Montgomery Road

Phase 1D

FEBRUARY 2025
SAN ANTONIO, TEXAS

BID PACKAGE

PREPARED FOR:

LENNAR HOMES OF TEXAS, LLC

100 NE I-410 LOOP, SUITE 1150

SAN ANTONIO, TX 78216

CUDE ENGINEERS
SAN ANTONIO | AUSTIN | SAN MARCOS

4122 POND HILL ROAD, STE 101
SAN ANTONIO, TEXAS 78231

PHONE: (210) 681-2951
CUDEENGINEERS.COM

TBPE NO. 455
TBPELS NO. 10048500

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INVITATION TO BIDDERS

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD.

INVITATION TO BIDDERS

CONSTRUCTION DOCUMENTS AND
TECHNICAL SPECIFICATIONS FOR
Montgomery Road - Phase 1D

STREETS and DRAINAGE CONSTRUCTION

BEXAR COUNTY, TEXAS

February 10, 2025

Sealed **bids** addressed to Lennar Homes of Texas LLC will be received at the office of Cude Engineers, 4122 Pond Hill Road, Suite 101, San Antonio Texas 78231 until **10:00 AM**, Local Time, **March 3rd, 2025**, for the following project:

Scope of Work in this Contract includes:

- Approximately 3,350 LF of Roadway
- Various Drainage Improvements

Instruction to bidders and other bid documents will be available for review or to download at www.CivCastUSA.com. Timeline for **Questions** will close at 12:00 PM, local time, Monday February17th, 2025.
An addendum (if needed) will be posted by end of business February 24th, 2025.
Contractor to provide schedule with bid, tentative start date for construction is March 24th.

A virtual bid opening will occur at 10:30 AM, local time Monday March 3rd, 2025. Please call into the number below:

INSTRUCTIONS TO BIDDERS

IMPORTANT NOTICE: Bidder must read ALL Instructions. Failure to do so may result in a non-responsive Bid. Failure to do so does not release Bidder from the obligation to comply.

1. Submission of Bids

1.1 In accordance with the Plans and Specifications prepared by the ENGINEER, any Proposal received after the published time of the bid opening will be returned unopened.

1.2 The OWNER reserves the right to reject any or all Bids if the OWNER believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or other criteria established by OWNER.

1.3 Bids shall be submitted at the location and time indicated in the Invitation to Bidders and shall be enclosed in an opaque sealed envelope, marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted) and name and address of Bidder and accompanied by the Bid security and other required documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation “BID ENCLOSED” on the face of it. Bids which are not received by the time and at the location specified in the Bidding Documents, will be returned unopened to the Bidder.

1.4 By submitting a Bid, each Bidder agrees to fully and forever waive and release any claim (known or unknown) it has or may have against the OWNER, DEVELOPER, ARCHITECT and ENGINEER, and their respective attorneys, employees, consultants, representatives, agents, successors, assigns, officers, directors, and members arising under the statutes of Texas, tort, contract or otherwise; or out of or in connection with the: (i) administration, evaluation, or recommendation (or lack thereof) of any Bid; (ii) waiver of any requirements under the Bid Documents or the CONTRACT DOCUMENTS; (iii) acceptance or rejection of any bids; (iv) award of the Contract; and, (v) provision of references (positive or negative) in connection with any work performed by Bidder, and Bidder’s contractors and subcontractors in connection with the Project and the CONTRACT DOCUMENTS, to which Bidder hereby consents and authorizes.

1.5 All work must conform to Federal, State and local governmental rules and criteria.

1.6 The successful bidder will be required to enter into a Contract with the Owner, requiring full compliance and performance of the conditions of the proposal, plans and specifications as designed by CUDE ENGINEERS (Engineer) and reviewed by the CITY OF SAN ANTONIO, and/or other agencies as required, and agrees to commence work within ten (10) days after notification to begin. It is the intent of the owner to start construction as soon as possible.

1.7 Bidders are required to inspect the site and inform themselves of all conditions affecting the execution of the work to be performed. The filing of the "Proposal" shall constitute an admission by the bidder that he has carried out the foregoing stipulations to his entire satisfaction. Quantities included in the plans and proposals are estimated and are to be regarded as approximate only. The Owner reserves the right to vary the quantities, to construct all, or any part, or to delete any part or item of work that may be deemed advisable.

1.8 The most current editions of the City of San Antonio Standard Specifications, Texas Department of Transportation Standard Specifications and San Antonio Water Systems shall be followed for all construction except as amended by the City of San Antonio.

1.9 Portions of this proposal may be deleted. Prices for all items must stand on their own.

1.10 Contractor to complete the material take-off for items bid lump sum to confirm the Engineer Quantities. Quantities shown are plan estimates only.

1.11 Direct all questions concerning this proposal to Sean McFarland, PE and Garrisson Wood at smcfarland@cudeengineers.com and gwood@cudeengineers.com with Cude Engineers at (210) 681-2951.

1.12 Contractor is responsible for all Texas Commission on Environmental Quality (TCEQ) Storm Water Pollution Prevention Plan (SW3P) requirements, including but not limited to setting up, installing and maintaining the erosion and sedimentation controls as designed and shall inspect the controls every two weeks and after every significant rainfall (1/2 inch or greater) to ensure significant disturbance to the structure has not occurred. Sediment deposited after a significant rainfall shall be removed and placed in a designated soil disposal area. Contractor to maintain erosion control inspection reports as required by the TCEQ and provide Owner with one complete set of all SW3P inspection reports, including updates and modifications, prior to receiving final payment for the project.

1.13 Contractor must keep a copy of the Storm Water Pollution Prevention Plan (SW3P) on site and readily available for authorities.

1.14 Clearing and/or grading for the utility easements as well as removal of on-site deleterious material and trash shall be included in the base bid cost for ~~site clearing and grading~~ Preparation of ROW. Contractor is to clear entire project of all underbrush and undesirable vegetation. Contact Owner for extent and sequence of lot clearing and coordination with any applicable tree ordinance.

1.15 Excavated material that is free of organic matter and other deleterious substances may be disposed of on-site. No fill shall be placed within the flood plain without a Flood Plain Development Permit as applicable. Said material will be utilized as fill material for lots and easements as per the Grading Plan and compacted to meet 79G requirements with 95% Standard Density using ASTM 698 or TEX-114E. For fills greater than one (1) foot within building pad area, a 79G Letter will be required with testing complete per eight (8) inch lift. Testing to be paid by the Owner. Contractor shall get owners approval of test lab. Contractor shall pay re-testing due to failure of density requirements. All quantities are “In-place, tight” cubic yards.

~~1.16 Excavated material placed on lots shall have positive drainage to prevent any ponding of water, and provide a minimum final grade of 1.5% in all areas with the exception of building pads which shall have a minimum final grade of 1.0%.~~

~~1.17 Contractor shall submit a letter to Engineer after completion of final grading of utility easements, certifying that the grades on the utility easements are completed as per the grading plan.~~

1.18 Contractor shall be responsible for disposing of all waste materials off project site including, but not limited to, excess excavation not suitable for use as lot fill, concrete, trees, and any other material which is not part of the completed contract work. No separate pay item.

1.19 Street excavation includes cut in the parkways, as per design plans.

1.20 Contractor will protect existing utilities, structures, curb, fences and sidewalk during construction. Any damage will be repaired by the Contractor at no extra cost.

1.21 The streets are public. The Contractor must coordinate and schedule all testing required by ~~the City of San Antonio and/or~~ Bexar County.

1.22 The Contractor will be required to coordinate work with the Utility companies that will be installing electric, telephone and TV.

1.23 The Contractor is responsible for coordinating with Utility companies to mark existing buried utilities that may be affected by construction. The Contractor will be responsible to repair damaged utilities due to construction.

1.24 Contractor to notify ~~City of San Antonio~~, Bexar County, CPS, AT&T, Time Warner Cable, and/or other appropriate Utility Providers prior to street (subgrade) and/or drain construction.

1.25 The Contractor shall coordinate with the Developer for placement of private conduit.

1.26 The Contractor is responsible for obtaining all final approvals and shall provide Engineer with street and grading "As-builts" at or before the final inspection. Copies of acceptance letters for such shall also be provided to Engineer, as applicable. One year warranty period shall begin at the date of the final acceptance letter as determined and provided by the City. Contractor is responsible for obtaining final approvals prior to the expiration of warranty period for City maintenance.

~~1.27 The Owner is to provide and pay for construction staking.~~ Refer to Contractor and Engineer responsibilities.

~~1.28 Water Tie-ins are will not be measured and are considered subsidiary to other Water Improvement items.~~

~~1.29 All Sanitary Sewer pipe to be SDR-26.~~

1.30 **Bid is due on or before 10:00 a.m. March 3rd, 2025.** ~~Please submit bid to Adrian Todsen, John Bare and Richard Mott of Lennar Homes of Texas Land and Construction, LTD.~~ Hard copies to be sent to Cude office as described above.

2. Copies of the Bidding Documents

2.1 Complete sets of the Bidding Documents in the number and for the deposit sum of $100, if any, stated in the Invitation to Bidders may be obtained from the ENGINEER's Office. Checks for the Plans and Specifications shall be made payable to Cude Engineers.

2.2 Copies of Bidding Documents are made available only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

2.3 Complete sets of Bidding Documents must be used in preparing Bids; neither OWNER nor ENGINEER assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.4 The Bidding Documents may include reports on the geotechnical, subsurface, physical or environmental conditions which contain information used by the ENGINEER and OWNER. Neither the ENGINEER nor OWNER are responsible for accuracy or completeness of any such information or data. Bidder shall have full responsibility for interpretation of the reports and use of the information for bidding and construction purposes.

3. Bid Security

3.1 No bid security required.

4. Contract Documents

Contract Documents include the Agreement, Addenda, all Conditions (General, Supplementary and Special), specifications and plans, the Bid Proposal, and any written modifications.

5. Defined Terms

Terms used in these Instructions to Bidders which are defined in the Standard General Conditions have the meanings assigned to them in the Standard General Conditions unless modified by the Supplementary and Special Conditions.

6. Bid Proposal Form

6.1 The Bid Proposal Form is included with the Bidding Documents; additional copies may be obtained from the ENGINEER.

6.2 All blanks on the Bid Proposal Form must be completed by printing in ink or by typewriter.

6.3 Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature.

6.4 Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature. Bids by limited partnerships must

be executed by an authorized representative of the general partner on behalf of the general partner.

6.5 All names must be typed or printed in ink below the signature. The address (including County), telephone number, e-mail address (if available), and facsimile number for communications regarding the Bid must be shown.

6.6 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in on the Bid Proposal Form).

6.7 Evidence of authority to conduct business as an out-of-state corporation in the state where the Work is to be performed, shall be provided. State Contractor license number, if any, must also be shown.

7. Interpretations and Addenda

7.1 All questions about the meaning or intent of the Bidding Documents are to be directed to ENGINEER. As necessary, interpretations or clarifications will be issued by Addenda mailed or delivered to all parties having received the Bidding Documents. Questions received less than three days prior to the date for opening of Bids may not be answered. Verbal discussions and answers are not binding.

7.2 Addenda may also be issued to modify the Bidding Documents as deemed advisable by OWNER or ENGINEER.

8. Self Performing

As a condition of this Agreement, the CONTRACTOR is required to self perform at least 60 percent of the work (based on total contract price awarded, complete in place) with personnel directly employed by CONTRACTOR.

9. Subcontractors, Suppliers and Others

9.1 If the Special Conditions require the identity of certain Subcontractors, Suppliers and other persons and organizations (including those who are to furnish the principal items of material and equipment) to be submitted to OWNER prior to the Effective Date of the Agreement, apparent Successful Bidder, and any other Bidder so requested, shall within five days after the Bid opening, submit to OWNER a list of all such Subcontractors, Suppliers and other persons and organizations.

9.2 OWNER reserves the right to reject a proposed subcontractor or supplier at its sole discretion. OWNER may request apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price.

If apparent Successful Bidder declines to make any such substitution, OWNER may award the contract to another Bidder meeting the Bid requirements that proposes to use acceptable subcontractors, suppliers, and other persons and organizations. By declining to make requested substitutes, the apparent Successful Bidder will not sacrifice their Bid security.

9.3 No CONTRACTOR shall be required to employ any subcontractor, supplier, organization against whom CONTRACTOR has reasonable objection.

10. Examination of Contract Documents and Site

10.1 It is the responsibility of each Bidder before submitting a Bid:

10.1.1 To thoroughly examine the Contract Documents and other reports, tests, and drawings identified in the Bidding Documents and Special Conditions. Bidder is instructed to read all Bidding and Contract Documents before completing the bid form. Bidder is advised that failure to read Contract Documents, including without limitation, the General, Supplementary and Special Conditions, does not relieve Bidder from compliance with these documents.

10.1.1.1 Copies of available reports, tests and drawings will be produced by OWNER for review by Bidder on request. OWNER and ENGINEER disclaim any responsibility for the accuracy, true location and extent of surface and subsurface investigations that have been prepared by others.

10.1.1.2 Bidder is responsible for any interpretation or conclusion drawn from any reports, tests, and drawings, or any such data, interpretations, opinions or information, and OWNER and ENGINEER disclaim any responsibility for such interpretations by Bidders, e.g., without limitation, projecting soil-bearing values, rock profiles, soil stability and the presence, level and extent of underground water or underground facilities.

10.1.1.3 Bidder will be responsible for considering how said reports, tests and drawings may relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by Bidder and safety precautions and programs performing the Work in accordance with the Contract Documents.

10.1.2 To visit the site to become familiar with and satisfy Bidder as to the general, local and site conditions that may affect cost, progress, performance or furnishing of the Work;

10.1.3 To consider Federal, State and local laws and regulations that may affect cost, progress, performance or furnishing of the Work;

10.1.4 To correlate Bidder's knowledge and observations of the site with the Contract Documents and such other related reports, tests and drawings;

10.1.5 To promptly notify ENGINEER of all conflicts, errors, ambiguities or discrepancies which Bidder has discovered in or between the Contract Documents and such other related documents.

10.2 On request, OWNER may provide each Bidder access to the site to conduct such examinations, investigations, explorations, tests and studies as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the site to its former conditions upon completion of such explorations, investigations, tests and studies.

11. Availability of Lands for Work, etc.

The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by CONTRACTOR in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by the CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by OWNER unless otherwise provided in the Contract Documents.

12. Substitute and "Or-Equal" Items

All Bids shall be based on work, materials and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or-equal" items. Although the Drawings or Specifications may state a substitute or "or-equal" item of material or equipment may be furnished or used by CONTRACTOR if acceptable to ENGINEER, Bids shall not be based on any substitutions or as equal items. ENGINEER will not consider any application for substitute or as equal until after the Effective Date of the Agreement. The procedure for submission of any such application by CONTRACTOR and consideration by ENGINEER is set forth in the Standard General Conditions and may be supplemented in the Special Conditions.

13. Contract Time

The number of calendar days within which, or the dates by which, the Work is to be substantially completed and the Work is to achieve final completion are set forth in the Agreement and in the Special Conditions.

14. Economic Disincentive for Late Completion of Work

The CONTRACTOR and the OWNER agree that time is of the essence of this Contract. The CONTRACTOR and the OWNER agree that the Agreement is based on completion of the Work by CONTRACTOR in the time specified in the Agreement. CONTRACTOR and the OWNER agree that for each and every calendar day the work or any portion thereof shall remain uncompleted after the expiration of the time limit set in the Contract, or as extended under the provisions for Extension of Time in this Contract, CONTRACTOR shall be liable to OWNER for an economic disincentive in an amount specified in the Special Conditions for such calendar day. The OWNER shall have the option to deduct and withhold said amount from any monies that the OWNER owes the CONTRACTOR or to recover such amount from the CONTRACTOR or the Sureties on the CONTRACTOR's bond.

15. Modification and Withdrawal of Bids

15.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

15.2 If, within twenty-four hours after Bids are opened, any Bidder files a duly signed, written notice with OWNER and promptly thereafter demonstrates to the

reasonable satisfaction of OWNER that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid and the Bid security will be returned. Thereafter, that Bidder will be disqualified from further bidding on the Work to be provided under the Contract Documents.

16. Opening of Bids

A virtual bid opening will occur at 10:30 AM, local time Monday March 3rd, 2025.

17. Bids to Remain Subject to Acceptance

17.1 All Bids will remain subject to acceptance for ninety (90) days after the day of the Bid opening, but OWNER may, in its sole discretion, release any Bid and return the Bid security prior to that date.

18. Award of Contract

18.1 If the contract is to be awarded, it will be awarded to the Successful Bidder as evaluated by OWNER. The Bid price shall include such amounts as the Bidder deems proper for overhead and profit.

18.2 Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words or figures will be resolved in favor of the words. In case of any ambiguity or lack of clarity in stating the prices in the Bid, OWNER reserves the right to consider the most advantageous construction thereof or reject the Bid.

18.3 OWNER reserves the right to reject any or all Bids, including without limitation the rights to reject any or all nonconforming, non-responsive, unbalanced or conditional Bids. OWNER also reserves the right to waive all irregularities and defects in the Bids and the bidding process, except time of submitting a Bid.

18.4 OWNER may conduct such investigations as OWNER deems necessary to assist in the evaluation of any bid and to establish the responsibility, qualifications and financial ability of bidders, proposed subcontractors, suppliers and other persons and organizations to perform and furnish the Work in accordance with the CONTRACT DOCUMENTS to OWNER's satisfaction. OWNER may require Bidders to submit bank references and financial statements in connection with bid evaluation.

18.5 OWNER may also consider Bidder's (or Bidder's officers', partners', directors', affiliates') (i) prior dealings with OWNER or with any entity responsible for payment to Bidder under this Contract and (ii) the amount, size, number, cost and completion-status of any projects that Bidder currently has underway (including, without limitation, projects underway with OWNER or with any entity responsible for payment to Bidder under this Contract), and the amount, nature and quality of the manpower, materials and equipment available to bidder.

18.6 By submitting a Bid, each Bidder agrees to fully and forever waive and release any claim (known or unknown) it has or may have against the OWNER, DEVELOPER, ARCHITECT and ENGINEER, and their respective attorneys, employees, consultants, representatives, agents, successors, assigns, officers, directors, and

members arising under the statutes of Texas, tort, contract or otherwise; or out of or in connection with the: (i) administration, evaluation, or recommendation (or lack thereof) or any BID; (ii) waiver of any requirements under the Bid Documents or the CONTRACT DOCUMENTS; (iii) acceptance or rejection of any bids; (iv) award of the Contract; and (v) provision of references (positive or negative) in connection with any work performed by Bidder, and Bidder's contractors and subcontractors in connection with the Project and the CONTRACT DOCUMENTS, to which Bidder hereby consents and authorizes.

18.7 If the contract is to be awarded, OWNER will give the Successful Bidder Notice of Award within ninety (90) days after the day of the Bid opening.

19. Bonds

Standard General Conditions and the Special Conditions set forth OWNER's requirements, if any, as to Bonds. When the Successful Bidder delivers the executed Agreement to OWNER, it must be accompanied by the required payment and performance bonds.

20. Signing of Agreement

When OWNER gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with all other written Contract Documents attached. Within seven days thereafter CONTRACTOR shall sign and deliver the required number of counterparts of the Agreement and attached documents to OWNER with the required Bonds. Within ten days thereafter OWNER shall deliver one fully signed counterpart to CONTRACTOR.

21. Retainage

The amount of retainage is set forth in the Special Conditions.

22. Sales Tax

22.1 Applicable taxes, licenses, fees and other similar items are part of the cost of the work and it shall be CONTRACTOR's responsibility to familiarize itself with these costs and to observe and comply with the laws and regulations relating to the same. The prices, sums, rates and other charges set forth in the CONTRACTOR's bid shall cover and include all such costs.

22.2 The Special Conditions will indicate if OWNER is exempt from sales tax.

23. Insurance Requirements

CONTRACTOR shall maintain such insurance as specified in the Standard General, Supplementary, and Special Conditions.

24. Estimates of Quantities

Unless otherwise noted in the Special Conditions, the quantities listed in the Bid Proposal shall be considered as approximate and will be used only for comparison of Bids. Payment to the CONTRACTOR will be made only for the actual quantities of work performed or materials furnished in accordance with the contract. The quantities may be increased or decreased as provided in the Standard General Conditions without in any way invalidating the unit Bid prices.

25. Statement of Qualifications

No statement of qualifications required.

26. Prevailing Wage Rate

Minimum wage rates, if applicable to this Contract, shall be specified in the Special Conditions.

26. Civil Engineer Responsibilities:

27.1 The Engineer does not guarantee the performance of, and shall have no responsibility for, the acts or omissions of any Contractor, Subcontractor, Supplier or any other entity furnishing materials or performing any work on the project. Engineer shall not be responsible for the means, methods, techniques, sequences or procedures of construction selected by the Contractor(s) or the safety precautions and programs incident to the work of the Contractor(s).

27.2 The engineering design of this project was performed by a representative of the Owner, referred to in these Specifications as the “Engineer” who will exercise the authority and functions of the Owner in the following respects:

- Staking the work for construction as described in the below “Staking Criteria”.
- Checking of shop and working drawings furnished by the Contractor.
- Consultation and advice during construction and rendering those decisions requiring interpretation of the Plans and Specifications.
- Periodic visits to the project for consultation with the Owner.
- Assist in the final inspection.
- Assist in processing of the monthly and final estimate.

27.3 Staking of requested infrastructure within 72 hours of notification by Contractor. Re-staking will be Charged to the Contractor by the Owner.

27.4 Staking Criteria

- Control - CUDE will set up to three (3) temporary benchmark and control points onsite and/or adjacent to the site for Contractor to layout the proposed improvements of the Project. Plan includes boundary dimensions, benchmarks, survey control points, and alignment control. CUDE will provide one (1) set of centerline staking prior to construction at 100-foot interval including PCs, PTs, and PIs.
- Clearing Staking - CUDE will set staking for clearing of street right-of-ways, drainage right-of-ways, utility easements, drainage easements, and lot grading. Staking will consist of laths defining the centerline of streets and the limits of the non-street ROW or easements.

- Contractor's Responsibility - When horizontal control points, benchmarks, construction stakes and iron lot pins have been set, the preservation of such stakes/pins as to position, elevation and/or marking shall become the responsibility of the Contractor. Should any of the original construction stakes/pins be destroyed by the Contractor's operation, or by any other parties or means whatsoever, the replacement of such stakes/pins will be at the expense of the Contractor. Prior to beginning each phase of work, the contractor shall check for stakes/pins that have been destroyed and request re-staking before commencing work on that phase. Any re-staking requested after work has started on that phase will be charged to the Contractor. Upon completion of construction, any iron pins that have been destroyed/disturbed by the Contractor will be re-set by the Engineer at the expense of the Contractor.
- Street Staking - Construction staking shall consist of a single line of hubs at 100-foot common intervals on the water main side of the street and at 50-foot intervals on curves, PC's and PT's, on both sides of the street. All hubs shall be set at five feet (5') outside the street ROW. The line of hubs shall also be used for water main construction. In addition, the location of blow-offs and Fire hydrants will be staked on this line.
- Each of these staking bullets mentioned above are to be staked in one trip to the site. Separate staking dates due to contractor request will result in additional services to be charged to the contractor by the owner. The contractor is to submit any modifications to the above-noted staking terms in writing along with the bid proposal.

27.5 Unless otherwise provided or ordered, all inspections will be performed by an authorized representative of the authorities having jurisdiction over the work, referred to in these Specifications as the "Inspector" who will exercise authority and function in the following respects:

- Review laboratory, mill and shop tests of materials and equipment for compliance with the Plans and Specifications.
- General supervision and administration of the authorized construction and review of all work performed for compliance with Plans and Specifications.
- Accept the completed work for the authority having jurisdiction over the work.
- The Inspector shall have the authority to stop the work whenever such stoppage may be necessary to insure the proper execution of the Contract. The Inspector shall also have the authority to reject all work and materials which do not conform to the Contract. The Contractor shall give the Inspector timely notice of the readiness for inspection of all work requiring inspection. If any underground work is performed without approval or consent of the Inspector, it shall be uncovered for inspection and properly restored at the Contractor's expense.

27.6 Cude Engineers will not inspect conduit locations and/or depths for CPS, AT&T or Spectrum/Charter infrastructure.

28. Contractor Responsibilities:

28.1 Contractor is to perform an independent quantity take-off prior to signing the contract, to verify that the quantities given in the bid proposal are within five percent (5%) of the actual quantities required to complete the construction represented by the plans and specifications. If any quantities are found to be in error of more than

five percent (5%), the Contractor shall notify the Engineer at least forty-eight (48) hours prior to submitting the bid proposal.

28.2 Bidders are required to inspect the site and to verify all quantities from the construction plans, other material supplied with bid documents as applicable and site inspections. If bidders find a discrepancy in the estimated quantity provided, bidder shall bid their estimated quantity instead. Bidders shall also add any line items to proposal, if needed, to construct the plans provided. Bidders are required to inform themselves of any field conditions that could affect the execution of the work being performed. Once bid proposals are received it will be understood that the Contractor agrees that no change order requests will be allowed to be submitted to the Owner unless a plan revision is issued.

28.3 The Contractor's signature on the contract shall imply that the Contractor accepts the proposal quantities as accurate (within 5%) and shall not make claims for payments for additional quantities unless the scope of work changes.

28.4 The Contractor is responsible to performing an existing topographic survey to verify the existing ground surface provided by Cude Engineers in this bid. Time is of the essence, and sufficient allocation of time and resources to complete such verification prior to submittal of bid proposal is required. No change orders for dirt quantities related to existing ground will be issued after bids are received. It is the responsibility of the Contractor to verify the data provided and adjust the bid accordingly.

28.5 Contractor is to verify existing material on site used to fill the units included in this bid is acceptable to be used. No change orders will be accepted regarding the condition of the existing material used to fill.

28.6 All bidders must submit a project construction schedule for major milestone construction completion items. Bids will not be considered without a construction schedule.

28.7 The Contractor is responsible for filing a NOI and installing all required all required SWPPP measures prior to starting construction.

28.8 Contractor will be responsible for coordinating and scheduling all required meetings and inspections as needed. A minimum of 72 hours notice must be given to the Engineer for any requested site visits. Any and all costs for re-testing of sewer and water facilities due to failure to meet specifications or lack of preparedness will be paid by the Contractor.

28.9 Re-staking of stakes set by Engineer will be charged to the Contractor by the Owner.

28.10 The location and depths of existing utilities shown on the plans were placed on the plans from the best available information from various sources. The Contractor is required to verify the location and depth, prior to construction, of all utilities shown on the plans. The Contractor's attention is hereby specifically directed to the information regarding the existing utility structures, lines and mains which are known to exist and may be encountered within and adjacent to the limits of the work covered by this contract. The existence and location of the underground utilities indicated on the Plans are taken from the best records available and are not guaranteed but shall be investigated and verified by the Contractor before starting work. The Contractor shall be held responsible for any damage to, and for maintenance and protection of, existing utilities which cross proposed construction. The cost of temporarily relocating utilities for the convenience of the Contractor shall be paid by the Contractor. In instances where gas or water mains are exposed during the course of construction, the purveyor shall be notified prior to backfilling operations in order that protective coatings on mains may be inspected or repaired. It shall be the responsibility of the Contractor to determine the exact location of the existing utilities which cross proposed construction. It is the Contractor's responsibility to excavate bridging, if necessary, during construction, so as to maintain continuous service. It shall be his responsibility to backfill around the utility facility and to complete construction so as to leave the

line firmly and securely bedded in its original position. In areas where utilities near the construction area would be damaged by soil movement, slips or cave-ins, the Contractor shall take all precautions to protect such utilities from damage and the Contractor shall be fully responsible for and shall pay for the repair of such damage without additional cost to the Owner or the purveyor.

28.11 It shall be the Contractor's responsibility to perform a final "site clean" after construction activity has ceased and obtained all final acceptances. The Contractor will be responsible for hauling off and disposing of all infrastructure construction related debris, regardless of origin.

28.12 The responsibility shall be upon the Contractor to provide and maintain at his own expense an adequate supply of water for his use for construction and domestic consumption. Any connections and piping that the Contractor deems necessary shall be installed at his expense and at locations approved by the Water Purveyor. Before final acceptance, all temporary connections and piping installed shall be removed in a manner satisfactory to the Engineer.

28.13 All electric current required by the Contractor shall be furnished at his own expense. All necessary meters, switches, connections and wiring shall be installed at his expense and at locations approved by the Electric Company. Before final acceptance, all meters, switches, connections and wiring installed by the Contractor shall be removed in a manner satisfactory to the Engineer.

28.14 Contractor shall coordinate with Owner for parking and placement of all materials and equipment. Owner will not be responsible for any damaged, stolen or vandalized equipment, vehicles, etc.

~~28.15 Only those trees designated by the Engineer will be removed by the Contractor during construction operations. The Contractor shall be required to lay out all proposed improvements and notify the Engineer prior to any tree removal necessary for the execution of work. Trees which are intended to remain, and which are damaged beyond repair or removed, shall be replaced by the Contractor at no extra cost. Trees shall be trimmed and when doing so will avoid removal or damage. Trimmed or damaged trees shall be treated and repaired by persons with experience in this specialty and who are approved by the Engineer. This work is incidental to construction. (No separate pay item.) In the area where excavation or construction occurs within two feet of the canopy of a tree to be saved, the Contractor shall saw cut the edge of the excavation. This will allow for a clean cut of the tree roots and enable the Contractor to excavate in the proximity of trees with minimal damage to the root system. Contact the Engineer if in doubt where to saw cut. This work is incidental to construction. (No separate pay item.)~~

28.16 Contractor shall notify owner/Engineer if any evidence of ground water is present during any phase of the construction process.

28.17 Contractor is responsible for installing and maintaining the erosion and sedimentation controls as designed and shall inspect the controls weekly (7 days) and after every significant rainfall to ensure significant disturbance to the structure has not occurred. Sediment deposited after a significant rainfall shall be removed and placed in designated soil disposal area. Contractor to provide Owner with one complete set of all SW3P inspection reports, including updates and modifications, prior to receiving final payment for project. Contractor is also responsible for replacing SW3P measures if damaged during construction. Contractor must keep and maintain a copy of the Storm Water Pollution Prevention Plan (SW3P) on site and readily available for authorities.

28.18 Excavated material that is free of organic matter and other deleterious substances may be disposed on-site, as approved by Owner. Said material will be utilized as fill material for lots and easements as per the Grading Plan and compacted to meet 79G requirements with 95% Standard Density using ASTM 698 or TEX-114E. No fill shall be placed within natural lows unless indicated on grading plan. Fills in lot areas required compaction testing for every twelve (12") inch lift and fills greater

than one foot deep within building pad areas require compaction testing for every six (6") inch lift.

28.19 Contractor shall coordinate with the Owner's choice of geotechnical testing lab to schedule all geotechnical and compaction testing.

28.20 The Owner will pay for all geotechnical testing required for verification of conformance with the project specifications as needed for acceptances and future permitting for uses determined by the Owner. Any and all costs for re-testing due to failure to meet specifications or lack of preparedness will be paid by the Contractor.

28.21 Contractor will be required to coordinate work with the utility companies that will be installing electric, telephone and TV. Contractor is responsible for coordinating with utility companies to mark existing buried utilities regardless of construction plan depiction plan, error or omission that may be affected by construction. The Contractor will be responsible to repair damaged utilities due to construction. It is the sole responsibility of the contractor to identify all potential conflicts between existing and proposed facilities.

28.22 Contractor shall coordinate with the Owner for placement of private conduit.

28.23 Contractor shall be responsible for periodic sweeping of existing streets adjacent to the site to insure they are free from silt and debris. It shall be the Contractors responsibility to perform a final "site clean" after construction activity has ceased. The Contractor will be responsible for hauling off and disposing of all infrastructure construction related debris, regardless of origin.

28.24 Contractor agrees that it will, as part of the award of this contract, obtain and provide to Owner all interim and final field inspection approvals, all interim and final completion approvals or certificate by governing utility and governmental authorities in writing. The applicable warranty period shall follow required governmental requirements for the jurisdiction the project is located in. Contractor agrees to provide plan of record documents within 30 days of substantial completion of project.

28.25 Contractor shall submit a letter to the Engineer and Owner prior to acceptance of infrastructure by all jurisdictional entities, that certifies the final grading of the lots is within 0.25' of the surface file provided by the Engineer. In addition, all spot elevations shown on the grading plan must be certified that the grade is within 0.1'. The Owner reserves the right to perform an as-built topographic survey to confirm such certification at or near substantial grading completion of the project. If errors or discrepancies are found, the Contractor shall be responsible for correcting grades at their own expense. The Contractor will also be responsible for additional as-built topographic survey costs incurred by the Owner for corrections to a miss on grades.

28.26 Contractor is responsible for the hydromulch (soil, seeding, or sodding and watering) of all earthen drainage channels, detention ponds, and on-site and off-lot grading. 85% of channel surface must have established vegetation prior to acceptance of the channel by the City of San Antonio and Bexar County. Hydromulch pay item to include soil, seeding, or sodding and watering for the time period needed to achieve 85% vegetation.

28.27 Contractor to haul excess material to a future unit within the Tres Laurels Subdivision. Contractor shall coordinate with owner/Engineer of location of excess material to be placed.

BID PROPOSAL

Date:_____

Bid of _____
(Legal Name of Bidder – Company)

[ ] an individual proprietorship

[ ] a corporation organized and existing under the laws of _____

[ ] a partnership consisting of _____

_____

[ ] a joint venture

[ ] other _____

FOR:

Montgomery Road - Phase 1D

STREETS and DRAINAGE CONSTRUCTION

TO:

LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD.
100 NE Loop 410, Suite 1155
San Antonio, TX 78216

PROPOSAL BIDDING SHEET

Montgomery Road – Phase 1D

STREETS and DRAINAGE CONSTRUCTION

Gentlemen:

Pursuant to the foregoing Invitation and Instructions to Bidders, the undersigned bidder hereby proposes to do all the work for the unit prices bid to furnish all necessary superintendence, labor, machine, equipment, tools, materials, insurance and miscellaneous items, to complete all work according to the bids, as provided in the construction plan and contract documents for the **CONSTRUCTION OF MONTGOMERY ROAD – PHASE 1D, STREETS, DRAINS** and clean up the site to the satisfaction of the Owner/Engineer, and bind himself on acceptance of this proposal to execute a contract and bonds for completing said project within the time stated for the following prices, to wit:

Montgomery Road – Phase 1D

STREETS and DRAINAGE CONSTRUCTION

ACKNOWLEDGMENT OF RECEIPT OF ADDENDUM

ADDENDUM NO. 1 _____
Signature Date

ADDENDUM NO. 2 _____
Signature Date

ADDENDUM NO. 3 _____
Signature Date

ADDENDUM NO. 4 _____
Signature Date

ADDENDUM NO. 5 _____
Signature Date

ADDENDUM NO. 6 _____
Signature Date

BID FORM

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

2/10/2025
Job No. R03050.107.0

BID PROPOSAL SCHEDULE
MONTGOMERY ROAD - PHASE 1D

BIDDER'S NAME: _____

BID SUMMARY

SEDIMENTATION AND EROSION CONTROL	$ -
STREET IMPROVEMENTS	$ -
DRAINAGE IMPROVEMENTS	$ -
STREET BID ALTERNATE	
MOBILIZATION	
TOTAL BASE BID:	$ -
TOTAL ALTERNATE BID:	$ -

No shrinkage or swelling facor is accounted for in the engineering excavation and embankment quantities. Contractor to adjust unit price as he deems necessary to account for shrinkage and swelling.

* Includes Bid Bond, Warranty Assignments or Bonds, Per City of San Antonio, and SAWS Requirements

** Contractor is to perform an independent quantity take-off prior to signing the contract, to verify that the quantities given in the bid proposal are within three percent (3%) of the actual quantities required to complete the construction represented by the plans and specifications. If any quantity is found to be in error of more than three percent (3%), the Contractor shall notify the Engineer forty-eight (48) hours prior to signing the contract.

** Bids shall include all Unit Price costs as indicated by the Contract Documents and Bid Form. The bid price submitted by the Contractor shall be the sum of the unit prices times the estimated quantity of each item shown in the bid form. However, the Contractor shall guarantee himself of the accuracy of the quantities shown in the bid form. The quantities shown are estimates only and indicate only the magnitude of the project and a basis for bid comparison. Any discrepancies in quantity or work necessary to fulfill the intent of the plans shall be included, whether a bid item is included or not. Any work required for which a bid item is not shown shall be considered subsidiary to other work items.

Bidders Initials _____
Date _____

2/10/2025
Job No. R03050.107.0

BID PROPOSAL SCHEDULE
MONTGOMERY ROAD - PHASE 1D
SEDIMENTATION & EROSION CONTROL

NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT PRICES	COST
0506-6001	ROCK FILTER DAMS (TY 1)	LF	140	$ -	$ -
0506-6020	CONSTRUCTION EXITS (TY 1)	SY	420	$ -	$ -
0506-6038	TEMP SEDMT CONT FENCE	LF	3560	$ -	$ -
0506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	180	$ -	$ -
				TOTAL COST	$ -

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** Commence of Construction:

1. Initial project clearing will need to be limited to the locations of the proposed temporary SWP3 Best Management Practices (BMP) designed by the engineer. These BMPs may include, but are not limited to:
Stabilized Construction Exit(s), Silt Fence, Discharge Point Rock Berms/Check Dams, Trash containment, Temporary Sediment Basins (if applicable), Demarcation of protected site features for exapmle; Wetlands, Environmental Buffers, Caves or Solution Features, and Habitats,
2. Prior to commencement of additional clearing or earth disturbing activities, the proposed BMPs will need to be installed by the Contractor and inspected by a Lennar Representative. Contractor must provide at minimum, 48-hours of notice to Lennar when the BMPs are scheduled to be installed and completed. The Lennar Representative will coordinate the Land Development Manager to release the project for construction.
When the project is located within the Bexar County controlled MS4, the Contractor must provide 48-hours of notice to the assigned Bexar County SWP3 Inspector noted on the Storm Water Quality (SWQ) permit letter.
3. When a Temporary Sediment Basin is required for the project, limited clearing of the proposed basin location and any material borrow areas to construct the Temporary Sediment Basin may occur during the initial BMP installation period. The Temporary Sediment Basin must be completely constructed to Engineer's design. This may include the following; Construction of the dewatering structure (Riser Pipe or Fair Cloth Skimmer and pump), Construction of the Emergency Overflow Structure, Installation of a sediment depth marker. Note-Once accessible to appropriate equipment, the only the Temporary Sediment Basin berms/slopes shall be temporarily stabilized.
4. General Contractor is to maintain all pollution control measures in effective operating condition throughout the contract period to the extent achievable. To ensure BMPs are operating effectively, and in accordance with the Construction General Permit, Lennar will provide regular and if applicable, post-rain event BMP inspections and inspection reports. The General Contractor will be provided an electronic copy of the BMP inspection report via email. weekly regarding issues with BMPs at the project through the Lennar SWP3 Inspection process. Items noted in the BMP Inspection report must be addressed by the General Contractor as soon as possible, and within 7 calendar days. General Contractor shall provide documentation to the assigned Lennar Land Development Project Manager to include:
a. Actions taken in response to the BMP inspection report and date(s) the actions were completed or,
b. Statement of extenuating circumstance as to why an item could not be completed within the 7-day timeframe and proposed scheduled date of completion.
5. Contractor to maintain Spill Response Supplies/Kit at the project location while actively working onsite.
6. When dewatering activities disccharge into onsite creeks or rivers, or discharge outside the limits of construction, daily dewatering inspections must be documented in accordance with the 03.05.2023 TCEQ Construction General Permit. Daily report must be sent to Lennar within 24-hours.

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Stabilized Construction Exit(s), Silt Fence, Discharge Point Rock Berms/Check Dams, Trash containment, Temporary Sediment Basins (if applicable), Demarcation of protected site features for exapmle; Wetlands, Environmental Buffers, Caves or Solution Features, and Habitats,

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Bidders Initials _____

Date _____

2/10/2025
Job No. R03050.107.0

BID PROPOSAL SCHEDULE
MONTGOMERY ROAD - PHASE 1D
STREET IMPROVEMENTS

ITEM/DESC CODE	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT PRICES	COST
0100-6002	PREPARING ROW	STA	34	$ -	$ -
0104-6021	REMOVING CONC (CURB)	LF	154	$ -	$ -
0110-6001	EXCAVATION (ROADWAY)	CY	4,694	$ -	$ -
0132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	7,067	$ -	$ -
0161-6017	COMPOST MANUF TOPSOIL (4")	SY	24,819	$ -	$ -
0164-6066	DRILL SEEDING (PERM)(WARM OR COOL)	SY	24,819	$ -	$ -
0168-6001	VEGETATIVE WATERING	MG	387	$ -	$ -
0216-6001	PROOF ROLLING	HR	50	$ -	$ -
0247-6041	FL BS (CMP IN PLC)(TYA GR1-2)(FNAL POS)	CY	4,291	$ -	$ -
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	268	$ -	$ -
0260-6079	LIME TRT (SUBGRADE)(6")	SY	19,557	$ -	$ -
0310-6027	PRIME COAT(MC-30 OR AE-P)	GAL	3,813	$ -	$ -
0420-6074	CL C CONC (MISC)	CY	11	$ -	$ -
0432-6001	RIPRAP (CONC) (4 IN)	CY	8	$ -	$ -
0502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	4	$ -	$ -
0529-6001	CONC CURB (TY I)	LF	4,898	$ -	$ -
0531-6001	CONC SIDEWALKS (4")	SY	1,826	$ -	$ -
0531-6010	CURB RAMPS (TY 7)	EA	8	$ -	$ -
0536-6002	CONC MEDIAN	SY	274	$ -	$ -
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	6	$ -	$ -
0644-6060	IN SM RD SN SUP&AM TYTWT(1)WS(P)	EA	8	$ -	$ -
0666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	513	$ -	$ -
0666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	875	$ -	$ -
0666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	3	$ -	$ -
0666-6072	REFL PAV MRK TY I(W)(LNDP ARW)(100MIL)	EA	2	$ -	$ -
0666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	3	$ -	$ -
0666-6105	REFL PAV MRK TY I (W)(BIKE ARW)(100MIL)	EA	2	$ -	$ -
0666-6111	REFL PAV MRK TY I(W)(BIKE SYML)(100MIL)	EA	2	$ -	$ -
0666-6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF	728	$ -	$ -
0666-6156	REFL PAV MRK TY I(Y)(MED NOSE)(100MIL)	EA	2	$ -	$ -
0666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	290	$ -	$ -
0666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	2,718	$ -	$ -
0666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	7,493	$ -	$ -
0672-6009	REFL PAV MRKR TY II-A-A	EA	283	$ -	$ -
0672-6010	REFL PAV MRKR TY II-C-R	EA	42	$ -	$ -
3076-6001	D-GR HMA TY-B PG64-22	TON	6,575	$ -	$ -
3076-6040	D-GR HMA TY-D PG70-22	TON	4,138	$ -	$ -
3076-6066	TACK COAT	GAL	5,505	$ -	$ -
9990BEXAR-X	TREATED TIMBER BOLLARDS	EA	42	$ -	$ -
	STOCKPILE IN TRES LAURELS UNIT 4B (EXCESS METERIAL)	CY	2,469	$ -	$ -
				TOTAL COST	$ -

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Bidders Initials _____

Date _____

2/10/2025
Job No. R03050.107.0

BID PROPOSAL SCHEDULE
MONTGOMERY ROAD - PHASE 1D
STREET IMPROVEMENTS

ITEM/DESC CODE	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT PRICES	COST
0110-6002	EXCAVATION (CHANNEL)	CY	4,994	$ -	$ -
0132-6001	EMBANKMENT (FINAL)(ORD COMP)(TY A)	CY	152	$ -	$ -
0402-6001	TRENCH EXCAVATION PROTECTION	LF	1,043	$ -	$ -
0420-6009	CL A CONC (COLLAR)	EA	18	$ -	$ -
0432-6002	RIPRAP (CONC)(5 IN)	CY	18.35	$ -	$ -
0432-6031	RIPRAP (STONE PROTECTION)(12 IN)	CY	101	$ -	$ -
0432-6042	RIPRAP (CONC)(DISSIPATER)	CY	4.32	$ -	$ -
0459-6009	GABIONS (3' X 3')(GALV)	CY	27	$ -	$ -
0462-6002	CONC BOX CULV (3 FT X 3 FT)	LF	64	$ -	$ -
0462-6003	CONC BOX CULV (4 FT X 2 FT)	LF	34	$ -	$ -
0462-6004	CONC BOX CULV (4 FT X 3 FT)	LF	468	$ -	$ -
0462-6007	CONC BOX CULV (5 FT X 3 FT)	LF	147	$ -	$ -
0462-6010	CONC BOX CULV (6 FT X 3 FT)	LF	335	$ -	$ -
0464-6007	RC PIPE (CL III)(30 IN)	LF	8	$ -	$ -
0465-6012	JCTBOX(COMPL)(PJB)(8FTX8FT)	EA	1	$ -	$ -
0465-XXX	JCTBOX(COMPL)(PJB)(6FTX6FT)	EA	1	$ -	$ -
0465-XXX	JCTBOX(COMPL)(PJB)(7FTX10FT)	EA	1	$ -	$ -
0465-XXX	JCTBOX(COMPL)(PJB)(10FTX10FT)	EA	1	$ -	$ -
0465-6074	INLET (COMPL)(PSL)(RC)(5FTX5FT)	EA	1	$ -	$ -
0465-XXX	INLET (COMPL)(PSL)(FG)(6FTX6FT-5FTX5FT)	EA	2	$ -	$ -
0465-XXX	INLET (COMPL)(PSL)(FG)(8FTX8FT-5FTX5FT)	EA	1	$ -	$ -
0465-6207	INLET (COMPL)(CURB)(TY 1)(10')	EA	3	$ -	$ -
0465-6268	INLET (COMPL)(EXT)(TY 1)	EA	3	$ -	$ -
0465-XXX	MANH(COMPL)(PRM)(48")	EA	2	$ -	$ -
0466-6179	WINGWALL (PW - 1) (HW=4 FT)	EA	2	$ -	$ -
SAWS 856	24" STEEL CASING	LF	44	$ -	$ -

TOTAL COST $ -

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Bidders Initials _____
Date _____

2/10/2025
Job No. R03050.107.0

BID PROPOSAL SCHEDULE
MONTGOMERY ROAD - PHASE 1D
STREET BID ALTERNATE

NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES*	UNIT PRICES	COST
275	CEMENT SUBGRADE (27LBS/SY)(6%)	TON	268	$ -	$ -

TOTAL COST $ -

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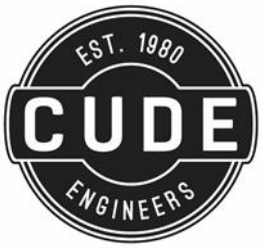
Bidders Initials _____
Date _____



MONTGOMERY ROAD, PHASE 1D
CONSTRUCTION PLANS

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

INDEX OF SHEETS

SEE SHEET 2 FOR THE INDEX OF SHEETS

WT MONTGOMERY ROAD
ROADWAY EXTENSION - PHASE 1D

LIMITS: 1.44 MILES NORTH OF US 90 WBFR TO 0.34 MILES SOUTH OF CANTHREE DR

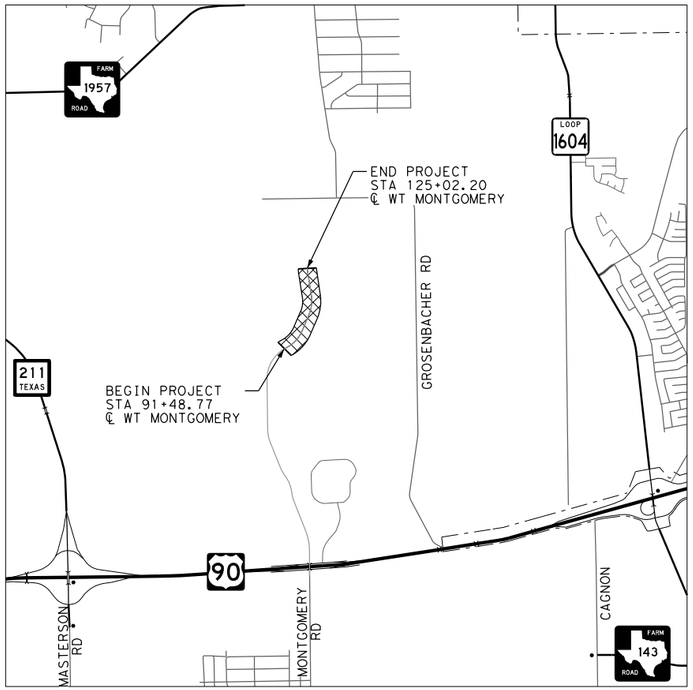
NET LENGTH OF ROADWAY =	3353.43 FT	0.64 MI
NET LENGTH OF BRIDGE =	0.0 FT	0.00 MI
NET LENGTH OF PROJECT =	3353.43 FT	0.64 MI

FOR WORK CONSISTING OF ROADWAY, DRAINAGE, SIGNING, AND PAVEMENT MARKINGS

ROAD CLASSIFICATION
PRIMARY ARTERIAL

DESIGN SPEED
WT MONTGOMERY RD = 45 MPH

AREA OF DISTRIBUTED SOIL
9.24 ACRES



LOCATION MAP
N.T.S

EXCEPTIONS: N/A
EQUATIONS: N/A
R.R. CROSSINGS: N/A

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND THE SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: SPECIAL LABOR PROVISIONS FOR STATE PROJECTS (000--008)

PETER SAKAI	COUNTY JUDGE
REBECA CLAY-FLORES	COMMISSIONER PCT. 1
JUSTIN RODRIGUEZ	COMMISSIONER PCT. 2
GRANT MOODY	COMMISSIONER PCT. 3
TOMMY CALVERT	COMMISSIONER PCT. 4
DAVID L. SMITH	COUNTY MANAGER
ART REINHARDT, P.E., CFM	DIRECTOR OF PUBLIC WORKS/ COUNTY ENGINEER

STATE OF TEXAS
SEAN P. MCFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

Sean McFarland
08/14/2024

CUDE ENGINEERS
TBPE No. 455
TBPLS No. 10048500

APPROVED FOR LETTING

DIRECTOR OF PUBLIC WORKS/
COUNTY ENGINEER

* TxDOT STANDARDS
** SAT DISTRICT STANDARDS

2/7/2025

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED BY (#), HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED BY (&), HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

LEGACY ENGINEERING GROUP

Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

INDEX OF SHEETS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	-	2

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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Legacy Engineering Group
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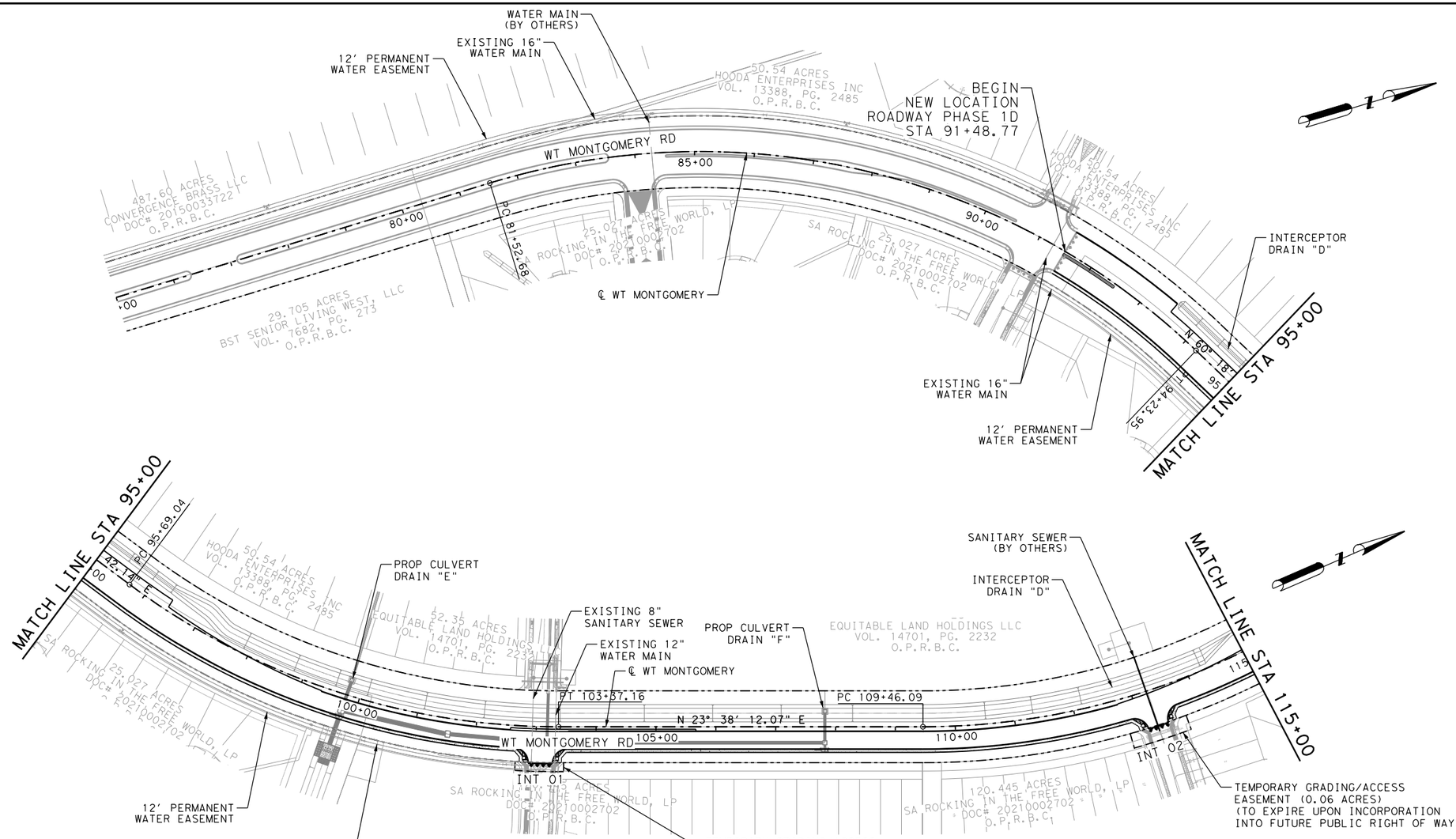

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED
PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

PROJECT LAYOUT

SCALE: 1" = 100' SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	-		3
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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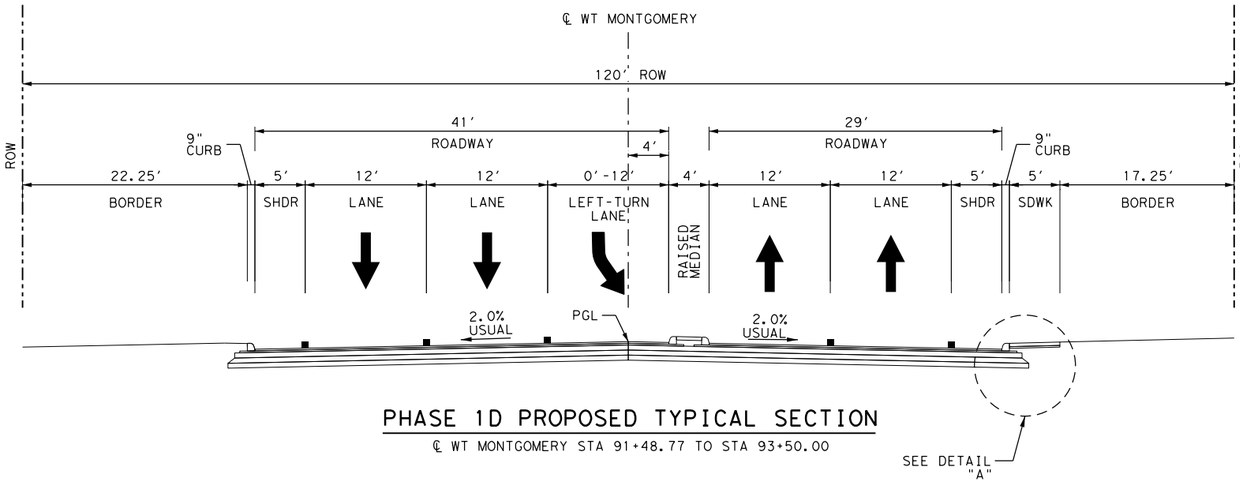
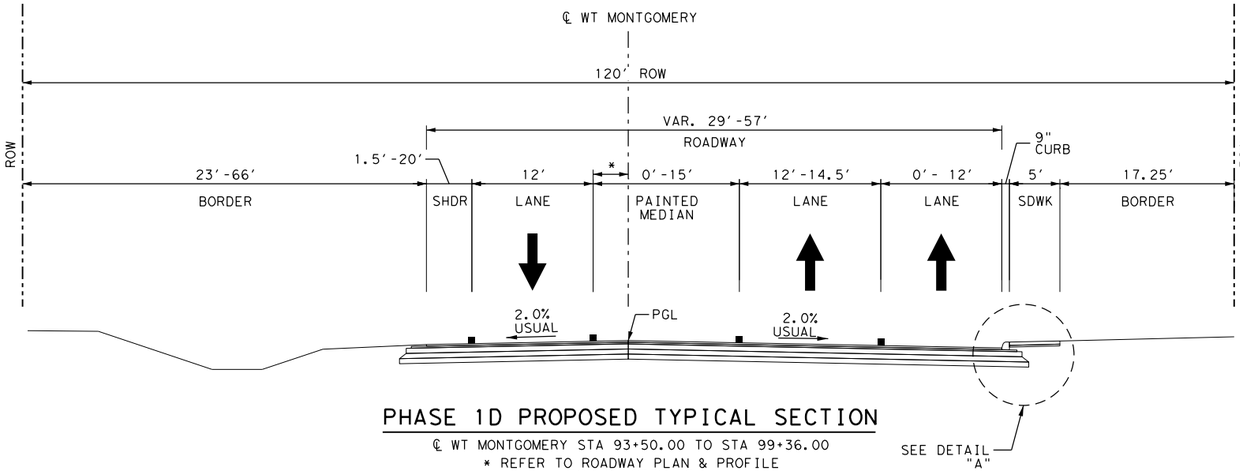


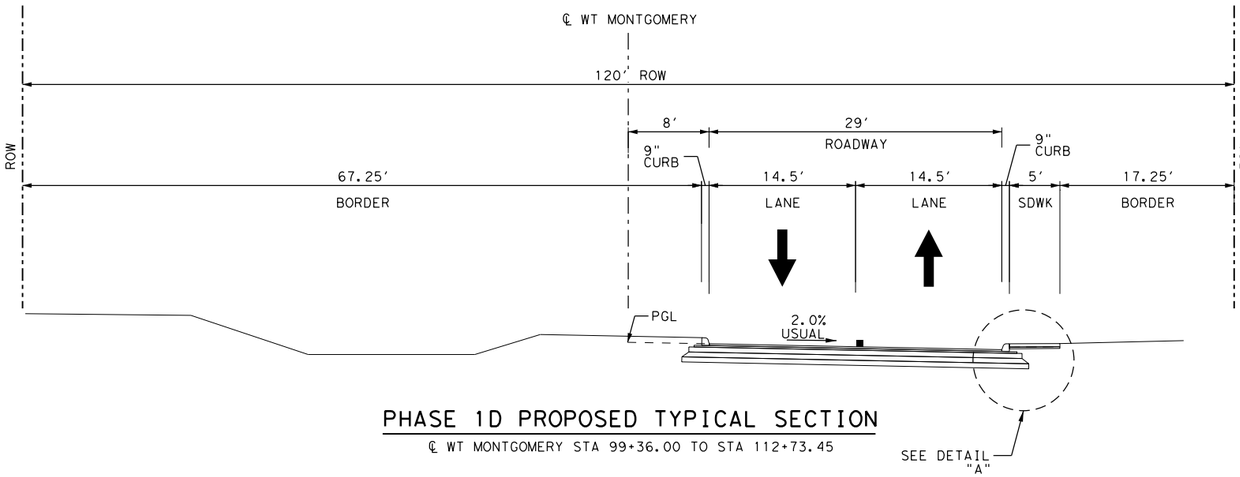
PHASE 1D PROPOSED TYPICAL SECTION

℄ WT MONTGOMERY STA 91+48.77 TO STA 93+50.00



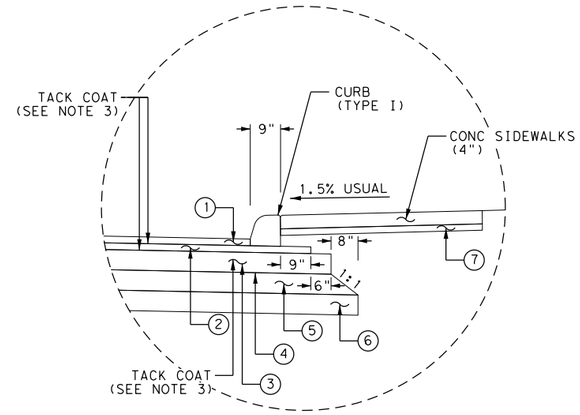
PHASE 1D PROPOSED TYPICAL SECTION

℄ WT MONTGOMERY STA 93+50.00 TO STA 99+36.00
* REFER TO ROADWAY PLAN & PROFILE FOR CL OFFSETS



PHASE 1D PROPOSED TYPICAL SECTION

℄ WT MONTGOMERY STA 99+36.00 TO STA 112+73.45



DETAIL "A"

N.T.S

LEGEND

(1)	2" WARM MIX ASPHALTIC PAVEMENT, TYPE D
(2)	2" WARM MIX ASPHALTIC PAVEMENT, TYPE D
* (3)	6" WARM MIX ASPHALTIC PAVEMENT, TYPE B
(4)	PRIME COAT (MC-30 OR AE-P) @ 0.20 GAL/SY
* (5)	8" FLEX BASE TY A GR 1-2
(6)	6" LIME-STABILIZED SUBGRADE
(7)	2" FLEX BASE (SEE NOTE 2)

* TO BE PLACED IN 2 EQUAL LIFTS

NOTES:

1. FOR SPECIFICATION 340, 'DENSE-GRADED HOT MIX ASPHALT (SMALL QUANTITY)AND 341, "DENSE-GRADED HOT-MIX ASPHALT", THE FOLLOWING REQUIREMENTS SHALL BE FOLLOWED FOR ASPHALT USED ON THIS PROJECT:
   a. ALL ASPHALT SHALL BE WARM MIX PER SPECIFICATION SECTION 340.2.6.2 AND 341.2.6.2
   b. NO RECYCLED ASPHALT SHINGLES (RAS) IS ALLOWED IN THE ASPHALT MIXES.
   c. NO MORE THAN 5% RECLAIMED ASPHALT PAVEMENT (RAP) IS ALLOWED IN THE ASPHALT MIXES.
2. FLEX BASE IS SUBSIDIARY TO ITEM 531.
3. TACK COAT TO BE APPLIED BETWEEN EVERY HMA LIFT. RATE OF APPLICATION SHALL BE 0.1 GAL/SY

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

PROPOSED TYPICAL SECTIONS

N.T.S. SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	-	4

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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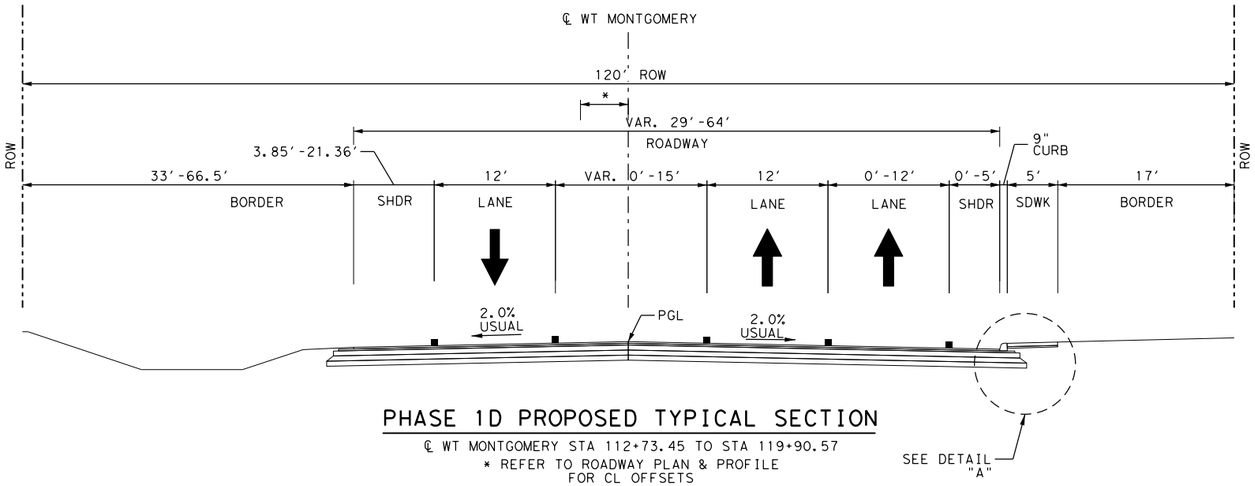
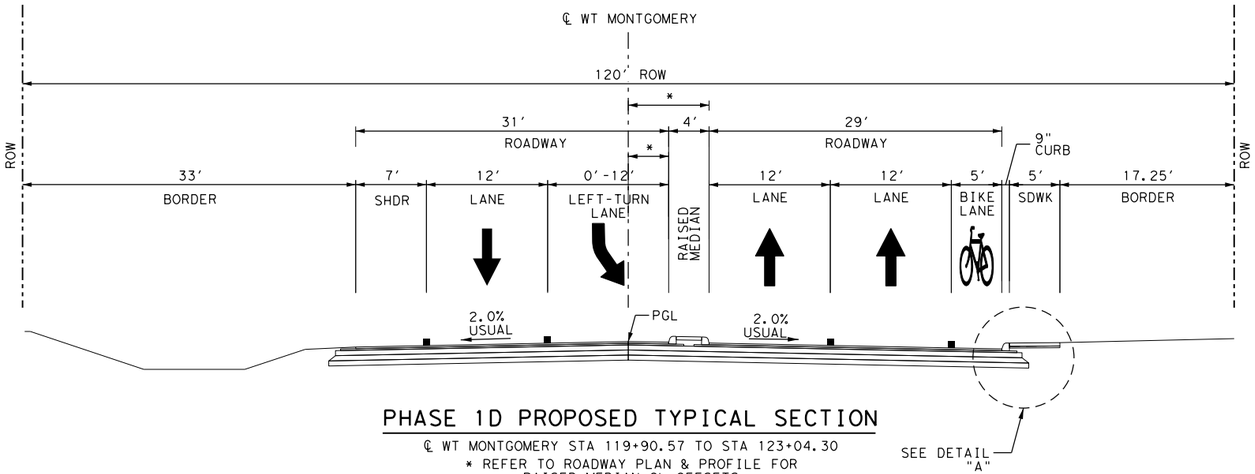


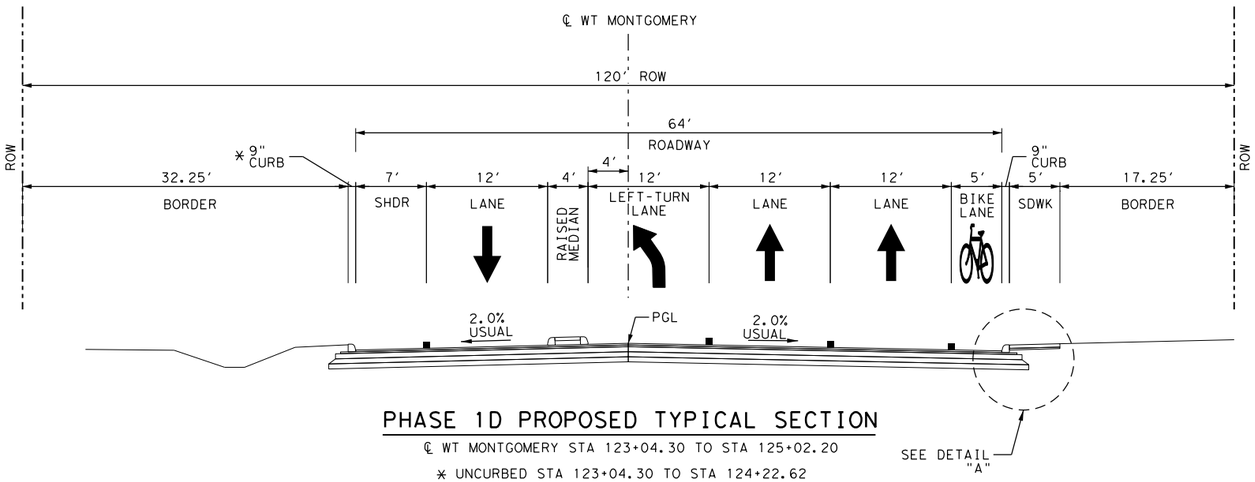
PHASE 1D PROPOSED TYPICAL SECTION

℄ WT MONTGOMERY STA 112+73.45 TO STA 119+90.57
* REFER TO ROADWAY PLAN & PROFILE FOR CL OFFSETS



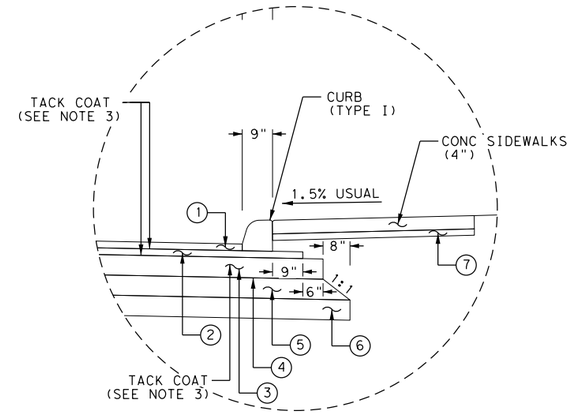
PHASE 1D PROPOSED TYPICAL SECTION

℄ WT MONTGOMERY STA 119+90.57 TO STA 123+04.30
* REFER TO ROADWAY PLAN & PROFILE FOR RAISED MEDIAN CL OFFSETS



PHASE 1D PROPOSED TYPICAL SECTION

℄ WT MONTGOMERY STA 123+04.30 TO STA 125+02.20
* UNCURBED STA 123+04.30 TO STA 124+22.62



DETAIL "A"

N.T.S

LEGEND

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3. TACK COAT TO BE APPLIED BETWEEN EVERY HMA LIFT. RATE OF APPLICATION SHALL BE 0.1 GAL/SY

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
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WT MONTGOMERY ROAD

PROPOSED TYPICAL SECTIONS

N.T.S. SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	-	5

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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Legacy Engineering Group
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GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS TO BE IN ACCORDANCE WITH THE TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) "STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTAINANCE OF HIGHWAY, STREETS AND BRIDGES JUNE 2014" AND CITY OF SAN ANTONIO "STANDARD SPECIFCATIONS FOR PUBLIC WORKS CONSTRUCTION" DATED JUNE 2008 WITH ALL APPLICABLE AMENDMENTS AND ANY SPECIAL SPECIFICATIONS ISSUED FOR THE PROJECT UNLESS OTHERWISE SPECIFIED.
2. NO EXTRA PAYMENT SHALL BE ALLOWED FOR WORK CALLED FOR ON THE PLANS, BUT NOT INCLUDED ON THE BID SCHEDULE. THIS INCIDENTAL WORK WILL BE REQUIRED AND SHALL BE INCLUDED IN THE PAY ITEM TO WHICH IT RELATES.
3. CONFLICTS IN THE PLANS AND/OR SPECIFICATIONS FOUND BY THE CONTRACTOR SHALL BE PROMPTLY REPORTED TO THE INSPECTOR BEFORE PROCEEDING WITH CONSTRUCTION.
4. BIDDERS ARE HEREBY NOTIFIED TO MAKE SUBSURFACE INVESTIGATIONS AS THEY DEEM NECESSARY. NO ADDITIONAL PAYMENT SHALL BE MADE FOR ROCK, SAND, GRAVEL, OR OTHER UNSTABLE CONDITIONS ENCOUNTERED IN STREET EXCAVATION, BOX CULVERT EXCAVATION, STRUCTURAL EXCAVATION, OR CHANNEL EXCAVATION.
5. THE CONTRACTOR SHALL LIMIT WORK ACTIVITIES TO THE STREET RIGHT-OF-WAY AND EASEMENTS. NO PROVISIONS HAVE BEEN MADE FOR WORK ACTIVITIES OR STORAGE OF MATERIALS AND/OR EQUIPMENT ON PRIVATE PROPERTY.
6. THE CONTRACTOR SHALL PRESERVE ALL CONSTRUCTION STAKES, MARKERS, ETC. ANY CONSTRUCTION STAKES, MARKERS, ETC., REMOVED BY THE CONTRACTOR OR THE CONTRACTOR'S EMPLOYEES SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
7. DUE TO FEDERAL REGULATIONS TITLE 49, PART 192.181, GAS UTILITY OWNERS MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES. THE CONTRACTOR MUST PROTECT AND WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA.
8. DURING THE CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF FENCING. DAMAGED FENCING SHALL BE REPLACED WITH EQUAL OR BETTER MATERIALS AND WORKMANSHIP. THE CONTRACTOR SHALL COORDINATE WITH THE LANDOWNER FOR WORK WITHIN PRIVATE PROPERTY. EASEMENT FENCES MAY BE REMOVED AND REPLACED AS REQUIRED. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN AND SET UP TEMPORARY FENCING FOR LIVESTOCK AS NECESSARY FOR ALL PHASES OF WORK. NO SEPARATE PAYMENT SHALL BE MADE FOR MAINTAINING FENCING.
9. CONTRACTOR SHALL PROTECT FROM DAMAGE ALL TREES WITHIN THE PROJECT'S RIGHT-OF-WAY AND VARIOUS CONSTRUCTION AND FILL EASEMENTS EXCEPT FOR THOSE TREES SPECIFICALLY DESIGNATED BY THE "CONSTRUCTION INSPECTOR" TO BE REMOVED FOR CONSTRUCTION PURPOSES AND WILL BE SUBSIDARY TO THE VARIOUS BID ITEMS FOR THE PROJECT. ALL TREES WHICH ARE NOT DESIGNED FOR REMOVAL AND ARE DAMAGED BY CONTRACTOR SHALL BE COMPENSATED FOR OR REPLACED BY THE CONTRACTOR TO THE SATISFACTION OF BEXAR COUTY OR THE PROPERTY OWNER.
10. CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTUAL DESIGN/GEOTECHNICAL/SAFETY EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO DEVELOP THE CONTRACTOR'S PLAN TO IMPLEMENT THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS.
11. THE CONTRACTOR'S PLANS SHALL PROVIDE ADEQUATE TRENCH SAFETY SYSTEMS THAT COMPLY WITH AS MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS, SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL DEVELOP STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.
12. THE CONTRACTOR SHALL MAINTAIN ALL ADJOINING STREETS AND TRAVELED ROUTES FREE FROM SPILLED AND/OR TRACKED CONSTRUCTION MATERIALS.
13. ANY CAVERN OR SOLUTION CHANNELS ENCOUNTERED DURING CONSTRUCTION SHALL BE REPORTED TO THE ENGINEER AND THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) REGION 13 OFFICE WITH A REQUEST FOR APPROVAL OF CONSTRUCTION.
14. ALL WASTE MATERIAL SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND IT WILL BE HIS SOLE RESPONSIBILITY TO DISPOSE OF THIS MATERIAL OFF THE LIMITS OF THE RIGHT-OF-WAY AND TO PRIVATE OWNERS. NO WASTE MATERIALS SHALL BE PLACED IN EXISTING LOWS THAT WILL BLOCK OR ALTER FLOW LIMITS OF EXISTING NATURAL DRAINAGE. THE CONTRACTOR SHALL NOT PLACE ANY WASTE MATERIALS IN THE 100-YEAR FLOODPLAIN WITHOUT FIRST OBTAINING A FLOOD PLAIN DEVELOPMENT PERMIT FROM THE APPROPRIATE ENTITY.
15. CONTRACTOR IS TO MAINTAIN UNRESTRICTED DRAINAGE OF THE PROJECT SITE AND ADJACENT AREAS DURING CONSTRUCTION.
16. AFTER COMPLETION OF ALL WORK, THE CONTRACTOR SHALL REMOVE ALL DEBRIS FROM THE RIGHT-OF-WAY AND LEAVE THE WORK AREA NEAT AND CLEAN. ANY TEMPORARY FILL TO FACILITATE CONSTRUCTION SHALL BE REMOVED AND DISPOSED OF IN A MANNER APPROVED BY THE COUNTY ENGINEER.
17. ALL DISTURBED AREAS SHALL BE FINISHED WITH TOPSOIL AND HYDROMULCH OR SOD AS NOTED ON THE PLANS.
18. CONTRACTOR TO VERIFY EXISTING ELEVATIONS AT ALL TIE-IN LOCATIONS PRIOR TO CONSTRUCTION. NOTIFY ENGINEER IF SIGNIFICANT DISCREPANCIES EXIST.
19. THE EXISTING CONDITIONS AND UTILITIES SHOWN ON THE PLANS WERE DETERMINED AT THE TIME OF PLAN PREPARATION MAY 2021. THE UTILITY LOCATIONS SHOWN ARE APPROXIMATE ONLY. THE ACTUAL LOCATIONS AND DEPTHS OF UTILITIES SHOWN ON THE PLANS INCLUDING THOSE WHICH HAVE BEEN ADDED, ELIMINATED, ADJUSTED AND/OR RELOCATED AFTER THE AFOREMENTIONED DATE OF PLAN PREPARATION MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO THE EXISTING UTILITIES DUE TO NEGLIGENCE OF THE CONTRACTOR OR DUE TO EXCAVATION OUTSIDE OF THE DEFINED CONSTRUCTION LIMITS OF THIS PROJECT. CONTRACTOR SHALL HAVE THE SOLE RESPONSIBILITY OF FIELD VERIFYING EACH UTILITY LOCATION AND COORDINATING AND NOTIFYING OWNERS AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO EXCAVATION. THE LATEST TELEPHONE NUMBERS OF UTILITY OWNERS ARE LISTED BELOW FOR THE CONTRACTOR'S CONVENIENCE.

COMPANY NAME	PHONE NO.
TEXAS 811- TEXAS STATEWIDE ONE CALL LOCATOR	(800) 344-8377
SAN ANTONIO WATER SYSTEM (SAWS)	(210)233-2010
CITY PUBLIC SERVICE ENERGY	(210)353-2747
SPECTRUM	(800) 344-8377
SAN ANTONIO RIVER AUTHORITY	(210) 302-4204
AT&T	(210) 283-1935
UNITE PRIVATE NETWORKS	(816) 903-9400

20. OVERHEAD UTILITIES MAY EXIST ON THE PROPERTY WE HAVE NOT ATTEMPTED TO MARK THOSE SINCE THEY ARE CLEARLY VISIBLE. BUT YOU SHOULD LOCATE THEM BEFORE BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH AND SAFETY CODE FORBIDS ALL ACTIVITIES IN WHICH PERSONS OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES. CONTRACTOS AND OWNERS ARE LEGALLY RESPOSIBLE FOR SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILILTY, TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CONTACT CPS AT (210) 978-3500.
21. CONTRACTOR SHALL BE RESPONSIBLE OR ACQUIRING ALL PERMITS, TESTS, APPROVALS AND ACCEPTANCES REQUIRED COMPLETING CONSTRUCTION OF THIS PROJECT.
22. CONTRACTOR SHALL NOTIFY THE COUNTY AT (210) 335-6700 TWENTY-FOUR (24) HOURS PRIOR TO THE BACKFILL OF ANY TRENCHES TO SCHEDULE FOR DENSITY TESTING AS REQUIRED.
23. IF SUSPECTED CONTAMINATION IS ENCOUNTERED DURING CONSTRUCTION OPERATIONS, BEXAR COUNTY SHALL BE NOTIFIED IMMEDIATELY. THE NOTIFICATION SHOULD INCLUDE THE STATION NUMBER, TYPE OF CONTAMINATED MEDIA, EVIDENCE OF CONTAMINATION AND MEASURES TAKEN TO CONTAIN THE CONTAMINATED MEDIA AND PREVENT PUBLIC ACCESS. THE CONTAMINATED SOIL AND/OR GROUNDWATER SHALL NOT BE REMOVED FROM THE LOCATION WITHOUT PRIOR BEXAR COUNTY APPROVAL. THE CONTRACTOR MUST STOP THE EXCAVATION IMMEDIATELY AND CONTACT THE BEXAR COUNTY INSPECTOR. THE CONTRACTOR WILL NOT RE-COMMENCE EXCAVATION ACTIVITIES WITHOUT WRITTEN PERMISSION FROM BEXAR COUNTY.
24. LOCATION OF ALL CONCRETE FOUNDATIONS SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
25. ALL SPOILS FROM EXCAVATION SHALL BE PLACED IN A TRUCK OR TRAILER TO BE REMOVED DAILY AND SHALL NOT BE PLACED ON THE GROUND OR ROADWAY.
26. ALL STREETS AND/OR DRIVEWAYS MUST BE BORED, IF NECESSARY. NO OPEN CUT OF STREETS OR DRIVEWAYS WILL BE ALLOWED.
27. REMOVE EXISTING RAISED PAVEMENT MARKERS AND EXISTING PAVEMENT MARKINGS AS THE WORK PROGRESSES OR AS APPROVED. THIS WORK IS SUBIDIARY TO THE VARIOUS BID ITEMS.
28. ANY MATERIALS REMOVED AND NOT REUSED AND DETERMINED TO BE SALVAGEABLE SHALL BE STORED WITHIN THE PROJECT LIMITS AT AN APPROVED LOCATION OR DELIVERED UNDAMAGED TO THE STORAGE YARD AS DIRECTED. PROPERLY DISPOSE UNSALVAGEABLE MATERIALS IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.
29. ANY SIGN PANELS THAT ARE ADJUSTED OR REMOVED AND REPLACED, SHALL BE DONE THE SAME WORKDAY UNLESS OTHERWISE APPROVED. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS PROJECT SHALL CONFORM TO APPLICABLE CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (LATEDT ADDITION), TXDOT STANDARD SPECIFICATIONS AS WELL AS PROVISIONS APPLICABLE TO THE PROJECT AND AS OTHER SAFETY CODE AND INSPECTION REQUIREMENTS OF THE FIRE DEPARTMENT.
30. MATERIAL FURNISHED BY THE CONTRACTOR SHALL BE NEW, UN-DEPRECIATED STOCK. ALL EQUIPMENT SHALL BE NEW, UNLESS NOTED OTHERWISE ON THE PLANS.
31. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ORIGINAL CONDITION, OR BETTER, ANY DAMAGE DONE TO EXISTING BUILDINGS, RETAINING WALLS, UTILITIES, FENCES, PAVEMENT, CURBS OR DRIVEWAYS (NO SEPARATE PAY ITEM). CONTRACTOR SHALL RESTORE THE CONSTRUCTION AREA TO ORIGINAL CONDITION, OR BETTER, PRIOR TO FINAL INSPECTION.
32. CONTRACTOR IS RESPONSIBLE FOR KEEPING STREETS AND SIDEWALKS ADJACENT TO THE PROJECT FREE OF MUD AND DEBRIS FROM THE CONSTRUCTION AT ALL TIMES.
33. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN ALL EROSION CONTROL FACILITIES BEFORE, DURING AND AFTER ALL CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS.
34. ALL JOINTS, SEALS, CONNECTIONS, AND MODIFICATIONS NECESSARY FOR PROPER INSTALLATION OF RCP SHALL BE SUBSIDIARY TO THE RCP PAY ITEM.
35. FOR PEDESTRIAN SAFETY, THE CONTRACTOR SHALL INSTALL ORANGE PLASTIC CONSTRUCTION FENCING (4 FEET TALL MINIMUM) AROUND ALL OPEN EXCAVATIONS OR AS DIRECTED BY THE ENGINEER. SUCH FENCING SHALL NOT OBSTRUCT SIGHT LINES OF THE TRAVELING PUBLIC.
36. CONTRACTOR SHALL BE RESPONSIBLE FOR CLEARING ANY CONSTRUCTION MATERIALS FROM ADJACENT WATERWAYS AFTER A FLOOD EVENT. REPAIR OF ANY DAMAGES TO DRAINAGE STRUCTURES IN THE PROJECT AREA, OR DOWNSTREAM CAUSED BY CONSTRUCTION DEBRIS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
37. PREPARATION OF RIGHT OF WAY SHALL INCLUDE ALL DRIVEWAY PENETRATION AREAS.
38. FOR SPECIFICATION 340, "DENSE-GRADED HOT-MIXED ASPHALT (SMALL QUANTITY) AND 341," DENSE -GRADED HOT-MIX ASPHALT", THE FOLLOWING REQUIREMENTS SHALL BE FOLLOWED FOR ASPHALT USED ON THIS PROJECT:
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STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED
PROFESSIONAL ENGINEER

2/7/2025

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WT MONTGOMERY ROAD

GENERAL NOTES

SHEET 1 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	-		6
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

TRAFFIC NOTES
GENERAL AND SPECIAL CONDITIONS

1. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO SEE THAT ALL TRAFFIC CONTROL DEVICES ARE PROPERLY INSTALLED AND MAINTAINED AT THE JOB SITE IN ACCORDANCE WITH THE PLANS, SPECIFICATIONS AND RELATED INDUSTRY STANDARDS AND REGULATIONS. THE CONTRACTOR SHALL SUBMIT FOR REVIEW A SIGN AND BARRICADE PLAN CONFORMING TO THE REQUIREMENTS OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES. THE COUNTY'S CONSTRUCTION INSPECTOR AND THE TRAFFIC ENGINEERING REPRESENTATIVE WILL ONLY BE RESPONSIBLE TO INSPECT THE TRAFFIC CONTROL DEVICES BEING DEPLOYED. IF, IN THE OPINION OF THE TRAFFIC ENGINEERING REPRESENTATIVE AND THE CONSTRUCTION INSPECTOR, THE TRAFFIC CONTROL DEVICES DO NOT CONFORM TO ESTABLISHED STANDARDS OR ARE INCORRECTLY PLACED OR ARE INSUFFICIENT IN QUANTITY TO PROTECT THE GENERAL PUBLIC, THE CONSTRUCTION INSPECTOR SHALL HAVE THE OPTION TO STOP CONSTRUCTION OPERATIONS AT NO EXPENSE TO THE COUNTY UNTIL SUCH TIME AS THE CONDITIONS ARE CORRECTED BY THE CONTRACTOR.
2. PRIOR TO MOVING ANY TRAFFIC SIGNS OR TRAFFIC SIGNALS, THE CONTRACTOR SHALL CONTACT THE COUNTY'S TRAFFIC OPERATIONS SECTION. PRIOR TO COMPLETION OF THE CONTRACT AND REMOVAL OF THE BARRICADES, THE CONTRACTOR SHALL AGAIN CONTACT THE TRAFFIC OPERATIONS SECTION. THE BARRICADES SHALL NOT BE REMOVED UNTIL ALL APPLICABLE PERMANENT TRAFFIC SIGNS AND SIGNALS ARE IN PLACE.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN AND MAINTAIN TEMPORARY STOP SIGNS AND ALL OTHER TRAFFIC CONTROL DEVICES REQUIRED TO PROTECT THE GENERAL PUBLIC. IF THE COUNTY HAS REMOVED PERMANENT STOP SIGNS, THE CONTRACTOR SHALL REQUEST THAT TEMPORARY SIGNS BE FURNISHED TO THE CONSTRUCTION SITE SO THAT THEY CAN BE REINSTALLED BY HIM. ALL PERMANENT SIGNS OR TRAFFIC CONTROL DEVICES MISSING OR DAMAGED UPON COMPLETION OF CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
4. THE CONTRACTOR MUST CONTACT THE COUNTY ENGINEER OR HIS DESIGNATED REPRESENTATIVE 72 HOURS IN ADVANCE (NOT INCLUDING WEEKENDS OR HOLIDAYS) OF ANY MINOR STREET CLOSURE. THIS MUCH TIME IS NECESSARY TO INSTALL ADVISORY SIGNS AND GIVE THE MOTORIST A MINIMUM OF 3 DAYS NOTICE OF THE STREET CLOSURE. THE TRAFFIC ENGINEERING OFFICE WILL MAKE THE NECESSARY ARRANGEMENTS AND NOTIFY ALL EMERGENCY SERVICES AND AGENCIES.
5. AS WORK PROGRESSES, LOCATION OF TEMPORARY TRAFFIC CONTROL DEVICES WILL BE ADJUSTED AND MODIFIED AS NECESSARY BY THE CONTRACTOR, WITH THE APPROVAL OF THE TRAFFIC ENGINEER OR HIS DESIGNATED REPRESENTATIVE.
6. IF THE NEED ARISES, ADDITIONAL TEMPORARY TRAFFIC CONTROL DEVICES, SPECIAL DIRECTIONAL DEVICES AND/OR BUSINESS NAME SIGNS MAY BE ORDERED BY THE TRAFFIC ENGINEERING REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE.
7. TEMPORARY TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE TXDOT "BC-07" SHEETS AND TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
8. THE CONTRACTOR MUST MAINTAIN ALL STREETS OPEN TO THROUGH TRAFFIC BY REPAIRING TRENCHES, POTHOLES, LEVELING UP WITH ASPHALT, ETC., AT NO DIRECT PAYMENT. COST TO BE INCLUDED WITH OTHER ITEMS.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SUITABLE ACCESS ACCOMMODATIONS FOR SCHOOL CHILDREN AND PEDESTRIANS.
10. THE CONTRACTOR SHALL PROVIDE ACCESS FOR DELIVERY OF MAIL BY THE U.S. POSTAL SERVICE.
11. THE CONTRACTOR SHALL PROVIDE FOR ACCESS TO RESIDENCES AND ALL BUSINESSES AT ALL TIMES WITHIN ALL PHASES OF THE WORK.
12. WHEN CONSTRUCTION WORK NECESSITATES THE UTILIZATION OF VEHICLE PATHS OTHER THAN THE LANES NORMALLY USED, TRAFFIC CONTROL MARKINGS NO LONGER APPLICABLE SHALL BE REMOVED AND APPROVED TEMPORARY PAVEMENT MARKINGS AND SIGNS SHALL BE INSTALLED IN ACCORDANCE WITH PART VI OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
13. ALL TEMPORARY TRAFFIC CONTROL DEVICES, ETC., SHALL BE PROVIDED BY THE CONTRACTOR WITHOUT DIRECT PAYMENT, UNLESS OTHERWISE NOTED OR STATED.
14. THE CONSTRUCTION INSPECTOR SHALL MONITOR THE CONTRACTOR'S TRAFFIC CONTROL DEVICES AND WILL BE RESPONSIBLE TO FURNISH ALL RESIDENTS AND BUSINESSES WITH PROGRESS ADVISORIES ON ALL PHASES DURING THE COURSE OF CONSTRUCTION.
15. ANY DAMAGE TO PERMANENT TRAFFIC SIGNALS, THE CONTROLLER BOX, LOOPS OR CONDUITS DURING OR UPON COMPLETION OF THE PROJECT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE. THE DECISION TO REPAIR AS OPPOSED TO REPLACE THE DAMAGED EQUIPMENT SHALL BE MADE BY THE COUNTY TRAFFIC ENGINEERING SECTION.
16. CONTRACTOR SHALL PROVIDE APPROPRIATE SAFE ACCESS AND BARRICADE WORK AT ALL TIMES TO PROTECT THE PUBLIC. THE SITE MUST BE LEFT IN A SECURE SAFE CONDITION AT NIGHT. THIS INCLUDES SUBSTANTIAL BARRICADES AROUND ALL TRENCHES, OPEN EXCAVATIONS, EQUIPMENT, ETC. IT IS THE CONTRACTOR'S RESPONSIBILITY TO TAKE NECESSARY PRECAUTIONS TO PROTECT THE PUBLIC THROUGHOUT THE DURATION OF THE PROJECT.
17. ANY QUESTIONS REGARDING PHASING OR STAGING WILL BE STRICTLY HANDLED BY THE DEPARTMENT OF PUBLIC WORKS WHICH HAS COMPLETE AUTHORITY TO MAKE FINAL DECISIONS ON ANY CHANGES OR MODIFICATIONS.
18. EXISTING CROSS DRAINS SHALL BE TEMPORARILY EXTENDED AS REQUIRED BY THE PLANS FOR TEMPORARY WIDENING OF ROADWAYS. NO DIRECT PAYMENT.
19. ANY ADDITIONAL CONSTRUCTION THAT IS NOT SHOWN AND IS REQUIRED TO COMPLETE THE TEMPORARY PAVEMENT SECTION FOR TEMPORARY WIDENING OF ROADWAYS WILL BE AT NO DIRECT PAYMENT TO THE CONTRACTOR, COST TO BE INCLUDED IN OTHER ITEMS.
20. WHEN DROP-OFF ADJACENT TO THE ROADWAY (TEMPORARY OR OTHERWISE) EXCEEDS TWO (2) INCHES AND IS LESS THAN TWO (2) FEET, THE CONTRACTOR SHALL PROVIDE DELINEATED DRUMS OR VERTICAL PANELS IN ACCORDANCE WITH THE MOST CURRENT STANDARDS BY BEXAR COUNTY PUBLIC WORKS & THE TEXAS DEPARTMENT OF TRANSPORTATION. HOWEVER, THIS WILL ONLY BE POSSIBLE IF A MINIMUM BUFFER ZONE OF FOUR (4) FEET IS AVAILABLE BETWEEN THE EDGE OF TRAVELWAY AND THE WARNING OR CONTROL DEVICE. THE DRUMS OR PANELS SHALL BE PLACED AT TWENTY-FIVE (25) FOOT INTERVALS ALONG THE EDGE OF THE TEMPORARY ROADWAY. THERE WILL BE NO SEPARATE PAY FOR THIS WORK.
21. WHEN A DROP-OFF ON THE ROADWAY (TEMPORARY OR OTHERWISE) EXCEEDS TWO (2) FEET, THE CONTRACTOR SHALL PLACE A TEMPORARY PROTECTIVE BARRIER ON THE EDGE OF THE TEMPORARY ROADWAY CONFORMING TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES. THE COST OF CONCRETE TRAFFIC BARRIERS (PORTABLE) FOR TEMPORARY WIDENING OF ROADWAYS SHALL NOT BE PAID DIRECTLY.
22. WHEN TWO-WAY TRAFFIC IS ROUTED ON ONE-SIDE OF THE EXISTING OR PROPOSED CENTER OF ROADWAY, AS PART OF STAGED CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY BEXAR COUNTY 48 HOURS PRIOR TO THE INSTALLATION OF TEMPORARY MARKINGS. CENTERLINE DIVIDING TWO-WAY TRAFFIC SHALL CONSIST OF SOLID DOUBLE YELLOW LINES, UNLESS BARRICADES OR BARRELS ARE APPROVED FOR SHORT TERM USE.
23. ADDITIONAL TEMPORARY WIDENING MAY BE REQUIRED FOR SLOPES TO MAINTAIN THE MINIMUM TRAVEL SURFACE. EMBANKMENT SHALL BE AT NO DIRECT PAYMENT, COST TO BE INCLUDED IN OTHER ITEMS.

WATER POLLUTION ABATENENT PLAN GENERAL NOTES

1. WRITTEN CONSTRUCTION NOTIFICATION MUST BE GIVEN TO THE APPROPRIATE TCEQ REGIONAL OFFICE NO LATER THAN 48 HOURS PRIOR TO COMMENCEMENT OF THE REGULATED ACTIVITY. INFORMATION MUST INCLUDE THE DATE ON WHICH THE REGULATED ACTIVITY WILL COMMENCE, THE NAME OF THE APPROVED PLAN FOR THE REGULATED ACTIVITY, AND THE NAME OF THE PRIME CONTRACTOR AND THE NAME AND TELEPHONE NUMBER OF THE CONTACT PERSON.
2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT MUST BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED WATER POLLUTION ABATEMENT PLAN AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS ARE REQUIRED TO KEEP ON-SITE COPIES OF THE APPROVED PLAN AND APPROVAL LETTER.
3. IF ANY SENSITIVE FEATURE IS DISCOVERED DURING CONSTRUCTION, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY THE APPROPRIATE TCEQ REGIONAL OFFICE MUST BE IMMEDIATELY NOTIFIED OF ANY SENSITIVE FEATURES ENCOUNTERED DURING CONSTRUCTION. THE REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MAY NOT PROCEED UNTIL THE TCEQ HAS REVIEWED AND APPROVED THE METHODS PROPOSED TO PROTECT THE SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM ANY POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY.
4. SENSITIVE FEATURE S-7 AS IDENTIFIED IN THE "REVISED GEOLOGIC ASSESSMENT" DATED JUNE 8, 2012, SHALL BE SEALED BY FILLING SURFACE VOIDS WITH FLOWABLE CONCRETE FILL PRIOR TO THE START OF CONSTRUCTION ACTIVITY IN THIS AREA.
5. NO TEMPORARY ABOVEGROUND HYDROCARBON AND HAZARDOUS SUBSTANCE STORAGE TANK SYSTEM IS INSTALLED WITHIN 150 FEET OF A DOMESTIC, INDUSTRIAL, IRRIGATION, OR PUBLIC WATER SUPPLY WELL, OR OTHER SENSITIVE FEATURE.
6. PRIOR TO COMMENCEMENT OF CONSTRUCTION, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY SELECTED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS AND GOOD ENGINEERING PRACTICES. CONTROLS SPECIFIED IN THE TEMPORARY STORM WATER SECTION OF THE APPROVED EDWARDS AQUIFER PROTECTION PLAN ARE REQUIRED DURING CONSTRUCTION. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THE CONTROLS MUST REMAIN IN PLACE UNTIL DISTURBED AREAS ARE REVEGETATED AND THE AREAS HAVE BECOME PERMANENTLY STABILIZED.
7. IF SEDIMENT ESCAPES THE CONSTRUCTION SITE, OFF-SITE ACCUMULATIONS OF SEDIMENT MUST BE REMOVED AT A FREQUENCY SUFFICIENT TO MINIMIZE OFF-SITE IMPACTS TO WATER QUALITY (E.G., FUGITIVE SEDIMENT IN STREET BEING WASHED INTO SURFACE STREAMS OR SENSITIVE FEATURES BY THE NEXT RAIN)
8. SEDIMENT MUST BE REMOVED FROM SEDIMENT TRAPS OR SEDIMENTATION PONDS NOT LATER THAN WHEN DESIGN CAPACITY HAS BEEN REDUCED BY 50%. A PERMANENT STAKE MUST BE PROVIDED THAT CAN INDICATE WHEN THE SEDIMENT OCCUPIES 50% OF THE BASIN VOLUME.
9. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS EXPOSED TO STORMWATER SHALL BE PREVENTED FROM BECOMING A POLLUTANT SOURCE FOR STORMWATER DISCHARGES (E.G., SCREENING OUTFALLS, PICKED UP DAILY).
10. ALL SPOILS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE MUST BE STORED ON-SITE WITH PROPER E&S CONTROLS. FOR STORAGE OR DISPOSAL OF SPOILS AT ANOTHER SITE ON THE EDWARDS AQUIFER RECHARGE ZONE, THE OWNER OF THE SITE MUST RECEIVE APPROVAL OF A WATER POLLUTION ABATEMENT PLAN FOR THE PLACEMENT OF FILL MATERIAL OR MASS GRADING PRIOR TO THE PLACEMENT OF SPOILS AT THE OTHER SITE.
11. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY TEMPORARY OR PERMANENTLY CEASE IS PRECLUDED BY WEATHER CONDITIONS, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE. WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH DISTURBING ACTIVITIES WILL BE RESUMED WITHIN 21 DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF SITE. IN AREAS EXPERIENCING DROUGHTS WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY HAS TEMPORARILY OR PERMANENTLY CEASED IS PRECLUDED BY SEASONAL ARID CONDITIONS, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE.
12. THE FOLLOWING RECORDS SHALL BE MAINTAINED AND MADE AVAILABLE TO THE TCEQ UPON REQUEST: THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR; THE DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE; AND THE DATES WHEN STABILIZATION MEASURES ARE INITIATED.
13. THE HOLDER OF ANY APPROVED EDWARD AQUIFER PROTECTION PLAN MUST NOTIFY THE APPROPRIATE REGIONAL OFFICE IN WRITING AND OBTAIN APPROVAL FROM THE EXECUTIVE DIRECTOR PRIOR TO INITIATING ANY OF THE FOLLOWING:
    a. ANY PHYSICAL OR OPERATIONAL MODIFICATION OF ANY WATER POLLUTION ABATEMENT STRUCTURE(S), INCLUDING BUT NOT LIMITED TO PONDS, DAMS, BERMS, SEWAGE TREATMENT PLANTS, AND DIVERSIONARY STRUCTURES;

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED
PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

GENERAL NOTES

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	-		7
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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b. ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FROM THAT WHICH WAS ORIGINALLY APPROVED OR A CHANGE WHICH WOULD SIGNIFICANTLY IMPACT THE ABILITY OF THE PLAN TO PREVENT POLLUTION OF THE EDWARDS AQUIFER;
c. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED AS UNDEVELOPED IN THE ORIGINAL WATER POLLUTION ABATEMENT PLAN.

AUSTIN REGIONAL OFFICE	SAN ANTONIO REGIONAL OFFICE
2800 S. IH 35, SUITE 100	14250 JUDSON ROAD
AUSTIN, TEXAS 78704-5712	SAN ANTONIO, TEXAS 78233-4480
PHONE: (512) 339-2929	PHONE: (210) 490-3096
FAX: (512) 339-3795	FAX: (210) 545-4329

ENVIRONMENTAL GENERAL NOTES

1. TO COMPLY WITH THE MIGRATORY BIRD TREATY ACT, CONSTRUCTION ASSOCIATED WITH VEGETATION REMOVAL WITHIN AREAS DESIGNATED AS GOLDEN CHEEKED WARBLER HABITAT SHALL OCCUR ONLY OUTSIDE THE MIGRATORY BIRD NESTING SEASON. THE GOLDEN CHEEKED WARBLER BREEDING SEASON IS MARCH 15 - AUGUST 30 THEREFORE BRUSH CLEARING OPERATIONS WITHIN AREAS DESIGNATED AS GOLDEN CHEEKED WARBLER HABITAT SHALL ONLY TAKE PLACE SEPTEMBER 1 - MARCH 14.

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED
PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
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GENERAL NOTES

SHEET 3 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	-		8
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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2/7/2025
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SUMMARY OF TRAFFIC CONTROL PLAN ITEMS

ITEM NO.				502
DESCRIPTION CODE				6001
SHEET NO.	ALIGNMENT	BEGINNING STATION	ENDING STATION	BARRICADES, SIGNS AND TRAFFIC HANDLING
				MO
PHASE 1				
1	WT MONTGOMERY	BEGIN PROJECT	END PROJECT	
PHASE 1 TOTAL				4
PROJECT TOTAL				4

LEGACY ENGINEERING GROUP

Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

TCP
SUMMARY OF QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	-		9
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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2/7/2025
Legacy Engineering Group
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SUMMARY OF ROADWAY ITEMS *

ITEM NO.				100	104	110	132	161	164	168	216	247	BASE BID 1 260	BASE BID 1 260	310	420
DESCRIPTION CODE				6002	6021	6001	6003	6017	6066	6001	6001	6041	6002	6079	6027	6074
SHEET NO.	ALIGNMENT	BEGINNING STATION	ENDING STATION	PREPARING ROW	REMOVING CONC (CURB)	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)	COMPOST MANUF TOPSOIL (4")	DRILL SEEDING (PERM) (WARM OR COOL)	VEGETATIVE WATERING	PROOF ROLLING	FL BS (CMP IN PLC) (TYA GR1-2) (FNAL POS)	LIME (HYDRATED LIME (SLURRY))	LIME TRT (SUBGRADE) (6")	PRIME COAT (MC-30 OR AE-P)	CL C CONC (MISC)
				STA	LF	CY	CY	SY	SY	MG	HR	CY	TON	SY	GAL	CY
1	WT MONTGOMERY	BEGIN PROJECT	94+00	3	154	1077	35	1210	1210	19	6	467	29	2118	416	
2	WT MONTGOMERY	94+00	100+00	6		1216	375	4614	4614	72	8	731	46	3336	649	
3	WT MONTGOMERY	100+00	106+00	6		825	499	5342	5342	83	8	564	35	2582	499	2
4	WT MONTGOMERY	106+00	112+00	6		24	1691	5602	5602	87	8	503	32	2307	444	
5	WT MONTGOMERY	112+00	118+00	6		58	2784	4367	4367	68	8	782	49	3563	695	2
6	WT MONTGOMERY	118+00	124+00	6		1002	1574	3179	3179	50	8	1057	65	4802	943	4
7	WT MONTGOMERY	124+00	END PROJECT	1		492	109	505	505	8	4	187	12	849	167	3
PROJECT TOTALS				**34**	**154**	**4694**	**7067**	**24819**	**24819**	**387**	**50**	**4291**	**268**	**19557**	**3813**	**11**

SUMMARY OF ROADWAY ITEMS

ITEM NO.				432	529	531	531	536	3076	3076	3076	9990BEXAR	
DESCRIPTION CODE				6001	6001	6001	6010	6002	6001	6040	6066	1	
SHEET NO.	ALIGNMENT	BEGINNING STATION	ENDING STATION	RIPRAP (CONC) (4 IN)	CONC CURB (TY I)	CONC SIDEWALKS (4")	CURB RAMPS (TY 7)	CONC MEDIAN	D-GR HMA TY-B PG64-22	D-GR HMA TY-D PG70-22	TACK COAT	TREATED TIMBER BOLLARDS	24" STEEL CASING
				CY	LF	SY	EA	SY	TON	TON	GAL	EA	LF
1	WT MONTGOMERY	BEGIN PROJECT	94+00		453	137		45	718	457	606		
2	WT MONTGOMERY	94+00	100+00		678	341			1120	708	940		
3	WT MONTGOMERY	100+00	106+00	2	1101	323	2		860	535	715	8	
4	WT MONTGOMERY	106+00	112+00		1210	338			765	471	632		
5	WT MONTGOMERY	112+00	118+00	2	673	325	2		1198	761	1009	7	130
6	WT MONTGOMERY	118+00	124+00	4	599	305	4	183	1626	1025	1363	12	120
7	WT MONTGOMERY	124+00	END PROJECT		184	57		46	288	180	240	15	
PROJECT TOTALS				**8**	**4898**	**1826**	**8**	**274**	**6575**	**4138**	**5505**	**42**	**250**

ITEM QUANTITIES DENOTED WITH AN "*" ARE FOR CONTRACTOR'S INFORMATION ONLY AND ARE INCLUDED UNDER ITEM 100-6002 PREPARING ROW FOR PAYMENT

ALTERNATE BID ITEM 1A					
ITEM NO.				275	275
DESCRIPTION CODE				6001	6019
SHEET NO.	ALIGNMENT	BEGINNING STATION	ENDING STATION	CEMENT	CEMENT TREAT (SUBGRADE) (6")
				TON	SY
1	WT MONTGOMERY	BEGIN PROJECT	94+00	29	2118
2	WT MONTGOMERY	94+00	100+00	46	3336
3	WT MONTGOMERY	100+00	106+00	35	2582
4	WT MONTGOMERY	106+00	112+00	32	2307
5	WT MONTGOMERY	112+00	118+00	49	3563
6	WT MONTGOMERY	118+00	124+00	65	4802
7	WT MONTGOMERY	124+00	END PROJECT	12	849
PROJECT TOTALS				**268**	**19557**

LEGACY ENGINEERING GROUP
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WT MONTGOMERY ROAD

ROADWAY
SUMMARY OF QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	-	10

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

SHEET	STATION	0110 6001 EXCAVATION (ROADWAY)	0132 6003 EMBANKMENT (FINAL) (ORD COMP) (TY B)
		CY	CY
1 OF 7	91+50.0000	0	0
1 OF 7	92+00.0000	257	0
1 OF 7	92+50.0000	281	4
1 OF 7	93+00.0000	108	8
1 OF 7	93+50.0000	223	13
1 OF 7	94+00.0000	208	10
	SHEET TOTAL	1077	35
2 OF 7	94+50.0000	180	10
2 OF 7	95+00.0000	160	9
2 OF 7	95+50.0000	141	10
2 OF 7	96+00.0000	150	13
2 OF 7	96+50.0000	141	19
2 OF 7	97+00.0000	110	23
2 OF 7	97+50.0000	88	27
2 OF 7	98+00.0000	73	36
2 OF 7	98+50.0000	59	42
2 OF 7	99+00.0000	36	59
2 OF 7	99+50.0000	32	69
2 OF 7	100+00.0000	46	58
	SHEET TOTAL	1216	375
3 OF 7	100+50.0000	34	62
3 OF 7	101+00.0000	48	52
3 OF 7	101+50.0000	85	28
3 OF 7	102+00.0000	106	21
3 OF 7	102+50.0000	101	27
3 OF 7	103+00.0000	87	30
3 OF 7	103+50.0000	112	26
3 OF 7	104+00.0000	102	35
3 OF 7	104+50.0000	55	47
3 OF 7	105+00.0000	35	51
3 OF 7	105+50.0000	33	54
3 OF 7	106+00.0000	27	66
	SHEET TOTAL	825	499
4 OF 7	106+50.0000	12	73
4 OF 7	107+00.0000	2	89
4 OF 7	107+50.0000	0	111
4 OF 7	108+00.0000	3	108
4 OF 7	108+50.0000	3	111
4 OF 7	109+00.0000	2	107
4 OF 7	109+50.0000	2	132
4 OF 7	110+00.0000	0	157
4 OF 7	110+50.0000	0	182
4 OF 7	111+00.0000	0	219
4 OF 7	111+50.0000	0	201
4 OF 7	112+00.0000	0	201
	SHEET TOTAL	24	1691
5 OF 7	112+50.0000	0	225
5 OF 7	113+00.0000	0	300
5 OF 7	113+50.0000	0	358
5 OF 7	114+00.0000	0	309
5 OF 7	114+50.0000	0	269
5 OF 7	115+00.0000	0	260
5 OF 7	115+50.0000	1	225
5 OF 7	116+00.0000	4	191
5 OF 7	116+50.0000	7	171
5 OF 7	117+00.0000	14	146
5 OF 7	117+50.0000	16	159
5 OF 7	118+00.0000	16	171
	SHEET TOTAL	58	2784
6 OF 7	118+50.0000	10	184
6 OF 7	119+00.0000	0	238
6 OF 7	119+50.0000	0	274
6 OF 7	120+00.0000	1	225
6 OF 7	120+50.0000	2	167
6 OF 7	121+00.0000	29	140
6 OF 7	121+50.0000	70	109
6 OF 7	122+00.0000	97	80
6 OF 7	122+50.0000	125	56
6 OF 7	123+00.0000	170	42
6 OF 7	123+50.0000	213	29
6 OF 7	124+00.0000	285	30
	SHEET TOTAL	1002	1574

SHEET	STATION	0110 6001 EXCAVATION (ROADWAY)	0132 6003 EMBANKMENT (FINAL) (ORD COMP) (TY B)
		CY	CY
7 OF 7	124+50.0000	287	44
7 OF 7	125+00.0000	205	65
	SHEET TOTAL	492	109
PROJECT TOTAL		4694	7067

LEGACY ENGINEERING GROUP

Legacy Engineering Group, PLLC
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210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

EARTHWORK SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	-		11
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

SUMMARY OF DRAINAGE ITEMS

ITEM NO.				110	132	402	420	432	432	432	459	462	462	462	462	462
DESCRIPTION CODE				6002	6001	6001	6009	6002	6031	6042	6009	6002	6003	6004	6007	6010
SHEET NO.	ALIGNMENT	BEGINNING STATION	ENDING STATION	EXCAVATION (CHANNEL)	EMBANKMENT (FINAL) (ORD COMP) (TY A)	TRENCH EXCAVATION PROTECTION	CL A CONC (COLLAR)	RIPRAP (CONC) (5 IN)	RIPRAP (STONE PROTECTION) (12 IN)	RIPRAP (CONC) (DISSIPATER)	GABIONS (3' X 3') (GALV)	CONC BOX CULV (3 FT X 3 FT)	CONC BOX CULV (4 FT X 2 FT)	CONC BOX CULV (4 FT X 3 FT)	CONC BOX CULV (5 FT X 3 FT)	CONC BOX CULV (6 FT X 3 FT)
				CY	CY	LF	EA	CY	CY	CY	CY	LF	LF	LF	LF	LF
DRAINAGE PLAN & PROFILE (SHEET 1 OF 3)	MONTGOMERY CL	94+00	100+00			18	1									18
DRAINAGE PLAN & PROFILE (SHEET 2 OF 3)	MONTGOMERY CL	100+00	106+00			600	4							281	147	154
DRAINAGE PLAN & PROFILE (SHEET 3 OF 3)	MONTGOMERY CL	106+00	112+00			187	1							187		
DRAIN "D" PLAN & PROFILE (SHEET 1 OF 7)	MONTGOMERY CL	88+00	94+00	79												
DRAIN "D" PLAN & PROFILE (SHEET 2 OF 7)	MONTGOMERY CL	94+00	100+00	1051	9											
DRAIN "D" PLAN & PROFILE (SHEET 3 OF 7)	MONTGOMERY CL	100+00	106+00	1527	3											
DRAIN "D" PLAN & PROFILE (SHEET 4 OF 7)	MONTGOMERY CL	106+00	112+00	1069	18											
DRAIN "D" PLAN & PROFILE (SHEET 5 OF 7)	MONTGOMERY CL	112+00	118+00	420	97											
DRAIN "D" PLAN & PROFILE (SHEET 6 OF 7)	MONTGOMERY CL	118+00	124+00	717	25											
DRAIN "E" CULVERT (SHEET 1 OF 1)	DRAIN E CL	25+63	27+24			85	5	11	50	3.82	18		34			52
DRAIN "F" CULVERT (SHEET 1 OF 1)	DRAIN F CL	10+21	10+99			42	4	1.35				34				
DRAIN "G" CULVERT (SHEET 1 OF 2)	DRAIN G CL	10+29	11+60	122												
DRAIN "G" CULVERT (SHEET 2 OF 2)	DRAIN G CL	11+60	13+62			111	3	6	51	0.5	9					111
LATERAL PROFILE (1 OF 1)	LAT E-2 CL	103+08	103+08			30	2					30				
PROJECT TOTALS				4985	152	1073	20	18.35	101	4.32	27	64	34	468	147	335

SUMMARY OF DRAINAGE ITEMS

ITEM NO.				464	465	465	465	465	465	465	465	465	465	465	466
DESCRIPTION CODE				6007	6002	6011	6012	XXX	XXX	6074	XXX	XXX	6207	6268	6179
SHEET NO.	ALIGNMENT	BEGINNING STATION	ENDING STATION	RC PIPE (CL III) (30 IN)	MANH (COMPL) (PRM) (48IN)	JCTBOX (COMPL) (PJB) (6FTX6FT)	JCTBOX (COMPL) (PJB) (8FTX8FT)	JCTBOX (COMPL) (PJB) (7FTX10FT)	JCTBOX (COMPL) (PJB) (10FTX10FT)	INLET (COMPL) (PSL) (RC) (5FTX5FT)	INLET (COMPL) (PSL) (FG) (6FTX6FT-5FTX5FT)	INLET (COMPL) (PSL) (FG) (8FTX8FT-5FTX5FT)	INLET (COMPL) (CURB) (TY 1) (10')	INLET (COMPL) (EXT) (TY I)	WINGWALL (PW - 1) (HW=4 FT)
				LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
DRAINAGE PLAN & PROFILE (SHEET 1 OF 3)	MONTGOMERY CL	94+00	100+00												
DRAINAGE PLAN & PROFILE (SHEET 2 OF 3)	MONTGOMERY CL	100+00	106+00		1		1	1							
DRAINAGE PLAN & PROFILE (SHEET 3 OF 3)	MONTGOMERY CL	106+00	112+00												
DRAIN "D" PLAN & PROFILE (SHEET 1 OF 7)	MONTGOMERY CL	88+00	94+00												
DRAIN "D" PLAN & PROFILE (SHEET 2 OF 7)	MONTGOMERY CL	94+00	100+00												
DRAIN "D" PLAN & PROFILE (SHEET 3 OF 7)	MONTGOMERY CL	100+00	106+00												
DRAIN "D" PLAN & PROFILE (SHEET 4 OF 7)	MONTGOMERY CL	106+00	112+00												
DRAIN "D" PLAN & PROFILE (SHEET 5 OF 7)	MONTGOMERY CL	112+00	118+00												
DRAIN "D" PLAN & PROFILE (SHEET 6 OF 7)	MONTGOMERY CL	118+00	124+00												
DRAIN "E" CULVERT (SHEET 1 OF 1)	DRAIN E CL	25+63	27+24		1				1		1		1	1	1
DRAIN "F" CULVERT (SHEET 1 OF 1)	DRAIN F CL	10+21	10+99	8		1					1		1	1	
DRAIN "G" CULVERT (SHEET 1 OF 2)	DRAIN G CL	10+29	11+60												
DRAIN "G" CULVERT (SHEET 2 OF 2)	DRAIN G CL	11+60	13+62									1	1	1	1
LATERAL PROFILE (1 OF 1)	LAT E-2 CL	103+08	103+08							1					
PROJECT TOTALS				8	2	1	1	1	1	1	2	1	3	3	2

LEGACY ENGINEERING GROUP

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WT MONTGOMERY ROAD

DRAINAGE SUMMARY OF QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	-		12
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

SUMMARY OF SIGNING AND PAVEMENT MARKING ITEMS

ITEM NO.				666	666	666	666	666	666	666	666	666	666	666	666	672	672
DESCRIPTION CODE				6036	6048	6054	6072	6078	6105	6111	6147	6156	6300	6303	6315	6009	6010
SHEET NO.		BEGINNING STATION	ENDING STATION	REFL PAV MRK TY I (W)8" (SLD) (100MIL)	REFL PAV MRK TY I (W)24" (SLD) (100 MIL)	REFL PAV MRK TY I (W) (ARROW) (100MIL)	REFL PAV MRK TY I(W) (LNDP ARW) (100M IL)	REFL PAV MRK TY I (W) (WORD) (100MIL)	REFL PAV MRK TY I (W) (BIKE ARW) (100M IL)	REFL PAV MRK TY I(W) (BIKE SYML) (100 MIL)	REFL PAV MRK TY I (Y)24" (SLD) (100MIL)	REFL PAV MRK TY I(Y) (MED NOSE) (100 MIL)	RE PM W/RET REQ TY I (W)4" (BRK) (100MIL)	RE PM W/RET REQ TY I (W)4" (SLD) (100MIL)	RE PM W/RET REQ TY I (Y)4" (SLD) (100MIL)	REFL PAV MRKR TY II-A-A	REFL PAV MRKR TY II-C-R
				LF	LF	EA	EA	EA	EA	EA	LF	EA	LF	LF	LF	EA	EA
1	MONTGOMERY RD	BEGIN PROJECT	100+00.00	102	238	1	2	1			372		120	875	2896	141	13
2	MONTGOMERY RD	100+00.00	112+00.00												2248	29	
3	MONTGOMERY RD	112+00.00	124+00.00	309	563	2		2	2	2	356	2	140	1637	2349	113	22
4	MONTGOMERY RD	124+00.00	END PROJECT	102	74								30	206			7
PROJECT TOTALS				513	875	3	2	3	2	2	728	2	290	2718	7493	283	42

SUMMARY OF SIGNING ITEMS

ITEM NO.				644	644
DESCRIPTION CODE				6001	6060
SHEET NO.		BEGINNING STATION	ENDING STATION	IN SM RD SN SUP&AM TY10BWG(1) SA(P)	IN SM RD SN SUP&AM TYTWT(1)WS (P)
				EA	EA
1	MONTGOMERY RD	BEGIN PROJECT	100+00.00	2	5
2	MONTGOMERY RD	100+00.00	112+00.00	1	
3	MONTGOMERY RD	112+00.00	124+00.00	3	3
4	MONTGOMERY RD	124+00.00	END PROJECT		
PROJECT TOTALS				**6**	**8**

LEGACY ENGINEERING GROUP

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WT MONTGOMERY ROAD

SIGNING & PAVEMENT MARKING SUMMARY OF QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	-	13

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

SUMMARY OF EROSION CONTROL ITEMS

ITEM NO.						506	506	506	506
DESCRIPTION CODE						6001	6020	6038	6041
PHASE	STEP	SHEET NO.	ALIGNMENT	BEGINNING STATION	ENDING STATION	ROCK FILTER DAMS (INSTALL) (TY 1)	CONSTRUCTION EXITS (INSTALL) (TY 1)	TEMP SEDMT CONT FENCE (INSTALL)	BIODEG EROSN CONT LOGS (INSTL) (12")
						LF	SY	LF	LF
1	1		MONTGOMERY CL	98+48	125+02	140	420	3560	180
					TOTAL	140	420	3560	180

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Legacy Engineering Group
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WT MONTGOMERY ROAD

SW3P
SUMMARY OF QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	-		14
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

1. GENERAL

A. HANDLE TRAFFIC APPROPRIATELY THROUGHOUT THE PROJECT DURING CONSTRUCTION. PROVIDE FOR THE SAFETY OF THE TRAVELING PUBLIC AT ALL TIMES. ROADWAY CLOSURES ARE NOT ALLOWED UNLESS OTHERWISE SPECIFIED IN THE PLANS AND/OR AS APPROVED BY THE ENGINEER. PROVIDE ACCESS TO PROPERTIES AND BUSINESSES ADJACENT TO THE RIGHT-OF-WAY AT ALL TIMES DURING THE DURATION OF THE PROJECT. THE ADEQUACY OF THE PROPERTY ACCESS WILL BE DETERMINED BY THE COUNTY AND ENGINEER. DO NOT LEAVE EQUIPMENT IN A POSITON THAT WILL ENDANGER THE TRAVELING PUBLIC. MAINTAIN ADEQUATE SAFETY PROVISIONS THROUGHOUT THE PROJECT BY INCLUSION OF SIGNING, MARKINGS, SIGNALS, BARRIERS AND BARRICADES. CONFORM TO THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) WHEN USING THESE PROVISIONS.

B. THE USE OF THE RIGHT-OF-WAY IS NOT EXCLUSIVE. COOPERATE WITH THE COUNTY, THE VARIOUS UTILITY COMPANIES AND CONTRACTORS, AS REQUIRED TO ALLOW ADJUSTMENTS TO BE MADE BY OTHERS. IF BY VIRTUE OF THE ADJUSTMENTS OF THESE UTILITIES THE CONTRACTOR IS DELAYED, AN EXTENSION OF THE WORKING TIME MAY BE GRANTED, IF IN THE OPINION OF THE ENGINEER IT IS WARRANTED.

C. ALL DETOURS, TRAFFIC MOVEMENTS, ETC., ARE DIRECTLY RELATED TO THE SEQUENCE OF WORK; THEREFORE, PROCEED WITH CONSTRUCTION OPERATIONS IN CONFORMITY WITH THE DETAILS SHOWN ON THE PLANS AND AS REQUIRED BY THIS NARRATIVE.

D. PROPOSE AND/OR RECOMMEND ANY MODIFICATIONS TO THE SEQUENCE OF WORK FOR CONSIDERATION TO THE ENGINEER IN WRITING. INCLUDE ANY CHANGES TO THE VARIOUS PAY ITEMS, IMPACT TO TRAFFIC, AND THE EFFECT OF THE OVERALL PROJECT IN TIME AND COST, ETC. WITH ANY MAJOR RECOMMENDED MODIFICATIONS. WRITTEN APPROVAL FROM THE ENGINEER IS REQUIRED PRIOR TO PROCEEDING WITH ANY CONSTRUCTION OPERATION BASED ON A REVISED PHASE/SEQUENCE OF WORK.

E. OFF-DUTY PEACE OFFICERS MAY BE HIRED TO SUPPLEMENT THE WORK FORCE TO CONTROL TRAFFIC AT INTERSECTIONS DURING THE DETOURING OF TRAFFIC, CLOSURE OF ROADWAY AND/OR INTERSECTIONS, AND ANY OTHER CRITICAL PHASES OF TRAFFIC HANDLING AS DETERMINED BY THE ENGINEER.

F. THE ENGINEER MAY DIRECT THE CONTRACTOR TO VARY THE NUMBER AND LOCATIONS OF SIGNS AND BARRICADES FROM THAT INDICATED ON THE PLANS.

G. COOPERATE FULLY WITH THE VARIOUS UTILITY COMPANIES.

H. WEEKEND HOURS ARE DEFINED AS THE HOURS BETWEEN FRIDAY 9:00 PM TO MONDAY 5:00 AM.

I. OFF PEAK HOURS ARE DEFINED AS A TIME FRAME BETWEEN 8:00 PM TO 5:00 AM MONDAY THRU FRIDAY.

J. MAINTAIN POSITIVE DRAINAGE DURING CONSTRUCTION, INCLUDING OFFSITE DRAINAGE FROM ADJACENT PROPERTIES AND AVOID IMPEDING FLOW FROM PRIVATE PROPERTY.

K. PLACE CONSTRUCTION EXITS AS NEEDED OR AS DIRECTED BY THE ENGINEER.

L. DAILY LANE CLOSURES WILL BE USED IN ACCORDANCE WITH STATE TCP STANDARDS.

M. DROP OFF CONDITIONS OF GREATER THAN 2 IN. MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS AND SIDE STREETS.

N. PLANING, SURFACE TREATMENTS AND OVERLAYS SHALL BE PERFORMED IN THE DIRECTION OF TRAFFIC.

2. SEQUENCE OF WORK

THE SEQUENCE OF WORK WILL BE AS FOLLOWS UNLESS OTHERWISE DIRECTED/APPROVED BY THE COUNTY INSPECTOR. THIS PROJECT WILL BE CONSTRUCTED IN (1) PHASE. BEFORE THE COMMENCEMENT OF THIS PHASE, INSTALL TRAFFIC CONTROL DEVICES AND SW3P MEASURES AS SHOWN AND/OR DIRECTED BY THE COUNTY INSPECTOR. APPROVAL BY THE ENGINEER MUST BE OBTAINED PRIOR TO THE BEGINNING OF CONSTRUCTION, REFER TO "BARRICADES AND CONSTRUCTION STANDARDS". PREPARING ROW / REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURING, AS PER THE PHASE NOTED BELOW. A BRIEF DESCRIPTION OF THIS PHASE ARE AS FOLLOWS:

PHASE 1

THE INTENT OF THIS PHASE TO CONSTRUCT WT MONTGOMERY ROAD (NEW LOCATION) FROM STA 91+48.77 TO END OF PROJECT STA 125+02.20.

1. CONTRACTOR SHALL BARRICADE THIS SECTION OF ROADWAY TO TRAFFIC UNTIL PHASE 1 IS COMPLETED.
2. CONSTRUCT LONGITUDINAL AND CROSS DRAINAGE, PAVEMENT STRUCTURE, RAISED MEDIANS, CURB, AND SIDEWALKS.
3. INSTALL SEEDING, PERMANENT SIGNING AND PAVEMENT MARKINGS.
4. PERFORM FINAL CLEAN-UP.
5. OPEN ROADWAY TO VEHICULAR TRAFFIC.

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED
PROFESSIONAL ENGINEER

2/7/2025

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WT MONTGOMERY ROAD

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

N. T. S. SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.			SHEET
6	-			15
STATE	DIST.	COUNTY		
TEXAS	SAT	BEXAR		
CONT.	SECT.	JOB	ROADWAY	
-	-	-	WT MONTGOMERY RD	

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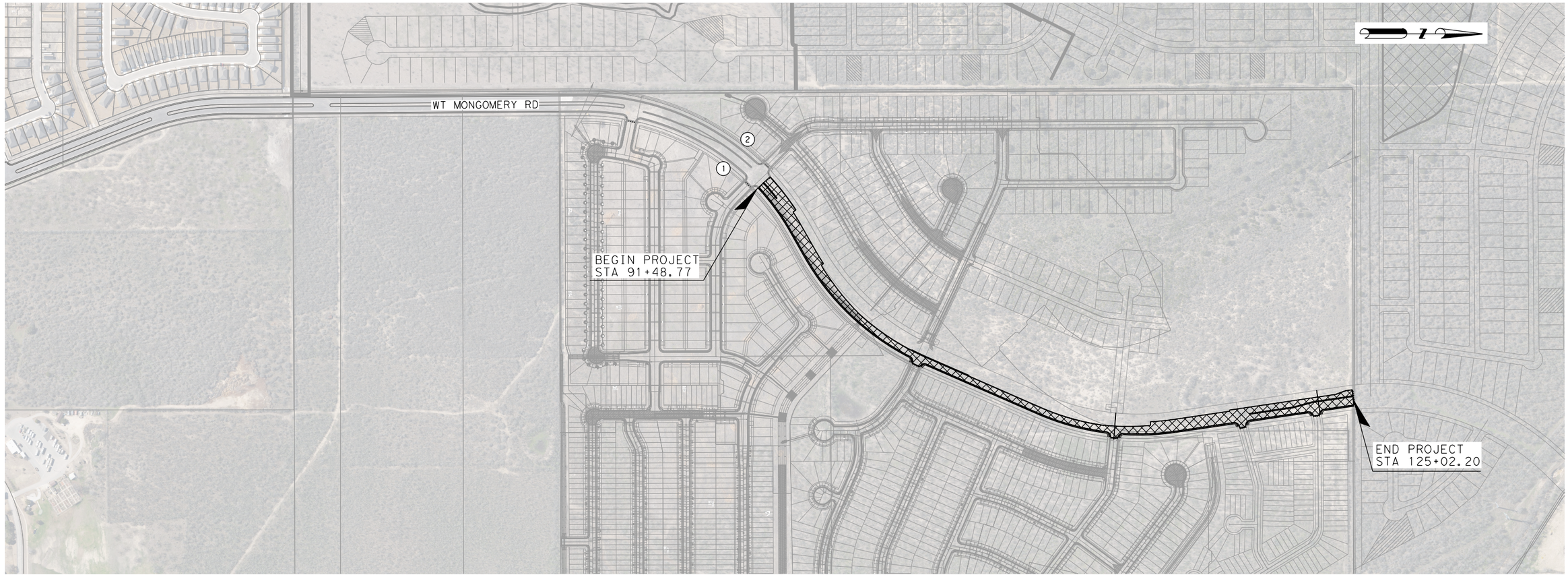

LOCATION	BEGIN WORK ZONE	NAME ADDRESS CITY STATE CONTRACTOR	ROAD WORK AHEAD	STAY ALERT TALK OR TEXT LATER	OBEY WARNING SIGNS STATE LAW	TRAFFIC FINES DOUBLE	WHEN WORKERS ARE PRESENT	ROAD CLOSED 500 FT	END ROAD WORK	ROAD CLOSED	SIDEWALK CLOSED	TRUCK CROSSING	UNEVEN LANES	POWER LINES	P.C.M.S.	ARROW BOARD
	G20-9TP	G20-6T	CW20-1D	G20-10T	R20-3T	R20-5	R20-5aTP	CW20-3C	G20-2	R11-2	R9-9	CW8-6	CW8-11	CW28-1T		
	36 X 30	48 X 30	36 X 36	48 X 60	48 X 42	36 X 36	36 X 18	36 X 36	48 X 24	48 X 30	24 X 12	36 X 36	36 X 36	36 X 36		
(1)	✓	✓	✓	✓	✓	✓	✓	✓								
(2)									✓							
(3)										✓	✓	✓	✓	✓	✓	✓

LOCATION	TY 3 BARRICADE	DRUMS
(1)		
(2)		
(3)	✓	✓

(1) SIGNS TO BE PLACED AT THE BEGINNING OF PROJECT LIMITS.

(2) SIGNS TO BE PLACED AT THE END OF THE PROJECT LIMITS.

(3) SIGNS TO BE PLACED THROUGHOUT THE COURSE OF THE PROJECT AS DIRECTED BY THE ENGINEER.

NOTES:

1. CERTAIN SIGNS MUST BE USED IN CONJUNCTION WITH OTHER SIGNS. EXAMPLE: "FLAGGER AHEAD" MUST HAVE A "BE PREPARED TO STOP".

2. BARRICADES AND WARNING SIGNS ON THIS SHEET ARE THE MINIMUM REQUIRED. ADDITIONAL CONSTRUCTION ZONES, SIGNING, BARRICADES, WARNING SIGNS, ARROW PANELS, CONES, ETC. MAY BE USED IN AREAS OF ACTUAL CONSTRUCTION IN ACCORDANCE WITH CURRENT BC STANDARDS AND THE TEXAS MUTCD.

3. A DISTANCE PLAQUE IN FEET OR MILES MAY BE REQUIRED FOR USE IN CONJUNCTION WITH WARNING SIGNS.

0 250 500

SCALE: 1"=500'

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED
PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP
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WT MONTGOMERY ROAD

ADVANCE WARNING SIGNS

SCALE: 1" = 500' SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	-		16
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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2/7/2025
Legacy Engineering Group
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. 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).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. 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 NOTES:

1. 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.

2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14				
5-10 5-21	SAT	BEXAR		17

DATE: 2/7/2025 11:20:01 AM
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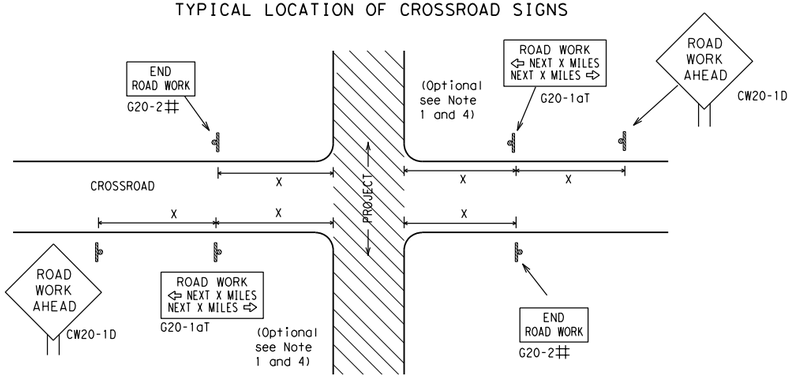
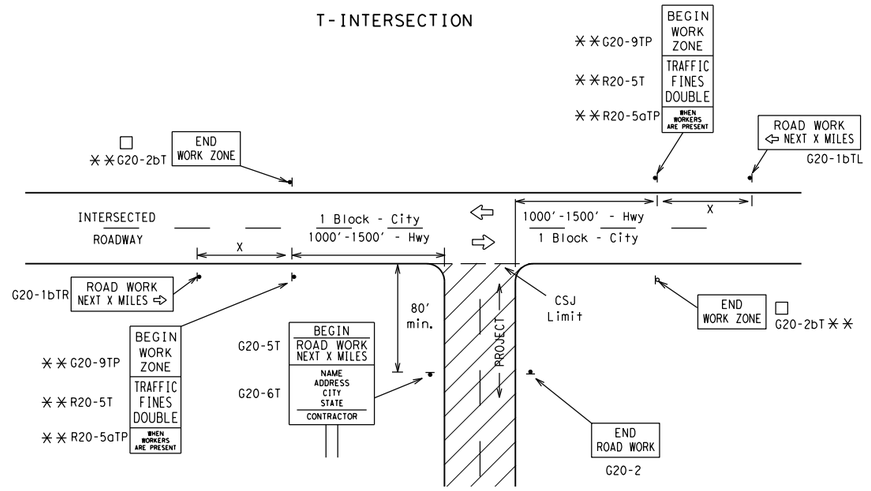
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) 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 as per TMUTCD Part 5. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1aT)sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
*	*[3]

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

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

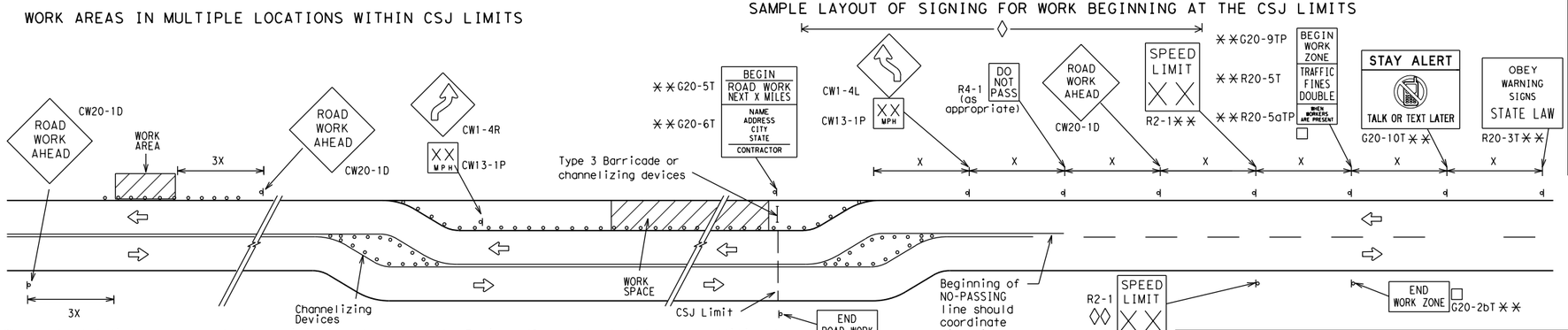
GENERAL NOTES

1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

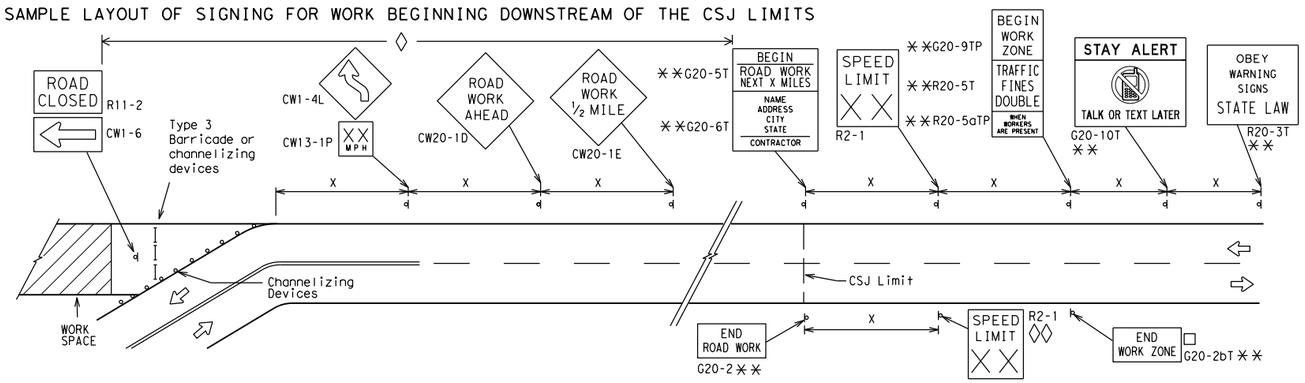
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF 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.

** CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◊ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	-	-	-	-
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		18

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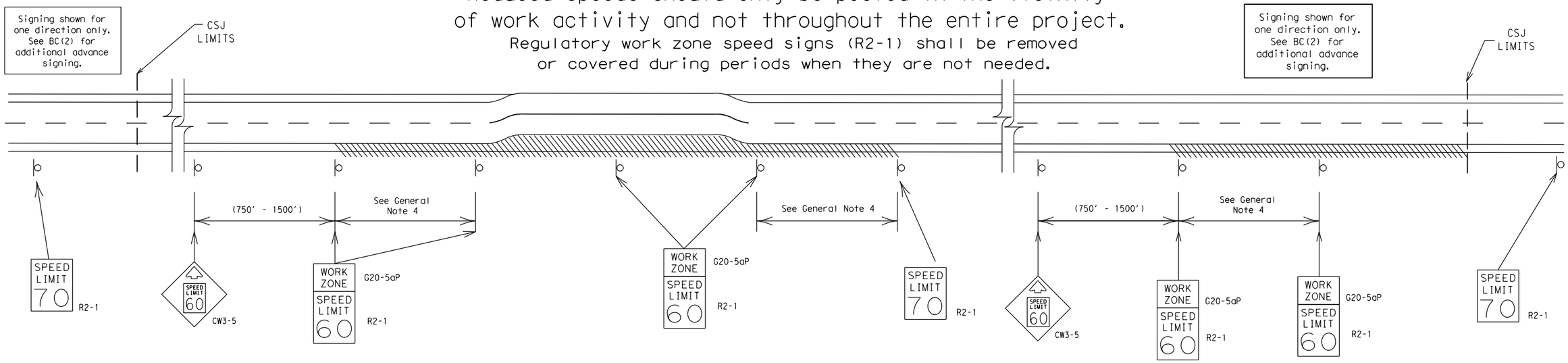
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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 traveled way.

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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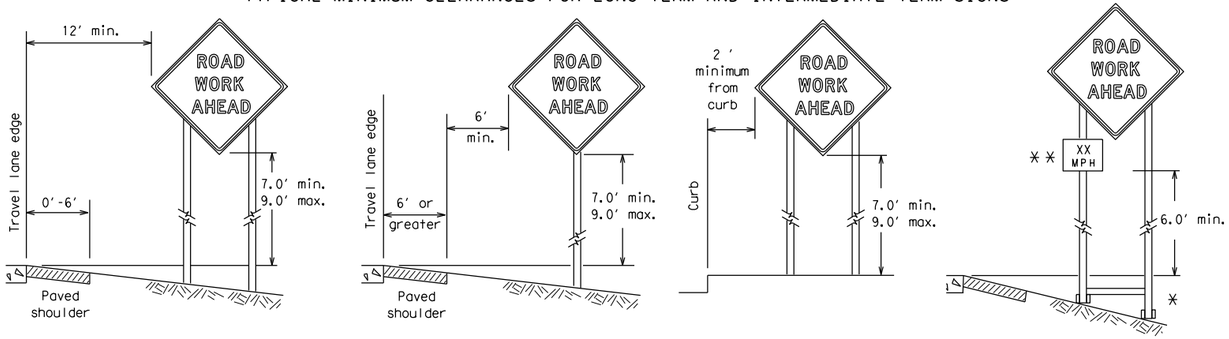
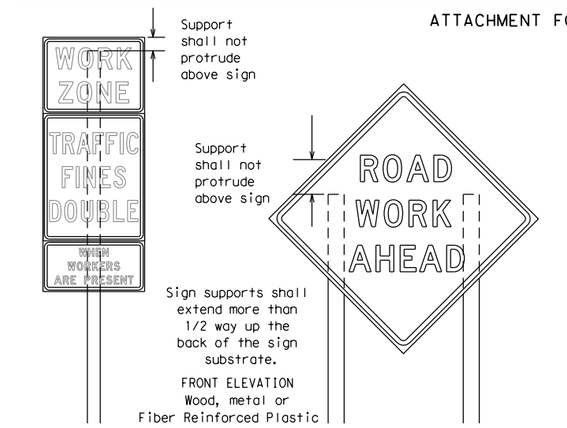
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

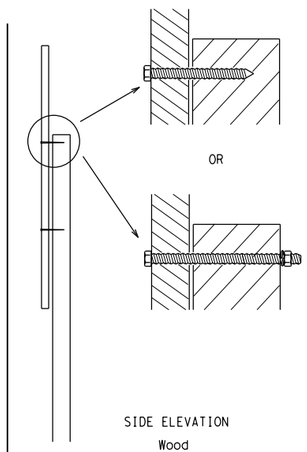


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





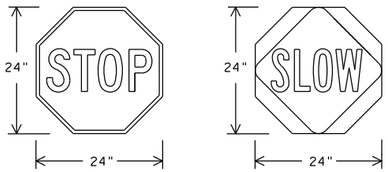
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice 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 flaggers. The STOP/SLOW paddle size should be 24" x 24".
2. STOP/SLOW paddles shall be retroreflectorized when used at night.
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.



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

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, specific service (LOGO), 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. For details for covering large guide signs see the TS-CD standard.
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 standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets 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) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets. 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_{FL} or Type C_{FL}, 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.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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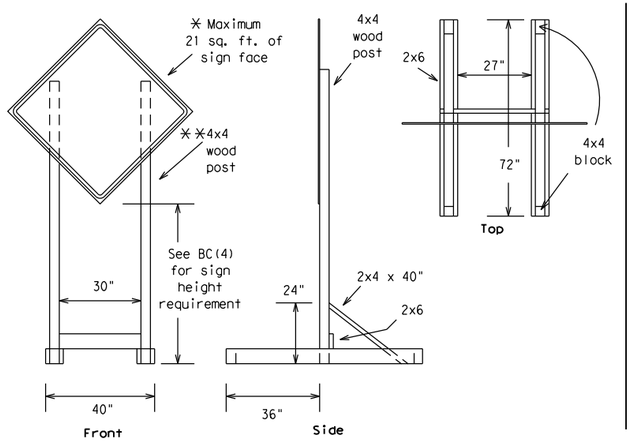
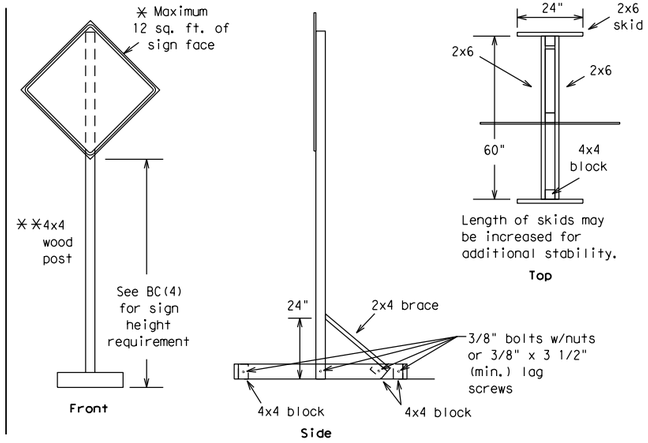
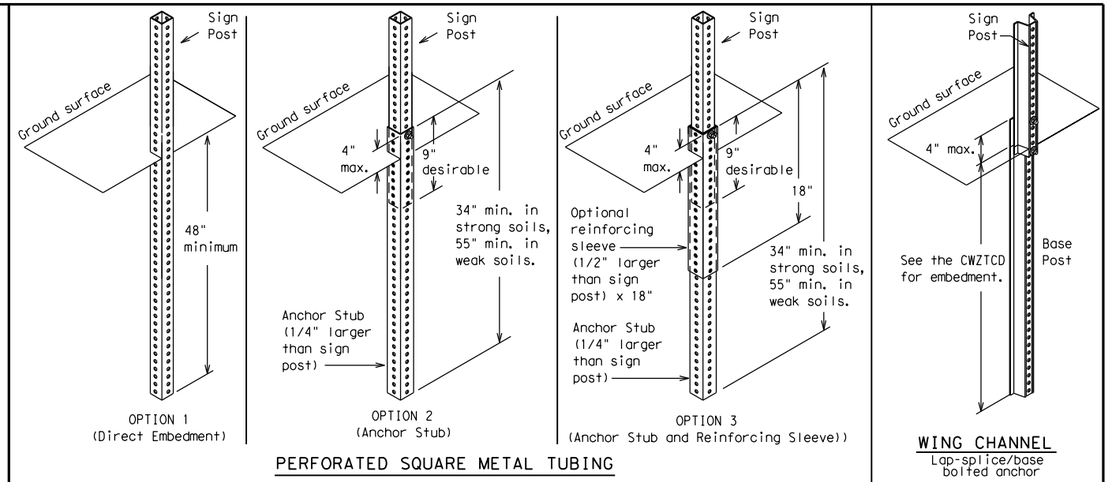




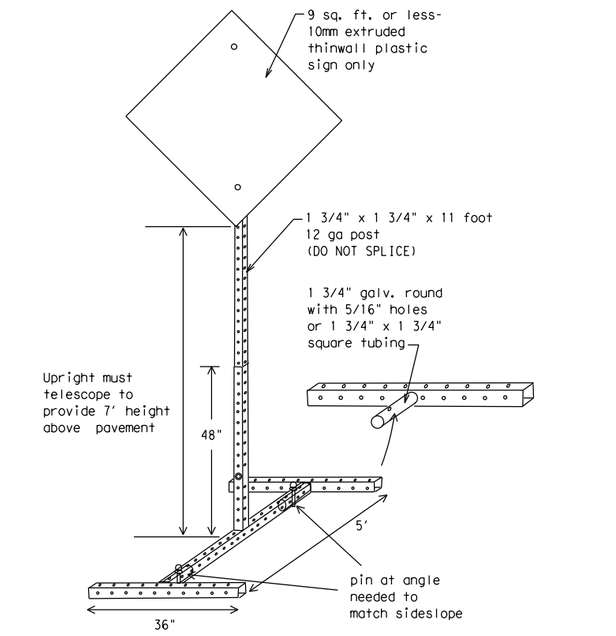
SKID MOUNTED WOOD SIGN SUPPORTS

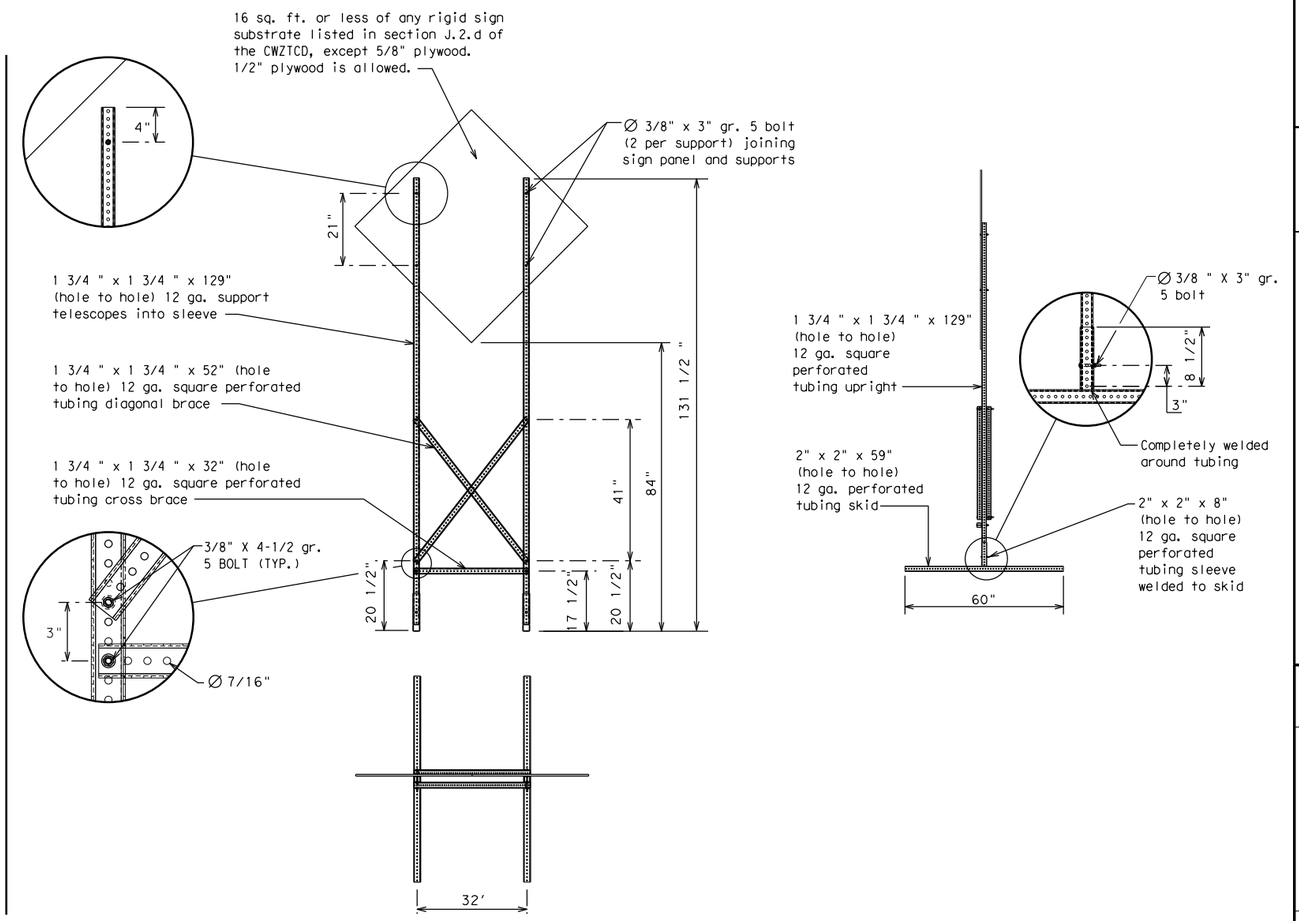
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS



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

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

1. 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.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. 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.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT
RIGHT X LANES CLOSED	RIGHT X LANES OPEN
CENTER LANE CLOSED	DAYTIME LANE CLOSURES
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE
EXIT CLOSED	RIGHT LN TO BE CLOSED
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI
XXXXXXXX BLVD CLOSED	

Other Condition List

ROADWORK XXX FT	ROAD REPAIRS XXXX FT
FLAGGER XXXX FT	LANE NARROWS XXXX FT
RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
DETOUR X MILE	ROUGH ROAD XXXX FT
ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
BUMP XXXX FT	US XXX EXIT X MILES
TRAFFIC SIGNAL XXXX FT	LANES SHIFT *

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List		Location List	Warning List	** Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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.

WORDING ALTERNATIVES

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 phase is used.

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

FULL MATRIX PCMS SIGNS

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.

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		22

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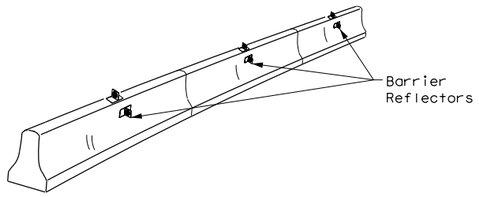
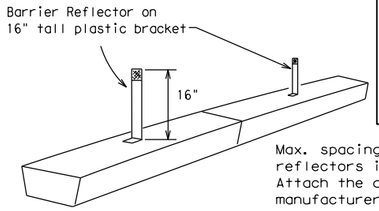
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



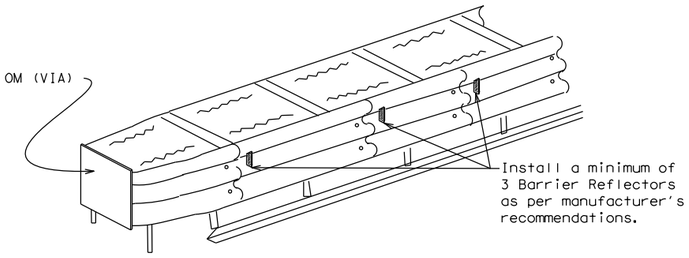
CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.



Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

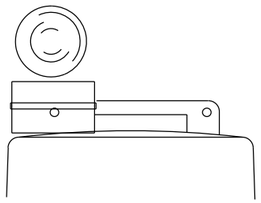
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

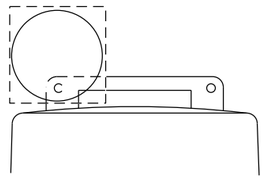
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
7. When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

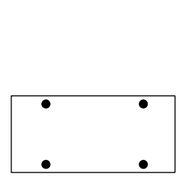
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

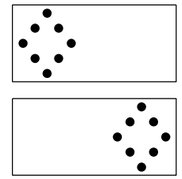
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
4. The Flashing Arrow Board should be able to display the following symbols:

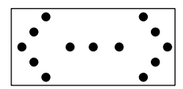


4 CORNER CAUTION

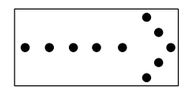
OR



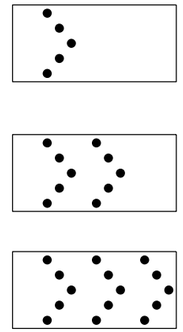
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



RIGHT/LEFT ARROW
(right arrow shown; left is similar)



RIGHT/LEFT SEQUENTIAL CHEVRON
(right chevron shown; left is similar)

5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
8. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-21

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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAT	BEXAR		23

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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

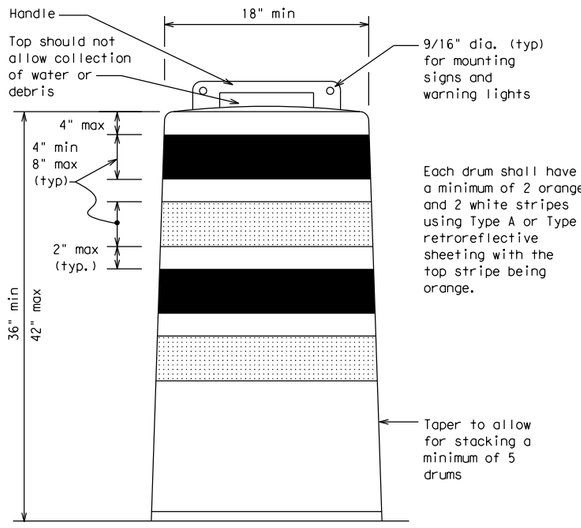
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

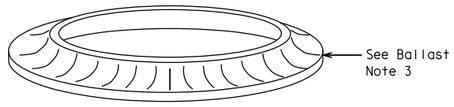
RETROREFLECTIVE SHEETING

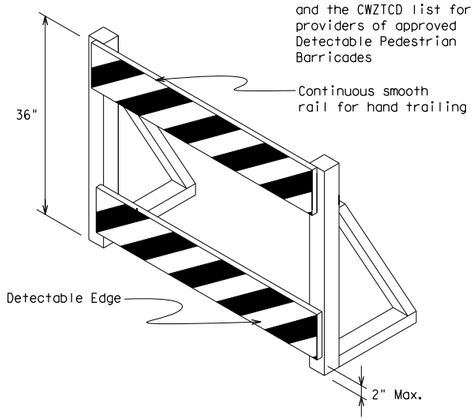
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

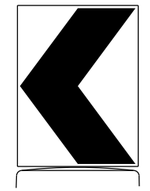




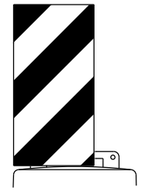


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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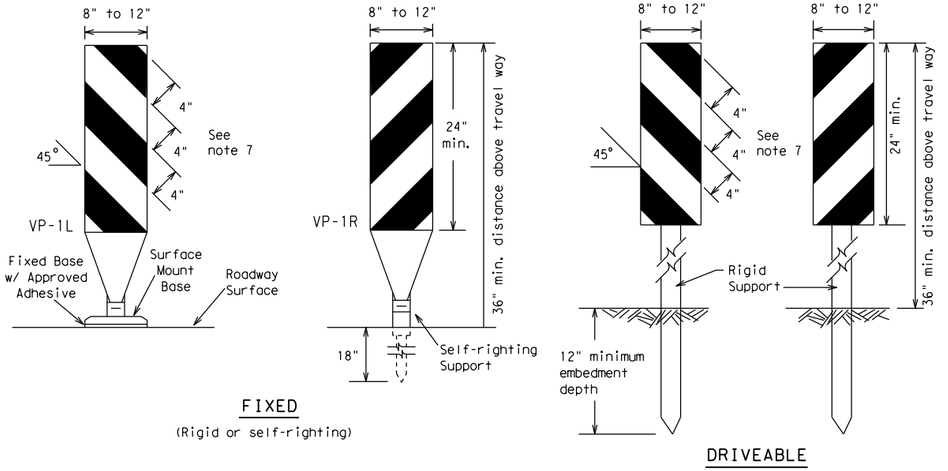
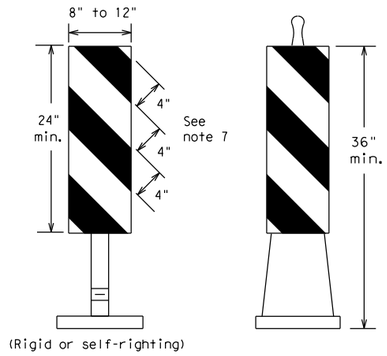
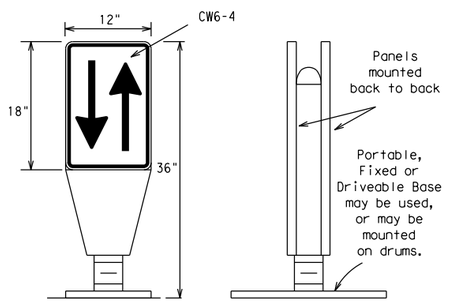




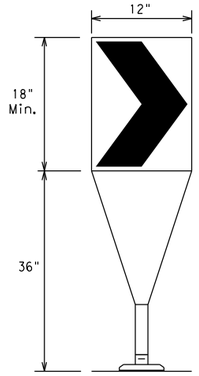
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

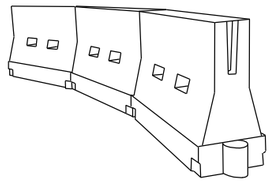
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.

Posted Speed	Formula	Minimum Desirable Taper Lengths ✳✳ 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

✳✳Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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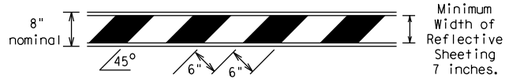
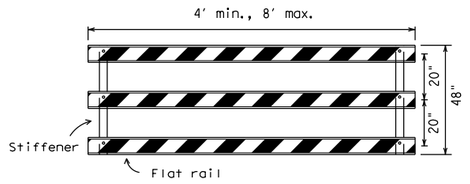
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



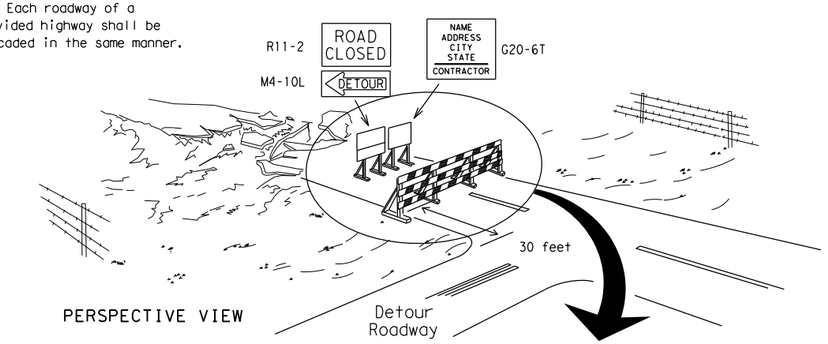
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

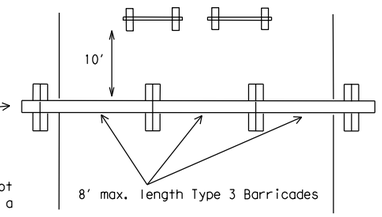
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

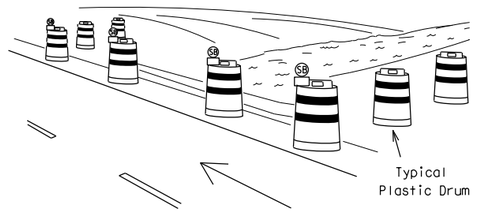
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

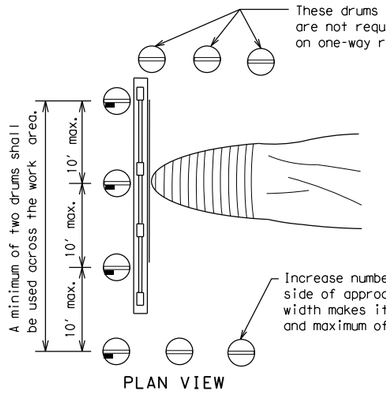
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

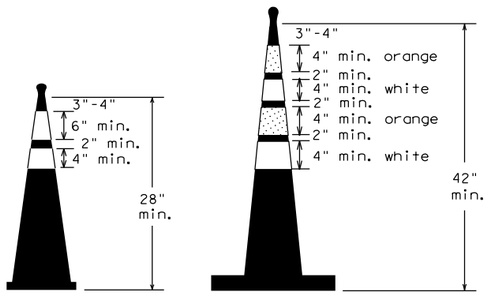
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.



PLAN VIEW

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

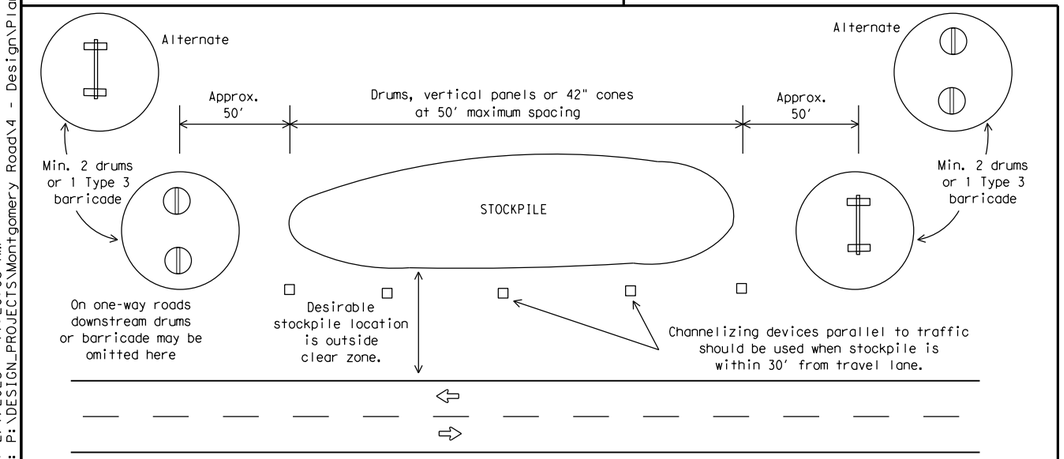
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



28" Cones shall have a minimum weight of 9 1/2 lbs.

42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

1. Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

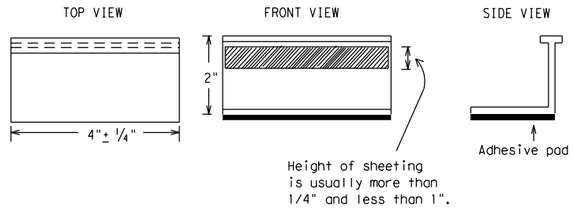
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

Texas Department of Transportation

Traffic Safety Division Standard

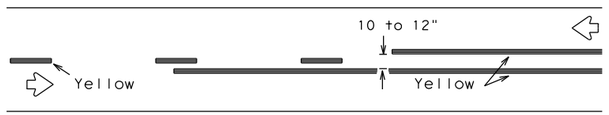
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

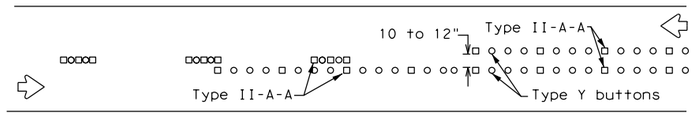
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	SAT	BEXAR		27
11-02 8-14				

DATE: 2/7/2025 11:20:03 AM
FILE: P:\DESIGN_PROJECTS\Montgomery Road\4 - Design\Plan Set\2. TCP\TCP_PH_ID\TCP Standards\bc-21.dgn

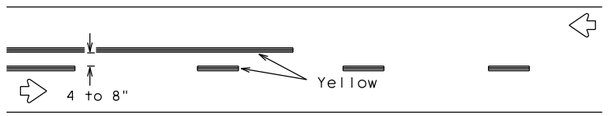
PAVEMENT MARKING PATTERNS



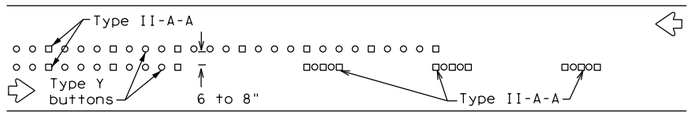
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



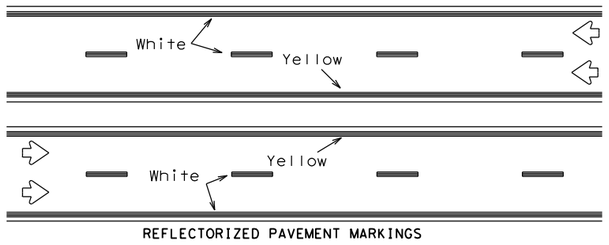
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



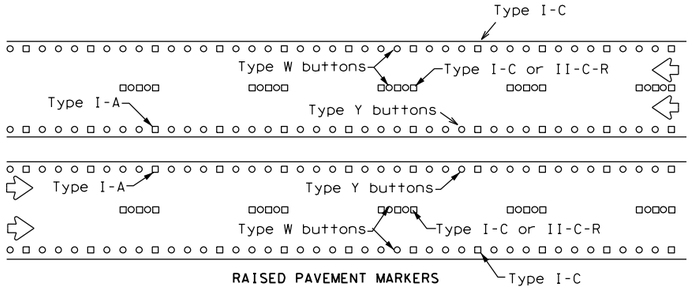
RAISED PAVEMENT MARKERS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



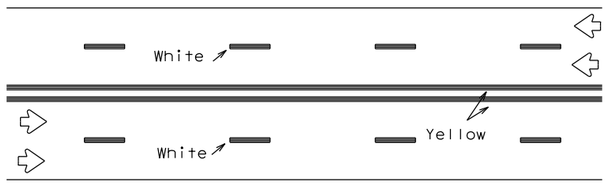
REFLECTORIZED PAVEMENT MARKINGS



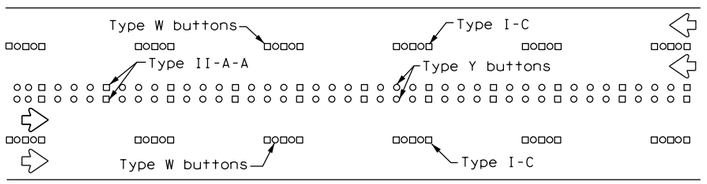
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



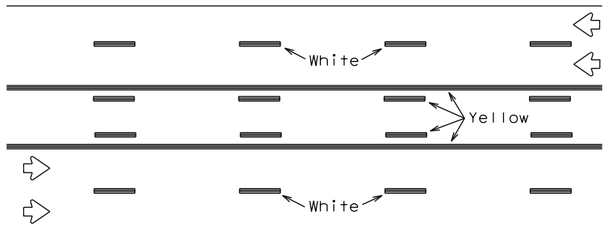
REFLECTORIZED PAVEMENT MARKINGS



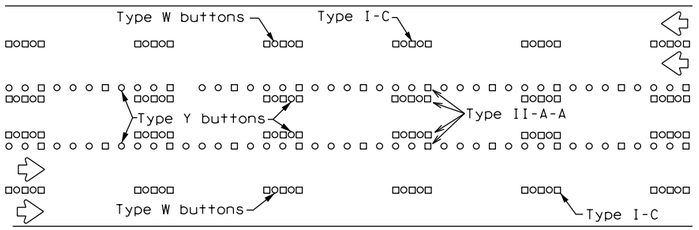
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

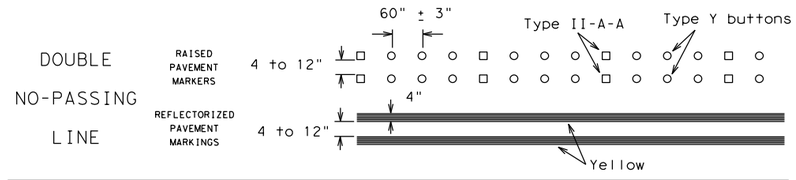
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

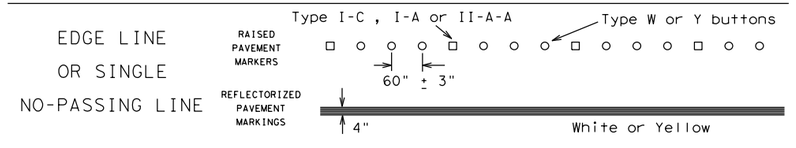
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

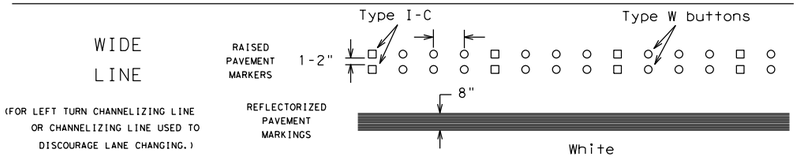


EDGE LINE OR SINGLE NO-PASSING LINE



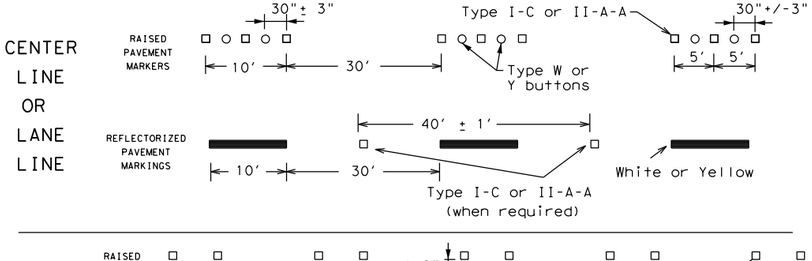
WIDE LINE

(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)

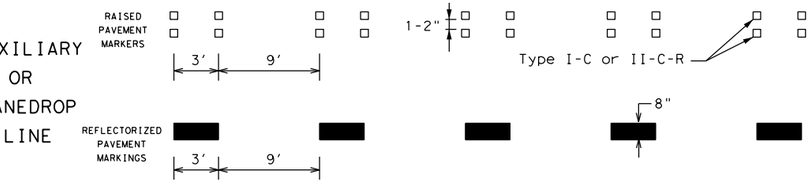


BROKEN LINES

CENTER LINE OR LANE LINE

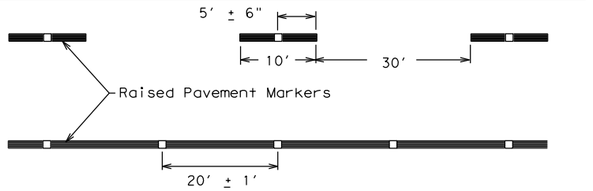


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only - not to be used on edge lines

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	-	-	-	-
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		28

MONT_CL

==========

Course from PT MONT_CL_5 to PC MONT_CL_6 N 0° 23′ 12.38" W Dist 1,737.1039

		Curve Data				
Curve MONT_CL_6						
P.I. Station		88+55.29	N	13,693,765.8074	E	2,050,646.3600
Delta	= 60° 41′ 54.52"	(RT)				
Degree	= 4° 46′ 28.73"					
Tangent	=	702.6075				
Length	=	1,271.2659				
Radius	=	1,200.0000				
External	=	190.5601				
Long Chord	=	1,212.6466				
Mid. Ord.	=	164.4460				
P.C. Station		81+52.68	N	13,693,063.2159	E	2,050,651.1029
P.T. Station		94+23.95	N	13,694,113.7957	E	2,051,256.7381
C.C.			N	13,693,071.3164	E	2,051,851.0755
Back	= N 0° 23′ 12.38" W					
Ahead	= N 60° 18′ 42.14" E					
Chord Bear	= N 29° 57′ 44.88" E					

Course from PT MONT_CL_6 to PC MONT_CL_7 N 60° 18′ 42.14" E Dist 145.0996

		Curve Data				
Curve MONT_CL_7						
P.I. Station		99+66.78	N	13,694,382.6508	E	2,051,728.3152
Delta	= 36° 40′ 30.07"	(LT)				
Degree	= 4° 46′ 28.73"					
Tangent	=	397.7338				
Length	=	768.1198				
Radius	=	1,200.0000				
External	=	64.1962				
Long Chord	=	755.0735				
Mid. Ord.	=	60.9363				
P.C. Station		95+69.04	N	13,694,185.6607	E	2,051,382.7908
P.T. Station		103+37.16	N	13,694,747.0172	E	2,051,887.7808
C.C.			N	13,695,228.1400	E	2,050,788.4534
Back	= N 60° 18′ 42.14" E					
Ahead	= N 23° 38′ 12.07" E					
Chord Bear	= N 41° 58′ 27.11" E					

Course from PT MONT_CL_7 to PC MONT_CL_8 N 23° 38′ 12.07" E Dist 608.9255

		Curve Data				
Curve MONT_CL_8						
P.I. Station		112+90.36	N	13,695,620.2493	E	2,052,269.9526
Delta	= 32° 00′ 57.06"	(LT)				
Degree	= 4° 46′ 28.73"					
Tangent	=	344.2741				
Length	=	670.5384				
Radius	=	1,200.0000				
External	=	48.4088				
Long Chord	=	661.8487				
Mid. Ord.	=	46.5317				
P.C. Station		109+46.09	N	13,695,304.8576	E	2,052,131.9208
P.T. Station		116+16.63	N	13,695,960.8484	E	2,052,219.7838
C.C.			N	13,695,785.9805	E	2,051,032.5934
Back	= N 23° 38′ 12.07" E					
Ahead	= N 8° 22′ 44.99" W					
Chord Bear	= N 7° 37′ 43.54" E					

Course from PT MONT_CL_8 to PC MONT_CL_9 N 8° 22′ 44.99" W Dist 854.9801

		Curve Data				
Curve MONT_CL_9						
P.I. Station		130+68.89	N	13,697,397.6075	E	2,052,008.1556
Delta	= 52° 55′ 19.99"	(RT)				
Degree	= 4° 46′ 28.73"					
Tangent	=	597.2813				
Length	=	1,108.4004				
Radius	=	1,200.0000				
External	=	140.4271				
Long Chord	=	1,069.4166				
Mid. Ord.	=	125.7156				
P.C. Station		124+71.61	N	13,696,806.7019	E	2,052,095.1934
P.T. Station		135+80.01	N	13,697,823.3039	E	2,052,427.1156
C.C.			N	13,696,981.5698	E	2,053,282.3838
Back	= N 8° 22′ 44.99" W					
Ahead	= N 44° 32′ 35.00" E					
Chord Bear	= N 18° 04′ 55.01" E					

Course from PT MONT_CL_9 to PC MONT_CL_10 N 44° 32′ 35.00" E Dist 698.5487

		Curve Data				
Curve MONT_CL_10						
P.I. Station		145+67.18	N	13,698,526.8841	E	2,053,119.5620
Delta	= 44° 48′ 52.07"	(LT)				
Degree	= 8° 11′ 06.40"					
Tangent	=	288.6225				
Length	=	547.5120				
Radius	=	700.0000				
External	=	57.1677				
Long Chord	=	533.6619				
Mid. Ord.	=	52.8514				
P.C. Station		142+78.56	N	13,698,321.1760	E	2,052,917.1091
P.T. Station		148+26.07	N	13,698,815.5034	E	2,053,118.1948
C.C.			N	13,698,812.1875	E	2,052,418.2026
Back	= N 44° 32′ 35.00" E					
Ahead	= N 0° 16′ 17.07" W					
Chord Bear	= N 22° 08′ 08.97" E					

Beginning chain INT01 description

==========

Point 114 N 13,694,720.5120 E 2,051,875.7959 Sta 10+00.00

Course from 114 to 115 S 64° 58′ 27.79" E Dist 70.9920

Point 115 N 13,694,690.4807 E 2,051,940.1231 Sta 10+70.99

==========

Ending chain INT01 description

DESCRIBE CHAIN INT02

Chain INT02 contains:
116 117

Beginning chain INT02 description

==========

Point 116 N 13,695,672.3186 E 2,052,227.1983 Sta 10+00.00

Course from 116 to 117 S 84° 21′ 17.90" E Dist 91.2742

Point 117 N 13,695,663.3405 E 2,052,318.0299 Sta 10+91.27

==========

Ending chain INT02 description

DESCRIBE CHAIN INT03

Chain INT03 contains:
118 119

Beginning chain INT03 description

==========

Point 118 N 13,696,279.8019 E 2,052,172.8034 Sta 10+00.00

Course from 118 to 119 N 75° 02′ 39.87" E Dist 75.9944

Point 119 N 13,696,299.4138 E 2,052,246.2235 Sta 10+75.99

==========

Ending chain INT03 description

DESCRIBE CHAIN INT04

Chain INT04 contains:
120 121

Beginning chain INT04 description

==========

Point 120 N 13,696,648.9567 E 2,052,118.4285 Sta 10+00.00

Course from 120 to 121 N 81° 36′ 24.34" E Dist 82.2788

Point 121 N 13,696,660.9666 E 2,052,199.8261 Sta 10+82.28

==========

Ending chain INT04 description

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED
PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

HORIZONTAL ALIGNMENT DATA SHEET

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	SHEET
6	-	31

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

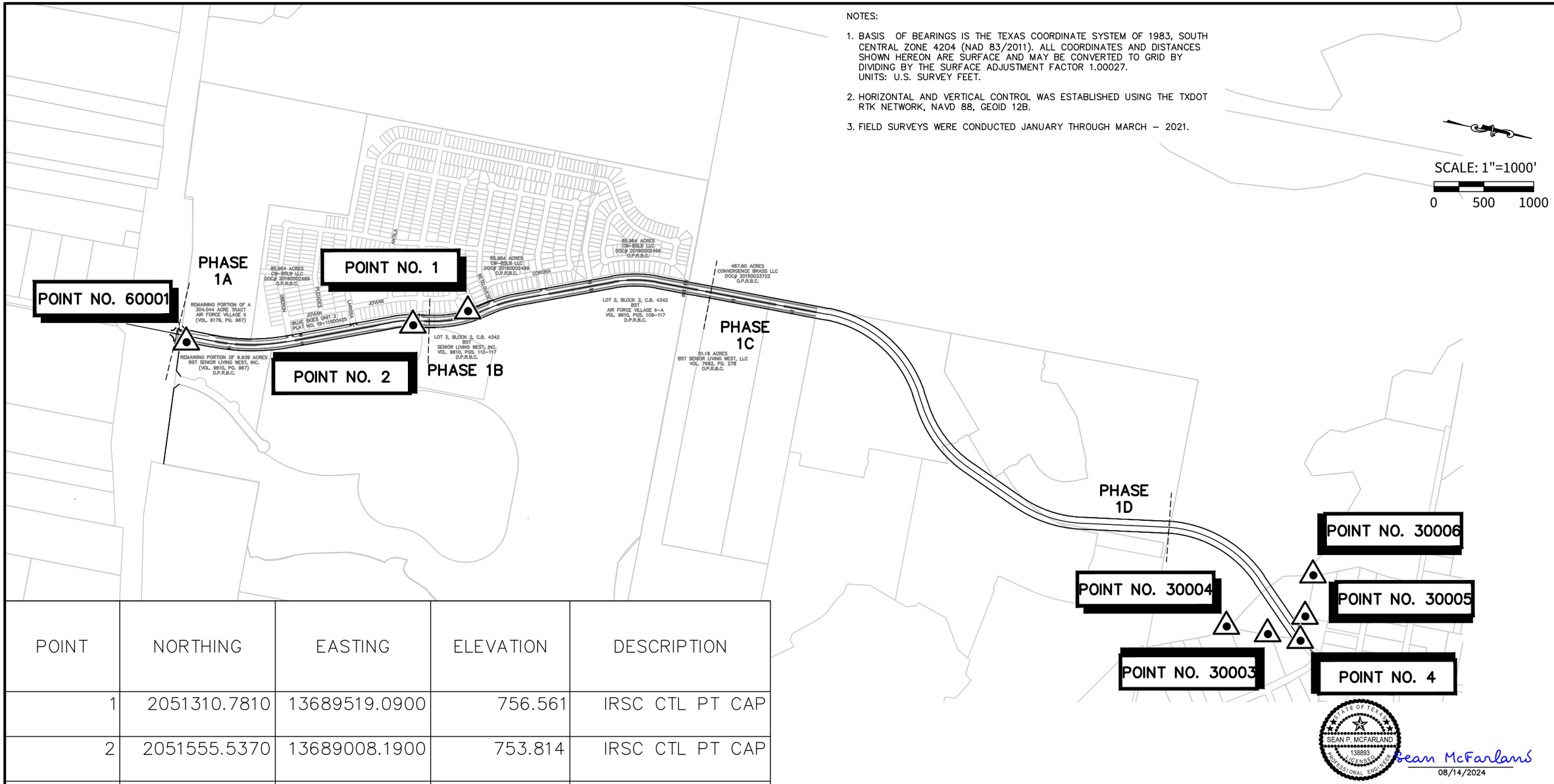
11:20:04 AM
2/7/2025
Legacy Engineering Group
P:\DESIGN_PROJECTS\Montgomery Road\4 - Design\Plan Set\3. Roadway\Set 3 - Phase 1D\MONT_RDW_HALIGN_DATA_1D.dgn

NOTES:

1. BASIS OF BEARINGS IS THE TEXAS COORDINATE SYSTEM OF 1983, SOUTH CENTRAL ZONE 4204 (NAD 83/2011). ALL COORDINATES AND DISTANCES SHOWN HEREON ARE SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR 1.00027. UNITS: U.S. SURVEY FEET.
2. HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK, NAVD 88, GEOID 12B.
3. FIELD SURVEYS WERE CONDUCTED JANUARY THROUGH MARCH – 2021.

SCALE: 1"=1000'

0 500 1000



POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	2051310.7810	13689519.0900	756.561	IRSC CTL PT CAP
2	2051555.5370	13689008.1900	753.814	IRSC CTL PT CAP
4	2052944.6780	13698350.7900	782.399	CP CTL PT CAP
30003	2052948.2180	13698019.4300	764.741	IRFC RPLS 5464
30004	2052949.8610	13697596.5600	747.353	IR 4
30005	2052709.5100	13698350.7200	773.755	IR 4
30006	2052277.7080	13698349.0900	756.989	IR 4
60001	2052155.9270	13686809.1200	759.122	MON

STATE OF TEXAS
SEAN P. MCFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

Sean McFarland
08/14/2024

CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112
TBPE No. 455 •TBPLS No. 10048500

WT MONTGOMERY ROAD

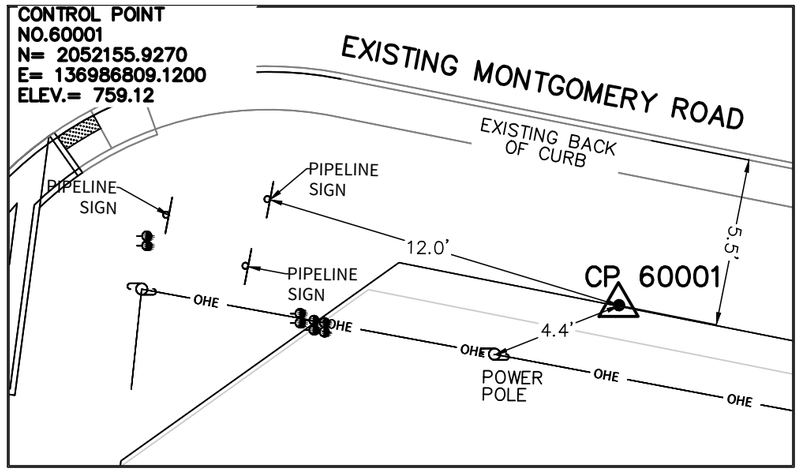
SURVEY CONTROL

SCALE: 1" = 1000' SHEET 1 OF 2

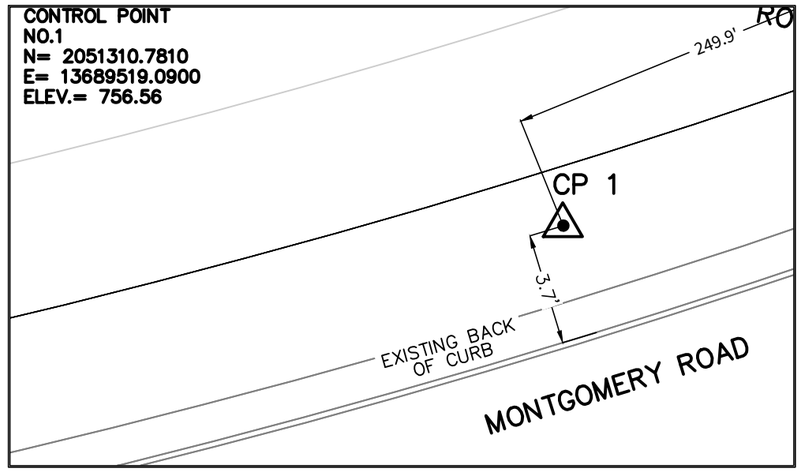
FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	29

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

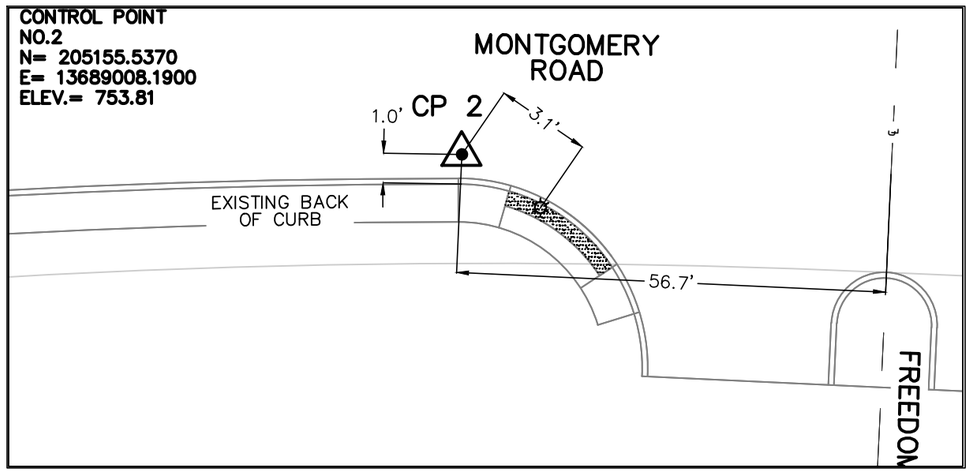
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



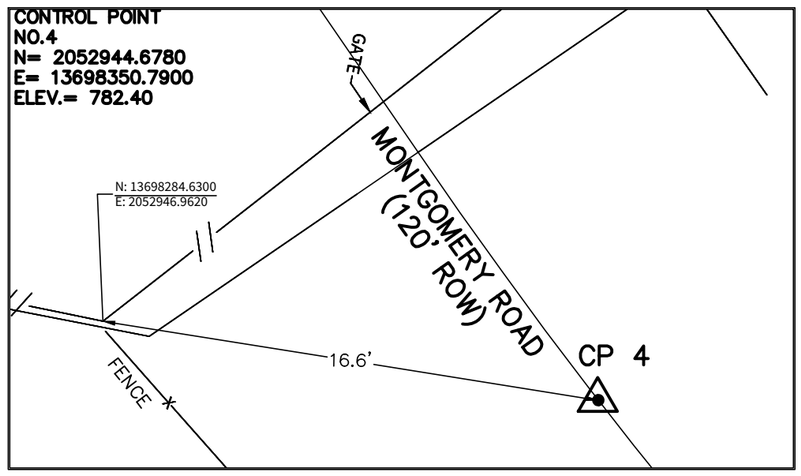
FOUND WITHIN PHASE 1A OF THE EXISTING MONTGOMERY ROAD. ON THE EAST SIDE OF THE NORTHBOUND LANE, CP 60001 IS APPROXIMATELY 5.5' OFF THE BACK OF CURB, 12' NORTH FROM AN EXISTING PIPELINE SIGN, AND 4.4' NORTHWEST OF AN EXISTING POWER POLE.



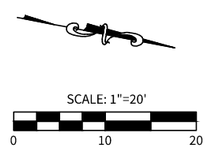
FOUND WITHIN PHASE 1A OF THE EXISTING MONTGOMERY ROAD. ON THE WEST SIDE OF THE SOUTHBOUND LANE, CP 1 IS APPROXIMATELY 3.7' OFF THE BACK OF CURB AND 249.9' SOUTHEAST OF THE INTERSECTION OF BETELGUESE AND MONTGOMERY ROAD.



FOUND WITHIN PHASE 1A OF THE EXISTING MONTGOMERY ROAD. ON THE EAST SIDE OF THE NORTHBOUND LANE, CP 2 IS APPROXIMATELY 1' OFF THE BACK OF CURB, 3.1' SOUTHWEST OF AN EXISTING STREET LIGHT AND 56.7' SOUTH OF THE INTERSECTION OF FREEDOM WAY AND MONTGOMERY ROAD.



FOUND WITHIN PHASE 1F OF THE FUTURE MONTGOMERY ROAD AND ROW. CP4 IS APPROXIMATELY 16.6' FROM A KNOWN CORNER OF EXISTING FENCE WITHIN THE PROPERTY OF VARGAS JUAN PABLO & ESTELA CASTRO, CB 4341 P-17 (7.33 AC), AT A BEARING OF N37° 25' 59.13"E.



STATE OF TEXAS
SEAN P. MCFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

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08/14/2024

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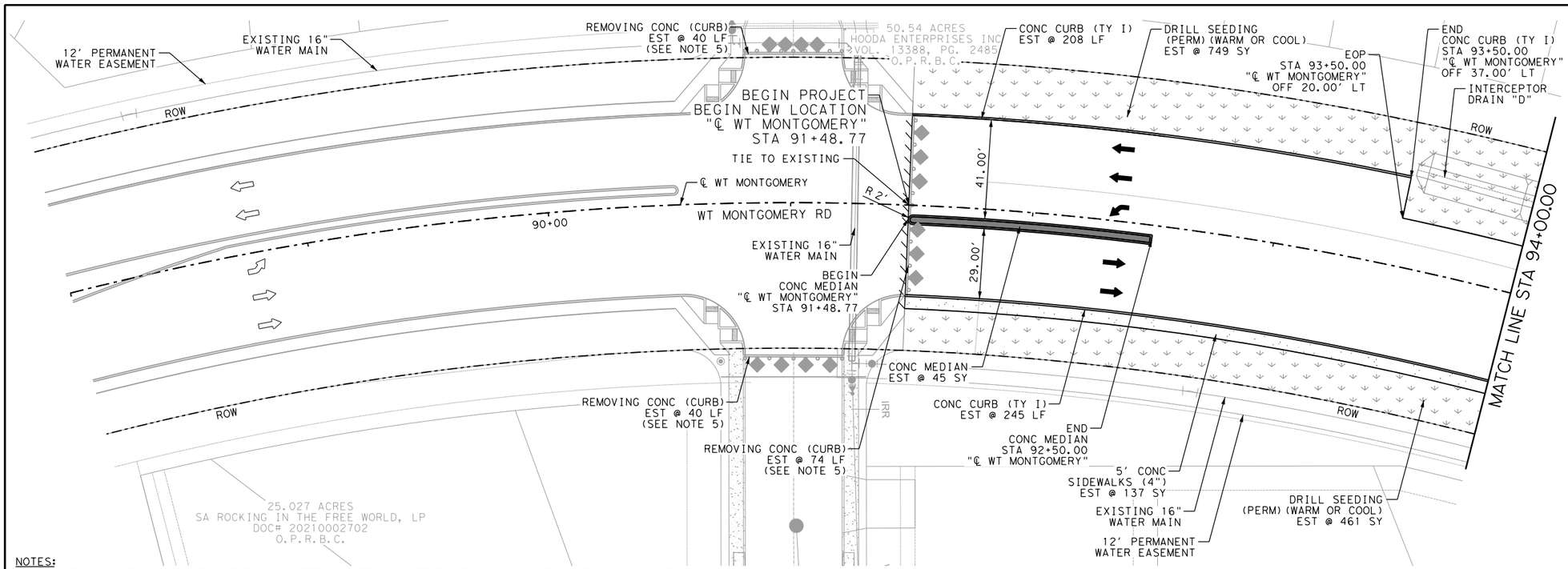
WT MONTGOMERY ROAD

SURVEY CONTROL

SCALE: 1" = 20'

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	03050.104		30
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



QUANTITY			
ITEM CODE	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	3
0104-6021	REMOVING CONC (CURB)	LF	154
0161-6017	COMPOST MANUF TOPSOIL (4")	SY	1210
0164-6066	DRILL SEEDING (PERM) (WARM OR COOL)	SY	1210
0168-6001	VEGETATIVE WATERING	MG	19
0216-6001	PROOF ROLLING	HR	6
0247-6041	FL BS (CMP IN PLC) (TYA GR1-2) (FNAL POS)	CY	467
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	29
0260-6079	LIME TRT (SUBGRADE) (6")	SY	2118
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	416
0529-6001	CONC CURB (TY I)	LF	453
0531-6001	CONC SIDEWALKS (4")	SY	137
0536-6002	CONC MEDIAN	SY	45
3076-6001	D-GR HMA TY-B PG64-22	TON	718
3076-6040	D-GR HMA TY-D PG70-22	TON	457
3076-6066	TACK COAT	GAL	606

NOTES:

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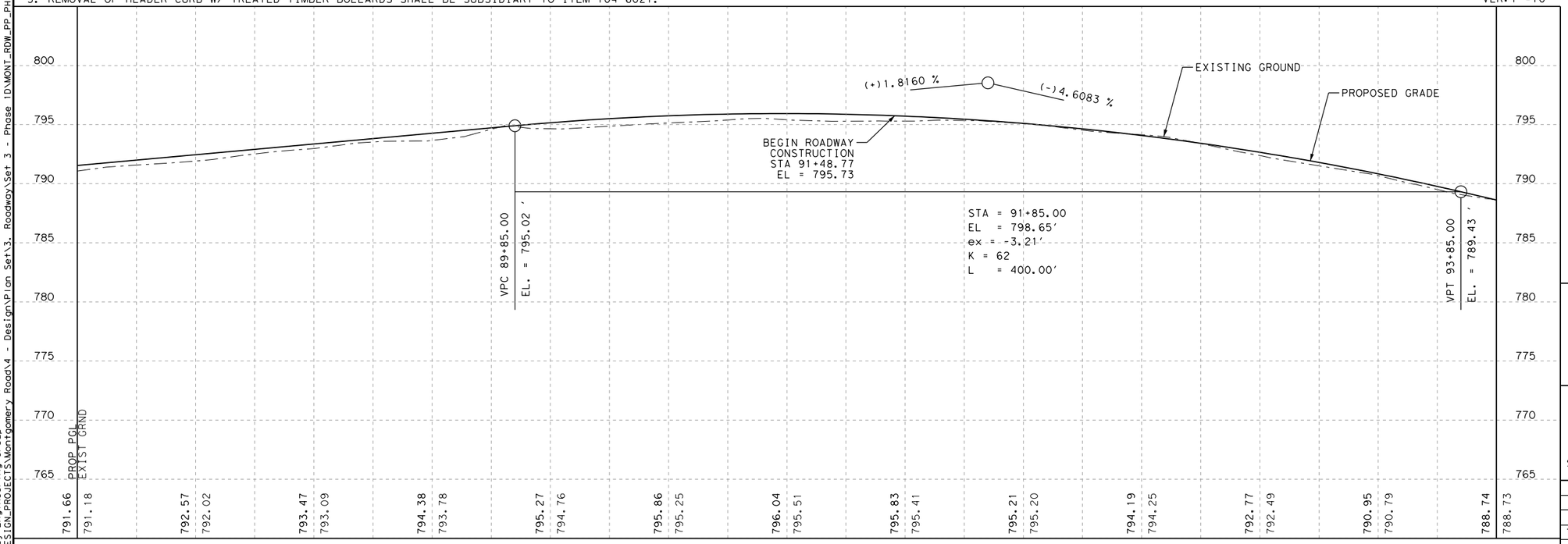
2. CONTRACTOR SHALL PROTECT ANY AND ALL GAS VALVES, MANHOLES, OR OTHER ITEMS IN PAVING AND SIDEWALK.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING OPERATION OF ALL EXISTING UTILITIES AFFECTED BY PROPOSED CONSTRUCTION.
4. REFER TO MISCELLANEOUS CURB AND SIDEWALK DETAILS STANDARD FOR CONCRETE CURB ENDS TRANSITION DETAILS.
5. REMOVAL OF HEADER CURB W/ TREATED TIMBER BOLLARDS SHALL BE SUBSIDIARY TO ITEM 104 6021.

LEGEND

- ROW
- PROPOSED LIMITS OF CONSTRUCTION
- REMOVE STAB. BASE & ASPHALT PAV
- PROPOSED SIDEWALK
- SEEDING AREA
- PROPOSED CONC MEDIAN
- EXISTING TRAFFIC FLOW
- PROPOSED TRAFFIC FLOW
- GAS — UNDERGROUND GAS LINE
- UE — UNDERGROUND ELECTRIC POWER LINE
- FOL — FIBER OPTIC LINE
- OHE — OVERHEAD ELECTRIC
- WWL — WASTEWATER LINE

0 25 50

SCALE: HOR: 1"=50'
VER: 1"=10'



STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP

Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

ROADWAY PLAN & PROFILE

SCALE: HOR: 1" = 50'
VER: 1" = 10'
SHEET 1 OF 7

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	-	32

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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2/7/2025
Legacy Engineering Group
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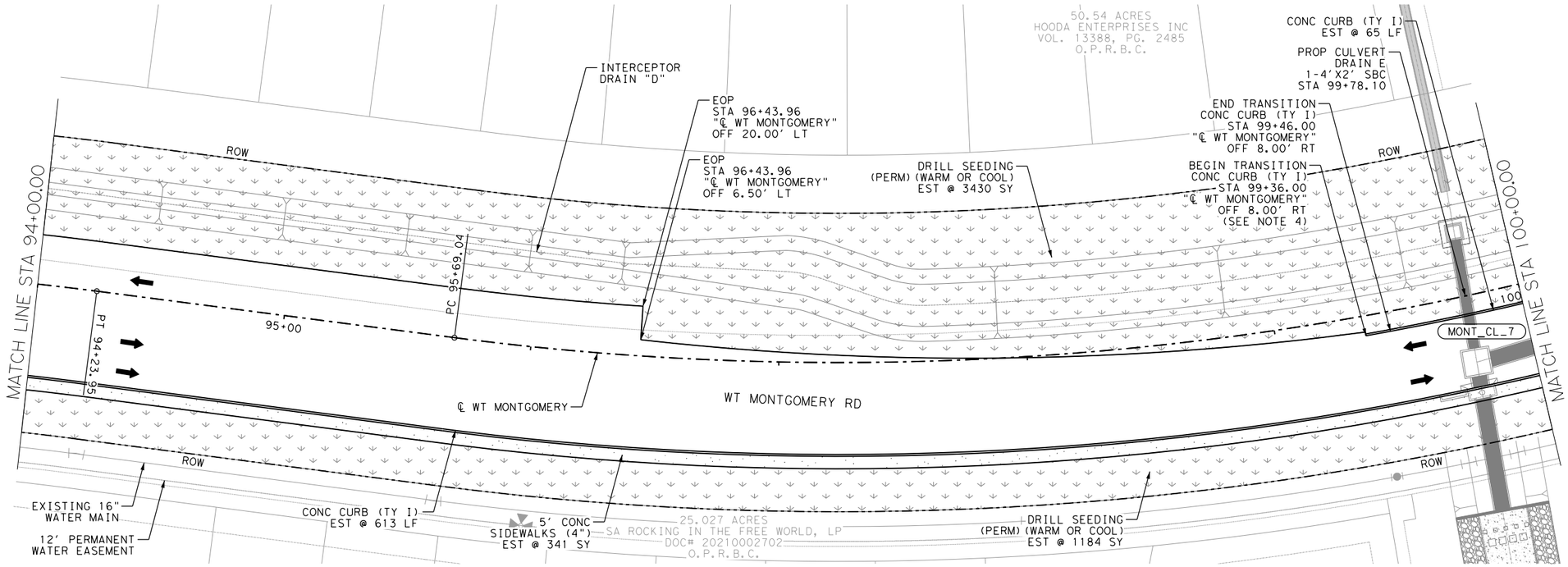

QUANTITY			
ITEM NO.	ITEM	UNIT	QTY
0100-6002	PREPARING ROW	STA	6
0161-6017	COMPOST MANUF TOPSOIL (4")	SY	4614
0164-6066	DRILL SEEDING (PERM) (WARM OR COOL)	SY	4614
0168-6001	VEGETATIVE WATERING	MG	72
0216-6001	PROOF ROLLING	HR	8
0247-6041	FL BS (CMP IN PLC) (TYA GR1-2) (FNAL POS)	CY	731
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	46
0260-6079	LIME TRT (SUBGRADE) (6")	SY	3336
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	649
0529-6001	CONC CURB (TY I)	LF	678
0531-6001	CONC SIDEWALKS (4")	SY	341
3076-6001	D-GR HMA TY-B PG64-22	TON	1120
3076-6040	D-GR HMA TY-D PG70-22	TON	708
3076-6066	TACK COAT	GAL	940

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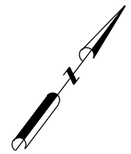
HORIZONTAL CURVE DATA

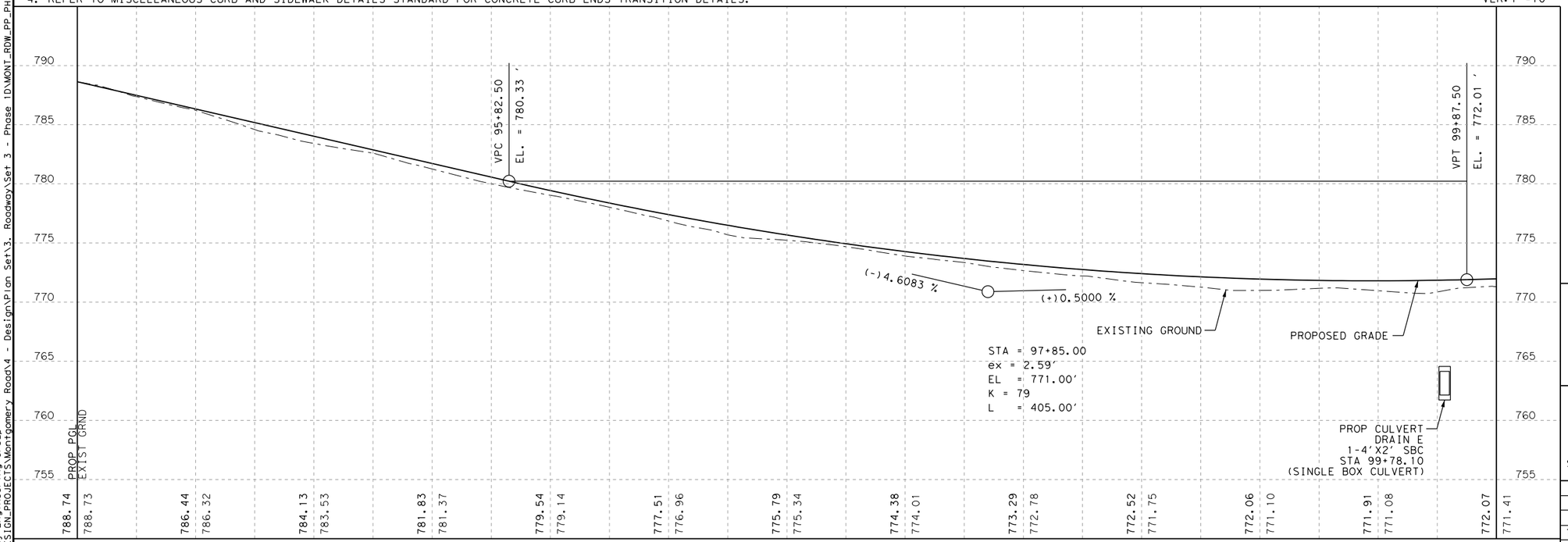
MONT_CL_7

PI STATION	=	99+66.78
DELTA	=	36° 40' 30.07" (LT)
DEGREE OF CURVE	=	4° 46' 28.73"
TANGENT	=	397.73
LENGTH	=	768.12
RADIUS	=	1,200.00



0 25 50
SCALE: HOR: 1"=50'
VER: 1"=10'

LEGEND
- ROW
- PROPOSED LIMITS OF CONSTRUCTION
- REMOVE STAB. BASE & ASPHALT PAV
- PROPOSED SIDEWALK
- SEEDING AREA
- PROPOSED CONC MEDIAN
- EXISTING TRAFFIC FLOW
- PROPOSED TRAFFIC FLOW
- GAS — UNDERGROUND GAS LINE
- UE — UNDERGROUND ELECTRIC POWER LINE
- FOL — FIBER OPTIC LINE
- OHE — OVERHEAD ELECTRIC
- WWL — WASTEWATER LINE



STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED PROFESSIONAL ENGINEER
2/7/2025

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD
ROADWAY PLAN & PROFILE

SCALE: HOR: 1" = 50'
VER: 1" = 10'
SHEET 2 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	-		33
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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2/7/2025
Legacy Engineering Group
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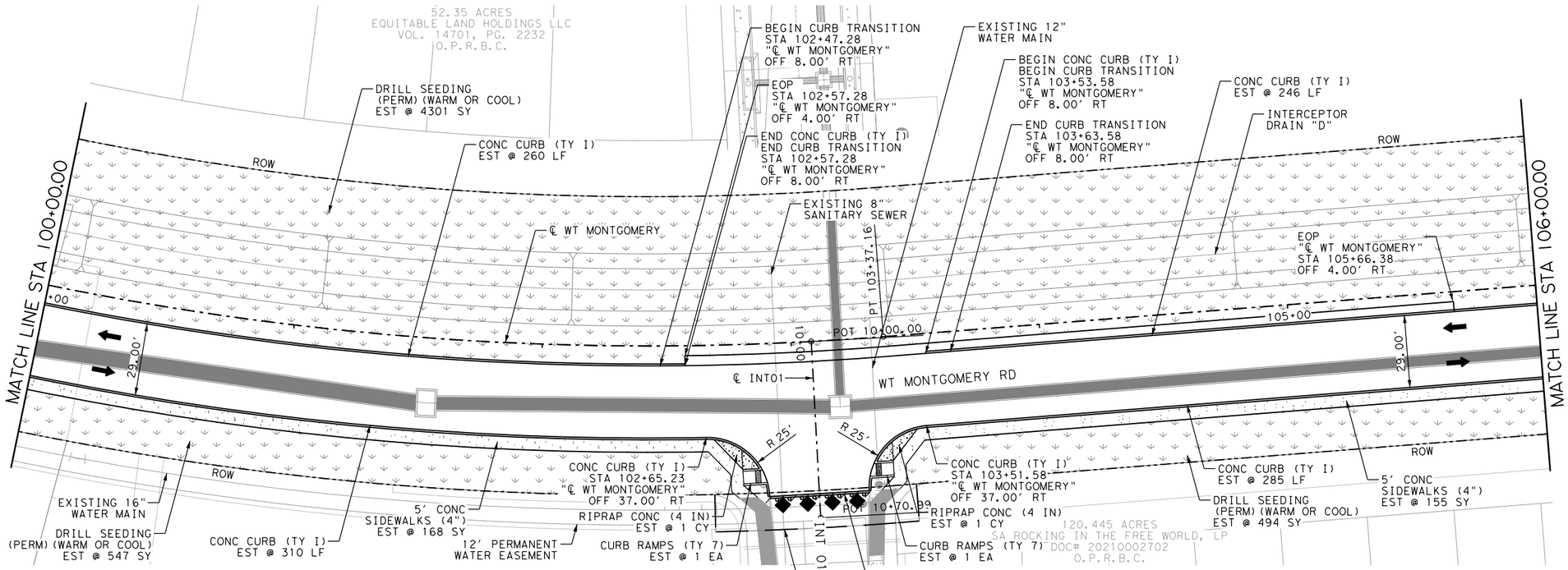

QUANTITY			
ITEM NO.	ITEM	UNIT	QTY
0100-6002	PREPARING ROW	STA	6
0161-6017	COMPOST MANUF TOPSOIL (4")	SY	5342
0164-6066	DRILL SEEDING (PERM) (WARM OR COOL)	SY	5342
0168-6001	VEGETATIVE WATERING	MG	83
0216-6001	PROOF ROLLING	HR	8
0247-6041	FL BS (CMP IN PLC) (TYA GR1-2) (FNAL POS)	CY	564
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	35
0260-6079	LIME TRT (SUBGRADE) (6")	SY	2582
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	499
0420-6074	CL C CONC (MISC)	CY	2
0432-6001	RIPRAP (CONC) (4 IN)	CY	2
0529-6001	CONC CURB (TY I)	LF	1101
0531-6001	CONC SIDEWALKS (4")	SY	323
0531-6010	CURB RAMPS (TY 7)	EA	2
3076-6001	D-GR HMA TY-B PG64-22	TON	860
3076-6040	D-GR HMA TY-D PG70-22	TON	535
3076-6066	TACK COAT	GAL	715
9990BEXAR -0001	TREATED TIMBER BOLLARDS	EA	8

NOTES:
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LEGEND
- ROW
- PROPOSED LIMITS OF CONSTRUCTION
- REMOVE STAB. BASE & ASPHALT PAV
- PROPOSED SIDEWALK
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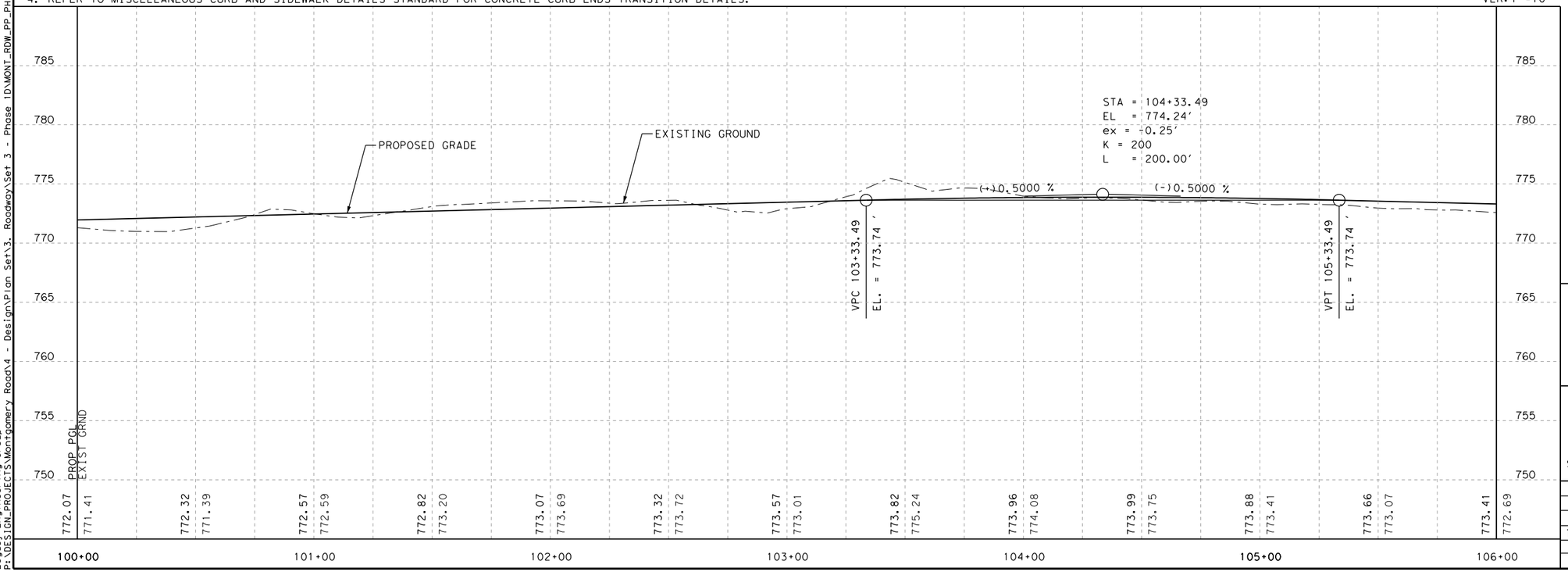
0 25 50
SCALE: HOR: 1"=50'
VER: 1"=10'



STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED PROFESSIONAL ENGINEER
2/7/2025

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

ROADWAY PLAN & PROFILE

SCALE: HOR: 1" = 50'
VER: 1" = 10'

SHEET 3 OF 7

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	-	34

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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2/7/2025
Legacy Engineering Group
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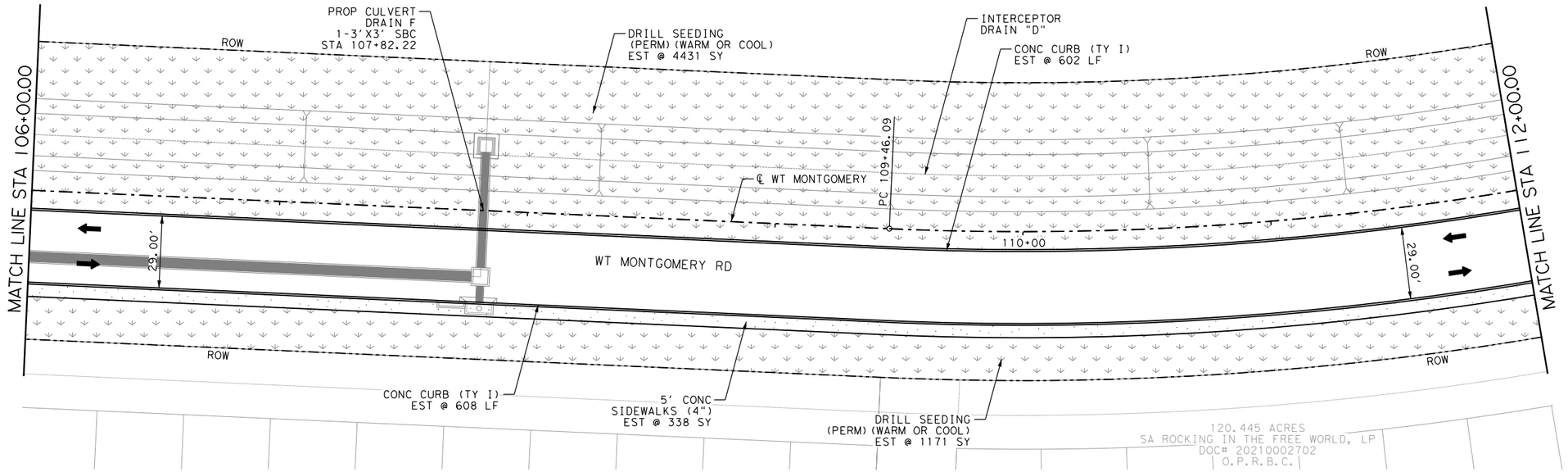

QUANTITY			
ITEM NO.	ITEM	UNIT	QTY
0100-6002	PREPARING ROW	STA	6
0161-6017	COMPOST MANUF TOPSOIL (4")	SY	5602
0164-6066	DRILL SEEDING (PERM)(WARM OR COOL)	SY	5602
0168-6001	VEGETATIVE WATERING	MG	87
0216-6001	PROOF ROLLING	HR	8
0247-6041	FL BS (CMP IN PLC)(TYA GR1-2)(FNAL POS)	CY	503
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	32
0260-6079	LIME TRT (SUBGRADE)(6")	SY	2307
0310-6027	PRIME COAT(MC-30 OR AE-P)	GAL	444
0529-6001	CONC CURB (TY I)	LF	1210
0531-6001	CONC SIDEWALKS (4")	SY	338
3076-6001	D-GR HMA TY-B PG64-22	TON	765
3076-6040	D-GR HMA TY-D PG70-22	TON	471
3076-6066	TACK COAT	GAL	632

NOTES:

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SCALE: HOR: 1"=50'
VER: 1"=10'

LEGEND

- ROW
- PROPOSED LIMITS OF CONSTRUCTION
- REMOVE STAB. BASE & ASPHALT PAV
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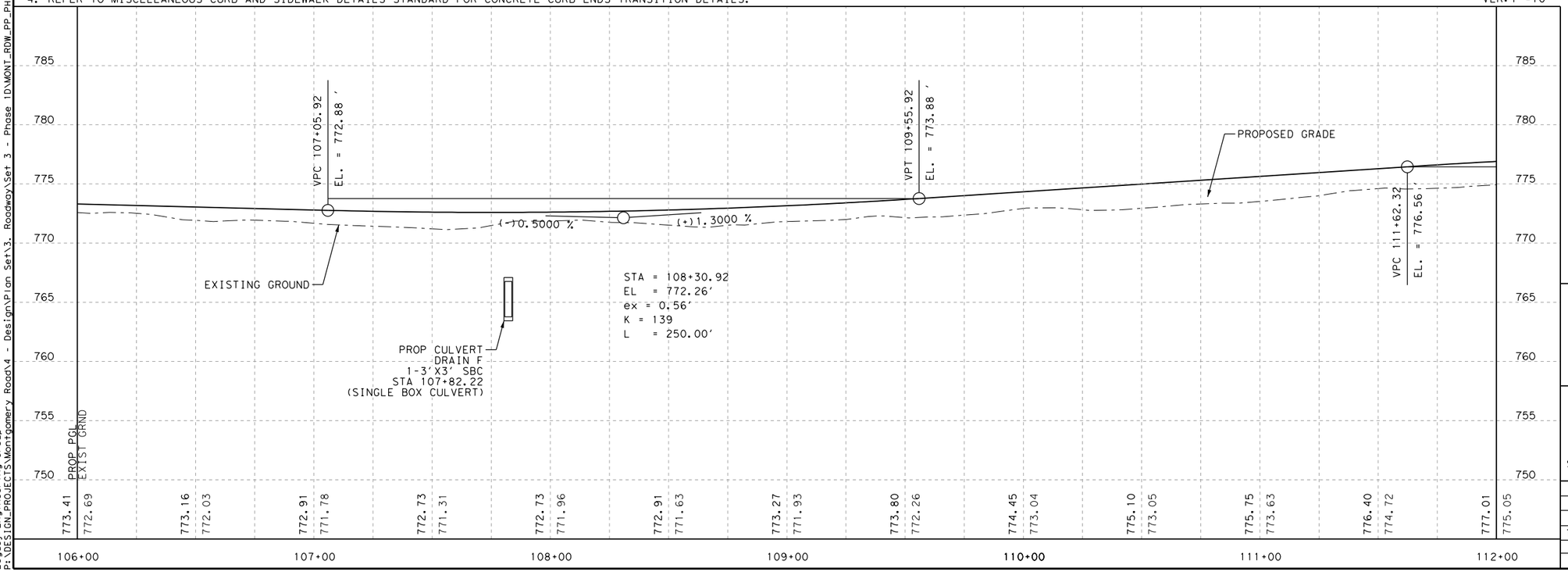

STATE OF TEXAS
ERIC HERNANDEZ
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LICENSED
PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

ROADWAY PLAN & PROFILE

SCALE: HOR: 1" = 50'
VER: 1" = 10'

SHEET 4 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	-		35
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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2/7/2025
Legacy Engineering Group
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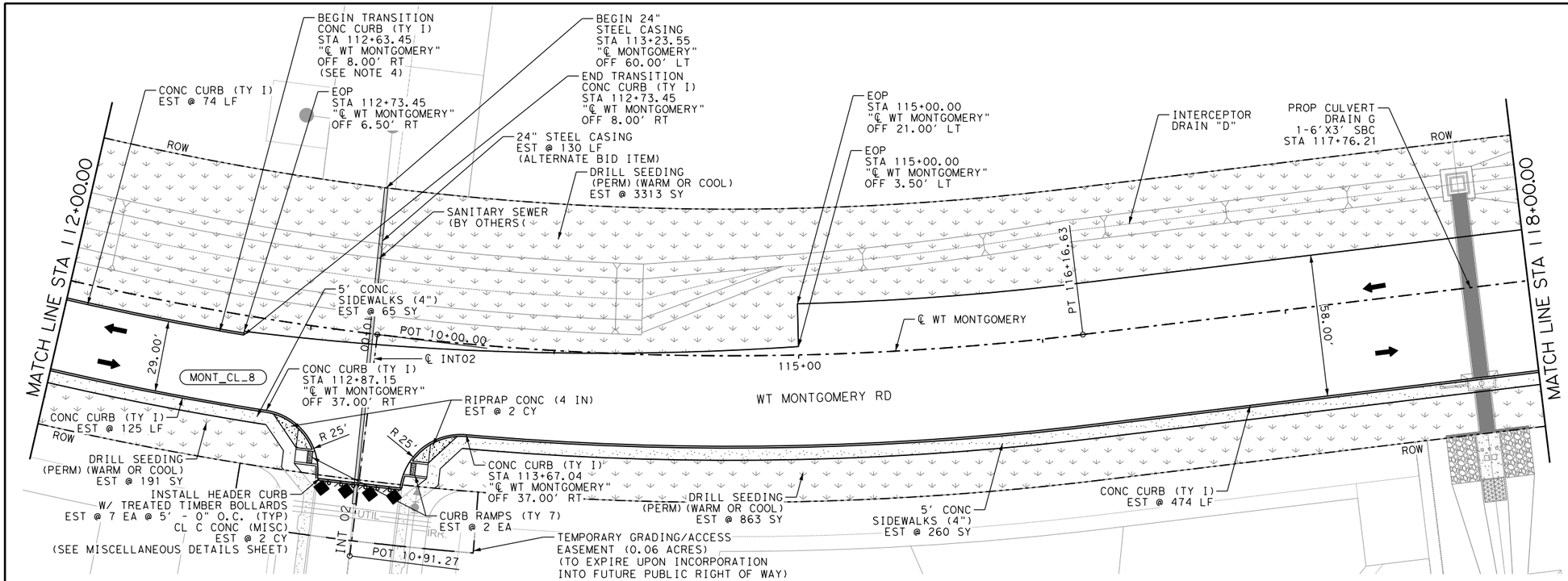

QUANTITY			
ITEM NO.	ITEM	UNIT	QTY
0100-6002	PREPARING ROW	STA	6
0161-6017	COMPOST MANUF TOPSOIL (4")	SY	4367
0164-6066	DRILL SEEDING (PERM) (WARM OR COOL)	SY	4367
0168-6001	VEGETATIVE WATERING	MG	68
0216-6001	PROOF ROLLING	HR	8
0247-6041	FL BS (CMP IN PLC) (TYA GR1-2) (FNAL POS)	CY	782
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	49
0260-6079	LIME TRT (SUBGRADE) (6")	SY	3563
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	695
0420-6074	CL C CONC (MISC)	CY	2
0432-6001	RIPRAP (CONC) (4 IN)	CY	2
0529-6001	CONC CURB (TY I)	LF	673
0531-6001	CONC SIDEWALKS (4")	SY	325
0531-6010	CURB RAMPS (TY 7)	EA	2
3076-6001	D-GR HMA TY-B PG64-22	TON	1198
3076-6040	D-GR HMA TY-D PG70-22	TON	761
3076-6066	TACK COAT	GAL	1009
9990BEXAR -0001	TREATED TIMBER BOLLARDS	EA	7
	24" STEEL CASING	LF	130

NOTES:

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4. REFER TO MISCELLANEOUS CURB AND SIDEWALK DETAILS STANDARD FOR CONCRETE CURB ENDS TRANSITION DETAILS.

HORIZONTAL CURVE DATA

MONT_CL_8

PI STATION	= 112+90.36	
DELTA	= 32° 00' 57.06"	(LT)
DEGREE OF CURVE	= 4° 46' 28.73"	
TANGENT	= 344.27	
LENGTH	= 670.54	
RADIUS	= 1,200.00	

0 25 50

SCALE: HOR: 1"=50'
VER: 1"=10'

LEGEND

- ROW
- PROPOSED LIMITS OF CONSTRUCTION
- REMOVE STAB. BASE & ASPHALT PAV
- PROPOSED SIDEWALK
- SEEDING AREA
- PROPOSED CONC MEDIAN
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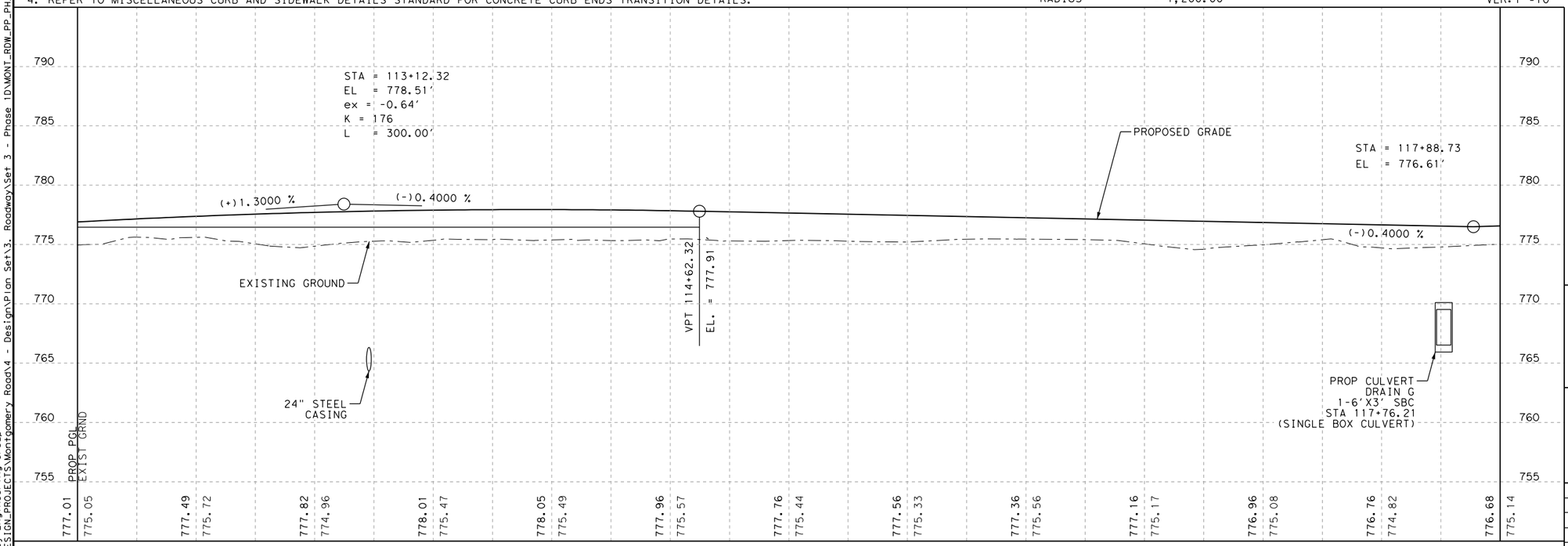

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED
PROFESSIONAL ENGINEER

2/7/2025

LEGACY
ENGINEERING GROUP

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WT MONTGOMERY ROAD

ROADWAY PLAN & PROFILE

SCALE: HOR: 1" = 50'
VER: 1" = 10'

SHEET 5 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	-		36
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

11:20:14 AM
2/7/2025
Legacy Engineering Group
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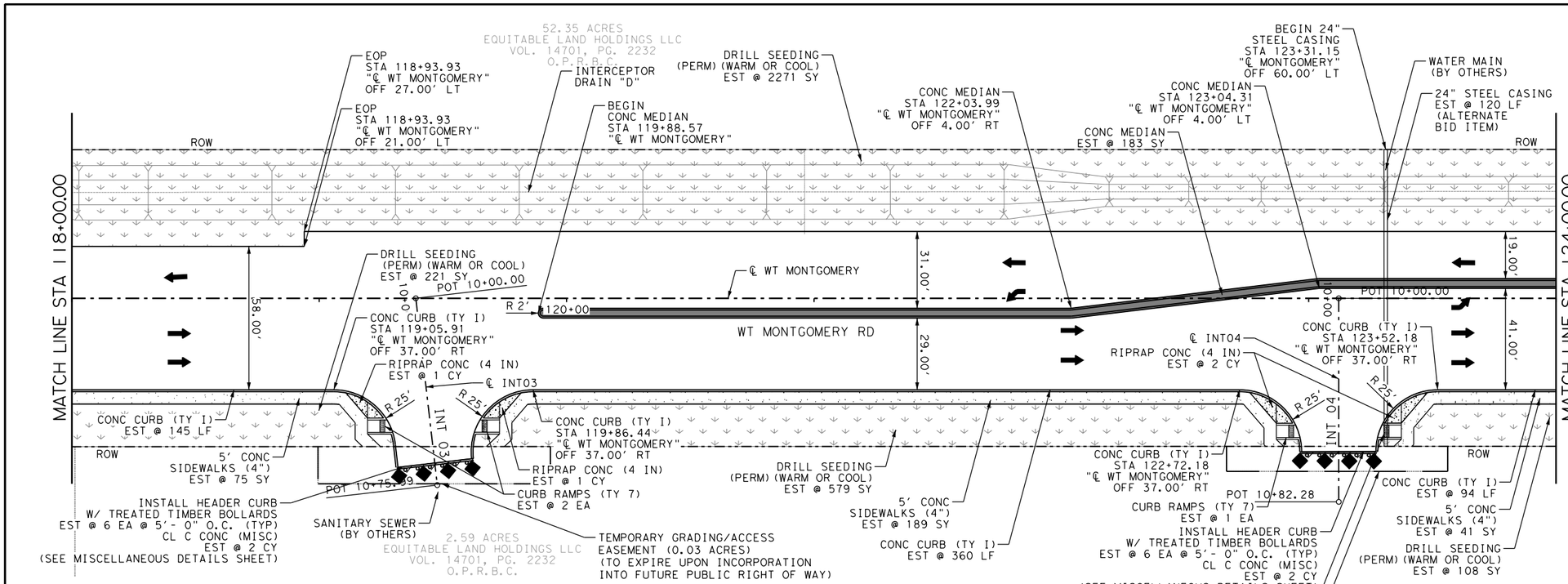

QUANTITY			
ITEM NO.	ITEM	UNIT	QTY
0100-6002	PREPARING ROW	STA	6
0161-6017	COMPOST MANUF TOPSOIL (4")	SY	3179
0164-6066	DRILL SEEDING (PERM) (WARM OR COOL)	SY	3179
0168-6001	VEGETATIVE WATERING	MG	50
0216-6001	PROOF ROLLING	HR	8
0247-6041	FL BS (CMP IN PLC) (TYA GR1-2) (FNAL POS)	CY	1057
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	65
0260-6079	LIME TRT (SUBGRADE) (6")	SY	4802
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	943
0420-6074	CL C CONC (MISC)	CY	4
0432-6001	RIPRAP (CONC) (4 IN)	CY	4
0529-6001	CONC CURB (TY I)	LF	599
0531-6001	CONC SIDEWALKS (4")	SY	305
0531-6010	CURB RAMPS (TY 7)	EA	4
0536-6002	CONC MEDIAN	SY	183
3076-6001	D-GR HMA TY-B PG64-22	TON	1626
3076-6040	D-GR HMA TY-D PG70-22	TON	1025
3076-6066	TACK COAT	GAL	1363
9990BEXAR-0001	TREATED TIMBER BOLLARDS	EA	12
	24" STEEL CASING	LF	120

LEGEND

- ROW
- PROPOSED LIMITS OF CONSTRUCTION
- REMOVE STAB. BASE & ASPHALT PAV
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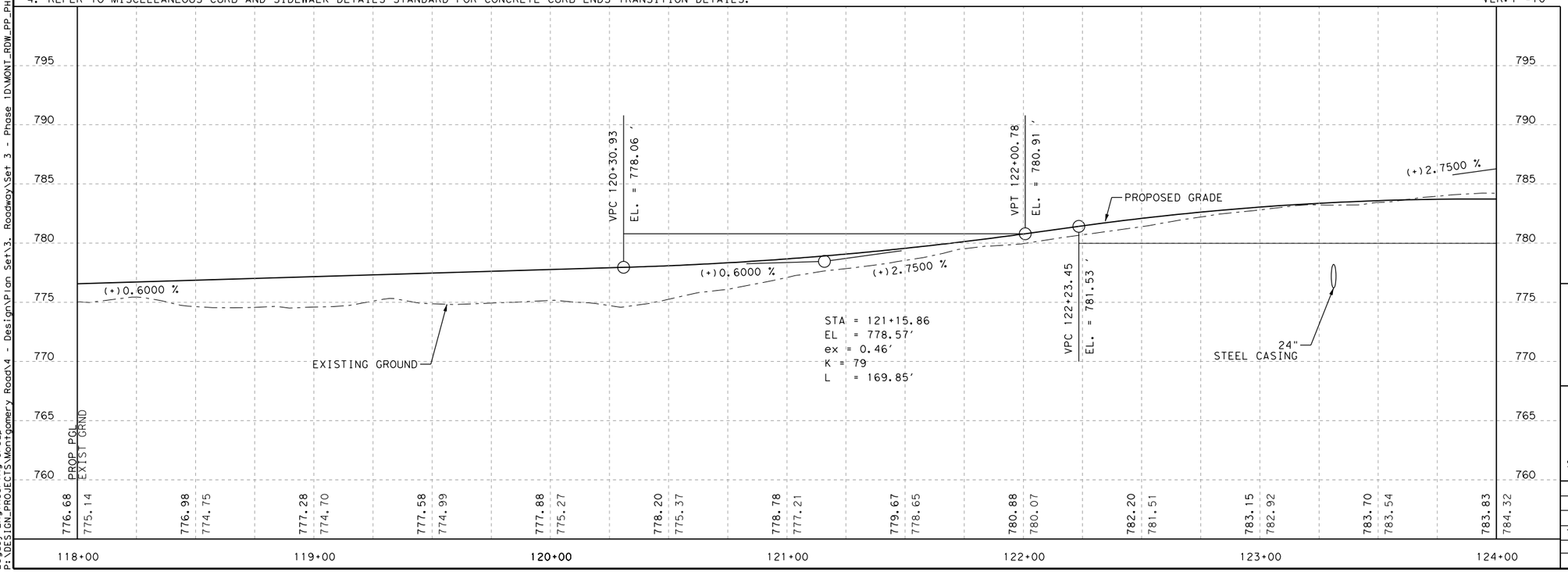

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LICENSED
PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

ROADWAY PLAN & PROFILE

SCALE: HOR: 1" = 50'
VER: 1" = 10'

SHEET 6 OF 7

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	-	37

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

11:20:15 AM
2/7/2025
Legacy Engineering Group
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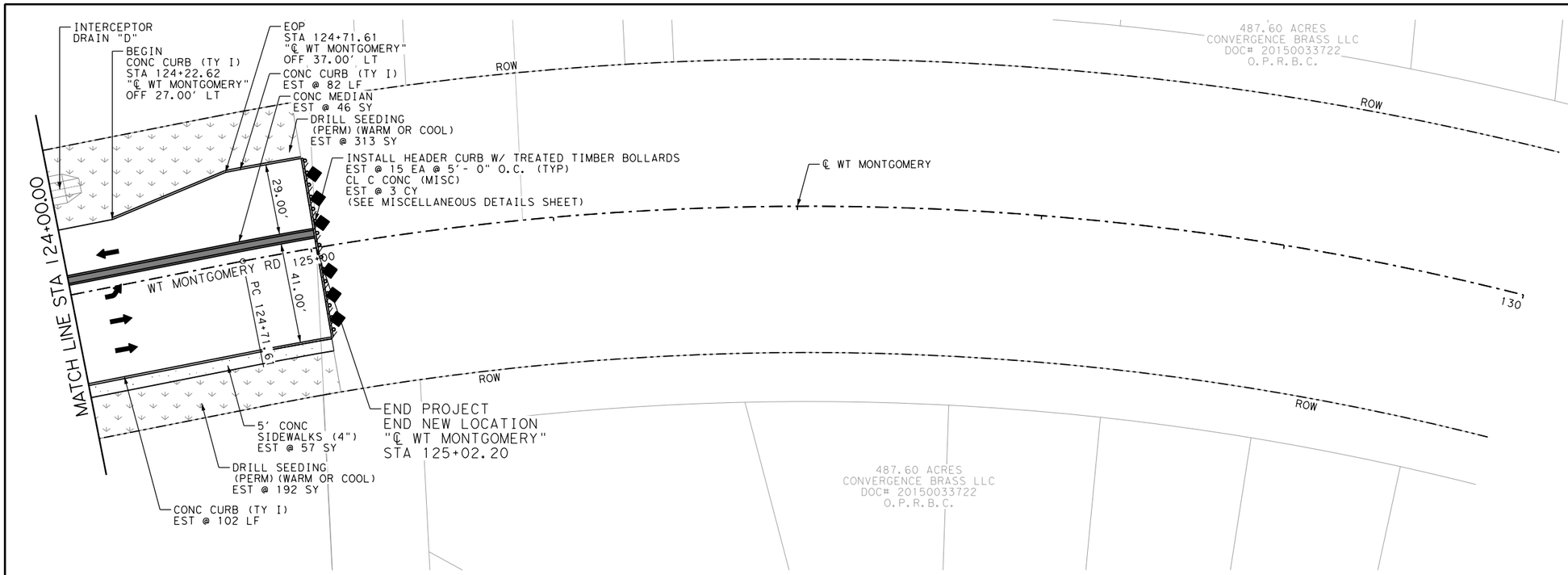


QUANTITY			
ITEM NO.	ITEM	UNIT	QTY
0100-6002	PREPARING ROW	STA	1
0161-6017	COMPOST MANUF TOPSOIL (4")	SY	505
0164-6066	DRILL SEEDING (PERM) (WARM OR COOL)	SY	505
0168-6001	VEGETATIVE WATERING	MG	8
0216-6001	PROOF ROLLING	HR	4
0247-6041	FL BS (CMP IN PLC) (TYA GR1-2) (FNAL POS)	CY	187
0260-6002	LIME (HYDRATED LIME (SLURRY))	TON	12
0260-6079	LIME TRT (SUBGRADE) (6")	SY	849
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	167
0420-6074	CL C CONC (MISC)	CY	3
0529-6001	CONC CURB (TY I)	LF	184
0531-6001	CONC SIDEWALKS (4")	SY	57
0536-6002	CONC MEDIAN	SY	46
3076-6001	D-GR HMA TY-B PG64-22	TON	288
3076-6040	D-GR HMA TY-D PG70-22	TON	180
3076-6066	TACK COAT	GAL	240
9990BEXAR-0001	TREATED TIMBER BOLLARDS	EA	15

NOTES:

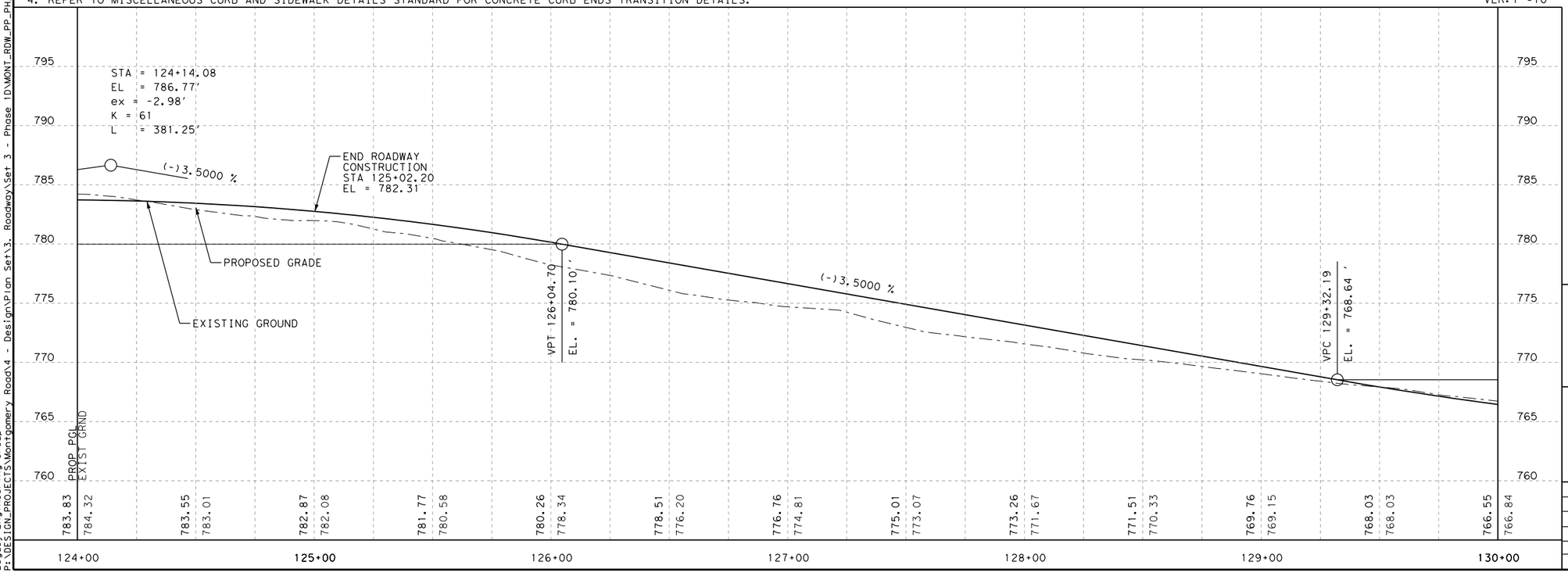
1. LOCATION OF EXISTING UTILITIES ARE APPROXIMATE AND ARE BASED ON AVAILABLE DRAWINGS AND FIELD SURVEYS. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL ALIGNMENT OF ALL UTILITIES IN THE VICINITY OF THE PROJECT PRIOR TO BEGINNING CONSTRUCTION.
2. CONTRACTOR SHALL PROTECT ANY AND ALL GAS VALVES, MANHOLES, OR OTHER ITEMS IN PAVING AND SIDEWALK.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING OPERATION OF ALL EXISTING UTILITIES AFFECTED BY PROPOSED CONSTRUCTION.
4. REFER TO MISCELLANEOUS CURB AND SIDEWALK DETAILS STANDARD FOR CONCRETE CURB ENDS TRANSITION DETAILS.

LEGEND

- ROW
- PROPOSED LIMITS OF CONSTRUCTION
- REMOVE STAB. BASE & ASPHALT PAV
- PROPOSED SIDEWALK
- SEEDING AREA
- PROPOSED CONC MEDIAN
- EXISTING TRAFFIC FLOW
- PROPOSED TRAFFIC FLOW
- GAS — UNDERGROUND GAS LINE
- UE — UNDERGROUND ELECTRIC POWER LINE
- FOL — FIBER OPTIC LINE
- OHE — OVERHEAD ELECTRIC
- WWL — WASTEWATER LINE

0 25 50

SCALE: HOR: 1"=50'
VER: 1"=10'



STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED PROFESSIONAL ENGINEER

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ROADWAY PLAN & PROFILE

SCALE: HOR: 1" = 50'
VER: 1" = 10'

SHEET 7 OF 7

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	-	38

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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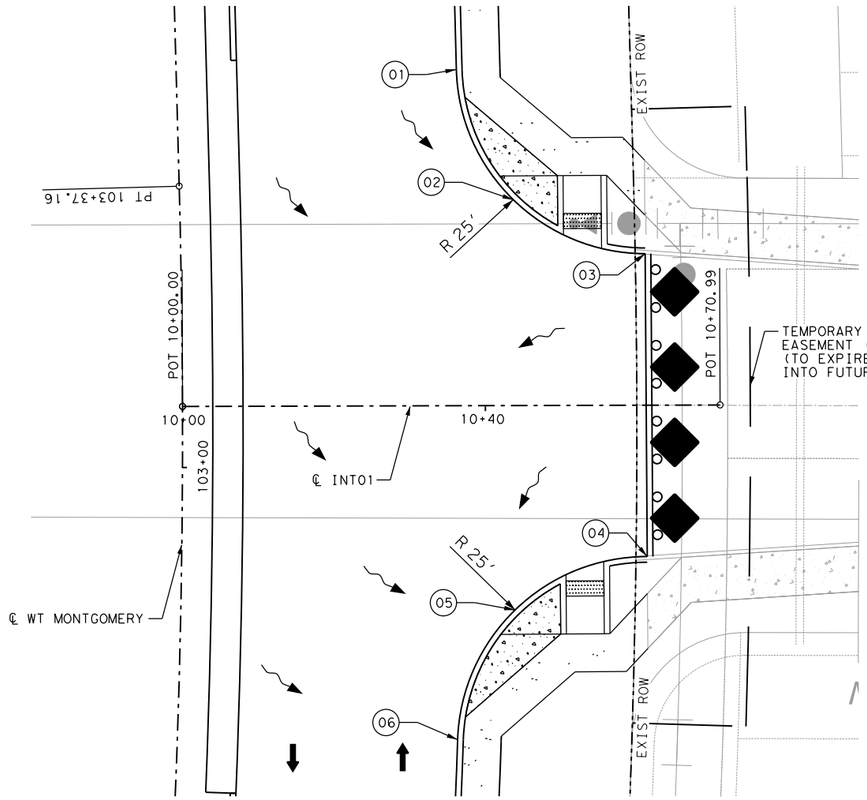
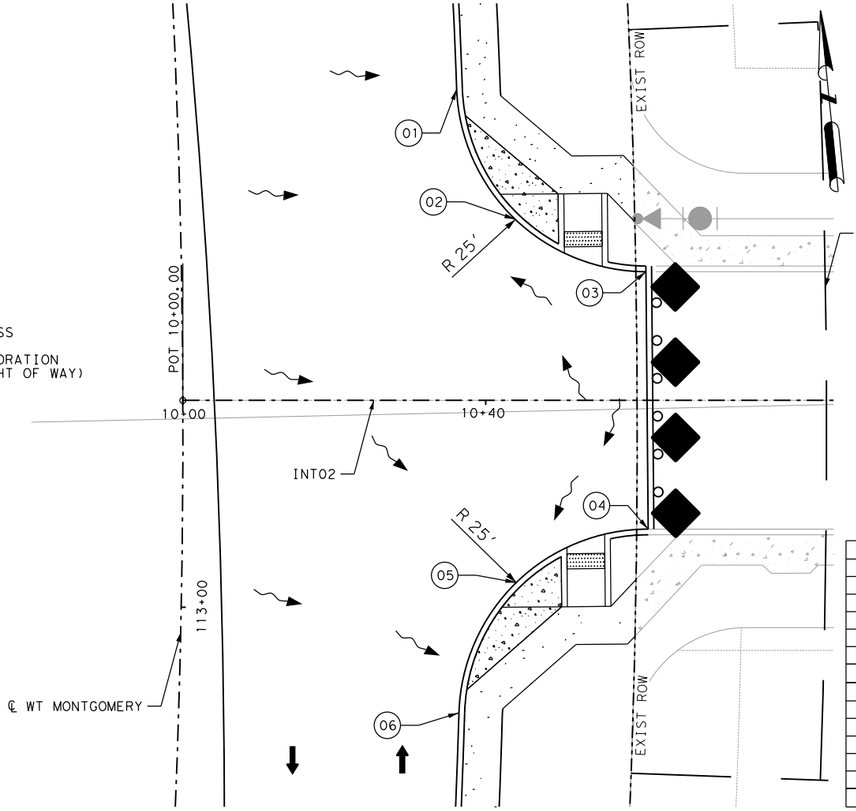


INTERSECTION 1



INTERSECTION 2

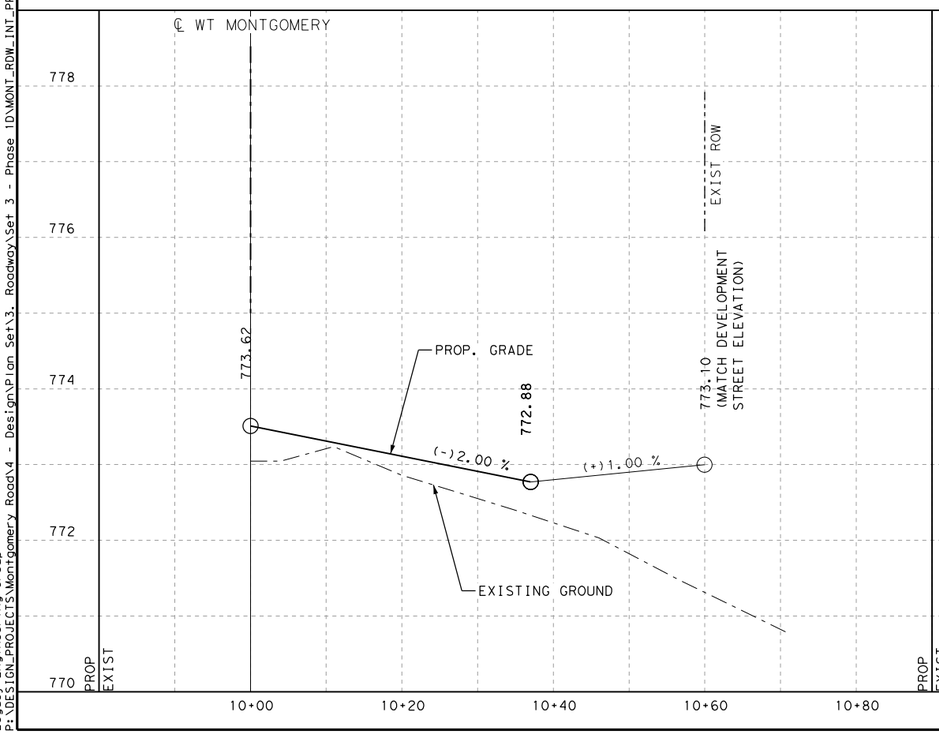
LEGEND

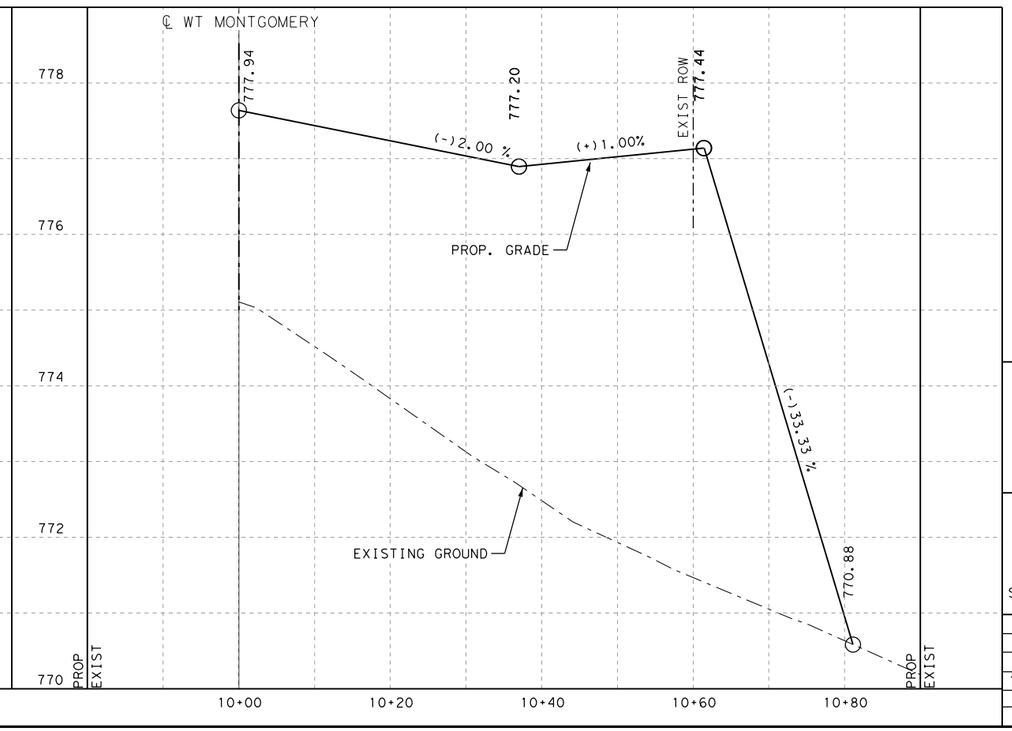
FLOW ARROWS

NOTES:

1. REFER TO TRES LAURELS UNIT 4A & 4B DEVELOPMENT PLANS FOR PROPOSED GEOMETRY AND ADDITIONAL INFORMATION.
2. CONTRACTOR SHALL FIELD VERIFY TIE-IN ELEVATION PRIOR TO CONSTRUCTION. TIE-IN ELEVATION MAY BE ADJUSTED TO MATCH FIELD CONDITIONS, BUT SHALL NOT RESULT IN ADVERSE IMPACTS TO DRAINAGE PATTERN AND/OR PED CROSSING SLOPE.

WT MONTGOMERY @ INT01				
POINT	CL	STA	OFFSET	ELEV
1	WT MONTGOMERY	103+51.41	37.00' RT	773.08'
2	WT MONTGOMERY	103+34.23	44.11' RT	773.28'
3	WT MONTGOMERY	103+27.10	61.31' RT	773.30'
4	WT MONTGOMERY	102+89.05	61.44' RT	773.04'
5	WT MONTGOMERY	102+82.02	44.13' RT	772.89'
6	WT MONTGOMERY	102+65.28	37.00' RT	772.66'
WT MONTGOMERY @ INT02				
1	WT MONTGOMERY	113+67.03	37.00' RT	777.30'
2	WT MONTGOMERY	113+50.20	44.22' RT	777.20'
3	WT MONTGOMERY	113+43.26	61.33' RT	777.10'
4	WT MONTGOMERY	113+10.92	61.50' RT	777.10'
5	WT MONTGOMERY	113+03.94	44.18' RT	777.05'
6	WT MONTGOMERY	112+87.14	37.00' RT	777.00'





0 10 20

SCALE: HOR: 1"=20'
VER: 1"=2'

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WT MONTGOMERY ROAD

INTERSECTION PLAN & PROFILE

SCALE: HOR: 1" = 20'
VER: 1" = 2'

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	-	39

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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2/7/2025
Legacy Engineering Group
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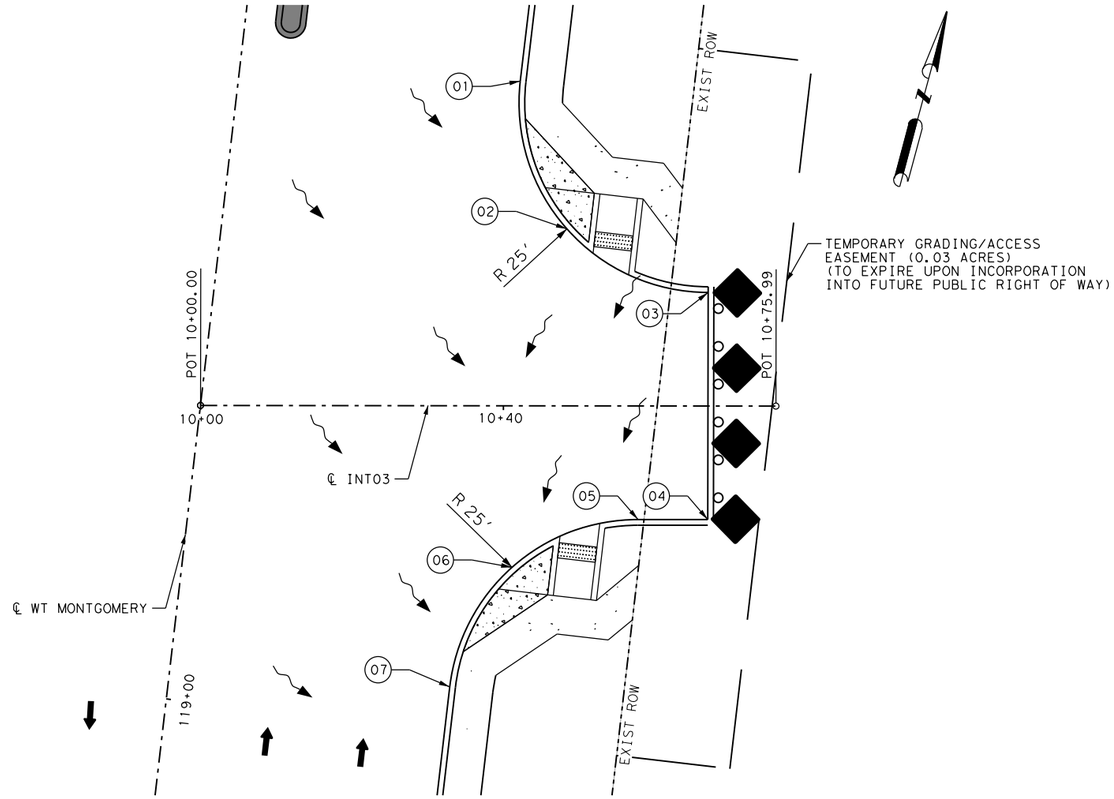
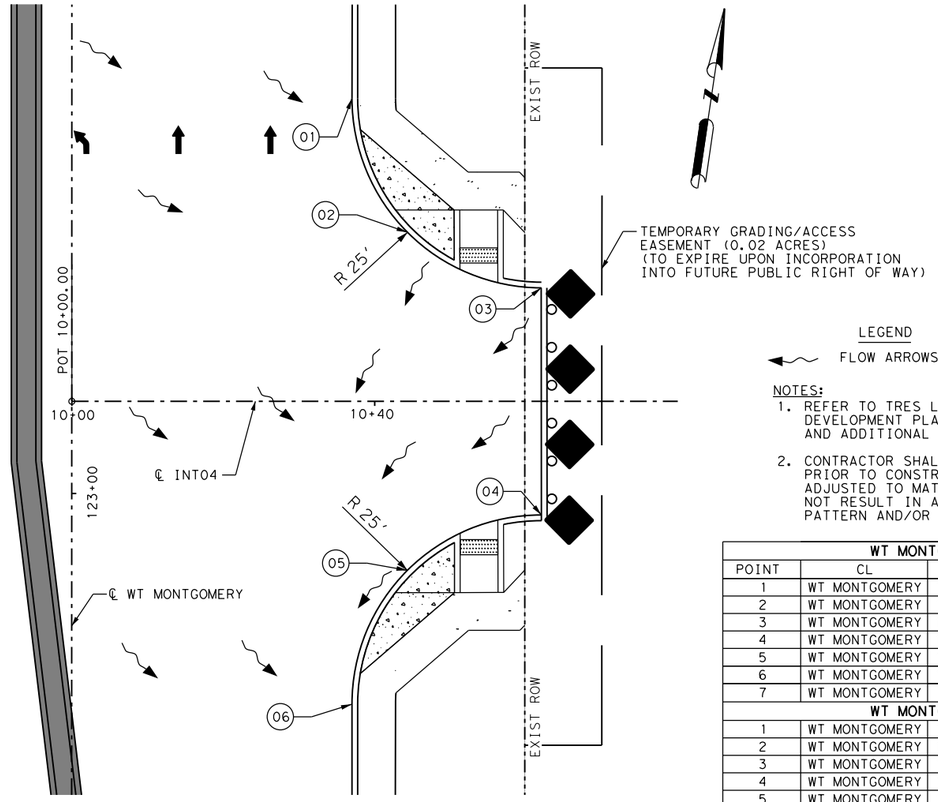


INTERSECTION 3



INTERSECTION 4

LEGEND

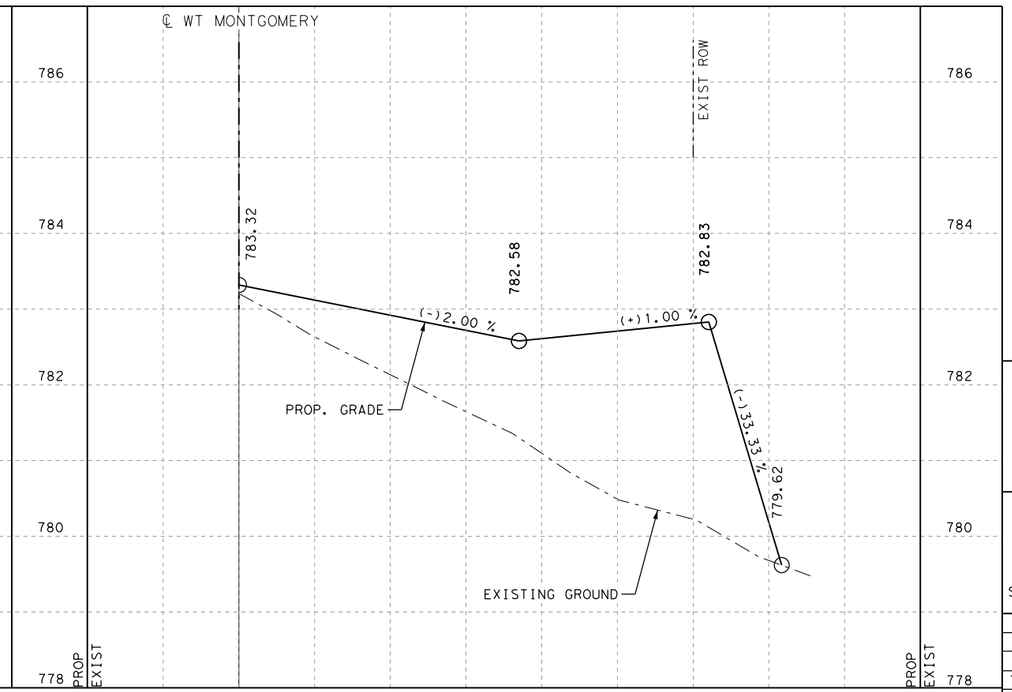
FLOW ARROWS

NOTES:

1. REFER TO TRES LAURELS UNIT 5B DEVELOPMENT PLANS FOR PROPOSED GEOMETRY AND ADDITIONAL INFORMATION.
2. CONTRACTOR SHALL FIELD VERIFY TIE-IN ELEVATION PRIOR TO CONSTRUCTION. TIE-IN ELEVATION MAY BE ADJUSTED TO MATCH FIELD CONDITIONS, BUT SHALL NOT RESULT IN ADVERSE IMPACTS TO DRAINAGE PATTERN AND/OR PED CROSSING SLOPE.

WT MONTGOMERY @ INT03				
POINT	CL	STA	OFFSET	ELEV
1	WT MONTGOMERY	119+86.44	37.00' RT	777.05'
2	WT MONTGOMERY	119+67.77	44.37' RT	777.26'
3	WT MONTGOMERY	119+61.60	64.86' RT	777.48'
4	WT MONTGOMERY	119+31.80	68.30' RT	776.79'
5	WT MONTGOMERY	119+30.74	59.14' RT	776.70'
6	WT MONTGOMERY	119+22.54	43.34' RT	776.64'
7	WT MONTGOMERY	119+05.91	37.00' RT	776.57'
WT MONTGOMERY @ INT04				
1	WT MONTGOMERY	123+52.18	37.00' RT	782.97'
2	WT MONTGOMERY	123+34.50	44.32' RT	782.94'
3	WT MONTGOMERY	123+27.18	62.00' RT	782.91'
4	WT MONTGOMERY	122+97.18	62.00' RT	782.76'
5	WT MONTGOMERY	122+89.86	44.33' RT	782.40'
6	WT MONTGOMERY	122+72.18	37.00' RT	782.05'

INTERSECTION 3



INTERSECTION 4

0 10 20

SCALE: HOR: 1"=20'
VER: 1"=2'

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WT MONTGOMERY ROAD

INTERSECTION PLAN & PROFILE

SCALE: HOR: 1" = 20'
VER: 1" = 2'

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	-	40

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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2/7/2025
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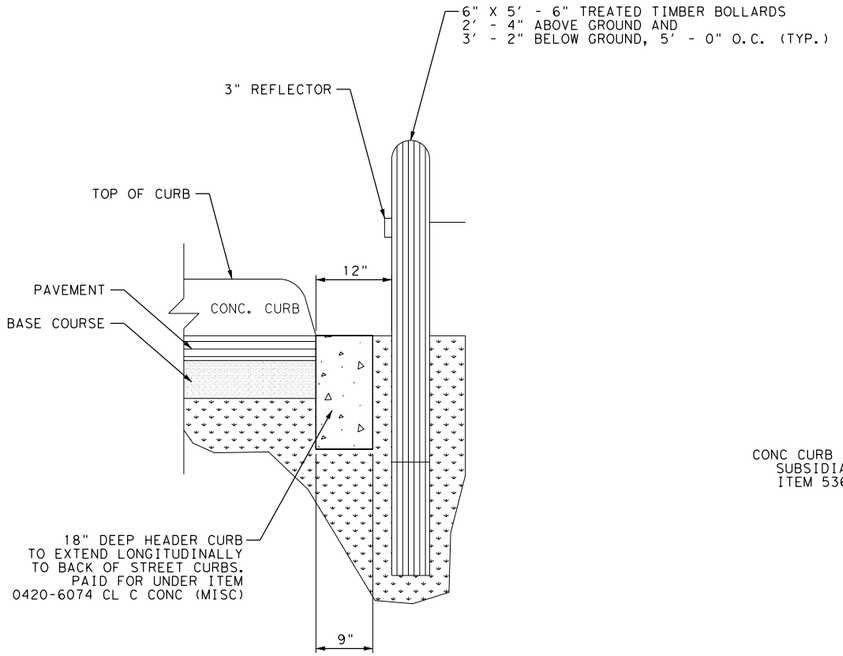
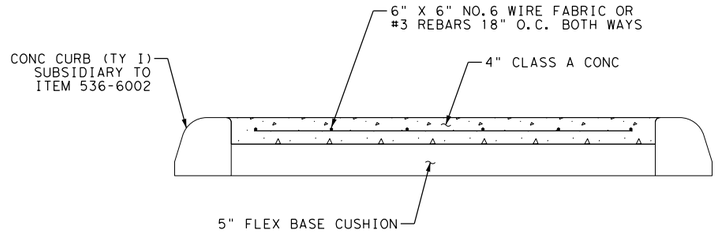
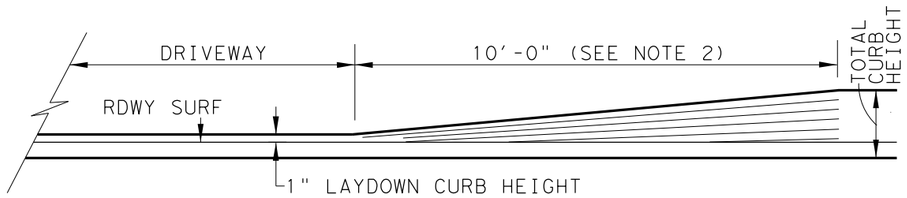


HEADER CURB & BARRICADE POST DETAIL



CONCRETE MEDIAN DETAIL



LAYDOWN CURB AT DRIVEWAYS DETAIL

NOTES:

1. REFER TO PLAN SHEETS FOR GEOMETRIC DESIGN DETAILS.
2. WHERE SIDEWALK IS PRESENT, SLOPE AND LENGTH OF CURB TRANSITION SHOULD MATCH THE SIDEWALK AND MEET ADA REQUIREMENTS.

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WT MONTGOMERY ROAD

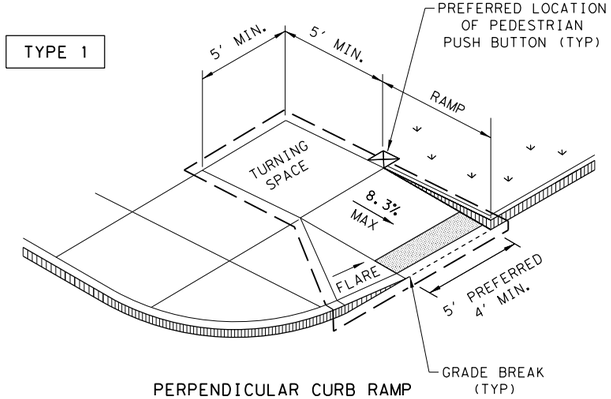
MISCELLANEOUS DETAIL

N. T. S. SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	-		41
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

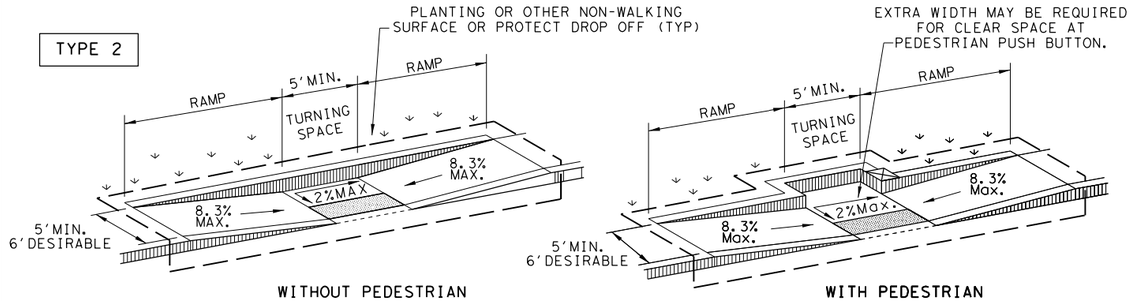
DATE: 2/7/2025
FILE: P:\DESIGN_PROJECTS\Montgomery Road\4 - Design\Plan Set\3. Roadway\Set 3 - Phase 1D\Standards\ped18.dgn

TYPE 1



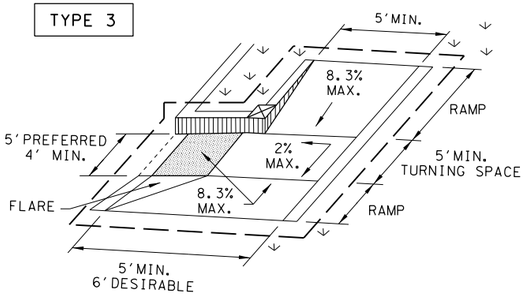
PERPENDICULAR CURB RAMP

TYPE 2

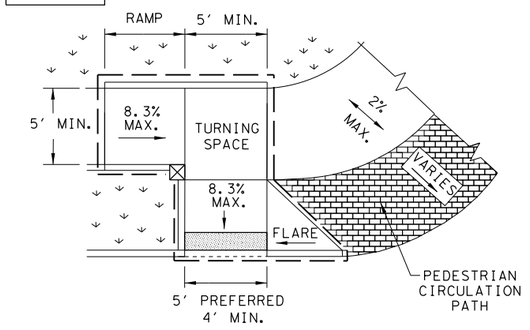


PARALLEL CURB RAMP

TYPE 3

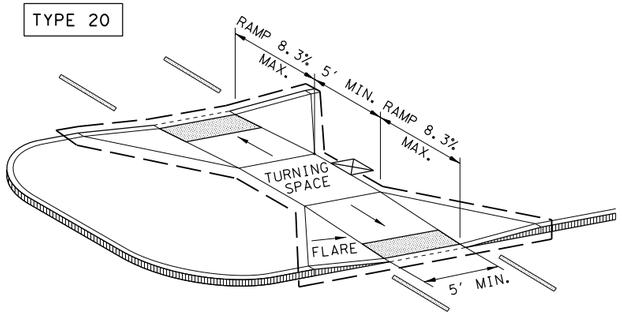


TYPE 6



COMBINATION CURB RAMPS

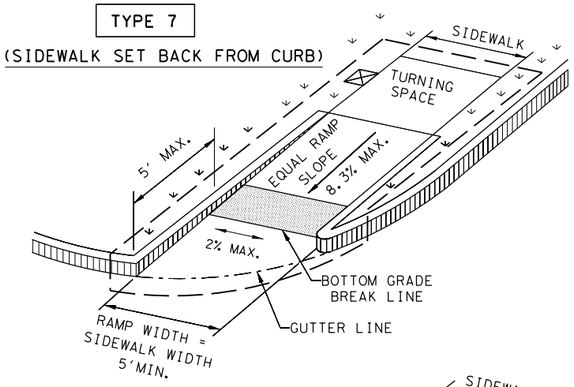
TYPE 20



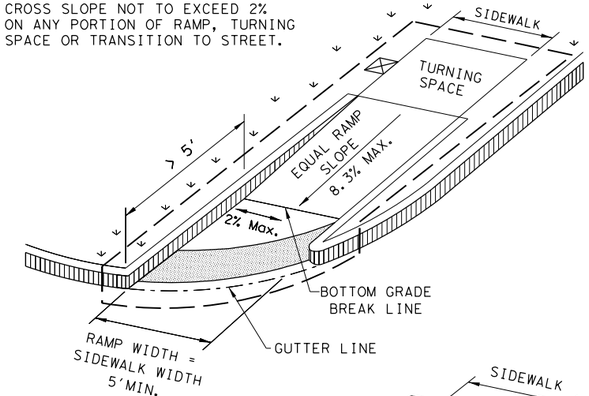
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

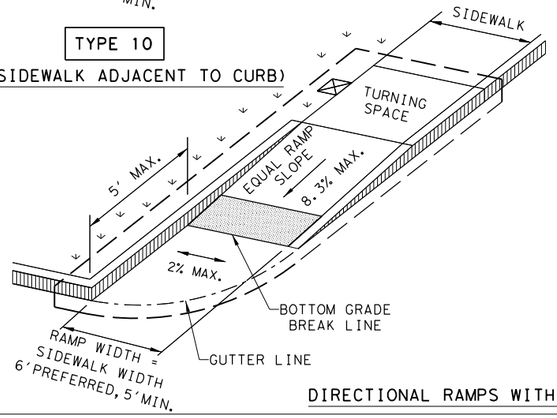


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

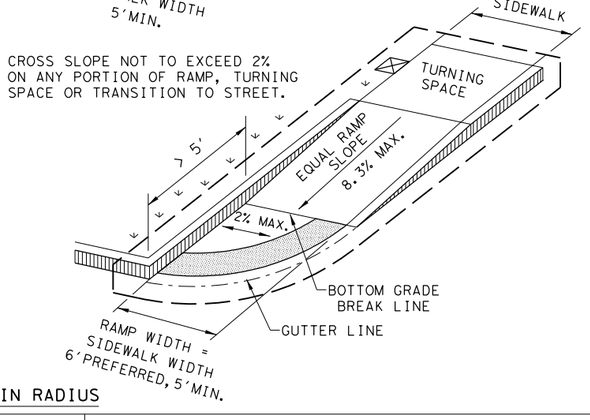


TYPE 10

(SIDEWALK ADJACENT TO CURB)

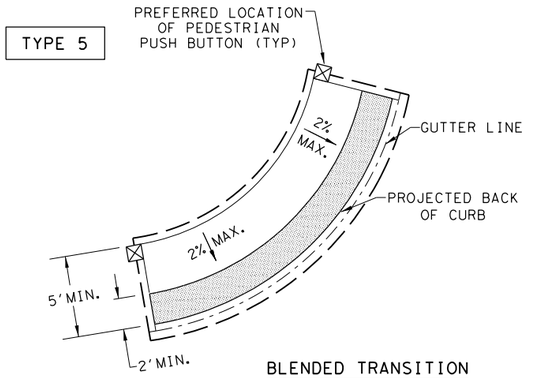


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

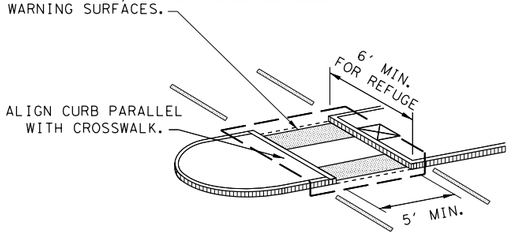
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

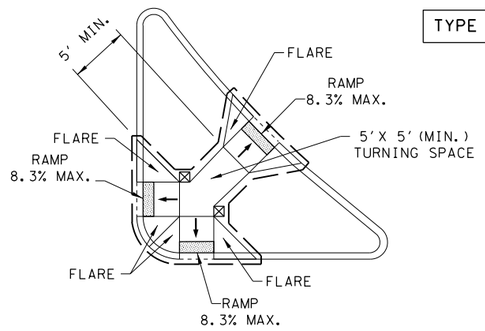
INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.

TYPE 21

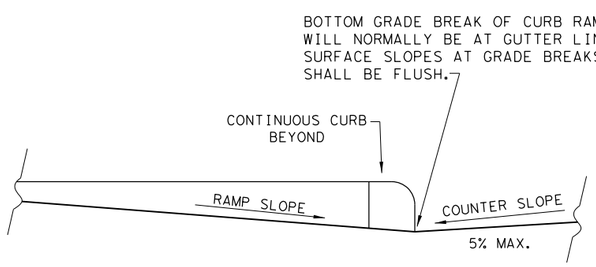


NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		42

DATE: 2/7/2025
FILE: P:\DESIGN_PROJECTS\Montgomery Road\4 - Design\Plan Set\3. Roadway\Set 3 - Phase 1D\Standards\ped18.dgn

GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
5. Turning Spaces shall be 5'x 5' minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicalble standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

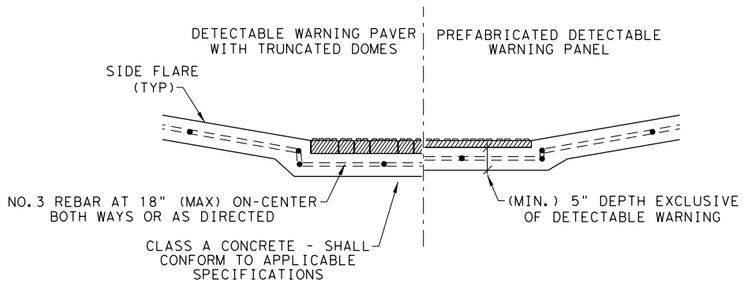
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

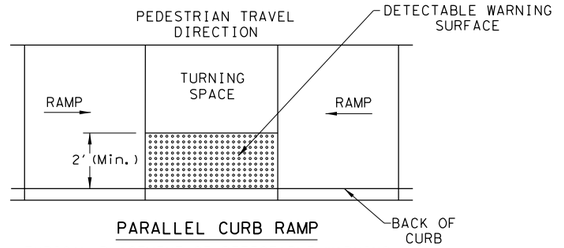
SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.



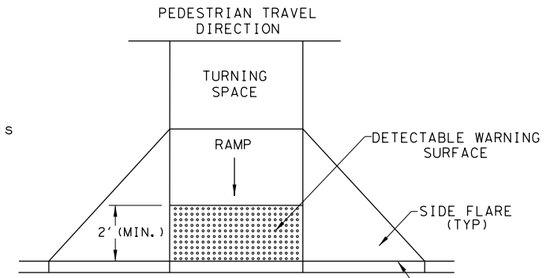
SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

DETECTABLE WARNING SURFACE DETAILS



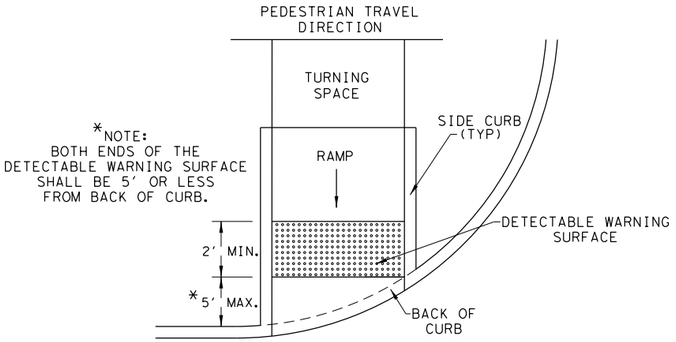
PARALLEL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.



PERPENDICULAR CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation

Design Division Standard

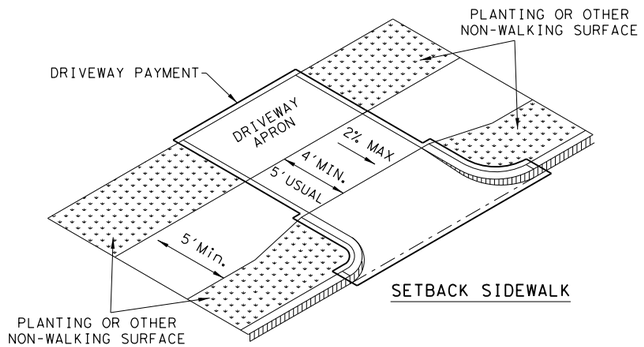
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

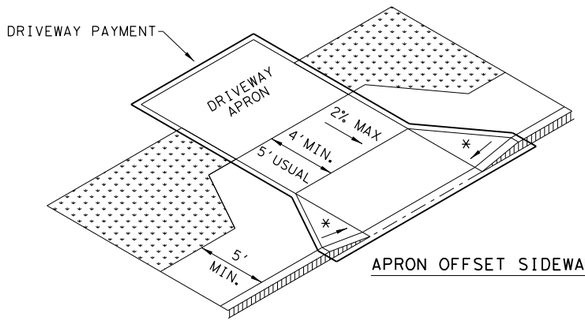
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		43

DATE: 2/7/2025
FILE: P:\DESIGN_PROJECTS\Montgomery Road\4 - Design\Plan Set\3. Roadway\Set 3 - Phase 1D\Standards\ped18.dgn

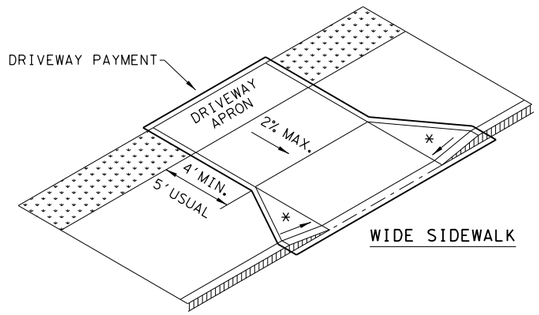
SIDEWALK TREATMENT AT DRIVEWAYS



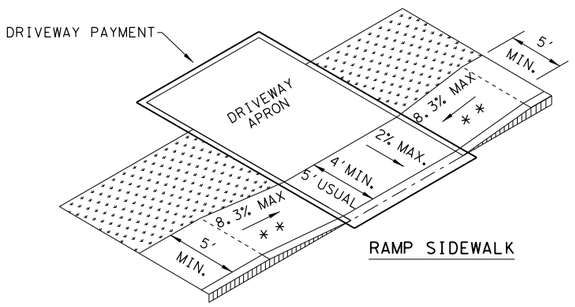
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

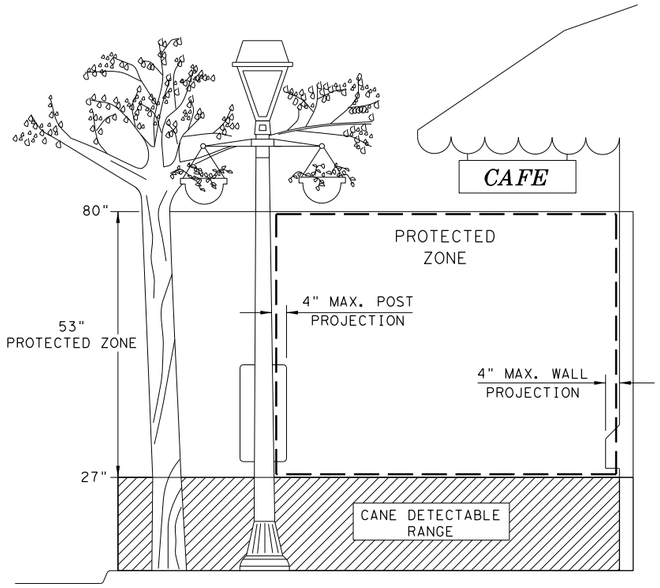


RAMP SIDEWALK

NOTES:

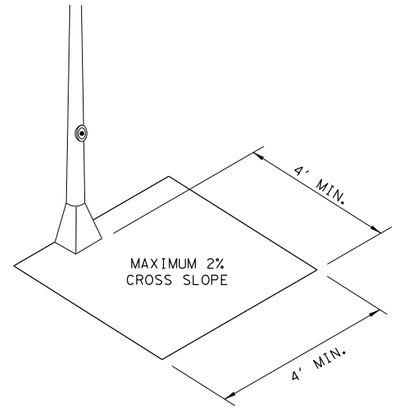
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

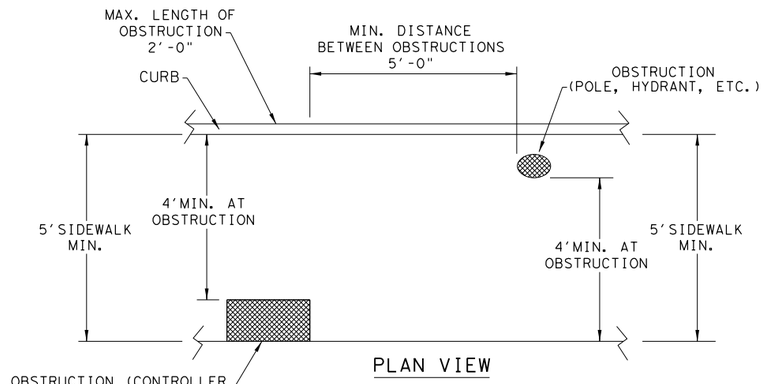


PROTECTED ZONE

NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



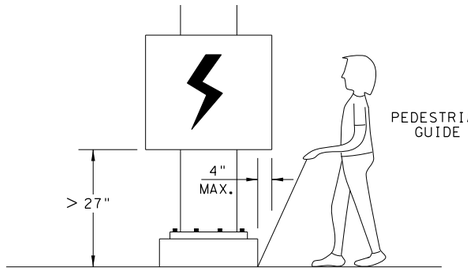
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



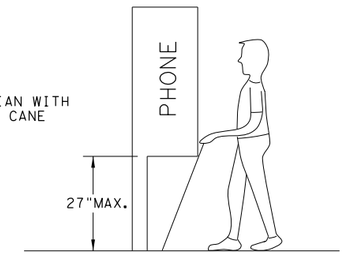
PLAN VIEW

PLACEMENT OF STREET FIXTURES

NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.



PROTRUDING OBJECTS OF A HEIGHT ≤ 27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

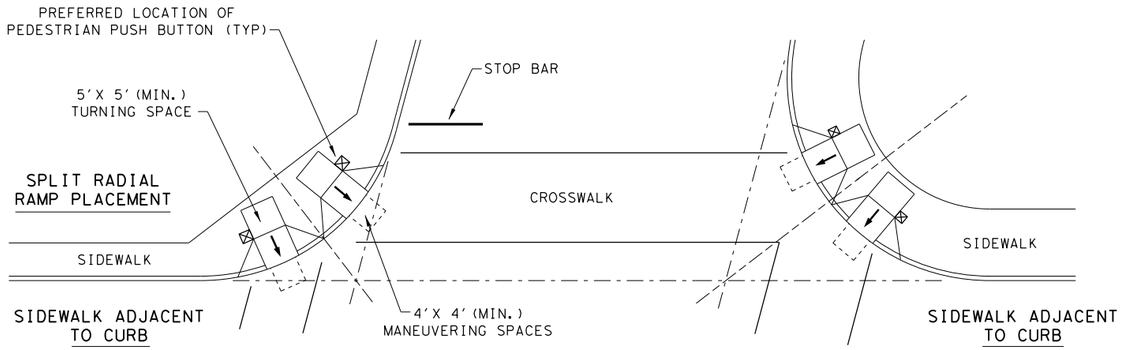
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		44

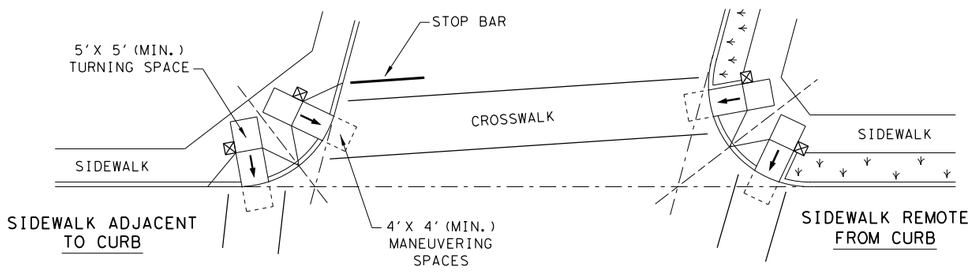
DATE: 2/7/2025
FILE: P:\DESIGN_PROJECTS\Montgomery Road\4 - Design\Plan Set\3. Roadway\Set 3 - Phase 1D\Standards\ped18.dgn

TYPICAL CROSSING LAYOUTS

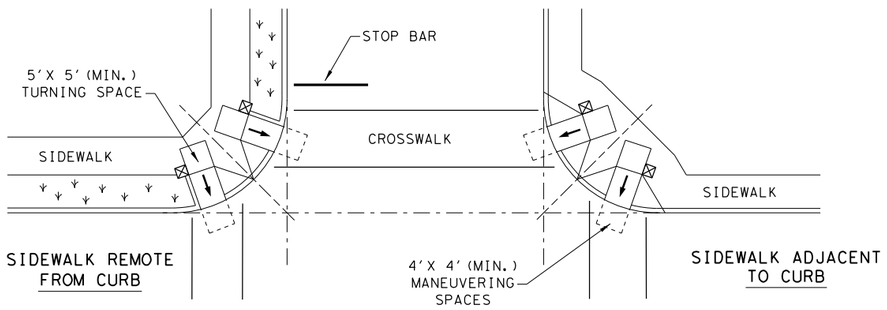
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



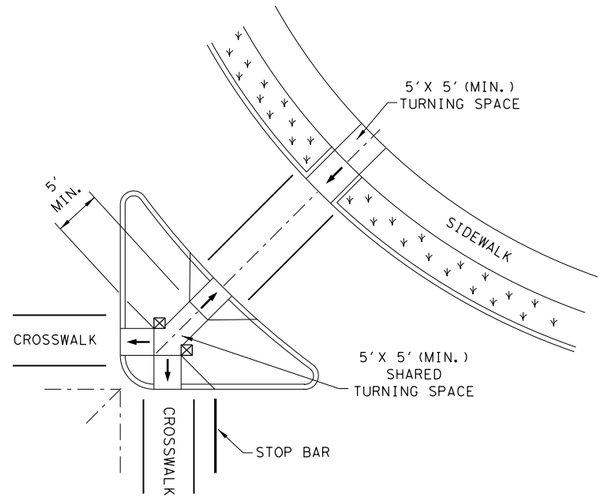
SKEWED INTERSECTION WITH "LARGE" RADIUS



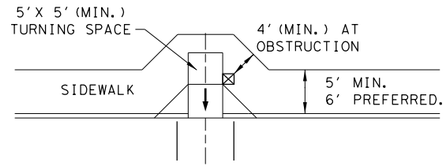
SKEWED INTERSECTION WITH "SMALL" RADIUS



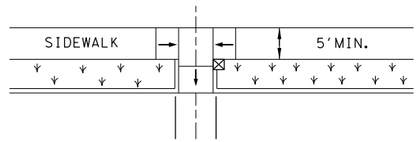
NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



SIDEWALK ADJACENT TO CURB



SIDEWALK REMOTE FROM CURB

MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ☒

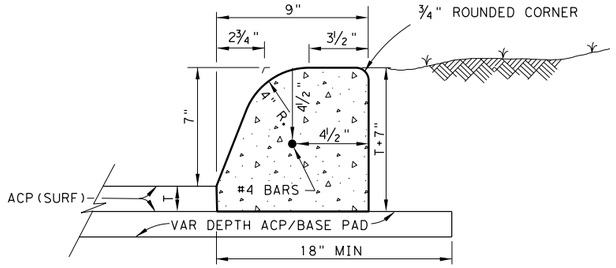
DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

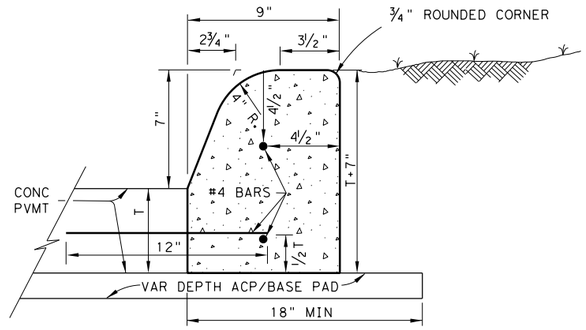
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS	-	-	-	-	
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.	
	SAT	BEXAR		45	



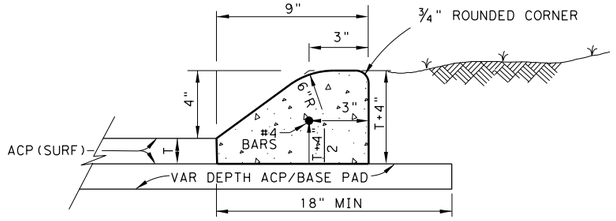
CONCRETE CURB (TYPE 1)

W/ ACP



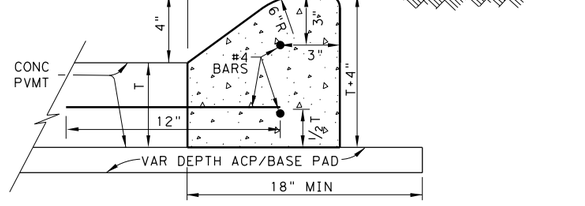
CONCRETE CURB (TYPE 1)

W/ CONC PAVEMENT



CONCRETE CURB (TYPE 2)

W/ ACP

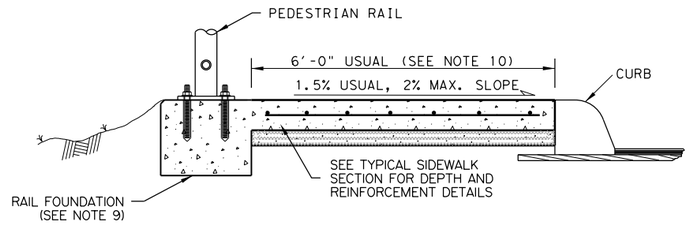


CONCRETE CURB (TYPE 2)

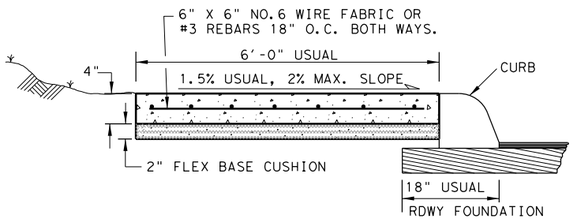
W/ CONC PAVEMENT

GENERAL NOTES:

1. CONCRETE CURB TYPE 1 AND 2 SHOWN SHALL MEET THE MINIMUM SPECIFICATION REQUIREMENTS OF CLASS "A" CONCRETE PER ITEM 529 AND 421.
2. ALL REINFORCING STEEL SHALL BE GRADE 60
3. WHERE CONCRETE CURB IS PLACED ON EXISTING CONCRETE PAVEMENT, THE PAVEMENT SHALL BE DRILLED AND THE REINFORCING BARS GROUTED IN PLACE.
4. EXPANSION AND CONTRACTION JOINTS SHALL BE CONSTRUCTED TO MATCH PAVEMENT JOINTS IN ALL CURBS AND CURB AND GUTTER ADJACENT TO JOINTED CONCRETE PAVEMENT. WHERE PLACEMENT OF CURB OR CURB AND GUTTER IS NOT ADJACENT TO CONCRETE PAVEMENT, EXPANSION JOINTS SHALL BE PROVIDED AT STRUCTURES, CURB RETURNS AT STREETS, AND AT LOCATIONS DIRECTED BY THE ENGINEER.
5. VERTICAL AND HORIZONTAL DOWEL BARS AND TRANSVERSE REINFORCING BARS SHALL BE PLACED AT 4 FEET C-C, UNLESS OTHERWISE SHOWN.
6. ONE-HALF INCH EXPANSION JOINT MATERIAL SHALL BE PROVIDED WHERE CURB OR CURB AND GUTTER IS ADJACENT TO SIDEWALK OR RIPRAP. THIS IS SUBSIDIARY TO THE CURB, ITEM 529.
7. LAYDOWN CURB AT DRIVEWAYS WILL BE PAID AS SUBSIDIARY TO ITEM 530.
8. FOR SIDEWALK DETAILS AT DRIVEWAYS, SEE SAN ANTONIO DISTRICT STANDARD "DRIVEWAY DETAILS".
9. SEE PEDESTRIAN HANDRAIL DETAILS STANDARD "PRD" FOR MORE INFORMATION. CONCRETE RAIL FOUNDATION TO BE POURED WITH THE SIDEWALK BUT PAYMENT IS SUBSIDIARY TO ITEM 450 "RAILING".
10. CLEAR SIDEWALK WIDTH EXCLUDING THE PEDESTRIAN RAIL FOUNDATION SHALL BE 6' UNLESS OTHERWISE SPECIFIED IN THE PLANS

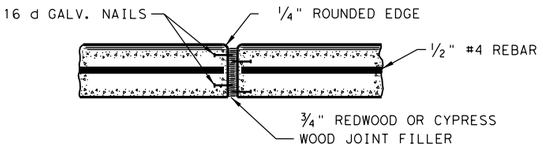


TYPICAL SIDEWALK SECTION WITH PEDESTRIAN RAIL



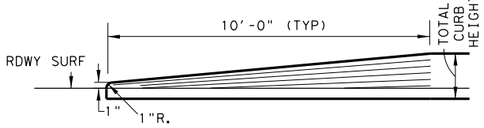
TYPICAL SIDEWALK SECTION

GROOVED JOINTS IN THE SIDE WALK SHALL BE AT A MAX. SPACING OF 10 FT. AND SHALL HAVE 3/4" EXPANSION JOINTS AT A MAX. SPACING OF 60' AND TO COINSIDE WITH THE CURB EXP. JOINTS.



TYPICAL CURB EXPANSION JOINT DETAIL

EXPANSION JOINTS TO BE PLACED AT BEGINNING AND END OF CURVES, DRIVEWAYS WHEELCHAIR RAMPS, INLETS, ILLUMINATION/ SIGNAL FOUNDATIONS AND OTHER FIXED OBJECTS.



TRANSITION FOR CONCRETE CURB ENDS

SEE CURB DETAIL FOR REINFORCEMENT

Texas Department of Transportation
San Antonio District

MISCELLANEOUS CURB AND SIDEWALK DETAILS

San Antonio District Standard
Sheet (1 of 2)

T:\Engdata\Standards\MiscCurbdetails.dgn

ORIGINAL DRAWING DATE:

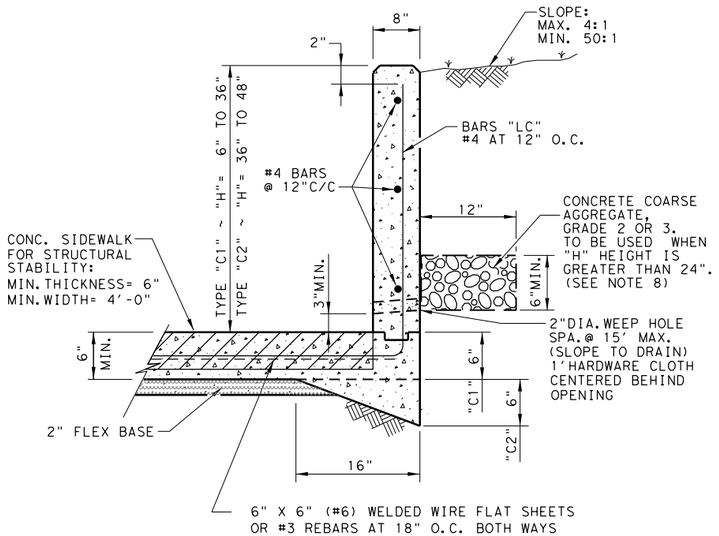
REVISIONS
09-01-08
10-10-17 sidewalk width equals 6' usual
07-22-20 9" curb + curb w/ conc pvmt det.
- -

PREPARED BY AND FOR USE OF TxDoT.

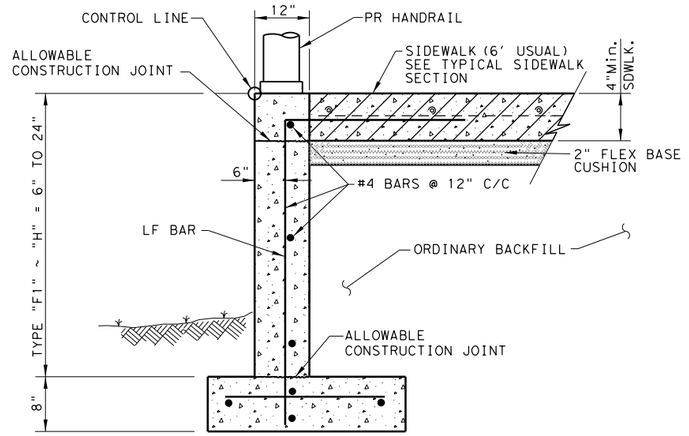
STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #	SHEET
SAT	6		46

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
BEXAR	-	-	-	

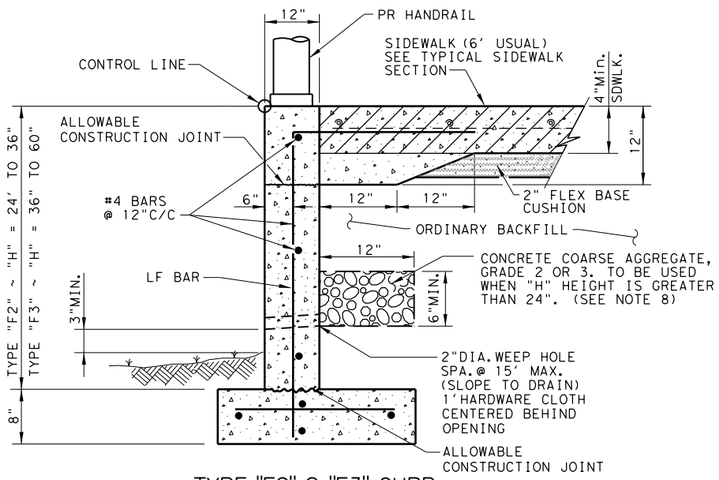
P:\DESIGN\PROJECTS\Montgomery Road\4 - Design\Plan Set\3. Roadway\Set 3 - Phase 1\Standards\misccurbdetails.dgn 7/2025 11:20:19 AM



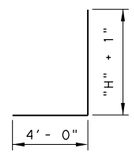
TYPE "C1" & "C2" CURB



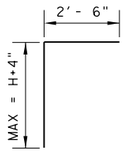
TYPE "F1" CURB



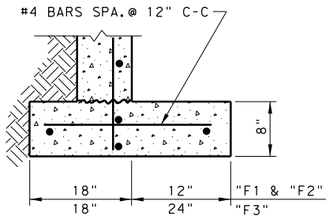
TYPE "F2" & "F3" CURB



BAR "LC"



BAR "LF"



FOOTING DETAIL

CLASS C CONCRETE PAID UNDER ITEM 531, SIDEWALK. (NOTE. ADDITIONAL CONCRETE TO MEET THE THICKENED SECTIONS REQUIRED BY THESE DETAILS IS SUBSIDIARY TO ITEM 531, CURB.)

GENERAL NOTES:

1. CONCRETE FOR CURB TYPE F AND C SHOWN SHALL MEET THE MINIMUM SPECIFICATION REQUIREMENTS OF CLASS "C" CONCRETE PER ITEM 421
2. ALL REINFORCING STEEL SHALL BE GRADE 60
3. EXPANSION AND CONTRACTION JOINTS SHALL BE CONSTRUCTED TO MATCH PAVEMENT JOINITS IN ALL CURBS AND CURB AND GUTTER ADJACENT TO JOINTED CONCRETE PAVEMENT. WHERE PLACEMENT OF CURB OR CURB AND GUTTER IS NOT ADJACENT TO CONCRETE PAVEMENT, EXPANSION JOINTS SHALL BE PROVIDED AT STRUCTURES, CURB RETURNS AT STREETS, AND AT LOCATIONS DIRECTED BY THE ENGINEER.
4. VERTICAL AND HORIZONTAL DOWEL BARS AND TRANSVERSE REINFORCING BARS SHALL BE PLACED AT 4 FEET C-C, UNLESS OTHERWISE SHOWN.
5. UNTIL THE SIDEWALK IS COMPLETE, LATERAL SUPPORT FOR THE "F" CURBS WILL BE REQUIRED.
6. IF AGGREGATE IS REQUIRED PER THE DETAIL, IT IS PAID AS SUBSIDIARY TO THE CURB, ITEM 529.

DESIGN SOIL PARAMETERS:
Soil Unit Wt. = 120 pcf
Phi = 30 Degrees
Cohesion = 50 psf
Min. PI = 15
Max. PI = 30
SURCHARGE:
TYPE F CURB q = 2' Adjacent to sidewalk
Max. slope behind TYPE C Curb = 4:1
Min. Factor of Safety against sliding is 1.5.
Designed in accordance with current AASHTO Standards and Interim Specifications.

Texas Department of Transportation
San Antonio District

MISCELLANEOUS CURB AND SIDEWALK DETAILS

San Antonio District Standard
Sheet (2 of 2)

T:Engdata/Standards/MiscCurbdetails.dgn

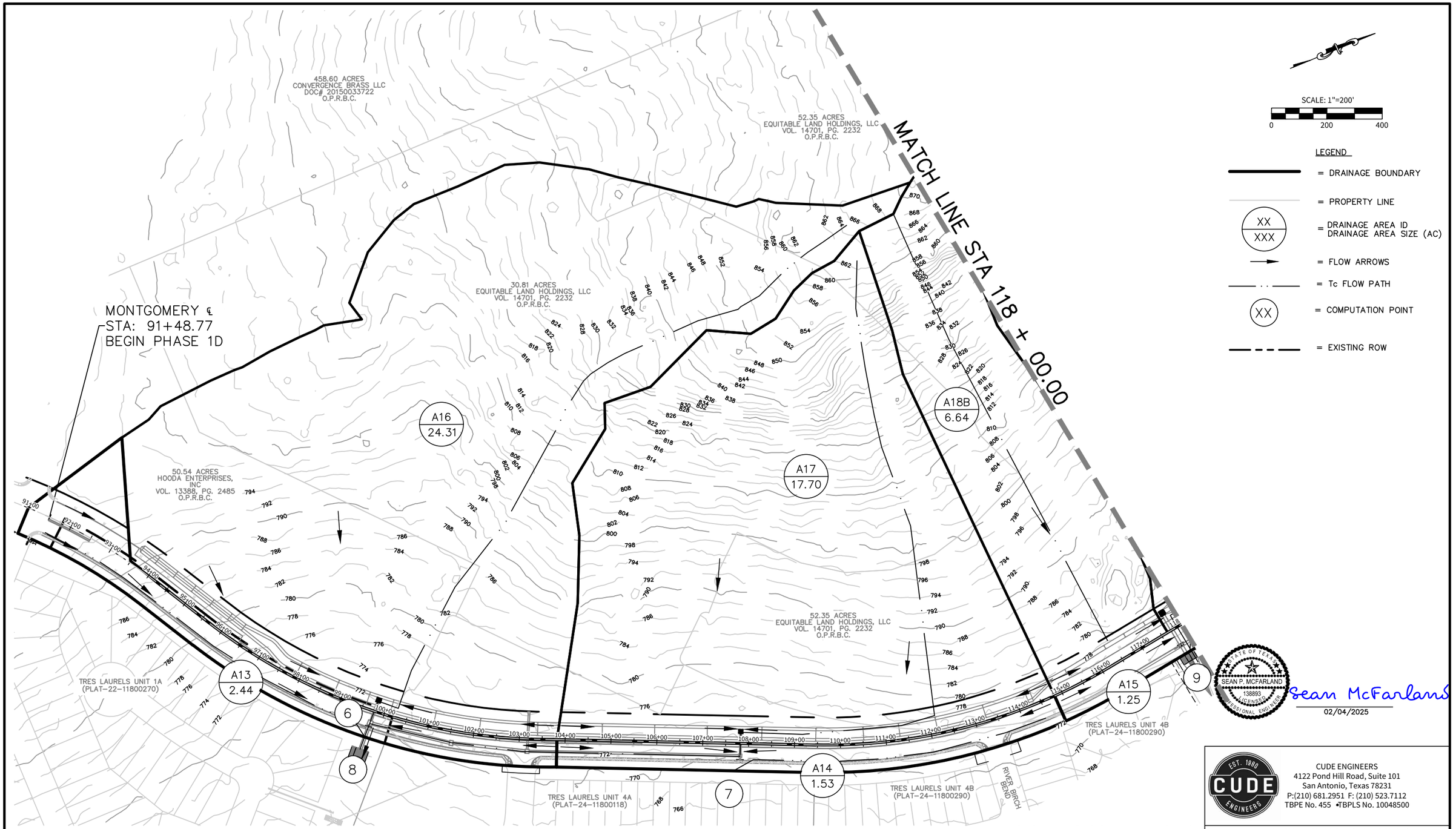
PREPARED BY AND FOR USE OF TxDoT.

ORIGINAL DRAWING DATE:

REVISIONS
09-01-08
10-10-17 sidewalk width equals 6' usual
07-22-20 9" curb + curb w/ conc pvmt det.
- -

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #	SHEET
SAT	6		47

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
BEXAR	-	-	-	



SCALE: 1"=200'

0 200 400

LEGEND

= DRAINAGE BOUNDARY

= PROPERTY LINE

XX / XXX = DRAINAGE AREA ID / DRAINAGE AREA SIZE (AC)

= FLOW ARROWS

= Tc FLOW PATH

XX = COMPUTATION POINT

= EXISTING ROW

STATE OF TEXAS
SEAN P. MCFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

Sean McFarland
02/04/2025

CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
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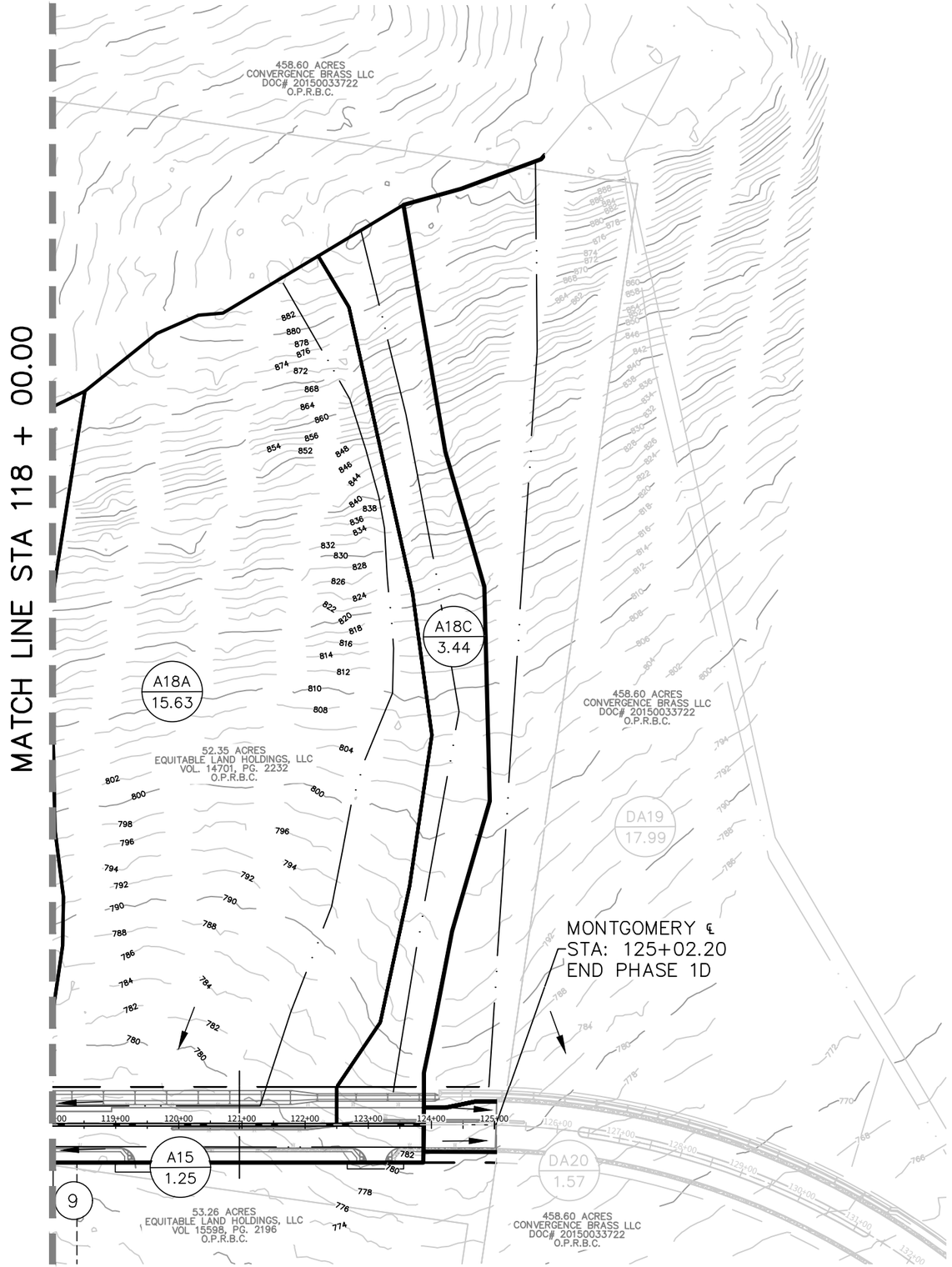
TBPE No. 455 ◂TBPLS No. 10048500

WT MONTGOMERY ROAD
OVERALL DRAINAGE MAPS

SCALE: HOR:1" =200'

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.			SHEET
6	03050.104			48
STATE	DIST.	COUNTY		
TEXAS	SAT	BEXAR		
CONT.	SECT.	JOB	ROADWAY	
–	–	–	WT MONTGOMERY RD	



SCALE: 1"=200'

0 200 400

LEGEND

= DRAINAGE BOUNDARY

= PROPERTY LINE

XX / XXX = DRAINAGE AREA ID / DRAINAGE AREA SIZE (AC)

= FLOW ARROWS

= Tc FLOW PATH

XX = COMPUTATION POINT

= EXISTING ROW

STATE OF TEXAS
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TBPE No. 455 •TBPLS No. 10048500

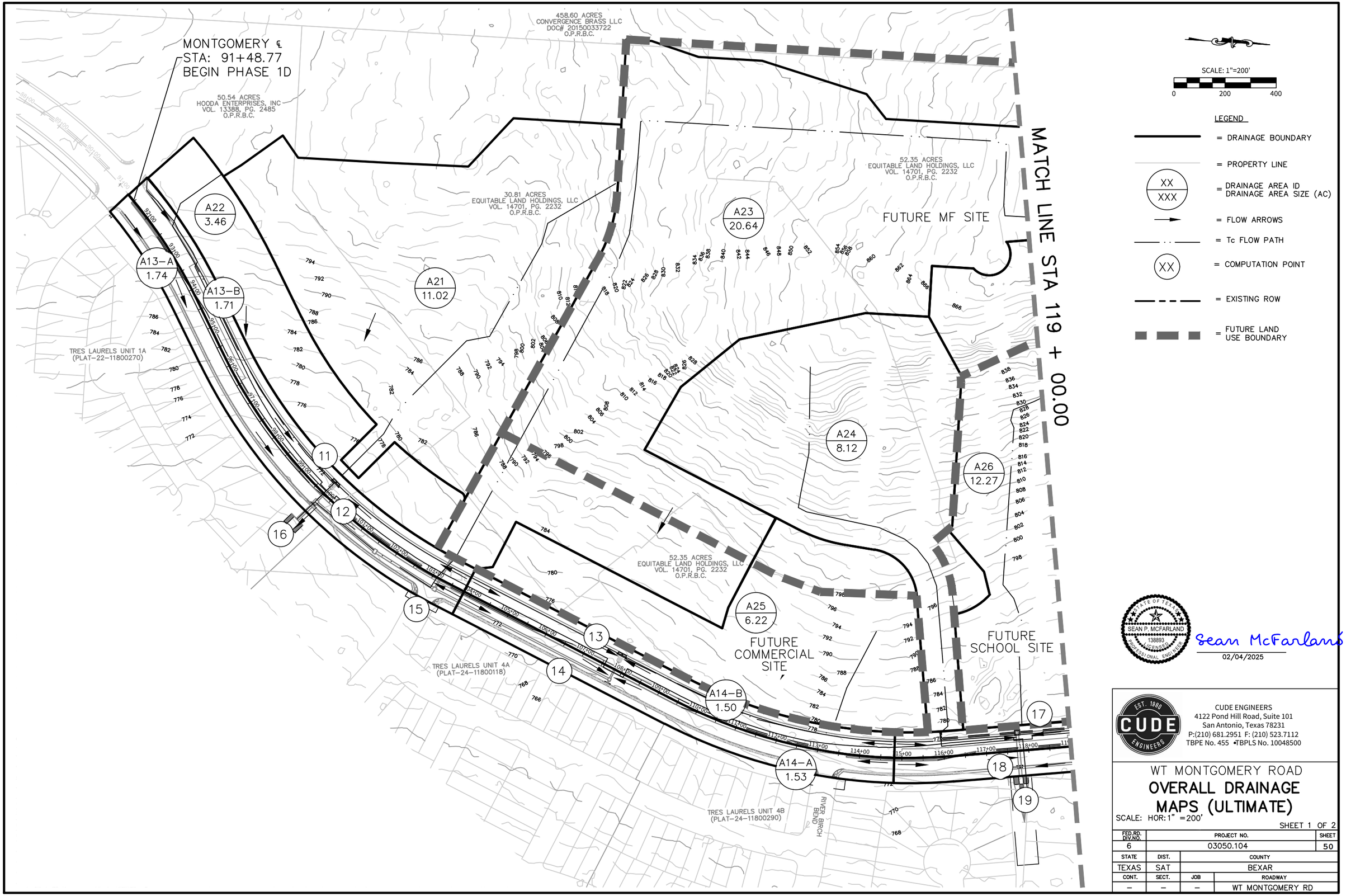
WT MONTGOMERY ROAD

OVERALL DRAINAGE MAPS

SCALE: HOR: 1" =200'

SHEET 2 OF 2

FED. RD. DIV.NO.	PROJECT NO.		SHEET
6	03050.104		49
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



SCALE: 1"=200'

0 200 400

LEGEND

- = DRAINAGE BOUNDARY
- = PROPERTY LINE
- XX / XXX = DRAINAGE AREA ID / DRAINAGE AREA SIZE (AC)
- = FLOW ARROWS
- = Tc FLOW PATH
- XX = COMPUTATION POINT
- = EXISTING ROW
- = FUTURE LAND USE BOUNDARY

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WT MONTGOMERY ROAD

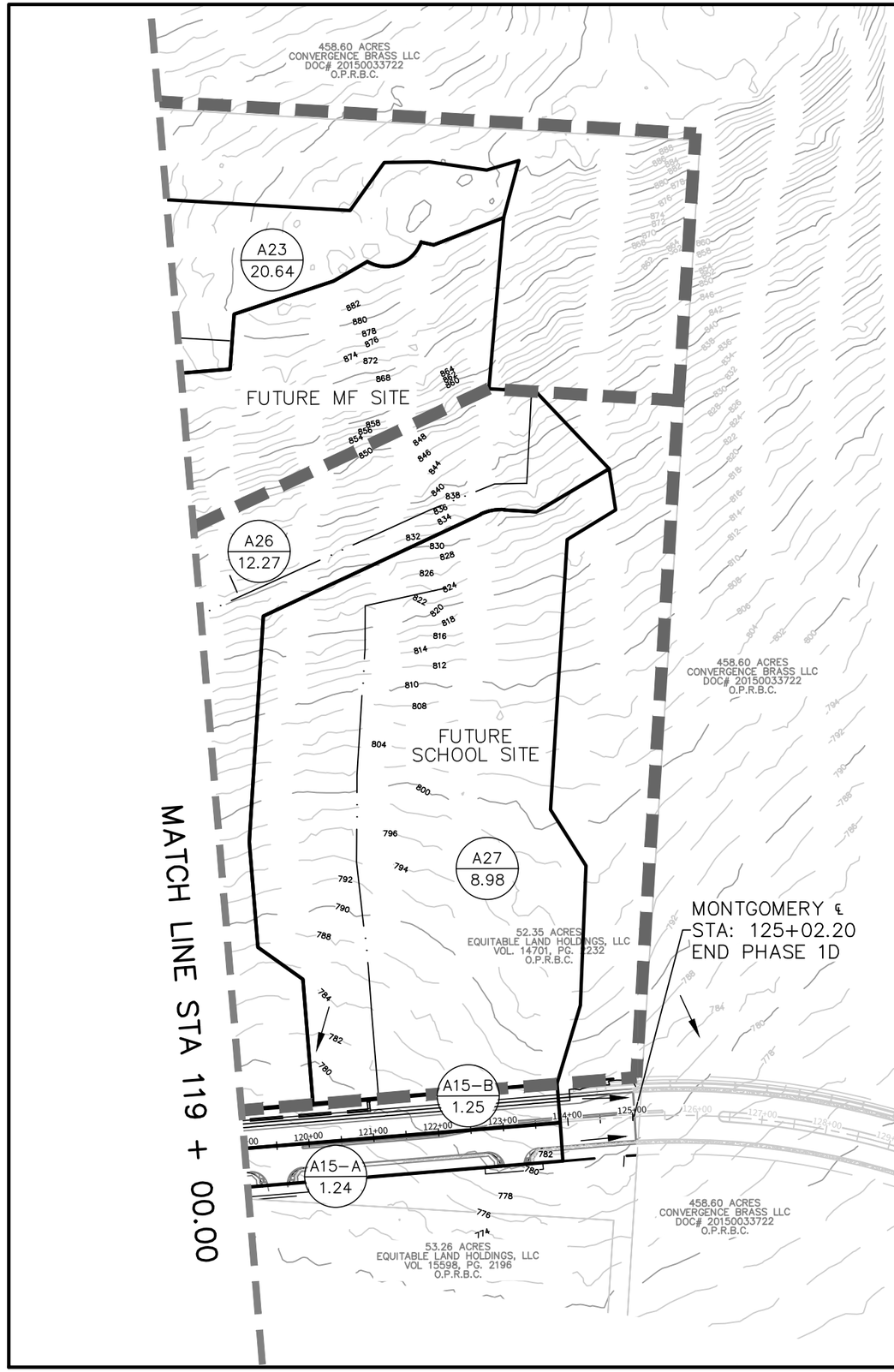
OVERALL DRAINAGE MAPS (ULTIMATE)

SCALE: HOR: 1" = 200'

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	50

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



SCALE: 1"=200'

0 200 400

LEGEND

= DRAINAGE BOUNDARY

= PROPERTY LINE

XX / XXX = DRAINAGE AREA ID / DRAINAGE AREA SIZE (AC)

= FLOW ARROWS

= Tc FLOW PATH

XX = COMPUTATION POINT

= EXISTING ROW

= FUTURE LAND USE BOUNDARY

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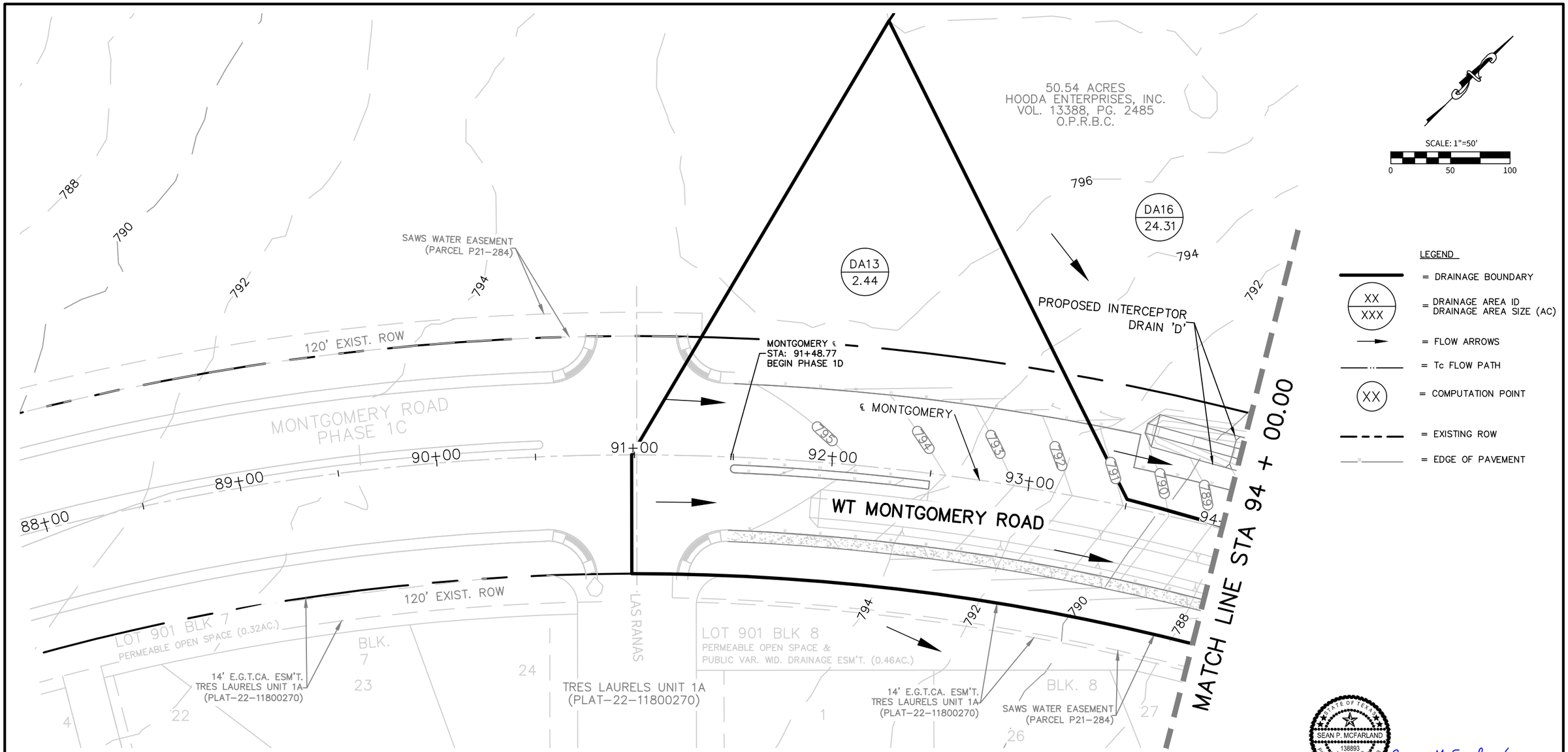
WT MONTGOMERY ROAD
OVERALL DRAINAGE MAPS (ULTIMATE)

SCALE: HOR:1" =200'

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	03050.104		51
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



FLOW CALCULATIONS (RATIONAL METHOD)									
				10 YEAR *		25 YEAR		100 YEAR	
DRAINAGE AREA	Tc (min)	C VALUE	AREA (Ac.)	I (in/hr)	Q (cfs)	I (in/hr)	Q (cfs)	I (in/hr)	Q (cfs)
DA13	5.00	0.95	2.44	9.06	21.00	10.83	25.10	13.54	31.39
DA16	22.00	0.55	24.31	4.97	66.45	5.91	79.02	7.34	98.14
*DESIGN STORM									

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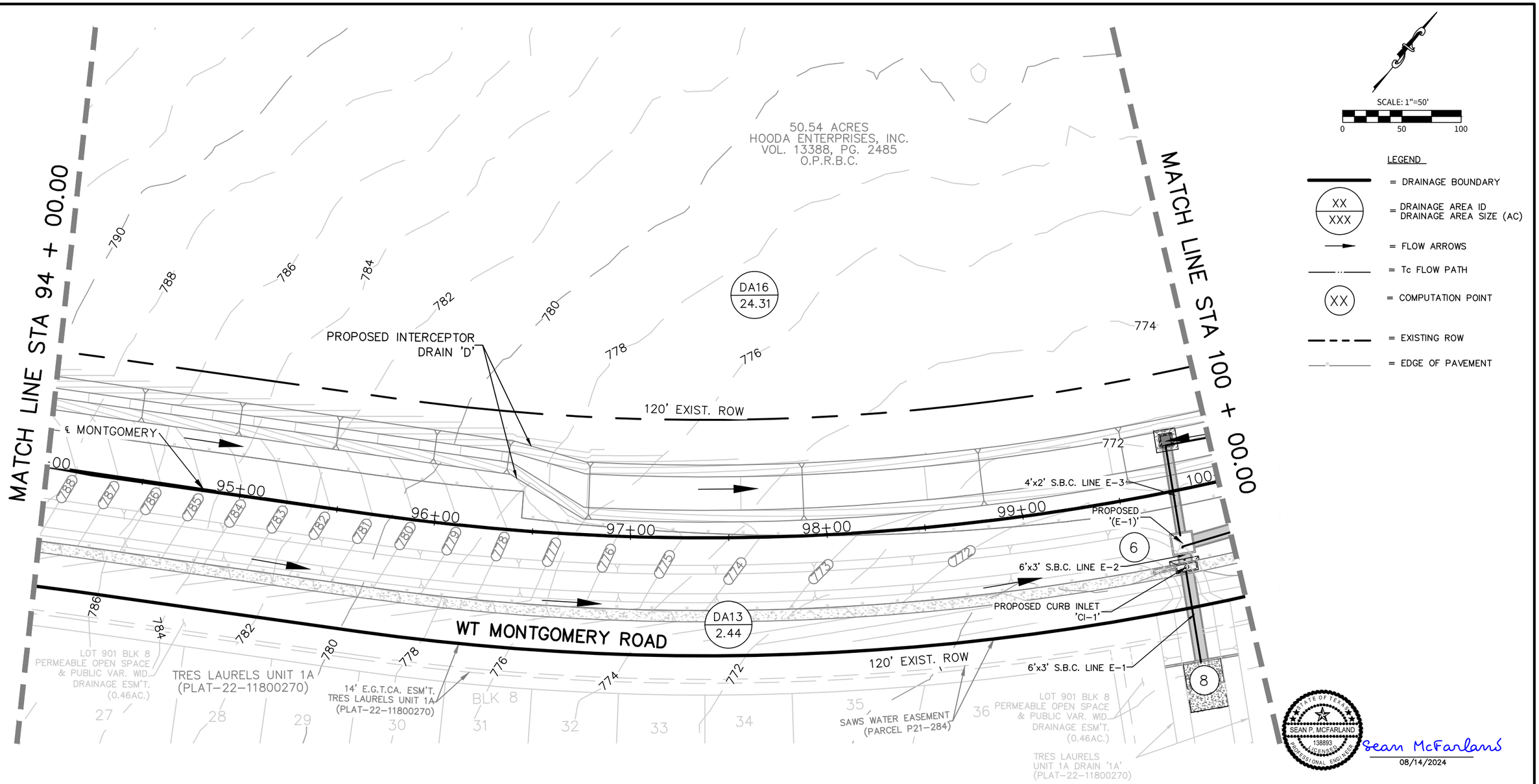
WT MONTGOMERY ROAD
SYSTEM DRAINAGE MAPS
STA 88+00.00 to STA 94+00.00

SCALE: HOR:1" = 50'

SHEET 1 OF 7

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	03050.104		52
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



FLOW CALCULATIONS (RATIONAL METHOD)									
				10 YEAR *		25 YEAR		100 YEAR	
DRAINAGE AREA	Tc (min)	C VALUE	AREA (Ac.)	I (in/hr)	Q (cfs)	I (in/hr)	Q (cfs)	I (in/hr)	Q (cfs)
DA13	5.00	0.95	2.44	9.06	21.00	10.83	25.10	13.54	31.39
DA16	21.00	0.55	24.31	4.97	66.45	5.91	79.02	7.34	98.14
6	22.00	0.59	26.75	4.97	66.45	5.91	79.02	7.34	115.15
8	21.00	0.58	45.98	5.09	136.80	6.05	162.61	7.52	202.12
*DESIGN STORM									

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WT MONTGOMERY ROAD

SYSTEM DRAINAGE MAPS

STA 94+00.00 to STA 100+00.00

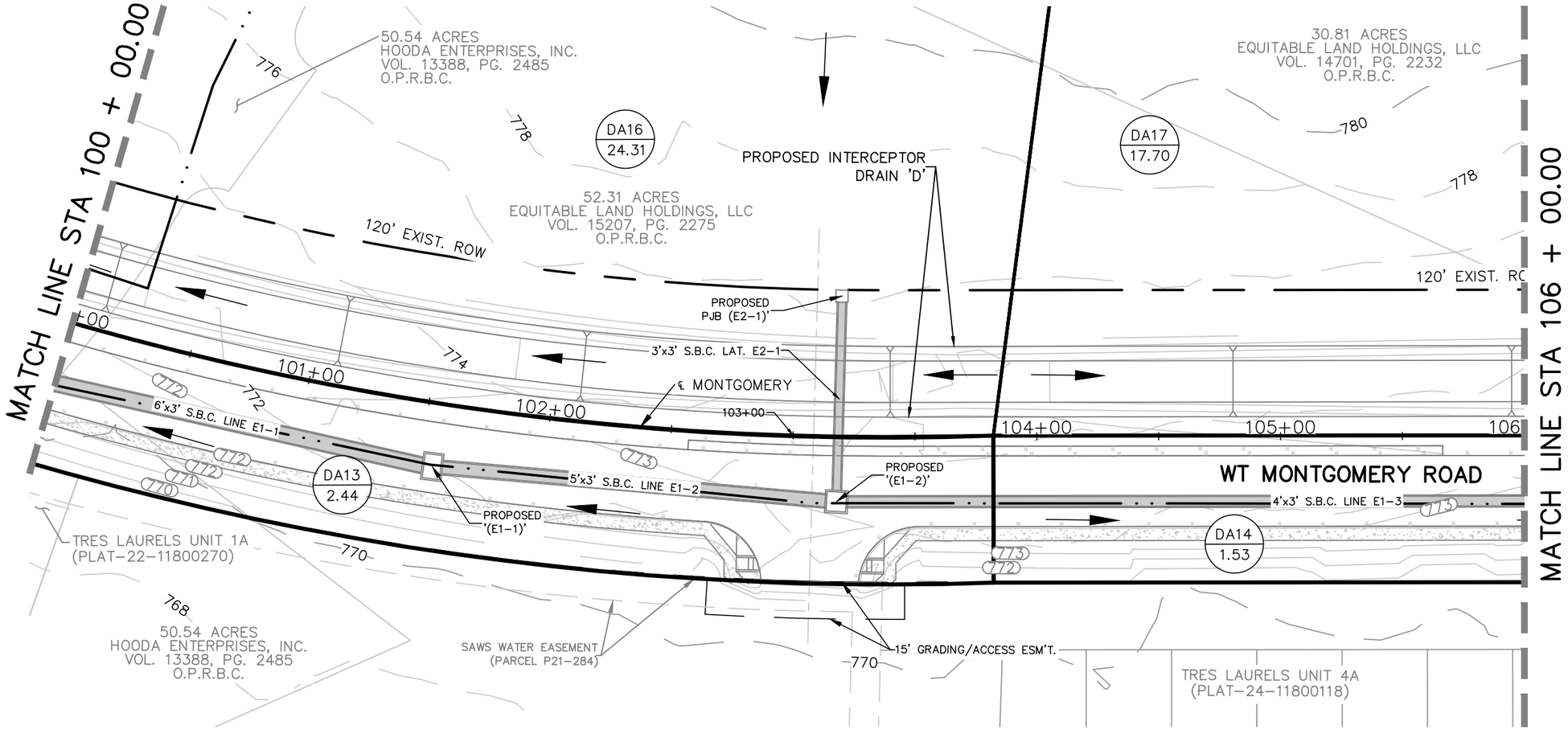
SCALE: HOR:1" = 50'

SHEET 2 OF 7

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	53

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



SCALE: 1"=50'

0 50 100

LEGEND

= DRAINAGE BOUNDARY

XX / XXX = DRAINAGE AREA ID / DRAINAGE AREA SIZE (AC)

= FLOW ARROWS

= Tc FLOW PATH

XX = COMPUTATION POINT

= EXISTING ROW

= EDGE OF PAVEMENT

FLOW CALCULATIONS (RATIONAL METHOD)

				10 YEAR *		25 YEAR		100 YEAR	
DRAINAGE AREA	Tc (min)	C VALUE	AREA (Ac.)	I (in/hr)	Q (cfs)	I (in/hr)	Q (cfs)	I (in/hr)	Q (cfs)
DA13	5.00	0.95	2.44	9.06	21.00	10.83	25.10	13.54	31.39
DA14	5.00	0.95	1.53	9.06	13.17	10.83	15.74	13.54	19.68
DA16	21.00	0.55	24.31	4.97	66.45	5.91	79.02	7.34	98.14
DA17	18.00	0.55	17.70	5.51	53.64	6.56	63.86	8.16	91.30

*DESIGN STORM

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WT MONTGOMERY ROAD

SYSTEM DRAINAGE MAPS

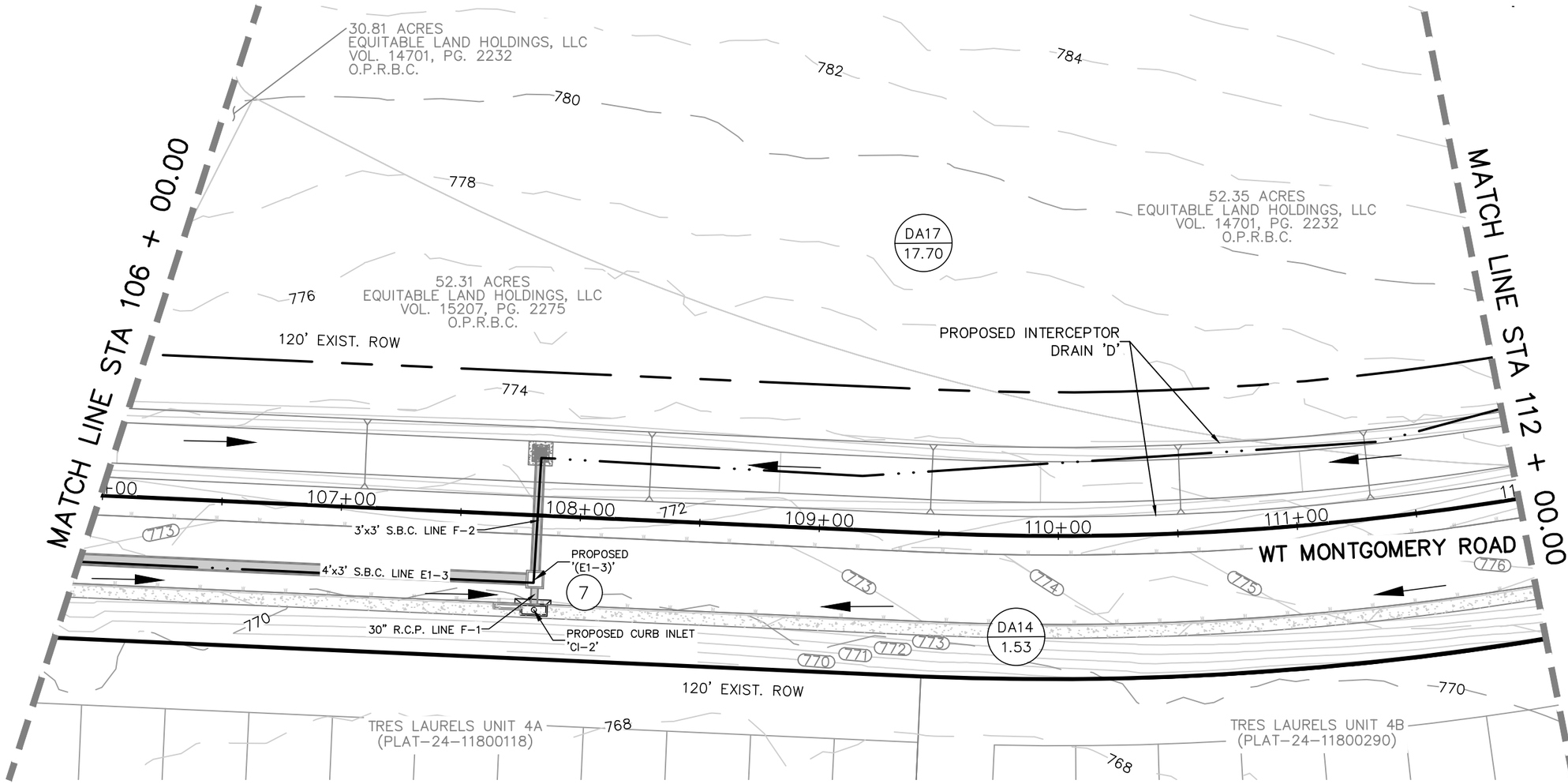
STA 100+00.00 to STA 106+00.00

SCALE: HOR:1" = 50'

SHEET 3 OF 7

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	54

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



SCALE: 1"=50'

0 50 100

LEGEND

= DRAINAGE BOUNDARY

XX / XXX = DRAINAGE AREA ID / DRAINAGE AREA SIZE (AC)

= FLOW ARROWS

= Tc FLOW PATH

XX = COMPUTATION POINT

= EXISTING ROW

= EDGE OF PAVEMENT

FLOW CALCULATIONS (RATIONAL METHOD)									
				10 YEAR *		25 YEAR		100 YEAR	
DRAINAGE AREA	Tc (min)	C VALUE	AREA (Ac.)	I (in/hr)	Q (cfs)	I (in/hr)	Q (cfs)	I (in/hr)	Q (cfs)
DA14	5.00	0.95	1.53	9.06	13.17	10.83	15.74	13.54	19.68
DA17	18.00	0.55	17.70	5.51	53.64	6.56	63.86	8.16	91.30
7	18.00	0.58	19.23	5.51	61.65	6.56	73.40	8.16	91.30
*DESIGN STORM									

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WT MONTGOMERY ROAD

SYSTEM DRAINAGE MAPS

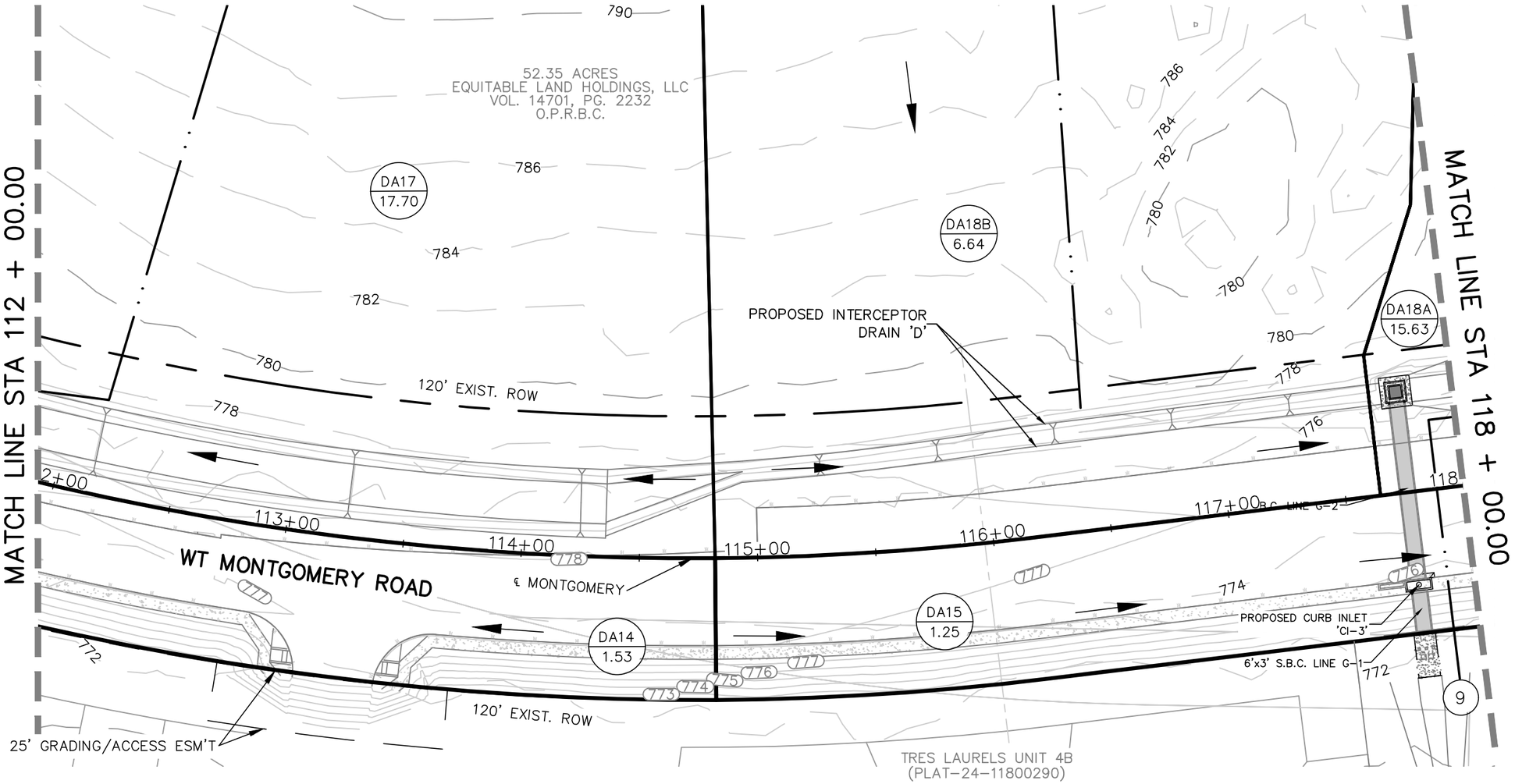
STA 106+00.00 to STA 112+00.00

SCALE: HOR:1" = 50'

SHEET 4 OF 7

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	55

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



SCALE: 1"=50'

0 50 100

LEGEND

- = DRAINAGE BOUNDARY
- XX / XXX = DRAINAGE AREA ID / DRAINAGE AREA SIZE (AC)
- = FLOW ARROWS
- = Tc FLOW PATH
- XX = COMPUTATION POINT
- = EXISTING ROW
- = EDGE OF PAVEMENT

FLOW CALCULATIONS (RATIONAL METHOD)

DRAINAGE AREA	Tc (min)	C VALUE	AREA (Ac.)	10 YEAR * I (in/hr)	10 YEAR * Q (cfs)	25 YEAR I (in/hr)	25 YEAR Q (cfs)	100 YEAR I (in/hr)	100 YEAR Q (cfs)
DA14	5.00	0.95	1.53	9.06	13.17	10.83	15.74	13.54	19.68
DA15	5.00	0.95	1.25	9.06	10.76	10.83	12.86	13.54	16.08
DA17	18.00	0.55	17.70	5.51	53.64	6.56	63.86	8.16	91.30
DA18A	19.00	0.55	15.63	5.36	46.08	6.37	54.76	7.93	68.17
DA18B	17.00	0.55	6.64	5.68	20.74	6.76	24.69	8.42	30.75
9	19.00	0.58	16.88	5.36	52.44	6.37	62.32	7.93	77.59

*DESIGN STORM

STATE OF TEXAS
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WT MONTGOMERY ROAD

SYSTEM DRAINAGE MAPS

STA 112+00.00 to STA 118+00.00

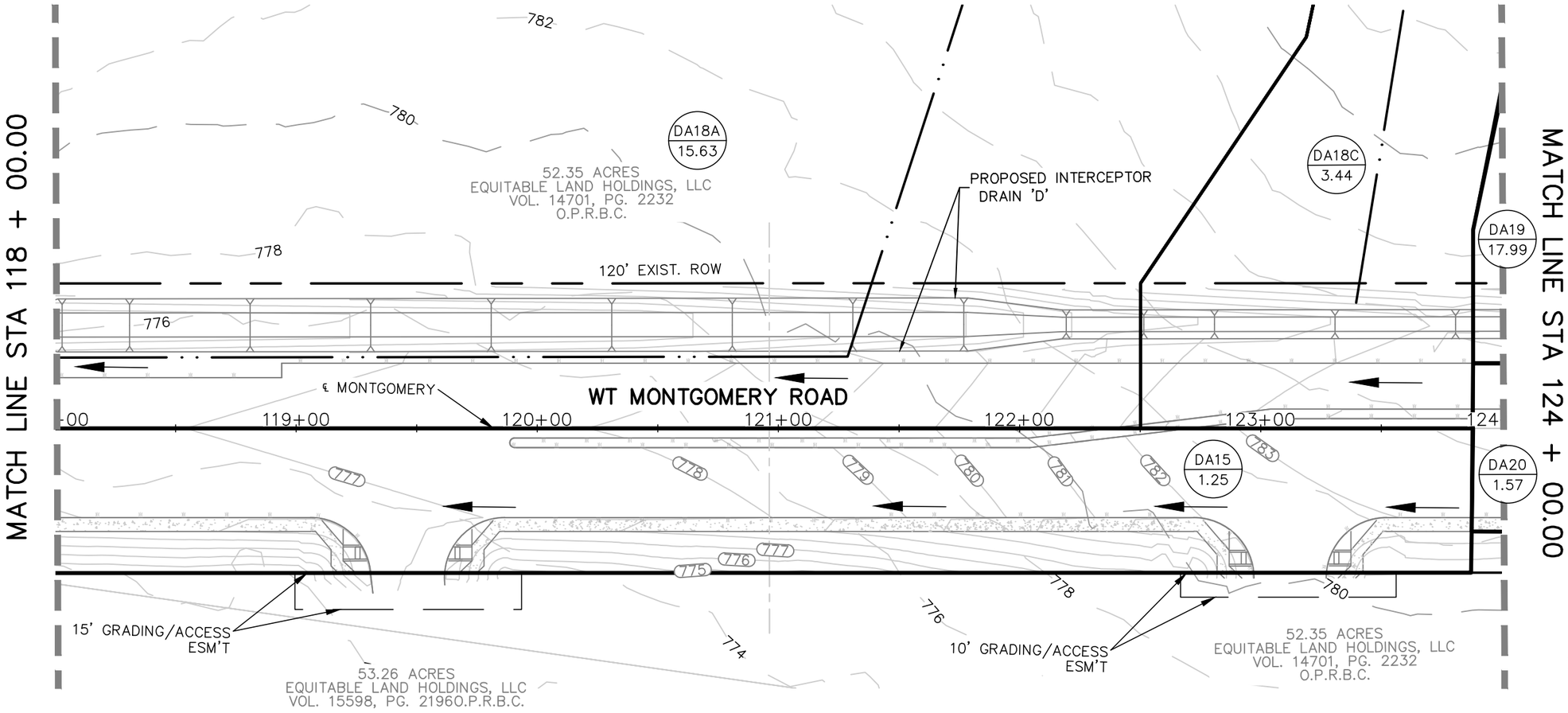
SCALE: HOR:1" = 50'

SHEET 5 OF 7

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	56

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



SCALE: 1"=50'

0 50 100

LEGEND

= DRAINAGE BOUNDARY

XX / XXX = DRAINAGE AREA ID / DRAINAGE AREA SIZE (AC)

= FLOW ARROWS

= Tc FLOW PATH

XX = COMPUTATION POINT

= EXISTING ROW

= EDGE OF PAVEMENT

STATE OF TEXAS
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Sean McFarland

08/14/2024

FLOW CALCULATIONS (RATIONAL METHOD)

				10 YEAR *		25 YEAR		100 YEAR	
DRAINAGE AREA	Tc (min)	C VALUE	AREA (Ac.)	I (in/hr)	Q (cfs)	I (in/hr)	Q (cfs)	I (in/hr)	Q (cfs)
DA15	5.00	0.95	1.25	9.06	10.76	10.83	12.86	13.54	16.08
DA18A	19.00	0.55	15.63	5.36	46.08	6.37	54.76	7.93	68.17
DA18C	18.00	0.55	3.44	5.51	10.42	6.56	12.41	8.16	15.44
DA19	22.00	0.80	17.99	4.97	71.53	5.91	85.06	7.34	105.64
DA20	5.00	0.95	1.57	9.06	13.51	10.83	16.15	13.54	20.19

*DESIGN STORM

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WT MONTGOMERY ROAD

SYSTEM DRAINAGE MAPS

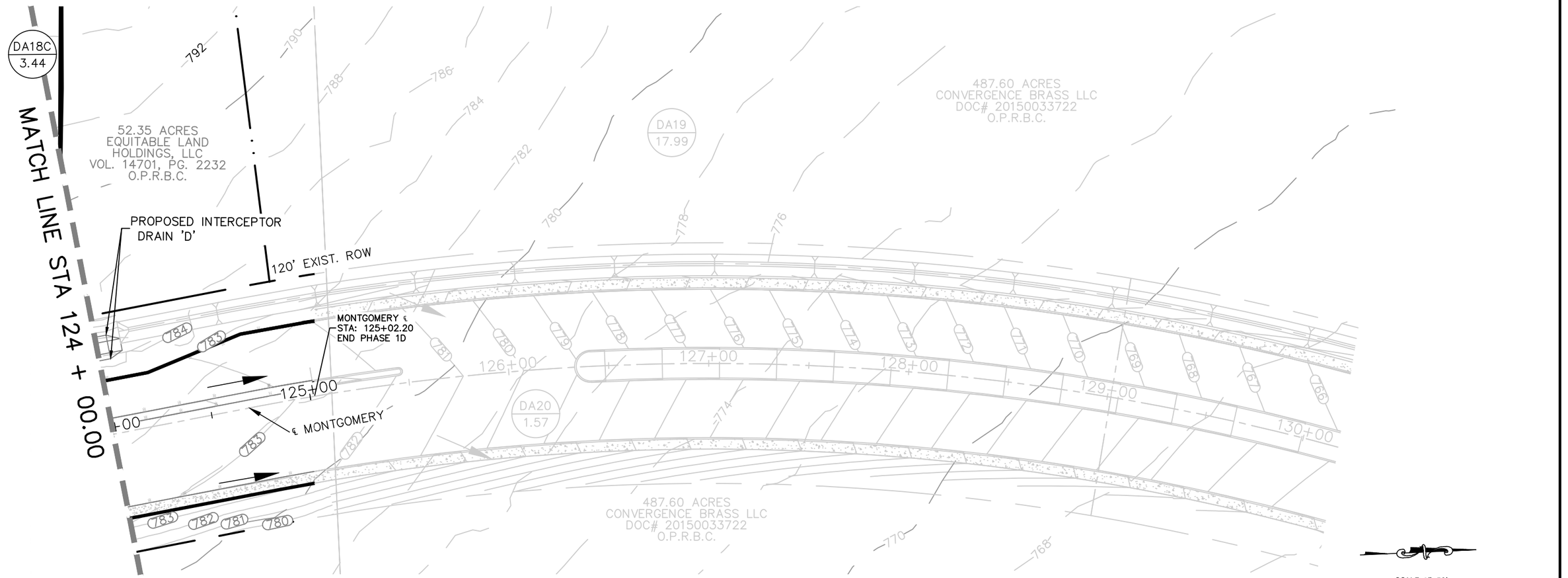
STA 118+00.00 to STA 124+00.00

SCALE: HOR:1" = 50'

SHEET 6 OF 7

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	57

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



FLOW CALCULATIONS (RATIONAL METHOD)									
				10 YEAR *		25 YEAR		100 YEAR	
DRAINAGE AREA	Tc (min)	C VALUE	AREA (Ac.)	I (in/hr)	Q (cfs)	I (in/hr)	Q (cfs)	I (in/hr)	Q (cfs)
DA18C	19.00	0.55	3.44	5.51	10.42	6.56	12.41	8.16	15.44
DA19	22.00	0.80	17.99	4.97	71.53	5.91	85.06	7.34	105.64
DA20	5.00	0.95	1.57	9.06	13.51	10.83	16.15	13.54	20.19
*DESIGN STORM									

LEGEND

= DRAINAGE BOUNDARY

XX / XXX = DRAINAGE AREA ID / DRAINAGE AREA SIZE (AC)

= FLOW ARROWS

= Tc FLOW PATH

XX = COMPUTATION POINT

= EXISTING ROW

= EDGE OF PAVEMENT

STATE OF TEXAS
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WT MONTGOMERY ROAD

SYSTEM DRAINAGE MAPS

STA 124+00.00 to STA 130+00.00

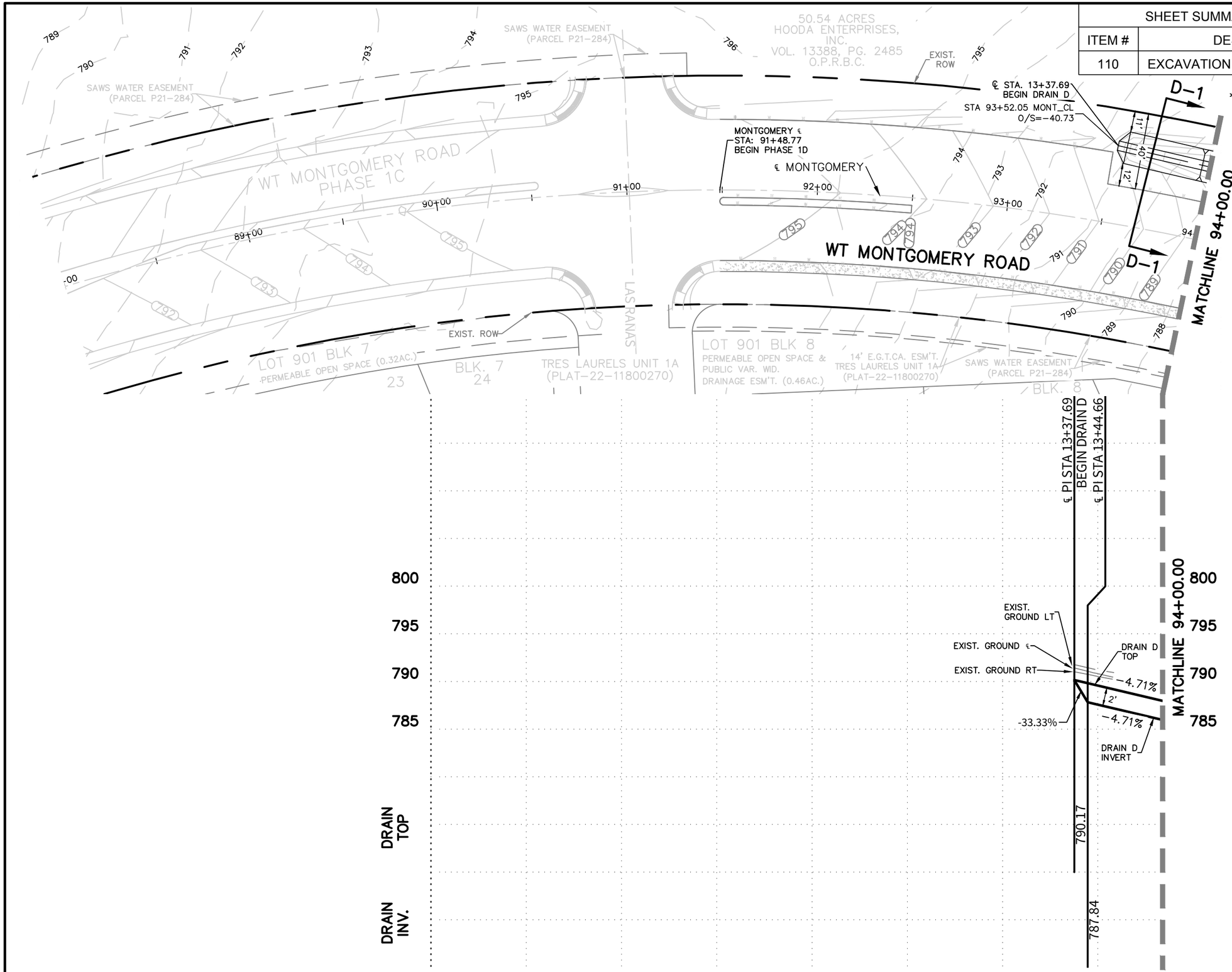
SCALE: HOR:1" = 50'

SHEET 7 OF 7

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	58

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD

SHEET SUMMARY OF ESTIMATED QUANTITIES			
ITEM #	DESCRIPTION	UNIT	QTY
110	EXCAVATION CHANNEL	CY	79



* SEE SHEET 7 OF 7 FOR TYPICAL DRAIN CROSS SECTIONS

LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- T/C — TOP OF CURB
- O/S — OFFSET

0 25 50

SCALE: HOR: 1"=50'
VER: 1"=10'

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WT MONTGOMERY ROAD

DRAIN 'D' PLAN & PROFILE STA. 88+00.00 TO STA. 94+00.00

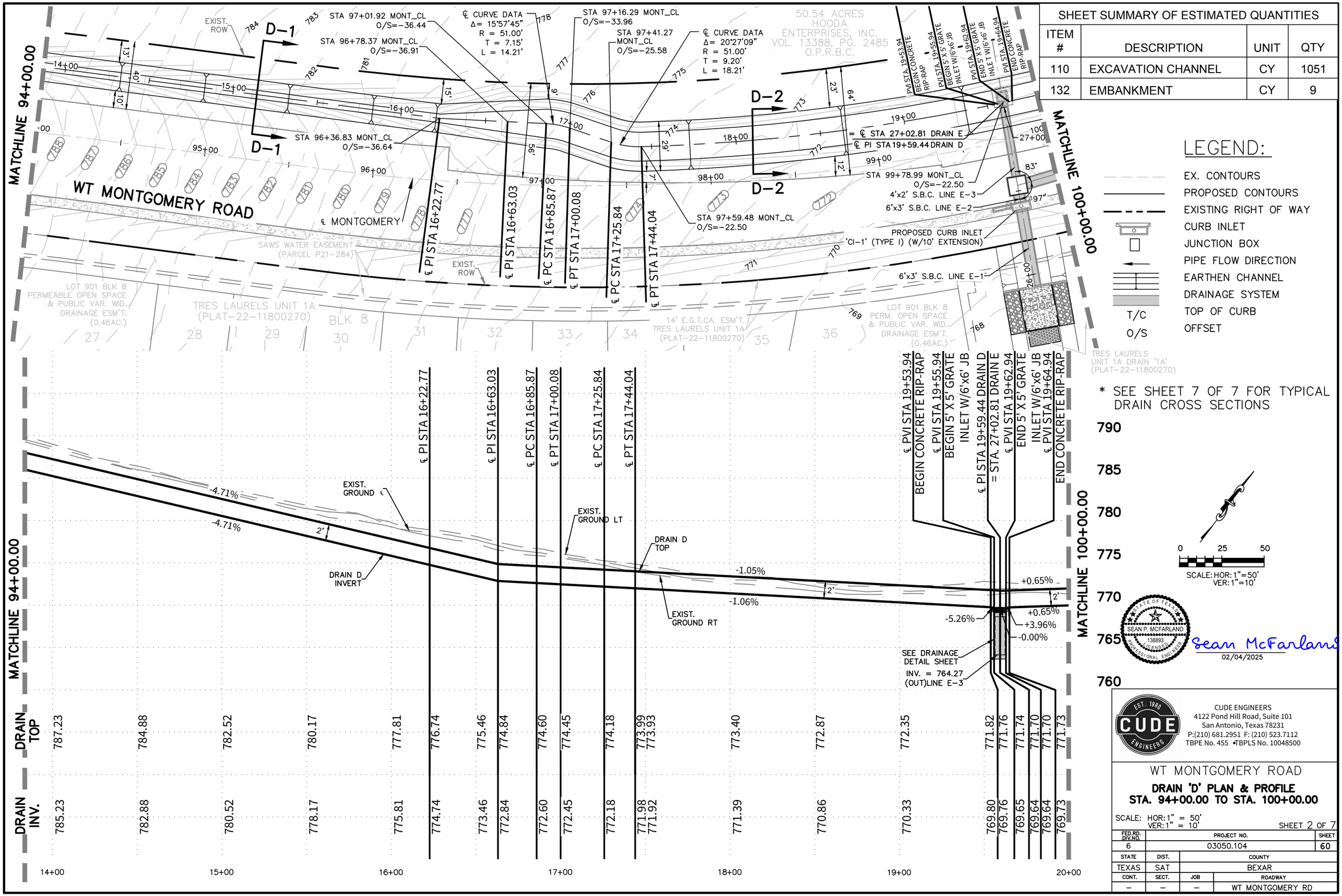
SCALE: HOR: 1" = 50'
VER: 1" = 10'

SHEET 1 OF 7

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	59

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD

SHEET SUMMARY OF ESTIMATED QUANTITIES			
ITEM #	DESCRIPTION	UNIT	QTY
110	EXCAVATION CHANNEL	CY	1051
132	EMBANKMENT	CY	9



LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- T/C — TOP OF CURB
- O/S — OFFSET

* SEE SHEET 7 OF 7 FOR TYPICAL DRAIN CROSS SECTIONS

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WT MONTGOMERY ROAD

DRAIN 'D' PLAN & PROFILE STA. 94+00.00 TO STA. 100+00.00

SCALE: HOR: 1" = 50'
VER: 1" = 10'

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	60

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

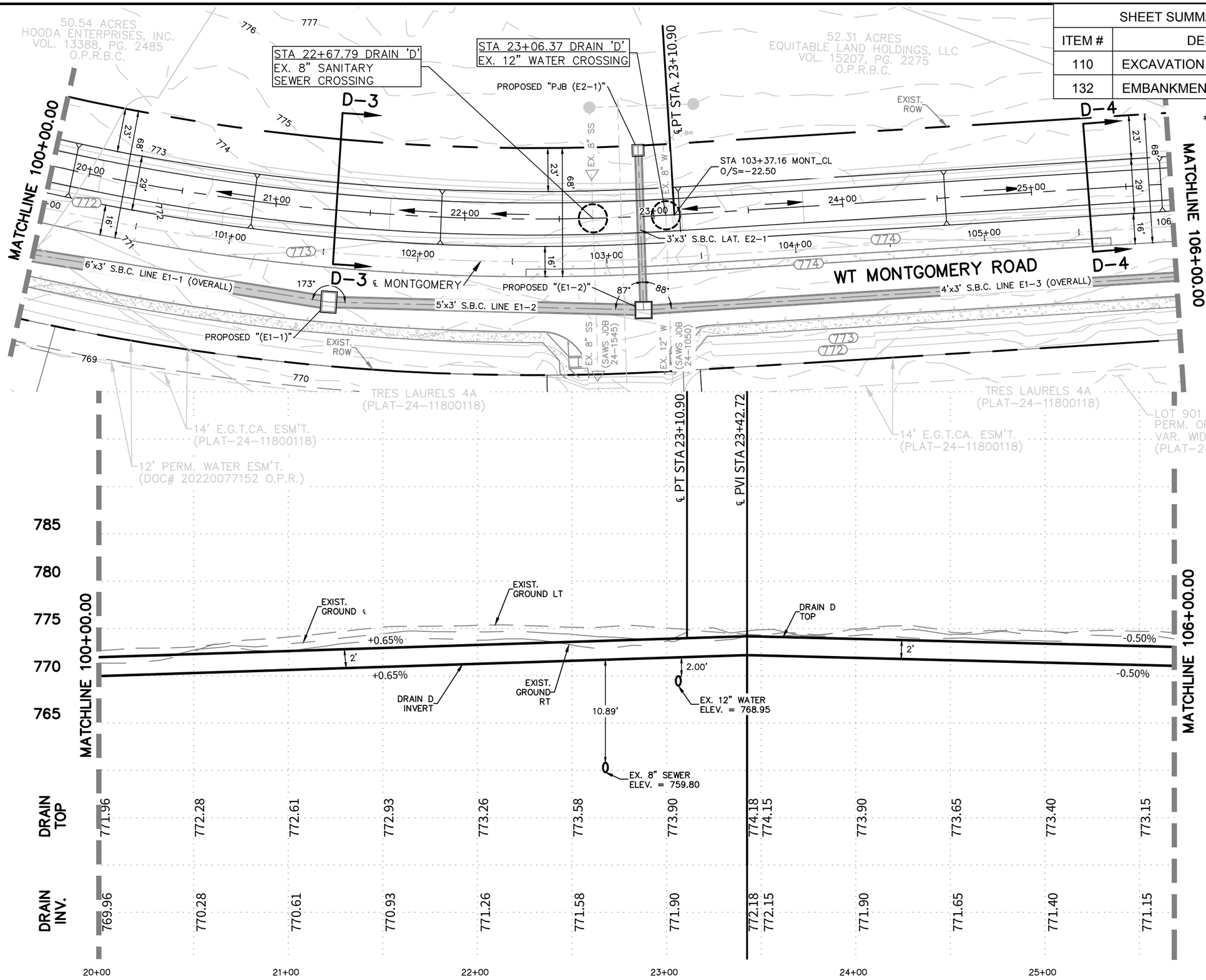
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD

SHEET SUMMARY OF ESTIMATED QUANTITIES			
ITEM #	DESCRIPTION	UNIT	QTY
110	EXCAVATION CHANNEL	CY	1527
132	EMBANKMENT	CY	3

* SEE SHEET 7 OF 7 FOR TYPICAL DRAIN CROSS SECTIONS

LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- T/C TOP OF CURB
- O/S OFFSET



0 25 50

SCALE: HOR: 1"=50'
VER: 1"=10'

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02/04/2025

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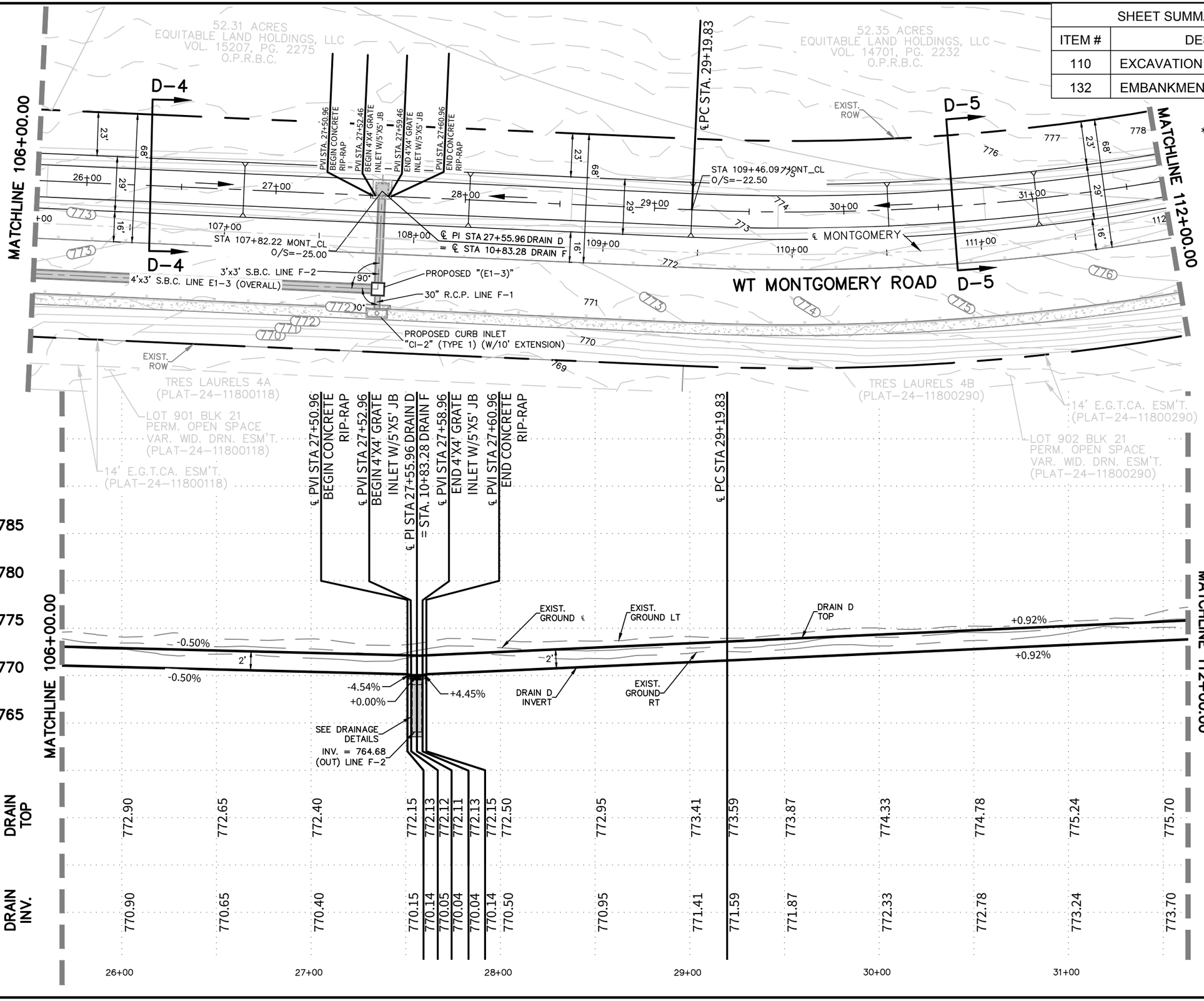
WT MONTGOMERY ROAD

DRAIN 'D' PLAN & PROFILE
STA. 100+00.00 TO STA. 106+00.00

SCALE: HOR: 1" = 50'
VER: 1" = 10'

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	03050.104		61
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD

SHEET SUMMARY OF ESTIMATED QUANTITIES			
ITEM #	DESCRIPTION	UNIT	QTY
110	EXCAVATION CHANNEL	CY	1069
132	EMBANKMENT	CY	18



* SEE SHEET 7 OF 7 FOR TYPICAL DRAIN CROSS SECTIONS

LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- T/C — TOP OF CURB
- O/S — OFFSET

0 25 50

SCALE: HOR: 1"=50'
VER: 1"=10'

STATE OF TEXAS
SEAN P. MCFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

Sean McFarland
02/04/2025

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4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112
TBPE No. 455 •TBPLS No. 10048500

WT MONTGOMERY ROAD

DRAIN 'D' PLAN & PROFILE
STA. 106+00.00 TO STA. 112+00.00

SCALE: HOR: 1" = 50'
VER: 1" = 10'

SHEET 4 OF 7

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	62

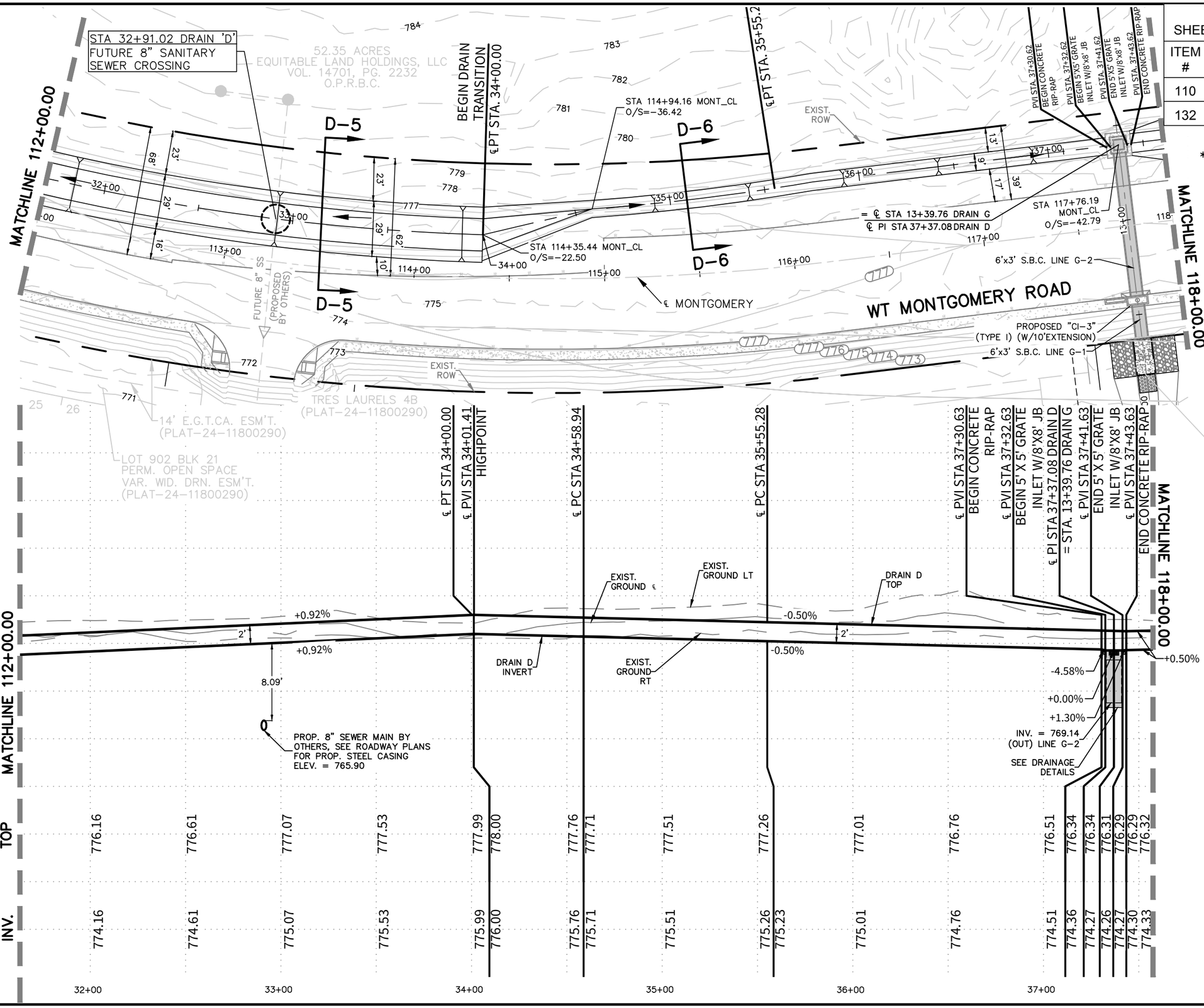
STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD

SHEET SUMMARY OF ESTIMATED QUANTITIES

ITEM #	DESCRIPTION	UNIT	QTY
110	EXCAVATION CHANNEL	CY	420
132	EMBANKMENT	CY	97

* SEE SHEET 7 OF 7 FOR TYPICAL DRAIN CROSS SECTIONS



LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- T/C — TOP OF CURB
- O/S — OFFSET

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WT MONTGOMERY ROAD

DRAIN 'D' PLAN & PROFILE
STA. 112+00.00 TO STA. 118+00.00

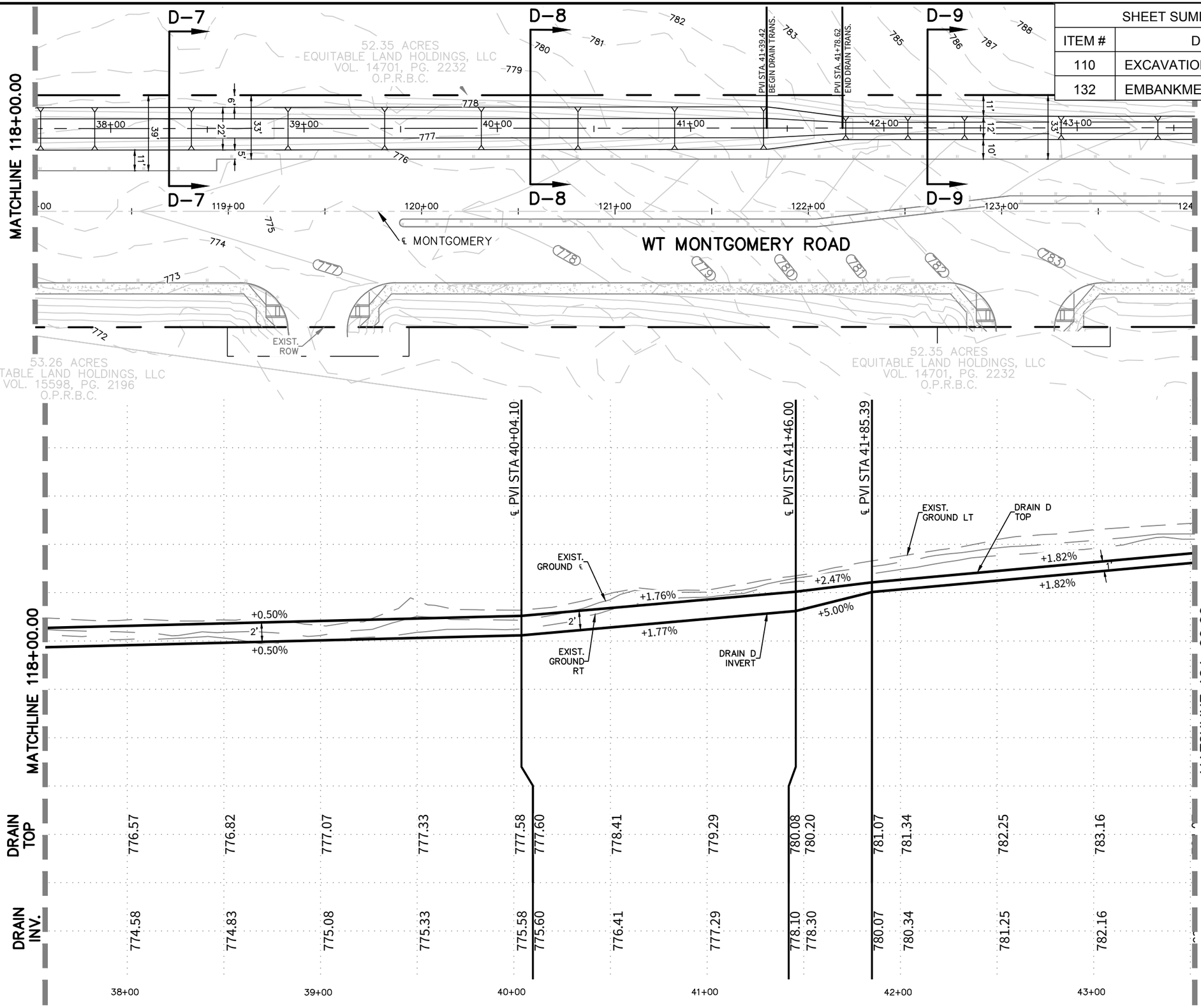
SCALE: HOR: 1" = 50'
VER: 1" = 10'

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	63

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD

SHEET SUMMARY OF ESTIMATED QUANTITIES			
ITEM #	DESCRIPTION	UNIT	QTY
110	EXCAVATION CHANNEL	CY	717
132	EMBANKMENT	CY	25



* SEE SHEET 7 OF 7 FOR TYPICAL DRAIN CROSS SECTIONS

LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- T/C — TOP OF CURB
- O/S — OFFSET

SCALE: HOR: 1"=50'
VER: 1"=10'

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WT MONTGOMERY ROAD

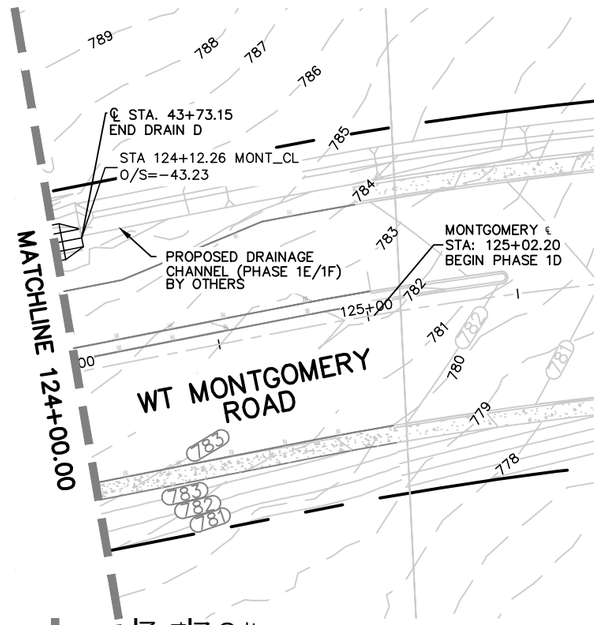
DRAIN 'D' PLAN & PROFILE
STA. 118+00.00 TO STA. 124+00.00

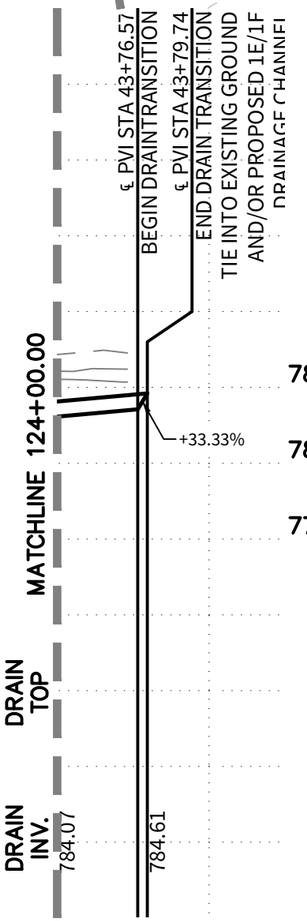
SCALE: HOR: 1" = 50'
VER: 1" = 10'

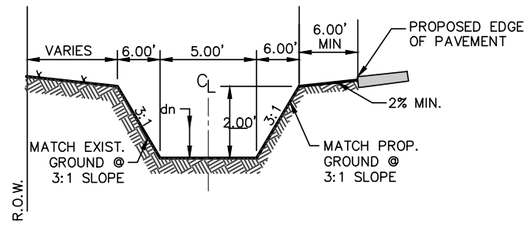
FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	64

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD





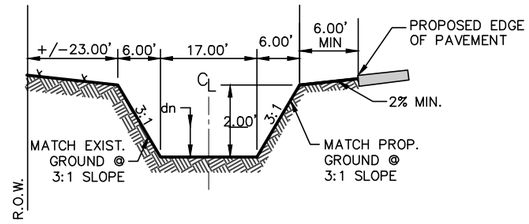


DRAIN "D-1" SECTION

"D-1" STA.13+37.69 TO STA. 16+22.77

(N.T.S.)

	"D-1"
Q_{10PRO} (cfs)	66.45
Bw (ft)	5.00'
z	3:1
n	0.035
SLOPE	4.71
dn	1.07
VELOCITY (fps)	7.56



DRAIN "D-2", "D-3", "D-4","D-5" SECTION

"D-2" STA.16+85.87 TO STA. 19+53.94

"D-3" STA.19+64.94 TO STA. 23+44.13

"D-4" STA.23+44.13 TO STA. 27+50.96

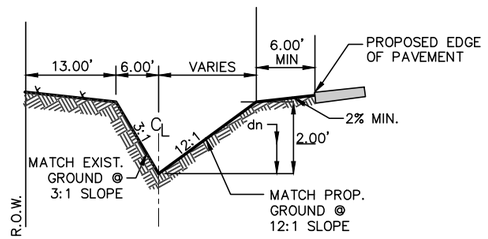
"D-5" STA.27+50.96 TO STA. 34+00.00

(N.T.S.)

	"D-2"	"D-3"	"D-4"	"D-5"
Q_{10PRO} (cfs)	66.45	66.45	53.64	53.64
Bw (ft)	17.00'	17.00'	17.00'	17.00'
z	3:1	3:1	3:1	3:1
n	0.035	0.035	0.035	0.035
SLOPE	1.06	0.65	0.50	0.92
dn	0.91	1.05	1.00	0.77
VELOCITY (fps)	3.70	3.14	2.68	3.61

LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- TOP OF CURB (T/C)
- OFFSET (O/S)

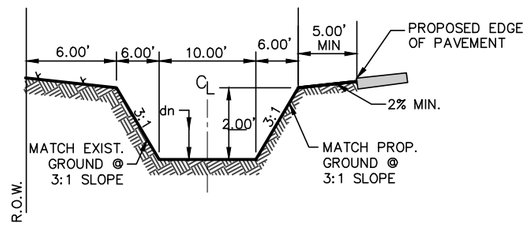


DRAIN "D-6" SECTION

"D-6" STA.34+00.00 TO STA. 37+30.63

(N.T.S.)

	"D-6"
Q_{10PRO} (cfs)	20.74
Bw (ft)	0'
z	3:1
n	0.035
SLOPE	0.50
dn	1.16
VELOCITY (fps)	2.06



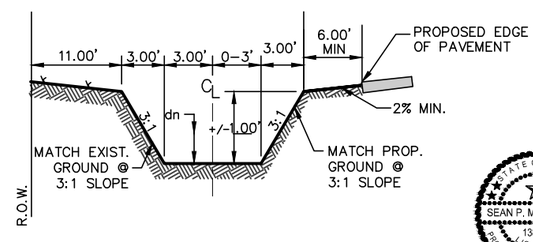
DRAIN "D-7","D-8" SECTION

"D-7" STA.37+43.63 TO STA. 40+05.50

"D-8" STA.40+05.50 TO STA. 41+39.42

(N.T.S.)

	"D-7"	"D-8"
Q_{10PRO} (cfs)	75.79	56.50
Bw (ft)	10.00'	10.00'
z	3:1	3:1
n	0.035	0.035
SLOPE	0.50	1.77
dn	1.57	0.95
VELOCITY (fps)	3.28	4.63



DRAIN "D-9" SECTION

"D-9" STA.41+78.62 TO END

(N.T.S.)

	"D-9"
Q_{10PRO} (cfs)	10.42
Bw (ft)	6.00'
z	3:1
n	0.035
SLOPE	1.82
dn	0.47
VELOCITY (fps)	2.99

0 25 50

SCALE: HOR: 1"=50'
VER: 1"=10'

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02/04/2025

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WT MONTGOMERY ROAD

DRAIN 'D' PLAN & PROFILE

CROSS SECTIONS

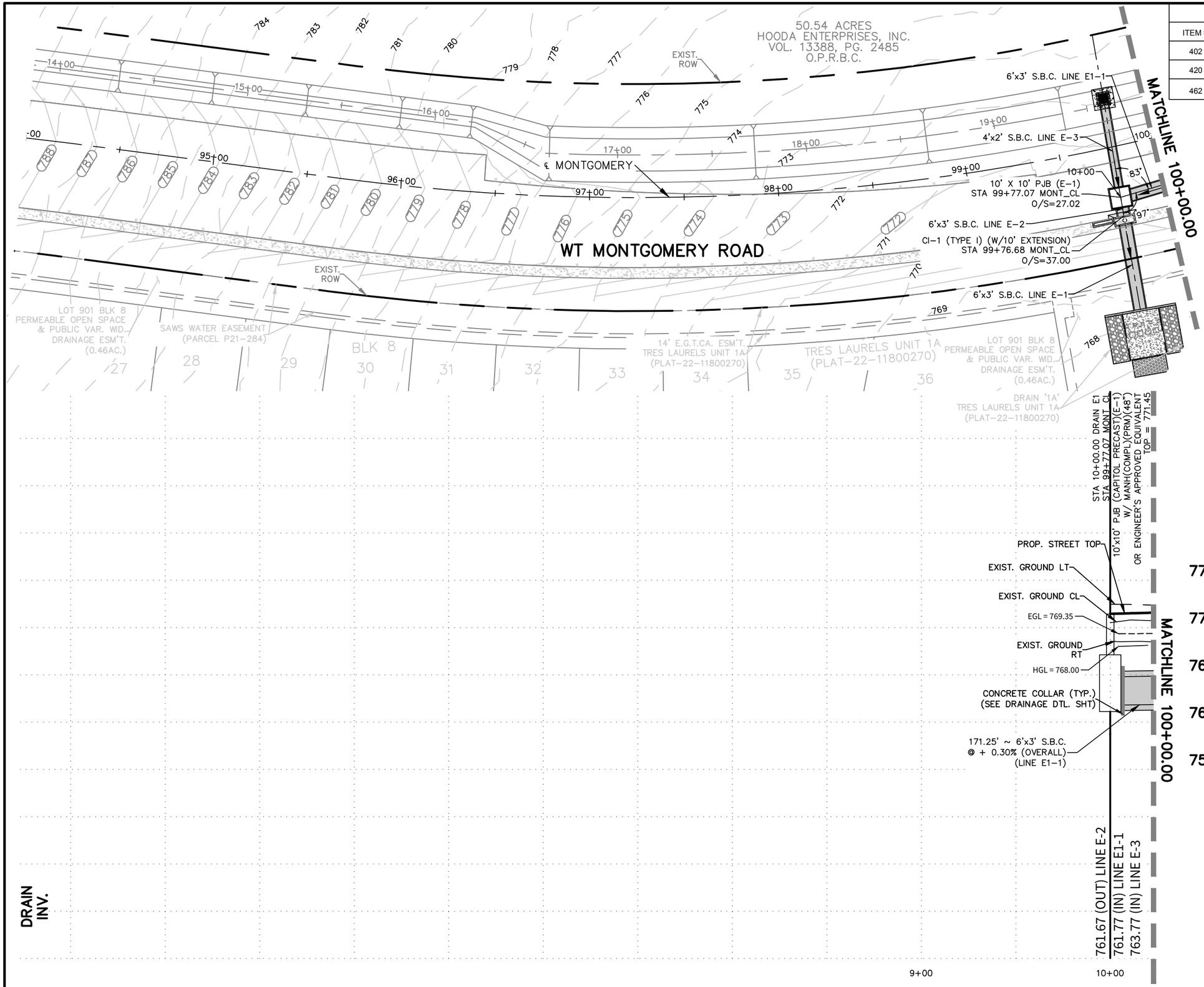
STA. 124+00.00 TO END

SCALE: HOR: 1" = 50'
VER: 1" = 10'

SHEET 7 OF 7

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	65

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



SHEET SUMMARY OF ESTIMATED QUANTITIES			
ITEM #	DESCRIPTION	UNIT	QTY
402	TRENCH EXCAVATION PROTECTION	LF	18
420	CLASS A CONC (COLLAR)	EA	1
462	CONC BOX CULV (6 FT X 3 FT)	LF	18

LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- T/C — TOP OF CURB
- O/S — OFFSET

NOTES:

1. OFFSETS TO CURB INLETS ARE TO FACE OF CURB. OFFSETS TO JUNCTION BOX ARE AT THE CENTER OF THE STRUCTURE.
2. ELEVATIONS AT CURB INLETS GIVEN IN PROFILE ARE AT TOP OF CURB. ELEVATIONS AT JUNCTION BOXES ARE AT TOP OF THE STRUCTURE.
3. EXISTING UTILITIES ARE SHOWN AT ASSUMED DEPTHS. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL EXISTING UTILITIES. CONTRACTOR SHALL REFER TO UTILITY LAYOUT SHEETS FOR ADDITIONAL INFORMATION.
4. STRUCTURAL EXCAVATION IS NOT PAID FOR DIRECTLY, BUT IS CONSIDERED SUBSIDIARY TO VARIOUS DRAINAGE BID ITEMS.
5. HGL/EGL CALCS ARE BASED OFF ULTIMATE FLOWS.

0 25 50

SCALE: HOR: 1"=50'
VER: 1"=10'

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08/14/2024

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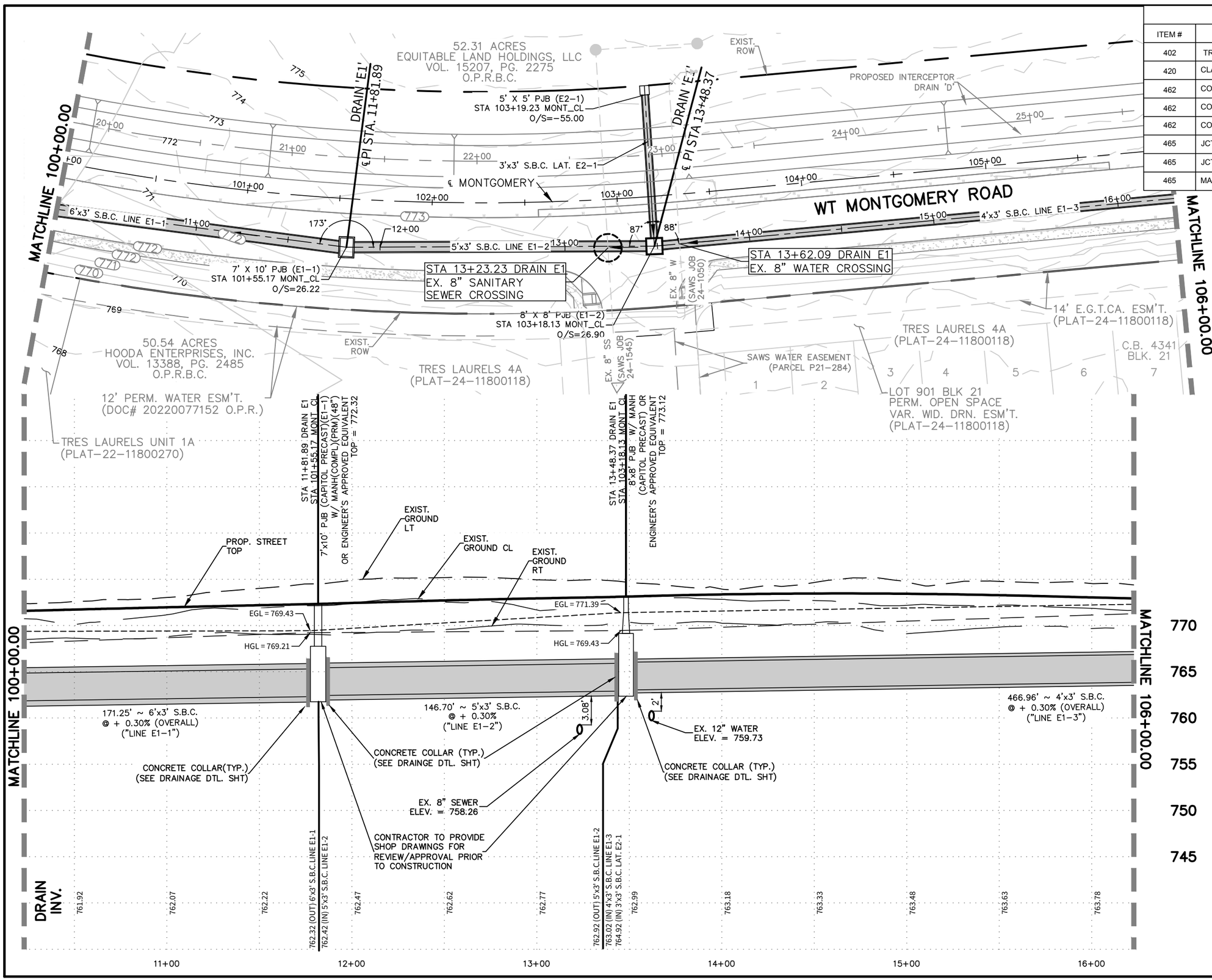
WT MONTGOMERY ROAD

DRAINAGE PLAN & PROFILE
STA. 94+00.00 TO STA. 100+00.00

SCALE: HOR: 1" = 50'
VER: 1" = 10'

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	03050.104		66
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



SHEET SUMMARY OF ESTIMATED QUANTITIES			
ITEM #	DESCRIPTION	UNIT	QTY
402	TRENCH EXCAVATION PROTECTION	LF	600
420	CLASS A CONC (COLLAR)	EA	4
462	CONC BOX CULV (4 FT X 3 FT)	LF	281
462	CONC BOX CULV (5 FT X 3 FT)	LF	147
462	CONC BOX CULV (6 FT X 3 FT)	LF	154
465	JCTBOX(COMPL)(PJB)(8FTX8FT)	EA	1
465	JCTBOX(COMPL)(PJB)(7FTX10FT)	EA	1
465	MANH(COMPL)(PRM)(48")	EA	1

LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- T/C — TOP OF CURB
- O/S — OFFSET

NOTES:

1. OFFSETS TO CURB INLETS ARE TO FACE OF CURB. OFFSETS TO JUNCTION BOX ARE AT THE CENTER OF THE STRUCTURE.
2. ELEVATIONS AT CURB INLETS GIVEN IN PROFILE ARE AT TOP OF CURB. ELEVATIONS AT JUNCTION BOXES ARE AT TOP OF THE STRUCTURE.
3. EXISTING UTILITIES ARE SHOWN AT ASSUMED DEPTHS. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL EXISTING UTILITIES. CONTRACTOR SHALL REFER TO UTILITY LAYOUT SHEETS FOR ADDITIONAL INFORMATION.
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5. HGL/EGL CALCS ARE BASED OFF ULTIMATE FLOWS.

0 25 50

SCALE: HOR: 1"=50'
VER: 1"=10'

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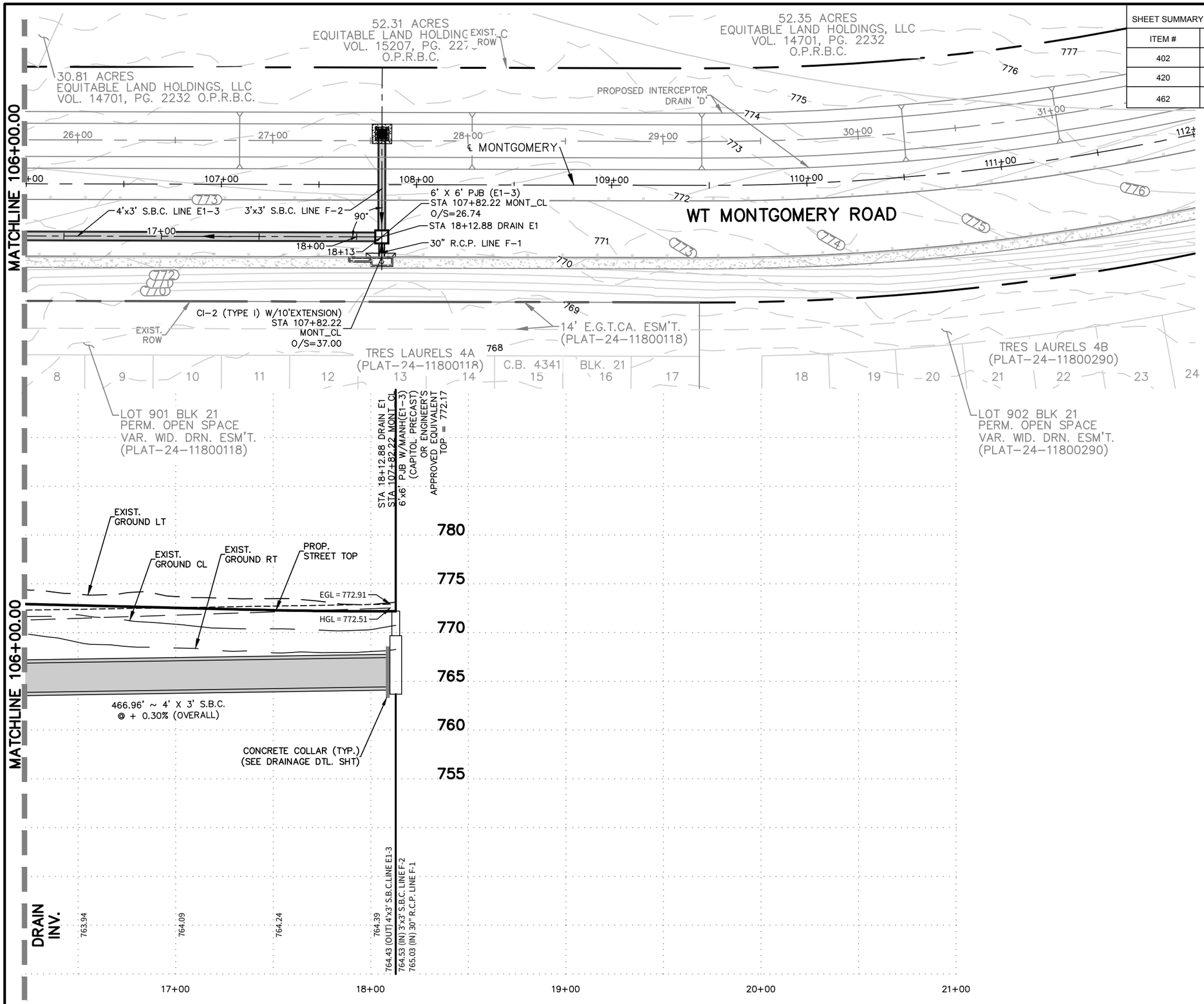
WT MONTGOMERY ROAD

DRAINAGE PLAN & PROFILE
STA. 100+00.00 TO STA. 106+00.00

SCALE: HOR: 1" = 50'
VER: 1" = 10'

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	03050.104		67
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



SHEET SUMMARY OF ESTIMATED QUANTITIES

ITEM #	DESCRIPTION	UNIT	QTY
402	TRENCH EXCAVATION PROTECTION	LF	187
420	CLASS A CONC (COLLAR)	EA	1
462	CONC BOX CULV (4 FT X 3 FT)	LF	187

LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- T/C — TOP OF CURB
- O/S — OFFSET

NOTES:

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0 25 50

SCALE: HOR: 1"=50'
VER: 1"=10'

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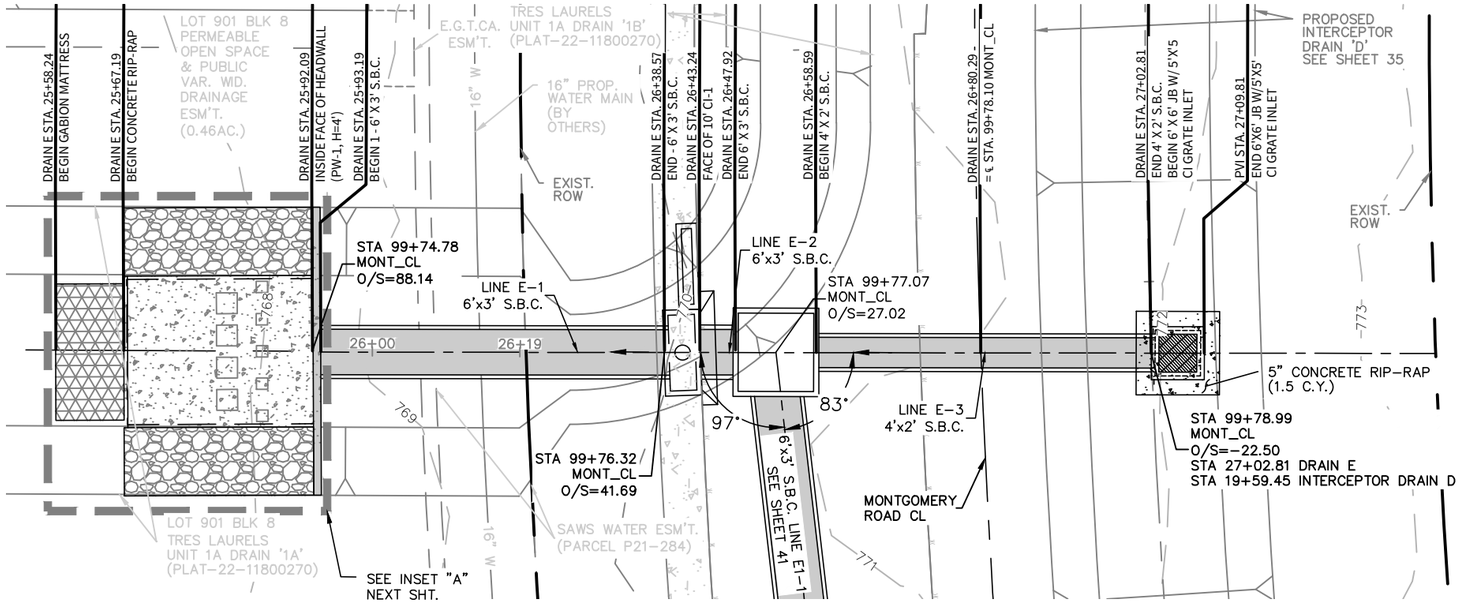
WT MONTGOMERY ROAD

DRAINAGE PLAN & PROFILE
STA. 106+00.00 TO STA. 112+00.00

SCALE: HOR: 1" = 50'
VER: 1" = 10'

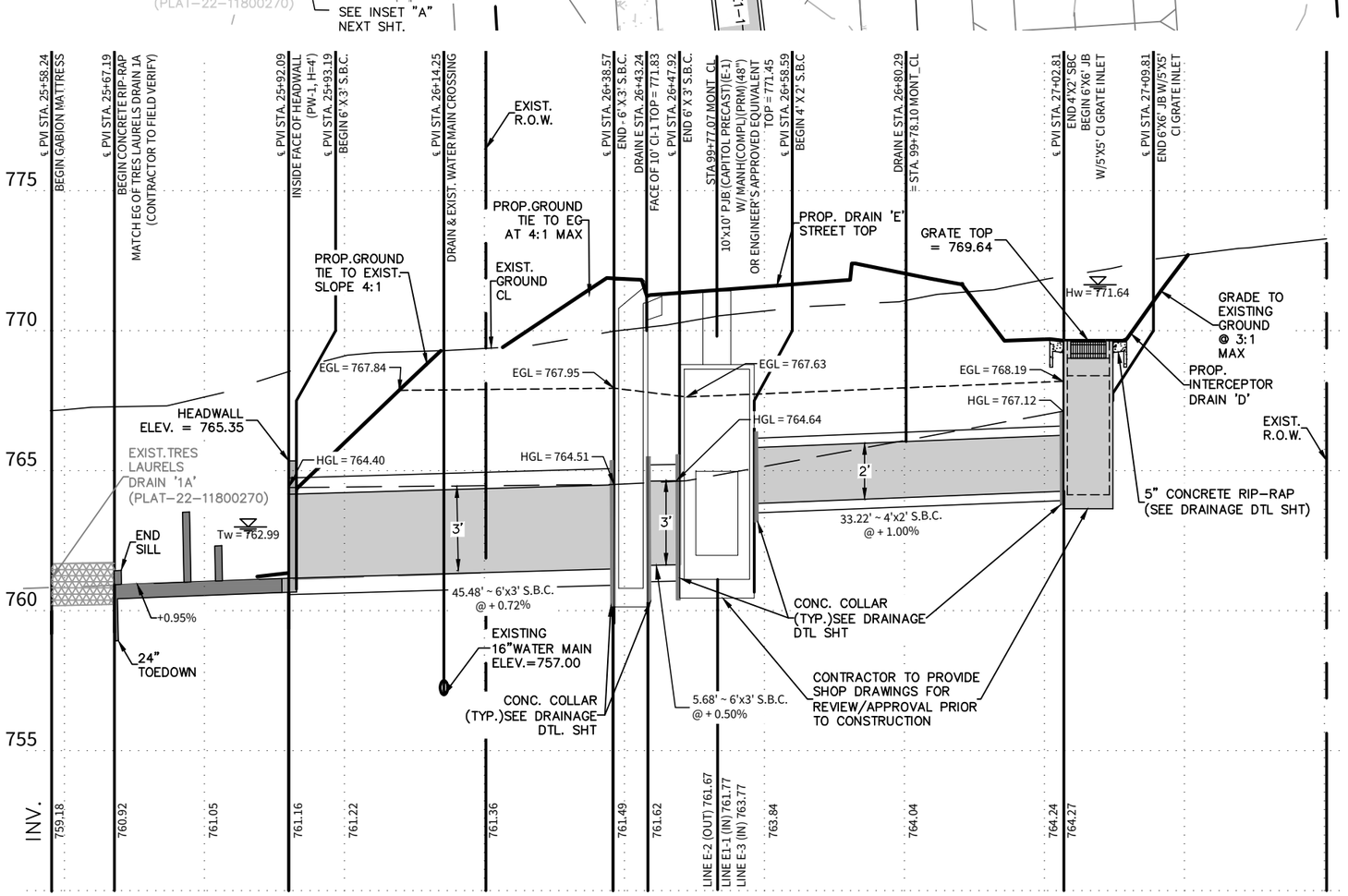
SHEET 3 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	03050.104		68
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



SHEET SUMMARY OF ESTIMATED QUANTITIES

ITEM #	DESCRIPTION	UNIT	QTY
402	TRENCH EXCAVATION PROTECTION	LF	85
420	CLASS A CONC (COLLAR)	EA	5
432	RIPRAP (CONC) (5 IN)	CY	11
432	RIPRAP (CONC) (DISSIPATER)	CY	3.82
432	RIPRAP (STONE PROTECTION)(12 IN)	SY	50
459	GABIONS (1.5'X3') (GALV)	SY	18
464	CONC BOX CULV (6 FT X 3 FT)	LF	52
464	CONC BOX CULV (4 FT X 2 FT)	LF	34
465	INLET (COMPL)(CURB)(TY 1)(10')	EA	1
465	INLET (COMPL)(10' EXT)(TY 1)	EA	1
465	JCTBOX(COMPL)(PJB)(10FTX10FT)	EA	1
466	WINGWALL (PW-1) (HW=4FT)	EA	1
465	INLET(COMPL)(PSL)(FG)(6FTX6FT-5FTX5FT)	EA	1
465	MANH(COMPL)(PRM)(48")	EA	1



LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- T/C — TOP OF CURB
- O/S — OFFSET

SCALE: 1"=20'

0 10 20

NOTES:

1. OFFSETS TO CURB INLETS ARE TO FACE OF CURB. OFFSETS TO JUNCTION BOX ARE AT THE CENTER OF THE STRUCTURE.
2. ELEVATIONS AT CURB INLETS GIVEN IN PROFILE ARE AT TOP OF CURB. ELEVATIONS AT JUNCTION BOXES ARE AT TOP OF THE STRUCTURE.
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5. HGL/EGL CALCS ARE BASED OFF ULTIMATE FLOWS.

GRATE INLET CALCULATIONS

$Q = CA(2gh)^{0.5}$

Orifice Coefficient, C = 0.70

Acceleration due to Gravity, g = 32.2

WIDTH = 5'

LENGTH = 5'

AREA = 25 S.F.

HEAD = 2'

Q (cfs) = 198.6

$Q_{(allowable)}$(cfs) = 99.3

$Q_{(design)}$(cfs) = 96.8

*NOTES: DESIGN Q ASSUMED TO BE 1/2 GRATE CAPACITY TO ACCOUNT FOR CLOGGING OF THE GRATE.

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WT MONTGOMERY ROAD

DRAIN 'E' CULVERT PLAN & PROFILE STA. 25+63.22 TO STA. 27+24.23

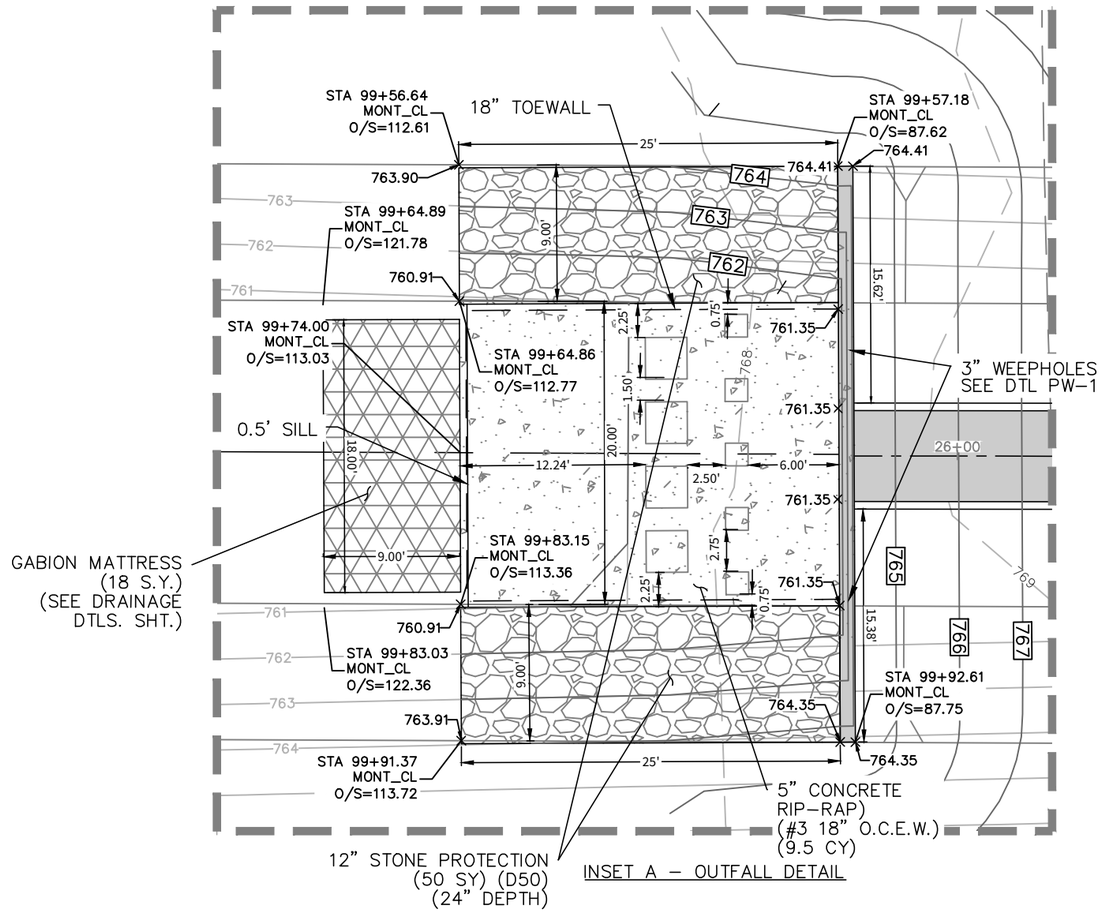
SCALE: HOR: 1" = 20'
VER: 1" = 5'

SHEET 1 OF 2

FED. RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	69

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



INSET A – OUTFALL DETAIL

HYDRAULIC TABLE (STORM SEWER)

PIPE SLOPE = 0.46%

$Q_{25(ULT)}$ = 264.55 c.f.s.

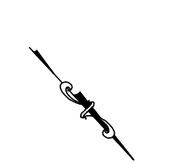
$VELOCITY_{(EXIT)}$ = 14.70 f.p.s.

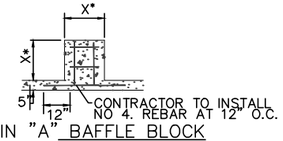
n – 0.013

HGL_{UP} = 764.51

HGL_{DOWN} = 764.40

HW = 762.99





DRAIN "A" BAFFLE BLOCK REINFORCEMENT DETAIL (N.T.S.)

* HEIGHT/WIDTH OF BAFFLE BLOCK (FROM HEADWALL)

FIRST ROW: 1.50'

SECOND ROW: 2.75'

SILL HEIGHT: 0.5'

BAFFLE BLOCK CALCULATIONS (N.T.S.)

TAILWATER DEPTH = 3.00'

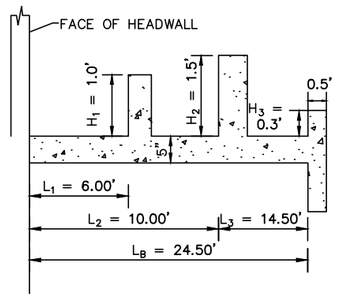
Fr = 1.411

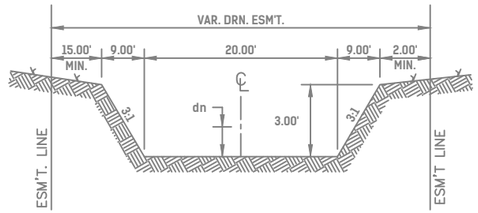
Yc = 1.75FT

Y_2 = 5.30FT

Y_3 = 3.00FT

BASIN OUTLET VELOCITY = 3.97 FT/S





EX. DRAIN "1A" SECTION (N.T.S.)

	"1A"
Q_{25ULT} (cfs)	244.32
Q_{100ULT} (cfs)	303.33
Bw (ft)	20.00'
z	3:1
n	0.035
SLOPE	0.85
dn_{25ULT} (ft)	1.83'
V_{25ULT} (fps)	5.06
dn_{100ULT} (ft)	2.07'
V_{100ULT} (fps)	5.40

LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- T/C — TOP OF CURB
- O/S — OFFSET

NOTES:

1. OFFSETS TO CURB INLETS ARE TO FACE OF CURB. OFFSETS TO JUNCTION BOX ARE AT THE CENTER OF THE STRUCTURE.
2. ELEVATIONS AT CURB INLETS GIVEN IN PROFILE ARE AT TOP OF CURB. ELEVATIONS AT JUNCTION BOXES ARE AT TOP OF THE STRUCTURE.
3. EXISTING UTILITIES ARE SHOWN AT ASSUMED DEPTHS. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL EXISTING UTILITIES. CONTRACTOR SHALL REFER TO UTILITY LAYOUT SHEETS FOR ADDITIONAL INFORMATION.
4. STRUCTURAL EXCAVATION IS NOT PAID FOR DIRECTLY, BUT IS CONSIDERED SUBSIDIARY TO VARIOUS DRAINAGE BID ITEMS.
5. HGL/EGL CALCS ARE BASED OFF ULTIMATE FLOWS.

Sean McFarland
08/14/2024

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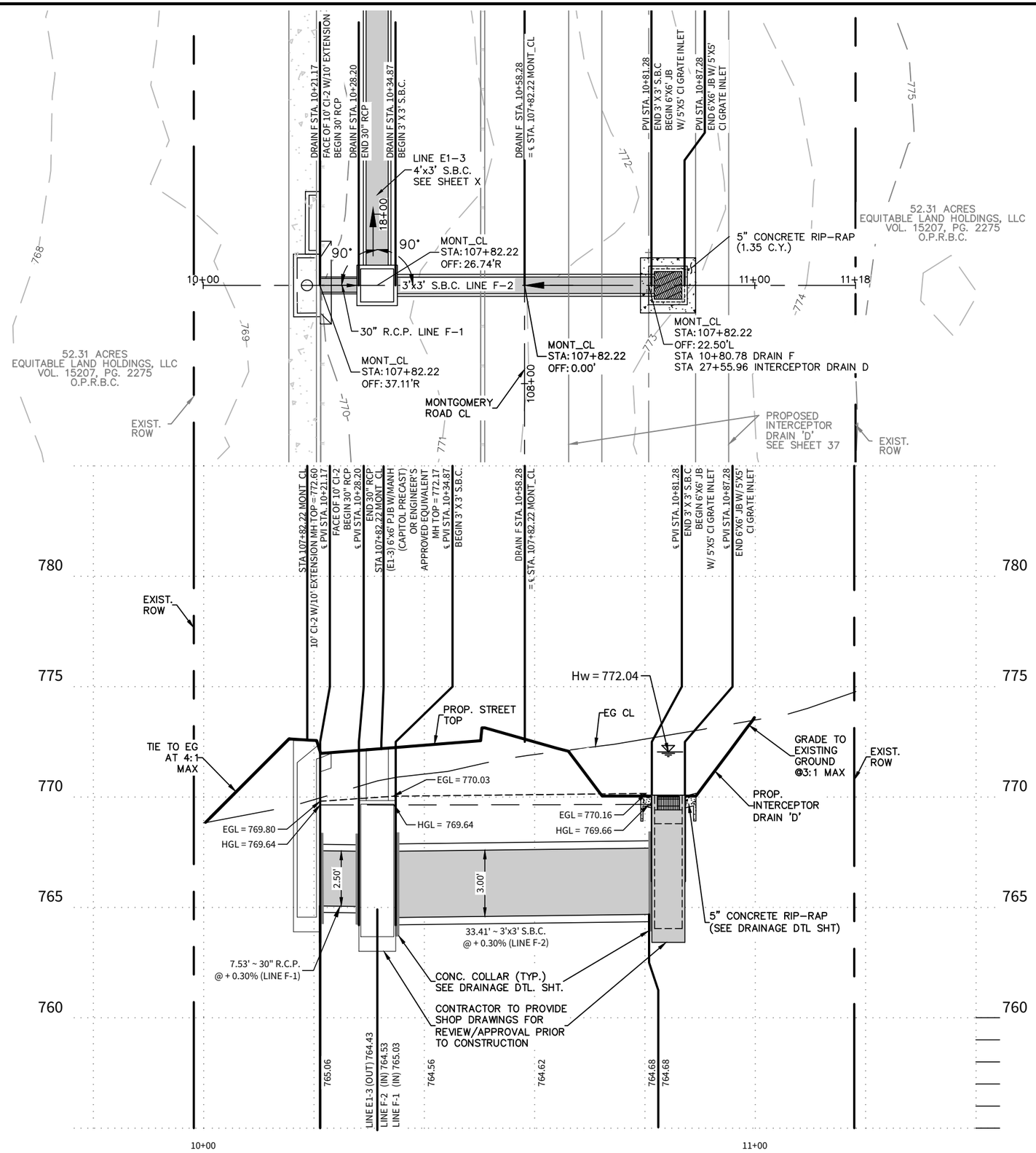
TBPE No. 455 ◂TBPLS No. 10048500

WT MONTGOMERY ROAD

DRAIN 'E' CULVERT PLAN & PROFILE
STA. 25+63.22 TO STA. 27+24.23

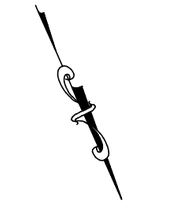
SCALE: HOR: 1" = 10'

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	03050.104		70
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



SHEET SUMMARY OF ESTIMATED QUANTITIES

ITEM #	DESCRIPTION	UNIT	QTY
402	TRENCH EXCAVATION PROTECTION	LF	42
420	CLASS A CONC (COLLAR)	EA	4
432	RIPRAP (CONC) (5 IN)	CY	1.35
464	CONC BOX CULV (3 FT X 3 FT)	LF	34
464	RC PIPE (CL III)(30 IN)	LF	8
465	INLET (COMPL)(CURB)(TY 1)(10')	EA	1
465	INLET (COMPL)(10' EXT)(TY 1)	EA	1
465	INLET(COMPL)(PSL)(FG)(6FTX6FT-5FTX5FT)	EA	1
465	JCTBOX(COMPL)(PJB)(6FTX6FT)	EA	1



LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- T/C TOP OF CURB
- O/S OFFSET

GRATE INLET CALCULATIONS

$Q = CA(2gh)^{0.5}$

Orifice Coefficient, C = 0.70

Acceleration due to Gravity, g = 32.2

WIDTH = 5'

LENGTH = 5'

AREA = 25 S.F.

HEAD = 1.5'

Q (cfs) = 172.0

$Q_{(allowable)}$(cfs) = 86.0

$Q_{(design)}$(cfs) = 73.3

*NOTES: DESIGN Q ASSUMED TO BE 1/2 GRATE CAPACITY TO ACCOUNT FOR CLOGGING OF THE GRATE.

NOTES:

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4. STRUCTURAL EXCAVATION IS NOT PAID FOR DIRECTLY, BUT IS CONSIDERED SUBSIDIARY TO VARIOUS DRAINAGE BID ITEMS.
5. HGL/EGL CALCS ARE BASED OFF ULTIMATE FLOWS.

STATE OF TEXAS
SEAN P. MCFARLAND
138893
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Sean McFarland
08/14/2024

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WT MONTGOMERY ROAD

DRAIN 'F' CULVERT PLAN & PROFILE
STA. 10+21.17 TO STA. 10+99.00

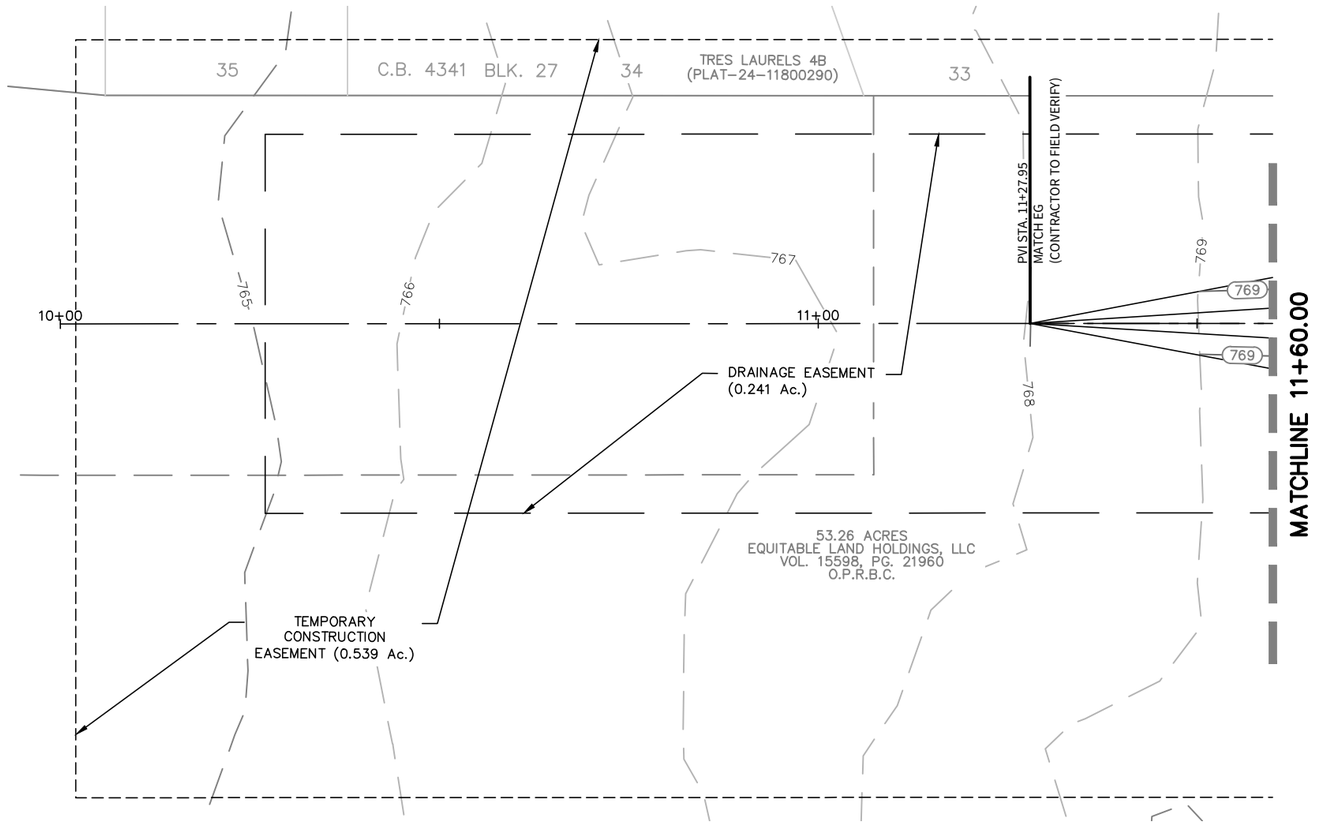
SCALE: HOR: 1" = 20'
VER: 1" = 5'

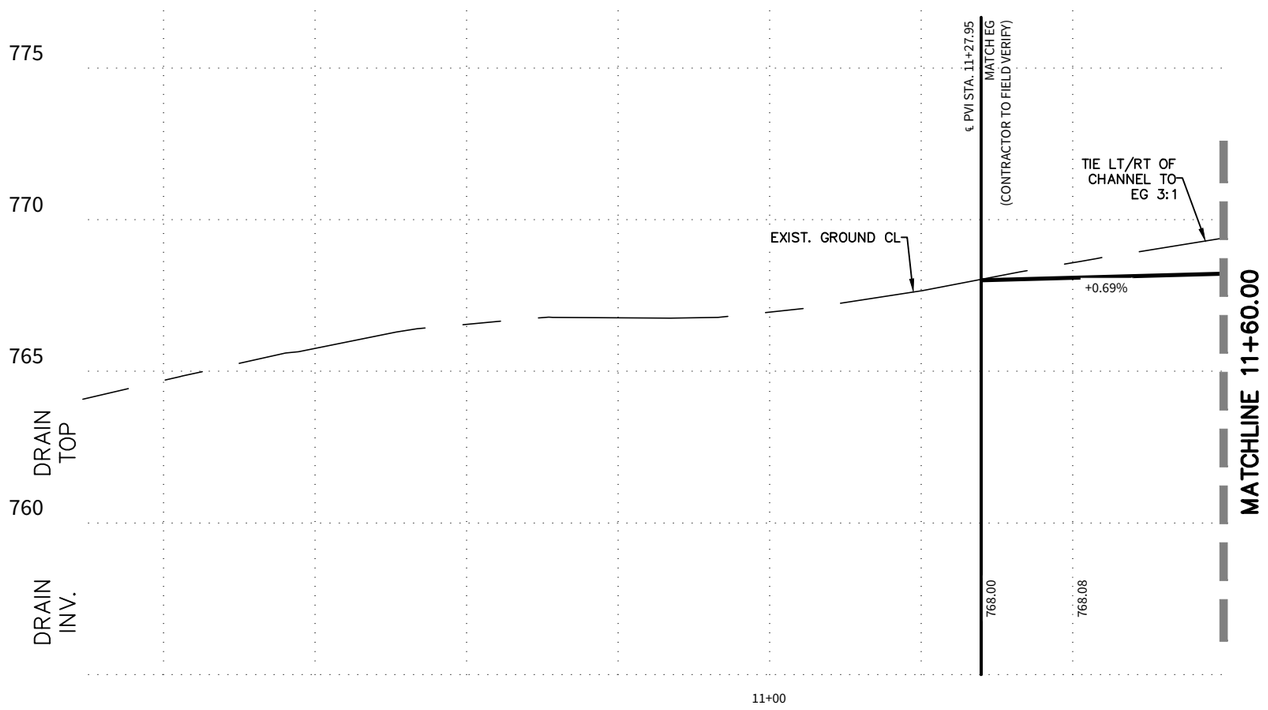
SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	71

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD





SHEET SUMMARY OF ESTIMATED QUANTITIES			
ITEM #	DESCRIPTION	UNIT	QTY
110	EXCAVATION CHANNEL	CY	122

* SEE SHEET 3 OF 3 FOR DRAIN G CROSS SECTIONS

SCALE: 1"=20'

0 10 20

LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- T/C — TOP OF CURB
- O/S — OFFSET

NOTES:

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02/04/2025

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WT MONTGOMERY ROAD

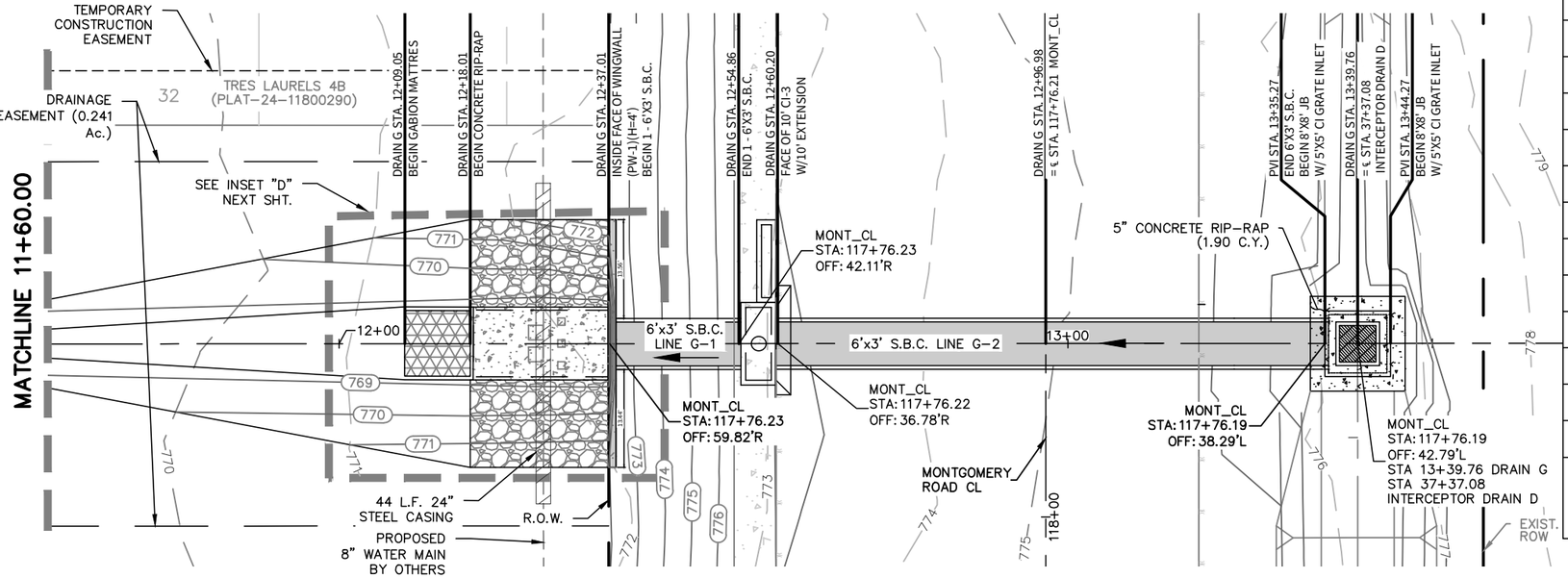
DRAIN 'G' CULVERT PLAN & PROFILE
STA. 10+29.65 TO STA. 11+60.00

SCALE: HOR: 1" = 20'
VER: 1" = 5'

SHEET 1 OF 3

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	72

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD

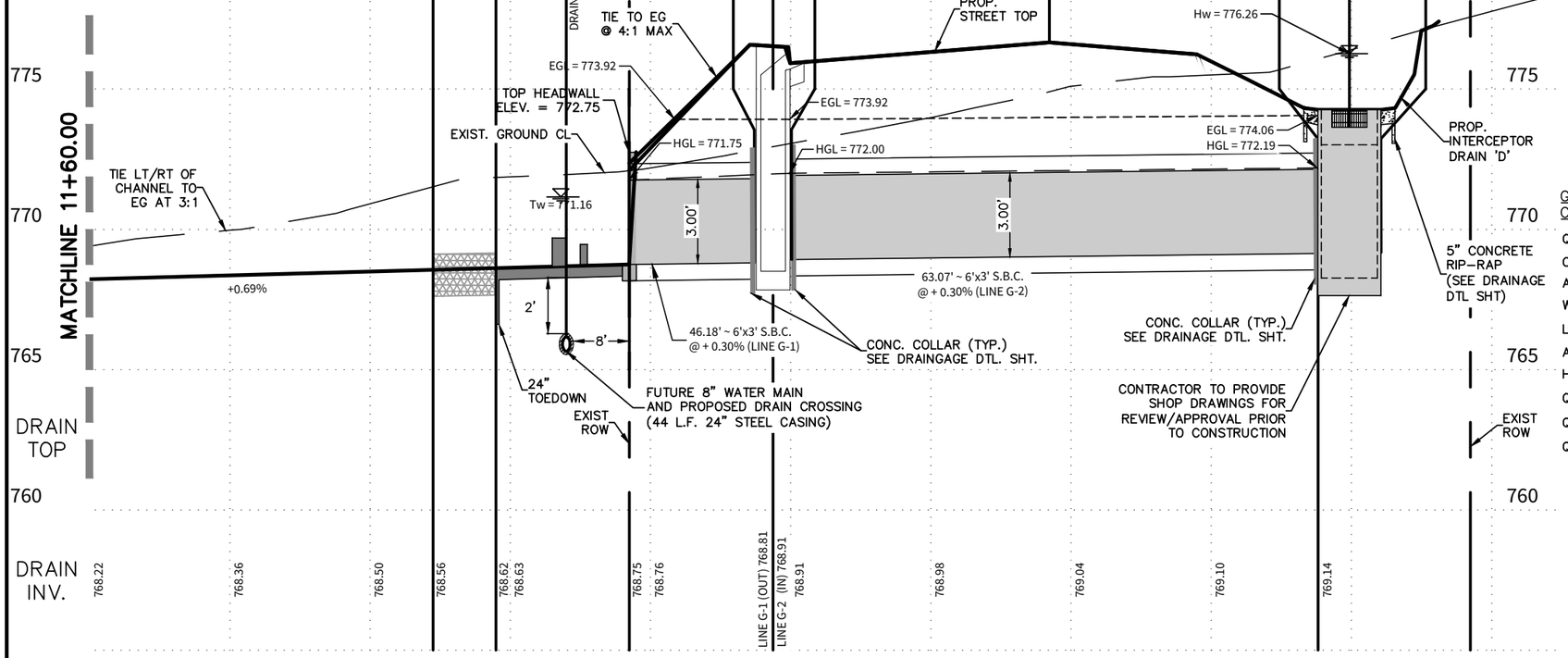


SHEET SUMMARY OF ESTIMATED QUANTITIES			
ITEM #	DESCRIPTION	UNIT	QTY
402	TRENCH EXCAVATION PROTECTION	LF	111
420	CLASS A CONC (COLLAR)	EA	3
432	RIPRAP (CONC) (5 IN)	CY	6
432	RIPRAP (STONE PROTECTION)(12 IN)	SY	51
432	RIPRAP (CONC) (DISSIPATER)	CY	0.5
459	GABIONS (1.5'X3') (GALV)	SY	9
464	CONC BOX CULV (6 FT X 3 FT)	LF	111
465	INLET (COMPL)(CURB)(TY 1)(10')	EA	1
465	INLET (COMPL)(10' EXT)(TY 1)	EA	1
466	WINGWALL (PW-1) (HW=4FT)	EA	1
465	INLET(COMPL)(PSL)(FG)(8FTX8FT-5FTX5FT)	EA	1
SAWS ITEM 856	24" STEEL CASING	LF	44

* SEE SHEET 3 OF 3 FOR DRAIN G CROSS SECTIONS

LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- T/C TOP OF CURB
- O/S OFFSET



SCALE: 1"=20'

0 10 20

GRATE INLET CALCULATIONS

$Q = CA(2gh)^{0.5}$

Orifice Coefficient, C = 0.70

Acceleration due to Gravity, g = 32.2

WIDTH = 5'

LENGTH = 5'

AREA = 25 S.F.

HEAD = 2'

Q (cfs) = 198.6

$Q_{(allowable)}$(cfs) = 99.3

$Q_{(design)}$(cfs) = 98.84

*NOTES: DESIGN Q ASSUMED TO BE 1/2 GRATE CAPACITY TO ACCOUNT FOR CLOGGING OF THE GRATE.

NOTES:

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STATE OF TEXAS · SEAN P. MCFARLAND · 138893 · LICENSED · PROFESSIONAL ENGINEER

Sean McFarland

02/04/2025

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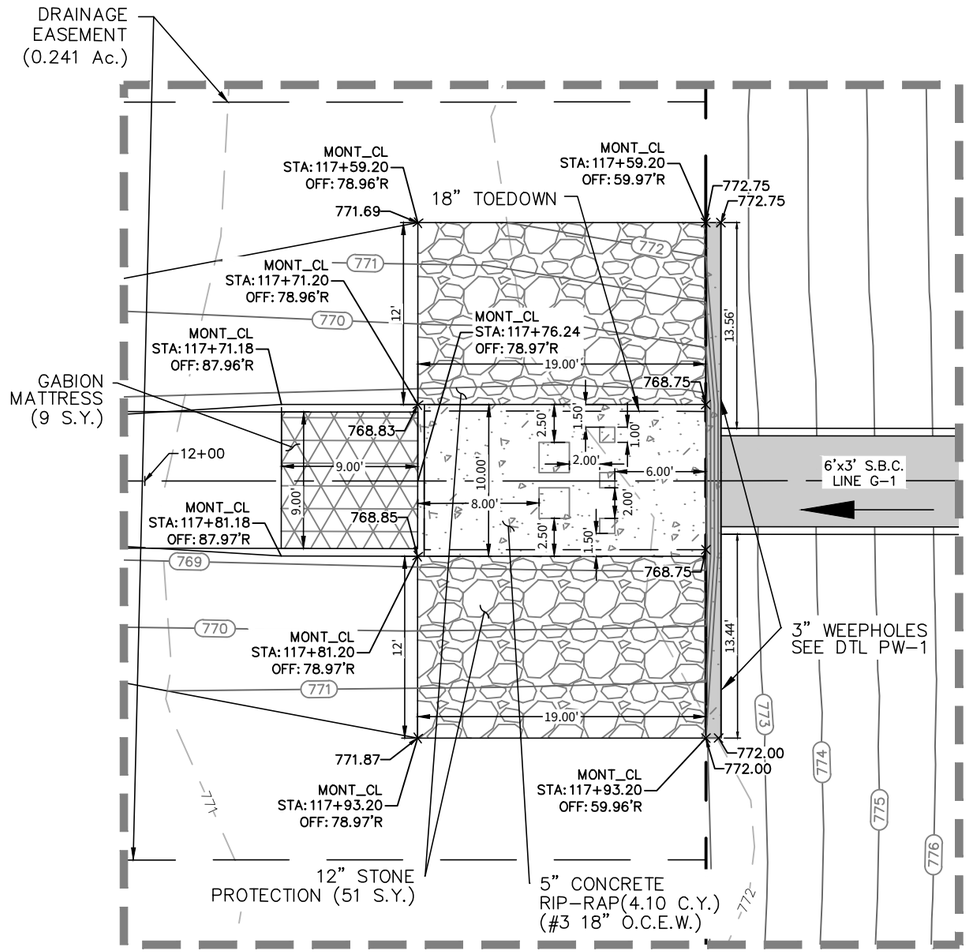
WT MONTGOMERY ROAD

DRAIN 'G' CULVERT PLAN & PROFILE STA. 11+60.00 TO STA. 13+62.80

SCALE: HOR: 1" = 20'
VER: 1" = 5'

SHEET 2 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	03050.104		73
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



INSET D – OUTFALL DETAIL

HYDRAULIC TABLE

PIPE SLOPE = 0.50%

Q_{25ULT} = 180.55 c.f.s.

$VELOCITY_{(EXIT)}$ = 10.26 f.p.s.

n – 0.013

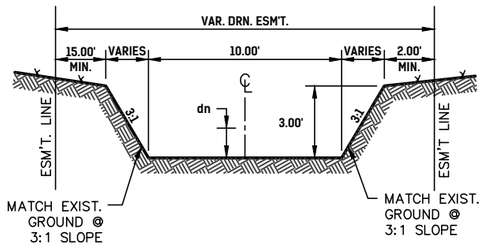
HGL_{UP} = 769.25

HGL_{DOWN} = 768.80

HW = 769.25

SCALE: 1"=10'

0 5 10



DRAIN "G" SECTION (N.T.S.)

	"G"
Q_{25ULT} (cfs)	180.55
Bw (ft)	10.00'
z	3:1
n	0.035
SLOPE	0.50
dn	2.41'
VELOCITY (fps)	4.25

BAFFLE BLOCK CALCULATIONS

(N.T.S.)

TAILWATER DEPTH = 3.00'

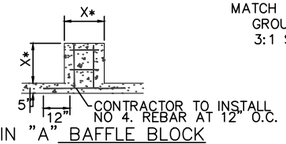
Fr = 1.411

Yc = 1.75FT

Y_2 = 5.30FT

Y_3 = 3.00FT

BASIN OUTLET VELOCITY = 3.97 FT/S



DRAIN "A" BAFFLE BLOCK REINFORCEMENT DETAIL

(N.T.S.)

* HEIGHT/WIDTH OF BAFFLE BLOCK (FROM HEADWALL)

FIRST ROW: 1.0'

SECOND ROW: 2.0'

SILL HEIGHT: 0.5'

LEGEND:

- EX. CONTOURS
- PROPOSED CONTOURS
- EXISTING RIGHT OF WAY
- CURB INLET
- JUNCTION BOX
- PIPE FLOW DIRECTION
- EARTHEN CHANNEL
- DRAINAGE SYSTEM
- T/C — TOP OF CURB
- O/S — OFFSET

NOTES:

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STATE OF TEXAS
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138893
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PROFESSIONAL ENGINEER

Sean McFarland
08/14/2024

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TBPE No. 455 •TBPLS No. 10048500

WT MONTGOMERY ROAD

DRAIN 'G' CULVERT PLAN & PROFILE STA. 11+60.00 TO STA. 13+62.80

SCALE: HOR: 1" = 20'
VER: 1" = 5'

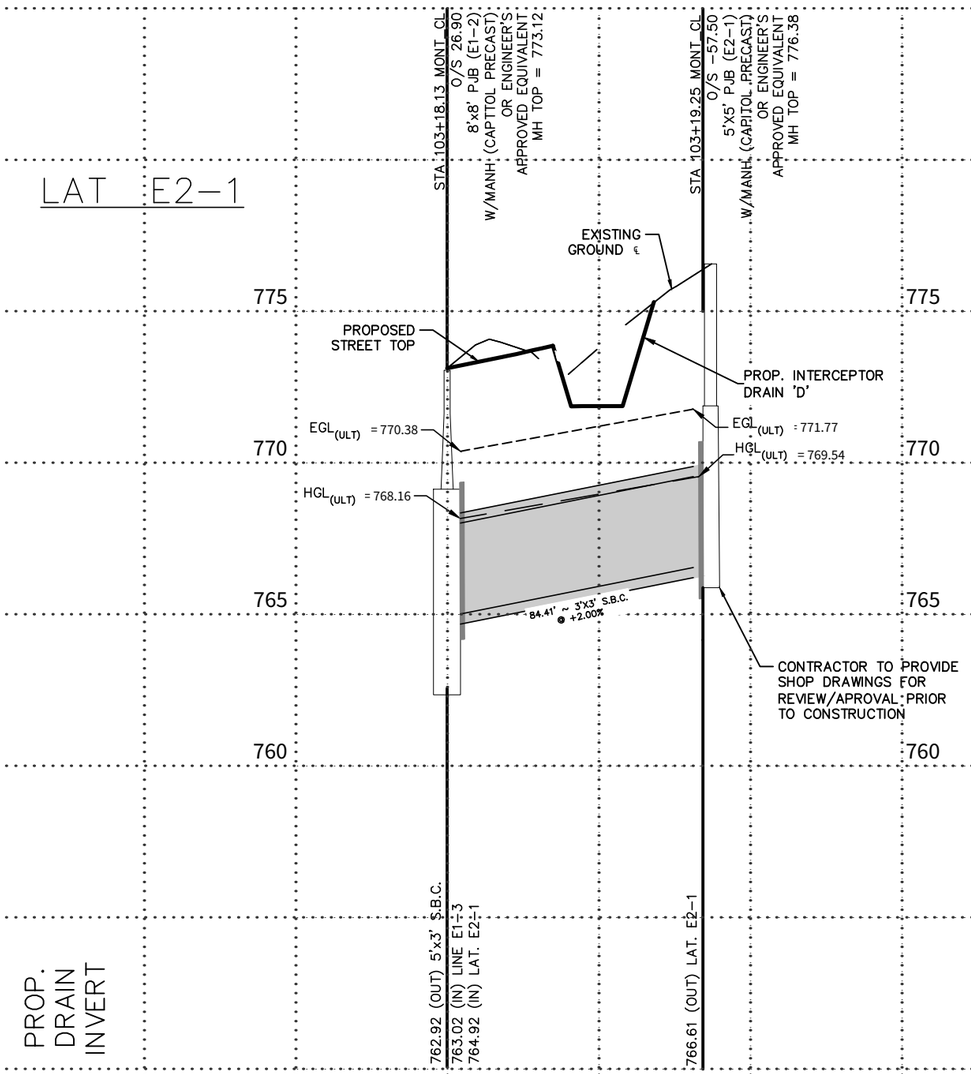
SHEET 3 OF 3

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	74

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD

LAT E2–1



SHEET SUMMARY OF ESTIMATED QUANTITIES

ITEM #	DESCRIPTION	UNIT	QTY
402	TRENCH EXCAVATION PROTECTION	LF	30
420	CLASS A CONC (COLLAR)	EA	2
462	CONC BOX CULV (3 FT X 3 FT)	LF	30
465	INLET(COMPL)(PSL)(RC)(5FTX5FT)	EA	1

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WT MONTGOMERY ROAD

LATERAL PROFILES

SCALE: HOR: 1" = 50'
VER: 1" = 5'

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	–		75
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	MONTGOMERY RD

HYDROLOGY				Sheet Flow Tc Compuations						Shallow Conc. Tc Compuations					Concentrated Tc Computations			Overall	INTENSITY			Q FLOW			
Drainage Shed/ Computation Point	Shed Area (Ac.)	AREA OF ACCUMULATION (Ac.)	C	*Length < 300'*	Paved (Y or N)	Upstream Elev.	Downstream Elev	Slope	Time of Concentration	*Length*	Paved (Y or N)	Downstream Elev	Slope	Time of Concentration	*Length*	Velocity (fps)	Time of Concentration	Time of Concentration (min)	I10	I25	I100	Q10	Q25	Q100	Drainage Shed
A13	2.44	=A13	0.95					#DIV/0!										5.00	9.06	10.83	13.54	21.00	25.10	31.39	A13
A16	24.31	=A16	0.55	*100.00*	N	864.84	860.00	4.84%	11.00	*650.00*	N	772.00	13.54%	1.81	*906.00*	6	2.52	15.00	6.08	7.24	9.03	81.29	96.80	120.74	A16
6	26.75	=A13 + A16	0.59	*100.00*	N	864.84	860.00	4.84%	11.00	*650.00*	N	772.00	13.54%	1.81	*906.00*	6	2.52	15.00	6.08	7.24	9.03	95.39	113.58	141.67	6.00
A14	1.53	=A14	0.95					#DIV/0!										5.00	9.06	10.83	13.54	13.17	15.74	19.68	A14
A17	17.70	=A17	0.55	*100.00*	N	863.0	855.0	8.00%	10.00	*650.00*	N	778.00	11.85%	1.95	*669.00*	6	1.86	14.00	6.31	7.53	9.39	61.43	73.30	91.41	A17
7	19.23	=A14 + A17	0.58	*100.00*	N	863.0	855.0	8.00%	10.00	*650.00*	N	778.00	11.85%	1.95	*669.00*	6	1.86	14.00	6.31	7.53	9.39	70.60	84.25	105.06	7.00
8	45.98	=6 + 7	0.58	*100.00*	N	864.84	860.00	4.84%	11.00	*650.00*	N	772.00	13.54%	1.81	*906.00*	6	2.52	15.00	6.08	7.24	9.03	163.41	194.59	242.70	8.00
A15	1.25	=A15	0.95					#DIV/0!										5.00	9.06	10.83	13.54	10.76	12.86	16.08	A15
A18A	15.63	=A18A	0.55	*100.0*	N	888.0	875.0	13.00%	10.00	*650.00*	N	800.00	11.54%	1.98	*763.00*	6	2.12	14.00	6.31	7.53	9.39	54.24	64.73	80.72	A18A
A18B	6.64	=A18B	0.55	*100.0*	N	869.0	860.0	9.00%	10.00	*650.00*	N	800.00	9.23%	2.20	*995.00*	6	2.76	15.00	6.08	7.24	9.03	22.20	26.44	32.98	A18B
A18C	3.44	=A18C	0.55	*100.0*	N	890.0	885.0	5.00%	11.00	*650.00*	N	800.00	13.08%	1.85	*1219.00*	6	3.39	16.00	5.87	6.99	8.71	11.11	13.23	16.48	A18C
9A	25.71	=A15 + A18	0.55	*100.0*	N	890.0	885.0	5.00%	11.00	*650.00*	N	800.00	13.08%	1.85	*1219.00*	6	3.39	16.00	5.87	6.99	8.71	83.00	98.84	123.16	9A

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WT MONTGOMERY ROAD

STORM SEWER COMPUTATIONS (PROPOSED)

SCALE: HOR: 1" = 50'
VER: 1" = 10'

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	03050.104		76
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD

HYDROLOGY				Sheet Flow Tc Compuations						Shallow Conc. Tc Compuations					Concentrated Tc Computations			Overall	INTENSITY			Q FLOW			
Drainage Shed/ Computation Point	Shed Area (Ac.)	AREA OF ACCUMULATION (Ac.)	C	*Length < 300'*	Paved (Y or N)	Upstream Elev.	Downstream Elev	Slope	Time of Concentration	*Length*	Paved (Y or N)	Downstream Elev	Slope	Time of Concentration	*Length*	Velocity (fps)	Time of Concentration	Time of Concentration (min)	I10	I25	I100	Q10	Q25	Q100	Drainage Shed
A22	3.46	=A22	0.82	*173.0*	N	798.5	793.5	2.89%	14.87						*721.00*	6	2.00	17.00	5.68	6.76	8.42	16.20	19.28	24.01	A22
A13-B	1.71	=A13-B	0.95					#DIV/0!										5.00	9.06	10.83	13.54	14.72	17.59	22.00	A13-B
11	5.17	=A13B+A22	0.87	*173.0*	N	798.5	793.5	2.89%	14.87						*721.00*	6	2.00	17.00	5.68	6.76	8.42	25.43	30.26	37.69	11
A21	11.02	=A21	0.84	*185.00*	N	811.58	804.00	4.10%	14.23	*357.00*	Y	792.20	3.31%	1.60	*458.00*	6	1.27	17.00	5.68	6.76	8.42	52.58	62.58	77.94	A21
12	16.19	=11 + A21	0.85	*185.00*	N	811.58	804.00	4.10%	14.23	*357.00*	Y	792.20	3.31%	1.60	*583.00*	6	1.62	17.00	5.68	6.76	8.42	78.00	92.84	115.63	12
A25	6.22	=A25	0.87	*150.00*	N	794.39	786.23	5.44%	12.50	*725.00*	Y	770.60	2.16%	4.07	*631.00*	6	1.75	18.00	5.51	6.56	8.16	29.72	35.38	44.01	A25
A14-B	1.50	=A14-B	0.95					#DIV/0!										5.00	9.06	10.83	13.54	12.91	15.43	19.29	A14-B
13	7.72	=A14-B+A25	0.88	*150.00*	N	794.39	786.23	5.44%	12.50	*725.00*	Y	770.60	2.16%	4.07	*631.00*	6	1.75	18.00	5.51	6.56	8.16	37.57	44.73	55.64	13
A14-A	1.53	=A14-A	0.95					#DIV/0!										5.00	9.06	10.83	13.54	13.17	15.74	19.68	A14-A
14	9.25	=A14-A+13	0.89	*150.00*	N	794.39	786.23	5.44%	12.50	*725.00*	Y	770.60	2.16%	4.07	*631.00*	6	1.75	18.00	5.51	6.56	8.16	45.58	54.26	67.50	14
A23	20.64	=A23	0.84	*133.00*	N	878.40	872.41	4.50%	12.32	*1184.00*	Y	821.83	4.27%	4.67	*987.00*	6	2.74	20.00	5.22	6.21	7.71	90.50	107.67	133.67	A23
15	29.89	=14+A23	0.86	*133.0*	N	878.4	872.4	4.50%	12.32	*1184.00*	Y	821.83	4.27%	4.67	*987.00*	6	2.74	20.00	5.22	6.21	7.71	133.68	159.03	197.45	15
A13-A	1.74	=A13-A	0.95					#DIV/0!										5.00	9.06	10.83	13.54	14.98	17.90	22.38	A13-A
16	47.82	= 15+A13-A+12	0.86	*133.0*	N	878.4	872.4	4.50%	12.32	*1184.00*	Y	821.83	4.27%	4.67	*987.00*	6	2.74	20.00	5.22	6.21	7.71	214.00	254.58	316.07	16
A24	8.12	=A24	0.90	*100.00*	N	850.71	840.00	10.71%	10.00						*1000.00*	6	2.78	13.00	6.55	7.82	9.76	47.87	57.15	71.33	A24
A15-B	1.25	=A15-B	0.95					#DIV/0!										5.00	9.06	10.83	13.54	10.76	12.86	16.08	A15-B
17	9.37	=A24+A15-B	0.91	*100.00*	N	850.71	840.00	10.71%	10.00						*1000.00*	6	2.78	13.00	6.55	7.82	9.76	55.65	66.43	82.92	17
A26	12.27	=A26	0.84	*100.0*	N	845.5	842.0	3.50%	11.50						*1000.00*	6	2.78	14.00	6.31	7.53	9.39	65.04	77.61	96.78	A26
A27	8.98	=A27	0.84	*100.00*	N	830.60	827.00	3.60%	11.40						*800.00*	6	2.22	14.00	6.31	7.53	9.39	47.60	56.80	70.83	A27
18	30.62	=A26+A27+17	0.86	*100.0*	N	845.5	842.0	3.50%	11.50						*1000.00*	6	2.78	14.00	6.31	7.53	9.39	166.24	198.38	247.38	18
A15-A	1.24	=A15-A	0.95					#DIV/0!										5.00	9.06	10.83	13.54	10.67	12.76	15.95	A15-A
19	31.86	= 18+A15-A	0.86	*100.0*	N	845.5	842.0	3.50%	11.50						*1000.00*	6	2.78	14.00	6.31	7.53	9.39	173.67	207.25	258.45	19

STATE OF TEXAS
SEAN P. MCFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

Sean McFarland
08/14/2024

CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112
TBPE No. 455 •TBPLS No. 10048500

WT MONTGOMERY ROAD

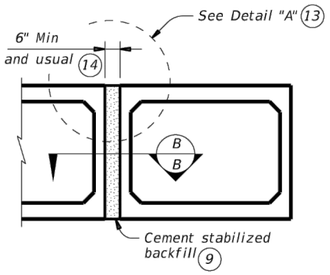
STORM SEWER COMPUTATIONS (ULTIMATE)

SCALE: HOR: 1" = 50'
VER: 1" = 10'

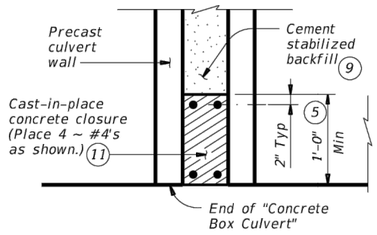
FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	77

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD

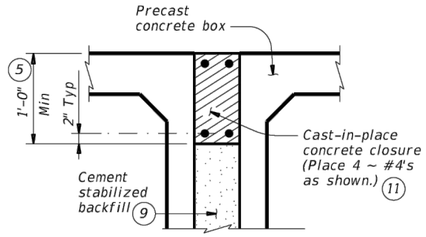
DATE:
FILE:



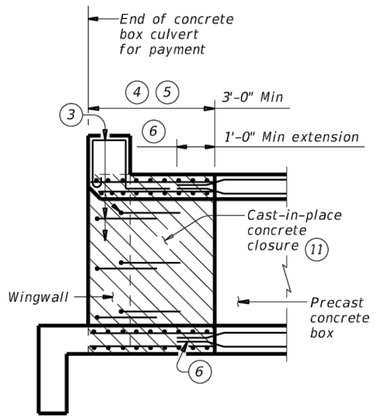
MULTIPLE UNIT PLACEMENT



SECTION B-B

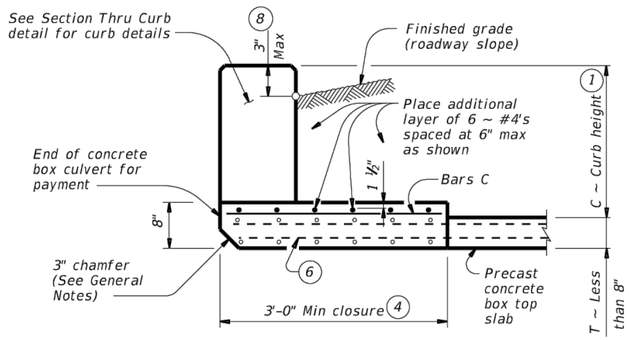


DETAIL "A" (13)

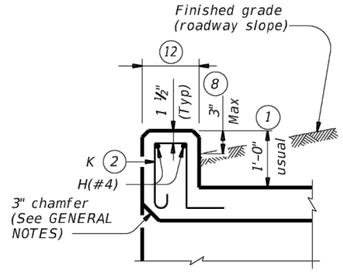


WINGWALL CONNECTION

(Also applies to safety end treatment.)

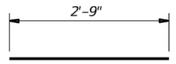


SECTION THRU TOP SLABS LESS THAN 8"

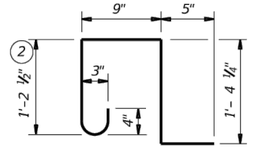


SECTION THRU CURB

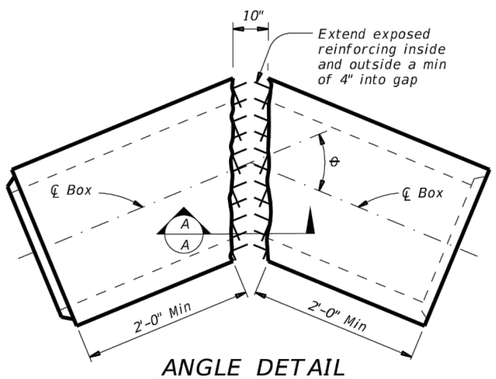
QUANTITIES PER FOOT OF CURB (10)	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



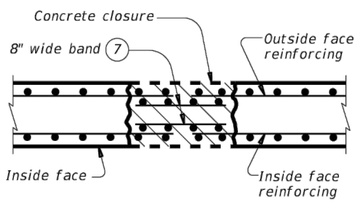
BARS C (#4)
(Spa = 1'–0" Max)



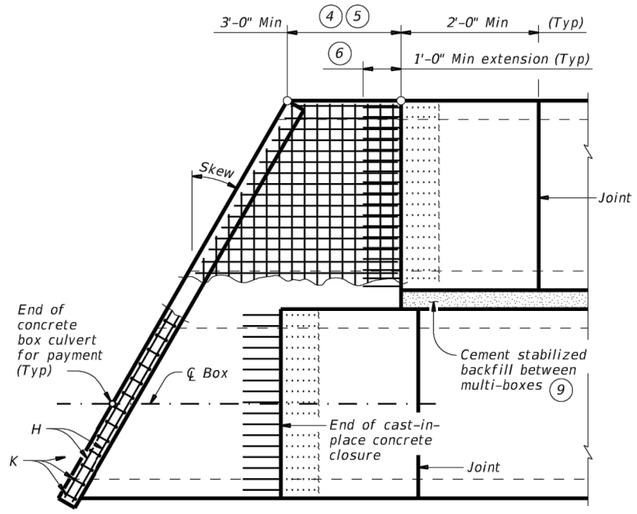
BARS K (#4)
(Spa = 1'–0" Max)
(Length = 4'–2")



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi–box placement.)

1. 0" Min to 5'–0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'–0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631–CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For curbs less than 1'–0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

3. Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.

4. Provide a 3'–0" Min cast–in–place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast–in–place closure flush with the inside and outside faces of the precast box section.

5. For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'–0" Min cast–in–place closure in the top slab, bottom slab, and exterior wall. See Section B–B detail when interior walls are cast full length.

6. Extend precast box reinforcing a minimum of 1'–0" into concrete closure (Typ).

7. Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.

8. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

9. Cement stabilized backfill between boxes is considered part of the box culvert for payment.

10. All curb concrete and reinforcing is considered part of the box culvert for payment.

11. Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.

12. 1'–0" typical. 2'–3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.

13. For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".

14. This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide ASTM A1064 welded wire reinforcement.
Provide Class C concrete (f'c = 3,600 psi) for the closures.
Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
Any additional concrete required for the closures will be considered subsidiary to the box culvert.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.
Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bars dimensions are out–to–out of bars.

HL93 LOADING

Texas Department of Transportation

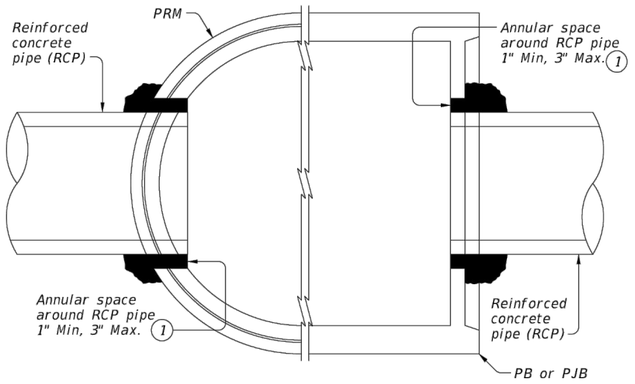
Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

FILE: scpmdsts-20.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO.
				78

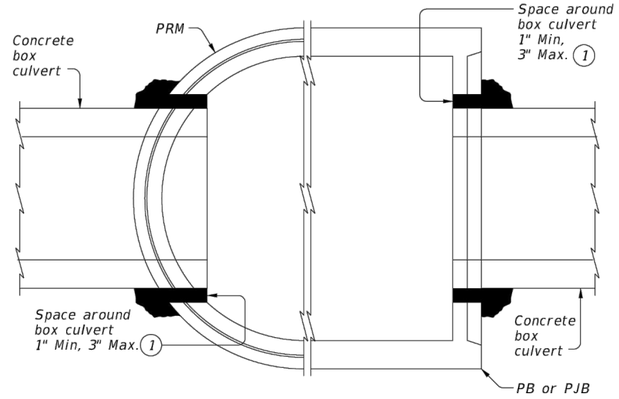
DATE:
FILE:



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

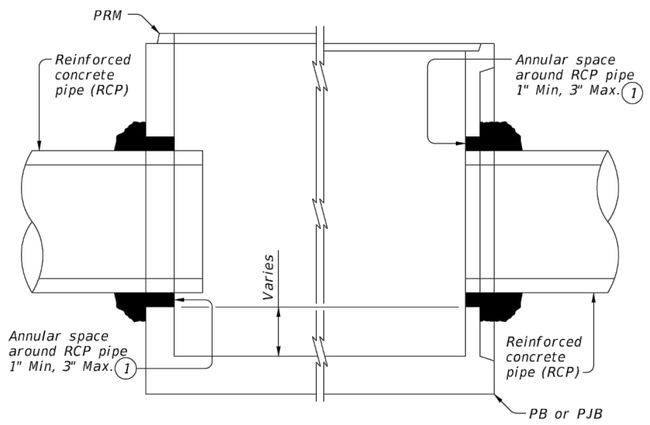
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

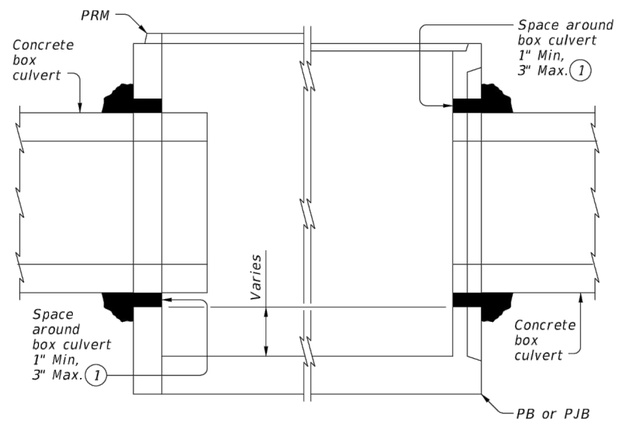
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

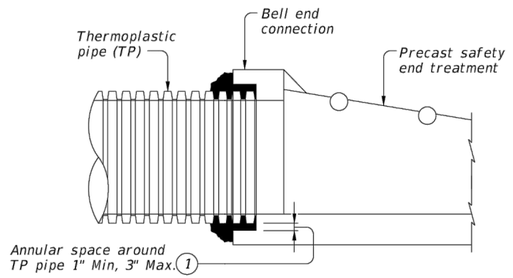
TYPICAL HALF ELEVATION



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF ELEVATION



TYPICAL PARTIAL ELEVATION OF PRECAST SAFETY END TREATMENTS

Showing square PSET for parallel drainage, cross drainage shown similar.

(1) Completely fill the void between the precast structure and the connecting pipe or box with cementitious grouts and mortars in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

CONSTRUCTION NOTES:

Do not grout rubber gasket joints without Manufacturer's recommendations.

Do not use bricks, masonry blocks, native stone, or similar materials in conjunction with grouted connections when filling void spaces around pipes or box culverts.

MATERIAL NOTES:

Provide grouted connections in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

GENERAL NOTES:

See applicable standards for notes and details not shown:
- Precast Base (PB)
- Precast Junction Box (PJB)
- Precast Round Manhole (PRM)
- Precast Safety End Treatments C/D Square (PSET-SC)
- Precast Safety End Treatments P/D Square (PSET-SP)

Provide Concrete Box Culverts in accordance with Item 462 "Concrete Box Culverts and Drains".

Provide Reinforced Concrete Pipe (RCP) in accordance with Item 464 "Reinforced Concrete Pipe".

Provide Thermoplastic Pipe (TP) in accordance with Special Specification Thermoplastic Pipe.

Payment for grouted connections is considered subsidiary to other bid Items.

Texas Department of Transportation

Bridge Division Standard

PIPE AND BOX GROUTED CONNECTIONS FOR PRECAST STRUCTURES

PBGC

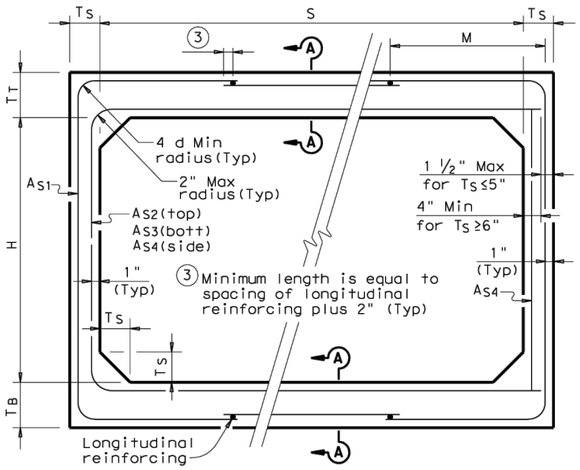
FILE: pbgcstd1-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR		
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0915	12	584	CRESTWAY RD.		
	DIST	COUNTY		SHEET NO.		
	SA	BEXAR		79		

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (in²/ft) ②								① Lift Weight (Tons)	Governing ASTM Standard
S (ft)	H (ft)	T_T (in)	T_B (in)	T_S (in)	(ft)	(in)	A_{S1}	A_{S2}	A_{S3}	A_{S4}	A_{S7}	A_{S8}	A_{S5}	A_{S6}		
3	2	7	6	4	< 2	-	0.17	0.34	0.20	0.13	0.17	0.14	0.17	0.17	3.3	C 850
3	2	4	4	4	2	17	0.19	0.20	0.21	0.10	-	-	-	-	2.4	C 789
3	2	4	4	4	3	15	0.10	0.11	0.11	0.10	-	-	-	-	2.4	C 789
3	2	4	4	4	8	15	0.10	0.10	0.10	0.10	-	-	-	-	2.4	C 789
3	2	4	4	4	10	15	0.10	0.11	0.11	0.10	-	-	-	-	2.4	C 789
3	2	4	4	4	12	14	0.10	0.13	0.13	0.10	-	-	-	-	2.4	C 789
3	2	4	4	4	14	14	0.11	0.14	0.14	0.10	-	-	-	-	2.4	C 789
3	2	4	4	4	16	14	0.12	0.16	0.16	0.10	-	-	-	-	2.4	C 789
3	2	4	4	4	18	14	0.13	0.17	0.18	0.10	-	-	-	-	2.4	C 789
3	2	4	4	4	20	14	0.14	0.19	0.19	0.10	-	-	-	-	2.4	C 789
3	3	7	6	4	< 2	-	0.13	0.36	0.22	0.13	0.17	0.14	0.18	0.17	3.7	C 850
3	3	4	4	4	2	27	0.15	0.24	0.25	0.10	-	-	-	-	2.8	C 789
3	3	4	4	4	3	20	0.10	0.13	0.14	0.10	-	-	-	-	2.8	C 789
3	3	4	4	4	6	17	0.10	0.10	0.10	0.10	-	-	-	-	2.8	C 789
3	3	4	4	4	8	15	0.10	0.11	0.11	0.10	-	-	-	-	2.8	C 789
3	3	4	4	4	10	15	0.10	0.12	0.13	0.10	-	-	-	-	2.8	C 789
3	3	4	4	4	12	15	0.10	0.14	0.14	0.10	-	-	-	-	2.8	C 789
3	3	4	4	4	14	15	0.10	0.15	0.16	0.10	-	-	-	-	2.8	C 789
3	3	4	4	4	16	15	0.10	0.17	0.18	0.10	-	-	-	-	2.8	C 789
3	3	4	4	4	18	15	0.10	0.19	0.19	0.10	-	-	-	-	2.8	C 789
3	3	4	4	4	20	15	0.11	0.21	0.21	0.10	-	-	-	-	2.8	C 789

① For Box Length = 8'-0"

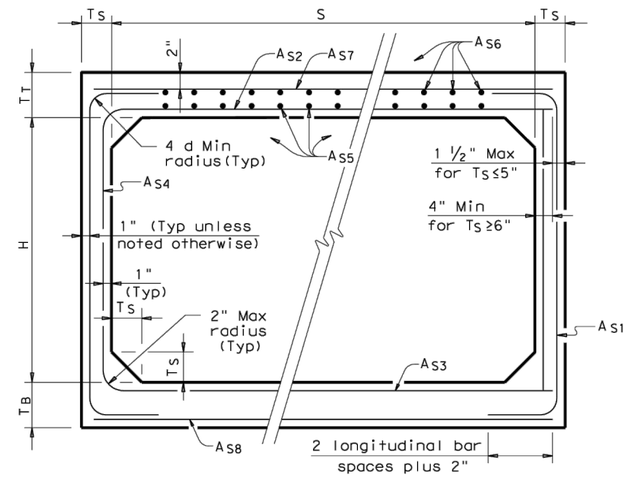
② A_{S1} thru A_{S4}, A_{S7} and A_{S8} are minimum required areas of reinforcement per linear foot of box length. A_{S6} and A_{S5} are minimum required areas of reinforcement per linear foot of box width.



C789 CORNER OPTION "A"

C789 CORNER OPTION "B"

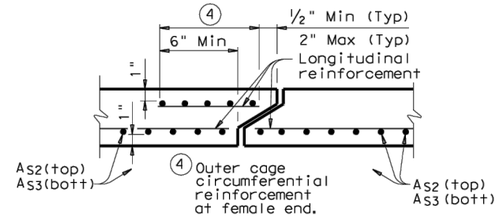
ASTM C789 STANDARD



C850 CORNER OPTION "A"

C850 CORNER OPTION "B"

ASTM C850 STANDARD



SECTION A-A

(TOP AND BOTTOM SLAB JOINT REINFORCEMENT)

GENERAL NOTES:

Designs shown conform to ASTM C789 or ASTM C850. Refer to ASTM C789 or ASTM C850 for information or details not shown.

For ASTM C789 designs, all reinforcing steel shall have a minimum specified yield stress of 65 ksi.

For ASTM C850 designs, all reinforcing steel shall have a minimum specified yield stress of 60 ksi.

All concrete shall be Class "H" Concrete with a minimum compressive strength of 5,000 psi.

See SCP-MD standard sheet for miscellaneous details and notes not shown.

Designed to the maximum fill height shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Shop plans for alternate designs shall be submitted in accordance with Item "Precast Concrete Structures".

HS20 LOADING

Texas Department of Transportation
Bridge Division

SINGLE BOX CULVERTS PRECAST
3'-0" SPAN

SCP-3

FILE: scp03ste.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT December 2003	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS				80
	COUNTY	CONTROL	SECT	JOB	HIGHWAY

LEVELS DISPLAYED
ACC:
1

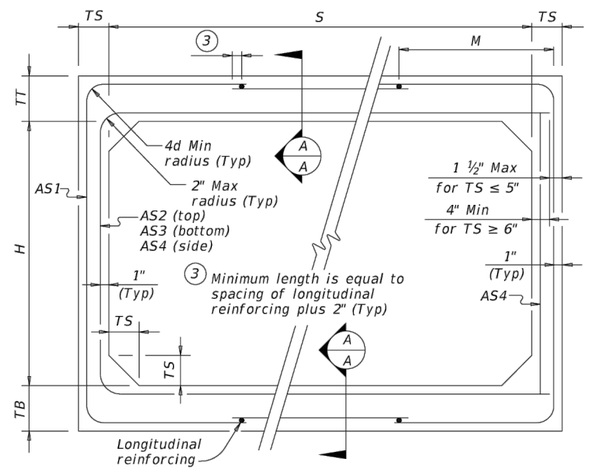
DATE:
FILE:

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) ②							① Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
4	2	7.5	6	5	< 2	–	0.18	0.27	0.15	0.12	0.18	0.18	0.14	4.5
4	2	5	5	5	2 < 3	38	0.18	0.19	0.17	0.12	–	–	–	3.6
4	2	5	5	5	3 – 5	38	0.13	0.13	0.13	0.12	–	–	–	3.6
4	2	5	5	5	10	38	0.12	0.12	0.12	0.12	–	–	–	3.6
4	2	5	5	5	15	38	0.14	0.16	0.16	0.12	–	–	–	3.6
4	2	5	5	5	20	38	0.18	0.20	0.21	0.12	–	–	–	3.6
4	2	5	5	5	25	38	0.23	0.25	0.25	0.12	–	–	–	3.6
4	2	5	5	5	30	38	0.28	0.30	0.30	0.12	–	–	–	3.6
4	3	7.5	6	5	< 2	–	0.18	0.31	0.18	0.12	0.18	0.18	0.14	5.0
4	3	5	5	5	2 < 3	38	0.15	0.23	0.20	0.12	–	–	–	4.1
4	3	5	5	5	3 – 5	38	0.12	0.16	0.16	0.12	–	–	–	4.1
4	3	5	5	5	10	38	0.12	0.14	0.14	0.12	–	–	–	4.1
4	3	5	5	5	15	38	0.12	0.18	0.18	0.12	–	–	–	4.1
4	3	5	5	5	20	38	0.14	0.23	0.24	0.12	–	–	–	4.1
4	3	5	5	5	25	38	0.17	0.29	0.29	0.12	–	–	–	4.1
4	3	5	5	5	30	38	0.21	0.35	0.35	0.12	–	–	–	4.1
4	4	7.5	6	5	< 2	–	0.18	0.33	0.20	0.12	0.18	0.18	0.14	5.5
4	4	5	5	5	2 < 3	38	0.12	0.26	0.23	0.12	–	–	–	4.6
4	4	5	5	5	3 – 5	38	0.12	0.18	0.18	0.12	–	–	–	4.6
4	4	5	5	5	10	38	0.12	0.15	0.15	0.12	–	–	–	4.6
4	4	5	5	5	15	38	0.12	0.19	0.20	0.12	–	–	–	4.6
4	4	5	5	5	20	38	0.12	0.25	0.25	0.12	–	–	–	4.6
4	4	5	5	5	25	38	0.14	0.31	0.31	0.12	–	–	–	4.6
4	4	5	5	5	30	38	0.17	0.37	0.37	0.12	–	–	–	4.6

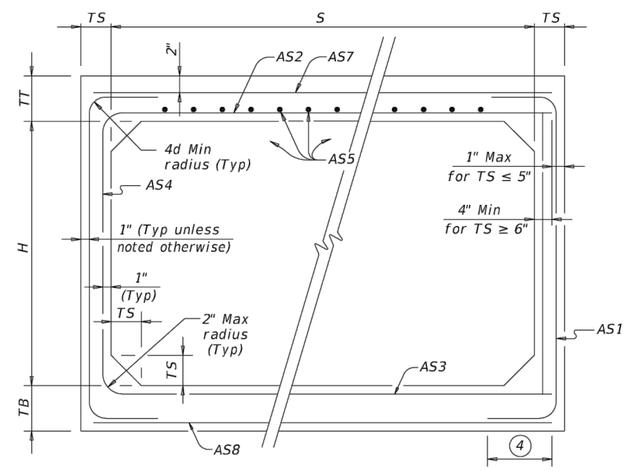
① For box length = 8'-0"

② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

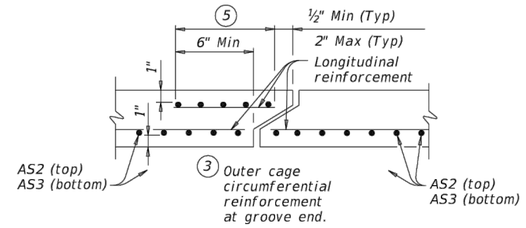
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

④ Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

4'-0" SPAN

SCP-4

FILE: scp04sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	584	CRESTWAY RD.
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		81

BOX DATA

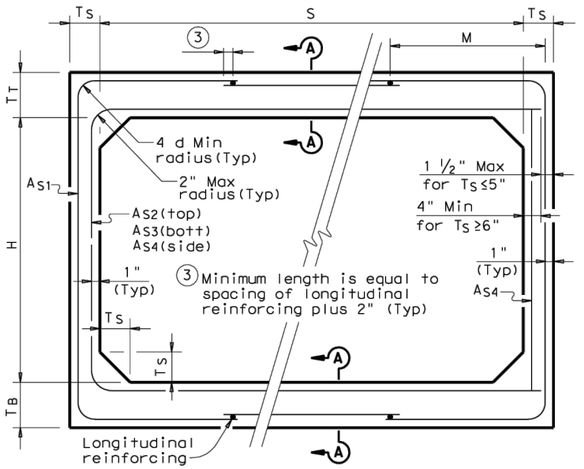
SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (in²/ft) ②								① Lift Weight (Tons)	Governing ASTM Standard
S (ft)	H (ft)	T_T (in)	T_B (in)	T_S (in)	(ft)	(in)	A_{S1}	A_{S2}	A_{S3}	A_{S4}	A_{S7}	A_{S8}	A_{S5}	A_{S6}		
5	3	8	7	6	< 2	-	0.22	0.41	0.22	0.14	0.19	0.17	0.19	0.19	6.6	C 850
5	3	6	6	6	2	23	0.26	0.28	0.23	0.14	-	-	-	-	5.7	C 789
5	3	6	6	6	3	21	0.17	0.18	0.18	0.14	-	-	-	-	5.7	C 789
5	3	6	6	6	4	21	0.14	0.15	0.15	0.14	-	-	-	-	5.7	C 789
5	3	6	6	6	5	20	0.14	0.14	0.15	0.14	-	-	-	-	5.7	C 789
5	3	6	6	6	6	20	0.14	0.15	0.15	0.14	-	-	-	-	5.7	C 789
5	3	6	6	6	8	20	0.14	0.16	0.16	0.14	-	-	-	-	5.7	C 789
5	3	6	6	6	10	20	0.15	0.18	0.19	0.14	-	-	-	-	5.7	C 789
5	3	6	6	6	12	20	0.17	0.20	0.21	0.14	-	-	-	-	5.7	C 789
5	3	6	6	6	14	20	0.19	0.23	0.23	0.14	-	-	-	-	5.7	C 789
5	3	6	6	6	16	19	0.21	0.26	0.26	0.14	-	-	-	-	5.7	C 789
5	3	6	6	6	18	19	0.23	0.28	0.29	0.14	-	-	-	-	5.7	C 789
5	4	8	7	6	< 2	-	0.19	0.44	0.24	0.14	0.19	0.17	0.21	0.19	7.2	C 850
5	4	6	6	6	2	28	0.23	0.32	0.27	0.14	-	-	-	-	6.3	C 789
5	4	6	6	6	3	23	0.15	0.20	0.21	0.14	-	-	-	-	6.3	C 789
5	4	6	6	6	6	22	0.14	0.16	0.17	0.14	-	-	-	-	6.3	C 789
5	4	6	6	6	8	20	0.14	0.17	0.18	0.14	-	-	-	-	6.3	C 789
5	4	6	6	6	10	20	0.14	0.20	0.21	0.14	-	-	-	-	6.3	C 789
5	4	6	6	6	12	20	0.14	0.22	0.23	0.14	-	-	-	-	6.3	C 789
5	4	6	6	6	14	20	0.16	0.25	0.26	0.14	-	-	-	-	6.3	C 789
5	4	6	6	6	16	19	0.18	0.28	0.29	0.14	-	-	-	-	6.3	C 789
5	4	6	6	6	18	19	0.20	0.31	0.31	0.14	-	-	-	-	6.3	C 789
5	5	8	7	6	< 2	-	0.16	0.46	0.26	0.14	0.19	0.17	0.22	0.19	7.8	C 850
5	5	6	6	6	2	41	0.20	0.35	0.29	0.14	-	-	-	-	6.9	C 789
5	5	6	6	6	3	29	0.14	0.22	0.23	0.14	-	-	-	-	6.9	C 789
5	5	6	6	6	4	25	0.14	0.18	0.19	0.14	-	-	-	-	6.9	C 789
5	5	6	6	6	5	24	0.14	0.17	0.18	0.14	-	-	-	-	6.9	C 789
5	5	6	6	6	6	22	0.14	0.17	0.18	0.14	-	-	-	-	6.9	C 789
5	5	6	6	6	8	22	0.14	0.18	0.19	0.14	-	-	-	-	6.9	C 789
5	5	6	6	6	10	21	0.14	0.21	0.22	0.14	-	-	-	-	6.9	C 789
5	5	6	6	6	12	21	0.14	0.23	0.24	0.14	-	-	-	-	6.9	C 789
5	5	6	6	6	14	21	0.14	0.26	0.27	0.14	-	-	-	-	6.9	C 789
5	5	6	6	6	16	21	0.16	0.29	0.30	0.14	-	-	-	-	6.9	C 789
5	5	6	6	6	18	20	0.17	0.32	0.33	0.14	-	-	-	-	6.9	C 789
5	2	8	7	6	< 2	-	0.24	0.33	0.25	0.14	0.19	0.17	0.19	0.19	6.0	C 850
5	2	6	6	6	18	23	0.27	0.19	0.19	0.14	-	-	-	-	5.1	C 789

⑤

① For Box Length = 8'-0"

② A_{S1} thru A_{S4}, A_{S7} and A_{S8} are minimum required areas of reinforcement per linear foot of box length. A_{S6} and A_{S5} are minimum required areas of reinforcement per linear foot of box width.

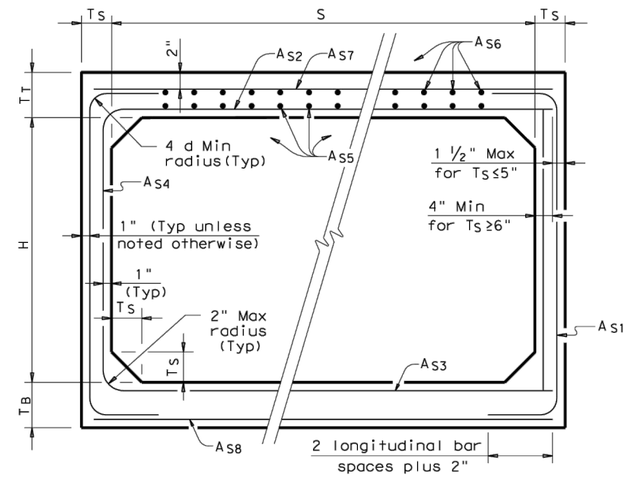
⑤ These designs were created by TxDOT and are not shown in the ASTM Specifications.



C789 CORNER OPTION "A"

C789 CORNER OPTION "B"

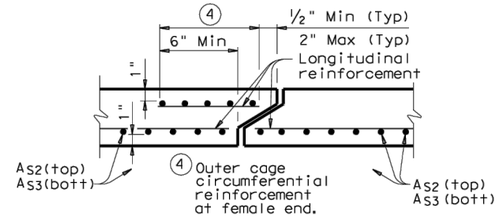
ASTM C789 STANDARD



C850 CORNER OPTION "A"

C850 CORNER OPTION "B"

ASTM C850 STANDARD



SECTION A-A

(TOP AND BOTTOM SLAB JOINT REINFORCEMENT)

GENERAL NOTES:

Designs shown conform to ASTM C789 or ASTM C850. Refer to ASTM C789 or ASTM C850 for information or details not shown.

For ASTM C789 designs, all reinforcing steel shall have a minimum specified yield stress of 65 ksi.

For ASTM C850 designs, all reinforcing steel shall have a minimum specified yield stress of 60 ksi.

All concrete shall be Class "H" Concrete with a minimum compressive strength of 5,000 psi.

See SCP-MD standard sheet for miscellaneous details and notes not shown.

Designed to the maximum fill height shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Shop plans for alternate designs shall be submitted in accordance with Item "Precast Concrete Structures".

HS20 LOADING

Texas Department of Transportation
Bridge Division

SINGLE BOX CULVERTS PRECAST
5'-0" SPAN

SCP-5

FILE: scp05ste.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT December 2003	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS				82
	COUNTY	CONTROL	SECT	JOB	HIGHWAY

LEVELS DISPLAYED
ACC:
1

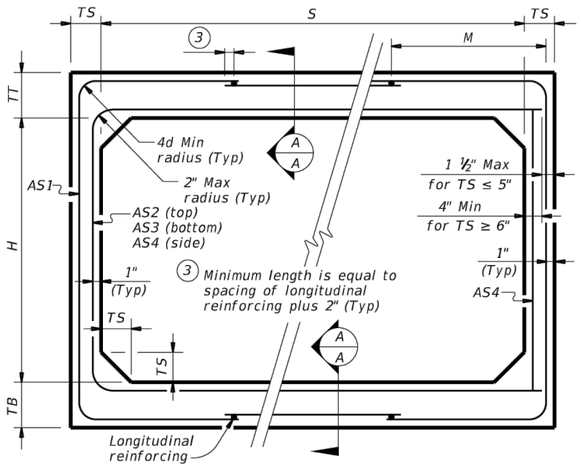
DATE:
FILE:

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
6	2	8	7	7	< 2	–	0.23	0.27	0.19	0.17	0.19	0.19	0.17	7.2
6	2	7	7	7	2 < 3	43	0.25	0.21	0.17	0.17	–	–	–	6.8
6	2	7	7	7	3 – 5	43	0.20	0.17	0.17	0.17	–	–	–	6.8
6	2	7	7	7	10	39	0.20	0.17	0.17	0.17	–	–	–	6.8
6	2	7	7	7	15	39	0.26	0.20	0.20	0.17	–	–	–	6.8
6	2	7	7	7	20	39	0.34	0.26	0.26	0.17	–	–	–	6.8
6	2	7	7	7	25	39	0.43	0.32	0.32	0.17	–	–	–	6.8
6	2	7	7	7	30	39	0.52	0.38	0.39	0.17	–	–	–	6.8
6	3	8	7	7	< 2	–	0.20	0.31	0.22	0.17	0.19	0.19	0.17	7.9
6	3	7	7	7	2 < 3	43	0.21	0.24	0.19	0.17	–	–	–	7.5
6	3	7	7	7	3 – 5	39	0.17	0.18	0.17	0.17	–	–	–	7.5
6	3	7	7	7	10	39	0.17	0.18	0.19	0.17	–	–	–	7.5
6	3	7	7	7	15	38	0.22	0.24	0.24	0.17	–	–	–	7.5
6	3	7	7	7	20	38	0.28	0.31	0.31	0.17	–	–	–	7.5
6	3	7	7	7	25	38	0.35	0.38	0.39	0.17	–	–	–	7.5
6	3	7	7	7	30	38	0.42	0.46	0.46	0.17	–	–	–	7.5
6	4	8	7	7	< 2	–	0.19	0.34	0.25	0.17	0.19	0.19	0.17	8.6
6	4	7	7	7	2 < 3	43	0.19	0.27	0.21	0.17	–	–	–	8.2
6	4	7	7	7	3 – 5	39	0.17	0.21	0.19	0.17	–	–	–	8.2
6	4	7	7	7	10	39	0.17	0.20	0.21	0.17	–	–	–	8.2
6	4	7	7	7	15	38	0.18	0.27	0.27	0.17	–	–	–	8.2
6	4	7	7	7	20	38	0.24	0.34	0.35	0.17	–	–	–	8.2
6	4	7	7	7	25	38	0.29	0.43	0.42	0.17	–	–	–	8.2
6	4	7	7	7	30	38	0.35	0.51	0.52	0.17	–	–	–	8.2
6	5	8	7	7	< 2	–	0.19	0.37	0.28	0.17	0.19	0.19	0.17	9.3
6	5	7	7	7	2 < 3	43	0.17	0.30	0.24	0.17	–	–	–	8.9
6	5	7	7	7	3 – 5	43	0.17	0.23	0.21	0.17	–	–	–	8.9
6	5	7	7	7	10	39	0.17	0.22	0.23	0.17	–	–	–	8.9
6	5	7	7	7	15	38	0.17	0.28	0.29	0.17	–	–	–	8.9
6	5	7	7	7	20	38	0.20	0.37	0.38	0.17	–	–	–	8.9
6	5	7	7	7	25	38	0.25	0.45	0.46	0.17	–	–	–	8.9
6	5	7	7	7	30	38	0.30	0.54	0.55	0.17	–	–	–	8.9
6	6	8	7	7	< 2	–	0.19	0.38	0.30	0.17	0.19	0.19	0.17	10
6	6	7	7	7	2 < 3	52	0.17	0.32	0.26	0.17	–	–	–	9.6
6	6	7	7	7	3 – 5	52	0.17	0.24	0.22	0.17	–	–	–	9.6
6	6	7	7	7	10	43	0.17	0.23	0.24	0.17	–	–	–	9.6
6	6	7	7	7	15	39	0.17	0.29	0.31	0.17	–	–	–	9.6
6	6	7	7	7	20	39	0.18	0.38	0.39	0.17	–	–	–	9.6
6	6	7	7	7	25	38	0.23	0.46	0.48	0.17	–	–	–	9.6
6	6	7	7	7	30	38	0.27	0.55	0.57	0.17	–	–	–	9.6

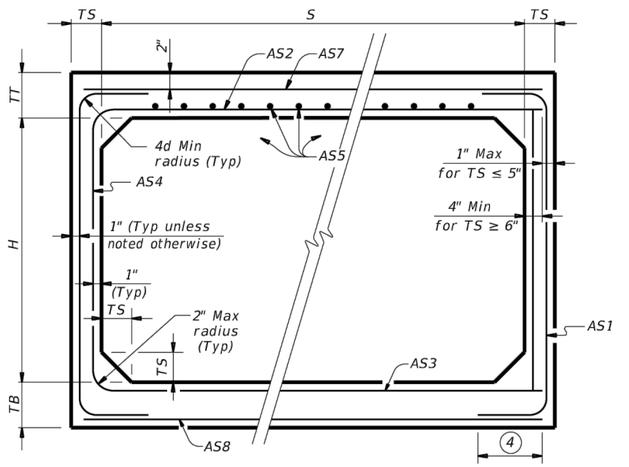
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

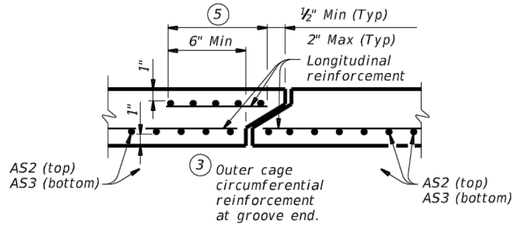
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation | Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

6'-0" SPAN

SCP-6

FILE: scp06sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				83

	Size	MAX DEPTH = 15 ft. to top of BASE SLAB										MAX DEPTH = 25 ft. to top of BASE SLAB										Min Height (See Gen Note 3)	Max HOLE DIA (See Fab Note 2)	Max KO DIA (See Fab Note 2)
		Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)				Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)						
		Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness			
	X x Y	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	BH MIN	HOLE DIA	KO DIA
	ft.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	ft.	in.	in.
Precast Junction Box (PJB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	0.37	0.37	9	0.29	0.29	6	0.24	0.24	6	N/A	0.37	0.37	9	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	0.41	0.41	9	0.47	0.47	6	0.38	0.38	6	N/A	0.41	0.41	9	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	N/A	0.48	0.48	9	0.39	0.18	6	0.23	0.59	6	N/A	0.48	0.48	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	N/A	0.42	0.42	9	0.53	0.26	6	0.39	0.59	6	N/A	0.42	0.42	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	N/A	0.43	0.43	9	0.62	0.62	6	0.59	0.59	6	N/A	0.43	0.43	9	5.5	60	60
	5x6	0.27	0.27	9	0.34	0.45	6	N/A	0.48	0.48	9	0.47	0.45	9	0.38	0.54	8	N/A	0.48	0.48	9	5.5	60/72	60/72
	6x6	0.27	0.27	9	0.45	0.45	6	N/A	0.56	0.56	9	0.52	0.52	9	0.54	0.54	8	N/A	0.56	0.56	9	6.5	72	72
	8x8	0.46	0.46	9	0.51	0.51	8	N/A	0.45	0.45	12	0.87	0.87	9	0.59	0.59	10	N/A	0.45	0.45	12	8.5	96	72
Precast Base (PB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	N/A	N/A	N/A	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	0.47	0.47	6	0.38	0.38	6	N/A	N/A	N/A	N/A	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	3x3	0.30	0.34	9	0.39	0.18	6	0.23	0.59	6	3x3	0.40	0.40	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x3	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	3x3	0.46	0.37	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	4x4	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	4x4	0.39	0.39	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	48"	0.39	0.39	9	0.53	0.26	6	0.39	0.59	6	48"	0.47	0.47	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x5	0.33	0.40	9	0.53	0.26	6	0.39	0.59	6	3x5	0.48	0.48	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	3x3	0.34	0.34	9	0.62	0.62	6	0.59	0.59	6	3x3	0.53	0.53	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	4x4	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	4x4	0.64	0.64	9	5.5	60	60
	5x5	0.38	0.38	6	0.34	0.34	6	48"	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	48"	0.64	0.64	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	3x5	0.34	0.40	9	0.62	0.62	6	0.59	0.59	6	3x5	0.53	0.53	9	5.5	60	60
	5x6	0.31	0.31	9	0.34	0.45	6	3x3	0.34	0.34	9	0.47	0.45	9	0.38	0.54	8	3x3	0.61	0.50	9	5.5	60/72	60/72
	5x6	0.27	0.27	9	0.34	0.45	6	4x4	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	4x4	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	48"	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	48"	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	3x5	0.45	0.45	9	0.47	0.45	9	0.38	0.54	8	3x5	0.61	0.61	9	5.5	60/72	60/72
	6x6	0.29	0.29	9	0.45	0.45	6	3x3	0.41	0.41	9	0.52	0.52	9	0.54	0.54	8	3x3	0.74	0.74	9	6.5	72	72
	6x6	0.27	0.27	9	0.45	0.45	6	4x4	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	4x4	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	48"	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	48"	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	3x5	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	3x5	0.87	0.87	9	6.5	72	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x3	0.61	0.61	12	0.91	0.91	9	0.70	0.70	10	3x3	0.85	0.85	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	4x4	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	4x4	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	48"	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	48"	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x5	0.70	0.85	12	0.87	0.87	9	0.70	0.70	10	3x5	1.01	1.01	12	8.5	96	72

** Unless otherwise indicated.

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.

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FABRICATION NOTES:
1. Maximum spacing of reinforcement is 8".
2. At manufacturer's option, provide cast or cored holes or thin wall panels (KO) to the maximum diameter shown for each. When no penetration is required, it is acceptable to provide a wall with no sectional reduction.

GENERAL NOTES:
1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PJB for details.
2. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PB for details.
3. Min Height shown is for stock base units. Use stock base units whenever practical. Smaller height base units can be used in special installation circumstances, when noted elsewhere in the plans. Absolute minimum height of base units is 2'-6".

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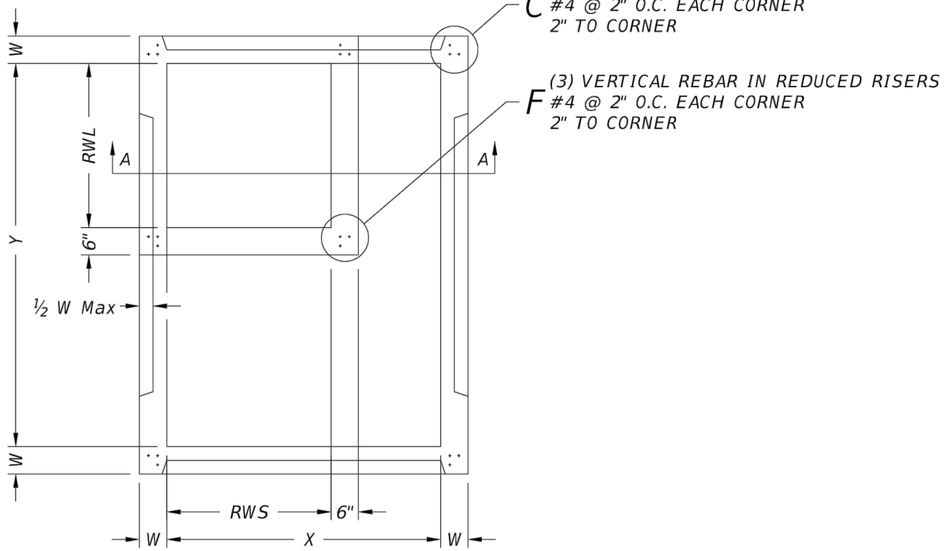
DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX

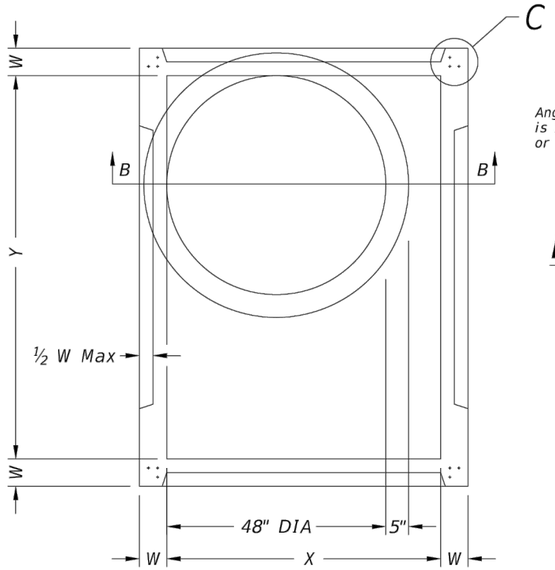
PDD

FILE: prestd10-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	584	CRESTWAY RD.
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		84



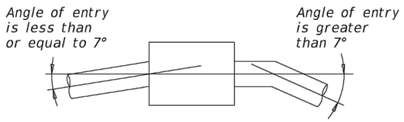
PLAN VIEW "A"

SQUARE REDUCED RISER OPTION



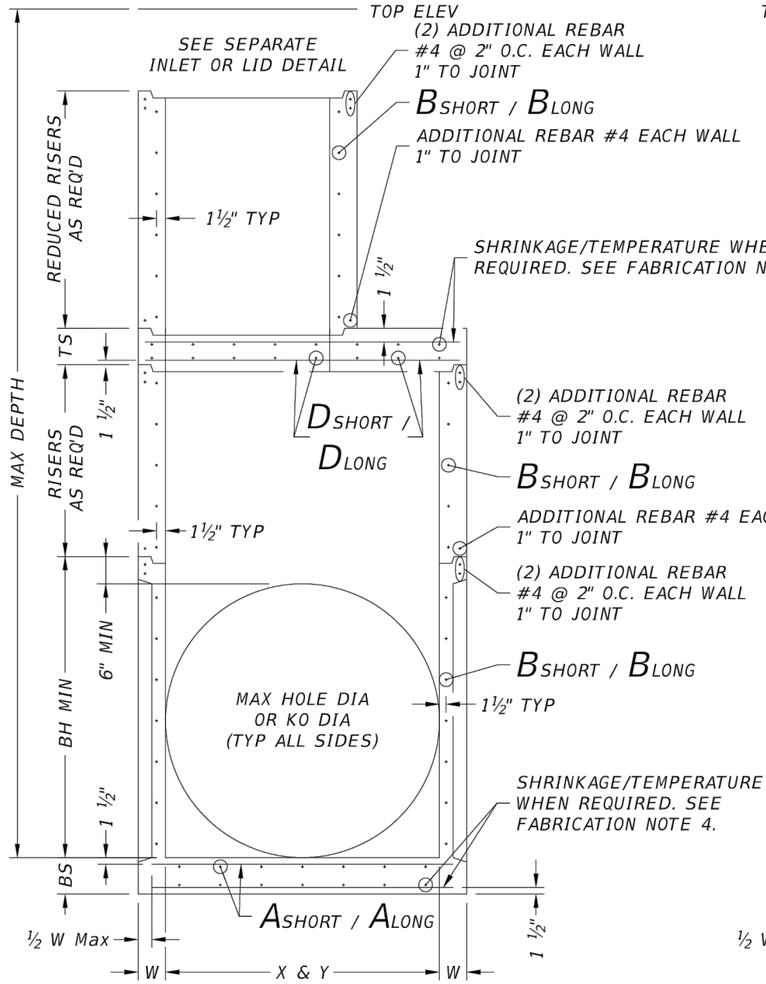
PLAN VIEW "B"

ROUND REDUCED RISER OPTION



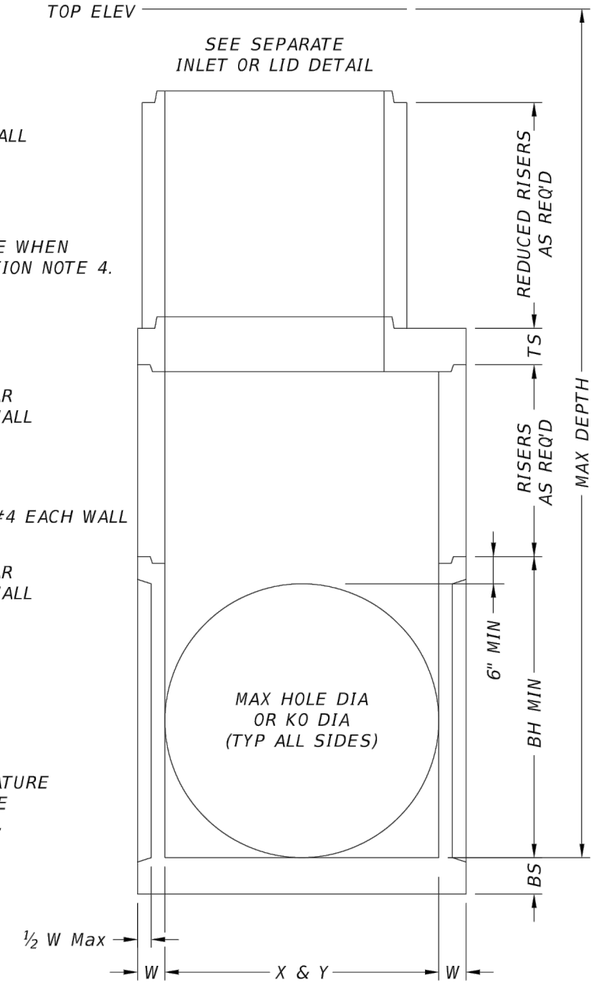
PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PB wall.
If necessary, use pipe elbow or curved
approach alignment to stay within this limit.



SECTION A-A

SQUARE REDUCED RISER OPTION



SECTION B-B

ROUND REDUCED RISER OPTION

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

Cover dimensions are clear dimensions, unless noted otherwise.

INSTALLATION NOTES:

1. If required elsewhere. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to specified inlet or manhole.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for precast base is subsidiary to the specified inlet, per Item 465, "Junction Boxes, Manholes, and Inlets."

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PRECAST BASE

PB

FILE: prestd01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0915	12	584	CRESTWAY RD.
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		85

DATE:
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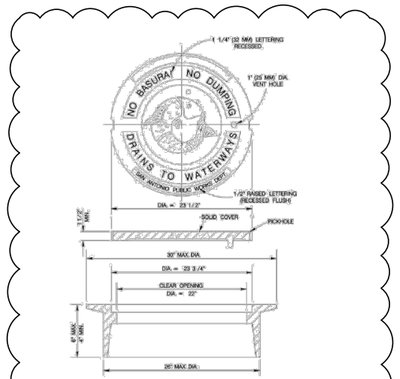
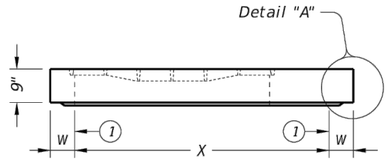


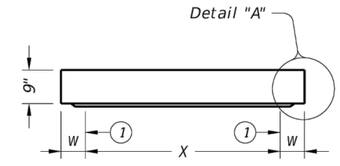
MANHOLE LID & RING DETAIL
(ITEM 409)

NOTES FOR MANHOLE LID AND RING

1. FOR LID DESIGN OUTSIDE OF CITY OF SAN ANTONIO, DELETE "SAN ANTONIO PUBLIC WORKS DEPT.".
2. CASTING NUMBER AND MANUFACTURER'S I.D. ON LID AND RING.
3. LOAD BEARING CAPABILITY OF H5-20 MINIMUM.
4. THE LOAD BEARING SURFACES SHALL BE MACHINE GROUND.
5. THE COMBINED WEIGHT OF THE MANHOLE RING AND COVER MUST BE AT LEAST 260 LBS.

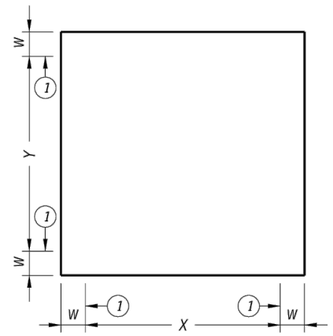


STYLE 'FG'



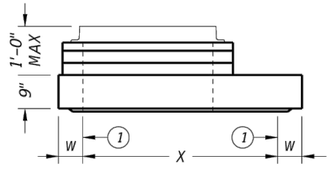
ELEVATION VIEW

STYLE 'SL'



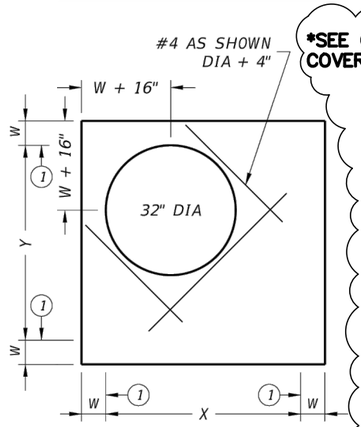
PLAN VIEW
NO OPENINGS

STYLE 'SL'



ELEVATION VIEW

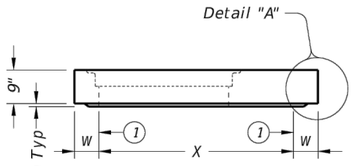
STYLE 'RH'



PLAN VIEW
SHIP LOOSE RING & COVER

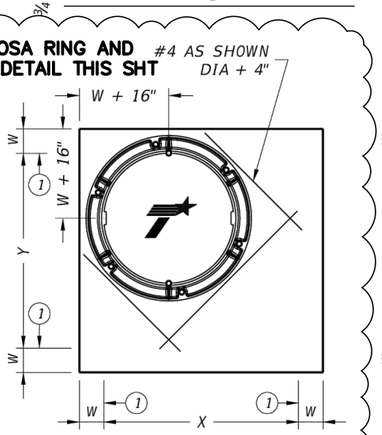
STYLE 'RH'

*SEE COSA RING AND COVER DETAIL THIS SHT



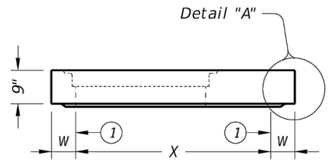
ELEVATION VIEW

STYLE 'RC'



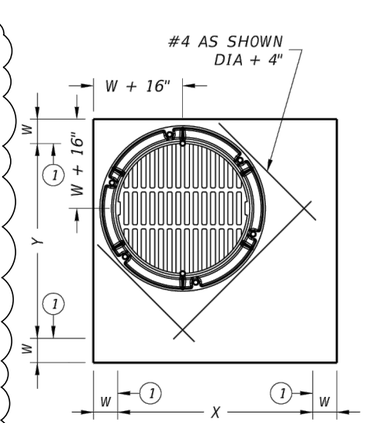
PLAN VIEW
32" DIA CAST-IN RING & COVER

STYLE 'RC'



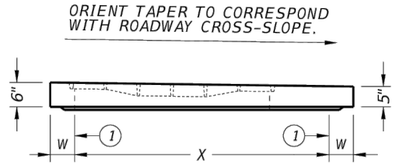
ELEVATION VIEW

STYLE 'RG'

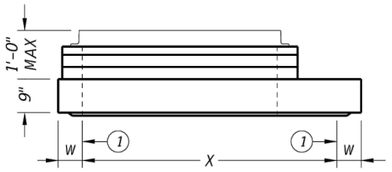


PLAN VIEW
32" DIA CAST-IN RING & GRATE

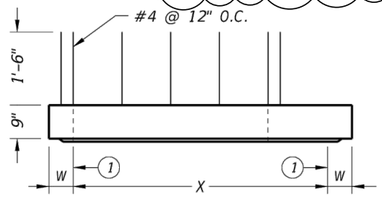
STYLE 'RG'



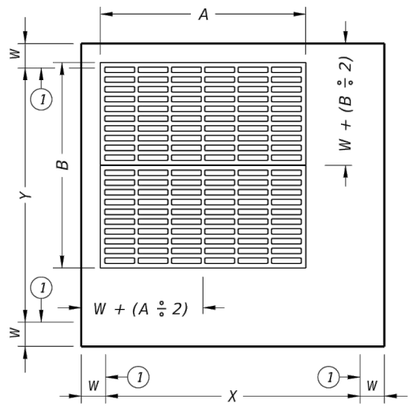
STYLE 'SFG'
ELEVATION VIEW



ELEVATION VIEW

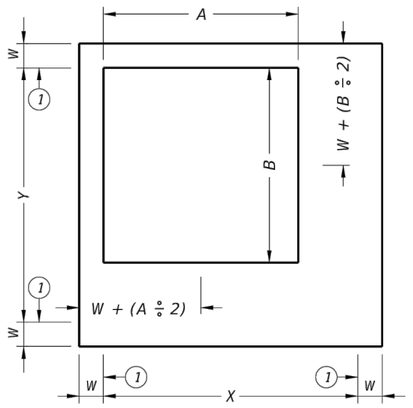


ELEVATION VIEW



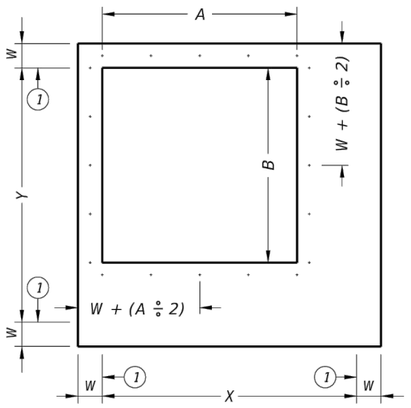
PLAN VIEW
CAST-IN FRAME & GRATE

STYLES 'FG' & 'SFG'



PLAN VIEW
SHIP LOOSE FRAME & GRATE

STYLE 'SH'



PLAN VIEW
EXPOSED REBAR

STYLE 'S1'

(1) Matches inside face of wall of precast base or riser below inlet.

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Bridge Division Standard

PRECAST SLAB LID

PSL

FILE: prestd05-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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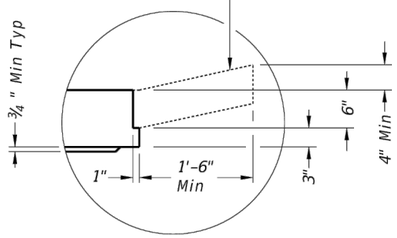
REVISIONS				
	DIST	COUNTY		SHEET NO.
				86

DATE:
FILE:

Style	Size (X x Y)	W (2)	A x B (nominal)	Short Span Reinf Steel Area	Long Span Reinf Steel Area
SL	3'x3'	6"	n/a	0.37 in²/ft	0.37 in²/ft
RH,RC,RG,SH,S1,FG	3'x3'	6"	3'x3' or 32" Dia	0.37 in²/ft	0.37 in²/ft
SFG	3'x3'	6"	3'x3'	0.32 in²/ft	0.32 in²/ft
SL	4'x4'	6"	n/a	0.34 in²/ft	0.34 in²/ft
RH,RC,RG,SH,S1,FG	4'x4'	6"	3'x3' or 32" Dia	0.41 in²/ft	0.41 in²/ft
SH,S1,FG	4'x4'	6"	4'x4'	0.41 in²/ft	0.41 in²/ft
SFG	4'x4'	6"	4'x4'	0.32 in²/ft	0.32 in²/ft
SL	3'x5'	6"	n/a	0.39 in²/ft	0.39 in²/ft
RH,RC,RG,SH,S1,FG	3'x5'	6"	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
SH,S1,FG	3'x5'	6"	3'x5'	0.48 in²/ft	0.48 in²/ft
SFG	3'x5'	6"	3'x5'	0.32 in²/ft	0.32 in²/ft
SL	4'x5'	6"	n/a	0.42 in²/ft	0.42 in²/ft
RH,RC,RG,SH,S1,FG	4'x5'	6"	3'x3' or 32" Dia	0.42 in²/ft	0.42 in²/ft
SH,S1,FG	4'x5'	6"	4'x4'	0.63 in²/ft	0.63 in²/ft
SH,S1,FG	4'x5'	6"	3'x5'	0.66 in²/ft	0.66 in²/ft
SL	5'x5'	6"	n/a	0.36 in²/ft	0.36 in²/ft
RH,RC,RG,SH,S1,FG	5'x5'	6"	3'x3' or 32" Dia	0.43 in²/ft	0.43 in²/ft
SH,S1,FG	5'x5'	6"	4'x4'	0.63 in²/ft	0.63 in²/ft
SH,S1,FG	5'x5'	6"	3'x5'	0.63 in²/ft	0.63 in²/ft
SL	5'x6'	6"/8"	n/a	0.48 in²/ft	0.48 in²/ft
RH,RC,RG,SH,S1,FG	5'x6'	6"/8"	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
SH,S1,FG	5'x6'	6"/8"	4'x4'	0.60 in²/ft	0.60 in²/ft
SH,S1,FG	5'x6'	6"/8"	3'x5'	0.60 in²/ft	0.60 in²/ft
SL	6'x6'	6"/8"	n/a	0.43 in²/ft	0.43 in²/ft
RH,RC,RG,SH,S1,FG	6'x6'	6"/8"	3'x3' or 32" Dia	0.56 in²/ft	0.56 in²/ft
SH,S1,FG	6'x6'	6"/8"	4'x4'	0.56 in²/ft	0.56 in²/ft
SH,S1,FG	6'x6'	6"/8"	3'x5'	0.59 in²/ft	0.59 in²/ft
SL	8'x8'	8"/10"	n/a	0.45 in²/ft	0.45 in²/ft
RH,RC,RG,SH,S1,FG	8'x8'	8"/10"	3'x3' or 32" Dia	0.45 in²/ft	0.45 in²/ft
SH,S1,FG	8'x8'	8"/10"	4'x4'	0.45 in²/ft	0.45 in²/ft
SH,S1,FG	8'x8'	8"/10"	3'x5'	0.45 in²/ft	0.45 in²/ft

(2) See sheet PDD for corresponding wall thickness (W) of base unit or riser.

Construct cast-in-place reinforced concrete apron, when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PSL. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"

(Reinforcing not shown for clarity)

When an apron is to be cast around PSL, use detail above to create an apron ledge on all 4 sides.

FABRICATION NOTES:

1. Locate penetration (Style 'RH'), ring and cover (Style 'RC'), ring and grate (Style 'RG'), and frame and grate (Style 'FG') in a corner. Only one penetration is allowed per slab lid.
2. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
3. Provide Grade 60 reinforcing steel or equivalent area of WWR.
4. Provide clear cover of ¾" to reinforcing from lower outside shoulder of slab for structural reinforcement, and 2" from top of slab for shrinkage and temperature reinforcement. Place short span reinforcing closest to surface.
5. Slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing. Provide steel area = 0.11 in²/ft each way.
6. No substitution is allowed for diagonal #4 bars around openings.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.

INSTALLATION NOTES:

1. Precast slab lids are intended for direct traffic and may be placed in roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. Initial installation of grade adjustment rings for Styles 'RH' and 'SH' is limited to 1'-0" Max as shown.
5. Grade adjustment rings for Styles 'RH' and 'SH' may be increased to 2'-0" Max when future construction affects final grade of structure. Make adjustments greater than 2'-0" with additional risers. Adjustments can be made up to Max depth shown on sheet PDD. Structure must be evaluated if Max depth will be exceeded.
6. Orient long dimension of grate slots perpendicular to traffic, unless noted otherwise on plans

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for lid is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

Cover dimensions are clear dimensions, unless noted otherwise.

Texas Department of Transportation

Bridge Division Standard

PRECAST SLAB LID

PSL

FILE: prestd05-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				
	DIST	COUNTY		SHEET NO.
				87

DATE:
FILE:

TABLE OF DIMENSIONS & REINFORCING STEEL
(Wings for One Structure End)

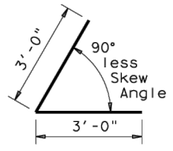
Dimensions					Variable Reinforcing				Estimated ④ Quantities per ft of wing (2~Wings)		Estimated Quantities per ft of Toewall (1~Toewall)	
					Bars J1		Bars J2					
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'- 2"	1'- 2"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'- 2"	1'- 2"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'- 9"	1'- 7"	1'- 2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'- 9"	1'- 7"	1'- 2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'- 4"	2'- 0"	1'- 4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'- 4"	2'- 0"	1'- 4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'- 0"	2'- 3"	1'- 9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'- 0"	2'- 3"	1'- 9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'- 6"	2'- 8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'- 6"	2'- 8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'- 0"	2'-10"	2'- 2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'- 5"	3'- 0"	2'- 5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'- 2"	3'- 6"	2'- 8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'- 8"	3'- 9"	2'-11"	1'- 0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'- 2"	4'- 0"	3'- 2"	1'- 2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'- 5"	3'- 5"	1'- 4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'- 6"	4'-10"	3'- 8"	1'- 6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'- 0"	3'-11"	1'- 7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING (2~Wings)

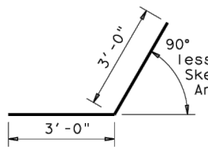
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

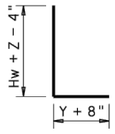
Bar	Size	No	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



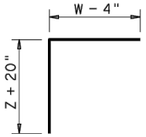
BARS D1



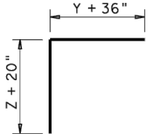
BARS D2



BARS J1



BARS J2



BARS J3

BARS V

WING DIMENSION CALCULATIONS:

Formulas: (All values are in Feet)

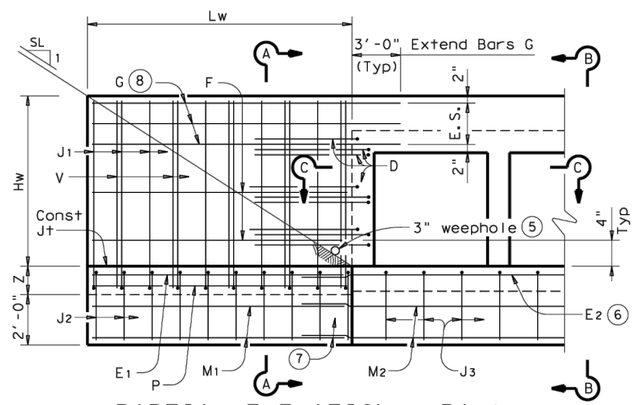
Hw = H + T + C
Lw = (Hw) (SL) ÷ Cosine θ for Ty PW-1
= (Hw - 1') (SL) ÷ Cosine θ for Ty PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ Cosine θ for Ty PW-2 and Hw < 4'

For Cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ Cosine θ

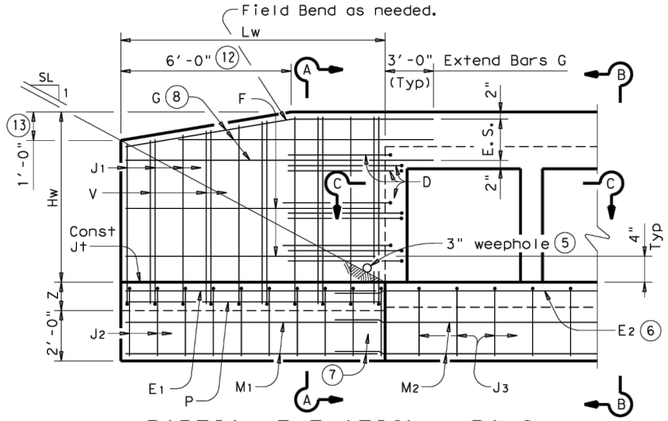
For Precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ Cosine θ
Total Wingwall Area (Two Wings ~ SF)
= (2)(Hw)(Lw) for Ty PW-1
= (2)(Hw)(Lw) - 6 SF for Ty PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) - 1.5 SF for Ty PW-2 and Hw < 4'

Hw = Height of Wingwall
Lw = Length of Wingwall
Ltw = Culvert Toewall Length
N = Number of Culvert Spans
SL:1 = Channel Slope ratio. (Horizontal: 1 Vertical, Usual value is 2:1)
θ = Culvert Skew

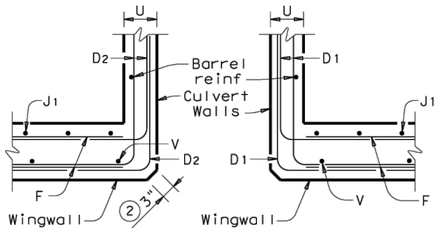
See applicable box culvert standard for S, H, T and U values.



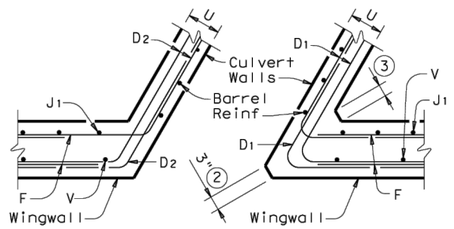
PARTIAL ELEVATION - PW-1



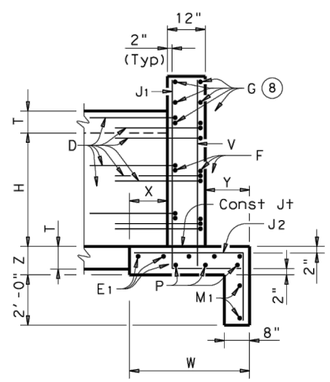
PARTIAL ELEVATION - PW-2



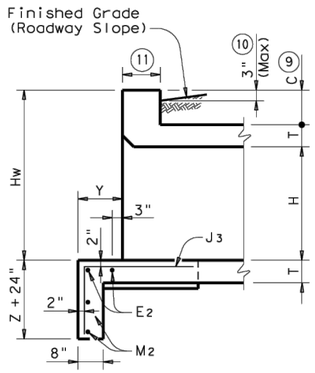
SECTION C-C



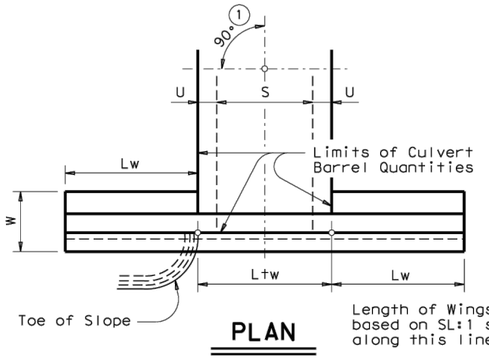
SECTION C-C



SECTION A-A
(Showing Wing Reinf)

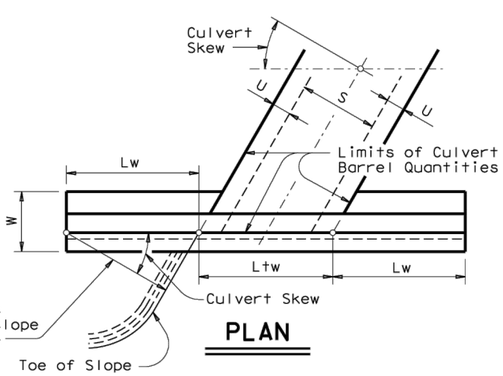


SECTION B-B
(Showing Wing Reinf)



PLAN

DETAILS FOR
NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR
SKEWED BOX CULVERTS
(Showing 30° Skew)

① Skew Angle = 0°

② At discharge end, chamfer may be ¾".

③ For 15° Skew ~ 1"
For 30° Skew ~ 2"
For 45° Skew ~ 3"

④ Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.

⑤ Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.

⑥ Extend Bars E2 1'-6" minimum into the wingwall footing.

⑦ Lap Bars M1 1'-6" minimum with Bars M2.

⑧ Bars G equally spaced at 8" maximum, place as shown. Provide at least two pair Bars G per wing.

⑨ 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.

⑩ For vehicle safety, the following requirements must be met:
- For structures without bridge rail, curbs cannot project more than 3" above finished grade.
- For structures with bridge rail, build curbs flush with finished grade.
Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

⑪ 1'-0" typical. 2'-0" typical when RAC standard is referenced elsewhere in the plans.

⑫ 3'-0" for Hw < 4'.

⑬ 6" for Hw < 4'.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

Provide Class "C" Concrete (f'c = 3,600 psi Min) and Grade 60 reinforcing steel.

Provide 1 ¼" Min clear cover to reinforcing steel.

Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.

See BCS sheet for wingwall type and additional dimensions and information.

The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

DESIGNER NOTES:

Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.

Type PW-2 can only be used for applications without a railing mounted to the wingwall.

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS
TYPES PW-1 AND PW-2

PW

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11-10: Reinforcing Quantities. 01-12: PW-1 & PW-2.	DIST	COUNTY		SHEET NO.
				88

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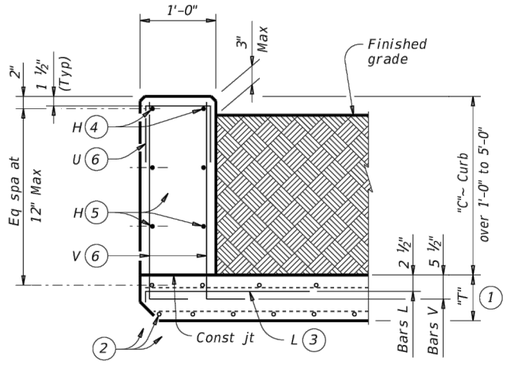
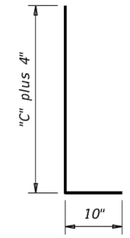
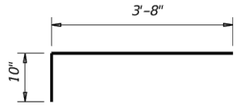


TYPICAL SECTION

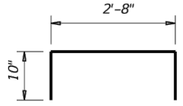
Used for curbs over 1'–0" to 5'–0"



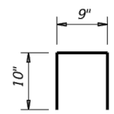
BARS V (#5) (6)
Spaced at 12" Max



BARS L (#5) (3)
Spaced at 12" Max



OPTIONAL BARS L (#5) (3) (7)
Spaced at 12" Max



BARS U (#4) (6)
Spaced at 12" Max

(1) "T" is equal to the culvert top slab thickness. For precast boxes with slabs less than 8" thick, see SCP-MD standard for additional details.

(2) Adjust normal culvert slab bars as necessary to clear obstructions.

(3) Place bars L as shown. Tilt hook as necessary to maintain cover.

(4) Place normal culvert curb bars H(#4) as shown. Adjust as necessary to clear obstructions.

(5) Additional bars H(#4) as required to maintain 12" Max spacing.

(6) Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.

(7) Optional bars L are to be used only for precast box culverts with 3'–0" closure pour.

(8) Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES (8)

Curb Height "C"	Conc (CY/LF)	Reinf Steel (Lb/LF)
1'–0"	0.037	10.4
1'–6"	0.056	14.5
2'–0"	0.074	15.6
2'–6"	0.093	18.0
3'–0"	0.111	19.0
3'–6"	0.130	21.3
4'–0"	0.148	22.4
4'–6"	0.167	24.8
5'–0"	0.185	25.9

CONSTRUCTION NOTES:

Adjust reinforcing steel as necessary to provide 1 ¼" cover.

For vehicle safety, top of the curb must not project more than 3" above the finished grade.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide galvanized reinforcing steel if required elsewhere in the plans.

Provide Class "C" concrete (f'c = 3,600 psi) minimum for curbs.

Provide bar laps, where required, as follows:

- Uncoated or galvanized ~ #4 = 1'–8" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

These extended curb details have sufficient strength to allow for future retrofit of Type T631 or T631LS railing. These details are suitable for use with PR11, PR22 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T631 or T631LS railing, use the T631-CM standard.

This Curb is considered as part of the Box Culvert for payment.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation

Bridge Division Standard

EXTENDED CURB DETAILS

FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 5'-0" TALL

ECD

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REVISIONS				
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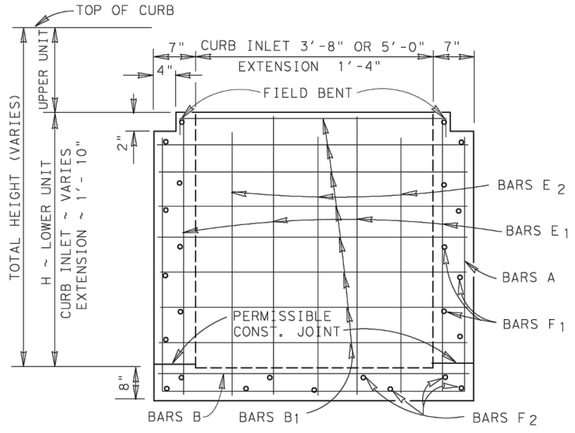
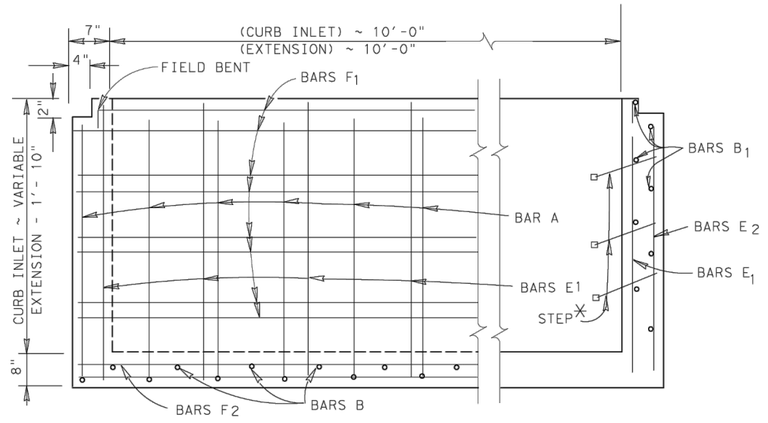
				89

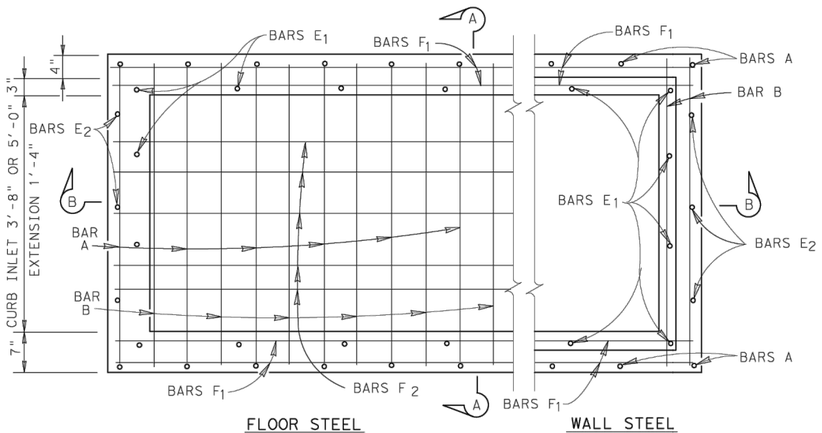


SECTION A-A



SECTION B-B

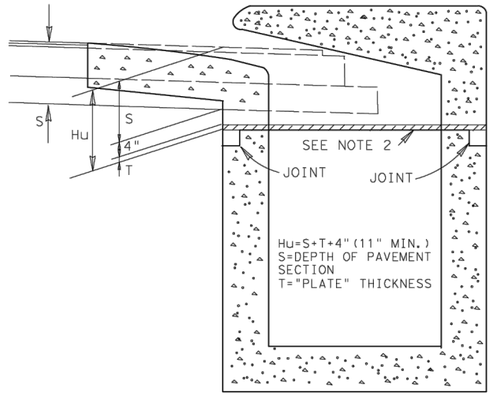
✳LOCATION OF STEPS IN CURB INLET (LOWER UNIT) ONLY, WILL BE DETERMINED BY THE LOCATION OF RING COVER PLACEMENT. STEPS @ 15" O.C.



FLOOR STEEL

WALL STEEL

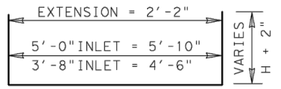
PLAN



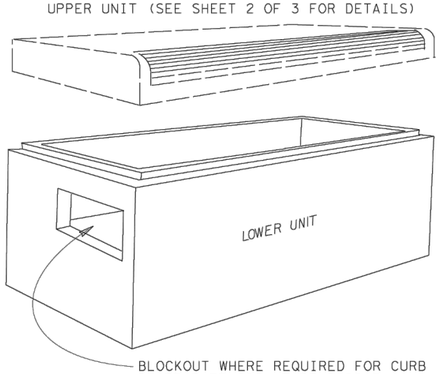
PHASE CONSTRUCTION

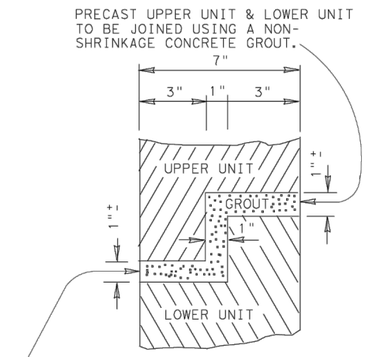
NOTES FOR PHASE CONSTRUCTION: (WHEN DIRECTED BY THE ENGINEER)

1. THE CURB INLET AND EXTENSION SHALL BE CONSTRUCTED TO A DEPTH "Hu" BELOW THE INLET AND EXTENSION GUTTER LINE ELEVATION.
2. CAP THE CURB INLET AND EXTENSION WITH A STEEL PLATE APPROVED BY THE ENGINEER AND CONSTRUCT THE ROADWAY OVER THE PLATE.
3. AFTER THE ROADWAY IS COMPLETED BUT PRIOR TO THE FINAL ACP, SAW CUT THE PAVEMENT, REMOVE THE PLATE AND COMPLETE THE UPPER PORTION OF THE CURB INLET AND/OR EXTENSION.



BARS A
(LOWER UNIT)





JOINT DETAIL

REINFORCING STEEL

LOWER UNIT 10' X 3'-8" (TY.I)				
BAR	NO.	SIZE	SPAC.	LENGTH
A	12	#4	12"	VARIES
B	11	#4	12"	4'-6"
B_1	VARIES	#4	12"	4'-6"
E_1	20	#4	18"±	VARIES
E_2	6	#4	18"±	VARIES
F_1	VARIES	#4	12"±	10'-10"
F_2	9	#4	—	10'-10"

LOWER UNIT 10' X 5'-0" (TY.II)				
BAR	NO.	SIZE	SPAC.	LENGTH
A	12	#4	12"	VARIES
B	11	#4	12"	5'-10"
B_1	VARIES	#4	12"	5'-10"
E_1	22	#4	18"±	VARIES
E_2	8	#4	18"±	VARIES
F_1	VARIES	#4	12"±	10'-10"
F_2	11	#4	—	10'-10"

GENERAL NOTES:

QUANTITIES SHOWN ARE FOR CONTRACTORS INFORMATION ONLY.
ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.
ALL REINFORCING STEEL SHALL HAVE A MINIMUM COVER OF 1½".
ALL EXPOSED CORNERS SHALL BE CHAMFERED ¾".
DEPRESSION SLAB SHALL RECEIVE A WOOD FLOAT FINISH.
FACE OF INLET TO CONFORM TO FACE OF CURB LINE.
ALL BARS INTERCEPTING MANHOLE RING & COVER SHALL BE CUT OR BENT.
PAYMENT FOR CONC., REINF. STEEL, M H RING & COVER, CURB ARMOR AND STEPS SHALL BE INCLUDED IN UNIT COST OF ITEM 465 "MANHOLE & INLETS".
RING & COVER LOCATION WILL BE AS DIRECTED/APPROVED BY THE ENGINEER.
GALVANIZED BOLTS, NUTS, WASHERS, PLATES AND GASKETS ARE SUBSIDIARY TO INLETS.
THE CONTRACTOR SHALL PROVIDE AN ADEQUATE MEANS TO LIFT AND PLACE THE INLETS, WHEN USING PRECAST UNITS.
ALL BARS AT PIPE BLOCKOUT LOCATIONS SHALL BE CUT OR BEND.
ALL LOWER UNITS SHALL RECEIVE INVERT MORTAR SHAPING.
PIPE BLOCKOUTS IN INLET WALLS SHOULD NOT EXCEED 3" BEYOND THE OUTER SHELL OF THE PIPE, TAKING INTO ACCOUNT THE SKEW OF THE PIPE AS NECESSARY.
CONSTRUCTION JOINT MAY BE RAISED A MAXIMUM OF 6"

SAN ANTONIO DISTRICT STANDARD

CURB INLET

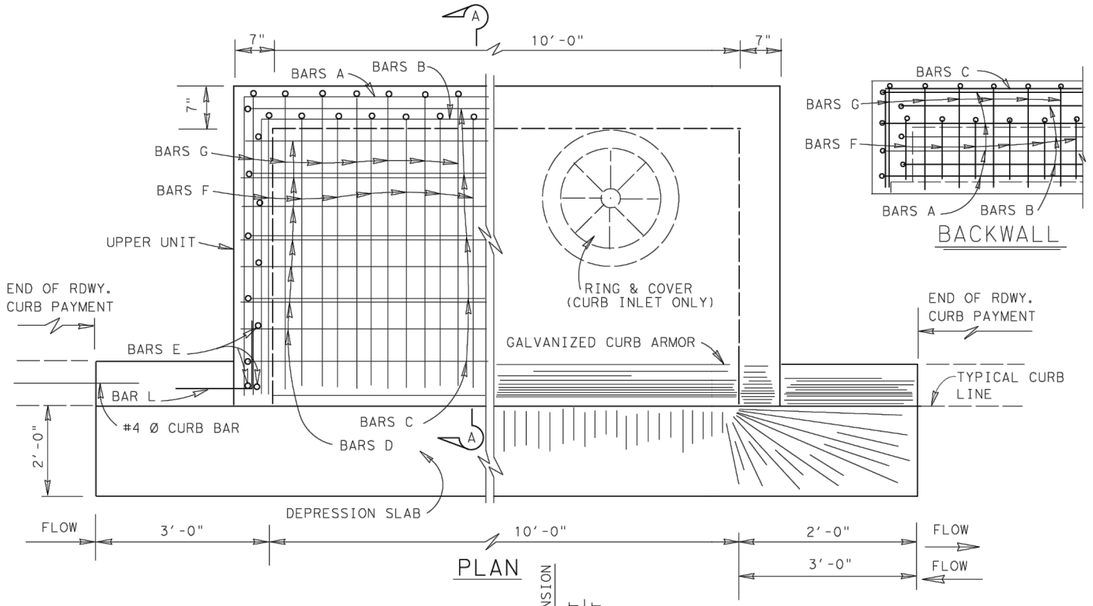
TYPE I & II WITH INLET EXTENSION I/II-E

SHEET 1 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			90
STATE	STATE DISTRICT	COUNTY	
TEXAS	SAT		
CONT.	SECT.	JOB	HIGHWAY NO.

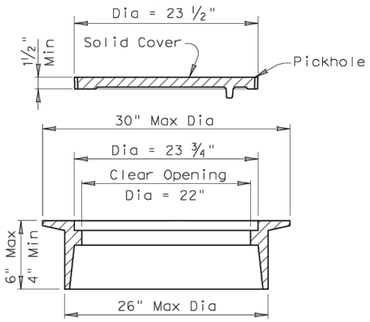
3/01

STRUCTURE DESIGN
/BRIDGE/STDS/CURBINEXT.DGN



PLAN

BACKWALL



RING AND COVER DETAILS

Approximate Weight = 255 lb

REINFORCING STEEL (FOR Hu = 11")

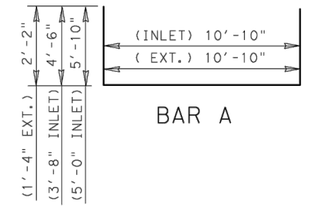
UPPER UNIT 10' X 3'-8" (TY. I)					
BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	4	#4	—	19'-10"	53
B	3	#4	—	18'-10"	38
C	5	#4	11"	13'-2"	44
D	7	#4	6"	10'-10"	51
E	12	#4	11"	1'-2"	9
F	21	#6	6"	4'-8"	147
G	22	#6	6"	5'-8"	187
H	4	#4	—	10'-10"	29
J	12	#4	12"	3'-6"	28
L	4	#4	—	2'-0"	5
M	3	#4	—	14'-8"	29
TOTAL WEIGHT				LBS.	620

UPPER UNIT 10' X 5' (TY. II)					
BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	4	#4	—	22'-6"	60
B	3	#4	—	21'-6"	43
C	7	#4	11"	13'-2"	62
D	11	#4	6"	10'-10"	80
E	16	#4	11"	1'-2"	13
F	21	#6	6"	5'-8"	179
G	22	#6	6"	7'-0"	231
H	4	#4	—	10'-10"	29
J	12	#4	12"	3'-6"	28
L	4	#4	—	2'-0"	5
M	3	#4	—	14'-8"	29
TOTAL WEIGHT				LBS.	759

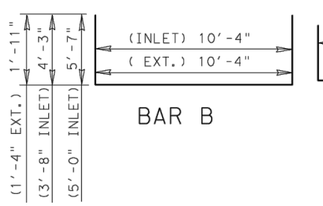
CL "A" CONCRETE QUANTITIES (FOR Hu = 11")

DEPRESSION SLAB	C.Y.
10' INLET	0.7
10' EXTENSION	0.7

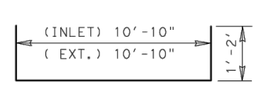
UPPER UNIT (ONLY)	C.Y.
10' X 3'-8" CURB INLET	1.9
10' X 5'-0" CURB INLET	2.7
10' EXTENSION	1.0



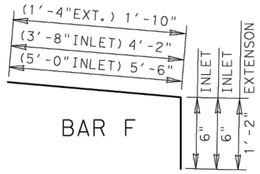
BAR A



BAR B

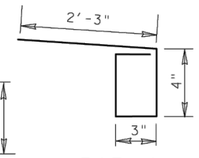


BAR C

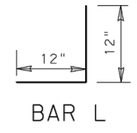


BAR F

BAR G

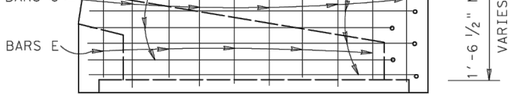


BAR J



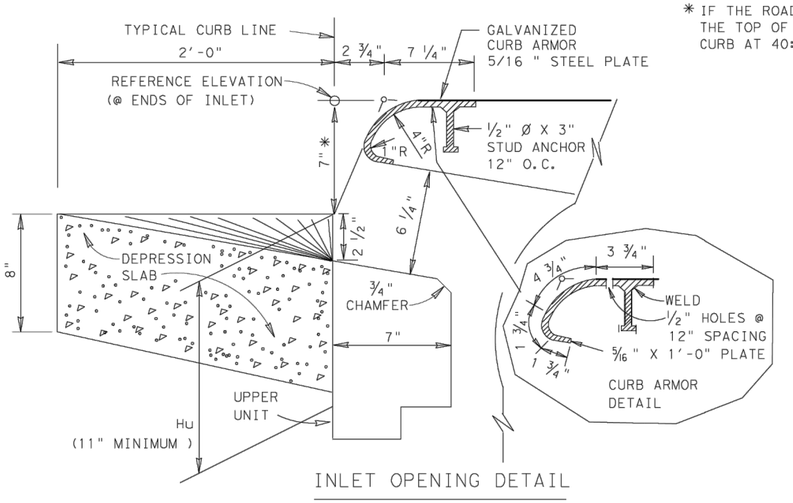
BAR L

SECTION A-A



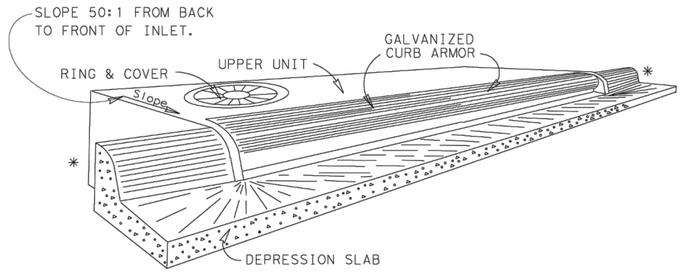
END WALL

SECTION A¹-A¹



INLET OPENING DETAIL

* IF THE ROADWAY CURB HEIGHT DOES NOT MATCH THE TOP OF THE INLET, TRANSITION THE ROADWAY CURB AT 40:1.



SEE SHEET 1 OF 3 FOR GENERAL NOTES.

SAN ANTONIO DISTRICT STANDARD

CURB INLET

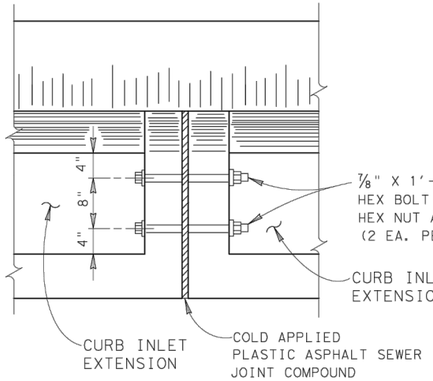
TYPE I & II WITH

INLET EXTENSION I/II-E

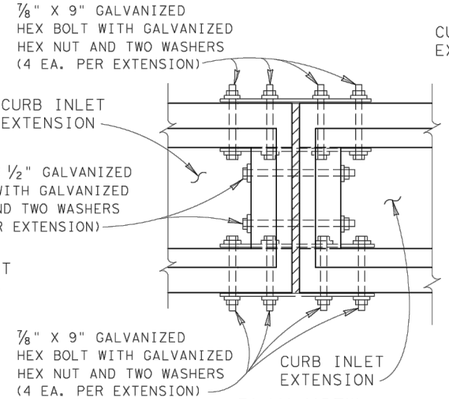
3/01

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			91
STATE	STATE DISTRICT	COUNTY	
TEXAS	SAT		
CONT.	SECT.	JOB	HIGHWAY NO.

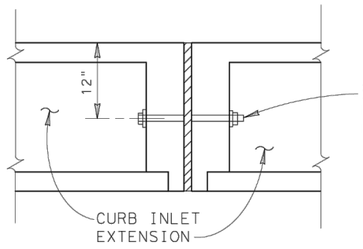
STRUCTURE DESIGN
/BRIDGE/STDS/CURBINEXT.DGN



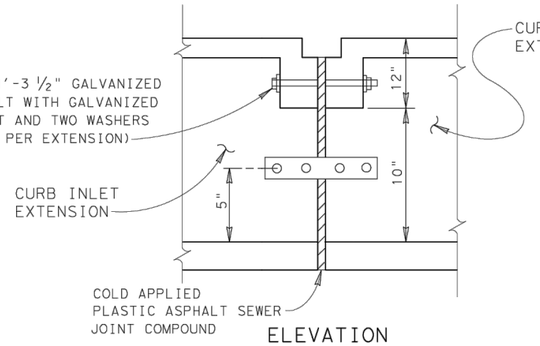
PLAN VIEW



PLAN VIEW



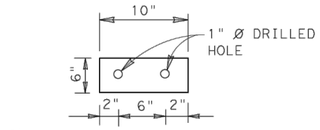
ELEVATION
UPPER UNIT



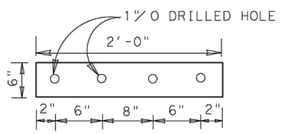
ELEVATION
LOWER UNIT

INLET BOLTING DETAILS

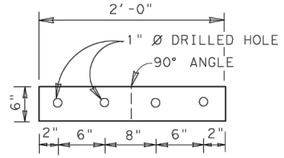
(SHOWING EXTENSION TO EXTENSION)



⅜" X 6" X 10" GALVANIZED STEEL
BOLTING EXTENSION TO CURB INLET
2 EACH REQUIRED

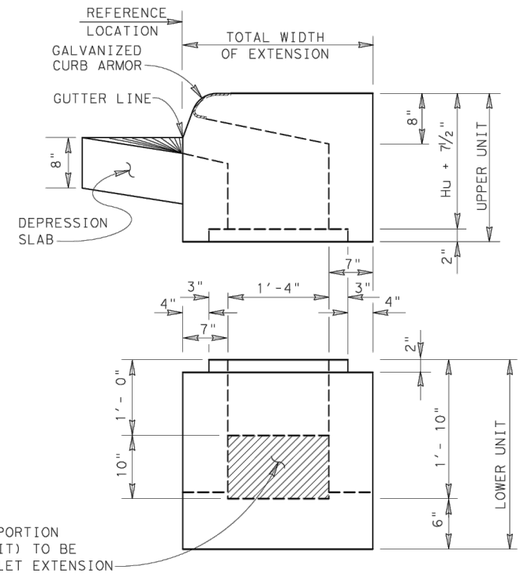


⅜" X 6" X 24" GALVANIZED STEEL
BOLTING EXTENSION TO CURB INLET
2 EACH REQUIRED
BOLTING EXTENSION TO EXTENSION
4 EACH REQUIRED

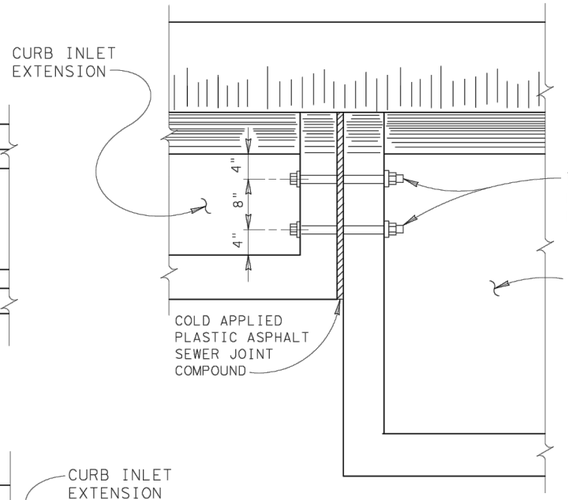


⅜" X 6" X 24" GALVANIZED STEEL
BOLTING EXTENSION TO CURB INLET
1 EACH REQUIRED

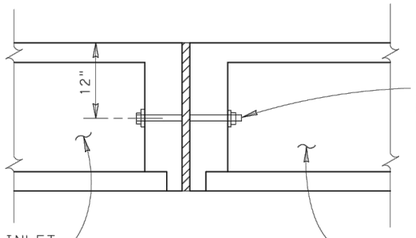
PLATES



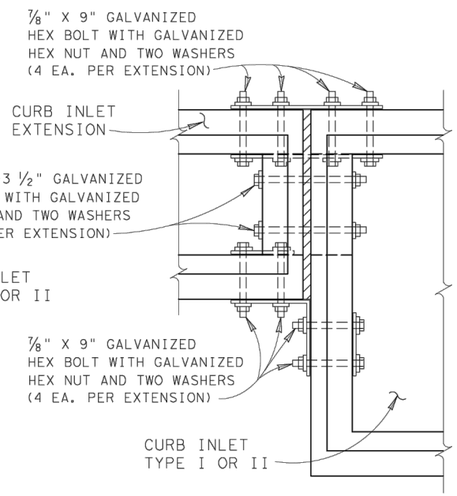
SECTION A-A CURB INLET EXTENSION TYPE E



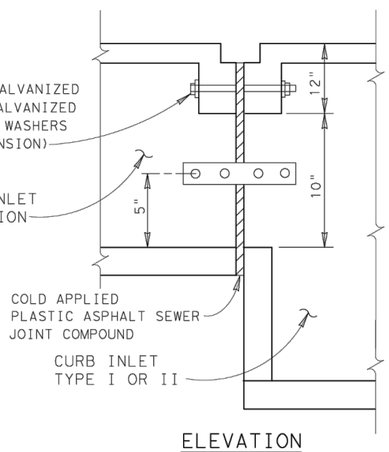
PLAN VIEW



ELEVATION
UPPER UNIT



PLAN VIEW



ELEVATION
LOWER UNIT

INLET BOLTING DETAILS

(SHOWING CURB INLET TO EXTENSION)

UPPER UNIT EXTENSION (FOR Hu = 11")					
BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	4	#4	—	15'-2"	41
B	3	#4	—	14'-2"	28
C	3	#4	11"	13'-2"	26
D	3	#4	6"	10'-10"	22
E	8	#4	11"	1'-2"	6
F	21	#6	6"	2'-0"	63
G	22	#6	6"	3'-4"	110
H	4	#4	—	10'-10"	29
J	12	#4	12"	3'-6"	28
L	4	#4	—	2'-0"	5
M	3	#4	—	14'-8"	29
REINFORCING STEEL				LBS.	387
CL. "A" CONC.				C.Y.	1.0

LOWER UNIT EXTENSION					
BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	12	#4	12"	6'-2"	49
B	11	#4	12"	2'-2"	16
B_1	3	#4	12"	2'-2"	4
E_1	18	#4	18"±	2'-3"	27
E_2	4	#4	18"±	2'-1"	6
F_1	16	#4	12"±	10'-10"	116
F_2	5	#4	—	10'-10"	36
REINFORCING STEEL				LBS.	254
CL. "A" CONC.				C.Y.	1.4

NOTES:
WHEN INLET EXTENSIONS ARE REQUIRED FOR ON GRADE INLETS THE EXTENSION(S) SHALL BE PLACED ON THE UPSTREAM END OF THE INLET.
FOR CURB INLET EXTENSION REINFORCING STEEL, NOTES & VARIOUS OTHER APPLICABLE DETAILS NOT FOUND ON THIS SHEET, REFER TO SHEETS 1 & 2.

SAN ANTONIO DISTRICT STANDARD

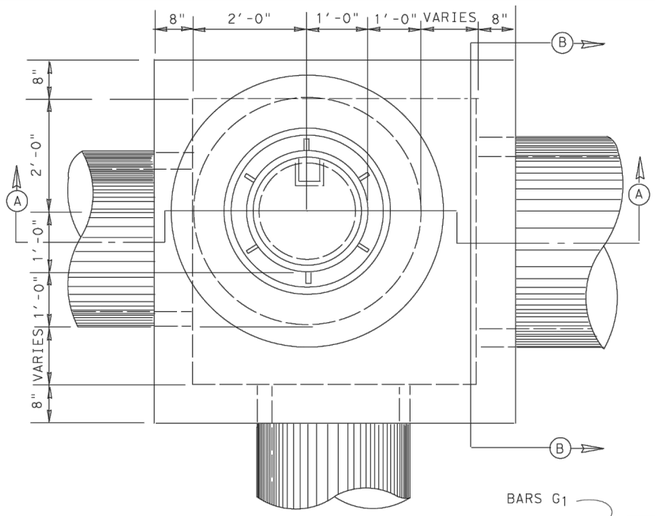
CURB INLET EXTENSION

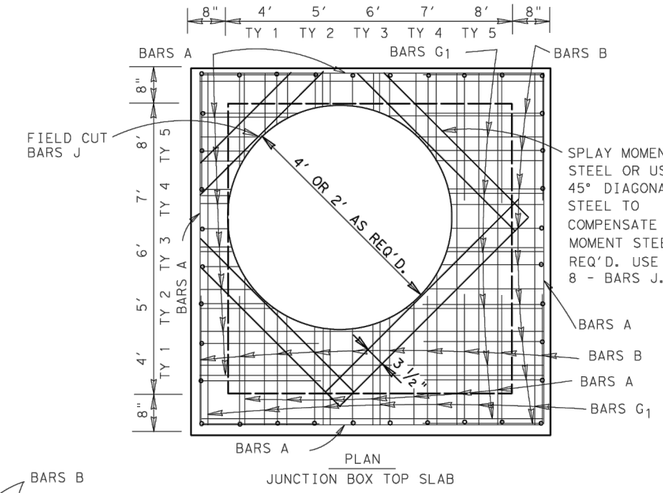
TYPE I/II-E

FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
6				92
STATE	STATE DISTRICT	COUNTY		
TEXAS	SAT			
CONT.	SECT.	JOB	HIGHWAY NO.	

3/01

T:/ENGDATA/STANDARDS/CURBINEXT.DGN





4' X 4' X 4' (TY 1)

BAR	NO.	SIZE	SPAC.	LEN.	WGT.
A	16	4	9"	5'-1"	54
B	32	5	8"	6'-6"	217
C	32	5	8"	4'-3"	142
D	16	4	9"	5'-1"	54
E	20	3	12"	3'-11"	29
G	20	4	12"	5'-0"	67
G_1	24	4	12"	5'-0"	80
H	20	3	12"	4'-5"	33
J	8	6	3 1/2"	3'-9"	45
REINF. STEEL				LBS.	721 *
± CL. A CONC.				C.Y.	3.35 *

6' X 6' X 6' (TY 3)

BAR	NO.	SIZE	SPAC.	LEN.	WGT.
A	20	4	9"	7'-1"	95
B	44	5	8"	8'-6"	390
C	44	5	8"	4'-3"	195
D	20	4	9"	7'-1"	95
E	28	3	12"	5'-11"	62
G	28	4	12"	7'-0"	131
G_1	32	4	12"	7'-0"	150
H	28	3	12"	6'-5"	68
J	8	6	3 1/2"	3'-9"	45
REINF. STEEL				LBS.	1231 *
± CL. A CONC.				C.Y.	6.87 *

5' X 5' X 5' (TY 2)

BAR	NO.	SIZE	SPAC.	LEN.	WGT.
A	18	4	9"	6'-1"	73
B	40	5	8"	7'-6"	313
C	40	5	8"	4'-3"	177
D	18	4	9"	6'-1"	73
E	24	3	12"	4'-11"	44
G	24	4	12"	6'-0"	96
G_1	28	4	12"	6'-0"	112
H	24	3	12"	5'-5"	49
J	8	6	3 1/2"	3'-9"	45
REINF. STEEL				LBS.	982 *
± CL. A CONC.				C.Y.	4.96 *

7' X 7' X 7' (TY 4)

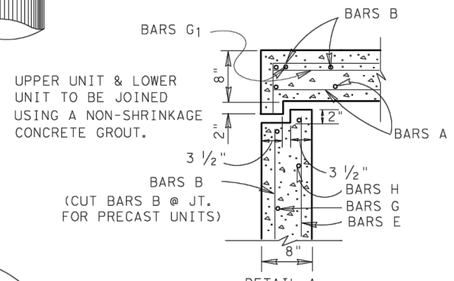
BAR	NO.	SIZE	SPAC.	LEN.	WGT.
A	24	4	9"	8'-1"	130
B	52	5	8"	10'-6"	569
C	52	5	8"	5'-3"	285
D	24	4	9"	8'-1"	130
E	32	4	12"	6'-11"	148
G	32	4	12"	8'-0"	171
G_1	36	4	12"	8'-0"	192
H	32	3	12"	7'-5"	89
J	8	6	3 1/2"	3'-9"	45
REINF. STEEL				LBS.	1759 *
± CL. A CONC.				C.Y.	9.09 *

8' X 8' X 8' (TY 5)

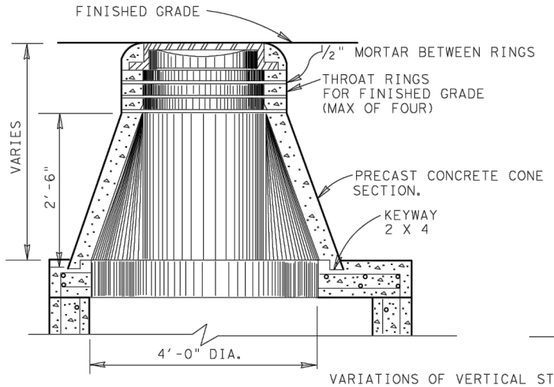
BAR	NO.	SIZE	SPAC.	LEN.	WGT.
A	26	5	9"	9'-1"	246
B	56	5	8"	11'-6"	672
C	56	5	8"	5'-3"	307
D	26	5	9"	9'-1"	246
E	36	4	12"	7'-11"	190
G	36	4	12"	9'-0"	216
G_1	40	4	12"	9'-0"	240
H	36	4	12"	8'-5"	202
J	8	6	3 1/2"	3'-9"	45
REINF. STEEL				LBS.	2364 *
± CL. A CONC.				C.Y.	11.62 *

* QUANTITIES ARE FOR CONTRACTOR'S INFORMATION ONLY.

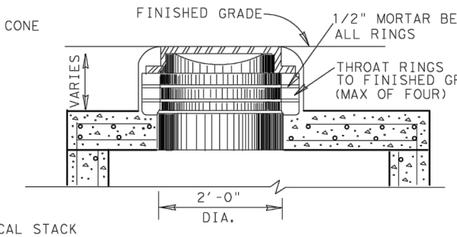
± CONCRETE QUANTITIES ALLOW FOR MANHOLE ACCESS BUT HAVE NOT BEEN DECREASED FOR DRAINAGE PIPES BECAUSE THE NUMBER AND SIZE VARY.

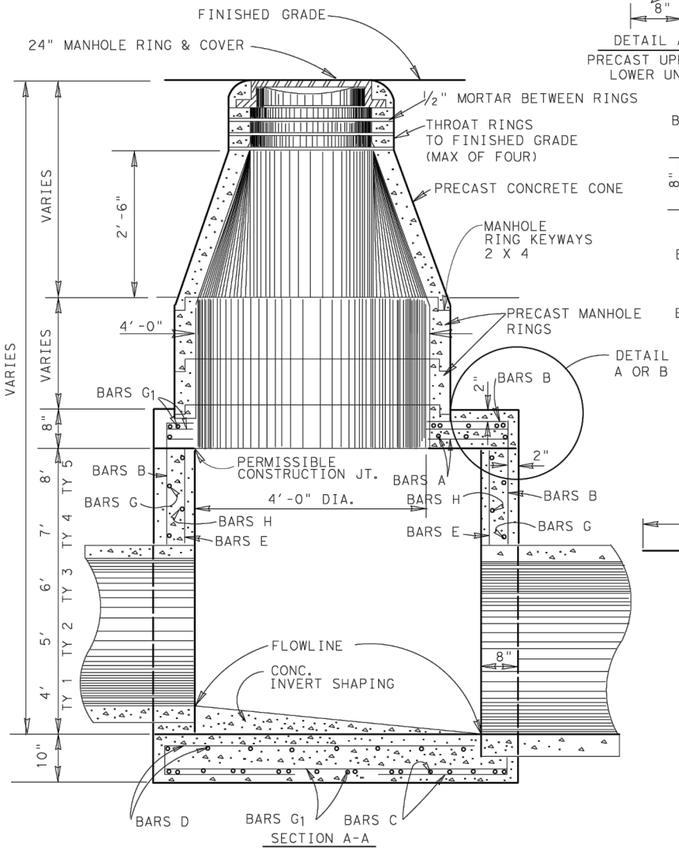


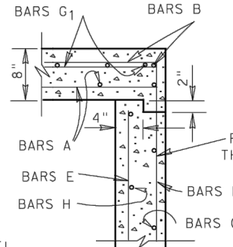
UPPER UNIT & LOWER UNIT TO BE JOINED USING A NON-SHRINKAGE CONCRETE GROUT.



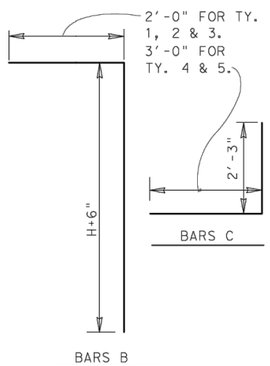
VARIATIONS OF VERTICAL STACK

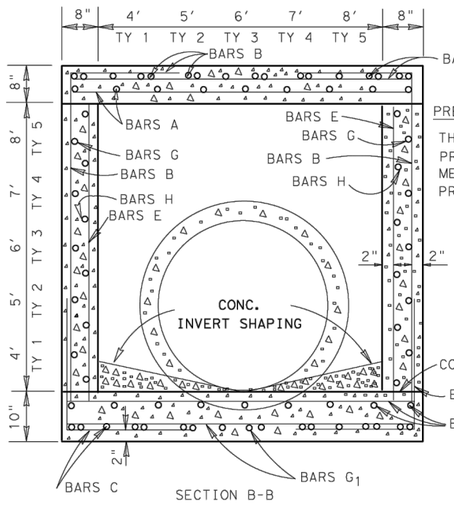






CAST-IN-PLACE UPPER UNIT W/PRECAST LOWER UNIT

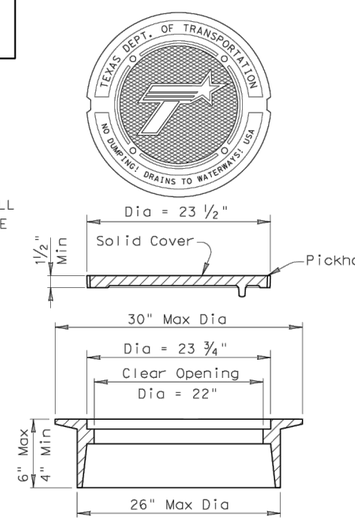




PRECASTING NOTE :

THE CONTRACTOR SHALL PROVIDE AN ADEQUATE METHOD TO LIFT THE PRECAST UNIT.

VERTICAL STACK DESIGN SHALL BE GOVERNED BY THE DEPTH FROM THE TOP OF THE LOWER UNIT TO FINISHED GRADE.



RING AND COVER DETAILS

Approximate Weight = 255 lb

GENERAL NOTES:

DIMENSIONS FOR REINFORCING STEEL ARE TO CENTER OF BARS.
ALL BARS INTERCEPTING MANHOLE AND PIPE OPENINGS SHALL BE FIELD CUT OR BEND.
WHEN THE MANHOLE IS CLOSE TO EXISTING UTILITIES, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROTECT AND MAINTAIN THESE LINES.

MANHOLE RING AND COVER SHALL BE DESIGNED FOR HEAVY DUTY ROADWAY SERVICE. THE COVER SHALL BE SECURED BY BOLTS OR A LOCKING DEVICE. FOR COVER NOT ON SAN ANTONIO CITY STREET, DELETE "CITY OF SAN ANTONIO & SCALES OF JUSTICE". THE LOAD BEARING SURFACE SHALL BE MACHINE GROUND.

THE NUMBER, SIZE AND LOCATION OF PIPES WILL VARY; SEE THE CULVERT SECTIONS.

MANHOLE

TYPE 1 THRU 5

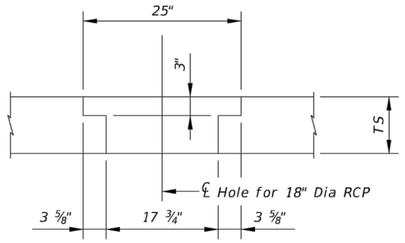
SAN ANTONIO DISTRICT STANDARD

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			93
STATE	STATE DISTRICT	COUNTY	
TEXAS	SAT		
CONT.	SECT.	JOB	HIGHWAY NO.

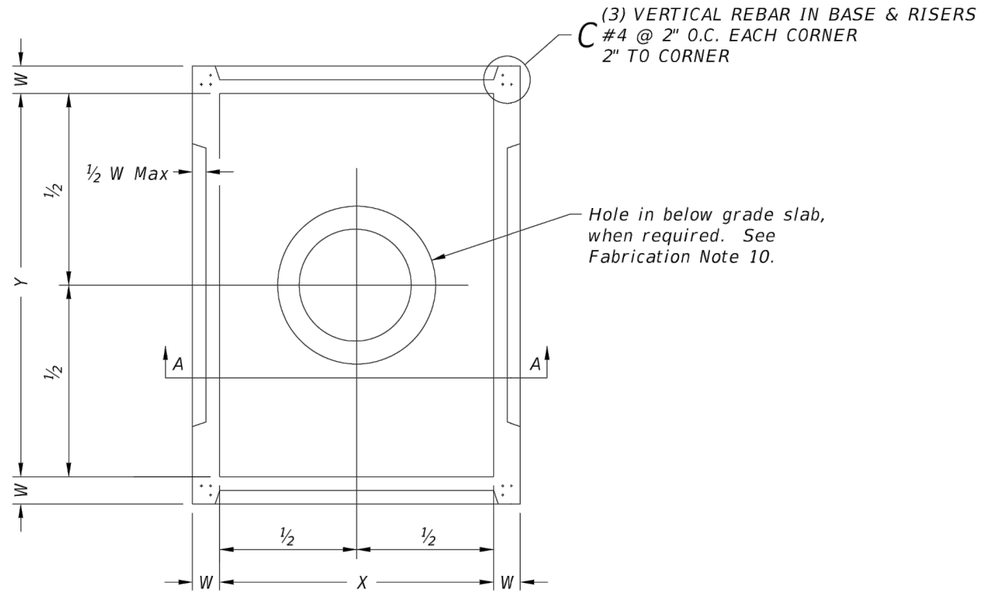
10/95

STRUCTURE DESIGN
/BRIDGE/STDS/DMHOLE1T5.DGN

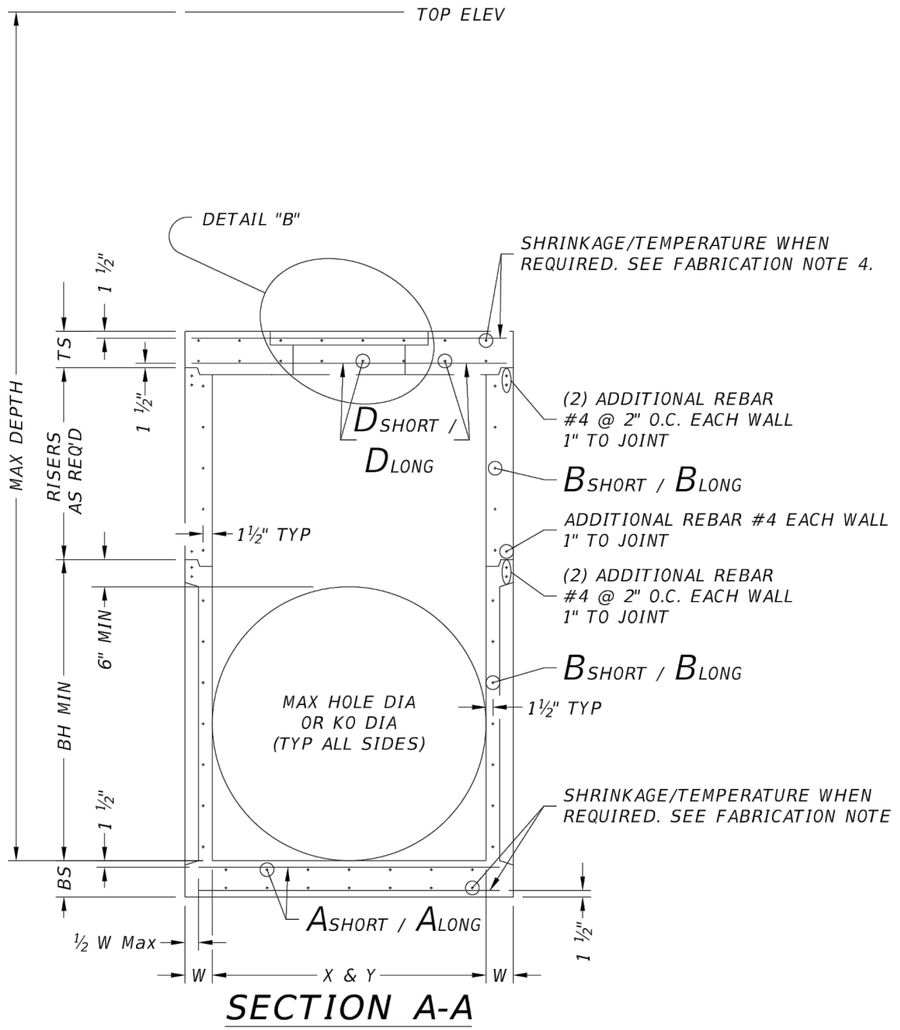
DATE:
FILE:



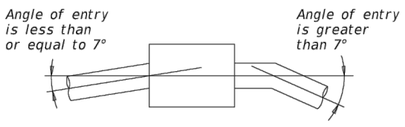
DETAIL "B"



PLAN VIEW



SECTION A-A



PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PJB wall.
If necessary, use pipe elbow or curved approach
alignment to stay within this limit.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.
10. Provide hole in below grade slab only when PJB is installed with inlet type POD.

INSTALLATION NOTES:

1. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to junction box.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for junction box is per Item 465 "Junction Boxes, Manholes, and Inlets" by type and size.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

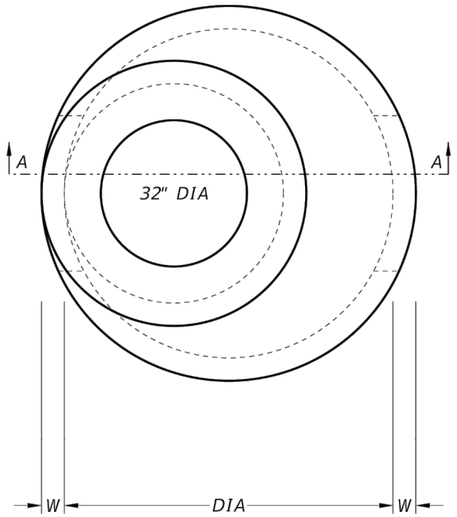
Texas Department of Transportation

Bridge Division Standard

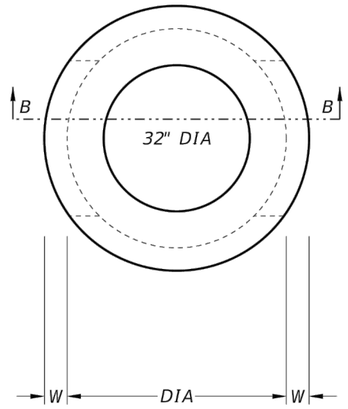
PRECAST JUNCTION BOX

PJB

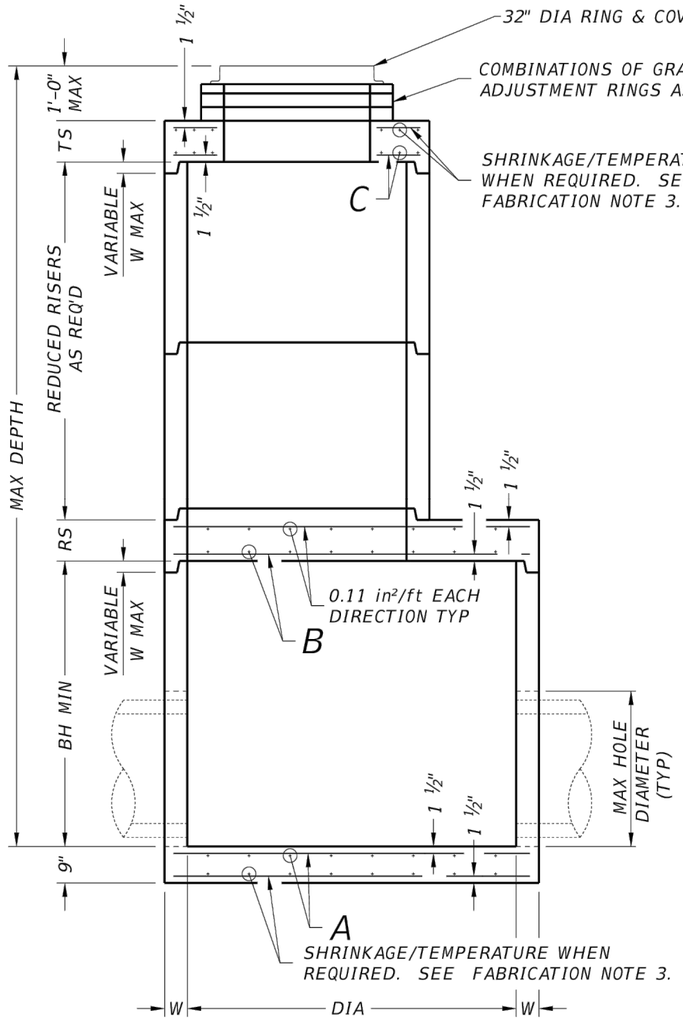
FILE: prestd09-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	584	CRESTWAY RD.
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		94



PLAN VIEW "A"

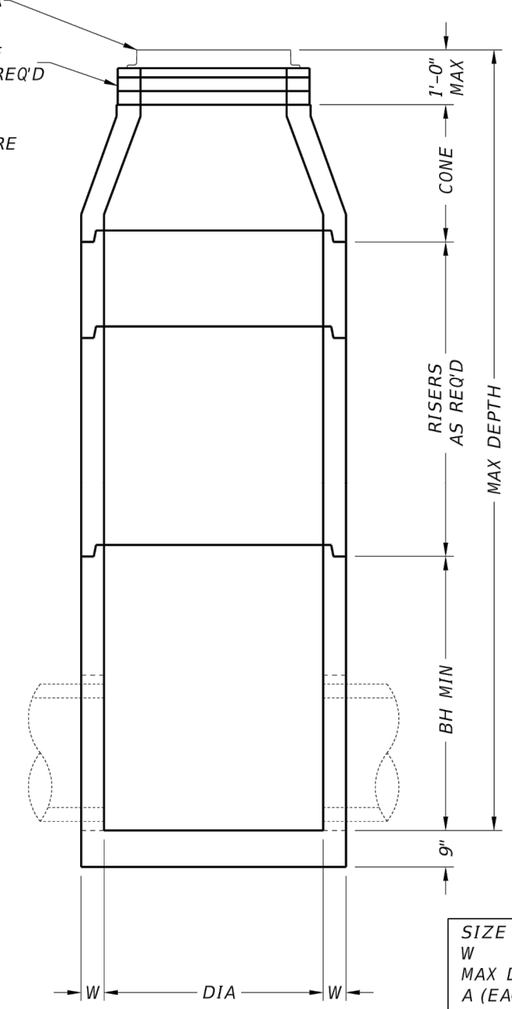


PLAN VIEW "B"



SECTION A-A

ROUND REDUCED RISER OPTION
SHOWING FLAT SLAB TOP



SECTION B-B

ROUND RISER OPTION
SHOWING CONE

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR. Provide circumferential reinforcing steel in vertical walls of base, riser and cone in accordance with ASTM C478.
3. Slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
4. Manufacture base and risers to nearest 3" increment.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
6. Provide lifting devices in conformance with Manufacturer's recommendations.
7. Provide cast iron solid cover, unless noted otherwise elsewhere in the plans.

INSTALLATION NOTES:

1. Cones may be concentric or eccentric. Reduction cones are acceptable. See Manufacturer for cone dimensions.
2. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to this item.
3. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
4. Do not grout rubber gasket joints without Manufacturer's recommendation.
5. Initial installation of grade adjustment rings is limited to 1'–0" Max as shown.
6. Grade adjustment rings may be increased to 2'–0" Max when future construction affects final grade of structure. Make adjustments greater than 2'–0" with additional risers. Adjustments may be made up to the Max depth shown. Structure must be evaluated if Max depth will be exceeded.

GENERAL NOTES:

1. Designed according to ASTM C478.
2. Payment for manhole is per Item 465, "Junction Boxes, Manholes, and Inlets" by type and size.
3. Pipe OD + placement tolerance must be equal or less than Max hole diameter. For rigid pipe, placement tolerance is 4" Max, 2" Min. For flexible pipe, consult boot/seal manufacturer's specification for placement tolerance.

Cover dimensions are clear dimensions, unless noted otherwise.

SIZE (DIA)	48 in	60 in	72 in
W	5 in	6 in	7 in
MAX DEPTH	25 ft	25 ft	25 ft
A (EACH WAY)	0.22 in²/ft	0.30 in²/ft	0.45 in²/ft
B (EACH WAY)	N/A	0.37 in²/ft	0.62 in²/ft
C (EACH WAY)	0.24 in²/ft	0.46 in²/ft	0.46 in²/ft
BH MIN	12 in	36 in	36 in
TS	9 in	9 in	9 in
RS	N/A	9 in	12 in
REDUCED RISER DIA	N/A	48 in	48/60 in
MAX HOLE DIA	32 in	40 in	54 in

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

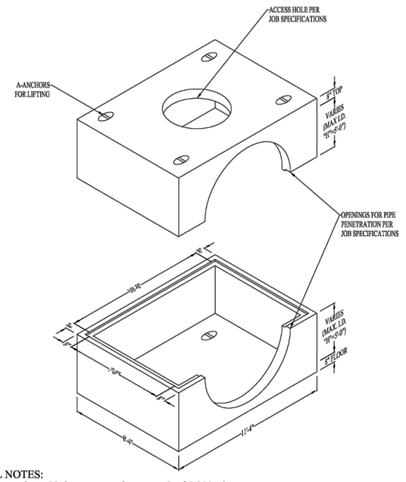
PRECAST ROUND MANHOLE

PRM

FILE: CD-PRM-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 3/2023 – Corrected TS and RS callout	DIST	COUNTY		SHEET NO. 95

DATE:
FILE:

7' x 10' I.D. Junction Box

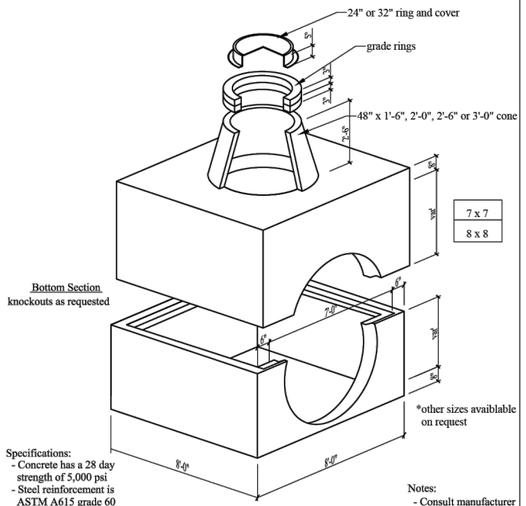


GENERAL NOTES:
All concrete to have 28 day compressive strength of 5,000psi.
Reinforcing steel shall comply with ASTM A615 Grade 60.
Bar bending and placement shall comply with latest ACI standards.
Design based on AASHTO HS 20 loading.

CAPITAL PRECAST, INC.
6905 SOUTH OLD BASTROP HWY
SAN MARCOS, TEXAS 78666
PH. (830) 606-6200

FOR 7 x 10 JUNCTION BOX
JOB
DRAWN DK | DATE 03/13/18 | Rev. No. | SHEET 1 OF 1
FILE RemovableDisk(G:)\7x10JB.dwg

Junction Box / Manhole



*other sizes avaiblable on request

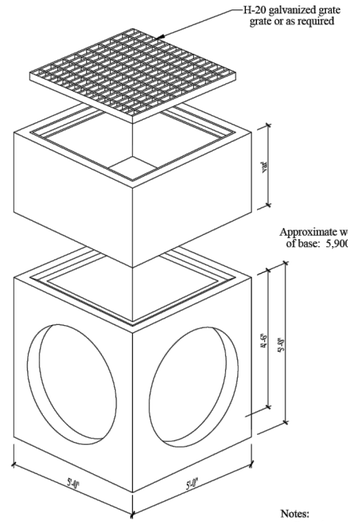
Specifications:
- Concrete has a 28 day strength of 5,000 psi
- Steel reinforcement is ASTM A615 grade 60
- Load design is H-20

Notes:
- Consult manufacturer before handling

CAPITAL PRECAST, INC.
6905 SOUTH OLD BASTROP HWY
SAN MARCOS, TEXAS 78666
PH. (830) 606-6200

FOR Junction Box / Manhole
JOB
DRAWN EJ | DATE 9/26/2016 | Rev. No. | SHEET 1 OF 1
FILE catalog/junction boxes/7ftJB with cone

4' x 4' x var Grate Inlet



Approximate weight of base: 5,900 lbs

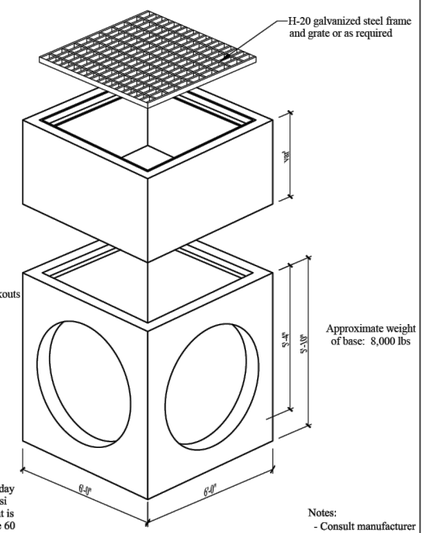
Specifications:
- Concrete has a 28 day strength of 5,000 psi
- Steel reinforcement is ASTM A615 grade 60
- Load design is H-20

Notes:
- Consult manufacturer before handling

CAPITAL PRECAST, INC.
6905 SOUTH OLD BASTROP HWY
SAN MARCOS, TEXAS 78666
PH. (830) 606-6200

FOR 4' x 4' x var Grate Inlet
JOB
DRAWN RW | DATE 12/1/2015 | Rev. No. | SHEET 1 OF 1
FILE catalog/grate inlets/4x4 Grate Inlet

5' x 5' x var Grate Inlet



Approximate weight of base: 8,000 lbs

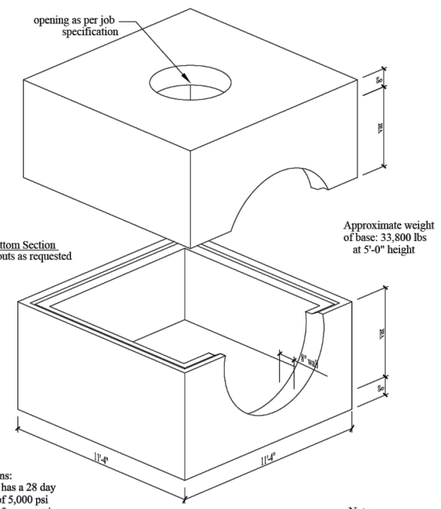
Specifications:
- Concrete has a 28 day strength of 5,000 psi
- Steel reinforcement is ASTM A615 grade 60
- Load design is H-20

Notes:
- Consult manufacturer before handling

CAPITAL PRECAST, INC.
6905 SOUTH OLD BASTROP HWY
SAN MARCOS, TEXAS 78666
PH. (830) 606-6200

FOR 5' x 5' x var Grate Inlet
JOB
DRAWN RW | DATE 12/1/2015 | Rev. No. | SHEET 1 OF 1
FILE catalog/grate inlets/5x5 Grate Inlet

10' x 10' x var Junction Box



Approximate weight of base: 33,800 lbs at 5'-0" height

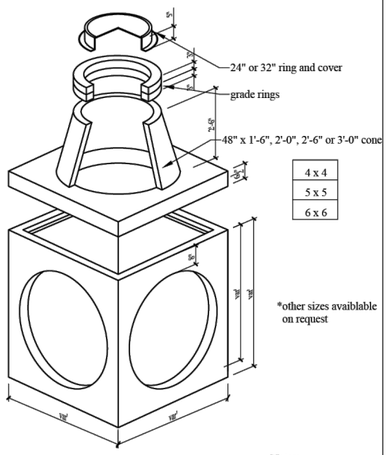
Specifications:
- Concrete has a 28 day strength of 5,000 psi
- Steel reinforcement is ASTM A615 grade 60
- Load design is H-20

Notes:
- Consult manufacturer before handling

CAPITAL PRECAST, INC.
6905 SOUTH OLD BASTROP HWY
SAN MARCOS, TEXAS 78666
PH. (830) 606-6200

FOR 10' x 10' x var Junction Box
JOB
DRAWN RW | DATE 12/1/2015 | Rev. No. | SHEET 1 OF 1
FILE catalog/junction boxes/10x10JB

Junction Box / Manhole



*other sizes avaiblable on request

Specifications:
- Concrete has a 28 day strength of 5,000 psi
- Steel reinforcement is ASTM A615 grade 60
- Load design is H-20

Notes:
- Consult manufacturer before handling

CAPITAL PRECAST, INC.
6905 SOUTH OLD BASTROP HWY
SAN MARCOS, TEXAS 78666
PH. (830) 606-6200

FOR Junction Box / Manhole
JOB
DRAWN RW | DATE 12/1/2015 | Rev. No. | SHEET 1 OF 1
FILE catalog/junction boxes/JB with cone

0 25 50

SCALE: HOR: 1"=50'
VER: 1"=10'

STATE OF TEXAS
SEAN P. MCFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

Sean McFarland
08/14/2024

CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112
TBPE No. 455 •TBPLS No. 10048500

WT MONTGOMERY ROAD
DRAINAGE DETAILS

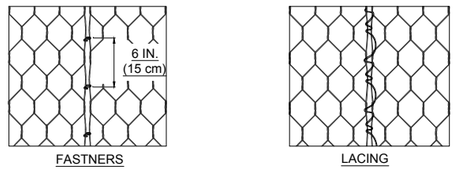
SCALE: HOR: 1" = 50'
VER: 1" = 10'

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	03050.104	96

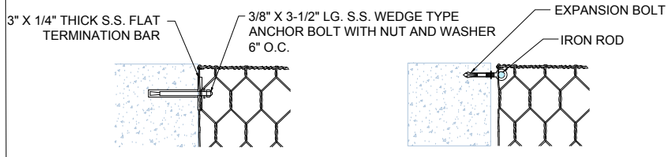
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD

NOTES:

1. GABION MATRESS MESH TO ASTM A975.
2. GABIONS USED SHALL BE ZINC.
3. BACKFILL COMPACTION 95% TO ASTM D698/D1557
4. GABION FILL TO ASTM D6711:
   - 6.1. ROCK SIZE 4" - 12", D50 = 6"
   - 6.2. ROCK UNIT WEIGHT 157 PCF MIN.
   - 6.3. VOIDS 30% MAX.
5. TYPE 2 FILTER FABRIC IN ACCORDANCE WITH DMS-6200, TO BE USED BELOW GABION BASKET AND GABION MATTRESS AT ALL LOCATIONS.
6. GABION WIRE SHALL MEET THE REQUIREMENTS OF 12 WIRE GAUGE FOR GABION BASKET AND 13.5 WIRE GAUGE FOR GABION MATTRESS.



FASTNERS LACING



GABION TO CONCRETE CONNECTION - A GABION TO CONCRETE CONNECTION - B

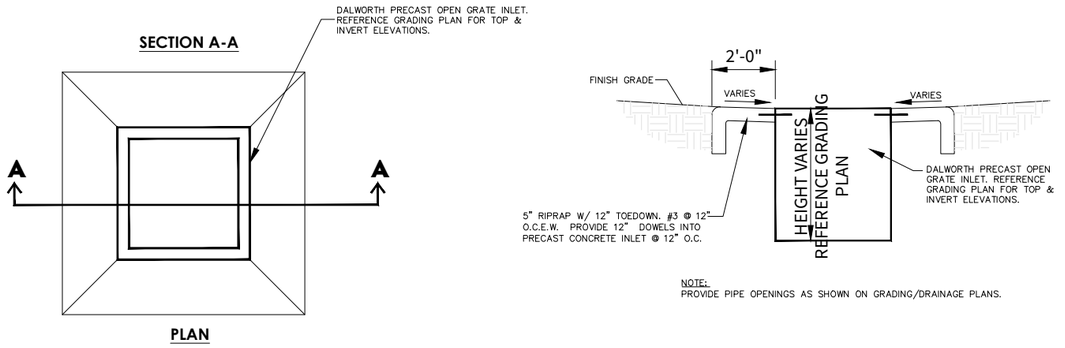
NOTES:
1. EDGES ARE JOINED TOGETHER, USING THE APPROPRIATE LACING TECHNIQUES OR FASTENERS.

LACING: CONTINUOUS WIRE LOOPED TIGHTLY AROUND EVERY MESH OPENING, ALTERNATING SINGLE AND DOUBLE LOOPS

FASTENERS: USE A PNEUMATIC OR HAND POWER TOOL, EMPLOYING SPENAX "C" SHAPED FASTENERS (FIG. 6.). FOR CLOSURE AND STRENGTH, THE RECOMMENDED SPACING IS EVERY MESH OPENING, NOT TO EXCEED 6 INCHES (150 MM).

1 SCALE: NONE

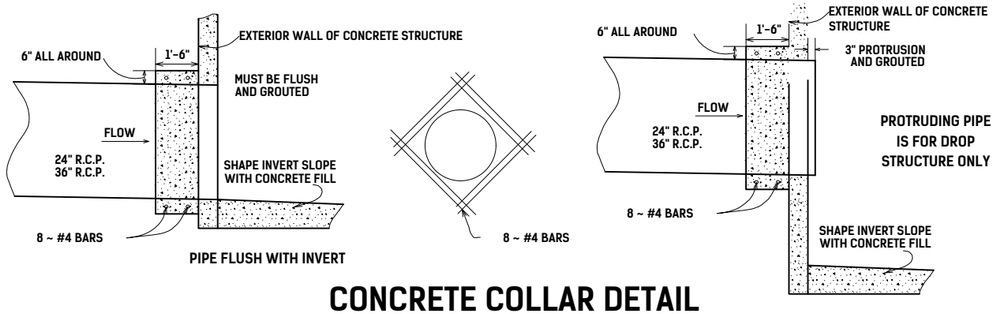
GABION MATTRESS CONNECTION DETAILS



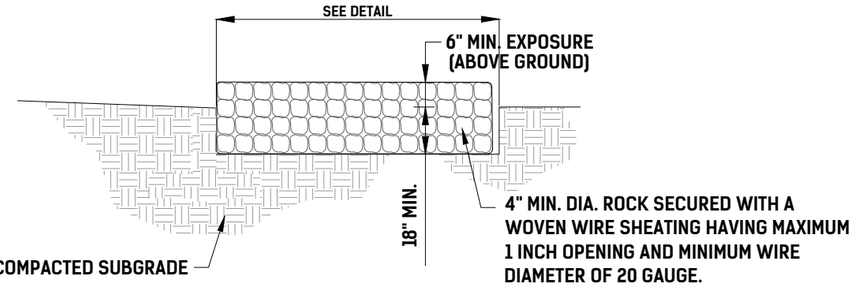
NOTE:
PROVIDE PIPE OPENINGS AS SHOWN ON GRADING/DRAINAGE PLANS.

2 SCALE: NONE

PRECAST INLET / CONCRETE RIPRAP DETAIL



CONCRETE COLLAR DETAIL



NOTE: GABION MATTRESS TO BE FREE OF GEO-TEXTILE FABRIC LINING.
SEE SHEET 9 FOR GABION MATTRESS DETAIL

GABION STYLE ROCK EROSION CONTROL MATTRESS DETAIL

STATE OF TEXAS
SEAN P. MCFARLAND
138893
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Sean McFarland
08/14/2024

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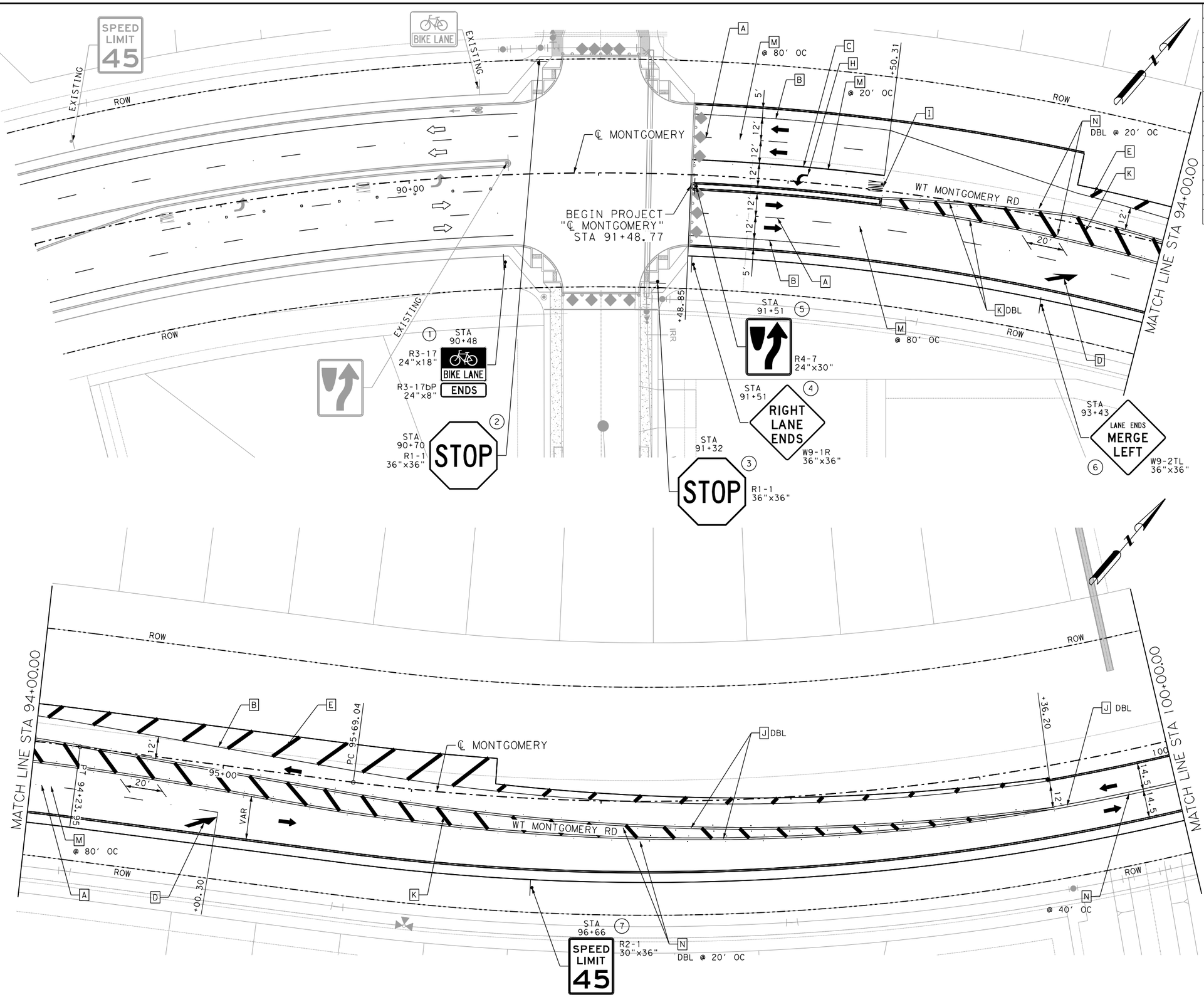
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112
TBPE No. 455 •TBPLS No. 10048500

WT MONTGOMERY ROAD
DRAINAGE DETAILS

SCALE: HOR: 1" = 50'
VER: 1" = 10'

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	03050.104		97
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD



QUANTITY

ITEM CODE	DESCRIPTION	UNIT	QTY
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	2
0644-6060	IN SM RD SN SUP&AM TYTWT(1)WS(P)	EA	5
0666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	102
0666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	238
0666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	1
0666-6072	REFL PAV MRK TY I (W)(LNDP ARW)(100MIL)	EA	2
0666-6078	REFL PAV MRK TY I (W)(WORD)(100 MIL)	EA	1
0666-6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF	372
0666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	120
0666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	875
0666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	2896
0672-6009	REFL PAV MRKR TY II-A-A	EA	141
0672-6010	REFL PAV MRKR TY II-C-R	EA	13

LEGEND

- A — RE PM W/RET REQ TY I (W) 4" (BRK) (100 MIL)
- B — RE PM W/RET REQ TY I (W) 4" (SLD) (100 MIL)
- C — REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
- D — REFL PAV MRK TY I (W) (LNDP ARW) (100 MIL)
- E — REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
- F — REFL PAV MRK TY I (W)(BIKE ARW) 100 MIL)
- G — REFL PAV MRK TY I (W)(BIKE SYML) 100 MIL)
- H — REFL PAV MRK TY I (W)(ARROW) 100 MIL)
- I — REFL PAV MRK TY I (W)(WORD) 100 MIL)
- J — RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
- K — REFL PAV MRK TY I (Y) 24" (SLD) (100 MIL)
- L — REFL PAV MRK TY I (Y)(MED NOSE)(100 MIL)
- M — REFL PAV MRKR TY II-C-R
- N — REFL PAV MRKR TY II-A-A

OBJECT MARKER
SIGN
SIGN EXISTING
(#) SIGN NUMBER
PROPOSED TRAFFIC FLOW ARROW
EXISTING TRAFFIC FLOW ARROW

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED
PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1" = 50' SHEET 1 OF 4

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	-	98

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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2/7/2025
Legacy Engineering Group
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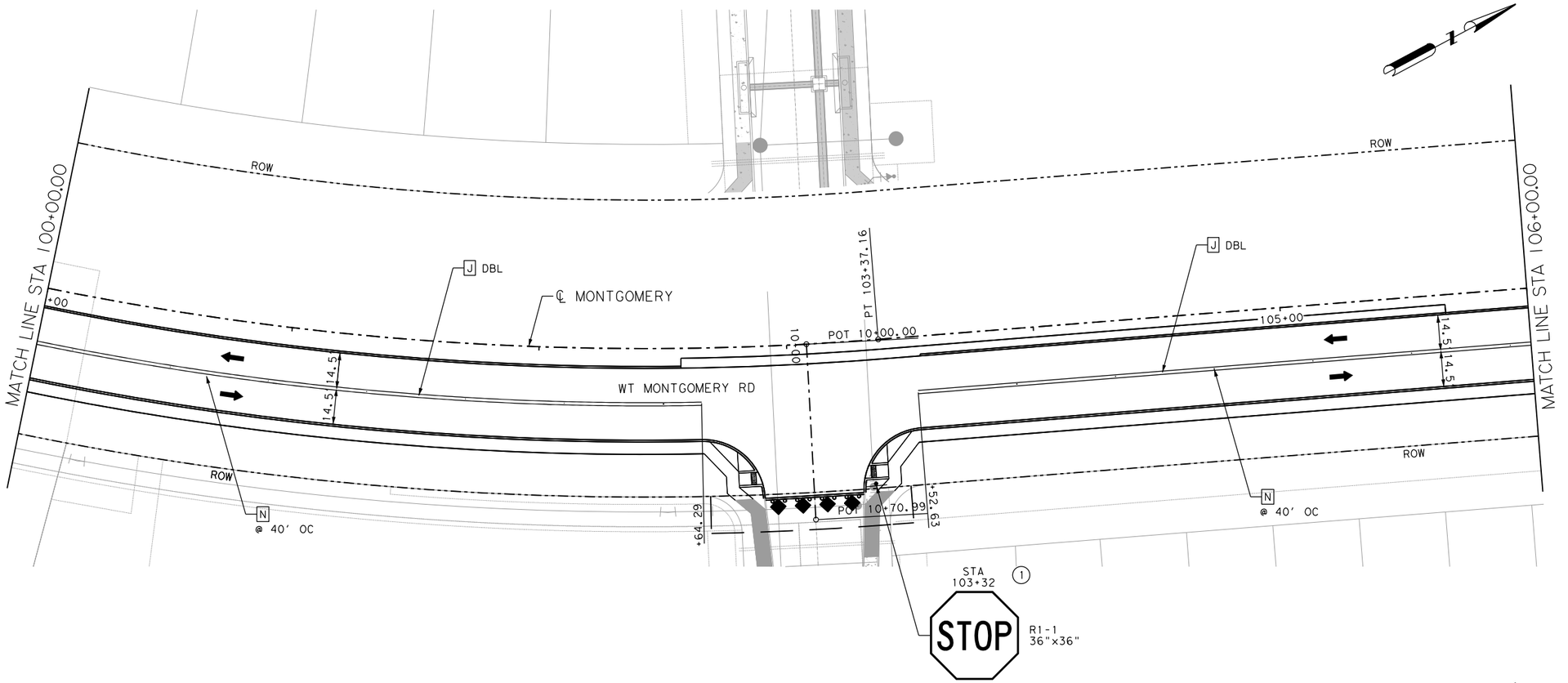

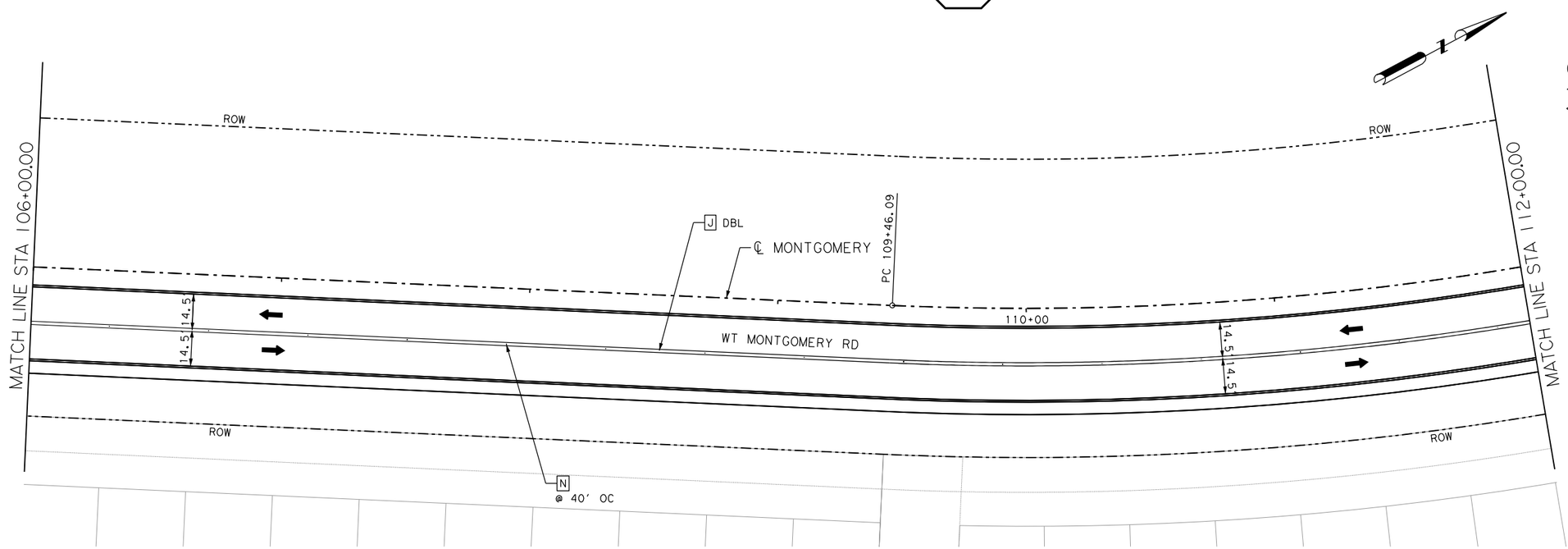

QUANTITY			
ITEM CODE	DESCRIPTION	UNIT	QTY
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
0666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	2248
0672-6009	REFL PAV MRKR TY II-A-A	EA	29

LEGEND

A	RE PM W/RET REQ TY I (W) 4" (BRK) (100 MIL)
B	RE PM W/RET REQ TY I (W) 4" (SLD) (100 MIL)
C	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
D	REFL PAV MRK TY I (W) (LNDP ARW) (100 MIL)
E	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
F	REFL PAV MRK TY I (W)(BIKE ARW) 100 MIL)
G	REFL PAV MRK TY I (W)(BIKE SYML) 100 MIL)
H	REFL PAV MRK TY I (W)(ARROW) 100 MIL)
I	REFL PAV MRK TY I (W)(WORD) 100 MIL)
J	RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
K	REFL PAV MRK TY I (Y) 24" (SLD) (100 MIL)
L	REFL PAV MRK TY I (Y)(MED NOSE)(100 MIL)
M	REFL PAV MRKR TY II-C-R
N	REFL PAV MRKR TY II-A-A

OBJECT MARKER
SIGN
SIGN EXISTING
(#) SIGN NUMBER
PROPOSED TRAFFIC FLOW ARROW
EXISTING TRAFFIC FLOW ARROW

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED
PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1" = 50' SHEET 2 OF 4

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	-	99

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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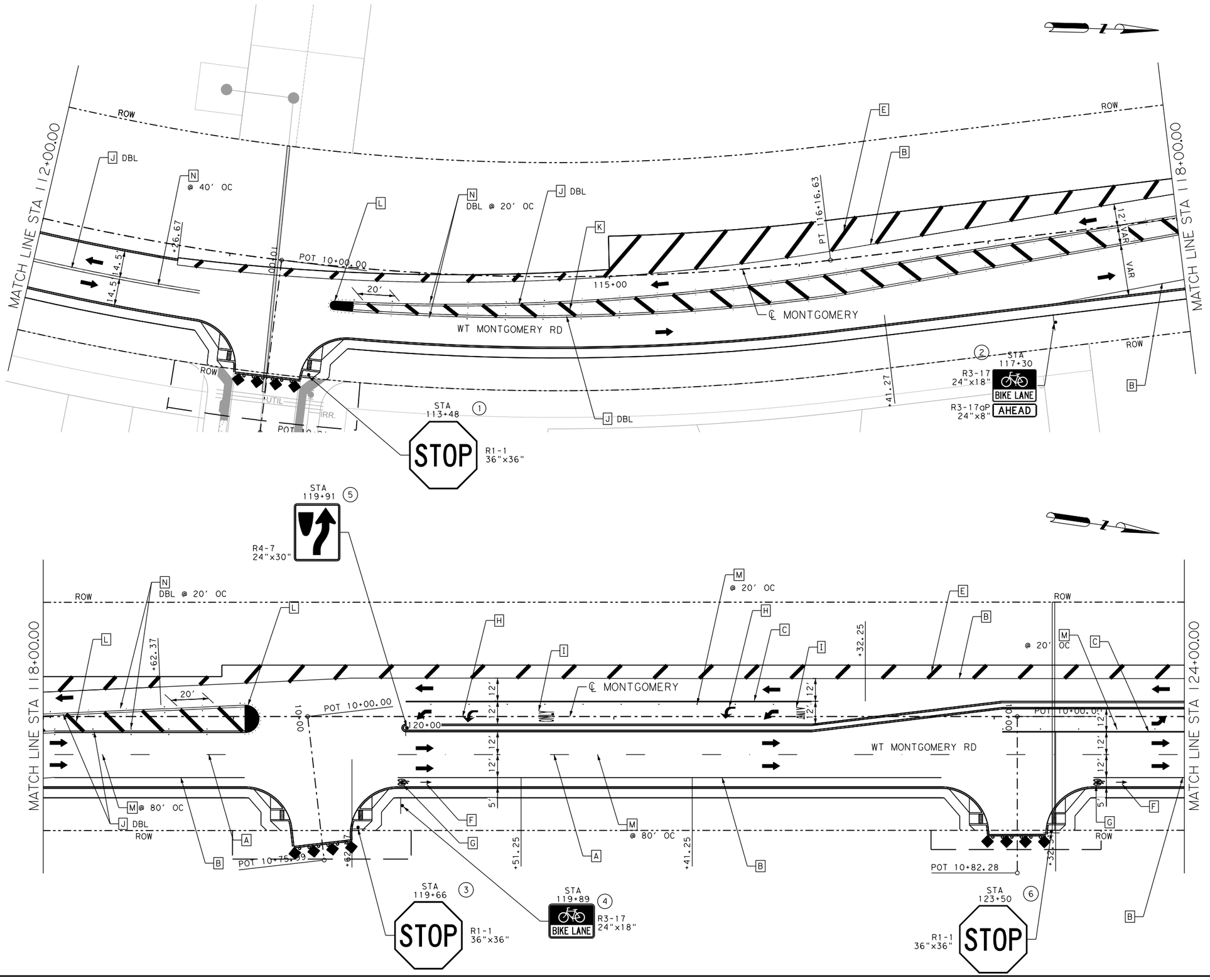

QUANTITY

ITEM CODE	DESCRIPTION	UNIT	QTY
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	3
0644-6060	IN SM RD SN SUP&AM TYTWT(1)WS(P)	EA	3
0666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	309
0666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	563
0666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	2
0666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	2
0666-6105	REFL PAV MRK TY I (W)(BIKE ARW)(100MIL)	EA	2
0666-6111	REFL PAV MRK TY I(W)(BIKE SYML)(100MIL)	EA	2
0666-6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF	356
0666-6156	REFL PAV MRK TY I (Y)(MED NOSE)(100MIL)	EA	2
0666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	140
0666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	1637
0666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	2349
0672-6009	REFL PAV MRKR TY II-A-A	EA	113
0672-6010	REFL PAV MRKR TY II-C-R	EA	22

LEGEND

A	RE PM W/RET REQ TY I (W) 4" (BRK) (100 MIL)
B	RE PM W/RET REQ TY I (W) 4" (SLD) (100 MIL)
C	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
D	REFL PAV MRK TY I (W) (LNDP ARW) (100 MIL)
E	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
F	REFL PAV MRK TY I (W)(BIKE ARW) 100 MIL)
G	REFL PAV MRK TY I (W)(BIKE SYML) 100 MIL)
H	REFL PAV MRK TY I (W)(ARROW) 100 MIL)
I	REFL PAV MRK TY I (W)(WORD) 100 MIL)
J	RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
K	REFL PAV MRK TY I (Y) 24" (SLD) (100 MIL)
L	REFL PAV MRK TY I (Y)(MED NOSE)(100 MIL)
M	REFL PAV MRKR TY II-C-R
N	REFL PAV MRKR TY II-A-A
	OBJECT MARKER
	SIGN
	SIGN EXISTING
#	SIGN NUMBER
	PROPOSED TRAFFIC FLOW ARROW
	EXISTING TRAFFIC FLOW ARROW

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED
PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1" = 50' SHEET 3 OF 4

FED.RD. DIV.NO.	PROJECT NO.	SHEET
6	-	100

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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2/7/2025
Legacy Engineering Group
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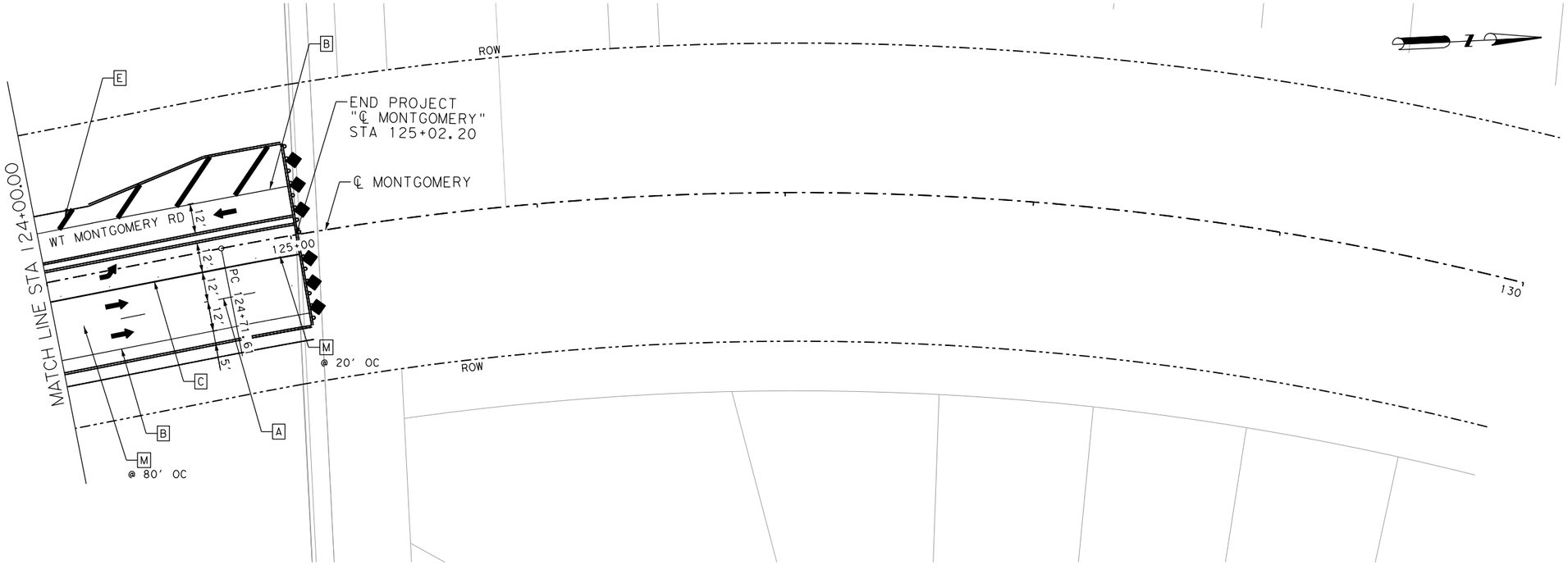

QUANTITY			
ITEM CODE	DESCRIPTION	UNIT	QTY
0666-6036	REFL PAV MRK TY I (W)8"(SLD)(100ML)	LF	102
0666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	74
0666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	30
0666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	206
0672-6010	REFL PAV MRKR TY II-C-R	EA	7

LEGEND

A	RE PM W/RET REQ TY I (W) 4" (BRK) (100 MIL)
B	RE PM W/RET REQ TY I (W) 4" (SLD) (100 MIL)
C	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)
D	REFL PAV MRK TY I (W) (LNDP ARW) (100 MIL)
E	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)
F	REFL PAV MRK TY I (W)(BIKE ARW) 100 MIL)
G	REFL PAV MRK TY I (W)(BIKE SYML) 100 MIL)
H	REFL PAV MRK TY I (W)(ARROW) 100 MIL)
I	REFL PAV MRK TY I (W)(WORD) 100 MIL)
J	RE PM W/RET REQ TY I (Y) 4" (SLD)(100 MIL)
K	REFL PAV MRK TY I (Y) 24" (SLD) (100 MIL)
L	REFL PAV MRK TY I (Y)(MED NOSE)(100 MIL)
M	REFL PAV MRKR TY II-C-R
N	REFL PAV MRKR TY II-A-A
	OBJECT MARKER
	SIGN
	SIGN EXISTING
#	SIGN NUMBER
	PROPOSED TRAFFIC FLOW ARROW
	EXISTING TRAFFIC FLOW ARROW

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED
PROFESSIONAL ENGINEER

2/7/2025

LEGACY
ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste 830, San Antonio, Texas 78230
210.660.1960/TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1" = 50' SHEET 4 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	-		101
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
-	-	-	WT MONTGOMERY RD

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2/7/2025
Legacy Engineering Group
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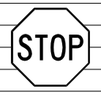
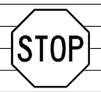
SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
1/4	1	R3-17		24"x18"	A		TWT	1	WS	P		
		R3-17bP		24"x8"	A							
	2	R1-1		36"x36"	A		10BWG	1	SA	P		
	3	R1-1		36"x36"	A		10BWG	1	SA	P		
	4	W9-1R		36"x36"	A		TWT	1	WS	P		
	5	R4-7		24"x30"	A		TWT	1	WS	P		
	6	W9-2TL		36"x36"	A		TWT	1	WS	P		
	7	R2-1		30"x36"	A		TWT	1	WS	P		
2/4	1	R1-1		36"x36"	A		10BWG	1	SA	P		
3/4	1	R1-1		36"x36"	A		10BWG	1	SA	P		
	2	R3-17		24"x18"	A		TWT	1	WS	P		
		R3-17aP		24"x8"	A							

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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:

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED
PROFESSIONAL ENGINEER

2/7/2025

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
4-16 8-16	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		102

18

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
3/4	3	R1-1		36"x36"	A		10BWG	1	SA	P		
	4	R3-17		24"x18"	A		TWT	1	WS	P		
	5	R4-7		24"x30"	A		TWT	1	WS	P		
	6	R1-1		36"x36"	A		10BWG	1	SA	P		

2/7/2025

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		-	-	-	-
4-16		DIST	COUNTY		SHEET NO.
8-16		SAT	BEXAR		103

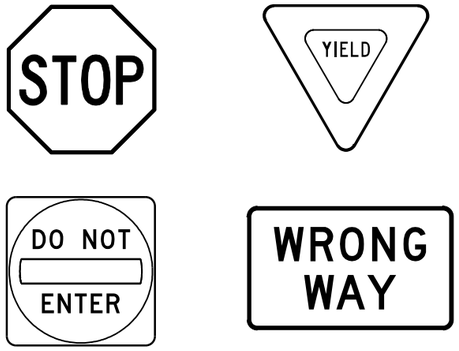
18

DATE:
FILE:

DATE: 2/7/2025 11:21:05 AM
FILE: P:\DESIGN_PROJECTS\Montgomery Road\4 - Design\Plan Set\8. Traffic\TRP\STANDARDS\tsr4-13.dgn

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

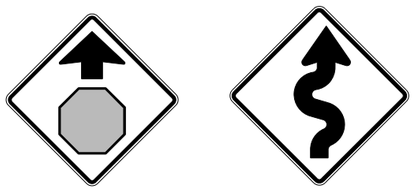
ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		104

4

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REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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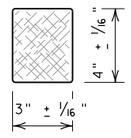
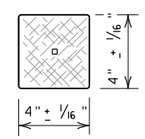
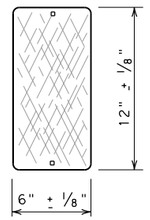
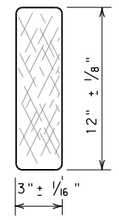
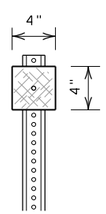
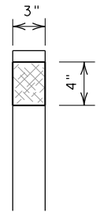
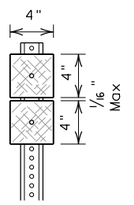
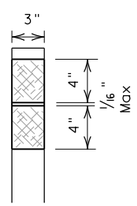
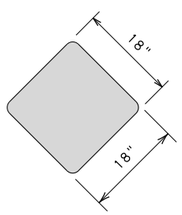
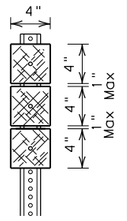
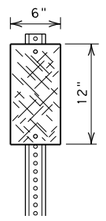
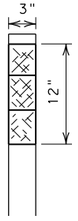
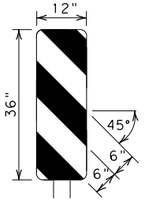
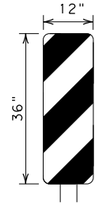
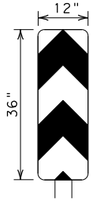
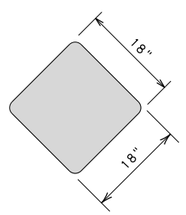
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

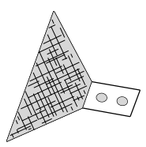
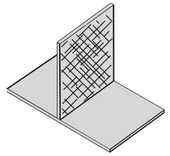
DELINEATORS

	SINGLE		DOUBLE	
DEVICE	 1-Size 2 reflector unit	 1-Size 1 reflector unit	 2-Size 2 reflector units	 2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

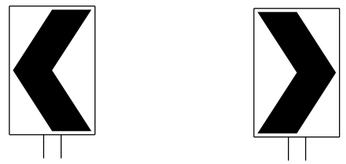
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE		 3-Size 2 reflector units	 1-Size 3 reflector unit	 3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

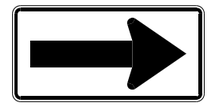
BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE	 W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	
NOTE	1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).			

ONE DIRECTION LARGE ARROW

DEVICE	 W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

- NUMBER OF REFLECTORS
  - S = Single
  - D = Double
- COLOR OF REFLECTORS
  - W = White
  - Y = Yellow
  - R = Red
- REFLECTOR UNIT SIZE
  - 1 or 2
- TYPE OF POST OR DELINEATOR
  - WC = Wing Channel Post
  - YFLX = Yellow Flexible Post
  - WFLX = White Flexible Post
  - BRF = Barrier Reflector
- TYPE OF MOUNT
  - GND = Embedded (drivable or set in concrete)
  - CTB = Concrete Barrier Mount
  - GF1 or GF2 = Guard Fence Attachment
  - SRF = Surface Mount
- DIRECTION
  - If Required
  - BI = Bi-Directional
  - BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

- TYPE OF OBJECT MARKER
  - 1, 2, 3, or 4
- NUMBER OF REFLECTORS OR DIRECTION
  - X = 3-Size 2 reflector units (Type 2 only)
  - Y = 1-Size 3 reflector unit (Type 2 only)
  - Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
  - L = Left Side (Type 3 Object Marker only)
  - R = Right Side (Type 3 Object Marker only)
  - C = Center (Type 3 Object Marker only)
- TYPE OF POST
  - WC = Wing Channel Post
  - WFLX = White Flexible Post
  - TWT = Thin Walled Tubing
- TYPE OF MOUNT
  - GND = Embedded (drivable)
  - SRF = Surface Mount
  - WAS = Wedge Anchor Steel
  - WAP = Wedge Anchor Plastic
- DIRECTION
  - If Required
  - BI = Bi-Directional

DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	SAT	BEXAR		105

20A

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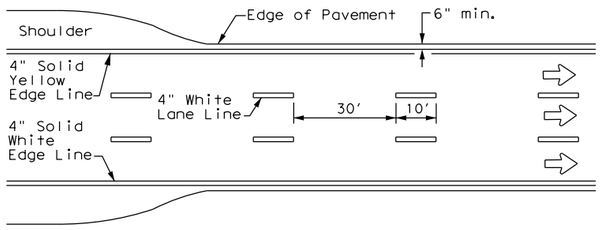
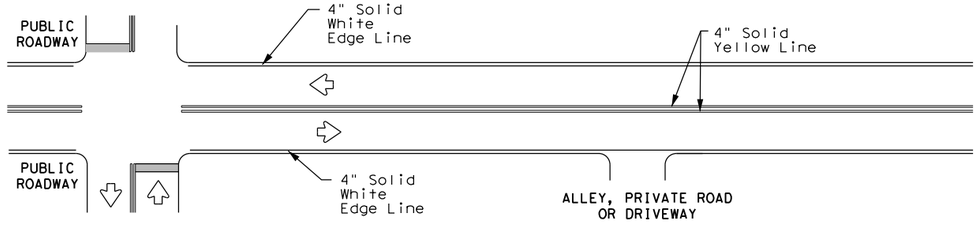
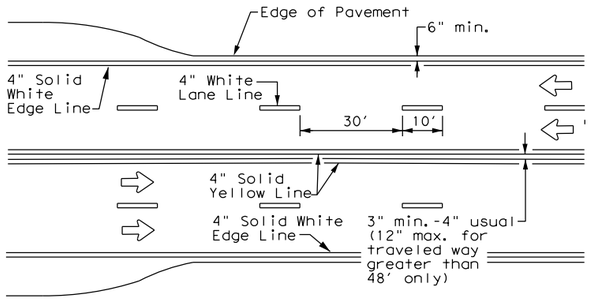


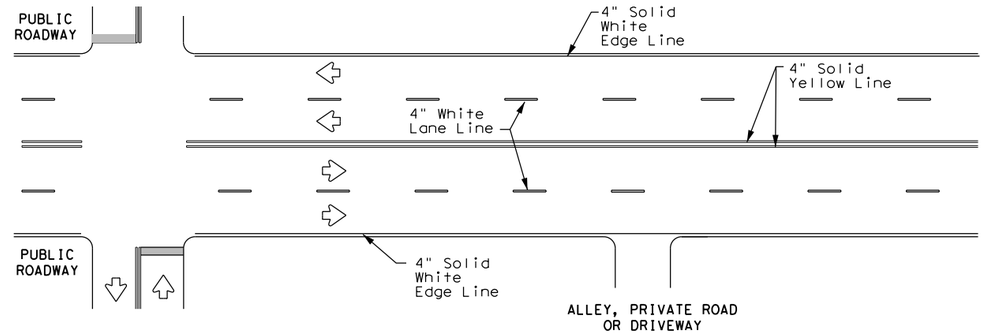
EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



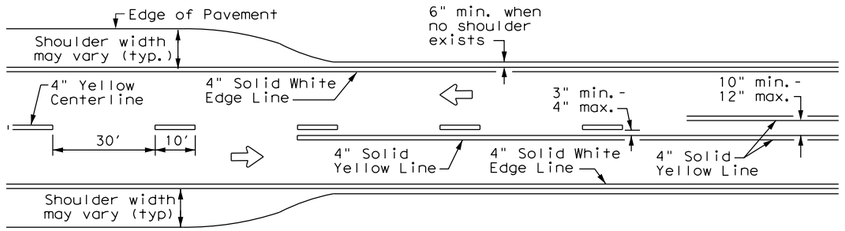
TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS



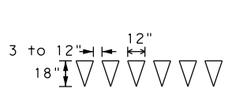
CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



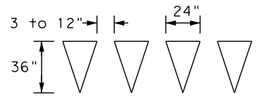
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS

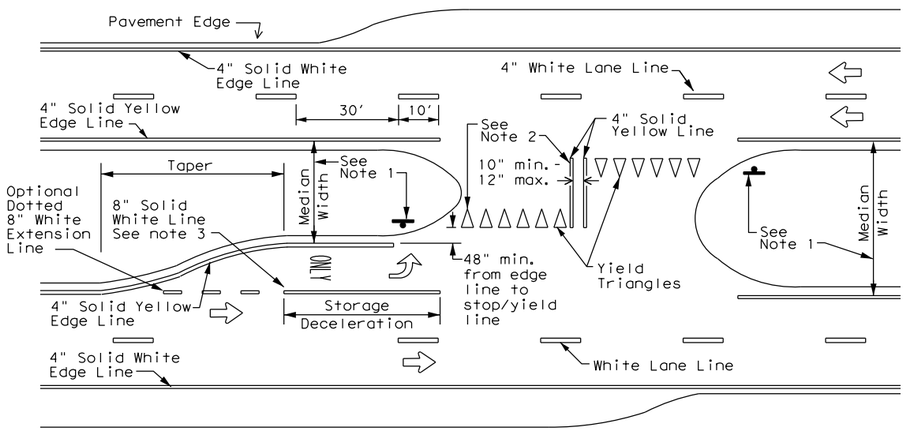


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

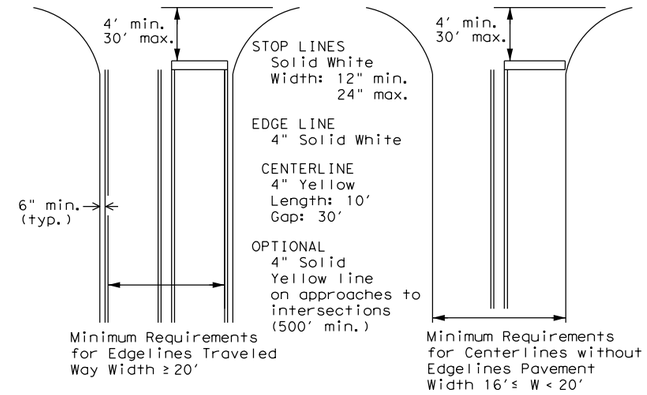
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the 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.



GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE
Based on Traveled Way and Pavement Widths
for Undivided Highways

Texas Department of Transportation
Traffic Safety Division Standard

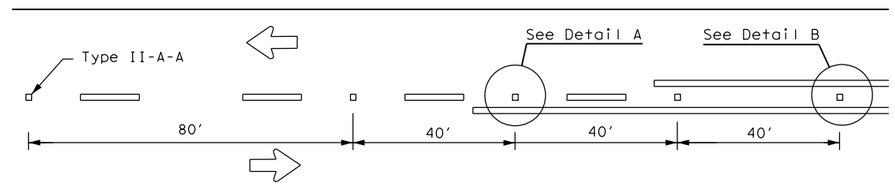
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

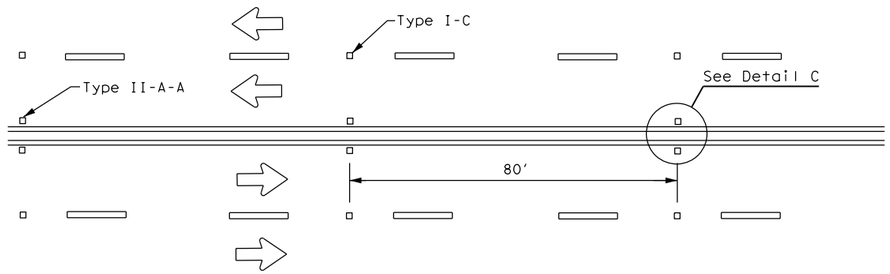
FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	-	-	-	-
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	SAT	BEXAR		106

22A

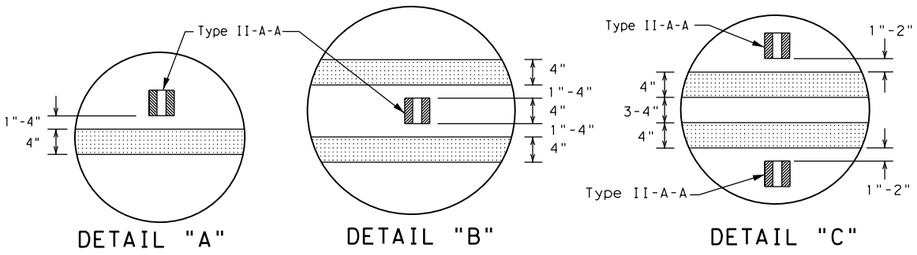
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



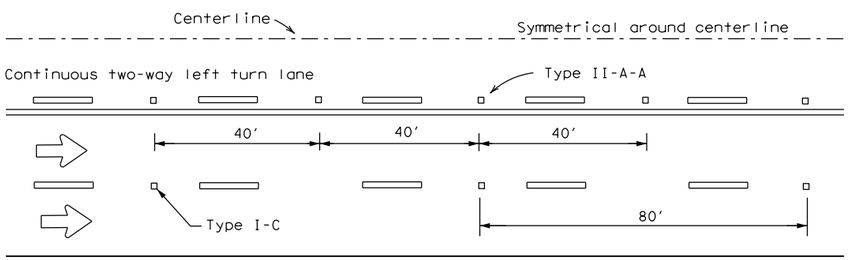
CENTERLINE FOR ALL TWO LANE ROADWAYS



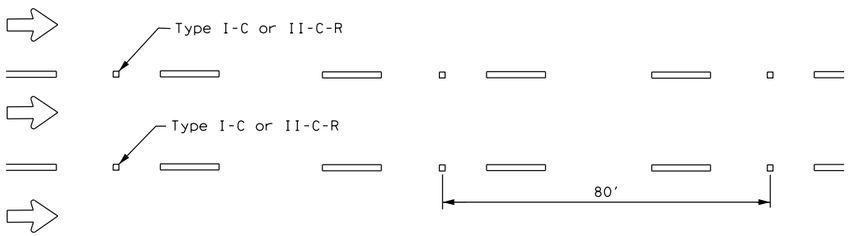
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" DETAIL "B" DETAIL "C"



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

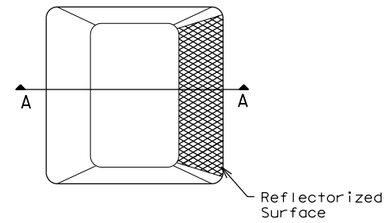


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

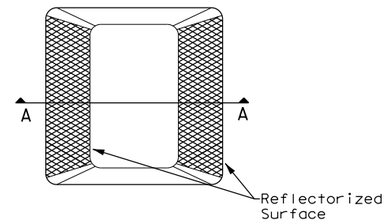
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

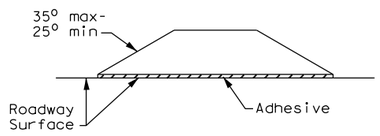
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

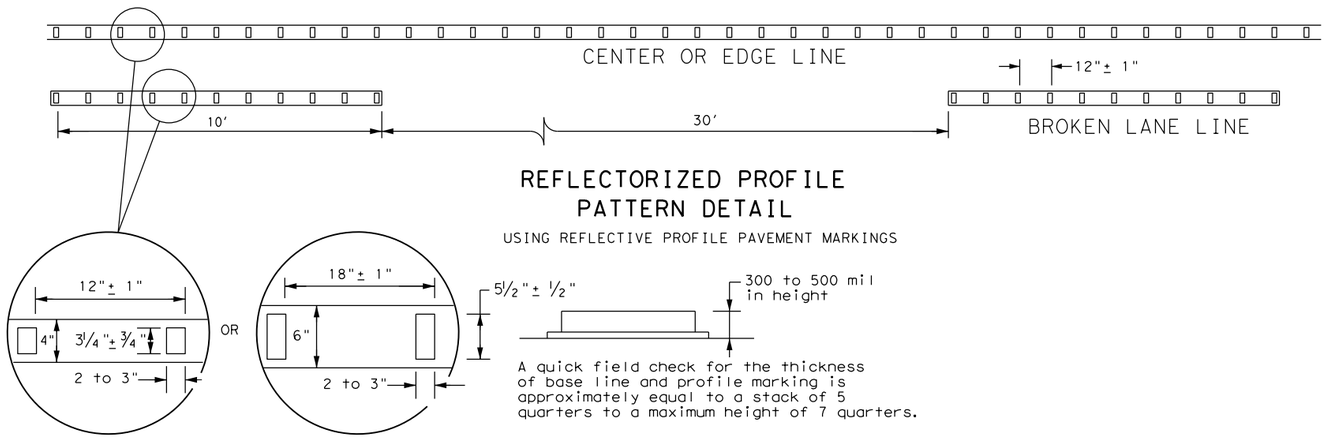


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



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.

4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

NOTE

Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10	-	-	-	-
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	SAT	BEXAR		107

22B

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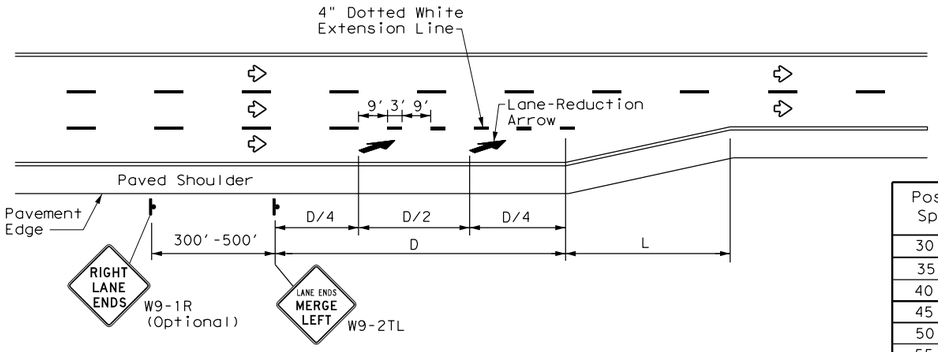
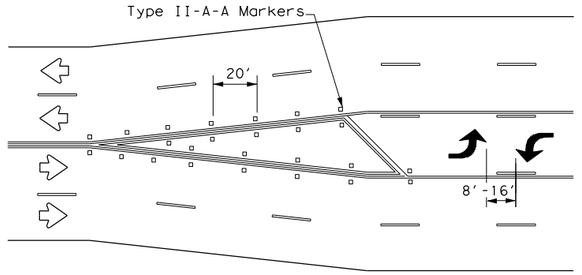


LANE REDUCTION

Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.



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.

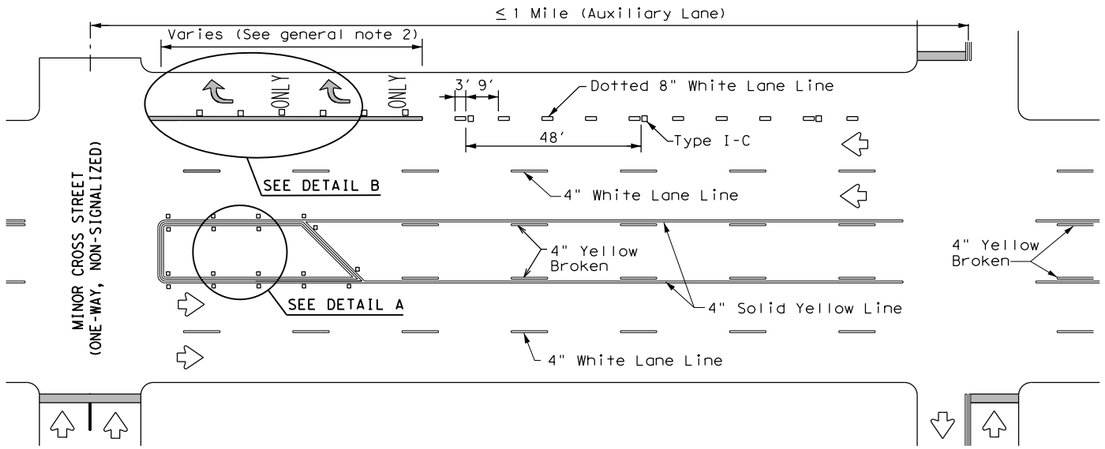
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

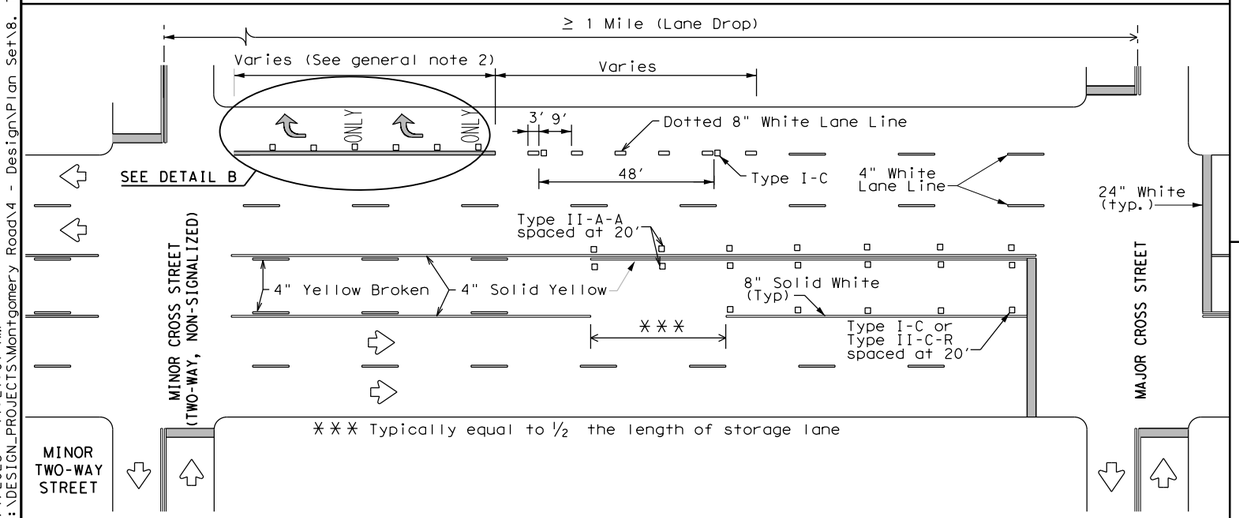
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words 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.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

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

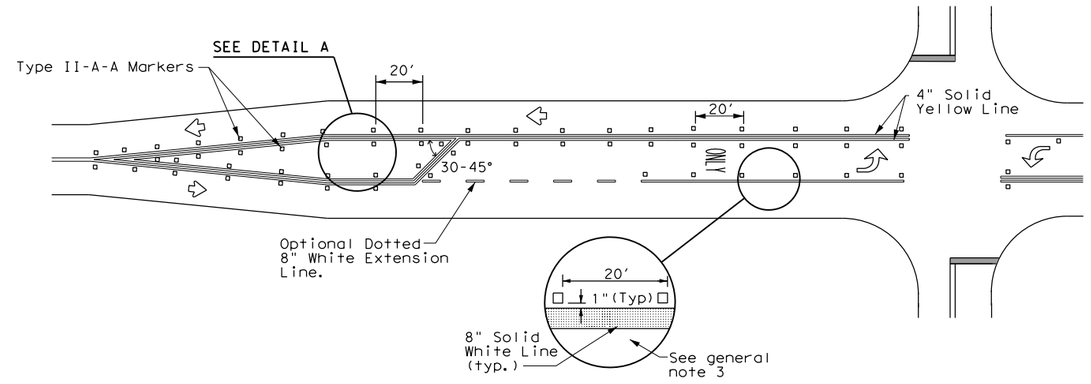
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



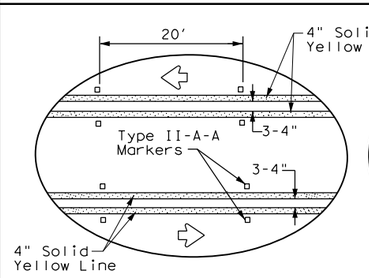
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



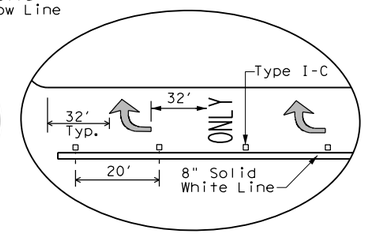
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A



DETAIL B

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
5-00 2-10	DIST	COUNTY		SHEET NO.
8-00 2-12	SAT	BEXAR		108
3-03 6-20				

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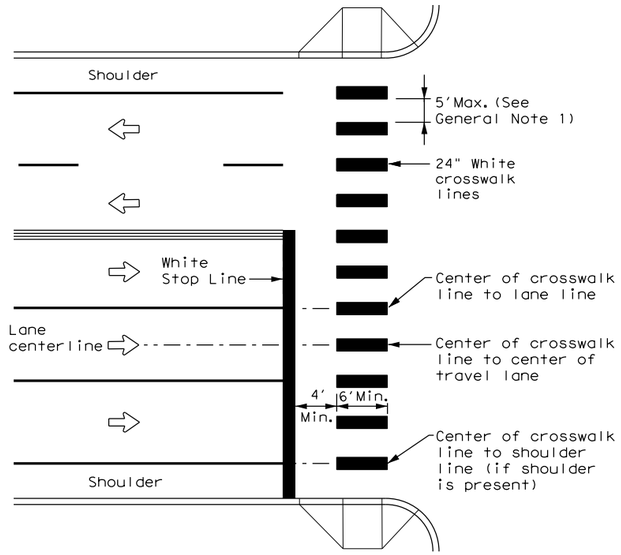


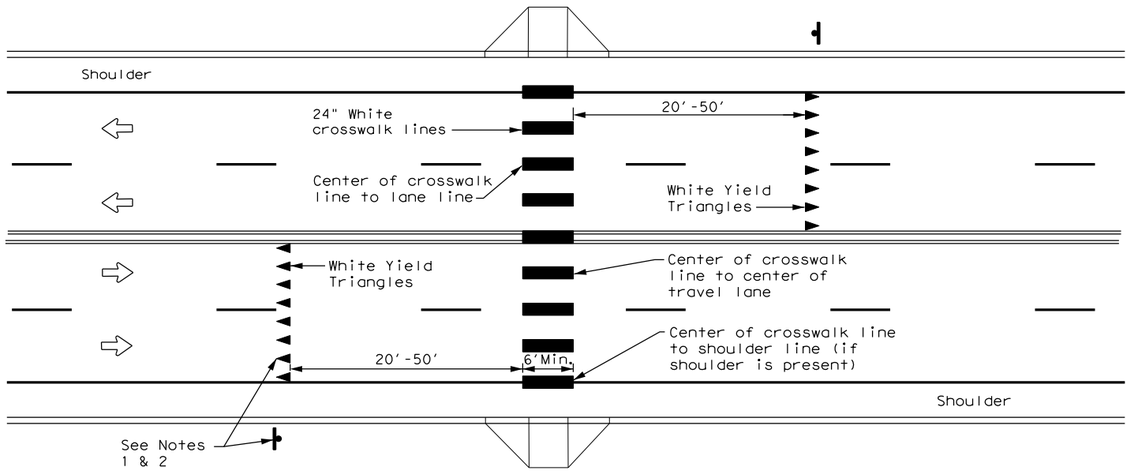
HIGH-VISIBILITY LONGITUDINAL CROSSWALK
AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar/Yield Triangles and Crosswalk shall be approved by the Engineer in the field.

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.



UNSIGNALIZED MID BLOCK HIGH-VISIBILITY
LONGITUDINAL CROSSWALK

NOTES

1. Use yield triangles with "Yield Here to Pedestrians" signs at unsignalized mid block crosswalks.
2. Use stop bars with "Stop Here on Red" signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-20

FILE: pm4-20.dgn	DN:	CK:	DW:	CK:
©TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		109

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DATE: 2/7/2025 11:21:08 AM
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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

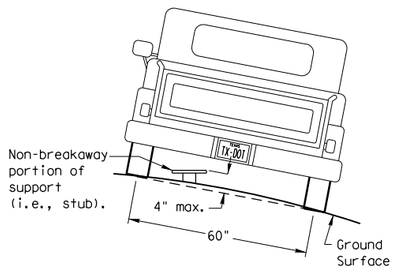
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

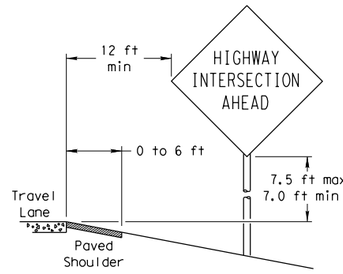
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

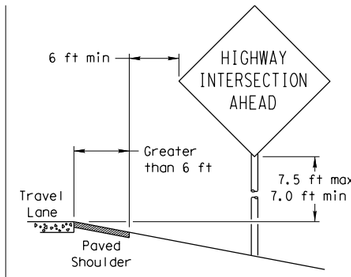
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

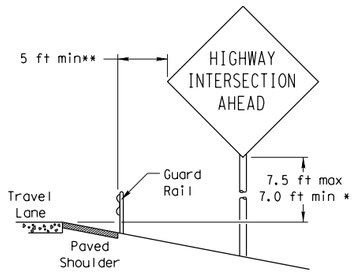
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



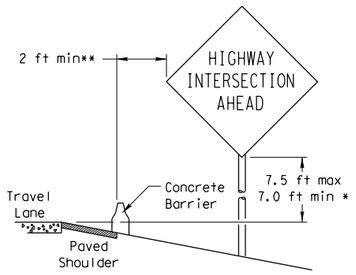
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

BEHIND BARRIER



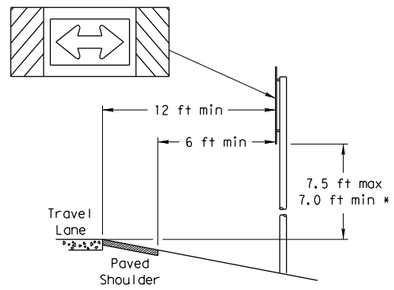
BEHIND GUARDRAIL



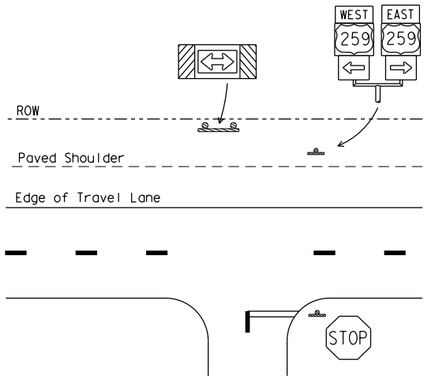
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

T-INTERSECTION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

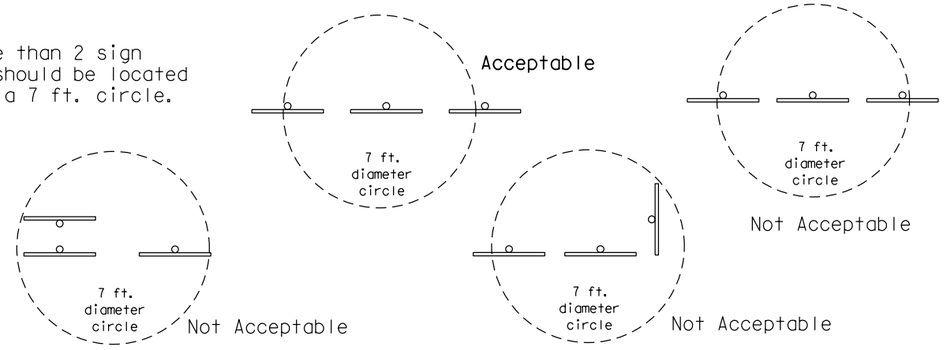
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

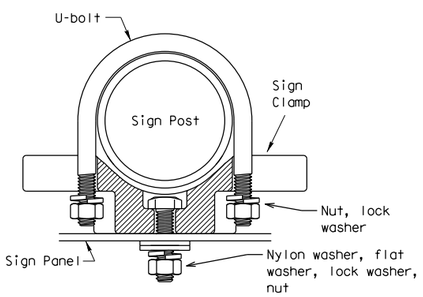
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

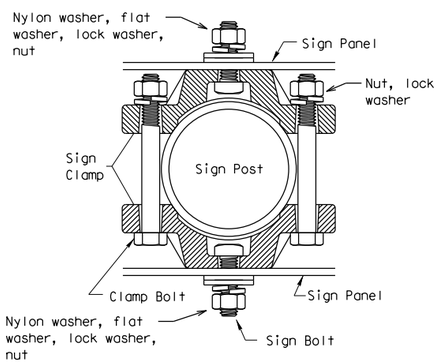


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

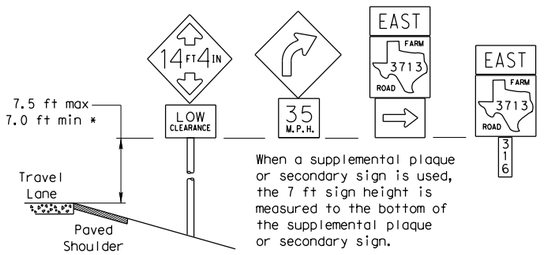
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



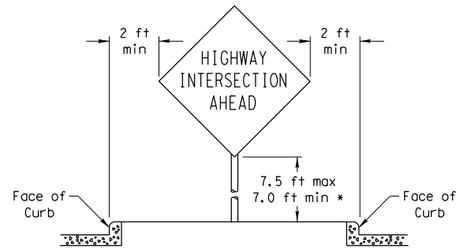
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



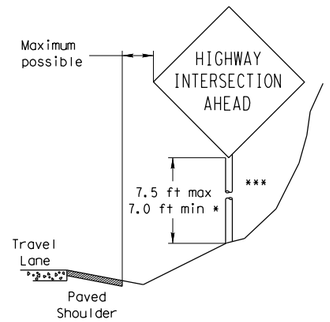
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

©TxDOT July 2002	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		110

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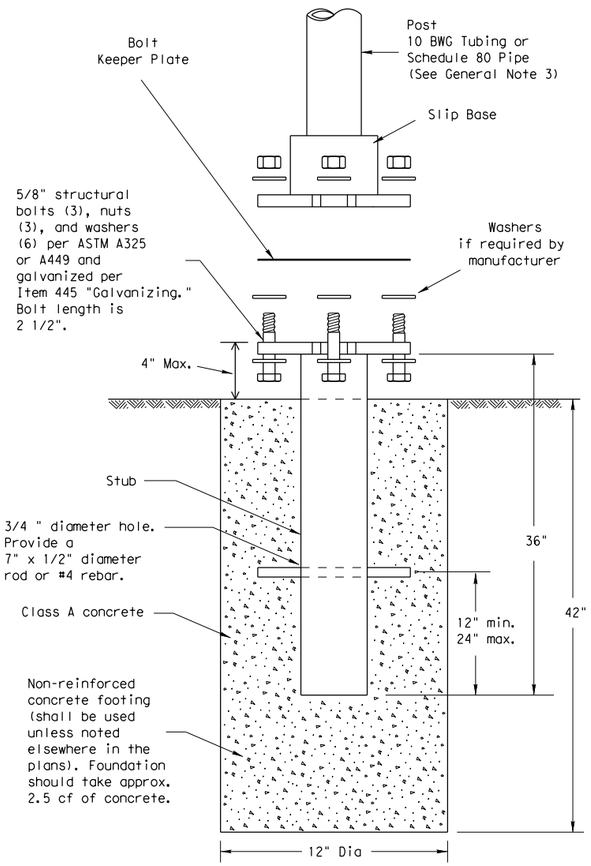
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

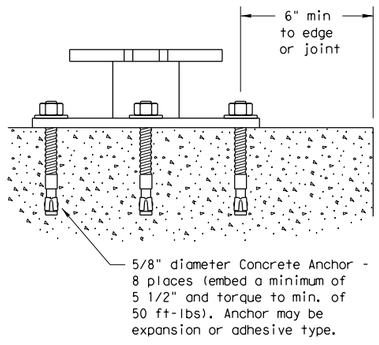
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
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SAT	BEXAR	111

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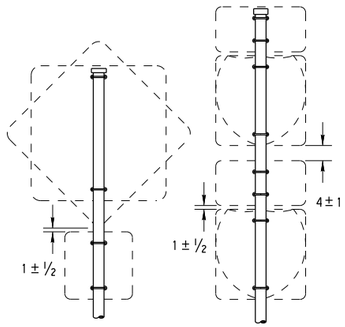
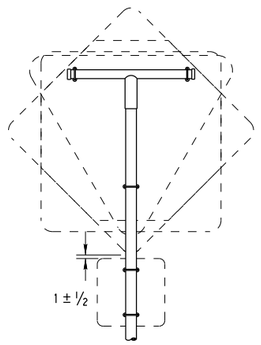


SM RD SGN ASSM TY XXXXX(1)XX(P)



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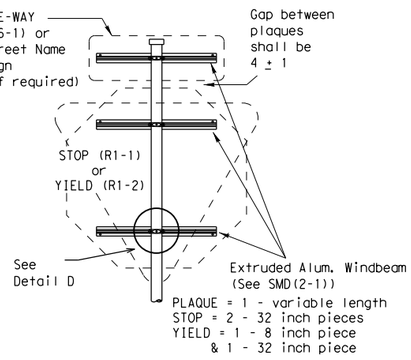

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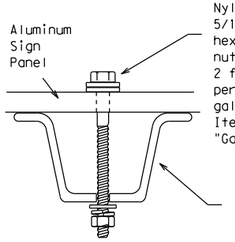
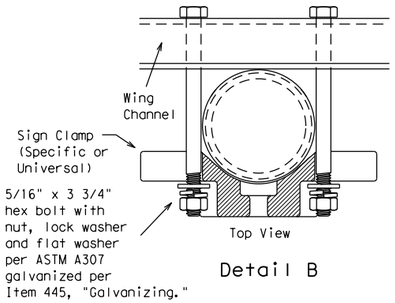
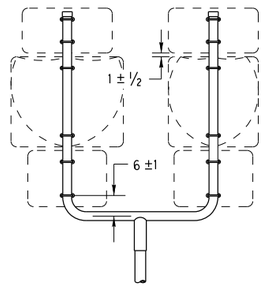


Detail A



Detail B



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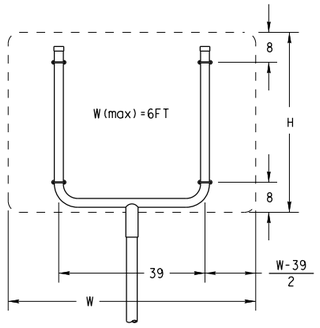
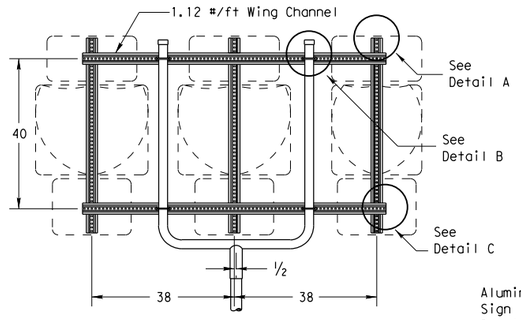
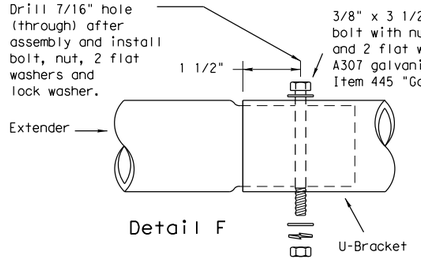


SM RD SGN ASSM TY XXXXX(1)XX(U)

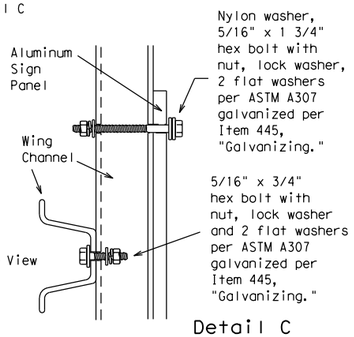


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

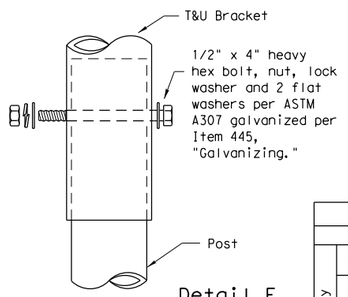


Detail F

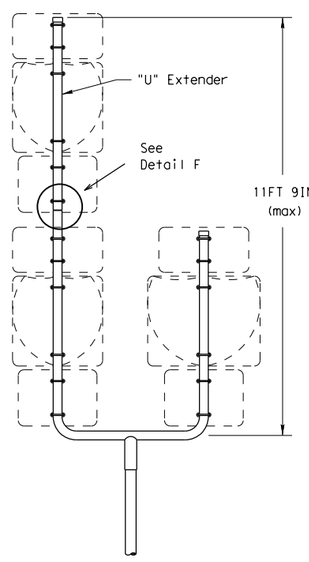
Splices shall only be allowed behind the sign substrate.



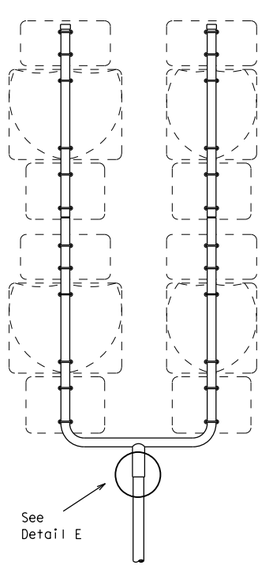
Detail C



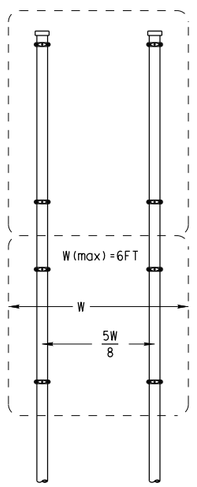
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

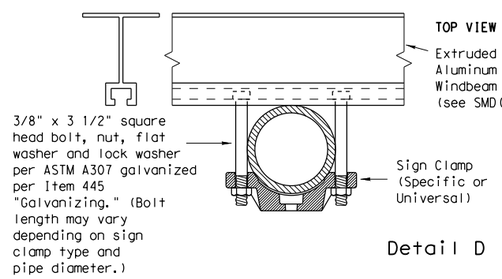


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

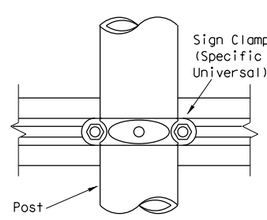


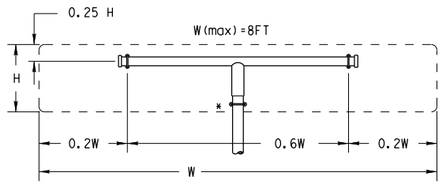
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

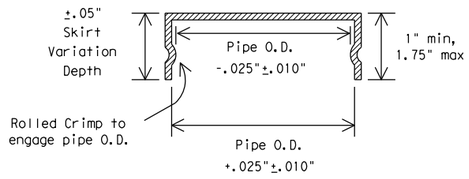




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
-	-	-	-
DIST	COUNTY		SHEET NO.
SAT	BEXAR		112

9-08 REVISIONS

26C

DATE: 2/7/2025 11:21:09 AM
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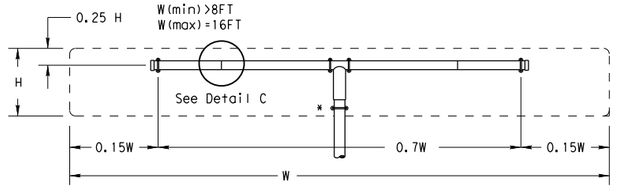
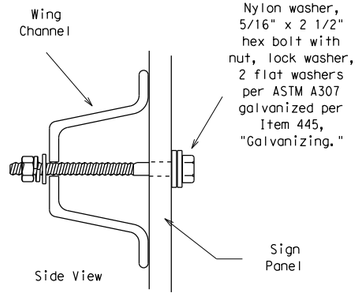
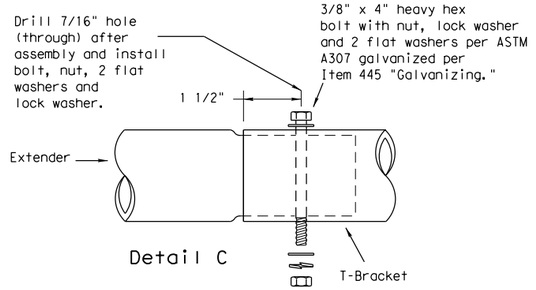


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



Detail B



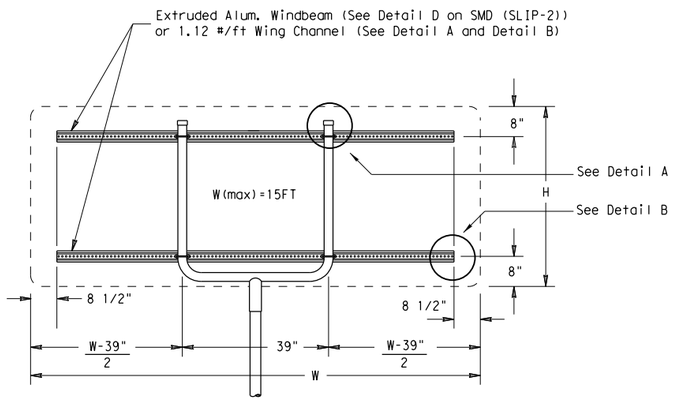
Detail C

Splices shall only be allowed behind the sign substrate.

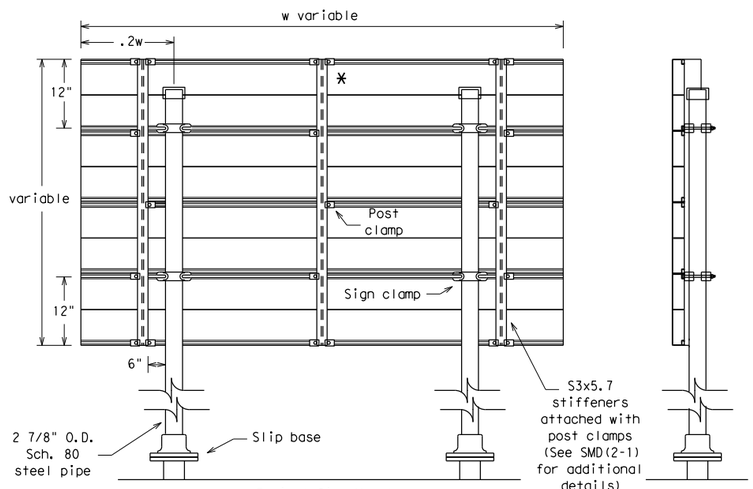
GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. See table above.
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.



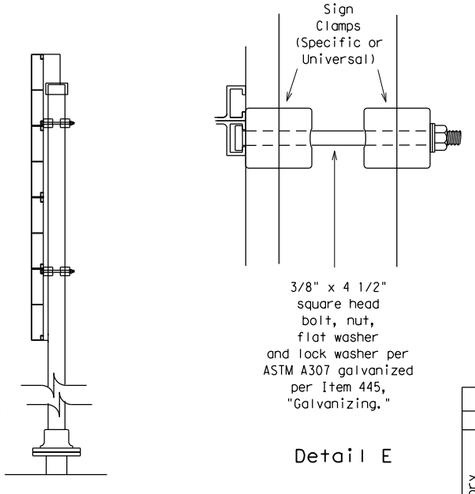
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



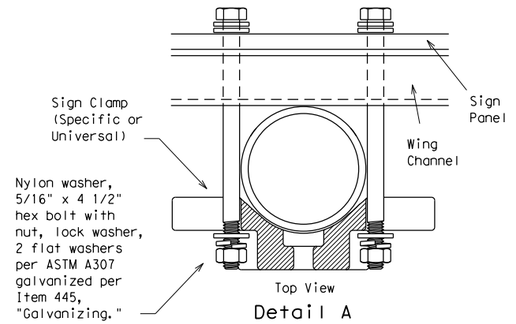
Typical Sign Mount

SM RD SGN ASSM TY S80(2)XX(P-EXAL)

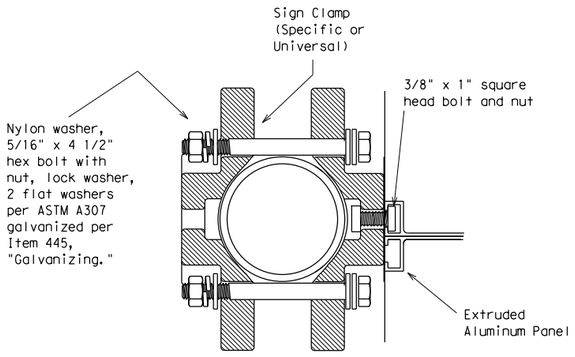
* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.



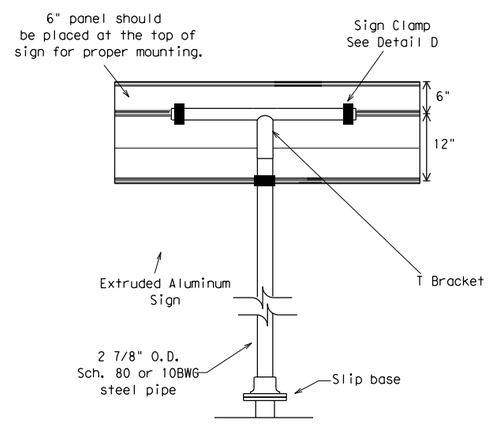
Detail E



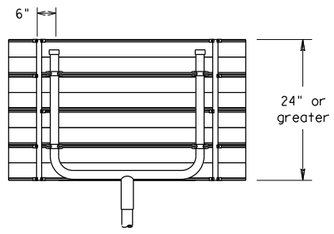
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

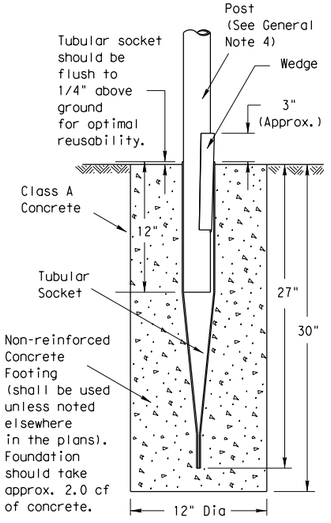
SMD(SLIP-3)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	-	-	-	-
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		113

26D

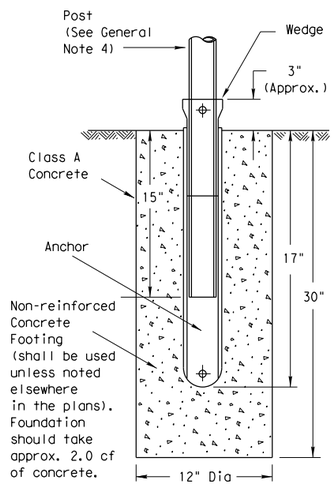
DATE: 2/7/2025 11:21:09 AM
FILE: P:\DESIGN*PROJECTS\Montgomery Road\4 - Design\Plan Set\8. Traffic\TRF*STANDARDS*PH4\SMDRDS*PH4D11 - smdtwt.dgn

Wedge Anchor Steel System



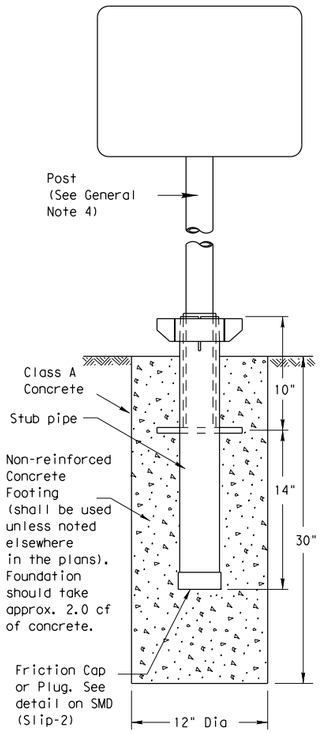
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

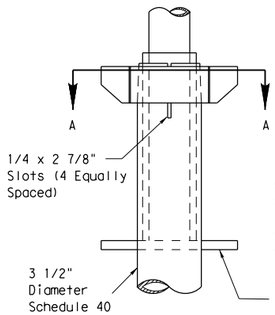


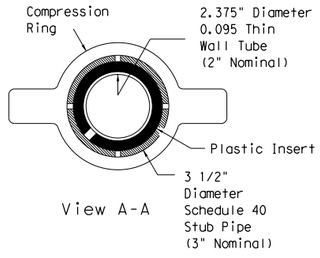
SMD RD SGN ASSM TY TWT(X)WP(X)

Universal Anchor System with Thin-Walled Tubing Post



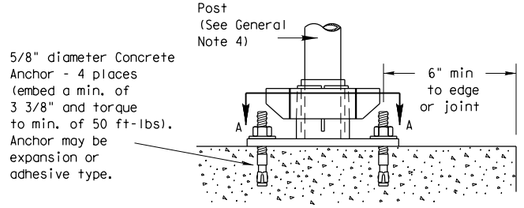
SM RD SGN ASSM TY TWT(X)UA(P)



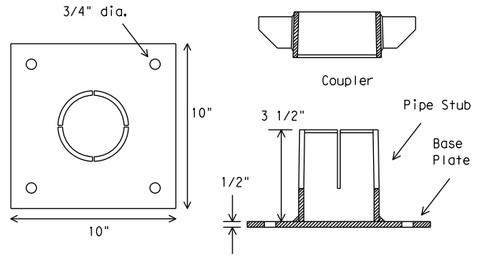


View A-A

Plastic insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The insert should be cut to approx. 4 1/2" when used with the Bolt Down Universal Anchor System.

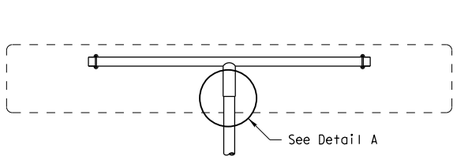


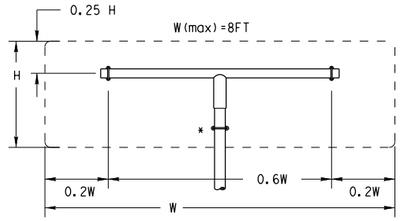
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.



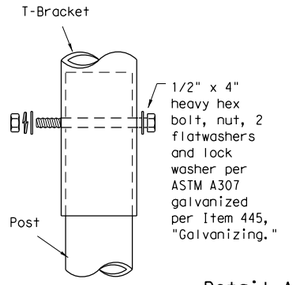
SM RD SGN ASSM TY TWT(X)UB(P)

Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





SM RD SGN ASSM TY TWT(X)XX(T)
(* - See General Note 6)



Detail A

9/16" hole may need to be drilled through post to accommodate bolt.

NOTE

The devices shall be installed per manufacturer's recommendations.
Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: http://www.txdot.gov/business/producer list.htm
4. Material used as post with this system shall conform to the following specifications:
   13 BWG Tubing (2.375" outside diameter) (TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the following:
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   18% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of .083" to .099"
   Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Place concrete into hole until it is approximately flush with the ground. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximaely 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer..
5. Attach the sign to the sign post.
6. Insert the sign post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. Insert base post in hole to depths shown and backfill hole with concrete.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain above the top of the concrete foundation.
4. Attach the sign to the sign post.
5. Install plastic insert around bottom of post.
6. Insert sign post into base post. Lower until the post comes to rest on steel rod.
7. Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
8. Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST

SMD(TWT)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
-	-	-	-

DIST	COUNTY	SHEET NO.
SAT	BEXAR	114

26E

DATE: 2/7/2025 11:21:10 AM
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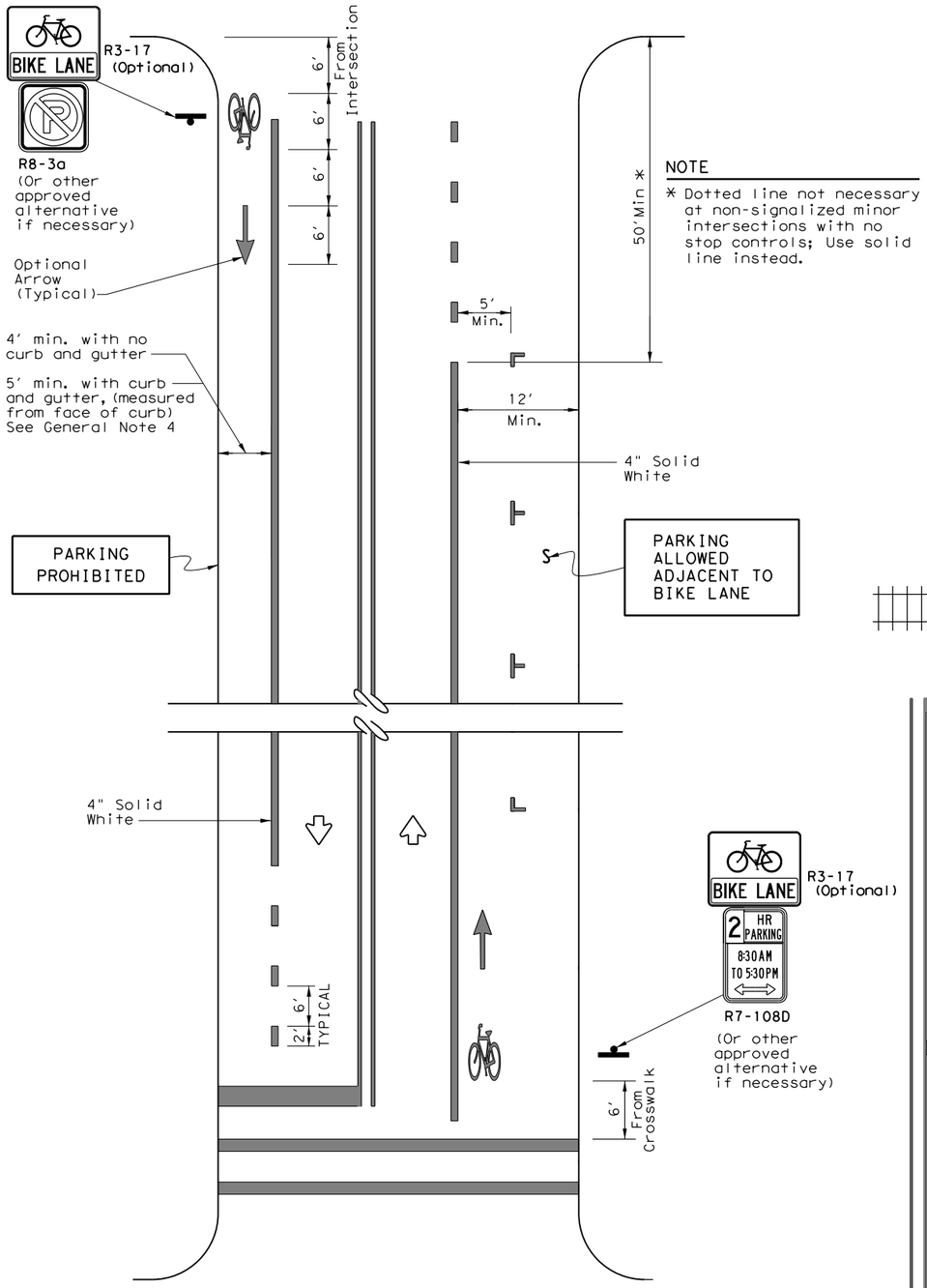


NOTES

1. Bicycle lane pavement markings typically repeated after each intersection or signalized driveway.
2. On uninterrupted sections of roadway, bicycle lane pavement markings typically repeated as follows:

   -1200' for 45 MPH or less roads
   -2500' for 50 MPH and greater roads.

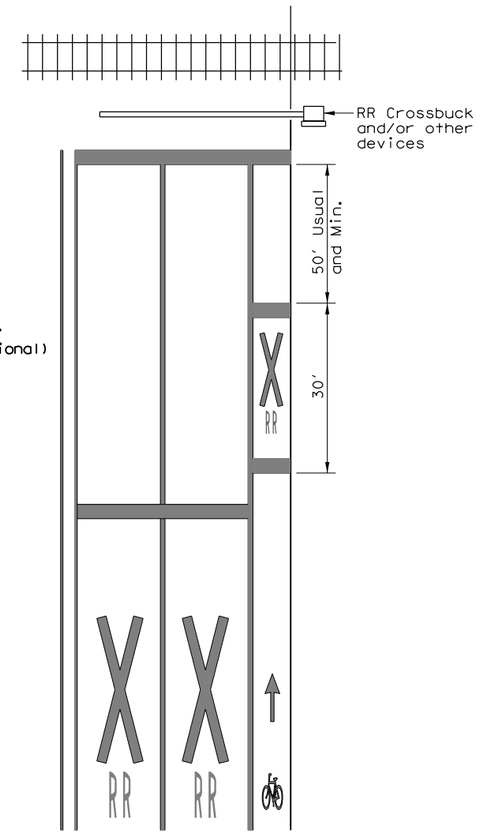
TWO-WAY STREET

NOTE

* Dotted line not necessary at non-signalized minor intersections with no stop controls; Use solid line instead.

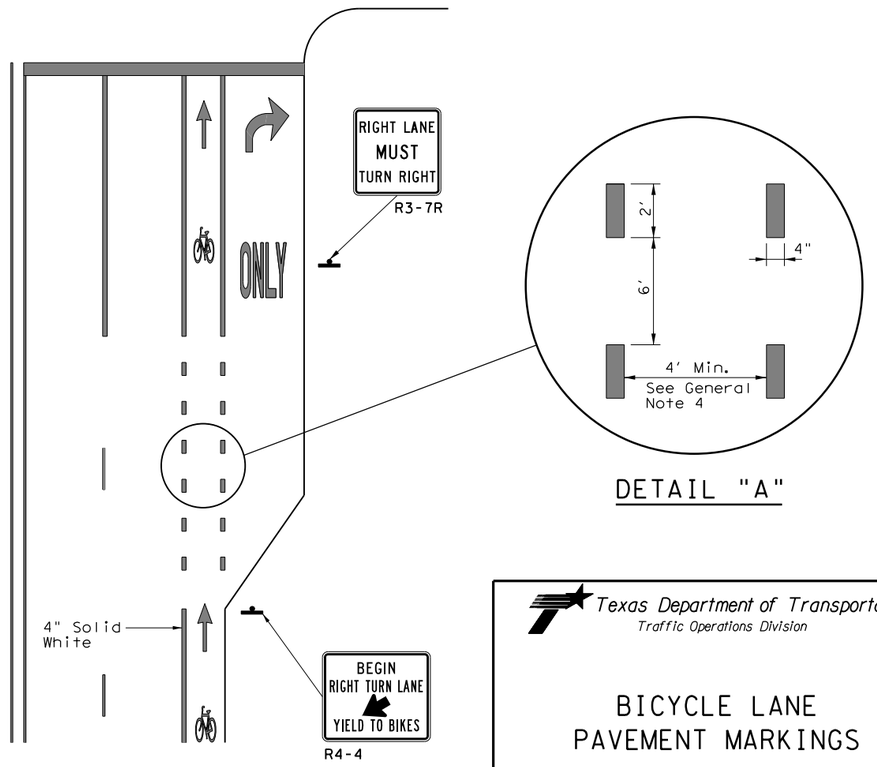
GENERAL NOTES

1. All bicycle lane pavement markings shall be white unless otherwise noted.
2. All pavement marking materials shall meet the required Department Material Specifications as specified by the plans.
3. Exact sign placement and details are shown elsewhere in the plans.
4. The current edition of AASHTO'S Guide for the Development of Bicycle Facilities should be referenced for variations in design, other geometric conditions, and lane width options.
5. Other bicycle lane symbol or word markings as shown in the Texas Manual on Uniform Traffic Control Devices may be used. Details for words, arrows and symbols as shown in the Standard Highway Sign Designs for Texas.
6. The "BIKE LANE" (R3-17) sign with the "AHEAD" (R3-17a) sign mounted directly below should be installed in advance of the beginning of a marked bike lane.
7. The "BIKE LANE" (R3-17) sign with the "END" (R3-17b) sign mounted directly below should be installed at the end of marked bicycle lane.



(See RCPM Standard for travel lane details)

RAILROAD CROSSING APPROACH



RIGHT TURN ONLY LANE

DETAIL "A"

LEGEND	
	Sign
	Traffic Flow

SPECIFICATION REFERENCE TABLE	
Traffic Paint	DMS-8200
Hot Applied Thermoplastic	DMS-8220
Permanent Prefabricated Pavement Markings	DMS-8240
Glass Traffic Beads	DMS-8290

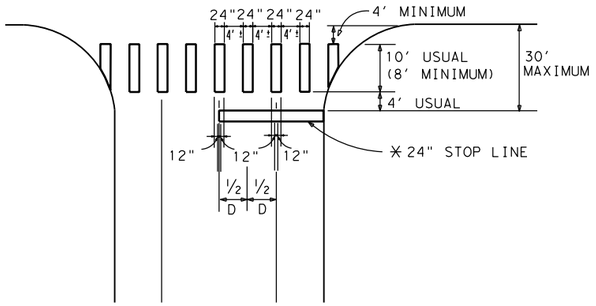
Texas Department of Transportation
Traffic Operations Division

BICYCLE LANE PAVEMENT MARKINGS

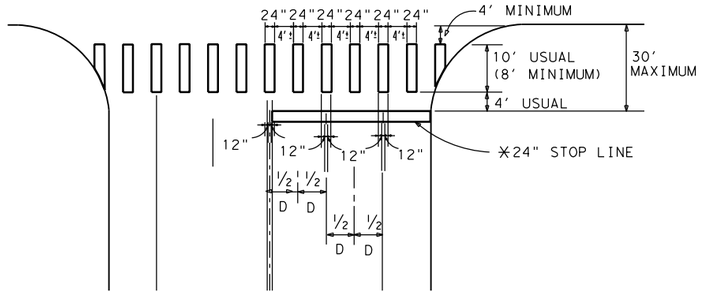
BLPM-10

REVISIONS

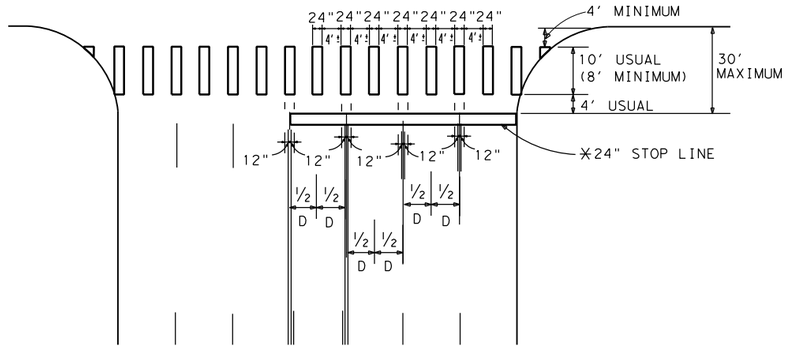
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
-	-	-	-
DIST	COUNTY		SHEET NO.
SAT	BEXAR		115



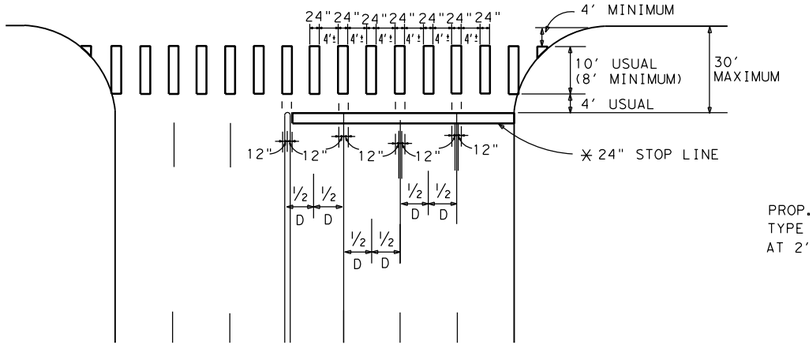
TWO LANES WITH SHOULDERS



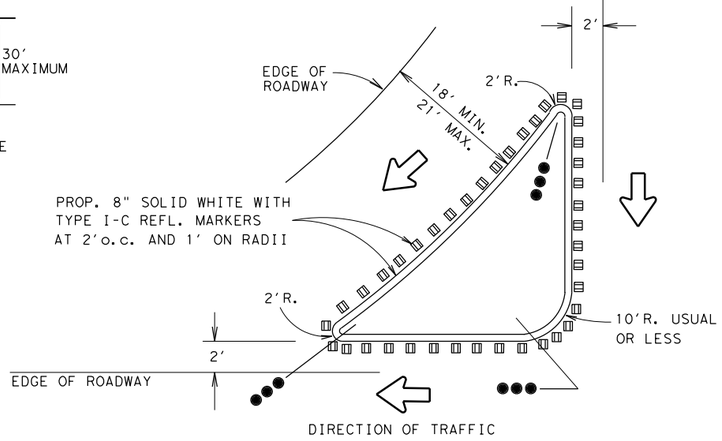
FOUR LANES WITH SHOULDERS



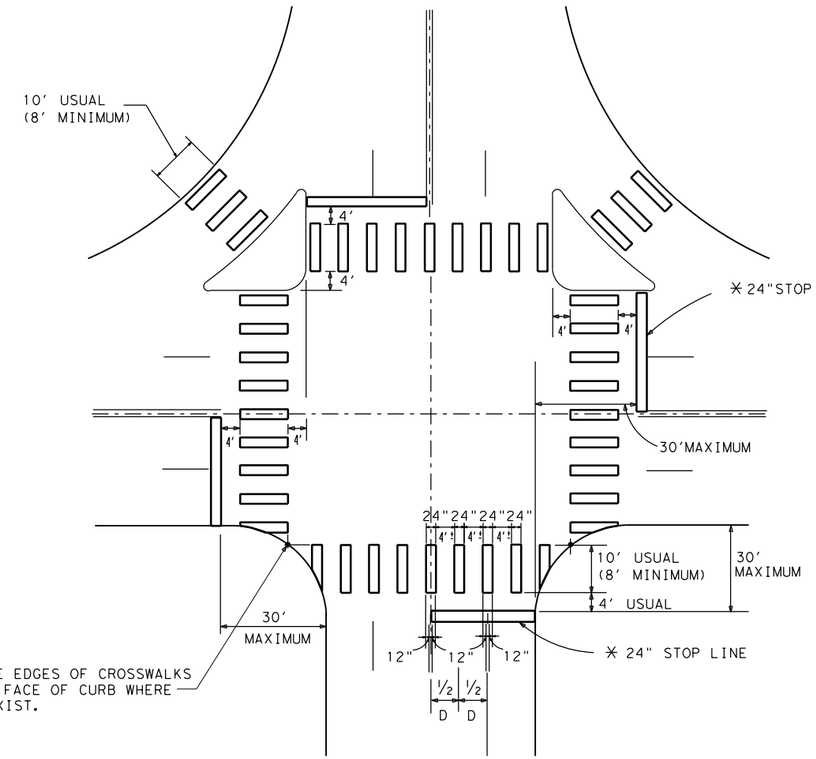
MULTI - LANES



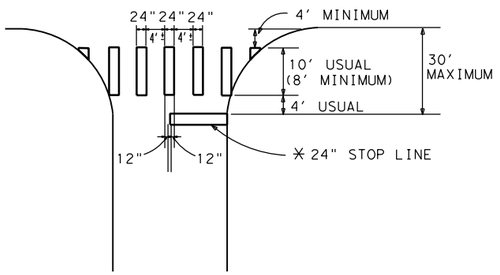
MULTI - LANE WITH MEDIAN



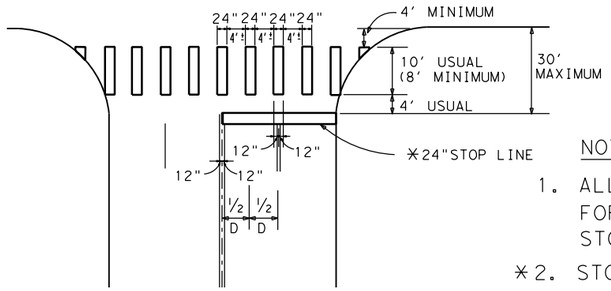
TYPICAL RIGHT TURN ISLAND
WITH DELINEATION



INTERSECTION WITH RIGHT - TURN ISLANDS



TWO LANES



FOUR LANES

NOTES:

1. ALL LONGITUDINAL LINES FORMING CROSSWALK AND STOP LINES SHALL BE WHITE
2. ✳ STOP LINES AS REQUIRED ON DETAILED PAVEMENT MARKING PLANS.
3. "D" IS EQUAL TO ONE HALF THE DISTANCE.

LEVELS DISPLAYED

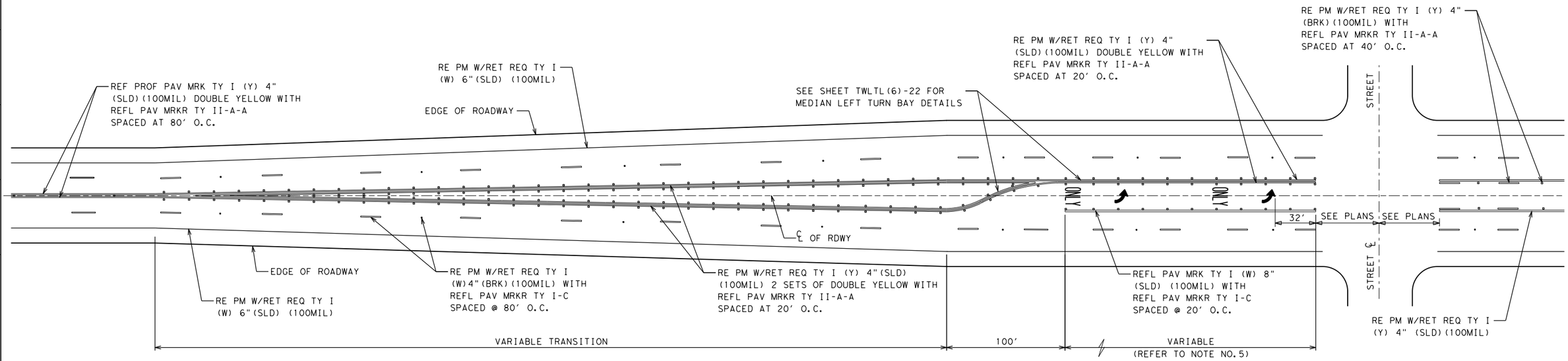
																ACC:
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	1	

San Antonio District Standard

TYPICAL CROSSWALK DETAILS

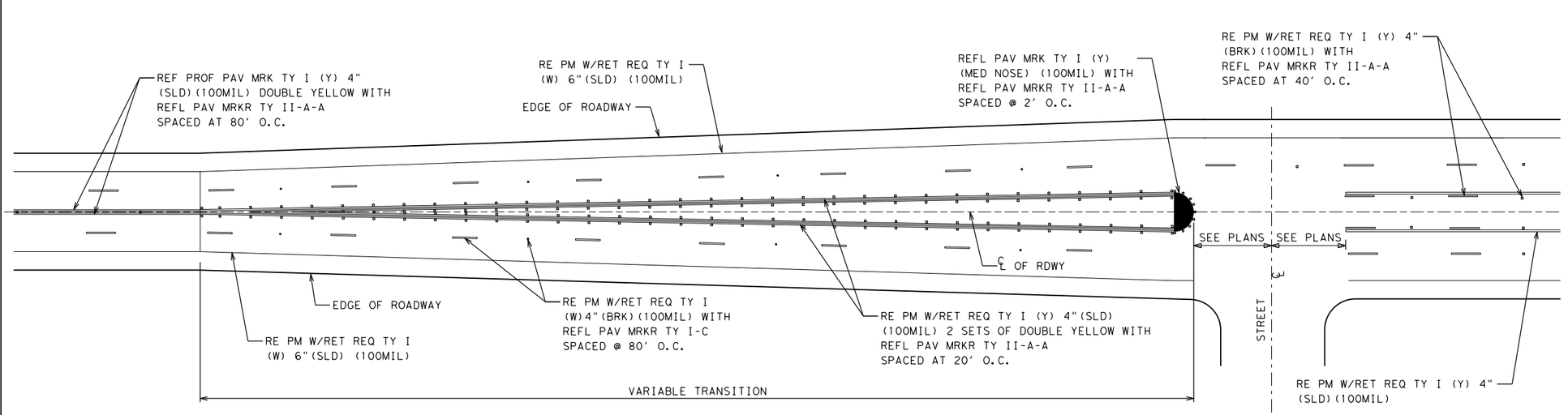
TCD-05

REVISIONS	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
DEC 1999	6			116
AUG 2005	STATE	DIST.	COUNTY	
	TEXAS	SAT	BEXAR	
	CONT.	SECT.	JOB	HIGHWAY NO.
	-	-	-	-



TYPICAL MEDIAN LEFT TURN BAY

SIGNALIZED AND NON-SIGNALIZED CROSS STREETS
AT BEGINNING AND END OF TWO WAY CENTER LEFT TURN LANE

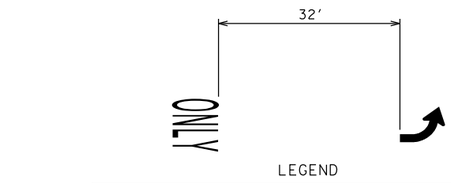


TYPICAL TRANSITION

AT BEGINNING AND END OF TWO WAY CENTER LEFT TURN LANE

NOTES:

1. PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STATE STANDARDS PM(2)-20 (POSITIONING GUIDANCE).
2. PAVEMENT MARKING ARROWS SHALL COMPLY TO TEXAS MUTCD
3. LEFT TURN BAY LAYOUT, TWO SETS OF "WORDS" AND "ARROWS" SHALL BE USED IF THE LENGTH OF THE BAY IS EQUAL TO OR GREATER THAN 180 FEET. THE BOTTOM OF THE FIRST "ONLY" SHALL BE PLACED AT THE BEGINNING OF THE TURN BAY LANE LINE AS SHOWN ABOVE.
4. REFER TO TXDOT STANDARD PM(3)-20 FOR MORE TURN LANE DETAILS.
5. REFER TO TXDOT ROADWAY DESIGN MANUAL FOR DECELERATION AND STORAGE LENGTH.



LEGEND

TYPICAL DETAIL
(PLACE LEGENDS IN ACCORDANCE TO STATE STANDARD PM(3)-20)

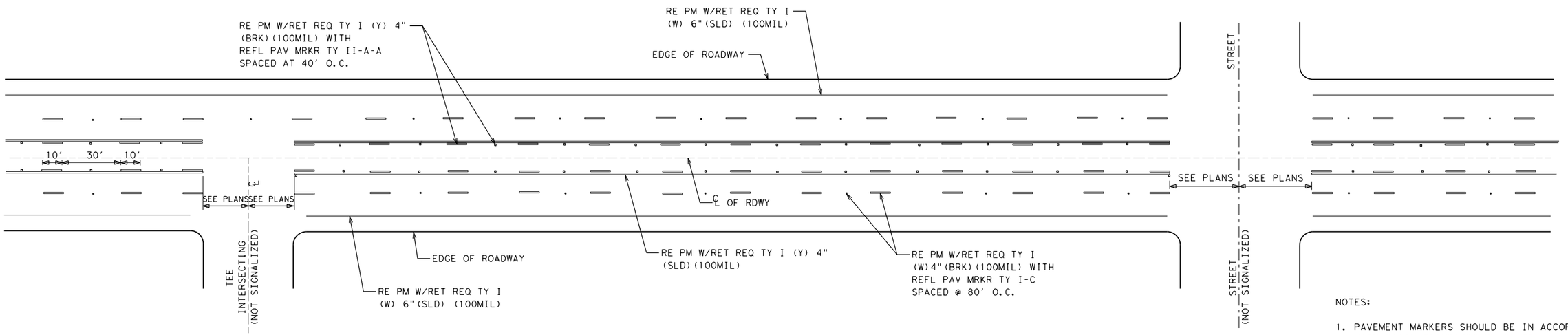
San Antonio District Standard

TWO WAY LEFT TURN LANE AND LEFT TURN BAYS - URBAN ROADS

SCALE: NS

TWLTL(2)-22

REVISIONS	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.			SHEET NO.
MAY 2010 MAY 2018 MAY 2022	6	$FAP-NUM$			117
	STATE	DIST.	COUNTY		
	TEXAS	SAT	BEXAR		
	CONT.	SECT.	JOB	HIGHWAY NO.	
	-	-	-	-	



TWO WAY LEFT TURN LANE DETAILS
NON-SIGNALIZED INTERSECTIONS

NOTES:

1. PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STATE STANDARDS PM(2)-20 (POSITIONING GUIDANCE).
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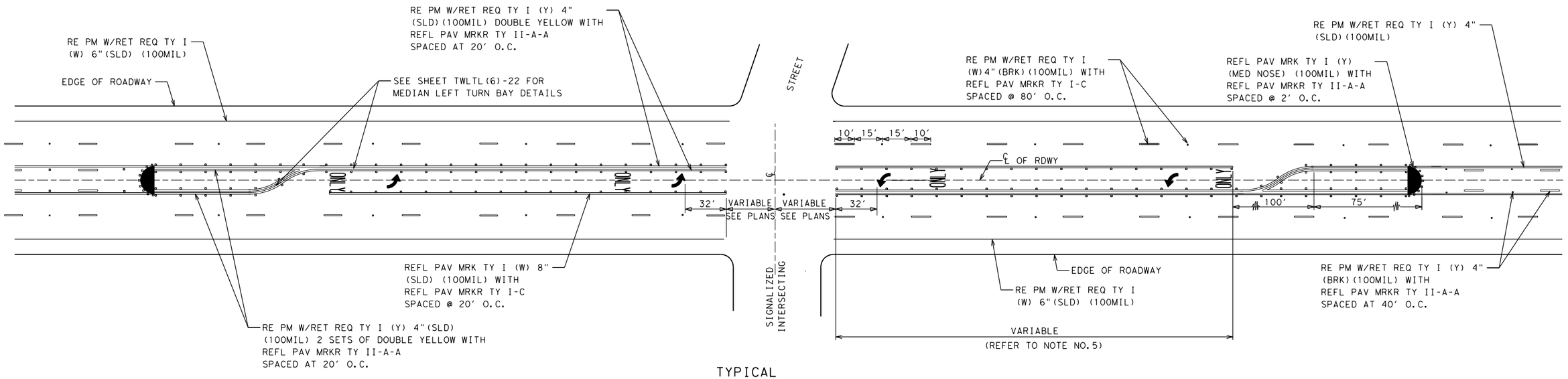
5. REFER TO TXDOT ROADWAY DESIGN MANUAL FOR DECELERATION AND STORAGE LENGTH.

San Antonio District Standard

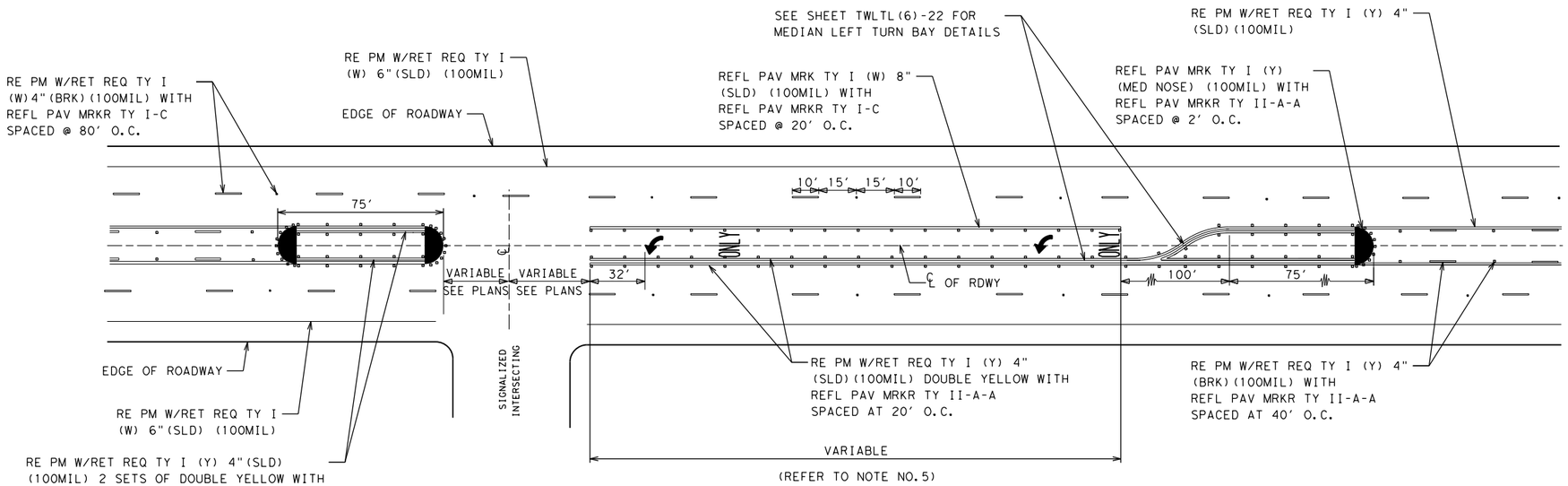
TWO WAY LEFT TURN LANE AND LEFT TURN BAYS - URBAN ROADS

SCALE: NS — **TWLTL(3)-21**

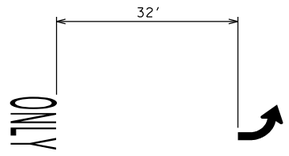
REVISIONS	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.			SHEET NO.
MAY 2010 MAY 2018 MAY 2022	6	$FAP-NUM$			118
	STATE	DIST.	COUNTY		
	TEXAS	SAT	BEXAR		
	CONT.	SECT.	JOB	HIGHWAY NO.	
	-	-	-	-	



TYPICAL
TWO WAY LEFT TURN LANE DETAILS
SIGNALIZED INTERSECTING



TYPICAL
TWO WAY LEFT TURN LANE DETAILS
SIGNALIZED TEE INTERSECTION



LEGEND

TYPICAL DETAIL
(PLACE LEGENDS IN ACCORDANCE TO STATE STANDARD PM(3)-20)

NOTES:

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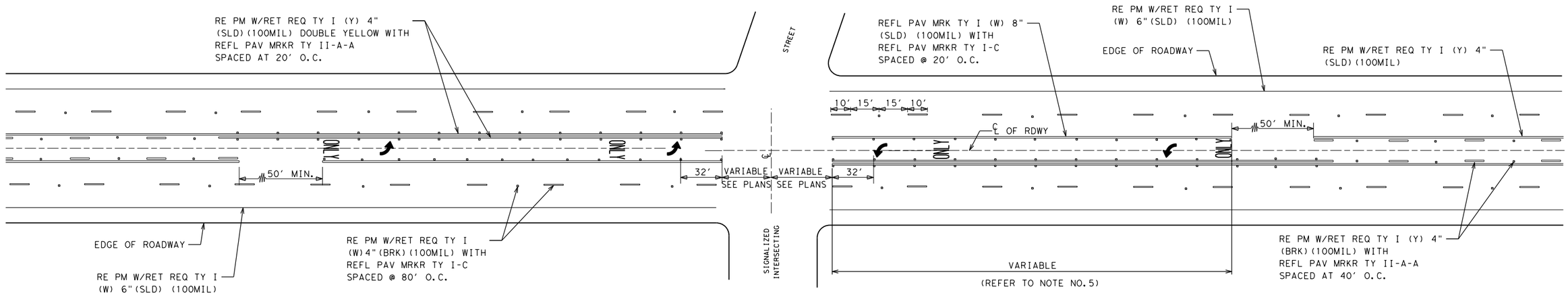
San Antonio District Standard

TWO WAY LEFT TURN LANE AND LEFT TURN BAYS - URBAN ROADS

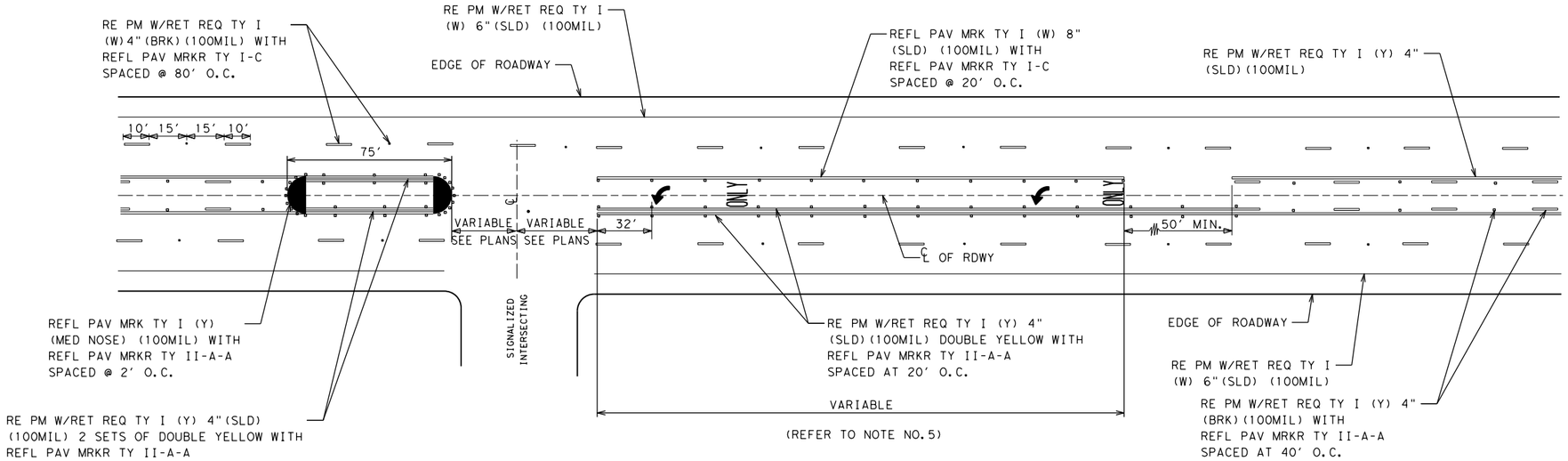
SCALE: NS

TWLTL(4)-21

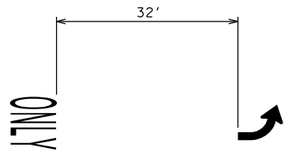
REVISIONS	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
MAY 2010 MAY 2018 MAY 2022	6	$FAP-NUM$		119
	STATE	DIST.	COUNTY	
	TEXAS	SAT	BEXAR	
	CONT.	SECT.	JOB	HIGHWAY NO.
	-	-	-	-



TYPICAL
TWO WAY LEFT TURN LANE DETAILS
SIGNALIZED INTERSECTION



TYPICAL
TWO WAY LEFT TURN LANE DETAILS
SIGNALIZED TEE INTERSECTION



LEGEND

TYPICAL DETAIL
(PLACE LEGENDS IN ACCORDANCE TO STATE STANDARD PM(3)-20)

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5. REFER TO TXDOT ROADWAY DESIGN MANUAL FOR DECELERATION AND STORAGE LENGTH.

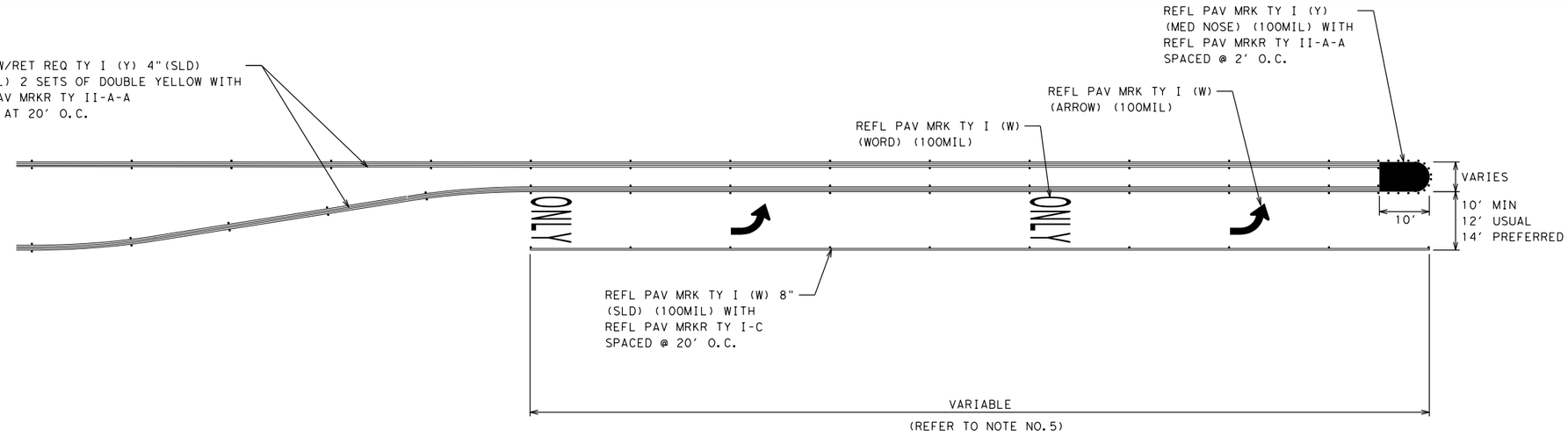
San Antonio District Standard

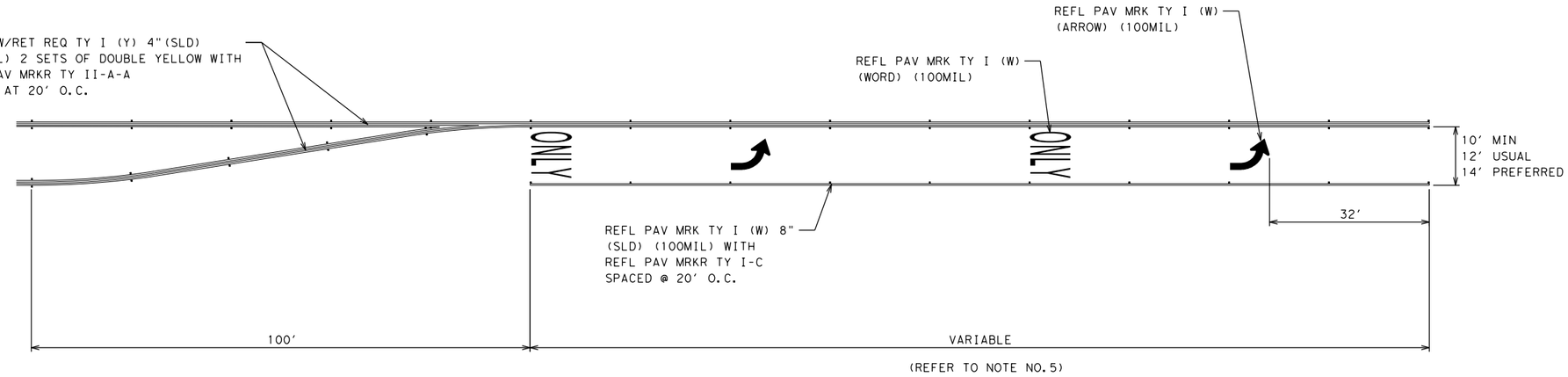
TWO WAY LEFT TURN LANE AND LEFT TURN BAYS - URBAN ROADS

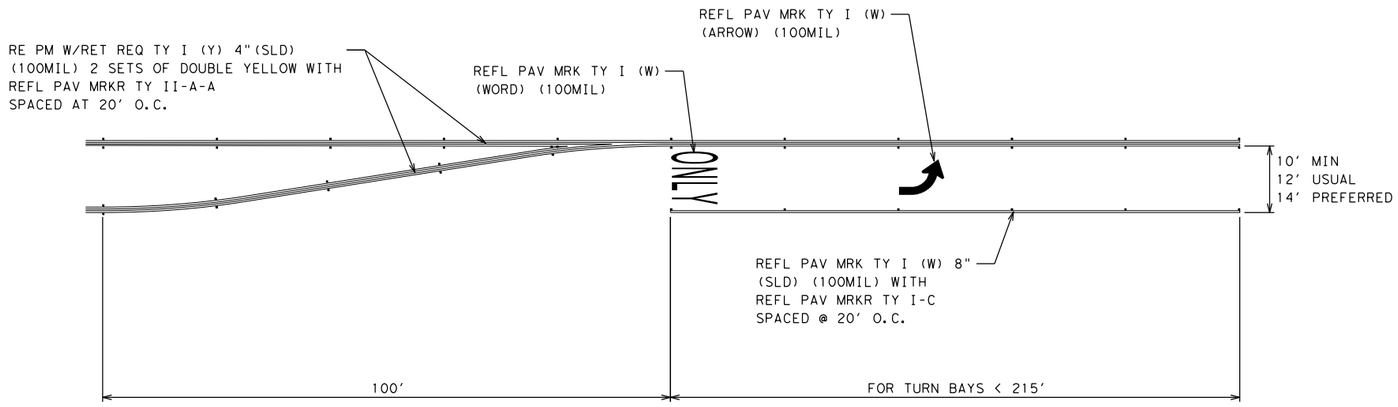
SCALE: NS

TWLTL(5)-22

REVISIONS	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
MAY 2010 MAY 2018 MAY 2022	6	$FAP-NUM$		120
	STATE	DIST.	COUNTY	
	TEXAS	SAT	BEXAR	
	CONT.	SECT.	JOB	HIGHWAY NO.
	-	-	-	-







MEDIAN LEFT TURN BAY DETAILS

NOTES:

1. PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STATE STANDARDS PM(2)-20 (POSITIONING GUIDANCE).
2. PAVEMENT MARKING ARROWS SHALL COMPLY TO TEXAS MUTCD
3. LEFT TURN BAY LAYOUT, TWO SETS OF "WORDS" AND "ARROWS" SHALL BE USED IF THE LENGTH OF THE BAY IS EQUAL TO OR GREATER THAN 180 FEET. THE BOTTOM OF THE FIRST "ONLY" SHALL BE PLACED AT THE BEGINNING OF THE TURN BAY LANE LINE AS SHOWN ABOVE.
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5. REFER TO TXDOT ROADWAY DESIGN MANUAL FOR DECELERATION AND STORAGE LENGTH.

San Antonio District Standard

TWO WAY LEFT TURN LANE AND LEFT TURN BAYS - URBAN ROADS

SCALE: NS

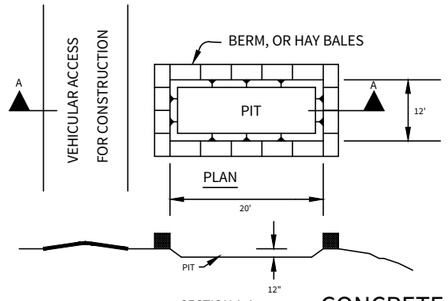
TWLTL(6)-22

REVISIONS	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
MAY 2010 MAY 2018 MAY 2022	6	$FAP-NUM$		121
	STATE	DIST.	COUNTY	
	TEXAS	SAT	BEXAR	
	CONT.	SECT.	JOB	HIGHWAY NO.
	-	-	-	-

DRAWN BY: TED | CHECKED BY: G.G./OMG | REVISED BY: JC03 | REVISED ON: 5-18

11:21:11 AM 2/7/2025

P:\DESIGN*PROJECTS\Montgomery Road\4 - Design\Plan Set\3. Roadway\Set 3 - Phase 1D\Standards\



SECTION A-A

CONCRETE WASHOUT PIT

N.T.S.

GENERAL NOTES:

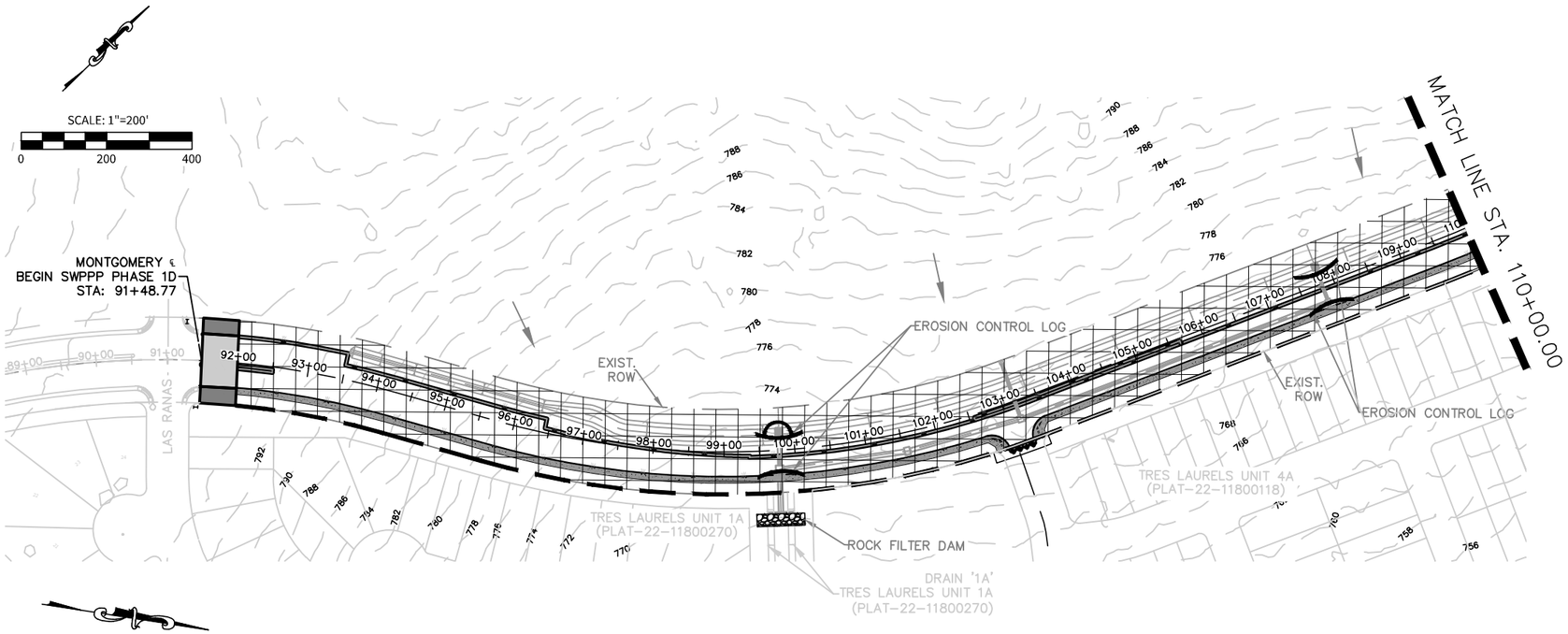
- DETAIL ILLUSTRATES MINIMUM DIMENSIONS. PIT CAN BE INCREASED IN SIZE DEPENDING ON EXPECTED FREQUENCY USE.
- IF HAY BALES ARE USED, THEY SHALL BE PLACED IN ACCORDANCE WITH DETAILS SHOWN ON EXHIBIT FOR HAY BALES.
- WASHOUT PIT SHALL BE LOCATED IN AN AREA EASILY ACCESSIBLE TO CONSTRUCTION TRAFFIC.
- WASHOUT PIT SHALL NOT BE LOCATED IN AREAS SUBJECT TO INUNDATION FROM STORMWATER RUNOFF.
- WASHOUT PIT SHALL BE LINED WITH A 10-MIL THICK POLYETHLENE SHEETING FREE OF HOLES, TEARS AND OTHER DEFECTS.

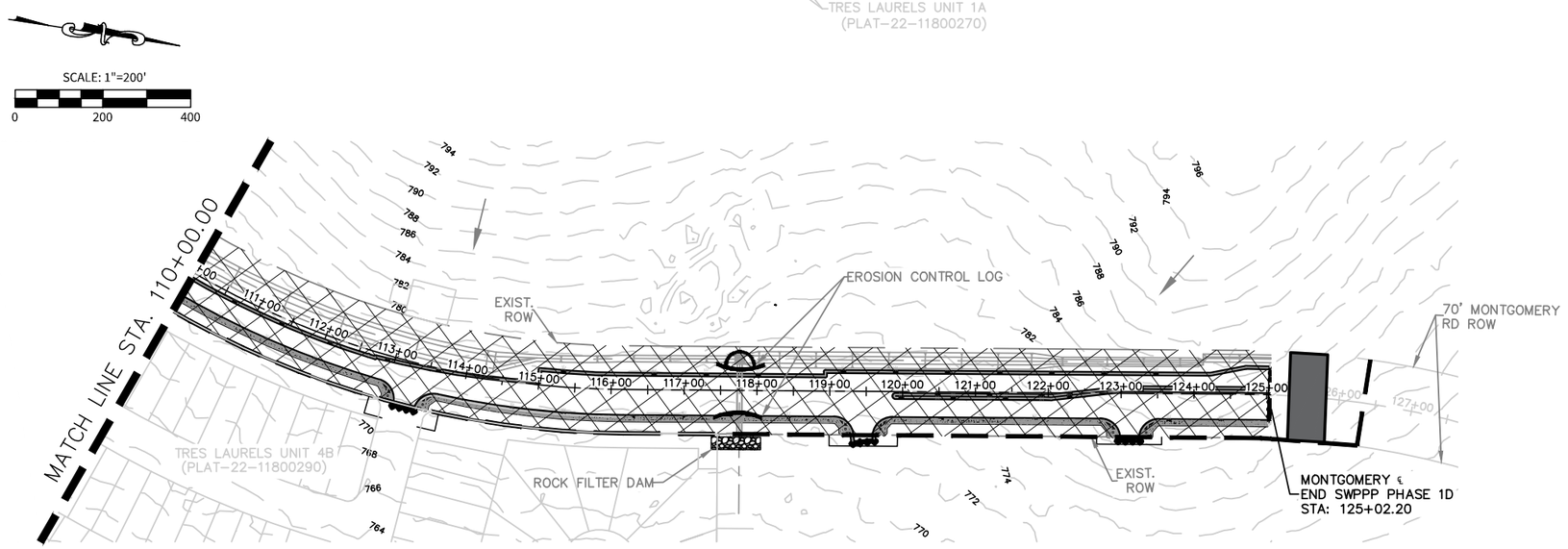
SHEET SUMMARY OF ESTIMATED QUANTITIES

ITEM #	DESCRIPTION	UNIT	QTY
506-6001	ROCK FILTER DAM (INSTALL)(TY 1)	LF	140
506-6020	CONSTRUCTION EXIT (INSTALL)(TY 1)	SY	420
506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	3560
506-6041	BIODEG EROSN CONT LOGS (INSTL)(12")	LF	180

LEGEND

- = CONSTRUCTION AND PERM./TEMP. STABILIZATION LIMITS
- = TEMPORARY SEDIMENT CONTROL FENCE
- = FLOW ARROWS
- = ROCK FILTER DAM
- = EROSION CONTROL LOG
- = CONSTRUCTION EXIT
- = CONCRETE WASHOUT PIT
- = STAGING AREA





NOTE:

1. ALL SILT FENCES AND/OR ROCK BERMS AND TEMPORARY CONSTRUCTION ENTRANCES/EXITS SHALL BE PLACED AT THE MOST DOWN-GRADIENT POINT OF CONSTRUCTION AS SHOWN ON THIS SITE PLAN. CONTRACTOR SHALL TAKE INTO CONSIDERATION ANY PROPOSED CONSTRUCTION THAT MAY TAKE PLACE AT THESE LOCATIONS. ANY RELOCATION OF SILT FENCE, ROCK BERMS AND/OR TEMPORARY CONSTRUCTION ENTRANCES/EXITS SHALL BE AT THE CONTRACTOR'S EXPENSE.
2. AREA OF SOIL DISTURBANCES INCLUDE STREET RIGHT-OF-WAYS, UTILITY EASEMENTS & LOTS.
3. THERE WILL NOT BE STORMWATER DISCHARGES INTO THE FEMA FLOOD PLAIN.
4. THE CONTRACTOR IS REQUIRED TO MAINTAIN EROSION CONTROLS THROUGHOUT THE DURATION OF THE PROJECT.
5. THE CITY INSPECTOR HAS THE AUTHORITY TO HAVE THE CONTRACTOR MODIFY THE EROSION CONTROLS AT THE DEVELOPER'S EXPENSE. THE DEVELOPER SHALL BE NOTIFIED OF THESE MODIFICATIONS PRIOR TO COMMENCEMENT OF MODIFICATIONS.

STATE OF TEXAS
SEAN P. MCFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

Sean McFarland
02/04/2025

CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112
TBPE No. 455 •TBPLS No. 10048500

WT MONTGOMERY ROAD
SWPPP
PHASE 1D

SCALE: 1" = 200'

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET
6	03050.104		122
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
–	–	–	WT MONTGOMERY RD

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) required for projects with 1 or more acres distrubed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
2. Comply with the Storm Water Pollution Prevention Plan (SW3P) and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
5. NOI required: ☒Yes ☐No

Note: If amount of soil disturbance changes, permit requirements may change.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

The Contractor shall adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required

☐ Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required

☐ Nationwide Permit 14 - PCN Required

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices (BMPs) planned to control erosion, sedimentation and post-project total suspended solids (TSS).

1.

2.

3.

4.

401 Best Management Practices: (Not applicable if no USACE permit)

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☒ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☒ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☒ Interceptor Swale	☒ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Sedimentation Chambers
		☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162,164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☒ No Action Required ☒ Required Action

Action No.

1. MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

   A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

   B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.

3.

4.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediated area, and contact the Engineer immediately.

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the follwing are detected:

* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Does the project involve the demolition of a span bridge?

☐ Yes ☒ No (No further action required)

If "Yes", a pre- demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridges(s) on the project to assist with the notification.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation
San Antonio District Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic_2015-10-09_SAT.dgn	DN: TxDOT	CK: TxDOT	DW: BW	CK: GAG
©TxDOT OCTOBER 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				123

Note To Designer:
1. Do not alter Sheet Design or Font style, size or weight - match text attributes.
2. If additional space is needed for a numbered section, fence and adjust sections up or down as needed for proportioning and readability but do not relocate from it's relative position.

A. GENERAL SITE DATA

1. PROJECT LIMITS: *Same as stated on the Title Sheet*

2. PROJECT SITE MAPS:
- *Project Latitude* 29°23'02" *Project Longitude* 98°44'26"
- *Project Location Map: Shown on Title Sheet*
- *Drainage Patterns: Shown on Drainage Area Maps*
- *Approx. Slopes Anticipated After Major Gradings and Areas of Soil Disturbance: Shown on Typical Sections*
- *Major Controls and Locations of Stabilization Practices: Shown on SW3P Sheets*
- *Project Specific Locations: Off-site waste, borrow, or storage areas are not part of this SW3P.*
- *Surface Waters and Discharge Locations: Shown on Drainage and Culvert Layout Sheets*

3. PROJECT DESCRIPTION: *Same description as stated on Title Sheet*

- *Joint-bid utilities are covered by this SW3P (Sheets X-Y) Non-Joint Bid Utilities are not part of this SW3P.*

4. FOR MAJOR SOIL DISTURBING ACTIVITIES SEQUENCE OF EVENTS:

1. *Install controls down-slope of work area and initiate inspection and maintenance activities.*
2. *Begin phased construction with interim stabilization practices. Adjust erosion and sedimentation controls during construction to meet requirements and changing conditions and as directed/approved by the Engineer.*
3. *Major soil disturbing activities may include but are not limited to: right-of-way preparation, cut and/or fill to improve roadway profile, final grading and placement of topsoil and the following (if marked):*

- [X] *Placement of road base*
- [X] *Exstensive ditch grading*
- [ ] *Upgrading or replacing culverts or bridges*
- [ ] *Temporary detour road(s)*
- [ ] *Other:* _____

5. EXISTING AND PROPOSED CONDITIONS:

Description of existing vegetative cover: (Provide type and description of vegetative cover)
Percentage of existing vegetative cover: (Provide percentage)
Existing vegetative cover: (mark one)
- [X] *Thick or uniformly established*
- [X] *Thin and Patchy*
- [ ] *None or minimal cover*

Description of soils: HgD & HuC, HYDRO GROUP D
Site Acreage: 11.036 *Acreage disturbed:* 11.036
Site runoff coefficient (pre-construction): 0.50 *Site runoff coefficient (post-construction):* 0.96

6. RECEIVING WATERS: *(Mark all that apply)*
- [X] *A classified stream does not pass through project.*
- [ ] *A classified stream passes through project. Name* _____ *Segment Number* _____

Name of receiving waters that will receive discharges from disturbed areas of the project: _____

Site is in a Municipal Separate Storm Sewer System (MS4). MS4 Operator (name): _____

B. BEST MANAGEMENT PRACTICES

General timing or sequence for implementation of BMPs shall be as required and/or as directed/approved by the Engineer to provide adequate controls. BMPs shown on plan sheets are to be considered "proposed" unless/until install date is shown. BMPs are to reduce sediments from road construction activities.

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

- [X] SEEDING
- [X] MULCHING (Hay or Straw)
- [ ] BUFFER ZONES
- [ ] PLANTING
- [ ] COMPOST/MULCH FILTER BERM
- [ ] SODDING
- [ ] PRESERVATION OF NATURAL RESOURCES
- [ ] FLEXIBLE CHANNEL LINER
- [ ] RIGID CHANNEL LINER
- [ ] SOIL RETENTION BLANKET
- [X] COMPOST MANUFACTURED TOPSOIL
- [ ] OTHER: (Specify Practice)

2. STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

- [X] SILT FENCES
- [X] HAY BALES
- [X] ROCK FILTER DAMS
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- [ ] DIVERSION DIKE AND SWALE COMBINATIONS
- [ ] PIPE SLOPE DRAINS
- [ ] PAVED FLUMES
- [X] ROCK BEDDING AT CONSTRUCTION EXIT
- [ ] TIMBER MATTING AT CONSTRUCTION EXIT
- [ ] CHANNEL LINERS
- [ ] SEDIMENT TRAPS
- [ ] SEDIMENT BASINS
- [X] STORM INLET SEDIMENT TRAP
- [X] STONE OUTLET STRUCTURES
- [X] CURBS AND GUTTERS
- [X] STORM SEWERS
- [X] VELOCITY CONTROL DEVICES
- [ ] OTHER: *(Specify Practice)*

3. STORM WATER MANAGEMENT:

The proposed facility was designed in consideration of hydraulic design standards to convey stormwater in a manner that is protective of public safety and property. The control of erosion from the facility is inherent to the design. Additional factors affecting post-construction stormwater at the project location include: (mark all that apply)

- [X] *Existing or new vegetation provides natural filtration.*
- [X] *The design includes provisions for permanent erosion controls provided by strategically placed pervious and impervious surfaces.*
- [ ] *Project includes permanent sedimentation controls (other than grass).*
- [ ] *Velocities do not require dissipation devices.*
- [X] *Velocity-dissipation devices included in the design.*
- [ ] *Other :* _____

4. NON-STORM WATER DISCHARGES:

Off-site discharges are prohibited except as follows:

1. *Discharges from fire fighting activities and/or fire hydrant flushings.*
2. *Vehicle, external building, and pavement wash water where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed).*
3. *Plain water used to control dust.*
4. *Plain water originating from potable water sources.*
5. *Uncontaminated groundwater, spring water or accumulated stormwater.*
6. *Foundation or footing drains where flows are not contaminated with process materials such as solvents.*
7. *Other:* _____

Concrete truck wash water discharges on the site should be prohibited or minimized. If allowed by the Engineer, they must be managed in a manner so as not to contaminate surface water. They must not be located in areas of concentrated flow. Concrete truck wash-out locations must be shown on the SW3P Layout and included in the inspections.

Hazardous material spill/leak shall be prevented or minimized. At a minimum, this includes asphalt products, fuels, oils, lubricants, solvents, paints, acids, concrete curing compounds and chemical additives for soil stabilization. BMPs shall be implemented to the storage areas of these products. All spills must be cleaned and disposed properly and reported to the Engineer. Report any release at or above the reportable quantity during a 24 hour period to the National Response Center at 1-800-424-8802.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:

All erosion and sediment controls shall be maintained in good working order. If a repair is necessary, it shall be performed before the next anticipated storm event but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from equipment. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable. Disturbed areas on which construction activities have ceased, temporarily or permanently, shall be stabilized within 14 calendar days unless they are scheduled to and do resume within 21 calendar days. The areas adjacent to creeks and drainageways shall have priority followed by protecting storm sewer inlets.

2. INSPECTION:

For areas of the construction site that have not been finally stabilized, areas used for storage of materials, structural control measures, and locations where vehicles enter or exit the site, personnel provided by the permittee and familiar with the SW3P must inspect disturbed areas at least once every seven (7) calendar days. An inspection and Maintenance Report shall be prepared for each inspection and the controls shall be revised on the SW3P within seven (7) calendar days following the inspection.

3. WASTE MATERIALS:

All non-hazardous municipal waste materials such as litter, rubbish, trash and garbage located on or originating from the project shall be collected and stored in a securely lidded metal dumpster, provided by the Contractor. The dumpster shall be emptied as necessary or as required by local regulation and the trash shall be hauled to a permitted disposal facility. The burying of non-hazardous municipal waste on the project shall not be permitted. Construction material waste sites, stockpiles and haul roads shall be constructed to minimize and control the amount of sediment that may enter receiving waters. Construction material waste sites shall not be located in any wetland, water body or stream bed. Construction staging areas and vehicle maintenance areas shall be constructed in a manner to minimize the runoff of pollutants.

4. OFFSITE VEHICLE TRACKING:

Off-site vehicle tracking of sediments and the generation of dust must be minimized. Excess sediments on road shall be removed on a regular basis as directed/approved by the Engineer.

5. OTHER:

See the EPIC sheet for additional environmental information.

CUDE ENGINEERS
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112
TBPE No. 455 •TBPLS No. 10048500

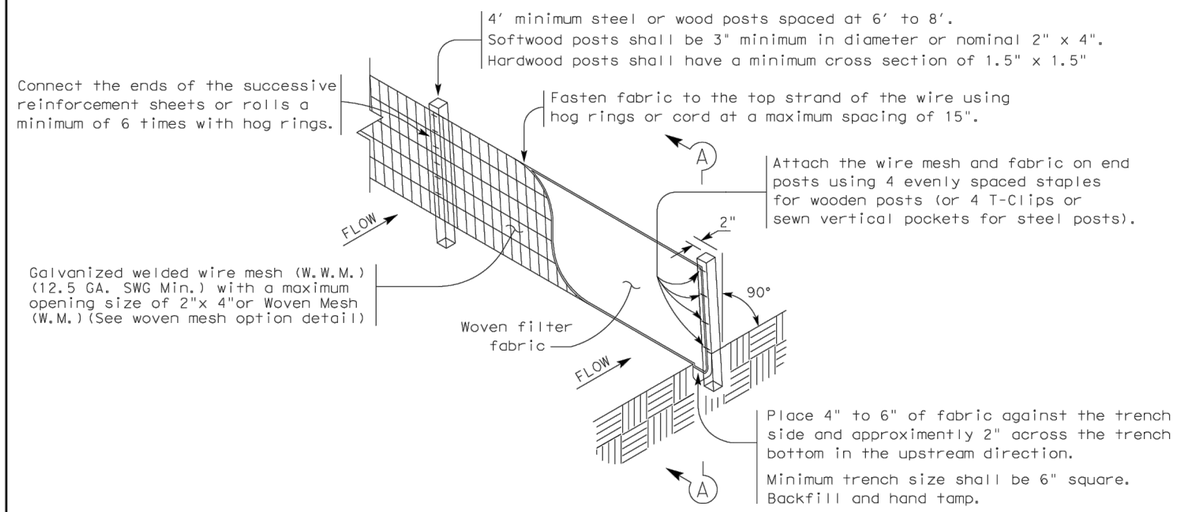
STATE OF TEXAS
SEAN P. McFARLAND
138893
LICENSED
PROFESSIONAL ENGINEER

Sean McFarland
08/14/2024
, P.E.
Signature of Registrant & Date

REVISION DATE: 10/12

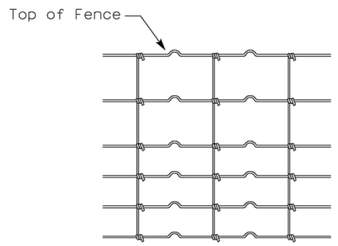
STORM WATER POLLUTION PREVENTION PLAN (SW3P)

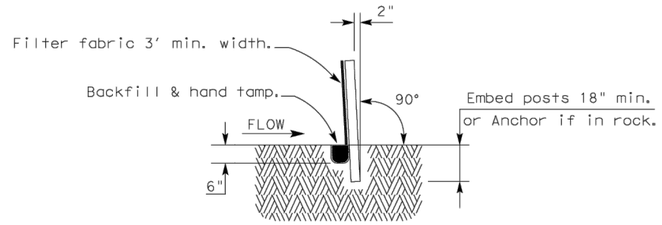
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			
STATE	DISTRICT	COUNTY	
TEXAS	SAT		
CONTROL	SECTION	JOB	SHEET NO.
			124



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

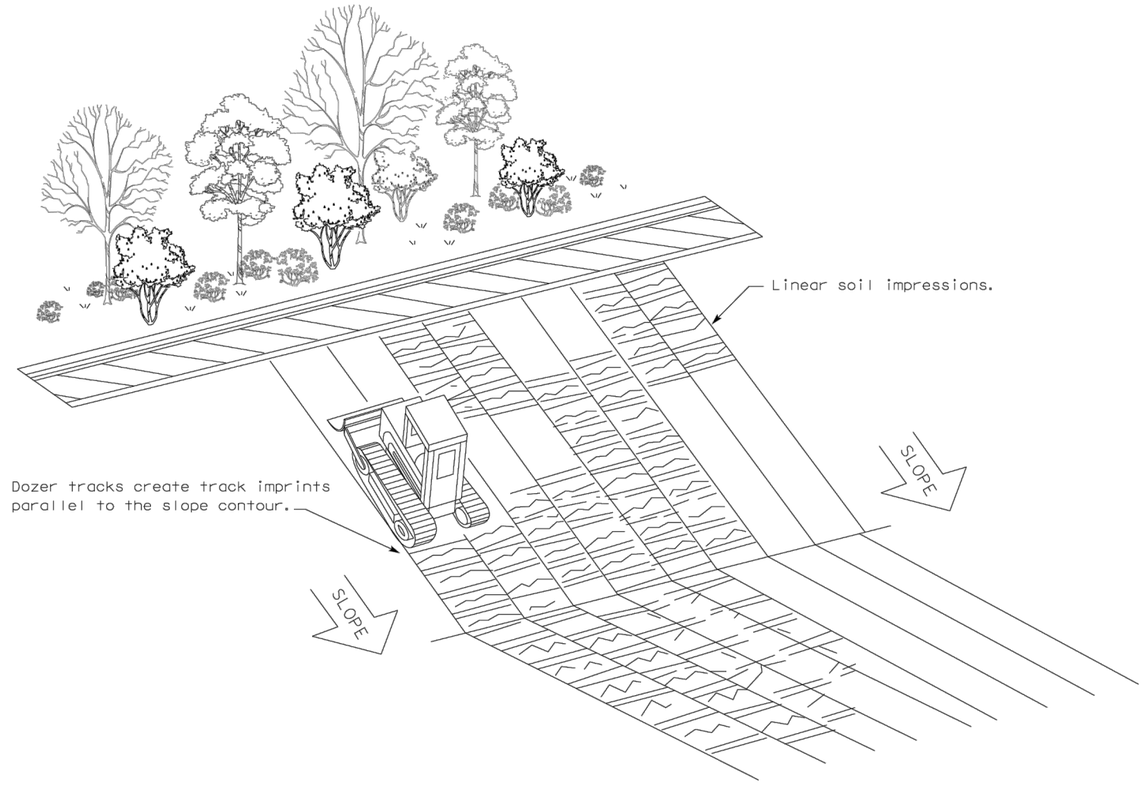
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	584	CRESTWAY RD.
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		125

DATE
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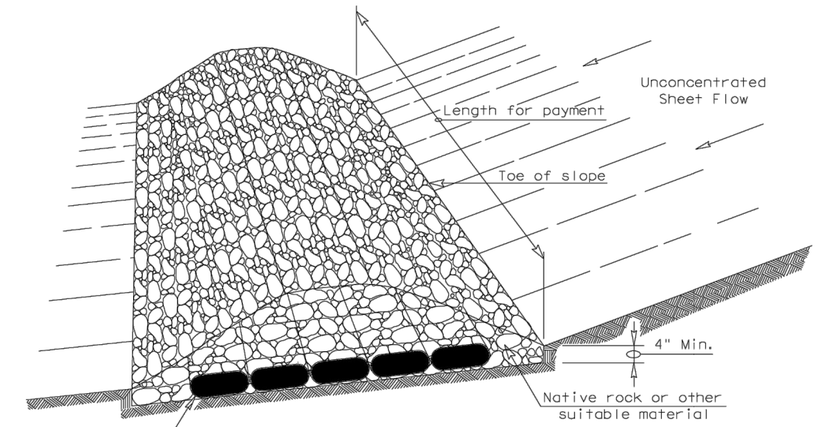
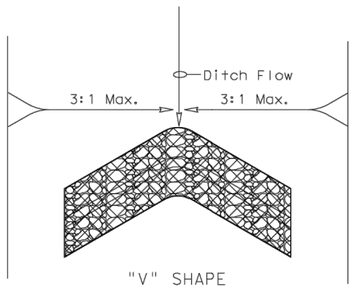
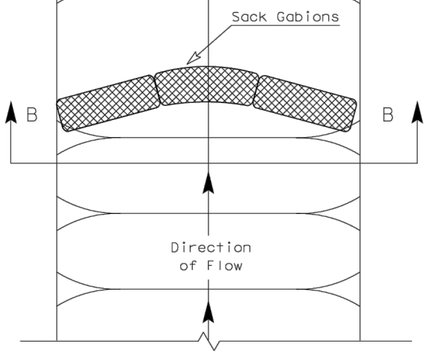


FILTER DAM AT TOE OF SLOPE

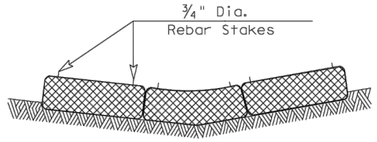
RFD1



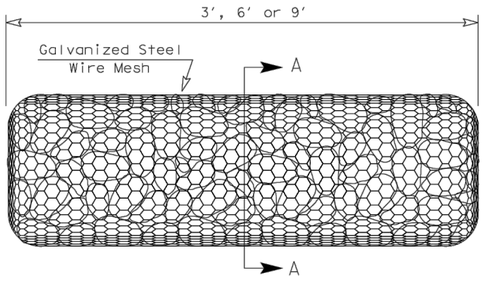
"V" SHAPE
PLAN VIEW



PLAN VIEW

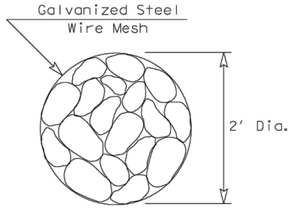


SECTION B-B

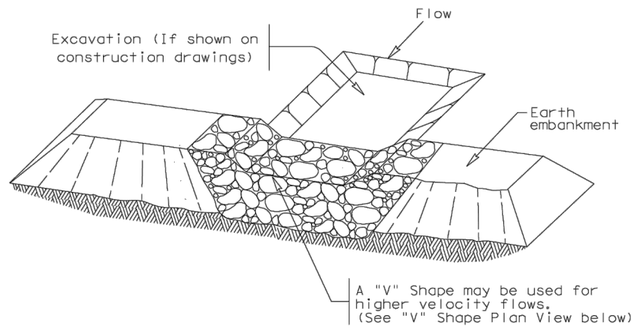


TYPE 4 (SACK GABIONS)

RFD4

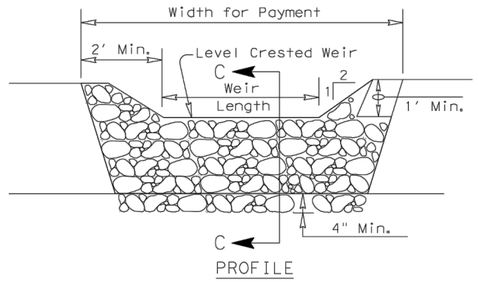


SECTION A-A

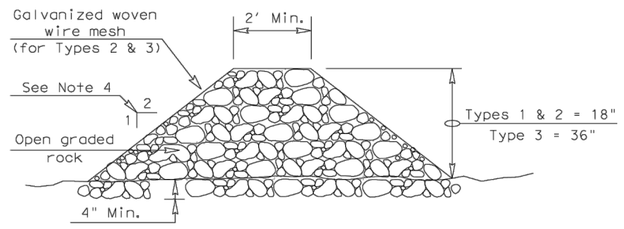


FILTER DAM AT SEDIMENT TRAP

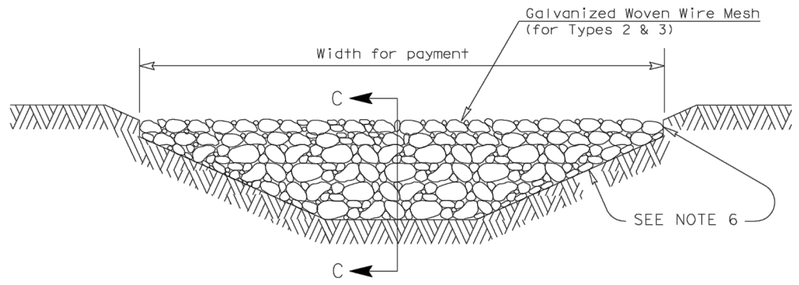
RFD1 OR RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	584	CRESTWAY RD.
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		126

DATE: 9/28/2020
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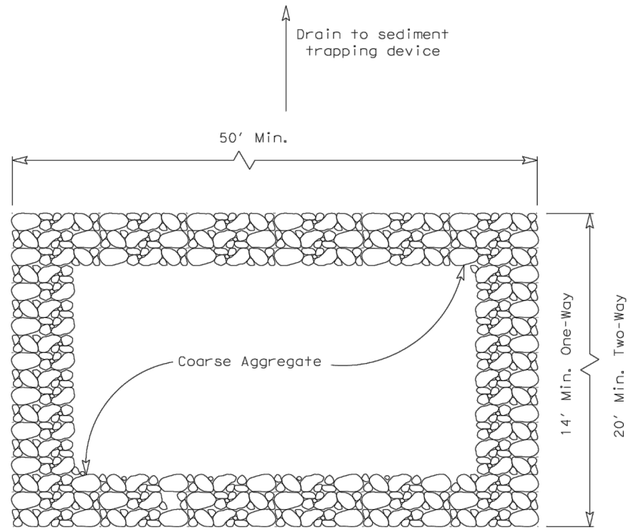
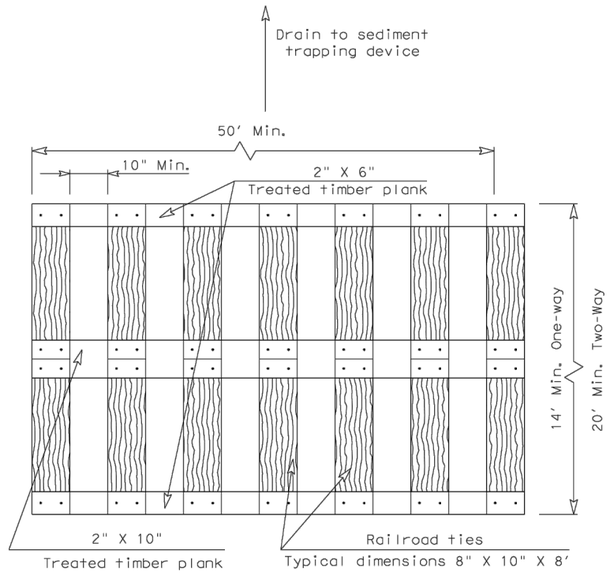
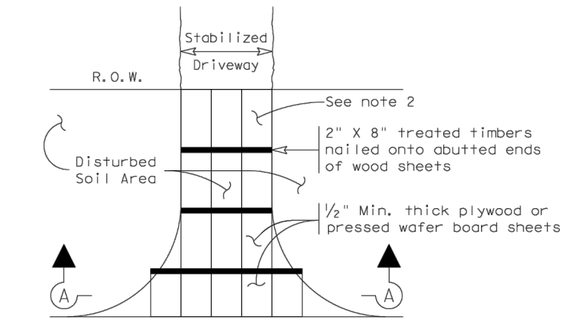


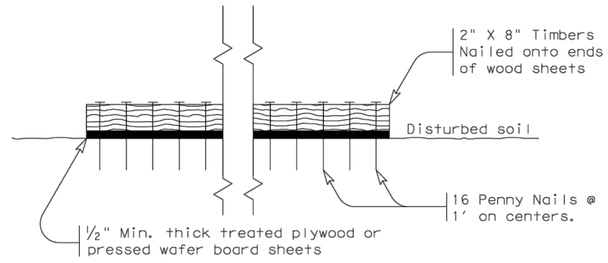
PLAN VIEW



PLAN VIEW



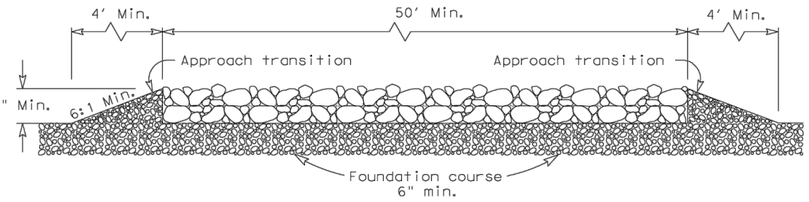
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

SHORT TERM



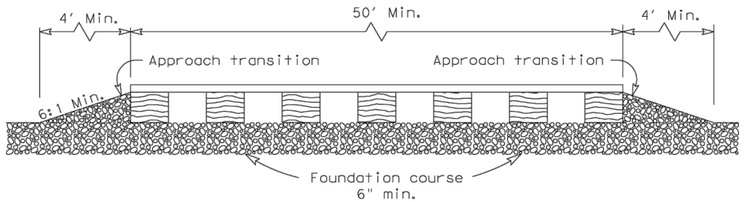
ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

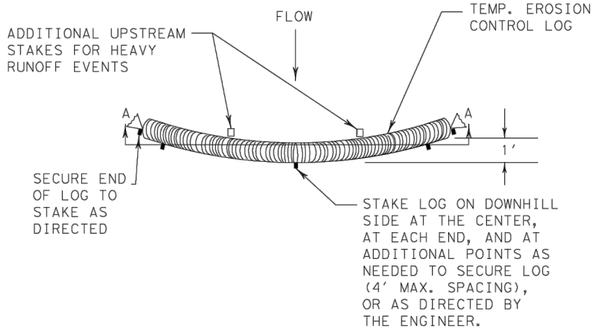
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

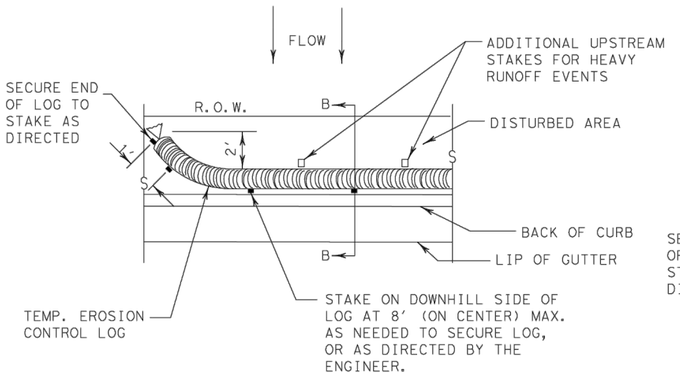
EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	584	CRESTWAY RD.
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		127

DATE:
FILE:



PLAN VIEW



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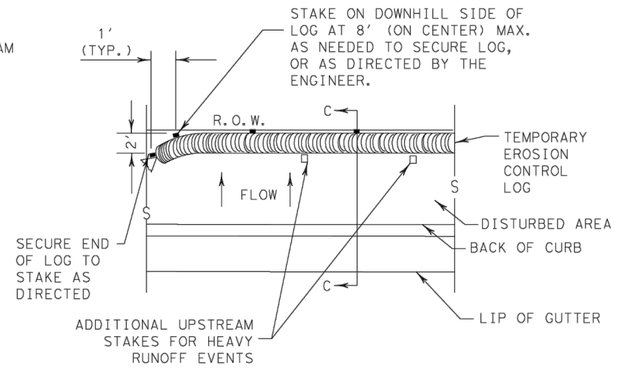
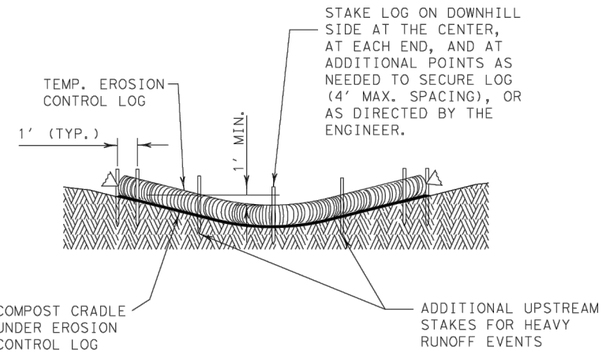


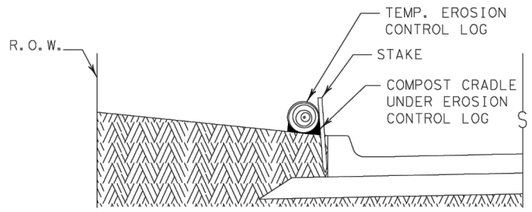
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

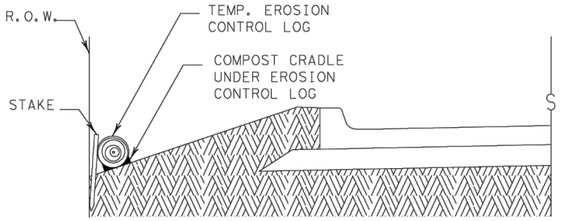
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

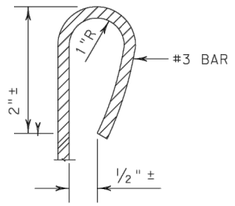
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



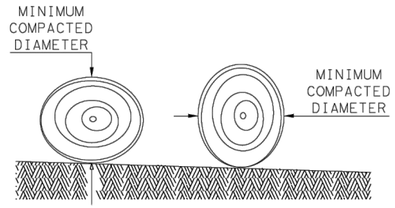
REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

Texas Department of Transportation | Design Division Standard

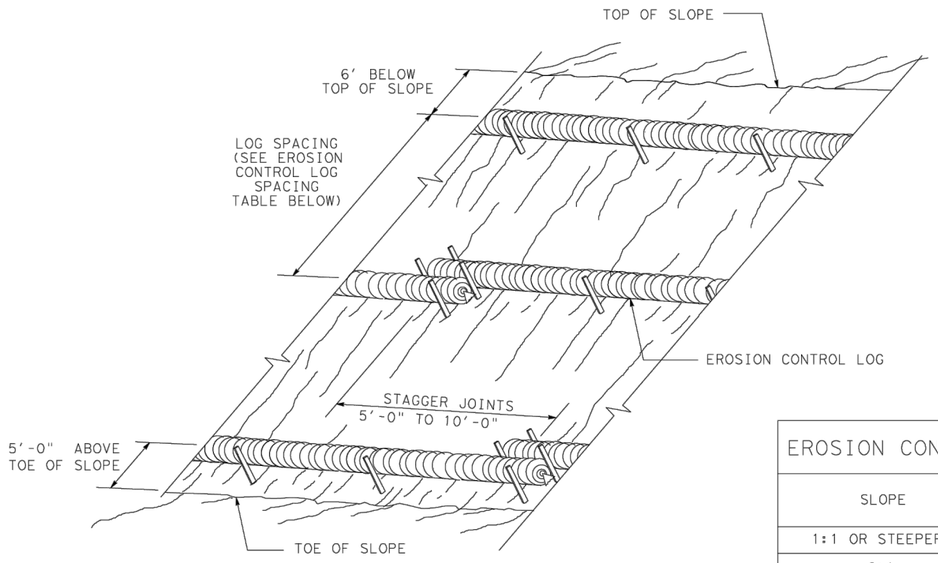
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

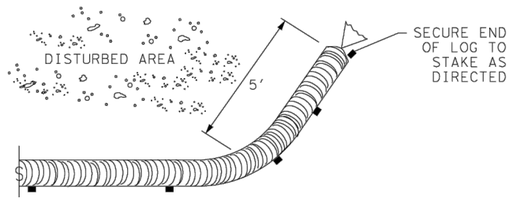
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	584	CRESTWAY RD.
	DIST	COUNTY		SHEET NO.
	SA	BEXAR		128

DATE:
FILE:



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

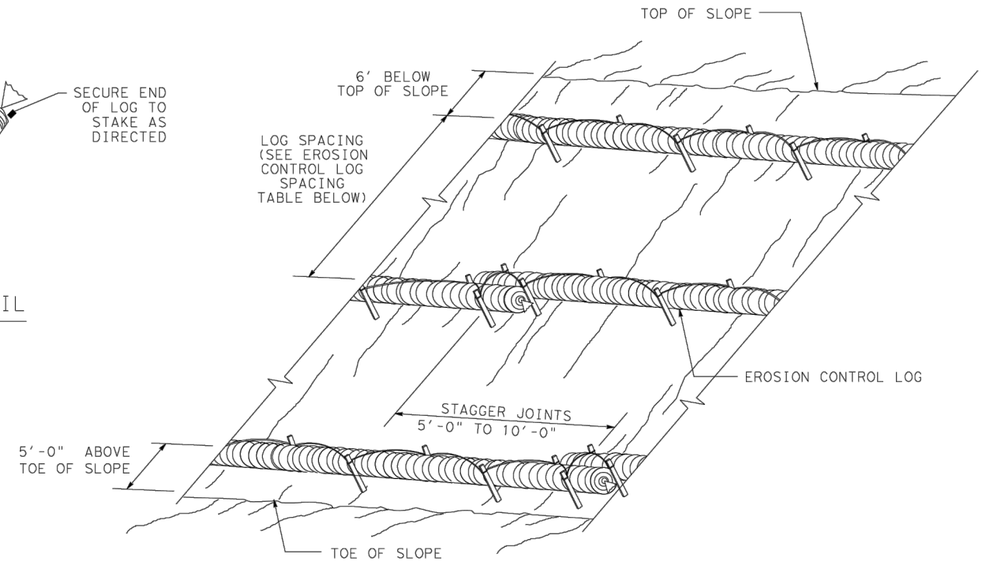
CL-SST



END SECTION RAP DETAIL

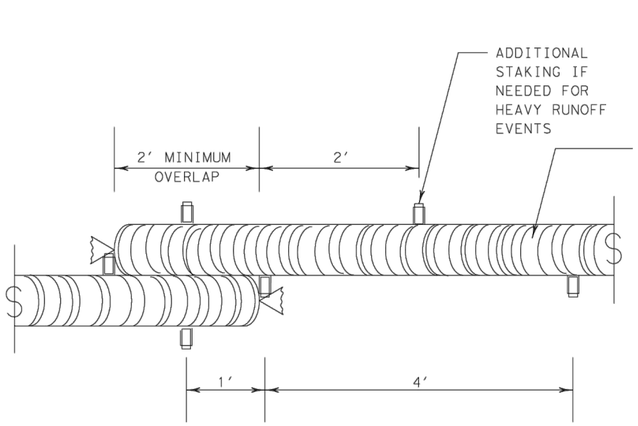
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5′	10′	15′	20′
2:1	10′	20′	30′	40′
3:1	15′	30′	45′	60′
4:1 OR FLATTER	20′	40′	60′	80′

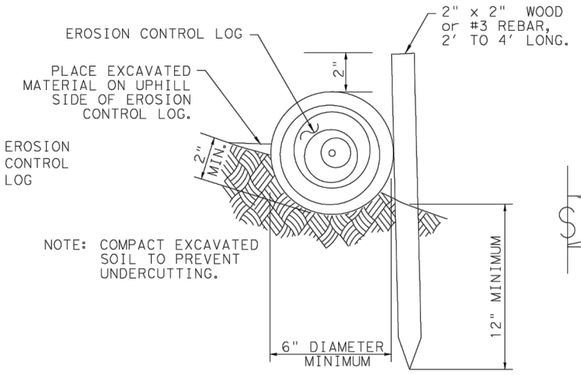
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

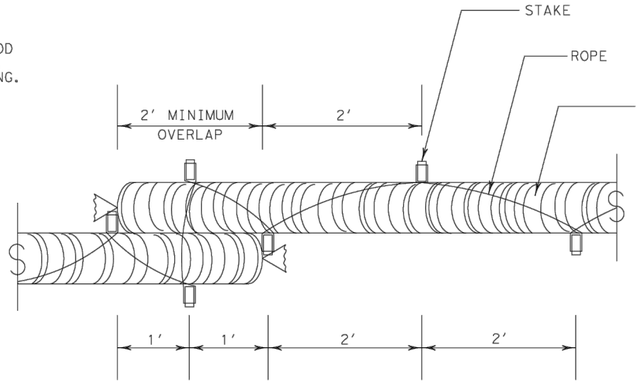


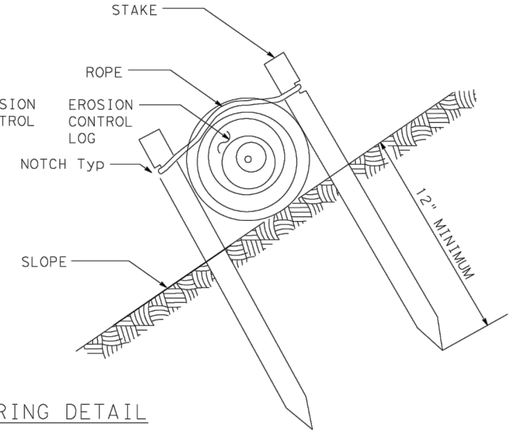


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

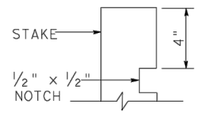
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

SHEET 2 OF 3

Texas Department of Transportation

Design Division Standard

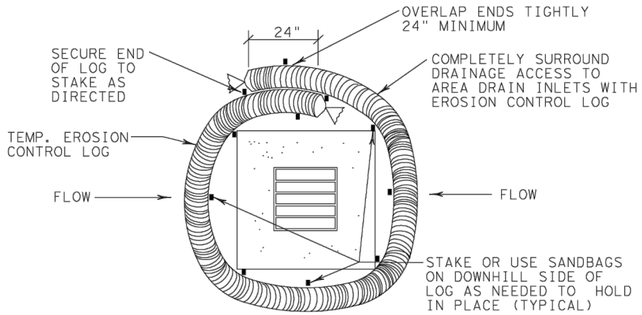
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

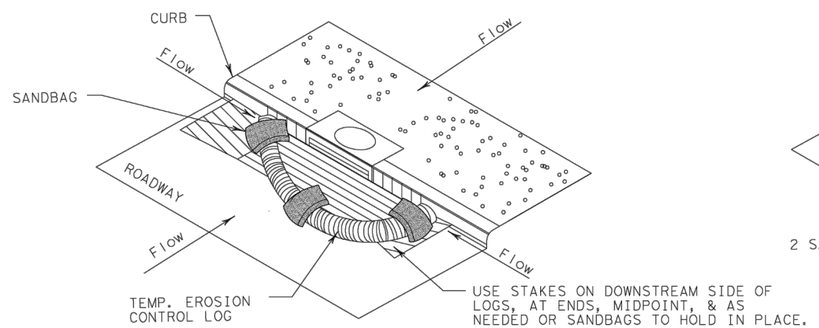
FILE: ec116	DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0915	12	584		CRESTWAY RD.	
	DIST	COUNTY			SHEET NO.	
	SA	BEXAR			129	

DATE:
FILE:



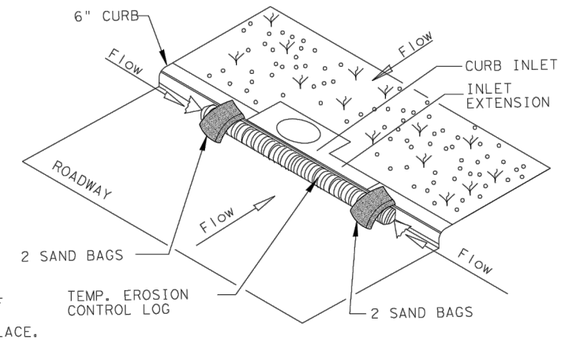
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

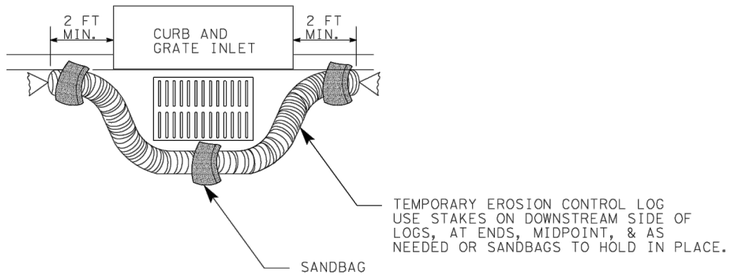
CL-CI



EROSION CONTROL LOG AT CURB INLET

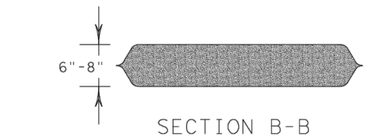
CL-CI

NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.

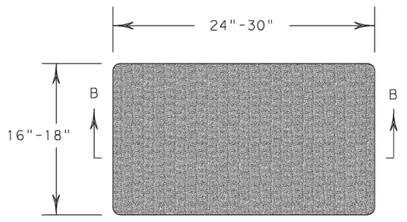


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SECTION B-B



SANDBAG DETAIL

Texas Department of Transportation

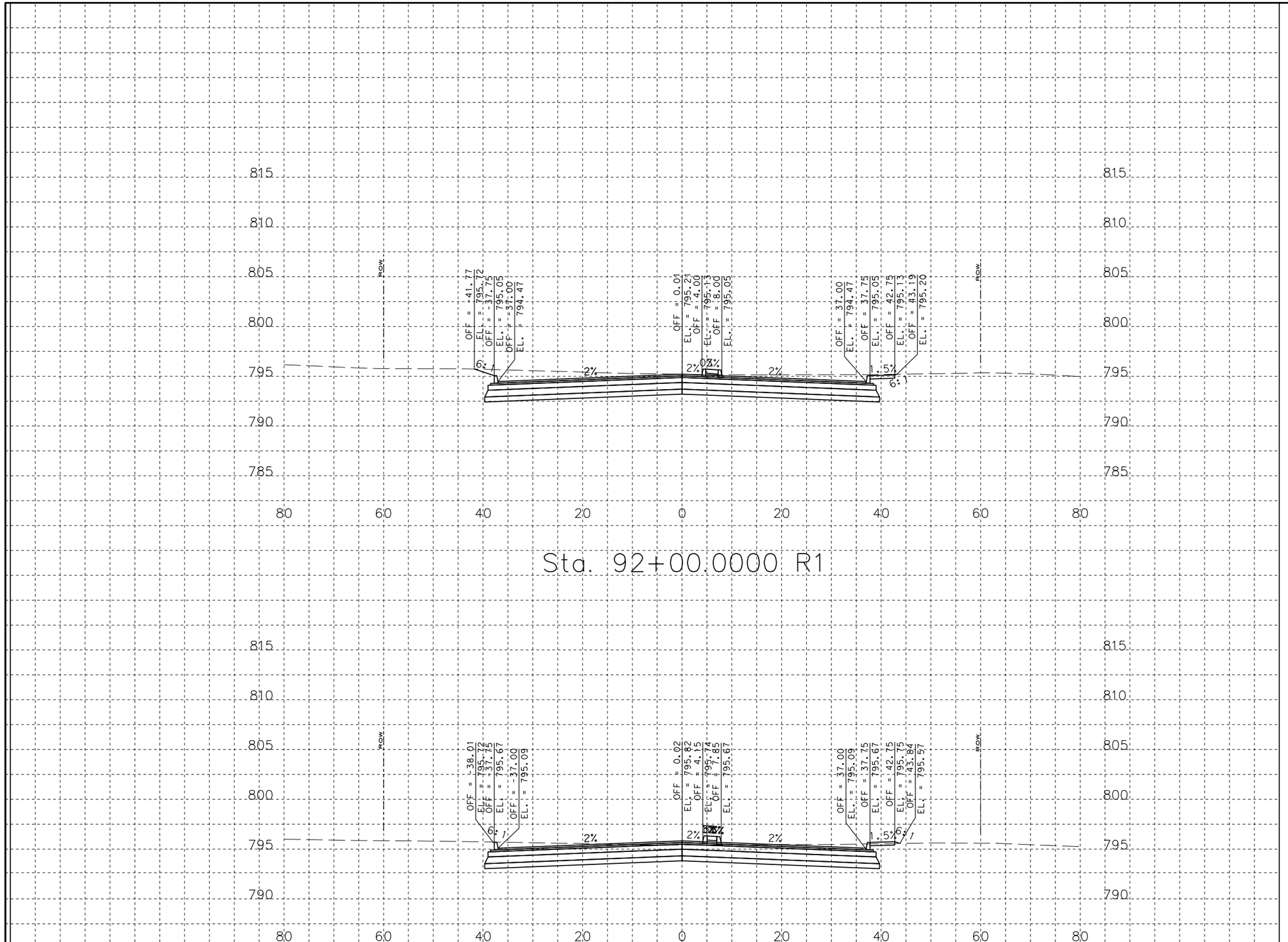
Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0915	12	584		CRESTWAY RD.		
	DIST	COUNTY			SHEET NO.		
	SA	BEXAR			130		



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11:21:12 AM

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED
PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste. 830, San Antonio, Texas 78230,
210.660.1960 / TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 1 OF 34

FED. RD. DIV. NO.	PROJECT NO.		SHEET
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STATE	DIST.	COUNTY	
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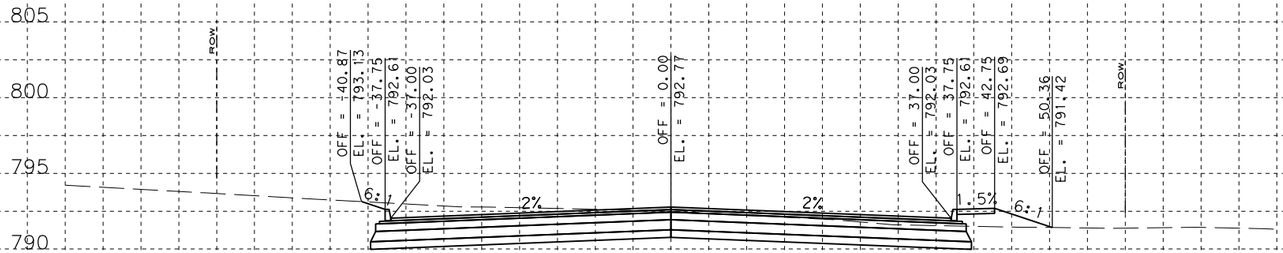

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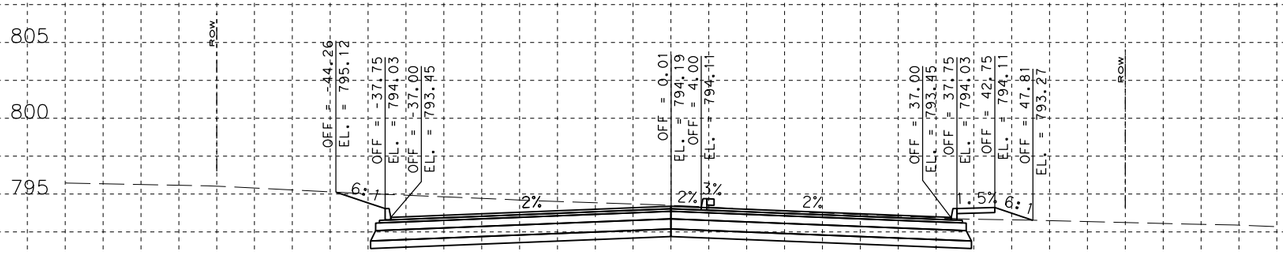

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11:21:13 AM

STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP

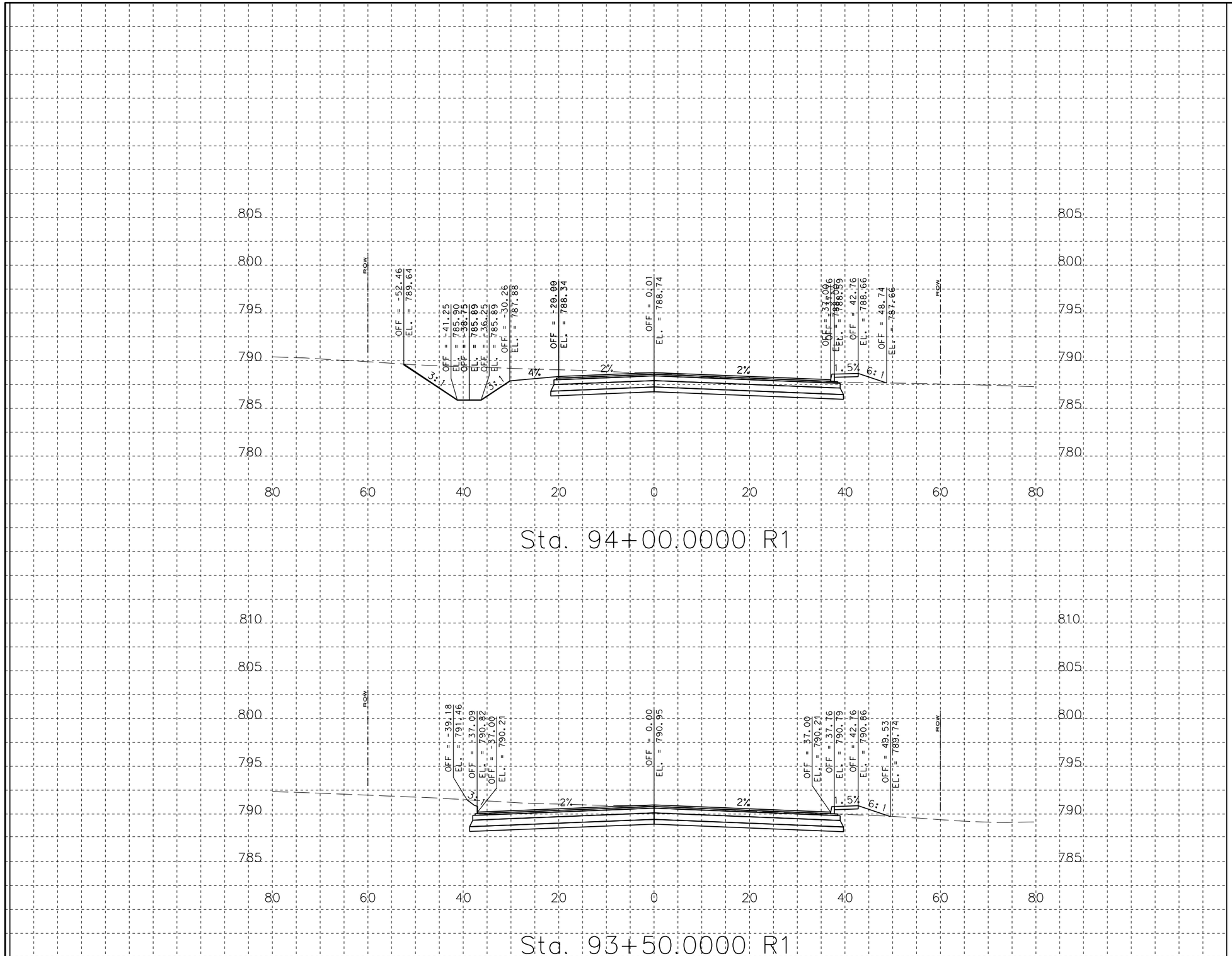
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste. 830, San Antonio, Texas 78230,
210.660.1960 / TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD

CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 2 OF 34

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	-		132
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED
PROFESSIONAL ENGINEER

2/7/2025

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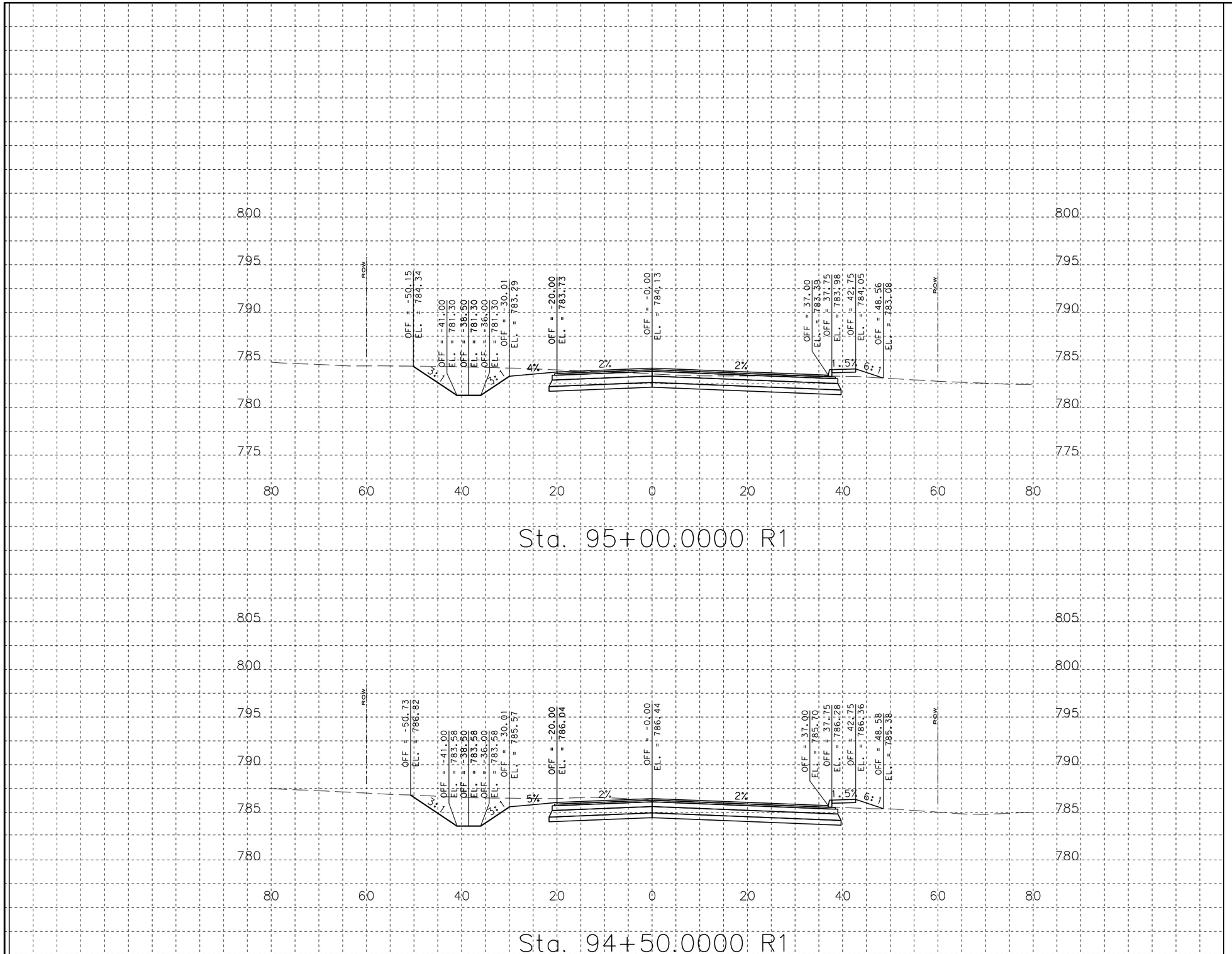
7800 W Interstate 10, Ste. 830, San Antonio, Texas 78230,
210.660.1960 / TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 3 OF 34

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	-		133
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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STATE OF TEXAS
ERIC HERNANDEZ
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PROFESSIONAL ENGINEER

2/7/2025

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Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste. 830, San Antonio, Texas 78230,
210.660.1960 / TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 4 OF 34

FED. RD. DIV. NO.	PROJECT NO.	SHEET
6	-	134

STATE	DIST.	COUNTY	
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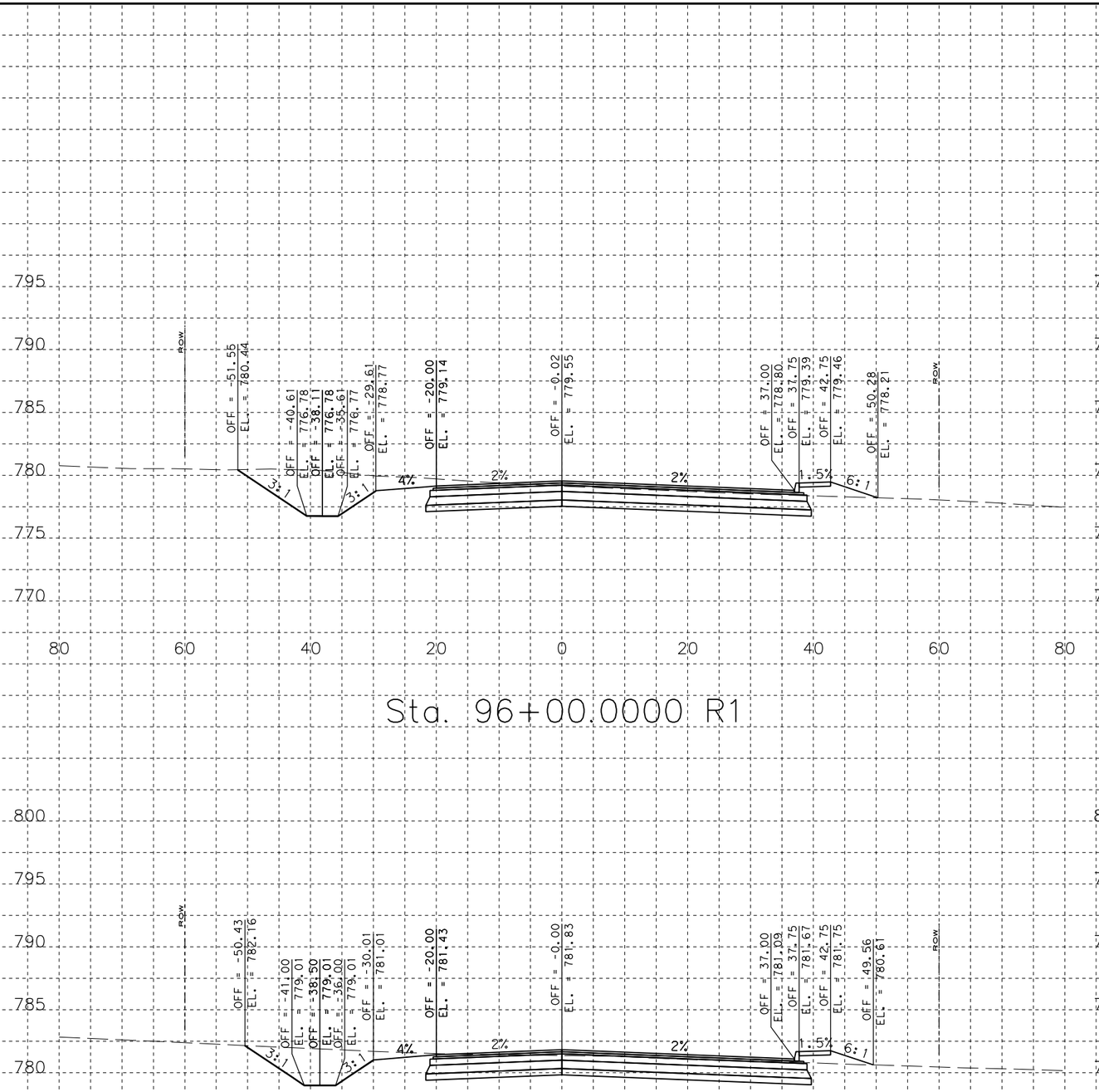

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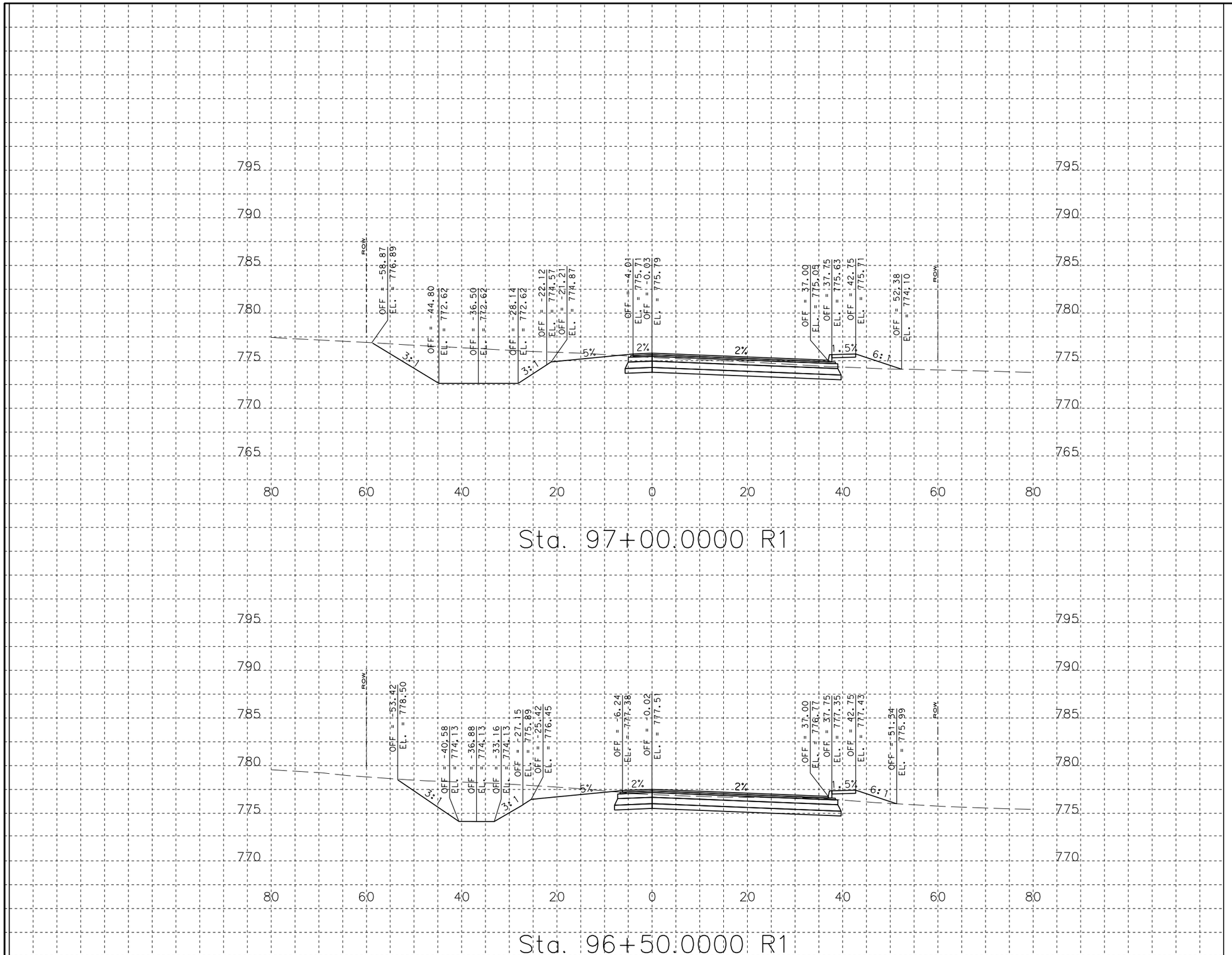
WT MONTGOMERY ROAD
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 5 OF 34

FED. RD. DIV. NO.	PROJECT NO.	SHEET
6	-	135

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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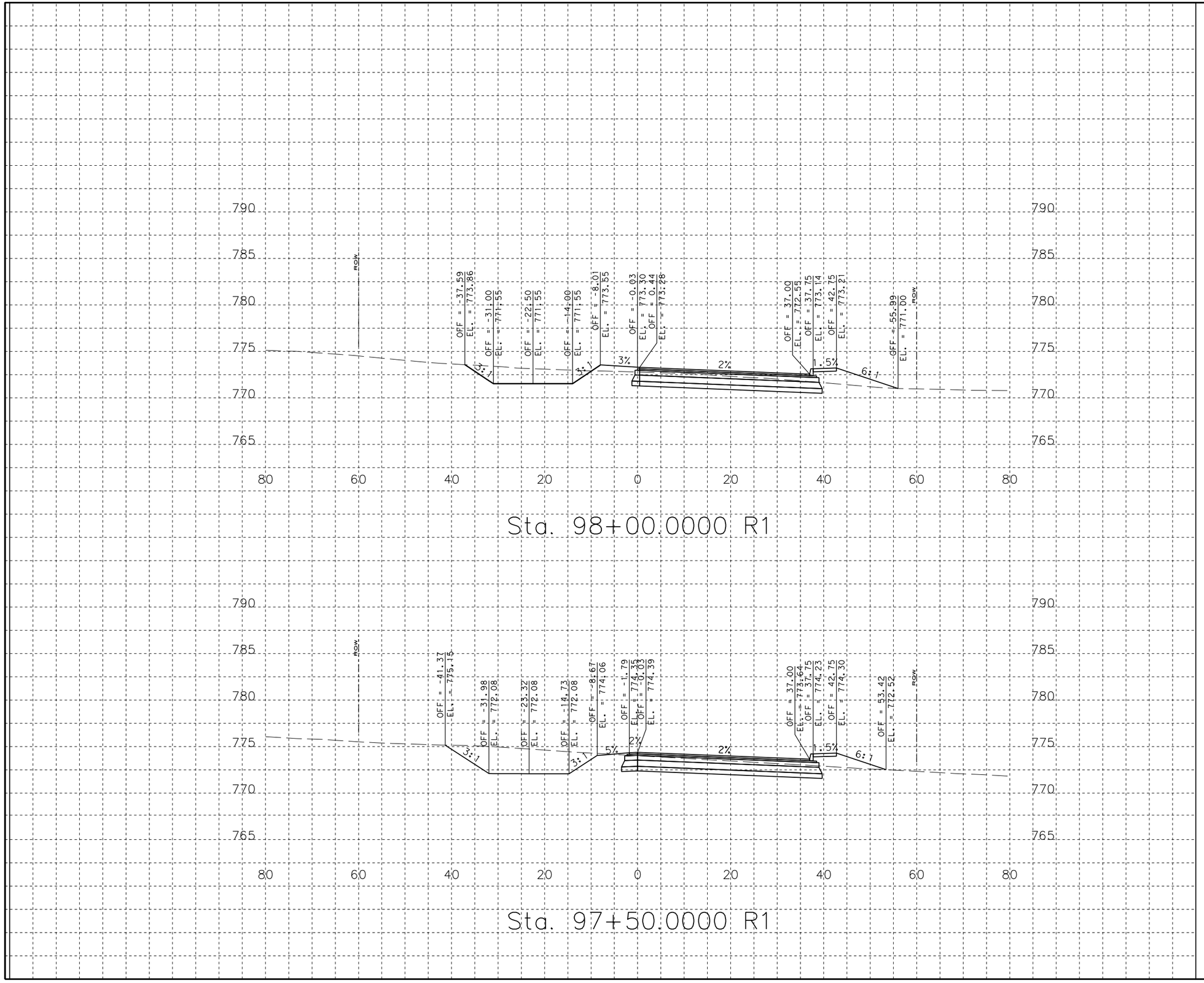
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 6 OF 34

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	-		136
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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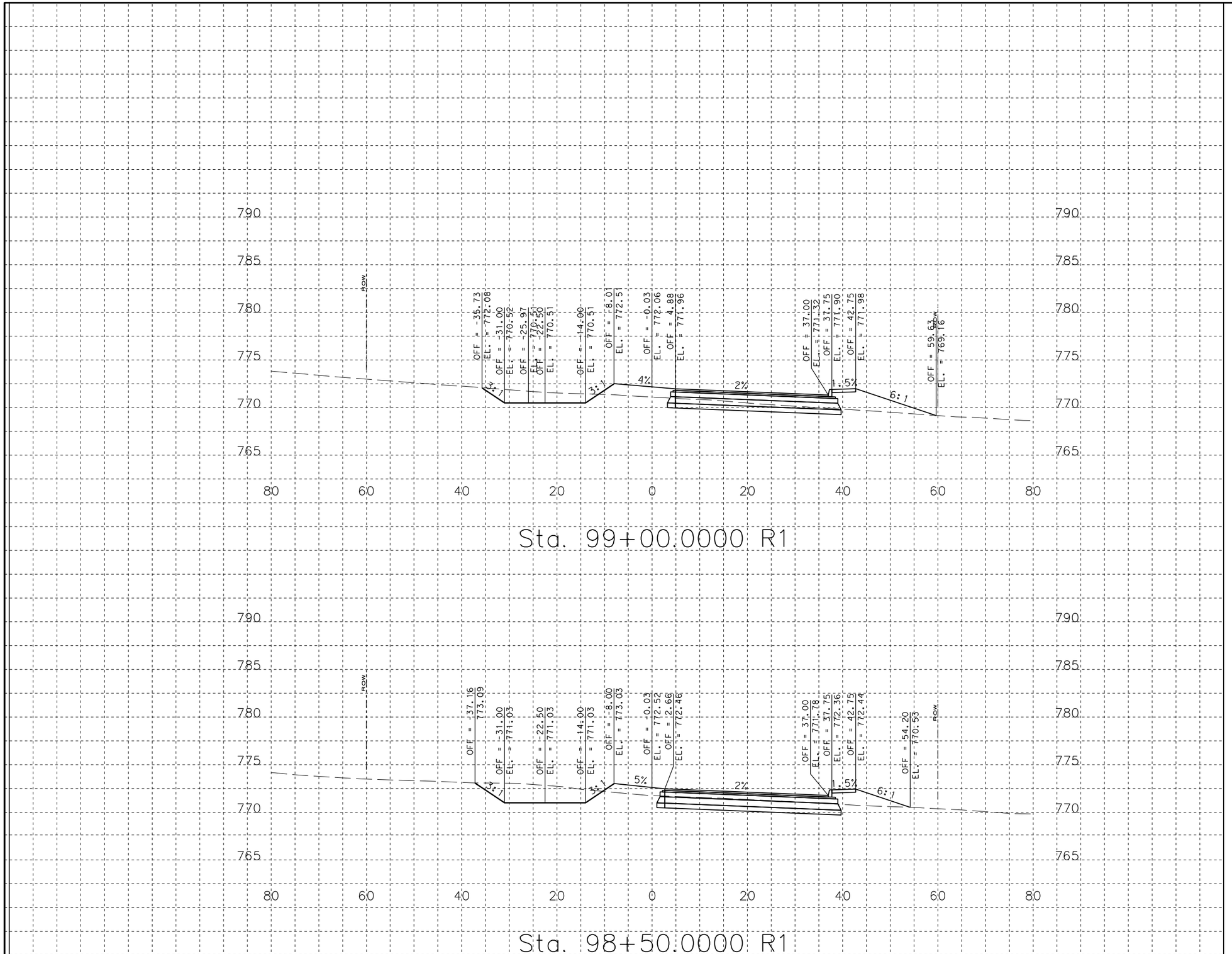
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 7 OF 34

FED. RD. DIV. NO.	PROJECT NO.	SHEET
6	-	137

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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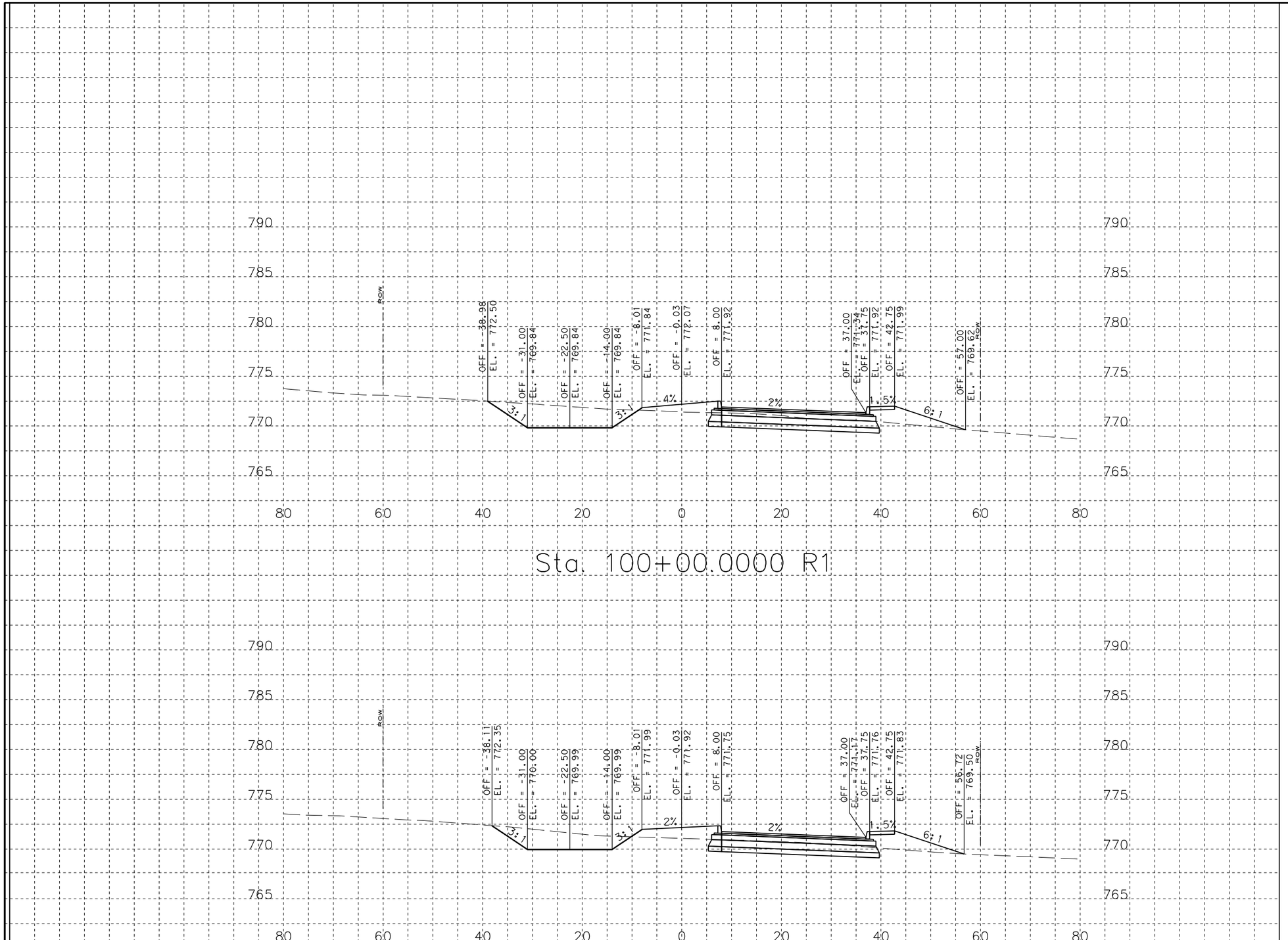
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 8 OF 34

FED. RD. DIV. NO.	PROJECT NO.	SHEET
6	-	138

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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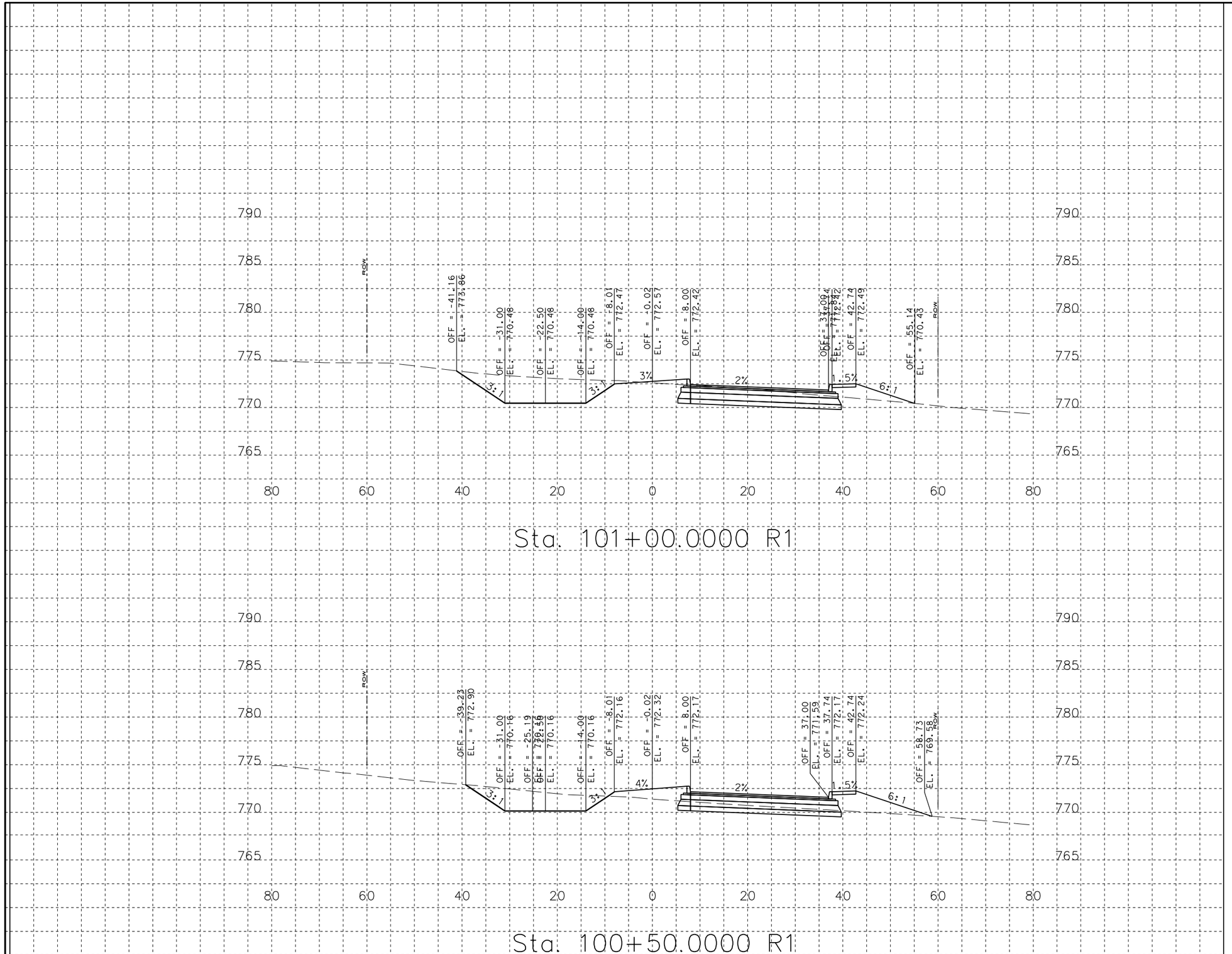
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 9 OF 34

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	-		139
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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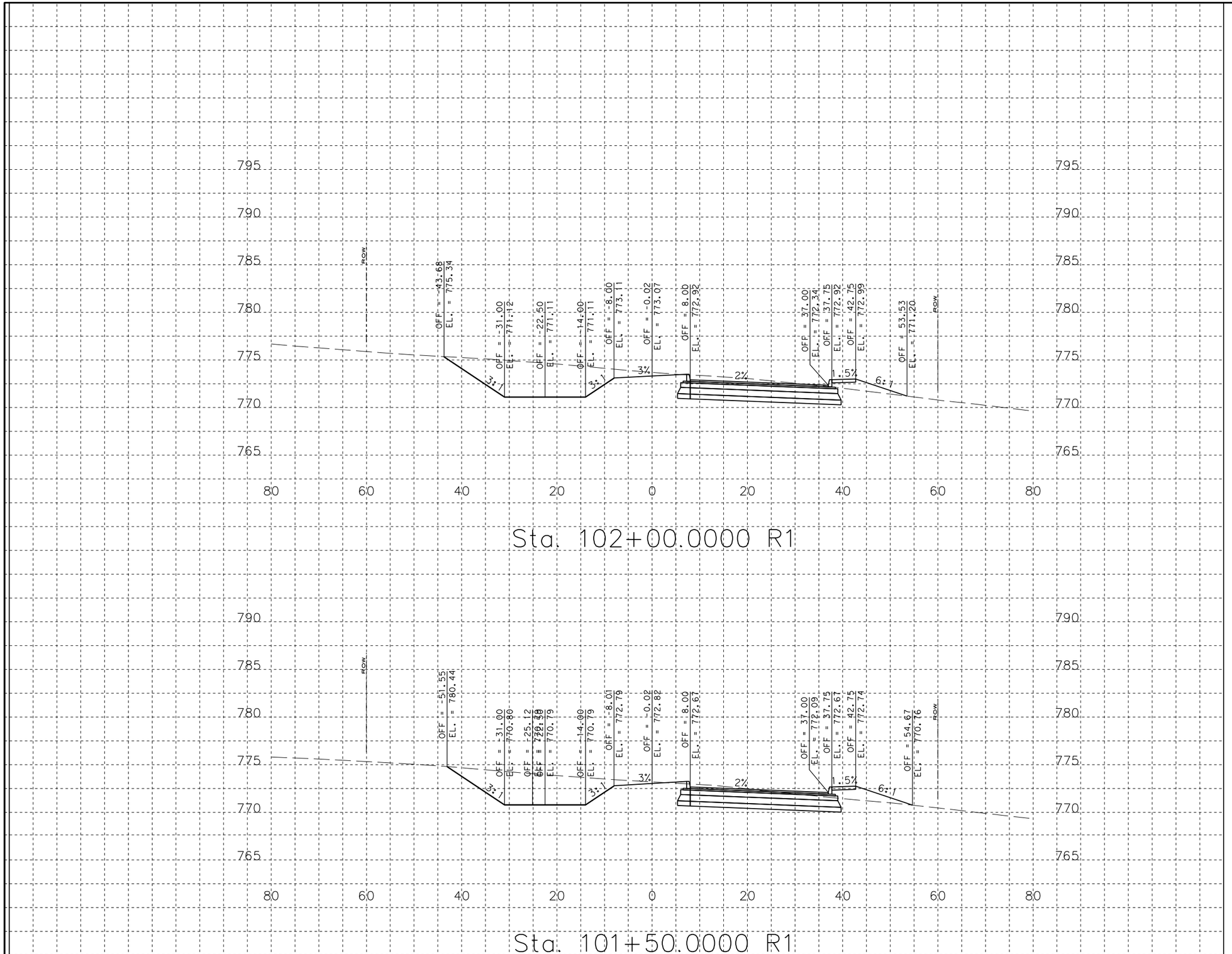
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 10 OF 34

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	-		140
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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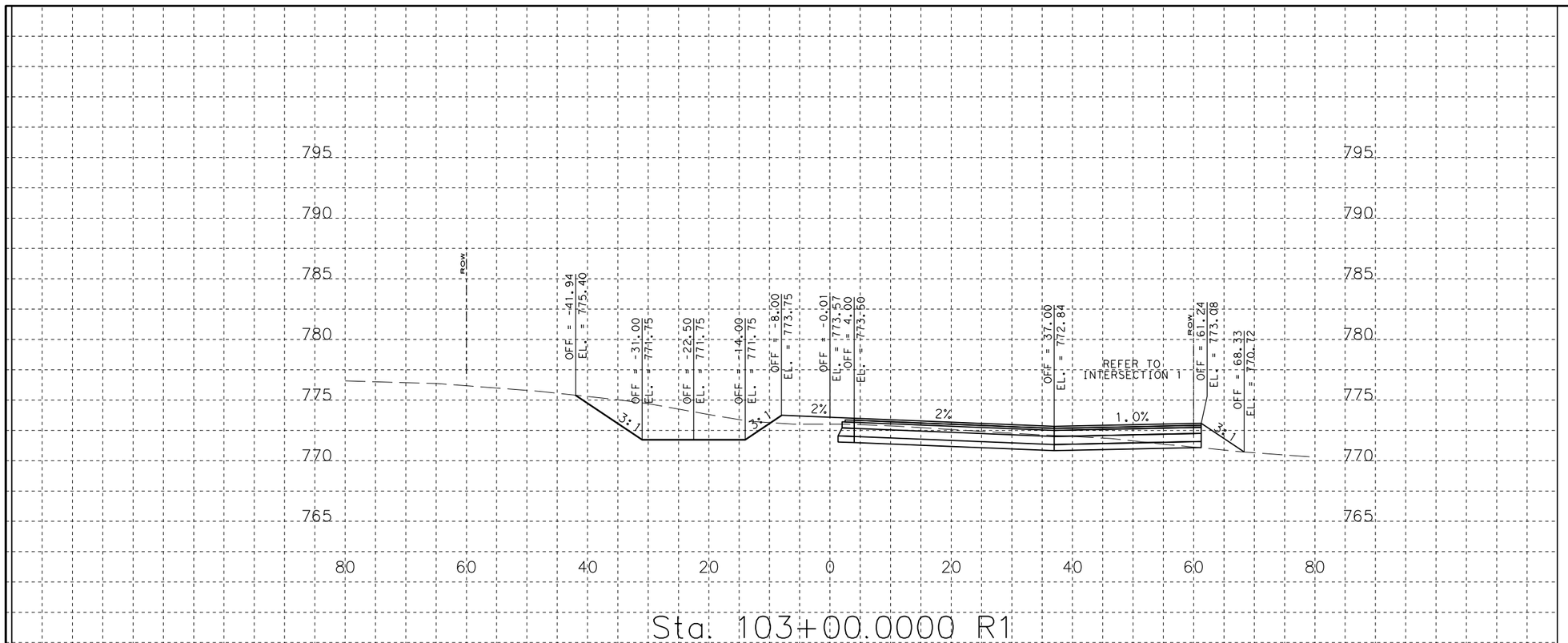
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 11 OF 34

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	-		141
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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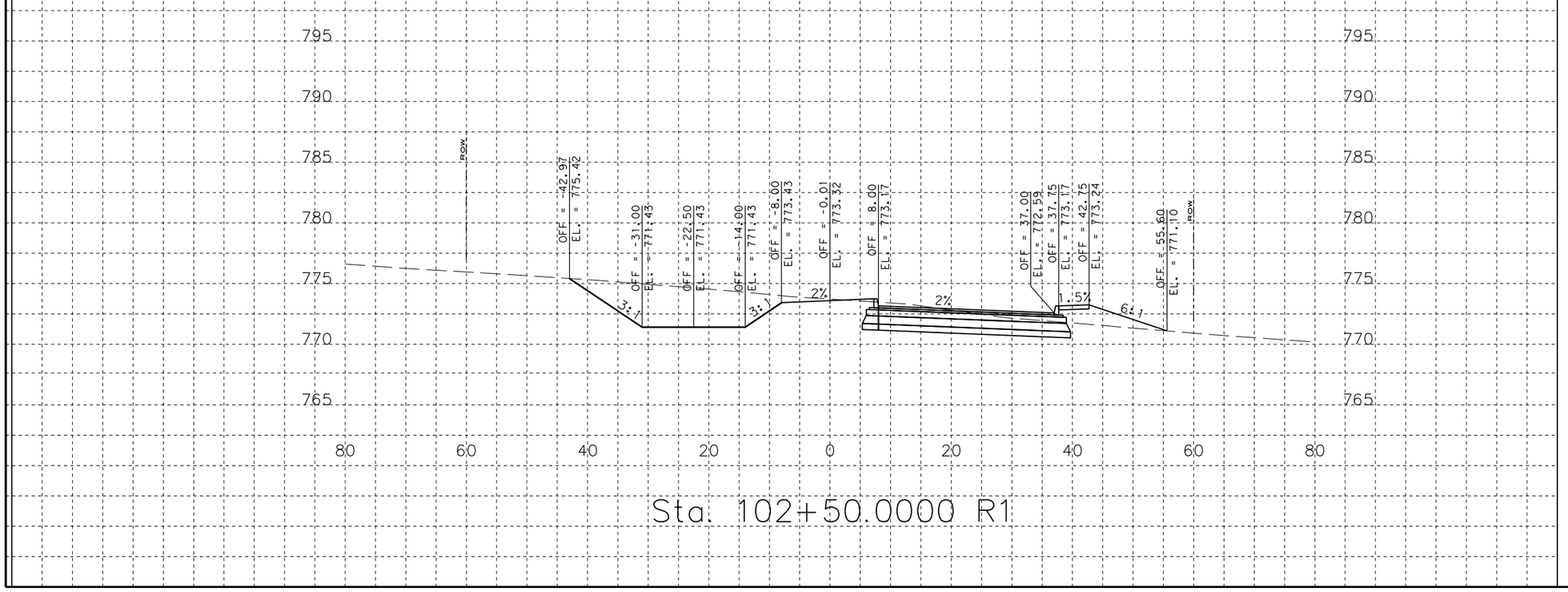

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CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 12 OF 34

FED. RD. DIV. NO.	PROJECT NO.	SHEET
6	-	142

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD

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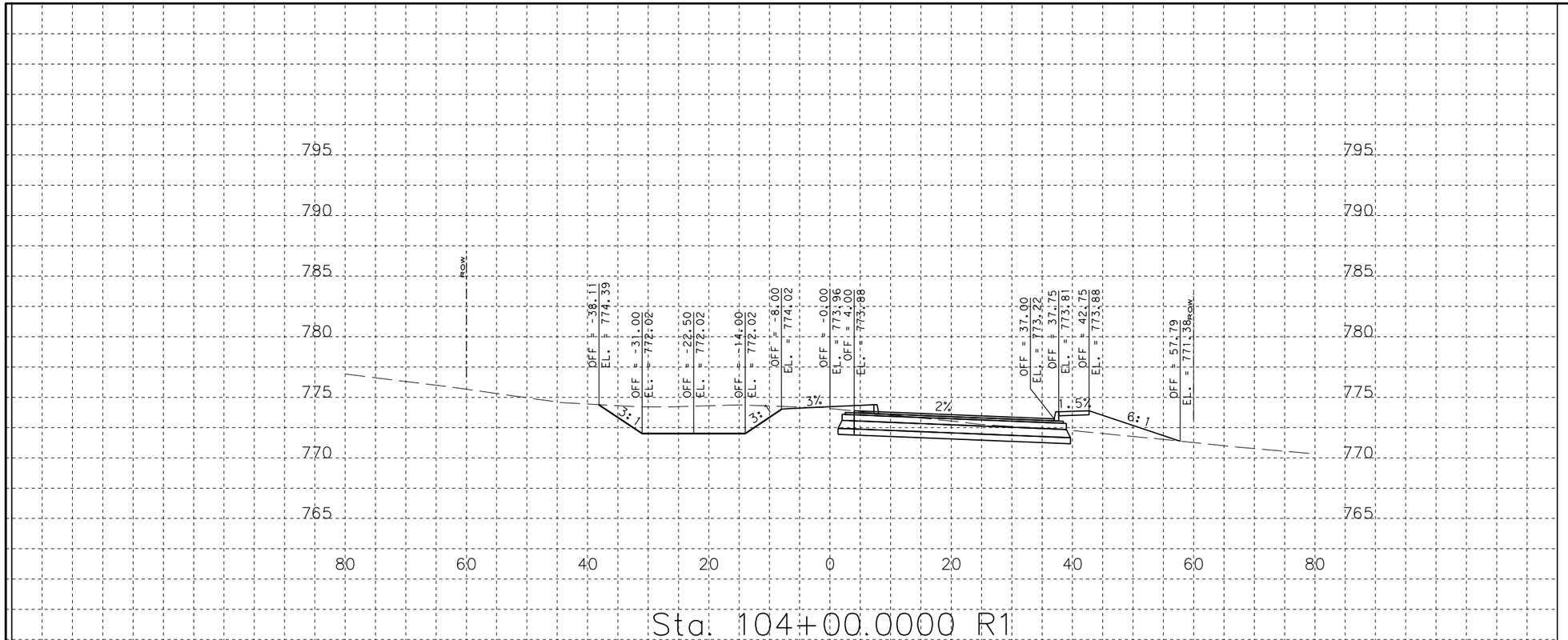

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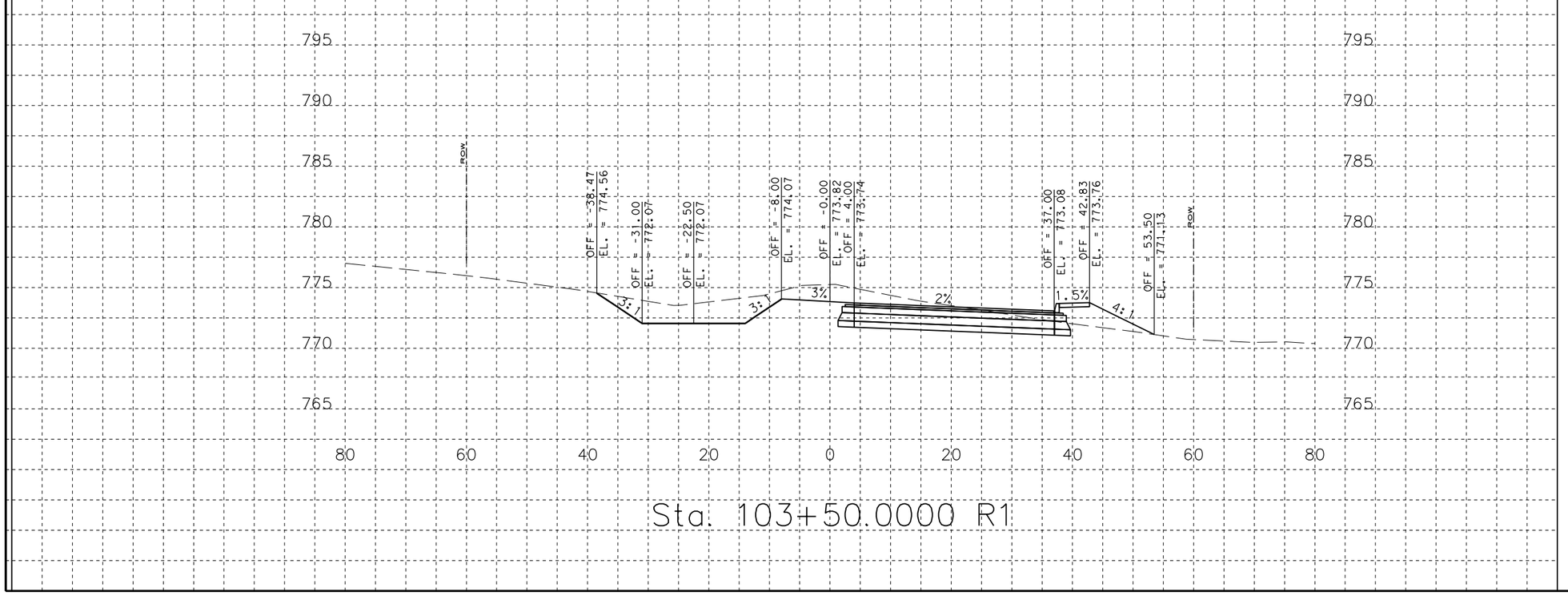

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CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 13 OF 34

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	-		143
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD

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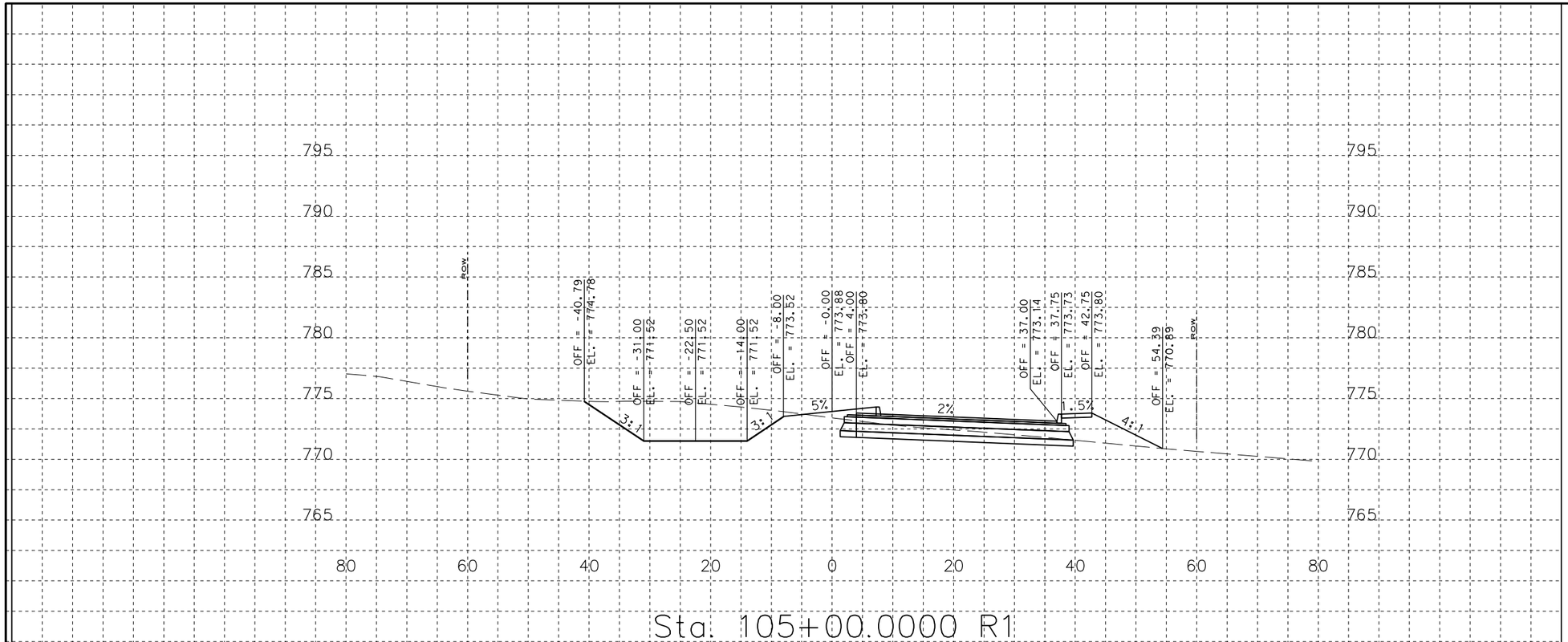

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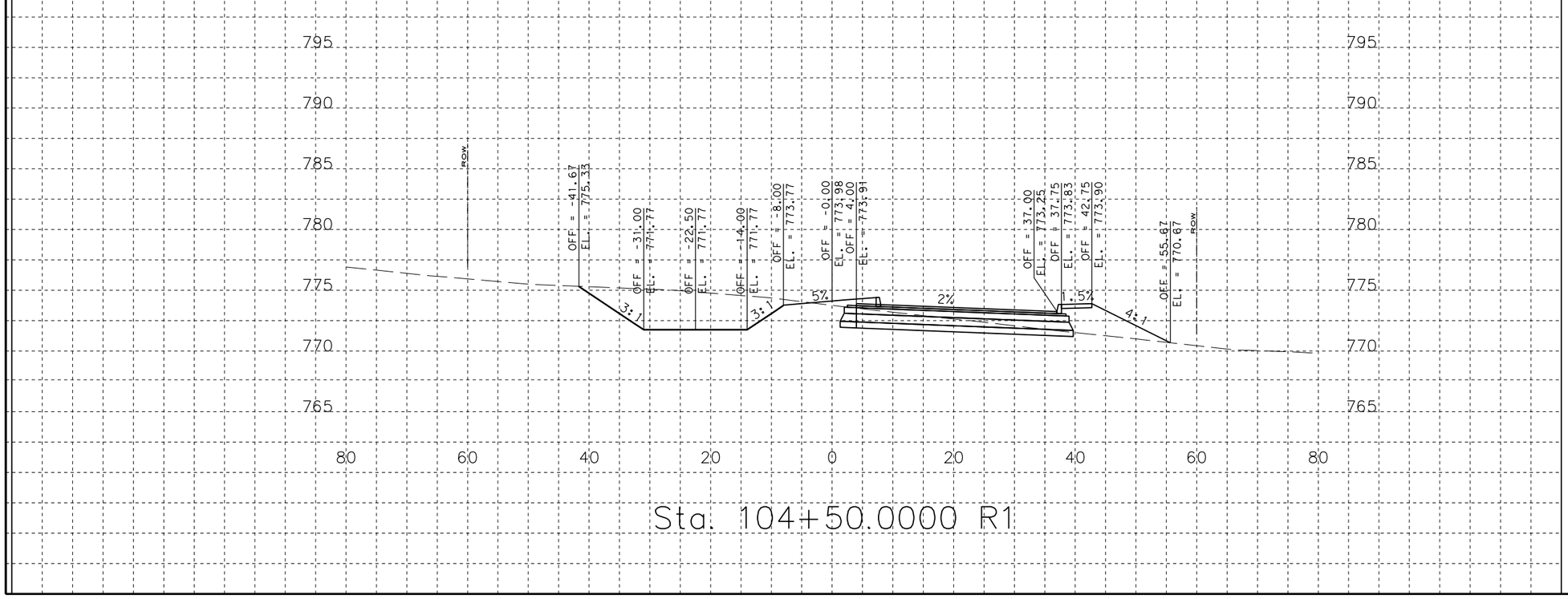

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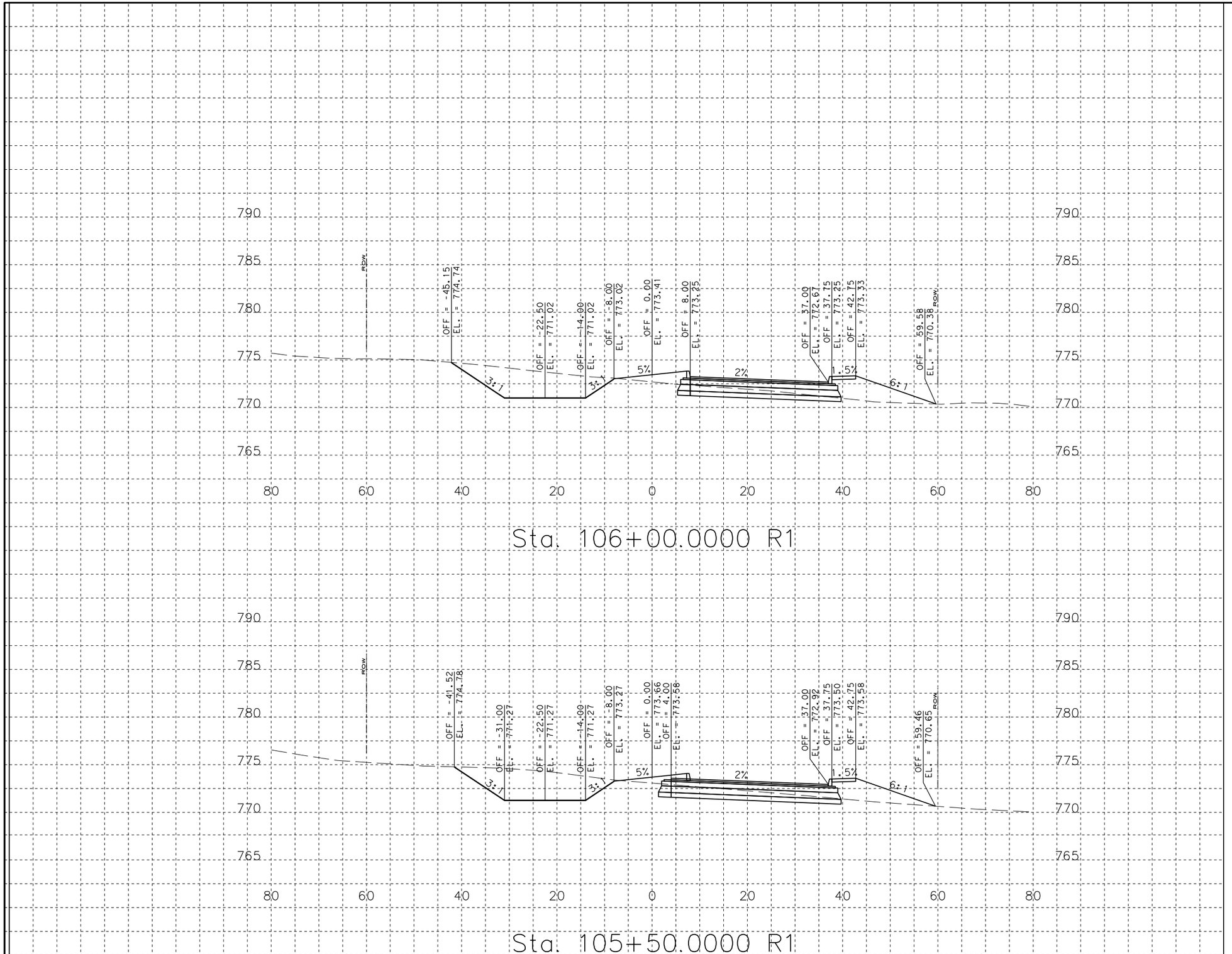
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 14 OF 34

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	-		144
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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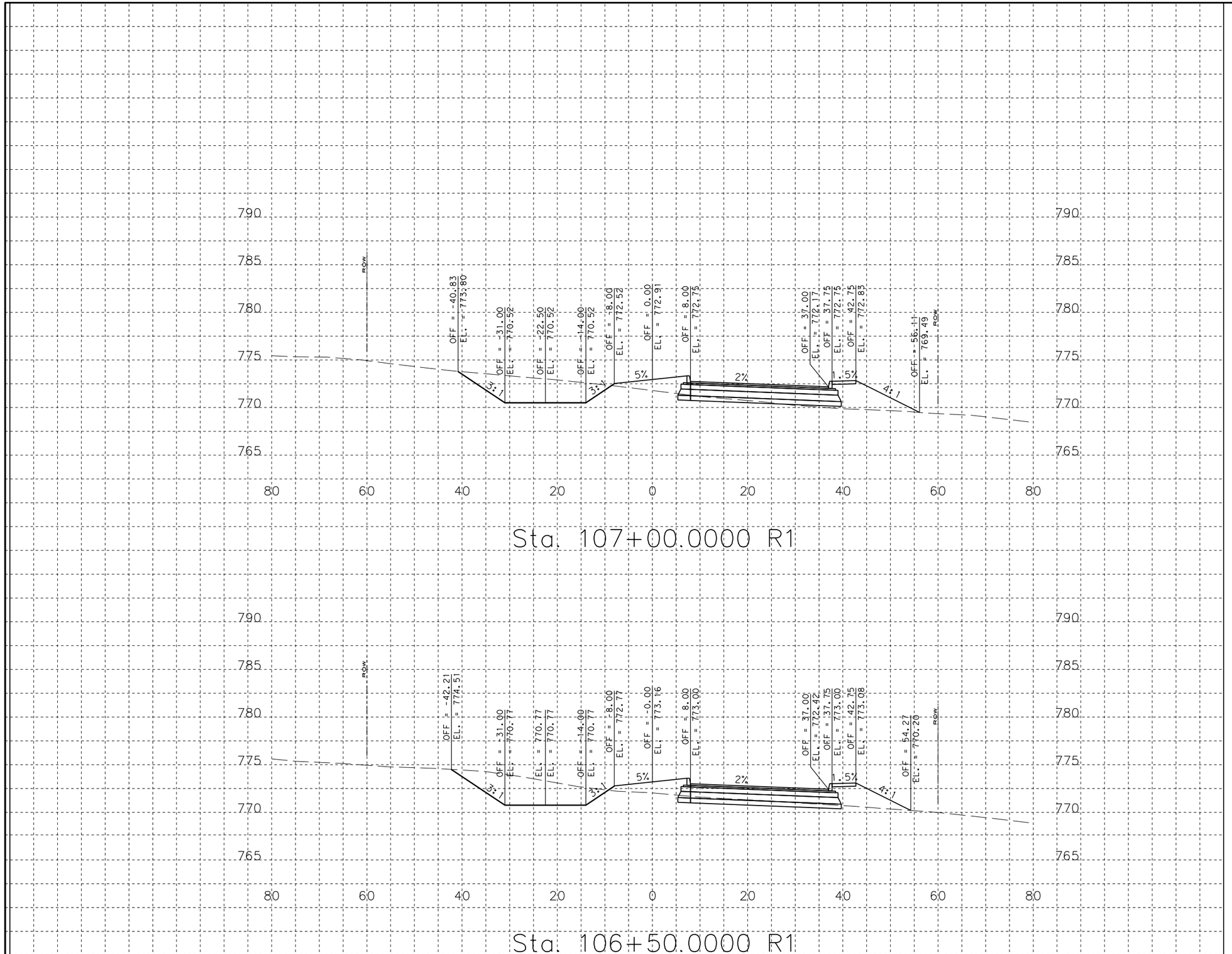
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 15 OF 34

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	-		145
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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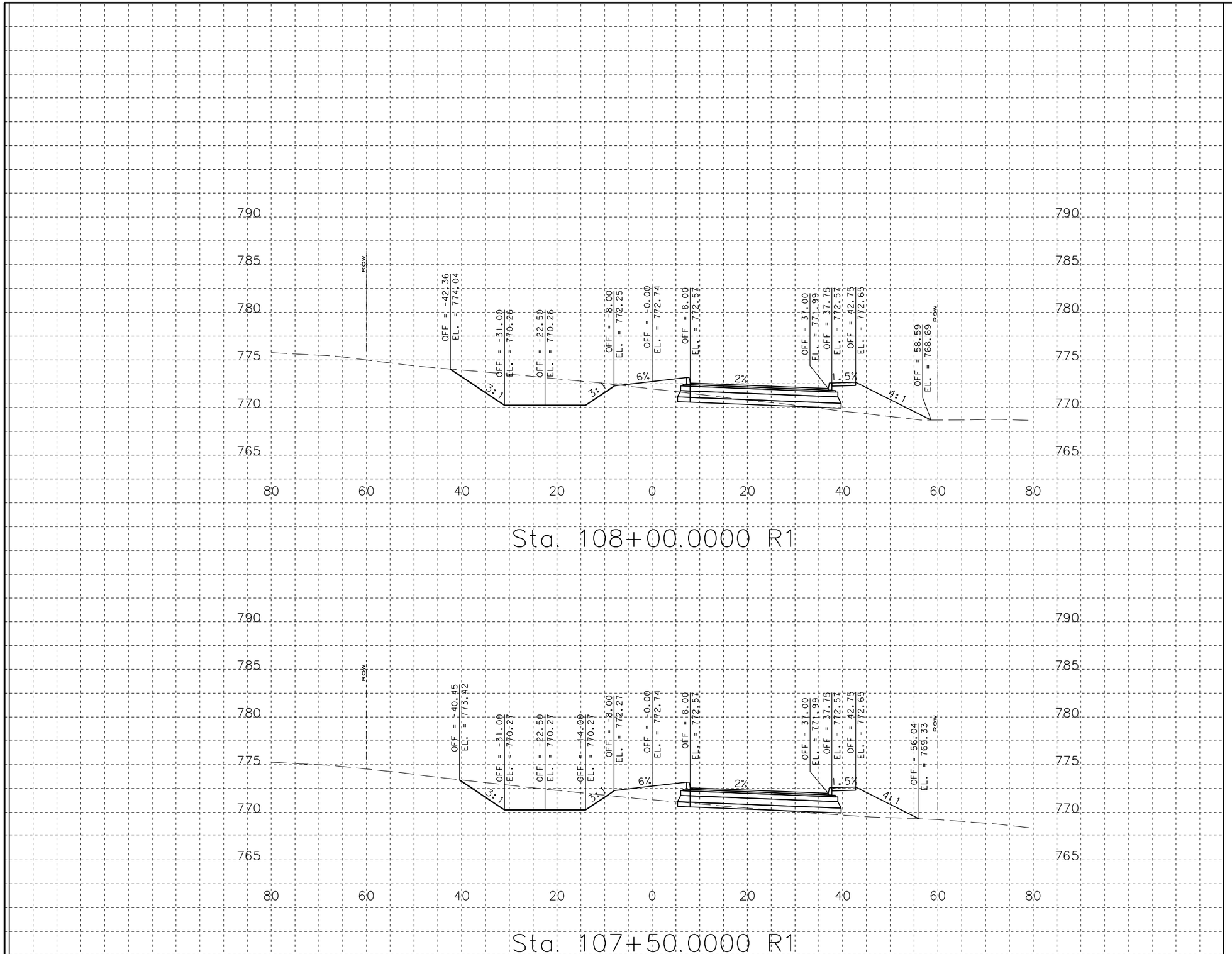
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 16 OF 34

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	-		146
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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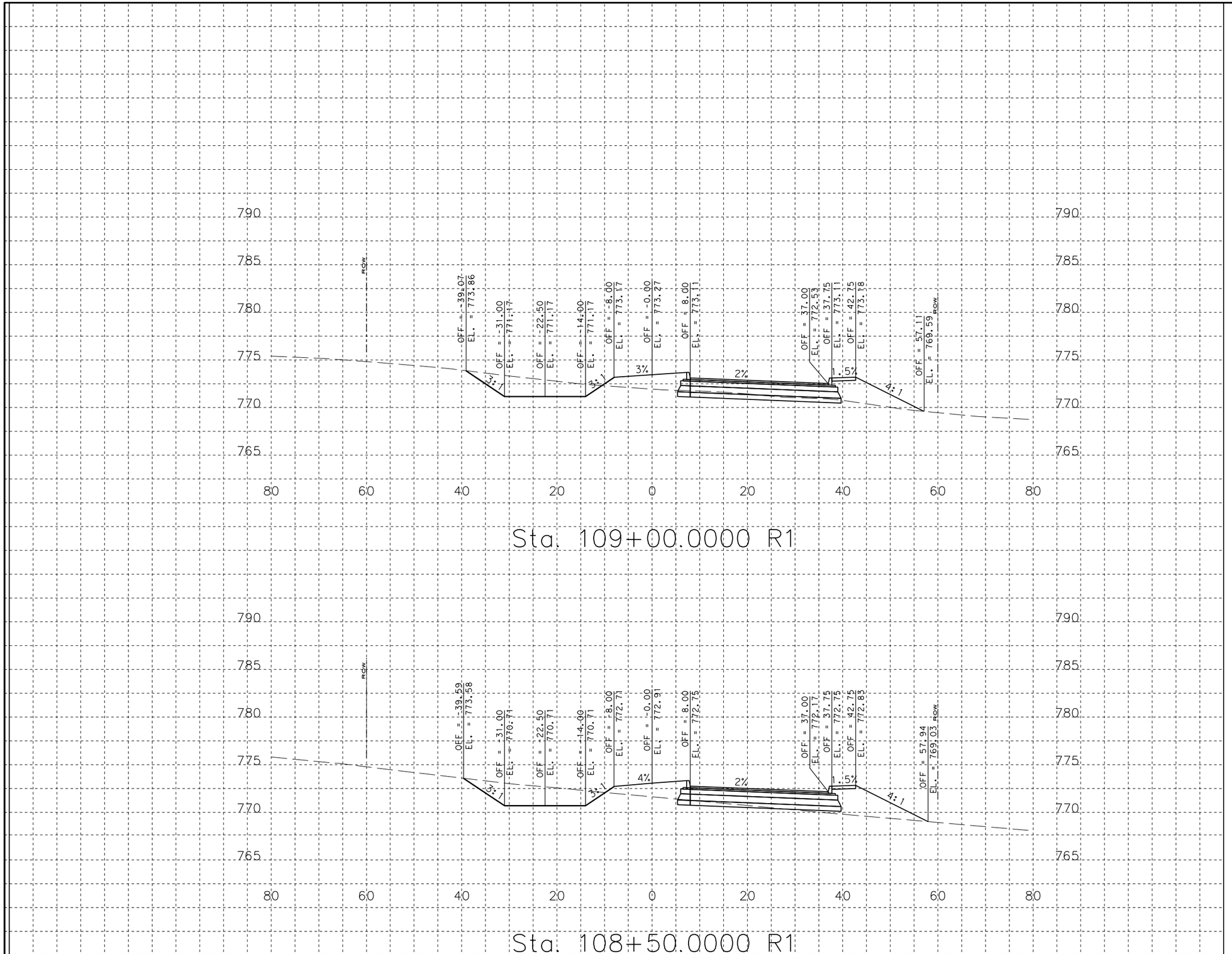
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 17 OF 34

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	-		147
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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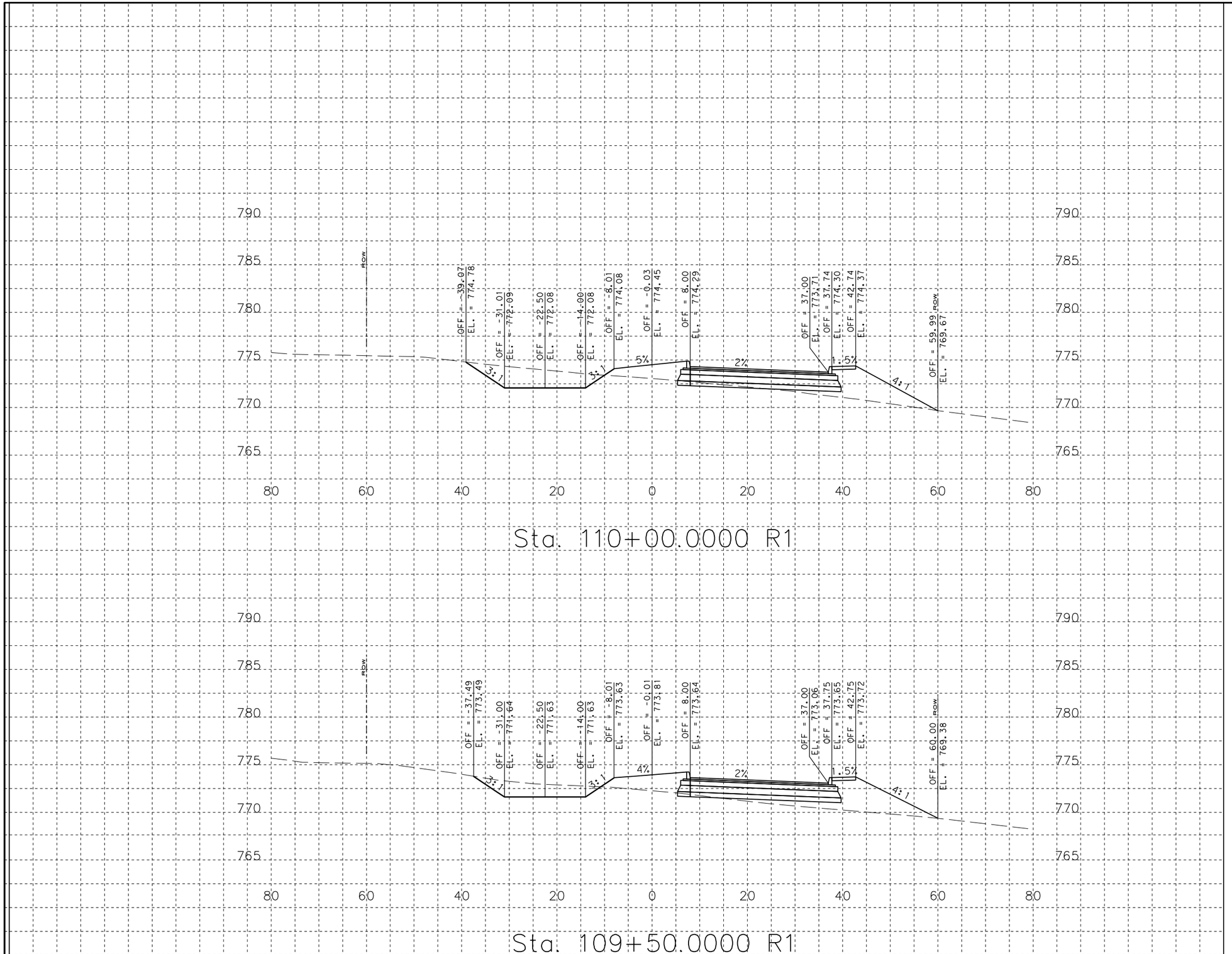
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 18 OF 34

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	-		148
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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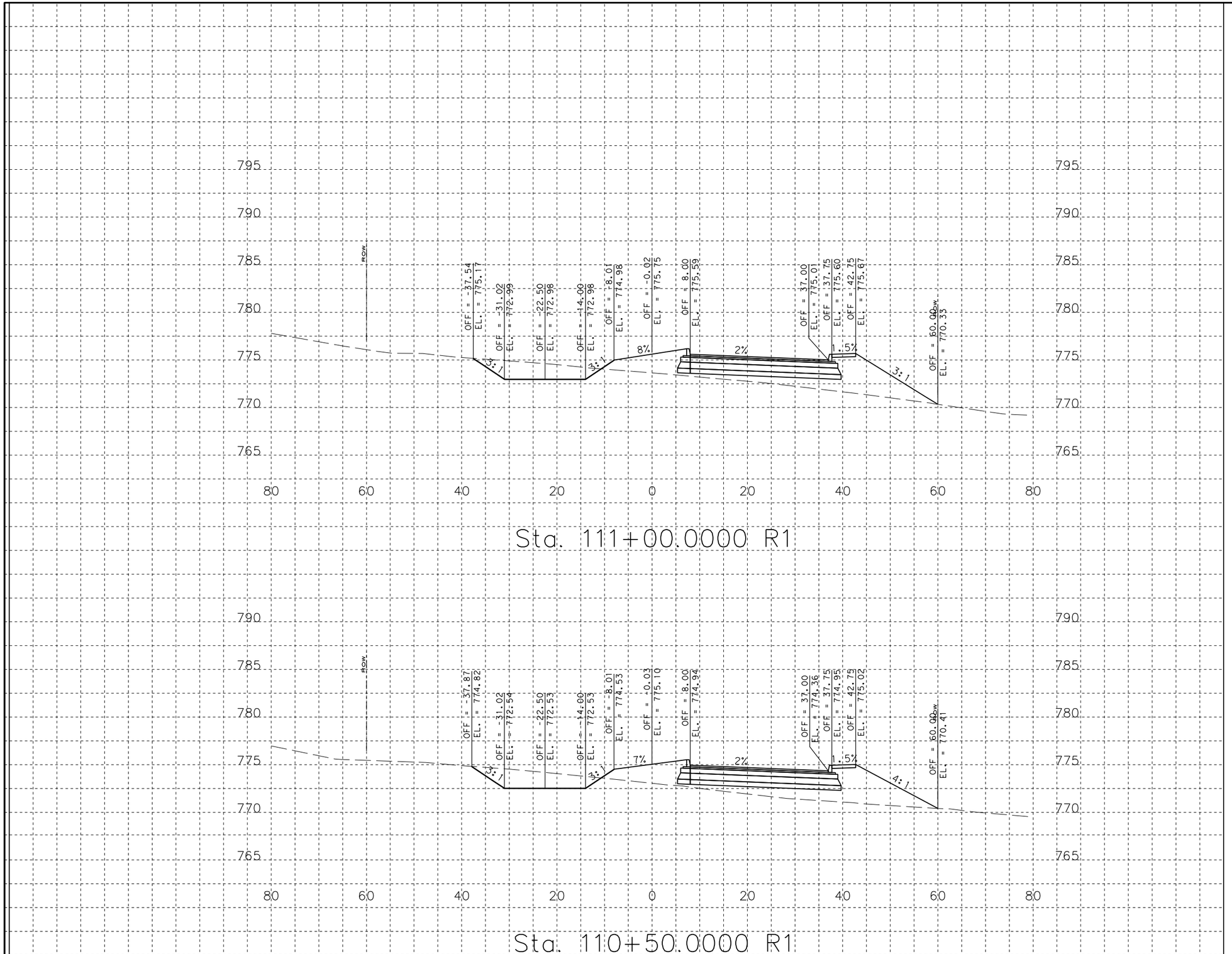
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 19 OF 34

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	-		149
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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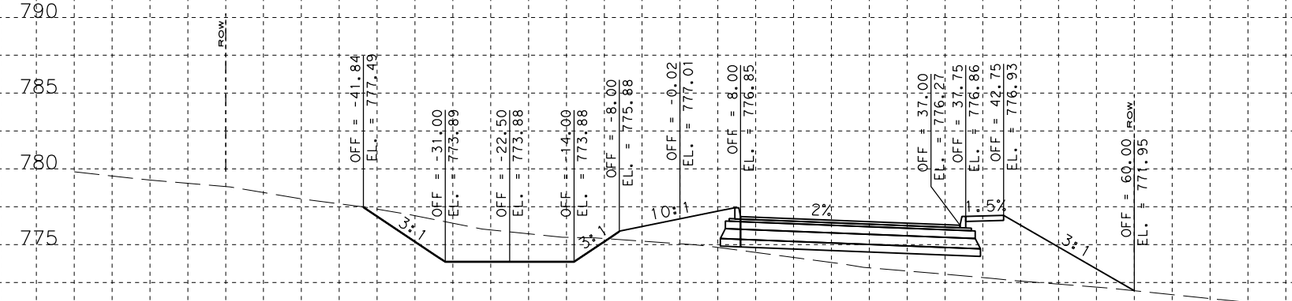
CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 20 OF 34

FED. RD. DIV. NO.	PROJECT NO.		SHEET
6	-		150
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD



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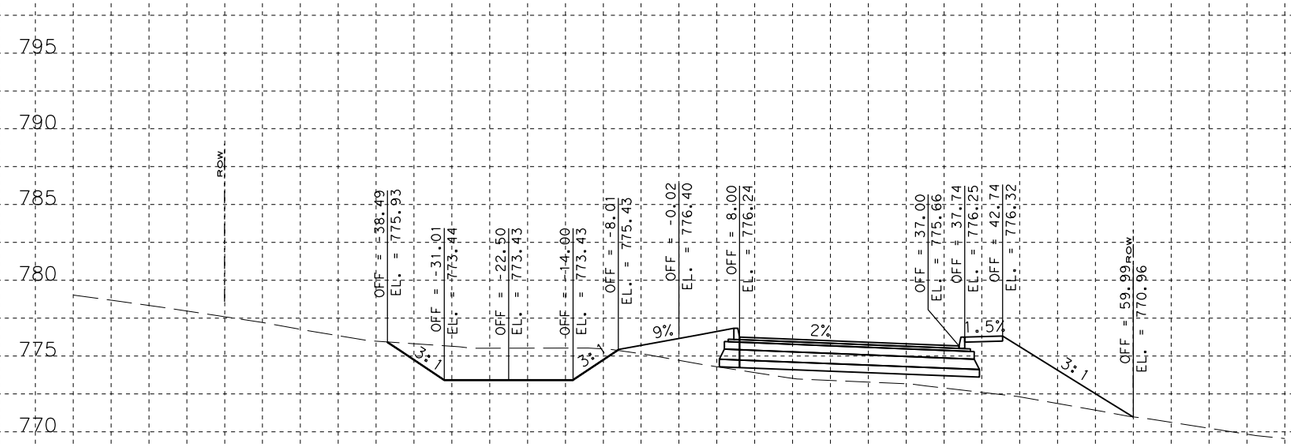

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CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 21 OF 34

FED. RD. DIV. NO.	PROJECT NO.	SHEET
6	-	151

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD

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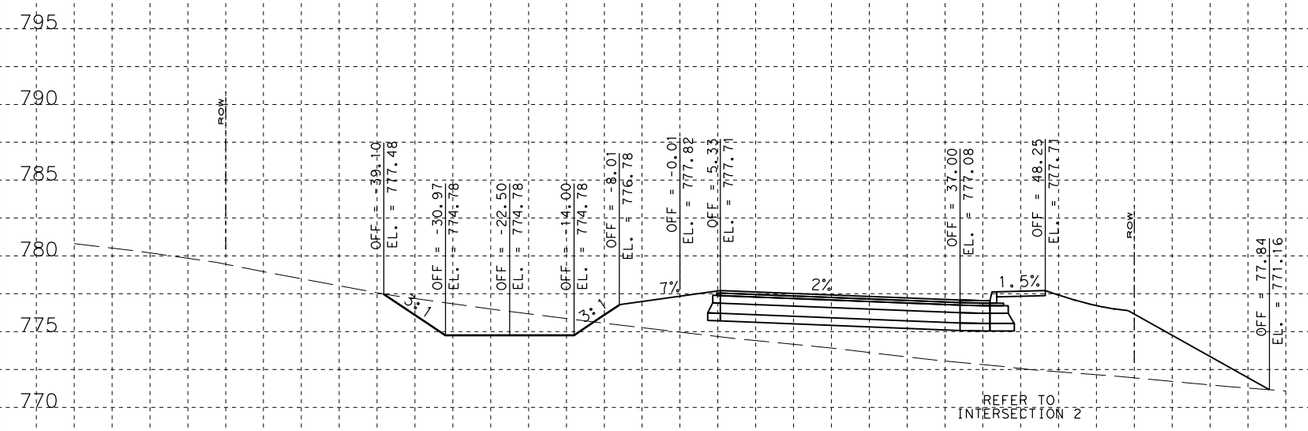

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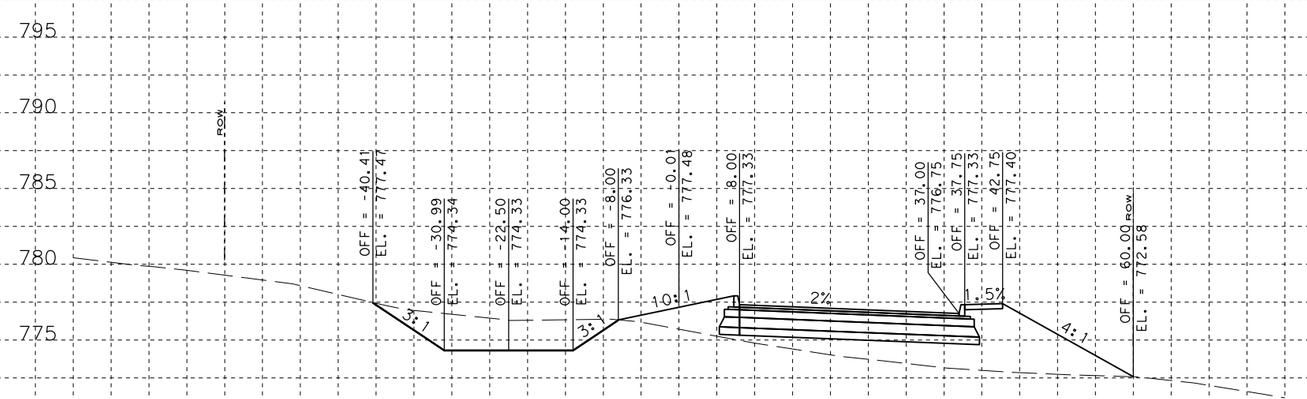

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CROSS SECTIONS

SCALE: 1"=20'H, 1"=10'V SHEET 22 OF 34

FED. RD. DIV. NO.	PROJECT NO.	SHEET
6	-	152

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	ROADWAY
			WT MONTGOMERY ROAD

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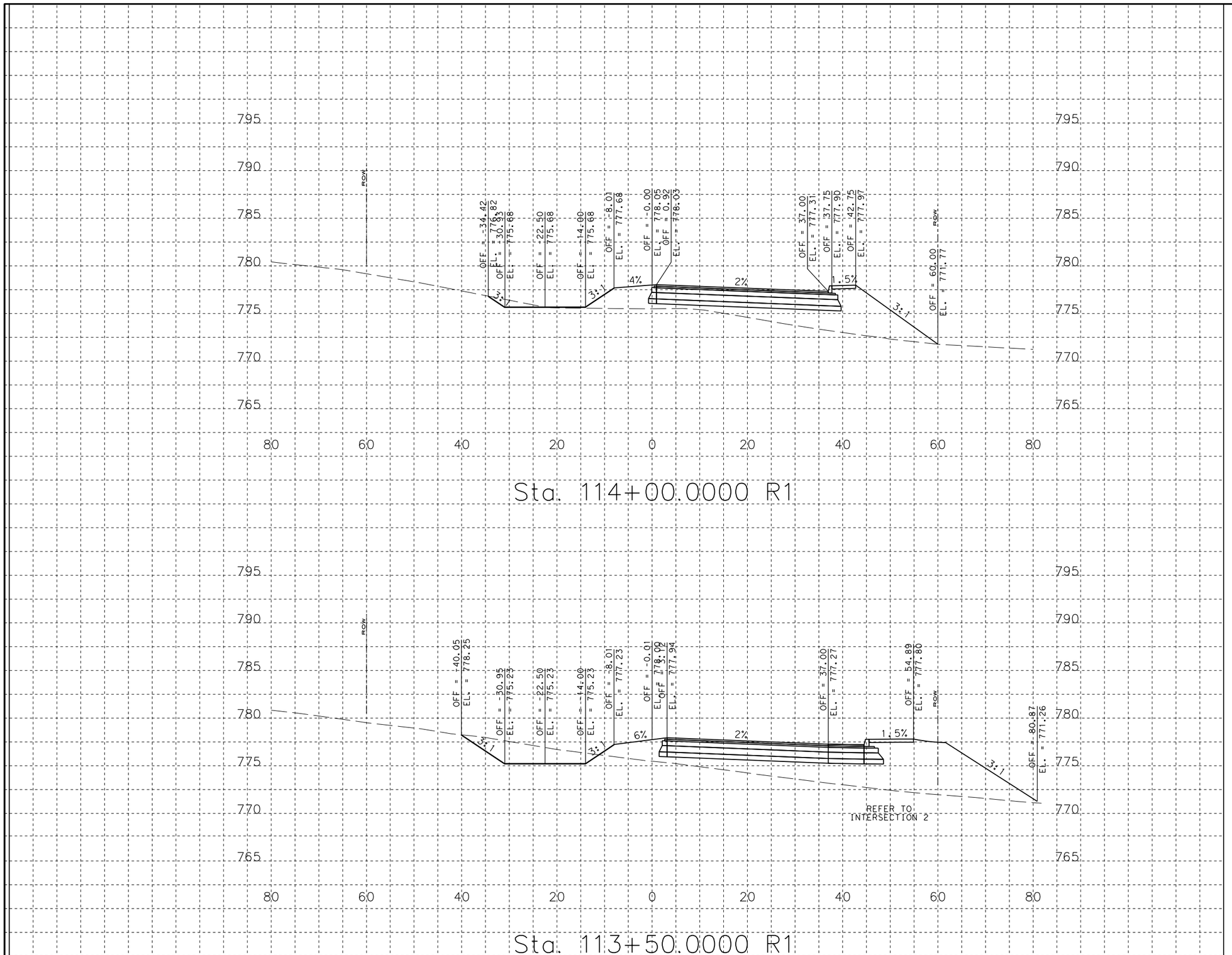

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STATE OF TEXAS
ERIC HERNANDEZ
114309
LICENSED PROFESSIONAL ENGINEER

2/7/2025

LEGACY ENGINEERING GROUP
Legacy Engineering Group, PLLC
7800 W Interstate 10, Ste. 830, San Antonio, Texas 78230,
210.660.1960 / TBPE Firm Registration No. 20623

WT MONTGOMERY ROAD
CROSS SECTIONS

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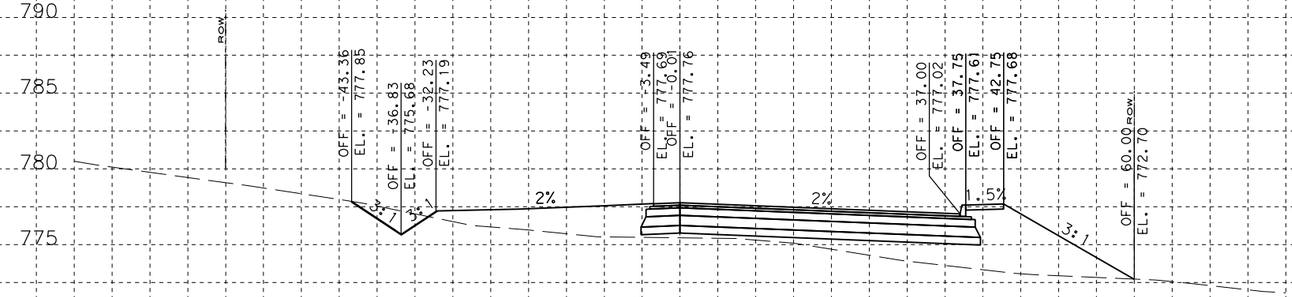

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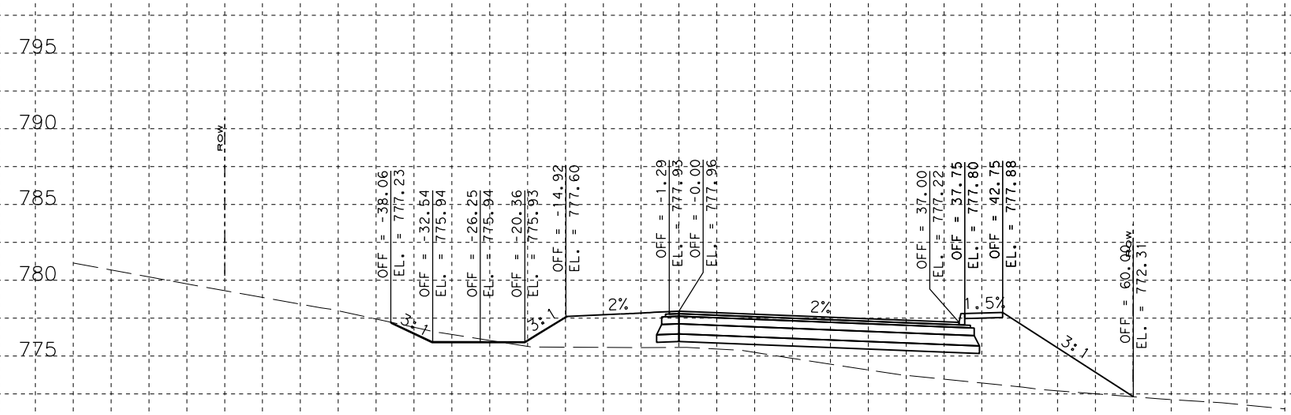

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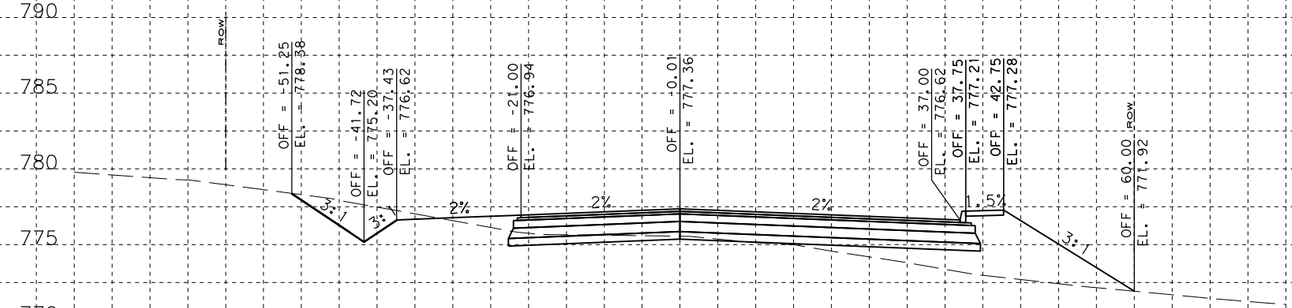

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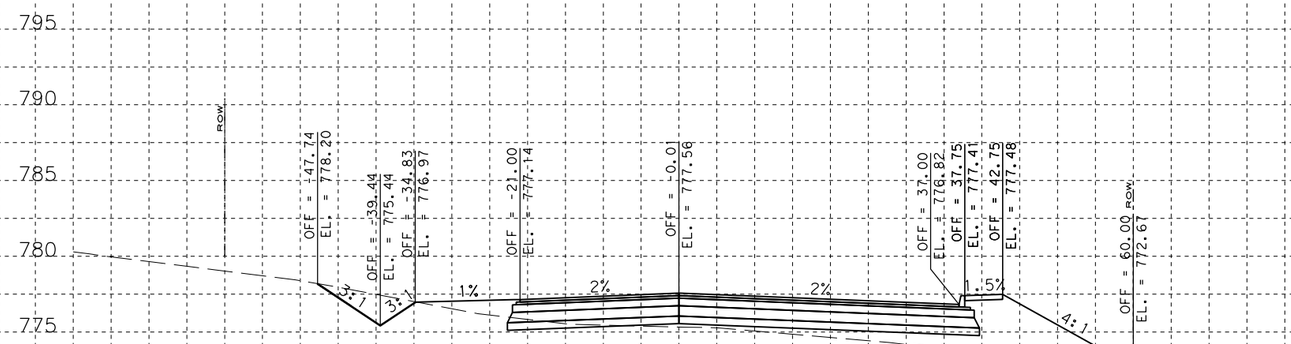

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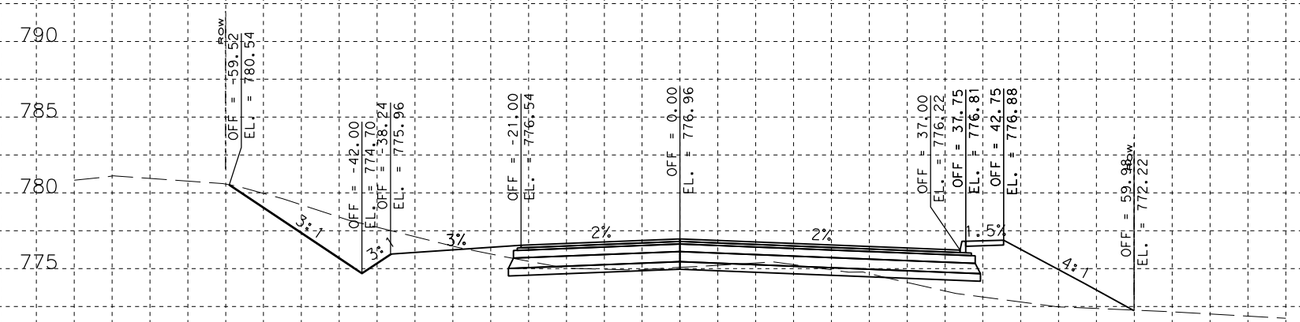

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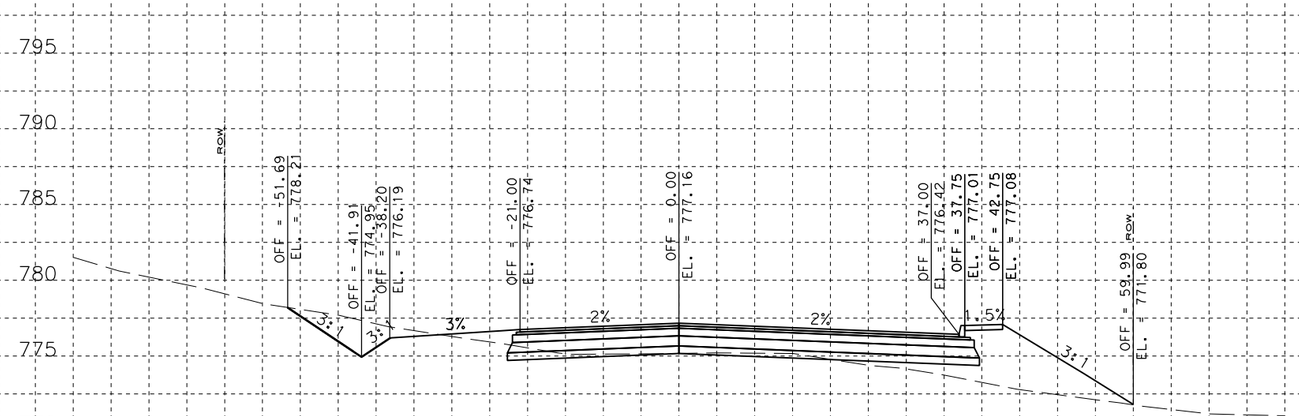

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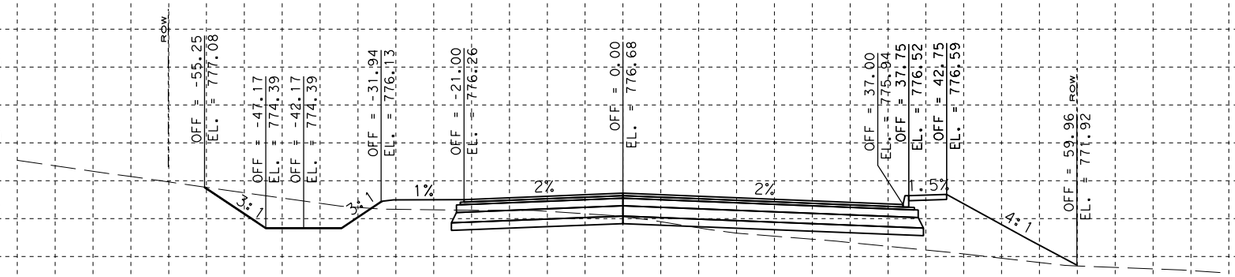

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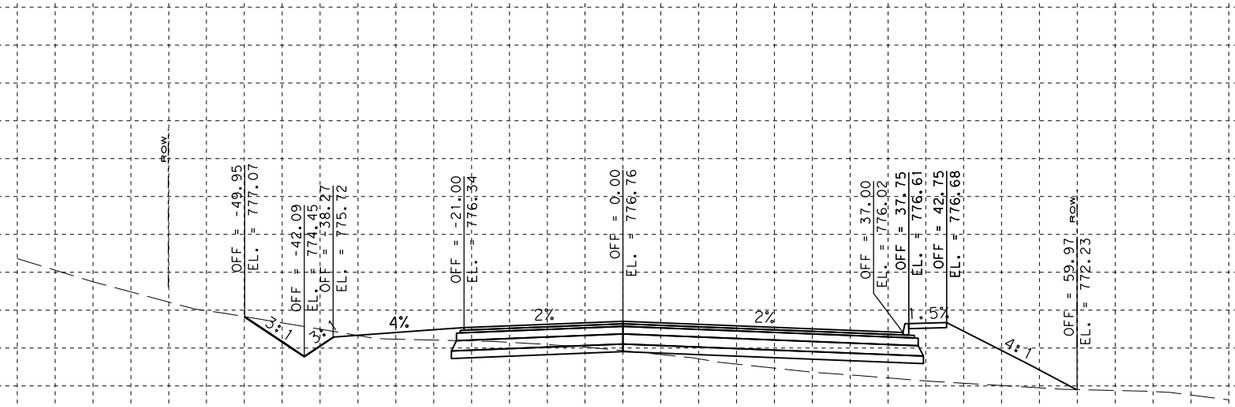

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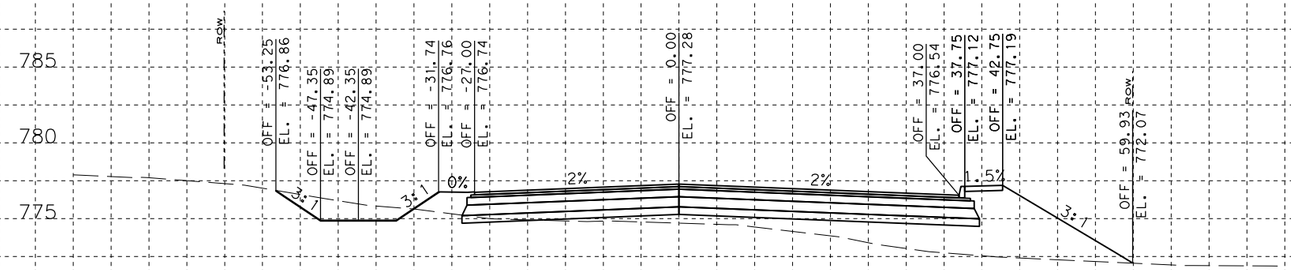

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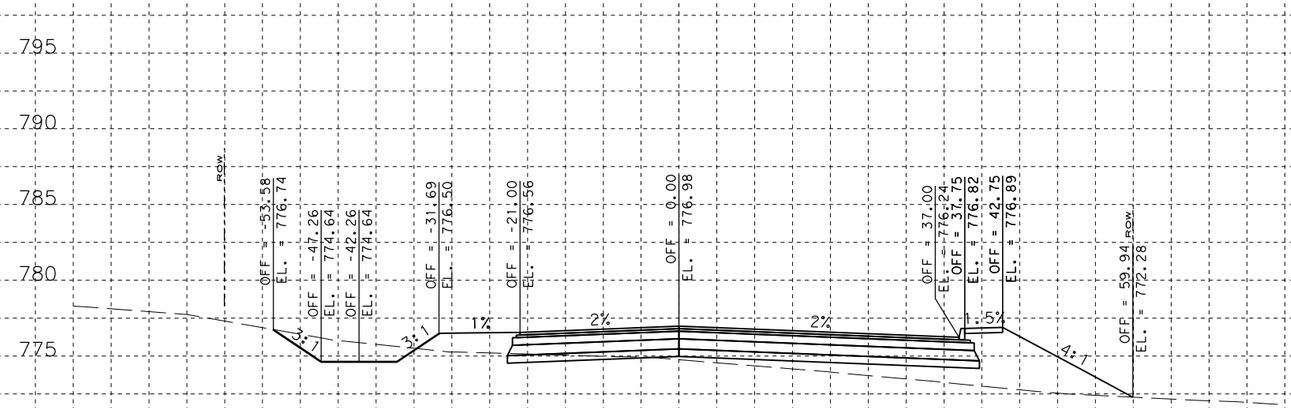

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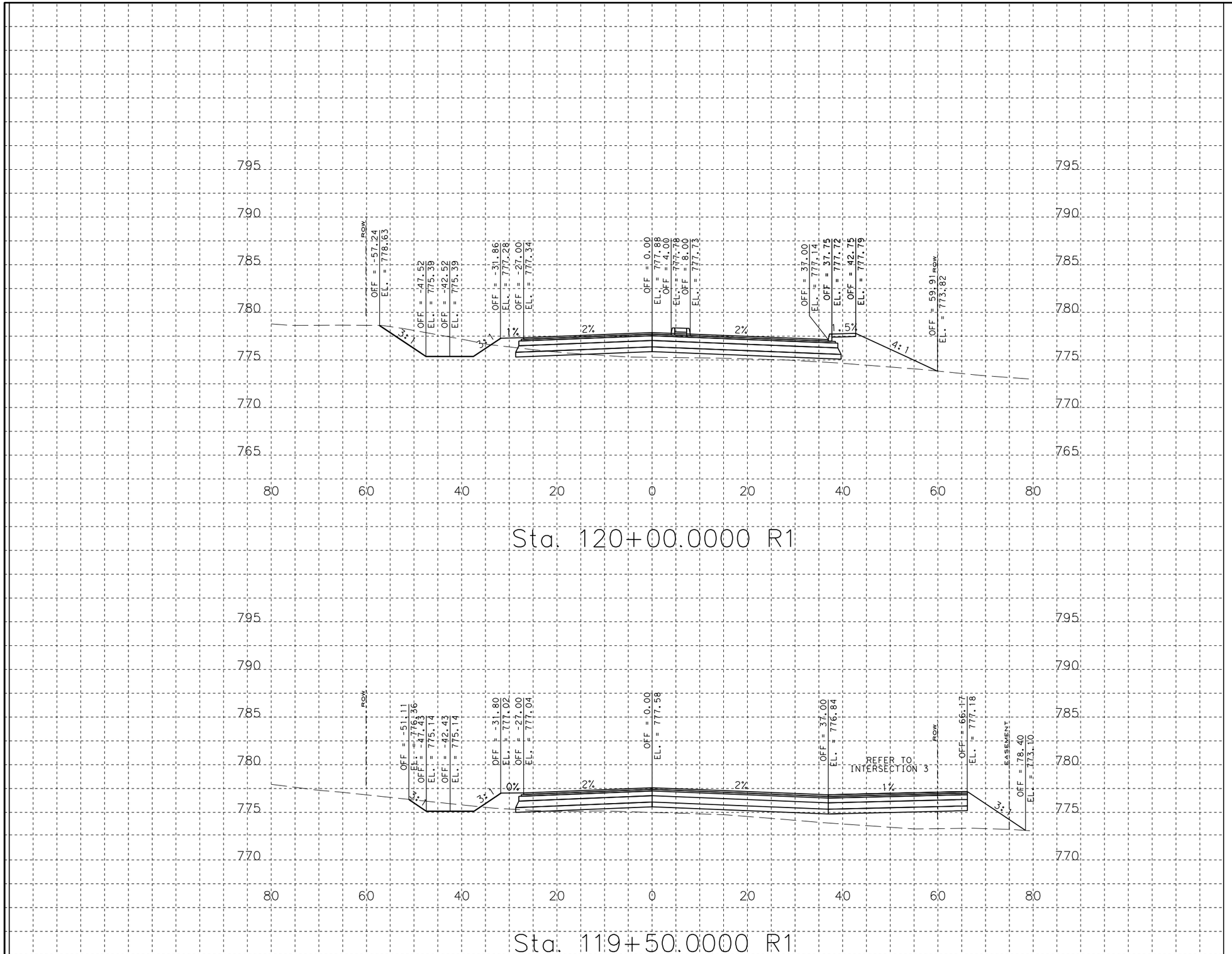

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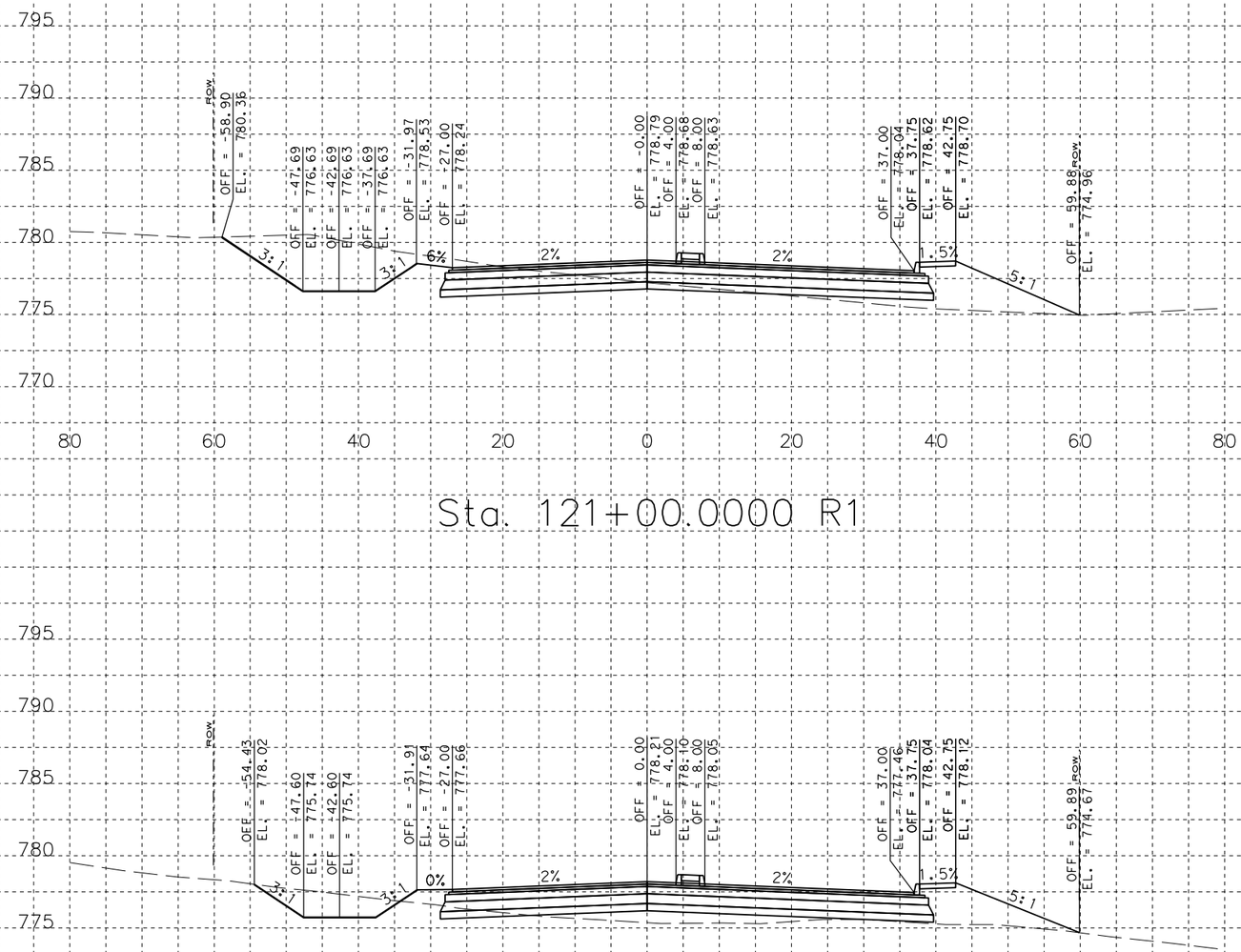

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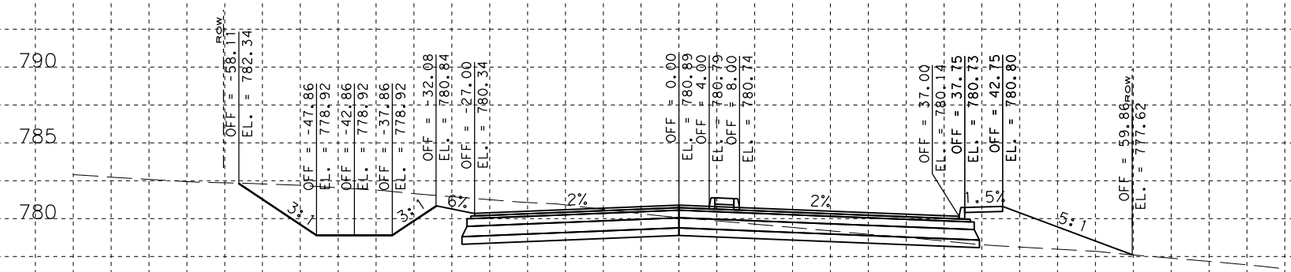

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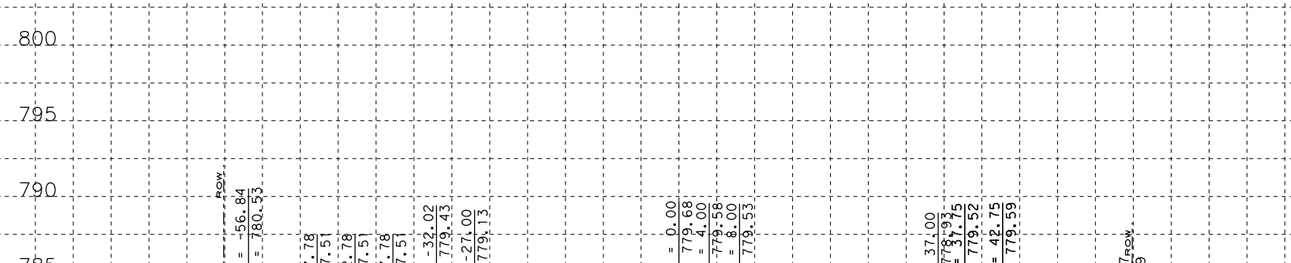

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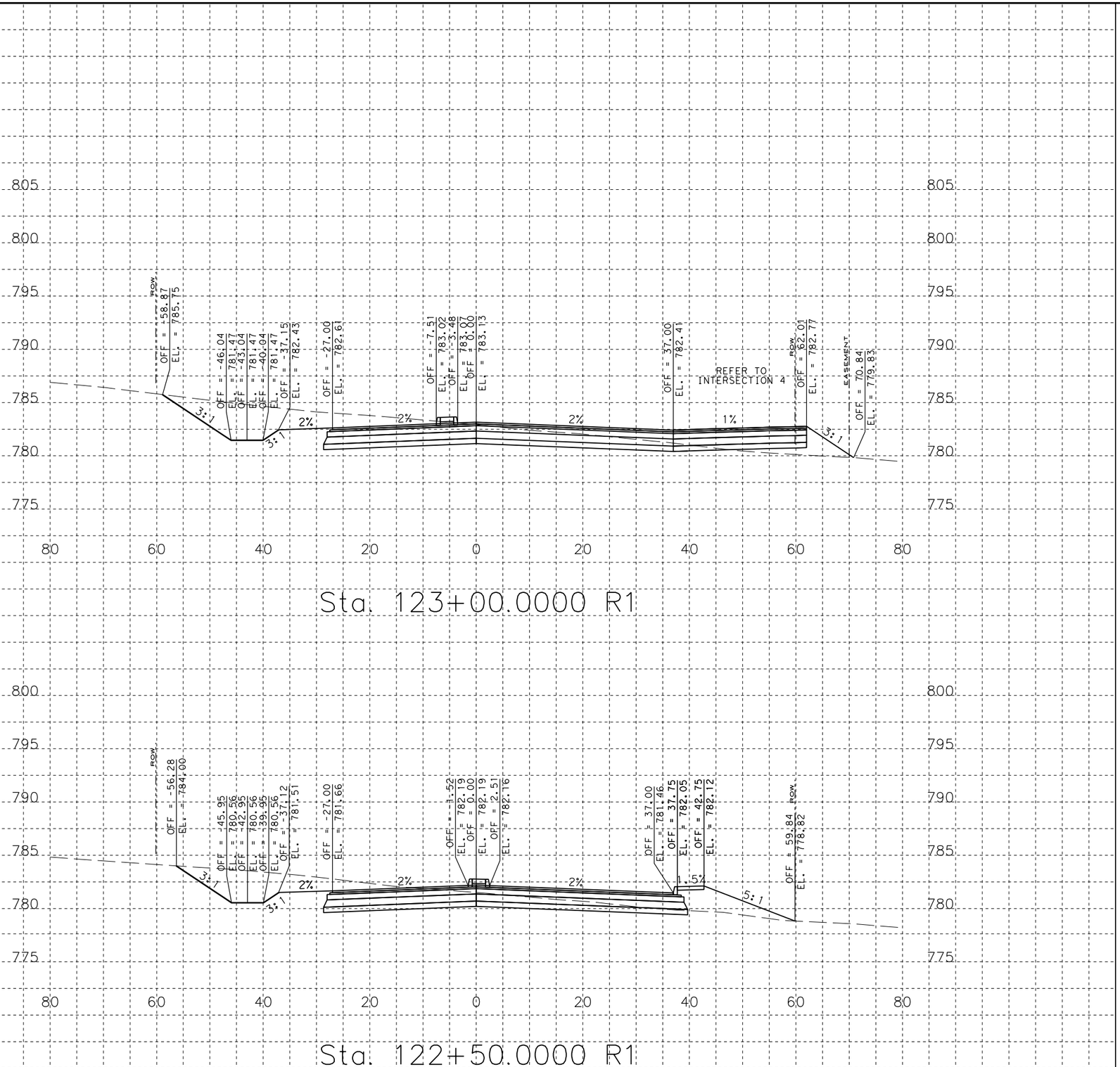

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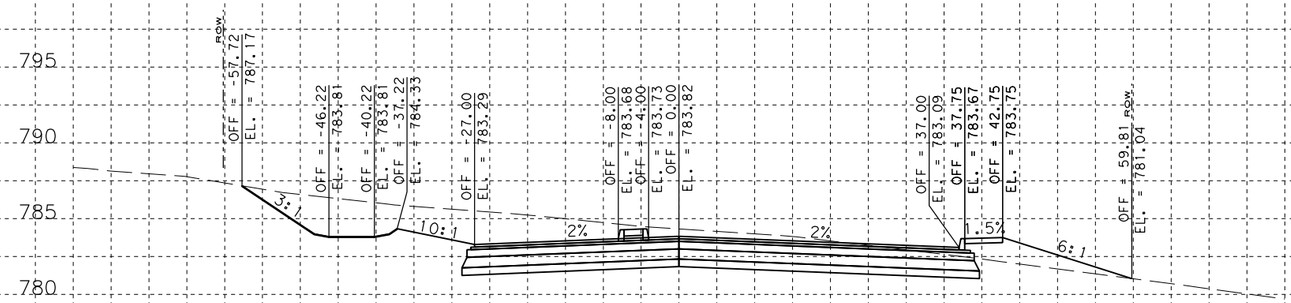

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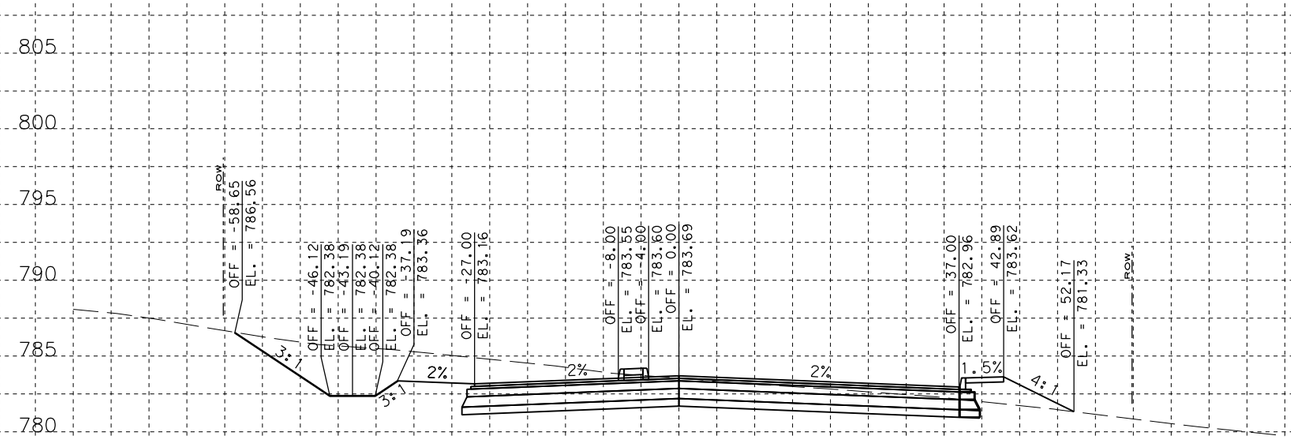

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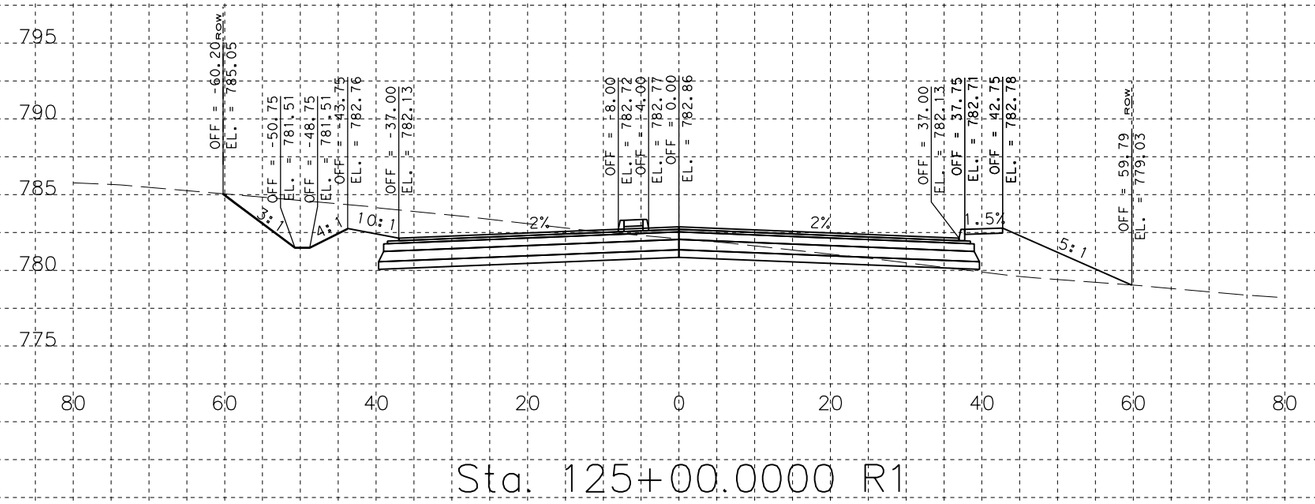

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GEOTECHNICAL REPORT
(Frost Project No. FGS-G 20016)

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

GEOTECHNICAL ENGINEERING STUDY

MONTGOMERY ROAD EXTENSION
PHASE 1C, 1D & 2
BEXAR COUNTY, TEXAS
PAVEMENT DESIGN

FROST GEOSCIENCES, INC. PROJECT NO.: FGS-G 21106
MAY 7, 2021

Prepared Exclusively for:

CUDE ENGINEERING
Attn: Mr. Jeffrey McKinnie, P.E.
4122 Pond Hill Road. Suite 101
San Antonio, Texas 78231

Frost GeoSciences
Construction Materials ▪ Forensics
Environmental ▪ Geotechnical

Frost GeoSciences
Construction Materials ▪ Forensics
Environmental ▪ Geotechnical

Frost GeoSciences

Frost Geosciences, Inc.
13406 Western Oak
Helotes, Texas 78023
Office (210)-372-1315
Fax (210)-372-1318
www.frostgeosciences.com
TBPE Firm Registration # F-9227
TBPG Firm Registration # 50040

May 7, 2021

Mr. Jeffrey McKinnie, P. E.
CUDE ENGINEERING
4122 Pond Hill Road, Suite # 101
San Antonio, Texas 78231

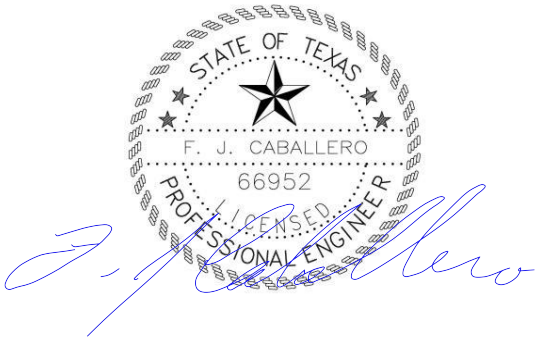
SUBJECT:
Geotechnical Engineering Services
Montgomery Road Extension, Phase 1C, 1D, & 2
Bexar County, Texas
FGS Project No: FGS-G21106

Dear Mr. McKinnie;

Frost GeoSciences, Inc. (FGS) is a geotechnical engineering company registered with the Texas Board of Professional Engineers, with registration No. F-9227, and is pleased to submit the results of our Geotechnical Engineering Study for the above referenced project. This report includes the results of field and laboratory testing along with our recommendations for use in preparation of the appropriate design and construction documents for this project.

We appreciate the opportunity to be of service to you in this phase of your project and future projects. If you have any questions pertaining to this report, or if we may be of further service, please contact our office.

Respectfully submitted,
Frost GeoSciences, Inc.



F. J. Caballero, P.E.
Project Engineer

FGS-G-21106

Copies Submitted:
i. One (1) Electronic: Mr. Jeffrey McKinnie, P. E., CUDE ENGINEERING, San Antonio, Texas
ii. One (1) File

TABLE OF CONTENTS

PROJECT INFORMATION

Project Authorization:

Frost GeoSciences, Inc. (FGS) has completed a geotechnical engineering study for new pavements to be constructed on **Phase 1C, 1D, & 2 of the Montgomery Road Extension in Bexar County, Texas**. This project was authorized by **Mr. Jeffrey McKinnie, P. E. of CUDE ENGINEERING,** through acceptance of Frost GeoSciences **Proposal No.: FGS-P-G20089 dated December 15, 2020.** Our scope of services for this project is as outlined in that proposal.

Project Description:

We understand that the **Phases 1C, 1D, & 2 of the Montgomery Road Extension** involves the design and construction of an **Arterial Street**. The pavement section design will be in accordance with the **Bexar County, Texas Flexible Pavement Design Criteria.** A Vicinity Map showing the location of the project is included in the section of this report entitled Illustrations.

Purpose and Scope of Services:

The purpose of the geotechnical investigation is to evaluate the subsurface conditions at the project site and develop geotechnical engineering recommendations and guidelines for use in preparing the appropriate design and other related construction documents for this project. Therefore, our scope of services for this project include the following:

- Drill borings and excavate test pits at selected locations within the project limits to evaluate subsurface conditions and to observe the potential presence of subsurface water;
- Perform geotechnical engineering laboratory tests on selected samples recovered during our field activities to evaluate their physical and engineering properties;
- Perform Engineering analyses to develop the appropriate geotechnical engineering recommendations and guidelines, to include:
- Appropriate pavement section thickness recommendations;
- Pavement section material requirements and specifications;
- General site and subgrade preparation within the construction limits; and
- General comments regarding construction methods, sequences and potential difficulties that may arise during overall construction as it relates to the geotechnical engineering aspects of this project.

- Prepare a written report that includes a boring location plan, boring log at each bore site, and results of the laboratory testing program, descriptions of the subsurface conditions encountered and our geotechnical engineering recommendations and guidelines developed for this project.

Our scope of services for this project did not include the assessment of any potential environmental concerns at this site. Therefore, such concerns are not addressed in this report.

SITE AND SUBSURFACE CONDITIONS

Site Description:

The site conditions were assessed using a combination of aerial photography and observations made by the FGS personnel during our field operations. The following site conditions were noted:

- The site is the Montgomery Road Extension, Phases 1C, 1D, & 2 located in Bexar County Texas.

Site Geology:

According to the Bureau of Economic Geology, Geologic Atlas of Texas – San Antonio Sheet (1982); the Site is located on the following geologic formation:

- The **Navarro Group and Marlbrook Marl ("upper Taylor marl") undivided (Kknm)** - This formation is made up of two parts. The upper part consists of marl, clay, sandstone, and siltstone. The marl and clay are typically glauconitic and contain concretions of limonite and siderite. The sandstone portion is fine-grained, and the siltstone portion is yellow-brown, with concretions of hard bluish-gray siliceous limestone 2-10' in diameter. Sandstone beds have little lateral continuity, becoming more abundant in the western portions. This formation's thickness can be up to 580'.

Soil Description:

According to the United States Department of Agricultural (USDA) Natural Resources Conservation Service (NRCS) Soil Survey of Comal and Hayes County (1984), the Site is located on the following soils:

- **The Houston Black gravelly clay, three to five percent slopes (HuC)** consists of clayey soils that are deep, dark gray to black and calcareous with some gravel. The surface layer is black and about 36" thick. Gravel ordinarily makes up 10-18% of this layer by volume. On a few minor ridge tops, gravel may compose of 60% of the soil. The subsurface layer is about 12" thick. Water intake is slow and erosion due to water is a hazard. The formation of plow pans is common.

- The **Hilly Gravelly Land (HgD)**. This soil consists of a bed of caliche or of gravelly, very strongly calcareous, loamy alluvium that is approximately 10-20' or more in thickness. The upper 3-12" of

the caliche layer is generally hard and platy. There are a few nearly level areas approximately 100' wide, and on these has formed a 4-8" thick mantle of limy, dark grayish brown loam or clay loam. On the slopes, there is very little soil; it is estimated that only approximately 15% of this land is actually soil. In some places, there is a 2-3' bed of weak conglomerate consisting of sediments cemented with calcium carbonate.

Subsurface Conditions:

Subsurface conditions at the site were evaluated by drilling a total of **Six (6)** soil borings to a depth of **Fifteen (15)** feet and **Three (3)** test pits to approximately **two (2) feet depth** were excavated to obtain **soil samples to determine the California Bearing Ratio (CBR)** of the soil samples. **One (1) test was taken on each phase of the project**. The number of borings and test pits, their locations and their depths were selected by FGS. The borings and test pits were located in the field by FGS personnel using Global Positioning System (GPS) technology. The borings were advanced using solid flight auger drilling methods and soil samples were routinely obtained during the drilling process; the test pits are routinely excavated to the appropriate depth. Drilling and sampling techniques were accomplished in general accordance with ASTM procedures. Logs of the borings are presented in the Appendix section at the end of the report. A Borehole Location Plan with the location of each boring is presented in the Illustrations section of this report.

The soil samples obtained during our field exploration were transported to our laboratory where they were reviewed by qualified geotechnical engineering personnel. Representative samples were selected and tested to determine pertinent engineering properties and characteristics for use in evaluating the project site. Laboratory testing and soil classification were accomplished in general accordance with ASTM procedures.

Based on the field and laboratory data, it is determined that the stratigraphy of the site is generally as follows:

Stratum	Range of Depth, (feet)	Stratum Description and Classification
I	0.0 to 5.0	Silty Clay (CL), Dark Brown
II	5.0 to 15.0	Silty Clay (CL), Tan

The subsurface descriptions shown above are general in nature and highlight major subsurface stratification features and material types. The boring logs included in Appendix A should be reviewed for specific information such as soil or rock material descriptions, stratifications, sampling depths and intervals, field test data and laboratory test data. The stratifications shown on each boring log only represent the conditions and approximate boundaries between strata at that actual boring location. The actual transitions between strata may be gradual. Variations will occur and should be expected at locations away from each boring location. Subsurface water level observations made during field operations are also

shown on the boring logs. The indicated stratum depths and any subsurface water levels are measured from the ground surface and are estimated to the nearest one-half (½) foot. Portions of any samples that are not altered or consumed by laboratory testing will be retained for 30 days from the date of issuance of this report. Unless otherwise requested by the client and/or depending upon project requirements, all soil samples will be discarded after that retention period.

The **P.I. values** obtained from the soil samples taken **near the surface ranged from 21 to 25 in** the **CLAY** subgrade soil. Due to the characteristics of the materials found in the area, FGS is of the opinion that the sulfate contents of the materials will **NOT** pose a problem if not treated with lime. In the case where the P.I. value of the material near the surface is greater than 20 the PI could be reduced if lime is applied to the subgrade material or the native Clay material is replaced with a more suitable material.

Subsurface Water Information:

The borings were advanced using dry drilling techniques to their full depths in an attempt to detect the potential presence of subsurface water in the material. Subsurface **water was not encountered** either during or upon completion of drilling or sampling operations. The boreholes were backfilled with soil cuttings upon completion of drilling and sampling operations. Short-term field observations generally do not provide accurate subsurface water levels for evaluation at most sites. Subsurface water levels are generally influenced by seasonal and climatic conditions that result in fluctuations of subsurface water levels over time. The earthwork contractor should check for subsurface water during excavation activities especially when sand and/or gravel are encountered. No specific notations concerning subsurface water are indicated on the boring logs in Appendix A since **no subsurface water was observed.**

ENGINEERING ANALYSIS AND RECOMMENDATIONS

Pavement Design:

Flexible pavements should be designed and constructed in accordance with the requirements established by local municipalities and the American Association of State Highway and Transportation Officials (AASHTO) “Guide for Design of Pavement Structures”, for this project, the Bexar County Flexible Pavement Design Criteria was used.

Below is a table which outlines the Bexar County Flexible Pavement Design Criteria, which was used in the design of the proposed street sections for this project:

Input Parameters used in Asphalt Pavement Section Calculation

Pavement Specifications								
	Primary and Secondary Arterials		Collector Streets		Local Type "B"		Local Type "A" Streets with Bus Traffic	
W18	ESAL = 3,000,000		ESAL = 2,000,000		ESAL = 2,000,000		ESAL = 1,000,000	
R	95%		90%		90%		70%	
So	Flexible	Rigid	Flexible	Rigid	Flexible	Rigid	Flexible	Rigid
	0.45	0.35	0.45	0.35	0.45	0.35	0.45	0.35
Po	4.2	4.5	4.2	4.5	4.2	4.5	4.2	4.5
Pt	2.5	2.5	2.5	2.5	2.0	2.5	2.0	2.0
ΔPSI	1.7	2.0	1.7	2.0	2.2	2.0	2.2	2.5
T	20		20		20		20	
SN	Min.	Max	Min.	Max.	Min.	Max.	Min.	Max.
	3.80	5.76	2.92	5.05	2.98	5.05	2.58	4.20

In addition to the parameters shown above, the soil resilient modulus, M_R, of the subgrade soil, must be determined. Typically, this value is obtained through California Bearing Ratio (CBR) testing. Field investigations show that all the soil samples obtained within the subgrade at the site are very similar with very similar (CBR) values. These soils are **Dark Brown Silty Clay (CL)** **with similar Plasticity and CBR values. The CBR values range between 3.3 and 4.0.** We will **use a CBR of 3.8 for all phases of** our pavement design. Information regarding the moisture density relationships of the bulk samples of subgrade soil collected at this site and the CBR test results are presented in the Appendix section of this report.

The Pavement Sections for Clay soils with a **CBR value of 3.8** are presented in the tables below. **It should be noted, the P.I. value of the Clay subgrade at this site varies between 21 and 25**. The subgrade soils with a **P.I. value greater than 20 should be treated with lime to reduce their P.I.** value or be replaced with better material approved by the Project Engineer. It will be important that once the field work starts, personnel from FGS be present to identify the areas where lime should be applied to reduce the P.I. value of the subgrade soil.

For the purposes of developing layer thicknesses for the pavement sections shown below, we have used the following structural coefficients in the calculation of pavement structural numbers:

Material Type	Structural Coefficient	Drainage Coefficient
TXDOT Item 340, Hot Mixed Asphaltic Concrete	0.44	1.00
TXDOT Items 292 or 340, Asphalt Treated Base	0.38	1.00
TXDOT Item 247, Flexible Base - Crushed Limestone	0.14	1.00
TXDOT Item 247, Flexible Base	0.08	1.00
Lime Stabilized Subgrade, (6 inch Min.)	0.08	1.00

Bexar County Minimum Layer Thickness Requirements:
For
ARTERIAL STREETS

Pavement Layer	Minimum Thickness (inches)
Hot Mixed Asphaltic Concrete Surface	4.0
Asphalt Treated Base	6.0
Aggregate Base Course	8.0
Moisture Condition Subgrade	6.0
Lime and Cement Treated Subgrade	6.0

THE NEW TENSAR PROGRAM CALCULATE THE RESILIENT MODULUS (MR) VALUE WITH THE USE OF THE LABORATORY CALIFORNIA BEARING RATIO, (CBR). In this case the **MR value calculates to be 5,700 psi.**

WE WILL USE MR=5,700 PSI FOR OUR PAVEMENT DESIGN.

In accordance with the **Bexar County, Texas** design parameters we have developed the following flexible pavement recommendations for an **"ARTERIAL STREET"** on a Clay subgrade.

COMPONENT	FLEXIBLE DESIGN SECTION (inches)			
	ARTERIAL, (Phases 1C, 1D, & 2)			
	Option # 1	Option # 2	Option # 3	Option # 4
Type D HMAC Surface	4.0 inches	4.0 inches		
Type B HMAC Base	6.0 inches	N/A		
Flexible Base, (Type A or Type B, Grade 2)	8.0 inches	13.5 inches		
Lime Stabilized Subgrade (6 inch Min.)	YES	YES		
*3 X 5 Rock Wrapped in Mirafi 180N Filter Fabric	NO	NO		
TENSAR GEOGRID (TX-7)	NO	YES		
Design ESAL Value	3,000,000	3,000,000		
Actual ESAL Value	4,804,300	3,002,400		

Pavement Analysis:

The pavement designs presented in the previous paragraphs include designs for lime stabilized subgrade and lime treated subgrade, to be used on pavement sections with a Clay subgrade and a P.I. value greater than 20. The **Bexar County pavement design criteria** requires that a minimum of six (6) inches of subgrade soil below the pavement structure be treated or stabilized if the subgrade has a P.I. value greater than 20. If a Geogrid fabric is used to reduce the base course thickness, treatment or stabilization of the underlying high P.I. soil is still required. In the case that subgrade fill is required to bring the subgrade elevation up to final grade, fills should be made with flexible base, on-site Chalk millings or other material approved by the Project Engineer. Fill material compaction shall be in accordance with subgrade compaction requirement for **Bexar County, Texas.**

Pavement Material Specifications:

The following guidelines have been prepared for use in the selection and preparation of various materials that may be used to construct the pavement sections. Submittals should be made for each pavement material and should be reviewed by the Geotechnical Engineer and other appropriate members of the design team. The submittals should provide the test information necessary to verify full compliance of the materials with the recommended or specified material properties.

Fill Material - If fill is used to raise the grade, approved fill material underneath the pavement should be used. The fill should be free of deleterious material with a **minimum CBR value of 3.8** and preferably a **Plastic Index below 20**. If the material has a PI greater than 20 the lime application rates should be re-evaluated and sulfate content tested for the fill material. The material should be placed as per applicable city or county guidelines.

Hot-Mix Asphaltic Surface Course – Asphaltic concrete should be plant mixed, hot laid, **Type D** meeting the 2014 TX DOT Standard Specification Item 340. Mix should be compacted to between 92 and 97 percent of the maximum theoretical density as determined by TEX-227-F.

Asphalt Treated Base – Asphalt treated base should be placed in **maximum six (6) inch compacted lifts**. These materials should conform to the requirements of the 2014 TX DOT Standard Specification Item 292, Grade 1 or Item 340, Type A or B.

Flexible Base Course – Flexible base materials should be placed in maximum eight (8) inch **compacted lifts.** The base materials should be compacted to at least 95 percent of the maximum dry density as determined by ASTM D 1557. Flexible base materials should be moisture conditioned to between plus or minus two (+-2) percentage points of the optimum moisture content. Flexible base materials should meet all requirements specified in 2014 TX DOT Standard Specification Item 247, Type A or B, Grade 1 or 2.

Lime Treated Subgrade – Clay subgrade (with P.I. values greater than 20) should be treated with hydrated lime to reduce its plasticity and improve its strength and load carrying ability. Hydrated lime should be mixed with the subgrade soils in accordance with Bexar County Specifications for Lime Treatment to reduce the P.I. value to 20 or less.

Lime Stabilized Subgrade – Clay subgrade **(with P.I. values greater than 20)** should be stabilized with hydrated lime to reduce its plasticity and improve its strength and load carrying ability. Hydrated lime should be mixed with the subgrade soils **in accordance with BEXAR COUNTY, Texas Specifications for Lime Stabilization.** We estimate that approximately **Four (4) percent** (by weight) hydrated lime will be required to properly stabilize these soils. This is equivalent to **about 18 pounds of hydrated lime per square yard for a six (6) inch depth.** The optimum lime content should result in a soil-lime mixture with a pH of at least 12.4 when tested in accordance with ASTM C 977, Appendix XI and should reduce the P.I. to 20 or less.

3 X 5 Rock Wrapped in Filter Fabric – The City may allow 3 X 5 rock wrapped in Filter Fabric instead of lime stabilization, however the **wrapping fabric must be Mirafi 180N Filter Fabric or equal, and prior approval must be obtained.**

Geogrid – Tensar TX7 geogrid may be used to provide additional structural support to flexible base materials. The geogrid should be placed as per manufacturer's recommendations at the interface between the flexible base and subgrade.

Moisture Conditioned Subgrade – Exposed subgrade soils that do not need to be stabilized or treated should be scarified and moisture conditioned to between plus or minus three (+-3) percentage points of optimum to a depth of at least six (6) inches. The soils should then be compacted to at least 95 percent of the maximum dry density as determined by ASTM D 698.

Lime Series Curve and Unconfined Compressive Strength:

A Lime Series Curve was developed for the project to determine the optimum amount of hydrated lime required to stabilize the subgrade in accordance with **Bexar County, Texas** design criteria. The optimum lime content should result in a soil-lime mixture with a pH of at least 12.4 when tested in accordance with ASTM C 977 and should reduce the Plasticity Index to 20 or less. The lime series curve depicts the percent lime added to the subgrade and the resulting pH/P.I. A strength verification test was performed on the lime stabilized subgrade to determine the Unconfined Compressive Strength (UCS) of the soil-lime mixture. **Bexar County requires an UCS of 160 psi, a pH of 12.4 or greater and a P.I. of 20 or less. Results of the** Lime Series Curve and the Unconfined Compressive Strength test are presented in the Appendix section of this report. **A 4 % of lime is required to reduce the plasticity value**, this translates into **approximately 18 lbs. of lime per square yard** of subgrade. Additional field verification testing will be required during the subgrade stabilization process once the project has started.

Subgrade Preparation:

The pavement alignment should be stripped of topsoil, vegetation, roots, loose or soft soils and any other deleterious materials. The stripped materials should be removed from the site and properly disposed of or

used elsewhere on site. Upon completion of stripping operations, the alignment may be either excavated or filled as necessary to achieve the desired pavement elevation. Prior to the placement of any fill for grade adjustments or the construction of the pavement section, the exposed subgrade should be proof rolled with appropriate construction equipment weighing at least 20 tons. Unstable or non-uniform areas should be removed to expose stable soils and may be replaced with clean, properly compacted flexible base material or other more suitable material approved by the Project Engineer. All fill placed within the paved areas should be free of any deleterious materials and should not contain stones larger than the maximum lift thickness. The fill materials should be placed on prepared surfaces in lifts not to exceed eight (8) inches compacted measure. All fill materials placed in paved areas should be moisture conditioned to between plus or minus three (+-3) percentage points of the optimum moisture content and compacted to at least 95 percent of the maximum dry density as determined by ASTM D 698.

Drainage:

Proper pavement perimeter drainage should be provided and maintained to minimize the infiltration of surface water into the pavement section from surrounding unpaved areas. The infiltration of water into the pavement section typically results in the accelerated degradation of the section with time as vehicular traffic traverses the infiltrated area. Curbs used in paved areas should extend at least three (3) inches into the base materials to help reduce the potential for water infiltration into the pavement section. Prefabricated strip drains or small “French” drains may also be installed behind curbs to intercept and remove water from the pavement perimeter before water infiltrates the pavement section. Furthermore, all concrete and asphalt interfaces should be sealed using a sealant that is compatible with both asphalt and concrete.

Proper pavement drainage is a critical component in the long-term performance of a pavement section. The pavement section recommendations shown above are based on generally recognized structural coefficients. These coefficients reflect the relative strength of each pavement material type and their contribution to the structural integrity of the pavement. The infiltration of water into these pavement materials will generally weaken the materials and result in the degradation of the pavement's performance. Therefore, proper drainage of the pavement should be carefully considered by the project design team to ensure that water rapidly drains from the pavement and does not pond on or around the pavement.

Utilities:

Care should be exercised to make sure that utility lines do not serve as conduits that transmit water beneath foundations or pavements at this site. Secondary backfill for utility lines that are located beneath pavement, sidewalk and building areas should consist of lean clay (CL), flowable fill or other material in accordance with local municipality or utility provider specifications. Proper compaction of trench backfill is essential in pavement areas where settlement of the trench backfill can cause significant distress to the overlaying pavement. Flowable fill materials should be as described in the American Concrete Institute ACI 229R. Granular materials such as sand or gravel are not recommended as secondary backfill in utility trenches located in building pad or pavement areas.

Excavations:

As was discussed previously, these materials that are penetrated by geotechnical augers can generally be excavated with conventional earthmoving equipment. It should be noted that excavation equipment varies and field conditions may vary. Generally, geologic processes (such as faulting, weathering, etc.) are erratic and large variations can occur in small lateral distances. Details regarding "means and methods" to accomplish the work (such as excavation equipment and technique selection) are the sole responsibility of the project contractor.

The Occupational Safety and Health Administration (OSHA) Safety and Health Standards (29 CFR Part 1926, Revised October 1989), require that excavations be constructed in accordance with the current OSHA guidelines. Furthermore, the State of Texas requires that detailed plans and specifications meeting OSHA standards be prepared for trench and excavation retention systems used during construction. The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavation as part of the contractor's safety procedures.

In no case should slope height, slope inclination or excavation depth exceed those specified in local, state and Federal safety regulations. OSHA addresses the construction of slopes in large excavations that are less than 20 feet deep on OSHA Table B-1. We have provided this information solely as a service to our client. The OSHA regulations and OSHA Table B-1 should be consulted prior to any excavations that

would be subject to OSHA regulations. FGS does not assume responsibility for construction site safety or the contractor's or other parties' compliance with local, state and Federal safety or other regulations.

QUALITY CONTROL

Document Review:

Due to the uniqueness of each project and construction site, it is important that all engineering reports, drawings, specifications, change orders and other related documents accurately reflect the recommendations intended by the respective design professionals involved in the project. The performance of the pavements planned for this project will depend on the correct interpretation and implementation of our geotechnical engineering report and guidelines. We should be provided the opportunity to review the final design and construction documents to check that our geotechnical recommendations are properly interpreted and implemented in these documents. This review is not a part of our scope of services for this project and would be an additional service. We cannot be responsible for misinterpretation of our geotechnical recommendations if we have not had an opportunity to review these documents.

Construction Materials Testing:

As the Geotechnical Engineer of Record, we recommend that Frost GeoSciences be retained to monitor the pavement installation and earthwork related activities for this project. Due to our familiarity with this project, it is important that FGS provide these services to make certain that our geotechnical recommendations are interpreted properly and to make certain that actual field conditions are those described in our geotechnical report. We believe this technical overview and on-site surveillance during these activities is essential to provide well-constructed pavements and to check that the intent of these geotechnical recommendations is met.

REPORT LIMITATIONS

The recommendations and guidelines submitted in this report are based on the available subsurface information developed by FGS and project information provided by the client. If there are any changes in the nature, design or location of the project, the opinions, conclusions, recommendations and guidelines submitted in this report should not be used until we are able to review the changes and respond in writing as to whether the information contained within this report remains applicable.

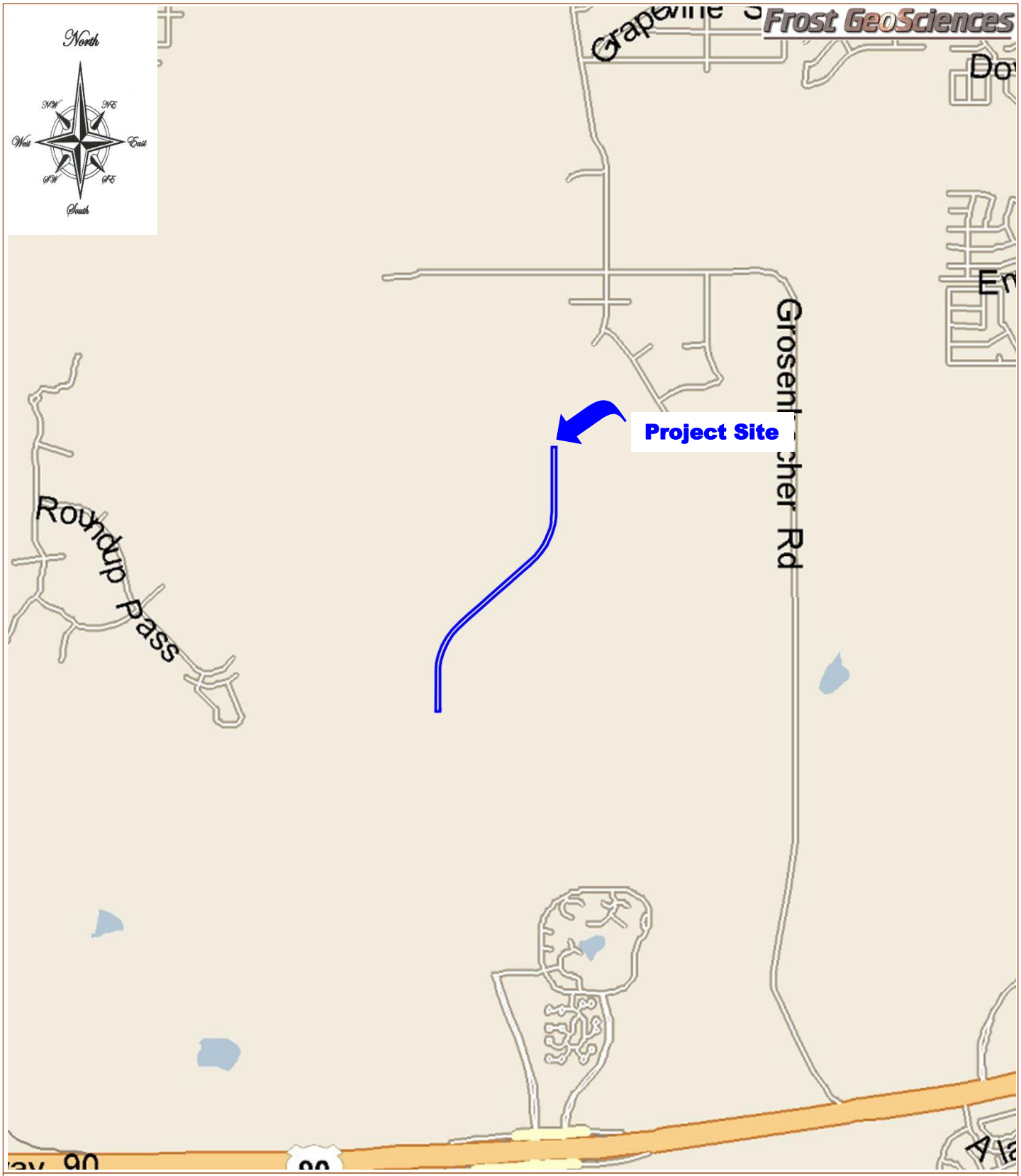
Subsurface conditions at this site have been observed and interpreted at the Boring Locations only. Substantial variations in subsurface materials resulting from local geologic conditions or previous site use may occur away from the boring locations. These variations may not become evident until construction begins. Therefore, any conditions that vary significantly from those described in our report should be reported to FGS immediately. FGS will then determine whether our conclusions, opinions and recommendations remain valid or whether additional investigation and/or engineering analysis is required.

This study has been performed in accordance with accepted geotechnical engineering practice using the standard of care and skill currently exercised by geotechnical engineers practicing in this area. No warranty, expressed or implied, is made or intended. This report has been prepared exclusively for the specified client; project and client's authorized project team for use in preparing the appropriate design and construction documents for this project. This report may be included in the construction documents for this project provided the report is reproduced in its entirety. This report shall not be reproduced or used for any other purpose without the express written consent of Frost GeoSciences, Inc.

ILLUSTRATIONS

Vicinity Map
Boring Location Plan

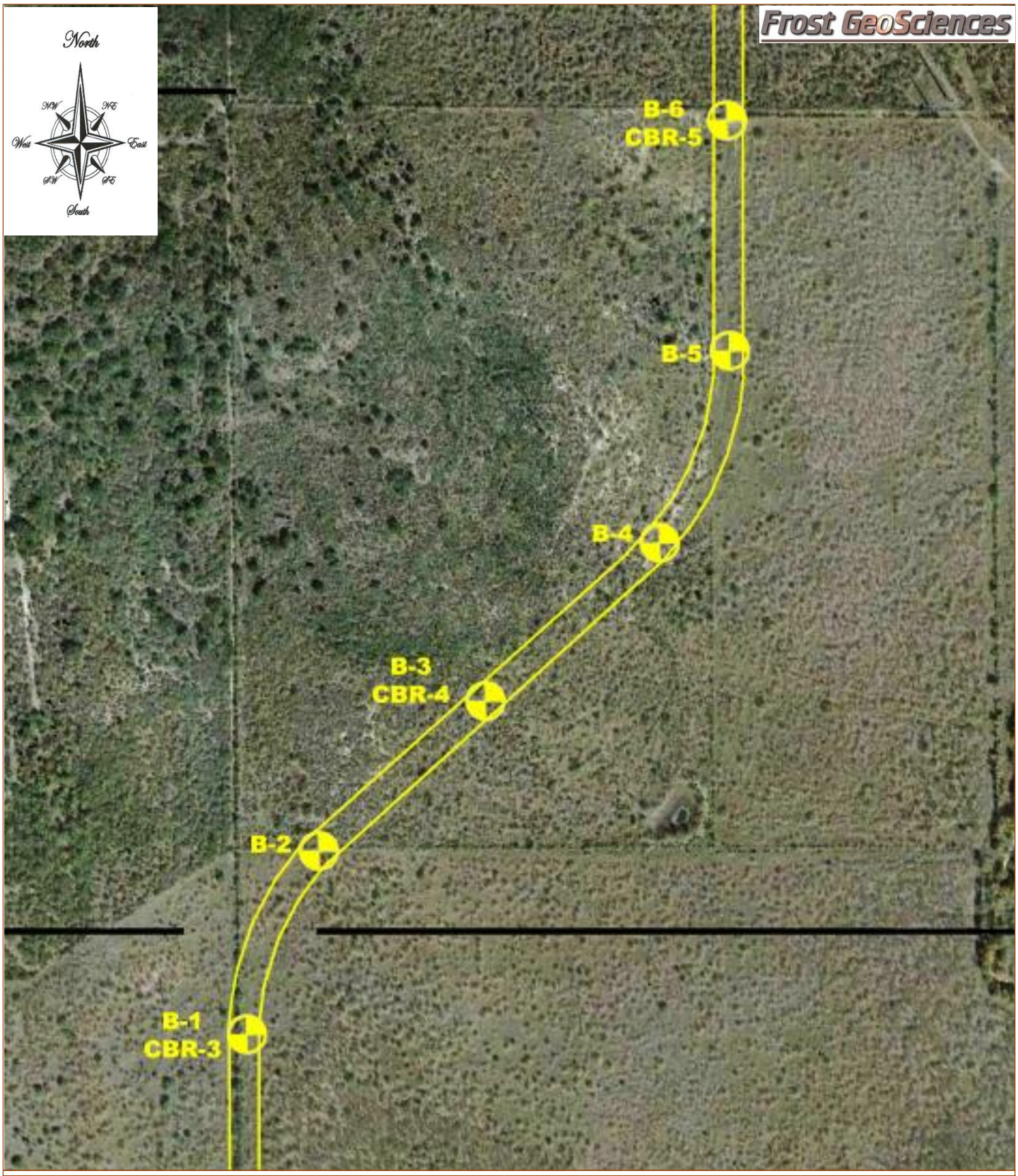
VICINITY MAP



PROJECT NAME:	VICINITY MAP	
Geotechnical Investigation Montgomery Rd Phase 1C, 1D & 2 +/- 4,600 Linear Feet, Bexar County, Texas	PROJECT NO.: FGS-G21106	DATE CREATED: May 7, 2021

BORING PLAN

FGS Project No: FGS-G21106



PROJECT NAME:

Geotechnical Investigation
Montgomery Rd Phase 1C, 1D & 2
+/- 4,600 Linear Feet, Bexar County, Texas

BORING LOCATION

PROJECT NO.: FGS-G21106

DATE CREATED: May 7, 2021

APPENDIX "A"

Boring Logs
PVR Values
Symbol Key Sheet

BORING LOGS

FGS Project No.: FGS-G21106

LOG OF BORING

Frost GeoSciences — Geotechnical • Construction Materials • Geologic • Environmental

PROJECT: Montgomery Road Phase 1C, 1D & 2

CLIENT: Cude Engineering

PROJECT NO.:	FGS-G 21106
BORING NO.:	B-01
DRILLING DATE:	4/5/2021
SURFACE EVALUATION:	
GPS LOCATION (UTM):	14R 0524916 E 3251777 N

DRILLING METHOD(S):
Dry auger techniques were used to the termination depth of the boring.

SUBSURFACE WATER INFORMATION:
Subsurface water was not encountered either during or upon completion of drilling operations and subsurface water observations.

SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: Blows R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY (POUNDS/CU.FT)	COMPRESSIVE STRENGTH (TONS/SQ FT)	FAILURE STRAIN (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
				12	44	21	23						Dark brown clay to 4'
				12									Dark brown clay
	5			16	40	21	19						Grayish tan clay to 8'
				18									Tan clay to 15'
	10												
				21	49	17	32						Tan clay
	15												Boring Terminated at 15 feet of Depth

N-STANDARDS PENETRATION TEST RESISTANCE
P-POCKET PENETROMETER RESISTANCE
T-TXDOT CONE PENETRATION RESISTANCE
R-ROCK CORE RECOVERY
RQD-ROCK QUALITY DESIGNATION

REMARKS:

LOG OF BORING

PROJECT: Montgomery Road Phase 1C, 1D & 2

CLIENT: Cude Engineering

PROJECT NO.: FGS-G 21106
BORING NO.: B-02
DRILLING DATE: 4/5/2021
SURFACE EVALUATION:
GPS LOCATION (UTM): 14R 0524986 E 3251974 N

DRILLING METHOD(S):
Dry auger techniques were used to the termination depth of the boring.

SUBSURFACE WATER INFORMATION:
Subsurface water was not encountered either during or upon completion of drilling operations and subsurface water observations.

FIELD DATA			LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: Blows R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY (POUNDS/CU.FT)	COMPRESSIVE STRENGTH (TONS/SQ FT)	FAILURE STRAIN (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
				7									Gravelly dark brown clay to 2'
				10	40	21	19						Grayish calcareous clay to 8'
	5			10									Grayish calcareous clay
				19	45	20	25						Grayish and tan calcareous clay to 15'
	10												
				22									Grayish and tan calcareous clay
	15												
													Boring Terminated at 15 feet of Depth

N-STANDARDS PENETRATION TEST RESISTANCE
P-POCKET PENETROMETER RESISTANCE
T-TXDOT CONE PENETRATION RESISTANCE
R-ROCK CORE RECOVERY
RQD-ROCK QUALITY DESIGNATION

REMARKS:

LOG OF BORING

Frost GeoSciences
Geotechnical • Construction Materials
Geologic • Environmental

PROJECT: Montgomery Road Phase 1C, 1D & 2

CLIENT: Cude Engineering

PROJECT NO.: FGS-G 21106
BORING NO.: B-03
DRILLING DATE: 4/5/2021
SURFACE EVALUATION:
GPS LOCATION (UTM): 14R 0525166 E 3252136 N

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: Blows R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY (POUNDS/CU.FT)	COMPRESSIVE STRENGTH (TONS/SQ FT)	FAILURE STRAIN (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
				7	45	20	25						Medium brown clay to 1'
				7	43	20	23						Medium to light brown silty clay at 1'
	5			3	44	20	24						Gravel at 4'
													Stiff light gray to white chalky marly clay at 5' Auger refural at 5' Boring Terminated at 5 feet of Depth
	10												
	15												

DRILLING METHOD(S):
Dry auger techniques were used to the termination depth of the boring.

SUBSURFACE WATER INFORMATION:
Subsurface water was not encountered either during or upon completion of drilling operations and subsurface water observations.

N-STANDARDS PENETRATION TEST RESISTANCE
P-POCKET PENETROMETER RESISTANCE
T-TXDOT CONE PENETRATION RESISTANCE
R-ROCK CORE RECOVERY
RQD-ROCK QUALITY DESIGNATION

REMARKS:

LOG OF BORING

Frost GeoSciences
Geotechnical • Construction Materials
Geologic • Environmental

PROJECT: Montgomery Road Phase 1C, 1D & 2

CLIENT: Cude Engineering

PROJECT NO.: FGS-G 21106
BORING NO.: B-4
DRILLING DATE: 4/5/2021
SURFACE EVALUATION:
GPS LOCATION (UTM): 14R 0525398 E 3252350 N

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: Blows R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY (POUNDS/CU.FT)	COMPRESSIVE STRENGTH (TONS/SQ FT)	FAILURE STRAIN (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
				8									Light brown silty clay to 4'
				7	45	22	23						Light brown silty clay
	5			10									Light yellow marly clay at 6.5'
				19	45	20	25						Light yellowish marly clay
	10												
				22									Light yellowish marly clay
	15												Boring Terminated at 15 feet of Depth

DRILLING METHOD(S):
Dry auger techniques were used to the termination depth of the boring.

SUBSURFACE WATER INFORMATION:
Subsurface water was not encountered either during or upon completion of drilling operations and subsurface water observations.

N-STANDARDS PENETRATION TEST RESISTANCE
P-POCKET PENETROMETER RESISTANCE
T-TXDOT CONE PENETRATION RESISTANCE
R-ROCK CORE RECOVERY
RQD-ROCK QUALITY DESIGNATION

REMARKS:

LOG OF BORING

Frost GeoSciences — Geotechnical • Construction Materials • Geologic • Environmental

PROJECT: Montgomery Road Phase 1C, 1D & 2

CLIENT: Cude Engineering

PROJECT NO.: FGS-G 21106
BORING NO.: B-5
DRILLING DATE: 4/5/2021
SURFACE EVALUATION:
GPS LOCATION (UTM): 14R 0525441 E 3252508 N

FIELD DATA				LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: Blows R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY (POUNDS/CU.FT)	COMPRESSIVE STRENGTH (TONS/SQ FT)	FAILURE STRAIN (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
				6	43	22	21						Light brown silty clay to 2.5'
	5			7									Light yellow marly clay at 2.5'
				5	48	17	31						Light yellow marly clay
	10			9									Tan clay at 8'
	15			10	49	17	32						Tan clay at 13'
													Boring Terminated at 15 feet of Depth

DRILLING METHOD(S):
Dry auger techniques were used to the termination depth of the boring.

SUBSURFACE WATER INFORMATION:
Subsurface water was not encountered either during or upon completion of drilling operations and subsurface water observations.

N-STANDARDS PENETRATION TEST RESISTANCE
P-POCKET PENETROMETER RESISTANCE
T-TXDOT CONE PENETRATION RESISTANCE
R-ROCK CORE RECOVERY
RQD-ROCK QUALITY DESIGNATION

REMARKS:

LOG OF BORING

Frost GeoSciences
Geotechnical • Construction Materials
Geologic • Environmental

PROJECT: Montgomery Road Phase 1C, 1D & 2

CLIENT: Cude Engineering

PROJECT NO.: FGS-G 21106
BORING NO.: B-6
DRILLING DATE: 4/5/2021
SURFACE EVALUATION:
GPS LOCATION (UTM): 14R 0525430 E 3252756 N

FIELD DATA			LABORATORY DATA									
SOIL SYMBOL	DEPTH (FT)	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: Blows R: % RQD: %	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY (POUNDS/CU.FT)	COMPRESSIVE STRENGTH (TONS/SQ FT)	FAILURE STRAIN (%)	CONFINING PRESSURE (POUNDS/SQ IN)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
				6	43	22	21						Light brown silty clay to 1.5'
	5			7									Light yellow marly clay at 2'
				5	48	17	31						Light yellow marly clay
	10			9									Tan marl at 7.5'
	15			10	49	17	32						Tan clay at 13'
													Boring Terminated at 15 feet of Depth

DRILLING METHOD(S):
Dry auger techniques were used to the termination depth of the boring.

SUBSURFACE WATER INFORMATION:
Subsurface water was not encountered either during or upon completion of drilling operations and subsurface water observations.

N-STANDARDS PENETRATION TEST RESISTANCE
P-POCKET PENETROMETER RESISTANCE
T-TXDOT CONE PENETRATION RESISTANCE
R-ROCK CORE RECOVERY
RQD-ROCK QUALITY DESIGNATION

REMARKS:

This log is not valid if separated from the report

PVR VALUES

PVR Calculator

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

Project Name:	MONTGOMERY ROAD, Phase 1C, 1D, & 2
Project Location:	BEXAR COUNTY
Project City:	SAN ANTONIO
Project Number:	FGS-G-21106
Boring Number:	B - 1

Surcharge Pressure: 1.00 **psi** **Climatic Rating, C_w:** 16

Stratum	Plasticity Index	Bottom Depth (feet)	Moisture Condition		
			Dry	Average	Optimum
I	23	2.0	X		
II	23	4.0	X		
III	19	8.0		X	
IV	32	12.0		X	
V	32	15.0			X
VI					
VII					
VIII					

PVR Results

PVR = **1.00** inches

Effective Plasticity Index

BRAB	PCI
25	25

Soil Support Index

BRAB	PCI
0.90	0.90

Soil/Climatic Rating Factor

$1 - C_w$ = **0.10**

RULES

1.) Depths should not extend greater than 15 feet.
2.) Use only one moisture condition per stratum.
3.) Moisture conditions must be selected using an "x".
4.) Integers or one-half foot intervals must be used.
5.) Use PI = 8 for none expansive layers.
6.) DO NOT USE PI = 0 FOR NON-EXPANSIVE LAYERS.
7.) **Error checking is limited.**

PVR Calculator

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

Project Name:	MONTGOMERY ROAD, Phase 1C, 1D, & 2
Project Location:	BEXAR COUNTY
Project City:	SAN ANTONIO
Project Number:	FGS-G-21106
Boring Number:	B - 2

Surcharge Pressure: 1.00 **psi** **Climatic Rating, C_w:** 16

Stratum	Plasticity Index	Bottom Depth (feet)	Moisture Condition		
			Dry	Average	Optimum
I	8	2.0	X		
II	19	4.0	X		
III	19	8.0		X	
IV	25	12.0		X	
V	25	15.0			X
VI					
VII					
VIII					

PVR Results

PVR = **0.41** inches

Effective Plasticity Index

BRAB	PCI
20	20

Soil Support Index

BRAB	PCI
0.94	0.94

Soil/Climatic Rating Factor

$1 - C_w$ = **0.06**

RULES

1.) Depths should not extend greater than 15 feet.
2.) Use only one moisture condition per stratum.
3.) Moisture conditions must be selected using an "x".
4.) Integers or one-half foot intervals must be used.
5.) Use PI = 8 for none expansive layers.
6.) DO NOT USE PI = 0 FOR NON-EXPANSIVE LAYERS.
7.) **Error checking is limited.**

PVR Calculator

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

Project Name:	MONTGOMERY ROAD, Phase 1C, 1D, & 2
Project Location:	BEXAR COUNTY
Project City:	SAN ANTONIO
Project Number:	FGS-G-21106
Boring Number:	B - 3

Surcharge Pressure: 1.00 **psi** **Climatic Rating, C_w:** 16

Stratum	Plasticity Index	Bottom Depth (feet)	Moisture Condition		
			Dry	Average	Optimum
I	25	1.0	X		
II	23	3.0	X		
III	24	5.0		X	
IV	8	12.0		X	
V	8	15.0			X
VI					
VII					
VIII					

PVR Results

PVR = **0.74** inches

Effective Plasticity Index

BRAB	PCI
25	19

Soil Support Index

BRAB	PCI
0.89	0.96

Soil/Climatic Rating Factor

$1 - C_w$ = **0.04**

RULES

1.) Depths should not extend greater than 15 feet.
2.) Use only one moisture condition per stratum.
3.) Moisture conditions must be selected using an "x".
4.) Integers or one-half foot intervals must be used.
5.) Use PI = 8 for none expansive layers.
6.) DO NOT USE PI = 0 FOR NON-EXPANSIVE LAYERS.
7.) **Error checking is limited.**

PVR Calculator

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

Project Name:	MONTGOMERY ROAD, Phase 1C, 1D, & 2
Project Location:	BEXAR COUNTY
Project City:	SAN ANTONIO
Project Number:	FGS-G-21106
Boring Number:	B - 4

Surcharge Pressure: 1.00 **psi** **Climatic Rating, C_w:** 16

Stratum	Plasticity Index	Bottom Depth (feet)	Moisture Condition		
			Dry	Average	Optimum
I	23	2.0	X		
II	22	4.0	X		
III	25	8.0		X	
IV	25	12.0		X	
V	22	15.0			X
VI					
VII					
VIII					

PVR Results

PVR = **0.98** inches

Effective Plasticity Index

BRAB	PCI
24	24

Soil Support Index

BRAB	PCI
0.91	0.91

Soil/Climatic Rating Factor

$1 - C_w$ = **0.09**

RULES

1.) Depths should not extend greater than 15 feet.
2.) Use only one moisture condition per stratum.
3.) Moisture conditions must be selected using an "x".
4.) Integers or one-half foot intervals must be used.
5.) Use PI = 8 for none expansive layers.
6.) DO NOT USE PI = 0 FOR NON-EXPANSIVE LAYERS.
7.) **Error checking is limited.**

PVR Calculator

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

Project Name:	MONTGOMERY ROAD, Phase 1C, 1D, & 2
Project Location:	BEXAR COUNTY
Project City:	SAN ANTONIO
Project Number:	FGS-G-21106
Boring Number:	B - 5

Surcharge Pressure: 1.00 **psi** **Climatic Rating, C_w:** 16

Stratum	Plasticity Index	Bottom Depth (feet)	Moisture Condition		
			Dry	Average	Optimum
I	21	3.0	X		
II	31	5.0	X		
III	31	8.0		X	
IV	32	12.0		X	
V	32	15.0			X
VI					
VII					
VIII					

PVR Results

PVR = **1.45** inches

Effective Plasticity Index

BRAB	PCI
28	28

Soil Support Index

BRAB	PCI
0.86	0.86

Soil/Climatic Rating Factor

$1 - C_w$ = **0.14**

RULES

1.) Depths should not extend greater than 15 feet.
2.) Use only one moisture condition per stratum.
3.) Moisture conditions must be selected using an "x".
4.) Integers or one-half foot intervals must be used.
5.) Use PI = 8 for none expansive layers.
6.) DO NOT USE PI = 0 FOR NON-EXPANSIVE LAYERS.
7.) **Error checking is limited.**

PVR Calculator

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

Project Name:	MONTGOMERY ROAD, Phase 1C, 1D, & 2
Project Location:	BEXAR COUNTY
Project City:	SAN ANTONIO
Project Number:	FGS-G-21106
Boring Number:	B - 6

Surcharge Pressure: 1.00 **psi** **Climatic Rating, C_w:** 16

Stratum	Plasticity Index	Bottom Depth (feet)	Moisture Condition		
			Dry	Average	Optimum
I	21	2.0	X		
II	31	5.0	X		
III	31	8.0		X	
IV	32	12.0		X	
V	32	15.0			X
VI					
VII					
VIII					

PVR Results

PVR = **1.55** inches

Effective Plasticity Index

BRAB	PCI
29	29

Soil Support Index

BRAB	PCI
0.85	0.85

Soil/Climatic Rating Factor

$1 - C_w$ = **0.15**

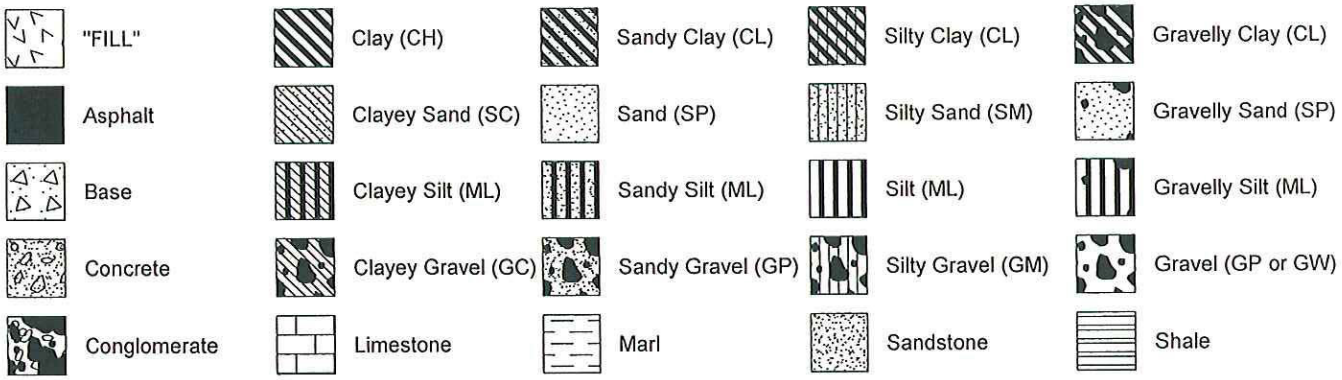
RULES

1.) Depths should not extend greater than 15 feet.
2.) Use only one moisture condition per stratum.
3.) Moisture conditions must be selected using an "x".
4.) Integers or one-half foot intervals must be used.
5.) Use PI = 8 for none expansive layers.
6.) DO NOT USE PI = 0 FOR NON-EXPANSIVE LAYERS.
7.) **Error checking is limited.**

SYMBOL KEY

Symbol Key Sheet

Material Symbols



Strength of Cohesive Soils

Consistency	Undrained Shear Strength, KSF
Very Soft	less than 0.25
Soft	0.25 to 0.50
Firm	0.50 to 1.00
Stiff	1.00 to 2.00
Very Stiff	2.00 to 4.00
Hard	greater than 4.00

Soil Plasticity

Degree of Plasticity	Plasticity Index (PI)
None	0 to 5
Low	5 to 10
Moderate	10 to 20
Plastic	20 to 40
Highly Plastic	more than 40

Density of Granular Soils

Descriptive Term	SPT Blow Count (blows/ft)
Very Loose	less than 4
Loose	4 to 10
Medium Dense	10 to 30
Dense	30 to 50
Very Dense	more than 50

Standard Penetration Test (ASTM D 1586) Driving Record

Note: Driving is limited to 50 blows per interval, or 25 blows for 0.25 inch advancement, whichever controls. This is done to avoid damaging sampling tools.

Blows Per Foot	Description
25	Sampler was seated 6 inches, then 25 blows were required to advance the sampler 12 inches.
75/8"	Sampler was seated 6 inches, 25 blows were required for the second 6 inch increment and the 50 blow limit was reached at 2 inches of the last increment.
Ref/2"	Sampler could only be driven 2 inches of the 6 inch seating penetration before the 50 blow limit was reached.

Terms Characterizing Structure

Soil Terms	Description
Blocky	Contains cracks or failure planes resulting in rough cubes of material.
Calcareous	Contains appreciable quantities of calcium carbonate.
Fissured	Contains shrinkage cracks, which are frequently filled with fine sand or silt. The fissures are usually near vertical in orientation.
Interbedded	Composed of alternating layers of different soil types.
Laminated	Composed of thin layers of varying color and texture.
Nodules	Secondary inclusions that appear as small lumps about 0.1 to 0.3 inch in diameter.
Partings	Inclusion of different material less than 1/8 inch thick extending through the sample.
Pockets	Inclusion of different material that is smaller than the diameter of the sample.
Seams	Inclusion of different material between 1/8 and 3 inches thick, and extends through the sample.
Slickensided	Has inclined planes of weakness that are slick and glossy in appearance. Slickensides are commonly thought to be randomly oriented.
Streaks or Stains	Stains of limited extent that appear as short stripes, spots or blotches.

Rock Terms	
Bedding Plane	A surface parallel to the surface of deposition, generally marked by changes in color or grain size.
Fracture	A natural break in rock along which no displacement has occurred.
Joint	A natural break along which no displacement has occurred, and which generally intersects primary surfaces.
% Recovery	The ratio of total length of recovery to the total length of core run, expressed as a percentage.
RQD - Rock Quality Designation	The ratio of total recovered length of fragments longer than 4 inches to the total run length, expressed as a percentage.
Weathering	The process by which rock is broken down and decomposed.

Sampler Symbols

APPENDIX "B"

Moisture Density Relationship
CBR Test Results
Lime Series Curve
Sulfate Report
Spectra Pave Design Analysis

MOISTURE DENSITY

FGS Project No.: FGS-G21106

13406 Western Oak
Helotes, TX 78023
(210) 372-1315 phone (210) 372-1318 fax

Frost GeoSciences
Construction Materials ▪ Forensics
Environmental ▪ Geotechnical

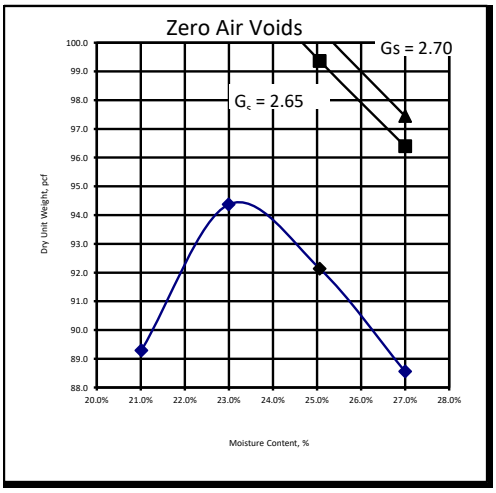
Project #: **FGS-G-21106**

Project: **MONTGOMERY ROAD**

Report Date: 5/5/2021
Sample Date: 1/0/1900

Client:	Cude Engineering		
Report:	ASTM - Standard Proctor	LAB NO:	4102
Material:	Subgrade	Report #:	S3

Moisture-Density Relationship - Subgrade Soil



Test Results

% Moisture	Dry Density Lbs./ft^3
21.0%	89.3
23.0%	94.4
25.1%	92.1
27.0%	88.6

Optimum = 23.3

Maximum = 94.5

Sieve	% Passing
3 inch	100.0%
3/4 inch	100.0%
3/8 inch	100.0%
No. 4	100.0%
No.10	56.3%
No. 40	16.3%
No.100	1.7%
No.200	0.8%

Color:	Dark Brown
Description:	Clay
Liquid Limit:	45
Plastic Limit:	22
Plasticity Index:	23
Location:	Project Site

Desc of Rammer: Mechanical
Preparation Method: Dry
Remarks: No comments at this time.

Test Method (As Applicable): ASTM D-698 A
ASTM D-4318

Respectfully Submitted,
Frost GeoSciences, Inc.

F.J.Caballero, P. E. , Project Manager

13406 Western Oak
Helotes, TX 78023
(210) 372-1315 phone (210) 372-1318 fax

Frost GeoSciences
Construction Materials ▪ Forensics
Environmental ▪ Geotechnical

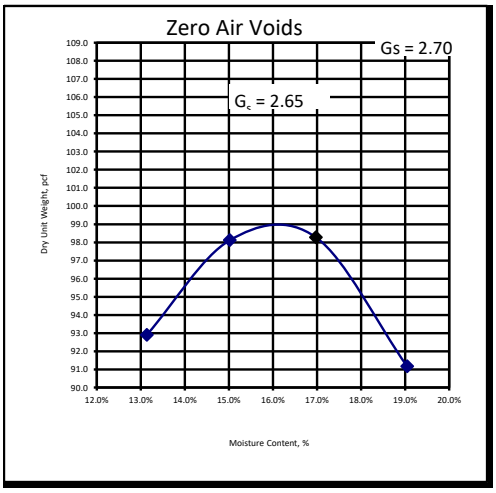
Project #: **FGS-G-21106**

Project: **MONTGOMERY ROAD**

Report Date: 5/5/2021
Sample Date: 1/0/1900

Client:	Cude Engineering		
Report:	ASTM - Standard Proctor	LAB NO:	4102
Material:	Subgrade	Report #:	S4

Moisture-Density Relationship - Subgrade Soil



Test Results

% Moisture	Dry Density Lbs./ft^3
13.1%	92.9
15.0%	98.1
17.0%	98.3
19.0%	91.2

Optimum = 16

Maximum = 99

Sieve	% Passing
3 inch	100.0%
3/4 inch	100.0%
3/8 inch	100.0%
No. 4	100.0%
No.10	57.1%
No. 40	24.6%
No.100	4.3%
No.200	0.9%

Color:	Light Brown
Description:	Clay
Liquid Limit:	36
Plastic Limit:	20
Plasticity Index:	16
Location:	Project Site

Desc of Rammer: Mechanical
Preparation Method: Dry
Remarks: No comments at this time.

Test Method (As Applicable): ASTM D-698 A
ASTM D-4318

Respectfully Submitted,
Frost GeoSciences, Inc.

F.J.Caballero, P. E. , Project Manager

13406 Western Oak
Helotes, TX 78023
(210) 372-1315 phone (210) 372-1318 fax

Frost GeoSciences
Construction Materials ▪ Forensics
Environmental ▪ Geotechnical

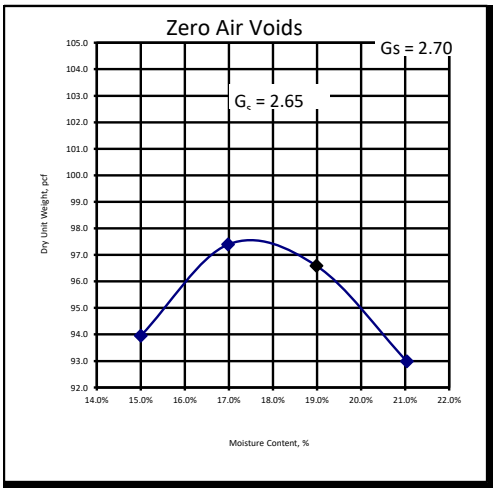
Project #: **FGS-G-2**1106

Project: **MONTGOMERY ROAD**

Report Date: 5/5/2021
Sample Date: 1/0/1900

Client:	Cude Engineering		
Report:	ASTM - Standard Proctor	LAB NO:	4102
Material:	Subgrade	Report #:	S5

Moisture-Density Relationship - Subgrade Soil



Test Results

% Moisture	Dry Density Lbs./ft^3
15.0%	94.0
17.0%	97.4
19.0%	96.6
21.0%	93.0

Optimum = 17.5

Maximum = 97.6

Sieve	% Passing
3 inch	100.0%
3/4 inch	100.0%
3/8 inch	100.0%
No. 4	100.0%
No.10	37.3%
No. 40	14.3%
No.100	2.6%
No.200	0.4%

Color:	Light Brown
Description:	Clay
Liquid Limit:	33
Plastic Limit:	18
Plasticity Index:	15

Location: Project Site

Desc of Rammer: Mechanical
Preparation Method: Dry
Remarks: No comments at this time.

Test Method (As Applicable): ASTM D-698 A
ASTM D-4318

Respectfully Submitted,
Frost GeoSciences, Inc.

F.J.Caballero, P. E. , Project Manager

CBR RESULTS

Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

CBR (California Bearing Ratio)
ASTM D1883

Project Name: Montgomery Road Project #: FGS-G-21106
Soil Desc. Dark Brown Clay CBR # 3
Tested By: Miguel Gonzalez Jr Test Date: 04/21/21

Compaction Energy: Rammer: 5.5 lbs. # layers: 3 Blows: 56
w at compaction: 23.30% Mold Dia. 6 in. Soil Ht. 4.584 in.
Volume 0.075 $ft.^3$

	Initial	Final	%S
Date/Time	4/21/21 9:15am	4/24/21 9:30am	
Swell Data	0.000	0.055	1.20

Opt. M.C.	23.3
Opt. Dry Unit wt.	94.5
Mold #	3
Surcharge, lbs.	10
Initial mass of wet soil + mold, lbs.	26.135
Final mass of wet soil + mold, lbs.	26.727
Mass of Mold, lbs.	18.06
Initial mass of wet soil, lbs.	8.075

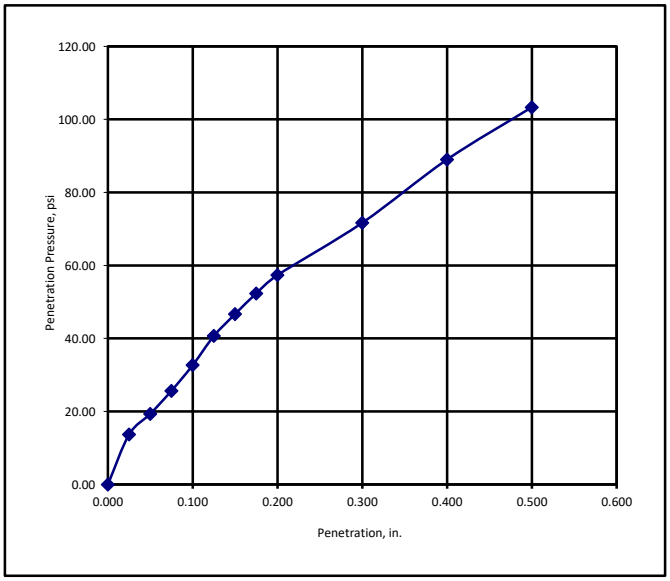
Dry density = 94.4 Comp. 0.99894
Moisture = 23.3 Points Opt. -0.04083

ASTM D2216 Moisture Content

Compaction	Project #	Can No.	Wet Wt. (1)	Dry Wt. (2)	Tare Wt. (3)	(1) - (2) = A	(2) - (3) = B	%MC = A/B*100
Before	GS-G-21106		515.22	422	126.12	93.22	295.88	31.50602
After	GS-G-21106		458.21	415	127.17	43.21	287.83	15.01233

ASTM D1883 Date: 4/24/2021
Time: 10:00am

Strain, in.	Load, lbs	Stress, psi	CBR
0.000	0.00	0.00	
0.025	41.00	13.67	
0.050	58.00	19.33	
0.075	77.00	25.67	
0.100	98.00	32.67	3.3
0.125	122.00	40.67	
0.150	140.00	46.67	
0.175	157.00	52.33	
0.200	172.00	57.33	3.8
0.300	215.00	71.67	
0.400	267.00	89.00	
0.500	310.00	103.33	



Frost GeoSciences, Inc.
13402 Western Oak
Helotes, Texas 78023

CBR (California Bearing Ratio)
ASTM D1883

Project Name: Montgomery Road Project #: FGS-G-21106
Soil Desc. Light Brown Clay CBR # 4
Tested By: Miguel Gonzalez Jr Test Date: 04/21/21

Compaction Energy: Rammer: 5.5 lbs. # layers: 3 Blows: 56
w at compaction: 16.00% Mold Dia. 6 in. Soil Ht. 4.584 in.
Volume 0.075 $ft.^3$ Opt. M.C. 16.0
Opt. Dry Unit wt. 99

	Initial	Final	%S
Date/Time	4/21/21 9:45am	4/24/21 10:00am	
Swell Data	0.000	0.07	1.53

Mold #	4
Surcharge, lbs.	10
Initial mass of wet soil + mold, lbs.	26.638
Final mass of wet soil + mold, lbs.	27.134
Mass of Mold, lbs.	18.15
Initial mass of wet soil, lbs.	8.488

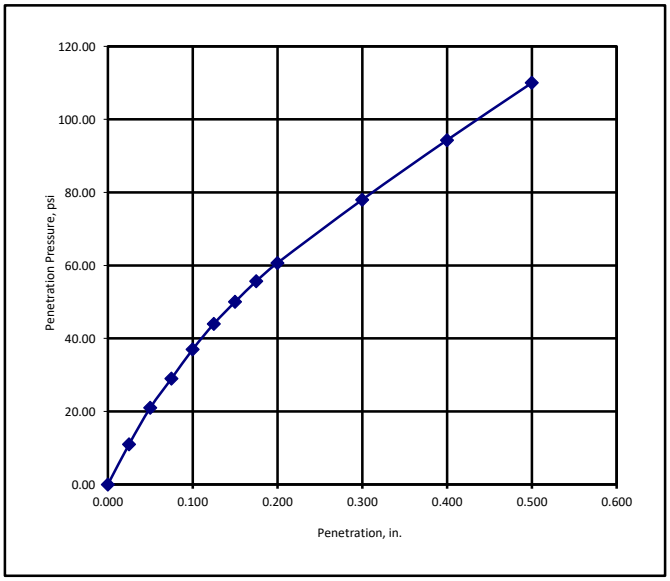
Dry density = 98.0 Comp. 0.9899
Moisture = 16.0 Points Opt. 0.03379

ASTM D2216 Moisture Content

Compaction	Project #	Can No.	Wet Wt. (1)	Dry Wt. (2)	Tare Wt. (3)	(1) - (2) = A	(2) - (3) = B	%MC = A/B*100
Before	GS-G-21106		551.19	496.01	128.05	55.18	367.96	14.9962
After	GS-G-21106		494.05	440.62	127.64	53.43	312.98	17.07138

ASTM D1883 Date: 4/24/2021
Time: 10:15am

Strain, in.	Load, lbs	Stress, psi	CBR
0.000	0.00	0.00	
0.025	33.00	11.00	
0.050	63.00	21.00	
0.075	87.00	29.00	
0.100	111.00	37.00	3.7
0.125	132.00	44.00	
0.150	150.00	50.00	
0.175	167.00	55.67	
0.200	182.00	60.67	4.0
0.300	234.00	78.00	
0.400	283.00	94.33	
0.500	330.00	110.00	



Frost GeoSciences, Inc.
13406 Western Oak
Helotes, Texas 78023

CBR (California Bearing Ratio)
ASTM D1883

Project Name: Montgomery Road Project #: FGS-G21106
Soil Desc. Light Brown Clay CBR # 5
Tested By: Miguel Gonzalez Jr Test Date: 04/21/21

Compaction Energy: Rammer: 5.5 lbs. # layers: 3 Blows: 56
w at compaction: 17.50% Mold Dia. 6 in. Soil Ht. 4.584 in.
Volume 0.075 ft.^{3}

	Initial	Final	%S
Date/Time	4/21/21 10:15am	4/24/21 10:30am	
Swell Data	0.000	0.075	1.64

Opt. M.C.	17.5
Opt. Dry Unit wt.	97.6
Mold #	5
Surcharge, lbs.	10
Initial mass of wet soil + mold, lbs.	27.111
Final mass of wet soil + mold, lbs.	27.333
Mass of Mold, lbs.	18.15
Initial mass of wet soil, lbs.	8.961

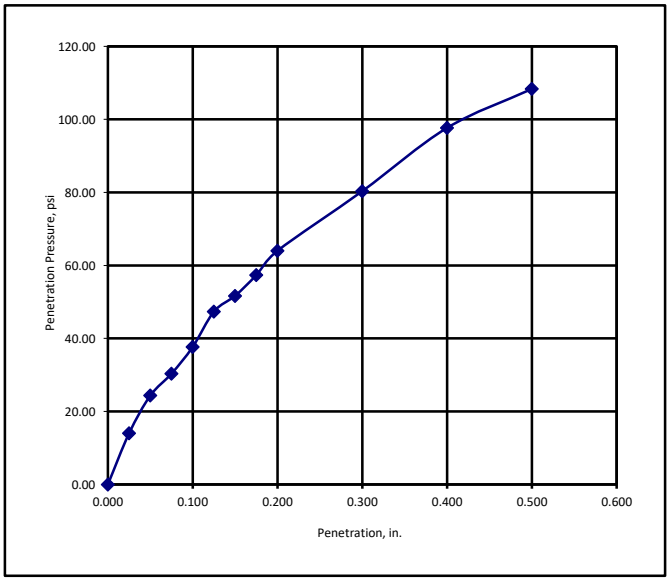
Dry density = 97.5 Comp. 0.99898
Moisture = 17.0 Points Opt. -0.5

ASTM D2216 Moisture Content

Compaction	Project #	Can No.	Wet Wt. (1)	Dry Wt. (2)	Tare Wt. (3)	(1) - (2) = A	(2) - (3) = B	%MC = A/B*100
Before	GS-G21006		561.12	423.15	127.22	137.97	295.93	46.62251
After	GS-G21006		512.18	485.36	126.05	26.82	359.31	7.464307

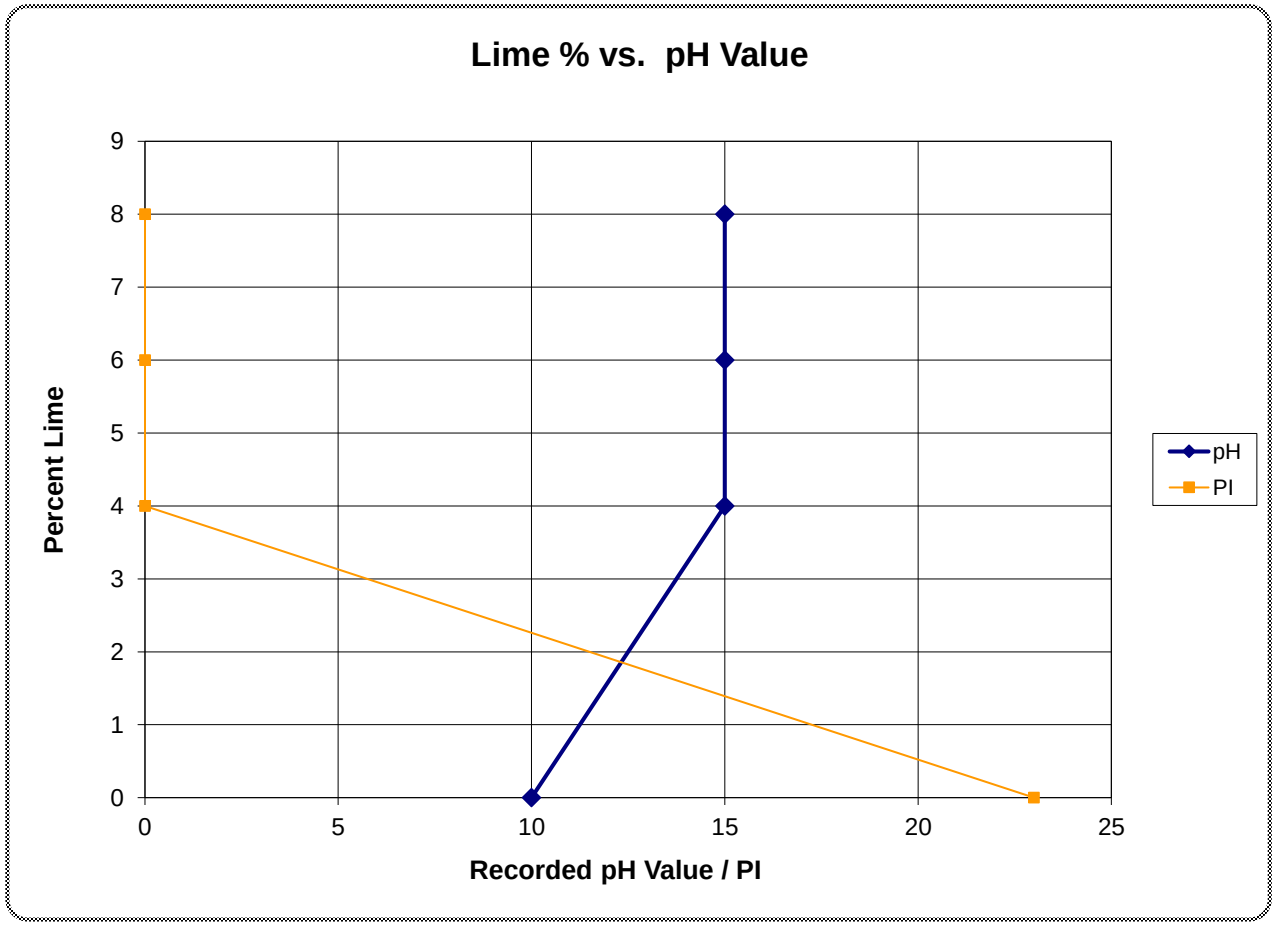
ASTM D1883 Date: 4/24/2021
Time: 10:45am

Strain, in.	Load, lbs	Stress, psi	CBR
0.000	0.00	0.00	
0.025	42.00	14.00	
0.050	73.00	24.33	
0.075	91.00	30.33	
0.100	113.00	37.67	3.8
0.125	142.00	47.33	
0.150	155.00	51.67	
0.175	172.00	57.33	
0.200	192.00	64.00	4.3
0.300	241.00	80.33	
0.400	293.00	97.67	
0.500	325.00	108.33	



LIME SERIES CURVE

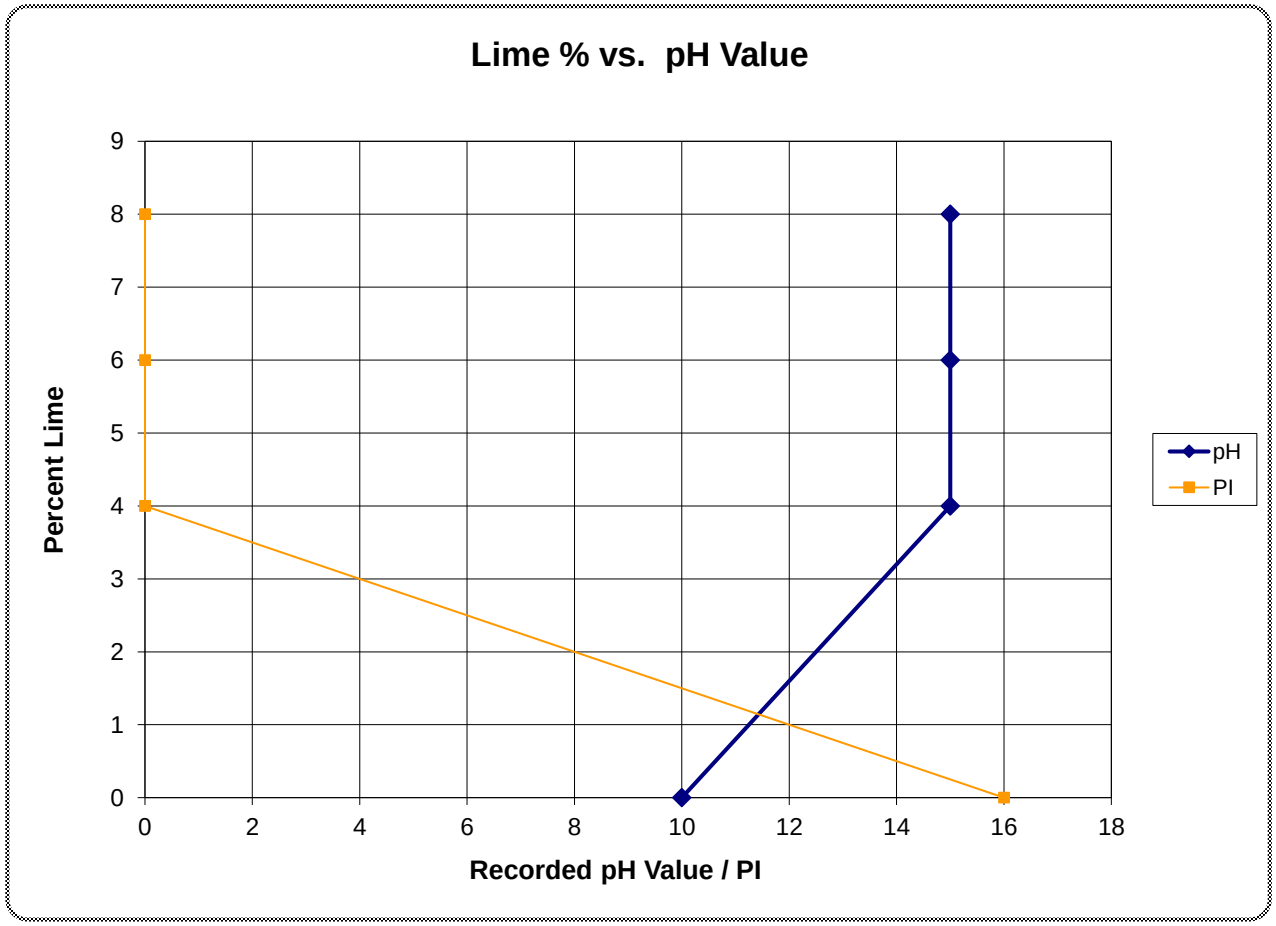
FGS Project No.: FGS-G21106



Project Name: Montgomery Road
Project Number: FGS-G-21106
Soil Description: Dark Brown Clay S3

%Lime	pH	PI
0	10	23
4	15	0
6	15	0
8	15	0

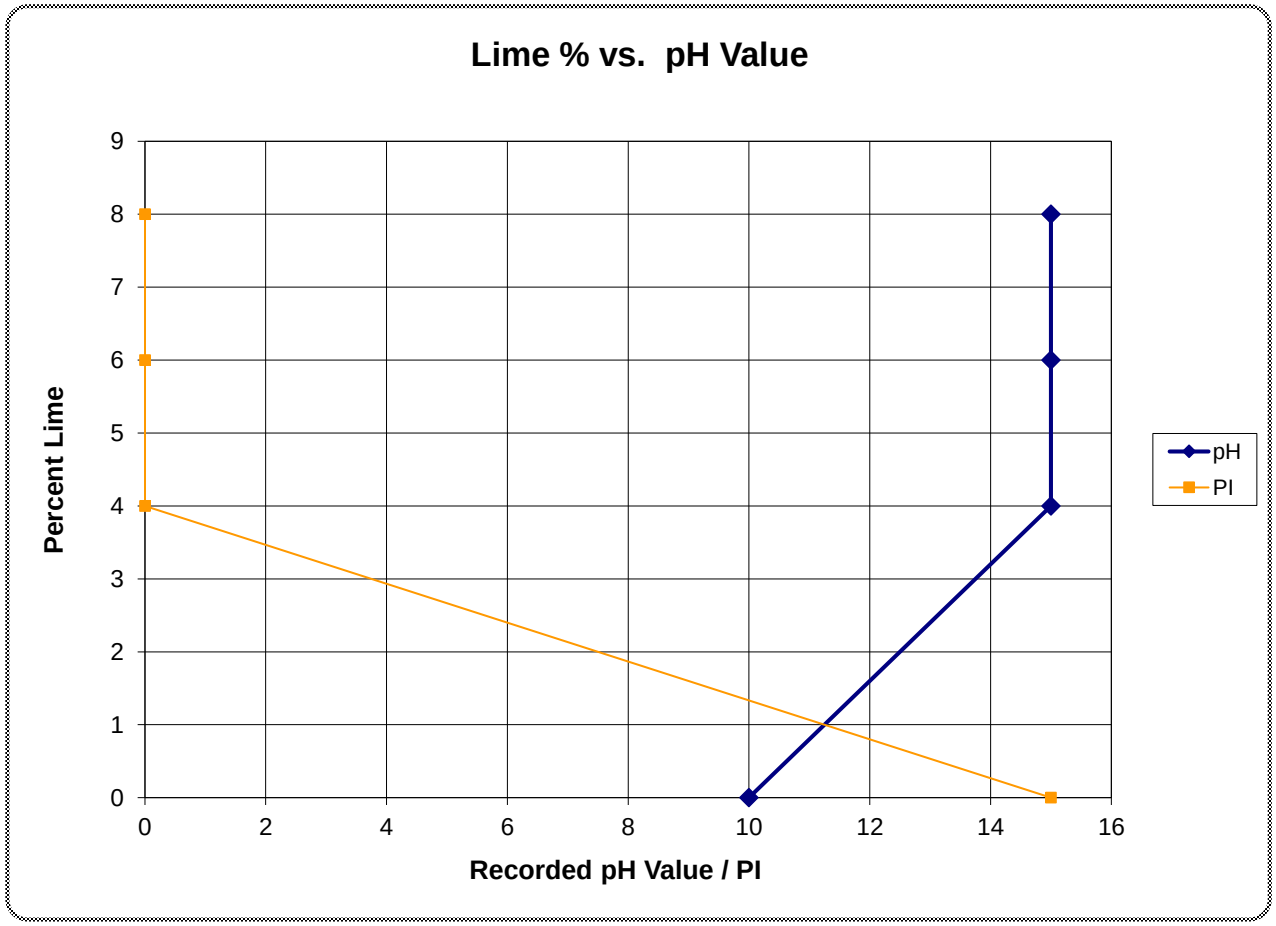
	6%	8%
Set #1	190psi	225psi
Set #2	200psi	230psi



Project Name: Montgomery Road
Project Number: FGS-G-21106
Soil Description: Light Brown Clay S4

%Lime	pH	PI
0	10	16
4	15	0
6	15	0
8	15	0

	6%	8%
Set #1	220psi	245psi
Set #2	205psi	240psi



Project Name: Montgomery Road
Project Number: FGS-G-21106
Soil Description: Light Brown Clay S5

%Lime	pH	PI
0	10	15
4	15	0
6	15	0
8	15	0

	6%	8%
Set #1	225psi	240psi
Set #2	215psi	240psi

Frost GeoSciences

SULFATE REPORT

FGS Project No.: FGS-G21106

SAN ANTONIO TESTING LABORATORY

April 21, 2021

Miguel Gonzalez
Frost GeoSciences, Inc
13406 Western Oak
Helotes, TX 78023

SATL Report No.: 2104102
RE: Montgomery Rd San Antonio TX
Project Number: FGS6-21005, 21006

Dear Miguel Gonzalez

SATL received 2 Sample(s) on 04/07/2021 for analyses identified on the chain of custody. The analyses were performed using methods indicated on the laboratory report. Any deviations observed at sample receiving are notated on the Sample Receipt Checklist and/or Chain of Custody documents attached as part of this analytical report.

Any deviations observed at sample receiving are notated on the Sample Receipt Checklist and/or Chain of Custody documents attached as part of this analytical report.

Sincerely,

For San Antonio Testing Laboratory, Inc.

Richard Hawk,
General Manager

NELAC Cert. No.: **T104704360**

Frost GeoSciences, Inc
13406 Western Oak
Helotes TX, 78023

Additional Notes:

Project Manager: Miguel Gonzalez
Project: Montgomery Rd San Antonio TX
Project Number: FGS6-21005, 21006

Reported:
04/21/21 10:31
Received:
04/07/21 11:36

Report No. 2104102

SAMPLE SUMMARY

Total Samples received in this work order: **2**

The following samples were requested for analysis as per the CoC. Any re-runs or re-analyses requested are identified as such.

Sample ID	Laboratory ID	Matrix	Sampling Method	Date Sampled	Date Received
S1 (Boring #4)	2104102-01	Solid	Grab	04/07/21 11:07	04/07/21 11:36
S2 (Boring #8)	2104102-02	Solid	Grab	04/07/21 11:08	04/07/21 11:36

Notes

All quality control samples and checks are within acceptance limits unless otherwise indicated.
Test results pertain only to those items tested.
All samples were in good condition when received by the laboratory unless otherwise noted.

NELAC Cert. No.: **T104704360**

Frost GeoSciences, Inc
13406 Western Oak
Helotes TX, 78023

Additional Notes:

Project Manager: Miguel Gonzalez
Project: Montgomery Rd San Antonio TX
Project Number: FGS6-21005, 21006

Reported:
04/21/21 10:31
Received:
04/07/21 11:36

Report No. 2104102

Sample ID #: S1 (Boring #4) **Sampling Method: Grab** **Lab Sample ID #: 2104102-01**

Sample Matrix: Solid **Date/Time Collected: 04/07/21 11:07**

Analyte	Result	Units	PQL	Prep Method	Batch	Analyzed	Method	Analyst	Notes
Anions by Ion Chromatography									
Sulfate *	16.3	mg/kg	0.10	EPA 1010	B117142	04/17/21 02:42	EPA 300.0	JL	

NELAC Cert. No.: **T104704360**

Frost GeoSciences, Inc
13406 Western Oak
Helotes TX, 78023

Additional Notes:

Project Manager: Miguel Gonzalez
Project: Montgomery Rd San Antonio TX
Project Number: FGS6-21005, 21006

Reported:
04/21/21 10:31
Received:
04/07/21 11:36

Report No. 2104102

Sample ID #: S2 (Boring #8) **Sampling Method: Grab** **Lab Sample ID #: 2104102-02**

Sample Matrix: Solid **Date/Time Collected: 04/07/21 11:08**

Analyte	Result	Units	PQL	Prep Method	Batch	Analyzed	Method	Analyst	Notes
Anions by Ion Chromatography									
Sulfate *	4.15	mg/kg	0.10	EPA 1010	B117142	04/17/21 03:18	EPA 300.0	JL	

Frost GeoSciences, Inc
13406 Western Oak
Helotes TX, 78023

Project Manager: Miguel Gonzalez
Project: Montgomery Rd San Antonio TX
Project Number: FGS6-21005, 21006

Reported:
04/21/21 10:31
Received:
04/07/21 11:36

Additional Notes:

Report No. 2104102

Anions by Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B117142 - EPA 1010									
Blank (B117142-BLK1)				Prepared: 04/16/21 16:00		Analyzed: 04/17/21 00:55			
Sulfate	<0.10	0.10	mg/kg						
LCS (B117142-BS1)				Prepared: 04/16/21 16:00		Analyzed: 04/17/21 01:13			
Sulfate	50.3	0.10	mg/kg	50.0		101	90-110		
LCS Dup (B117142-BSD1)				Prepared: 04/16/21 16:00		Analyzed: 04/17/21 01:30			
Sulfate	50.2	0.10	mg/kg	50.0		100	90-110	0.2	30
Duplicate (B117142-DUP1)		**Source: 2104084-01**		Prepared: 04/16/21 16:00		Analyzed: 04/17/21 02:06			
Sulfate	37.1	0.10	mg/kg		36.8			0.7	20
Matrix Spike (B117142-MS1)		**Source: 2104084-01**		Prepared: 04/16/21 16:00		Analyzed: 04/17/21 02:24			
Sulfate	85.1	0.10	mg/kg	50.0	36.8	96	90-110		

NELAC Cert. No.: **T104704360**

Frost GeoSciences, Inc
13406 Western Oak
Helotes TX, 78023

Additional Notes:

Project Manager: Miguel Gonzalez
Project: Montgomery Rd San Antonio TX
Project Number: FGS6-21005, 21006

Reported:
04/21/21 10:31
Received:
04/07/21 11:36

Report No. 2104102

DEFINITIONS

*	TNI / NELAC accredited analyte
PQL	Practical Quantitation Limit
MCL	Maximum Contaminant Level
mg/Kg	Milligrams per Kilogram (Parts per Million)
mg/L	Milligrams per Liter (Parts per Million)
PPM	Parts per Million
L	LCS recovery is outside QC acceptance limits, the results may have a slight bias.
M	MS recovery is outside QC limits, the results may have a slight bias due to possible matrix interferences.
NR	Not Recovered due to source sample concentration exceeds spiked concentration.
RMCCL	Recommended Maximum Concentration of Contaminants Level
Surr L	Surrogate recovery is low outside QC limits.
Surr H	Surrogate recovery is high outside QC limits.
HT	Sample received past holdtime
IC	Improper Container
IT	Improper Temperature
V	Inssuficient Volume
B	Sample collected in Bulk
S	RPD is outside QC limits.
AB	VOA Vial contained air bubbles.
OP	ortho-Phosphate was not filtered in the field within 15minutes of collection.
CCV	Continuing Calibration Verification Standard.
ICV	Initial Calibration Verification Standard.

Test Methods followed by the laboratory are referenced in the following approved methodology, unless otherwise specified.

Standard Methods for the Examination of Water and Wastewater, 22nd Edition
Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, Rev. March 1983
EPA SW Test Methods for the Examination of Solid Waste, SW-846, 1996

Aimee Landon For Marcela Gracia Hawk, President For

Richard Hawk, General Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CHAIN-OF-CUSTODY RECORD

SAN ANTONIO TESTING LABORATORY, LLC

1610 S. Laredo Street, San Antonio, Texas 78207
(210) 229-9920 • Fax (210) 229-9921
www.satestinglab.com

REPORT TO:	INVOICE TO:	P.O. #
COMPANY: Frost Geosciences	COMPANY:	REPORT NUMBER: 2104102
ADDRESS: 13406 Western Oaks	ADDRESS: SAME	
CITY: Helotes STATE: TX ZIP: 78023	CITY: STATE: ZIP:	E-MAIL: mgonzalez@frostgeosciences.com
ATTN: Miguel Gonzalez PHONE #: (210) 372-1315	ATTN: PHONE #:	

REQUESTED TURNAROUND TIME IN BUSINESS DAYS & SURCHARGE: ❑ 7-10 Days REG | X 5 Days +25% | ❑ 4 Days +50% | ❑ 3 DAYS +75% | ❑ 2 DAYS +100% | ❑ Next Day +150% | ❑ SAME DAY WHEN POSSIBLE +300%

PROJECT NAME/LOCATION/SITE: Montgomery Rd. San Antonio Tx.

THE TURNAROUND TIME FOR SAMPLES RECEIVED AFTER 3:00 PM SHALL BEGIN AT 8:00 AM THE FOLLOWING BUSINESS DAY / SPECIAL REQ.:

FOR STATE COMPLIANCE ❑ YES ❑ X NO

PROJECT NO.: FOS 6-21005, 21006

SAMPLE TEMPERATURE WITHIN COMPLIANCE (> 0°C ≤ 6°C) ❑ YES ❑ NO — INITIAL TO AUTHORIZE BULK ANALYSIS _____ — INSUFFICIENT SAMPLE AMOUNT: ❑ YES ❑ NO — AUTHORIZE TO PROCEED _____

PROPER CONTAINERS ❑ YES ❑ NO — IF NO, INITIAL HERE TO AUTHORIZE ANALYSIS _____

SAMPLED BY: Miguel Gonzalez

OBSERVED TEMP. 5.4°C / CORRECTED TEMP. 5.1°C / TEMP. I.R. GUN # 7 / SAMPLE ICED ❑ YES ❑ NO

TRRP 13 ❑ LPST PCLS ❑ PST ❑ TSDF Class 2 ❑

SAMPLE NUMBER	COLLECTED: DATE	COLLECTED: TIME	MATRIX: DRINKING WATER	MATRIX: NON-POTABLE WATER	MATRIX: PAINT CHIPS	MATRIX: OIL	MATRIX: ORGANIC LIQUID	MATRIX: SOLID	MATRIX: SLUDGE	MATRIX: OTHER	SAMPLING METHOD: COMPOSITE	SAMPLING METHOD: GRAB	SAMPLING METHOD: CORE	SAMPLING METHOD: OTHER	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	SAMPLE AMOUNT	CONTAINER SIZE	ANALYSIS REQUESTED: BTEX/MTBE 8260 / TPH TX1005/TX1006	Metals 8 / 11 / 12 / 13 / TCLP / SPLP / Total	PAH / SVOC / 8270 / 625 / TCLP / SPLP / Total	VOC / 8260 / 624 / TCLP / SPLP / Total	Water Quality - Drinking / Livestock / Irrigation	Coli / TC / FC / HPC / EColi / Enterococci / Q-Tray	Br / Cl / F / NO3 / NO2/O-P / SO4	PCB / 608 / 8082A	OC Pest / 608 / 8081A / TCLP / SPLP / Total	Sulfide (SO4)	PRESERVED WITH: HCl	HNO3	H2SO4	NaOH	ZnAc+NaOH	None	PRESERVED IN THE LAB	COMPOSITED IN THE LAB	FILTERED IN THE LAB	FILTERED IN THE FIELD	REMARKS
1	4-7-21	11:07 AM						X				X			S1 (Boring #4)	1	4oz	4oz									✓								X				
2	4-7-21	11:08 AM						X				X			S2 (Boring #8)	1	4oz	4oz									✓								X				

RELINQUISHED BY (SIGNATURE)	DATE / TIME	RECEIVED BY (SIGNATURE)	DATE / TIME	RELINQUISHED BY (SIGNATURE)	DATE / TIME	RECEIVED BY (SIGNATURE)	DATE / TIME
[signature]	4-7-21 11:34 AM	[signature]	040721				
RELINQUISHED BY (PRINT NAME)	DATE / TIME	RECEIVED BY (PRINT NAME)	DATE / TIME	RELINQUISHED BY (PRINT NAME)	DATE / TIME	RECEIVED BY (PRINT NAME)	DATE / TIME
Miguel Gonzalez	4-7-21 11:34 AM	SANDRA FELIX	1136				
RELINQUISHED BY (SIGNATURE)	DATE / TIME	RECEIVED BY (SIGNATURE)	DATE / TIME	METHOD OF SHIPMENT: walk-in		SUBCONTRACTED ❑ YES ❑ NO	
RELINQUISHED BY (PRINT NAME)	DATE / TIME	RECEIVED BY (PRINT NAME)	DATE / TIME	SAMPLED IN 5035 CONTAINERS ❑ YES ❑ NO ❑ N/A		CUSTODY SEAL IN PLACE & INTACT ❑ YES ❑ NO	

FORM: COC REV 02/2018 — WHITE - LAB — CANARY - CLIENT

SAN ANTONIO TESTING LABORATORY, INC.

Sample Receipt Checklist

Client: Frost GeoSciences — Report Number: 2104102

Project Name: — Date Received: 04/07/21

Shipped via: ☐FedEx ☐UPS ☐Lonestar ☑Hand Delivered ☐DHL ☐SATL ☐Other — Date Due: 04/14/21

Rush: ☐ Specify: ☐3-5 ☐2 ☐1

Items to be checked upon Receipt: [Yes, No, N/A]

	Yes	No	NA	If NA–reason:
1. Custody Seals present?	✓			
2. Custody Seals intact?	✓			
3. Air Bill included in folder, if received?		✓		
4. Is COC included with samples?	✓			
5. Is COC signed and dated by client?	✓			
6. Sample temperature: Thermal preservation between >0° - 6°C? (Samples that are delivered to the laboratory on the same day that they are collected may not meet this criterion, but are acceptable if they arrive on ice.)	✓			Temp: 5.9 °C
7. Samples received with ice ☑ ice packs ☐ other cooling ☐	✓			
8. Is the COC filled out correctly, and completely?	✓			
9. Information on the COC matches the samples?	✓			
10. Samples received within holding time?	✓			
11. Samples properly labeled?	✓			
12. Samples submitted with chemical preservation? (e.g. pH adjusted, or sodium thiosulfate added for microbiological tests)		✓		
13. Proper sample containers used?	✓			
14. All samples received intact, containers not damaged or leaking?	✓			
15. VOA vials (requesting BTEX/VOC analysis) received with no air bubbles? Bubbles acceptable on VOA vials for TPH.			✓	
16. Preservative for THMs only ($Na_2S_2O_3$)	✓			
17. Sample volume sufficient for requested analysis?	✓			
18. Sample amount sufficient for TCLP analysis?			✓	
19. Subcontracted Samples: [if Yes, complete the next section]		✓		

Analyses Subcontracted Out: _____ No. of Samples _____

Samples sent to: _____ Sent By: _____

Date samples sent: _____ Samples shipped via: _____

TAT Requested: _____

Tracking number [if any]: _____

Comments:

Received By: [signature] Date: 04/07/21

Labeled By: _____ Date: _____

Logged into LIMS By: _____ Date: _____

Logged into RF By: _____ Date: _____

SPECTRA PAVE

FGS Project No.: FGS-G21106

Pavement Optimization

Design Analysis

Parameters

Project Information

Subgrade resilient modulus	Target ESALs	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
5,700 psi	3,000,000	95%	0.45	4.2	2.5

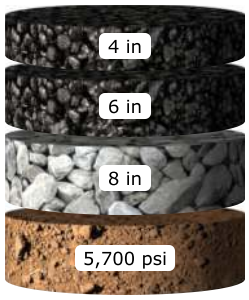
Results

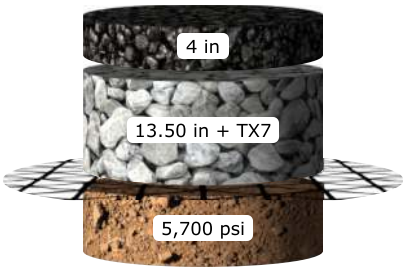
Unstabilized Pavement Section

	Thickness	Coeff.	SN
HMA layer 1	4 in	0.440	1.760
HMA layer 2	6 in	0.380	2.280
Aggregate base	8 in	0.140	1.120
Structural number (SN)			5.160
Calculated traffic (ESALs)			4,804,300

TriAx Stabilized Pavement Section

	Thickness	Coeff.	SN
HMA layer 1	4 in	0.440	1.760
Mechanically stabilized layer	13.50 in	0.227	3.064
Structural number (SN)			4.824
Calculated traffic (ESALs)			3,002,400





Total HMA thickness should be within the same range on both pavement sections for accurate comparison [2-3 in | 3-6 in | 6-14 in]

Limitations of this Report
The designs, illustration, and other content included in this report are necessarily general and conceptual in nature and do not constitute engineering advice or any design intended for actual construction. Specific design recommendations can be provided as the project develops.

Design	ARTERIAL	**Project**	MONTGOMERY ROAD EXTENSION, PHASES 1C, 1D, & 2
Company	FROST GEOSCIENCES, Inc.	**Location**	Bexar County, TX, USA
Designer	FLORENTINO CABALLERO, P. E.	**Date**	5/7/2021

This report was prepared using the Tensar app.

Pavement Optimization

Cost Analysis

Parameters

Project Size

Project length	2,500 ft
Project width	25 ft

Unstabilized Pavement Section Costs

HMA layer 1	$90/ton
HMA layer 2	$75/ton
Aggregate base	$20/ton

Stabilized Pavement Section Costs

HMA layer 1	$90/ton
Mechanically stabilized layer	$20/ton

Grading Requirements

Grade offset	Meet existing grade
Excavation cost	$5/yd³

Geosynthetic Costs

TX7	$5/yd²

Results

Initial Construction Costs

	Unstabilized	Stabilized
HMA layer 1	$138,766	$138,766
HMA layer 2	$173,457	$0
Aggregate base	$56,237	$94,900
Geogrid		$34,722
Excavation	$17,361	$16,879
Total cost	$385,821	$285,267
Unit cost	$55.56/yd²	$41.08/yd²
Savings		$100,554 (26%)

Additional Considerations

	Unstabilized	Stabilized
Construction time	26 days	24 days
Dump truck trips	738	727
Fuel required	1,010 gal	922 gal
Water required	38,587 gal	65,116 gal

Lifecycle Cost

	Unstabilized	Stabilized
Total	$1,531,654	$1,083,878
Net present value	$1,280,260	$934,061

Design	ARTERIAL	**Project**	MONTGOMERY ROAD EXTENSION, PHASES 1C, 1D, & 2
Company	FROST GEOSCIENCES, Inc.	**Location**	Bexar County, TX, USA
Designer	FLORENTINO CABALLERO, P. E.	**Date**	5/7/2021

Dewatering Plan

LENNAR®

Texas Construction Dewatering Discharge Form

Observe and evaluate the dewatering controls at a minimum of once per day while the dewatering discharges occur from the construction site. Complete this form within 24 hours following the evaluation. Keep hard copy in the SWPPP.

A. General Information

Community:	TPDES Permit No.:	Evaluation Date:
Name:		
Title:		

B. Complete the following items for each active construction dewatering discharge onsite.

General Comments:

Dewatering Discharge Location: _____

Approximate times the dewatering discharge began and ended today. *(If the dewatering discharge is a continuous discharge that continues after normal business hours, just check the box labeled 'Continuous'.)*	Time discharge began today: _____ Time discharge ended today: _____ ☐ Continuous
Estimate of the rate of discharge during this inspection.	_____ gallons per day
Did you observe any indications of pollutant discharge at the point of discharge (e.g., foam, oil sheen, noticeable odor, floating solids, suspended sediments, or other obvious indicators of stormwater pollution)?	☐ Yes ☐ No If Yes, document observations and actions needed in the table below. If No, proceed to the Certification and Signature section.

In the below table describe locations where erosion and discharges of sediment or other pollutants from the site have occurred; locations of BMPs that need to be maintained; locations of BMPs that failed to operate as designed or proved inadequate for a particular location; and locations where additional BMPs are needed. Document, initial, & date when the action taken has been completed on this page.

Date Noted:	**Description & Precise Location of Action Required Item(s):**	**Action Taken:**	**Date Actions Taken & Initial:**

Were any incidents of non-compliance observed during this construction dewatering discharge inspection? ☐ Yes ☐ No
If Yes, describe the incident(s): when, where, and why it happened; what action(s) was taken and when. Be specific.

Certification and Signature by BMP Inspector:

Check the following box if correct: ☐ There were no incidents of non-compliance noted during the inspection. The construction site is in compliance with the SWPPP and the Texas Construction General Permit.

By inserting my electronic signature below, I intend to sign this document and I hereby acknowledge and agree that my signature is being provided electronically and that my electronic signature and/or initials appearing on this report are the same as if I had affixed my original handwritten signature for the purpose of validity, enforceability, and admissibility. I acknowledge that I have access to this report.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Inspected By (Print Name): _____ Title: _____

Signature: _____ Date: _____

Company: _____

Certification and Signature by Permittee or "Duly Authorized Representative":

Check the following box if correct: ☐ There were no incidents of non-compliance noted during the inspection. The construction site is in compliance with the SWPPP and the Texas Construction General Permit.

By inserting my electronic signature below, I intend to sign this document and I hereby acknowledge and agree that my signature is being provided electronically and that my electronic signature and/or initials appearing on this report are the same as if I had affixed my original handwritten signature for the purpose of validity, enforceability, and admissibility. I acknowledge that I have access to this report.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Permittee or
"Duly Authorized Representative":

Print Name: _____ Title: _____

Signature: _____ Date: _____

[This area intentionally left blank.]

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

Specifications List

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)

GOVERNING SPECIFICATIONS

All specifications applicable to this project are identified as follows:

2014 TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges with any revisions thereto where specified "TxDOT".

Texas Department of Transportation - 2014

ITEM NO.	DESCRIPTION
100	PREPARING ROW
110	EXCAVATION
104	REMOVING CONC
110	EXCAVATION
132	EMBANKMENT
161	COMPOST
164	SEEDING OR EROSION CONTROL
168	VEGETATIVE WATERING
216	PROOF ROLLING
247	FLEXIBLE BASE
260	LIME TREATMENT (ROAD-MIXED)
310	PRIME COAT
402	TRENCH EXCAVATION PROTECTION
420	CONCRETE SUBSTRUCTURES
432	RIPRAP
459	GABIONS AND GABION MATTRESS
462	CONCRETE BOX CULVERTS AND DRAINS
464	REINFORCED CONCRETE PIPE
465	JUNCTION BOXES, MANHOLES, AND INLETS
466	HEADWALLS AND WINGWALLS
500	MOBILIZATION
502	BARRICADES, SIGNS, AND TRAFFIC HANDLING
506	TEMPORARY EROSION, SEDIMENTATION AND ENVIRONMENTAL CONTROLS
529	CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER
531	SIDEWALKS
536	CONC MEDIAN AND DIRECTIONAL ISLANDS
644	SMALL ROADSIDE SIGN ASSEMBLIES
666	RETROREFLECTIVE PAVEMENT MARKINGS
672	RAISED PAVEMENT MARKINGS

SPECIAL SPECIFICATIONS

ITEM NO.	DESCRIPTION
SS-3076	DENSE-GRADED HOT-MIX ASPHALT
SAWS ITEM 856	STEEL CASING

DIGITAL FILES

M.W. CUDE ENGINEERS, L.L.C 4122 Pond Hill Road, Suite 101 San Antonio, Texas 78231 210.681.2951 (tel) 210.523.7112 (fax)