICE SHALL BE REUSED AS SHOWN ON THE PLANS TO PROVIDE POWER TO THE SIGNAL CABINET, ILLUMINATION, AND ILSN.
10. ALL POLES SHALL BE GROUNDED. ALL ELECTRICAL GROUND BOXES AND GROUND BOX COVERS SHALL BE CONSTRUCTED OF REINFORCED POLYMER CONCRETE.
11. ALL SIGNAL HEADS SHALL HAVE BACKPLATES AND 12-INCH LED INDICATIONS.
12. SIGNAL HEADS SHALL NOT BE PLACED OVER THE ROADWAY UNTIL ALL NECESSARY MATERIALS ARE AT HAND AS APPROVED BY THE ENGINEER IN THE FIELD.
13. ALL PROPOSED LUMINAIRES SHALL BE LED. REFER TO SPECIAL SPECIFICATION FOR DETAILS ON LED LAMPS. LUMINAIRES SHALL BE INSTALLED TOWARDS THE ADJACENT STOP BAR UNLESS SPECIFIED OTHERWISE.
14. NEW SIEMENS EPAC M52 TS-2 TY 2 CONTROLLER WITH ETHERNET, AND DATA KEY SHALL BE PLACED AS SHOWN IN THE PROPOSED LAYOUT IN A SIZE P 16 POSITION BASE MOUNT CABINET. THE CONTRACTOR SHALL PROVIDE THE LATEST FIRMWARE BEING USED BY THE CITY OF ROUND ROCK AFTER CHECKING WITH THE TRAFFIC SIGNAL SHOP.
15. ALL MMU SHALL SUPPORT THE FLASHING YELLOW ARROW OPERATION. REFER TO SPECIAL SPECIFICATION FOR DETAILS.
16. ONE (1) GLOBAL TRAFFIC TECHNOLOGIES (GTT) MODEL 760 CARD RACK SHALL BE INSTALLED IN THE CONTROLLER CABINET AS SHOWN IN THE PLANS. ONE (1) GTT MODEL 764 OPTICON PHASE SELECTOR SHALL BE INSTALLED AS SHOWN IN PLANS. GTT MODEL 722 OPTICOM DETECTORS SHALL BE INSTALLED AS SHOWN IN THE PLANS. GTT MODEL 138 DETECTOR CABLE OR EQUIVALENT SHALL BE USED FOR CONNECTION OF ALL EMERGENCY PREEMPTION EQUIPMENT. ALL EMERGENCY PREEMPTION EQUIPMENT SHALL BE COMPATIBLE WITH EXISTING CITY OF ROUND ROCK EMERGENCY PREEMPTION TRANSMITTERS.

17. ALL CONDUIT SHALL BE SCHEDULE 80.
18. PAVEMENT MARKINGS SHALL BE INSTALLED AS PER TXDOT STANDARD SHEETS PM(1)-12, PM(2)-12, PM(3)-12.
19. CONTRACTOR SHALL HAVE QUALIFIED PERSONNEL TO ENSURE CORRECT WIRING AND PROGRAMMING IN THE CABINET TO ALL SIGNAL PHASES & OVERLAPS.
20. THE CONTRACTOR SHALL FURNISH AND INSTALL ONE (1) TITAN INTEGRATED DUALBAND (2.4/5.8 GHZ) WIRELESS RADIO (OR APPROVED EQUIVALENT) AND CAT 5 ETHERNET CABLE AS SHOWN IN THE PLANS. RADIO MUST BE 100% COMPATIBLE WITH EXISTING COMMUNICATIONS EQUIPMENT IN USE BY THE CITY OF ROUND ROCK.
21. THE CONTRACTOR SHALL FURNISH AND INSTALL A HARDENED ETHERNET SWITCH AND AN ITERIS EDGE CONNECT CARD FOR MONITORING DETECTION CAMERA VIDEO FEEDS.
22. THE CONTRACTOR SHALL COORDINATE WITH CITY TRAFFIC OPERATIONS STAFF TO FACILITATE INSTALLTION OF A BATTERY BACK-UP SYSTEM PRIOR TO SYSTEM TESTS. THIS WORK SHALL BE SUBSIDIARY TO ITEM 680. THE BATTERY BACK-UP SYSTEM SHALL BE SUPPLIED BY THE CONTRACTOR AND INSTALLED BY THE CITY OF ROUND ROCK.
23. THE CONTRACTOR SHALL BE RESPONSIBLE TO TAKE POSSESSION & HAUL OLD TRAFFIC CONTROL EQUIPMENT. THIS WORK WILL BE PAID FOR AS "REMOVING TRAFFIC SIGNALS".



12/04/15

**Kimley»Horn**  
F-928

 © 2015 **WILLIAMSON COUNTY**

CR 110 AND UNIVERSITY BLVD  
TRAFFIC SIGNAL  
  
**GENERAL NOTES**

DES: SAA	WILLIAMSON COUNTY JOB NO.	SHEET NO.
CK: VMD		<b>26</b>


12/25/2015 9:16 AM

ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
0416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	53
0500	6001	MOBILIZATION	LS	1
0502	6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2
0618	6046	CONDT (PVC) (SCH 80) (2")	LF	245
0618	6053	CONDT (PVC) (SCH 80) (3")	LF	45
0620	6007	ELEC CONDR (NO. 8) BARE	LF	160
0620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1,910
0620	6009	ELEC CONDR (NO. 6) BARE	LF	130
0620	6010	ELEC CONDR (NO. 6) INSULATED	LF	816
0624	6002	GROUND BOX TY A (122311)W/APRON	EA	1
0624	6010	GROUND BOX TY D (162922)W/APRON	EA	2
0625	6003	ZINC-COAT STL WIRE STRAND (3/8")	LF	1,024
0636	6001	ALUMINUM SIGNS (TY A) +	SF	26 +
0644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	4
0666	6011	REFL PAV MRK TY I (W)4" (SLD) (090MIL)	LF	2,000
0666	6026	REFL PAV MRK TY I (W)8" (BRK) (090MIL)	LF	150
0666	6047	REFL PAV MRK TY I (W)24" (SLD) (090MIL)	LF	79
0666	6053	REFL PAV MRK TY I (W) (ARROW) (090MIL)	EA	2
0666	6077	REFL PAV MRK TY I (W) (WORD) (090MIL)	EA	1
0666	6126	REFL PAV MRK TY I (Y)4" (SLD) (100MIL)	LF	2,000
0666	6224	PAVEMENT SEALER 4"	LF	4,000
0666	6226	PAVEMENT SEALER 8"	LF	150
0666	6230	PAVEMENT SEALER 24"	LF	79
0666	6231	PAVEMENT SEALER (ARROW)	EA	2
0666	6232	PAVEMENT SEALER (WORD)	EA	1
0672	6007	REFL PAV MRKR TY I-C	EA	8
0672	6009	REFL PAV MRKR TY II-A-A	EA	20
0678	6001	PAV SURF PREP FOR MRK (4")	LF	4,000
0678	6004	PAV SURF PREP FOR MRK (8")	LF	150
0678	6008	PAV SURF PREP FOR MRK (24")	LF	79
0678	6009	PAV SURF PREP FOR MRK (ARROW)	EA	2
0678	6016	PAV SURF PREP FOR MRK (WORD)	EA	1
0680	6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1
0680	6004	REMOVING TRAFFIC SIGNALS	EA	1
0682	6001	VEH SIG SEC (12")LED(GRN)	EA	8
0682	6002	VEH SIG SEC (12")LED(GRN ARW)	EA	3
0682	6003	VEH SIG SEC (12")LED(YEL)	EA	8
0682	6004	VEH SIG SEC (12")LED(YEL ARW)	EA	1
0682	6005	VEH SIG SEC (12")LED(RED)	EA	8
0682	6023	BACK PLATE (12") (3 SEC)	EA	5
0682	6024	BACK PLATE (12") (4 SEC)	EA	2
0682	6025	BACK PLATE (12") (5 SEC)	EA	1
0684	6008	TRF SIG CBL (TY A) (12 AWG) (3 CONDR)	LF	930
0684	6031	TRF SIG CBL (TY A) (14 AWG) (5 CONDR)	LF	1,062
0684	6033	TRF SIG CBL (TY A) (14 AWG) (7 CONDR)	LF	1,039
0684	6049	TRF SIG CBL (TY A) (16 AWG) (3 CONDR)	LF	1,422
0686	6001	INS TRF SIG PL AM (S)ILSN ARM(7')	EA	2
0686	6002	INS TRF SIG PL AM (S)ILSN ARM(9')	EA	2
0686	6008	INS TRF SIG PL AM (S)STR(TY B)LUM	EA	4
6001	6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2
6002	6001	VIVDS PROCESSOR SYSTEM	EA	1
6002	6002	VIVDS CAMERA ASSEMBLY	EA	6
6002	6003	VIVDS SET-UP SYSTEM	EA	1
6002	6004	VIVDS CENTRAL CONTROL	EA	1
6002	6005	VIVDS COMMUNICATION CABLE (COAXIAL)	LF	1,422
6089	6001	ETHERNET CABLE AND CONNECTORS	LF	60
6090	6001	ILSN (LED) (6D)	EA	2
6090	6002	ILSN (LED) (8D)	EA	2
CORR	001	BATTERY BACK-UP SYSTEM *	EA	1 *
CORR	002	HARDENED ETHERNET SWITCH	EA	1
CORR	003	DUAL BAND (2.4/5.8) WIRELESS ETHERNET RADIO	EA	1
CORR	004	OPTICOM DETECTOR - GTT MODEL 722	EA	2
CORR	005	OPTICOM PHASE SELECTOR - GTT MODEL 764	EA	1
CORR	006	OPTICOM CARD RACK - GTT MODEL 760	EA	1
CORR	007	OPTICOM CABLE - GTT MODEL 138	LF	494

\* FURNISH ONLY  
+ SUBSIDIARY TO ITEM 680

Kimley»Horn

F-928



© 2015 WILLIAMSON COUNTY

CR 110 AND UNIVERSITY BLVD  
TRAFFIC SIGNAL

ITEM SUMMARY

DES: SAA

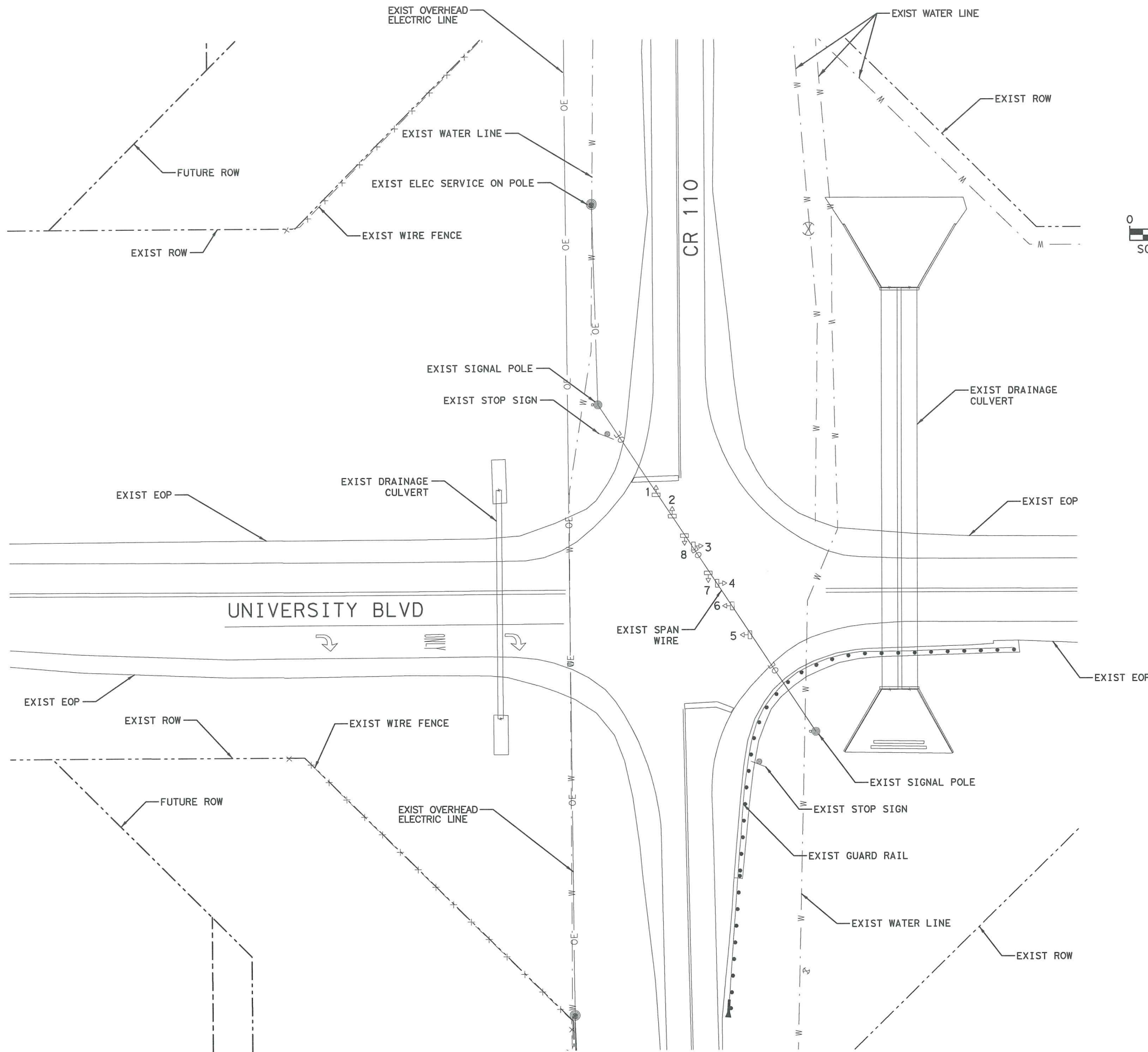
CK: VMD

WILLIAMSON COUNTY  
JOB NO.

SHEET NO.

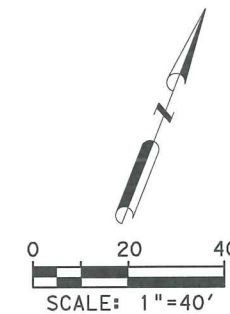
3

p. 259



LEGEND

- G — EXIST GAS LINE
- OE — EXIST OVERHEAD ELECTRIC
- W — EXIST WATER LINE
- WW — EXIST WASTE WATER LINE
- — EXIST ROW LINE
- ⊙ FIRE HYDRANT
- ⊙ EXISTING SIGN
- 1 EXIST SIGNAL HEAD & LABEL





HEADS 1, 2, 7, 8




HEADS 3, 4, 5, 6

NOTES:  
1. LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE. CONTRACTOR SHALL CALL "TEXAS ONE CALL" (800-245-4545) PRIOR TO EXCAVATION. TRENCHING IN THE VICINITY OF UNDERGROUND UTILITIES SHALL BE HAND DUG TO AVOID DAMAGE.



12/04/15

**Kimley»Horn**  
F-928

 © 2015 **WILLIAMSON COUNTY**

**CR 110 AND UNIVERSITY BLVD  
TRAFFIC SIGNAL  
EXISTING CONDITIONS LAYOUT**

DES: SAA	WILLIAMSON COUNTY JOB NO.	SHEET NO.
CK: VMD		<b>4</b>



SEQUENCE OF CONSTRUCTION

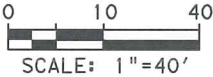
1. INSTALL TRAFFIC SIGNAL EQUIPMENT AS SHOWN ON THE PLANS.
2. SET UP TEMPORARY CHANGEABLE MESSAGE SIGN TO PROVIDE ADVANCE NOTICE TO MOTORISTS ABOUT NEW TRAFFIC SIGNAL AS DIRECTED BY THE ENGINEER.
3. OPERATE NEW SIGNAL TO DISPLAY FLASHING YELLOW ON UNIVERSITY BLVD AND FLASHING RED ON CR 110 FOR ONE WEEK.
4. ESTABLISH POLICE CONTROL AT THE INTERSECTION BEFORE TURNING ON THE SIGNAL.
5. REMOVE EXISTING EQUIPMENT UNLESS OTHERWISE SHOWN ON THE PLANS.

POLE LOCATIONS*			
POLE	STA	OFFSET (ft)	DIRECTION
A	154+46	57.5	RIGHT
B	155+53.5	56.5	RIGHT
C	155+76.5	41.5	LEFT
D	160+49	40.5	LEFT
E	EXISTING SIGNAL POLE TO REMAIN		

\* POLE LOCATIONS IN REFERENCE TO UNIVERSITY BLVD CENTERLINE

LEGEND

- STRAIN POLE
- ⬮ SIGNAL HEAD & LABEL
- ⬮ EXIST VIVDS CAMERA
- ⬮ EXIST ELECTRICAL SERVICE
- ⬮ EXIST SIGNAL CABINET
- ⬮ EXIST TYPE A GROUND BOX
- ⬮ EXIST TYPE D GROUND BOX
- ⬮ EXIST ILSN SIGN
- ⬮ EXIST RADIO
- ⬮ EXIST CONDUIT-TRENCHED
- ⬮ SIGNAL POLE LABEL
- ⬮ VIVDS LABEL
- ⬮ CONDUIT LABEL
- ⬮ LUMINAIRE
- ⬮ EXIST OPTICOM
- ⬮ PROP SIGN
- ⬮ EXIST GAS LINE
- ⬮ EXIST OVERHEAD ELECTRIC
- ⬮ EXIST STORM SEWER
- ⬮ EXIST WATER LINE
- ⬮ EXIST WASTE WATER LINE
- ⬮ FIRE HYDRANT
- ⬮ VALVE
- ⬮ RIGHT OF WAY
- ⬮ FENCE LINE
- ⬮ EXISTING SIGN



Chain UNIV contains:  
UNIV01 UNIV02

Beginning chain UNIV description

Point UNIV01 N 10,187,456.319 E 3,151,296.362 Sta 145+00.00  
Course from UNIV01 to UNIV02 N 68° 38' 05.79" E Dist 2,100.000  
Point UNIV02 N 10,188,221.367 E 3,153,252.046 Sta 166+00.00

Ending chain UNIV description

CONTROL POINT #1 IRON ROD  
C UNIV STA 155+76.59 703.50' RT  
Y=10187193.377 X=3152555.261  
EL= 771.88

CONTROL POINT #2 IRON ROD  
C UNIV STA 155+64.27 796.67' LT  
Y=10188585.97 X=3151997.263  
EL= 793.11

*Vivek Deshpande*  
STATE OF TEXAS  
VIVEK DESHPANDE  
105960  
LICENSED PROFESSIONAL ENGINEER  
12/04/15

F-928

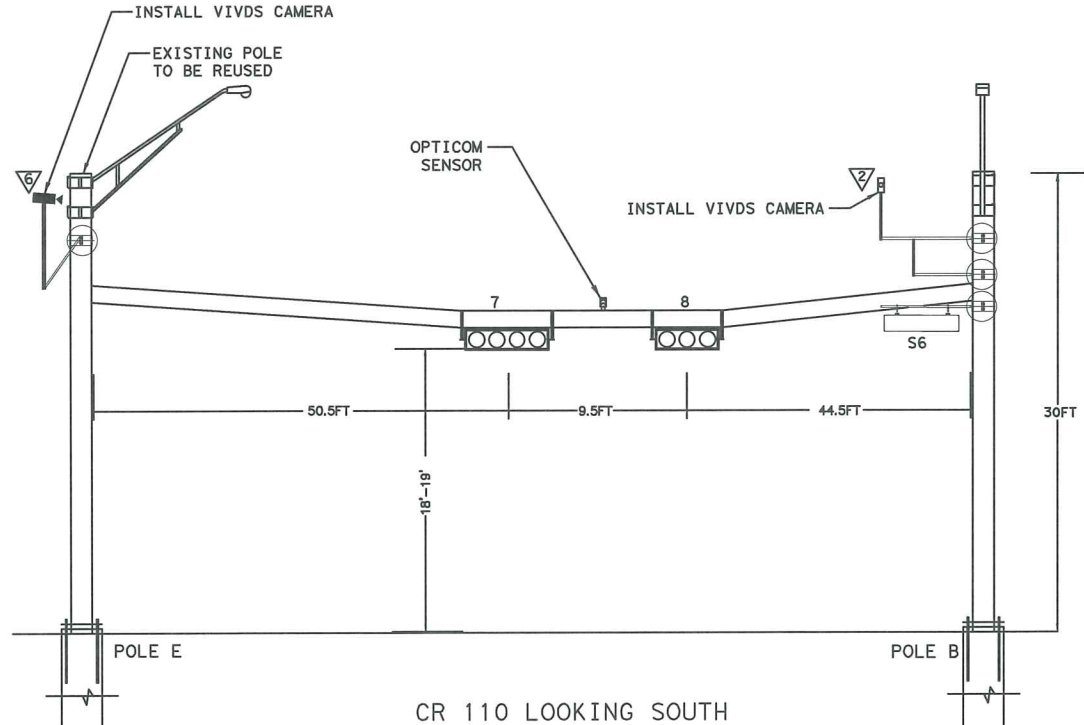
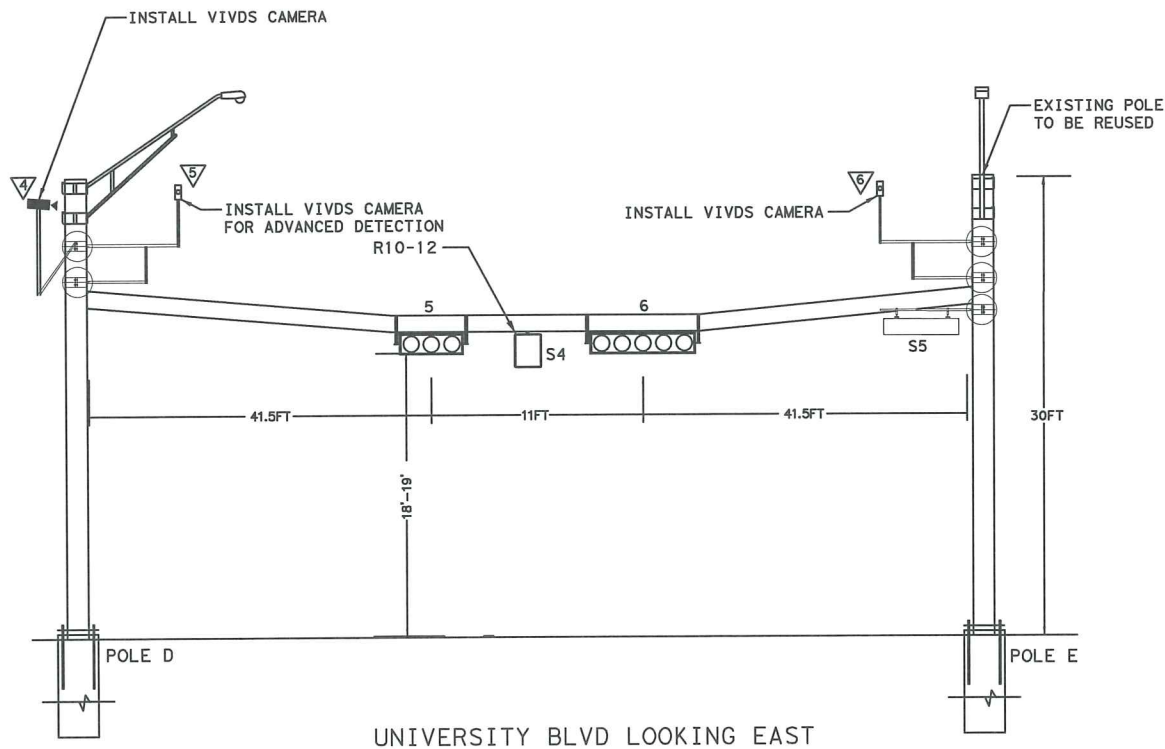
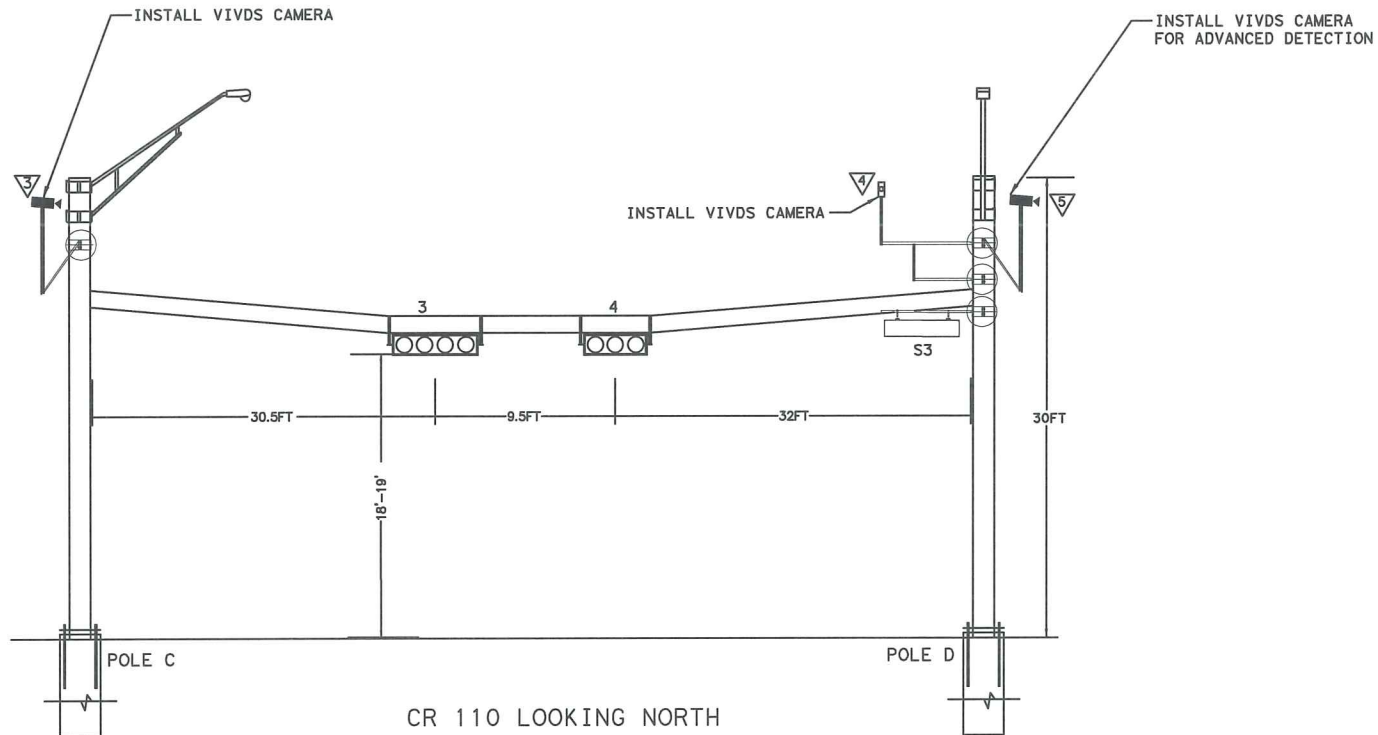
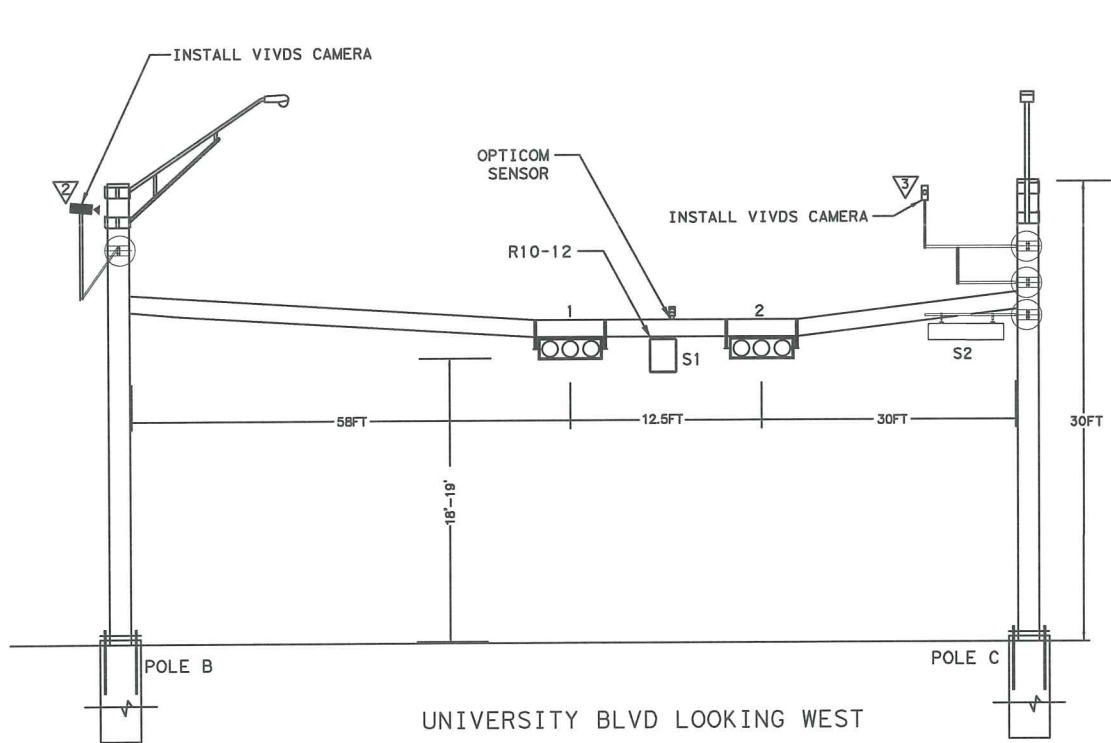
© 2015 WILLIAMSON COUNTY

CR 110 AND UNIVERSITY BLVD  
TRAFFIC SIGNAL  
PROPOSED SIGNAL LAYOUT

DES: SAA  
CK: VMD  
WILLIAMSON COUNTY  
JOB NO.

SHEET NO.  
5

- NOTES:
1. RESTRIPE 200' OF NORTHBOUND & SOUTHBOUND APPROACHES AND 300' OF EASTBOUND & WESTBOUND APPROACHES.
  2. CONTRACTOR SHALL TAKE POSSESSION AND BE RESPONSIBLE FOR EXISTING SIGNAL EQUIPMENT.
  3. EXACT LOCATION OF POLES WILL BE DETERMINED IN THE FIELD SUBJECT TO FINAL APPROVAL BY INSPECTING ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXACT LOCATION WITH THE INSPECTING ENGINEER PRIOR TO DRILLING OR EXCAVATION.
  4. LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE. CONTRACTOR SHALL CALL "TEXAS ONE CALL" (800-245-4545) PRIOR TO EXCAVATION.



NOTES:  
1. ORIENT ALL SIGNAL HEADS TO FACE  
ONCOMING TRAFFIC.

NOT TO SCALE

*Vivek Deshpande*

12/04/15

**Kimley»Horn** F-928

© 2015 WILLIAMSON COUNTY

CR 110 AND UNIVERSITY BLVD  
TRAFFIC SIGNAL  
SIGNAL ELEVATION



DES: SAA	WILLIAMSON COUNTY JOB NO.	SHEET NO.
CK: VMD		6

12/23/2015 9:16 AM




RUN ID	TOTAL QTY		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
RUN LENGTH			5	10	116	65	12	35	10	95	10	35	10	35	45	11	42	51	10	45
CONDUIT SIZE	245	2" PVC	1	1					2	2	2									
	45	3" PVC	3	3																
	1024	3/8" STEEL SPAN WIRE			2	2	2	2				2	2	2	2	2	2	2	2	2
		CIRCUIT	NUMBER OF WIRES																	
		TRENCH/BORE/SPAN	T	T	S	S	S	S	T	T	T	S	S	S	S	S	S	S	S	S
#12 3 CNDR IMSA CABLE		ILSN																		
	830					1	1	1	4	4	4	2	2	2	1	1	1			
#14 5 CNDR IMSA CABLE		SIGNAL																		
	290	PHASE 2	1	1	1											1	1	1		1
	176	PHASE 3	1	1	1															1
	288	PHASE 4	1	1	1	1	1	1				1	1							
	208	PHASE 6	1	1	1	1	1													
#14 7 CNDR IMSA CABLE		SIGNAL																		
	279	PHASE 2	1	1	1												1	1	1	1
	186	PHASE 3	1	1	1														1	1
	278	PHASE 4	1	1	1	1	1	1				1								
	196	PHASE 6	1	1	1	1														
#6 INSULATED	716	SIGNAL POWER	2	2	2	2	2	2	2	2	2									
#6 BARE	130	GROUND	1	1					1	1	1									
#8 INSULATED	1660	ILLUMINATION POWER				2	2	2	8	8	8	4	4	4	2	2	2			
#8 BARE	160	GROUND	3	3					1	1	1									
OPTICOM CABLE		SIGNAL																		
	186	PHASE 3	1	1	1														1	1
	208	PHASE 6	1	1	1	1	1													
COAX & #16 3 CNDR SIAMESE CABLE		VIVDS CAMERA																		
	252	PHASE 2	2	2	1												1	1	1	
	131	PHASE 3	1	1	1															
	323	PHASE 4	1	1	1	1	1	1				1	1	1						
	566	PHASE 6	2	2	2	2	2	2				1	1	1						
CAT5 ETHERNET	15	RADIO	1	1																

INSIDE POLES (IN FEET)	#8 INSULATED	#6 INSULATED	14 AWG		ILSN	RADIO	VIVDS	
	ILLUMINATION	SIGNAL	5C	7C	3/C NO. 12 TRAY	CAT 5E	COAX	3C
A		50	100	100		35	150	150
B	10							
C	220	50			100			
D	10							
E	10							
TOTAL QTY	250	100	100	100	100	35	150	150



12/04/15

**Kimley»Horn**  
F-928

 © 2015 **WILLIAMSON COUNTY**

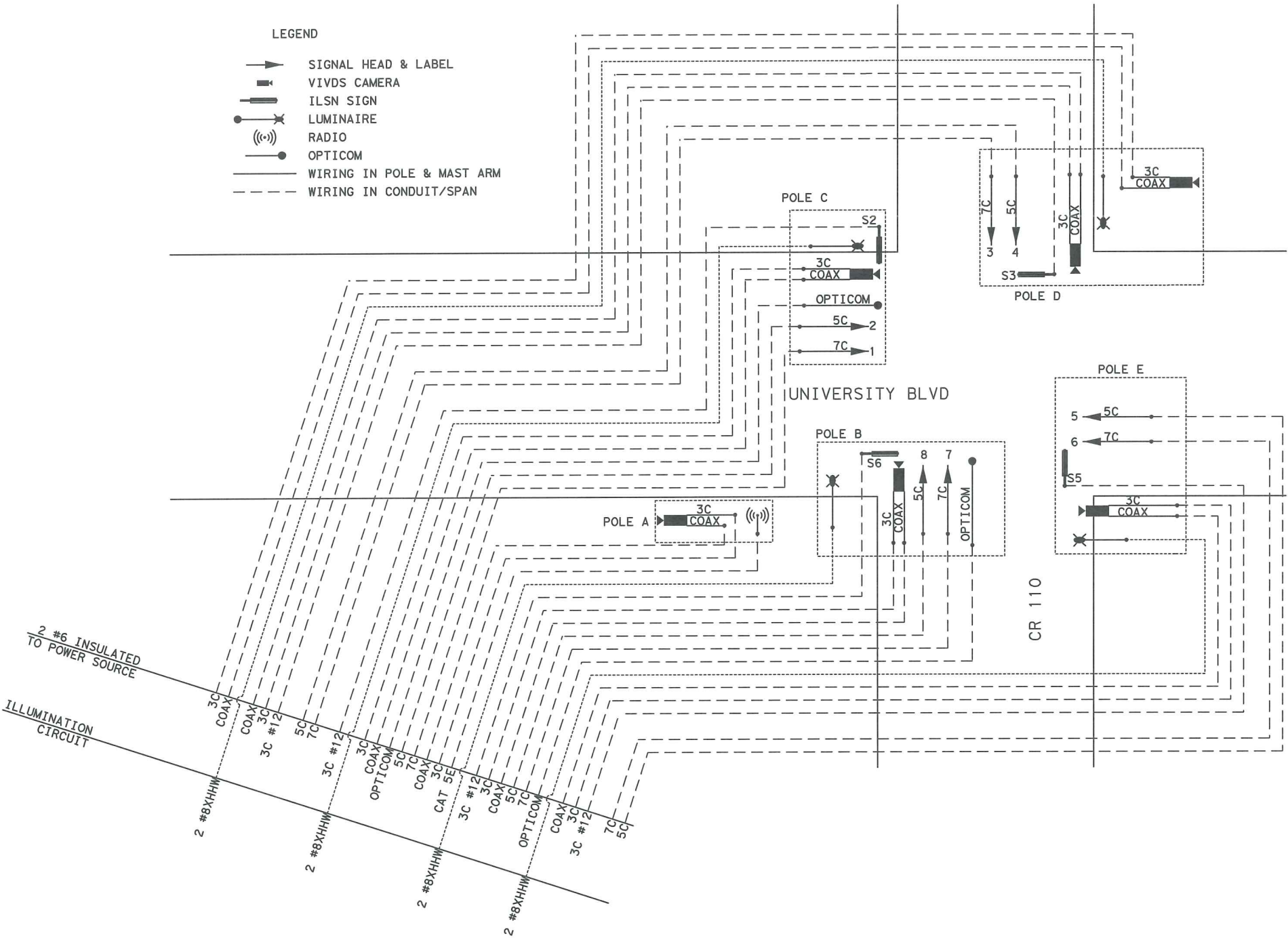
CR 110 AND UNIVERSITY BLVD  
TRAFFIC SIGNAL  
**CONDUITS AND WIRING**

DES: SAA  
CK: VMD

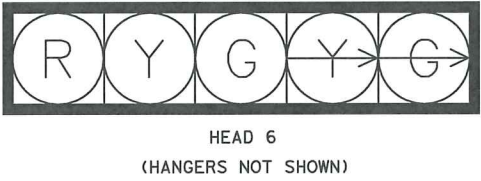
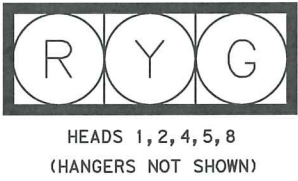
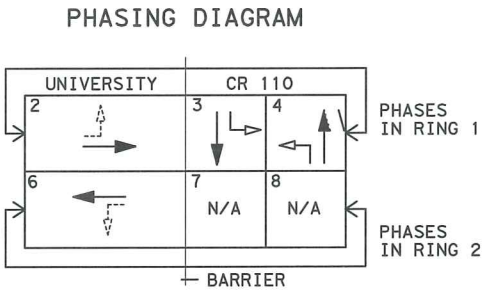
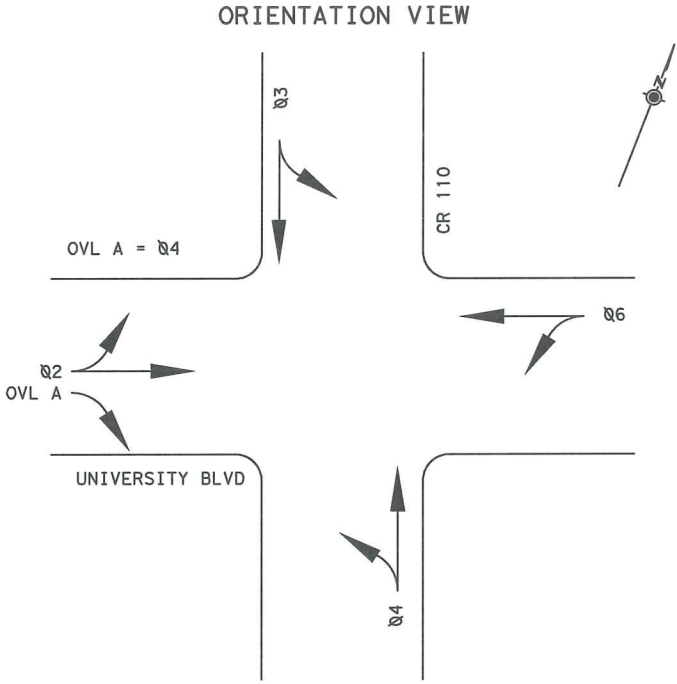
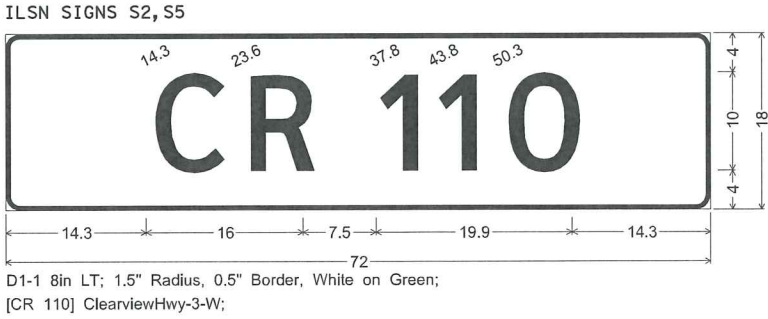
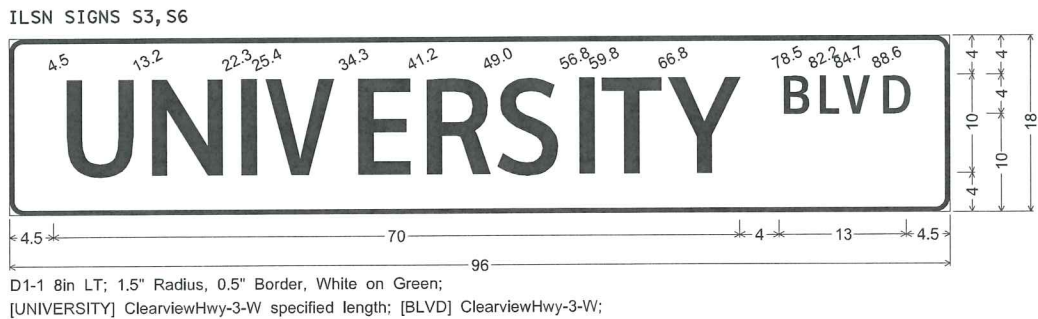
WILLIAMSON COUNTY  
JOB NO.

SHEET NO.  
**7**

12/23/2015 9:16 AM



	CR 110 SOUTHBOUND				UNIVERSITY BLVD WESTBOUND				CR 110 NORTHBOUND				UNIVERSITY BLVD EASTBOUND			
AM PEAK HOUR	SBL	SBT	SBR	TOTAL	WBL	WBT	WBR	TOTAL	NBL	NBT	NBR	TOTAL	EBL	EBT	EBR	TOTAL
7:00 - 8:00	34	63	34	131	12	524	88	624	83	80	23	186	21	408	114	543
PM PEAK HOUR	SBL	SBT	SBR	TOTAL	WBL	WBT	WBR	TOTAL	NBL	NBT	NBR	TOTAL	EBL	EBT	EBR	TOTAL
16:45 - 17:45	22	50	29	101	15	491	39	545	75	88	15	178	45	521	147	713



12/04/15

**Kimley»Horn**  
F-928

© 2015 WILLIAMSON COUNTY

CR 110 AND UNIVERSITY BLVD  
TRAFFIC SIGNAL  
PHASING AND SIGNS

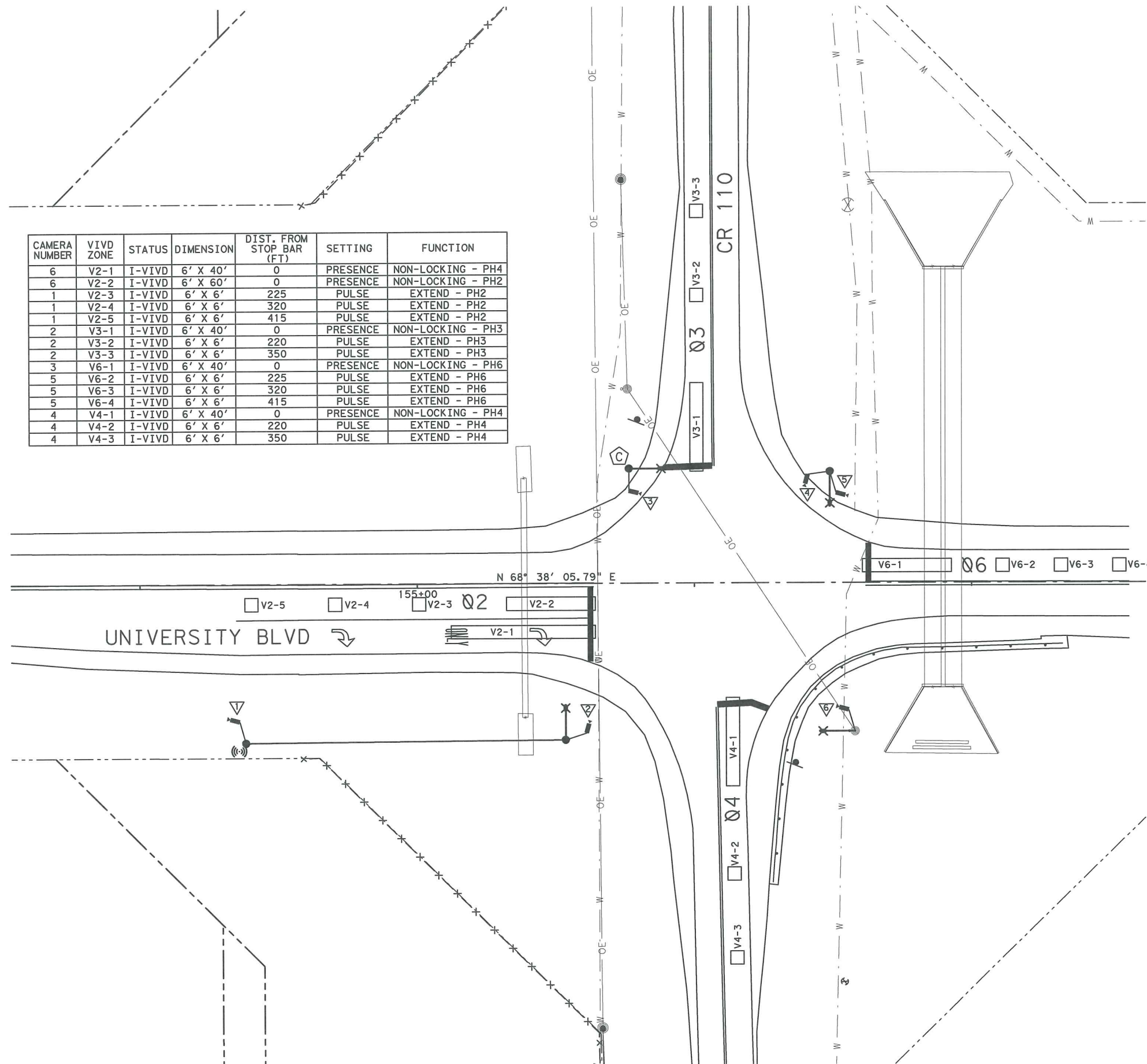
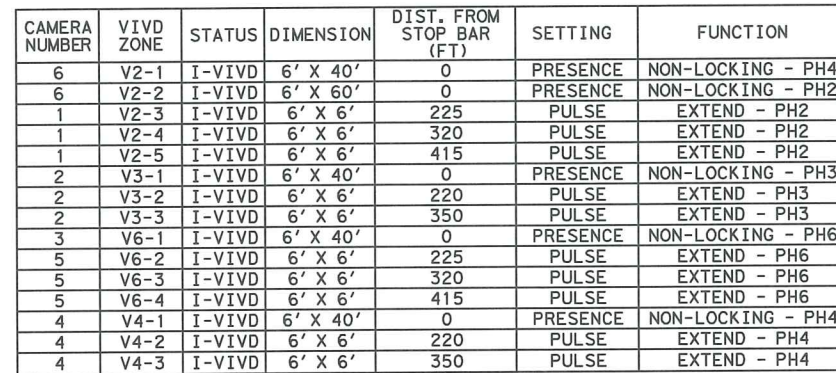
DES: SAA  
CK: VMD

WILLIAMSON COUNTY  
JOB NO.

SHEET NO.  
8

12/23/2015 9:16 AM





Wine & Spirits

STATE OF TEXAS  
VIVEK DESHPANDE  
105960  
LICENSED  
PROFESSIONAL ENGINEER

12/04/15



12/04/15

F-928

 © 2015 **WILLIAMSON COUNTY**

CR 110 AND UNIVERSITY BLVD  
TRAFFIC SIGNAL  
*DETECTION LAYOUT*  $\geq$

DES: SAA

WILLIAMSON COUNTY  
JOB NO.

CK: VMD

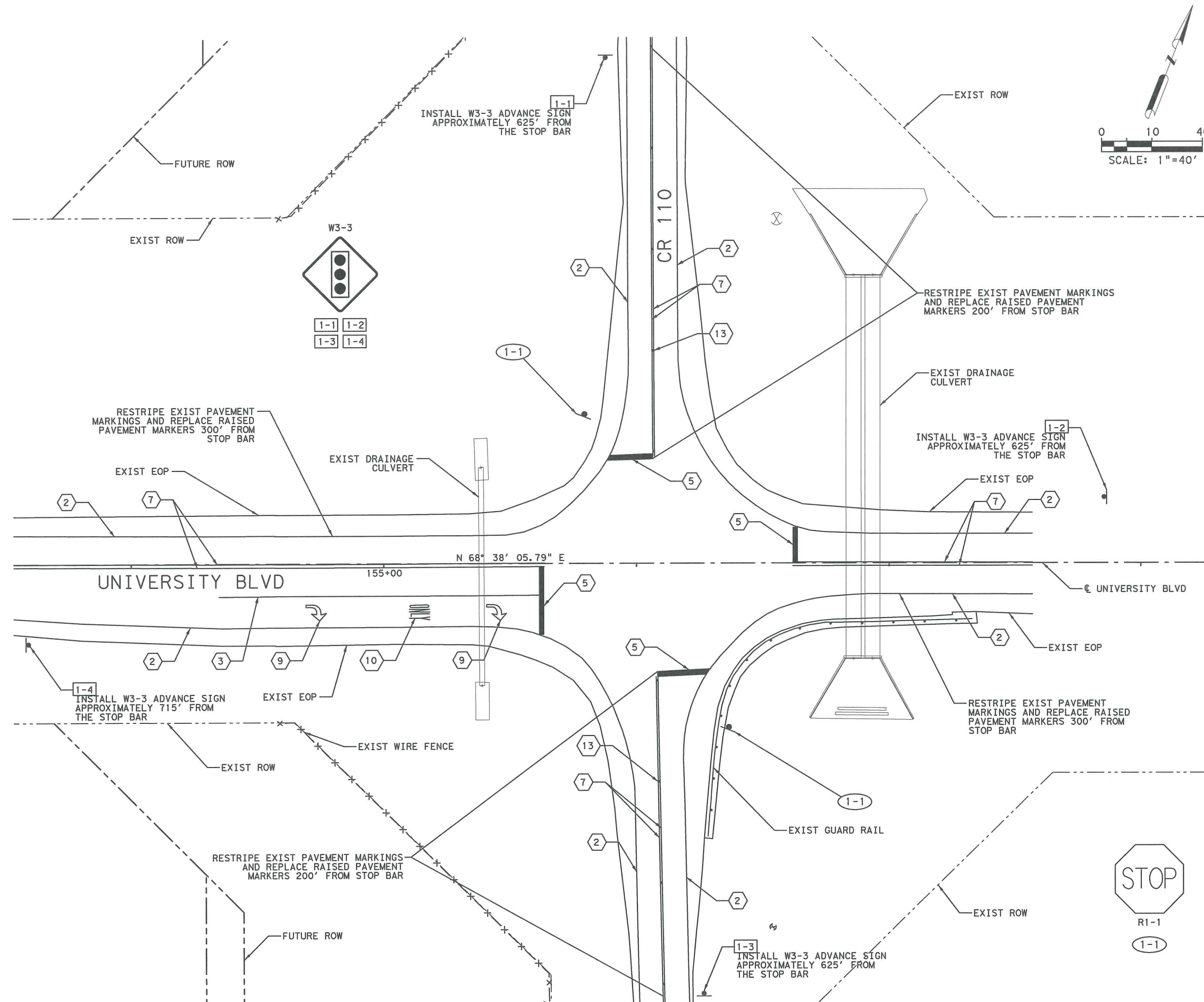
SHEET NO. 201

9

12/23/2015 9:16 AM

LEGEND

- X-X PROPOSED SIGN
- X-X EXISTING SIGN TO REMAIN
- X-X EXISTING SIGN TO BE REMOVED
- 1 REFL PAV MRK TY I (W) 4" (BRK)
- 2 REFL PAV MRK TY I (W) 4" (SLD)
- 3 REFL PAV MRK TY I (W) 8" (SLD)
- 4 REFL PAV MRK TY I (W) 12" (SLD)
- 5 REFL PAV MRK TY I (W) 24" (SLD)
- 6 REFL PAV MRK TY I (Y) 4" (BRK)
- 7 REFL PAV MRK TY I (Y) 4" (SLD)
- 8 REFL PAV MRK TY I (Y) 12" (SLD)
- 9 REFL PAV MRK TY I (W) (ARROW)
- 10 REFL PAV MRK TY I (W) (WORD)
- 11 REFL PAV MRK TY I (W) (RR XING)
- 12 REFL PAV MRKR TY II-C-R
- 13 REFL PAV MRKR TY II-A-A
- 14 REFL PAV MRKR TY I-C
- 15 REFL PAV MRK TY I (W) (DOUBLE ARROW)
- 16 REFL PAV MRK TY I-R
- 17 REFL PAV MRK TYI (W) 4" (DOT)



*Vivek Deshpande*  
STATE OF TEXAS  
VIVEK DESHPANDE  
105960  
LICENSED PROFESSIONAL ENGINEER  
12/04/15

**Kimley»Horn** F-928

© 2015 WILLIAMSON COUNTY

CR 110 AND UNIVERSITY BLVD  
TRAFFIC SIGNAL  
**PAVEMENT MARKING AND  
SIGNING**

DES: SAA	WILLIAMSON COUNTY JOB NO.	SHEET NO.
CK: VMD		1-0



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.

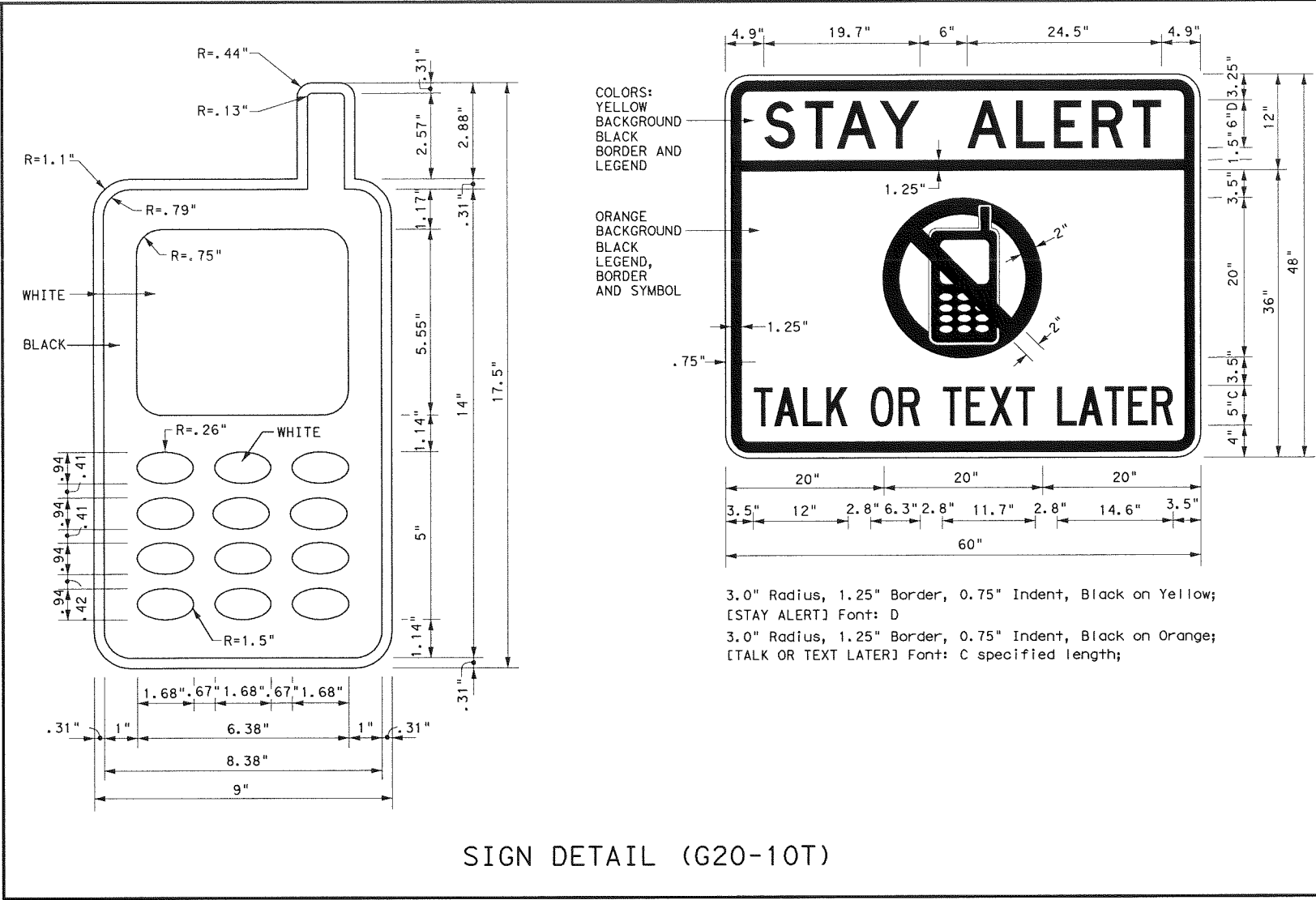
DATE: FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

- The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
- The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
- The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
- Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
- When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
- The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
- All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
- The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
- As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.
- Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.
- The Engineer has the final decision on the location of all traffic control devices.
- Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY APPAREL NOTES:

- Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.



Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation  
Traffic Operations Division - TE  
Phone (512) 416-3118

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT <a href="http://www.txdot.gov">http://www.txdot.gov</a>	
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)	
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)	
MATERIAL PRODUCER LIST (MPL)	
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"	
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)	
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)	
TRAFFIC ENGINEERING STANDARD SHEETS	

SHEET 1 OF 12



BARRICADE AND CONSTRUCTION  
GENERAL NOTES  
AND REQUIREMENTS

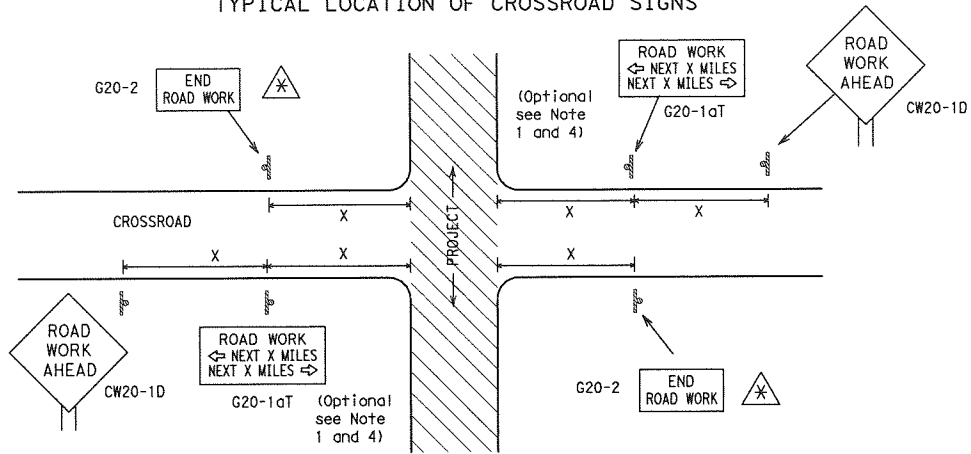
BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
4-03 5-10 8-14				
9-07 7-13				
	DIST	COUNTY	SHEET NO.	
		WILLIAMSON	11	

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.

DATE: FILE:

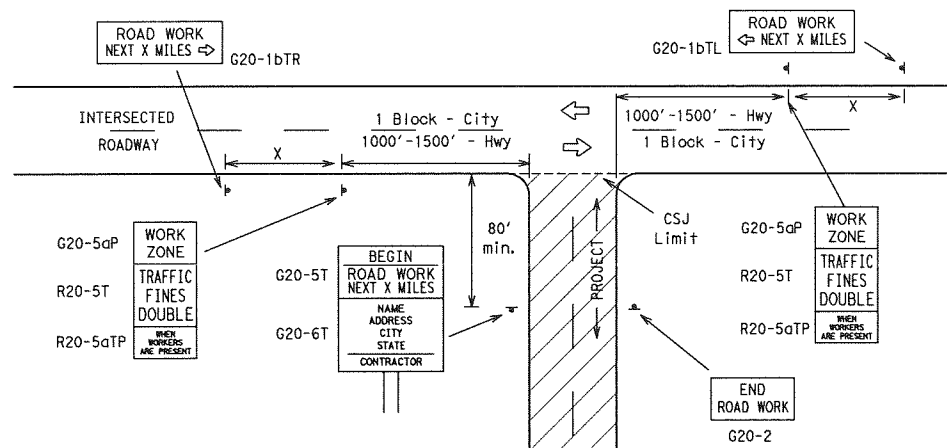
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD" (CW20-10) sign with approval of Engineer. (See note 2 below)

- The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-10) sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
- The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-10) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK" (G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume. This information shall be shown in the plans.
- Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
- The "ROAD WORK NEXT X MILES" (G20-1aT) sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
- Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
- When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

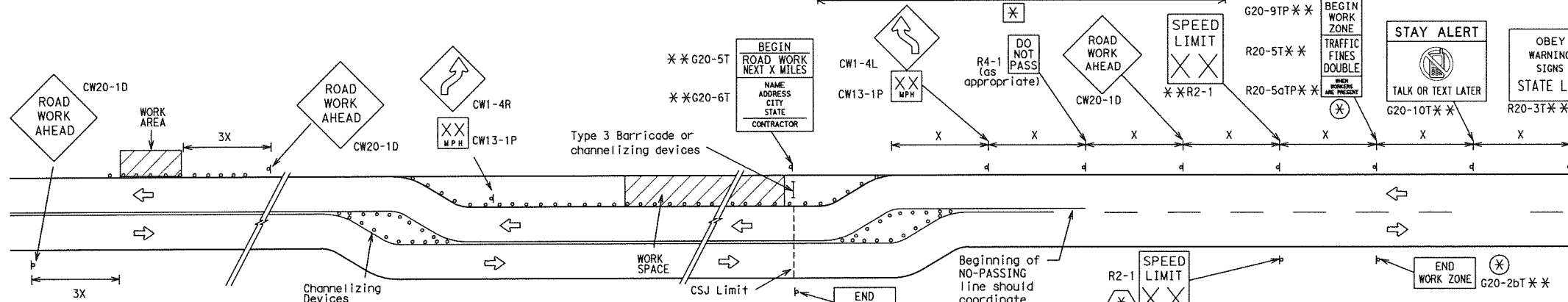
T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

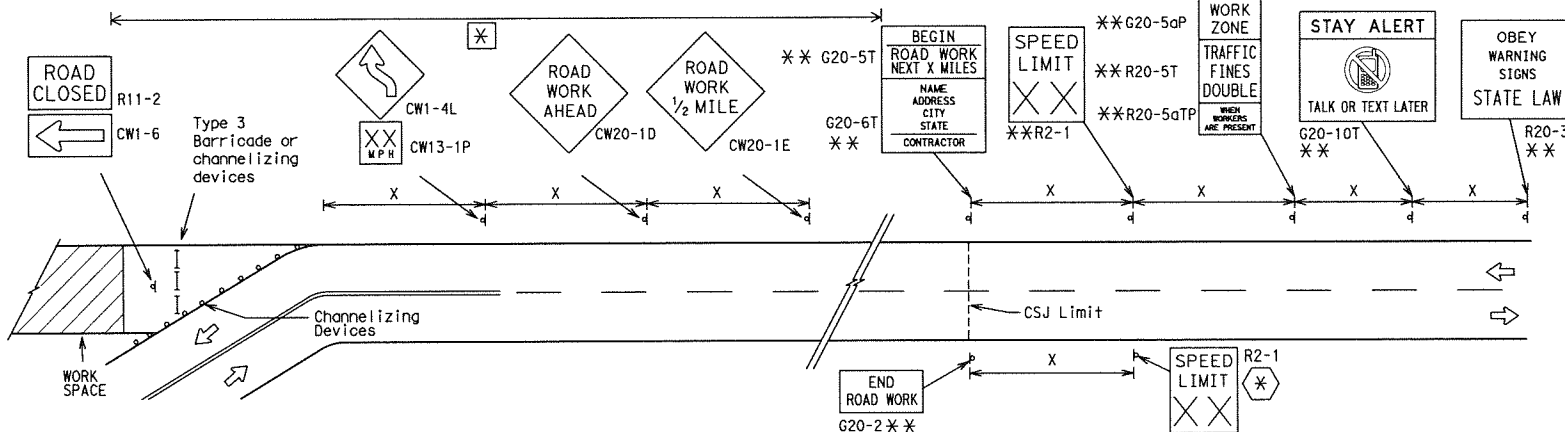
- The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
- If construction closes the road at a T-intersection the Contractor shall place the "CONTRACTOR NAME" (G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow (G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR) signs shall be replaced by the detour signing called for in the plans.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

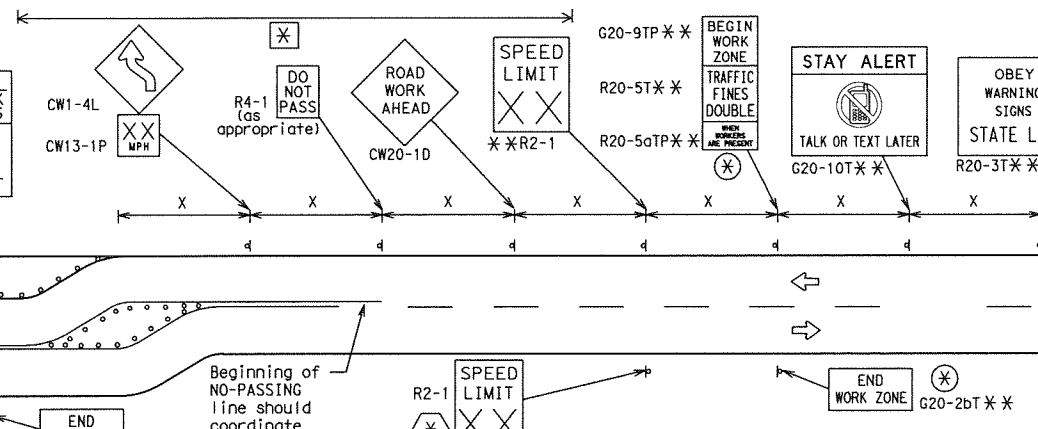


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-10) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

- The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

- Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

- Area for placement of "ROAD WORK AHEAD" (CW20-10) sign and other signs or devices as called for on the Traffic Control Plan.

- Contractor will install a regulatory speed limit sign at the end of the work zone.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING<sup>1,5,6</sup>

SIZE			SPACING	
Sign Number or Series	Conventional Road	Expressway/Freeway	Posted Speed	Sign Spacing "X" $\Delta$
CW20 <sup>4</sup>	48" x 48"	48" x 48"	MPH	Feet (Apprx. )
CW21			30	120
CW22			35	160
CW23			40	240
CW25			45	320
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	50	400
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	55	500 <sup>2</sup>
			60	600 <sup>2</sup>
			65	700 <sup>2</sup>
			70	800 <sup>2</sup>
			75	900 <sup>2</sup>
			80	1000 <sup>2</sup>
			*	* <sup>3</sup>

\* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

Δ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-10) signs may be used on low volume crossroads at the discretion of the Engineer. See Note 2 under "Typical Location of Crossroad Signs".
- Only diamond shaped warning sign sizes are indicated.
- See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

LEGEND

—	Type 3 Barricade
○ ○ ○	Channelizing Devices
—	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

SHEET 2 OF 12



BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY	SHEET NO.	
9-07 8-14		WILLIAMSON	12	
7-13				



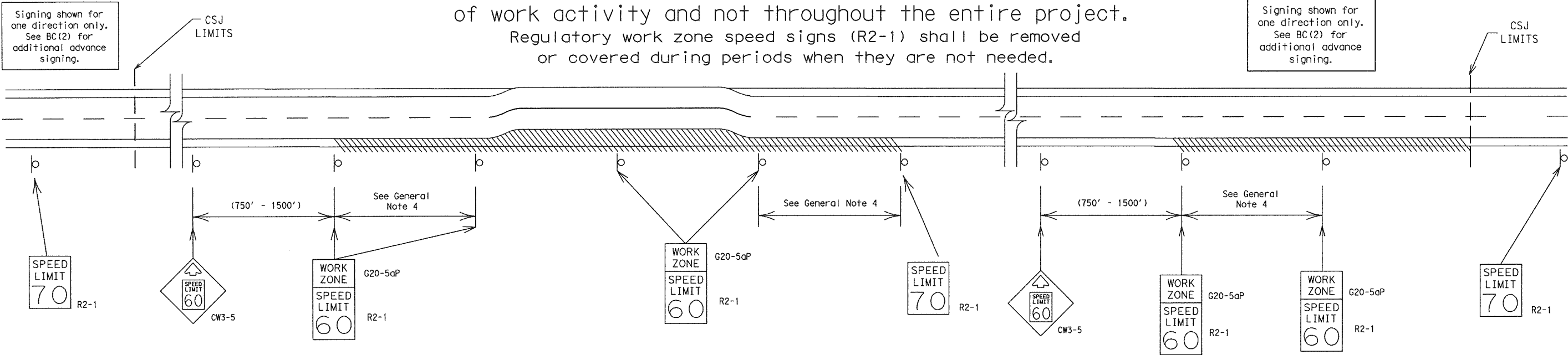
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:  
FILE:

# TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



## GUIDANCE FOR USE:

### LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

- a) rough road or damaged pavement surface
- b) substantial alteration of roadway geometrics (diversions)
- c) construction detours
- d) grade
- e) width
- f) other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

### SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the travelled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered. (See Removing or Covering on BC(4)).

## GENERAL NOTES

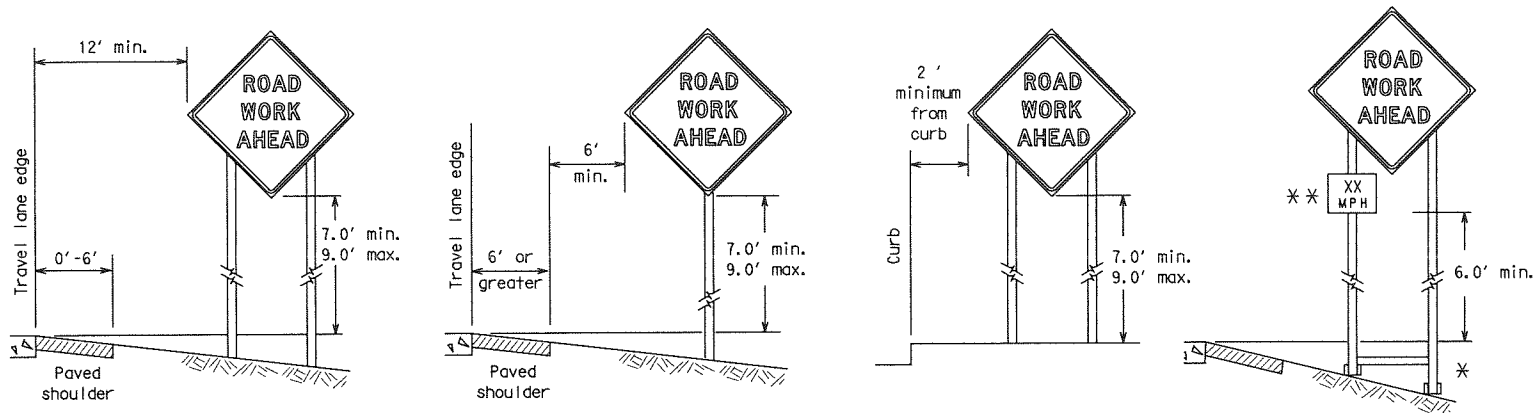
- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:
  - 40 mph and greater 0.2 to 2 miles
  - 35 mph and less 0.2 to 1 mile
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- Fabrication, erection and maintenance of the "ADVANCE SPEED LIMIT" (CW3-5) sign, "WORK ZONE" (G20-5aP) plaque and the "SPEED LIMIT" (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
  - A. Law enforcement.
  - B. Flagger stationed next to sign.
  - C. Portable changeable message sign (PCMS).
  - D. Low-power (drone) radar transmitter.
  - E. Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

SHEET 3 OF 12

		Traffic Operations Division Standard	
<b>BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT</b>			
<b>BC (3) - 14</b>			
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT November 2002	CONT	SECT	JOB
9-07 8-14	DIST	COUNTY	SHEET NO.
7-13		WILLIAMSON	13

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.

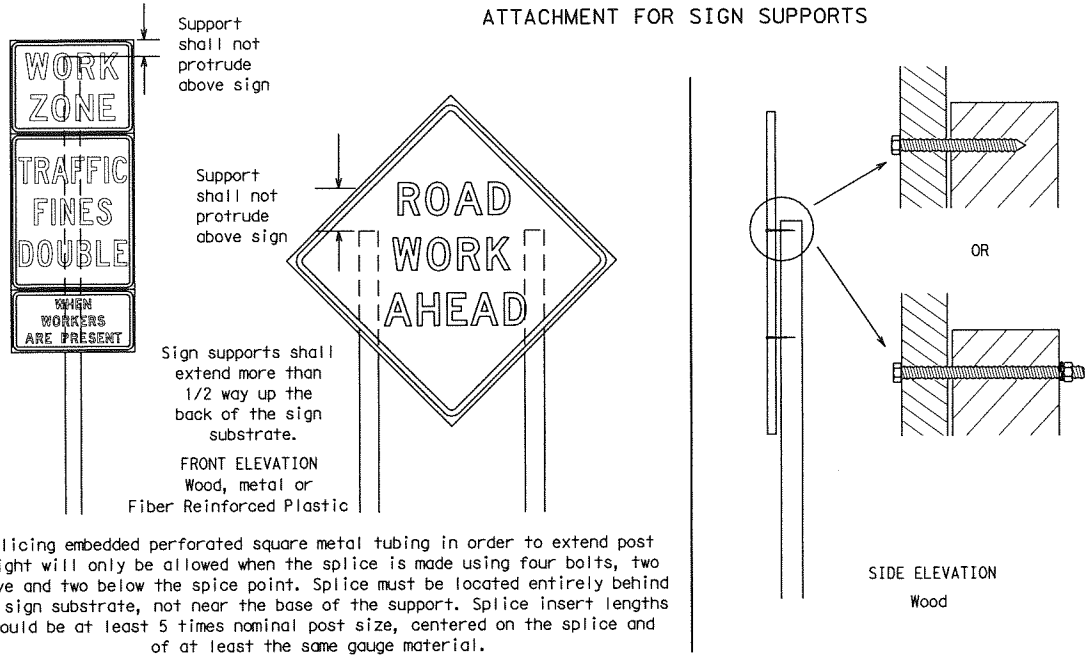
### TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



\* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

\*\* When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

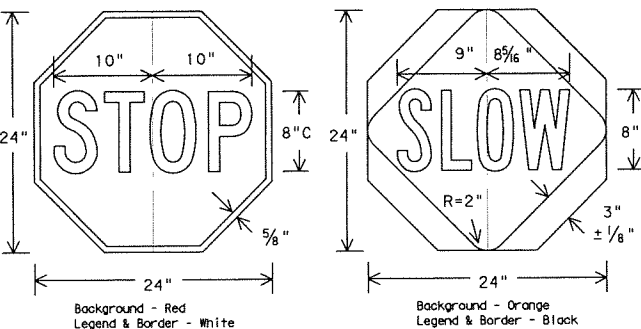
### ATTACHMENT FOR SIGN SUPPORTS



Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the splice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

### STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by floggers. The STOP/SLOW paddle size should be 24" x 24" as detailed below.
2. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



Background - Red  
Legend & Border - White

Background - Orange  
Legend & Border - Black

### CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

### GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD). The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

### DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
  - a. Long-term stationary - work that occupies a location more than 3 days.
  - b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
  - c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
  - d. Short, duration - work that occupies a location up to 1 hour.
  - e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

### SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

### SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

### SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

### REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type B<sub>FL</sub> or Type C<sub>FL</sub>, shall be used for rigid signs with orange backgrounds.

### SIGN LETTERS

1. All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

### REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

### SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

### FLAGS ON SIGNS

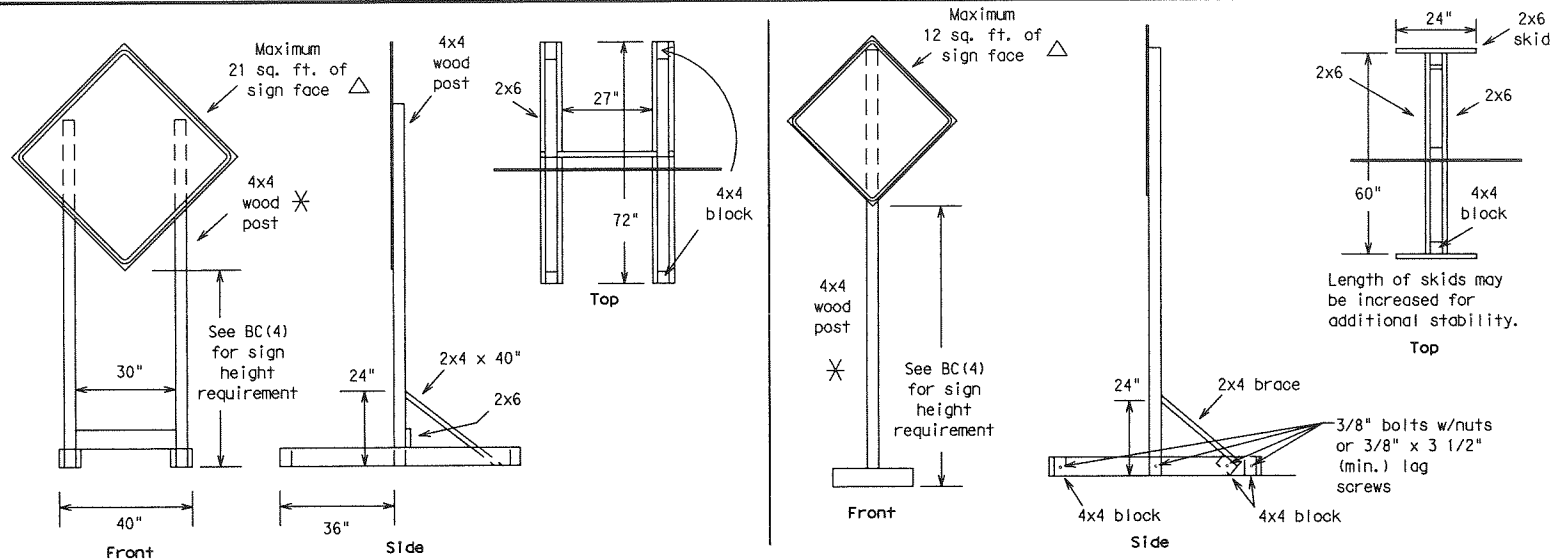
1. Flags may be used to draw attention to warning signs. When used the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

SHEET 4 OF 12

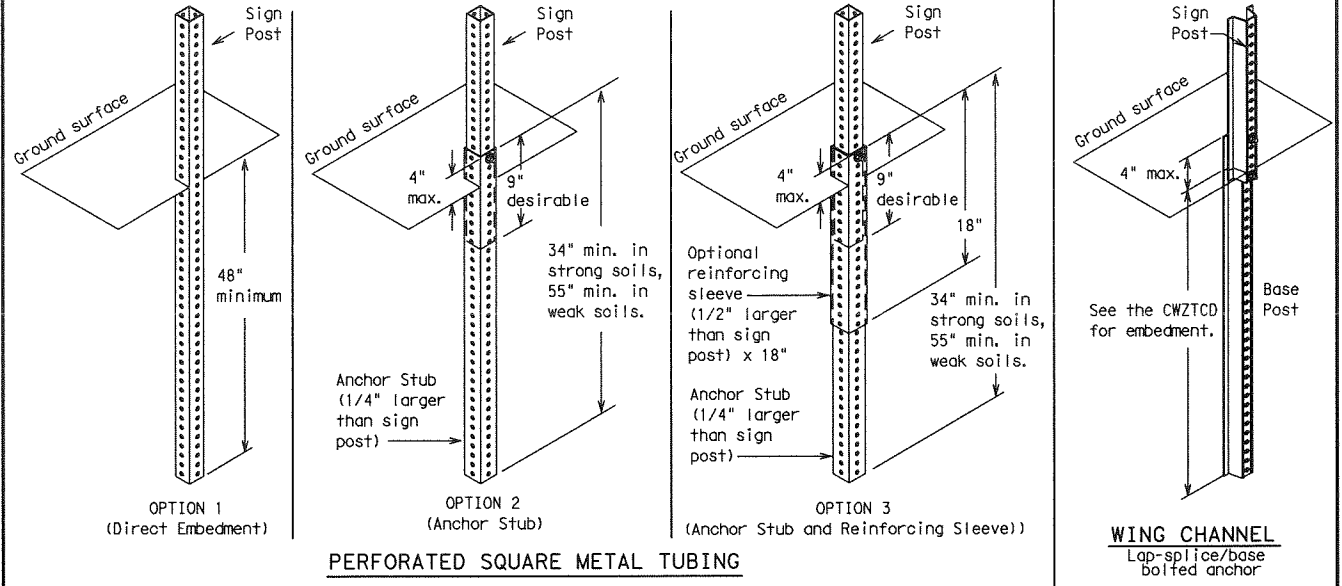
		<b>Traffic Operations Division Standard</b>	
<h2>BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES</h2>			
<h3>BC(4)-14</h3>			
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT November 2002	CONT	SECT	JOB
REVISIONS	DIST	COUNTY	SHEET NO.
9-07 8-14 7-13		WILLIAMSON	14

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 from its use.

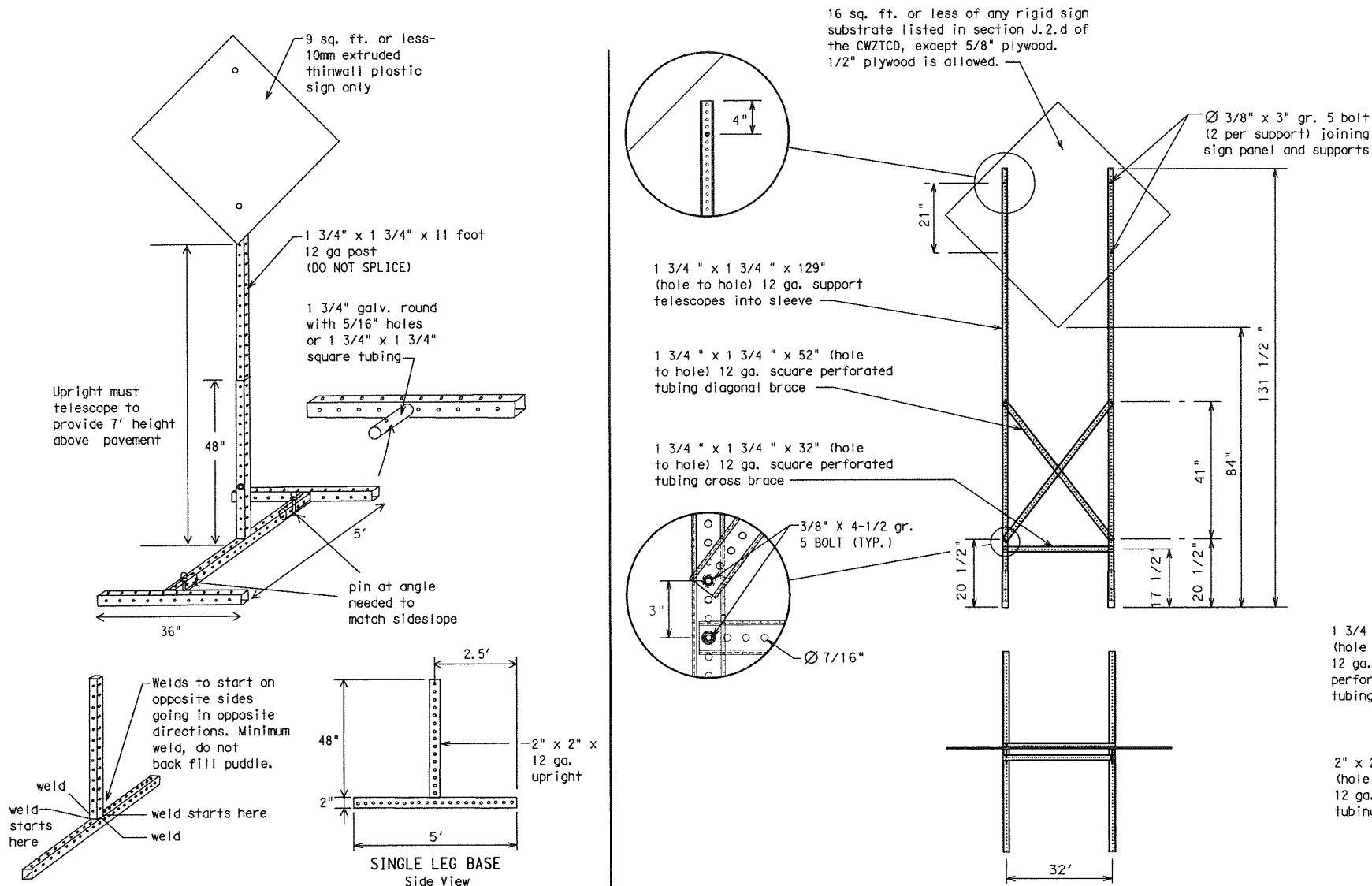
DATE: FILE:



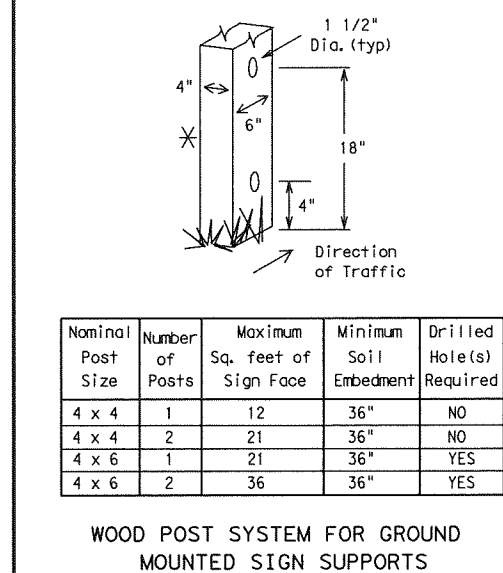
SKID MOUNTED WOOD SIGN SUPPORTS  
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □



GROUND MOUNTED SIGN SUPPORTS  
Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.  
The maximum sign square footage shall adhere to the manufacturer's recommendation.  
Two post installations can be used for larger signs.



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS



WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS

Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

**WEDGE ANCHORS**  
Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

**OTHER DESIGNS**  
MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

**GENERAL NOTES**

- Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
- When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

□ See BC(4) for definition of "Work Duration."  
✱ Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.  
△ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12

**Texas Department of Transportation**  
Traffic Operations Division Standard

**BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT**

**BC(5)-14**

FILES: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
9-07	8-14			
7-13				
DIST			COUNTY	SHEET NO.
			WILLIAMSON	15

**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.

DATE: FILE:

Roadway  
designation # IH-number, US-number, SH-number, FM-number

(The Engineer may approve other messages not specifically covered here.)

## \*

\* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol" (CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

\* \* See Application Guidelines Note 6.

TONIGHT  
XX PM-  
XX AM

\* \* See Application Guidelines Note 6.

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phrase is used.

SHEET 6 OF 12

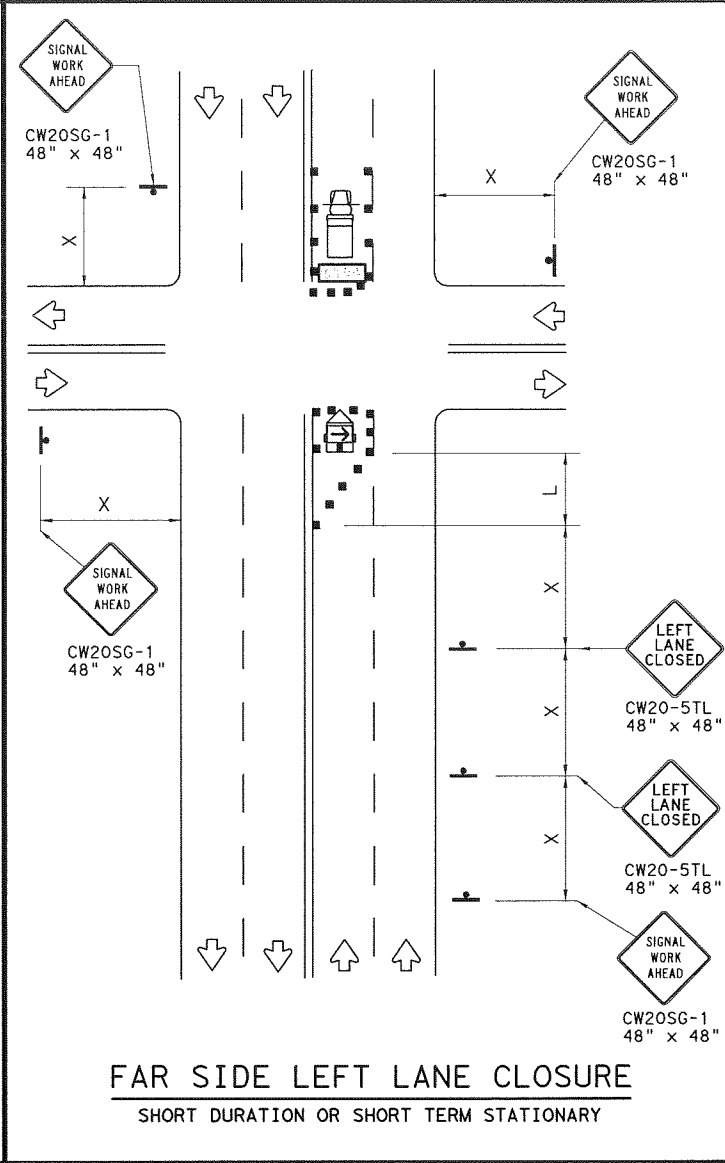
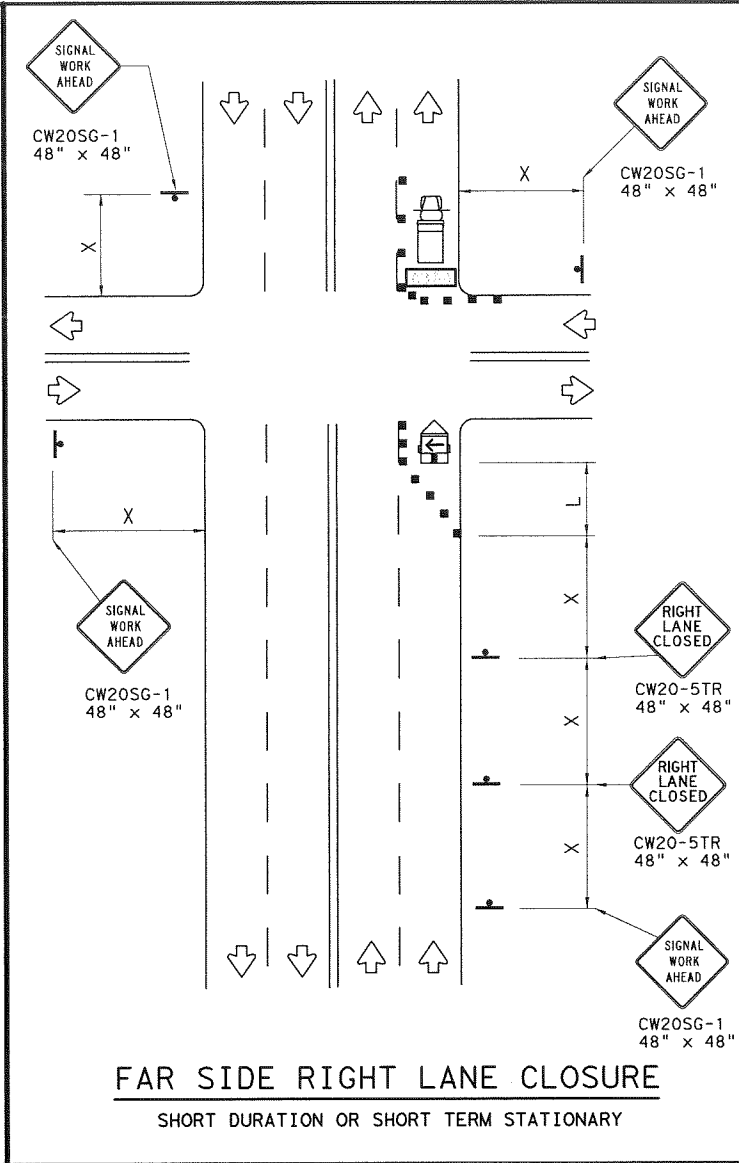
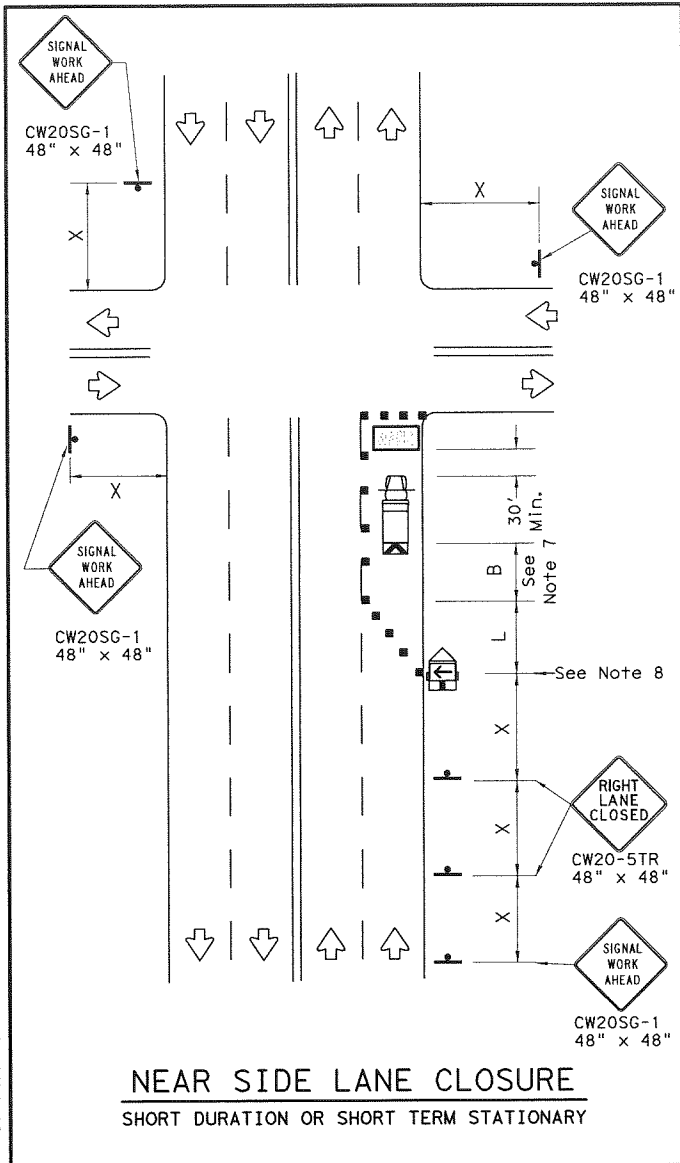


## BC (6) - 14

FILE:	bc-14.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	NOVEMBER 2002	CONT	SECT	JOB			HIGHWAY		
REVISONS		-	-	-			-		
9-07	8-14	DIST	COUNTY				SHEET NO.		
7-13		-	WILLIAMSON				16		

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.

DATE: FILE:

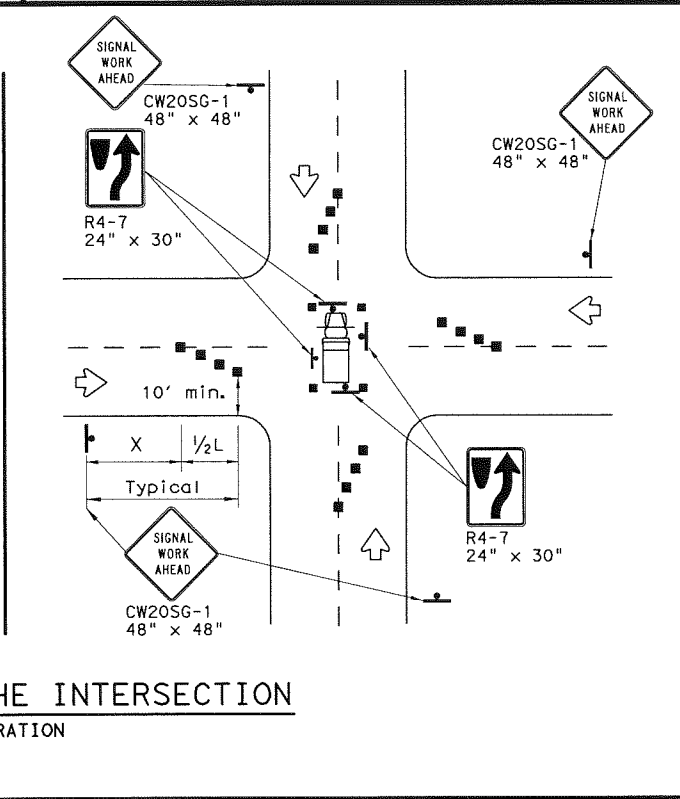
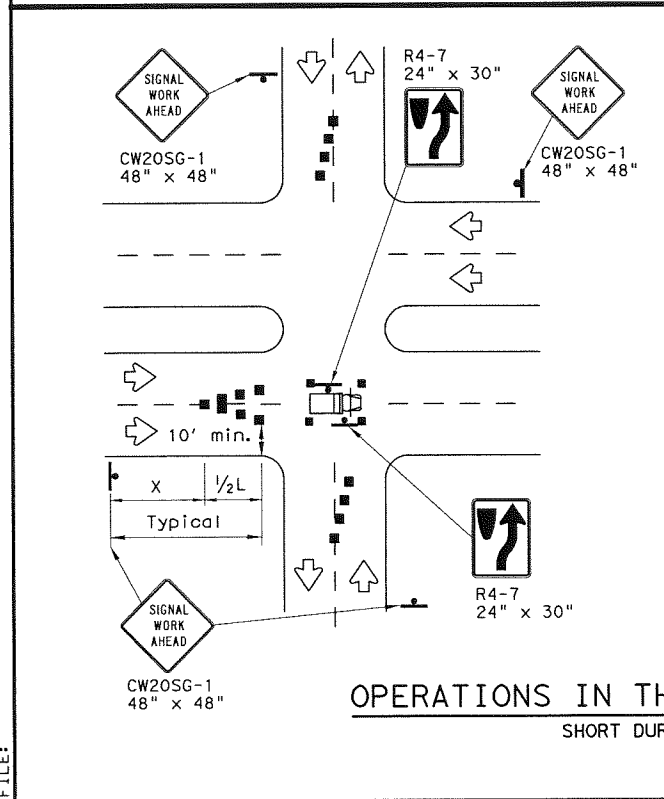


LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula L = WS / 60	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS / 60	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50	L = WS	500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

\* Conventional Roads Only  
\*\* Taper lengths have been rounded off.  
L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.



GENERAL NOTES

- The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
- Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
- Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
- Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
- High level warning devices (flag trees) may be used at corners of the vehicle.
- When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
- For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
- The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
- Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

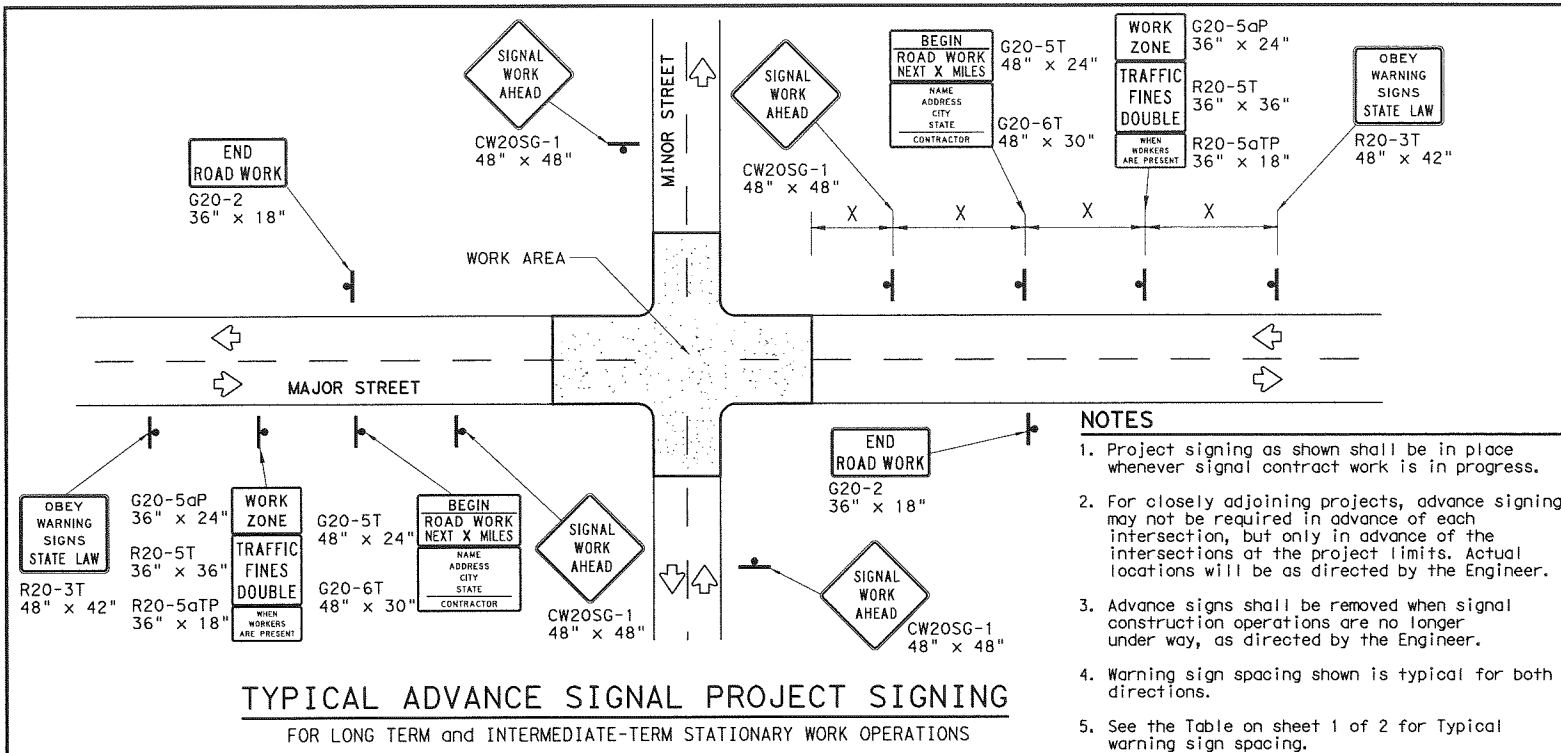
SHEET 1 OF 2

		Traffic Operations Division Standard			
<b>TRAFFIC SIGNAL WORK TYPICAL DETAILS</b>					
<b>WZ (BTS-1) -13</b>					
FILE: wzbtts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT		
© TxDOT April 1992	CONT	SECT	JOB		
REVISIONS	DIST	COUNTY	SHEET NO.		
2-98 10-99 7-13		WILLIAMSON	17		
4-98 3-03					



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.

DATE: FILE:



#### GENERAL NOTES FOR WORK ZONE SIGNS

- Signs shall be installed and maintained in a straight and plumb condition.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- Nails shall NOT be used to attach signs to any support.
- All signs shall be installed in accordance with the plans or as directed by the Engineer.
- The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
- The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
- Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
- Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1".
- Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

#### DURATION OF WORK

- Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

#### SIGN MOUNTING HEIGHT

- Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
- Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
- Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

#### REMOVING OR COVERING

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
- When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night without damaging the sign sheeting. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and anchor stubs shall be removed and holes backfilled upon completion of the work.

#### REFLECTIVE SHEETING

- All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

#### SIGN SUPPORT WEIGHTS

- Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support weights.
- Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
- Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber, such as tire inner tubes, shall not be used.
- Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
- Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

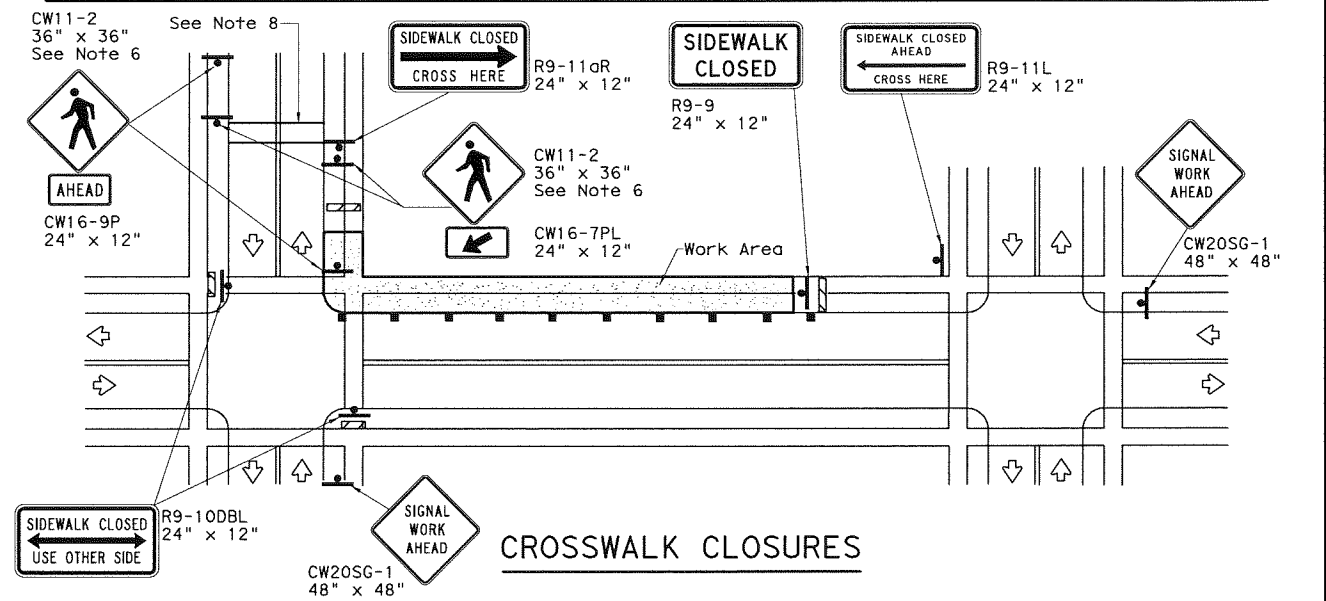
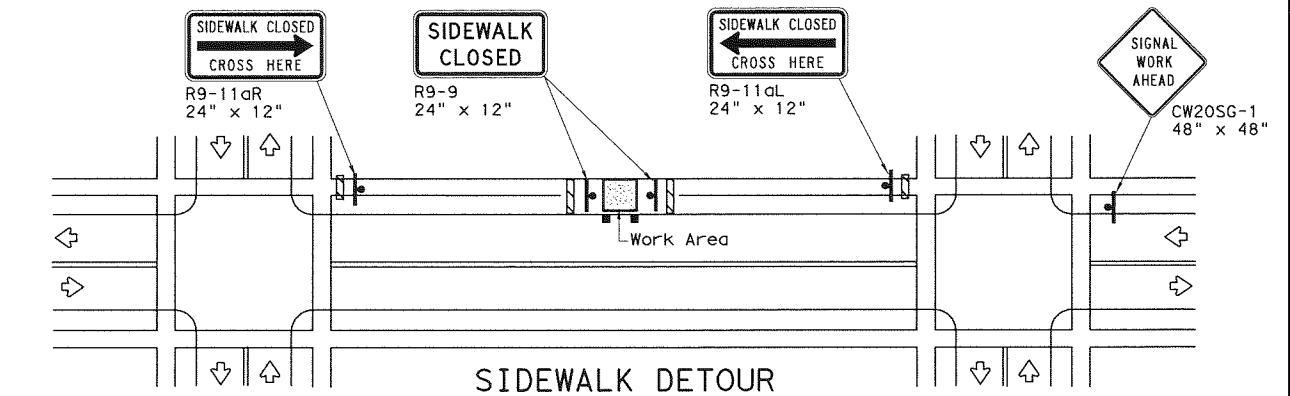
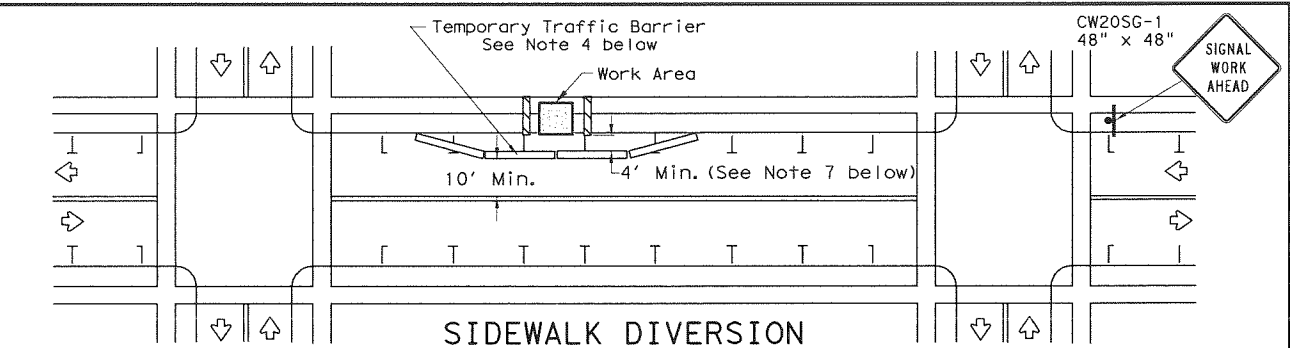
LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

#### DEPARTMENTAL MATERIAL SPECIFICATIONS

SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B <sub>FL</sub> OR TYPE C <sub>FL</sub> SHEETING
WHITE	BACKGROUND	TYPE A SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:  
[http://www.txdot.gov/txdot\\_library/publications/construction.htm](http://www.txdot.gov/txdot_library/publications/construction.htm)



#### PEDESTRIAN CONTROL

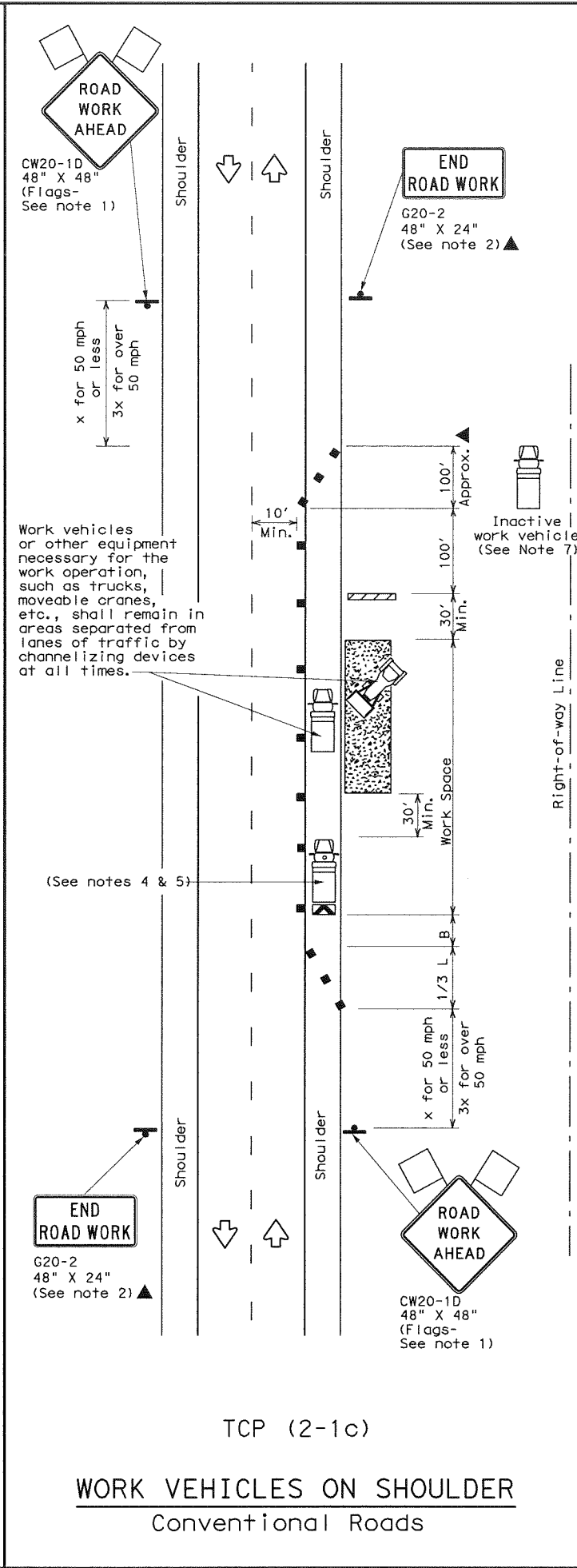
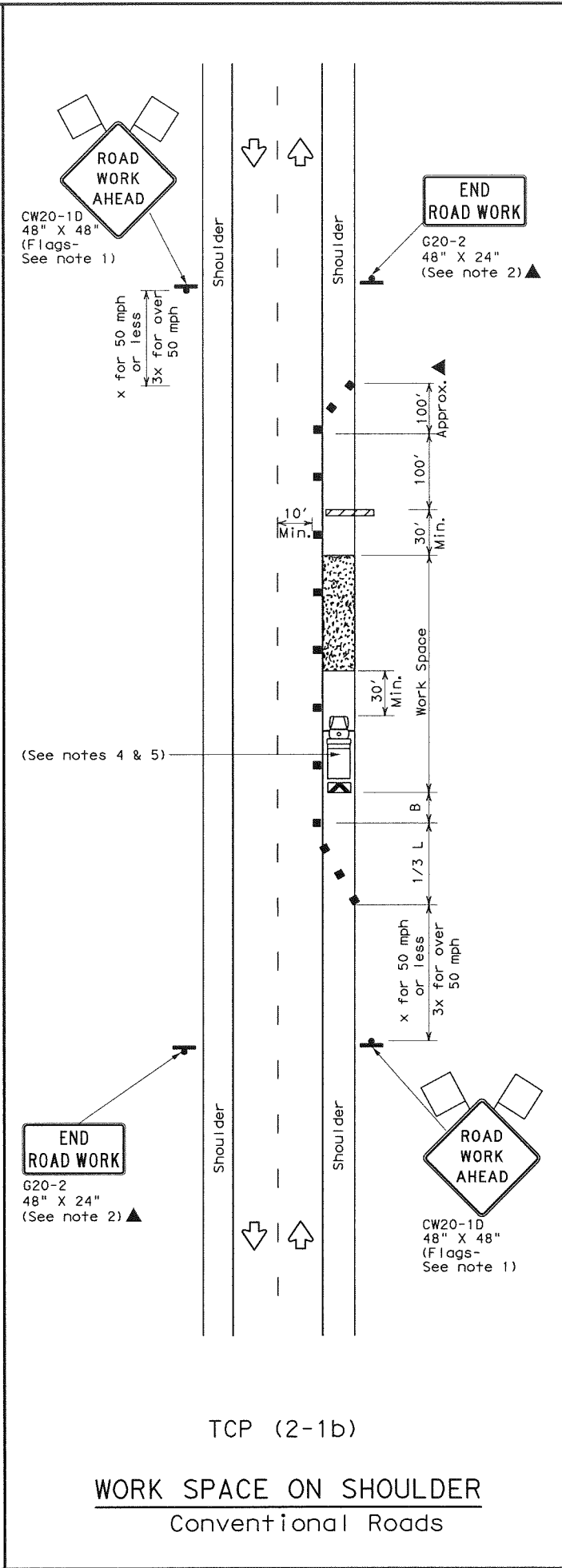
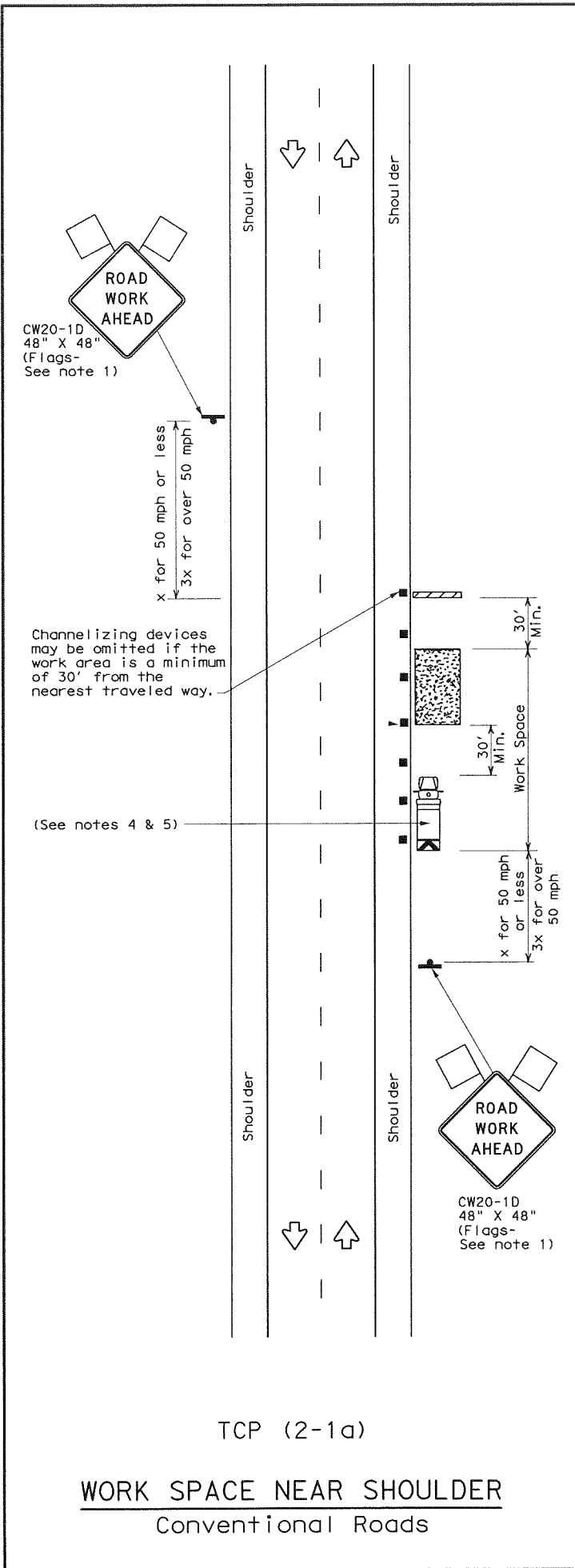
- Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
- "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
- R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
- For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
- Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
- Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
- The width of existing sidewalk should be maintained if practical.
- Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
- When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

SHEET 2 OF 2

		<b>Traffic Operations Division Standard</b>	
<h2>TRAFFIC SIGNAL WORK BARRICADES AND SIGNS</h2>			
<h3>WZ (BTS-2) - 13</h3>			
FILE: WZBTS-13.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT
© TxDOT April 1992	CONT	SECT	JOB
REVISIONS		HIGHWAY	
2-98 10-99 7-13	DIST	COUNTY	SHEET NO.
4-98 3-03	WILLIAMSON		18

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.

DATE: FILE:



LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **	Suggested Maximum Spacing of Channelizing Devices	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	10' Offset	On a Taper	120'	90'
35		11' Offset	On a Tangent	160'	120'
40		12' Offset		240'	155'
45				320'	195'
50	L=WS	150'	50'	400'	240'
55		205'	55'	500'	295'
60		225'	60'	600'	350'
65		245'	65'	700'	410'
70		295'	70'	800'	475'
75		320'	75'	900'	540'

\* Conventional Roads Only

\*\* Taper lengths have been rounded off.

L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	✓

GENERAL NOTES

- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
- Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
- Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
- Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
- CW21-5 "SHOULDER WORK" signs may be used in place of CW21-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation  
Traffic Operations Division

TRAFFIC CONTROL PLAN  
CONVENTIONAL ROAD  
SHOULDER WORK

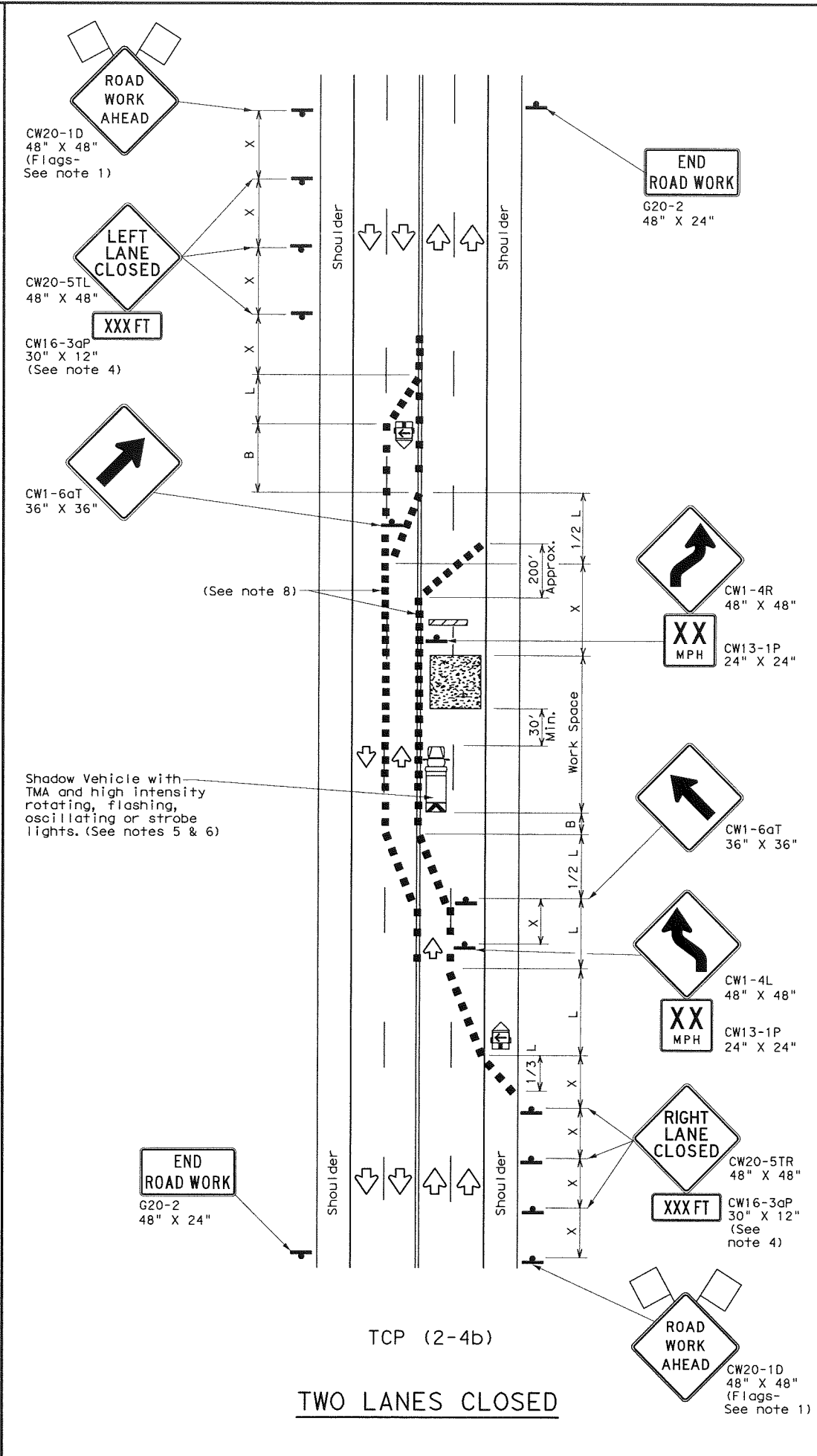
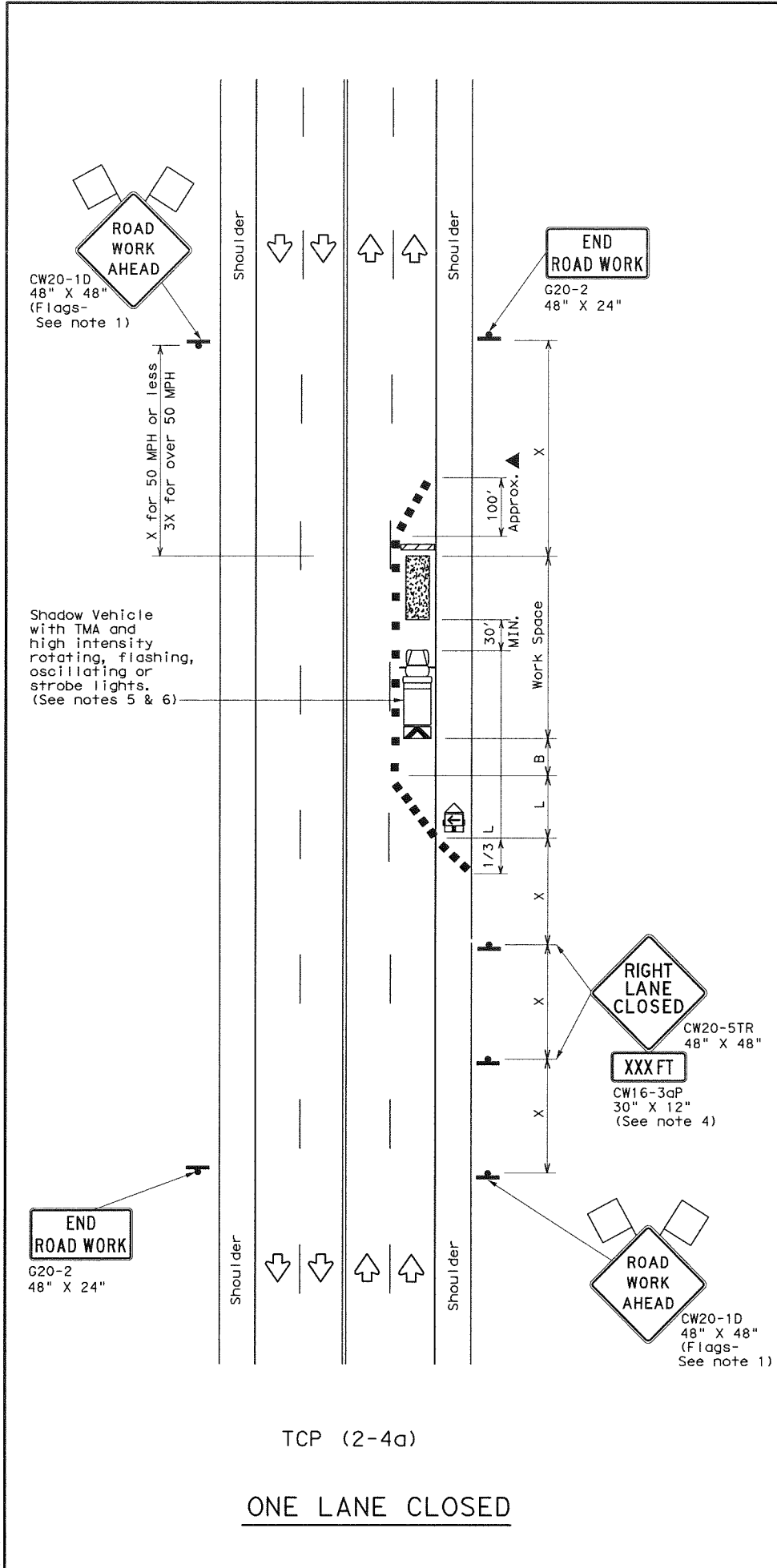
TCP (2-1)-12

© TxDOT December 1985	DH: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
2-94				
8-95				
1-97				
4-98				
	DIST	COUNTY	SHEET NO.	
		WILLIAMSON	19	

p. 275 12/23/2015 9:16 AM

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.

DATE: FILE:



LEGEND					
	Type 3 Barricade		Channelizing Devices		
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)		
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)		
	Sign		Traffic Flow		
	Flag		Flagger		

Posted Speed *	Formula L = WS <sup>2</sup> / 60	Minimum Desirable Taper Lengths * X			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55	L = WS	550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

\* Conventional Roads Only  
XX Taper lengths have been rounded off.  
L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
		✓	✓	

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
  - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
  - The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
  - For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
  - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
  - Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

- TCP (2-4a)**
- If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the merging taper.
- TCP (2-4b)**
- For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter devices spacing is intended for the area of conflicting markings, not the entire work zone.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation  
Traffic Operations Division

**TRAFFIC CONTROL PLAN  
LANE CLOSURES ON MULTILANE  
CONVENTIONAL ROADS**

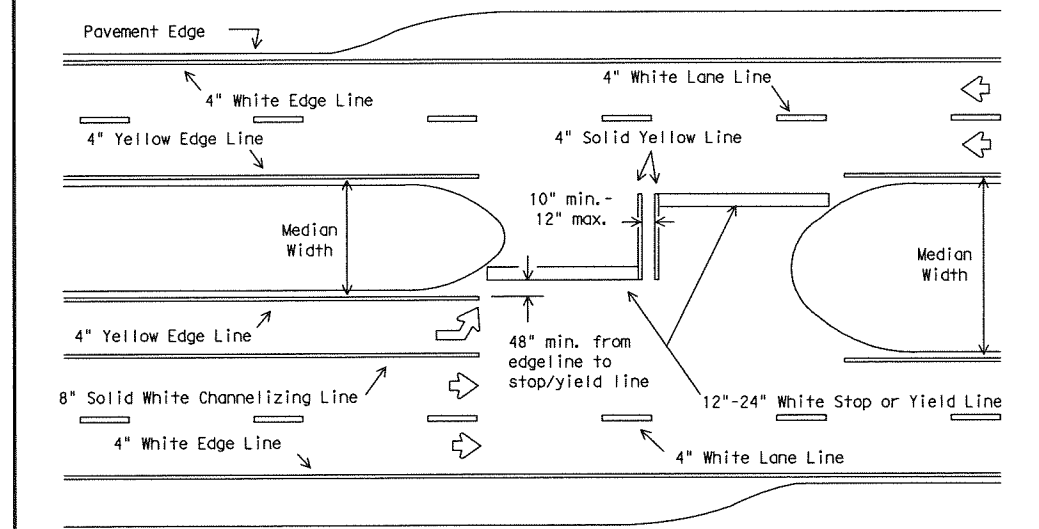
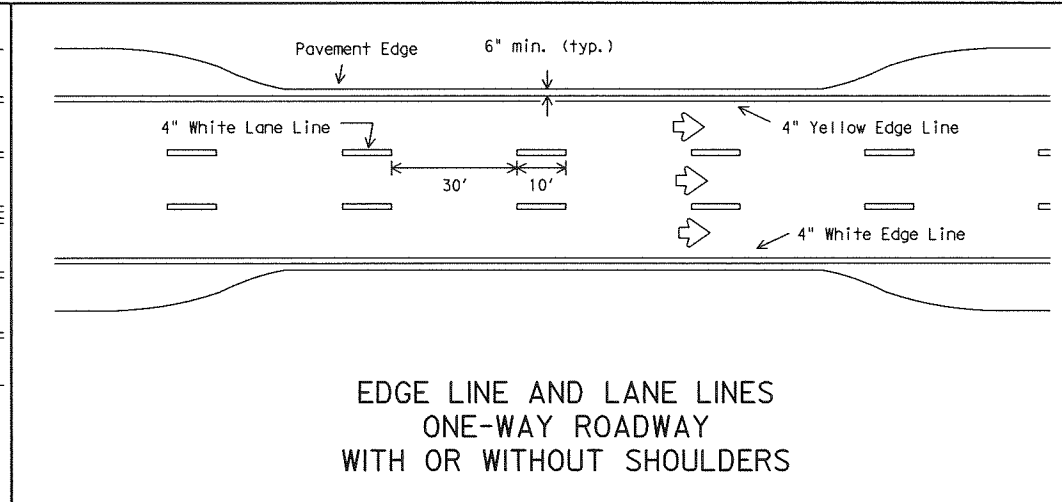
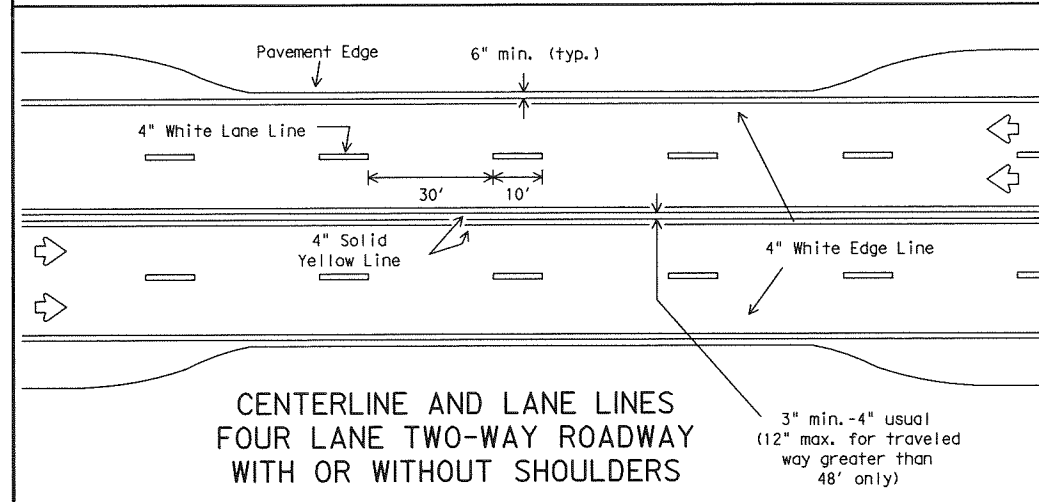
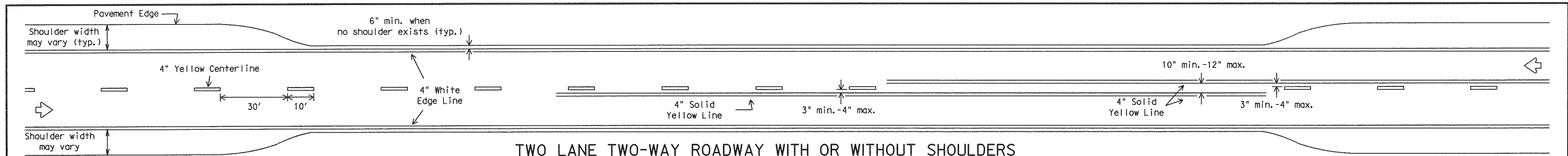
**TCP (2-4) -12**

© TxDOT December 1985		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS		CONT	SECT	JOB	HIGHWAY
8-95	2-12				
1-97					
4-98					
3-03					
		COUNTY		SHEET NO.	
		WILLIAMSON		20	



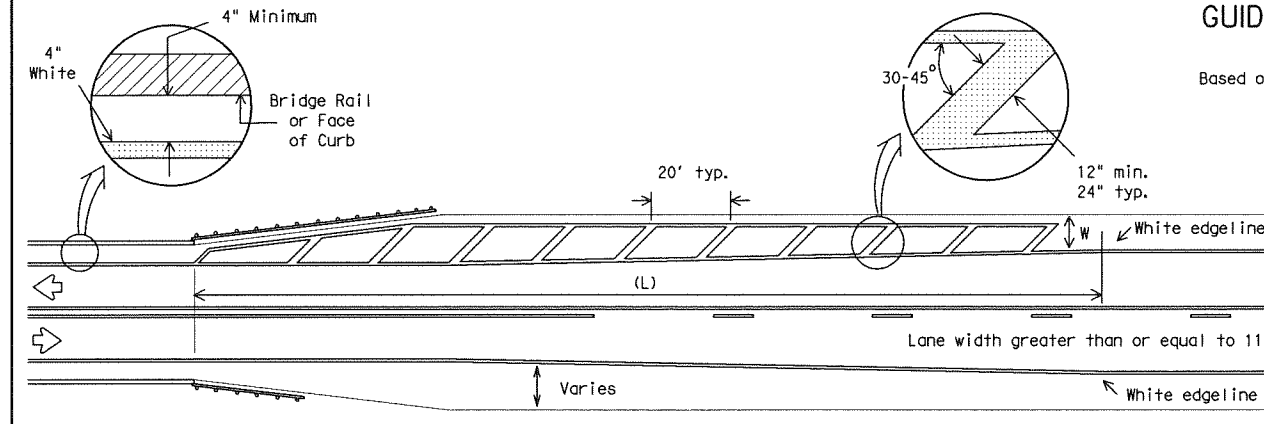
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:  
FILE:



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:

- No-passing zone on bridge approach is optional but if used, it shall be a minimum 500 feet long.
- For crosshatching length (L) see Table 1.
- The width of the offset (W) and the required crosshatching width is the full shoulder width in advance of the bridge.
- The crosshatching is not required if delineators or barrier reflectors are used along the structure.
- For guard fence details, refer elsewhere in the plans.

### ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT

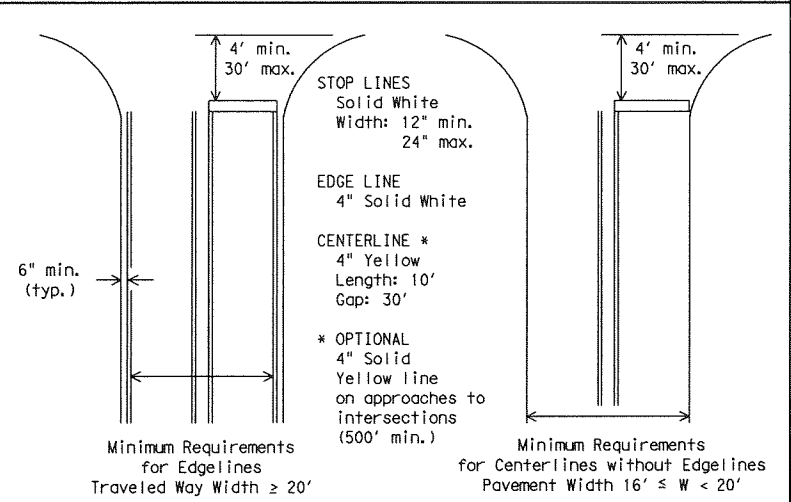


TABLE 1 - TYPICAL LENGTH (L)

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 cross-hatching 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 cross-hatching should be:  
 $L = 4(40)^2 / 60 = 106.67$  ft. rounded to 110 ft.

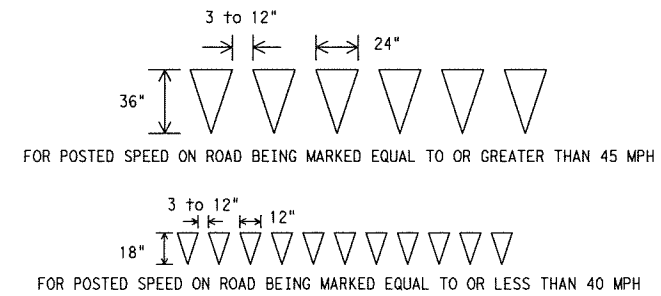
#### GENERAL NOTES

- 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.
- 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.



### TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-12

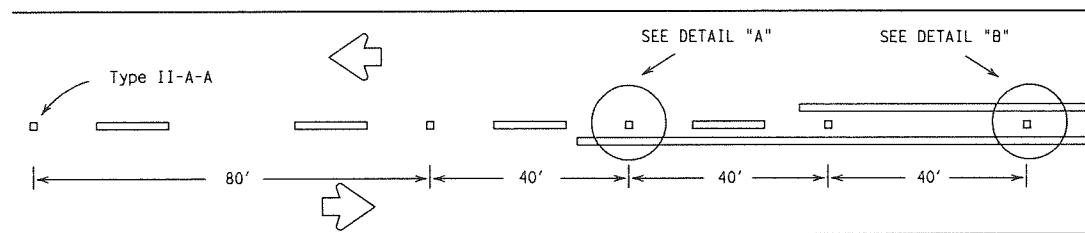
© TxDOT November 1978	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
8-95 2-12				
5-00				
8-00				
3-03				
			WILLIAMSON	21

22A

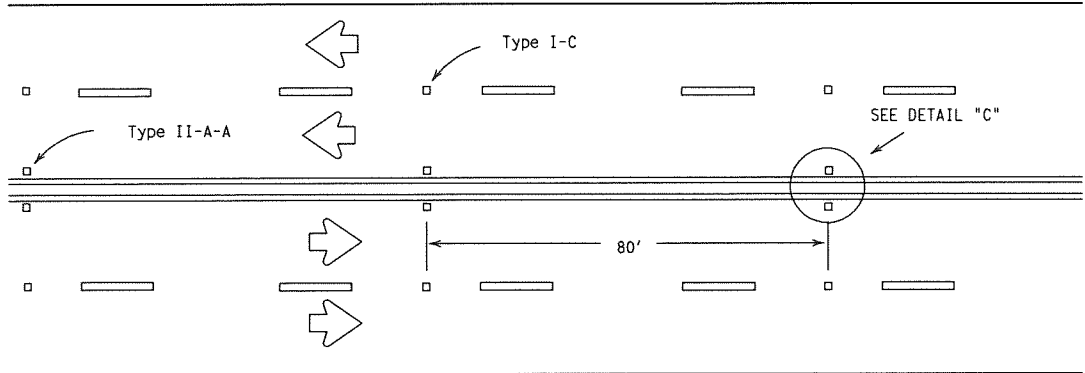
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:

REFLECTIVE RAISED PAVEMENT MARKERS  
FOR VEHICLE POSITIONING GUIDANCE

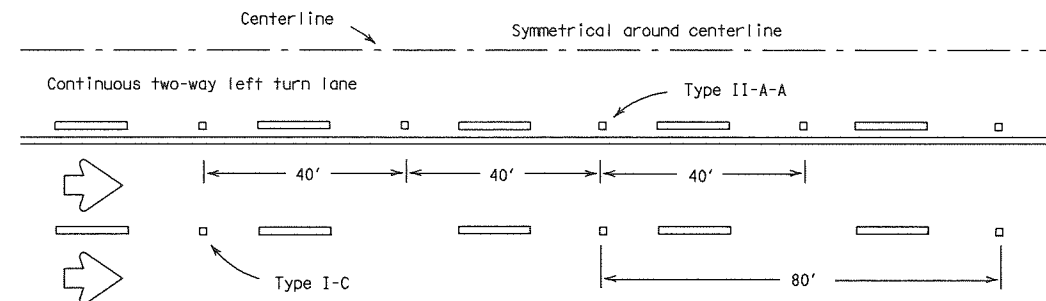


CENTERLINE FOR ALL TWO LANE ROADWAYS

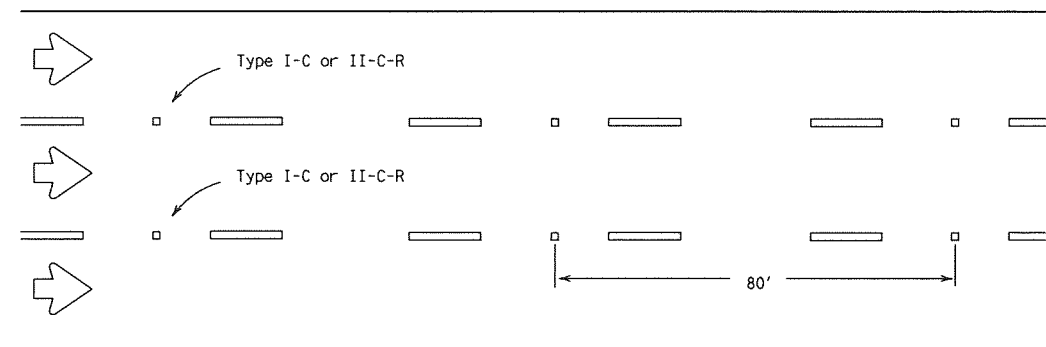


CENTERLINE & LANE LINES  
FOR FOUR LANE TWO-WAY HIGHWAYS

Raised pavement marker Type I-C, clear face toward normal traffic, shall be placed on 80-foot centers.

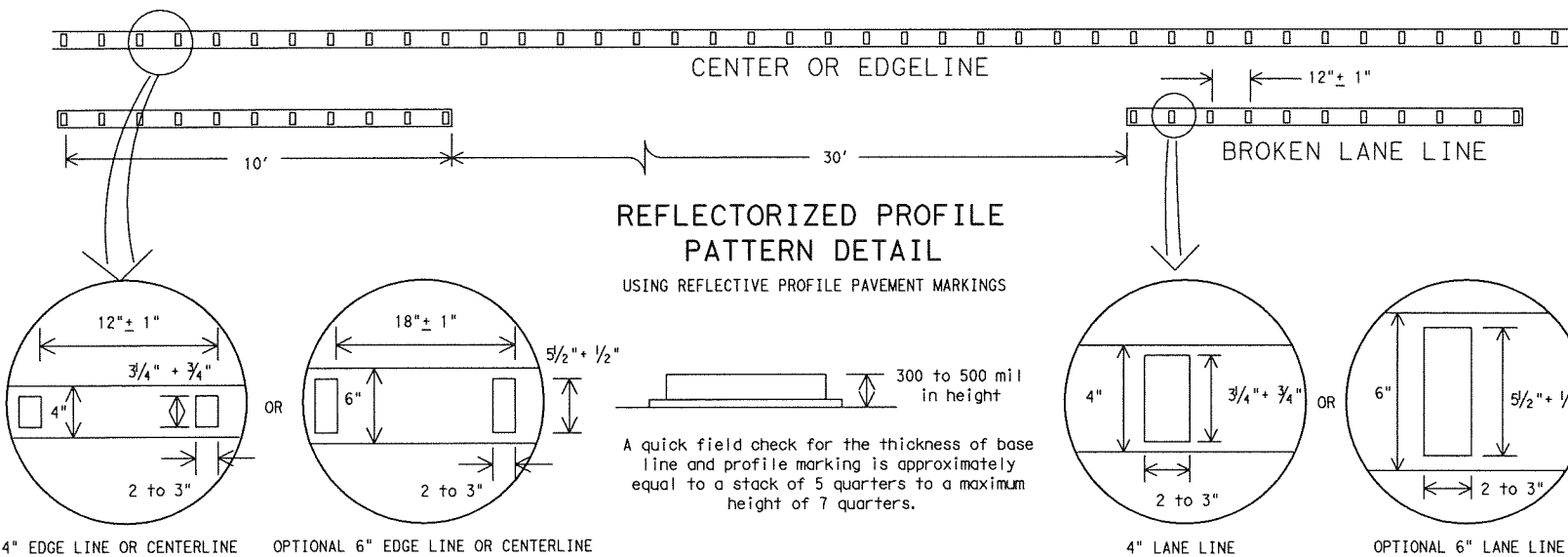
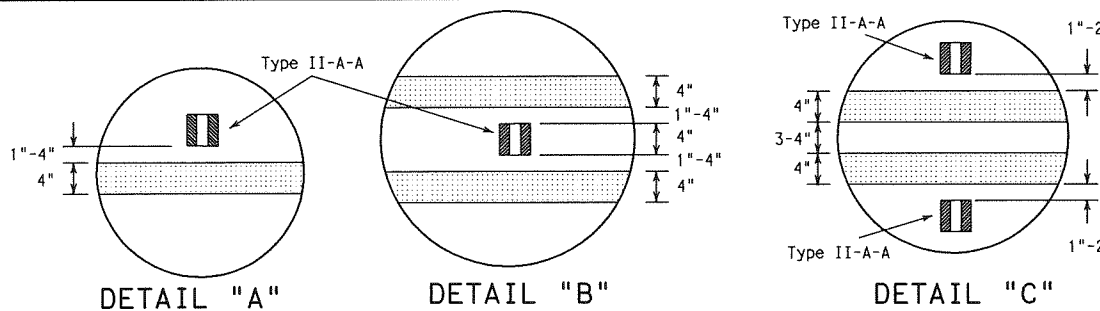


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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.



REFLECTORIZED PROFILE  
PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTE:

Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

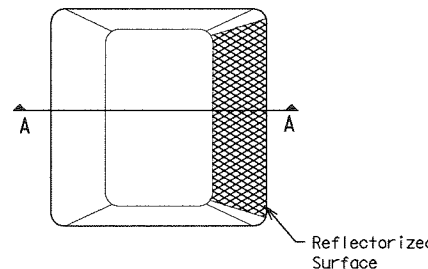
GENERAL NOTES

All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.

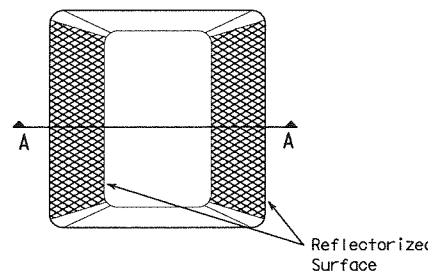
On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

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

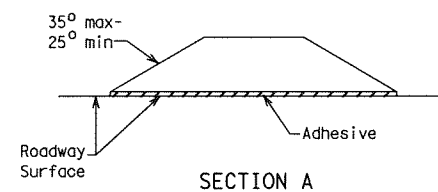
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



RAISED PAVEMENT MARKERS

Texas Department of Transportation  
Traffic Operations Division

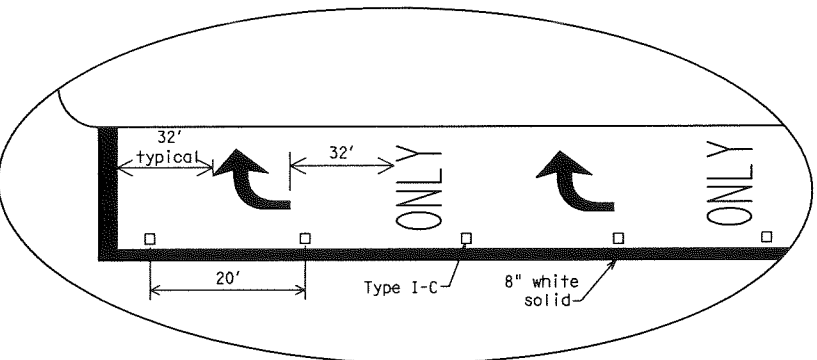
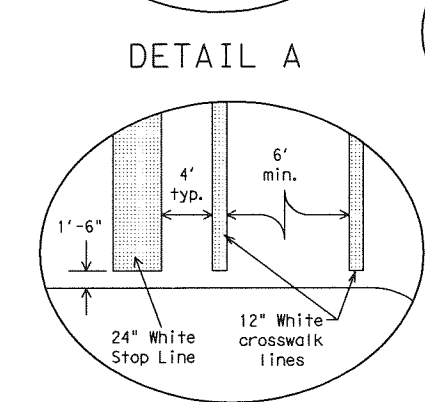
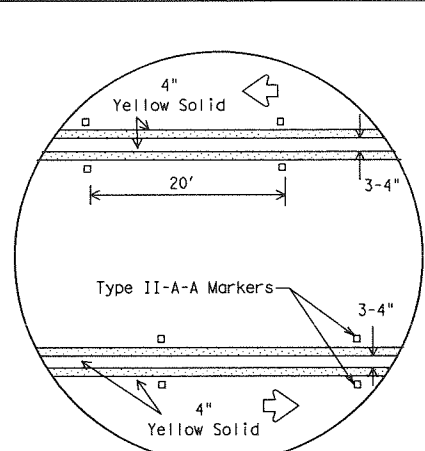
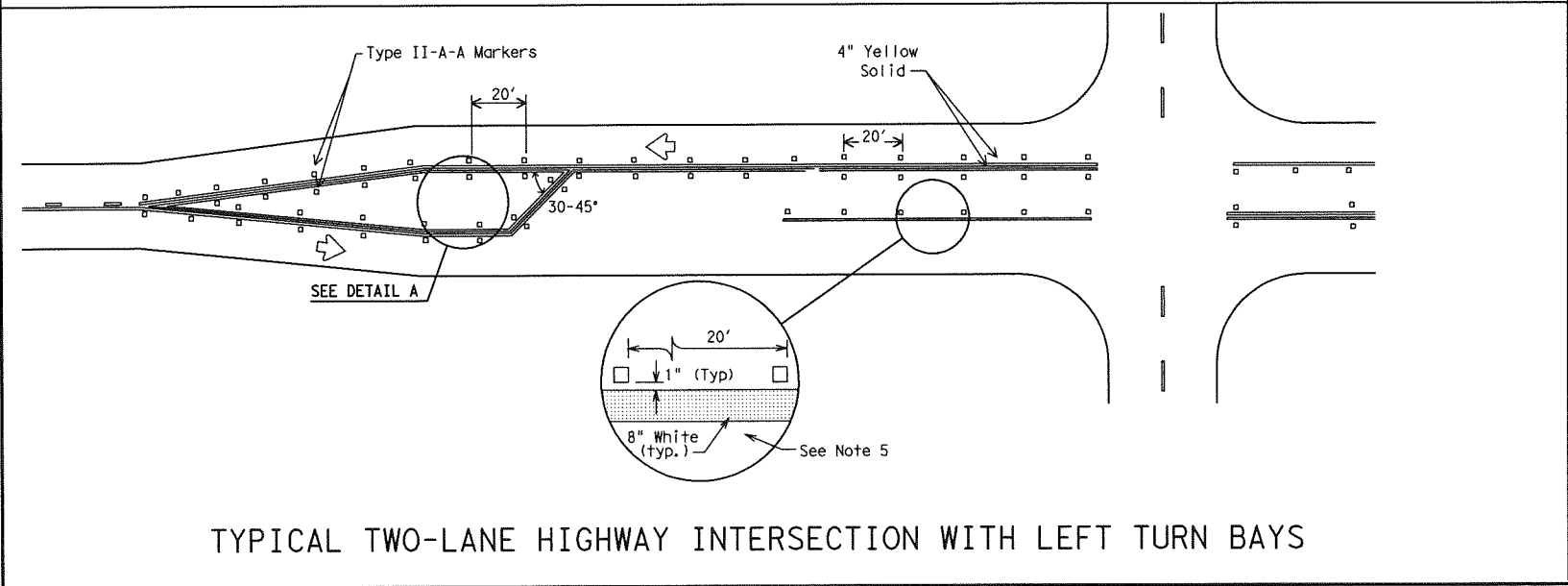
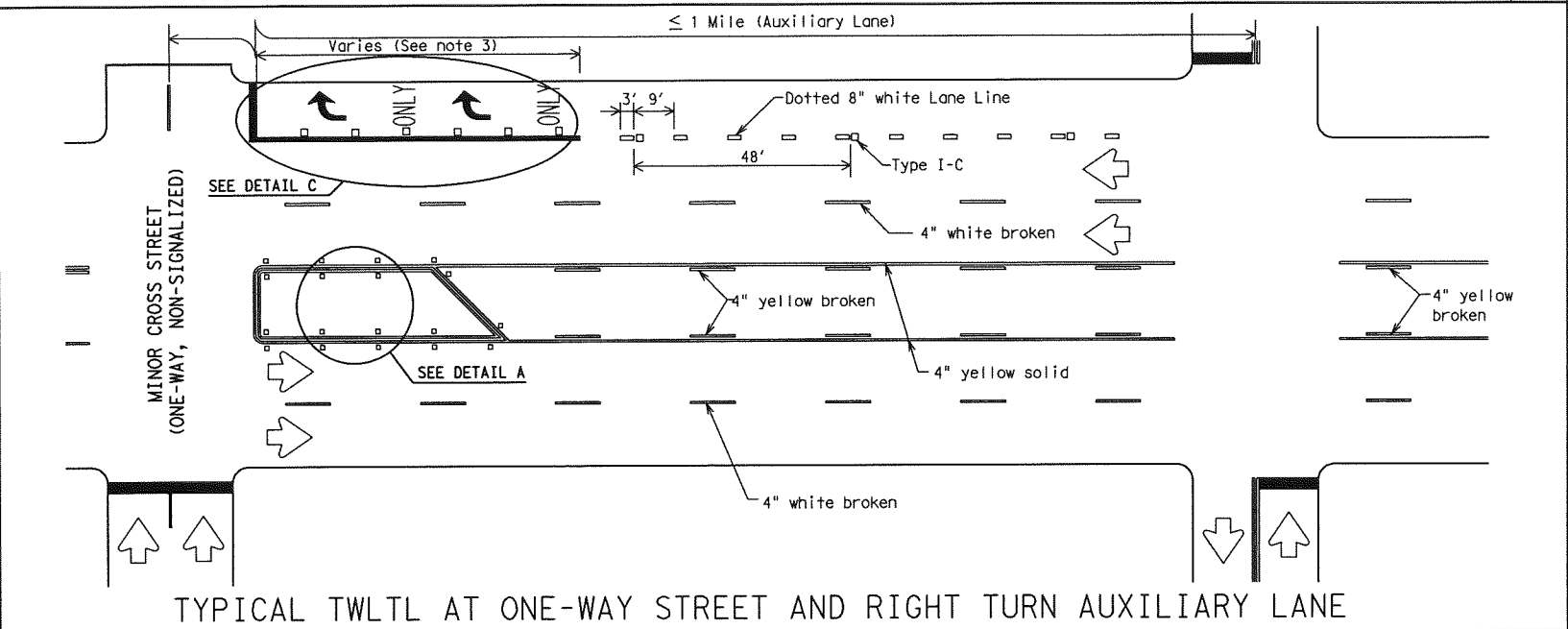
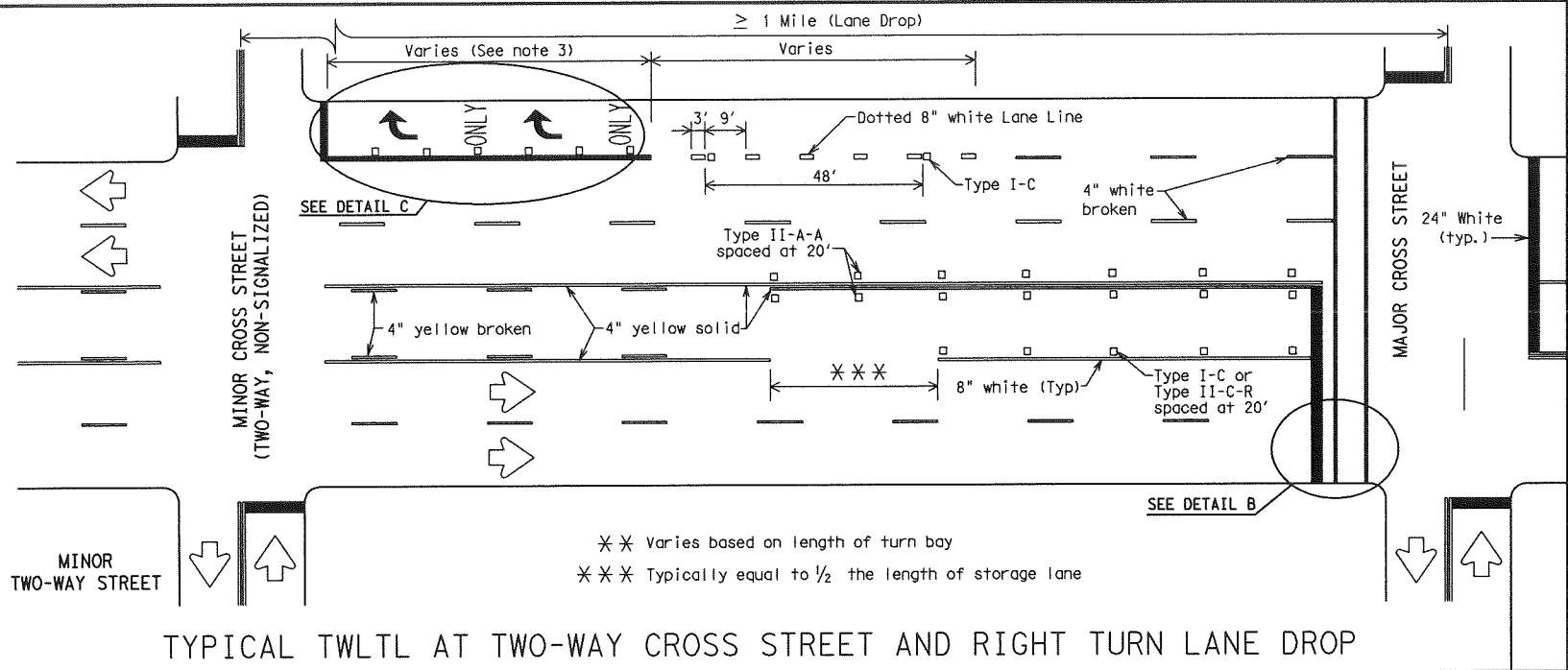
POSITION GUIDANCE USING  
RAISED MARKERS  
REFLECTORIZED PROFILE  
MARKINGS

PM(2)-12

© TxDOT April 1977	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
4-92 2-10				
5-00 2-12				
8-00				
2-08				
	DIST	COUNTY	SHEET NO.	
		WILLIAMSON	22	

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.

DATE:  
FILE:



Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

DETAIL B

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.

GENERAL NOTES

- Refer elsewhere in plans for additional RPM placement and details.
- 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.
- 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.
- Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used.
- 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.
- 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

© TxDOT April 1998	DW: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
5-00	2-12	CONT	SECT	JOB
8-00				HIGHWAY
3-03		DIST	COUNTY	SHEET NO.
2-10			WILLIAMSON	23

22C

TYPICAL TRANSITION FOR TWLTL  
AND DIVIDED HIGHWAY

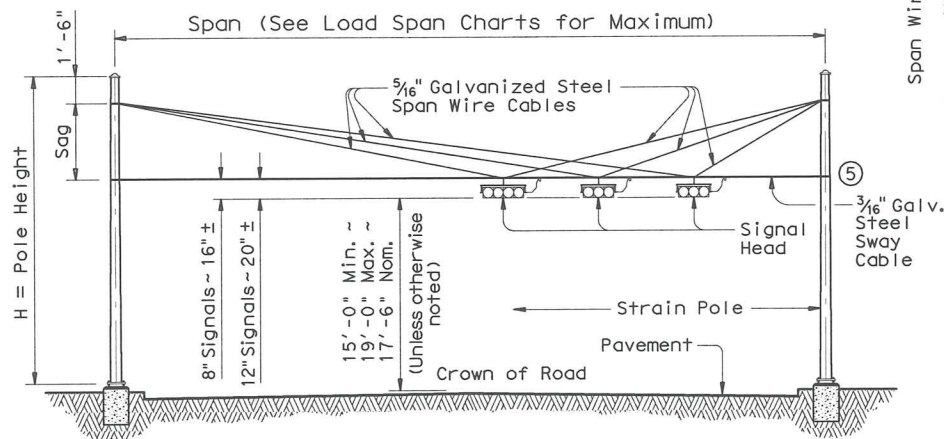


**DISCLAIMER:** The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TXDOT for any purpose whatsoever. TXDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

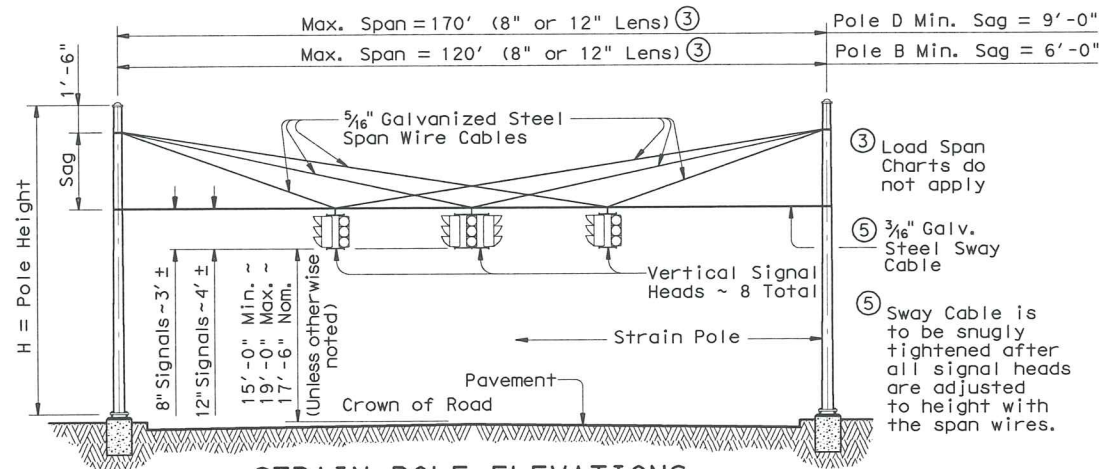
DATE: \_\_\_\_\_  
FILE: \_\_\_\_\_

STRAIN POLE DESCRIPTION	Pole Type	Foundation Type	Maximum Permissible Span Wire Load (lbs.)
26' Pole	A	36-A	5200
30' Pole	B	36-A	4600
30' Pole with Lum.	B	36-A	4400
30' Pole with 20' Mast Arm	C	36-B	5600
30' Pole with 24' Mast Arm	C	36-B	5500
30' Pole with 28' Mast Arm	C	36-B	5300
30' Pole with 32' Mast Arm	C	36-B	5100
30' Pole with 36' Mast Arm	C	36-B	4900
30' Pole with 20' Mast Arm & Lum.	C	36-B	5300
30' Pole with 24' Mast Arm & Lum.	C	36-B	5200
30' Pole with 28' Mast Arm & Lum.	C	36-B	5000
30' Pole with 32' Mast Arm & Lum.	C	36-B	4800
30' Pole with 36' Mast Arm & Lum.	C	36-B	4500
34' Pole	D	36-B	5600
34' Pole with Lum.	D	36-B	5400

② Numbers on Load Span Charts indicate the number of signal heads on the span. The total span wire design load is based on one 5-section head and one or more additional 3-section head(s). Design wind pressures on cables are assumed as 1.0 lb/ft. Weight of span wire cables (one per signal head) is assumed as 0.65 lb/ft which includes an allowance for conductor cables and miscellaneous hardware. The effect of the sway cable on load distribution is ignored as it is assumed to break at design wind conditions. When a pole supports 2 spans, the span wire design loads for both spans should be added vectorially to determine the design load for that pole.

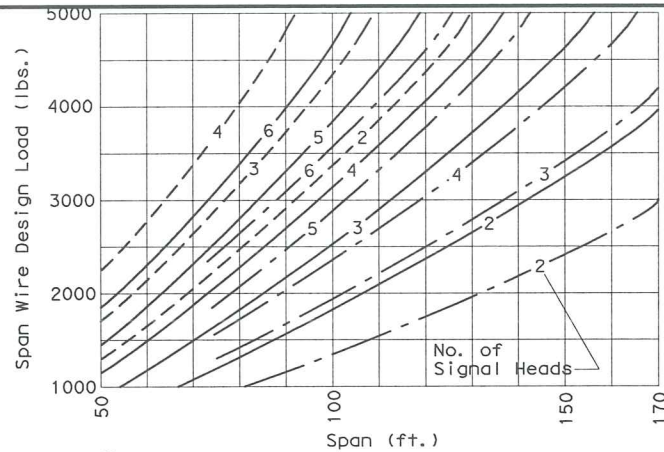


# STRAIN POLE ELEVATIONS HORIZONTAL SIGNALS

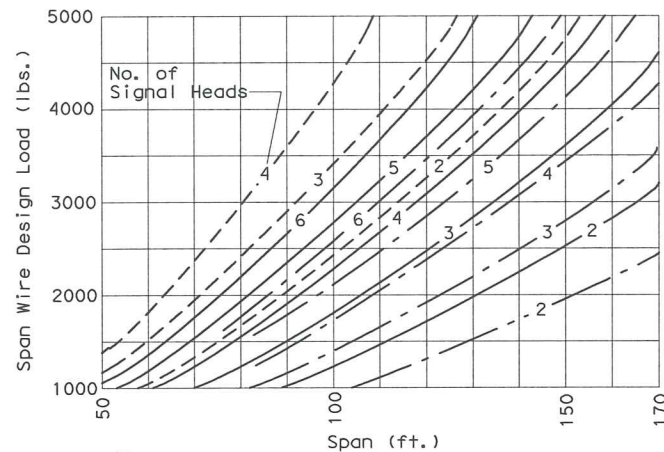


### STRAIN POLE ELEVATIONS VERTICAL SIGNALS

(Most arms are not used with vertical signals)



② SIGNALS WITH 12-INCH LENS



## ② SIGNALS WITH 8-INCH LENS

Signal Head Type	Wt. Per Head	Wind Area ♦
5-Section, 12" Lens	125 lbs	9.6 sq. ft.
5-Section, 8" Lens	70 lbs	4.8 sq. ft.
3-Section, 12" Lens	75 lbs	5.64 sq. ft.
3-Section, 8" Lens	45 lbs	3.0 sq. ft.

◆ Effective projected design wind area  
(actual area times drag coefficient)

----- Sag = 4'-6" (26' or 30' Pole)  
 \_\_\_\_\_ Sag = 8'-0" (30' or 34' Pole)  
 \_\_\_\_\_ - \_\_\_\_\_ Sag = 11'-6" (34' Pole)

Pole Type	ROUND POLES				POLYGONAL POLES			
	D <sub>B</sub>	D <sub>T</sub>	(4)thk	H	D <sub>B</sub>	D <sub>T</sub>	(4)thk	H
	in.	in.	in.	ft.	in.	in.	in.	ft.
A	12.5	8.9	.239	26	13.0	9.0	.239	26
B	13.5	9.3	.239	30	14.0	9.0	.239	30
C	15.5	11.3	.239	30	16.0	11.0	.239	30
D	15.5	10.7	.239	34	16.0	11.0	.239	34

$D_B$  = Pole Base O.D.       $D_T$  = Pole Top O.D.       $H$  = Pole Height

④ Thickness shown are minimum, thicker materials may be used.



## SHIPPING PARTS LIST

Poles	(Without Traffic Signal Arm)
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23
24	24
25	25
26	26
27	27
28	28
29	29
30	30
31	31
32	32
33	33
34	34
35	35
36	36
37	37
38	38
39	39
40	40
41	41
42	42
43	43
44	44
45	45
46	46
47	47
48	48
49	49
50	50
51	51
52	52
53	53
54	54
55	55
56	56
57	57
58	58
59	59
60	60
61	61
62	62
63	63
64	64
65	65
66	66
67	67
68	68
69	69
70	70
71	71
72	72
73	73
74	74
75	75
76	76
77	77
78	78
79	79
80	80
81	81
82	82
83	83
84	84
85	85
86	86
87	87
88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

Pole Type	Strain poles with Luminaire			Strain poles without Luminaire		
	Ship each pole with the following hardware attached: handhole at base, pole cap, 2 clamp-on simplex and 1 pipe plug.			Ship each pole with the following hardware attached: handhole at base, pole cap and 1 pipe plug.		
	Description	Designation	Quantity	Description	Designation	Quantity
A				26' Strain Pole	SP 26 A-80	
B	30' Strain Pole	SPL 30 B-80	4	30' Strain Pole	SP 30 B-80	
D	34' Strain Pole	SPL 34 D-80		34' Strain Pole	SP 34 D-80	

## Poles (With Traffic Signal Arm)

Pole Type	Strain poles with Luminaire			Strain poles without Luminaire		
	Ship each pole with the following hardware attached: handhole at base, pole cap, clamp-on simplex and 3 pipe plugs.			Ship each pole with the following hardware attached: handhole at base, pole cap and 3 pipe plugs.		
	Description	Designation	Quantity	Description	Designation	Quantity
C	30' SPw/TS Arm	SPL 30 C-80		30' SPw/TS Arm	SP 30 C-80	

### Traffic Signal Arms (For Type C poles)

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	Ship each Type I Arm with the following hardware attached: 2 CGB Connectors, 1 clamp with bolts and washers		Ship each Type II Arm with the following hardware attached: 1 Bracket Assembly ①, 3 CGB Connectors and 1 clamp with bolts and washers		Ship each Type III Arm with the following hardware attached: 2 Bracket Assemblies ①, 4 CGB Connectors and 1 clamp with bolts and washers	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24 II -80			
28	28I-80		28 II -80			
32			32 II -80		32 III -80	
36			36 II -80		36 III -80	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity	Each Top 8 ft (TY)
1 3/4"	3' - 10"	4	
2"	4' - 3"		

## Luminaire Arms

Nominal Arm Length	Quantity
8' Arm	4

Each Anchor Bolt Assembly consists of the following:  
Top and Bottom templates, 4 anchor bolts, 8 nuts,  
8 flat washers, and 4 nut anchor devices  
(Type 2) per Standard Drawing "TS-FD".

① See Sheet "DMA-80"

SHEET 1 OF 2



## TRAFFIC SIGNAL SUPPORT STRUCTURES STRAIN POLE ASSEMBLIES

(80 MPH WIND ZONE)

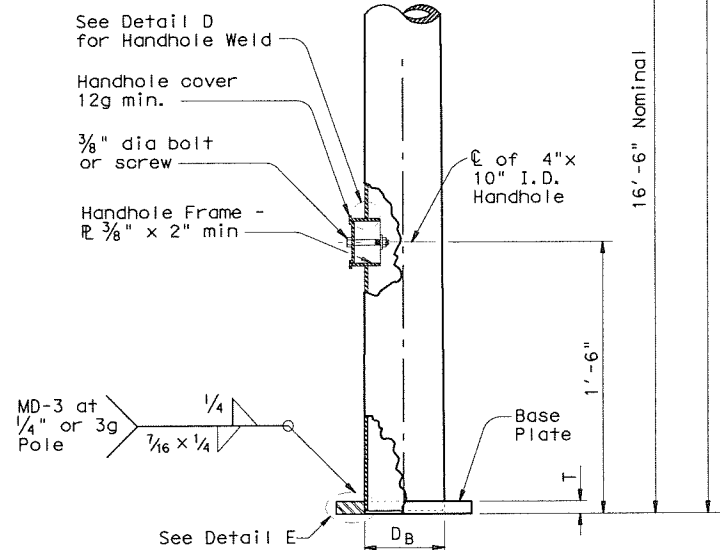
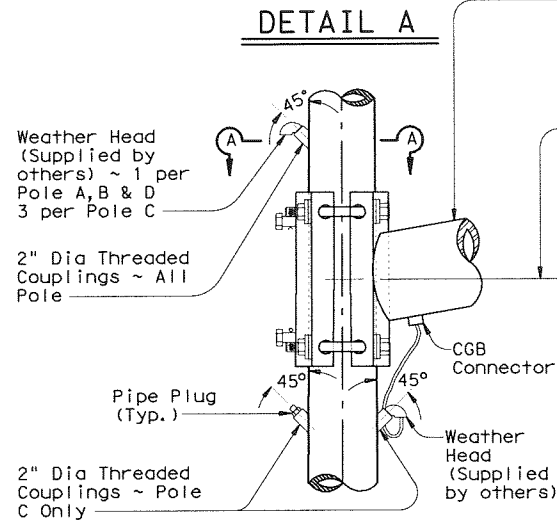
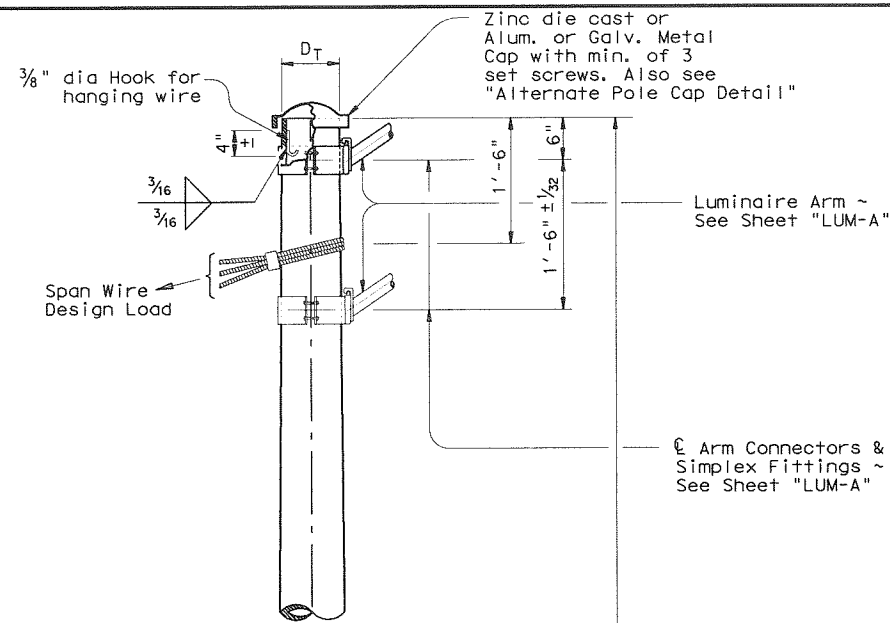
SP-80(1)-12

© TxDOT March 1996		DN: MS	CK: JSY	DW: BR	CK: JS
REVISIONS		CONT	SECT	JOB	HIGHWAY
6-96		.	.	.	.
1-12		DIST	COUNTY		SHEET N
		.	WILLIAMSON		24

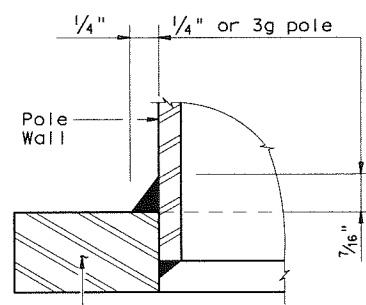
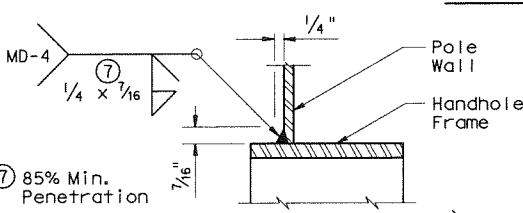
120A

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.

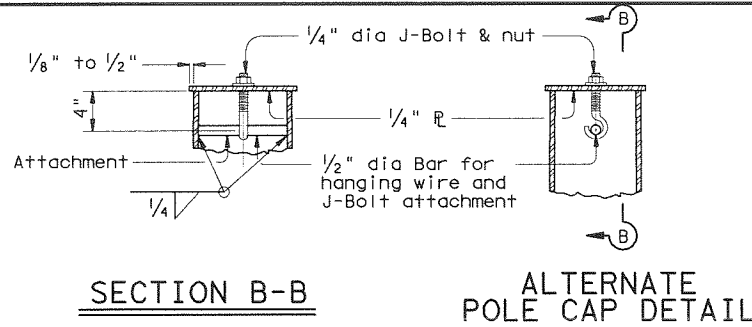
DATE: FILE:



**POLE ELEVATION**



**DETAIL E**



**SECTION B-B**

**ALTERNATE POLE CAP DETAIL**

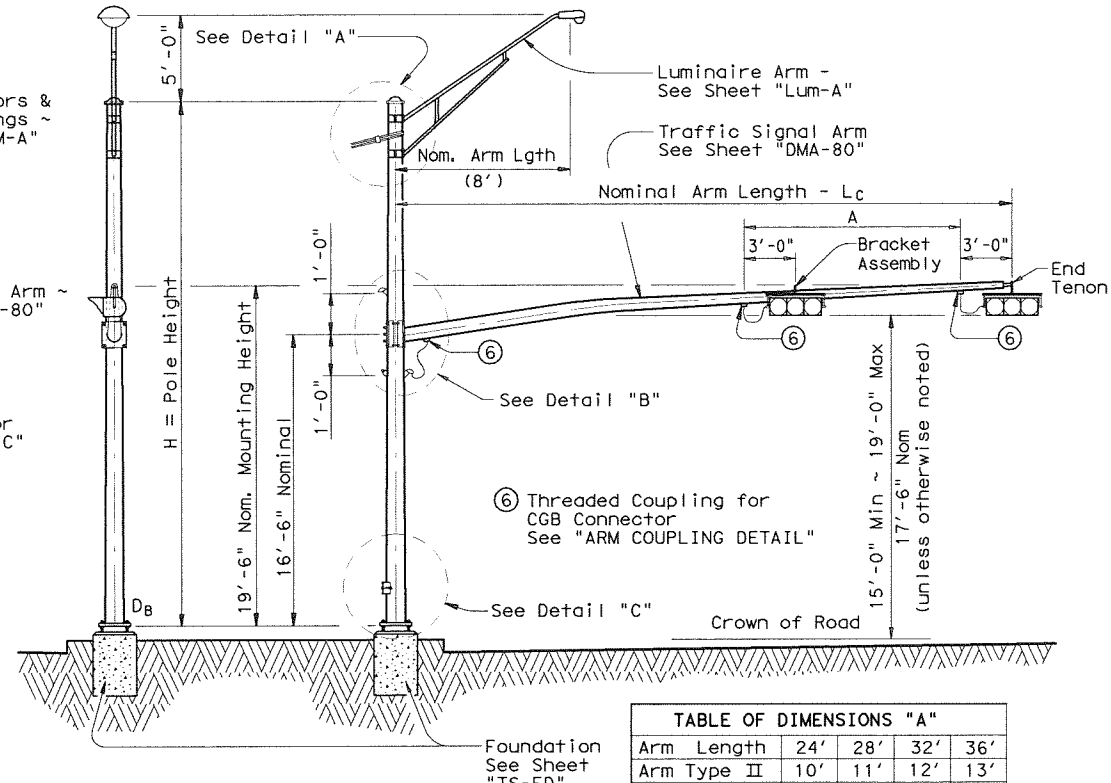


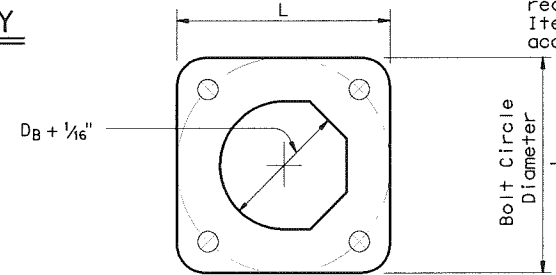
TABLE OF DIMENSIONS "A"				
Arm Length	24'	28'	32'	36'
Arm Type II	10'	11'	12'	13'
Arm Type III			10'	11'

**STRUCTURE ASSEMBLY**

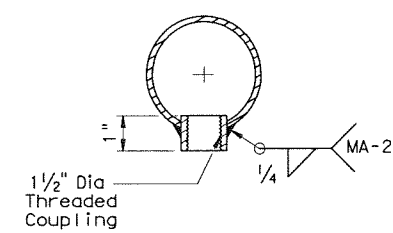
**SECTION A-A**

(Pole Coupling and Seam Weld Details)

⑧ 60% Min. penetration, except 100% penetration within 6" of circumferential base welds.



**BASE PLATE PLAN**



**ARM COUPLING DETAIL**

**MATERIALS**

Round Shafts or Polygonal Shafts⑨	ASTM A595 Gr. A, A588, A1008 HSLAS Gr. 50 Class 2, A1011 HSLAS Gr. 50 Class 2, A572 Gr. 50 or A1011 SS Gr. 50 ⑩
Plates ⑨	ASTM A36, A588, or A572 Gr. 50
Connection Bolts	ASTM A325 except where noted
Pin Bolts	ASTM A325
Pipe ⑨	ASTM A53 Gr. B, A501, A1008 HSLAS-F Gr. 50, A1011 HSLAS-F Gr. 50
Steel Cable	ASTM A475, 7 Wire Utilities Grade
Misc. Hardware	Galvanized steel or stainless steel or as noted

⑨ ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F, or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

⑩ ASTM A1011 SS Gr. 50 shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

**GENERAL NOTES**

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor. The maximum permissible span wire design loads tabulated are calculated at a stress load of 1.4 times the basic allowable stress. A simultaneous wind on the pole, mast arm, and luminaire is also included.

See standard sheet "DMA-80" for details of clamp-on traffic signal arms, sheet "MA-C" for traffic signal arm connection details, sheet "LUM-A" for luminaire arm and connection details, and sheet "TS-FD" for anchor bolt and foundation details.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

Foundation Type	Anchor Bolt Diameter	Bolt Hole Diameter	Bolt Circle Diameter	Base R. Dim. L x T
36-A	1 3/4"	2"	19"	19" x 1 3/4"
36-B	2"	2 1/4"	21"	21" x 2"

SHEET 2 OF 2

Texas Department of Transportation  
Traffic Operations Division

**TRAFFIC SIGNAL  
SUPPORT STRUCTURES  
STRAIN POLE ASSEMBLIES**

(80 MPH WIND ZONE)

**SP-80(2)-12**

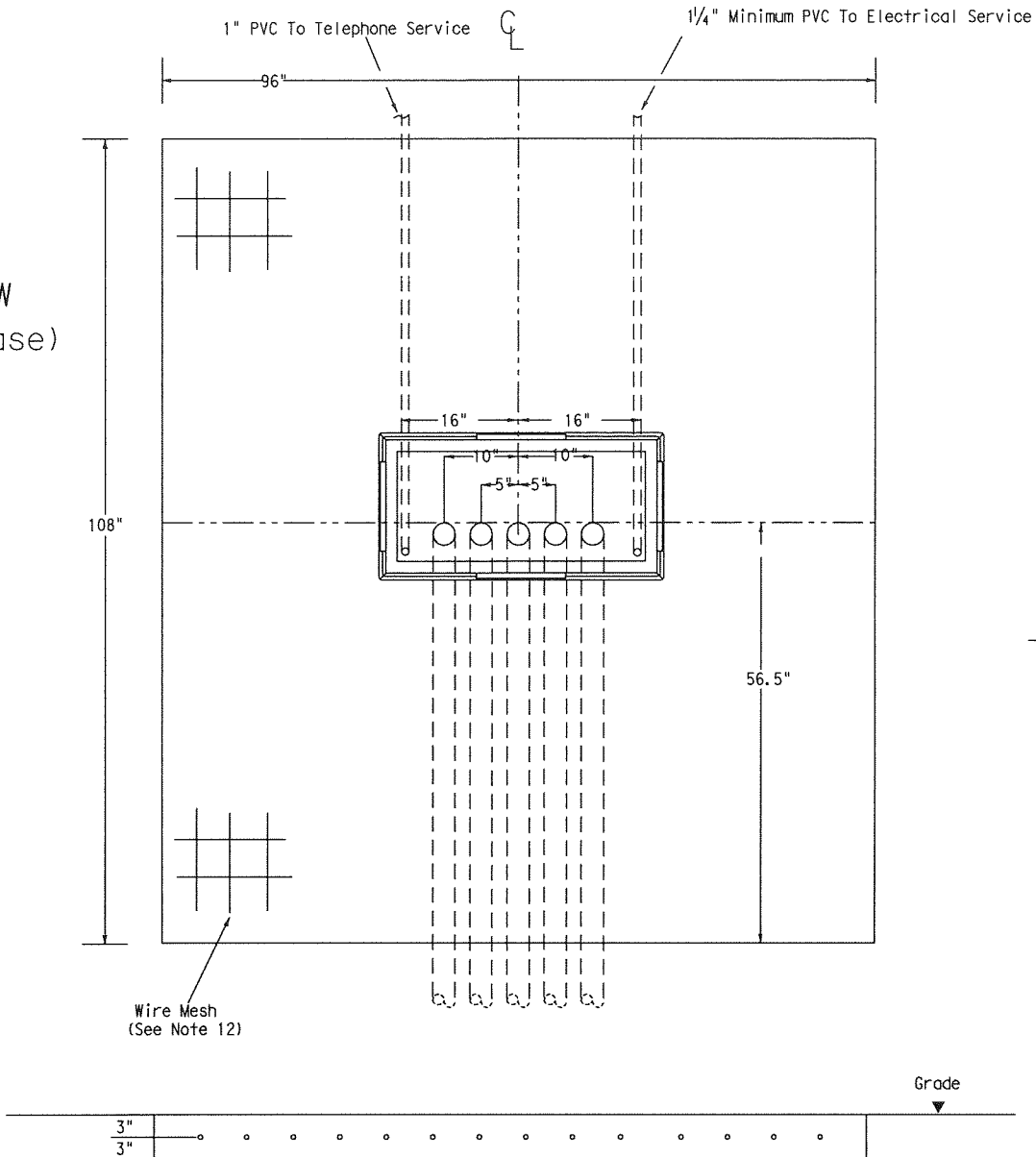
© TxDOT March 1996	DN: MS	CK: JSY	DW: BR	CK: JSY
6-96 1-12	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY	SHEET NO.	
		WILLIAMSON	25	



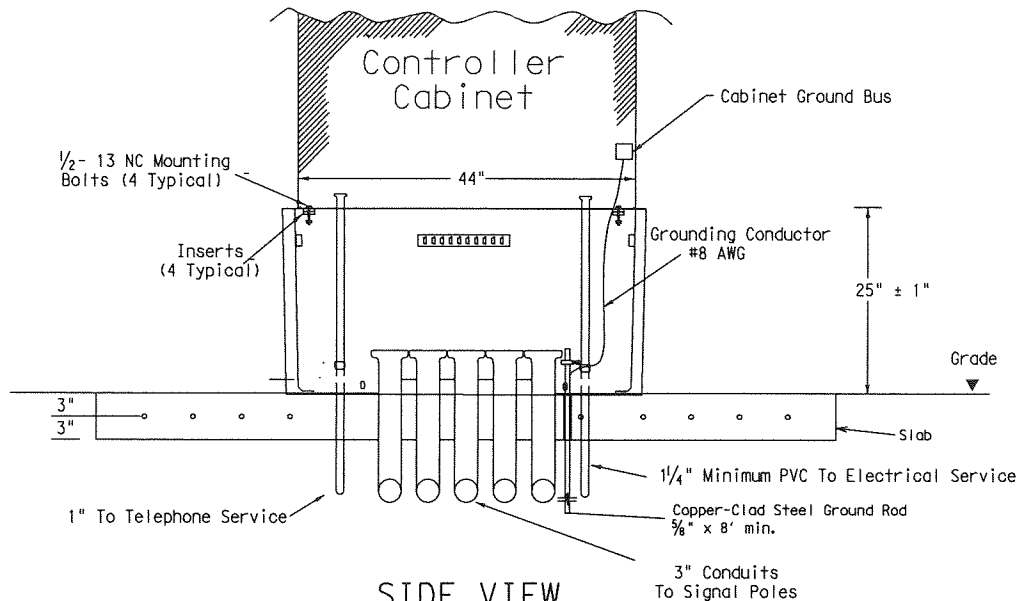
DISCLAIMER  
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

LEVELS DISPLAYED														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60	61	62	63	64	65

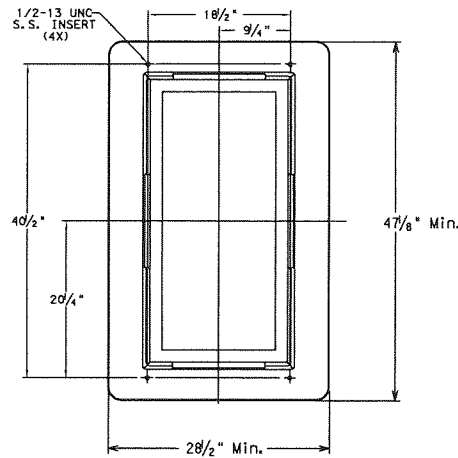
TOP VIEW  
(Slab & Base)



SIDE VIEW  
(Slab & Base)



CABINET BASE



TRAFFIC SIGNAL CONTROLLER BASE:

1. Provide a traffic signal controller base (cabinet base) manufactured of polymer concrete material consisting of calcareous and siliceous stone; glass fibers and thermoset polyester resin. The polymer concrete cabinet base must be reinforced on the inside of the cabinet base with fiberglass matting. Provide one of the following bases: Armorcast Part # A6001848X24, Quazite Model # PG3048Z709, or other as approved by TxDOT Traffic Operation Division.
2. The polymer concrete material must have a minimum compressive strength of 10,300 pounds per square inch (psi), minimum flexural strength of 3600 psi, and minimum shear strength of 3600 psi.
3. The polymer concrete cabinet base must conform to the dimensions shown and must accommodate a standard TxDOT basemount cabinet.
4. Supply the cabinet base with four 1/2"-13 UNC stainless steel inserts for attachment of the cabinet to the base. Inserts must withstand a minimum torque of 50 ft-lb and a minimum straight pull out strength of 750 lbs.
5. Provide the cabinet base with 4 cable racks mounted one on each side of the base 2" to 7" from the top edge of the base. Unless approved otherwise, cable racks must be 1-1/2 x 3/8 x 3/8 inch steel channel with eight T-slots spaced at 1-1/2 inches. The cable racks must easily accommodate the insertion of tie wraps to attach field wiring to the racks to serve as strain relief. Secure cable racks to the base using 1/2"-13 UNC stainless steel screws and inserts.
6. The cabinet base, when secured to the concrete slab with controller cabinet attached, must withstand a minimum wind load of 125 mph or a 850 lb force applied at 49" above the bottom of the base without causing the base or cabinet to come out of their anchored position or cause any permanent deformation. The manufacturer must supply certification by an independent testing laboratory or sealed by a Texas Licensed Professional Engineer. Provide the cabinet base with hardware for attachment to a concrete slab.
7. The traffic signal base must be permanently marked either by impress or by permanent ink with the manufacturer's model number and name or logo.
8. Seal the base to the concrete with a silicone caulk bead and fastened to the slab per manufacturer's instructions.

CONCRETE SLAB:

9. Traffic signal controller pad must be a portland cement concrete slab poured in place, must conform to the dimensions shown, and must be level.

10. Bond a #8 AWG copper ground wire and an 8 ft ground rod bonded to the reinforcing mesh by a suitable UL Listed clamp and terminated to the cabinet grounding bus for the purpose of providing a local ground for the electrical grounding conductor. The electrical grounding conductor specified in Item 680-3.A.4 is required and must be terminated to the cabinet ground bus.
11. Install a PVC sleeve to prevent the ground rod from direct embedment in the slab.
12. Provide welded wire mesh 6X6-W2.9 X W2.9 for reinforcement. Provide joints and splices in the mesh with a minimum 6-inch overlap. Center the mesh between top and bottom and provide a minimum 3 inch cover on the edges.
13. Provide Class B concrete minimum for the slab in accordance with Item 421. Construct the slab in accordance with Item 531.

CONDUITS:

14. Stub up and run 3-inch conduits through the slab to the various traffic signal poles and ground boxes as shown on the layouts. Install the number of conduits as shown on layouts plus two additional 3 inch conduits for future use. Terminate the conduits with a bushing between 2 and 4-inches above the slab.
15. Extend conduits for future use at least 18-inches from the edge of the slab, terminate underground with a coupling, and cap and seal so that the seal can be removed without damaging the coupling. This must also apply to unused telephone conduit.
16. Stub up two separate conduits through the slab from the electrical and telephone services. Run the conduit for the electrical feed directly to the electrical service enclosure. Run the conduit for the telephone line directly to the telephone service, usually located on the same pole as the electrical service. Telephone must not under any circumstance share a conduit with any other function.
17. Terminate electric and telephone conduits above the slab with a coupling. After the base is installed, extend the conduits above the top of the base and secure to the base using a steel one-hole strap or similar suitable substitute.

CONTROLLER CABINET:

18. Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.

19. The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:

20. Bid TS-CF as subsidiary to Item 680.



TRAFFIC SIGNAL  
CONTROLLER CABINET  
BASE AND PAD

TS-CF-04

© TxDOT October 2000	DN- HW	CG-	DN- CJ	CG- CAL
REVISIONS 12-04	STATE DISTRICT 6	FEDERAL REGION	FEDERAL AID PROJECT	SHEET 26
COUNTY WILLIAMSON	CONTROL	SECTION	JOB	HIGHWAY

DATE: \_\_\_\_\_  
FILE: \_\_\_\_\_

	128
--	-----



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.

DATE: FILE:

GENERAL NOTES FOR ALL ELECTRICAL WORK

- 1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.
- 2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.
- 3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is 1/2 in. or less in diameter.
- 4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.
- 5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaïres; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.
- 6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

- 1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.
- 2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.
- 3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.


AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

- 4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.
- 5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.
- 6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.
- 7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

- 8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.
- 9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.
- 10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

- 1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.
- 2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.
- 3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.
- 4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.
- 5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."
- 6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.
- 7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.
- 8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.
- 9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.
- 10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.
- 11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.
- 12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).
- 13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.
- 14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS  
CONDUITS & NOTES

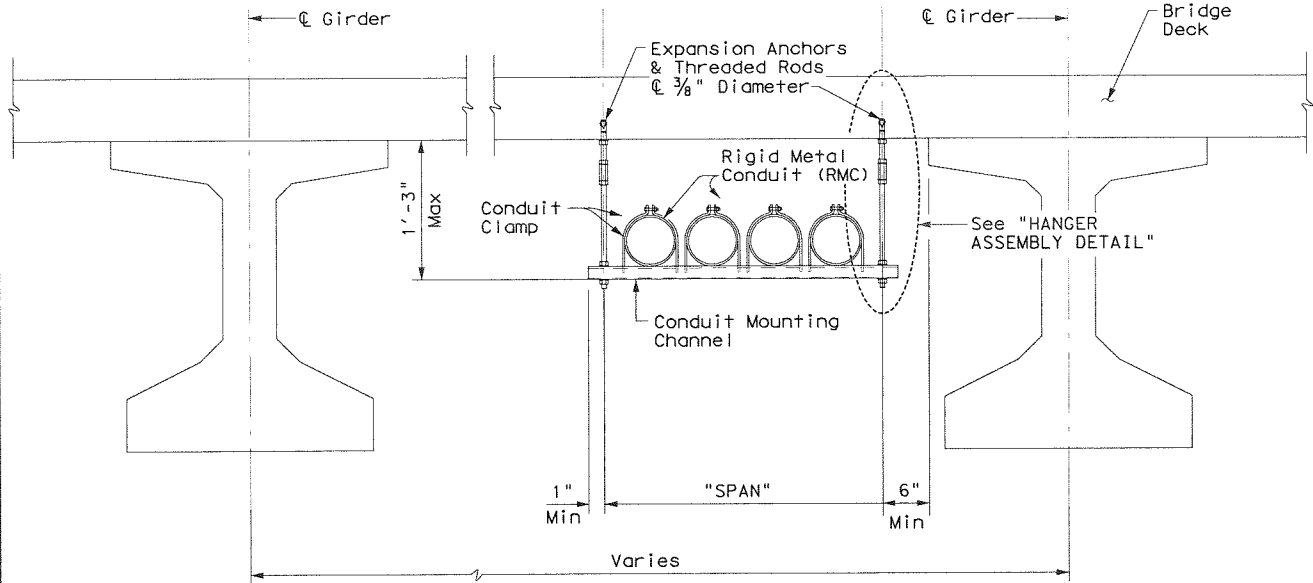
ED(1)-14

FILES: ed1-14.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
	DIST	COUNTY	SHEET NO.	
		WILLIAMSON	28	



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.

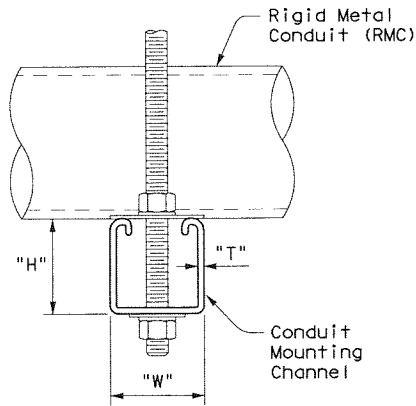
DATE: FILE:



CONDUIT HANGING DETAIL

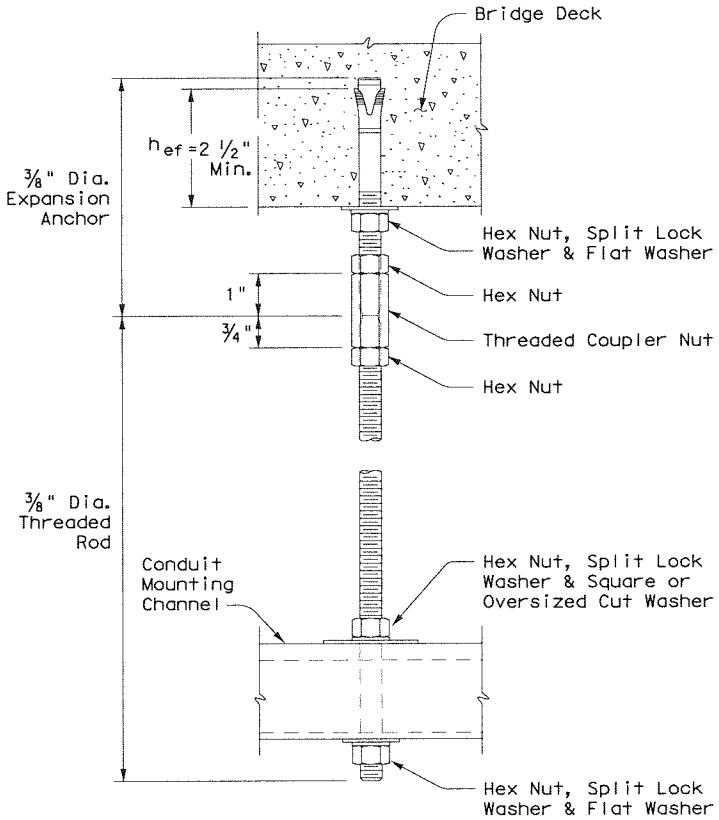
"SPAN"	"W" x "H"	"T"
less than 2'	1 5/8" x 1 3/8"	12 Ga.
2'-0" to 2'-6"	1 5/8" x 1 5/8"	12 Ga.
>2'-6" to 3'-0"	1 5/8" x 2 7/16"	12 Ga.

Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.



HANGER ASSEMBLY DETAIL

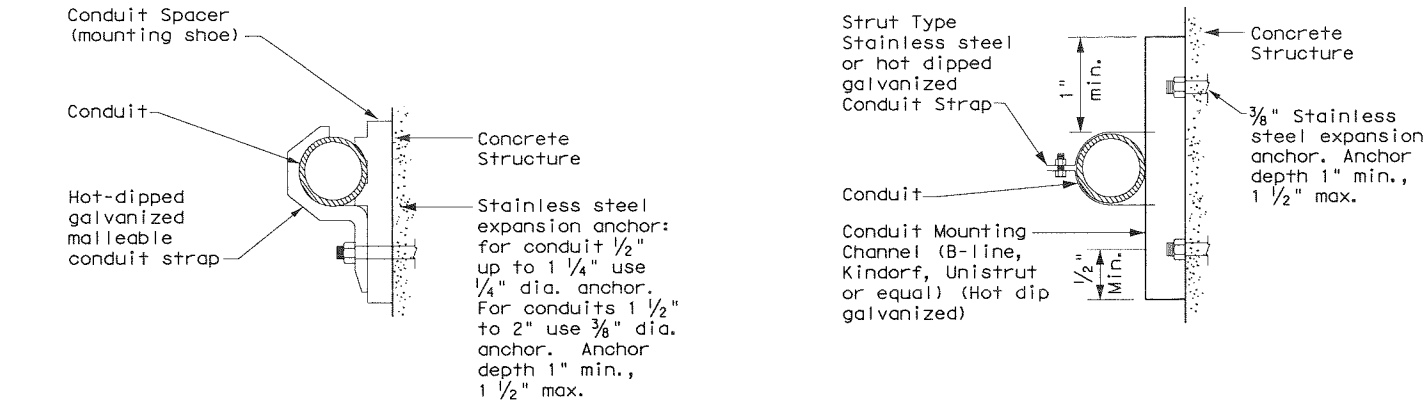
ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT



TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL


EXPANSION ANCHOR NOTES FOR BRIDGE DECK ATTACHMENT

1. Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). The chosen anchor product shall have a designated ICC-ES Evaluation Report number, and its approval status shall be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.
2. Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.
3. Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environment, both the anchor body and expansion wedge shall be stainless steel.
4. Install anchors as shown on the plans and in accordance with the anchor manufacturer's published installation instructions. Arrange a field demonstration test to evaluate the procedures and tools. The test shall be witnessed and approved by the Engineer prior to furnishing anchors on the structure.
5. Prior to hole drilling, use rebar locator to ensure clearing of existing deck strands or reinforcement. Install anchors to ensure a minimum effective embedment depth, ( $h_{ef}$ ), as shown. Increase ( $h_{ef}$ ) as needed to ensure sufficient thread length for proper torquing and tightening of anchors.
6. Use anchors of minimum 1600 Lbs tensile capacity (minimum of steel, concrete breakout, and concrete pullout strengths as determined by ACI 318 Appendix D) at the required minimum embedment depth ( $h_{ef}$ ). No lateral loads shall be introduced after conduit installation.



CONDUIT MOUNTING OPTIONS

Attachment to concrete surfaces  
See ED(1)B.2



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS

CONDUIT SUPPORTS

ED(2)-14

FILE: ed2-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CS: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY	SHEET NO.	
		WILLIAMSON	29	

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 from its use.

DATE: FILE:

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.
2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.
3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.
4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.
4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.
5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

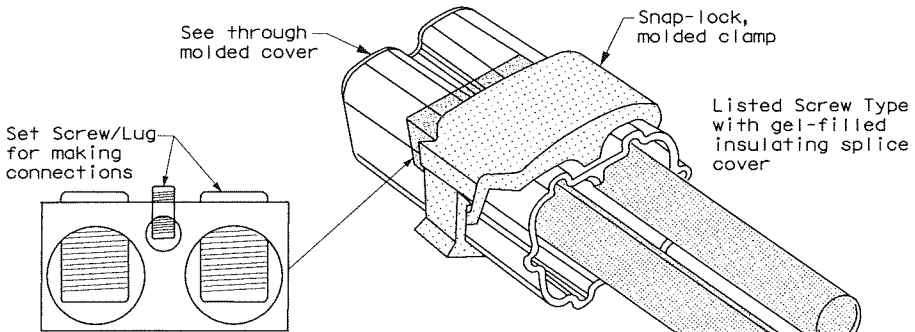
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

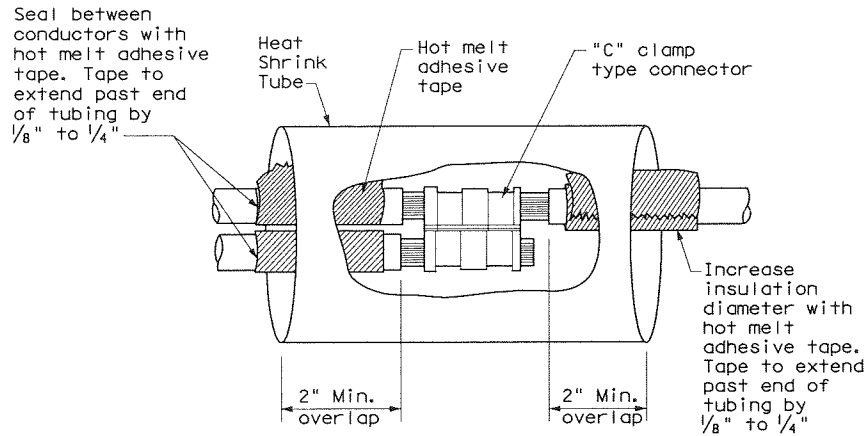
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

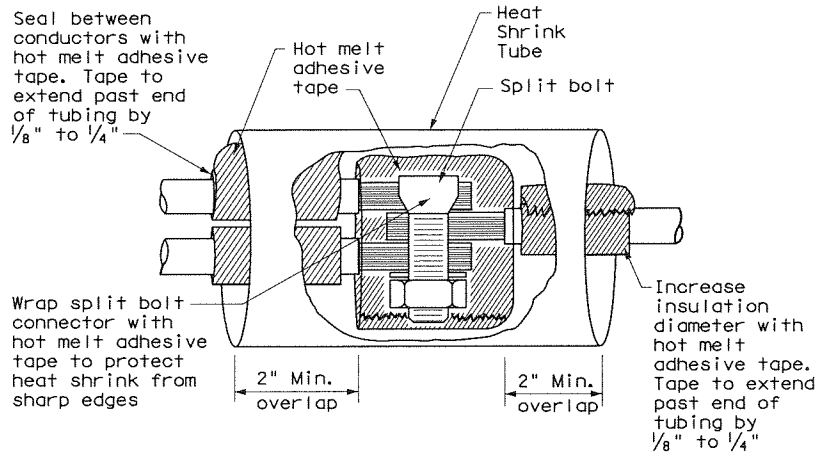
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a timber pole.
3. Install ground rods so the imprinted part number is at the upper end of the rod.
4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 3  
Listed Screw Type



SPLICE OPTION 1  
Compression Type

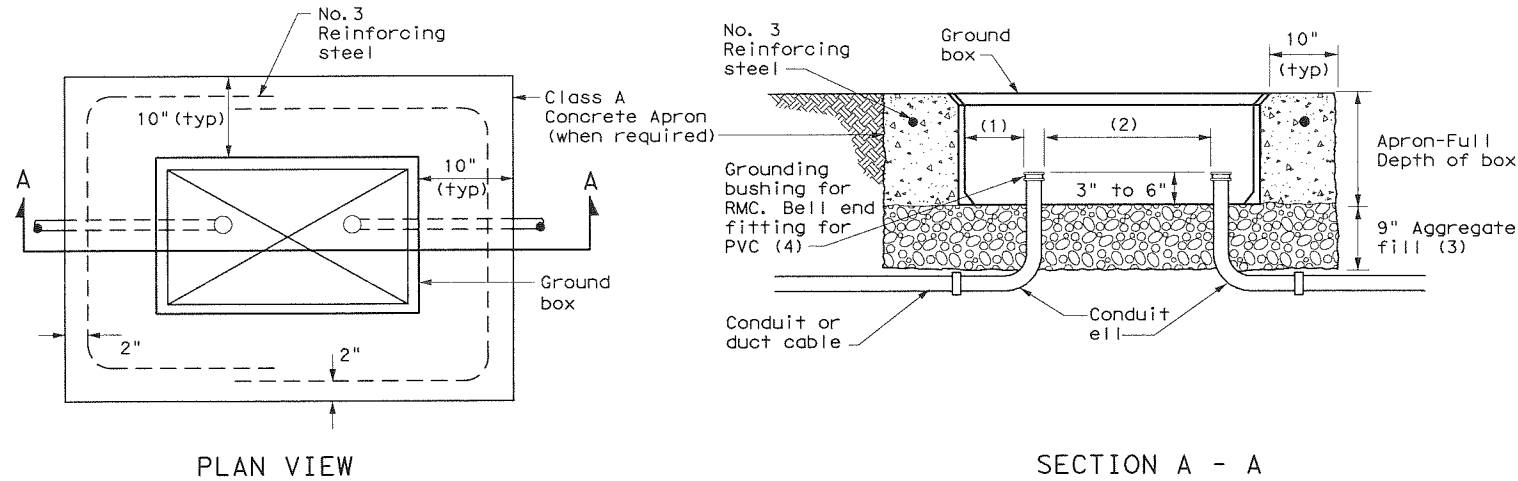


SPLICE OPTION 2  
Split Bolt Type

		Traffic Operations Division Standard	
ELECTRICAL DETAILS CONDUCTORS			
ED(3)-14			
FILE: ed3-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT October 2014	CONT	SECT	JOB
REVISIONS	DIST	COUNTY	SHEET NO.
		WILLIAMSON	30

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.

DATE: FILE:

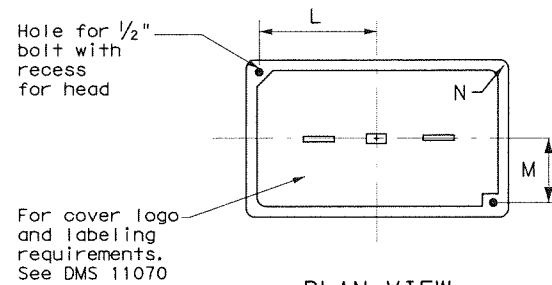


APRON FOR GROUND BOX

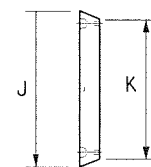
- (1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.
- (2) Maintain sufficient space between conduits to allow for proper installation of bushing.
- (3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.
- (4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

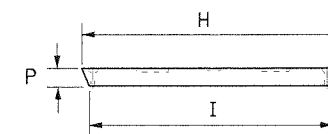
GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



PLAN VIEW



END



SIDE

GROUND BOX COVER

## GROUND BOXES

### A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."
2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

### B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.
2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.
3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.
4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.
5. Temporarily seal all conduits in the ground box until conductors are installed.
6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.
7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.
8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.
9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.
10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.
11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

				<b>Texas Department of Transportation</b>				<b>Traffic Operations Division Standard</b>			
<h2>ELECTRICAL DETAILS</h2> <h2>GROUND BOXES</h2> <h3>ED(4)-14</h3>											
FILE:	ed4-14.dgn	DN:	TxDOT	CK:	TxDOT	OW:	TxDOT	CK:	TxDOT		
© TxDOT October 2014		CONT	SECT	JOB		HIGHWAY					
REVISIONS		DIST		COUNTY		SHEET NO.					
				WILLIAMSON		31					

DISCLAIMER: 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.

DATE: FILE:

ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.
2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services," DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.
3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.
4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.
5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.
6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.
7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.
8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.
9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.
10. Provide rigid metal conduit (RMC) for all conduits on service, except for the 1/2 in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.
11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.
12. Ensure all mounting hardware and installation details of services conform to utility company specifications.
13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.
14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.
15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.
2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.
3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.
4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

* ELECTRICAL SERVICE DATA												
Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 1/4"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 1/4"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

\* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

\*\* Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National Electrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

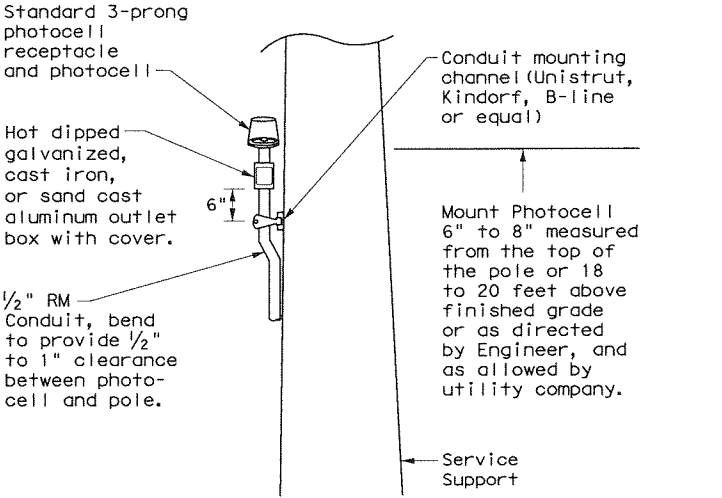
- Schematic Type
- Service Voltage V / V
- Disconnect Amp Rating  
000 indicates main lug only/  
Typically Type T
- (SS)= Safety Switch Ahead of Meter-Check with Utility  
(NS)= No safety Switch Ahead of Meter-Check with Utility
- Enclosure Type  
GS= Galvanized steel("off the shelf")  
SS= Stainless steel(Custom Enclosure)See MPL  
AL= Aluminum (Custom Enclosure)See MPL
- Photocell Mounting Location  
(E)= Inside Service/Enclosure Mounted  
(T)= Top of pole  
(L)= Luminaire mounted  
(N)= None/No Photocell or Lighting Contactor Required
- Service Support Type  
GC= Granite concrete  
OC= Other concrete  
TP= Timber pole  
SP= Steel pole  
SF= Steel frame  
OT= Pole by others or paid for separately  
EX= Existing pole  
TS= Service on traffic signal pole  
PS= Pedestal Service
- O= Overhead Service Feed from Utility  
U= Underground Service Feed from Utility

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.
2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS

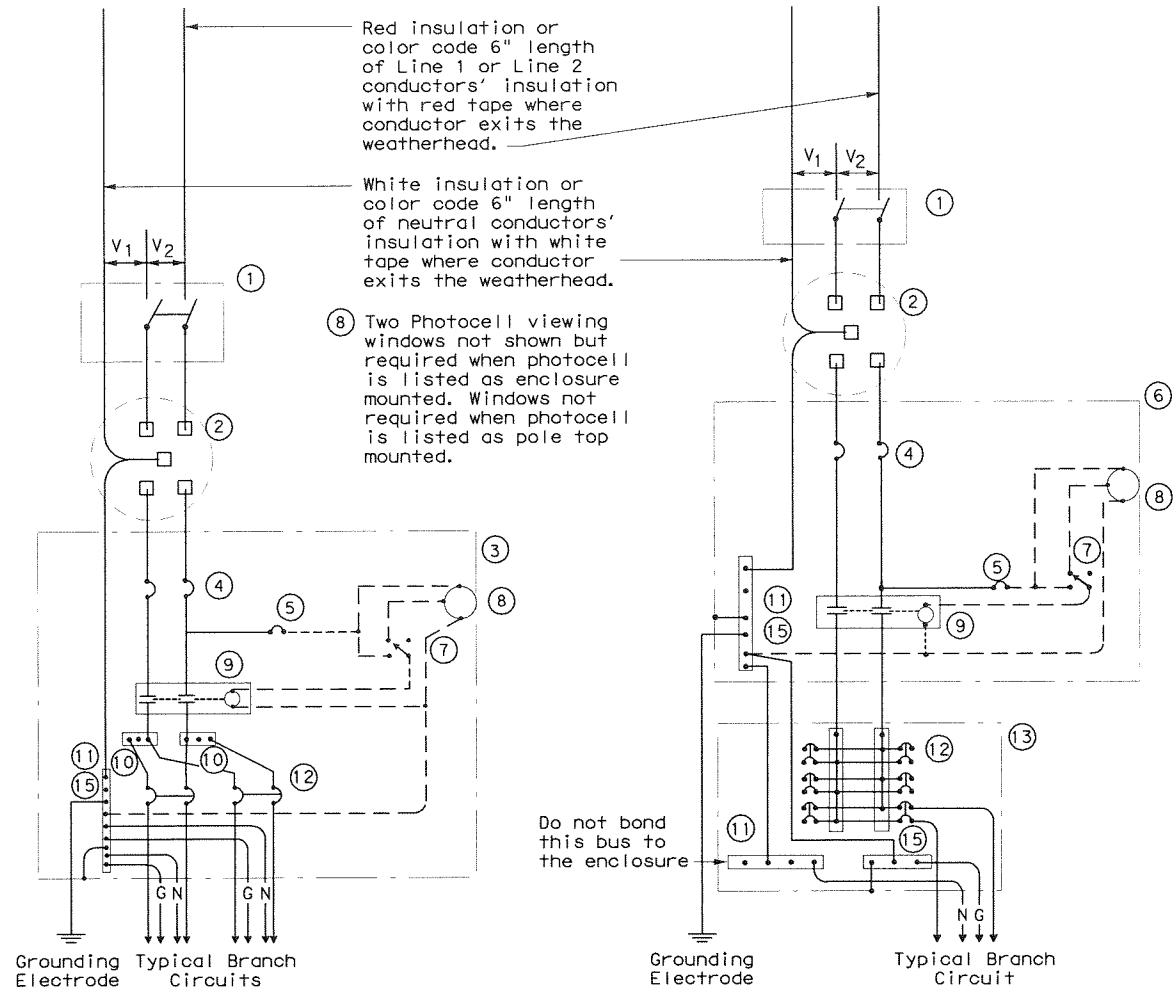
SERVICE NOTES & DATA

ED(5)-14

FILE: ed5-14.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
	DIST	COUNTY	SHEET NO.	
		WILLIAMSON	32	

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.

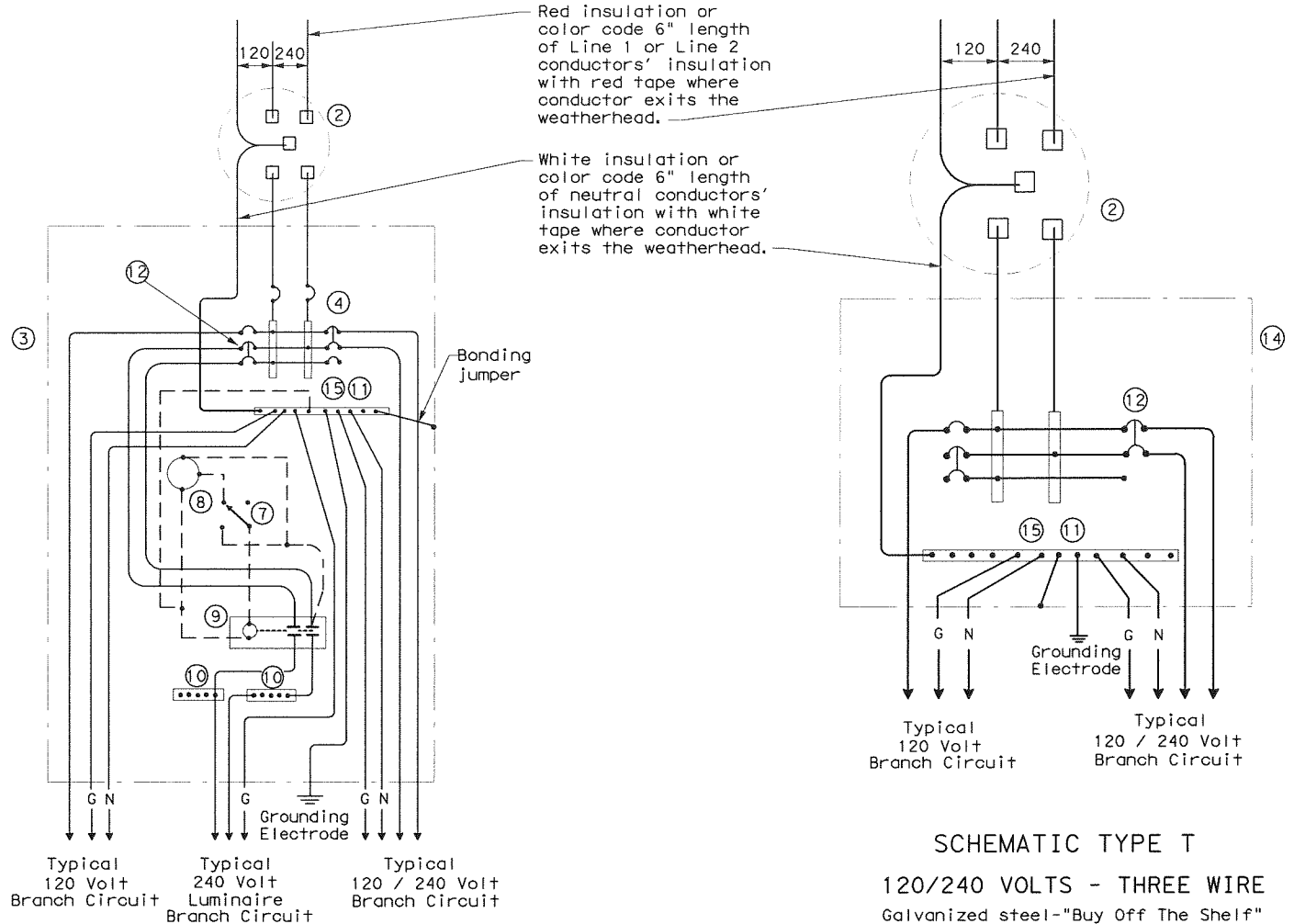
DATE:  
FILE:



SCHEMATIC TYPE A  
THREE WIRE

SCHEMATIC TYPE C  
THREE WIRE


WIRING LEGEND	
————	Power Wiring
-----	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required



SCHEMATIC TYPE D - CUSTOM  
120/240 VOLTS - THREE WIRE

SCHEMATIC TYPE T  
120/240 VOLTS - THREE WIRE  
Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit+)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

 <b>Texas Department of Transportation</b>		<b>Traffic Operations Division Standard</b>	
<div>ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES ED (6) - 14</div>			
FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT October 2014	CONT	SECT	JOB
REVISIONS			
	DIST	COUNTY	SHEET NO.
		WILLIAMSON	33



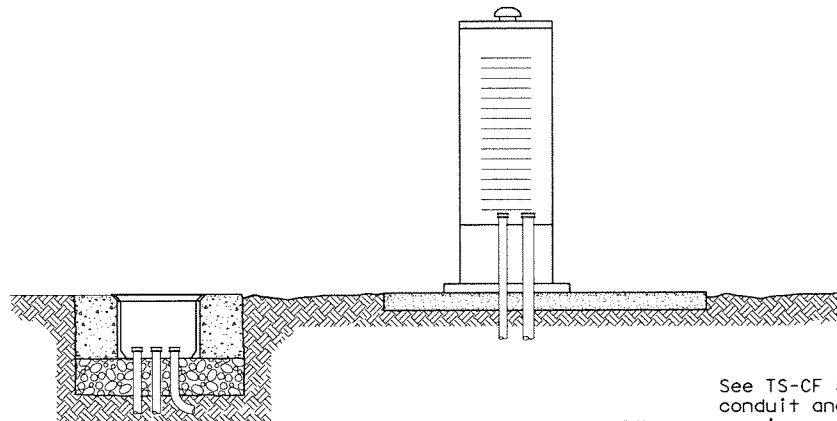
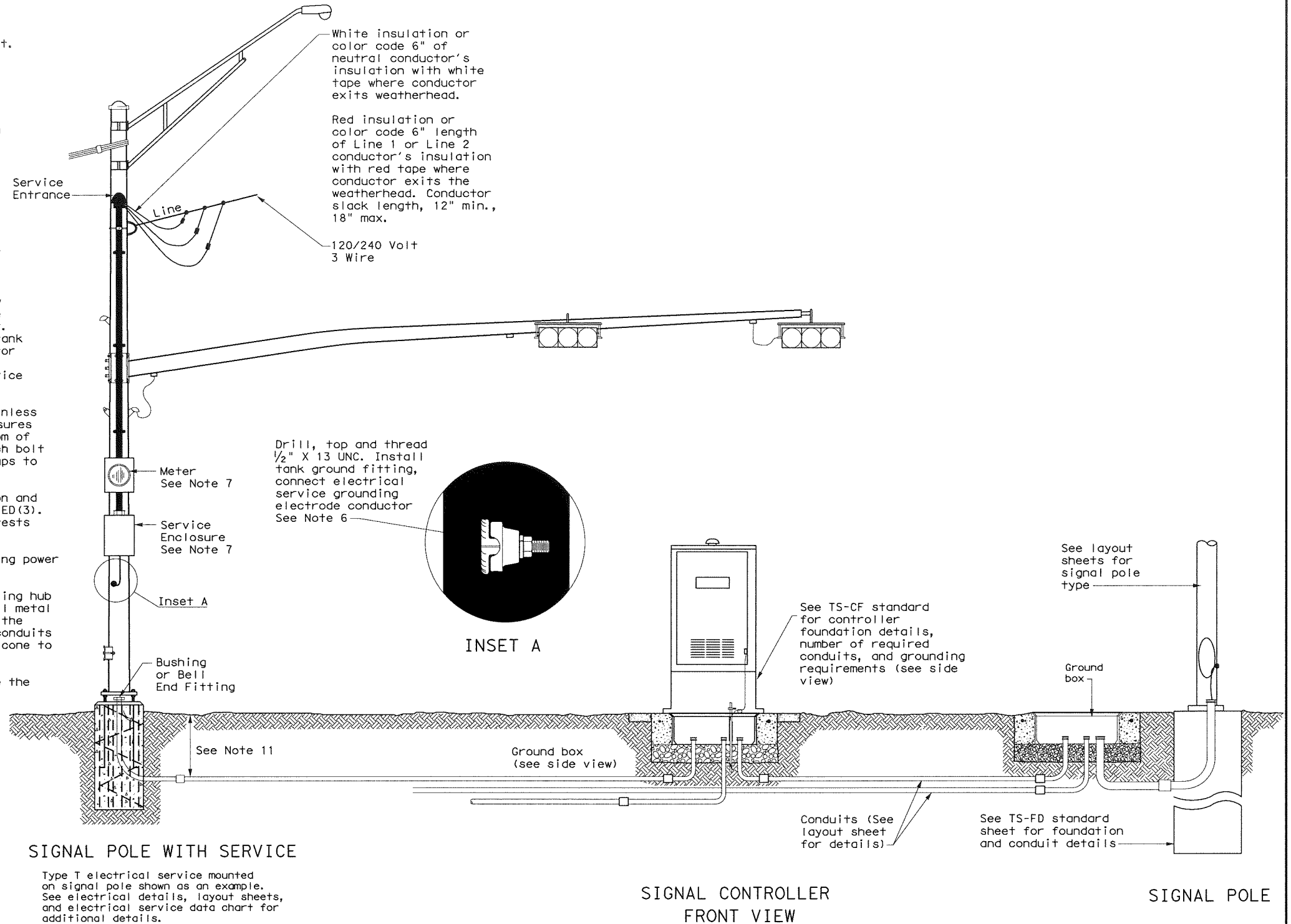


DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:  
FILE:

## TRAFFIC SIGNAL NOTES

1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TxDOT standard TS-FD for further details.
6. Drill and tap signal poles for 1/2 in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of 3/4 in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".



SIGNAL CONTROLLER  
SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.

		<b>Texas Department of Transportation</b>		<b>Traffic Operations Division Standard</b>	
<b>ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS</b>					
<b>ED(8) - 14</b>					
FILE: ed8-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY	
REVISIONS		DIST		COUNTY	SHEET NO.
				WILLIAMSON	35

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.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	ACC:
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	

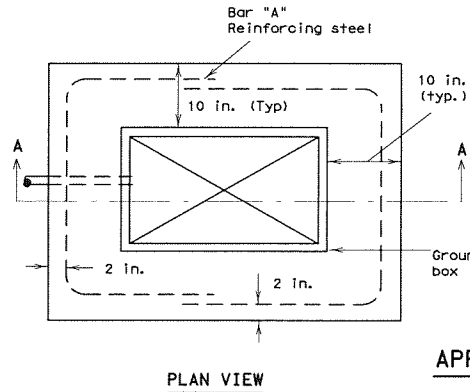
GROUND BOX - Type - Battery Box

A. MATERIALS

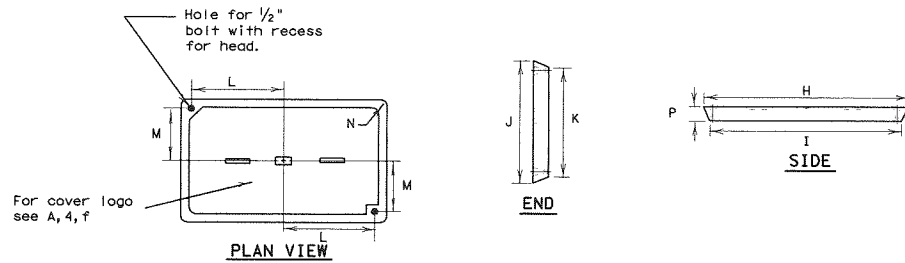
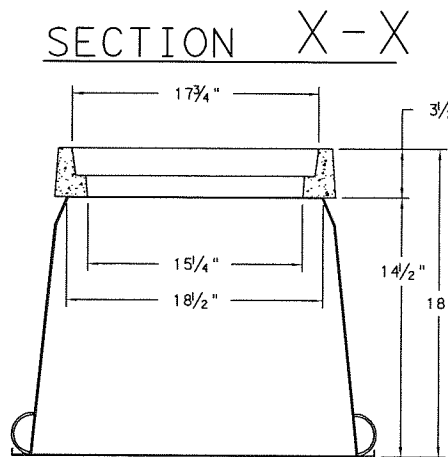
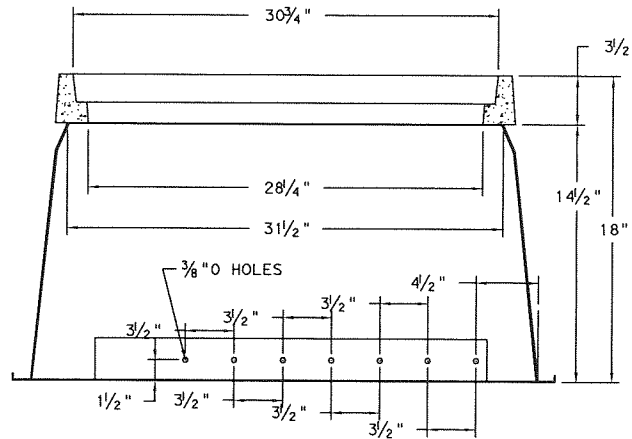
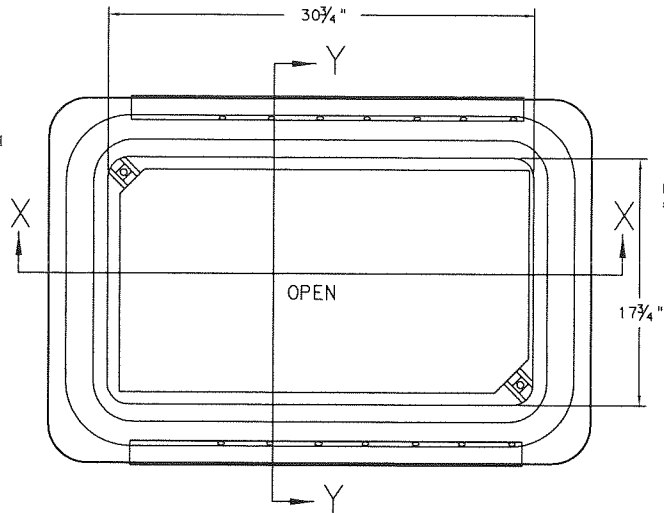
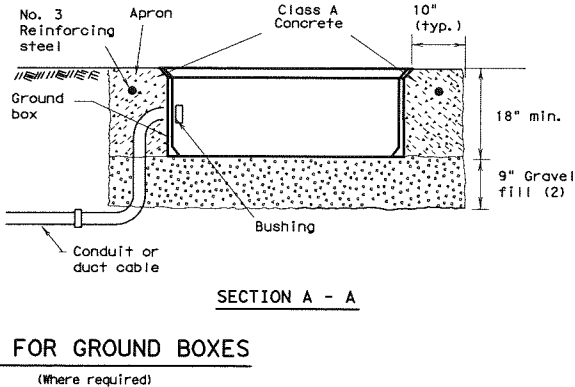
- Battery box ground boxes shall be constructed such that it will be possible to install and accommodate up to 4 batteries measuring 8" x 13.5" x 10" (W x L x D).
- All battery box ground boxes and covers shall be permanently marked either by impress or by permanent ink, with manufacturer's model number and manufacturer's name or logo.
- Covers shall be bolted down, and bolt holes in the box shall be arranged to drain dirt.
- Battery box ground boxes shall meet the following requirements:
  - Battery box cover and cover ring will be manufactured from polymer concrete reinforced with continuous strands of woven or stitched borosilicate fiberglass cloth. The polymer concrete shall be made from catalyzed polyester resin, sand and aggregate, and shall have a minimum compressive strength of 11,000 psi. Polymer concrete containing chopped fiberglass or fiberglass reinforced plastic is not acceptable.
  - Battery box ground box walls will be manufactured from fiberglass reinforced plastic reinforced with continuous strands of woven or stitched borosilicate fiberglass cloth. The fiberglass reinforced plastic shall be made from catalyzed polyester resin, lightweight filler and reinforced with woven roving and shall have a minimum compressive strength of 7,500 psi.
  - Minimum inside dimensions shall be at least as follows (width x length x depth):  
Battery box shall be at least 15 1/4 inches x 28 1/4 inches x 14 1/2 inches.
  - Bottom edge of box or extension shall be footed with a minimum 1/2 inch flange.
  - Battery ground boxes shall withstand 600 lbs. per sq. ft. applied over the entire sidewall with less than 1/4 inch deflection per foot length of box. Ground boxes and covers shall withstand a test loading of 20,000 lbs. over a 10 inch by 20 inch area centered on the cover with less than 1/2 inch deflection. Battery ground boxes and covers shall meet Western Underground Standards 3.6. Manufacturer shall supply certification by an independent laboratory or sealed by a Texas-Licensed Professional Engineer.
  - Covers shall be 2 inch thick polymer concrete. All hardware shall be stainless steel. Cover shall be secured with two 1/2 inch stainless steel bolts. Bolts shall be self-retaining and shall withstand a minimum of 70 ft-lbs. torque and shall have a minimum 750 lbs. straight pull out strength. Nuts shall be floating and shall provide a minimum of 1/2 inch movement from the center of the nut. Covers shall be skid resistant, minimum 0.5 coefficient of friction. Covers shall be interchangeable between manufacturers and shall conform to the dimensions shown herein. Unless otherwise approved by the Engineer, cover shall be legibly labeled, "Traffic Signals Danger High Voltage" in minimum 1 inch letters.
  - The battery box shall be supplied with predrilled holes to accept 3/8 inch stainless steel rods. The holes shall be installed 1 1/2 inches (+/- 1/4 inches) above the bottom edge of the box along the length of the box at 3 1/2 inch centers beginning 4 1/2 inches from the edge of the box.
  - A minimum of seven 3/8 inch stainless steel rods threaded on both ends shall come equipped to be inserted in the predrilled holes to serve as a rack sufficient to accommodate up to four batteries. The rods shall be secured in place utilizing 3/8" stainless steel (s.s.) nuts and 3/8" x 1" s.s. flat washers.
  - Ground boxes of the type specified above shall meet the requirements shown above. The Contractor will be permitted to furnish like materials of any manufacturer provided they are of equal quality and comply with the specifications.
  - Two 3/8" plastic sheets measuring a nominal 6" x 24" shall be supplied which are to be placed on the secured rods upon which the batteries (supplied by others) are to be set.
  - A minimum of four battery "bell jars" and respective tie down straps are to be supplied. These bell jars are inverted over the batteries and strapped to the batteries.

B. CONSTRUCTION METHODS

- Battery box ground boxes shall be set on a 9 inch (minimum) bed of coarse No. 1 aggregate as defined by Item 421. Gravel shall be in place prior to setting box and conduits shall be capped. Any gravel or dirt in conduit shall be removed.
- Construction of an apron enclosing the battery box ground box including concrete and reinforcing steel is required and shall not be paid for directly but shall be subsidiary to the ground box. Reinforcing steel may be field bent. Concrete for aprons shall be considered miscellaneous concrete for testing purposes. Aprons shall be cast in place.
- Any holes cut into the sidewall of battery box ground boxes shall be accomplished using a round hole saw or other method approved by the Engineer.

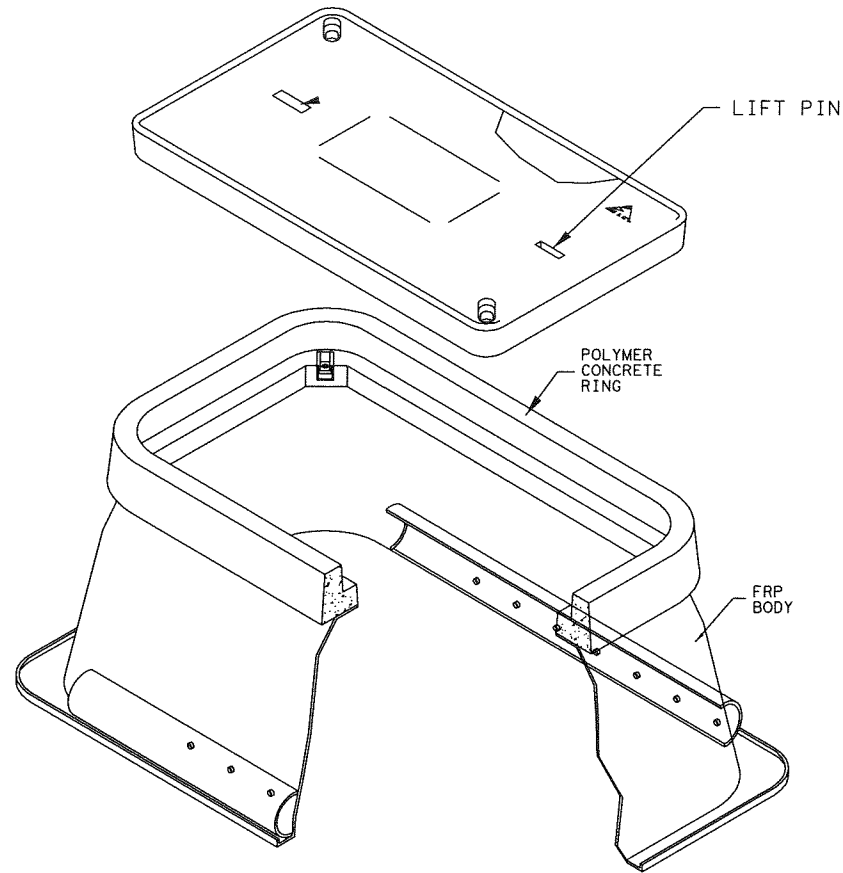


- Place gravel "under" the box, not "in" the box. Gravel should not encroach on the interior volume of the box.
- Install bushing on the upper end of all elis.
- All conduits shall be installed in a neat and workmanlike manner.



GROUND BOX COVER

GROUND BOX COVER DIMENSIONS								
BOX	DIMENSIONS (INCHES)							
SIZE	H	I	J	K	L	M	N	P
Battery box	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



STANDARD PLANS  
Texas Department of Transportation  
Traffic Operations Division

ELECTRICAL DETAILS  
GROUND BOXES/  
BATTERY BOX

ED(13)-03

© TxDOT May 2003	DN - HW	CK - BV	DN - HW	CK - CAL
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
	6			36
	COUNTY	CONTROL	SECTION	JOB
	WILLIAMSON			HIGHWAY



# WILLIAMSON COUNTY

## GATTIS SCHOOL AT WINTERFIELD PRECINCT NUMBER 4

FOR THE CONSTRUCTION OF TRAFFIC SIGNAL

### INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	QUANTITIES
3	EXISTING LAYOUT
4	PROPOSED TRAFFIC SIGNAL LAYOUT
5	PROPOSED SIGNING AND STRIPING LAYOUT
6	PROPOSED ELEVATIONS

ROADWAY	CLASSIFICATION	DESIGN SPEED
GATTIS SCHOOL	ARTERIAL	35 MPH
ROADWAY	ADT (CURRENT)	ADT (DESIGN YEAR)
GATTIS SCHOOL	N/A	N/A
ROADWAY	DHV (CURRENT)	DHV (DESIGN YEAR)
WINTERFIELD	N/A	N/A
ROADWAY	DIRECTIONAL DISTRIBUTION (D)	PERCENT TRUCKS (T)
GATTIS SCHOOL	52% EB/48% WB	2%

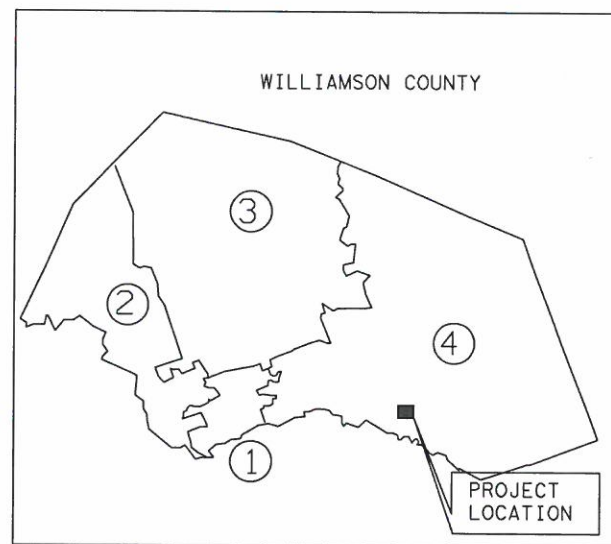
BEGIN PROJECT  
GATTIS SCHOOL/  
WINTERFIELD  
INTERSECTION



VICINITY MAP  
N. T. S.

EXCEPTIONS: N/A  
EQUATIONS: N/A  
RAILROAD CROSSINGS: 0  
WATERSHEAD: N/A  
AREA OF DISTURBANCE: INTERSECTION

REQUIRED SIGNS SHALL BE PLACED IN ACCORDANCE WITH STANDARD SHEETS BC(1)-14 THRU BC(12)-14 AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.:"



PREPARED BY: CLINTON JUMPER

*Clinton Jumper*  
CLINTON JUMPER  
SENIOR PROJECT MANAGER  
12/7/2015  
DATE



APPROVED BY:  
WILLIAMSON COUNTY

*Dan A. Gattis*  
DAN A GATTIS  
WILLIAMSON COUNTY JUDGE  
12-15-2015  
DATE

APPROVED BY:  
WILLIAMSON COUNTY

*Ron Morrison*  
RON MORRISON  
WILLIAMSON COUNTY COMMISSIONER, PRECINCT 4  
12/15/15  
DATE

APPROVED BY:  
HNTB CORPORATION

*Richard L. Ridings*  
RICHARD L RIDINGS, PE  
ROAD BOND MANAGER  
12/15/15  
DATE

TxDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES ADOPTED ON NOVEMBER 1, 2014 AND ALL APPLICABLE SPECIAL PROVISIONS AND SPECIAL SPECIFICATIONS AS INDICATED IN THE BID DOCUMENTS SHALL GOVERN ON THIS PROJECT.

MATERIALS TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR					
NO.	ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	ESTIMATED QUANTITY
1	0416	6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	22
2	0416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	26
3	0502	6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2
4	0618	6023	CONDT (PVC) (SCHD 40) (2")	LF	500
5	0618	6029	CONDT (PVC) (SCHD 40) (3")	LF	90
6	0618	6047	CONDT (PVC) (SCHD 80) (2") (BORE)	LF	75
7	0618	6054	CONDT (PVC) (SCHD 80) (3") (BORE)	LF	720
8	0620	6007	ELEC CONDR (NO. 8) BARE	LF	1000
9	0620	6008	ELEC CONDR (NO. 8) INSUL	LF	530
10	0620	6009	ELEC CONDR (NO. 6) BARE	LF	820
11	0620	6010	ELEC CONDR (NO. 6) INSULATED	LF	410
12	0624	6002	GROUND BOX TY A (122311) W/APRON	EA	2
13	0624	6010	GROUND BOX TY D (162922) W/APRON	EA	5
14	0628	6239	TY D (120/240)100(NS)SS(E)PS(U)	EA	1
15	0666	6041	REFL PAV MRK TY I (W) 12" (SLD) (090MIL)	LF	315
16	0666	6047	REFL PAV MRK TY I (W) 24" (SLD) (090MIL)	LF	96
17	0668	6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	1
18	0677	6007	ELIM EXT PAV MRK & MRKS (24")	LF	21
19	0680	6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1
20	0682	6001	VEH SIG SEC (12 IN) LED (GRN)	EA	9
21	0682	6002	VEH SIG SEC (12 IN) LED (GRN ARW)	EA	2
22	0682	6003	VEH SIG SEC (12 IN) LED (YEL)	EA	9
23	0682	6004	VEH SIG SEC (12 IN) LED (YEL ARW)	EA	4
24	0682	6005	VEH SIG SEC (12 IN) LED (RED)	EA	9
25	0682	6006	VEH SIG SEC (12 IN) LED (RED ARW)	EA	2
26	0682	6018	PED SIG SEC (12 IN) LED (COUNTDOWN)	EA	6
27	0682	6035	BACK PLATE (12 IN) (3 SEC) (VENTED) ALUM	EA	9
28	0682	6036	BACK PLATE (12 IN) (4 SEC) (VENTED) ALUM	EA	2
29	0684	6028	TRF SIG CBL (TY A) (14 AWG) (2 CONDR)	LF	30
30	0684	6029	TRF SIG CBL (TY A) (14 AWG) (3 CONDR)	LF	645
31	0684	6031	TRF SIG CBL (TY A) (14 AWG) (5 CONDR)	LF	470
32	0684	6033	TRF SIG CBL (TY A) (14 AWG) (7 CONDR)	LF	290
33	0684	XXXX	TRF SIG CBL (TY A) (14 AWG) (25 CONDR)	LF	385
34	0686	6025	INS TRF SIG PL AM(S) 1 ARM (24')	EA	1
35	0686	6033	INS TRF SIG PL AM(S) 1 ARM (32')	EA	1
36	0686	6047	INS TRF SIG PL AM(S) 1 ARM (44') (LUM)	EA	2
37	0687	6001	PED POLE ASSEMBLY	EA	2
38	0688	6001	PED DETECT PUSH BUTTON (APS)	EA	6
39	6002	6001	VIVDS PROCESSOR SYSTEM	EA	1
40	6002	6002	VIVDS CAMERA ASSEMBLY	EA	4
41	6002	6003	VIVDS SET-UP SYSTEM	EA	1
42	6002	6005	VIVDS COMMUNICATION CABLE (COAXIAL)	LF	625
43	6525	XXXX	EMERGENCY PREEMPTION DETECTOR SYSTEM	EA	1

NOTES:  
THE CONTRACTOR WILL PROVIDE SIGNAL CONTROLLER AND CABINET.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL ANCILLIARY ITEMS NOT INCLUDED OR LISTED IN THE BID ITEMS TO RESULT IN A COMPLETE AND OPERATIONAL TRAFFIC SIGNAL.

LOCAL ELECTRIC COMPANY RESPONSIBLE FOR PROVIDING POWER CABLES FROM TRANSFORMER TO FIRST GROUND BOX.

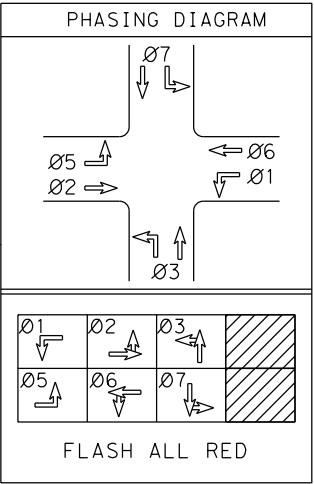
LOCATOR TONES TO BE USED FOR ACCESSIBLE PEDESTRIAN SIGNAL UNITS.

ELECTRICAL SERVICE DATA									
ELECTRICAL SERVICE #2 DESCRIPTION (SEE ED(4))	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT. BRK. POLE/AMP	TWO-POLE CONTACTOR AMPS ***	PANELBD./ LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRK. POLE /AMPS	KVA LOAD
TY D (120/240)100(NS)SS(E)PS(U)	1 1/4"	3/#4	N/A	2P/70	30	100	T. S. Lighting	1P/50 2P/15	<7.1

\*NOTE: SIZE MAY DIFFER DEPENDING ON THE LOCAL POWER PROVIDER'S REQUIREMENTS.

CONDUIT & CONDUCTOR SCHEDULE																		
CONDUIT/SPAN RUN NUMBER		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
CONDUIT SIZE IN INCHES		2	2	2	3	2	3	2	2	2	2	3	2	3	2	3	2	
RUN LENGTH IN FEET		275	40	75	75	10	10	10	10	25	30	25	70	15	30	20	95	10
NUMBER OF CONDUIT IN RUN		1	1	1	3	1	3	1	1	2	2	1	3	1	2	1	3	2
RUN TYPE		T	T	B	B	T	T	T	T	T	T	B	T	T	T	B	T	
		NUMBER OF CABLES IN RUN																
#6 INSUL	120 POWER	2	2	2		2	2											
#6 BARE	GROUND	1	1	1		1	1	1										
#8 BARE	GROUND				3		3		2	2	1	3	1	2	1	3	2	
#8 INSUL	ILLUM.				2			4		2							2	2
#14 AWG 3/C	EMERGENCY PREEMPTION DETECTION/STREET NAME				2		4		2	1		1	1	1		1	1	
#14 AWG 7/C	PED HEADS/PUSH BUTTONS				1		1			1	1				1			
#14 AWG 25/C	VEH SIGNAL/PED HEADS				2		3			1	1		1	1	1		1	1
VIVDS	2 IN 1 COAX/ POWER CABLE VIVDS				2		3			1	1		1	1	1		1	1
B - BORED CONDUIT									T - TRENCHED CONDUIT									

WIRING IN ARMS & POLES						
INSIDE ARMS AND POLES	#14 AWG 2/C	#14 AWG 3/C	#14 AWG 5/C	#14 AWG 7/C	VIVDS	LUMINAIRE
POLE #1						
HEAD W1			10			
DET Pb 1	5					
EMERGENCY		35				
HEAD H1			45			
VIDEO V-1					50	
HEAD H2			55			
HEAD H3				65		
LUMINAIRE						40
STREET NAME		30				
HEAD H11			25			
POLE #2						
HEAD W2			10			
DET Pb 2	5					
POLE #3						
HEAD W3			10			
DET Pb3	5					
POLE #4						
HEAD W4			10			
DET Pb 4	5					
VIDEO V-2					40	
HEAD H4			50			
HEAD H5			60			
STREET NAME		30				
POLE #5						
HEAD W5			10			
DET Pb 5	5					
HEAD H6			40			
VIDEO V-3					50	
HEAD H7			55			
HEAD H8				65		
LUMINAIRE						40
STREET NAME		30				
POLE #6						
HEAD W6			10			
DET Pb 6	5					
VIDEO V-4					30	
HEAD H9			35			
HEAD H10			45			
STREET NAME		30				
INTERSECTION TOTALS						
TOTAL	30	155	475	130	170	80





11500 Metric Blvd, Bldg M-1, Ste 150  
Austin, TX 78758  
Phone 512-821-2081 Fax 512-821-2085  
TBPE Firm Registration No. F - 812

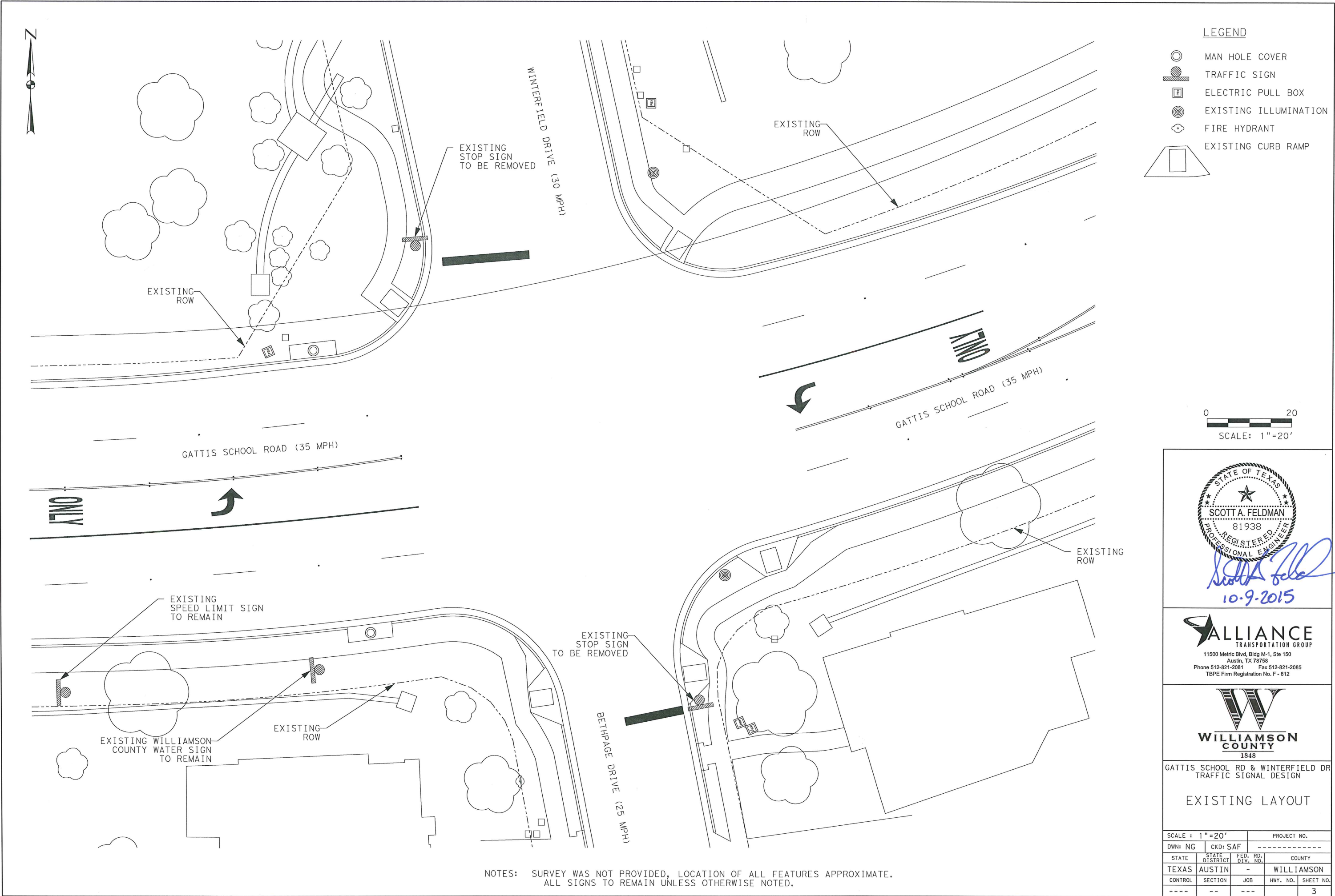


WILLIAMSON COUNTY  
1848

GATTIS SCHOOL RD & WINTERFIELD RD  
TRAFFIC SIGNAL DESIGN

QUANTITIES

SCALE : N/A		PROJECT NO.		
DWN: NSG	CKD: SAF	-----		
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY	
TEXAS	AUSTIN	-	WILLIAMSON	
CONTROL	SECTION	JOB	HWY. NO.	SHEET NO.
----	--	---		



- LEGEND
- MAN HOLE COVER
  - TRAFFIC SIGN
  - ELECTRIC PULL BOX
  - EXISTING ILLUMINATION
  - FIRE HYDRANT
  - EXISTING CURB RAMP

0 20  
SCALE: 1"=20'

STATE OF TEXAS  
SCOTT A. FELDMAN  
81938  
REGISTERED  
PROFESSIONAL ENGINEER  
10-9-2015

**ALLIANCE**  
TRANSPORTATION GROUP  
11500 Metric Blvd, Bldg M-1, Ste 150  
Austin, TX 78758  
Phone 512-821-2081 Fax 512-821-2085  
TBPE Firm Registration No. F - 812

**W**  
**WILLIAMSON**  
**COUNTY**  
1848

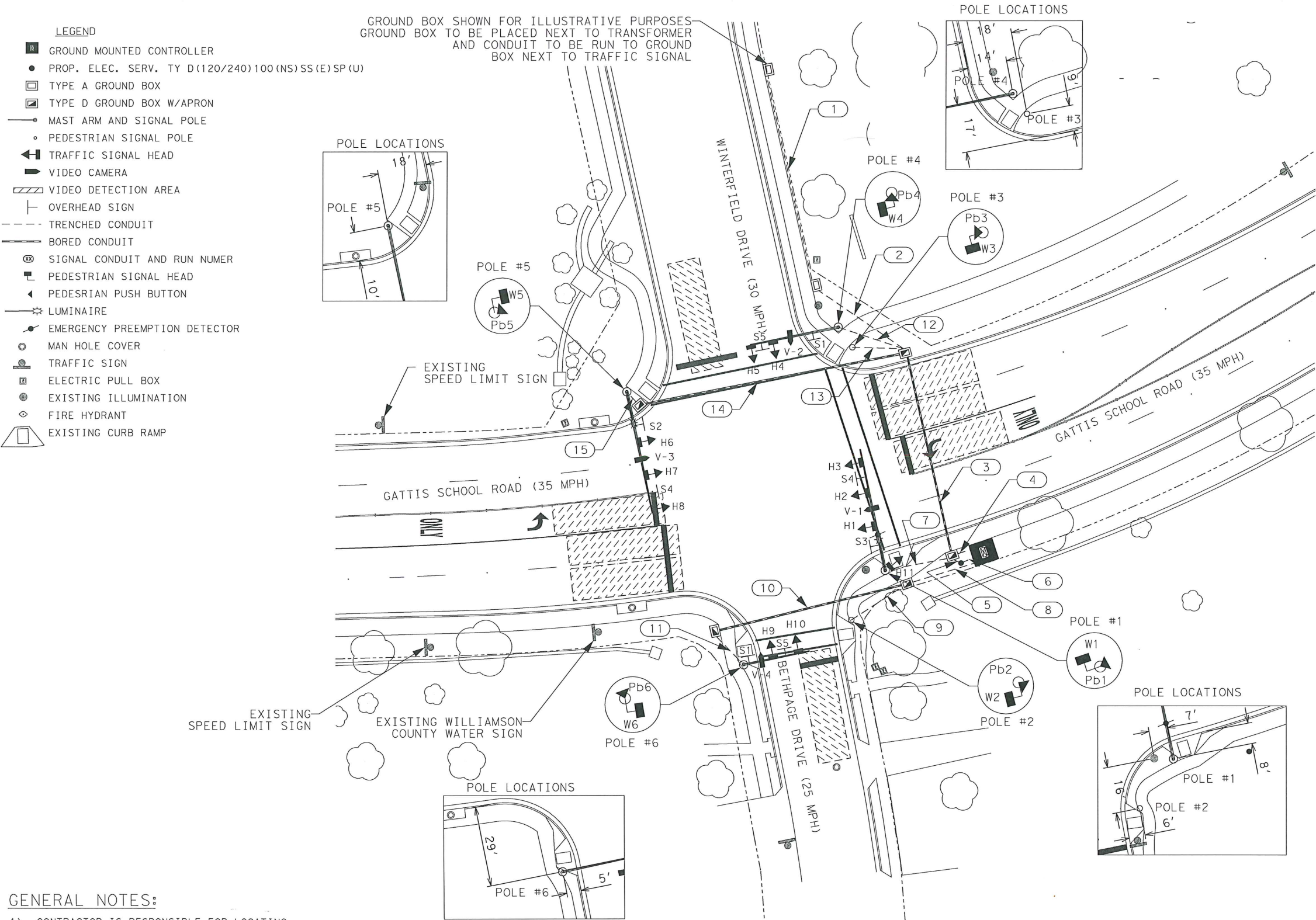
GATTIS SCHOOL RD & WINTERFIELD DR  
TRAFFIC SIGNAL DESIGN

EXISTING LAYOUT

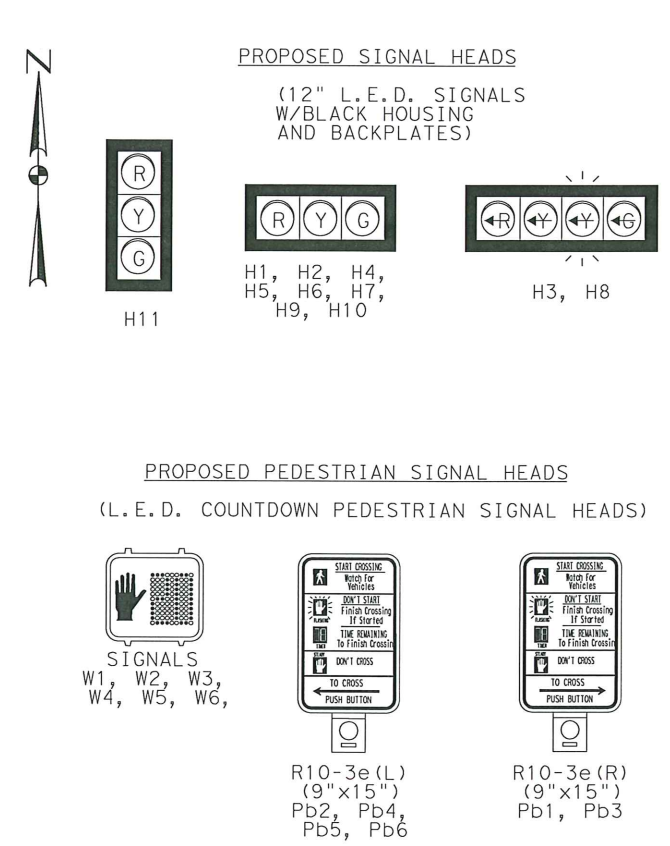
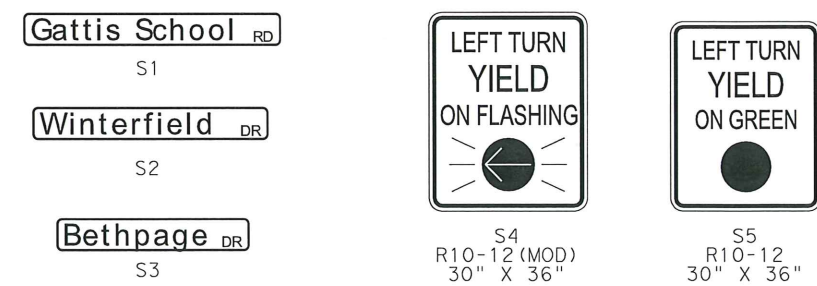
NOTES: SURVEY WAS NOT PROVIDED, LOCATION OF ALL FEATURES APPROXIMATE.  
ALL SIGNS TO REMAIN UNLESS OTHERWISE NOTED.

SCALE : 1"=20'			PROJECT NO.		
DWN: NG		CKD: SAF		-----	
STATE	STATE DISTRICT	FED. DIV. NO.	COUNTY		
TEXAS	AUSTIN	-	WILLIAMSON		
CONTROL	SECTION	JOB	HWY. NO.	SHEET NO.	
----	--	---		3	





- GENERAL NOTES:**
- CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES PRIOR TO CONSTRUCTION.
  - CONTRACTOR IS RESPONSIBLE FOR MAINTAINING & PROTECTING THE INTEGRITY OF UTILITIES DURING CONSTRUCTION.
  - LOCATION OF TRAFFIC SIGNAL POLES, CONDUIT, GROUND BOXES, CABINET, SIGNAL HEADS, CAMERAS, AND OTHER TRAFFIC SIGNAL EQUIPMENT IS APPROXIMATE. CONTRACTOR TO STAKE LOCATIONS AND CONTACT WILLIAMSON COUNTY FOR APPROVAL PRIOR TO CONSTRUCTION.
  - CONTRACTOR TO COORDINATE TESTING AND CONNECTION OF CABINET WITH THE WILLIAMSON COUNTY PRIOR TO PLACING SIGNAL INTO OPERATION.
  - ALL PAVEMENT MARKINGS AND SIGNING TO BE COMPLETED ACCORDING TO THIS PLAN PRIOR TO PLACING THE TRAFFIC SIGNAL INTO OPERATION.
  - TOP OF SIGNAL POLE FOUNDATIONS SHALL BE NO MORE THAN 4" ABOVE NATURAL GROUND.
  - ALL MEASUREMENTS ALONG ROADWAY ARE FROM EDGE OF CURB.



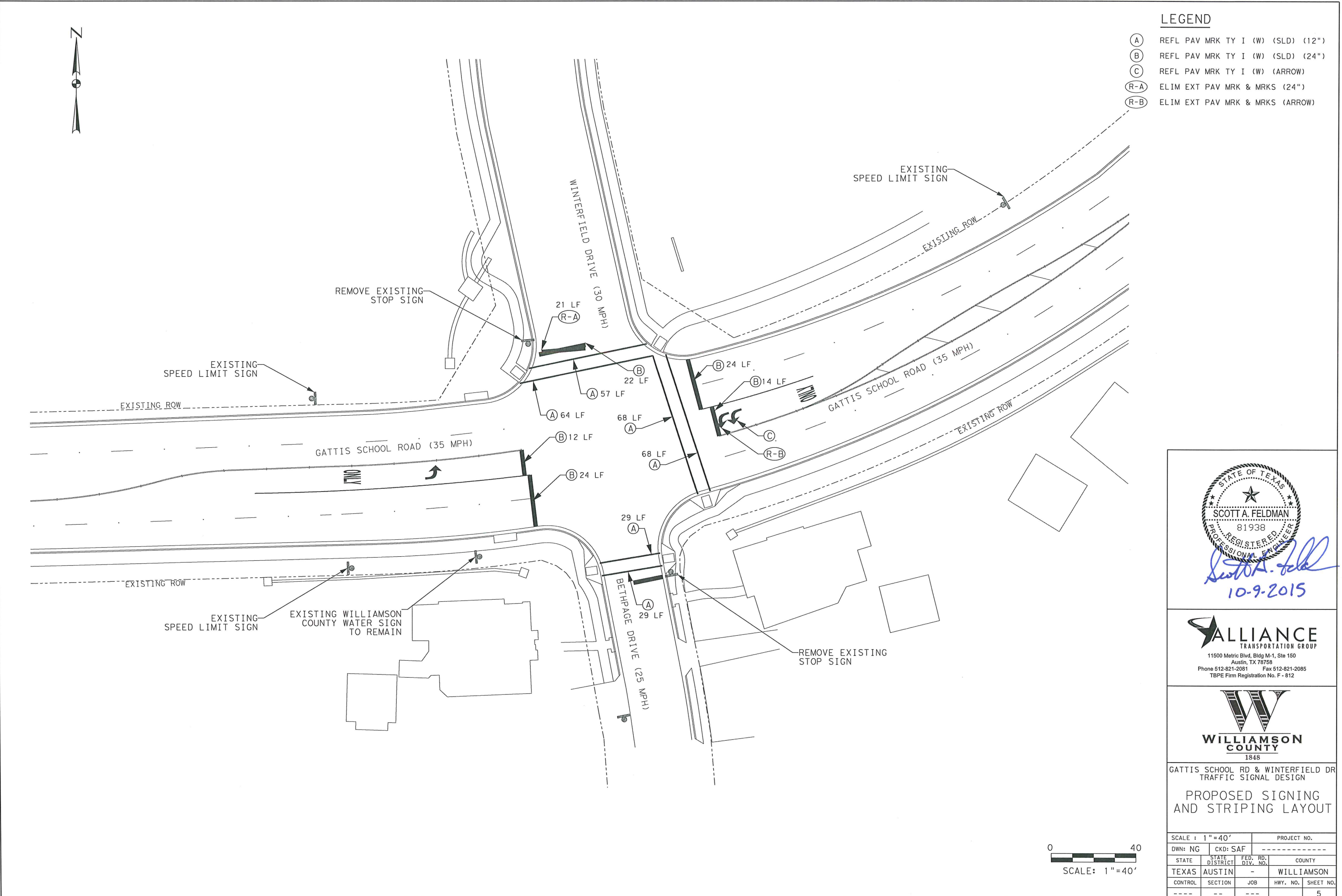
**ALLIANCE**  
TRANSPORTATION GROUP  
11500 Metric Blvd, Bldg M-1, Ste 150  
Austin, TX 78758  
Phone 512-821-2081 Fax 512-821-2085  
TBPE Firm Registration No. F - 812

**WILLIAMSON COUNTY**  
1848

GATTIS SCHOOL RD & WINTERFIELD DR  
TRAFFIC SIGNAL DESIGN

**PROPOSED TRAFFIC SIGNAL LAYOUT**

SCALE : 1"=40'		PROJECT NO.	
DWN: NG	CKD: SAF	-----	
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	AUSTIN	-	WILLIAMSON
CONTROL	SECTION	JOB	HWY. NO. SHEET NO.
----	--	---	4



STATE OF TEXAS  
SCOTT A. FELDMAN  
81938  
REGISTERED  
PROFESSIONAL ENGINEER  
*Scott A. Feldman*  
10-9-2015

**ALLIANCE**  
TRANSPORTATION GROUP  
11500 Metric Blvd, Bldg M-1, Ste 150  
Austin, TX 78758  
Phone 512-821-2081 Fax 512-821-2085  
TBPE Firm Registration No. F - 812

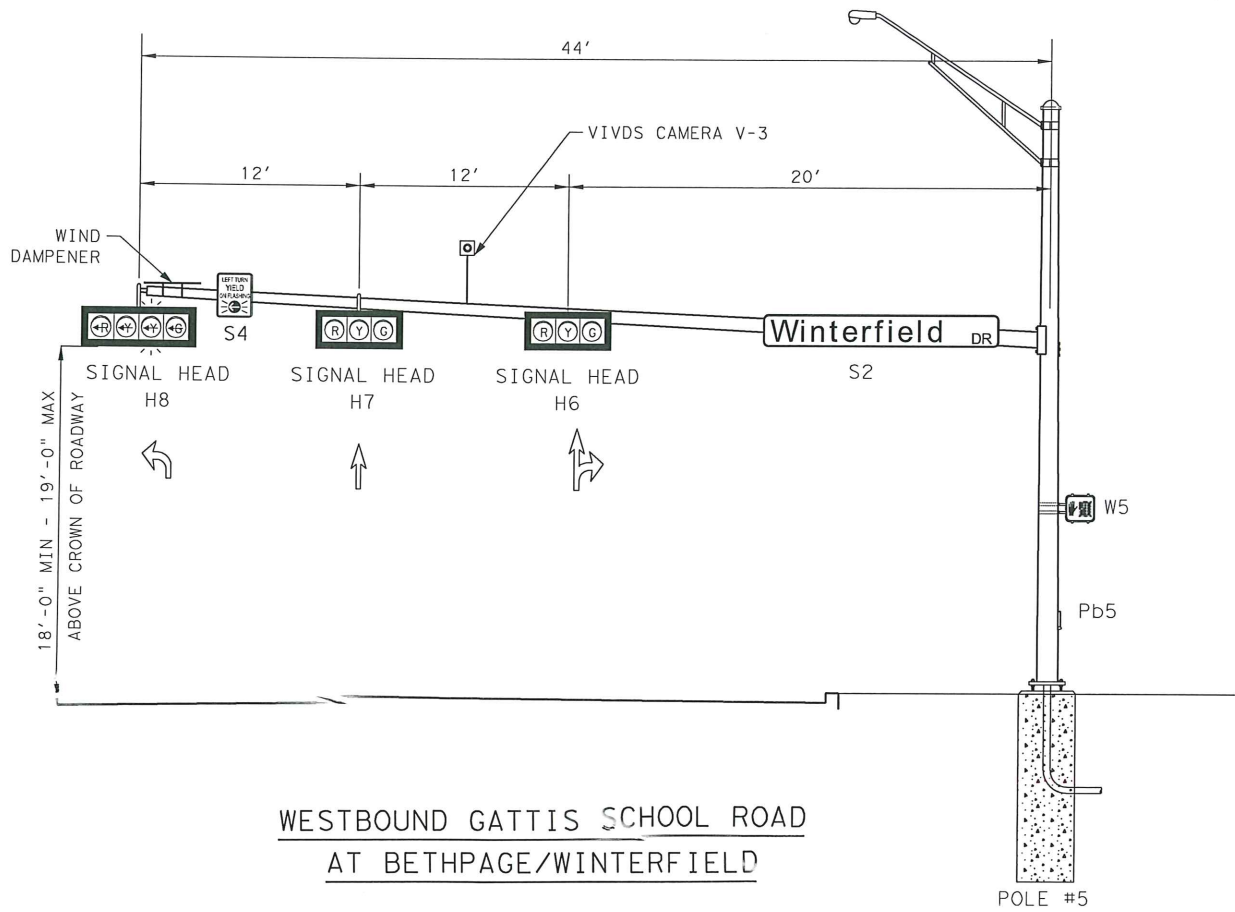
**W**  
**WILLIAMSON**  
**COUNTY**  
1848

GATTIS SCHOOL RD & WINTERFIELD DR  
TRAFFIC SIGNAL DESIGN

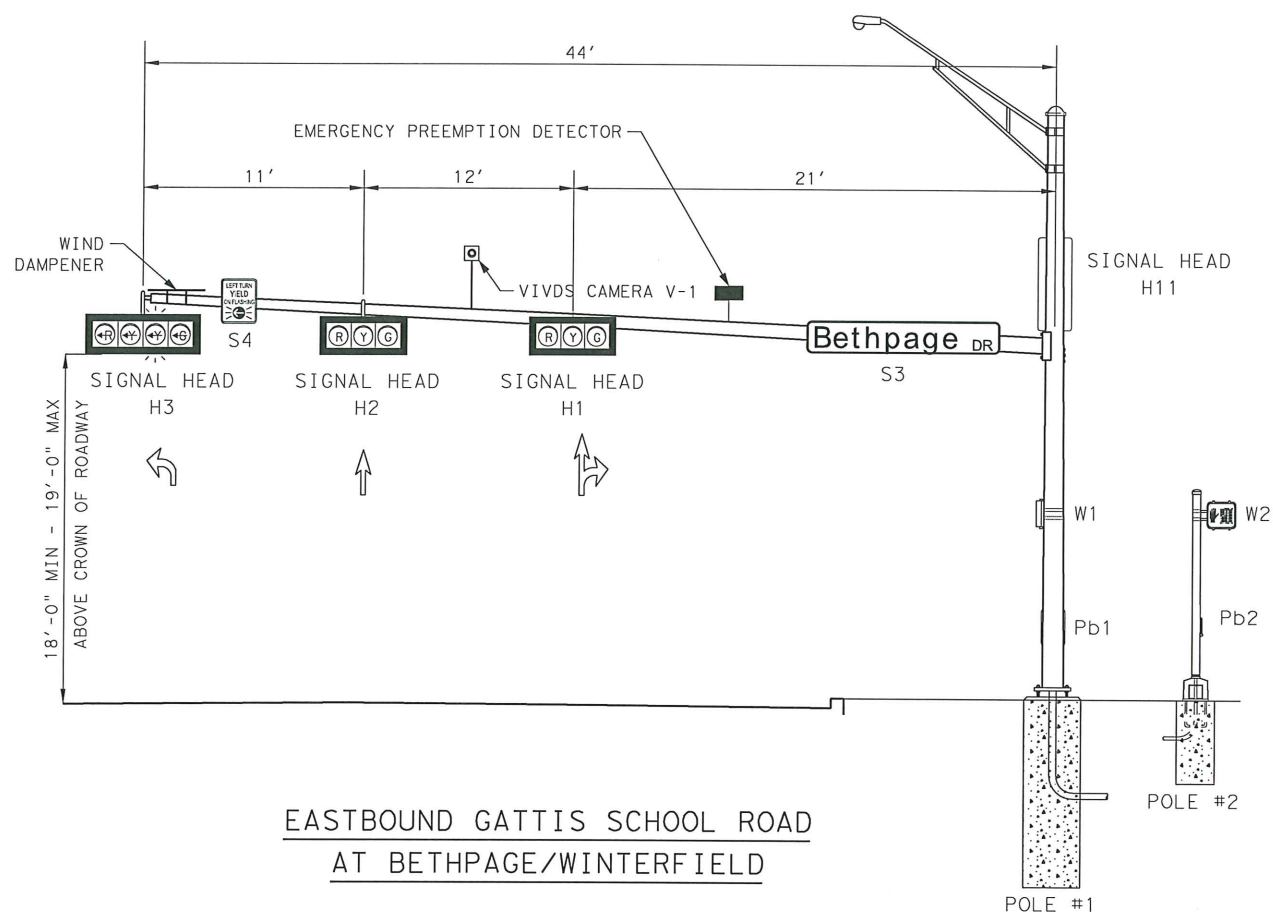
PROPOSED SIGNING  
AND STRIPING LAYOUT

SCALE : 1"=40'			PROJECT NO.		
DWN: NG		CKD: SAF		-----	
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY		
TEXAS	AUSTIN	-	WILLIAMSON		
CONTROL	SECTION	JOB	HWY. NO.	SHEET NO.	
---	--	---		5	



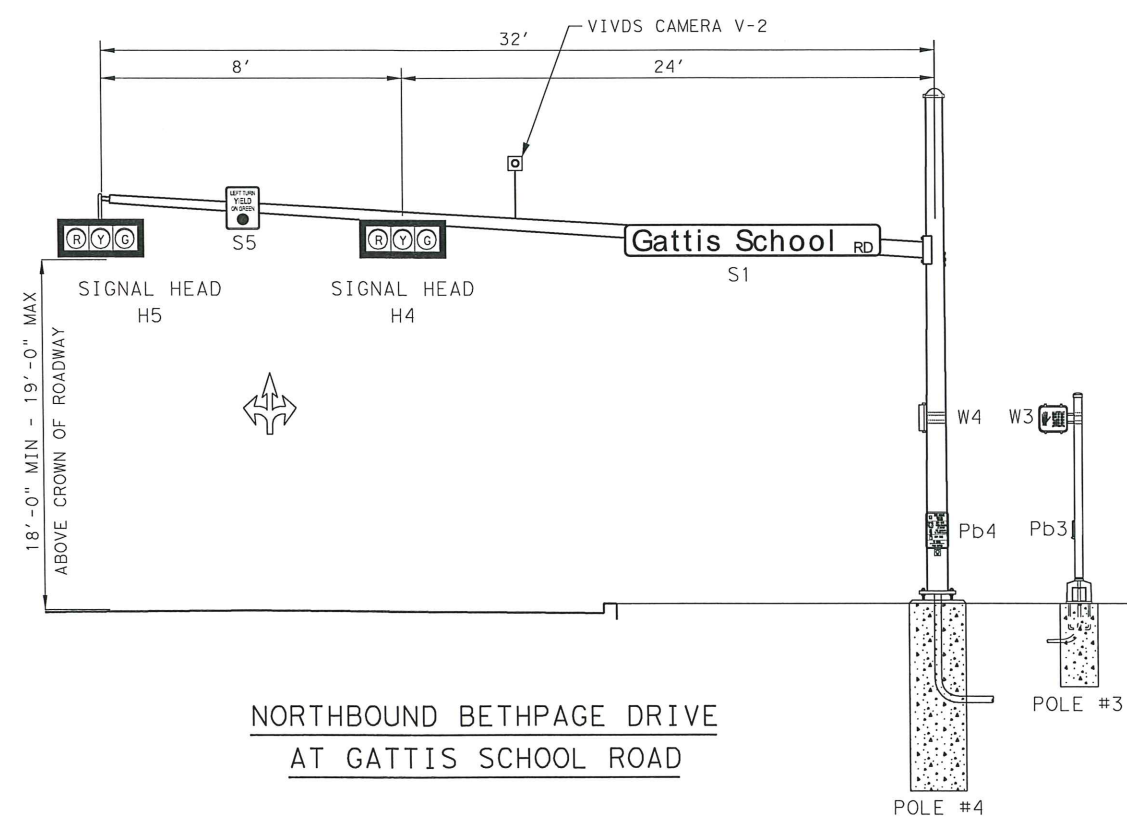


WESTBOUND GATTIS SCHOOL ROAD  
AT BETHPAGE/WINTERFIELD

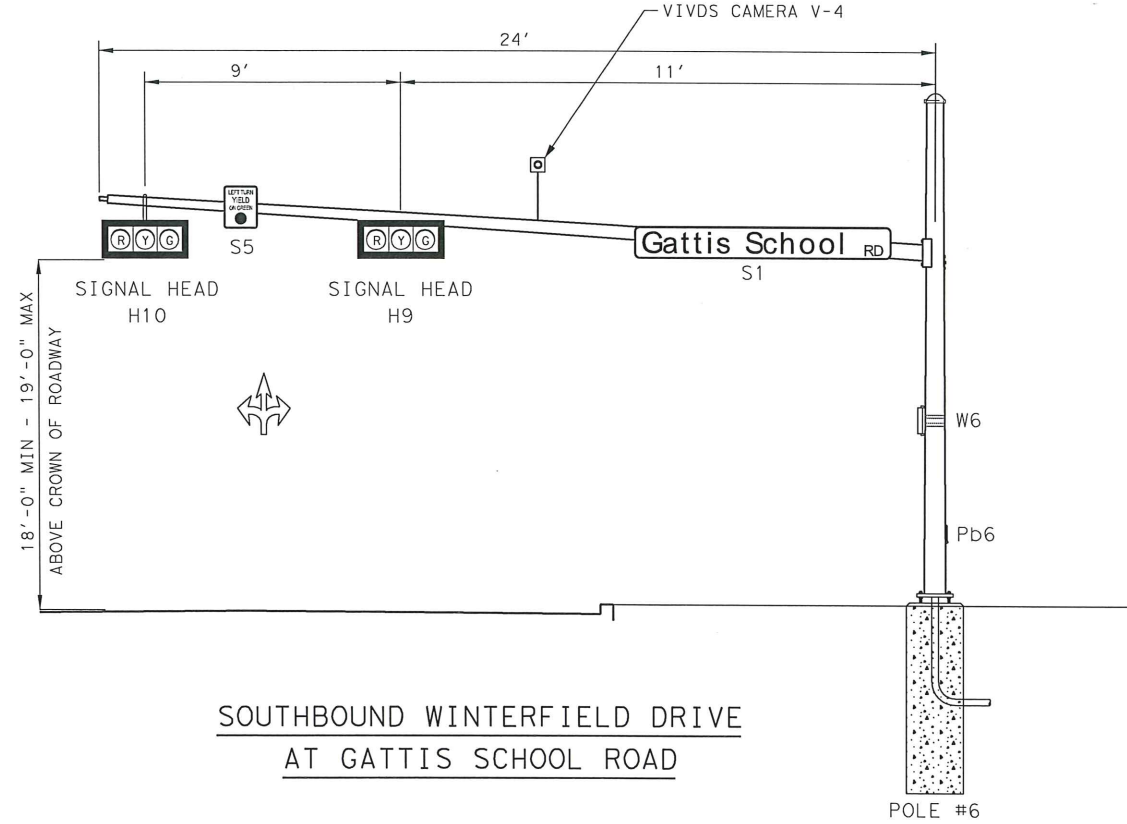


EASTBOUND GATTIS SCHOOL ROAD  
AT BETHPAGE/WINTERFIELD

NOT-TO-SCALE



NORTHBOUND BETHPAGE DRIVE  
AT GATTIS SCHOOL ROAD



SOUTHBOUND WINTERFIELD DRIVE  
AT GATTIS SCHOOL ROAD

NOTE: CONDUIT IN FOUNDATION SHOWN  
FOR ILLUSTRATIVE PURPOSES ONLY



**ALLIANCE**  
TRANSPORTATION GROUP  
11500 Metric Blvd, Bldg M-1, Ste 150  
Austin, TX 78758  
Phone 512-821-2081 Fax 512-821-2085  
TBPE Firm Registration No. F - 812



GATTIS SCHOOL RD & WINTERFIELD DR  
TRAFFIC SIGNAL DESIGN

PROPOSED ELEVATIONS

SCALE: NTS		PROJECT NO.	
DWN: NSG	CKD: SAF	-----	
STATE	STATE DISTRICT	FED. RD. DIV. NO.	COUNTY
TEXAS	AUSTIN	-	WILLIAMSON
CONTROL	SECTION	JOB	HWY. NO. SHEET NO.
----	---	---	6

**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.**

	5
	6

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.**

	5
	6





# **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.

	5
	6

**6. Describe any other affiliation or business relationship that might cause conflict of interest:**

	5
	6

7

Signature of person doing business with the governmental entity

Date

**Signature not required if completing in BIDSYNC electronically.**

Complete this to disclose lobbying activities pursuant to 31 U.S.C. 1352 (See reverse for public burden disclosure.)

p. 302

FEDERAL USE ONLY	Authorized for Local Reproduction Standard - <div></div>
------------------	--

**INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES**

This disclosure shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C section 1352. The filing of a is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Use the SF-LLL-A Continuation Sheet for additional information if the space on the is inadequate. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.
2. Identify the status of the covered Federal action.
3. Identify the appropriate classification of this report. If this is a follow-up report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity or this covered Federal action.
4. Enter the full name, address, city, state and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.
5. If the organization filing the report in item 4 checks "Subawardee", then enter the full name, address, city, state and zip code of the prime Federal recipient. Include Congressional District, if known.
6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.
7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.
8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitation for Bid (IFB) number; grant announcement number, the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."
9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.
10. (a) Enter the full name, address, city, state and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influence the covered Federal action.  
(b) Enter the full names of the individual(s) performing services, and include full address if different from 10(a). Enter Last Name, First Name, and Middle Initial (MI).
11. Enter the amount of compensation paid or reasonably expected to be paid by the reporting entity (item 4) to the lobbying entity (item 10). Indicate whether the payment has been made (actual) or will be made (planned).  
Check all boxes that apply. If this is a material change report, enter the cumulative amount of payment made or planned to be made.
12. Check the appropriate box(es). Check all boxes that apply. If payment is made through an in-kind contribution, specify the nature and value of the in-kind payment.
13. Check the appropriate box(es). Check all boxes that apply. If other, specify nature.
14. Provide a specific and detailed description of the services that the lobbyist has performed, or will be expected to perform, and the date(s) of any services rendered. Include all preparatory and related activity, not just time spent in actual contact with Federal officials. Identify the Federal official(s) or employee(s) contacted or the officer(s), employee(s), or Member(s) of Congress that were contacted.
15. Check whether or not a SF-LLL-A Continuation Sheet(s) is attached.
16. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, D.C. 20503.

**DISCLOSURE OF LOBBYING ACTIVITIES  
CONTINUATION SHEET**

Approved by OMB  
0348-0046

Reporting Entity	<input type="text"/>	Page	<input type="text"/>	of	<input type="text"/>

5

6

Authorized for Local Reproduction  
Standard Form - LLL-A

**BID References for** 

Bidders Name

List at least **(3) companies or governmental agencies**, where the same or similar goods and/or services as contained in this BID package, were recently provided by Respondent in the last 4 years – OR attach list of references with the following details.

**Reference 1**

Client Name:  Location:

Contact Name:  Title:

Phone:  Email:

Contract Dates:  Contract Value:

Scope of Work:

**Reference 2**

Client Name:  Location:

Contact Name:  Title:

Phone:  Email:

Contract Dates:  Contract Value:

Scope of Work:

**Reference 3**

Client Name:  Location:

Contact Name:  Title:

Phone:  Email:

Contract Dates:  Contract Value:

Scope of  
Work:

--

**BID FORM**  
**WILLIAMSON COUNTY, TEXAS**

**PROJECT:** CR 110 AND UNIVERSITY BLVD. TRAFFIC SIGNAL  
GATTIS SCHOOL AT WINTERFIELD TRAFFIC SIGNAL

**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 SPEC <sup>1</sup>	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
1	0416-6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	22.0	LF		\$ -
2	0416-6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	79.0	LF		\$ -
3	0500-6001	MOBILIZATION	1.0	LS		\$ -
4	0502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	4.0	MO		\$ -
5	0618-6023	CONDT (PVC) (SCH 40) (2")	500.0	LF		\$ -
6	0618-6029	CONDT (PVC) (SCH 40) (3")	90.0	LF		\$ -
7	0618-6046	CONDT (PVC) (SCH 80) (2")	245.0	LF		\$ -
8	0618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	75.0	LF		\$ -
9	0618-6053	CONDT (PVC) (SCH 80) (3")	45.0	LF		\$ -
10	0618-6054	CONDT (PVC) (SCH 80) (3") (BORE)	720.0	LF		\$ -
11	0620-6007	ELEC CONDR (NO.8) BARE	1160.0	LF		\$ -
12	0620-6008	ELEC CONDR (NO.8) INSULATED	2440.0	LF		\$ -
13	0620-6009	ELEC CONDR (NO.6) BARE	950.0	LF		\$ -
14	0620-6010	ELEC CONDR (NO.6) INSULATED	1226.0	LF		\$ -
15	0624-6002	GROUND BOX TY A (122311)W/APRON	3.0	EA		\$ -

<sup>1</sup>Refer to the Technical Specifications section for a description of the specific reference number.



**BID FORM**  
**WILLIAMSON COUNTY, TEXAS**

**PROJECT:** CR 110 AND UNIVERSITY BLVD. TRAFFIC SIGNAL  
GATTIS SCHOOL AT WINTERFIELD TRAFFIC SIGNAL

**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 SPEC <sup>1</sup>	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
16	0624-6010	GROUND BOX TY D (162922)W/APRON	7.0	EA		\$ -
17	0625-6003	ZINC-COAT STL WIRE STRAND (3/8")	1024.0	LF		\$ -
18	0628-6239	ELEC SRV TY D 120/240 100(NS)SS(E)PS(U)	1.0	EA		\$ -
19	0636-6001	ALUMINUM SIGNS (TY A)	26.0	SF		\$ -
20	0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	4.0	EA		\$ -
21	0666-6011	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	2000.0	LF		\$ -
22	0666-6026	REFL PAV MRK TY I (W)8"(BRK)(090MIL)	150.0	LF		\$ -
23	0666-6041	REFL PAV MRK TY I (W)12"(SLD)(090MIL)	315.0	LF		\$ -
24	0666-6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	175.0	LF		\$ -
25	0666-6053	REFL PAV MRK TY I (W)(ARROW)(090MIL)	2.0	EA		\$ -
26	0666-6077	REFL PAV MRK TY I (W)(WORD)(090MIL)	1.0	EA		\$ -
27	0666-6126	REFL PAV MRK TY I (Y)4"(SLD)(100MIL)	2000.0	LF		\$ -
28	0666-6224	PAVEMENT SEALER 4"	4000.0	LF		\$ -
29	0666-6226	PAVEMENT SEALER 8"	150.0	LF		\$ -
30	0666-6230	PAVEMENT SEALER 24"	79.0	LF		\$ -

<sup>1</sup>Refer to the Technical Specifications section for a description of the specific reference number.

**BID FORM**  
**WILLIAMSON COUNTY, TEXAS**

**PROJECT:** CR 110 AND UNIVERSITY BLVD. TRAFFIC SIGNAL  
GATTIS SCHOOL AT WINTERFIELD TRAFFIC SIGNAL

**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 SPEC <sup>1</sup>	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
31	0666-6231	PAVEMENT SEALER (ARROW)	2.0	EA		\$ -
32	0666-6232	PAVEMENT SEALER (WORD)	1.0	EA		\$ -
33	0668-6077	PREFAB PAV MRK TY C (W) (ARROW)	1.0	EA		\$ -
34	0672-6007	REFL PAV MRKR TY I-C	8.0	EA		\$ -
35	0672-6009	REFL PAV MRKR TY II-A-A	20.0	EA		\$ -
36	0677-6007	ELIM EXT PAV MRK & MRKS (24")	21.0	LF		\$ -
37	0678-6001	PAV SURF PREP FOR MRK (4")	4000.0	LF		\$ -
38	0678-6004	PAV SURF PREP FOR MRK (8")	150.0	LF		\$ -
39	0678-6008	PAV SURF PREP FOR MRK (24")	79.0	LF		\$ -
40	0678-6009	PAV SURF PREP FOR MRK (ARROW)	2.0	EA		\$ -
41	0678-6016	PAV SURF PREP FOR MRK (WORD)	1.0	EA		\$ -
42	0680-6002	INSTALL HWY TRF SIG (ISOLATED)	2.0	EA		\$ -
43	0680-6004	REMOVING TRAFFIC SIGNALS	1.0	EA		\$ -
44	0682-6001	VEH SIG SEC (12")LED(GRN)	17.0	EA		\$ -
45	0682-6002	VEH SIG SEC (12")LED(GRN ARW)	5.0	EA		\$ -

<sup>1</sup>Refer to the Technical Specifications section for a description of the specific reference number.

**BID FORM**  
**WILLIAMSON COUNTY, TEXAS**

**PROJECT:** CR 110 AND UNIVERSITY BLVD. TRAFFIC SIGNAL  
GATTIS SCHOOL AT WINTERFIELD TRAFFIC SIGNAL

**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 SPEC <sup>1</sup>	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
46	0682-6003	VEH SIG SEC (12")LED(YEL)	17.0	EA		\$ -
47	0682-6004	VEH SIG SEC (12")LED(YEL ARW)	5.0	EA		\$ -
48	0682-6005	VEH SIG SEC (12")LED(RED)	17.0	EA		\$ -
49	0682-6006	VEH SIG SEC (12")LED(RED ARW)	2.0	EA		\$ -
50	0682-6018	PED SIG SEC LED (COUNTDOWN)	6.0	EA		\$ -
51	0682-6023	BACK PLATE (12")(3 SEC)	5.0	EA		\$ -
52	0682-6024	BACK PLATE (12")(4 SEC)	2.0	EA		\$ -
53	0682-6025	BACK PLATE (12")(5 SEC)	1.0	EA		\$ -
54	0682-6035	BACK PLATE (12 IN) (3 SEC) (VENTED) ALUM	9.0	EA		\$ -
55	0682-6036	BACK PLATE (12 IN) (4 SEC) (VENTED) ALUM	2.0	EA		\$ -
56	0684-6008	TRF SIG CBL (TY A)(12 AWG)(3 CONDR)	930.0	LF		\$ -
57	0684-6028	TRF SIG CBL (TY A)(14 AWG)(2 CONDR)	30.0	LF		\$ -
58	0684-6029	TRF SIG CBL (TY A)(14 AWG)(3 CONDR)	645.0	LF		\$ -
59	0684-6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	1532.0	LF		\$ -
60	0684-6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	1329.0	LF		\$ -

<sup>1</sup>Refer to the Technical Specifications section for a description of the specific reference number.

**BID FORM**  
**WILLIAMSON COUNTY, TEXAS**

**PROJECT:** CR 110 AND UNIVERSITY BLVD. TRAFFIC SIGNAL  
GATTIS SCHOOL AT WINTERFIELD TRAFFIC SIGNAL

**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 SPEC <sup>1</sup>	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
61	0684-6049	TRF SIG CBL (TY A)(16 AWG)(3 CONDR)	1422.0	LF		\$ -
62	0684-XXXX	TRF SIG CBL (TY A)(14 AWG)(25 CONDR)	385.0	LF		\$ -
63	0686-6001	INS TRF SIG PL AM (S)ILSN ARM(7')	2.0	EA		\$ -
64	0686-6002	INS TRF SIG PL AM (S)ILSN ARM(9')	2.0	EA		\$ -
65	0686-6008	INS TRF SIG PL AM (S)STR(TY B)LUM	4.0	EA		\$ -
66	0686-6025	INS TRF SIG PL AM (S) 1 ARM (24')	1.0	EA		\$ -
67	0686-6033	INS TRF SIG PL AM (S) 1 ARM (32')	1.0	EA		\$ -
68	0686-6047	INS TRF SIG PL AM (S) 1 ARM (44') (LUM)	2.0	EA		\$ -
69	0687-6001	PED POLE ASSEMBLY	2.0	EA		\$ -
70	0688-6001	PED DETECT PUSH BUTTON (APS)	6.0	EA		\$ -
71	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	2.0	EA		\$ -
72	6002-6001	VIVDS PROCESSOR SYSTEM	2.0	EA		\$ -
73	6002-6002	VIVDS CAMERA ASSEMBLY	10.0	EA		\$ -
74	6002-6003	VIVDS SET-UP SYSTEM	2.0	EA		\$ -
75	6002-6004	VIVDS CENTRAL CONTROL	1.0	EA		\$ -

<sup>1</sup>Refer to the Technical Specifications section for a description of the specific reference number.

**BID FORM**  
**WILLIAMSON COUNTY, TEXAS**

**PROJECT:** CR 110 AND UNIVERSITY BLVD. TRAFFIC SIGNAL  
GATTIS SCHOOL AT WINTERFIELD TRAFFIC SIGNAL

**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 SPEC <sup>1</sup>	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
76	6002-6005	VIVDS COMMUNICATION CABLE (COAXIAL)	2047.0	LF		\$ -
77	6089-6001	ETHERNET CABLE AND CONNECTORS	60.0	LF		\$ -
78	6090-6001	ILSN (LED) (6D)	2.0	EA		\$ -
79	6090-6002	ILSN (LED) (8D)	2.0	EA		\$ -
80	6525-XXXX	EMERGENCY PREEMPTION DETECTOR SYSTEM	1.0	EA		\$ -
81	CORR-001	BATTERY BACK-UP SYSTEM	1.0	EA		\$ -
82	CORR-002	HARDENED ETHERNET SWITCH	1.0	EA		\$ -
83	CORR-003	DUAL BAND (2.4/5.8) WIRELESS ETHERNET RADIO	1.0	EA		\$ -
84	CORR-004	OPTICOM DETECTOR - GTT MODEL 722	2.0	EA		\$ -
85	CORR-005	OPTICOM PHASE SELECTOR - GTT MODEL 764	1.0	EA		\$ -
86	CORR-006	OPTICOM CARD RACK - GTT MODEL 760	1.0	EA		\$ -
87	CORR-007	OPTICOM CABLE - GTT MODEL 138	494.0	LF		\$ -
						\$ -

<sup>1</sup>Refer to the Technical Specifications section for a description of the specific reference number.

**BID FORM**  
**WILLIAMSON COUNTY, TEXAS**

**PROJECT:** CR 110 AND UNIVERSITY BLVD. TRAFFIC SIGNAL  
GATTIS SCHOOL AT WINTERFIELD TRAFFIC SIGNAL

**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 SPEC <sup>1</sup>	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
-------------	---------------------------	-------------	-----------------	-----------------	-----------	------------

NON-BID ITEMS TO BE INCLUDED IN BID AND CONTRACT AMOUNT. DO NOT MAKE CHANGES TO THIS SECTION.

88	999-WC01	FORCE ACCOUNT	15000	DOL	\$ 1.00	\$ 15,000.00
----	----------	---------------	-------	-----	---------	--------------

**TOTAL AMOUNT OF BID**

\_\_\_\_\_ Dollars and \_\_\_\_\_ Cents \$ 15,000.00

**NOTE: THE COURT MAY EITHER REJECT ALL BIDS OR AWARD A CONTRACT TO THE LOWEST AND BEST BID.**

<sup>1</sup>Refer to the Technical Specifications section for a description of the specific reference number.

100	-	6002	100-6002	0100 6002	PREPARING ROW	109.5	STA
104	-	6009	104-6009	0104 6009	REMOVING CONC (RIPRAP)	49.0	SY
104	-	6054	104-6054	0104 6054	REMOVING CONCRETE(MOW STRIP)	167.0	LF
106	-	6002	106-6002	0106 6002	OBLITERATING ABANDONED ROAD	19266.6	SY
110	-	6001	110-6001	0110 6001	EXCAVATION (ROADWAY)	59391.0	CY
132	-	6006	132-6006	0132 6006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	29400.0	CY
160	-	6003	160-6003	0160 6003	FURNISHING AND PLACING TOPSOIL (4")	99965.0	SY
164	-	6003	164-6003	0164 6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	99965.0	SY
164	-	6009	164-6009	0164 6009	BROADCAST SEED (TEMP) (WARM)	49982.5	SY
164	-	6011	164-6011	0164 6011	BROADCAST SEED (TEMP) (COOL)	49982.5	SY
168	-	6001	168-6001	0168 6001	VEGETATIVE WATERING	333.2	MG
169	-	6001	169-6001	0169 6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	34690.0	SY
247	-	6044	247-6044	0247 6044	FL BS (CMP IN PLC)(TY A GR 4)(FNAL POS)	26627.3	CY
260	-	6002	260-6002	0260 6002	LIME (HYDRATED LIME (SLURRY))	1078.6	TON
260	-	6073	260-6073	0260 6073	LIME TRT (SUBGRADE)(8")	59922.0	SY
310	-	6027	310-6027	0310 6027	PRIME COAT(MC-30 OR AE-P)	11982.0	GAL
316	-	6005	316-6005	0316 6005	ASPH (TIER II)	14981.0	GAL
316	-	6193	316-6193	0316 6193	AGGR(TY-D GR-5 SAC-B)	400.1	CY
341	-	6008	341-6008	0341 6008	D-GR HMA TY-B PG64-22	12770.0	TON
341	-	6027	341-6027	0341 6027	D-GR HMA TY-C SAC-B PG70-22	6079.0	TON
400	-	6006	400-6006	0400 6006	CUT & RESTORING PAV	54.0	SY
401	-	6001	401-6001	0401 6001	FLOWABLE BACKFILL	49.0	CY
402	-	6001	402-6001	0402 6001	TRENCH EXCAVATION PROTECTION	53.0	LF
403	-	6001	403-6001	0403 6001	TEMPORARY SPL SHORING	555.0	SF
416	-	6032	416-6032	0416 6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	13.2	LF
432	-	6001	432-6001	0432 6001	RIPRAP (CONC)(4 IN)	415.0	CY
432	-	6016	432-6016	0432 6016	RIPRAP (STONE TY R)(DRY)(12 IN)	187.0	CY
432	-	6017	432-6017	0432 6017	RIPRAP (STONE TY R)(DRY)(18 IN)	416.0	CY
432	-	6045	432-6045	0432 6045	RIPRAP (MOW STRIP)(4 IN)	63.0	CY
460	-	6002	460-6002	0460 6002	CMP (GAL STL 18 IN)	161.0	LF
462	-	6004	462-6004	0462 6004	CONC BOX CULV (4 FT X 3 FT)	286.0	LF
462	-	6006	462-6006	0462 6006	CONC BOX CULV (5 FT X 2 FT)	166.0	LF
462	-	6007	462-6007	0462 6007	CONC BOX CULV (5 FT X 3 FT)	1176.0	LF
462	-	6010	462-6010	0462 6010	CONC BOX CULV (6 FT X 3 FT)	747.0	LF
464	-	6003	464-6003	0464 6003	RC PIPE (CL III)(18 IN)	676.0	LF
466	-	6179	466-6179	0466 6179	WINGWALL (PW - 1) (HW=4 FT)	1.0	EA
466	-	6180	466-6180	0466 6180	WINGWALL (PW - 1) (HW=5 FT)	2.0	EA
466	-	6181	466-6181	0466 6181	WINGWALL (PW - 1) (HW=6 FT)	4.0	EA
466	-	6182	466-6182	0466 6182	WINGWALL (PW - 1) (HW=7 FT)	1.0	EA
467	-	6166	467-6166	0467 6166	SET (TY I)(S= 5 FT)(HW= 2 FT)(4:1) (C)	2.0	EA
467	-	6215	467-6215	0467 6215	SET (TY I)(S= 6 FT)(HW= 4 FT)(6:1) (P)	6.0	EA
467	-	6359	467-6359	0467 6359	SET (TY II) (18 IN) (RCP) (4: 1) (P)	4.0	EA
467	-	6362	467-6362	0467 6362	SET (TY II) (18 IN) (RCP) (6: 1) (C)	10.0	EA
496	-	6004	496-6004	0496 6004	REMOV STR (SET)	4.0	EA
496	-	6006	496-6006	0496 6006	REMOV STR (HEADWALL)	6.0	EA
496	-	6007	496-6007	0496 6007	REMOV STR (PIPE)	514.0	LF
500	-	6001	500-6001	0500 6001	MOBILIZATION	1.0	LS
502	-	6001	502-6001	0502 6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	11.0	MO
506	-	6001	506-6001	0506 6001	ROCK FILTER DAMS (INSTALL) (TY 1)	1090.0	LF
506	-	6011	506-6011	0506 6011	ROCK FILTER DAMS (REMOVE)	1090.0	LF
506	-	6020	506-6020	0506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	500.0	SY
506	-	6024	506-6024	0506 6024	CONSTRUCTION EXITS (REMOVE)	500.0	SY
506	-	6041	506-6041	0506 6041	BIODEG EROSN CONT LOGS (INSTL) (12")	570.0	LF
506	-	6043	506-6043	0506 6043	BIODEG EROSN CONT LOGS (REMOVE)	570.0	LF
508	-	6001	508-6001	0508 6001	CONSTRUCTING DETOURS	570.4	SY
512	-	6009	512-6009	0512 6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	440.0	LF
512	-	6010	512-6010	0512 6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	40.0	LF
512	-	6033	512-6033	0512 6033	PORT CTB (MOVE)(LOW PROF)(TY 1)	640.0	LF
512	-	6034	512-6034	0512 6034	PORT CTB (MOVE)(LOW PROF)(TY 2)	120.0	LF
512	-	6057	512-6057	0512 6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	440.0	LF
512	-	6058	512-6058	0512 6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	40.0	LF
529	-	6008	529-6008	0529 6008	CONC CURB & GUTTER (TY II)	9395.0	LF
530	-	6005	530-6005	0530 6005	DRIVEWAYS (ACP)	797.0	SY
540	-	6001	540-6001	0540 6001	MTL W-BEAM GD FEN (TIM POST)	975.0	LF
542	-	6001	542-6001	0542 6001	REMOVE METAL BEAM GUARD FENCE	100.0	LF

544	-	6001	544-6001	0544 6001 GUARDRAIL END TREATMENT (INSTALL)	6.0	EA
544	-	6003	544-6003	0544 6003 GUARDRAIL END TREATMENT (REMOVE)	2.0	EA
550	-	6001	550-6001	0550 6001 CHAIN LINK FENCE (INSTALL) (6')	220.0	LF
552	-	6001	552-6001	0552 6001 WIRE FENCE (TY A)	9548.0	LF
552	-	6005	552-6005	0552 6005 GATE (TY 1)	1.0	EA
560	-	6001	560-6001	0560 6001 MAILBOX INSTALL-S (TWG-POST) TY 1	2.0	EA
560	-	6015	560-6015	0560 6015 MAILBOX INSTALL-S (TIM-POST) TY 5	2.0	EA
620	-	6008	620-6008	0620 6008 ELEC CONDR (NO.8) INSULATED	1444.0	LF
625	-	6003	625-6003	0625 6003 ZINC-COAT STL WIRE STRAND (3/8")	524.0	LF
636	-	6001	636-6001	0636 6001 ALUMINUM SIGNS (TY A)	26.0	SF
644	-	6060	644-6060	0644 6060 IN SM RD SN SUP&AM TYTWT(1)WS(P)	35.0	EA
644	-	6061	644-6061	0644 6061 IN SM RD SN SUP&AM TYTWT(1)WS(T)	6.0	EA
644	-	6068	644-6068	0644 6068 RELOCATE SM RD SN SUP&AM TY 10BWG	3.0	EA
644	-	6076	644-6076	0644 6076 REMOVE SM RD SN SUP&AM	22.0	EA
658	-	6008	658-6008	0658 6008 INSTL DEL ASSM (D-SW)SZ 1(FX)GF2(BI)	18.0	EA
658	-	6046	658-6046	0658 6046 INSTL OM ASSM (OM-2X)(WC)GND	36.0	EA
662	-	6004	662-6004	0662 6004 WK ZN PAV MRK NON-REMOV (W)4"(SLD)	1469.0	LF
662	-	6034	662-6034	0662 6034 WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	754.0	LF
662	-	6063	662-6063	0662 6063 WK ZN PAV MRK REMOV (W)4"(SLD)	9093.0	LF
662	-	6095	662-6095	0662 6095 WK ZN PAV MRK REMOV (Y)4"(SLD)	7419.0	LF
662	-	6111	662-6111	0662 6111 WK ZN PAV MRK SHT TERM (TAB)TY Y-2	190.0	EA
666	-	6036	666-6036	0666 6036 REFL PAV MRK TY I (W)8"(SLD)(100MIL)	1316.0	LF
666	-	6048	666-6048	0666 6048 REFL PAV MRK TY I (W)24"(SLD)(100MIL)	256.0	LF
666	-	6054	666-6054	0666 6054 REFL PAV MRK TY I (W)(ARROW)(100MIL)	8.0	EA
666	-	6078	666-6078	0666 6078 REFL PAV MRK TY I (W)(WORD)(100MIL)	8.0	EA
666	-	6303	666-6303	0666 6303 RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	14824.0	LF
666	-	6312	666-6312	0666 6312 RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	4480.0	LF
666	-	6315	666-6315	0666 6315 RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	23322.0	LF
672	-	6007	672-6007	0672 6007 REFL PAV MRKR TY I-C	66.0	EA
672	-	6009	672-6009	0672 6009 REFL PAV MRKR TY II-A-A	626.0	EA
677	-	6001	677-6001	0677 6001 ELIM EXT PAV MRK & MRKS (4")	5361.0	LF
677	-	6003	677-6003	0677 6003 ELIM EXT PAV MRK & MRKS (8")	128.0	LF
677	-	6008	677-6008	0677 6008 ELIM EXT PAV MRK & MRKS (ARROW)	4.0	EA
677	-	6012	677-6012	0677 6012 ELIM EXT PAV MRK & MRKS (WORD)	1.0	EA
680	-	6002	680-6002	0680 6002 INSTALL HWY TRF SIG (ISOLATED)	1.0	EA
680	-	6004	680-6004	0680 6004 REMOVING TRAFFIC SIGNALS	1.0	EA
681	-	6001	681-6001	0681 6001 TEMP TRAF SIGNALS	1.0	EA
682	-	6001	682-6001	0682 6001 VEH SIG SEC (12")LED(GRN)	8.0	EA
682	-	6002	682-6002	0682 6002 VEH SIG SEC (12")LED(GRN ARW)	3.0	EA
682	-	6003	682-6003	0682 6003 VEH SIG SEC (12")LED(YEL)	8.0	EA
682	-	6004	682-6004	0682 6004 VEH SIG SEC (12")LED(YEL ARW)	5.0	EA
682	-	6005	682-6005	0682 6005 VEH SIG SEC (12")LED(RED)	8.0	EA
682	-	6006	682-6006	0682 6006 VEH SIG SEC (12")LED(RED ARW)	2.0	EA
682	-	6023	682-6023	0682 6023 BACK PLATE (12")(3 SEC)	7.0	EA
682	-	6024	682-6024	0682 6024 BACK PLATE (12")(4 SEC)	2.0	EA
682	-	6025	682-6025	0682 6025 BACK PLATE (12")(5 SEC)	1.0	EA
684	-	6008	684-6008	0684 6008 TRF SIG CBL (TY A)(12 AWG)(3 CONDR)	702.0	LF
684	-	6031	684-6031	0684 6031 TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	488.0	LF
684	-	6033	684-6033	0684 6033 TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	570.0	LF
684	-	6049	684-6049	0684 6049 TRF SIG CBL (TY A)(16 AWG)(3 CONDR)	960.0	LF
686	-	6003	686-6003	0686 6003 INS TRF SIG PL AM (S)LUM ARM(8')	1.0	EA
686	-	6008	686-6008	0686 6008 INS TRF SIG PL AM (S)STR(TY B)LUM	1.0	EA
001	-	6001	6001-6001	6001 6001 PORTABLE CHANGEABLE MESSAGE SIGN	330.0	DAY
002	-	6003	6002-6003	6002 6003 VIVDS SET-UP SYSTEM	1.0	EA
002	-	6005	6002-6005	6002 6005 VIVDS COMMUNICATION CABLE (COAXIAL)	960.0	LF
	-			OPTICOM CABLE - GTT MODEL 138	960.0	LF
730	-	6002	730-6002	0730 6002 FULL-WIDTH MOWING	30.2	AC



**BID AFFIDAVIT****This form must be completed, signed, notarized and returned with Bid package**

The undersigned certifies that the IFB and the Bidder's Bid have been carefully reviewed and are submitted as correct and final. Bidder further certifies and agrees to furnish any and/or all goods and/or services upon which prices are extended at the price Bid, and upon the conditions contained in the IFB.

STATE OF  COUNTY OF

BEFORE ME, the undersigned authority, a Notary Public in and for the State of , on this

day 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 Respondent*) and have been duly authorized

to execute the foregoing on behalf of the said

(*Name of Respondent*).

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 and Address of  
Respondent:

Fax:

Telephone #:

By:

Printed Name:

Title:

SUBSCRIBED AND SWORN to before me by the above-named

on this the  day of , 20

Notary Public in and for

The State of

## Question and Answers for Bid #1512-036 - Multi-Site Traffic Signals

### Overall Bid Questions

There are no questions associated with this bid.