

*Fort Bend County, Texas
Invitation for Bid*



*Construction of Brandt Road from Precinct Line Road to Mason Road
for Fort Bend County Mobility Bond Project No. 17310
BID 23-049*

SUBMIT BIDS TO:

Fort Bend County
Purchasing Department
Travis Annex
301 Jackson, Suite 201
Richmond, TX 77469

Note: All correspondence must include the term
“Purchasing Department” in address to assist in
proper delivery

SUBMIT NO LATER THAN:

Tuesday, May 9, 2023
2:00 PM (Central)

LABEL ENVELOPE:

BID 23-049
Brandt Road

***ALL BIDS MUST BE RECEIVED IN AND TIME/DATE STAMPED BY THE PURCHASING OFFICE
OF FORT BEND COUNTY ON OR BEFORE THE SPECIFIED TIME/DATE STATED ABOVE.***

BIDS RECEIVED AS REQUIRED WILL THEN BE OPENED AND PUBLICLY READ.

BIDS RECEIVED AFTER THE SPECIFIED TIME, WILL BE RETURNED UNOPENED.

Results will not be given by phone.
Results will be provided to bidder in writing
after Commissioners Court award.

Requests for information must be in
writing and directed to:
Brooke Lindemann
Senior Buyer
Brooke.Lindemann@fortbendcountytexas.gov

Vendor Responsibilities:

- Download and complete any addendums. (Addendums will be posted on the Fort Bend County website no
Later than 48 hours prior to bid opening)
- Submit response in accordance with requirements stated on the cover of this document.
- DO NOT submit responses via email or fax.



COUNTY PURCHASING AGENT

Fort Bend County, Texas

Vendor Information

Jaime Kovar
Purchasing Agent

Office (281-341-8640)

Legal Company Name <small>(top line of W9)</small>				
Business Name <small>(if different from legal name)</small>				
Federal ID # or S.S. #		DUNS #		
Type of Business	<input type="checkbox"/> Corporation/LLC <input type="checkbox"/> Partnership <input type="checkbox"/> Sole Proprietor/Individual <input type="checkbox"/> Tax Exempt Organization	Age in Business?		
Publicly Traded Business	<input type="checkbox"/> No <input type="checkbox"/> Yes Ticker Symbol _____			
Remittance Address				
City/State/Zip				
Physical Address				
City/State/Zip				
Phone/Fax Number	Phone: _____ Fax: _____			
Contact Person				
E-mail				
Check all that apply to the company listed above and provide certification number.	DBE-Disadvantaged Business Enterprise <input type="checkbox"/>	Certification # _____ Certification # _____ Certification # _____ Certification # _____	<u>Cert Date</u>	<u>Exp Date</u>
	SBE-Small Business Enterprise <input type="checkbox"/>		_____	_____
	HUB-Texas Historically Underutilized Business <input type="checkbox"/>		_____	_____
	WBE-Women's Business Enterprise <input type="checkbox"/>		_____	_____
			_____	_____
Company's gross annual receipts	<\$500,000 _____	\$500,000-\$4,999,999 _____		
	\$5,000,000-\$16,999,999 _____	\$17,000,000-\$22,399,999 _____		
	>\$22,400,000 _____			
NAICs codes (Please enter all that apply)				
Signature of Authorized Representative				
Printed Name				
Title				
Date				

THIS FORM MUST BE SUBMITTED WITH THE SOLICITATION RESPONSE

1.0 GENERAL REQUIREMENTS:

- 1.1 Read this entire document carefully. Follow all instructions. You are responsible for fulfilling all requirements and specifications. Be sure you understand them.
- 1.2 General Requirements apply to all advertised bids; however, these may be superseded, whole or in part, by the scope, special requirements, specifications, special specifications or other data contained herein.
- 1.3 Governing Law: Bidder is advised that these requirements shall be fully governed by the laws of the State of Texas and that Fort Bend County may request and rely on advice, decisions and opinions of the Attorney General of Texas and the County Attorney concerning any portion of these requirements.
- 1.4 Bid Form Completion: Fill out, sign, and return to the Fort Bend County Purchasing Department one (1) complete bid form. An authorized representative of the bidder must sign the Contract Sheet. The Contract will be binding only when signed by the County Judge, Fort Bend County and a purchase order authorizing the item(s) desired has been issued. The use of corrective fluid is not acceptable and may result in the disqualification of bid. If an error is made, the bidder must draw a line through error and initial each change.
- 1.5 Bid Returns: Bidders must return all completed bids to the Fort Bend County Purchasing Department at 301 Jackson, Suite 201 Richmond Texas no later than 2:00 P.M. on the date specified. Late bids will not be accepted. Bids must be submitted in a sealed envelope, addressed as follows: Fort Bend County Purchasing Agent, Travis Annex, 301 Jackson, Suite 201 Richmond, Texas 77469.
- 1.6 Addenda: No interpretation of the meaning of the drawings, specifications or other bid documents will be made to any bidder orally. All requests for such interpretations must be made in writing addressed to Brooke Lindemann, Senior Buyer, 301, Jackson, Suite 201, Richmond, Texas, 77469, E-mail: Brooke.Lindemann@fortbendcountytexas.gov. Any and all interpretations and any supplemental instructions will be in the form of written addenda to the contract documents which will be posted on Fort Bend County's website. Addenda will **ONLY** be issued by the Fort Bend County Purchasing Agent. It is the sole responsibility of each bidder to insure receipt of any and all addenda. All addenda issued will become part of the contract documents. Bidders must sign and include it in the returned bid package. Deadline for submission of questions and/or clarification is no later than **Tuesday, May 2, 2023 at 10:00AM (central)** Requests received after the deadline will not be responded to due to the time constraints of this bid process.
- 1.7 References: All bidders must submit, **WITH BID**, at least three (3) references from clients for whom a project similar to that specified herein has been

Initials of Bidder: _____

successfully accomplished. References must include clients name, contact person and telephone number.

- 1.8 Bid Bond: All bidders must submit, **WITH BID**, a cashier's check or certified check for at least five percent (5%) of the total bid price, payable to the order of Fort Bend County, or a Bid Bond in the same amount issued by a surety, acceptable to Fort Bend County, authorized to do business in the State of Texas, as a guarantee that the Bidder will do the work described herein at the rates stated herein. Unsuccessful bidder's Cashier's Check or Certified Check will be returned only after a written request to do so have been received in the Office of the Fort Bend County Purchasing Agent.
- 1.9 Material Safety Data Sheets: Under the "Hazardous Communication Act", commonly known as the "Texas Right to Know Act", a bidder must provide to Fort Bend County and using departments, with each delivery, material safety data sheets, which are, applicable to hazardous substances defined in the Act. Bidders are obligated to maintain a current, updated file in the Fort Bend County Purchasing Department. Failure of the bidder to maintain such a file will be cause to reject any bid applying thereto.
- 1.10 Pricing: Prices for all goods and/or services shall be firm for the duration of this Contract and shall be stated on the bid sheet. Prices shall be all inclusive. No price changes, additions, or subsequent qualifications will be honored during the course of the Contract. All prices must be written in ink or typewritten. If there are any additional charges of any kind, other than those mentioned above, specified or unspecified, bidder **MUST** indicate the items required and attendant costs or forfeit the right to payment for such items.
- 1.11 Term Contracts: If the Contract is intended to cover a specific time period, said time will be given in the specifications under scope.
- 1.12 Recycled Materials: Fort Bend County encourages the use of products made of recycled materials and shall give preference in purchasing to products made of recycled materials if the products meet applicable specifications as to quantity and quality. Fort Bend County will be the sole judge in determining product preference application.
- 1.13 Evaluation: Evaluation shall be used as a determinant as to which bid items or services are the most efficient and/or most economical for Fort Bend County. It shall be based on all factors which have a bearing on price and performance of the items in the user environment. All bids are subject to tabulation by the Fort Bend County Purchasing Department and recommendation to Fort Bend County Commissioners Court. Compliance with all bid requirements, delivery and needs of the using department are considerations in evaluating bids. Pricing is **NOT** the only criteria for making a recommendation. The Fort Bend County Purchasing Department reserves the right to contact any bidder, at any time, to clarify, verify or request information with regard to any bid.

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- 1.14 Disqualification of Bidder: Upon signing this bid document, a bidder offering to sell supplies, materials, services, or equipment to Fort Bend County certifies that the bidder has not violated the antitrust laws of this state codified in section 15.01, et seq., Business & Commerce Code, or the federal antitrust laws, and has not communicated directly or indirectly the bid made to any competitor or any other person engaged in such line of business. Any or all bids may be rejected if Fort Bend County believes that collusion exists among the bidders. Bids in which the prices are obviously unbalanced may be rejected. If multiple bids are submitted by a bidder and after the bids are opened, one of the bids is withdrawn, the result will be that all of the bids submitted by that bidder will be withdrawn; however, nothing herein prohibits a vendor from submitting multiple bids for different products or services.

- 1.15 Awards: Fort Bend County reserves the right to award this Contract on the basis of lowest and best bid in accordance with the laws of the State of Texas, to waive any formality or irregularity, to make awards to more than one bidder, to reject any or all bids. In the event the lowest dollar bidder meeting specifications is not awarded a contract, the bidder may appear before the Commissioners Court and present evidence concerning its responsibility.

- 1.16 Contract Obligation: Fort Bend County Commissioners Court must award the Contract and the County Judge or other person authorized by the Fort Bend County Commissioners Court must sign the Contract before it becomes binding on Fort Bend County or the bidders. Department heads are not authorized to sign agreements for Fort Bend County. Binding agreements shall remain in effect until all products and/or services covered by this purchase have been satisfactorily delivered and accepted.

2.0 SCOPE:

It is the intent of Fort Bend County to contract with one (1) vendor for all materials, supplies, equipment, tools, services, labor and supervision necessary to complete the Construction of Brandt Road from Precinct Line Road to Mason Road, hereinafter referred to as the “Project,” as specified herein.

3.0 PRE-BID CONFERENCE:

A pre-bid conference will be conducted on **Tuesday, April 25, 2023 at 9:30 AM (CST)**. The pre-bid conference will be held at the Fort Bend County Purchasing Department located in the Travis Annex at 301 Jackson, Suite 201, Richmond, Texas 77469. All bidders are encouraged to attend.

4.0 LIQUIDATED DAMAGES:

The County and the Contractor recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by the County if the work is not complete on time. Accordingly, instead of requiring any such proof, the County and the Contractor agree that as liquidated damages for delay (but not as a penalty) the Contractor shall

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pay the County \$1,500.00 for each day that expires after the time specified herein for completion until the Work is complete, unless contract time has been adjusted by extension of time approved by Commissioner's Court.

The Contractor will be placed on one (1) year probation if liquidated damages are accrued. During the probation period, if the Contractor accrues liquidated damages on another project, they will be disqualified from being awarded any County work for two (2) years.

5.0 COMPLETION TIME & PAYMENT:

5.1 Fort Bend County shall pay the Contractor in current funds for the Contractor's performance of the Contract the contract sum, as stated herein, after receipt of notice to proceed and a purchase order issued by the Fort Bend County Purchasing Agent.

5.2 Based upon Applications for payment submitted to the County Auditor, Fort Bend County shall make progress payments on account of the contract sum to the Contractor as provided below and elsewhere in the contract documents.

5.2.1 The period covered by each application for payment shall be one calendar month ending on the last day of the month.

5.2.2 Provided an application for payment is received by the County Auditor not later than the 15th day of a month, Fort Bend County shall make payment to the Contractor not later than the 15th day of the next month. If an application for payment is received by the County Auditor after the application deadline fixed above, payment shall be made by Fort Bend County not later than 30 days after the County Auditor receives the application for payment.

5.2.3 Application for payment shall indicate the percentage of completion of each portion of the Project as of the end of the period covered by the application for payment.

5.2.4 Subject to the provisions of the contract documents, the amount of each progress payment shall be computed as follows:

5.2.4.1 Take that portion of the contract sum properly allocable to completed Project less retainage of ten percent (10%).

5.2.4.2 Add that portion of the contract sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved by Fort Bend County, suitably stored off the site at a location agreed upon in writing), less retainage of ten percent (10%).

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5.2.4.3 Subtract the aggregate of previous payments made by Fort Bend County.

5.2.4.4 The progress payment amount as determined in above shall be further modified under the following circumstances:

Add, upon substantial completion of the Project, a sum sufficient to increase the total payments to one hundred percent (100%) of the contract sum, less such amounts as Fort Bend County shall determine for incomplete work and unsettled claims.

5.2.4.5 Final payment, constituting the entire unpaid balance of the contract sum, shall be made by Fort Bend County to the Contractor when the Contract has been fully performed by the Contractor.

5.3 Before the first application for payment, the Contractor shall submit to the Engineering Department a schedule of values allocated to various portions of the work, prepared in such form and supported by such data to substantiate its accuracy as the Engineering Department may require. This schedule, unless objected to by the Engineering Department shall be used as a basis for reviewing the Contractor's application for payment.

5.4 Contractor must provide with each application for payment a contractor's affidavit certifying bills against the Contractor for labor, material and expendable equipment employed in the performance of Contractor have been paid in full prior to acceptance of final payment from Fort Bend County.

5.5 The Contractor will permit Fort Bend County, or any duly authorized agent of Fort Bend County, to inspect and examine the books and records of the Contractor for the purpose of verifying the amount of work performed under the Contract. Fort Bend County's right to inspect survives the termination of the Contract for a period of five years.

6.0 LIMIT OF APPROPRIATION:

Prior to the execution of this Contract, Contractor has been advised by County, and Contractor clearly understands and agrees, such understanding and agreement being of the absolute essence to this Contract, that County shall have available only those funds specifically allocated in this Contract to fully discharge any and all liabilities which may be incurred by County in bringing this Project to an absolute conclusion, resulting in a complete, fully furnished, fully equipped and fully usable facility, and that the total of any and all basic construction costs, costs of providing the required services and materials, all fees and compensation of any sort to the Contractor, and any and all costs for any and all things or purposes coming inuring under or out of this Contract, irrespective of the nature thereof, shall not exceed said specifically allocated sum, notwithstanding any word, statement or thing contained in or inferred from the preceding provision of this Contract which might in any light by any person be interpreted to the contrary.

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7.0 RIGHT TO ASSURANCE:

Whenever Fort Bend County in good faith has reason to question the Contractor's intent to perform, Fort Bend County may demand that the Contractor give written assurance of its intent to perform. In the event that a demand is made and no assurance is given within five (5) days, Fort Bend County may treat this failure as an anticipatory repudiation of the Contract.

8.0 PERFORMANCE & PAYMENT BONDS:

Performance and Payment Bonds: In the event the total accepted bid price exceeds \$25,000 the Contractor must provide to the Office of the County Purchasing Agent, a performance bond and a payment bond, each in the amount of 100% of the total contract sum within ten (10) calendar days after receipt of notification of bid award. Such bonds shall be executed by a corporate surety duly authorized and admitted to do business in the State of Texas and licensed in the State of Texas to issue surety bonds with a Best Rating of "A" or better. Fort Bend County reserves the right to accept or reject any surety company proposed by the Contractor. In the event Fort Bend County rejects, the proposed surety company, the Contractor will be afforded five (5) additional days to submit the required bonds issued by a surety company acceptable to Fort Bend County.

9.0 POWER OF ATTORNEY:

An attorney-in-fact who signs a bid bond, performance bond or payment bond must file with each bond a certified and effectively dated copy of his or her power of attorney.

10.0 INSURANCE:

10.1 All respondents shall submit, with response, a current certificate of insurance indicating coverage in the amounts stated below. In lieu of submitting a certificate of insurance, respondents may submit, with response, a notarized statement from an Insurance company, authorized to conduct business in the State of Texas, and acceptable to Fort Bend County, guaranteeing the issuance of an insurance policy, with the coverage stated below, to the firm named therein, if successful, upon award of this Contract.

10.2 At contract execution, contractor shall furnish County with properly executed certificates of insurance which shall evidence all insurance required and provide that such insurance shall not be canceled, except on 30 days prior written notice to County. Contractor shall provide certified copies of insurance endorsements and/or policies if requested by County. Contractor shall maintain such insurance coverage from the time Services commence until Services are completed and provide replacement certificates, policies and/or endorsements for any such insurance expiring prior to completion of Services. Contractor shall obtain such insurance written on an Occurrence form (or a Claims Made form for Professional Liability insurance) from such companies having Best's rating of A/VII or better,

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licensed or approved to transact business in the State of Texas, and shall obtain such insurance of the following types and minimum limits:

- 10.2.1 Workers' Compensation insurance. Substitutes to genuine Workers' Compensation Insurance will not be allowed.
- 10.2.2 Employers' Liability insurance with limits of not less than \$1,000,000 per injury by accident, \$1,000,000 per injury by disease, and \$1,000,000 per bodily injury by disease.
- 10.2.3 Commercial general liability insurance with a limit of not less than \$1,000,000 each occurrence and \$2,000,000 in the annual aggregate. Policy shall cover liability for bodily injury, personal injury, and property damage and products/completed operations arising out of the business operations of the policyholder.
- 10.2.4 Business Automobile Liability coverage with a combined Bodily Injury/Property Damage limit of not less than \$1,000,000 each accident. The policy shall cover liability arising from the operation of licensed vehicles by policyholder.
- 10.3 County and the members of Commissioners Court shall be named as additional insured to all required coverage except for Workers' Compensation and Professional Liability (if required). All Liability policies including Workers' Compensation written on behalf of contractor, excluding Professional Liability, shall contain a waiver of subrogation in favor of County and members of Commissioners Court.
- 10.4 If required coverage is written on a claims-made basis, contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of the contract; and that continuous coverage will be maintained or an extended discovery period will be exercised for a period of two (2) years beginning from the time that work under the agreement is completed.
- 10.5 Contractor shall not commence any portion of the work under this Contract until it has obtained the insurance required herein and certificates of such insurance have been filed with and approved by Fort Bend County.
- 10.6 No cancellation of or changes to the certificates, or the policies, may be made without sixty (60) days prior, written notification to Fort Bend County.
- 10.7 Approval of the insurance by Fort Bend County shall not relieve or decrease the liability of the Contractor.

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11.0 INDEMNIFICATION:

Respondent shall save harmless County from and against all claims, liability, and expenses, including reasonable attorney's fees, arising from activities of respondent, its agents, servants or employees, performed under this agreement that result from the negligent act, error, or omission of respondent or any of respondent's agents, servants or employees.

- 11.1 Respondent shall timely report all such matters to Fort Bend County and shall, upon the receipt of any such claim, demand, suit, action, proceeding, lien or judgment, not later than the fifteenth day of each month; provide Fort Bend County with a written report on each such matter, setting forth the status of each matter, the schedule or planned proceedings with respect to each matter and the cooperation or assistance, if any, of Fort Bend County required by Respondent in the defense of each matter.
- 11.2 Respondent's duty to defend, indemnify and hold Fort Bend County harmless shall be absolute. It shall not abate or end by reason of the expiration or termination of any contract unless otherwise agreed by Fort Bend County in writing. The provisions of this section shall survive the termination of the contract and shall remain in full force and effect with respect to all such matters no matter when they arise.
- 11.3 In the event of any dispute between the parties as to whether a claim, demand, suit, action, proceeding, lien or judgment appears to have been caused by or appears to have arisen out of or in connection with acts or omissions of Respondent, Respondent shall never-the-less fully defend such claim, demand, suit, action, proceeding, lien or judgment until and unless there is a determination by a court of competent jurisdiction that the acts and omissions of Respondent are not at issue in the matter.
- 11.4 Respondent's indemnification shall cover, and Respondent agrees to indemnify Fort Bend County, in the event Fort Bend County is found to have been negligent for having selected Respondent to perform the work described in this request.
- 11.5 The provision by Respondent of insurance shall not limit the liability of Respondent under an agreement.
- 11.6 Respondent shall cause all trade contractors and any other contractor who may have a contract to perform construction or installation work in the area where work will be performed under this request, to agree to indemnify Fort Bend County and to hold it harmless from all claims for bodily injury and property damage that may arise from said Respondent's operations. Such provisions shall be in form satisfactory to Fort Bend County.
- 11.7 Loss Deduction Clause - Fort Bend County shall be exempt from, and in no way liable for, any sums of money which may represent a deductible in any insurance

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policy. The payment of deductibles shall be the sole responsibility of Respondent and/or trade contractor providing such insurance.

12.0 PREVAILING WAGES:

This project is subject to the prevailing wage rate requirements of Chapter 2258 of the Government Code. All persons employed by Contractor shall be compensated at not less than the rates shown below. Contractor shall keep detailed records of each of its workers and said records shall be made available to County for inspection at all reasonable times. The Contractor shall pay Fort Bend County sixty dollars (\$60.00) for each worker employed by the Contractor for the provision of services described herein for each calendar day or part of the day that the worker is paid less than the below stated rates. Contractors may also visit www.wdol.gov/dba.aspx.

General Decision Number: TX20230038 01/06/2023

Superseded General Decision Number: TX20220038

State: Texas

Construction Type: Highway

Counties: Austin, Brazoria, Chambers, Fort Bend, Galveston, Hardin, Harris, Jefferson, Liberty, Montgomery, Orange, San Jacinto and Waller Counties in Texas.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022, Executive Order 14026 generally applies to the contract. The contractor must pay all covered workers at least \$16.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2023.

If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022, Executive Order 13658 generally applies to the contract. The contractor must pay all covered workers at least \$12.15 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2023.

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The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at www.dol.gov/whd/govcontracts.

Modification Number Publication Date
 0 01/06/2023

SUTX2011-013 08/10/2011

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (Paving and Structures)	\$ 12.98 **	
ELECTRICIAN	\$ 27.11	
FORM BUILDER/FORM SETTER Paving & Curb Structures	\$ 12.34 ** \$ 12.23 **	
LABORER		
Asphalt Raker	\$ 12.36 **	
Flagger	\$ 10.33 **	
Laborer, Common	\$ 11.02 **	
Laborer, Utility	\$ 11.73 **	
Pipelayer	\$ 12.12 **	
Work Zone Barricade Servicer	\$ 11.67 **	
PAINTER (Structures)	\$ 18.62	
POWER EQUIPMENT OPERATOR:		
Asphalt Distributor	\$ 14.06 **	
Asphalt Paving Machine	\$ 14.32 **	
Broom or Sweeper	\$ 12.68 **	
Concrete Pavement Finishing Machine	\$ 13.07 **	
Concrete Paving, Curing, Float, Texturing Machine	\$ 11.71 **	
Concrete Saw	\$ 13.99 **	
Crane, Hydraulic 80 Tons or less	\$ 13.86 **	
Crane, Lattice boom 80 tons or less	\$ 14.97 **	
Crane, Lattice boom over 80 Tons	\$ 15.80	
Crawler Tractor	\$ 13.68 **	
Excavator, 50,000 pounds or less	\$ 12.71 **	

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Excavator, Over 50,000 pounds	\$ 14.53 **
Foundation Drill, Crawler Mounted	\$ 17.43
Foundation Drill, Truck Mounted	\$ 15.89 **
Front End Loader 3 CY or Less	\$ 13.32 **
Front End Loader, Over 3 CY	\$ 13.17 **
Loader/Backhoe	\$ 14.29 **
Mechanic	\$ 16.96
Milling Machine	\$ 13.53 **
Motor Grader, Fine Grade	\$ 15.69 **
Motor Grader, Rough	\$ 14.23 **
Off Road Hauler	\$ 14.60 **
Pavement Marking Machine	\$ 11.18 **
Piledriver	\$ 14.95 **
Roller, Asphalt	\$ 11.95 **
Roller, Other	\$ 11.57 **
Scraper	\$ 13.47 **
Spreader Box	\$ 13.58 **

Servicer	\$ 13.97 **
Steel Worker	
Reinforcing Steel	\$ 15.15 **
Structural Steel Welder	\$ 12.85 **
Structural Steel	\$ 14.39 **

TRUCK DRIVER

Low Boy Float	\$ 16.03 **
Single Axle	\$ 11.46 **
Single or Tandem Axle Dump	\$ 11.48 **
Tandem Axle Tractor w/Semi Trailer	\$ 12.27 **

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

** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$16.20) or 13658 (\$12.15). Please see the Note at the top of the wage determination for more information.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family

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member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

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

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

Union Rate Identifiers

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

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

Survey Rate Identifiers

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

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

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union

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data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

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

WAGE DETERMINATION APPEALS PROCESS

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

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

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

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

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

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

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

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

Initials of Bidder: _____

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

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

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

13.0 PERMITS:

It shall be the sole responsibility of the successful bidder to obtain all required permits in the name of Fort Bend County.

14.0 CONTRACTOR'S RESPONSIBILITY FOR WORK:

14.1 Preconstruction Work. Contractor shall do (or cause to be done) the following as preconstruction work:

14.1.1 On an as needed basis as determined by Fort Bend County, cause the Contractor's personnel to meet with Fort Bend County and the Engineer to discuss the status of the Project.

14.1.2 Review drawings and specifications with the Engineer to permit the Contractor and the Engineer to determine the compliance of the proposed facility with applicable building codes.

14.2 Construction Work. Contractor shall do (or cause to be done) the following as construction work:

14.2.1 Perform (or cause to be performed) all preparatory work at the construction site required herein, including (without limitation) soil and concrete testing and demolition of improvements existing at the construction site and all actions necessary for compliance with all laws and regulations as to actions to be taken by owners or contractors before construction begins, including without limitation those in regard to archaeological and environmental requirements.

14.2.2 Construct and install (or cause to be constructed and installed) the Project on the construction site in accordance with this Contract and the drawings and specifications approved by Fort Bend County.

14.2.3 Furnish (or cause to be furnished) all materials, supplies, equipment, tools, labor, supervision, utilities, transportation, and other materials and services necessary to complete the Project described herein.

Initials of Bidder: _____

14.2.4 Materials testing necessary for the Project and required by laws and regulations, construction industry standards as approved by Fort Bend County and this Contract; the frequency of testing shall be approved by Fort Bend County. **It is the contractor's responsibility to engage a material testing laboratory to perform testing on the structural concrete to be used for foundation work in this project. The cost of testing shall be incidental to bid item for drill shaft foundation. Testing of concrete shall comply with current TXDOT criteria. Contractor has to submit the name of the testing laboratory, intended to be used by the contractor for this project, for County's approval.**

14.3 Standards for Review and Approval. Fort Bend County acknowledges that in order to meet the deadlines for the completion of the Project, and in order to accomplish the efficient completion of the Project, the Contractor may submit matters to Fort Bend County in stages for approval or consent. Upon receipt of any matter submitted by the Contractor for review and approval, Fort Bend County shall review the same and shall diligently and promptly (but in any event within 14 calendar days for any such matter, other than a proposed change order, and within 28 calendar days for a proposed change order) give the Contractor notice of Fort Bend County's approval or disapproval, setting forth in detail all reasons for any disapproval. Fort Bend County's right to disapprove any such matter submitted (other than a proposed change order) shall be limited to the elements thereof (a) which do not conform substantially to matters previously approved, (b) which are new elements not previously presented and approved and the Contractor is unable to demonstrate that such new element is reasonably necessary for completion of the Project, or (c) which depict matters that are violations of this Contract or applicable laws and regulations.

14.3.1 If Fort Bend County disapproves of a particular matter or Proposed Change Order, the Contractor shall have the right to resubmit such matter or Proposed Change Order to Fort Bend County, altered to satisfy Fort Bend County's basis for disapproval. Any resubmission shall be subject to review and approval by Fort Bend County.

14.3.2 Fort Bend County and the Contractor shall attempt in good faith to resolve any disputes concerning the approval of any aspect of the Project expeditiously, so as not to delay the completion of the Project in accordance with this Contract.

14.3.3 Expedited Approvals. Fort Bend County recognizes the importance of expeditious action upon all matters submitted to Fort Bend County for review and approval and of expeditious response to those aspects of the Project requiring approval by governmental authorities having jurisdiction there over. Fort Bend County agrees to exercise its rights of review and approval hereunder with due diligence, reasonableness, and good faith. Fort Bend County shall use its reasonable efforts to expedite any required review of the Project or other matters by any governmental authority.

Initials of Bidder: _____

14.4 Changes.

14.4.1 General. Fort Bend County may make changes to the Project by altering, adding to, or deducting from the Project. All changes in the Project which (a) require an adjustment in the contract sum or an adjustment in the final completion date or (b) involve a material change in the overall scope or function of the Project shall be requested and authorized before commencing such changes by use of written change order notices, Proposed Change Orders and Change Orders, which change order procedure shall be the exclusive means to effect such changes in the Project.

14.4.2 Change Order Procedure. If at any time Fort Bend County desires to make any change in the Project requiring the issuance of a Change Order, Fort Bend County shall so advise the Contractor in writing by delivery to the Contractor of a written notice describing the change. Upon receipt of such notice initiated by Fort Bend County, the Contractor shall within a reasonable period of time advise Fort Bend County of the Contractor's proposal for the adjustments, if any, in the contract sum, the schedule of values, and the final completion date attributable to such change by delivering a written notice thereof (the "Proposed Change Order") to Fort Bend County. Such Proposed Change Order shall contain a description of the proposed change and shall set forth the Contractor's estimate of the increase or decrease, if any, in the contract sum and the change, if any, in the schedule of values and the final completion date attributable to such change. If the Contractor desires to make a change in the Project requiring the issuance of a change order, the Contractor shall deliver to Fort Bend County a Proposed Change Order. Upon execution by Fort Bend County, a Proposed Change Order shall constitute (and be defined herein as) a "Change Order" for purposes of this Contract. The Contractor shall forthwith perform the work as changed in accordance with such Change Order. All work performed pursuant to a Change Order shall be performed in accordance with the terms of this Contract. All Proposed Change Orders shall be submitted for approval by Fort Bend County. No action, acquiescence or inaction by Fort Bend County or any representative of Fort Bend County shall be construed to be a waiver of requirements set forth in this Contract in regard to Change Orders or ratification of a violation of such requirements, and all acts in violation of this provision shall be considered void.

14.4.3 Change Order Authorization. Each Change Order shall be signed by Fort Bend County and an authorized representative of the Contractor.

14.4.4 Contract Sum Adjustments. The contract sum and the schedule of values shall be adjusted only as a result of a Change Order requiring such adjustment. Any extra work performed without a proper Change Order shall be considered voluntary and not subject to additional compensation.

Initials of Bidder: _____

The Contractor shall not be entitled to an adjustment in the contract sum (or a Change Order permitting such adjustment) or to damages as a result of any delays in the Project caused by the acts or omissions of Fort Bend County, provided that this sentence is not applicable to delays that constitute more than 90 days in any 365-day period or cause the Project to be interrupted for a continuous period of 45 days through no fault of the Contractor.

- 14.4.5 When Fort Bend County and the Contractor agree upon the adjustments in the contract sum, the schedule of values, and the final completion date attributable to such adjustment, such agreement will be documented by preparation and if approved by the Fort Bend County Commissioners Court, execution of an appropriate Change Order.
- 14.5 Site Access. Prior to the transfer date, Fort Bend County and the Contractor shall have uninterrupted access to the construction site. Subsequent to the transfer date, Fort Bend County will permit the Contractor, the Engineer, and their representatives and subcontractors to enter upon the Project at times reasonably necessary to complete the punch list items.
- 14.6 Applicable Laws and Regulations. Contractor shall in its performance of the Project comply with all applicable laws and regulations. Any delays in the prosecution of the Project caused by any changes in the laws and regulations or the application or enforcement of the laws and regulations may entitle the Contractor to an extension of time.
- 14.7 Familiarity with Project. The Contractor represents and accepts that it has: (a) visited the property(ies), (b) taken such other steps as may be necessary to ascertain the nature and location of the Project and the general and local conditions which affect the Project or the cost thereof, (c) investigated the labor situation as regards to the Project, (d) examined the property(ies), the obstacles which may be encountered and all other observable conditions having a bearing upon the performance of the Project, the superintendence of the Project, the time of completion and all other relevant matters, and (e) reported to Fort Bend County the results of all of the foregoing. The Contractor represents that it is familiar with all phases of the Project and the matters that may affect the Project or its prosecution under this Contract.
- 14.8 Standard of Performance. The Contractor shall prosecute (or cause to be prosecuted) the Project in accordance with the best efforts for the construction and development of projects similar to the Project in the State of Texas, using qualified, careful, and efficient contractors and workers and in conformity with the provisions of this Contract. The Contractor shall perform the work in a good and workmanlike manner.
- 14.9 Warranty of Contractor. The Contractor warrants to Fort Bend County that: (i) the Contractor possesses the skill and knowledge ordinarily possessed by well-

Initials of Bidder: _____

informed members of its trade or profession and the Contractor will use its best efforts to ensure that the services provided under this Contract will be performed, delivered, and conducted in accordance with the best professional standards and in accordance with industry standards, and (ii) the Contractor is fully experienced and properly qualified to perform the class of work provided for herein, and that it is properly equipped, organized and financed to perform such work, and (iii) following the date of acceptance of this Contract, the services provided by the Contractor to Fort Bend County will conform to the representations contained in this Contract, including all attachments, schedules and exhibits. All warranties provided by the Contractor in this Contract shall be cumulative, shall be deemed consistent and not in conflict, are intended to be given full force and effect and to be interpreted expansively to give the broadest warranty protection to Fort Bend County.

- 14.10 Contractor's Personnel. Contractor shall employ only competent, skilled personnel for the Project. Prior to the final completion date, the Contractor shall maintain a superintendent who shall be authorized to act on behalf of the Contractor and with whom Fort Bend County may consult at all reasonable times. The superintendent shall not be transferred from the Project without Fort Bend County's consent (which shall not be unreasonably withheld or delayed); provided, however, the superintendent shall not be assigned solely to the Project and shall be entitled to spend reasonable time working on matters unrelated to the Project so long as such work on other matters does not render the superintendent unavailable to the Project or unavailable to Fort Bend County. However, such obligation to furnish the superintendent and such staff personnel shall not be construed (a) to preclude the promotion within the Contractor's organization of any person assigned to the Project or (b) to give rise to any liability of the Contractor if any person assigned to the Project (including, without limitation, the superintendent) leaves the Contractor's employment. If the superintendent is transferred from the Project, Fort Bend County shall have the right to approve the replacement superintendent (which approval will not be unreasonably withheld or delayed). The Contractor, the Architect, and the other subcontractors shall comply with all applicable health, safety, and loss prevention rules of applicable governmental authorities. The Contractor shall, at its own expense, remove from the Project any person who fails to comply with such rules and instructions. The Contractor shall at all times enforce strict discipline and good order among its employees and shall not employ on the Project any unfit person or anyone not skilled in the work assigned to him. Fort Bend County may, upon written notice to the Contractor, require the Contractor to remove an individual immediately from providing services for the following reasons: violation of the terms and conditions of this Contract; violation of Fort Bend County's or the Contractor's work rules and regulations; criminal activity; or violation of state, federal, or municipal statutes. Fort Bend County may, upon thirty (30) days written notice to the Contractor, require the removal of any individual from providing services without cause.

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- 14.11 Inspection. The Project and all parts thereof shall be subject to inspection from time to time by inspectors designated by Fort Bend County. No such inspections shall relieve The Contractor of any of its obligations hereunder. Neither failure to inspect nor failure to discover or reject any of the work as not in accordance with the drawings and specifications or any provision of this Contract shall be construed to imply an acceptance of such work or to relieve the Contractor of any of its obligations hereunder. Fort Bend County agrees that its right of inspection shall be used reasonably and in a timely manner so as not to delay orderly completion of the Project.
- 14.12 Protection Against Risks. The Contractor shall take all precautions which are necessary and adequate, against conditions created during the progress of the Project which involve a risk of bodily harm to persons or a risk of damage or loss to any property. The Contractor shall regularly inspect all work, materials and equipment to discover and determine any such conditions and shall be responsible for discovery, determination, and correction of any such conditions. The Contractor shall comply with all federal, state, and local occupational hazard and safety standards, codes and regulations applicable in the jurisdiction where the Project is being performed. The Contractor shall include the substance of this clause in its entirety in all subcontracts for any work to be performed at the construction site.
- 14.13 Equipment. Except as expressly provided herein to the contrary, the Contractor shall furnish (or cause to be furnished) all construction, transportation, installation, tools, and other equipment and facilities required for the performance of the Project within the times specified herein. Such equipment and facilities shall be serviceable and kept fit for the uses intended. Defective items shall be removed from the construction site promptly and at the Contractor's cost. The Contractor shall schedule (or cause to be scheduled) its other operations so as to not interfere with its duty to timely furnish the necessary equipment and facilities and personnel to operate the same at the times necessary for the orderly completion of the Project.
- 14.14 Materials. Except as may be specifically provided otherwise in the Contract or approved in advance by Fort Bend County, the Contractor shall provide Fort Bend County with copies of material testing reports and to cause all materials, equipment, and fabricated items incorporated in the Project to be new and of a suitable grade of their respective kinds for their intended use.

15.0 TERMINATION:

- 15.1 Fort Bend County may terminate the Contract if the Contractor:
- 15.1.1 Persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials.

Initials of Bidder: _____

- 15.1.2 Fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractor.
- 15.1.3 Persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction.
- 15.1.4 Otherwise is guilty of substantial breach of a provision of the Contract Documents.
- 15.2 When any of the above reasons exists, Fort Bend County may, without prejudice to any other rights or remedies of Fort Bend County and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:
 - 15.2.1 Take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor.
 - 15.2.2 Finish the Project by whatever reasonable method Fort Bend County may deem expedient.
- 15.3 Either party may terminate this Contract at any time by providing thirty (30) days written notice.
- 15.4 When Fort Bend County terminates the Contract for one of the reasons stated in this section, the Contractor shall not be entitled to receive further payment until the Project is finished. Therefore, the Contractor shall be promptly paid for all work actually and satisfactorily completed.

16.0 COMPLETION, TRANSFER, & ACCEPTANCE:

- 16.1 Final Completion. Upon the occurrence of the final completion date, the punch list items shall be promptly commenced and thereafter completed within thirty (30) days after final completion.
- 16.2 Transfer and Acceptance. Upon the occurrence of final completion, care, custody and control of the Project shall pass to Fort Bend County. As referenced herein, the "Transfer Date" shall mean the date on which the care, custody and control of the Project passes to Fort Bend County. Subsequent to the Transfer Date all risk of loss with respect to the Project shall be by Fort Bend County and the Contractor shall be thereafter obligated to cover the Project with their Insurance.

Initials of Bidder: _____

17.0 SUSPENSION BY FORT BEND COUNTY FOR CONVENIENCE:

- 17.1 Fort Bend County may, without cause, order the Contractor in writing to suspend, delay or interrupt the Project in whole or in part for such period of time as Fort Bend County may determine.
- 17.2 An adjustment shall be made for increase in the cost of performance, caused by suspension, delay or interruption. No adjustment shall be made to the extent:
 - 17.2.1 That performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible.
 - 17.2.2 That an equitable adjustment is made or denied under another provision of this Contract.
- 17.3 Adjustments made in the cost of performance may have a mutually agreed fixed or percentage fee.

18.0 INDEPENDENT CONTRACTOR:

The Contractor shall be an independent contractor and any provisions of this Contract that may appear to give Fort Bend County the right to direct the Contractor as to the details of the manner of doing the Project shall be deemed to mean that the Contractor shall follow the desires of Fort Bend County in the results of the Project only and not in the means whereby the Project is to be accomplished. The Contractor shall be responsible as to the details of completing the Project. Neither the agents, representatives, nor employees of the Contractor, shall be deemed to be the agents, representatives, or employees of Fort Bend County. The Contractor further represents that it accepts a fiduciary role and responsibility with respect to Fort Bend County and will, to its best abilities, act in the best interests of Fort Bend County and the timely completion of the Project. The Contractor agrees and understands that neither it nor any of its agents or employees may act in the name of Fort Bend County except and unless specifically authorized in writing by Fort Bend County to do so. The Contractor shall furnish construction administration and management services and use the Contractor's best efforts to complete the Project in an expeditious and economical manner consistent with the interests of Fort Bend County.

19.0 NOTICE

- 19.1 All written notices, demands, and other papers or documents to be delivered to Fort Bend County under this Contract shall be delivered to the Engineering Department, 301 Jackson, Richmond, Texas 77469, or at such other place or places as Fort Bend County may from time to time designate by written notice delivered to the Contractor. For purposes of notice under this Contract, a copy of any notice or communication hereunder shall also be forwarded to the following address: Fort Bend County, 301 Jackson Street, Richmond, Texas 77469, Attention: County Judge.

Initials of Bidder: _____

- 19.2 All written notices, demands, and other papers or documents to be delivered to the Contractor under this Contract shall be delivered to the Authorized Representative identified in the Contract documents or such other place or places as the Contractor may designate by written notice delivered to Fort Bend County.

20.0 RECORDS:

- 20.1 Fort Bend County shall be the absolute and unqualified owner of all drawings, preliminary layouts, record drawings, sketches and other documents prepared pursuant to the Contract by Contractor.
- 20.2 The Contractor agrees to maintain and preserve for a period of at least five years after the earlier of the expiration of the defects period or termination of this Contract, accurate and complete records relating to the performance of the Project. The Contractor agrees to, upon request, provide Fort Bend County with such records.

21.0 SUCCESSORS & ASSIGNS:

- 21.1 Fort Bend County and the Contractor bind themselves and their successors, executors, administrators and assigns to the other party of this Contract and to the successors, executors, administrators and assigns of such other party, in respect to all covenants of this Contract.
- 21.2 Neither Fort Bend County nor the Contractor shall assign, sublet or transfer its interest in this Contract without the prior written consent of the other.
- 21.3 Nothing herein shall be construed as creating any personal liability on the part of any officer or agent of any public and/or governmental body that may be a party hereto.

22.0 PUBLIC CONTACT:

Contact with the news media, citizens of Fort Bend County or governmental agencies shall be the sole responsibility of Fort Bend County. Under no circumstances, whatsoever, shall Contractor release any material or information developed in the performance of its services hereunder without the express written permission of Fort Bend County, except where required to do so by law.

23.0 MODIFICATIONS:

This instrument contains the entire Contract between the parties relating to the rights herein granted and obligations herein assumed. Any oral or written representations or modifications concerning this instrument shall be of no force and effect excepting a subsequent written modification signed by both parties hereto.

Initials of Bidder: _____

24.0 SILENCE OF SPECIFICATIONS:

The apparent silence of specifications as to any detail, or the apparent omission from it of a detailed description concerning any point, shall be regarded as meaning that only the best commercial practice is to prevail and that only material and workmanship of the finest quality are to be used. All interpretations of specifications shall be made on the basis of this statement. The items furnished under this contract shall be new, unused of the latest product in production to commercial trade and shall be of the highest quality as to materials used and workmanship. Manufacturer furnishing these items shall be experienced in design and construction of such items and shall be an established supplier of the item bid.

25.0 SEVERABILITY:

In the event one or more of the provisions contained in these requirements or the specifications shall for any reason be held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision hereof and these requirements or the specifications shall be construed as if such invalid, illegal, or unenforceable provision had never been contained herein.

26.0 GOVERNING FORMS:

In the event of any conflict between the terms and provisions of these requirements and the specifications, the specifications shall govern. In the event of any conflict of interpretation of any part of this overall document, Fort Bend County's interpretation shall govern.

27.0 TAX EXEMPT:

Fort Bend County is exempt from state and local sales and use taxes under Section 151.309 of the Texas Tax Code. This Contract is deemed to be a separate contract for Texas tax purposes, and as such, Fort Bend County hereby issues its Texas Exemption for the purchase of any items qualifying for exemption under this Contract. Contractor is to issue its Texas Resale Certificate to vendors and subcontractors for such items qualifying for this exemption, and further, contractor should state these items at cost.

28.0 ENTIRE AGREEMENT:

The Parties agree that this Contract contains all of the terms and conditions of the understanding of the parties relating to the subject matter hereof. All prior negotiations, discussions, correspondence and preliminary understandings between the parties and others relating hereto are superseded by this Contract. By entering into this Contract, the parties do not intend to create any obligations, express or implied, other than those specifically set out in this Contract.

29.0 APPLICABLE LAW & VENUE

This Contract shall be construed under and in accord with the laws of the State of Texas, and all obligations of the parties created hereunder are performable in Fort Bend County, Texas, and that

Initials of Bidder: _____

venue for any litigation arising out of or related to this Contract shall lie solely in the court of appropriate jurisdiction located in Fort Bend County, Texas.

30.0 ENCLOSURE:

The following being incorporated herein by reference for all purposes as though fully set forth herein word for word.

Enclosure #1 – Specifications and Plans

31.0 PRICING: Complete excel unit pricing form.

32.0 PROJECT DURATION:

Bidder agrees, if awarded the contract, to complete all work required by the contract documents **within _____ calendar days (maximum 365 days)** after issuance of a purchase order by the County Purchasing Agent and notice to proceed by the Engineering Department.

33.0 AWARD:

This contract will be awarded to the overall lowest and best bid.

34.0 TEXAS ETHICS COMMISSION FORM 1295:

34.1 Effective January 1, 2016 all contracts executed by Commissioners Court, regardless of the dollar amount, will require completion of Form 1295 "Certificate of Interested Parties", per the new Government Code Statute §2252.908. All vendors submitting a response to a formal Bid, RFP, SOQ or any contracts, contract amendments, renewals or change orders are required to complete the Form 1295 online through the State of Texas Ethics Commission website. Please visit: <https://www.ethics.state.tx.us/filinginfo/1295/>

34.2 On-line instructions:

34.2.1 Name of governmental entity is to read: Fort Bend County.

34.2.2 Identification number used by the governmental entity is: B23-049.

34.2.3 Description is the title of the solicitation: Construction of Brandt Road from Precinct Line Road to Mason Road.

34.3 Apparent low bidder(s) will be required to provide the Form 1295 within three (3) calendar days from notification; however, if your company is publicly traded you are not required to complete this form.

Initials of Bidder: _____

35.0 STATE LAW REQUIREMENTS FOR CONTRACTS:

The contents of this section are required by Texas Law and are included by County regardless of content.

- 35.1 Agreement to Not Boycott Israel Chapter 2271 Texas Government Code: Contractor verifies that if Contractor employs ten (10) or more full-time employees and this Agreement has a value of \$100,000 or more, Contractor does not boycott Israel and will not boycott Israel during the term of this Agreement.
- 35.2 Texas Government Code Section 2251.152 Acknowledgment: By signature on vendor form, Contractor represents pursuant to Section 2252.152 of the Texas Government Code, that Contractor is not listed on the website of the Comptroller of the State of Texas concerning the listing of companies that are identified under Section 806.051, Section 807.051 or Section 2253.153.

36.0 HUMAN TRAFFICKING:

By acceptance of this contract, Contractor acknowledges that Fort Bend County is opposed to human trafficking and that no County funds will be used in support of services or activities that violate human trafficking laws

37.0 ADDITIONAL REQUIRED FORMS:

All vendors submitting are required to complete and return with submission:

- 37.1 Vendor Form
- 37.2 W9 Form
- 37.3 Tax Form/Debt/Residence Certification
- 37.4 Contractor Acknowledgement of Stormwater Management Program

Initials of Bidder: _____

**Contract Sheet
Bid 23-049**

**THE STATE OF TEXAS
COUNTY OF FORT BEND**

This memorandum of agreement made and entered into on the _____ day of _____, 20____, by and between Fort Bend County in the State of Texas (hereinafter designated County), acting herein by County Judge KP George, by virtue of an order of Fort Bend County Commissioners Court, and _____ (hereinafter designated Contractor).

(company name)

WITNESSETH:

The Contractor and the County agree that the bid and specifications for the **Construction of Brandt Road from Precinct Line Road to Mason Road for Fort Bend County Mobility Bond Project No. 17310** which are hereto attached and made a part hereof, together with this instrument and the bond (when required) shall constitute the full agreement and contract between parties and for furnishing the items set out and described; the County agrees to pay the prices stipulated in the accepted bid.

It is further agreed that this contract shall not become binding or effective until signed by the parties hereto and a purchase order authorizing the items desired has been issued.

Executed at Richmond, Texas this _____ day of _____, 20_____.

Fort Bend County, Texas

By: _____
County Judge, KP George

By: _____
Signature of Contractor

By: _____
Printed Name and Title

Request for Taxpayer Identification Number and Certification

**Give Form to the
 requester. Do not
 send to the IRS.**

Print or type See Specific Instructions on page 2.	1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.	
	2 Business name/disregarded entity name, if different from above	
	3 Check appropriate box for federal tax classification; check only one of the following seven boxes: <input type="checkbox"/> Individual/sole proprietor or single-member LLC <input type="checkbox"/> C Corporation <input type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate <input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶ _____ Note. For a single-member LLC that is disregarded, do not check LLC; check the appropriate box in the line above for the tax classification of the single-member owner. <input type="checkbox"/> Other (see instructions) ▶ _____	
	4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3): Exempt payee code (if any) _____ Exemption from FATCA reporting code (if any) _____ <i>(Applies to accounts maintained outside the U.S.)</i>	
	5 Address (number, street, and apt. or suite no.)	Requester's name and address (optional)
	6 City, state, and ZIP code	
	7 List account number(s) here (optional)	

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the instructions for line 1 and the chart on page 4 for guidelines on whose number to enter.

Social security number											
				-			-				
or											
Employer identification number											
				-							

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

Sign Here	Signature of U.S. person ▶	Date ▶
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General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. Information about developments affecting Form W-9 (such as legislation enacted after we release it) is at www.irs.gov/fw9.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following:

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)

- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding? on page 2.

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting?* on page 2 for further information.

Note. If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States:

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.
4. The type and amount of income that qualifies for the exemption from tax.
5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,
2. You do not certify your TIN when required (see the Part II instructions on page 3 for details),

3. The IRS tells the requester that you furnished an incorrect TIN,

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code* on page 3 and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships* above.

What is FATCA reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code* on page 3 and the Instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of \$50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a \$500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account, list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

Note. ITIN applicant: Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or "doing business as" (DBA) name on line 2.

c. **Partnership, LLC that is not a single-member LLC, C Corporation, or S Corporation.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulations section 301.7701-2(c)(2)(iii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, "Business name/disregarded entity name." If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

Line 3

Check the appropriate box in line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box in line 3.

Limited Liability Company (LLC). If the name on line 1 is an LLC treated as a partnership for U.S. federal tax purposes, check the "Limited Liability Company" box and enter "P" in the space provided. If the LLC has filed Form 8832 or 2553 to be taxed as a corporation, check the "Limited Liability Company" box and in the space provided enter "C" for C corporation or "S" for S corporation. If it is a single-member LLC that is a disregarded entity, do not check the "Limited Liability Company" box; instead check the first box in line 3 "Individual/sole proprietor or single-member LLC."

Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space in line 4 any code(s) that may apply to you.

Exempt payee code.

- Generally, individuals (including sole proprietors) are not exempt from backup withholding.
- Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.
- Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.
- Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

- 1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)
- 2—The United States or any of its agencies or instrumentalities
- 3—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities
- 4—A foreign government or any of its political subdivisions, agencies, or instrumentalities
- 5—A corporation
- 6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession
- 7—A futures commission merchant registered with the Commodity Futures Trading Commission
- 8—A real estate investment trust
- 9—An entity registered at all times during the tax year under the Investment Company Act of 1940
- 10—A common trust fund operated by a bank under section 584(a)
- 11—A financial institution
- 12—A middleman known in the investment community as a nominee or custodian
- 13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over \$600 required to be reported and direct sales over \$5,000 ¹	Generally, exempt payees 1 through 5 ²
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

¹ See Form 1099-MISC, Miscellaneous Income, and its instructions.

² However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 581

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

Note. You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited Liability Company (LLC)* on this page), enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at www.ssa.gov. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at www.irs.gov/businesses and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting IRS.gov or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, or 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code* earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account ¹
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor ²
4. a. The usual revocable savings trust (grantor is also trustee) b. So-called trust account that is not a legal or valid trust under state law	The grantor-trustee ¹ The actual owner ¹
5. Sole proprietorship or disregarded entity owned by an individual	The owner ³
6. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A))	The grantor*
For this type of account:	Give name and EIN of:
7. Disregarded entity not owned by an individual	The owner
8. A valid trust, estate, or pension trust	Legal entity ⁴
9. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
10. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
11. Partnership or multi-member LLC	The partnership
12. A broker or registered nominee	The broker or nominee
13. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
14. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i)(B))	The trust

¹ List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

² Circle the minor's name and furnish the minor's SSN.

³ You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

⁴ List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships* on page 2.

*Note. Grantor also must provide a Form W-9 to trustee of trust.

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Publication 4535, Identity Theft Prevention and Victim Assistance.

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to phishing@irs.gov. You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at: spam@uce.gov or contact them at www.ftc.gov/idtheft or 1-877-IDTHEFT (1-877-438-4338).

Visit IRS.gov to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

Mandatory Form



Contractor Acknowledgement of Storm Water Management Program

I hereby acknowledge that I am aware of the stormwater management program and standard operating procedures developed by Fort Bend County in compliance with the TPDES General Permit No. TXR040000. I agree to comply with all applicable best management practices and standard operating procedures while conducting my services for Fort Bend County. I agree to conduct all services in a manner that does not introduce illicit discharges of pollutants to streets, stormwater inlets, drainage ditches or any portion of the drainage system. The following materials and/or pollutant sources must not be discharged to the drainage system as a result of any services provided:

1. Grass clippings, leaves, mulch, rocks, sand, dirt or other waste materials resulting from landscaping activities, (except those materials resulting from ditch mowing or maintenance activities)
2. Herbicides, pesticides and/or fertilizers, (except those intended for aquatic use)
3. Detergents, fuels, solvents, oils and/or lubricants, other equipment and/or vehicle fluids,
4. Other hazardous materials including paints, thinners, chemicals or related waste materials,
5. Uncontrolled dewatering discharges, equipment and/or vehicle wash waters,
6. Sanitary waste, trash, debris, or other waste products
7. Wastewater from wet saw machinery,
8. Other pollutants that degrade water quality or pose a threat to human health or the environment.

Furthermore, I agree to notify Fort Bend County immediately of any issue caused by or identified by:

(Company/Contractor)

that is believed to be an immediate threat to human health or the environment.

Contractor Signature

Date

Printed Name

Title

**BRANDT ROAD - PHASE 2
for Fort Bend County
Bid 23-049**

INDEX OF TECHNICAL SPECIFICATIONS

Reference Harris County Standard Engineering Design Specifications (2017 revision) where applicable.

Harris County Specifications

Item No.	Specification Title
102	Clearing and Grubbing
104	Removing Concrete Pavement
110	Roadway Excavation
130	Borrow
132	Embankment
162	Sodding for Erosion Control and Stabilization
165	Hydro-Mulch Seeding (for Erosion Control and Stabilization)
220	Lime Stabilized Subgrade
221	Hydrated Lime and Lime Slurry
340	Hot Mix-Hot Laid Asphaltic Concrete
360	Concrete Pavement
429	Trench Safety System
433	Cement Stabilized Sand Bending and Backfill Material
460	Reinforced Concrete Pipe
465	Remove and Dispose of Exist. Conc. Or Metal Pipe
471	Precast Concrete Manholes and Junction Boxes
472	Inlets
480	Precast Reinforced Concrete Box Sewers
500	Signs
516	Installation of Flex Beam Guardrail
530	Concrete Curb, Concrete Curb and Gutter, Sidewalks and Driveways

Item No.	Specification Title
535	Medians and Directional Islands
536	Coloring Concrete Median Nose (Black)
540	Surface and Base Material
559	Construction Safety Fence
624	Aluminum Signs
646	Roadside Traffic Sign Support
660	Reflectorized Pavement Markings
663	Traffic Buttons and Pavements Markers
665	Work Zone Pavement Markings
671	Traffic Control
672	Flagmen
673	two-way traffic
713	Reinforced Filter Fabric Barrier
719	Inlet Protection Barriers
724	Stabilized Construction Access
730	Concrete Truck Washout Structures
741	Bags
750	Rock Filter Dams
751	SWPPP Inspection and Maintenance

For channel construction of this project, the contractor shall reference Harris County Flood Control, Department of Public Works and Engineering, STANDARD CONSTRUCTION SPECIFICATIONS (2020 revision), when identified in the Bid Form specification reference as "HCFCD"

Harris County Flood Control Specifications

Item No.	Specification Title
02378	Riprap
03310	Concrete

**BRANDT ROAD - PHASE 2
for Fort Bend County
Bid 23-049**

INDEX OF TECHNICAL SPECIFICATIONS

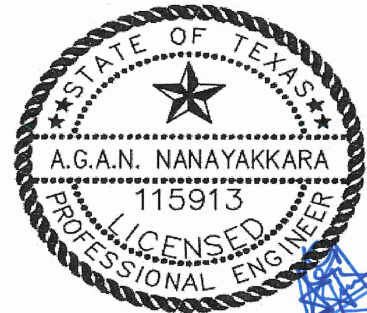
Texas Department of Transportation Standard Specifications

Reference Texas Department of Transportation Standard Specifications for Construction of Highways, Streets and Bridges (2014 revision) where applicable when identified in the Bid Form specification reference as "TxDOT"

Item No.	Specification Title
0105	Removing Treated and Untreated Base and Asphalt Pavement
0400	Excavation and Backfill for Structures
0416	Drilled Shaft Foundations
0420	Concrete Substructures
0422	Concrete Superstructures
0423	Retaining Walls
0425	Precast Prestressed Concrete Structural Members
0432	Riprap
0442	Metal for Structures
0450	Railing
0454	Bridge Expansion Joints
0466	Headwall and Wingwalls
0467	Safety End Treatment
0514	Permanent Concrete Traffic Barrier

Item No.	Specification Title
0540	Metal Beam Guard Fence
0544	Guardrail End Treatments
0556	Pipe Underdrains
0618	Conduit
0620	Electrical Conductors
0621	Tray Cable
0624	Ground Boxes
0628	Electrical Services
0680	Highway Traffic Signals
0682	Vehicle and Pedestrian Signal Heads
0686	Traffic Signal Pole Assemblies (Steel)
0687	Pedestal Pole Assemblies
0688	Pedestrian Detectors and Vehicle Loop Detectors
0690	Maintenance of Traffic Signals

Other specifications to be listed as applicable.
Geotechnical Investigation (included herein)



THE SEAL APPEARING ON THIS
DOCUMENT WAS AUTHORIZED BY
A.G.A.N. NANAYAKKARA, P.E. 115913
ON April 10, 2023

The Murillo Company

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**GEOTECHNICAL INVESTIGATION
BRANDT ROAD EXTENSION
RICHMOND, FORT BEND COUNTY, TEXAS**

**PREPARED BY
THE MURILLO COMPANY
GEOTECHNICAL CONSULTANTS
HOUSTON, TEXAS**

**REPORT NUMBER
GEO24118
(REVISED 2)**

**REPORTED TO
TERRA ASSOCIATES, INC.
HOUSTON, TEXAS**

FEBRUARY 2019

**GEOTECHNICAL INVESTIGATION
BRANDT ROAD EXTENSION
RICHMOND, FORT BEND COUNTY, TEXAS**

INTRODUCTION

The study reported herein is an investigation of the subsurface conditions at the site of an extension to Brandt Road from Mc Cray Road, east to Mason Road in Richmond, Fort Bend County, Texas (Key Map 565 G/H).

AUTHORIZATION

This investigation was authorized on May 24, 2018 by Lyle Henkel, P.E., President of Terra Associates, Inc., in an agreement with this office for Geotechnical Engineering Services.

PURPOSE

The Purpose of this study was to determine the subsurface soil conditions along the street alignment, with particular reference to installation of utilities, bridge and pavement design.

SUBSURFACE EXPLORATION

The Subsurface Exploration at the site was accomplished by means of seventeen (17) undisturbed sample core borings drilled to a depth of twenty (20) feet and two (2) to a depth of seventy five (75) feet below existing ground surface. Approximate locations of the borings are shown on the attached Boring Plan.

SUBSURFACE INVESTIGATION

The Subsurface Investigation consisted of drilling three (3) inch nominal diameter core borings. Undisturbed samples of the cohesive soils were obtained from the borings by means of thin-wall, seamless steel Shelby Tube samplers in accordance with ASTM Method D-1587.

All undisturbed samples were extruded mechanically from the core barrels in the field, classified, wrapped in aluminum foil and sealed in air-tight plastic bags to prevent moisture loss and disturbance. The samples were placed in core boxes and transported to our laboratory for testing and further study.

Where granular soils were encountered, they were sampled with a two (2) inch diameter split-barrel sampler in general accordance with ASTM Method D-1586. Driving resistance for the granular soils is recorded as "Blows per Foot" on the Boring Logs.

LABORATORY INVESTIGATIONS

Boring Logs have been included in this report. The logs present visual descriptions of all soil strata encountered using the Unified Soils Classification System.

All samples from the borings were examined and classified in the laboratory by a senior soils technician or geotechnical engineer in accordance with the Unified Soils Classification System.

Laboratory tests were performed of selected samples in order to evaluate the engineering properties of the foundation medium in accordance with the ASTM Standards.

Undrained shear strengths of selected cohesive soils were determined by unconfined compression tests. The results of these tests are plotted on the Boring Logs as small solid circles.

Water content and dry unit weight of the foundation soils were determined as routine parts of the unconfined compression tests. Liquid and plastic limit tests were also performed on appropriate cohesive soils.

Estimated shear strengths of cohesive samples were also determined in the field with a calibrated hand penetrometer, and these values are plotted on the Boring Logs as open circles.

SUBSURFACE CONDITIONS

Specific types and depths of subsurface strata encountered at the site are shown on the attached Boring Logs. Review of the Boring Logs indicates that the generalized stratigraphy within the areas investigated are approximately as follows:

<u>Depth, Feet</u>	<u>Description of Strata</u>
0 - 20	Very stiff brown clay (CH) or Firm reddish-tan clayey silt (ML) or Firm reddish-tan silty clay (CL) or Firm reddish-tan sandy silt (ML)
20 - 37	Firm reddish-tan silty fine sand (SM), moist or Stiff to plastic brown clay (CH), slickensided
37 - 67	Firm to dense brown, gray and tan silty fine sand (SM), waterbearing or Dense to very dense reddish-tan clayey silt (ML) or Firm sandy silt (ML), waterbearing or Stiff reddish-tan clay (CH)
67 - 75	Stiff reddish-tan clay (CH) or Firm brown silty fine sand (SM), waterbearing

Surface Soils

The near Surface Soils are “CH-ML-CL” type when classified by the Unified Soils Classification System. This type soil normally exhibits moderate to high swell potential during seasonal moisture variations.

Water Table

Ground water was encountered at the site during drilling operations in Borings B10 thru B12 and B15 thru B19 at depths varying from eighteen (18) to twenty six (26) feet below existing ground surface. Drilling fluids were used to advance the boreholes, therefore a final water reading was not recorded. All remaining boreholes were dry upon completion.

SUBSURFACE VARIATIONS

The information contained in this report summarizes conditions encountered on the date and at the locations where the borings were drilled. The depth to a static ground water table and subsurface soil moisture content will vary with seasonal and environmental variations, such as frequency and magnitude of rainfall and future construction activities, which may alter the surface and drainage characteristics of the site. In cohesive soils, fluctuations in ground water depth occur over a longer period than in granular soils.

An accurate evaluation of the steady ground water level requires long-term measurements of monitoring wells and/or piezometers, which was beyond the scope of this study. The ground water level that might occur cannot be accurately predicted based on short-term exploration.

DESIGN ANALYSIS AND RECOMMENDATIONS

Information provided to this office is that construction will include the extension of Brandt Road from the intersection of Mc Crary Road, east to Mason Road, a proposed bridge and installation of utilities. Each will be discussed in subsequent paragraphs.

BRANDT ROAD

The proposed extension of Brandt Road from Mc Crary Road, east to Mason Road is designed as a Major Collector Street.

Based on the review of Laboratory Test Results and typical engineering assumptions, the extension may be constructed using a Portland Cement Concrete Pavement with a minimum thickness of eight (8) inches, if placed on eight (8) inches of stabilized subgrade.

Concrete strength should be equivalent to 3,000 psi compression strength at twenty eight (28) days, and a minimum 500 psi Flexural Strength at seven (7) days. Steel reinforcement should consist of #4 bars spaced twenty four (24) inches in the longitudinal direction and twenty four (24) inches in the transverse direction.

Subgrade preparation after reaching rough grade, should consist of scarifying to a depth of eight (8) inches and stabilizing with thirty (30) pounds of Hydrated Lime per square yard.

The soil mixture should be compacted to a minimum 95% of Standard Proctor Density as determined by the ASTM D-698 Procedure, at Optimum Moisture Content or above.

BRIDGE DESIGN

Information provided to our office is a 3:1 slope with slope pavement will be used at the embankment. If the slope is 3:1 or flatter at the embankment, this is acceptable to TMC.

If fill material is needed at the bridge approach, it should be a non-active sandy clay or clayey sand having a Plasticity Index (P.I.) between 8% and 25%. The fill material should be placed under laboratory control, in no greater than eight (8) inch loose layers, and compacted to a minimum 95% of Standard Proctor

Density as determined by the ASTM D-698 Procedure, at Optimum Moisture Content (0 to +3%).

Analysis of the Boring Logs and Laboratory Testing indicates that the proposed Bridge may be supported by Square Concrete Piles or Drilled Straight Shaft Footings.

AXIAL PILE CAPACITY

Square Concrete Piles

The allowable axial pile capacity was computed for precast Square Concrete Piles. Based on the Boring Logs, we developed a typical profile representative of soil conditions, and computed pile capacities for this profile. In our calculations, we used a limiting value of 1.20 ksf for skin friction of precast concrete piles in the cohesive soils.

The results of computations in the cohesive and non-cohesive soils are presented on the attached Pile Capacity Curves (see Figure 1 and 2). A minimum factor of safety of 2.0 was used to obtain the allowable pile capacity.

The top of pile should be taken at an elevation of 80 feet.

16" Square Concrete Pile (Figure 1)

<u>Length, Ft.</u>	<u>Capacity, Kips</u>
40	75
50	100
60	135
70	190

18" Square Concrete Pile (Figure 2)

<u>Length, Ft.</u>	<u>Capacity, Kips</u>
40	83
50	113
60	154
70	220

Driven Pile Foundation Recommendations

Center-to-center spacing of driven piles should be at least three (3) pile widths. For pile groups with center-to-center spacing greater than three (3) times the pile width, the total capacity will equal the sum of the capacities of the individual piles in the group.

At closer spacing, the pile capacity may be less than the sum of the capacities of the individual pile in the group. For piles aligned in a single row, center-to-center spacing of two (2) times the pile width can be used; the total capacity of the pile group can be still taken as the sum of the capacities of the individual piles.

Pilot holes may be used as a supplementary installation aid. We recommend that the diameter of pilot holes be no larger than about one-half of the pile width, and terminated at a maximum depth of two-thirds the anticipated pile penetration.

Based on our experience, we prefer that the pilot holes be formed using “dry-auger” drilling techniques. This procedure provides a greater control of the dimensions of the drilled holes and reduces the risk of disturbance and loosening of materials that will surround the pile.

We also recommend that the piles be driven immediately after the auger for drilling the pilot holes is withdrawn from the hole. Pilot holes completed in accordance with these recommendations are not expected to adversely influence the axial capacity of the piles. We recommend that jetting not be permitted in making pilot holes.

Proper handling of concrete piles is necessary during transportation and installation to avoid developing high bending stresses that can crack the pile. If cracks develop, the reinforcing steel may become exposed and later corrode, damaging the pile.

Concrete piles are typically designed for the bending stress that may develop during lifting which are dependent on the location of the pickup point(s). The contractor should determine, from the manufacturer, the specific pickup point(s) for the piles being used and lift only at these locations.

Pile driving "refusal" criteria should be established prior to the installation activities, to avoid structurally damaging the precast concrete piles.

Our recommendation is that a maximum driving resistance of eight (8) blows per inch should be considered refusal to avoid structural damage to the concrete piles.

Drilled Straight Shaft Footings

Due to the waterbearing non-cohesive soils encountered in the boreholes, a Bentonite Slurry may be required during installation of Drilled Straight Shafts to stabilize the sides and prevent sloughing below a depth of approximately eighteen (18) feet.

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The allowable capacity was computed for both thirty (30) inch diameter and thirty six (36) inch diameter Drilled Straight Shaft Footings. A minimum Factor of Safety of 2 was used to obtain the allowable pile capacity. The results are presented on the attached Capacity Curve (see Figure 3 and 4).

The top of Drilled Straight Shaft Footings should be taken at an elevation of 80 feet.

<u>Size (Inches)</u>	<u>Depth (Feet)</u>	<u>Total Load (KIPS)</u>
30	40	110
30	50	147
30	60	210
30	70	305
36	40	130
36	50	178
36	60	250
36	70	375

Slurry Pile Installation

A sufficient head of the water/fluid mixture (slurry) should be maintained to ensure that collapse of the sides of the hole does not occur when drilling through the waterbearing non-cohesive layers. Additional water and drilling fluids should be added as the hole is advanced to maintain the balance of pressure.

Placement of concrete should be accomplished immediately after drilling of the circular shafts to prevent changes in the state of stress and caving of the foundation walls. No circular drilled shafts should be poured without the prior approval of the Project's Engineer, Architect or Owner's Representative.

The minimum center-to-center spacing between adjacent drilled shafts should not be less than three (3) times the diameter of the larger shaft, to reduce excessive stress overlap from adjacent footings.

Footing Installation

Each footing excavation should be inspected by the Project's Engineer, Architect, or Owner's Representative prior to placing concrete to insure that (a) the footing has been constructed to the specified dimensions, at the correct depth and in the correct formation established by the previously mentioned criteria, (b) the footing is concentric with the pier shaft or column, and (c) excessive cuttings, build-up and any soft compressible materials have been removed from the bottom of the excavation.

Placement of concrete should start immediately after completion of drilling of the piers to prevent changes in the state of stress and caving of the foundation walls. No footings should be poured without the prior approval of the Project's Engineer, Architect, or Owner's Representative.

STORM SEWERS

The generalized stratigraphy consists of highly plastic clays (CH), silty clays (CL), clayey silts (ML) or sandy silts (ML) to the full depth explored at twenty (20) feet. Static water level at each borehole is shown on the attached Boring Logs.

Bedding for Storm Sewers should be in accordance with the **City of Houston Department of Public Works and Engineering Infrastructure Design Manual, July 2018, latest revision or equivalent local authority.**

The following table summarizes the City of Houston Storm Sewer Bedding Requirements for various soil conditions and pipe diameters.

<u>Soil Condition</u>	<u>Bedding Requirements</u>
Stable Soils	Drawing 2317-02
	Drawing 2317-03
	Drawing 2317-05
	Drawing 2317-06
Unstable Soils	Drawing 2317-07

Segments of Storm Sewer placed in a waterbearing strata will require a six (6) inch thick reinforced concrete slab, as specified on Drawing 2317-07. An alternative detail includes the use of a twelve (12) to eighteen (18) inch thick

crushed stone foundation wrapped with a geotextile as specified on Drawing 2317-06 for wet stable trenches.

Unstable soil conditions are defined by the **City of Houston Department of Public Works and Engineering Infrastructure Design Manual, July 2018, latest revision or equivalent local authority**, as when ground water inflow or high water content causes soil disturbances, such as sloughing, sliding, boiling, heaving or loss of density.

TRENCHING AND SHORING

Recommendations for excavations and trenching contained herein are in accordance with proposed Occupational Safety and Health Administration (OSHA) revisions to 29 CFR, Part 1926, Subpart P published in Federal Register Vol. 54, No. 209 dated October 31, 1989.

The proposed changes permit excavations deeper than five (5) feet with: (a) safe inclined sides or (b) vertical sides supported by a shoring system.

Maximum side slopes permitted by the proposed standards depend on the soil classification and its characteristics. Within the area of our investigation, the soils encountered from the ground to six (6) foot depth are classified as clays

and silty clays, having sufficient shear strength or in-place density to be classified as Type "B" by the OSHA Standards. The clayey silt and sandy silt should be classified as Type "C". Static water levels at each borehole location are shown on the attached Boring Logs.

Although no wet sand conditions were encountered in Borings B1 thru B9, B13 and B14, if found during time of excavation, those soils should be classified as Type "C".

Trenches with vertical sides should utilize a retention system which is designed in accordance with the OSHA guidelines for the type of soils described above. The OSHA regulations in Appendix C contain specific design information that can be used when timber shoring is provided as a method of protection against cave-ins. Other systems of support, such as steel sheet piles, are permitted provided that they are designed by a qualified person or engineer.

SITE PREPARATION

In order to remedy construction problems which may develop if attempts are made to work the surface materials following prolonged periods of rainfall, it is recommended that prior to starting any work at the site, proper construction drainage be provided to maintain a relatively dry construction site.

CONSTRUCTION MATERIALS TESTING

The Murillo Company (TMC) should be retained to provide Construction Materials Testing (CMT) and observation services during construction, particularly during all foundation installation and earthwork related activities. As the Geotechnical Engineer of Record, it is important that our technical personnel provide these services to help ensure that our design recommendations are interpreted properly and that actual field conditions are those described in our geotechnical report.

With TMC's involvement in the project during the construction phase, we can help avoid potential problems before they become a significant issue. This can only be an effective process if our technical personnel routinely visit the project site and perform appropriate tests and observations during construction.

By continuing our involvement on the project after the geotechnical design phase, and by providing the CMT services during construction, a single point of contact is established for the owner regarding TMC's services for the project.

LIMITATIONS

This report was intended for the exclusive use of Client or Their Representative, and is applicable only for the project and property identified herein. As to any other property or project, this report is informational only and is not a recommendation for any design of any other structure. It is not to be used for any other purpose or property and is specifically not to be used as a basis to design any other structure.

An environmental assessment of the site or identification or prevention of pollutants, hazardous materials or conditions was not in our scope of services for this project and any reference in this report is provided for information purposes only. Your receipt of this report signifies your agreement to hold harmless The Murillo Company from any liability whatsoever if this report is used for, or the basis of, a design of any other structure.

Respectfully submitted,



Daniel Gutierrez, P.E.
Vice President

February 21, 2019

Copies submitted:

Terra Associates, Inc. (1)
File (1)



The Murillo Company

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APPENDIX

Boring Plan

Boring Logs B1 - B19

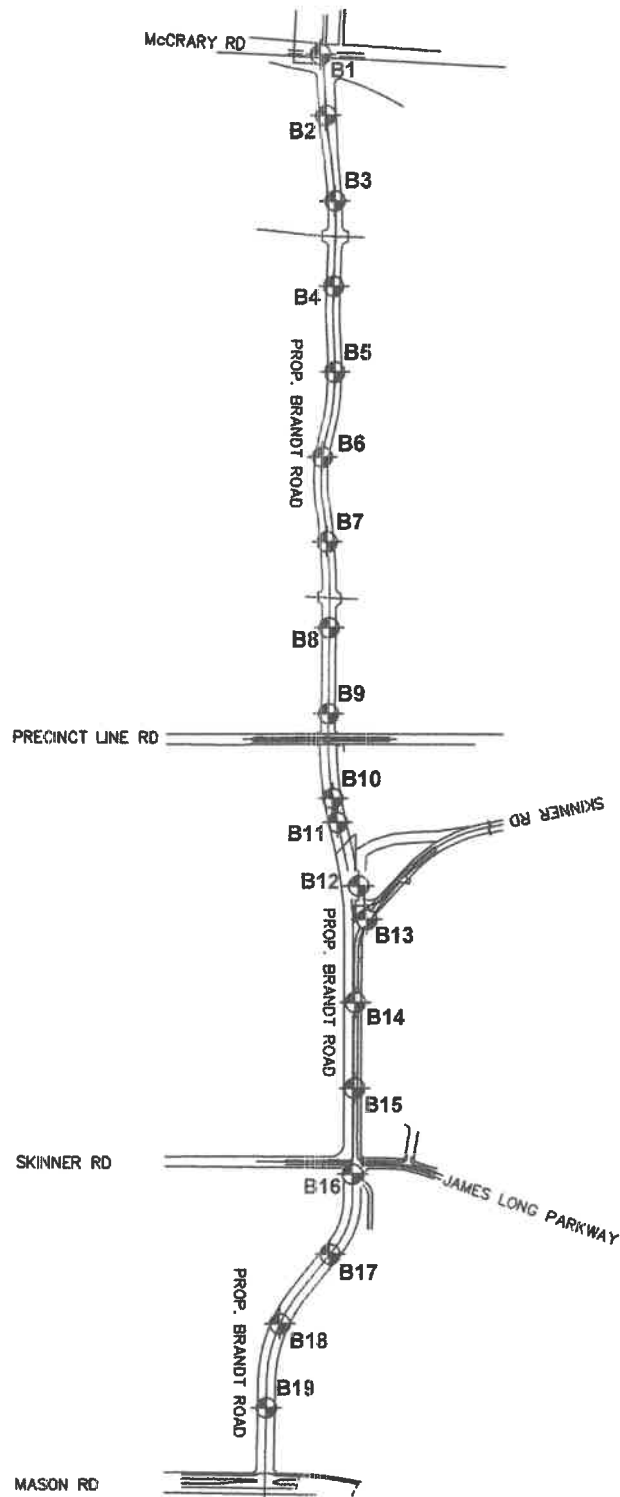
Pile Capacity Curves (Figures 1 - 4)

Test Methods Used

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NOT TO SCALE

BORING PLAN
GEO24118
FEBRUARY 2019

BORING LOG B1

Sheet 1 of 1



The Murillo Company
 10325 Landsbury Drive, Suite 400
 Houston, TX, 77099
 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-24-18

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf					
												○ POCKET PENETROMETER					● LABORATORY UNCONFINED
												0.5	1.0	1.5	2.0	2.5	
0			Reddish-tan silt w/Surface Vegetation														
5			Firm reddish-tan clayey silt		7	30	16	14			6						
10			Firm reddish-tan silty clay		13	23	19	4			10						
15			Firm reddish-tan silty clay								6						
20			Very stiff reddish-tan clay, slickensided	95	32												
20			Termination depth = 20 feet depth														
25																	
30																	
35																	
40																	

LOG A GNGN05 GEO24118.GPJ LOG A GNGN05.GDT 9/27/18

WATER OBSERVATIONS:
 NO WATER ENCOUNTERED DURING DRILLING

BORING LOG B2



The Murillo Company
 10325 Landsbury Drive, Suite 400
 Houston, TX, 77099
 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-24-18

DEPTH, ft	SYMBOL CORES	DESCRIPTION	UNIT DRY WEIGHT PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf									
											0.5	1.0	1.5	2.0	2.5					
0		Firm reddish-tan clayey silt w/Surface Vegetation		12	33	17	16													
5										4										
6				13	23	20	3			6										
9										9										
15		Firm reddish-tan silty clay								7										
20		Very stiff reddish-tan clay																		
20		Termination depth = 20 feet depth																		
25																				
30																				
35																				
40																				

WATER OBSERVATIONS:
 NO WATER ENCOUNTERED DURING DRILLING

LOG A GNGN05 GEO24118.GPJ LOG A GNGN05.GDT 9/27/18

BORING LOG B3



The Murillo Company
 10325 Landsbury Drive, Suite 400
 Houston, TX, 77099
 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-24-18

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf					
												○ POCKET PENETROMETER					● LABORATORY UNCONFINED
												0.5	1.0	1.5	2.0	2.5	
0			Firm dark brown silty clay w/Surface Vegetation		11	40	17	23									
5			Very stiff reddish-tan silty clay		12	31	16	15									
9			Firm reddish-tan sandy silt														
15					8	20	20	0									
20			Termination depth = 20 feet depth														

LOGA GNGN05 GEO24118.GPJ LOGA GNGN05.GDT 9/27/18

WATER OBSERVATIONS:
 NO WATER ENCOUNTERED DURING DRILLING

BORING LOG B4

Sheet 1 of 1



The Murillo Company
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PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-24-18

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf					
												○					●
												0.5	1.0	1.5	2.0	2.5	
0			Very stiff dark brown to brown silty clay w/Surface Vegetation	122	12	44	17	27									●
5			Firm reddish-tan sandy silt								8						
10			Firm reddish-tan sandy silt		16	22	20	2			11						
15			Stiff reddish-tan clay								5						
20			Firm reddish-tan sandy silt		15	22	18	4			13						
20			Termination depth = 20 feet depth														
25																	
30																	
35																	
40																	

LOG A GNGN05 GEO24118.GPJ LOG A GNGN05.GDT 9/27/18

WATER OBSERVATIONS:
 NO WATER ENCOUNTERED DURING DRILLING

BORING LOG B5

Sheet 1 of 1



The Murillo Company
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 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-24-18

DEPTH, ft	SYMBOL CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf					
											○ POCKET PENETROMETER					● LABORATORY UNCONFINED
											0.5	1.0	1.5	2.0	2.5	
0		Firm reddish-tan silt w/Surface Vegetation		5	22	20	2									
5		Firm reddish-tan sandy silt								6						
7										7						
6				15	23	20	3			6						
10		Stiff brown sandy clay	118	15	26	15	11									
11																
15		Firm reddish-tan clayey silt														
11				15	26	18	8			11						
15																
20		Firm tan silty fine sand w/clay layers														
12																
20		Termination depth = 20 feet depth														
20																
25																
25																
30																
30																
35																
35																
40																
40																

LOG A GNGN05 GEO24118.GPJ LOG A GNGN05.GDT 9/27/18

WATER OBSERVATIONS:
 NO WATER ENCOUNTERED DURING DRILLING

BORING LOG B6

Sheet 1 of 1



The Murillo Company
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PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-16-18

DEPTH, ft	SYMBOL CORES	DESCRIPTION	UNIT DRY WEIGHT, pcf	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf				
											○	●	○	●	○
0		Very stiff dark brown clay w/Surface Vegetation									0.5	1.0	1.5	2.0	2.5
5		Very stiff dark brown silty clay	115	17	49	19	30								
5		Stiff brown silty clay	109	18	35	16	19				9				
10		Firm reddish-tan sandy silt													
15		Stiff brown clay									5				
15		Very stiff reddish-tan clay, slickensided	84	41	90	29	61								
20		Termination depth = 20 feet depth													
25															
30															
35															
40															

LOG A GNGN05 - GEO24118.GPJ LOG A GNGN05.GDT 9/27/18

WATER OBSERVATIONS:
 NO WATER ENCOUNTERED DURING DRILLING

BORING LOG B7



The Murillo Company
 10325 Landsbury Drive, Suite 400
 Houston, TX, 77099
 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-16-18

DEPTH, ft	SYMBOL CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf									
											○ POCKET PENETROMETER ● LABORATORY UNCONFINED									
0		Stiff reddish-tan clay w/silt seams and Surface Vegetation		19	66	23	43													
5		Very stiff reddish-tan clay	111	18	52	19	33													
		Very stiff reddish-tan silty clay w/silt layers								7										
10		Firm reddish-tan sandy silt								13										
15		Very stiff reddish-tan silty clay		30	43	17	26			7										
20		Very stiff reddish-tan clay																		
		Termination depth = 20 feet depth																		

LOG A GNGND5 GEO24118.GPJ LOG A GNGND5.GDT 9/27/18

WATER OBSERVATIONS:
 NO WATER ENCOUNTERED DURING DRILLING

BORING LOG B8

Sheet 1 of 1



The Murillo Company
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PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-16-18

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf
0			Very stiff dark brown clay w/Surface Vegetation	121	11	56	21	35				○ POCKET PENETROMETER ● LABORATORY UNCONFINED
5			Very stiff reddish-tan silty clay								21	● 2.0
			Very stiff reddish-tan clay								19	● 2.0
10				107	24	63	23	40				● 2.0
15				116	15							● 2.0
			Firm reddish-tan clayey silt, dry								14	
20			Termination depth = 20 feet depth									
25												
30												
35												
40												

LOG A.GNGN05 GEO24118.GPJ LOG A.GNGN05.GDT 9/27/18

WATER OBSERVATIONS:
 NO WATER ENCOUNTERED DURING DRILLING

BORING LOG B9



The Murillo Company
 10325 Landsbury Drive, Suite 400
 Houston, TX, 77099
 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-16-18

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf						
												0.5	1.0	1.5	2.0	2.5		
0			Very stiff dark brown clay w/Surface Vegetation									●	○					
5			Firm reddish-tan clayey silt	104	5	23	20	3			20							
10			Firm reddish-tan sandy silt		5	29	16	13			22							
15					11	26	19	7			9							
20			Termination depth = 20 feet depth								14							
25																		
30																		
35																		
40																		

LOG A GNGN05 GEO24118.GPJ LOG A GNGN05.GDT 9/27/18

WATER OBSERVATIONS:
 NO WATER ENCOUNTERED DURING DRILLING

BORING LOG B10



The Murillo Company
 10325 Landsbury Drive, Suite 400
 Houston, TX, 77099
 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-16-18

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf								
												○ POCKET PENETROMETER ● LABORATORY UNCONFINED								
0			Very stiff brown clay w/Surface Vegetation	108	17	81	26	55												
5			Very stiff reddish-tan clay	100	25															
10																				
15			Firm reddish-tan clayey silt, waterbearing	106	21	78	24	54												
20																				
20			Termination depth = 20 feet depth																	
25																				
30																				
35																				
40																				

LOG A GNGN05 GEO24118.GPJ LOG A GNGN05.GDT 9/27/18

WATER OBSERVATIONS:
 ∇ : WATER ENCOUNTERED AT 18.0 FT. DURING DRILLING.

BORING LOG B11

Sheet 1 of 1



The Murillo Company
 10325 Landsbury Drive, Suite 400
 Houston, TX, 77099
 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-15-18

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf						
												0.5	1.0	1.5	2.0	2.5		
0			Very stiff brown clay w/Surface Vegetation	101	22	73	24	49				●						
10			Very stiff reddish-tan clay, slickensided	102	24	66	24	42				○						
20			Firm reddish-tan silt fine sand, moist	102	23						10	●						
30			Very dense to dense gray and tan silty fine sand, waterbearing								14							
40				Firm brown silty fine sand, waterbearing								12						
50						19	17	16	1				65					
60			Very dense to dense reddish-tan clayey silt w/pea gravel, waterbearing								34							
70			Stiff reddish-tan clay								21							
75			Termination depth = 75 feet depth								19							
80											45							

LOG A GNGN05 GEO24118.GPJ LOG A GNGN05.GDT 9/26/18

WATER OBSERVATIONS:
 ∇ : WATER ENCOUNTERED AT 23.0 FT. DURING DRILLING.

BORING LOG B12

Sheet 1 of 1



The Murillo Company
 10325 Landsbury Drive, Suite 400
 Houston, TX, 77099
 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-26-18

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf				
												○ POCKET PENETROMETER ● LABORATORY UNCONFINED				
												0.5	1.0	1.5	2.0	2.5
0			Very stiff brown clay w/Surface Vegetation													
			Very stiff reddish-tan clay	112	17											
				101	21						9					
10																
			Stiff to plastic brown clay, slickensided	80	42											
20				86	35											
			Stiff to plastic brown clay													
30				82	41											
40			Firm brown silty fine sand w/pea gravel, waterbearing								12					
											18					
50			Firm reddish-tan sandy silt, waterbearing								12					
											14					
60			Stiff reddish-tan clay								15					
			Firm brown silty fine sand, waterbearing			18	16	2			17					
70											17					
			Termination depth = 75 feet depth								23					
80																

LOG A GNGN05 GEO24118.GPJ LOG A GNGN05.GDT 9/26/18

WATER OBSERVATIONS:
 ∇ : WATER ENCOUNTERED AT 26.0 FT. DURING DRILLING.

BORING LOG B13

Sheet 1 of 1



The Murillo Company
 10325 Landsbury Drive, Suite 400
 Houston, TX, 77099
 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-14-18

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf						
												0.5	1.0	1.5	2.0	2.5		
0			Very stiff brown clay w/Surface Vegetation	99	24	32	16	16				●	○					
5			Stiff reddish-tan clay w/silt seams								5							
6			Very stiff reddish-tan clay, slickensided	91	31						6	●	○					
15			Stiff brown clay, slickensided	91	26	83	27	56				●	○					
20			Termination depth = 20 feet depth															
25																		
30																		
35																		
40																		

LOG A GNGN05 GEO24118.GPJ LOG A GNGN05.GDT 9/27/18

WATER OBSERVATIONS:
 NO WATER ENCOUNTERED DURING DRILLING

BORING LOG B14

Sheet 1 of 1



The Murillo Company
 10325 Landsbury Drive, Suite 400
 Houston, TX, 77099
 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-14-18

DEPTH, ft	SYMBOL CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf									
											○ POCKET PENETROMETER ● LABORATORY UNCONFINED									
0		Stiff brown clay		20	42	18	24													
5		Very stiff reddish-tan clay w/silt seams	108	8	28	17	11													
7		Firm reddish-tan sandy silt								7										
10										10										
15		Firm reddish-tan sandy silt, waterbearing		4	20	20	0			7										
20		Termination depth = 20 feet depth								5										
25																				
30																				
35																				
40																				

LOG A GNGN05 GEO24118.GPJ LOG A GNGN05.GDT 9/27/18

WATER OBSERVATIONS:
 NO WATER ENCOUNTERED DURING DRILLING

BORING LOG B15

Sheet 1 of 1



The Murillo Company
 10325 Landsbury Drive, Suite 400
 Houston, TX, 77099
 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-14-18

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf							
												0.5	1.0	1.5	2.0	2.5			
0			Very stiff brown clay w/Surface Vegetation		22	82	25	57											
5			Very stiff brown clay w/silt seams	118	13	55	20	35											
8			Very stiff reddish-tan silty clay																
10			Firm reddish-tan silty fine sand, dry																
15			Firm reddish-tan silty fine sand, waterbearing ▽																
20			Termination depth = 20 feet depth		21	20	19	1											
25																			
30																			
35																			
40																			

LOG A GNGN05 GEO24118.GPJ LOG A GNGN05.GDT 9/27/18

WATER OBSERVATIONS:
 ▽ : WATER ENCOUNTERED AT 18.0 FT. DURING DRILLING.

BORING LOG B16

Sheet 1 of 1



The Murillo Company
 10325 Landsbury Drive, Suite 400
 Houston, TX, 77099
 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-10-18

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf
												○ POCKET PENETROMETER ● LABORATORY UNCONFINED
												0.5 1.0 1.5 2.0 2.5
0			Very stiff brown clay w/slickensides and Surface Vegetation	99	24	70	24	46				●
5			Very stiff reddish-tan silty clay	117	15	49	19	30				○ ●
10			Firm reddish-tan sandy silt								7	
15			Firm reddish-tan sandy silt, moist to waterbearing								8	
20			Termination depth = 20 feet depth								10	
25												
30												
35												
40												

LOG A GNGN05 GEO24118.GPJ LOG A GNGN05.GDT 9/27/18

WATER OBSERVATIONS:
 ∇ : WATER ENCOUNTERED AT 18.0 FT. DURING DRILLING.

BORING LOG B17

Sheet 1 of 1



The Murillo Company
 10325 Landsbury Drive, Suite 400
 Houston, TX, 77099
 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-10-18

DEPTH, ft	SYMBOL CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf					
											0.5	1.0	1.5	2.0	2.5	
0		Very stiff brown clay w/Surface Vegetation	105	21	72	24	48				●					
5		Very stiff reddish-tan clay									○					
8		Very stiff reddish-tan silty clay	113	17							●					
10		Firm reddish-tan silty fine sand								8						
15		Firm reddish-tan silty fine sand		17	24	21	3			5						
18		Firm reddish-tan silty fine sand, waterbearing ▽								4						
20		Termination depth = 20 feet depth														
25																
30																
35																
40																

LOG A GNGN05 GEO24118.GPJ LOG A GNGN05.GDT 9/27/18

WATER OBSERVATIONS:

▽: WATER ENCOUNTERED AT 18.0 FT. DURING DRILLING.

BORING LOG B18



The Murillo Company
 10325 Landsbury Drive, Suite 400
 Houston, TX, 77099
 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-10-18

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf							
												○ POCKET PENETROMETER ● LABORATORY UNCONFINED							
0			Very stiff brown clay w/Surface Vegetation	103	21	61	24	37				0.5 1.0 1.5 2.0 2.5							
4			Stiff to very stiff reddish-tan clay, slickensided																
5					96	25													
7				95	28	76	24	52											
10			Firm reddish-tan sandy silt, waterbearing																
15																			
18																			
20			Termination depth = 20 feet depth																
25																			
30																			
35																			
40																			

LOG A GNGND5 GEO24118.GPJ LOG A GNGND5.GDT 9/27/18

WATER OBSERVATIONS:
 ∇ : WATER ENCOUNTERED AT 18.0 FT. DURING DRILLING.

BORING LOG B19

Sheet 1 of 1



The Murillo Company
 10325 Landsbury Drive, Suite 400
 Houston, TX, 77099
 OFFICE: 281-933-9702

PROJECT: BRANDT ROAD
 PROJECT NO.: GEO24118
 LOCATION: SEE BORING PLAN
 DATE: 8-10-18

DEPTH, ft	SYMBOL	CORES	DESCRIPTION	UNIT DRY WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	PERCENT PASSING NO. 200 SIEVE	PERCENT CLAY CONTENT	BLOWS PER FOOT	SHEAR STRENGTH, tsf
0			Very stiff brown silty clay w/Surface Vegetation	106	17	47	16	31				<div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; padding-bottom: 2px;"> 0.5 1.0 1.5 2.0 2.5 </div> <div style="display: flex; justify-content: space-between; align-items: center;"> ○ POCKET PENETROMETER ● LABORATORY UNCONFINED </div>
5			Firm reddish-tan silty clay		27	34	17	17			2	
10			Stiff reddish-tan clay w/silt seams		28	50	22	28			3	
15			Stiff brown clay	89	34	77	24	53			5	
18			Firm reddish-tan sandy silt, waterbearing								4	
20			Termination depth = 20 feet depth									

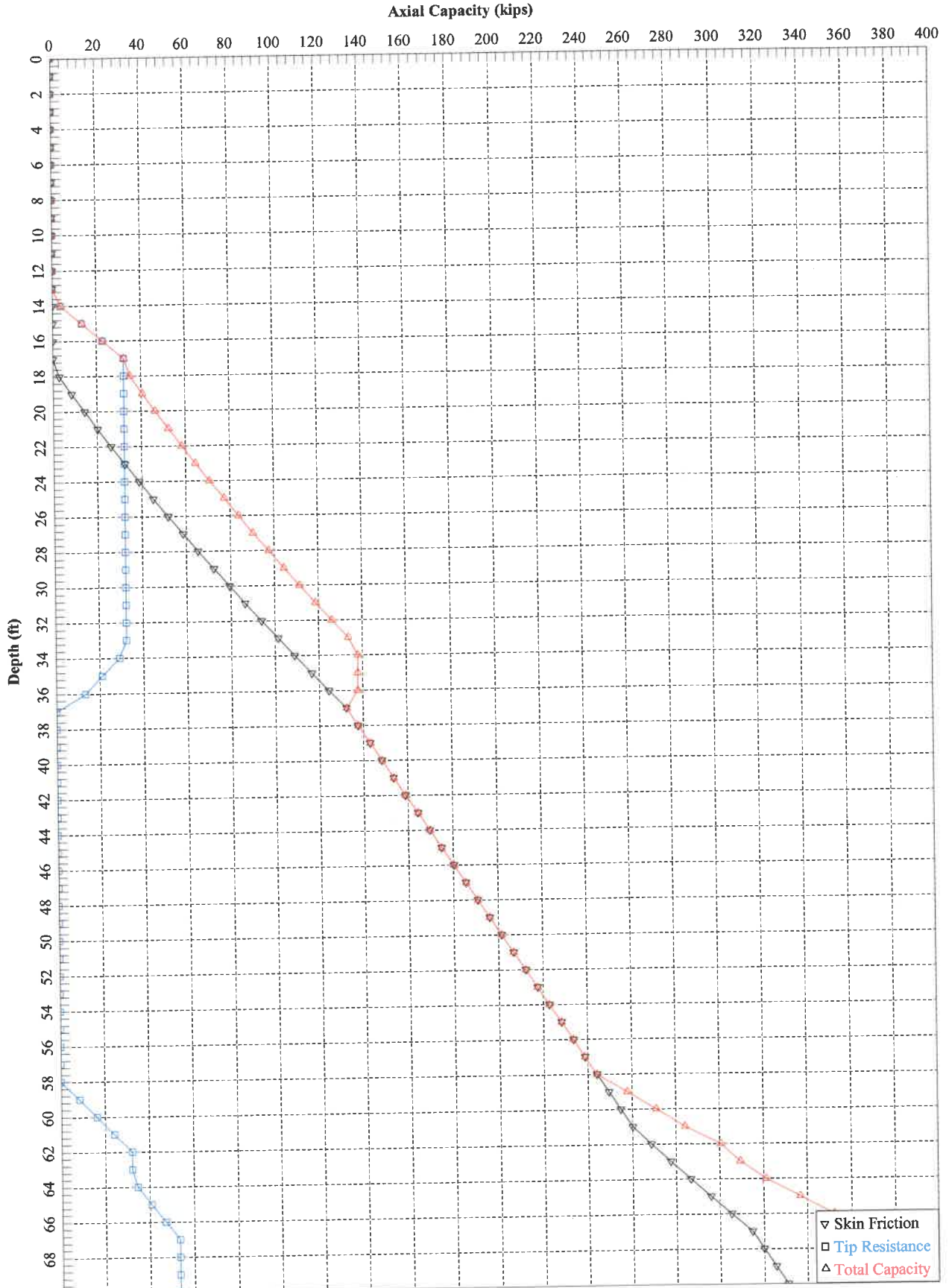
WATER OBSERVATIONS:

▽: WATER ENCOUNTERED AT 18.0 FT. DURING DRILLING.

LOG A GNGN05 GEO24118.GPJ LOG A GNGN05.GDT 9/27/18

The Murillo Company

10325 LANDBURY STE. 400 • HOUSTON, TX 77099-4299
PHONE (281) 933-9702 • FAX (281) 933-1051



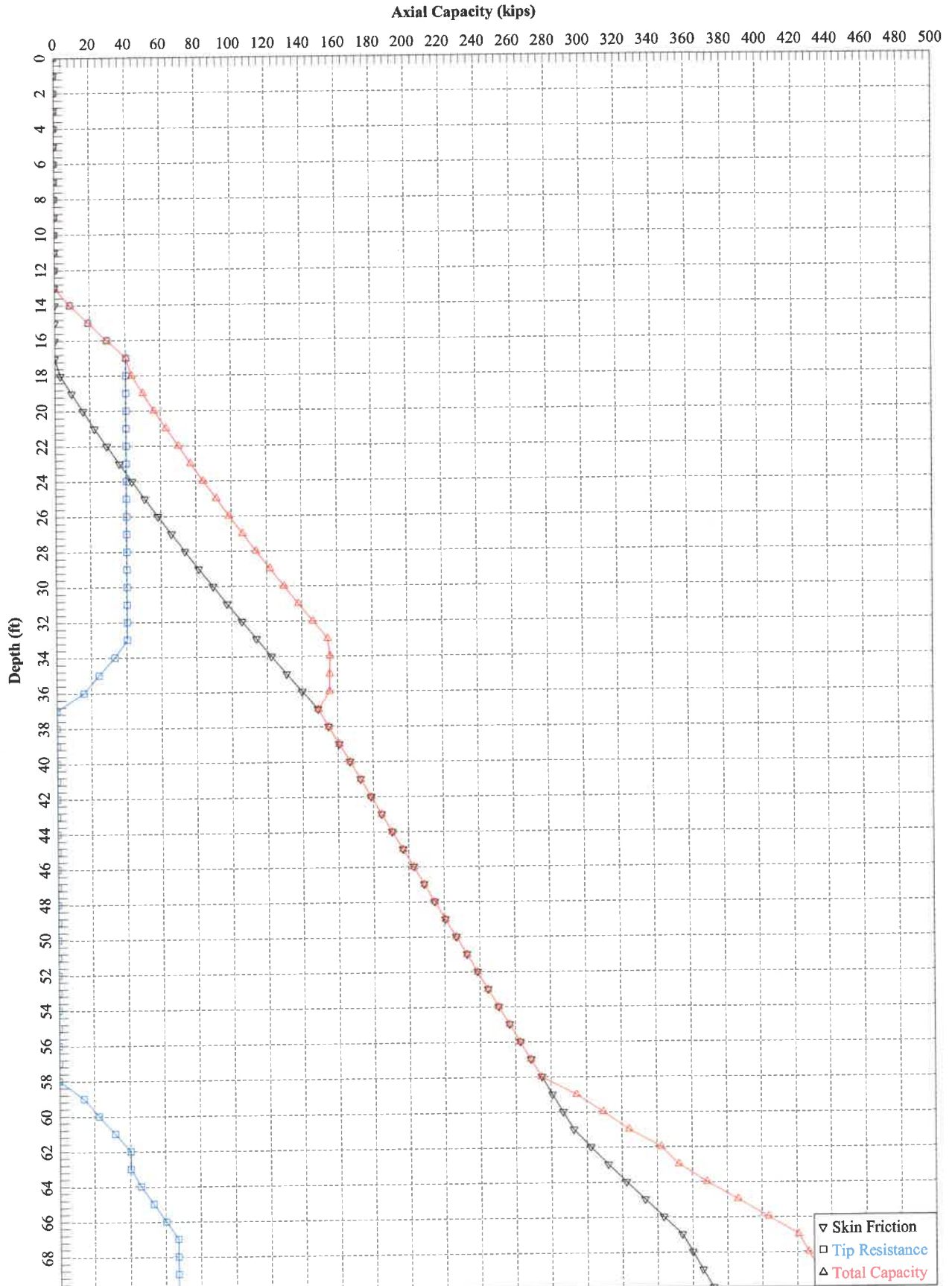
*Values given are Ultimate Capacity

16 Inch Square Concrete Pile

GEO24118
FIGURE 1

The Murillo Company

10325 LANDBURY STE. 400 • HOUSTON, TX 77099-4296
PHONE (281) 933-9702 • FAX (281) 933-1051



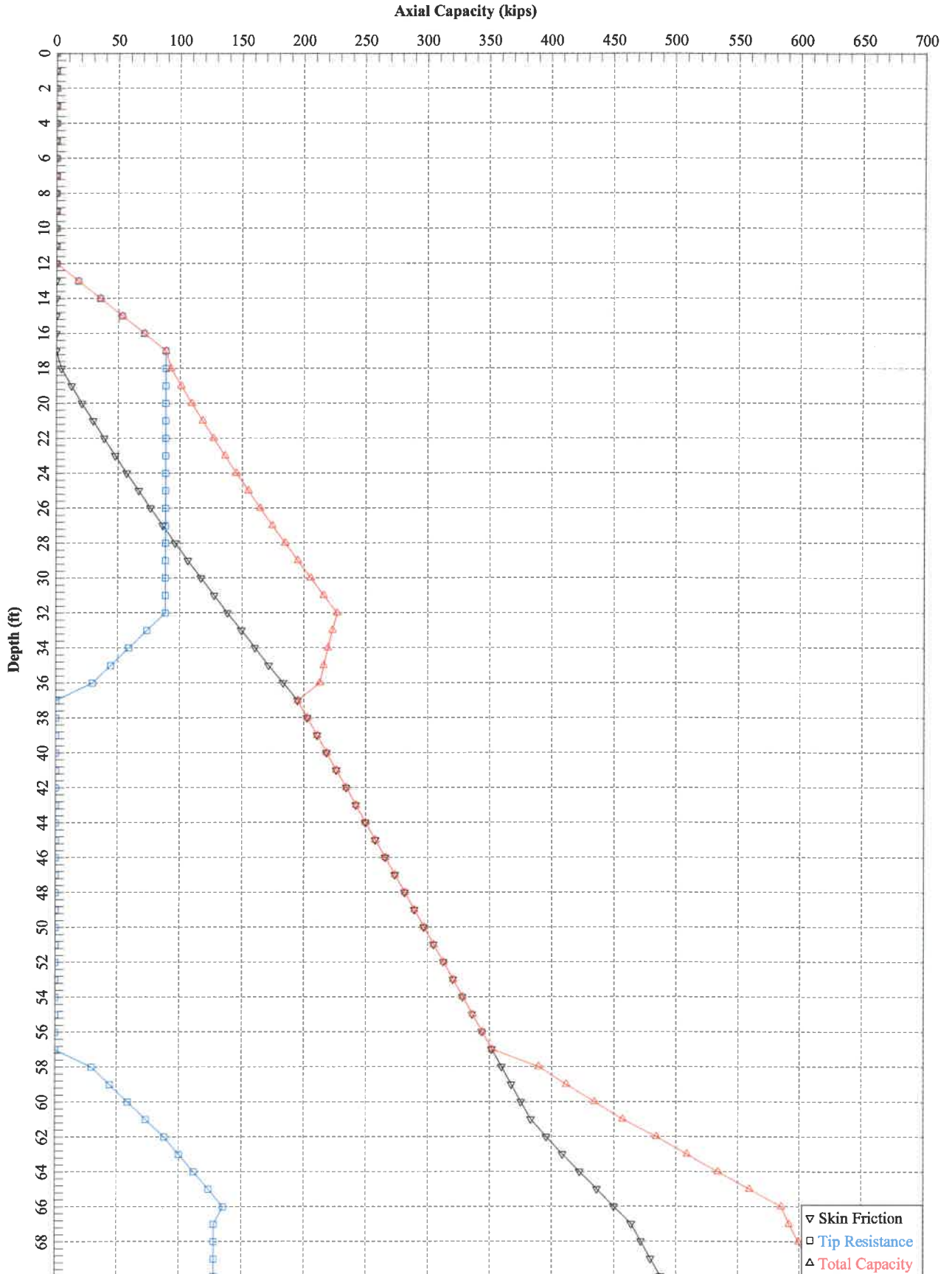
*Values given are Ultimate Capacity

18 Inch Square Concrete Pile

GEO24118
FIGURE 2

The Murillo Company

10325 LANDBURY STE. 400 • HOUSTON, TX 77099-4299
PHONE (281) 933-9702 • FAX (281) 933-1051



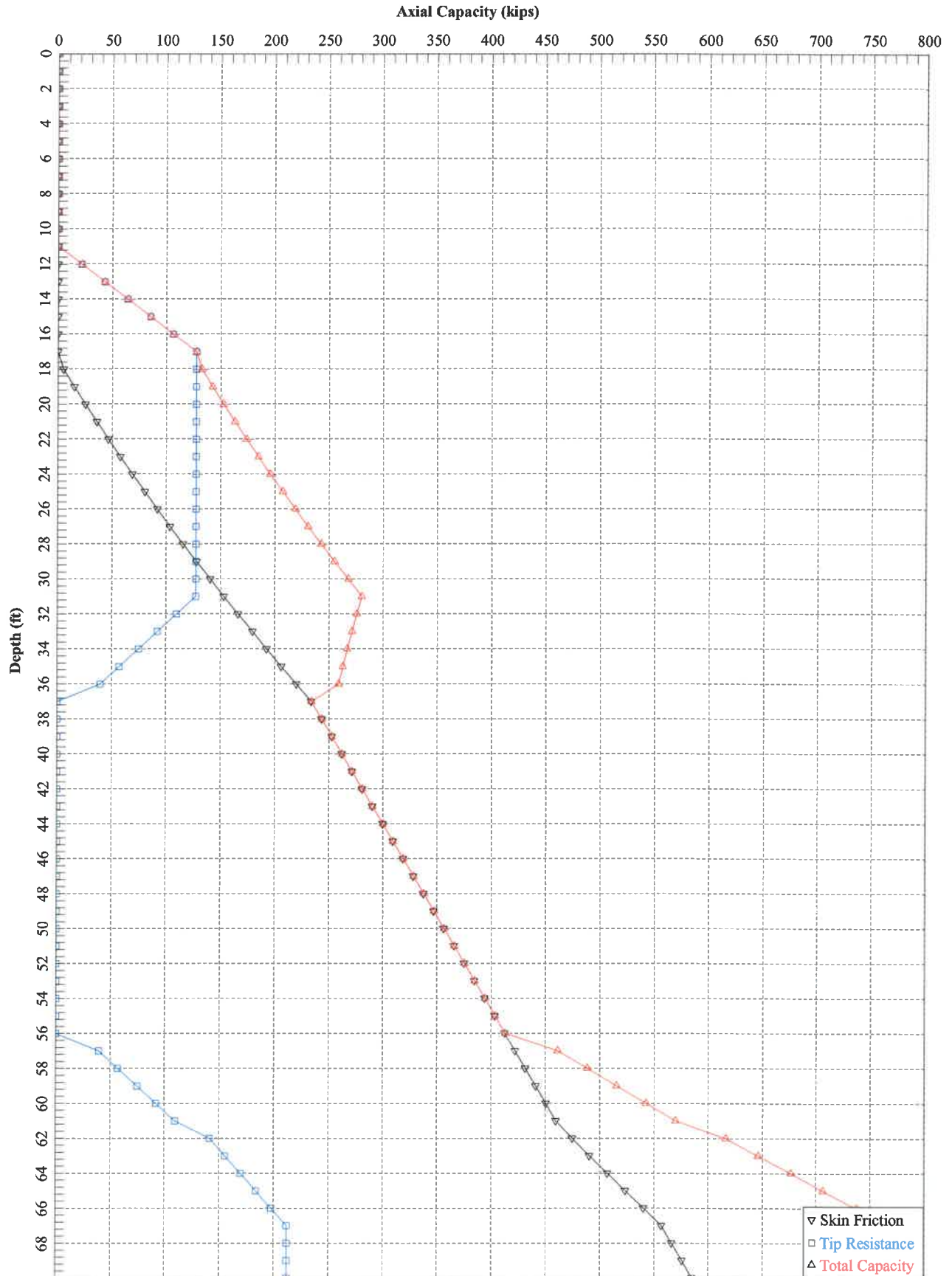
*Values given are Ultimate Capacity

30 Inch Diameter Straight Shaft

GEO24118
FIGURE 3

The Murillo Company

10325 LANDBURY STE. 400 • HOUSTON, TX 77099-4299
PHONE (281) 933-9702 • FAX (281) 933-1051



*Values given are Ultimate Capacity

36 Inch Diameter Straight Shaft

GEO24118
FIGURE 4

TEST METHODS USED (If Applicable)

- ASTM D421 – Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constant
- ASTM D422 – Particle Size Analysis of Soils
- ASTM D698 – Moisture Density Relations (Standard Proctor)
- ASTM D854 – Specific Gravity of Soils
- ASTM D1140 – Amount of Material in Soils Finer than No. 200 Sieve
- ASTM D1557 – Moisture Density Relations (Modified Proctor)
- ASTM D1883 – CBR (California Bearing Ratio) of Laboratory-Compacted Soils
- ASTM D2166 – Unconfined Compressive Strength of Cohesive Soil
- ASTM D2216 – Water Content of Soil, Rock, and Soil-Aggregate Mixtures
- ASTM D2217 – Wet Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Content
- ASTM D2435 – One-Dimensional Consolidation Properties of Soils
- ASTM D2487 – Classification of Soils for Engineering Purposes
- ASTM D2850 – Unconsolidated, Undrained Strength of Cohesive Soils in Triaxial Compression
- ASTM D4318 – Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D4546 – One-Dimensional Swell or Settlement Properties of Cohesive Soils

FORT BEND COUNTY ENGINEERING DEPARTMENT

BRANDT ROAD

PRECINCT LINE RD TO MASON RD FORT BEND COUNTY, TEXAS

2017 MOBILITY PROJECT NUMBER 17310

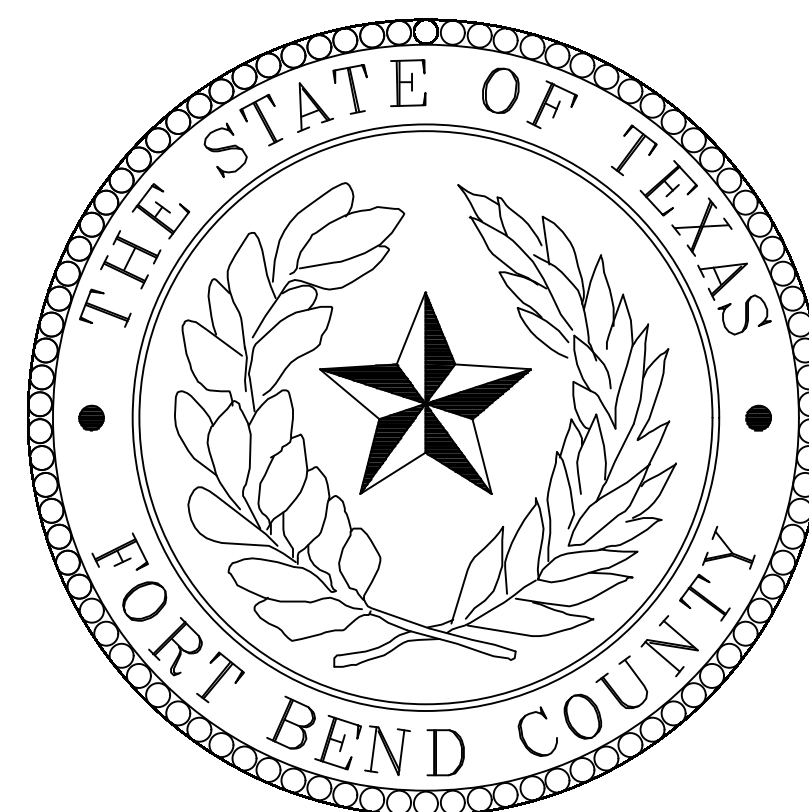
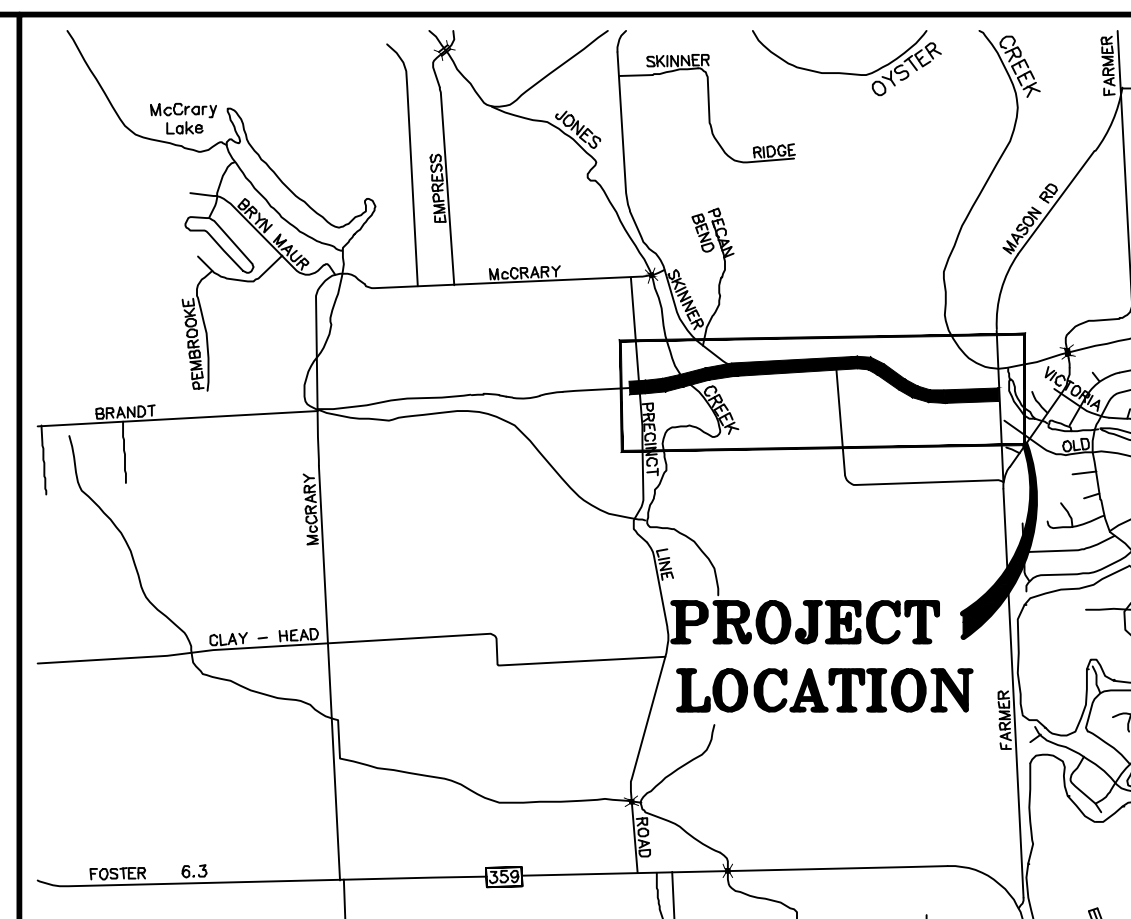
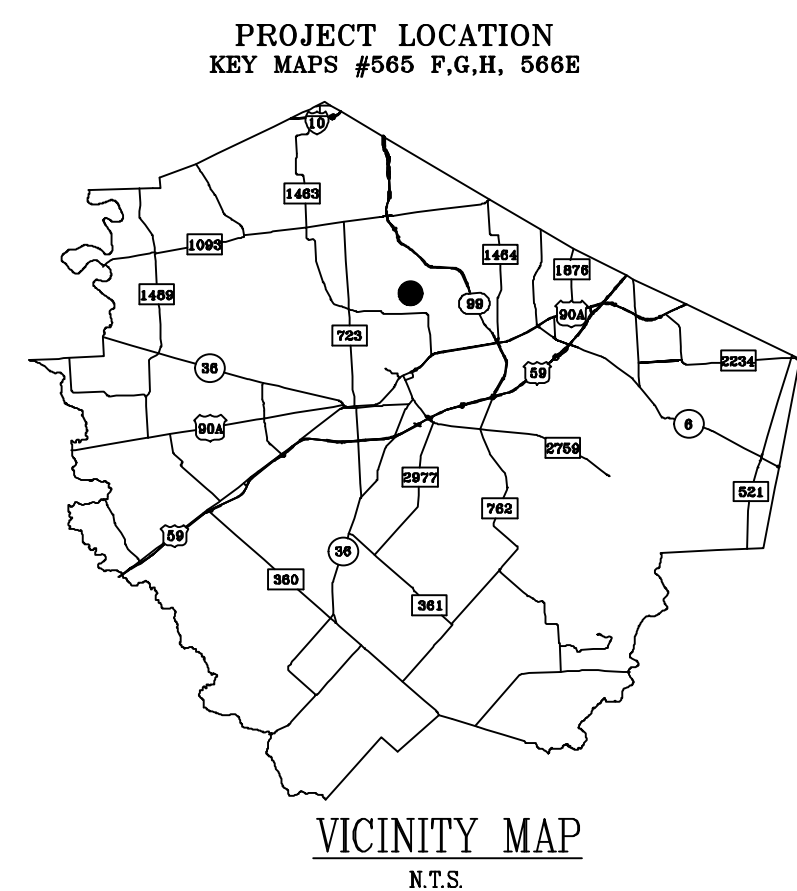
VINCENT M. MORALES, JR.
COMMISSIONER PRECINCT 1

GRADY PRESTAGE
COMMISSIONER PRECINCT 2

KP GEORGE
COUNTY JUDGE

ANDY MEYERS
COMMISSIONER PRECINCT 3

DEXTER L. McCOY
COMMISSIONER PRECINCT 4



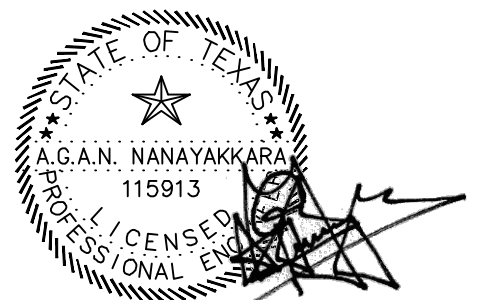
FEBRUARY, 2023
PRECINCT # 1
Fort Bend County, Texas



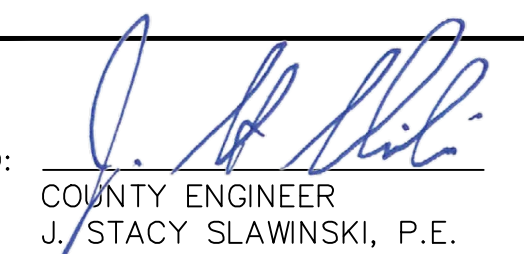
1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309



JNS ENGINEERS, LLC.
722 PIN OAK ROAD, SUITE 202A
HOUSTON, TEXAS 77494
TELEPHONE: (281) 391-3366 FAX: (281) 391-3375
T.B.P.E. FIRM REGISTRATION NO. F-11653



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913 ON FEBRUARY 17, 2023

APPROVED:  03/22/2023
COUNTY ENGINEER DATE
J. STACY SLAWINSKI, P.E.

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\GE02 INDEX SHEET.dwg Feb 17, 2023-9:49am Terra Associates Inc., Thanh Dao

SHEET NO.

GE01
GE02
GE03 - GE04
GE05
GE06
GE07 - GE11

GENERAL

COVER SHEET
INDEX SHEET
CONSTRUCTION NOTES
OVERALL SHEET LAYOUT
EXISTING TYPICAL SECTION
PROPOSED TYPICAL SECTIONS

SURVEY

SU00 SURVEY CONTROL MAP BRANDT ROAD OVERALL LAYOUT
SU01 - SU07 RIGHT OF WAY & PROPOSED PARCEL MAP
SU09 SURVEY CONTROL MAP BRANDT ROAD DATA SHEET
SU10 - SU15 SURVEY CONTROL MAP BRANDT ROAD
SU16 SURVEY CONTROL OYSTER CREEK
SU17 SURVEY CONTROL PRECINCT LINE ROAD
SU18 SURVEY CONTROL MAP JAMES LONG PARKWAY
SU19 SURVEY CONTROL MAP SKINNER ROAD
SU20 SURVEY CONTROL MAP JONES CREEK

ROADWAY DETAILS

PP01 - PP14 BRANDT ROAD PLAN & PROFILE
PP15 PRECINCT LINE ROAD PLAN AND PROFILE
PP16 SKINNER ROAD PLAN AND PROFILE
PP17 SKINNER ROAD/JAMES LONG ROAD PLAN AND PROFILE
PP18 PLAN AND PROFILE OUTFALL U
PP19 PLAN AND PROFILE OUTFALL V
PP20 - PP24 STORM SEWER LATERALS
PP25 ROAD WIDTH TRANSITION DETAIL

INTERSECTION PLAN & PROFILE

IP01 ROUNDABOUT AT BRANDT ROAD AND PRECINCT ROAD
IP02 ROUNDABOUT AT BRANDT ROAD AND JAMES LONG PKWY
IP03 DRIVEWAY DESIGN

GRADING PLAN

GR01 PROPOSED CUT AND FILL AT JONES CREEK
GR02 PROPOSED CUT AND FILL AT SKINNER ROAD
GR03 PROPOSED GRADING AT PROPOSED DRAINAGE EASEMENT
GR04 PROPOSED GRADING FOR RETAINING WALL
GR05 PROPOSED GRADING MODIFIED TYPE "A" INLET

BRIDGE DETAILS

BR1 BRIDGE LAYOUT
BR2 ESTIMATED QUANTITIES & BEARING SEAT ELEVATIONS
BR3 ABUTMENT 1
BR4 ABUTMENT 4
BR5 ABUTMENT DETAILS
BR6 BENT 2-3
BR7 BENT 2-3
BR8 GIRDER LAYOUT
BR9 195.00' PRESTRESSED CONCRETE GIRDER UNIT
BR10 195.00' PRESTRESSED CONCRETE GIRDER UNIT
BR11 PRESTRESSED CONCRETE GIRDER DESIGNS (IGND)
BR12 BRIDGE APPROACH SLAB CONCRETE PAVEMENT (BAS-C)
BR13 - BR14 BRIDGE RAISED SIDEWALK AND MEDIAN DETAILS (BRSM)
BR15 BRIDGE SIDEWALK EXPANSION JOINT COVER PLATE (BS-EJCP)
BR16 - BR18 COMBINATION RAIL (TYPE C221)
BR19 CONCRETE RIPRAP AND SLDER DRAINS EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9) (CRR)
BR20-BR21 CEMENT STABILIZED ABUTMENT BACKFILL (CSAB)
BR22 - BR23 COMMON FOUNDATION DETAILS (FD) (S)
BR24 - BR25 PRESTRESSED CONCRETE I-GIRDER DETAILS (IGD)
BR26 - BR28 ELASTOMERIC BEARING AND GIRDER END DETAILS (IGEB)
BR29 - BR30 MISCELLANEOUS SLAB DETAILS PRESTR CONCRETE I-GIRDERS (IGMS)
BR31 PRESTRESSED CONCRETE I-GIRDER SPANS (IGTS)
BR32 - BR33 MINIMUM ERECTION BRACING REQUIREMENTS
BR34 - BR35 PRESTRESSED CONCRETE I-GIRDER AND I-BEAMS (MEBR(C))
PCP(O)-FAB
BR36 - BR37 PRECAST CONCRETE PANELS FOR OVERHANGS FABRICATION DETAILS
PCP(O)-FAB
BR38 PRESTRESSED CONCRETE PANEL FABRICATION DETAILS (PCP-FAB)
BR39 - BR42 PRESTRESSED CONCRETE PANEL DECK DETAILS (PCP)
BR43 - BR44 PERMANENT METAL DECK FORMS (PMDF)
BR45 - BR46 PEDESTRIAN RAIL (TYPE PR11)
BR47 SEALED EXPANSION JOINT TYPE A WITOUTH OVERLAY (SEJ-M)
BR48 - BR49 TRAFFIC RAIL TYPE T221

RETAINING WALL DETAILS

RW01 - RW03 RETAINING WALL & DETAILS

DRAINAGE DETAILS

DR01 DRAINAGE AREA MAP - REGIONAL
DR02 DRAINAGE AREA MAP - PROJECT LIMITS
DR03 DRAINAGE AREA MAP - STORM SEWER SYSTEM
DR04 - DR05 STORM SEWER SYSTEM CALCULATIONS

TRAFFIC CONTROL PLAN

TC01 TRAFFIC CONTROL PLAN GENERAL NOTES
TC02 OVERVIEW OF TRAFFIC CONTROL PLAN
TC03 TRAFFIC CONTROL PLAN PHASING LAYOUT
TC04 - TC06 TRAFFIC CONTROL PLAN PHASE 1
TC07 - TC10 TRAFFIC CONTROL PLAN PHASE 2
TC11 - TC13 TRAFFIC CONTROL PLAN PHASE 3 - STEP 1
TC14 TRAFFIC CONTROL PLAN PHASE 3 STEP 2 & 3
TC15 TRAFFIC CONTROL PLAN PHASE 4 - STEP 1
TC16 TRAFFIC CONTROL PLAN PHASE 4 - STEP 2
TC17 TRAFFIC CONTROL PLAN PHASE 4 - STEP 3
TC18 TRAFFIC CONTROL PLAN PHASE 4 - STEP 4 & 5
TC19 PHASE 4 - STEP 1 PRECINCT LINE RD DETOUR
TC20 TRAFFIC CONTROL PLAN PHASE 4 - STEP 2 DETOUR
TC21 TRAFFIC CONTROL PLAN PHASE 4 - STEP 3 DETOUR
TC22 TRAFFIC CONTROL PLAN PHASE 4 - STEP 4 DETOUR
TC23 TRAFFIC CONTROL PLAN PHASE 4 - STEP 5 DETOUR

TRAFFIC SIGNAL

TS01 - TS02 PROPOSED TRAFFIC SIGNAL LAYOUT
TS03 TRAFFIC SIGNAL POLE FOUNDATION
TS04 - TS05 SINGLE MAST ARM ASSEMBLY
TS06 - TS10 MAST ARM ASSEMBLY
TS11 MAST ARM POLE DETAILS
TS12 MAST ARM CONNECTIONS
TS13 PEDESTRIAN SIGNALS
TS14 VIVDS CAMERA MOUNTING DETAILS
TS15 OVERHEAD STREET NAME SIGN MOUNTING DETAILS
TS16 CONTROLLER FOUNDATION DETAIL
TS17 GROUND BOX DETAILS INSTALLATIONS
TS18 ELECTRICAL DETAILS CONDUIT SUPPORTS
TS19 ELECTRICAL DETAILS CONDUCTORS
TS20 ELECTRICAL DETAILS GROUND BOXES
TS21 ELECTRICAL DETAILS SERVICE SCHEMATIC AND SUPPORT
TS22 ELECTRICAL DETAILS SERVICE ENCLOSURE & NOTES
TS23 ELECTRICAL DETAILS SERVICE SUPPORT SF & SP
TS24 ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS
TS25 ROADWAY ILLUMINATION DETAILS

SIGNING AND PAVEMENT MARKING DETAILS

SP01 - SP06 BRANDT ROAD SIGNING & PAVEMENT MARKINGS
SP07 PRECINCT LINE ROAD SIGNING & PAVEMENT MARKINGS
SP08 JAMES LONG PKWY SIGNING & PAVEMENT MARKINGS
SP09 SKINNER ROAD SIGNING & PAVEMENT MARKINGS
SP10 - SP11 PAVEMENT MARKING DETAILS
SP12 SIGN MOUNTING DETAILS

STORM WATER POLLUTION PLAN AND DETAILS

SW01 - SW04 STORM WATER POLLUTION PREVENTION PLAN
SW05 STORM WATER POLLUTION PREVENTION PLAN DETAILS

INTERSECTION VISIBILITY TRIANGLE

VT01 - VT02 INTERSECTION VISIBILITY TRIANGLE

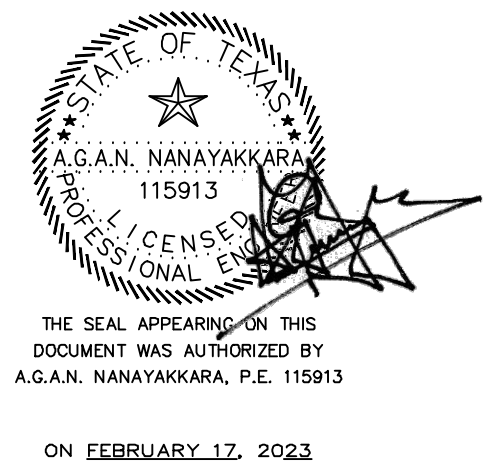
STANDARD DETAILS

SD01 - SD02 FORT BEND COUNTY CONCRETE PAVEMENT DETAILS
SD04 FORT BEND COUNTY DRIVEWAY DETAILS
SD05 FORT BEND COUNTY ADA RAMP DETAILS
SD06 TYPICAL PAVEMENT SECTIONS FOR DEVELOPMENT PROJECTS
SD07 ROUNDABOUT DETAILS
SD08 STORM SEWER CONSTRUCTION DETAILS
SD09 TYPE "C" "C-1" AND "C-2" AND "C-2A" INLET DETAILS
SD10 MODIFIED TYPE "C" INLET DETAILS
SD11 TYPE "A" INLET DETAILS
SD12 MODIFIED TYPE "A" INLET DETAILS
SD13 PRECAST CONCRETE STORM SEWER MANHOLE DETAILS
SD14 JUNCTION BOX / MANHOLE DETAILS
SD15 TxDOT DETAILS SINGLE BOX CULVERT PRECAST 3'-0" SPAN
SD16 TxDOT DETAILS SINGLE BOX CULVERT PRECAST 5'-0" SPAN
SD17 TxDOT DETAILS SINGLE BOX CULVERT PRECAST 6'-0" SPAN
SD18 TxDOT DETAILS SINGLE BOX CULVERT PRECAST 8'-0" SPAN
SD19 TxDOT DETAILS SINGLE BOX CULVERT PRECAST 10'-0" SPAN
SD20 SAFETY END TREATMENT DETAILS
SD21 TxDOT CONCRETE HEADWALLS
SD22 OUTFALL AND INTERCEPTOR STRUCTURE DETAILS
SD23 SINGLE GUARDRAIL TERMINAL
SD24 METAL BEAM GUARD FENCE
SD25 BRIDGE END DETAILS
SD26 FORT BEND COUNTY PROJECT SIGN
SD27 CONCRETE SAFETY BARRIER (F-SHAPE)

CROSS-SECTION

CS01 - CS05 CROSS-SECTIONS
CS06 SKINNER ROAD CROSS-SECTIONS
CS07 EARTHWORK QUANTITIES

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



REV.NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
INDEX SHEET			
TERRA a Bowman company		1445 N. LOOP WEST – SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC.		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: NONE	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET GE02

722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.B.P.E. FIRM
REGISTRATION NO. 11653

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\GE03 CONSTRUCTION NOTES.dwg Feb 17, 2023-9:49am Terra Associates Inc., Thanh Dao

GENERAL

1. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS BEFORE BEGINNING CONSTRUCTION.
2. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING SECURITY TO PROTECT THE PROJECT SITE, CONTRACTOR PROPERTY, EQUIPMENT, AND WORK.
3. THE CONTRACTOR IS RESPONSIBLE FOR CLEANING STREETS OF CONSTRUCTION DIRT AND DEBRIS AT CLOSE OF EACH WORK DAY.
4. THE CONDITION OF THE ROAD AND/OR RIGHT-OF-WAY, UPON COMPLETION OF THE JOB SHALL BE AS GOOD AS OR BETTER THAN PRIOR TO STARTING WORK.
5. PRIOR TO CONSTRUCTION, THE CONTRACTOR, ALONG WITH CONCURRENCE FROM THE FIELD ENGINEER, SHALL DETERMINE HIS/HER LAY-DOWN AND/OR STAGING AREA LOCATIONS.
6. THE CONTRACTOR SHALL NOTIFY ALL PROPERTY OWNERS A MINIMUM OF 24 HOURS PRIOR TO BLOCKING DRIVEWAYS OR ENTERING UTILITY EASEMENTS.
7. TRAFFIC INGRESS AND EGRESS FOR DRIVEWAYS AND PEDESTRIAN ACCESS FACILITIES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION WITH ALL WEATHER SURFACES.
8. THE CONTRACTOR SHALL REMOVE ANY FENCES, POSTS, MAILBOXES, PLANTERS, PERMANENT TRASH CONTAINERS, CULVERTS, ETC. OR SECTIONS THEREOF, THAT ENCROACH WITHIN THE COUNTY'S RIGHT-OF-WAY. NOTE: PRIOR TO CONSTRUCTION, THE PROPERTY OWNER WAS PAID TO RELOCATE OR REPLACE THESE ITEMS OUTSIDE OF THE COUNTY'S RIGHT-OF-WAY. IF THE OWNER HAS FAILED TO DO SO, THE CONTRACTOR WILL REPLACE THEM WITH THE MINIMUM LEVEL OF QUALITY NEEDED TO SECURE THE PROPERTY AND/OR MAINTAIN MAIL DELIVERY. IN THAT CASE, PAYMENT FOR THESE INSTALLATIONS WILL BE INCLUDED AS EXTRA WORK ITEMS OR AS OVERRUNS TO EXISTING PAY ITEMS.

ANY DAMAGE CAUSED BY THE CONTRACTOR TO SUCH ITEMS LOCATED OUTSIDE OF THE COUNTY'S RIGHT-OF-WAY, SHALL BE REPLACED WITH LIKE-KIND OR BETTER AT THE CONTRACTOR'S EXPENSE.

ALSO, IF THESE ITEMS ARE LOCATED WITHIN THE PROJECT RIGHT-OF-WAY AND ARE DESIGNATED TO REMAIN, ANY DAMAGE CAUSED BY THE CONTRACTOR TO SUCH ITEMS, SHALL BE REPLACED WITH LIKE-KIND OR BETTER AT THE CONTRACTOR'S EXPENSE.

TREES, BUSHES, SHRUBBERY AND OTHER DAMAGED PLANTINGS DESIGNATED TO REMAIN SHALL BE REPLACED WITHIN 72 HOURS OF REMOVAL AND ARE TO BE THOROUGHLY WATERED-IN. NO SEPARATE PAY.
9. PAVED SURFACES, PAVEMENT MARKERS AND MARKINGS SHALL BE PROTECTED FROM DAMAGE BY TRACKED EQUIPMENT.
10. IRON RODS DISTURBED DURING CONSTRUCTION ARE TO BE REPLACED BY A REGISTERED PROFESSIONAL LAND SURVEYOR FOR THE ORIGINAL PROPERTY OWNER AT NO SEPARATE PAY.
11. CONSTRUCTION STAKING WILL BE PROVIDED BY THE CONTRACTOR. TWO COPIES OF STAKING NOTES TO BE PROVIDED TO THE ENGINEER PRIOR TO CONSTRUCTION.
12. THE COUNTY OR THE COUNTY'S SURVEYOR SHALL PROVIDE A BENCHMARK OR TEMPORARY BENCHMARK AND SURVEY CONTROLS.
13. THE CONTRACTOR SHALL MAINTAIN UPDATED RED-LINED RECORD DRAWINGS ON SITE FOR INSPECTION BY THE ENGINEER.
14. MOWING, MAINTENANCE, AND CLEAN-UP OF THE PROJECT SHALL MEET THE REQUIREMENT OF SPECIFICATION ITEM 560 (NO SEPARATE PAY). MOWING, MAINTENANCE, AND CLEAN-UP IS REQUIRED FOR THE PROJECT LIMITS AND DURATION, REGARDLESS OF THE CONTRACTOR'S SCOPE OF ACTIVITIES WITHIN THE PROJECT LIMITS.
15. THE REMOVAL OF ANY ABANDONED UTILITIES REQUIRED TO COMPLETE THE WORK SHALL BE INCIDENTAL AND NO SEPARATE PAYMENT SHALL BE MADE.
16. IT IS THE CONTRACTOR'S RESPONSIBILITY TO STOCKPILE NECESSARY MATERIAL ON-SITE OR AT A SECURED OFF-SITE LOCATION AT NO ADDITIONAL EXPENSE TO FORT BEND COUNTY. ANY SUITABLE EXCAVATED MATERIAL ON THE PROJECT WHICH IS AVAILABLE AT THE TIME OF NEED; WHETHER FROM STORM SEWER, ROADWAY, AND/OR CHANNEL EXCAVATION, SHALL BE USED BEFORE BORROW IS BROUGHT ON-SITE.
17. MANHOLES, JUNCTION BOXES, INLETS, AND RISERS ARE TO BE PRE-CAST OR CAST IN PLACE.
18. THE FOLLOWING DETAILS ARE MINIMUM REQUIREMENTS AND MAY BE SUPERSEDED BY GEOTECHNICAL ENGINEER RECOMMENDATIONS OR MORE STRINGENT REQUIREMENTS FROM THE CITY'S ETJ PROJECT IS WITHIN.
19. POP UP DRAINS AREA NOT ALLOWED IN FORT BEND COUNTY RIGHT OF WAY.

SWPPP

SWPPP: THIS PROJECT DISTURBS OVER 5 ACRES; THEREFORE COVERAGE IS REQUIRED UNDER THE TPDES GENERAL PERMIT TXR150000 FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTATION, INSPECTION, AND MAINTENANCE OF THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS. THE COSTS TO IMPLEMENT, INSPECT, AND MAINTAIN THE SWPPP SHALL BE CONSIDERED INCIDENTAL TO THE SWPPP BID ITEMS.

SINCE THIS PROJECT DISTURBS GREATER THAN 5 ACRES, A NOTICE OF INTENT (NOI) IS REQUIRED TO BE SUBMITTED TO THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) AT LEAST 7 DAYS PRIOR TO THE START OF ANY EARTH DISTURBING ACTIVITIES. THIS PROJECT SHALL HAVE ONE NOIS, LISTING THE CONTRACTOR AS THE PRIMARY OPERATOR AND FT. BEND COUNTY AS THE SECOND OPERATOR. NOI IS SUBJECT TO A \$325 APPLICATION FEE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOI APPLICATION FEE. THE CONTRACTOR HAS THE OPTION TO SUBMIT THE CONTRACTOR'S NOI FORM AND FEE ELECTRONICALLY TO THE TCEQ (IF SUBMITTED ELECTRONICALLY, THEN THE CONTRACTOR SHALL PROVIDE COPIES OF THE ELECTRONIC SUBMITTAL TO FT. BEND COUNTY AT THE PRECONSTRUCTION MEETING). COPIES OF THE CONTRACTOR'S NOI AND CONSTRUCTION SITE NOTICE (CSN) SHALL BE POSTED AT THE SITE BY THE CONTRACTOR. THE CONTRACTOR SHALL LAMINATE AND POST THE NOI, CSN AND ANY "SECONDARY OPERATOR" CSNS ON THE PROJECT SITE AT A LOCATION WITH EASY ACCESS TO THE PUBLIC FOR CLEAR VIEWING AND AS APPROVED BY THE ENGINEER. THE COST OF LAMINATION AND POSTING OF THE NOI & CSN SHALL BE CONSIDERED INCIDENTAL TO THE SWPPP BID ITEMS.

UPON COMPLETION OF CONSTRUCTION ACTIVITIES AND FINAL STABILIZATION OF THE SITE, AS DEFINED BY THE TPDES GENERAL PERMIT, A NOTICE OF TERMINATION (NOT) IS REQUIRED TO BE SUBMITTED TO THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ). THIS PROJECT SHALL HAVE ONE NOT, LISTING THE CONTRACTOR AS THE PRIMARY OPERATOR AND FT. BEND COUNTY AS THE SECONDARY OPERATOR. WHEN DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL PROVIDE TO FT. BEND COUNTY A SIGNED COPY OF THE CONTRACTOR'S NOTICE OF TERMINATION (NOT). THE CONTRACTOR SHALL SUBMIT TO THE TCEQ THE CONTRACTOR'S SIGNED NOT. THE CONTRACTOR SHALL ALSO SUBMIT COPIES OF SIGNED NOT TO THE LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM OPERATOR.

A RAIN GAUGE SHALL BE KEPT ON THE PROJECT SITE OR WITHIN THE IMMEDIATE PROJECT VICINITY. RECORDS OF RAINFALL EVENTS SHALL BE KEPT BY THE CONTRACTOR TO ASSIST WITH DETERMINING IF AN SWPPP SITE INSPECTION IS REQUIRED. THE COSTS FOR THE RAIN GAUGE SHALL BE CONSIDERED INCIDENTAL TO THE SWPPP BID ITEMS.

THE SWPPP, INSPECTION & MAINTENANCE REPORTS, CERTIFICATIONS, RAINFALL RECORDS, MAJOR GRADING DATE RECORDS AND TEMPORARY AND PERMANENT STABILIZATION DATE RECORDS SHALL BE KEPT CURRENT BY THE CONTRACTOR AND IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS. COPIES OF THE ALL SWPPP RECORDS SHALL BE KEPT ON-SITE, IF FEASIBLE, UNTIL THE NOTICE OF TERMINATIONS HAS BEEN SUBMITTED TO THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY. THE SWPPP RECORDS SHALL BE MADE READILY AVAILABLE TO REGULATORY AUTHORITIES UPON AN ON-SITE INSPECTION. THE CONTRACTOR SHALL DELIVER COPIES OF ALL SWPPP RECORDS TO FT. BEND COUNTY AS DIRECTED BY THE ENGINEER.

TRAFFIC SIGNAL

1. ALL ITEMS RELATING TO THE CONSTRUCTION OF TRAFFIC SIGNAL INSTALLATIONS, EXCEPT FOR PUNCHLIST ITEMS, SHALL BE COMPLETED PRIOR TO THE ACTIVATION OF THE SIGNAL SYSTEM(S), UNLESS OTHERWISE REQUIRED BY THE CONTRACT.
2. THE CONTRACTOR SHALL MEET WITH THE FORT BEND COUNTY TRAFFIC SIGNAL MAINTENANCE GROUPS FIELD INSPECTOR, HEREAFTER REFERRED TO AS THE TRAFFIC INSPECTOR, ONE-WEEK PRIOR TO THE DESIRED ACTIVATION OF ANY NEW TRAFFIC SIGNALS. THE CONTRACTOR SHALL OBTAIN VERBAL CONCURRENCE FROM THE TRAFFIC INSPECTOR THAT ADEQUATE PROGRESS HAS BEEN ACHIEVED AND THAT ADEQUATE PREPARATIONS ARE IN PLACE TO SCHEDULE A PRE-"TURN ON" WALK-THROUGH INSPECTION MEETING. IF IN THE OPINION OF THE TRAFFIC INSPECTOR, REQUIRED PROGRESS AND ADEQUATE PREPARATIONS ARE NOT COMPLETE, THE PRE-"TURN ON" WALK-THROUGH INSPECTION MEETING WILL BE POSTPONED TO ALLOW ADEQUATE TIME FOR INCOMPLETE CONSTRUCTION ITEMS AND PREPARATIONS TO BE COMPLETED. AFTER THE CONTRACTOR HAS COMPLETED ALL INCOMPLETE ITEMS AND PREPARATIONS, THE CONTRACTOR SHALL REQUEST THE TRAFFIC INSPECTOR REVIEW AND APPROVE ITEMS PREVIOUSLY IDENTIFIED. IF, IN THE OPINION OF THE TRAFFIC INSPECTOR, ALL ITEMS HAVE BEEN ADDRESSED SATISFACTORILY, THE DATE OF THE PRE-"TURN ON" WALK-THROUGH INSPECTION SHALL BE ESTABLISHED. TIME EXTENSIONS TO THE CONTRACT TIME WILL NOT BE GRANTED FOR DELAYS CAUSED BY INCOMPLETE CONSTRUCTION OR INADEQUATE CONTRACTOR PREPARATIONS REQUIRED TO COMPLETE TRAFFIC SIGNAL SYSTEM WITHIN THE TIMEFRAME SET FORTH IN THE CONTRACT.
3. PRIOR TO ACTIVATING A NEW TRAFFIC SIGNAL, THE CONTRACTOR SHALL REQUEST A PRE-TURN ON WALK-THROUGH INSPECTION MEETING, IN ACCORDANCE WITH ITEM 2. THE PURPOSE OF THE MEETING WILL BE TO ESTABLISH THAT THE TRAFFIC SIGNAL SYSTEM HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT, AND IN A MANNER THAT DOES NOT ADVERSELY IMPACT PUBLIC SAFETY. THIS MEETING SHALL BE ATTENDED BY THE TRAFFIC INSPECTOR, THE ENGINEER OF RECORD, AND THE CONTRACTOR. AS A MINIMUM, ANY DEFICIENCIES THAT ADVERSELY IMPACT PUBLIC SAFETY WILL BE IDENTIFIED FOR CORRECTION PRIOR TO ESTABLISHING THE "TURN ON" DATE FOR THE TRAFFIC SIGNAL SYSTEM. ITEMS THAT HAVE AN IMPACT ON PUBLIC SAFETY INCLUDE, BUT ARE NOT LIMITED TO: PAVEMENT MARKINGS AND SIGNAGE, PROPER AND ACCEPTABLE BONDING OF EARTH GROUNDS, PROPERLY ALIGNED TRAFFIC SIGNALS, FULLY OPERATIONAL VEHICULAR AND PEDESTRIAN DETECTION, COMPLETED CABINET-TO-FIELD WIRING, AND PROPERLY TERMINATED ELECTRICAL SERVICE CONDUCTORS. FAILURE TO ADDRESS THE PUNCHLIST ITEMS IDENTIFIED AS BEING CRITICAL TO PUBLIC SAFETY PRIOR TO THE PRE-TURN ON WALK-THROUGH MEETING WILL RESULT IN THE "TURN ON" BEING POSTPONED TO ALLOW ADEQUATE TIME FOR THE INCOMPLETE ITEMS TO BE COMPLETED. AT SUCH TIME AS MEETING ATTENDEES AGREE THAT THE TRAFFIC SIGNAL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT, AND THAT THE TRAFFIC SIGNAL, AS IT EXISTS, IS NOT A THREAT TO PUBLIC SAFETY, A "TURN ON" DATE WILL BE ESTABLISHED.
4. THE CONTRACTOR SHALL HAVE 10 DAYS FROM THE DATE THE TRAFFIC SIGNAL SYSTEM IS TURNED ON TO COMPLETE ANY PUNCHLIST ITEMS IDENTIFIED AT THE PRE-"TURN ON" WALK-THROUGH MEETING OR AT THE TIME THE SIGNAL SYSTEM IS ACTIVATED THAT ARE NOT OTHERWISE ADDRESSED PRIOR TO ACTIVATION OF THE TRAFFIC SIGNAL SYSTEM.
5. THE CONTRACTOR'S ATTENTION IS DIRECTED TO STANDARD SPECIFICATION ITEM 1000, TRAFFIC SIGNAL INSTALLATION AND MODIFICATION, WHICH INCLUDES PROCEDURES AND REQUIREMENTS REGARDING ACTIVATION OF TRAFFIC SIGNAL CONTROL SYSTEMS. THE PROJECT MANUAL MAY INCLUDE SPECIAL SPECIFICATIONS AND/OR SPECIAL PROVISIONS RELATED TO PROPOSED TRAFFIC CONTROL SIGNAL SYSTEM INSTALLATION(S) AND MODIFICATION(S) REQUIRING THE CONTRACTOR'S ADHERENCE TO DEFINED CHECKLISTS, PROCEDURES AND/OR REPORTS AT NO ADDITIONAL COST TO THE COUNTY BEYOND THE ESTABLISHED BID ITEMS OF THE CONTRACT.
6. ALL SIGNAL ALTERATIONS MUST BE APPROVED AND COORDINATED THROUGH FBC ENGINEERING AND ROAD & BRIDGE.

**PRIVATE UTILITY NOTES
AT&T TEXAS/SWBT FACILITIES NOTES**

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

DIRECT BURIED CABLE PROCEDURE

DIRECT BURIED CABLE RECORDS ARE NOT AVAILABLE. TO DETERMINE THE LOCATION OF BURIED CABLE PLANT DURING THE DESIGN PHASE OF YOUR PROJECT, FOLLOW THE PROCEDURES BELOW:

- CALL 1-800-344-8377 AND ADVISE YOU NEED THE EXISTING AT&T TEXAS/SWBT FACILITIES LOCATED FOR THE DESIGN PHASE OF YOUR PROJECT. PLEASE ALLOW 72 HOURS FOR THE CABLE TO GET MARKED BEFORE SENDING YOUR FIELD CREW FOR BASE LINE SURVEY FOR LOCATES OF. BE SPECIFIC ON THE PROJECT LOCATION.
- THE LOCATOR WILL FIELD LOCATE THE EXISTING AT&T/SWBT FACILITIES ORANGE PAINT AND/OR FLAGS.
- YOUR FIELD PARTY CAN SURVEY THE BURIED CABLE LOCATION USING THE ORANGE MARKS ON THE GROUND. IF THE CABLES ARE NOT MARKED, PLEASE CONTACT THE AT&T TEXAS DAMAGE PREVENTION MANAGER MR. ROOSEVELT LEE JR. AT (713)567-4552 OR EMAIL HIM AT RL7259@ATT.COM.
- PLOT THE EXACT LOCATION OF THE AT&T TEXAS/SWBT DIRECT BURIED CABLE FACILITIES ON THE PLAN AND PROFILE SHEET.

CENTERPOINT ENERGY NOTES

CAUTION: UNDERGROUND GAS FACILITIES

THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT 1-800-545-6005 OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

- WHEN CENTERPOINT ENERGY PIPE LINE MARKINGS ARE NOT VISIBLE, CALL (713) 945-8036 OR (713) 945-8037 (7:00AM TO 4:30 PM) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.
- WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.
- WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.
- FOR EMERGENCIES REGARDING GAS LINES CALL (713) 656-3552 OR (713) 207-4200.

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

WARNING: OVERHEAD ELECTRICAL FACILITIES

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

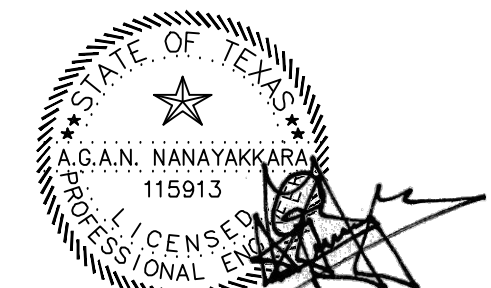
- ANY ACTIVITY WHERE PERSON OR THINGS MAY COME WITHIN SIX(6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES; AND
- OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER, HOISTING EQUIPMENT, OR SIMILAR APPARATUS WITHIN 10 FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES.

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

ACTIVITIES ON/OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY: NO APPROVAL TO USE, CROSS OR OCCUPY CENTERPOINT FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE CENTERPOINT PROPERTY, PLEASE CONTACT OUR SURVEYING & RIGHT OF WAY DIVISION AT (713)207-6248 OR (713)207-5769.

TRAFFIC CONTROL

1. THE CONTRACTOR SHALL PROVIDE AND INSTALL TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH PART VI OF THE MOST RECENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THE APPROVED TRAFFIC CONTROL PLAN.
2. THE CONTRACTOR SHALL MAINTAIN AT LEAST ONE LANE OF TRAFFIC IN EACH DIRECTION DURING WORKING HOURS EXCEPT DURING FLAGGING OPERATION.
3. LANE CLOSURES SHALL BE DURING OFF-PEAK HOURS ONLY (MONDAY THROUGH FRIDAY 9 A.M. TO 4 P.M.) UNIFORMED PEACE OFFICERS OR FLAGGERS IN RADIO CONTACT ARE REQUIRED TO DIRECT TRAFFIC DURING LANE CLOSURES.
4. DETOURS REQUIRE PRIOR APPROVAL OF THE FIELD ENGINEER AND PRECINCT. DETOUR PLANS, IF ALLOWED, MUST INCLUDE APPROPRIATE DETOUR SIGNAGE, PUBLIC NOTICE VIA SIGNAGE TWO WEEKS IN ADVANCE STATING THE DATES OF THE AGREED UPON DATE OF CLOSURE AND DATE THE ROAD WILL RE-OPEN TO TRAFFIC. CONTRACTOR TO USE (WITH PRIOR APPROVAL OF THE FIELD ENGINEER) HIGH EARLY STRENGTH CONCRETE AND OTHER RELATED CONSTRUCTION METHODS TO MINIMIZE THE DURATION OF THE DETOUR AND TO ENSURE THAT THE ROADWAY IS OPEN ON, OR PRIOR TO, THE AGREED UPON DATE.
5. ONE DAY PRIOR TO THE IMPLEMENTATION OF A TRAFFIC CONTROL PLAN PHASE OR STEP, OR THE IMPLEMENTATION OF AN ADDITIONAL, REVISED, OR NEW TRAFFIC CONTROL ELEMENT, THE CONTRACTOR SHALL MEET WITH THE ENGINEER TO GIVE A DETAILED DESCRIPTION OF THE CONTRACTOR'S PLAN AND PREPARATIONS. THE CONTRACTOR SHALL OBTAIN WRITTEN CONCURRENCE FROM THE ENGINEER THAT ADEQUATE PROJECT PROGRESS HAS BEEN ACHIEVED AND THAT ADEQUATE PREPARATIONS ARE IN PLACE PRIOR TO SWITCHING TRAFFIC. IF, IN THE OPINION OF THE ENGINEER, REQUIRED PROGRESS AND ADEQUATE PREPARATIONS ARE NOT COMPLETE, THE CONTRACTOR SHALL NOT IMPLEMENT THE NEXT PHASE, STEP, OR ELEMENT OF TRAFFIC CONTROL UNTIL INCOMPLETE CONSTRUCTION ITEMS OR PREPARATIONS ARE COMPLETED. TIME EXTENSIONS WILL NOT BE GRANTED FOR DELAYS CAUSED BY THE INCOMPLETE CONSTRUCTION ITEMS OR INADEQUATE CONTRACTOR PREPARATIONS REQUIRED TO IMPLEMENT TRAFFIC CONTROL.
6. TRAFFIC CONTROL PER THE CONTRACT IS REQUIRED FOR THE ENTIRE DURATION OF THE PROJECT, INCLUDING THE PUNCHLIST PERIOD. PAYMENT FOR TRAFFIC CONTROL THAT IS PROPERLY INSTALLED FOR LESS THAN A FULL MONTH SHALL BE BASED ON A PERCENTAGE BASIS OF THE TIME INSTALLED. TRAFFIC CONTROL PAYMENTS TO THE CONTRACTOR SHALL END 10 DAYS AFTER SUBSTANTIAL COMPLETION, ALTHOUGH PROPER TRAFFIC CONTROL MUST BE MAINTAINED UNTIL PUNCHLIST COMPLETION.
7. THE PURPOSE OF THE CONSTRUCTION SEQUENCE AND TRAFFIC HANDLING OUTLINED HEREIN IS TO DOCUMENT A VIABLE TCP THAT CAN BE UTILIZED TO CONSTRUCT THE PROJECT. IT IS THE BASIS OF ESTIMATION FOR THE TRAFFIC CONTROL BID ITEMS, AND IS TO BE UTILIZED AND IMPLEMENTED, UNLESS OTHERWISE DIRECTED BY THE ENGINEER. IF THE CONTRACTOR CHOOSES TO USE A DIFFERENT TCP, HE/SHE SHALL PREPARE AND SUBMIT THE ALTERNATIVE TCP TO THE COUNTY FOR APPROVAL NO LESS THAN 10 WORKING DAYS PRIOR TO THE PROPOSED IMPLEMENTATION DATE. THE TCP SHALL BE DRAWN TO SCALE AND SIGNED & SEALED BY A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS. UPON APPROVAL BY FORT BEND COUNTY, THE ALTERNATIVE PLAN SHALL BECOME THE BASIS FOR A "CHANGE IN CONTRACT" TO REVISE THE TRAFFIC CONTROL BID ITEMS ACCORDINGLY AND BECOME PART OF THE CONTRACT DOCUMENTS.
8. ALL TEMPORARY PAVEMENT MARKINGS ON PERMANENT SHOULD BE RPMS OR TABS.
9. TRAFFIC PATTERN CHANGES REQUIRE CHANGEABLE MESSAGE BOARDS PLACED AT LEAST 2 WEEKS IN ADVANCE OF PROPOSED CHANGE. QUANTITY, PLACEMENT AND WORDING TBD BY FBC.



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913

ON FEBRUARY 17, 2023

REV.NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
CONSTRUCTION NOTES			
TERRA a Bowman company		1445 N. LOOP WEST -- SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	
PROJECT No. 0522-1801 CONTRACT: 1		SHEET GE03	

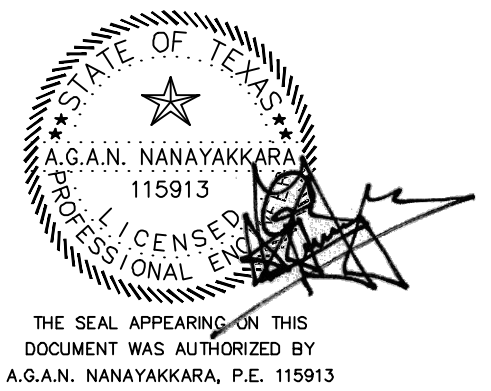
722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77494
TELEPHONE: (281)391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.S.P.E. FIRM
REGISTRATION NO. 11653

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\GE04 CONSTRUCTION NOTES.dwg Feb 17, 2023-9:49am Terra Associates Inc., Thanh Dao

CONSTRUCTION NOTES

1. FORT BEND COUNTY MUST BE INVITED TO THE PRE-CONSTRUCTION MEETING.
2. THE CONTRACTOR SHALL NOTIFY THE FORT BEND COUNTY ENGINEERING DEPARTMENT 48 HOURS PRIOR TO COMMENCING CONSTRUCTION AND 48 HOUR NOTICE TO ANY CONSTRUCTION ACTIVITY WITHIN THE LIMITS OF THE PAVING AT Construction@fortbendcountytx.gov
3. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED FROM FORT BEND COUNTY PRIOR TO COMMENCING CONSTRUCTION OF ANY IMPROVEMENTS WITHIN COUNTY ROAD RIGHT OF WAYS.
4. ALL PAVING IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH FORT BEND COUNTY "RULES, REGULATIONS AND REQUIREMENTS" RELATING TO THE APPROVAL AND ACCEPTANCE OF IMPROVEMENTS IN SUBDIVISIONS AS CURRENTLY AMENDED.
5. ALL ROAD WIDTHS, CURB RADII AND CURB ALIGNMENT SHOWN INDICATES BACK OF CURB.
6. A CONTINUOUS LONGITUDINAL REINFORCING BAR SHALL BE USED IN THE CURBS.
7. ALL CONCRETE PAVEMENT SHALL BE 5 1/2 SACK CEMENT WITH A MINIMUM COMPRESSIVE STRENGTH OF 3500 PSI AT 28 DAYS. TRANSVERSE EXPANSION JOINTS SHALL BE INSTALLED AT EACH CURB RETURN AND AT A MAXIMUM SPACING OF 60 FEET.
8. ALL WEATHER ACCESS TO ALL EXISTING STREETS AND DRIVEWAYS SHALL BE MAINTAINED AT ALL TIMES.
9. 4" X 12" REINFORCED CONCRETE CURB SHALL BE PLACED IN FRONT OF SINGLE FAMILY LOTS ONLY. ALL OTHER AREAS SHALL BE 6" REINFORCED CONCRETE CURB.
10. CURB HEADERS ARE REQUIRED AT CURB CONNECTIONS TO HANDICAP RAMPS, WITH NO CONSTRUCTION JOINT WITHIN 5' OF RAMPS.
11. GUIDELINES ARE SET FORTH IN THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", AS CURRENTLY AMENDED, SHALL BE OBSERVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE FLAGMEN, SIGNING, STRIPING AND WARNING DEVICES, ETC., DURING CONSTRUCTION - BOTH DAY AND NIGHT.
12. ALL R1-1 STOP SIGNS SHALL BE 36"X36" WITH DIAMOND GRADE SHEETING PER TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
13. STREET NAME SIGNAGE SHALL BE ON A 9" HIGH SIGN FLAT BLADE W/REFLECTIVE GREEN BACKGROUND. STREET NAMES SHALL BE UPPER AND LOWERCASE LETTERING WITH UPPERCASE LETTERS OF 6" MINIMUM AND LOWERCASE LETTERS OF 4.5" MINIMUM. THE LETTERS SHALL BE REFLECTIVE WHITE. STREET NAME SIGNS SHALL BE MOUNTED ON STOP SIGN POST.
14. A BLUE DOUBLE REFLECTORIZED BUTTON SHALL BE PLACED AT ALL FIRE HYDRANT LOCATIONS. THE BUTTON SHALL BE PLACED 12 INCHES OFF OF THE CENTERLINE OF THE STREET ON THE SAME SIDE AS THE HYDRANT.
15. THE PROJECT AND ALL PARTS THEREOF SHALL BE SUBJECT TO INSPECTION FROM TIME TO TIME BY INSPECTORS DESIGNATED BY FORT BEND COUNTY. NO SUCH INSPECTIONS SHALL RELIEVE THE CONTRACTOR OF ANY OF ITS OBLIGATIONS HEREUNDER. NEITHER FAILURE TO INSPECT NOR FAILURE TO DISCOVER OR REJECT ANY OF THE WORK AS NOT IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS, REQUIREMENTS AND SPECIFICATIONS OF FORT BEND COUNTY OR ANY PROVISION OF THIS PROJECT SHALL BE CONSTRUED TO IMPLY AN ACCEPTANCE OF SUCH WORK OR TO RELIEVE THE CONTRACTOR OF ANY OF ITS OBLIGATIONS HEREUNDER.
16. STABILIZED SUBGRADE: DETERMINE THE THICKNESS OF THE STABILIZED SUBGRADE AFTER CURING ANID COMPACTION. IF THE SUBGRADE DEPTH IS GREATER THAN THE PROPOSED THICKNESS BY 20% OR MORE, THE CMT LAB MUST PROVIDE VERIFICATION THE PERCENTAGE OF MATERIAL BEING USED TO STABILIZE THE SUBGRADE MEETS OR EXCEEDS PROJECT REQUIREMENTS. TEST RESULTS REQUIRED.

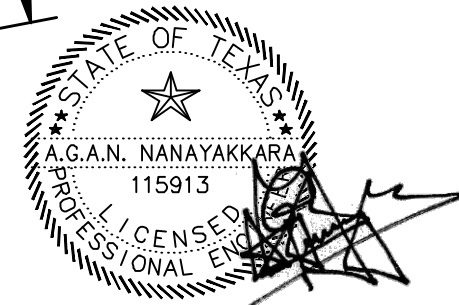
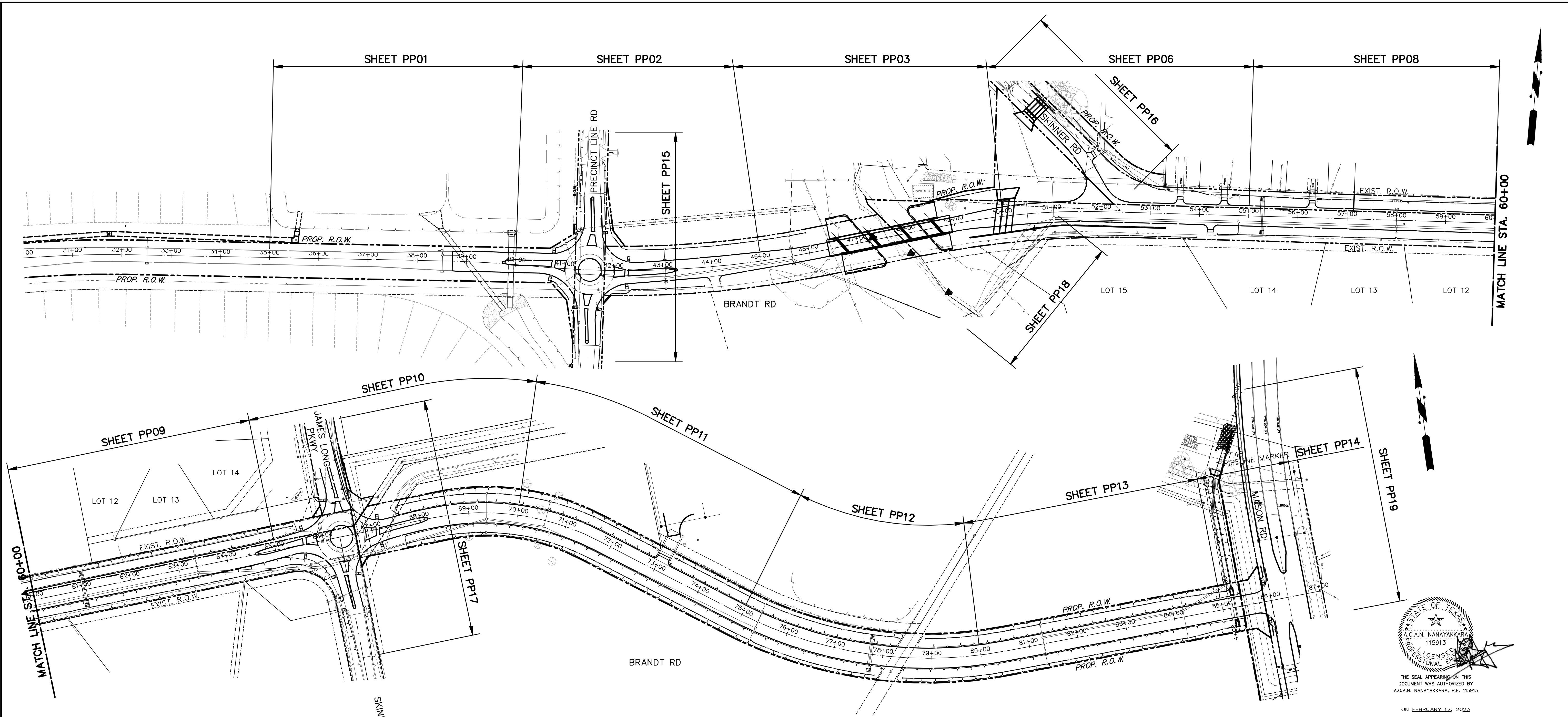
NOTE: FORT BEND COUNTY NOTES SUPERSEDE ANY CONFLICTING NOTES.



ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
CONSTRUCTION NOTES			
TERRA <small>a Bowman company</small>		1445 N. LOOP WEST -- SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC.		JNS ENGINEERS, LLC <small>722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281)391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653</small>	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET GEO4	

F:\Clients\0522-Fort Bend County_Engineering\0522-1801_Brandt_Road\Drawings\Seg 2\GE05 OVERALL SHEET LAYOUT.dwg Feb 17, 2023-9:49am Terra Associates Inc., Thanh Dao



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913 ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.

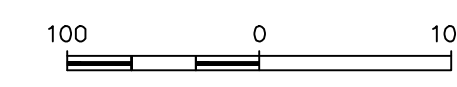
**BRANDT ROAD
PRECINCT LINE RD TO MASON RD**

OVERALL SHEET LAYOUT

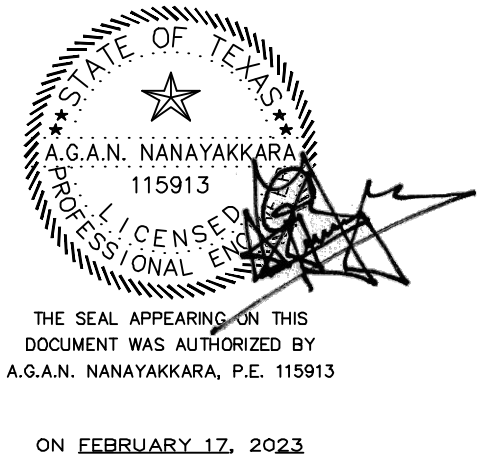
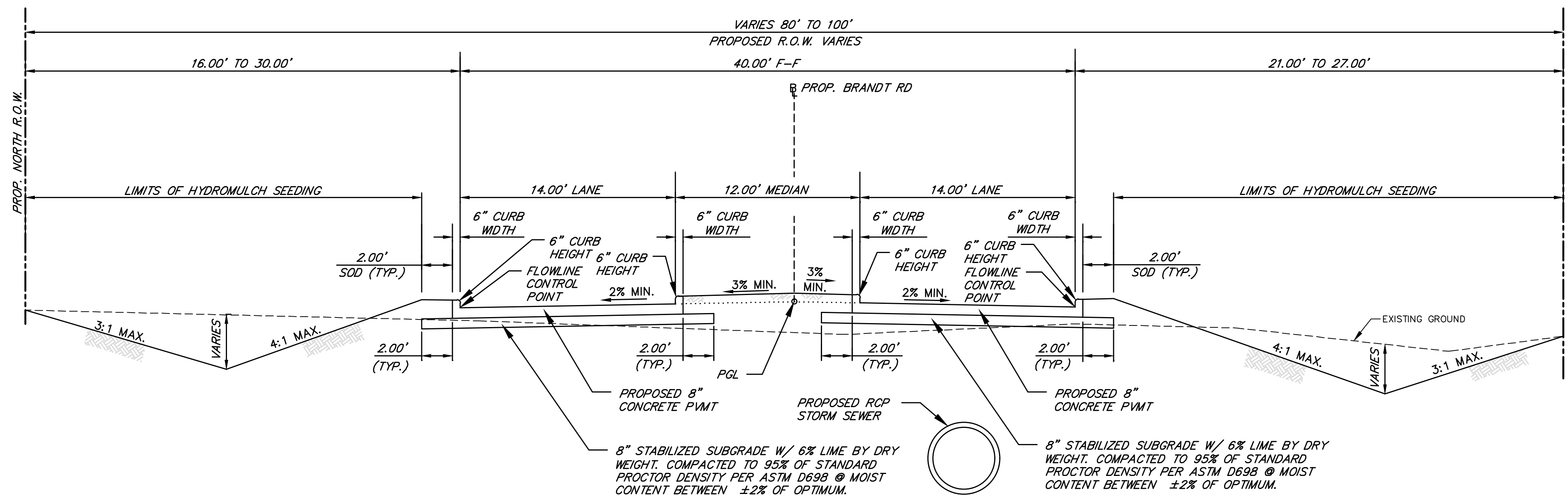
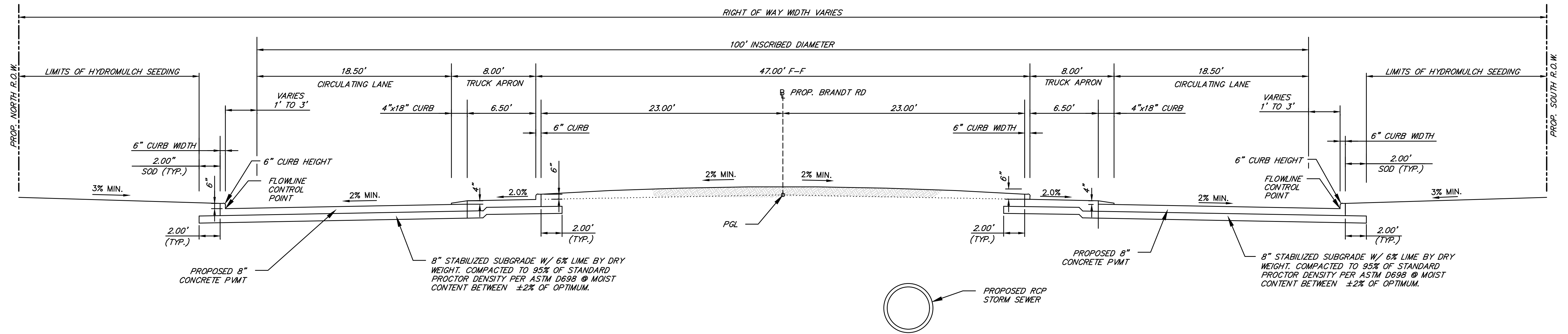
TERRA a Bowman company 1445 N. LOOP WEST – SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.B.P.E. FIRM
REGISTRATION NO. 11653

DRAWN BY: T.D. SCALE: 1" = 100' PROJECT No. 0522-1801
CHECKED BY: A.G.A.N. DATE: FEBRUARY, 2023 CONTRACT: 1
SHEET GE05

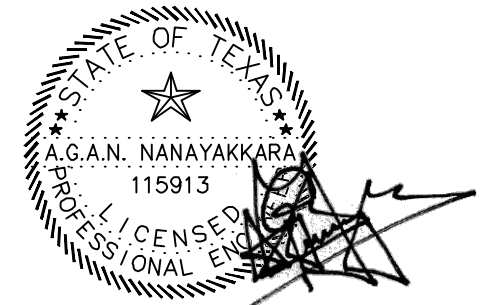
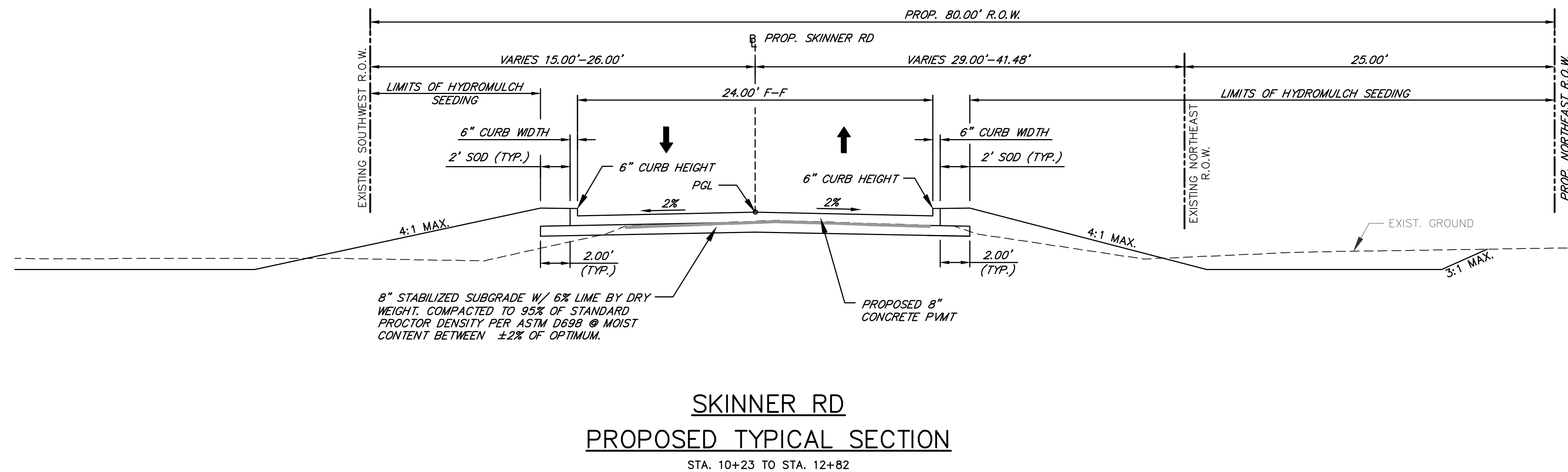
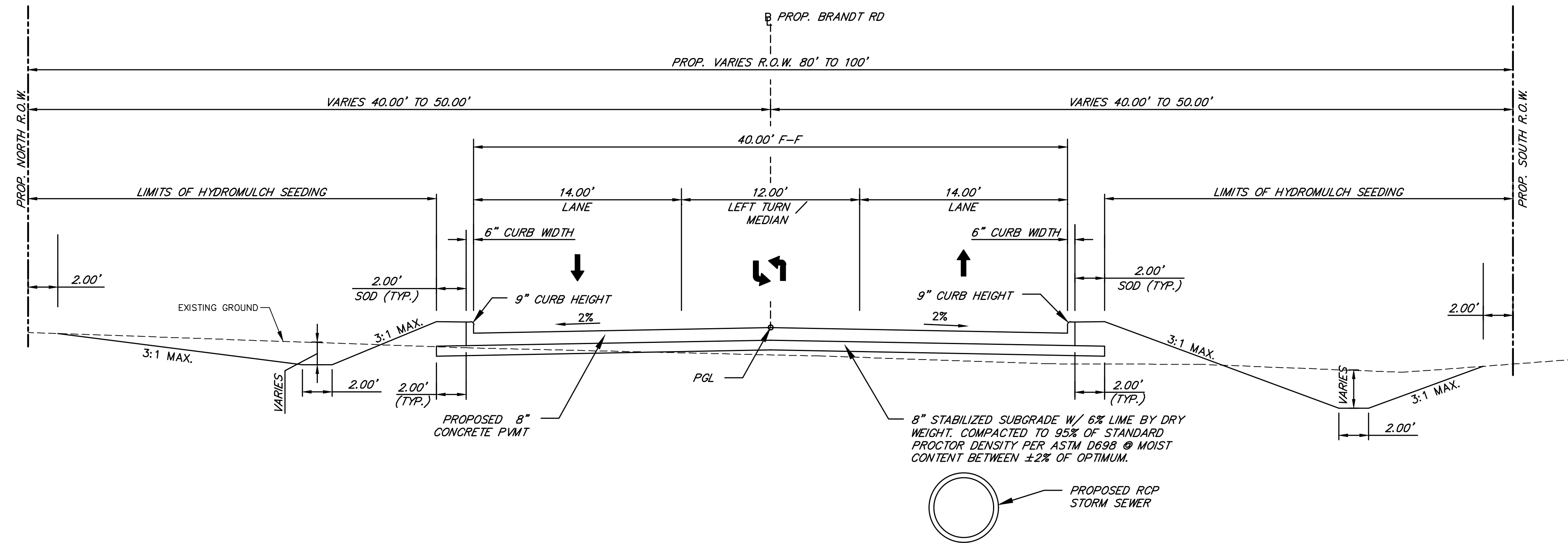


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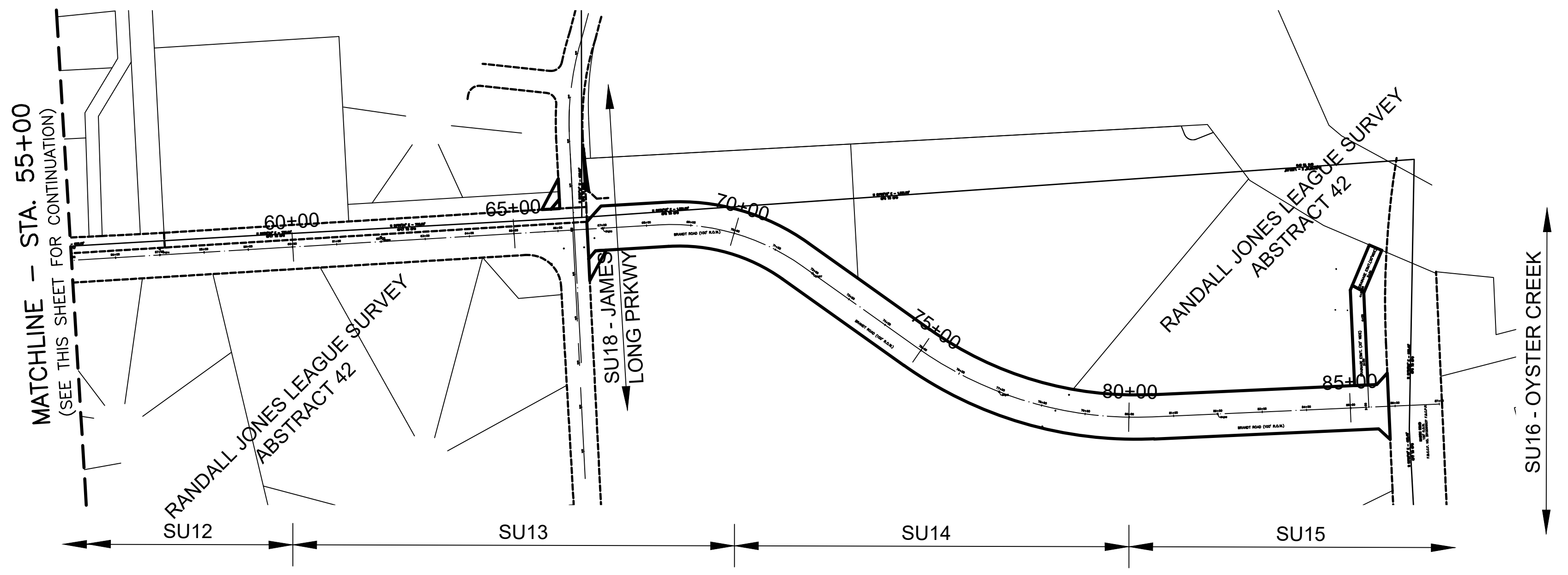
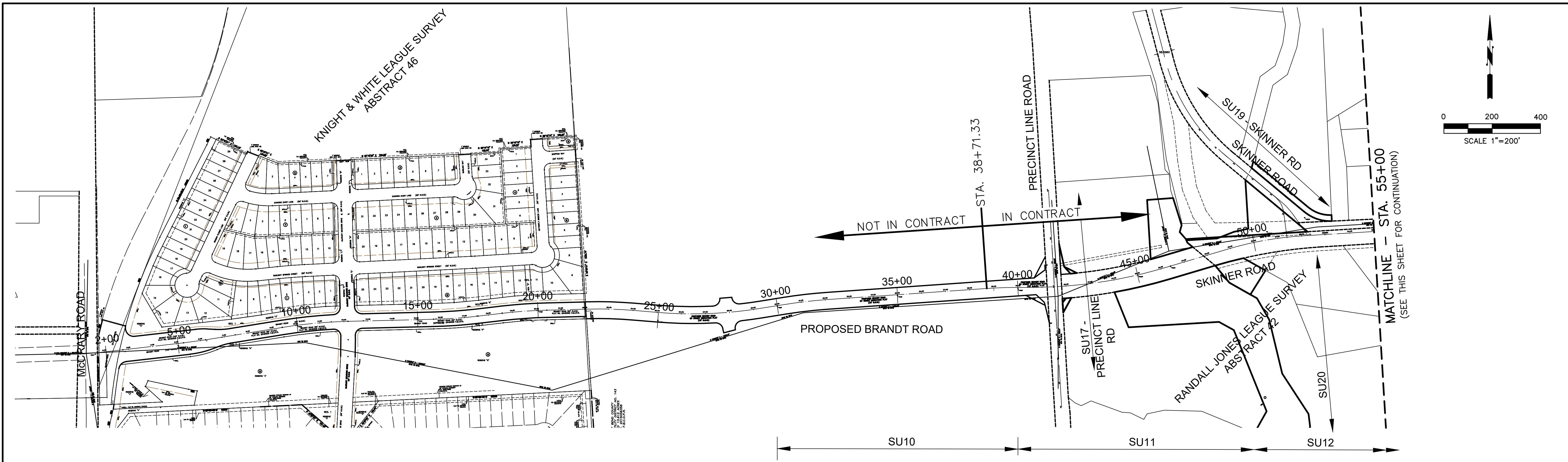
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BRANDT ROAD PRECINCT LINE RD TO MASON RD PROPOSED TYPICAL SECTIONS (2 OF 5)			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET GE08	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\GE11 PROPOSED TYPICAL SECTIONS (5 OF 5).dwg, Feb 17, 2023-9:50am Terra Associates Inc., Thanh Dao



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913 ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD PROPOSED TYPICAL SECTIONS (5 OF 5)			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET GE11	



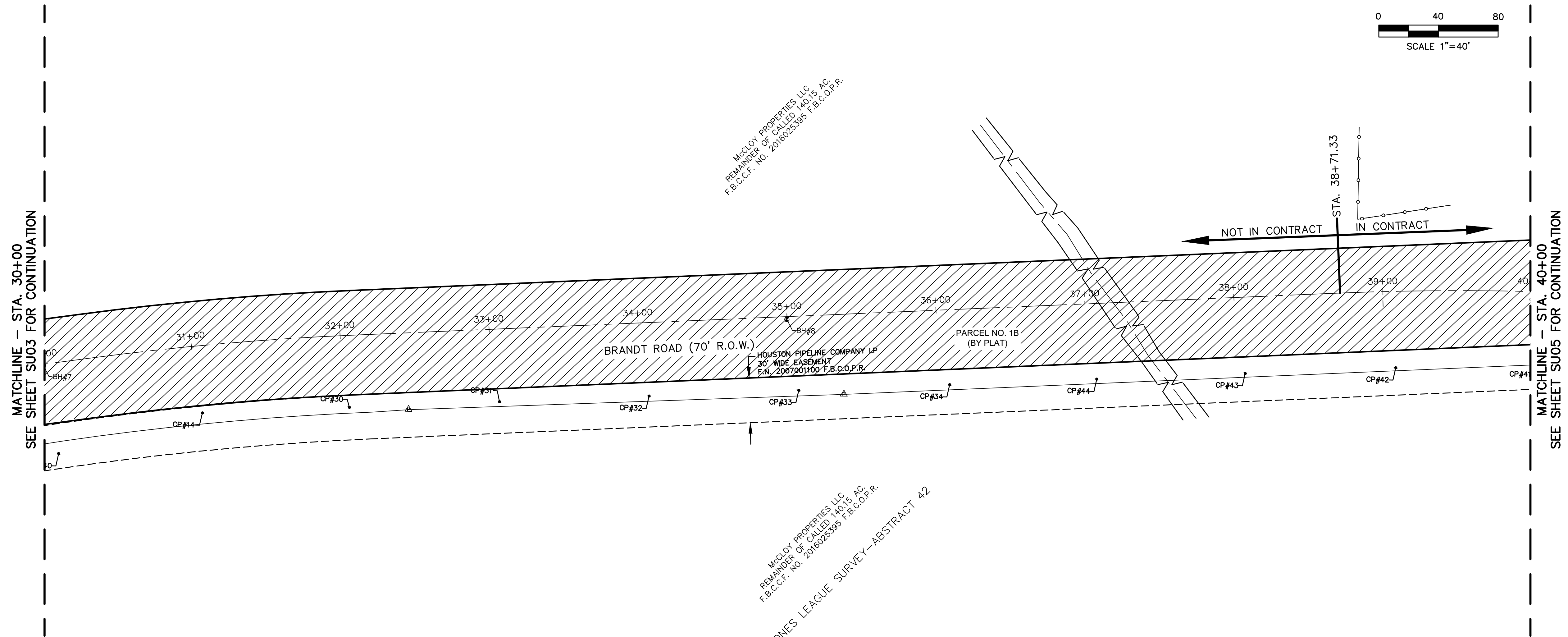
JNS ENGINEERS, LLC. 722 PIN OAK ROAD, SUITE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 T.B.P.E. FIRM REGISTRATION NO. F-11653	
TOPOGRAPHIC SURVEY BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD FORT BEND COUNTY PROJECT #17310 PRECINCT #3 PHASE 2	
SURVEY CONTROL MAP BRANDT ROAD OVERALL LAYOUT	
SUBMITTED BY: JNS SCALE: 1"=200' DATE: JANUARY, 2020 SURVEY BY: JNS FIELD BOOK NO.	DESIGNED BY: BDCP DRAWN BY: BDCP SHT. NO. SU08 CITY DWG. NO.



We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category 1A, Condition II Survey and Category 6, Condition II Survey.

Jon N. Strange
 Jon N. Strange
 Registered Professional Land Surveyor No. 4417
 09-10-2020

10 Sep 2020 1:52PM Bombi Pessquera
 \\192.168.1.5\Cad\Misc\262-08_BRANDT_LANE\SURVEY\PHASE 2 SHEETS\BRANDT ROAD SURVEY - ROW & PARCEL MAPS_REVISED.dwg



BENCHMARKS:
 Flood Reference Mark Number AW4693 is a NGS brass disk
 Elevation = 90.68 NAVD 88, 2001 Adjustment
 Flood Reference Mark Number AW4690 is a NGS brass disk
 Elevation = 94.56 NAVD 88, 2001 Adjustment

TEMPORARY BENCHMARKS
 TBM A Elevation = 87.61 Square cut in SET at 30- inch RCP at McCrary Road
 TBM B Elevation = 91.92 Railroad Spike in Power Pole on Precinct Line Road
 TBM C Elevation = 82.10 Square cut on top of 18-inch RCP
 TBM D Elevation = 87.53 Square cut on Top of Concrete Back of Curb
 TBM E Elevation = 87.17 Square Cut on Inlet Mason Road

CONTROL POINTS:
 CP 1 - "X" cut in Concrete in Brandt Road West of McCrary Road
 Elevation = 90.16
 CP 2 - MAG Nail with Shiner Asphalt on Brandt Road
 Elevation = 84.63
 CP 12 - 3/8" Iron Rod
 Elevation = 84.43
 CP 13 - 5/8" Iron Rod
 Elevation = 89.55
 CP 14 - 5/8" Iron Rod
 Elevation = 88.68
 CP 15 - 5/8" Capped Iron Rod.
 Elevation = 85.54
 CP 16 - 5/8" Iron Rod
 Elevation = 85.81
 CP 29 - 5/8" Capped Iron Rod.
 Elevation = 79.40
 CP 5 - 5/8" Capped Iron Rod on Existing Skinner Road New Brandt Road.
 Elevation = 82.36
 CP 17 - Mag Nail with Shiner.
 Elevation = 87.16
 CP 6 - 5/8" Iron Rod
 Elevation = 87.16
 CP 19 - 100D Nail.
 Elevation = 83.03
 CP 7 - X in Concrete
 Elevation = 88.00
 McCrary Road
 CP 10 - 100 D Nail with cap at McCrary Road.
 Elevation = 89.43
 CP 11 - 100 D nail with cap at McCrary Road.
 Elevation = 89.07
 Precinct Line Road
 CP 3 - MAG Nail with Shiner at Precinct Line Road.
 Elevation = 89.06
 CP 4 - Mag nail with Shiner at Precinct Line Road.
 Elevation = 84.46
 Skinner Road
 CP 54 - MAG Nail with Shiner.
 Elevation = 87.13
 James long
 CP 53 - MAG Nail with Shiner.
 Elevation = 86.75
 Mason Road
 CP 9 - 5/8" Capped Iron Rod.
 Elevation = 90.82
 CP 8 - 5/8" Capped Iron Rod.
 Elevation = 88.13

MATCHLINE - STA. 30+00
 SEE SHEET SU03 FOR CONTINUATION

MATCHLINE - STA. 40+00
 SEE SHEET SU05 FOR CONTINUATION

McLOY PROPERTIES LLC
 REMAINDER OF CALLED 140.15 AC.
 F.B.C.C.F. NO. 2016025395 F.B.C.O.P.R.

McLOY PROPERTIES LLC
 REMAINDER OF CALLED 140.15 AC.
 F.B.C.C.F. NO. 2016025395 F.B.C.O.P.R.
 RANDALL JONES LEAGUE SURVEY-ABSTRACT 42



We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category 1A, Condition II Survey and Category 6, Condition II Survey.

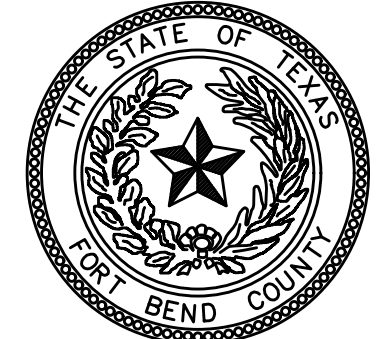
Jon N. Strange
 Jon N. Strange
 Registered Professional Land Surveyor
 09-10-2020

SET 5/8-INCH IRON ROD WITH CAP STAMPED "JNS ENG"

JNS ENGINEERS, LLC.
 722 PIN OAK ROAD, SUITE 202A
 KATY, TEXAS 77494
 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375
 T.B.P.E. FIRM REGISTRATION NO. F-11653

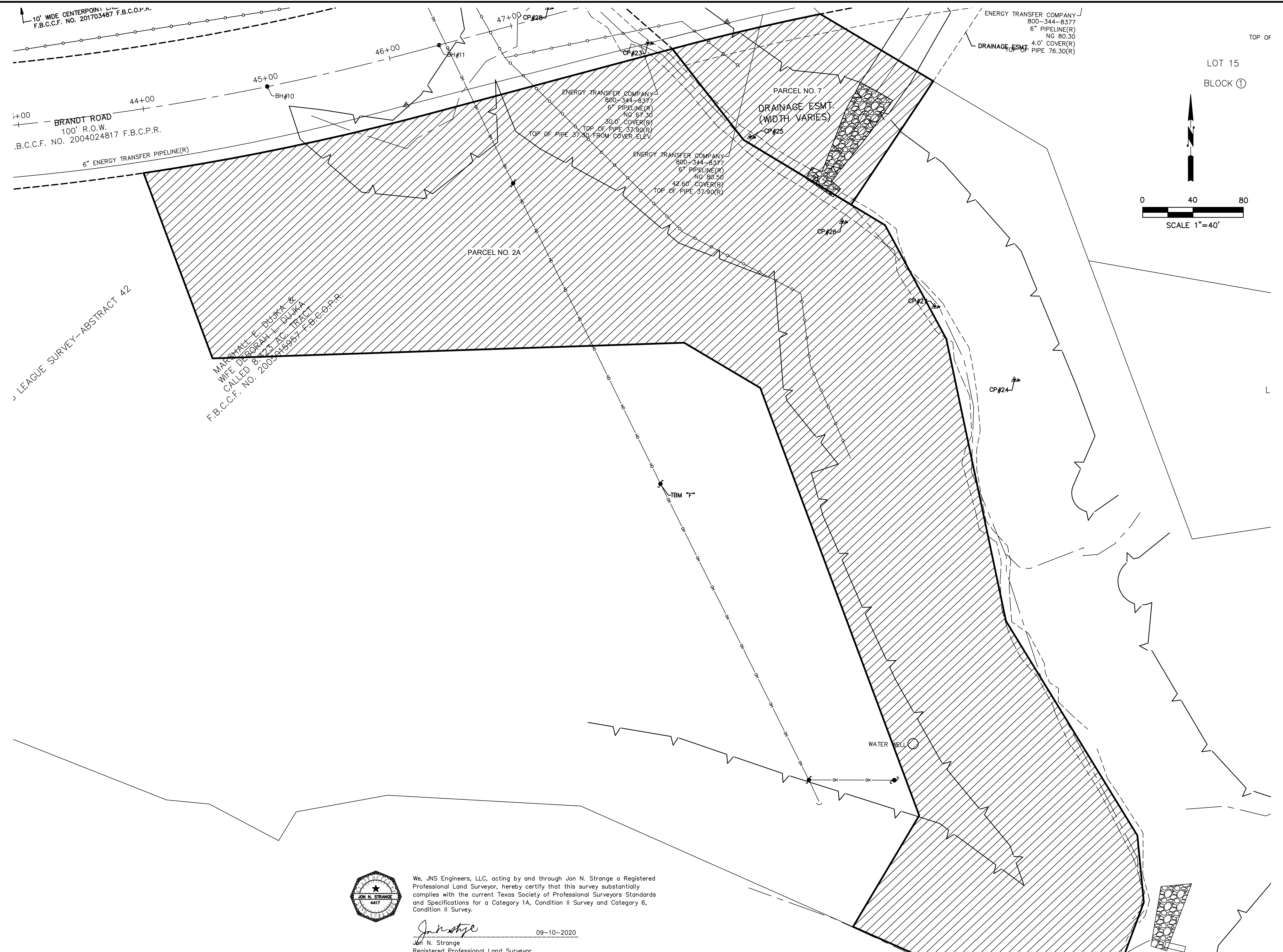
NO.	REVISIONS	DATE	NAME

**FORT BEND COUNTY
 ENGINEERING DEPARTMENT**



PROJECT TITLE: BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD - PHASE 2	JOB NO:
DRAWN BY: BDCP	SHEET DESCRIPTION: RIGHT OF WAY & PROPOSED PARCEL MAP
CHK BY: JNS	FILE NAME:
SCALE: 1"=40'	FILE NO:
DATE: 01-2020	APPROVED BY: SHEET 1 OF 7
	SHT NO: SU01 /

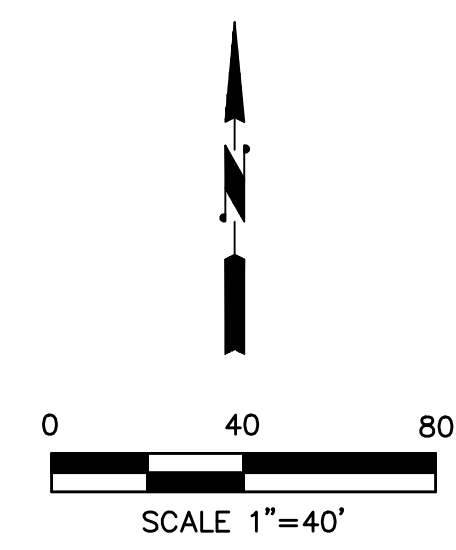
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BENCHMARKS:
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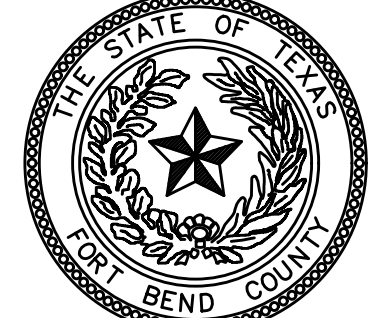
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Jon N. Strange 09-10-2020
 Jon N. Strange
 Registered Professional Land Surveyor

SET 5/8-INCH IRON ROD WITH CAP STAMPED "JNS ENG"

NO.	REVISIONS	DATE	NAME

**FORT BEND COUNTY
 ENGINEERING DEPARTMENT**



PROJECT TITLE: BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD - PHASE 2		JOB NO:
DRAWN BY: BDCP	SHEET DESCRIPTION: RIGHT OF WAY & PROPOSED PARCEL MAP	FILE NAME:
DATE: 01-2020	APPROVED BY:	FILE NO:
SCALE: 1"=40'	SHEET 3 OF 7	SHT NO: SU03 /

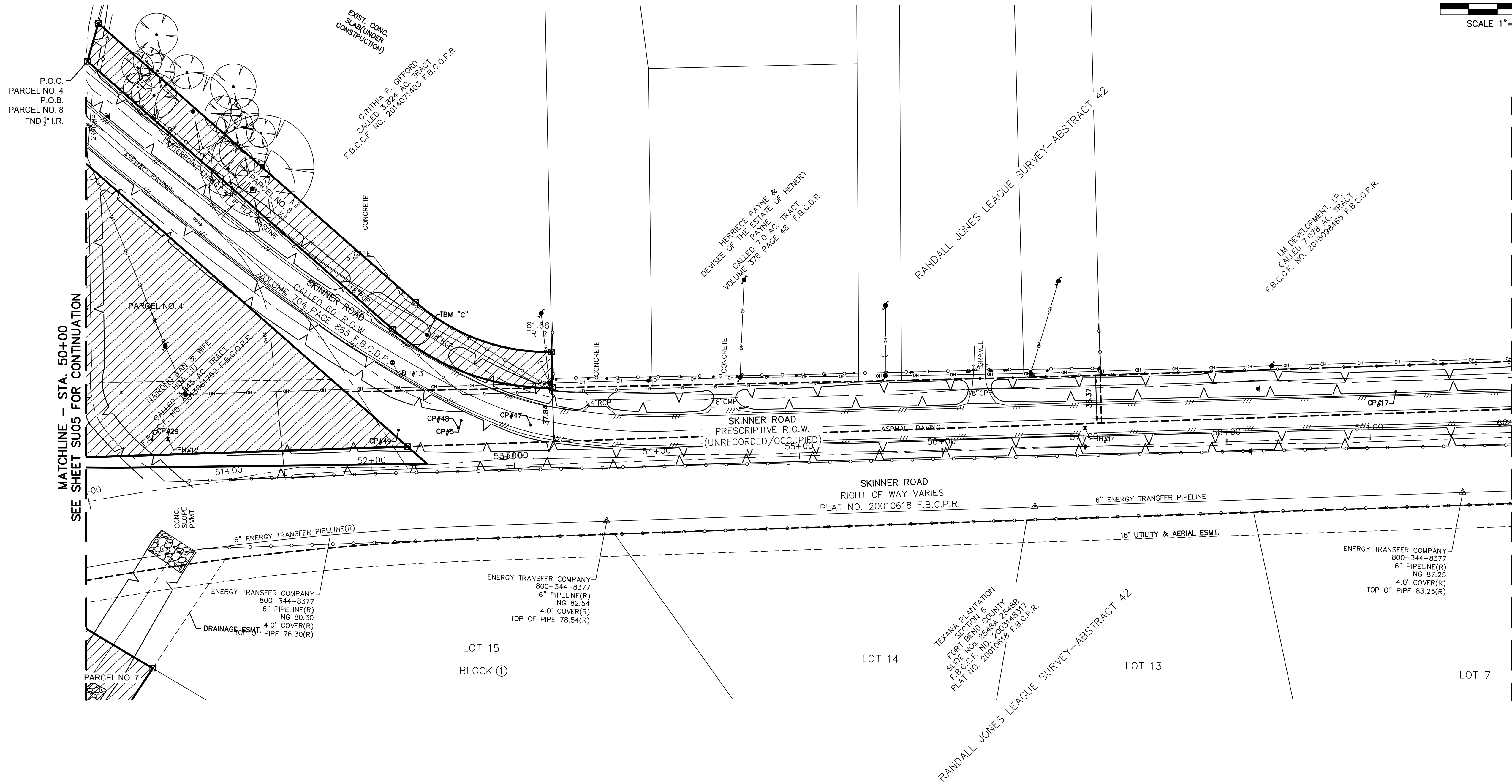
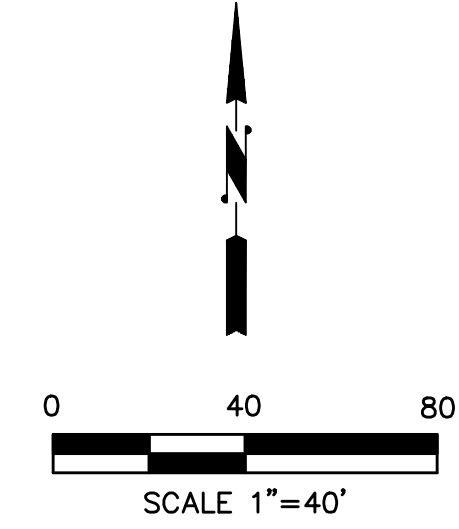
JNS ENGINEERS, LLC.
 722 PIN OAK ROAD, SUITE 202A
 KATY, TEXAS 77494
 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375
 T.B.P.E. FIRM REGISTRATION NO. F-11653

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 \\192.168.1.5\Cad\Misc\262-08_BRANDT_LANE_SURVEY\PHASE 2 SHEETS\BRANDT ROAD SURVEY - ROW & PARCEL MAPS_REVISED.dwg

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MATCHLINE - STA. 50+00
SEE SHEET SU05 FOR CONTINUATION

MATCHLINE - STA. 60+00
SEE SHEET SU08 FOR CONTINUATION



We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category 1A, Condition II Survey and Category 6, Condition II Survey.
 Jon N. Strange
 Registered Professional Land Surveyor
 09-10-2020

SET 5/8-INCH IRON ROD WITH CAP STAMPED "JNS ENG"

JNS ENGINEERS, LLC.
 722 PIN OAK ROAD, SUITE 202A
 KATY, TEXAS 77494
 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375
 T.B.P.E. FIRM REGISTRATION NO. F-11653

NO.	REVISIONS	DATE	NAME

**FORT BEND COUNTY
 ENGINEERING DEPARTMENT**

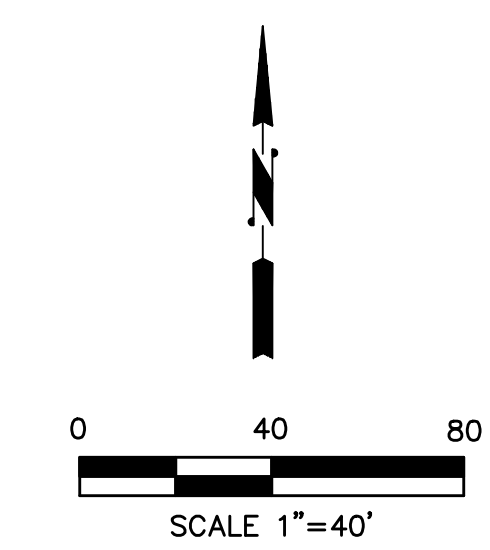
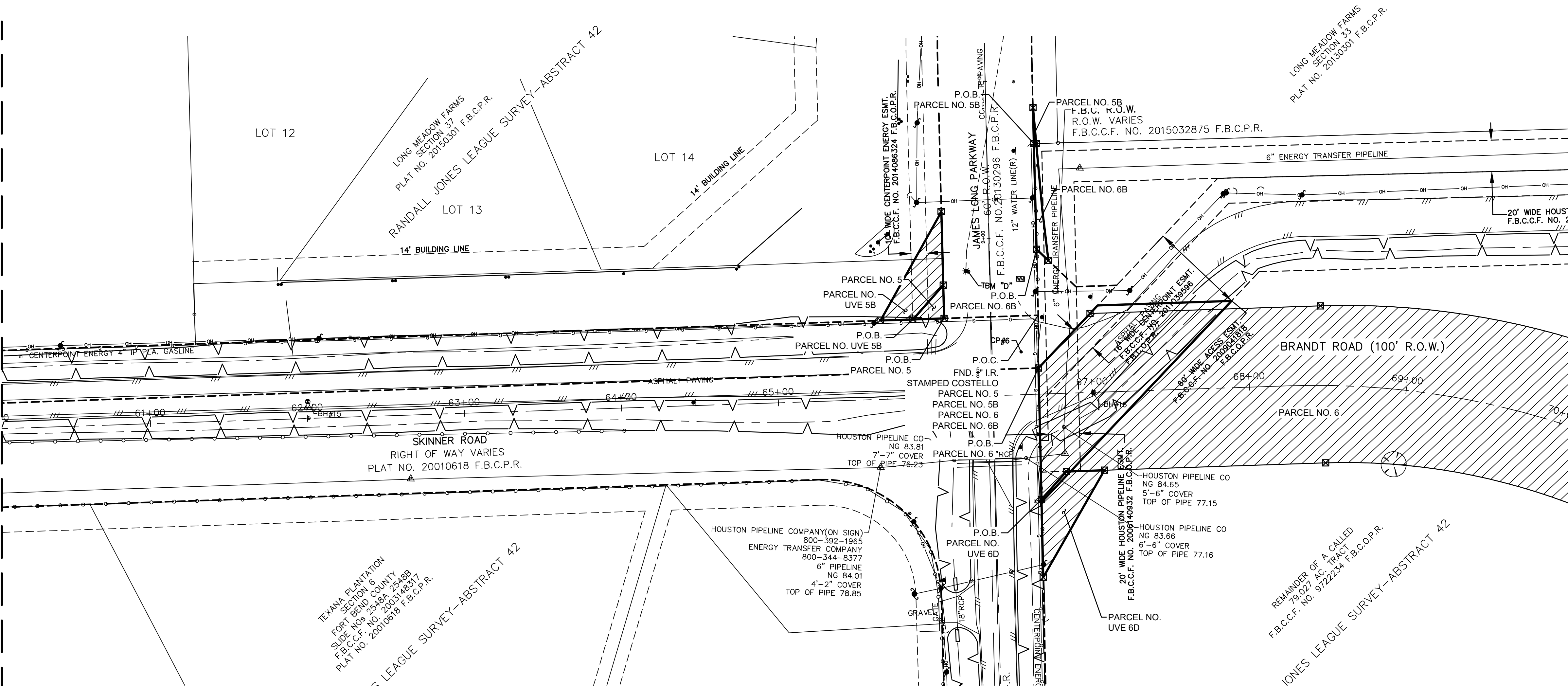
PROJECT TITLE: FROM McCRARY ROAD TO MASON ROAD - PHASE 2	JOB NO.:
DRAWN BY: BDCP	SHEET DESCRIPTION: RIGHT OF WAY & PROPOSED PARCEL MAP
FILE NAME:	FILE NO.:
DATE: 01-2020	APPROVED BY:
DATE: 01-2020	FILE NO.:
DATE: 01-2020	SHT NO.:

PROJECT TITLE: FROM McCRARY ROAD TO MASON ROAD - PHASE 2	JOB NO.:
DRAWN BY: BDCP	SHEET DESCRIPTION: RIGHT OF WAY & PROPOSED PARCEL MAP
FILE NAME:	FILE NO.:
DATE: 01-2020	APPROVED BY:
DATE: 01-2020	FILE NO.:
DATE: 01-2020	SHT NO.:

10 Sep 2020 1:54PM Bambi_Pesquera \\192.168.1.5\Cad\Misc\262-08_BRANDT_LANE_SURVEY\PHASE 2 SHEETS\BRANDT_LANE_SURVEY\REVISED.dwg

MATCHLINE - STA. 60+00
SEE SHEET SU07 FOR CONTINUATION

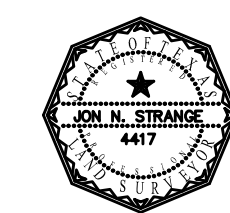
MATCHLINE - STA. 70+00
SEE SHEET SU09 FOR CONTINUATION



- BENCHMARKS:**
 Flood Reference Mark Number AW4693 is a NGS brass disk
 Elevation = 90.68 NAVD 88, 2001 Adjustment
 Flood Reference Mark Number AW4690 is a NGS brass disk
 Elevation = 94.56 NAVD 88, 2001 Adjustment
- TEMPORARY BENCHMARKS**
 TBM A Elevation = 87.61 Square cut in SET at 30-inch RCP at McCrary Road
 TBM B Elevation = 91.92 Railroad Spike in Power Pole on Precinct Line Road
 TBM C Elevation = 82.10 Square cut on top of 18-inch RCP
 TBM D Elevation = 87.53 Square cut on Top of Concrete Back of Curb
 TBM E Elevation = 87.17 Square Cut on Inlet Mason Road
- CONTROL POINTS:**
 CP 1 - "X" cut in Concrete in Brandt Road West of McCrary Road
 Elevation = 90.16
 CP 2 - MAG Nail with Shiner Asphalt on Brandt Road
 Elevation = 84.63
 CP 12 - 5/8" Iron Rod
 Elevation = 84.43
 CP 13 - 5/8" Iron Rod
 Elevation = 89.55
 CP 14 - 5/8" Iron Rod
 Elevation = 88.68
 CP 15 - 5/8" Capped Iron Rod.
 Elevation = 85.54
 CP 16 - 5/8" Iron Rod
 Elevation = 85.81
 CP 29 - 5/8" Capped Iron Rod.
 Elevation = 79.40
 CP 5 - 5/8" Capped Iron Rod on Existing Skinner Road New Brandt Road.
 Elevation = 82.36
 CP 17 - Mag Nail with Shiner.
 Elevation = 87.16
 CP 6 - 5/8" Iron Rod
 Elevation = 87.16
 CP 19 - 100D Nail.
 Elevation = 83.03
 CP 7 - X in Concrete
 Elevation = 88.00
 McCrary Road
 CP 10 - 100 D Nail with cap at McCrary Road.
 Elevation = 89.43
 CP 11 - 100 D nail with cap at McCrary Road.
 Elevation = 89.07
 Precinct Line Road
 CP 3 - MAG Nail with Shiner at Precinct Line Road.
 Elevation = 89.06
 CP 4 - Mag nail with Shiner at Precinct Line Road.
 Elevation = 84.46
 Skinner Road
 CP 54 - MAG Nail with Shiner.
 Elevation = 87.13
 James long
 CP 53 - MAG Nail with Shiner.
 Elevation = 86.75
 Mason Road
 CP 9 - 5/8" Capped Iron Rod.
 Elevation = 90.82
 CP 8 - 5/8" Capped Iron Rod.
 Elevation = 88.13

TEXAMA PLANTATION
 FOR FORT BEND COUNTY
 SLIDE NOS. 25489, 25490
 F.B.C.C.F. NO. 2003748917
 PLAT NO. 20010618 F.B.C.P.R.
 RANDALL JONES LEAGUE SURVEY-ABSTRACT 42

HOUSTON PIPELINE COMPANY (ON SIGN)
 800-392-1965
 ENERGY TRANSFER COMPANY
 800-344-8377
 6" PIPELINE
 NG 84.01
 4'-2" COVER
 TOP OF PIPE 78.85

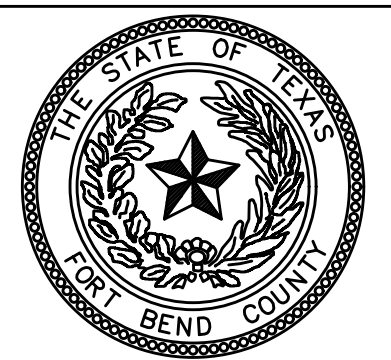


We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category 1A, Condition II Survey and Category 6, Condition II Survey.

Jon N. Strange
 Jon N. Strange
 Registered Professional Land Surveyor
 09-10-2020

☒ SET 5/8-INCH IRON ROD WITH CAP STAMPED "JNS ENG"

FORT BEND COUNTY ENGINEERING DEPARTMENT



NO.	REVISIONS	DATE	NAME

PROJECT TITLE: BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD - PHASE 2		JOB NO.:
DRAWN BY: BDCP	SHEET DESCRIPTION: RIGHT OF WAY & PROPOSED PARCEL MAP	FILE NAME:
DATE: 01-2020	APPROVED BY:	FILE NO.:
SCALE: 1"=40'	SHEET 5 OF 7	SHT NO.:
		SU05 /

JNS ENGINEERS, LLC.
 722 PIN OAK ROAD, SUITE 202A
 KATY, TEXAS 77494
 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375
 T.B.P.E. FIRM REGISTRATION NO. F-11653

10 Sep 2020 1:55PM Bambi Pesquera \\192.168.1.5\Cad\Misc\262-08_BRANDT_LANE\SURVEY\PHASE 2 SHEETS\BRANDT ROAD SURVEY - ROW & PARCEL MAPS_REVISED.dwg

BENCHMARKS:

Flood Reference Mark Number AW4693 is a NGS brass disk
Elevation = 90.68 NAVD 88, 2001 Adjustment

Flood Reference Mark Number AW4690 is a NGS brass disk
Elevation = 94.56 NAVD 88, 2001 Adjustment

TEMPORARY BENCHMARKS

TBM A Elevation = 87.61 Square cut in SET at 30- inch RCP at McCrary Road

TBM B Elevation = 91.92 Railroad Spike in Power Pole on Precinct Line Road

TBM C Elevation = 82.10 Square cut on top of 18-inch RCP of Curb

TBM D Elevation = 87.53 Square cut on Top of Concrete Back of Curb

TBM E Elevation = 87.17 Square Cut on Inlet Mason Road

CONTROL POINTS:

CP 1 - "X" cut in Concrete in Brandt Road West of McCrary Road
Elevation = 90.16

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CP 15 - 5/8" Capped Iron Rod.
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CP 16 - 5/8" Iron Rod
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CP 29 - 5/8" Capped Iron Rod.
Elevation = 79.40

CP 5 - 5/8" Capped Iron Rod on Existing Skinner Road New Brandt Road.
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CP 17 - Mag Nail with Shiner.
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CP 6 - 5/8" Iron Rod
Elevation = 87.16

CP 19 - 100D Nail.
Elevation = 83.03

CP 7 - X in Concrete
Elevation = 88.00

McCrary Road

CP 10 - 100 D Nail with cap at McCrary Road.
Elevation = 89.43

CP 11 - 100 D nail with cap at McCrary Road.
Elevation = 89.07

Precinct Line Road

CP 3 - MAG Nail with Shiner at Precinct Line Road.
Elevation = 89.06

CP 4 - Mag nail with Shiner at Precinct Line Road.
Elevation = 84.46

Skinner Road

CP 54 - MAG Nail with Shiner.
Elevation = 87.13

James long

CP 53 - MAG Nail with Shiner.
Elevation = 86.75

Mason Road

CP 9 - 5/8" Capped Iron Rod.
Elevation = 90.82

CP 8 - 5/8" Capped Iron Rod.
Elevation = 88.13

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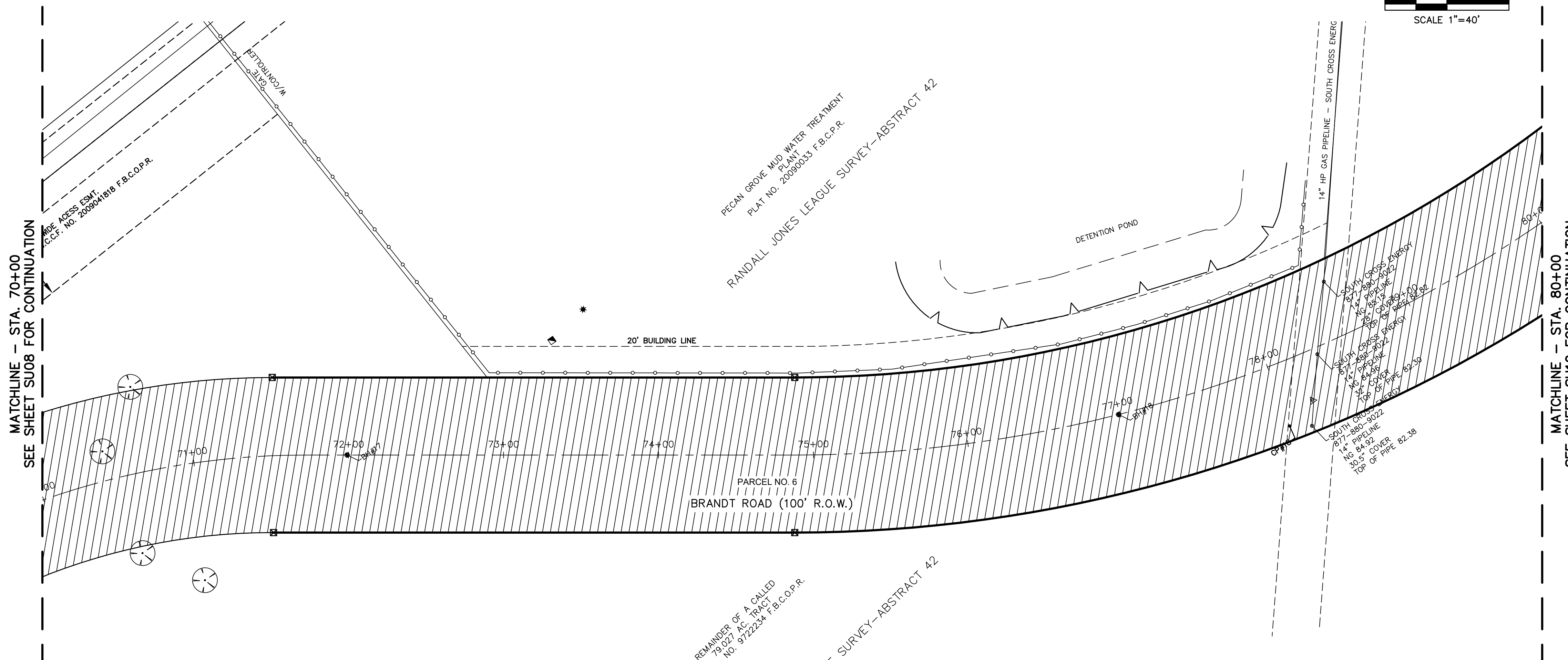
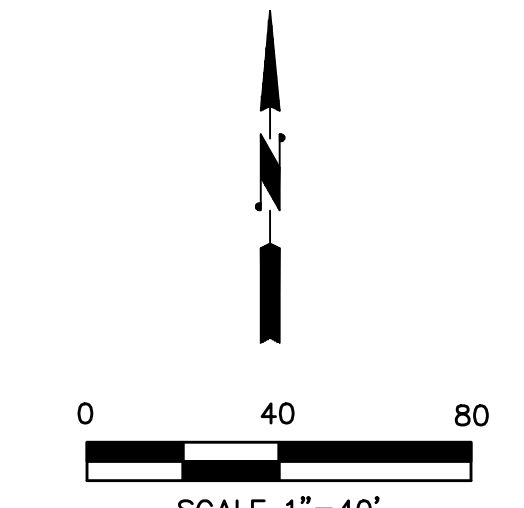
CP 8 - 5/8" Capped Iron Rod.
Elevation = 88.13

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Elevation = 88.13

CP 8 - 5/8" Capped Iron Rod.
Elevation = 88.13

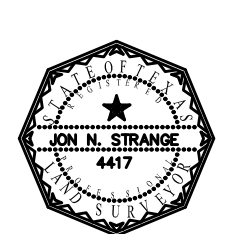
CP 8 - 5/8" Capped Iron Rod.
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Elevation = 88.13



MATCHLINE - STA. 70+00
SEE SHEET SU08 FOR CONTINUATION

MATCHLINE - STA. 80+00
SEE SHEET SUTO FOR CONTINUATION



We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category 1A, Condition II Survey and Category 6, Condition II Survey.

Jon N. Strange
Jon N. Strange
Registered Professional Land Surveyor

09-10-2020

SET 5/8-INCH IRON ROD WITH CAP STAMPED "JNS ENG"

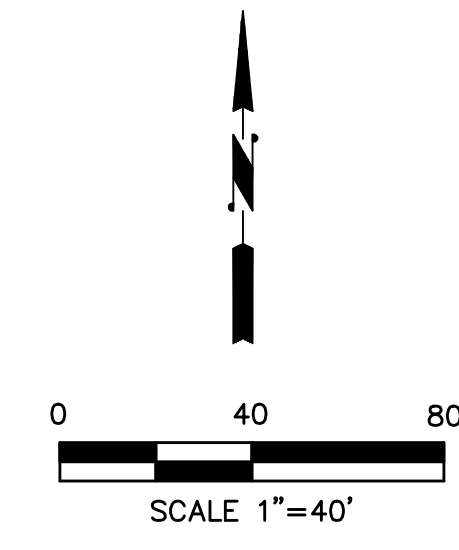
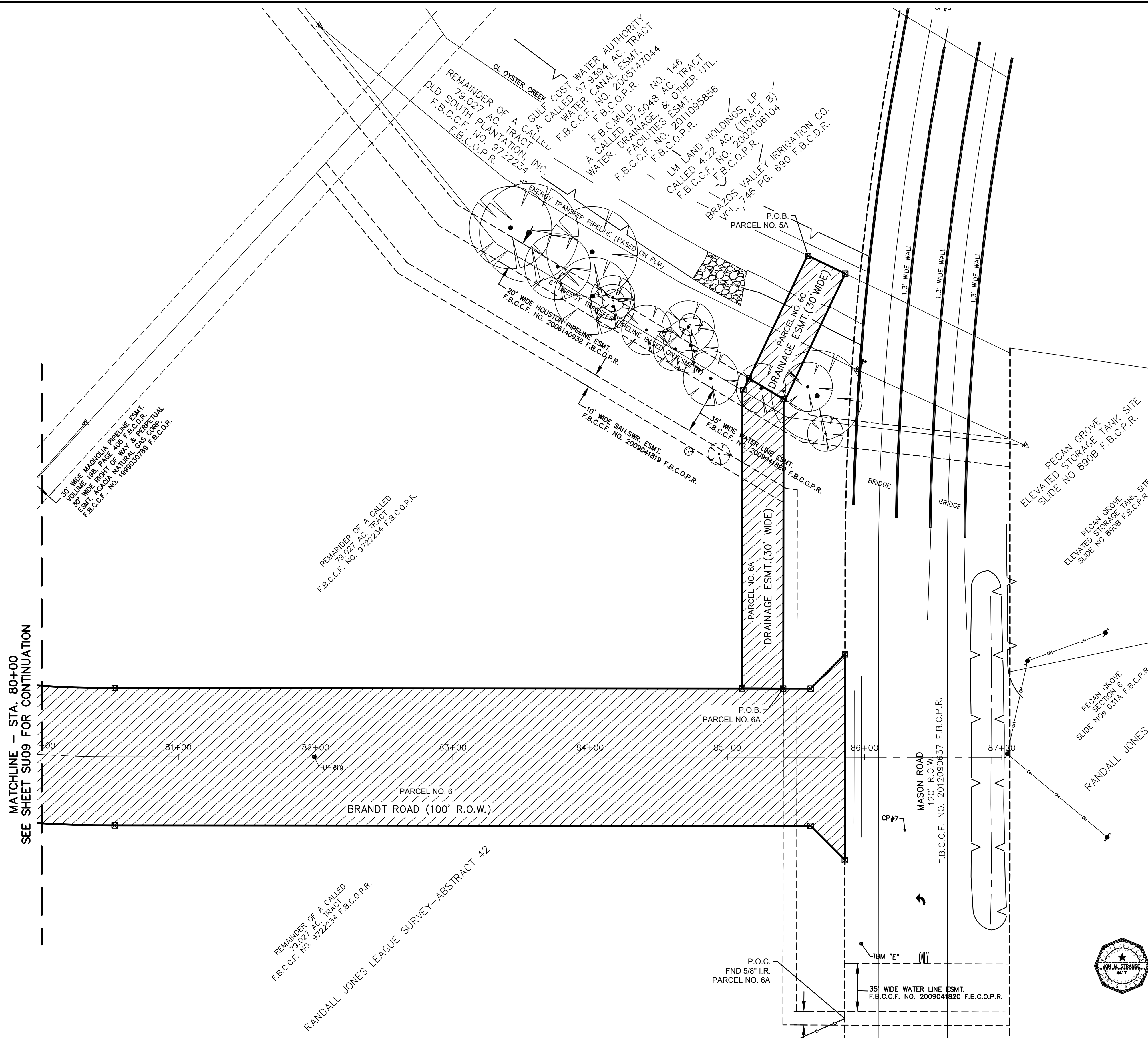
JNS ENGINEERS, LLC.
722 PIN OAK ROAD, SUITE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366 FAX: (281) 391-3375
T.B.P.E. FIRM REGISTRATION NO. F-11653

NO.	REVISIONS	DATE	NAME

**FORT BEND COUNTY
ENGINEERING DEPARTMENT**

PROJECT TITLE: BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD - PHASE 2		JOB NO.:	
DRAWN BY: BDCP	SHEET DESCRIPTION: RIGHT OF WAY & PROPOSED PARCEL MAP		FILE NAME:
DATE: 01-2020	SCALE: 1"=40'		FILE NO.:
DATE: 01-2020	APPROVED BY:		SHT NO.:
			SU06 /

10 Sep 2020 1:55PM Bambi_Pesquera \\192.168.1.5\Cad\Misc\262-08_BRANDT_LANE\SURVEY\PHASE 2 SHEETS\BRANDT ROAD SURVEY - ROW & PARCEL MAPS_REVISED.dwg



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MATCHLINE - STA. 80+00
SEE SHEET SU09 FOR CONTINUATION

REMANINDER OF A CALLED
 79.027 AC. TRACT
 F.B.C.C.F. NO. 9722234 F.B.C.O.P.R.
 RANDALL JONES LEAGUE SURVEY-ABSTRACT 42



We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category I/A, Condition II Survey and Category 6, Condition II Survey.
 Jon N. Strange
 Registered Professional Land Surveyor
 09-10-2020

SET 5/8-INCH IRON ROD WITH CAP STAMPED "JNS ENG"

NO.	REVISIONS	DATE	NAME

FORT BEND COUNTY ENGINEERING DEPARTMENT

PROJECT TITLE: BRANDT ROAD FROM MCCRARY ROAD TO MASON ROAD - PHASE 2		JOB NO:	
DRAWN BY: BDCP	SHEET DESCRIPTION: RIGHT OF WAY & PROPOSED PARCEL MAP	FILE NAME:	
DATE: 01-2020	APPROVED BY:	SCALE: 1"=40'	FILE NO:
DATE: 01-2020		APPROVED BY:	SHT NO: SU07 /

JNS ENGINEERS, LLC.
 722 PIN OAK ROAD, SUITE 202A
 KATY, TEXAS 77494
 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375
 T.B.P.E. FIRM REGISTRATION NO. F-11653

Curve Table					
Curve #	Length	Radius	Delta	Chord Direction	Chord Length
C1	164.18'	1500.00'	6°16'16"	N86° 38' 38"E	164.10'
C2	273.17'	2010.00'	7°47'12"	S84° 42' 23"W	272.96'
C3	185.09'	2000.00'	5°18'09"	N85° 56' 55"E	185.03'
C4	185.09'	2000.00'	5°18'09"	S85° 56' 55"W	185.03'
C5	187.63'	1750.00'	6°08'35"	N88° 19' 43"W	187.54'
C6	423.39'	1750.00'	13°51'43"	N87° 48' 43"E	422.36'
C7	178.81'	2000.00'	5°07'21"	S83° 26' 32"W	178.75'
C8	160.47'	2000.00'	4°35'50"	S88° 18' 08"W	160.43'
C9	592.52'	1971.23'	17°13'20"	N81° 59' 23"E	590.29'
C10	319.31'	1400.00'	13°04'04"	S80° 00' 35"W	318.62'
C11	346.20'	510.00'	38°53'36"	N74° 00' 35"W	339.59'
C12	563.92'	850.00'	38°00'43"	S73° 34' 08"E	553.64'

Curve Table					
Curve #	Length	Radius	Delta	Chord Direction	Chord Length
C13	68.35'	35.00'	111°53'22"	S40° 35' 40"E	57.99'
C14	48.58'	300.00'	9°16'39"	N88° 05' 59"E	48.52'
C15	62.44'	300.00'	11°55'32"	N86° 46' 33"E	62.33'
C16	217.35'	2040.00'	6°06'16"	N83° 51' 55"E	217.25'
C17	46.24'	30.00'	88°19'04"	N42° 45' 32"E	41.80'
C18	47.12'	30.00'	90°00'00"	S46° 24' 00"E	42.43'
C19	182.32'	1970.00'	5°18'09"	N85° 56' 55"E	182.25'
C20	187.87'	2030.00'	5°18'09"	S85° 56' 55"W	187.80'
C21	190.77'	1780.00'	6°08'26"	S88° 19' 38"E	190.68'
C22	226.59'	1720.00'	7°32'53"	S89° 01' 52"E	226.43'
C23	48.10'	30.00'	91°51'54"	N41° 15' 44"E	43.11'
C24	48.10'	30.00'	91°51'54"	S50° 36' 10"E	43.11'
C25	77.56'	1720.00'	2°35'01"	N82° 10' 23"E	77.56'
C26	181.49'	2030.00'	5°07'21"	N83° 26' 32"E	181.43'
C27	45.30'	35.00'	74°09'18"	N46° 23' 01"E	42.20'
C28	109.30'	400.00'	15°39'24"	N75° 38' 54"E	108.96'
C29	73.67'	300.00'	14°04'11"	N73° 46' 42"E	73.48'

Curve Table					
Curve #	Length	Radius	Delta	Chord Direction	Chord Length
C30	207.38'	1980.00'	6°00'03"	N83° 48' 49"E	207.28'
C31	48.06'	30.00'	91°47'09"	S47° 17' 35"E	43.08'
C32	47.12'	30.00'	90°00'00"	N43° 36' 00"E	42.43'
C33	187.87'	2030.00'	5°18'09"	N85° 56' 55"E	187.80'
C34	182.32'	1970.00'	5°18'09"	S85° 56' 55"W	182.25'
C35	183.27'	1710.00'	6°08'26"	S88° 19' 38"E	183.18'
C36	242.29'	1790.00'	7°45'19"	S89° 08' 05"E	242.11'
C37	42.67'	30.00'	81°30'06"	S52° 15' 42"E	39.17'
C38	17.82'	300.00'	3°24'14"	S13° 12' 45"E	17.82'
C39	51.52'	30.00'	98°24'07"	N34° 17' 12"E	45.42'
C40	81.43'	1790.00'	2°36'24"	N82° 11' 04"E	81.42'
C41	175.23'	1960.00'	5°07'21"	S83° 26' 32"W	175.17'
C42	271.53'	400.00'	38°53'36"	S74° 00' 35"E	266.34'
C43	599.03'	899.86'	38°08'28"	S73° 37' 55"E	588.03'
C44	532.46'	799.86'	38°08'28"	S73° 37' 55"E	522.68'
C45	339.41'	500.00'	38°53'36"	S74° 00' 35"E	332.93'

POINT TABLE						
CP NO.	NORTHING	EASTING	DESCRIPTION	BASELINE	STATION	OFFSET
CP1	13797249.67	2994027.53	X IN CONC	BRANDT ROAD	550' W OF McCRARY INT.	0
CP2	13797262.68	2994594.09	PK NAIL	BRANDT ROAD	1+17.53	11.66 LT
CP3	13797897.30	2998593.34	PK NAIL	PRECINCT LINE ROAD	13+58.77	10.57 RT
CP4	13797117.02	2998620.14	PK NAIL	PRECINCT LINE ROAD	5+78.29	9.71 LT
CP5	13797786.13	2999690.27	5/8" IR	BRANDT ROAD	52+63.22	32.94 LT
CP6	13797864.40	3001079.86	5/8" IR	BRANDT ROAD	66+54.80	27.26 LT
CP7	13797387.13	3002945.88	X IN CONC	MASON ROAD	83+30.41	53.55 RT
CP8	13796952.32	3002969.52	5/8" IR	MASON ROAD	5+11.02	12.46 LT
CP9	13797995.50	3002957.21	5/8" IR	MASON ROAD	15+52.38	20.15 RT
CP10	13796803.86	2994662.35	100D NAIL W/CAP	McCRARY ROAD	450' S OF BRANDT	0
CP11	13797649.30	2994601.03	100D NAIL W/CAP	McCRARY ROAD	400' N OF BRANDT	0
CP12	13797306.80	2995501.70	5/8" IR	BRANDT ROAD	10+25.14	77.00 RT
CP13	13797109.95	2996523.80	5/8" IR	BRANDT ROAD	20+50.46	333.41 RT
CP14	13797430.47	2997564.06	5/8" IR	BRANDT ROAD	31+02.27	43.72 RT
CP15	13797499.07	2998619.84	5/8" IR	BRANDT ROAD	41+64.19	40.53 RT
CP16	13797686.42	2999078.56	5/8" IR	BRANDT ROAD	46+52.03	61.43 LT
CP17	13797823.95	3000345.30	MAG NAIL W/SHINER	BRANDT ROAD	59+19.14	31.17 LT
CP19	13798121.36	2998988.45	100D NAIL	SKINNER LANE	500' N OF BRANDT	219.09 LT
CP53	13798357.35	3001078.79	MAG NAIL W/SHINER	JAMES LONG PKWY	520' N OF SKINNER	0
CP54	13799031.32	3001492.14	MAG NAIL W/SHINER	JAMES LONG PKWY	1,300' N OF SKINNER	0

POINT NO.	NORTHING	EASTING
1	13,797,257.30	2,994,470.24
2	13,797,257.38	2,994,491.80
3	13,797,266.99	2,994,655.61
4	13,797,277.06	2,994,745.68
5	13,797,306.03	2,994,998.67
6	13,797,318.52	2,995,088.64
7	13,797,369.91	2,995,406.35
8	13,797,395.09	2,995,678.15
9	13,797,403.76	2,996,032.79
10	13,797,416.83	2,996,217.35
11	13,797,428.57	2,996,317.25
12	13,797,441.64	2,996,501.82
13	13,797,445.88	2,996,675.10
14	13,797,440.41	2,996,862.56
15	13,797,432.24	2,996,961.05
16	13,797,448.36	2,997,383.10
17	13,797,464.95	2,997,486.44
18	13,797,485.36	2,997,664.02
19	13,797,531.16	2,998,319.60
20	13,797,535.92	2,998,479.96
21	13,797,538.55	2,998,604.56
22	13,797,618.17	2,999,064.49
23	13,797,694.60	2,999,522.11
24	13,797,749.88	2,999,635.90
25	13,797,750.97	2,999,653.96
26	13,797,835.87	3,001,059.62
27	13,797,836.02	3,001,062.11
28	13,797,847.47	3,001,251.79
29	13,797,753.92	3,001,578.23
30	13,797,570.91	3,001,835.40
31	13,797,414.31	3,002,366.43
32	13,797,443.43	3,003,013.96
33	13,797,377.09	2,994,757.36
34	13,797,333.06	2,994,795.10
35	13,797,361.93	2,995,047.04
36	13,797,363.54	2,995,095.54
37	13,797,361.96	2,995,128.72
38	13,797,365.46	2,995,190.96
39	13,797,399.52	2,995,401.56
40	13,797,422.74	2,995,617.56
41	13,797,453.43	2,995,645.94
42	13,797,455.79	2,995,705.90
43	13,797,426.53	2,995,736.62
44	13,797,433.75	2,996,032.06
45	13,797,446.63	2,996,213.85
46	13,797,458.37	2,996,313.75
47	13,797,471.63	2,996,501.08
48	13,797,475.57	2,996,662.18
49	13,797,476.02	2,996,662.15
50	13,797,476.22	2,996,670.21
51	13,797,470.66	2,996,860.81
52	13,797,462.13	2,996,963.54
53	13,797,458.30	2,997,189.93
54	13,797,490.71	2,997,218.37
55	13,797,494.78	2,997,268.20
56	13,797,467.42	2,997,301.51
57	13,797,477.98	2,997,378.35
58	13,797,494.57	2,997,481.68
59	13,797,515.29	2,997,661.93
60	13,797,575.30	2,998,520.86
61	13,797,608.69	2,998,566.15
62	13,797,589.57	2,998,631.53
63	13,797,665.38	2,999,050.44
64	13,797,703.11	2,999,177.64
65	13,797,721.64	2,999,155.18
66	13,797,725.99	2,999,149.13
67	13,797,744.78	2,999,293.28
68	13,797,803.87	2,999,608.51
69	13,797,810.79	2,999,753.56
70	13,797,829.72	3,000,137.63
71	13,797,883.19	3,001,010.54
72	13,797,905.55	3,001,029.16
73	13,797,929.96	3,001,087.96
74	13,797,906.82	3,001,113.60
75	13,797,890.02	3,001,123.08
76	13,797,898.87	3,001,269.62
77	13,797,807.15	3,001,589.67
78	13,797,611.63	3,001,864.42
79	13,797,464.34	3,002,365.91
80	13,797,487.13	3,002,872.62
81	13,797,513.23	3,002,896.47
82	13,797,363.38	3,002,903.16
83	13,797,387.23	3,002,877.07
84	13,797,364.45	3,002,370.63
85	13,797,530.12	3,001,806.43
86	13,797,725.68	3,001,531.69
87	13,797,799.05	3,001,275.65
88	13,797,789.09	3,001,110.78
89	13,797,770.92	3,001,095.39
90	13,797,779.65	3,000,953.74
91	13,797,703.64	2,999,707.62
92	13,797,626.39	2,999,270.62
93	13,797,569.51	2,999,078.89
94	13,797,490.84	2,998,852.52
95	13,797,473.35	2,998,638.55
96	13,797,387.02	2,998,583.79
97	13,797,473.39	2,998,563.30
98	13,797,505.69	2,998,528.96
99	13,797,446.16	2,997,676.79
100	13,797,425.45	2,997,492.78
101	13,797,408.87	2,997,389.44
102	13,797,397.79	2,997,308.77
103	13,797,360.27	2,997,283.19
104	13,797,347.40	2,997,234.87
105	13,797,364.74	2,997,230.80
106	13,797,388.72	2,997,199.82
107	13,797,392.37	2,996,997.75
108	13,797,400.90	2,996,855.02
109	13,797,406.34	2,996,671.91
110	13,797,406.11	2,996,666.56
111	13,797,415.65	2,996,666.04
112	13,797,411.65	2,996,502.55
113	13,797,398.78	2,996,320.75
114	13,797,387.04	2,996,220.86
115	13,797,373.77	2,996,033.52
116	13,797,366.55	2,995,738.09
117	13,797,335.82	2,995,708.83
118	13,797,333.41	2,995,648.87
119	13,797,362.63	2,995,617.22
120	13,797,340.29	2,995,411.14
121	13,797,306.20	2,995,200.36
122	13,797,285.67	2,995,129.80
123	13,797,258.67	2,995,024.24
124	13,797,228.38	2,994,760.05
125	13,797,199.27	2,994,729.50



We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category 1A, Condition II Survey and Category 6, Condition II Survey.

Jon N. Strange
 Jon N. Strange
 Registered Professional Land Surveyor No. 4417

09-10-2020

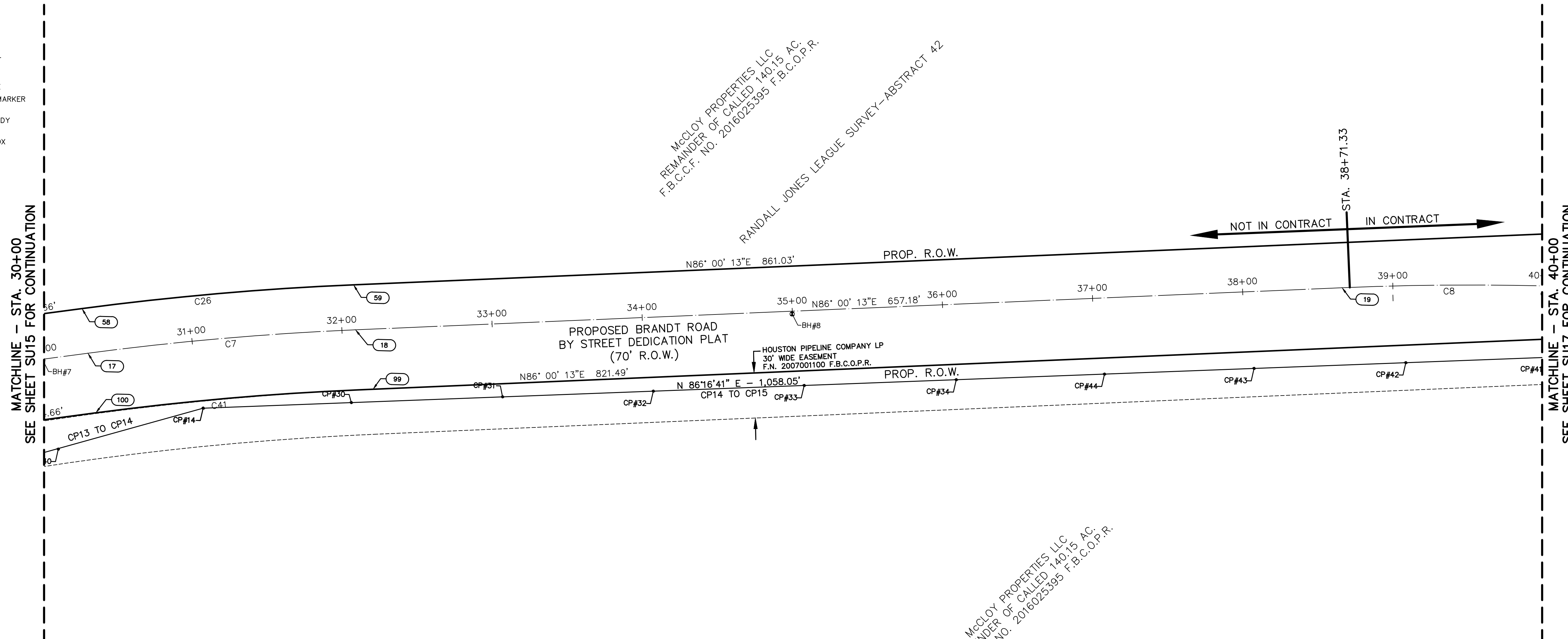
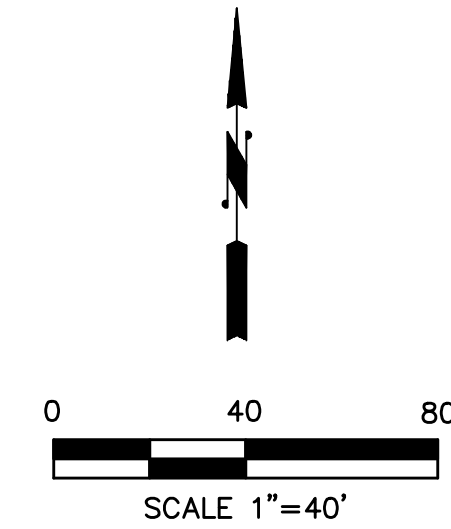
	JNS ENGINEERS, LLC. 722 PIN OAK ROAD, SUITE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 T.B.P.E. FIRM REGISTRATION NO. F-11653
	TOPOGRAPHIC SURVEY BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD FORT BEND COUNTY PROJECT #17310 PRECINCT #3 PHASE 2
SURVEY CONTROL MAP BRANDT ROAD DATA SHEET	
SUBMITTED: JNS SCALE: N.T.S. DATE: JANUARY, 2020 SURVEY BY: JNS FIELD BOOK NO.	DESIGNED BY: BDPC DRAWN BY: BDPC SHT. NO. SU09 CITY DWG. NO.

- SYMBOLS LEGEND**
- W WATER VALVE
 - W WATER METER
 - ⊗ IRRIGATION CONTROL VALVE
 - ⊕ FIRE HYDRANT
 - ⊗ BACKFLOW PREVENTER
 - ⊕ BOREHOLE
 - ⊕ LIGHT STANDARD
 - ⊕ MANHOLE
 - ⊕ STOP SIGN
 - ⊕ SIGN
 - ⊕ MAILBOX
 - ⊕ FLAGPOLE
 - ⊕ TYPE "BB" INLET
 - ⊕ GRATE INLET
 - ⊕ CLEAN OUT
 - ⊕ ELECTRIC METER
 - ⊕ ELECTRIC RISER
 - ⊕ ELECTRIC PULLBOX
 - ⊕ GROUND LIGHT
 - ⊕ UTILITY POLE
 - ⊕ METER POLE
 - ⊕ GUY ANCHOR
 - ⊕ TRANSFORMER
 - ⊕ TELEPHONE MANHOLE
 - ⊕ TELEPHONE PEDESTAL
 - ⊕ TELEPHONE PULLBOX
 - ⊕ TRAFFIC PULL BOX
 - ⊕ TRAFFIC SIGNAL POLE
 - ⊕ FIBER OPTIC CABLE MARKER
 - ⊕ PIPELINE MARKER
 - ⊕ R.O.W., PROPERTY BNDY
 - ⊕ EASEMENT LINES
 - ⊕ FIBER OPTIC PULL BOX
 - ⊕ RECORD DRAWINGS
 - ⊕ GAS METER
 - TREE

BENCHMARKS:
 Flood Reference Mark Number AW4693 is a NGS brass disk
 Elevation = 90.68 NAVD 88, 2001 Adjustment
 Flood Reference Mark Number AW4690 is a NGS brass disk
 Elevation = 94.56 NAVD 88, 2001 Adjustment

TEMPORARY BENCHMARKS
 TBM A Elevation = 87.61 Square cut in SET at 30-inch RCP at McCrary Road
 TBM B Elevation = 91.92 Railroad Spike in Power Pole on Precinct Line Road
 TBM C Elevation = 82.10 Square cut on top of 18-inch RCP
 TBM D Elevation = 87.53 Square cut on Top of Concrete Back of Curb
 TBM E Elevation = 87.17 Square Cut on Inlet Mason Road

CONTROL POINTS:
 CP 1 - "X" cut in Concrete in Brandt Road West of McCrary Road
 Elevation = 90.16
 CP 2 - MAG Nail with Shiner Asphalt on Brandt Road
 Elevation = 84.63
 CP 12 - 5/8" Iron Rod
 Elevation = 84.43
 CP 13 - 5/8" Iron Rod
 Elevation = 89.55
 CP 14 - 5/8" Iron Rod
 Elevation = 88.68
 CP 15 - 5/8" Capped Iron Rod.
 Elevation = 85.54
 CP 16 - 5/8" Iron Rod
 Elevation = 85.81
 CP 29 - 5/8" Capped Iron Rod.
 Elevation = 79.40
 CP 5 - 5/8" Capped Iron Rod on Existing Skinner Road New Brandt Road.
 Elevation = 82.36
 CP 17 - Mag Nail with Shiner.
 Elevation = 87.16
 CP 6 - 5/8" Iron Rod
 Elevation = 87.16
 CP 19 - 100D Nail.
 Elevation = 83.03
 CP 7 - X in Concrete
 Elevation = 88.00
 McCrary Road
 CP 10 - 100 D Nail with cap at McCrary Road.
 Elevation = 89.43
 CP 11 - 100 D nail with cap at McCrary Road.
 Elevation = 89.07
 Precinct Line Road
 CP 3 - MAG Nail with Shiner at Precinct Line Road.
 Elevation = 89.06
 CP 4 - Mag nail with Shiner at Precinct Line Road.
 Elevation = 84.46
 Skinner Road
 CP 54 - MAG Nail with Shiner.
 Elevation = 87.13
 James long
 CP 53 - MAG Nail with Shiner.
 Elevation = 86.75
 Mason Road
 CP 9 - 5/8" Capped Iron Rod.
 Elevation = 90.82
 CP 8 - 5/8" Capped Iron Rod.
 Elevation = 88.13

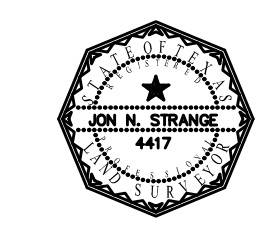


McCloy Properties LLC
 REMAINDER OF CALLED 140.15 AC.
 F.B.C.C.F. NO. 2016023395 F.B.C.O.P.R.

NOTES:

1. THE BEARINGS HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983 (NAD'83), 1993 ADJUSTMENT.
2. F.B.C.C.F. = FORT BEND COUNTY CLERK'S FILE.
3. F.B.C.M.R. = FORT BEND COUNTY MAP RECORDS.
4. FIELD SURVEY PERFORMED JULY & AUGUST, 2018.
5. EASEMENTS SHOWN HEREON ARE BASED ON RECORDED SUBDIVISION PLATS AND RESEARCH PREPARED BY POSTLE SERVICES, DATED JULY, 2018 NO ADDITIONAL RESEARCH FOR EASEMENTS OR ENCUMBRANCES WAS PERFORMED BY JNS ENGINEERS, LLC.
6. RESEARCH FOR ADJOINER TRACTS WAS PERFORMED BY POSTLE SERVICES IN JULY, 2018.
7. ALL COORDINATES AND DISTANCES SHOWN ARE SURFACE VALUES. TO CONVERT TO GRID VALUES BY A SCALE FACTOR OF 0.999870017.

- LEGEND**
- ⊕ RIGHT OF WAY POINT NUMBER
 - CP CONTROL POINT
 - C1 CURVE DATA NUMBER



We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category 1A, Condition II Survey and Category 6, Condition II Survey.
 Jon N. Strange
 Registered Professional Land Surveyor
 09-10-2020

JNS ENGINEERS, LLC.
 722 PIN OAK ROAD, SUITE 202A
 KATY, TEXAS 77494
 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375
 T.B.P.E. FIRM REGISTRATION NO. F-11653

TOPOGRAPHIC SURVEY
BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD
FORT BEND COUNTY
PROJECT #17310 PRECINCT #3
PHASE 2

SURVEY CONTROL MAP
BRANDT ROAD
STA. 30+00 TO 40+00

SUBMITTED: JNS	DESIGNED BY: BDCP
SCALE: 1"=40'	DRAWN BY: BDCP
DATE: JANUARY, 2020	SHT. NO. SU10
SURVEY BY: JNS	CITY DWG. NO.
FIELD BOOK NO.	

- SYMBOLS LEGEND**
- W WATER VALVE
 - WM WATER METER
 - ICV IRRIGATION CONTROL VALVE
 - FH FIRE HYDRANT
 - BP BACKFLOW PREVENTER
 - BH BOREHOLE
 - LS LIGHT STANDARD
 - MH MANHOLE
 - ST STOP SIGN
 - SIGN SIGN
 - MB MAILBOX
 - FP FLAGPOLE
 - TI TYPE "TB" INLET
 - GI GRATE INLET
 - CO CLEAN OUT
 - EM ELECTRIC METER
 - ER ELECTRIC RISER
 - EP ELECTRIC PULLBOX
 - GL GROUND LIGHT
 - UP UTILITY POLE
 - MP METER POLE
 - GA GUY ANCHOR
 - TR TRANSFORMER
 - TM TELEPHONE MANHOLE
 - TE TELEPHONE PEDESTAL
 - TP TELEPHONE PULLBOX
 - TRB TRAFFIC SIGNAL POLE
 - FOC FIBER OPTIC CABLE MARKER
 - PM PIPELINE MARKER
 - RWB R.O.W., PROPERTY BNDY
 - EL EASEMENT LINES
 - FOPB FIBER OPTIC PULL BOX
 - RD RECORD DRAWINGS
 - GM GAS METER

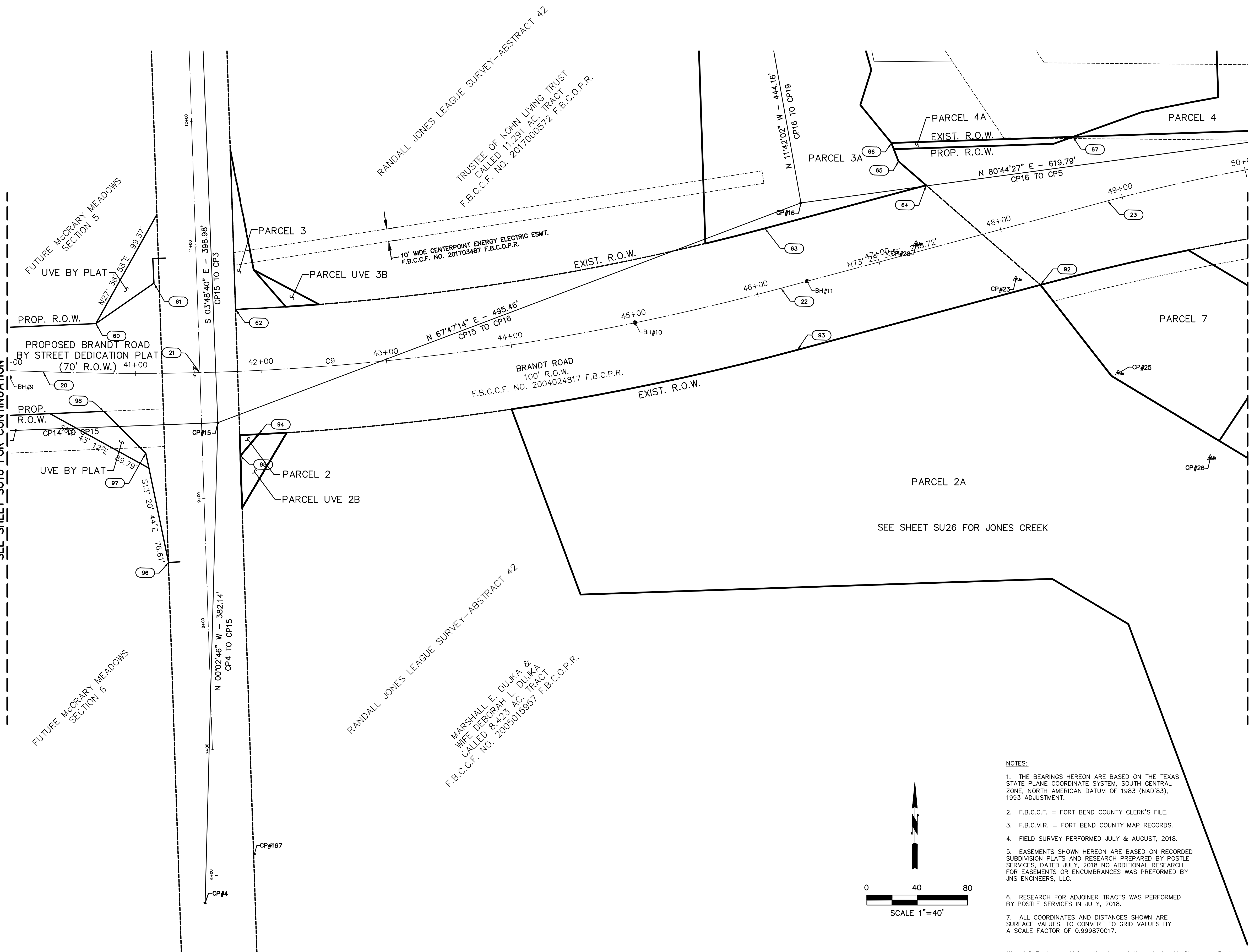
BENCHMARKS:
 Flood Reference Mark Number AW4693 is a NGS brass disk
 Elevation = 90.68 NAVD 88, 2001 Adjustment
 Flood Reference Mark Number AW4690 is a NGS brass disk
 Elevation = 94.56 NAVD 88, 2001 Adjustment

TEMPORARY BENCHMARKS
 TBM A Elevation = 87.61 Square cut in SET at 30-inch RCP at McCrary Road
 TBM B Elevation = 91.92 Railroad Spike in Power Pole on Precinct Line Road
 TBM C Elevation = 82.10 Square cut on top of 18-inch RCP
 TBM D Elevation = 87.53 Square cut on Top of Concrete Back of Curb
 TBM E Elevation = 87.17 Square Cut on Inlet Mason Road

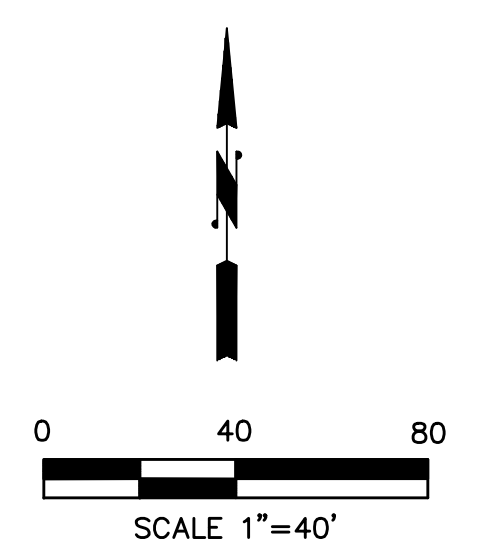
CONTROL POINTS:
 CP 1 - "X" cut in Concrete in Brandt Road West of McCrary Road
 Elevation = 90.16
 CP 2 - MAG Nail with Shiner Asphalt on Brandt Road
 Elevation = 84.63
 CP 12 - 1/2" Iron Rod
 Elevation = 84.43
 CP 13 - 5/8" Iron Rod
 Elevation = 88.68
 CP 14 - 5/8" Iron Rod
 Elevation = 88.68
 CP 15 - 5/8" Capped Iron Rod.
 Elevation = 85.54
 CP 16 - 5/8" Iron Rod
 Elevation = 85.81
 CP 29 - 5/8" Capped Iron Rod.
 Elevation = 79.40
 CP 5 - 5/8" Capped Iron Rod on Existing Skinner Road New Brandt Road.
 Elevation = 82.36
 CP 17 - Mag Nail with Shiner.
 Elevation = 87.16
 CP 6 - 5/8" Iron Rod
 Elevation = 87.16
 CP 19 - 100D Nail.
 Elevation = 83.03
 CP 7 - X in Concrete
 Elevation = 88.00
 McCrary Road
 CP 10 - 100 D Nail with cap at McCrary Road.
 Elevation = 89.43
 CP 11 - 100 D nail with cap at McCrary Road.
 Elevation = 89.07
 Precinct Line Road
 CP 3 - MAG Nail with Shiner at Precinct Line Road.
 Elevation = 89.06
 CP 4 - Mag nail with Shiner at Precinct Line Road.
 Elevation = 84.46
 Skinner Road
 CP 54 - MAG Nail with Shiner.
 Elevation = 87.13
 James long
 CP 53 - MAG Nail with Shiner.
 Elevation = 86.75
 Mason Road
 CP 9 - 5/8" Capped Iron Rod.
 Elevation = 90.82
 CP 8 - 5/8" Capped Iron Rod.
 Elevation = 88.13

MATCHLINE - STA. 40+00
SEE SHEET SU16 FOR CONTINUATION

MATCHLINE - STA. 50+00
SEE SHEET SU18 FOR CONTINUATION



SEE SHEET SU23 FOR PRECINCT LINE ROAD



- LEGEND**
- (1) RIGHT OF WAY POINT NUMBER
 - CP CONTROL POINT
 - C1 CURVE DATA NUMBER



- NOTES:**
1. THE BEARINGS HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983 (NAD'83), 1993 ADJUSTMENT.
 2. F.B.C.C.F. = FORT BEND COUNTY CLERK'S FILE.
 3. F.B.C.M.R. = FORT BEND COUNTY MAP RECORDS.
 4. FIELD SURVEY PERFORMED JULY & AUGUST, 2018.
 5. EASEMENTS SHOWN HEREON ARE BASED ON RECORDED SUBDIVISION PLATS AND RESEARCH PREPARED BY POSTLE SERVICES, DATED JULY, 2018. NO ADDITIONAL RESEARCH FOR EASEMENTS OR ENCUMBRANCES WAS PERFORMED BY JNS ENGINEERS, LLC.
 6. RESEARCH FOR ADJOINER TRACTS WAS PERFORMED BY POSTLE SERVICES IN JULY, 2018.
 7. ALL COORDINATES AND DISTANCES SHOWN ARE SURFACE VALUES. TO CONVERT TO GRID VALUES BY A SCALE FACTOR OF 0.999870017.

We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category 1A, Condition II Survey and Category 6, Condition II Survey.

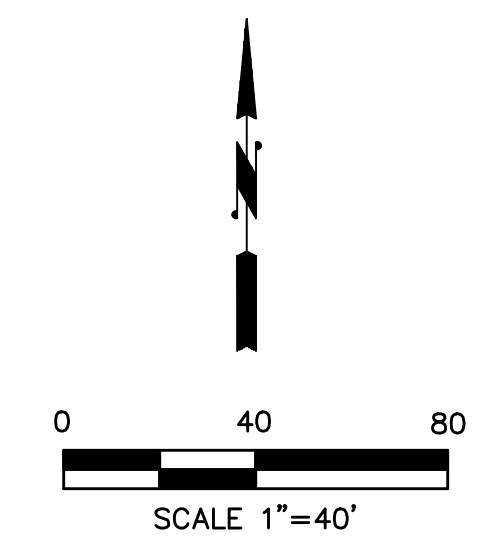
Jon N. Strange
 Jon N. Strange
 Registered Professional Land Surveyor

09-10-2020

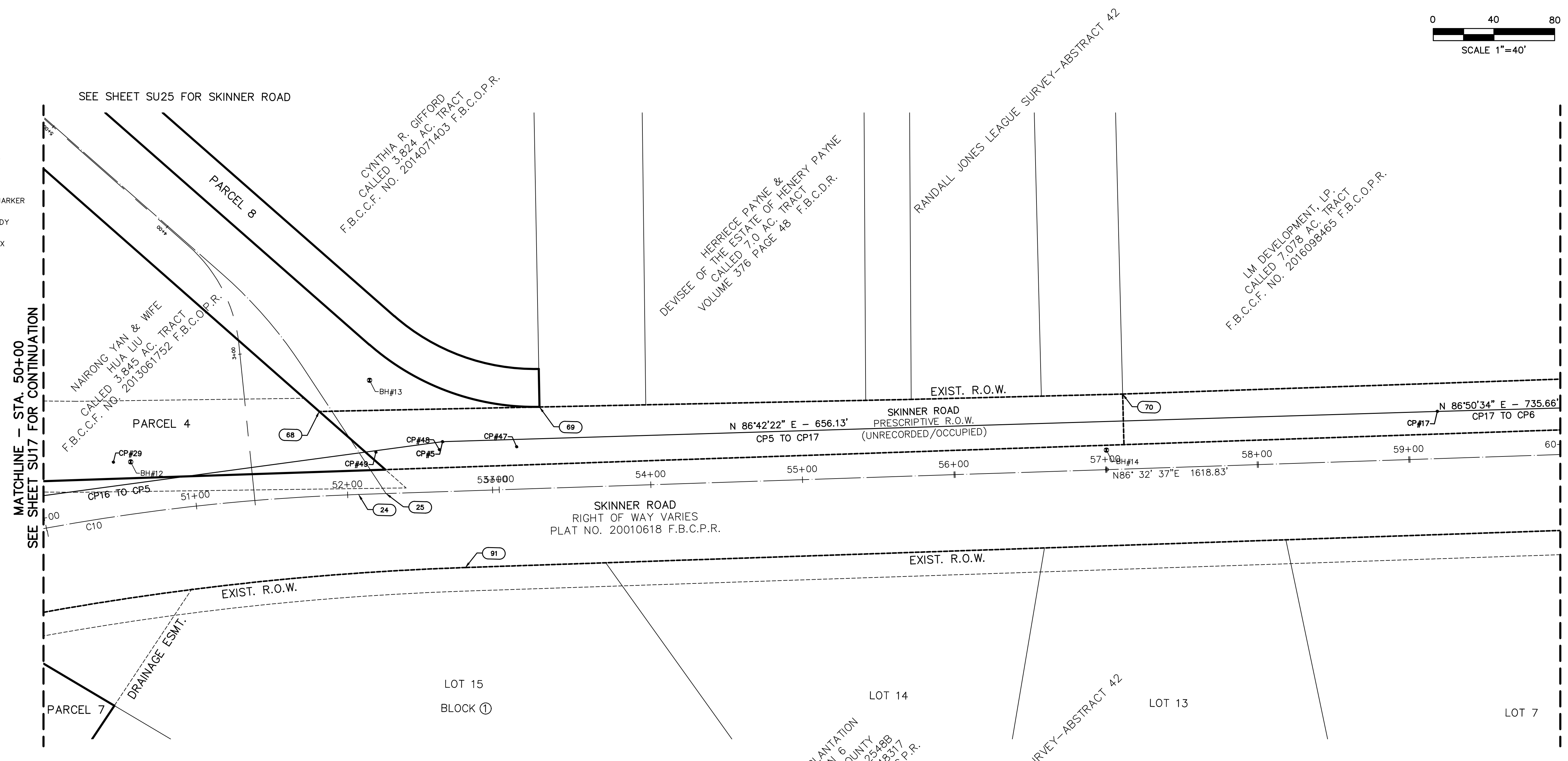
	JNS ENGINEERS, LLC. 722 PIN OAK ROAD, SUITE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 T.B.P.E. FIRM REGISTRATION NO. F-11653
	TOPOGRAPHIC SURVEY BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD FORT BEND COUNTY PROJECT #17310 PRECINCT #3 PHASE 2
SURVEY CONTROL MAP BRANDT ROAD STA. 40+00 TO 50+00	
SUBMITTED: JNS SCALE: 1"=40' DATE: JANUARY, 2020 SURVEY BY: JNS FIELD BOOK NO.	DESIGNED BY: BDCP DRAWN BY: BDCP SHT. NO. SU11 CITY DWG. NO.

- SYMBOLS LEGEND**
- WV WATER VALVE
 - WM WATER METER
 - ICV IRRIGATION CONTROL VALVE
 - FH FIRE HYDRANT
 - BPF BACKFLOW PREVENTER
 - BH BOREHOLE
 - LS LIGHT STANDARD
 - MH MANHOLE
 - ST STOP SIGN
 - SIGN SIGN
 - MB MAILBOX
 - FP FLAGPOLE
 - TI TYPE "BI" INLET
 - GI GRATE INLET
 - CO CLEAN OUT
 - EM ELECTRIC METER
 - ER ELECTRIC RISER
 - EPB ELECTRIC PULLBOX
 - GL GROUND LIGHT
 - UP UTILITY POLE
 - MP METER POLE
 - GA GUY ANCHOR
 - TR TRANSFORMER
 - TM TELEPHONE MANHOLE
 - TP TELEPHONE PEDESTAL
 - TPB TELEPHONE PULLBOX
 - TFB TRAFFIC PULL BOX
 - TSP TRAFFIC SIGNAL POLE
 - FOCM FIBER OPTIC CABLE MARKER
 - PLM PIPELINE MARKER
 - R.O.W. PROPERTY BNDY
 - EASEMENT LINES
 - FIBER OPTIC PULL BOX
 - RECORD DRAWINGS
 - GAS METER
 - TREE

- BENCHMARKS:**
- Flood Reference Mark Number AW4693 is a NGS brass disk
Elevation = 90.68 NAVD 88, 2001 Adjustment
 - Flood Reference Mark Number AW4690 is a NGS brass disk
Elevation = 94.56 NAVD 88, 2001 Adjustment
- TEMPORARY BENCHMARKS**
- TBM A Elevation = 87.61 Square cut in SET at 30-inch RCP at McCrary Road
 - TBM B Elevation = 91.92 Railroad Spike in Power Pole on Precinct Line Road
 - TBM C Elevation = 82.10 Square cut on top of 18-inch RCP
 - TBM D Elevation = 87.53 Square cut on Top of Concrete Back of Curb
 - TBM E Elevation = 87.17 Square Cut in Inlet Mason Road



- CONTROL POINTS:**
- CP 1 - "X" cut in Concrete in Brandt Road West of McCrary Road
Elevation = 90.16
 - CP 2 - MAG Nail with Shiner Asphalt on Brandt Road
Elevation = 84.63
 - CP 12 - 5/8" Iron Rod
Elevation = 84.43
 - CP 13 - 5/8" Iron Rod
Elevation = 89.55
 - CP 14 - 5/8" Iron Rod
Elevation = 88.68
 - CP 15 - 5/8" Capped Iron Rod.
Elevation = 85.54
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 - CP 7 - X in Concrete
Elevation = 88.00
 - McCrary Road
 - CP 10 - 100 D nail with cap at McCrary Road.
Elevation = 89.43
 - CP 11 - 100 D nail with cap at McCrary Road.
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 - Precinct Line Road
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 - Skinner Road
 - CP 54 - MAG Nail with Shiner.
Elevation = 87.13
 - James long
 - CP 53 - MAG Nail with Shiner.
Elevation = 86.75
 - Mason Road
 - CP 9 - 5/8" Capped Iron Rod.
Elevation = 90.82
 - CP 8 - 5/8" Capped Iron Rod.
Elevation = 88.13



MATCHLINE - STA. 50+00
SEE SHEET SU17 FOR CONTINUATION

MATCHLINE - STA. 60+00
SEE SHEET SU19 FOR CONTINUATION

- NOTES:**
1. THE BEARINGS HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983 (NAD'83), 1993 ADJUSTMENT.
 2. F.B.C.C.F. = FORT BEND COUNTY CLERK'S FILE.
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 4. FIELD SURVEY PERFORMED JULY & AUGUST, 2018.
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- LEGEND**
- ① RIGHT OF WAY POINT NUMBER
 - CP CONTROL POINT
 - C1 CURVE DATA NUMBER



We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category 1A, Condition II Survey and Category 6, Condition II Survey.

Jon N. Strange
Jon N. Strange
Registered Professional Land Surveyor

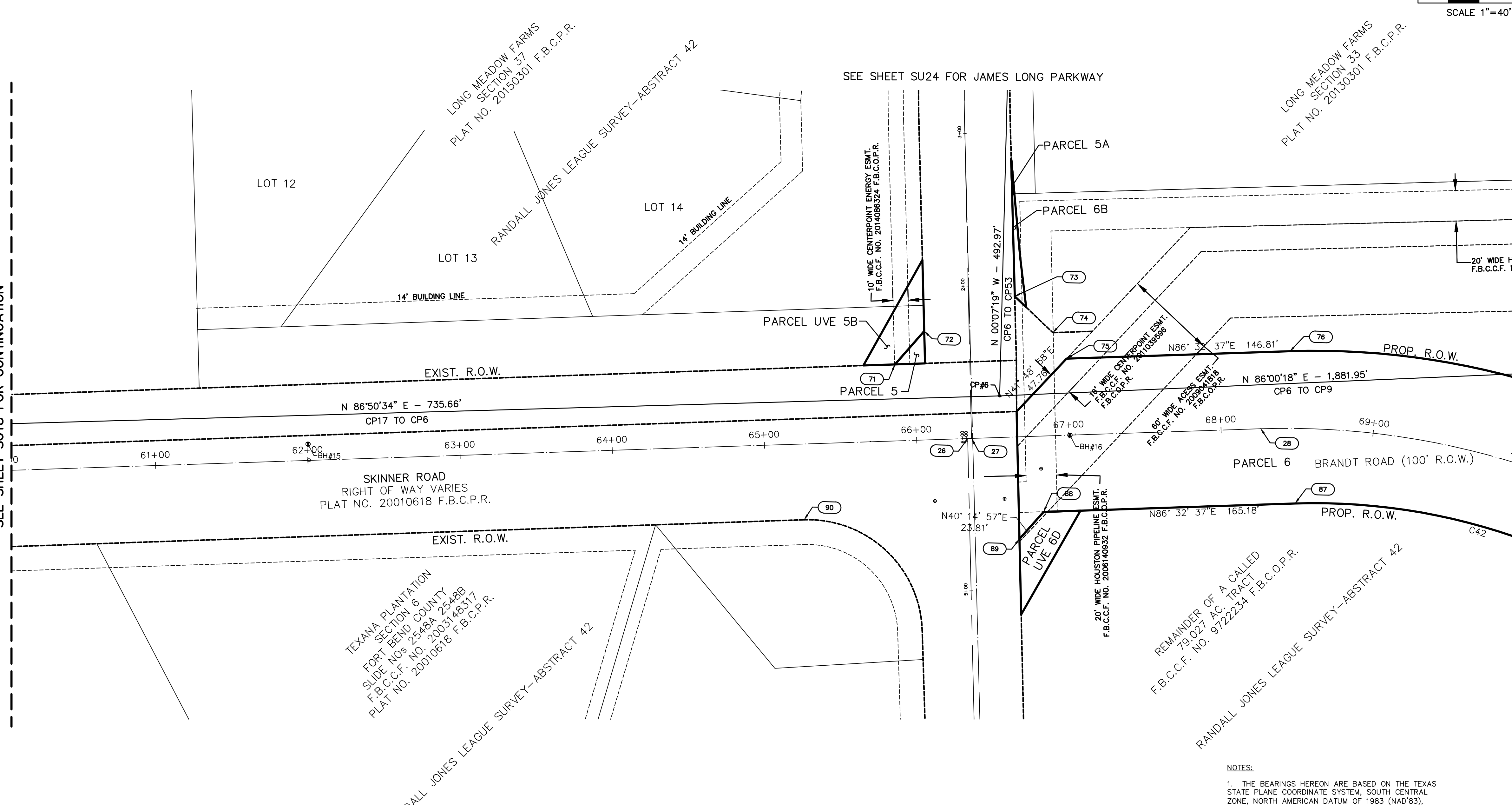
09-10-2020

JNS LLC	<p>JNS ENGINEERS, LLC. 722 FIN OAK ROAD, SUITE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 T.B.P.E. FIRM REGISTRATION NO. F-11653</p>	
<p>TOPOGRAPHIC SURVEY BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD FORT BEND COUNTY PROJECT #17310 PRECINCT #3 PHASE 2</p>		
<p>SURVEY CONTROL MAP BRANDT ROAD STA. 50+00 TO 60+00</p>		
<p>SUBMITTED: JNS SCALE: 1"=40' DATE: JANUARY, 2020 SURVEY BY: JNS FIELD BOOK NO.</p>	<p>DESIGNED BY: BDCP DRAWN BY: BDCP SHT. NO. SU12 CITY DWG. NO.</p>	

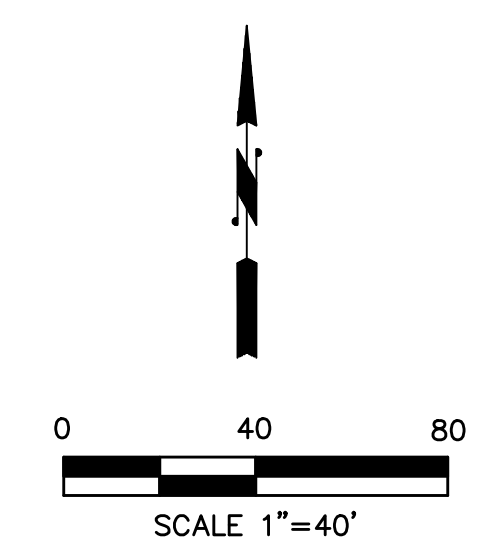
- SYMBOLS LEGEND**
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 - WM WATER METER
 - ICV IRRIGATION CONTROL VALVE
 - FH FIRE HYDRANT
 - BP BACKFLOW PREVENTER
 - BH BOREHOLE
 - LS LIGHT STANDARD
 - MH MANHOLE
 - ST STOP SIGN
 - S SIGN
 - MB MAILBOX
 - FP FLAGPOLE
 - TI TYPE "BI" INLET
 - GI GRATE INLET
 - CO CLEAN OUT
 - EM ELECTRIC METER
 - ER ELECTRIC RISER
 - EP ELECTRIC PULLBOX
 - GL GROUND LIGHT
 - UP UTILITY POLE
 - MP METER POLE
 - GA GUY ANCHOR
 - TR TRANSFORMER
 - TM TELEPHONE MANHOLE
 - TP TELEPHONE PEDESTAL
 - TL TELEPHONE PULLBOX
 - TF TRAFFIC PULL BOX
 - TS TRAFFIC SIGNAL POLE
 - FOCM FIBER OPTIC CABLE MARKER
 - PM PIPELINE MARKER
 - R.O.W. PROPERTY BNDY
 - EL EASEMENT LINES
 - FOPB FIBER OPTIC PULL BOX
 - RD RECORD DRAWINGS
 - GM GAS METER
 - TREE

MATCHLINE - STA. 60+00
SEE SHEET SU18 FOR CONTINUATION

MATCHLINE - STA. 70+00
SEE SHEET SU20 FOR CONTINUATION



- BENCHMARKS:**
- Flood Reference Mark Number AW4693 is a NGS brass disk
Elevation = 90.68 NAVD 88, 2001 Adjustment
 - Flood Reference Mark Number AW4690 is a NGS brass disk
Elevation = 94.56 NAVD 88, 2001 Adjustment
- TEMPORARY BENCHMARKS**
- TBM A Elevation = 87.61 Square cut in SET at 30-inch RCP at McCrary Road
 - TBM B Elevation = 91.92 Railroad Spike in Power Pole on Precinct Line Road
 - TBM C Elevation = 82.10 Square cut on top of 18-inch RCP
 - TBM D Elevation = 87.53 Square cut on Top of Concrete Back of Curb
 - TBM E Elevation = 87.17 Square Cut in Inlet Mason Road
- CONTROL POINTS:**
- CP 1 - "X" cut in Concrete in Brandt Road West of McCrary Road
Elevation = 90.16
 - CP 2 - MAG Nail with Shiner Asphalt on Brandt Road
Elevation = 84.63
 - CP 12 - 1/2" Iron Rod
Elevation = 84.43
 - CP 13 - 5/8" Iron Rod
Elevation = 89.55
 - CP 14 - 5/8" Iron Rod
Elevation = 88.68
 - CP 15 - 5/8" Capped Iron Rod.
Elevation = 85.54
 - CP 16 - 5/8" Iron Rod
Elevation = 85.81
 - CP 29 - 5/8" Capped Iron Rod.
Elevation = 79.40
 - CP 5 - 5/8" Capped Iron Rod on Existing Skinner Road New Brandt Road.
Elevation = 82.36
 - CP 17 - Mag Nail with Shiner.
Elevation = 87.16
 - CP 6 - 5/8" Iron Rod
Elevation = 87.16
 - CP 19 - 100D Nail.
Elevation = 83.03
 - CP 7 - X in Concrete
Elevation = 88.00
 - McCrary Road
 - CP 10 - 100 D Nail with cap at McCrary Road.
Elevation = 89.43
 - CP 11 - 100 D nail with cap at McCrary Road.
Elevation = 89.07
 - Precinct Line Road
 - CP 3 - MAG Nail with Shiner at Precinct Line Road.
Elevation = 89.06
 - CP 4 - Mag nail with Shiner at Precinct Line Road.
Elevation = 84.46



- NOTES:**
1. THE BEARINGS HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983 (NAD'83), 1993 ADJUSTMENT.
 2. F.B.C.C.F. = FORT BEND COUNTY CLERK'S FILE.
 3. F.B.C.M.R. = FORT BEND COUNTY MAP RECORDS.
 4. FIELD SURVEY PERFORMED JULY & AUGUST, 2018.
 5. EASEMENTS SHOWN HEREON ARE BASED ON RECORDED SUBDIVISION PLATS AND RESEARCH PREPARED BY POSTLE SERVICES, DATED JULY, 2018 NO ADDITIONAL RESEARCH FOR EASEMENTS OR ENCUMBRANCES WAS PERFORMED BY JNS ENGINEERS, LLC.
 6. RESEARCH FOR ADJOINER TRACTS WAS PERFORMED BY POSTLE SERVICES IN JULY, 2018.
 7. ALL COORDINATES AND DISTANCES SHOWN ARE SURFACE VALUES. TO CONVERT TO GRID VALUES BY A SCALE FACTOR OF 0.999870017.

- LEGEND**
- RIGHT OF WAY POINT NUMBER
 - CP CONTROL POINT
 - C1 CURVE DATA NUMBER



We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category 1A, Condition II Survey and Category 6, Condition II Survey.

Jon N. Strange
Jon N. Strange
Registered Professional Land Surveyor

09-10-2020

<p>JNS ENGINEERS, LLC. 722 PIN OAK ROAD, SUITE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3368 FAX: (281) 391-3375 T.B.P.E. FIRM REGISTRATION NO. F-11653</p>	
<p>TOPOGRAPHIC SURVEY BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD FORT BEND COUNTY PROJECT #17310 PRECINCT #3 PHASE 2</p>	
<p>SURVEY CONTROL MAP BRANDT ROAD STA. 60+00 TO 70+00</p>	
<p>SUBMITTED: JNS SCALE: 1"=40' DATE: JANUARY, 2020 SURVEY BY: JNS FIELD BOOK NO.</p>	<p>DESIGNED BY: BDCP DRAWN BY: BDCP SHT. NO. SU13 CITY DWG. NO.</p>

- SYMBOLS LEGEND**
- WV WATER VALVE
 - WM WATER METER
 - ICV IRRIGATION CONTROL VALVE
 - FH FIRE HYDRANT
 - BP BACKFLOW PREVENTER
 - BH BOREHOLE
 - LS LIGHT STANDARD
 - MH MANHOLE
 - SG STOP SIGN
 - SI SIGN
 - MB MAILBOX
 - FP FLAGPOLE
 - TI TYPE "BI" INLET
 - GI GRATE INLET
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 - PM PIPELINE MARKER
 - R.O.W., PROPERTY BNDY
 - EASEMENT LINES
 - FIBER OPTIC PULL BOX
 - RECORD DRAWINGS
 - GAS METER
 - TREE

BENCHMARKS:

Flood Reference Mark Number AW4693 is a NGS brass disk
Elevation = 90.68 NAVD 88, 2001 Adjustment

Flood Reference Mark Number AW4690 is a NGS brass disk
Elevation = 94.56 NAVD 88, 2001 Adjustment

TEMPORARY BENCHMARKS

TBM A Elevation = 87.61 Square cut in SET at 30-inch RCP at McCrary Road

TBM B Elevation = 91.92 Railroad Spike in Power Pole on Precinct Line Road

TBM C Elevation = 82.10 Square cut on top of 18-inch RCP

TBM D Elevation = 87.53 Square cut on Top of Concrete Back of Curb

TBM E Elevation = 87.17 Square Cut in Inlet Mason Road

CONTROL POINTS:

CP 1 - "X" cut in Concrete in Brandt Road West of McCrary Road
Elevation = 90.16

CP 2 - MAG Nail with Shiner Asphalt on Brandt Road
Elevation = 84.63

CP 12 - 5/8" Iron Rod
Elevation = 84.43

CP 13 - 5/8" Iron Rod
Elevation = 89.55

CP 14 - 5/8" Iron Rod
Elevation = 88.68

CP 15 - 5/8" Capped Iron Rod.
Elevation = 85.54

CP 16 - 5/8" Iron Rod
Elevation = 85.81

CP 29 - 5/8" Capped Iron Rod.
Elevation = 79.40

CP 5 - 5/8" Capped Iron Rod on Existing Skinner Road New Brandt Road.
Elevation = 82.36

CP 17 - Mag Nail with Shiner.
Elevation = 87.16

CP 6 - 5/8" Iron Rod
Elevation = 87.16

CP 19 - 100D Nail.
Elevation = 83.03

CP 7 - X in Concrete
Elevation = 88.00

McCrary Road

CP 10 - 100 D Nail with cap at McCrary Road.
Elevation = 89.43

CP 11 - 100 D nail with cap at McCrary Road.
Elevation = 89.07

Precinct Line Road

CP 3 - MAG Nail with Shiner at Precinct Line Road.
Elevation = 89.06

CP 4 - Mag nail with Shiner at Precinct Line Road.
Elevation = 84.46

Skinner Road

CP 54 - MAG Nail with Shiner.
Elevation = 87.13

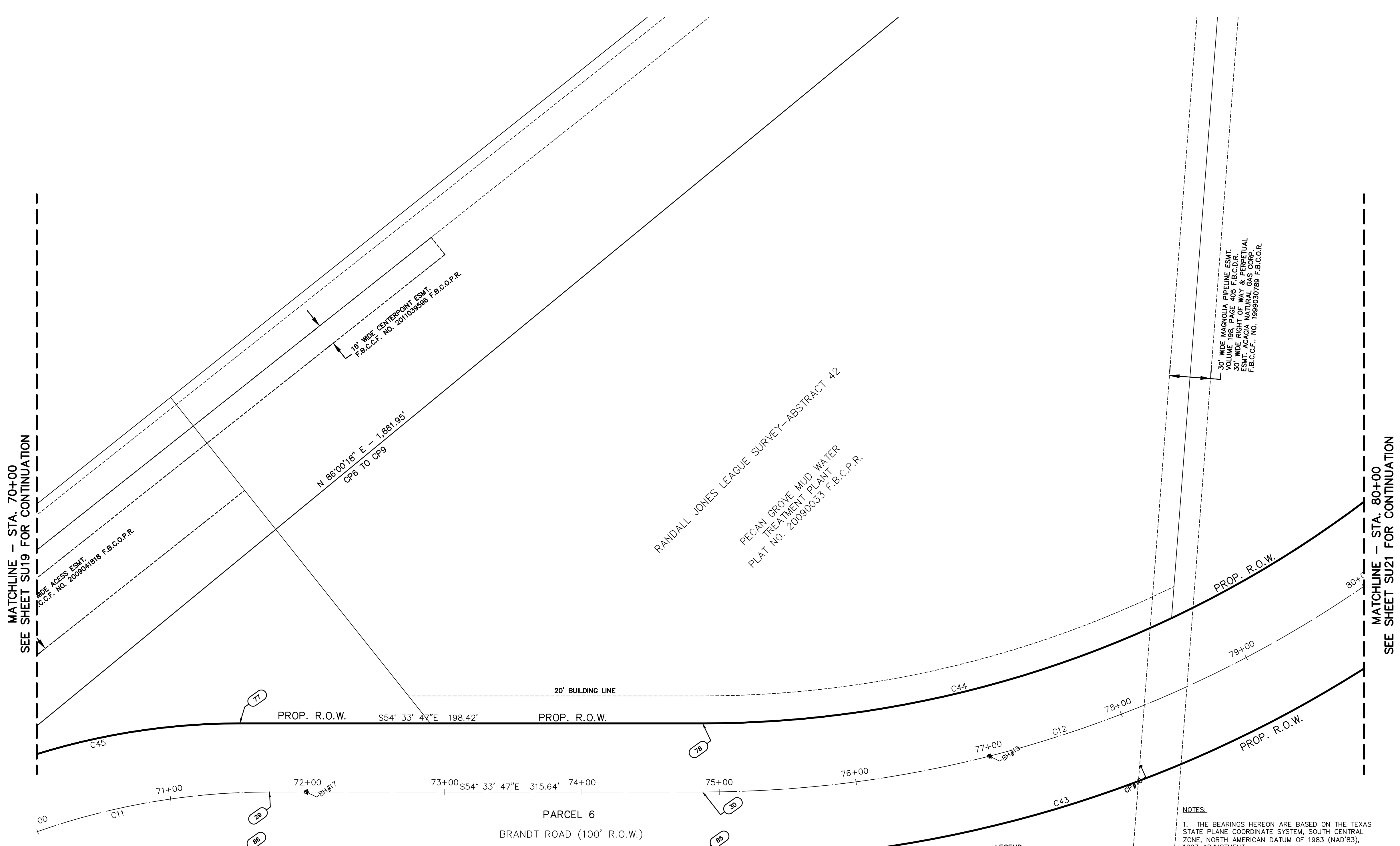
James long

CP 53 - MAG Nail with Shiner.
Elevation = 86.75

Mason Road

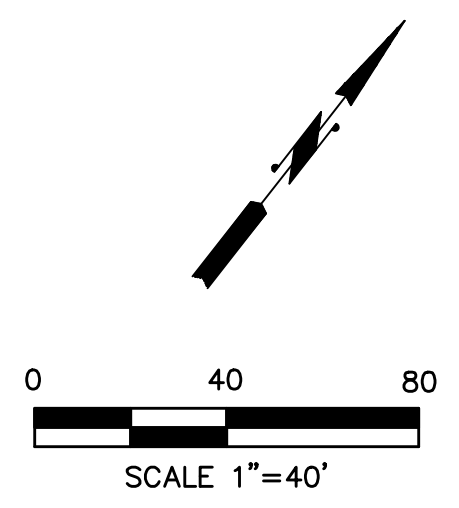
CP 9 - 5/8" Capped Iron Rod.
Elevation = 90.82

CP 8 - 5/8" Capped Iron Rod.
Elevation = 88.13



- NOTES:**
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- LEGEND**
- (1) RIGHT OF WAY POINT NUMBER
 - CP CONTROL POINT
 - C1 CURVE DATA NUMBER



We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category 1A, Condition II Survey and Category 6, Condition II Survey.

Jon N. Strange
Jon N. Strange
Registered Professional Land Surveyor

09-10-2020

JNS ENGINEERS, LLC.
722 PIN OAK ROAD, SUITE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366 FAX: (281) 391-3375
T.B.P.E. FIRM REGISTRATION NO. F-11653

TOPOGRAPHIC SURVEY
BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD
FORT BEND COUNTY
PROJECT #17310 PRECINCT #3
PHASE 2

SURVEY CONTROL MAP
BRANDT ROAD
STA. 70+00 TO 80+00

SUBMITTED: JNS	DESIGNED BY: BDCP
SCALE: 1"=40'	DRAWN BY: BDCP
DATE: JANUARY, 2020	SHT. NO. SU14
SURVEY BY: JNS	CITY DWG. NO.
FIELD BOOK NO.	

REMAINDER OF A CALLED
79.027 AC. TRACT
F.B.C.C.F. - No. 9722234 F.B.C.O.P.R.

RANDALL JONES LEAGUE SURVEY-ABSTRACT 42

RANDALL JONES LEAGUE SURVEY-ABSTRACT 42
PECAN GROVE MUD WATER
TREATMENT PLANT
PLAT NO. 20090033 F.B.C.P.R.

SYMBOLS LEGEND

- WATER VALVE
- WATER METER
- IRRIGATION CONTROL VALVE
- FIRE HYDRANT
- BACKFLOW PREVENTER
- BOREHOLE
- LIGHT STANDARD
- MANHOLE
- STOP SIGN
- SIGN
- MAILBOX
- FLAGPOLE
- TYPE "BB" INLET
- GRATE INLET
- CLEAN OUT
- ELECTRIC METER
- ELECTRIC RISER
- ELECTRIC PULLBOX
- GROUND LIGHT
- UTILITY POLE
- METER POLE
- GUY ANCHOR
- TRANSFORMER
- TELEPHONE MANHOLE
- TELEPHONE PEDESTAL
- TELEPHONE PULLBOX
- TRAFFIC PULL BOX
- TRAFFIC SIGNAL POLE
- FIBER OPTIC CABLE MARKER
- PIPELINE MARKER
- R.O.W., PROPERTY BNDY
- EASEMENT LINES
- FIBER OPTIC PULL BOX
- RECORD DRAWINGS
- GAS METER
- TREE

NOTES:

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BENCHMARKS:

Flood Reference Mark Number AW4693 is a NGS brass disk
Elevation = 90.68 NAVD 88, 2001 Adjustment

Flood Reference Mark Number AW4690 is a NGS brass disk
Elevation = 94.56 NAVD 88, 2001 Adjustment

TEMPORARY BENCHMARKS

TBM A Elevation = 87.61 Square cut in SET at 30-inch RCP at McCrary Road

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TBM C Elevation = 82.10 Square cut on top of 18-inch RCP

TBM D Elevation = 87.53 Square cut on Top of Concrete Back of Curb

TBM E Elevation = 87.17 Square Cut in Inlet Mason Road

CONTROL POINTS:

CP 1 - "X" cut in Concrete in Brandt Road West of McCrary Road
Elevation = 90.16

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Elevation = 84.63

CP 12 - 1/2" Iron Rod
Elevation = 84.43

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Elevation = 89.55

CP 14 - 5/8" Iron Rod
Elevation = 88.68

CP 15 - 5/8" Capped Iron Rod.
Elevation = 85.54

CP 16 - 5/8" Iron Rod
Elevation = 85.81

CP 29 - 5/8" Capped Iron Rod.
Elevation = 79.40

CP 5 - 5/8" Capped Iron Rod on Existing Skinner Road New Brandt Road.
Elevation = 82.36

CP 17 - Mag Nail with Shiner.
Elevation = 87.16

CP 6 - 5/8" Iron Rod
Elevation = 87.16

CP 19 - 100D Nail.
Elevation = 83.03

CP 7 - X in Concrete
Elevation = 88.00

McCrary Road

CP 10 - 100 D Nail with cap at McCrary Road.
Elevation = 89.43

CP 11 - 100 D nail with cap at McCrary Road.
Elevation = 89.07

Precinct Line Road

CP 3 - MAG Nail with Shiner at Precinct Line Road.
Elevation = 89.06

CP 4 - Mag nail with Shiner at Precinct Line Road.
Elevation = 84.46

Skinner Road

CP 54 - MAG Nail with Shiner.
Elevation = 87.13

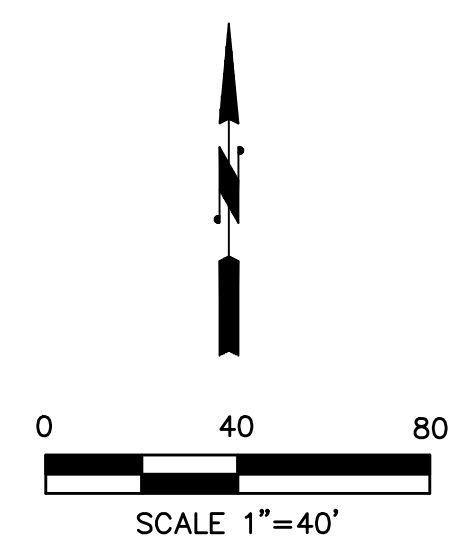
James long

CP 53 - MAG Nail with Shiner.
Elevation = 86.75

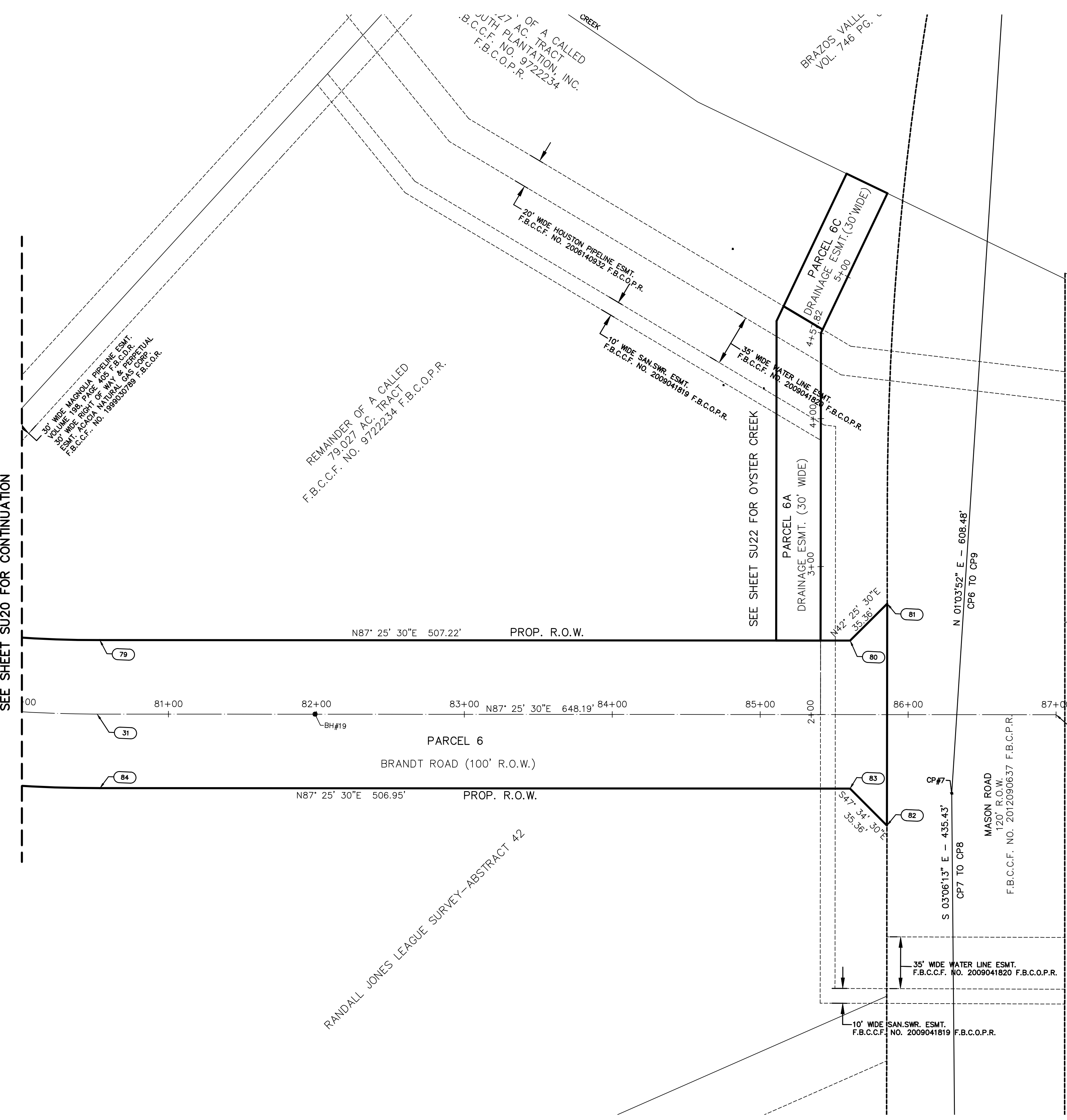
Mason Road

CP 9 - 5/8" Capped Iron Rod.
Elevation = 90.82

CP 8 - 5/8" Capped Iron Rod.
Elevation = 88.13



MATCHLINE - STA. 80+00
SEE SHEET SU20 FOR CONTINUATION



- LEGEND**
- (1) RIGHT OF WAY POINT NUMBER
 - CP CONTROL POINT
 - C1 CURVE DATA NUMBER



We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category 1A, Condition II Survey and Category 6, Condition II Survey.

Jon N. Strange
Jon N. Strange
Registered Professional Land Surveyor

09-10-2020

JNS LLC	<p>JNS ENGINEERS, LLC. 722 PIN OAK ROAD, SUITE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 T.B.P.E. FIRM REGISTRATION NO. F-11653</p>
<p>TOPOGRAPHIC SURVEY BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD FORT BEND COUNTY PROJECT #17310 PRECINCT #3 PHASE 2</p>	
<p>SURVEY CONTROL MAP BRANDT ROAD STA. 80+00 TO END</p>	
<p>SUBMITTED: JNS</p> <p>SCALE: 1"=40'</p> <p>DATE: JANUARY, 2020</p> <p>SURVEY BY: JNS</p> <p>FIELD BOOK NO.</p>	<p>DESIGNED BY: BDCP</p> <p>DRAWN BY: BDCP</p> <p>SHT. NO. SU15</p> <p>CITY DWG. NO.</p>

SYMBOLS LEGEND

- WV WATER VALVE
- WM WATER METER
- ICV IRRIGATION CONTROL VALVE
- FH FIRE HYDRANT
- BP BACKFLOW PREVENTER
- BH BOREHOLE
- LS LIGHT STANDARD
- MH MANHOLE
- ST STOP SIGN
- S SIGN
- MB MAILBOX
- FP FLAGPOLE
- TI TYPE "BB" INLET
- GI GRATE INLET
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- EM ELECTRIC METER
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- EASEMENT LINES
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- TREE

BENCHMARKS:

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Elevation = 94.56 NAVD 88, 2001 Adjustment

TEMPORARY BENCHMARKS

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TBM C Elevation = 82.10 Square cut on top of 18-inch RCP

TBM D Elevation = 87.53 Square cut on Top of Concrete Back of Curb

TBM E Elevation = 87.17 Square Cut on Inlet Mason Road

CONTROL POINTS:

CP 1 - "X" cut in Concrete in Brandt Road West of McCrary Road
Elevation = 90.16

CP 2 - MAG Nail with Shiner Asphalt on Brandt Road
Elevation = 84.63

CP 12 - 3/4" Iron Rod
Elevation = 84.43

CP 13 - 5/8" Iron Rod
Elevation = 89.55

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CP 4 - Mag nail with Shiner at Precinct Line Road.
Elevation = 84.46

Skinner Road

CP 54 - MAG Nail with Shiner.
Elevation = 87.13

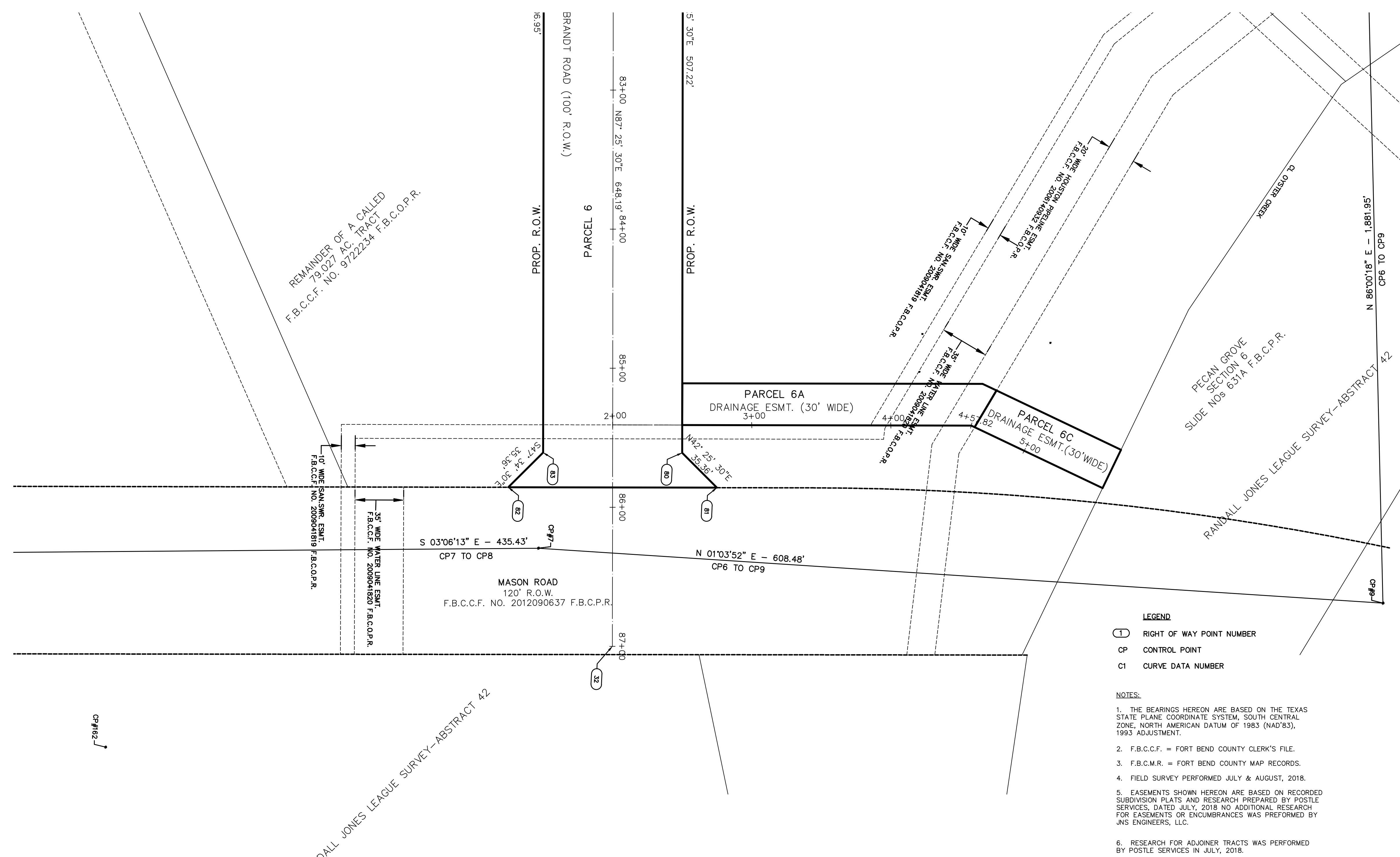
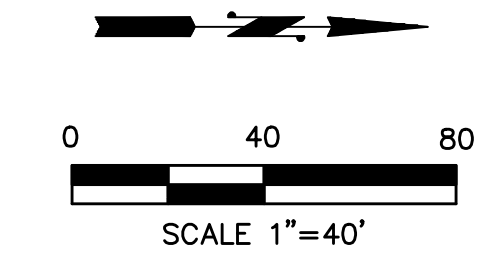
James long

CP 53 - MAG Nail with Shiner.
Elevation = 86.75

Mason Road

CP 9 - 5/8" Capped Iron Rod.
Elevation = 90.82

CP 8 - 5/8" Capped Iron Rod.
Elevation = 88.13



LEGEND

- ① RIGHT OF WAY POINT NUMBER
- CP CONTROL POINT
- C1 CURVE DATA NUMBER

NOTES:

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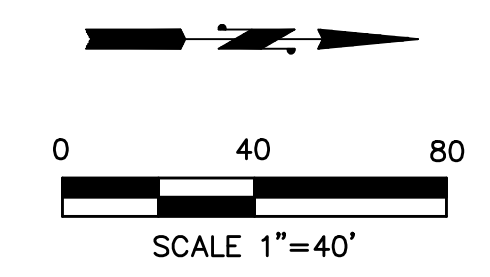
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09-10-2020

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TOPOGRAPHIC SURVEY BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD FORT BEND COUNTY PROJECT #17310 PRECINCT #3 PHASE 2		
SURVEY CONTROL MAP OYSTER CREEK		
SUBMITTED: JNS SCALE: 1"=40' DATE: JANUARY, 2020 SURVEY BY: JNS FIELD BOOK NO.	DESIGNED BY: BDCP DRAWN BY: BDCP SHT. NO. SU16 CITY DWG. NO.	

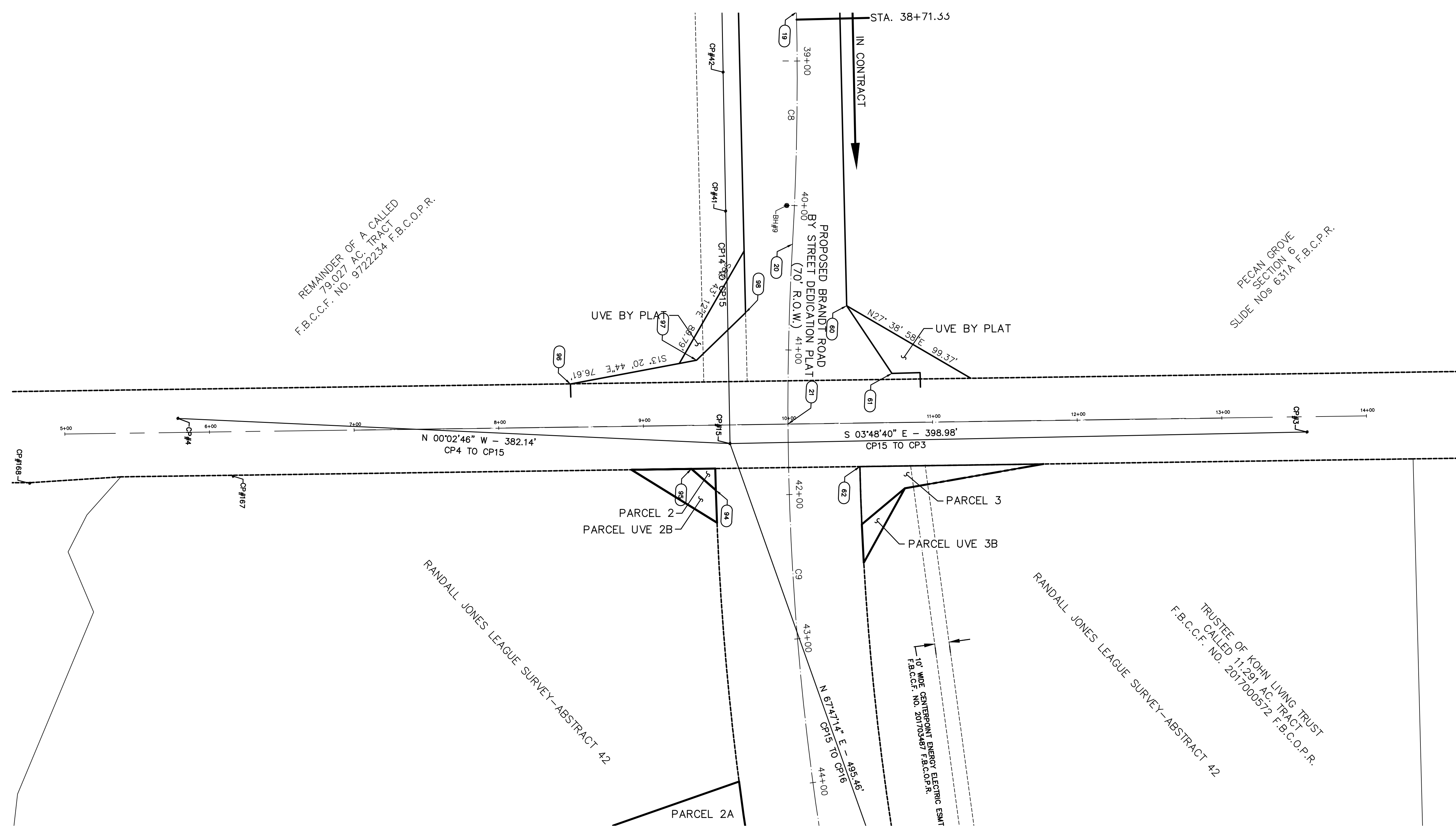
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 CP 5 - 5/8" Capped Iron Rod on Existing Skinner Road New Brandt Road.
 Elevation = 82.36
 CP 17 - Mag Nail with Shiner.
 Elevation = 87.16
 CP 6 - 5/8" Iron Rod
 Elevation = 87.16
 CP 19 - 100D Nail.
 Elevation = 83.03
 CP 7 - X in Concrete
 Elevation = 88.00
 McCrary Road
 CP 10 - 100 D Nail with cap at McCrary Road.
 Elevation = 89.43
 CP 11 - 100 D nail with cap at McCrary Road.
 Elevation = 89.07
 Precinct Line Road
 CP 3 - MAG Nail with Shiner at Precinct Line Road.
 Elevation = 89.06
 CP 4 - Mag nail with Shiner at Precinct Line Road.
 Elevation = 84.46
 Skinner Road
 CP 54 - MAG Nail with Shiner.
 Elevation = 87.13
 James long
 CP 53 - MAG Nail with Shiner.
 Elevation = 86.75
 Mason Road
 CP 9 - 5/8" Capped Iron Rod.
 Elevation = 90.82
 CP 8 - 5/8" Capped Iron Rod.
 Elevation = 88.13



REMAINDER OF A CALLED
 79.027 AC. TRACT
 F.B.C.C.F. NO. 9722234 F.B.C.O.P.R.

PECAN GROVE
 SECTION 6
 SLIDE NOS 631A F.B.C.P.R.

TRUSTEE OF KOHN LIVING TRUST
 F.B.C.C.F. NO. 2017000572 F.B.C.O.P.R.

- NOTES:**
1. THE BEARINGS HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983 (NAD'83), 1993 ADJUSTMENT.
 2. F.B.C.C.F. = FORT BEND COUNTY CLERK'S FILE.
 3. F.B.C.M.R. = FORT BEND COUNTY MAP RECORDS.
 4. FIELD SURVEY PERFORMED JULY & AUGUST, 2018.
 5. EASEMENTS SHOWN HEREON ARE BASED ON RECORDED SUBDIVISION PLATS AND RESEARCH PREPARED BY POSTLE SERVICES, DATED JULY, 2018 NO ADDITIONAL RESEARCH FOR EASEMENTS OR ENCUMBRANCES WAS PERFORMED BY JNS ENGINEERS, LLC.
 6. RESEARCH FOR ADJOINER TRACTS WAS PERFORMED BY POSTLE SERVICES IN JULY, 2018.
 7. ALL COORDINATES AND DISTANCES SHOWN ARE SURFACE VALUES. TO CONVERT TO GRID VALUES BY A SCALE FACTOR OF 0.999870017.

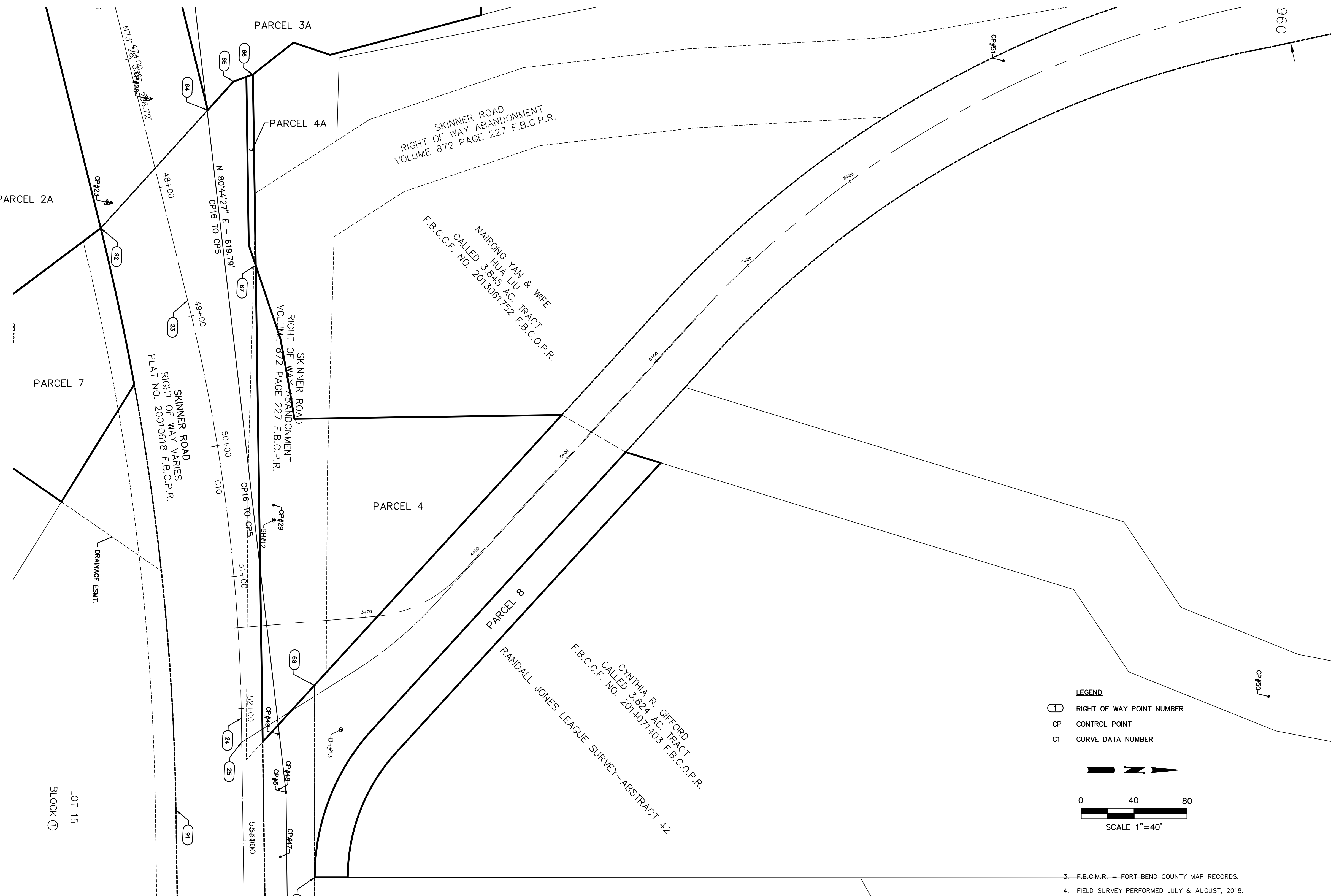
- LEGEND**
- ⊖ RIGHT OF WAY POINT NUMBER
 - CP CONTROL POINT
 - C1 CURVE DATA NUMBER



We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category 1A, Condition II Survey and Category 6, Condition II Survey.
 Jon N. Strange
 Registered Professional Land Surveyor
 09-10-2020

JNS ENGINEERS, LLC. 722 PIN OAK ROAD, SUITE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 T.B.P.E. FIRM REGISTRATION NO. F-11653	
TOPOGRAPHIC SURVEY BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD FORT BEND COUNTY PROJECT #17310 PRECINCT #3 PHASE 2	
SURVEY CONTROL MAP PRECINCT LINE ROAD	
SUBMITTED: JNS SCALE: 1"=40' DATE: JANUARY, 2020 SURVEY BY: JNS FIELD BOOK NO.	DESIGNED BY: BDCP DRAWN BY: BDCP SHT. NO. SU17 CITY DWG. NO.

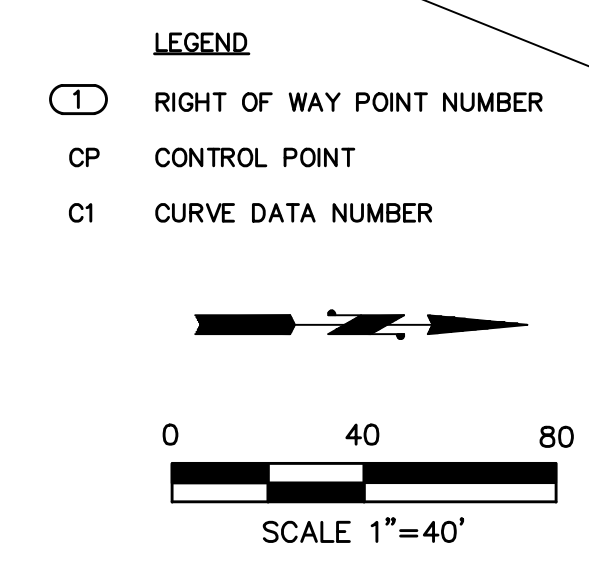
- SYMBOLS LEGEND**
- W WATER VALVE
 - WM WATER METER
 - ICV IRRIGATION CONTROL VALVE
 - FH FIRE HYDRANT
 - BPF BACKFLOW PREVENTER
 - BH BOREHOLE
 - LS LIGHT STANDARD
 - MH MANHOLE
 - STP STOP SIGN
 - SIGN
 - MB MAILBOX
 - FP FLAGPOLE
 - TI TYPE "BB" INLET
 - GI GRATE INLET
 - CO CLEAN OUT
 - EM ELECTRIC METER
 - ER ELECTRIC RISER
 - EPLB ELECTRIC PULLBOX
 - GL GROUND LIGHT
 - UP UTILITY POLE
 - MP METER POLE
 - GA GUY ANCHOR
 - TR TRANSFORMER
 - TM TELEPHONE MANHOLE
 - TP TELEPHONE PEDESTAL
 - TPB TELEPHONE PULLBOX
 - TPB TRAFFIC PULL BOX
 - TS TELEPHONE SIGNAL POLE
 - FOCM FIBER OPTIC CABLE MARKER
 - PM PIPELINE MARKER
 - R.O.W. R.O.W., PROPERTY BNDY
 - EL EASEMENT LINES
 - FOPB FIBER OPTIC PULL BOX
 - RD RECORD DRAWINGS
 - GM GAS METER
 - TREE



BENCHMARKS:
 Flood Reference Mark Number AW4693 is a NGS brass disk
 Elevation = 90.68 NAVD 88, 2001 Adjustment
 Flood Reference Mark Number AW4690 is a NGS brass disk
 Elevation = 94.56 NAVD 88, 2001 Adjustment

TEMPORARY BENCHMARKS
 TBM A Elevation = 87.61 Square cut in SET at 30- inch RCP at McCrary Road
 TBM B Elevation = 91.92 Railroad Spike in Power Pole on Precinct Line Road
 TBM C Elevation = 82.10 Square cut on top of 18-inch RCP
 TBM D Elevation = 87.53 Square cut on Top of Concrete Back of Curb
 TBM E Elevation = 87.17 Square Cut on Inlet Mason Road

CONTROL POINTS:
 CP 1 - "X" cut in Concrete in Brandt Road West of McCrary Road
 Elevation = 90.16
 CP 2 - MAG Nail with Shiner Asphalt on Brandt Road
 Elevation = 84.63
 CP 12 - 5/8" Iron Rod
 Elevation = 84.43
 CP 13 - 5/8" Iron Rod
 Elevation = 89.55
 CP 14 - 5/8" Iron Rod
 Elevation = 88.68
 CP 15 - 5/8" Capped Iron Rod.
 Elevation = 85.54
 CP 16 - 5/8" Iron Rod
 Elevation = 85.81
 CP 29 - 5/8" Capped Iron Rod.
 Elevation = 79.40
 CP 5 - 5/8" Capped Iron Rod on Existing Skinner Road New Brandt Road.
 Elevation = 82.36
 CP 17 - Mag Nail with Shiner.
 Elevation = 87.16
 CP 6 - 5/8" Iron Rod
 Elevation = 87.16
 CP 19 - 100D Nail.
 Elevation = 83.03
 CP 7 - X in Concrete
 Elevation = 88.00
 McCrary Road
 CP 10 - 100 D Nail with cap at McCrary Road.
 Elevation = 89.43
 CP 11 - 100 D nail with cap at McCrary Road.
 Elevation = 89.07
 Precinct Line Road
 CP 3 - MAG Nail with Shiner at Precinct Line Road.
 Elevation = 89.06
 CP 4 - Mag nail with Shiner at Precinct Line Road.
 Elevation = 84.46
 Skinner Road
 CP 54 - MAG Nail with Shiner.
 Elevation = 87.13
 James long
 CP 53 - MAG Nail with Shiner.
 Elevation = 86.75
 Mason Road
 CP 9 - 5/8" Capped Iron Rod.
 Elevation = 90.82
 CP 8 - 5/8" Capped Iron Rod.
 Elevation = 88.13



3. F.B.C.M.R. = FORT BEND COUNTY MAP RECORDS.
4. FIELD SURVEY PERFORMED JULY & AUGUST, 2018.
5. EASEMENTS SHOWN HEREON ARE BASED ON RECORDED SUBDIVISION PLATS AND RESEARCH PREPARED BY POSTLE SERVICES, DATED JULY, 2018. NO ADDITIONAL RESEARCH FOR EASEMENTS OR ENCUMBRANCES WAS PERFORMED BY JNS ENGINEERS, LLC.
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We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category 1A, Condition II Survey and Category 6, Condition II Survey.

Jon N. Strange
 Jon N. Strange
 Registered Professional Land Surveyor

09-10-2020

JNS ENGINEERS, LLC.
 722 PIN OAK ROAD, SUITE 202A
 KATY, TEXAS 77494
 TELEPHONE: (281) 391-5366 FAX: (281) 391-3375
 T.B.P.E. FIRM REGISTRATION NO. F-11653

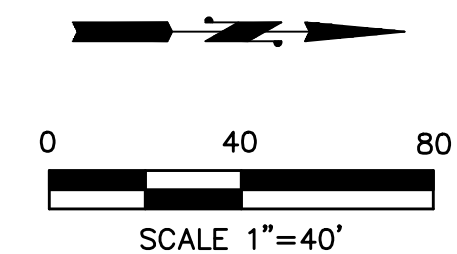
TOPOGRAPHIC SURVEY
BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD
FORT BEND COUNTY
PROJECT #17310 PRECINCT #3
PHASE 2

SURVEY CONTROL MAP
SKINNER ROAD

SUBMITTED: JNS	DESIGNED BY: BDCP
SCALE: 1"=40'	DRAWN BY: BDCP
DATE: JANUARY, 2020	SHT. NO. SU19
SURVEY BY: JNS	CITY DWG. NO.
FIELD BOOK NO.	

SYMBOLS LEGEND

- WV WATER VALVE
- WM WATER METER
- ICV IRRIGATION CONTROL VALVE
- FH FIRE HYDRANT
- BFP BACKFLOW PREVENTER
- BH BOREHOLE
- LS LIGHT STANDARD
- MH MANHOLE
- ST STOP SIGN
- SIGN SIGN
- MB MAILBOX
- FP FLAGPOLE
- TI TYPE "BI" INLET
- GI GRATE INLET
- CO CLEAN OUT
- EM ELECTRIC METER
- ER ELECTRIC RISER
- EPB ELECTRIC PULLBOX
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- UL UTILITY POLE
- MP METER POLE
- GA GUY ANCHOR
- TR TRANSFORMER
- TM TELEPHONE MANHOLE
- TP TELEPHONE PEDESTAL
- PL TELEPHONE PULLBOX
- TRB TRAFFIC PULL BOX
- TS TRAFFIC SIGNAL POLE
- FOCM FIBER OPTIC CABLE MARKER
- PM PIPELINE MARKER
- R.O.W. PROPERTY BNDY
- EL EASEMENT LINES
- FOPB FIBER OPTIC PULL BOX
- RD RECORD DRAWINGS
- GM GAS METER
- TREE



BENCHMARKS:

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CP 19 - 100D Nail.
Elevation = 83.03

CP 7 - X in Concrete
Elevation = 88.00

McCrary Road

CP 10 - 100 D Nail with cap at McCrary Road.
Elevation = 89.43

CP 11 - 100 D nail with cap at McCrary Road.
Elevation = 89.07

Precinct Line Road

CP 3 - MAG Nail with Shiner at Precinct Line Road.
Elevation = 89.06

CP 4 - Mag nail with Shiner at Precinct Line Road.
Elevation = 84.46

Skinner Road

CP 54 - MAG Nail with Shiner.
Elevation = 87.13

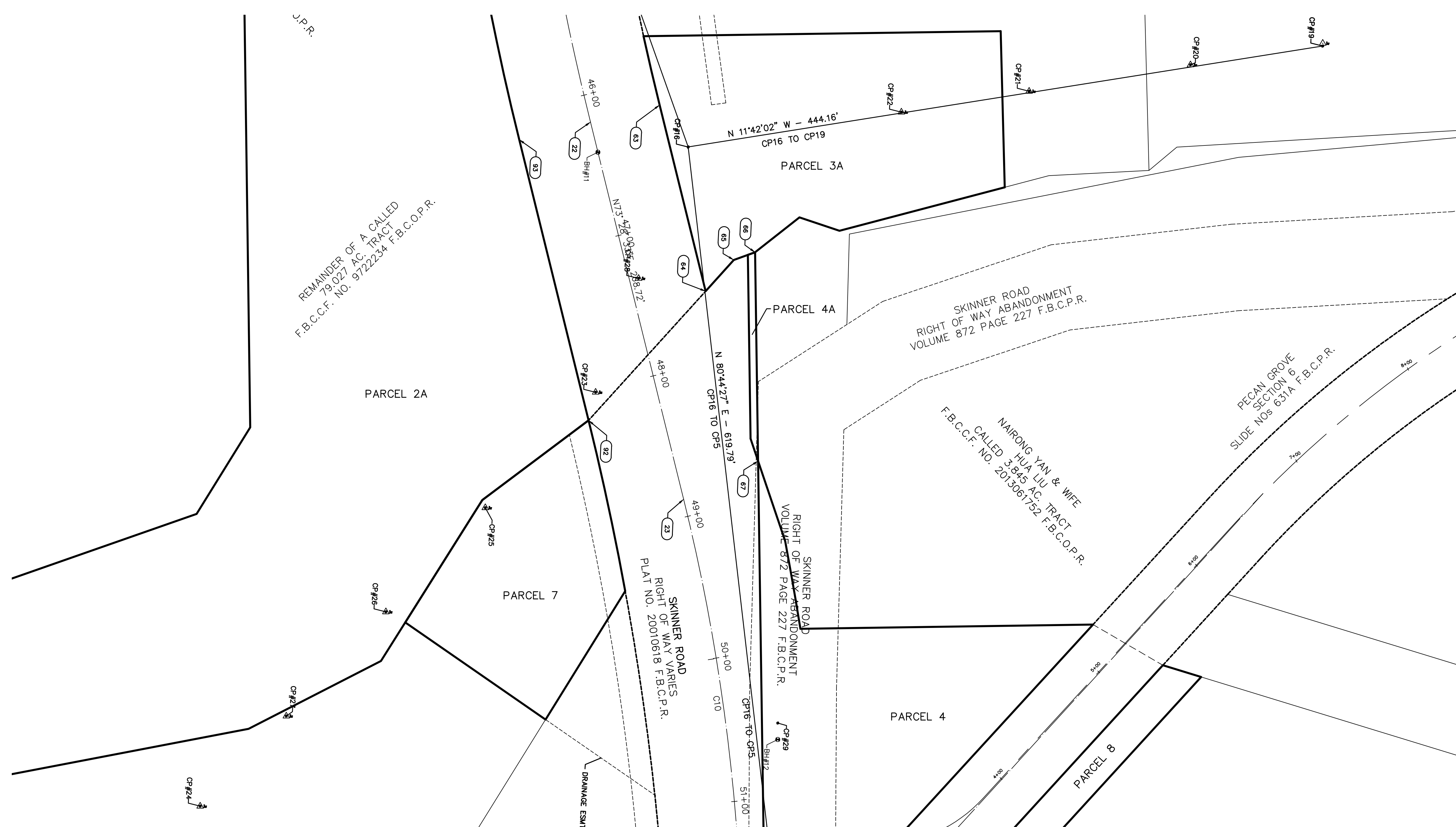
James long

CP 53 - MAG Nail with Shiner.
Elevation = 86.75

Mason Road

CP 9 - 5/8" Capped Iron Rod.
Elevation = 90.82

CP 8 - 5/8" Capped Iron Rod.
Elevation = 88.13



REMAINDER OF A CALLED
79.027 AC. TRACT
F.B.C.C.F. No. 9722234 F.B.C.O.P.R.

SKINNER ROAD
RIGHT OF WAY ABANDONMENT
VOLUME 872 PAGE 227 F.B.C.P.R.

NAIRONG YAN & WIFE
CALLED HUA LIU TRACT
F.B.C.C.F. NO. 2013061732 F.B.C.O.P.R.

PECAN GROVE
SECTION 6
SLIDE NOS 631A F.B.C.P.R.

SKINNER ROAD
RIGHT OF WAY VARIES
PLAT NO. 20010618 F.B.C.P.R.

- NOTES:**
1. THE BEARINGS HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983 (NAD'83), 1993 ADJUSTMENT.
 2. F.B.C.C.F. = FORT BEND COUNTY CLERK'S FILE.
 3. F.B.C.M.R. = FORT BEND COUNTY MAP RECORDS.
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- LEGEND**
- (1) RIGHT OF WAY POINT NUMBER
 - CP CONTROL POINT
 - C1 CURVE DATA NUMBER



We, JNS Engineers, LLC, acting by and through Jon N. Strange a Registered Professional Land Surveyor, hereby certify that this survey substantially complies with the current Texas Society of Professional Surveyors Standards and Specifications for a Category 1A, Condition II Survey and Category 6, Condition II Survey.

Jon N. Strange
Jon N. Strange
Registered Professional Land Surveyor

09-10-2020

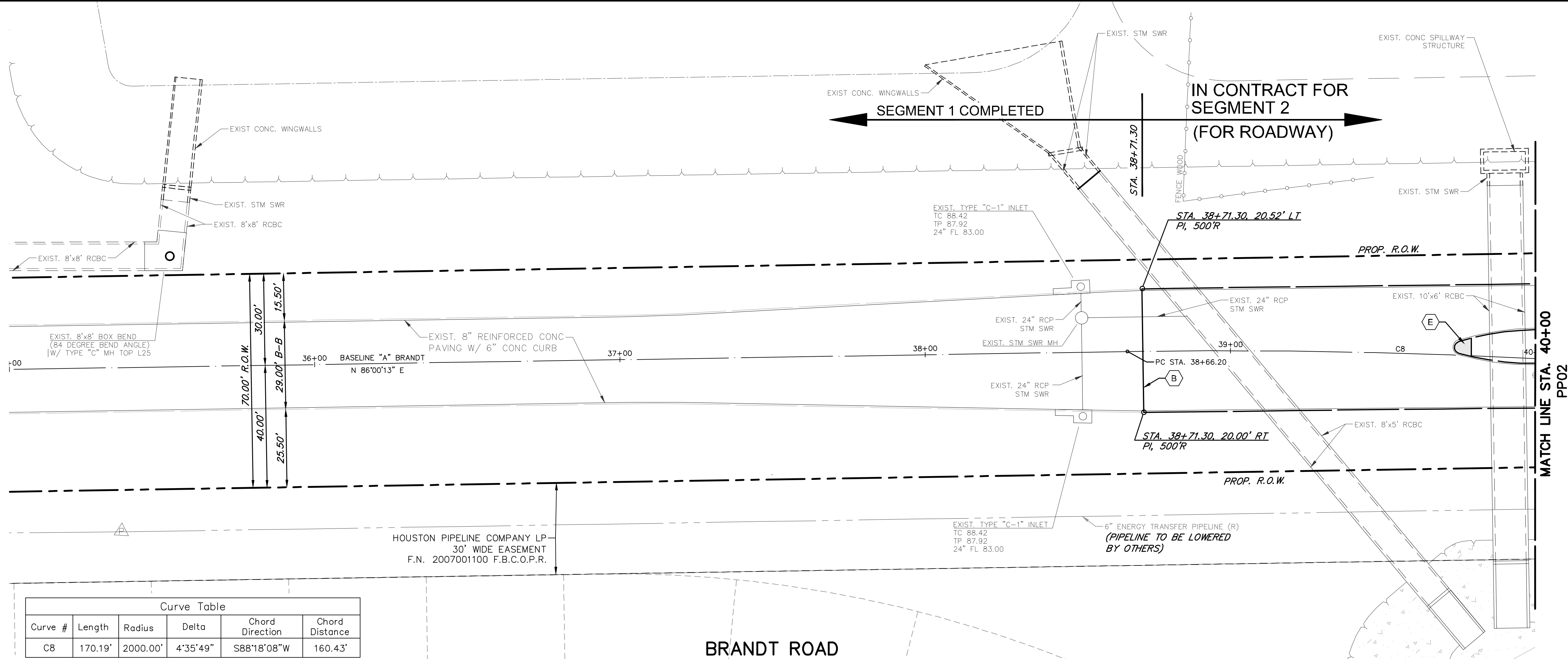
JNS ENGINEERS, LLC.
722 PIN OAK ROAD, SUITE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366 FAX: (281) 391-3375
T.B.P.E. FIRM REGISTRATION NO. F-11653

TOPOGRAPHIC SURVEY
BRANDT ROAD FROM McCRARY ROAD TO MASON ROAD
FORT BEND COUNTY
PROJECT #17310 PRECINCT #3
PHASE 2

SURVEY CONTROL MAP
JONES CREEK

SUBMITTED: JNS	DESIGNED BY: BDCP
SCALE: 1"=40'	DRAWN BY: BDCP
DATE: JANUARY, 2020	SHT. NO. SU20
SURVEY BY: JNS	CITY DWG. NO.
FIELD BOOK NO.	

F:\Clients\Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\PP01 PLAN AND PROFILE STA 35+00 TO STA 40+00.dwg Feb 17, 2023-9:56am Terra Associates Inc., Thanh Dao



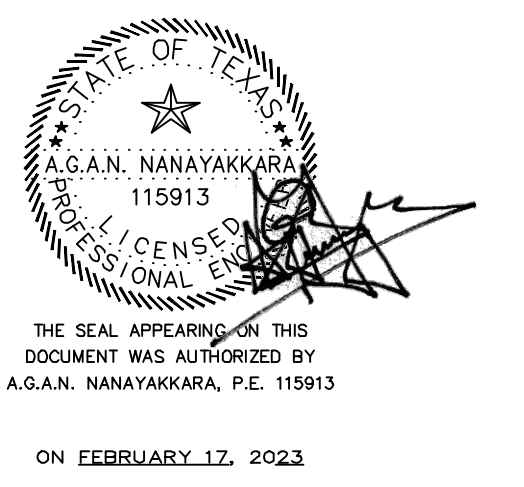
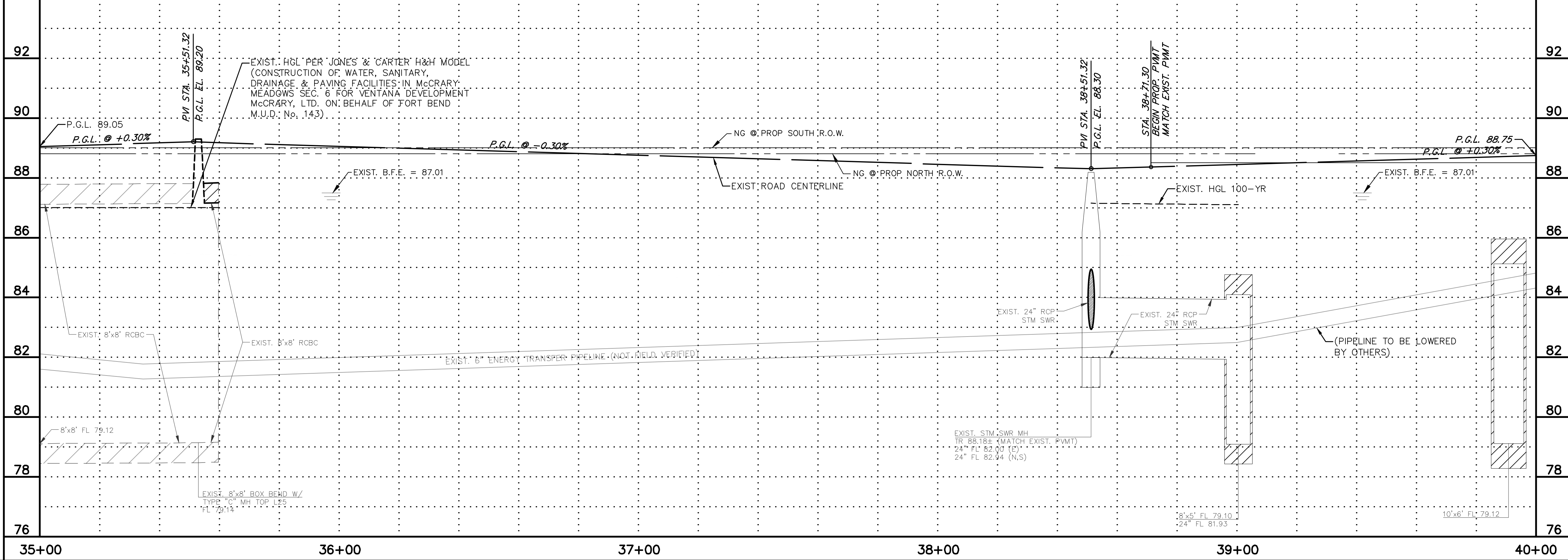
DRAIN SURFACE WATER, EXCAVATE, AND REPLACE WITH SUITABLE MATERIAL PER SPECIAL ROADWAY EXCAVATION ITEM 110.3. EXCAVATED MATERIALS SHALL BE DRIED AND BLENDED WITH OTHER ROADWAY EXCAVATION TO CREATE A SUITABLE MATERIAL.

- TO BE CONSTRUCTED**
- A FULL DEPTH SAWCUT (2' FROM FACE OF CURB)
 - B STANDARD PAVEMENT HEADER
 - C TYPE 1 WHEEL CHAIR RAMP
 - D TYPE 7 WHEEL CHAIR RAMP
 - E BLACK CONCRETE MEDIAN NOSE 6'

- TO BE REMOVED**
- 1 CONCRETE PAVEMENT & CURB
 - 2 TREE
 - 3 ASPHALT ROAD, BASE & SUBGRADE
 - 4 DITCH
 - 5 RCP CULVERT & SET
 - 6 WOODED FENCE
 - 7 SIGN
 - 8 GRAVEL

- NOTES:**
1. EXISTING DITCHES TO BE REMOVED SHALL BE MUCKED OUT PRIOR TO BACKFILLING.
 2. THE PIPELINE INFORMATION ON THIS SHEET IS BASED ON INFORMATION RECEIVED FROM JNS ENGINEERS, LLC, EMAIL DATED 11-20-19 SHOWING ENERGY TRANSFER PIPELINE DEPTHS. NO REPRESENTATION FOR THE ACCURACY OF THE INFORMATION THEREIN AND NO LIABILITY BY ENGINEER IS ASSUMED FOR USE THEREOF.

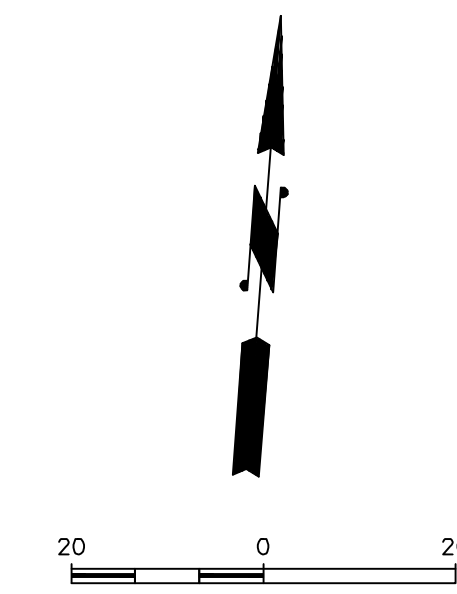
Curve #	Length	Radius	Delta	Chord Direction	Chord Distance
C8	170.19'	2000.00'	4°35'49"	S88°18'08"W	160.43'



REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
PLAN AND PROFILE STA 35+00 TO STA 40+00			
TERRA <small>a Bowman company</small>		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS <small>LLC</small>		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.		SHEET PP01	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\PP03 PLAN STA 45+00 TO STA 50+00.dwg Feb 17, 2023 9:57am Terra Associates Inc., Thanh Dao

Curve Table					
Curve #	Length	Radius	Delta	Chord Direction	Chord Distance
C9	592.52'	1971.23'	17°13'20"	N81°59'23"E	590.29'
C10	319.31'	1400.00'	13°04'05"	N80°00'35"E	318.62'



DRAIN SURFACE WATER, EXCAVATE, AND REPLACE WITH SUITABLE MATERIAL PER SPECIAL ROADWAY EXCAVATION ITEM 110.3. EXCAVATED MATERIALS SHALL BE DRIED AND BLENDED WITH OTHER ROADWAY EXCAVATION TO CREATE A SUITABLE MATERIAL.

TO BE CONSTRUCTED

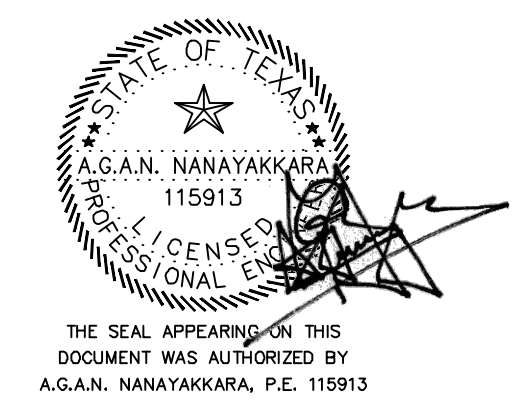
- (A) FULL DEPTH SAWCUT (2' FROM FACE OF CURB)
- (B) STANDARD PAVEMENT HEADER
- (C) TYPE 1 WHEEL CHAIR RAMP
- (D) TYPE 7 WHEEL CHAIR RAMP
- (E) BLACK CONCRETE MEDIAN NOSE 6"

TO BE REMOVED

- 1 CONCRETE PAVEMENT & CURB
- 2 TREE
- 3 ASPHALT ROAD, BASE & SUBGRADE
- 4 DITCH
- 5 RCP CULVERT & SET
- 6 WOODEN FENCE
- 7 SIGN
- 8 GRAVEL

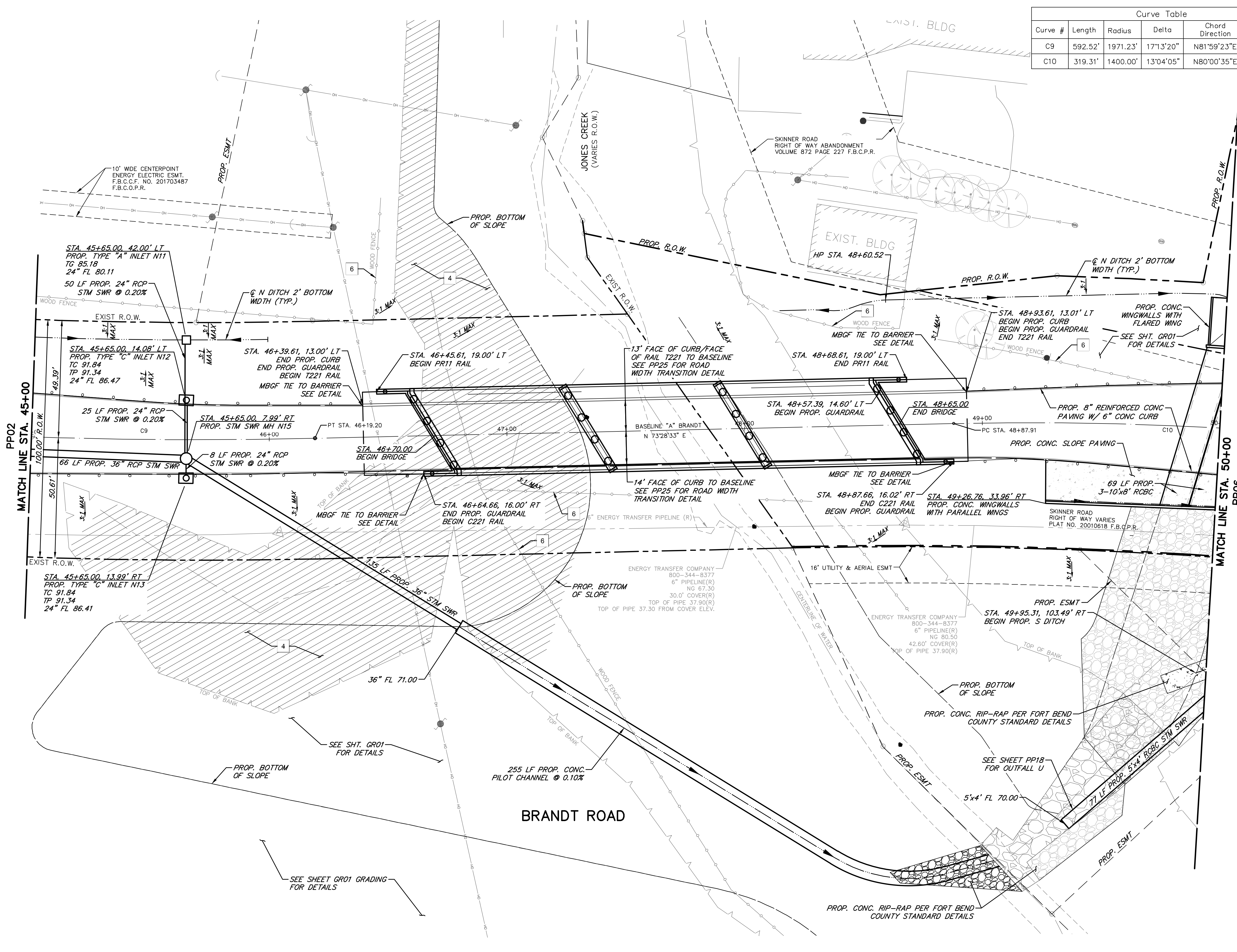
NOTES:

1. EXISTING DITCHES TO BE REMOVED SHALL BE MUCKED OUT PRIOR TO BACKFILLING.
2. THE PIPELINE INFORMATION ON THIS SHEET IS BASED ON INFORMATION RECEIVED FROM JNS ENGINEERS, LLC. EMAIL DATED 11-20-19 SHOWING ENERGY TRANSFER PIPELINE DEPTHS. NO REPRESENTATION FOR THE ACCURACY OF THE INFORMATION THEREIN AND NO LIABILITY BY ENGINEER IS ASSUMED FOR USE THEREOF.

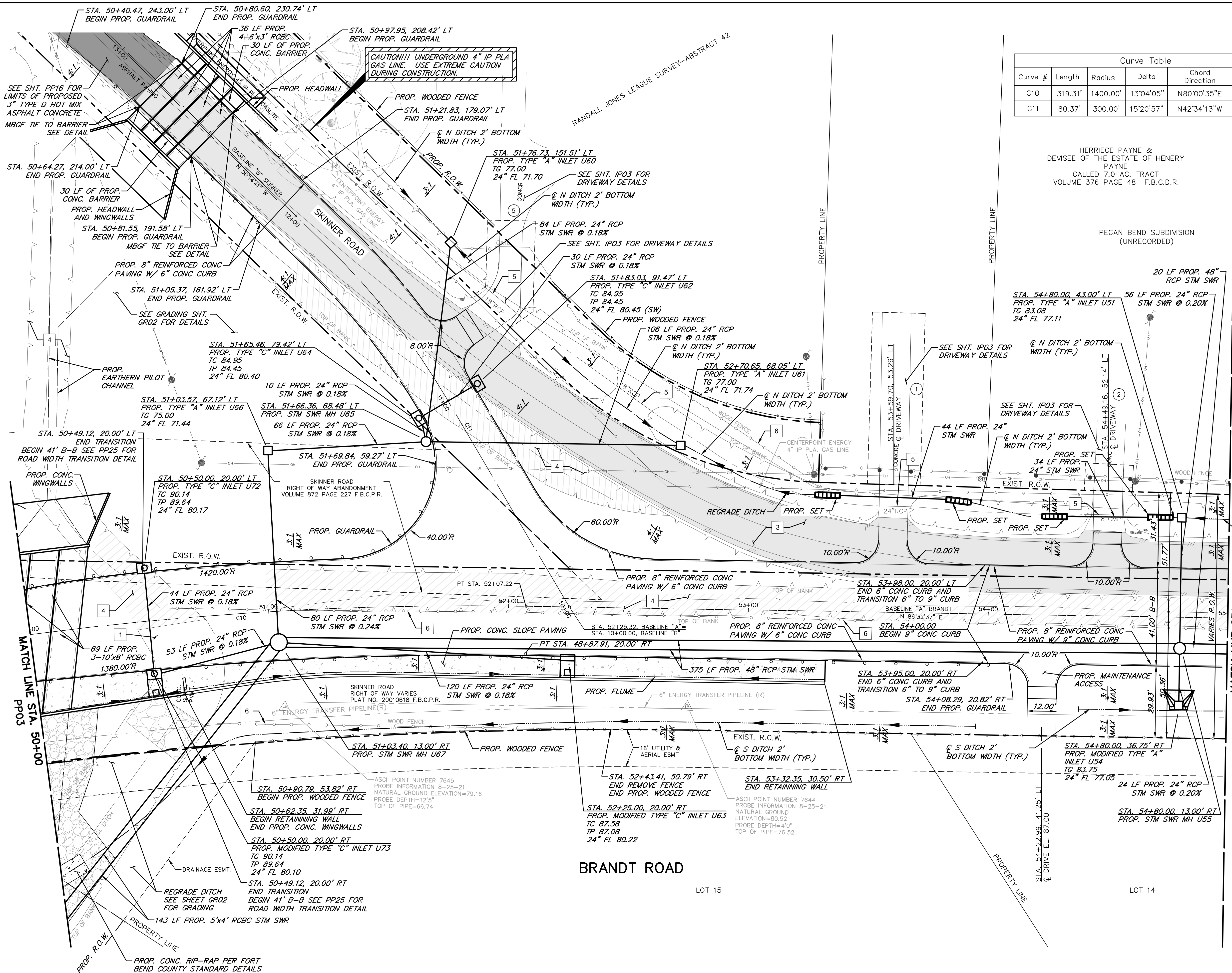


ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
PLAN STA 45+00 TO STA 50+00			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 20'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET PP03	

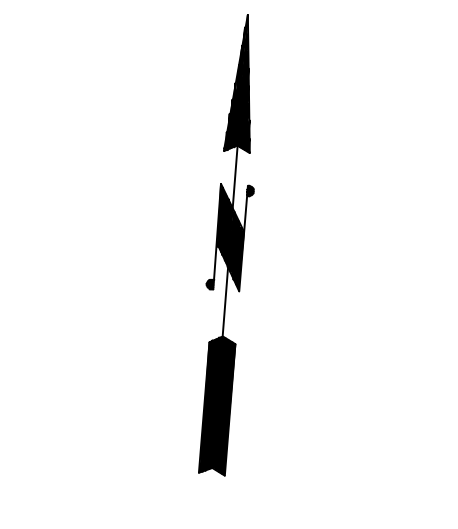


F:\Clients\0522-Fort Bend County_Engineering\0522-1801_Brandt_Road\Drawings\Seg 2\PP06_Plan_STA 50+00 TO STA 55+00.dwg Feb 17, 2023 9:59am Terra Associates Inc., Thanh Dao



Curve Table				
Curve #	Length	Radius	Delta	Chord Distance
C10	319.31'	1400.00'	13°04'05"	N80°00'35"E 318.62'
C11	80.37'	300.00'	15°20'57"	N42°34'13"W 80.13'

HERRICE PAYNE &
DEVISEE OF THE ESTATE OF HENRY
PAYNE
CALLED 7.0 AC. TRACT
VOLUME 376 PAGE 48 F.B.C.D.R.

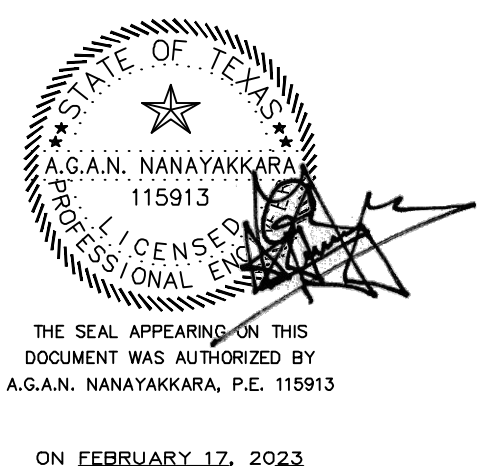


DRAIN SURFACE WATER, EXCAVATE, AND REPLACE WITH SUITABLE MATERIAL PER SPECIAL ROADWAY EXCAVATION ITEM 110.3. EXCAVATED MATERIALS SHALL BE DRIED AND BLENDED WITH OTHER ROADWAY EXCAVATION TO CREATE A SUITABLE MATERIAL.

- TO BE CONSTRUCTED**
- (A) FULL DEPTH SAWCUT (2' FROM FACE OF CURB)
 - (B) STANDARD PAVEMENT HEADER
 - (C) TYPE 1 WHEEL CHAIR RAMP
 - (D) TYPE 7 WHEEL CHAIR RAMP
 - (E) BLACK CONCRETE MEDIAN NOSE 6"

- TO BE REMOVED**
- (1) CONCRETE PAVEMENT & CURB
 - (2) TREE
 - (3) ASPHALT ROAD, BASE & SUBGRADE
 - (4) DITCH
 - (5) RCP CULVERT & SET
 - (6) WOODEN FENCE
 - (7) SIGN
 - (8) GRAVEL

- NOTES:**
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REV. NO.	DESCRIPTION	DATE	APP.

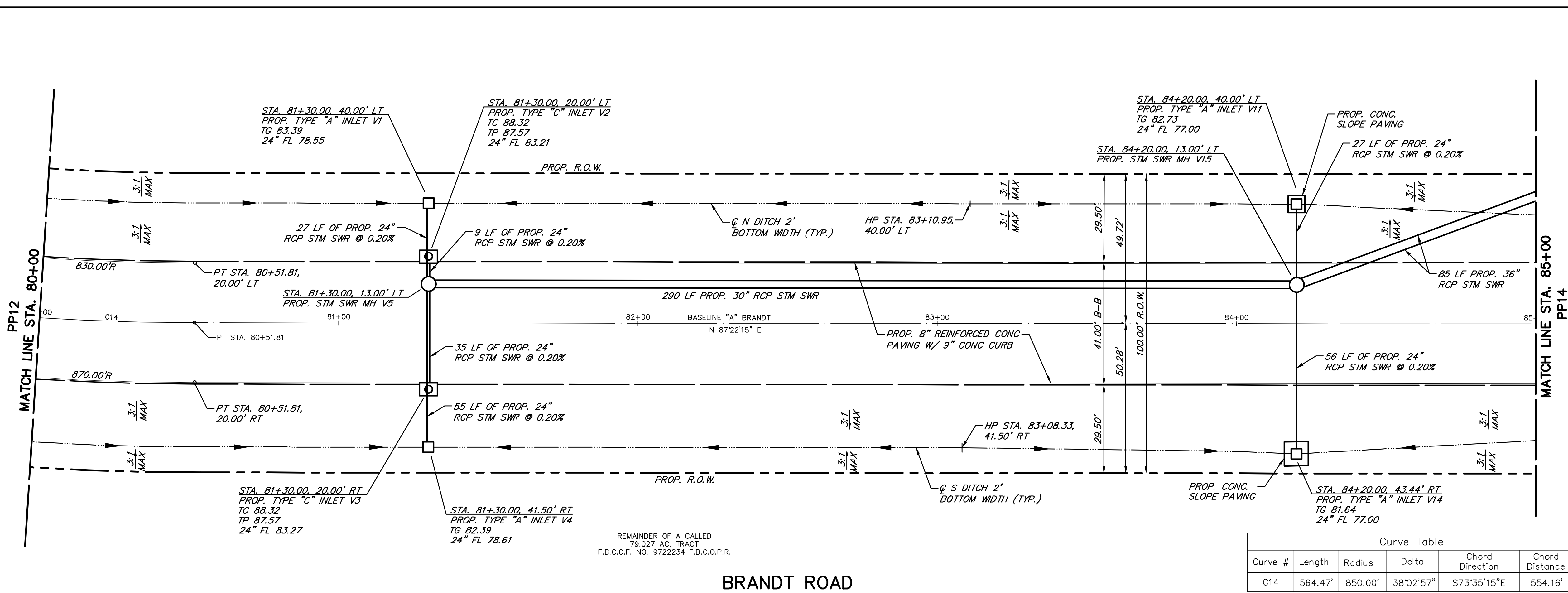
**BRANDT ROAD
PRECINCT LINE RD TO MASON RD
PLAN
STA 50+00 TO STA 55+00**

TERRA 1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

JNS ENGINEERS, LLC
722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.B.P.E. FIRM
REGISTRATION NO. 11653

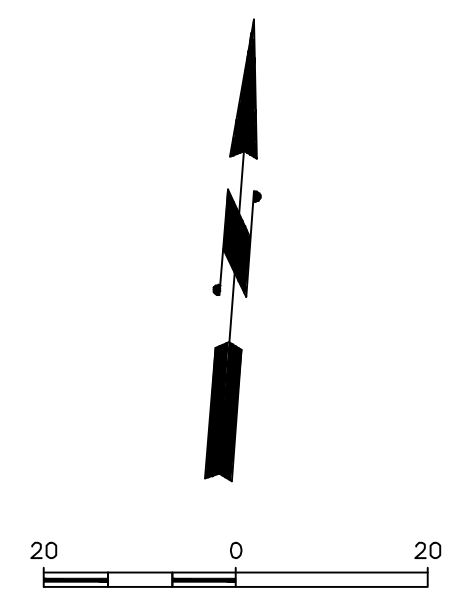
DRAWN BY: T.D.	SCALE: 1" = 20' H 1" = 2' V	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET PP06

F:\Clients\0522-Fort Bend County_Engineering\0522-1801-Brandt Road\Drawings\Seg 2\PP13 PLAN AND PROFILE STA 80+00 TO STA 85+00.dwg Feb 17, 2023-10:11am Terra Associates Inc., Thanh Dao



REMAINDER OF A CALLED
79.027 AC. TRACT
F.B.C.C.F. NO. 9722234 F.B.C.O.P.R.

Curve Table					
Curve #	Length	Radius	Delta	Chord Direction	Chord Distance
C14	564.47'	850.00'	38°02'57"	S73°35'15"E	554.16'



DRAIN SURFACE WATER, EXCAVATE, AND REPLACE WITH SUITABLE MATERIAL PER SPECIAL ROADWAY EXCAVATION ITEM 110.3. EXCAVATED MATERIALS SHALL BE DRIED AND BLENDED WITH OTHER ROADWAY EXCAVATION TO CREATE A SUITABLE MATERIAL.

TO BE CONSTRUCTED

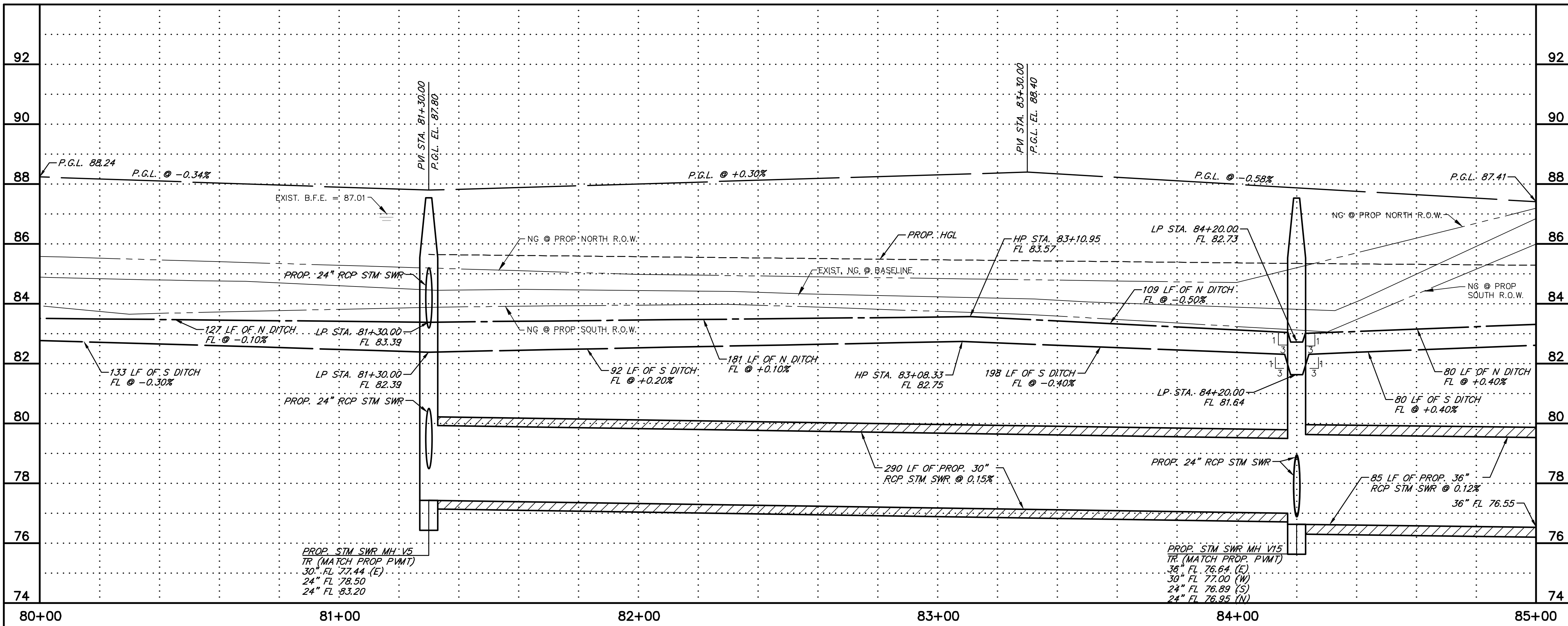
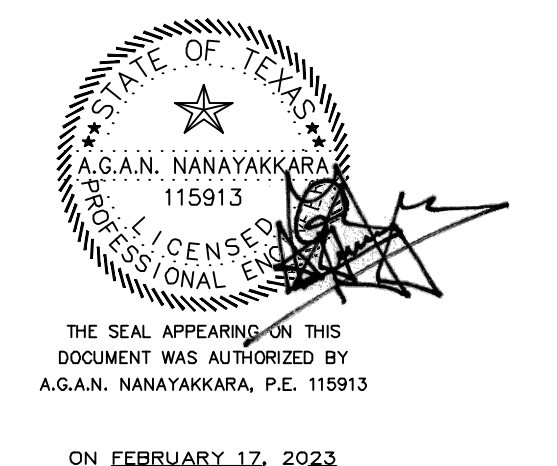
- (A) FULL DEPTH SAWCUT (2' FROM FACE OF CURB)
- (B) STANDARD PAVEMENT HEADER
- (C) TYPE 1 WHEEL CHAIR RAMP
- (D) TYPE 7 WHEEL CHAIR RAMP
- (E) BLACK CONCRETE MEDIAN NOSE 6"

TO BE REMOVED

- 1 CONCRETE PAVEMENT & CURB
- 2 TREE
- 3 ASPHALT ROAD, BASE & SUBGRADE
- 4 DITCH
- 5 RCP CULVERT & SET
- 6 WOODED FENCE
- 7 SIGN
- 8 GRAVEL

NOTES:

1. EXISTING DITCHES TO BE REMOVED SHALL BE MUCKED OUT PRIOR TO BACKFILLING.
2. THE PIPELINE INFORMATION ON THIS SHEET IS BASED ON INFORMATION RECEIVED FROM JNS ENGINEERS, LLC, EMAIL DATED 11-20-19 SHOWING ENERGY TRANSFER PIPELINE DEPTHS. NO REPRESENTATION FOR THE ACCURACY OF THE INFORMATION THEREIN AND NO LIABILITY BY ENGINEER IS ASSUMED FOR USE THEREOF.



REV. NO.	DESCRIPTION	DATE	APP.

BRANDT ROAD
PRECINCT LINE RD TO MASON RD

PLAN AND PROFILE
STA 80+00 TO STA 85+00

TERRA
a Bowman company

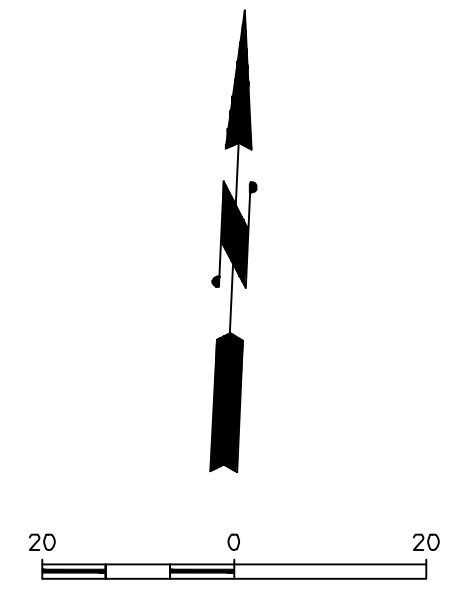
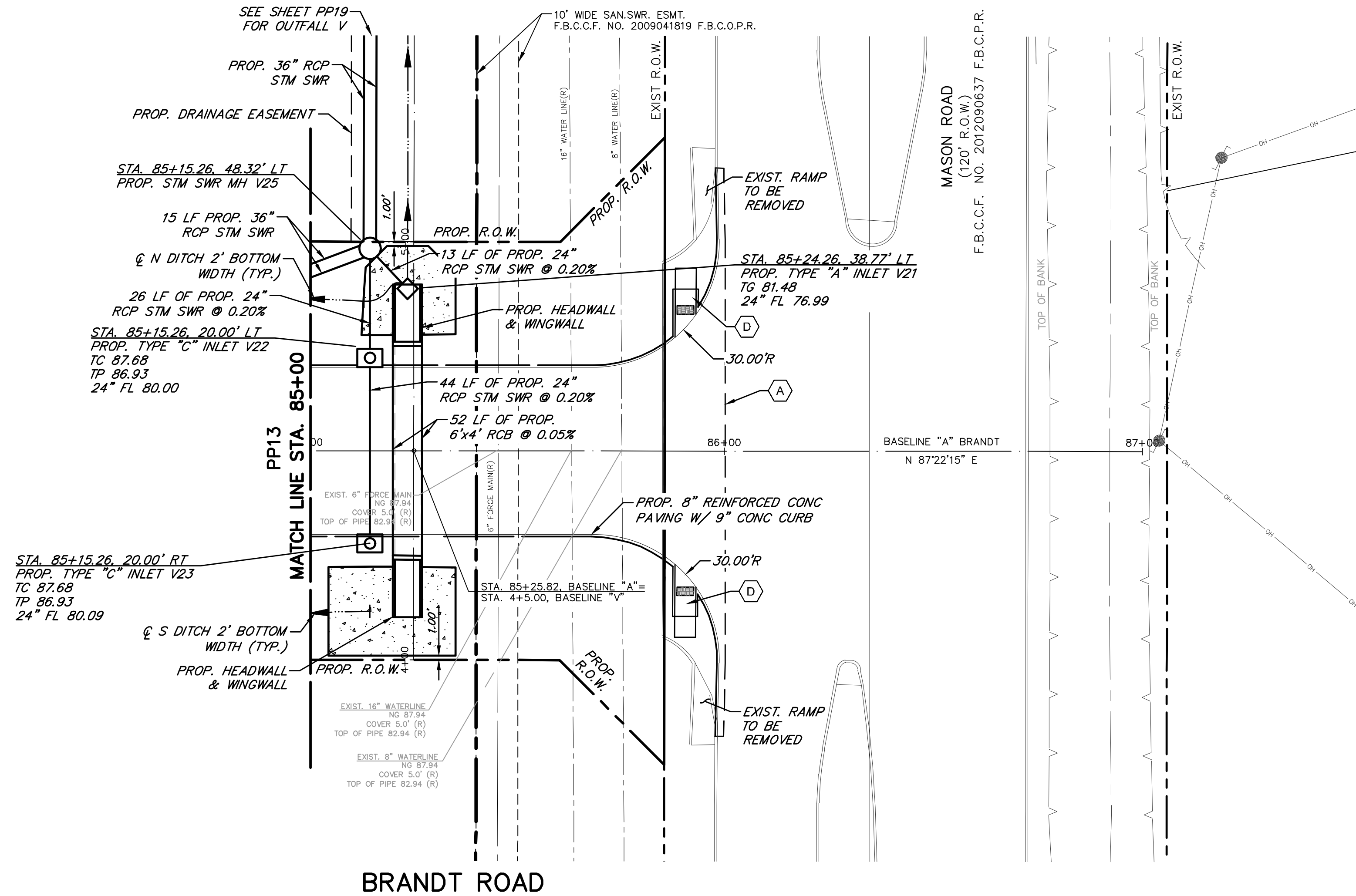
1445 N. LOOP WEST – SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

JNS ENGINEERS, LLC

722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCOE.COM
T.B.P.E. FIRM
REGISTRATION NO. 11653

DRAWN BY: T.D.	SCALE: 1" = 20' H 1" = 2' V	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET PP13

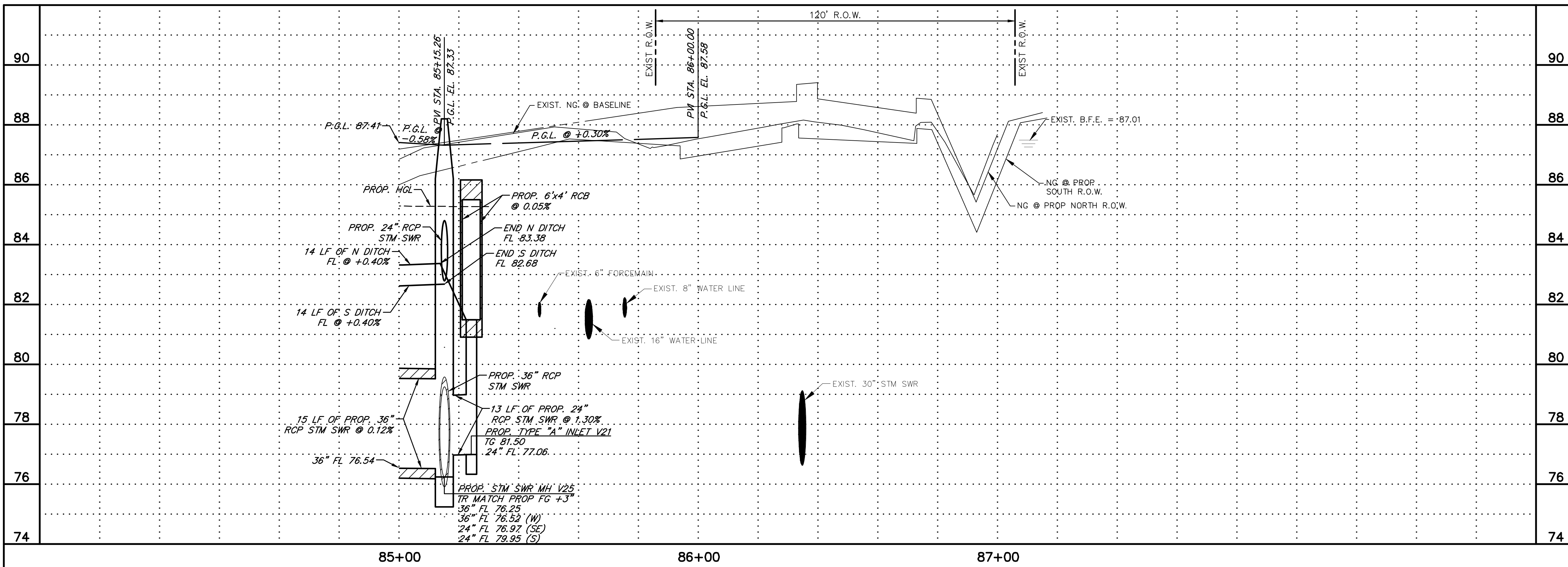
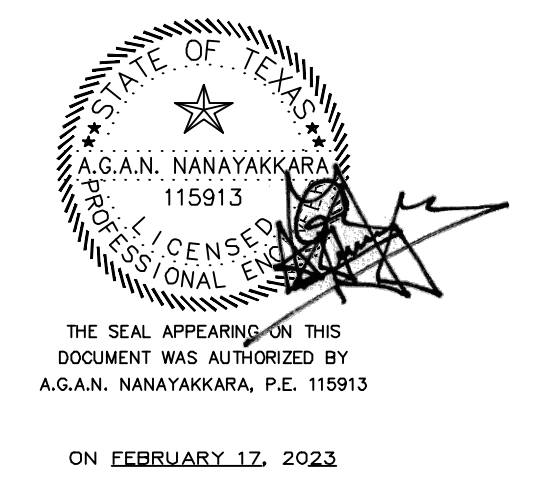
F:\clients\0522-Fort Bend County Engineering\0522-1801-Brandt Road\Drawings\Seg 2\PP14-PLAN AND PROFILE STA 85+00 TO END.dwg Feb 17, 2023-10:11am Terra Associates Inc., Thanh Dao



DRAIN SURFACE WATER, EXCAVATE, AND REPLACE WITH SUITABLE MATERIAL PER SPECIAL ROADWAY EXCAVATION ITEM 110.3. EXCAVATED MATERIALS SHALL BE DRIED AND BLENDED WITH OTHER ROADWAY EXCAVATION TO CREATE A SUITABLE MATERIAL.

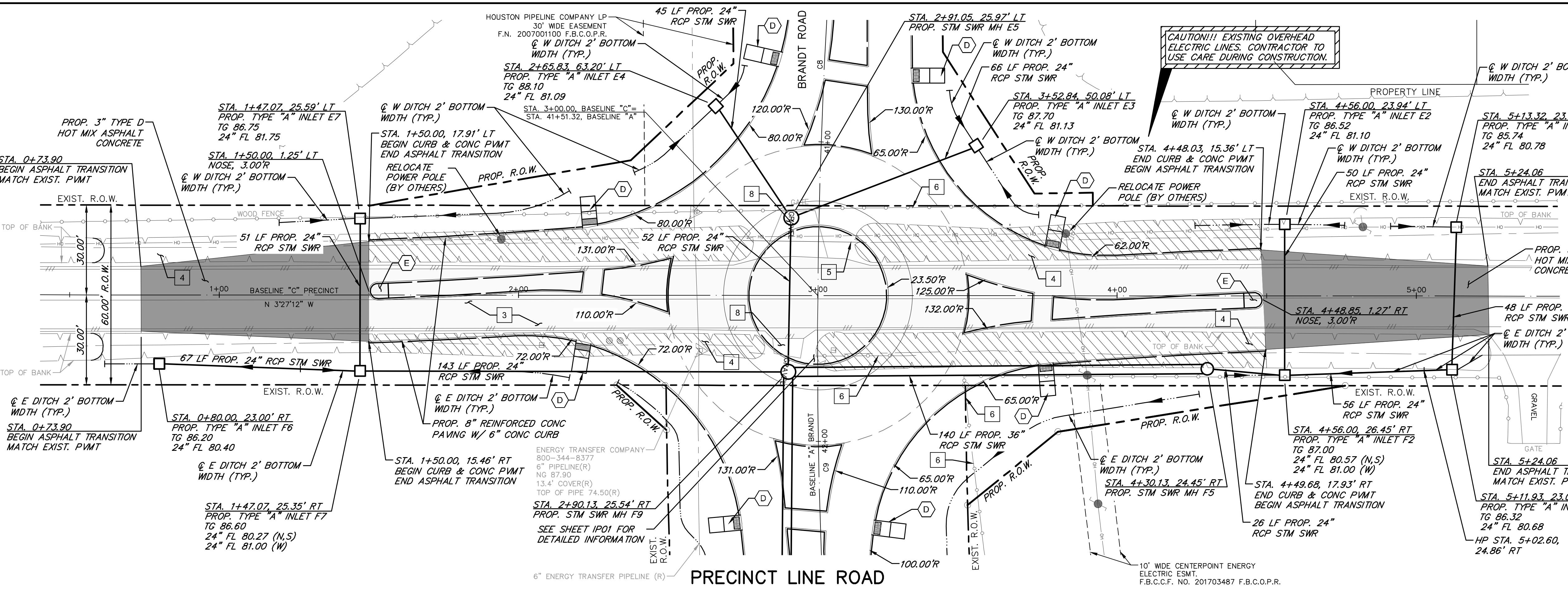
- TO BE CONSTRUCTED**
- (A) FULL DEPTH SAWCUT (2' FROM FACE OF CURB)
 - (B) STANDARD PAVEMENT HEADER
 - (C) TYPE 1 WHEEL CHAIR RAMP
 - (D) TYPE 7 WHEEL CHAIR RAMP
 - (E) BLACK CONCRETE MEDIAN NOSE 6"
- TO BE REMOVED**
- 1 CONCRETE PAVEMENT & CURB
 - 2 TREE
 - 3 ASPHALT ROAD, BASE & SUBGRADE
 - 4 DITCH
 - 5 RCP CULVERT & SET
 - 6 WOODED FENCE
 - 7 SIGN
 - 8 GRAVEL

- NOTES:**
- EXISTING DITCHES TO BE REMOVED SHALL BE MUCKED OUT PRIOR TO BACKFILLING.
 - THE PIPELINE INFORMATION ON THIS SHEET IS BASED ON INFORMATION RECEIVED FROM JNS ENGINEERS, LLC. EMAIL DATED 11-20-19 SHOWING ENERGY TRANSFER PIPELINE DEPTHS. NO REPRESENTATION FOR THE ACCURACY OF THE INFORMATION THEREIN AND NO LIABILITY BY ENGINEER IS ASSUMED FOR USE THEREOF.



REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
PLAN AND PROFILE STA 85+00 TO END			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCO.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 20' H 1" = 2' V	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET PP14	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\PP15 PRECINCT LINE ROAD PLAN AND PROFILE.dwg Feb 17, 2023-10:11am Terra Associates Inc., Thanh Dao



TO BE CONSTRUCTED

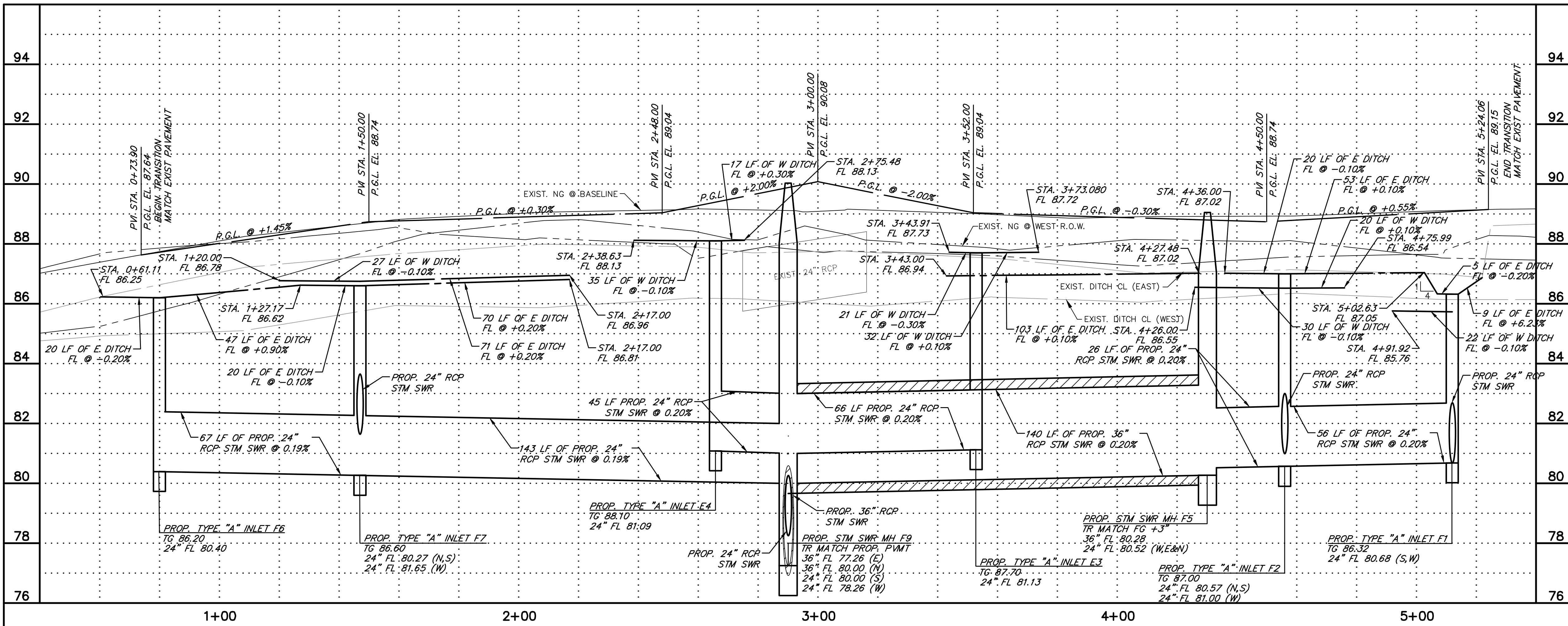
- (A) FULL DEPTH SAWCUT (2' FROM FACE OF CURB)
- (B) STANDARD PAVEMENT HEADER
- (C) TYPE 1 WHEEL CHAIR RAMP
- (D) TYPE 7 WHEEL CHAIR RAMP
- (E) BLACK CONCRETE MEDIAN NOSE 6"

TO BE REMOVED

- 1 CONCRETE PAVEMENT & CURB
- 2 TREE
- 3 ASPHALT ROAD, BASE & SUBGRADE
- 4 DITCH
- 5 RCP CULVERT & SET
- 6 WOODED FENCE
- 7 SIGN
- 8 GRAVEL

NOTES:

- EXISTING DITCHES TO BE REMOVED SHALL BE MUCKED OUT PRIOR TO BACKFILLING.
- THE PIPELINE INFORMATION ON THIS SHEET IS BASED ON INFORMATION RECEIVED FROM JNS ENGINEERS, LLC. EMAIL DATED 11-20-19 SHOWING ENERGY TRANSFER PIPELINE DEPTHS. NO REPRESENTATION FOR THE ACCURACY OF THE INFORMATION THEREIN AND NO LIABILITY BY ENGINEER IS ASSUMED FOR USE THEREOF.

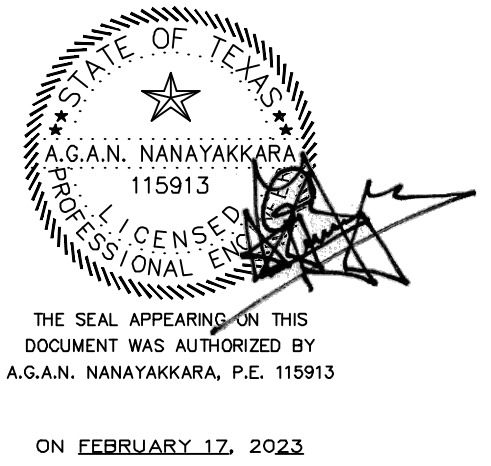
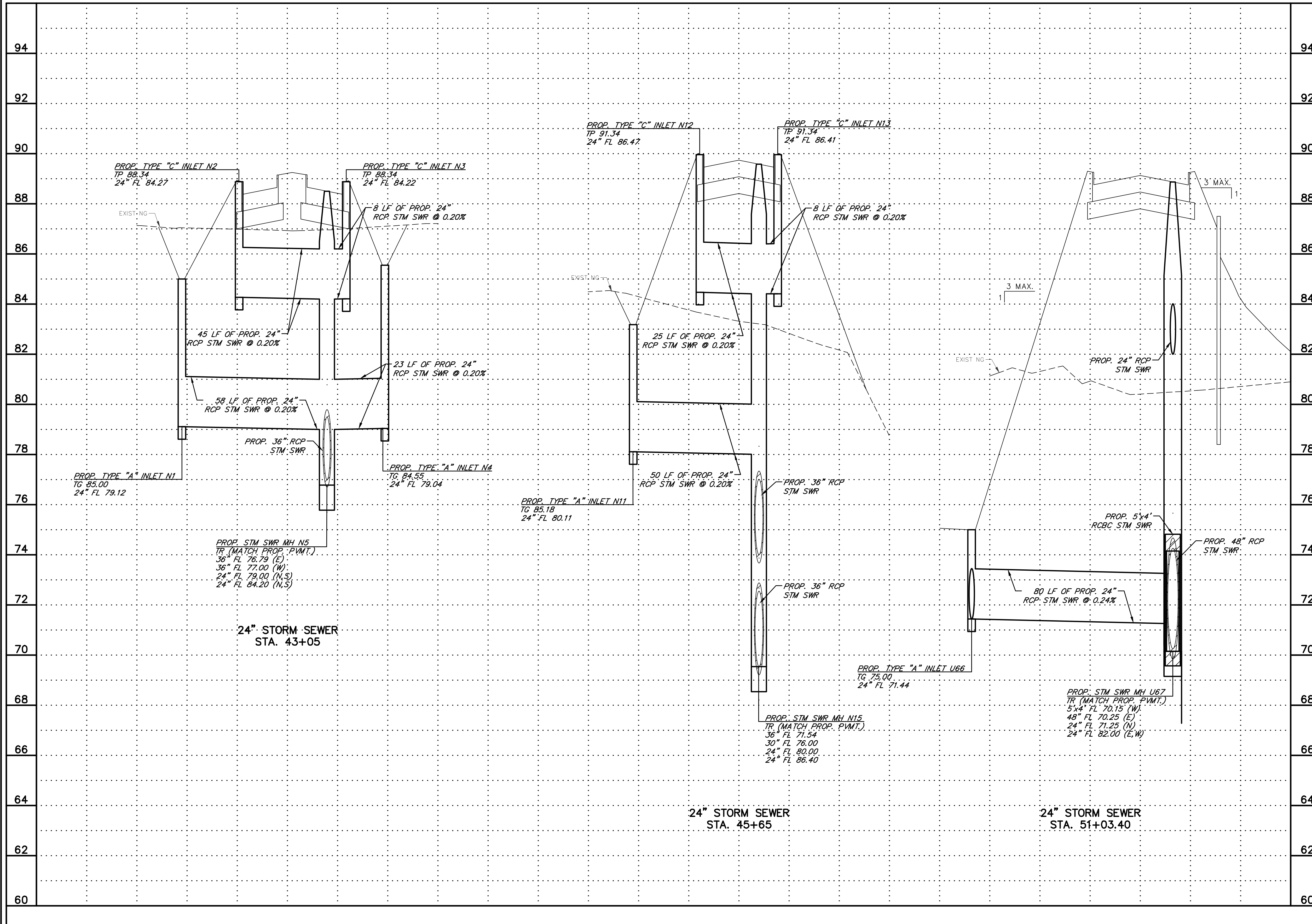


Curve Table				
Curve #	Length	Radius	Delta	Chord Distance
C8	170.19'	2000.00'	4°35'49"	S88°18'08"W 160.43'
C9	592.52'	1971.23'	17°13'20"	N81°59'28"E 590.29'

STATE OF TEXAS
 A.G.A.N. NANAYAKKARA
 115913
 PROFESSIONAL ENGINEER
 THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913
 ON FEBRUARY 17, 2023

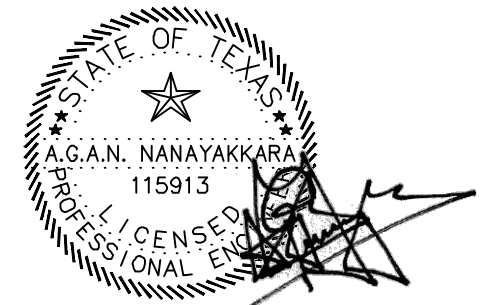
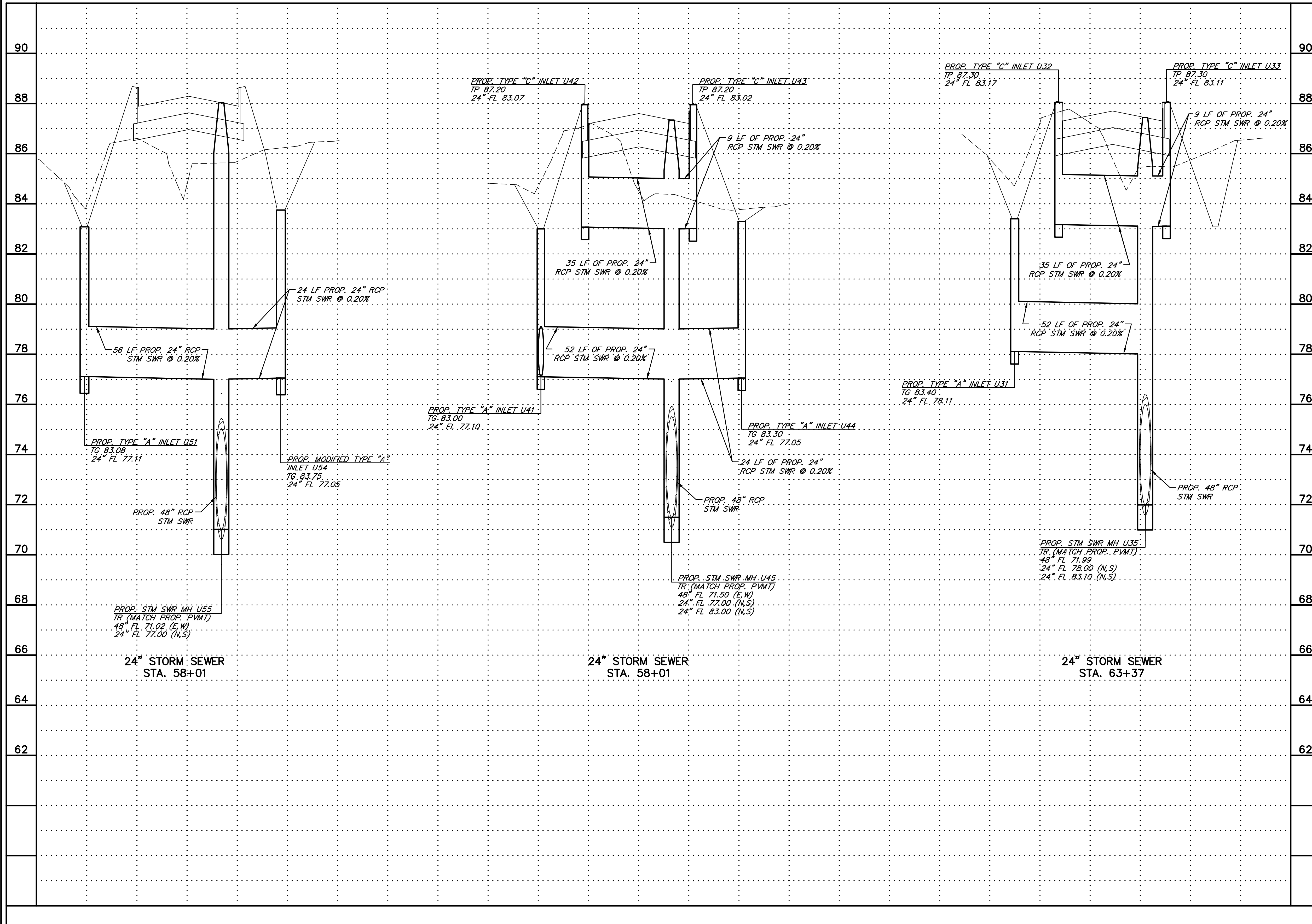
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
PRECINCT LINE ROAD PLAN AND PROFILE			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC		JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281)391-3366 FAX: (281) 391-3375 WWW.JNSCO.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.		PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	
		SHEET PP15	

F:\Clients\Fort Bend County_Engineering\0522-1801_Brandt_Road_Drawings\0522-1801_Brandt_Road\Drawings\Seg 2\PP20 STORM SEWER LATERALS (1 OF 5).dwg, Feb 17, 2023-10:32am, Terra Associates Inc., Thanh Dao


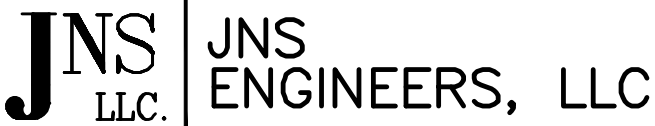


REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
STORM SEWER LATERALS (1 OF 5)			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.		SCALE: 1" = 20' H 1" = 2' V	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET PP20

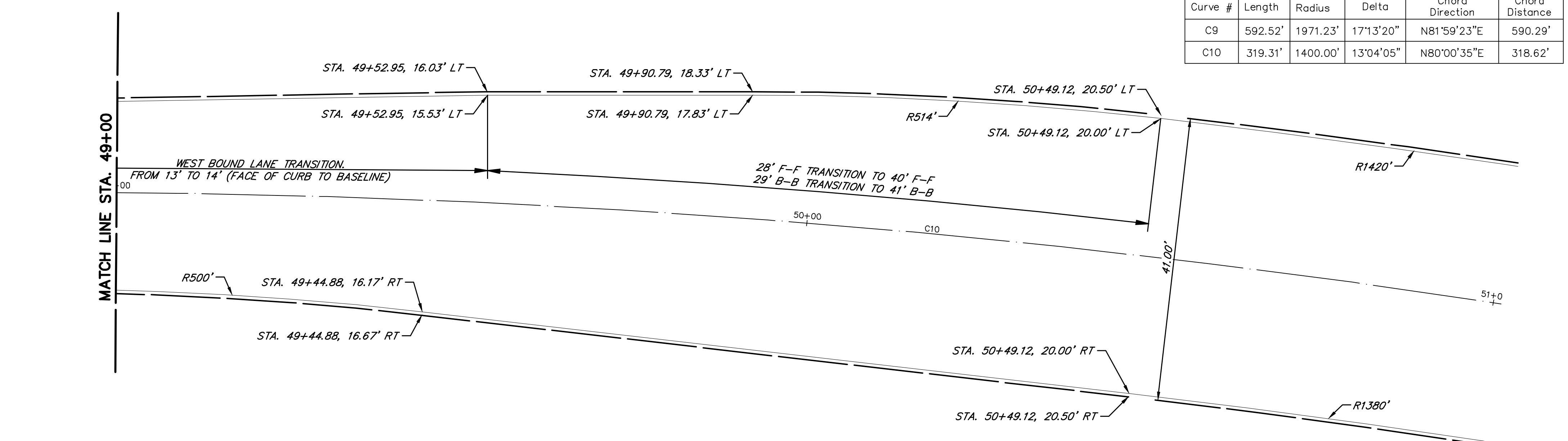
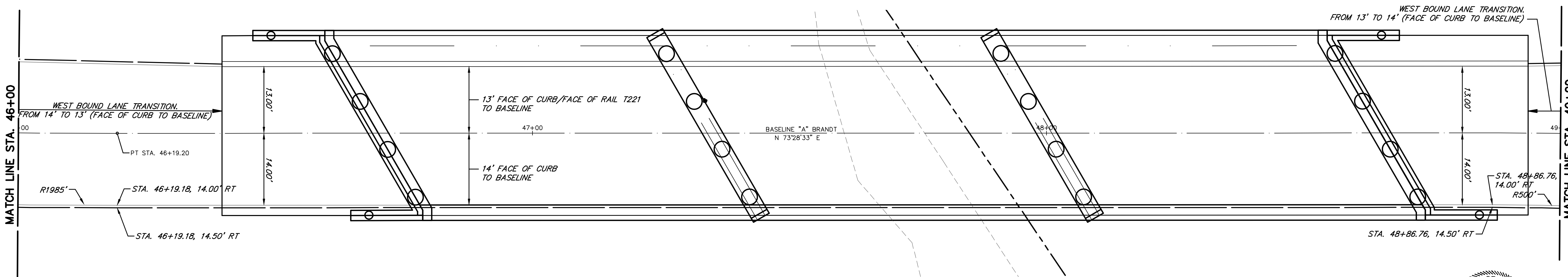
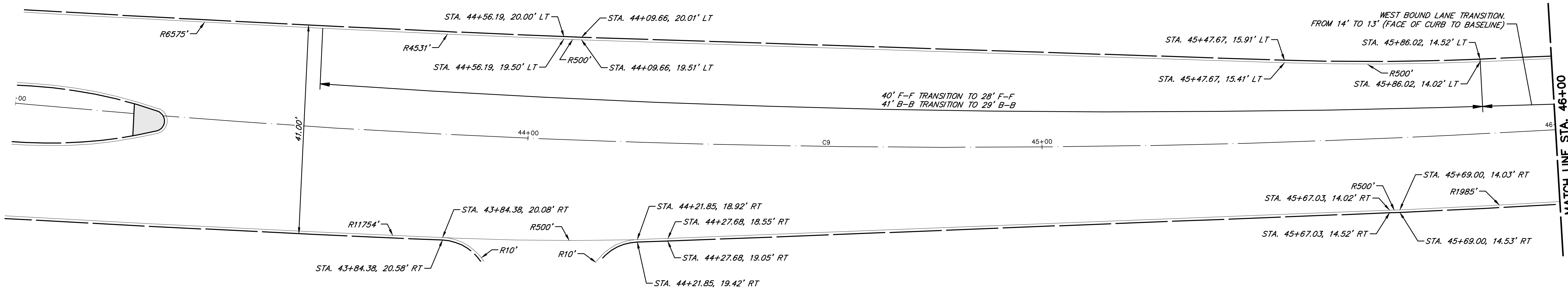
F:\Clients\0522-Fort Bend County_Engineering\0522-1801-Brandt Road\Drawings\Seg 2\PP22 STORM SEWER LATERALS (3 OF 5).dwg, Feb 17, 2023-10:37am, Terra Associates Inc., Thanh Dao



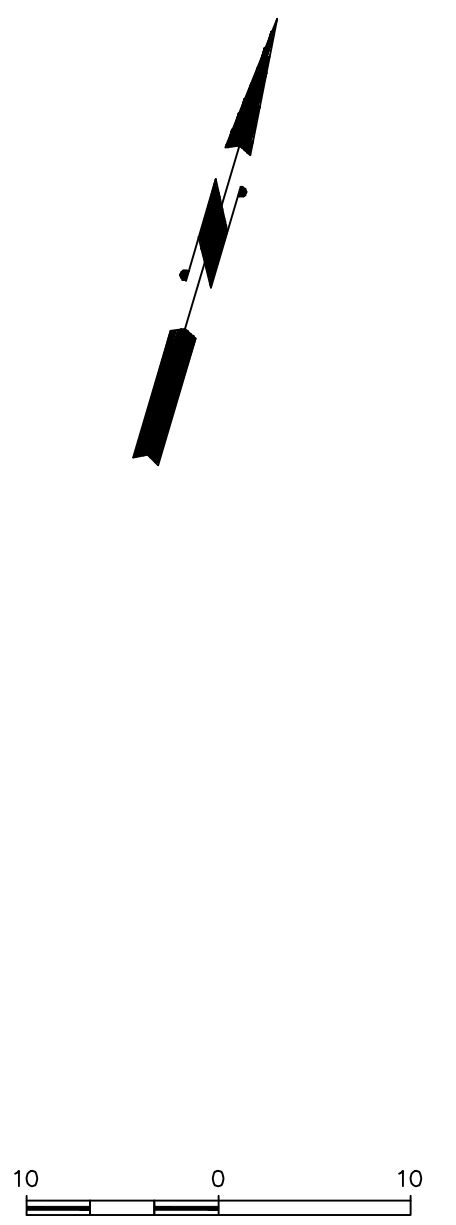
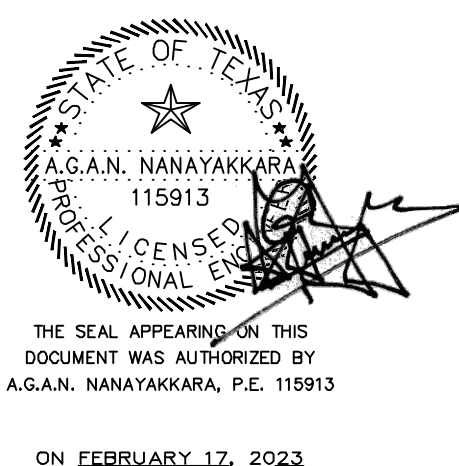
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913 ON FEBRUARY 17, 2023

66				
64	REV. NO.	DESCRIPTION	DATE	APP.
62		BRANDT ROAD PRECINCT LINE RD TO MASON RD STORM SEWER LATERALS (3 OF 5)		
			1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
			722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
	DRAWN BY: T.D.	SCALE: 1" = 20' H 1" = 2' V	PROJECT No. 0522-1801 CONTRACT: 1	
	CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET PP22	

F:\Clients\Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\PP25 PLAN STA 43+00 TO STA 48+00.dwg Feb 17, 2023-10:36am Terra Associates Inc., Thanh Dao

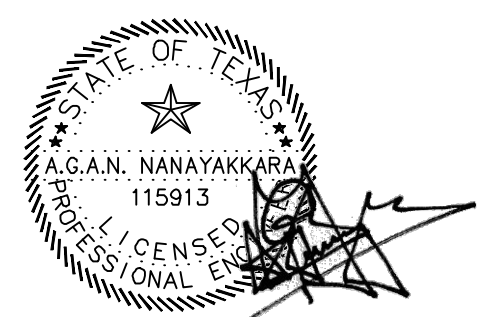
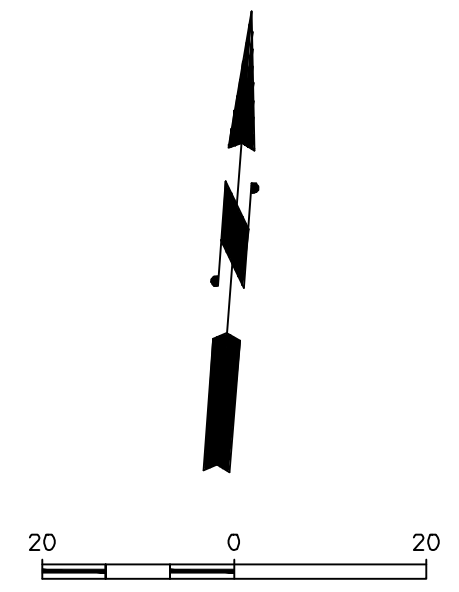
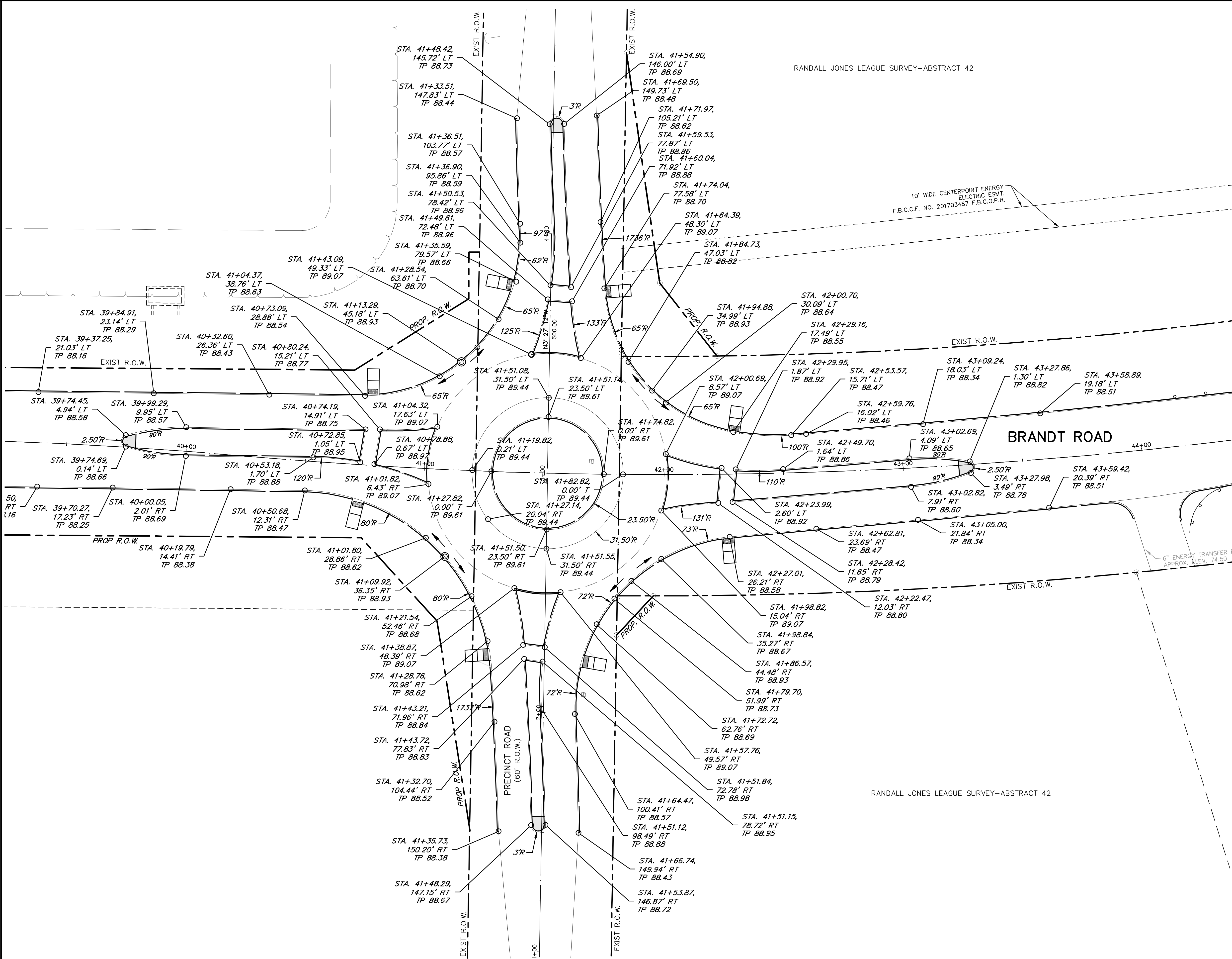


Curve Table					
Curve #	Length	Radius	Delta	Chord Direction	Chord Distance
C9	592.52'	1971.23'	17°13'20"	N81°59'23"E	590.29'
C10	319.31'	1400.00'	13°04'05"	N80°00'35"E	318.62'



REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
ROAD WIDTH TRANSITION DETAIL			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 10'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET PP25	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\IPO1 ROUNDABOUT BRANDT RD AND PRECINCT RD.dwg Feb 17, 2023-10:40am Terra Associates Inc., Thanh Dao

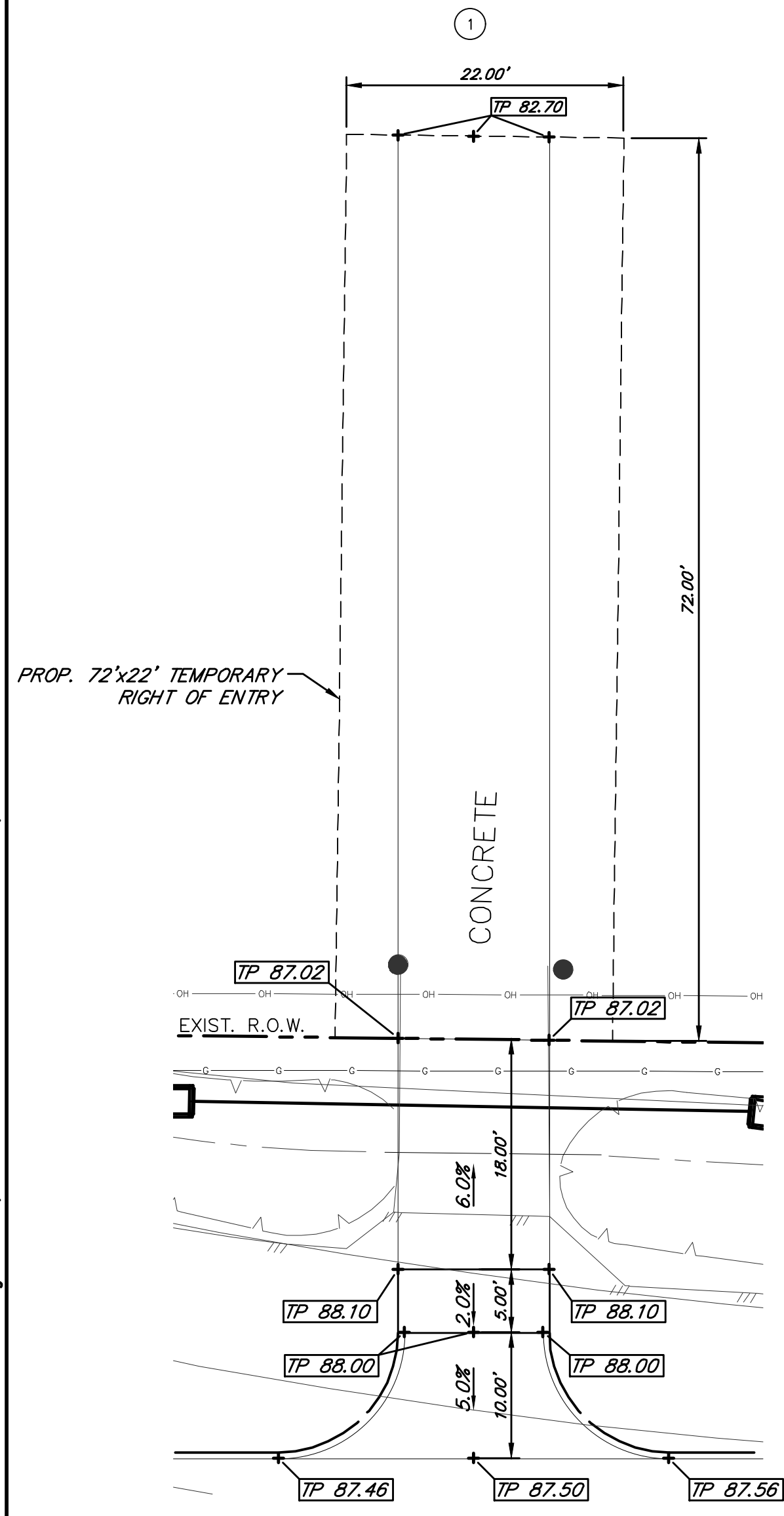


THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913

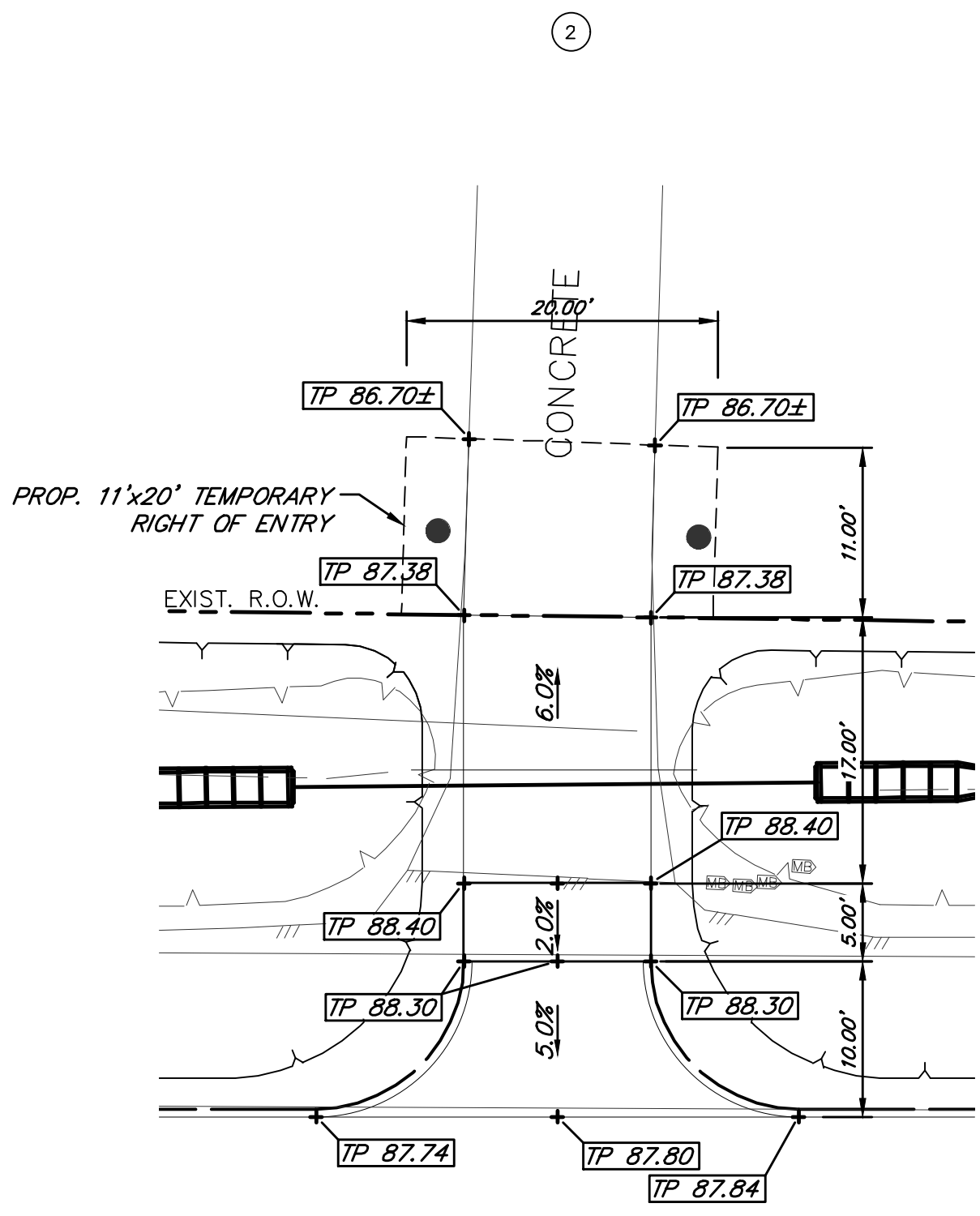
ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
ROUNDABOUT AT BRANDT ROAD AND PRECINCT ROAD			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC		JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 20'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET IPO1	

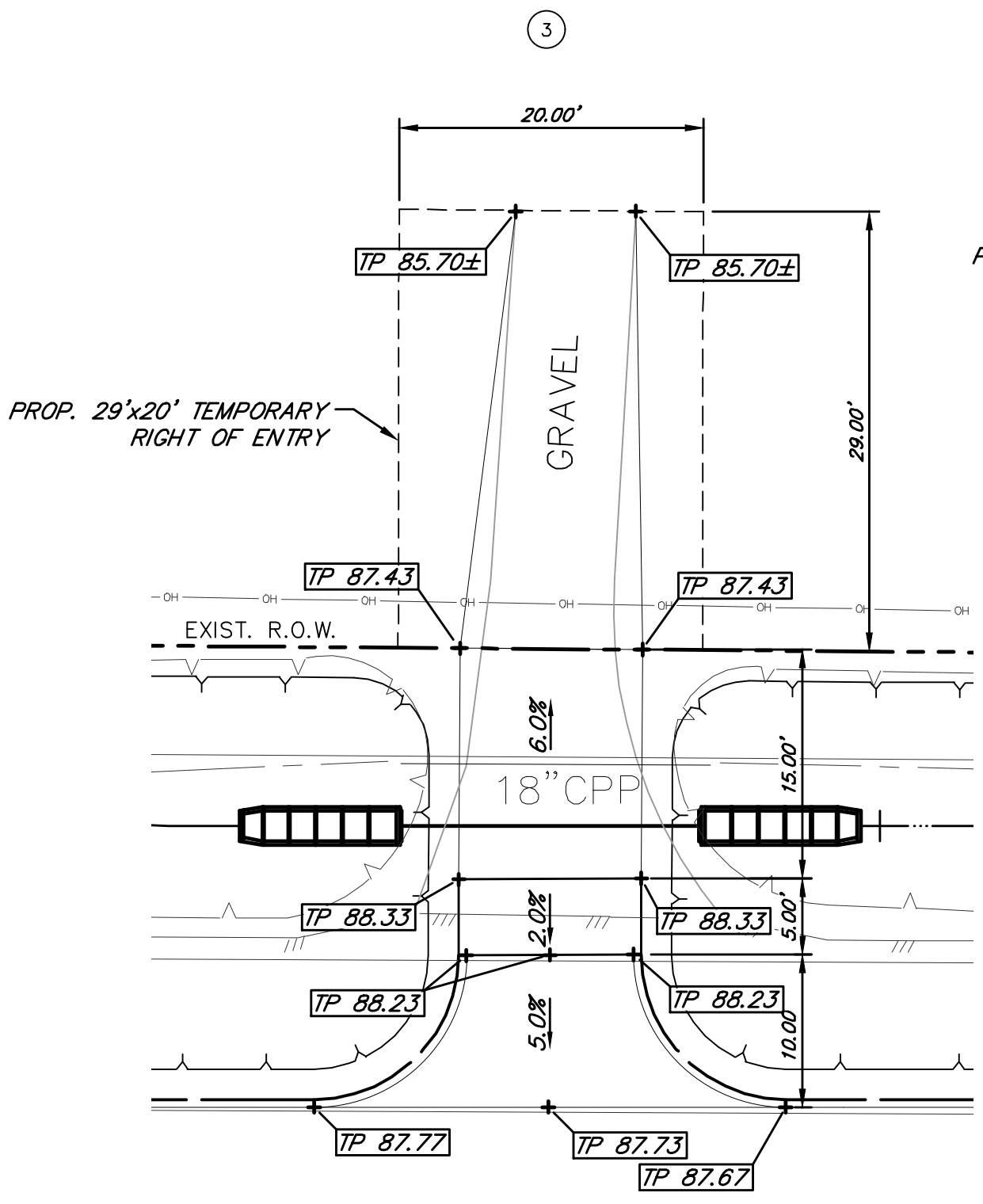
F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\IPO3 DRIVEWAY DESIGN.dwg, Feb 17, 2023-10:41am Terra Associates Inc., Thanh Dao



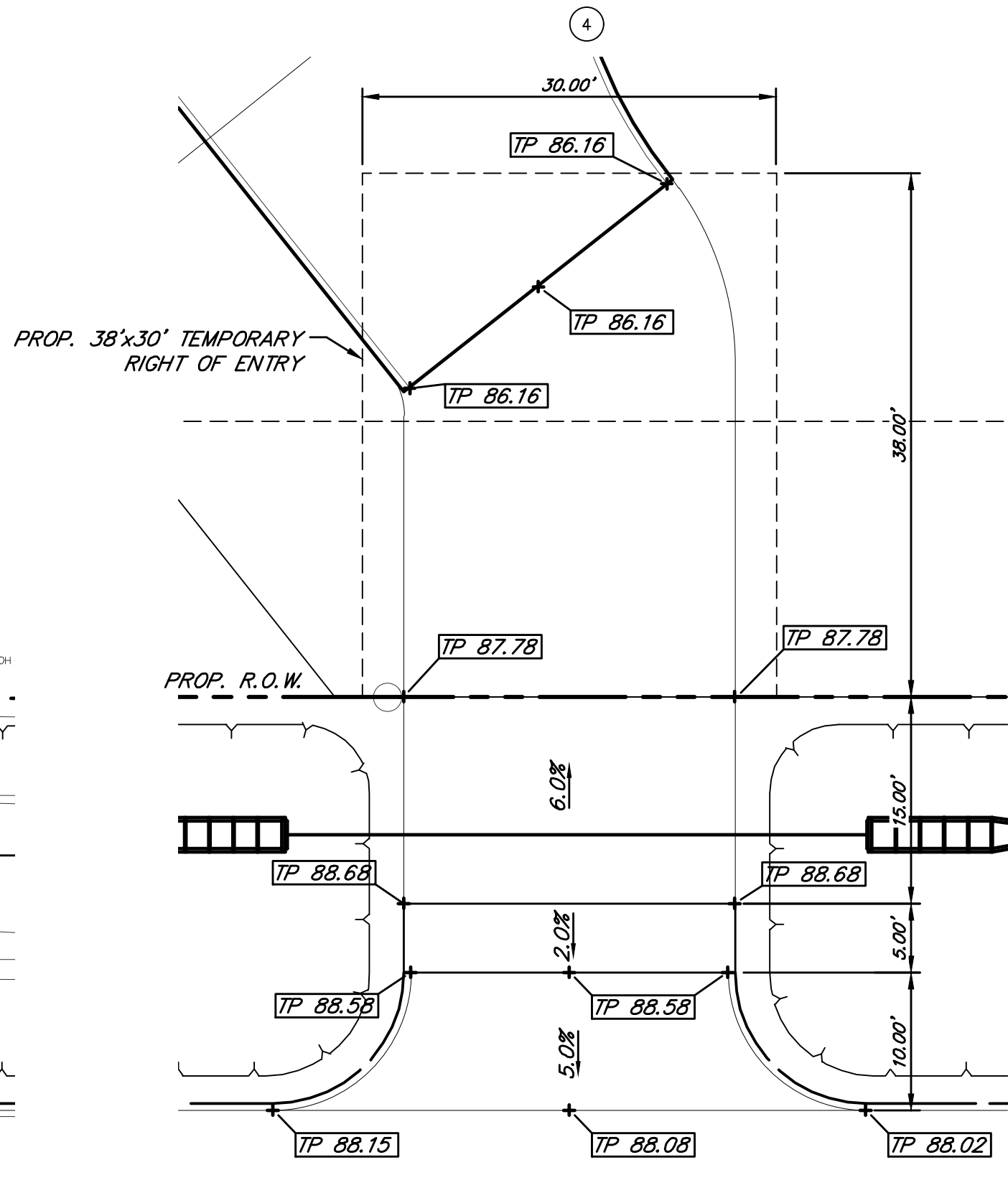
PROPOSED DRIVEWAY STA. 53+59.70
SCALE: 1"=10'



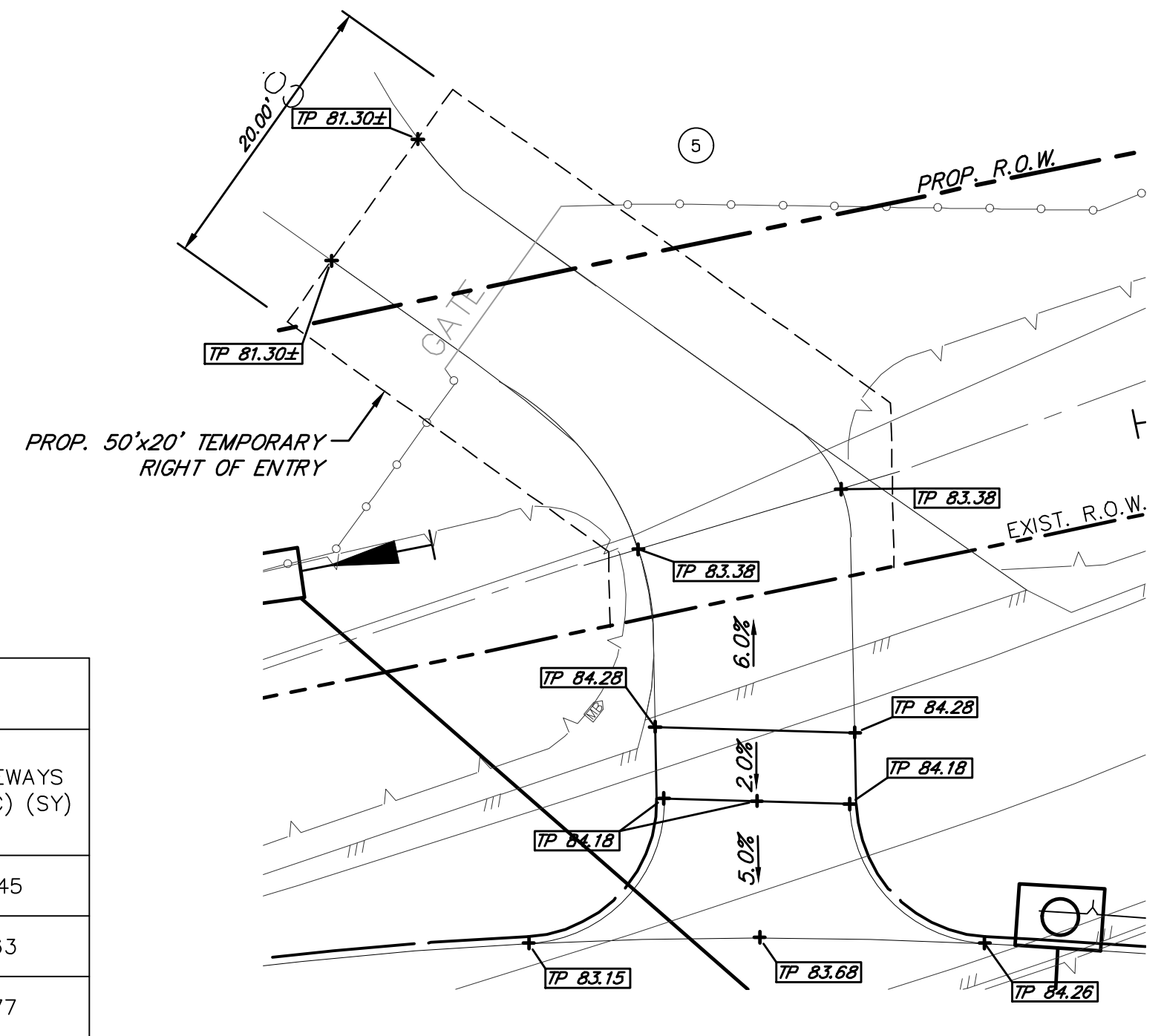
PROPOSED DRIVEWAY STA. 54+49.16
SCALE: 1"=10'



PROPOSED DRIVEWAY STA. 56+27.91
SCALE: 1"=10'



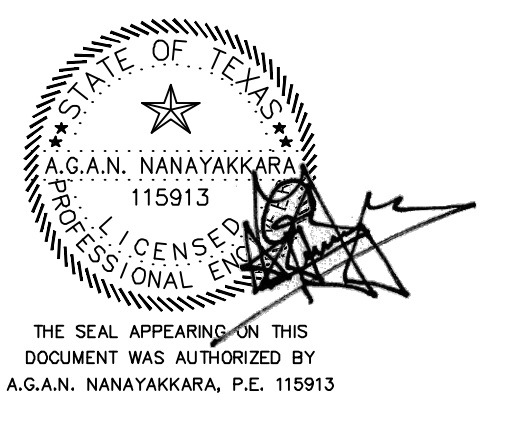
PROPOSED DRIVEWAY STA. 73+07.77
SCALE: 1"=10'



PROPOSED DRIVEWAY AT SKINNER STA. 11+20.44
SCALE: 1"=10'

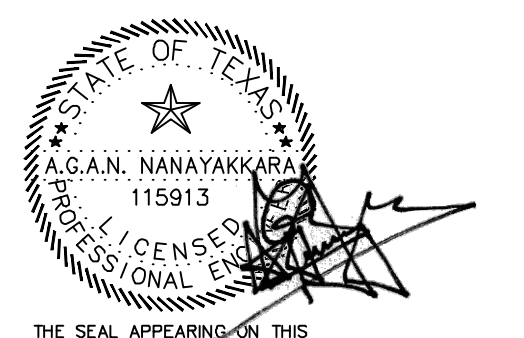
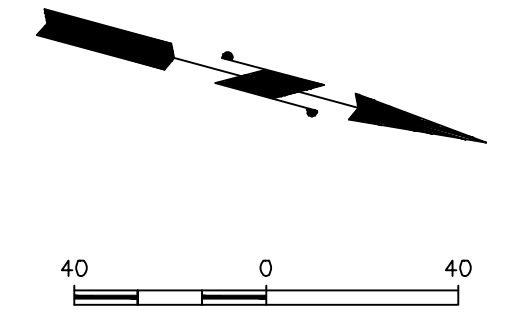
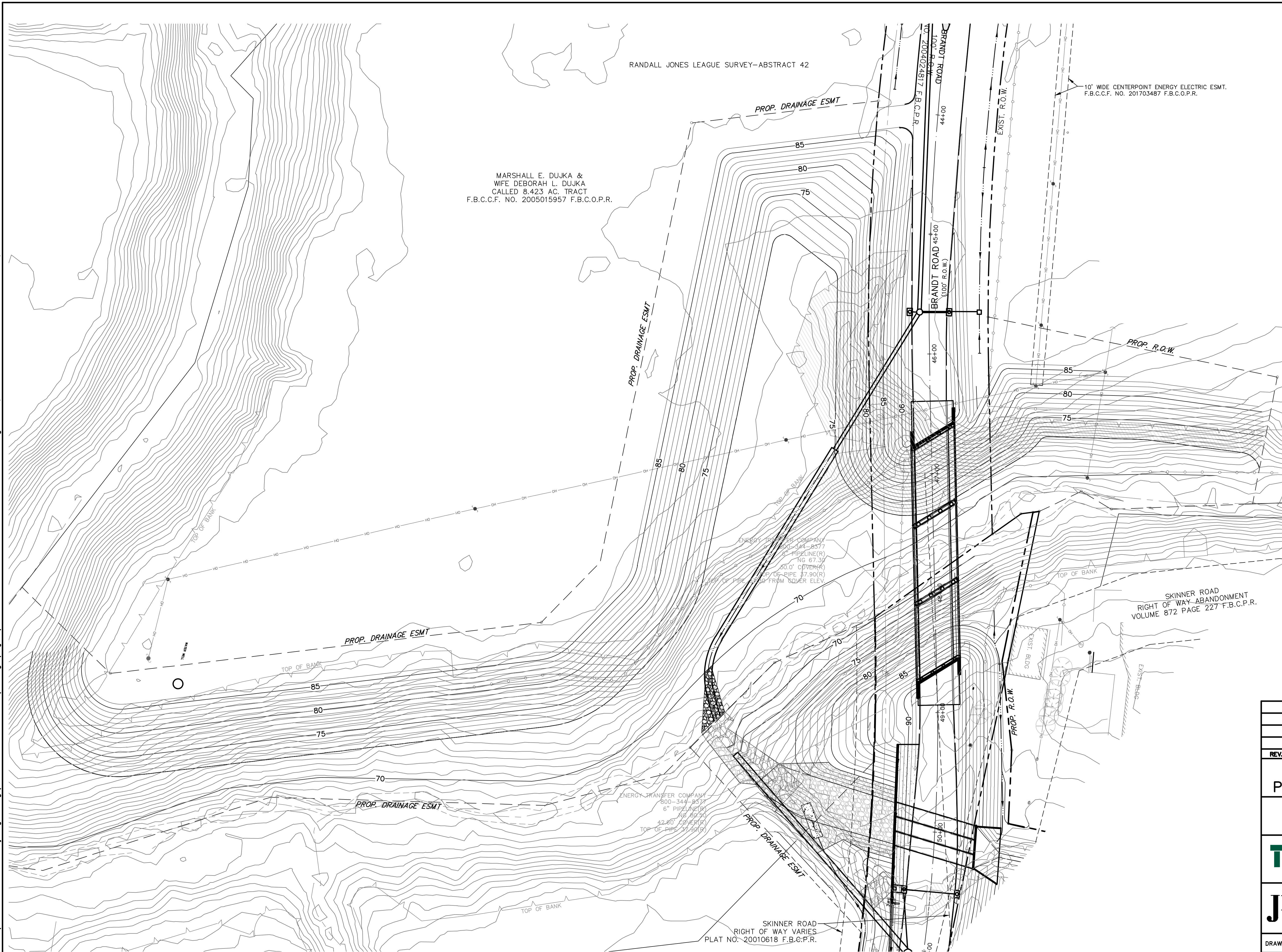
- LEGEND**
- TP 54.00 TOP OF PAVEMENT
 - 1.5% SLOPE ARROW
 - 4 DRIVEWAY NUMBER

SUMMARY OF DRIVEWAY QUANTITIES													
ROADWAY P&P SHEET	DRIVEWAY NO	CENTERLINE STATION	WIDTH (FT)	LENGTH UP TO R.O.W. (FT)	LENGTH BEYOND R.O.W. (FT)	LT RADIUS (FT)	RT RADIUS (FT)	ELEV AT EDGE OF PVMT	ELEV AT R.O.W.	ELEV AT END OF TCE	ELEV AT WITHIN TCE	SLOPE (%)	DRIVEWAYS (CONC) (SY)
PP06	1	53+59.70	12	33	72	10	10	87.50	87.02	82.70	87.02	+5.00% FOR 10', +2.00% FOR 5', -6.0% FOR 105'	145
PP06	2	54+49.16	12	32	11	10	10	87.80	87.38	86.70	87.38	+5.00% FOR 10', +2.00% FOR 5', -6.00% FOR 43'	63
PP08	3	56+27.91	12	30	29	10	10	87.73	87.43	85.70	87.43	+5.00% FOR 10', +2.00% FOR 5', -6.00% FOR 59'	77
PP11	4	73+07.77	24	30	30	10	10	88.08	87.78	86.16	87.78	+5.00% FOR 10', -5.00% FOR 10', -5.00% FOR 45'	167
PP17	5	11+20.44	14	30	10	10	10	83.68	83.38	81.30	83.38	+5.00% FOR 10', +2.00% FOR 5', -6.00% FOR 50'	92


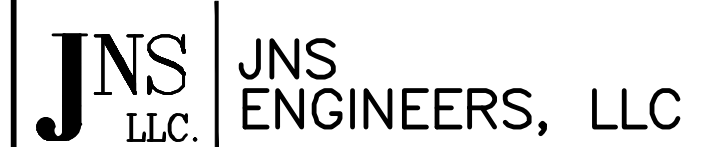


REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
DRIVEWAY DESIGN			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 10'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET IPO3	

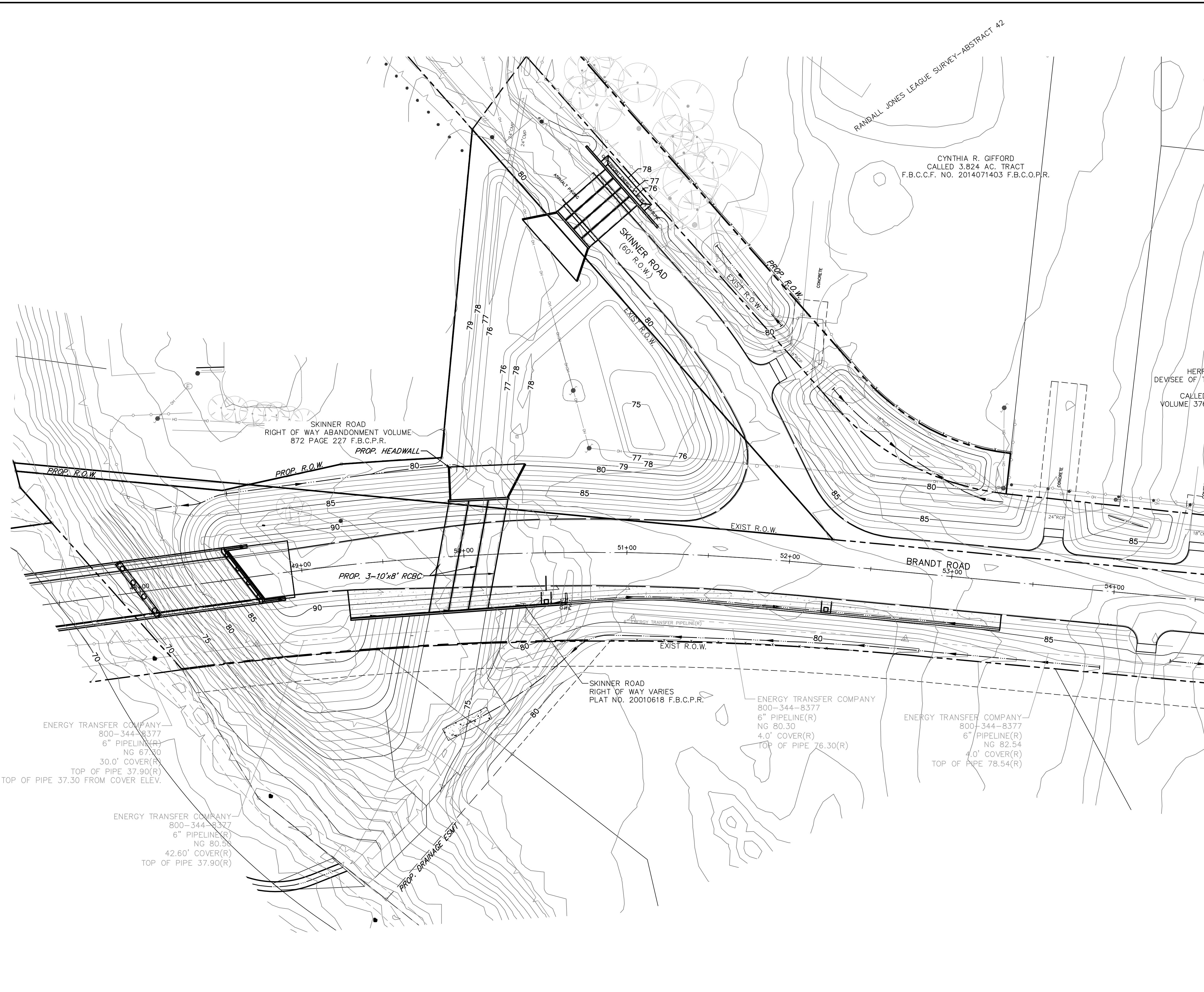
F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\GR01 PROPOSED CUT AND FILL AT JONES CREEK.dwg Feb 17, 2023-10:41am Terra Associates Inc., Thanh Dao



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913 ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD PROPOSED CUT AND FILL AT JONES CREEK			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 40'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET GR01	

F:\Clients\Fort_Band_County_Engineering\0522-1801_Brandt_Road\Drawings\Seg_2\GR02_PROPOSED CUT AND FILL AT SKINNER ROAD.dwg Feb 17, 2023-10:42am Terra Associates Inc., Thanh Dao



RANDALL JONES LEAGUE SURVEY-ABSTRACT 42

CYNTHIA R. GIFFORD
CALLED 3.824 AC. TRACT
F.B.C.C.F. NO. 2014071403 F.B.C.O.P.R.

HERRIECE PAYNE &
DEVISEE OF THE ESTATE OF HENRY
PAYNE
CALLED 7.0 AC. TRACT
VOLUME 376 PAGE 48 F.B.C.D.R.

SKINNER ROAD
RIGHT OF WAY ABANDONMENT VOLUME
872 PAGE 227 F.B.C.P.R.

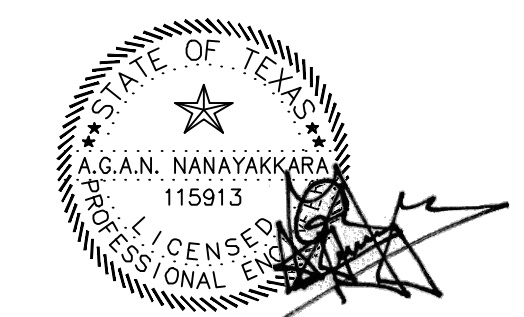
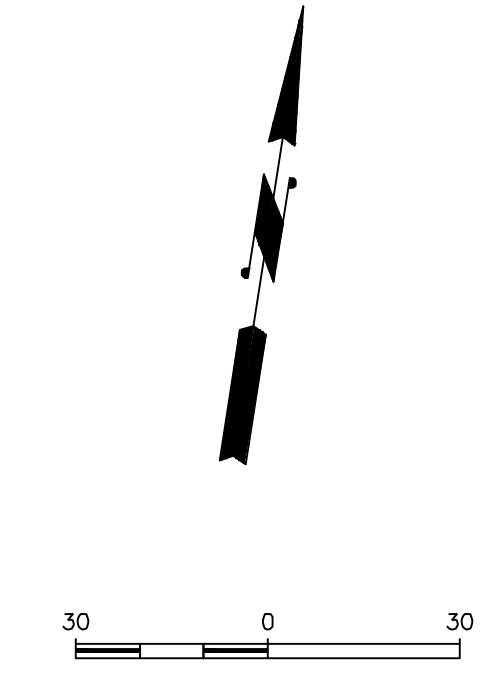
SKINNER ROAD
RIGHT OF WAY VARIES
PLAT NO. 20010618 F.B.C.P.R.

ENERGY TRANSFER COMPANY
800-344-8377
6" PIPELINE(R)
NG 80.30
4.0' COVER(R)
TOP OF PIPE 76.30(R)

ENERGY TRANSFER COMPANY
800-344-8377
6" PIPELINE(R)
NG 82.54
4.0' COVER(R)
TOP OF PIPE 78.54(R)

ENERGY TRANSFER COMPANY
800-344-8377
6" PIPELINE(R)
NG 67.30
30.0' COVER(R)
TOP OF PIPE 37.90(R)
TOP OF PIPE 37.30 FROM COVER ELEV.

ENERGY TRANSFER COMPANY
800-344-8377
6" PIPELINE(R)
NG 80.58
42.60' COVER(R)
TOP OF PIPE 37.90(R)

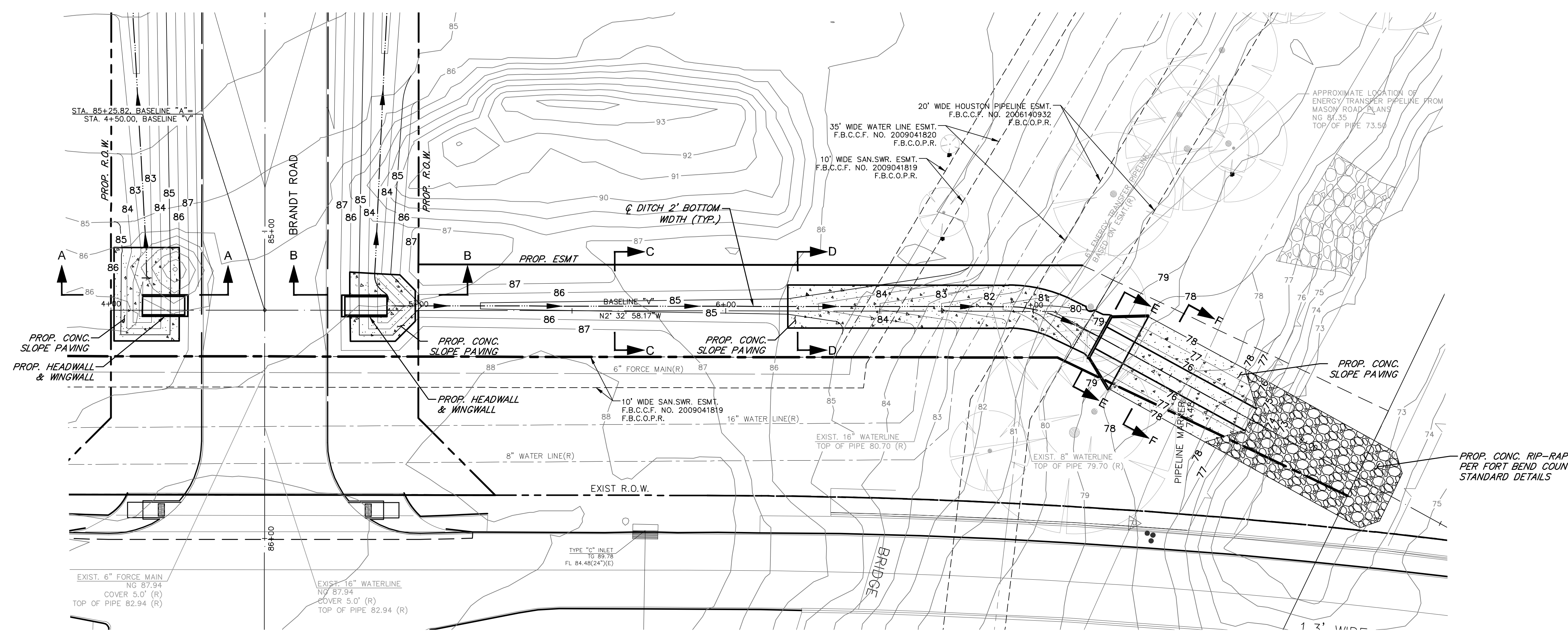


THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913 ON FEBRUARY 17, 2023

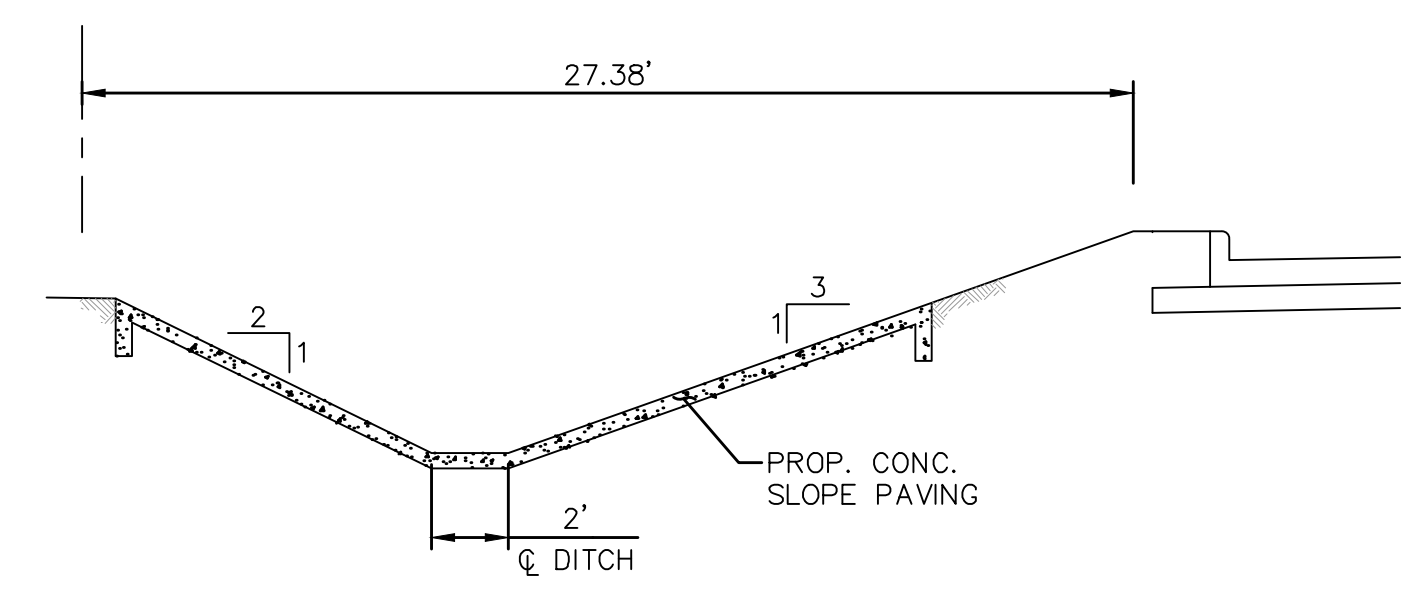
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
PROPOSED CUT AND FILL AT SKINNER ROAD			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: 1" = 30'	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET GR02

722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.B.P.E. FIRM
REGISTRATION NO. 11653

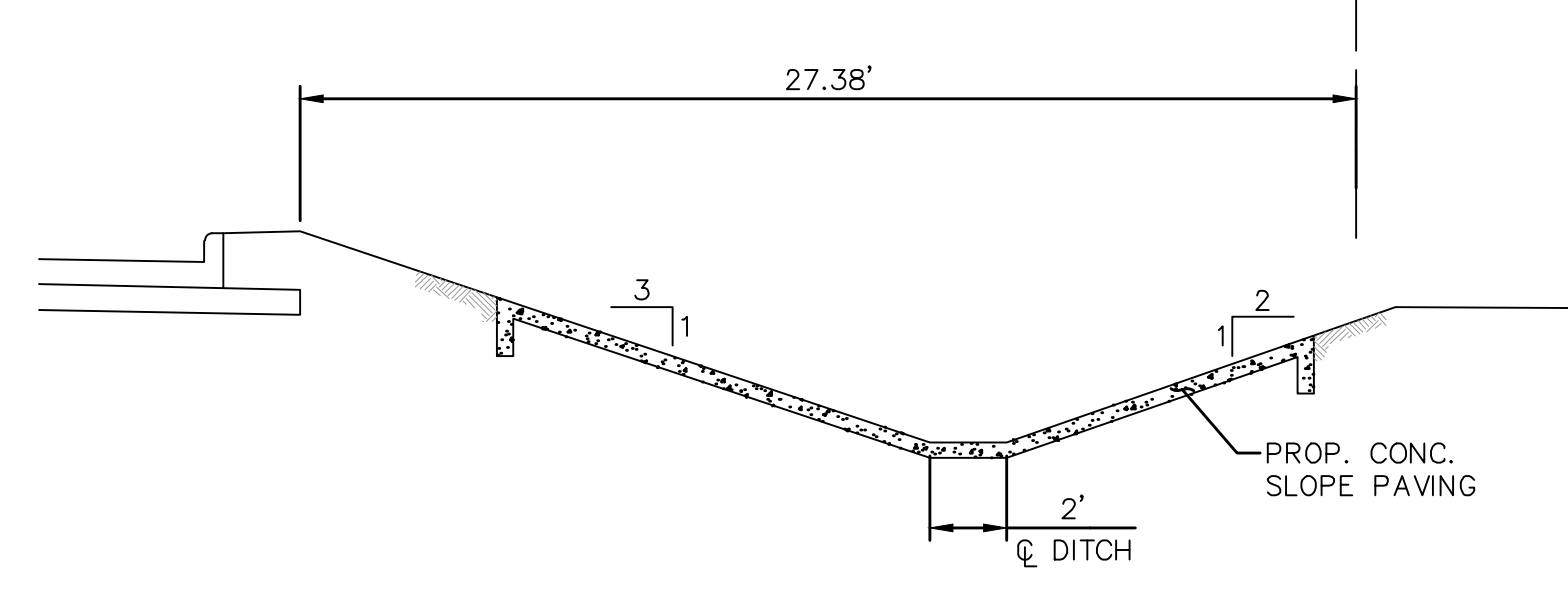
F:\Clients\Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\GR06 OUTFALL.dwg Feb 17, 2023-10:42am Terra Associates Inc., Thanh Dao



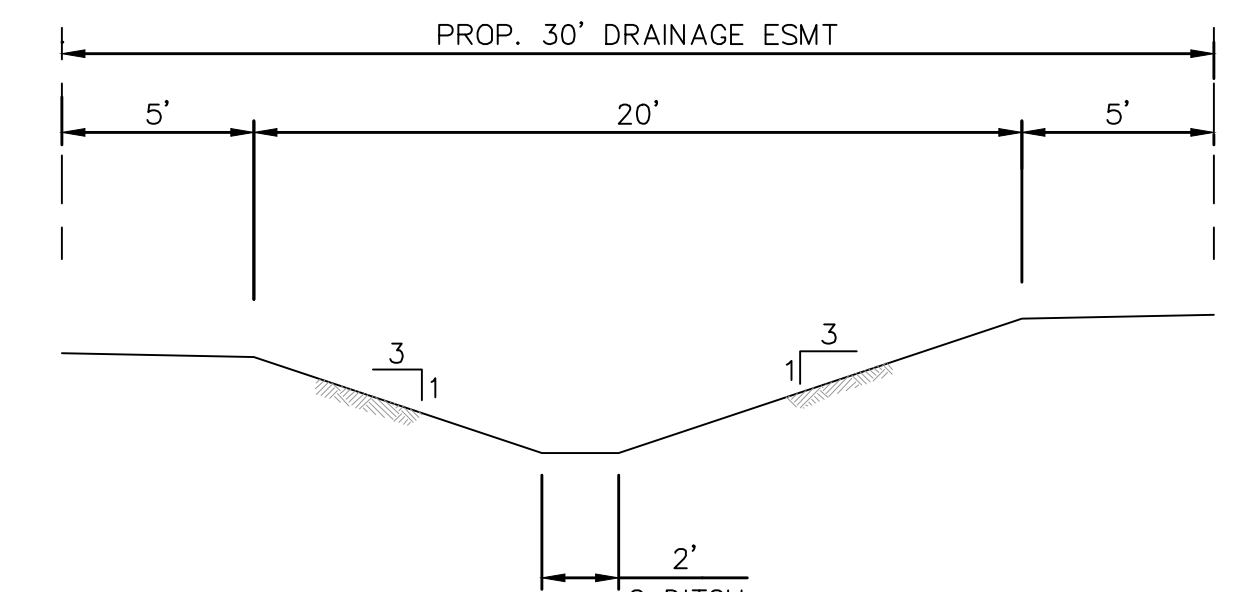
MASON ROAD
(120' R.O.W.)
F.B.C.C.F. NO. 2012090637 F.B.C.P.R.



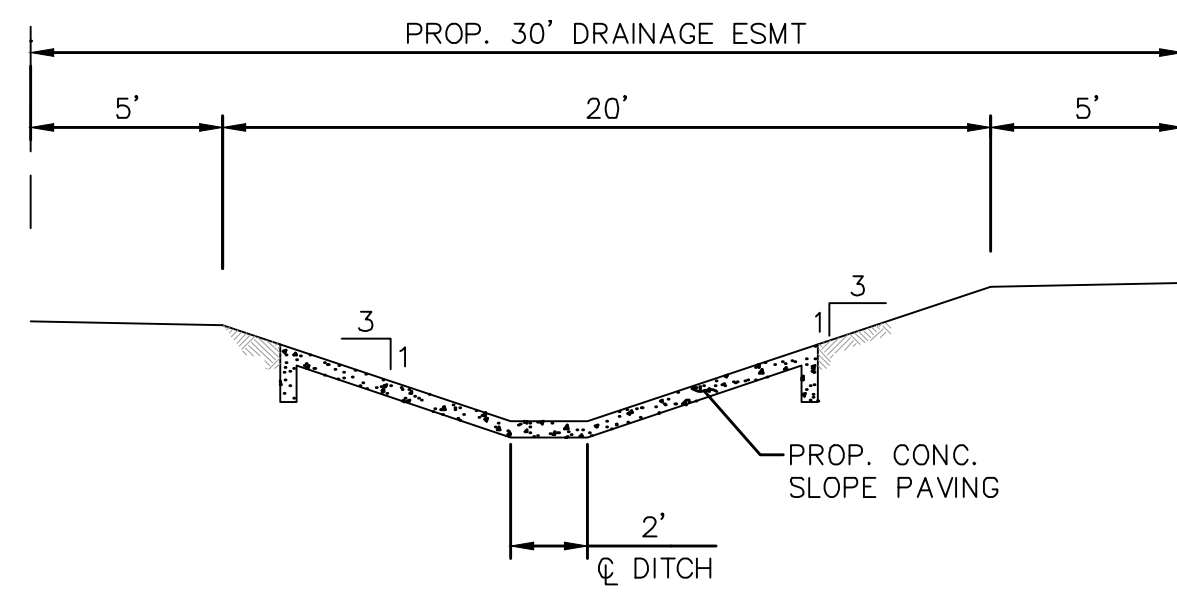
SECTION A-A
SCALE: N.T.S.



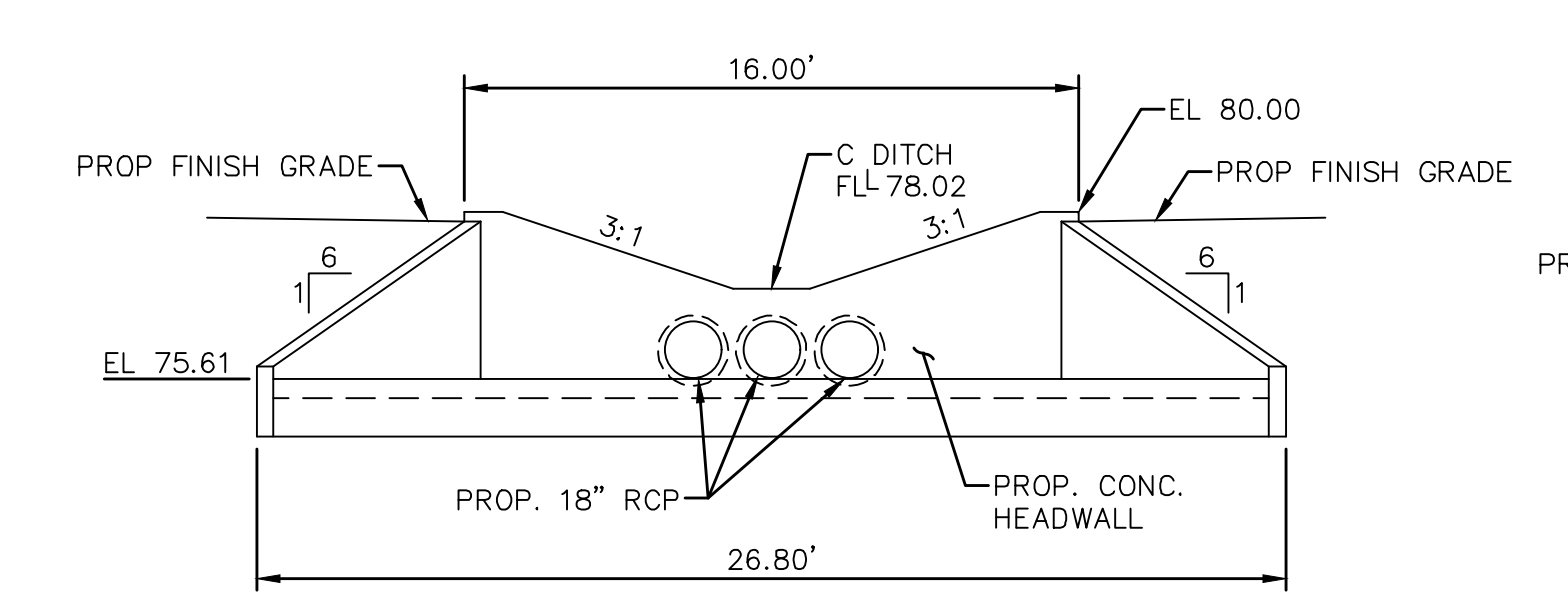
SECTION B-B
SCALE: N.T.S.



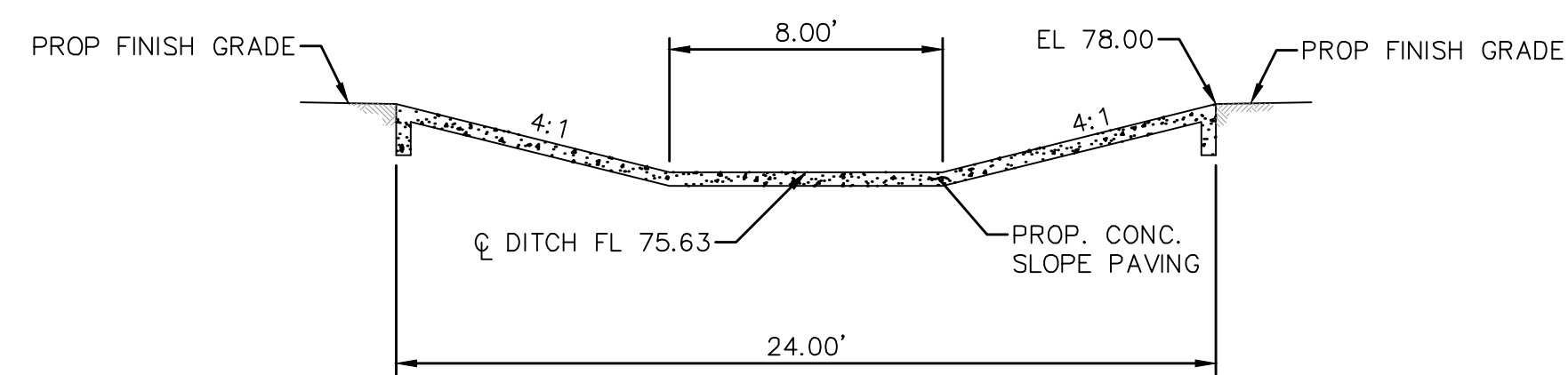
SECTION C-C
SCALE: N.T.S.



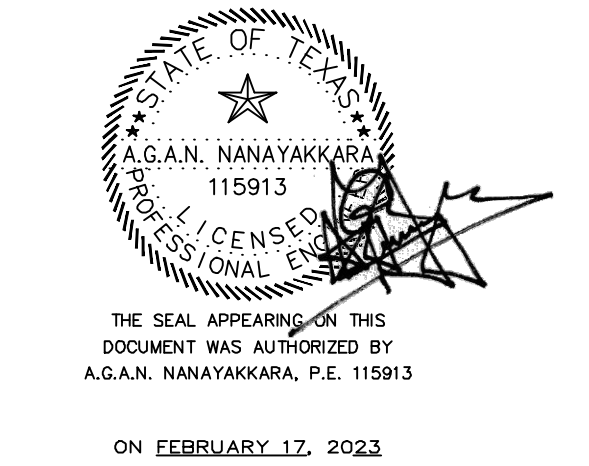
SECTION D-D
SCALE: N.T.S.



SECTION E-E
SCALE: N.T.S.

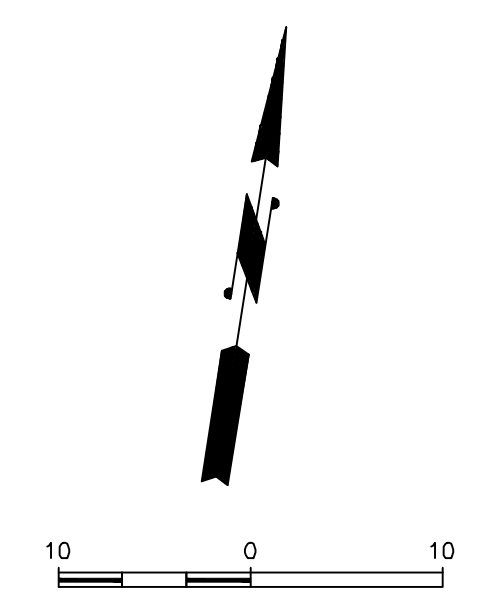
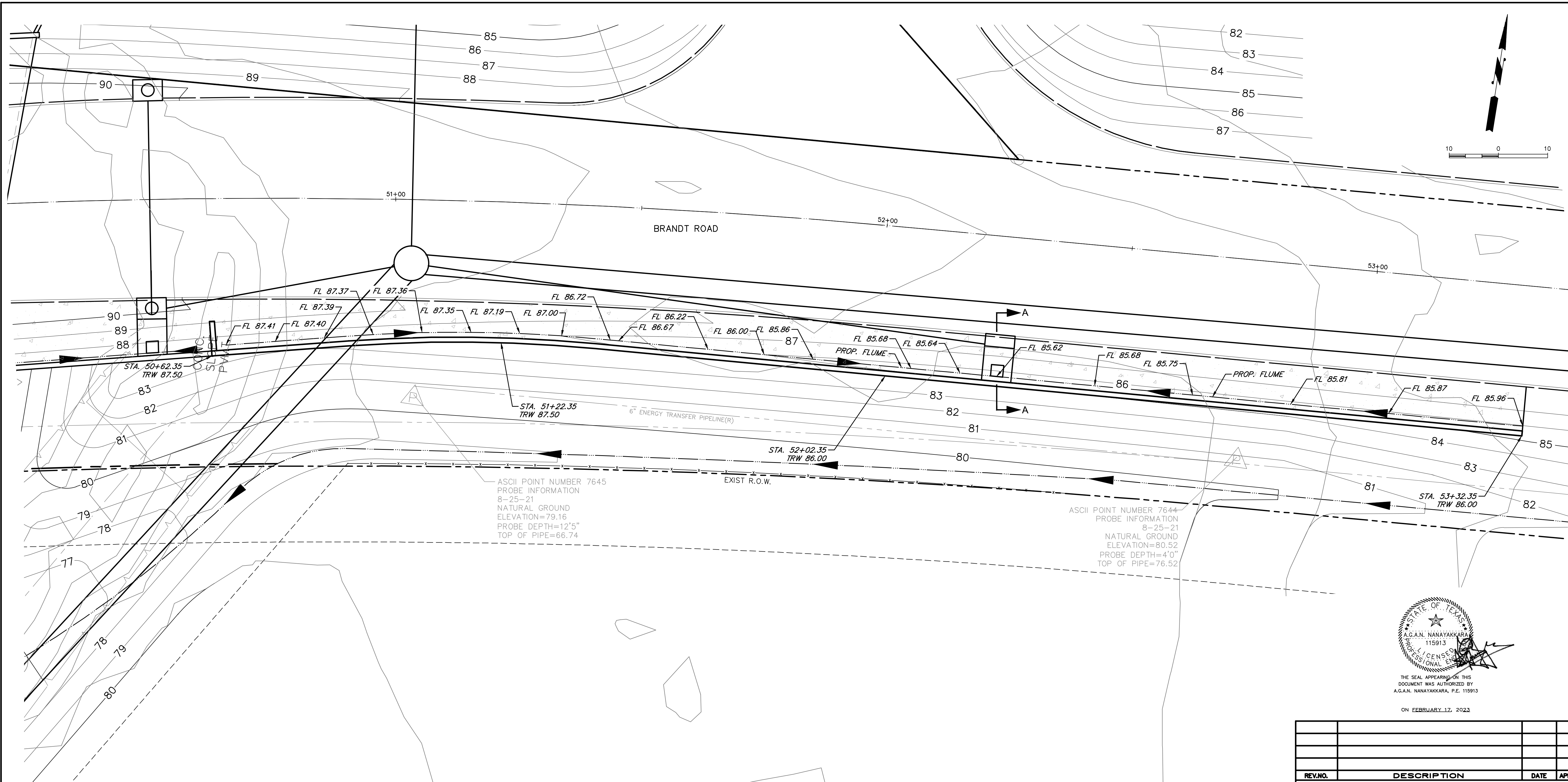


SECTION F-F
SCALE: N.T.S.



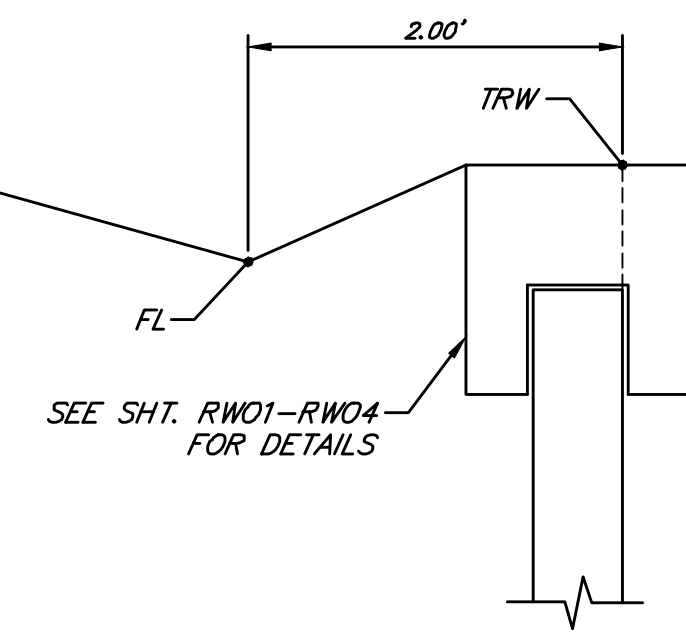
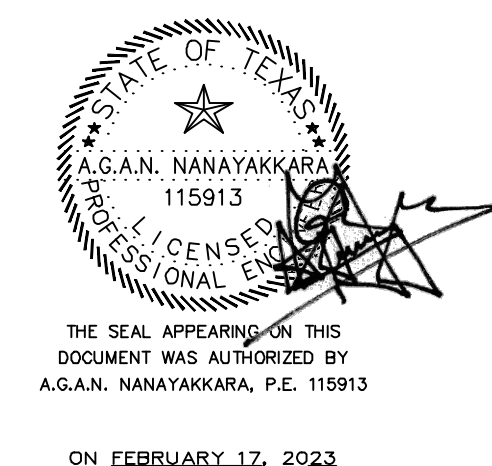
REVNO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD PROPOSED GRADING AT PROPOSED DRAINAGE EASEMENT			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.		SCALE: 1" = 20'	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET GR03

F:\Clients\0522-Fort Bend County_Engineering\0522-1801 Brandt Road\Drawings\Seg 2\GR04 PROPOSED GRADING FOR RETAINING WALL.dwg Feb 17, 2023-10:42am Terra Associates Inc., Thanh Dao



ASCII POINT NUMBER 7645
 PROBE INFORMATION
 8-25-21
 NATURAL GROUND
 ELEVATION=79.16
 PROBE DEPTH=12'5"
 TOP OF PIPE=66.74

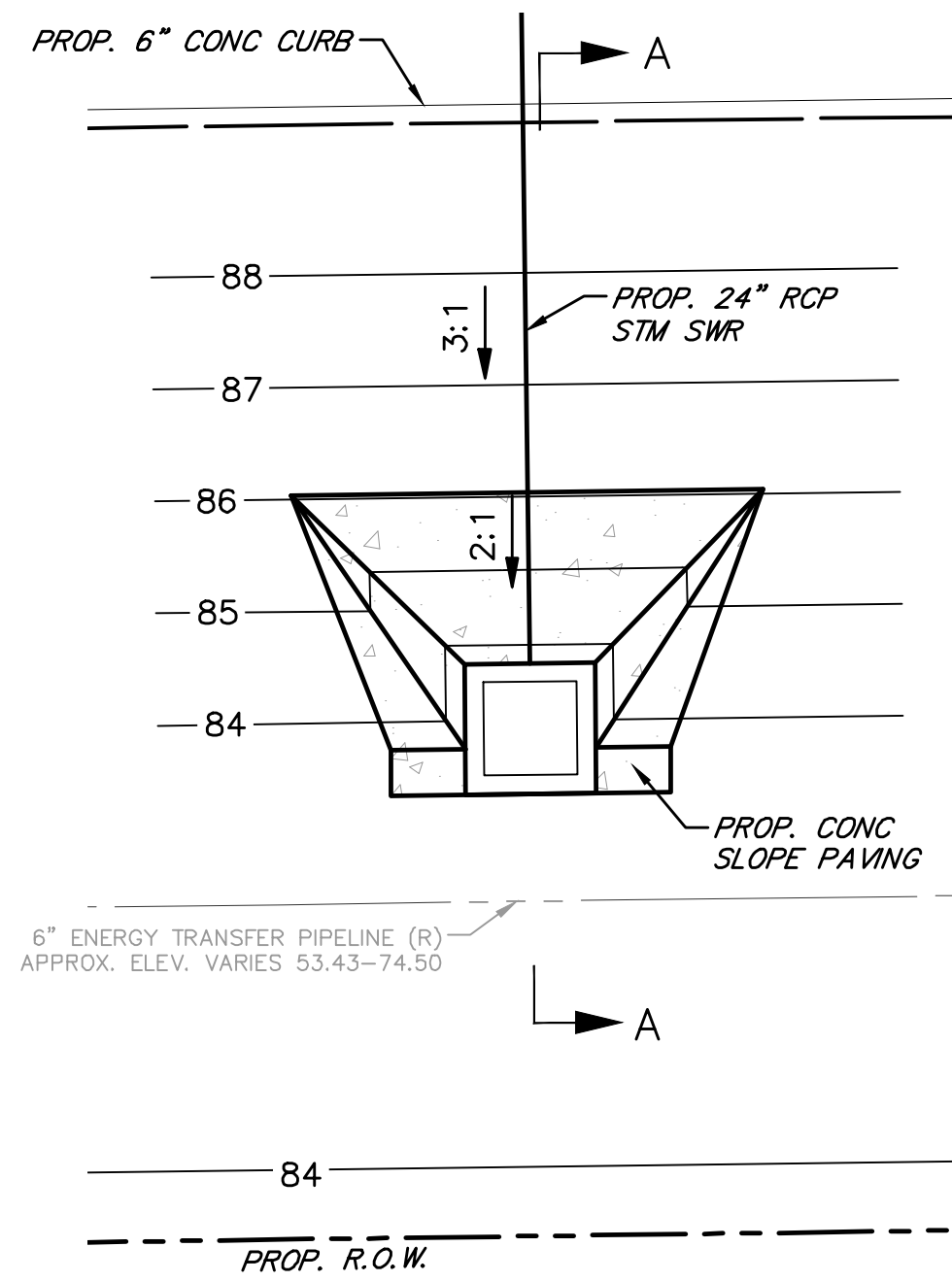
ASCII POINT NUMBER 7644
 PROBE INFORMATION
 8-25-21
 NATURAL GROUND
 ELEVATION=80.52
 PROBE DEPTH=4'0"
 TOP OF PIPE=76.52



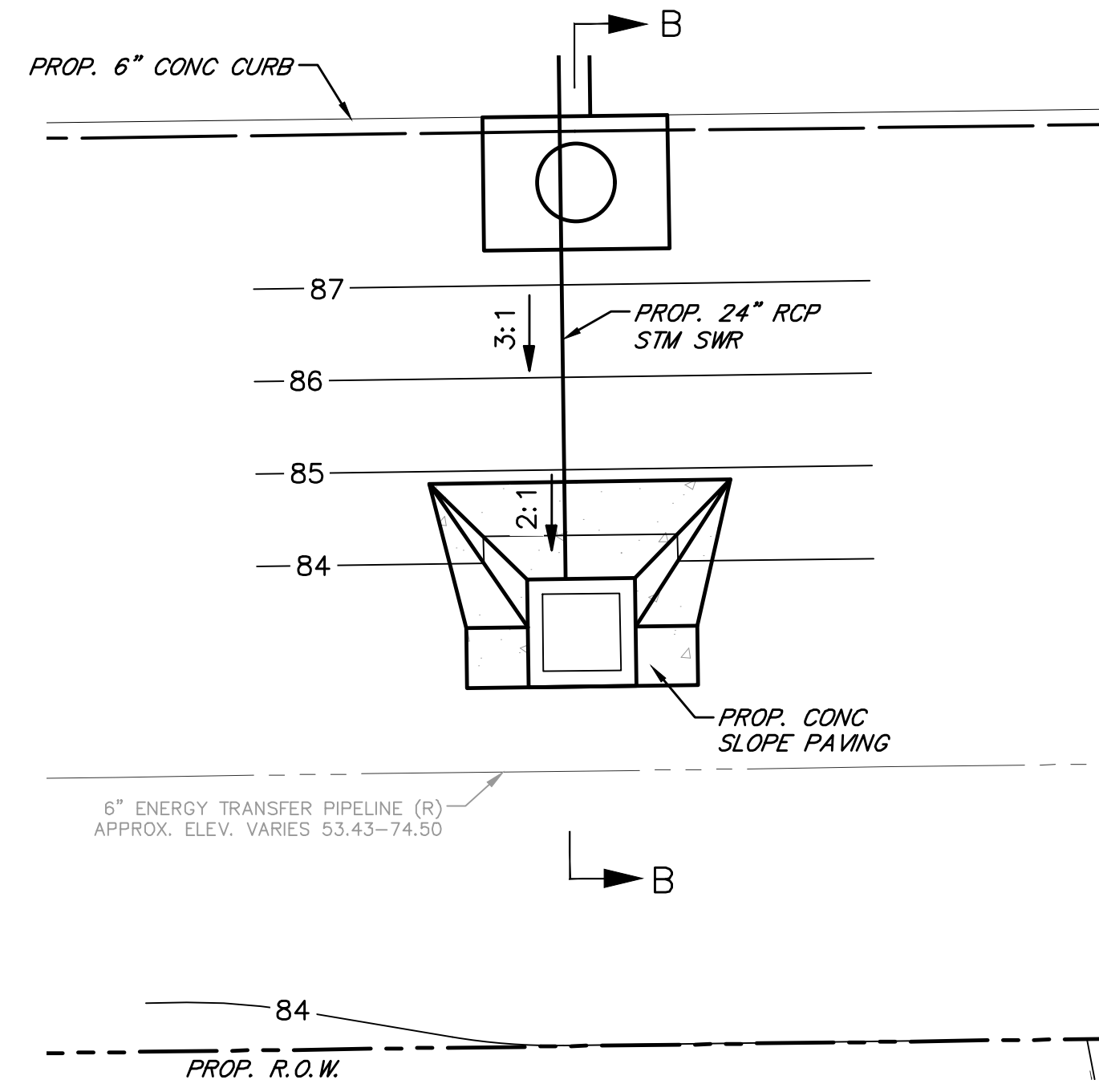
SECTION A-A
 SCALE: N.T.S.

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
PROPOSED GRADING FOR RETAINING WALL			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 10'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET GR04	

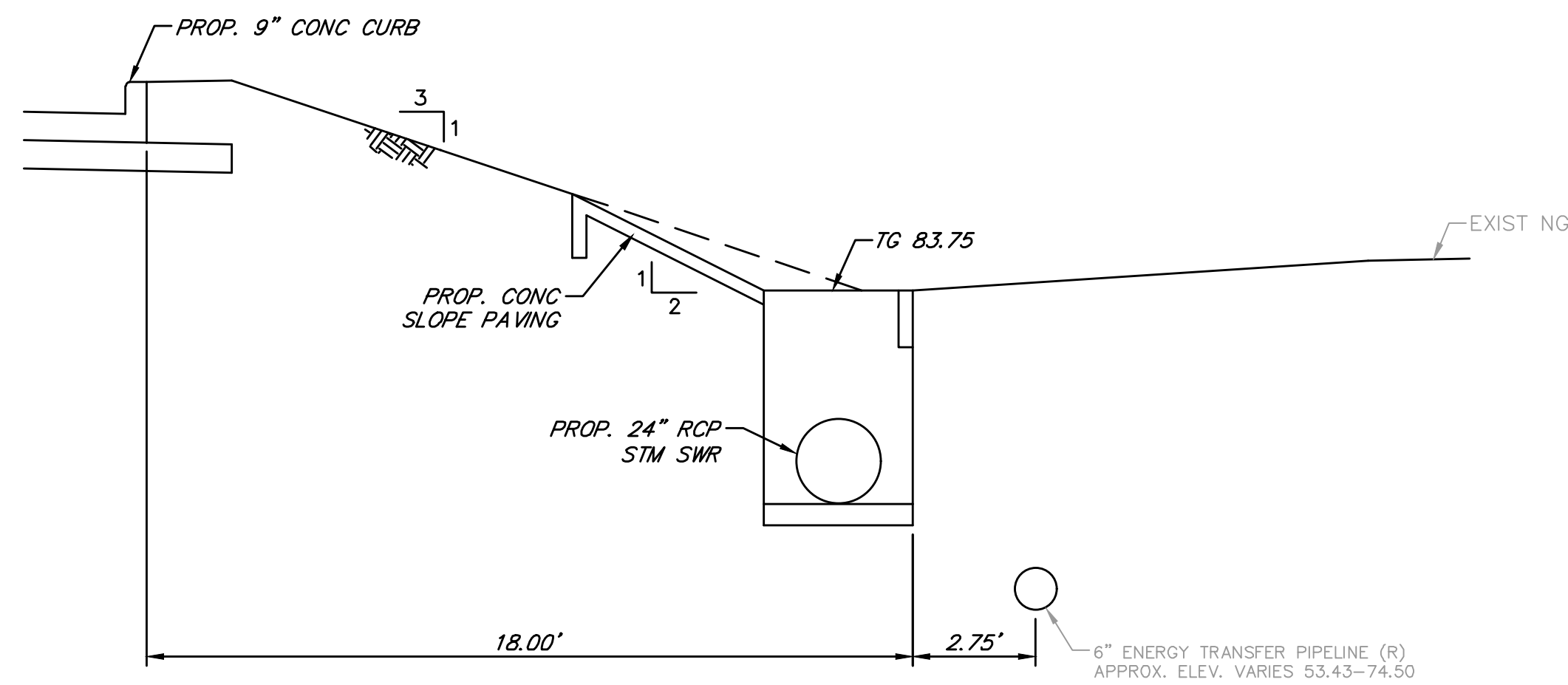
F:\Clients\Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\GR05 PROPOSED GRADING MODIFIED TYPE A INLET.dwg Feb 17, 2023-10:42am Terra Associates Inc., Thanh Dao



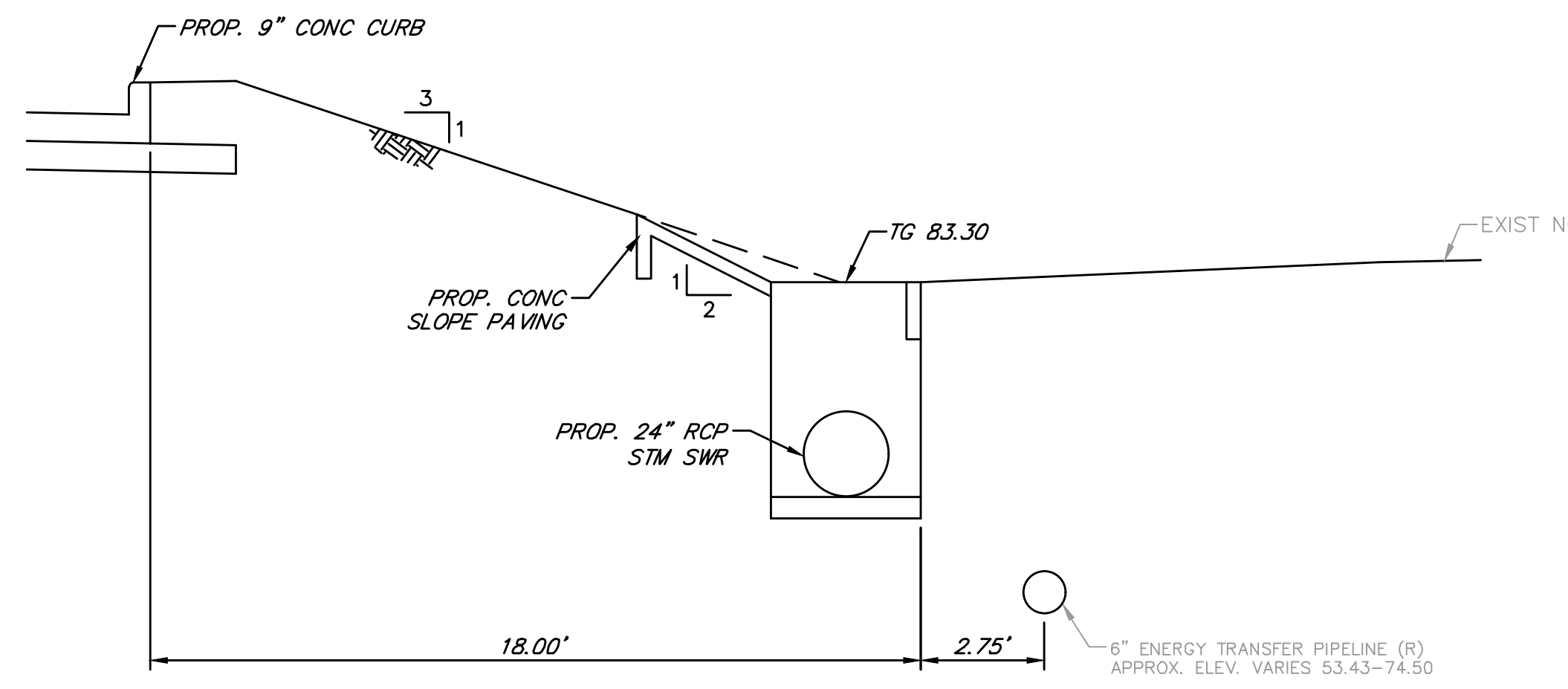
MODIFIED TYPE "A" AT STA. 54+80
SCALE: 1" = 5'



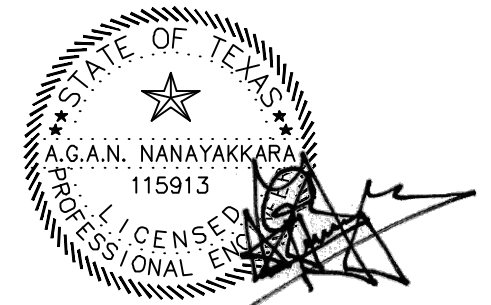
MODIFIED TYPE "A" AT STA. 58+01
SCALE: 1" = 5'



SECTION A-A
NTS



SECTION B-B
NTS



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913

ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
PROPOSED GRADING MODIFIED TYPE "A" INLET			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 5'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET GR05	

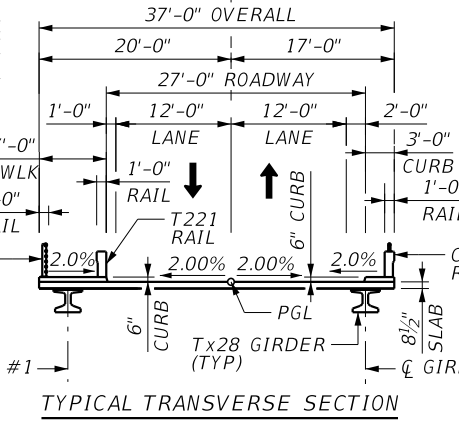
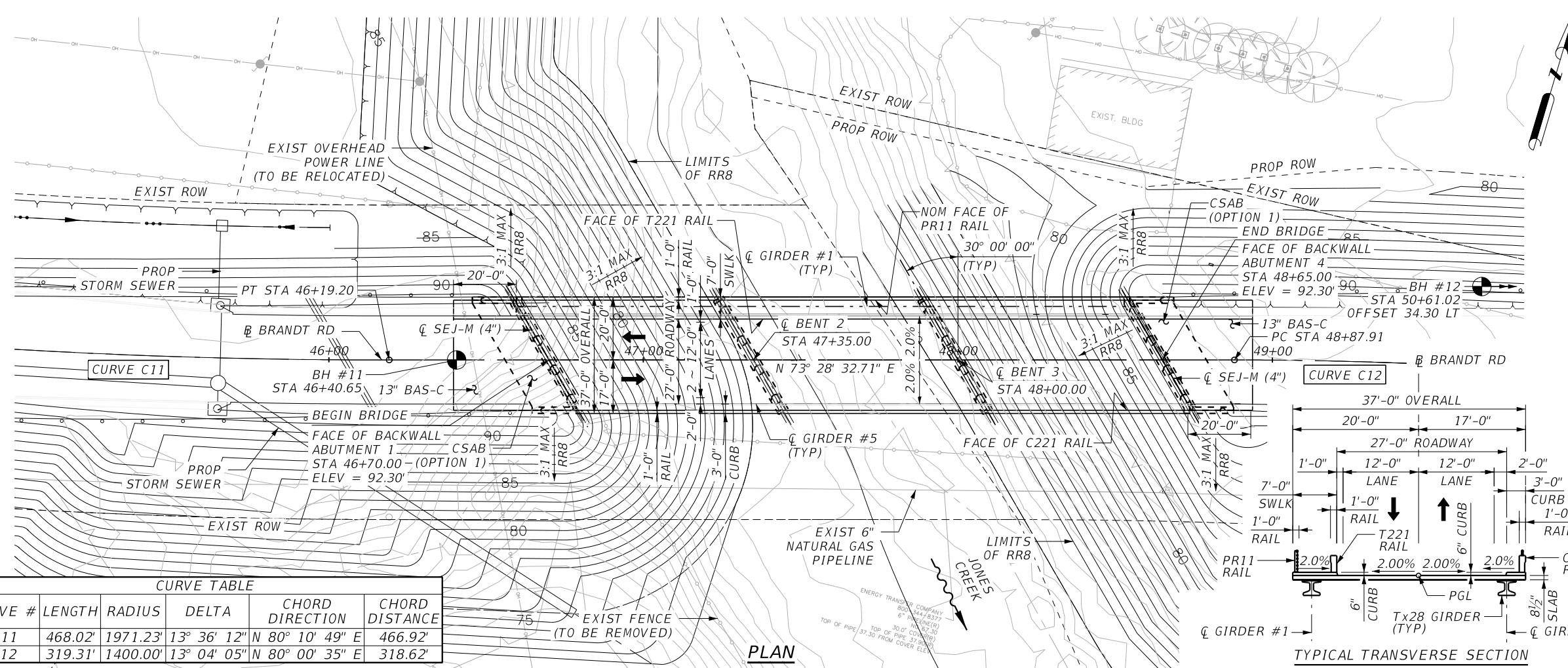
GENERAL NOTES

- DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (8TH EDITION) (HL-93 LOADING).
- UTILITIES SHOWN ARE IN APPROXIMATE LOCATIONS. CONTRACTOR MUST VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION OR FABRICATION. CONTRACTOR MUST INFORM ENGINEER IN WRITING OF ANY CONFLICTS PRIOR TO BEGINNING CONSTRUCTION, ALLOWING TIME FOR UTILITY RELOCATION SHOULD A CONFLICT EXIST.
- SEE BORING LOG SHEETS FOR TEST HOLE DATA.
- SEE "CSAB" STANDARD FOR CEMENT STABILIZED ABUTMENT BACKFILL DETAILS.
- GIRDER END CONDITIONS:
D - DENOTES DOWEL AT EXTERIOR GIRDER
BLANK - DENOTES NO DOWEL
- THE "H" VALUES SHOWN ARE ESTIMATED COLUMN HEIGHTS. THE CONTRACTOR IS RESPONSIBLE FOR CALCULATION OF THE ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS.
- SEE ROADWAY PLAN AND PROFILE SHEETS FOR DETAILED CROSS SLOPE INFORMATION.

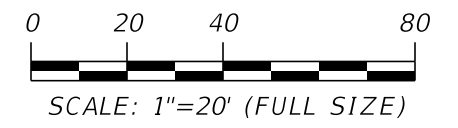
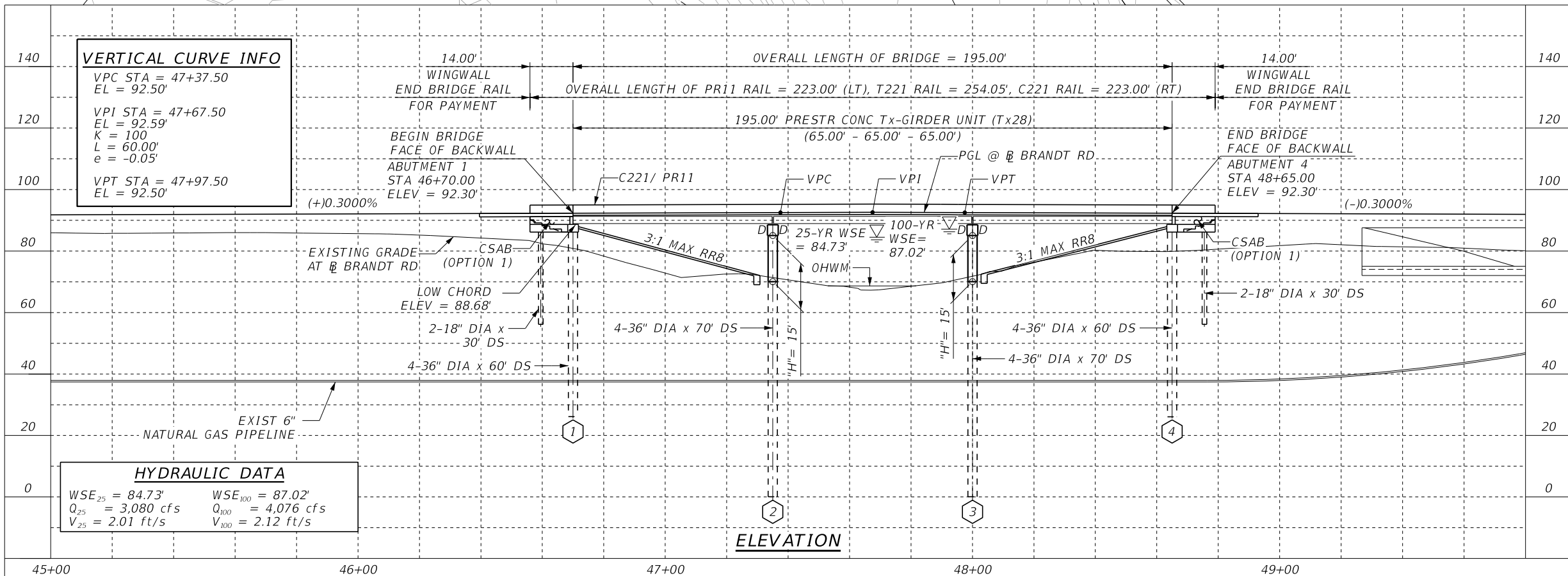
BORING HOLE

ALL ABUTMENTS AND BENTS ARE AT A BEARING OF S 46° 31' 27.29" E

JONES CREEK BRIDGE
DESIGN SPEED = 40 MPH
FUNCT CLASS = RURAL ARTERIAL COLLECTOR



CURVE TABLE				
CURVE #	LENGTH	RADIUS	DELTA	CHORD DIRECTION
C11	468.02'	1971.23'	13° 36' 12"	N 80° 10' 49" E
C12	319.31'	1400.00'	13° 04' 05"	N 80° 00' 35" E



STATE OF TEXAS
 RICHARD A. PARDO
 144068
 LICENSED PROFESSIONAL ENGINEER
 12/9/2022
 HL-93 LOADING

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD FROM McCRARY RD. TO MASON RD.			
BRANDT RD AT JONES CREEK BRIDGE LAYOUT			
1225 NORTH LOOP WEST SUITE 220 HOUSTON, TEXAS 77008 (832) 494-3800		Firm Registration No. F-10161	
DRAWN BY: F.P.	SCALE: AS NOTED	PROJECT No. 0522-1801	CONTRACT: 1
CHECKED BY: T.F.	DATE: JULY, 2019	SHEET BR1 OF 49	

\\pusschrf101\j-jobs\2113_Terra_Brandt_Lane\06.00_Design\06.04.07_Bridges\2113_BDG_PLN_01_OPT_2.dgn

\\psscshrf101\j-l-jobs\2113_Terro_Brandt_Lone\06.00_Design\06.04_Sheets\06.04.07_Bridges\BEC001.dgn

SUMMARY OF ESTIMATED QUANTITIES															
BID ITEM NUMBER	0400	0416	0416	0420	0420	0420	0422	0422	0422	0425	0442	0450	0450	0450	0454
	6005	6001	6004	6013	6029	6037	6001	6013	6015	6035	6007	6004	6030	6103	6018
JONES CREEK BRIDGE AT BRANDT RD	CEM STABIL BKFL	DRILL SHAFT (18 IN)	DRILL SHAFT (36 IN)	CL C CONC (ABUT)	CL C CONC (CAP)	CL C CONC (COLUMN)	REINF CONC SLAB	BRIDGE SIDEWALK	APPROACH SLAB	PRESTR CONC GIRDER (TX28)	STR STEEL (MISC NON - BRIDGE)	RAIL (TY T221)	RAIL (TY C221)	RAIL (TY PR11)	SEALED EXPANSION JOINT (4 IN) (SEJ - M)
	CY	LF	LF	① CY	② CY	CY	SF	③ SF	CY	LF	④ LB	LF	LF	LF	LF
2 - ABUTMENTS	109	120	480	52.2											
2 - BENTS			560		38.4	31.4									
1 - 195.00' PRESTR CONC TX-GIRDER UNIT							7,215	2,541	82.9	967.10	145	254.1	223.0	223.0	65
TOTAL	109	120	1040	52.2	38.4	31.4	7,215	2,541	82.9	967.10	145	254.1	223.0	223.0	65

- ① QUANTITY INCLUDES SHEAR KEYS. SEE "ABUTMENT 1", "ABUTMENT 4", AND "IGSK" STANDARD FOR SHEAR KEY LOCATION, DETAILS AND NOTES.
- ② QUANTITY INCLUDES SHEAR KEYS. SEE "BENT 2-3" AND "IGSK" STANDARD FOR SHEAR KEY LOCATION, DETAILS AND NOTES.
- ③ QUANTITY INCLUDES SIDEWALK ON LEFT SIDE AND RAISED CURB ON RIGHT SIDE.
- ④ QUANTITIES ARE FOR BS-EJCP SIDEWALK COVER PLATE.

BEARING SEAT ELEVATIONS

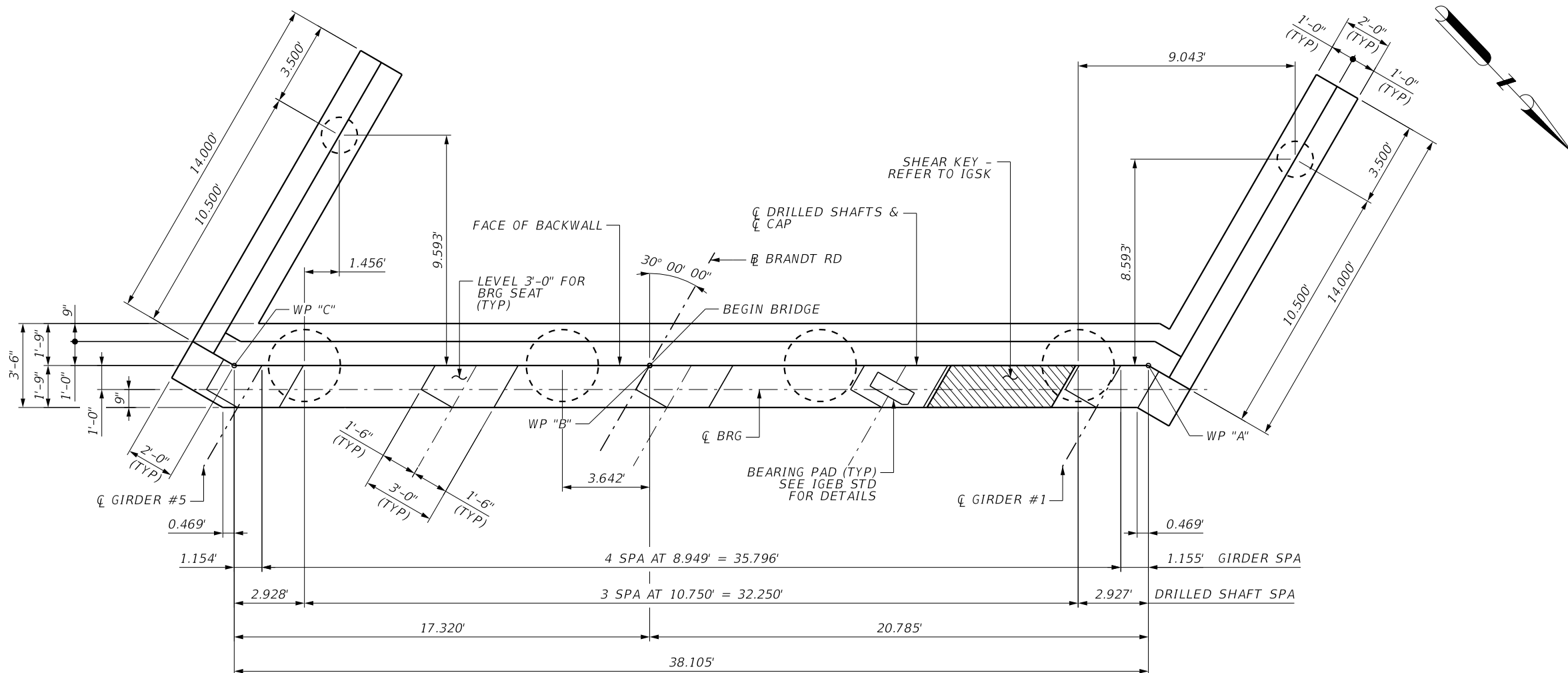
		GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5
ABUT 1	(FWD)	88.413	88.582	88.750	88.668	88.527
	(BK)	88.600	88.769	88.937	88.855	88.713
BENT 2	(FWD)	88.648	88.816	88.985	88.903	88.759
	(BK)	88.703	88.847	88.990	88.881	88.713
BENT 3	(FWD)	88.657	88.800	88.942	88.834	88.666
ABUT 4	(BK)	88.472	88.614	88.755	88.647	88.478



HL-93 LOADING

REV. NO.	DESCRIPTION	DATE	APP.
	BRANDT ROAD FROM McCRARY RD. TO MASON RD.		
ESTIMATED QUANTITIES & BEARING SEAT ELEVATIONS			
		1225 NORTH LOOP WEST SUITE 220 HOUSTON, TEXAS 77008 (832) 494-3800	
Firm Registration No. F-10161		PROJECT No. 0522-1801 CONTRACT: 1	
DRAWN BY: F.P.	SCALE: AS NOTED	PROJECT No. 0522-1801	
CHECKED BY: T.F.	DATE: JULY, 2019	CONTRACT: 1	
		SHEET BR2 OF 49	

\\pussachrf101\jobs\2113_Terro_Brandt_Lane\06.00_Design\06.04_Sheets\06.04.07_Bridges\BAD01.dgn



PLAN

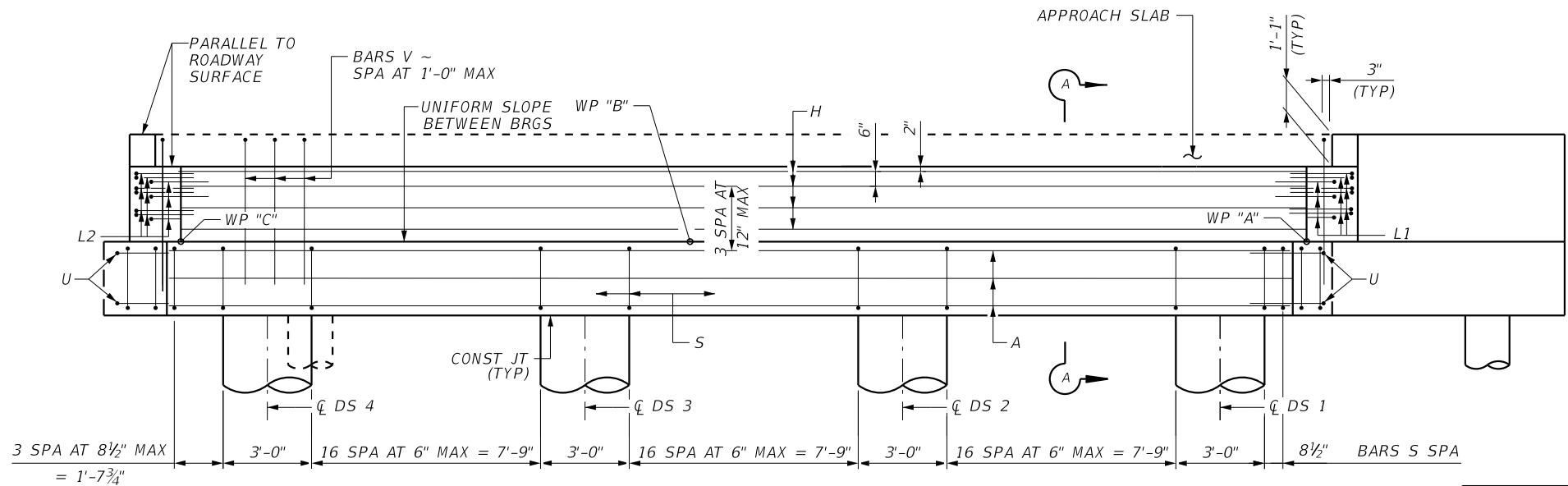
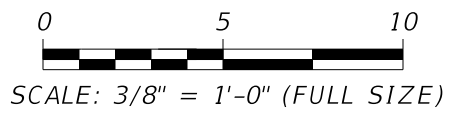
GENERAL NOTES

- DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (8TH EDITION) (HL-93 LOADING).
- SEE BRIDGE LAYOUT FOR HEADER SLOPE AND FOUNDATION TYPE, SIZE, AND LENGTH.
- SEE COMMON FOUNDATION DETAIL FD STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES NOT SHOWN.
- SEE CONCRETE RIPRAP (CRR) STANDARD SHEET FOR RIPRAP ATTACHMENT DETAILS.
- SEE APPLICABLE RAIL DETAILS FOR RAIL ANCHORAGE IN WINGWALLS.

MATERIAL NOTES

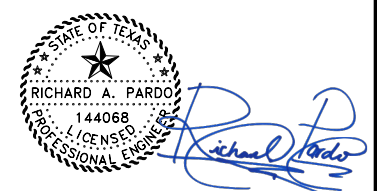
- PROVIDE CLASS "C" CONCRETE STRENGTH $f'_c=3,600$ psi.
- PROVIDE GRADE 60 REINFORCING STEEL.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.



ELEVATION
(LOOKING BACK STATION)

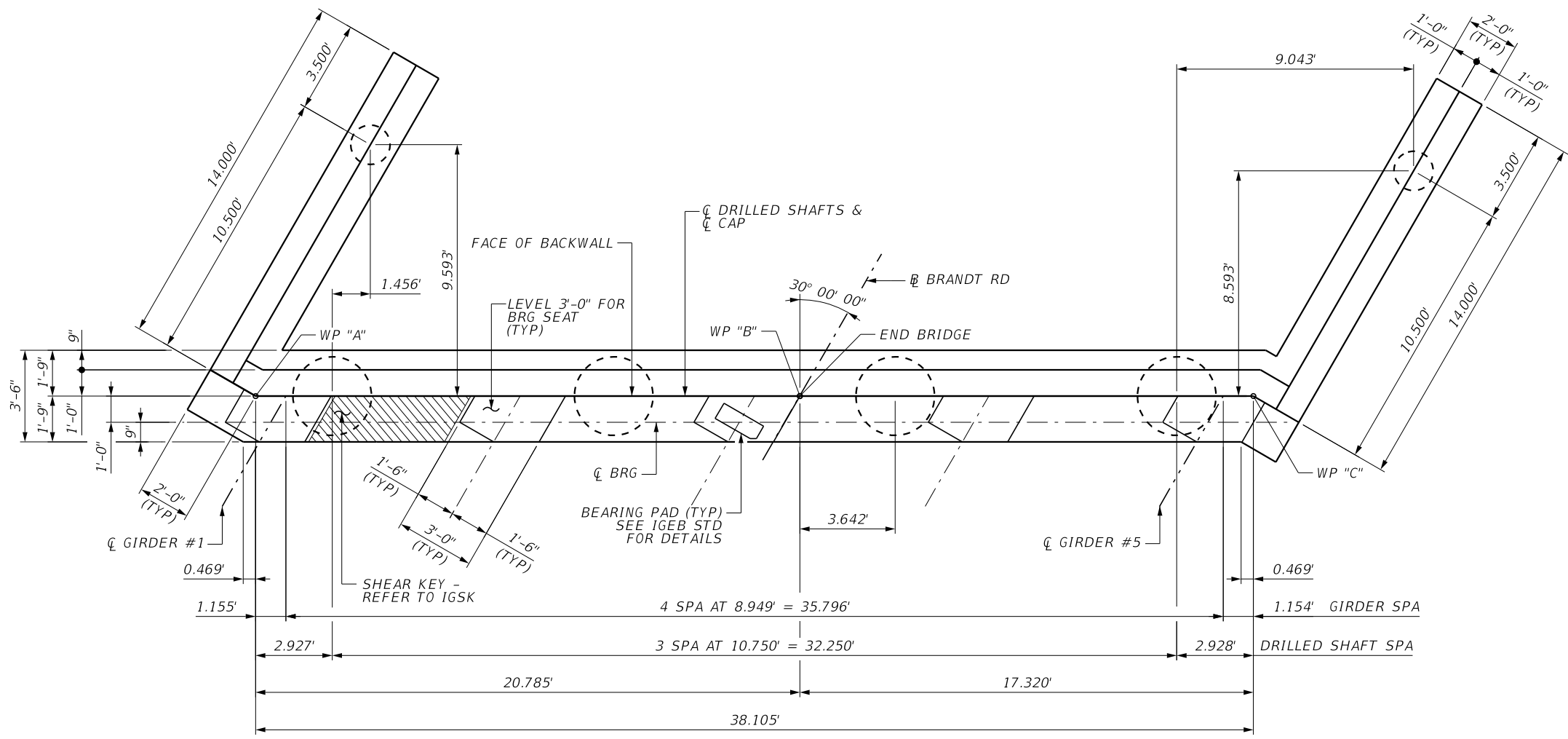
WORK POINT ELEVATIONS			
ABUT NO.	WP "A"	WP "B"	WP "C"
1	88.255	88.647	88.393



12/9/2022
HL-93 LOADING

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD FROM McCRARY RD. TO MASON RD.			
ABUTMENT 1			
		1225 NORTH LOOP WEST SUITE 220 HOUSTON, TEXAS 77008 (832) 494-3800	Firm Registration No. F-10161
DRAWN BY: F.P.	SCALE: AS NOTED	PROJECT No. 0522-1801	
CHECKED BY: T.F.	DATE: JULY, 2019	CONTRACT: 1	
		SHEET BR3 OF 49	

\\pussachrf101\jobs\2113_Terra_Brandt_Lone\06.00_Design\06.04_Sheets\06.04.07_Bridges\BAD02.dgn



PLAN

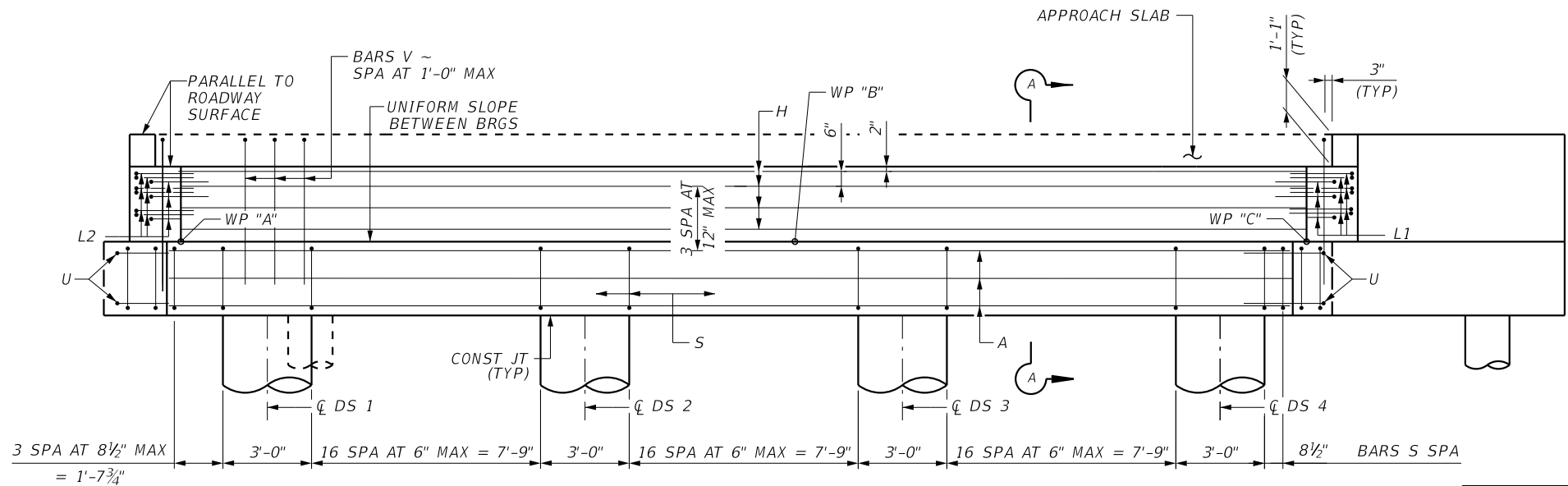
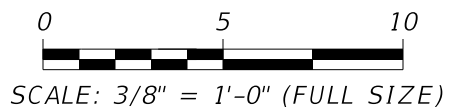
GENERAL NOTES

- DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (8TH EDITION) (HL-93 LOADING).
- SEE BRIDGE LAYOUT FOR HEADER SLOPE AND FOUNDATION TYPE, SIZE, AND LENGTH.
- SEE COMMON FOUNDATION DETAIL FD STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES NOT SHOWN.
- SEE CONCRETE RIPRAP (CRR) STANDARD SHEET FOR RIPRAP ATTACHMENT DETAILS.
- SEE APPLICABLE RAIL DETAILS FOR RAIL ANCHORAGE IN WINGWALLS.

MATERIAL NOTES

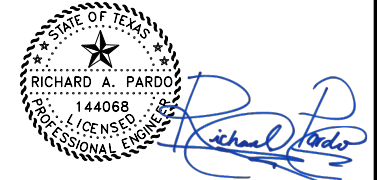
- PROVIDE CLASS "C" CONCRETE STRENGTH $f'_c=3,600$ psi.
- PROVIDE GRADE 60 REINFORCING STEEL.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.



ELEVATION
(LOOKING FORWARD STATION)

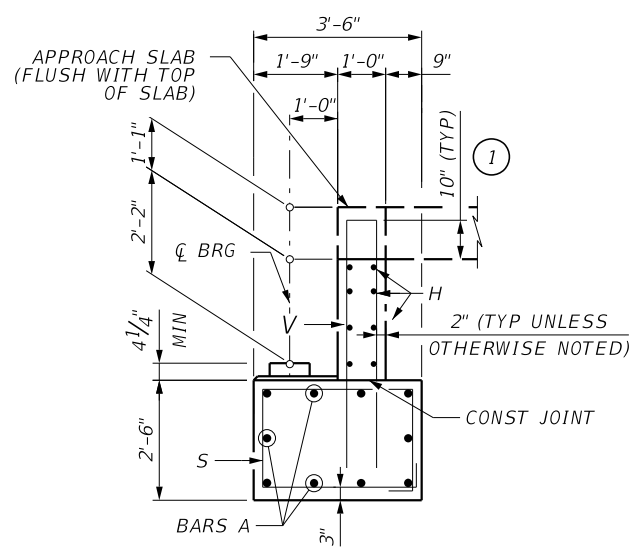
WORK POINT ELEVATIONS			
ABUT. NO.	WP "A"	WP "B"	WP "C"
4	88.338	88.647	88.320



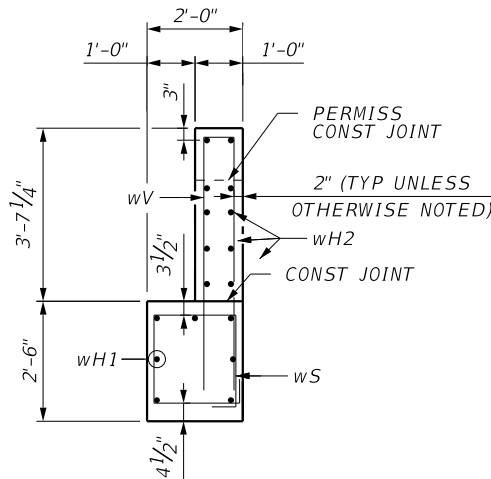
12/9/2022
HL-93 LOADING

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD FROM McCRARY RD. TO MASON RD.			
ABUTMENT 4			
		1225 NORTH LOOP WEST SUITE 220 HOUSTON, TEXAS 77008 (832) 494-3800	Firm Registration No. F-10161
DRAWN BY: F.P.	SCALE: AS NOTED	PROJECT No. 0522-1801	
CHECKED BY: T.F.	DATE: JULY, 2019	CONTRACT: 1	
		SHEET BR4 OF 49	

\\pusschrf101\jobs\2113_Terro_Brandt_Lone\06.00_Design\06.04_Sheets\06.04.07_Bridges\BAD03.dgn

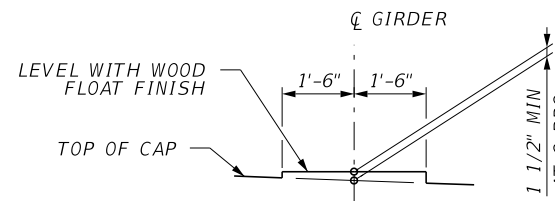


SECTION A-A



SECTION B-B

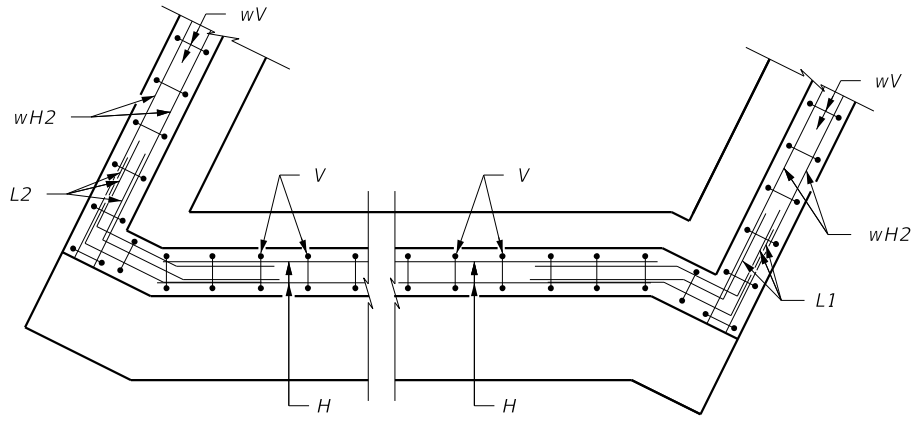
① INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE



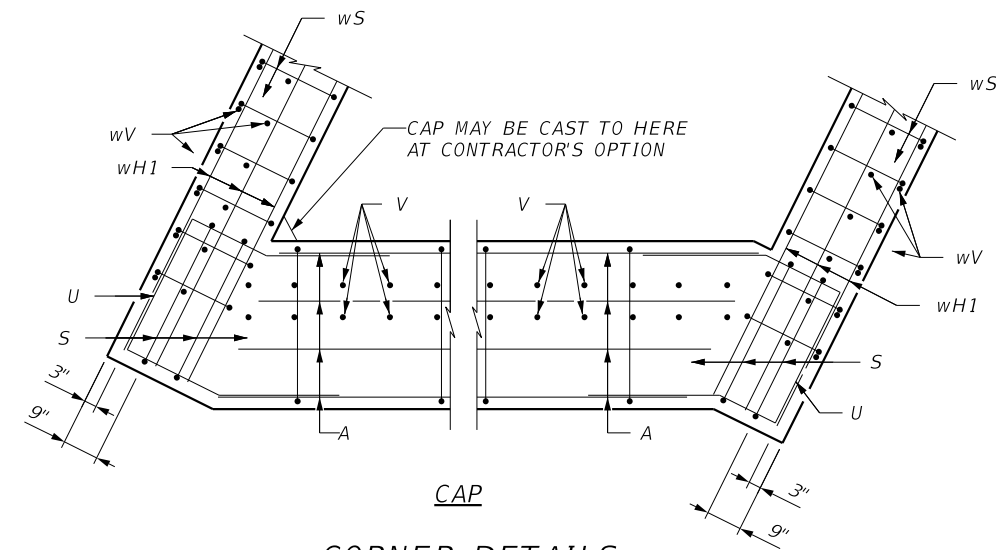
BEARING SEAT DETAIL

SCALE: NTS

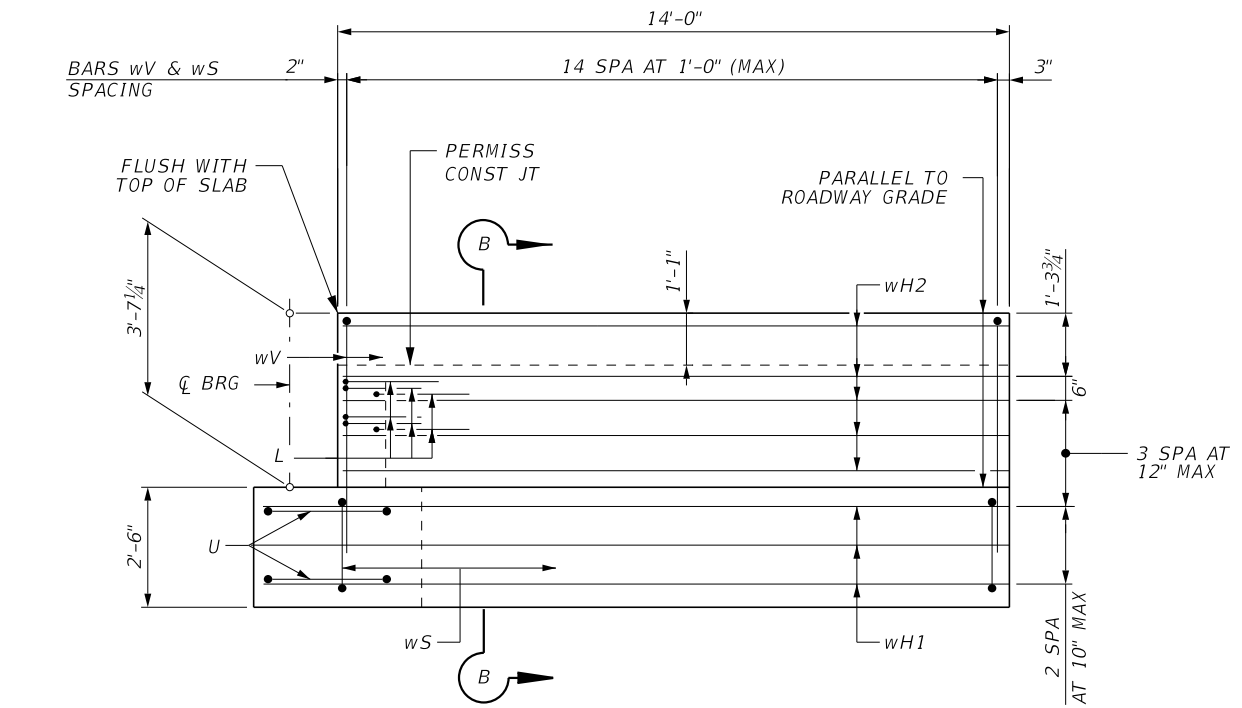
(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD.)



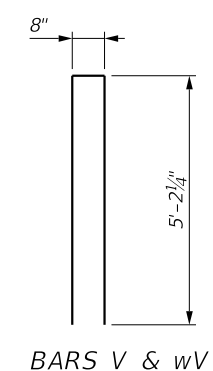
BACKWALL



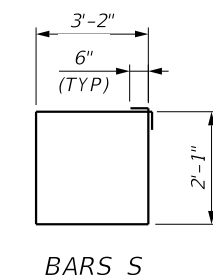
CORNER DETAILS



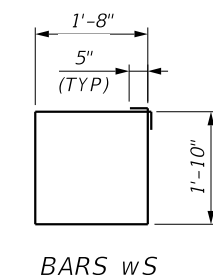
WINGWALL ELEVATION



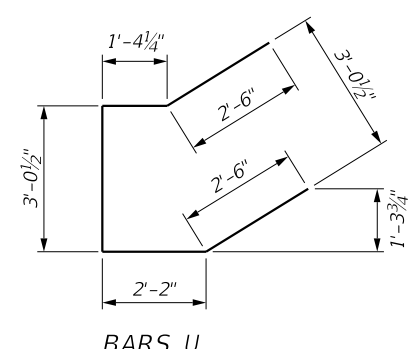
BARS V & wV



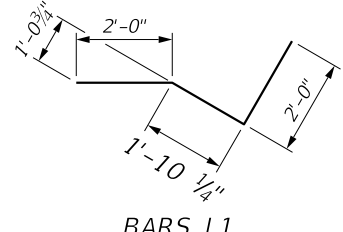
BARS S



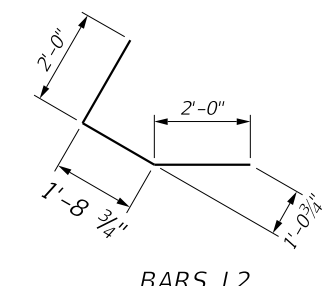
BARS wS



BARS U



BARS L1



BARS L2

TABLE OF ABUTMENT QUANTITIES *

BAR	NO	SIZE	LENGTH	WEIGHT
A	10	#11	38'-1"	2,023
H	8	#6	38'-1"	458
L1	9	#6	5'-11"	80
L2	9	#6	5'-9"	78
S	61	#5	11'-6"	732
U	4	#6	11'-7"	70
V	41	#5	11'-1"	474
wH1	14	#6	15'-5"	324
wH2	20	#6	13'-8"	411
wS	30	#4	7'-10"	157
wV	30	#5	11'-1"	347

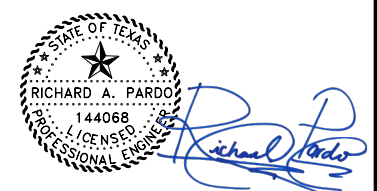
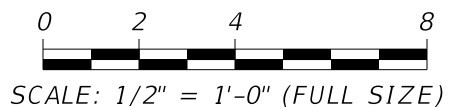
REINFORCING STEEL LB 5,154
CL C CONC (ABUT) CY 26.1

* QUANTITIES SHOWN ARE PER ABUTMENT INCLUDING SHEAR KEY

GENERAL NOTES

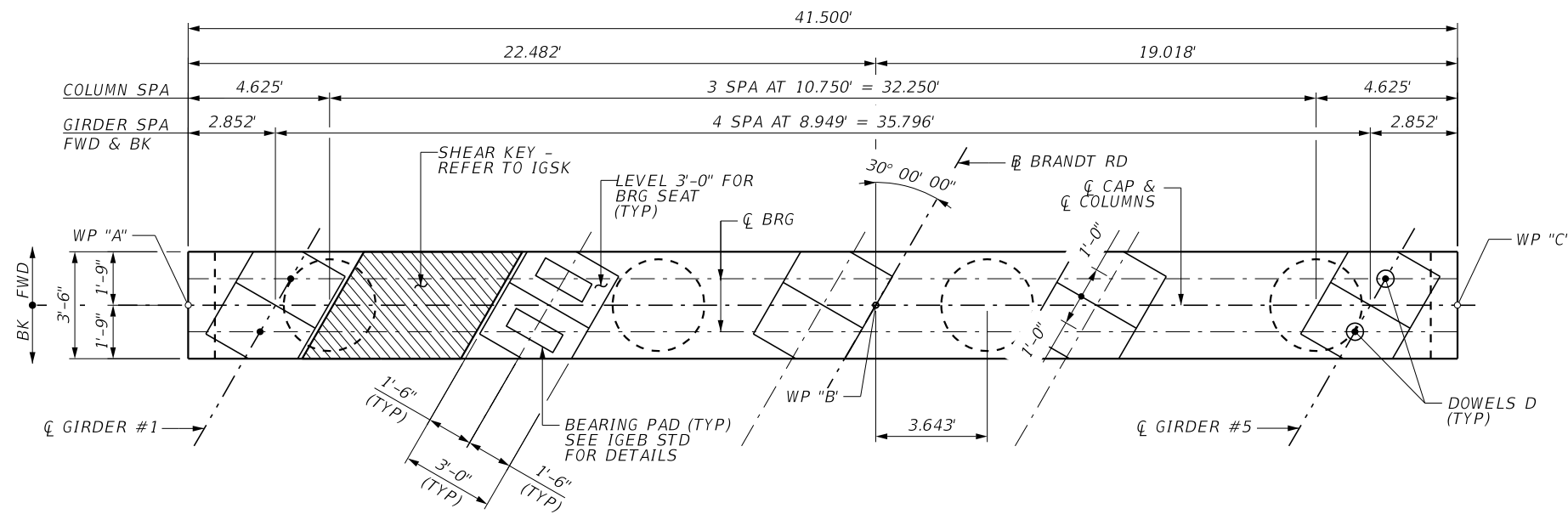
CALCULATED FOUNDATION LOAD: 96 TONS/DS.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

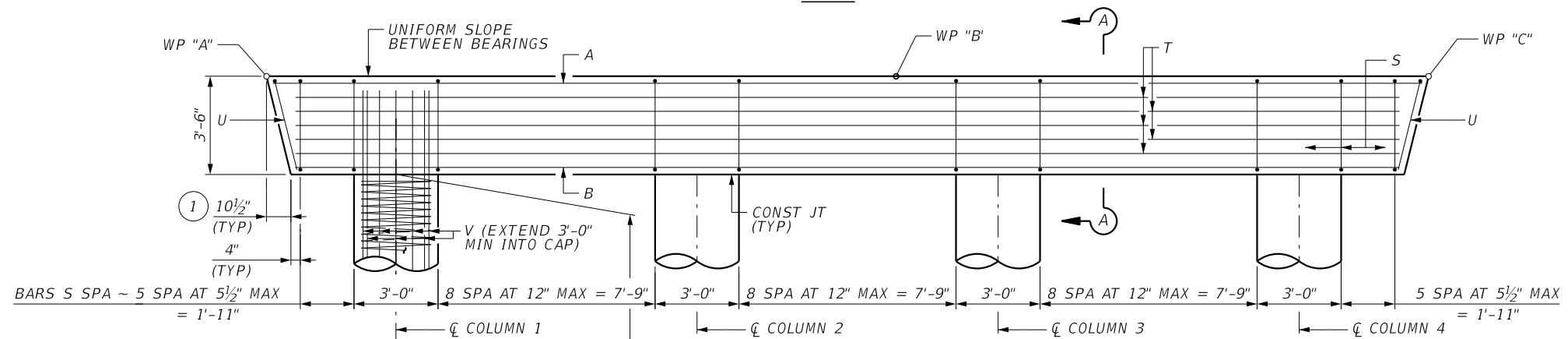


HL-93 LOADING

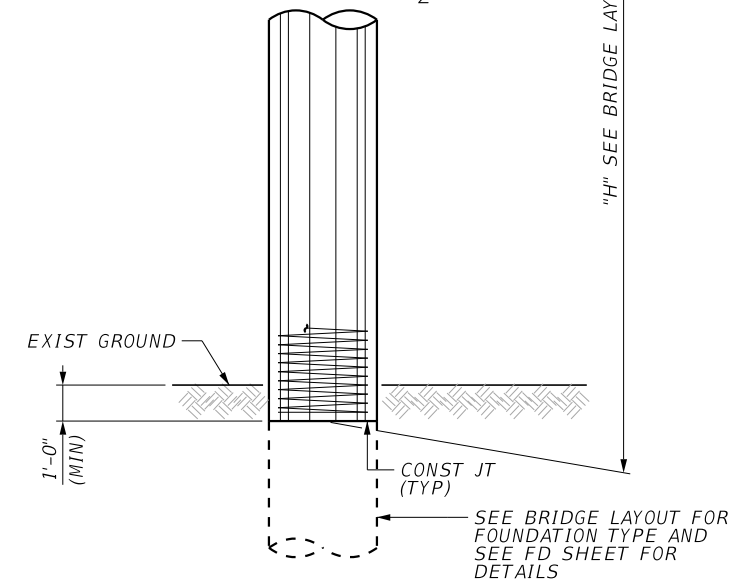
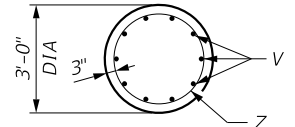
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD FROM McCRARY RD. TO MASON RD.			
ABUTMENT DETAILS			
IEA 1225 NORTH LOOP WEST SUITE 220 HOUSTON, TEXAS 77008 (832) 494-3800		Firm Registration No. F-10161	
DRAWN BY: F.P.	SCALE: AS NOTED	PROJECT No. 0522-1801	
CHECKED BY: T.F.	DATE: JULY, 2019	CONTRACT: 1	
		SHEET BR5 OF 49	



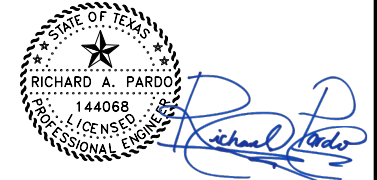
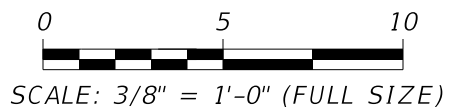
PLAN



ELEVATION



SEE SHEET 2 OF 2 FOR NOTES.
 ① MEASURED PARALLEL TO TOP OF CAP CROSS-SLOPE



HL-93 LOADING

WORK POINT ELEVATIONS			
BENT NO.	WP "A"	WP "B"	WP "C"
2	88.430	88.835	88.534
3	88.477	88.838	88.496

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD FROM McCRARY RD. TO MASON RD.			
BENT 2-3			
1225 NORTH LOOP WEST SUITE 220 HOUSTON, TEXAS 77008 (832) 494-3800			
DRAWN BY: F.P.		SCALE: AS NOTED	PROJECT No. 0522-1801
CHECKED BY: T.F.		DATE: JULY, 2019	CONTRACT: 1
			SHEET BR6 OF 49

\\pussachrf101\j-jobs\2113 Terra Brandt Lane\06.00 Design\06.04 Sheets\06.04.07 Bridges\BBD01.dgn

\\pusschrf101\j-l-jobs\2113_Terra_Brandt_Lone\06.00_Design\06.04_Sheets\06.04.07_Bridges\BBD02.dgn

TABLE OF COLUMN QUANTITIES *										
BENT NO	COL NO	COLUMN HEIGHT "H"	BARS "V" 10~#9 (PER COLUMN)		BARS "Z" #4 (PER COLUMN)		REINF STEEL PER COLUMN	CL "C" CONC COLUMN	TOTAL REINF STEEL PER BENT	CL "C" CONC COLUMN PER BENT
			LENGTH	WEIGHT	LENGTH	WEIGHT				
			FT	FT-IN	LB	FT-IN				
2	1-4	15	18'-0"	612	176'-1"	118	730	3.9	2920	15.7
3	1-4	15	18'-0"	612	176'-1"	118	730	3.9	2920	15.7

* QUANTITIES SHOWN ARE BASED ON "H" VALUE SHOWN. CONTRACTOR IS RESPONSIBLE FOR CALCULATING THE ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS. FOR EACH LINEAR FOOT VARIATION IN "H" VALUE, MAKE THE FOLLOWING ADJUSTMENTS PER COLUMN:

BARS V LENGTH 1'-0"
 BARS Z LENGTH 10'-6"
 REINFORCING STEEL 41 LB
 CLASS "C" CONC (COL) 0.26 CY

TABLE OF ESTIMATED CAP QUANTITIES *					
BAR	NO	SIZE	LENGTH	WEIGHT	
A	5	#11	41'-2"	1,094	
B	5	#11	39'-5"	1,047	
D	4	#9	1'-8"	23	
S	39	#5	13'-8"	556	
T	10	#5	39'-5"	411	
U	2	#5	9'-8"	20	
REINFORCING STEEL				LB	3,151
CL C CONC (CAP)				CY	19.2

* QUANTITIES SHOWN ARE PER BENT CAP INCLUDING SHEAR KEY

GENERAL NOTES

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (8TH EDITION) (HL-93 LOADING).

SEE COMMON FOUNDATION DETAIL FD STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES NOT SHOWN.

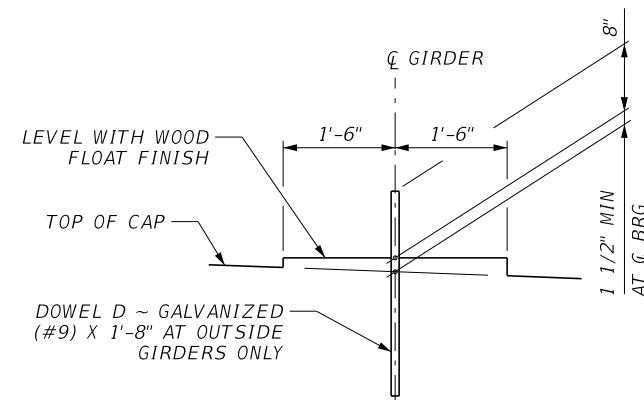
CALCULATED FOUNDATION LOAD: 161 TONS/DS.

MATERIAL NOTES

PROVIDE CLASS "C" CONCRETE STRENGTH $f'_c=3,600$ psi.

PROVIDE GRADE 60 REINFORCING STEEL.

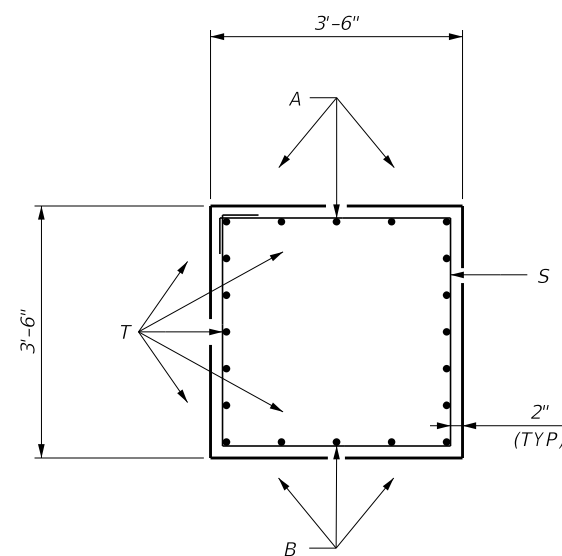
COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.



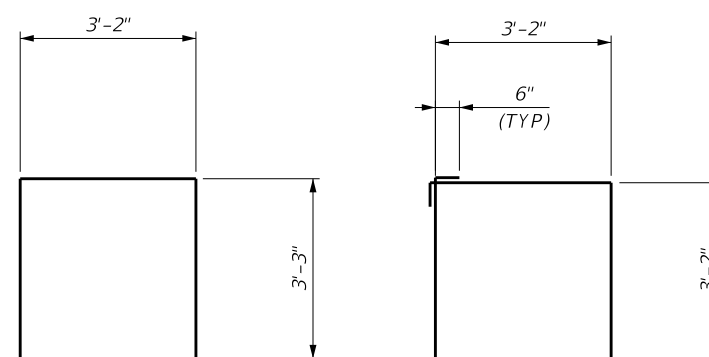
BEARING SEAT DETAIL

SCALE: NTS

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD.)

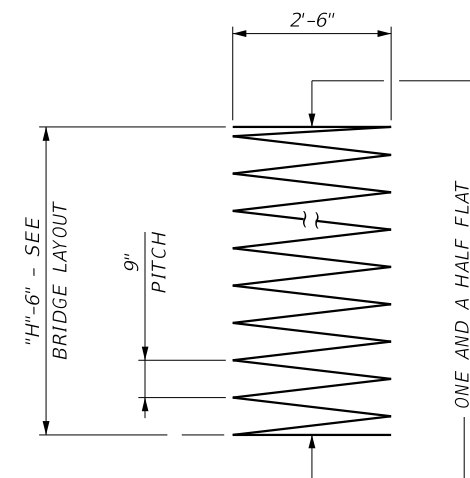


SECTION A-A

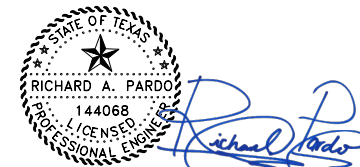
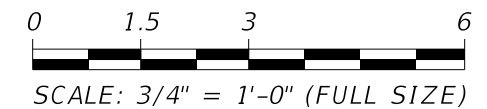


BARS U

BARS S



BARS Z

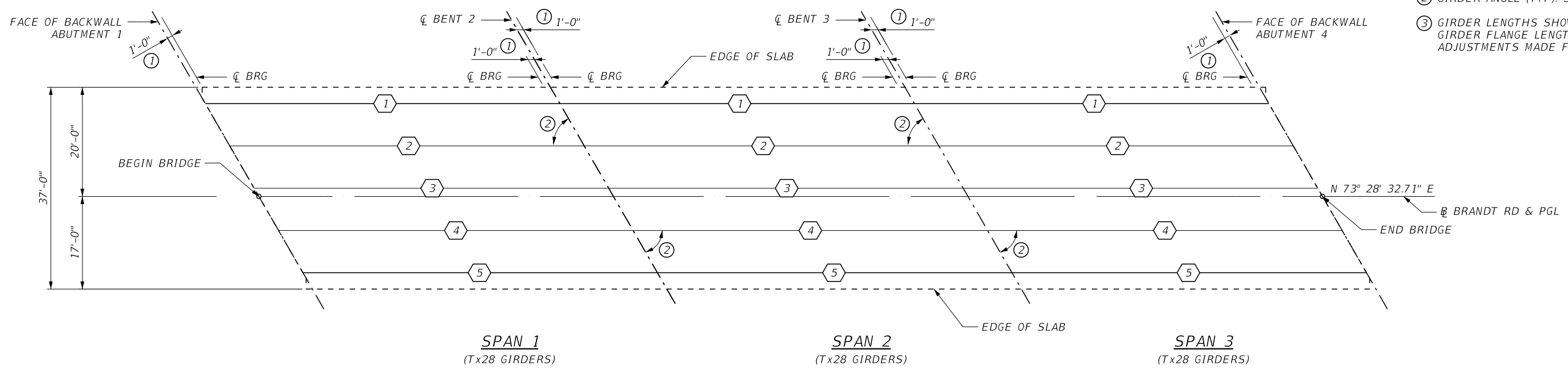


12/9/2022

HL-93 LOADING

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD FROM McCRARY RD. TO MASON RD.			
BENT 2-3			
1225 NORTH LOOP WEST SUITE 220 HOUSTON, TEXAS 77008 (832) 494-3800		Firm Registration No. F-10161	
DRAWN BY: F.P.	SCALE: AS NOTED	PROJECT No. 0522-1801	
CHECKED BY: T.F.	DATE: JULY, 2019	CONTRACT: 1	
		SHEET BR7 OF 49	

- ① SEE IGEB STANDARD FOR ORIENTATION OF DIMENSION.
- ② GIRDER ANGLE (TYP). SEE BENT REPORT.
- ③ GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.



BENT REPORT

ABUTMENT 1 (S 46 31 27.29 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 19.630 L

SPAN	GIRDER	GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE		
			D	M	S
SPAN 1	GIRDER 1	0.000	60	0	0
	GIRDER 2	8.949	60	0	0
	GIRDER 3	8.949	60	0	0
	GIRDER 4	8.949	60	0	0
	GIRDER 5	8.949	60	0	0
TOTAL		35.796			

BENT 2 (S 46 31 27.29 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 19.630 L

SPAN	GIRDER	GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE		
			D	M	S
SPAN 1	GIRDER 1	0.000	60	0	0
	GIRDER 2	8.949	60	0	0
	GIRDER 3	8.949	60	0	0
	GIRDER 4	8.949	60	0	0
	GIRDER 5	8.949	60	0	0
TOTAL		35.796			

BENT 3 (S 46 31 27.29 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 19.630 L

SPAN	GIRDER	GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE		
			D	M	S
SPAN 2	GIRDER 1	0.000	60	0	0
	GIRDER 2	8.949	60	0	0
	GIRDER 3	8.949	60	0	0
	GIRDER 4	8.949	60	0	0
	GIRDER 5	8.949	60	0	0
TOTAL		35.796			

BENT 3 (S 46 31 27.29 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 19.630 L

SPAN	GIRDER	GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE		
			D	M	S
SPAN 2	GIRDER 1	0.000	60	0	0
	GIRDER 2	8.949	60	0	0
	GIRDER 3	8.949	60	0	0
	GIRDER 4	8.949	60	0	0
	GIRDER 5	8.949	60	0	0
TOTAL		35.796			

ABUTMENT 4 (S 46 31 27.29 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 19.630 L

SPAN	GIRDER	GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE		
			D	M	S
SPAN 3	GIRDER 1	0.000	60	0	0
	GIRDER 2	8.949	60	0	0
	GIRDER 3	8.949	60	0	0
	GIRDER 4	8.949	60	0	0
	GIRDER 5	8.949	60	0	0
TOTAL		35.796			

ABUTMENT 4 (S 46 31 27.29 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 19.630 L

SPAN	GIRDER	GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE		
			D	M	S
SPAN 3	GIRDER 1	0.000	60	0	0
	GIRDER 2	8.949	60	0	0
	GIRDER 3	8.949	60	0	0
	GIRDER 4	8.949	60	0	0
	GIRDER 5	8.949	60	0	0
TOTAL		35.796			

GIRDER REPORT

GIRDER REPORT, SPAN 1

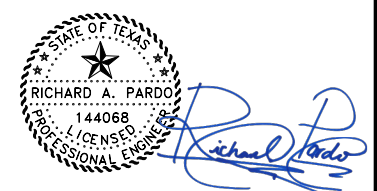
GIRDER	HORIZONTAL DISTANCE		TRUE DISTANCE	GIRDER SLOPE
	C-C BENT	C-C BRG.		
GIRDER 1	65.000	62.845	64.46	0.0030
GIRDER 2	65.000	62.845	64.46	0.0030
GIRDER 3	65.000	62.845	64.46	0.0030
GIRDER 4	65.000	62.845	64.46	0.0030
GIRDER 5	65.000	62.845	64.46	0.0030

GIRDER REPORT, SPAN 2

GIRDER	HORIZONTAL DISTANCE		TRUE DISTANCE	GIRDER SLOPE
	C-C BENT	C-C BRG.		
GIRDER 1	65.000	63.000	64.50	0.0009
GIRDER 2	65.000	63.000	64.50	0.0005
GIRDER 3	65.000	63.000	64.50	0.0001
GIRDER 4	65.000	63.000	64.50	-0.0003
GIRDER 5	65.000	63.000	64.50	-0.0007

GIRDER REPORT, SPAN 3

GIRDER	HORIZONTAL DISTANCE		TRUE DISTANCE	GIRDER SLOPE
	C-C BENT	C-C BRG.		
GIRDER 1	65.000	62.845	64.46	-0.0029
GIRDER 2	65.000	62.845	64.46	-0.0030
GIRDER 3	65.000	62.845	64.46	-0.0030
GIRDER 4	65.000	62.845	64.46	-0.0030
GIRDER 5	65.000	62.845	64.46	-0.0030



12/9/2022

HL-93 LOADING

REV. NO.	DESCRIPTION	DATE	APP.

BRANDT ROAD FROM
McCrary Rd. to Mason Rd.

GIRDER LAYOUT

IEA 1225 NORTH LOOP WEST SUITE 220 HOUSTON, TEXAS 77008 (832) 494-3800 **Firm Registration No. F-10161**

DRAWN BY: F.P.	SCALE: AS NOTED	PROJECT No. 0522-1801
CHECKED BY: T.F.	DATE: JULY, 2019	CONTRACT: 1
SHEET BR8 OF 49		

\\pussachrifl01\1-jobs\2113_Terra_Brandt_Lone\06.00_Design\06.04_Sheets\06.04.07_Bridges\BFP01.dgn

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 units or for any errors or omissions in this document. The user assumes all liability for any damages resulting from its use.

DATE: 12/9/2022 12:53:35 PM
 FILE: \\pusscsnr\1101\J-Jobs\2113 Terra Brandt Lone\06.00 Design\06.04 Design\06.04.dgn

STRUCTURE	DESIGNED GIRDERS									DEPRESSED STRAND PATTERN		CONCRETE		OPTIONAL DESIGN					LOAD RATING FACTORS		
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS					NO.	TO END (in)	RELEASE STRGTH (1) f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	DESIGN LOAD COMP STRESS (TOP ☐) (SERVICE I) fct(ksi)	DESIGN LOAD TENSILE STRESS (BOT ☐) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR (2)		STRENGTH I SERVICE III			
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ☐ (in)								"e" END (in)	Moment	Shear	Inv	Opr	Inv
JONES CREEK BRIDGE AT BRANDT RD	1	1	Tx28		26	0.6	270	9.56	6.48	4	24.5	5.700	6.700	2.687	-3.461	2630	0.605	0.905			
		2		2.792										-3.576	2688	0.605	0.905				
		3		2.792										-3.576	2688	0.605	0.797				
		4		2.776										-3.479	2611	0.605	0.905				
		5		2.668										-3.363	2554	0.605	0.905				
	2	1	Tx28		26	0.6	270	9.56	6.48	4	24.5	5.700	6.700	2.687	-3.461	2630	0.605	0.905			
		2		2.792										-3.576	2688	0.605	0.905				
		3		2.792										-3.576	2688	0.605	0.797				
		4		2.776										-3.479	2611	0.605	0.905				
		5		2.668										-3.363	2554	0.605	0.905				
	3	1	Tx28		26	0.6	270	9.56	6.48	4	24.5	5.700	6.700	2.687	-3.461	2630	0.605	0.905			
		2		2.792										-3.576	2688	0.605	0.905				
		3		2.792										-3.576	2688	0.605	0.797				
		4		2.776										-3.479	2611	0.605	0.905				
		5		2.668										-3.363	2554	0.605	0.905				

NON-STANDARD STRAND PATTERNS	
PATTERN	STRAND ARRANGEMENT AT ☐ OF GIRDER

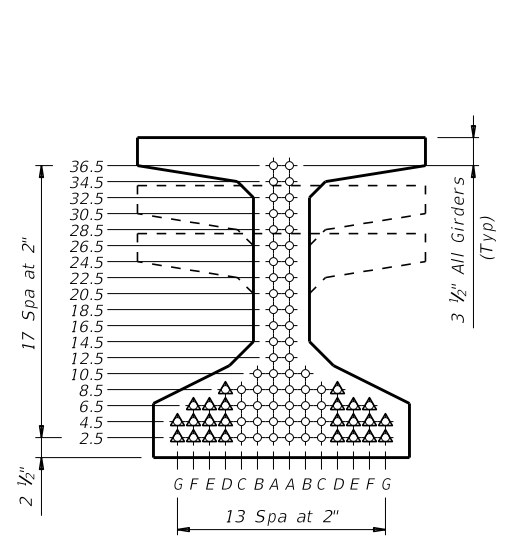
- When TO END (in) equals TO ☐ (in), place these straight strands at the defined TO values. Fill the lower rows with the remainder of the total number of strands in accordance with the Debonded Strand Designs notes.
- Based on the following allowable stresses (ksi):
 Compression = 0.65 f'ci
 Tension = 0.24 √ f'ci
 Optional designs must likewise conform.
- Portion of full HL93.

DESIGN NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications. Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.
 Prestress losses for the designed girders have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

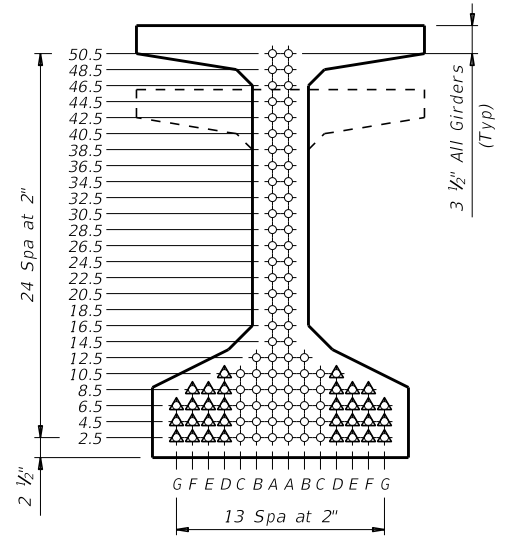
FABRICATION NOTES:
 Provide Class H concrete.
 Provide Grade 60 reinforcing steel bars.
 Use low relaxation strands, each pretensioned to 75 percent of fpu.
 Strand debonding must comply with Item 424.4.2.2.4. Full-length debonded strands are only permitted in positions marked Δ. Double wrap full-length debonded strands in outer most position of each row.
 When shown on this sheet, the Fabricator has the option of furnishing either the designed girder or an approved optional design. All optional design submittals must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

DEBONDED STRAND DESIGNS:
 Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc. Place strands within a row as follows:
 1) Locate a strand in each "A" and outer most positions.
 2) Place strand symmetrically about vertical centerline of girder.
 3) Space strands as equally as possible across the entire width.
 Do not debond strands in position "G". Distribute debonded strands symmetrically about the vertical centerline. Increase debonded lengths working outward, with debonding staggered in each row.

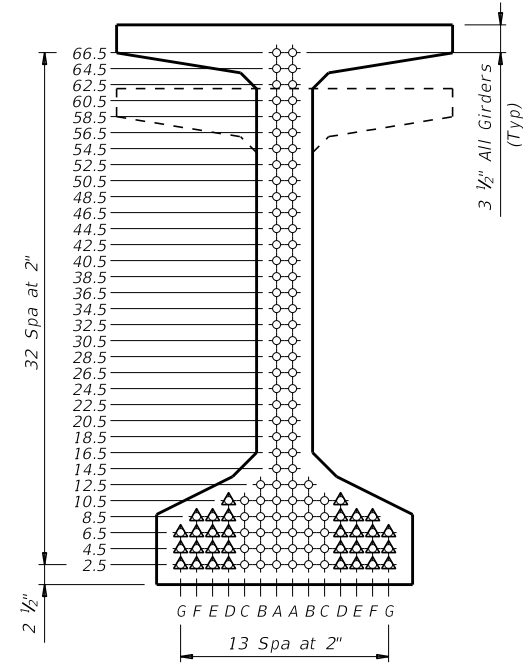
DEPRESSED STRAND DESIGNS:
 Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.



TYPE Tx28, Tx34 & Tx40



TYPE Tx46 & Tx54

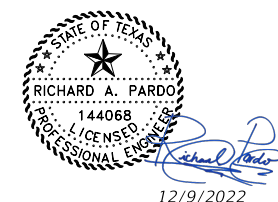


TYPE Tx62 & Tx70

HL93 LOADING

Texas Department of Transportation
 Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS)



12/9/2022

IGND

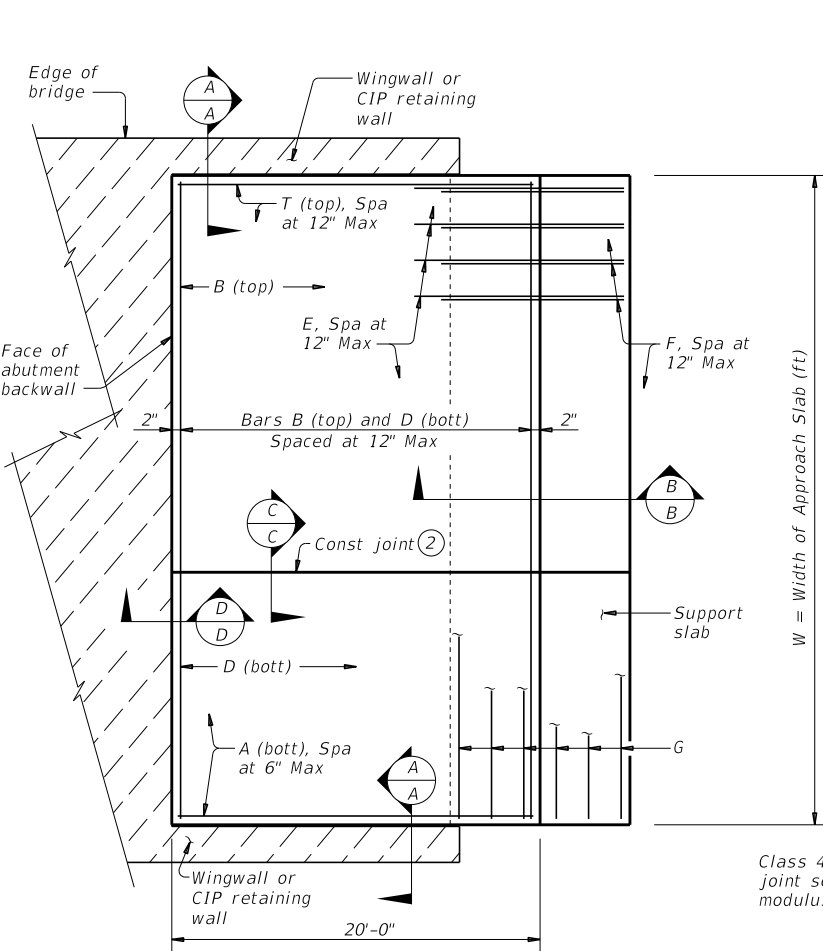
IEA 1225 NORTH LOOP WEST SUITE 220 HOUSTON, TEXAS 77008 (832) 494-3800

Firm Registration No. F-10161

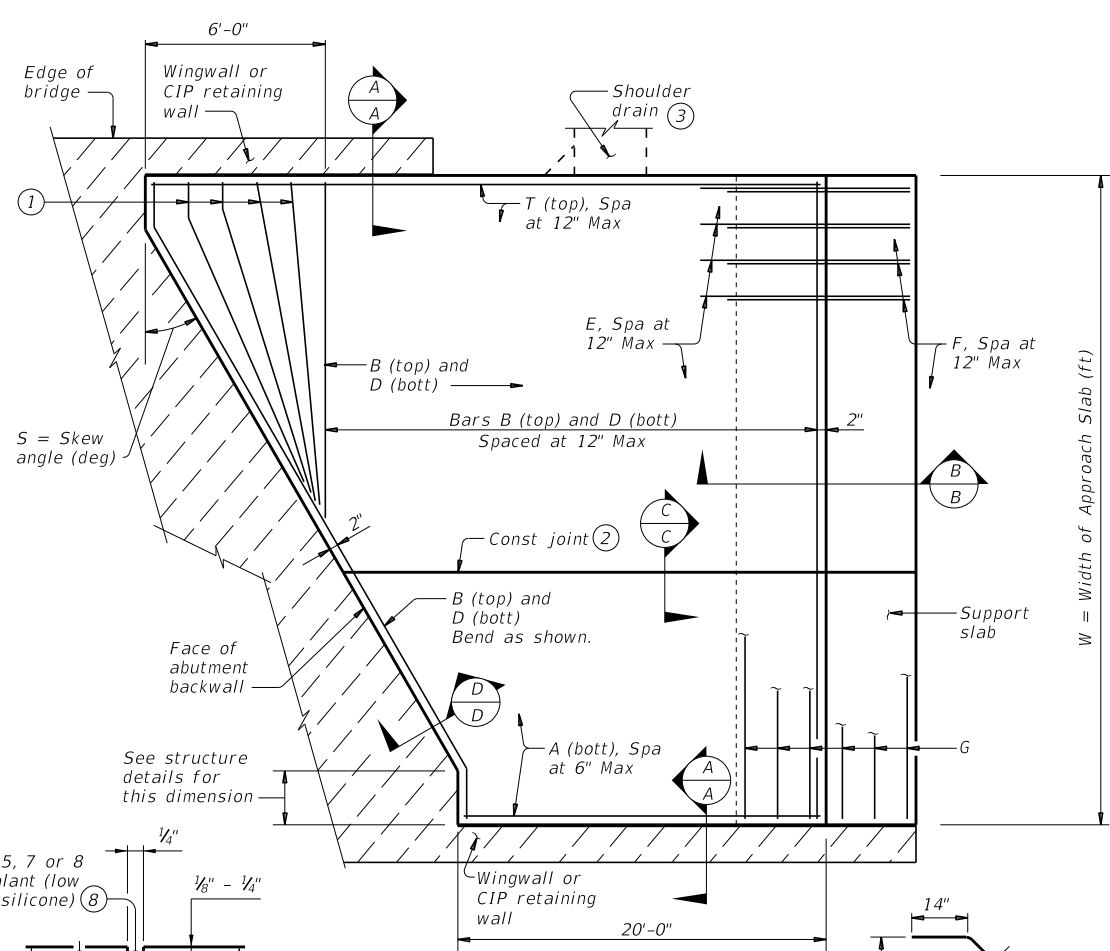
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©TxDOT August 2017	CONTRACT	SECTION	JOB	HIGHWAY
REVISIONS			0522-1801	BRANDT RD
	DIST	COUNTY	SHEET NO.	
	HOU	FORT BEND	BR11	

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 units or for any errors or omissions in this drawing. Sheet 5062-04 of 15. **BRIDGE APPROACH SLAB** - J.E. DODD

DATE: 12/9/2022 12:53:37 PM
 FILE: \\psscshrf1101\J-Jobs\2113 Terra Brandt Lone\06.00 Design\06.04 Sheet 5062-04.dwg



PLAN
(Showing non-skewed approach slab.)



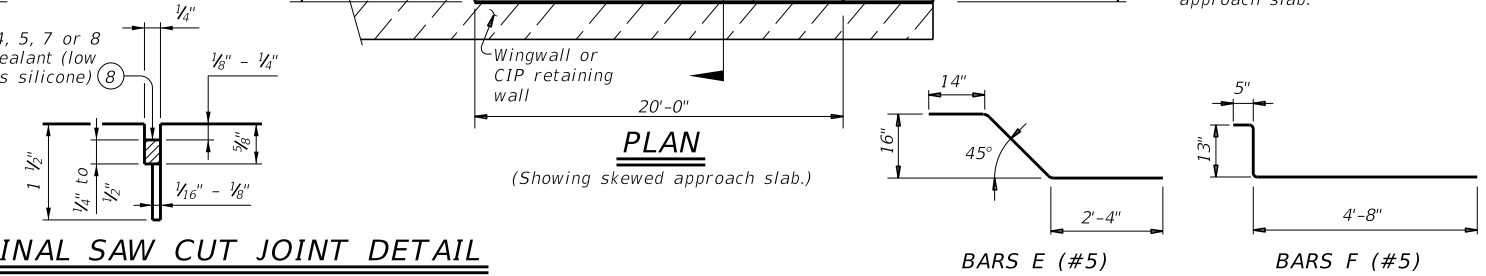
PLAN
(Showing skewed approach slab.)

BAR TABLE	
BAR	SIZE
A	#8
B	#5
D	#5
E	#5
F	#5
G	#5
T	#5

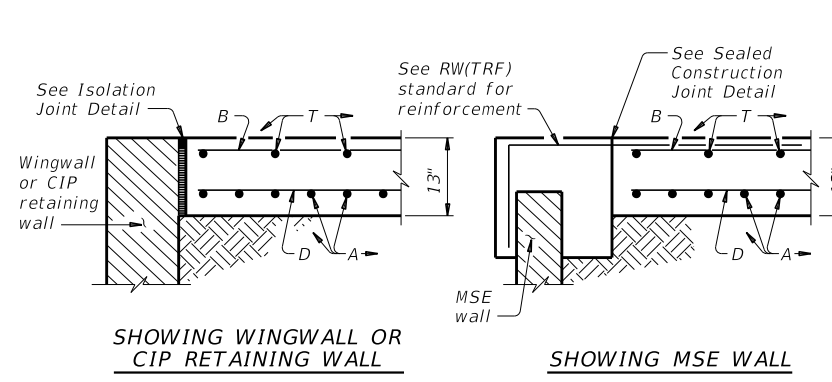
APPROXIMATE QUANTITIES ⁽⁴⁾	
Reinf steel weight =	8.5 Lbs/SF of Approach Slab 18.4 Lbs/LF of Support Slab
Vol of Appr Slab Conc (CY) =	1.057W - 0.008W x T + 0.02W ² Tan S (Includes Support Slab)
W =	Width of Approach Slab (ft)
T =	Conc Pavement Thickness (in)
S =	Skew Angle (deg)

- Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.
- Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.
- See details elsewhere in plans for shoulder drain location and details.
- For Contractor's information only. Quantities shown are for one approach slab only.
- On portion of support slab that supports the concrete pavement, adjust top surface elevation, if required, to accommodate concrete pavement thickness. Smooth trowel finish. Oil top of support slab with 60 grade oil and apply heavy coat of powdered graphite. Press down one layer of 30# roofing felt.
- Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.
- See details elsewhere in plans for required cross-slope.
- Place in accordance with Item 438.
- Provide backer rod that is 25% larger than joint opening and compatible with the sealant.
- If bridge rail is present at the wingwall or CIP retaining wall, place 1/2" rebonded recycled tire rubber between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.

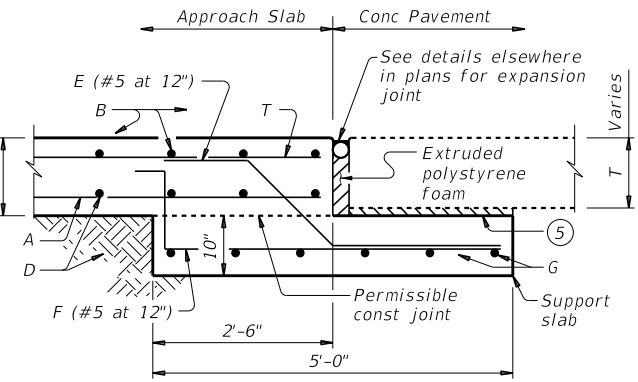
LONGITUDINAL SAW CUT JOINT DETAIL



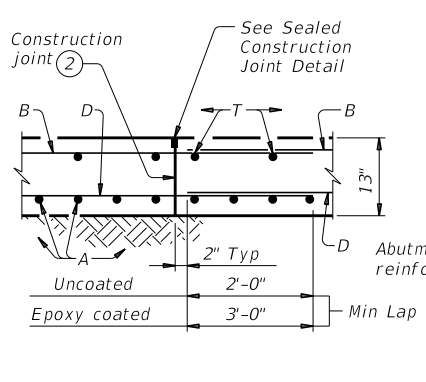
GENERAL NOTES:
 Construct approach slab in accordance with Item 422.
 Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.
 Provide Grade 60 reinforcing steel.
 Provide longitudinal joints as shown on the Longitudinal Saw Cut Joint Detail at lane lines and shoulders when width between longitudinal construction joints or edges of approach slab exceeds 16 feet. Saw cut joints within 24 hours of concrete placement to a depth of 1 1/2" and seal in accordance with Item 438. Alternately, provide a controlled joint consisting of 1 1/2" vinyl or plastic joint former (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)
 Provide rebonded recycled tire rubber joint filler that meets the requirements of DMS-6310, "Joint Sealants and Fillers."
 Construct the subgrade or subbase away from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.
 Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.
 Cure for 4 days using water or membrane curing per Item 422. All details shown herein are subsidiary to bridge approach slab.
 Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



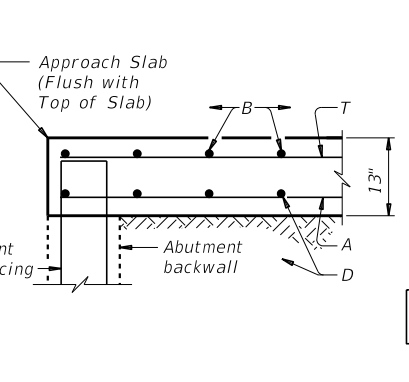
SECTION A-A



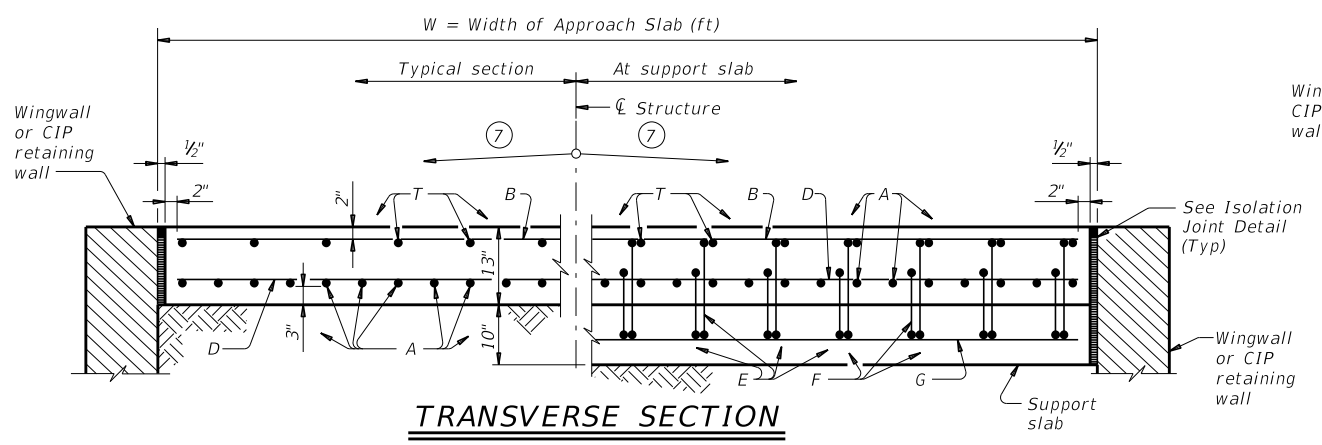
SECTION B-B



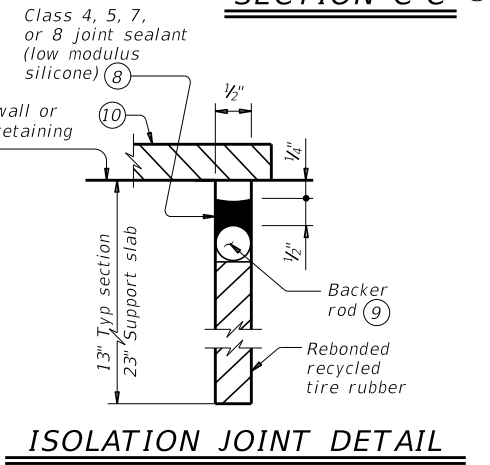
SECTION C-C



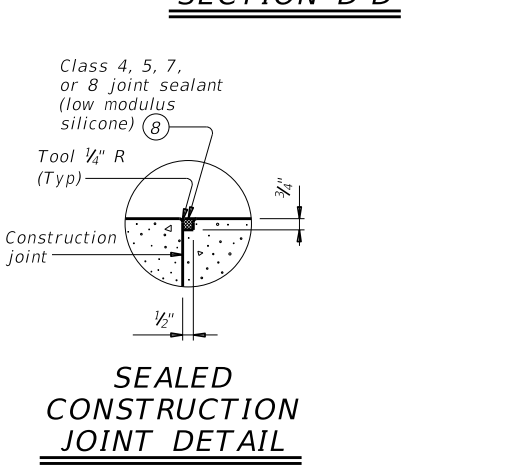
SECTION D-D



TRANSVERSE SECTION



ISOLATION JOINT DETAIL

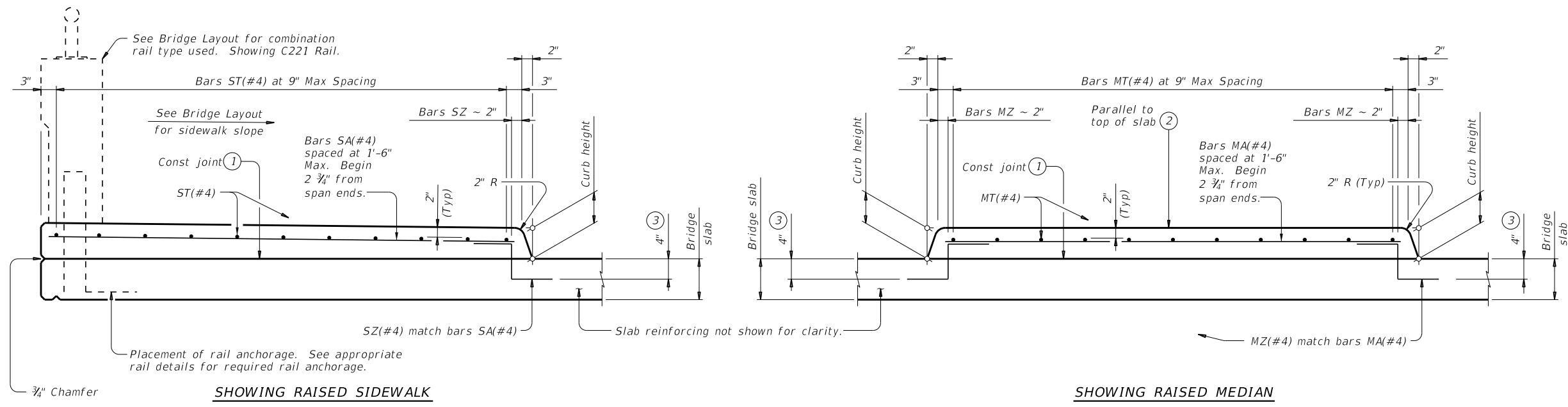


SEALED CONSTRUCTION JOINT DETAIL

		Bridge Division Standard	
BRIDGE APPROACH SLAB CONCRETE PAVEMENT			
BAS-C			
FILE: bascste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
REV: April 2019	CON: TxDOT	SECT: TxDOT	JOB: TxDOT
REVISIONS: 0522-1801		HIGHWAY: BRANDT RD	
DIST: FORT BEND		COUNTY: FORT BEND	
SHEET NO.: BR12		REMOVED STRESS RELIEVING PAD.	

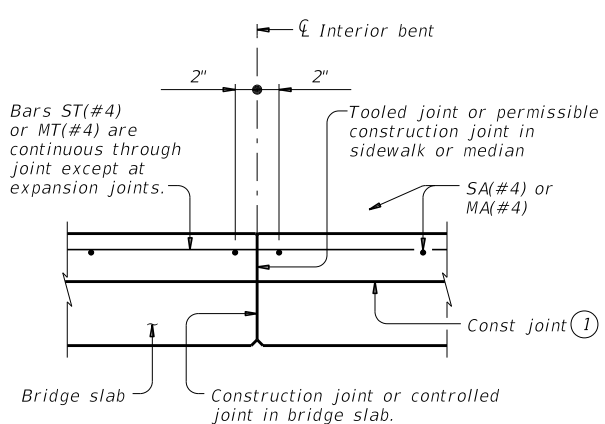
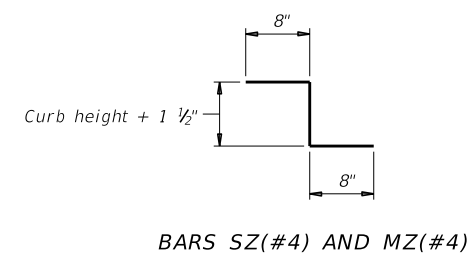
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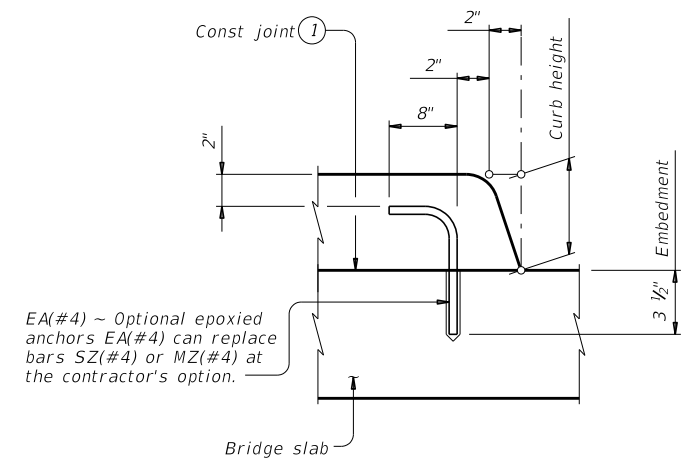
TYPICAL TRANSVERSE SECTIONS
 See Span Details for dimensions not shown.

- ① Provide broom finish to top of bridge slab where raised sidewalk or raised median area is defined.
- ② Unless noted otherwise on the span details.
- ③ Bars may rest on top of PCPs.



LONGITUDINAL SECTION AT INTERIOR BENT

At bents with expansion joints, provide an open joint in the sidewalk/median matching the deck's joint width.



OPTIONAL EPOXY ANCHORS

Embed EA(#4) bar into concrete with a Type III (Class C, D, E, or F) epoxy meeting the requirements of DMS-6100, "Epoxy and Adhesives". Follow manufacturer's directions for installing the epoxied anchor bars.

APPROVED SLIP RESISTANT PLATE	
Product	Manufacturer Website
Algrip™, Steel	www.algrip.com
Mebac® #3, Steel	www.harscoikg.com
SlipNOT® Grade 2, Steel	www.slipnot.com

Provide drain cover plates fabricated with a product from this list. No exceptions are permitted.

MATERIAL NOTES:

- Provide the same concrete required for the bridge deck, Class S or Class S (HPC) concrete.
- Provide Grade 60 reinforcing steel. Deformed welded wire reinforcement (WWR) meeting ASTM A1064 of equivalent size and spacing may be substituted for bars SA, ST, MA, and MT.
- Provide epoxy coat or galvanize reinforcement if bridge deck reinforcement is required to be epoxy coated or galvanized.
- Provide hot-dip galvanize slip resistant steel plate after fabrication in accordance with Item 445, "Galvanizing".
- Chamfer or round edges approximately 1/8" prior to galvanizing.

GENERAL NOTES:

- Designed according to AASHTO LRFD Bridge Design Specifications.
- Provide the following bar or wire lap lengths when required:
 Uncoated, 1'-7" Min
 Coated, 2'-5" Min
- Submittal and approval of drain cover plate shop drawings is not required if fabrication is accordance with these details.
- Raised sidewalks will be paid under Item 422 by the SF of Bridge Sidewalk or Bridge Sidewalk (HPC). Raised medians will be paid under Item 422 by the SF of Bridge Median or Bridge Median (HPC).
- Payment for drain cover plates will be by the pound of "Structural Steel (Misc Non-Bridge)" as per Item 442, "Metal for Structures". Weight of one drain cover plate is 48 plf.

DESIGNER NOTES:

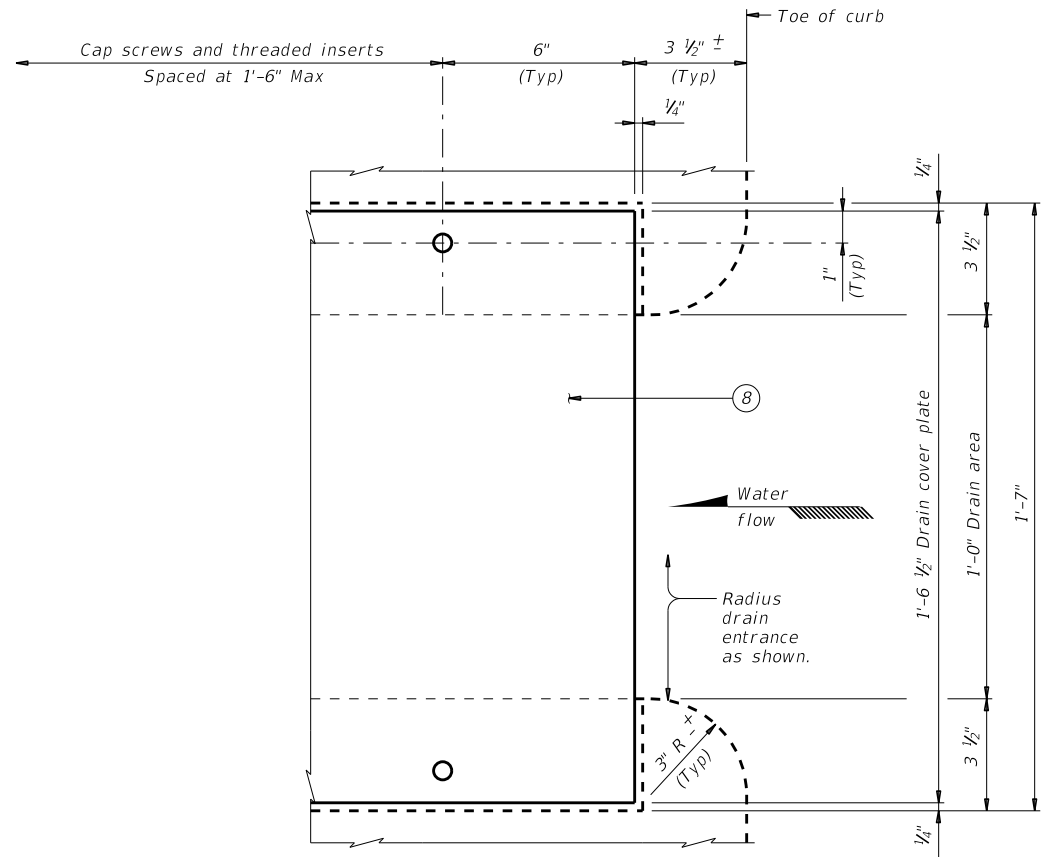
- These details do not apply for longitudinal grades exceeding 5 percent.

Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bar dimensions shown are out-to-out of bar.

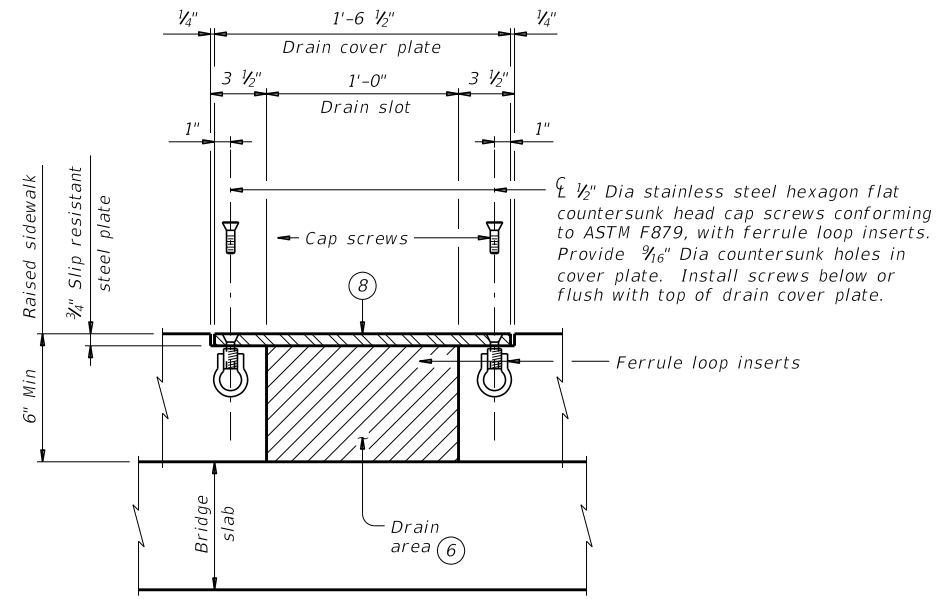
		Bridge Division Standard	
BRIDGE RAISED SIDEWALK AND MEDIAN DETAILS			
BRSM			
FILE: brsmste1-19.dgn	DN: JMH	CK: TxDOT	DW: JTR
©TxDOT April 2019	CONT	SECT	JOB
REVISIONS	0522-1801		BRANDT RD
DIST	COUNTY	SHEET NO.	
HOU	FORT BEND	BR13	

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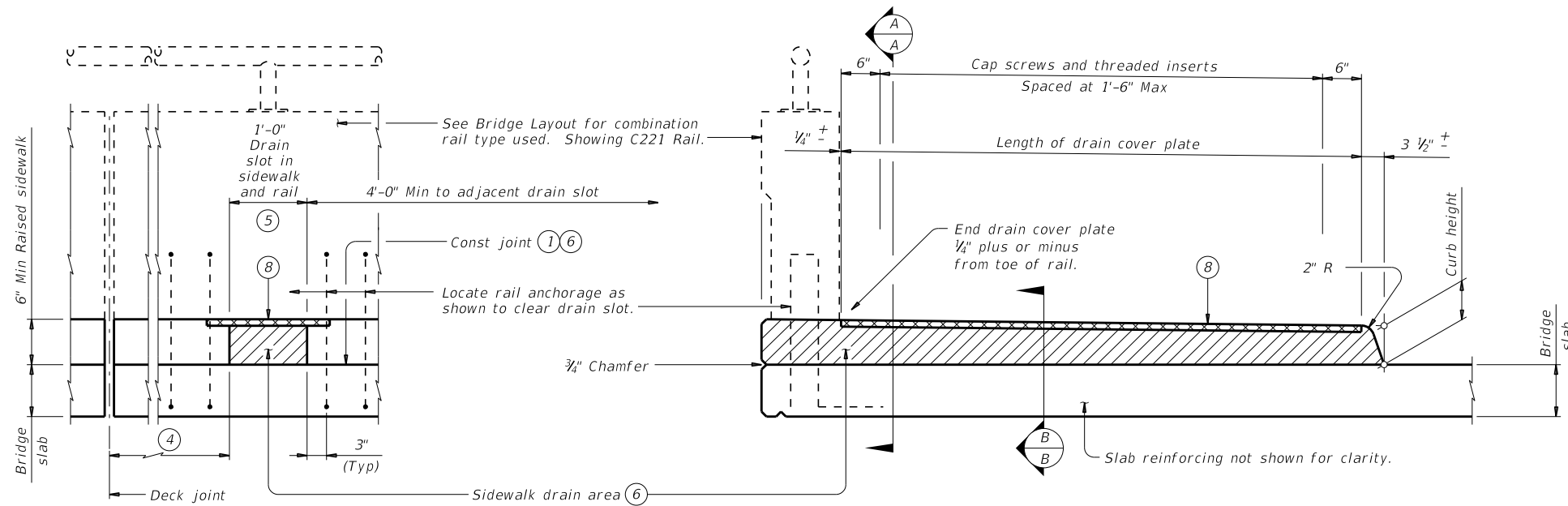
PARTIAL PLAN CURB DRAIN



SECTION B-B

Reinforcing not shown for clarity.

- ① Provide broom finish to top of bridge slab where raised sidewalk or raised median area is defined.
- ④ 3'-0" Min at deck expansion joints, deck construction joints or controlled joints, rail intermediate wall joints or from face of substructure.
- ⑤ For rail Type C1W, center drain slots between posts.
- ⑥ Steel trowel top surface of bridge deck in drain locations.
- ⑦ Provide sidewalk drains where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. Place drain and cover plate perpendicular to toe of rail.
- ⑧ Drain cover plate (PL 3/4 x 18 1/2 slip resistant steel plate). Install flush with top of sidewalk.



SECTION A-A

SHOWING RAISED SIDEWALK WITH DRAIN SLOT

OPTIONAL DRAIN DETAILS ⑦

SHEET 2 OF 2



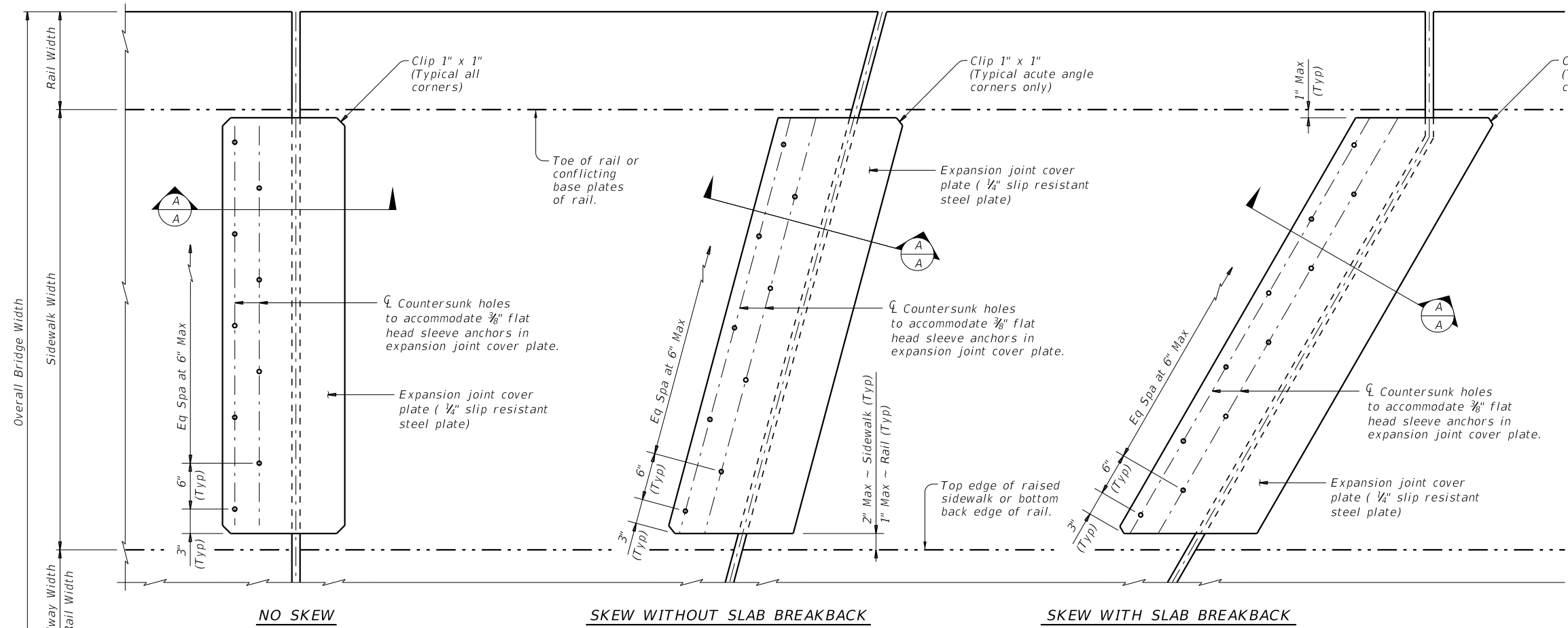
BRIDGE RAISED SIDEWALK AND MEDIAN DETAILS

BRSM

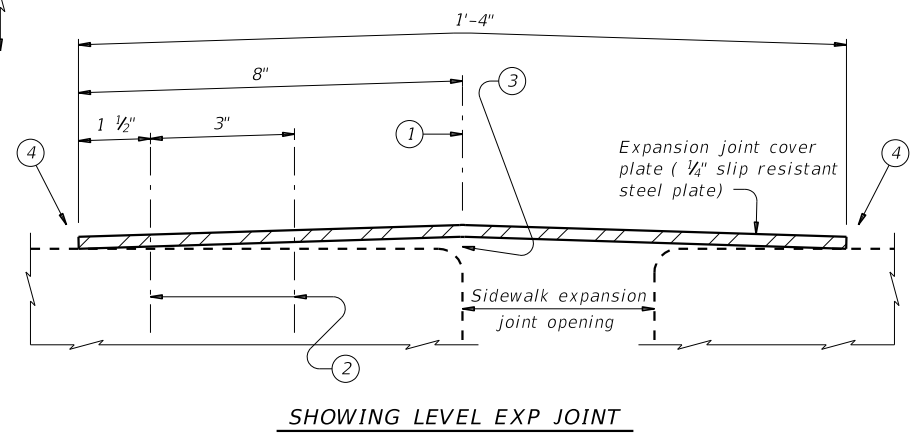
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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS			0522-1801	BRANDT RD
DIST	COUNTY	SHEET NO.		
HOU	FORT BEND	BR 14		

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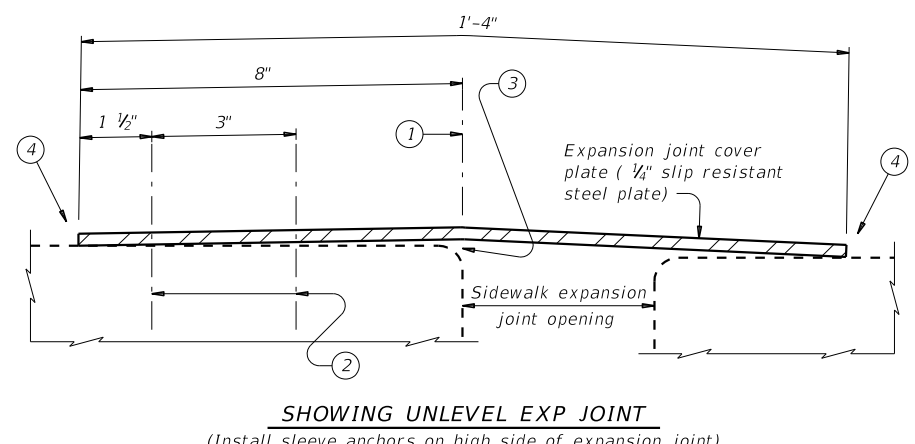
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PLAN

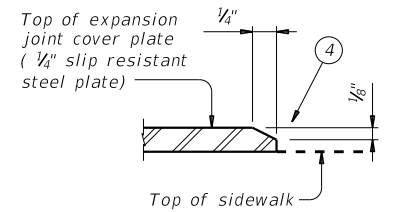


SHOWING LEVEL EXP JOINT

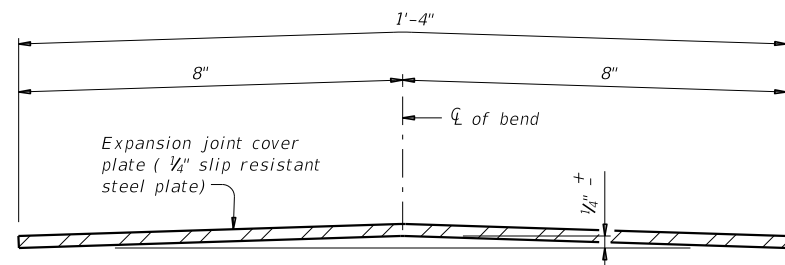


SHOWING UNLEVEL EXP JOINT
 (Install sleeve anchors on high side of expansion joint)

SECTION A-A



EXP JOINT COVER PLATE BEVEL DETAIL
 Bevel all plate edges as shown.



BENDING DIAGRAM OF EXP JOINT COVER PLATE

- ① Expansion joint cover plate and edge of expansion joint.
- ② 3/8" x 2 1/2" Min, Flat Head Sleeve Anchors, Stainless Steel. Countersink Flat Head Sleeve Anchors in 1/4" Slip Resistant Steel Plate.
- ③ It is not necessary to remove plate crown provided the plate is firmly secured to the sidewalk.
- ④ Transverse edges must be in contact with sidewalk surface after installation.

APPROVED SLIP RESISTANT PLATE	
Product	Manufacturer Website
Algrip™, Steel	www.algrip.com
Mebac® #3, Steel	www.harscoikg.com
SlipNOT® Grade 2, Steel	www.slipnot.com

Provide cover plates fabricated with a product from this list. No exceptions are permitted.

FABRICATION NOTES:
 Shop drawings for the fabrication of Bridge Sidewalk Expansion Joint Cover Plate will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

A Bridge Sidewalk Expansion Joint Cover Plate Layout which identifies location side of sleeve anchors and orientation of all cover plate sections must be developed by the fabricator. Mark each steel section in accordance with the Bridge Sidewalk Expansion Joint Cover Plate Layout. A copy of the Bridge Sidewalk Expansion Joint Cover Plate Layout is to be provided to the Engineer.

Sidewalk expansion joint cover plates must be hot-dipped galvanized 1/4" slip resistant steel plate. Checker plate or diamond side of sleeve anchors meeting the requirements of ASTM F 593, Group 1, Alloy 304. Countersink holes in slip-resistant plate for sleeve anchors. Drill holes in sidewalk as per sleeve anchor manufacturer's recommendations. Install sleeve anchors flush with, or slightly recessed below, top surface of sidewalk expansion joint cover plate.

Minimum required yield strength of steel plate is 36 ksi.

Hot-dip galvanize slip resistant steel plate after fabrication in accordance with Item 445, "Galvanizing".

Provide stainless steel flat head sleeve anchors meeting the requirements of ASTM F 593, Group 1, Alloy 304. Countersink holes in slip-resistant plate for sleeve anchors. Drill holes in sidewalk as per sleeve anchor manufacturer's recommendations. Install sleeve anchors flush with, or slightly recessed below, top surface of sidewalk expansion joint cover plate.

GENERAL NOTES:
 Sidewalk expansion joint cover plates can only accommodate up to a 7" maximum expansion joint opening.

Details provided are applicable to concrete walkway surfaces only.

Payment for sidewalk expansion joint cover plates are by the pound of "Structural Steel (Misc Non-Bridge)" as per Item 442, "Metal for Structures".

Estimated weight of one sidewalk expansion joint cover plate is 14 plf.



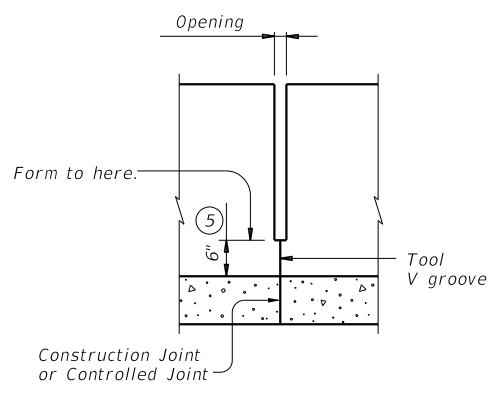
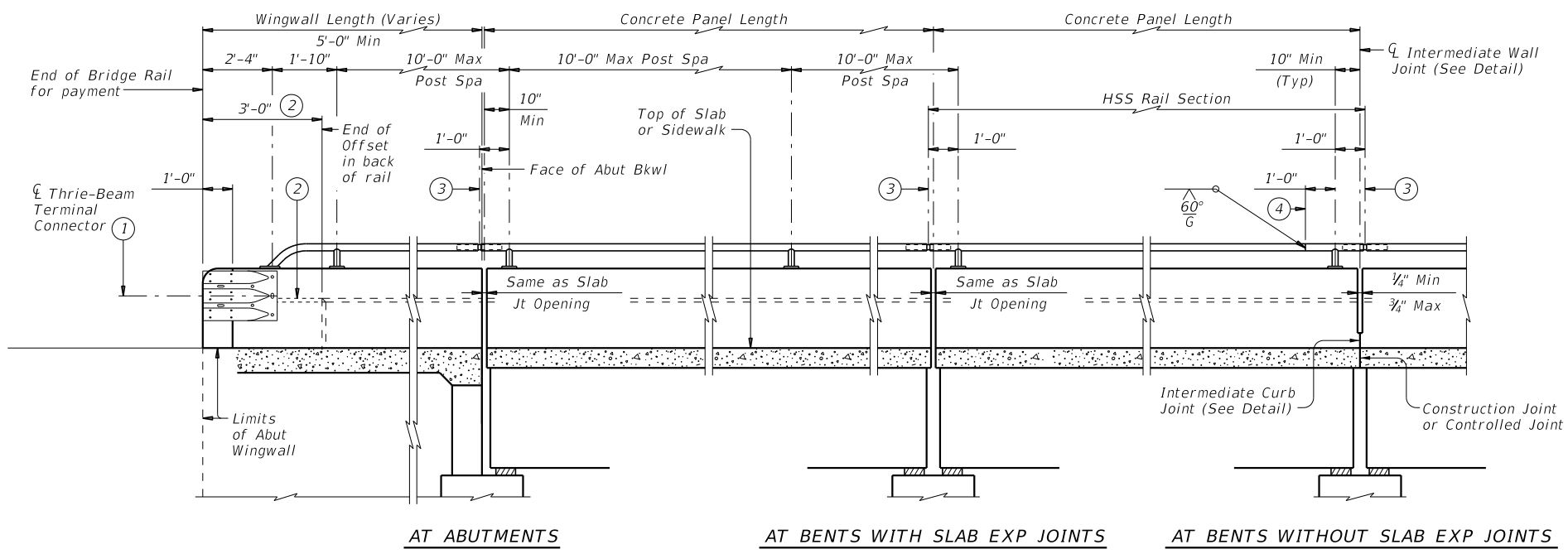
BRIDGE SIDEWALK EXPANSION JOINT COVER PLATE (ALL SKEWS)

BS-EJCP

FILE: bsejste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS			0522-1801	BRANDT RD
8-20: Closer tolerances on cover plate.	DIST	COUNTY		SHEET NO.
	HOU	FORT BEND		BR15

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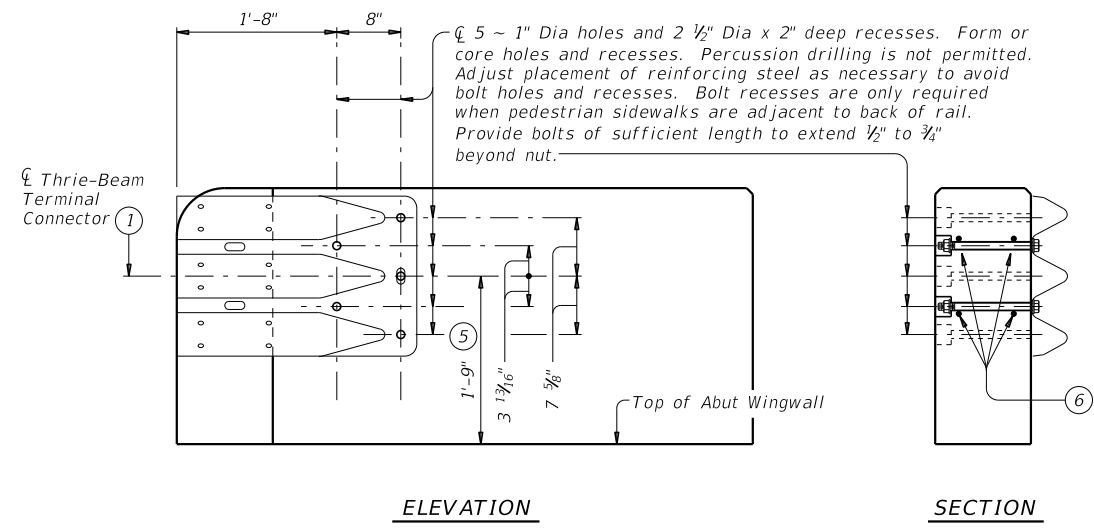
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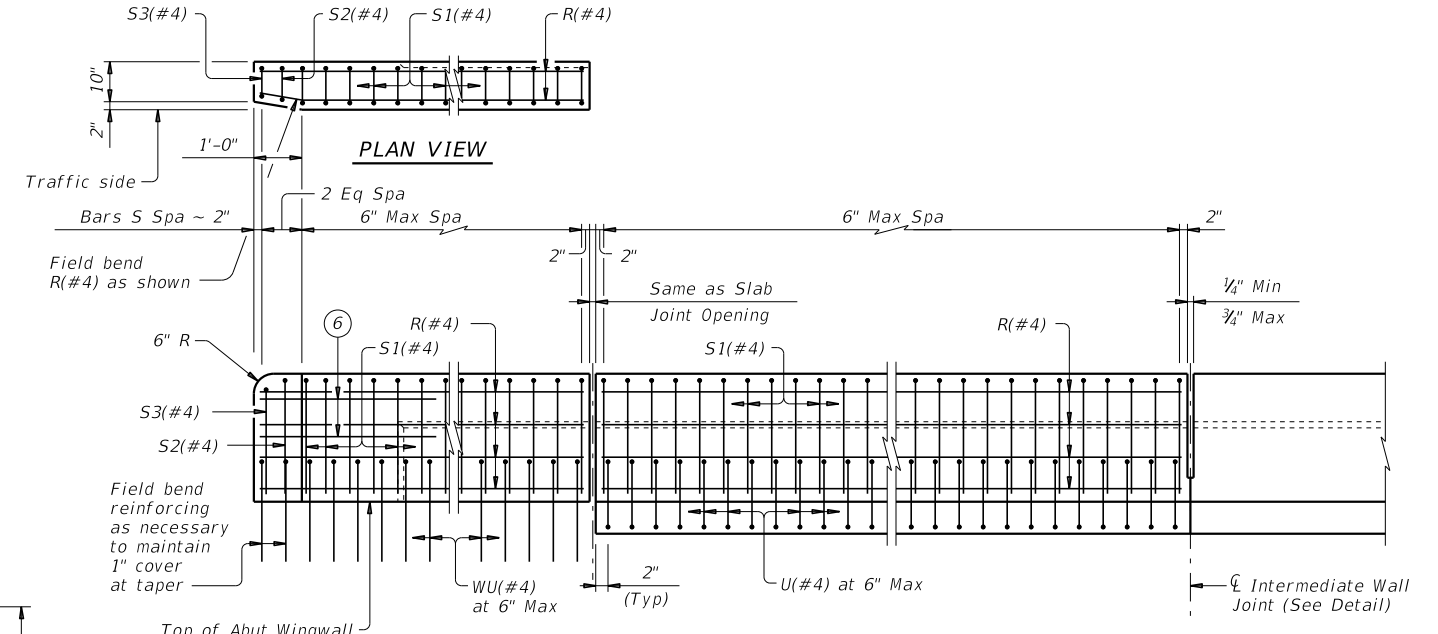
INTERMEDIATE WALL JOINT DETAIL
 Provide at all interior bents without slab expansion joints.

- 1 Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- 2 Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
- 3 Exp Joint or Splice Joint as required.
- 4 One shop splice per HSS rail section is permitted with minimum 85 percent penetration. The weld may be square groove, or single vee groove. Grind smooth.
- 5 Increase 2" for structures with overlay.
- 6 Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.
- 7 HSS 2.875 x 0.203
- 8 HSS 2.375 x 0.154
- 9 3/8" Dia Hole in bottom of HSS rail (Minimum 1 hole between posts ~ Typ)

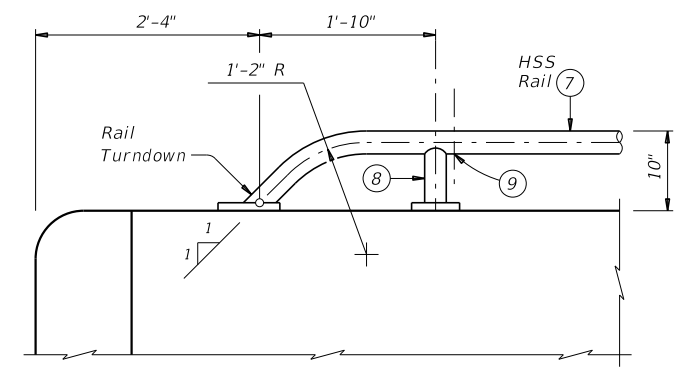
ROADWAY ELEVATION OF RAIL



TERMINAL CONNECTION DETAILS

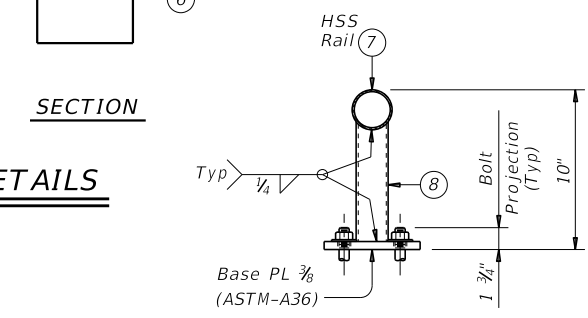


ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT
 (Showing without raised sidewalk)

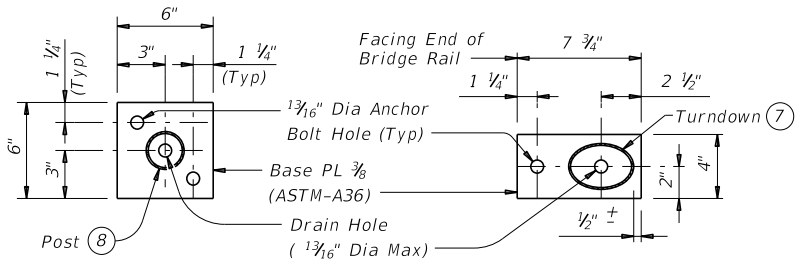


Note that at least two anchor points (as shown) are required for the Bridge Rail on the Abutment Wingwall. Longer Wingwalls may require more than two Rail anchorages.

HSS RAIL TERMINAL DETAIL



TRANSVERSE SECTION



POST BASE PLATE PLAN

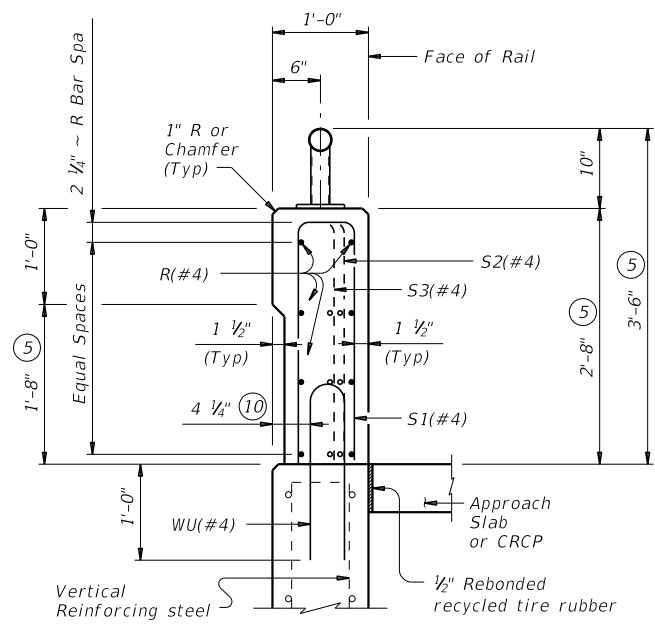
RAIL TURNDOWN BASE PLATE PLAN

HSS RAIL DETAILS

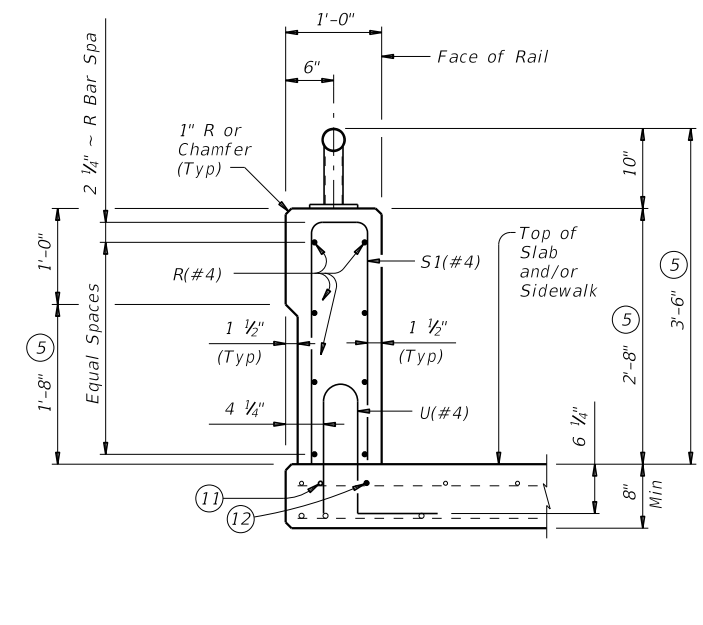
SHEET 1 OF 3

COMBINATION RAIL			
TYPE C221			
FILE: r1std018-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONV	SECT	JOB
REVISIONS			0522-1801 BRANDT RD
DIST	COUNTY	SHEET NO.	
HOU	FORT BEND	BR16	

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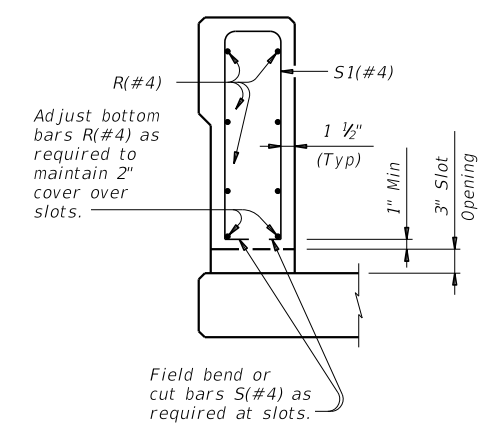


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

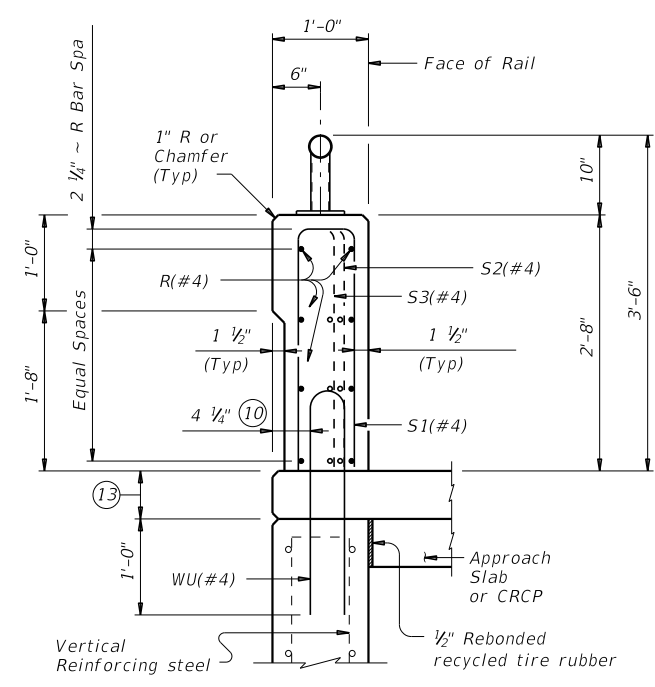


ON BRIDGE SLAB

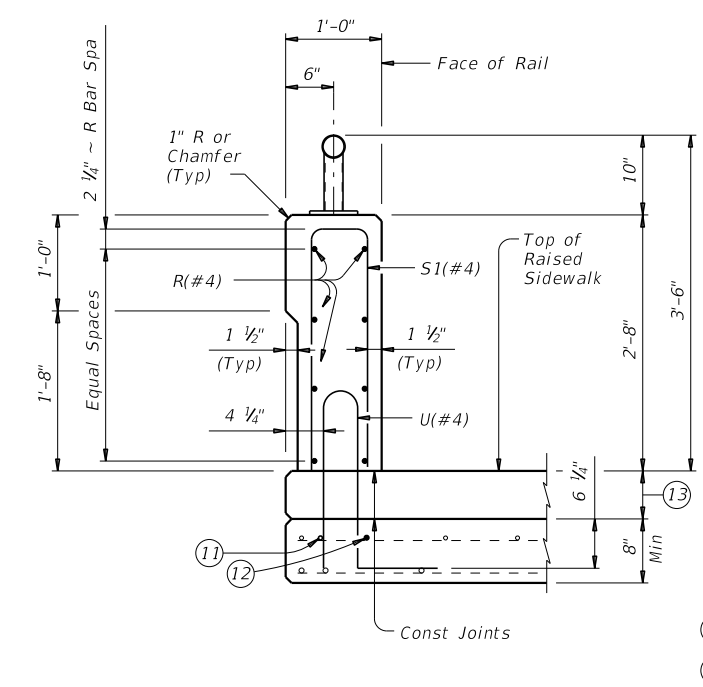
SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK



SECTION THRU OPTIONAL SIDE SLOT DRAIN

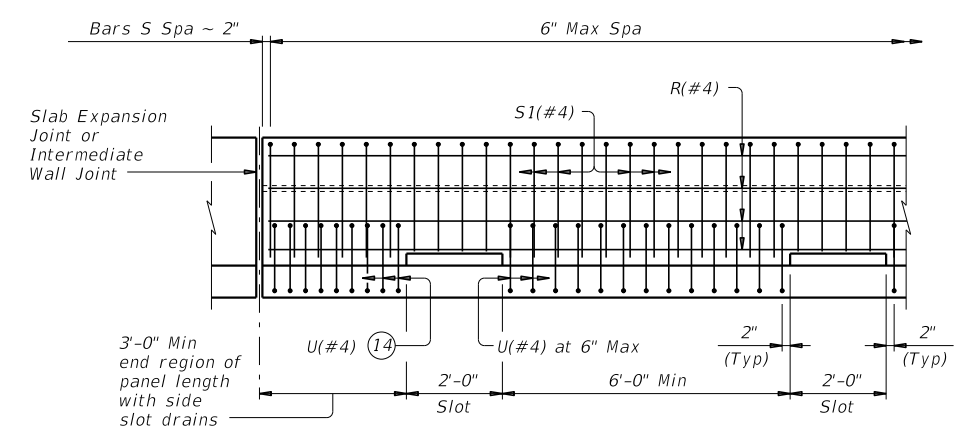


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL WITH RAISED SIDEWALK



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.

- ⑤ Increase 2" for structures with overlay.
- ⑩ 5 1/4" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.
- ⑪ As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractors expense.
- ⑫ Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.
- ⑬ Raised Sidewalk
- ⑭ Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.



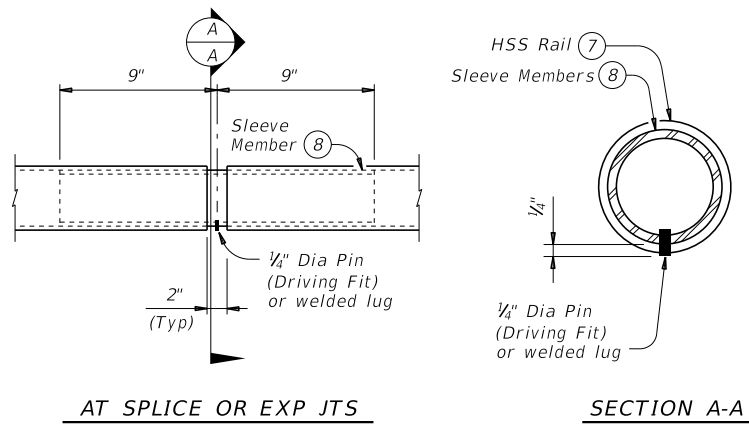
COMBINATION RAIL

TYPE C221

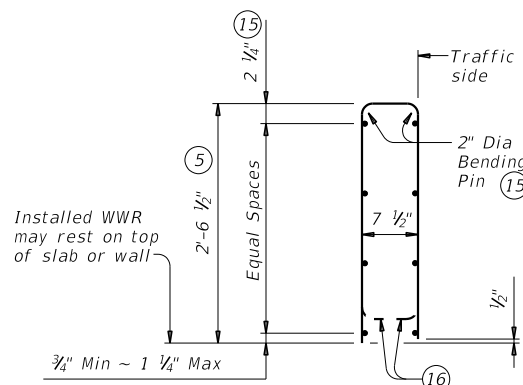
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©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0522-1801		BRANDT RD	
DIST	COUNTY	SHEET NO.		
HOU	FORT BEND	BR17		

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RAIL DATA FOR HORIZONTAL CURVES			
	RADIUS TO FACE OF RAIL	MAX CHORD LENGTH	CONSTRUCT OR FABRICATE
HSS Rail	Over 2800'	29'-0"	Straight rail panels
	Over 1400' thru 2800'	14'-6"	To required radius or to chords shown
	Over 700' thru 1400'	7'-3"	To required radius
	Thru 700'	Zero	To required radius



PIPE SPLICE DETAILS



OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
Minimum	No. of Wires 8	Spacing 4"
Maximum	No. of Wires 10	Spacing 8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer and when adhesive anchor bolts are used. Slipforming parapet is not allowed if anchor bolts are cast with parapet wall. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a 3/8" width x 1/4" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

At the Contractor's option anchor bolts may be cast with the parapet. See "Material Notes".

Face of rail, parapet must be plumb unless otherwise approved by the Engineer. HSS rail posts must be square to the top of parapet. Use epoxy mortar under post base plates if gaps larger than 1/16" exist.

Round or chamfer exposed edges of HSS rail and HSS rail posts to approximately 1/16" by grinding.

HSS rail sections must not include less than two posts, and no more than four (except at Abutments).

Chamfer all parapet exposed corners.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Provide ASTM A1085 or A500 Gr B or A53 Gr B for all HSS.

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over galvanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel". Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM 1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than that shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Anchor bolts must be 3/8" Dia ASTM A307 Gr A fully threaded rods with one hex nut and one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 3". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 5 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

Optional cast-in-place anchor bolts must be 3/8" Dia ASTM A307 Gr A bolts (or threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer (ASTM F436) at each bolt. Nuts must conform to ASTM A563 requirements.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

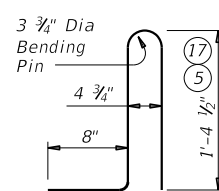
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Submit erection drawings showing panel lengths, rail post spacing, and anchor bolt setting to the Engineer for approval.

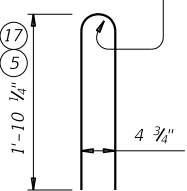
Average weight of railing with no overlay: 380 plf (total)
370 plf (Conc)
10 plf (Steel)

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

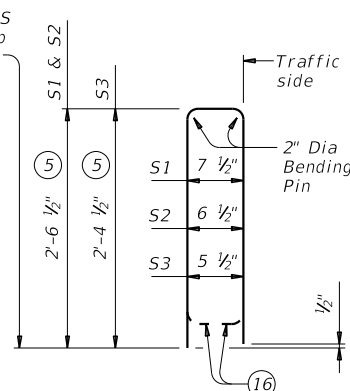
BARS U (#4)



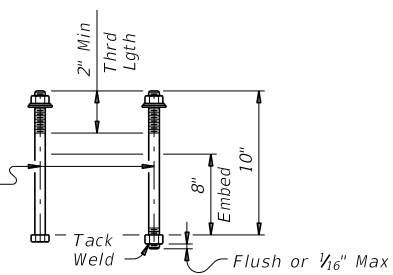
BARS WU (#4)



BARS S (#4)

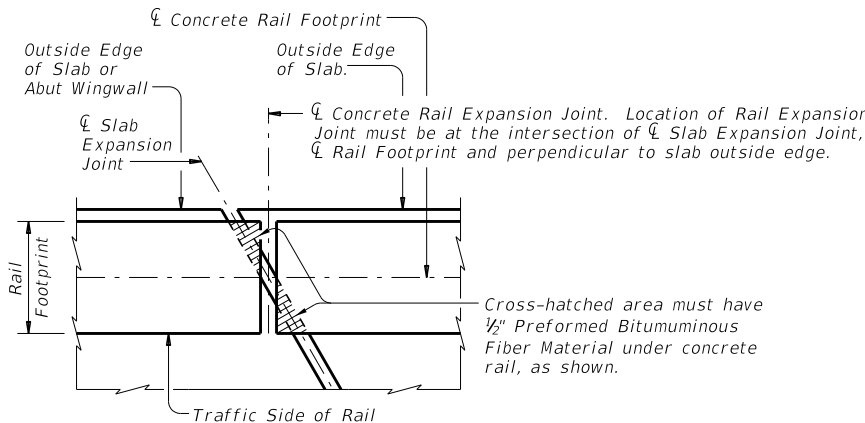


3/8" Dia hex head anchor bolt or threaded rod (ASTM A307 Gr A) with one hardened steel washer (ASTM F436) placed under each hex nut (ASTM A563). One additional hex nut must be furnished and tack welded for each threaded rod.



CAST-IN-PLACE ANCHOR BOLT OPTIONS (18)

- (5) Increase 2" for structures with overlay.
- (7) HSS 2.875 x 0.203
- (8) HSS 2.375 x 0.154
- (15) No longitudinal wires may be in top center of cage.
- (16) Bend or cut as required to clear drain slots.
- (17) For raised sidewalks, add sidewalk height to total bar height. Use sidewalk height at rail's location.
- (18) See "Material Notes" for anchor bolt information.



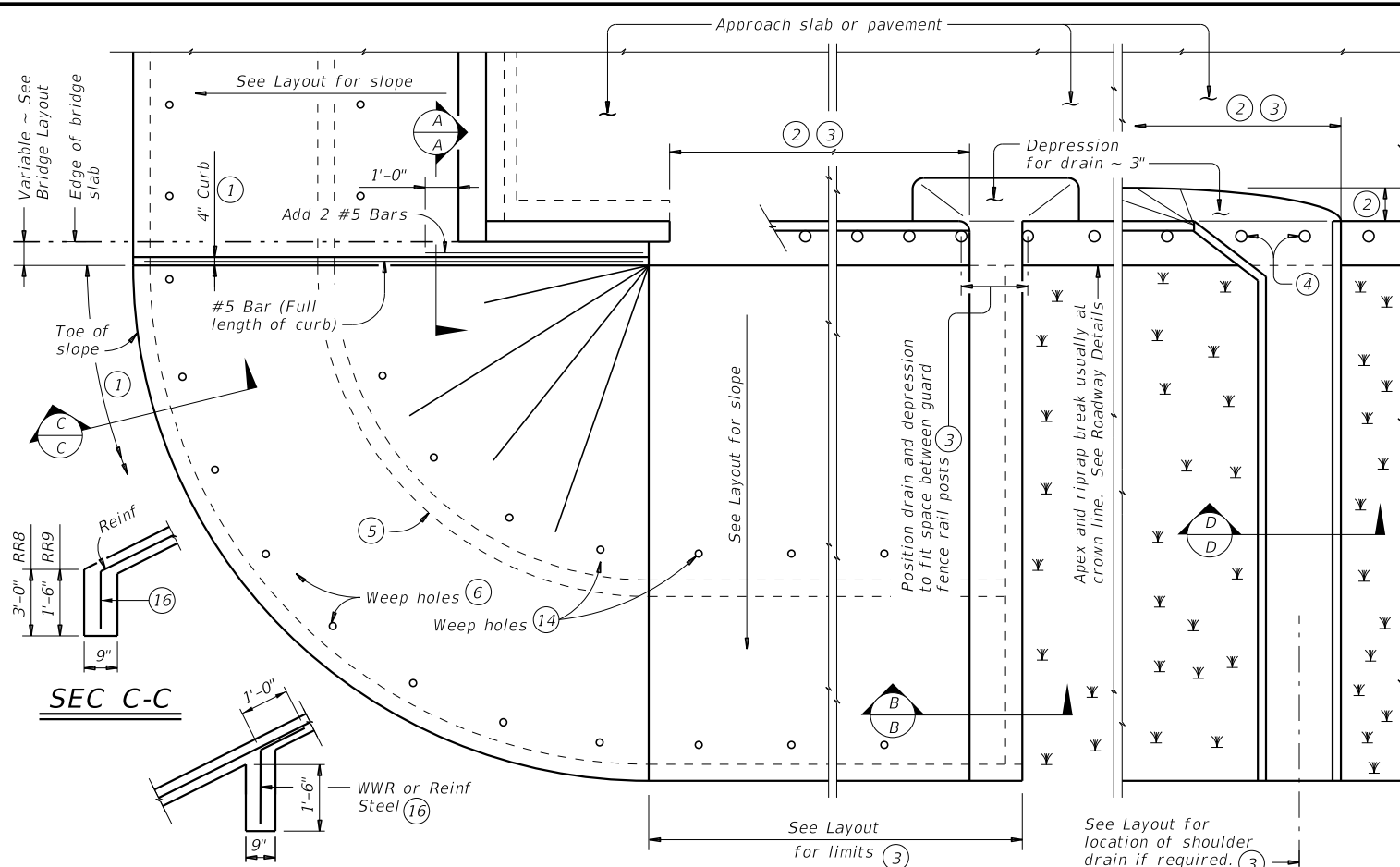
PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

		Bridge Division Standard	
<h2>COMBINATION RAIL</h2>			
<h3>TYPE C221</h3>			
FILE: r1std018-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONTRACT	SECTION	JOB
REVISIONS			0522-1801 BRANDT RD
	DIST	COUNTY	SHEET NO.
	HOU	FORT BEND	BR18

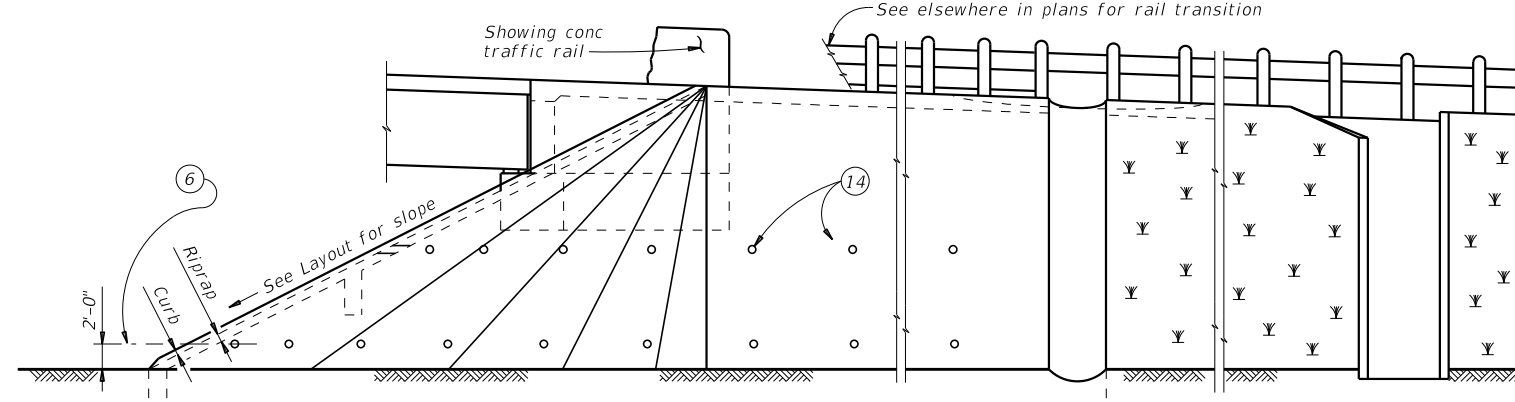
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DATE: 12/9/2022 12:53:44 PM
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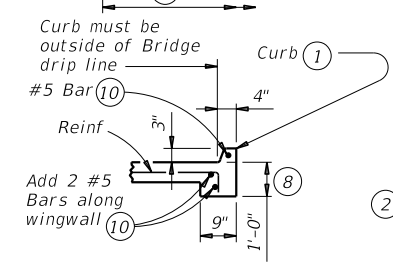


INTERMEDIATE TOEWALL 5

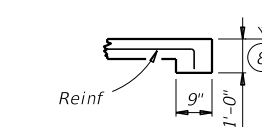
PLAN



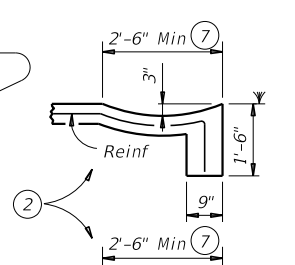
ELEVATION



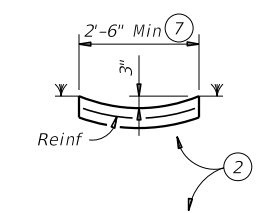
SEC A-A



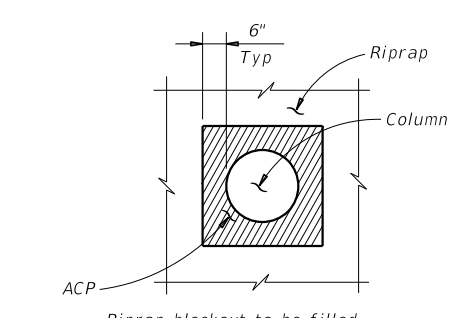
SEC B-B
(No drain)



SEC B-B
(Shoulder drain integral with riprap)

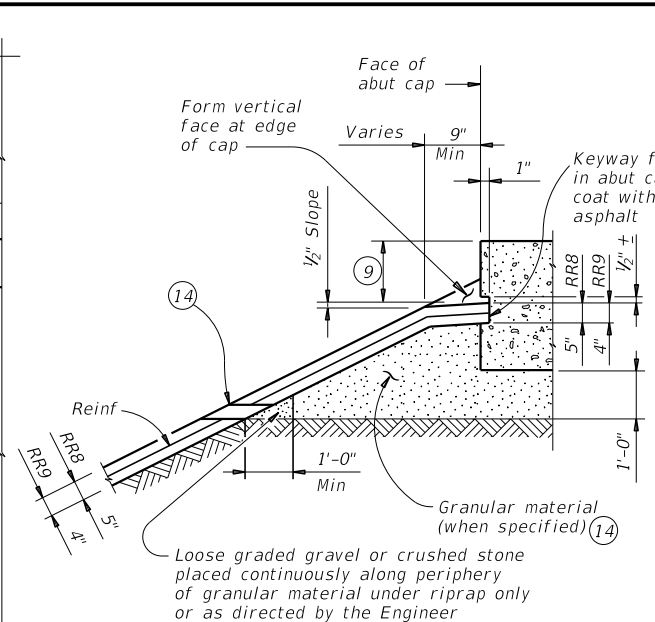


SEC D-D
(Shoulder drain)

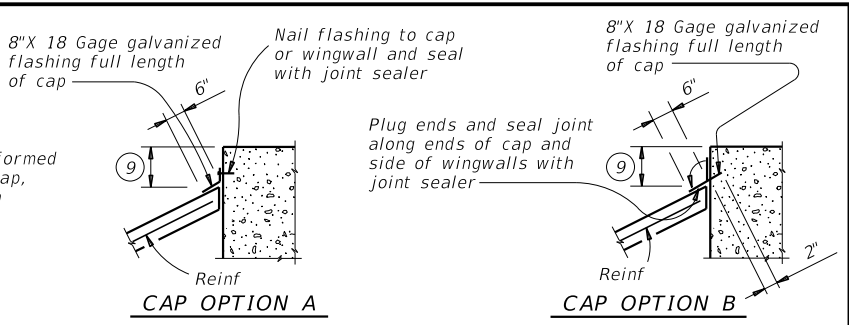


RIPRAP DETAIL AT COLUMNS

(As directed by the Engineer)

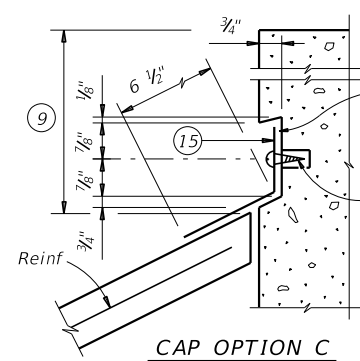


SHOWING KEYWAY OPTION



CAP OPTION A

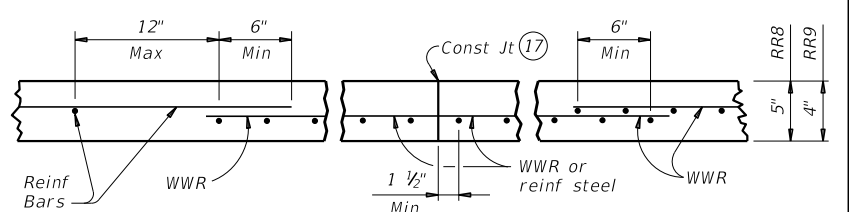
CAP OPTION B



CAP OPTION C

SECT THRU RIPRAP AT WINGWALL 12

SECTIONS THRU RIPRAP AT CAP 11



REINFORCEMENT DETAILS 13

See General Notes for optional synthetic fiber reinforcement.

- 1 When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
- 2 Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
- 3 Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
- 4 See details elsewhere in plans for installation of guard fence posts through concrete riprap.
- 5 Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
- 6 Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
- 7 Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
- 8 Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
- 9 Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
- 10 #5 bars shown are required even when synthetic fiber reinforcing option is selected.
- 11 Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
- 12 Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
- 13 Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
- 14 If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
- 15 8" x 18 Gage Galv Sheet Metal
- 16 Provide WWR or #3 bars, with 1'-0" extension into slope.
- 17 WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

GENERAL NOTES:

- Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.
- Provide Grade 60 reinforcing steel.
- Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.
- Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.
- Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.
- Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.
- Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap". See Layout for limits of riprap.
- RR8 is to be used on stream crossings.
- RR9 is to be used on other embankments.

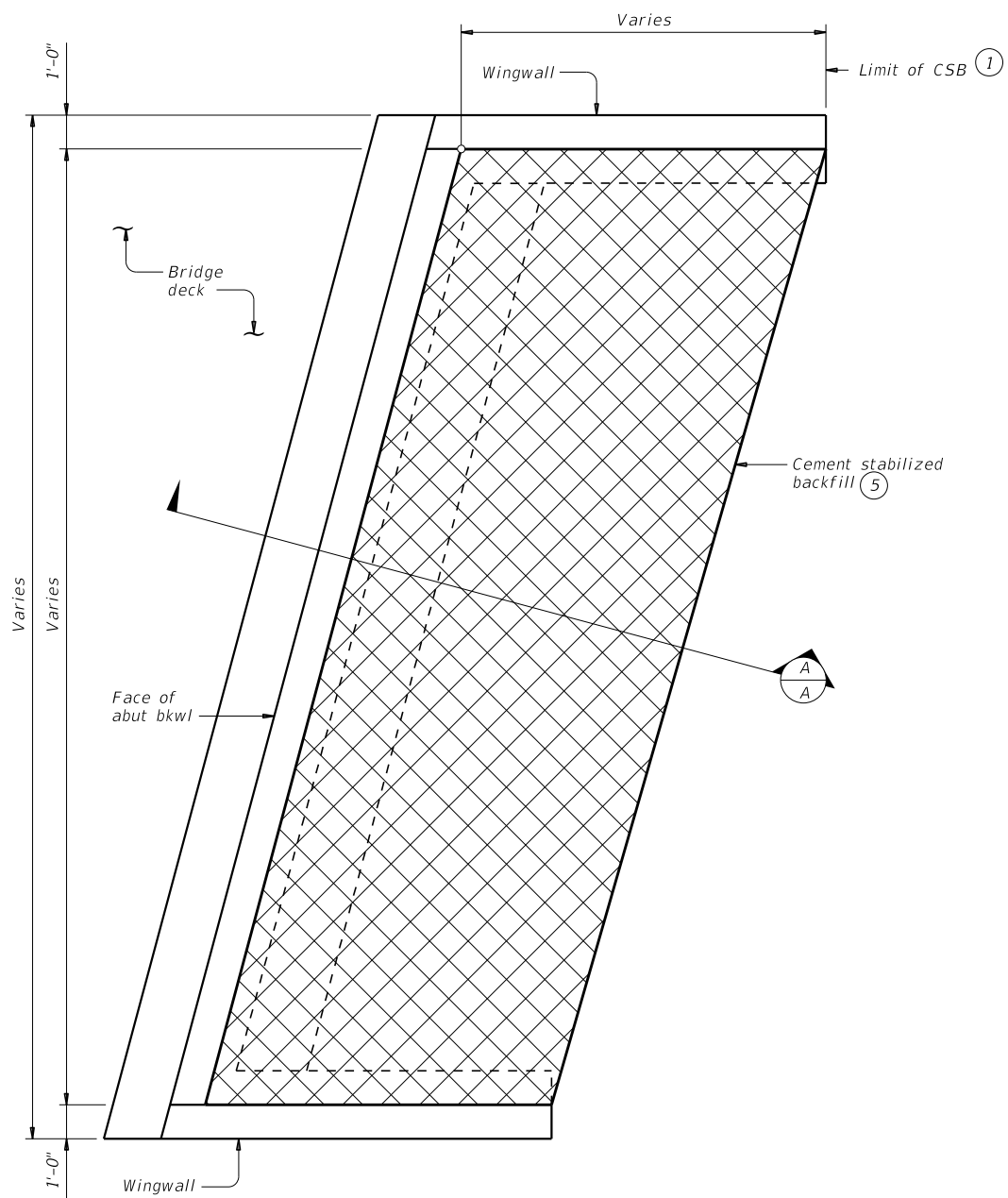
FOR CONTRACTOR'S INFORMATION ONLY:

5" of RR8	= 0.015 CY/SF
4" of RR9	= 0.012 CY/SF
#3 Reinf at 18" c-c	= 0.501 Lbs/SF
6x6-D3xD3	= 0.408 Lbs/SF

		Bridge Division Standard	
CONCRETE RIPRAP AND SHOULDER DRAINS EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)			
CRR			
FILE: crrstd1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT April 2019	CON: TxDOT	SECT: 0522-1801	JOB: BRANDT RD
REVISIONS		DIST: HOU	COUNTY: FORT BEND
		SHEET NO: BR19	

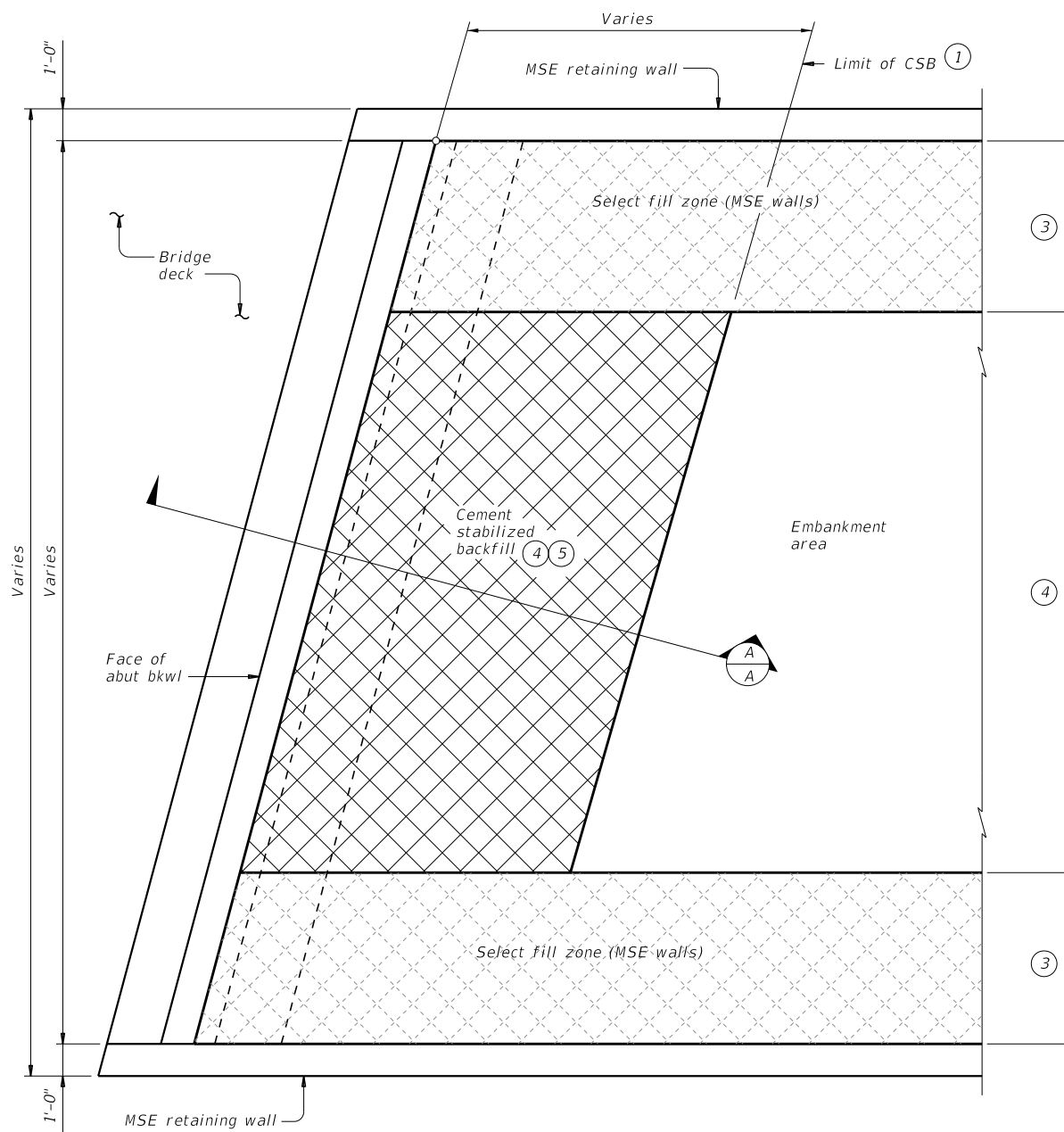
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OPTION 1 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.

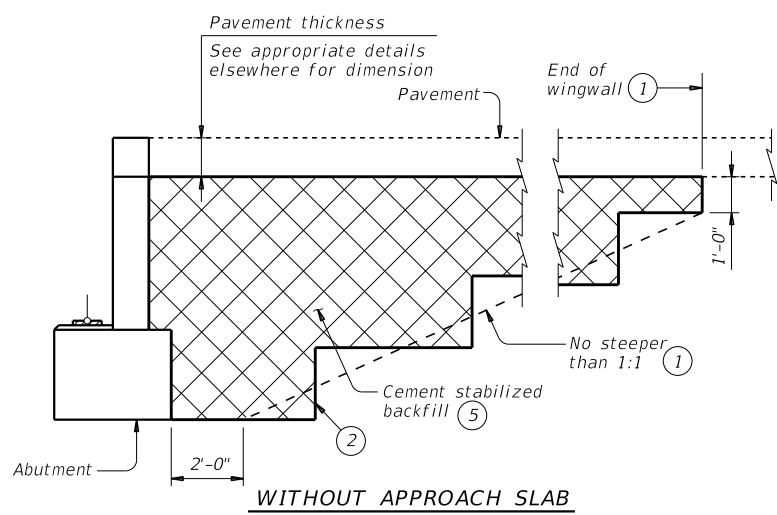


OPTION 1 ~ PLAN WITH MSE RETAINING WALLS

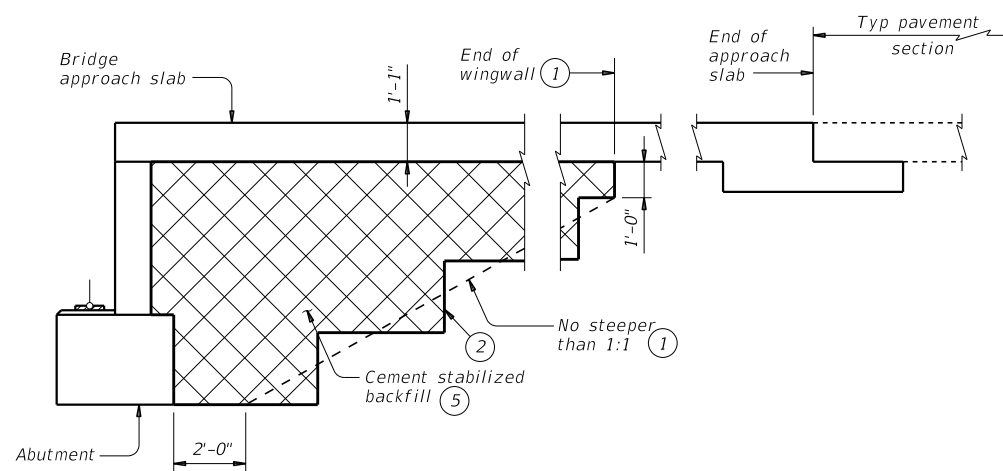
- ① Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.
- ② Bench backfill as shown with 12" (approximate) bench depths.
- ③ Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
- ④ When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.
- ⑤ If shown in the plans flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
 - a) If flowable backfill is to be placed over MSE backfill then a filter fabric will be placed over the flowable fill; and
 - b) Place flowable fill in lifts not exceeding 2 feet in height, place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).

GENERAL NOTES:

See the Bridge Layout for selected Option. Option 2 is intended for new construction requiring high plasticity embankment fill with a plasticity index (PI) greater than 30 or pavement built in poor native soil. Poor soils are defined as high plasticity clays or expansive clays. Option 1 is intended for construction only requiring PI controlled embankment fill or excavation in competent soils/rocks in order to construct the abutment. Provide Cement Stabilized Backfill (CSB) meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments. If required elsewhere in the plans, provide Flowable Backfill meeting the requirements of Item 401, "Flowable Backfill", to the limits shown at bridge abutments. Details are drawn showing left forward skew. See Bridge Layout for actual skew direction. These details do not apply when Concrete Block retaining walls are used in lieu of wingwalls.



WITHOUT APPROACH SLAB



SECTION A-A

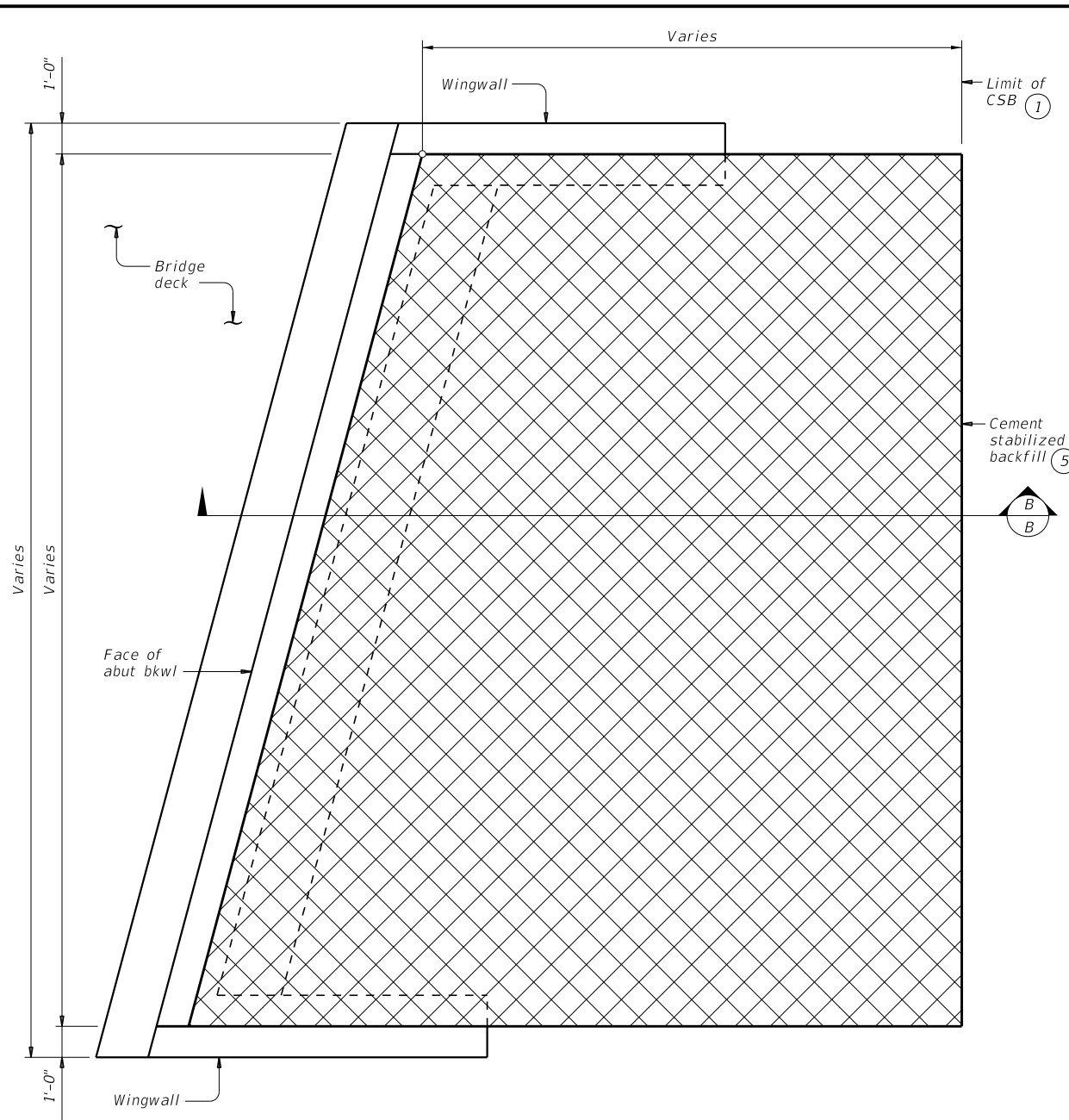
WITH APPROACH SLAB
 (Showing BAS-C, BAS-A similar.)

SHEET 1 OF 2

		Bridge Division Standard	
CEMENT STABILIZED ABUTMENT BACKFILL BRIDGE ABUTMENT			
CSAB			
FILE: csabste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT April 2019	CONTRACT	SECTION	JOB
02-20: Added Option 2.			0522-1801 BRANDT RD
	DIST	COUNTY	SHEET NO.
	HOU	FORT BEND	BR20

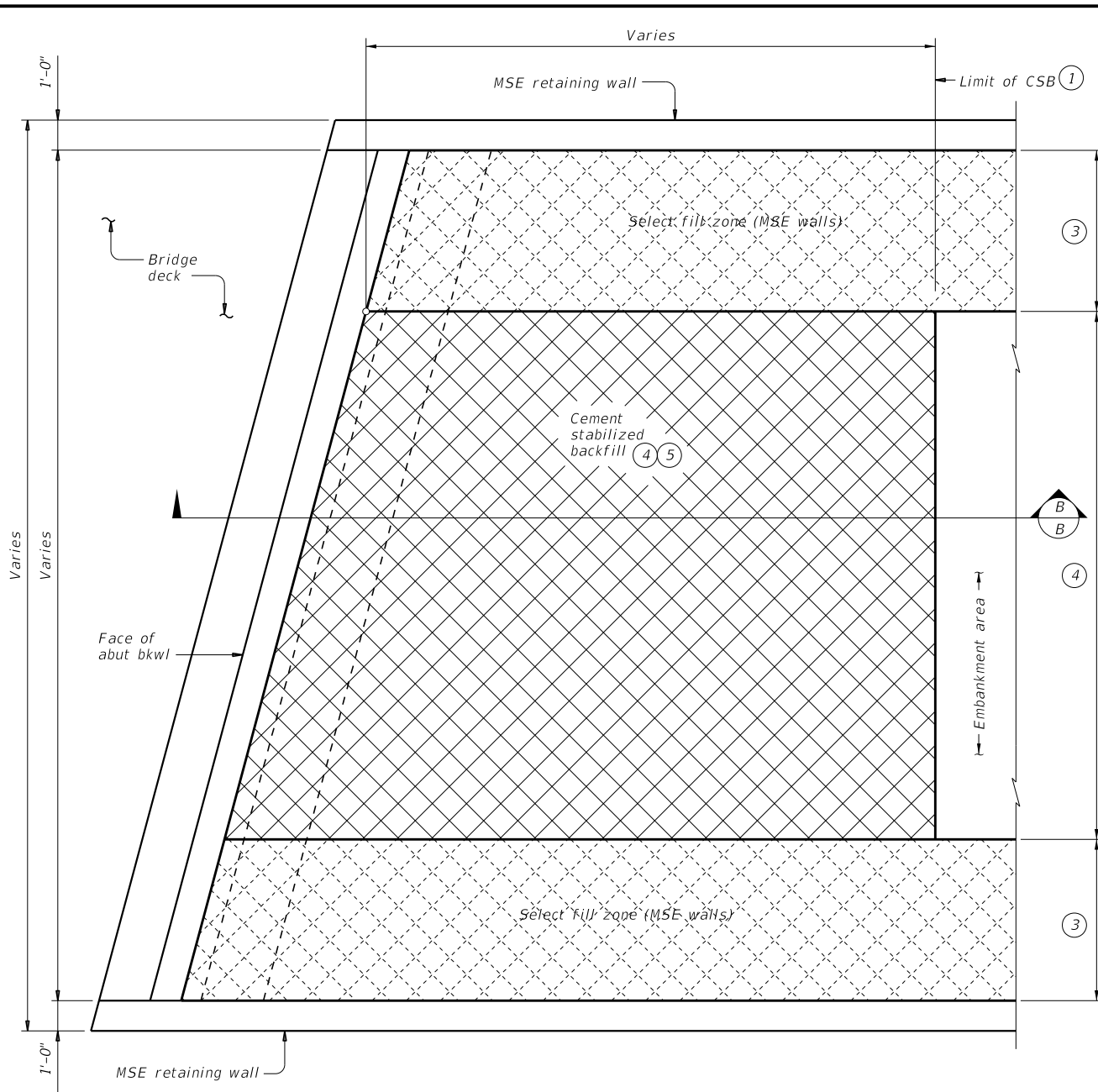
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 FILE: \\pusscshrf1101\J-Jobs\2113 Terra Brandt Lone\06.00 Design\06.04 Sheet 5\06.04.dgn



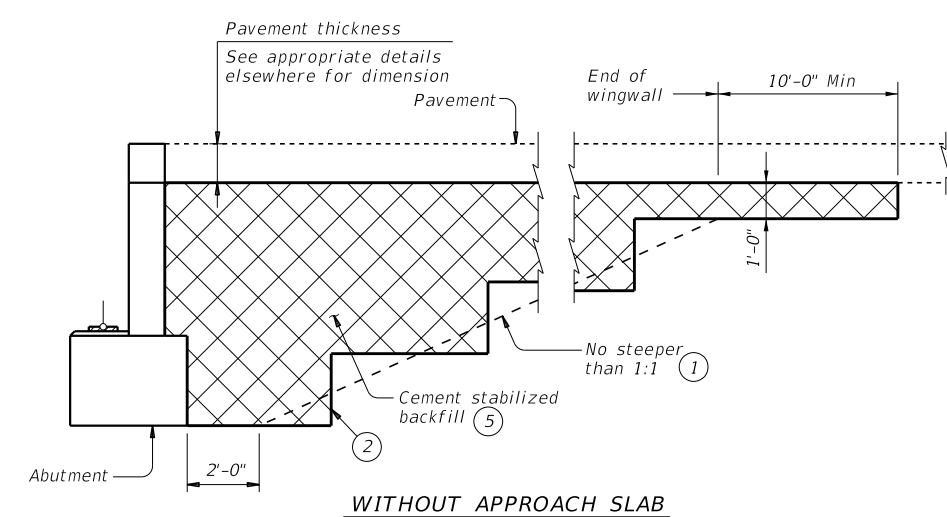
OPTION 2 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.

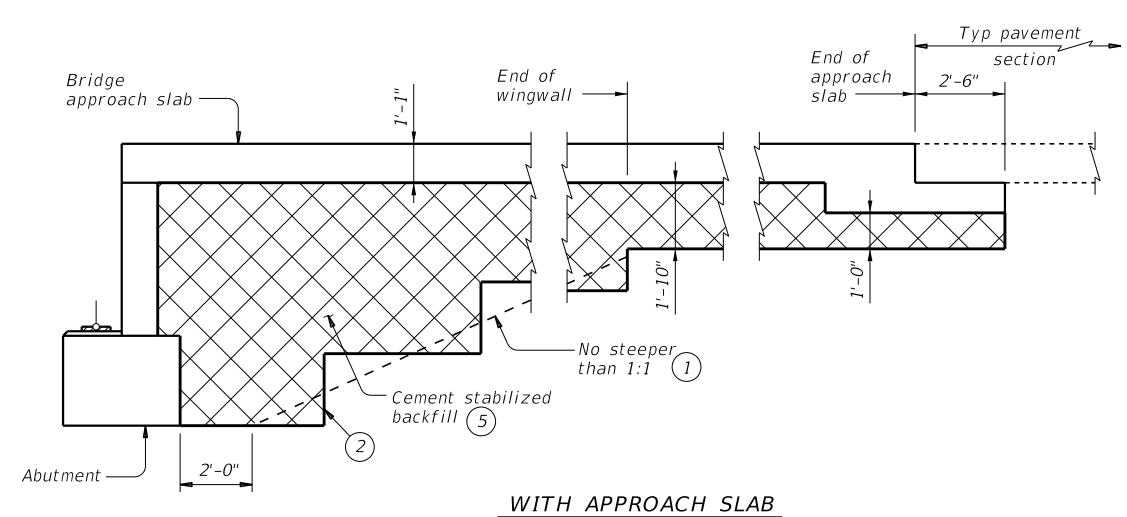


OPTION 2 ~ PLAN WITH MSE RETAINING WALLS

- ① Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.
- ② Bench backfill as shown with 12" (approximate) bench depths.
- ③ Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
- ④ When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.
- ⑤ If shown in the plans flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
 - a). If flowable backfill is to be placed over MSE backfill then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
 - b). Place flowable fill in lifts not exceeding 2 feet in height, place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).



WITHOUT APPROACH SLAB



SECTION B-B

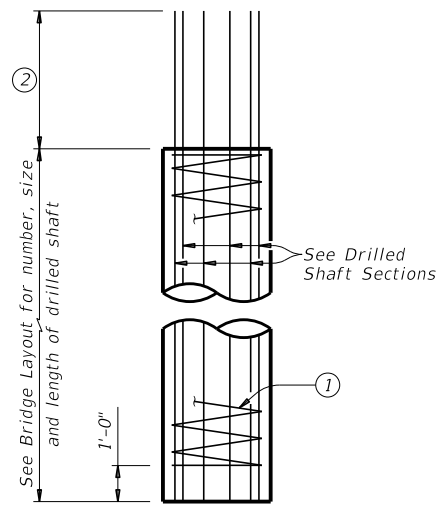
WITH APPROACH SLAB
 (Showing BAS-C, BAS-A similar.)

SHEET 2 OF 2

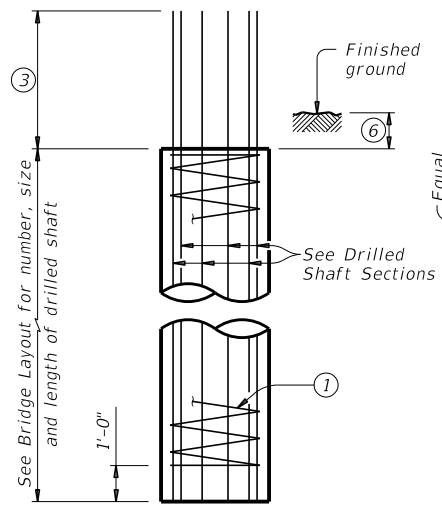
		Bridge Division Standard	
CEMENT STABILIZED ABUTMENT BACKFILL BRIDGE ABUTMENT			
CSAB			
FILE: csabste1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT April 2019	CONTRACT	SECTION	JOB
REVISIONS	0522-1801		BRANDT RD
02-20: Added Option 2.	DIST	COUNTY	SHEET NO.
	HOU	FORT BEND	BR21

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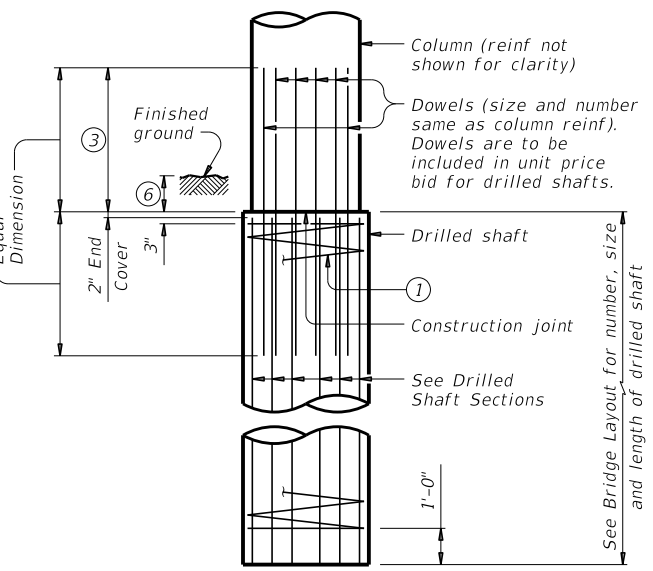
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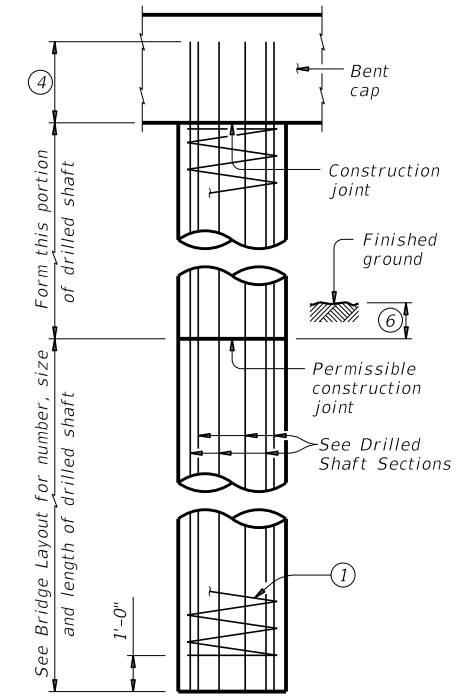
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



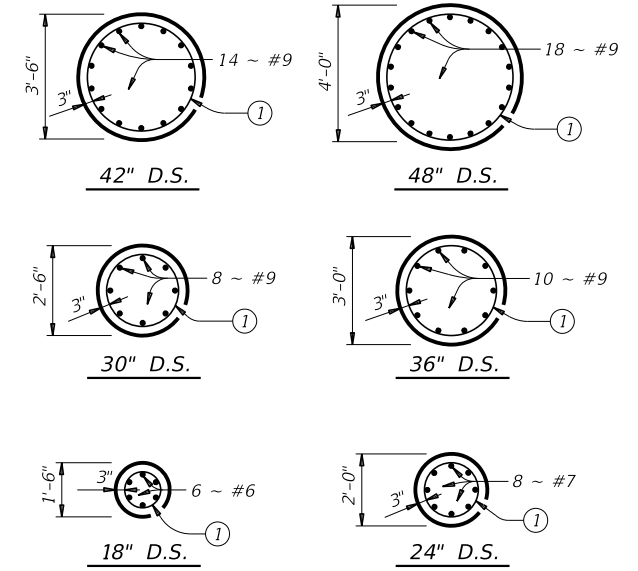
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL

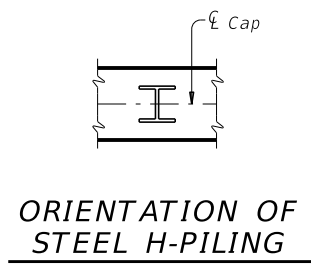


DRILLED SHAFT SECTIONS

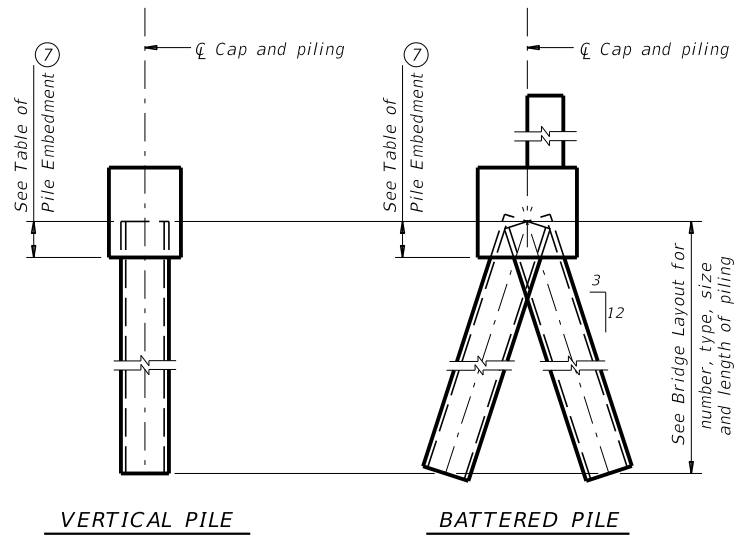
DRILLED SHAFT DETAILS

TABLE OF PILE EMBEDMENT	
Pile Type	Embedment Depth (Ft)
16" Sq Concrete 18" Sq Concrete HP14 Steel HP16 Steel	1'-0"
20" Sq Concrete 24" Sq Concrete HP18 Steel	1'-6"

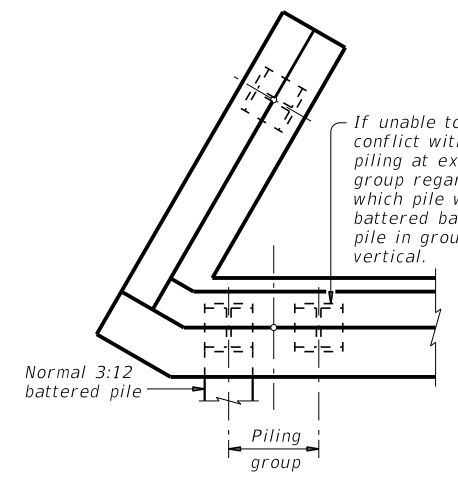
See Prestressed Concrete Piling (CP) standard for additional details on concrete pile embedment.



ORIENTATION OF STEEL H-PIILING

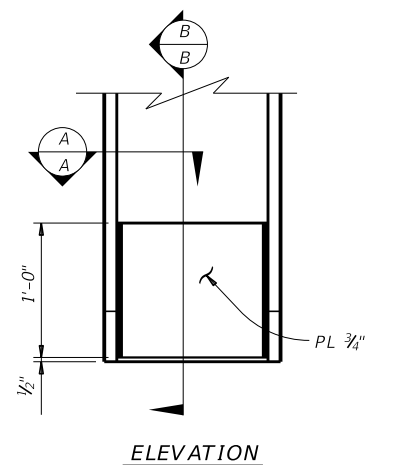


PIILING DETAILS
(Concrete or steel H)



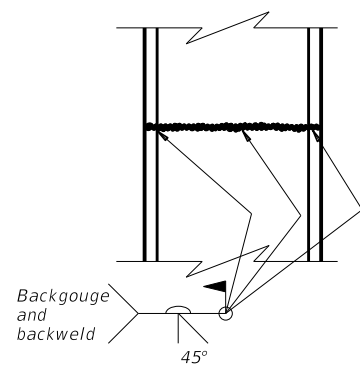
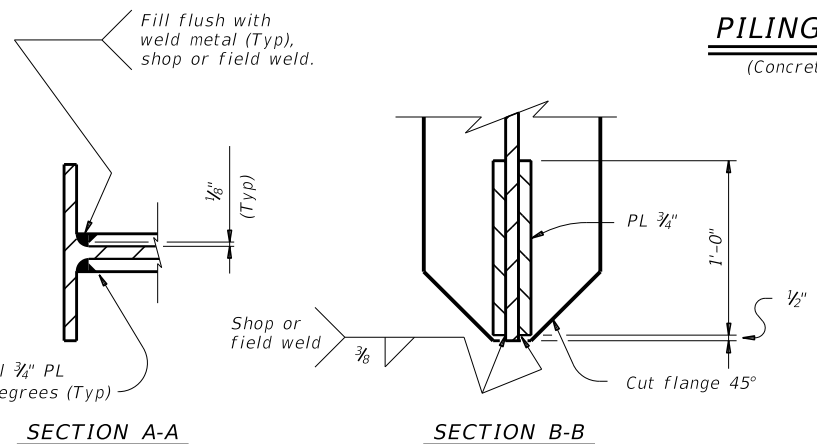
DETAIL "A"
(Showing plan view of a 30° skewed abutment)

- ① #3 spiral at 6" pitch (one and a half flat turns top and bottom).
- ② Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-0"
#9 Bars = 2'-3"
- ③ Min lap with column reinf:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"
- ④ Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-3"
#9 Bars = 2'-9"
- ⑤ Drilled shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the drilled shaft diameter equals the column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.
- ⑥ 1'-0" Min, unless shown otherwise on plans.
- ⑦ Or as shown on plans.



STEEL H-PILE TIP REINFORCEMENT

See Item 407 "Steel Piling" to determine when tip reinforcement is required and for options to the details shown.



STEEL H-PILE SPLICE DETAIL

Use when required.

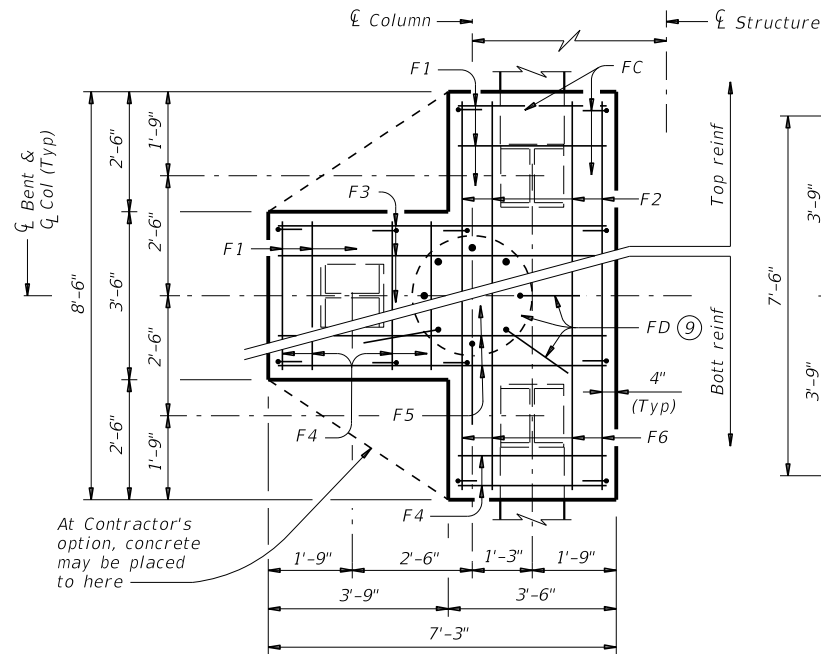
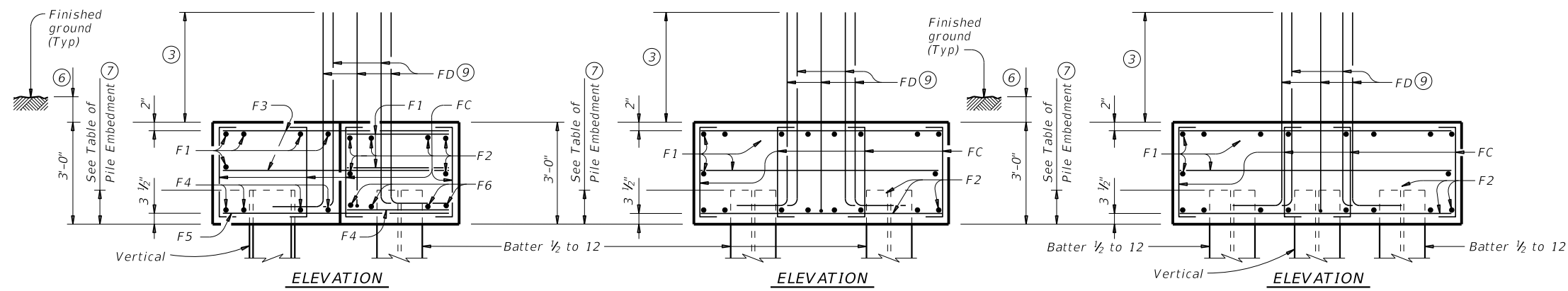
		Bridge Division Standard	
COMMON FOUNDATION DETAILS			
FD			
FILE: fdst0e01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT April 2019	CONTRACT	SECTION	JOB
01-20: Added #11 bars to the FD bars.			0522-1801 BRANDT RD
	DIST	COUNTY	SHEET NO.
	HOU	FORT BEND	BR22

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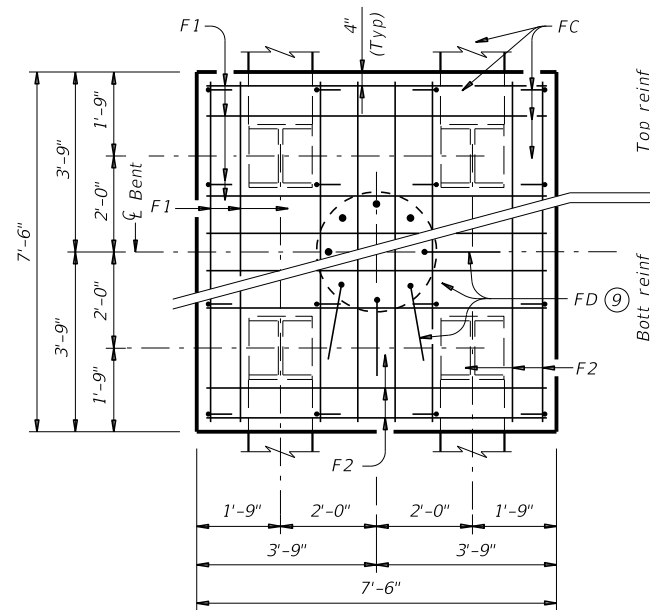
DATE: 12/9/2022 12:53:48 PM
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TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS

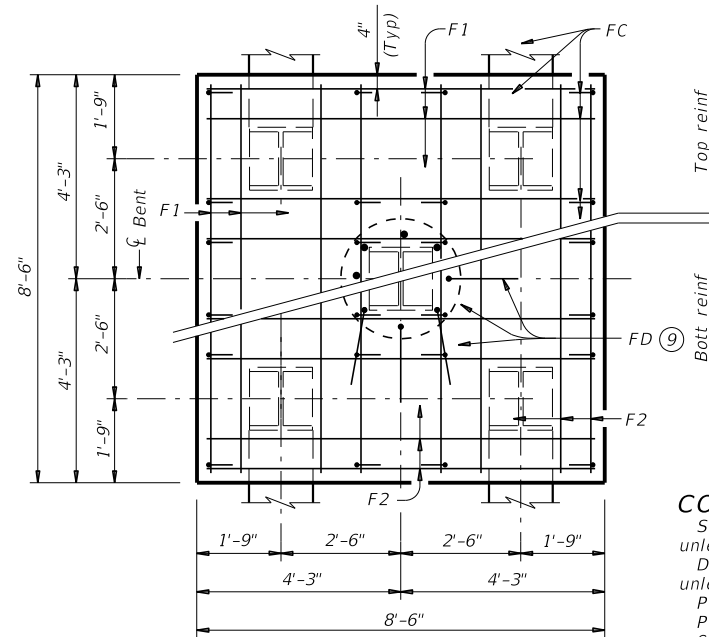
ONE 3 PILE FOOTING					
Bar	No.	Size	Length	Weight	
F1	11	#4	3'- 2"	23	
F2	6	#4	8'- 2"	33	
F3	6	#4	6'- 11"	28	
F4	8	#9	3'- 2"	86	
F5	4	#9	6'- 11"	94	
F6	4	#9	8'- 2"	111	
FC	12	#4	3'- 6"	28	
FD(10)	8	#9	8'- 1"	220	
Reinforcing Steel				Lb	623
Class "C" Concrete				CY	4.8
ONE 4 PILE FOOTING					
Bar	No.	Size	Length	Weight	
F1	20	#4	7'- 2"	96	
F2	16	#8	7'- 2"	306	
FC	16	#4	3'- 6"	37	
FD(10)	8	#9	8'- 1"	220	
Reinforcing Steel				Lb	659
Class "C" Concrete				CY	6.3
ONE 5 PILE FOOTING					
Bar	No.	Size	Length	Weight	
F1	20	#4	8'- 2"	109	
F2	16	#9	8'- 2"	444	
FC	24	#4	3'- 6"	56	
FD(10)	8	#9	8'- 1"	220	
Reinforcing Steel				Lb	829
Class "C" Concrete				CY	8.0



THREE PILE FOOTING⁸
 For 36" Dia and smaller columns.



FOUR PILE FOOTING⁸
 For 42" Dia and smaller columns.



FIVE PILE FOOTING⁸
 For 42" Dia and smaller columns.

CONSTRUCTION NOTES:

- See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise.
- Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile unless shown otherwise.
- Provide Class C Concrete ($f'_c = 3,600$ psi), unless shown otherwise.
- Provide Grade 60 reinforcing steel.
- Galvanize reinforcing if shown elsewhere in the plans.
- Provide bar laps for drilled shaft reinforcing, where required, as follows:
 - Uncoated or galvanized (#6) ~ 2'-6"
 - Uncoated or galvanized (#7) ~ 2'-11"
 - Uncoated or galvanized (#9) ~ 3'-9"

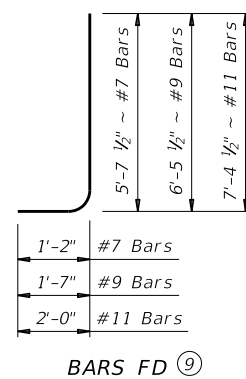
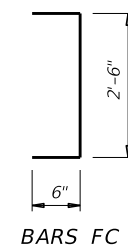
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bar dimensions shown are out-to-out of bar.

DESIGNER NOTES:

- Do not use the drilled shaft details shown on this standard for retaining wall, noise wall, barrier, or sign foundations without structural evaluation.
- Do not use the footings shown on this standard in direct contact with salt water or exposed to salt water spray.
- Maximum allowable pile loads for the footings shown are:
 - 72 Tons/Pile with 24" Dia Columns
 - 80 Tons/Pile with 30" Dia Columns
 - 100 Tons/Pile with 36" Dia Columns
 - 120 Tons/Pile with 42" Dia Columns



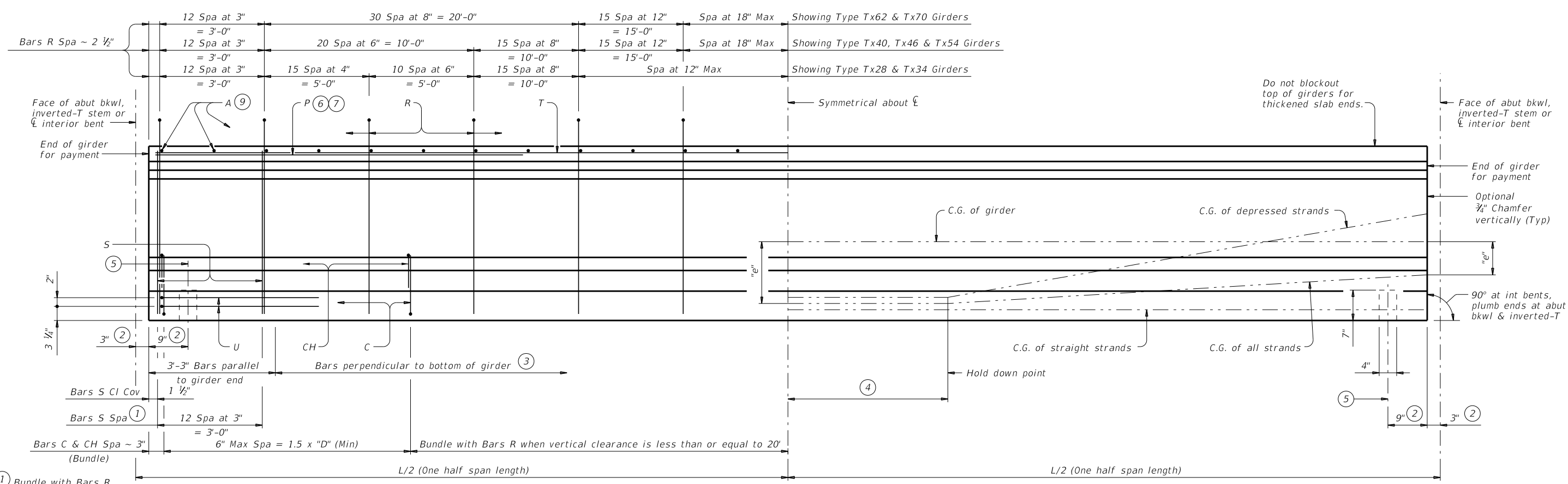
- ③ Min lap with column reinforcing:
 - #7 Bars = 2'-11"
 - #9 Bars = 3'-9"
 - #11 Bars = 4'-8"
- ⑥ 1'-0" Min, unless shown otherwise on plans.
- ⑦ Or as shown on plans.
- ⑧ See Bridge Layout for type, size and length of piling.
- ⑨ Number and size of FD bars must match column reinforcing. Tie FD bars to the top of the bottom reinforcing mat.
- ⑩ Adjust FD quantity, size and weight as needed to match column reinforcing.

COMMON FOUNDATION DETAILS

FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONTRACT	SECTION	JOB	HIGHWAY
REVISIONS	0522-1801		BRANDT RD	
01-20: Added #11 bars to the FD bars.	DIST	COUNTY	SHEET NO.	
	HOU	FORT BEND	BR23	

DATE: 12/9/2022 12:53:49 PM
 FILE: \\psscshrf1101\J-Jobs\2113 Terra Brandt Lone\06.00 Design\06.04 Sheet\IGD\06.04.dgn
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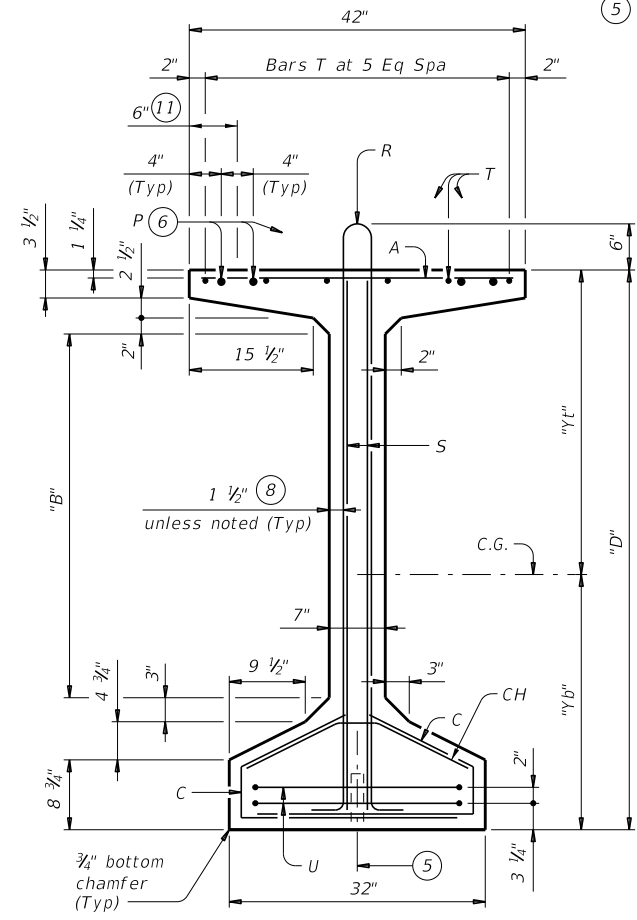
- ① Bundle with Bars R.
- ② Measured along ϵ Girder at interior bents; perpendicular to abutment bkwl or inverted-T stem.
- ③ The average of the top and bottom spacing of Bars R cannot exceed the required spacing.
- ④ L/20, but not less than 5'-0" (-0,+2').

GIRDER ELEVATION

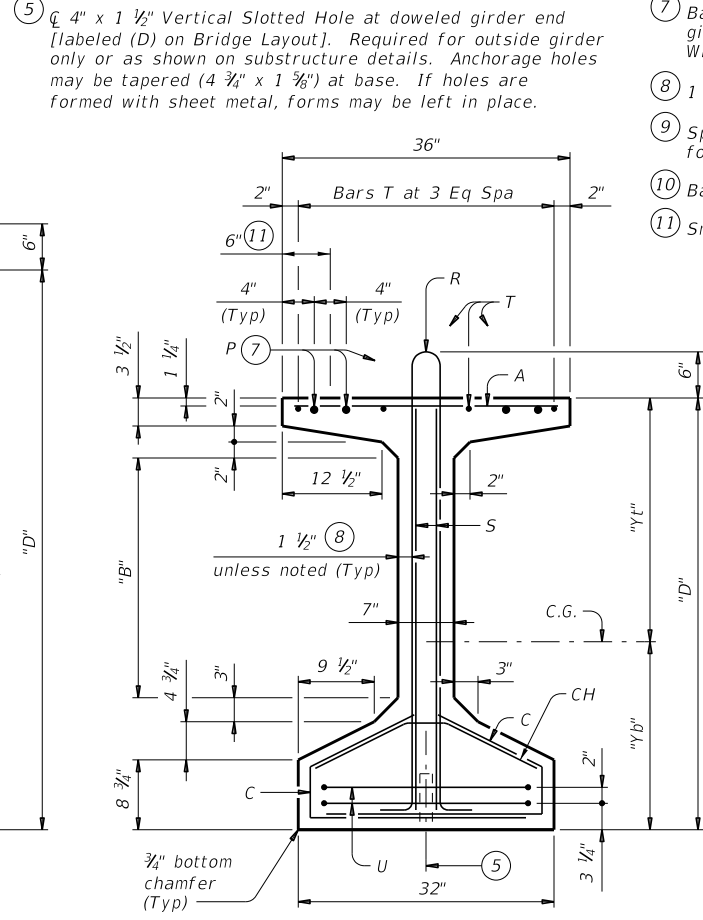
- ⑥ Bars P (#6 x 15'-0") required in Tx62 and Tx70 girders. At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.
- ⑦ Bars P (#6 x 15'-0") are only required in Tx28, Tx34, Tx40, Tx46, and Tx54 girders when "e" at girder ends exceeds 0.25 x "D". At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.
- ⑧ 1 3/8" Clear Cover to Bars S.
- ⑨ Space Bars A at 6" Max for girders requiring overhang bracket hangers. Space at 12" Max for all other girders. Tie to Bars R as necessary. See standard IGMS for "Deck Forming Notes".
- ⑩ Based on 155 pcf total weight of concrete and reinforcing steel.
- ⑪ Smooth trowel finish on the slab overhang side of exterior girder.

GIRDER DIMENSIONS AND SECTION PROPERTIES								
Girder Type	"D" (in.)	"B" (in.)	"Yt" (in.)	"Yb" (in.)	Area (in. ²)	"Ix" (in. ⁴)	"Iy" (in. ⁴)	Weight (plf) ⁽¹⁰⁾
Tx28	28	6	15.02	12.98	585	52,772	40,559	630
Tx34	34	12	18.49	15.51	627	88,355	40,731	675
Tx40	40	18	21.90	18.10	669	134,990	40,902	720
Tx46	46	22	25.90	20.10	761	198,089	46,478	819
Tx54	54	30	30.49	23.51	817	299,740	46,707	880
Tx62	62	37 1/2	33.72	28.28	910	463,072	57,351	980
Tx70	70	45 1/2	38.09	31.91	966	628,747	57,579	1,040

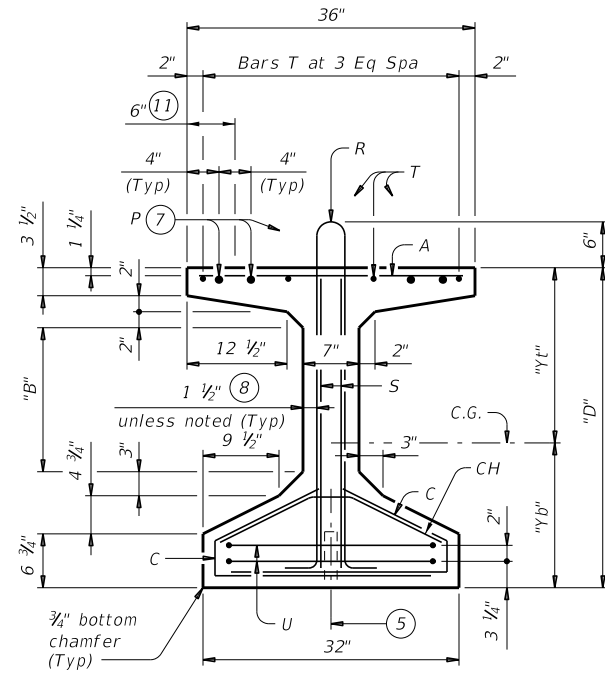
GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications. Provide Class H concrete. Provide Grade 60 reinforcing steel. An equal area of deformed Welded Wire Reinforcement (WWR) (ASTM A1064) may be substituted for Bars A, C, R or T unless otherwise noted. It is permissible for bars or strands to come in contact with materials used in forming anchor holes.
 Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



TYPE Tx62 & Tx70



TYPE Tx46 & Tx54



TYPE Tx28, Tx34 & Tx40

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation
 Bridge Division Standard

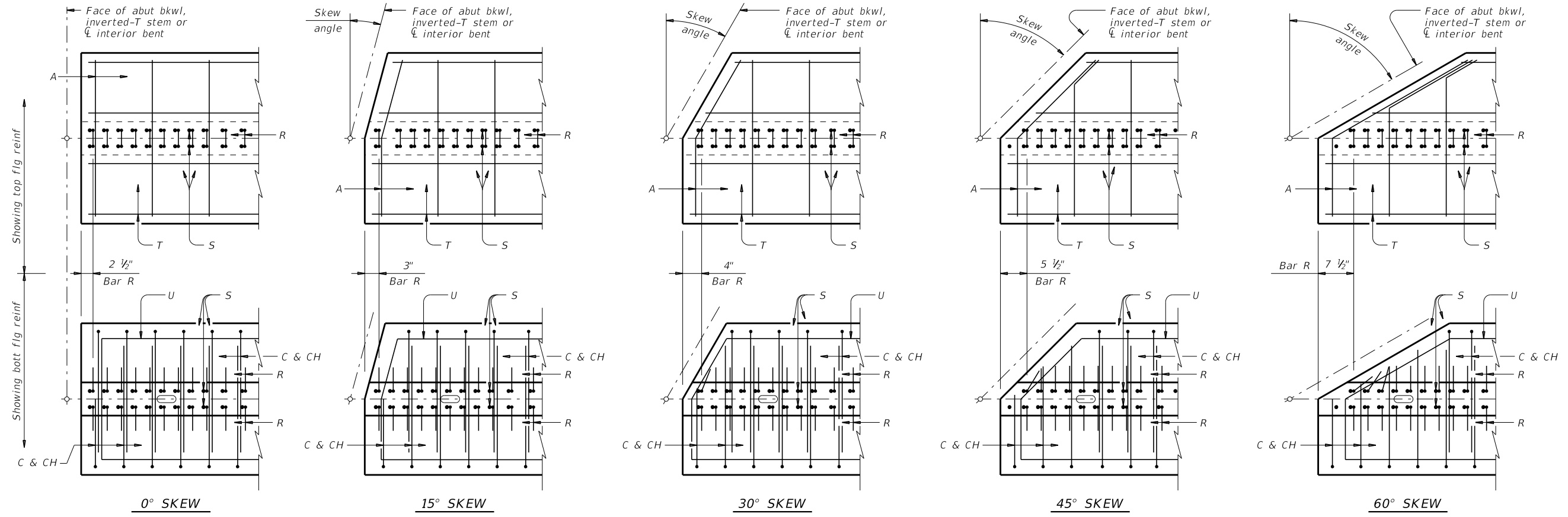
PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

FILE: igdstds1-19.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TAR
©TxDOT August 2017	CONV	SECT	JOB	HIGHWAY
REVISIONS	0522-1801		BRANDT RD	
10-19: Added Bars C and CH full length for VC <= 20'	DIST	COUNTY	SHEET NO.	
	HOU	FORT BEND	BR24	

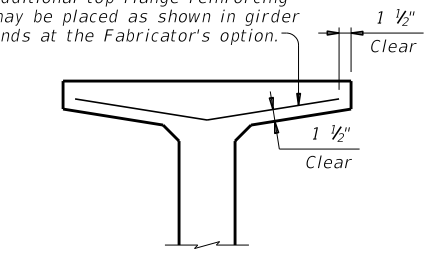
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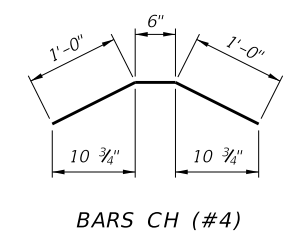


PLAN OF GIRDER ENDS (12)

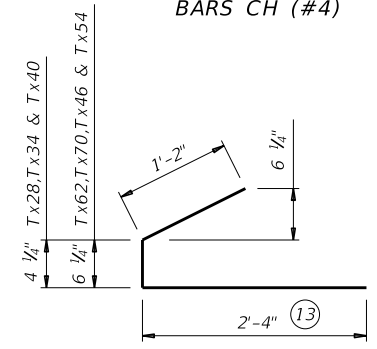
To control top flange cracking that may occur during form removal, additional top flange reinforcing may be placed as shown in girder ends at the Fabricator's option.



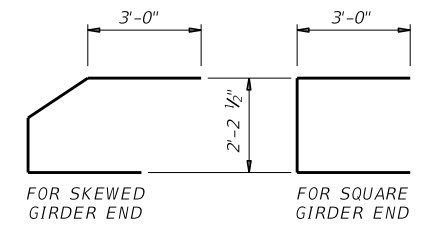
OPTIONAL TOP FLANGE REINFORCING DETAIL



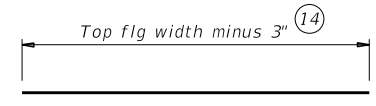
BARS CH (#4)



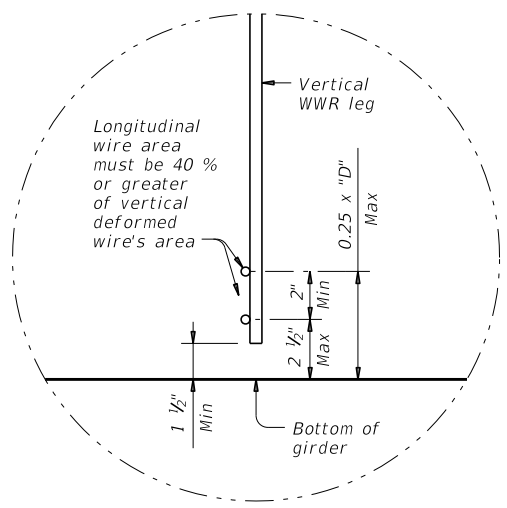
BARS C (#4)



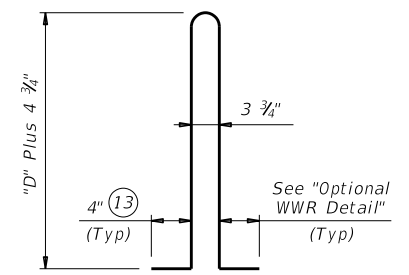
BARS U (#5)



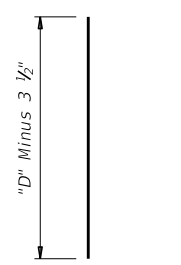
BARS A (#3)



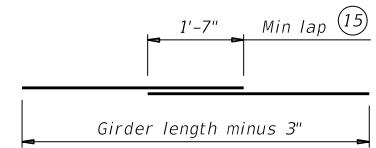
OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL



BARS R (#4) (16)



BARS S (#6)



BARS T (#4)

- (12) Reinforcing patterns shown are provided as guides to determine reinforcement placement in skewed ends. Place Bars S as close to girder end as cover requirements permit, which may prevent them to be bundled with Bars R.
- (13) Bars may be cut or bent at skewed end as required.
- (14) Increase as necessary for bars at skewed end.
- (15) No portion of bar less than 10 ft.
- (16) For Welded Wire Reinforcement (WWR) option, area of Bars R may be reduced in proportion to the increase in reinforcement yield strength over 60 ksi. Yield strength of WWR is limited to 75 ksi.



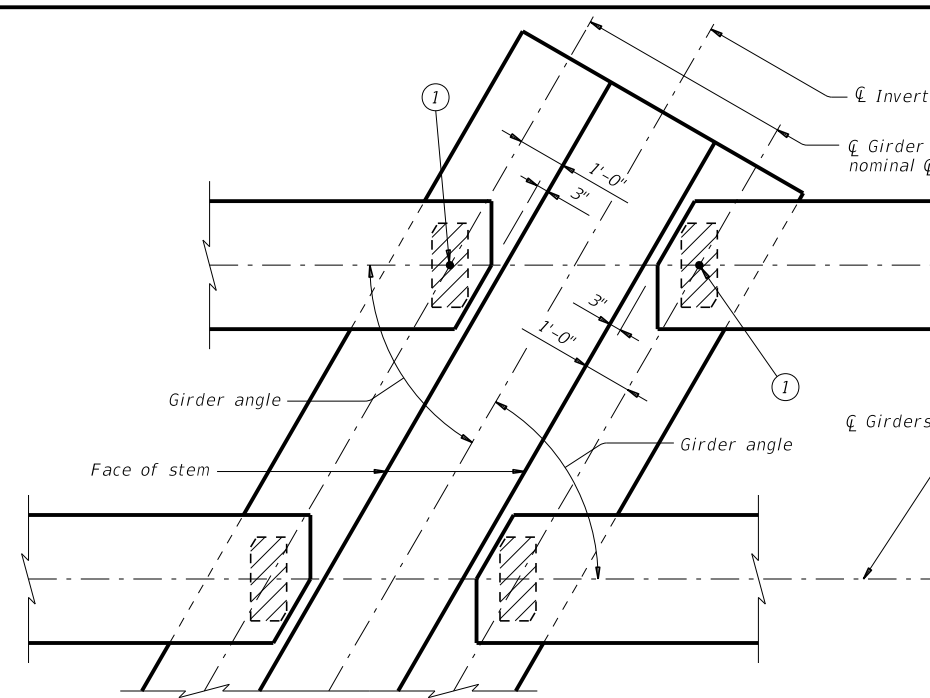
PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

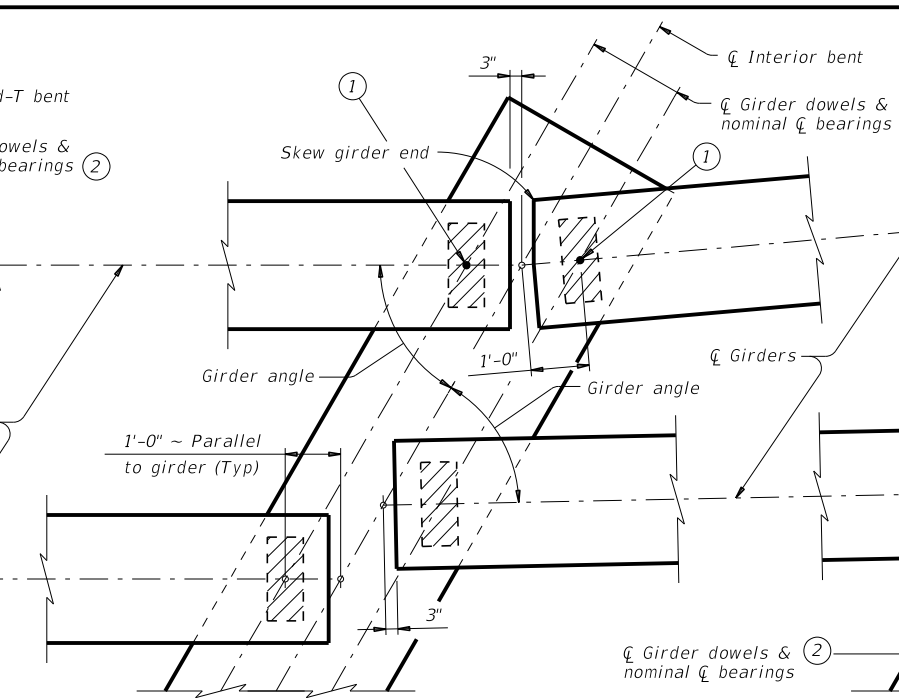
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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0522-1801		BRANDT RD	
10-19: Added Bars C and CH full length for VC <= 20'	DIST	COUNTY	SHEET NO.	
HOU	FORT BEND	BR25		

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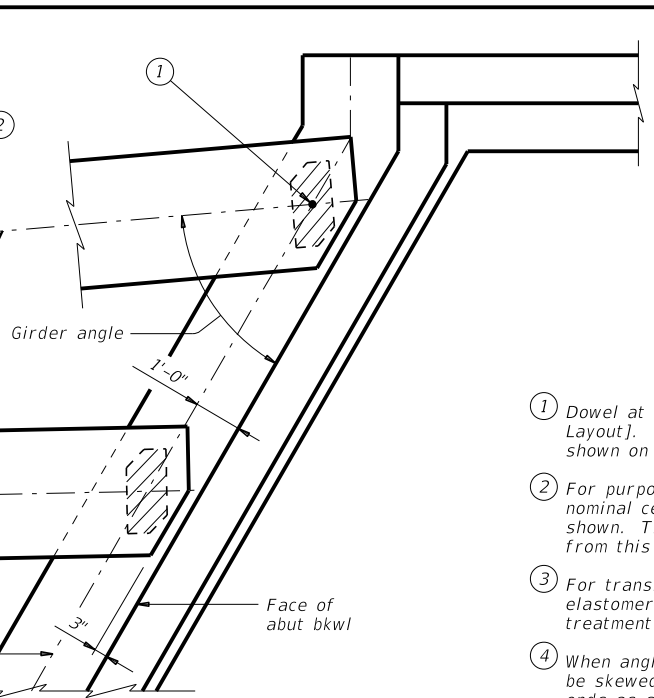
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AT INVERTED-T BENT W/SKEW

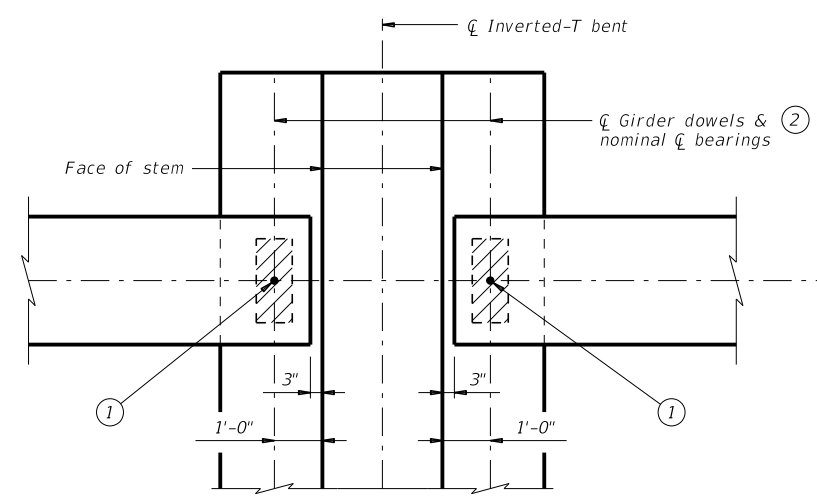


AT CONVENTIONAL INTERIOR BENT W/SKEW

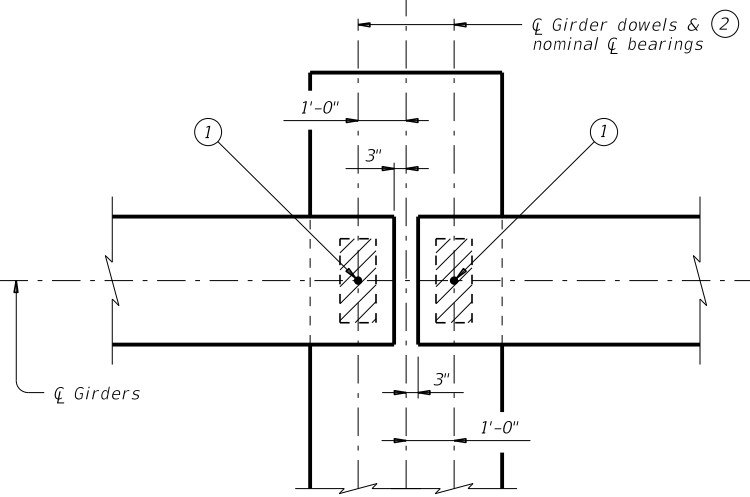


AT ABUTMENT W/SKEW

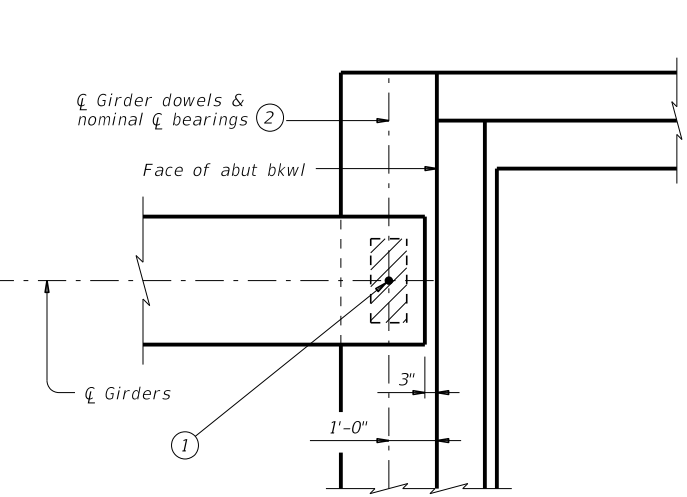
- ① Dowel at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details.
- ② For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.
- ③ For transition bents with backwall, girder and elastomeric bearings must receive the same treatment as shown for abutments.
- ④ When angle exceeds 0°, one or both girder ends must be skewed to maintain the clearance between girder ends as shown in view.
- ⑤ See Table of Bearing Pad Dimensions for bearing size. Girder end skew angles in Table not applicable for this situation. Table reflects girder conflicts of this type on radial bents only.



AT INVERTED-T BENT



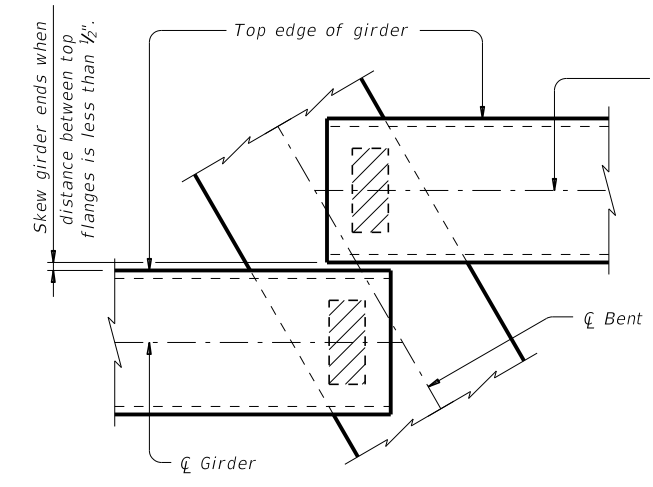
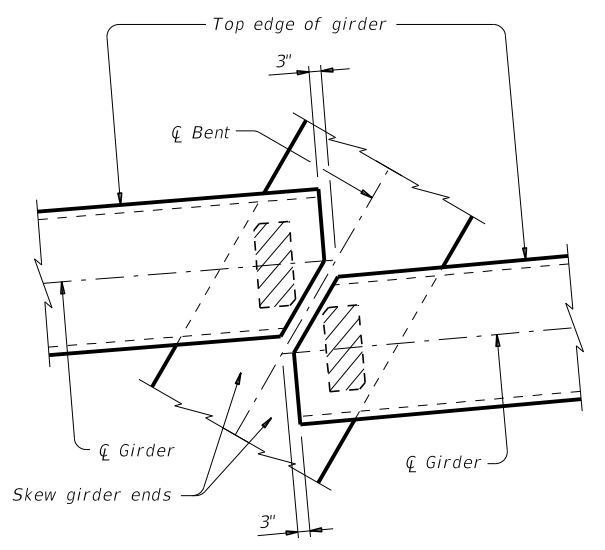
AT CONVENTIONAL INTERIOR BENT



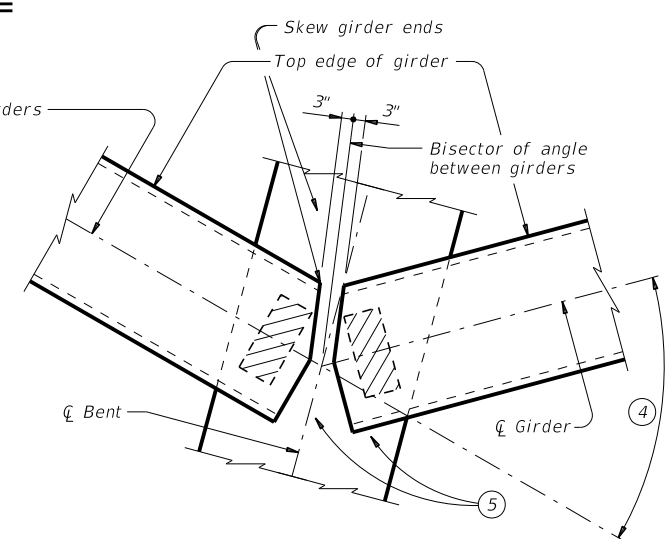
AT ABUTMENT

GENERAL NOTES:
 These details accommodate skew angles up to 60°. Shop drawings for approval are required. A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer. Cost of furnishing and installing elastomeric bearings, including beveled and embedded steel plates, must be included in unit price bid for "Prestressed Concrete Girders".

GIRDER END DETAILS



GIRDER CONFLICT DETAILS



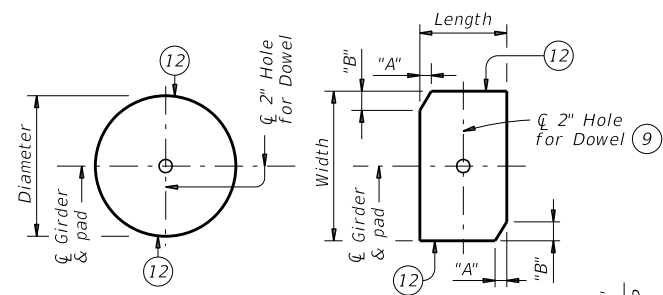
ELASTOMERIC BEARING AND GIRDER END DETAILS PRESTR CONCRETE I-GIRDERS

IGEB

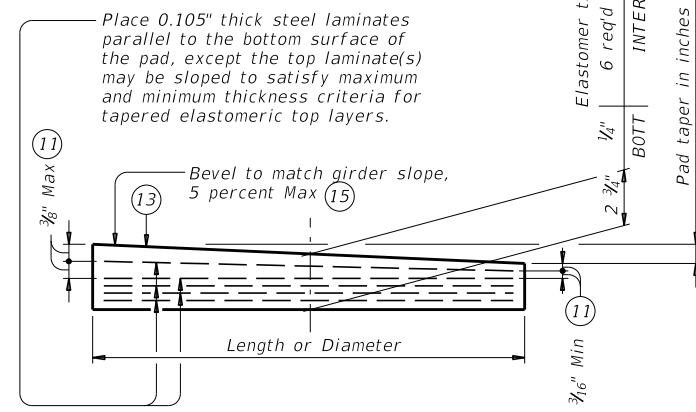
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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0522-1801		BRANDT RD	
DIST	COUNTY	SHEET NO.		
HOU	FORT BEND	BR26		

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PLANS (10)



ELEVATION

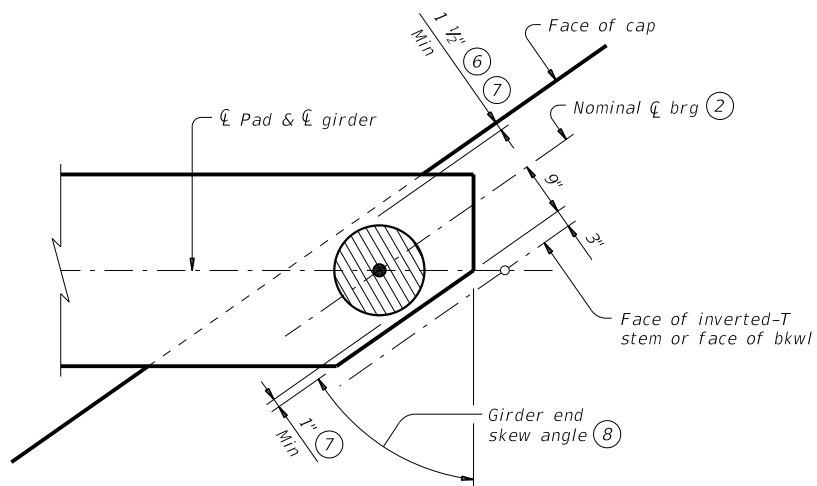
LAMINATED ELASTOMERIC BEARING PAD
 (50 DUROMETER)

TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS (14)

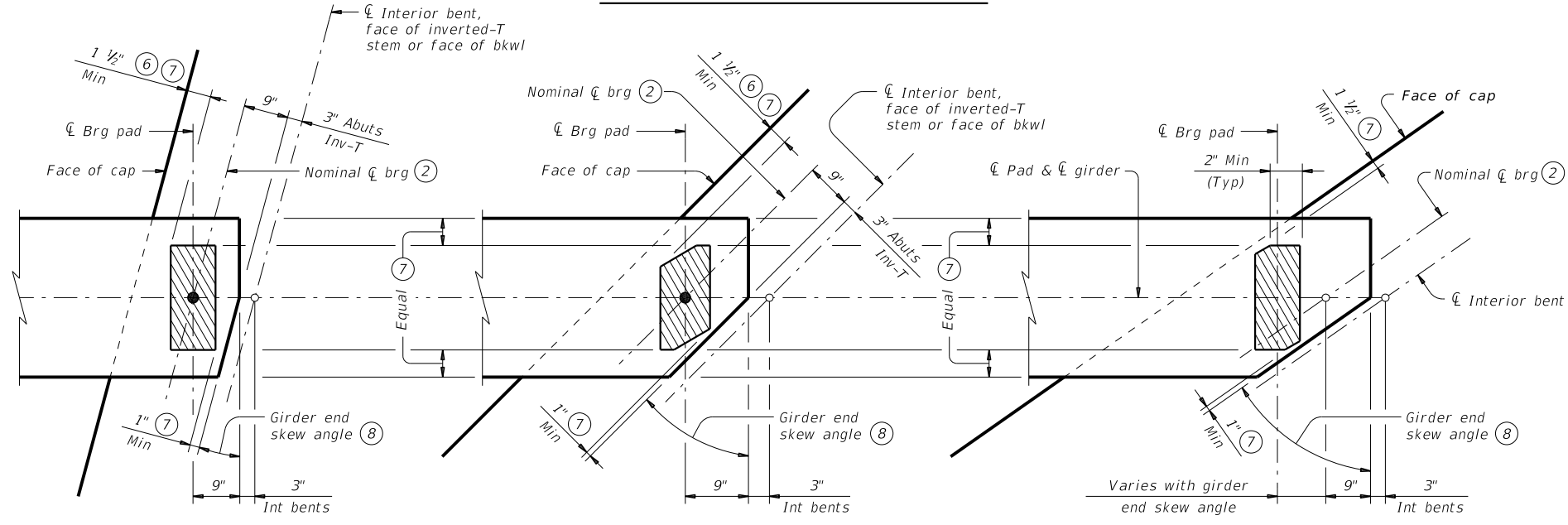
Girder Type	Abutments	Int Bents	Inv-T Bents
	Face of Bkwl to Face of Cap	Overall Cap Width	Corbel Width
Tx28 thru Tx54	1'-9"	3'-6"	1'-10 1/2"
Tx62 & Tx70	2'-0"	4'-0"	2'-1 1/2"

TABLE OF BEARING PAD DIMENSIONS

Bent Type	Girder Type	Bearing Type (13)	Girder End Skew Angle Range	Pad Size Lgth x Wdth	Pad Clip Dimensions	
					"A"	"B"
ABUTMENTS, INVERTED-T AND TRANSITION BENTS WITH BACKWALLS	Tx28, Tx34, Tx40, Tx46 & Tx54	G-1-"N"	0° thru 21°	8" x 21"	---	---
		G-2-"N"	21°+ thru 30°	8" x 21"	1 1/2"	2 1/2"
		G-3-"N"	30°+ thru 45°	9" x 21"	4 1/2"	4 1/2"
		G-4-"N"	45°+ thru 60°	15" Dia	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 21°	9" x 21"	---	---
		G-6-"N"	21°+ thru 30°	9" x 21"	1 1/2"	2 1/2"
		G-7-"N"	30°+ thru 45°	10" x 21"	4 1/2"	4 1/2"
		G-8-"N"	45°+ thru 60°	10" x 21"	7 1/4"	4 1/4"
CONVENTIONAL INTERIOR BENTS	Tx28, Tx34, Tx40, Tx46 & Tx54	---	---	---	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 60°	9" x 21"	---	---
CONVENTIONAL INTERIOR BENTS WITH SKEWED GIRDER ENDS (GIRDER CONFLICTS) (16)	Tx28, Tx34, Tx40, Tx46 & Tx54	G-1-"N"	0° thru 18°	8" x 21"	---	---
		G-2-"N"	18°+ thru 30°	8" x 21"	1 1/2"	2 1/2"
		G-9-"N"	30°+ thru 45°	8" x 21"	3"	3"
		G-10-"N"	45°+ thru 60°	9" x 21"	6"	3 1/2"
	Tx62 & Tx70	G-5-"N"	0° thru 18°	9" x 21"	---	---
		G-5-"N"	18°+ thru 30°	9" x 21"	---	---
		G-11-"N"	30°+ thru 45°	9" x 21"	1 1/2"	1 1/2"
		G-12-"N"	45°+ thru 60°	9" x 21"	3"	1 3/4"



ROUND BEARINGS FOR SKEWED GIRDER ENDS AT FACE OF INVERTED-T STEM OR FACE OF BKWL



SKWED GIRDER ENDS AT INT BENTS, FACE OF INVERTED-T STEM OR FACE OF BKWL

SKWED GIRDER ENDS AT CONVENTIONAL INTERIOR BENTS (NO GIRDER DOWELS)

BEARING PAD PLACEMENT DIAGRAMS

- (2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.
- (6) 3" for inverted-T.
- (7) Place centerline pad as near nominal centerline bearing as possible between limits shown.
- (8) Girder end skew angle is equal to 90° minus the girder angle except at some conflicting girders.
- (9) Provide 2" dia hole only at locations required. See Substructure details for location.
- (10) See Table of Bearing Pad Dimensions for dimensions.
- (11) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.
- (12) Locate Permanent Mark here.
- (13) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in 1/8" increments) in this mark.
 Examples: N=0, (for 0" taper)
 N=1, (for 1/8" taper)
 N=2, (for 1/4" taper)
 (etc.)
 Fabricated pad top surface slope must not vary from plan girder slope by more than (0.0625" / IN) / IN.
- (14) Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.
- (15) See sheet 3 of 3 for beveled plate use when slopes exceed 5 percent.
- (16) If girder end is skewed for a girder conflict at an interior bent and a beveled sole plate is required, use bearing type for abutments at this location. Location of bearing centerline is to be set as for abutments in this case.

HL93 LOADING SHEET 2 OF 3



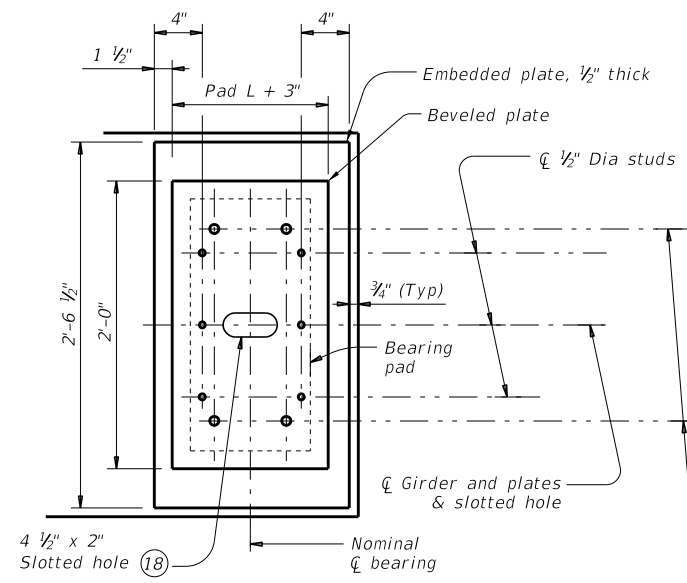
ELASTOMERIC BEARING AND GIRDER END DETAILS PRESTR CONCRETE I-GIRDERS

IGEB

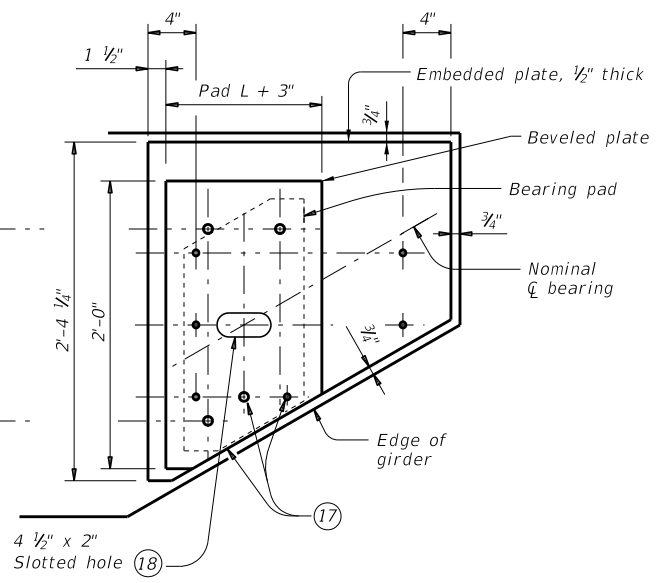
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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0522-1801		BRANDT RD	
DIST	COUNTY	SHEET NO.		
HOU	FORT BEND	BR27		

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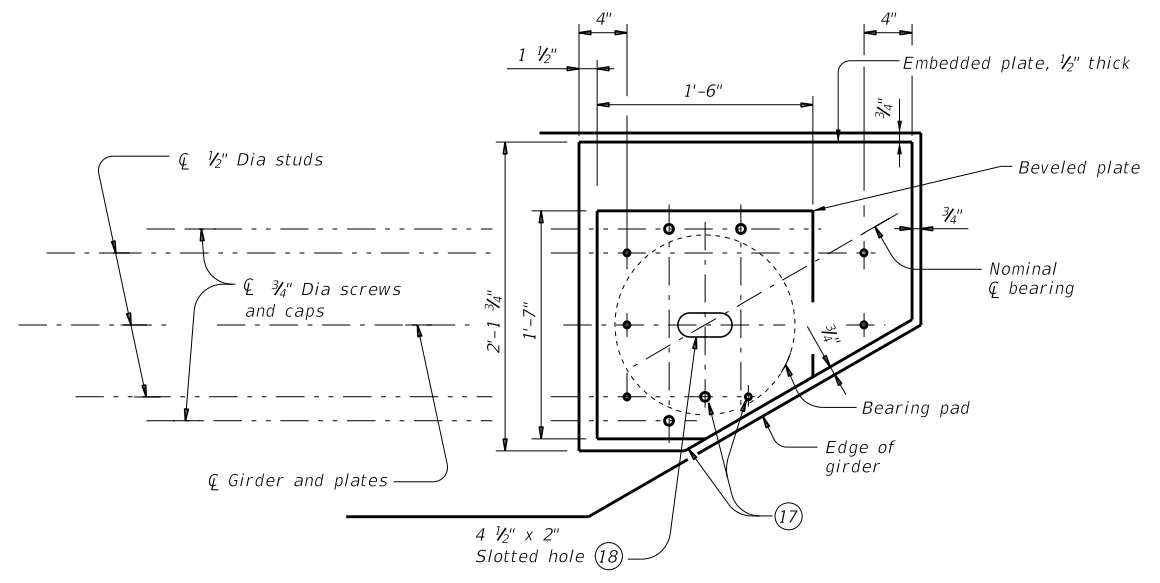
DATE: 12/9/2022 12:53:52 PM
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**NORMAL GIRDER END
 RECTANGULAR BEARING PAD**

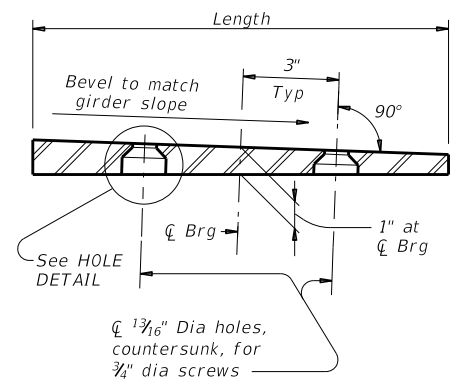


**SKewed GIRDER END
 CLIPPED RECTANGULAR BEARING PAD**

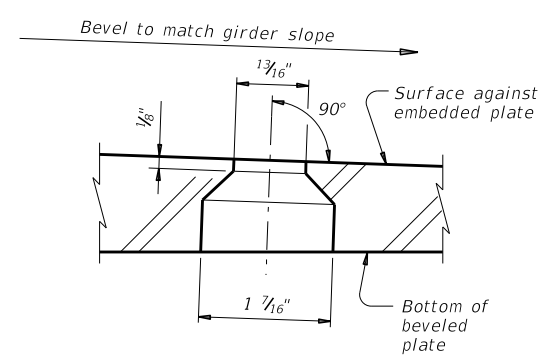


**SKewed GIRDER END
 15" DIA BEARING PAD**

PLAN VIEW OF SOLE PLATE DETAILS



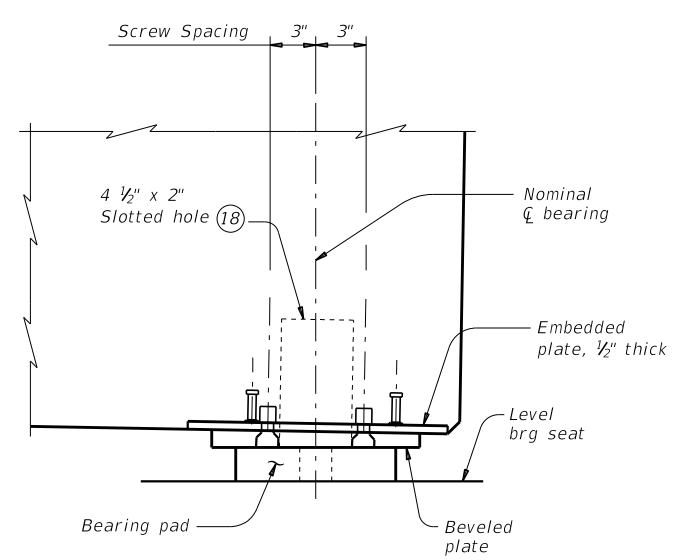
SECTION



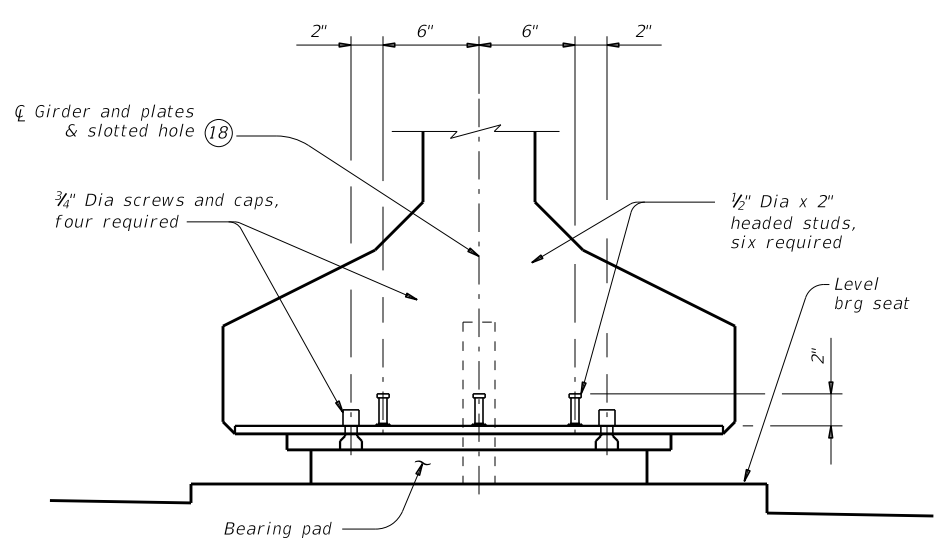
HOLE DETAIL

- 17 Cut beveled and embedded plates to match girder end skew. Adjust location of screw and stud as shown when necessary.
- 18 Slotted hole is required at doweled girder end locations.

BEVELED PLATE DETAILS



SIDE ELEVATION



**END ELEVATION
 Showing normal girder end.**

GIRDER DETAILS

SOLE PLATE NOTES:

Provide constant thickness elastomeric bearings with beveled and embedded steel sole plates in accordance with these details when the girder slope exceeds 5 percent or if otherwise required in the plans. Provide for all girders in the span.

On the shop drawings, dimension sole plates to the nearest 1/16" based on required thickness at centerline of bearing and slope of girder. Thickness tolerance variation from the approved shop drawings is 1/16" +/-, except variation from a plane parallel to the theoretical top surface can not exceed 1/16" total. Bearing surface tolerances listed in Item 424 apply to embedded and beveled plates.

Steel plate must conform to ASTM A36, A572 Gr 50, or A709 Gr 36 or Gr 50. Hot dip galvanize both the embedded plate and beveled sole plate after fabrication. Seal weld caps to embedded plate before galvanizing.

When determining if relocation of screw holes and studs are necessary for skewed girder ends, minimum clearance from screw or stud centerline to plate edge is 1.25".

Tap threads in the embedded plate only. Drill and tap prior to galvanizing.

3/4" Dia screws must be electroplated, socket flat head countersunk cap screws conforming to ASTM F835. Electroplating must conform to ASTM B633, SC 2, Type I. Provide screws long enough to maintain a 3/4" minimum embedment into the embedded plate and galvanized cap. Provide galvanized steel caps (16 ga Min) with a nominal 1" inside diameter and deep enough to accommodate the screws, but not less than 1/2" deep or deeper than 1".

Install beveled sole plates prior to shipping girders. Installed screw heads must not protrude below the bottom of the beveled plate.



**ELASTOMERIC BEARING
 AND GIRDER END DETAILS
 PRESTR CONCRETE I-GIRDERS**

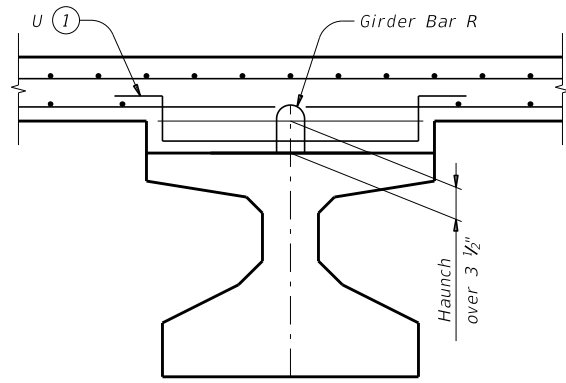
IGEB

FILE: igebsts1-17.dgn	DN: AEE	CK: JMH	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0522-1801		BRANDT RD	
DIST	COUNTY	SHEET NO.		
HOU	FORT BEND	BR28		

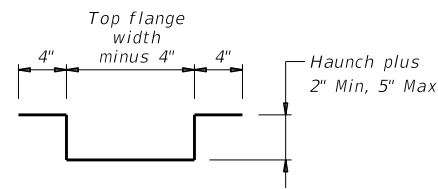
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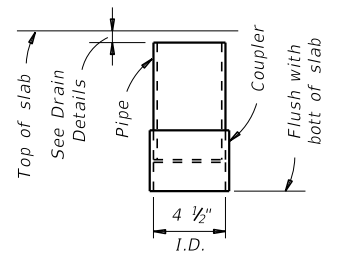
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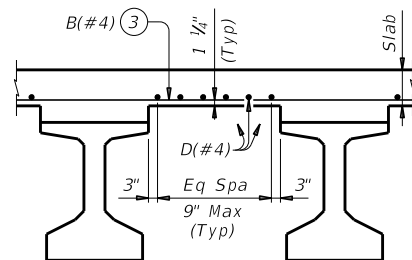
HAUNCH REINFORCING DETAIL



BARS U (#4)

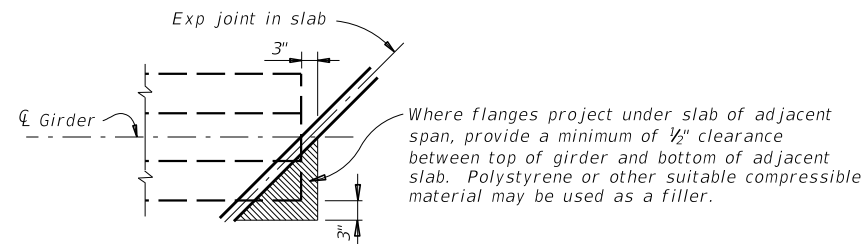


C-I-P DRAIN DETAIL

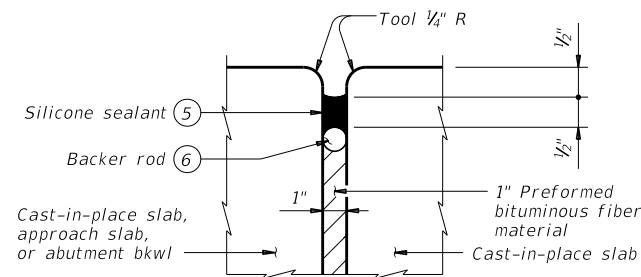


TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP

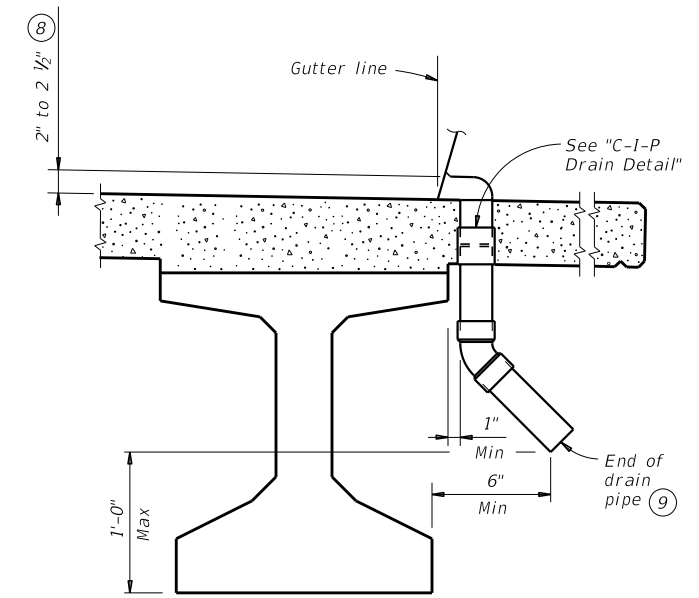
Top reinforcing steel not shown for clarity.



TREATMENT AT GIRDER END FOR SKEWED SPANS



TYPE A JOINT DETAIL



DRAIN DETAIL

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 Payment for Type A joint will be as per Item 454, "Bridge Expansion Joints."
 All other items (reinforcing steel, drains, etc.) shown on this sheet are subsidiary to other bid items.

Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bar dimensions shown are out-to-out of bar.

DECK FORMWORK NOTES:
 Overhang bracket hangers are limited to a safe working load of 3,600 lbs, applied to and along the axis of a coil rod at 45 degrees from vertical, regardless of higher loads permitted by hanger manufacturers. Do not place a hanger less than 12" from girder end. Space hangers accordingly.

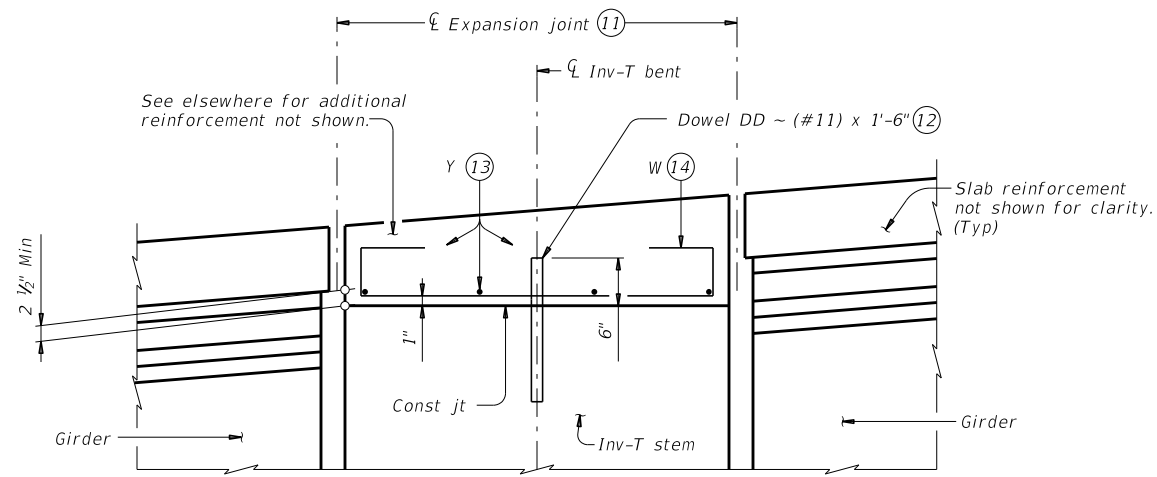
- ① Space Bars U with girder Bars R in all areas where measured haunch exceeds 3 1/2".
- ② Roughen outside of PVC with coarse rasp or equal to ensure bond with cast-in-place concrete.
- ③ Bars B(#4) spaced at 9" Max with 2" end cover. Overhang option, Contractor's may end alternating bars B(#4) at centerline outside girder.
- ④ Provide Grade 60 reinforcing steel. Provide bar laps, where required, as follows:
 Uncoated ~ #4 = 1'-7"
 Epoxy coated ~ #4 = 2'-5"
- ⑤ Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.
- ⑥ 1 1/4" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- ⑦ The maximum distance between Type A expansion joints is 100'. See Bridge Layout for location of joints.
- ⑧ Drain entrance formed in rail or sidewalk.
- ⑨ Water may not be discharged onto girders.
- ⑩ All drain pipe and fittings to be 4" diameter (Sch 40) PVC. See Item 481 "Pipe for Drains" for pipe, connections and solvent welding. Bend reinforcing steel to clear PVC 1". Drain length and location is as directed by the Engineer. Drains are not permitted over roadways or railroads, or within 10'-0" of bent caps. Degrease outside of exposed PVC, apply acrylic water base primer, then coat with same surface finishing material as used for outside girder face. Variations of the above designs, as required for the type of rail used and its location on the structure, may be installed with the approval and direction of the Engineer.

SHEET 1 OF 2

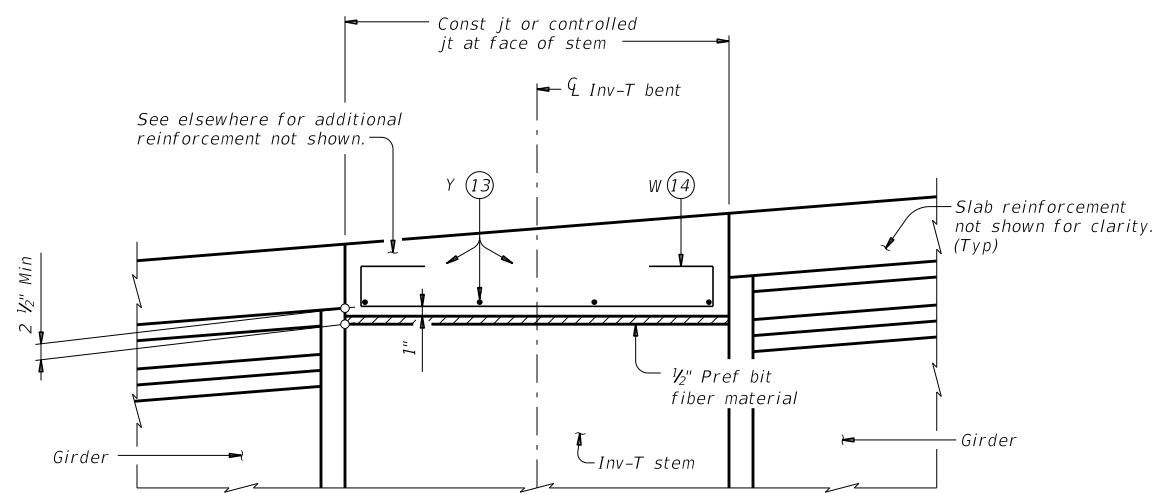
				Bridge Division Standard	
MISCELLANEOUS SLAB DETAILS PRESTR CONCRETE I-GIRDERS					
IGMS					
FILE: igmsts1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT	
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY	
REVISIONS			0522-1801	BRANDT RD	
10-19: Modified Note 7. Type A now a pay item.	DIST	COUNTY	SHEET NO.		
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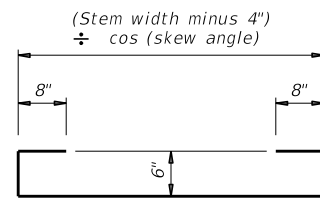
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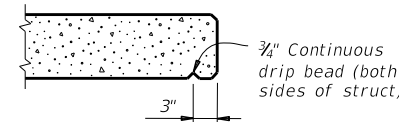
SHOWING EXPANSION JOINTS



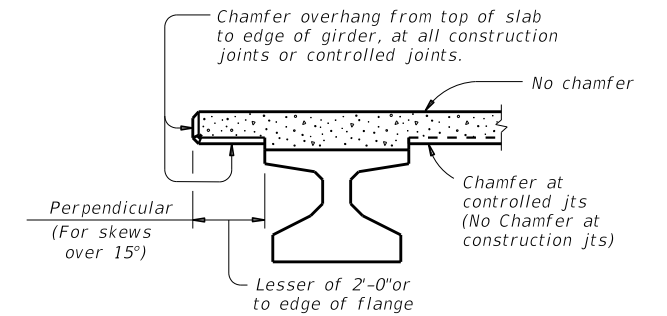
**SHOWING CONST JTS OR CONTROLLED JTS
 REINFORCEMENT OVER INV-T BENTS**



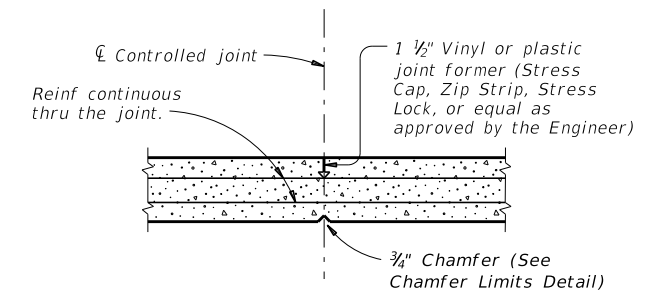
BARS W (#4)



DRIP BEAD DETAIL



CHAMFER LIMITS DETAIL (15)



CONTROLLED JOINT DETAIL

(Saw-cutting is not allowed)

- (11) See Layout for joint type.
- (12) Dowels DD (#11) spaced at 5 Ft Max. See Inv-T bents for quantity and location.
- (13) Space Bars Y (#4) at 12" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.
- (14) Space Bars W at 12" Max (3" from end of cap). Tilt if necessary to maintain cover requirements. Place parallel to longitudinal slab reinforcement.
- (15) See Span details for type of joint and joint locations.

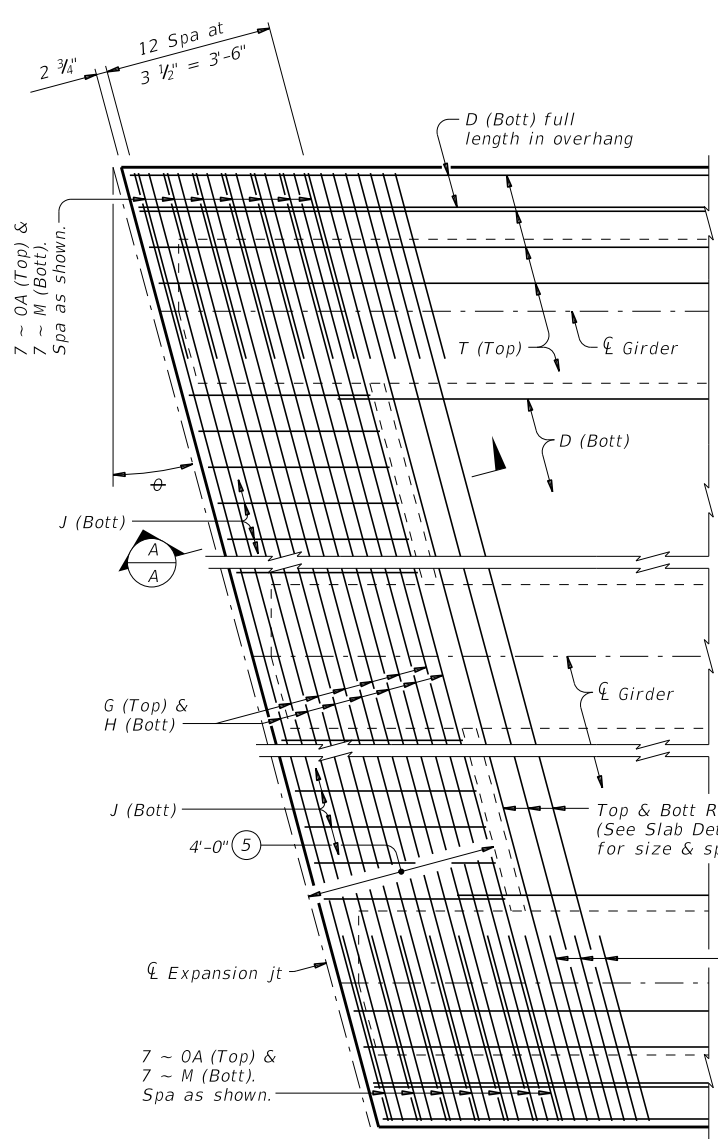
**MISCELLANEOUS
 SLAB DETAILS
 PRESTR CONCRETE I-GIRDERS**

IGMS

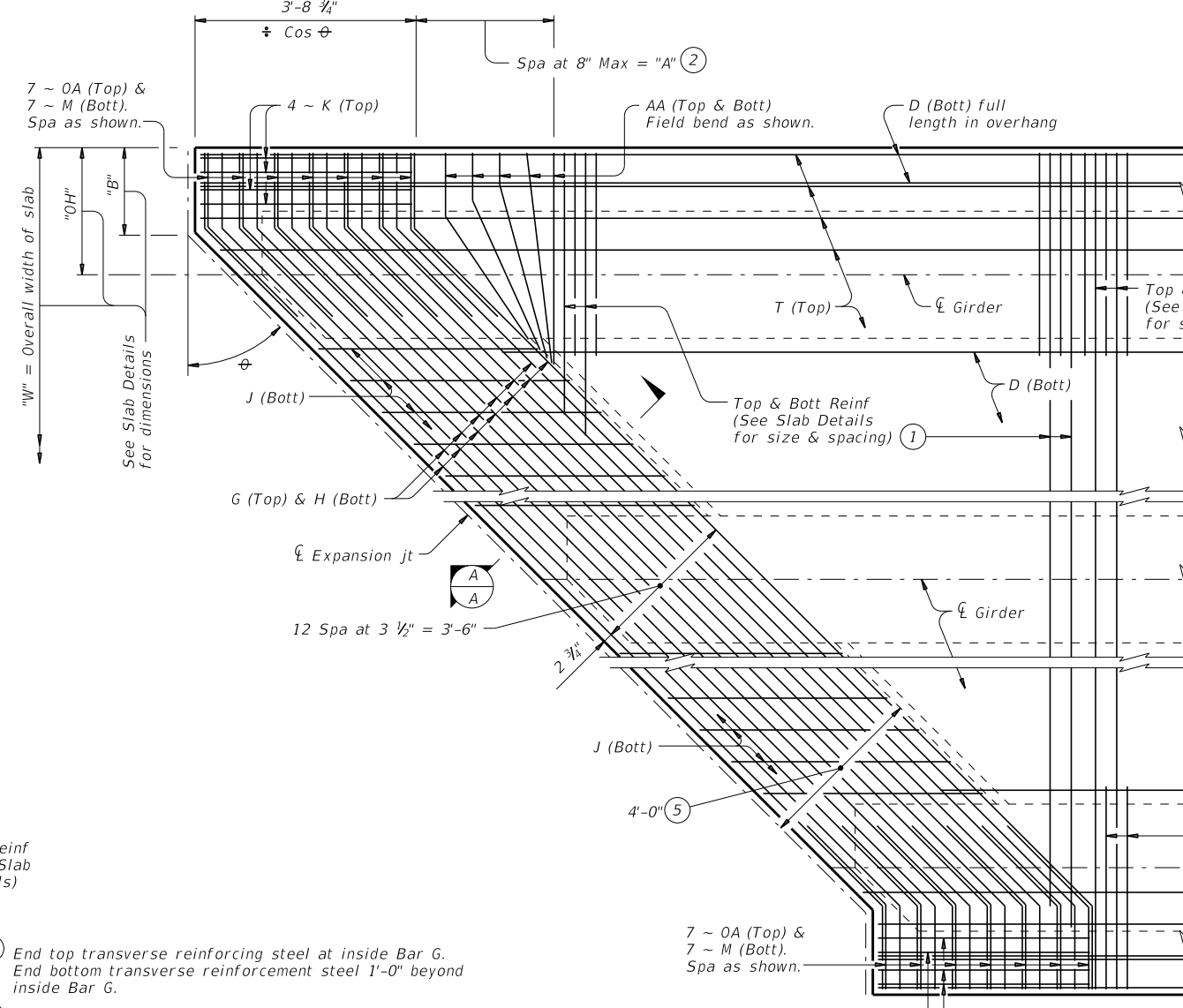
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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0522-1801		BRANDT RD	
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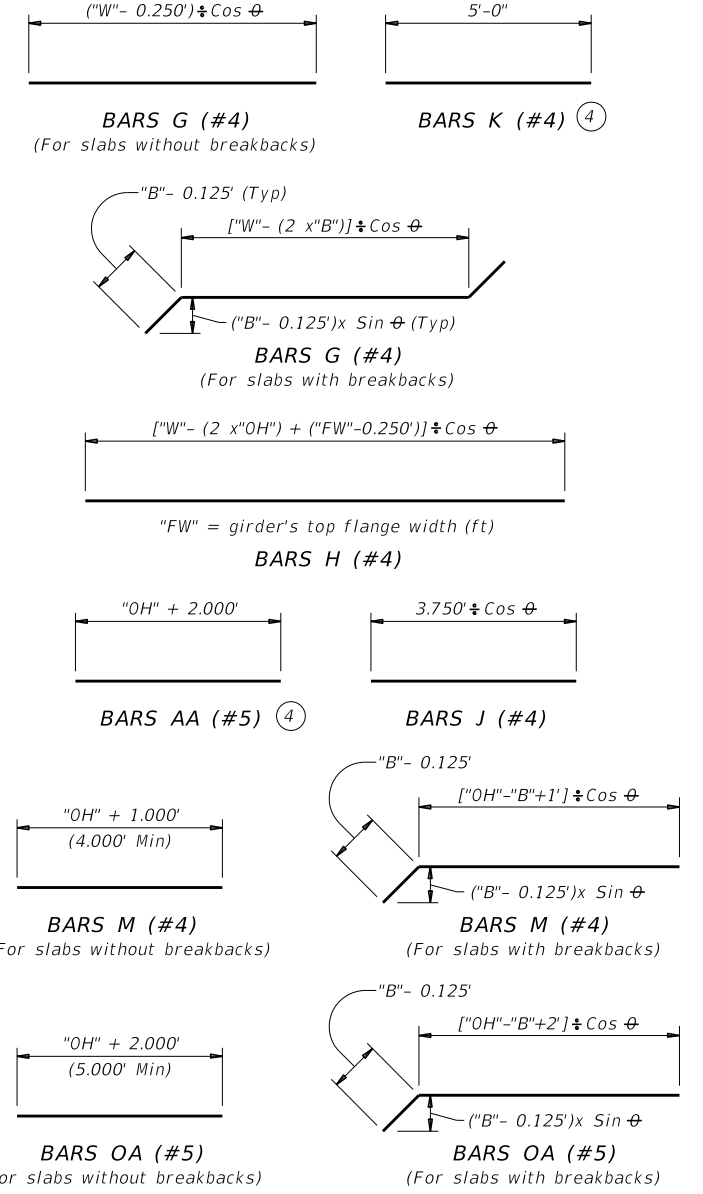


PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



PARTIAL PLAN FOR SLABS WITH BREAKBACK

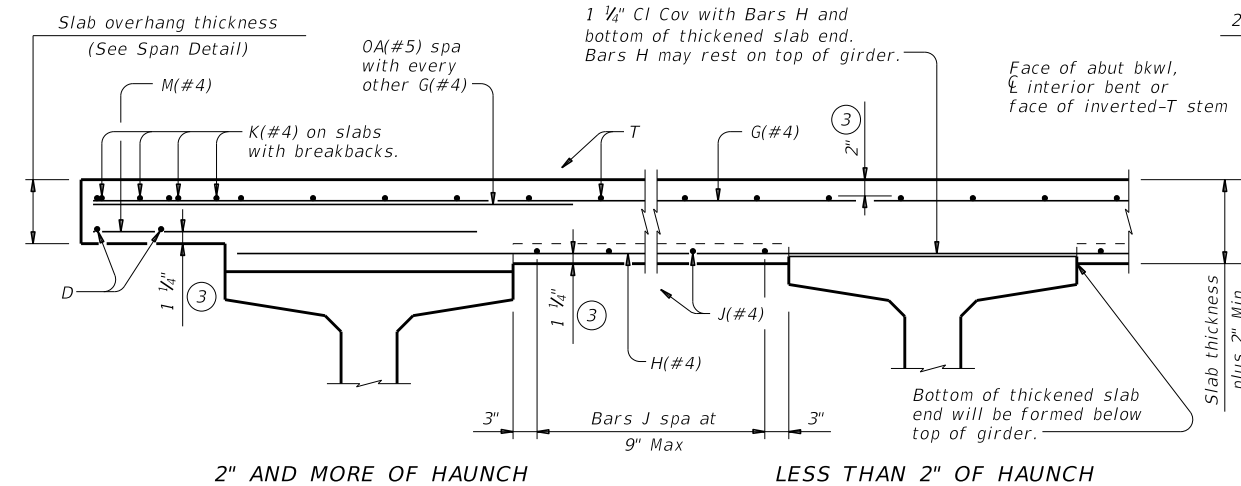
- 1 End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.
- 2 "A" = ("OH" + 2.333' - "B") x Tan ϕ
- 3 Provide clear cover as indicated unless otherwise shown on Span Details.
- 4 Only required on slabs with breakbacks.
- 5 Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.



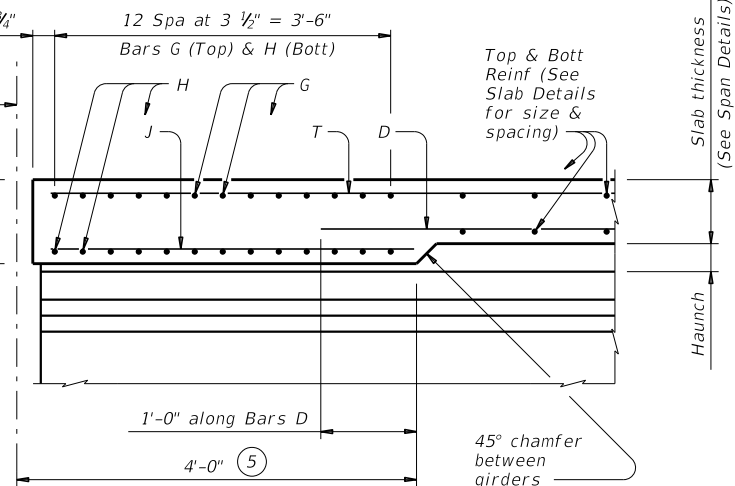
GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications. These details are restricted to Prestressed Concrete I-Girder Spans. These details are to be used in conjunction with the Span Details and PCP standard (if prestressed concrete panels are used). When Option 2 from PCP standard is used, provide Bars AA, G, K and OA in the slab.

MATERIAL NOTES:
 Provide Grade 60 reinforcing steel.
 If slab reinforcing steel is shown on the Slab Details to be epoxy coated, then Bars AA, G, K, H, J, M and OA must be epoxy coated.
 Provide bar laps, where required, as follows:
 Uncoated ~ #4 = 1'-7"
 Epoxy Coated ~ #4 = 2'-5"

Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bar dimensions shown are out-to-out of bar.



TYPICAL TRANSVERSE SECTION
 (Showing Prestressed Conc I-Girders at ϕ Brg)

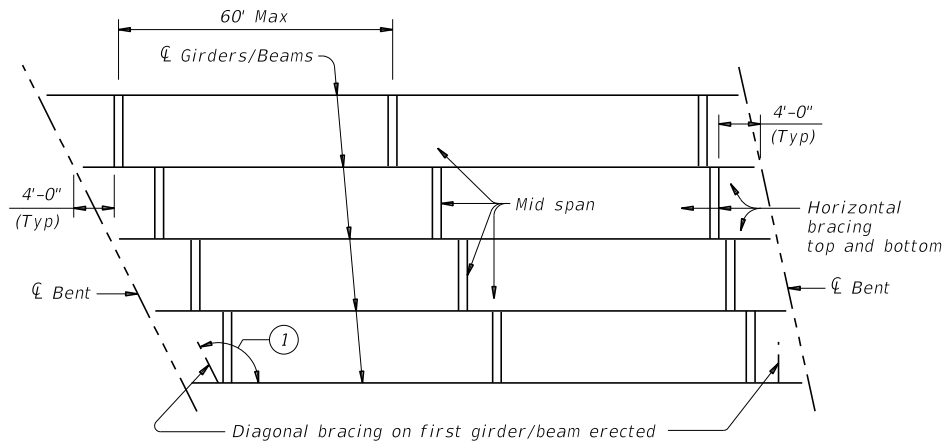


SECTION A-A
 (Showing with 2" and more of haunch)

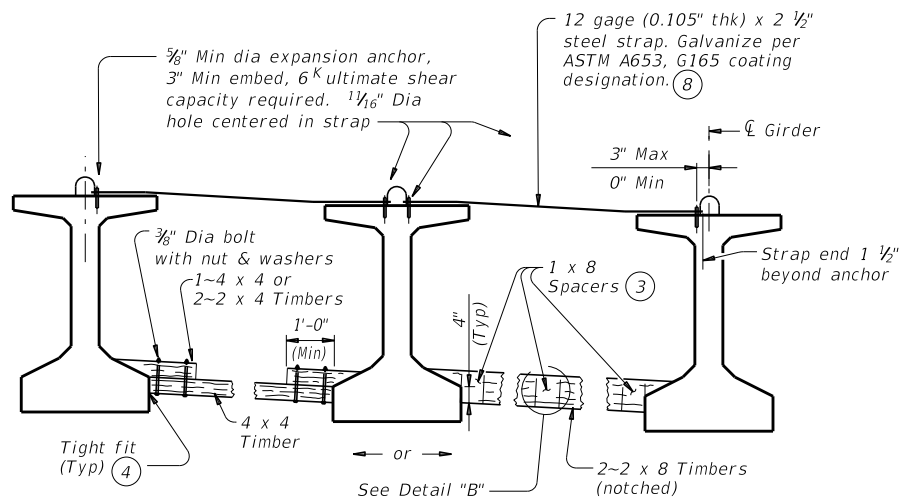
HL93 LOADING		Texas Department of Transportation		Bridge Division Standard	
THICKENED SLAB END DETAILS					
PRESTRESSED CONCRETE I-GIRDER SPANS					
IGTS					
FILE: igtss1-17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT	
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	HOU	FORT BEND		BR31	

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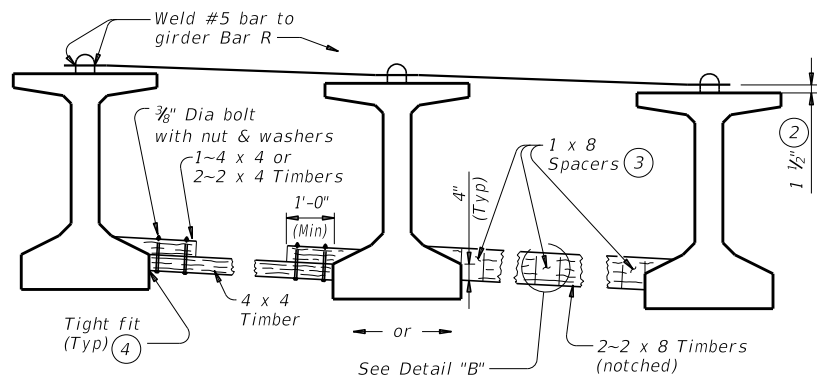


ERECTION BRACING



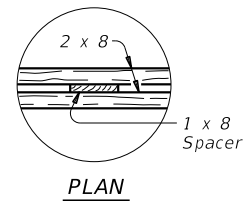
FOR ERECTION BRACING, OPTION 1

(This option is not allowed when slab is formed with PMDF or plywood.)

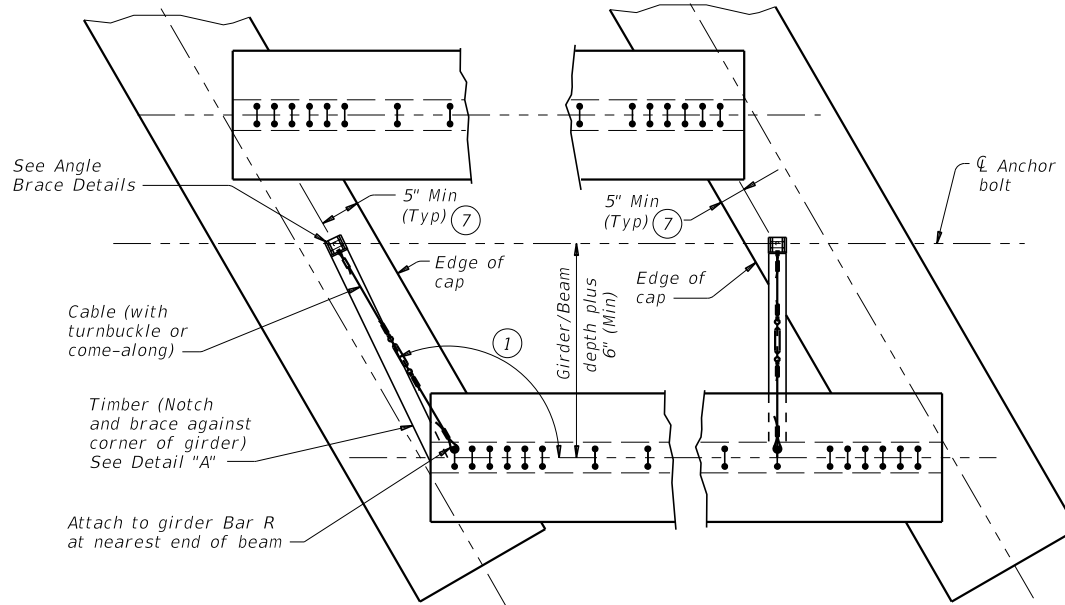


FOR ERECTION BRACING, OPTION 2

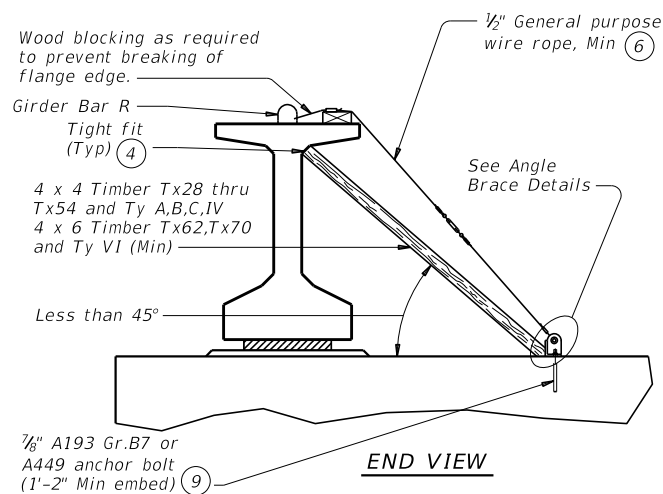
HORIZONTAL BRACING DETAILS



DETAIL "B"



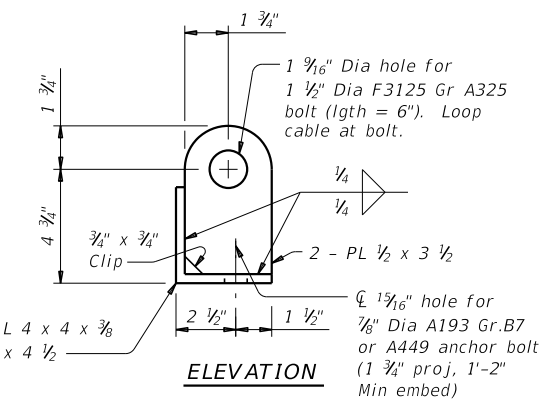
PLAN



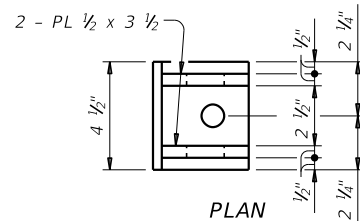
END VIEW

DIAGONAL BRACING DETAILS

(To be used on both ends of the first girder/beam erected in the span in each phase.)



ELEVATION



PLAN

ANGLE BRACE DETAILS

HAULING & ERECTION:

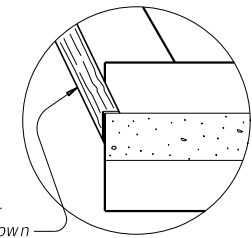
The Contractor's attention is directed to the possible lateral instability of prestressed concrete girders and beams over 130' long, especially during hauling and erection. The use of the following methods to improve stability is encouraged: Locate lifting devices at the maximum practical distance from girder ends; use external lateral stiffening devices during hauling and erection; lift with vertical lines using two machines; and take care in handling to minimize inertial and impact forces.

ERECTION BRACING:

Erection bracing details shown are considered the minimum for fulfilling the bracing requirements of Item 425. Required erection bracing must be placed immediately after erection of each girder and remain in place until additional bracing as required for slab placement is in place. This standard is needed in all cases to meet requirements for Slab Placement Bracing.

PHASED CONSTRUCTION:

Place erection and slab placement bracing for all girders in a phase as shown in these details. For phases after first, also place erection and slab placement bracing between outer girder of completed phase and adjacent girder of current phase. When the phase construction joint is between girders, top bracing can be omitted.



DETAIL "A"

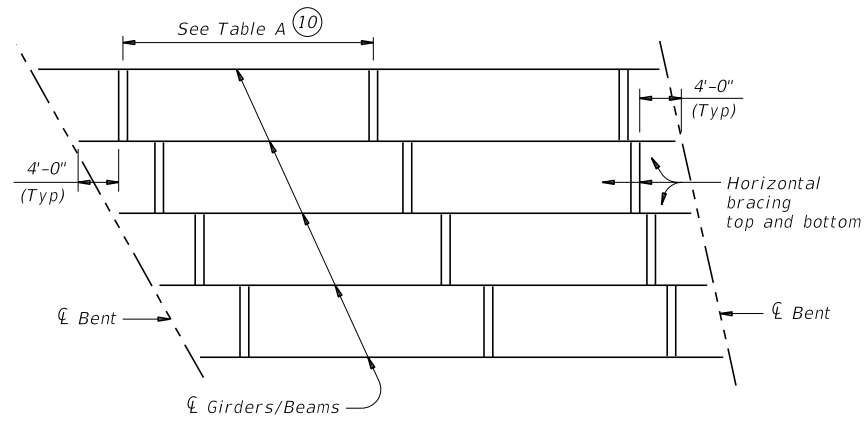
- 1 If angle shown exceeds 120 degrees, move diagonal brace to other side of girder/beam and place square to girder/beam. This may prevent exterior girder from being erected first.
- 2 Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R (See Sheet 2 of 2).
- 3 Clear distance between spacers must not exceed 3'. Nail together with 16d nails.
- 4 Use wedges as necessary to obtain tight fit. Nail wedges to timbers.
- 5 Pressure treated landscape timbers can not be used.
- 6 All hardware used with cable must be able to develop a minimum 25 kips breaking strength. Use thimbles at all loops in cable. Install cable clamps with saddles bearing against the live end and U-bolts bearing against the dead end.
- 7 It is acceptable to tie anchor bolts to cap reinforcement.
- 8 Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.
- 9 Anchor bolt may be drilled and epoxied in place. Provide 25k minimum pullout. Core drill hole.

SHEET 1 OF 2

		Bridge Division Standard	
MINIMUM ERECTION AND BRACING REQUIREMENTS PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS			
MEBR(C)			
FILE: mebcsts1-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT August 2017	CONTRACT	SECTION	JOB
REVISIONS			0522-1801 BRANDT RD
	DIST	COUNTY	SHEET NO.
	HOU	FORT BEND	BR32

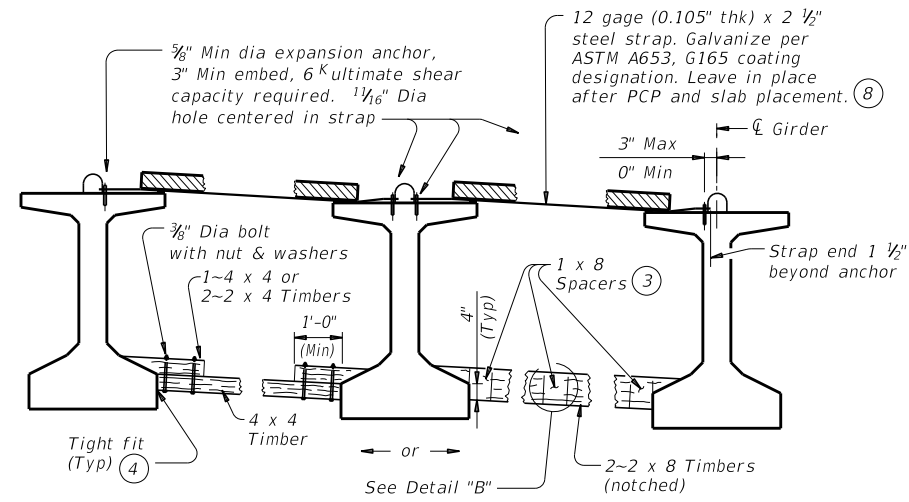
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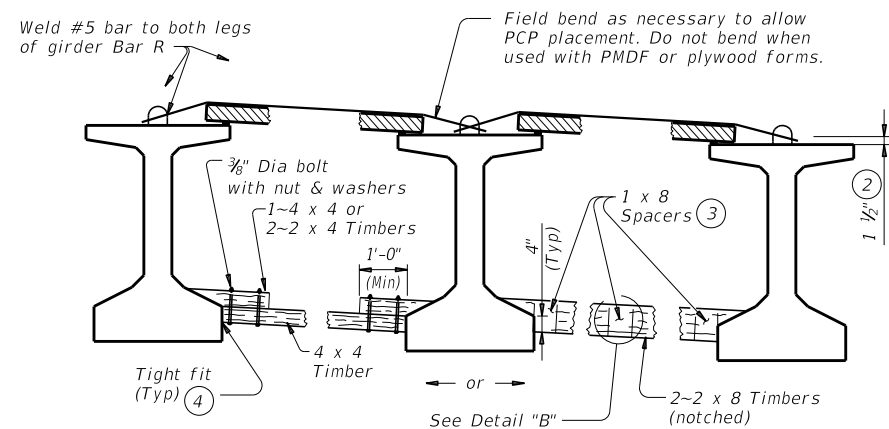
SLAB PLACEMENT BRACING

TABLE A				
Girder or Beam Type	OPTION 1-RIGID BRACING (STEEL STRAP)		OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)	
	Maximum Bracing Spacing		Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	1/4 points	1/4 points	Tx28	1/4 points
Tx34	1/4 points	1/4 points	Tx34	1/4 points
Tx40	1/4 points	1/8 points	Tx40	1/4 points
Tx46	1/4 points	1/8 points	Tx46	1/4 points
Tx54	1/4 points	1/8 points	Tx54	1/4 points
Tx62	1/4 points	1/8 points	Tx62	1/4 points
Tx70	1/4 points	1/8 points	Tx70	1/4 points
A	1/8 points	1/8 points	A	2.0 ft
B	1/8 points	1/8 points	B	3.0 ft
C	1/8 points	1/8 points	C	4.5 ft
IV	1/4 points	1/8 points	IV	1/4 points
VI	1/4 points	1/8 points	VI	1/4 points



FOR SLAB PLACEMENT BRACING, OPTION 1 - RIGID

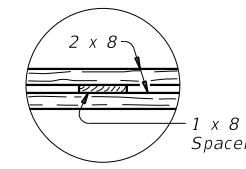
(Showing slab formed with PCP. This option is not allowed when slab is formed with PMDF or plywood.)



FOR SLAB PLACEMENT BRACING, OPTION 2 - FLEXIBLE

(Showing slab formed with PCP.)

HORIZONTAL BRACING DETAILS (5)



**PLAN
DETAIL "B"**

- (2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R.
- (3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.
- (4) Use wedges as necessary to obtain tight fit. Nail wedges to timbers.
- (5) Pressure treated landscape timbers can not be used.
- (8) Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.
- (10) Bracing spacing (1/4 and 1/8 points) measured between first and last typical brace location.
- (11) Measure slab overhang from centerline of girder or beam. When overhang varies in span, determine bracing spacing based on largest overhang.

SLAB PLACEMENT BRACING:

The details for slab placement bracing are considered minimum for fulfilling the requirements of Specification Items 422 and 425. Required slab placement bracing must remain in place until slab concrete has attained a compressive strength of 3000 psi.

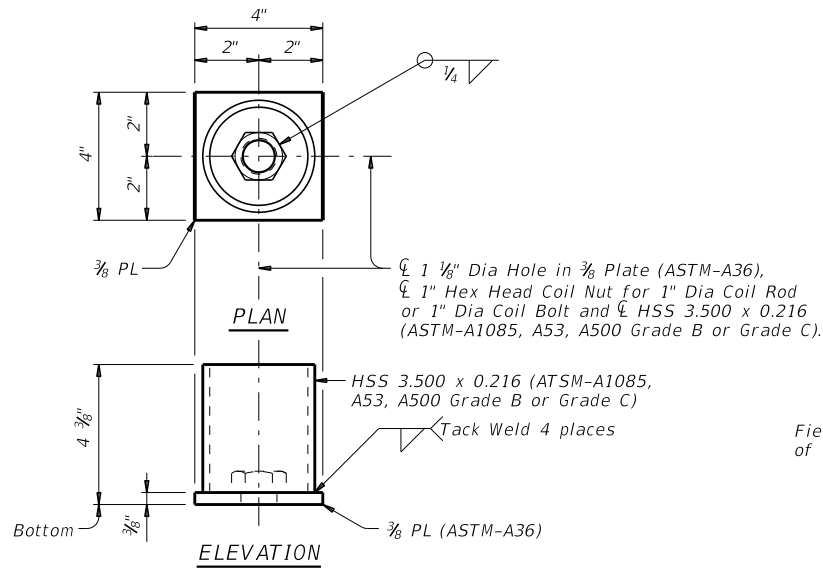
GENERAL NOTES:

Bracing details for spans longer than 150' are not provided. The Contractor must submit proposed bracing details for such conditions to the Engineer for approval prior to erection. Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection. Use of these systems or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure. Removal of bracing for short periods of time to align girders and beams is permissible. All turn-buckles, come-alongs, anchors and other connections must be capable of developing the full strength of the cable shown. Furnish anchor bolts and nuts in accordance with Item 449, "Anchor Bolts".

		Bridge Division Standard	
MINIMUM ERECTION AND BRACING REQUIREMENTS PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS			
MEBR(C)			
FILE: mebcsts1-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT August 2017	CONTRACT	SECTION	JOB
REVISIONS	0522-1801	BRANDT RD	
DIST	COUNTY	SHEET NO.	
HOU	FORT BEND	BR33	

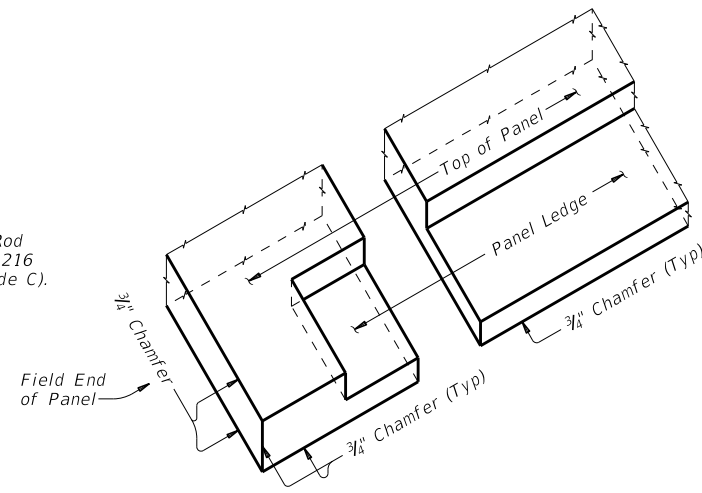
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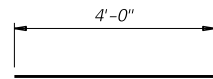
LEVELING BOLT PAD DETAILS

Galvanize if epoxy coated reinforcing steel is used in slab. Do not oil this assembly.

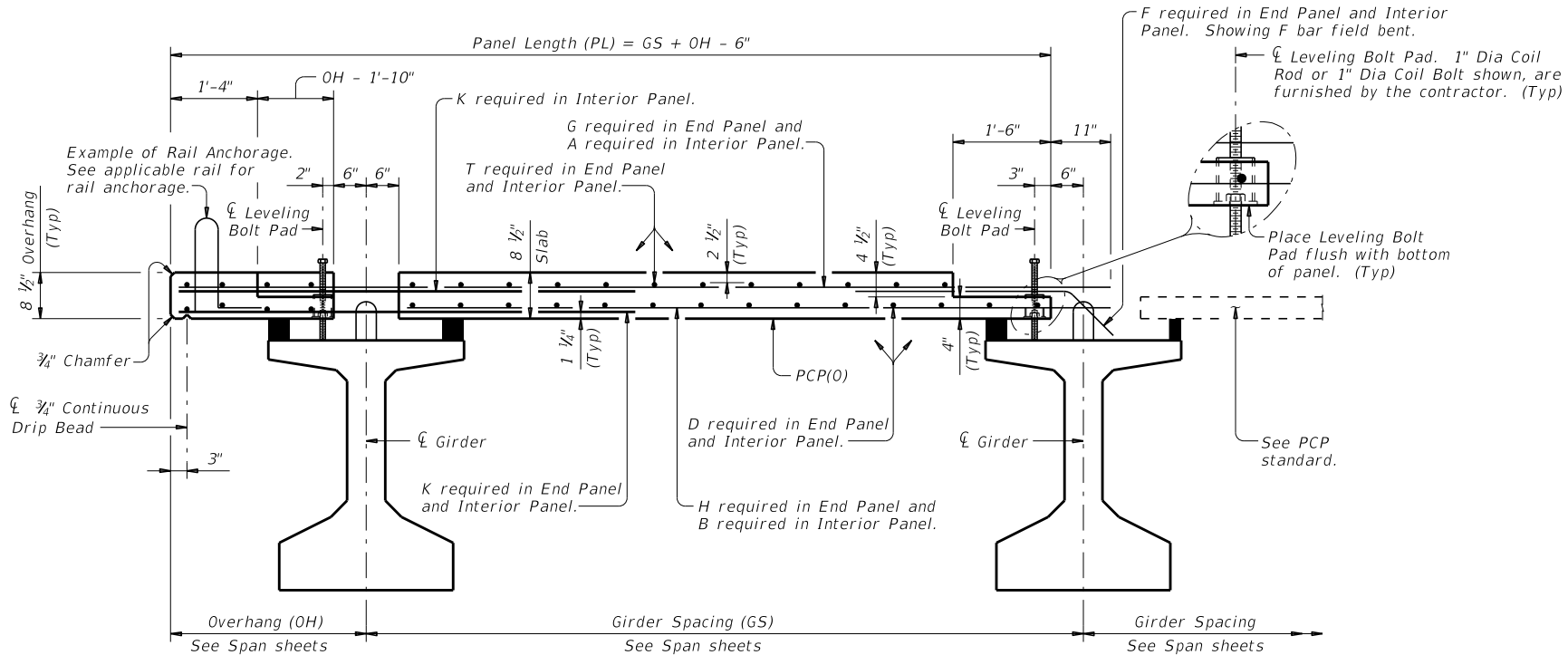


ISOMETRIC VIEW AT CORNER OF PANEL

Showing Typical Chamfers on Panel. Drip Bead and reinforcing steel not shown for clarity.



BARS F



TYPICAL TRANSVERSE SECTION

(Showing Girder Type Tx46)

CONSTRUCTION/FABRICATION NOTES:

Remove laitance from top panel surface.
 Finish top surface area of panel with a broom finish.
 Finish top ledge of panel to a roughness between a No. 6 and No. 9 concrete surface profile, inclusive, as specified by the International Concrete Repair Institute (ICRI).
 Provide 3/4" concrete chamfers as shown on these details.
 Do not lap splice bars D, F, K & T. Bars A, B, G & H, may be spliced with only one lap splice allowed on each bar.
 Panels must be fabricated by a fabricator meeting the requirements of DMS 7300 for Multi-Project Nonstressed Member Fabrication Plant.

MATERIAL NOTES:

Provide Class H concrete ($f'c=4000$ psi) in panels. Provide Class H (HPC) concrete for panels if required elsewhere in plans. Maximum large aggregate size is 1".
 Provide material as shown on this standard for the Leveling Bolt Pad.
 Provide Grade 60 conventional reinforcing steel.
 Provide epoxy coated reinforcement for bars A, B, D, G, H, K & T if slab reinforcement is epoxy coated.
 An equal area and spacing of deformed Welded Wire Reinforcement (WWR) ASTM-A1064 may be substituted for bars A, B, D, G, H & T, unless otherwise noted. Bars F and K can not be replaced with WWR.
 Galvanize leveling bolt pad assembly if epoxy-coated reinforcing steel is used in slab.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications. These details are only applicable for Prestr Conc I-Girders. Any additional reinforcement, lifting devices or epoxy coated reinforcement required on these details are subsidiary to the bid Item "Reinforced Concrete Slab".
 See railing details for rail anchorage in panel overhang. A panel layout which identifies location of each panel must be developed by the fabricator. Permanently mark each panel in accordance with the panel layout. A copy of the layout is to be provided to the Engineer.
 Submit stable lifting methods and devices to the Engineer for approval.
 Shop drawings for the fabrication of panels will require the Engineer's approval.

Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bar dimensions shown are out-to-out of bar.



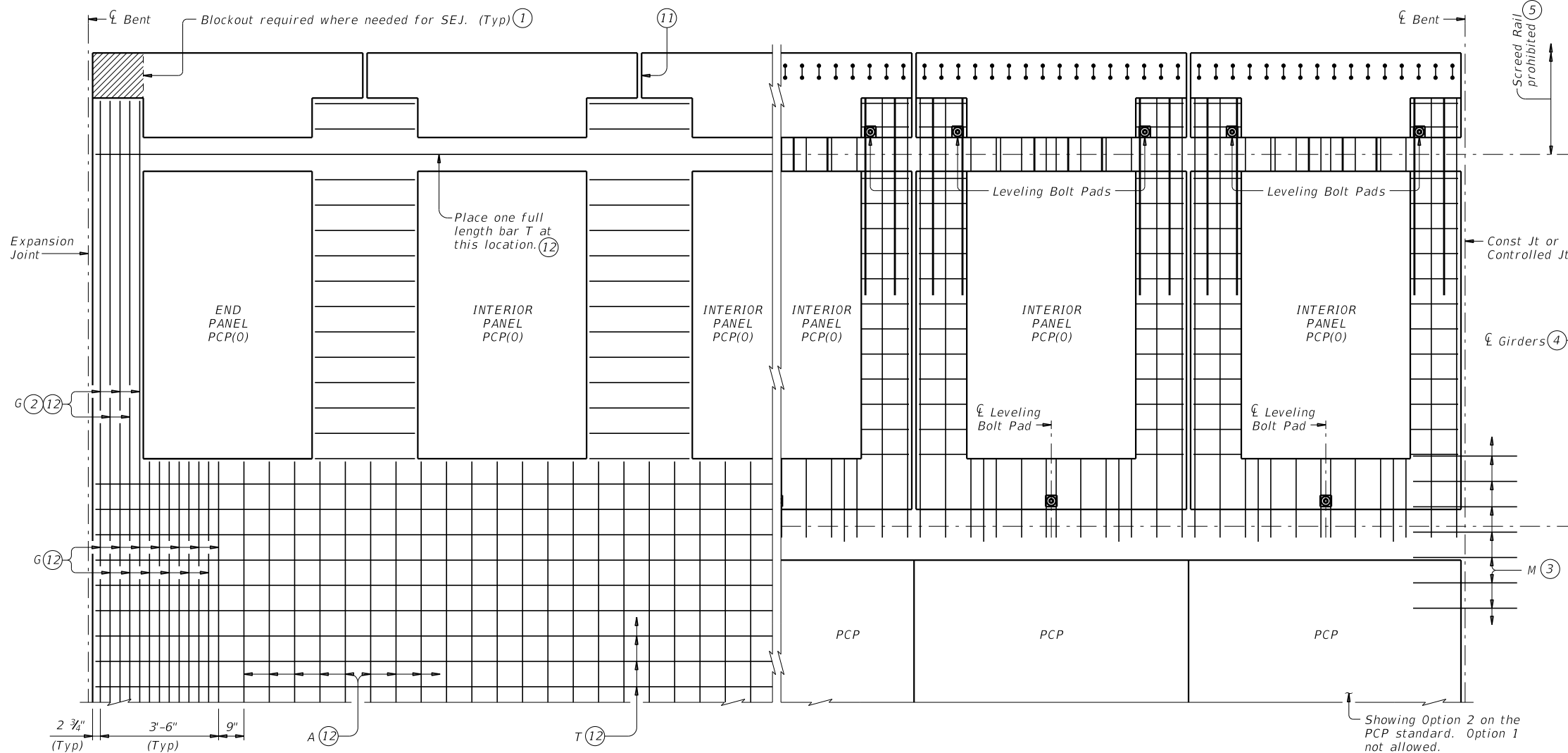
PRECAST CONCRETE PANELS FOR OVERHANGS FABRICATION DETAILS

PCP(O)-FAB

FILE: pcpstd02-17.dgn	DN: KLM	CK: DVL	DW: JTR	CK: KLM
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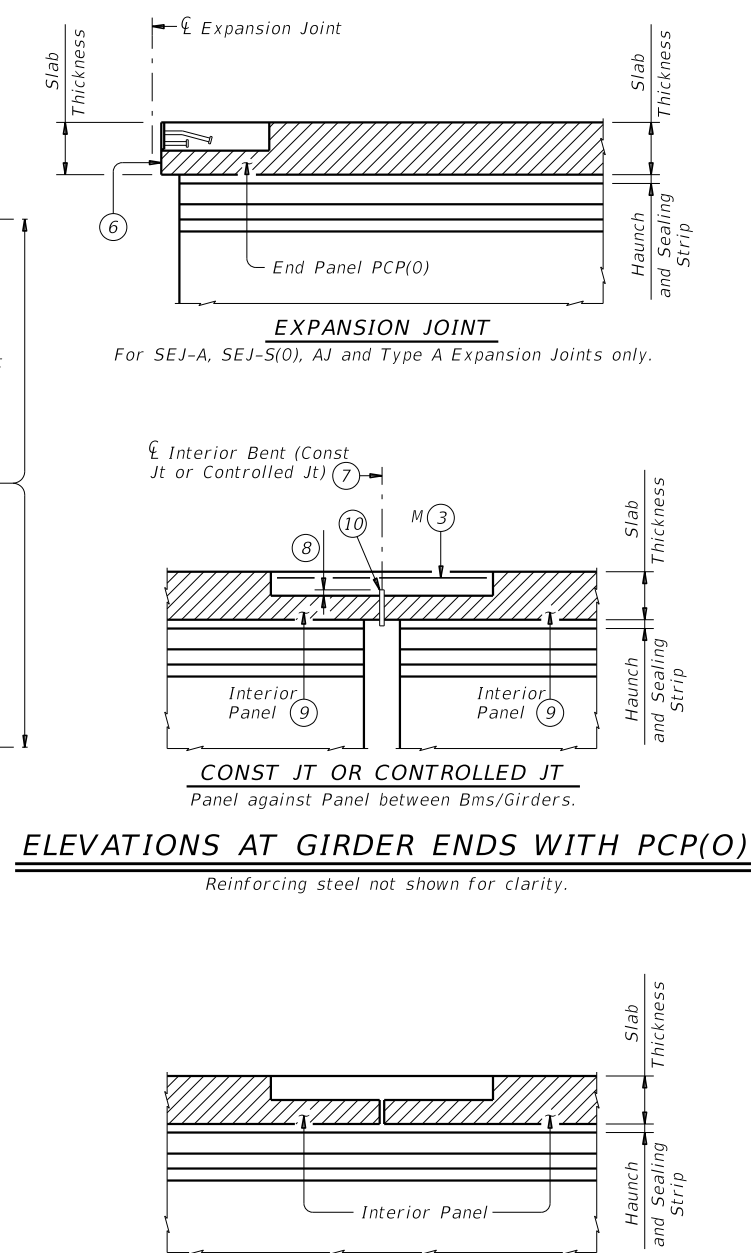
SHOWING FIELD PLACEMENT OF TOP REINFORCING STEEL

SHOWING PCP(O) EXPOSED REINFORCING STEEL

PANEL LAYOUT

PCP(O) shown with gaps between panels for clarity. The gap cannot be considered as a panel fabrication tolerance.

- ① 1'-4" x 1'-6" x 4 1/2" blockout to accommodate SEJ that require an upturn. Contractor to communicate with fabricator the location and type of SEJ to be utilized.
- ② When blockout is required, extend bars G into blockout.
- ③ Place additional bars M 2'-11" in length on top of bars A and between every bar T. Center bars M at center of bent. Located at bents with construction joints or controlled joints only. Bars M may replace additional (#4) bars 5'-0" in length as shown on PCP standard in Option 2 ~ Elevations At Beam Ends. Option 1 not allowed.
- ④ It is recommended to profile every 4 ft by surveying each girder under PCP(O) for proper grading of panels.
- ⑤ Screed rail used to set grade for paving machine is not allowed past exterior girder as shown.
- ⑥ Place end panel PCP(O) within 1/2" of expansion joint opening. Do not encroach on required expansion joint opening.
- ⑦ Top Plastic Joint Former at Controlled Joints (Stress Cap, Zip Strip, Stress Lock, etc.) is not required with these Details.
- ⑧ 0" Min, 3/4" Max, support as necessary.
- ⑨ Place panel within 1/2" of 3/4" thick board.
- ⑩ 3/4" thick wood/timber board, leave in place. Place straight, within 1/4" of Centerline of Bent, across bridge width and end board at exterior flange edge of fascia girders. Do not extend into overhang.
- ⑪ Seal top of panel only, with a Class 4 sealant prior to rail construction. Typical between panels. Do not seal at Expansion Joints.
- ⑫ 1 1/2" End Cover. (Typ)



EXPANSION JOINT
 For SEJ-A, SEJ-S(0), AJ and Type A Expansion Joints only.

CONST JT OR CONTROLLED JT
 Panel against Panel between Bms/Girders.

ELEVATIONS AT GIRDER ENDS WITH PCP(O)

Reinforcing steel not shown for clarity.

ELEVATION BETWEEN PCP(O)

The gap cannot be considered as a panel fabrication tolerance. Reinforcing steel not shown for clarity.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation Bridge Division

PRECAST CONCRETE PANELS FOR OVERHANGS

PCP(O)

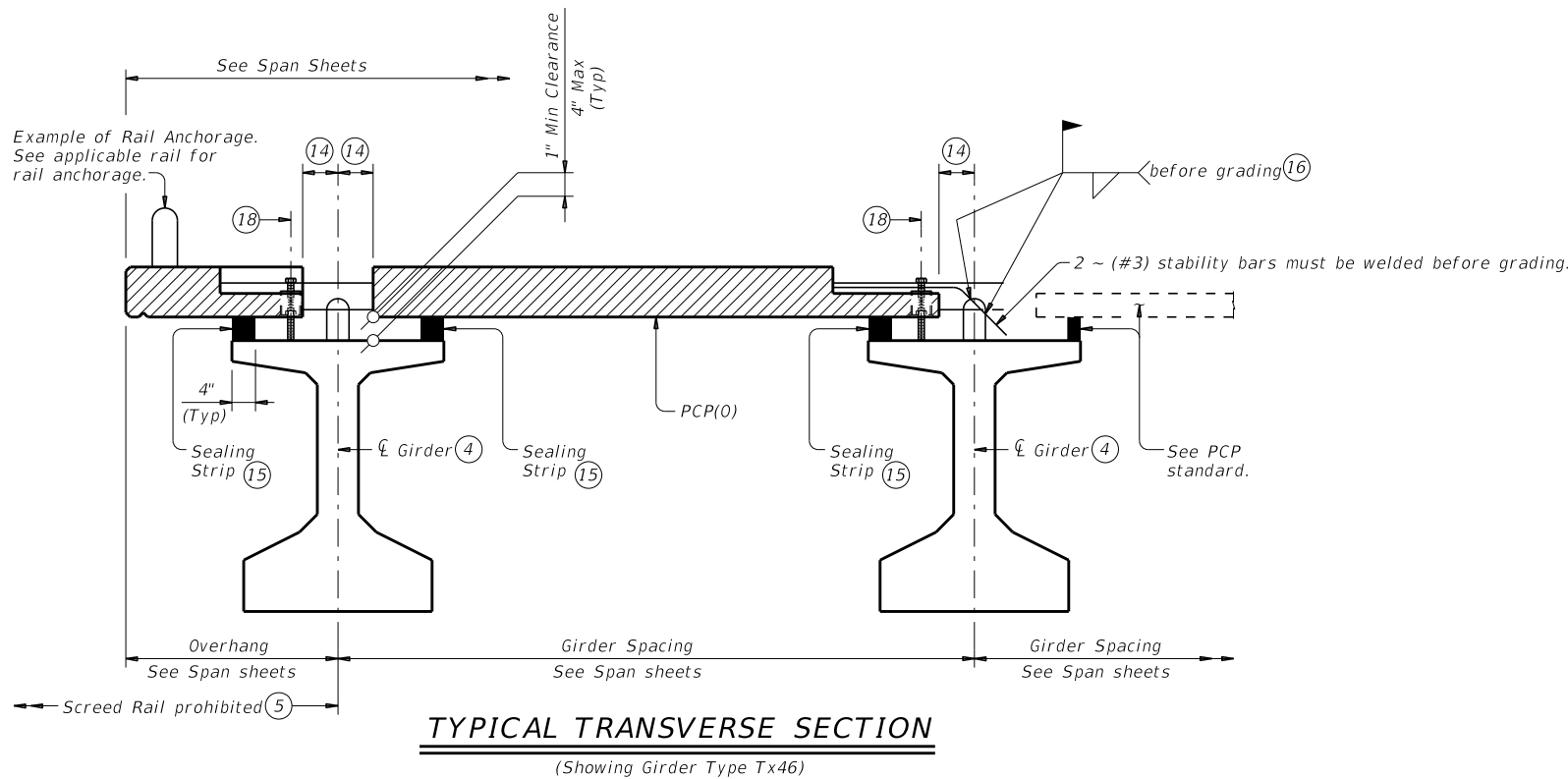
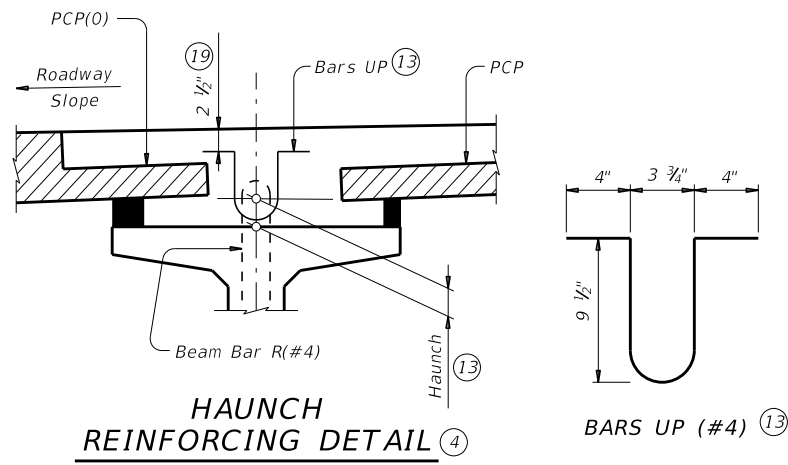
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REVISIONS	0522-1801		BRANDT RD	
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BAR TABLE		
BAR	SIZE	MAX SPA (IN)
A (12)(17)	#4	9"
G (12)(17)	#4	3 1/2"
M	#4	9"
T (12)(17)	#4	9"

- ④ It is recommended to profile every 4 ft by surveying each girder under PCP(0) for proper grading of panels.
- ⑤ Screed rail used to set grade for paving machine is not allowed past exterior girder as shown.
- ⑫ 1 1/2" End Cover on bars. (Typ)
- ⑬ Space bars UP(#4) with girder bars R(#4) in all areas where measured haunch exceeds 3 1/2" with Prestressed Concrete I-Girders. Epoxy coating for Bars UP is not required.
- ⑭ 6" plus or minus.
- ⑮ Place sealing strip at flange edge as shown. Butt adjacent sealing strips longitudinally together with adhesive. Use pencil vibrators with concrete placement over girder and between sealing strips to avoid rupturing sealing strips. Cut sealing strips 2" higher than anticipated haunch thickness and compress to grade.
- ⑯ (#3) Panel bars F must be field bent and welded to the R bars in girder. Two bars F per panel.
- ⑰ Field placed bars that are allowed to be lapped. Reinforcing steel that protrudes from panels are not considered bars to be lapped. See "Material Notes" for applicable bar laps.
- ⑱ Leveling Bolt Pad. 1" Dia Coil Rod or 1" Dia Coil Bolt shown, are furnished by the contractor. After grading each PCP(0) panel with the 1" Dia coil rods or coil bolts, secure each panel in its final resting position (plastic shims, welding, etc) and remove all 1" Dia coil rods or coil bolts for the cast-in-place concrete. Coil rods/bolts may be left in place at contractor's option. If coil rods/bolts are left in place, coil rods/bolts must have at least 2 1/2" of cover to top of finish grade. Grading bolts are inadequate to carry all conceivable screed/construction loads. Panel support method must be calculated, location identified, and placed on shop drawings. Method chosen to support panels must be adequate for all construction loads. Panel support method must be placed/constructed after final grading and before screed rail placement.
- ⑲ Unless shown otherwise on Span Details.



CONSTRUCTION NOTES:

Placing panels adjacent to expansion joints and bent centerlines prior to completing interior panel placement is recommended. Ensure proper cleaning of construction debris and consolidation of concrete mortar under the edges of the panels. Place sealing strips at girder flange edges so that adequate space is provided for the mortar to flow a minimum of 8" transversely under the panels as the slab concrete is placed. Panel placement with Option 1 on the PCP standard is not allowed. It is recommended to profile every 4 ft by surveying each girder under PCP(0) for proper grading of panels. To allow the proper amount of mortar to flow between girder and panel, maintain a minimum vertical opening of 1". Roadway cross-slope reduces the opening available for entry of the mortar. Sealing strips vary in thickness along girder are therefore required. Seal the top panel with a Class 4 sealant as shown in the Panel Layout.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel in cast-in-place slab. See Table of Reinforcing Steel for size and spacing of reinforcement. If the reinforcing steel is shown on the Span Details to be epoxy coated, then epoxy coat bars A, G, M, & T. Provide bar laps, where required, as follows:
 Uncoated ~ #4 = 1'-7"
 Epoxy Coated ~ #4 = 2'-5"
 Provide sealing strips comprised of one layer low density polyurethane (1.0 Lbs density) foam sealing strips or equivalent. Oversize the height of sealing strips by 2". Bond sealing strips to the girder with 3M Scotch® 4693 or equivalent adhesive compatible with sealing strips.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications. These details can be used as an option to construct the deck overhang when noted on the Span details and in conjunction with the PCP(0)-FAB, PCP and applicable Standard sheets. These details are only applicable for Prestr Conc I-Girders. Any additional reinforcement or concrete required on these details is subsidiary to the bid Item "Reinforced Concrete Slab".

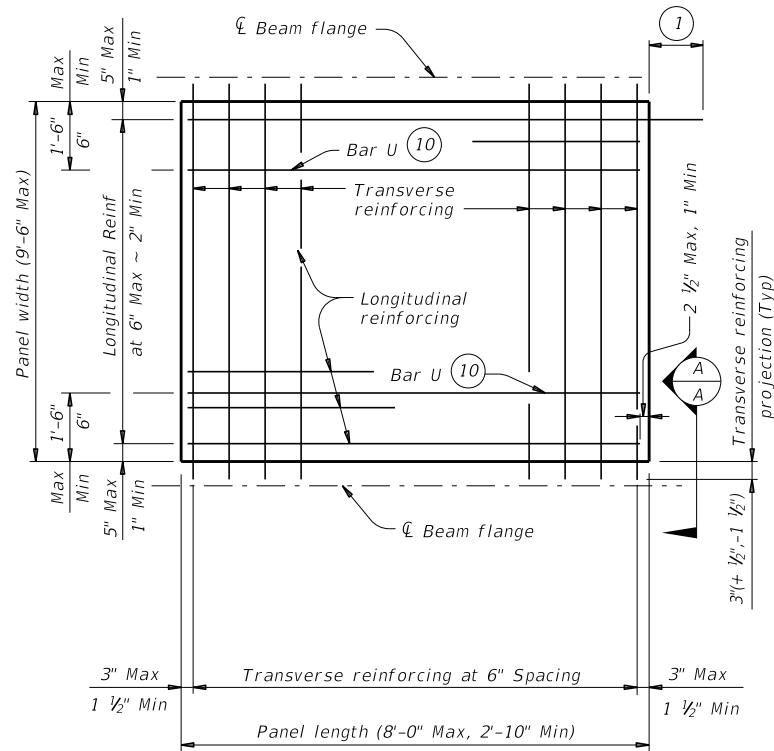
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING SHEET 2 OF 2

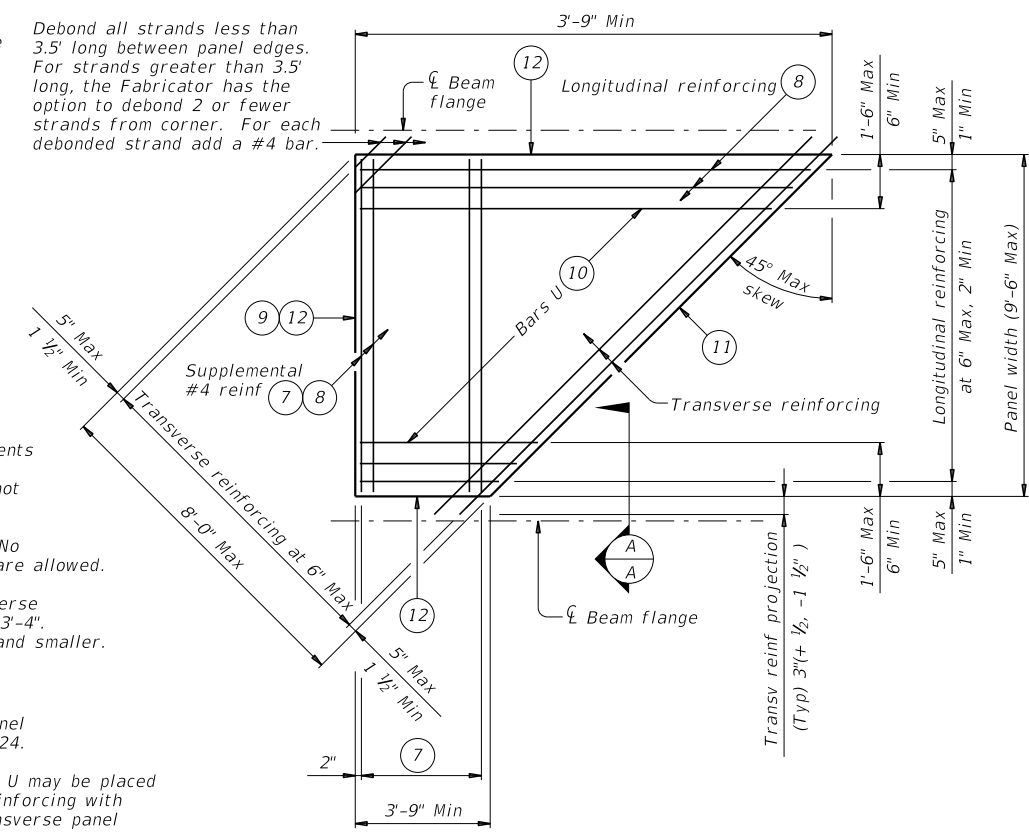
		Bridge Division	
<h2>PRECAST CONCRETE PANELS FOR OVERHANGS</h2>			
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TYPICAL NON-SKEWED PANEL PLAN



TYPICAL SKEWED END PANEL PLAN

(Only to be used with details shown elsewhere in the plans.)

- 1 At connection with cast-in-place slab, extend longitudinal panel reinforcement 1'-0" (+2", -0") past panel end. Alternatively, provide (#3) x 2'-0" dowels at 6" Max Spacing and extend dowels 1'-0" past panel end.
- 2 Four loops required per panel.
- 3 Four loops required per panel. 3/8" or 1/2" strands may be used.
- 4 Normal dimensions must be used on spans with parallel beams. Maximum and Minimum dimensions apply only to spans with flared beams.
- 5 See Normal Grading Detail on PCP standard for lap requirements and bedding strip dimensions. Some laps shown in tables cannot utilize all bedding strip widths.
- 6 One Splice allowed per panel. No more than two sheets of WWR are allowed.
- 7 Provide (#4) bars under transverse reinforcing, 10 Spaces at 4" = 3'-4". Omit for 5 degree (1:12) skew and smaller.
- 8 End Cover 2 1/2" Max, 1" Min.
- 9 Recess strands on indicated panel edge in accordance with Item 424.
- 10 At the fabricator's option, Bars U may be placed parallel to transverse panel reinforcing with horizontal legs in plane of transverse panel reinforcing.
- 11 Use length of indicated panel edge as panel width for purpose of determining type of transverse reinforcing.
- 12 Timber form work permissible this edge.

TABLE A (4) (5)				TABLE B (4) (5)			
Beam Type	Normal (In.)	Min (In.)	Max (In.)	Top Flange Width	Normal (In.)	Min (In.)	Max (In.)
A	3	2 1/2	3 1/2	11" to 12"	2 3/4	2 1/2	2 3/4
B	3	2 1/2	3 1/2	Over 12" to 15"	3 1/4	3	3 1/4
C	4	3	4 1/2	Over 15" to 18"	4	3	4 3/4
IV	6	4	7 1/2	Over 18"	5	3 1/2	6 1/4
VI	6 1/2	4 1/2	8 1/2				
U40 - 54	5 1/2	5 1/2	7				
Tx28-70	6	5	7 1/2				
XB20 - 40	4	3	4 1/2				
XSB12 - 15	4	3	4 1/2				

GENERAL NOTES:

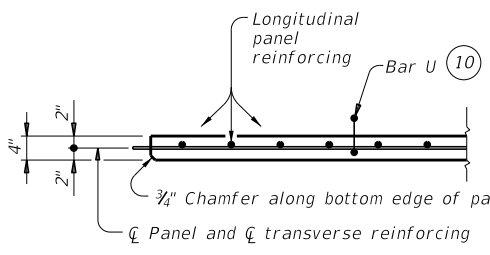
Provide Class H concrete for panels. Release strength $f'_{ci}=3,500$ psi. Minimum 28 day strength $f'_c=5,000$ psi.
 Provide 3/4" chamfer along bottom edge of panel on beam side.
 Do not use epoxy-coated reinforcing steel bar or strand in panels. Remove laitance from top panel surface.
 Finish top of panel to a roughness between a No. 6 and No. 9 concrete surface profile, inclusive, as specified by the International Concrete Repair Institute (ICRI).
 Shop drawings for the fabrication of panels will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.
 A panel layout which identifies location of each panel must be developed by the Fabricator. Permanently mark each panel in accordance with the panel layout. A copy of the layout is to be provided to the Engineer.

TRANSVERSE PANEL REINFORCEMENT:

For panel widths over 5', use 3/8" or 1/2" Dia (270k) prestressing strands with a tension of 14.4 kips per strand.
 For panel widths over 3'-6" up to and including 5', use 3/8" or 1/2" Dia (270k) prestressing strands with a tension of 14.4 kip per strand. Optionally, (#4) Grade 60 reinforcing bars may be used in lieu of prestressed strands.
 For panel widths up to 3'-6", use (#4) Grade 60 reinforcing bars (prestressed strands alone are not allowed).
 Place transverse panel reinforcement at panel centroid and space at 6" Max.

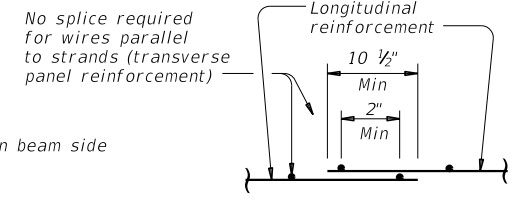
LONGITUDINAL PANEL REINFORCEMENT:

Any of the following options may be used for longitudinal panel reinforcement:
 1. (#3) Grade 60 reinforcing steel at 6" Max Spacing. No splices allowed.
 2. 3/8" Dia prestressing strands at 4 1/2" Max Spacing (unstressed). No splices allowed.
 3. 1/2" Dia prestressing strands at 6" Max Spacing (unstressed). No splices allowed.
 4. Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) providing 0.22 sq in per foot of panel width. Wires larger than D11 not permitted. Provide transverse wires to ensure proper handling of reinforcing. One splice per panel is allowed. See WWR Splice Detail.
 No combination of longitudinal reinforcement options in a panel is allowed. Place longitudinal panel reinforcement above or below transverse panel reinforcement. Must be placed above transverse panel reinforcement for skewed end panels with supplemental (#4) reinforcement.

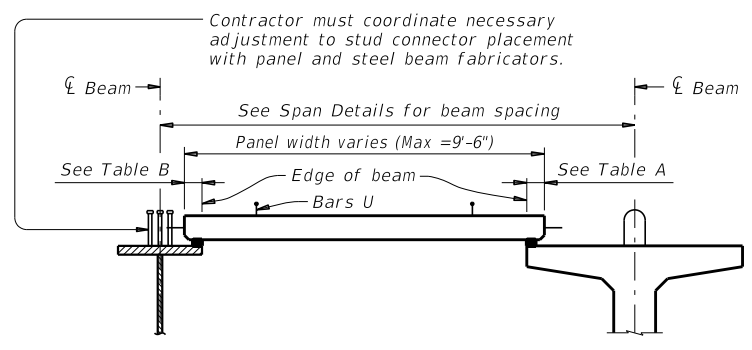


SECTION A-A

(Not showing supplemental #4 bars for skewed end panels.)

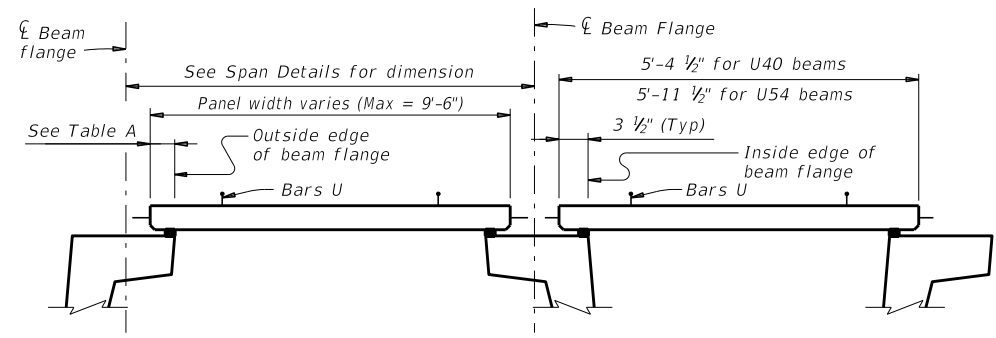


WELDED WIRE REINFORCEMENT (WWR) SPLICE DETAIL



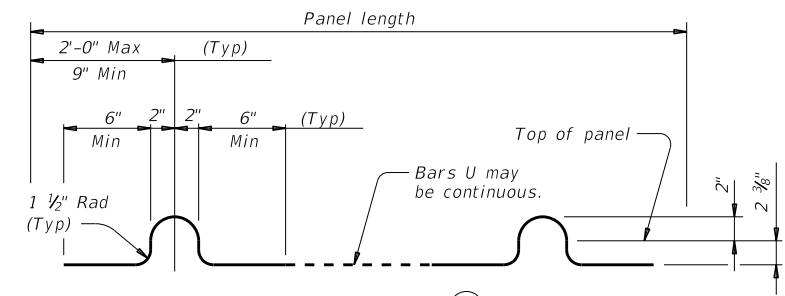
STEEL BEAMS

PRESTRESSED CONCRETE BEAMS OR GIRDERS

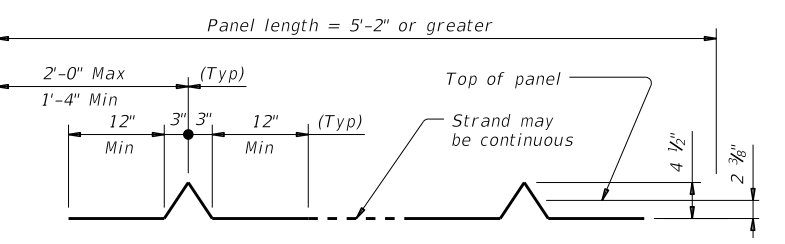


PRESTRESSED CONCRETE U-BEAMS

TYPICAL SECTIONS FOR DETERMINING PANEL WIDTH



BARS U (#3)

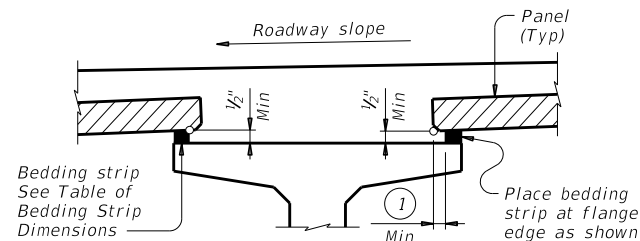


OPTIONAL STRAND FOR BARS U

HL93 LOADING

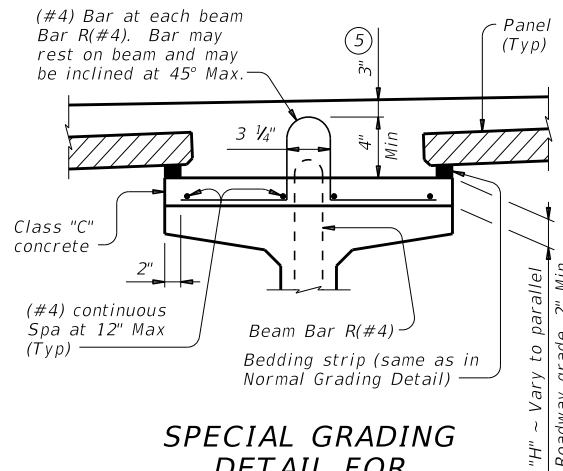
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<p>PCP-FAB</p>			
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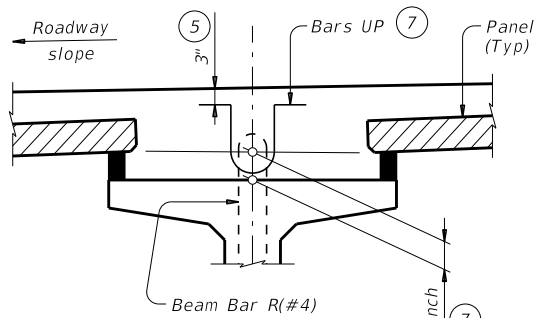
NORMAL GRADING DETAIL ③

Showing prestressed concrete I-girders.
(Other beam types similar)



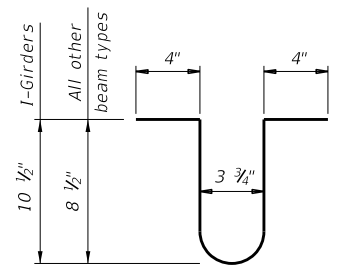
SPECIAL GRADING DETAIL FOR CONCRETE BEAMS

Showing prestressed concrete I-girders.
(Other beam types similar)



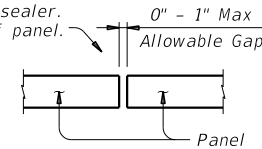
HAUNCH REINFORCING DETAIL

Showing prestressed concrete I-girders.
(Other beam types similar)



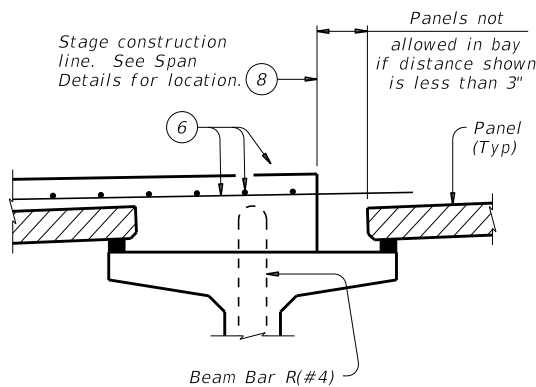
BARS UP (#4) ⑦

Seal joint between panels when gap exceeds 1/4 inch with polyurethane sealant or expanding foam sealer. Make seal flush with top of panel.

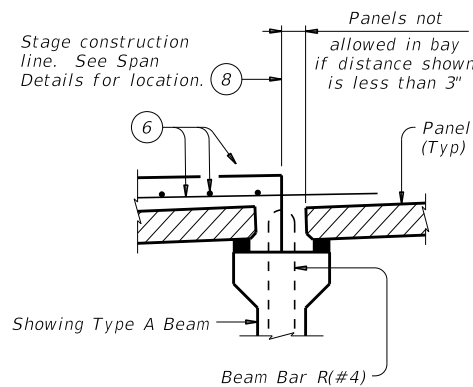


PANEL JOINTS

(Panel reinforcing not shown for clarity. The gap cannot be considered as a panel fabrication tolerance. Adjust panel placement to minimize joint openings.)



PRESTR CONC I-GIRDERS



PRESTR CONC I-BEAMS

STAGE CONSTRUCTION LIMITATIONS

(Other beam types similar)

WIDTH	HEIGHT ④	
	Min	Max
1" (Min)	1/2"	2"
1 1/4"	1/2"	2 1/2"
1 1/2"	1/2"	3"
1 3/4"	1/2"	3 1/2"
2"	1/2"	4"
2 1/4"	1/2"	4 1/2"
2 1/2"	1/2"	5"
2 3/4"	1/2"	5 1/2"
3" (Max)	1/2"	6"

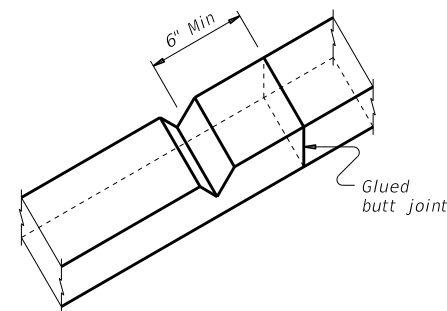
- ① 2" Min for I-girders, 1 1/2" Min for all other beam types.
- ② Allowed for I-girders, not allowed on other beam types.
- ③ To reduce the quantity of cast-in-place concrete, bedding strip thickness may be increased in 1/4 inch increments. Bedding strips must be comprised of one layer. Bond bedding strips to the beams with an adhesive compatible with bedding strips. Bedding strips over 2.5 inch high may need to be bonded to panels. The same thickness strip must be used under any one panel edge and the maximum change in thickness between adjacent panels is 1/4 inch. Alternatively, bedding strips may be cut to grade. Panels may be supported by an alternate method, using a commercial product, if approved by the Engineer of Bridge Design, Bridge Division. If bedding strips exceed 6 inch high for I-Girders, 4 inch high for all other beam types, use Special Grading Detail for Concrete Beams or submit an alternate method to the Bridge Division for approval.
- ④ Height must not exceed twice the width.
- ⑤ Provide clear cover as indicated unless otherwise shown on Span Details.
- ⑥ See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- ⑦ Space Bars UP(#4) with Beam Bars R(#4) in all areas where measured haunch exceeds 3 1/2 inch with I-girders, and 3 inch for all other beam types. Epoxy coating for Bars UP is not required.
- ⑧ Do not locate construction joints on top of a panel.
- ⑨ Butt adjacent bedding strips together with adhesive. Cut v-notches, approx 1/4 inch deep, in the top of the bedding strips at 8 inch o.c..

CONSTRUCTION NOTES:
 Erected panels must bear uniformly on bedding strips of extruded polystyrene placed along top flange edges. Placing panels to minimize joint openings is recommended. If additional blocking is needed, special grading details for supporting the panels and extra reinforcing between beam and slab will be considered subsidiary to deck construction. Bars U, shown on PCP-FAB, may be bent over or cut off if necessary. Care must be taken to ensure proper cleaning of construction debris and consolidation of concrete material under the edges of the panels. Bedding strips must be placed at beam flange edges so that adequate space is provided for the mortar to flow a minimum of 1 1/2 inch under the panels as the slab concrete is placed. To allow the proper amount of mortar to flow between beam and panel, the minimum vertical opening must be at least 1/2 inch. Roadway cross-slope reduces the opening available for entry of the mortar. Bedding strips varying in thickness across the beam are therefore required. For clear span between U-beams less than or equal to 18 inch, see Permissible Slab Forming Detail on Miscellaneous Slab Detail sheets, UBMS.

MATERIAL NOTES:
 Provide Grade 60 reinforcing steel in the cast-in-place slab. See Table of Reinforcing Steel for size and spacing of reinforcement. If the top and bottom layer of reinforcing steel is shown on the Span Details to be epoxy coated, then the D, E, P, & Z bars must be epoxy coated. Provide bar Laps, where required, as follows:
 Uncoated ~ #4 = 1'-7"
 Epoxy Coated ~ #4 = 2'-5"

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications. Panel placement may follow either Option 1 or Option 2 except Option 1 must be used if the skew exceeds 45 degrees. Use of Prestressed Concrete Panels is not permitted for horizontally curved steel plate or tub girders. See Span Details for other possible restrictions on their use. These details are to be used in conjunction with the Span Details, PCP-FAB and other applicable standard drawings. When panel support (bedding strips) deviates from what is shown herein, provide details signed and sealed by a professional Engineer. Any additional reinforcing or concrete required on this standard is considered subsidiary to the bid item "Reinforced Concrete Slab".

Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bar dimensions shown are out-to-out of bar.

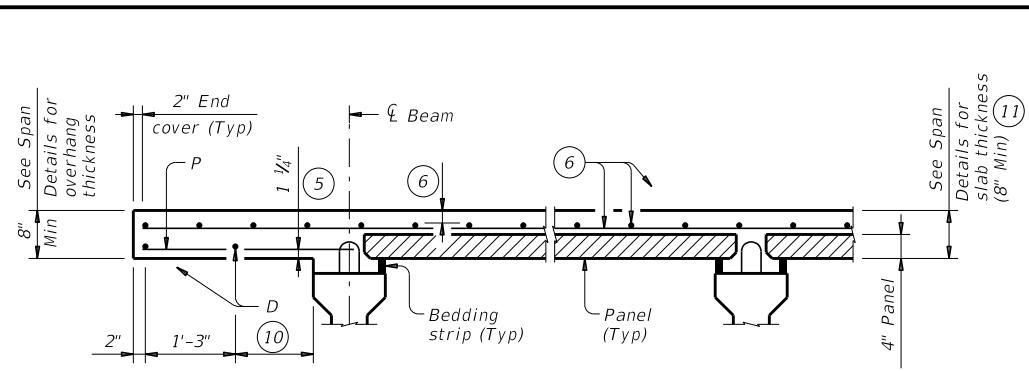


BEDDING STRIP DETAIL ⑨

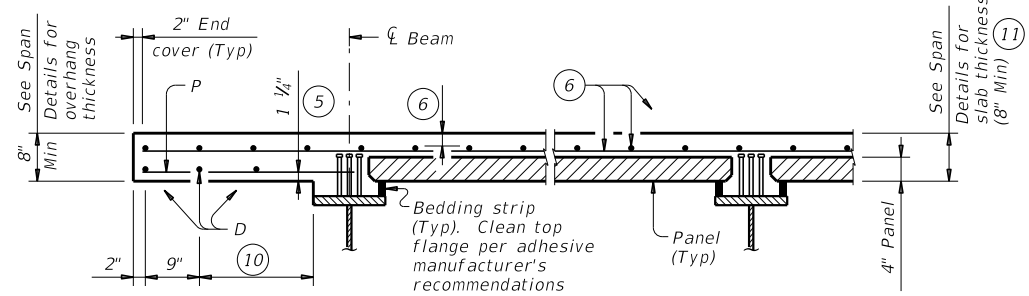
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PRESTRESSED CONCRETE PANELS DECK DETAILS			
PCP			
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REVISIONS	0522-1801		BRANDT RD
DIST	COUNTY	SHEET NO.	
HOU	FORT BEND	BR39	

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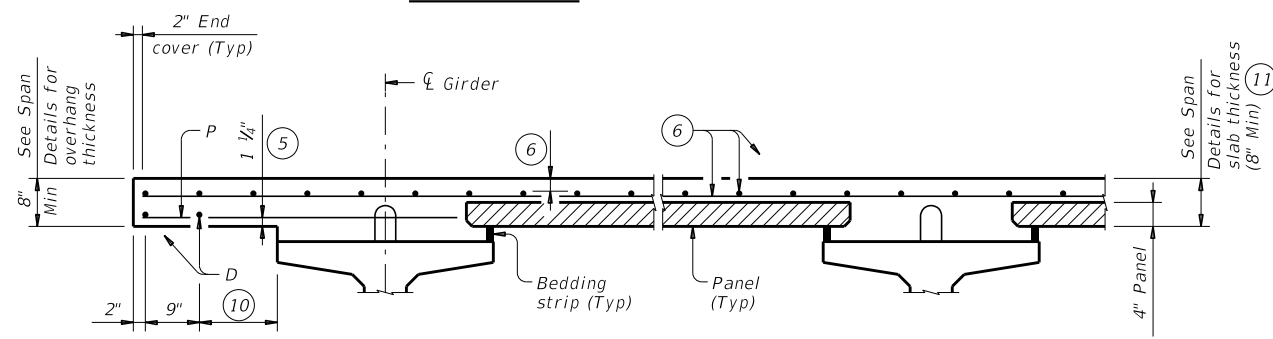
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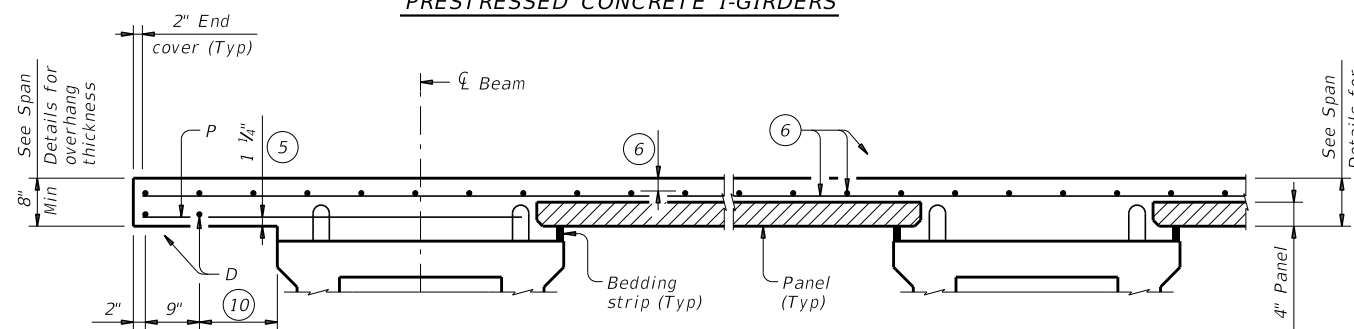
PRESTRESSED CONCRETE I-BEAMS



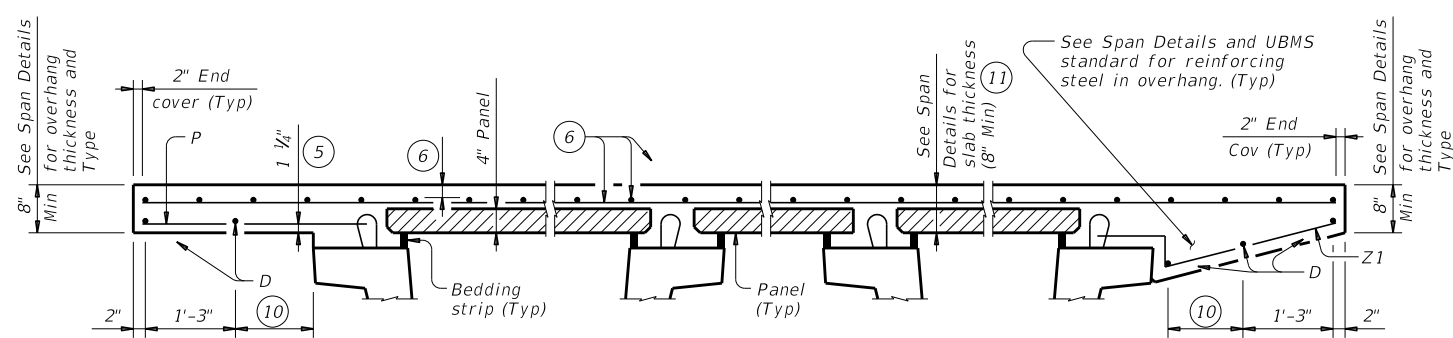
STEEL BEAMS



PRESTRESSED CONCRETE I-GIRDERS



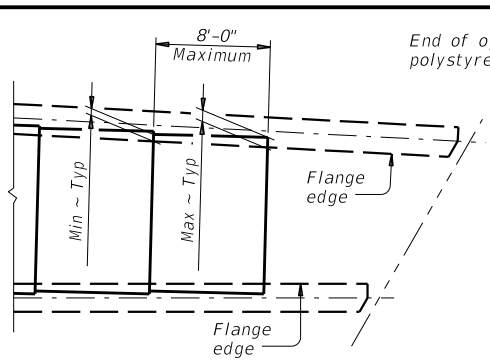
PRESTRESSED CONCRETE X-BEAMS



NORMAL OVERHANG WITH PRESTR CONC U-BEAMS

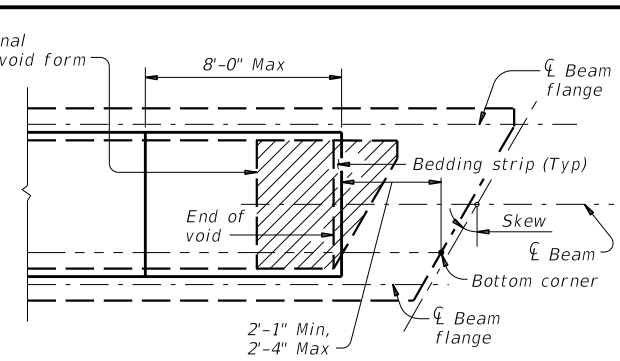
TYPICAL PART TRANSVERSE SECTIONS

SLOPED OVERHANG WITH PRESTR CONC U-BEAMS



AT FLARED BEAMS OR GIRDERS

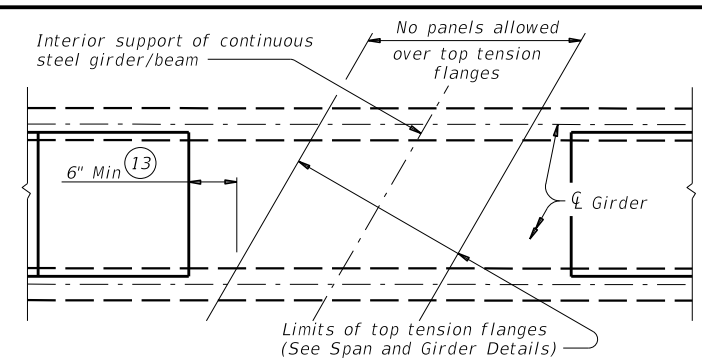
See PCP-FAB standard for Min and Max dimensions based on beam/girder type.



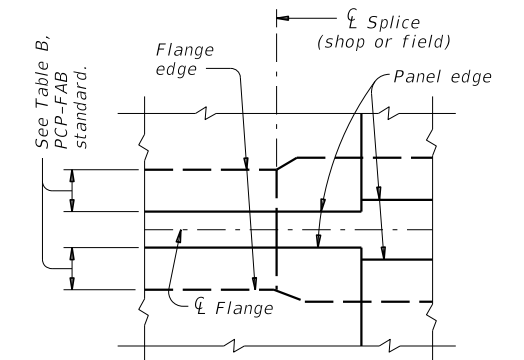
OVER CONC U-BEAMS

PART PLANS OF PANEL PLACEMENT

- 5 Provide clear cover as indicated unless otherwise shown on Span Details.
- 6 See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- 9 Butt adjacent bedding strips together with adhesive. Cut v-notches, approx 1/4" deep, in the top of the bedding strips at 8' o.c..
- 10 Equally space additional bar if more than 1'-3" Max.
- 11 The actual thickness constructed may exceed the slab thickness shown on the Span Details but the extra thickness may be no more than 2" (1" for prestressed concrete U-beams and steel beams). Bearing seat elevations or finished grade may be adjusted.
- 12 Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at Inverted-Tee stems only.
- 13 Location of concrete placement sequence boundaries and bolted field splices should be considered by the contractor in determining panel limits.



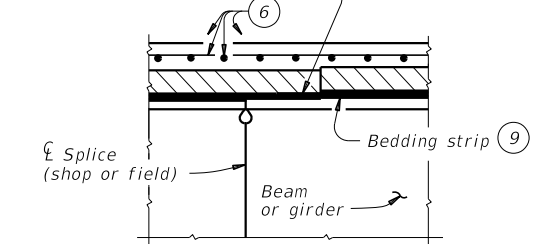
AT INT SUPPORTS OF CONTINUOUS STEEL GIRDERS



PLAN AT SPLICE

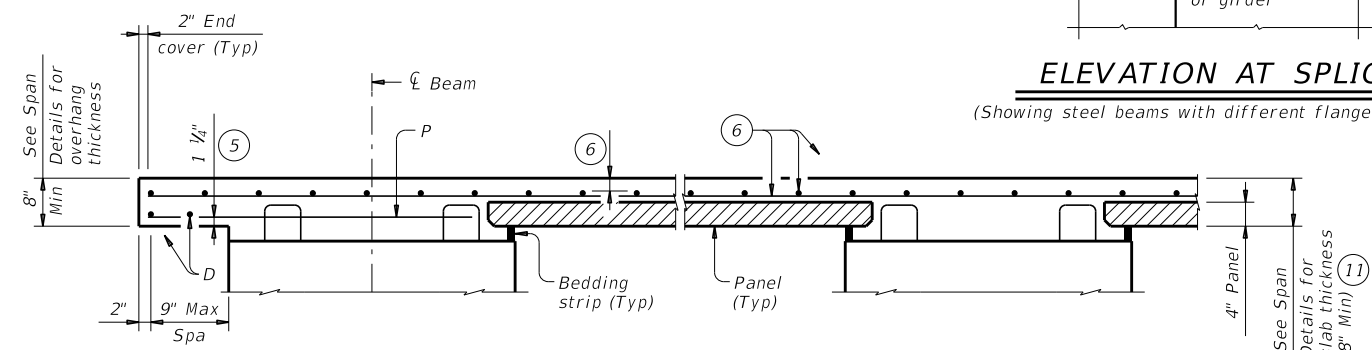
(Showing steel beams with flange width transition)

Cut bedding strip to adjust for difference in flange thickness.



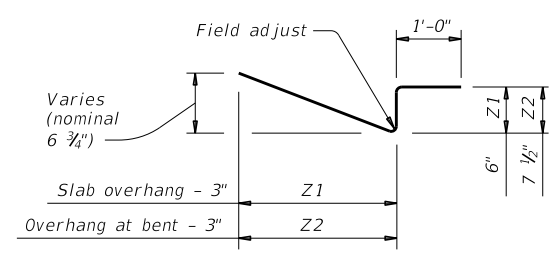
ELEVATION AT SPLICE

(Showing steel beams with different flange thickness)



PRESTRESSED CONCRETE SPREAD SLAB BEAMS

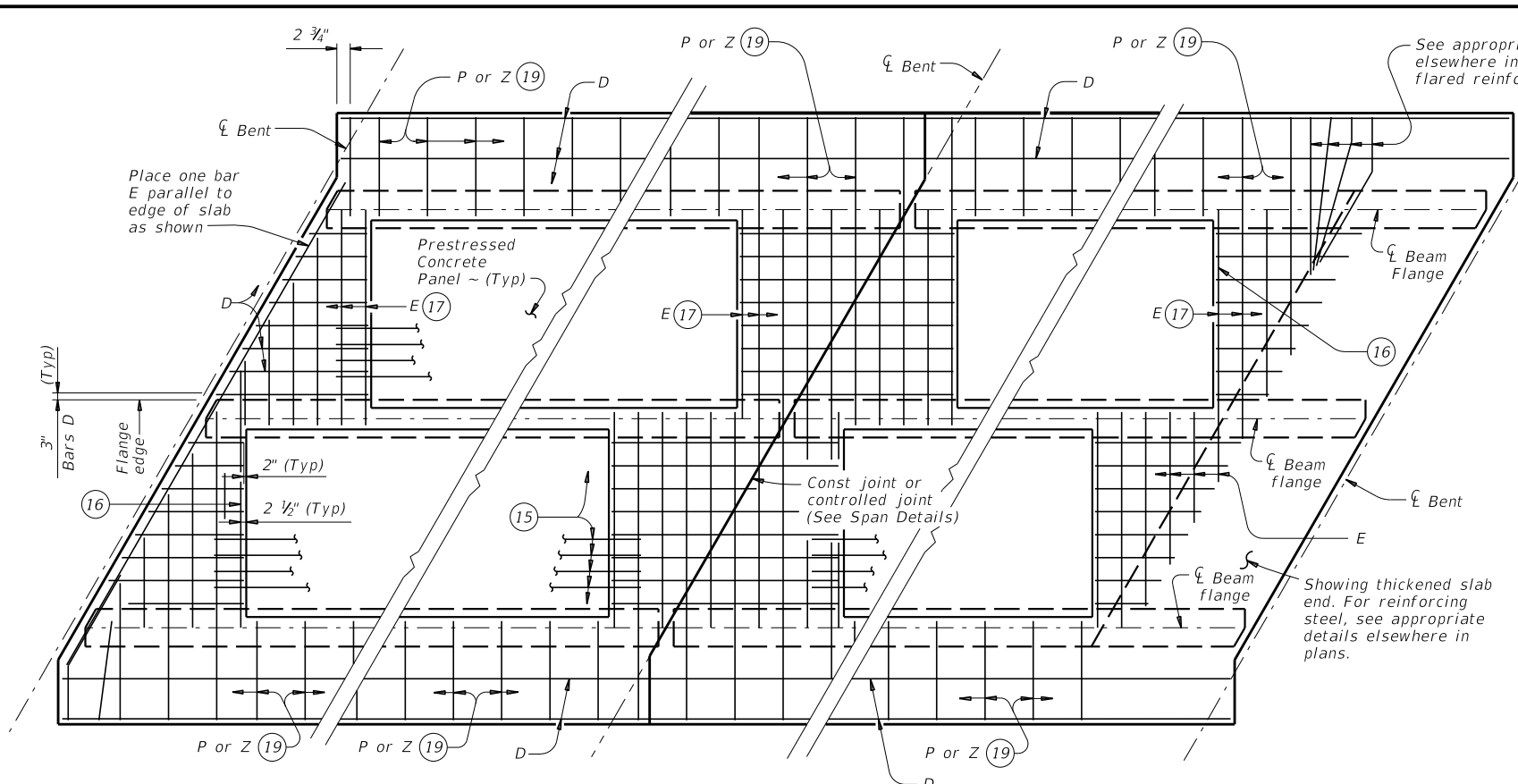
Bars P over exterior beams are still required when no overhang is used. In this case, only one Bar D, 2" from slab edge, is required.



BARS Z (#4) (12)

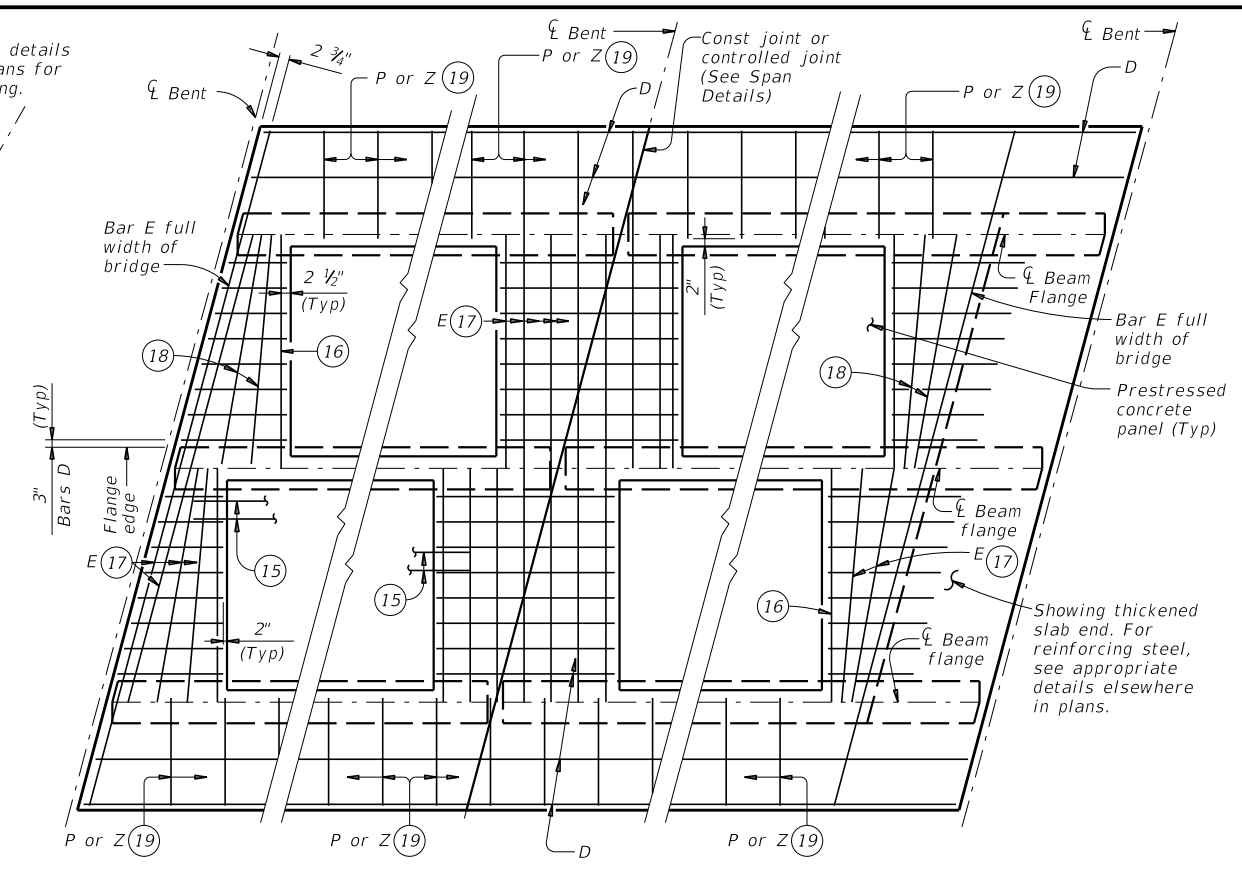
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PRESTRESSED CONCRETE PANELS DECK DETAILS			
PCP			
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©TxDOT April 2019	CONTRACT	SECTION	JOB
REVISIONS	0522-1801		BRANDT RD
DIST	COUNTY	SHEET NO.	
HOU	FORT BEND	BR40	

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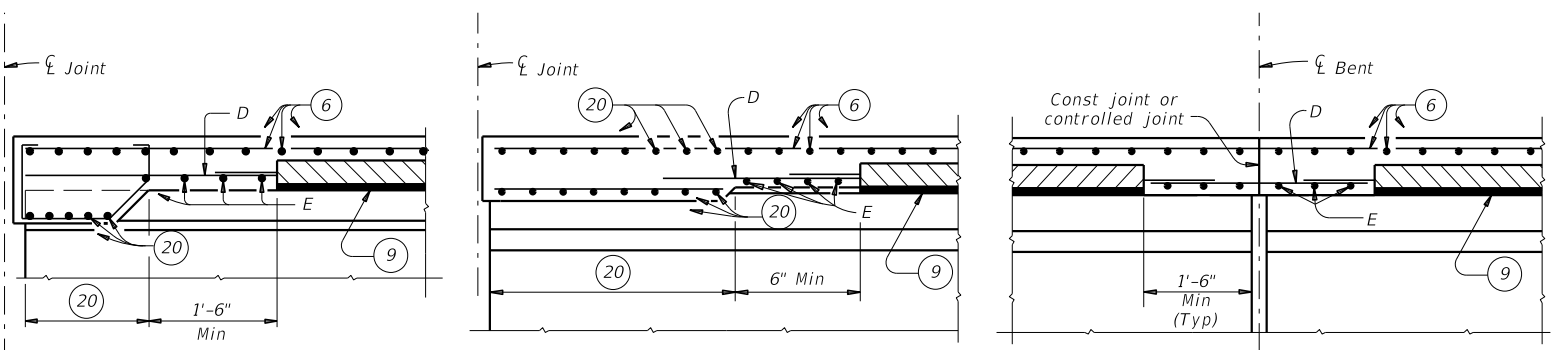
AT ALL SPAN ENDS UNLESS NOTED OTHERWISE
 AT INTERIOR BENTS
 AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH NORMAL REINFORCEMENT

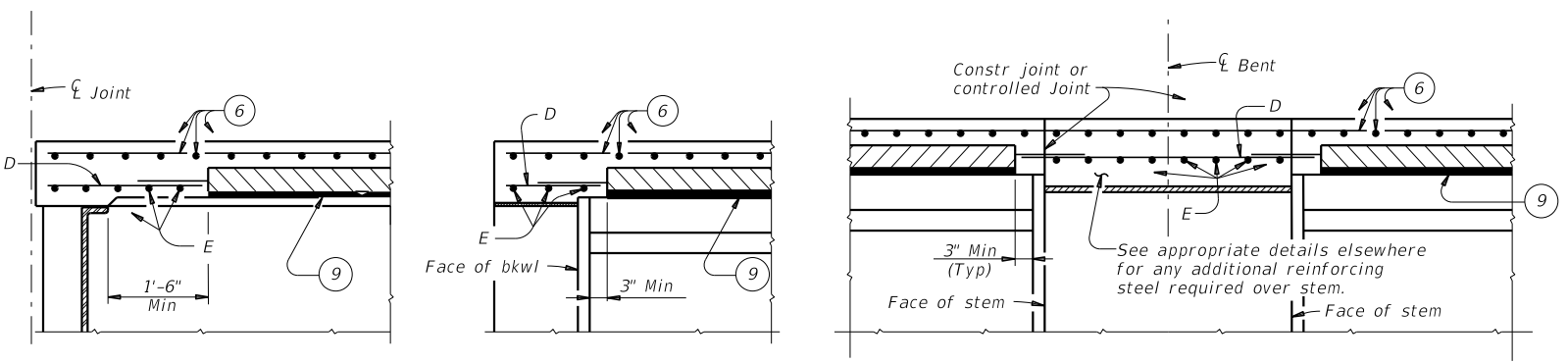


AT ALL SPAN ENDS UNLESS NOTED OTHERWISE
 AT INTERIOR BENTS
 AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH SKEWED REINFORCEMENT



AT THICKENED SLAB ENDS FOR PRESTR CONC U-BMS
 AT THICKENED SLAB ENDS FOR PRESTR CONC I-BMS AND STEEL BMS
 AT SLAB CONTINUOUS OVER CONVENTIONAL INTERIOR BENTS FOR ALL SIMPLE SPAN BMS



AT CONVENTIONAL END DIAPHRAGMS FOR STEEL BMS
 AT SLAB OVER ABUTMENT BACKWALL FOR ALL BMS
 AT SLAB CONTINUOUS OVER INVERTED-T BENTS FOR ALL BMS

OPTION 1 ~ ELEVATIONS AT BEAM ENDS

- 6 See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- 9 Butt adjacent bedding strips together with adhesive. Cut v-notches, approx 1/4" deep, in the top of the bedding strips at 8' o.c.
- 14 Max Spacing as listed unless otherwise shown.
- 15 At connection with cast-in-place slab, extend longitudinal panel reinforcement. See PCP-FAB for details.
- 16 Maintain one Bar E(#4) parallel to panel ends (Typ).
- 17 Bars E(#4) not continuous over beam flanges must overlap beam flange 6" Min.
- 18 Add flared Bars E(#4) (Min Spa = 6", Max Spa = 12") as required at panel ends.
- 19 Where possible, Bars E(#4) may be extended into overhangs to replace Bars P(#4). Bars Z(#4) are required for sloped overhangs with U-Beams.
- 20 See appropriate thickened slab end details for reinforcing and limits of thickened slab end.

TABLE OF REINFORCING STEEL (14)		
BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18



PRESTRESSED CONCRETE PANELS DECK DETAILS

PCP

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REVISIONS	0522-1801		BRANDT RD	
HOU	FORT BEND	SHEET NO.		BR41

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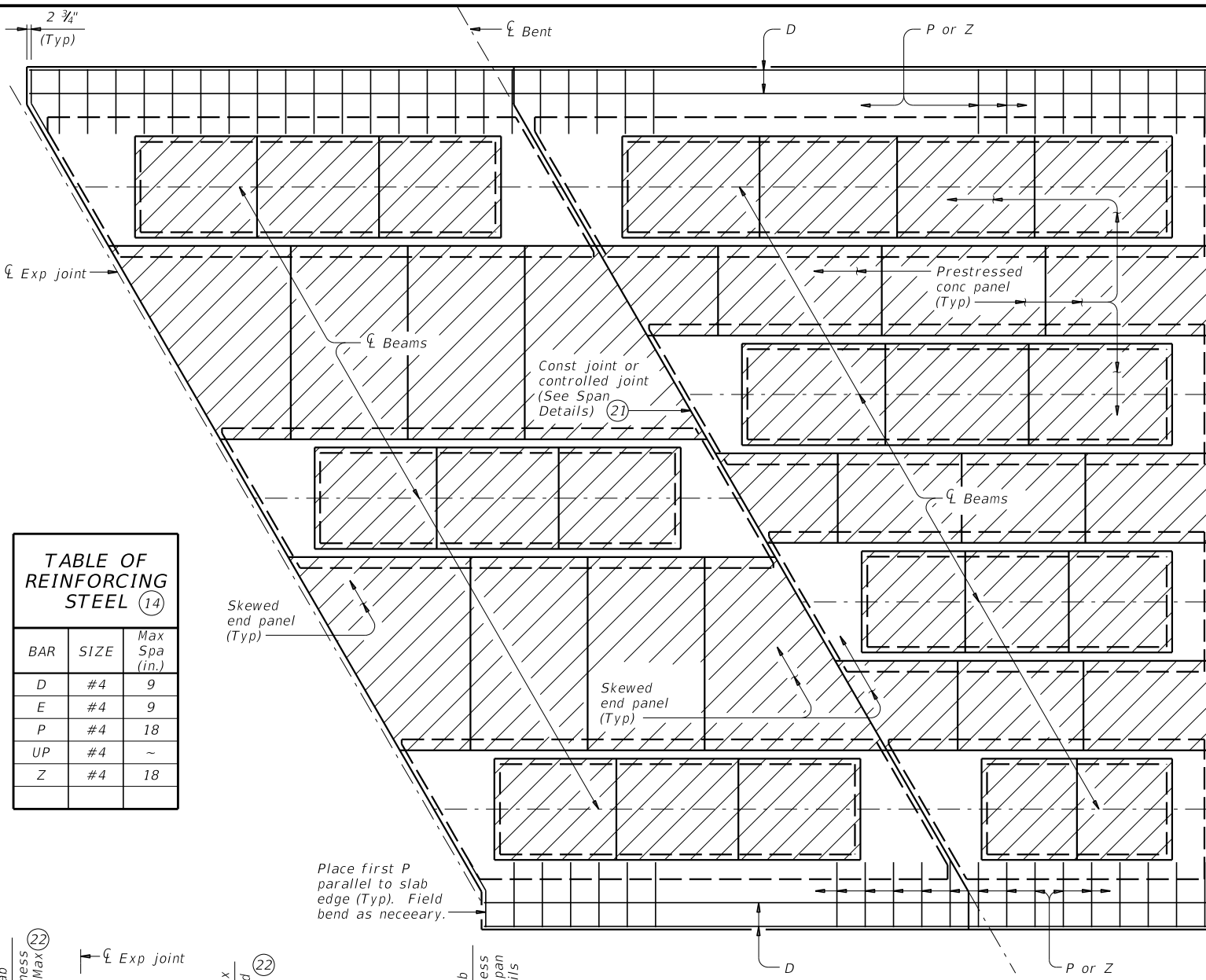
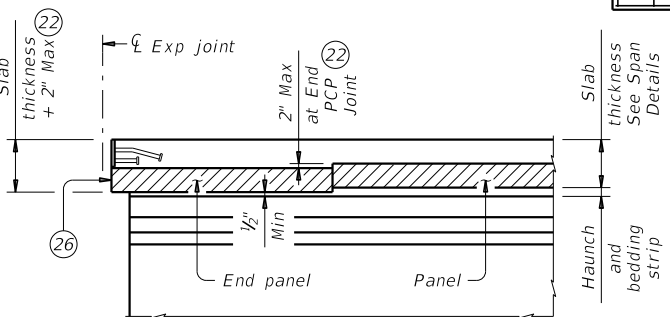
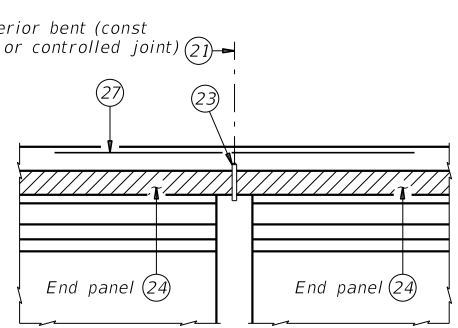


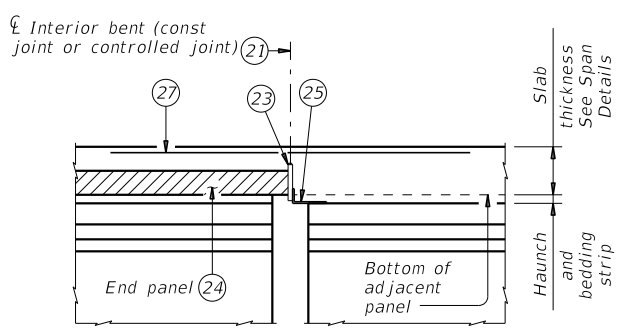
TABLE OF REINFORCING STEEL (14)		
BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18



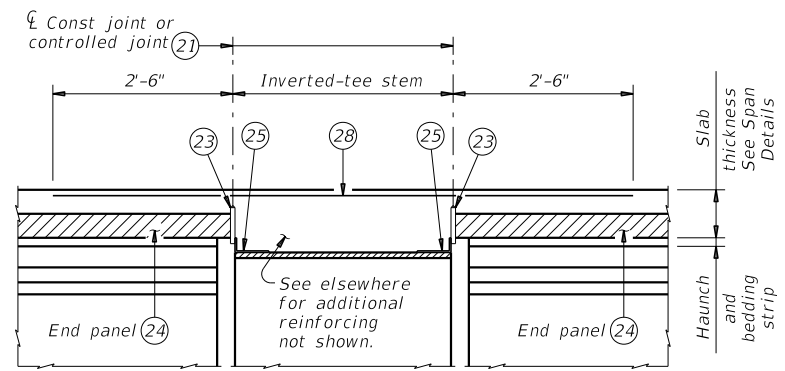
JOINTS (BETWEEN BEAMS/GIRDERS OR AT INV-T STEM)
 For SEJ-B, SEJ-M, SEJ-S(0), AJ, and Type A expansion joints only.



CONVENTIONAL INTERIOR BENT
 Panel against panel between beams/girders.



CONVENTIONAL INTERIOR BENT
 Panel against beam/girder end in adjacent span.



INVERTED-T BENT
 Panels against inverted-tee stem

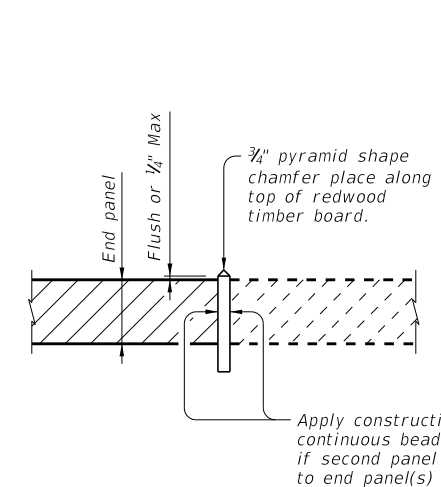
OPTION 2 ~ ELEVATIONS AT BEAM ENDS (6)

OPTION 2 ~ PLAN OF SLAB
 (Showing U-Beams; other beams similar)

ELEVATION EXAMPLE OF END PANEL AND TIMBER BOARD (23)

See "Option 2 ~ Elevation At Beam Ends".

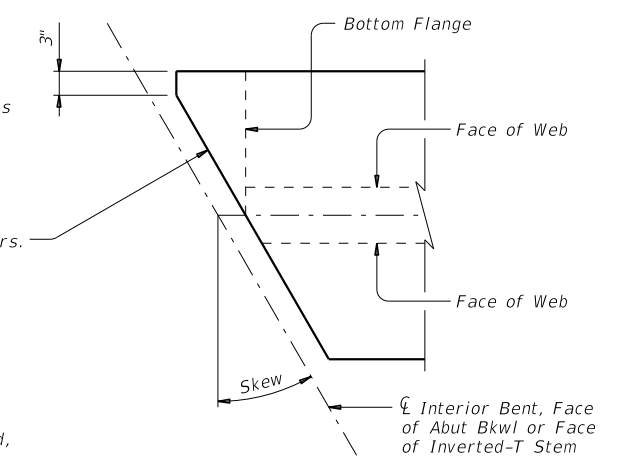
- (6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.
- (14) Max Spacing as listed unless otherwise shown.
- (21) 1 1/2" Vinyl or plastic joint former at controlled joints (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)
- (22) End panel may be set up to 2" lower to accommodate expansion joint hardware, provided bedding strip is not less than 1/2" thick.
- (23) 3/4" thick redwood timber board, leave in place. Redwood timber board placed flush with top of panel or within 1/4" Max above panel. Place 3/4" pyramid shape chamfer along top of timber board. See "Elevation Example of End Panel and Timber Board". Place straight, within 1/4" of centerline of bent or face of inverted-tee, across bridge width and end board at exterior flange edge of fascia beams/girders. Do not extend into overhang.
- (24) Place panel within 1/2" of 3/4" thick board.
- (25) Permanent galvanized steel sheet form. Removable formwork is acceptable.
- (26) Place end panel within 1/2" of expansion joint opening. End panel cannot encroach on required expansion joint opening.
- (27) Place additional (#4) bar 5'-0" in length between every slab bars T. Center (#4) bar on Joint.
- (28) Place additional (#4) bar continuous 2'-6" beyond each side of Inverted-T Stem between every slab bars T.



Apply construction adhesive in a continuous bead to both sides of board, if second panel is present, to adhere to end panel(s) and seal interface.

OPTION 2 ~ SHOWING MODIFICATION TO BEAM/GIRDER TOP FLANGE FOR SKEWS OVER 5°

Showing I-Bm/I-Girder, U-Bms and Steel Bms similar.



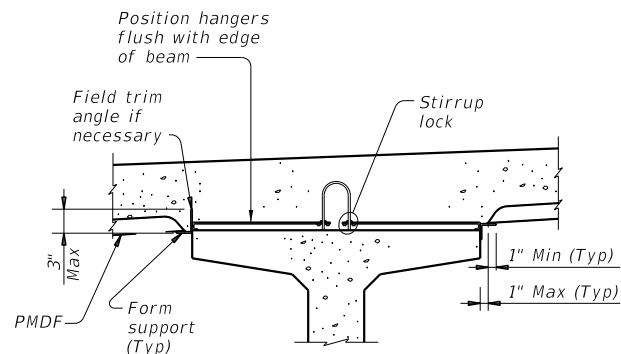
SPECIAL OPTION 2 CONSTRUCTION NOTES:

When Option 2 is chosen bottom mat of thickened end slab reinforcing is not required. Use the same top mat as shown on the Thickened Slab End Details sheet.
 Placing panels adjacent to expansion joints and bent centerlines prior to completing interior panel placement is recommended. Saw cutting panels to fit is acceptable when approved by the Engineer. Minimum distance from a saw cut edge to a panel strand is 1 1/2".
 Do not extend the longitudinal panel reinforcement into the cast-in-place slab.
 Top flanges of beams and girders on skewed bridges must be modified as shown on this drawing. The Contractor is responsible for coordinating this modification with the beam fabricator prior to submitting shop drawings for approval.
 Fabricator may optionally skew the whole end. When electing to skew whole end, girder end details and bearing type at conventional interior bent must be changed to use condition at abutment. Fabricator must coordinate change in bearing type, bearing centerline location, and dowel location with Engineer and Contractor. Show appropriate changes on girder and bearing shop drawings.
 Bending of anchor studs of expansion joints shown on standards AJ, SEJ-B, SEJ-M, and SEJ-S(0) is permissible if necessary to clear top of end panels. The Contractor is responsible for coordinating modifications with the joint fabricator. Submit shop drawings for approval when modifications to expansion joint hardware are made.
 Bedding strips under skewed end panels must conform to the requirements of Item 422 except their minimum compressive strength must be 60 psi.
 Provide Bars AA, G, K and OA from standard IGTS in the slab.

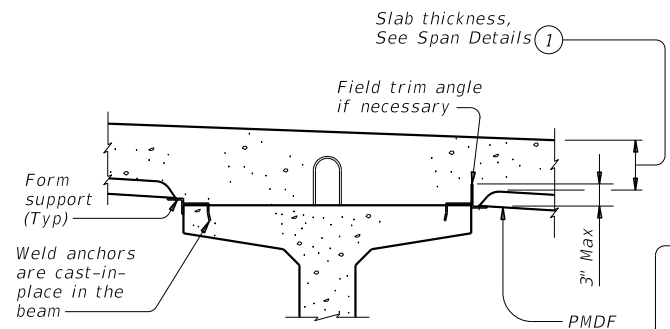
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PRESTRESSED CONCRETE PANELS DECK DETAILS			
PCP			
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	HOU	FORT BEND	BR42

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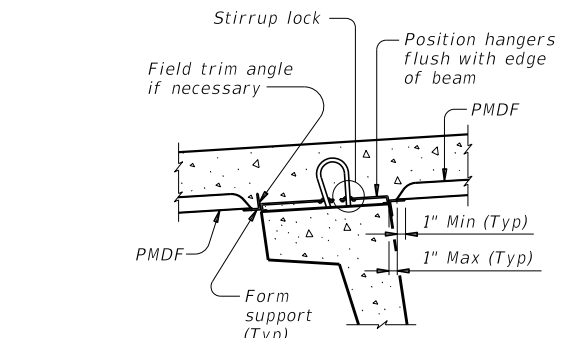
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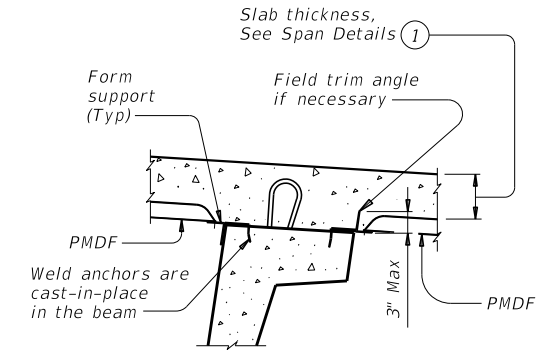
PRESTR CONC I-BEAMS AND I-GIRDERS WITH STIRRUP LOCKS



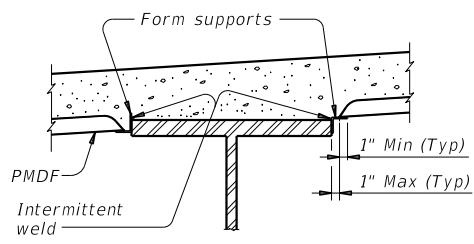
PRESTR CONC I-BEAMS AND I-GIRDERS WITH WELD ANCHORS



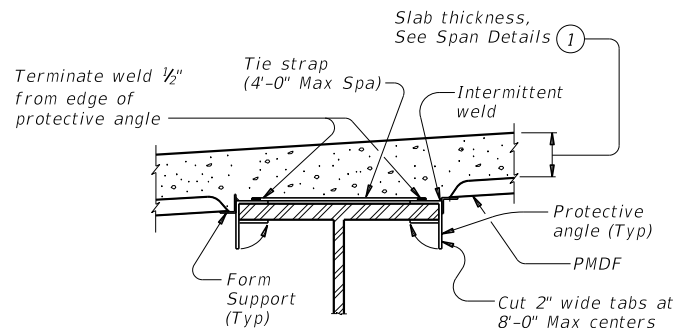
U-BEAMS WITH STIRRUP LOCKS



U-BEAMS WITH WELD ANCHORS

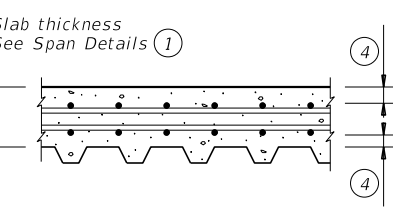


STEEL BEAMS AT COMPRESSION FLANGES

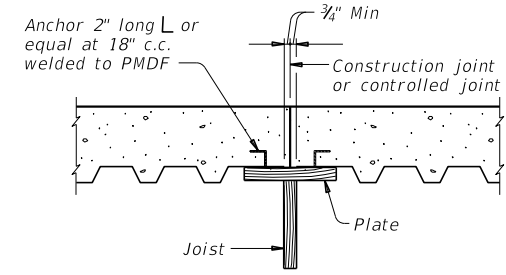


STEEL BEAMS AT TENSION FLANGES

TYPICAL TRANSVERSE SECTIONS



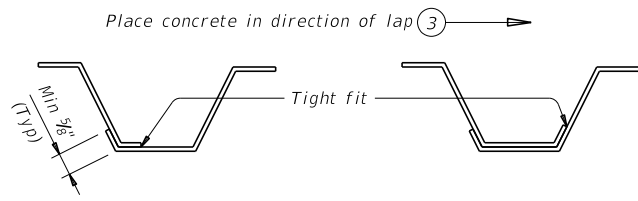
TYP LONGITUDINAL SLAB SECTION



Note: In spans where PMD forms are used, timber forms must be used at construction joints. Adequate provision must be made to support edge of metal form and to provide anchorage of metal form to slab concrete where joined to wood forms.

SECTION THRU CONSTRUCTION JOINT

FOR PRESTR CONC U-BEAM AND STEEL GIRDER BRIDGES:
 Unless shown elsewhere in the plans, size, spacing, and orientation of bottom mat of slab reinforcement must match the top mat of reinforcing shown on the span details except all bottom mat bars are to be #5. Bottom mat reinforcement and additional concrete is subsidiary to Item 422 "Concrete Superstructures."
FOR PRESTR CONC TX-GIRDER BRIDGES:
 See Miscellaneous Slab Details, Prestr Concrete I-Girders (IGMS) standard sheet for bottom mat reinforcing.



SIDE LAP DETAILS

- 1 Slab thickness minus 5/8" if corrugations match reinforcing bars.
- 2 Welding of form supports to tension flanges will not be permitted. Other methods of providing wind hold down resistance for PMDF in tension flange zones will be considered. At least one layer of sheet metal must be provided between the flange and the weld joint.
- 3 The direction of concrete placement will be such that the upper layer of the form overlap is loaded first.
- 4 See Span details for cover requirements.

GENERAL NOTES:

Steel for Permanent Metal Deck Forms (PMDF) and support angles shall conform to ASTM A653, structural steel (SS), with coating designation G165. Steel must have a minimum yield strength of 33 ksi. Minimum thickness of PMDF is 20 gage and that of support angles and protective angles is 12 gage.
 Submit two copies of forming plans for PMDF to the Engineer. These plans must show all essential details of proposed form sheets, closures, fasteners, supports, connectors, special conditions and size and location of welds. These plans must clearly show areas of tension flanges for steel beams and provisions for protecting the tension flanges from welding notch effects by inclusion of separating sheet metal or other positive method. These plans must be designed, signed, and sealed by a licensed professional engineer. Department approval of these plans is not required, but the Department reserves the right to require modifications to the plans. The Contractor is responsible for the adequacy of these plans.
 The details and notes shown on this standard are to be used as a guide in preparation of the forming plans.
 All material, labor, tools and incidentals necessary to form a bridge deck with Permanent Metal Deck Forms is considered subsidiary to Item 422, "Concrete Superstructures".

DESIGN NOTES:
 As a minimum, PMDF and support angles must be designed for the dead load of the form, reinforcement and concrete plus 50 psf for construction loads. Flexural stresses due to these design loads must not exceed 75 percent of the yield strength of the steel. Allowable stress for weld metal must be 12,400 psi.
 Maximum deflection under the weight of forms, reinforcement and concrete or 120 psf, whichever is greater, shall not exceed the following:

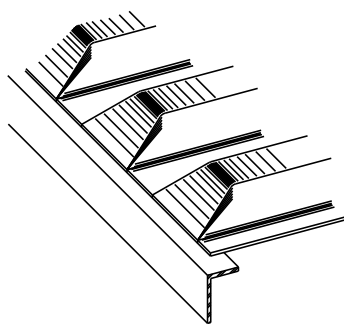
- 1/180 of the form design span, but not more than 0.50", for design spans of 10' or less.
- 1/240 of the form design span, but not more than 0.75", for all design spans of railroad overpass bridge spans fully or partially over railroad right-of-way, and for all bridge spans of railroad underpass structures.
- 1/240 of the form design span, but not more than 0.75", for all design spans of railroad overpass bridge spans fully or partially over railroad right-of-way, and for all bridge spans of railroad underpass structures.

The form design span must not be less than the clear distance between beam flanges, measured parallel to the form flutes, minus 2".

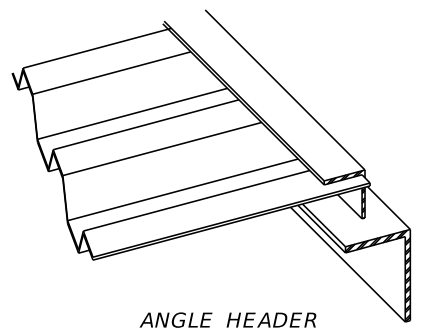
CONSTRUCTION NOTES:

Form sheets must not be permitted to rest directly on the top of beam flanges. Form sheets must be securely fastened to form supports and must have a minimum bearing length of one inch at each end. Form supports must be placed in direct contact with beam flanges.
 All attachments must be made by permissible welds, screws, bolts, clips or other means shown on the the forming plans. All sheet metal assembly screws must be installed with torque-limiting devices to prevent stripping. Only welds or bolts must be used to support vertical loads.
 Welding and welds must be in accordance with the provisions of Item 448, "Structural Field Welding", pertaining to fillet welds. All welds must be made by a qualified welder in accordance with Item 448.
 All permanently exposed form metal, where the galvanized coating has been damaged, must be thoroughly cleaned and repaired in accordance with Item 445, "Galvanizing". Minor heat discoloration in areas of welds need not be touched up.
 Flutes must line up uniformly across the entire width of the structure where main reinforcing steel is located in the flute.
 Construction joints will not be permitted unless shown on the plans. The location of and forming details for any construction joint used must be shown on the forming plans. Forms below a construction joint must be removed after curing of the slab.
 A sequence for uniform vibration of concrete must be approved by the Engineer prior to concrete placement. Attention must be given to prevent damage to the forms, yet provide proper vibration to prevent voids or honeycomb in the flutes and at headers and/or construction joints.

		Bridge Division Standard	
<h2>PERMANENT METAL DECK FORMS</h2>			
<h3>PMDF</h3>			
FILE: pmdfste1-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
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REVISIONS			0522-1801 BRANDT RD
02-20: Modified box note by adding steel beams/girders and subsidiary	DIST	COUNTY	SHEET NO.
12-21: Updated max deflection for RR.	HOU	FORT BEND	BR43



PRECLOSED



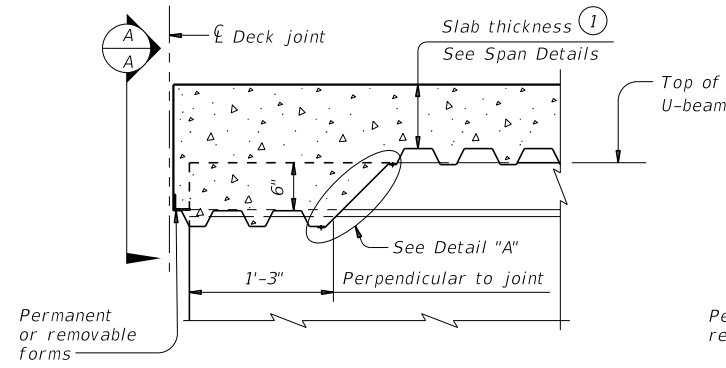
ANGLE HEADER

NOTE: This type is to be used for skewed ends only.

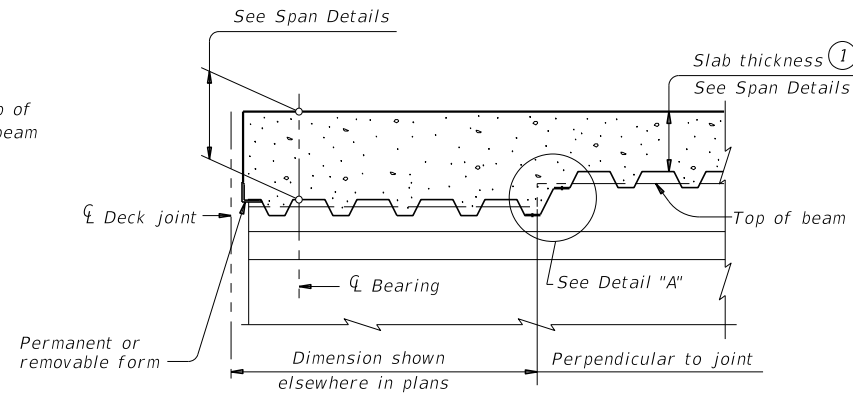
TYPES OF END CLOSURES

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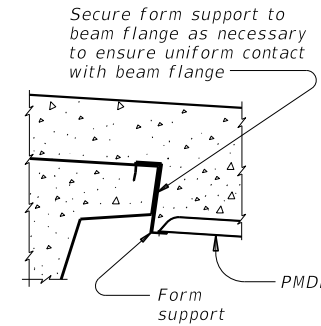
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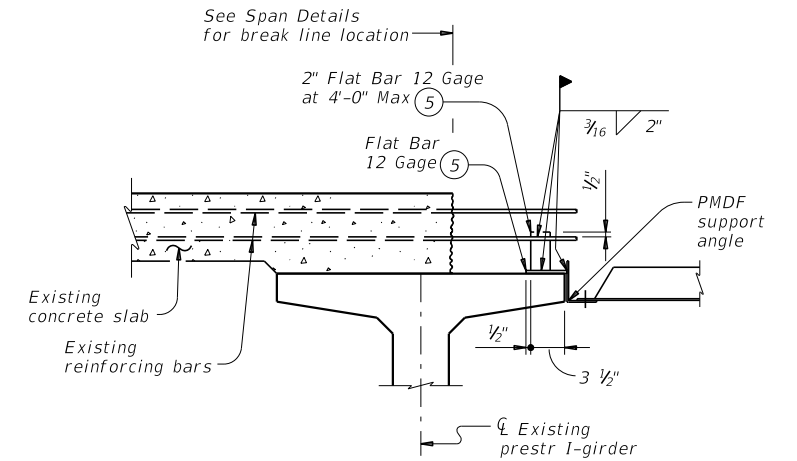
AT THICKENED SLAB END FOR U-BEAMS



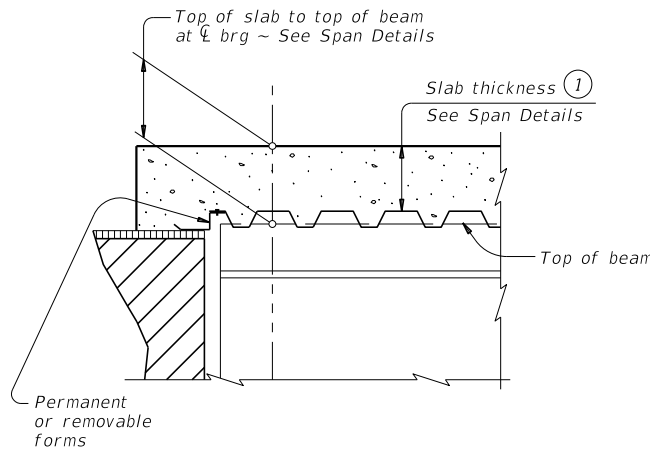
AT THICKENED SLAB END FOR PRESTRESSED I-BEAMS, I-GIRDERS AND STEEL BEAMS
 Showing I-beam block-out. No block-out for I-girders or steel beams.



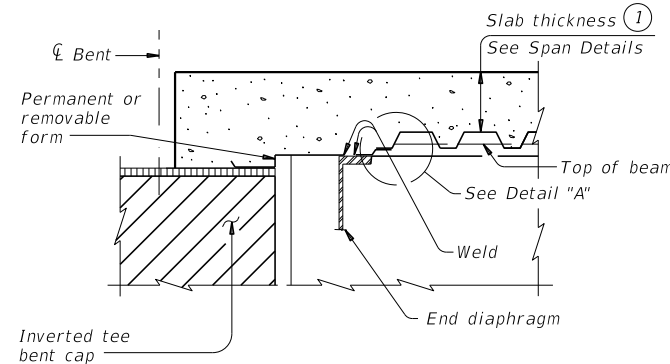
SECTION A-A



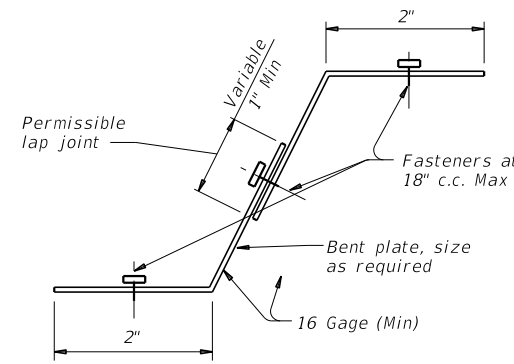
SHOWING PRESTRESSED CONCRETE I-BEAMS, I-GIRDERS AND U-BEAMS



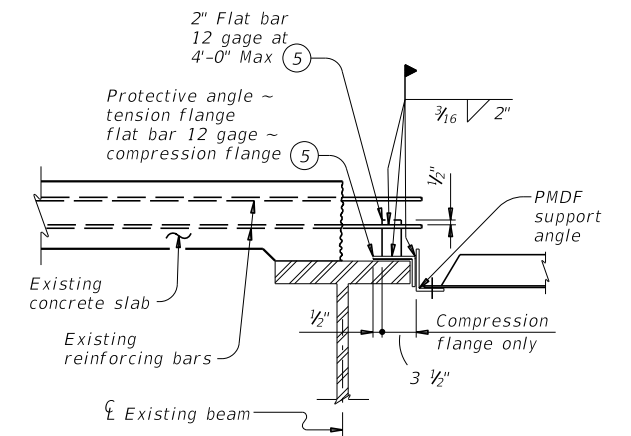
AT SLAB OVER ABUT BKWL OR INV TEE STEM FOR CONC BEAMS WITHOUT THICKENED SLAB END



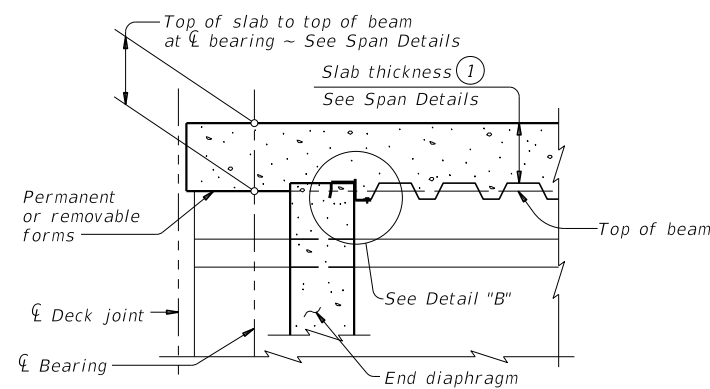
AT SLAB OVER INV TEE STEM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



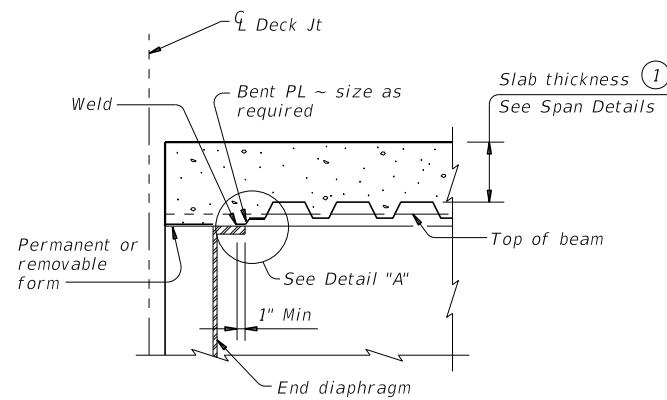
DETAIL "A"



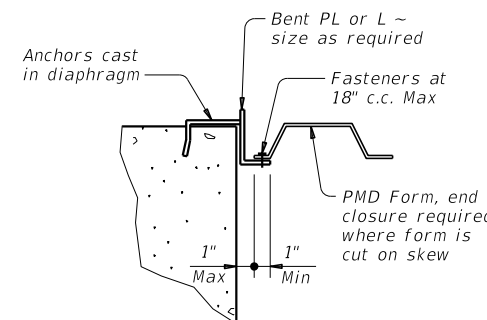
SHOWING STEEL BEAMS



AT CONC END DIAPHRAGM FOR PRESTRESSED I-BEAMS AND STEEL BEAMS



AT END DIAPHRAGM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



DETAIL "B"

- ① Slab thickness minus 3/8" if corrugations match reinforcing bars
- ⑤ Minimum yield stress of 12 gage bars shall be 40 ksi

DETAILS AT ENDS OF BEAMS

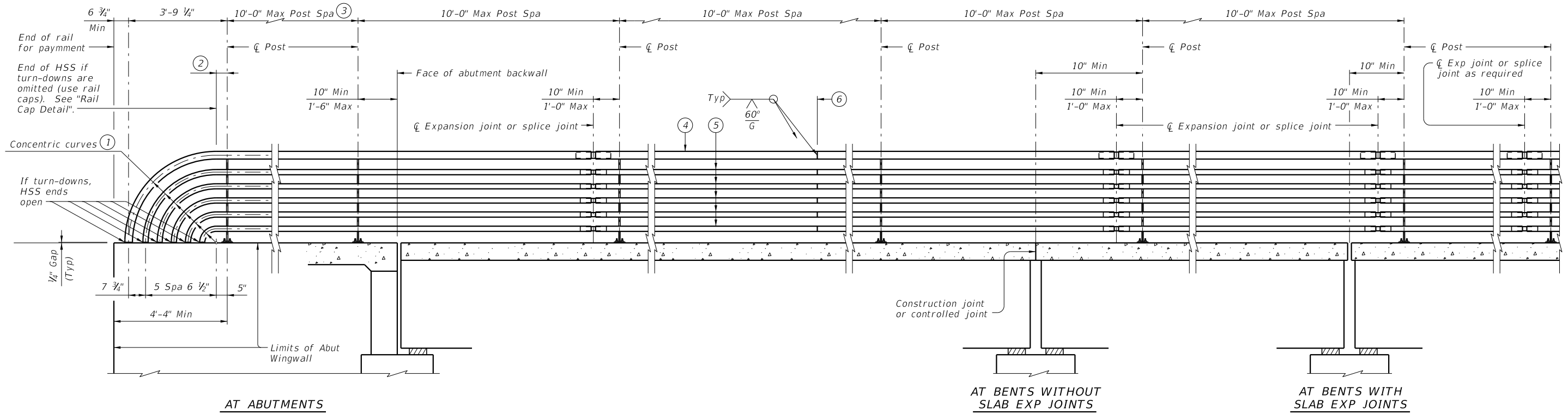
WIDENING DETAILS

SHEET 2 OF 2

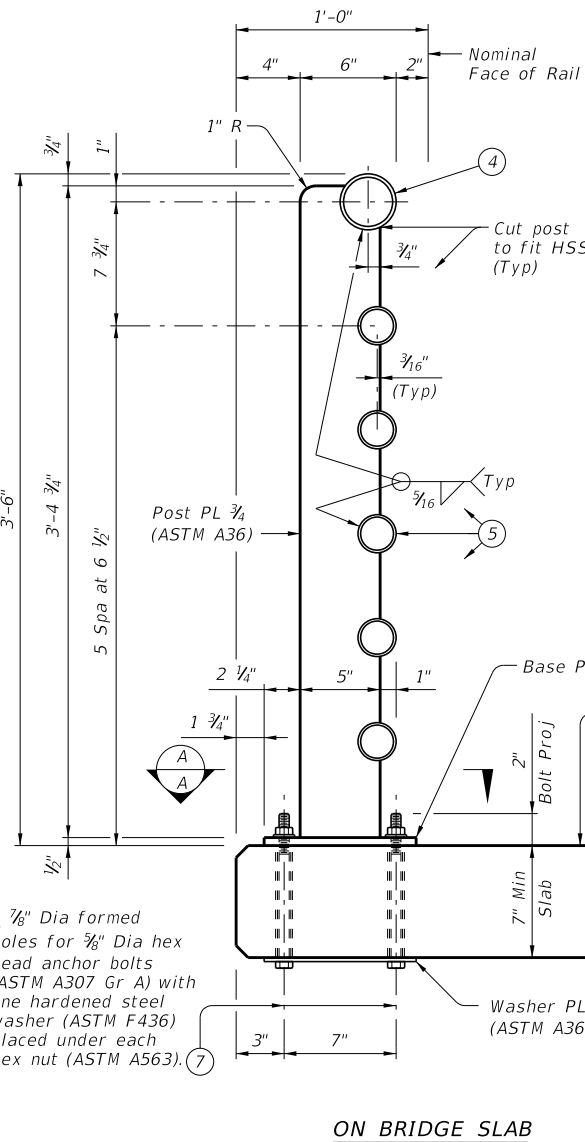
		Bridge Division Standard	
PERMANENT METAL DECK FORMS			
PMDF			
FILE: pmdfste1-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT April 2019	CONV	SECT	JOB
REVISIONS		0522-1801	BRANDT RD
02-20: Modified box note by adding steel beams/girders and Subsidiary.		DIST	COUNTY
12-21: Updated max deflection for RR.		HOU	FORT BEND
		SHEET NO. BR44	

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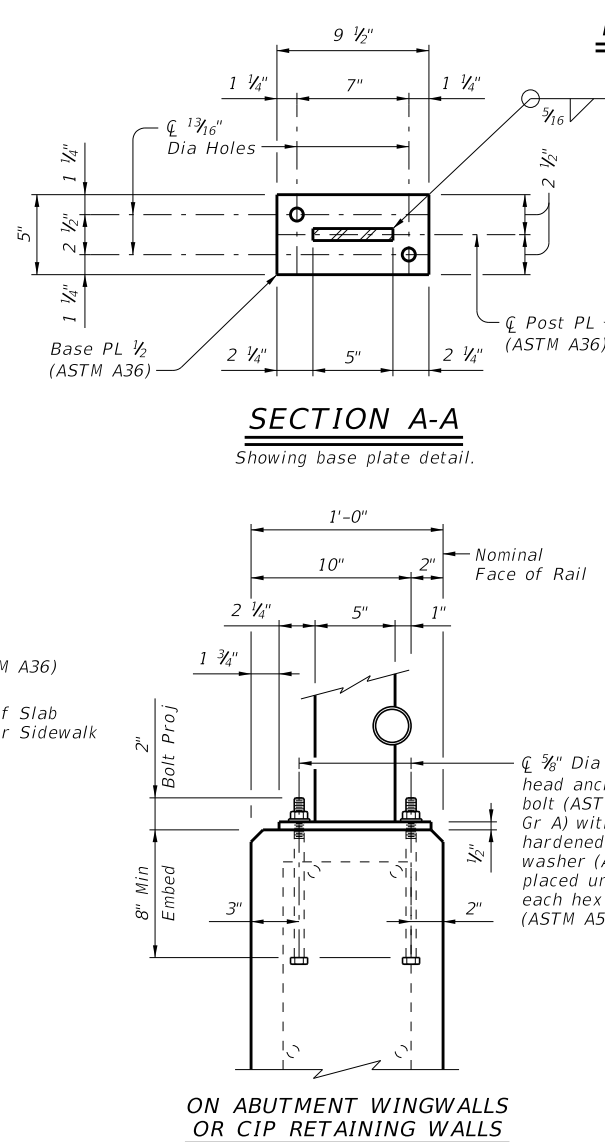


ROADWAY ELEVATION OF RAIL



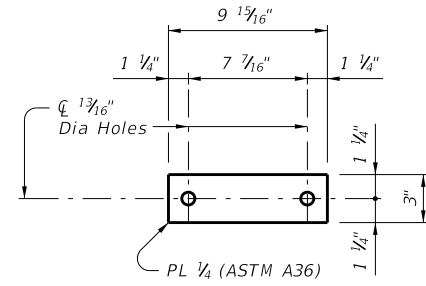
SECTION A-A

Showing base plate detail.

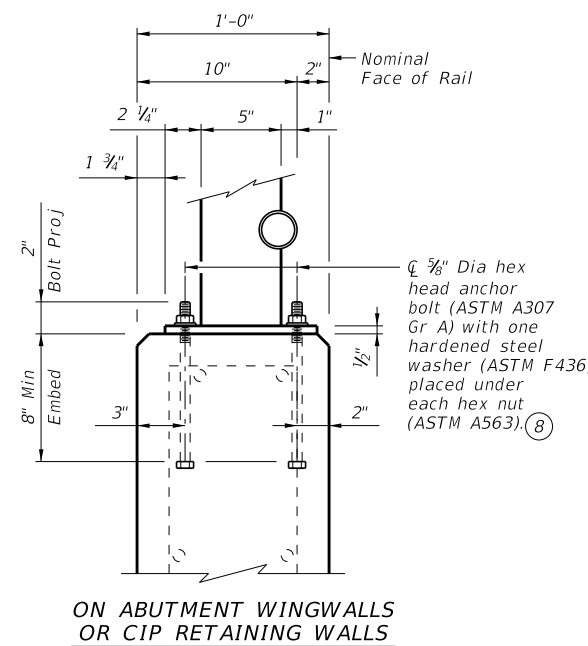


SECTION B-B

Showing washer plate detail.

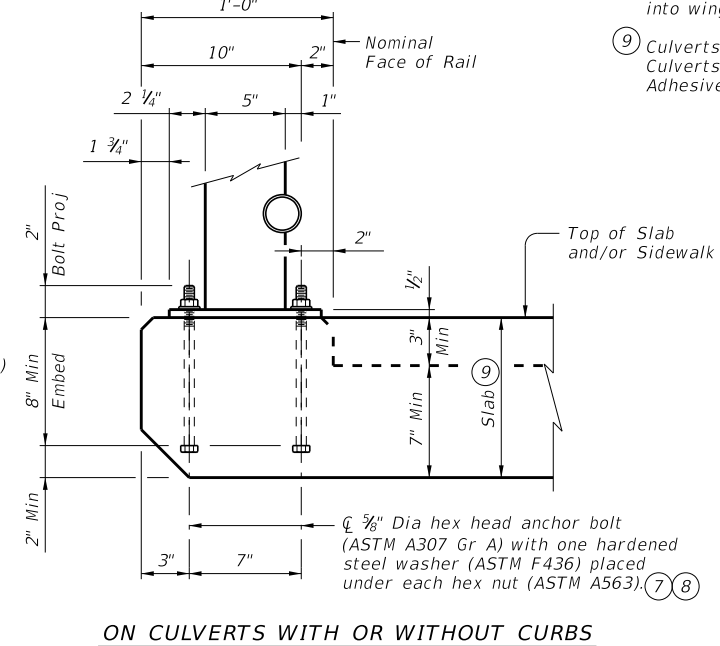


WASHER PLATE DETAIL



ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

SECTIONS THRU RAIL



ON CULVERTS WITH OR WITHOUT CURBS

Used with 1'-0" Min thick parallel wings on culverts.

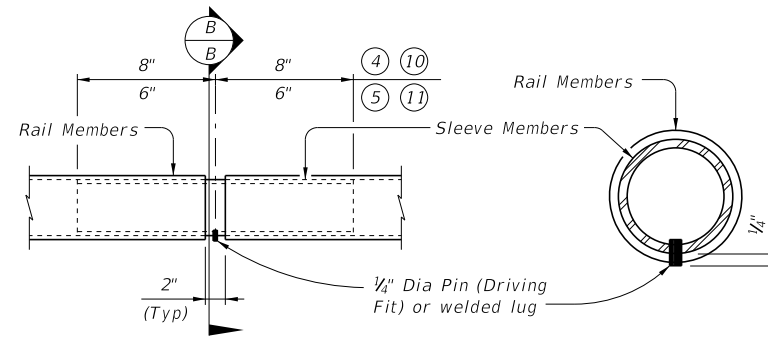
- ① Portion of railing with turn-downs to be used or omitted as indicated on Bridge Layout.
- ② 10" Min ~ 1'-6" Max if turn-downs are omitted.
- ③ Min of 2 posts required on wingwall.
- ④ HSS 3.500 x 0.216 (Rail Member)
- ⑤ HSS 2.375 x 0.154 (Rail Member)
- ⑥ One shop splice per panel is permitted (with minimum 85 percent penetration). The weld may be square groove or single vee groove. Grind smooth.
- ⑦ At Contractor's option, adhesive anchors may be used. Adhesive anchors must be 5/8" Dia ASTM A307 Grade A fully threaded rods. Minimum adhesive anchor embedment depth is 5" into slabs or culverts without curbs. See "Material Notes" for adhesive anchor requirements.
- ⑧ At Contractor's option, adhesive anchors may be used. Adhesive anchors must be 5/8" Dia ASTM A307 Grade A fully threaded rods. Minimum adhesive anchor embedment depth is 7" into wingwalls or culverts with curbs. See "Material Notes" for adhesive anchor requirements.
- ⑨ Culverts without curbs for cast-in-place anchor bolts require a 10" Min slab thickness. Culverts with curbs for cast-in-place anchor bolts require a curb plus slab thickness of 10" Min. Adhesive anchors may be used with a 7" Min slab thickness or culverts with curbs.

SHEET 1 OF 2

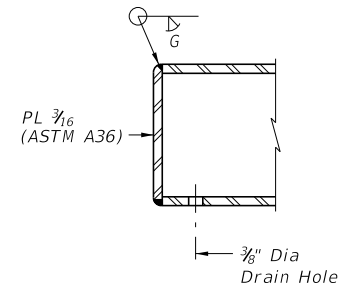
		Bridge Division Standard	
<h1>PEDESTRIAN RAIL</h1>			
<h2>TYPE PR11</h2>			
FILE: r1std028-19.dgn	DN: TAR	CK: TBE	DW: JTR
©TxDOT September 2019	CONTRACT	SECTION	JOB
REVISIONS	0522-1801		BRANDT RD
DIST	COUNTY	SHEET NO.	
HOU	FORT BEND	BR45	

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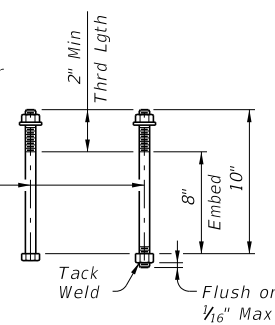
AT SPLICES OR EXP JTS SECTION B-B
PIPE SPLICE DETAIL



RAIL CAP DETAIL

- ④ HSS 3.500 x 0.216 (Rail Member)
- ⑤ HSS 2.375 x 0.154 (Rail Member)
- ⑩ HSS 2.875 x 0.203 (Sleeve Member)
- ⑪ HSS 1.900 x 0.145 (Sleeve Member)

④ 3/8" Dia hex head anchor bolt or threaded rod (ASTM A307 Gr A) with one hardened steel washer (ASTM F436) placed under each hex nut (ASTM A563). One additional hex nut must be furnished and tack welded for each threaded rod.



CAST-IN-PLACE & FORMED HOLE ANCHOR BOLT OPTIONS

CONSTRUCTION NOTES:

Panel lengths of railing must be attached to a minimum of three posts except at abutment wingwalls.
 At the Contractor's option anchor bolts may be an adhesive anchorage system. See "Material Notes".
 Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.
 Face of rail and posts must be vertical transversely unless otherwise approved. Posts must be perpendicular to adjacent roadway grade. Use Type VIII epoxy mortar under post base plates if gaps larger than 1/16" exist.
 For curved railing applications, fabricate the HSS rail to the radius when the radius is 600' or less. Submit shop drawings for approval when tubes are required to be fabricated to a radius. Shop drawings must be submitted to the Engineer for approval.
 Round or chamfer all exposed edges of steel components 1/16" by grinding prior to galvanizing.

MATERIAL NOTES:

Provide ASTM A500 Gr B, A1085 or A53 Gr B for all HSS.
 Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over galvanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel". Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.
 Anchor bolts must be 3/8" Dia ASTM A307 Gr A with one hardened steel washer (ASTM F436) placed under each hex nut or ASTM A307 Gr A threaded rods with one tack welded hex nut each and with one hex nut with one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements.
 Optional adhesive anchorage system must be 3/8" Dia ASTM A307 Gr A fully threaded rods with one hex nut and one hardened steel washer (ASTM F436). Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into slab, wingwalls, or culvert curbs using a Type III, Class C, D, E, or F anchor adhesive. Anchor adhesive chosen must be able to achieve a nominal bond strength in tension, Na, of a single anchor of 10 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

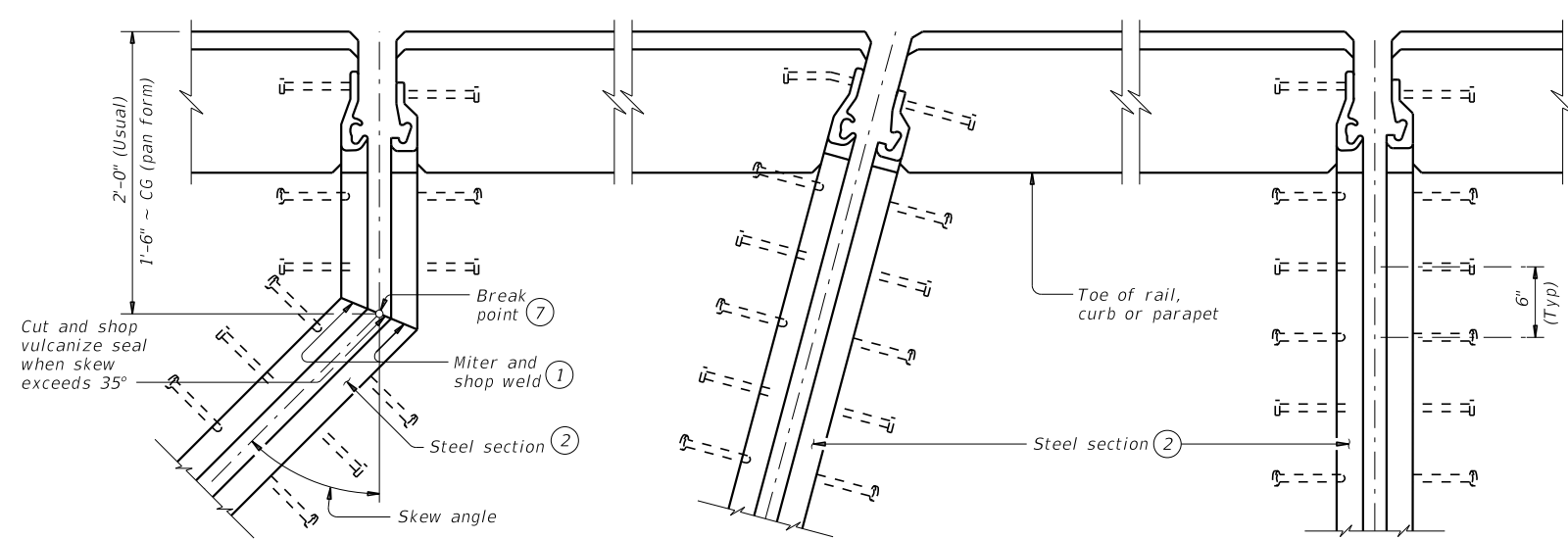
GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.
 Do not use this railing on bridges with expansion joints providing more than 5" movement.
 Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.
 For all rails, submit erection drawings showing section lengths, splice locations, rail post spacing and anchor bolt setting for approval. Average weight of railing is 30 plf.

		Bridge Division Standard	
<h1>PEDESTRIAN RAIL</h1>			
<h2>TYPE PR11</h2>			
FILE: r1std028-19.dgn	DN: TAR	CK: TBE	DW: JTR
CONTRACT: September 2019	SECTION:	JOB:	HIGHWAY:
REVISIONS		0522-1801	BRANDT RD
DIST:	COUNTY:	SHEET NO.	
HOU	FORT BEND	BR46	

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 FILE: \\pusscsnrfl101\J-Jobs\2113 Terra Brandt Lone\06.00 Design\06.04 Sheet\0606.dgn

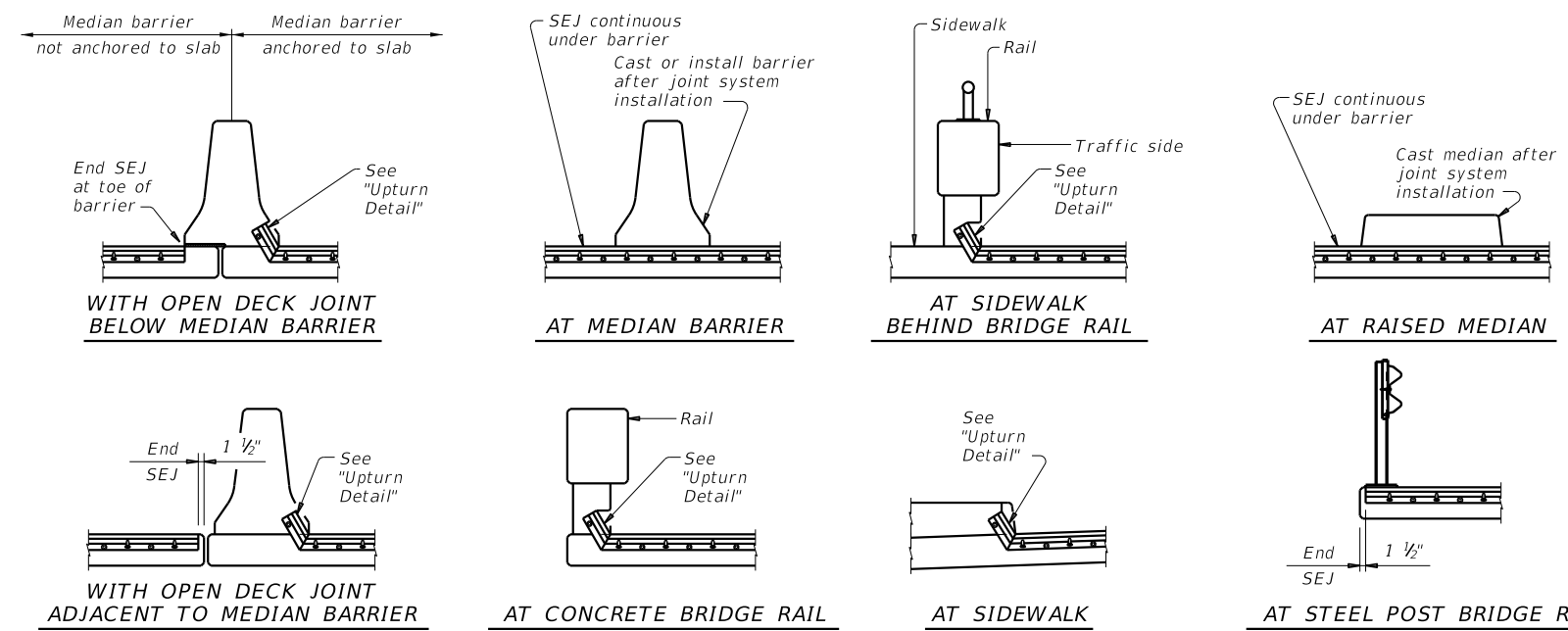


SHOWING SKEWS WITH SLAB BREAKBACKS

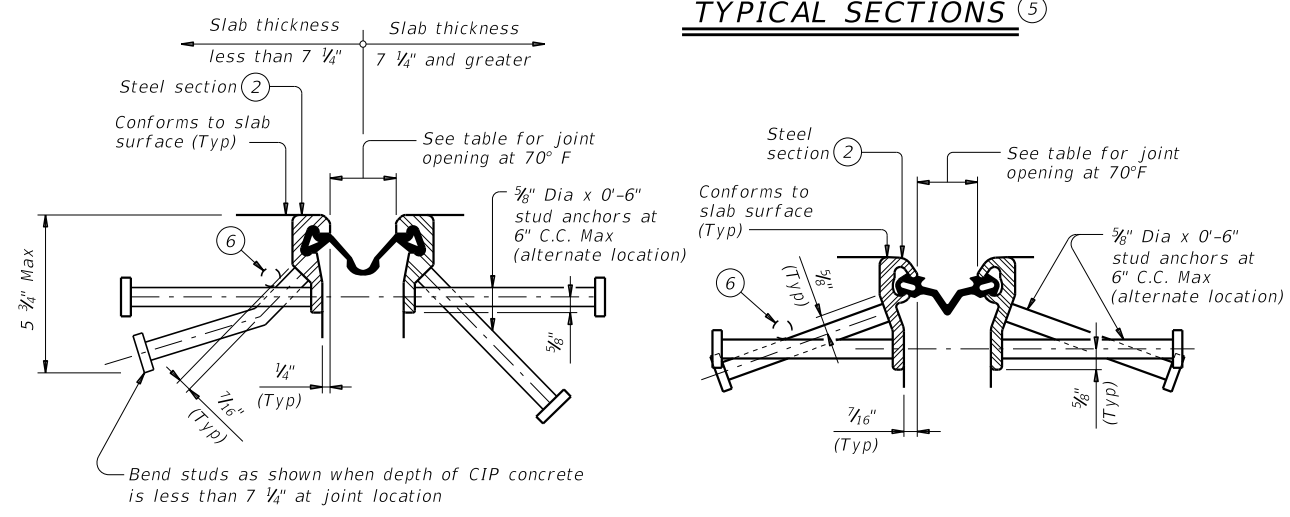
SHOWING SKEWS WITHOUT SLAB BREAKBACKS

SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS

PLANS OF END CONDITIONS

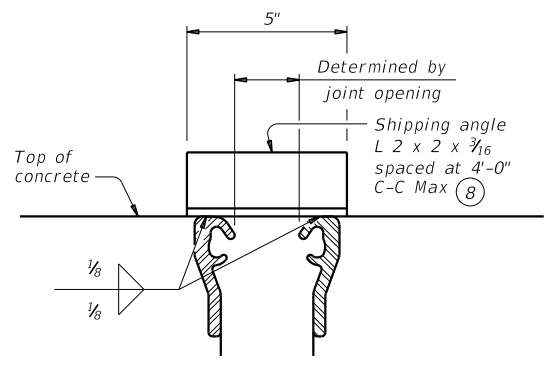


TYPICAL SECTIONS



SECTION THRU WATSON BOWMAN ACME (SE-400 OR SE-500) JOINTS

SECTION THRU D.S. BROWN (A2R-400 OR A2R-XTRA) JOINTS



SHOWING D.S. BROWN (Ty SSCM2)
 (All joints are similar.) (Studs are not shown for clarity.)

SHIPPING ANGLE

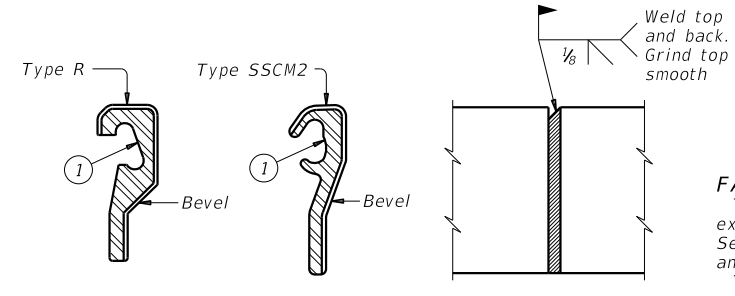
An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.

TABLE OF SEALED EXPANSION JOINT INFORMATION					
MANUFACTURER	STEEL SECTION ②	STRIP SEAL			
		4" JOINT		5" JOINT	
		Seal Type	Joint Opening ③	Seal Type	Joint Opening ③
D.S. Brown	Type SSCM2	A2R-400	1 3/4"	A2R-XTRA	2"
Watson Bowman Acme	Type R	SE-400	1 3/4"	SE-500	2"

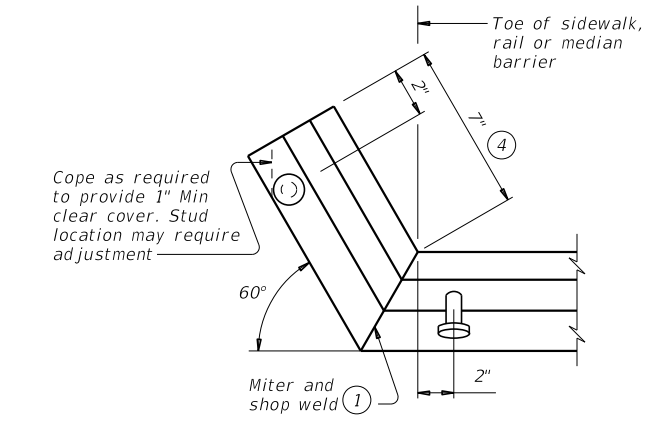
SKEW (deg)	JOINT SIZE	
	4"	5"
0	4.0"	5.0"
15	4.0"	5.0"
30	3.5"	4.3"
45	2.8"	3.5"

DESIGN NOTES:
 Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations. For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).

- Remove all burrs which will be in contact with seal prior to making splice.
- Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.
- These openings are also the recommended minimum installation openings.
- Reduce for sidewalk or parapet heights less than 6".
- Other conditions affecting the joint profile should be noted elsewhere.
- Move transverse bars that are in conflict with SEJ studs, in either the bridge slab or approach slab, to rest at the junction of the studs.
- See Span details for location of break point.
- Align shipping angle perpendicular to joint.



FIELD SPLICE DETAIL



UPTURN DETAIL

FABRICATION NOTES:

Temporarily shop assemble corresponding sections of sealed expansion joints (SEJ), check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts.
 The seal must be continuous and included in the price bid for sealed expansion joint.
 Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.
 Weld studs in accordance with AWS D1.1.
 Butt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.
 Paint the entire steel section with System II or IV primer in accordance with Item 446, "Field Cleaning and Painting Steel", unless required to galvanize when shown in the plans. Provide galvanizing in accordance with Item 445, "Galvanizing". Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Item 446.7.3 and 446.7.4.
 Shop drawings for the fabrication of sealed expansion joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

Secure the sealed expansion joint in position and place to the proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for sealed expansion joint.
 Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.
 Clean and prepare seal cavity for seal installation as per the Manufacturer's installation procedures.

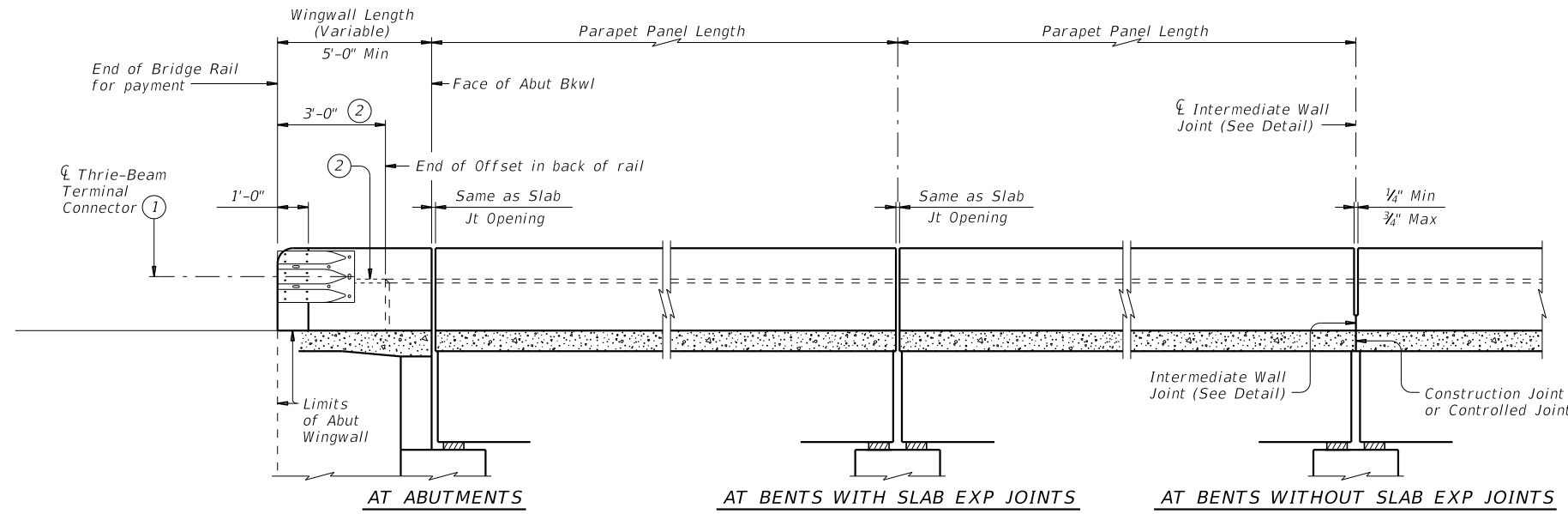
GENERAL NOTES:

Provide sealed expansion joints in the size and at locations shown on the plans.
 Minimum slab and overhang thickness required for the use of SEJ-M is 6 1/2".

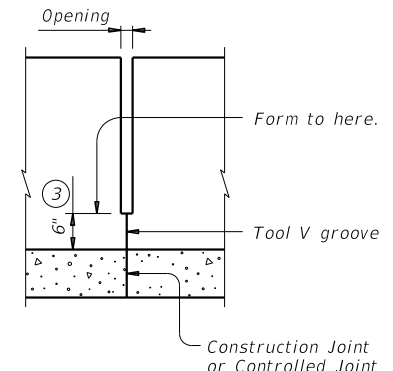
				Bridge Division Standard	
SEALED EXPANSION JOINT TYPE M WITHOUT OVERLAY					
SEJ-M					
FILE: sejmste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH	
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS			0522-1801	BRANDT RD	
	DIST	COUNTY	SHEET NO.		
	HOU	FORT BEND	BR47		

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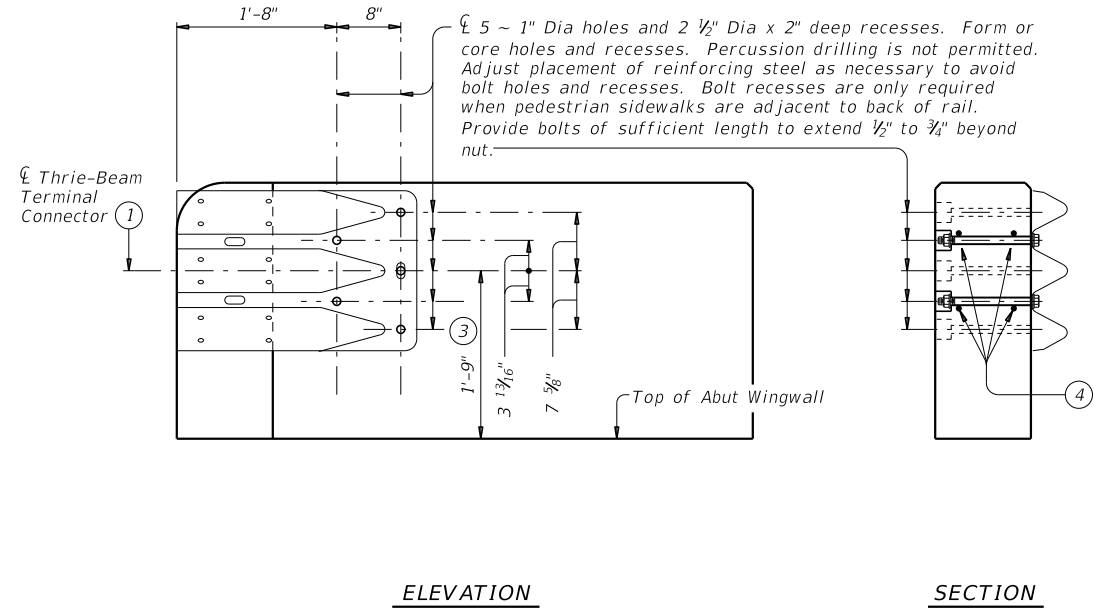
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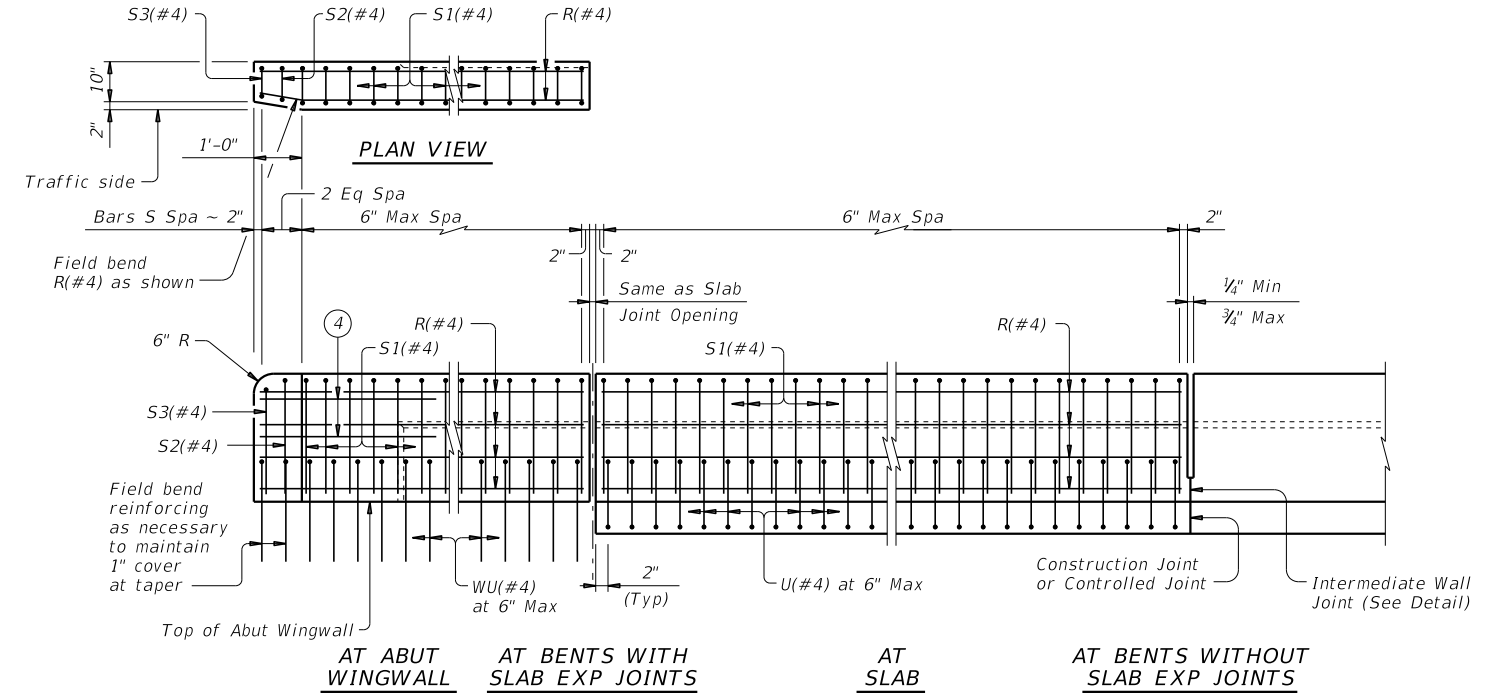
ROADWAY ELEVATION OF RAIL



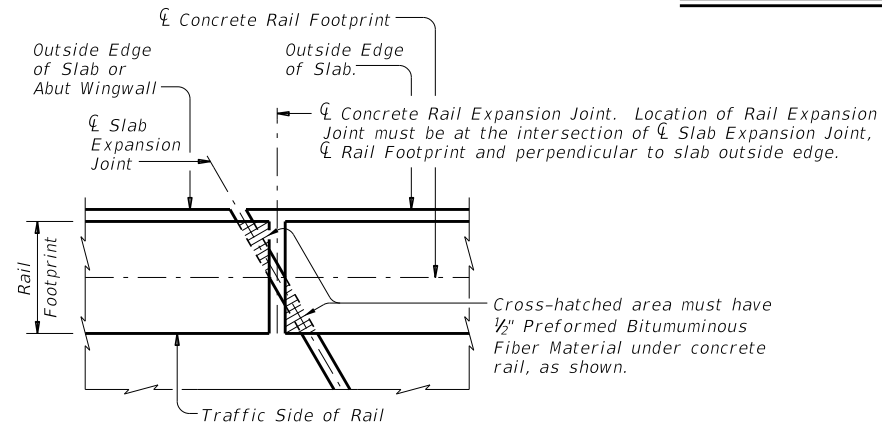
INTERMEDIATE WALL JOINT DETAIL
 Provide at all interior bents without slab expansion joints.



TERMINAL CONNECTION DETAILS



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



PLAN OF RAIL AT EXPANSION JOINTS
 Example showing Slab Expansion Joints without breakbacks.

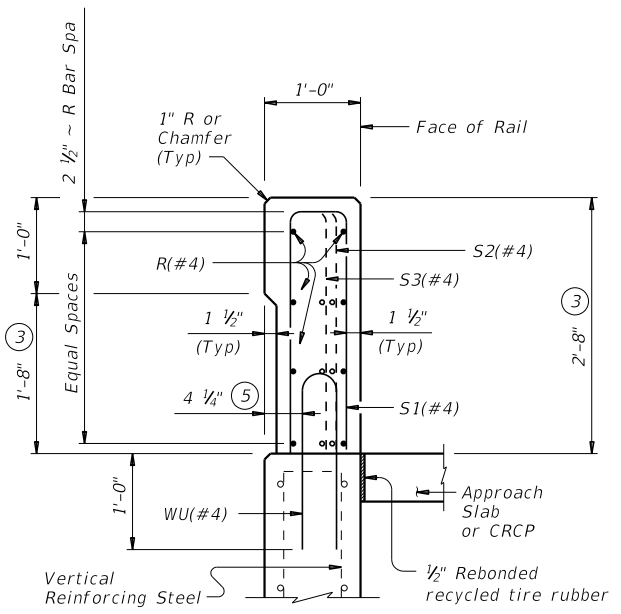
- ① Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- ② Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
- ③ Increase 2" for structures with overlay.
- ④ Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.

SHEET 1 OF 2

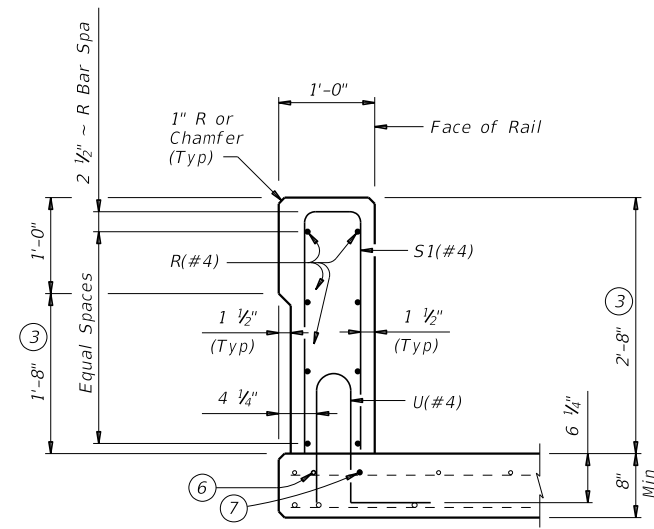
		Bridge Division Standard	
<h1>TRAFFIC RAIL</h1>			
<h2>TYPE T221</h2>			
FILE: r1std004-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONT	SECT	JOB
REVISIONS	0522-1801		BRANDT RD
DIST	COUNTY	SHEET NO.	
HOU	FORT BEND	BR48	

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ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL

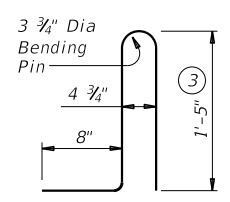
- ③ Increase 2" for structures with overlay.
- ⑤ 5 1/2" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.
- ⑥ As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars will be furnished at the Contractors expense.
- ⑦ Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.
- ⑧ Bend or cut as required to clear drain slots.
- ⑨ No longitudinal wires may be in top center of cage.
- ⑩ Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.

CONSTRUCTION NOTES:
 This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".
 If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a 3/8" width x 1/4" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.
 Face of rail and parapet must be vertical transversely unless otherwise shown in the plans or approved by the Engineer.
 Chamfer all exposed concrete corners.

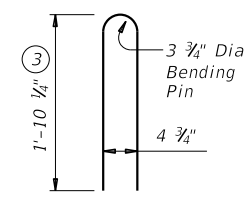
MATERIAL NOTES:
 Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.
 Provide Grade 60 reinforcing steel.
 Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.
 Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM 1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.
 Provide bar laps, where required, as follows:
 Uncoated or galvanized ~ #4 = 1'-7"
 Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:
 This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.
 Do not use this railing on bridges with expansion joints providing more than 5" movement.
 Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.
 Shop drawings are not required for this rail.
 Average weight of railing with no overlay is 370 plf.

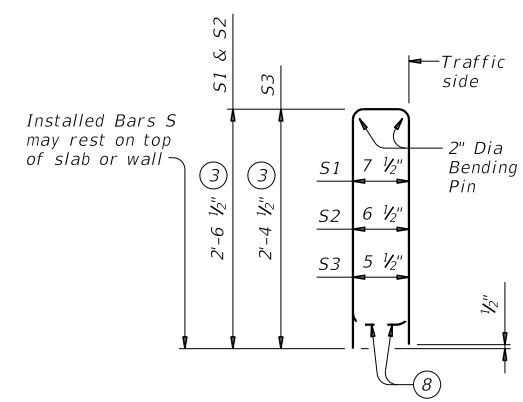
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



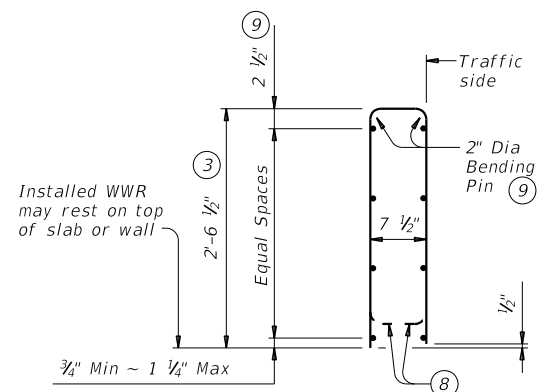
BARS U (#4)



BARS WU (#4)

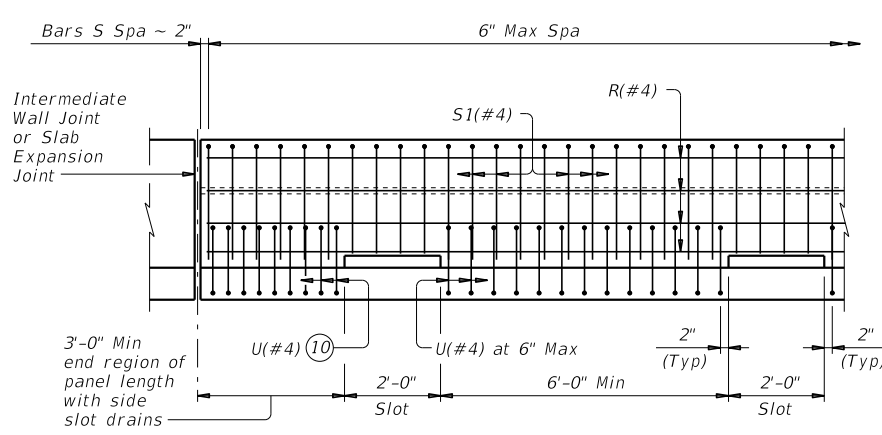


BARS S (#4)



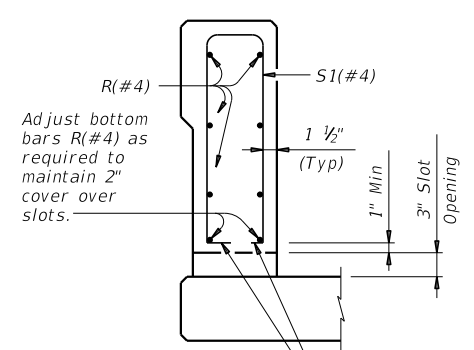
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
Minimum	No. of Wires	Spacing
Maximum	8	4"
Maximum Wire Size Differential	10	8"
	The smaller wire must have an area of 40% or more of the larger wire.	



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



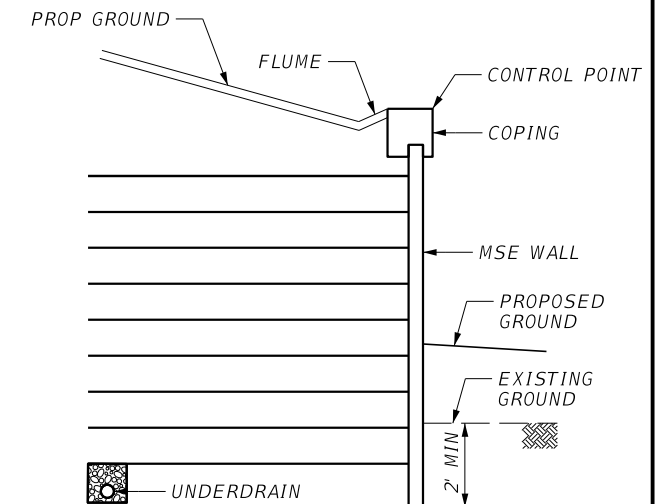
SECTION THRU OPTIONAL SIDE SLOT DRAIN

		Bridge Division Standard	
<h1>TRAFFIC RAIL</h1>			
<h2>TYPE T221</h2>			
FILE: r1std004-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONTRACT	SECTION	JOB
			HIGHWAY
REVISIONS		0522-1801	BRANDT RD
DIST:	COUNTY	SHEET NO.	
HOU	FORT BEND	BR49	

GENERAL NOTES

1. REFER TO RW (MSE) (DD) STANDARD FOR MINIMUM DESIGN REQUIREMENTS.
2. CONTRACTOR SHALL VERIFY UTILITY AND DRAINAGE LOCATIONS AND DEPTHS PRIOR TO CONSTRUCTION.
3. SEE BORING LOGS SHEETS FOR BORINGS.
4. CONTRACTOR SHALL ENSURE NO WATER RUNOFF REACHES LEVELING PAD DURING CONSTRUCTION.
5. SEE STORM SEWER LAYOUT SHEET FOR INLET LOCATIONS AND DETAILS.
6. SQUARE FOOT SURFACE AREA OF WALL IS MEASURED BETWEEN TOP OF WALL AND EMBEDMENT INDICATED IN ELEVATION VIEW BELOW THE EXISTING GROUND UNLESS NOTED OTHERWISE.

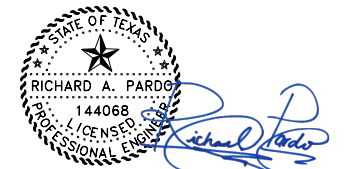
● BORING HOLE



SECTION A-A

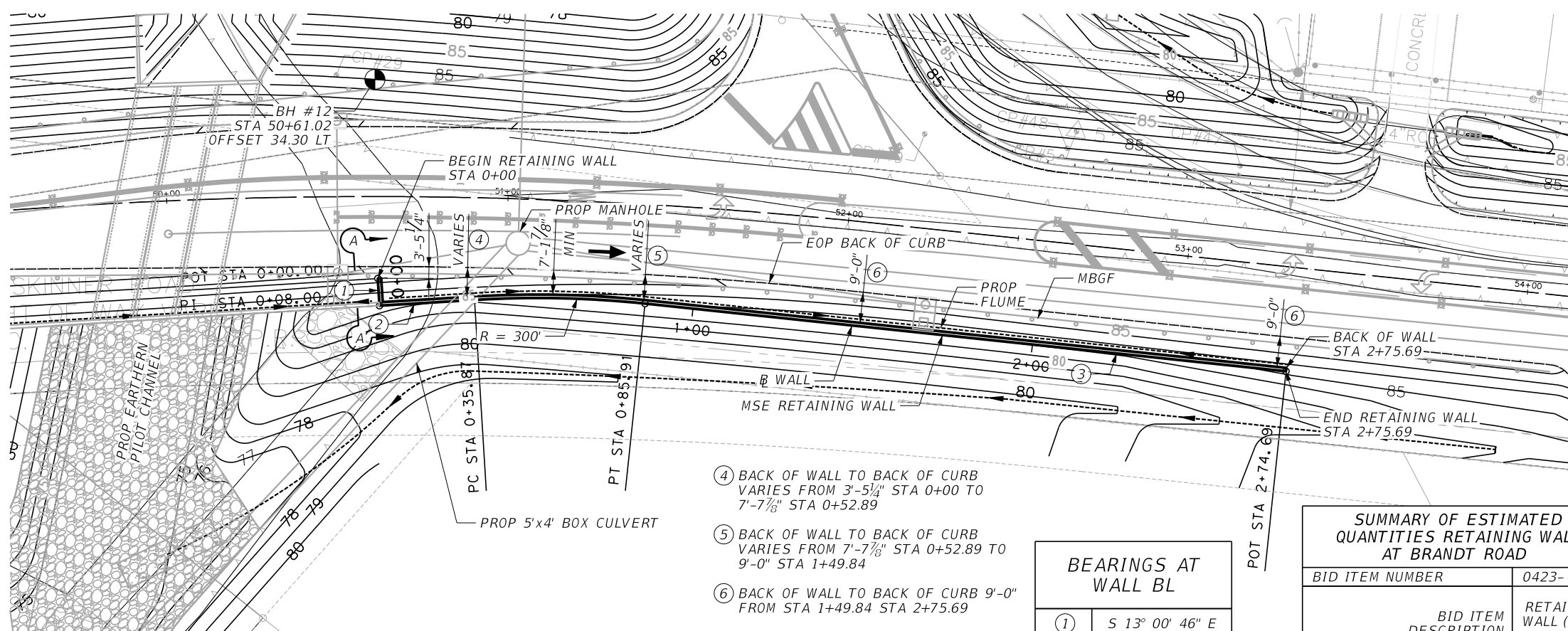


SCALE: 1"=20' (FULL SIZE)
1"=4' VERTICAL



10/17/2022

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD FROM McCRARY RD. TO MASON RD. BRANDT RD AT JONES CREEK RETAINING WALL 01			
		1225 NORTH LOOP WEST SUITE 220 HOUSTON, TEXAS 77008 (832) 494-3800	Firm Registration No. F-10161
DRAWN BY: F.P. CHECKED BY: T.F.	SCALE: AS NOTED DATE: JULY, 2019	PROJECT No. 0522-1801 CONTRACT: 1	SHEET RW01 OF 1



- ④ BACK OF WALL TO BACK OF CURB VARIES FROM 3'-5 1/4" STA 0+00 TO 7'-7 7/8" STA 0+52.89
- ⑤ BACK OF WALL TO BACK OF CURB VARIES FROM 7'-7 7/8" STA 0+52.89 TO 9'-0" STA 1+49.84
- ⑥ BACK OF WALL TO BACK OF CURB 9'-0" FROM STA 1+49.84 STA 2+75.69

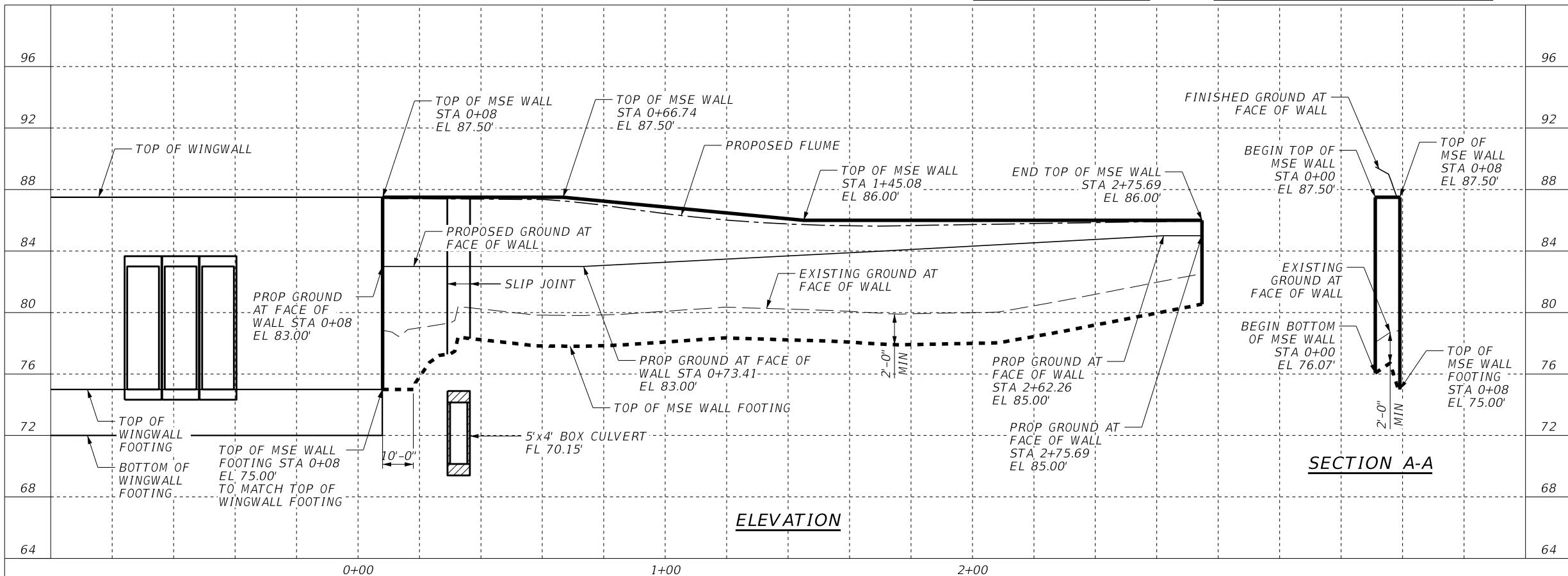
BEARINGS AT WALL BL

①	S 13° 00' 46" E
②	N 76° 59' 14" E
③	N 86° 32' 37" E

SUMMARY OF ESTIMATED QUANTITIES RETAINING WALL AT BRANDT ROAD

BID ITEM NUMBER	0423-6001
BID ITEM DESCRIPTION	RETAINING WALL (MSE)
1 - RETAINING WALL	SF 2325
TOTAL	2325

PLAN

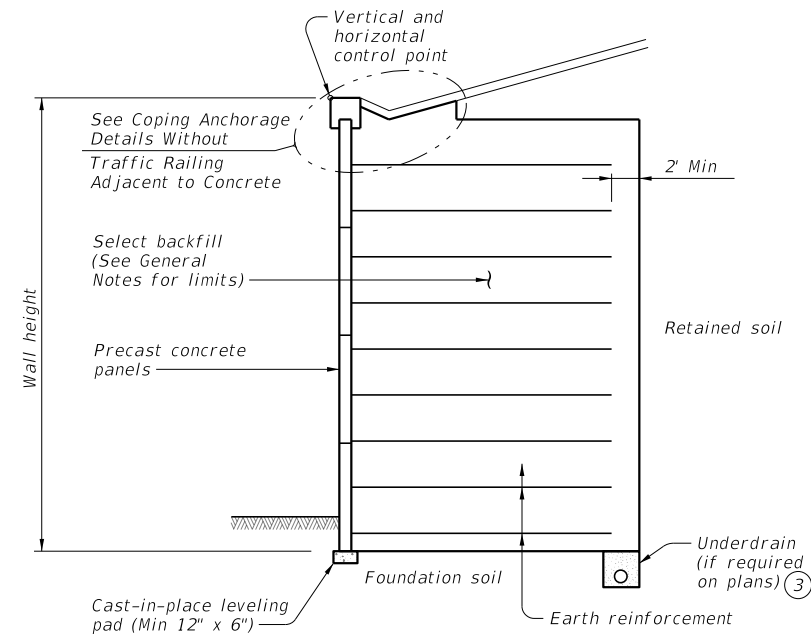


ELEVATION

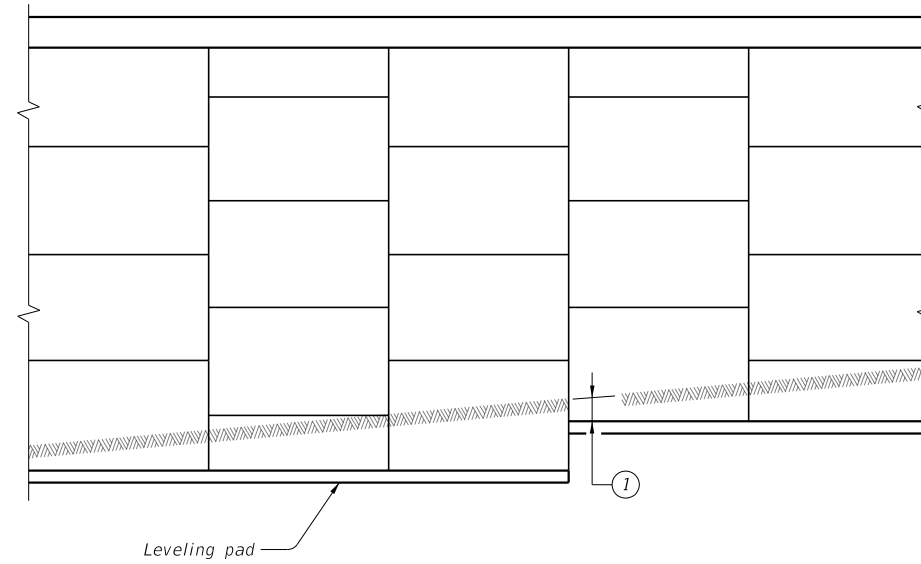
SECTION A-A

\\pusschrf101\jobs\2113_Terra_Brandt_Lone\06.00_Design\06.04_Sheets\06.04.07_Bridges\2113_WALL01.dgn

DATE: 12/9/2022 12:54:43 PM
 FILE: \\pusscsrhfr1101\J-Jobs\2113 Terra Brandt Lone\06.00 Design\06.04 Sheets\06.04.11 Standards\RW-MSE-22.dgn
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

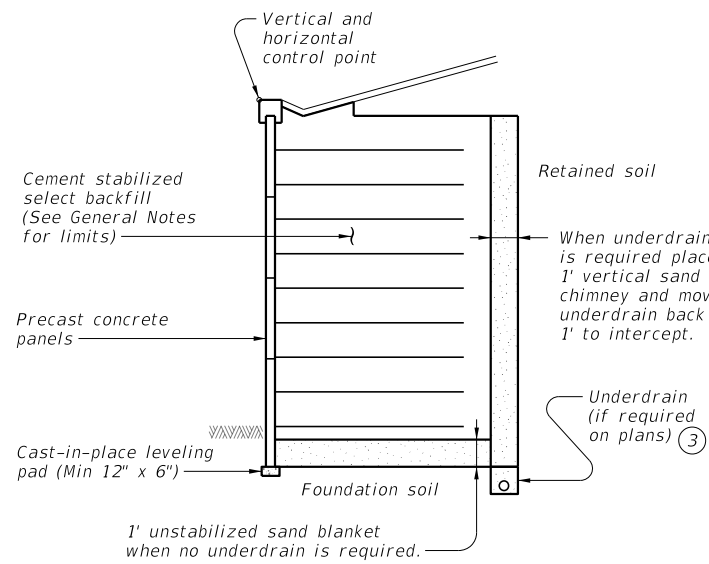


TYPICAL SECTION
(Wall at bottom of slope.)

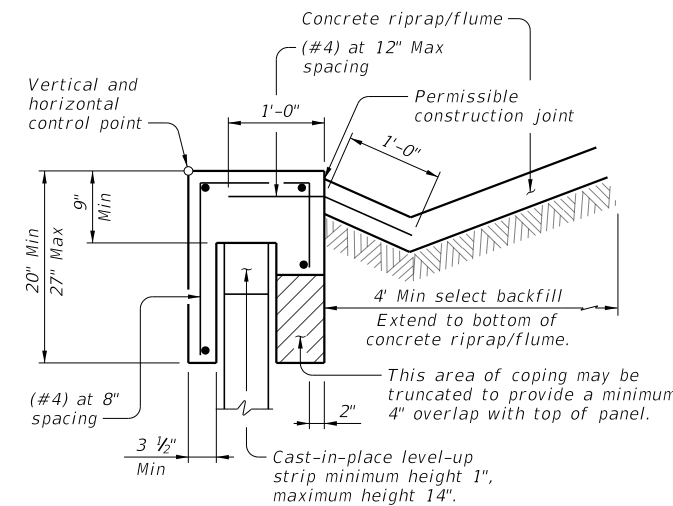


ELEVATION

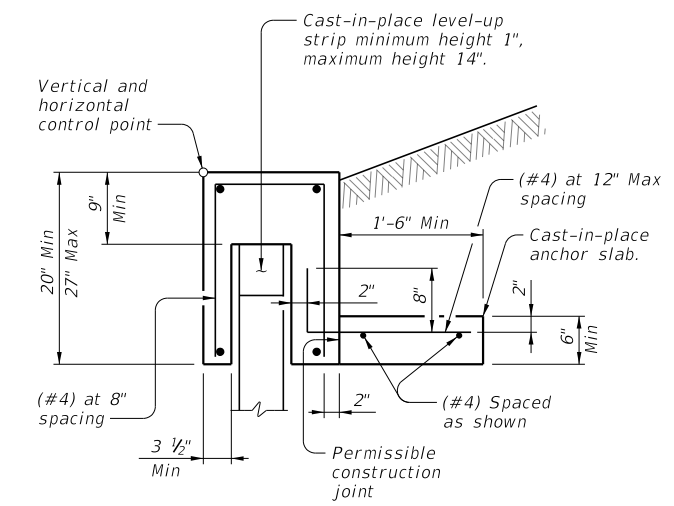
- (1) Minimum embedment conforming to values given on the RW(MSE)DD standard.
- (2) Form map of Texas emblem into a wall panel next to each bridge abutment. Submit the exact location of each emblem to the Engineer for approval. The cost of forming the emblems will not be paid for directly, but is subsidiary to Item 423, "Retaining Walls." Inset the map of Texas a minimum of 3/4" into the face of the panel with a smooth finish. Finish the inset area in a contrasting color as approved by the Engineer.
- (3) Provide underdrain pipe and filter material in accordance with Item 556, "Pipe Underdrains."
- (4) Anchor precast coping to prevent rotation or displacement. Use these details to develop custom anchorage for precast copings. Provide details that include coping reinforcement. Concrete flume (if required) is paid for separately from Item 423, "Retaining Walls."



SPECIAL DRAINAGE PROVISIONS
(When cement stabilized backfill is used.)

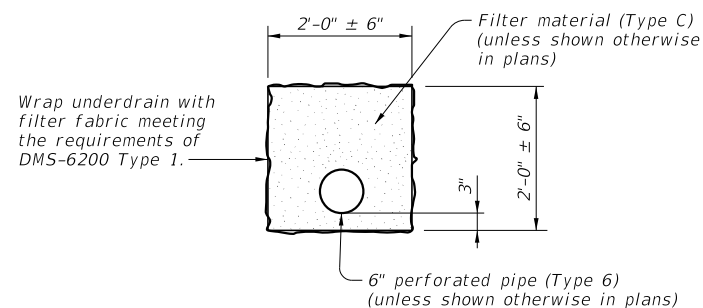


ADJACENT TO CONCRETE
(Excluding concrete pavement)

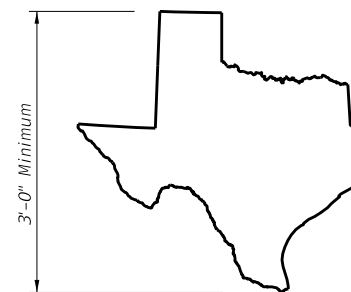


ADJACENT TO SOIL

COPING ANCHORAGE DETAILS WITHOUT TRAFFIC RAILING (4)



UNDERDRAIN DETAIL (3)

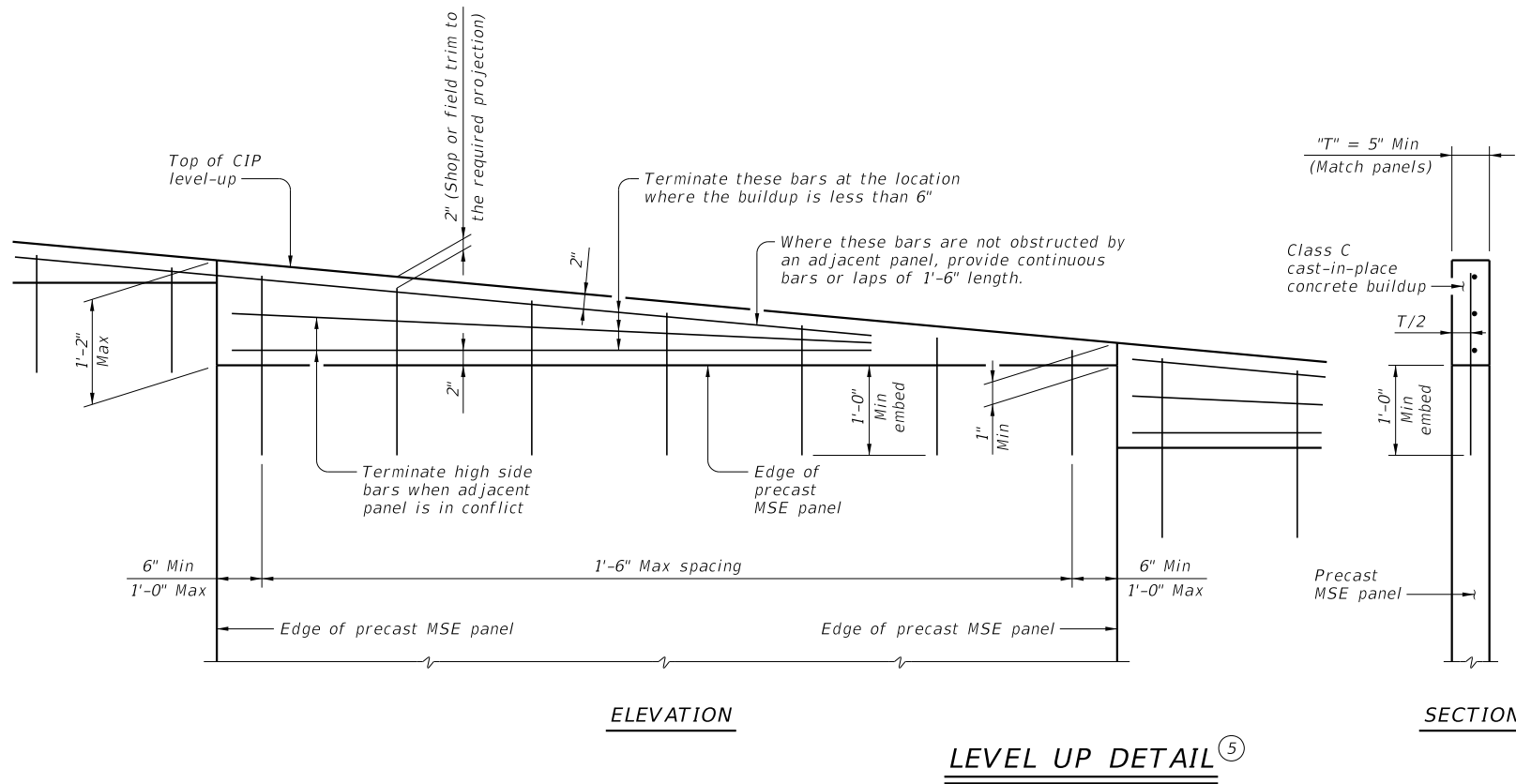


MAP OF TEXAS EMBLEM (2)

SHEET 1 OF 2

				Bridge Division Standard	
MECHANICALLY STABILIZED EARTH RETAINING WALL					
RW(MSE)					
FILE: RW-MSE-22.dgn	DN: TxDOT	CK: TxDOT	DW: JER	CK: RLE	
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY	
REVISIONS			0522-1801	BRANDT RD	
	DIST	COUNTY	SHEET NO.		
	HOU	FORT BEND	RW2		

DATE: 12/9/2022 12:54:43 PM
 FILE: \\psscshrf1101\J-Jobs\2113_Terra_Brandt_Lone\06_00_Design\06_04_Sheets\06_04_11_Standards\RW-MSE-22.dgn
 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.



- 5 Cast vertical bars into the top of panels. At Contractor's option vertical bars may be embedded 4 inches with a Type III Class C epoxy anchorage system. Follow manufacturer's directions for installing the epoxy vertical bars.
- 6 Soil design parameters must be based on long term soil strength. Design parameters must be listed on the RW(MSE)DD standard.

7

SELECT BACKFILL UNIT WEIGHT			
Type AS, BS & DS	Unit Weight	Internal Stability	External Stability
	105 PCF	Pullout	Sliding, Overturning, Eccentricity
	125 PCF	Rupture	Bearing

PRECAST COPINGS:

Wall supplier is to maximize lengths of precast coping. Provide precast coping in 10-foot minimum lengths (typical.) To optimize coping lengths at radiuses, ends of runs, or other wall geometric conditions favorable to shorter coping sections, shorter lengths may be used pending approval by the Engineer. This applies only to coping without railing.

JOINT SEALANT:

Seal joints between coping segments in accordance with Item 438, "Cleaning and Sealing Joints." Provide Class 4 joint seal. Place sealant flush with coping surface. The purpose of the joint sealing is to reduce surface drainage infiltration into the retaining wall backfill. Sealing coping joint is considered subsidiary to other items.

EARTH REINFORCEMENT:

Place the uppermost earth reinforcement no more than 3 feet below the top of wall. Place the lowest level of earth reinforcement no more than 2 feet above the top of the leveling pad. Provide earth reinforcement with a minimum wire size of W7.0. If different longitudinal and cross wires are used in an earth reinforcement mesh, the smaller wire must be at least 50% of the cross sectional area of the larger wire. A maximum of four wire mesh configurations (wire sizes) will be allowed on a project. Provide unique transverse bar spacing for each mesh configuration, differing from other configurations by a minimum of 3 inches. Step earth reinforcement lengths in increments no finer than 12 inches.

PANELS:

Fabricate standard precast concrete panels to a maximum height of 6 feet and a maximum surface area of 50 sq ft. Top and bottom panels may exceed these limitations as necessary to achieve required wall grades. Maximum height of any panel must not exceed 7 ft.-6 in. Provide a minimum panel thickness of 5 inches. Arrange panels to provide offset horizontal joints. Provide an open joint around the perimeter of the concrete panels. Configure joints such that 1) the filter fabric and/or pad materials are not exposed at the wall face and 2) the design opening is between 3/8" and 3/4". Provide a one-piece corner panel for wall angle changes of greater than 30 degrees. Butting of chamfered panels will be allowed for angle changes of 30 degrees or less.

MATERIAL NOTES:

- Provide Class C concrete for reinforced concrete and precast coping.
- Provide Class H concrete for precast concrete panels.
- Provide Class A concrete for unreinforced concrete.
- Provide Grade 60 reinforcing steel.

GENERAL NOTES:

- Section and elevation shown is for informational purposes only. Determine specific geometry based on wall layouts and other plan information.
- Extend select backfill specified for use within the mechanically stabilized earth volume horizontally from the back of the panels a minimum 2 feet beyond the end of the earth reinforcement. Extend select backfill vertically to the top of the panels from either the top of the leveling pad, or from 4 inches below the lowest earth reinforcement, whichever is lower.
- Provide concrete coping along the top of wall, at the vertical steps at bridge backwalls, and at other vertical steps along the top of wall.
- Provide details and calculations that establish support for panels that are affected when obstructions (inlets, drilled shafts, piling, etc.) prevent placement of soil reinforcement in their normal locations. Furnish the same earth reinforcement coverage as that required in the absence of the obstruction. For skewed (rotated) earth reinforcement, no adjustment in length is needed for skew angles less than or equal to 10 degrees. Adjust the length of earth reinforcement to provide a cosine length of the reinforcement equivalent to the stated design length for the section of wall when skew angles are greater than 10 degrees. Provide calculations that justify any alterations made to the soil reinforcement or modifications to their normal placement. Do not use panels without any soil reinforcement connected to them unless they are connected with galvanized hardware to adjacent panels which do have supporting soil reinforcement attached to them and as approved by the Engineer.
- Coping and anchor slabs are considered subsidiary to the Item 423, "Retaining Walls."
- Use these details in conjunction with the retaining wall layout, the Mechanically Stabilized Earth Retaining Wall Design Data (RW[MSE]DD) standard and other applicable standards.

Cover dimensions are clear dimensions, unless noted otherwise.

DESIGN CRITERIA NOTES:

Design Parameters:
Base design of retaining walls on the following design parameters unless stated elsewhere in the plans:

Retained Soil	Unit Weight = 125 pcf $\phi = \textcircled{6}$ C = 0 psf
Foundation Soil	$\phi = \textcircled{6}$ C = 0 psf
Select Backfill	Unit Weight = See Table 7 $\phi = 34^\circ$ C = 0 psf
Cement Stabilized Select Backfill	Unit Weight = 125 pcf $\phi = 45^\circ$ C = 0 psf

Limit stress in steel and concrete in accordance with current AASHTO Standard Specifications for Highway Bridges and Interim Specifications. The minimum length of earth reinforcement are as shown on the Mechanically Stabilized Earth Retaining Wall Design Data (RW[MSE]DD) standard.

Stability Criteria:
Stability criteria applies to both dry and drawdown analysis. Base design on the following factors of safety.

Sliding along the base of the structure	Factor of Safety ≥ 1.5
Overturning	Factor of Safety ≥ 2.0
Pullout of Earth Reinforcement at each level	Factor of Safety ≥ 1.5

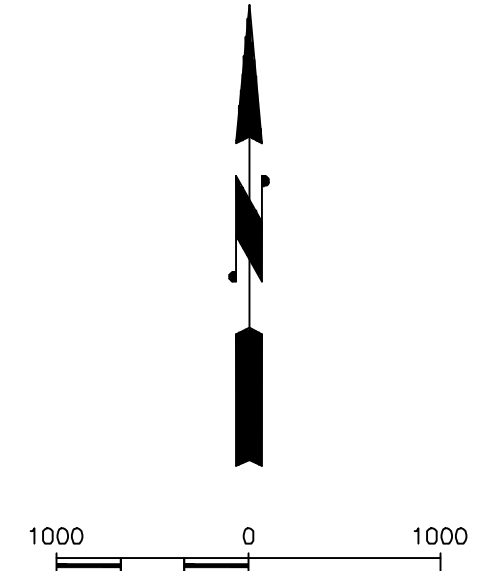
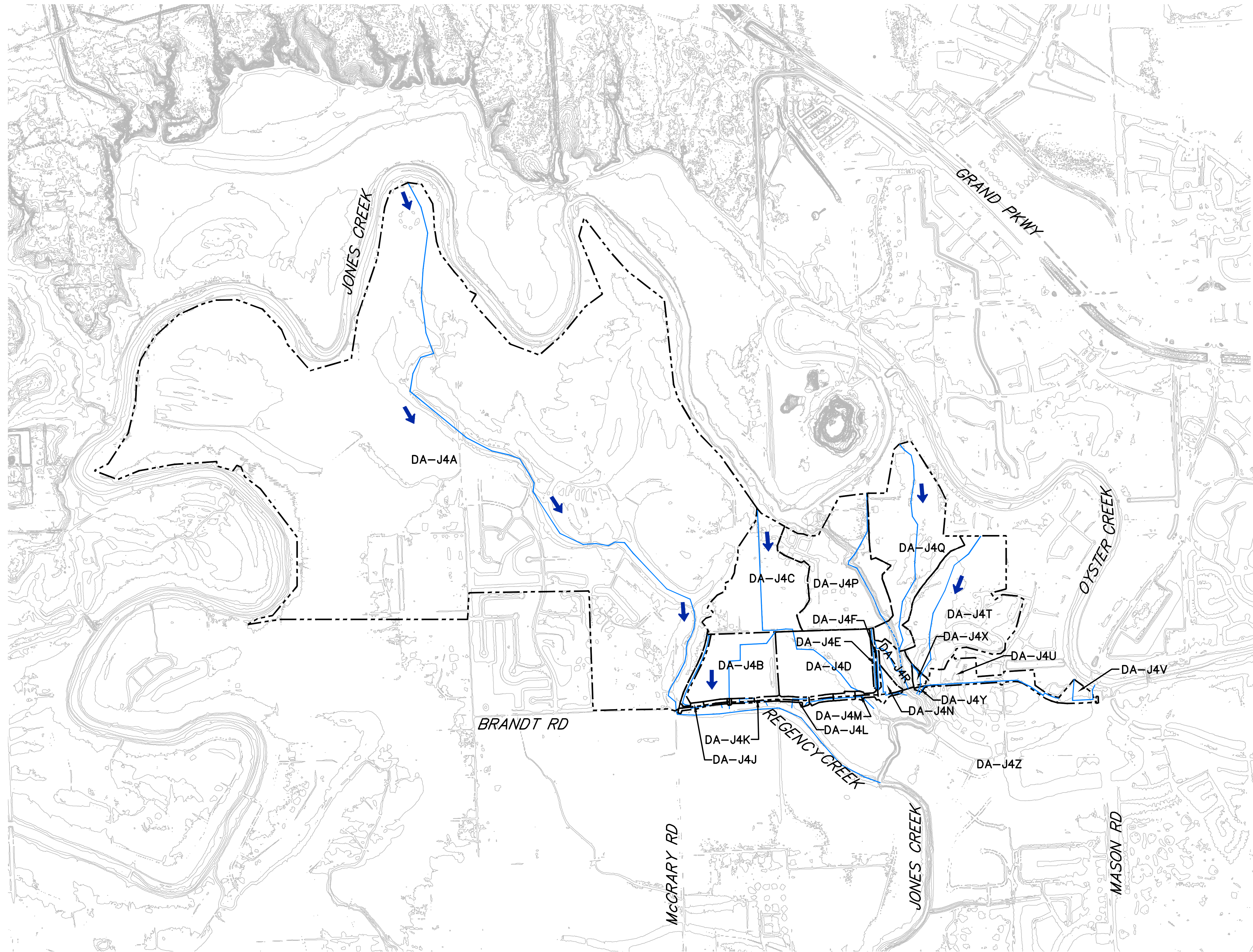
Design the wall such that the base pressure resultant falls within the middle third of the retaining wall. Determine pullout resistance from test data evaluated at 3/4 inch strain.

Corrosion Criteria:
Design the earth reinforcement elements to have a minimum design life of 75 years, using current AASHTO corrosion rates. Perform stress calculations (rupture) on the calculated earth reinforcement section remaining after 75 years. Pullout calculations may be based on non-corroded section.

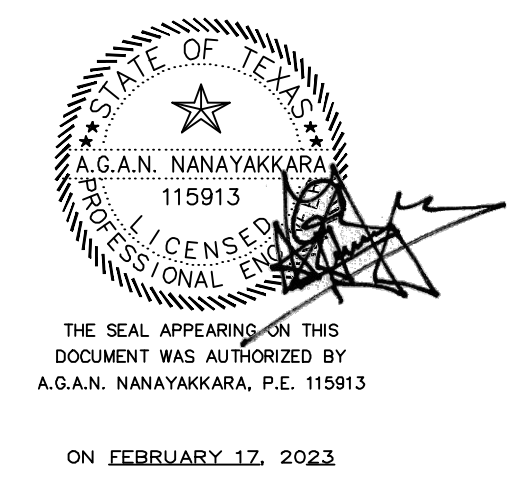
SHEET 2 OF 2

				Bridge Division Standard
<h2>MECHANICALLY STABILIZED EARTH RETAINING WALL</h2>				
<h3>RW(MSE)</h3>				
FILE: RW-MSE-22.dgn	DN: TxDOT	CK: TxDOT	DW: JER	CK: RLE
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS		0522-1801		BRANDT RD
DIST		COUNTY		SHEET NO.
HOU		FORT BEND		RW3

F:\Clients\Fort Bend County Engineering\0522-1801 Brandt Road Drawings\Seg 2\DR00 OVERALL DRAINAGE.dwg Feb 17, 2023-10:46am Terra Associates Inc., Thanh Dao

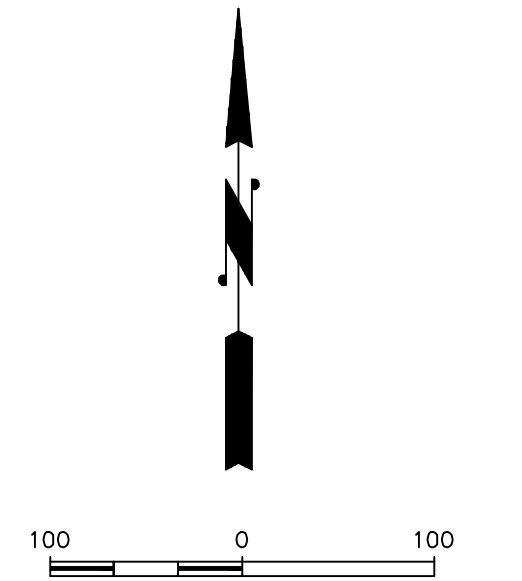
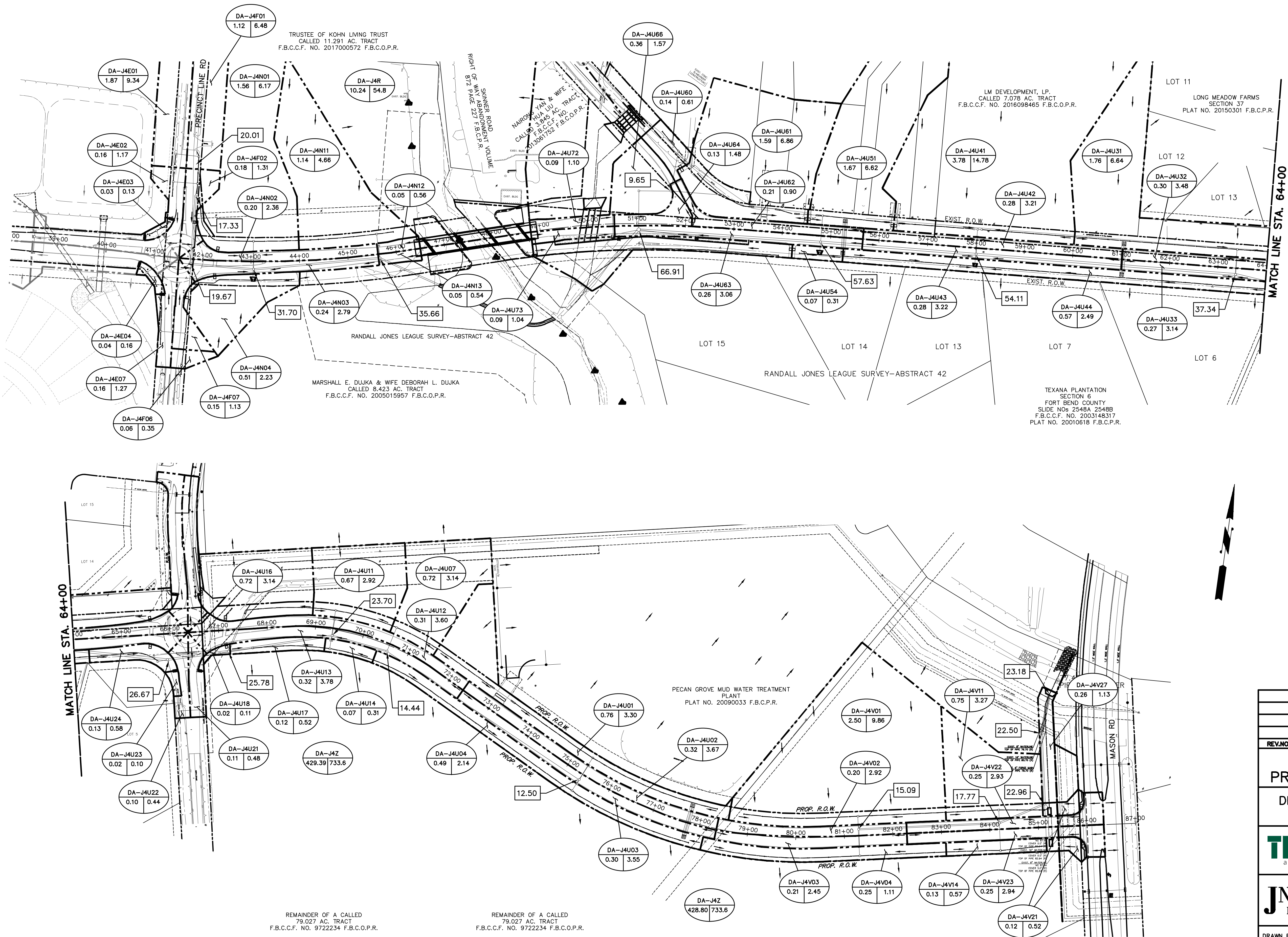


LEGEND	
	PROPOSED DRAINAGE AREA DIVIDE
	EXISTING SHEET FLOW ROUTE

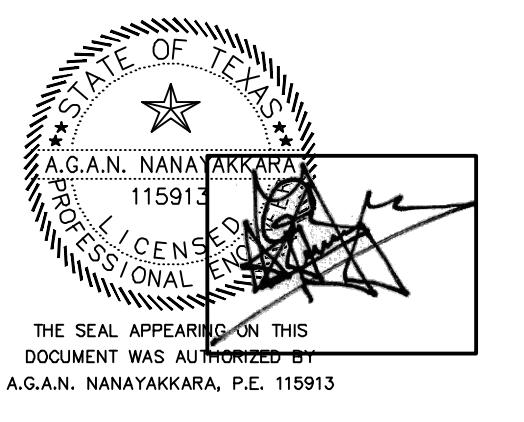


REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD DRAINAGE AREA MAP - REGIONAL			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D. CHECKED BY: A.G.A.N.	SCALE: 1" = 1000' DATE: FEBRUARY, 2023	PROJECT No. 0522-1801 CONTRACT: 1 SHEET DR01	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\DR03 DRAINAGE AREA MAP - STORM SEWER SYSTEM.dwg Feb 17, 2023-10:46am Terra Associates Inc., Thanh Dao



LEGEND	
	PROPOSED DRAINAGE AREA DIVIDE
	DIRECT OF FLOW
	DRAINAGE AREA ID.
	100-YR FLOW IN CFS
	DRAINAGE AREA IN ACRES
	100-YR CUMULATIVE FLOW IN CFS



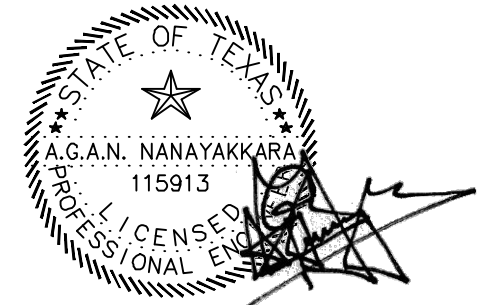
ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD DRAINAGE AREA MAP - STORM SEWER SYSTEM			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 100'	PROJECT No. 0522-1801	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1	
		SHEET DR03	

BASED ON RATIONAL METHOD EXCEL COMPUTATIONS

F:\Clients\Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\STORM_SEWER_SYSTEM_CALCULATIONS (2 OF 2).dwg Feb 17, 2023-10:46am Terra Associates Inc., Thanh Dao

Drainage Area	From Node	To Node	Area		Runoff Coefficients		Time of Concentration Calculation						Intensity (Individual area)						Intensity (cumulative)						Flow Q (Individual Area)						Flow Q (Accum.)						Storm Sewer Pipe					Flow line						
			Indiv.	Accum.	Average C	Weighted C	Overland	Gutter/ditch		Pipe	Tc (For Individual Area)	Tc (From Node)	Tc (To Node)	2 Year	3 Year	5 Year	10 Year	25 Year	100 Year	2 Year	3 Year	5 Year	10 Year	25 Year	100 Year	2 Year	3 Year	5 Year	10 Year	25 Year	50 Year	100 Year	2 Year	3 Year	5 Year	10 Year	25 Year	50 Year	100 Year	Barrels	Size	Slope	Capacity	Velocity	Up-Stream	Down-Stream		
			IDs	IDs	AC	AC			ft	fps	ft	fps	ft	fps	min.	min.	min.	in/hr	in/hr	in/hr	in/hr	in/hr	in/hr	in/hr	in/hr	in/hr	in/hr	cfs.	cfs.	cfs.	cfs.	cfs.	cfs.	cfs.	cfs.	cfs.	cfs.	cfs.	cfs.	cfs.	cfs.	No.	in or ft x ft	%	cfs.	fps.	ft.	ft.
Branch-V	V01	V05	2.50	2.50	0.30	0.30	300	0.5	310	1.5	27	3.0	13.4	13.44	13.59	4.74	5.28	6.08	7.12	8.23	10.52	4.71	5.26	6.05	7.08	8.19	10.52	3.55	3.96	4.56	5.60	6.79	8.04	9.86	3.53	3.94	4.54	5.58	6.76	8.00	9.86	1	24	0.20	10.12	3.2	78.55	78.50
	V02	V05	0.20	0.20	0.80	0.80	20	2.7	290	1.5	9	3.0	10.0	10.00	10.05	5.37	5.98	6.87	8.02	9.21	11.63	5.36	5.96	6.85	8.00	9.19	11.63	0.85	0.94	1.08	1.33	1.60	1.88	2.29	0.84	0.94	1.08	1.32	1.59	1.87	2.29	1	24	0.20	10.12	3.2	83.22	83.20
	V03	V05	0.21	0.21	0.80	0.80	20	2.7	297	1.5	35	3.0	10.0	10.00	10.19	5.37	5.98	6.87	8.02	9.21	11.63	5.33	5.93	6.82	7.96	9.14	11.63	0.90	1.01	1.16	1.42	1.71	2.01	2.45	0.90	1.00	1.15	1.41	1.70	2.00	2.45	1	24	0.20	10.12	3.2	83.27	83.20
	V04	V05	0.25	0.25	0.30	0.30	19	0.5	328	1.5	54	3.0	10.0	10.00	10.30	5.37	5.98	6.87	8.02	9.21	11.63	5.30	5.91	6.79	7.93	9.11	11.63	0.41	0.46	0.52	0.64	0.77	0.91	1.11	0.41	0.45	0.52	0.64	0.77	0.90	1.11	1	24	0.20	10.12	3.2	78.61	78.50
	V05	V15	0.00	3.16	0.80	0.36	0	0.0	0	0.0	290	3.0	10.0	13.59	15.21	5.37	5.98	6.87	8.02	9.21	11.63	4.47	5.00	5.75	6.74	7.81	10.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.15	5.76	6.63	8.16	9.90	11.75	15.09	1	30	0.15	15.89	3.2	77.44	77.00
	V11	V15	0.75	0.75	0.30	0.30	216	0.5	104	1.5	27	3.0	10.0	10.00	10.15	5.37	5.98	6.87	8.02	9.21	11.63	5.33	5.94	6.83	7.97	9.16	11.63	1.21	1.34	1.54	1.89	2.28	2.68	3.27	1.20	1.34	1.54	1.88	2.27	2.67	3.27	1	24	0.20	10.12	3.2	77.00	76.95
	V14	V15	0.13	0.13	0.30	0.30	19	0.5	110	1.5	56	3.0	10.0	10.00	10.31	5.37	5.98	6.87	8.02	9.21	11.63	5.30	5.90	6.79	7.92	9.11	11.63	0.21	0.23	0.27	0.33	0.39	0.46	0.57	0.21	0.23	0.26	0.32	0.39	0.46	0.57	1	24	0.20	10.12	3.2	77.00	76.89
	V15	V25	0.00	4.04	0.80	0.35	0	0.0	0	0.0	100	3.0	10.0	15.21	15.76	5.37	5.98	6.87	8.02	9.21	11.63	4.40	4.91	5.66	6.63	7.69	10.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.23	6.96	8.02	9.86	11.98	14.23	17.77	1	36	0.12	23.11	3.3	76.64	76.52
	V21	V25	0.12	0.12	0.30	0.30	80	0.5	75	1.5	13	3.0	10.0	10.00	10.07	5.37	5.98	6.87	8.02	9.21	11.63	5.35	5.96	6.85	7.99	9.18	11.63	0.19	0.22	0.25	0.30	0.36	0.43	0.52	0.19	0.21	0.25	0.30	0.36	0.43	0.52	1	24	0.20	10.12	3.2	77.00	76.97
	V22	V25	0.25	0.50	0.80	0.80	20	2.7	286	1.5	26	3.0	10.0	10.24	10.39	5.37	5.98	6.87	8.02	9.21	11.63	5.29	5.89	6.77	7.90	9.08	11.55	1.08	1.21	1.39	1.70	2.05	2.41	2.93	2.14	2.38	2.74	3.36	4.04	4.76	5.83	1	24	0.20	10.12	3.2	80.00	79.95
	V23	V22	0.25	0.25	0.80	0.80	20	2.7	286	1.5	44	3.0	10.0	10.00	10.24	5.37	5.98	6.87	8.02	9.21	11.63	5.32	5.92	6.80	7.94	9.13	11.63	1.09	1.21	1.39	1.70	2.05	2.41	2.94	1.08	1.20	1.38	1.69	2.03	2.39	2.94	1	24	0.20	10.12	3.2	80.09	80.00
	V25	V26	0.00	4.67	0.80	0.40	0	0.0	0	0.0	146	3.0	10.0	15.76	16.57	5.37	5.98	6.87	8.02	9.21	11.63	4.29	4.80	5.53	6.48	7.52	9.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.97	8.90	10.26	12.63	15.36	18.27	22.96	1	36	0.15	25.83	3.7	76.25	76.03
	V26	V27	0.00	4.67	0.80	0.40	0	0.0	0	0.0	82	3.0	10.0	16.57	17.03	5.37	5.98	6.87	8.02	9.21	11.63	4.23	4.73	5.45	6.39	7.43	9.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.86	8.79	10.13	12.47	15.17	18.05	22.50	3	18	0.26	16.07	3.0	75.86	75.65
V27	Outfall V	0.26	4.93	0.30	0.39	60	0.5	225	1.5	41	3.0	10.0	17.03	17.26	5.37	5.98	6.87	8.02	9.21	11.63	4.20	4.70	5.42	6.35	7.38	9.59	0.42	0.47	0.54	0.66	0.79	0.93	1.13	8.14	9.10	10.48	12.91	15.72	18.70	23.18	1	48	0.15	55.63	4.4	72.06	72.00	



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913 ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD STORM SEWER SYSTEM CALCULATIONS (2 OF 2)			
		1445 N. LOOP WEST – SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET DR05	

F:\Clients\Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\TC01 TRAFFIC CONTROL NOTES.dwg Feb 17, 2023-10:49am Terra Associates Inc., Thanh Dao

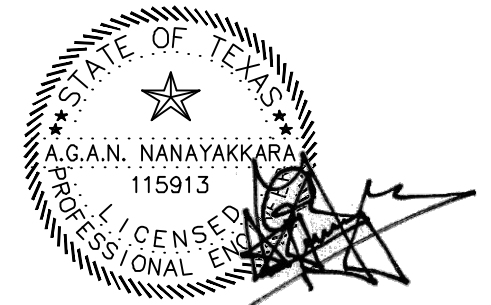
SPECIAL NOTES FOR BARRICADES, SIGNS, AND TRAFFIC HANDLING:

1. THE SIGNS AND BARRICADES SHOWN ON THESE DRAWINGS CONSTITUTE MINIMUM REQUIREMENTS AND ARE NOT INTENDED TO COVER SPECIAL CIRCUMSTANCES OR OTHER CONDITIONS THAT MAY ARISE DUE TO UNFORESEEN FIELD CONDITIONS. THE CONTRACTOR SHALL PLACE AND MAINTAIN SUFFICIENT ADDITIONAL SIGNS, BARRICADES AND WARNING DEVICES TO WARN THE PUBLIC AND PROVIDE FOR THE SAFE MOVEMENT OF TRAFFIC WHERE PROJECT REQUIREMENTS ARE NOT FULLY SATISFIED BY THE STANDARDS SHOWN HEREON. "THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" SHALL GOVERN.
2. BARRICADES, SIGNS, CHANNELIZING DEVICES, AND TRAFFIC HANDLING DEVICES AS SHOWN SHALL BE ADJUSTED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
3. ALL CONSTRUCTION SIGNS AND BARRICADES SHALL REMAIN IN PLACE UNTIL THEIR REMOVAL IS DIRECTED BY THESE PLANS OR BY THE ENGINEER.
4. ALL BARRICADES, SIGNS, STRIPING, CHANNELIZING DEVICES, AND ALL EQUIPMENT, INCIDENTALS, AND LABOR REQUIRED TO CONSTRUCT BARRICADES AND SIGNS, ETC. AS SHOWN IN THE DETAILS ON THESE PLANS SHALL BE INCLUDED IN THE LUMP SUM PRICE BID AS PER ITEM 671 FOR "TRAFFIC CONTROL".
5. THE ENGINEER MAY DIRECT THE CONTRACTOR TO FURNISH ADDITIONAL SIGNS, BARRICADES, AND CHANNELIZING DEVICES AS REQUIRED TO MAINTAIN TRAFFIC AND MOTORIST SAFETY DURING CONSTRUCTION. ANY SUCH ADDITIONAL SIGNS, BARRICADES, ETC. SHALL BE CONSIDERED A PART OF THE LUMP SUM PAY ITEM 671 "TRAFFIC CONTROL".
6. CONTRACTOR SHALL INSURE THAT ALL BARRICADES, SIGNS, CHANNELIZING DEVICES, WARNING LIGHTS, AND TRAFFIC HANDLING DEVICES ARE MAINTAINED IN A CLEAN, FUNCTIONAL CONDITION AT ALL TIMES.
7. THE CONTRACTOR SHALL REMOVE ALL EXISTING STRIPING AND SIGNS WHICH ARE IN CONFLICT WITH THE CONSTRUCTION STRIPING AND SIGNS. EXISTING PAVEMENT MARKINGS SHALL BE REMOVED TO AREAS WHERE TRAFFIC IS DIRECTED TO CROSS THEM. THE SIGNS SHALL BE PROPERLY STORED. AT TIMES OF COMPLETION, ALL SUCH MARKERS AND SIGNAGE SHALL BE REPLACED TO ORIGINAL CONDITION AS PER FORT BEND COUNTY REQUIREMENTS AND SPECIFICATIONS.
8. ALL EXISTING STOP SIGNS, STREET NAME SIGNS, AND WARNING SIGNS SHALL BE MAINTAINED IN PLACE DURING THE ENTIRE PERIOD OF CONSTRUCTION BY THE CONTRACTOR.
9. ALL TEMPORARY PAVEMENT MARKINGS DURING CONSTRUCTION SHALL BE IN ACCORDANCE WITH FORT BEND COUNTY REQUIREMENTS AND SPECIFICATIONS.
10. WHEN DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL PROVIDE FLAGMAN TO DIRECT TRAFFIC AND SHALL BE PAID FOR BY THE CONTRACTOR. THIS DOES NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR TAKING OTHER STEPS NECESSARY FOR PROTECTION OF WORK AND THE PUBLIC.
11. THE CONTRACTOR AND SUBCONTRACTORS SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL LAWS, CODES, AND ORDINANCES APPLICABLE TO THE WORK, AND ALL REQUIREMENTS OF THE NATIONAL BOARD OF FIRE UNDERWRITERS HAVING JURISDICTION. IF THE ABOVE LAWS, CODES, OR ORDINANCES CONFLICT WITH SPECIFICATIONS, THEN THE LAWS, CODES, OR ORDINANCES SHALL GOVERN EXCEPT WHERE SPECIFICATION EXCEEDS THEM IN QUALITY OR QUANTITY OF MATERIAL OR LABOR. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS REQUIRED IN CONNECTION WITH THE EXECUTION OF THE WORK. UNDER NO CIRCUMSTANCES SHALL ANY WORK BE STARTED BEFORE THE REQUIRED PERMITS ARE OBTAINED. THE ENGINEER SHALL BE FURNISHED WITH CERTIFIED COPIES IF HE SO REQUESTS.
12. ALL SIGNS AND MARKINGS SHALL COMPLY WITH THE REQUIREMENTS OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, UNLESS SPECIFICALLY DIRECTED BY FORT BEND COUNTY, OR SPECIFIED OTHERWISE ON THE PLANS.
13. ALL DETOUR SIGNING IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR, INCLUDING ACTS OF VANDALISM OR ACCIDENT.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE FORT BEND COUNTY PUBLIC INFRASTRUCTURE DEPARTMENT, TRAFFIC AND TRANSPORTATION SECTION FOR REMOVAL AND INSTALLATION OF ANY PARKING RESTRICTIONS AND TRAFFIC SIGNAL ALTERATIONS MADE NECESSARY BY THESE PLANS. THE CONTRACTOR SHALL NOTIFY THE TRAFFIC AND TRANSPORTATION SECTION AT LEAST FIVE (5) WORKING DAYS PRIOR TO THE IMPLEMENTATION OF TRAFFIC ROUTING AROUND THE CONSTRUCTION AREA, AND AGAIN UPON COMPLETION OF WORK AT EACH SITE.
15. CONTRACTOR SHALL PROVIDE ACCESS TO ALL BUSINESSES AND RESIDENCES ALONG THIS PROJECT AT ALL TIMES DURING CONSTRUCTION UNLESS OTHERWISE AUTHORIZED SPECIFICALLY BY THE ENGINEER.
16. CONTRACTOR SHALL MAINTAIN A MINIMUM OF ONE TEN (10) FOOT WIDE ALL WEATHER TRAVEL LANE AT ALL TIMES DURING CONSTRUCTION ACTIVITY UNLESS OTHERWISE SPECIFIED.
17. THE CONTRACTOR SHALL CONSTRUCT TEMPORARY DETOUR PAVEMENT REQUIRED AS SHOWN IN THE PLANS.
18. ALL TEMPORARY SIGNAL WORK AND REPAIR TO BE COMPLETED IN CONFORMANCE WITH H.C.P.I.D. TRAFFIC AND TRANSPORTATION SECTION AND/OR TxDOT STANDARD DRAWINGS AND SPECIFICATIONS AS FOUND IN THE PLANS.
19. DAMAGE TO SIGNAL EQUIPMENT SHALL BE REPAIRED IMMEDIATELY BY CONTRACTOR.
20. THE CONTRACTOR SHALL SEQUENCE THE CONSTRUCTION IN SUCH A MANNER THAT NO TWO ADJACENT CROSS STREETS ARE CLOSED AT THE SAME TIME, UNLESS OTHERWISE SHOWN ON THE PLANS (NOT IN CONTRACT).
21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PREPARATION AND MAINTENANCE OF ALL TEMPORARY PAVEMENT STRUCTURES REQUIRED UNTIL WORK AT THE SITE IS COMPLETED AND ACCEPTED BY THE OWNER.

22. THE CONTRACTOR SHALL ADJUST ALL UTILITIES THAT MAY AFFECT TRAFFIC FLOW PRIOR TO TRAFFIC DISRUPTION.
23. THE CONTRACTOR SHALL LIMIT HIS/HER ACTIVITY AND STAY WITHIN THE CONSTRUCTION AREA SHOWN ON THE PLANS. THE CONTRACTOR SHALL SUBMIT VARIATIONS IN SIZE AND LOCATION OF THE CONSTRUCTION AREA FOR REVIEW PRIOR TO USE.
24. THE CONTRACTOR SHALL CONDUCT HIS/HER OPERATION IN A MANNER SUCH THAT TRUCKS AND OTHER VEHICLES DO NOT CREATE A DIRT NUISANCE OR SAFETY HAZARD IN ANY PUBLIC OR PRIVATE STREET.
25. IN THE EVENT THE CONTRACTOR CHOOSES TO USE A DIFFERENT METHOD OF DETOUR DURING THE CONSTRUCTION, THE CONTRACTOR SHALL PREPARE AND SUBMIT AN ALTERNATE SET OF "TRAFFIC CONTROL PLANS" TO F.B.C.P.I.D. TRAFFIC AND TRANSPORTATION SECTION FOR APPROVAL TEN (10) WORKING DAYS PRIOR TO IMPLEMENTATION. PLANS SHALL BE TO SCALE ON MYLAR AND SHALL BE SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
26. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY ALL LOCAL FIRE DEPTS, POLICE/SHERIFF'S DEPT, AMBULANCE AND LOCAL ISD TWO (2) WEEKS PRIOR TO CLOSURE OF ANY ROAD(S), WITHIN THE CONSTRUCTION LIMITS OF THIS PROJECT.
27. ALL WORK SHALL BE DONE ONLY DURING OFF-PEAK HOURS, 9AM-3PM MONDAY THROUGH FRIDAY AND 9AM-6PM SATURDAY AND SUNDAY, UNLESS APPROVED BY THE ENGINEER. IF WORKING WEEKENDS, THE CONTRACTOR NEEDS TO COORDINATE WITH THE CONSTRUCTION MANAGER AND NEEDS TO COORDINATE 48 HOURS IN ADVANCE FOR INSPECTION WORK.
28. ALL EXCAVATION FOR STORM SEWER CONSTRUCTION SHALL BE BACKFILLED AT THE END OF EACH WORK DAY UNLESS OTHERWISE AUTHORIZED BY THE COUNTY ENGINEER.
29. THE CONTRACTOR SHALL MAINTAIN DRAINAGE CONDITIONS EQUAL TO OR BETTER THAN EXISTING CONDITIONS IN ALL AREAS THROUGHOUT THE PROJECT AT ALL TIMES. TEMPORARY RCP DRAINAGE CULVERTS SHALL BE INSTALLED (IF REQUIRED) TO ELIMINATE PONDING DUE TO CONSTRUCTION ACTIVITIES WITHIN AND ADJACENT TO THE PROJECT RIGHT-OF-WAY. ALL TEMPORARY CULVERTS SHALL BE REUSED FOR PERMANENT INSTALLATION WHERE POSSIBLE OR DELIVERED TO PRECINCT 2 AFTER USE OF THE CONTRACTOR SHALL BE COMPENSATED BY THE UNIT PRICE BID FOR "TEMPORARY RCP DRAINAGE CULVERTS" AS DESCRIBED IN THE "BID FORM".
30. THE CONTRACTOR SHALL CONSTRUCT DRIVEWAYS WHILE MAINTAINING ACCESS TO FACILITIES.
31. CONTRACTOR SHALL COVER OPEN PAVEMENT EXCAVATIONS WITH ANCHORED STEEL PLATES DURING NON-WORKING HOURS, AND OPEN LANES FOR NORMAL TRAFFIC FLOW UNLESS OTHERWISE AUTHORIZED BY THE COUNTY ENGINEER.

SPACING FOR CHANNELIZING DEVICES	
1.	Plastic drums on merging taper @ 30' c-c with chevron sign @ 60' c-c and type 'C' warning light (for overnight closure)
2.	Plastic drums on downstream taper @ 35' c-c
3.	Plastic drums on radii @ 5' c-c
4.	Plastic drums on tangent @ 35' c-c with vertical panel @ 70' c-c and type 'C' warning light @ 70' c-c (for overnight closure)
5.	Plastic drums in front of construction zone @ 20' c-c with vertical panel @ 40' c-c and Type 'A' warning light @ 40' c-c (for overnight closure)
6.	Concrete traffic barrier (CTB) or low profile concrete traffic barrier (lpctb) with reflectors @ 10' c-c if pavement drop is more than twelve inches (12") or plastic drums with guardrail mounted.
7.	Tubular marker @ 20' C-C.
Note: Spacing shown on traffic control plans shall supersede the above spacings. Spacings may be adjusted to provide driveways, intersections, and median openings.	

Length for Longitudinal Buffer		TYPICAL SIGN SPACING AND TAPER LENGTHS.				
Posted Speed (mph)	Length in Feet (B)	Posted Speed (mph)	Sign Spacing "X"	Min. Desirable Taper Length "L"		
				10' Offset	11' Offset	12' Offset
20	35					
25	55					
30	85	30	120'	150'	165'	180'
35	120	35	160'	205'	225'	245'
40	170	40	240'	265'	295'	320'
45	220	45	320'	450'	495'	540'
50	280	50	400'	500'	550'	600'
55	335	55	500'	550'	605'	660'



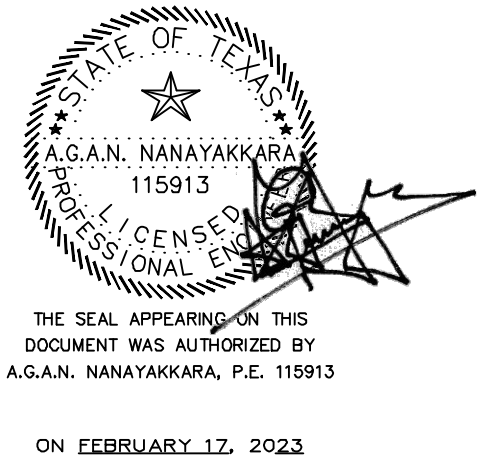
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913

ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN GENERAL NOTES			
		1445 N. LOOP WEST – SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET TC01	

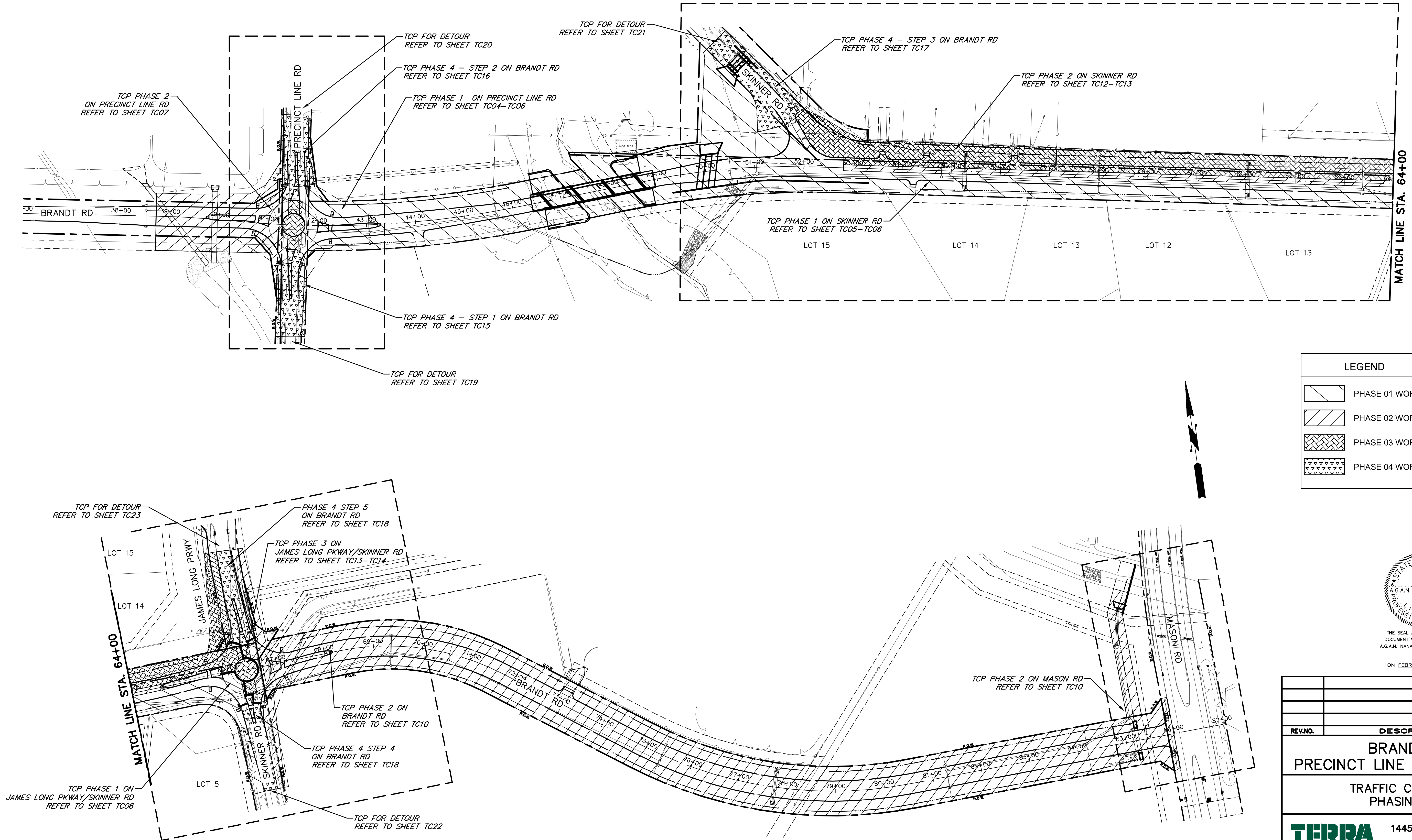
F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\TC02 OVERVIEW OF TRAFFIC CONTROL PLAN.dwg Feb 17, 2023-10:49am Terra Associates Inc., Thanh Dao

Phase & Step		Location	Details	Lanes Open
1		Sta. 41+75 to Sta. 52+75	Construct all lanes of Brandt Road including bridge across Jones Creek, storm drainage with swales, inlets/laterals and trunk lines. For this segment TCP is not required except for the duration of construction near Precinct Line Road.	N/A
		Sta. 52+75 to Sta. 66+25	Maintain two-way traffic along Skinner Road and James Long Parkway as shown in plan. Construct the EB lane of Brandt Road with the storm drainage. Drainage include swales, inlets/laterals and trunk lines.	2
2		Sta. 38+71 to Sta. 41+25	Maintain two-way traffic along Precinct line Road as shown in the plan. Construct all lanes of Brandt Road and storm drainage which includes swales. For this segment TCP is not required except for the duration of construction near Precinct Line Road.	N/A
		Sta. 52+75 to Sta. 66+25	Maintain two-way traffic along Skinner Road (EB on pavement constructed in Phase 1 and WB on existing Skinner Road) and maintain two-way traffic along James Long Parkway as shown in plan. Construct the center lane of Brandt Road. Drainage includes storm sewer laterals.	2
		Sta. 66+75 to Sta. 86+00	Maintain two-way traffic along Precinct line Road and Skinner Road/James Long Parkway as shown in the plan. Construct all lanes of Brandt Road and storm drainage which includes swales. For this segment TCP is not required except for the duration of construction near Mason Rd.	N/A
3	Step 1	Sta. 41+25 to Sta. 41+75	Maintain two-way traffic along Precinct line Road as shown in the plan. Construct the remaining areas of the rounabout as shown in plans.	2
		Sta. 52+75 to Sta. 66+25	Maintain two-way traffic along Skinner Road and James Long Parkway as shown in plan. Construct WB lane of Brandt Road with the storm drainage. Drainage include swales, inlets/laterals.	2
	Step 2	Sta. 66+25 to Sta. 66+75 North	Maintain two-way traffic along Skinner Road and James Long Parkway as shown in the plan. Construct the north segemnt of the remaining areas of the rounabout as shown in plans.	2
	Step 3	Sta. 66+25 to Sta. 66+75 South	Maintain two-way traffic along Skinner Road and James Long Parkway as shown in the plan. Construct the south segemnt of the remaining areas of the rounabout as shown in plans.	2
4	Step 1	South side of Precinct Line Road and Brandt Road intersection	Close the road and complete construction of the south arm of the intersection of Brandt Road and Precinct Line Road. Apply Detour plan as shown in plan.	0
	Step 2	North side of Precinct Line Road and Brandt Road intersection	Close the road and complete construction of the north arm of the intersection of Brandt Road and Precinct Line Road. Apply Detour plan as shown in plan.	0
	Step 3	Northwest side of Brandt Rd and Skinner Rd intersection	Close Skinner Road and complete construction to connect Skinner Road with Brandt Road. Apply detour as shown in plan.	0
	Step 4	South side of James Long Parkway and Brandt Road intersection	Close the road and complete construction of the south arm of the intersection of Brandt Road and James Long Parkway. Apply Detour plan as shown in plan.	0
	Step 5	North side of James Long Parkway and Brandt Road intersection	Close the road and complete construction of the north arm of the intersection of Brandt Road and James Long Parkway. Apply Detour plan as shown in plan	0

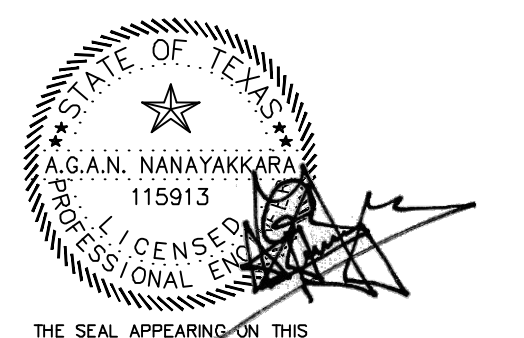


REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
OVERVIEW OF TRAFFIC CONTROL PLAN			
TERRA <small>a Bowman company</small>		1445 N. LOOP WEST – SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET TC02	

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LEGEND	
	PHASE 01 WORK AREA
	PHASE 02 WORK AREA
	PHASE 03 WORK AREA
	PHASE 04 WORK AREA



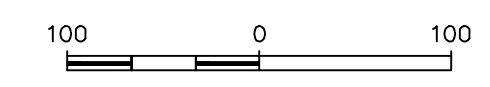
REV. NO.	DESCRIPTION	DATE	APP.

**BRANDT ROAD
PRECINCT LINE RD TO MASON RD
TRAFFIC CONTROL PLAN
PHASING LAYOUT**

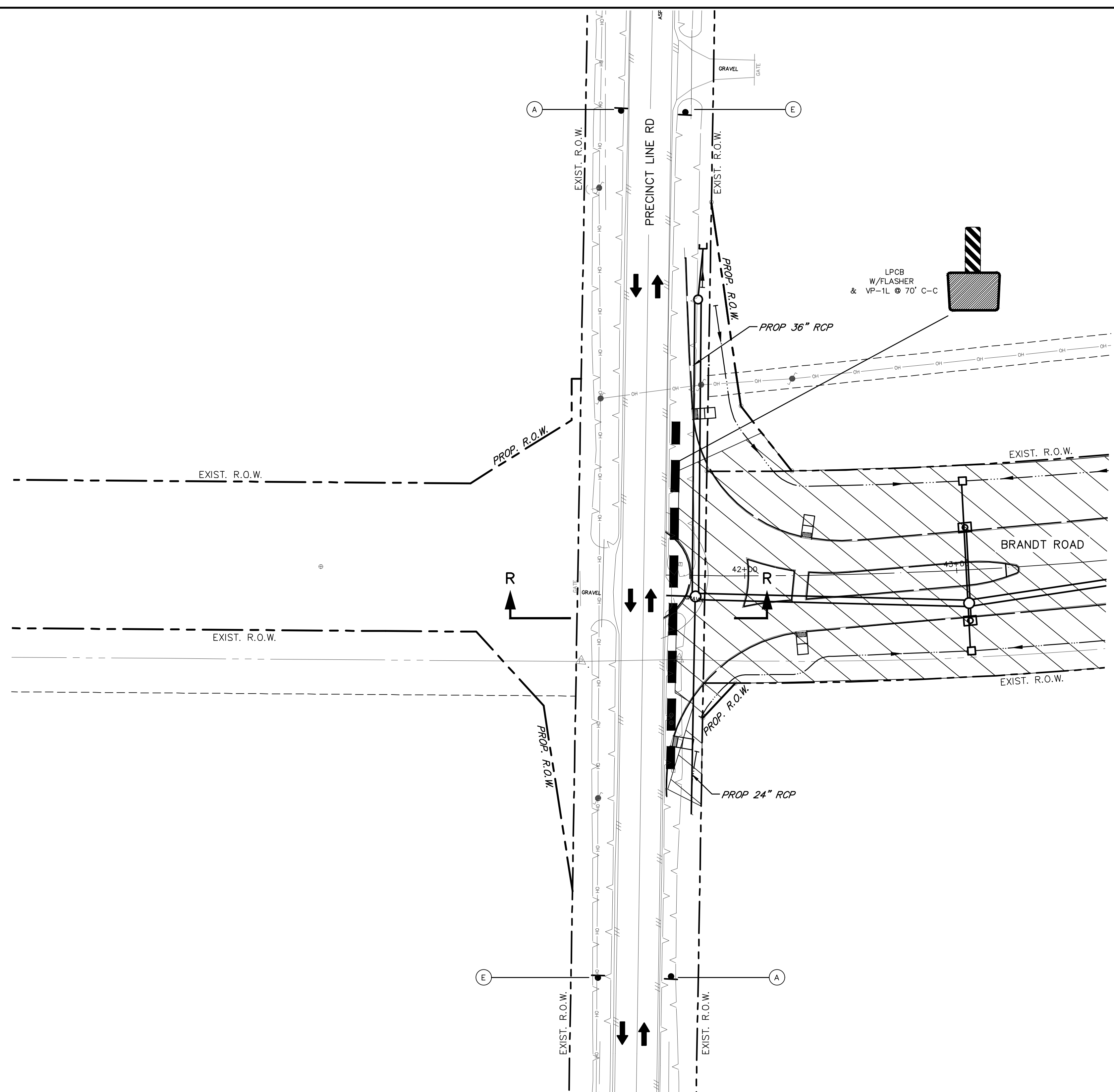
TERRA a Bowman company 1445 N. LOOP WEST – SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.B.P.E. FIRM
REGISTRATION NO. 11653

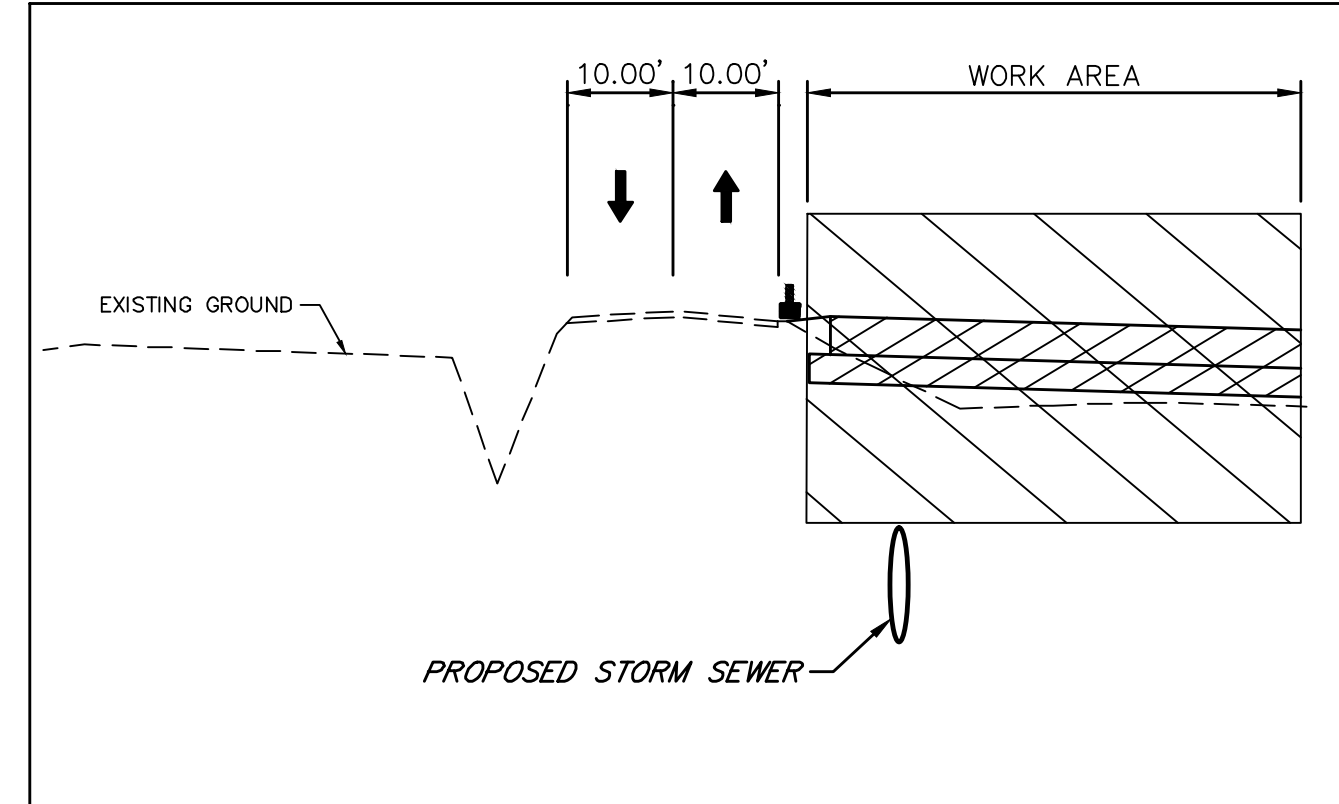
DRAWN BY: T.D.	SCALE: 1" = 100'	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1
		SHEET TC03



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POSTED SPEED LIMIT:
 PRECINCT LINE RD: 35 MPH
 BRANDT RD: 35 MPH



LEGEND	
	PHASE 01 WORK AREA
	TEMPORARY ASPHALT
	LOW PROFILE CONCRETE BARRIER (LPCB)
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE

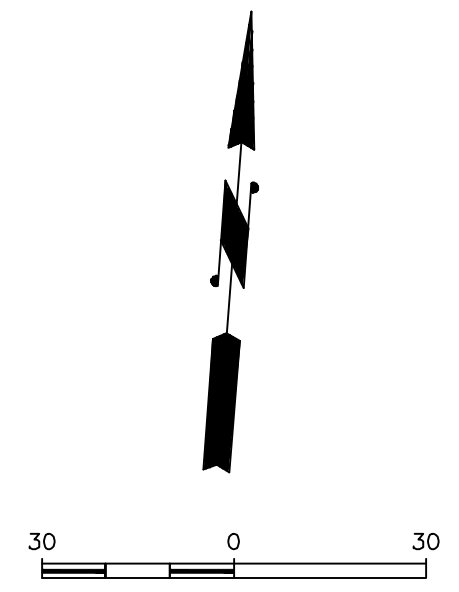
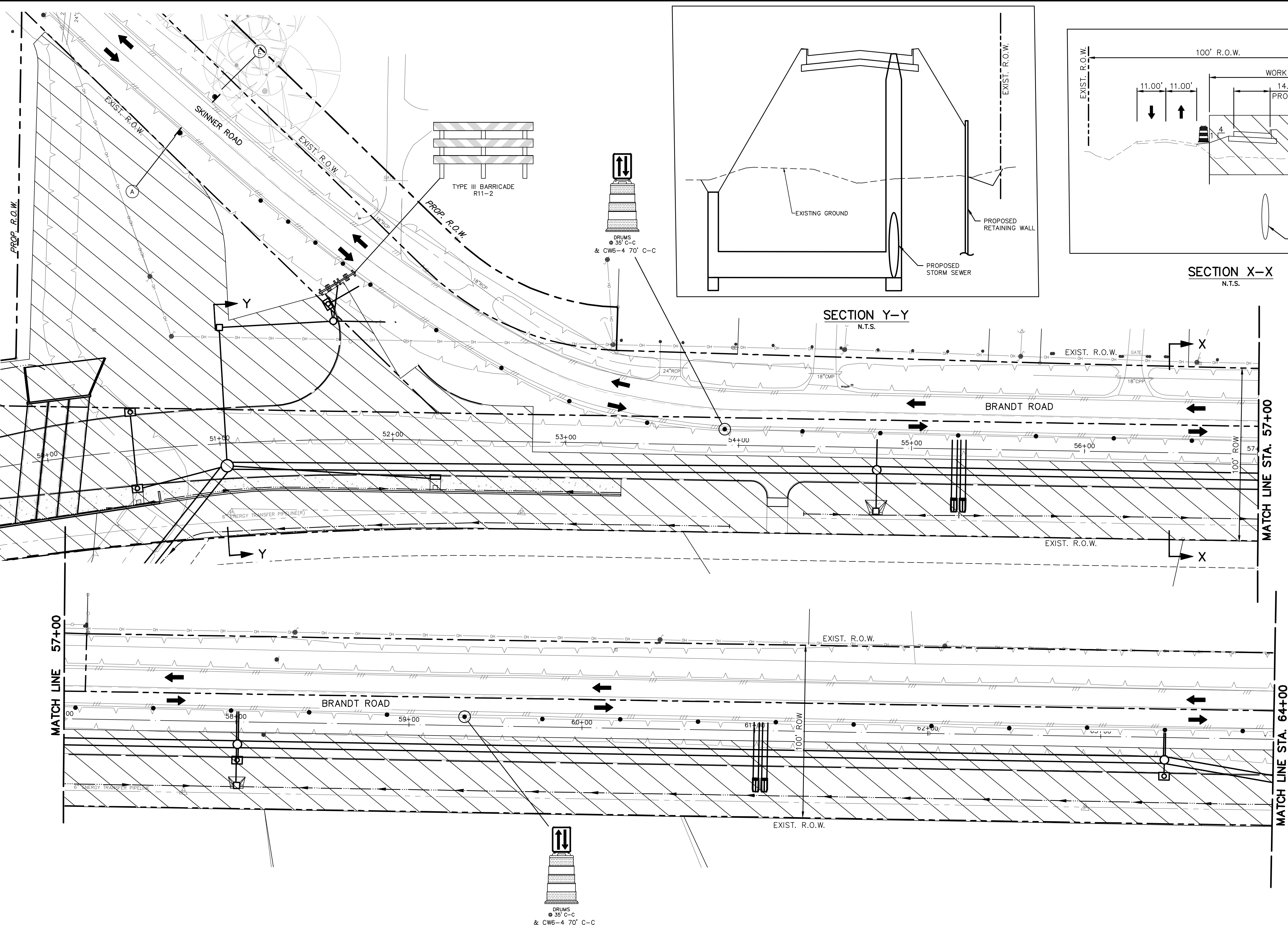
TRAFFIC CONTROL PLAN - PHASE 01
 © BRANDT ROAD AND PRECINCT LINE RD

STATE OF TEXAS
 A.G.A.N. NANAYAKKARA
 115913
 LICENSED PROFESSIONAL ENGINEER
 THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913
 ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 1			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: 1" = 30'	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET TC04

 CW20-1D 48 X 48	 W6-3 36 X 36	 R1-2 36 X 36 X 36	 R1-1 36 X 36	 G20-2a 48 X 24	 CW8-17 36 X 36	 CW1-2R 36 X 36	 CW1-2L 36 X 36	 CW1-4L 36 X 36	 CW1-4R 36 X 36	 CW24-1R 36 X 36	 CW24-1L 36 X 36	 AHEAD CW20-5R 48 X 48 PLAQUE 30 X 12	 CW20-5R 48 X 48
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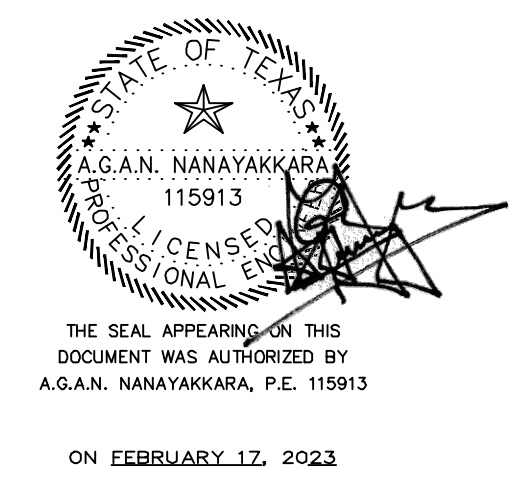
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LEGEND	
	PHASE 01 WORK AREA
	TEMPORARY ASPHALT
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE

NOTES:
 ALL DRIVEWAYS TO REMAIN ACCESSIBLE AT ALL TIMES.
 CONTRACTOR MUST COORDINATE WITH PROPERTY OWNERS FOR ACCESS TO THEIR PROPERTY AT ALL TIMES.

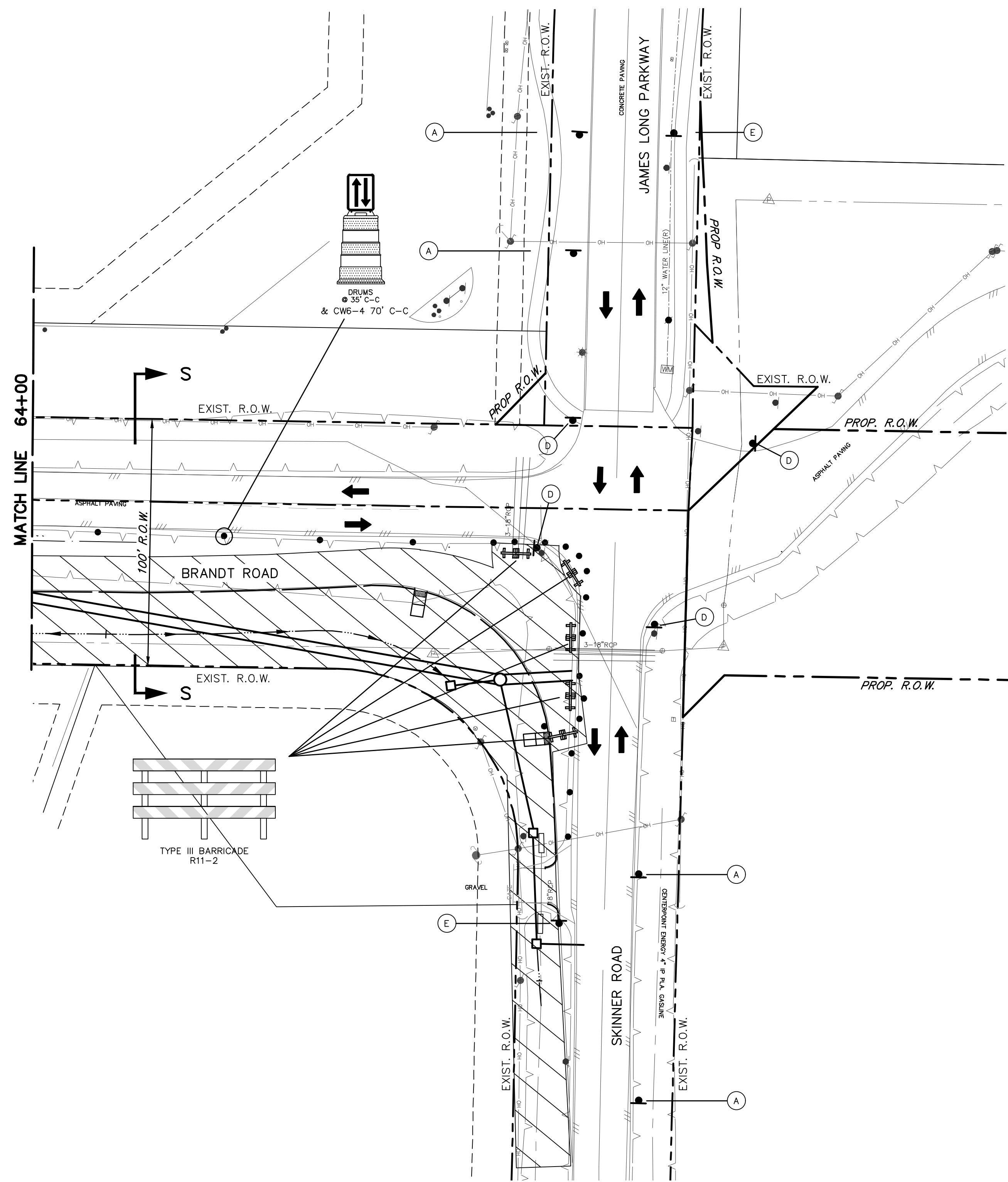
POSTED SPEED LIMIT:
 SKINNER ROAD: 35 MPH



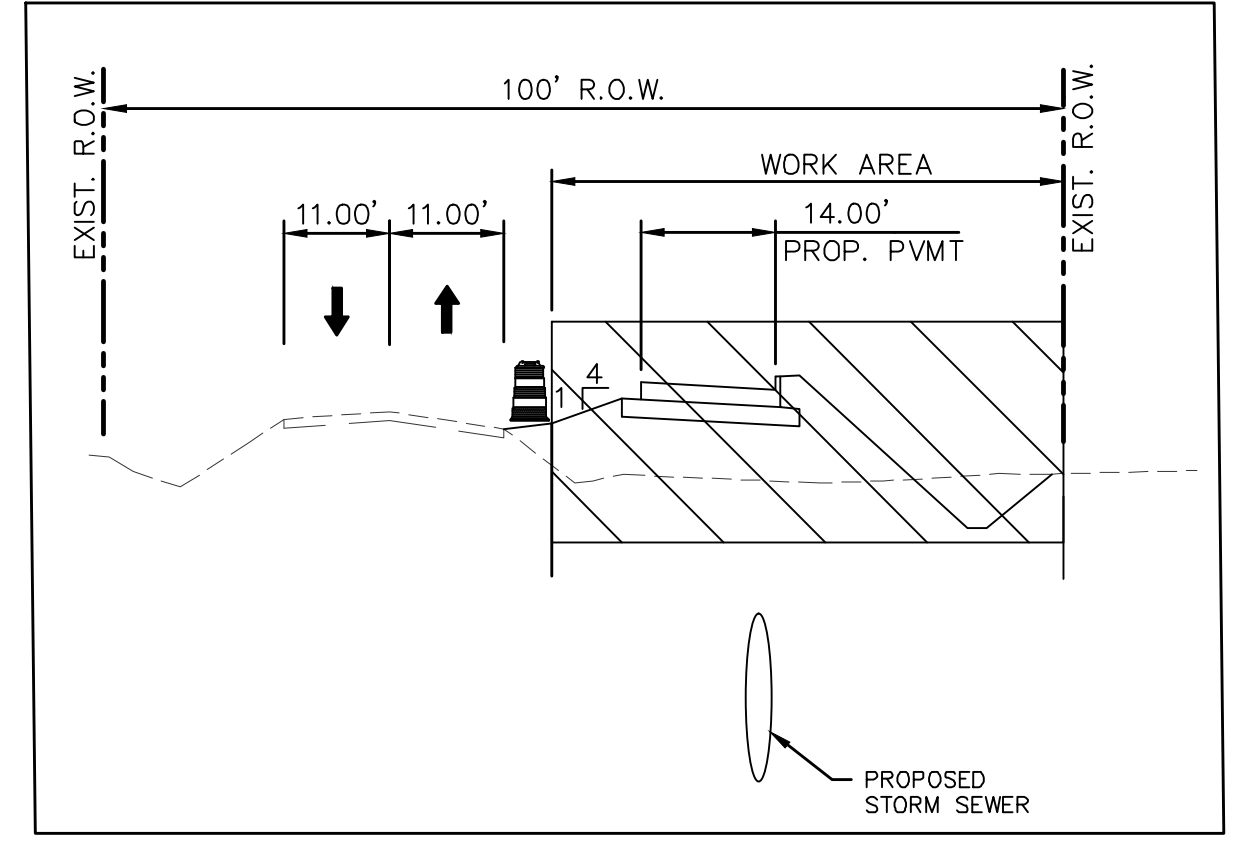
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CW20-1D 48 X 48	W6-3 36 X 36	R1-2 36 X 36 X 36	R1-1 36 X 36	G20-2a 48 X 24	CW8-17 36 X 36	CW1-2R 36 X 36	CW1-2L 36 X 36	CW1-4L 36 X 36	CW1-4R 36 X 36	CW24-1R 36 X 36	CW24-1L 36 X 36	AHEAD CW20-5R 48 X 48 PLAQUE 30 X 12	CW20-5R 48 X 48		

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD TRAFFIC CONTROL PLAN PHASE 1			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281)391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 30'	PROJECT No. 0522-1801	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1	
		SHEET TC05	

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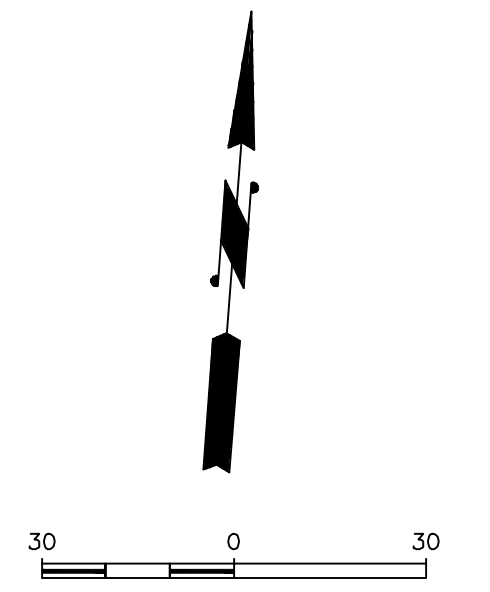
TRAFFIC CONTROL PLAN - PHASE 01
 © BRANDT ROAD AND JAMES LONG PRKWY AND SKINNER ROAD



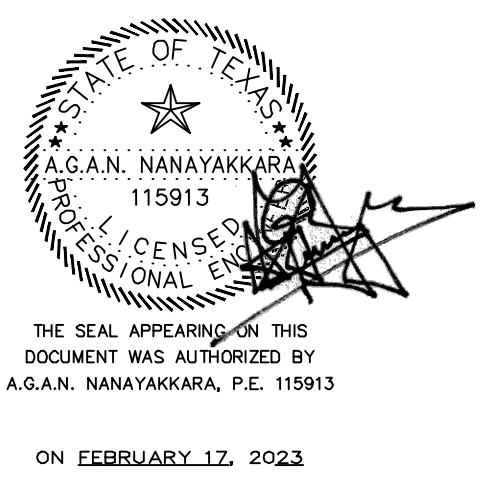
SECTION S-S
 N.T.S.

NOTES:
 ALL DRIVEWAYS TO REMAIN ACCESSIBLE AT ALL TIMES.
 CONTRACTOR MUST COORDINATE WITH PROPERTY OWNERS FOR ACCESS TO THEIR PROPERTY AT ALL TIMES.

POSTED SPEED LIMIT:
 SKINNER ROAD: 35 MPH
 JAMES LONG PRKWY 30 MPH



LEGEND	
	PHASE 01 WORK AREA
	TEMPORARY ASPHALT
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE

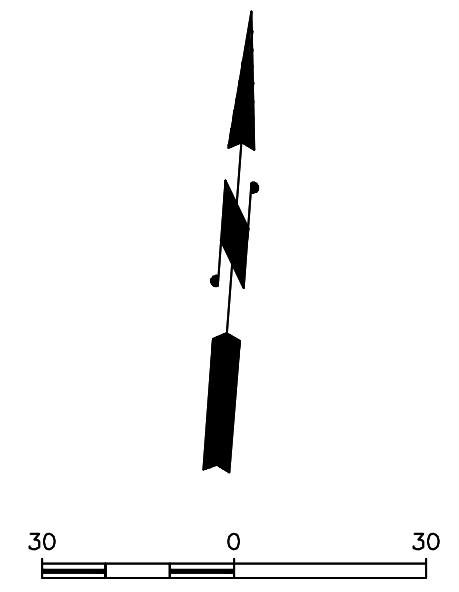
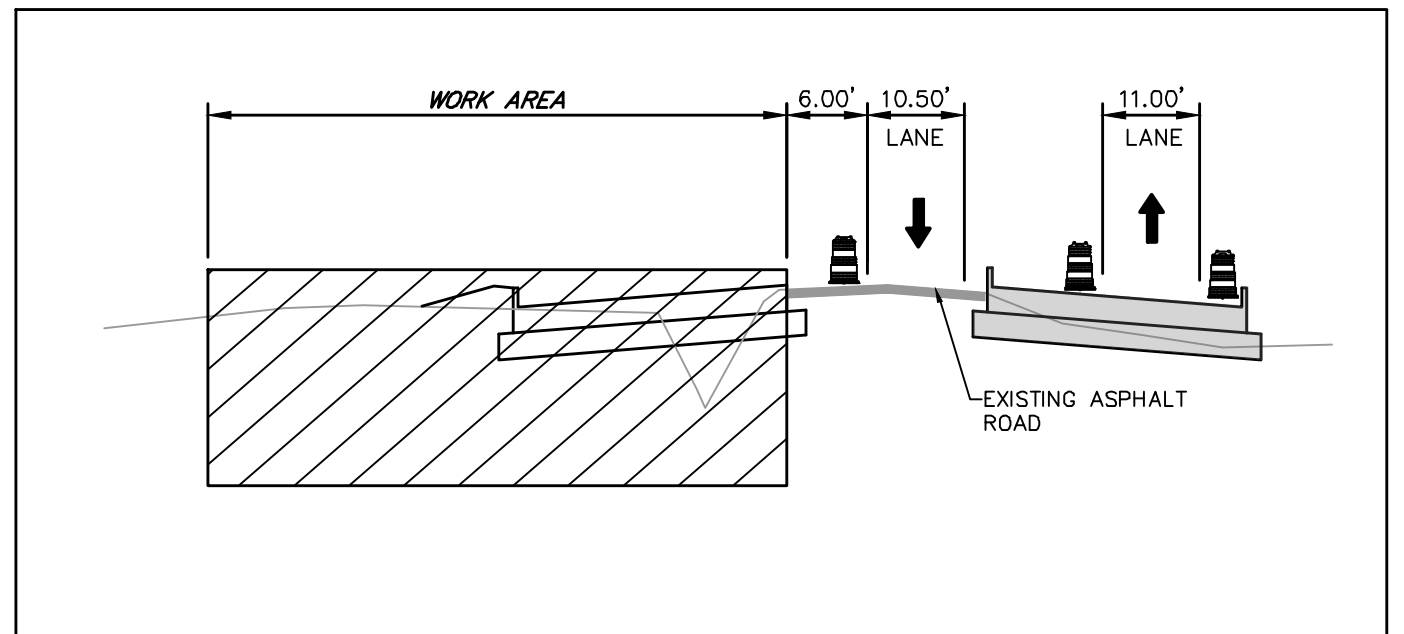
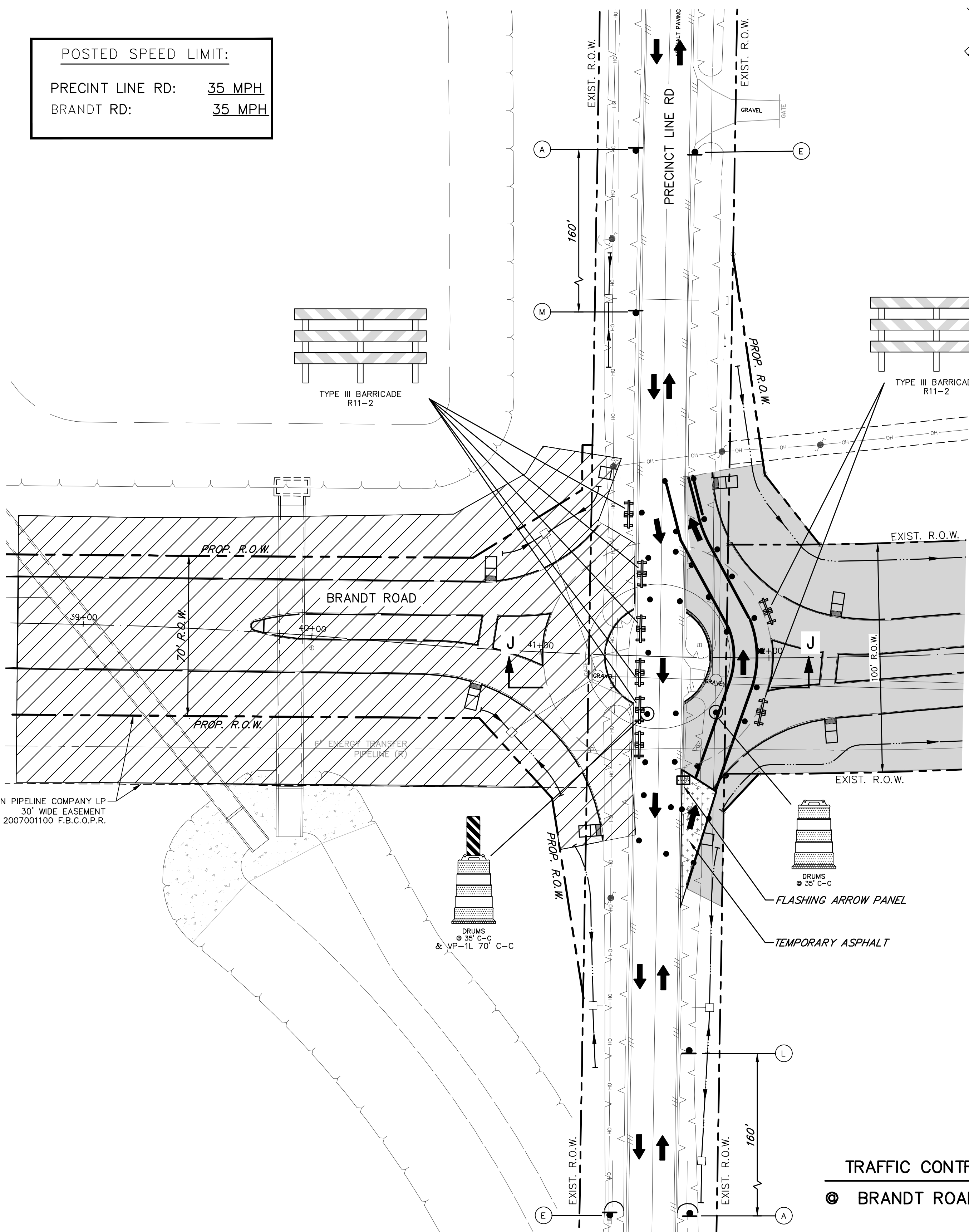


CW20-1D 48 X 48	W6-3 36 X 36	R1-2 36 X 36 X 36	R1-1 36 X 36	G20-2a 48 X 24	CW8-17 36 X 36	CW1-2R 36 X 36	CW1-2L 36 X 36	CW1-4L 36 X 36	CW1-4R 36 X 36	CW24-1R 36 X 36	CW24-1L 36 X 36	AHEAD RIGHT LANE CLOSED CW20-5R 48 X 48 PLAQUE 30 X 12	CW20-5R 48 X 48

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 1			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 30'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET TC06	

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POSTED SPEED LIMIT:
 PRECINCT LINE RD: 35 MPH
 BRANDT RD: 35 MPH



LEGEND	
	PHASE 02 WORK AREA
	TEMPORARY ASPHALT
	COMPLETED AREA
	LOW PROFILE CONCRETE BARRIER (LPCB)
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE

TRAFFIC CONTROL PLAN - PHASE 2
 © BRANDT ROAD AND PRECINCT LINE RD

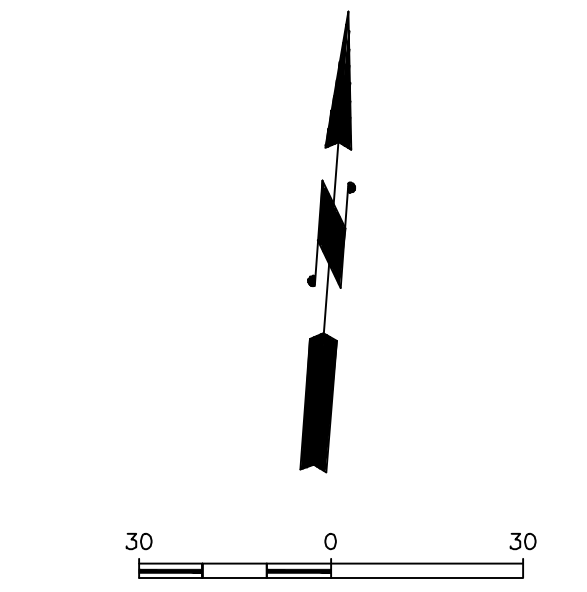
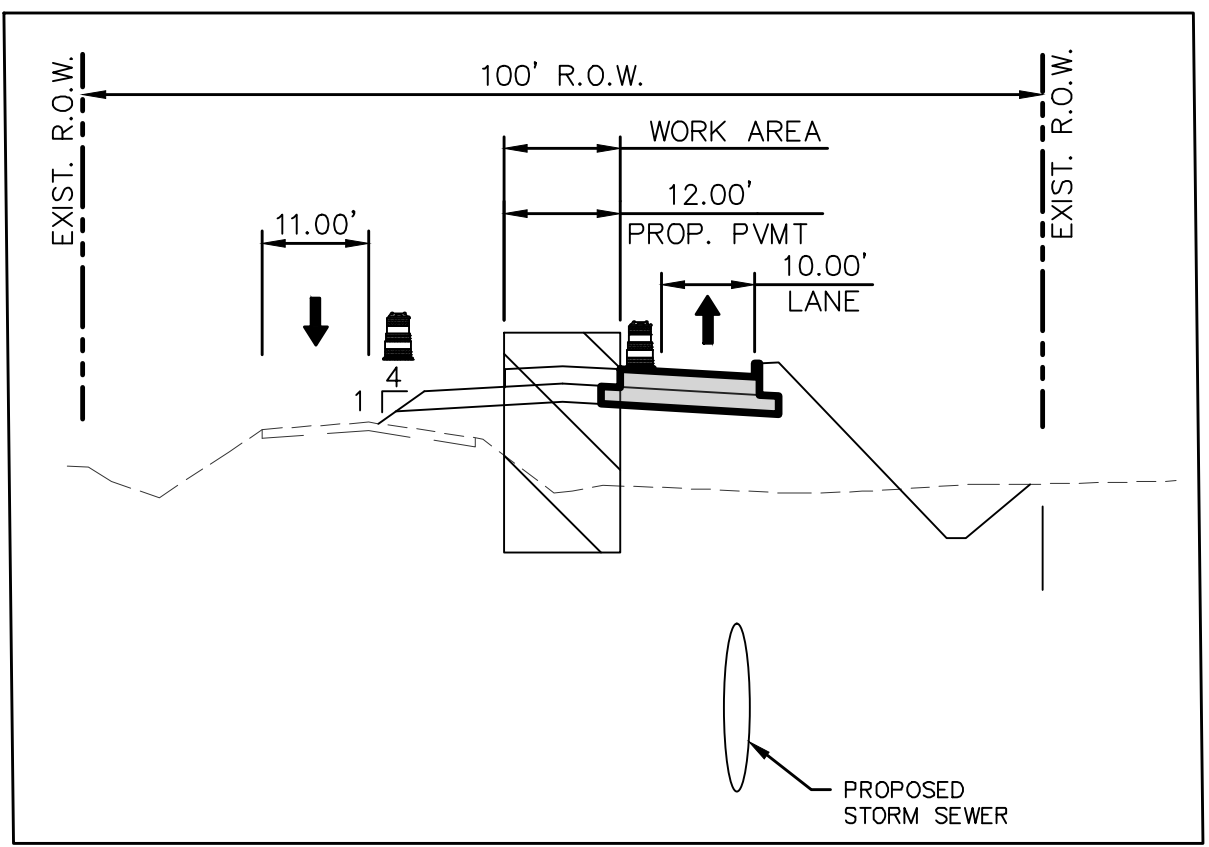
STATE OF TEXAS
 A.G.A.N. NANAYAKKARA
 115913
 LICENSED PROFESSIONAL ENGINEER
 THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913
 ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 2			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281)391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 30'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET TC07	

 CW20-1D 48 X 48	 W6-3 36 X 36	 R1-2 36 X 36 X 36	 R1-1 36 X 36	 G20-2a 48 X 24	 CW8-17 36 X 36	 CW1-2R 36 X 36	 CW1-2L 36 X 36	 CW1-4L 36 X 36	 CW1-4R 36 X 36	 CW24-1R 36 X 36	 CW24-1L 36 X 36	 RIGHT LANE CLOSED AHEAD CW20-5R 48 X 48 PLAQUE 30 X 12	 RIGHT LANE CLOSED CW20-5R 48 X 48
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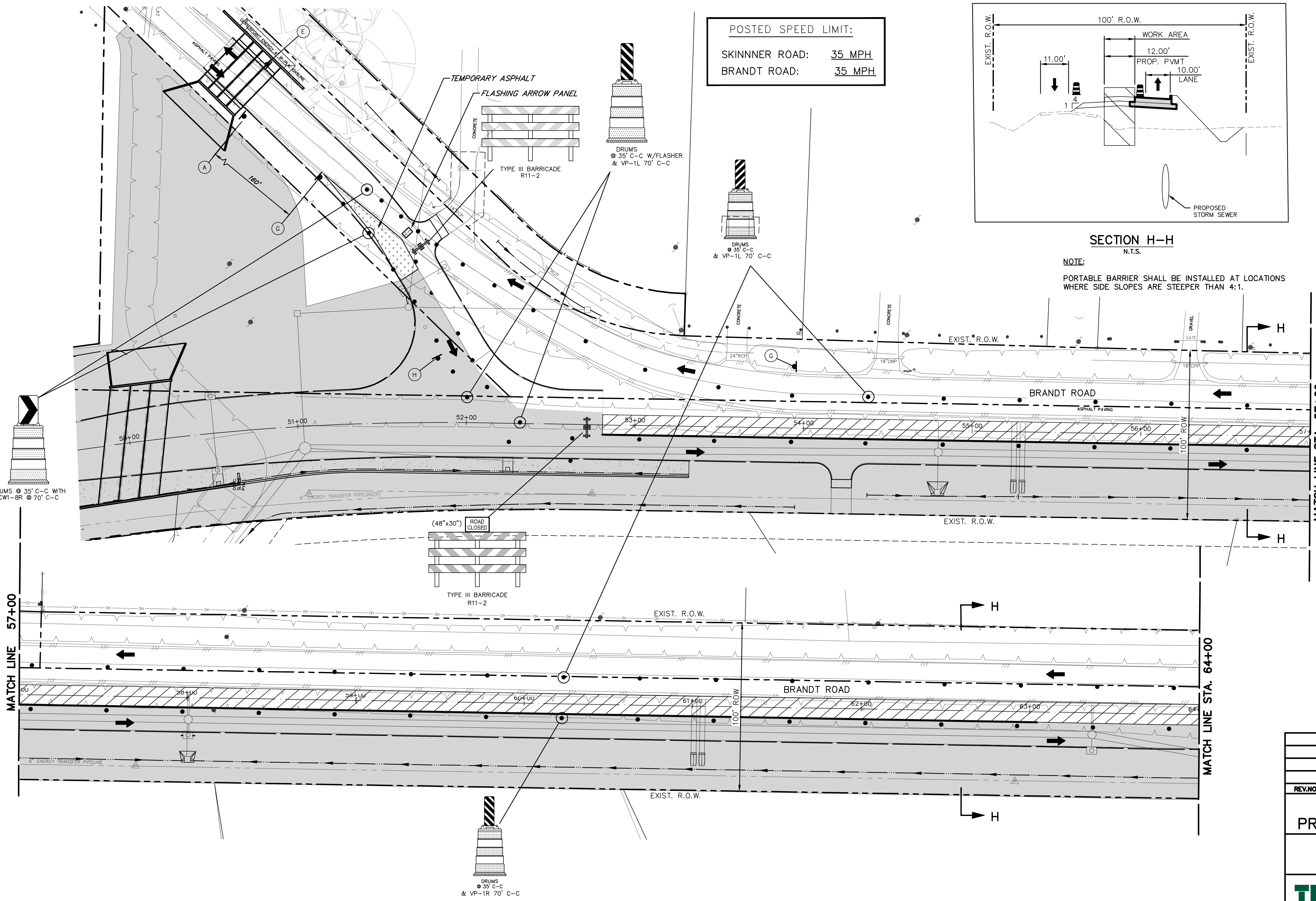
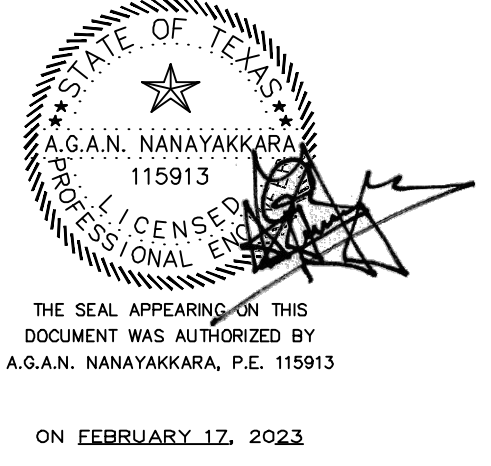
POSTED SPEED LIMIT:
 SKINNER ROAD: 35 MPH
 BRANDT ROAD: 35 MPH



LEGEND

	PHASE 02 WORK AREA
	TEMPORARY ASPHALT
	COMPLETED AREA
	LOW PROFILE CONCRETE BARRIER (LPCB)
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE

NOTES:
 ALL DRIVEWAYS TO REMAIN ACCESSIBLE AT ALL TIMES.
 CONTRACTOR MUST COORDINATE WITH PROPERTY OWNERS FOR ACCESS TO THEIR PROPERTY AT ALL TIMES.

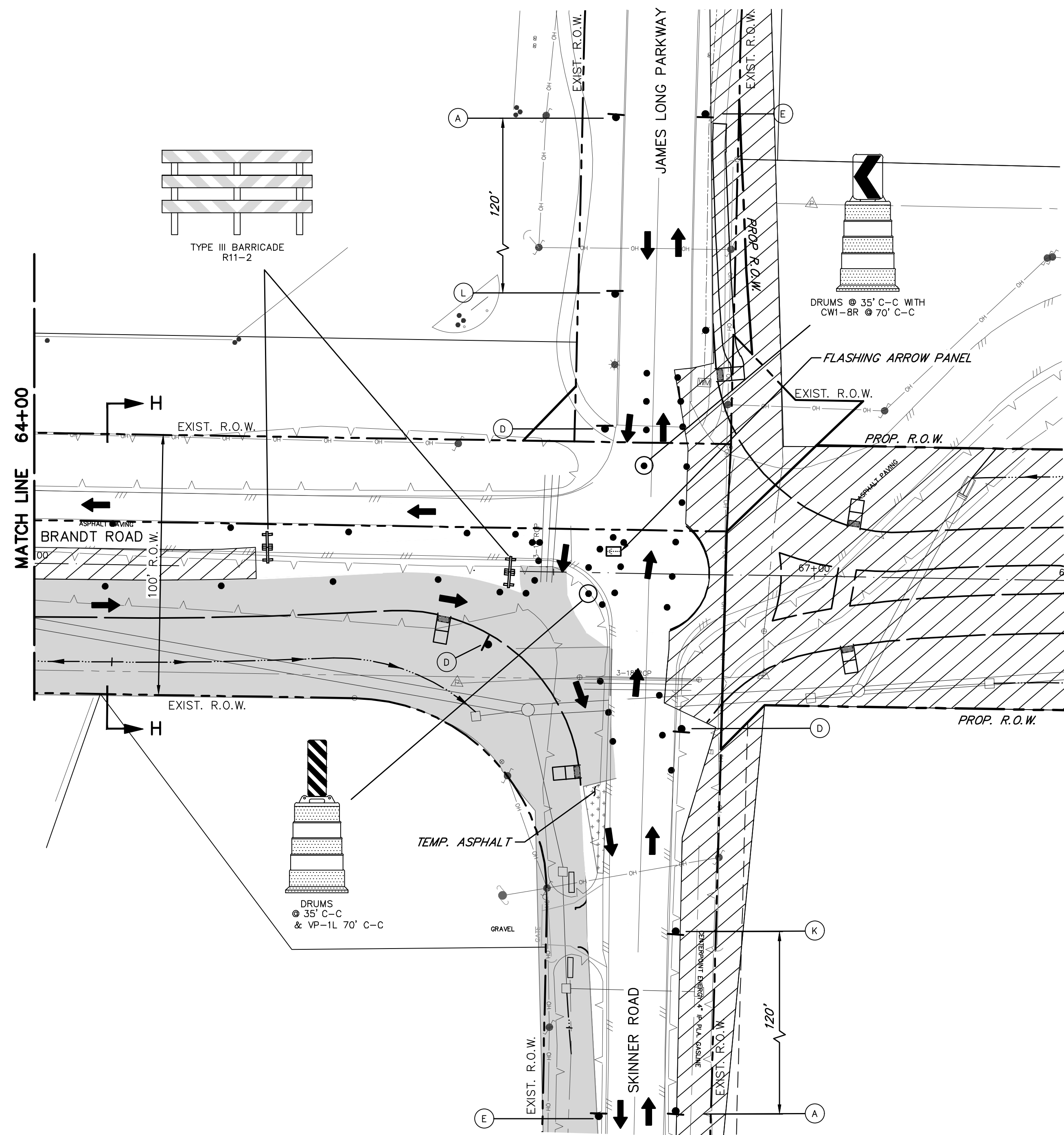


CW20-1D 48 X 48	W6-3 36 X 36	R1-2 36 X 36 X 36	R1-1 36 X 36	G20-2a 48 X 24	CW8-17 36 X 36	CW1-2R 36 X 36	CW1-2L 36 X 36	CW1-4L 36 X 36	CW1-4R 36 X 36	CW24-1R 36 X 36	CW24-1L 36 X 36	AHEAD RIGHT LANE CLOSED CW20-5R 48 X 48 PLAQUE 30 X 12	CW20-5R 48 X 48

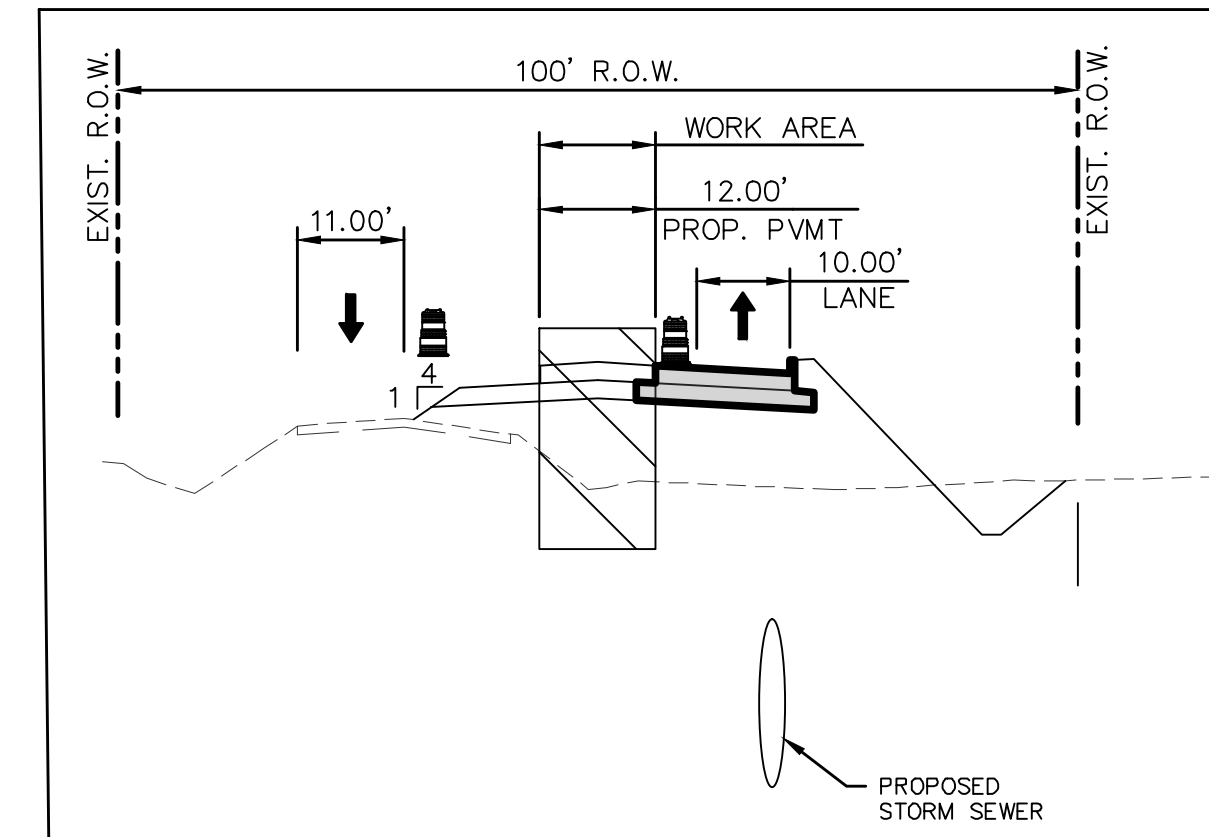
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 2			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: 1" = 30'	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET TC08

722 PIN OAK ROAD, STE 202A
 KATY, TEXAS 77494
 TELEPHONE: (281)391-3366
 FAX: (281) 391-3375
 WWW.JNSCE.COM
 T.S.P.E. FIRM
 REGISTRATION NO. 11653

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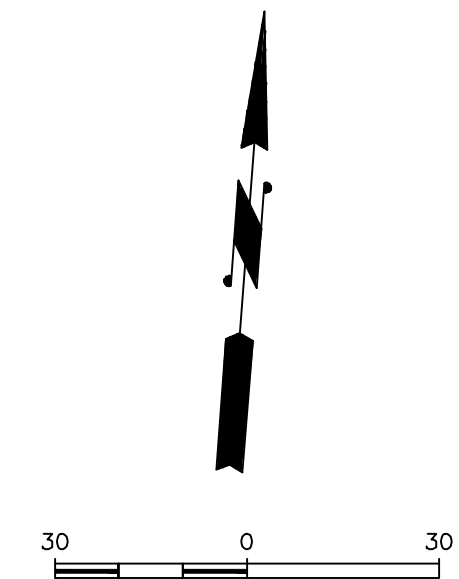
TRAFFIC CONTROL PLAN PHASE 2
 © BRANDT ROAD AND SKINNER ROAD



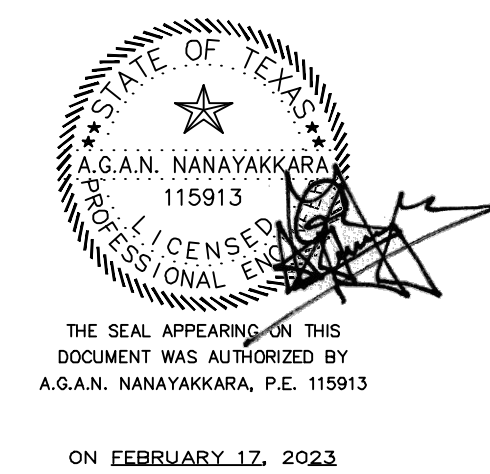
SECTION H-H
 N.T.S.

NOTE:
 PORTABLE BARRIER SHALL BE INSTALLED AT LOCATIONS WHERE SIDE SLOPES ARE STEEPER THAN 4:1.

POSTED SPEED LIMIT:
 SKINNER ROAD: 35 MPH
 JAMES LONG PKWY: 30 MPH



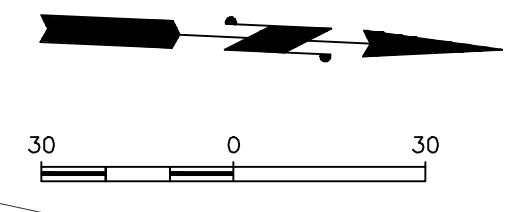
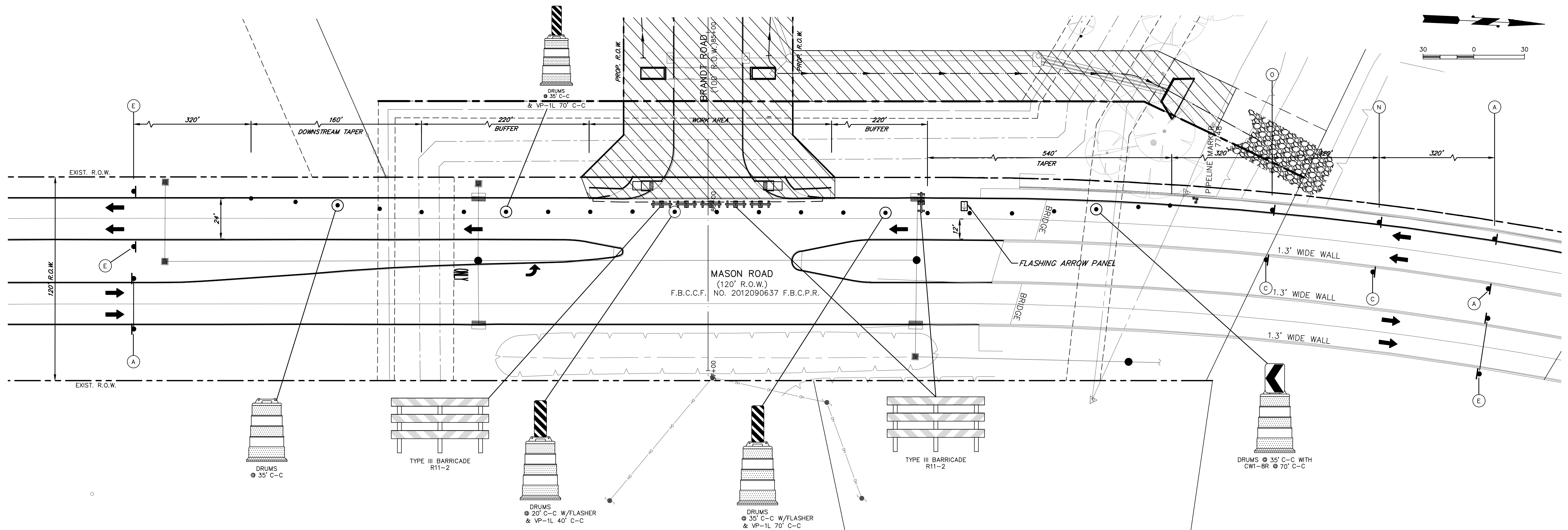
LEGEND	
	PHASE 02 WORK AREA
	TEMPORARY ASPHALT
	COMPLETED AREA
	LOW PROFILE CONCRETE BARRIER (LPCB)
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE



REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 2			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.		SCALE: 1" = 30'	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	CONTRACT: 1
SHEET TC09			

CW20-1D 48 X 48	W6-3 36 X 36	R1-2 36 X 36 X 36	R1-1 36 X 36	G20-2a 48 X 24	CW8-17 36 X 36	CW1-2R 36 X 36	CW1-2L 36 X 36	CW1-4L 36 X 36	CW1-4R 36 X 36	CW24-1R 36 X 36	CW24-1L 36 X 36	AHEAD CW20-5R 48 X 48 PLAQUE 30 X 12	CW20-5R 48 X 48

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POSTED SPEED LIMIT:
MASON ROAD: 45 MPH

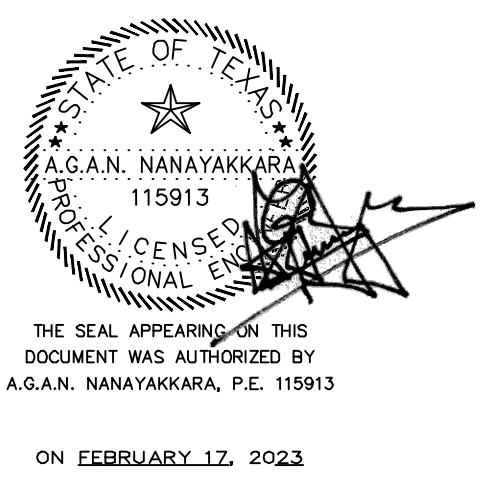
NOTES:
ALL DRIVEWAYS TO REMAIN ACCESSIBLE AT ALL TIMES.
CONTRACTOR MUST COORDINATE WITH PROPERTY OWNERS FOR ACCESS TO THEIR PROPERTY AT ALL TIMES.

- TRAFFIC NOTES:**
- ALL CONSTRUCTION SIGNS AND BARRICADES SHALL CONFORM TO THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST REVISION AND FORT BEND COUNTY STANDARD DETAILS.
 - ALL PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH FORT BEND COUNTY STANDARD DETAILS AND SPECIFICATIONS.
 - CONTRACTOR TO COORDINATE WITH FORT BEND COUNTY TO DETERMINE HOURS OF CONSTRUCTION. LANE CLOSURE SHOULD BE LIMITED TO OFF-PEAK HOURS ONLY. NO LANE CLOSURE DURING 7:00-9:00 AM OR 4:00-6:30 PM.

TRAFFIC CONTROL PLAN PHASE 2
BRANDT ROAD AND MASON ROAD

LEGEND	
	PHASE 02 WORK AREA
	TEMPORARY ASPHALT
	COMPLETED AREA
	LOW PROFILE CONCRETE BARRIER (LPCB)
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE

- SPACING FOR CHANNELIZING DEVICES**
- Plastic drums on merging taper @ 30' c-c with chevron sign @ 60' c-c and type 'C' warning light (for overnight closure)
 - Plastic drums on downstream taper @ 35' c-c
 - Plastic drums on radii @ 5' c-c
 - Plastic drums on tangent @ 35' c-c with vertical panel @ 70' c-c and type 'C' warning light @ 70' c-c (for overnight closure)
 - Plastic drums in front of construction zone @ 20' c-c with vertical panel @ 40' c-c and Type 'A' warning light @ 40' c-c (for overnight closure)
 - Concrete traffic barrier (CTB) or low profile concrete traffic barrier (lpctb) with reflectors @ 10' c-c if pavement drop is more than twelve inches (12") or plastic drums with guardrail mounted.
 - Tubular marker @ 20' C-C.
- Note: Spacing shown on traffic control plans shall supersede the above spacings. Spacings may be adjusted to provide driveways, intersections, and median openings.

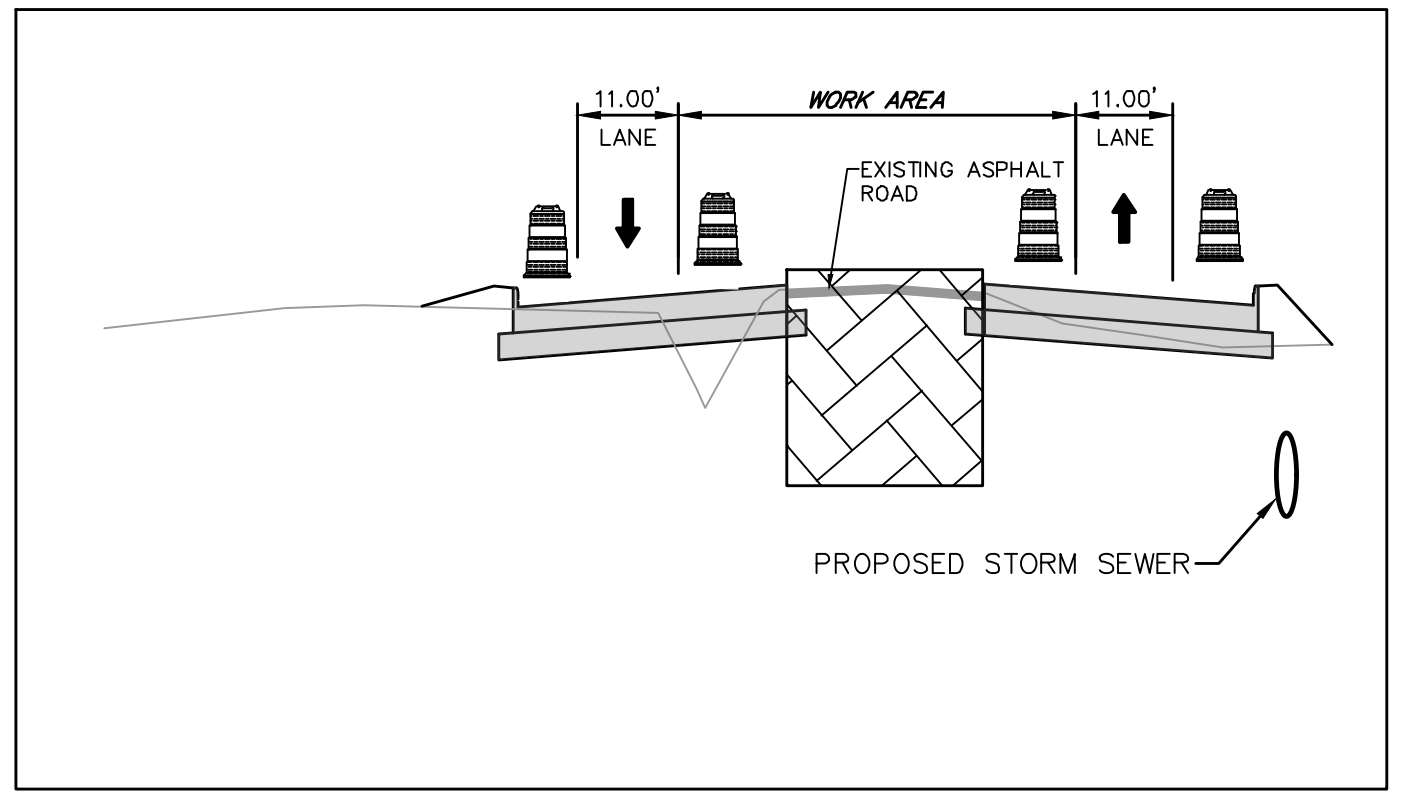
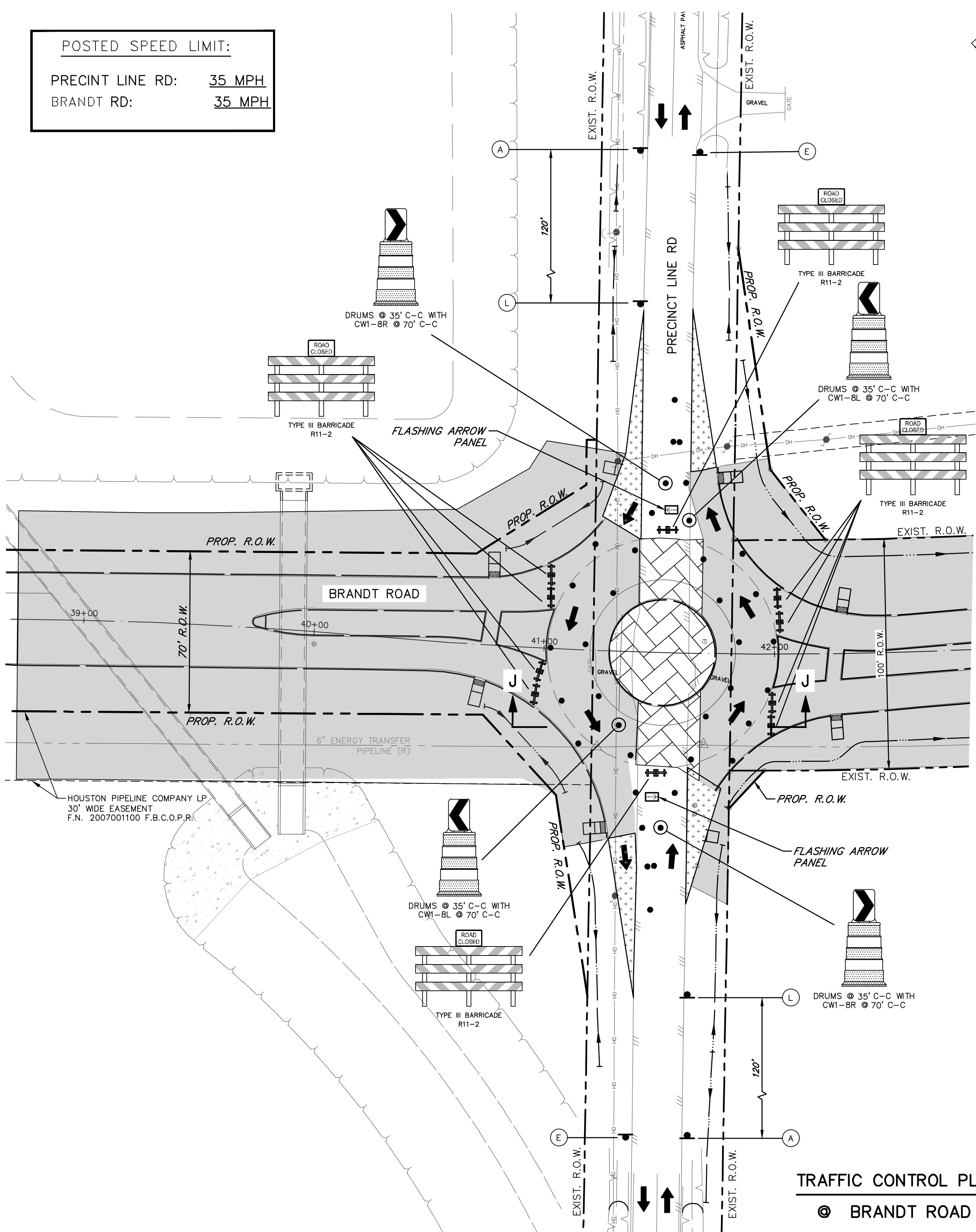


CW20-1D 48 X 48	W6-3 36 X 36	R1-2 36 X 36 X 36	R1-1 36 X 36	G20-2a 48 X 24	CW8-17 36 X 36	CW1-2R 36 X 36	CW1-2L 36 X 36	CW1-4L 36 X 36	CW1-4R 36 X 36	CW24-1R 36 X 36	CW24-1L 36 X 36	AHEAD CW20-5R 48 X 48 PLAQUE 30 X 12	CW20-5R 48 X 48

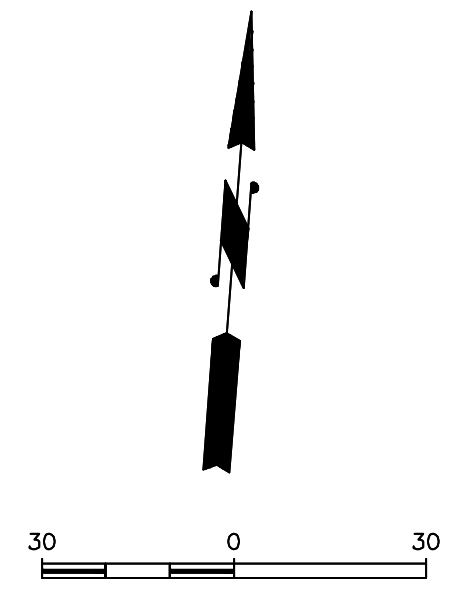
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 2			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281)391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 30'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET TC10	

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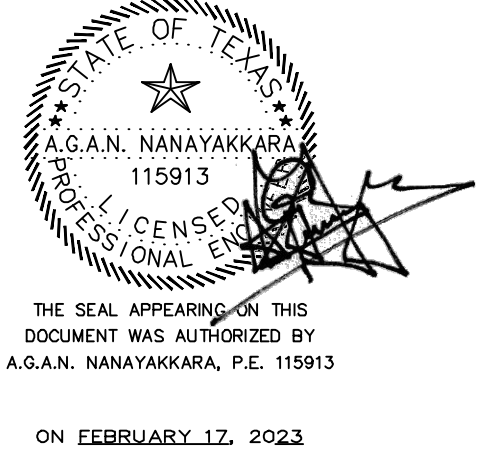
POSTED SPEED LIMIT:
 PRECINCT LINE RD: 35 MPH
 BRANDT RD: 35 MPH



NOTES:
 ALL DRIVEWAYS TO REMAIN ACCESSIBLE AT ALL TIMES.
 CONTRACTOR MUST COORDINATE WITH PROPERTY OWNERS FOR ACCESS TO THEIR PROPERTY AT ALL TIMES.



LEGEND	
	PHASE 03 WORK AREA
	TEMPORARY ASPHALT
	COMPLETED AREA
	LOW PROFILE CONCRETE BARRIER (LPCB)
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE



TRAFFIC CONTROL PLAN - PHASE 3 - STEP 1
 © BRANDT ROAD AND PRECINCT LINE RD

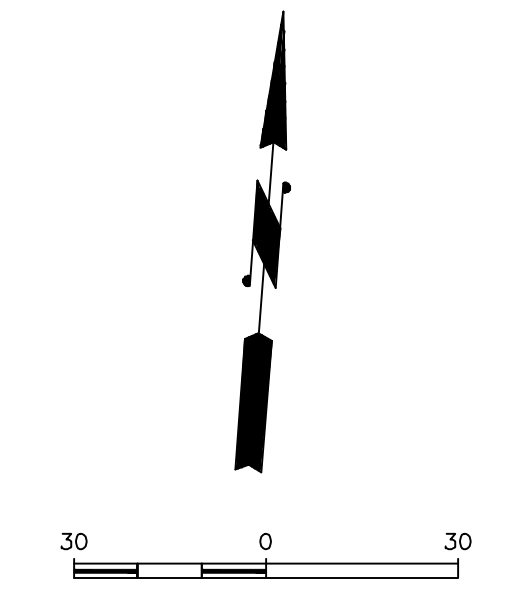
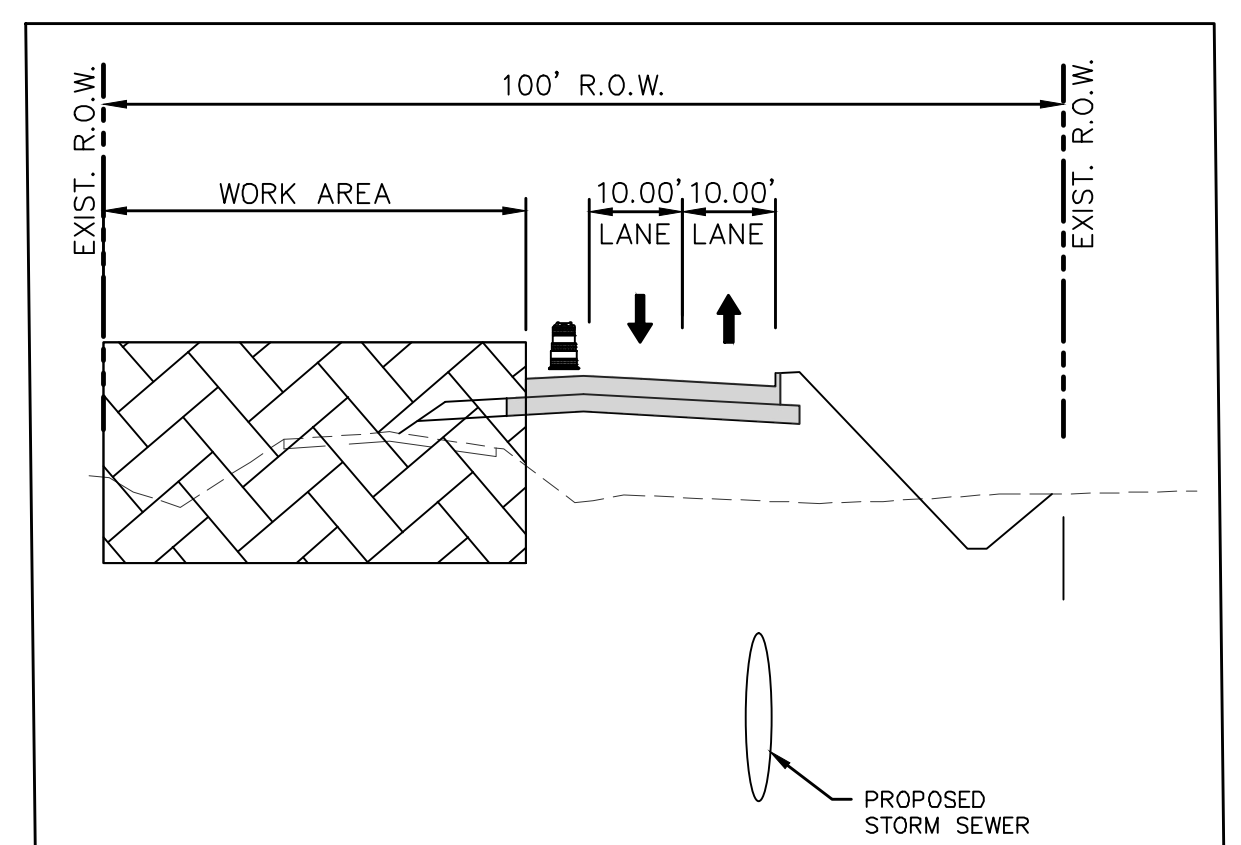
CW20-1D 48 X 48	W6-3 36 X 36	R1-2 36 X 36 X 36	R1-1 36 X 36	G20-2a 48 X 24	CW8-17 36 X 36	CW1-2R 36 X 36	CW1-2L 36 X 36	CW1-4L 36 X 36	CW1-4R 36 X 36	CW24-1R 36 X 36	CW24-1L 36 X 36	AHEAD CW20-5R 48 X 48 PLAQUE 30 X 12	CW20-5R 48 X 48

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 3 - STEP 1			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: 1" = 30'	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET TC11

722 PIN OAK ROAD, STE 202A
 KATY, TEXAS 77494
 TELEPHONE: (281) 391-3366
 FAX: (281) 391-3375
 WWW.JNSCE.COM
 T.S.P.E. FIRM
 REGISTRATION NO. 11653

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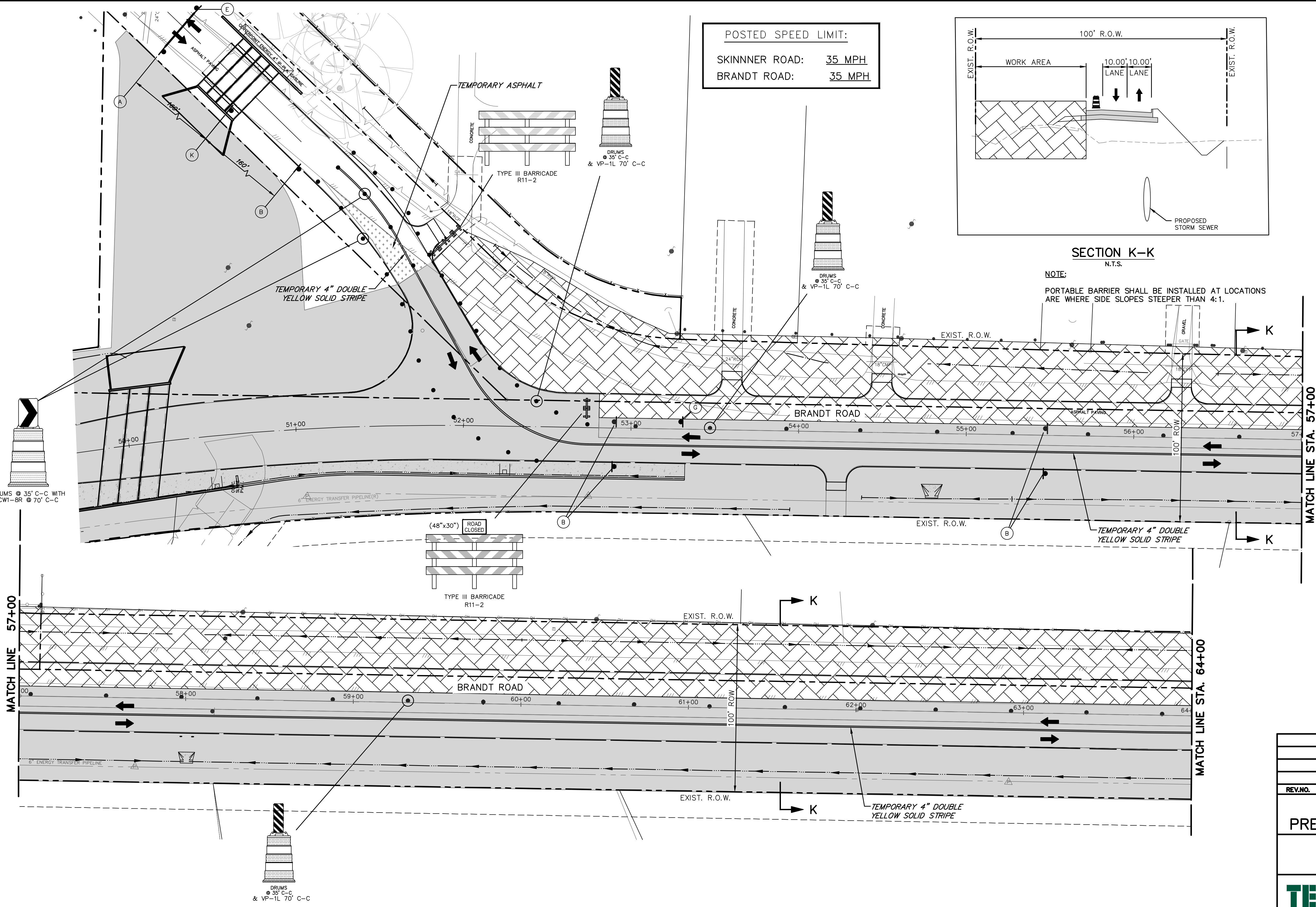
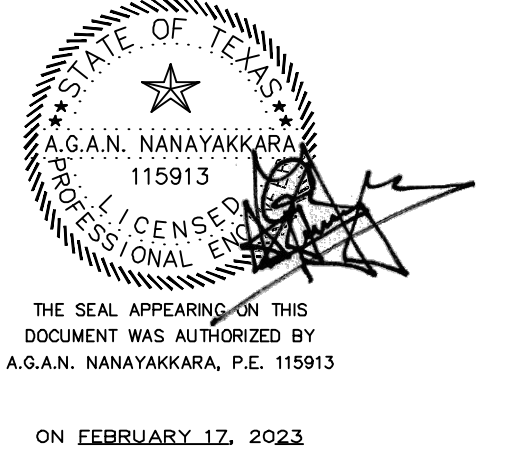
POSTED SPEED LIMIT:
 SKINNER ROAD: 35 MPH
 BRANDT ROAD: 35 MPH



LEGEND

	PHASE 03 WORK AREA
	TEMPORARY ASPHALT
	COMPLETED AREA
	LOW PROFILE CONCRETE BARRIER (LPCB)
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE

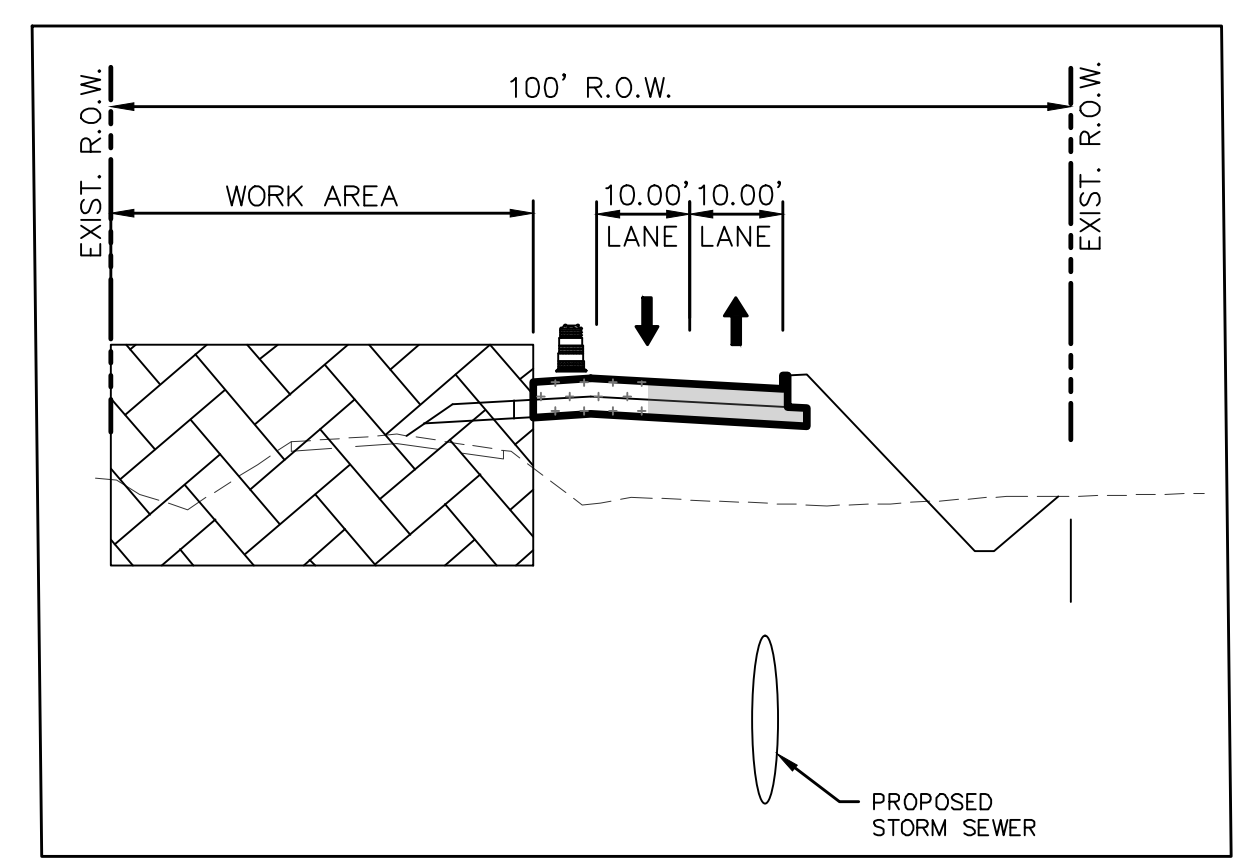
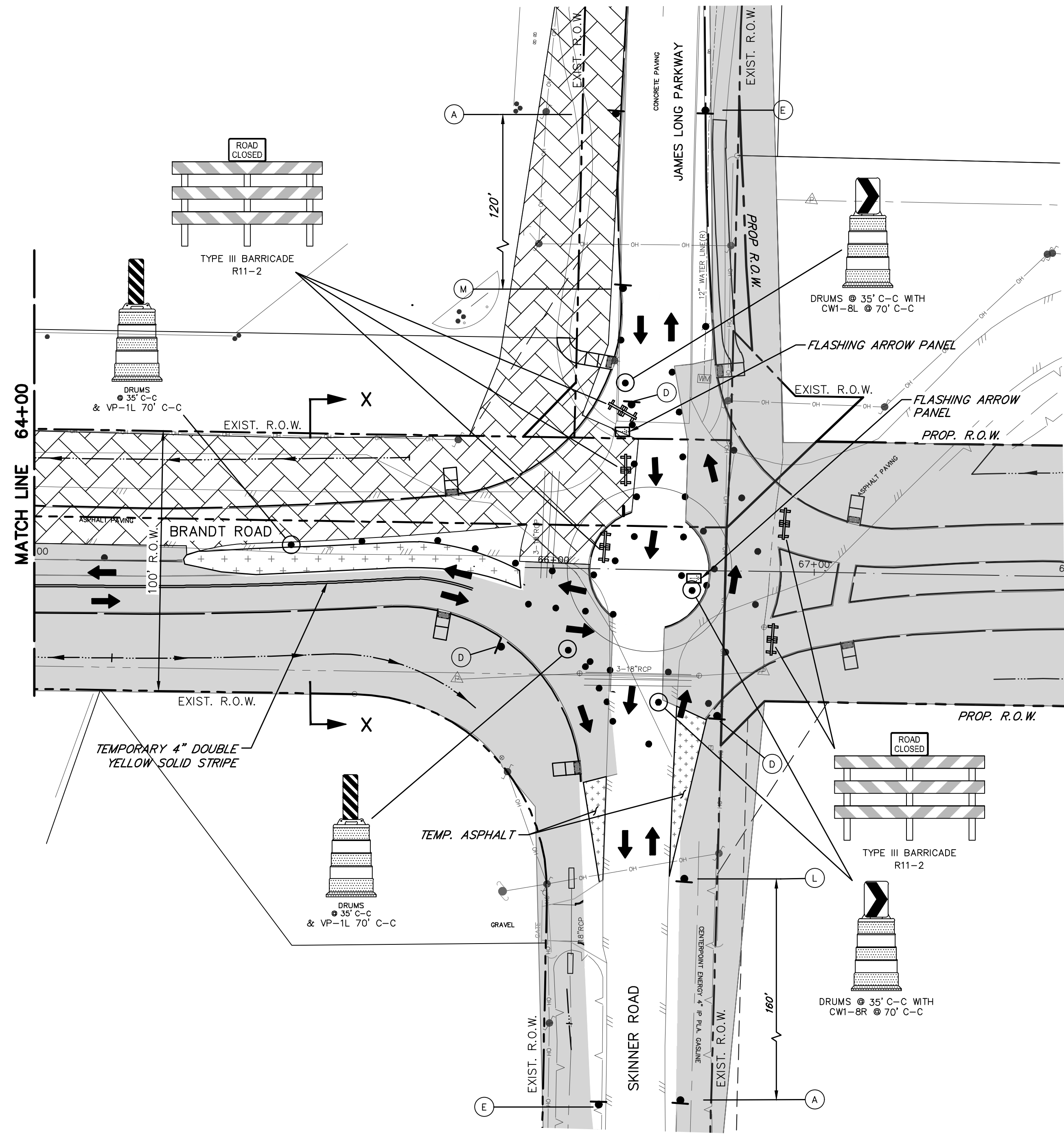
NOTES:
 ALL DRIVEWAYS TO REMAIN ACCESSIBLE AT ALL TIMES.
 CONTRACTOR MUST COORDINATE WITH PROPERTY OWNERS FOR ACCESS TO THEIR PROPERTY AT ALL TIMES.



CW20-1D 48 X 48	W6-3 36 X 36	R1-2 36 X 36 X 36	R1-1 36 X 36	G20-2a 48 X 24	CW8-17 36 X 36	CW1-2R 36 X 36	CW1-2L 36 X 36	CW1-4L 36 X 36	CW1-4R 36 X 36	CW24-1R 36 X 36	CW24-1L 36 X 36	AHEAD CW20-5R 48 X 48 PLAQUE 30 X 12	CW20-5R 48 X 48

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 3 - STEP 1			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC		JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 30'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET TC12	

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POSTED SPEED LIMIT:
 SKINNER ROAD: 35 MPH
 JAMES LONG PKWY: 30 MPH

LEGEND	
	PHASE 03 WORK AREA
	TEMPORARY ASPHALT
	COMPLETED AREA
	LOW PROFILE CONCRETE BARRIER (LPCB)
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE

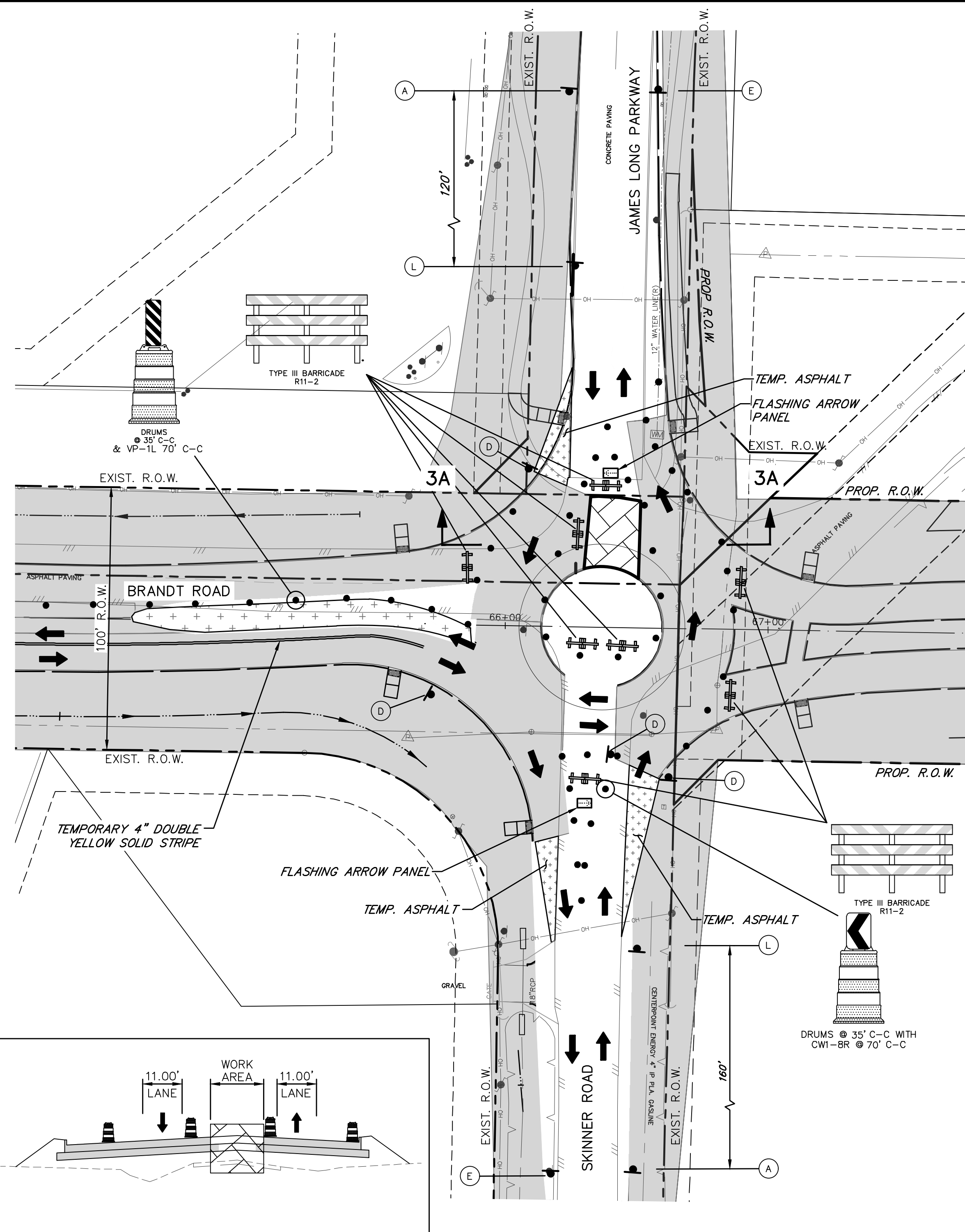
TRAFFIC CONTROL PLAN PHASE 3 - STEP 1
 @ BRANDT ROAD AND SKINNER ROAD
 JAMES LONG PARKWAY

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913
 ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 3 - STEP 1			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.		SCALE: 1" = 30'	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	CONTRACT: 1
			SHEET TC13

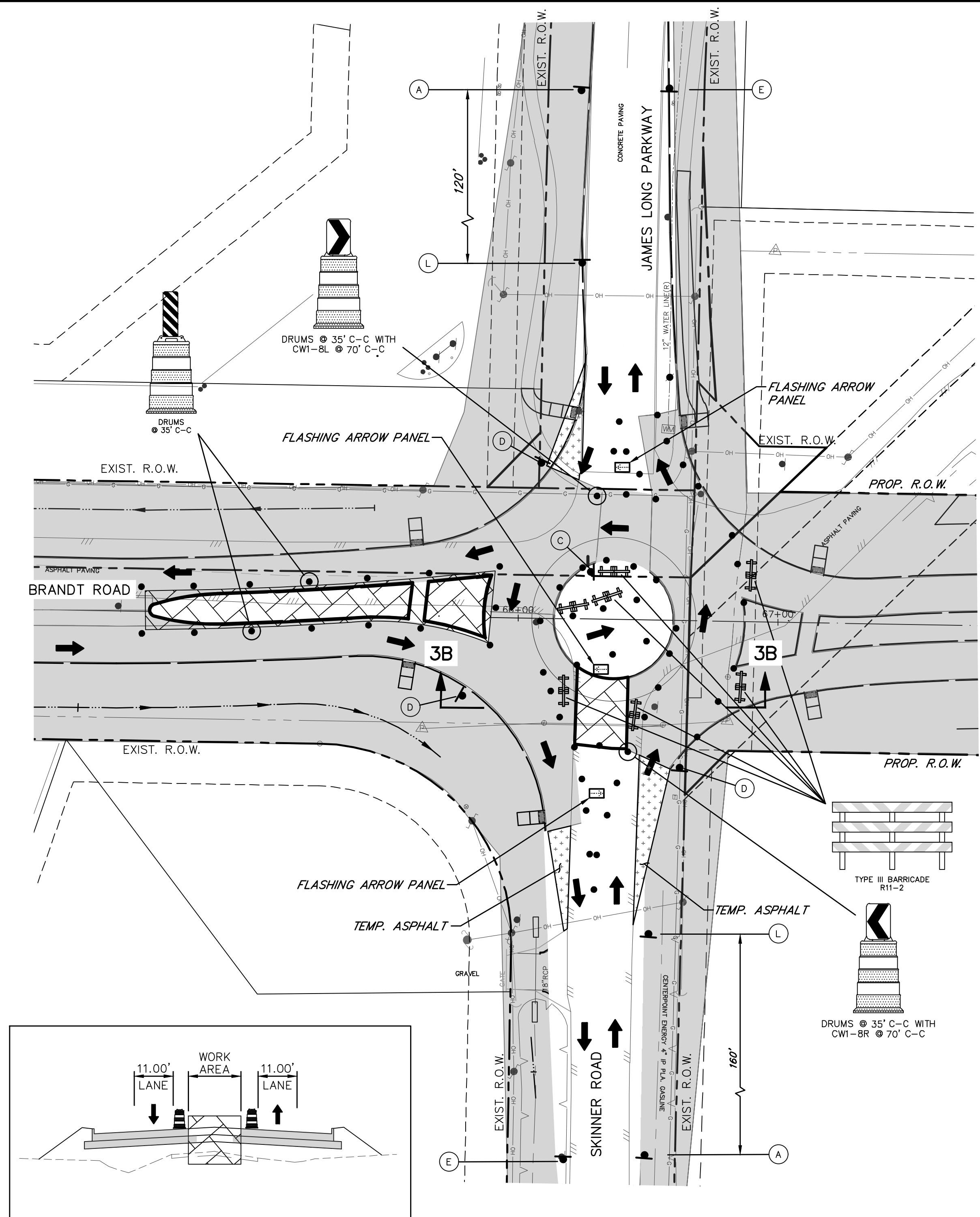
 CW20-1D 48 X 48	 W6-3 36 X 36	 R1-2 36 X 36 X 36	 R1-1 36 X 36	 G20-2a 48 X 24	 CW8-17 36 X 36	 CW1-2R 36 X 36	 CW1-2L 36 X 36	 CW1-4L 36 X 36	 CW1-4R 36 X 36	 CW24-1R 36 X 36	 CW24-1L 36 X 36	 AHEAD CW20-5R 48 X 48 PLAQUE 30 X 12	 CW20-5R 48 X 48
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F:\Clients\0522-Fort Bend County Engineering\0522-1801-Brandt Road\Drawings\Seg 2\TC11 TRAFFIC CONTROL PLAN PHASE 3.dwg Feb 17, 2023-10:55am Terra Associates Inc., Thanh Dao



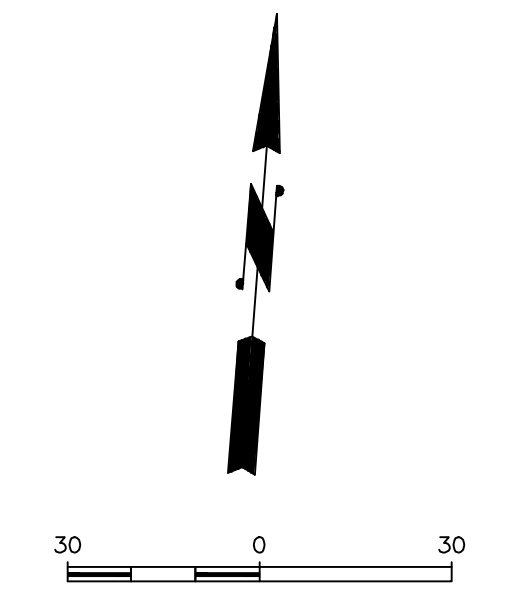
SECTION 3A-3A
N.T.S.

TRAFFIC CONTROL PLAN PHASE 3 - STEP 2
Ⓞ BRANDT ROAD AND SKINNER ROAD/JAMES LONG PARKWAY



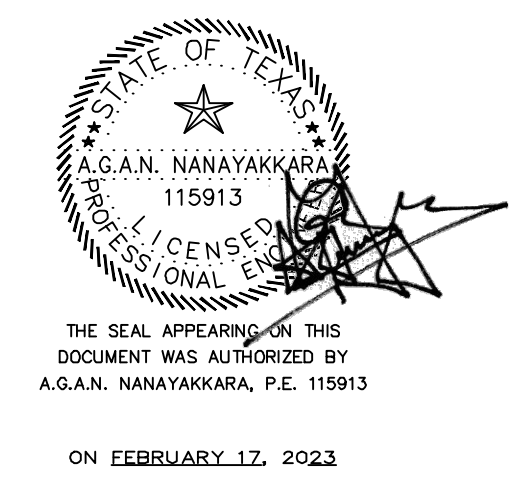
SECTION 3B-3B
N.T.S.

TRAFFIC CONTROL PLAN PHASE 3 - STEP 3
Ⓞ BRANDT ROAD AND SKINNER ROAD/JAMES LONG PARKWAY



LEGEND	
	PHASE 03 WORK AREA
	TEMPORARY ASPHALT
	COMPLETED AREA
	LOW PROFILE CONCRETE BARRIER (LPCB)
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE

POSTED SPEED LIMIT:	
SKINNER ROAD:	35 MPH
JAMES LONG PKWY:	30 MPH



REV. NO.	DESCRIPTION	DATE	APP.

BRANDT ROAD
PRECINCT LINE RD TO MASON RD
TRAFFIC CONTROL PLAN PHASE 3
STEP 2 & 3

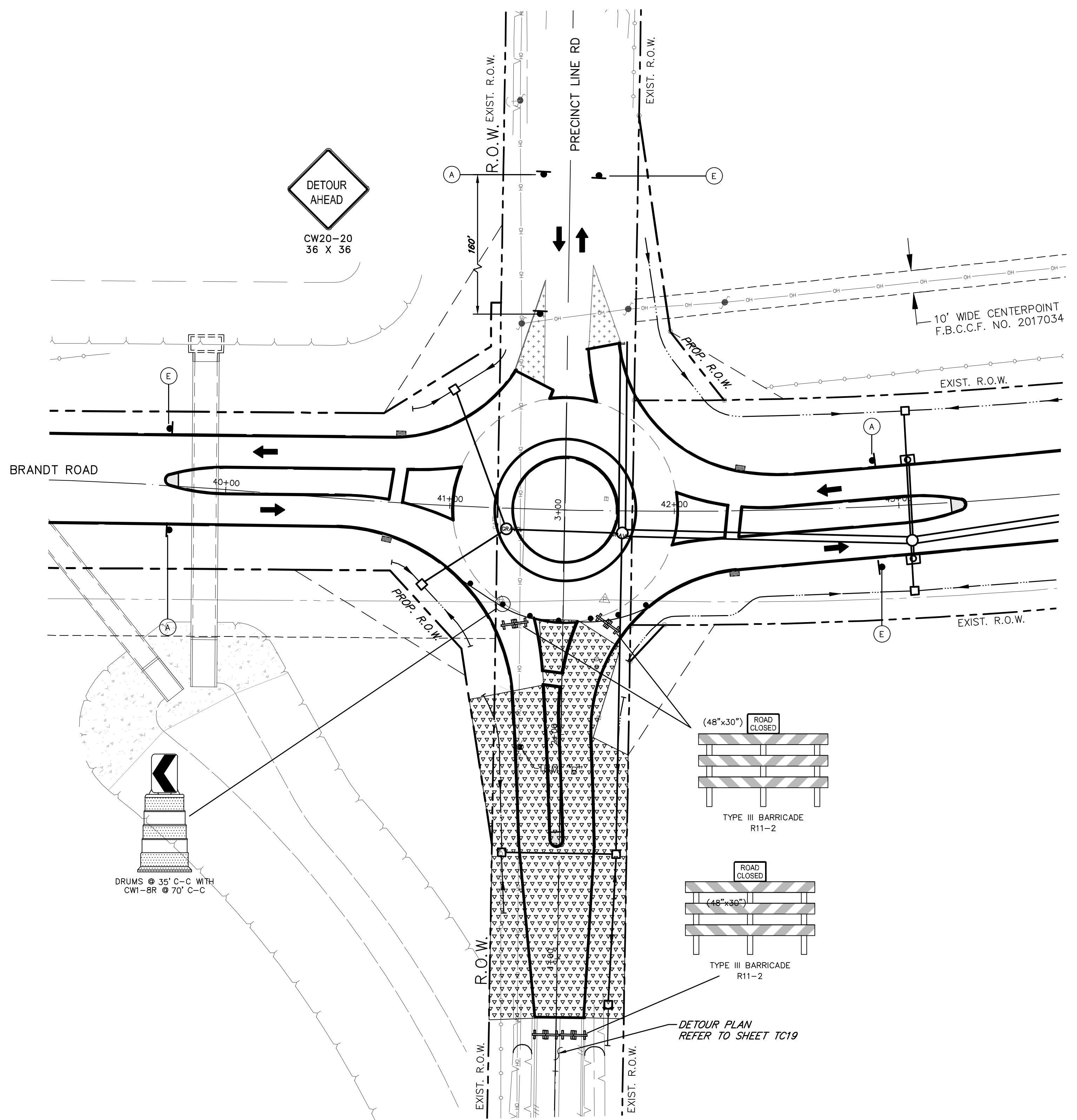
TERRA a Bowman company
1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

JNS ENGINEERS, LLC
722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.S.P.E. FIRM
REGISTRATION NO. 11653

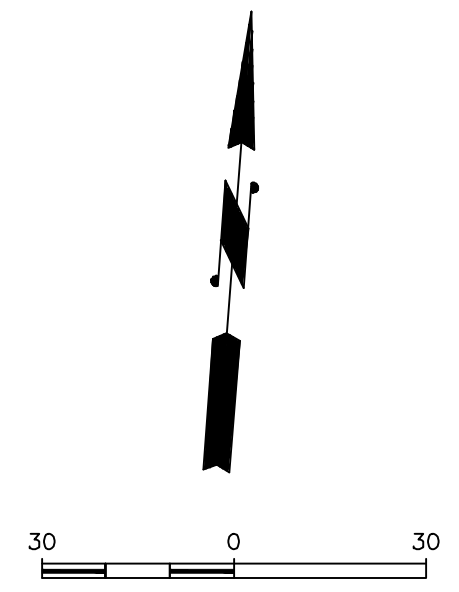
DRAWN BY: T.D.	SCALE: 1" = 30'	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1
		SHEET TC14

CW20-1D 48 X 48	W6-3 36 X 36	R1-2 36 X 36 X 36	R1-1 36 X 36	G20-2a 48 X 24	CW8-17 36 X 36	CW1-2R 36 X 36	CW1-2L 36 X 36	CW1-4L 36 X 36	CW1-4R 36 X 36	CW24-1R 36 X 36	CW24-1L 36 X 36	AHEAD CW20-5R 48 X 48 PLAQUE 30 X 12 CW20-5R 48 X 48

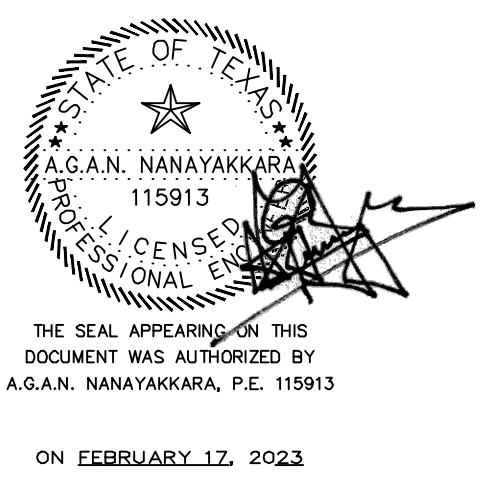
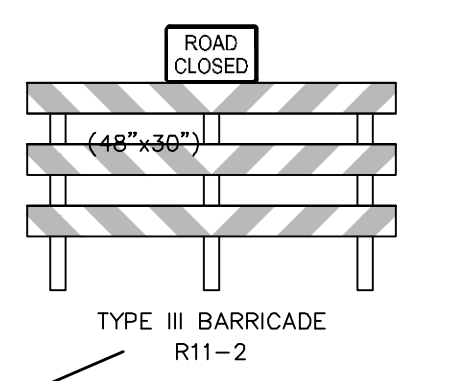
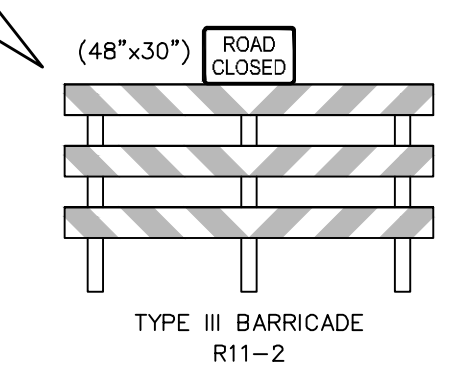
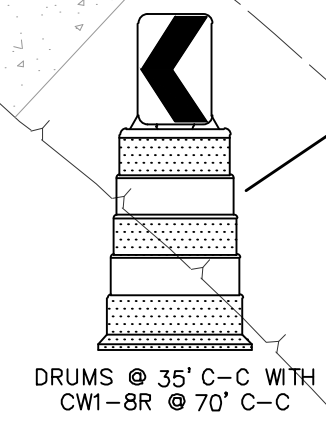
F:\Clients\0522-Fort Bend County Engineering\0522-1801-Brandt Road\Drawings\Seg 2\TC15 TRAFFIC CONTROL PLAN PHASE 4 - STEP 1.dwg Feb 17, 2023-10:55am Terra Associates Inc., Thanh Dao



POSTED SPEED LIMIT:
 PRECINCT LINE RD: 35 MPH
 BRANDT RD: 35 MPH



LEGEND	
	PHASE 04 WORK AREA
	TEMPORARY ASPHALT
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE

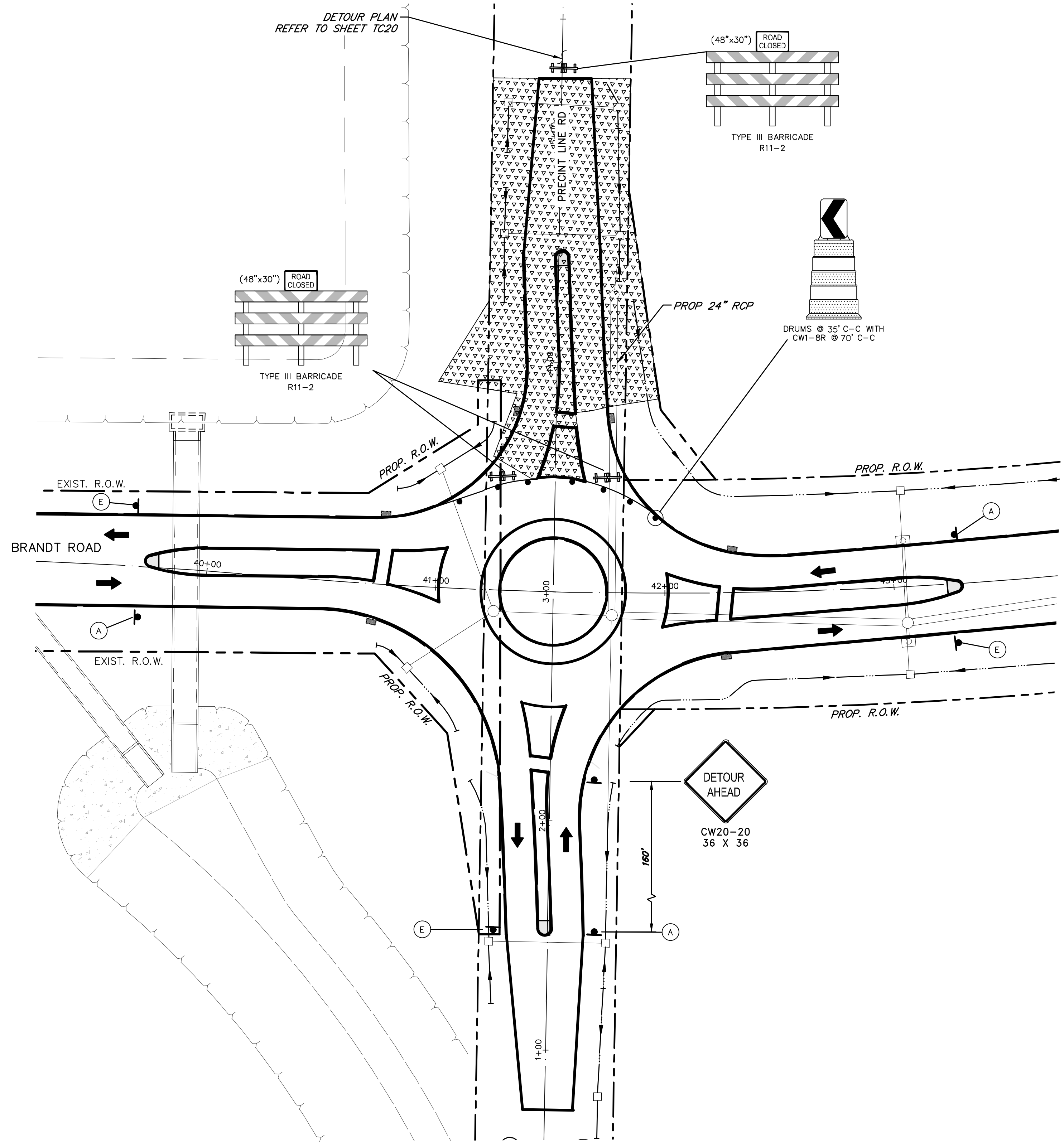


TRAFFIC CONTROL PLAN PHASE 4 - STEP 1
 © BRANDT ROAD AND PRECINCT LINE RD

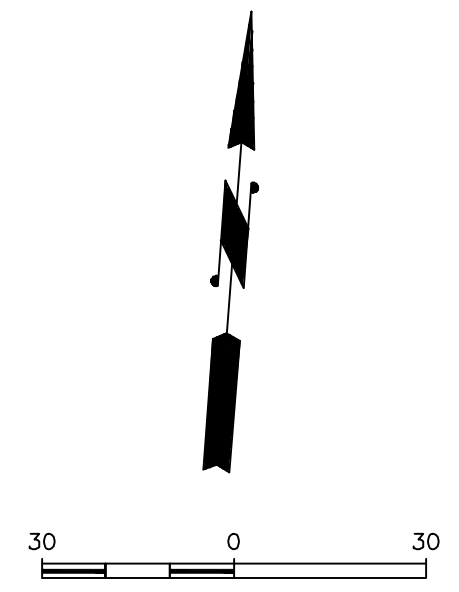
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 4 - STEP 1			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 30'	PROJECT No. 0522-1801	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1	
		SHEET TC15	

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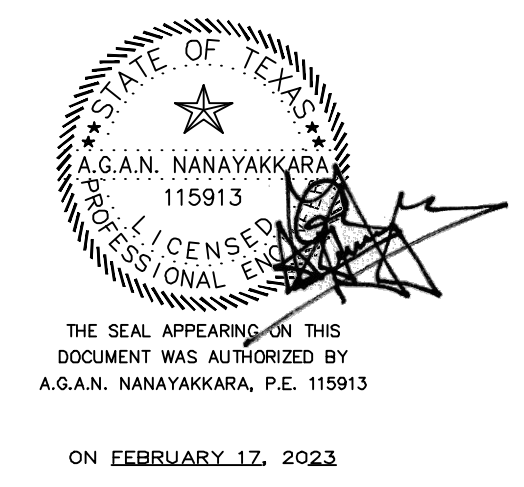
F:\Clients\0522-Fort Bend County Engineering\0522-1801-Brandt Road\Drawings\Seg 2\TC16 TRAFFIC CONTROL PLAN PHASE 4 - STEP 2.dwg Feb 17, 2023-10:55am Terra Associates Inc., Thanh Dao



POSTED SPEED LIMIT:
 PRECINCT LINE RD: 35 MPH
 BRANDT RD: 35 MPH



LEGEND	
	PHASE 04 WORK AREA
	TEMPORARY ASPHALT
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE

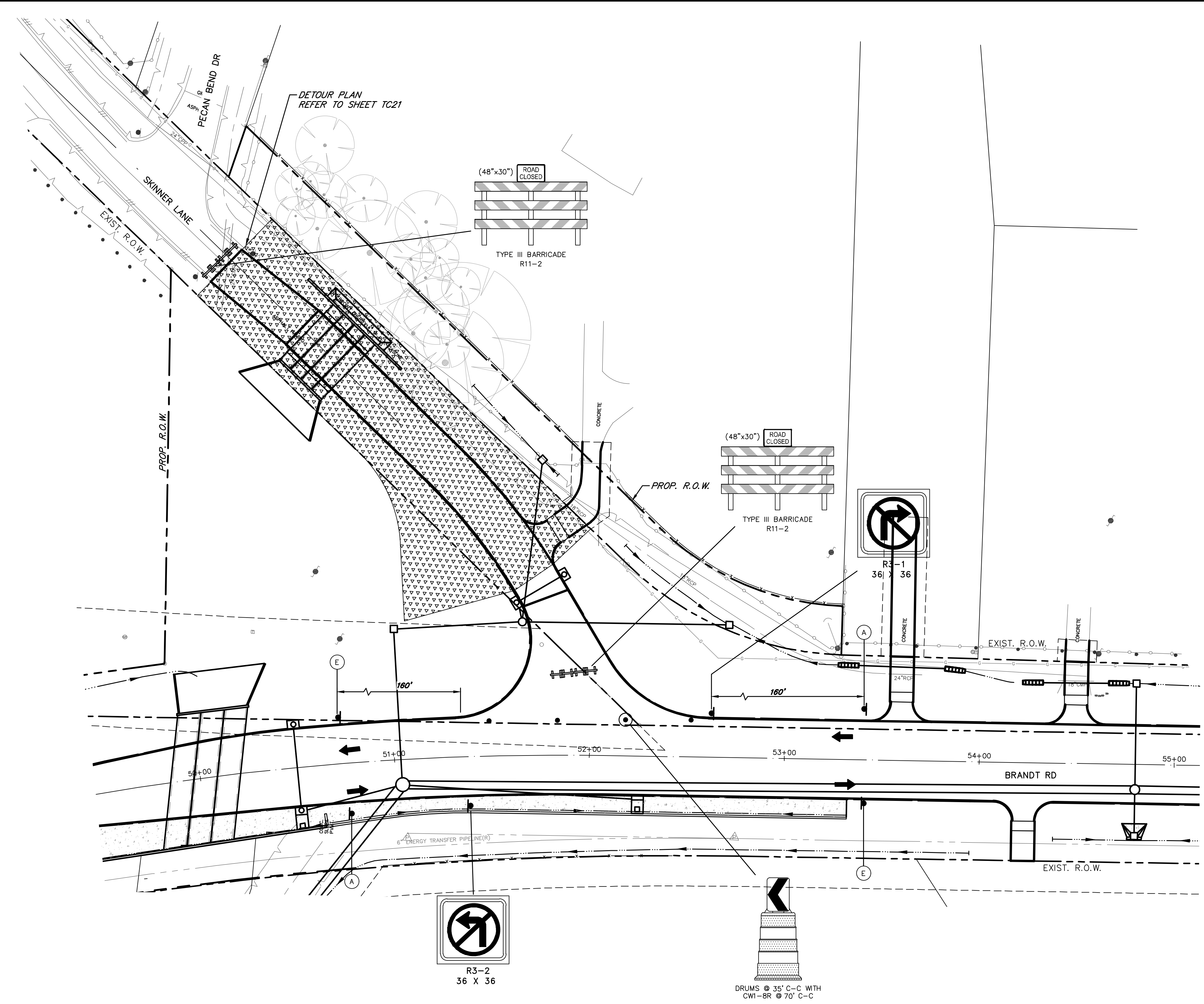


TRAFFIC CONTROL PLAN PHASE 4 - STEP 2
 © BRANDT ROAD AND PRECINCT LINE RD

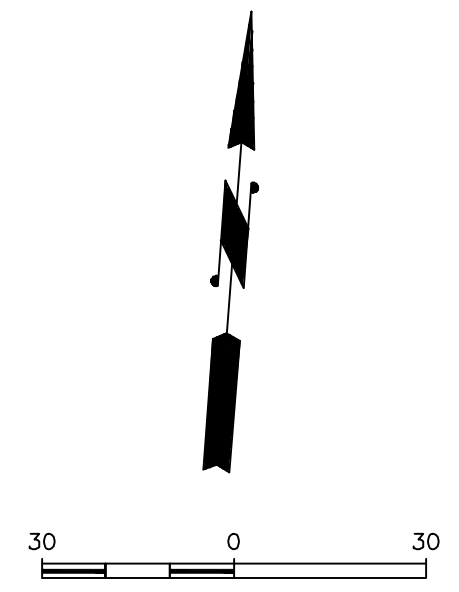
 CW20-1D 48 X 48	 W6-3 36 X 36	 R1-2 36 X 36 X 36	 R1-1 36 X 36	 G20-2a 48 X 24	 CW8-17 36 X 36	 CW1-2R 36 X 36	 CW1-2L 36 X 36	 CW1-4L 36 X 36	 CW1-4R 36 X 36	 CW24-1R 36 X 36	 CW24-1L 36 X 36	 RIGHT LANE CLOSED AHEAD CW20-5R 48 X 48 PLAQUE 30 X 12	 RIGHT LANE CLOSED CW20-5R 48 X 48
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REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 4 - STEP 2			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 30'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET TC16	

F:\Clients\0522-Fort Bend County Engineering\0522-1801-Brandt Road Drawings\Seg 2\TC17 TRAFFIC CONTROL PLAN PHASE 4 - STEP 3.dwg Feb 17, 2023-10:56am Terra Associates Inc., Thanh Dao



POSTED SPEED LIMIT:
 SKINNERN ROAD: 35 MPH
 BRANDT ROAD: 35 MPH



LEGEND	
	PHASE 04 WORK AREA
	TEMPORARY ASPHALT
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE

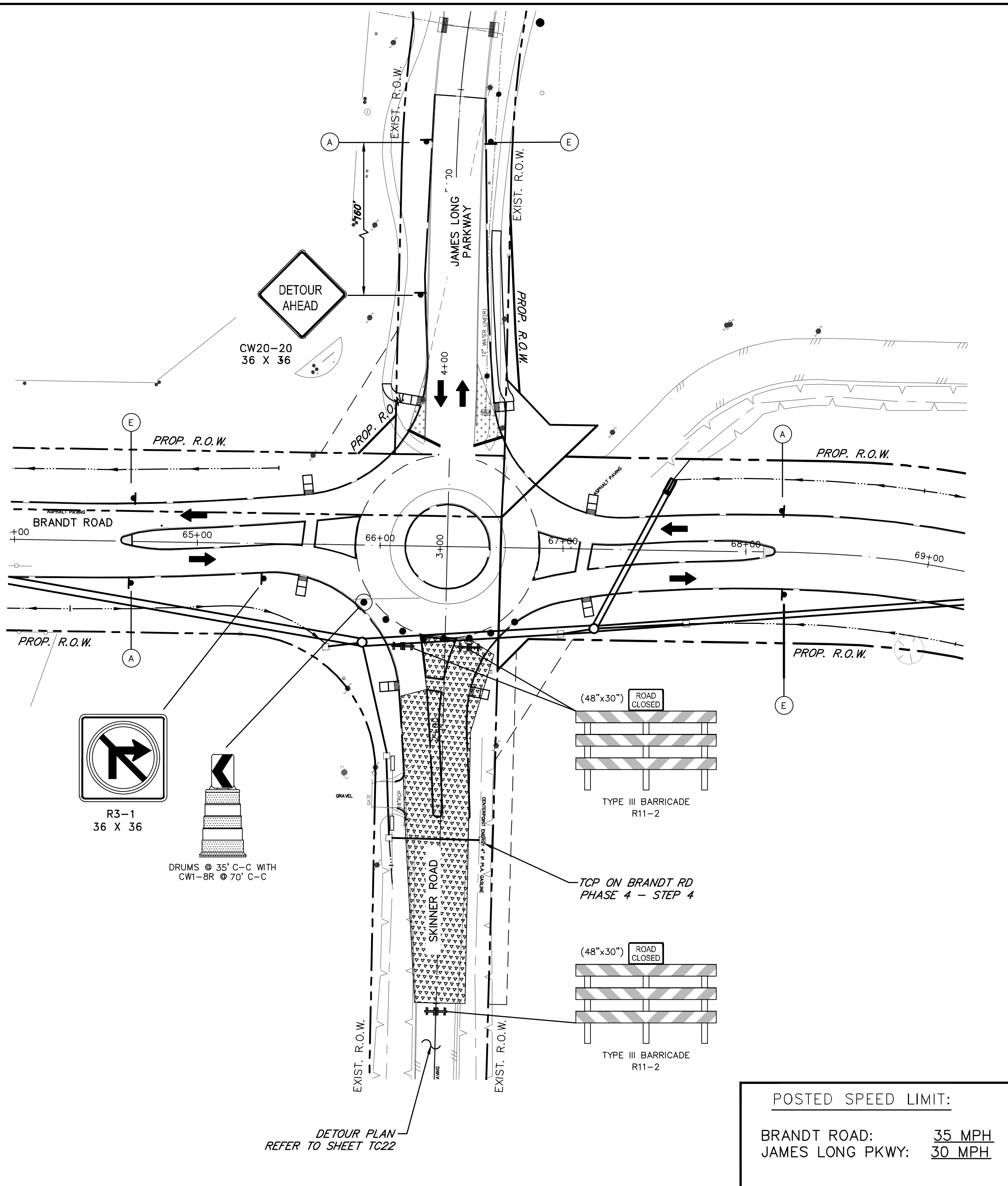
STATE OF TEXAS
 A.G.A.N. NANAYAKKARA
 115913
 LICENSED PROFESSIONAL ENGINEER
 THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913
 ON FEBRUARY 17, 2023

TRAFFIC CONTROL PLAN PHASE 4 - STEP 3
 @ SKINNER RD AND BRANDT RD

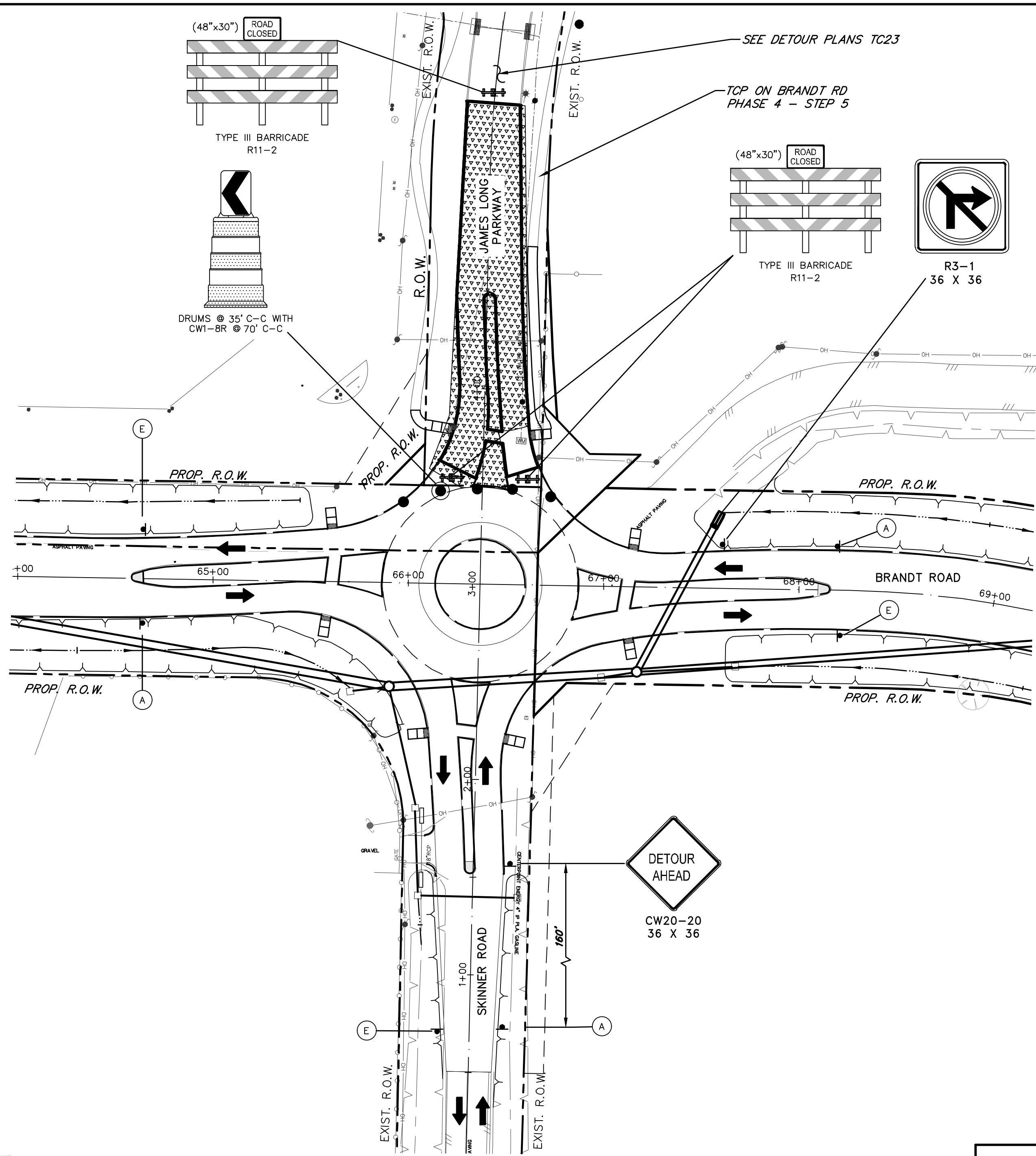
 CW20-1D 48 X 48	 W6-3 36 X 36	 R1-2 36 X 36 X 36	 R1-1 36 X 36	 G20-2a 48 X 24	 CW8-17 36 X 36	 CW1-2R 36 X 36	 CW1-2L 36 X 36	 CW1-4L 36 X 36	 CW1-4R 36 X 36	 CW24-1R 36 X 36	 CW24-1L 36 X 36	 RIGHT LANE CLOSED AHEAD CW20-5R 48 X 48 PLAQUE 30 X 12	 RIGHT LANE CLOSED CW20-5R 48 X 48
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REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 4 - STEP 3			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 30'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET TC17	

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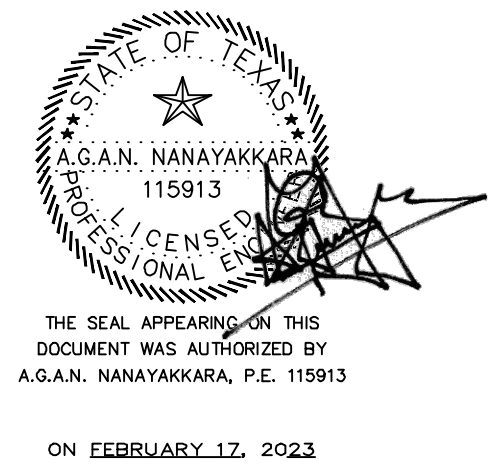


TRAFFIC CONTROL PLAN PHASE 4 - STEP 4
 © BRANDT ROAD AND JAMES LONG PRKWY



TRAFFIC CONTROL PLAN PHASE 4 - STEP 5
 © BRANDT ROAD AND JAMES LONG PRKWY

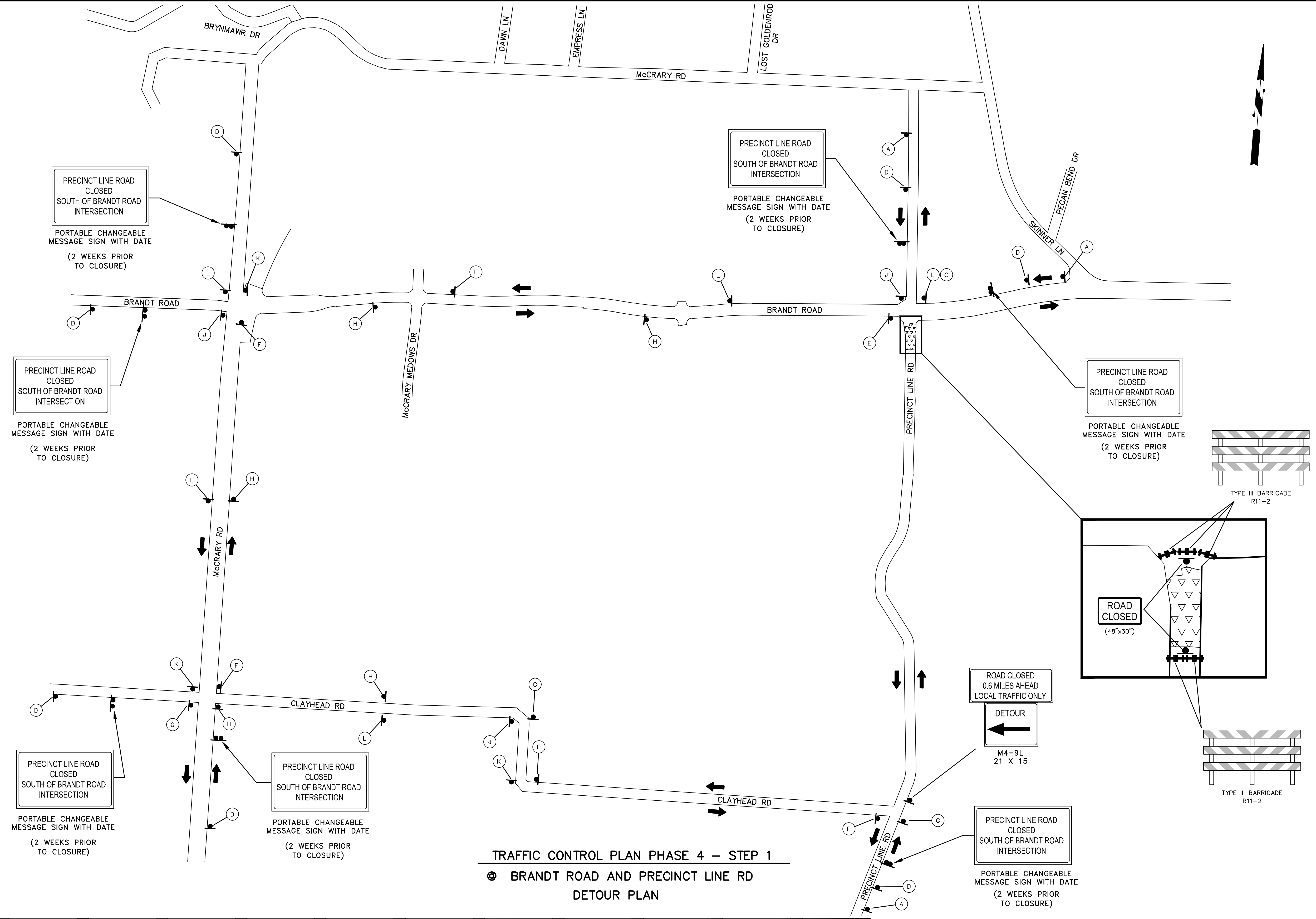
LEGEND	
	PHASE 04 WORK AREA
	TEMPORARY ASPHALT
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE



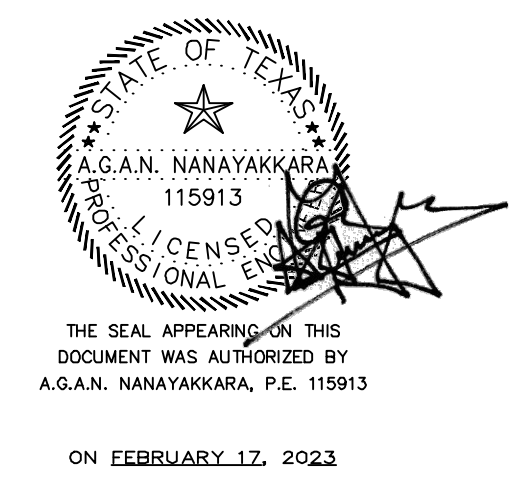
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 4 - STEP 4 & 5			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: 1" = 40'	
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	
PROJECT No. 0522-1801 CONTRACT: 1		SHEET TC18	

CW20-1D 48 X 48	W6-3 36 X 36	R1-2 36 X 36 X 36	R1-1 36 X 36	G20-2a 48 X 24	CW8-17 36 X 36	CW1-2R 36 X 36	CW1-2L 36 X 36	CW1-4L 36 X 36	CW1-4R 36 X 36	CW24-1R 36 X 36	CW24-1L 36 X 36	CW20-5R 48 X 48

F:\Clients\0522-Fort Bend County Engineering\0522-1801_Brandt Road\Drawings\Seg 2\TC19 PHASE 4 - STEP 1 PRECINCT LINE RD DETOUR.dwg Feb 17, 2023-10:56am Terra Associates Inc., Thanh Dao



LEGEND	
	PHASE 04 WORK AREA
	TEMPORARY ASPHALT
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE

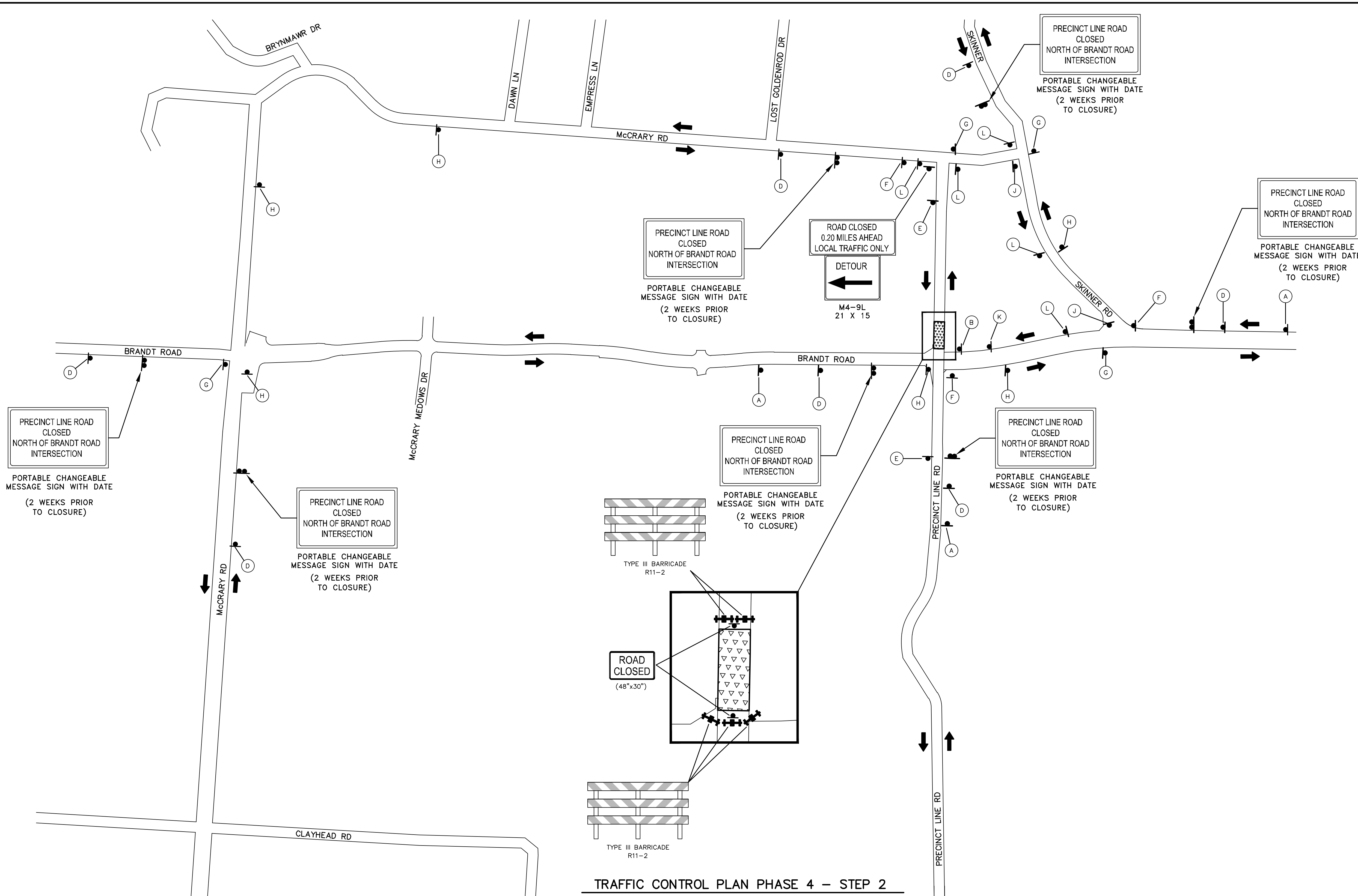


TRAFFIC CONTROL PLAN PHASE 4 - STEP 1
© BRANDT ROAD AND PRECINCT LINE RD
DETOUR PLAN

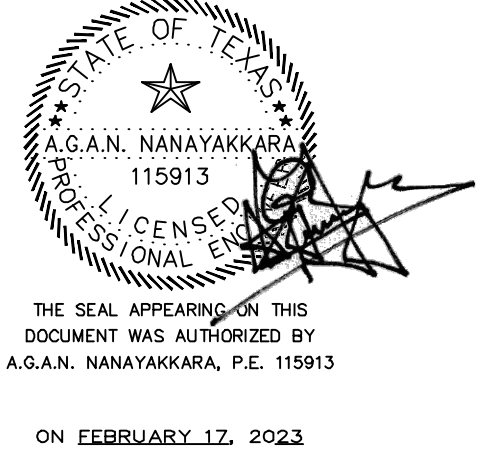
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REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD TRAFFIC CONTROL PLAN PHASE 4 - STEP 1 PRECINCT LINE RD DETOUR			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	
PROJECT No. 0522-1801 CONTRACT: 1		SHEET TC19	

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LEGEND	
	PHASE 04 WORK AREA
	TEMPORARY ASPHALT
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE

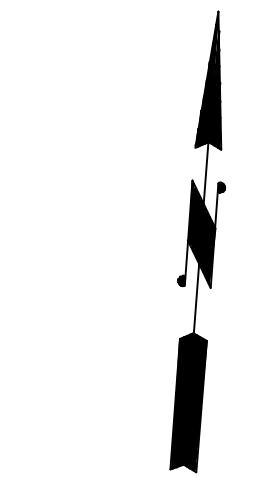
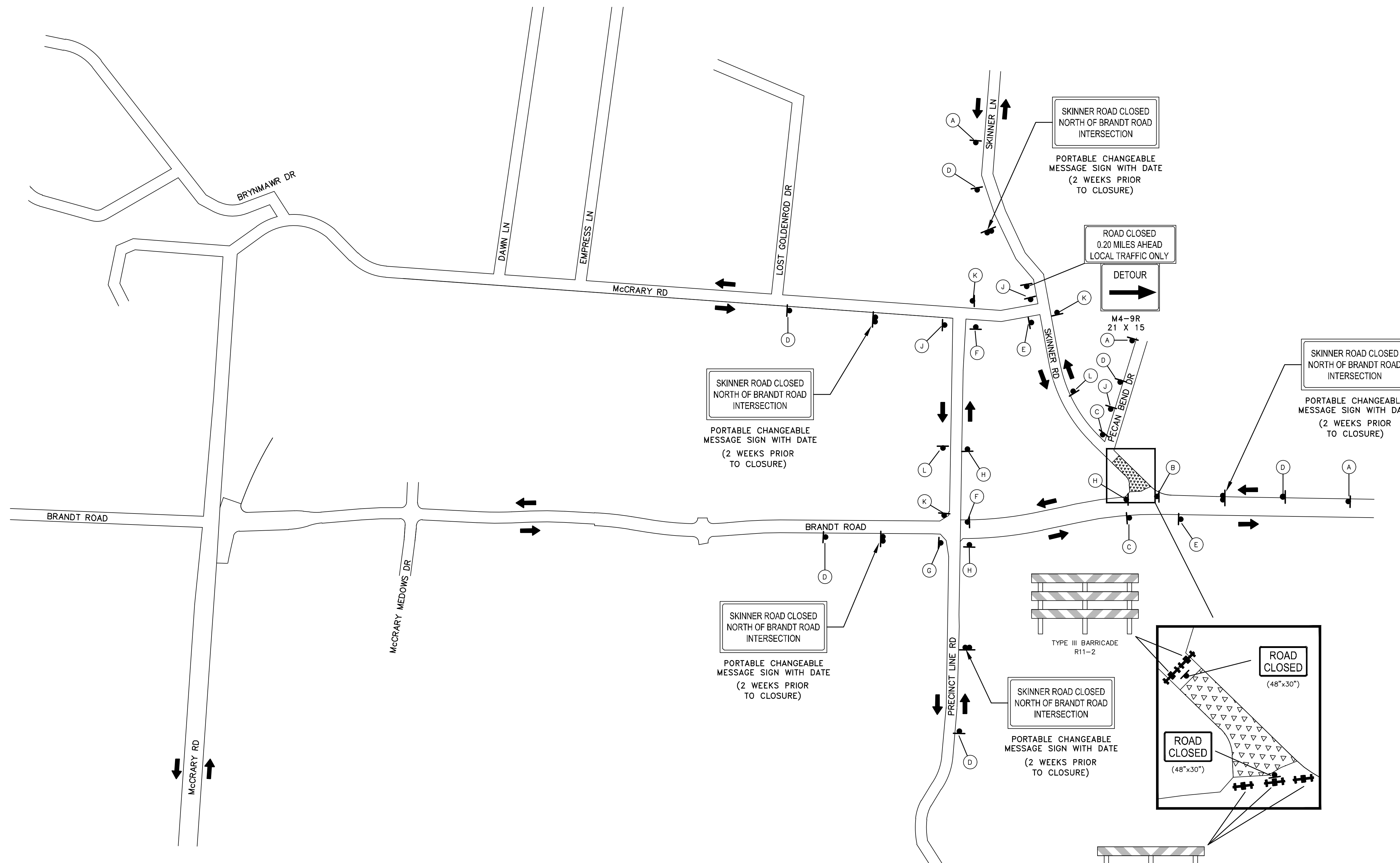


TRAFFIC CONTROL PLAN PHASE 4 - STEP 2
 Ⓢ BRANDT ROAD AND PRECINCT LINE RD
 DETOUR PLAN

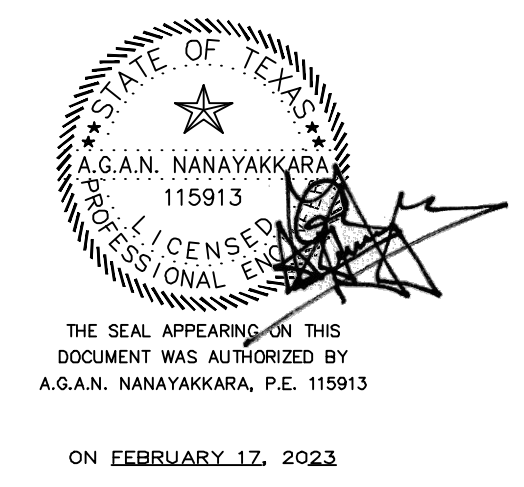
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 4 - STEP 2 DETOUR			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET TC20

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LEGEND	
	PHASE 04 WORK AREA
	TEMPORARY ASPHALT
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE



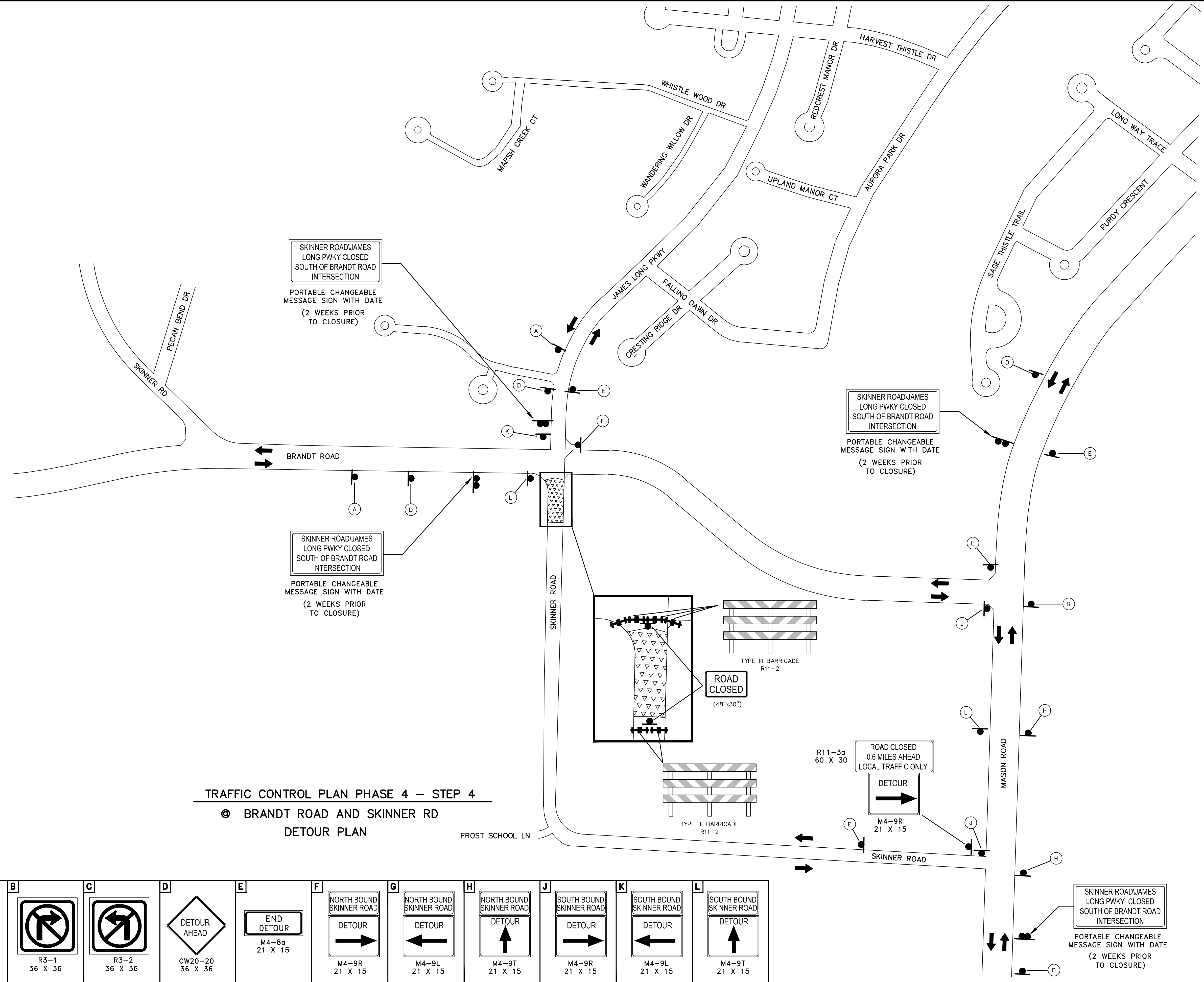
TRAFFIC CONTROL PLAN PHASE 4 - STEP 3
© BRANDT ROAD AND SKINNER RD
DETOUR PLAN

 CW20-1D 48 X 48	 R3-1 36 X 36	 R3-2 36 X 36	 CW20-20 36 X 36	 M4-8a 21 X 15	 M4-9R 21 X 15	 M4-9L 21 X 15	 M4-9T 21 X 15	 M4-9R 21 X 15	 M4-9L 21 X 15	 M4-9T 21 X 15
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REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 4 - STEP 3 DETOUR			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	
PROJECT No. 0522-1801		CONTRACT: 1	
SHEET		TC21	

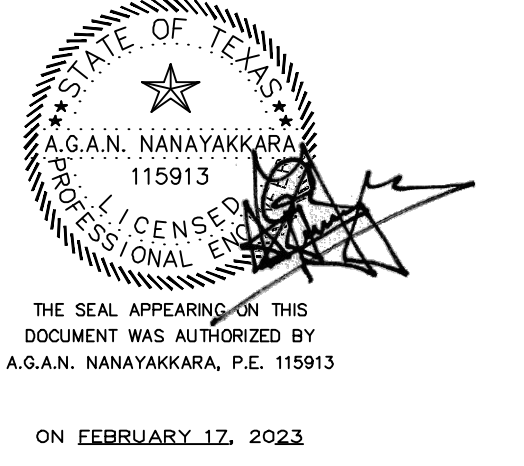
722 PIN OAK ROAD, STE 202A
 KATY, TEXAS 77494
 TELEPHONE: (281)391-3366
 FAX: (281) 391-3375
 WWW.JNSCE.COM
 T.S.P.E. FIRM
 REGISTRATION NO. 11653

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TRAFFIC CONTROL PLAN PHASE 4 - STEP 4
© BRANDT ROAD AND SKINNER RD
DETOUR PLAN

LEGEND	
	PHASE 04 WORK AREA
	TEMPORARY ASPHALT
	SIGN
	FLAGGER
	TYPE III BARRICADE
	FLASHING ARROW PANEL
	BARREL/DRUM
	OPEN TRAFFIC LANE

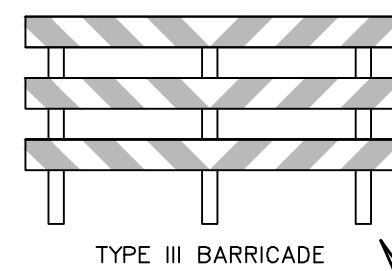


REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 4 - STEP 4 DETOUR			
TERRA <small>a Bowman company</small>		1445 N. LOOP WEST - SUITE 450 <small>HOUSTON, TEXAS 77008</small> <small>713-993-0333</small> <small>TBPE Registration No.: F-14309</small>	
JNS L.L.C.		JNS ENGINEERS, LLC <small>722 PIN OAK ROAD, STE 202A</small> <small>KATY, TEXAS 77494</small> <small>TELEPHONE: (281)391-3366</small> <small>FAX: (281) 391-3375</small> <small>WWW.JNSCE.COM</small> <small>T.S.P.E. FIRM</small> <small>REGISTRATION NO. 11653</small>	
<small>DRAWN BY: T.D.</small>	<small>SCALE: N.T.S.</small>	<small>PROJECT No. 0522-1801</small> <small>CONTRACT: 1</small>	
<small>CHECKED BY: A.G.A.N.</small>	<small>DATE: FEBRUARY, 2023</small>	<small>SHEET TC22</small>	

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F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\TC23 TRAFFIC CONTROL PLAN PHASE 4 - STEP 5 DETOUR.dwg Feb 17, 2023-10:58am Terra Associates Inc., Thanh Dao

A ROAD WORK AHEAD CW20-1D 48 X 48	B NO RIGHT TURN R3-1 36 X 36	C NO LEFT TURN R3-2 36 X 36	D DETOUR AHEAD CW20-20 36 X 36	E END DETOUR M4-8a 21 X 15
F JAMES LONG PKWY DETOUR M4-9R 21 X 15	G JAMES LONG PKWY DETOUR M4-9L 21 X 15	H JAMES LONG PKWY DETOUR M4-9T 21 X 15		
J SKINNER ROAD DETOUR M4-9R 21 X 15	K SKINNER ROAD DETOUR M4-9L 21 X 15	L SKINNER ROAD DETOUR M4-9T 21 X 15		



ROAD CLOSED
(48"x30")

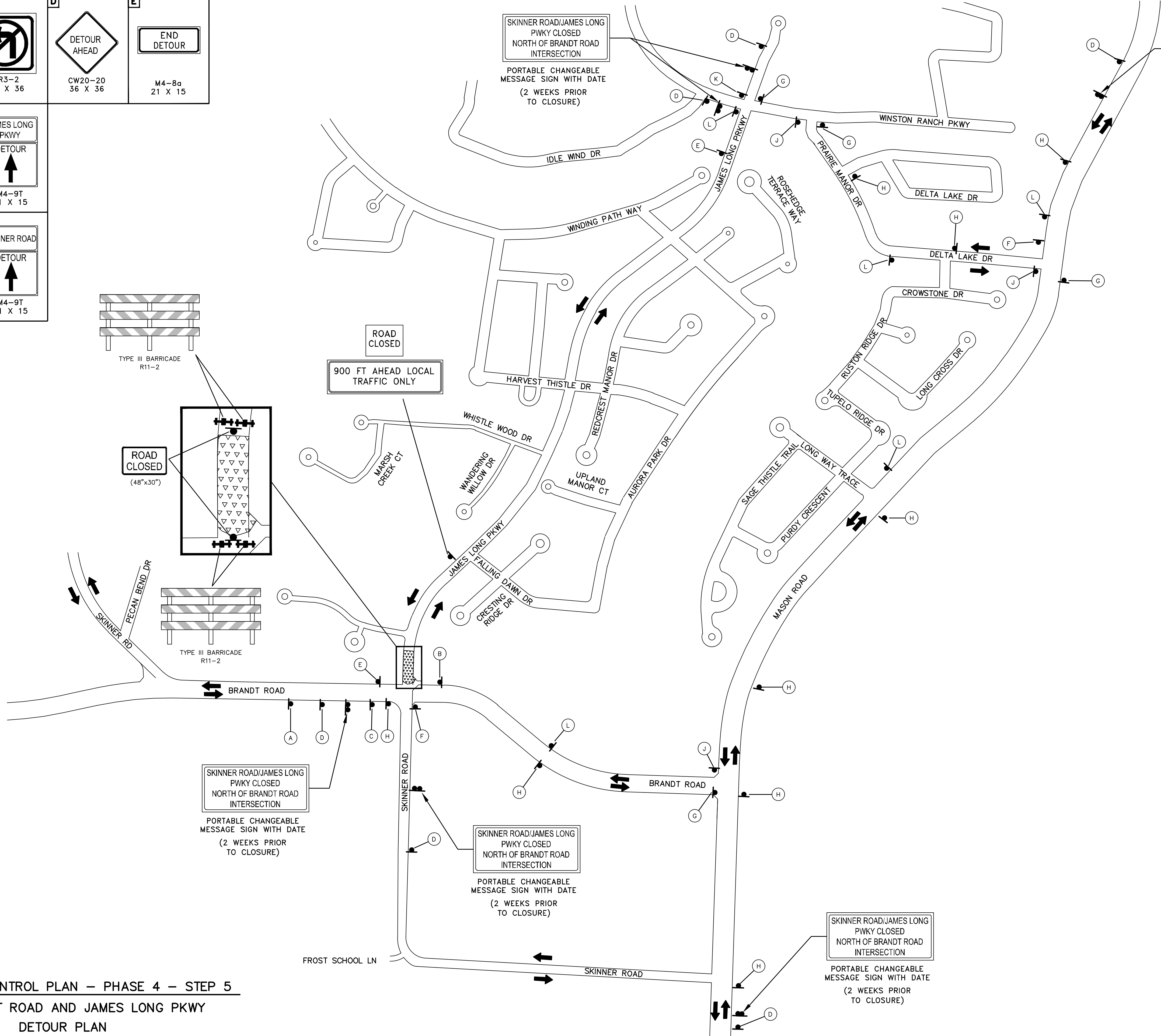
TYPE III BARRICADE
R11-2

SKINNER ROAD/JAMES LONG
PKWY CLOSED
NORTH OF BRANDT ROAD
INTERSECTION
PORTABLE CHANGEABLE
MESSAGE SIGN WITH DATE
(2 WEEKS PRIOR
TO CLOSURE)

SKINNER ROAD/JAMES LONG
PKWY CLOSED
NORTH OF BRANDT ROAD
INTERSECTION
PORTABLE CHANGEABLE
MESSAGE SIGN WITH DATE
(2 WEEKS PRIOR
TO CLOSURE)

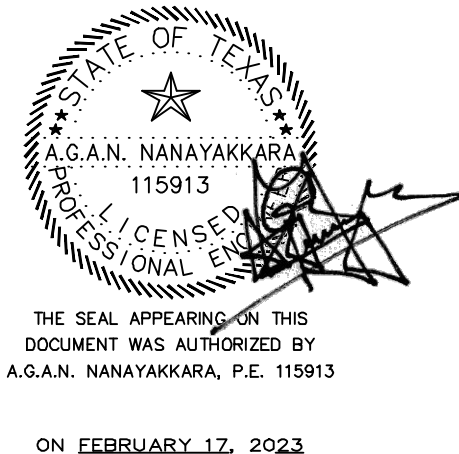
SKINNER ROAD/JAMES LONG
PKWY CLOSED
NORTH OF BRANDT ROAD
INTERSECTION
PORTABLE CHANGEABLE
MESSAGE SIGN WITH DATE
(2 WEEKS PRIOR
TO CLOSURE)

SKINNER ROAD/JAMES LONG
PKWY CLOSED
NORTH OF BRANDT ROAD
INTERSECTION
PORTABLE CHANGEABLE
MESSAGE SIGN WITH DATE
(2 WEEKS PRIOR
TO CLOSURE)



LEGEND

- PHASE 04 WORK AREA
- TEMPORARY ASPHALT
- SIGN
- FLAGGER
- TYPE III BARRICADE
- FLASHING ARROW PANEL
- BARREL/DRUM
- OPEN TRAFFIC LANE



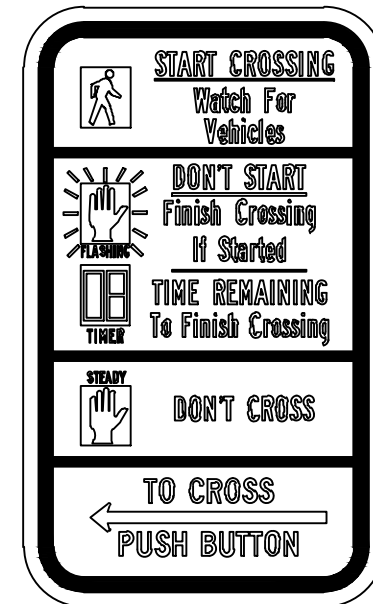
TRAFFIC CONTROL PLAN - PHASE 4 - STEP 5
© BRANDT ROAD AND JAMES LONG PKWY
DETOUR PLAN

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TRAFFIC CONTROL PLAN PHASE 4 - STEP 5 DETOUR			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET TC23	

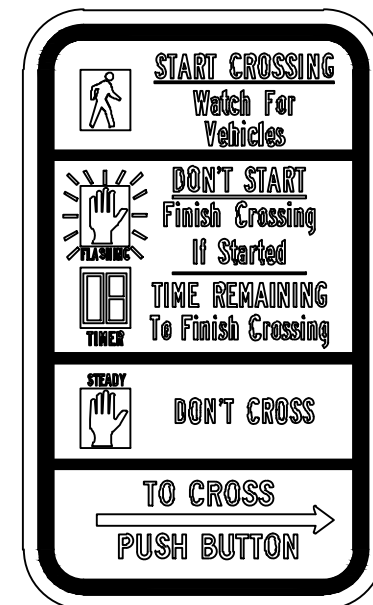
F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\TS02 PROPOSED TRAFFIC SIGNAL LAYOUT (2 OF 2).dwg Feb 17, 2023-10:59am Terra Associates Inc., Thanh Dao

ELECTRIC SERVICE DATA												
LOCATION	ELEC SERVICE NO.	ELECTRICAL SERVICE DESCRIPTION (SEE-ED(4) & (5) -03)	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO/SIZE	SAFETY SWICTH AMPS	MAIN. CKT. BRK. POLE/AMP	TWO-POLE CONTACTOR AMPS	PANEL BOARD LOADCENTER AMP RATING	CIRICUIT NO.	BRANCH CKT. BRK. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
BRANDT RD @ MASON RD	1.00000	ELEC SERVICE TY D 120/240 070 (NS)SSESP(U)	2"	3/#4	N/A	2P/70	30.00000	100.00000	TRF SIGNAL ILLUMINATION	1P/50 2P/15	40 30	5.50000

PROPOSED SIGNS

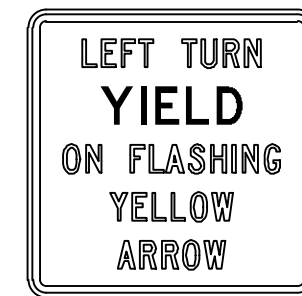


R10-3eR(L)
Pb2



R10-3eR(R)
Pb1

VEHICLE DETECTION CHART	
CAMERA	SETTING
V1	PRESENCE SB THRU
V2	PRESENCE EB LEFT AND RIGHT TURN
V3	PRESENCE NB THRU AND LEFT

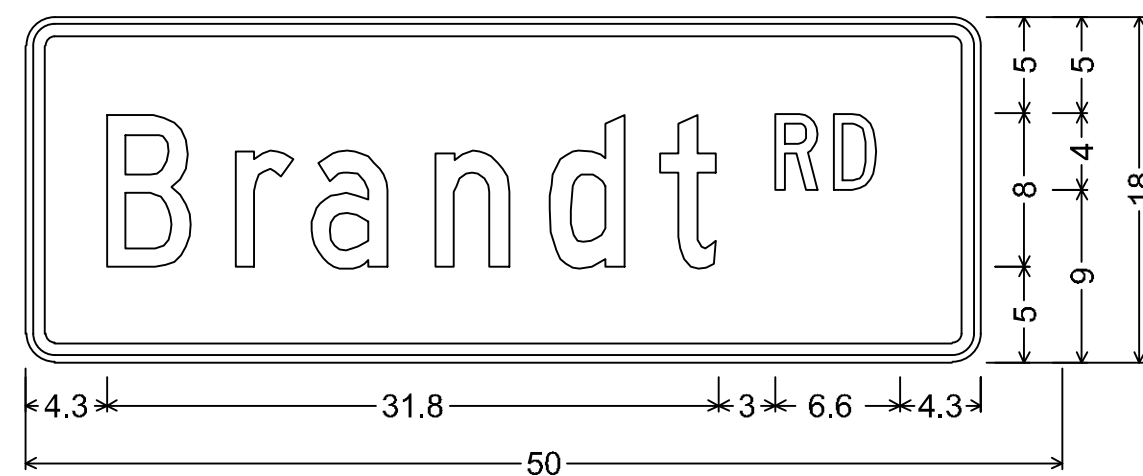
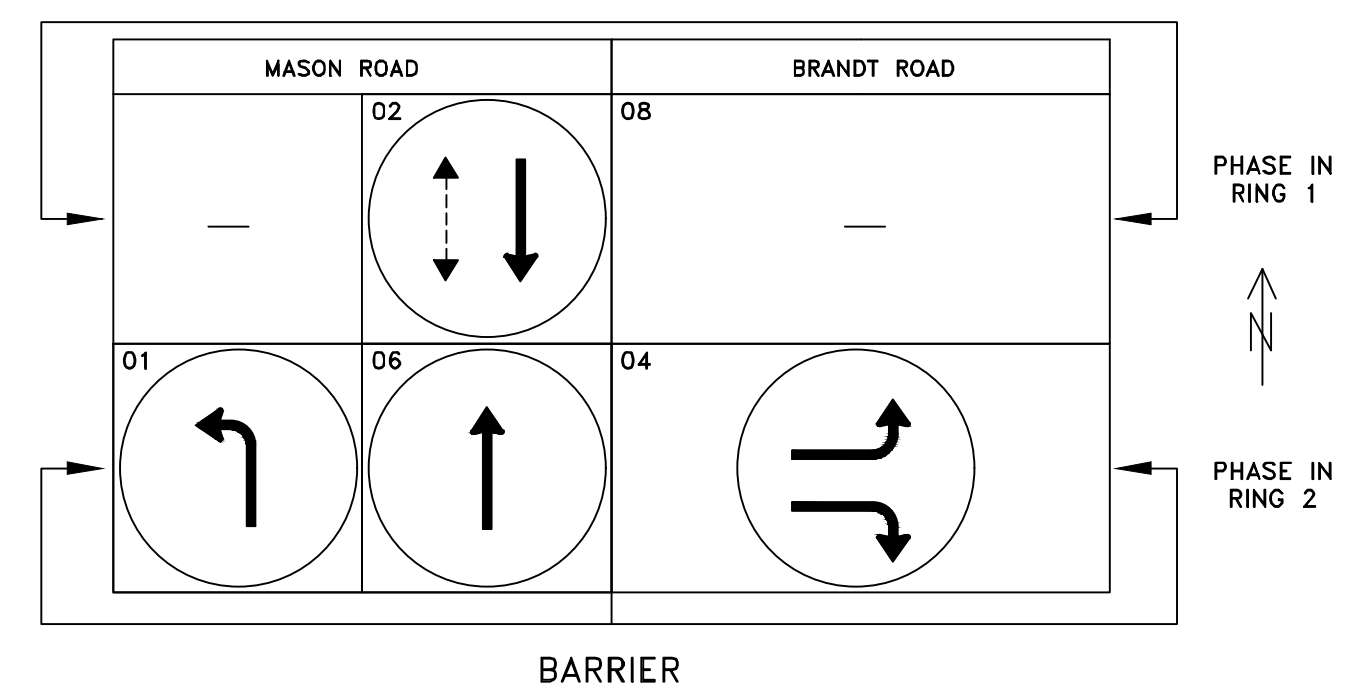


S6

TRAFFIC SIGNAL POLE AND CONTROLLER LOCATIONS			
POLE NO.	BASELINE STATION	OFFSET	DESCRIPTION
P1	85+87.26	41.74'LT	PROPOSED 10' PEDESTAL POLE W/Pb1 AND W1
P2	86+80.75	30.42'LT	PROPOSED 55' MAST ARM, CCTV, V3,OPTICOM*, LUMINAIRE, SIGNAL HEADS (G, F, AND E), AND S2
P3	86+80.72	29.58'RT	PROPOSED 32' MAST ARM, CCTV, V2,OPTICOM, ANTENNA SIGNAL HEADS (C AND D), S1 AND S3
P4	85+87.22	41.54'RT	PROPOSED 44' MAST ARM, CCTV, V1,OPTICOM, LUMINAIRE, ANTENNA, SIGNAL HEADS (A AND B), S2, W2 AND Pb2
P5	86+84.70	37.10' LT	PROPOSED 4"x21" METER POLE, SERVICE LOOP AND DISCONNECT, TY D (120/240) 100 (NS)SS(E)SP(O)
CONTROLLER & FOUNDATION	86+80.76	43.42' LT	PROPOSED GROUND MOUNTED CONTROLLER CABINET

NOTE:
*WI-FI COMMUNICATION SHALL BE ALVARON BREEZE ACCESS.
PED SIGNAL INDICATIONS SHALL COUNTDOWN SIGNAL MODULE.

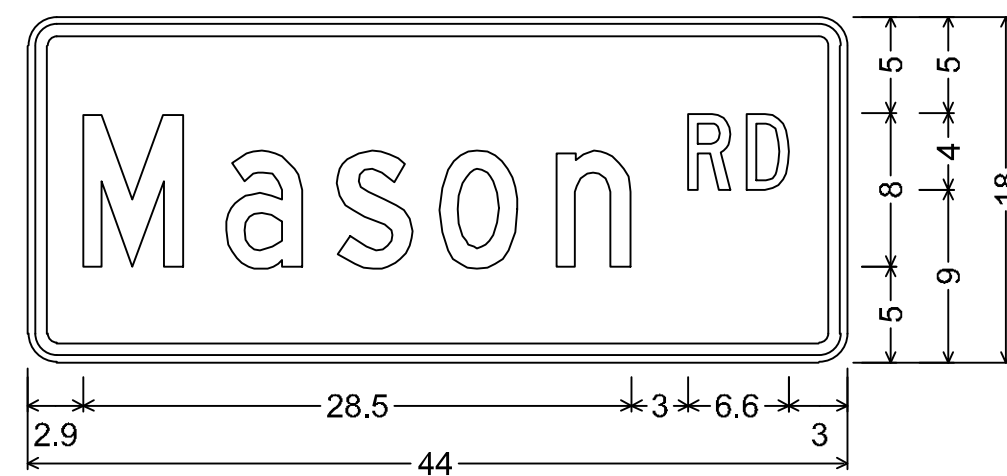
PHASING DIAGRAM



1.5" Radius, 0.6" Border, 0.4" Indent, White on Green;
[BrandtRoad] C;
Table of letter and object lefts.

B	r	a	n	d	t	R	D
4.3	11.0	14.9	21.4	27.3	33.0	39.0	47.8

S2

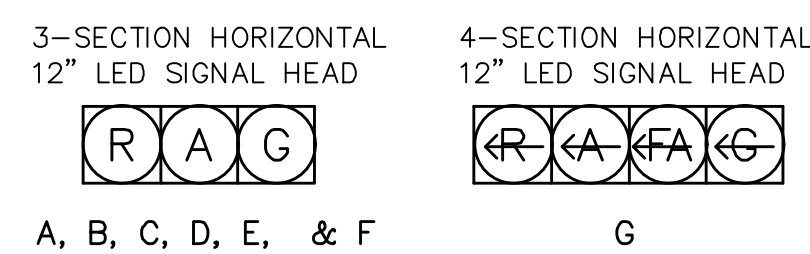


1.5" Radius, 0.6" Border, 0.4" Indent, White on Green;
[MasonRoad] C;
Table of letter and object lefts.

M	a	s	o	n	R	D
2.9	10.4	16.1	21.4	27.5	34.4	37.5

S1

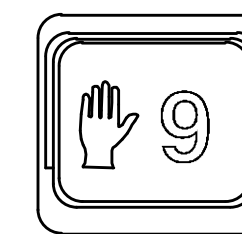
PROPOSED TRAFFIC SIGNAL LED HEADS SCHEDULE



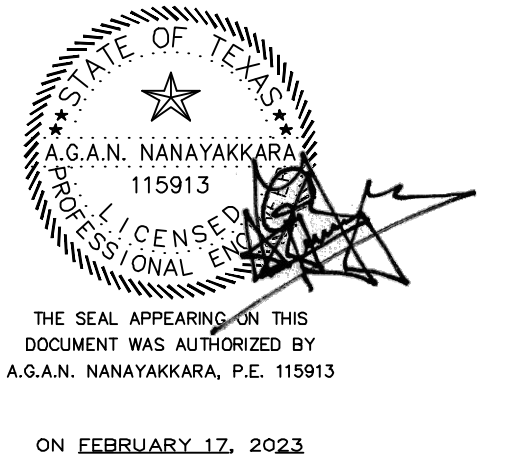
A, B, C, D, E, & F

G

1-SECTION PEDESTRIAN SIGNAL W/ 9" NUMBERS



W1 AND W2 (L.E.D.)



REV.NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD PROPOSED TRAFFIC SIGNAL LAYOUT (1 OF 2)			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281)391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET TS02	

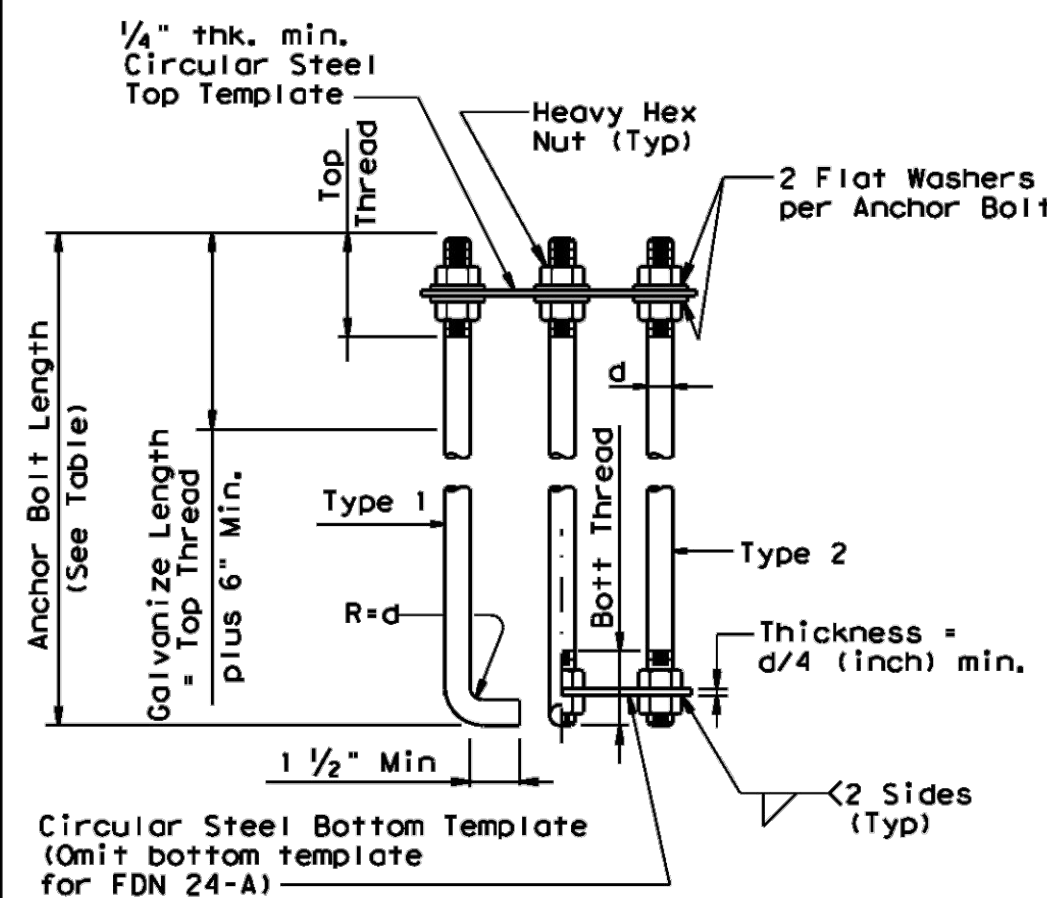
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DATE: FILE:

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-FT (4), (5), (6)			ANCHOR BOLT DESIGN (1)			FOUNDATION DESIGN LOAD (2)		TYPICAL APPLICATION	
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N DIALS/FT			ANCHOR BOLT DIA	F _y (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT/ K-FT		SHEAR KIPS
				10	15	40							
24-A	24"	4-#5	#2 @ 12"	5.7	5.3	4.5	3/4"	36	12 3/4"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8-#9	#3 @ 6"	11.3	10.3	8.0	1 1/2"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10-#9	#3 @ 6"	13.2	12.0	9.4	1 3/4"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12-#9	#3 @ 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14-#9	#3 @ 6"	17.4	15.6	11.9	2 1/4"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

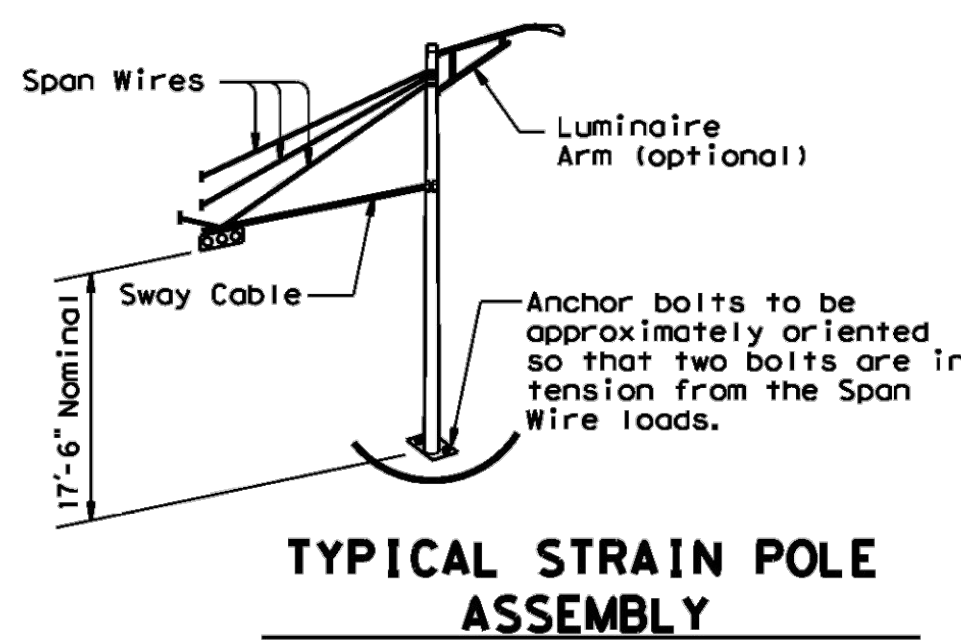
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
		24' X 24'	48'		
MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	28' X 28'				
	32' X 28'				
	32' X 32'				
	36' X 36'				
100 MPH DESIGN WIND SPEED	40' X 36'				
	44' X 28'			44' X 36'	
	36'			44'	
	24' X 24'				
MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	28' X 28'				
	32' X 24'				
	32' X 32'			32' X 32'	
	36' X 36'			36' X 36'	
	40' X 24'			40' X 36'	
	44' X 36'			44' X 36'	

EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.

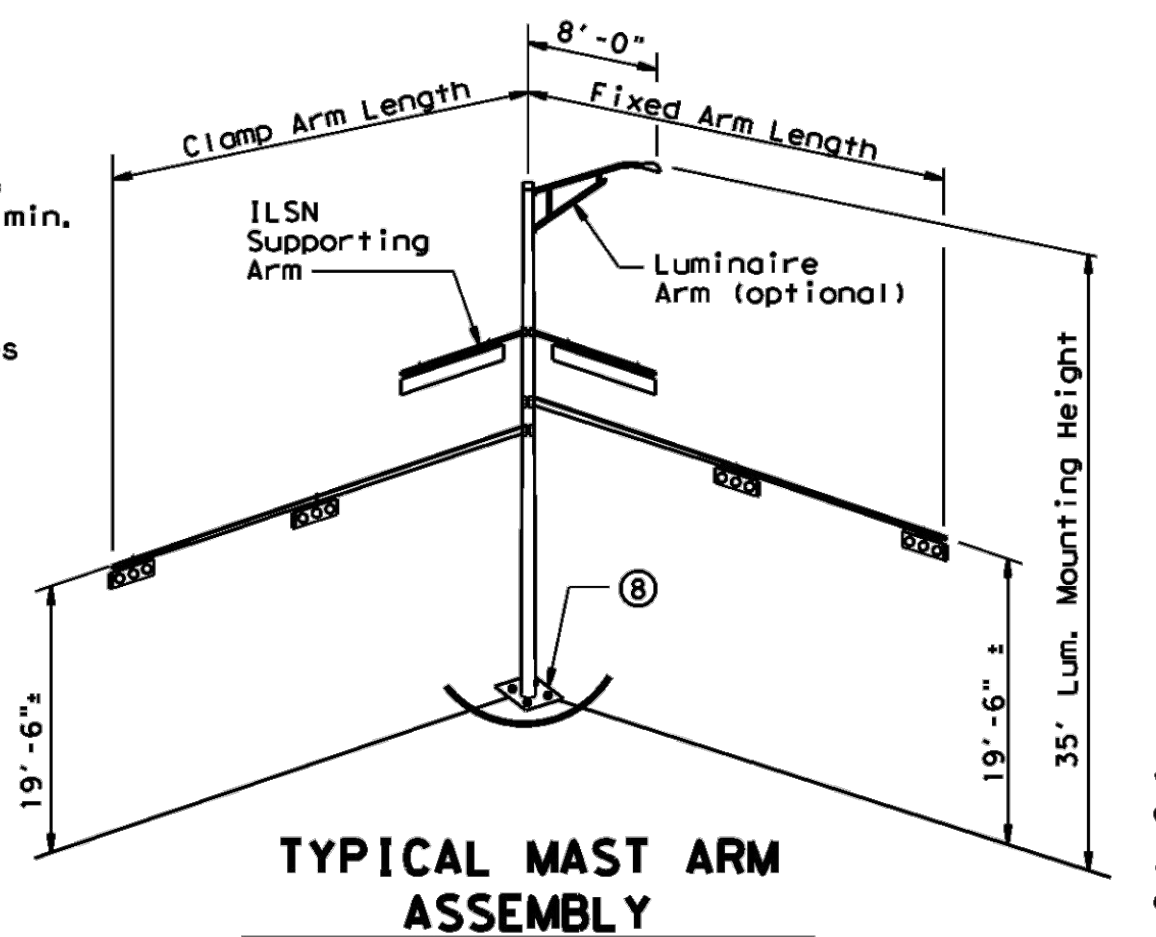


HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)
ANCHOR BOLT ASSEMBLY

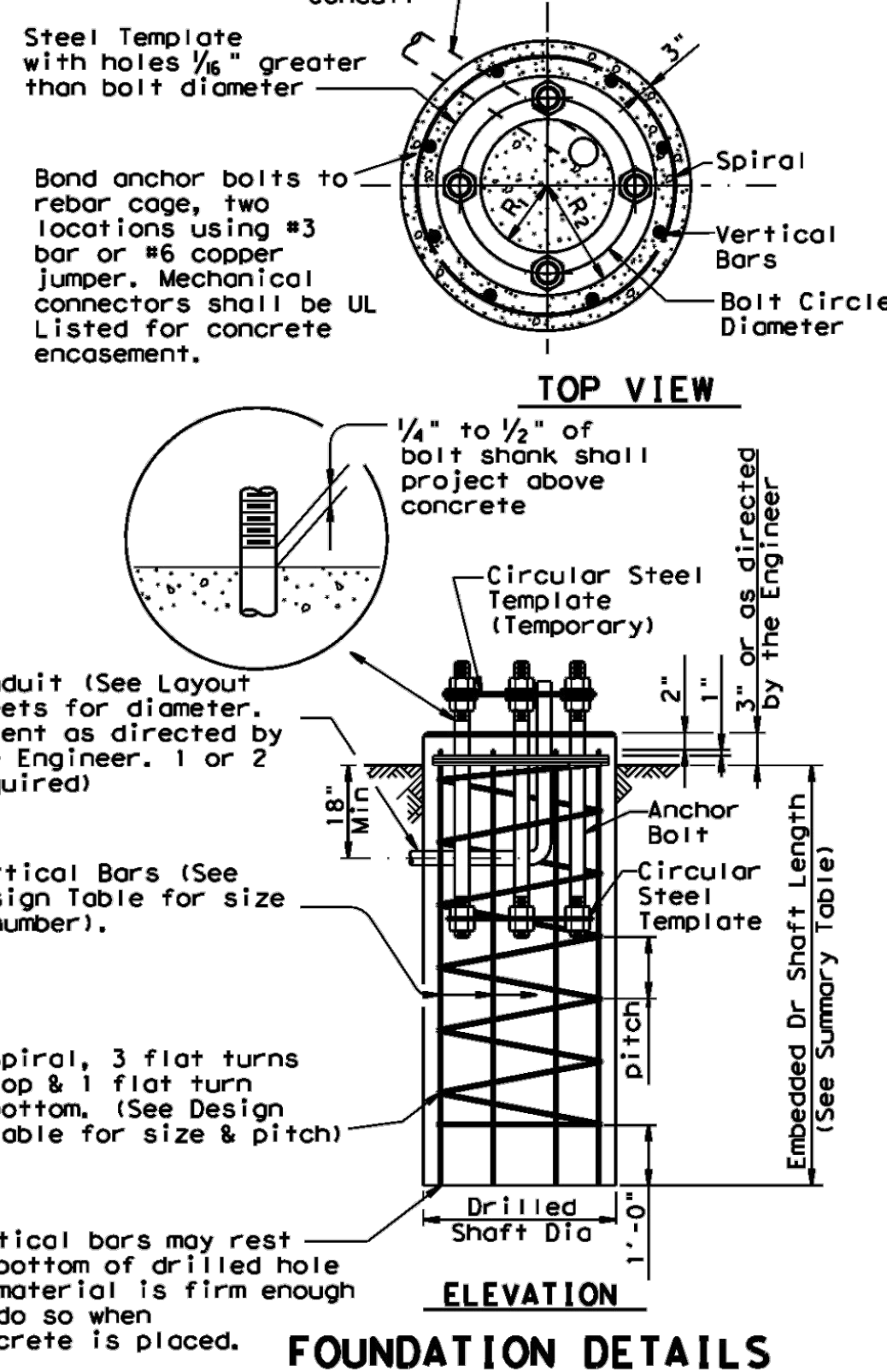
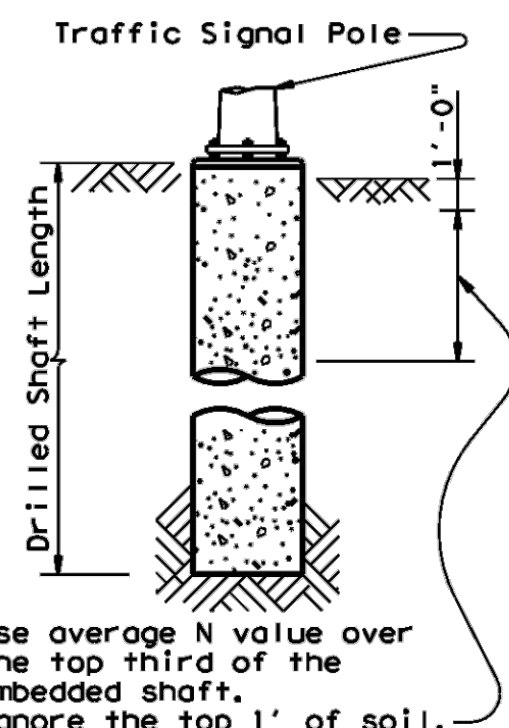
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



TYPICAL STRAIN POLE ASSEMBLY



TYPICAL MAST ARM ASSEMBLY



FOUNDATION DETAILS

BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R ₂	R ₁
3/4"	1'-6"	3"	—	12 3/4"	7 1/8"	5 3/8"
1 1/2"	3'-4"	6"	4"	17"	10"	7"
1 3/4"	3'-10"	7"	4 1/2"	19"	11 1/4"	7 3/4"
2"	4'-3"	8"	5"	21"	12 1/2"	8 1/2"
2 1/4"	4'-9"	9"	5 1/2"	23"	13 3/4"	9 1/4"

⑦ Min dimensions given, longer bolts are acceptable.

- NOTES:**
- Anchor bolt design develops the foundation capacity given under Foundation Design Loads.
 - Foundation Design Loads are the allowable moments and shears at the base of the structure.
 - Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.
 - Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.
 - If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.
 - Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH (FEET)				
				24-A	30-A	36-A	36-B	42-A
POLE 3	13.2	36-A	1			13.2		
TOTAL DRILLED SHAFT LENGTHS						13.2		

- GENERAL NOTES:**
- Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and interim revisions thereto.
 - Reinforcing steel shall conform to Item 440, "Reinforcing Steel".
 - Concrete shall be Class "C".
 - Threads for anchor bolts and nuts shall be rolled or cut threads of BUN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.
 - Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".
 - Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".

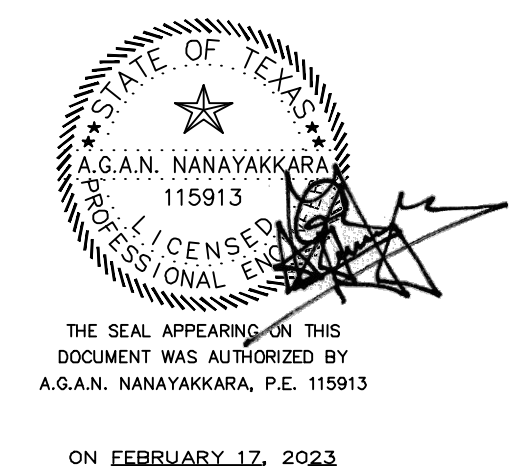
Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

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REV. NO.	DESCRIPTION	DATE	APP.



BRANDT ROAD PRECINCT LINE RD TO MASON RD

TRAFFIC SIGNAL POLE FOUNDATION

TERRA 1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

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REGISTRATION NO. 11653

DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1
		SHEET TSO3

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road Drawings\Seg 2\TS04 MAST ARM DETAILS (1 OF 2).dwg Feb 17, 2023-10:59am Terra Associates Inc., Thanh Dao

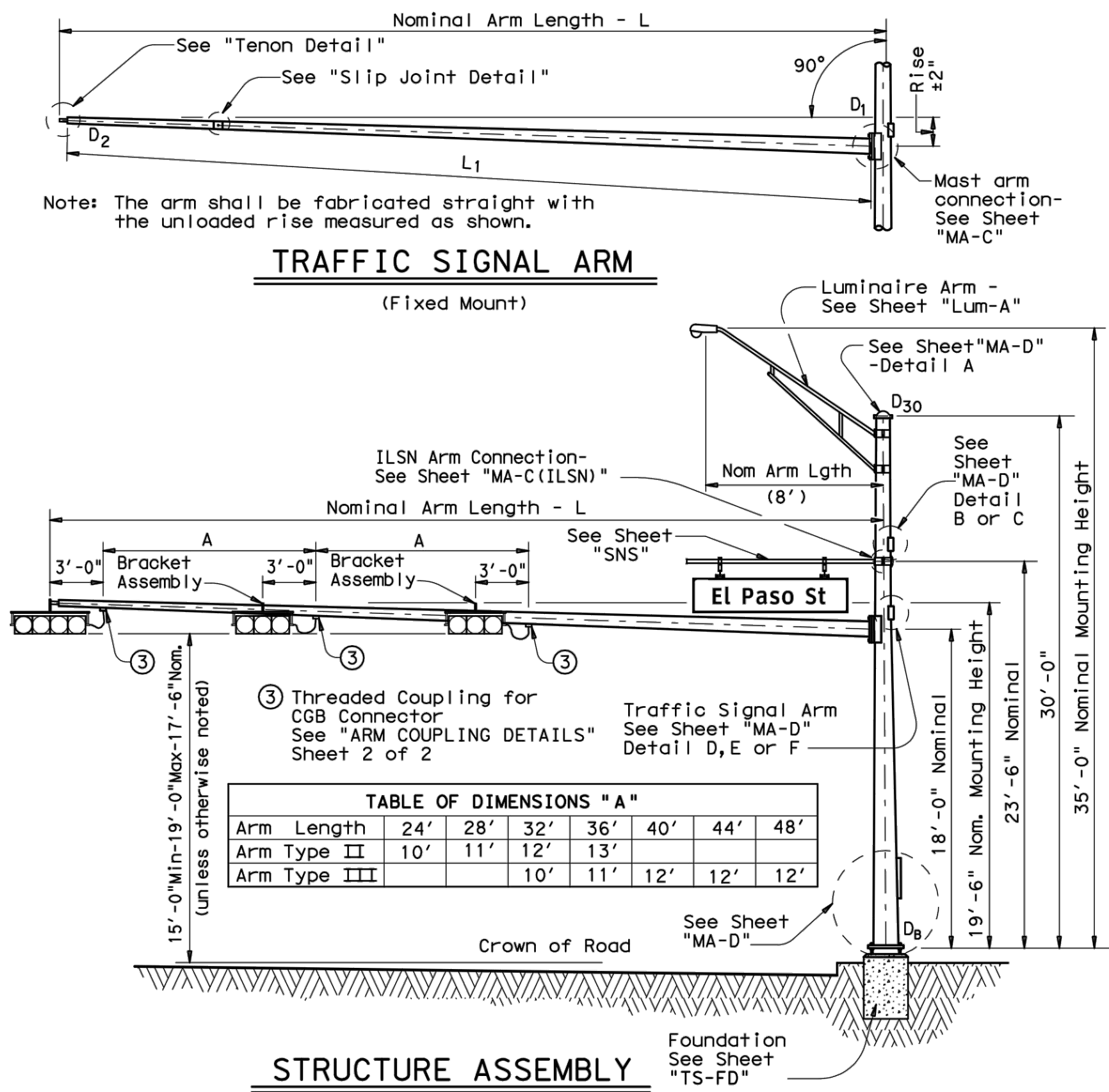
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DATE: FILE:

Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D _B	D ₁₉	D ₂₄	D ₃₀	① thk	D _B	D ₁₉	D ₂₄	D ₃₀	① thk	
20	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
24	12.0	9.3	8.6	7.8	.239	13.0	10.0	9.2	8.3	.239	36-A
28	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
32	13.0	10.3	9.6	8.8	.239	14.0	11.0	10.2	9.3	.239	36-A
36	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
40	14.0	11.3	10.6	9.8	.239	16.0	13.0	12.2	11.3	.239	36-B
44	14.5	11.8	11.1	10.3	.239	16.5	13.5	12.7	11.8	.239	36-B

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L ₁	D ₁	D ₂	① thk	Rise	L ₁	D ₁	② D ₂	① thk	Rise
20	19.1	8.0	5.3	.179	1'-8"	19.1	8.0	3.5	.179	1'-7"
24	23.1	9.0	5.8	.179	1'-9"	23.1	9.0	3.5	.179	1'-8"
28	27.1	9.5	5.7	.179	1'-10"	27.1	10.0	3.5	.179	1'-9"
32	31.0	9.5	5.2	.239	1'-11"	31.0	9.5	3.5	.239	1'-10"
36	35.0	10.0	5.1	.239	2'-0"	35.0	10.0	3.5	.239	1'-11"
40	39.0	10.5	5.1	.239	2'-3"	39.0	11.0	3.5	.239	2'-1"
44	43.0	11.0	5.1	.239	2'-8"	43.0	11.5	4.0	.239	2'-3"

D_B = Pole Base O.D.
D₁₉ = Pole Top O.D. with no Luminaire and no ILSN
D₂₄ = Pole Top O.D. with ILSN w/out Luminaire
D₃₀ = Pole Top O.D. with Luminaire
D₁ = Arm Base O.D.
D₂ = Arm End O.D.
L₁ = Shaft Length
L = Nominal Arm Length
① Thickness shown are minimums, thicker materials may be used.
② D₂ may be increased by up to 1" for polygonal arms.



SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30' Poles With Luminaire	24' Poles With ILSN	19' Poles With No Luminaire and No ILSN			
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex	Above hardware plus one small hand hole	See note above			
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-100		20S-100		20-100	
24	24L-100		24S-100		24-100	
28	28L-100		28S-100		28-100	
32	32L-100	1	32S-100		32-100	
36	36L-100		36S-100		36-100	
40	40L-100		40S-100		40-100	
44	44L-100	1	44S-100		44-100	

Traffic Signal Arms (1 per pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)	Type II Arm (2 Signals)	Type III Arm (3 Signals)			
	1 CGB connector	1 Bracket Assembly and 2 CGB Connectors	2 Bracket Assemblies and 3 CGB Connectors			
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-100					
24	24I-100		24II-100			
28	28I-100		28II-100			
32			32II-100	1	32III-100	
36			36II-100		36III-100	
40					40III-100	
44					44III-100	1

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	2

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 1/2"	3'-4"	
1 3/4"	3'-10"	2
2"	4'-3"	1

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".
 Templates may be removed for shipment.

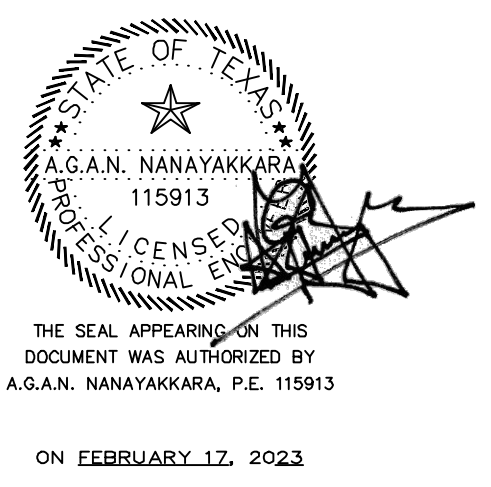
SHEET 1 OF 2

Texas Department of Transportation
 Traffic Operations Division
TRAFFIC SIGNAL SUPPORT STRUCTURES
 SINGLE MAST ARM ASSEMBLY
 (100 MPH WIND ZONE)
SMA-100(1)-12

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REV. NO.	DESCRIPTION	DATE	APP.
5-96			
11-99			
11-12			

123A



REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
MAST ARM DETAILS (1 OF 2)			

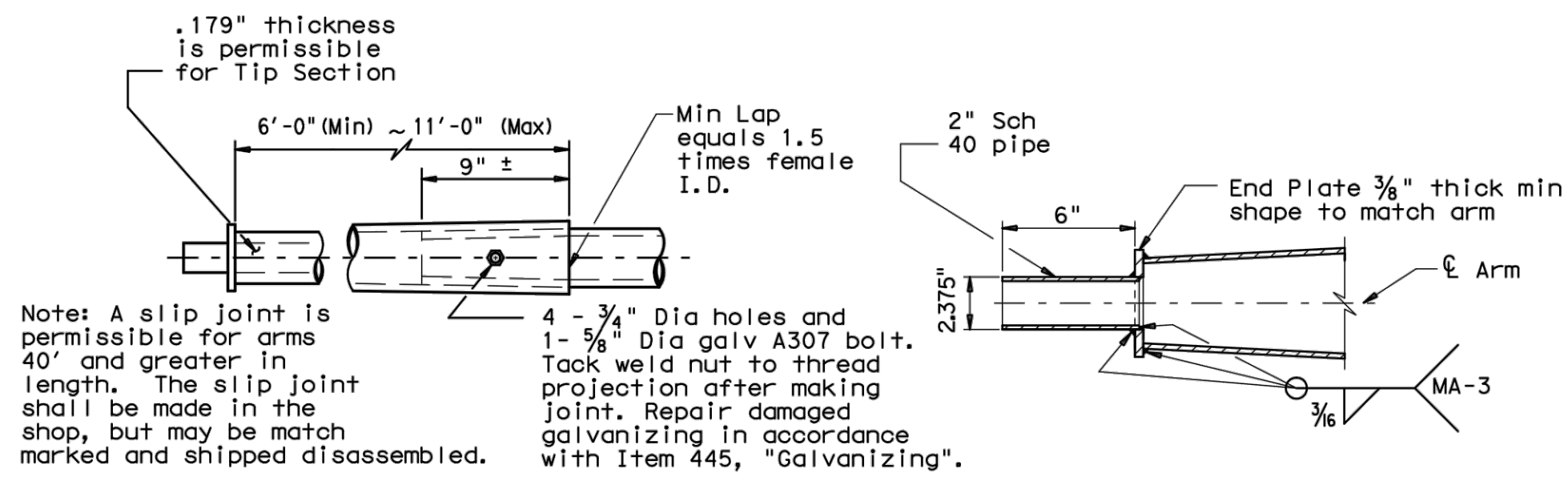
TERRA a Bowman company
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DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1
		SHEET TS04

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DATE: FILE:



SLIP JOINT DETAIL

TENON DETAIL

Note: A slip joint is permissible for arms 40' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

4 - 3/4" Dia holes and 1 - 5/8" Dia galv A307 bolt. Tack weld nut to thread projection after making joint. Repair damaged galvanizing in accordance with Item 445, "Galvanizing".

VIBRATION WARNING

Most Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable vibration and/or galloping is rather high.

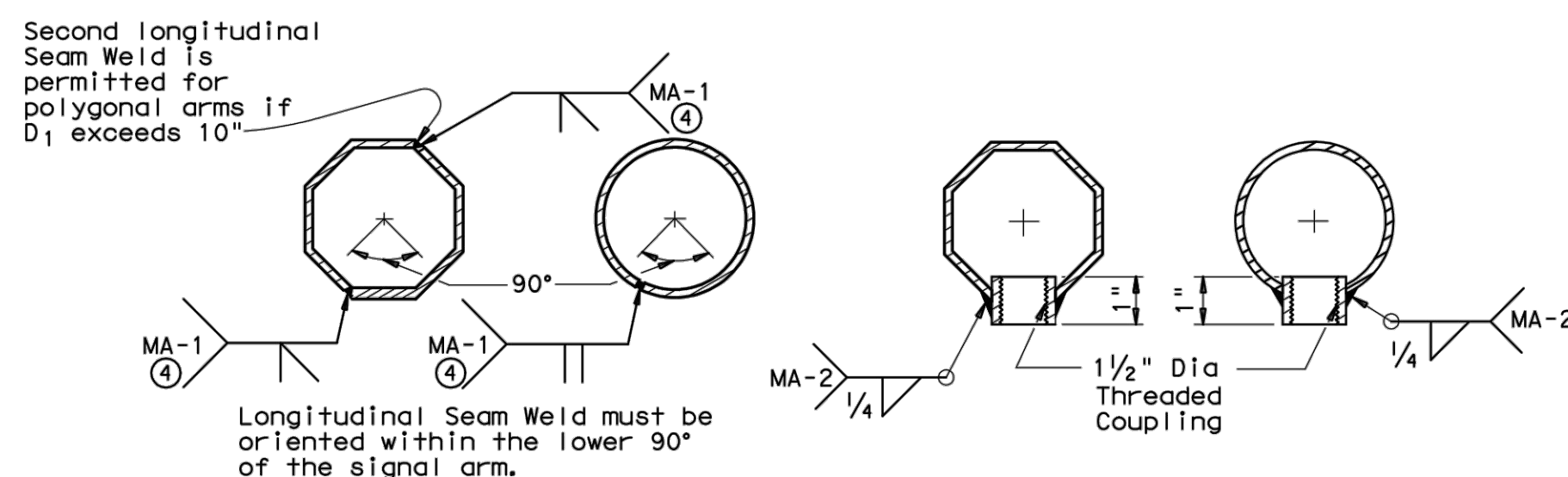
If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backplates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DP-10.

This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 1/2" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

ARM COUPLING DETAILS

④ 60% Min. penetration
100% penetration within
6" of circumferential
base welds.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 100 mph plus a 1.3 gust factor.

Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

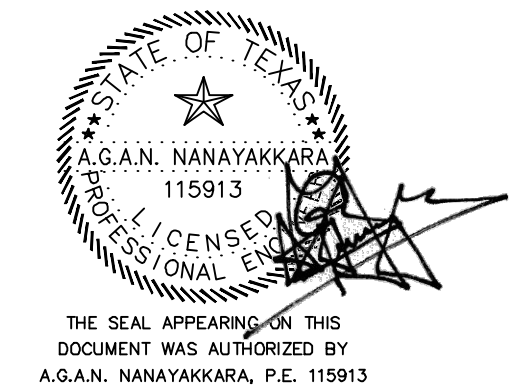
Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

SHEET 2 OF 2

Texas Department of Transportation
Traffic Operations Division
TRAFFIC SIGNAL SUPPORT STRUCTURES
SINGLE MAST ARM ASSEMBLY
(100 MPH WIND ZONE)
SMA-100(2)-12

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5-96	CONT	SECT	JOB	HIGHWAY
1-12	DIST	COUNTY	SHEET NO.	

123B



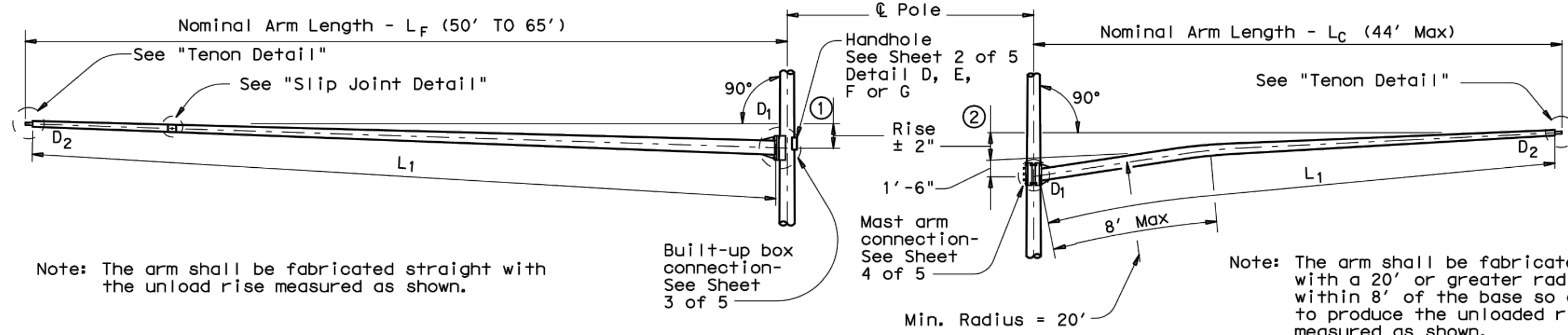
ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
MAST ARM DETAILS (2 OF 2)			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET TS05

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REGISTRATION NO. 11653

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DATE: FILE:

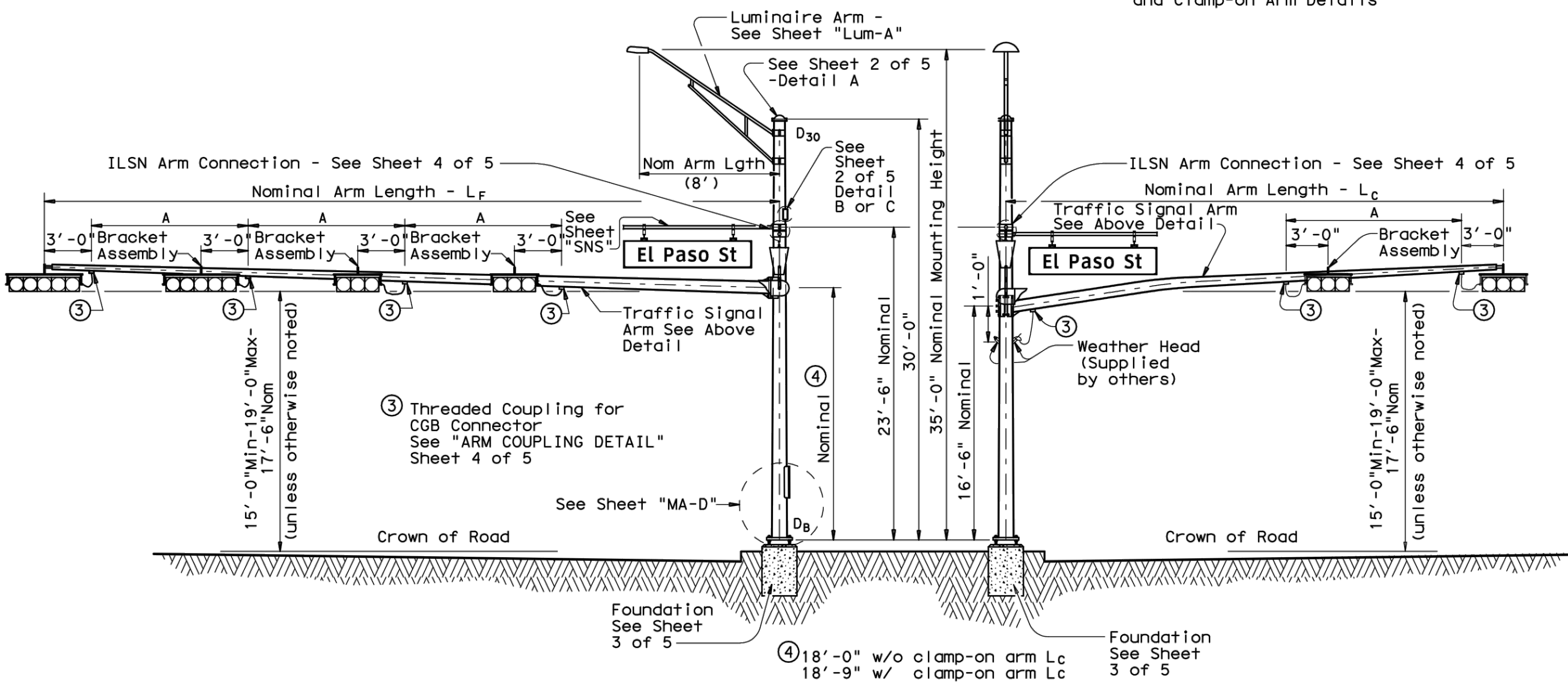


FIXED MOUNT TRAFFIC SIGNAL ARM

CLAMP-ON TRAFFIC SIGNAL ARM (IF REQUIRED)

① See Sheet 3 of 5 for Arm Rise

② See Sheet 4 of 5 for Arm Rise and Clamp-on Arm Details



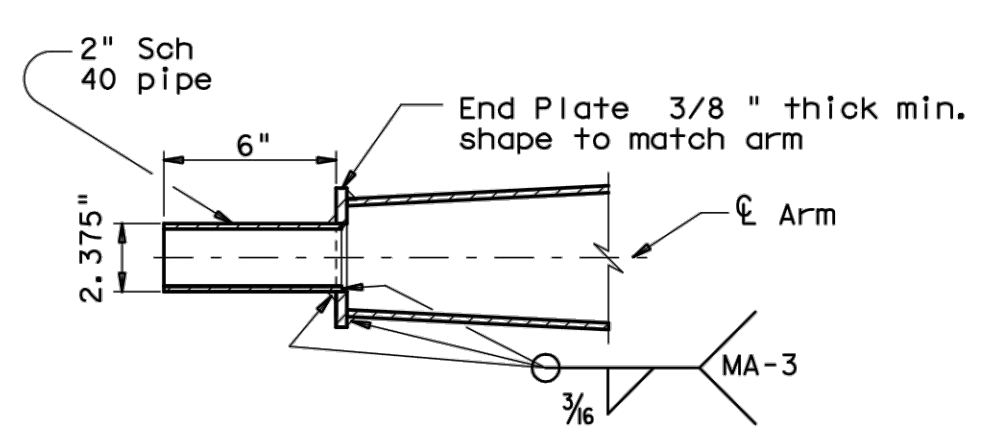
ELEVATION
(Showing fixed mount arm)

STRUCTURE ASSEMBLY

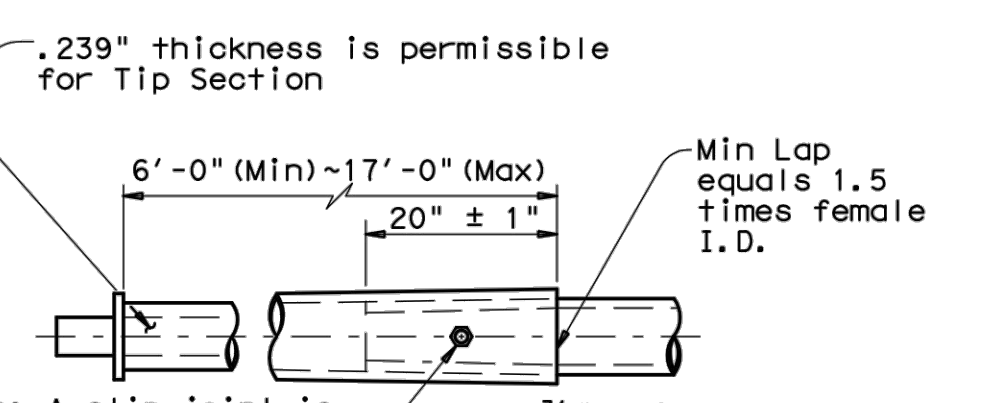
ELEVATION
(Showing clamp-on arm)

TABLE OF DIMENSIONS "A"

Arm Length	24'	28'	32'	36'	40'	44'	50'	55'	60'	65'
Arm Type II	10'	11'	12'	13'						
Arm Type III			10'	11'	12'	12'				
Arm Type IV							12'	12'	12'	12'



TENON DETAIL



SLIP JOINT DETAIL (FIXED MOUNT ARM)

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed can be either 100 mph or 80 mph plus a 1.3 gust factor. If clamp-on traffic signal is required, designs are based on an arm included angle of 90 degrees or more. Angles of less than approximately 75 degrees will require a special design.

Poles are designed to support one 8'-0" luminaire arm, two 9'-0" internally lighted street name (ILSN) signs and two traffic signal arms with limited length combinations.

Each arm with its related attachment is shown below

Arm	Equivalent DL ⑤	WL EPA ⑤⑥
8' Luminaire Arm	Luminaire 60 lbs	1.6 sq ft
9' ILSN Arm	Sign 85 lbs	11.5 sq ft
50' to 65' Fixed Mount Arm	Signal Loads 310 lbs	52 sq ft
Up to 44' Clamp-on Arm	Signal Loads 180 lbs	32.4 sq ft

⑤ Equivalent dead load plus horizontal wind load applied at the end of arm except ILSN arm, which applied 4.5' from the centerline of the pole.

⑥ Effective projected area (actual area times drag coefficient) for the application of horizontal wind load.

Except as noted in Sheet 1 thru 5 of 5, other details not covered shall refer to Standard Sheet "MA-D" for pole details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-PD" for anchor bolt and foundation details.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Material, fabrication tolerances, and shipping practices shall also meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

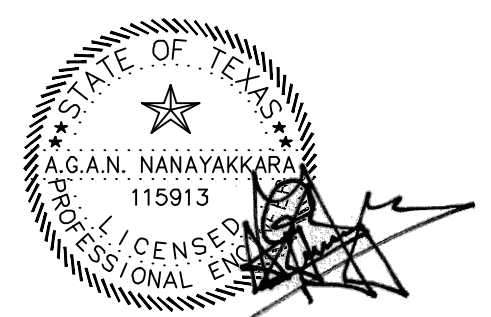
Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing" after fabrication.

Deviations from the details and dimensions shown herein require submission of shop drawings in accordance with the Item 441, "Steel Structures". Alternate designs are not acceptable.

Installation of damping plate for the long mast arm is not recommended.

Provision of the bracket assembly used to support the traffic signal heads shall be under the direction of the Engineer for approval.

Design also conforms to NCHRP Report 412 for fatigue resistance except that there are no stiffeners at the base plate. TxDOT is conducting tests to determine if stiffeners at the base plate will or will not result in optimal performance, depending upon the results of the tests, poles may need a retrofit to ensure optimal fatigue performance.



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913 ON FEBRUARY 17, 2023

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY
(50 TO 65 FT)
(80 AND 100 MPH WIND ZONE)
LMA (1) - 12

Sheet 1 of 5

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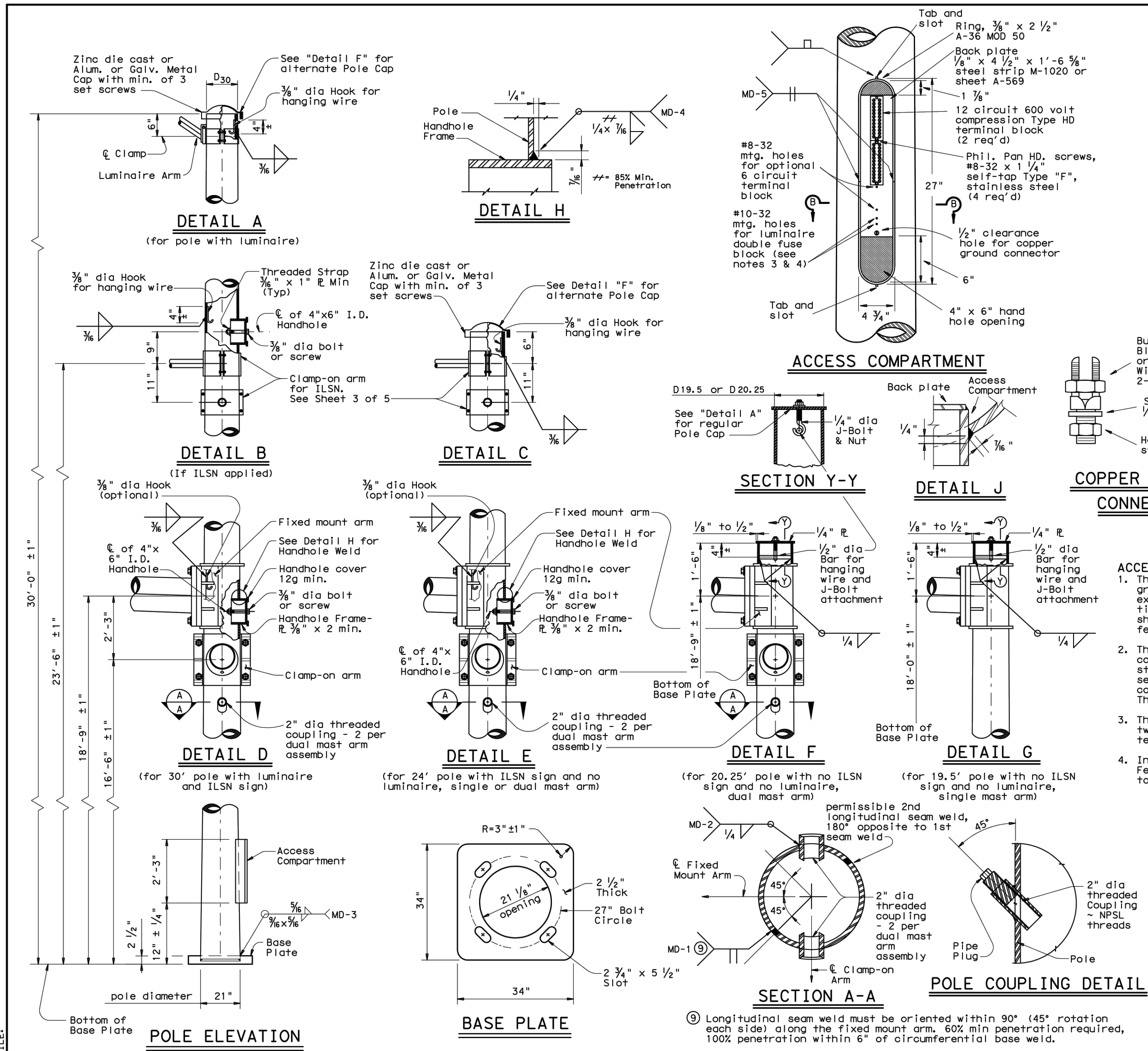
REVISIONS	CONT	SECT	JOB	HIGHWAY
4-20-01 1-12				

DIST COUNTY SHEET NO.

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD LONG MAST ARM ASSEMBLY (1 OF 5)			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	

JNS L.L.C.	JNS ENGINEERS, LLC	722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET TS06

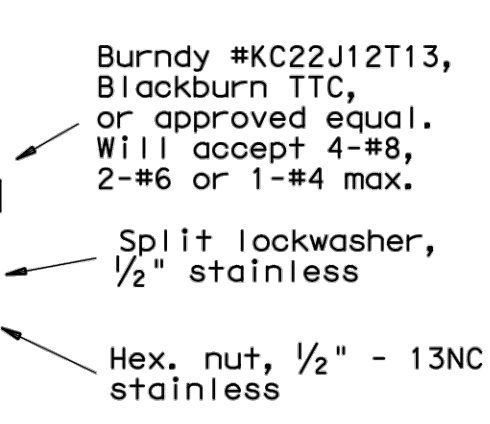
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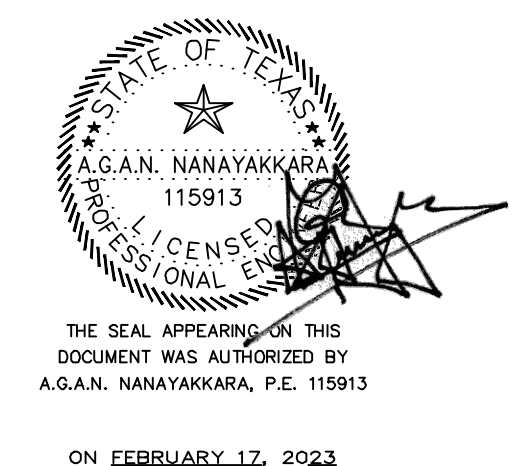
MATERIALS	
Round Shafts or Polygonal Shafts	ASTM A595 Gr. A, A588, A1008 HSLAS Gr. 50 Class 2, A1011 HSLAS Gr. 50 Class 2, A572 Gr. 50 or A1011 SS Gr. 50
Plates	ASTM A36, A588, or A572 Gr. 50
Connection Bolts	ASTM A325, or A449 except where noted
Pin Bolts	ASTM A325
Pipe	ASTM A53 Gr. B, A501, A1008 HSLAS-F Gr. 50, A1011 HSLAS-F Gr. 50
Misc. Hardware	Galvanized steel or stainless steel or as noted

⑦ ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F, or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

⑧ ASTM A1011 SS Gr. 50 shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.



- ACCESS COMPARTMENT NOTES:**
- The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
 - The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilco SSS-5). The traffic signal contractor shall install the kit items in the field.
 - The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
 - Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.



Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY
(50 TO 65 FT)
(80 AND 100 MPH WIND ZONE)
LMA (2) - 12

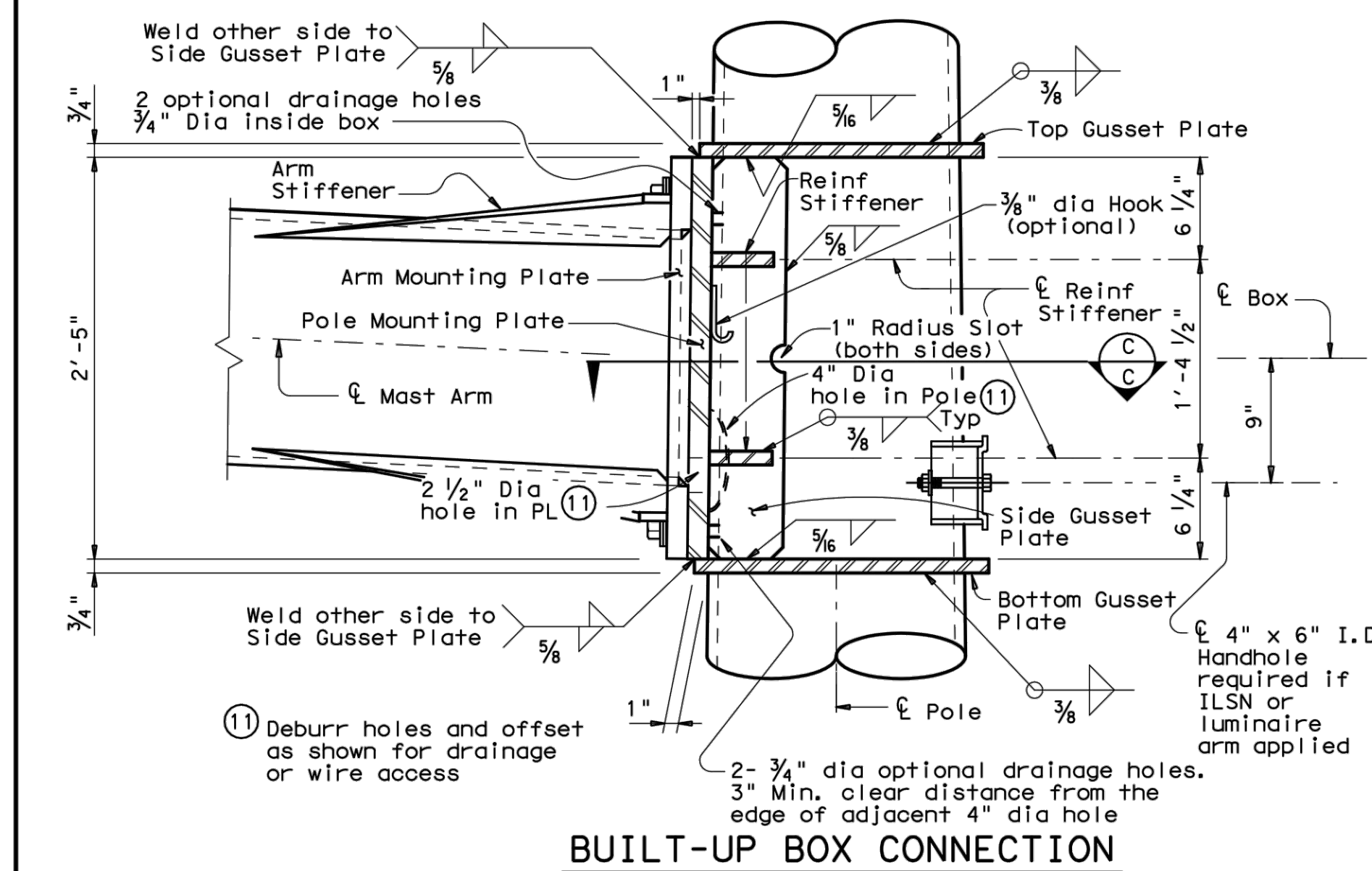
Sheet 2 of 5

© TxDOT July 2000	DNS JSY	CKI ARC	DWR TGG	CKI JSY
REVISIONS	CONT	SECT	JOB	HIGHWAY
1-12				
	DIST	COUNTY	SHEET NO.	

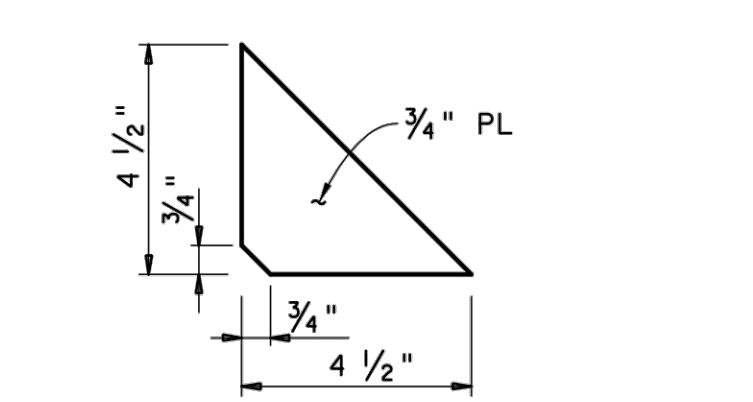
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD LONG MAST ARM ASSEMBLY (2 OF 5)			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET TS07

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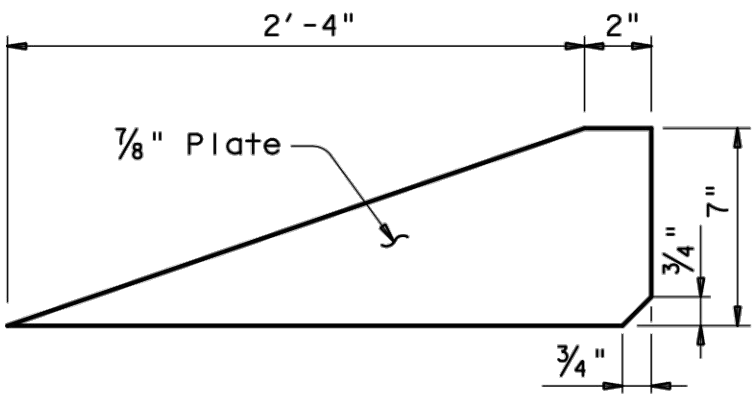
DISCLAIMER: The use of this drawing is governed by the "Texas Engineering Practice Act". No warranty is made by the drafter or the engineer for the accuracy or reliability of the information or for the results of its use.



BUILT-UP BOX CONNECTION



REINFORCING STIFFENER

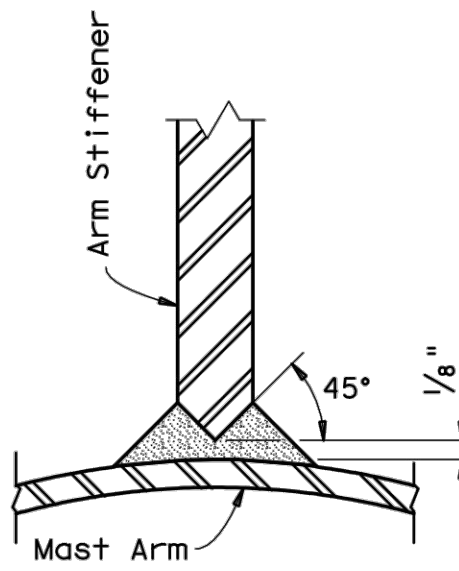


ARM STIFFENER
(Cut to match arm inclination and taper)

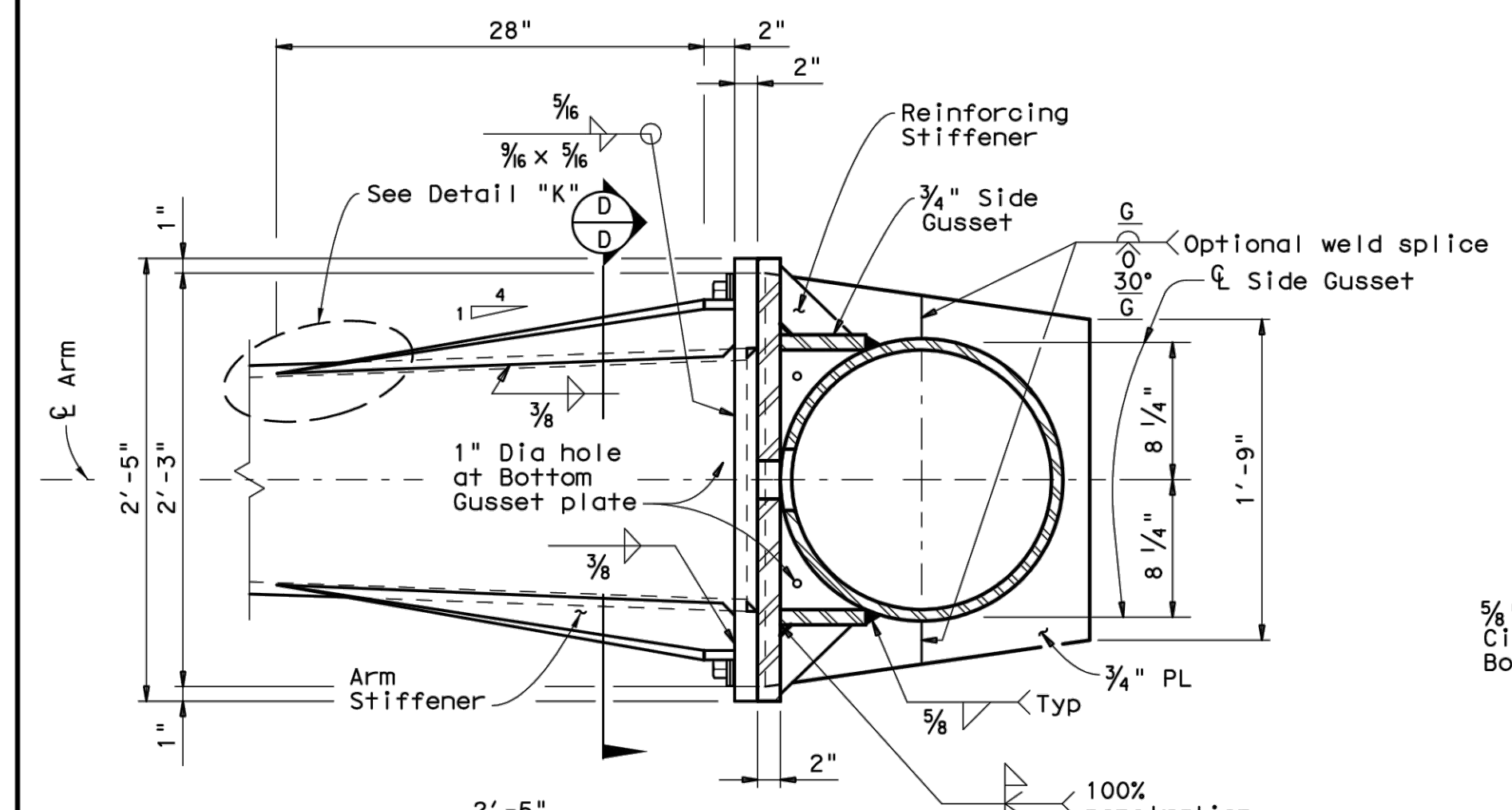
Provide Detail shown in SECTION F-F or equivalent 100% complete joint penetration weld from both sides.

Only 4" length at tip of Arm Stiffener requires a complete joint penetration weld. Smooth weld radius to connect Stiffener. Only a fillet weld is required for the remaining weld length.

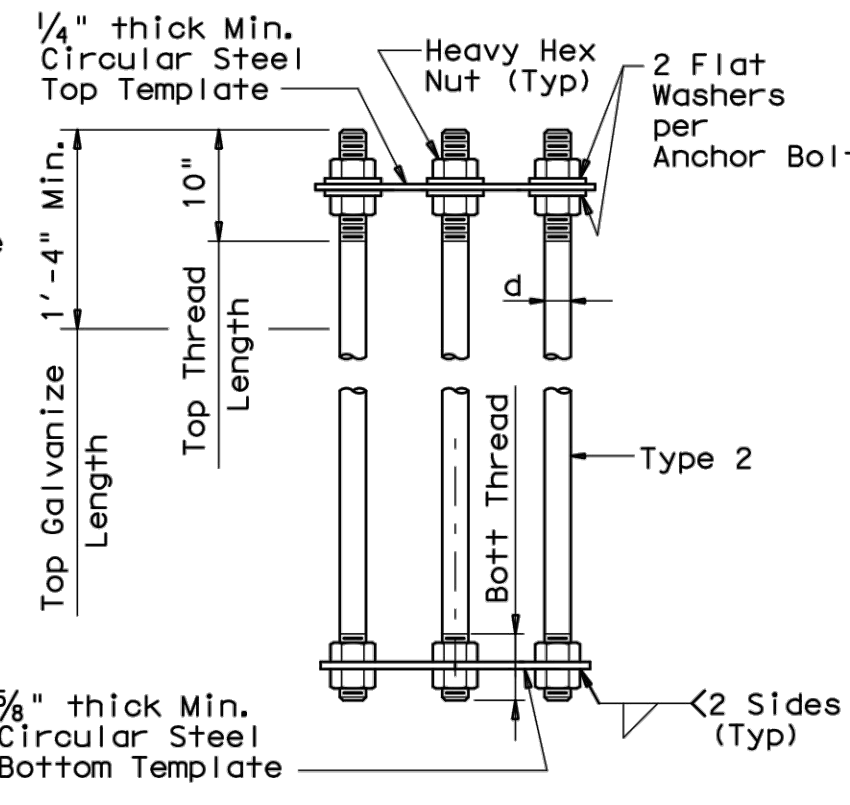
DETAIL "K"



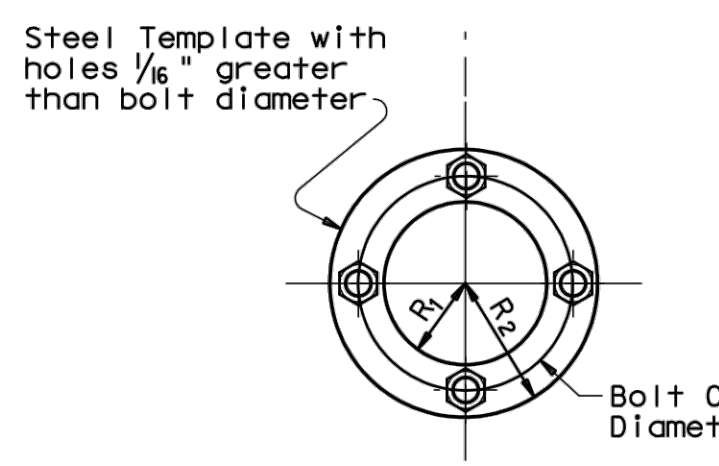
SECTION F-F



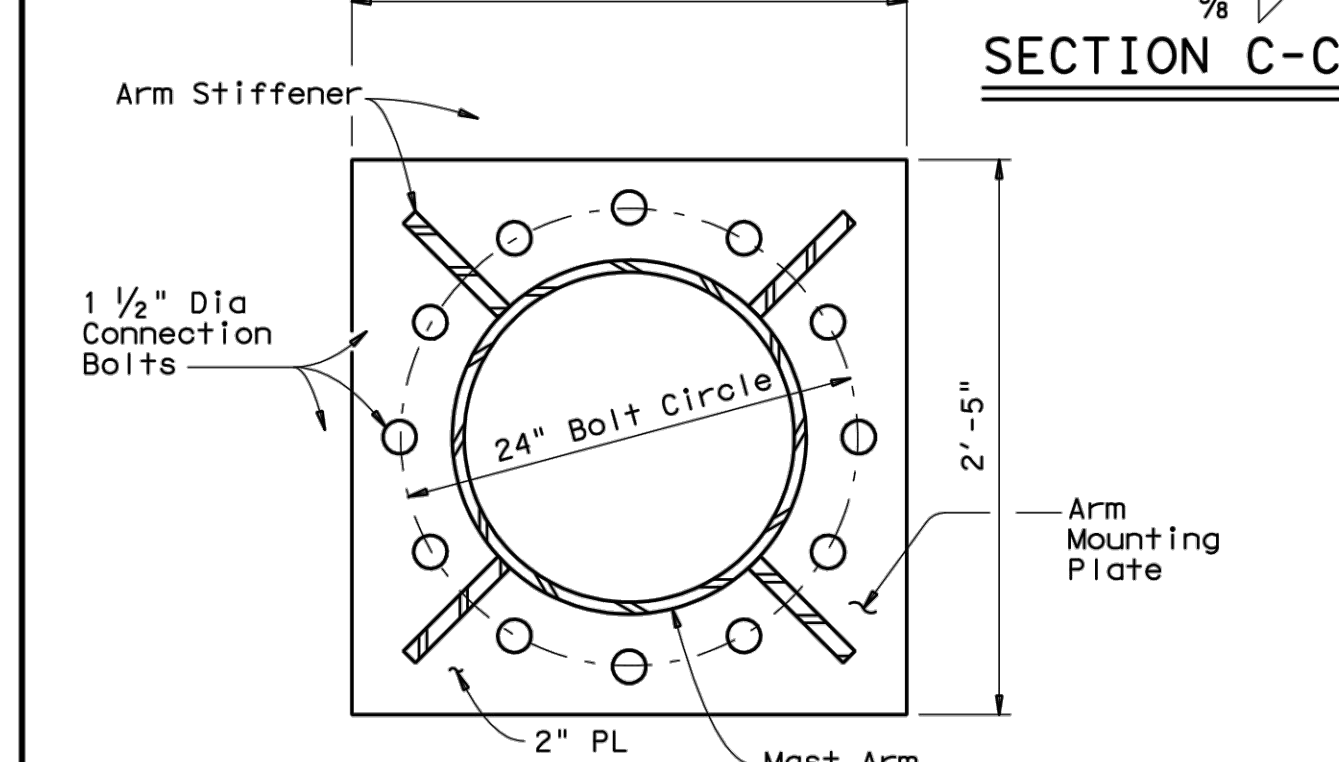
SECTION C-C



ANCHOR BOLT ASSEMBLY



TEMPLATE DETAIL



SECTION D-D

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		DRILLED SHAFT LENGTH-FT (16), (17), (18)			ANCHOR BOLT DESIGN (14)			FOUNDATION DESIGN LOAD (15)		TYPICAL APPLICATION	
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N Blows/ft	ANCHOR BOLT DIA	Fy (Ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips			
48-A	48"	20 #9	#4 at 6"	21.9	19.5	14.7	2 1/2"	55	27"	2	490	10	50' to 65' Mast arm assembly.

SEE SHEET "TS-FD" FOR ADDITIONAL DETAILS.

- (14) Anchor bolt design develops the foundation capacity given under Foundation Design Loads.
- (15) Foundation Design Loads are the allowable moments and shears at the base of the structure.
- (16) Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.
- (17) If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.
- (18) Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

Fixed Mount Arm L F	ROUND POLES (13)					Foundation Type
	D _B	D _{19.5} or D _{20.25}	D ₂₄	D ₃₀	(12)thk	
ft.	in.	in.	in.	in.	in.	
50', 55', 60', 65'	21.0	18.2	17.6	16.8	.3125	48-A

Fixed Mount Arm L F	ROUND ARMS (13)				
	L ₁	D ₁	D ₂	(12)thk	Rise
ft.	ft.	in.	in.	in.	
50	49	18.5	11.7	.3125	3'-3"
55	54	18.5	11.0	.3125	3'-7"
60	59	18.5	10.3	.3125	3'-11"
65	64	18.5	9.6	.3125	4'-4"

- D_B = Pole Base O.D.
- D_{19.5} = Pole Top O.D. with no Luminaire and no ILSN (single mast arm)
- D_{20.25} = Pole Top O.D. with no Luminaire and no ILSN (dual mast arm)
- D₂₄ = Pole Top O.D. with ILSN w/out Luminaire
- D₃₀ = Pole Top O.D. with Luminaire
- D₁ = Arm Base O.D.
- D₂ = Arm End O.D.
- L₁ = Shaft Length
- L_F = Fixed Arm Length

- (12) Thickness shown is minimum, thicker materials may be used.
- (13) Shaft profile 16-sided or 18-sided is considered to be equivalent to round section.

GENERAL NOTES:

Built-up Box Connection: For the welded arm-to-pole connection as a build-up box configuration illustrated here is an example only, fabricators are required to submit a shop drawing of box connection for approval. The drawing shall specify the details of each box element, welds of arm-to-pole connection, arm-to-plate socket connection, and arm rise creation. Specify the proper location of drain holes along the pole. 2 1/2" dia hole in the pole mounting plate and 4" dia hole in the pole need to be aligned for wiring access or drainage. Arm stiffeners cut to match arm inclination and taper shall also be included.

The deviation from flat for either arm or pole mounting plate shall not exceed 1/8 in., which is measured along the center of mounting plate to a radial distance of 13.5 in. The deformed-from-flat connection between arm and pole mounting plates shall not be allowed if the center of both mounting plates cannot contact directly.

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

ANCHOR BOLT & TEMPLATE SIZE

Bolt Dia in.	Length †	Top Thread	Bottom Thread	Bolt Circle	R ₂	R ₁
2 1/2"	5'-2"	10"	6 1/2"	27"	16"	11"

† Min dimension given, longer bolts are acceptable.

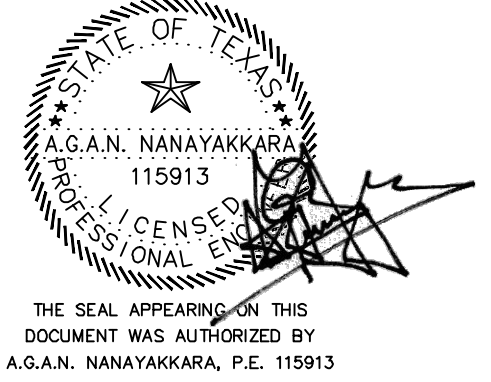
Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY
(50 TO 65 FT)
(80 AND 100 MPH WIND ZONE)

Sheet 3 of 5 LMA (3) - 12

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REV. NO.	DESCRIPTION	DATE	APP.
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ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
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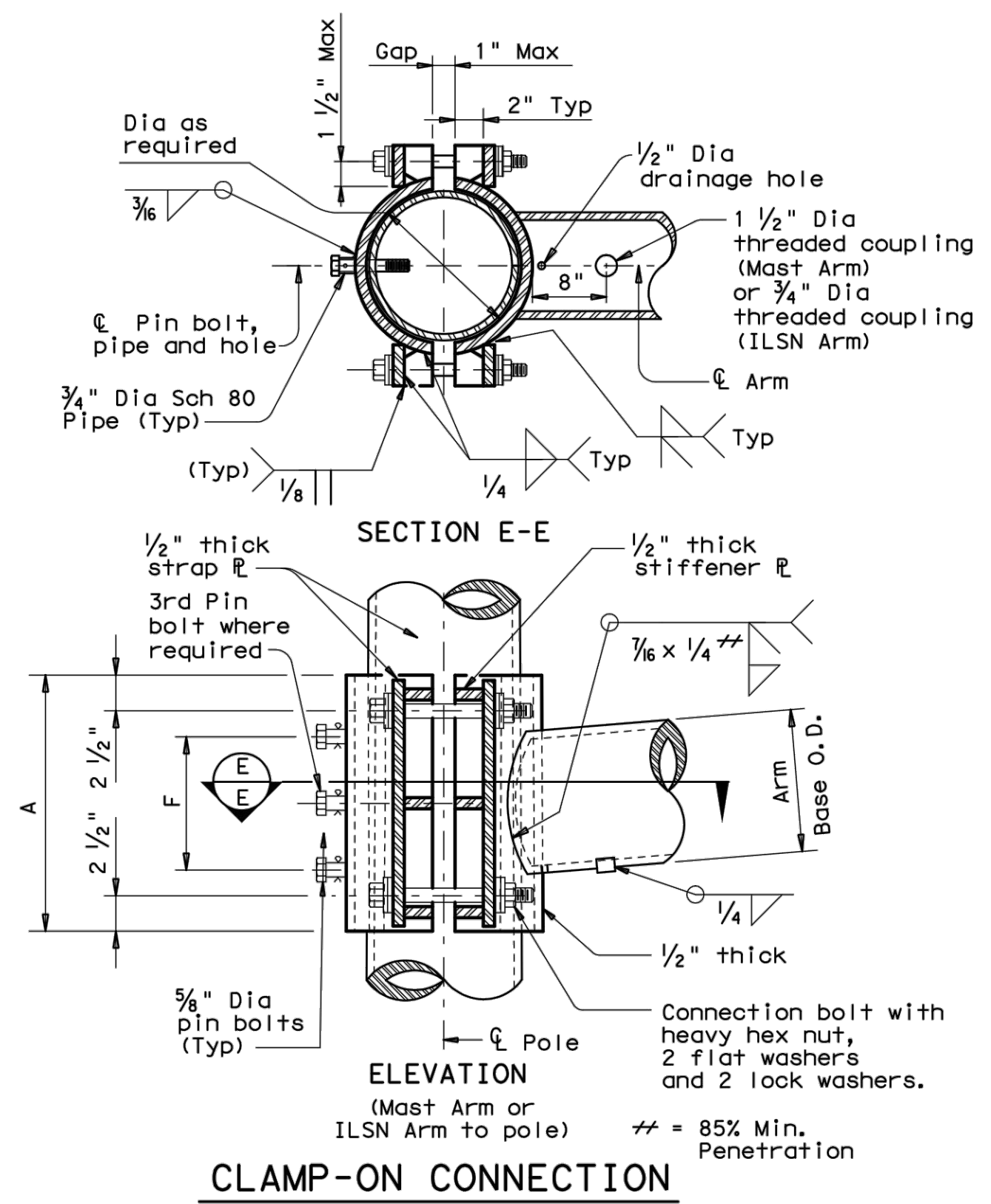
BRANDT ROAD PRECINCT LINE RD TO MASON RD
LONG MAST ARM ASSEMBLY
(3 OF 5)

TERRA a Bowman company
1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
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TBPE Registration No.: F-14309

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REGISTRATION NO. 11653

DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1
		SHEET TS08

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CLAMP-ON CONNECTION

80 MPH WIND												
Clamp-on Arm Lc	ROUND ARMS					Rise	POLYGONAL ARMS					Rise
	L ₁	D ₁	D ₂	thk (12)	in.		L ₁	D ₁	D ₂	thk (12)	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"		
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"		
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"		
32	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"		
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"		
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"		
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"		

100 MPH WIND												
Clamp-on Arm Lc	ROUND ARMS					Rise	POLYGONAL ARMS					Rise
	L ₁	D ₁	D ₂	thk (12)	in.		L ₁	D ₁	D ₂	thk (12)	in.	
20	19.1	8.0	5.3	.179	1'-8"	19.1	8.0	3.5	.179	1'-7"		
24	23.1	9.0	5.8	.179	1'-9"	23.1	9.0	3.5	.179	1'-8"		
28	27.1	9.5	5.7	.179	1'-10"	27.1	10.0	3.5	.179	1'-9"		
32	31.0	9.5	5.2	.239	1'-11"	31.0	9.5	3.5	.239	1'-10"		
36	35.0	10.0	5.1	.239	2'-0"	35.0	10.0	3.5	.239	1'-11"		
40	39.0	10.5	5.1	.239	2'-3"	39.0	11.0	3.5	.239	2'-1"		
44	43.0	11.0	5.1	.239	2'-8"	43.0	11.5	4.0	.239	2'-3"		

D₁ = Arm Base O.D.
 D₂ = Arm End O.D.
 L₁ = Shaft Length
 L_c = Clamp-on Arm Length
 (12) Thickness shown is minimum, thicker materials may be used.

CLAMP-ON ARM CONNECTION					
ILSN Arm Size		A	F	4 Conn. Bolts	5/8" Dia. Pin Bolts
Sch 40 pipe Dia	Thick				
in.	in.	in.	in.	in.	ea
3	.216	10	4	3/4	2

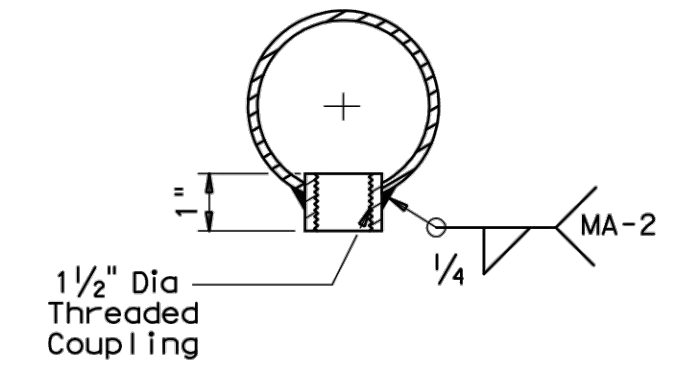
Mast Arm Size					
Base Dia	Thick	A	F	4 Conn. Bolts	5/8" Dia. Pin Bolts
6.5	.179	12	6	1	2
7.5	.179	14	8	1	2
8.0	.179	14	8	1	2
9.0	.179	16	10	1	2
9.5	.179	18	12	1 1/4	3
9.5	.239	18	12	1 1/4	3
10.0	.239	18	12	1 1/4	3
10.5	.239	18	12	1 1/4	3
11.0	.239	18	12	1 1/4	3
11.5	.239	18	12	1 1/4	3

GENERAL NOTES:

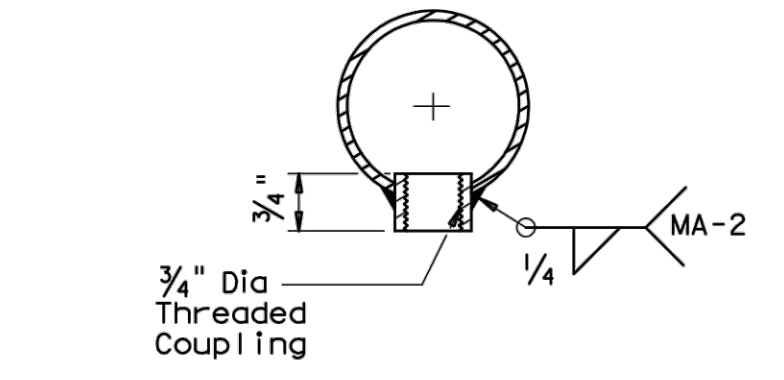
Clamp-on details are used for the second arm on dual mast arm assemblies or ILSN arm support. For a clamp-on mast arm, a maximum 1 1/2" wide vertical slotted hole may be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1". For an ILSN arm, a 1 1/2" diameter hole shall be cut in the front clamp plate for wire access. A matched hole shall be field drilled through the pole to provide wire access after arm is oriented. Deburr both holes.

Where duplicate parts occur on a detail, welds shown for part shall apply to all similar parts on the detail.

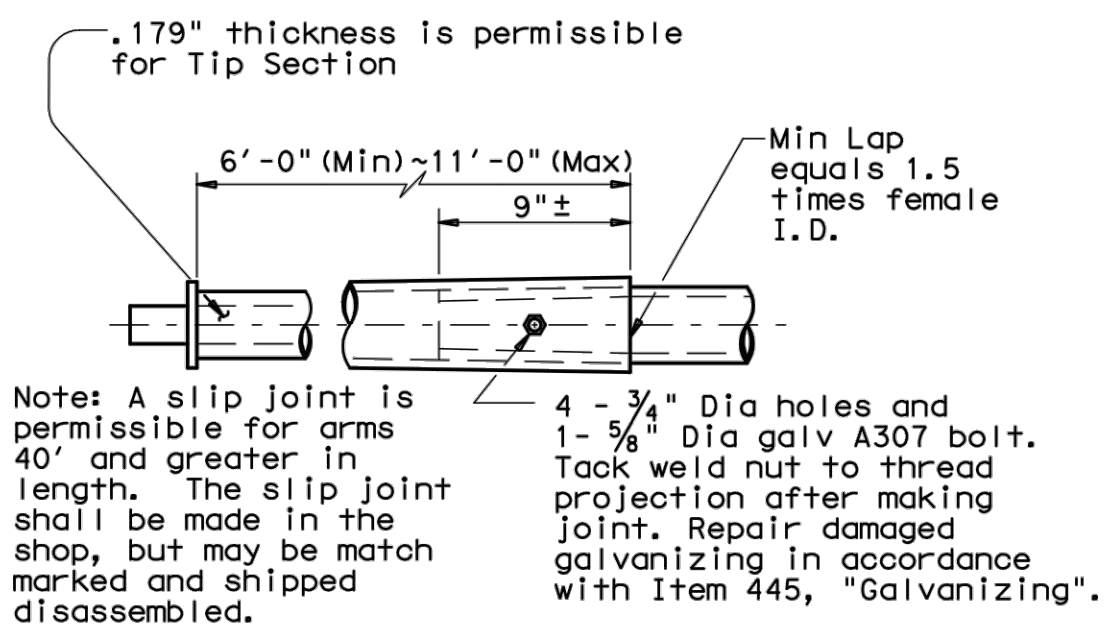
Pin bolts are required to prevent rotation of clamp-on arms under design wind forces. Pin bolts shall be ASTM A325 with threads excluded from the shear plane. Pin bolt and 3/4" diameter pipe shall have 3/8" diameter holes for a 1/8" diameter galvanized cotter pin. Back clamp plate shall be furnished with a 3/4" diameter hole for each pin bolt. An 1/8" diameter hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.



ARM COUPLING DETAIL



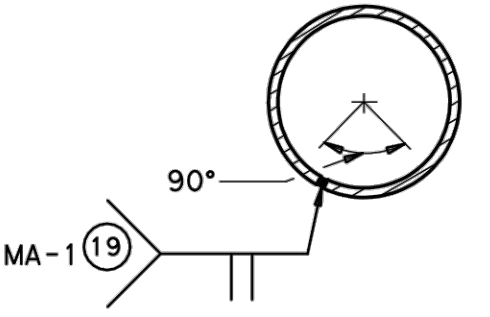
ILSN ARM COUPLING DETAIL



SLIP JOINT DETAIL (CLAMP-ON ARM)

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 1/2" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

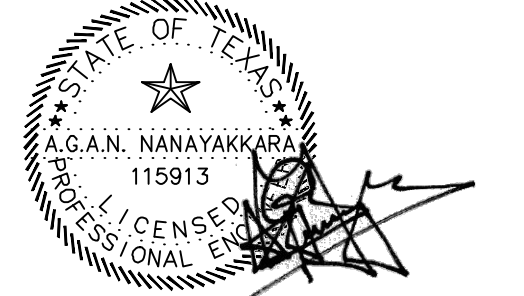
(19) Longitudinal Seam Weld must be oriented within the lower 90° of the signal arm. 60% Min penetration 100% penetration within 6" of circumferential base welds.

Texas Department of Transportation
 Traffic Operations Division
TRAFFIC SIGNAL SUPPORT STRUCTURES
 LONG MAST ARM ASSEMBLY (50 TO 65 FT)
 (80 AND 100 MPH WIND ZONE)
 Sheet 4 of 5 LMA (4) - 12

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REV. NO.	DESCRIPTION	DATE	APP.
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131D



ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
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BRANDT ROAD PRECINCT LINE RD TO MASON RD LONG MAST ARM ASSEMBLY (4 OF 5)

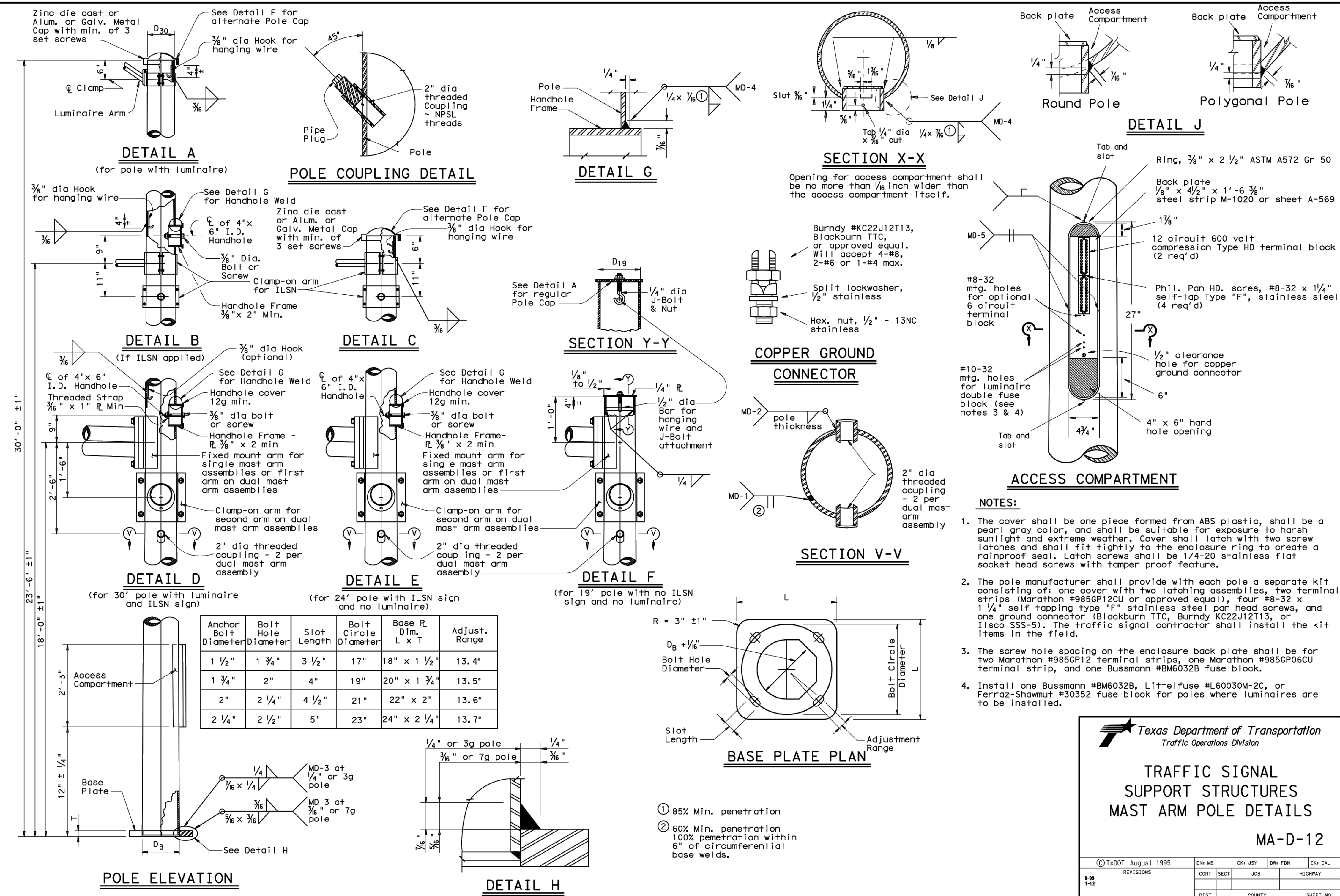
TERRA a Bowman company
 1445 N. LOOP WEST - SUITE 450
 HOUSTON, TEXAS 77008
 713-993-0333
 TBPE Registration No.: F-14309

JNS ENGINEERS, LLC
 722 PIN OAK ROAD, STE 202A
 KATY, TEXAS 77494
 TELEPHONE: (281) 391-3366
 FAX: (281) 391-3375
 WWW.JNSCE.COM
 T.S.P.E. FIRM
 REGISTRATION NO. 11653

DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1
		SHEET TS09

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DATE: FILE:



Texas Department of Transportation
 Traffic Operations Division

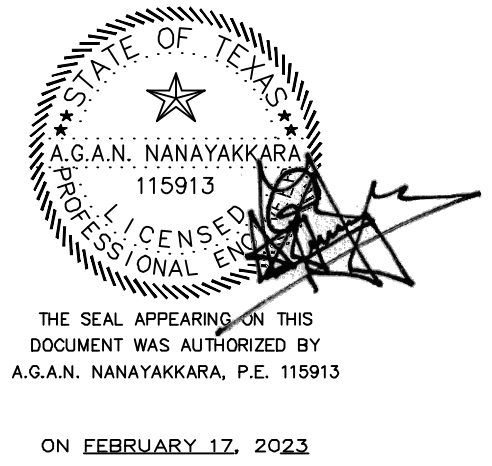
TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12

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DN: MS	CK: JSY	DW: FDN	CK: CAL
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY	SHEET NO.	

121



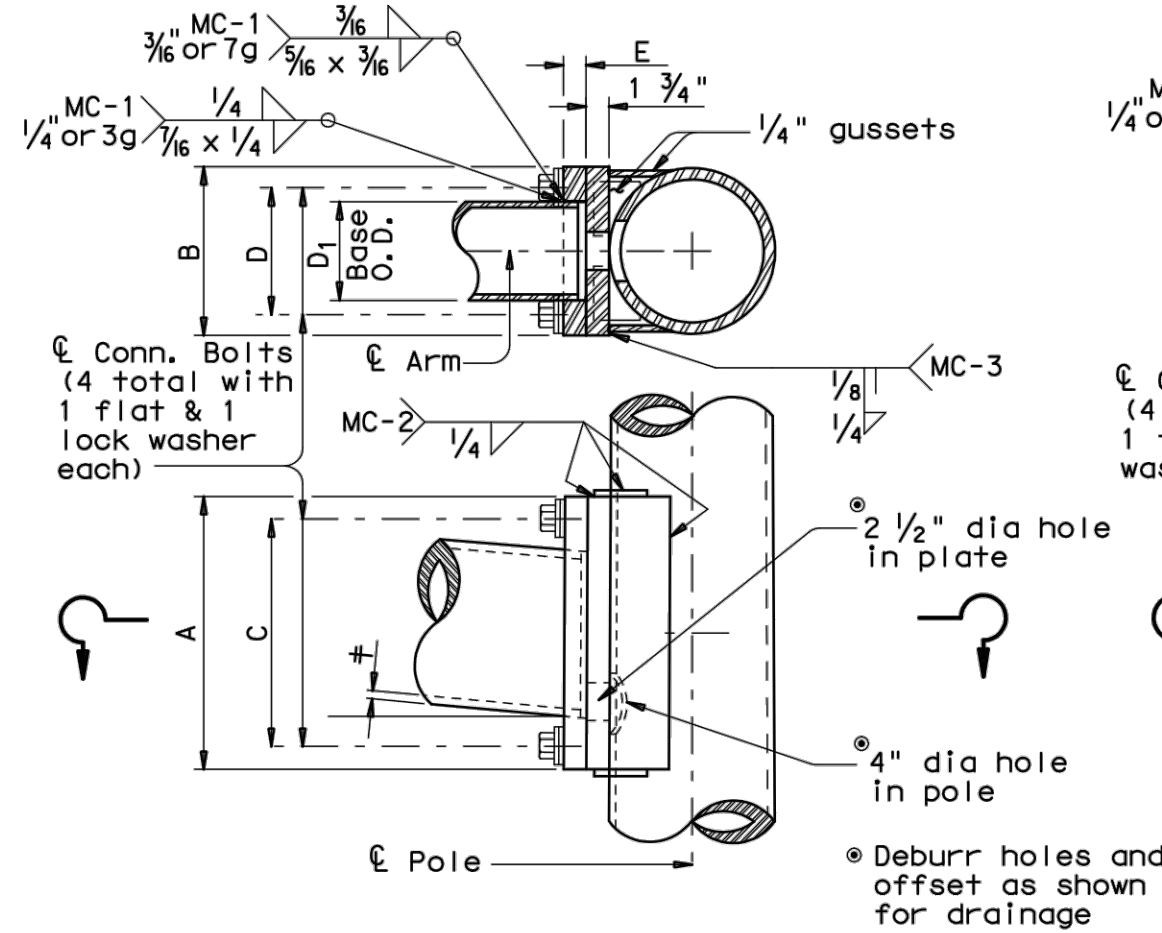
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
MAST ARM POLE DETAILS			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET TS11

722 PIN OAK ROAD, STE 202A
 KATY, TEXAS 77494
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 FAX: (281) 391-3375
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 REGISTRATION NO. 11653

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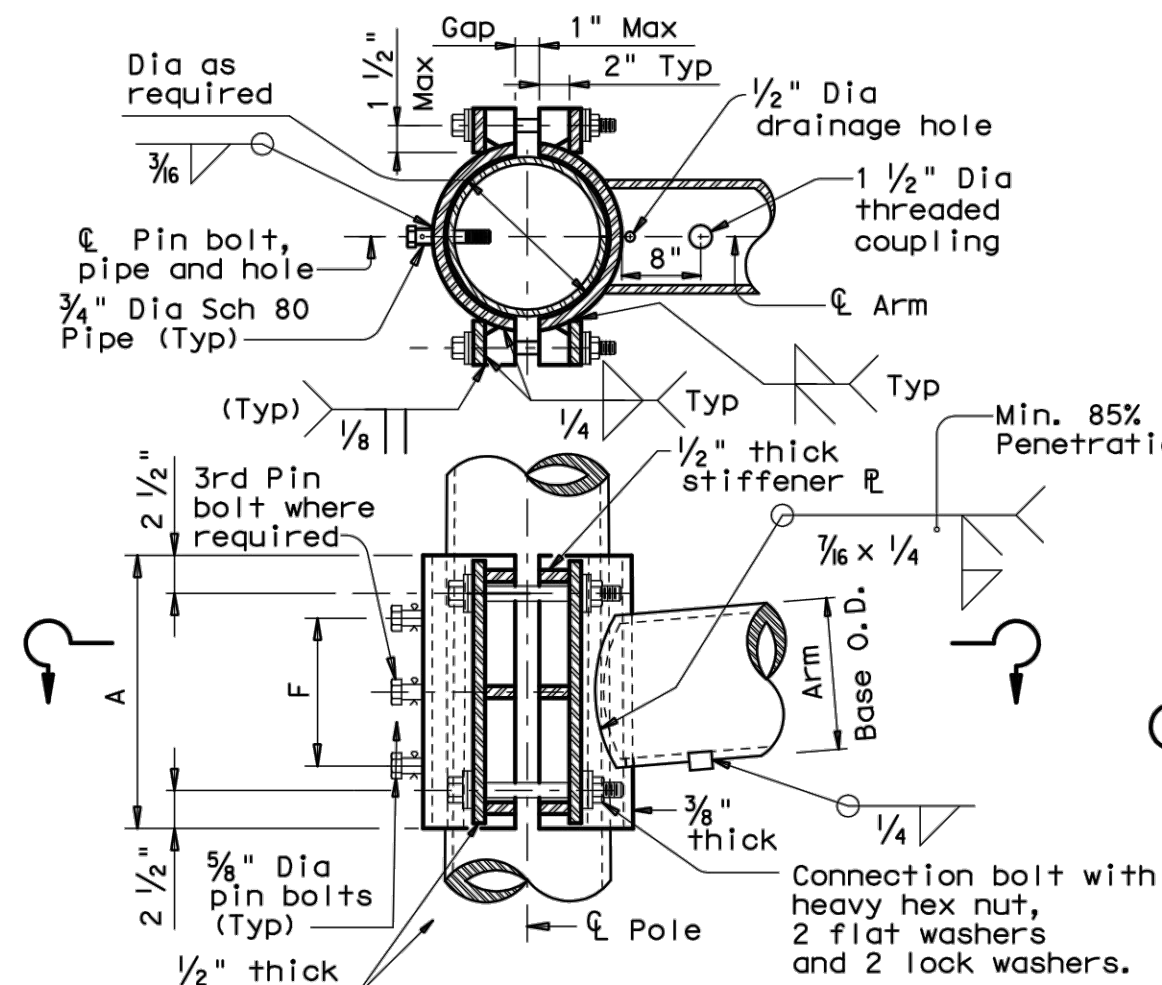
DATE: FILE:

ARM SIZE		A	B	C	D	E	CONN. BOLT DIA
D ₁	#	in.	in.	in.	in.	in.	in.
6.5	.179	12	9	9	6	1 3/4	1
7.5	.179	13	9	10	6	1 3/4	1
8.0	.179	14	10	11	7	2	1 1/4
9.0	.179	16	11	13	8	2	1 1/4
9.5	.179	17	12	14	9	2	1 1/4
9.5	.239	18	12	15	9	2	1 1/4
10.0	.239	18	12	15	9	2	1 1/4
10.5	.239	18	13	15	10	3	1 1/2
11.0	.239	18	13	15	10	3	1 1/2



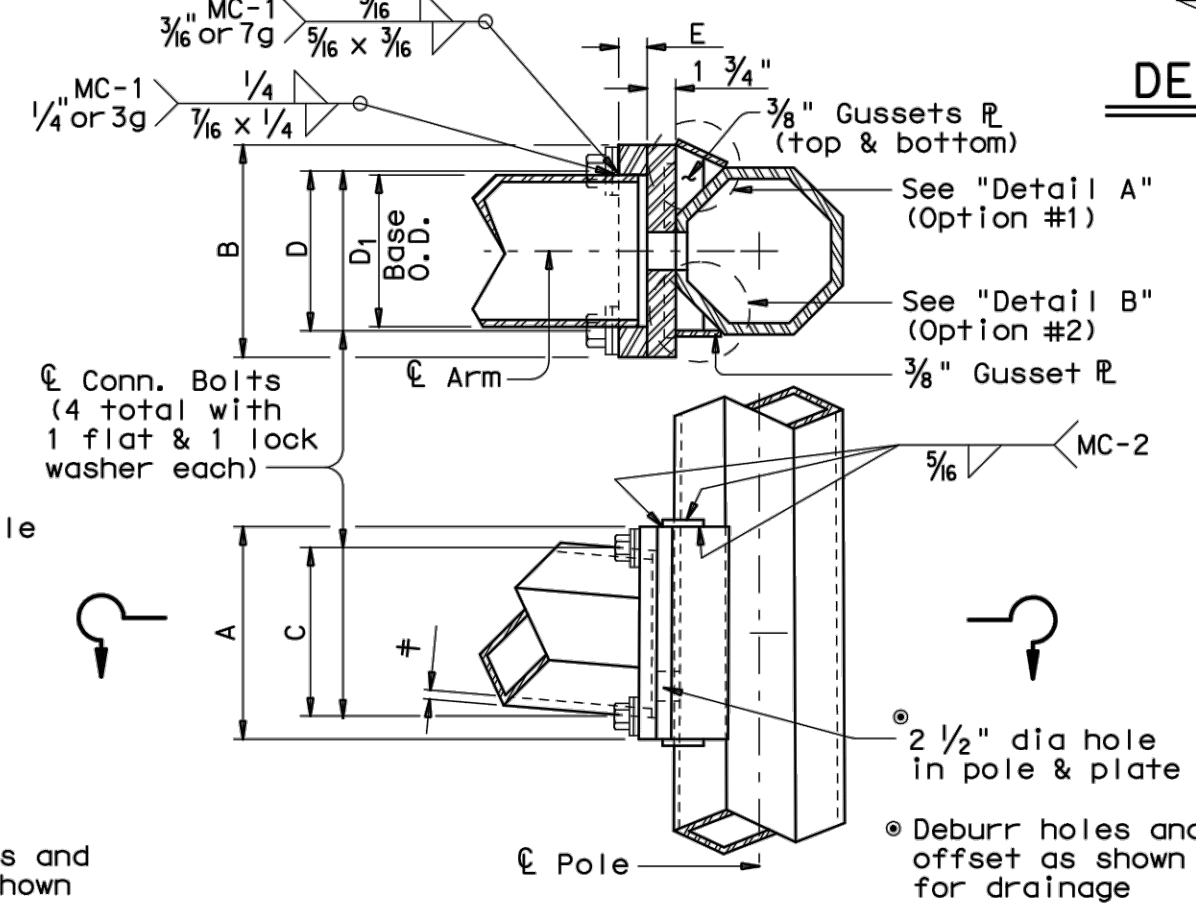
FIXED MOUNT DETAIL 1

ARM SIZE		A	F	CONN. BOLTS	PIN BOLTS
D ₁	#	in.	in.	No. Dia	No. Dia
6.5	.179	12	6	4 1/2	2 3/8
7.5	.179	14	8	4 1/2	2 3/8
8.0	.179	14	8	4 1/2	2 3/8
9.0	.179	16	10	4 1/2	2 3/8
9.5	.179	18	12	4 1/2	3 3/8
9.5	.239	18	12	4 1/2	3 3/8
10.0	.239	18	12	4 1/2	3 3/8



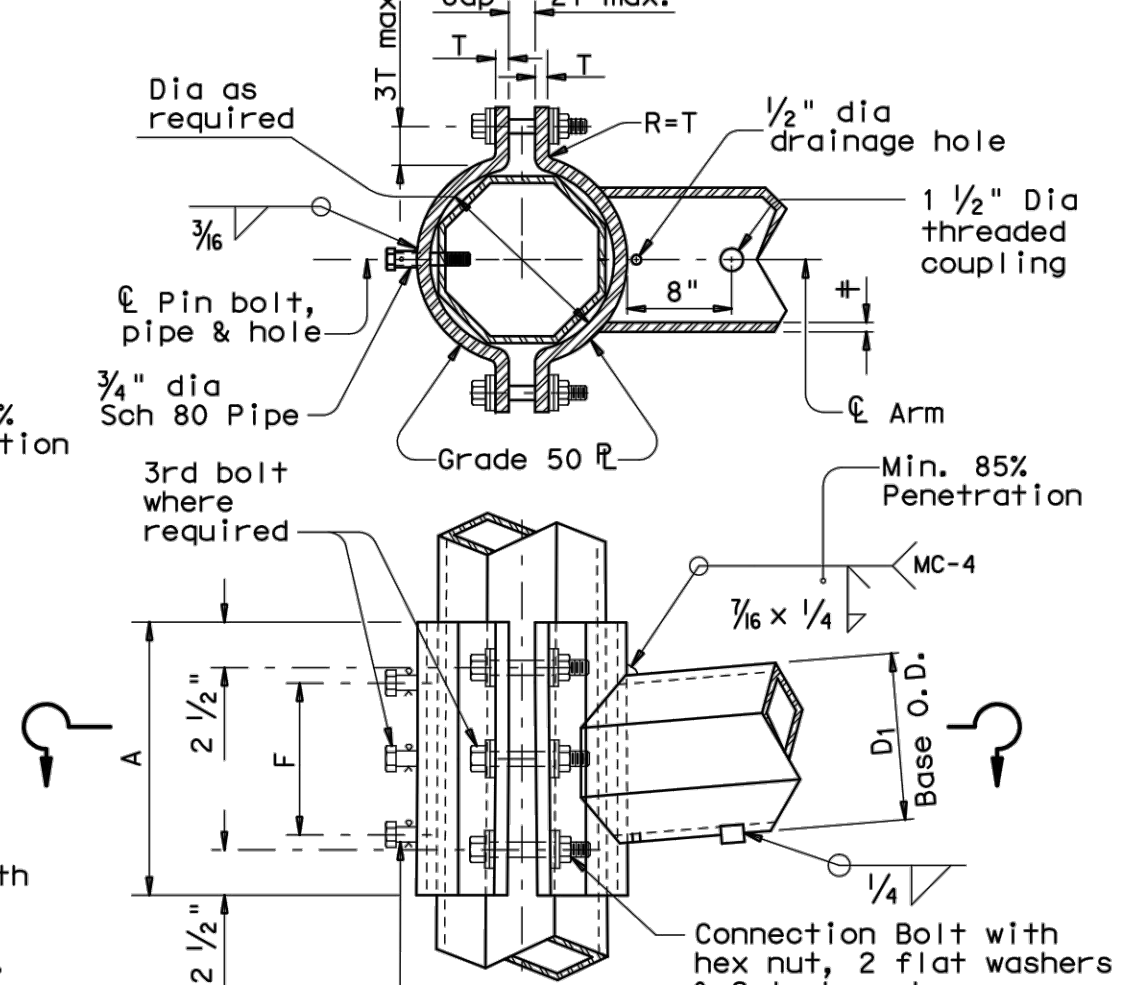
CLAMP-ON DETAIL 1

ARM SIZE		A	B	C	D	E	CONN. BOLT DIA
D ₁	#	in.	in.	in.	in.	in.	in.
7.0	.179	11	11	8	8	1 3/4	1 1/4
7.5	.179	11	11	8	8	1 3/4	1 1/4
8.0	.179	11	11	8	8	2	1 1/4
9.0	.179	13	13	10	10	2	1 1/4
10.0	.179	13	13	10	10	2	1 1/4
9.5	.239	13	13	10	10	2	1 1/4
10.0	.239	14	14	11	11	2	1 1/2
11.0	.239	14	14	11	11	3	1 1/2
11.5	.239	14	14	11	11	3	1 1/2

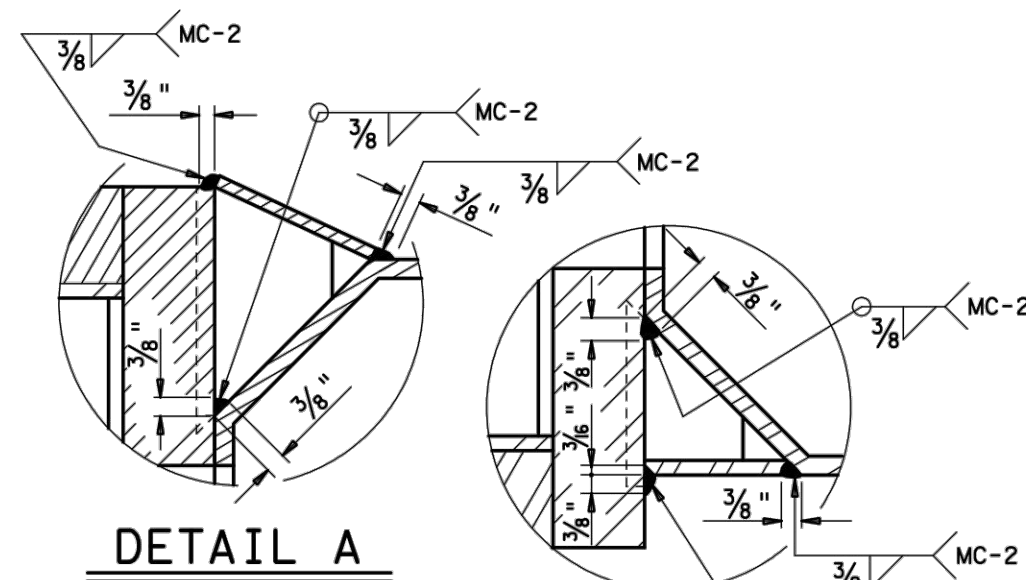


FIXED MOUNT DETAIL 2

ARM SIZE		A	F	T	CONN. BOLTS	PIN BOLTS
D ₁	#	in.	in.	in.	No. Dia	No. Dia
7.0	.179	12	6	3/4	4 3/4	2 3/8
7.5	.179	14	8	3/4	4 3/4	2 3/8
8.0	.179	14	8	3/4	4 3/4	2 3/8
9.0	.179	16	10	3/4	4 1/2	2 3/8
9.5	.179	18	10	3/4	4 1/2	2 3/8
9.5	.239	18	10	1	6	1 3/8
10.0	.239	18	10	1	6	1 3/8

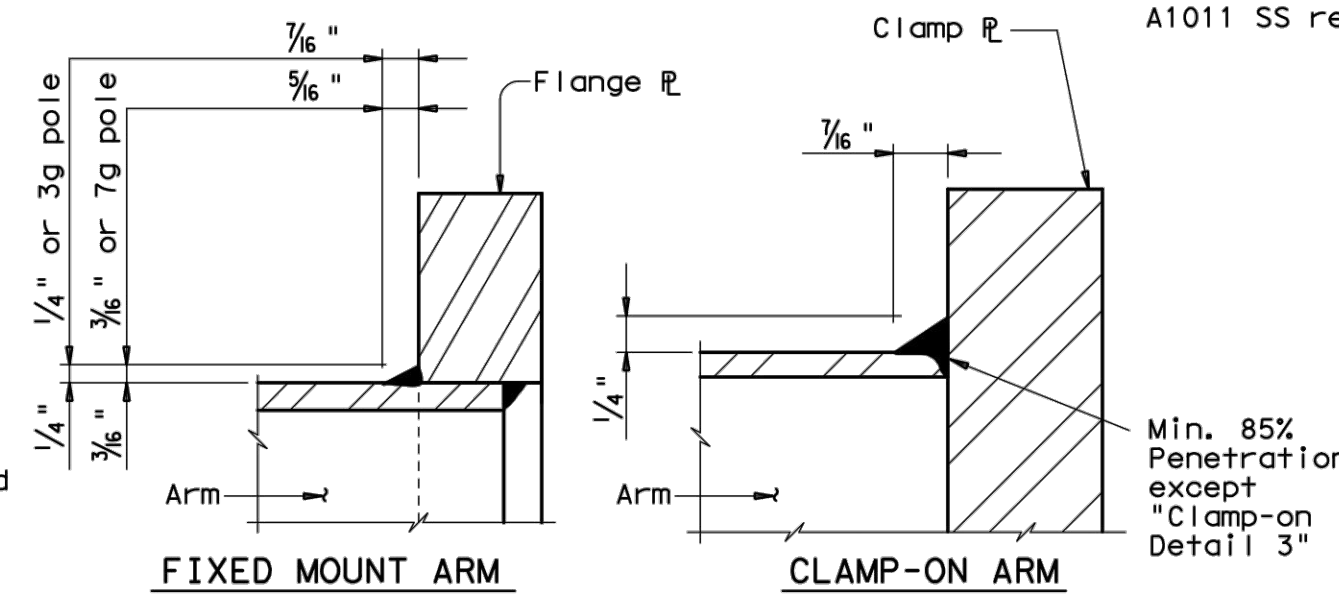


CLAMP-ON DETAIL 2



DETAIL A

DETAIL B

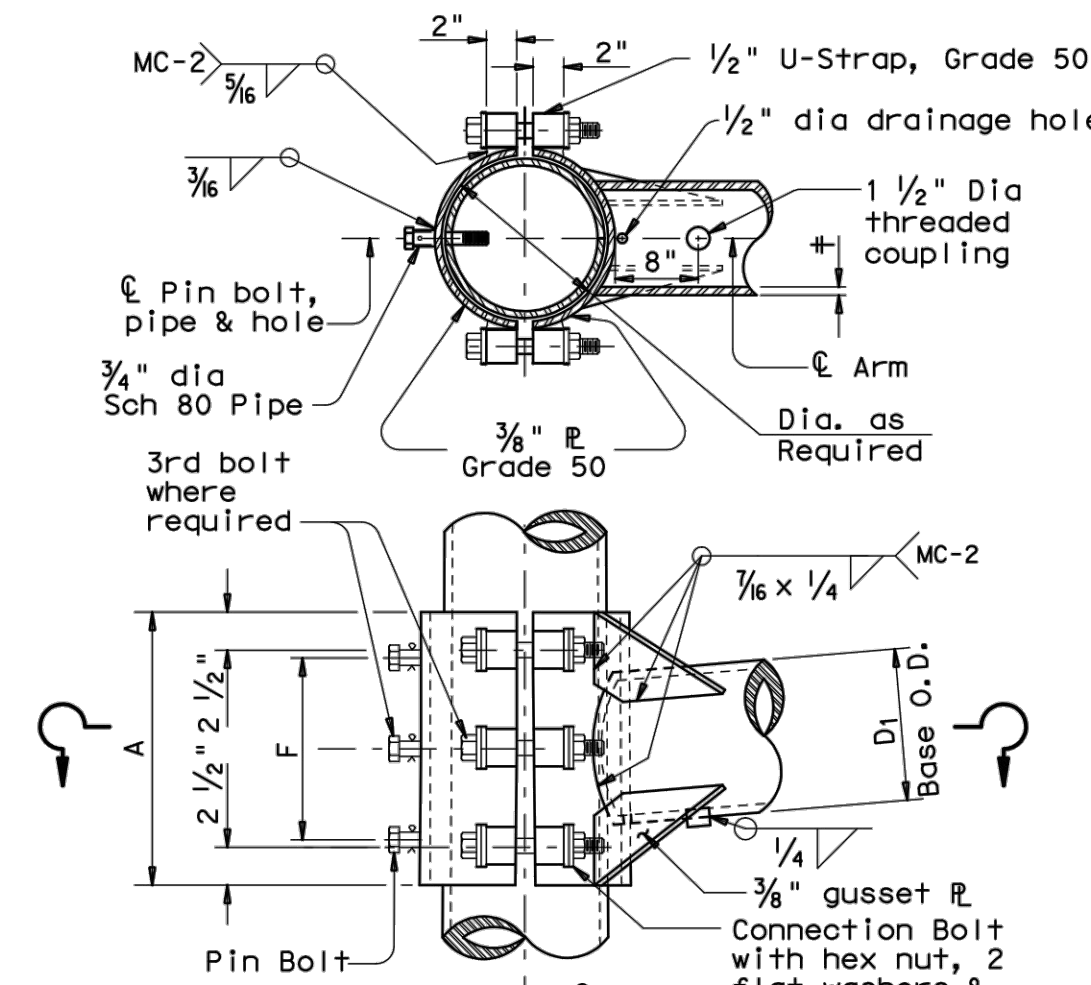


FIXED MOUNT ARM

CLAMP-ON ARM

ARM BASE WELD DETAILS

ARM SIZE		A	F	CONN. BOLTS	PIN BOLTS
D ₁	#	in.	in.	No. Dia	No. Dia
6.5	.179	12	6	4	2 3/8
7.5	.179	14	8	4	2 3/8
8.0	.179	14	8	4	2 3/8
9.0	.179	16	10	4	2 3/8
9.5	.179	18	12	6	1 3/8
9.5	.239	18	12	6	1 3/8
10.0	.239	18	12	6	1 3/8



CLAMP-ON DETAIL 3

MATERIALS	
Round Shafts or Polygonal Shafts ①	ASTM A595 Gr. A, A588, A1008 HSLAS Gr. 50 Class 2, A1011 HSLAS Gr. 50 Class 2, A572 Gr. 50 or A1011 SS Gr. 50 ②
Plates ①	ASTM A36, A588, or A572 Gr. 50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe ①	ASTM A53 Gr. B, A501, A1008 HSLAS-F Gr. 50, A1011 HSLAS-F Gr. 50
Misc. Hardware	Galvanized steel or stainless steel or as noted

- ① ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.
- ② ASTM A1011 SS Gr. 50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 1/2" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and 3/4" dia pipe shall have 3/8" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a 3/4" dia hole for each pin bolt. An 1/8" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

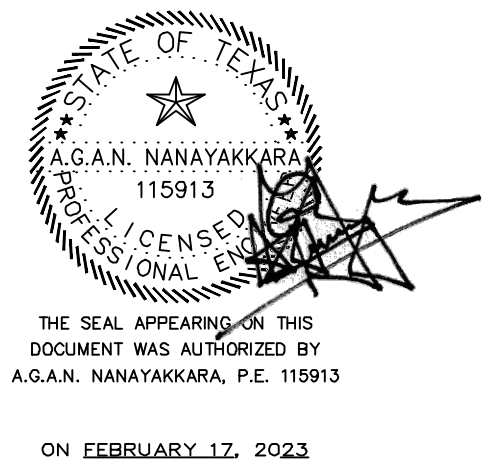
Texas Department of Transportation
Traffic Operations Division

**STANDARD ASSEMBLY
FOR TRAFFIC SIGNAL
SUPPORT STRUCTURES
MAST ARM CONNECTIONS
MA-C-12**

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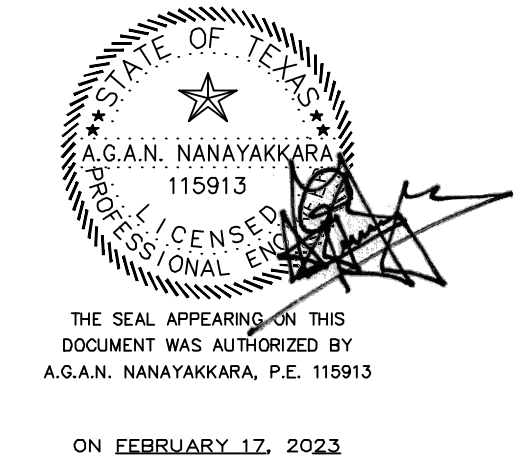
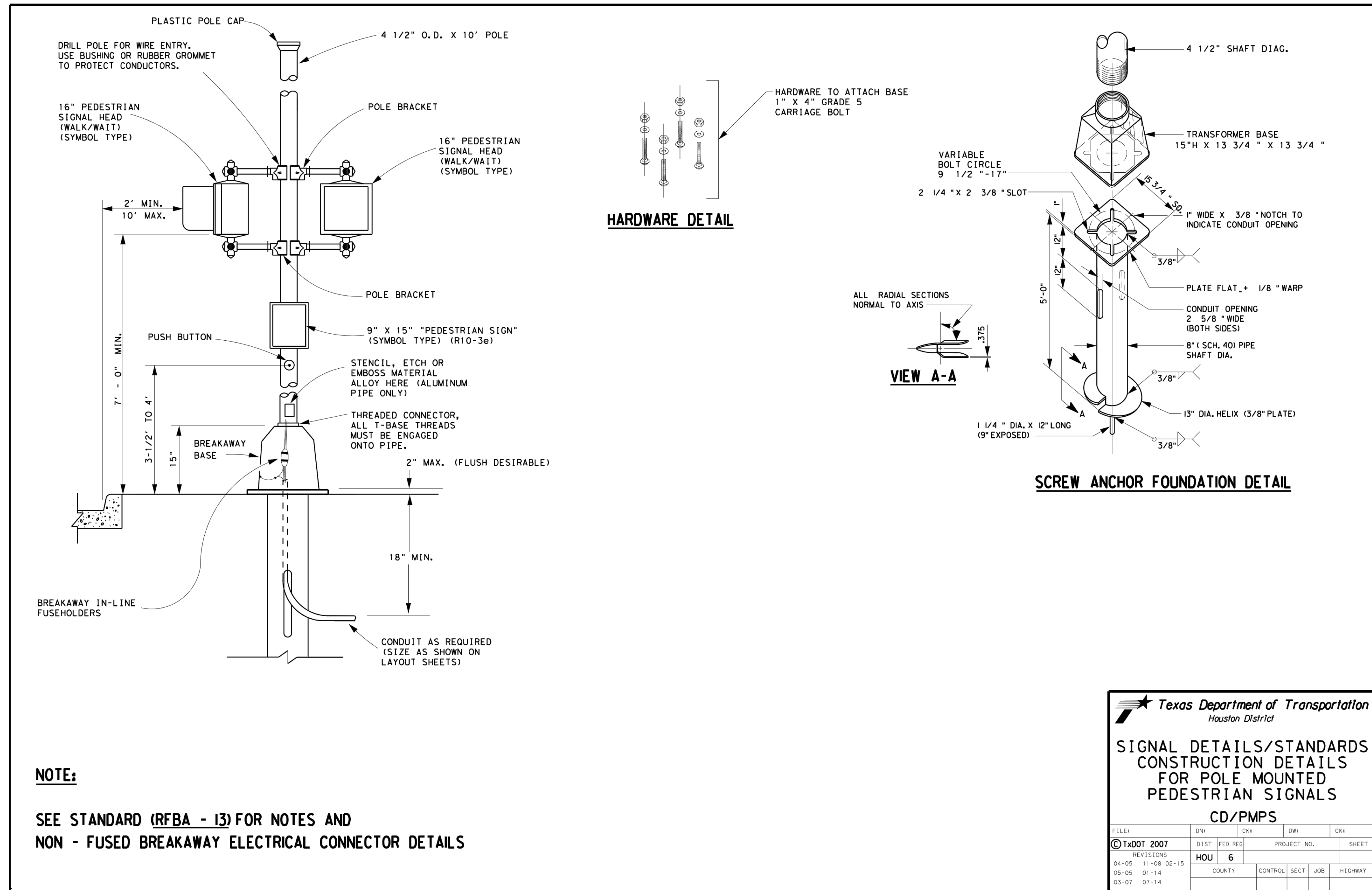
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CON: SECT	JOB	HIGHWAY	
DIST	COUNTY	SHEET NO.	

126A



REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
MAST ARM CONNECTIONS			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET TS12	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Sig 2\TS13 PEDESTRIAN SIGNALS.dwg Feb 17, 2023-11:01am Terra Associates Inc., Thanh Dao



Texas Department of Transportation
Houston District

SIGNAL DETAILS/STANDARDS
CONSTRUCTION DETAILS
FOR POLE MOUNTED
PEDESTRIAN SIGNALS
CD/PMPS

FILE:	DN:	CK:	DW:	CK:
© TxDOT 2007	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS	HOU	6		
04-05 11-08 02-15	COUNTY	CONTROL	SECT	JOB
05-05 01-14				HIGHWAY
03-07 07-14				

STD-M4

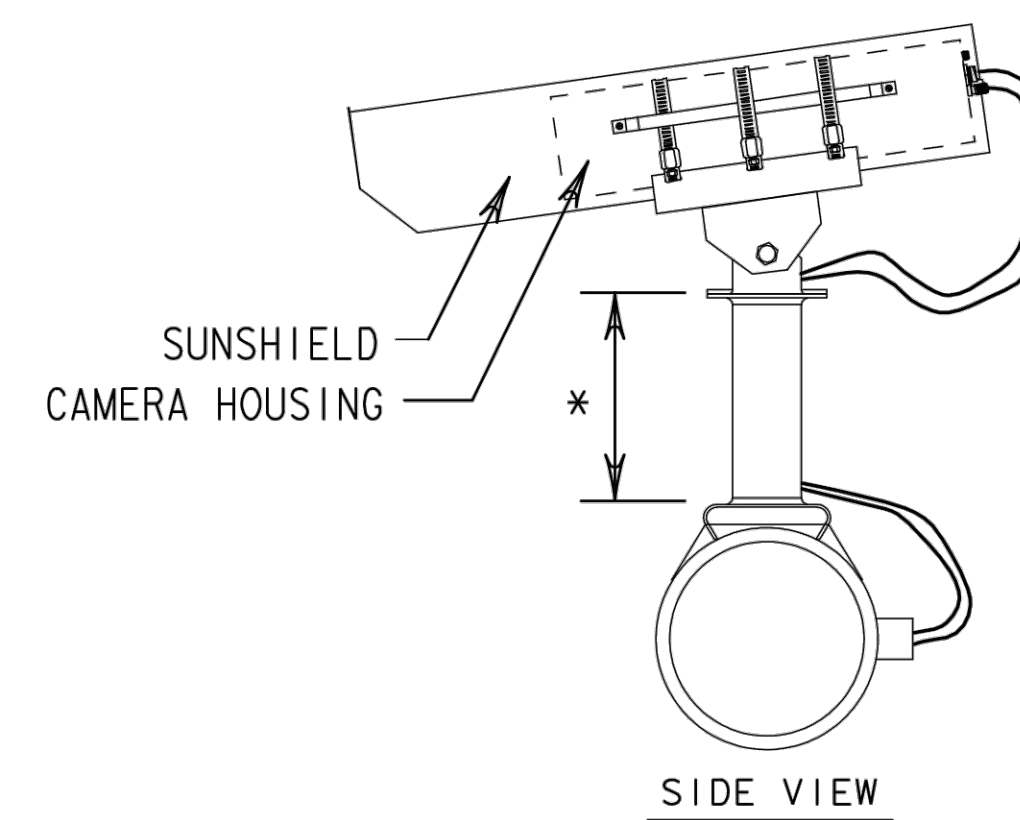
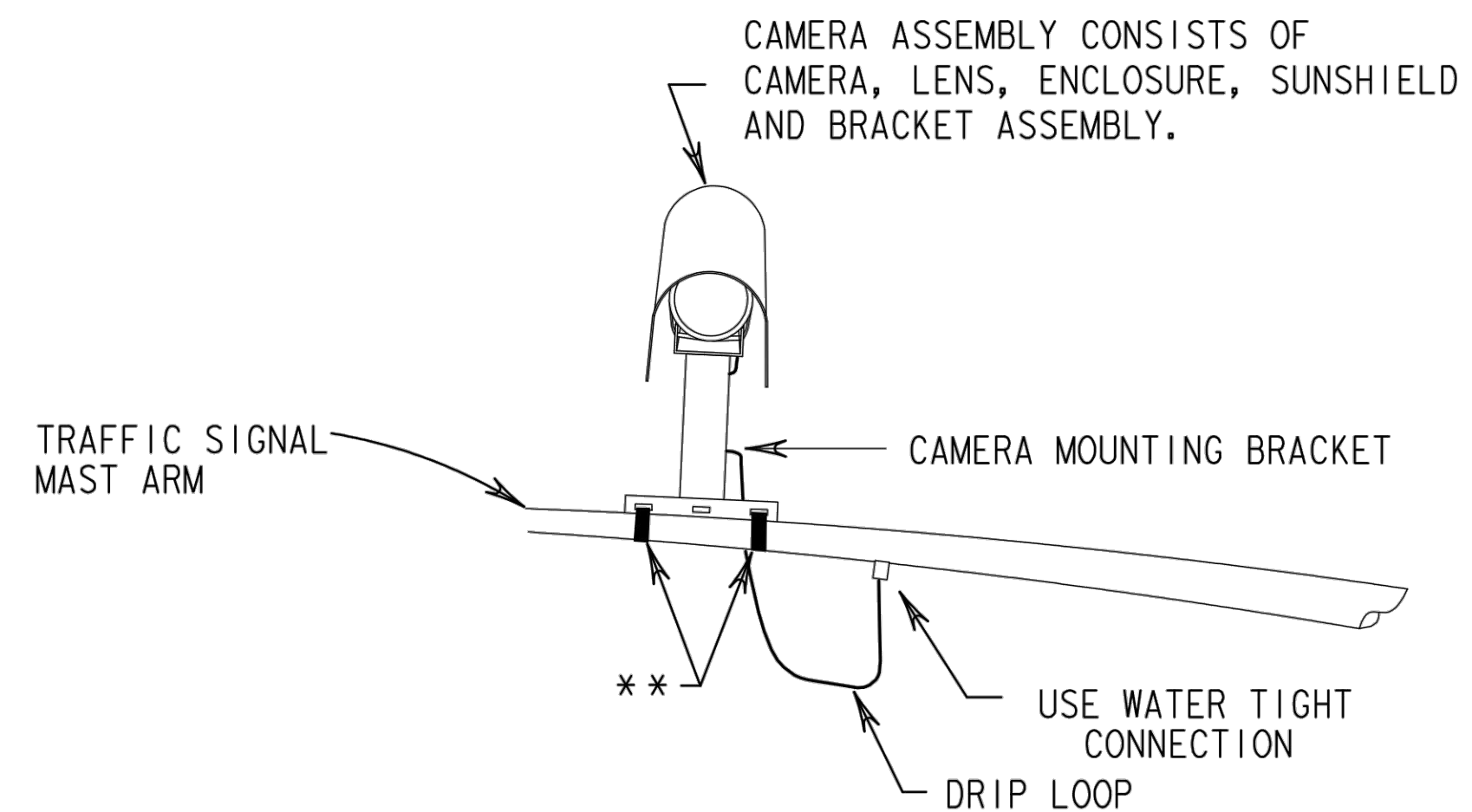
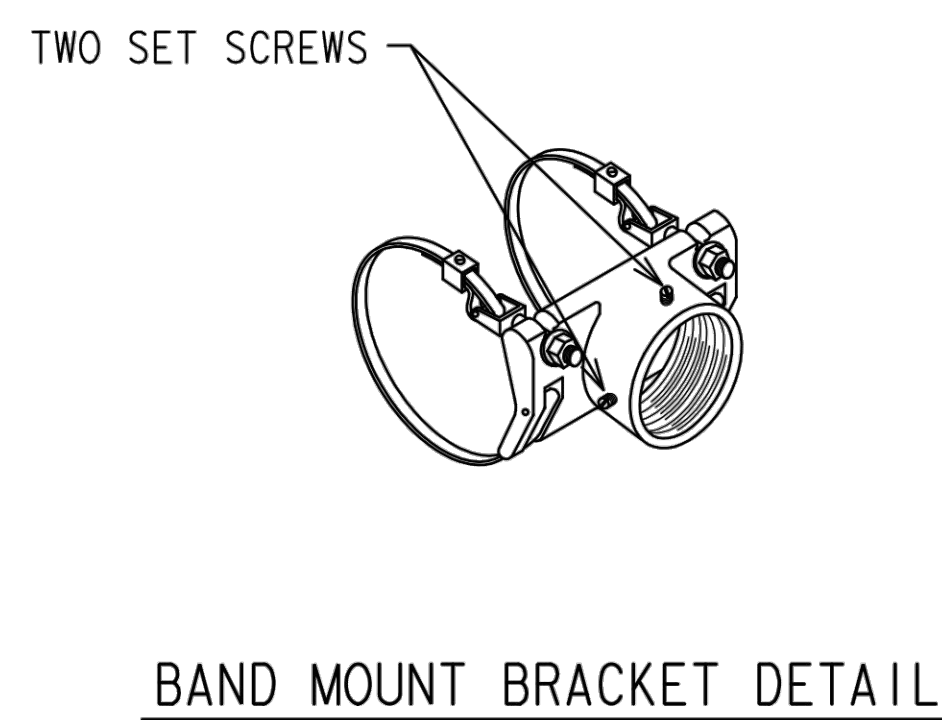
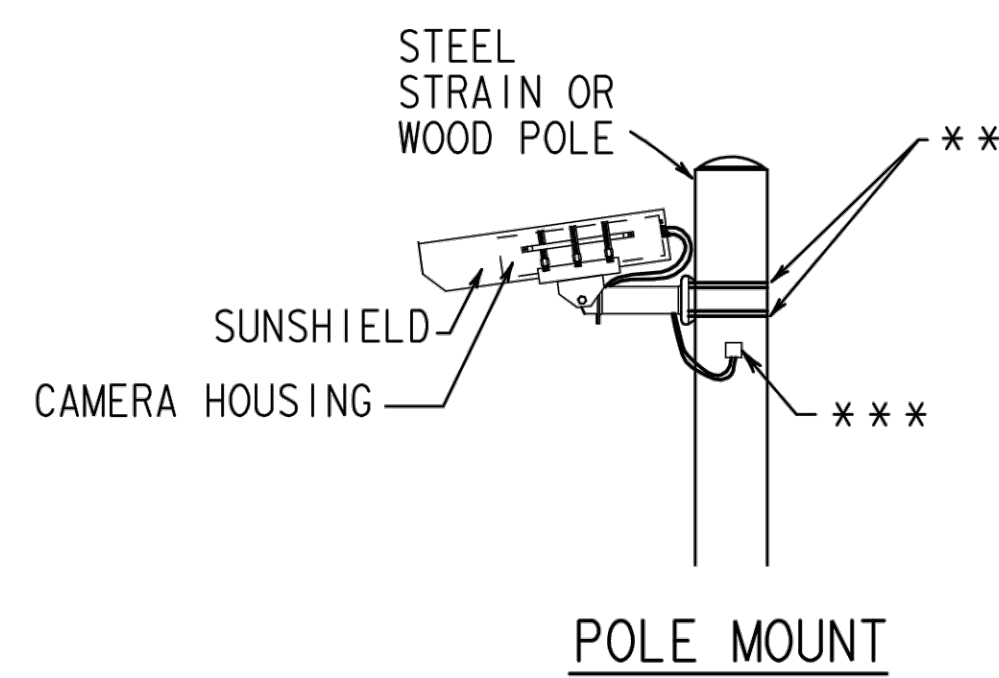
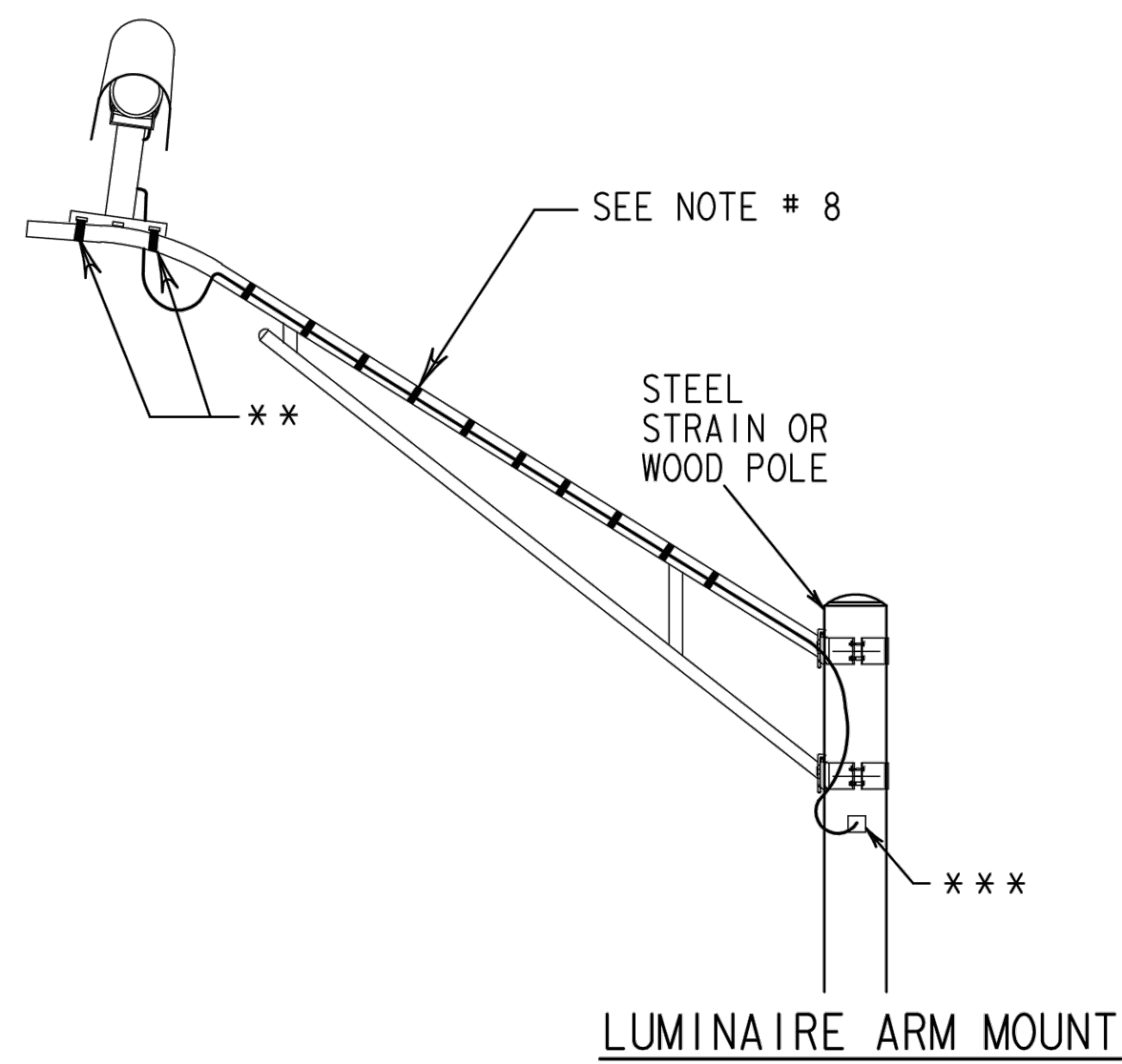
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BRANDT ROAD PRECINCT LINE RD TO MASON RD			
PEDESTRIAN SIGNALS			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC		JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281)391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET TS13	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Sag 2\TS14 VIVDS CAMERA MOUNTING DETAILS.dwg Feb 17, 2023-11:01am Terra Associates Inc., Thanh Dao

NOTES FOR VIDEO DETECTION:

1. INSTALL VIDEO DETECTION PROCESSOR UNIT INSIDE CONTROLLER CABINET.
2. INSTALL VIDEO DETECTION CAMERA & BRACKET AS DETAILED OR AS DIRECTED BY THE VIDEO DETECTION SUPPLIER.
3. MOUNT CAMERAS AS FAR OVER THE ROADWAY AS POSSIBLE.
4. USE 3/4 IN. STAINLESS STEEL BANDING MATERIAL TO INSTALL CAMERA MOUNTS.
5. AIM CAMERA SO THAT HORIZON IS NOT VISIBLE IN THE FIELD OF VIEW.
6. INSTALL CAMERA ENCLOSURE ASSEMBLY SO THAT IT CAN ROTATE AFTER INSTALLATION TO PROVIDE PROPER ALIGNMENT.
7. PROVIDE WATER TIGHT CABLE ENTRY AND EXIT POINTS IN THE MAST ARM AND/OR POLES.
8. FOR VIVDS COAX AND POWER CABLES ATTACHED TO LUMINAIRE ARM, PROVIDE A METAL CABLE STRAP (ALUMINUM OR STAINLESS STEEL), 3/4-IN MINIMUM WIDTH AND TWO WRAPS AT 8 IN. MAXIMUM SPACING.

- * 4 FT. PIPE EXTENSION WHEN MOUNTED ON TRAFFIC SIGNAL MAST ARM.
 - ** 3/4 IN. (MIN) STAINLESS STEEL BANDING 2 PLACES MIN.
 - *** ENTRY INTO STEEL POLE OR CONDUIT WEATHERHEAD ON WOOD POLE



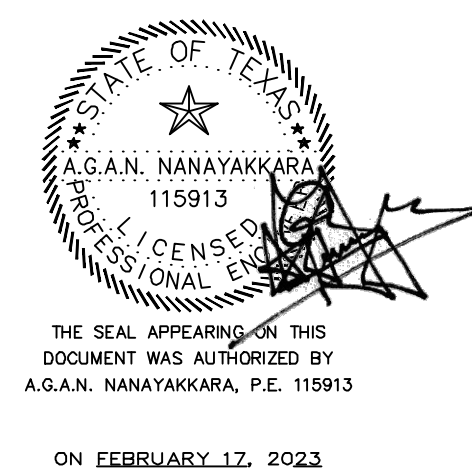
Texas Department of Transportation
 Houston District

SIGNAL DETAILS/STANDARDS
VIVDS CAMERA
MOUNTING DETAILS

VC/MD

FILE#	DN#	CK#	DW#	CK#
© TxDOT 2010	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS		HOU	6	
02/2004		COUNTY	CONTROL	SECT
03/16/2006				JOB
09/2010				HIGHWAY

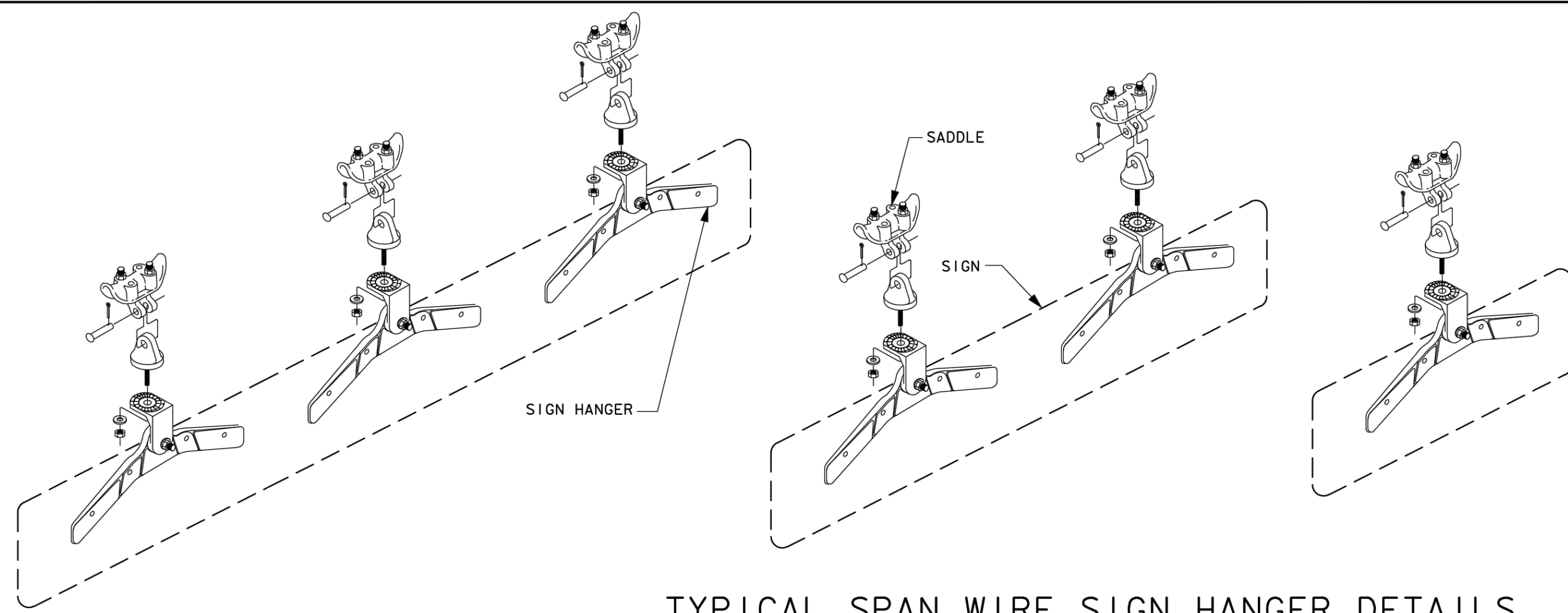
STD-M13



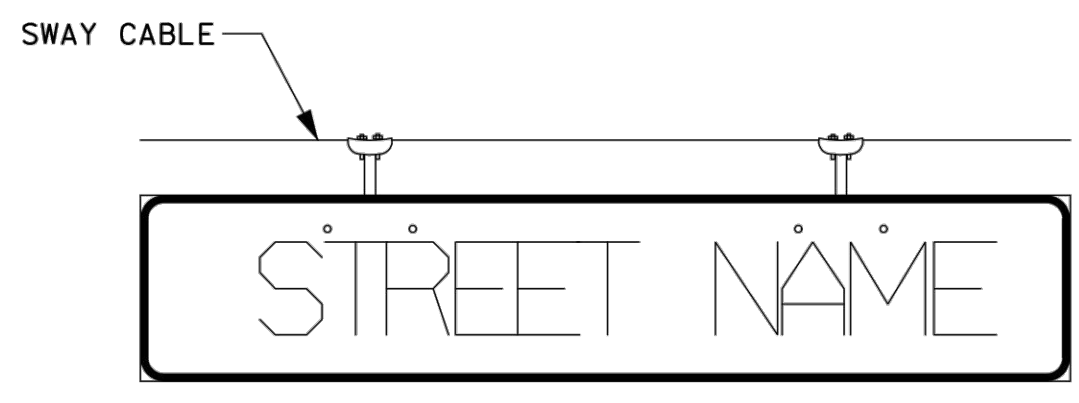
REV.NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
VIVDS CAMERA MOUNTING DETAILS			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281)391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1	
		SHEET TS14	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Sag 2\TS15 OVERHEAD STREET NAME SIGN MOUNTING DETAILS.dwg Feb 17, 2023-11:01am Terra Associates Inc., Thanh Dao

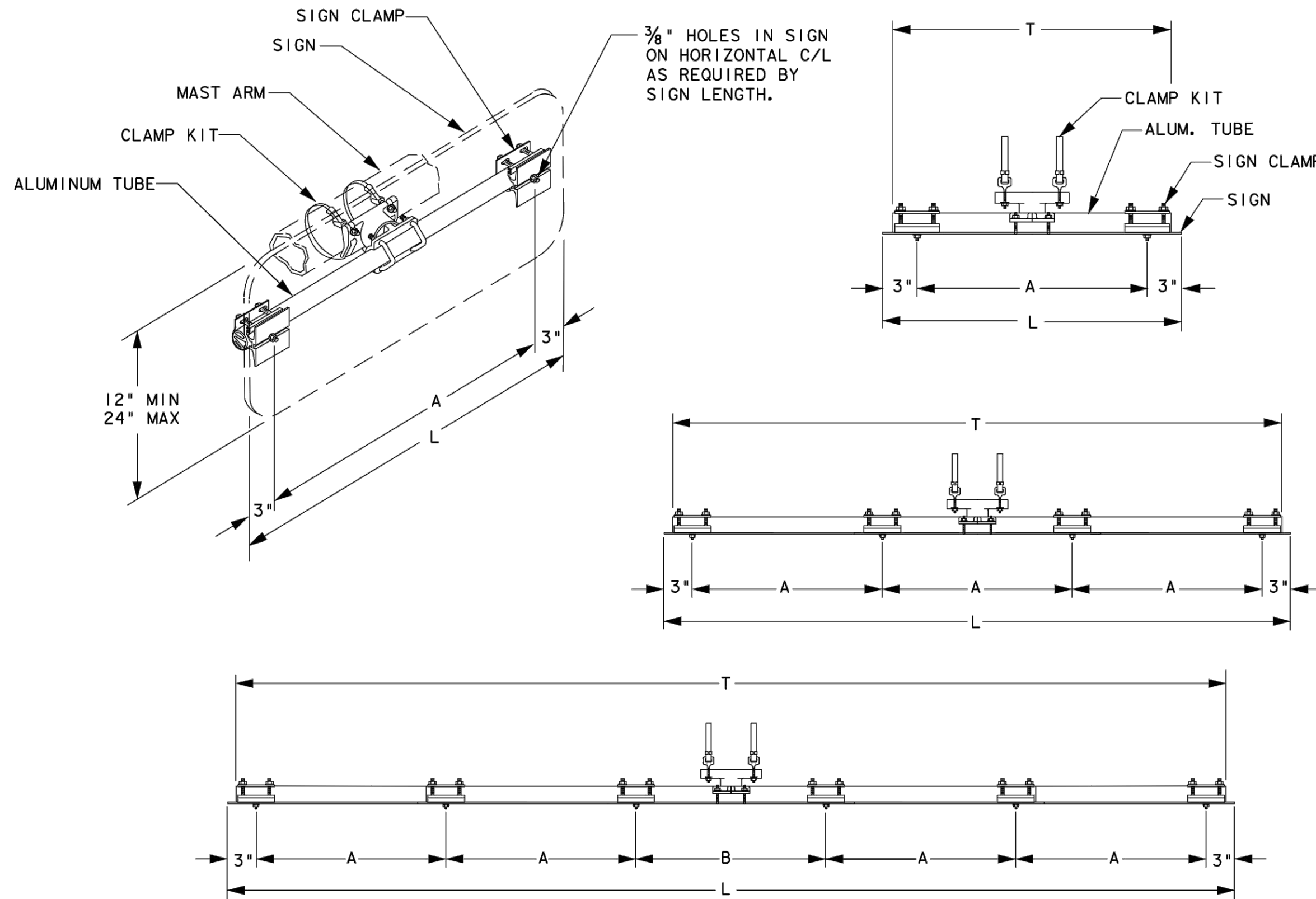
FILE: Overhead-Sign-mount-det-sp04.dgn



TYPICAL SPAN WIRE SIGN HANGER DETAILS



1. USE PELCO PARTS OR APPROVED EQUAL.
2. FURNISH HARDWARE FOR A COMPLETE INSTALLATION.
3. ATTACH THE 90* SPAN WIRE CLAMPS (SADDLES) TO TETHERS (SWAY CABLES).
4. FURNISH 1 ADJUSTABLE FREE SWINGING SIGN HANGER PER STREET NAME SIGN SMALLER THAN 3 FT. - 0 IN. SIGNS 3 FT - 0 IN. TO 6 FT.- 0 IN. REQUIRE 2 HANGERS. SIGNS LARGER THAN 6 FT. - 0 IN. REQUIRE 3 HANGERS.



TYPICAL MAST ARM SIGN MOUNT DETAILS

SIGNS (1'-6" to 3'-0" Long)

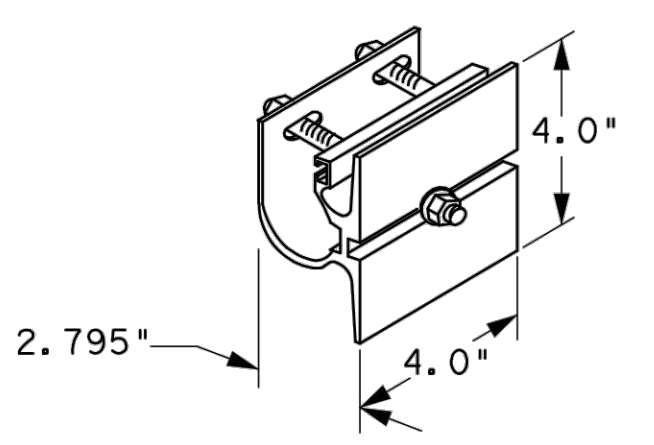
SIGN LENGTH (L)	TUBE LENGTH (T)	A
1'-6"	16"	12"
2'-0"	22"	18"
2'-6"	28"	24"
3'-0"	34"	30"

SIGNS (3'-6" to 8'-0" Long)

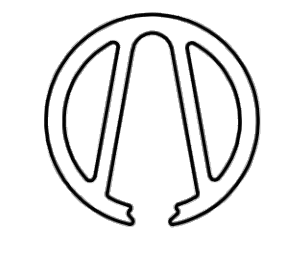
SIGN LENGTH (L)	TUBE LENGTH (T)	A
3'-6"	40"	12"
4'-0"	46"	14"
4'-6"	52"	16"
5'-0"	58"	18"
5'-6"	64"	20"
6'-0"	70"	22"
6'-6"	76"	24"
7'-0"	82"	26"
7'-6"	88"	28"
8'-0"	94"	30"

SIGNS (8'-6" to 10'-0" Long)

SIGN LENGTH (L)	TUBE LENGTH (T)	A	B
8'-6"	100"	19"	20"
9'-0"	106"	20"	22"
9'-6"	112"	21"	24"
10'-0"	118"	22"	26"



SIGN CLAMP DETAIL



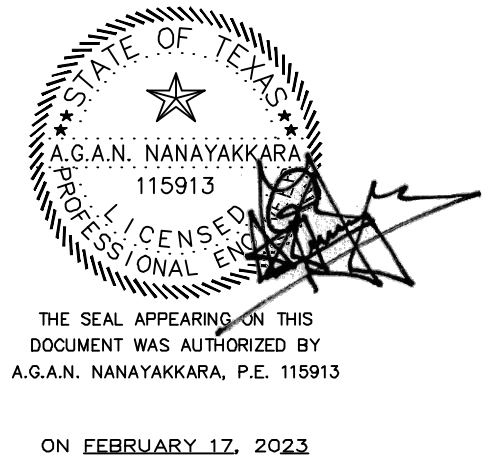
GUSSETED TUBE CROSS SECTION

Texas Department of Transportation
Houston District

SIGNAL DETAILS/STANDARDS
OVERHEAD STREET NAME SIGN
MOUNTING DETAILS
OSNS/MD

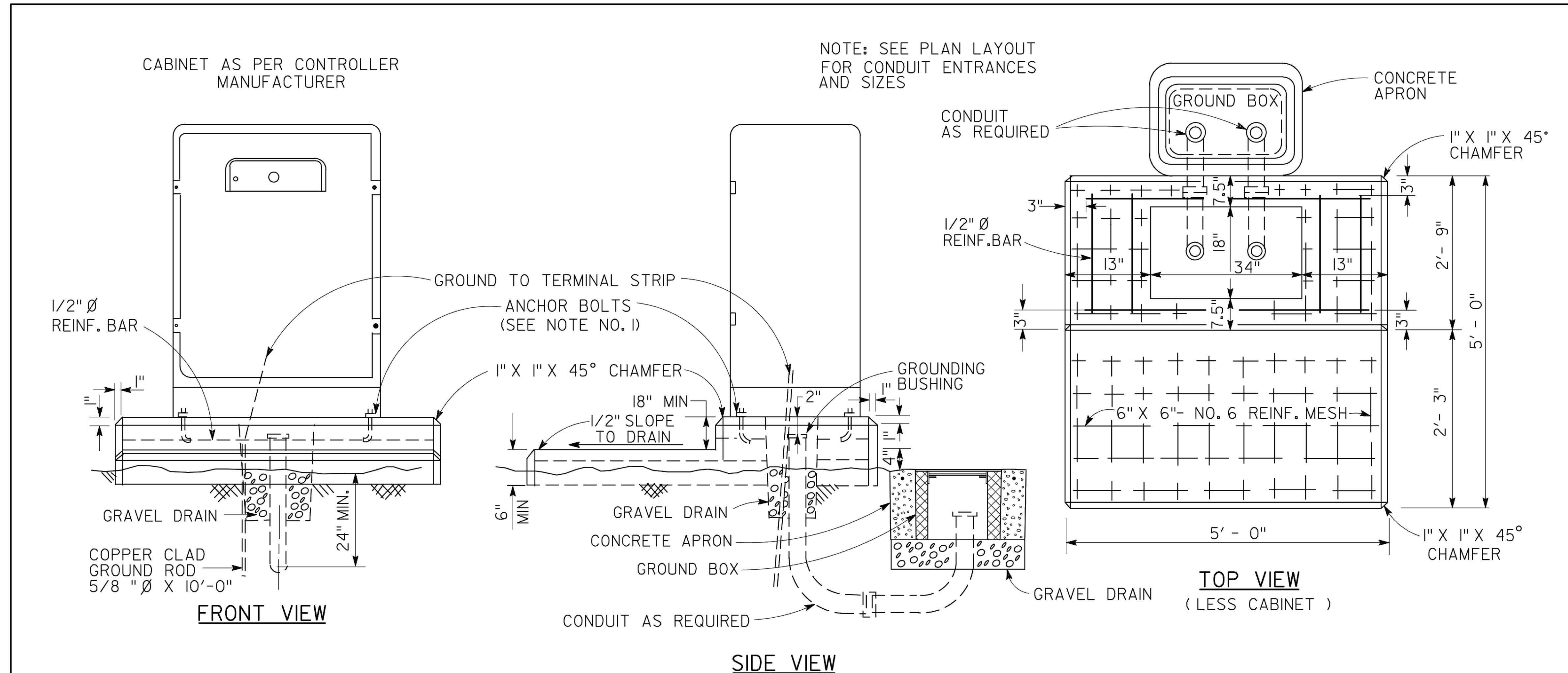
DN#	CK#	DW#	CK#
© TxDOT 2004	DIST	FED REG	PROJECT NO.
HOU	6		SHEET
COUNTY	CONTROL	SECT	JOB
			HIGHWAY

STD-M12



REV.NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD OVERHEAD STREET NAME SIGN MOUNTING DETAILS			
TERRA 1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 a Bowman company TBPE Registration No.: F-14309			
JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281)391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653			
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET TS15	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Sag 2\TS16 CONTROLLER FOUNDATION DETAIL.dwg Feb 17, 2023-11:01am Terra Associates Inc., Thanh Dao



NOTES:

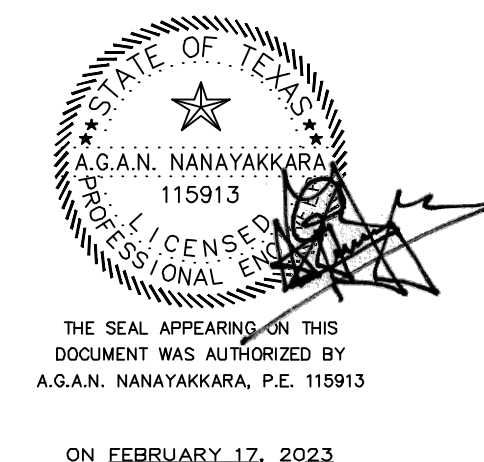
- | | |
|--|---|
| <ol style="list-style-type: none"> 1. CABINET MANUFACTURER TO PROVIDE DETAILS OF ANCHOR BOLT LOCATION. 2. MODIFY DIMENSIONS FOR CONCRETE BASE TO FIT EQUIPMENT FURNISHED, IF NECESSARY. 3. PROVIDE GRAVEL DRAIN FOR CONTROLLER AND ALL GROUND BOXES. 4. FURNISH CLASS "B" OR CLASS "C" CONCRETE. 5. SET CONTROLLER FOUNDATION LEVEL WITH THE PAVEMENT SURFACE OR AS APPROVED BY THE ENGINEER. | <ol style="list-style-type: none"> 6. FURNISH AT NO COST TO THE DEPARTMENT ANY ADDITIONAL CONCRETE WHICH MAY BE NECESSARY TO STABILIZE THE FOUNDATION AT UNUSUAL LOCATIONS. 7. PLACE REINFORCING BARS AS DIRECTED. 8. UPON INSTALLING THE CONTROLLER CABINET, APPLY A SILICON-BASED CAULKING COMPOUND AROUND THE BASE OF THE CONTROLLER CABINET. |
|--|---|

Texas Department of Transportation
 Houston District

SIGNAL DETAILS/STANDARDS
CONTROLLER FOUNDATION
DETAIL
SD/SCFD

FILE#	DN#	CK#	DW#	CK#
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REVISIONS	HOU	6		
08-04	COUNTY	CONTROL	SECT	JOB
03-07				HIGHWAY

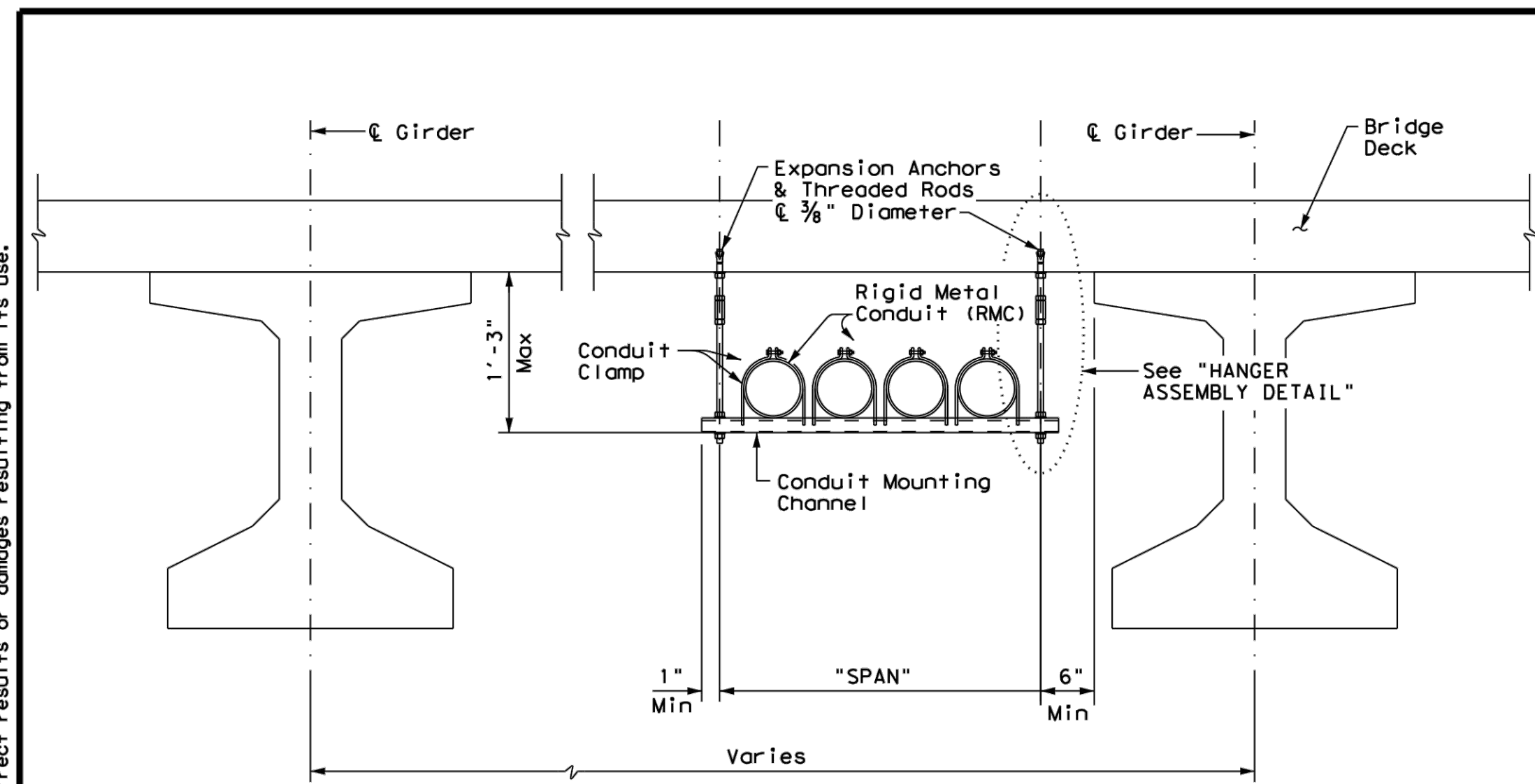
STD-MI



REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD CONTROLLER FOUNDATION DETAIL			
TERRA <small>a Bowman company</small>		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1	
		SHEET TS16	

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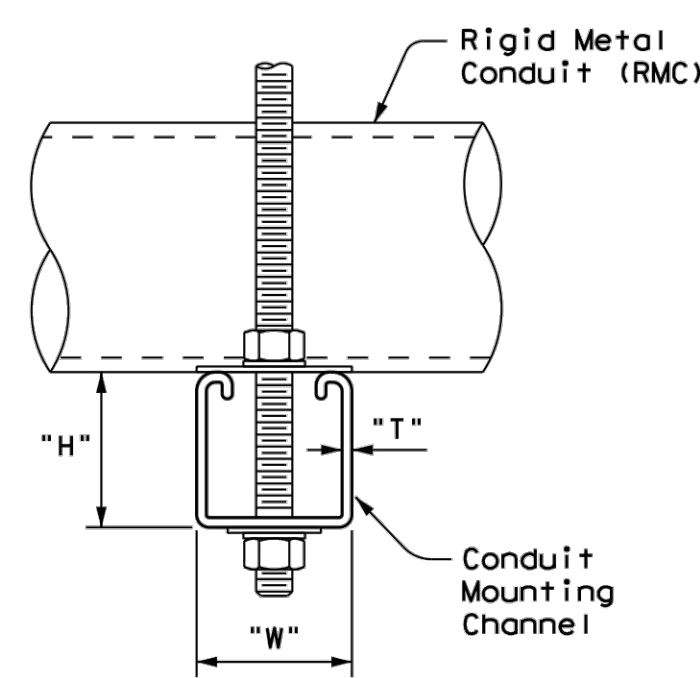
DATE: FILE:



CONDUIT HANGING DETAIL

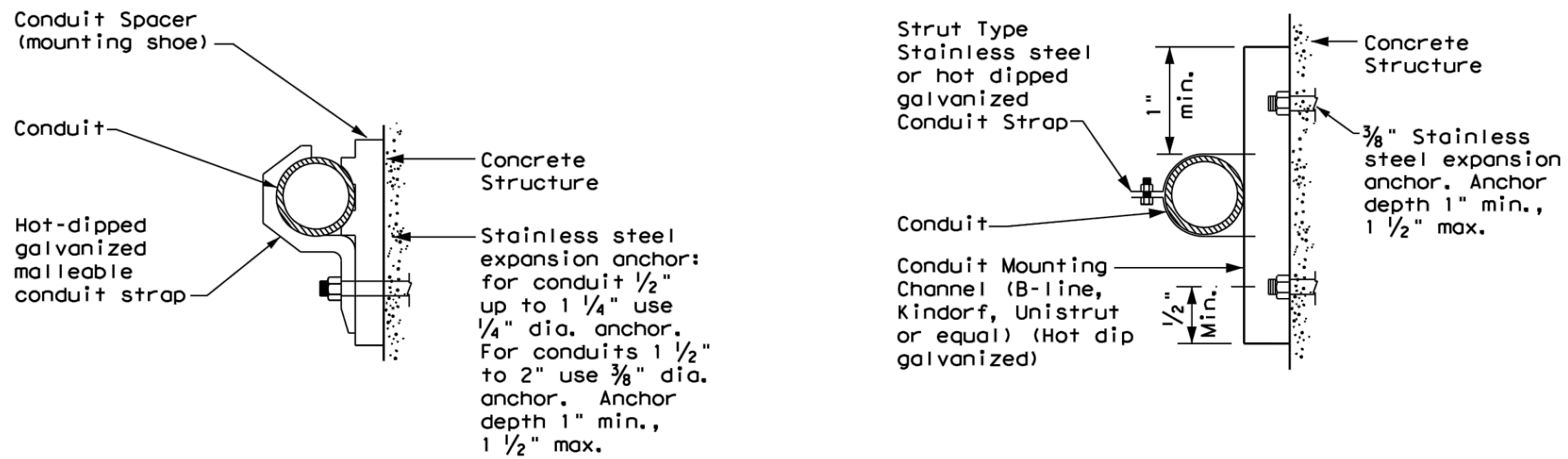
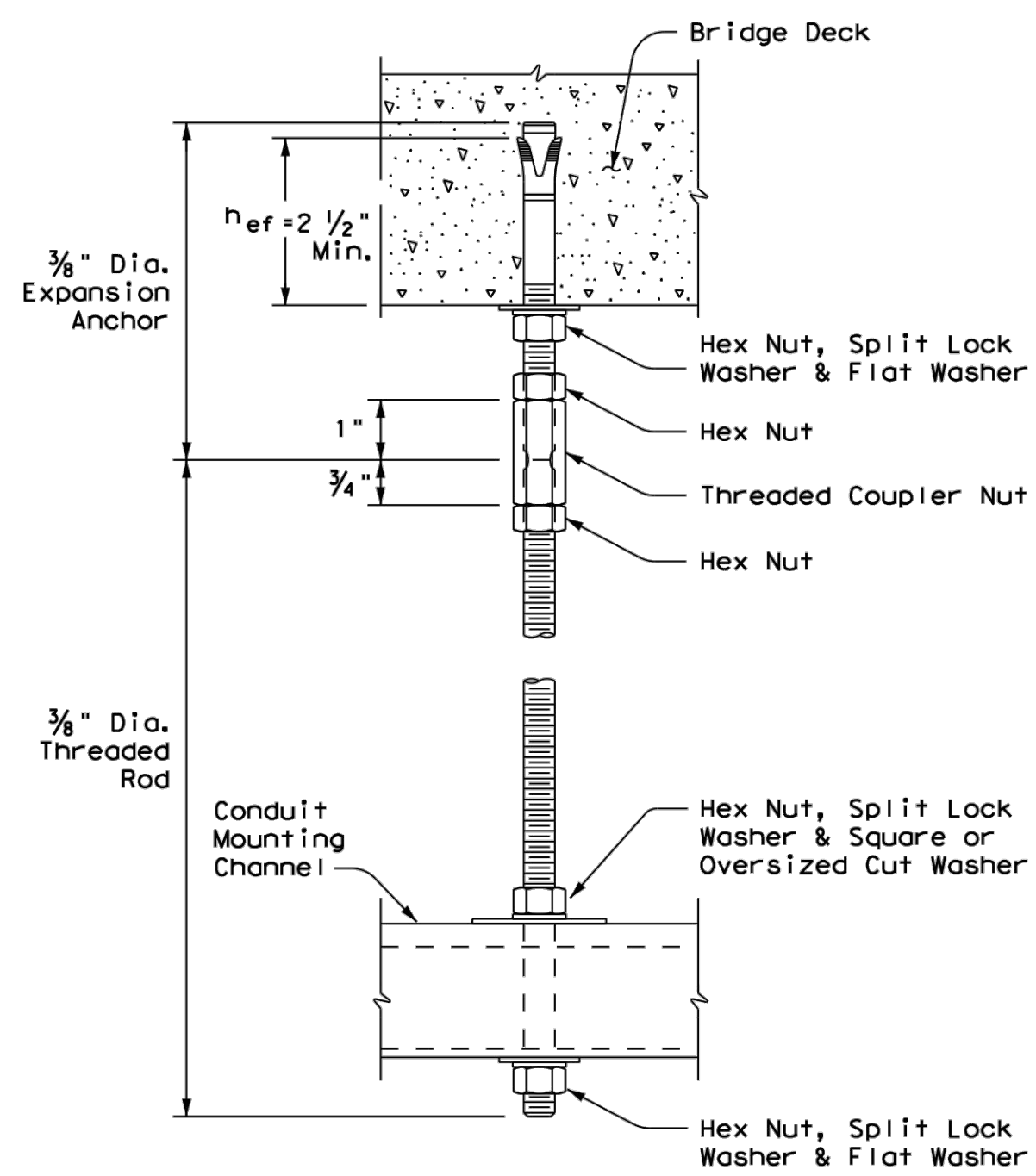
"SPAN"	"W" x "H"	"T"
less than 2'	1 5/8" x 1 3/8"	12 Ga.
2'-0" to 2'-6"	1 5/8" x 1 5/8"	12 Ga.
>2'-6" to 3'-0"	1 5/8" x 2 1/8"	12 Ga.

Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.



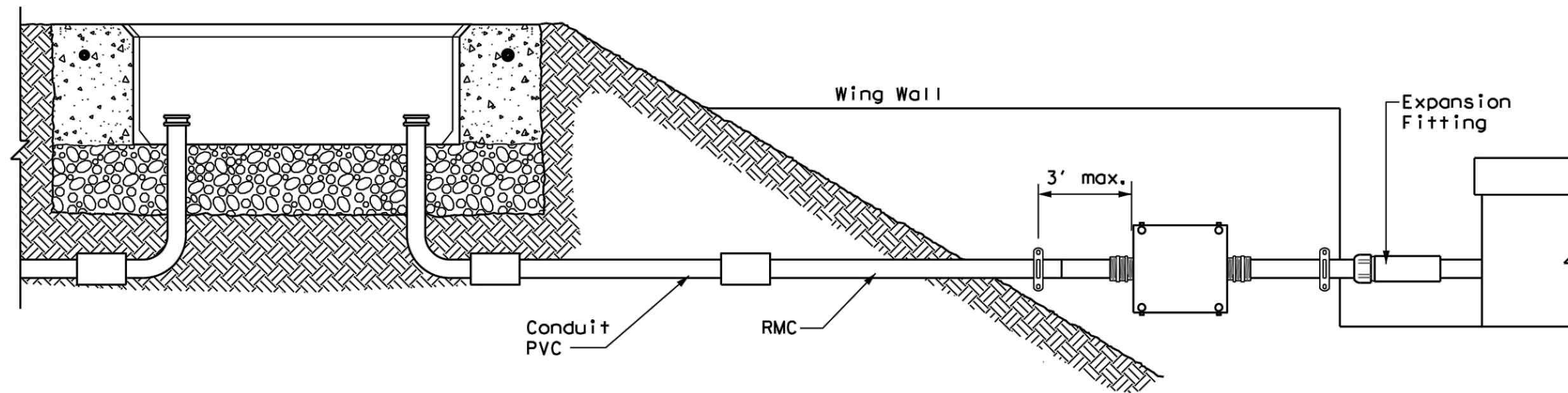
HANGER ASSEMBLY DETAIL

ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT



CONDUIT MOUNTING OPTIONS

Attachment to concrete surfaces
See ED(1)B.2

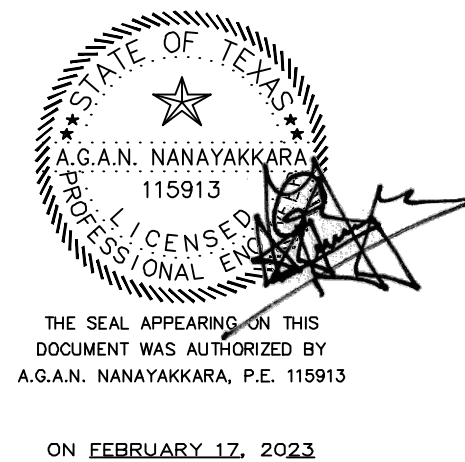


TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

EXPANSION ANCHOR NOTES FOR BRIDGE DECK ATTACHMENT

1. Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). The chosen anchor product shall have a designated ICC-ES Evaluation Report number, and its approval status shall be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.
2. Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.
3. Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environment, both the anchor body and expansion wedge shall be stainless steel.
4. Install anchors as shown on the plans and in accordance with the anchor manufacturer's published installation instructions. Arrange a field demonstration test to evaluate the procedures and tools. The test shall be witnessed and approved by the Engineer prior to furnishing anchors on the structure.
5. Prior to hole drilling, use rebar locator to ensure clearing of existing deck strands or reinforcement. Install anchors to ensure a minimum effective embedment depth, (h_{ef}), as shown. Increase (h_{ef}) as needed to ensure sufficient thread length for proper torquing and tightening of anchors.
6. Use anchors of minimum 1600 Lbs tensile capacity (minimum of steel, concrete breakout, and concrete pullout strengths as determined by ACI 318 Appendix D) at the required minimum embedment depth (h_{ef}). No lateral loads shall be introduced after conduit installation.

Texas Department of Transportation		Traffic Operations Division Standard	
ELECTRICAL DETAILS CONDUIT SUPPORTS			
ED(2) - 14			
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REVISIONS	DIST	COUNTY	SHEET NO.

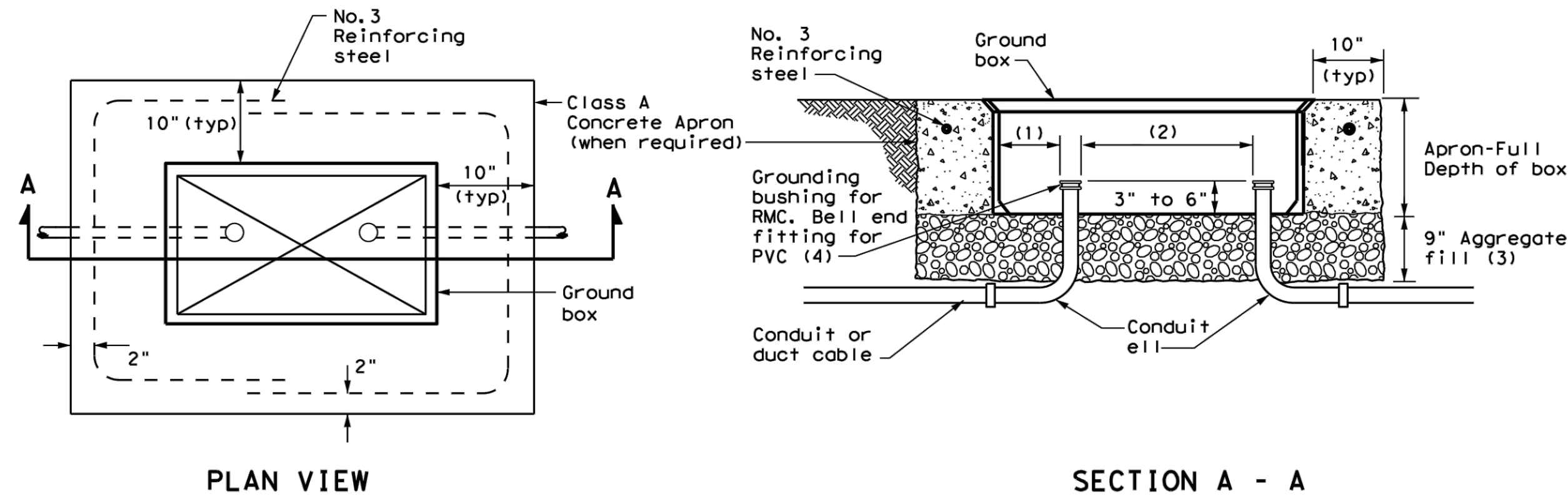


REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
ELECTRICAL DETAILS CONDUIT SUPPORTS			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET TS18

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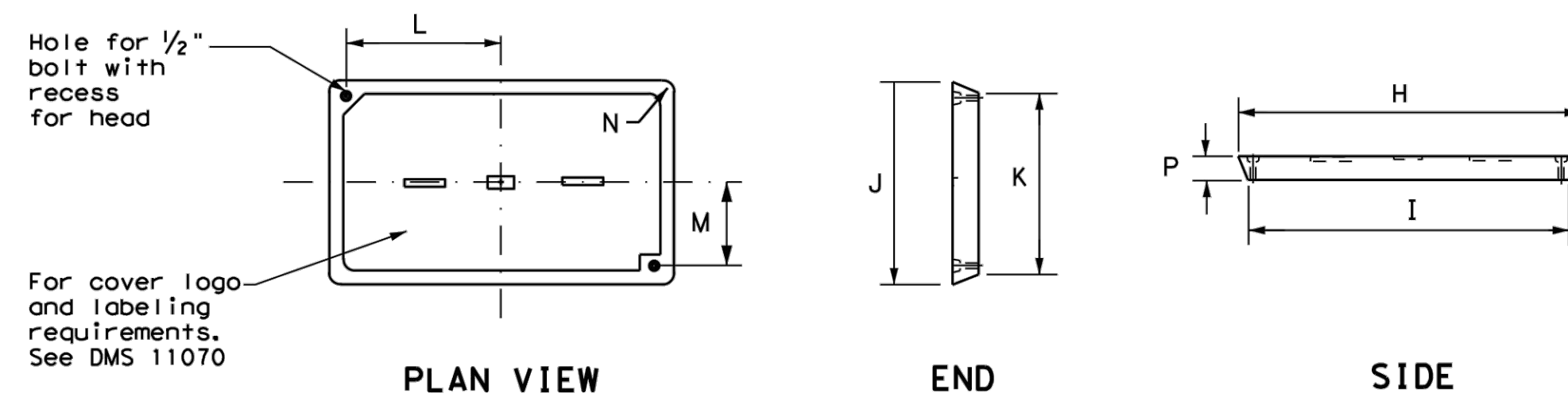


APRON FOR GROUND BOX

- (1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.
- (2) Maintain sufficient space between conduits to allow for proper installation of bushing.
- (3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.
- (4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



GROUND BOX COVER

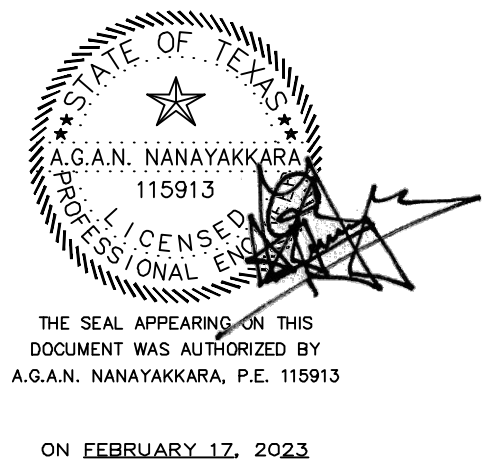
GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."
2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.
3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.
4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.
2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.
3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.
4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.
5. Temporarily seal all conduits in the ground box until conductors are installed.
6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.
7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.
8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.
9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.
10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.
11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.



Texas Department of Transportation		Traffic Operations Division Standard	
ELECTRICAL DETAILS GROUND BOXES			
ED(4) - 14			
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BRANDT ROAD PRECINCT LINE RD TO MASON RD			
ELECTRICAL DETAILS GROUND BOXES			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET TS20

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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.
2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services," DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.
3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.
4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.
5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.
6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.
7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.
8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.
9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.
10. Provide rigid metal conduit (RMC) for all conduits on service, except for the 1/2 in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.
11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.
12. Ensure all mounting hardware and installation details of services conform to utility company specifications.
13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.
14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.
15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.
2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.
3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.
4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.
2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

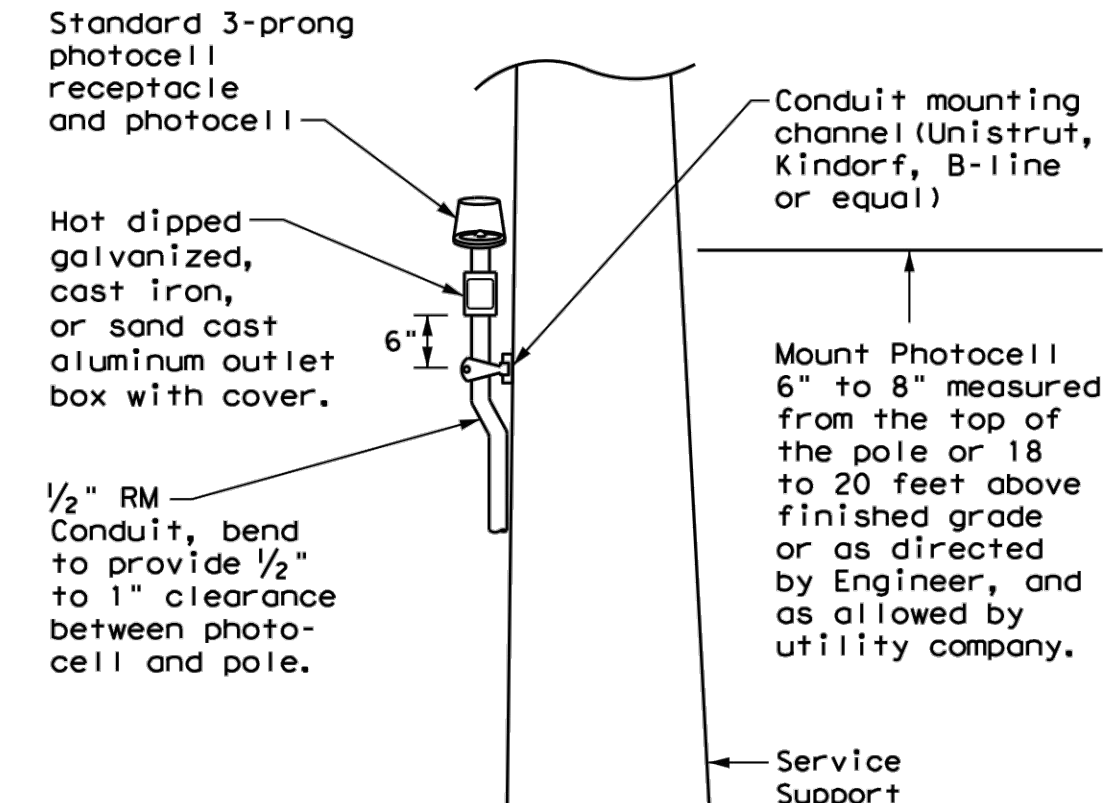
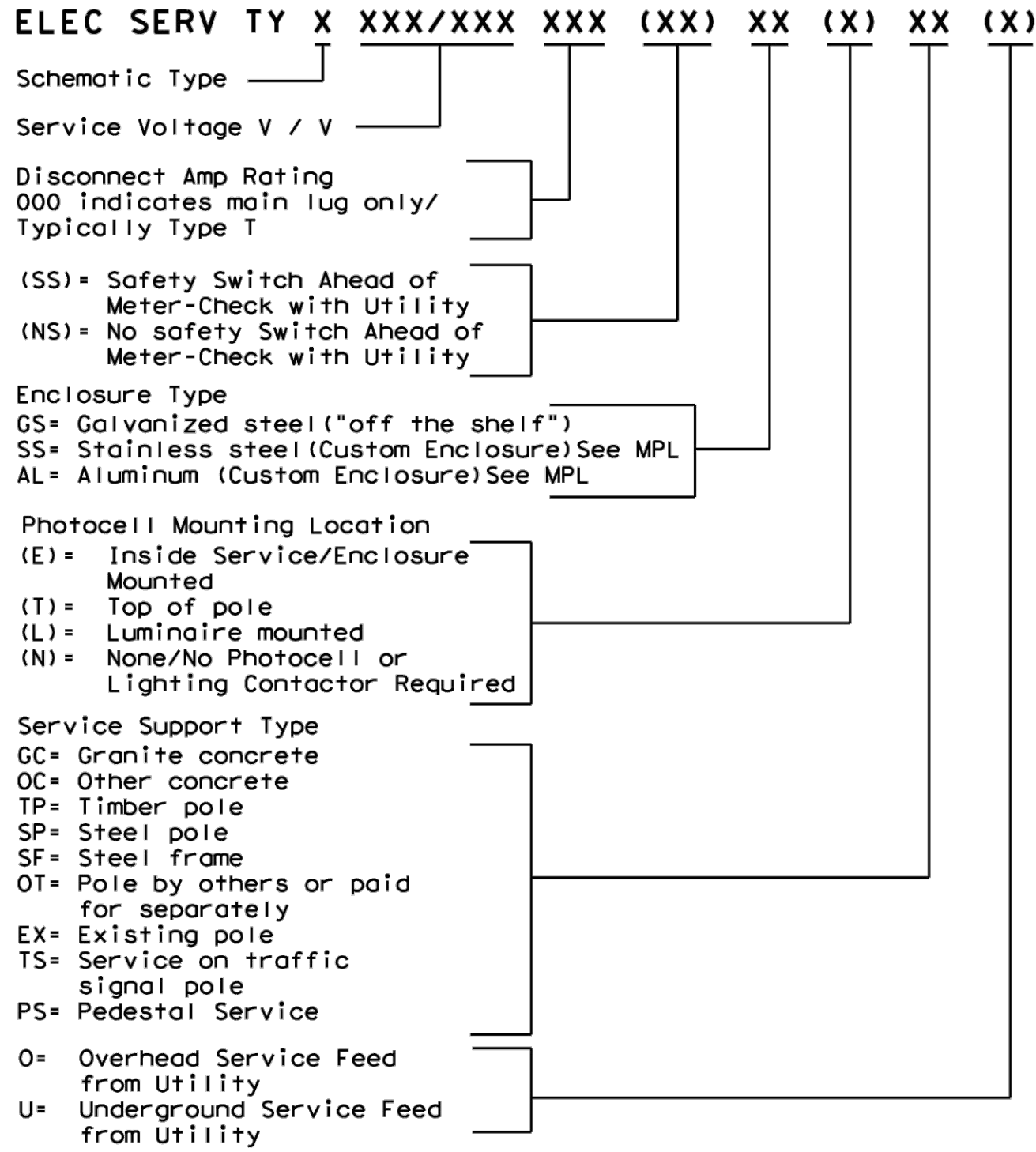
PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

* ELECTRICAL SERVICE DATA												
Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit #*Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 1/4"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaire	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 1/4"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.
 ** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National Electrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE



TOP MOUNTED PHOTOCELL

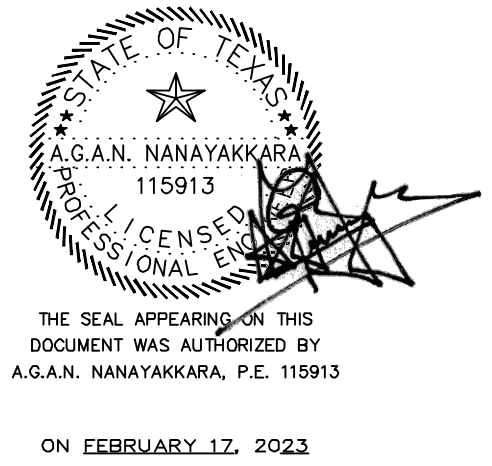
Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

Texas Department of Transportation
 Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

ED(5) - 14

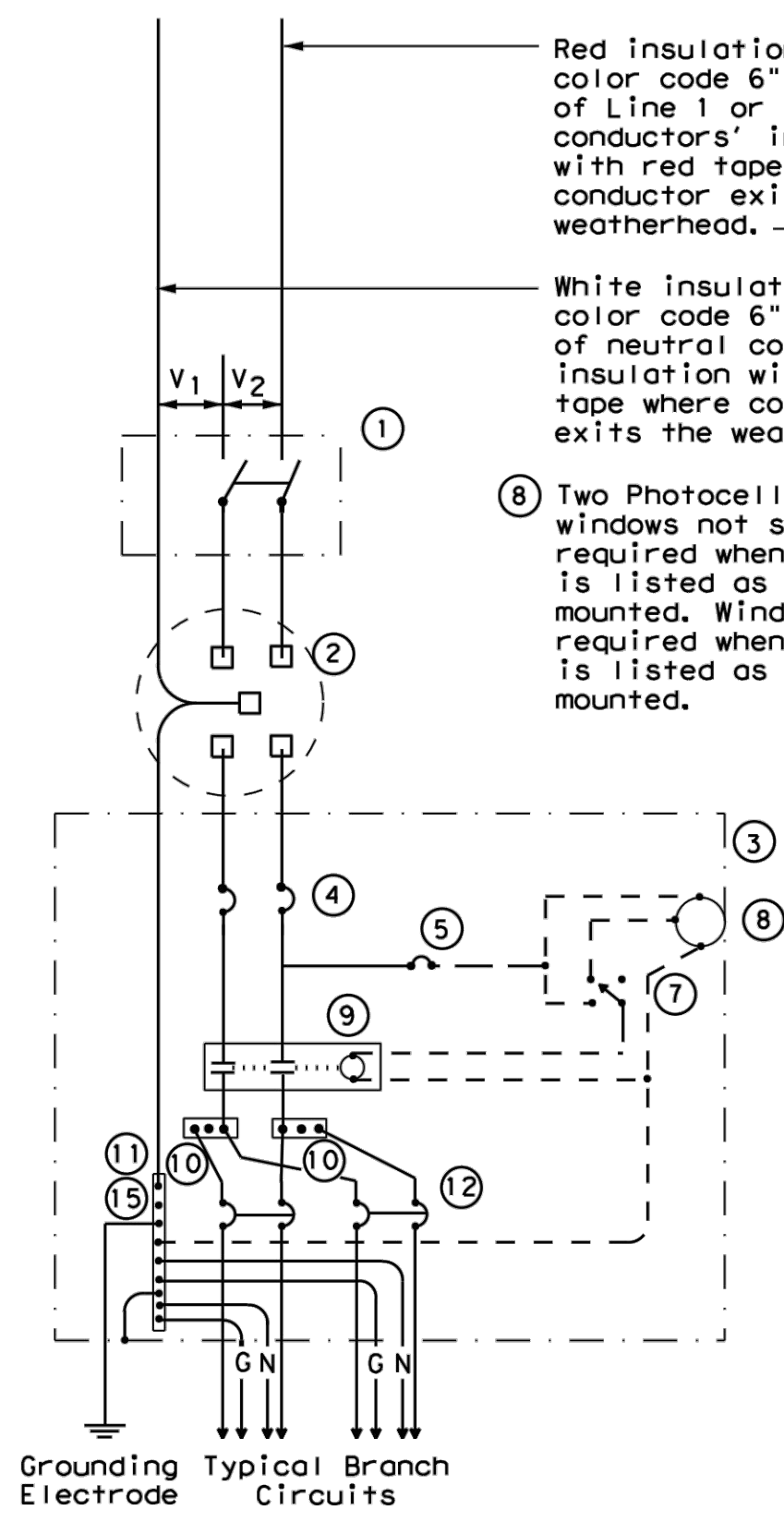
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 REVISIONS: DIST: COUNTY: SHEET NO.:
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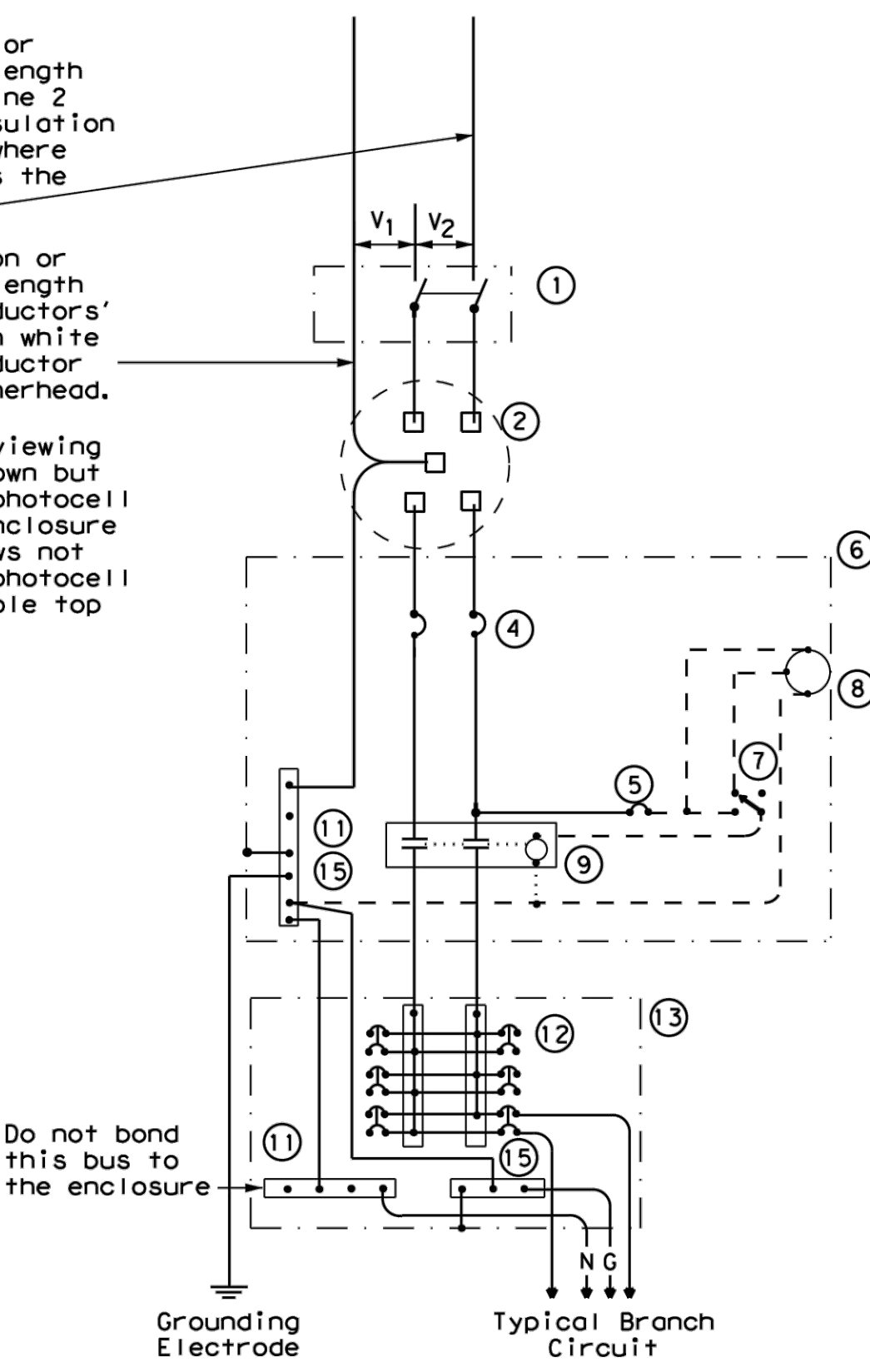
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
ELECTRICAL DETAILS SERVICE SCHEMATIC AND SUPPORT			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	
PROJECT No. 0522-1801		CONTRACT: 1	
SHEET TS21		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNS-LLC.COM T.B.P.E. FIRM REGISTRATION NO. 11653	

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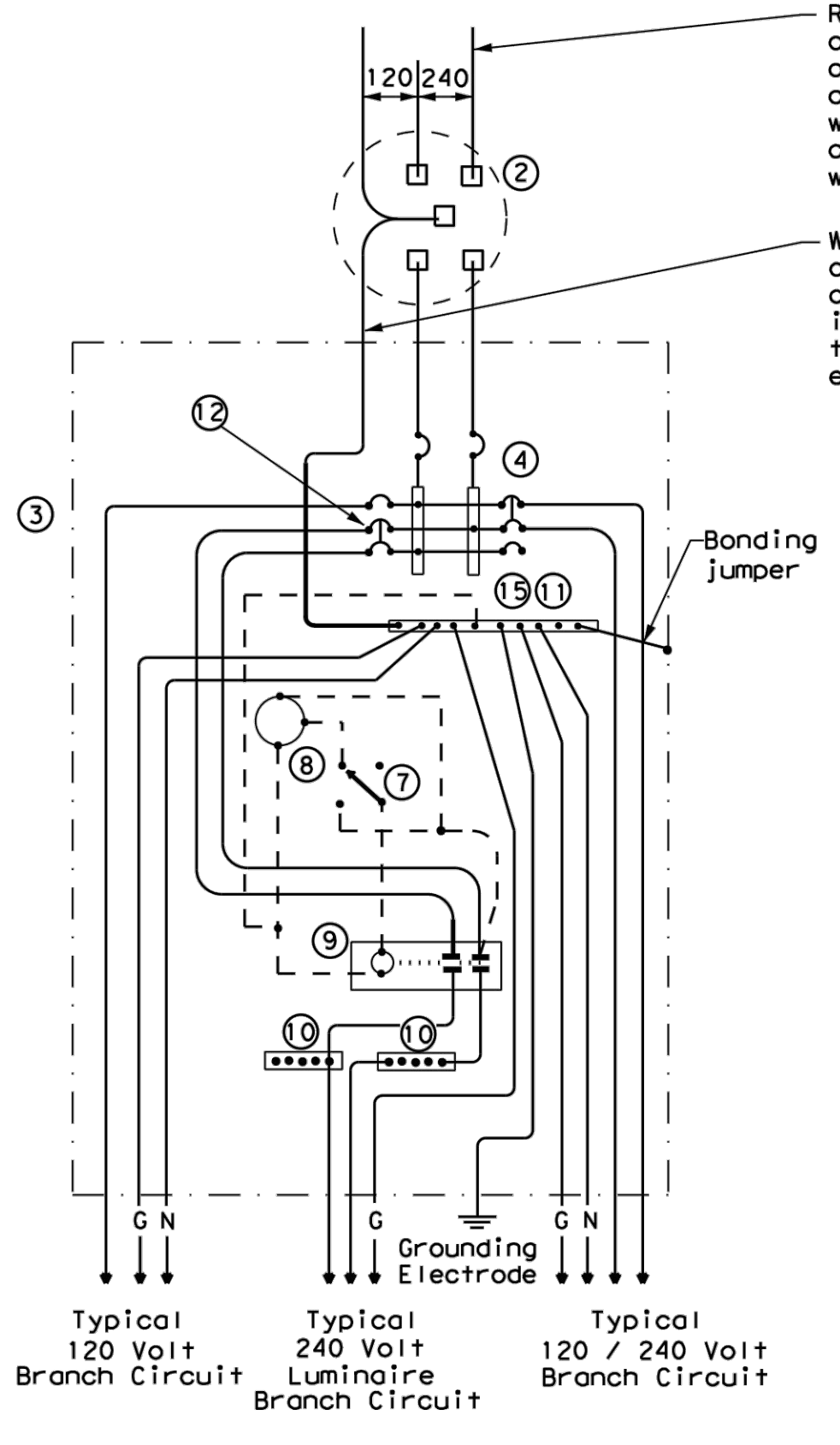
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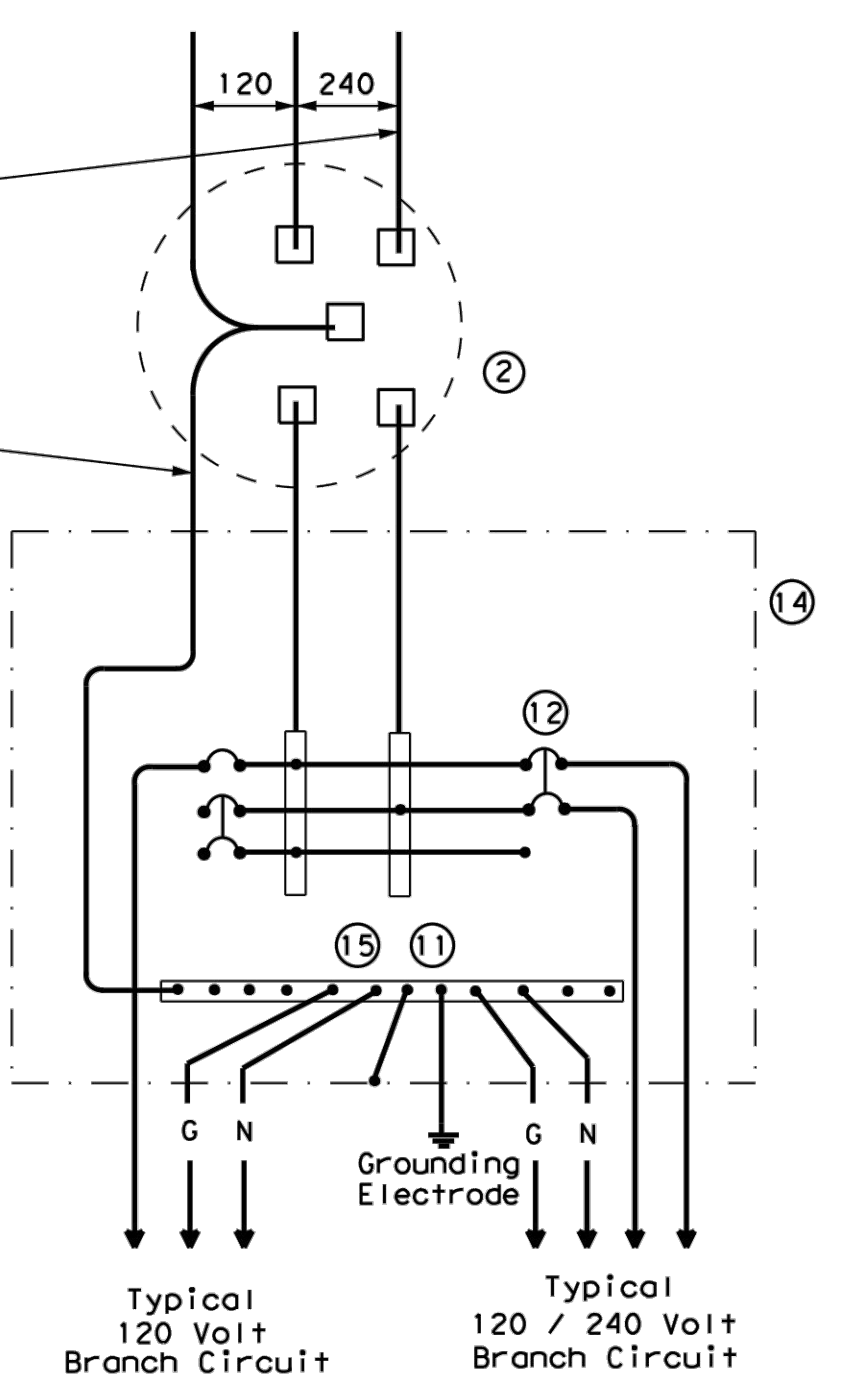
**SCHEMATIC TYPE A
THREE WIRE**



**SCHEMATIC TYPE C
THREE WIRE**



**SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE**



**SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE**
Galvanized steel - "Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
—	Power Wiring
- - -	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

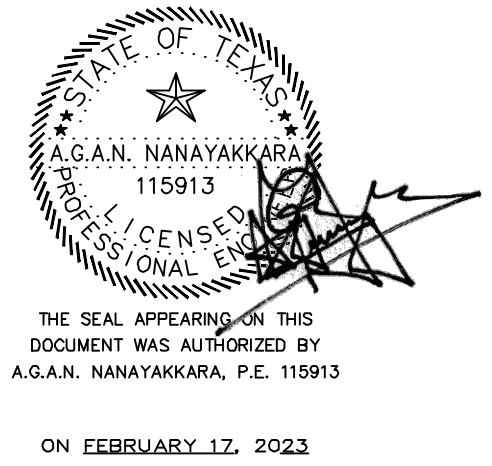
SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

**ELECTRICAL DETAILS
SERVICE ENCLOSURE
AND NOTES
ED(6) - 14**

FILE: ed6-14.dgn DN: TxDOT CK: TxDOT DW: TxDOT CR: TxDOT
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Traffic Operations Division Standard



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ELECTRICAL DETAILS SERVICE ENCLOSURE & NOTES			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
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DRAWN BY: T.D.		SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET TS22

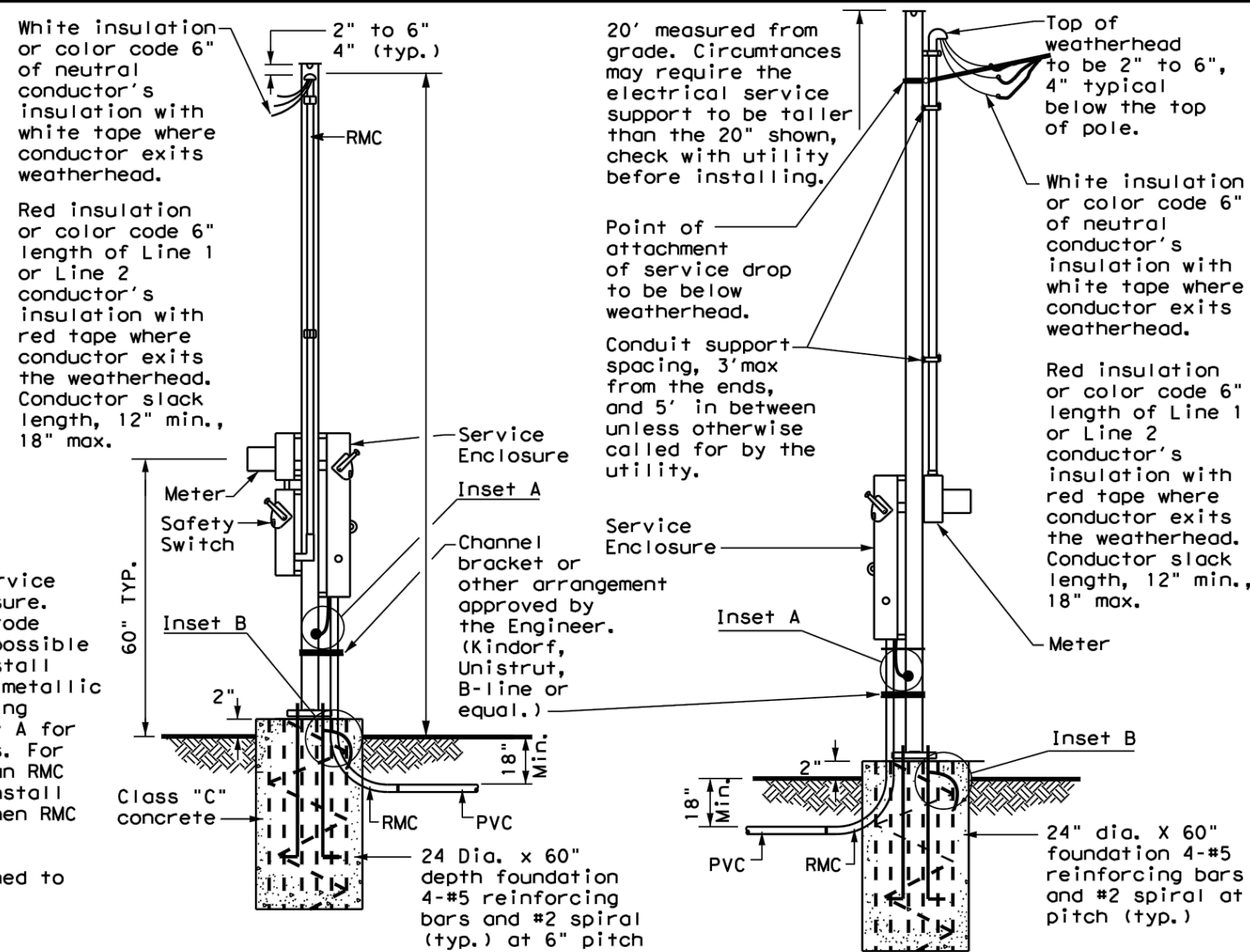
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T.B.E. FIRM
REGISTRATION NO. 11653

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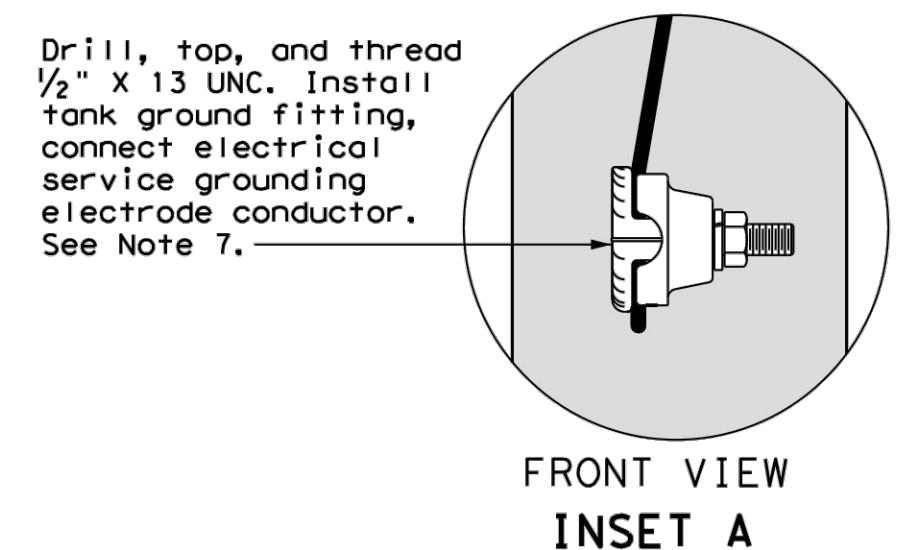
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SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

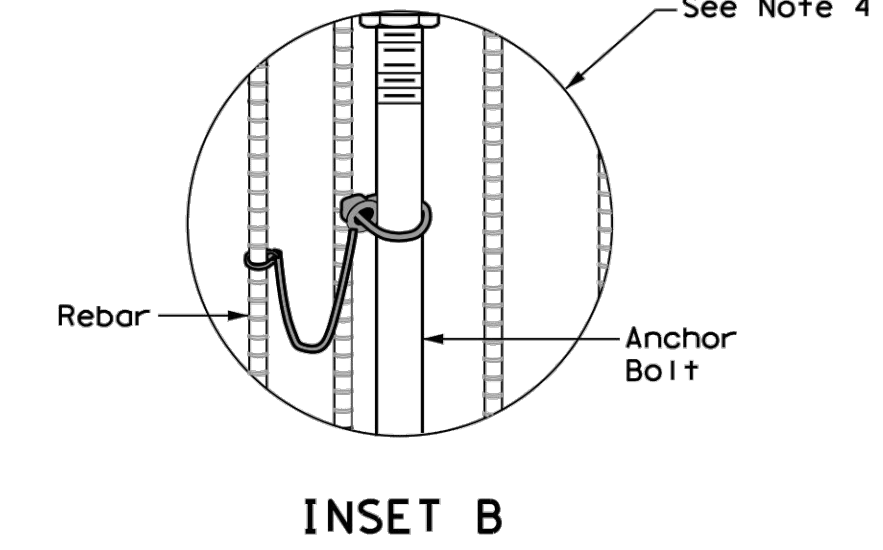
1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS) 11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 1/2 in. or 1 3/8 in. wide by 1 in. up to 3 3/4 in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.
2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.
3. Provide and install galvanized 3/4 in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized 3/4 in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in. of thread, with 3 1/4 in. to 3 1/2 in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.
4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.
5. Furnish and install rigid metallic EMT in all steel pole and steel frame foundations for all conduits entering the service from underground.
6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.
7. Drill and tap steel poles and frames for 1/2 in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.
8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.
9. Provide 1/4" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.
10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.
11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.



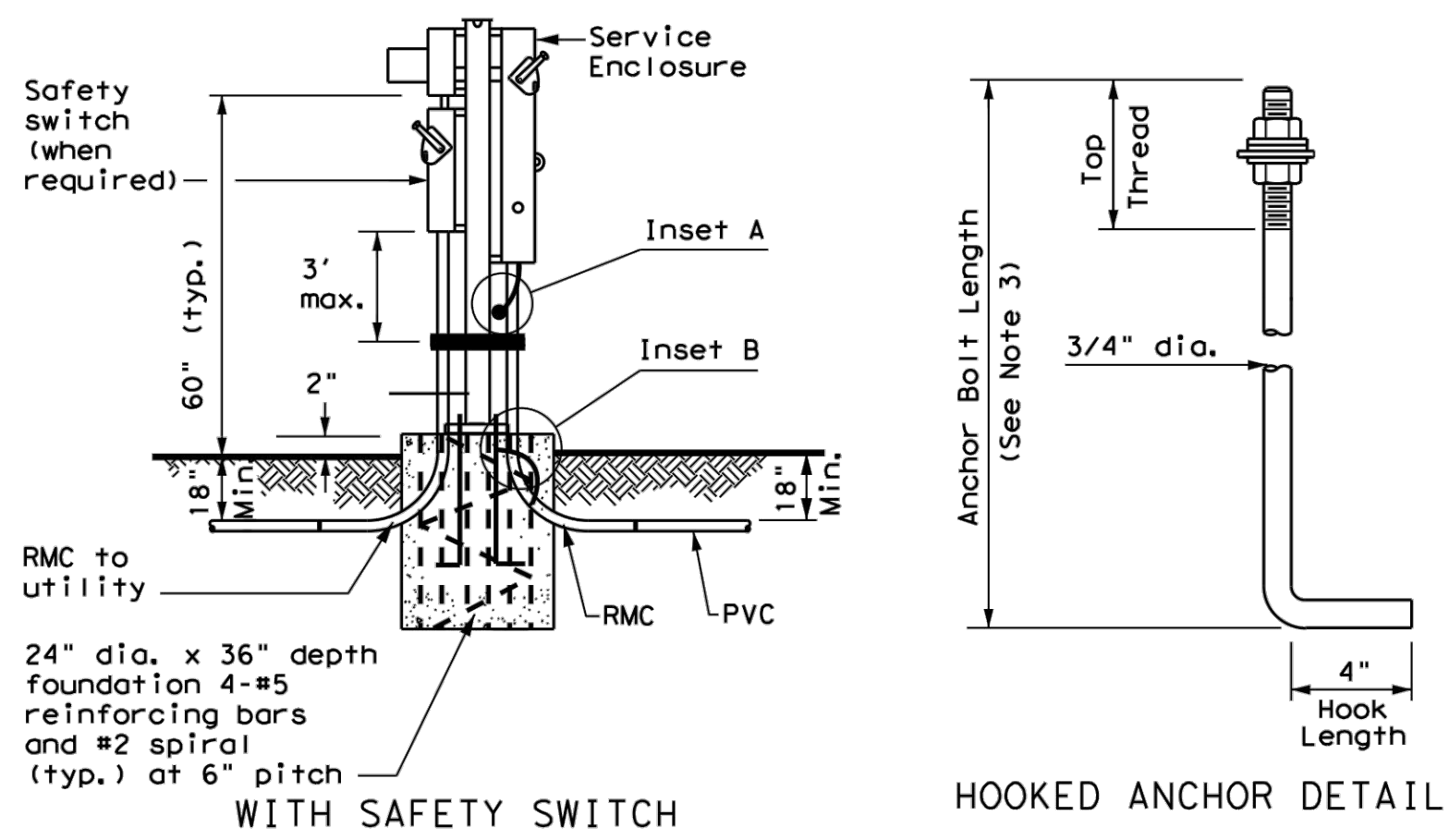
WITH SAFETY SWITCH WITHOUT SAFETY SWITCH
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



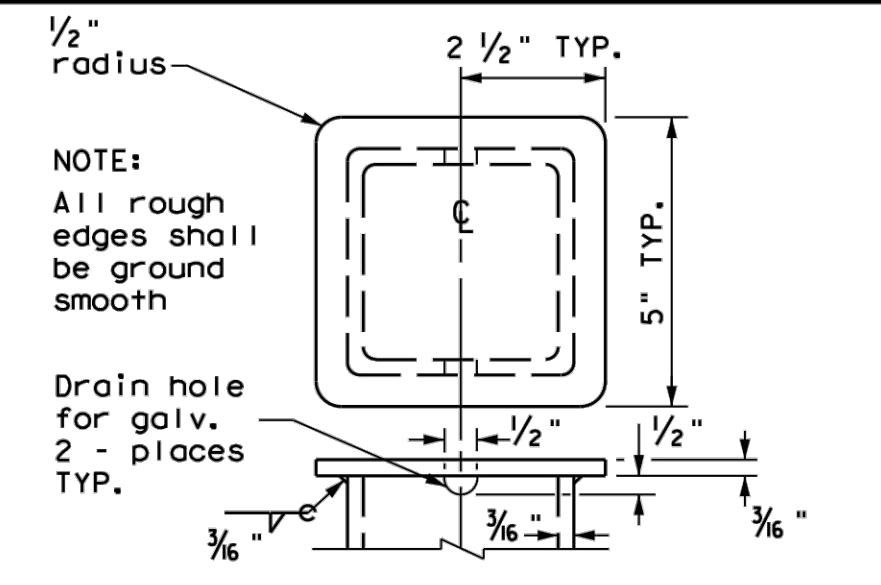
FRONT VIEW
INSET A



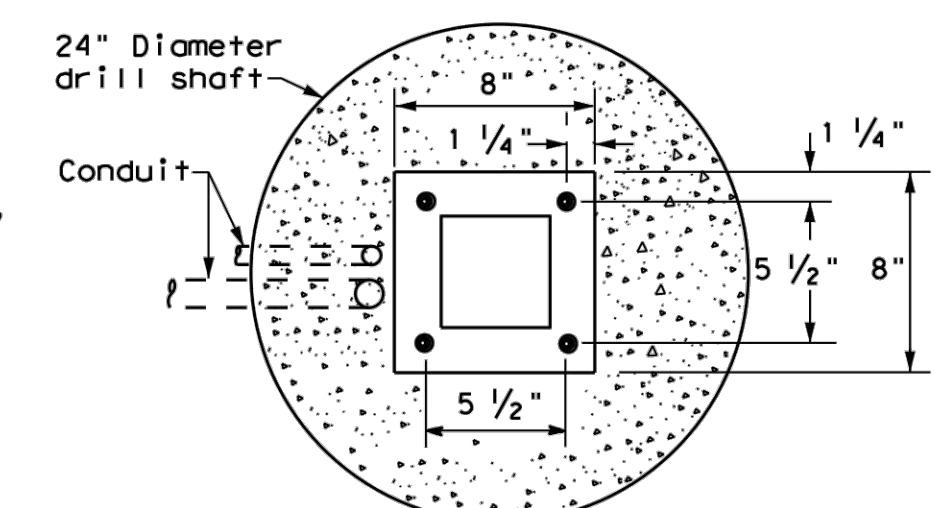
INSET B



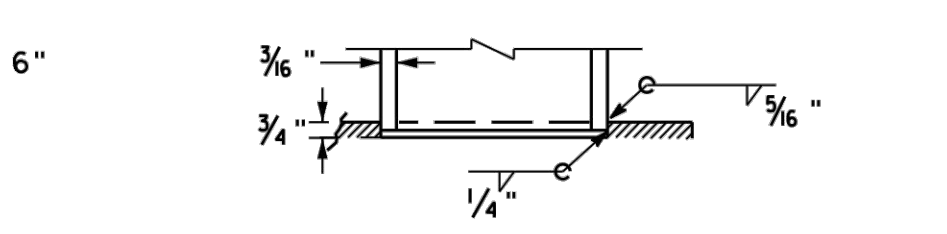
WITH SAFETY SWITCH HOOKED ANCHOR DETAIL
SERVICE SUPPORT TYPE SP (U) - UNDERGROUND SERVICE



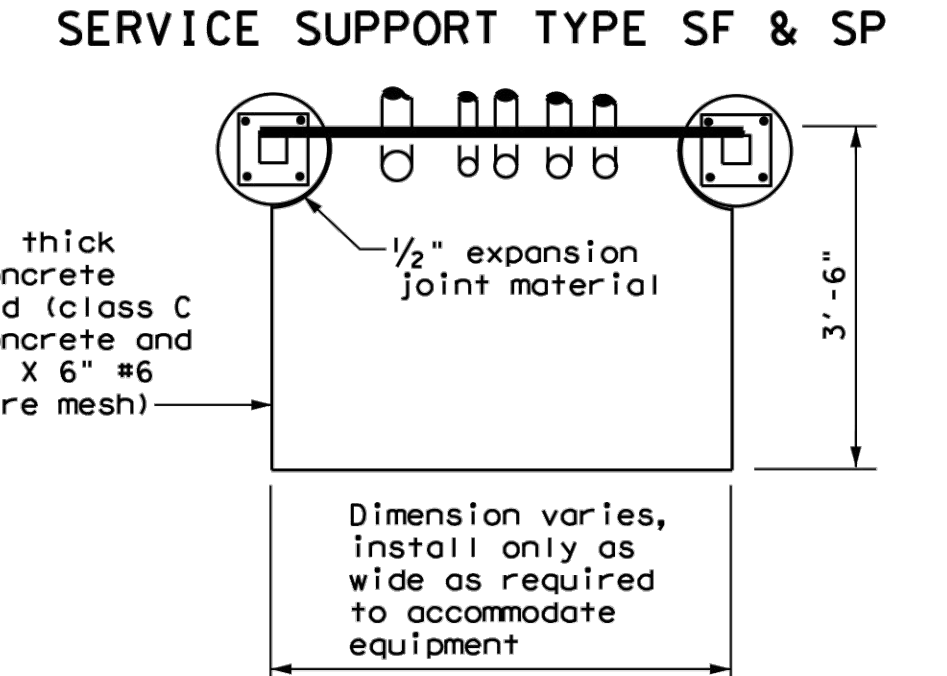
POLE TOP PLATE



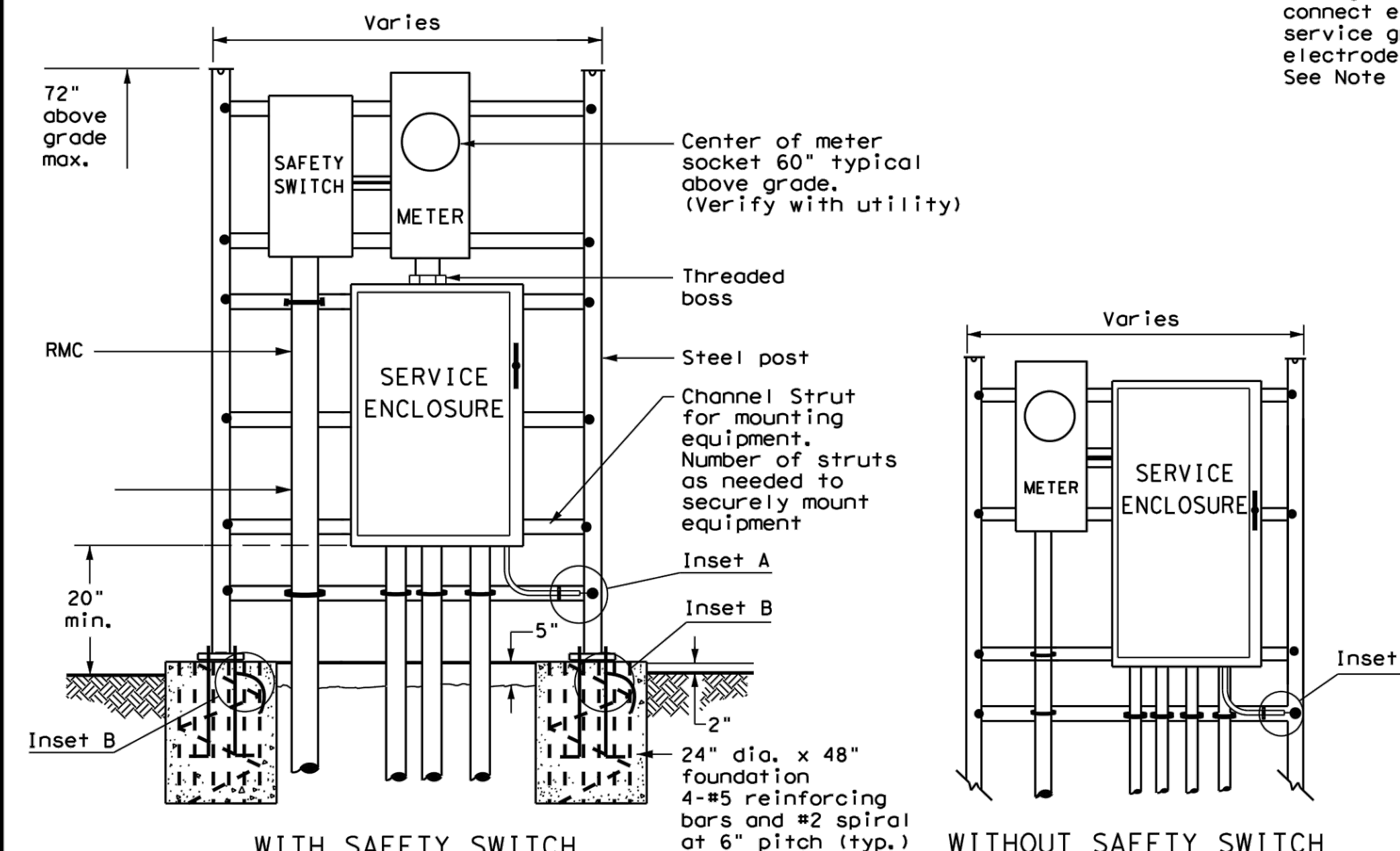
BASE PLATE DETAIL



BOTTOM OF POLE



TOP VIEW
SERVICE SUPPORT TYPE SF (O) & SF (U)

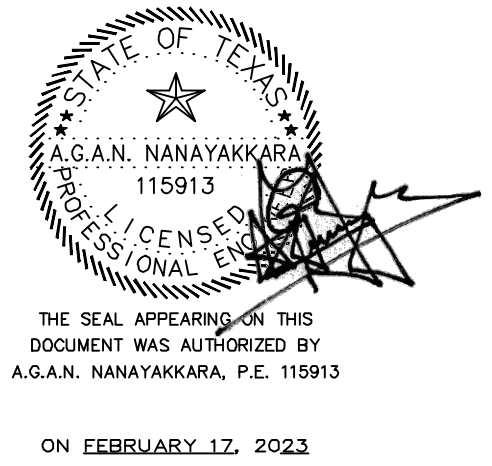


WITH SAFETY SWITCH WITHOUT SAFETY SWITCH
FRONT VIEW
SERVICE SUPPORT TYPE SF (U) - UNDERGROUND SERVICE

Texas Department of Transportation
Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP ED(7)-14

FILE: ed7-14.dgn	DN: TxDOT	CK: TxDOT	DR: TxDOT	CR: TxDOT
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REVISIONS	DIST	COUNTY	SHEET NO.	



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BRANDT ROAD PRECINCT LINE RD TO MASON RD			
ELECTRICAL DETAILS SERVICE SUPPORT SF & SP			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-93-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET TS23

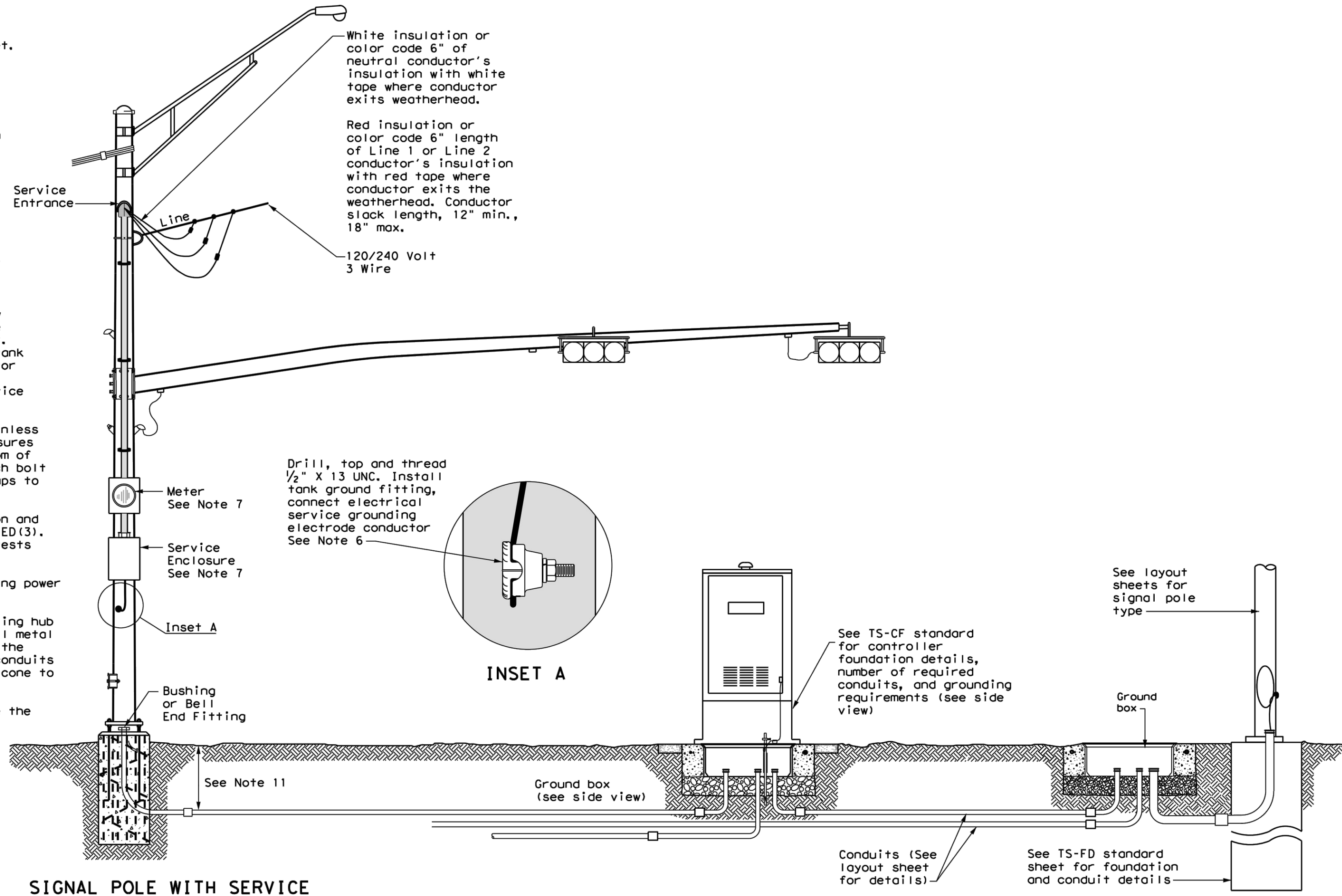
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TRAFFIC SIGNAL NOTES

1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TxDOT standard TS-FD for further details.
6. Drill and tap signal poles for 1/2 in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of 3/4 in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".

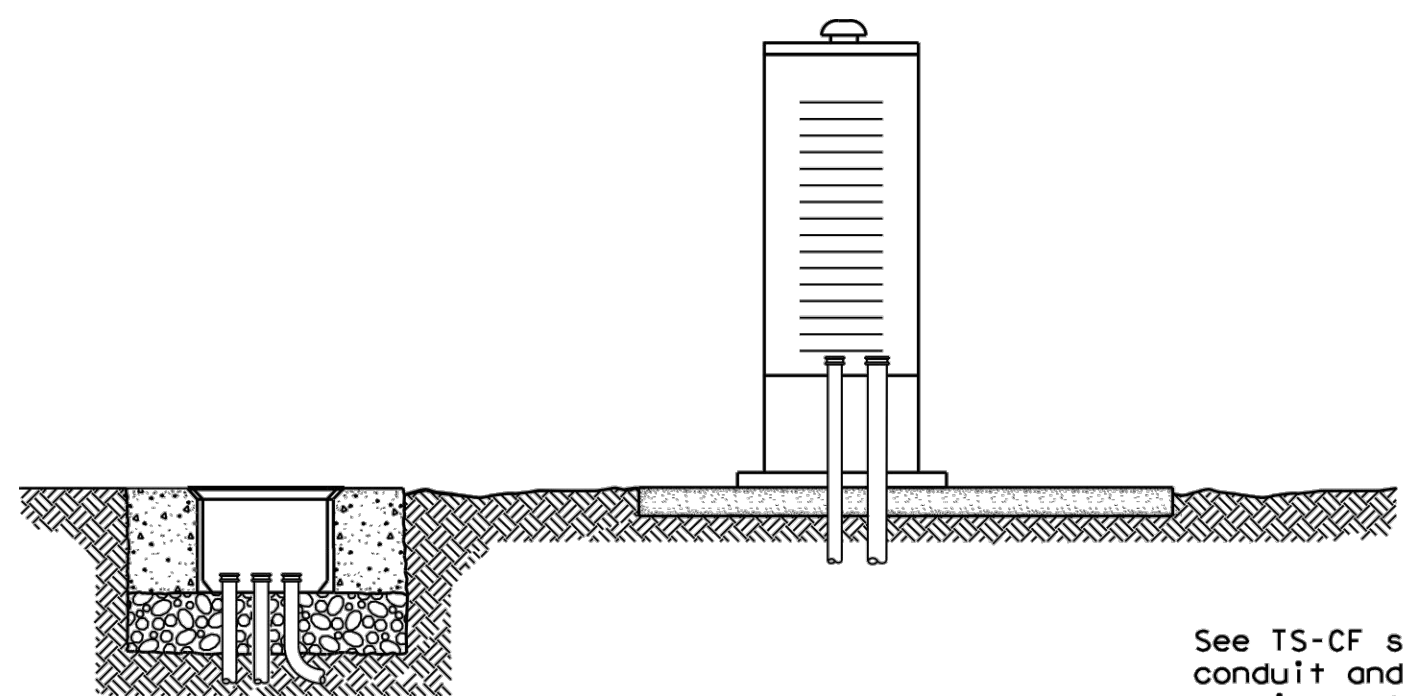


SIGNAL POLE WITH SERVICE

Type I electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

SIGNAL CONTROLLER FRONT VIEW

SIGNAL POLE



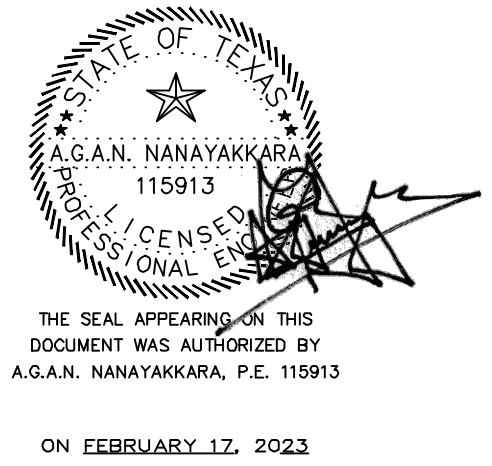
SIGNAL CONTROLLER SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.

Texas Department of Transportation
Traffic Operations Division Standard

**ELECTRICAL DETAILS
TYPICAL TRAFFIC SIGNAL
SYSTEM DETAILS
ED(8) - 14**

FILE: ed8-14.dgn	DN: TxDOT	CK: TxDOT	DR: TxDOT	CR: TxDOT
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REVISIONS	DIST	COUNTY	SHEET NO.	



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BRANDT ROAD PRECINCT LINE RD TO MASON RD			
ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS L.L.C.		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET TS24

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ROADWAY ILLUMINATION ASSEMBLY NOTES

- Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.
- The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.
- Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.
- Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.
- Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.
 - Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.
 - Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25' above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 6th Edition (2013) of the AASHTO Design Specifications. For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25' above the surrounding terrain, provide poles meeting the following requirements:
 - Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).
 - Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.
- For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.
- Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.
- Install T-Base with following procedure:
 - Anchor Bolt Tightening.
 - Coat the threads of the anchor bolts with electrically conductive lubricant.
 - Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.
 - Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.
 - Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.
 - Check top of T-base for level. If not level then foundation must be leveled.
 - Top Bolt Procedure
 - Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

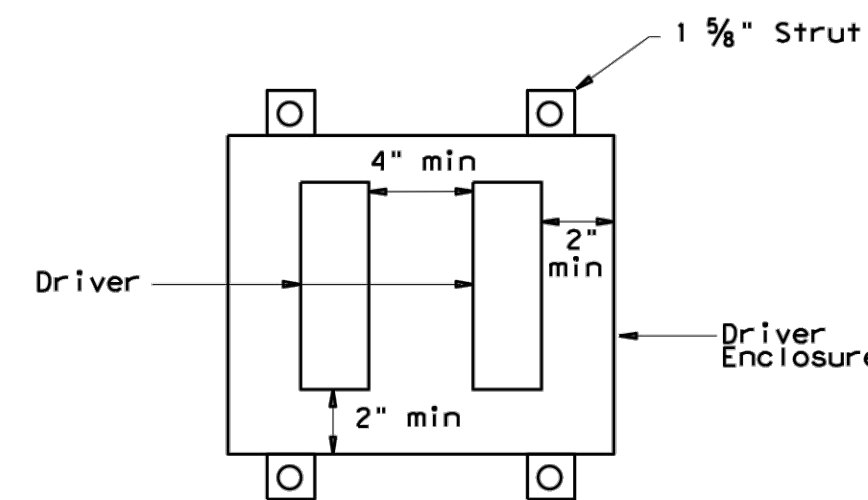
- Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."
 - Tighten each nut to 150 ft-lb. using a torque wrench.
- c. Level and Plumb
- Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.
- Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).
 - Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.
 - Mount luminaires on arms level as shown by the luminaire level indicator.
 - Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.

Wiring Diagram Notes:

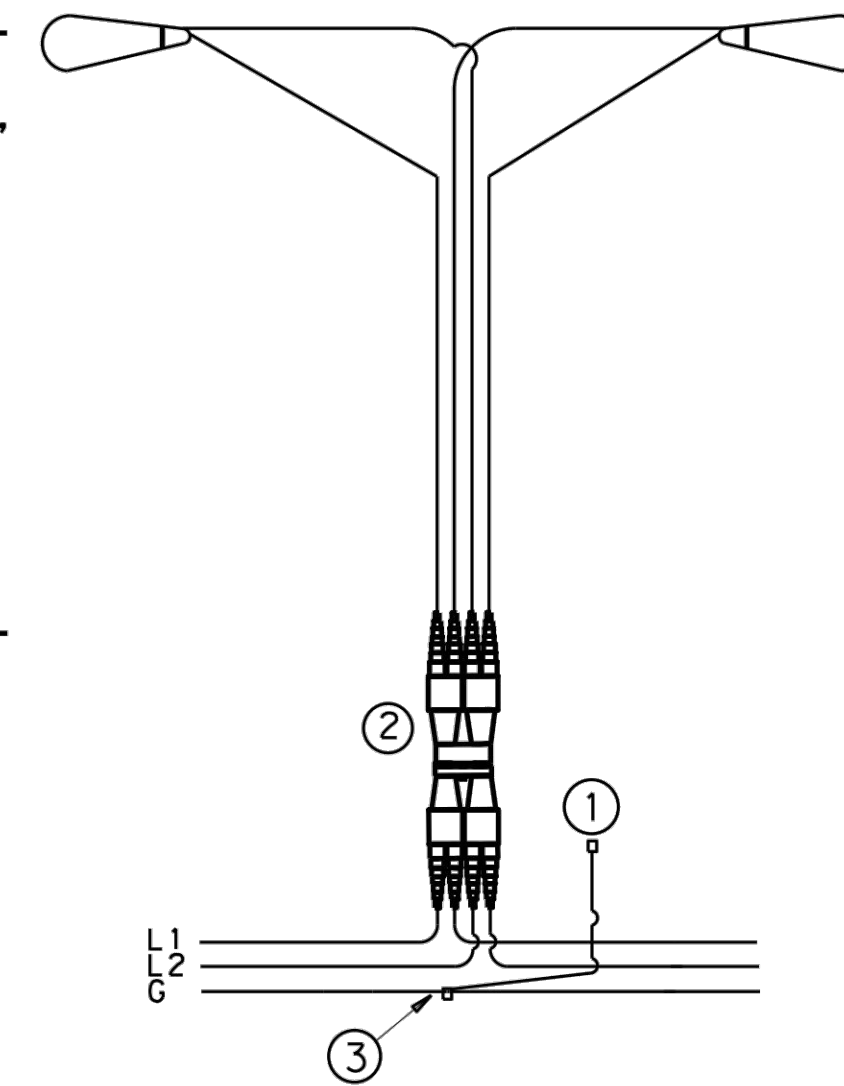
- Use 1/2 in. -13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.
- Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.
- Split Bolt or other connector.

Decorative LED Lighting Notes:

- LED Drivers in Remote Outdoor enclosures (for drivers that do not include an enclosure as part of a factory assembly):
 - Provide NEMA 3R outdoor enclosure or as approved.
 - Install enclosure at least 12" above ground or other horizontal surface. Mount vertically or on ceiling, and avoid direct sun where possible.
 - Install drivers with at least 2 inches of space from enclosure walls.
 - For multiple drivers in an enclosure, provide at least 4 inches side to side and 1 inch end to end from other drivers or electronic equipment
 - For drivers mounted on back wall of enclosure, mount enclosure on 1 5/8" strut or other standoff to dissipate heat, or mount driver to side of the enclosure or to the metal cover.
 - Provide remote drivers with a maximum of 100 watts
 - Provide drivers with documentation of 100,000 hr lifetime at Tcase of 65C or higher.



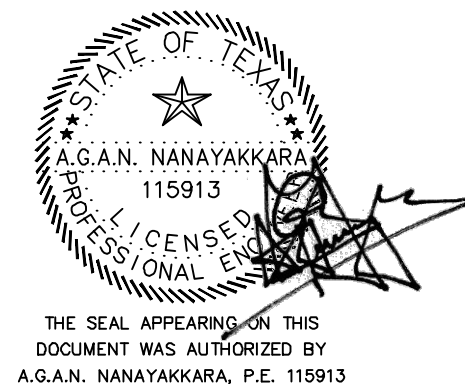
Driver Spacing In Remote Enclosure



L1, L2 = Hot Conductors
G = Grounding Conductor

TYPICAL WIRING DIAGRAM

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR 120/240 VOLT SERVICE.



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ON FEBRUARY 17, 2023

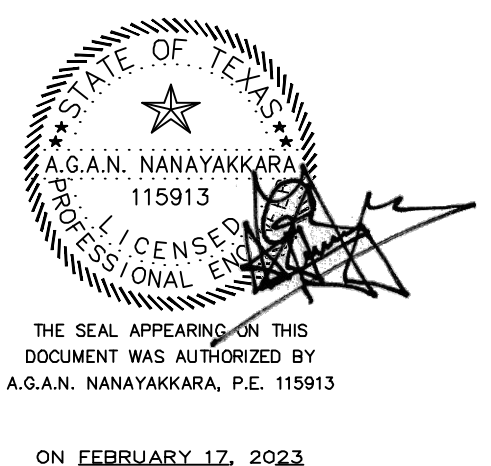
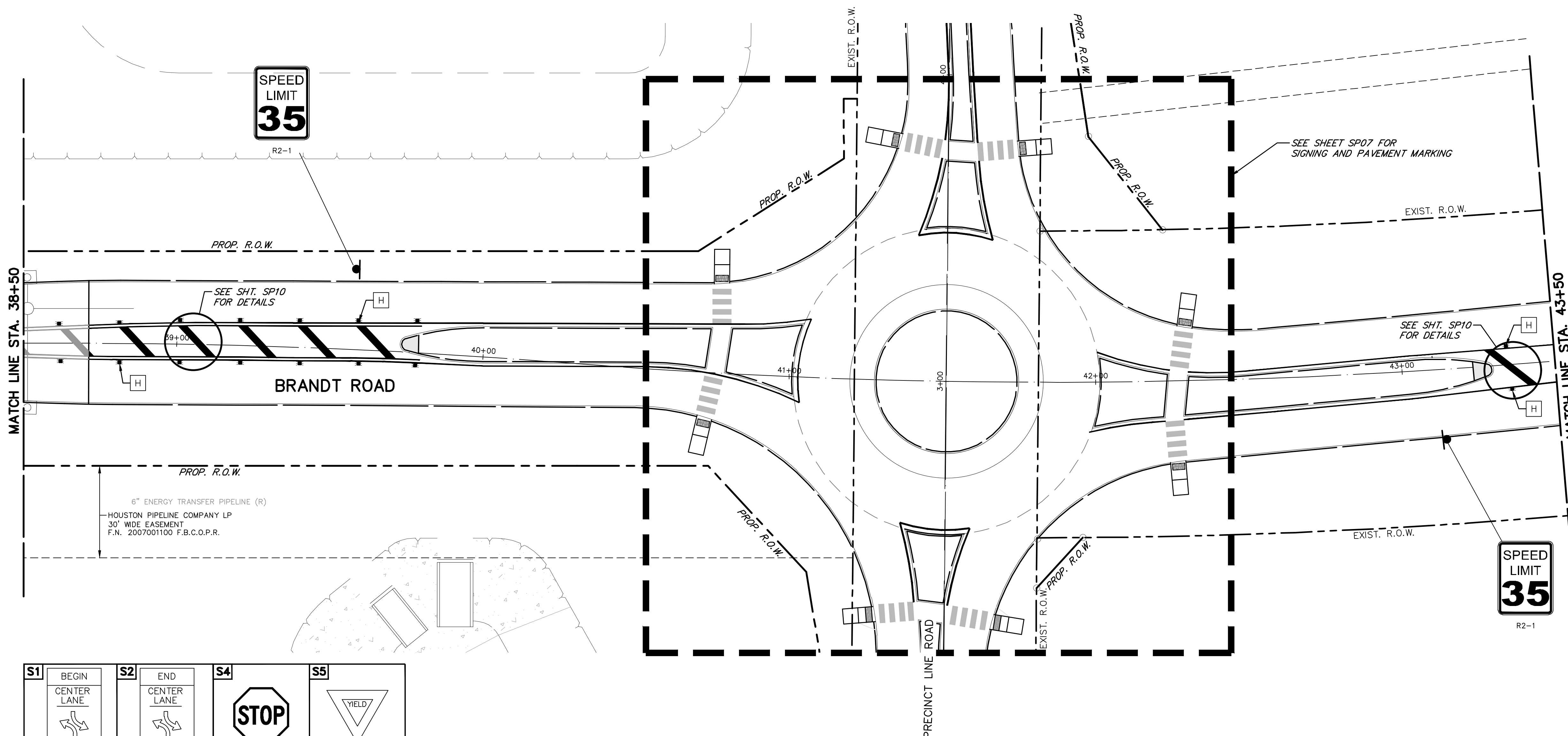
Texas Department of Transportation		Traffic Safety Division Standard	
ROADWAY ILLUMINATION DETAILS			
RID(1)-20			
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7-17	DIST:	COUNTY:	SHEET NO.:
12-20			

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
ROADWAY ILLUMINATION DETAILS			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC.		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281)391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.		SCALE: N.T.S.	PROJECT No. 0522-1801
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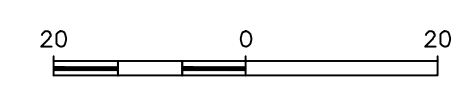
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PAVEMENT MARKING LEGEND

- A THERMOPLASTIC PAV MRK TY I (W) (4") (BRKN).
- B THERMOPLASTIC PAV MRK TY I (W) (8") (SLD).
- C THERMOPLASTIC PAV MRK TY I (W) (12") (SLD).
- D THERMOPLASTIC PAV MRK TY I (W) (24") (SLD).
- E THERMOPLASTIC PAV MRK TY I (W) (ARROW).
- F THERMOPLASTIC PAV MRK TY I (W) (WORD).
- G REFL PAV MRK TY II-C-R.
- H 4" 2-WAY REFL (Y) RAISED PAV MRK (TY II-A-A).
- I NON-REFLECTORIZED WHITE RAISE TRAFFIC BUTTONS.
- J THERMOPLASTIC PAV MRK TY I (W) (4") (SLD).
- K THERMOPLASTIC PAV MRK TY I (Y) (4") (SLD).
- L THERMOPLASTIC PAV MRK TY I (Y) (24") (SLD).
- M THERMOPLASTIC PAV MRK TY I (Y) (4") (DBL) (SLD).
- N THERMOPLASTIC PAV MRK TY I (W) YIELD TRIANGLE.
- O THERMOPLASTIC PAV MRK TY I (W) (8") (DOT).
- P 4" NON-REFLECTORIZED YELLOW RAISE TRAFFIC BUTTONS.
- Q 4" WIDE DASHED YELLOW STRIPE.
- R 4" SQ. 1-WAY REFLECTORIZED WHITE RAISED PAV MRK (TYPE I-C).

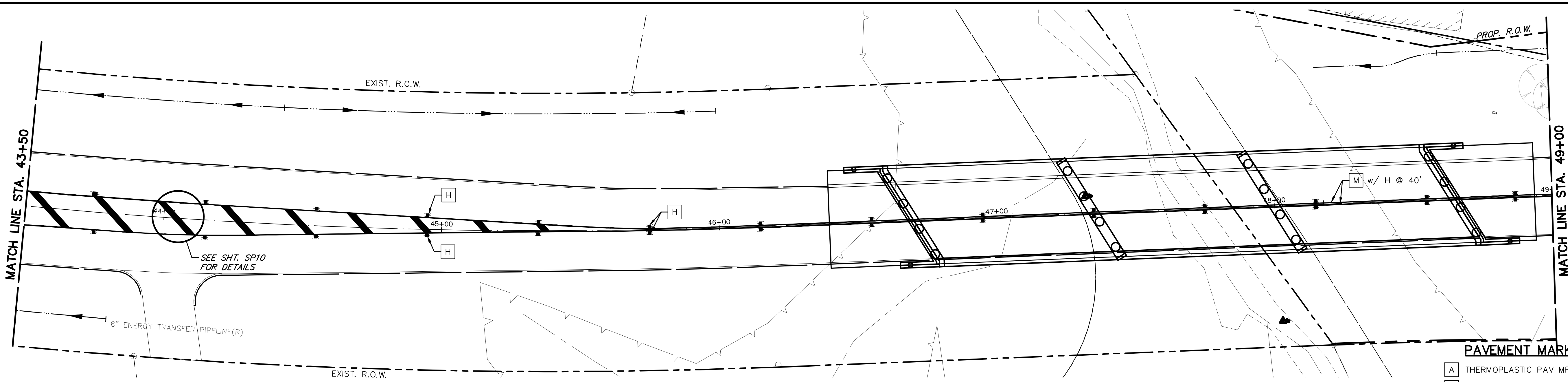


S1	BEGIN CENTER LANE ONLY	S2	END CENTER LANE ONLY	S4	STOP (R1-1) (18"x18")	S5	YIELD (R1-2) (30"x30"x30")
	R3-9B W/ R3-9CP (24"x36")		R3-9B W/ R3-9CP (24"x36")				

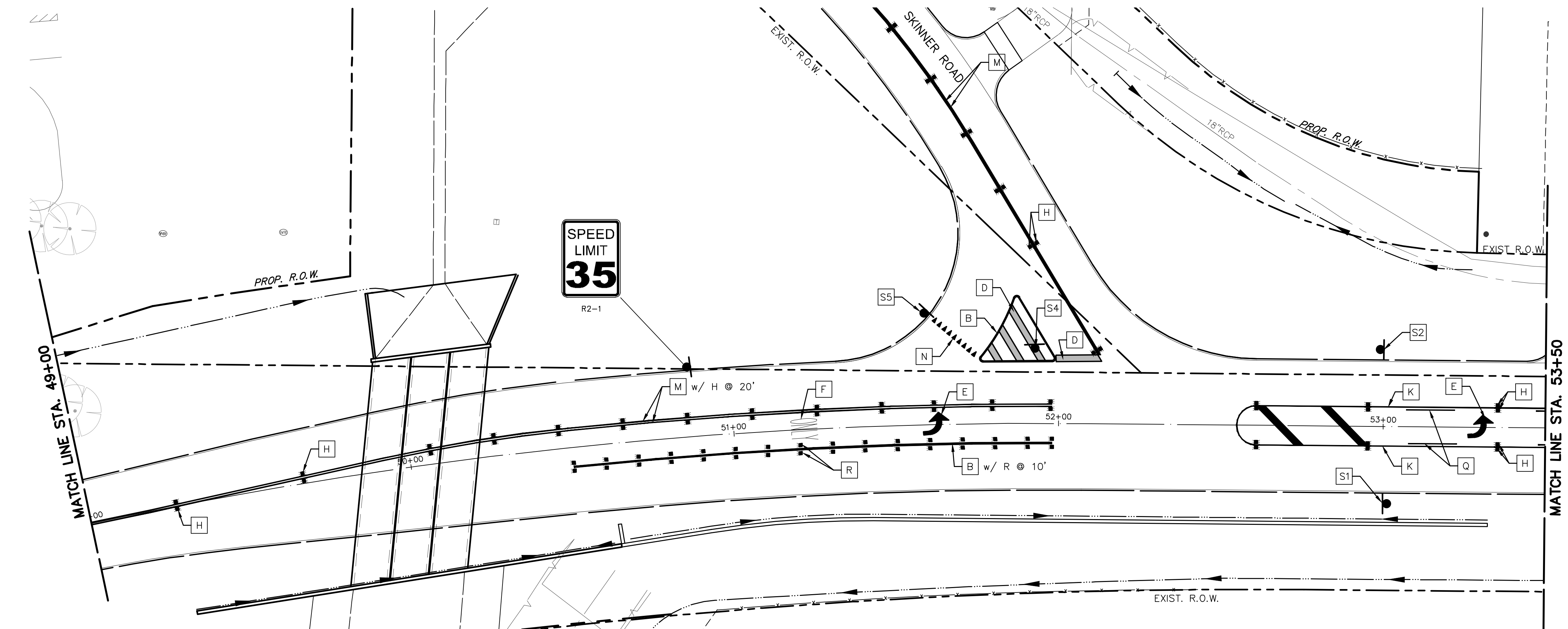


REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD SIGNING & PAVEMENT MARKINGS STA. 33+00 TO STA. 43+50			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77454 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 20'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SP01	

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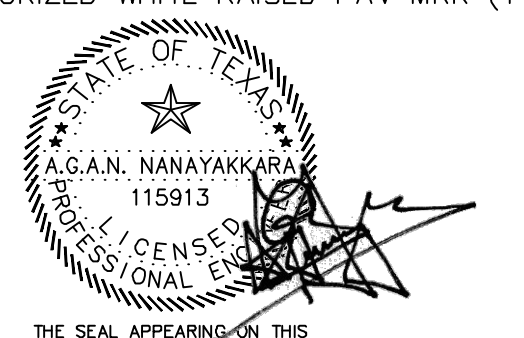


BRANDT ROAD



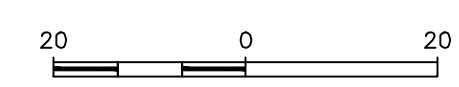
BRANDT ROAD

- PAVEMENT MARKING LEGEND**
- A THERMOPLASTIC PAV MRK TY I (W) (4") (BRKN).
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 - C THERMOPLASTIC PAV MRK TY I (W) (12") (SLD.)
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 - J THERMOPLASTIC PAV MRK TY I (W) (4") (SLD.)
 - K THERMOPLASTIC PAV MRK TY I (Y) (4") (SLD.)
 - L THERMOPLASTIC PAV MRK TY I (Y) (24") (SLD.)
 - M THERMOPLASTIC PAV MRK TY I (Y) (4") (DBL) (SLD.)
 - N THERMOPLASTIC PAV MRK TY I (W) YIELD TRIANGLE.
 - O THERMOPLASTIC PAV MRK TY I (W) (8") (DOT).
 - P 4" NON-REFLECTORIZED YELLOW RAISE TRAFFIC BUTTONS.
 - Q 4" WIDE DASHED YELLOW STRIPE.
 - R 4" SQ. 1-WAY REFLECTORIZED WHITE RAISED PAV MRK (TYPE I-C).



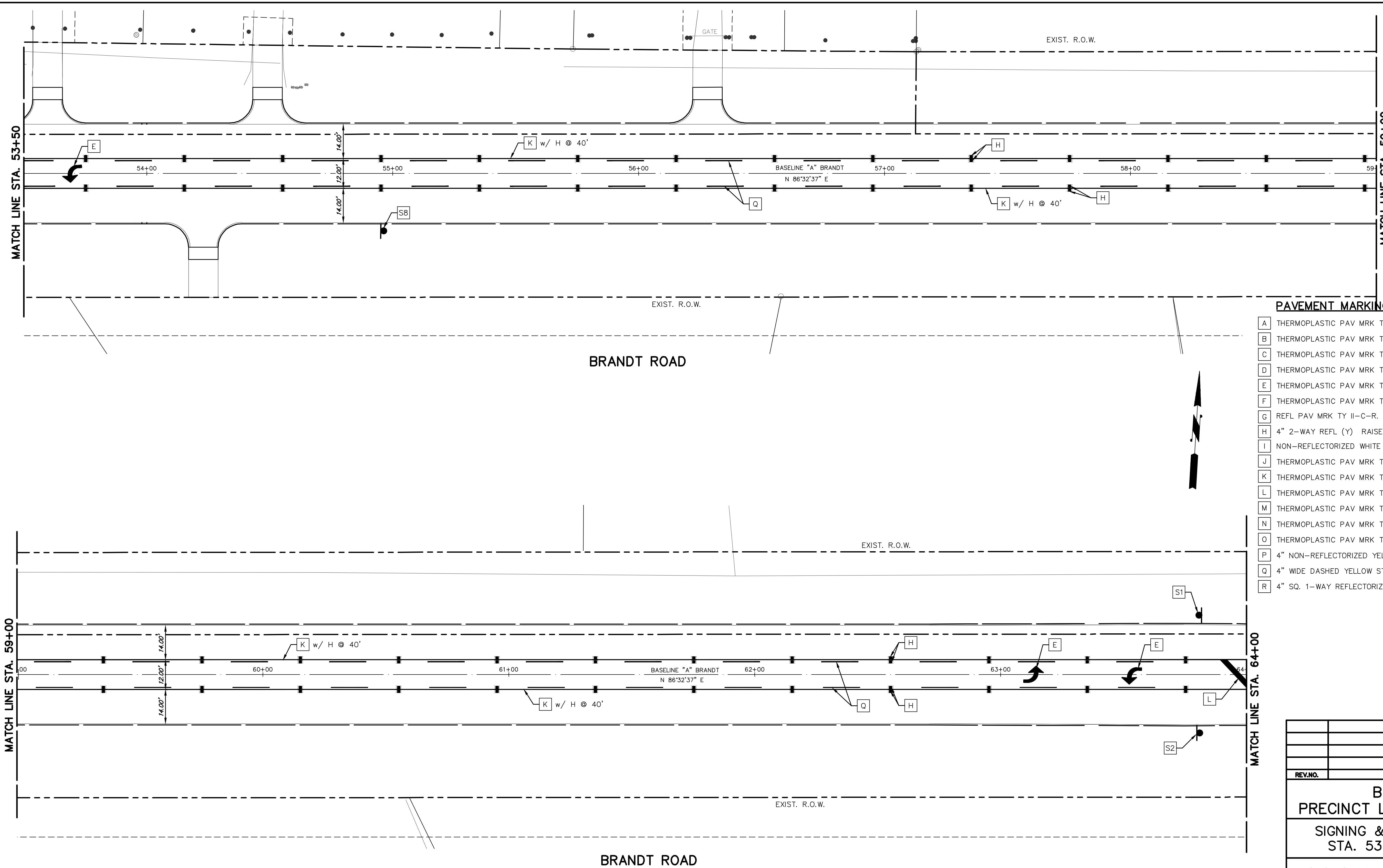
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913
ON FEBRUARY 17, 2023

S1 BEGIN CENTER LANE ONLY R3-9B W/ R3-9CP (24"x36")	S2 END CENTER LANE ONLY R3-9B W/ R3-9CP (24"x36")	S4 R1-1 (18"x18")	S5 R1-2 (30"x30"x30")
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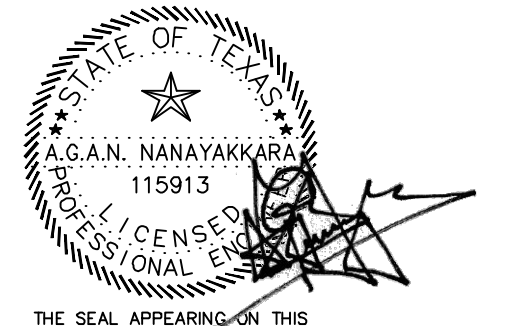
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD SIGNING & PAVEMENT MARKINGS STA. 43+50 TO STA. 53+50			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 20'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SP02	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\SP03 SIGNING & PAVEMENT MARKINGS STA. 53+50 TO STA. 64+00.dwg Feb 17, 2023-11:29am Terra Associates Inc., Thanh Dao

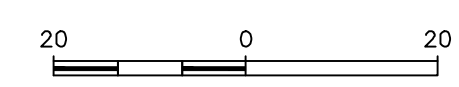
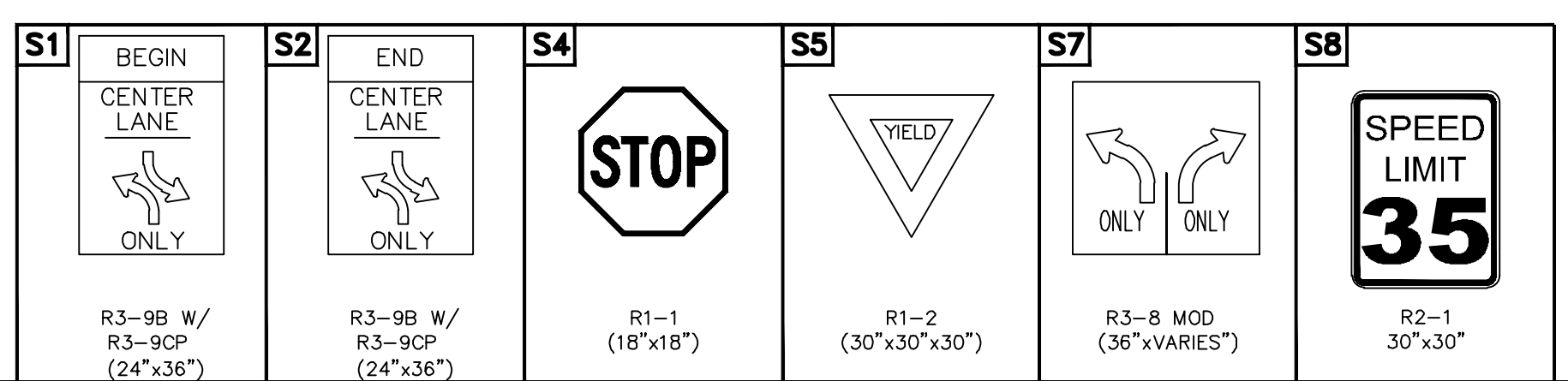


PAVEMENT MARKING LEGEND

- A THERMOPLASTIC PAV MRK TY I (W) (4") (BRKN).
- B THERMOPLASTIC PAV MRK TY I (W) (8") (SLD).
- C THERMOPLASTIC PAV MRK TY I (W) (12") (SLD).
- D THERMOPLASTIC PAV MRK TY I (W) (24") (SLD).
- E THERMOPLASTIC PAV MRK TY I (W) (ARROW).
- F THERMOPLASTIC PAV MRK TY I (W) (WORD).
- G REFL PAV MRK TY II-C-R.
- H 4" 2-WAY REFL (Y) RAISED PAV MRK (TY II-A-A).
- I NON-REFLECTORIZED WHITE RAISE TRAFFIC BUTTONS.
- J THERMOPLASTIC PAV MRK TY I (W) (4") (SLD).
- K THERMOPLASTIC PAV MRK TY I (Y) (4") (SLD).
- L THERMOPLASTIC PAV MRK TY I (Y) (24") (SLD).
- M THERMOPLASTIC PAV MRK TY I (Y) (4") (DBL) (SLD).
- N THERMOPLASTIC PAV MRK TY I (W) (8") (DOT).
- O THERMOPLASTIC PAV MRK TY I (W) (8") (DOT).
- P 4" NON-REFLECTORIZED YELLOW RAISE TRAFFIC BUTTONS.
- Q 4" WIDE DASHED YELLOW STRIPE.
- R 4" SQ. 1-WAY REFLECTORIZED WHITE RAISED PAV MRK (TYPE I-C).

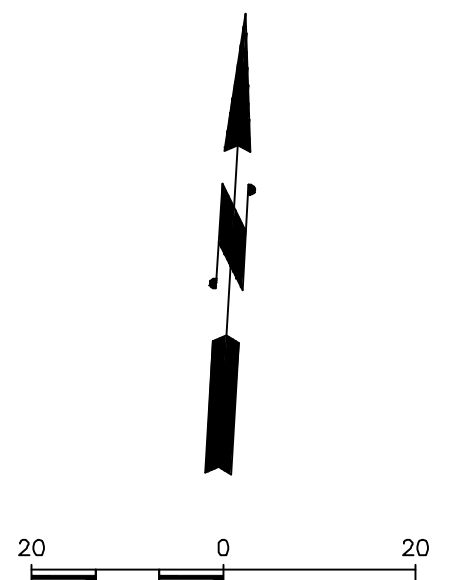
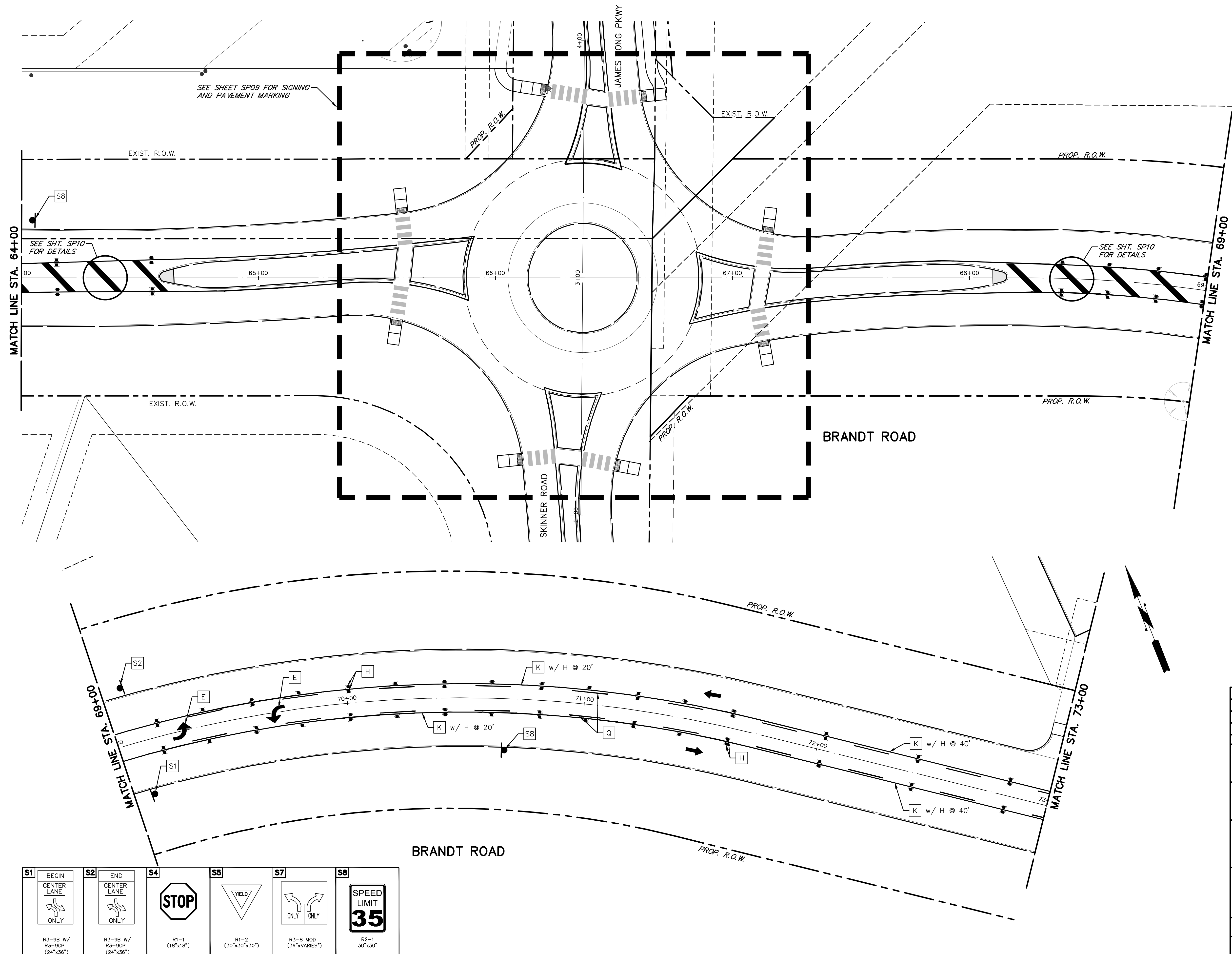


ON FEBRUARY 17, 2023



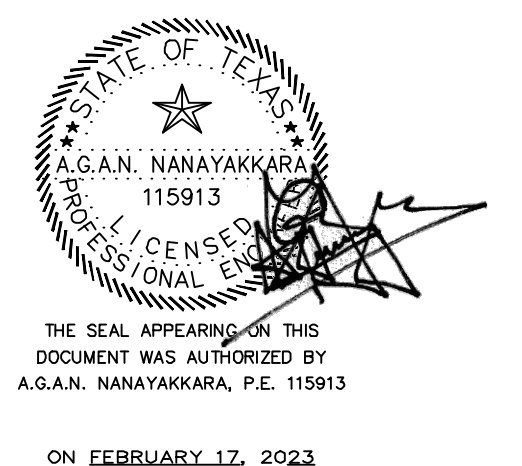
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD SIGNING & PAVEMENT MARKINGS STA. 53+50 TO STA. 64+00			
TERRA <small>a Bowman company</small>		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77454 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 20'	PROJECT No. 0522-1801	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1	
		SHEET SP03	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\SP04_SIGNING & PAVEMENT MARKINGS STA. 64+00 TO STA. 73+00.dwg Feb 17, 2023-11:29am Terra Associates Inc., Thanh Dao



PAVEMENT MARKING LEGEND

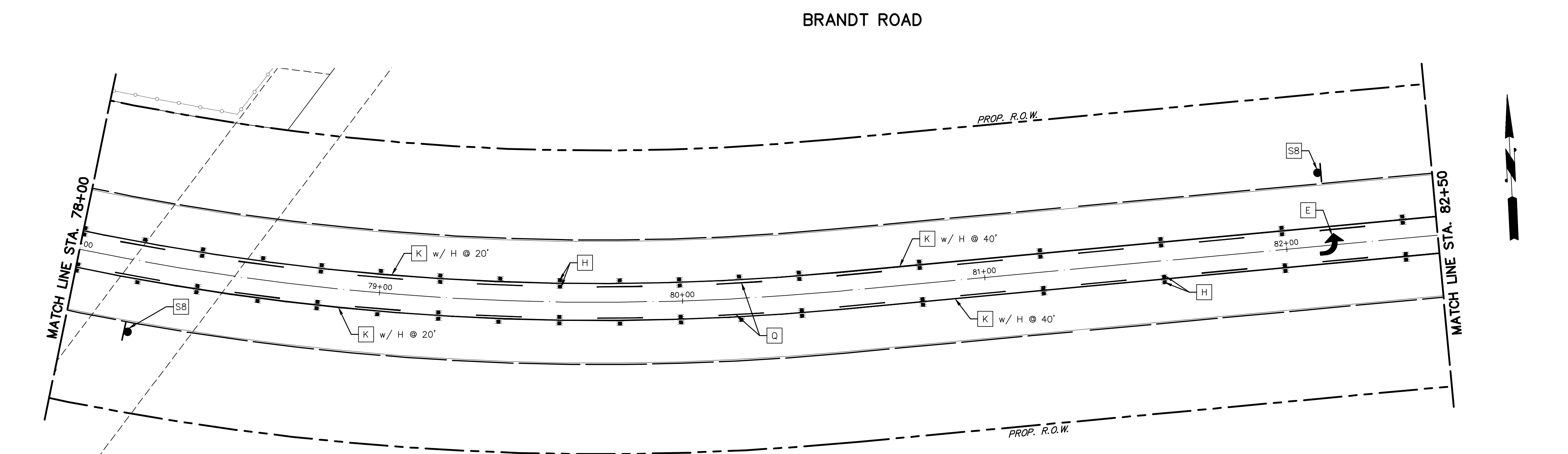
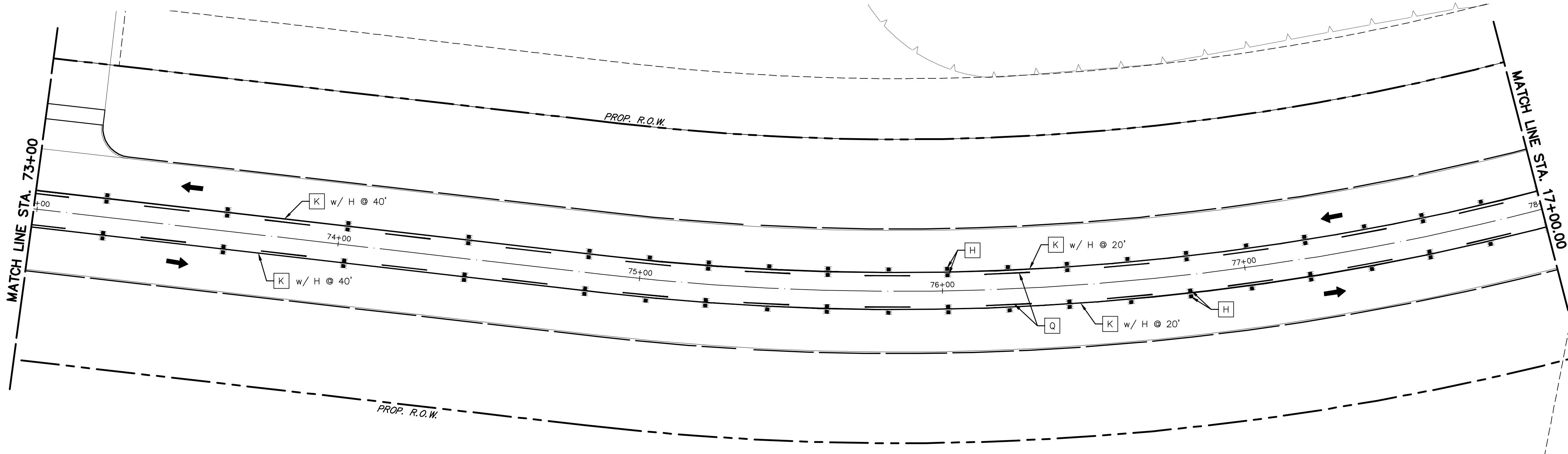
- A THERMOPLASTIC PAV MRK TY I (W) (4") (BRKN.)
- B THERMOPLASTIC PAV MRK TY I (W) (8") (SLD.)
- C THERMOPLASTIC PAV MRK TY I (W) (12") (SLD.)
- D THERMOPLASTIC PAV MRK TY I (W) (24") (SLD.)
- E THERMOPLASTIC PAV MRK TY I (W) (ARROW).
- F THERMOPLASTIC PAV MRK TY I (W) (WORD).
- G REFL PAV MRK TY II-C-R.
- H 4" 2-WAY REFL (Y) RAISED PAV MRK (TY II-A-A).
- I NON-REFLECTORIZED WHITE RAISE TRAFFIC BUTTONS.
- J THERMOPLASTIC PAV MRK TY I (W) (4") (SLD.)
- K THERMOPLASTIC PAV MRK TY I (Y) (4") (SLD.)
- L THERMOPLASTIC PAV MRK TY I (Y) (24") (SLD.)
- M THERMOPLASTIC PAV MRK TY I (Y) (4") (DBL) (SLD.)
- N THERMOPLASTIC PAV MRK TY I (W) YIELD TRIANGLE.
- O THERMOPLASTIC PAV MRK TY I (W) (8") (DOT).
- P 4" NON-REFLECTORIZED YELLOW RAISE TRAFFIC BUTTONS.
- Q 4" WIDE DASHED YELLOW STRIPE.
- R 4" SQ. 1-WAY REFLECTORIZED WHITE RAISED PAV MRK (TYPE I-C).



REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD			
PRECINCT LINE RD TO MASON RD			
SIGNING & PAVEMENT MARKINGS			
STA. 64+00 TO STA. 73+00			
TERRA <small>a Bowman company</small>		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS <small>L.L.C.</small>		JNS <small>ENGINEERS, LLC</small>	
DRAWN BY: T.D.		SCALE: 1" = 20'	
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	
PROJECT No. 0522-1801		CONTRACT: 1	
SHEET SP04		REGISTRATION NO. 11653	

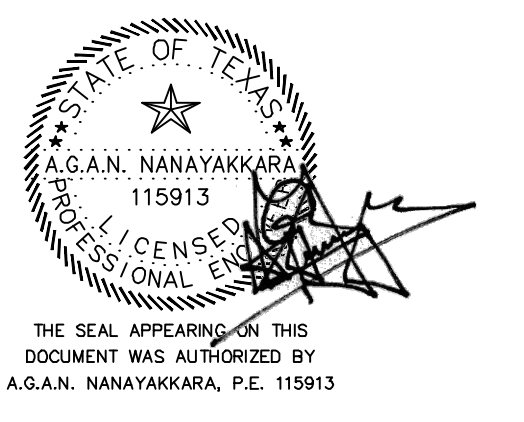
S1	BEGIN CENTER LANE ONLY 	S2	END CENTER LANE ONLY 	S4		S5		S7		S8	
	R3-9B W/ R3-9CP (24"x36")		R3-9B W/ R3-9CP (24"x36")		R1-1 (18"x18")		R1-2 (30"x30"x30")		R3-9 MOD (36"xVARIES")		R2-1 30"x30"

F:\Clients\Fort_Band_County_Engineering\0522-1801_Brandt_Road\Drawings\Sig 2\SP05_SIGNING & PAVEMENT MARKINGS STA. 73+00 TO STA. 82+50.dwg Feb 17, 2023-11:29am Terra Associates Inc., Thanh Dao

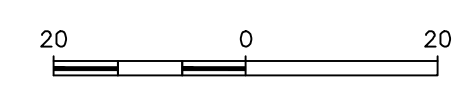


PAVEMENT MARKING LEGEND

A	THERMOPLASTIC PAV MRK TY I (W) (4") (BRKN).
B	THERMOPLASTIC PAV MRK TY I (W) (8") (SLD).
C	THERMOPLASTIC PAV MRK TY I (W) (12") (SLD).
D	THERMOPLASTIC PAV MRK TY I (W) (24") (SLD).
E	THERMOPLASTIC PAV MRK TY I (W) (ARROW).
F	THERMOPLASTIC PAV MRK TY I (W) (WORD).
G	REFL PAV MRK TY II-C-R.
H	4" 2-WAY REFL (Y) RAISED PAV MRK (TY II-A-A).
I	NON-REFLECTORIZED WHITE RAISE TRAFFIC BUTTONS.
J	THERMOPLASTIC PAV MRK TY I (W) (4") (SLD).
K	THERMOPLASTIC PAV MRK TY I (Y) (4") (SLD).
L	THERMOPLASTIC PAV MRK TY I (Y) (24") (SLD).
M	THERMOPLASTIC PAV MRK TY I (Y) (4") (DBL) (SLD).
N	THERMOPLASTIC PAV MRK TY I (W) YIELD TRIANGLE.
O	THERMOPLASTIC PAV MRK TY I (W) (8") (DOT).
P	4" NON-REFLECTORIZED YELLOW RAISE TRAFFIC BUTTONS.
Q	4" WIDE DASHED YELLOW STRIPE.
R	4" SQ. 1-WAY REFLECTORIZED WHITE RAISED PAV MRK (TYPE I-C).

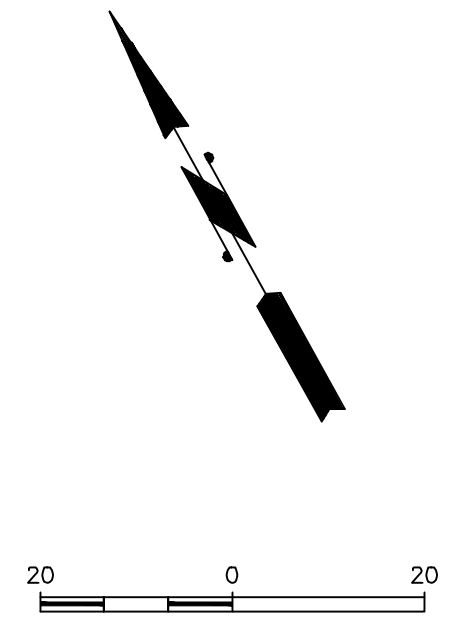
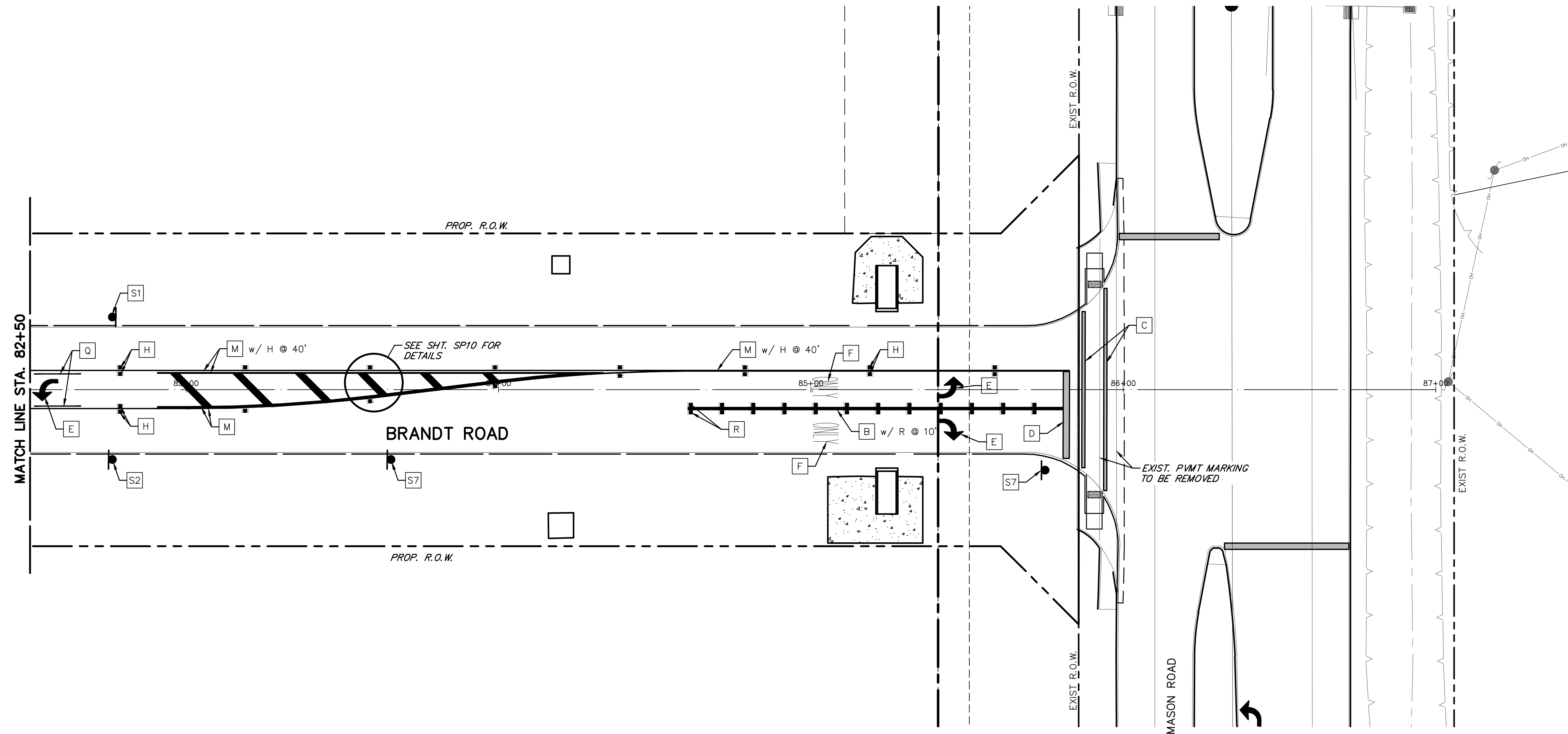


S1 BEGIN CENTER LANE ONLY R3-9B W/ R3-9CP (24"x36")	S2 END CENTER LANE ONLY R3-9B W/ R3-9CP (24"x36")	S4 STOP R1-1 (18"x18")	S5 YIELD R1-2 (30"x30"x30")	S7 ONLY ONLY R3-8 MOD (36"xVARIES")	S8 SPEED LIMIT 35 R2-1 30"x30"
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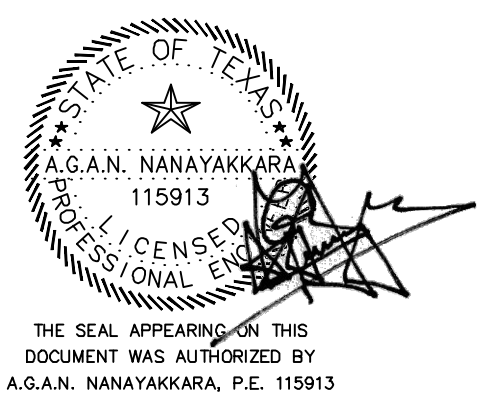
REV.NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD SIGNING & PAVEMENT MARKINGS STA. 73+00 TO STA. 82+50			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 20'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SP05	

F:\Clients\Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\SP06 SIGNING & PAVEMENT MARKINGS STA. 82+50 TO END.dwg Feb 17, 2023-11:29am Terra Associates Inc., Thanh Dao



PAVEMENT MARKING LEGEND

- A THERMOPLASTIC PAV MRK TY I (W) (4") (BRKN).
- B THERMOPLASTIC PAV MRK TY I (W) (8") (SLD).
- C THERMOPLASTIC PAV MRK TY I (W) (12") (SLD).
- D THERMOPLASTIC PAV MRK TY I (W) (24") (SLD).
- E THERMOPLASTIC PAV MRK TY I (W) (ARROW).
- F THERMOPLASTIC PAV MRK TY I (W) (WORD).
- G REFL PAV MRK TY II-C-R.
- H 4" 2-WAY REFL (Y) RAISED PAV MRK (TY II-A-A).
- I NON-REFLECTORIZED WHITE RAISE TRAFFIC BUTTONS.
- J THERMOPLASTIC PAV MRK TY I (W) (4") (SLD).
- K THERMOPLASTIC PAV MRK TY I (Y) (4") (SLD).
- L THERMOPLASTIC PAV MRK TY I (Y) (24") (SLD).
- M THERMOPLASTIC PAV MRK TY I (Y) (4") (DBL) (SLD).
- N THERMOPLASTIC PAV MRK TY I (W) YIELD TRIANGLE.
- O THERMOPLASTIC PAV MRK TY I (W) (8") (DOT).
- P 4" NON-REFLECTORIZED YELLOW RAISE TRAFFIC BUTTONS.
- Q 4" WIDE DASHED YELLOW STRIPE.
- R 4" SQ. 1-WAY REFLECTORIZED WHITE RAISED PAV MRK (TYPE I-C).

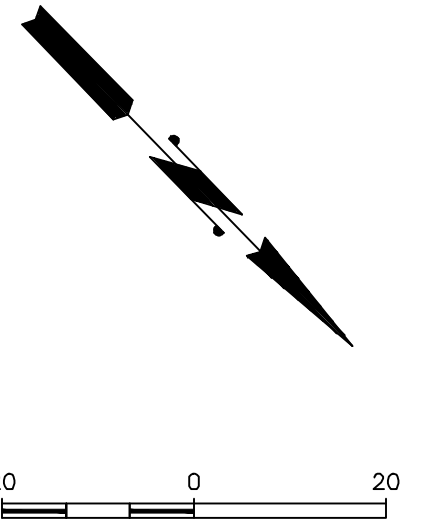
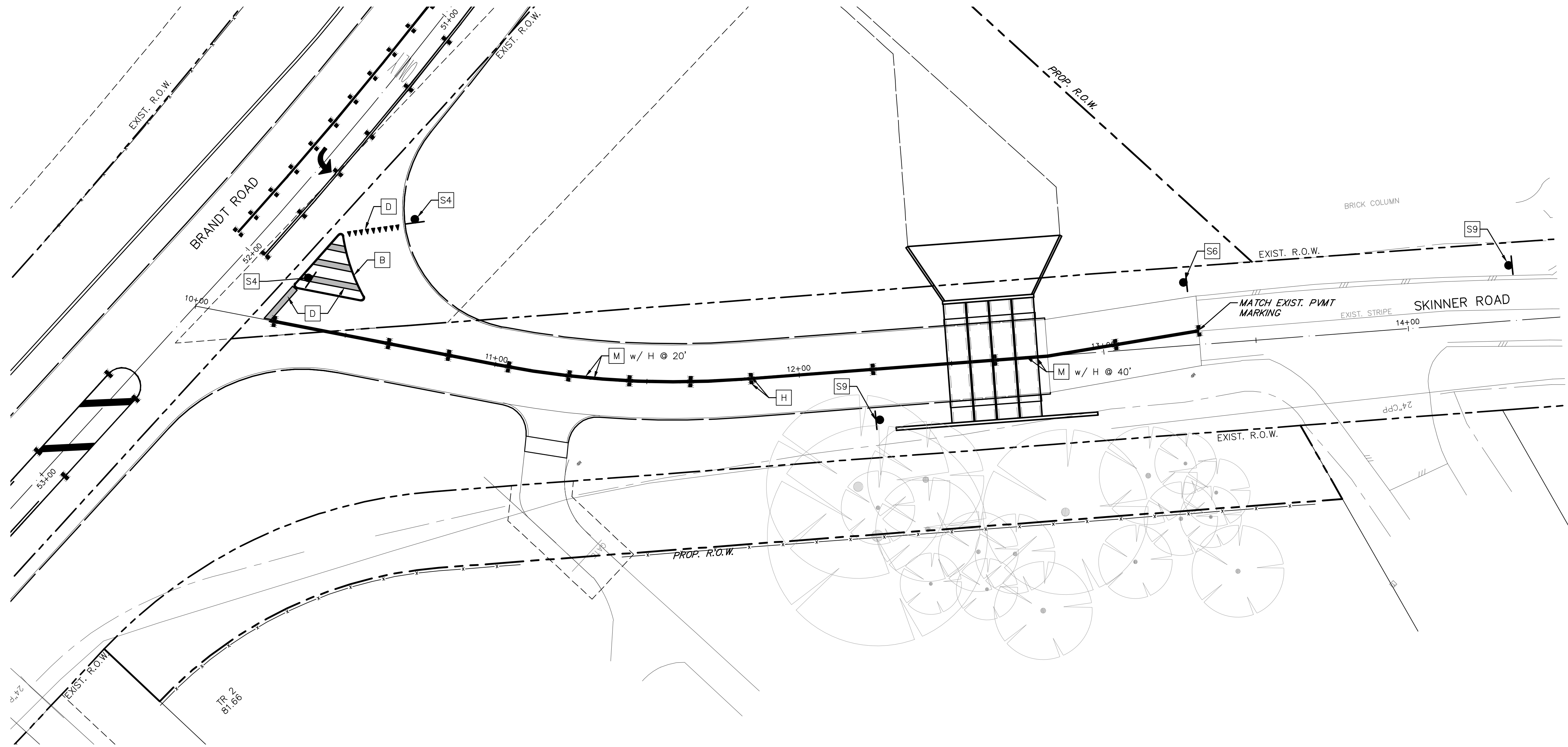


ON FEBRUARY 17, 2023

S1	 <small>R3-9B W/ R3-9CP (24"x36")</small>	S2	 <small>R3-9B W/ R3-9CP (24"x36")</small>	S3	S4	S5	S6	S7	S8
	 <small>R1-1 (36"x36")</small>		 <small>R1-2 (30"x30"x30")</small>		 <small>R3-8 MOD (36"xVARIES")</small>		 <small>R2-1 30"x30"</small>		

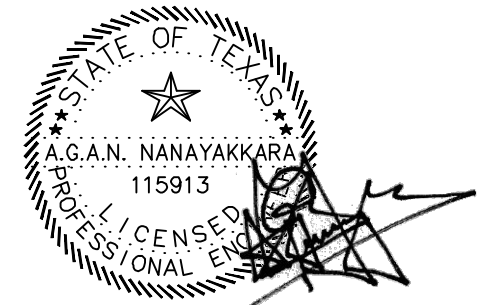
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD SIGNING & PAVEMENT MARKINGS STA. 82+50 TO END			
		1445 N. LOOP WEST - SUITE 450 <small>HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309</small>	
		<small>722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653</small>	
<small>DRAWN BY: T.D.</small>	<small>SCALE: 1" = 20'</small>	<small>PROJECT No. 0522-1801 CONTRACT: 1</small>	
<small>CHECKED BY: A.G.A.N.</small>	<small>DATE: FEBRUARY, 2023</small>	<small>SHEET SP06</small>	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\SP09 SKINNER ROAD SIGNING & PAVEMENT MARKINGS.dwg, Feb 17, 2023-11:30am Terra Associates Inc., Thanh Dao



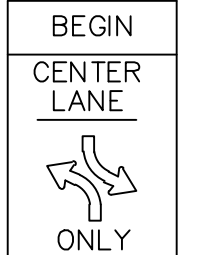
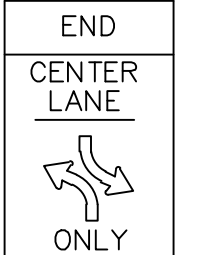
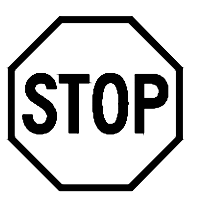
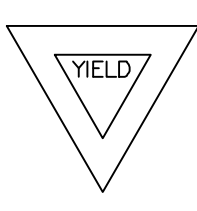
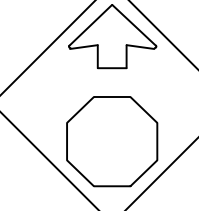
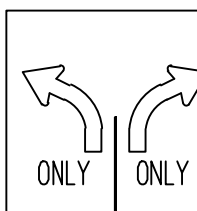


PAVEMENT MARKING LEGEND


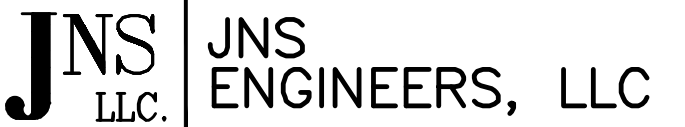
- A THERMOPLASTIC PAV MKR TY I (W) (4") (BRKN).
- B THERMOPLASTIC PAV MKR TY I (W) (8") (SLD).
- C THERMOPLASTIC PAV MKR TY I (W) (12") (SLD).
- D THERMOPLASTIC PAV MKR TY I (W) (24") (SLD).
- E THERMOPLASTIC PAV MKR TY I (W) (ARROW).
- F THERMOPLASTIC PAV MKR TY I (W) (WORD).
- G REFL PAV MKR TY II-C-R.
- H 4" 2-WAY REFL (Y) RAISED PAV MKR (TY II-A-A).
- I NON-REFLECTORIZED WHITE RAISE TRAFFIC BUTTONS.
- J THERMOPLASTIC PAV MKR TY I (W) (4") (SLD).
- K THERMOPLASTIC PAV MKR TY I (Y) (4") (SLD).
- L THERMOPLASTIC PAV MKR TY I (Y) (24") (SLD).
- M THERMOPLASTIC PAV MKR TY I (Y) (4") (DBL) (SLD).
- N THERMOPLASTIC PAV MKR TY I (W) YIELD TRIANGLE.
- O THERMOPLASTIC PAV MKR TY I (W) (8") (DOT).
- P 4" NON-REFLECTORIZED YELLOW RAISE TRAFFIC BUTTONS.
- Q 4" WIDE DASHED YELLOW STRIPE.
- R 4" SQ. S1-1-WAY REFLECTORIZED WHITE RAISED PAV MKR (TYPE I-C).



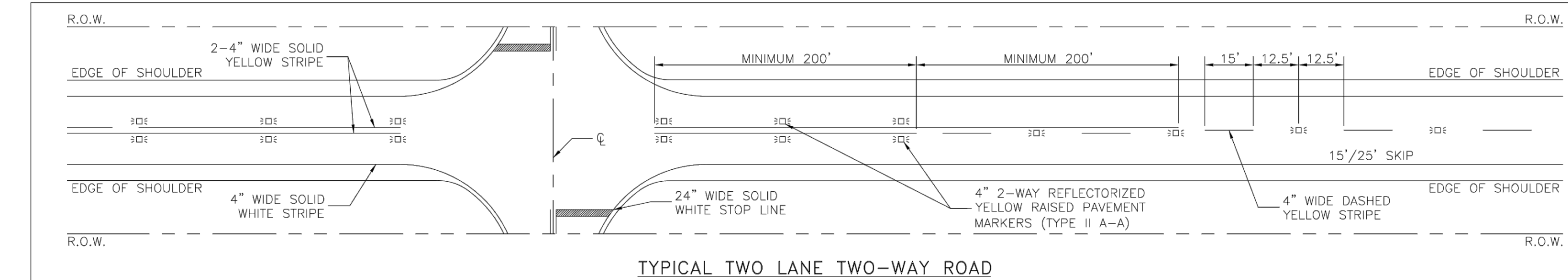
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913

ON FEBRUARY 17, 2023

S1	 BEGIN CENTER LANE ONLY	S2	 END CENTER LANE ONLY	S3		S4	 R1-1 (18"x18")	S5	 R1-2 (30"x30"x30")	S6	 W3-1 (30"x30")	S7	 R3-8 MOD (36"xVARIES")	S8	 R2-1 30"x30"	S9	 R2-1 30"x30"
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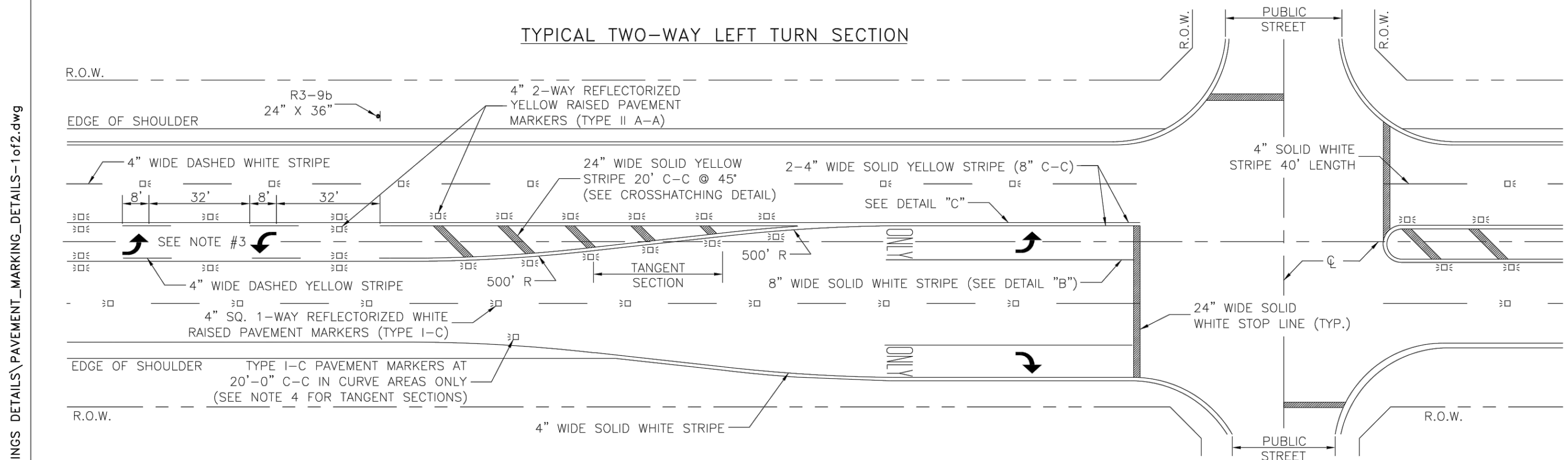
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
SKINNER ROAD SIGNING & PAVEMENT MARKINGS			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 20'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SP09	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\SP10 PAVEMENT MARKING DETAILS (1 OF 2).dwg Feb 17, 2023-11:30am Terra Associates Inc., Thanh Dao

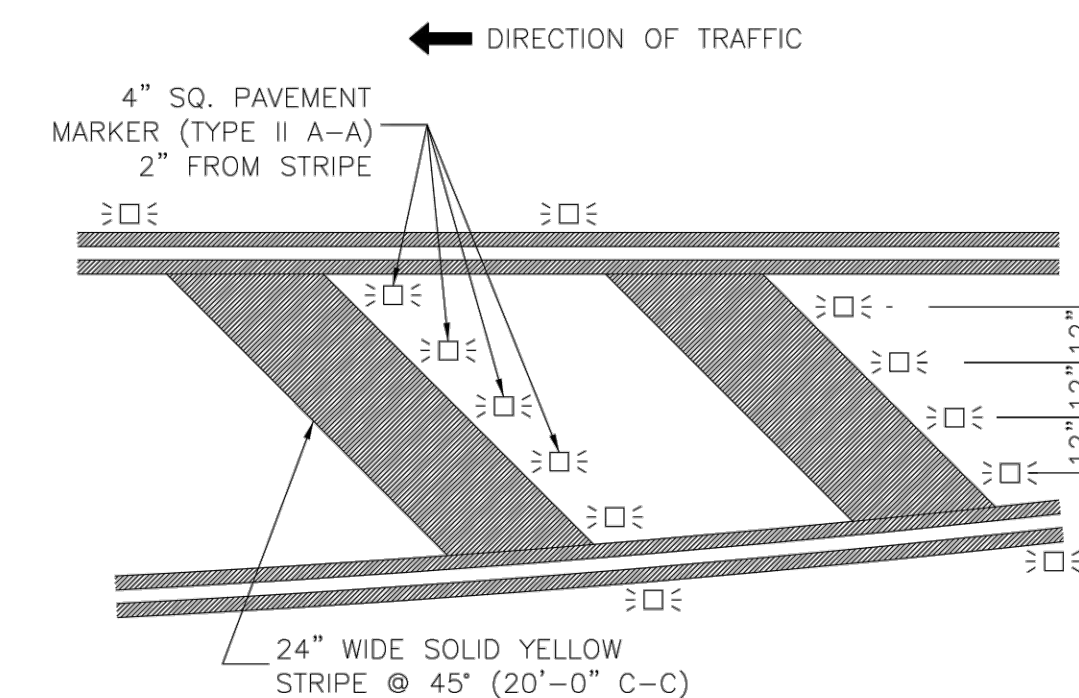


NOTES:

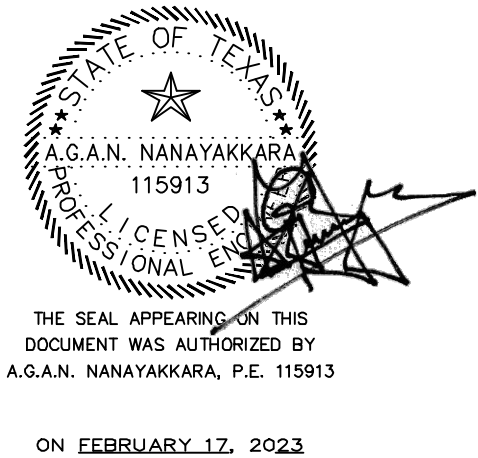
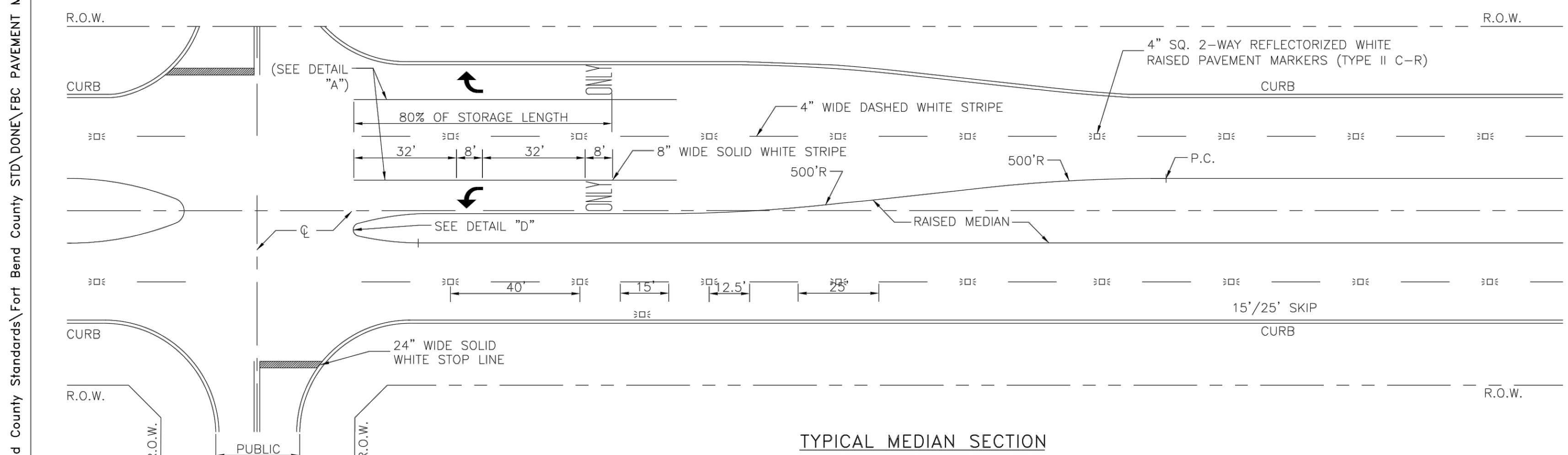
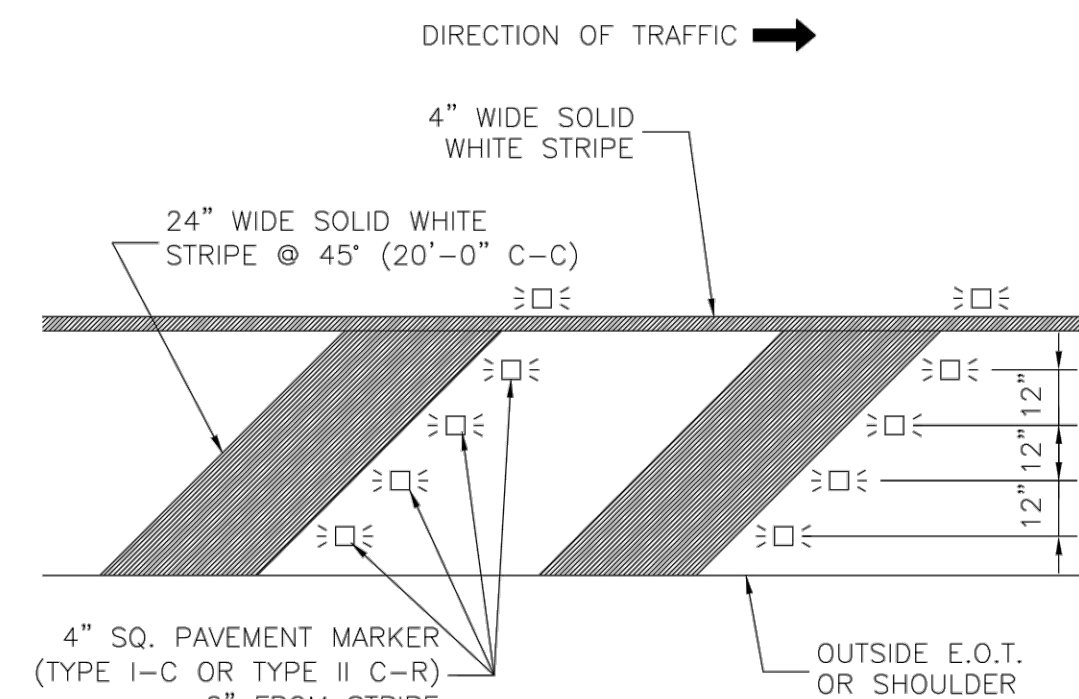
1. ALL PAVEMENT MARKINGS SHALL CONFORM TO THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS (TMUTCD).
2. ALL TRAFFIC BUTTONS AND MARKERS SHALL BE INSTALLED ADJACENT TO STRIPES (APPROXIMATELY 2").
3. REPEAT ARROWS AT APPROXIMATELY 1000' INTERVALS WITHIN TWO-WAY LEFT TURN SECTION.
4. WITHIN A TANGENT SECTION THE TYPE I-C PAVEMENT MARKERS SHALL BE PLACED AT 40' C-C ON ROADWAYS WITHOUT CURB AND GUTTERS.
5. WHEN PAVEMENT MARKINGS EXTEND INTO OR CONTINUE THROUGH AN INTERSECTION AREA, THEY SHALL BE THE SAME COLOR AND AT LEAST THE SAME WIDTH AS THE LINE MARKINGS THEY EXTEND.
6. WHEN CROSSWALK MARKINGS ARE USED WITHIN AN ESTABLISHED SCHOOL ZONE, MID-BLOCK, OR AT UNCONTROLLED INTERSECTIONS, CROSSWALK SHALL BE CONTINENTAL STYLE.
7. ADDITIONAL SET OF "WORD" AND "ARROW" PAVEMENT MARKINGS SHALL BE USED WHEN TURN LANE STORAGE LENGTH IS 160 FEET OR GREATER.



CROSSHATCHING DETAIL



OUTSIDE EDGE CROSSHATCHING DETAIL



NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	2-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT



PROJECT TITLE:		
DRAWN BY: INIT	SHEET DESCRIPTION: PAVEMENT MARKING DETAILS	FBCD STANDARD 46
CK'D BY: INIT		SHEET NO: /
SCALE: NONE	SHEET 1 OF 2	
DATE: 2-1-22	APPROVED BY:	

REV. NO.	DESCRIPTION	DATE	APP.

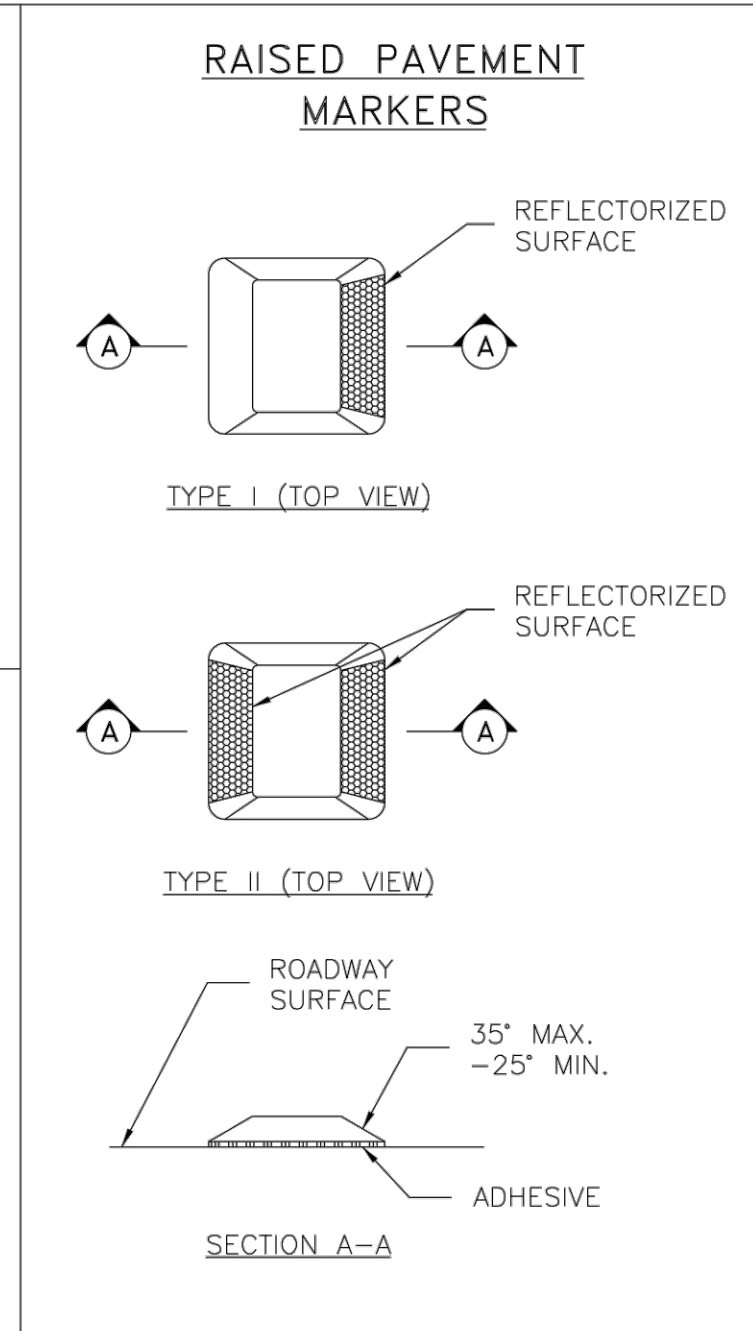
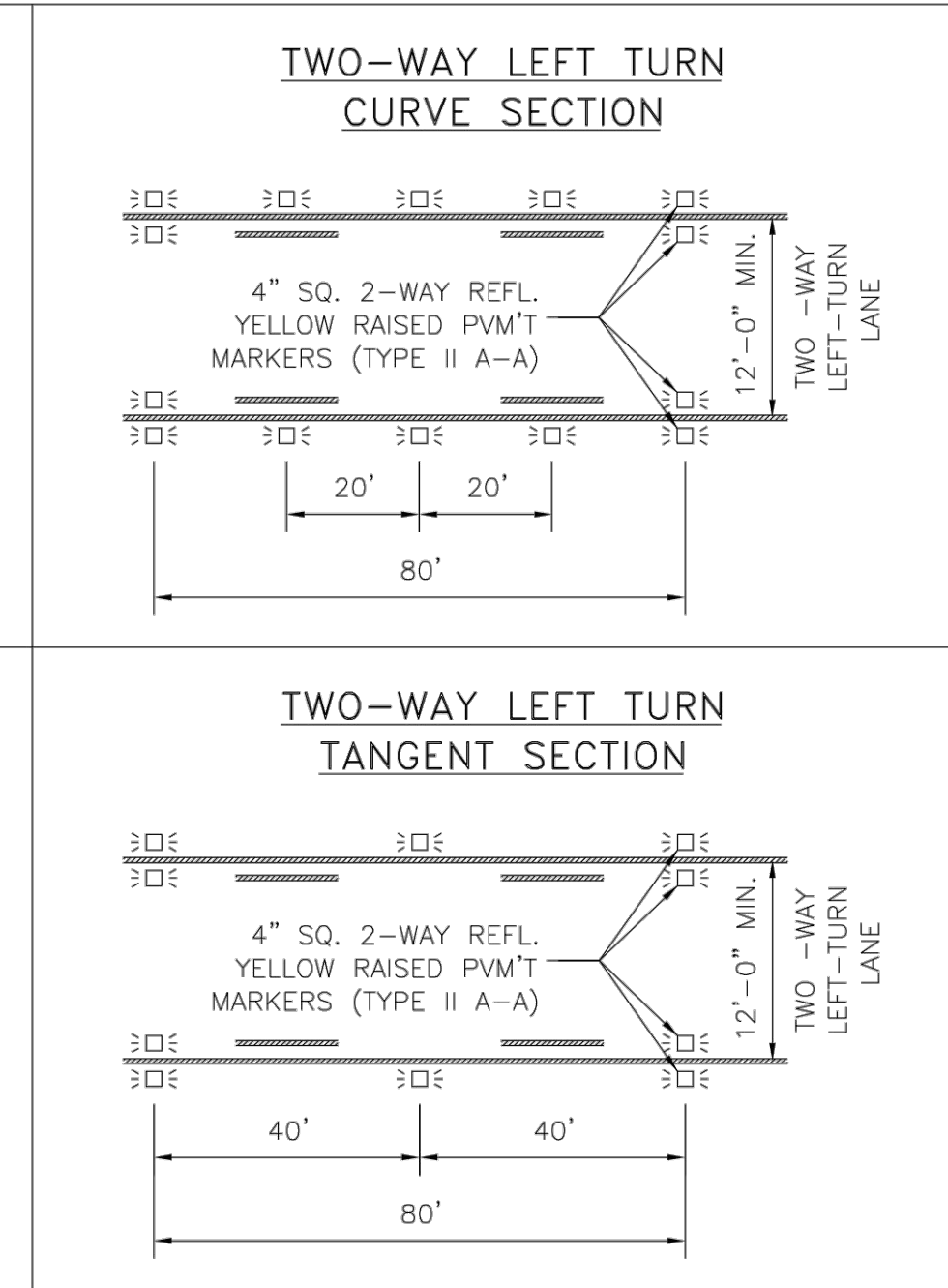
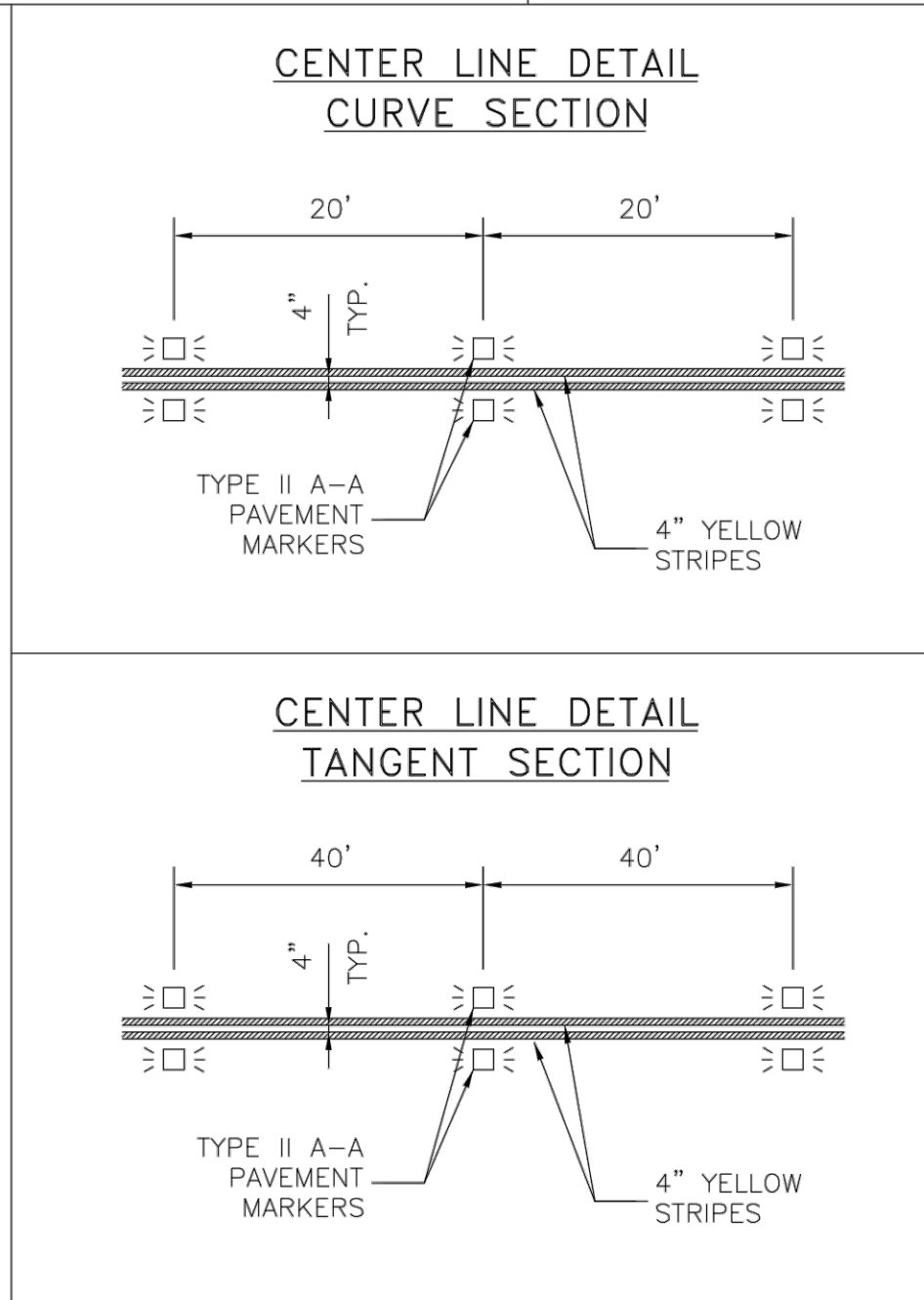
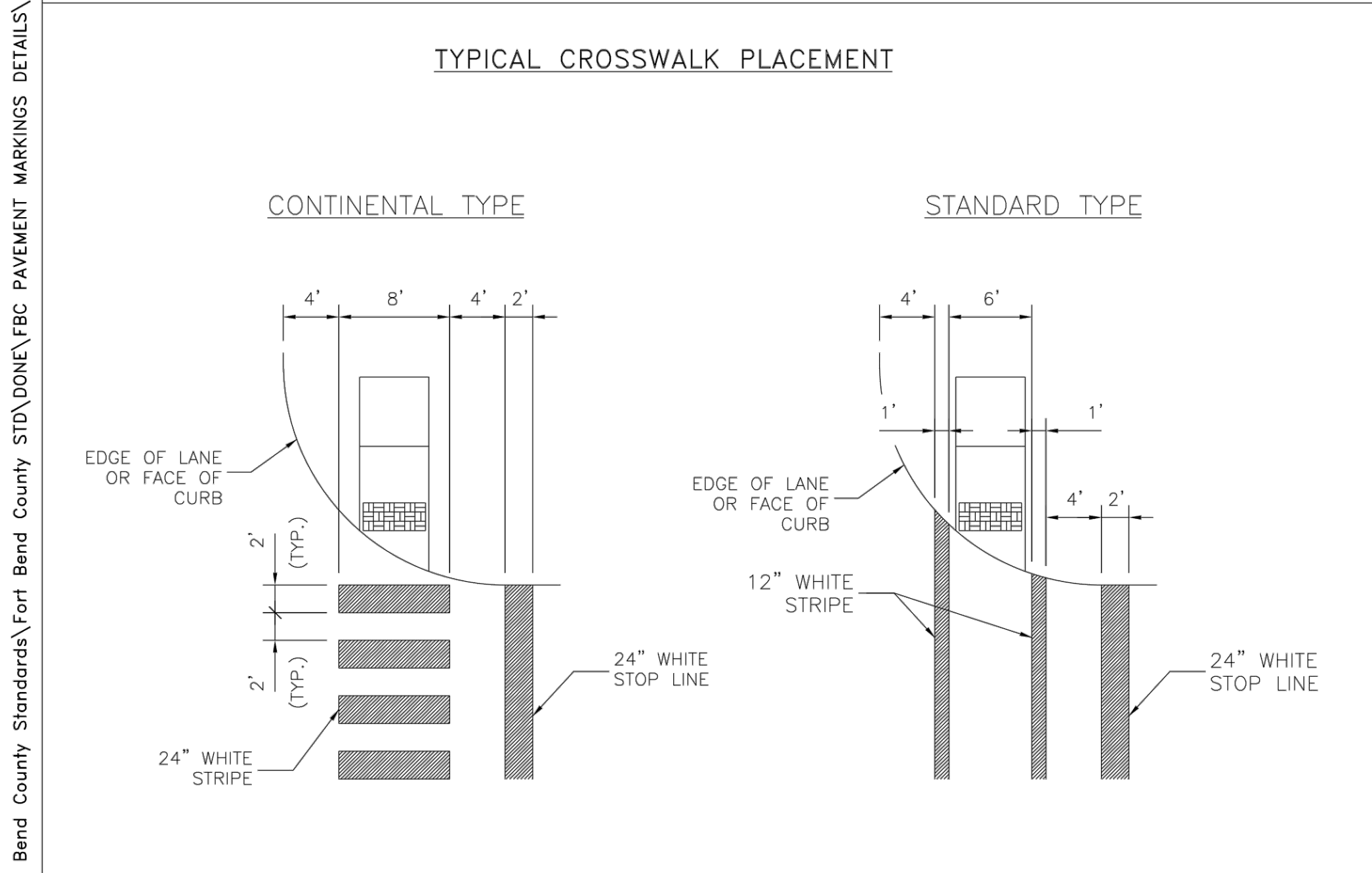
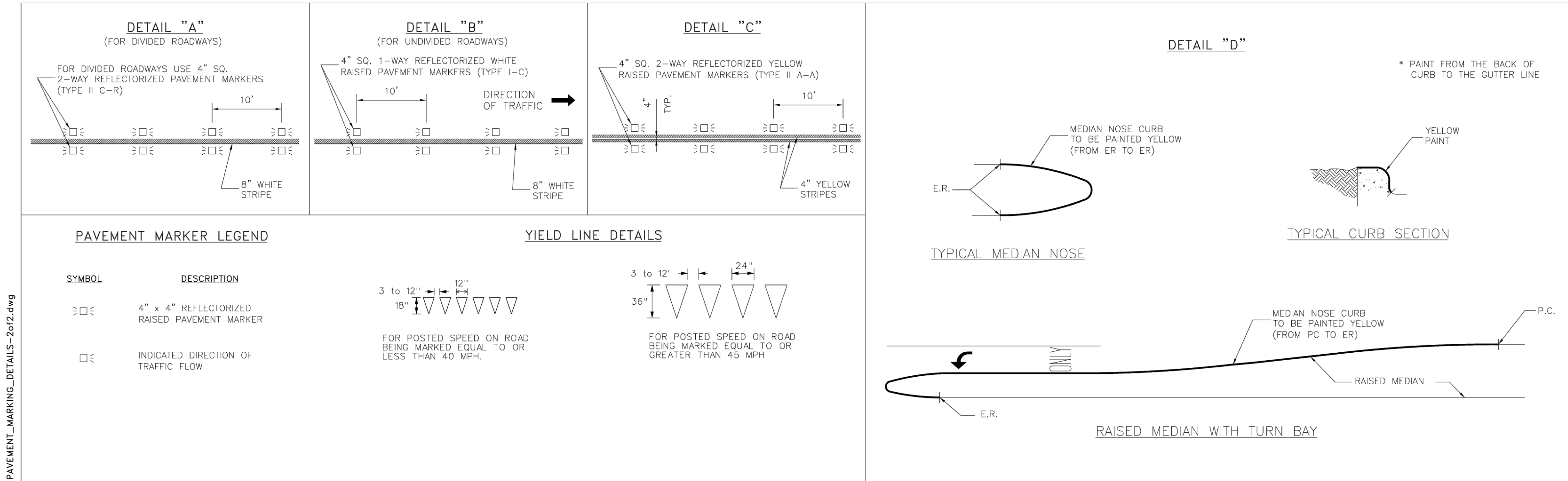
**BRANDT ROAD
PRECINCT LINE RD TO MASON RD
PAVEMENT MARKING DETAILS
(1 OF 2)**

TERRA a Bowman company | 1445 N. LOOP WEST – SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

JNS ENGINEERS, LLC
722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77454
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.B.P.E. FIRM
REGISTRATION NO. 11653

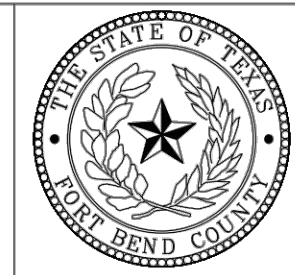
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SP10

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\SP11 PAVEMENT MARKING DETAILS (2 OF 2).dwg Feb 17, 2023-11:30am Terra Associates Inc., Thanh Dao

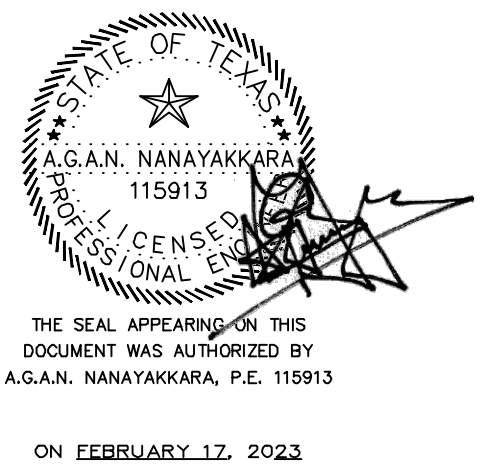


NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	2-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT



PROJECT TITLE:		
DRAWN BY:	INIT	FBCE STANDARD
CK'D BY:	INIT	47
SCALE:	NONE	SHEET NO:
DATE:	2-1-22	APPROVED BY:
SHEET DESCRIPTION: PAVEMENT MARKING DETAILS		
SHEET 2 OF 2		



REV. NO.	DESCRIPTION	DATE	APP.

**BRANDT ROAD
PRECINCT LINE RD TO MASON RD
PAVEMENT MARKING DETAILS
(2 OF 2)**

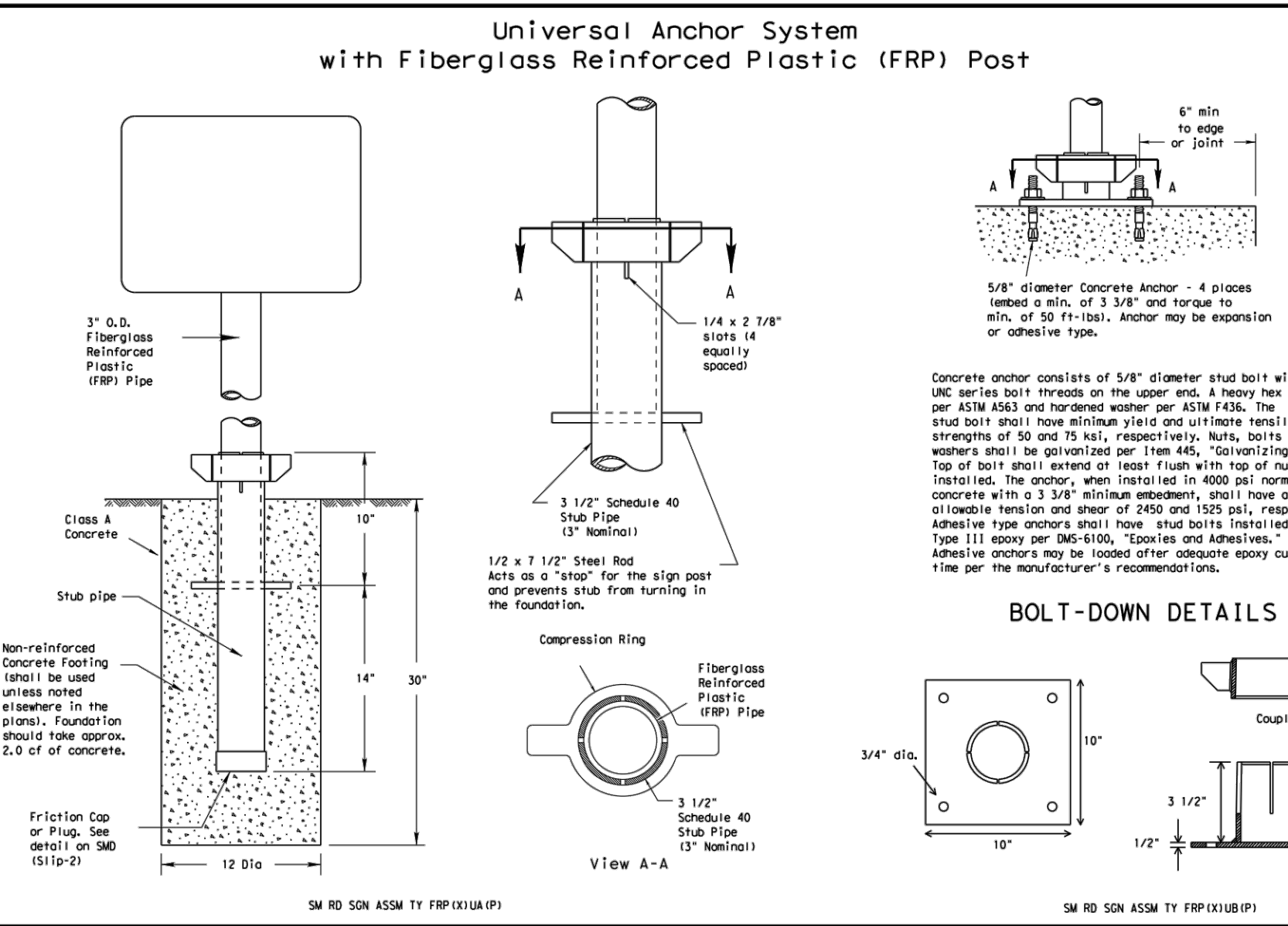
TERRA a Bowman company
1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

JNS ENGINEERS, LLC
722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.B.P.E. FIRM REGISTRATION NO. 11653

DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SP11

DISCLAIMER: The use of this drawing is governed by the terms and conditions of the contract. The user of this drawing is responsible for obtaining the necessary permits or approvals from the appropriate authorities. The user of this drawing is responsible for obtaining the necessary permits or approvals from the appropriate authorities.

DATE: 02/17/23



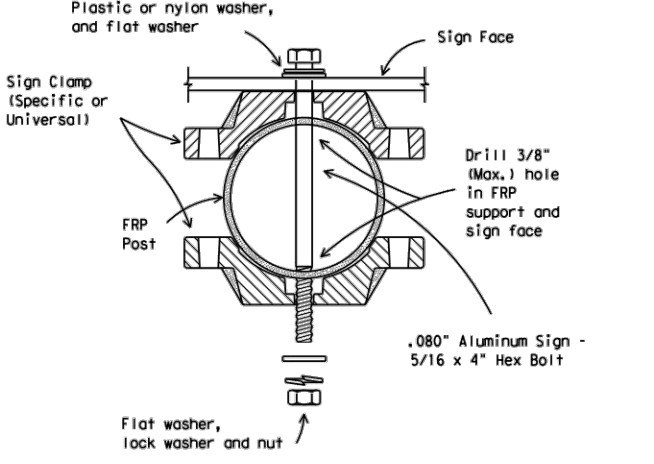
- GENERAL NOTES:**
- FRP sign supports for a single type sign support may be used for signs up to and including 16 square feet. Dual post installation may be used for signs up to and including 32 square feet.
 - All nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing."
 - See the Traffic Operations Division website for detailed drawings of sign clamps. The website address is: <http://www.txdot.gov/publications/traffic.htm>

- FRP POST REQUIREMENTS**
- Materials shall conform to the requirements of Departmental Material Specification (MS-410) and will be furnished in a yellow or gray color as specified elsewhere in the plans.
 - Thickness of FRP sign supports is 0.125" ± 0.031", - 0.0".
 - FRP sign supports are prequalified by the Traffic Operations Division. Prequalification procedures are obtained by writing: Texas Department of Transportation, Traffic Operations Division, 129 East 11th Street, Austin, Texas 78701-2483

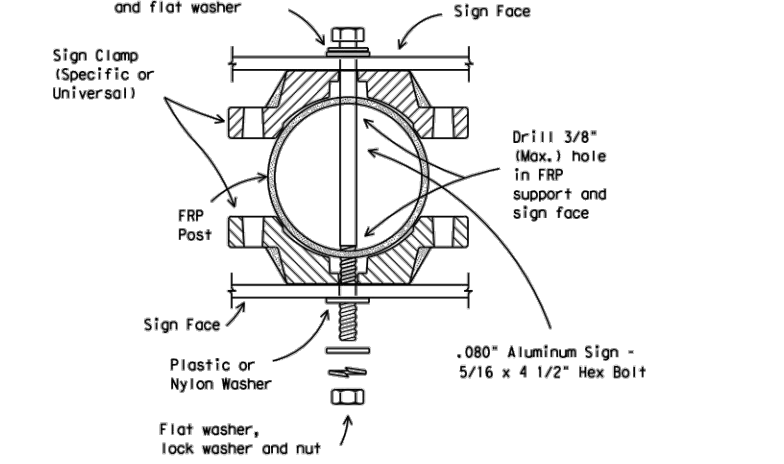
- UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURES**
- Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide 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(SLIP-1) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
 - 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.
 - Insert base post in foundation hole to depth shown and fill hole with concrete. Cut base post from bottom and ensure a minimum of 18" embedment if installed in solid rock.
 - Level and plumb the base post with coupler using a torpedo level and let concrete set a minimum of 4 days, unless otherwise directed by Engineer. Bottom of base post slots shall be above the concrete footing.
 - Attach sign to FRP post.
 - Insert sign post into base post. Lower until the post comes to rest on the steel rod.
 - Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
 - Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

- BOLT DOWN SUPPORT**
- Position base plate with coupler on existing concrete.
 - Drill holes into concrete and insert the 5/8" diameter bolts with wedge anchors, and tighten nuts.
 - Attach sign to FRP post.
 - Insert bottom of sign post into pipe stub.
 - Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
 - Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

Typical Sign Mounting Detail for FRP Support with Single Sign



Typical Sign Mounting Detail for FRP Support with Back-to-Back Signs



Texas Department of Transportation
Traffic Operations Division

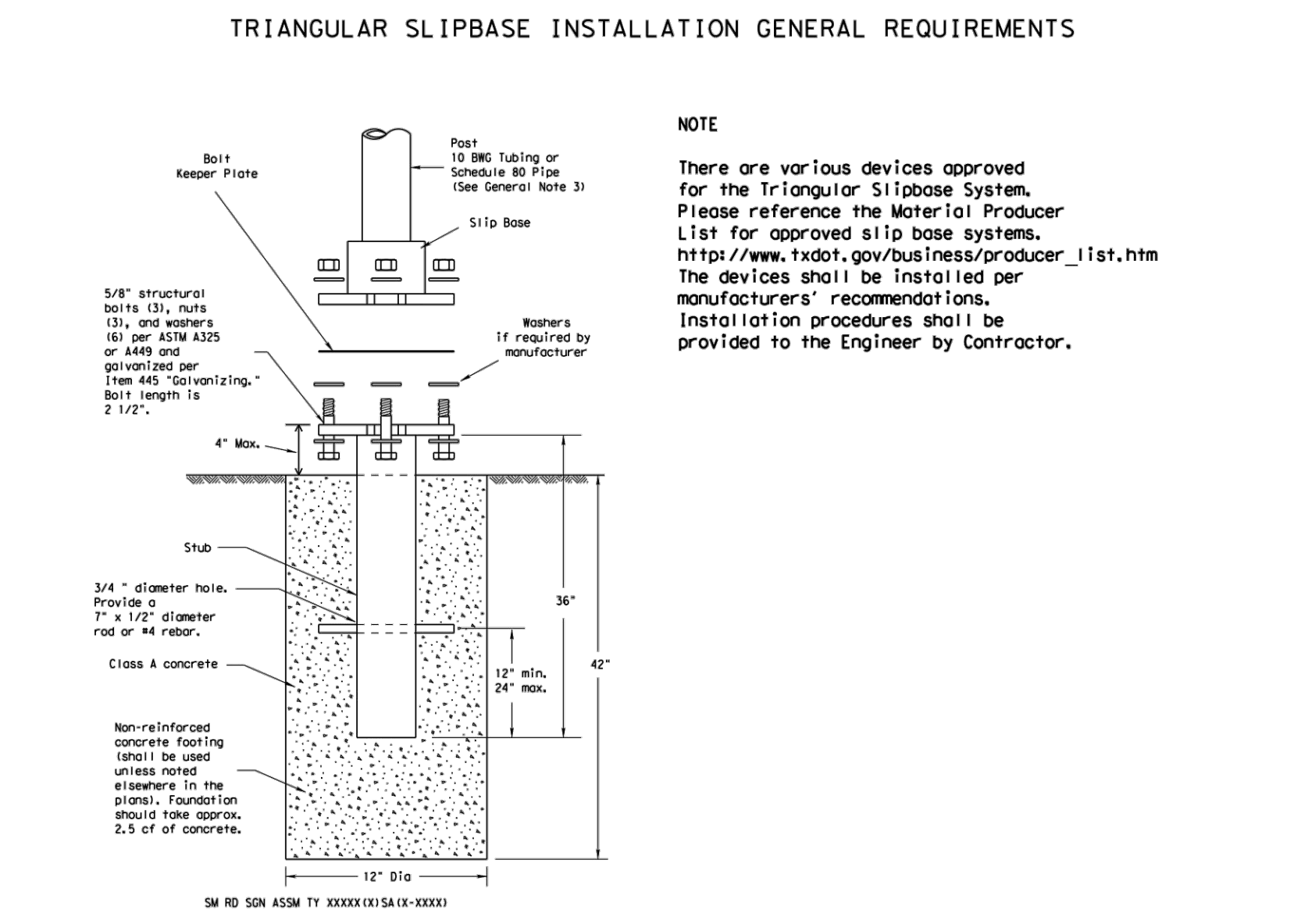
**SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
UNIVERSAL ANCHOR SYSTEM
WITH FRP POST**

SMD (FRP) - 08

DATE	7/17/2022	REV	1	BY	TH	CHK	TH	DATE	07/17/2022
9-08	REVISED								
		REV	2	BY	TH	CHK	TH	DATE	

DISCLAIMER: The use of this drawing is governed by the terms and conditions of the contract. The user of this drawing is responsible for obtaining the necessary permits or approvals from the appropriate authorities. The user of this drawing is responsible for obtaining the necessary permits or approvals from the appropriate authorities.

DATE: 02/17/23



- GENERAL NOTES:**
- Slip base shall be permanently marked to indicate manufacturer, method, design, and location of marking or subject to approval of the TxDOT Traffic Standards Engineer.
 - Material used as post with this system shall conform to the following specifications:
 - 10.886 Tubing (2.875" outside diameter, 0.134" nominal wall thickness)
 - Seamless or electric-resistance welded steel tubing or pipe
 - Steel shall be HSLA 50 or 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 0.136"
 Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
 Galvanization per ASTM A123 or ASTM A653 G90. For pre-coated steel tubing ASTM A653, recast tube outside diameter would vary by metallizing with zinc wire per ASTM B653.
 Schedule 80 Pipe (2.875" outside diameter)
 0.276" nominal wall thickness
 Steel tubing per ASTM A500 or 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
 - 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>
 - Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

- ASSEMBLY PROCEDURE**
- Foundation**
- 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.
 - 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.
 - 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.
 - Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
 - The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

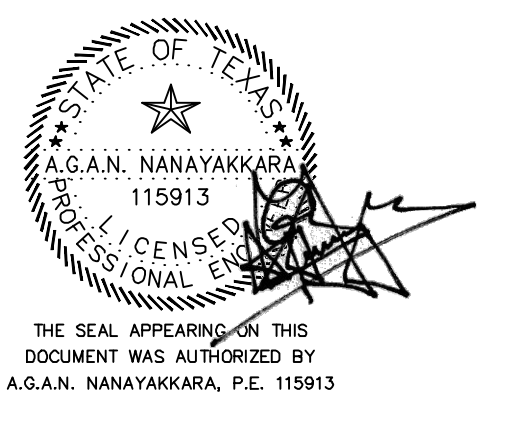
- Support**
- Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
 - 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.

Texas Department of Transportation
Traffic Operations Division

**SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM**

SMD (SLIP-1) - 08

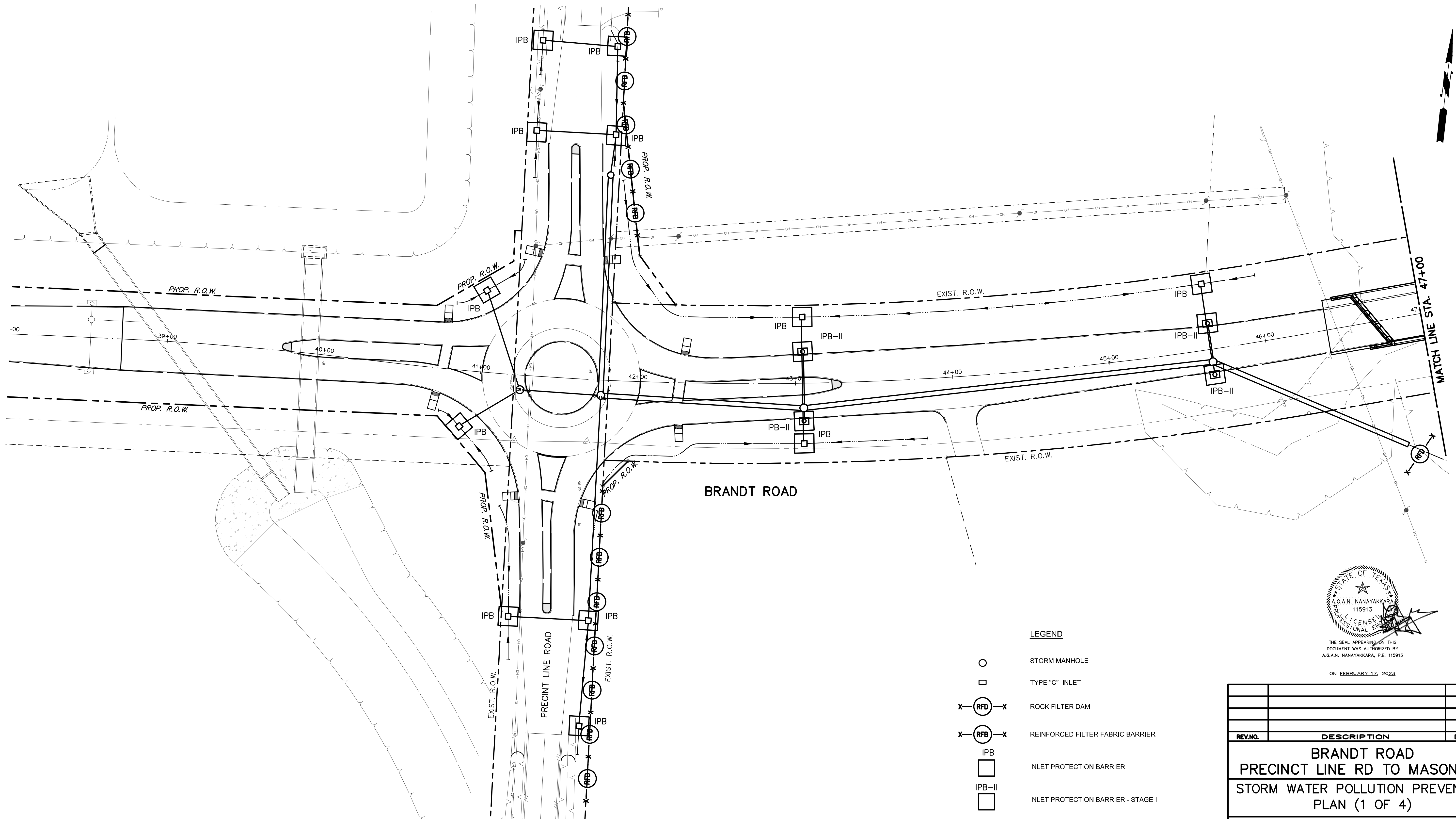
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9-08	REVISED								
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



ON FEBRUARY 17, 2023

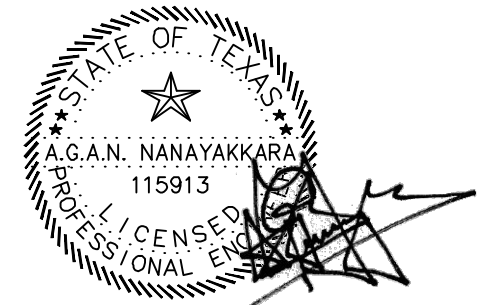
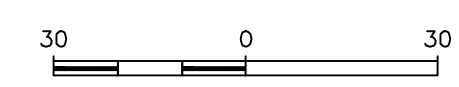
REV. NO.	DESCRIPTION	DATE	APP.
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SIGN MOUNTING DETAILS			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77454 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SP12	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\SW01 STORM WATER POLLUTION PREVENTION PLAN (1 OF 4).dwg Feb 17, 2023-11:36am Terra Associates Inc., Thanh Dao




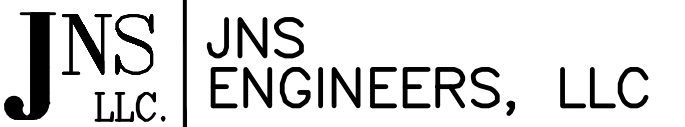
LEGEND

-  STORM MANHOLE
-  TYPE "C" INLET
-  ROCK FILTER DAM
-  REINFORCED FILTER FABRIC BARRIER
-  INLET PROTECTION BARRIER
-  INLET PROTECTION BARRIER - STAGE II
-  STABILIZED CONSTRUCTION EXIT
-  CONCRETE TRUCK WASHOUT AREA (LOCATION TBD)

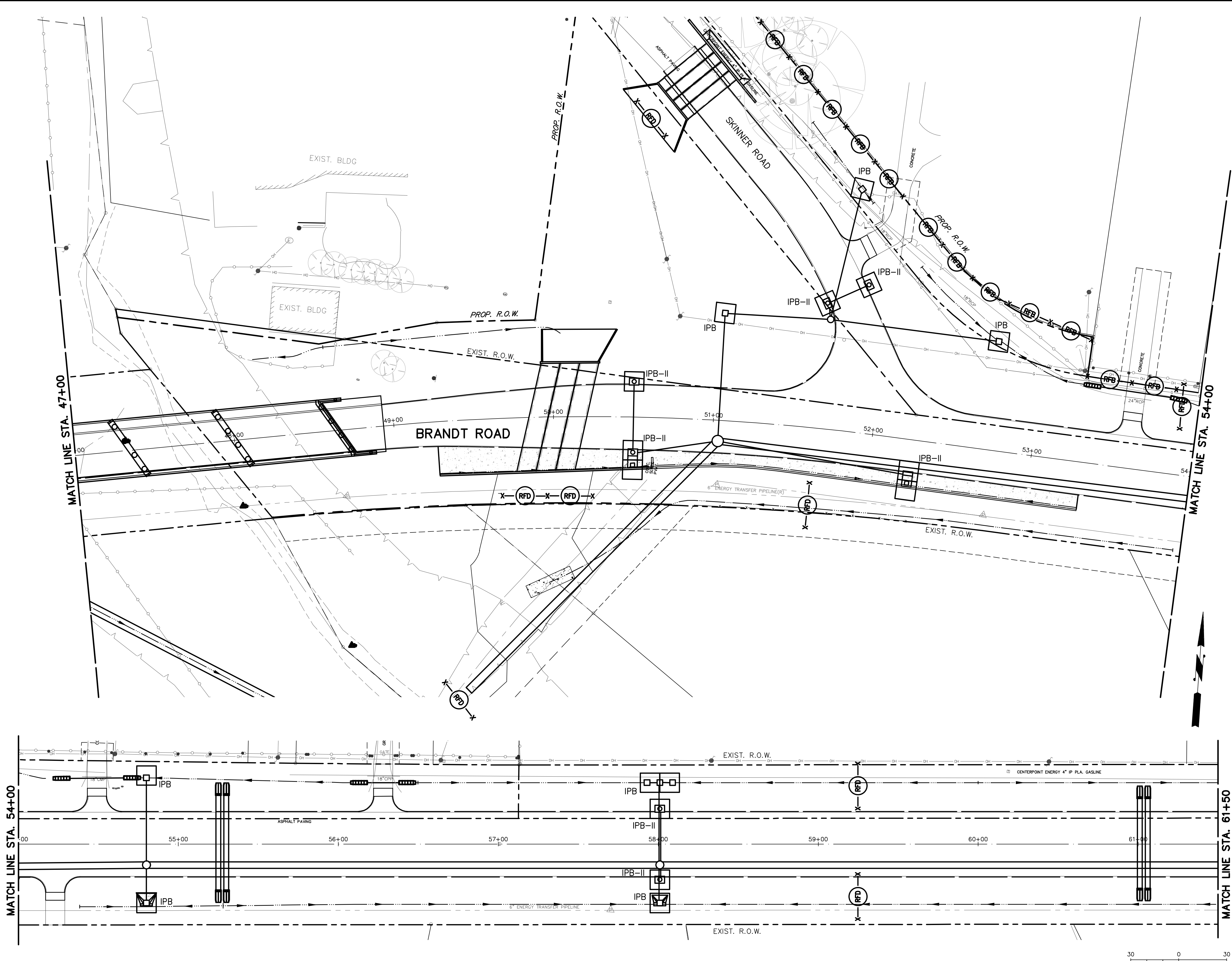


THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913

ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD STORM WATER POLLUTION PREVENTION PLAN (1 OF 4)			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 30'	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SW01	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\SW02 STORM WATER POLLUTION PREVENTION PLAN (2 OF 4).dwg, Feb 17, 2023-11:39am, Terra Associates Inc., Thanh Dao



LEGEND

- STORM MANHOLE
- TYPE "C" INLET
- ROCK FILTER DAM
- REINFORCED FILTER FABRIC BARRIER
- INLET PROTECTION BARRIER
- INLET PROTECTION BARRIER - STAGE II
- STABILIZED CONSTRUCTION EXIT
- CONCRETE TRUCK WASHOUT AREA (LOCATION TBD)

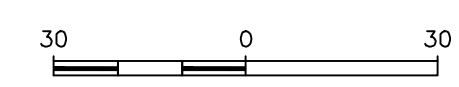
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913 ON FEBRUARY 17, 2023

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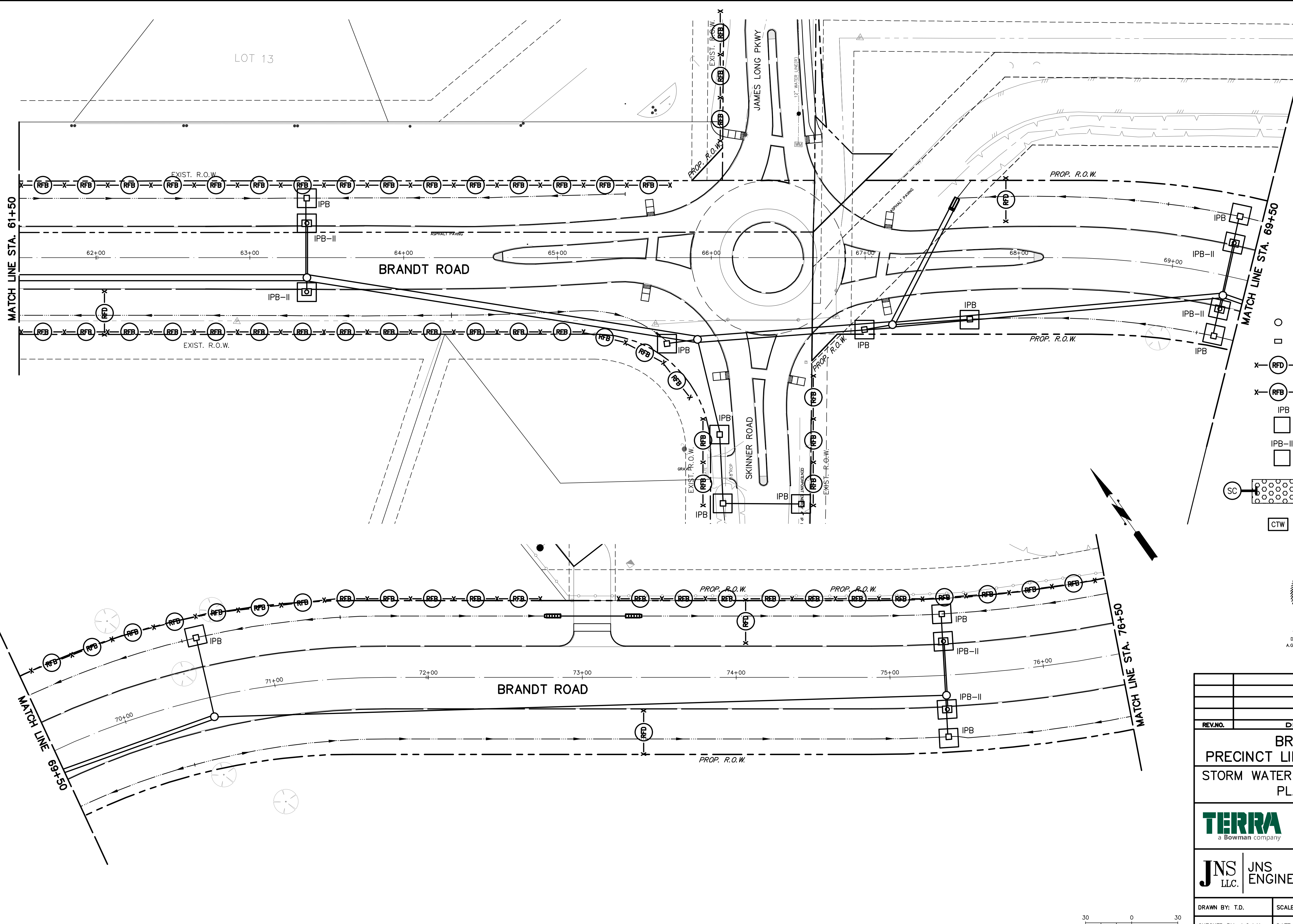
**BRANDT ROAD
PRECINCT LINE RD TO MASON RD
STORM WATER POLLUTION PREVENTION
PLAN (2 OF 4)**

TERRA <small>a Bowman company</small>	1445 N. LOOP WEST – SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309
JNS ENGINEERS, LLC	722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653

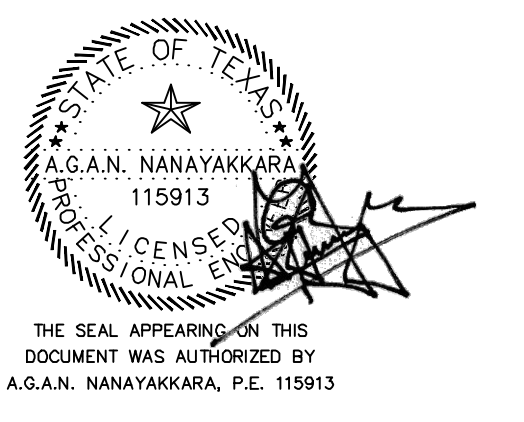
DRAWN BY: T.D.	SCALE: 1" = 30'	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SW02



F:\Clients\Fort_Band_County_Engineering\0522-1801_Brandt_Road\Drawings\Seg 2 SWO3 STORM WATER POLLUTION PREVENTION PLAN (3 OF 4).dwg, Feb 17, 2023--11:39am Terra Associates Inc., Thanh Dao

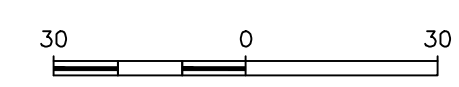


- LEGEND**
- STORM MANHOLE
 - TYPE "C" INLET
 - ROCK FILTER DAM
 - REINFORCED FILTER FABRIC BARRIER
 - INLET PROTECTION BARRIER
 - INLET PROTECTION BARRIER - STAGE II
 - STABILIZED CONSTRUCTION EXIT
 - CONCRETE TRUCK WASHOUT AREA (LOCATION TBD)

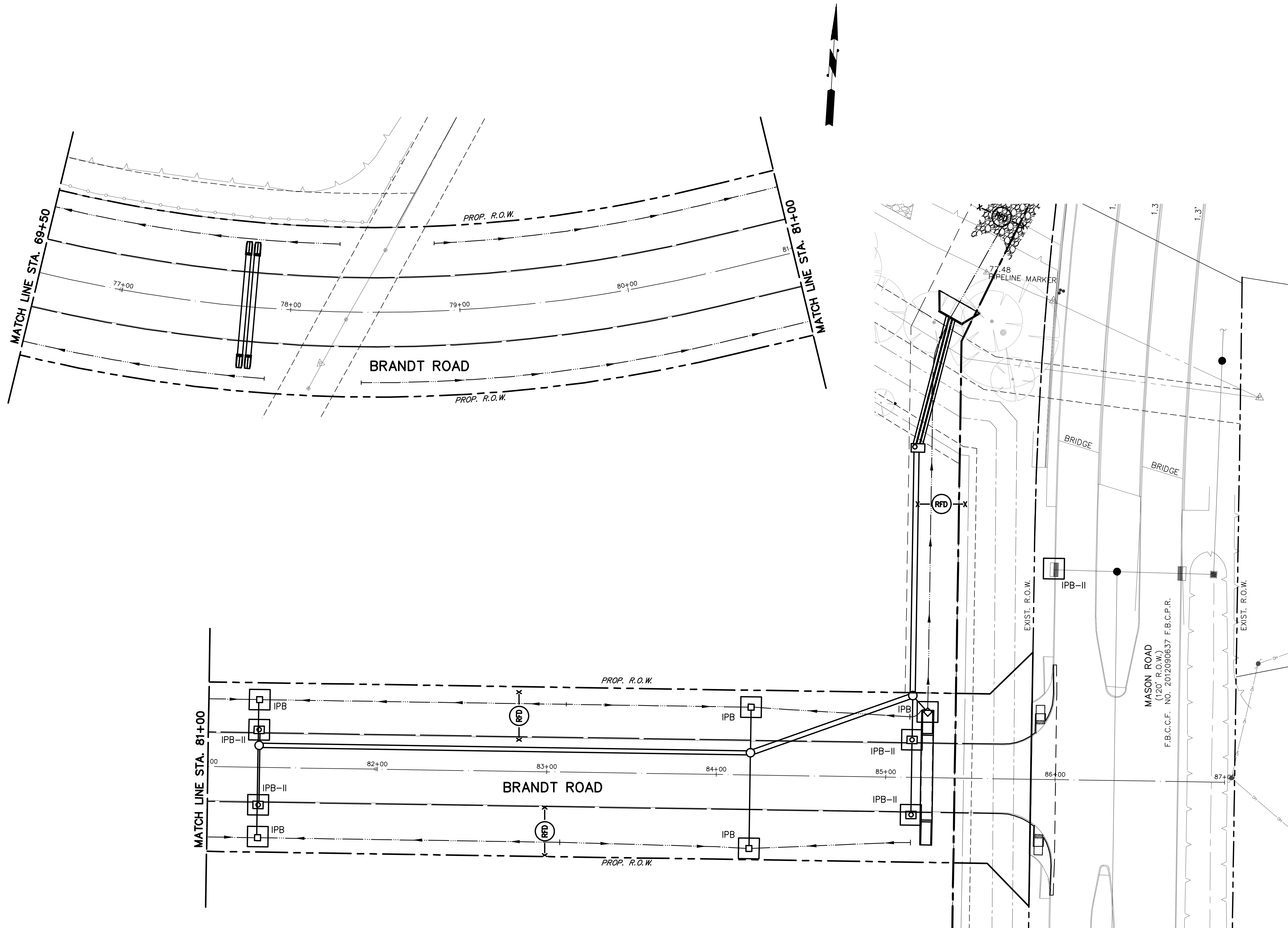


ON FEBRUARY 17, 2023

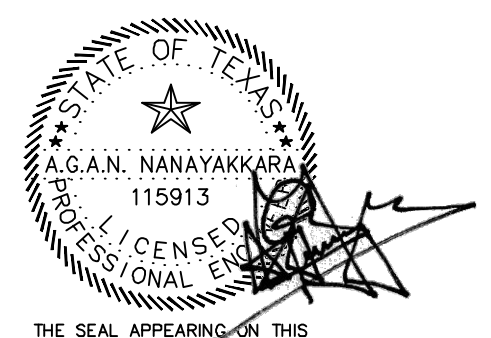
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BRANDT ROAD PRECINCT LINE RD TO MASON RD STORM WATER POLLUTION PREVENTION PLAN (3 OF 4)			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D. CHECKED BY: A.G.A.N.	SCALE: 1" = 30' DATE: FEBRUARY, 2023	PROJECT No. 0522-1801 CONTRACT: 1 SHEET SWO3	



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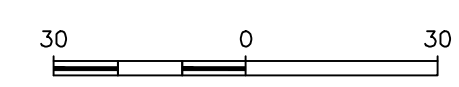
- LEGEND**
- STORM MANHOLE
 - TYPE "C" INLET
 - ⊗ RFD ⊗ ROCK FILTER DAM
 - ⊗ RFB ⊗ REINFORCED FILTER FABRIC BARRIER
 - IPB INLET PROTECTION BARRIER
 - IPB-II INLET PROTECTION BARRIER - STAGE II
 - ⊗ SC ⊗ STABILIZED CONSTRUCTION EXIT
 - CTW CONCRETE TRUCK WASHOUT AREA (LOCATION TBD)



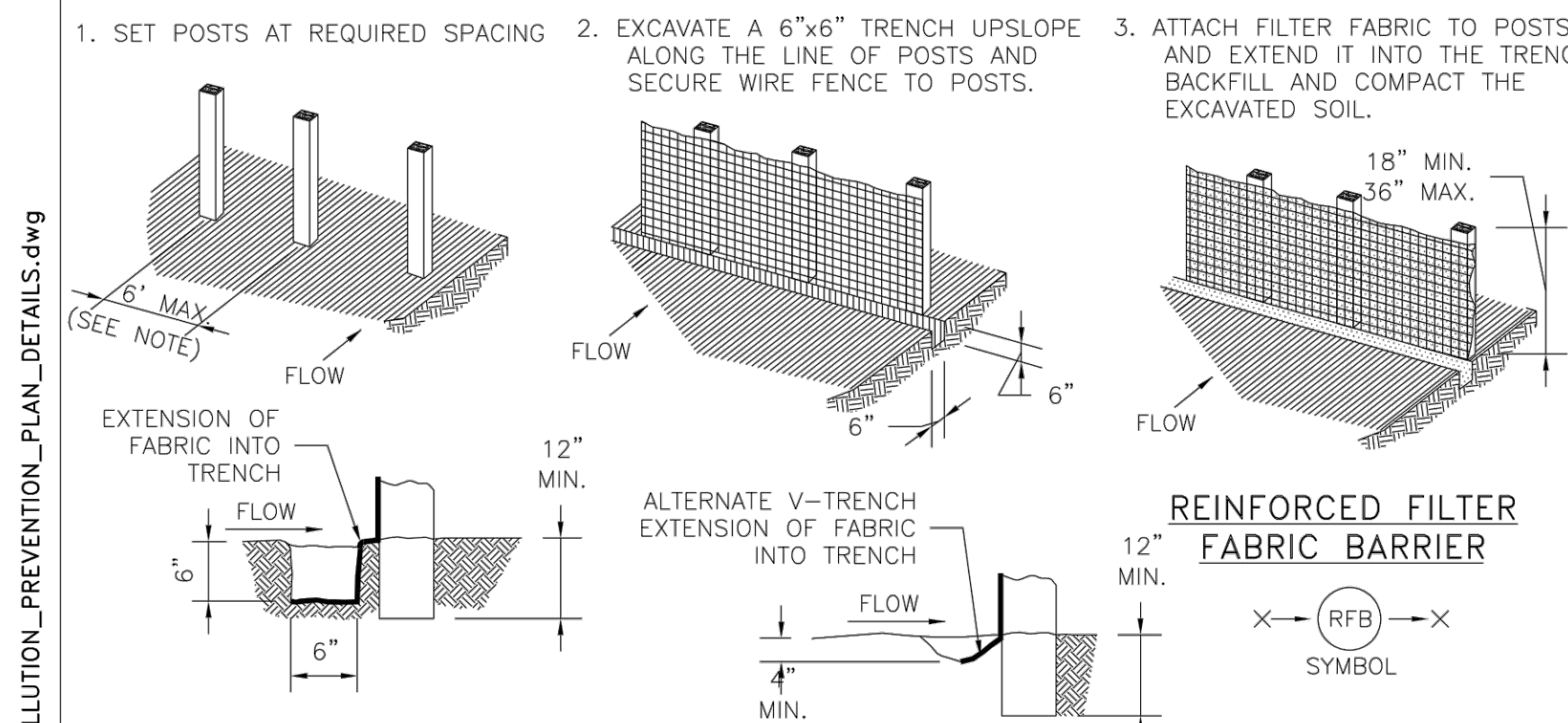
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913

ON FEBRUARY 17, 2023

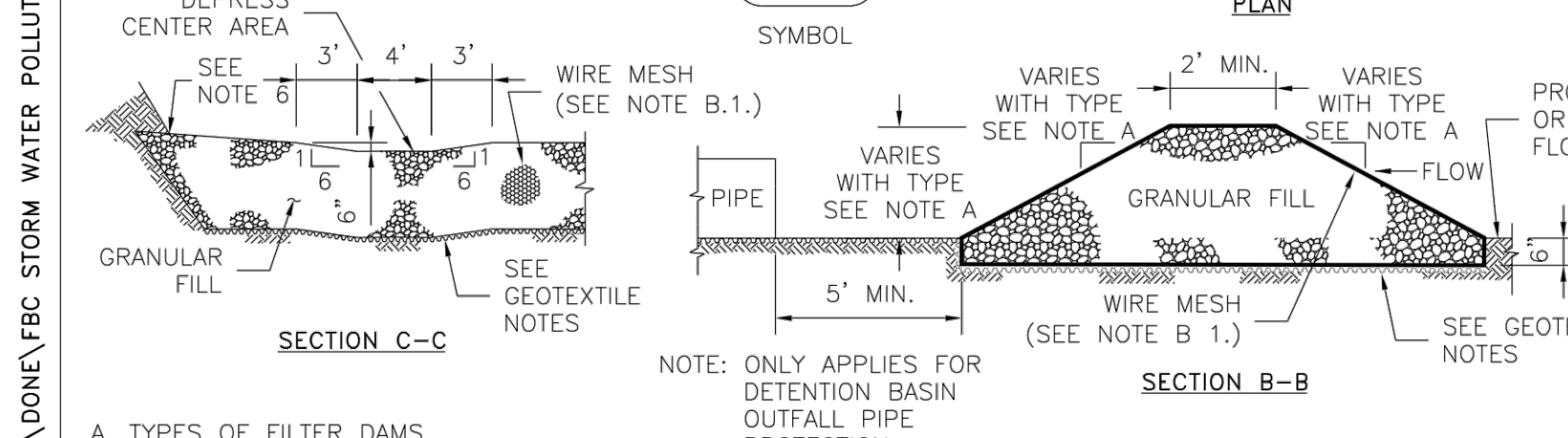
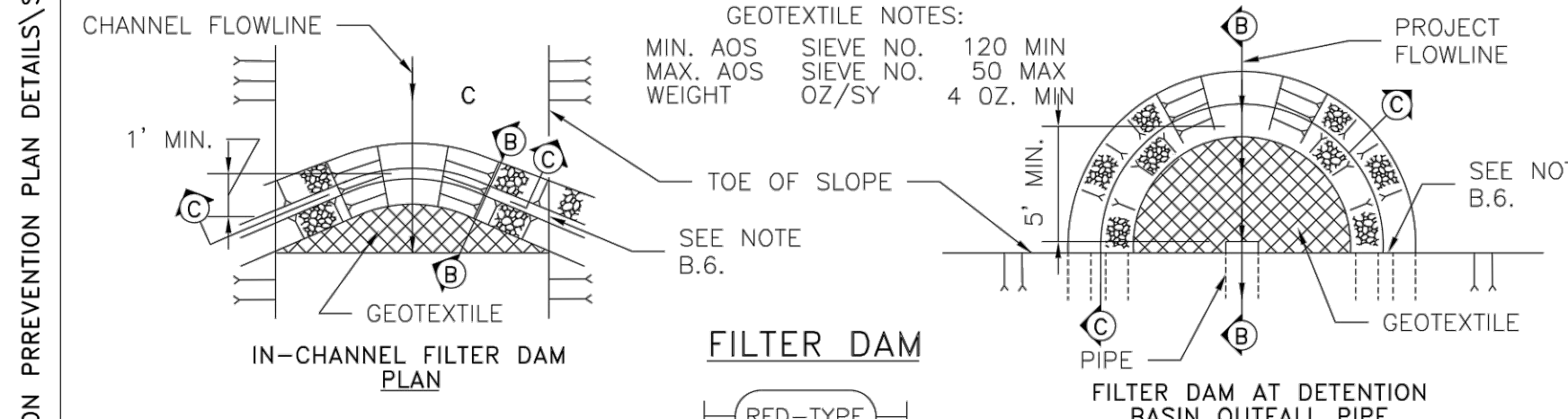
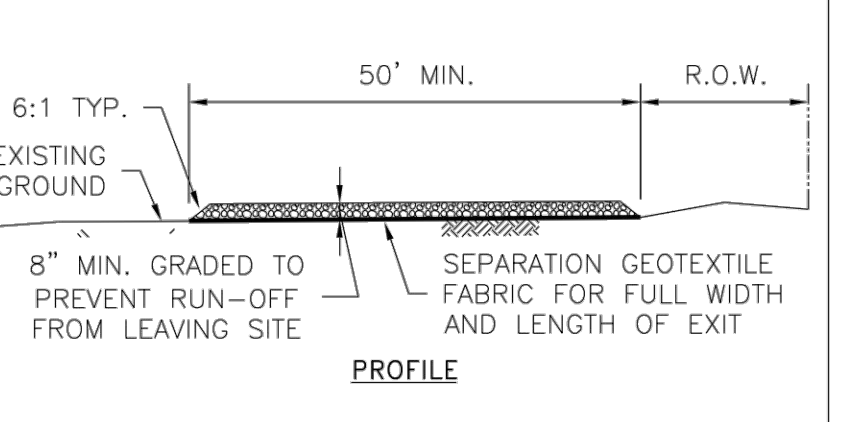
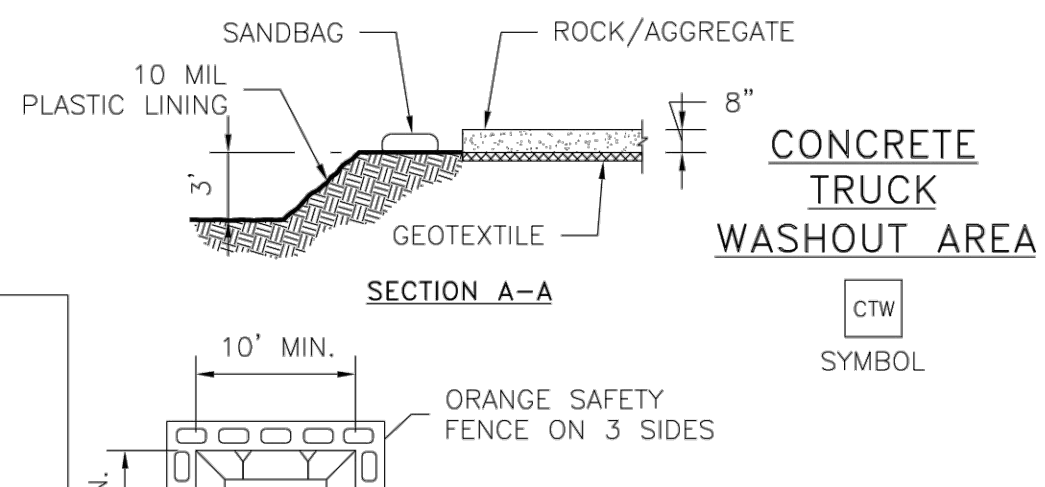
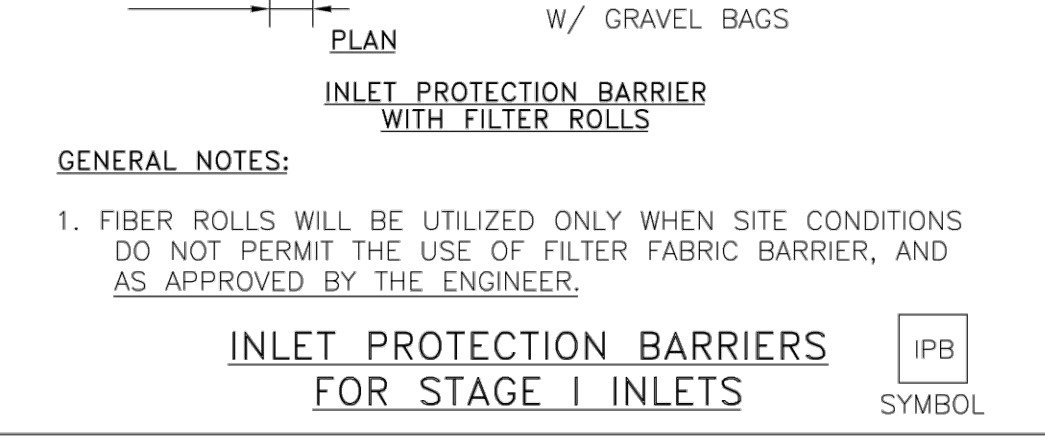
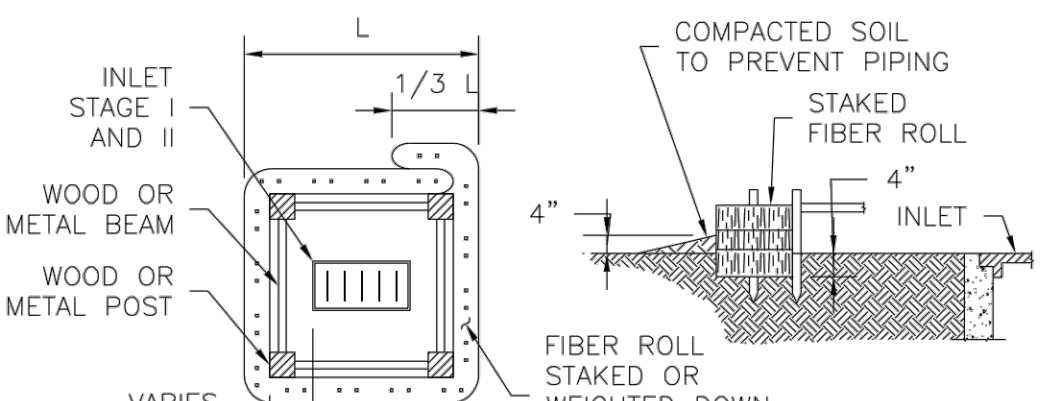
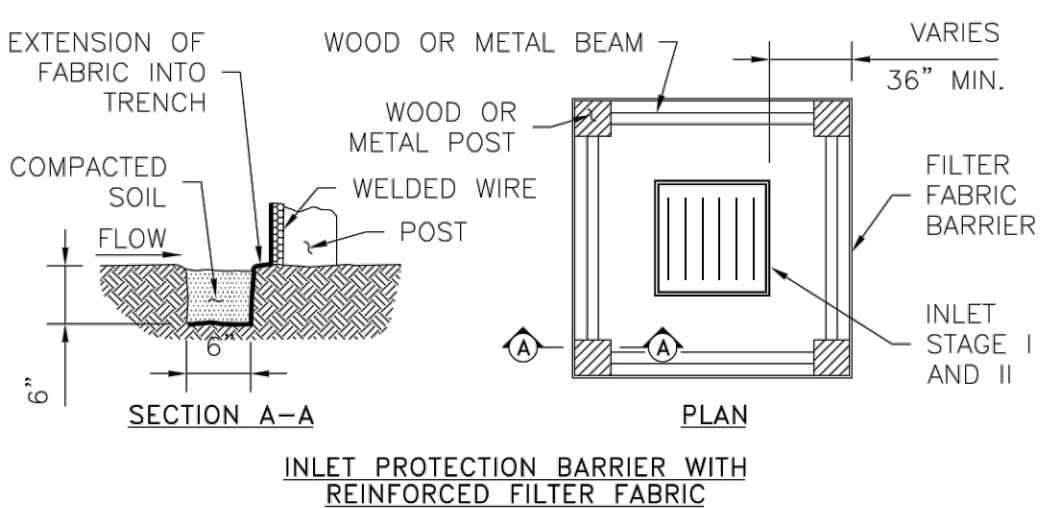
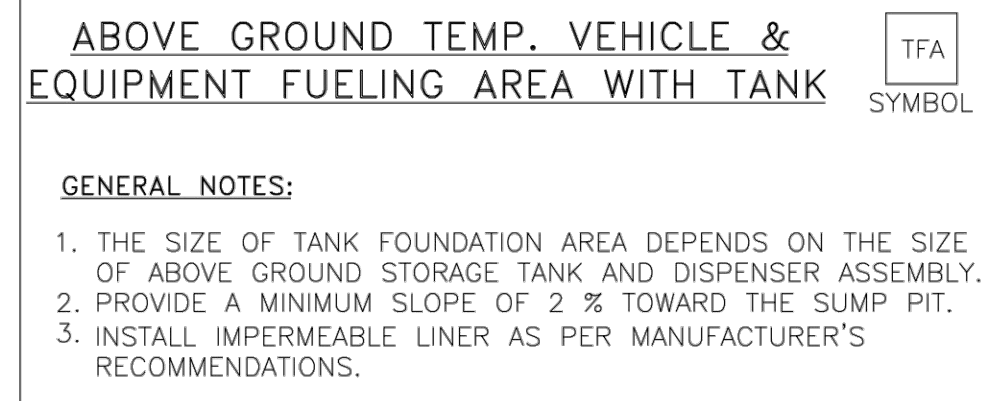
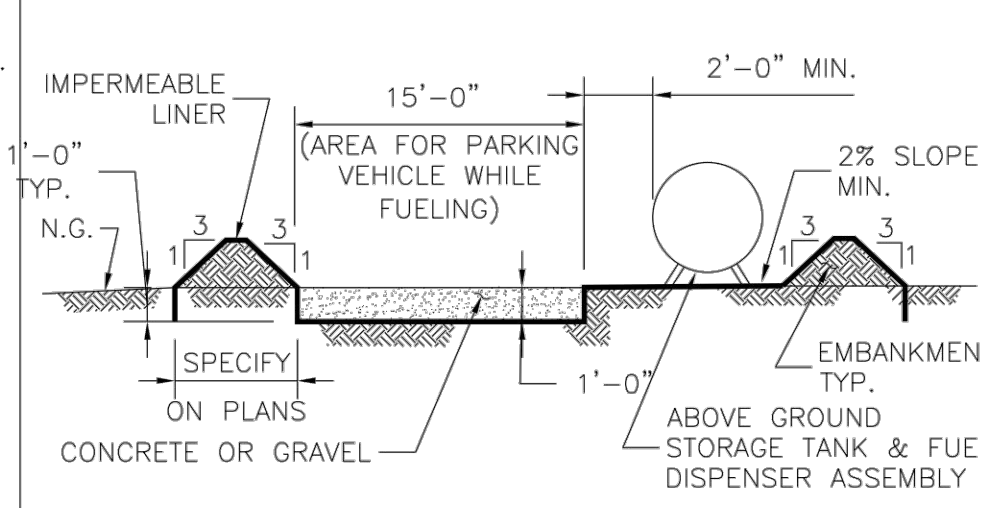
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BRANDT ROAD PRECINCT LINE RD TO MASON RD STORM WATER POLLUTION PREVENTION PLAN (4 OF 4)			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D. CHECKED BY: A.G.A.N.	SCALE: 1" = 30' DATE: FEBRUARY, 2023	PROJECT No. 0522-1801 CONTRACT: 1 SHEET SW04	



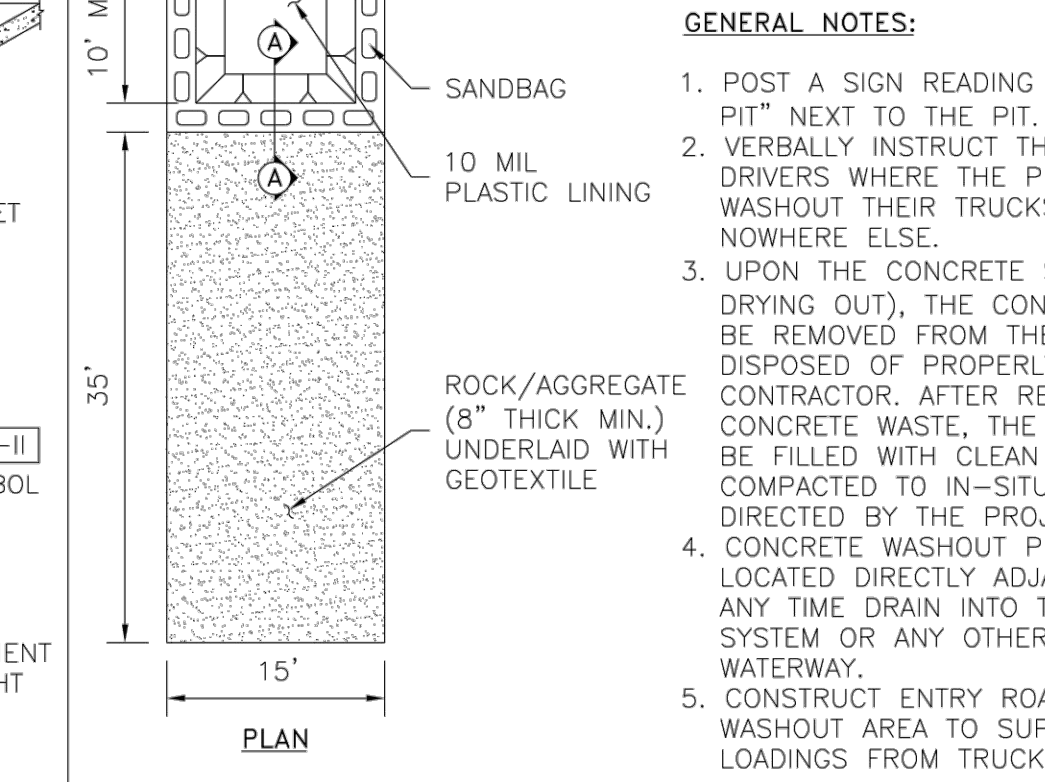
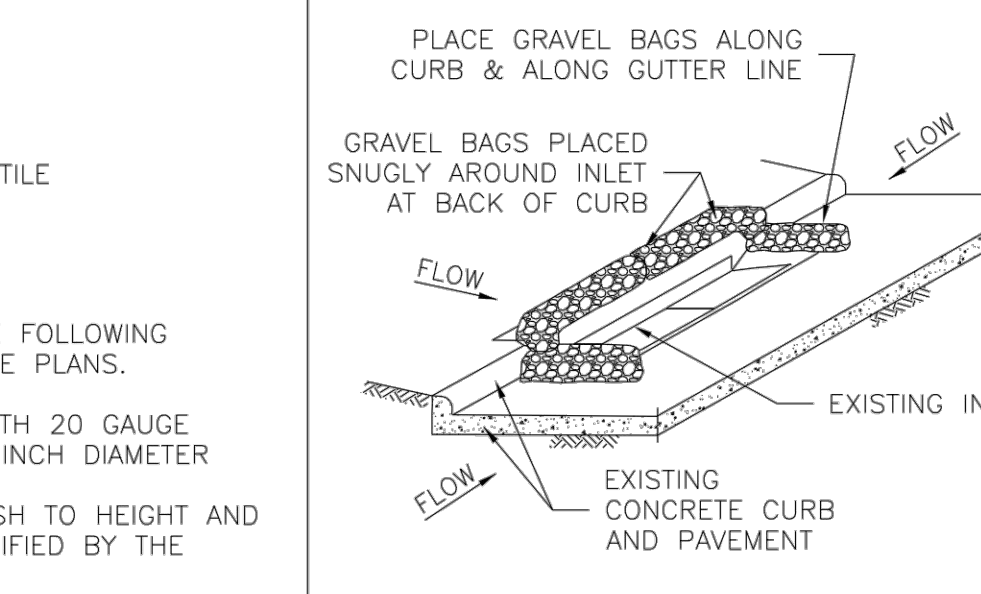
F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\SW05 STORM WATER POLLUTION PREVENTION PLAN DETAILS.dwg Feb 17, 2023-11:39am Terra Associates Inc., Thanh Dao



- GENERAL NOTES:**
1. SECURELY FASTEN MESH FENCING TO POSTS WITH STAPLES OR THE WIRES.
 2. SECURELY FASTEN FILTER FABRIC TO MESH FENCING.
 3. WHEN TWO SECTIONS OF FILTER FABRIC ADJOIN EACH OTHER, OVERLAP 6 INCHES AT A POST, FOLD TOGETHER, AND ATTACH TO A POST.
 4. REMOVE SEDIMENT DEPOSITS WHEN SILT REACHES ONE-THIRD OF THE HEIGHT OF THE FENCE IN DEPTH.
 5. SILT FENCE MINIMUM 2' BEHIND CURB.

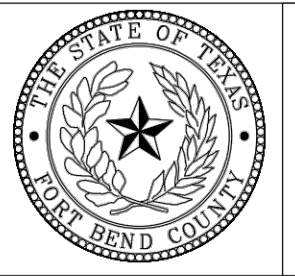


- A. TYPES OF FILTER DAMS
1. TYPE 1 (NON-REINFORCED)
 - a. HEIGHT - 18-24 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
 - b. TOP WIDTH - 2 FEET (MINIMUM).
 - c. SLOPES - 2:1 (MAXIMUM).
 2. TYPE 2 (REINFORCED)
 - a. HEIGHT - 18-36 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
 - b. TOP WIDTH - 2 FEET (MINIMUM).
 - c. SLOPES - 2:1 (MAXIMUM).
 3. TYPE 3 (REINFORCED)
 - a. HEIGHT - 36-48 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
 - b. TOP WIDTH - 2 FEET (MINIMUM).
 - c. SLOPES - 3:1 (MAXIMUM).
 4. TYPE 4 (GABION)
 - a. HEIGHT - 30 INCHES (MINIMUM). MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
 - b. TOP WIDTH - 2 FEET (MINIMUM).
 - c. SLOPES - 3:1 (MAXIMUM).
 5. TYPE 5. AS SHOWN ON THE PLANS.
- B. CONSTRUCT FILTER DAMS ACCORDING TO THE FOLLOWING CRITERIA UNLESS SHOWN OTHERWISE ON THE PLANS.
1. TYPE 2 AND 3 FILTER DAMS: SECURE WITH 20 GAUGE GALVANIZED WOVEN WIRE MESH WITH 1 INCH DIAMETER HEXAGONAL OPENINGS.
 2. PLACE GRANULAR FILL ON THE WIRE MESH TO HEIGHT AND SLOPES SHOWN ON PLANS OR AS SPECIFIED BY THE ENGINEER.
 - a. 3-5 INCHES FOR ROCK FILTER DAM TYPES 1, 2 AND 4.
 - b. 4-8 INCHES FOR ROCK FILTER DAM TYPE REFER TO GRANULAR FILL IN SPECIFICATION SECTION NO. 02378 RIPRAP AND GRANULAR FILL.
 3. FOLD WIRE MESH AT UPSTREAM SIDE OVER GRANULAR FILL AND TIGHTLY SECURED TO ITSELF ON THE DOWNSTREAM SIDE USING WIRE TIES OR HOG RINGS.
 4. IN STREAMS: SECURE OR STAKE MESH TO STREAM BED PRIOR TO AGGREGATE PLACEMENT.
 5. SEE HCFOD SPECIFICATION SECTION NO. 02364-FILTER DAMS.
 6. EMBED ONE FOOT MINIMUM INTO SLOPE AND RAISE ONE FOOT HIGHER THAN CENTER OF DEPRESSED AREA AT SLOPE.



NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	2-1-22	RJS

FORT BEND COUNTY ENGINEERING DEPARTMENT



PROJECT TITLE:		FCED STANDARD
DRAWN BY: INIT	SHEET DESCRIPTION:	54
CK'D BY: INIT	STORM WATER POLLUTION	
SCALE: NONE	PREVENTION PLAN DETAILS	SHEET NO: /
DATE: 2-1-22	APPROVED BY:	

REV. NO.	DESCRIPTION	DATE	APP.

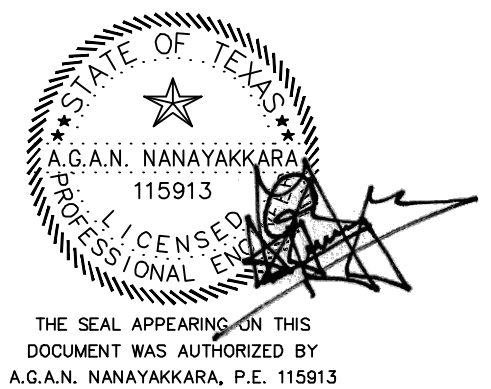
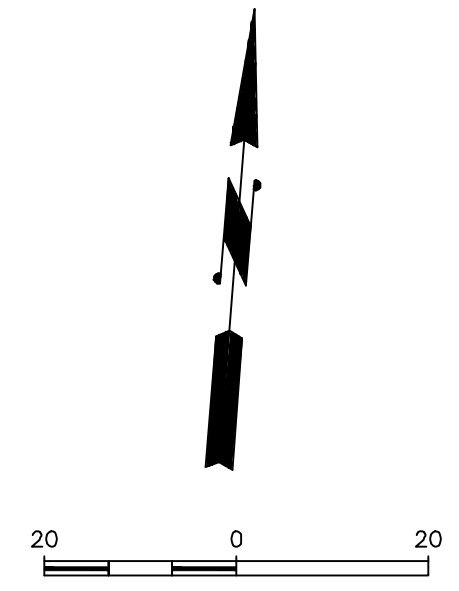
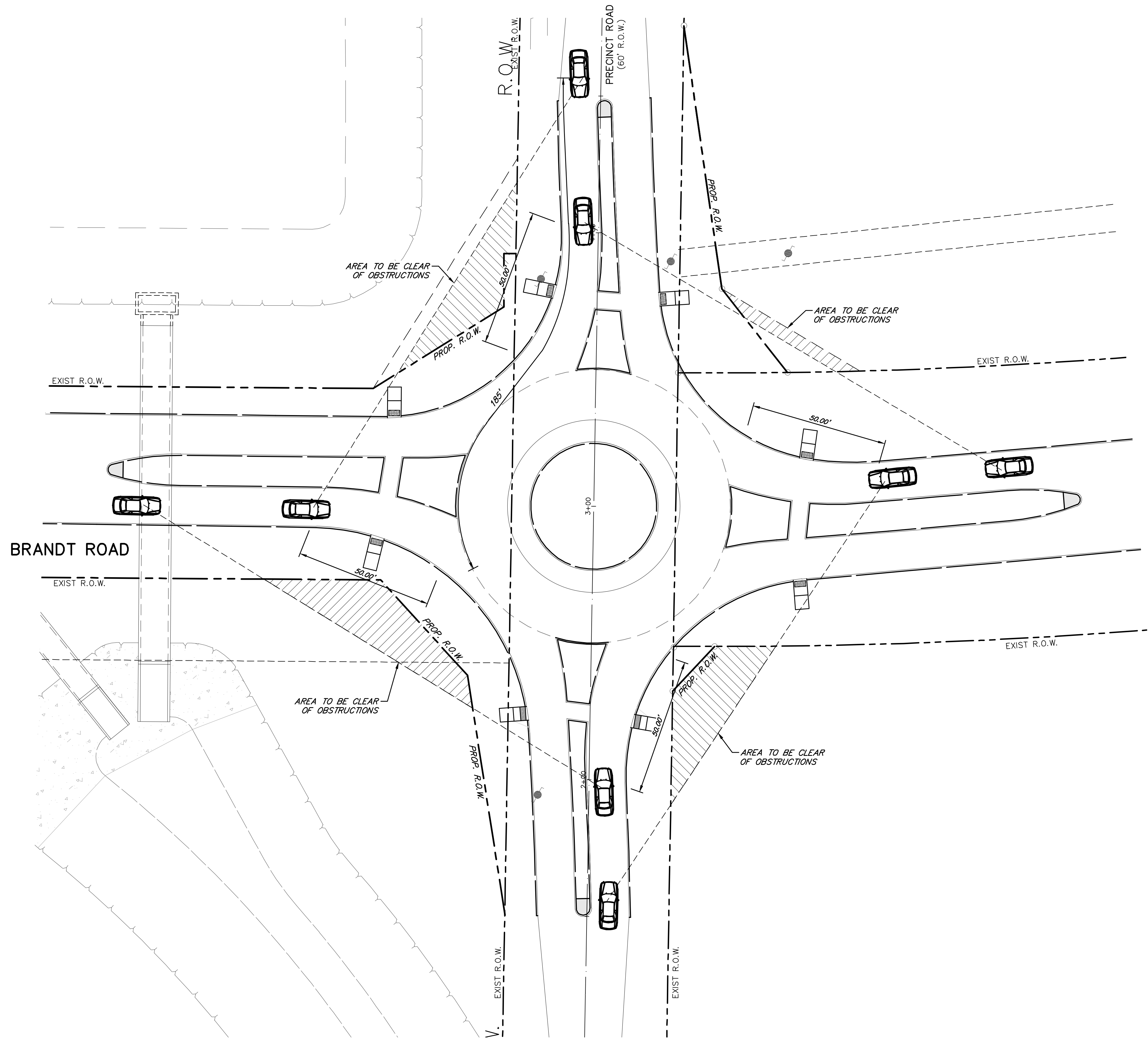
BRANDT ROAD
PRECINCT LINE RD TO MASON RD
STORM WATER POLLUTION PREVENTION
PLAN DETAILS

TERRA a Bowman company
1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

JNS ENGINEERS, LLC
722 PIN OAK ROAD, STE 202A
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FAX: (281) 391-3375
WWW.JNSCE.COM
T.S.P.E. FIRM
REGISTRATION NO. 11653

DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1
		SHEET SW05

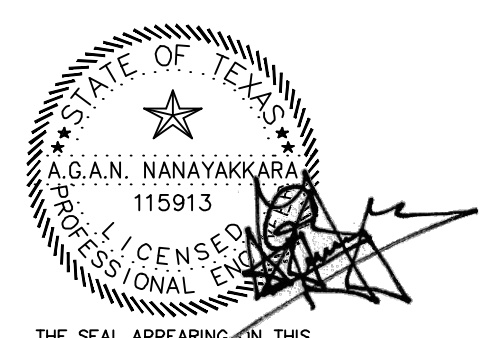
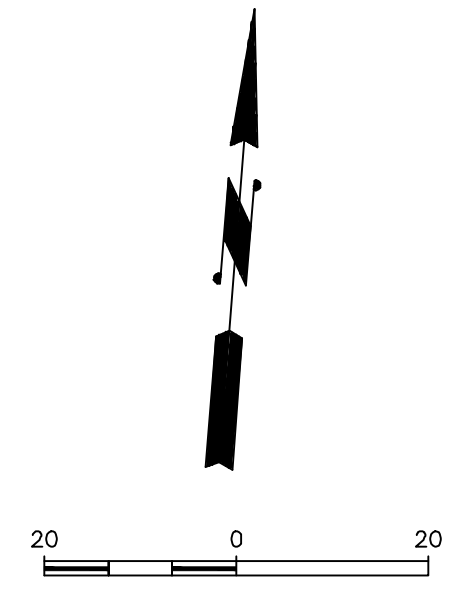
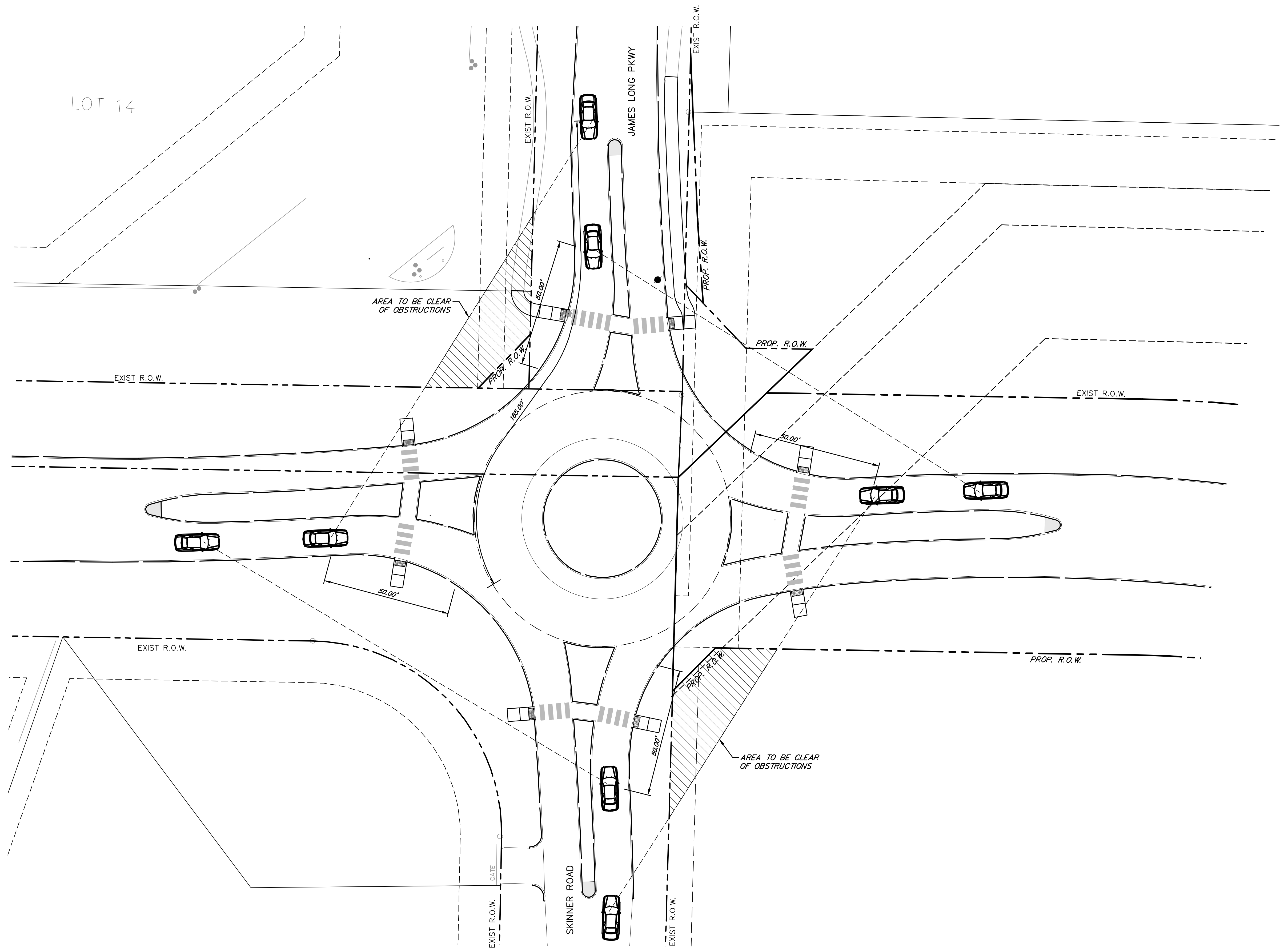
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ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD INTERSECTION VISIBILITY TRIANGLE (SHEET 1 OF 2)			
TERRA <small>a Bowman company</small>		1445 N. LOOP WEST – SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 20'	PROJECT No. 0522-1801	CONTRACT: 1
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET VT01	

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THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913 ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.

**BRANDT ROAD
PRECINCT LINE RD TO MASON RD
INTERSECTION VISIBILITY TRIANGLE
(SHEET 2 OF 2)**

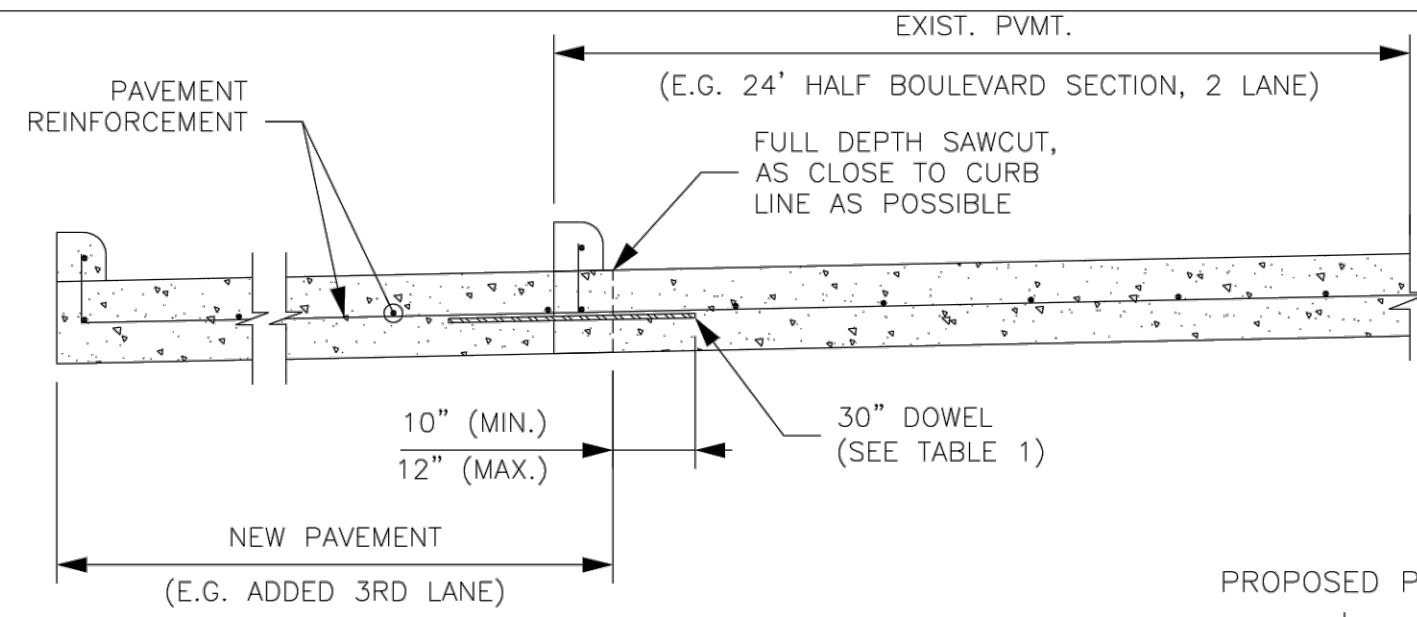
TERRA a Bowman company 1445 N. LOOP WEST – SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A
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WWW.JNSCE.COM
T.B.P.E. FIRM REGISTRATION NO. 11653

DRAWN BY: T.D.	SCALE: 1" = 20'	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET VT02

BRANDT ROAD

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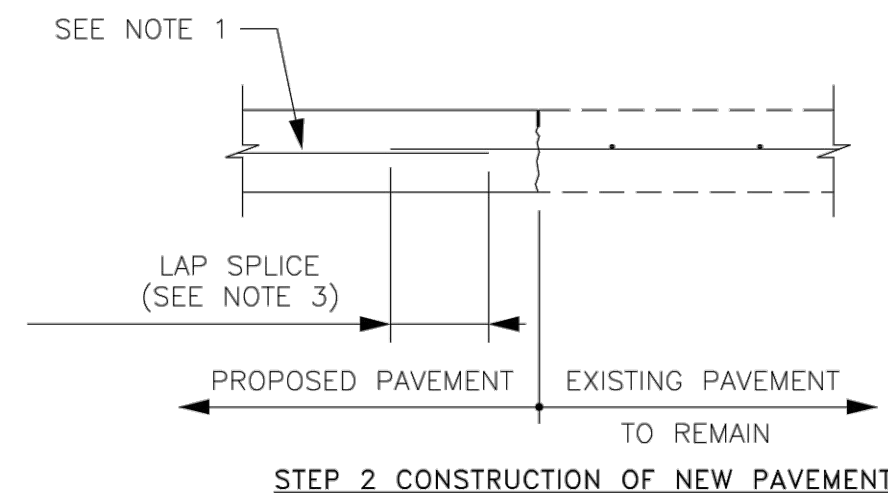
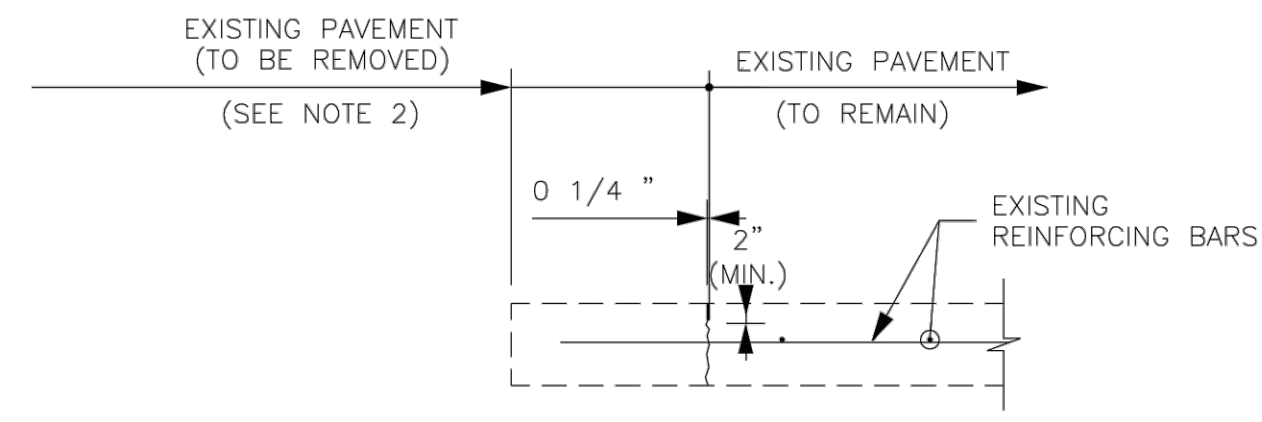
**TABLE 1
(CONSTRUCTION JOINT DOWELS)**

DOWEL SIZE	PAVEMENT DEPTH
#4 BAR	< 6"
#5 BAR	6" ≤ D < 9"
#6 BAR	≥ 9"

DOWEL SHALL BE DRILLED INTO EXISTING PAVEMENT (MIN. 10", MAX. 12") AND EPOXIED. (SEE ITEM 361.3)

EXPANSION JOINT DOWELS 12" O.C.

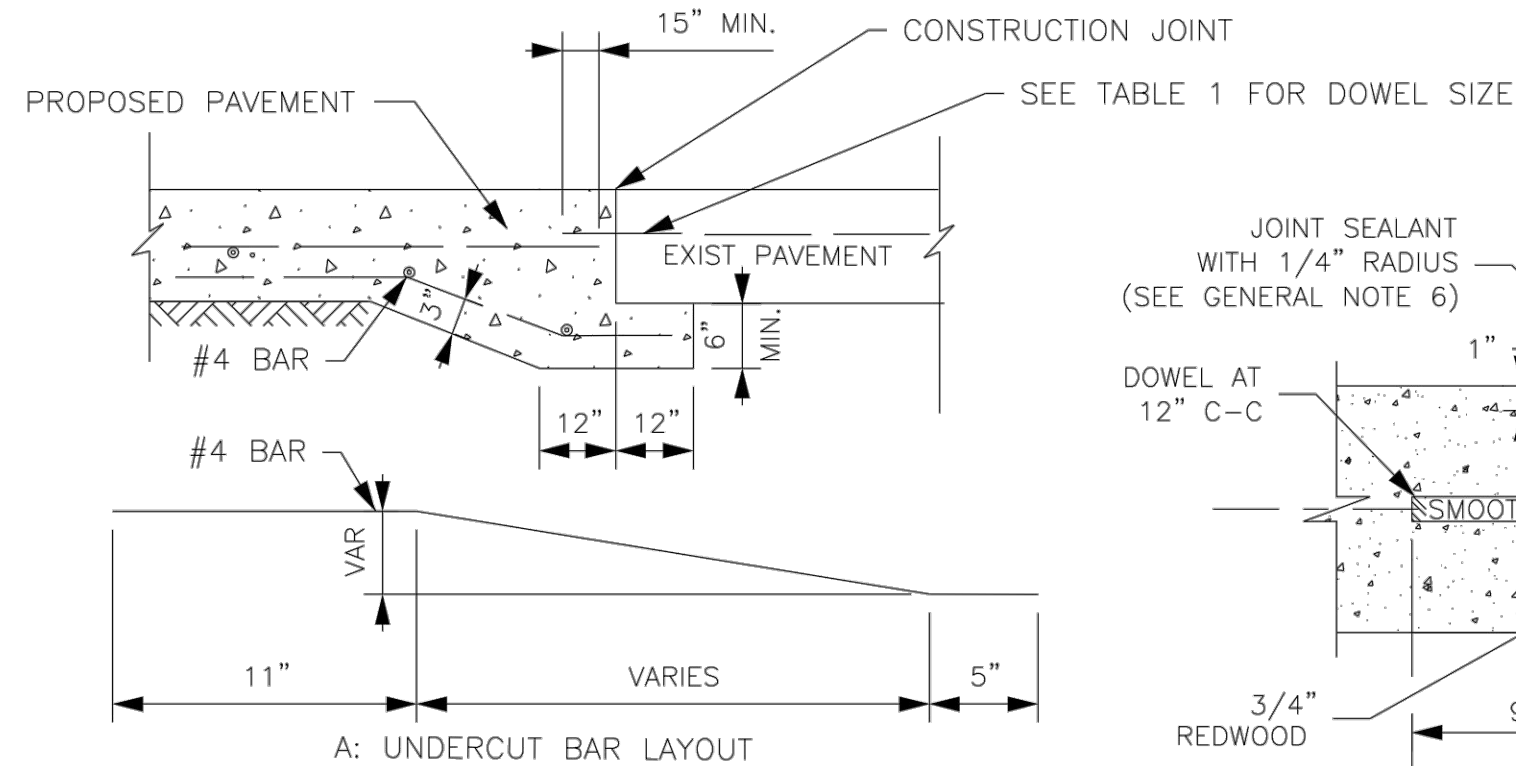
PAVEMENT THICKNESS (D)	DOWEL DIA.
6"	3/4"
7"	1"
8"	1"
9" & 10"	1 1/4"



CONCRETE TO CONCRETE STANDARD PAVEMENT TIE-IN
SCALE: 1" = 1'-6"

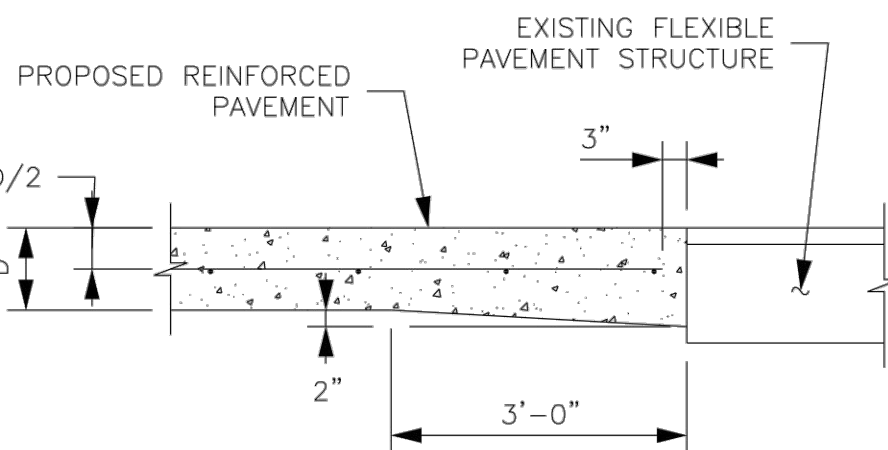
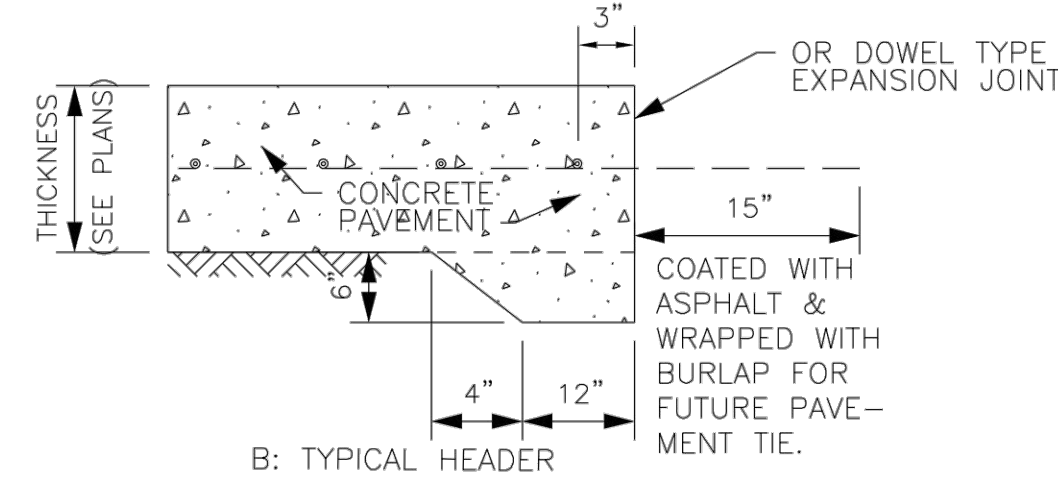
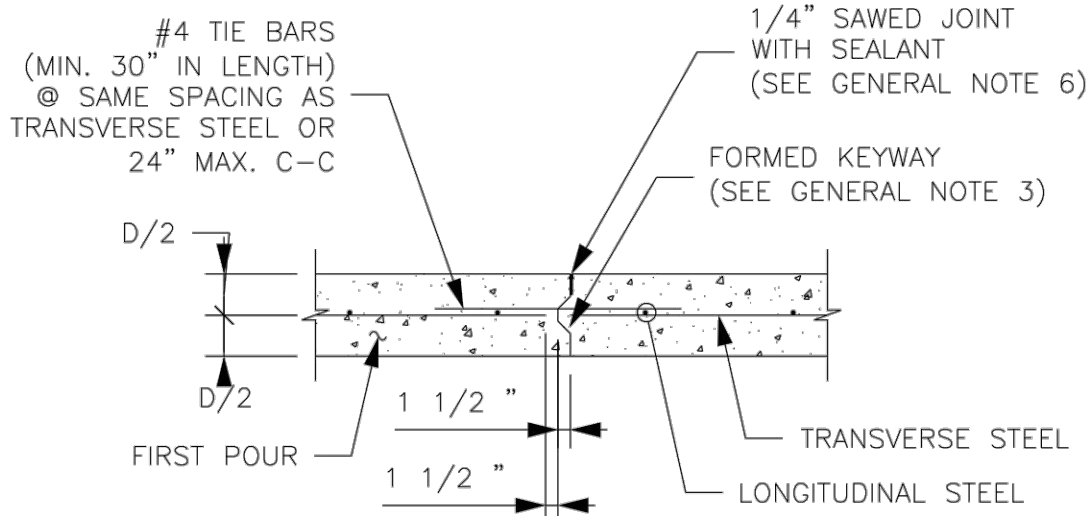
NOTES FOR STANDARD PAVEMENT TIE-IN:

- REINFORCING CENTERED IN PROPOSED PAVEMENT, 3" CLEAR AT EDGES.
- ONLY FULL DEPTH SAWCUTS WILL BE ALLOWED
- USE FULL DEPTH SAWCUT WITH DRILLED IN DOWELS (AS SHOWN IN THE "TYPICAL CONCRETE ROADWAY WIDENING DETAIL" ON THIS SHEET. THE SAWCUTTING AND DOWELS WILL BE AT CONTRACTOR'S EXPENSE.
- ALL PAVEMENT CONCRETE SHALL BE 5 1/2 SACK PER CY, 3500, PSI AT 28 DAYS
- SIZE OF DOWEL BARS SHALL CONFORM TO TABLE 1. DOWELS SHALL BE PLACED 24" CENTER TO CENTER OR MATCH EXISTING, IF CLOSER



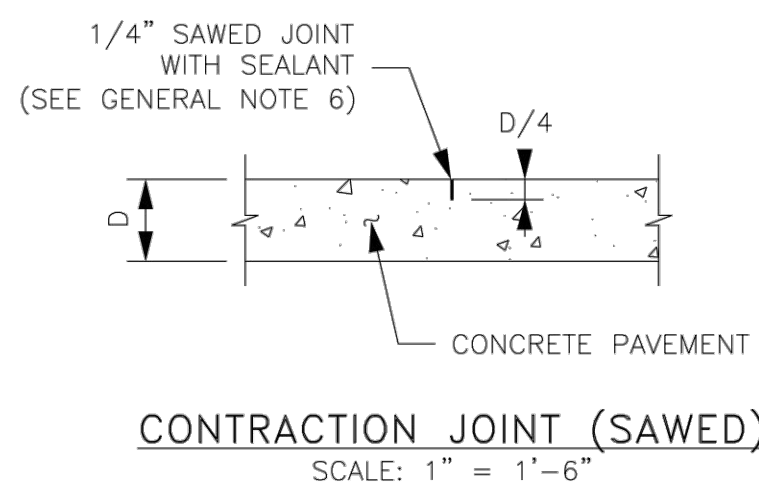
NOTES FOR DOWEL EXPANSION JOINT:

- EXPANSION JOINT SHALL BE PLACED AT THE END OF EACH CURB RADIUS AND SPACED AT A MAXIMUM DISTANCE OF 60 FEET.
- CENTER DOWEL HORIZONTALLY ON JOINT.
- EXPANSION JOINT BARS SHALL BE HELD PARALLEL TO THE FINISHED CONCRETE SURFACE.

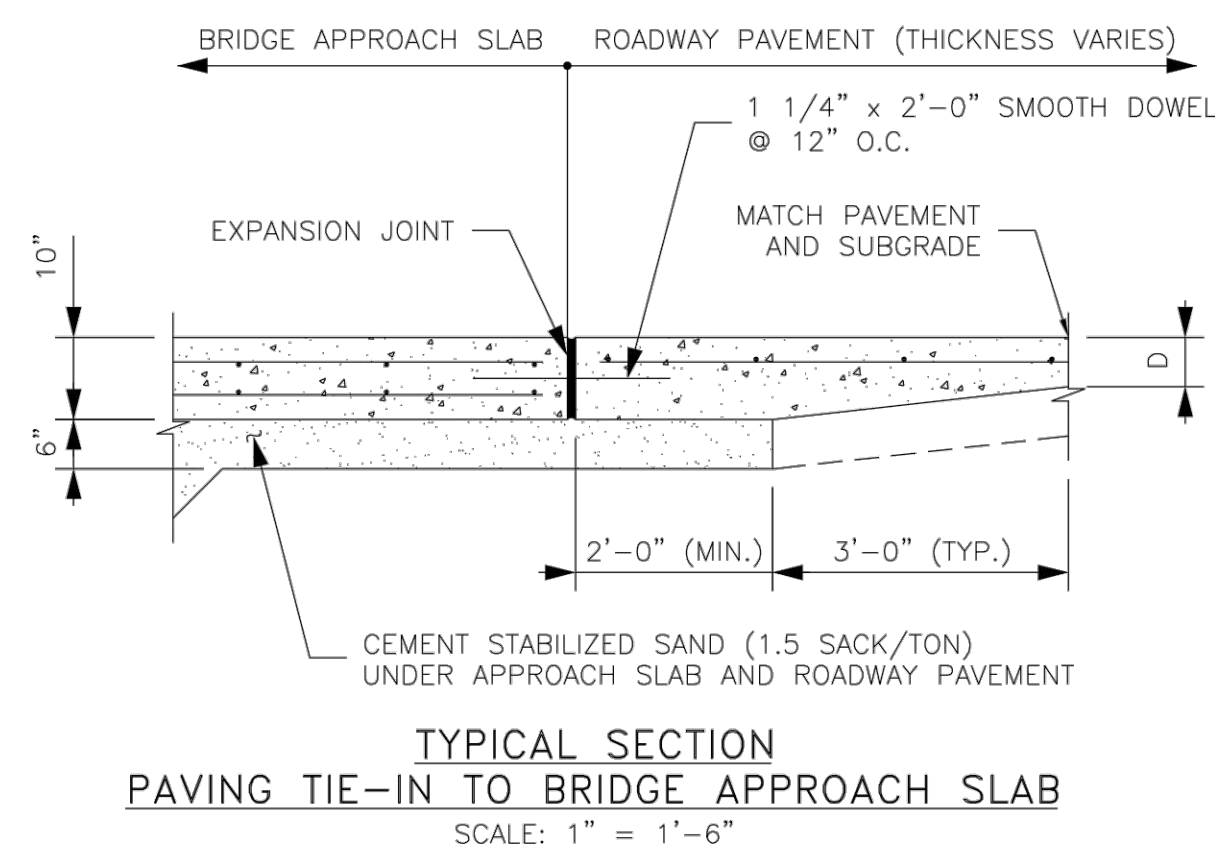


NOTES FOR PAVING HEADER:

- ADDITIONAL CONCRETE FOR PAVING HEADER SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAVING BID ITEMS.
- DISTURBED MATERIAL IN THE FLEXIBLE PAVEMENT WILL BE BACKFILLED WITH ASPHALT CONCRETE PAVEMENT (ACP). THE ACP WILL BE CONSIDERED INCIDENTAL TO VARIOUS PAVING BID ITEMS.

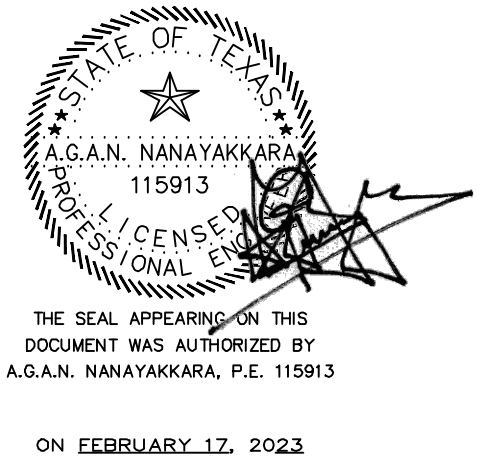


- NOTE FOR CONTRACTION JOINT:**
- 20'-0" MAXIMUM SPACING BETWEEN JOINTS.



GENERAL NOTES:

- FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND REINFORCING, REFER TO ITEM 360 HARRIS COUNTY SPECIFICATIONS
- THE CHAIRS USED TO SUPPORT THE BAR MATS SHALL BE OF SUFFICIENT STRUCTURAL QUALITY AND NUMBER TO HOLD THE MAT WITHIN THE PLACEMENT HEIGHT, AND SHALL BE OF A TYPE APPROVED BY THE ENGINEER. SPACING OF BAR SUPPORT CHAIRS SHALL BE 3'-0" MAXIMUM.
- SAWED CONTRACTION JOINTS SHALL BE USED FOR LONGITUDINAL JOINTS WHEREVER MORE THAN ONE LANE WIDTH IS PLACED IN A SINGLE POUR. KEYED CONSTRUCTION JOINTS SHALL BE USED AT ALL OTHER JOINTS.
- ALL SAW CUTTING SHOWN ON THIS DETAIL SHALL BE INCIDENTAL TO ITEM 360 "CONCRETE PAVEMENT".
- D = THICKNESS OF CONCRETE PAVEMENT.
 - FOR DEVELOPMENT PROJECTS SEE REGULATIONS OF FORT BEND COUNTY, TEXAS FOR THE APPROVAL AND ACCEPTANCE OF INFRASTRUCTURE.
- ALL CONSTRUCTION JOINTS SHALL BE SEALED. JOINT SEALANT SHALL CONFORM TO THE REQUIREMENTS OF ITEM 360
- NO TRAFFIC ON CONCRETE PAVEMENT UNTIL 7 DAYS CURE TIME AND 3,500 PSI HAS BEEN REACHED.



NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	2-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT



PROJECT TITLE:		FBCD STANDARD
DRAWN BY: INIT	SHEET DESCRIPTION: CONCRETE PAVEMENT DETAILS	05
CK'D BY: INIT		SHEET NO:
SCALE: AS NOTED	SHEET 1 OF 3	/
DATE: 2-1-22	APPROVED BY:	

REV. NO.	DESCRIPTION	DATE	APP.

**BRANDT ROAD
PRECINCT LINE RD TO MASON RD**

**FORT BEND COUNTY CONCRETE
PAVEMENT DETAILS (1 OF 3)**

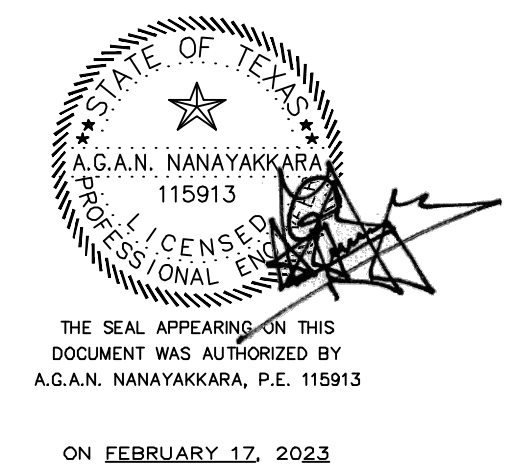
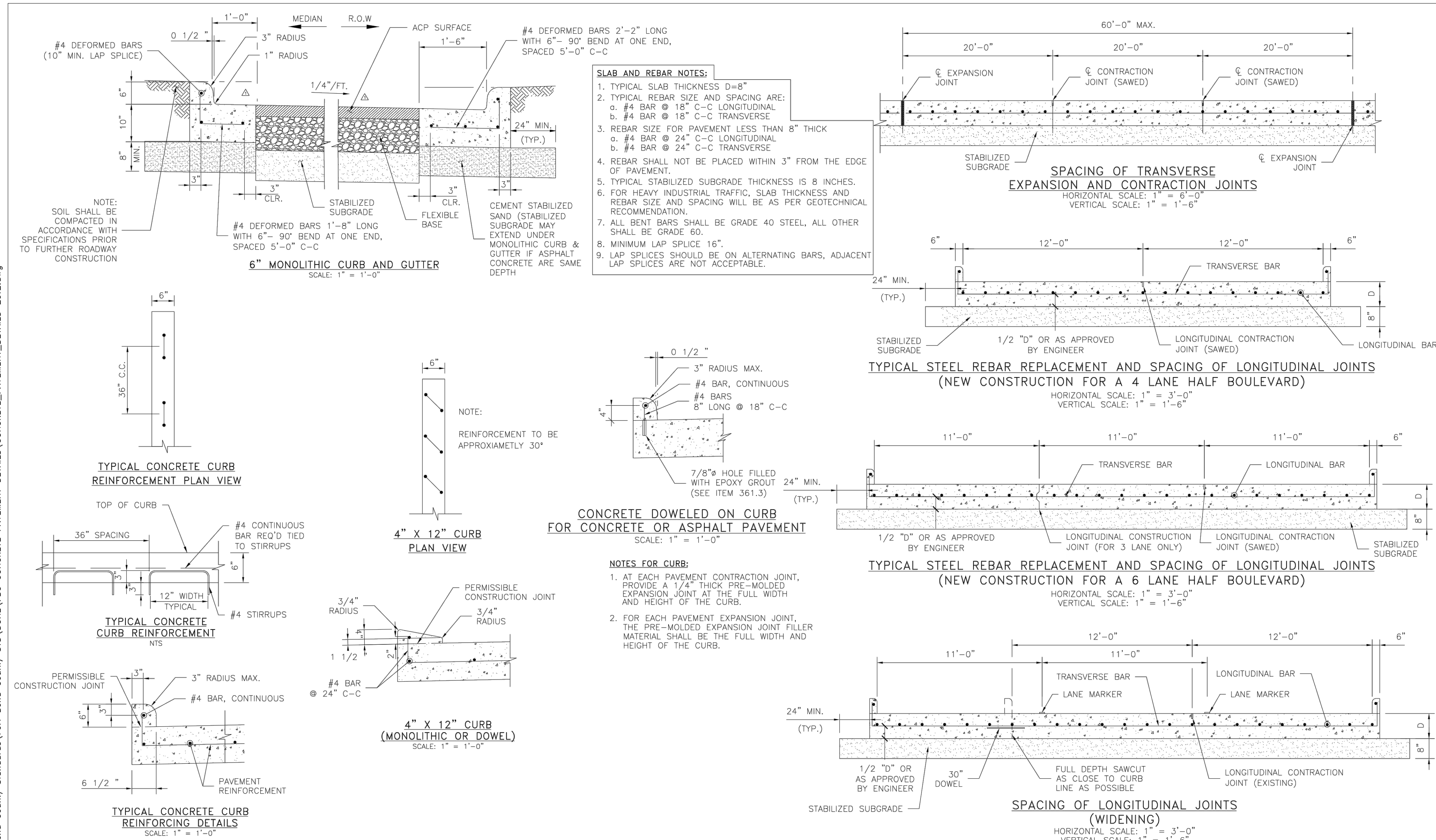
TERRA a Bowman company | 1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

JNS ENGINEERS, LLC | 722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.B.P.E. FIRM REGISTRATION NO. 11653

DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1
		SHEET SD01

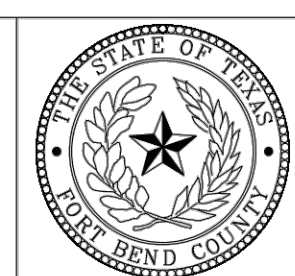
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NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	2-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT

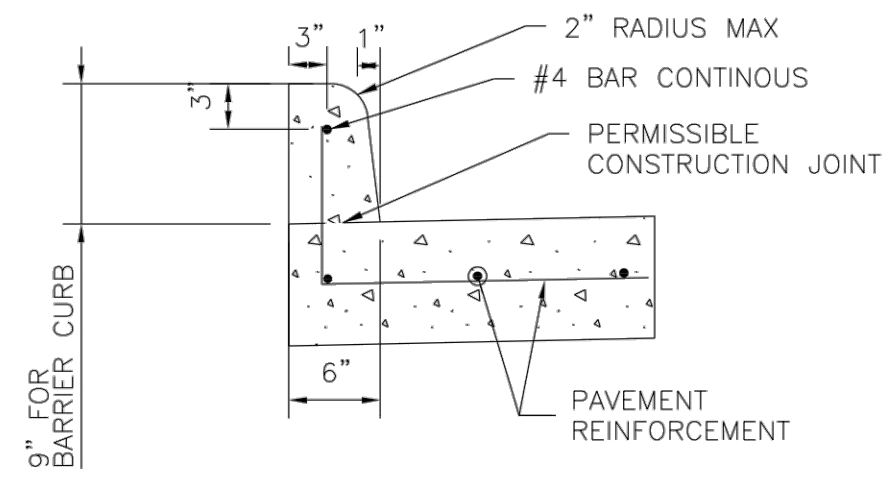


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DRAWN BY: INIT	SHEET DESCRIPTION: CONCRETE PAVEMENT DETAILS	06
SCALE: AS NOTED	SHEET 2 OF 3	SHEET NO: /
DATE: 2-1-22	APPROVED BY:	

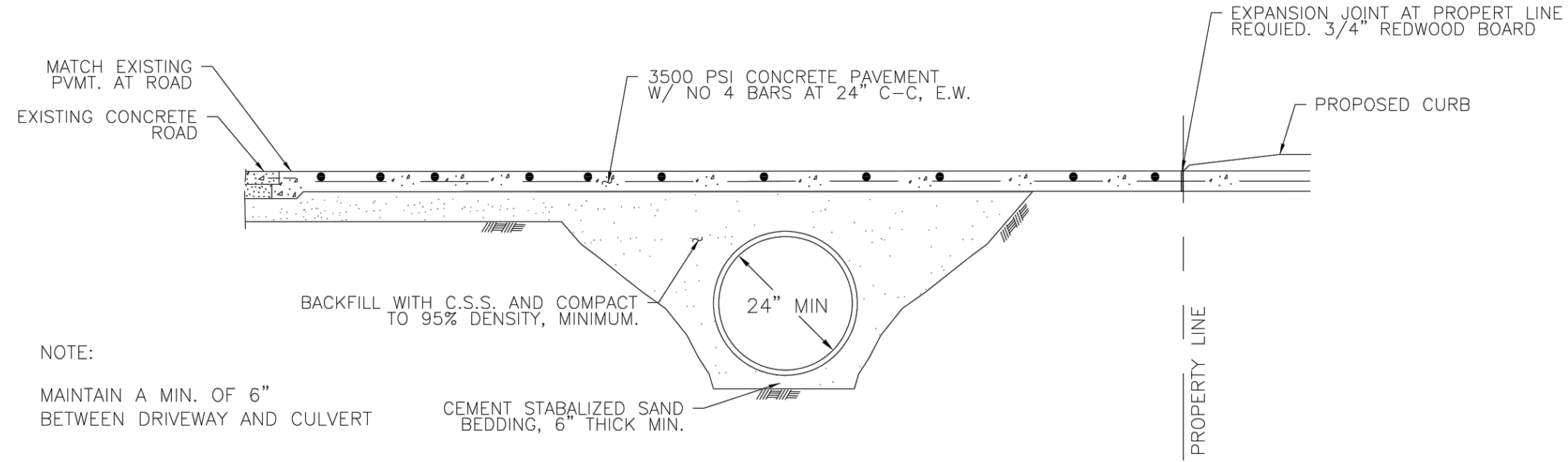
REVNO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
FORT BEND COUNTY CONCRETE PAVEMENT DETAILS (2 OF 3)			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	
PROJECT No. 0522-1801		CONTRACT: 1	
SHEET SD02		REGISTRATION NO. 11653	

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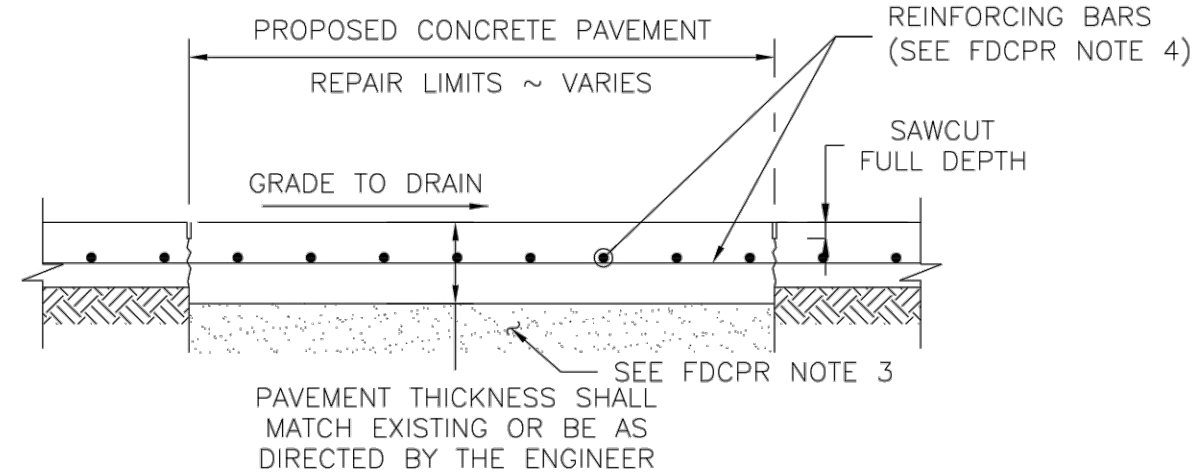
9" BARRIER CURB



NOTE:

MAINTAIN A MIN. OF 6" BETWEEN DRIVEWAY AND CULVERT

CONCRETE APRON DETAIL - DRIVEWAY PROFILE FOR CULVERT DRAINAGE



FULL DEPTH CONCRETE PAVEMENT REPAIR

HORIZONTAL SCALE: 1" = 3'-0"
VERTICAL SCALE: 1" = 1'-6"

FULL DEPTH CONCRETE PAVEMENT REPAIR (FDCPR) NOTES:

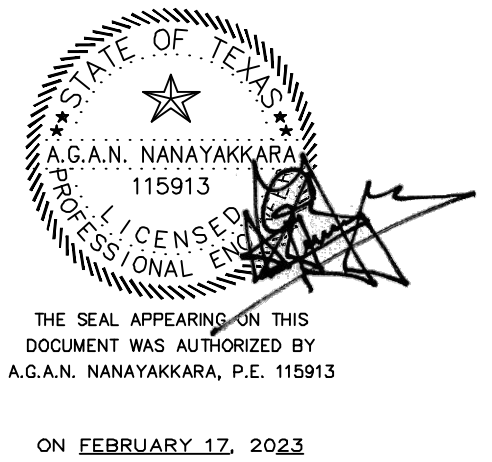
1. ONLY FULL DEPTH SAWCUTS WILL BE ALLOWED
2. EXISTING CONCRETE VERTICAL FACES SHALL BE CLEANED OF ALL DELETERIOUS LOOSE MATERIAL PRIOR TO CONCRETE PLACEMENT.
3. FOR REPAIR/REPLACE AREAS, A 8" DEPTH BASE SHALL BE REMOVED AND REPLACED WITH CEMENT STABILIZED SAND PER ITEM 433 HARRIS COUNTY SPECIFICATIONS.
4. REINFORCEMENT OF 9"-10" THICK CONCRETE PAVEMENT SHALL BE NO. 5 BARS AT 18" SPACING IN EACH DIRECTION. REFER TO TABLE ON CONCRETE PAVEMENT SHEET 2 OF 2
5. REFER TO FBC STREET ACCEPTANCE GUIDELINES

NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	2-1-22	RJS
2			
3			
4			

FORT BEND COUNTY
ENGINEERING DEPARTMENT



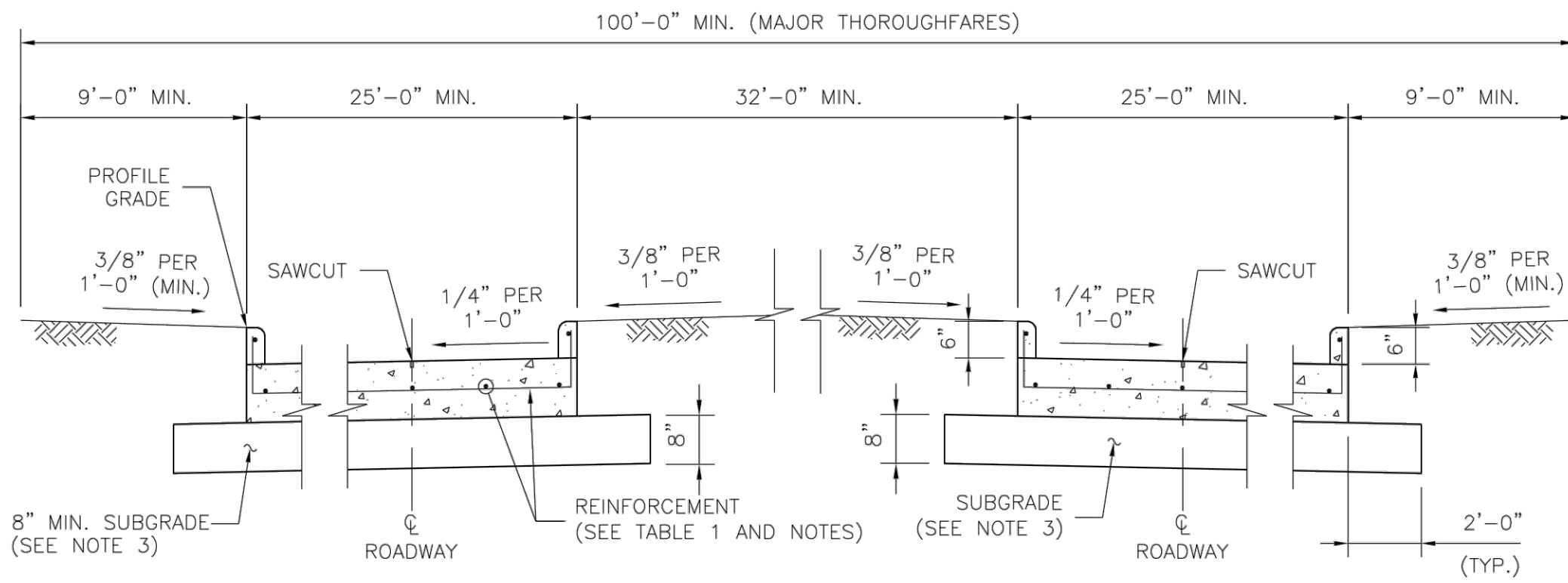
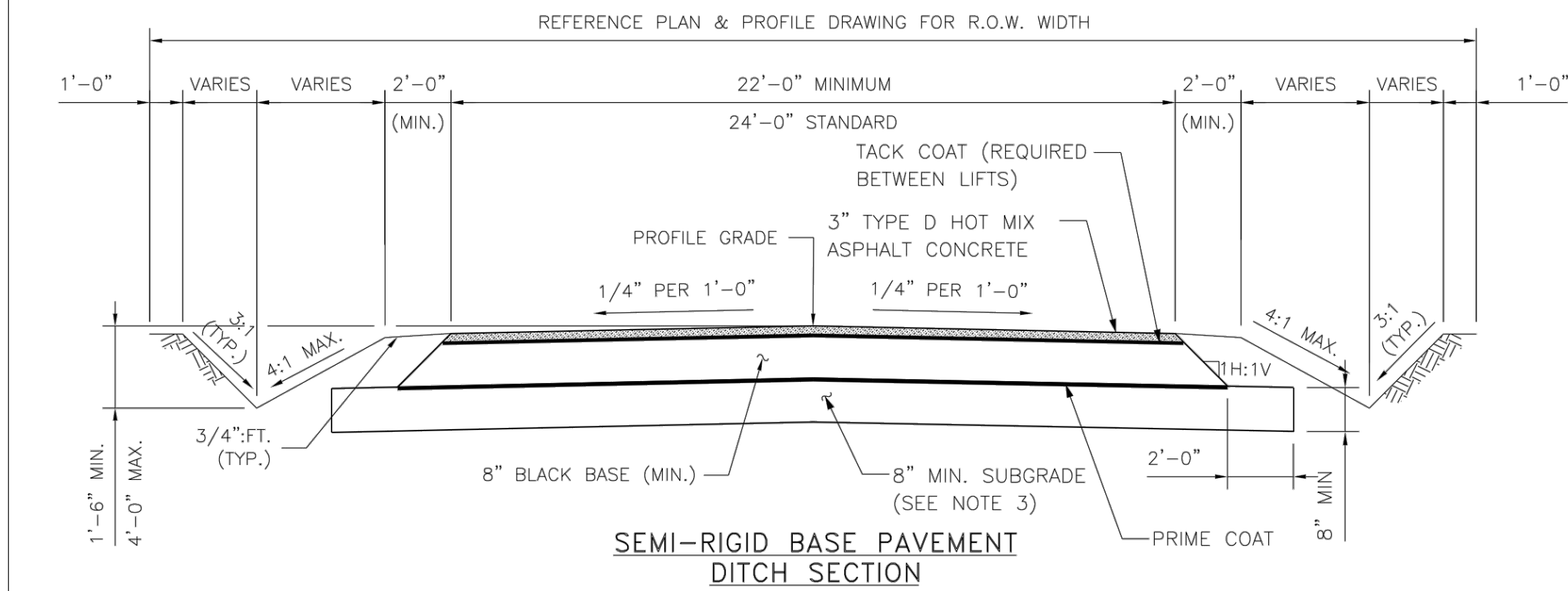
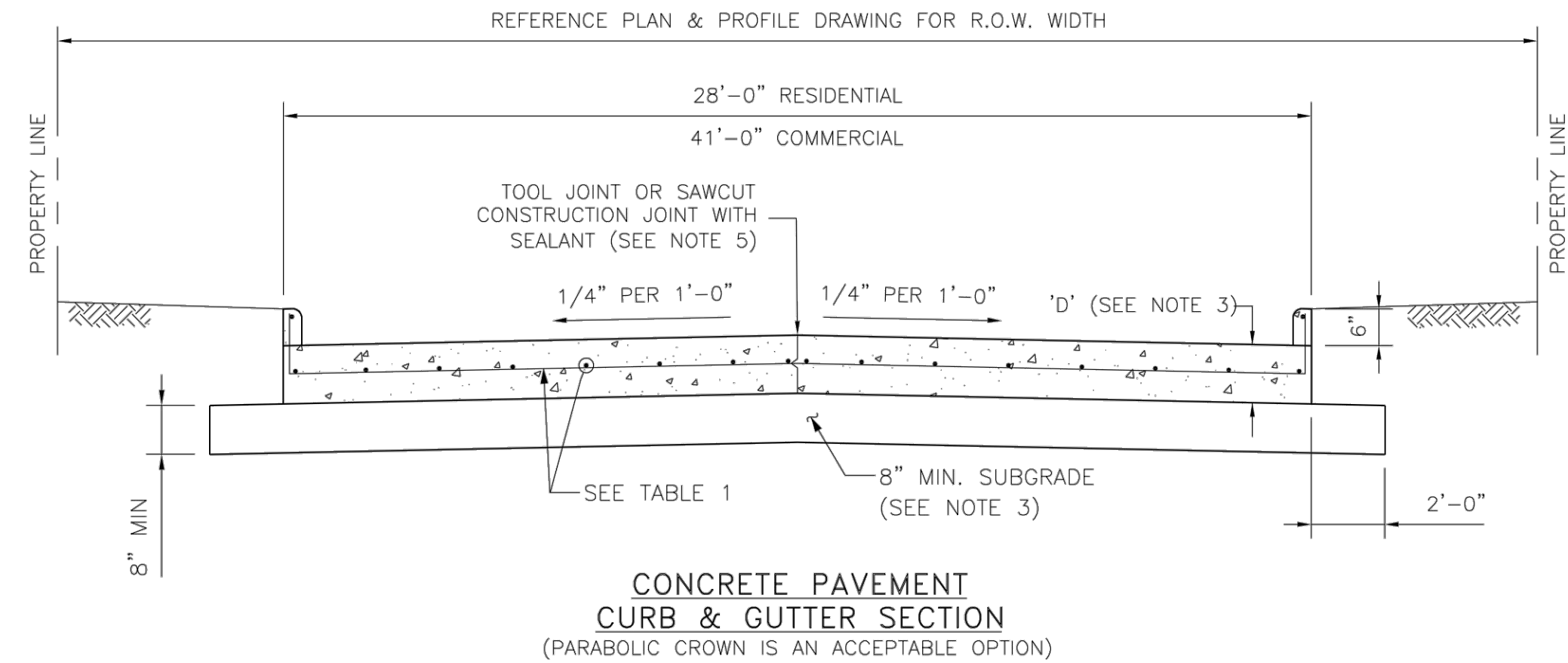
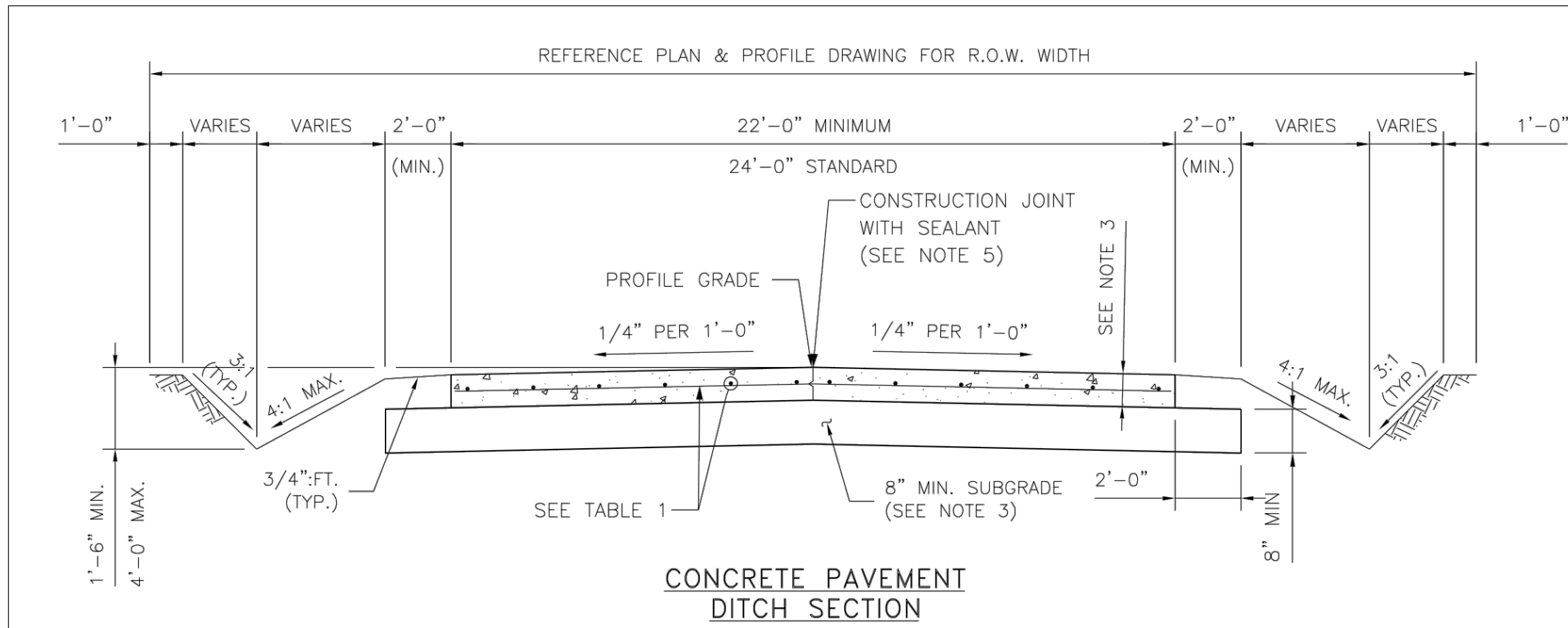
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DRAWN BY: INIT	SHEET DESCRIPTION: CONCRETE PAVEMENT DETAILS	FBCED STANDARD 07
SCALE: AS NOTED	SHEET 3 OF 3	SHEET NO: /
DATE: 2-1-22	APPROVED BY:	



REVNO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD FORT BEND COUNTY CONCRETE PAVEMENT DETAILS (3 OF 3)			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC		JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281)391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801	CONTRACT: 1
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET	SD03

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**TABLE 1
(CONSTRUCTION JOINT DOWELS)**

DOWEL SIZE	PAVEMENT DEPTH
#4 BAR	< 6"
#5 BAR	6" ≤ D < 9"
#6 BAR	≥ 9"

DOWEL SHALL BE DRILLED INTO EXISTING PAVEMENT (MIN. 10", MAX. 12") AND EPOXIED. (SEE ITEM 361.3)

NOTES:

- PAVEMENT SECTIONS SHOWN ARE INTENDED FOR DEVELOPMENT PROJECTS AND NOT FOR PUBLIC PROJECTS, WHERE WIDTH OF R.O.W. MAY VARY.
- PAVEMENT SECTIONS SHALL BE LOCATED IN CENTER OF R.O.W.
- SUBGRADE TREATMENT AND PAVEMENT THICKNESS AS DESIGNATED IN PLANS
- REFERENCE CONSTRUCTION JOINT DETAIL ON THE STANDARD CIVIL DRAWING "CONCRETE PAVEMENT DETAILS - SHEET 1 OF 2" FOR JOINT AND SEALANT REQUIREMENTS.
- NO TRAFFIC ON CONCRETE PAVEMENT FOR 7 DAYS AND COMPRESSIVE STRENGTH OF 3,500 psi HAS BEEN REACHED.
- ALL CONSTRUCTION JOINTS SHALL BE SEALED

SLAB AND REBAR NOTES:

- TYPICAL SLAB THICKNESS D=8"
- TYPICAL REBAR SIZE AND SPACING ARE:
 - a. #4 BAR @ 18" C-C LONGITUDINAL
 - b. #4 BAR @ 18" C-C TRANSVERSE
- REBAR SIZE FOR PAVEMENT LESS THAN 8" THICK
 - a. #4 BAR @ 24" C-C LONGITUDINAL
 - b. #4 BAR @ 24" C-C TRANSVERSE
- REBAR SHALL NOT BE PLACED WITHIN 3" FROM THE EDGE OF PAVEMENT.
- TYPICAL STABILIZED SUBGRADE THICKNESS IS 8 INCHES.
- FOR HEAVY INDUSTRIAL TRAFFIC, SLAB THICKNESS AND REBAR SIZE AND SPACING WILL BE AS PER GEOTECHNICAL RECOMMENDATION.
- ALL BENT BARS SHALL BE GRADE 40 STEEL, ALL OTHER SHALL BE GRADE 60.
- MINIMUM LAP SPLICE 16".
- LAP SPLICES SHOULD BE ON ALTERNATING BARS, ADJACENT LAP SPLICES ARE NOT ACCEPTABLE.

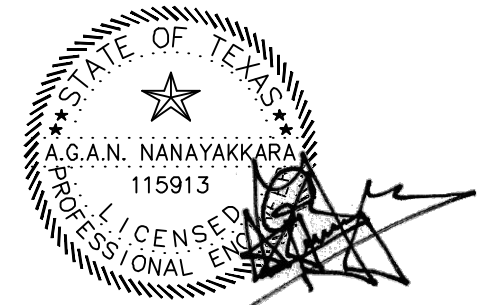
HORIZONTAL SCALE: 1"=3'-0"
VERTICAL SCALE: 1"=1'-6"

NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	2-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT



PROJECT TITLE:		FBCD STANDARD
DRAWN BY:	INIT	09
CK'D BY:	INIT	
SCALE:	SHEET DESCRIPTION:	SHEET NO.:
AS NOTED	TYPICAL PAVEMENT SECTIONS	/
DATE:	FOR DEVELOPMENT PROJECTS	
2-1-22	APPROVED BY:	



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913

ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.

**BRANDT ROAD
PRECINCT LINE RD TO MASON RD**

**TYPICAL PAVEMENT SECTIONS
FOR DEVELOPMENT PROJECTS**

TERRA a Bowman company
1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

JNS ENGINEERS, LLC
722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.B.P.E. FIRM
REGISTRATION NO. 11653

DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1
		SHEET SD06

GENERAL NOTES:
 1.) CROSSWALK AND TRUCK APRON SHALL BE STAMPED CONCRETE WITH CONTRASTING COLORS

CROSS SECTION A-A SPLITTER ISLAND CUT THROUGH
 10'-0" CROSSWALK
 9'-4" STAMPED CONCRETE
 4" CONCRETE PAVEMENT
 8" STABILIZED SUBGRADE

CROSS SECTION OF CROSS WALK WITH STAMPED CONCRETE
 9'-4" PAVERS
 STAMPED CONCRETE
 8" CONCRETE PAVEMENT
 8" STABILIZED SUBGRADE

4"x18" MOUNTABLE CURB DETAIL
 18" REINFORCED CONCRETE PAVEMENT
 8" LIME STABILIZED SUBGRADE @ 95% PROCTOR DENSITY MIN.

CROSS SECTION OF TRUCK APRON
 MOUNTABLE CURB AREA (WIDTH VARIES)
 18" CURB
 STAMPED CONCRETE
 6" CURB
 10" CONCRETE PAVEMENT
 10" STABILIZED SUBGRADE
 8" STABILIZED SUBGRADE
 8" CONCRETE PAVEMENT

NOTES:
 1. 1.0 LBS. OF APPROVED NON-METALLIC FIBER MESH PER C/Y ON 4"x18" CURBS.
 2. #4 RE-BAR STIRRUPS TO BE PLACED AT INTERVALS OF 2' (T) C-C.
 3. #4 RE-BAR LONGITUDINAL SHALL BE TIED TO EACH STIRRUP.

NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	2-1-22	RJS

FORT BEND COUNTY ENGINEERING DEPARTMENT

PROJECT TITLE:	DATE:	NO.
ROUNDABOUT CONSTRUCTION DET I	2-1-22	42
SHEET DESCRIPTION:		
SCALE:		
AS NOTED		
DATE:		
APPROVED BY:		
2-1-22		

SIGNAGE FOR SINGLE LANE ROUNDABOUT
 N.T.S.

SIGNAGE FOR 2-LANE ROUNDABOUT
 N.T.S.

NOTES: SIGNS ARE SHOWN FOR ONE APPROACH ONLY

NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	2-1-22	RJS

FORT BEND COUNTY ENGINEERING DEPARTMENT

PROJECT TITLE:	DATE:	NO.
ROUNDABOUT CONSTRUCTION DET II	2-1-22	43
SHEET DESCRIPTION:		
SCALE:		
AS NOTED		
DATE:		
APPROVED BY:		
2-1-22		

PAVEMENT MARKINGS FOR SINGLE LANE ROUNDABOUT
 N.T.S.

PAVEMENT MARKINGS FOR 2-LANE ROUNDABOUT
 N.T.S.

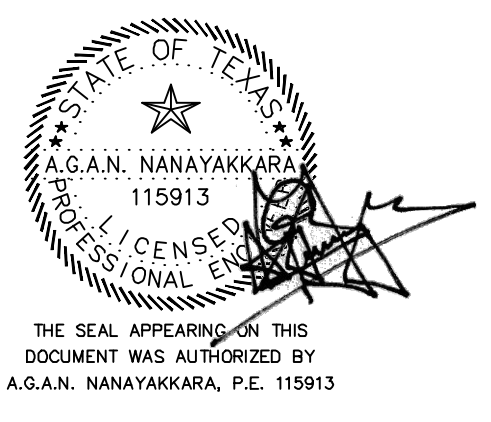
NOTES:
 1. USE STANDARD (NON FISHHOOK) ARROWS ON ROUNDABOUT APPROACHES AND IN CIRCULATORY ROADWAY.
 2. PLACE "SHARK'S TEETH" YIELD MARKINGS PERPENDICULAR TO LEFT LANE LINE OR CURB FOR EACH LANE.
 3. CROSSWALK OMITTED FROM TWO-LANE DETAIL FOR CLARITY. MINIMUM CROSSWALK DIMENSIONS FOR SINGLE-LANE ROUNDABOUT ALSO APPLY TO MULTI-LANE.
 4. PAVEMENT MARKING MUST BE SHOWN ON THE APPROVED CONSTRUCTION PLANS.
 5. PAVEMENT SURFACE AREAS PRIOR TO PLACEMENT OF PAVEMENT MARKINGS AND/OR RAISED PAVEMENT MARKERS SHALL BE CLEANED IN ACCORDANCE WITH COUNTY STANDARDS. CONCRETE SURFACES SHALL BE CLEANED BY ABRASIVE BLASTING MEDIUM. ASPHALT PAVEMENT SURFACE SHALL BE CLEANED BY BRUSHING WASHING, COMPRESSED AIR, AND/OR HIGH-PRESSURE WATER. AREAS MUST BE FREE OF CURING MEMBRANCE, DIRT, GREASE, LOOSE AND/OR FLAKING EXISTING MARKERS, AND FORMS OF DEBRIS.
 6. ALL STREET CROSSING SHALL COMPLY WITH T.A.S. AND A.D.A. SEE HANDICAP CROSS DETAIL.
 7. ALL PAVEMENT MARKING AND/OR RAISED PAVEMENT MARKERS SHALL COMPLY WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, A.D.A. T.A.S., AND COUNTY STANDARDS AND ALL REVISIONS THEREOF.
 8. PAVEMENT MARKINGS PLACED THAT ARE NOT IN ALIGNMENT OR SEQUENCE AS SHOWN ON THE PLANS OR STATED IN THE PROJECT SPECIFICATIONS SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

PAVEMENT MARKING SPECIFICATIONS:
 4" SOLID WHITE EDGE LINE - NOT TO BE STRIPED
 4" SOLID YELLOW EDGE LINE OR PAINT SPLITTER ISLAND CURB YELLOW WITH REFLECTIVE BEADS
 8" WHITE (6' DASH, 3' GAP)
 24" WHITE (3' DASH, 2' GAP)
 8" SOLID WHITE
 PLACE ARROWS AT START OF DEFLECTION / END OF TANGENT OR BROAD CURVE
 40" IF L=250' OR MORE
 20" IF L=200'
 FLUSH IF L=150'

NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	2-1-22	RJS

FORT BEND COUNTY ENGINEERING DEPARTMENT

PROJECT TITLE:	DATE:	NO.
ROUNDABOUT CONSTRUCTION DET III	2-1-22	44
SHEET DESCRIPTION:		
SCALE:		
AS NOTED		
DATE:		
APPROVED BY:		
2-1-22		

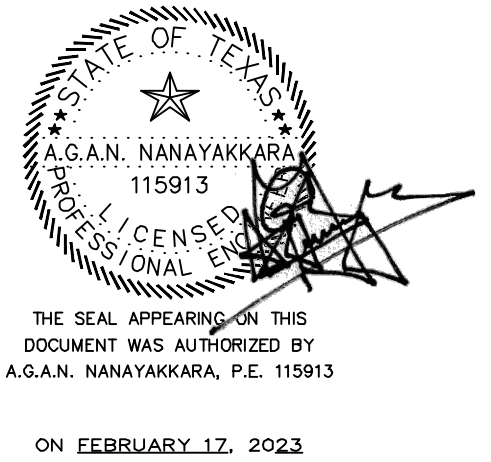
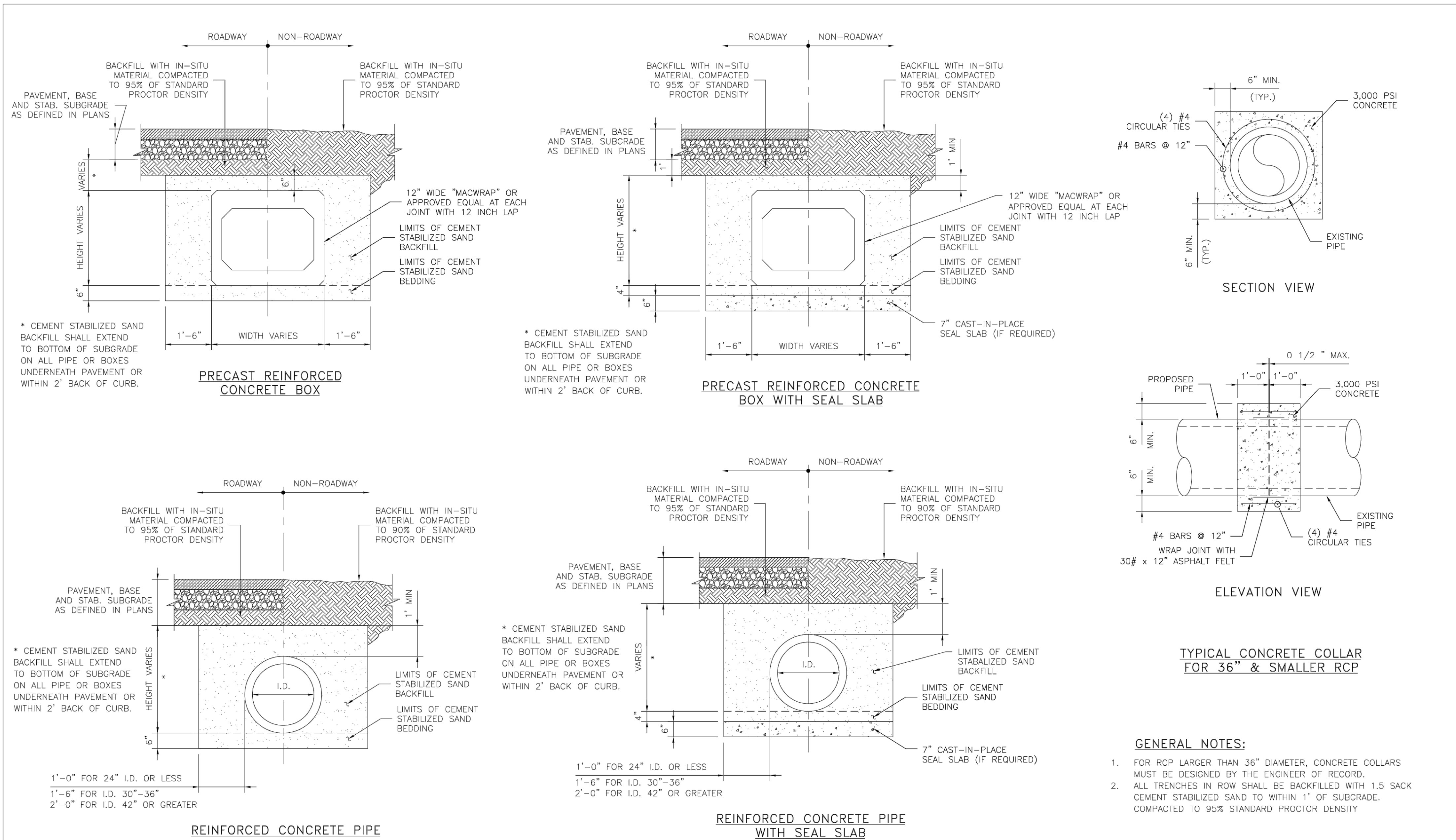


ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
ROUNDABOUT DETAILS			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77454 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SD07	

F:\Clients\0522-1801-Brandt.Road\Drawings\Seg 2\SD08 STORM SEWER CONSTRUCTION DETAILS.dwg Feb 17, 2023-11:42am Terra Associates Inc., Thanh Dao

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NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	2-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT



PROJECT TITLE:		FBCD STANDARD
DRAWN BY:	INIT	18
CR'D BY:	INIT	
SCALE:	SHEET DESCRIPTION:	SHEET NO:
1"=1'-6"	STORM SEWER CONSTRUCTION	/
DATE:	APPROVED BY:	
2-1-22		

REV. NO.	DESCRIPTION	DATE	APP.

**BRANDT ROAD
PRECINCT LINE RD TO MASON RD
STORM SEWER CONSTRUCTION
DETAILS**

TERRA a Bowman company 1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

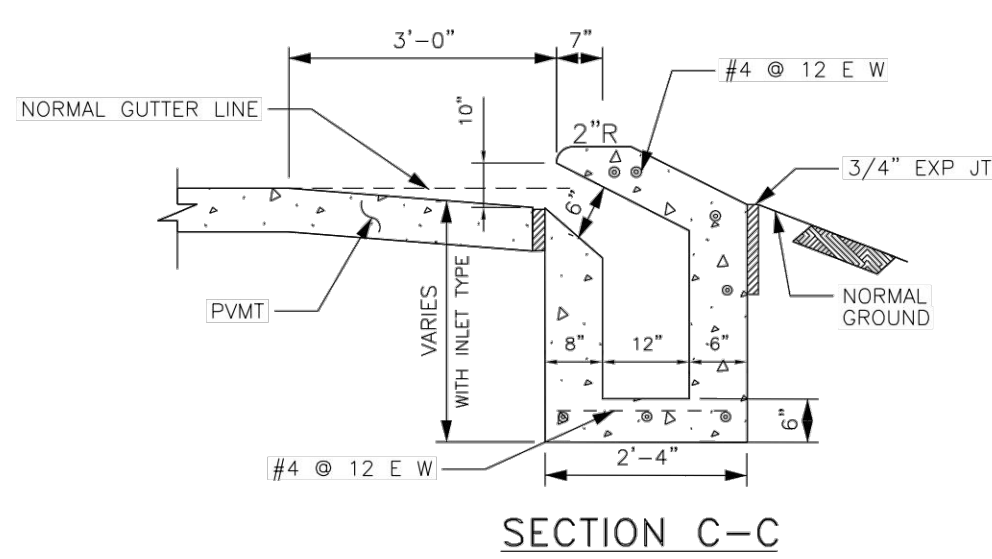
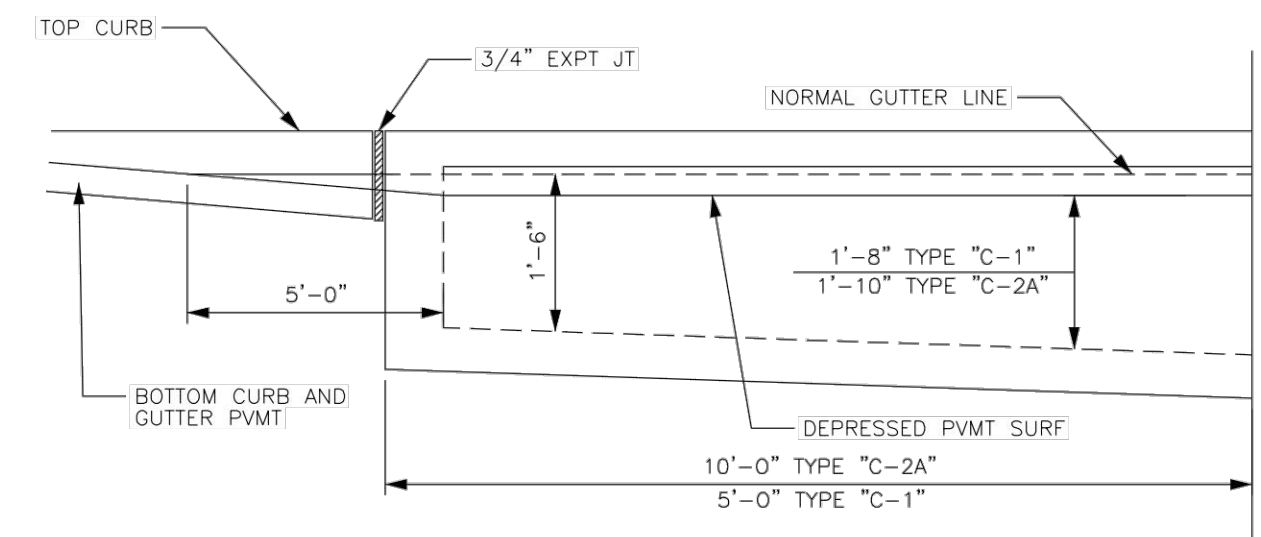
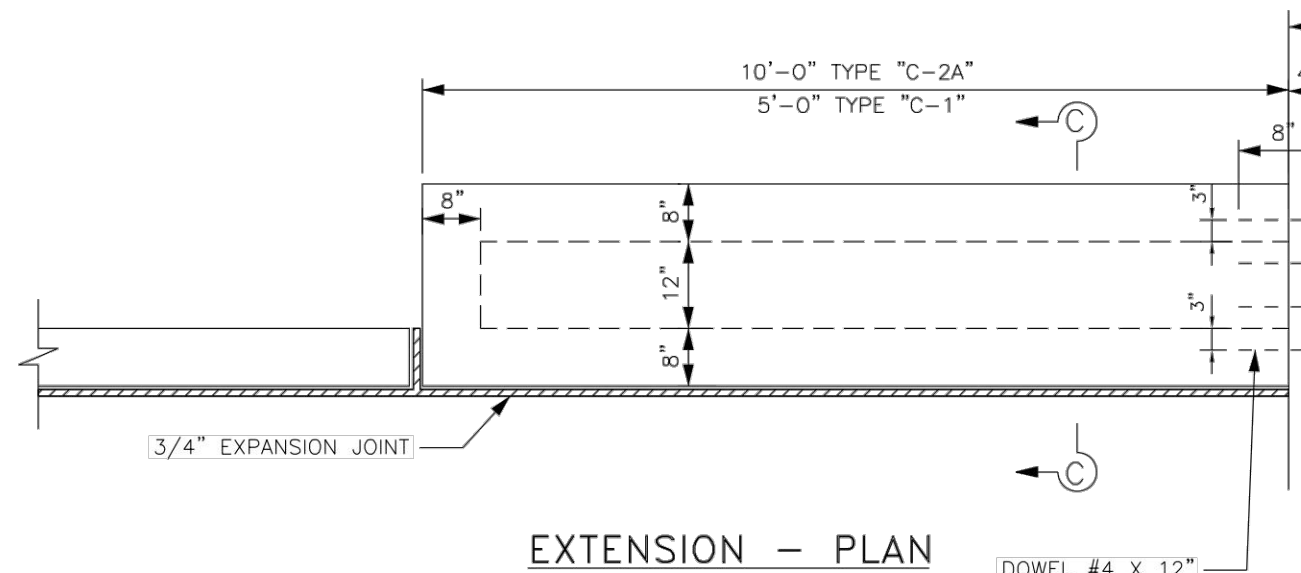
JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77454
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.B.P.E. FIRM
REGISTRATION NO. 11653

DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1
		SHEET SD08

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\SD10 MODIFIED TYPE C INLET DETAILS.dwg Feb 17, 2023-11:42am Terra Associates Inc., Thanh Dao

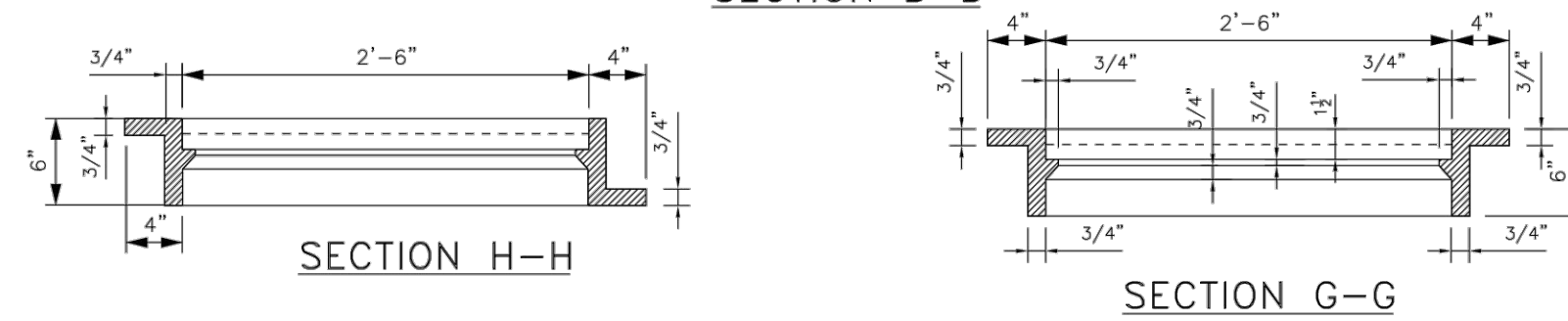
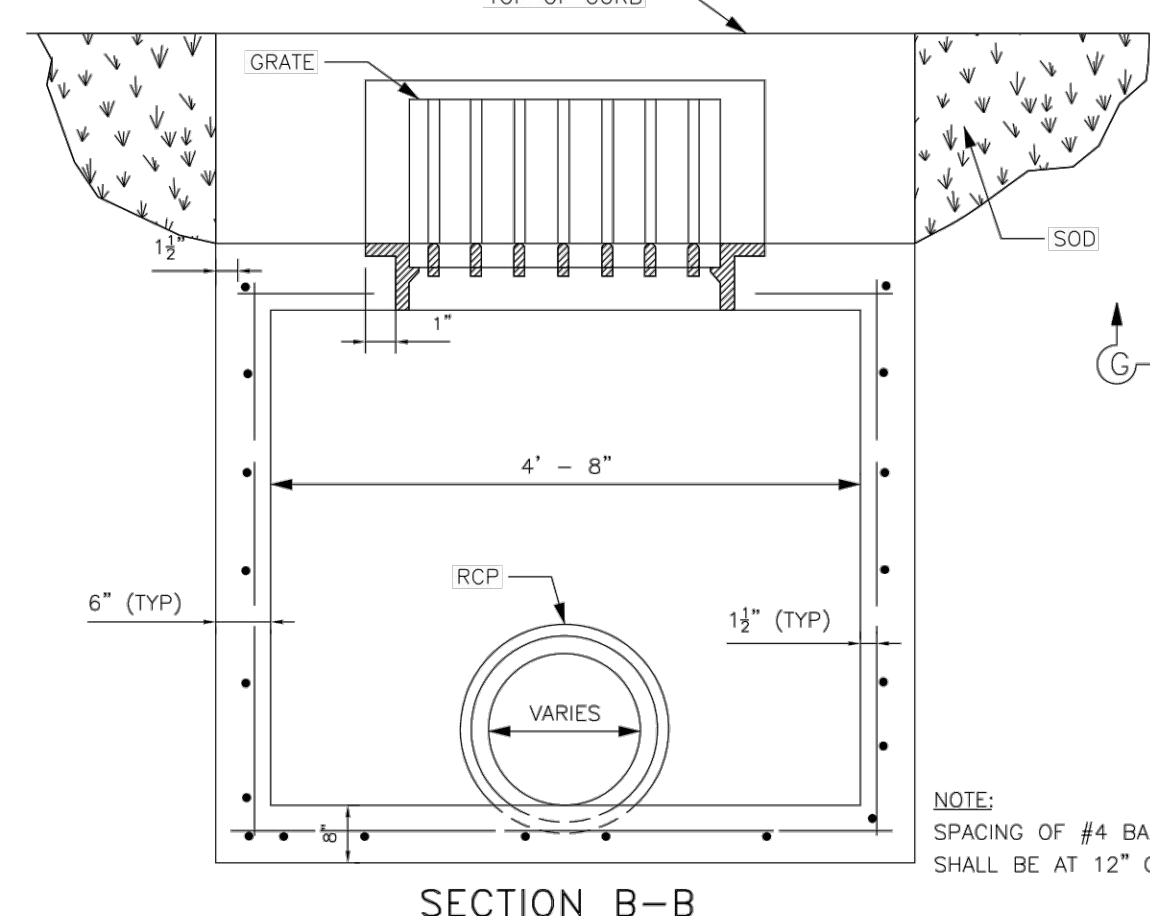
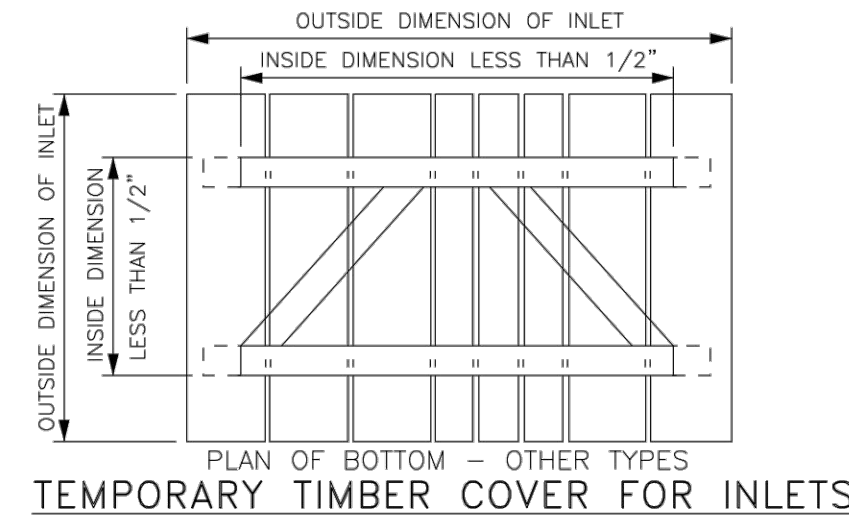
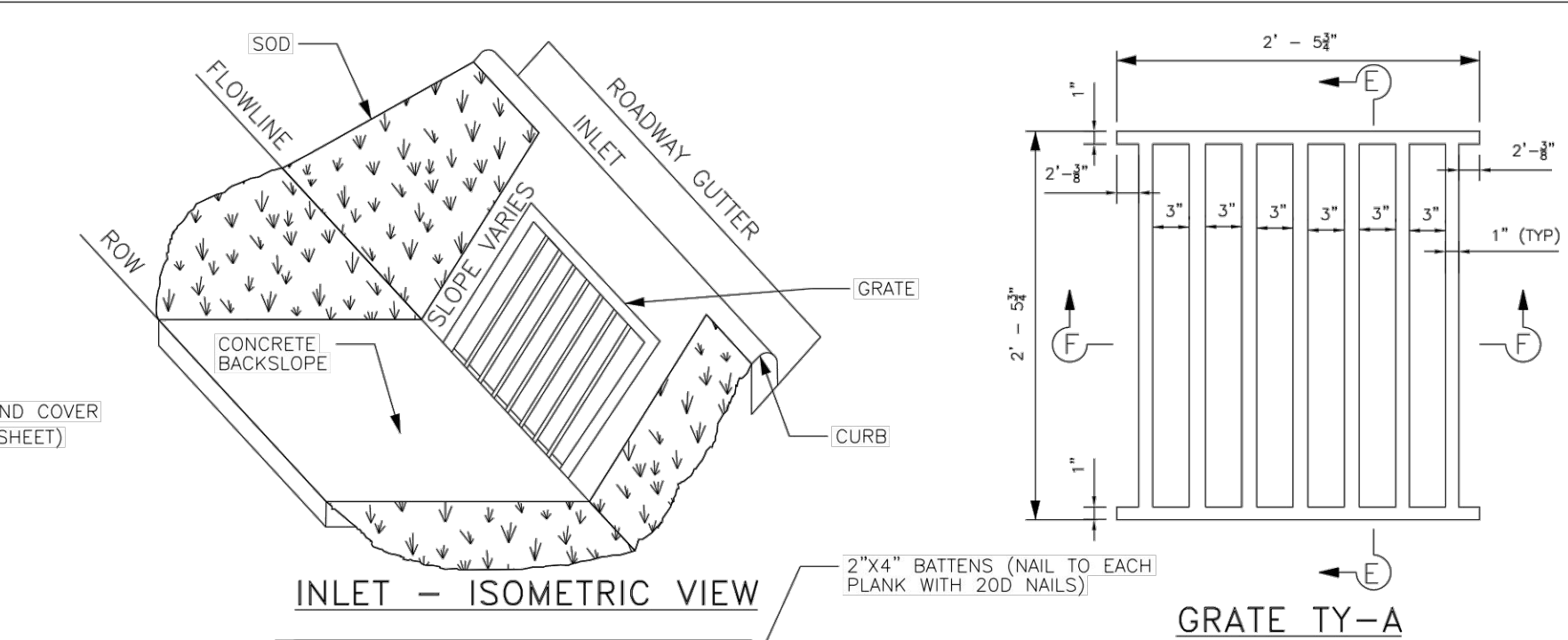
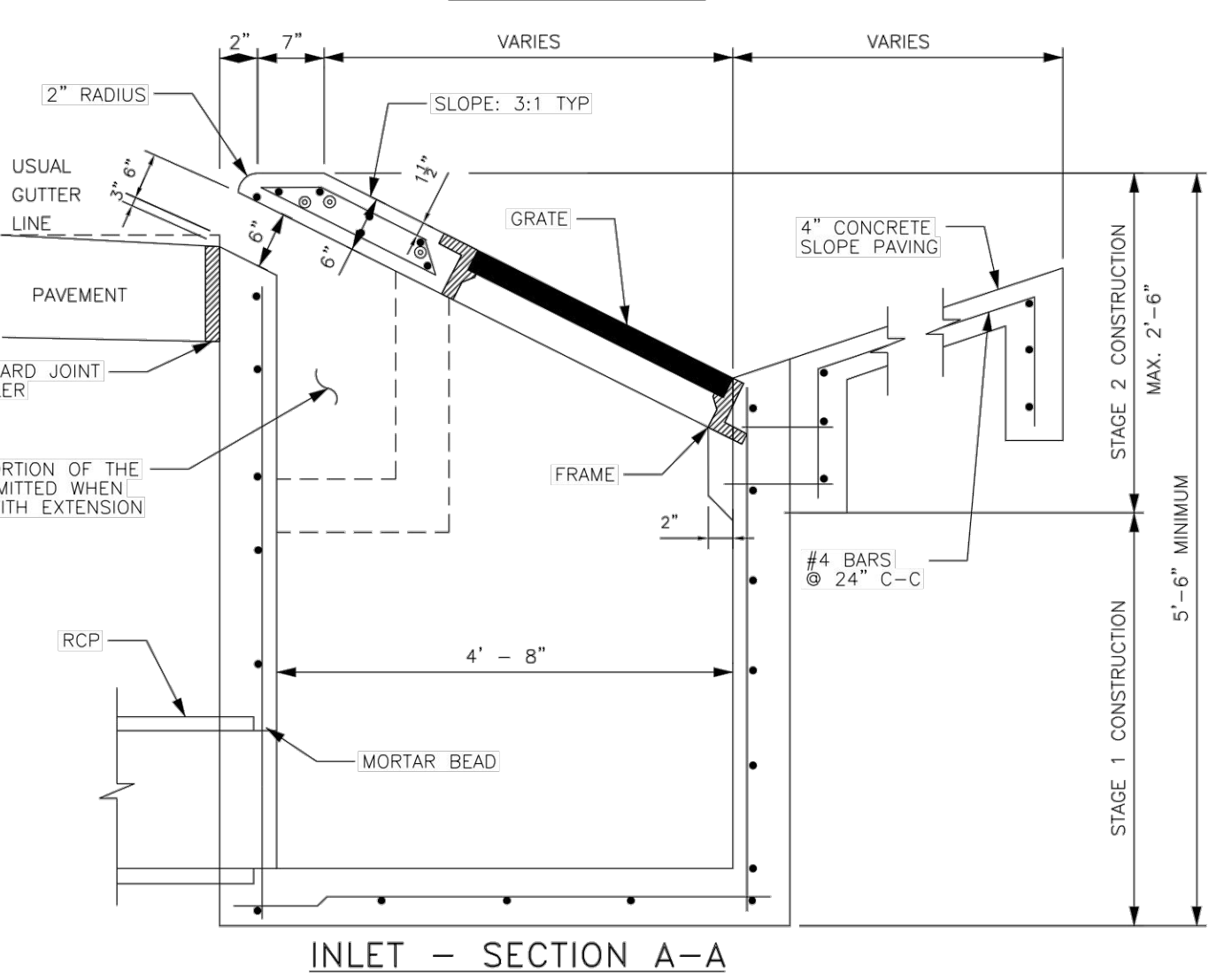
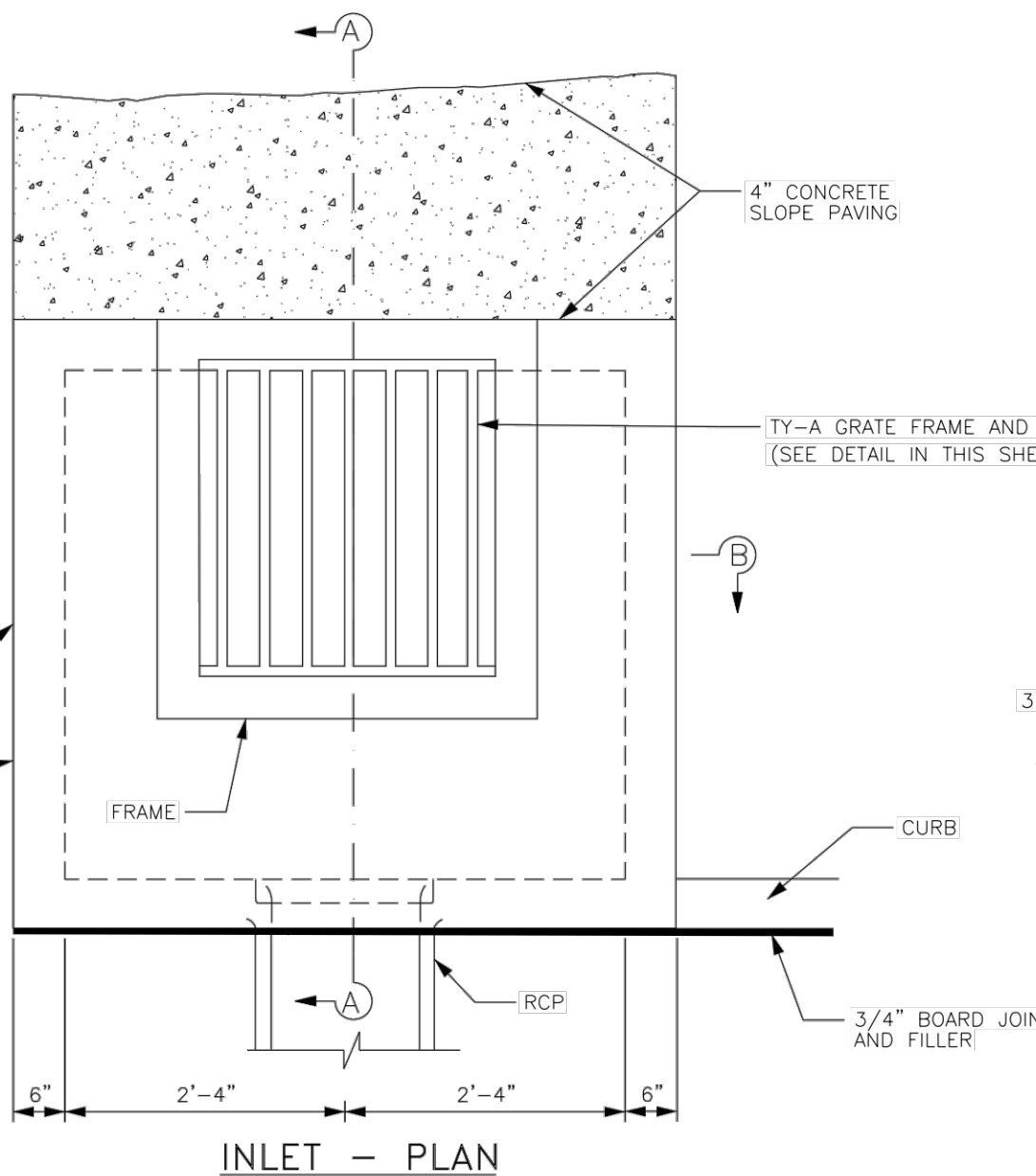
GENERAL NOTES:

- CONSTRUCTION AND MATERIALS SHALL MEET REQUIREMENTS OF HC BID ITEM 472 "INLETS"
- CONCRETE FOR INLET: MINIMUM 4,000 PSI IN 28 DAYS
- PRECAST STRUCTURE TO MEET ASTM
- FRAME AND COVER SHALL BE JORDAN IRON WORKS MODEL V-1814 FRAME AND V-1418 COVER OR APPROVED EQUAL.
- IF THE ENGINEER OF RECORD SPECIFIES A CAST-IN-PLACE INLET, HE/SHE SHALL INCORPORATE A DETAILED DRAWING INTO THE CONTRACT DOCUMENTS. HOWEVER, IF THE CONTRACTOR ELECTS TO CONSTRUCT A CAST-IN-PLACE INLET, THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING A DETAILS DRAWING, SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS.
- SHOP DRAWINGS WILL BE REQUIRED FOR THE PRECAST SECTION OF INLET.
- KNOCK-OUTS ARE NOT PERMISSIBLE FOR THE PRECAST SECTION OF INLET.
- 5'-6" MINIMUM OR AS SPECIFIED BY THE ENGINEER OF RECORD



INLET NOTES:

- TYPE "C": INLET ONLY - NO EXTENSION
- TYPE "C-1": INLET WITH ONE EXTENSION (5'-0" LONG)
- TYPE "C-2": INLET WITH ONE EXTENSION (5'-0" LONG) ON EACH SIDE
- TYPE "C-2A": INLET WITH ONE DOUBLE EXTENSION (10'-0" LONG) ON ONE SIDE
- * FOR TYPE "C-2A" INLETS, PROVIDE A CENTER 6"x6" COLUMN IN THE CURB LINE BETWEEN ALL EXTENSIONS.

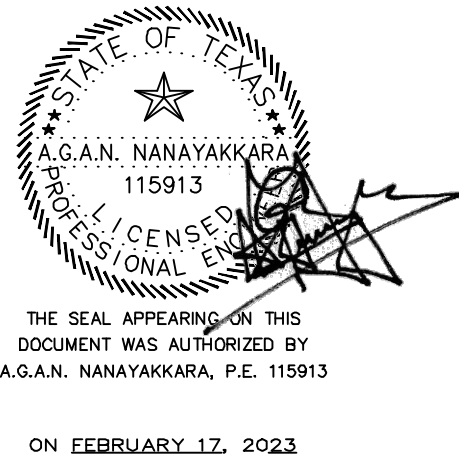


NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	2-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT



PROJECT TITLE:		FBCE STANDARD 28
DRAWN BY: INIT	SHEET DESCRIPTION: TYPE "C MODIFIED" INLET DETAILS	
CR'D BY: INIT	APPROVED BY:	SHEET NO.: /
SCALE: AS NOTED	DATE: 2-1-22	



REV. NO.	DESCRIPTION	DATE	APP.

**BRANDT ROAD
PRECINCT LINE RD TO MASON RD**

MODIFIED TYPE "C" INLET DETAILS

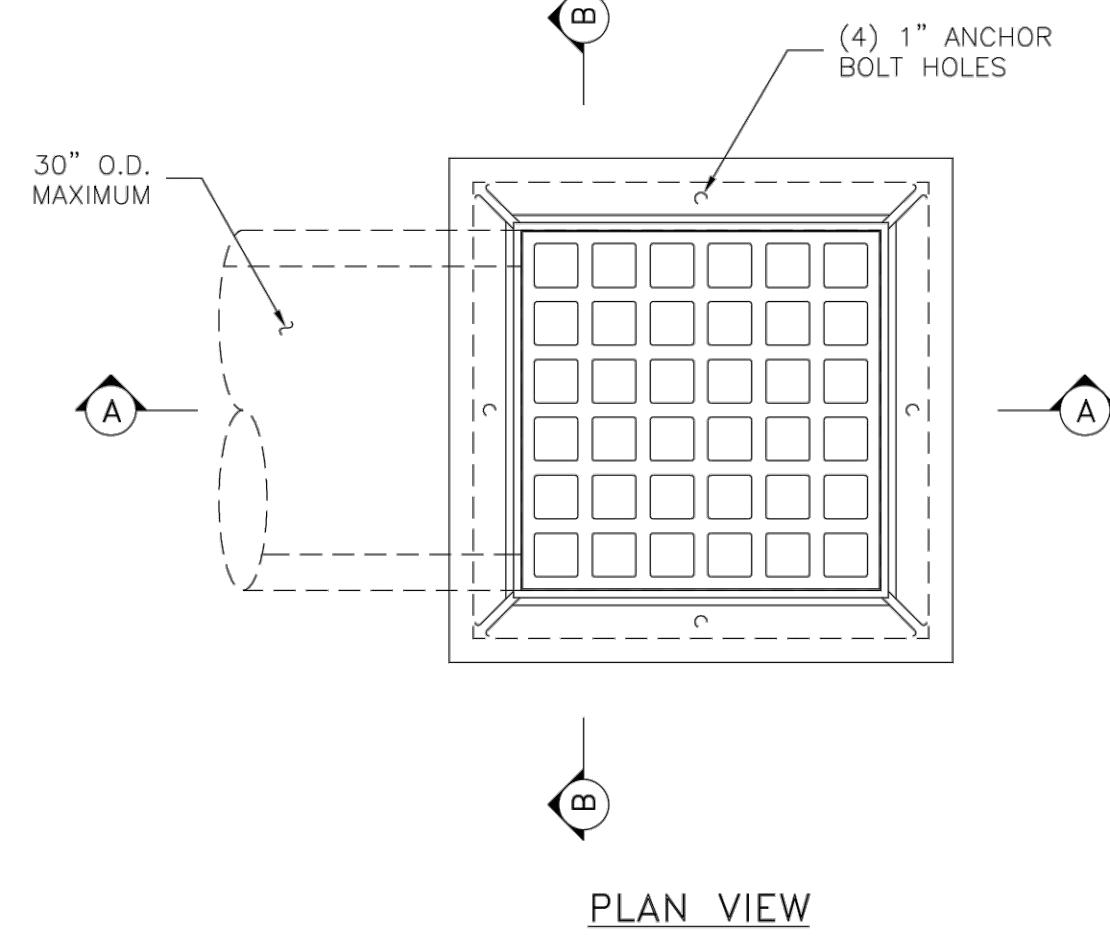
TERRA a Bowman company
1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

JNS ENGINEERS, LLC
722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.B.P.E. FIRM
REGISTRATION NO. 11653

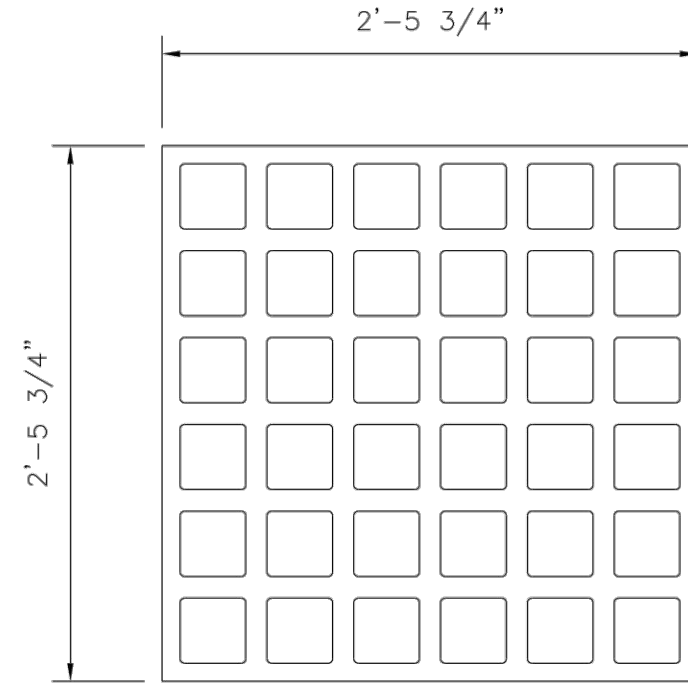
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1
		SHEET SD10

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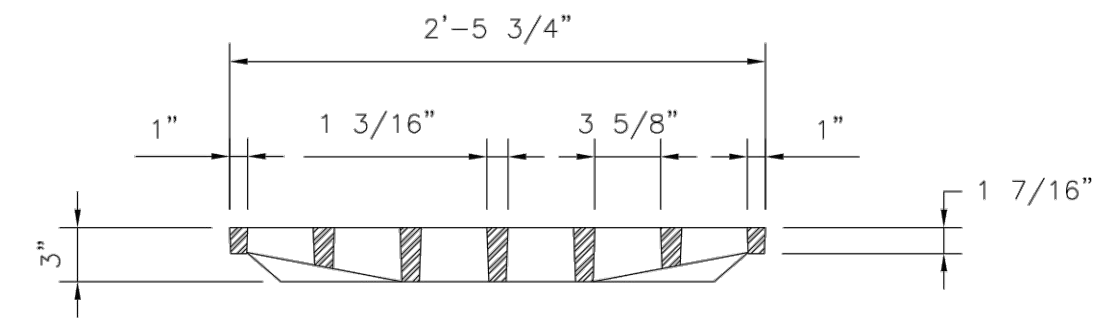
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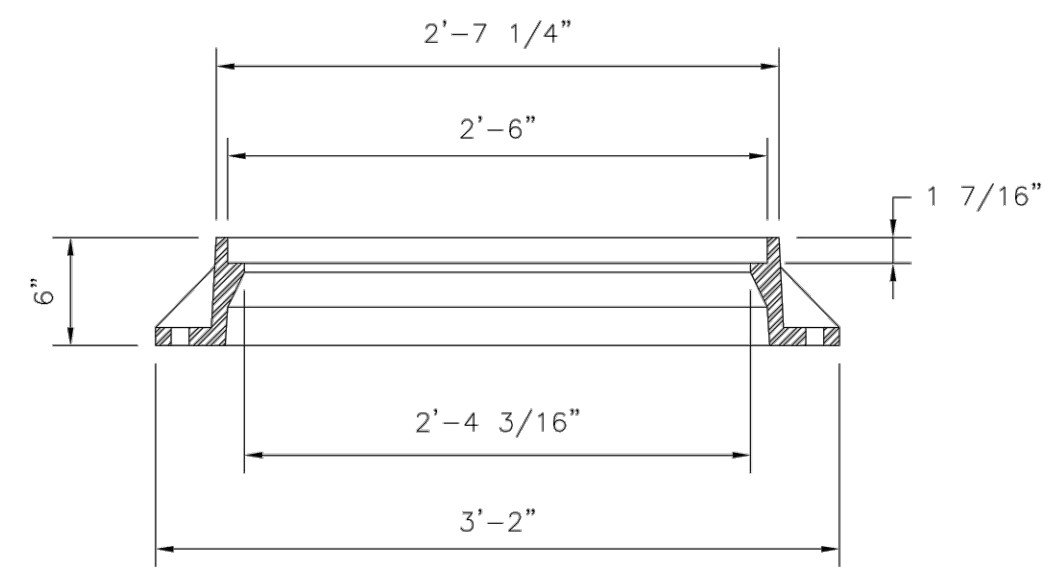
PLAN VIEW



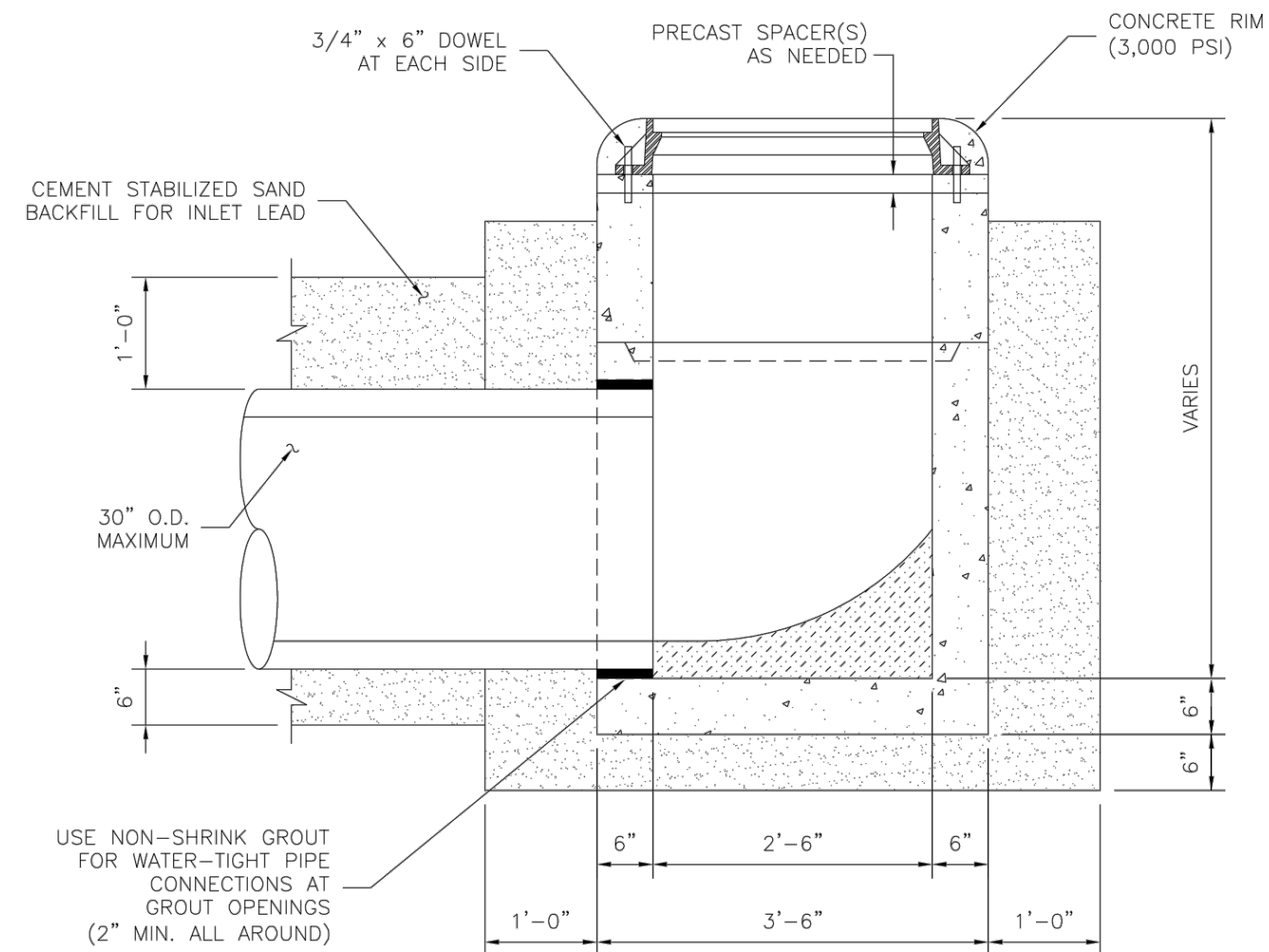
GRATE PLAN VIEW



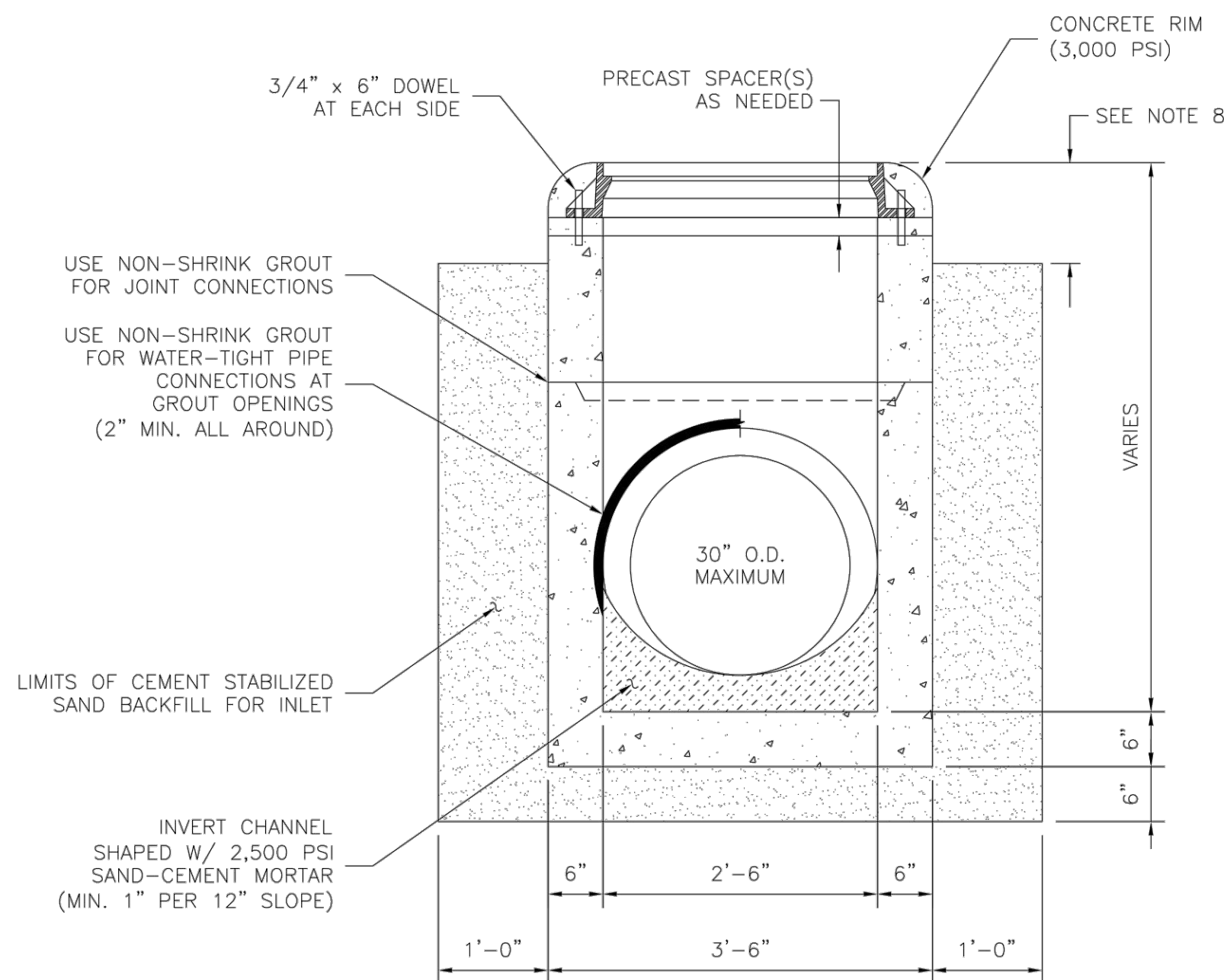
GRATE SECTION A-A



FRAME SECTION A-A



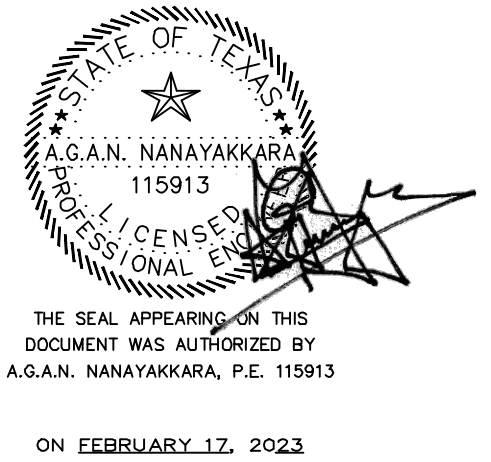
SECTION A-A



SECTION B-B

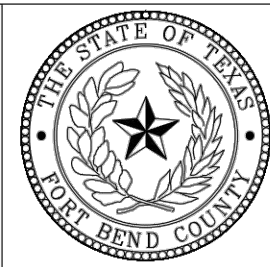
GENERAL NOTES:

1. CONSTRUCTION AND MATERIALS SHALL MEET REQUIREMENTS OF ITEM 472 "INLETS".
2. CONCRETE FOR INLET: MINIMUM 4,000 PSI IN 28 DAYS
3. PRECAST STRUCTURE TO MEET ASTM C913
4. FRAME AND GRATE SHALL BE EAST JORDAN IRON WORKS MODEL V-4880-1 (OPEN AREA 473 SQ. IN.) OR APPROVED EQUAL.
5. IF THE ENGINEER OF RECORD SPECIFIES A CAST-IN-PLACE INLET, HE/SHE SHALL INCORPORATE A DETAILED DRAWING INTO THE CONTRACT DOCUMENTS. HOWEVER, IF THE CONTRACTOR ELECTS TO CONSTRUCT A CAST-IN-PLACE INLET, THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING A DETAILED DRAWING, SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS.
6. SHOP DRAWINGS SHALL BE REQUIRED FOR PRECAST CONSTRUCTION OF INLET.
7. KNOCK-OUTS ARE NOT PERMISSIBLE FOR PRECAST CONSTRUCTION OF INLET.
8. CEMENT STABILIZED SAND SHALL EXTEND TO THE BOTTOM OF PAVEMENT OR SLOPE PAVING, OR 12 INCHES BELOW THE SURFACE IF INLET IS LOCATED IN AN UNPAVED AREA.



NO.	REVISIONS	DATE	NAME
▲	ORIGINAL STANDARD ISSUED	2-1-22	RJS
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FORT BEND COUNTY
ENGINEERING DEPARTMENT

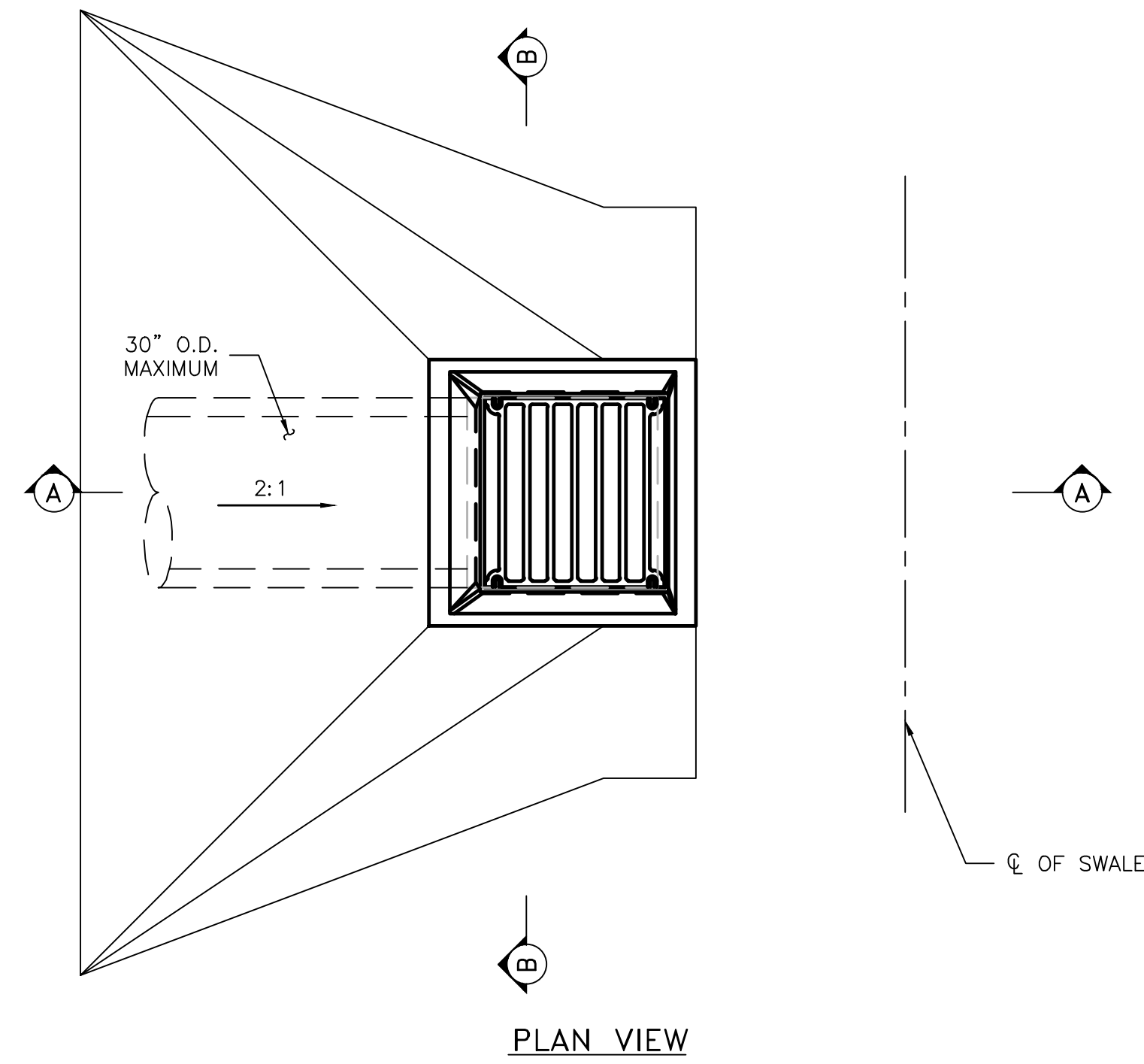


PROJECT TITLE:		
DRAWN BY:	INIT	FBCEC STANDARD
CR'D BY:	INIT	22
SCALE:	SHEET DESCRIPTION: TYPE "A" INLET DETAILS	
DATE:	FOR MAXIMUM 30" O.D. PIPE	
	APPROVED BY:	SHEET NO: /

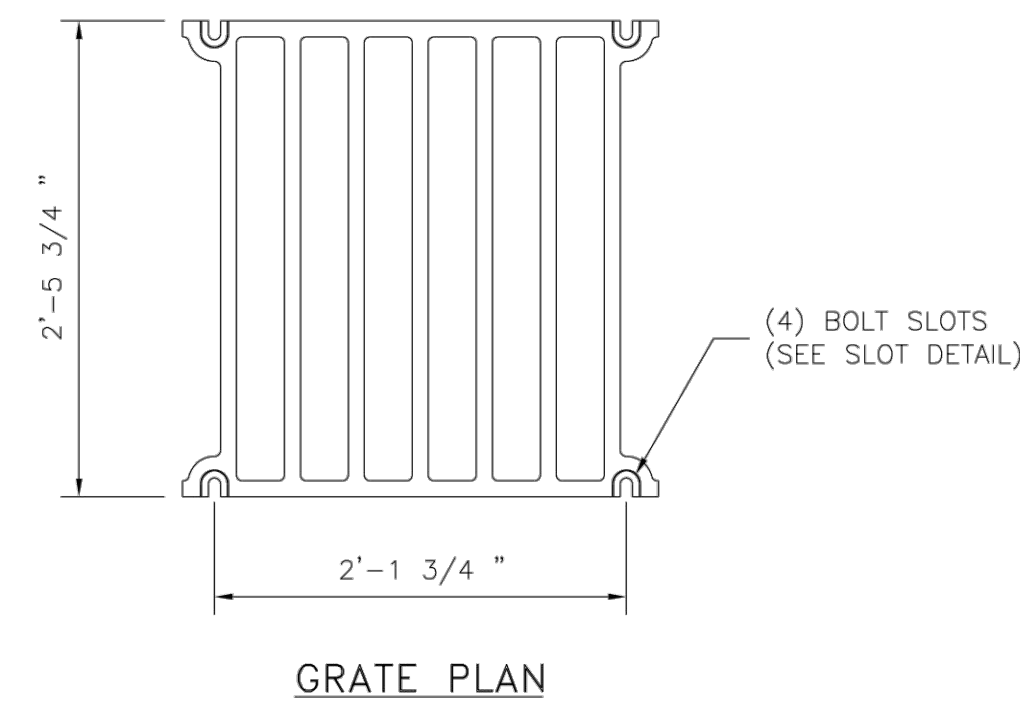
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TYPE "A" INLET DETAILS			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SD11	

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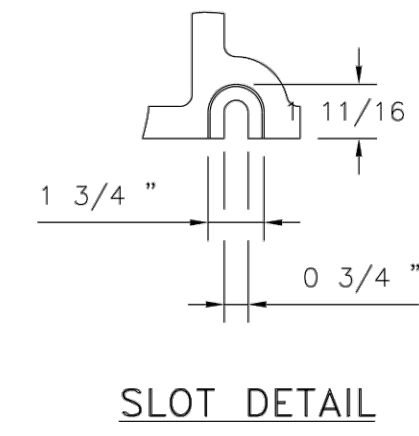
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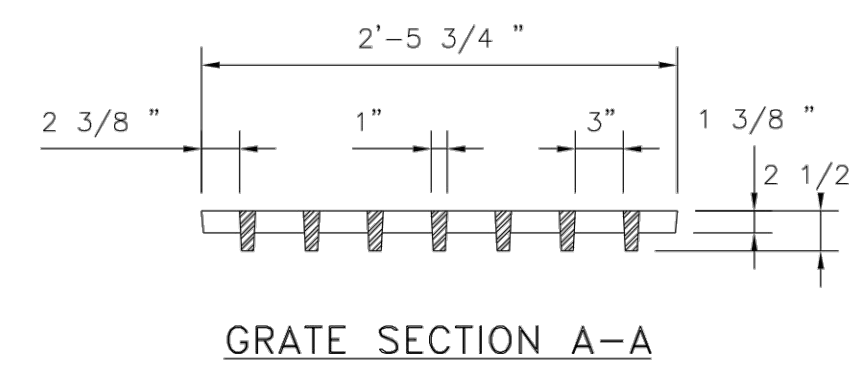
PLAN VIEW



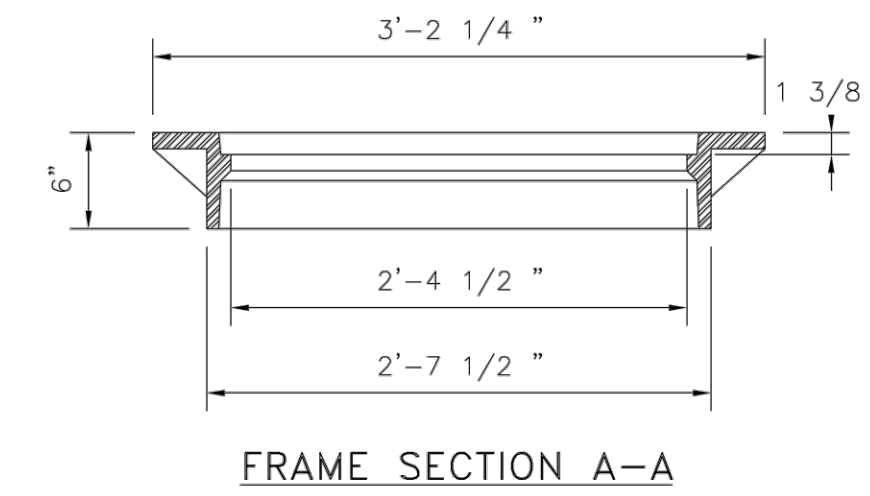
GRATE PLAN



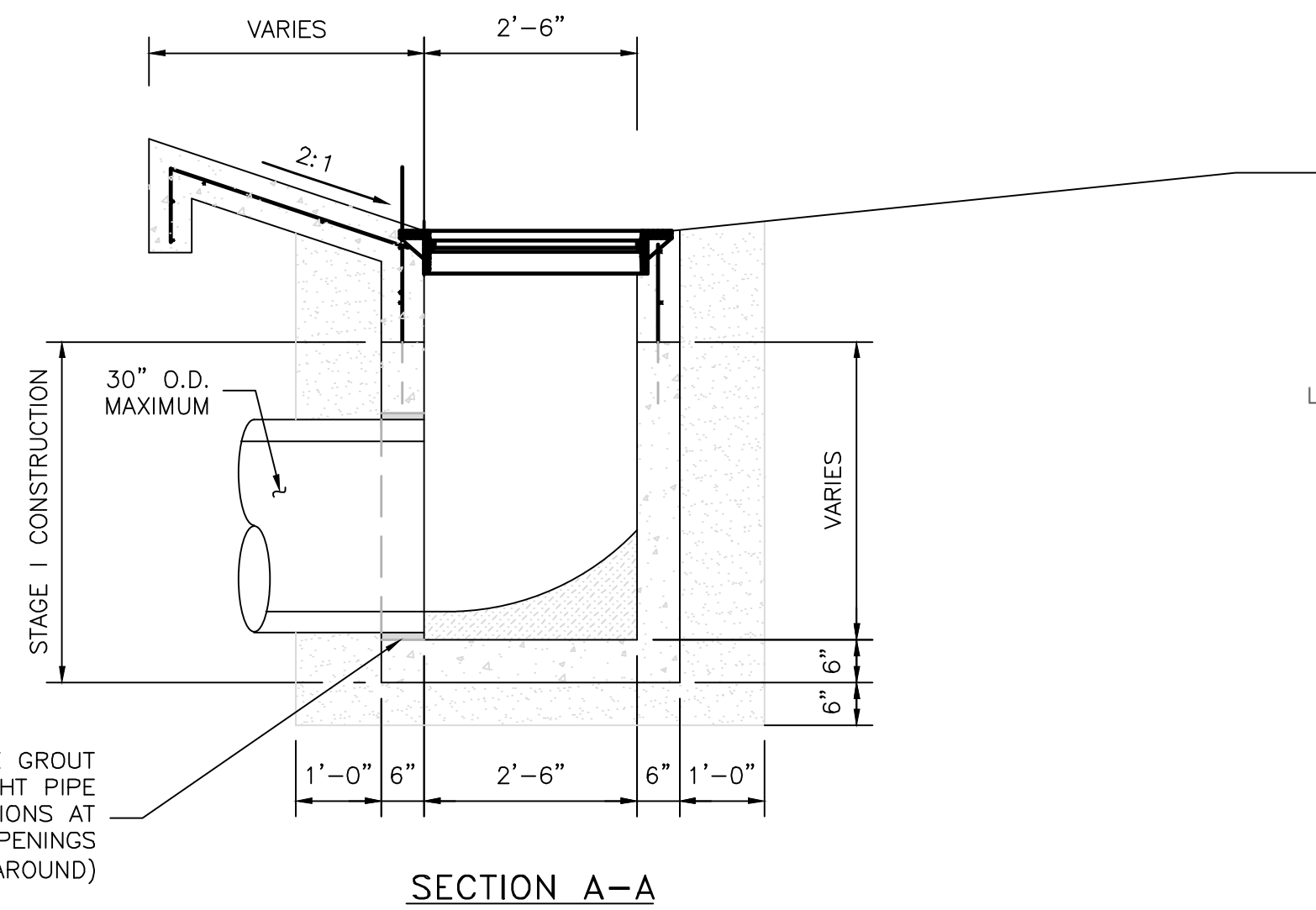
SLOT DETAIL



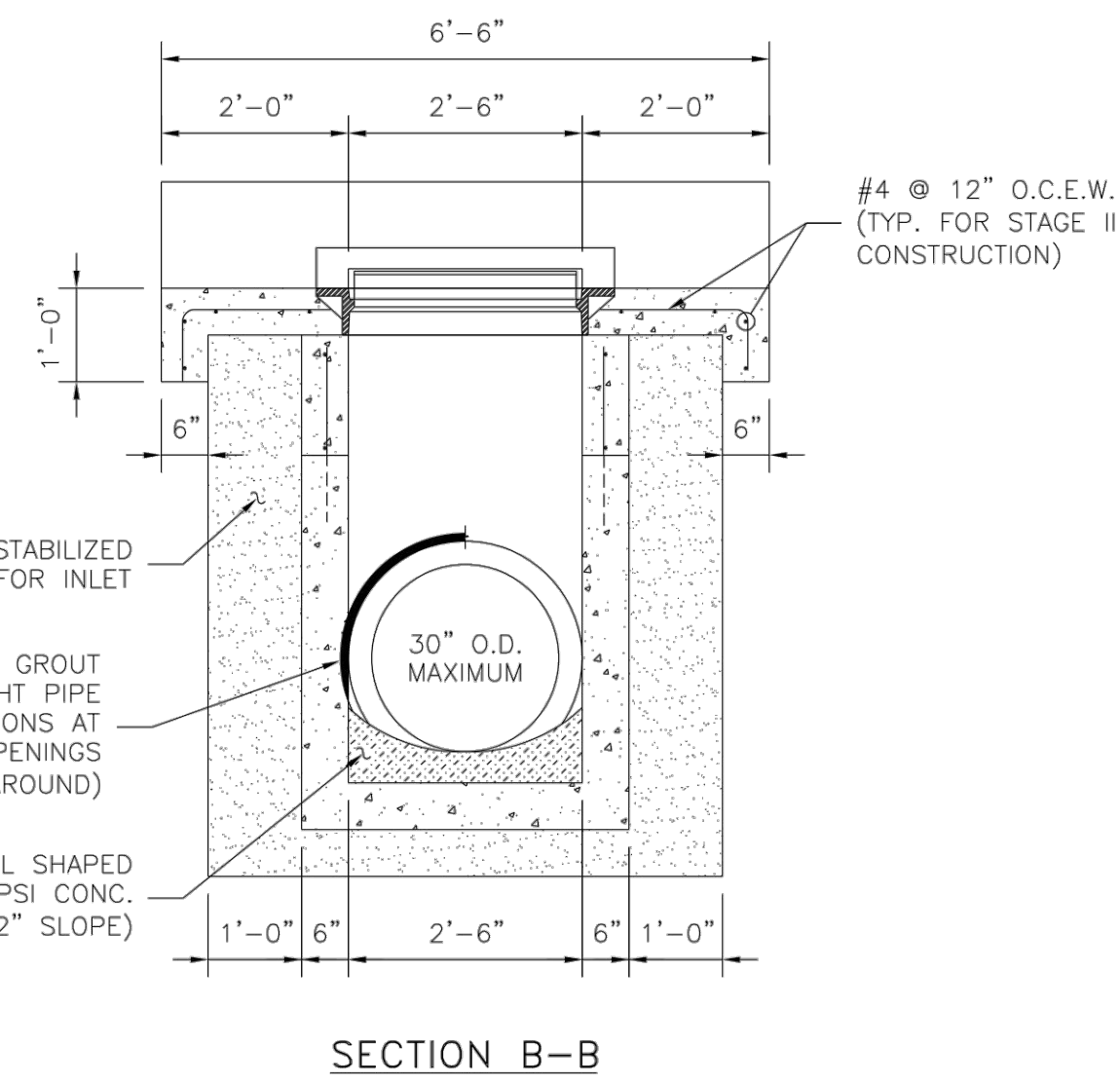
GRATE SECTION A-A



FRAME SECTION A-A



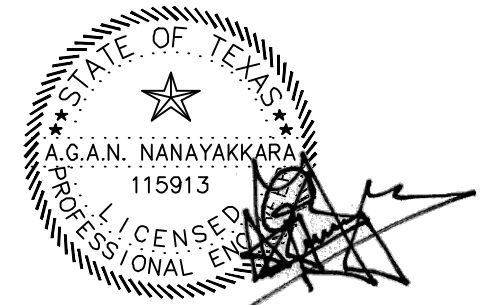
SECTION A-A



SECTION B-B

GENERAL NOTES:

- CONSTRUCTION AND MATERIALS SHALL MEET REQUIREMENTS OF ITEM 472 "INLETS"
- CONCRETE: MINIMUM 4,000 PSI IN 28 DAYS
- PRECAST STRUCTURE TO MEET ASTM C913.
- FRAME AND GRATE SHALL BE EAST JORDAN IRON WORKS MODEL V-4882-3 FRAME AND V-4880-2 GRATE WITH (4) BOLT SLOT GRATE OR APPROVED EQUAL.
- IF THE ENGINEER OF RECORD SPECIFIES A CAST-IN-PLACE INLET; HE/SHE SHALL INCORPORATE A DETAILED DRAWING INTO THE CONTRACT DOCUMENTS. HOWEVER, IF THE CONTRACTOR ELECTS TO CONSTRUCT A CAST-IN-PLACE INLET, THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING A DETAILED DRAWING, SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS.
- USE PRECAST UNITS FOR STAGE I CONSTRUCTION. CAST IN PLACE MAY BE REQUIRED DURING STAGE II CONSTRUCTION. SHOP DRAWINGS WILL BE REQUIRED FOR PRECAST CONSTRUCTION OF INLET.
- KNOCK-OUTS ARE NOT PERMISSIBLE FOR PRECAST CONSTRUCTION OF INLET.
- CONCRETE SLOPE PAVING SHALL CONFORM TO ITEM 491 "REINFORCED CONCRETE SLOPE PAVING", BUT IS INCIDENTAL TO THE INLET.
- STAGE I OF THE INLET SHALL BE PRECAST. STAGE II SHALL BE CAST-IN-PLACE.
- MINIMUM CLEARANCE FOR REINFORCING STEEL IN SLOPE PAVING SHALL BE TWO INCHES.



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913

ON FEBRUARY 17, 2023

NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	2-1-22	RJS

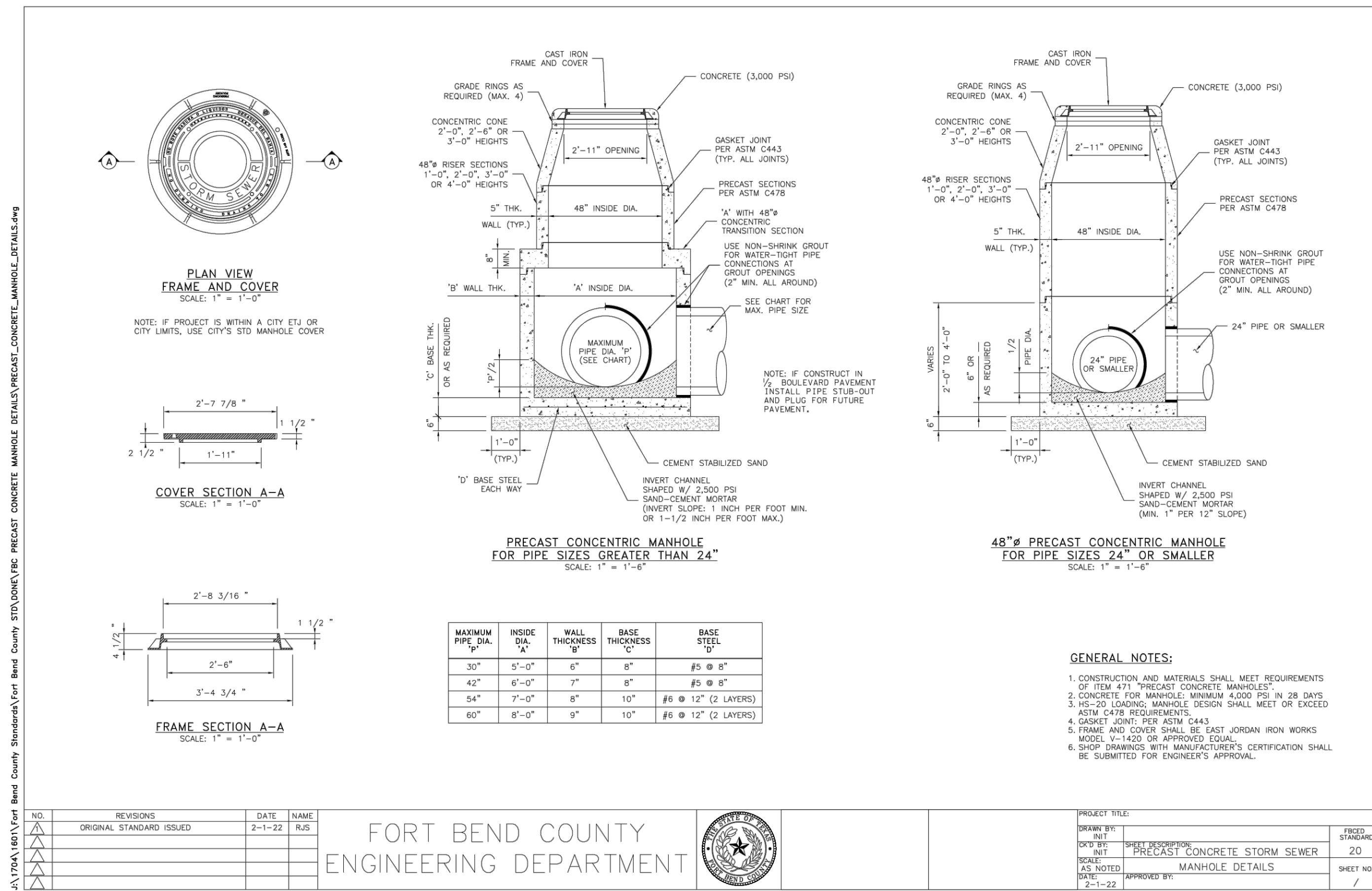
FORT BEND COUNTY
ENGINEERING DEPARTMENT



PROJECT TITLE:

DRAWN BY: INIT	FBCD STANDARD
CK'D BY: INIT	23
SCALE: 1"=1'-6"	SHEET NO: /
DATE: 2-1-22	APPROVED BY:

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
MODIFIED TYPE "A" INLET DETAILS			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SD12	

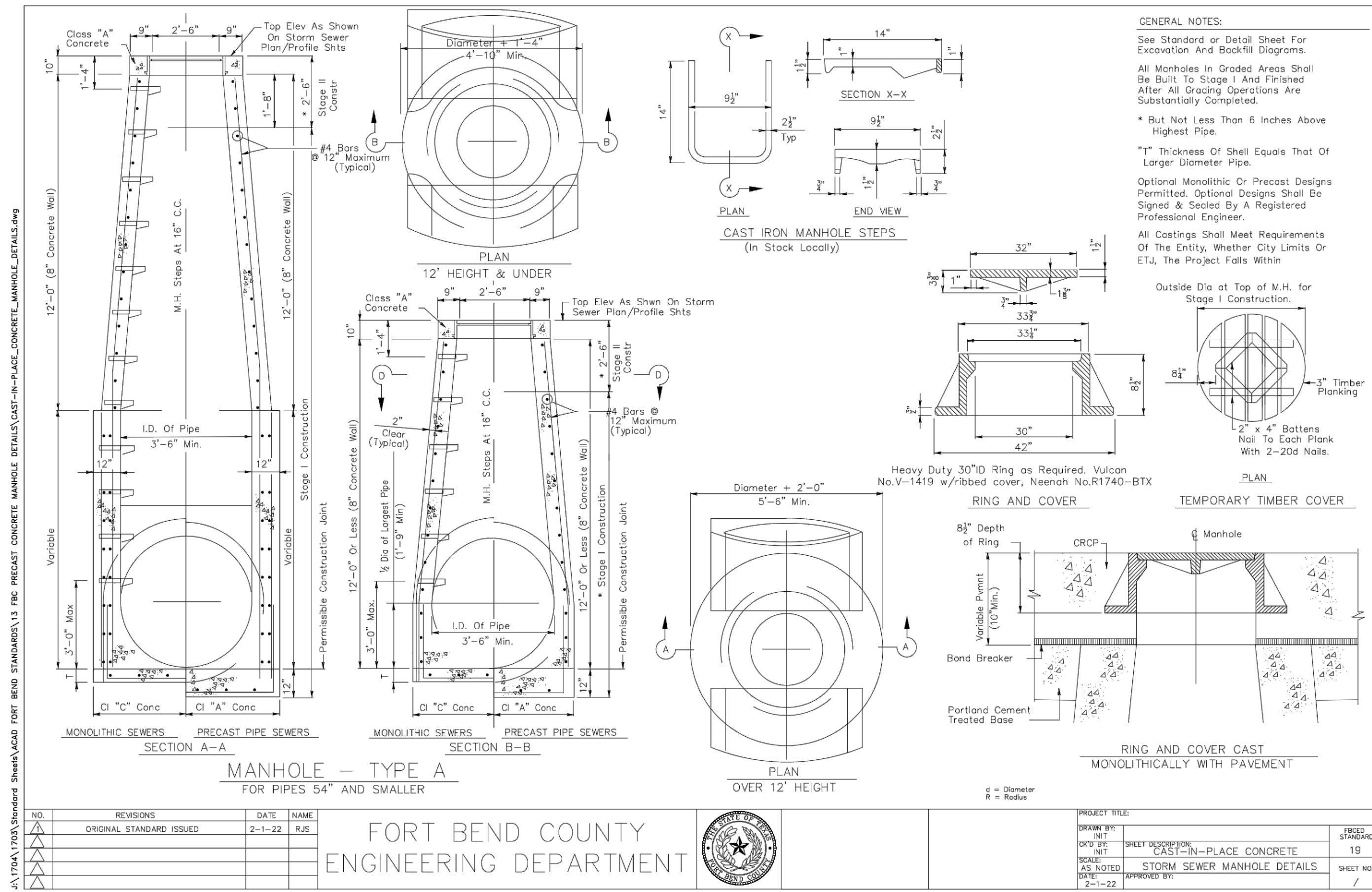


NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	2-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT



PROJECT TITLE	DRAWN BY	CHECKED BY	DATE	REVISED STANDARD	SHEET NO.
PRECAST CONCRETE STORM SEWER MANHOLE DETAILS	INT	INT	2-1-22	20	/

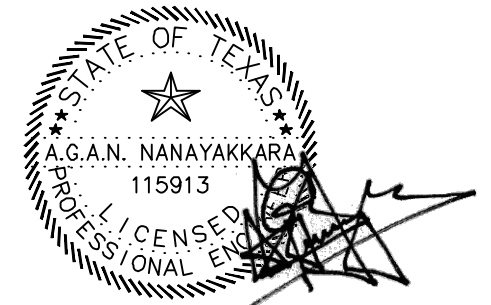


NO.	REVISIONS	DATE	NAME
1	ORIGINAL STANDARD ISSUED	2-1-22	RJS

FORT BEND COUNTY
ENGINEERING DEPARTMENT



PROJECT TITLE	DRAWN BY	CHECKED BY	DATE	REVISED STANDARD	SHEET NO.
CAST-IN-PLACE CONCRETE STORM SEWER MANHOLE DETAILS	INT	INT	2-1-22	19	/



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913
ON FEBRUARY 17, 2023

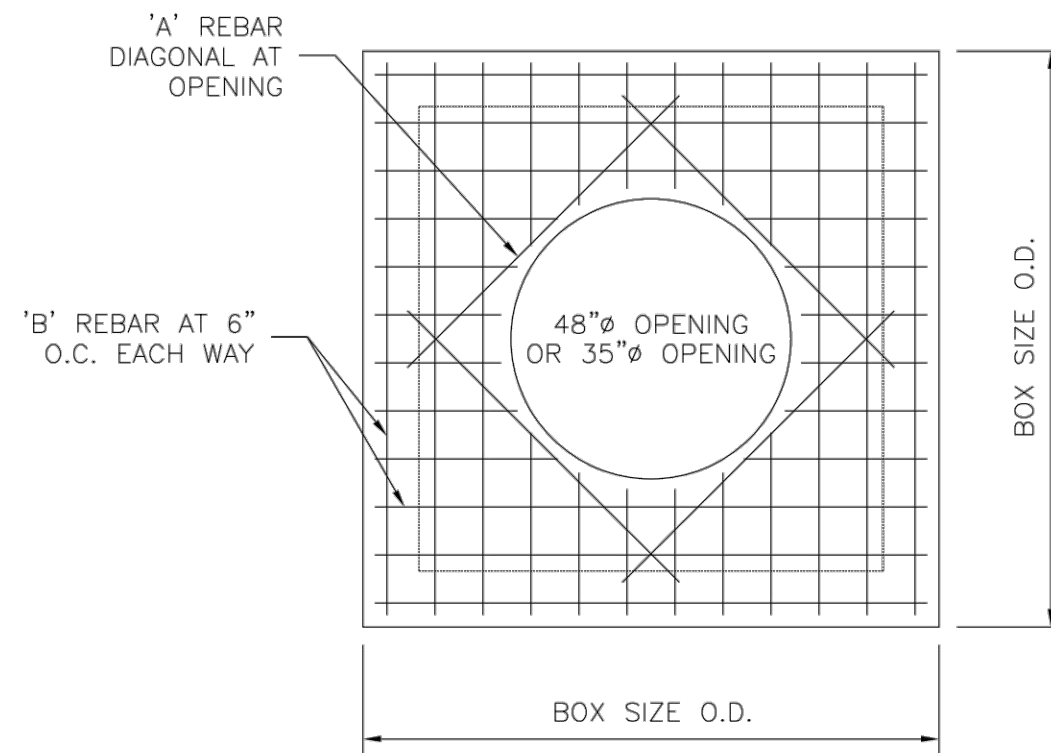
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD PRECAST CONCRETE STORM SEWER MANHOLE DETAILS			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801	CONTRACT: SD13
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SD13	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road\Drawings\Seg 2\SD14 Junction Box MANHOLE DETAILS.dwg Feb 17, 2023-11:45am Terra Associates Inc., Thanh Dao

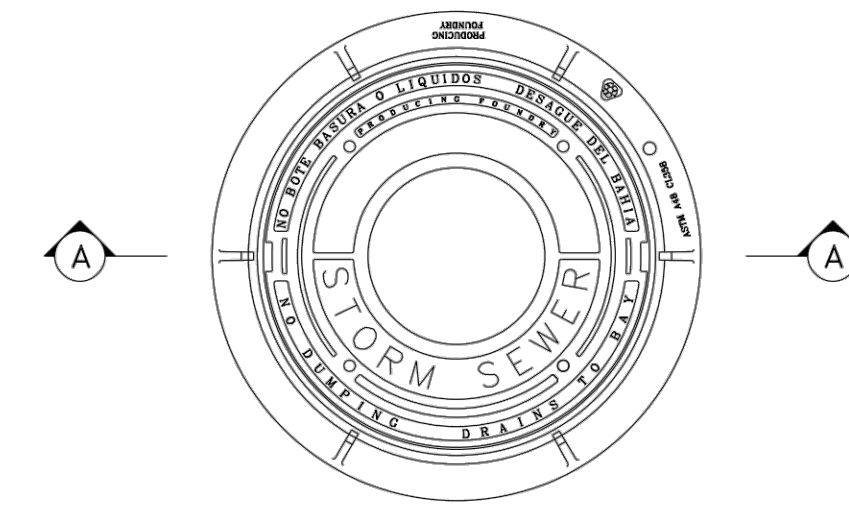
J:\1704\160\Fort Bend County Standards\Fort Bend County STD\DONE\FBC PRECAST CONCRETE MANHOLE DETAIL\PRECAST_CONCRETE_JUNCTION_BOX_MANHOLE_DETAILS.dwg

BOX SIZE I.D.	MAX. OPENING SIZE	FLAT SLAB THK.	WALL THK.	BASE THK.	BAR 'A'	BAR 'B'	BAR 'C'	*BAR 'D'
4'x4'	48"	8"	6"	6"	#4	#4	#4	#4
5'x5'	60"	10"	6"	8"	#5	#5	#4	#4
6'x6'	72"	10"	8"	8"	#5	#5	#5	#5
7'x7'	84"	10"	8"	8"	#5	#5	#5	#5
8'x8'	96"	10"	8"	8"	#5	#5	#5	#5

* FOR 7'x7' AND 8'x8' BOX SIZE: TWO LAYERS OF STEEL REQUIRED. (FOR DEPTHS GREATER THAN 15')

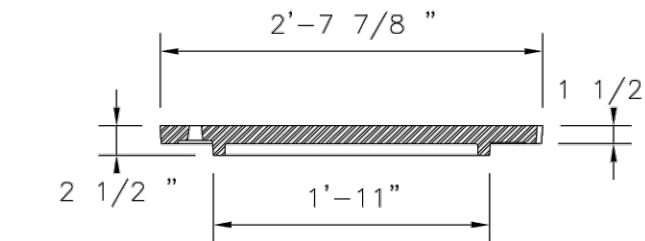


PLAN VIEW
FLAT SLAB WITH OPENING
SCALE: 1"=1'-6"

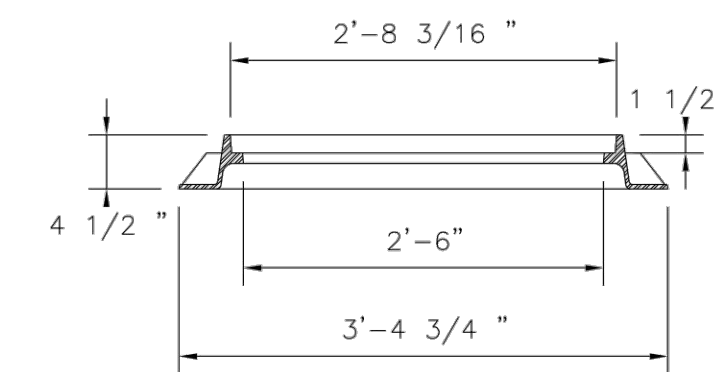


PLAN VIEW
FRAME AND COVER
SCALE: 1"=1'-0"

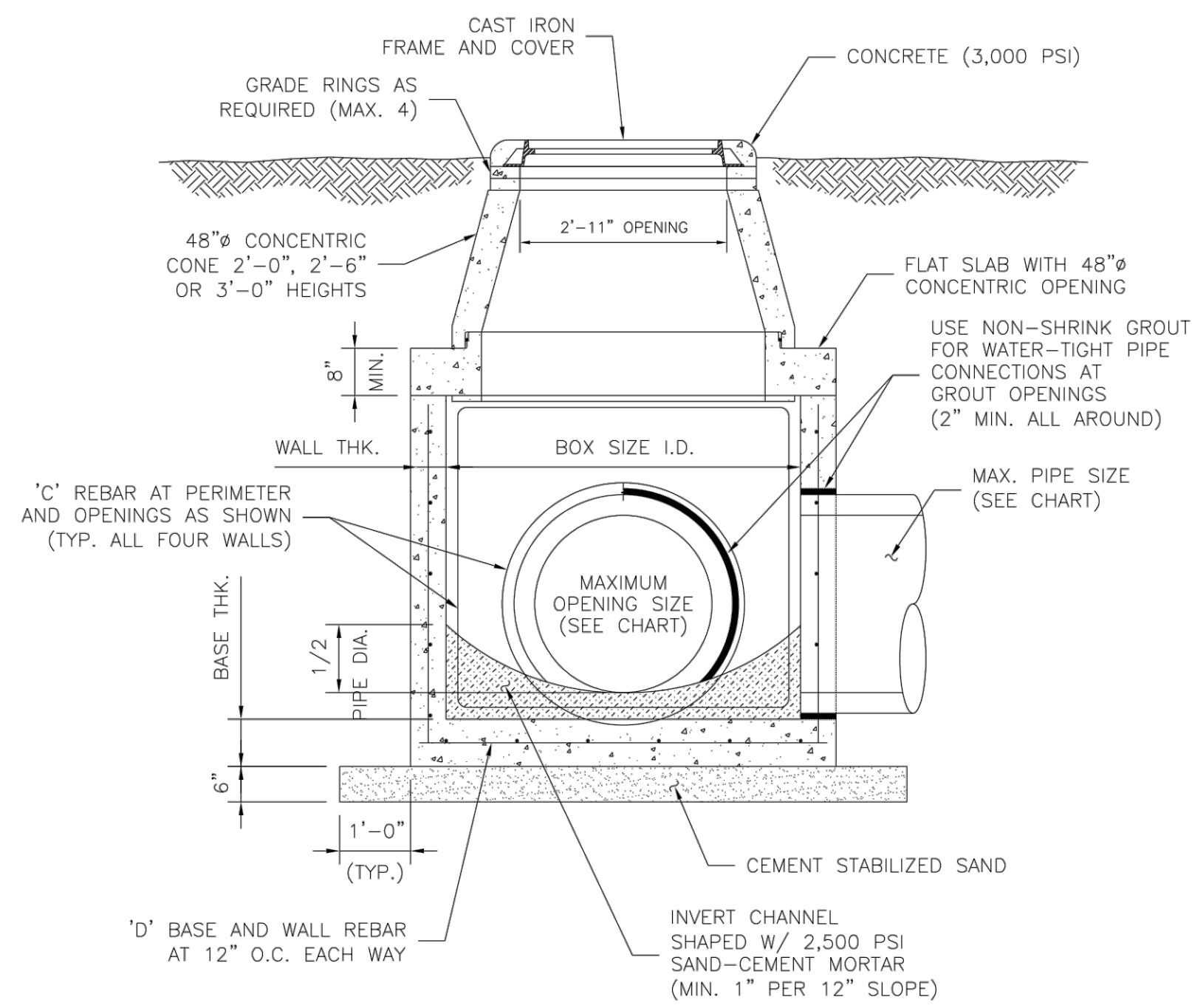
NOTE: IF PROJECT IS WITHIN A CITY ETJ
USE CITY'S STD MANHOLE COVER



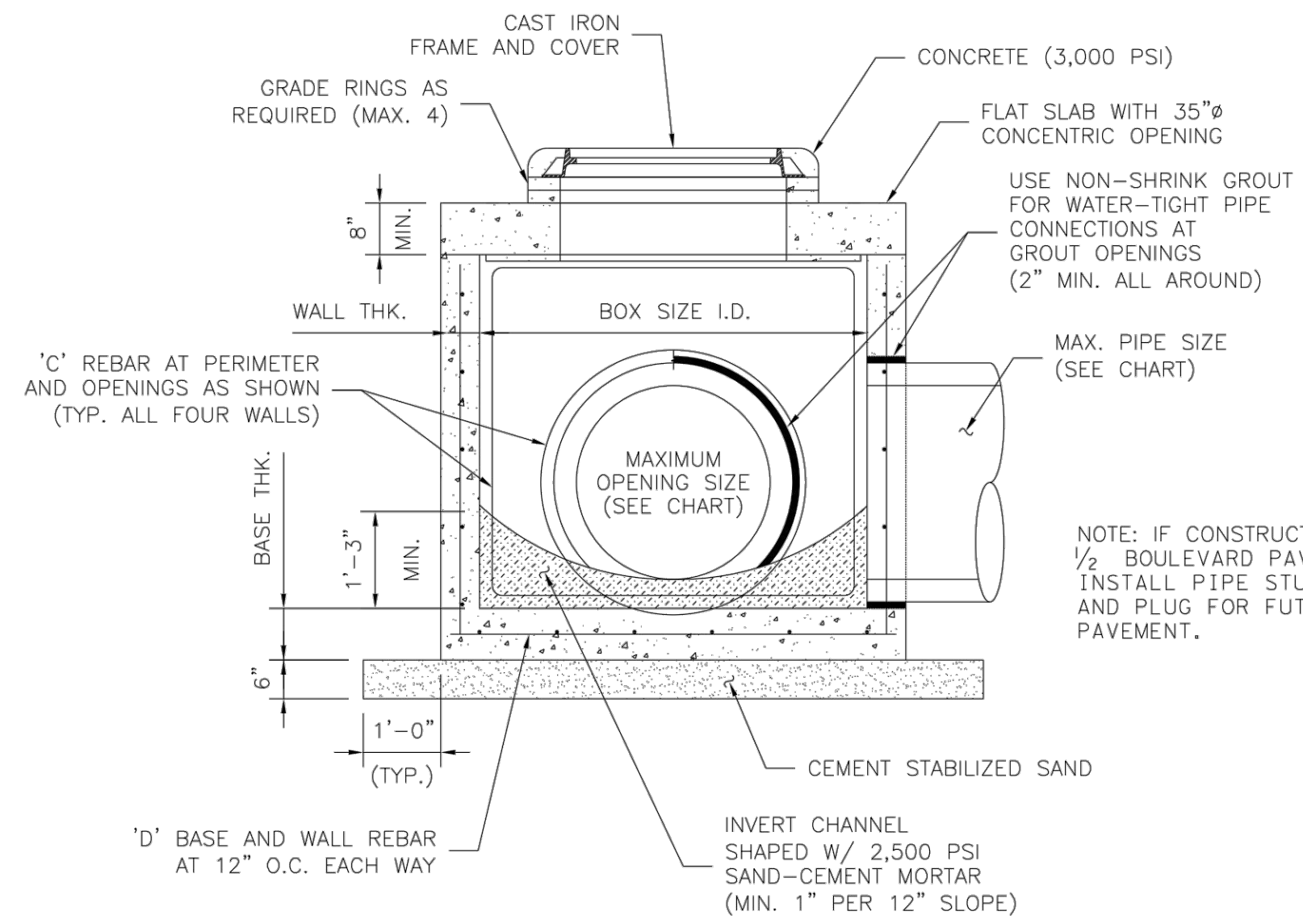
COVER SECTION A-A
SCALE: 1"=1'-0"



FRAME SECTION A-A
SCALE: 1"=1'-0"



JUNCTION BOX/MANHOLE
WITH CONCENTRIC CONE
SCALE: 1"=1'-6"

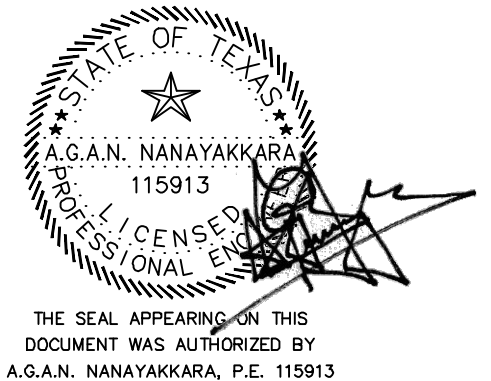


JUNCTION BOX/MANHOLE
WITH FLAT SLAB
SCALE: 1"=1'-6"

NOTE: IF CONSTRUCT IN
1/2 BOULEVARD PAVEMENT
INSTALL PIPE STUB-OUT
AND PLUG FOR FUTURE
PAVEMENT.

GENERAL NOTES:

- CONSTRUCTION AND MATERIALS SHALL MEET REQUIREMENTS OF ITEM 471 "PRECAST CONCRETE MANHOLES".
- CONCRETE FOR JUNCTION BOX: MINIMUM 4,000 PSI IN 28 DAYS
- HS-20 LOADING; MANHOLE DESIGN SHALL MEET OR EXCEED ASTM C478 AND ASTM C913 REQUIREMENTS.
- JOINT SEALANT: RAM-NEK GASKET MATERIAL
- FRAME AND COVER SHALL BE EAST JORDAN IRON WORKS MODEL V-1420 OR APPROVED EQUAL.
- SHOP DRAWINGS WITH MANUFACTURER'S CERTIFICATION SHALL BE SUBMITTED FOR ENGINEER'S APPROVAL.



ON FEBRUARY 17, 2023

NO.	REVISIONS	DATE	NAME
▲	ORIGINAL STANDARD ISSUED	2-1-22	RJS
▲			
▲			
▲			

FORT BEND COUNTY
ENGINEERING DEPARTMENT



PROJECT TITLE:		
DRAWN BY:	INIT	FBCED STANDARD
CK'D BY:	INIT	21
SCALE:	AS NOTED	SHEET NO:
DATE:	2-1-22	/

REV. NO.	DESCRIPTION	DATE	APP.

**BRANDT ROAD
PRECINCT LINE RD TO MASON RD**

JUNCTION BOX / MANHOLE DETAILS

TERRA a Bowman company
1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

JNS ENGINEERS, LLC
722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.B.P.E. FIRM
REGISTRATION NO. 11653

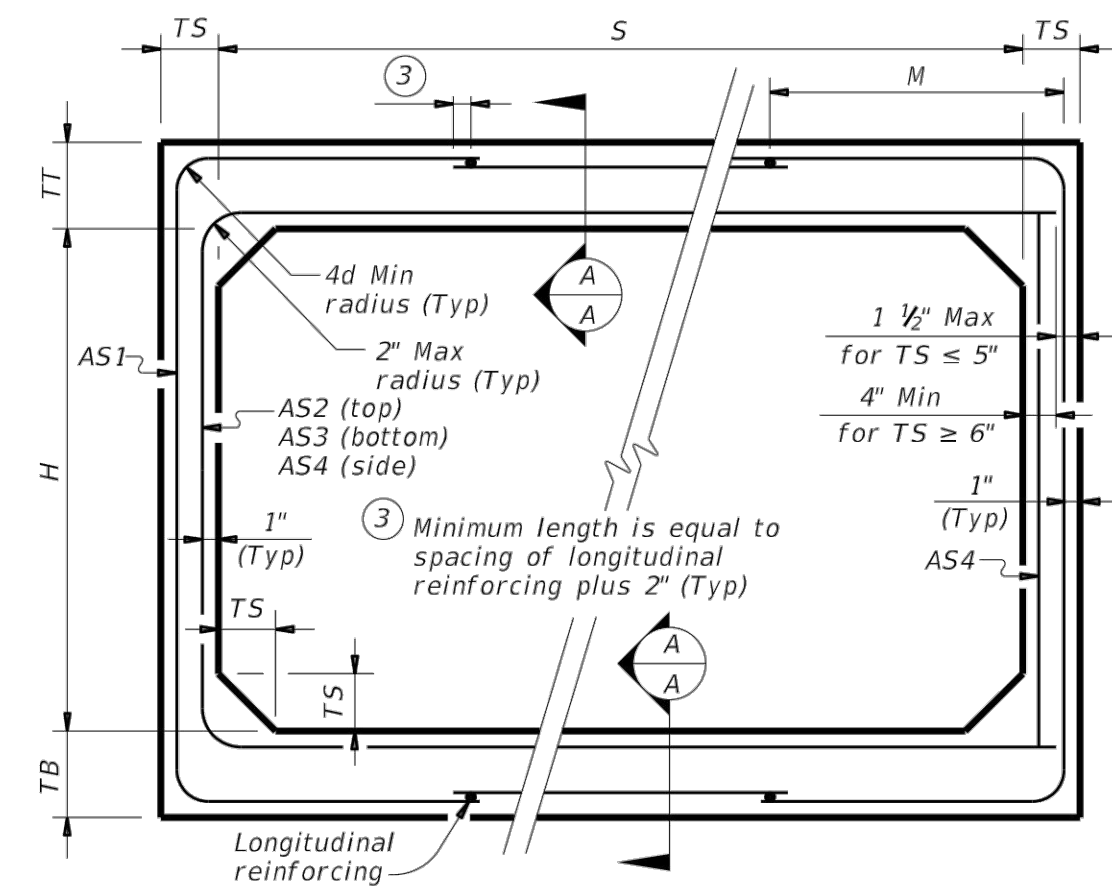
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1
		SHEET SD14

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DATE: FILE:

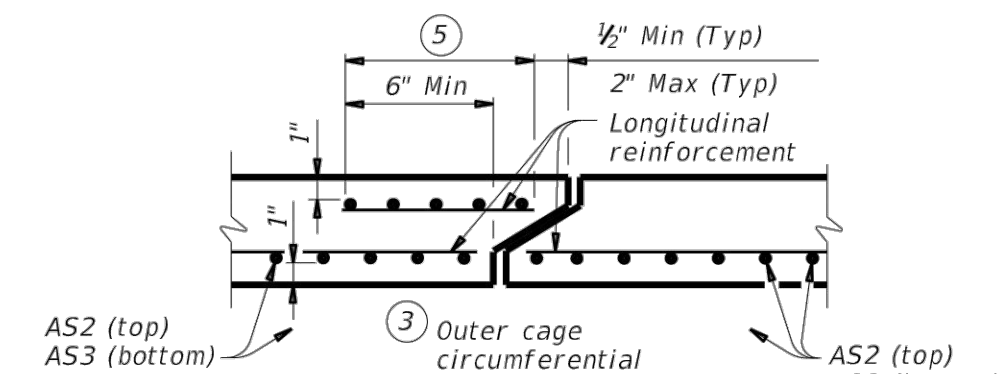
BOX DATA															
SECTION DIMENSIONS					Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) ⁽²⁾								Lift Weight (tons) ⁽¹⁾
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8		
3	2	7	6	4	< 2	-	0.17	0.25	0.16	0.10	0.17	0.17	0.14	3.3	
3	2	4	4	4	2 < 3	31	0.13	0.19	0.18	0.10	-	-	-	2.4	
3	2	4	4	4	3 - 5	31	0.10	0.11	0.12	0.10	-	-	-	2.4	
3	2	4	4	4	10	31	0.10	0.10	0.10	0.10	-	-	-	2.4	
3	2	4	4	4	15	31	0.10	0.13	0.13	0.10	-	-	-	2.4	
3	2	4	4	4	20	31	0.11	0.17	0.17	0.10	-	-	-	2.4	
3	2	4	4	4	25	31	0.14	0.21	0.21	0.10	-	-	-	2.4	
3	2	4	4	4	30	31	0.17	0.25	0.25	0.10	-	-	-	2.4	
3	2	4	4	4	35	31	0.20	0.29	0.30	0.10	-	-	-	2.4	
3	3	7	6	4	< 2	-	0.17	0.27	0.17	0.10	0.17	0.17	0.14	3.7	
3	3	4	4	4	2 < 3	31	0.10	0.22	0.21	0.10	-	-	-	2.8	
3	3	4	4	4	3 - 5	31	0.10	0.14	0.14	0.10	-	-	-	2.8	
3	3	4	4	4	10	31	0.10	0.11	0.11	0.10	-	-	-	2.8	
3	3	4	4	4	15	31	0.10	0.14	0.15	0.10	-	-	-	2.8	
3	3	4	4	4	20	31	0.10	0.18	0.19	0.10	-	-	-	2.8	
3	3	4	4	4	25	31	0.10	0.23	0.23	0.10	-	-	-	2.8	
3	3	4	4	4	30	31	0.12	0.27	0.28	0.10	-	-	-	2.8	
3	3	4	4	4	35	31	0.14	0.32	0.32	0.10	-	-	-	2.8	

(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.



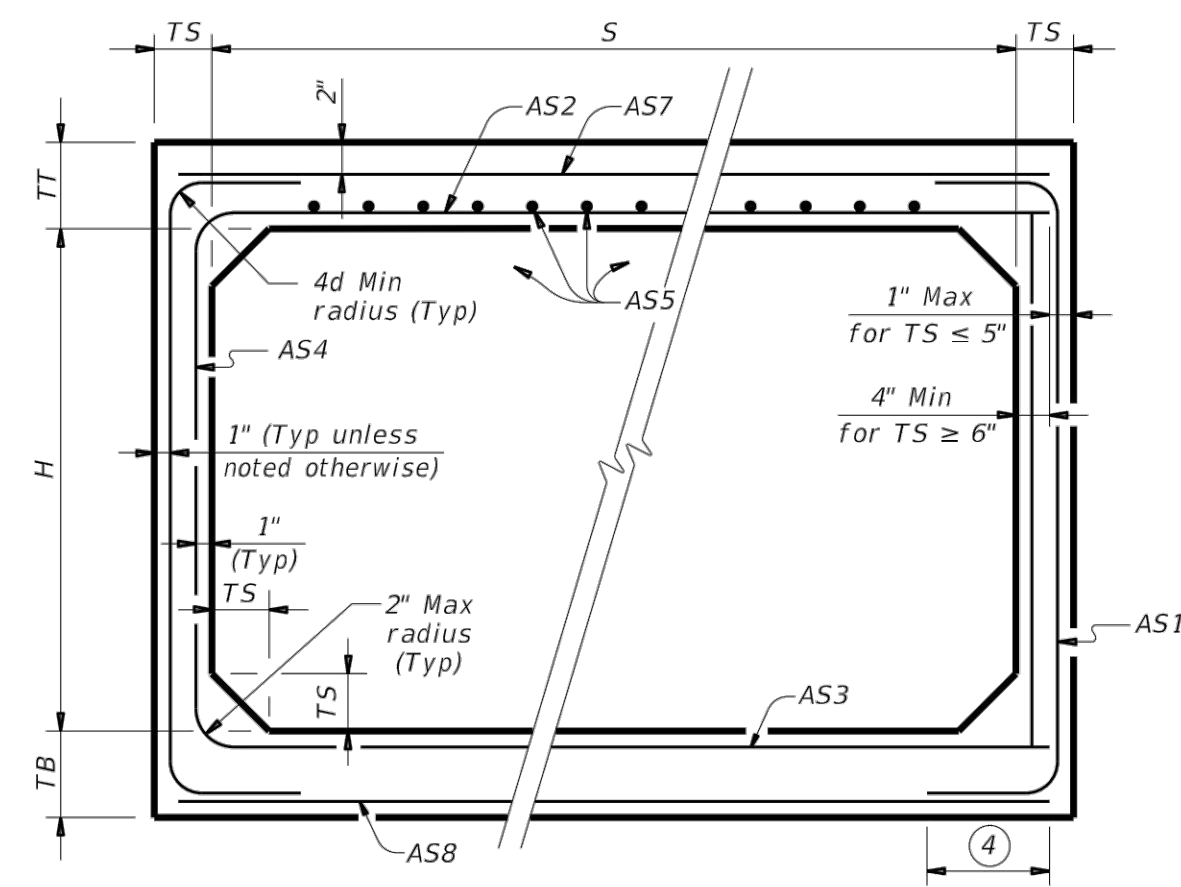
CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT 2 FT AND GREATER



SECTION A-A

(Showing top and bottom slab joint reinforcement.)



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)

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)".

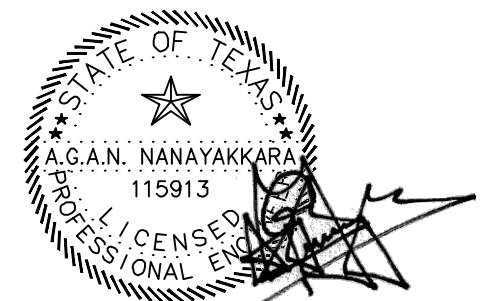
HL93 LOADING

Texas Department of Transportation Bridge Division Standard

SINGLE BOX CULVERTS PRECAST
 3'-0" SPAN

SCP-3

FILE: scp03st5-20.dgn	DR: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
February 2020	COMP	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY	SHEET NO.	



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913

ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
SINGLE BOX CULVERT PRECAST 3'-0" SPAN			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77454 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SD15	

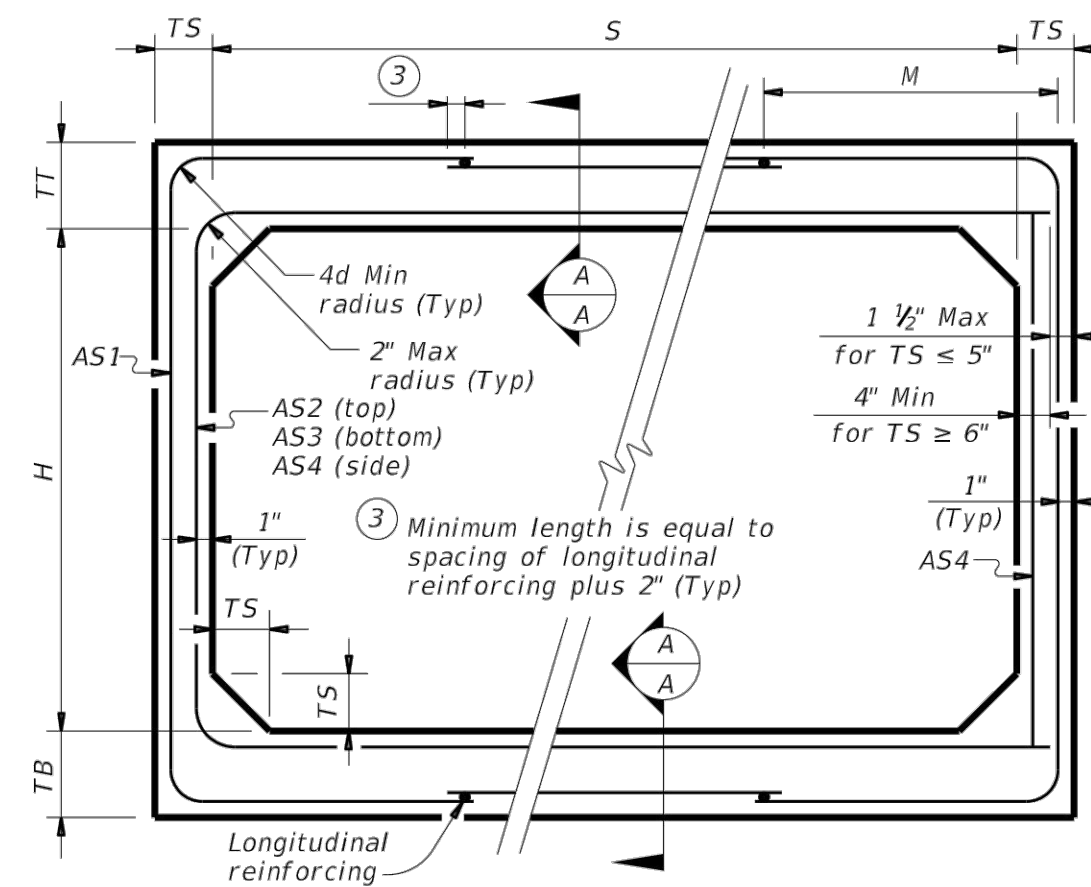
DISCLAIMER: This standard is governed by the Texas Engineering Practice Act. No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:

BOX DATA																
SECTION DIMENSIONS						Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) ^②								① Lift Weight (tons)
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8		
5	2	8	7	6	< 2	-	0.19	0.27	0.18	0.14	0.19	0.19	0.17	6.0		
5	2	6	6	6	2 < 3	44	0.22	0.20	0.16	0.14	-	-	-	5.1		
5	2	6	6	6	3 - 5	44	0.16	0.14	0.14	0.14	-	-	-	5.1		
5	2	6	6	6	10	36	0.15	0.14	0.14	0.14	-	-	-	5.1		
5	2	6	6	6	15	36	0.20	0.18	0.18	0.14	-	-	-	5.1		
5	2	6	6	6	20	36	0.26	0.23	0.24	0.14	-	-	-	5.1		
5	2	6	6	6	25	36	0.33	0.29	0.29	0.14	-	-	-	5.1		
5	2	6	6	6	30	36	0.39	0.34	0.35	0.14	-	-	-	5.1		
5	3	8	7	6	< 2	-	0.19	0.31	0.21	0.14	0.19	0.19	0.17	6.6		
5	3	6	6	6	2 < 3	45	0.18	0.24	0.19	0.14	-	-	-	5.7		
5	3	6	6	6	3 - 5	36	0.14	0.17	0.16	0.14	-	-	-	5.7		
5	3	6	6	6	10	36	0.14	0.16	0.17	0.14	-	-	-	5.7		
5	3	6	6	6	15	35	0.16	0.21	0.22	0.14	-	-	-	5.7		
5	3	6	6	6	20	35	0.21	0.27	0.28	0.14	-	-	-	5.7		
5	3	6	6	6	25	35	0.26	0.34	0.34	0.14	-	-	-	5.7		
5	3	6	6	6	30	35	0.31	0.41	0.41	0.14	-	-	-	5.7		
5	4	8	7	6	< 2	-	0.19	0.33	0.24	0.14	0.19	0.19	0.17	7.2		
5	4	6	6	6	2 < 3	45	0.16	0.27	0.22	0.14	-	-	-	6.3		
5	4	6	6	6	3 - 5	45	0.14	0.19	0.18	0.14	-	-	-	6.3		
5	4	6	6	6	10	36	0.14	0.18	0.18	0.14	-	-	-	6.3		
5	4	6	6	6	15	35	0.14	0.23	0.24	0.14	-	-	-	6.3		
5	4	6	6	6	20	35	0.17	0.30	0.31	0.14	-	-	-	6.3		
5	4	6	6	6	25	35	0.21	0.37	0.38	0.14	-	-	-	6.3		
5	4	6	6	6	30	35	0.25	0.44	0.45	0.14	-	-	-	6.3		
5	5	8	7	6	< 2	-	0.19	0.35	0.26	0.14	0.19	0.19	0.17	7.8		
5	5	6	6	6	2 < 3	45	0.14	0.29	0.24	0.14	-	-	-	6.9		
5	5	6	6	6	3 - 5	45	0.14	0.21	0.20	0.14	-	-	-	6.9		
5	5	6	6	6	10	45	0.14	0.19	0.20	0.14	-	-	-	6.9		
5	5	6	6	6	15	36	0.14	0.24	0.25	0.14	-	-	-	6.9		
5	5	6	6	6	20	35	0.15	0.31	0.32	0.14	-	-	-	6.9		
5	5	6	6	6	25	35	0.18	0.38	0.39	0.14	-	-	-	6.9		
5	5	6	6	6	30	35	0.21	0.46	0.47	0.14	-	-	-	6.9		

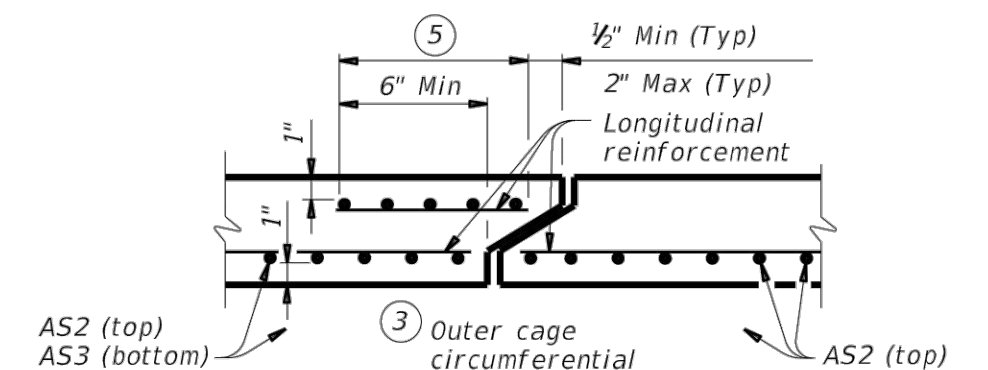
① For box length = 8'-0"

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.



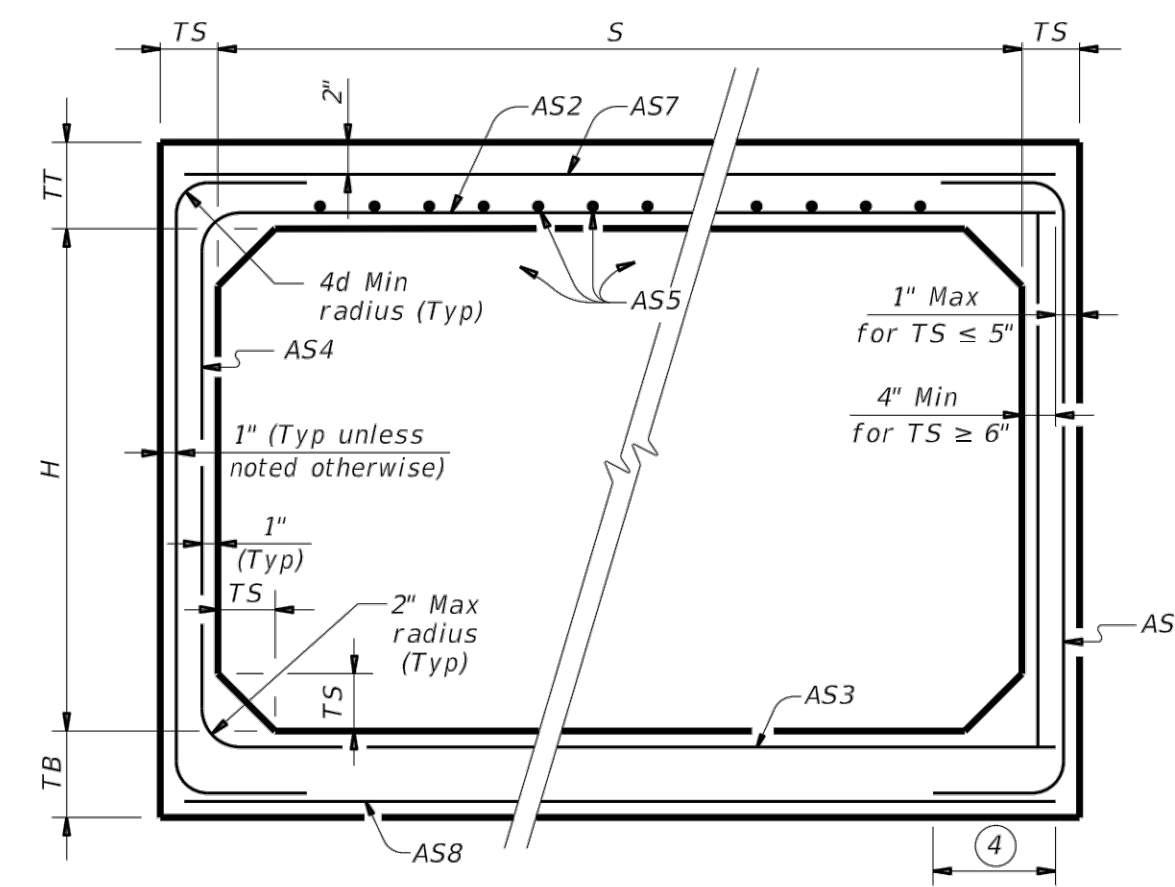
CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT 2 FT AND GREATER



SECTION A-A

(Showing top and bottom slab joint reinforcement.)



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)

MATERIAL NOTES:

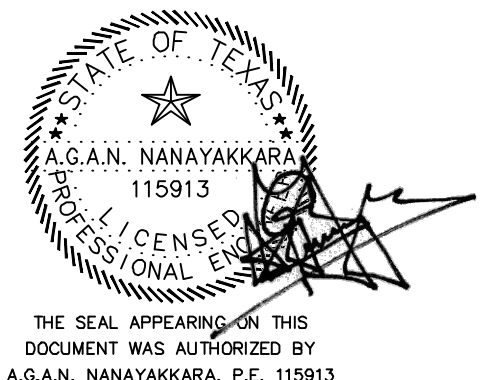
Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
Provide Class H concrete (f'c = 5,000 psi).

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.
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HL93 LOADING

SINGLE BOX CULVERTS PRECAST 5'-0" SPAN			
SCP-5			
FILE: scp05sts-20.dgn	DN: TxDOT	CR: TxDOT	DW: TxDOT
① TxDOT February 2020	COMP	SECT	JOB HIGHWAY
REVISIONS	DIST	COUNTY	SHEET NO.



ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
SINGLE BOX CULVERT PRECAST 5' -0" SPAN			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77454 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1	
		SHEET SD16	

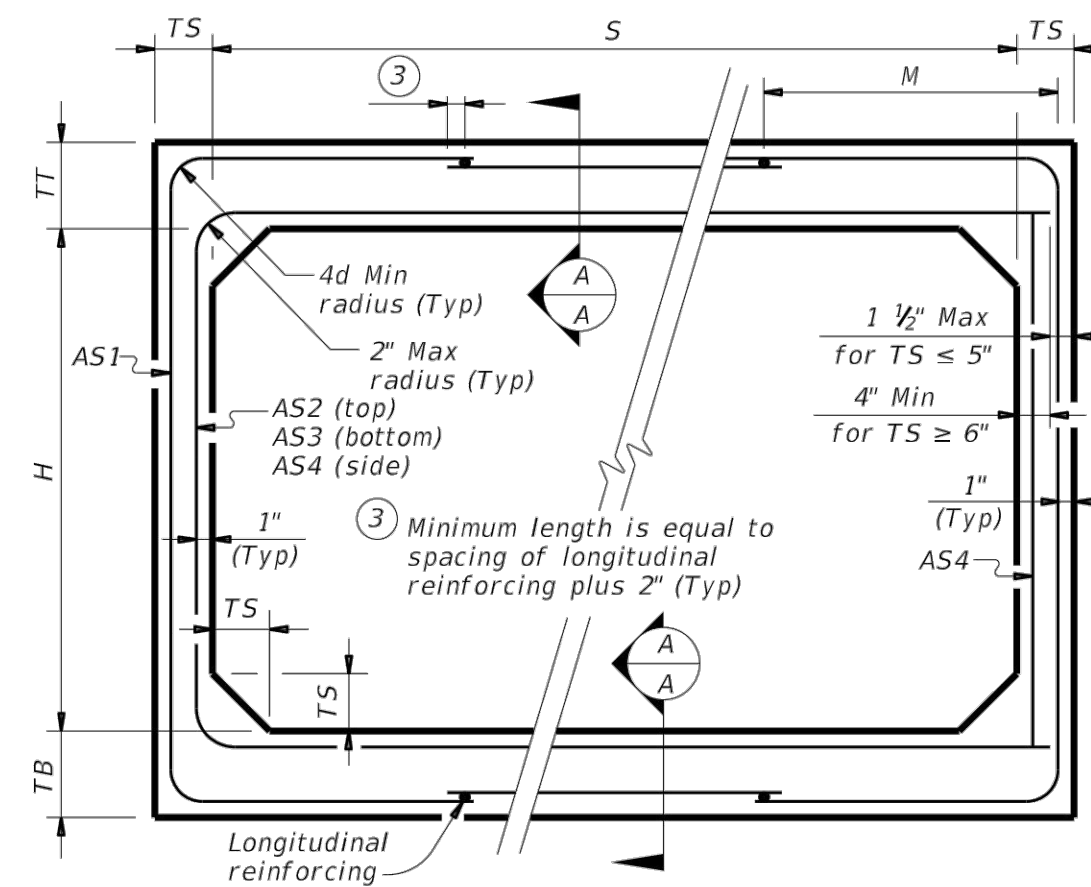
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DATE: FILE:

BOX DATA															
SECTION DIMENSIONS					Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) ⁽²⁾								Lift Weight (tons) ⁽¹⁾
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8		
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	

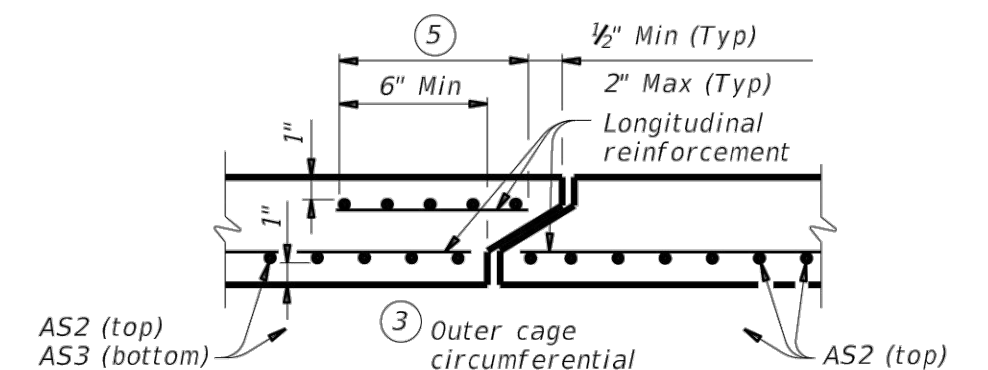
⁽¹⁾ For box length = 8'-0"

⁽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.



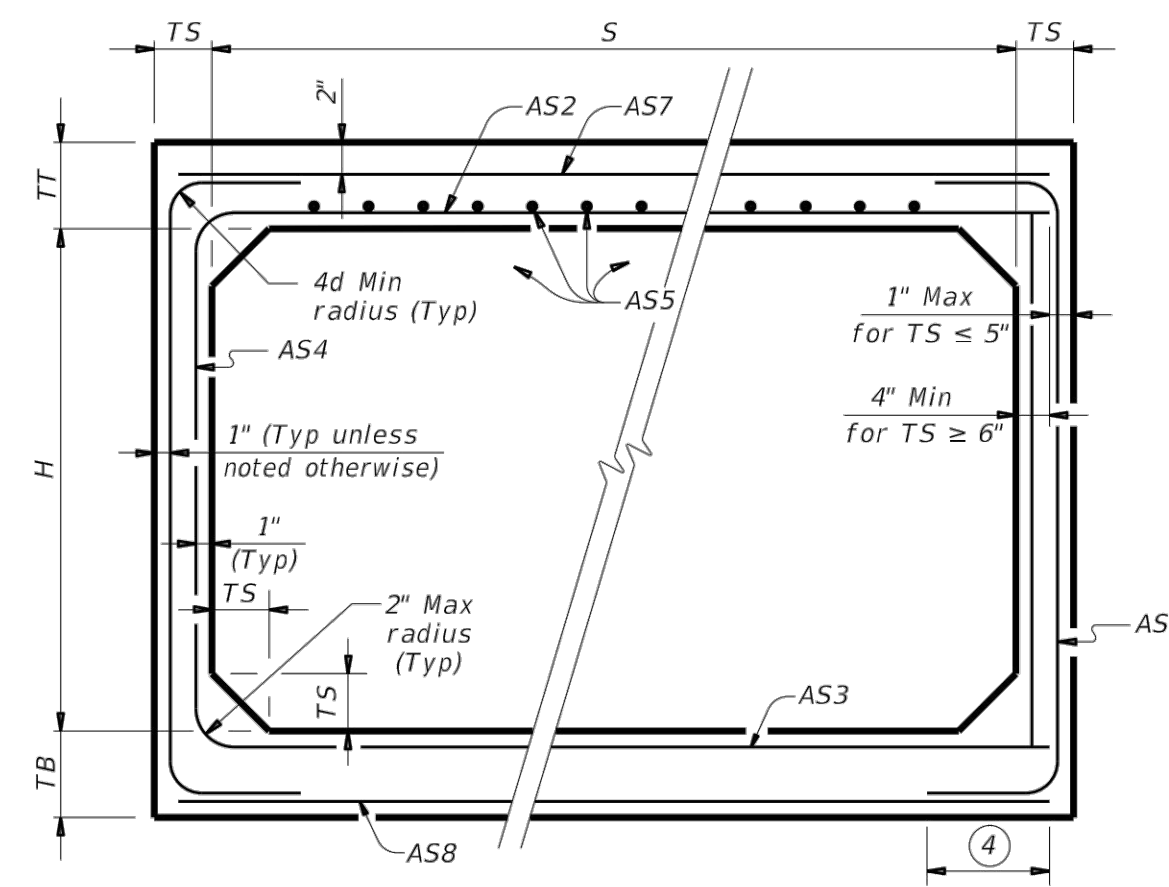
CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT 2 FT AND GREATER



SECTION A-A

(Showing top and bottom slab joint reinforcement.)



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)

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)".

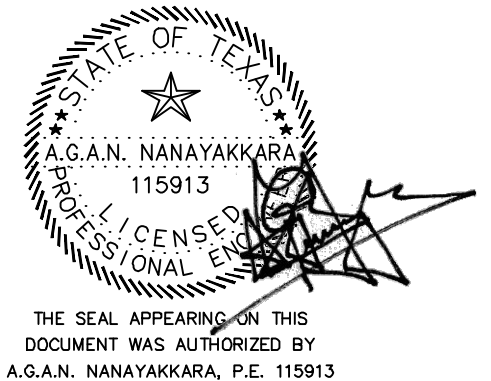
HL93 LOADING

Texas Department of Transportation
Bridge Division Standard

SINGLE BOX CULVERTS
PRECAST
6'-0" SPAN

SCP-6

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



ON FEBRUARY 17, 2023

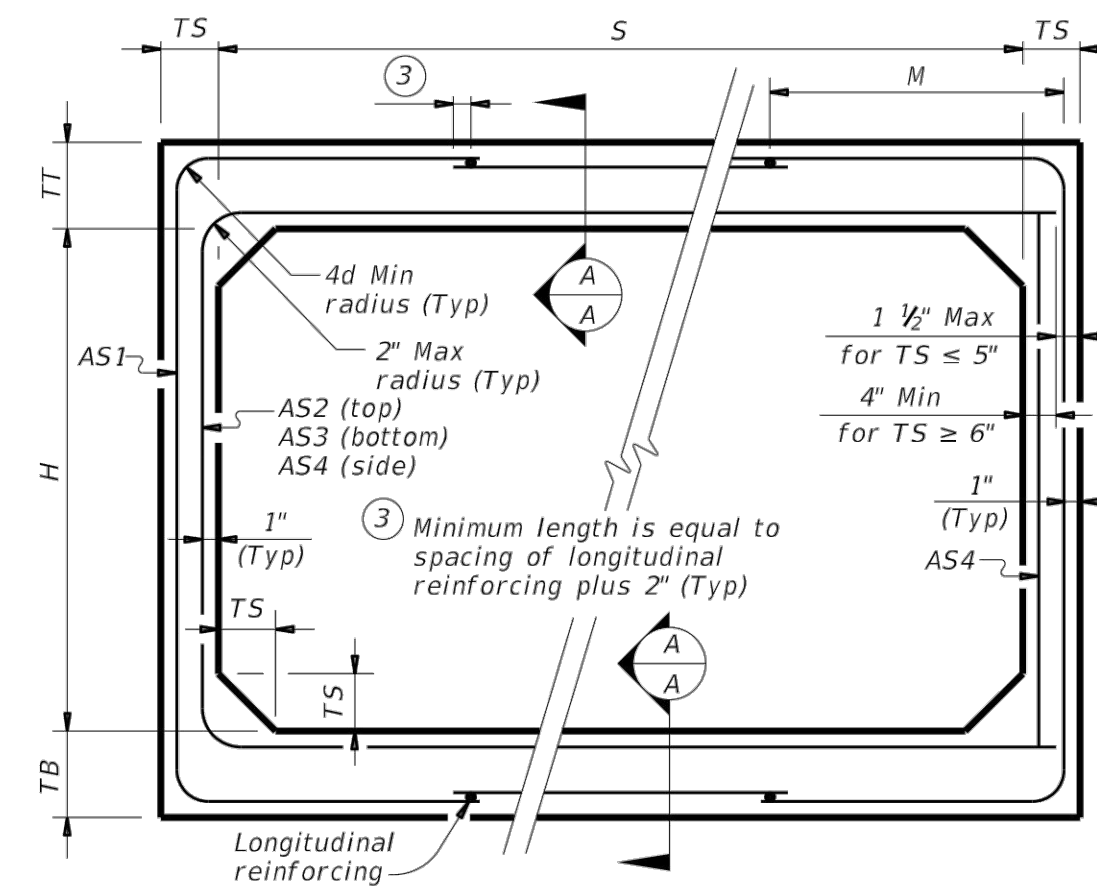
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
SINGLE BOX CULVERT PRECAST 6' -0" SPAN			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC		JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A KATY, TEXAS 77454 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SD17	

DISCLAIMER: 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:

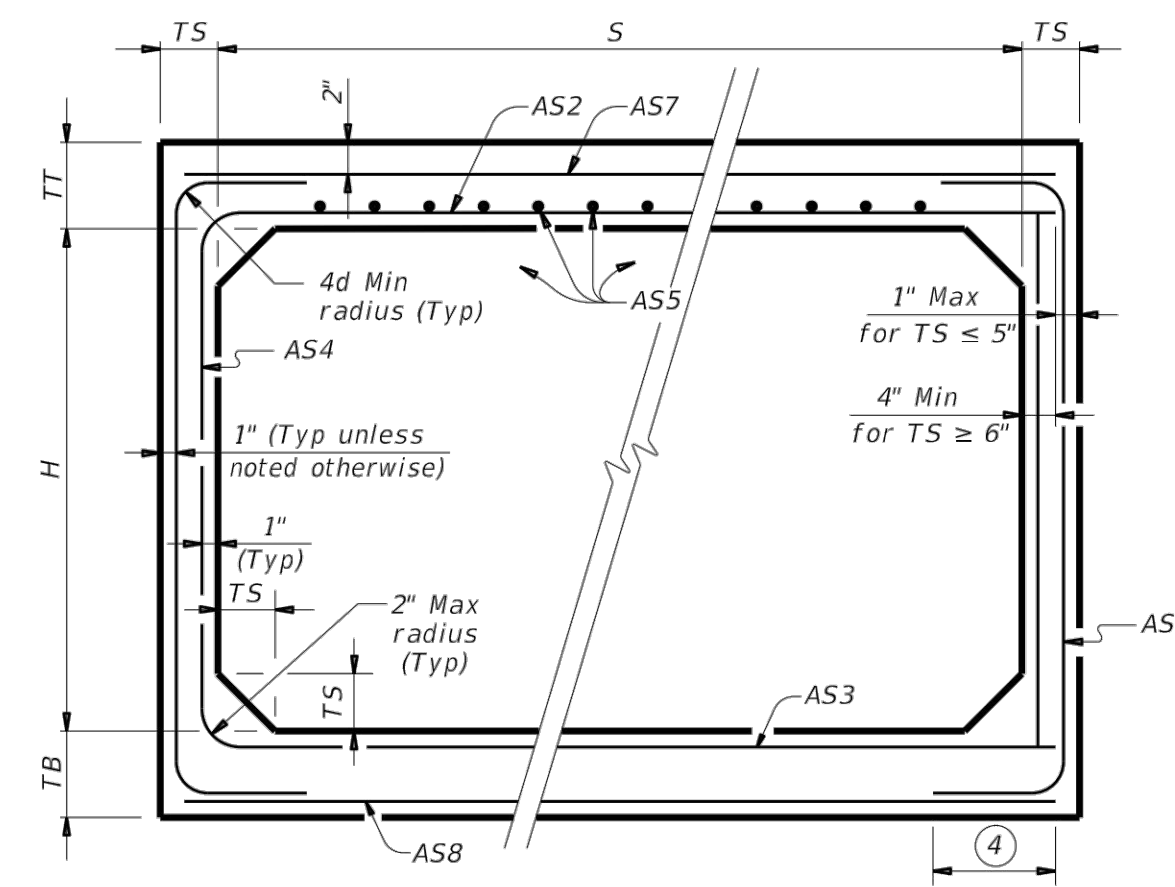
BOX DATA															
SECTION DIMENSIONS					Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) ⁽²⁾								Lift Weight (tons) ⁽¹⁾
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8		
8	3	8	8	8	< 2	-	0.31	0.35	0.25	0.19	0.19	0.19	0.19	10.4	
8	3	8	8	8	2 < 3	55	0.35	0.29	0.28	0.19	-	-	-	10.4	
8	3	8	8	8	3 - 5	50	0.28	0.23	0.24	0.19	-	-	-	10.4	
8	3	8	8	8	10	45	0.29	0.25	0.26	0.19	-	-	-	10.4	
8	3	8	8	8	15	45	0.39	0.33	0.34	0.19	-	-	-	10.4	
8	3	8	8	8	20	45	0.51	0.43	0.44	0.19	-	-	-	10.4	
8	3	8	8	8	25	45	0.63	0.53	0.54	0.19	-	-	-	10.4	
8	4	8	8	8	< 2	-	0.27	0.38	0.29	0.19	0.19	0.19	0.19	11.2	
8	4	8	8	8	2 < 3	50	0.31	0.34	0.32	0.19	-	-	-	11.2	
8	4	8	8	8	3 - 5	50	0.25	0.27	0.27	0.19	-	-	-	11.2	
8	4	8	8	8	10	45	0.26	0.28	0.29	0.19	-	-	-	11.2	
8	4	8	8	8	15	41	0.34	0.37	0.38	0.19	-	-	-	11.2	
8	4	8	8	8	20	41	0.44	0.48	0.49	0.19	-	-	-	11.2	
8	5	8	8	8	< 2	-	0.24	0.40	0.32	0.19	0.19	0.19	0.19	12.0	
8	5	8	8	8	2 < 3	50	0.28	0.37	0.35	0.19	-	-	-	12.0	
8	5	8	8	8	3 - 5	45	0.23	0.29	0.30	0.19	-	-	-	12.0	
8	5	8	8	8	10	45	0.23	0.31	0.32	0.19	-	-	-	12.0	
8	5	8	8	8	15	41	0.30	0.41	0.42	0.19	-	-	-	12.0	
8	5	8	8	8	20	41	0.39	0.52	0.54	0.19	-	-	-	12.0	
8	6	8	8	8	< 2	-	0.22	0.42	0.35	0.19	0.19	0.19	0.19	12.8	
8	6	8	8	8	2 < 3	50	0.25	0.40	0.38	0.19	-	-	-	12.8	
8	6	8	8	8	3 - 5	50	0.21	0.32	0.33	0.19	-	-	-	12.8	
8	6	8	8	8	10	45	0.22	0.33	0.34	0.19	-	-	-	12.8	
8	6	8	8	8	15	41	0.28	0.43	0.45	0.19	-	-	-	12.8	
8	6	8	8	8	20	41	0.36	0.55	0.57	0.19	-	-	-	12.8	
8	7	8	8	8	< 2	-	0.20	0.44	0.37	0.19	0.19	0.19	0.19	13.6	
8	7	8	8	8	2 < 3	55	0.23	0.43	0.41	0.19	-	-	-	13.6	
8	7	8	8	8	3 - 5	55	0.19	0.34	0.35	0.19	-	-	-	13.6	
8	7	8	8	8	10	50	0.20	0.34	0.36	0.19	-	-	-	13.6	
8	7	8	8	8	15	41	0.26	0.45	0.47	0.19	-	-	-	13.6	
8	7	8	8	8	20	41	0.33	0.57	0.60	0.19	-	-	-	13.6	
8	8	8	8	8	< 2	-	0.20	0.45	0.40	0.19	0.19	0.19	0.19	14.4	
8	8	8	8	8	2 < 3	65	0.21	0.45	0.44	0.19	-	-	-	14.4	
8	8	8	8	8	3 - 5	65	0.19	0.36	0.38	0.19	-	-	-	14.4	
8	8	8	8	8	10	55	0.19	0.35	0.38	0.19	-	-	-	14.4	
8	8	8	8	8	15	45	0.24	0.46	0.49	0.19	-	-	-	14.4	
8	8	8	8	8	20	45	0.31	0.59	0.62	0.19	-	-	-	14.4	

- (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"

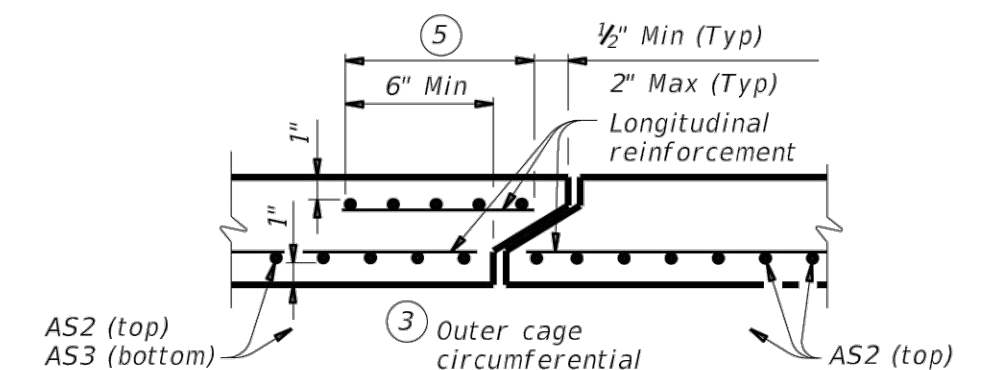
FILL HEIGHT 2 FT AND GREATER



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.
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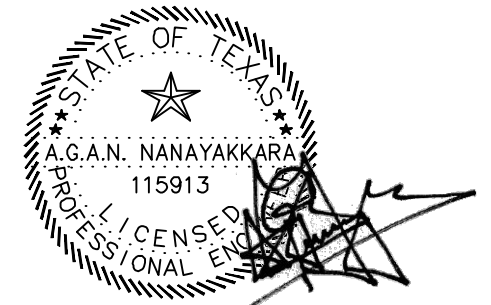
HL93 LOADING

Texas Department of Transportation
Bridge Division Standard

**SINGLE BOX CULVERTS
PRECAST
8'-0" SPAN**

SCP-8

FILE: scp08sts-20.dgn DW: TxDOT CK: TxDOT DW: TxDOT CK: TxDOT
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REVISIONS DIST COUNTY SHEET NO.



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913

ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
SINGLE BOX CULVERT PRECAST 8' -0" SPAN			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77454 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SD18	

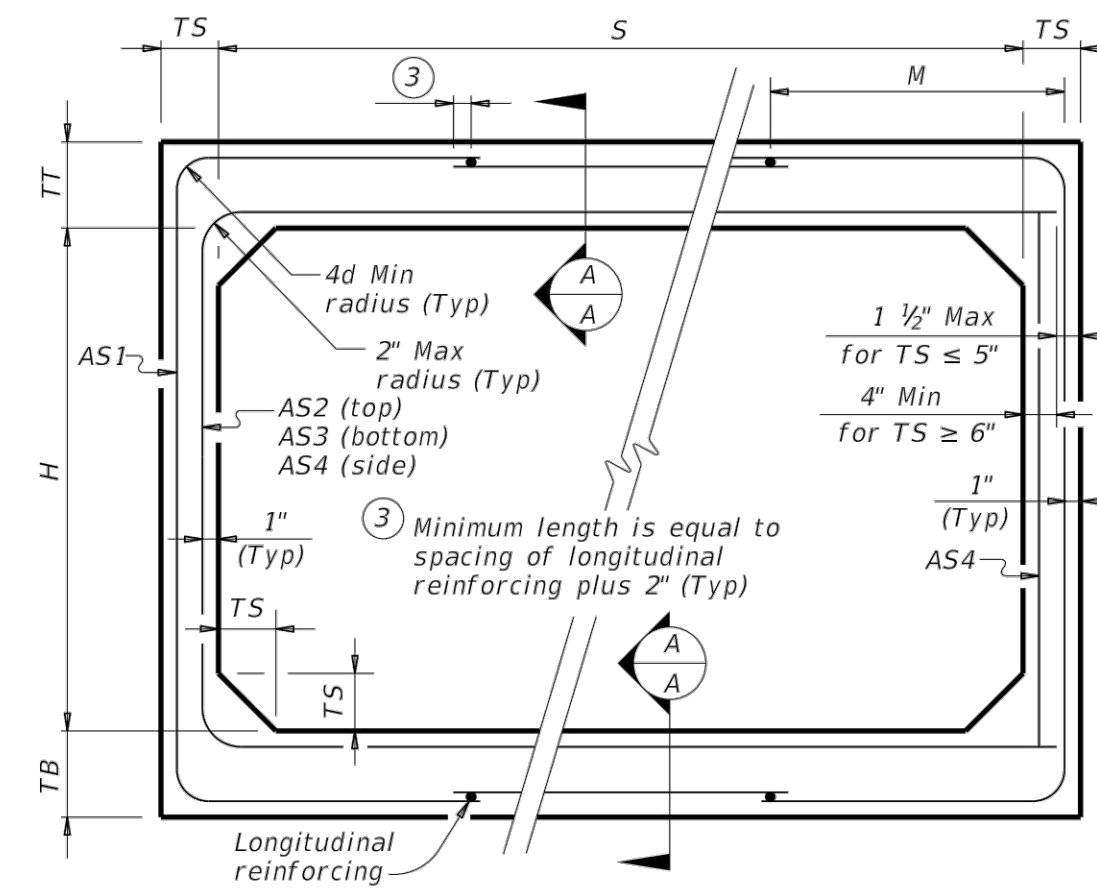
DISCLAIMER: This standard is governed by the Texas Engineering Practice Act. No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

BOX DATA															
SECTION DIMENSIONS						Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) ⁽²⁾							Lift Weight (tons) ⁽¹⁾
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8	
10	4	10	10	10	< 2	-	0.33	0.34	0.27	0.24	0.24	0.24	0.24	16.5	
10	4	10	10	10	2 < 3	58	0.38	0.35	0.30	0.24	-	-	-	16.5	
10	4	10	10	10	3 - 5	53	0.31	0.28	0.27	0.24	-	-	-	16.5	
10	4	10	10	10	10	15	0.36	0.32	0.33	0.24	-	-	-	16.5	
10	4	10	10	10	15	52	0.47	0.42	0.43	0.24	-	-	-	16.5	
10	4	10	10	10	20	52	0.61	0.54	0.55	0.24	-	-	-	16.5	
10	4	10	10	10	25	52	0.75	0.67	0.68	0.24	-	-	-	16.5	
10	5	10	10	10	< 2	-	0.30	0.36	0.30	0.24	0.24	0.24	0.24	17.5	
10	5	10	10	10	2 < 3	58	0.35	0.39	0.34	0.24	-	-	-	17.5	
10	5	10	10	10	3 - 5	52	0.28	0.31	0.30	0.24	-	-	-	17.5	
10	5	10	10	10	10	15	0.33	0.35	0.36	0.24	-	-	-	17.5	
10	5	10	10	10	15	47	0.42	0.46	0.47	0.24	-	-	-	17.5	
10	5	10	10	10	20	47	0.55	0.59	0.61	0.24	-	-	-	17.5	
10	5	10	10	10	25	47	0.68	0.73	0.75	0.24	-	-	-	17.5	
10	6	10	10	10	< 2	-	0.28	0.38	0.33	0.24	0.24	0.24	0.24	18.5	
10	6	10	10	10	2 < 3	58	0.32	0.42	0.37	0.24	-	-	-	18.5	
10	6	10	10	10	3 - 5	53	0.26	0.34	0.33	0.24	-	-	-	18.5	
10	6	10	10	10	10	15	0.30	0.38	0.39	0.24	-	-	-	18.5	
10	6	10	10	10	15	47	0.39	0.49	0.51	0.24	-	-	-	18.5	
10	6	10	10	10	20	47	0.50	0.63	0.65	0.24	-	-	-	18.5	
10	6	10	10	10	25	47	0.61	0.78	0.80	0.24	-	-	-	18.5	
10	7	10	10	10	< 2	-	0.25	0.40	0.36	0.24	0.24	0.24	0.24	19.5	
10	7	10	10	10	2 < 3	58	0.30	0.45	0.40	0.24	-	-	-	19.5	
10	7	10	10	10	3 - 5	58	0.24	0.36	0.35	0.24	-	-	-	19.5	
10	7	10	10	10	10	15	0.28	0.40	0.42	0.24	-	-	-	19.5	
10	7	10	10	10	15	47	0.36	0.52	0.54	0.24	-	-	-	19.5	
10	7	10	10	10	20	47	0.46	0.67	0.69	0.24	-	-	-	19.5	
10	7	10	10	10	25	47	0.56	0.82	0.85	0.24	-	-	-	19.5	
10	8	10	10	10	< 2	-	0.24	0.41	0.38	0.24	0.24	0.24	0.24	20.5	
10	8	10	10	10	2 < 3	64	0.27	0.47	0.43	0.24	-	-	-	20.5	
10	8	10	10	10	3 - 5	58	0.24	0.38	0.38	0.24	-	-	-	20.5	
10	8	10	10	10	10	15	0.26	0.42	0.44	0.24	-	-	-	20.5	
10	8	10	10	10	15	47	0.34	0.54	0.57	0.24	-	-	-	20.5	
10	8	10	10	10	20	47	0.43	0.69	0.72	0.24	-	-	-	20.5	
10	9	10	10	10	< 2	-	0.24	0.42	0.41	0.24	0.24	0.24	0.24	21.5	
10	9	10	10	10	2 < 3	70	0.26	0.50	0.46	0.24	-	-	-	21.5	
10	9	10	10	10	3 - 5	64	0.24	0.40	0.40	0.24	-	-	-	21.5	
10	9	10	10	10	10	15	0.25	0.43	0.46	0.24	-	-	-	21.5	
10	9	10	10	10	15	52	0.32	0.56	0.59	0.24	-	-	-	21.5	
10	9	10	10	10	20	47	0.40	0.71	0.75	0.24	-	-	-	21.5	
10	10	10	10	10	< 2	-	0.24	0.44	0.44	0.24	0.24	0.24	0.24	22.5	
10	10	10	10	10	2 < 3	79	0.25	0.52	0.48	0.24	-	-	-	22.5	
10	10	10	10	10	3 - 5	70	0.24	0.42	0.43	0.24	-	-	-	22.5	
10	10	10	10	10	10	15	0.24	0.44	0.48	0.24	-	-	-	22.5	
10	10	10	10	10	15	52	0.30	0.57	0.61	0.24	-	-	-	22.5	
10	10	10	10	10	20	52	0.38	0.73	0.77	0.24	-	-	-	22.5	

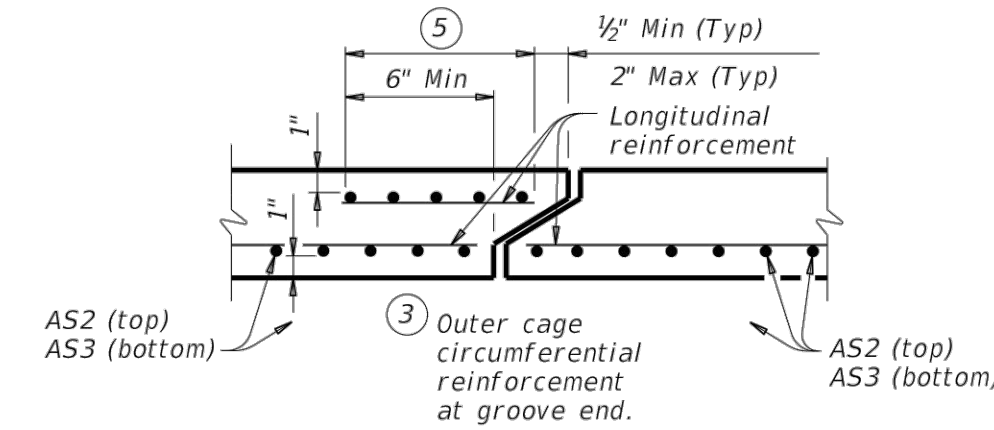
⁽¹⁾ For box length = 8'-0"

⁽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.



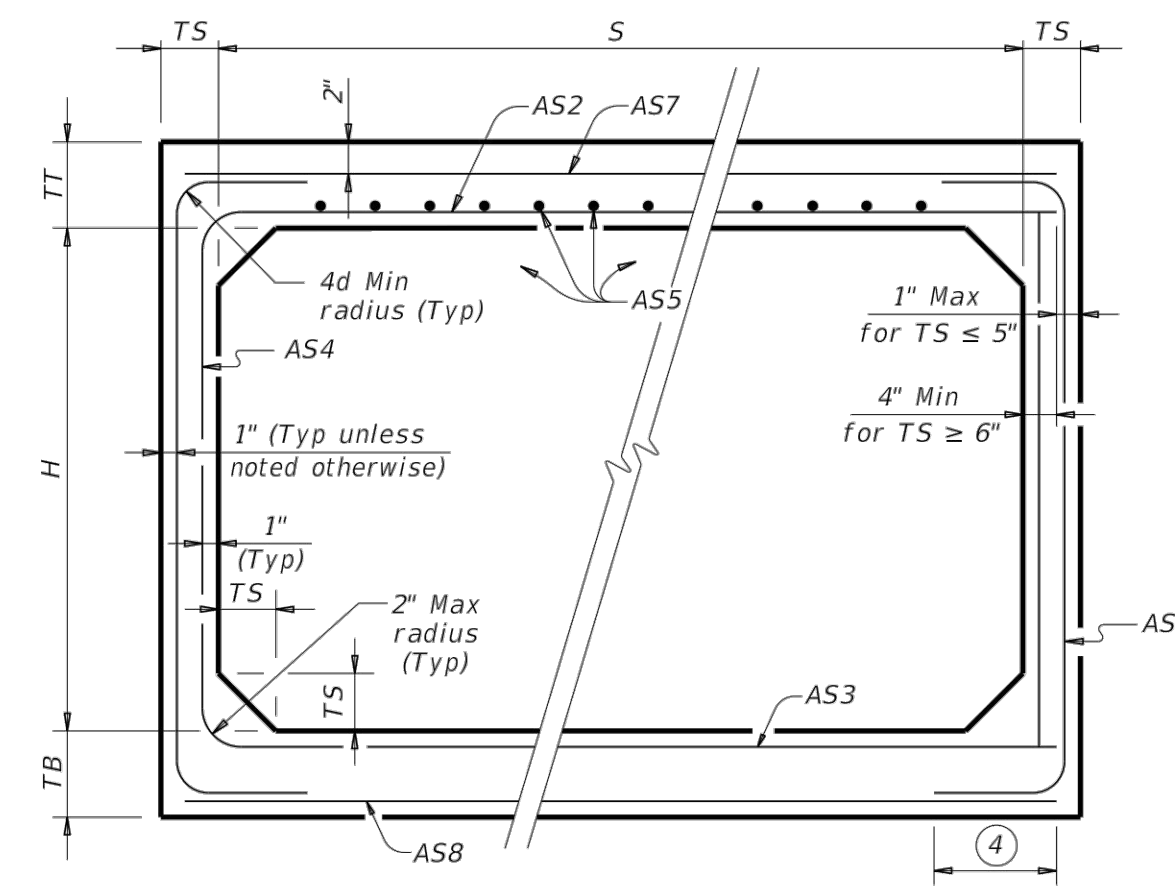
CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT 2 FT AND GREATER



SECTION A-A

(Showing top and bottom slab joint reinforcement.)



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)

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:

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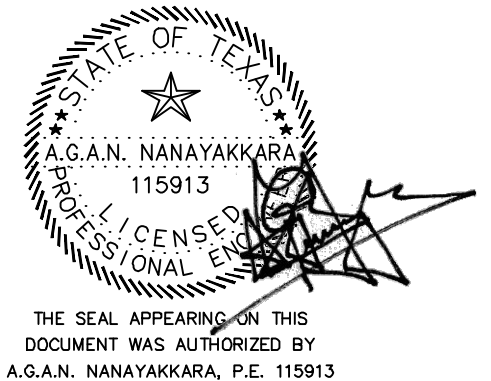
HL93 LOADING

Texas Department of Transportation
Bridge Division Standard

**SINGLE BOX CULVERTS
PRECAST
10'-0" SPAN**

SCP-10

FILE: scp10sts-20.dgn DW: TxDOT CK: TxDOT DW: TxDOT CK: TxDOT
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REVISIONS
DISP COUNTY SHEET NO.



ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
	BRANDT ROAD PRECINCT LINE RD TO MASON RD		
	SINGLE BOX CULVERT PRECAST 10' - 0" SPAN		
	TERRA 1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309		
	JNS ENGINEERS, LLC 722 PIN OAK ROAD, STE 202A KATY, TEXAS 77454 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.E. FIRM REGISTRATION NO. 11653		
	DRAWN BY: T.D. SCALE: N.T.S. PROJECT No. 0522-1801 CONTRACT: 1		
	CHECKED BY: A.G.A.N. DATE: FEBRUARY, 2023 SHEET SD19		

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PLAN VIEW - 12" THRU 24"
(Showing spigot end connection.)

LONGITUDINAL ELEVATION - 12" THRU 24"
(Showing spigot end connection.)

SECTION A-A

MULTIPLE PIPE INSTALLATION

① Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.

② Provide cement stabilized bedding and backfill in accordance with the Item "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill is directed by Engineer.

③ Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".

④ Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

⑤ Safety pipe runners are required for multiple pipe culverts with more than two pipes.

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	Min Wall Thickness	Min O.D.	Min O.D. at Tapered End	Min Reinf. Requirements (sq. in. per ft. of Pipe)	Slope	Pipe Runner Requirements		Required Pipe Runner Size
						Single Pipe	Multiple Pipes	
12"	2"	16"	16"	0.07 Circ.	6:1	4'-0"	No	3" STD 3,500' 3,068'
15"	2 1/2"	19 1/2"	19"	0.07 Circ.	6:1	5'-6"	No	3" STD 3,500' 3,068'
18"	2 1/2"	23"	21 1/2"	0.07 Circ.	6:1	7'-3"	No	3" STD 3,500' 3,068'
24"	3"	30"	27"	0.07 Circ.	6:1	10'-6"	No	3" STD 3,500' 3,068'
30"	3 1/2"	37"	31"	0.18 Circ.	6:1	12'-1"	Yes	4" STD 4,500' 4,020'
36"	4"	44"	36"	0.19 Ellip.	6:1	15'-4"	Yes	4" STD 4,500' 4,020'
42"	4 1/2"	51"	41 1/2"	0.23 Ellip.	6:1	18'-7"	Yes	4" STD 4,500' 4,020'

MATERIAL NOTES:
 Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.
 Provide pipe runners meeting the requirements of ASTM A53 Type E or S, Gr. B, ASTM A500 Gr. B, or API 5LX52.
 Galvanize steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:
 Precast safety end treatment for reinforced concrete pipe (RCP) may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".
 When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.
 Manufacture precast concrete end sections in accordance with Item 464, "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.
 Provide precast concrete end sections with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for grout, mortar, cold applied asphalt, joint compound or pre-formed plastic gasket material.
 Methods of lifting shall be provided by the manufacturer for ease of loading, unloading, and installation.
 Pipe runners are designed for a traversing load of 10,000 lbs at yield as recommended by Research Report 380-2P, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

TEXAS DEPARTMENT OF TRANSPORTATION Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ PARALLEL DRAINAGE

PSET-RP

REV	DATE	BY	CHK	APP	DESCRIPTION
01	02/17/2023	THD	THD	THD	ISSUED FOR CONSTRUCTION

PLAN VIEW
(Showing spigot end connection.)

LONGITUDINAL ELEVATION
(Showing spigot end connection.)

DETAIL A

MULTIPLE PIPE INSTALLATION

① Slope as shown elsewhere in the plans. Slope of 3:1 or flatter is required for vehicle safety.

② Provide cement stabilized bedding and backfill in accordance with the Item "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill is directed by Engineer.

③ Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item "Safety End Treatment".

④ Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

MAX SAFETY PIPE RUNNER LENGTHS AND REQUIRED SAFETY PIPE RUNNER SIZES

Max Safety Pipe Runner Length	Required Pipe Runner Size	Pipe O.D.	Pipe I.D.
11'-2"	3" STD	3,500'	3,068'
15'-6"	3 1/2" STD	4,000'	3,548'
20'-10"	4" STD	4,500'	4,020'
25'-4"	5" STD	5,563'	5,043'

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	Min Wall Thickness	Min O.D.	Min O.D. at Tapered End	Min Reinf. Requirements (sq. in. / ft. of pipe)	Slope	Minimum Length of Unit	Single Pipe		Multiple Pipe	
							Skew	Pipe Runners Required	Skew	Pipe Runners Required
12"	2"	16"	16"	0.07 Circ.	3:1	2'-0"	≤ 45°	No	≤ 45°	No
15"	2 1/2"	19 1/2"	19"	0.07 Circ.	4:1	3'-9"	≤ 45°	No	≤ 45°	No
18"	2 1/2"	23"	21 1/2"	0.07 Circ.	6:1	4'-10"	≤ 45°	No	≤ 45°	No
24"	3"	30"	27"	0.07 Circ.	3:1	5'-3"	≤ 45°	No	≤ 30°	No
30"	3 1/2"	37"	31"	0.18 Circ.	4:1	7'-0"	≤ 15°	Yes	≤ 15°	Yes
36"	4"	44"	36"	0.19 Ellip.	3:1	7'-10"	≥ 0°	No	≥ 0°	Yes
42"	4 1/2"	51"	41 1/2"	0.23 Ellip.	6:1	12'-1"	≥ 0°	Yes	≥ 0°	Yes

MATERIAL NOTES:
 Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.
 Provide safety pipe runners, cross pipes, pipe support posts, and pipe stubs meeting the requirements of ASTM A53 Type E or S, Gr. B, ASTM A500 Gr. B, or API 5LX52.
 Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:
 Precast safety end treatment for reinforced concrete pipe (RCP) may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".
 When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.
 Manufacture precast concrete end sections in accordance with Item 464, "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.
 Provide precast concrete end sections with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for grout, mortar, cold applied asphalt, joint compound or pre-formed plastic gasket material.
 Methods of lifting shall be provided by the manufacturer for ease of loading, unloading, and installation.
 Pipe runners are designed for a traversing load of 1,800 lbs at yield as recommended by Research Report 260-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

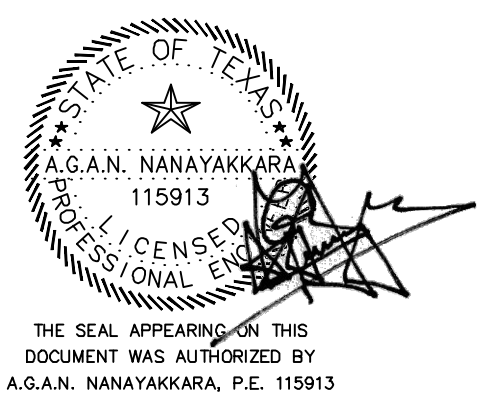
TEXAS DEPARTMENT OF TRANSPORTATION Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

PSET-RC

REV	DATE	BY	CHK	APP	DESCRIPTION
01	02/17/2023	THD	THD	THD	ISSUED FOR CONSTRUCTION



ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.

BRANDT ROAD
PRECINCT LINE RD TO MASON RD

SAFETY END TREATMENT DETAILS

TERRA
a Bowman company

1445 N. LOOP WEST – SUITE 450
 HOUSTON, TEXAS 77008
 713-993-0333
 TBPE Registration No.: F-14309

JNS ENGINEERS, LLC

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 FAX: (281) 391-3375
 WWW.JNSCE.COM
 T.B.P.E. FIRM
 REGISTRATION NO. 11653

DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1
		SHEET SD20

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL

Values For One Pipe

Diag. of Pipe (ft)	W	X	Y	L	Reinf. (lbs)	Conc. (CY)
12"	4'-7 1/2"	2'-0"	2'-10"	3'-3 1/2"	88	1.9
15"	5'-5 1/2"	2'-9 1/2"	3'-4"	3'-10 1/2"	103	2.2
18"	6'-4 1/2"	3'-1"	3'-10"	4'-5"	124	2.8
21"	7'-2 1/2"	3'-4 1/2"	4'-4"	5'-0"	143	3.1
24"	8'-2 1/2"	3'-9 1/2"	4'-10"	5'-7"	164	3.7
27"	9'-1 1/2"	4'-1"	5'-4"	6'-2"	179	3.9
30"	9'-11 1/2"	4'-5 1/2"	5'-10"	6'-8 1/2"	203	4.4
33"	10'-10"	4'-8"	6'-4"	7-3 1/2"	224	4.8
36"	11'-8 1/2"	4'-11 1/2"	6'-10"	7-10 1/2"	249	5.2
42"	13'-5 1/2"	5'-6 1/2"	7'-10"	9-0 1/2"	298	6.4
48"	15'-9"	6'-1 1/2"	9'-4"	10-9 1/2"	360	7.7
54"	17'-5 1/2"	6'-8 1/2"	10'-4"	11-11 1/2"	427	8.9
60"	19'-2 1/2"	7-3 1/2"	11'-4"	13'-1"	481	9.9
66"	20'-11 1/2"	7-10 1/2"	12'-4"	14-3"	544	11.2
72"	22-8 1/2"	8-5 1/2"	12'-4"	15-4 1/2"	601	11.9

Values to be Added for Each Additional Pipe

Diag. of Pipe (ft)	Reinf. (lbs)	Conc. (CY)
12"	17	0.4
15"	20	0.5
18"	23	0.6
21"	26	0.7
24"	29	0.8
27"	32	0.9
30"	35	1.0
33"	38	1.1
36"	41	1.2
42"	47	1.4
48"	54	1.6
54"	61	1.8
60"	68	2.0
66"	75	2.2
72"	82	2.4

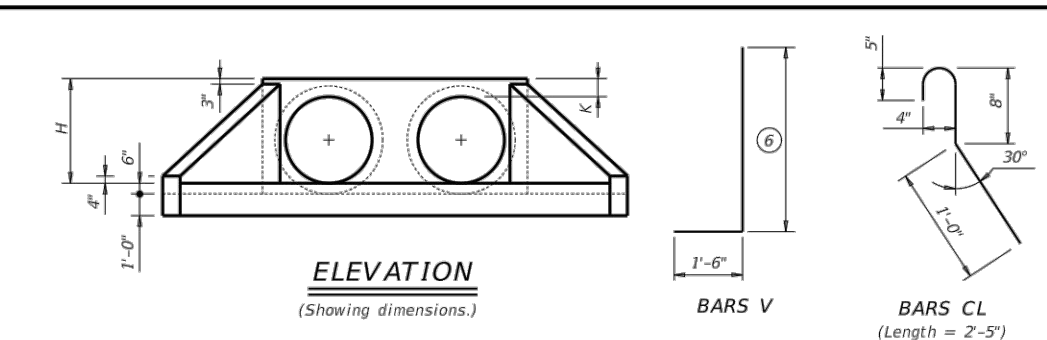
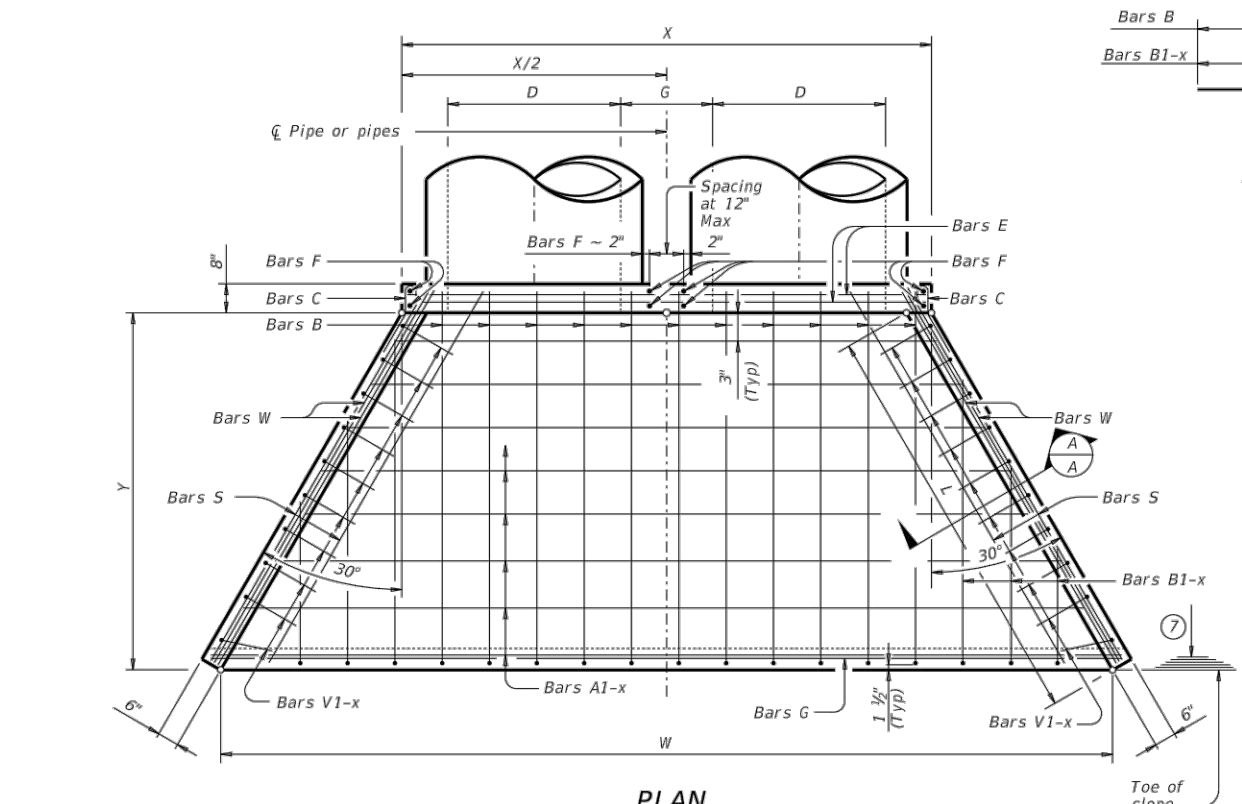


TABLE OF REINFORCING STEEL

Bar	Size	Spa	No.
A	#4	1'-0"	2
B	#3	1'-0"	2
C	#4	1'-0"	2
D	#3	1'-0"	2
E	#5	4	4
F	#5	4	4
G	#3	2	2
H	#4	6	6
V	#4	1'-0"	4
W	#5	4	4

TABLE OF CONSTANT DIMENSIONS

Diag. of Pipe (ft)	G	K	H
12"	0'-9"	1'-0"	2'-0"
15"	0'-11"	1'-0"	2'-3"
18"	1'-2"	1'-0"	2'-6"
21"	1'-4"	1'-0"	2'-9"
24"	1'-7"	1'-0"	3'-0"
27"	1'-8"	1'-0"	3'-3"
30"	1'-10"	1'-0"	3'-6"
33"	1'-11"	1'-0"	3'-9"
36"	2'-1"	1'-0"	4'-0"
42"	2'-4"	1'-0"	4'-6"
48"	2'-7"	1'-0"	5'-3"
54"	3'-0"	1'-0"	5'-9"
60"	3'-3"	1'-0"	6'-3"
66"	3'-6"	1'-0"	6'-9"
72"	3'-9"	1'-0"	7'-3"



BARS B and BI-x

Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

Provide a 1'-0" footing as shown where required to maintain 4" minimum cover for pipes.

Dimensions shown are usual and maximum.

Quantities shown are for one structure end only (one headwall).

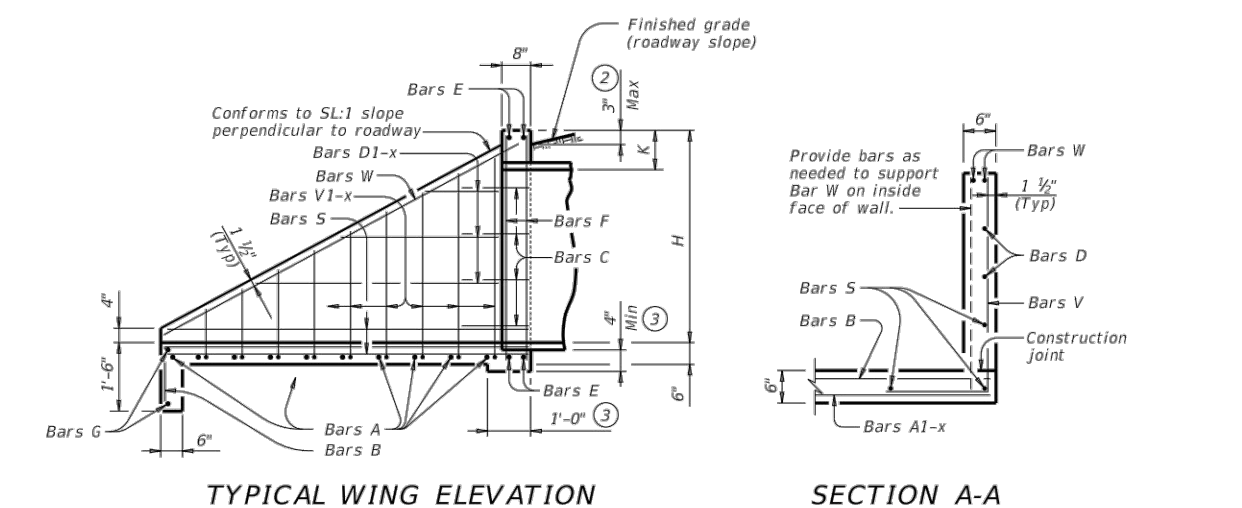
Min Length = $6' + 3' \times \left[\frac{12 \times H - Z}{12 \times L} \right]$

Max Length = $12' + H - 3' \times \left[\frac{12 \times H - Z}{12 \times L} \right] - 1'$

Lengths of wings based on SL1 slope along this line.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.



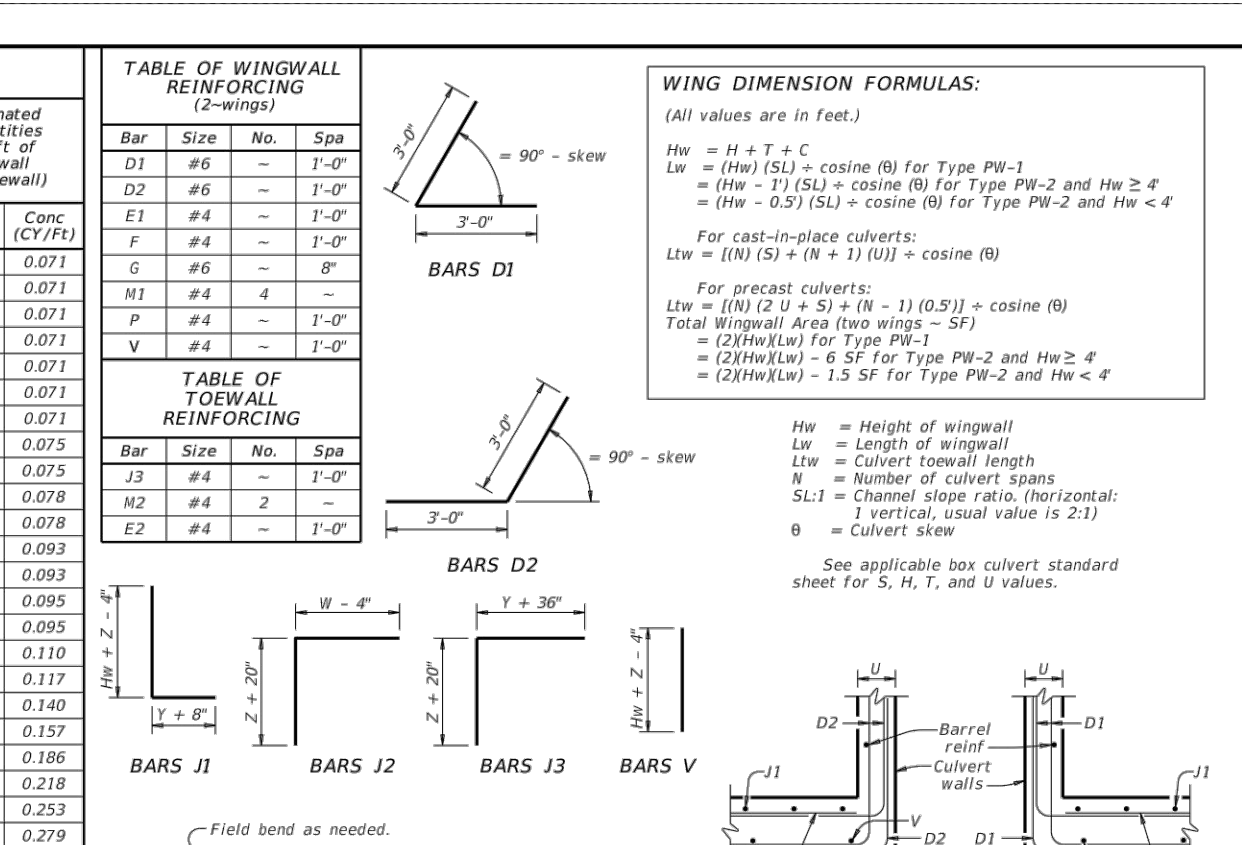
CONCRETE HEADWALLS WITH FLARED WINGS FOR 0° SKEW PIPE CULVERTS

CH-FW-0

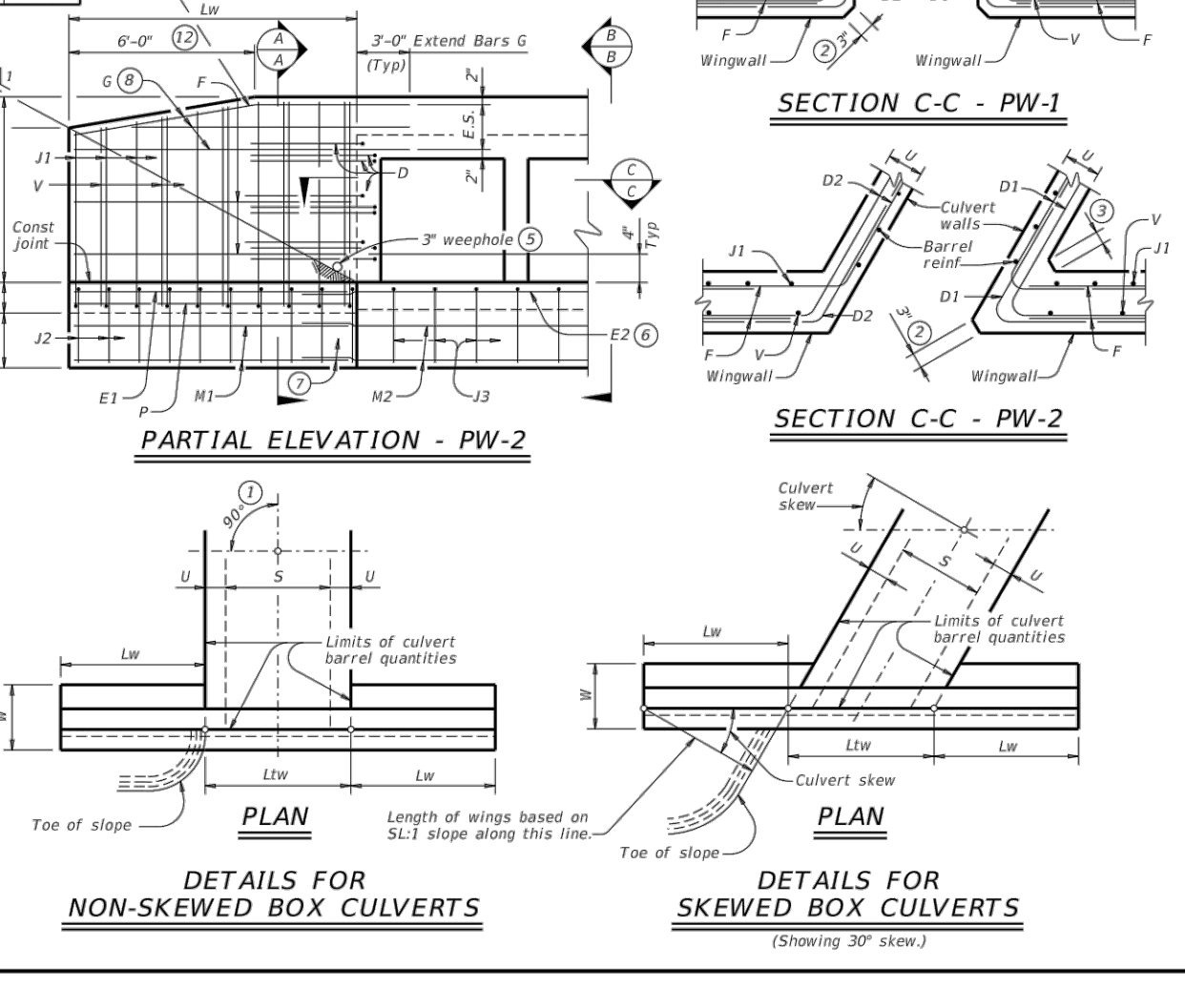
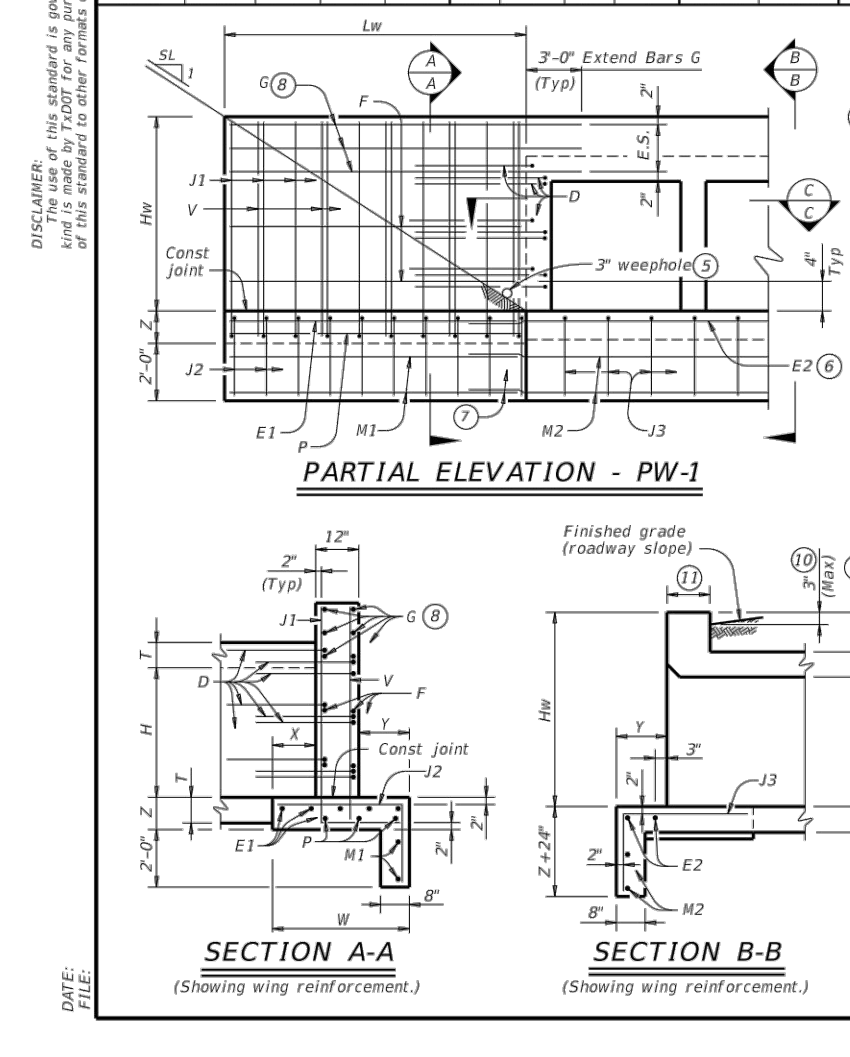
Rev: 01/2023
Date: February 2023
Author: [Name]
Checked: [Name]
Scale: [Scale]

TABLE OF DIMENSIONS AND REINFORCING STEEL (Wings for one structure end)

Dimensions	Variable Reinforcing	Estimated Quantities per Ft of Wing (2-wings)	Estimated Quantities per Ft of Toe-wall (1-toe-wall)
2'-0" x 2'-10"	#4 1'-0" #4 1'-0"	48.64 0.406	6.85 0.071
2'-9" x 2'-10"	#4 1'-0" #4 1'-0"	49.31 0.424	6.85 0.071
3'-0" x 2'-10"	#4 1'-0" #4 1'-0"	49.98 0.444	6.85 0.071
3'-9" x 2'-10"	#4 1'-0" #4 1'-0"	53.32 0.462	6.85 0.071
3'-0" x 2'-10"	#4 1'-0" #4 1'-0"	53.98 0.480	6.85 0.071
4'-0" x 2'-10"	#4 1'-0" #4 1'-0"	55.77 0.532	6.85 0.071
4'-6" x 2'-10"	#4 1'-0" #4 1'-0"	59.77 0.568	6.85 0.071
5'-0" x 2'-10"	#4 1'-0" #4 1'-0"	63.45 0.632	6.96 0.075
5'-9" x 2'-10"	#4 1'-0" #4 1'-0"	67.46 0.668	6.96 0.075
6'-0" x 2'-10"	#4 1'-0" #4 1'-0"	80.67 0.730	7.07 0.078
6'-6" x 2'-10"	#4 1'-0" #4 1'-0"	85.05 0.768	7.07 0.078
7'-0" x 2'-10"	#4 1'-0" #4 1'-0"	92.15 0.864	8.07 0.093
7'-6" x 2'-10"	#4 1'-0" #4 1'-0"	96.54 0.902	8.07 0.093
8'-0" x 2'-10"	#4 1'-0" #4 1'-0"	129.04 0.962	8.13 0.095
8'-6" x 2'-10"	#4 1'-0" #4 1'-0"	144.47 1.000	8.13 0.095
9'-0" x 2'-10"	#4 1'-0" #4 1'-0"	156.93 1.136	8.41 0.110
10'-0" x 2'-10"	#4 1'-0" #4 1'-0"	196.27 1.234	8.57 0.117
11'-0" x 2'-10"	#4 1'-0" #4 1'-0"	230.13 1.438	9.52 0.140
12'-0" x 2'-10"	#4 1'-0" #4 1'-0"	283.41 1.592	9.74 0.157
13'-0" x 2'-10"	#4 1'-0" #4 1'-0"	348.72 1.804	10.02 0.186
14'-0" x 2'-10"	#4 1'-0" #4 1'-0"	432.94 2.046	10.30 0.218
15'-0" x 2'-10"	#4 1'-0" #4 1'-0"	489.52 2.302	11.24 0.253
16'-0" x 2'-10"	#4 1'-0" #4 1'-0"	505.72 2.448	11.47 0.278



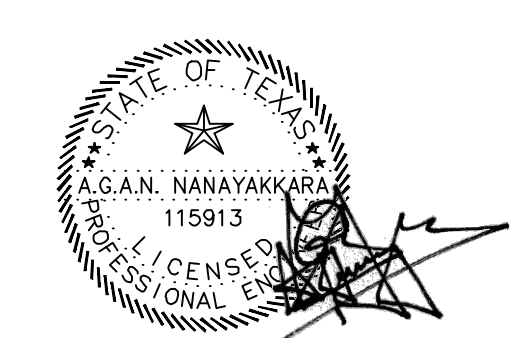
- Skew = 0°
- At discharge end, chamfer may be 1/2" minimum.
- For 15° skew - 1"
For 30° skew - 2"
For 45° skew - 3"
- Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
- Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
- Extend Bars E2 2'-0" minimum into the wingwall footing.
- Lap Bars M1 1'-0" minimum with Bars M2.
- Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
- Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with 1'-0" or 1'-6" bridge rail, refer to the Mounting Details for T631 & T631S Rails (T631-CH) standard sheet. Refer to the Box Culvert Rail Mounting Details (RMC) standard sheet for structures with bridge rail other than T631 or T631S.
- 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.
- 1'-0" typical, 2'-3" when the Box Culvert Rail Mounting Details (RMC) standard sheet is referred to elsewhere in the plans.
- 3'-0" for Hw < 4'.
- 6" for Hw < 4'.



CONCRETE WINGWALLS WITH PARALLEL WINGS FOR BOX CULVERTS TYPES PW-1 AND PW-2

PW

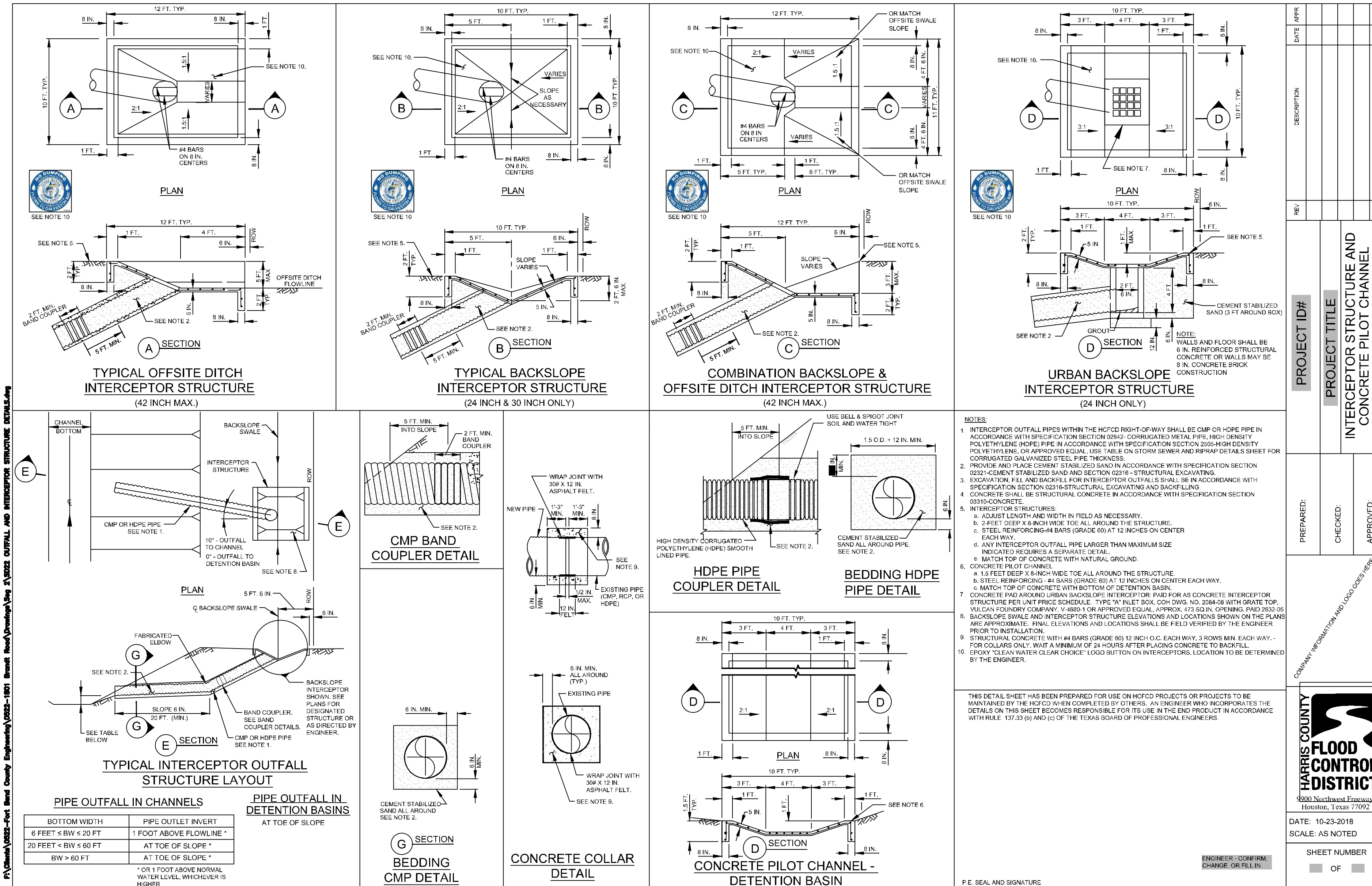
Rev: 01/2023
Date: February 2023
Author: [Name]
Checked: [Name]
Scale: [Scale]



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913

ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
TxDOT CONCRETE HEADWALLS			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77454 TELEPHONE: (281) 331-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801	CONTRACT: 1
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET	SD21



3-33

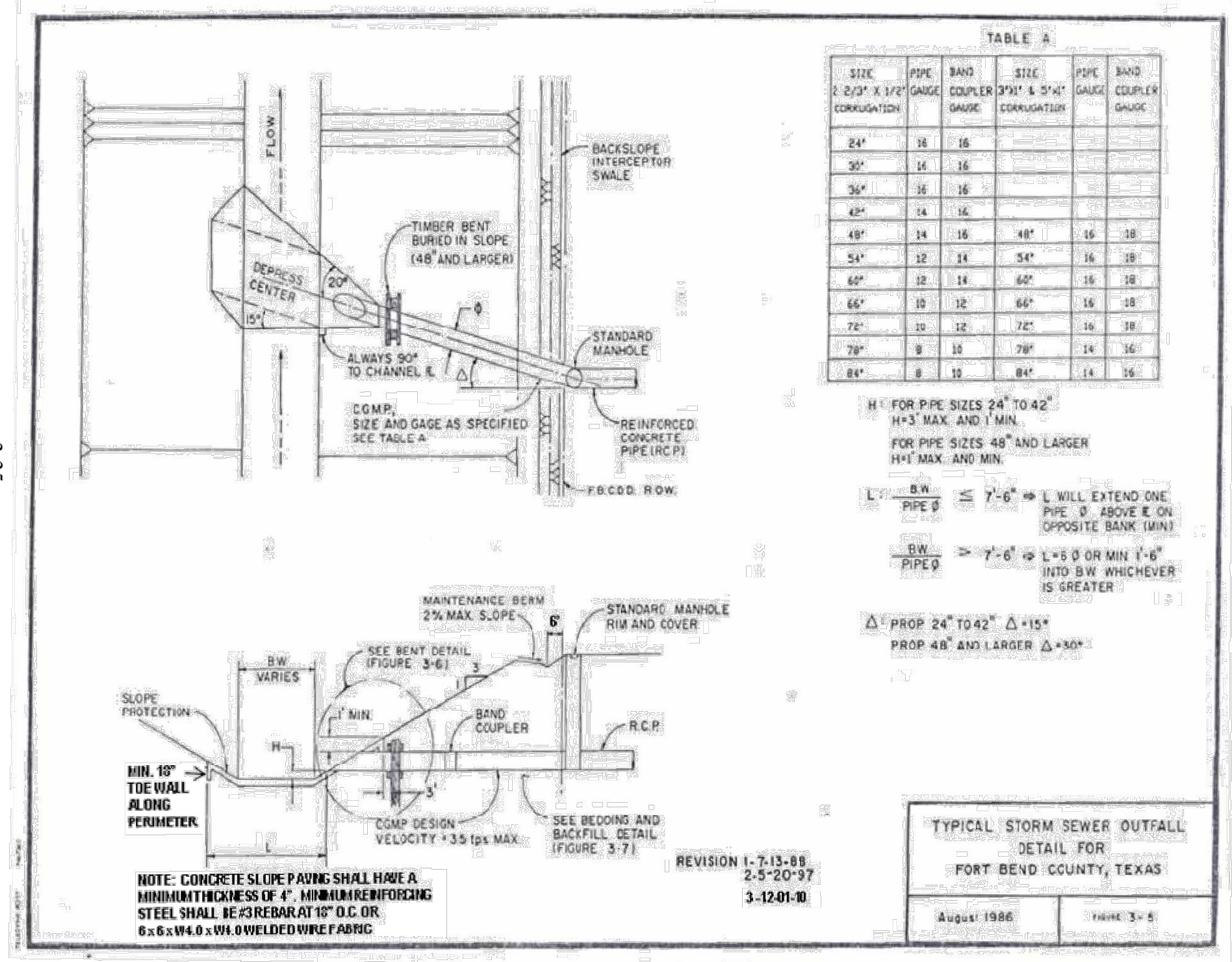


TABLE A

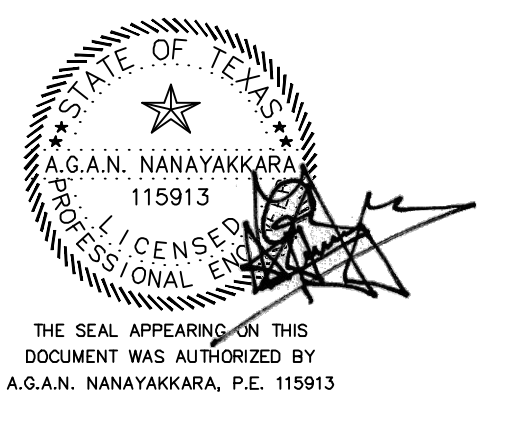
PIPE SIZE	PIPE GAUGE	BAND COUPLER GAUGE	PIPE SIZE	PIPE GAUGE	BAND COUPLER GAUGE
24"	18	16			
30"	18	16			
36"	18	16			
42"	18	16			
48"	18	16	48"	18	16
54"	18	16	54"	18	16
60"	18	16	60"	18	16
66"	18	16	66"	18	16
72"	18	16	72"	18	16
78"	18	16	78"	18	16
84"	18	16	84"	18	16

H = FOR PIPE SIZES 24" TO 42"
H=3 MAX. AND 1 MIN.
FOR PIPE SIZES 48" AND LARGER
H=1 MAX. AND MIN.

L = B.W. PIPE ≤ 7'-6" → L WILL EXTEND ONE PIPE Ø ABOVE E.O. ON OPPOSITE BANK (MIN)

L = B.W. PIPE ≥ 7'-6" → L=8 Ø OR MIN 1'-6" INTO B.W. WHICHEVER IS GREATER

Δ = PROP 24" TO 42" Δ=15"
PROP 48" AND LARGER Δ=30"



REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
OUTFALL AND INTERCEPTOR STRUCTURE DETAILS			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	SHEET SD22

DATE APPR. _____

DESCRIPTION _____

REV. _____

PROJECT ID# _____

PROJECT TITLE
**INTERCEPTOR STRUCTURE AND
CONCRETE PILOT CHANNEL
DETAILS**

PREPARED: _____

CHECKED: _____

APPROVED: _____

COMPANY INFORMATION AND LOGO COMES HERE

**HARRIS COUNTY
FLOOD CONTROL DISTRICT**
4001 Northwest Freeway
Houston, Texas 77092

DATE: 10-23-2018
SCALE: AS NOTED

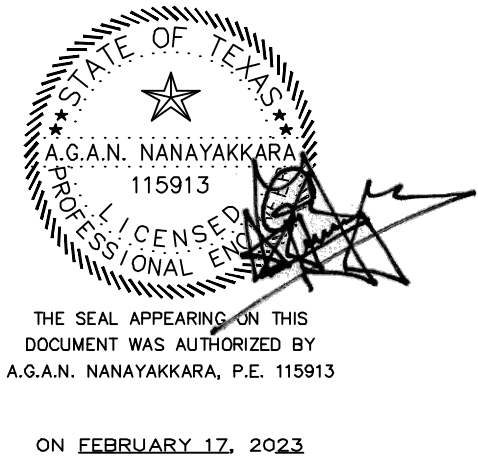
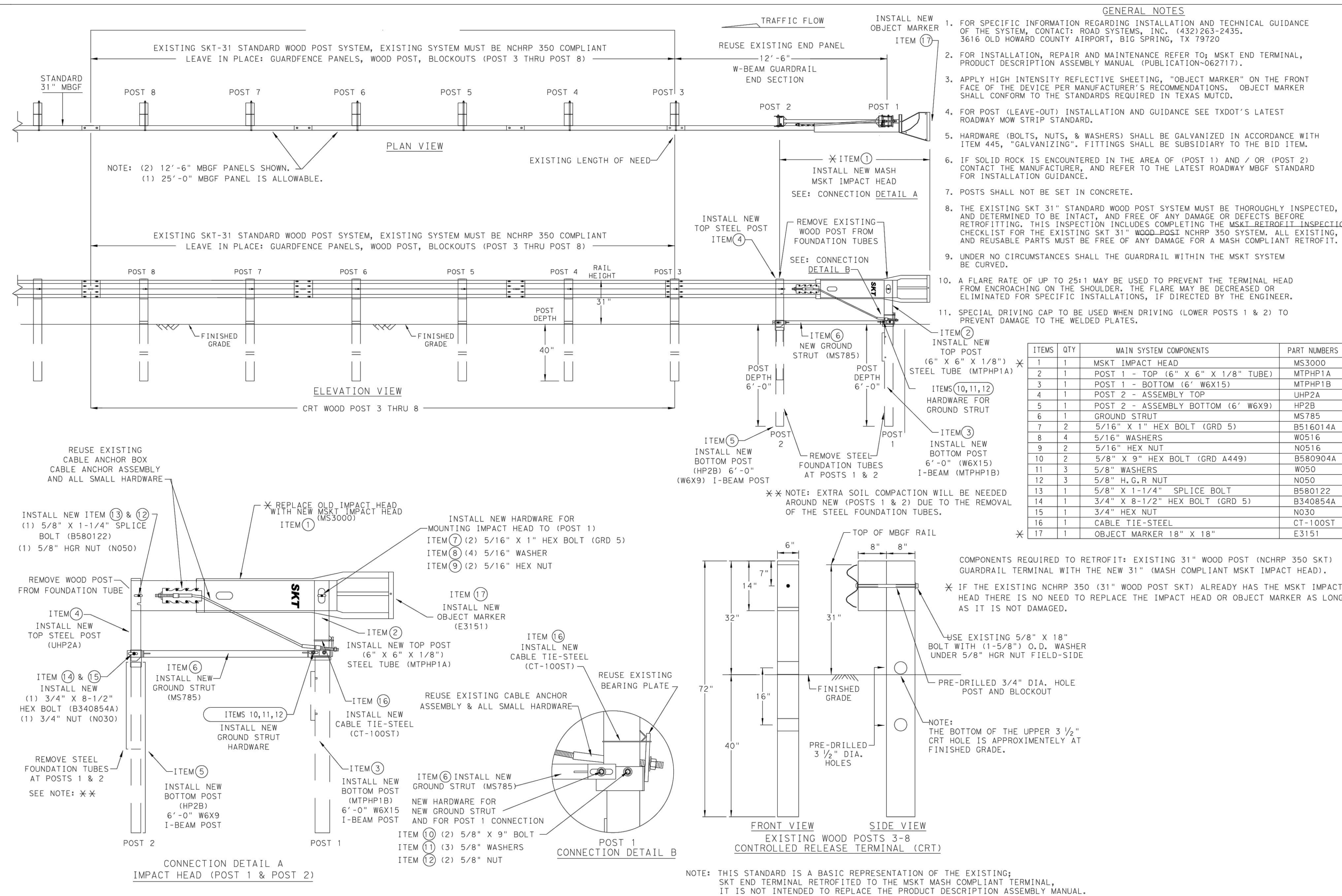
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ENGINEER - CONFIRM
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F.P.E. SEAL AND SIGNATURE

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NO.	REVISIONS	DATE	NAME
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FORT BEND COUNTY
ENGINEERING DEPARTMENT

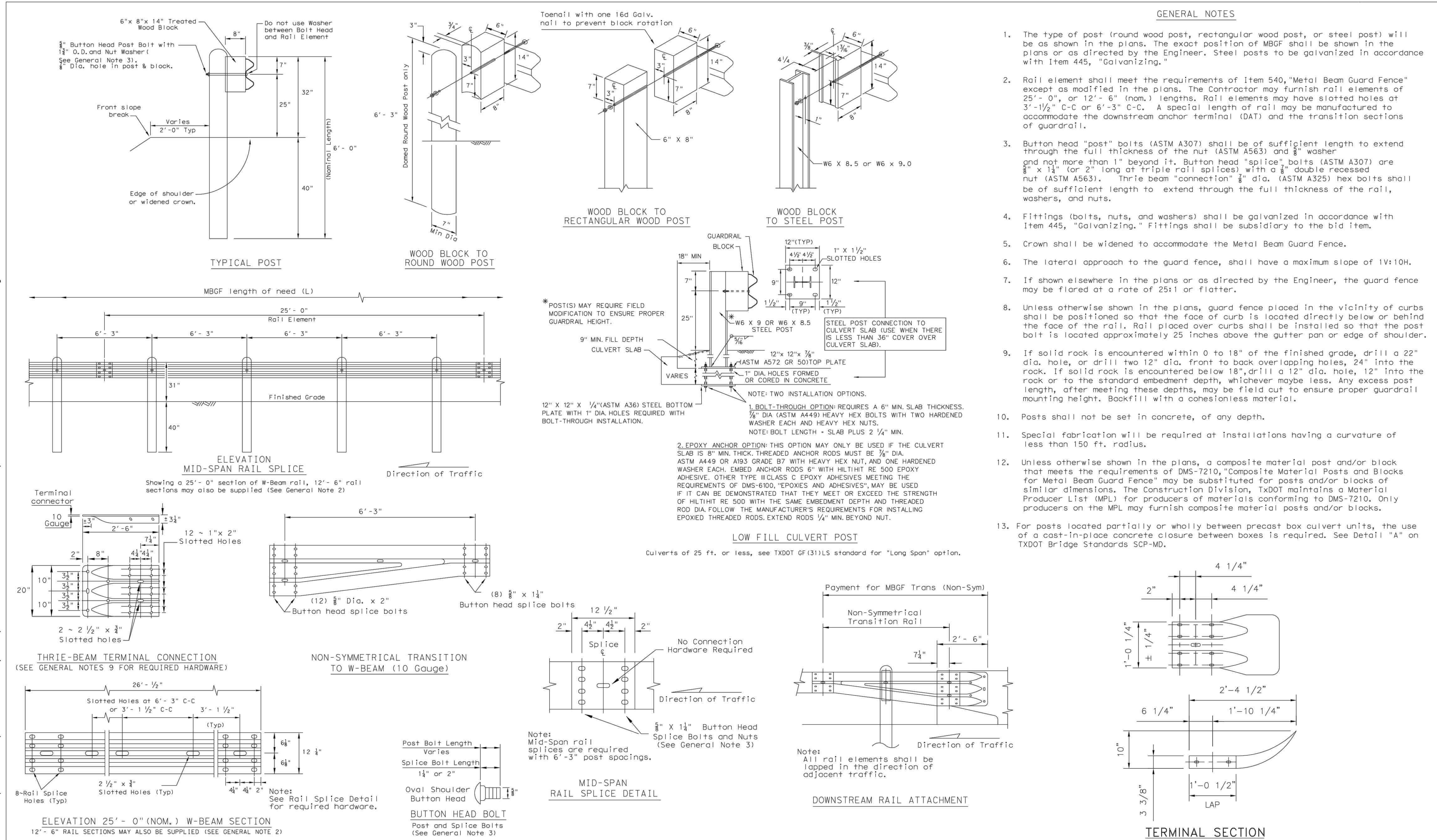


PROJECT TITLE:		FRCD STANDARD
DRAWN BY:	INIT	3.3
CK'D BY:	INIT	
SCALE:	SHEET DESCRIPTION:	SHEET NO.:
AS NOTED	SINGLE GUARDRAIL TERMINAL	/
DATE:	APPROVED BY:	
2-1-22		

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
SINGLE GUARDRAIL TERMINAL			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS ENGINEERS, LLC		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77454 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SD23	

F:\Clients\0522-Fort Bend County Engineering\0522-1801 Brandt Road Drawings\Seg 2\SD24 METAL BEAM GUARD FENCE.dwg Feb 17, 2023-11:46am Terra Associates Inc., Thanh Dao

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GENERAL NOTES

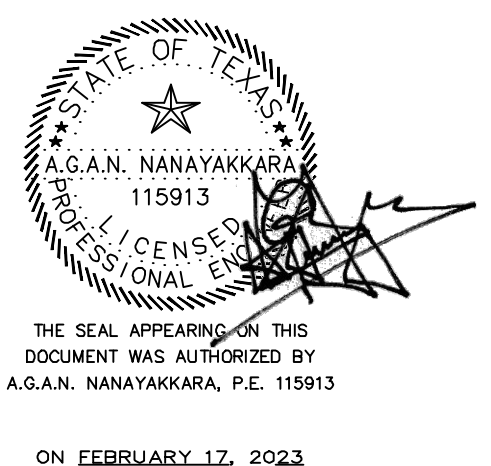
- The type of post (round wood post, rectangular wood post, or steel post) will be as shown in the plans. The exact position of M.B.G.F. shall be shown in the plans or as directed by the Engineer. Steel posts to be galvanized in accordance with Item 445, "Galvanizing."
- Rail element shall meet the requirements of Item 540, "Metal Beam Guard Fence" except as modified in the plans. The Contractor may furnish rail elements of 25'-0", or 12'-6" (nom.) lengths. Rail elements may have slotted holes at 3'-1 1/2" C-C or 6'-3" C-C. A special length of rail may be manufactured to accommodate the downstream anchor terminal (DAT) and the transition sections of guardrail.
- Button head "post" bolts (ASTM A307) shall be of sufficient length to extend through the full thickness of the nut (ASTM A563) and 3/8" washer and not more than 1" beyond it. Button head "splice" bolts (ASTM A307) are 3/8" x 1 1/4" (or 2" long at triple rail splices) with a 3/8" double recessed nut (ASTM A563). Three beam "connection" 3/8" dia. (ASTM A325) hex bolts shall be of sufficient length to extend through the full thickness of the rail, washers, and nuts.
- Fittings (bolts, nuts, and washers) shall be galvanized in accordance with Item 445, "Galvanizing." Fittings shall be subsidiary to the bid item.
- Crown shall be widened to accommodate the Metal Beam Guard Fence.
- The lateral approach to the guard fence, shall have a maximum slope of 1V:10H.
- If shown elsewhere in the plans or as directed by the Engineer, the guard fence may be flared at a rate of 25:1 or flatter.
- Unless otherwise shown in the plans, guard fence placed in the vicinity of curbs shall be positioned so that the face of curb is located directly below or behind the face of the rail. Rail placed over curbs shall be installed so that the post bolt is located approximately 25 inches above the gutter pan or edge of shoulder.
- If solid rock is encountered within 0 to 18" of the finished grade, drill a 22" dia. hole, or drill two 12" dia. front to back overlapping holes, 24" into the rock. If solid rock is encountered below 18", drill a 12" dia. hole, 12" into the rock or to the standard embedment depth, whichever may be less. Any excess post length, after meeting these depths, may be field cut to ensure proper guardrail mounting height. Backfill with a cohesionless material.
- Posts shall not be set in concrete, of any depth.
- Special fabrication will be required at installations having a curvature of less than 150 ft. radius.
- Unless otherwise shown in the plans, a composite material post and/or block that meets the requirements of DMS-7210, "Composite Material Posts and Blocks for Metal Beam Guard Fence" may be substituted for posts and/or blocks of similar dimensions. The Construction Division, TxDOT maintains a Material Producer List (MPL) for producers of materials conforming to DMS-7210. Only producers on the MPL may furnish composite material posts and/or blocks.
- For posts located partially or wholly between precast box culvert units, the use of a cast-in-place concrete closure between boxes is required. See Detail "A" on TxDOT Bridge Standards SCP-MD.

NO.	REVISIONS	DATE	NAME
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FORT BEND COUNTY
ENGINEERING DEPARTMENT



PROJECT TITLE:		
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CK'D BY:	INIT	34
SCALE:	NONE	SHEET NO:
DATE:	2-1-22	APPROVED BY:

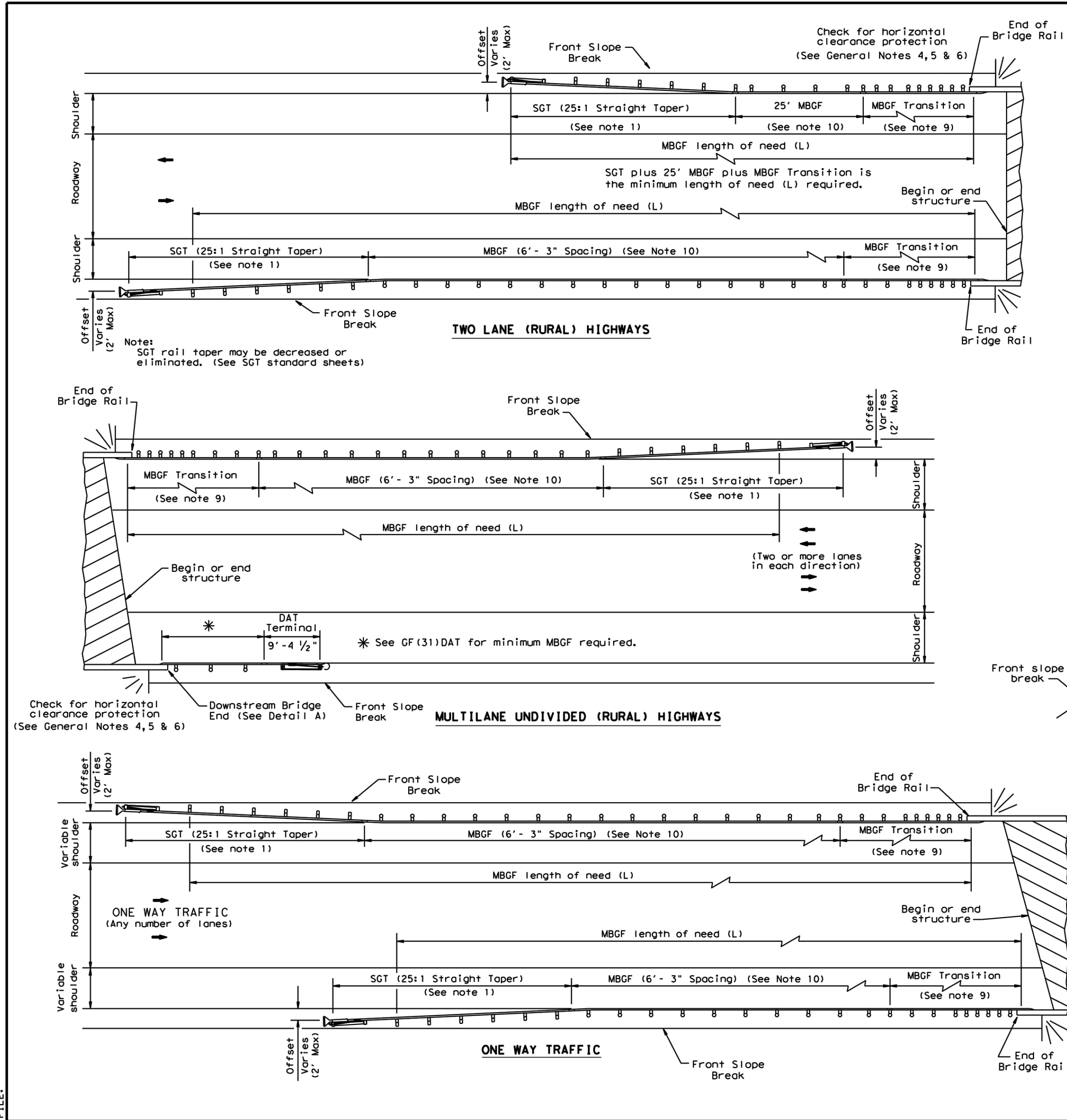


REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
METAL BEAM GUARD FENCE			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	
		PROJECT No. 0522-1801 CONTRACT: 1 SHEET SD24	

722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77454
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.B.P.E. FIRM
REGISTRATION NO. 11653

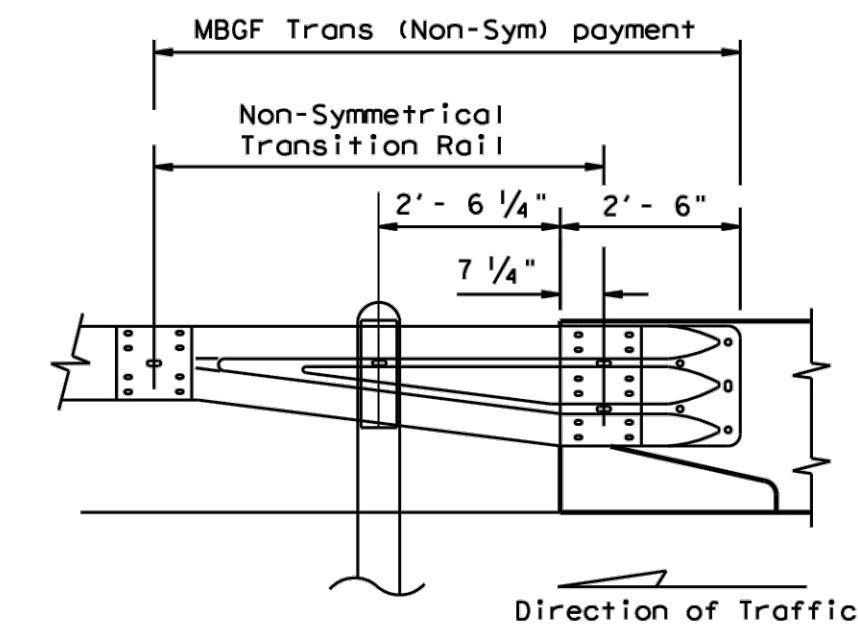
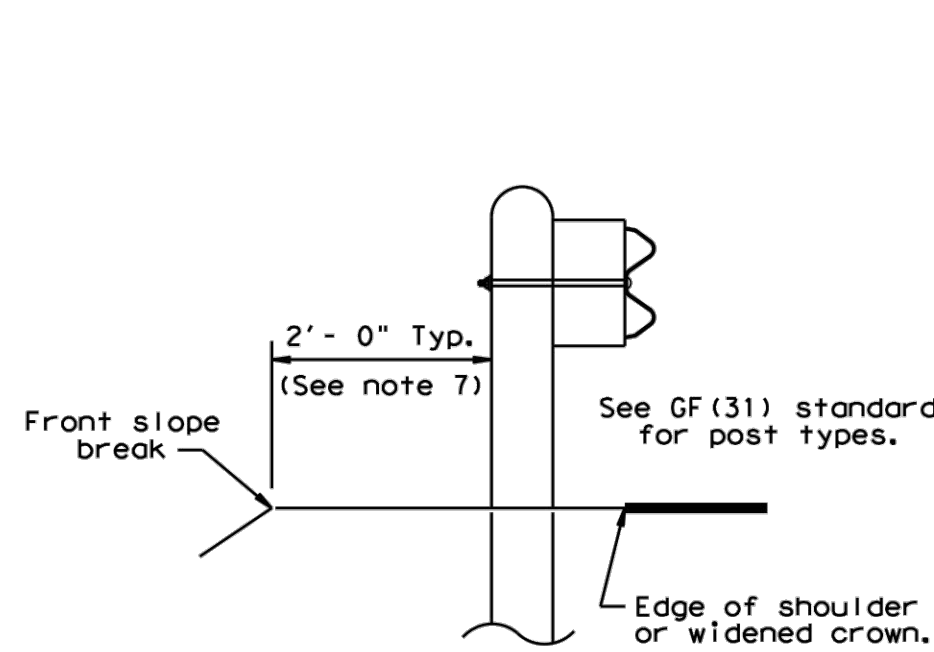
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GENERAL NOTES

- For more detail: See GF(31), SGT(31), GF(31)TR, and GF(31)TL2 standard sheets.
- Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
- Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
- MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
- Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
- Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
- The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'-0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
- For restrictive bridge widths: The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft. "maximum" offset from the shoulder edge in the approach direction.
- Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
- A minimum 25' length of MBGF will be required.

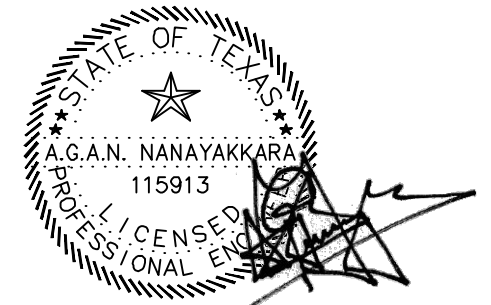


Texas Department of Transportation
Design Division Standard

**BRIDGE END DETAILS
(METAL BEAM GUARD FENCE
APPLICATIONS TO RIGID RAILS)**

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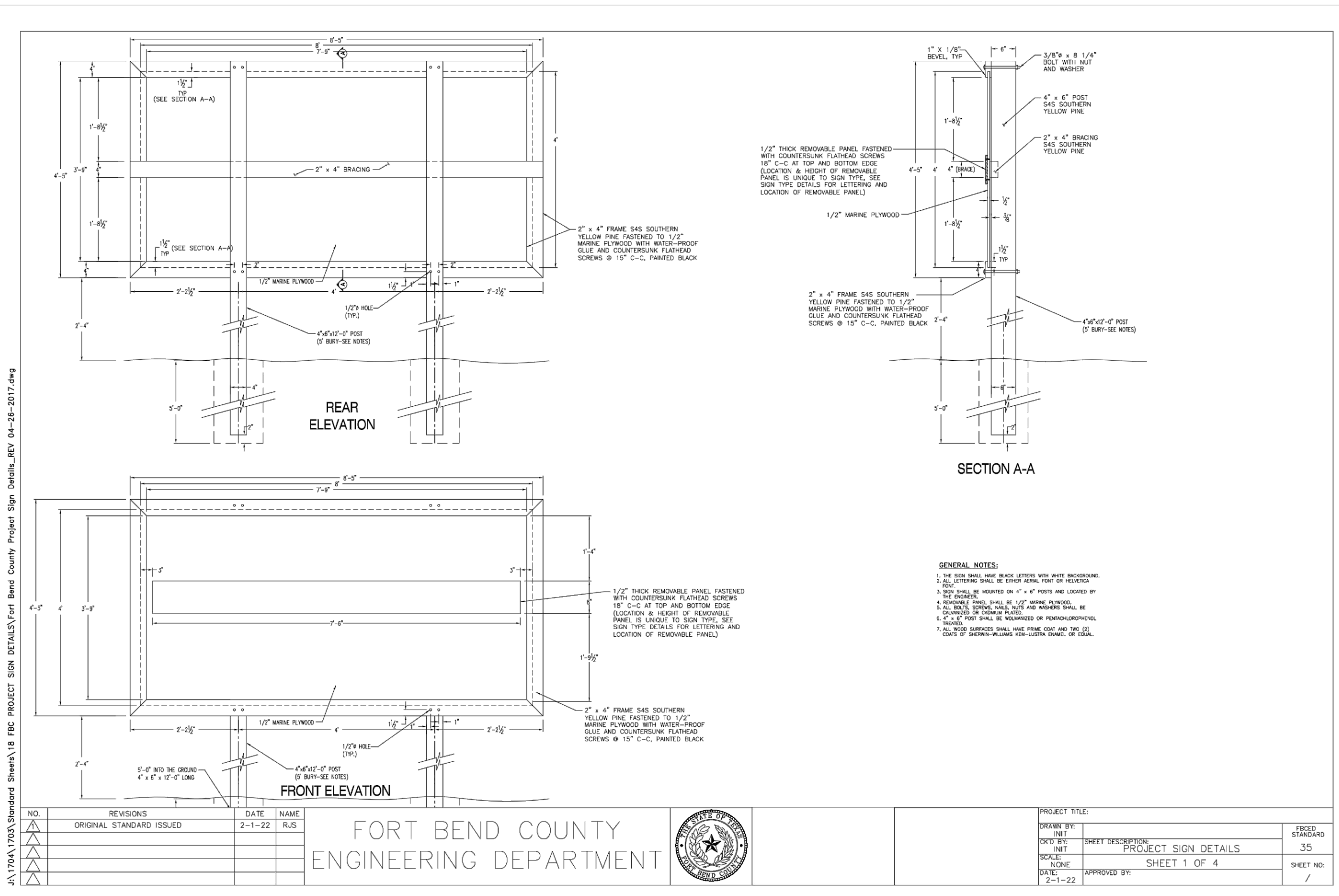
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REVISED APRIL 2014 SEE INWD 0414	REVISIONS		DIST	COUNTY
				SHEET NO.



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ON FEBRUARY 17, 2023

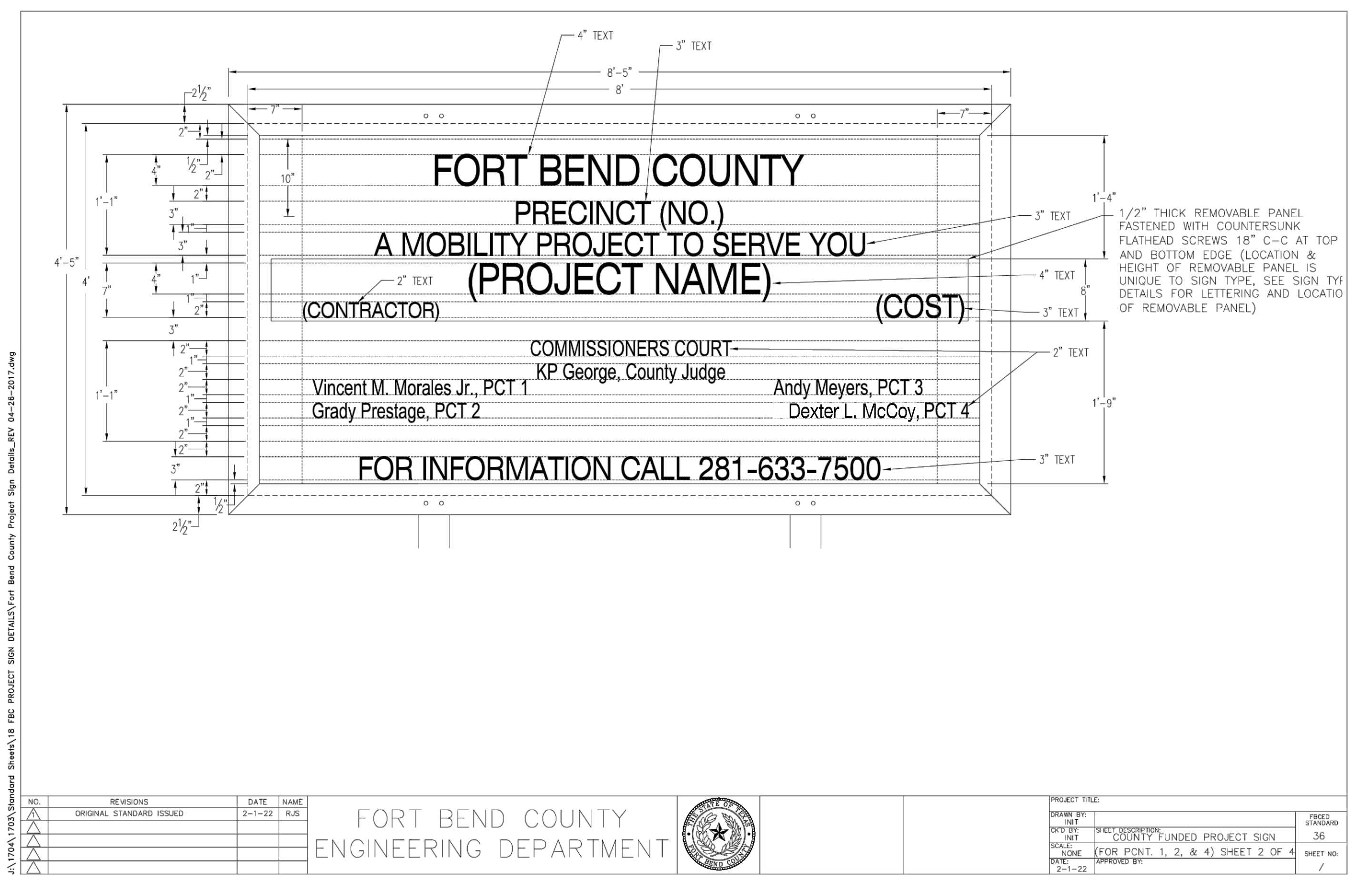
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BRANDT ROAD PRECINCT LINE RD TO MASON RD			
BRIDGE END DETAILS			
TERRA a Bowman company			
1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309			
JNS ENGINEERS, LLC			
722 PIN OAK ROAD, STE 202A KATY, TEXAS 77454 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653			
DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET SD25	



NO.	REVISIONS	DATE	NAME
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**FORT BEND COUNTY
ENGINEERING DEPARTMENT**

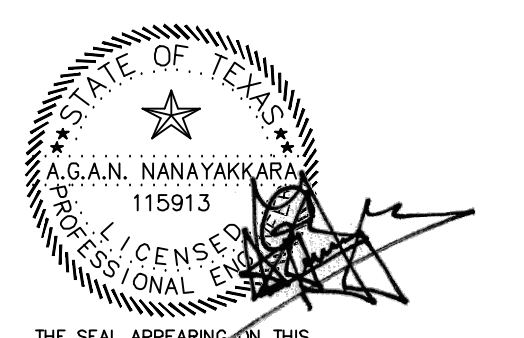
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SCALE:	NONE	SHEET 1 OF 4	SHEET NO.:
DATE:	2-1-22	APPROVED BY:	/



NO.	REVISIONS	DATE	NAME
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**FORT BEND COUNTY
ENGINEERING DEPARTMENT**

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DATE:	2-1-22	APPROVED BY:	/

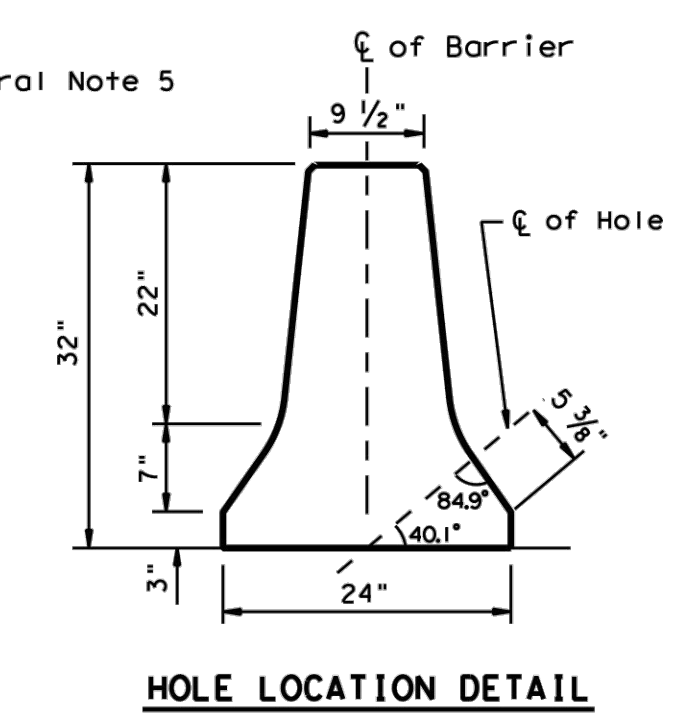
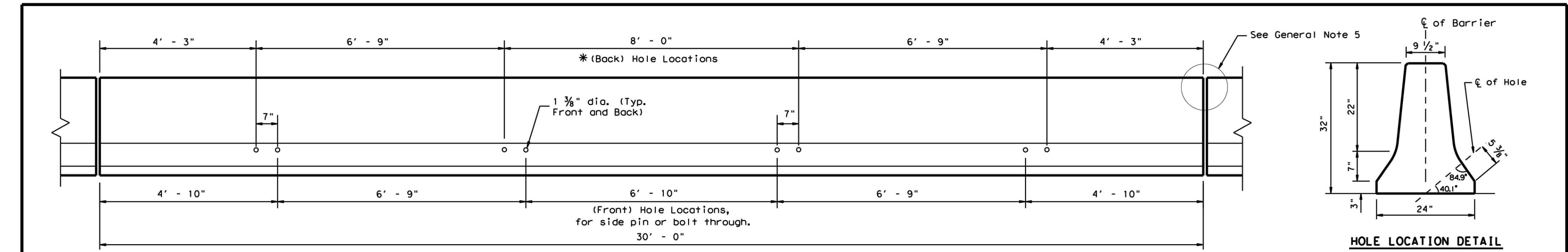


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BRANDT ROAD PRECINCT LINE RD TO MASON RD			
FORT BEND COUNTY PROJECT SIGN			
TERRA a Bowman company		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
JNS LLC		JNS ENGINEERS, LLC	
DRAWN BY: T.D.		SCALE: N.T.S.	
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	
PROJECT No. 0522-1801		CONTRACT: 1	
SHEET SD26		SHEET SD26	

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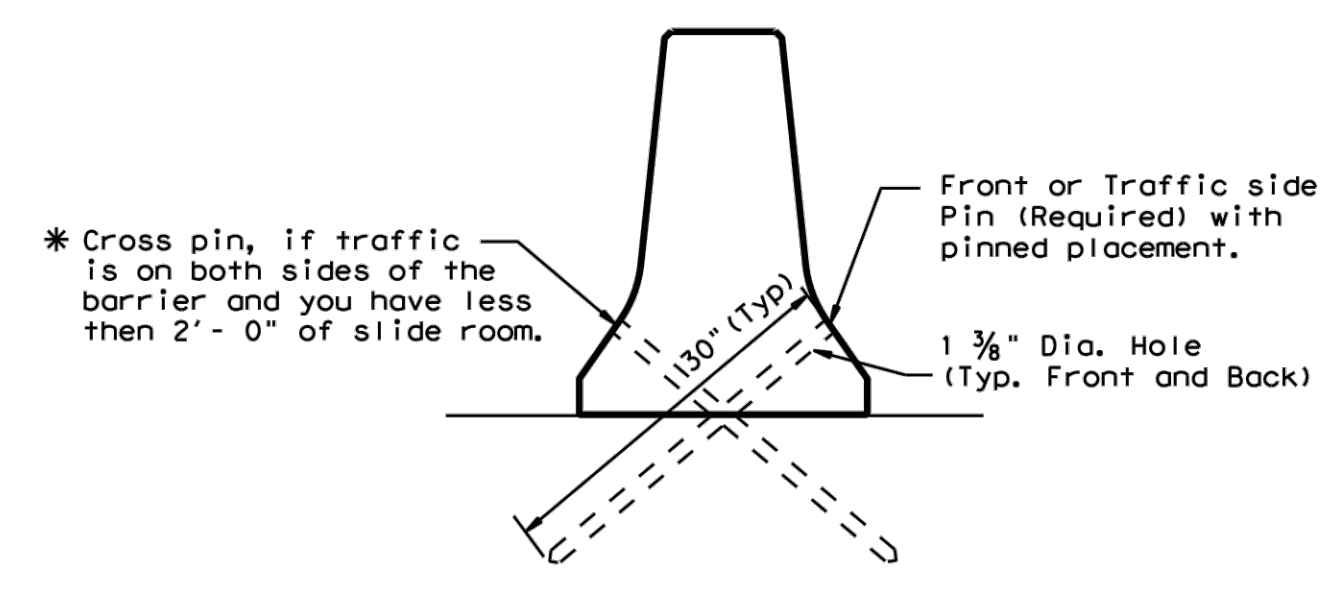
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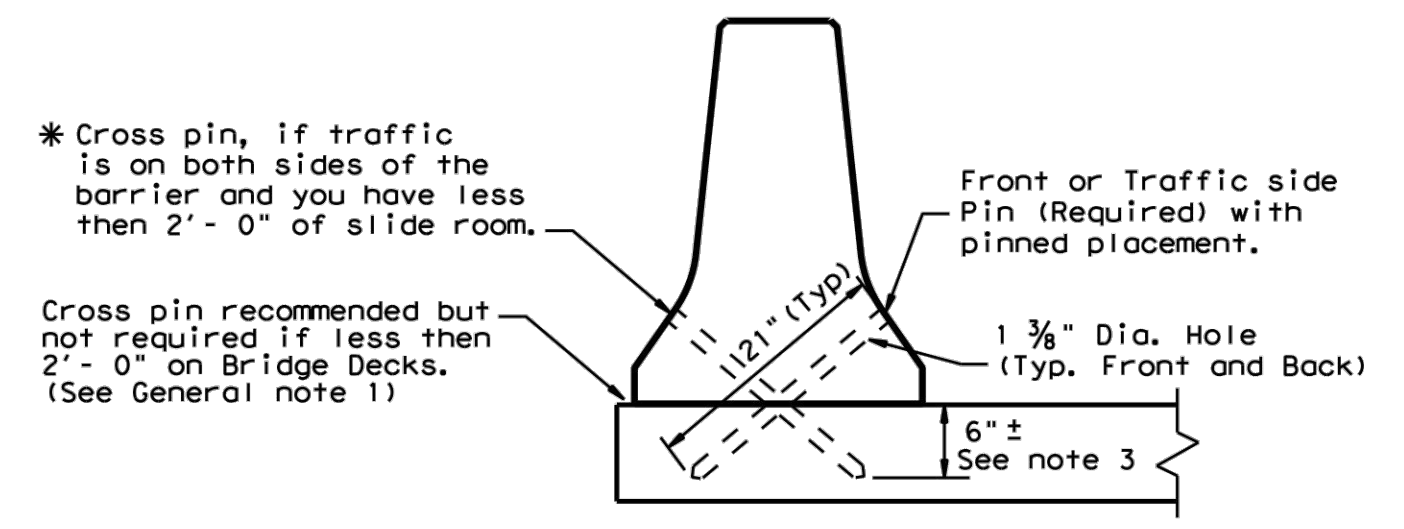
DETAIL 1

GENERAL NOTES

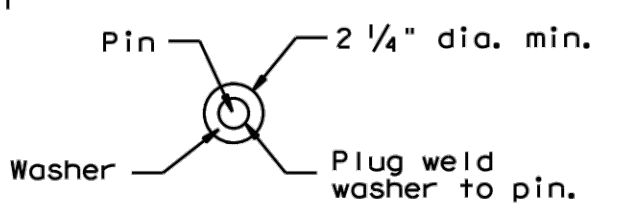
- These details provide a method of laterally restraining precast concrete barrier to limit deflections under normally expected passenger vehicle impacts. These details are intended for use in work zones, primarily on bridge decks, or pavement where temporary barrier must be placed less than 2 ft. from the longitudinal edge of the deck or dropoff and parallel to the direction of travel. Other applications of these details are acceptable as directed by the Engineer.
- Each precast concrete barrier section shall have a minimum of four or total of eight 1 3/8" ID, holes formed or cored through the barrier. The center lines of the holes are shown in the hole location detail. If rebar is encountered, the entry point may be shifted 2" plus or minus longitudinally along the barrier. The eight holes are spaced along the length of the barrier as shown in Detail 1.
- The drilling of the travel surface is accomplished by placing the pre-drilled barrier section on the travel surface in the desired position. Then the hole is drilled with the bit passing through the hole in the barrier. The bit is to be inserted into the hole in the barrier so that the travel surface is drilled to a point which is slightly more than the pin length.
- Note that steel washers have been welded to the top of the steel pins to aid in the removal of the pins, when the barrier is removed.
- See CSB(1) standard sheets for reinforcement requirements and joint connection types.
- The forming or coring of holes in the barrier, drilling of holes in bridge deck or pavement, fabrication and materials for the 1/4" pins, installation of pins, and any repair to the barrier shall be considered as subsidiary to the barrier bid items.
- The barrier and travel surface will be repaired as directed by the Engineer in accordance with Item 429, "Concrete Structure Repair."
- Provide galvanized bolts, nuts, and plate washers. All steel pins shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
- Weight of barrier is approx. 440 lbs per foot.



DETAIL 2

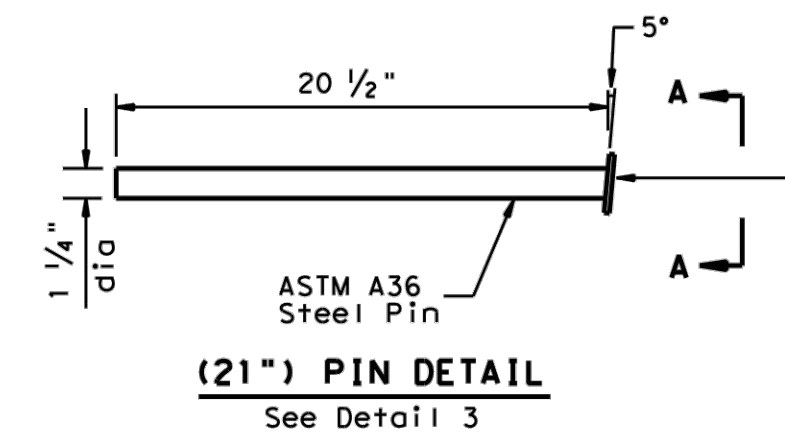


DETAIL 3

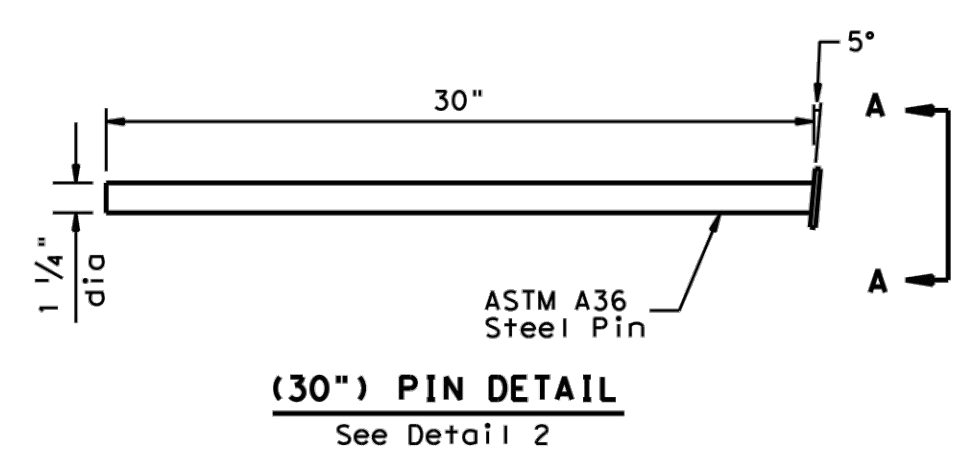


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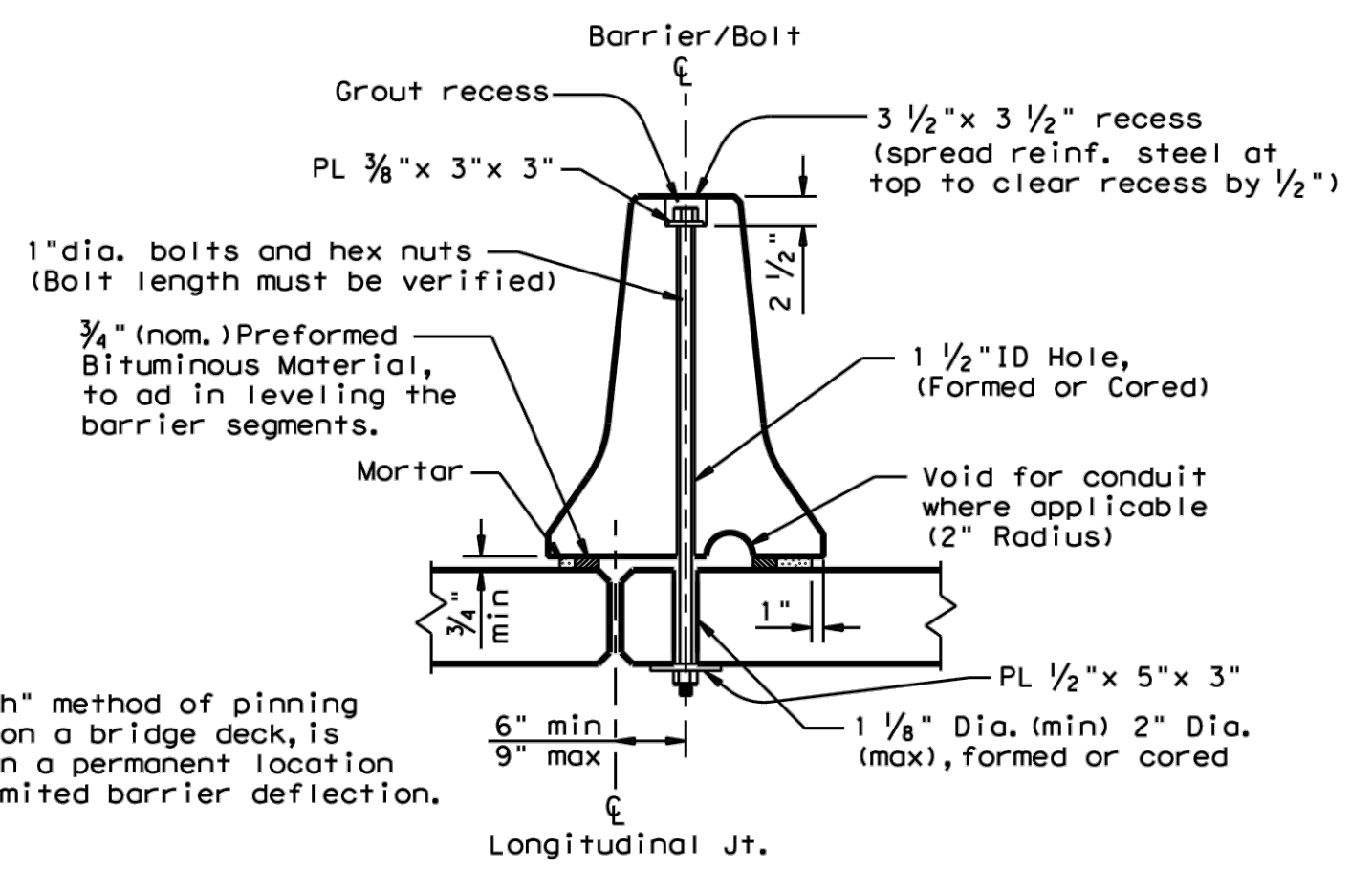
CORE DRILLING EXISTING BARRIER
Core drilling existing concrete barrier is permitted. Holes shall be drilled with coring or masonry drilling type equipment. Percussion (star) drilling shall not be used. A special drill bit (to cut through existing reinforcing) will likely be required. Spalls in the concrete exceeding 1/2" shall be patched.



(21") PIN DETAIL
See Detail 3



(30") PIN DETAIL
See Detail 2



Note:
The "Bolt Through" method of pinning precast barrier on a bridge deck, is primarily used in a permanent location that requires limited barrier deflection.

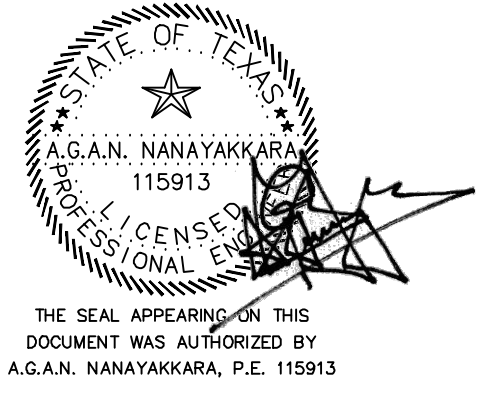
PRECAST CSB (BOLT THROUGH) PLACEMENT OVER LONGITUDINAL EXPANSION JOINT

For bolt through locations, use the (Front) hole locations shown on Detail 1.

Texas Department of Transportation
Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE) PRECAST BARRIER (TYPE 1) PINNED PLACEMENT CSB(7)-10

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ON FEBRUARY 17, 2023

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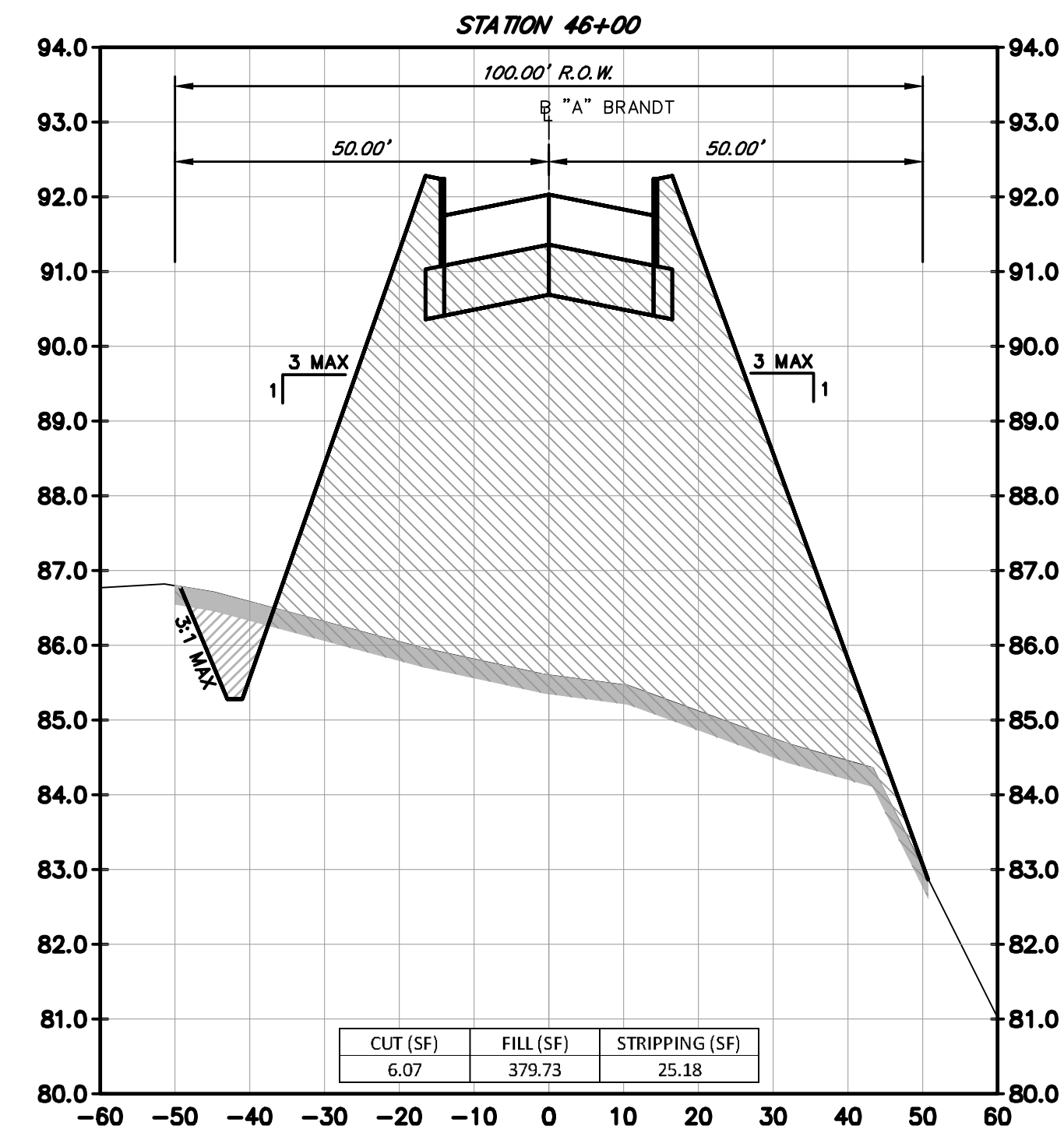
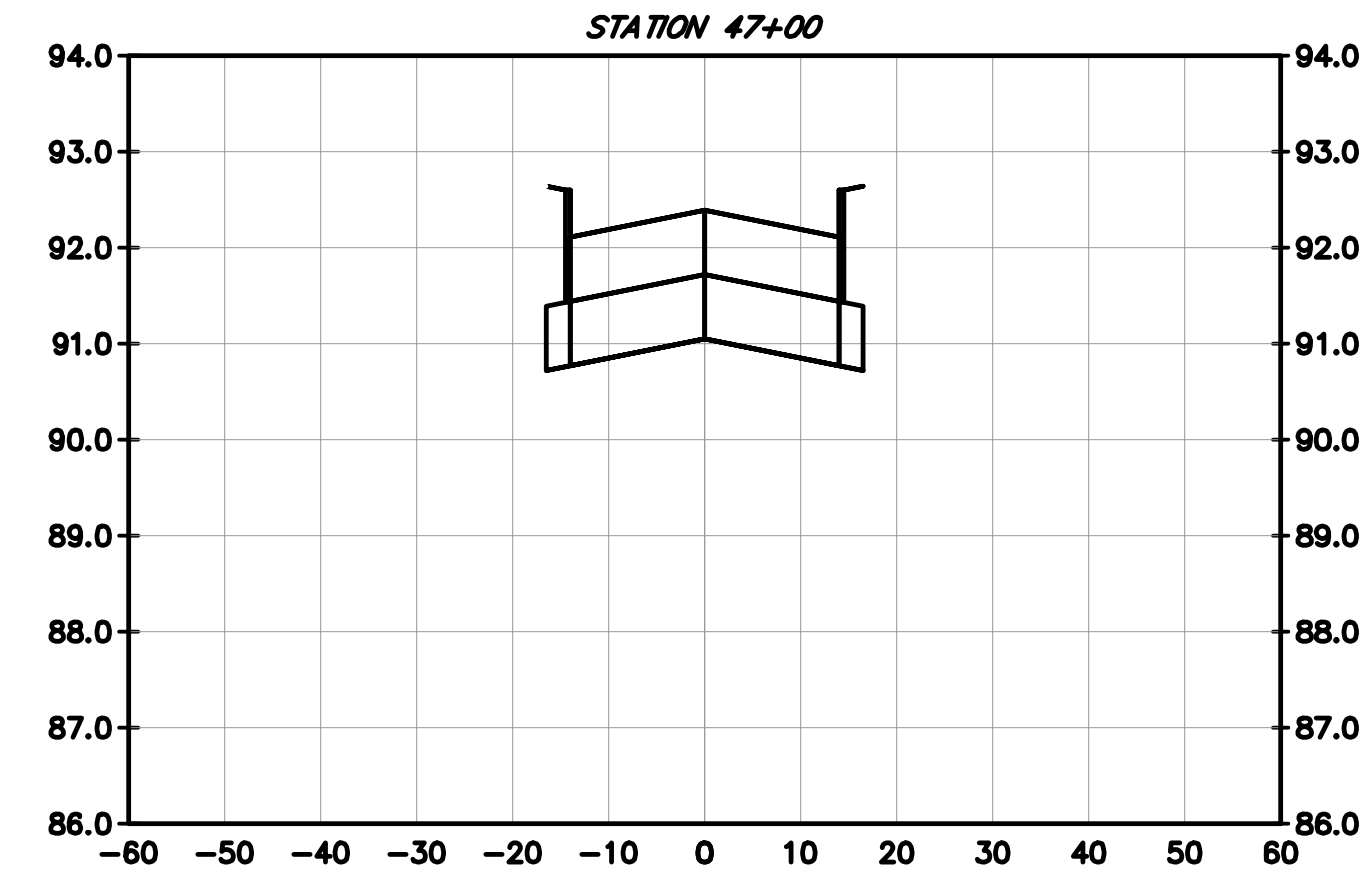
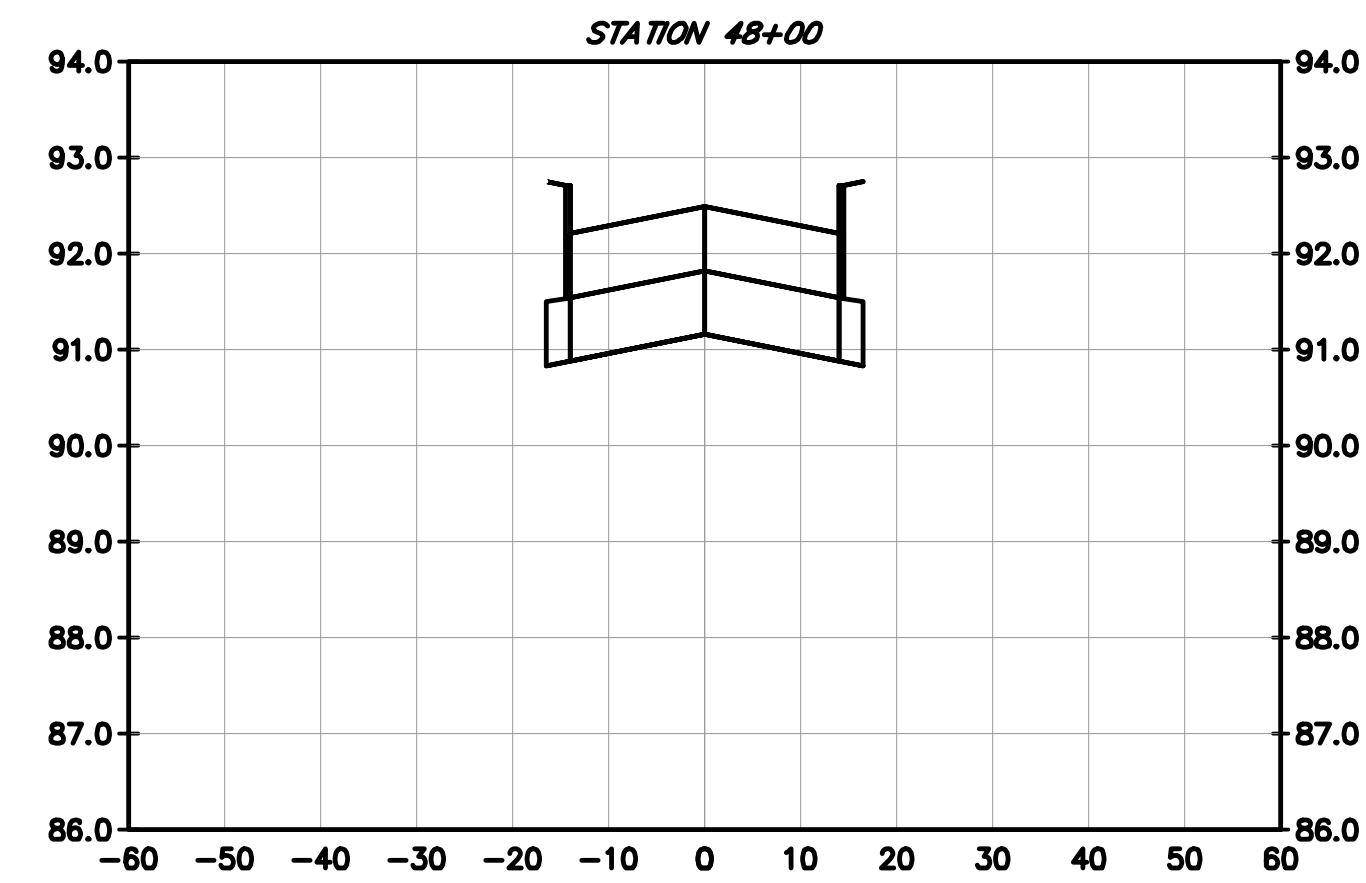
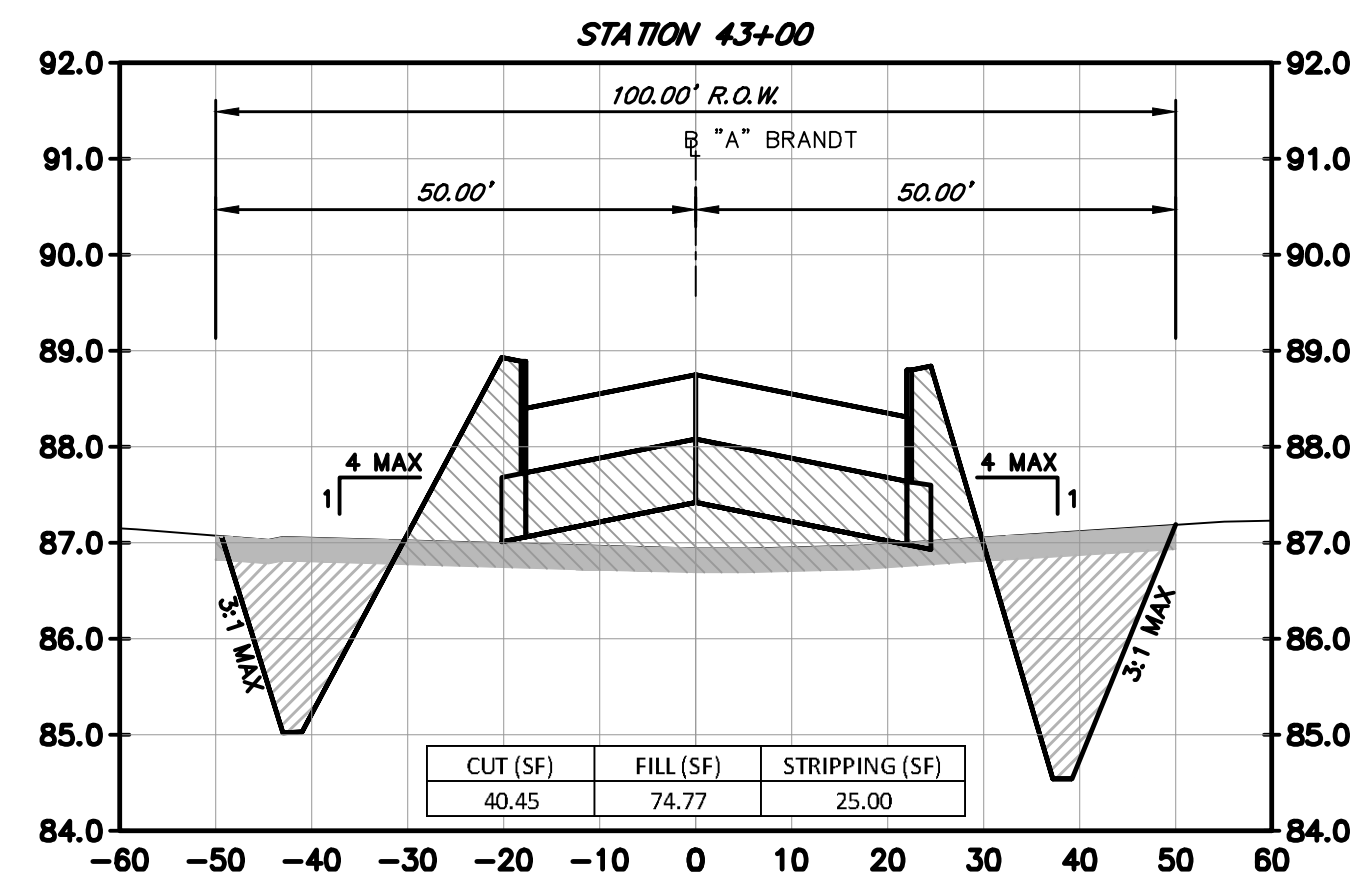
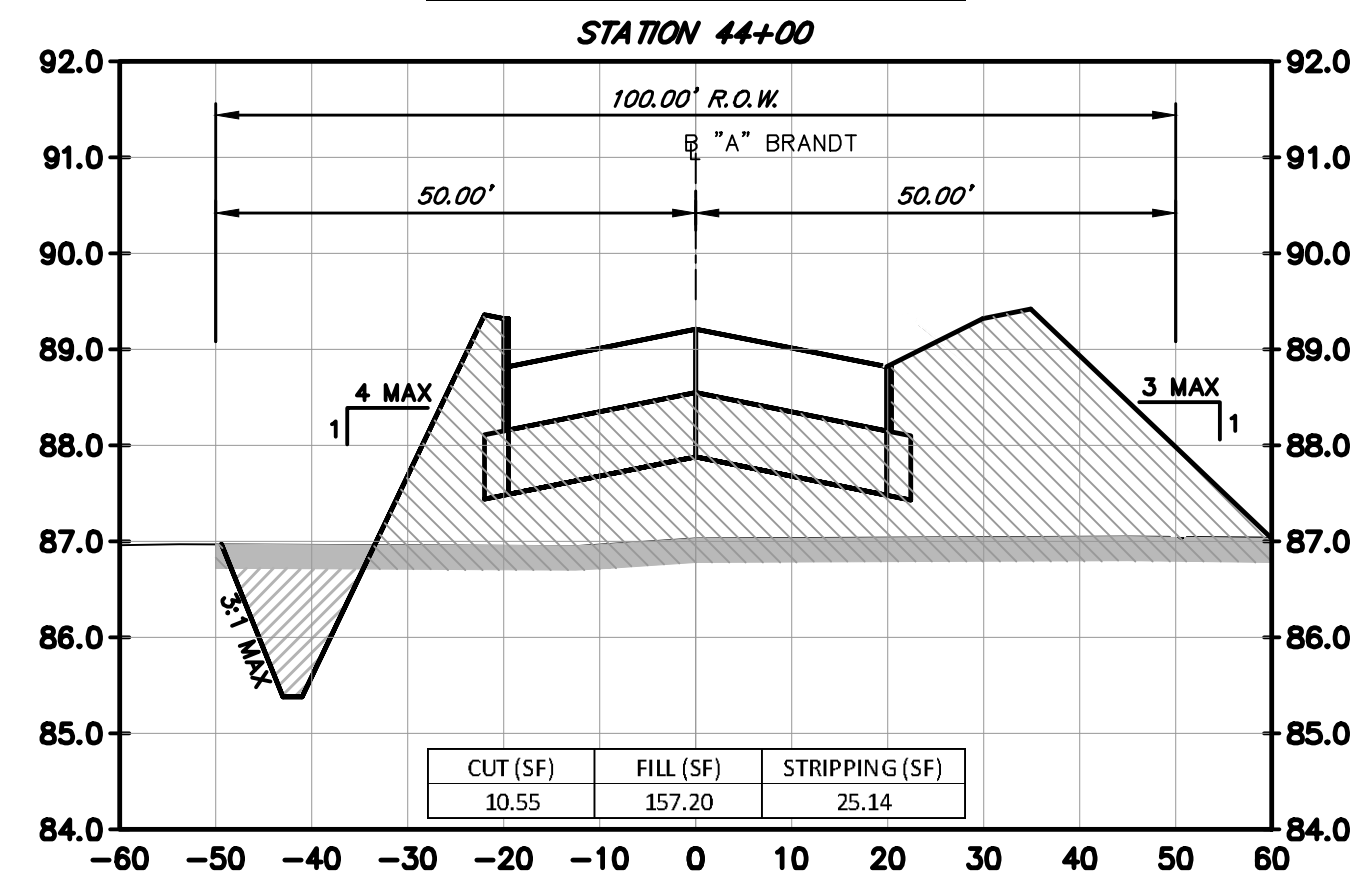
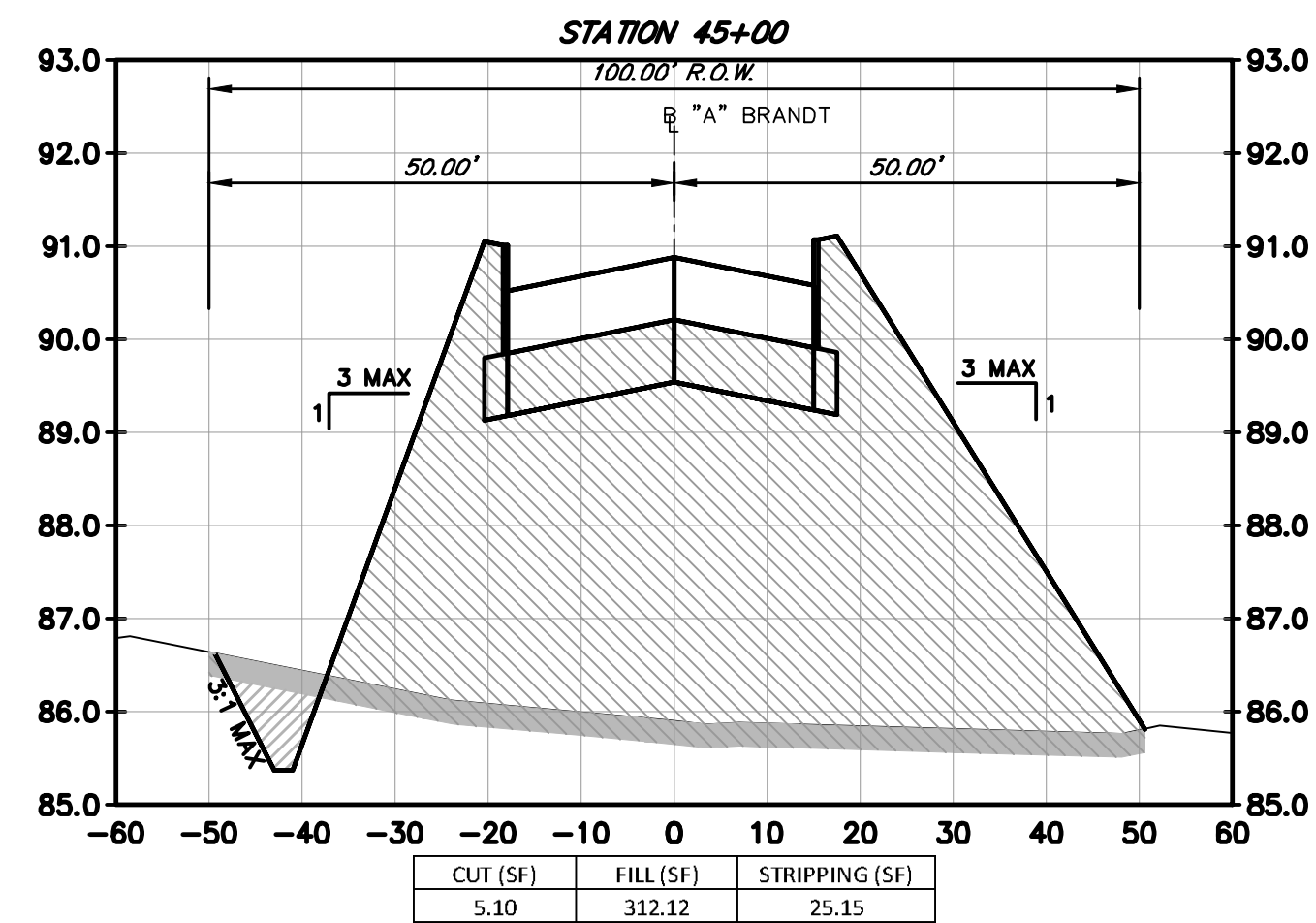
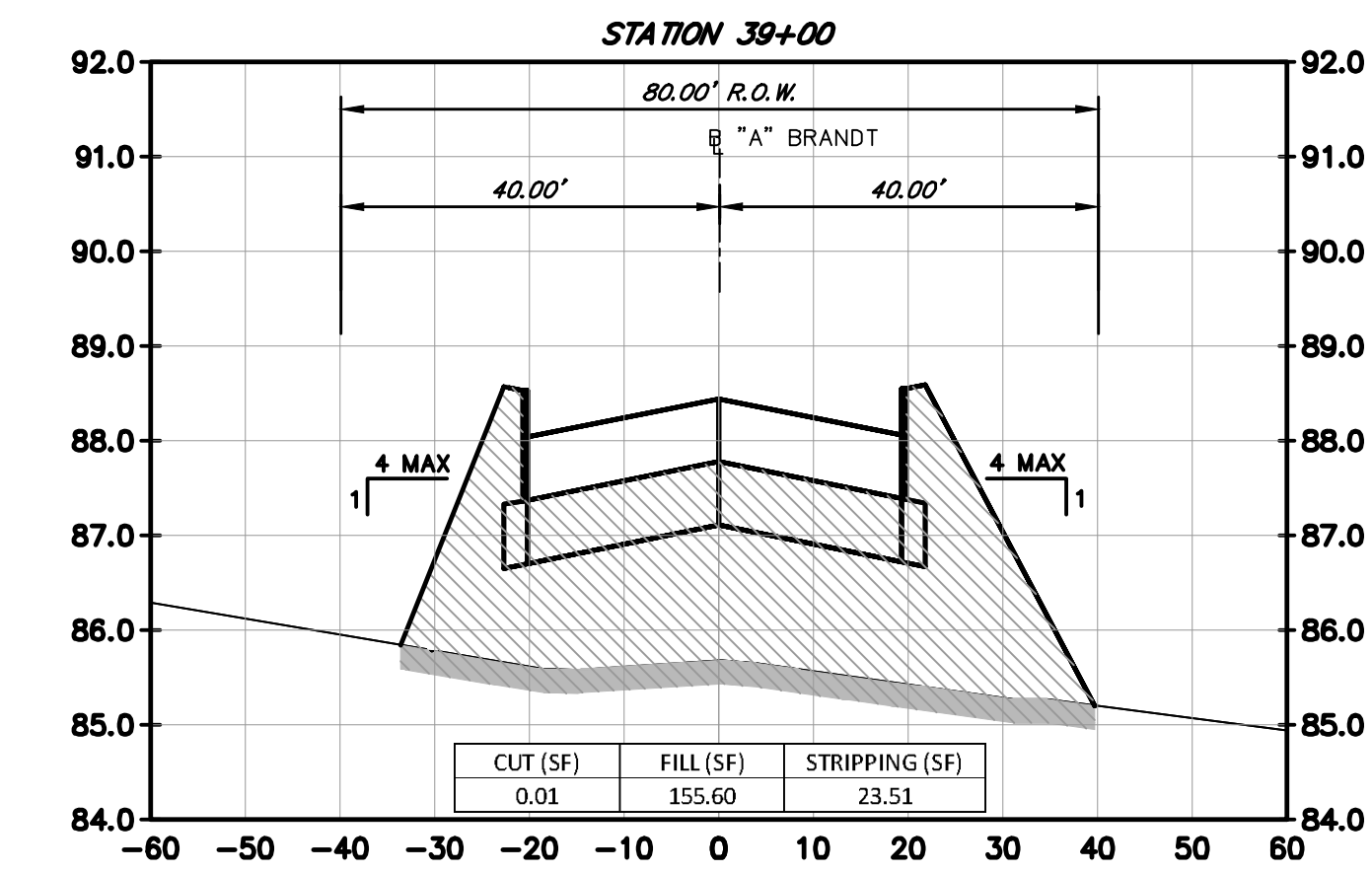
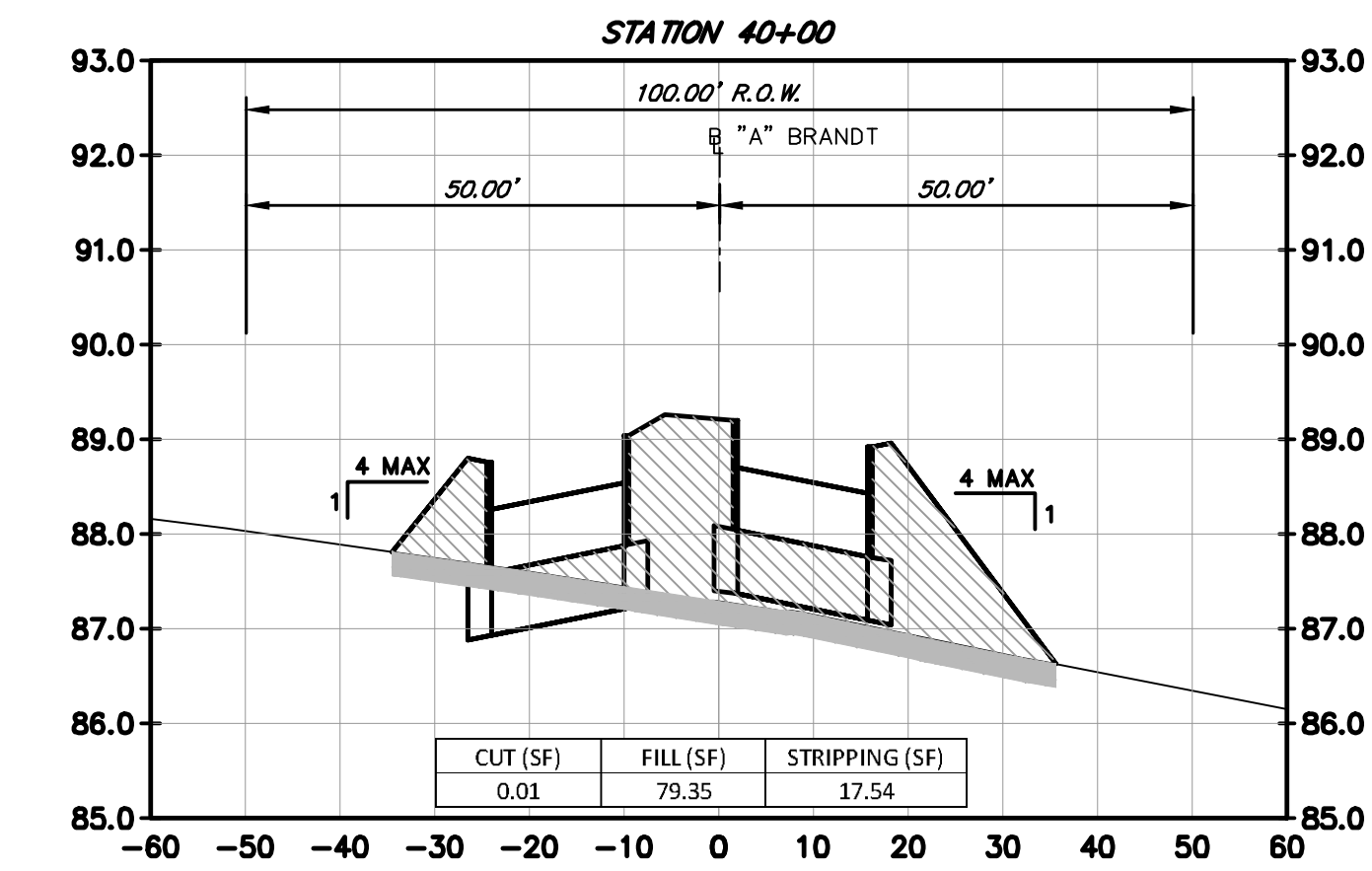
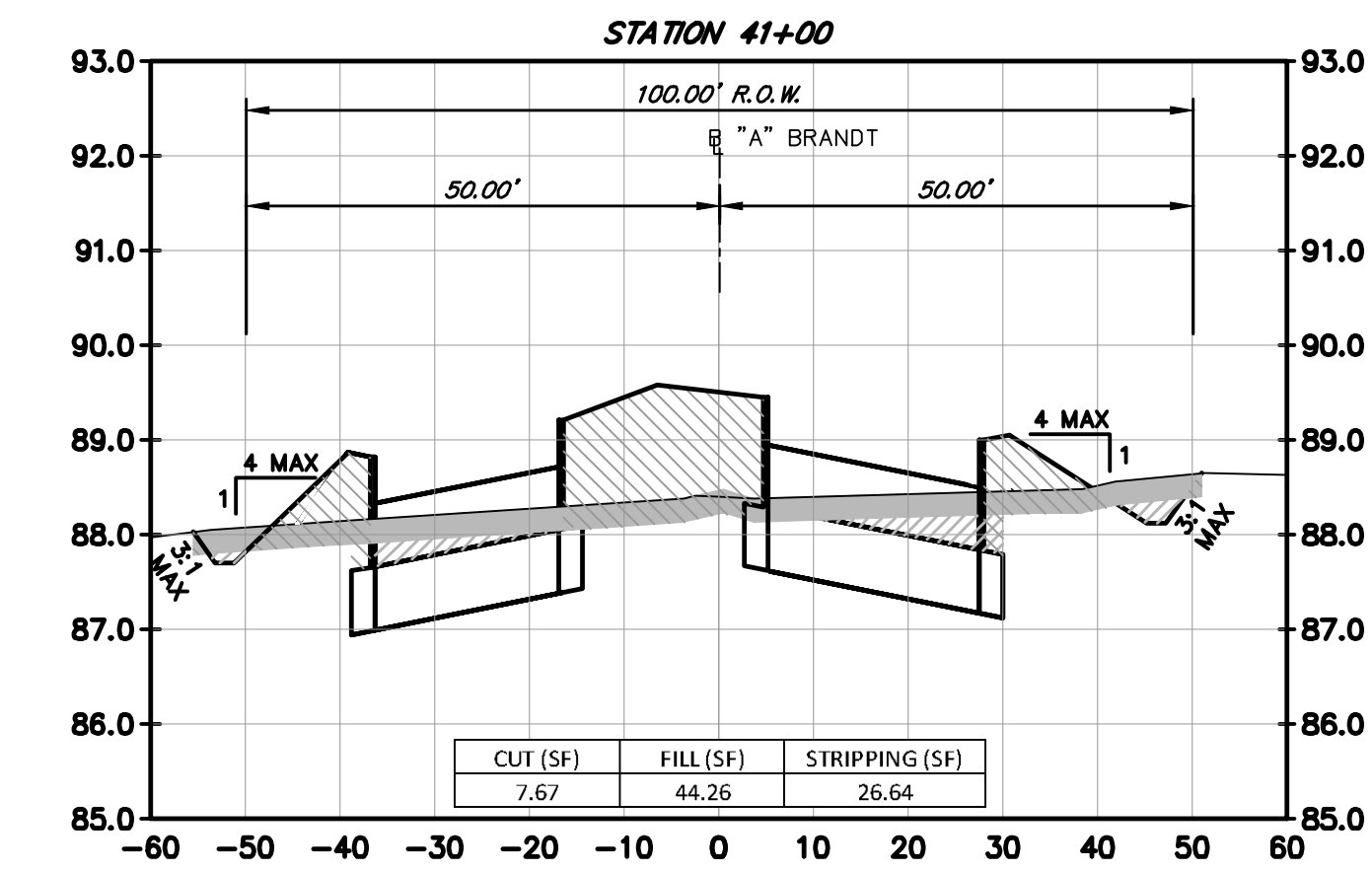
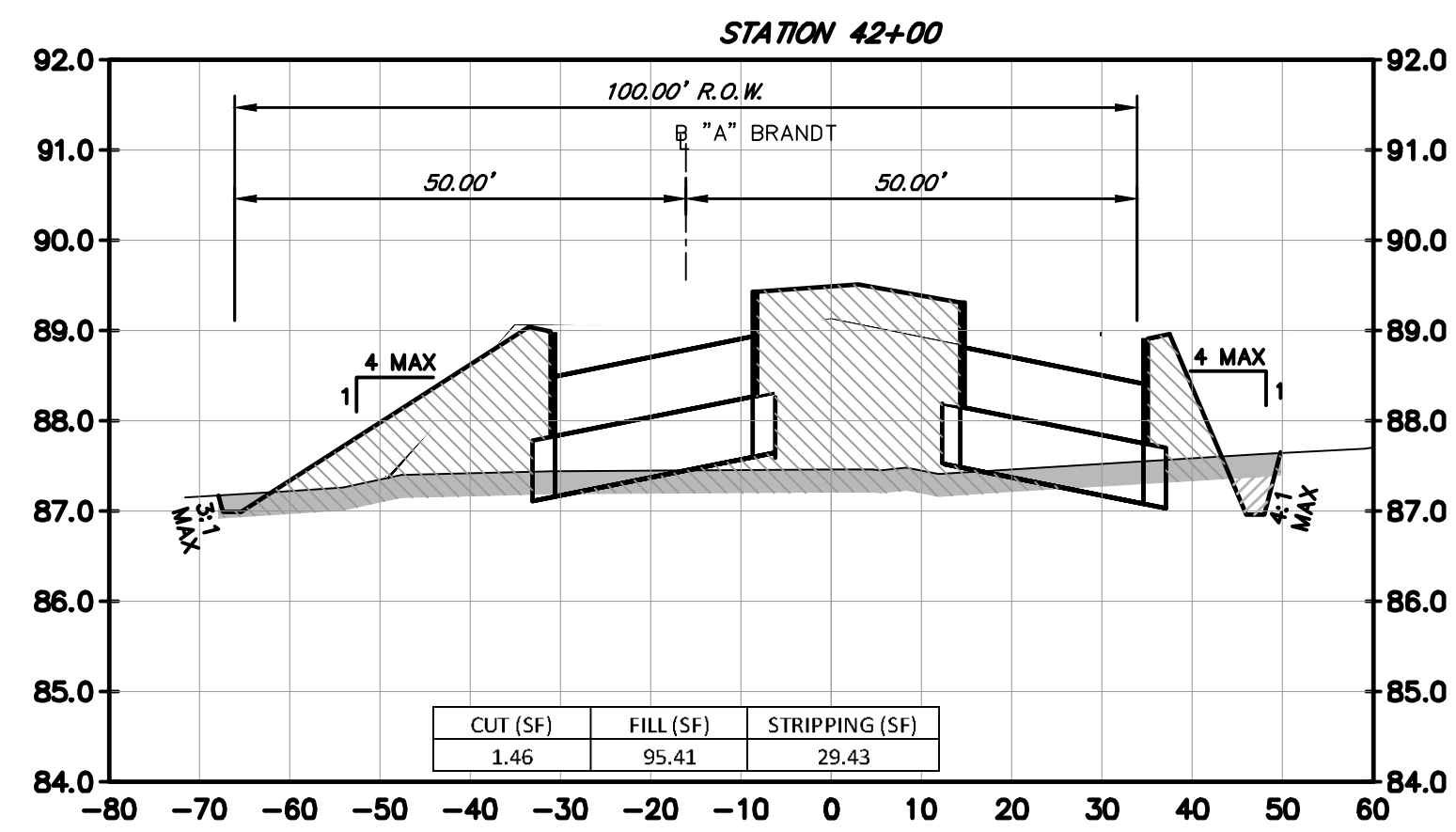
**BRANDT ROAD
PRECINCT LINE RD TO MASON RD
CONCRETE SAFETY BARRIER
(F-SHAPE)**

TERRA 1445 N. LOOP WEST - SUITE 450
HOUSTON, TEXAS 77008
713-993-0333
TBPE Registration No.: F-14309

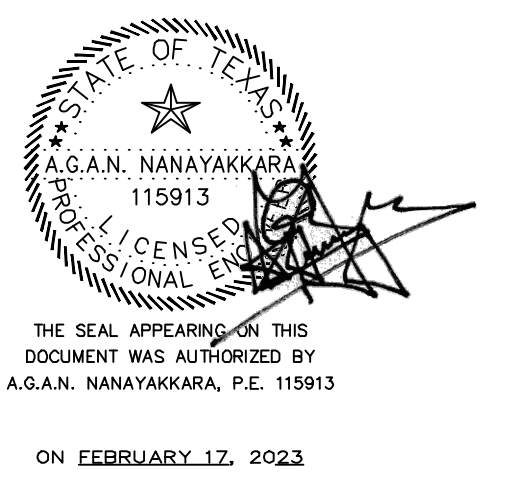
JNS ENGINEERS, LLC
722 PIN OAK ROAD, STE 202A
KATY, TEXAS 77494
TELEPHONE: (281) 391-3366
FAX: (281) 391-3375
WWW.JNSCE.COM
T.B.P.E. FIRM
REGISTRATION NO. 11653

DRAWN BY: T.D.	SCALE: N.T.S.	PROJECT No. 0522-1801
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	CONTRACT: 1
		SHEET SD27

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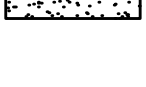


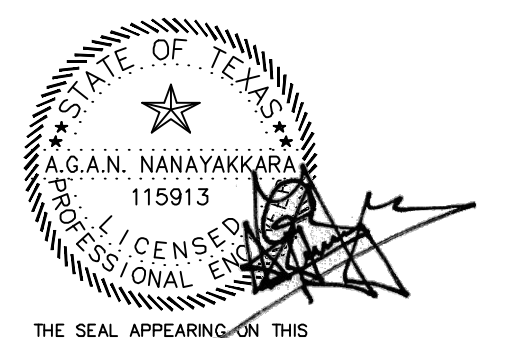
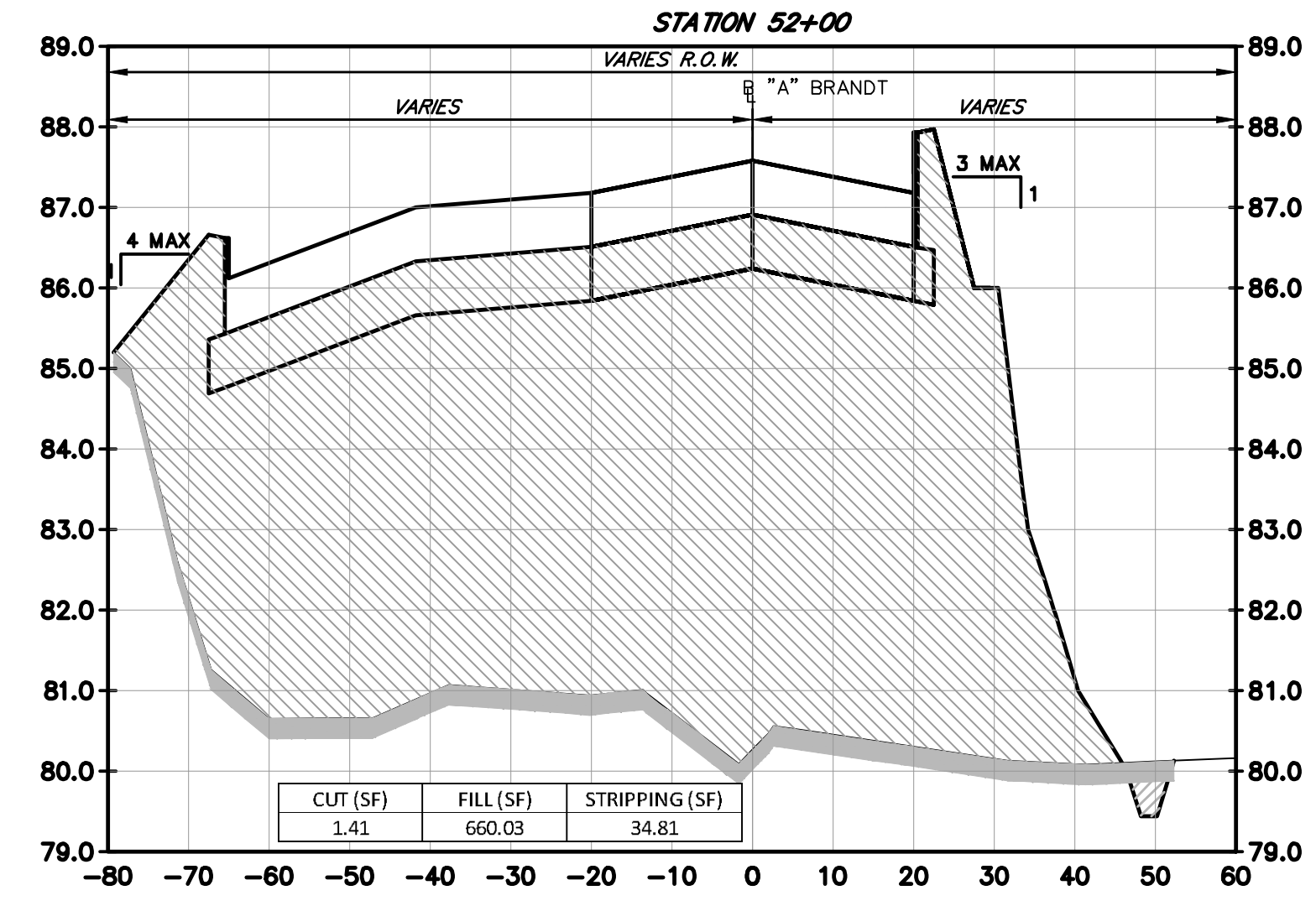
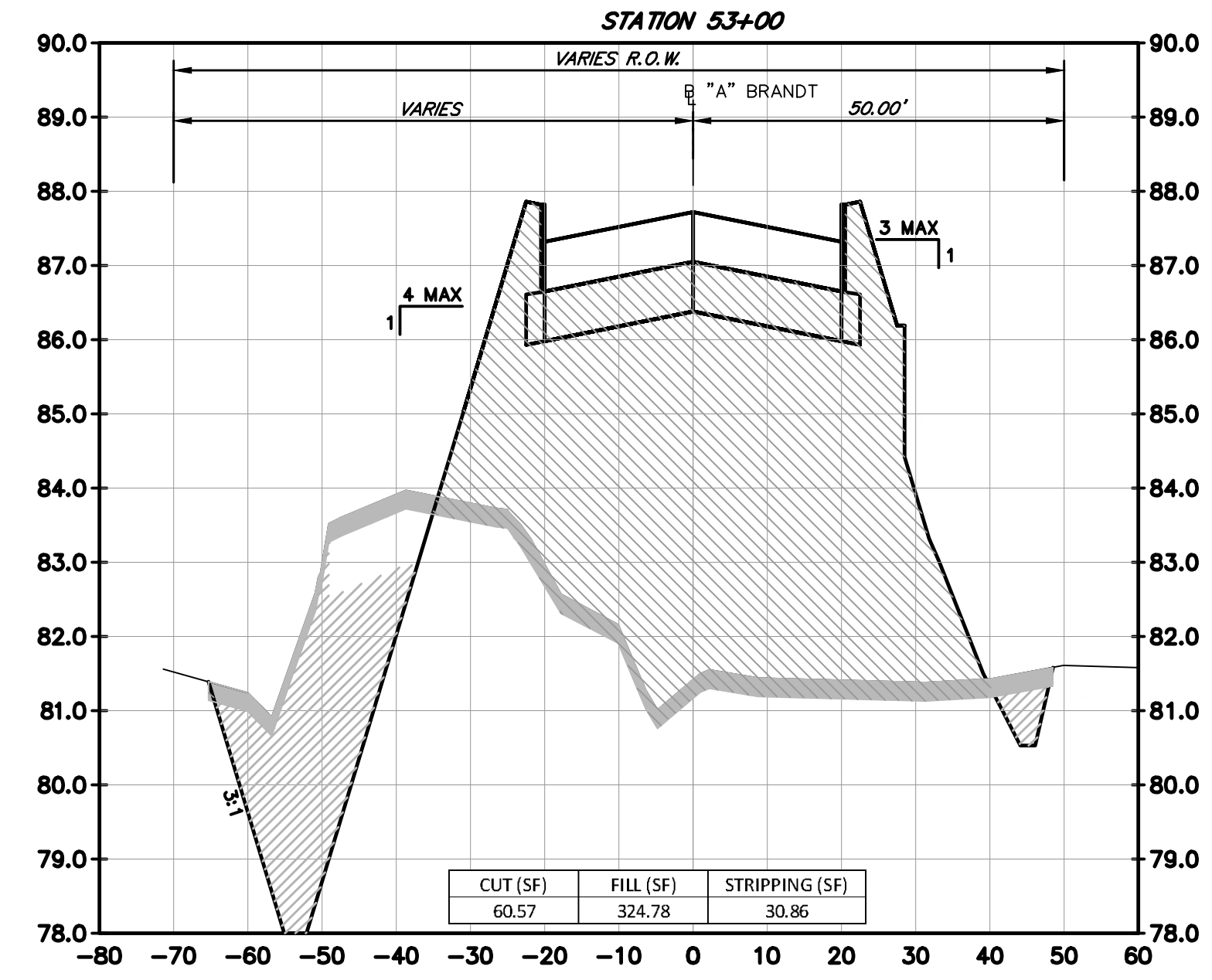
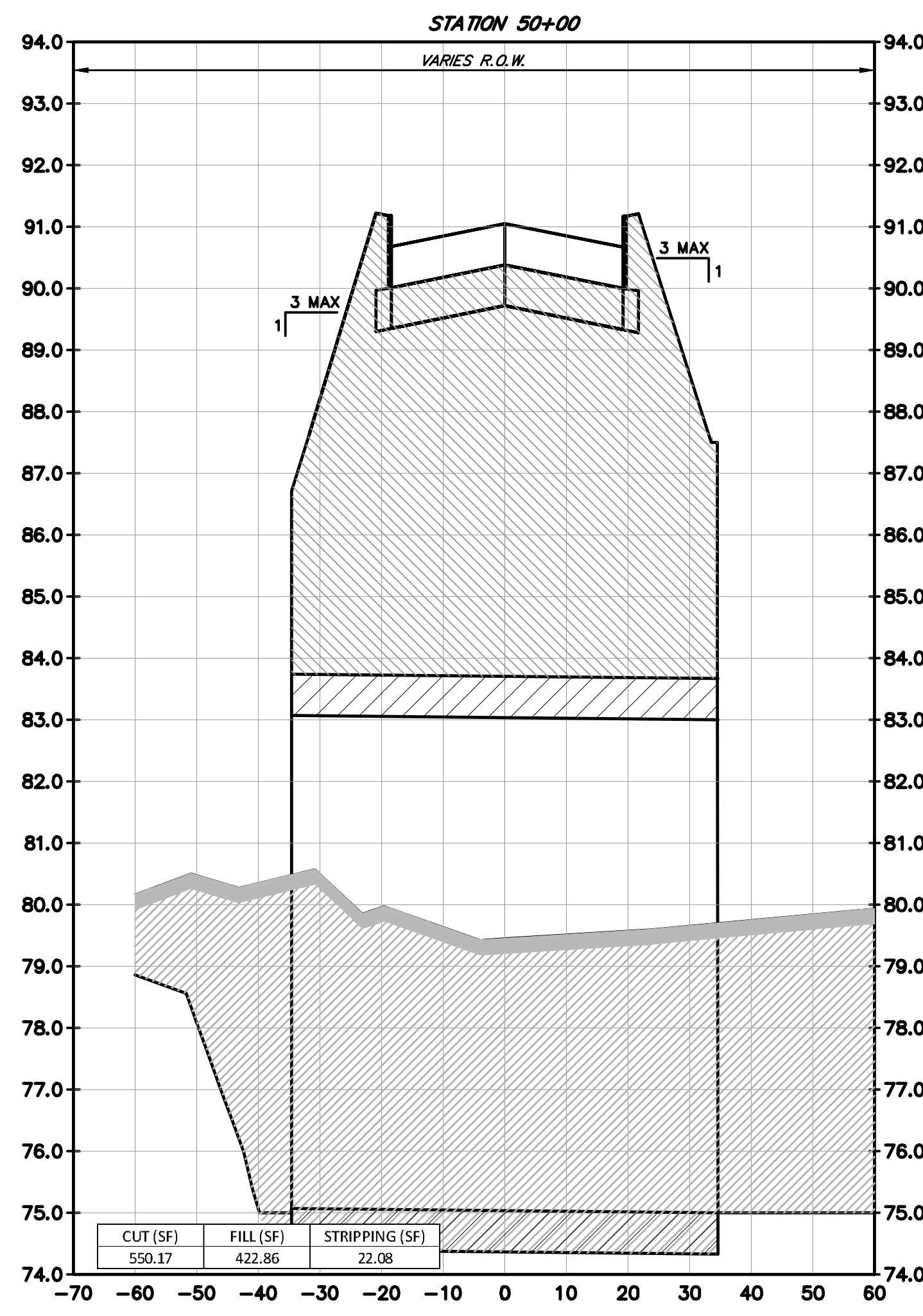
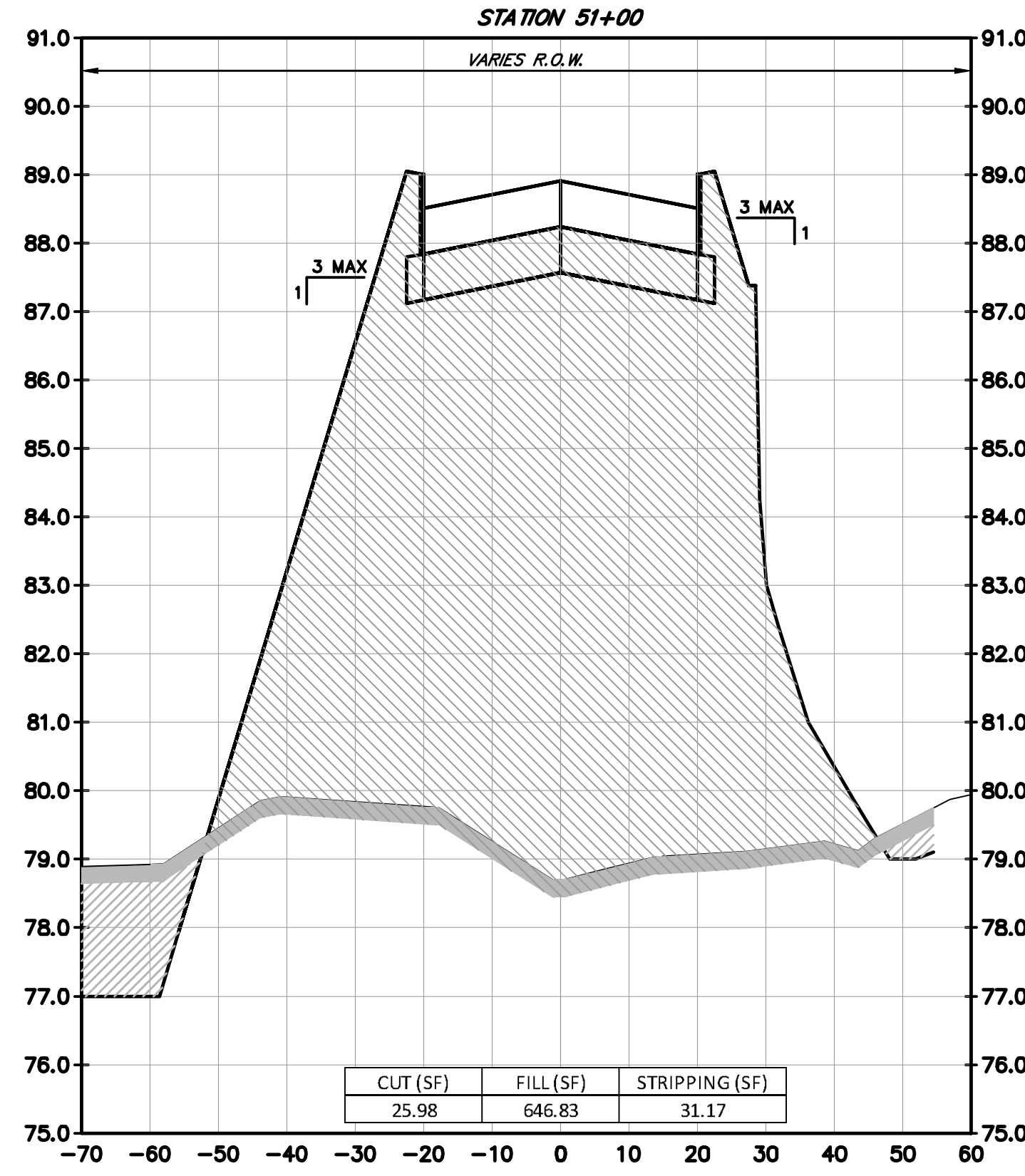
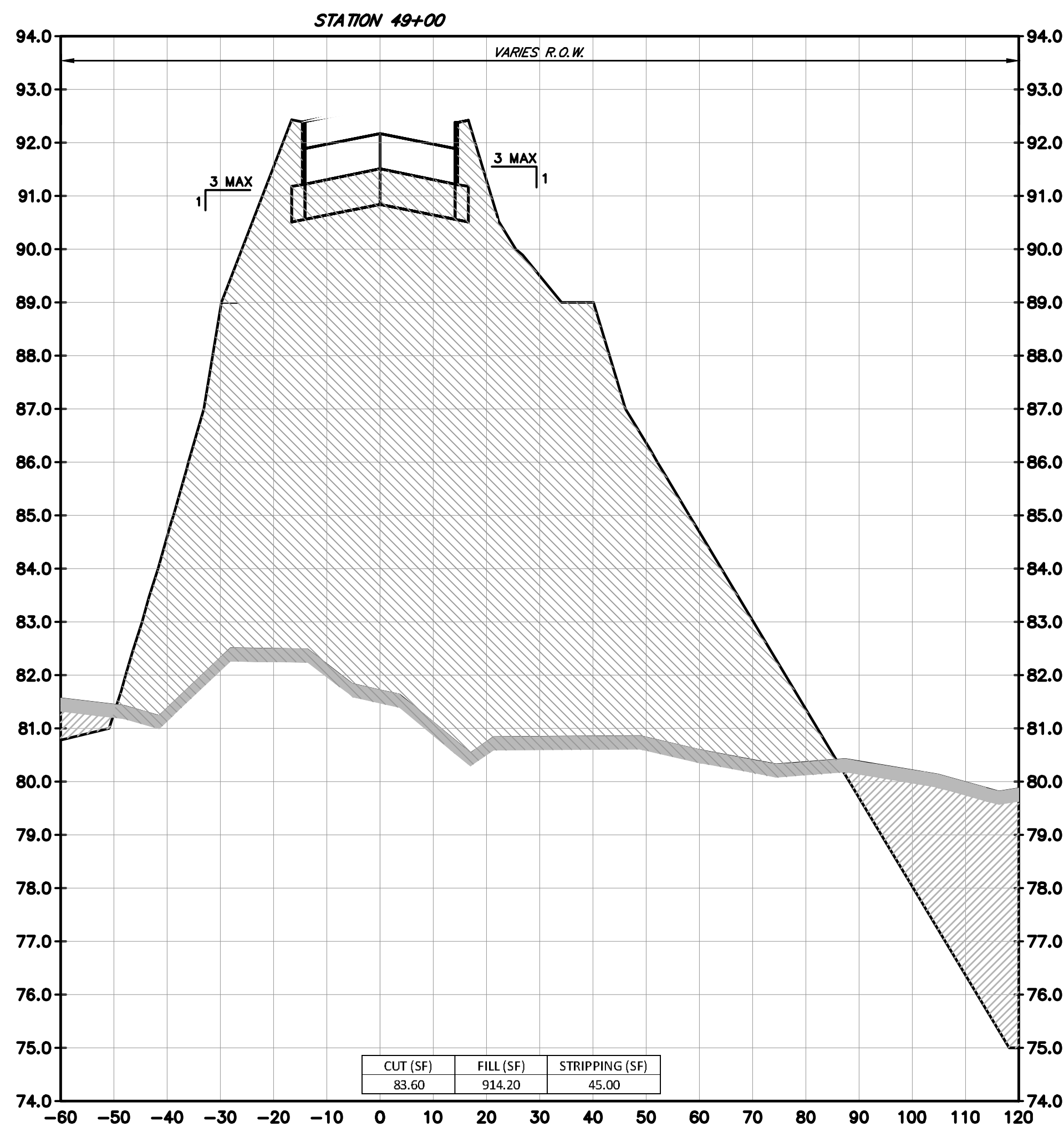
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- 3" STRIPPING
 - EMBANKMENT AREA
 - ROADWAY EXCAVATION
 - REMOVED EXISTING ROAD




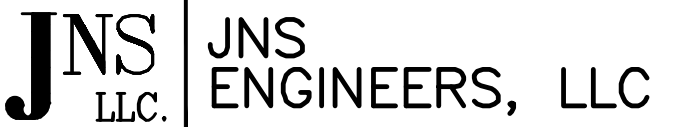
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BRANDT ROAD PRECINCT LINE RD TO MASON RD			
CROSS-SECTIONS STA. 39+00 TO STA. 47+00			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77454 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 20' H 1" = 2' V	PROJECT No. 0522-1801	CONTRACT: 1
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET CS01	

F:\Clients\0522-Fort Bend County_Engineering\0522-1801-Brandt_Road\Drawings\Reference\C3D_CS07_EARTHWORK_QUANTITIES.dwg, Feb 17, 2023 11:50am Terra Associates Inc., Thanh Dao

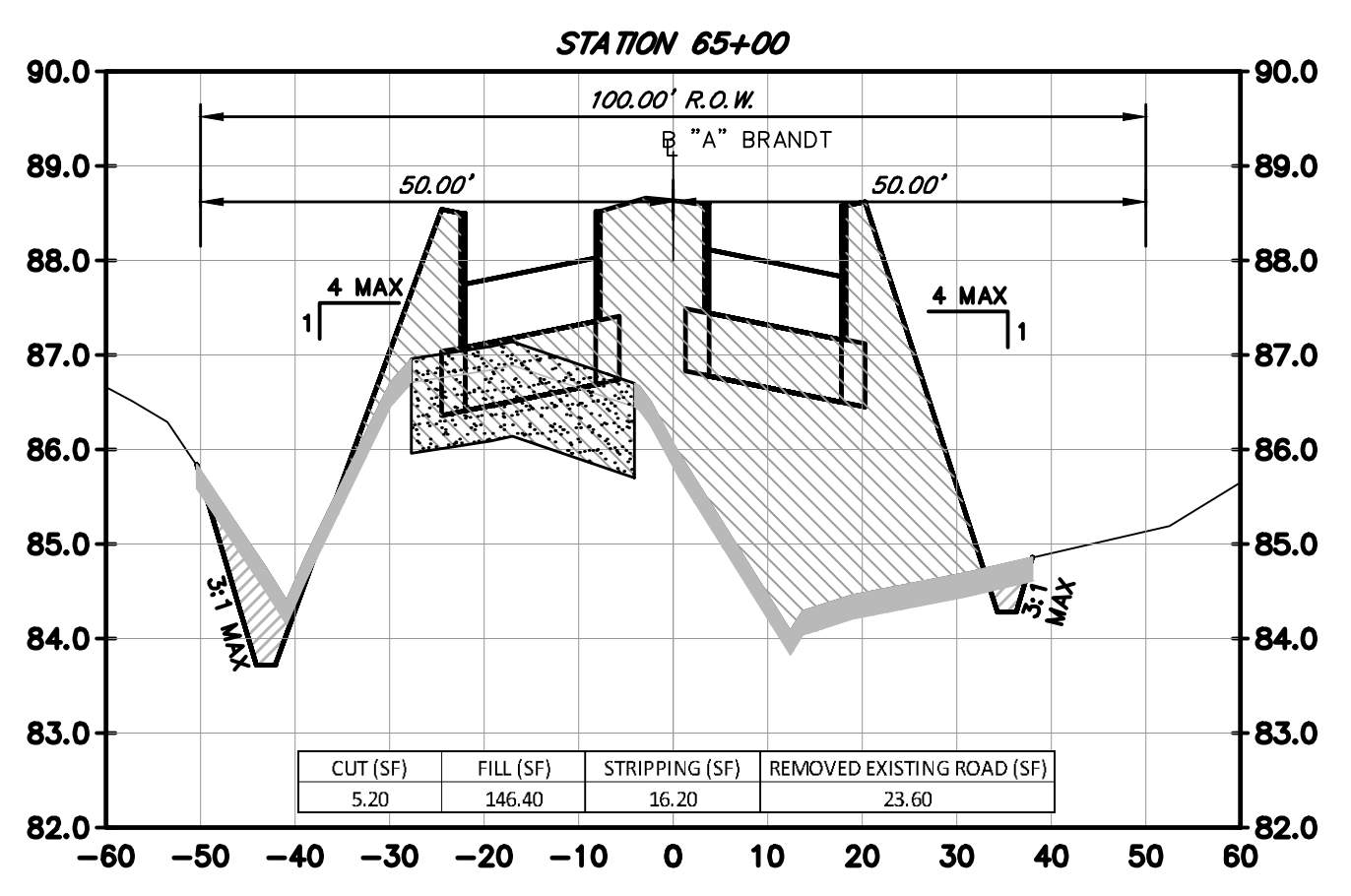
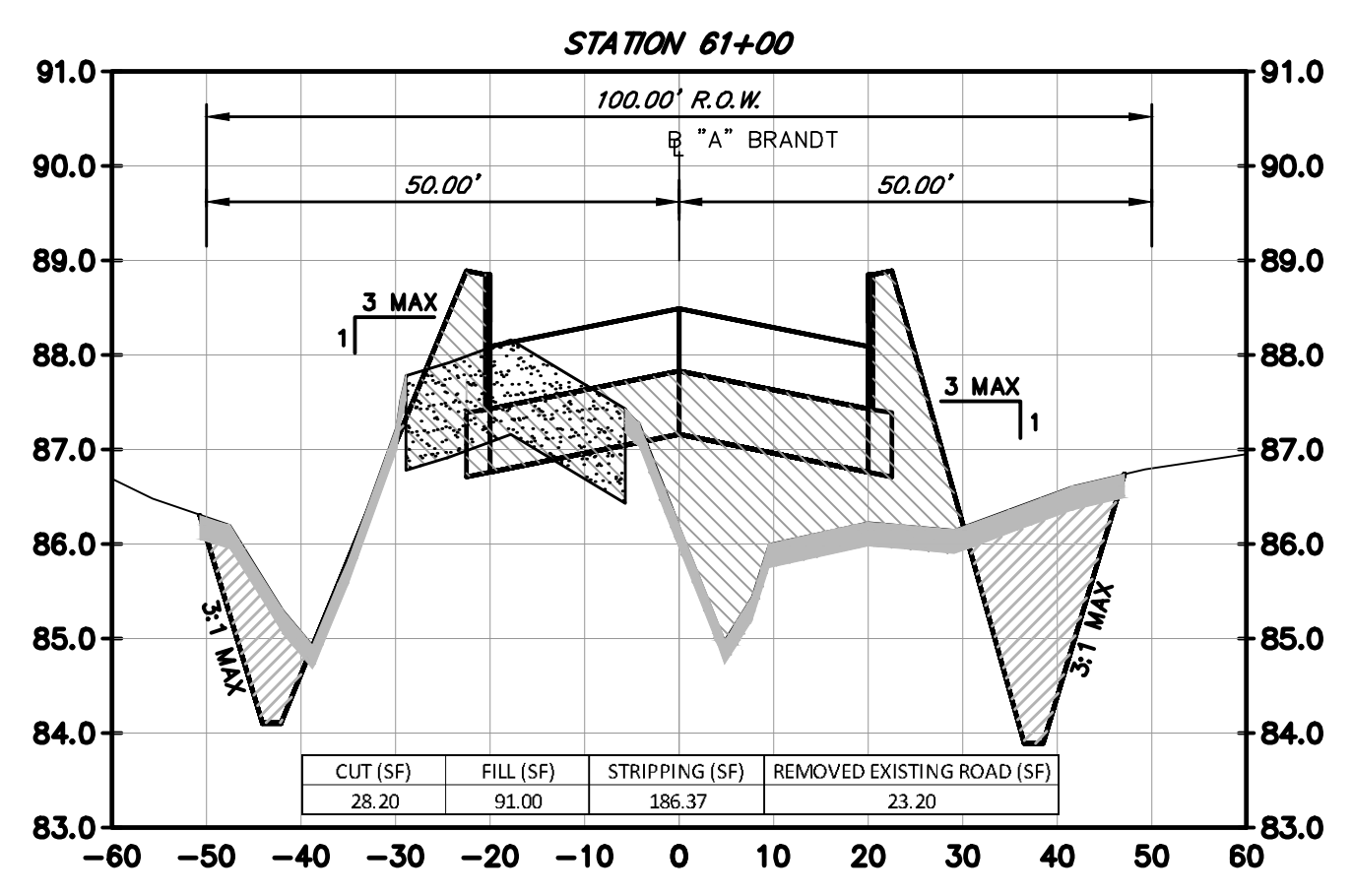
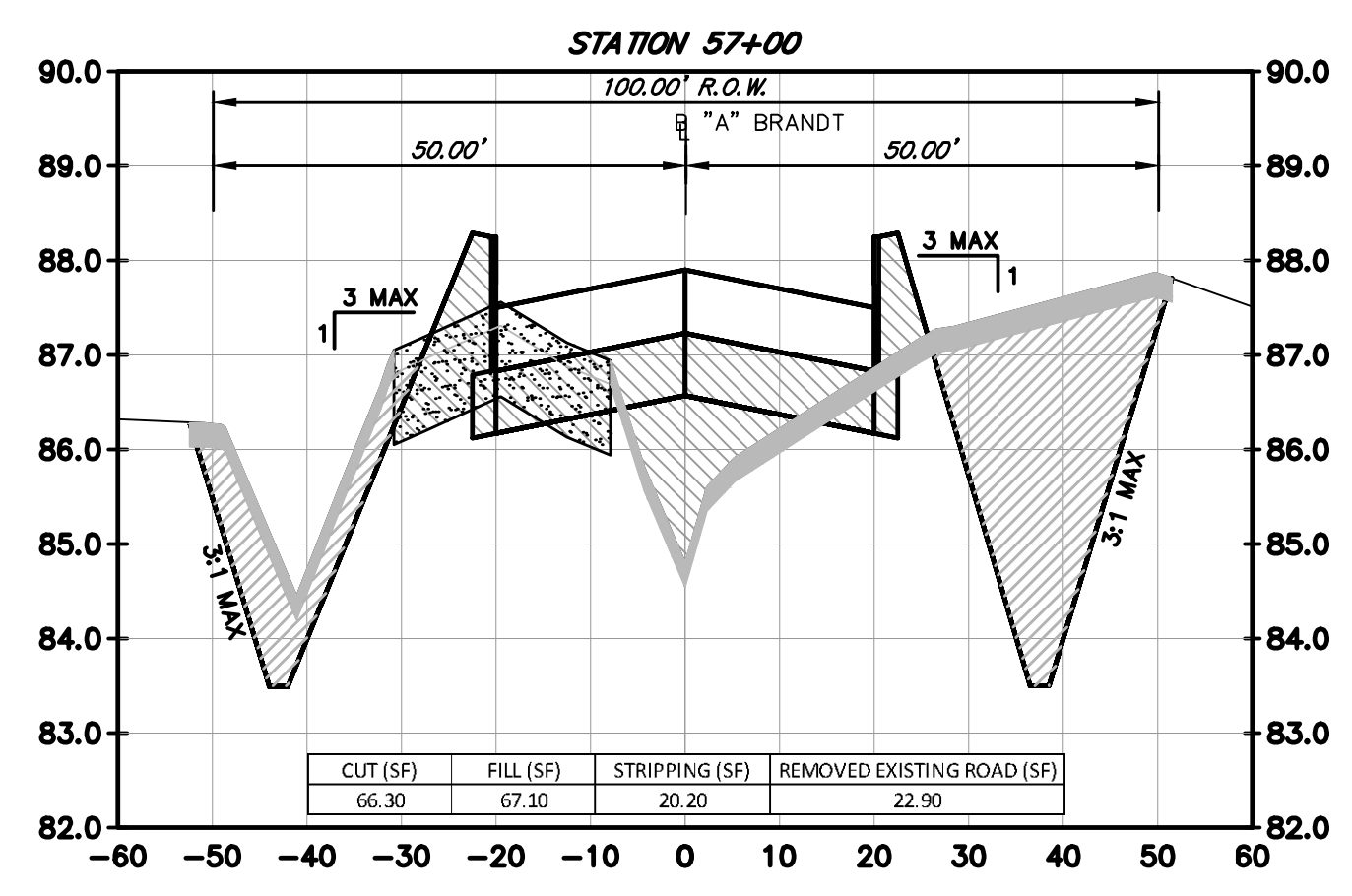
- LEGEND**
-  3" STRIPPING
 -  EMBANKMENT AREA
 -  ROADWAY EXCAVATION
 -  REMOVED EXISTING ROAD



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY A.G.A.N. NANAYAKKARA, P.E. 115913
ON FEBRUARY 17, 2023

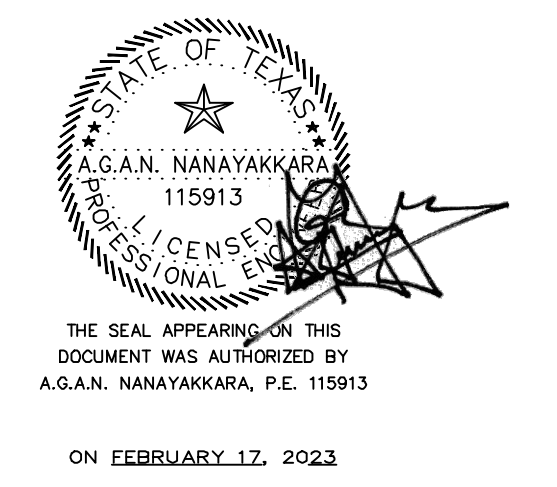
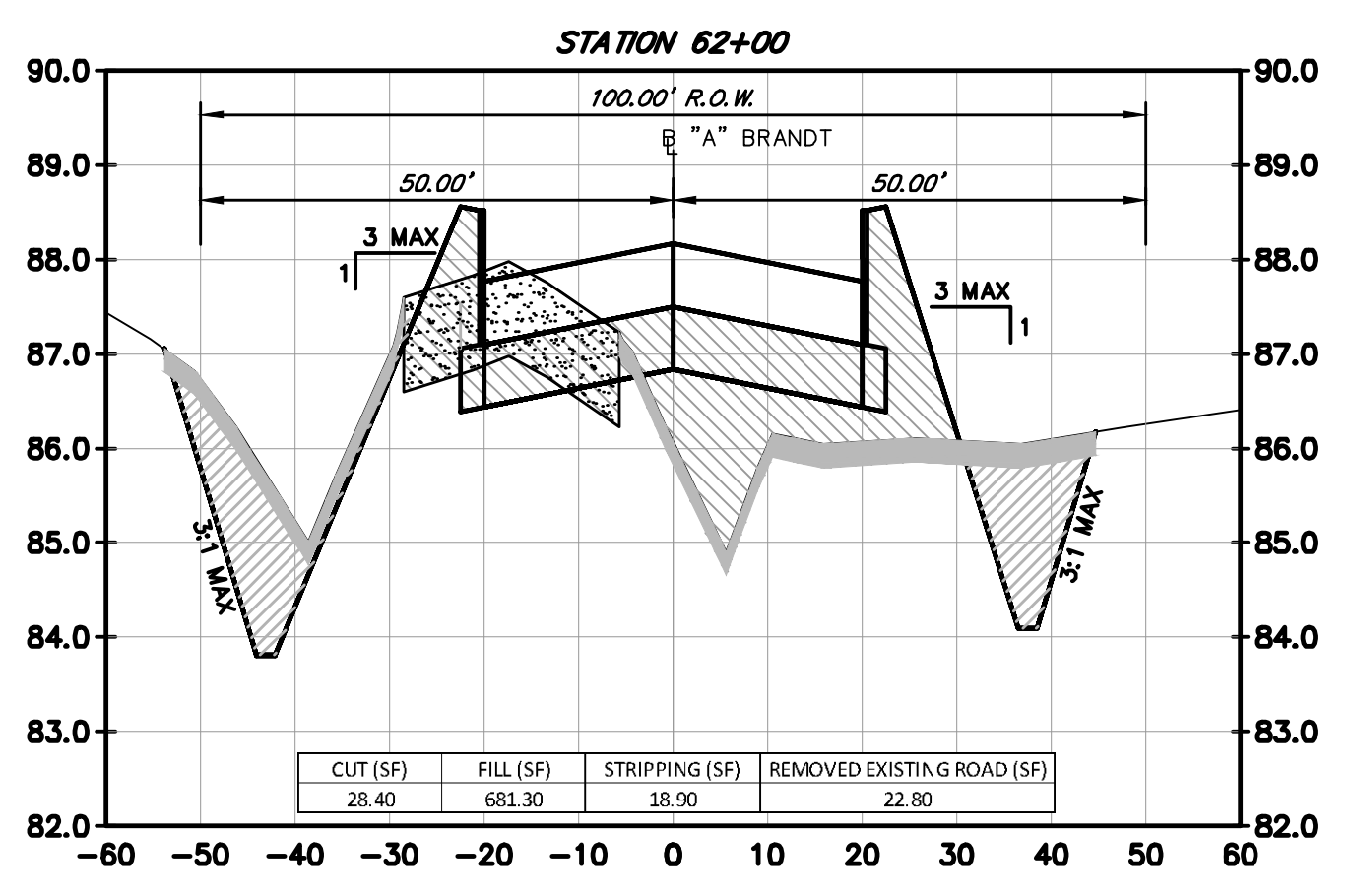
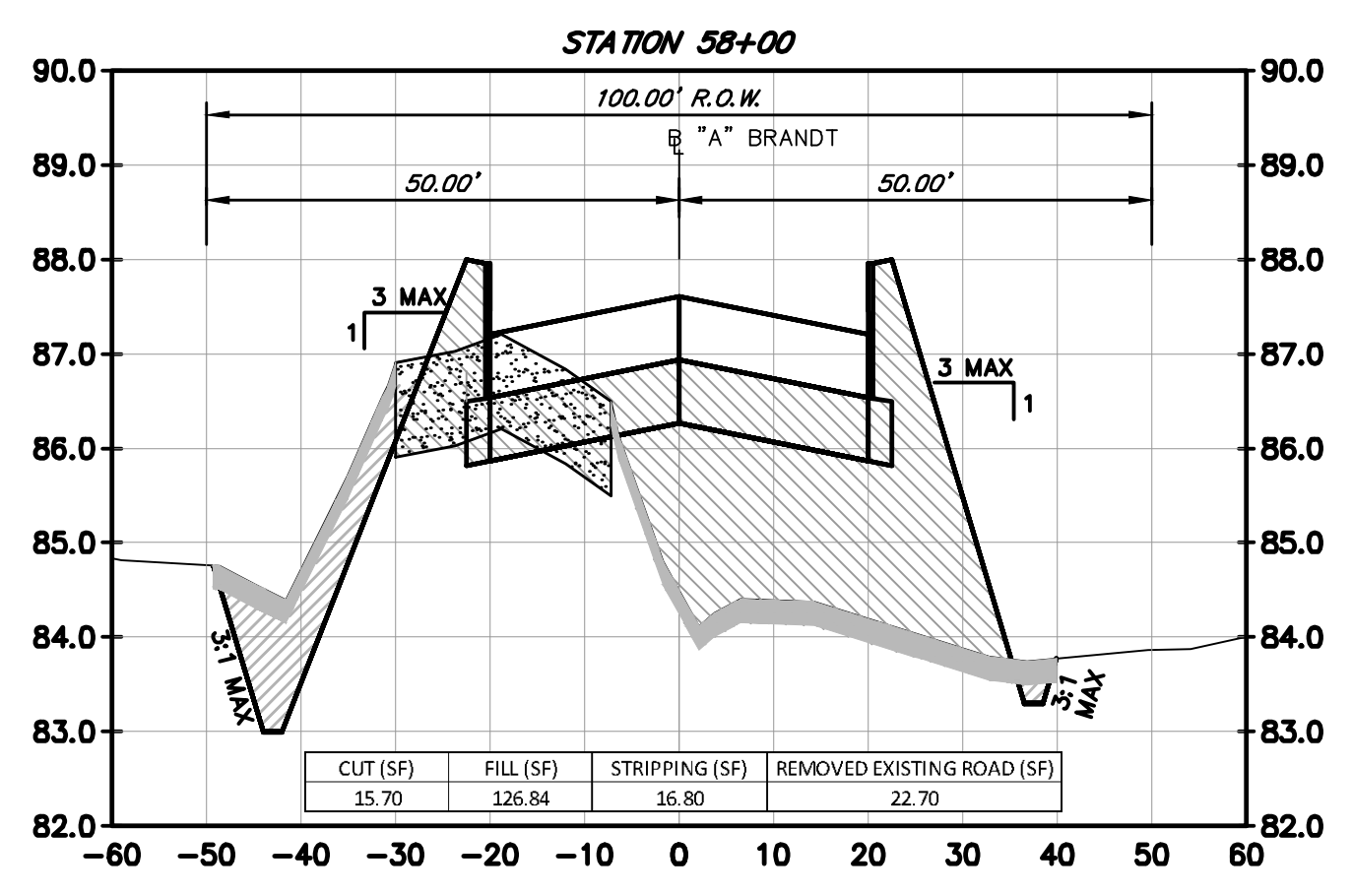
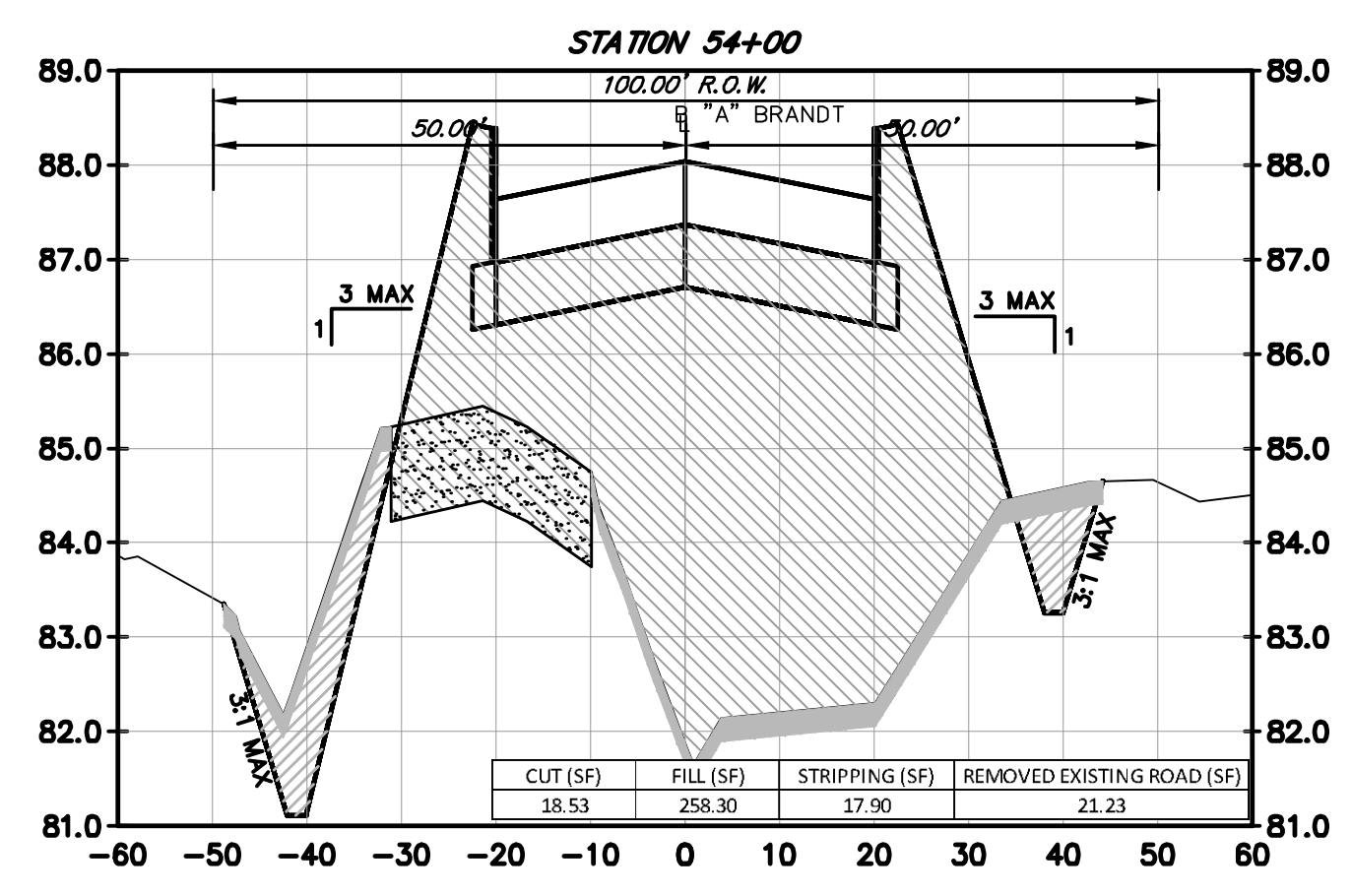
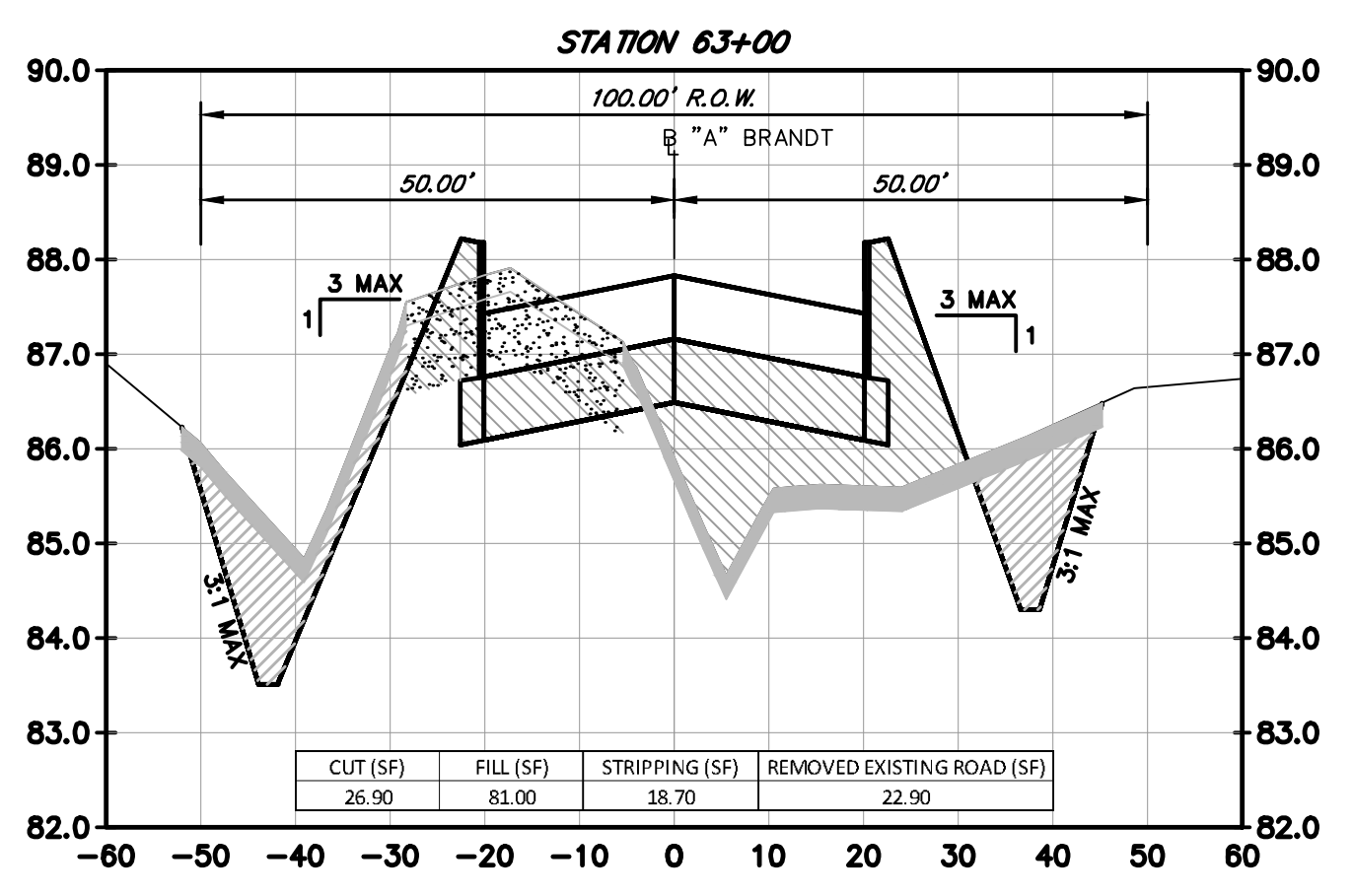
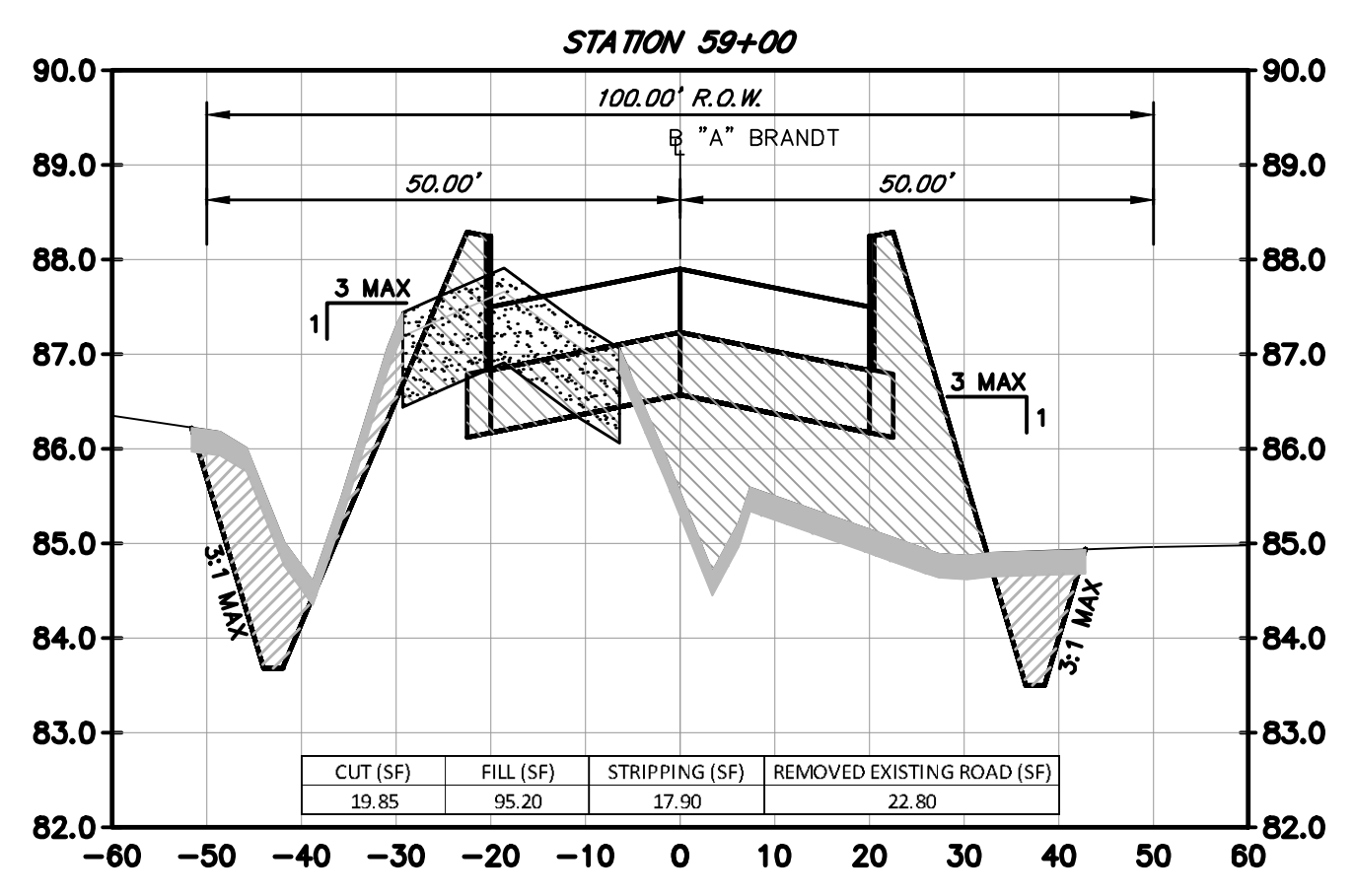
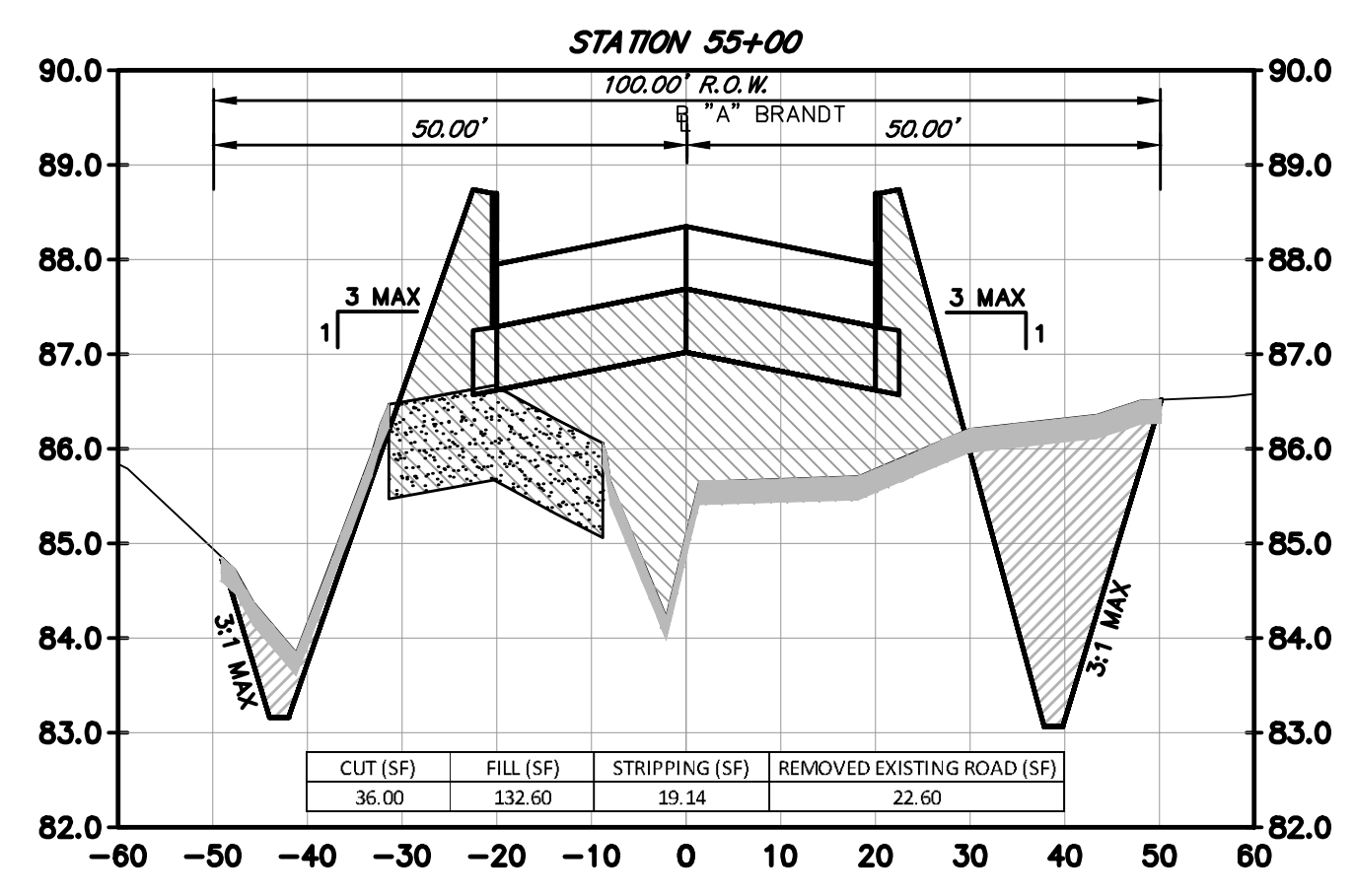
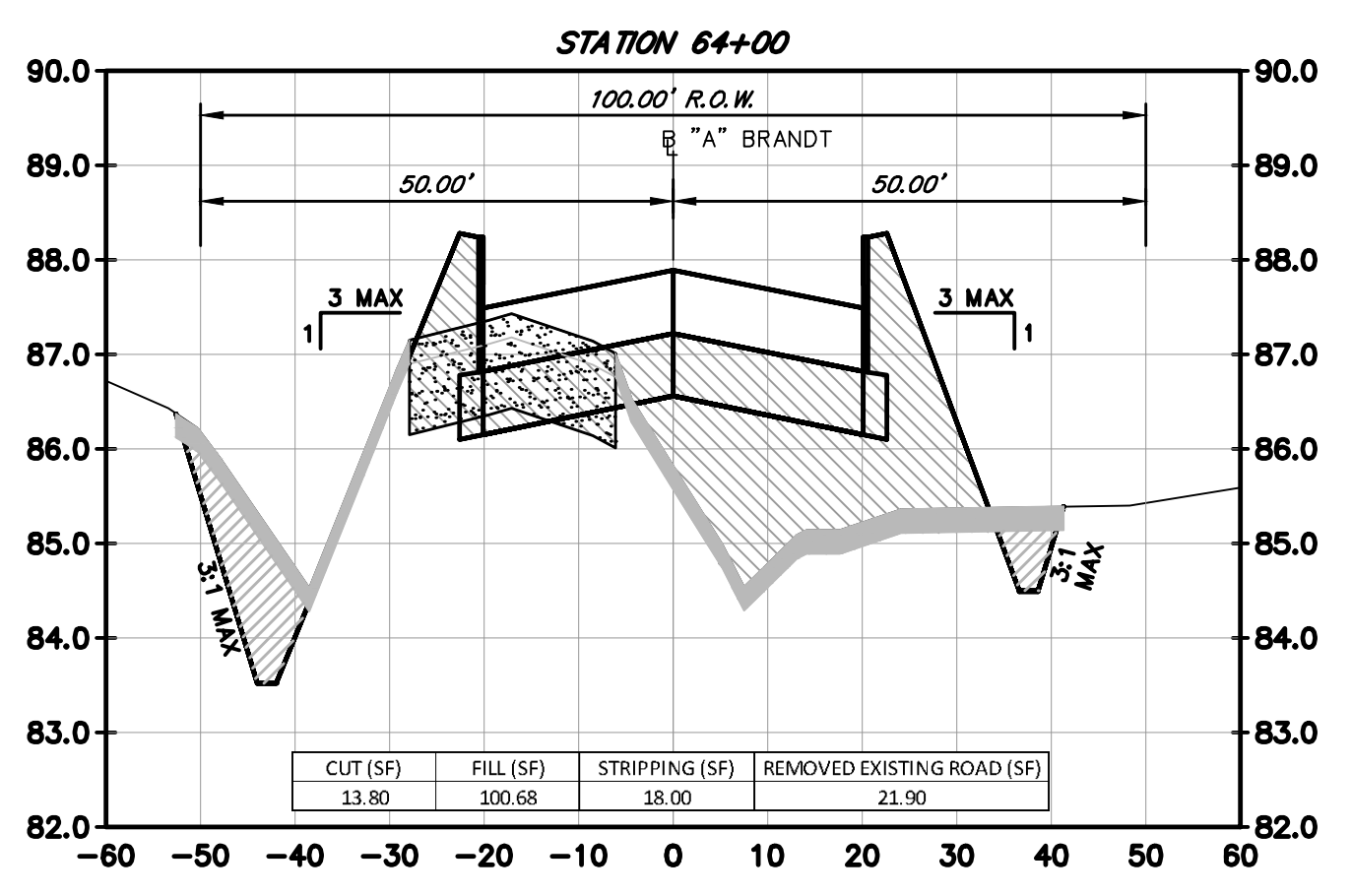
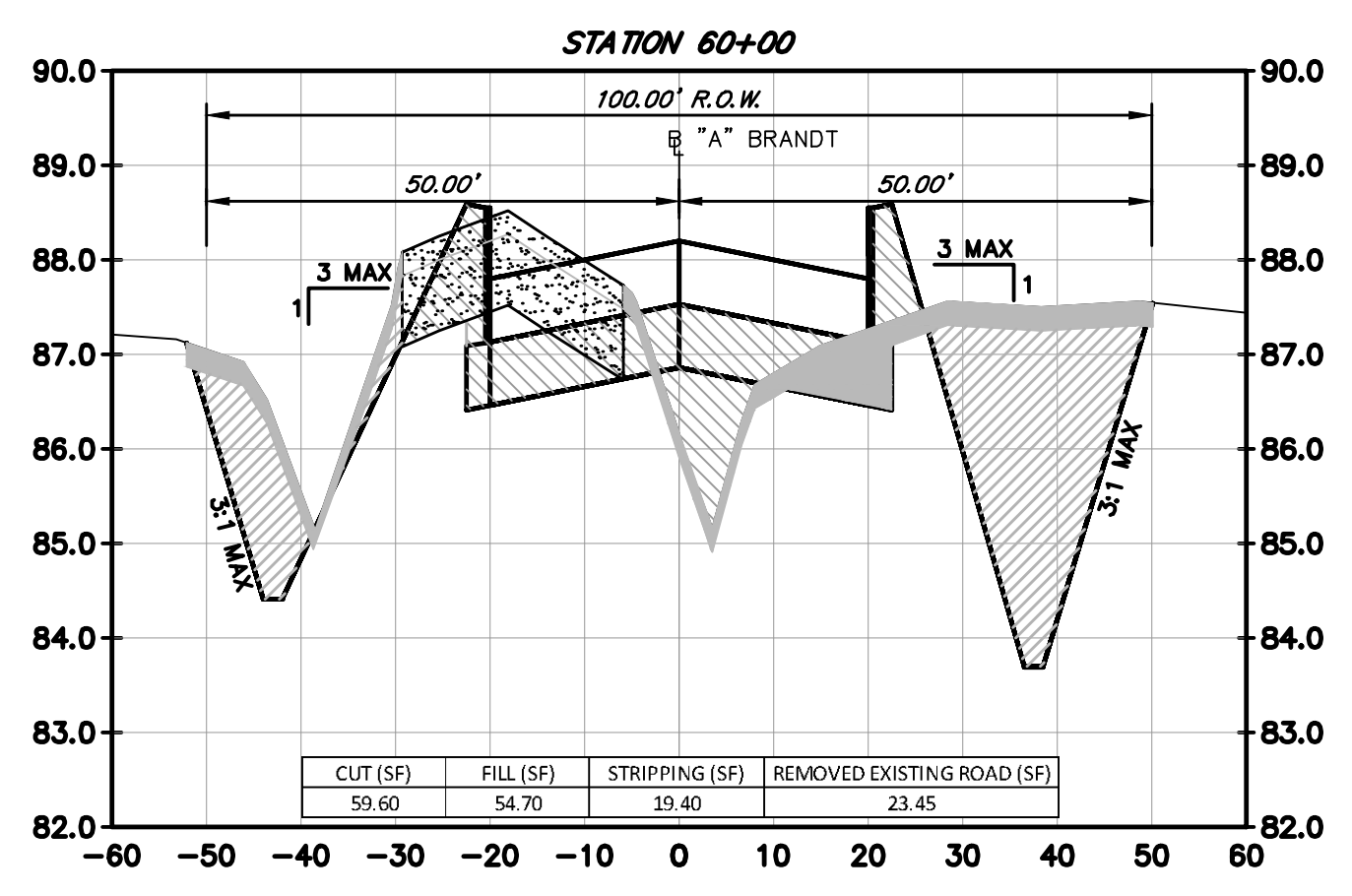
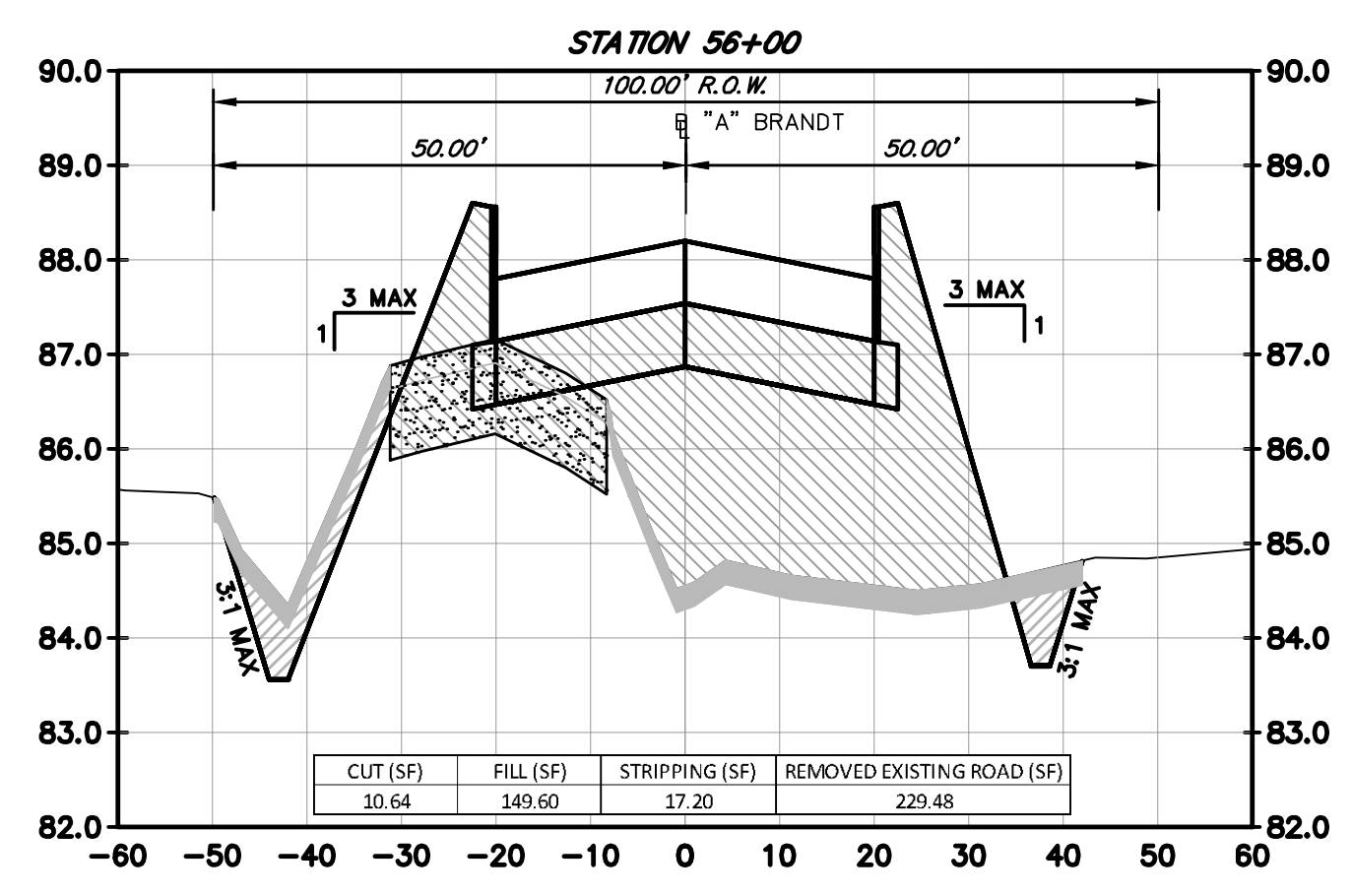
REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
CROSS-SECTIONS STA. 48+00 TO STA. 53+00			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 20' H 1" = 2' V	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET CS02	

F:\Clients\0522-Fort Bend County_Engineering\0522-1801_Brandt_Road\Drawings\Reference\C3D_Data\CSD7_EARTHWORK_QUANTITIES.dwg, Feb 17, 2023-11:50am Terra Associates Inc., Thanh Dao



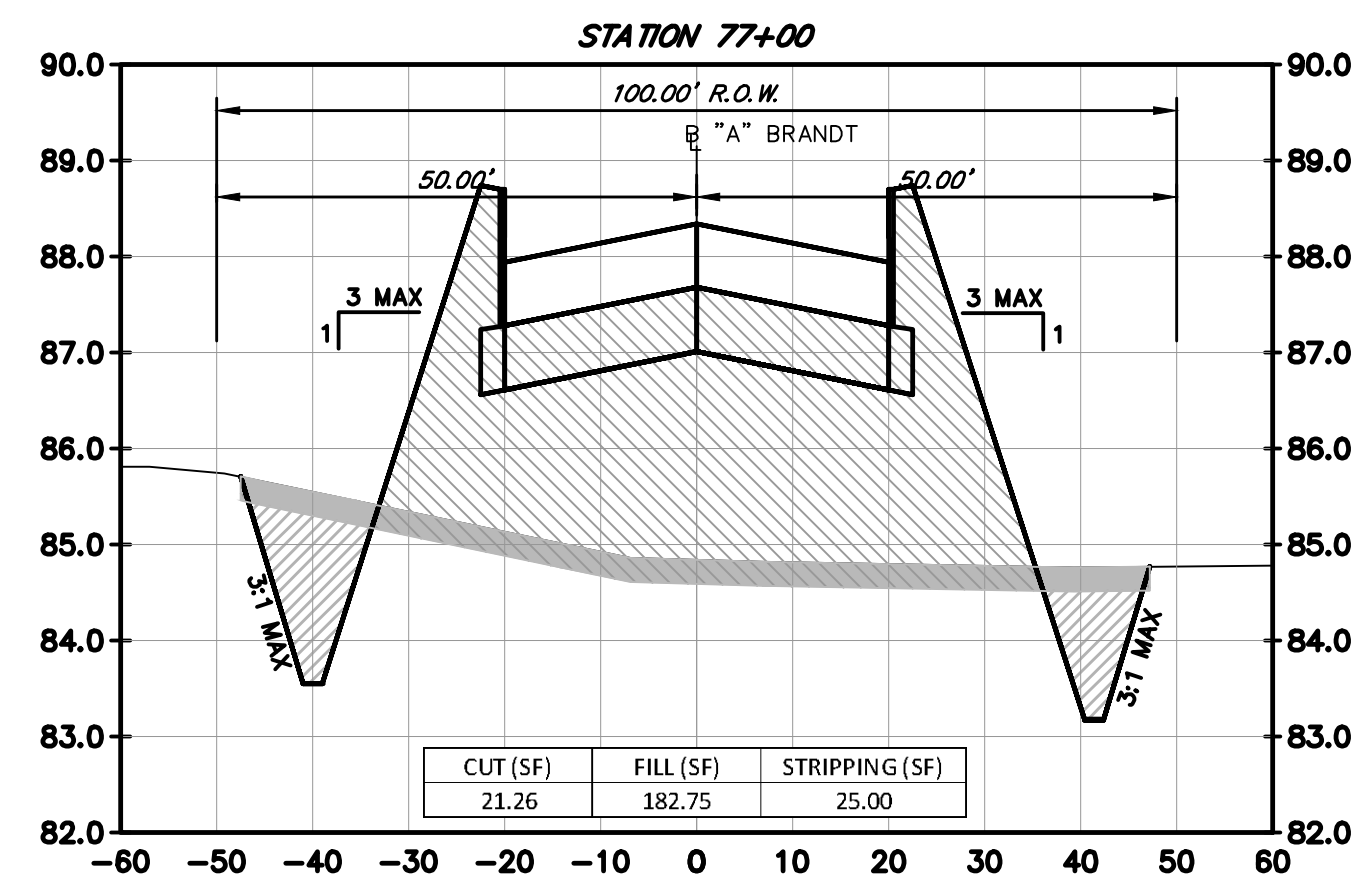
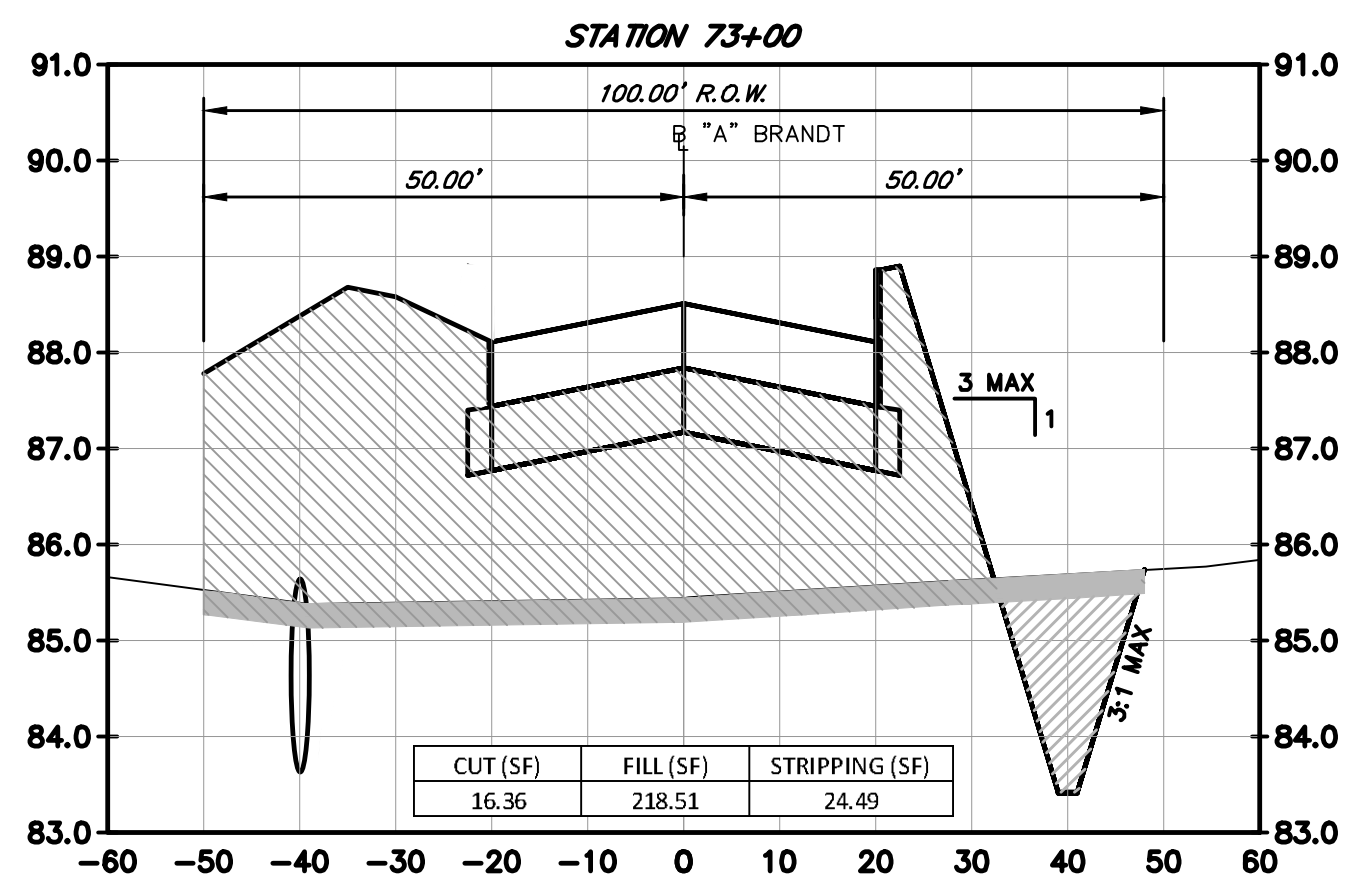
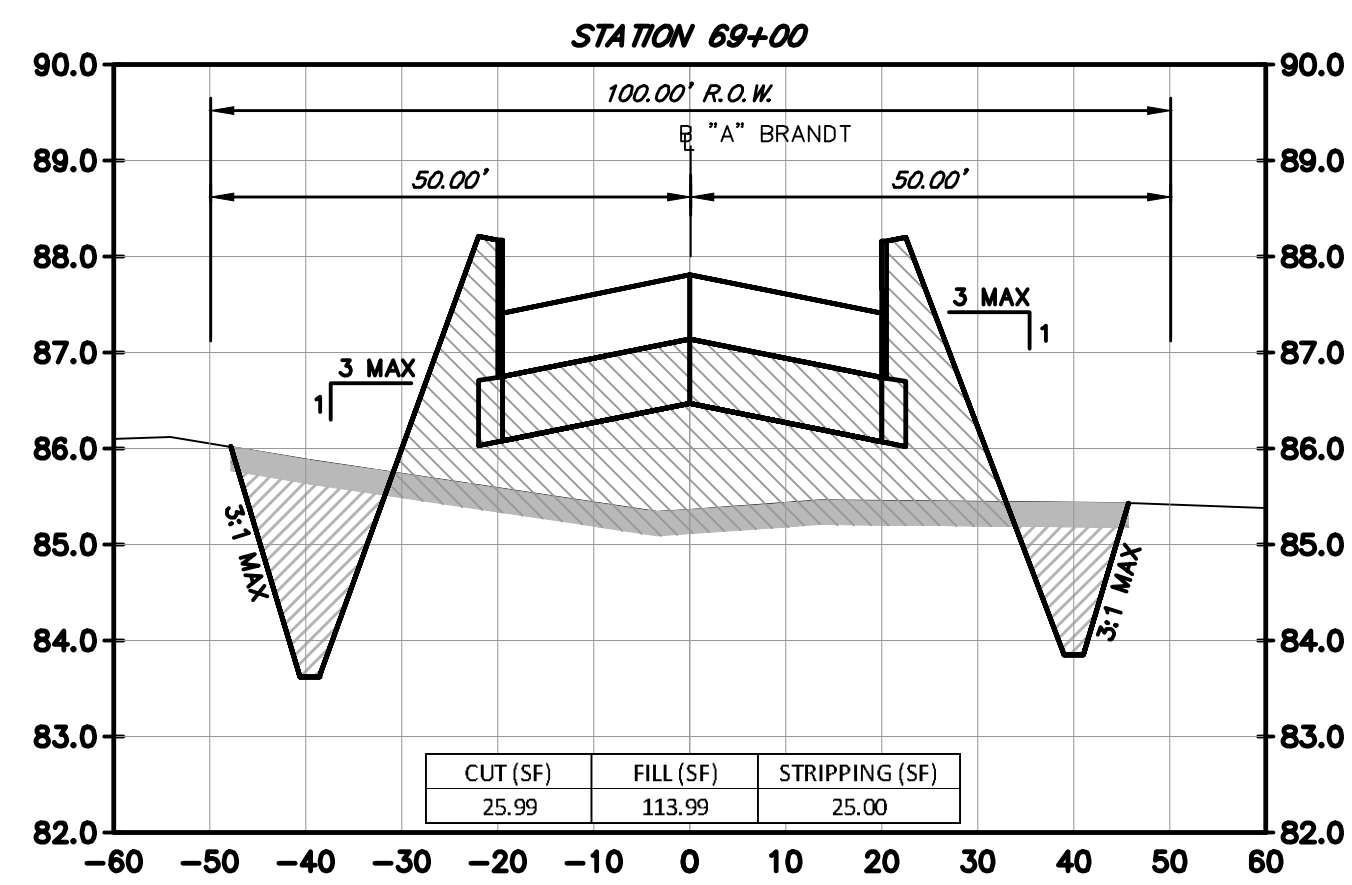
LEGEND

- 3" STRIPPING
- EMBANKMENT AREA
- ROADWAY EXCAVATION
- REMOVED EXISTING ROAD

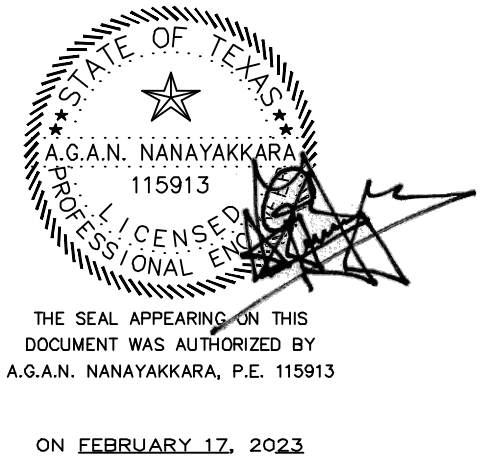
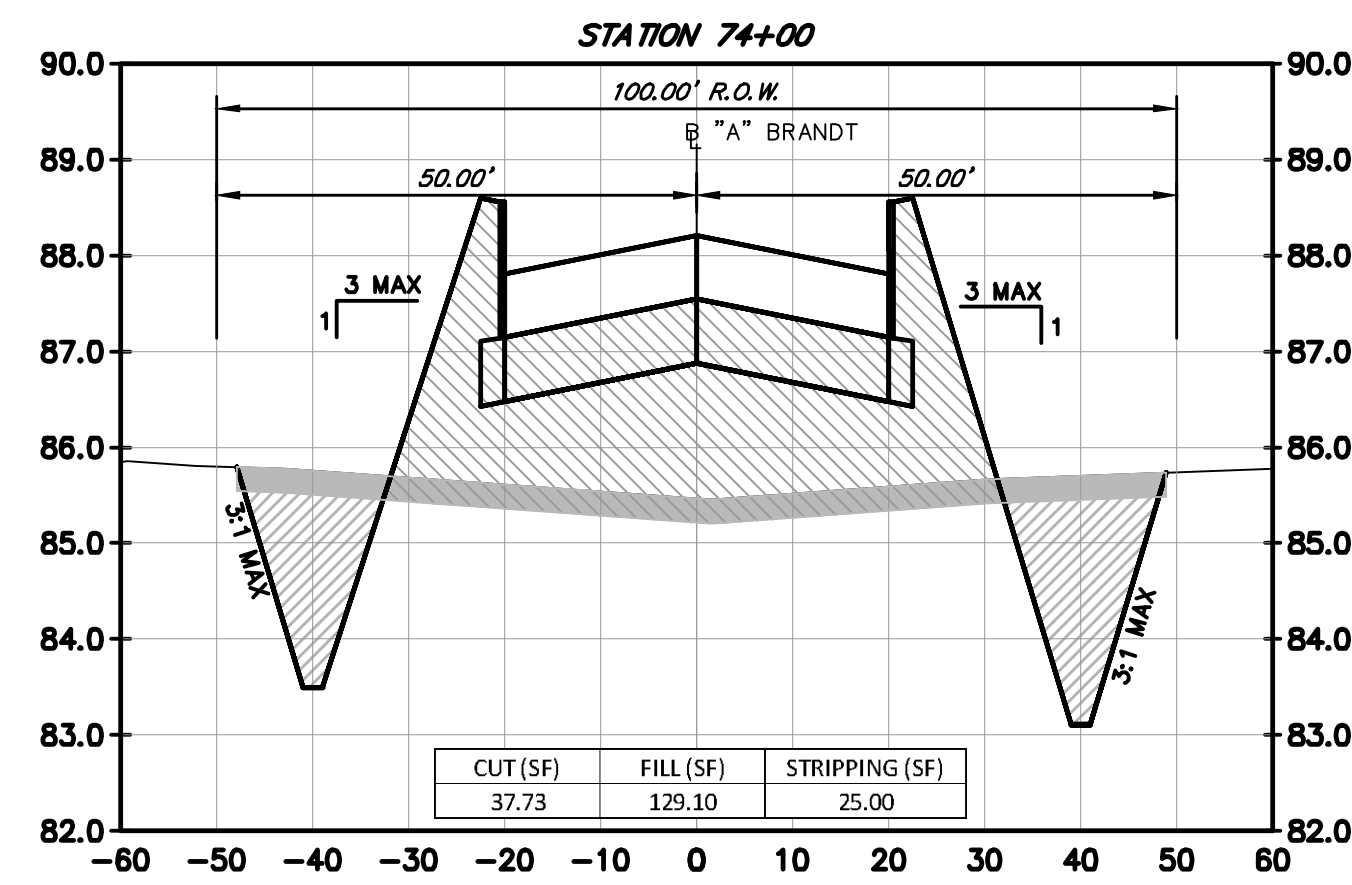
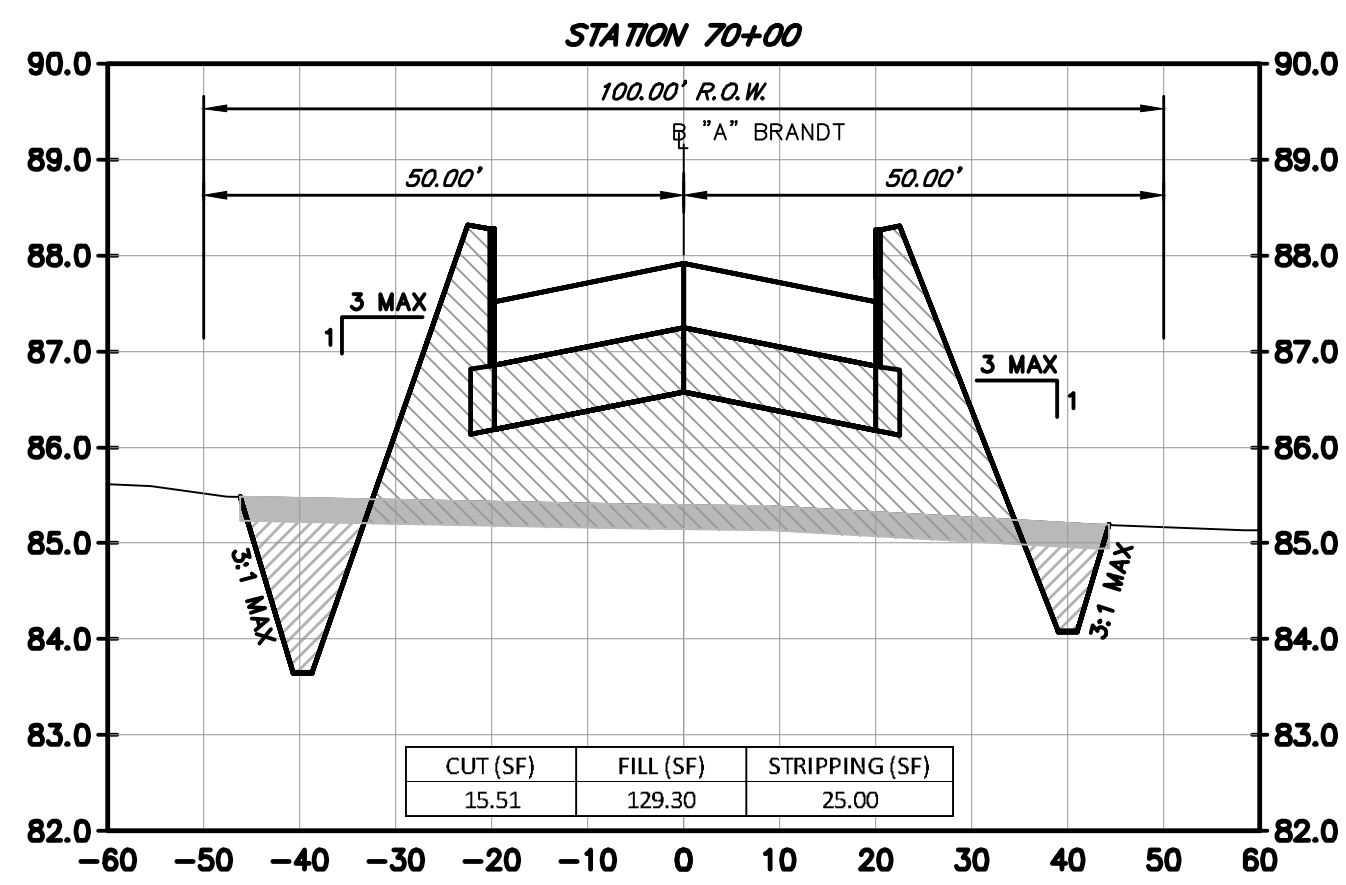
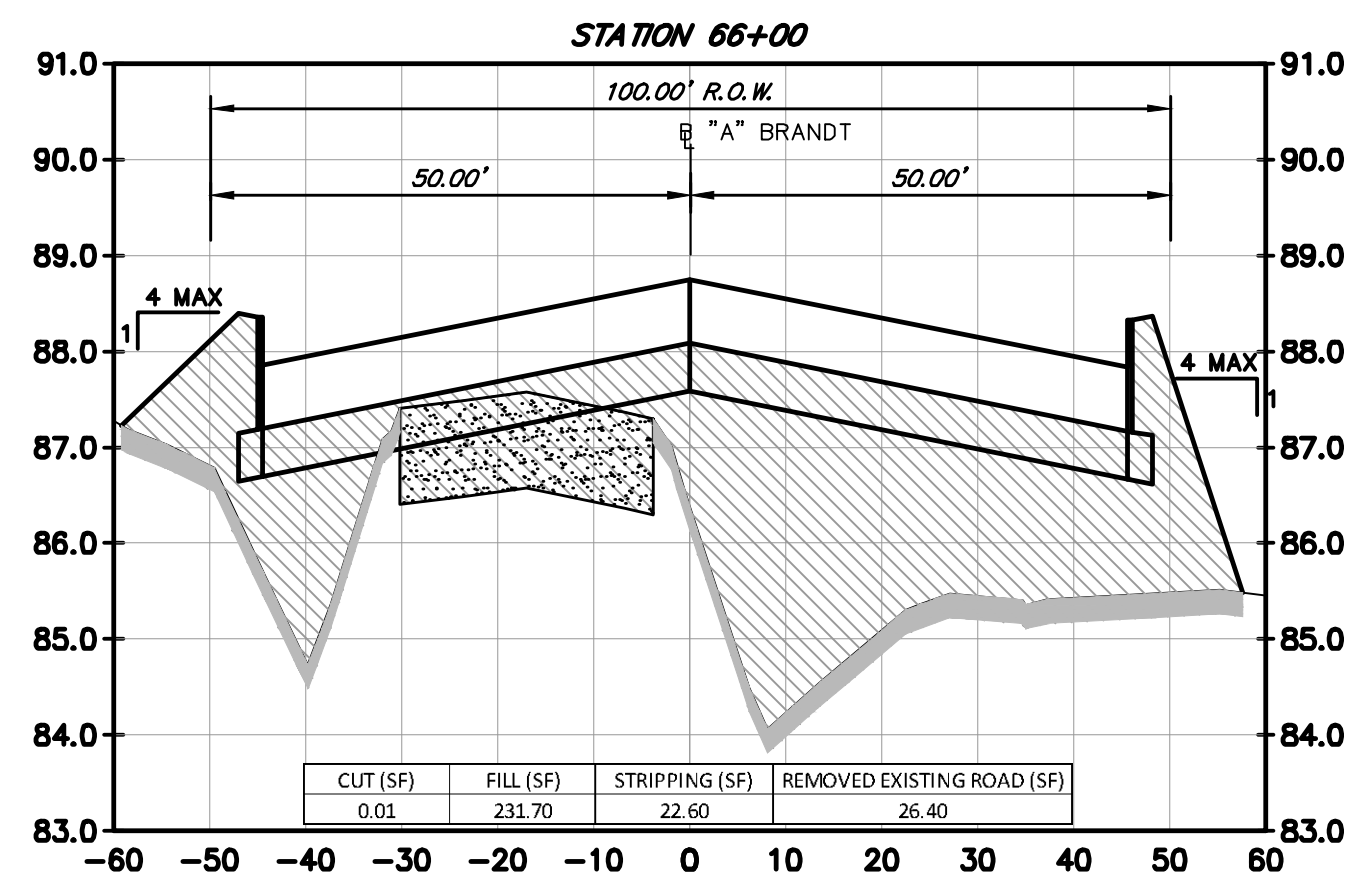
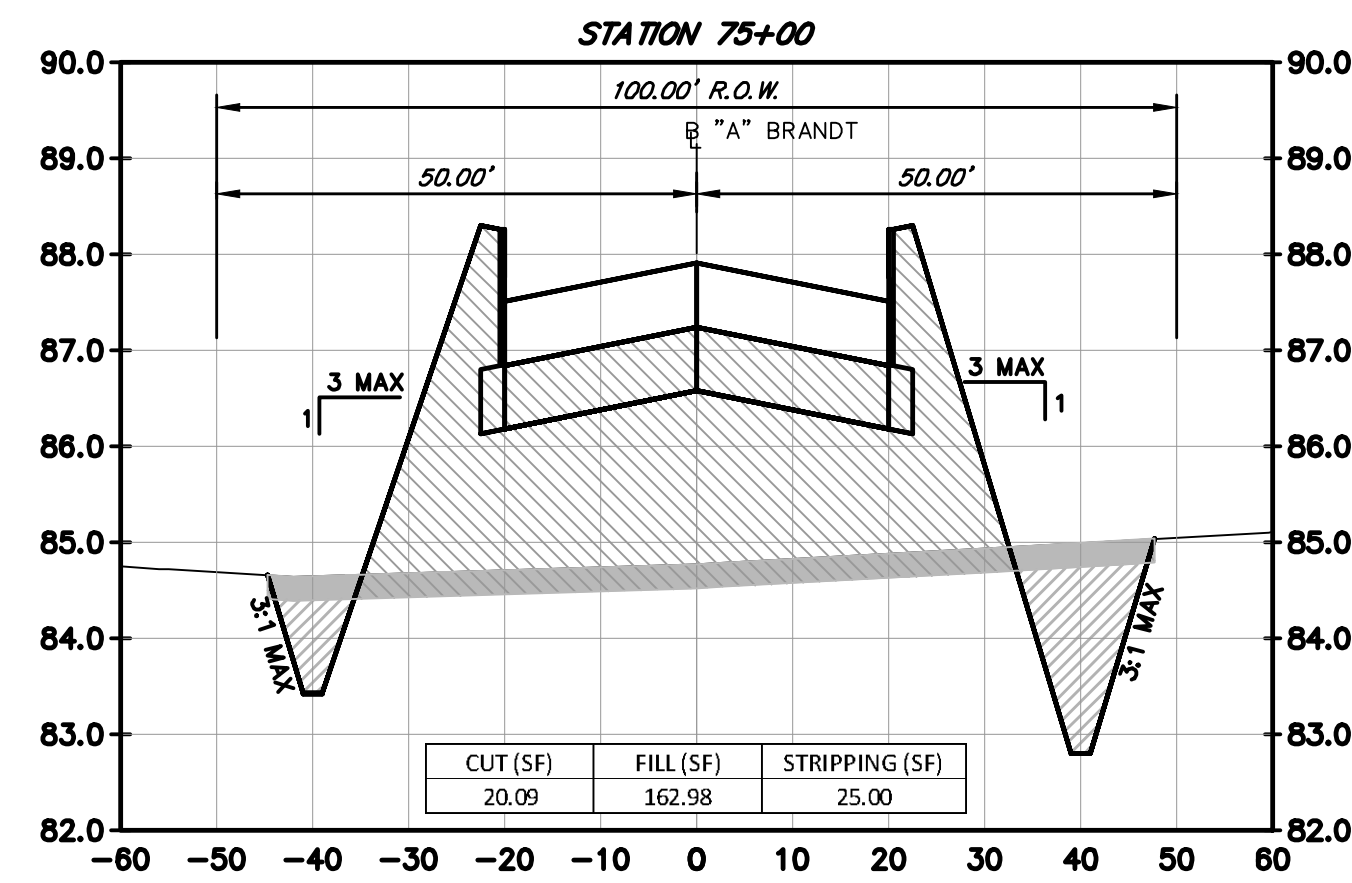
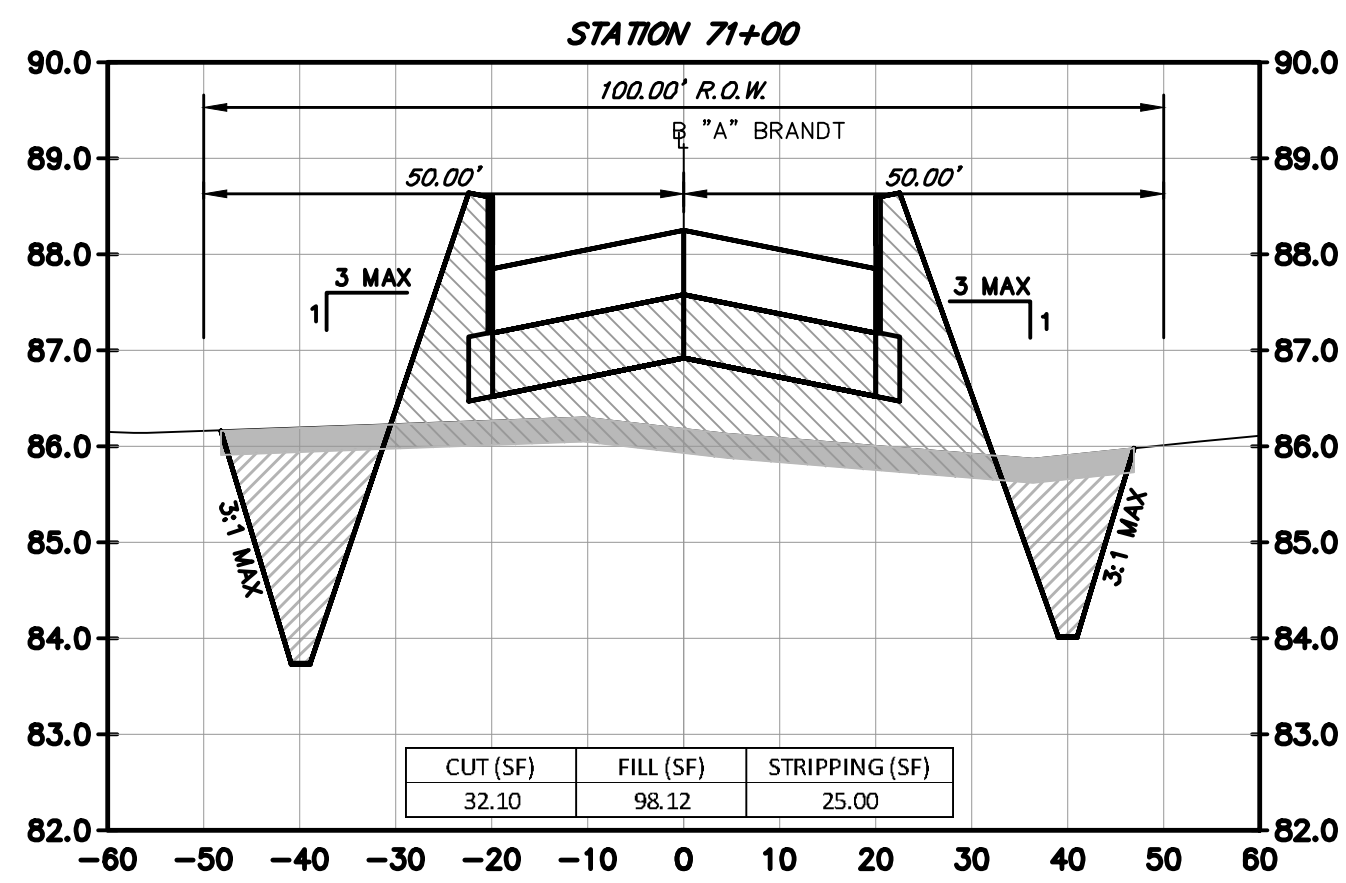
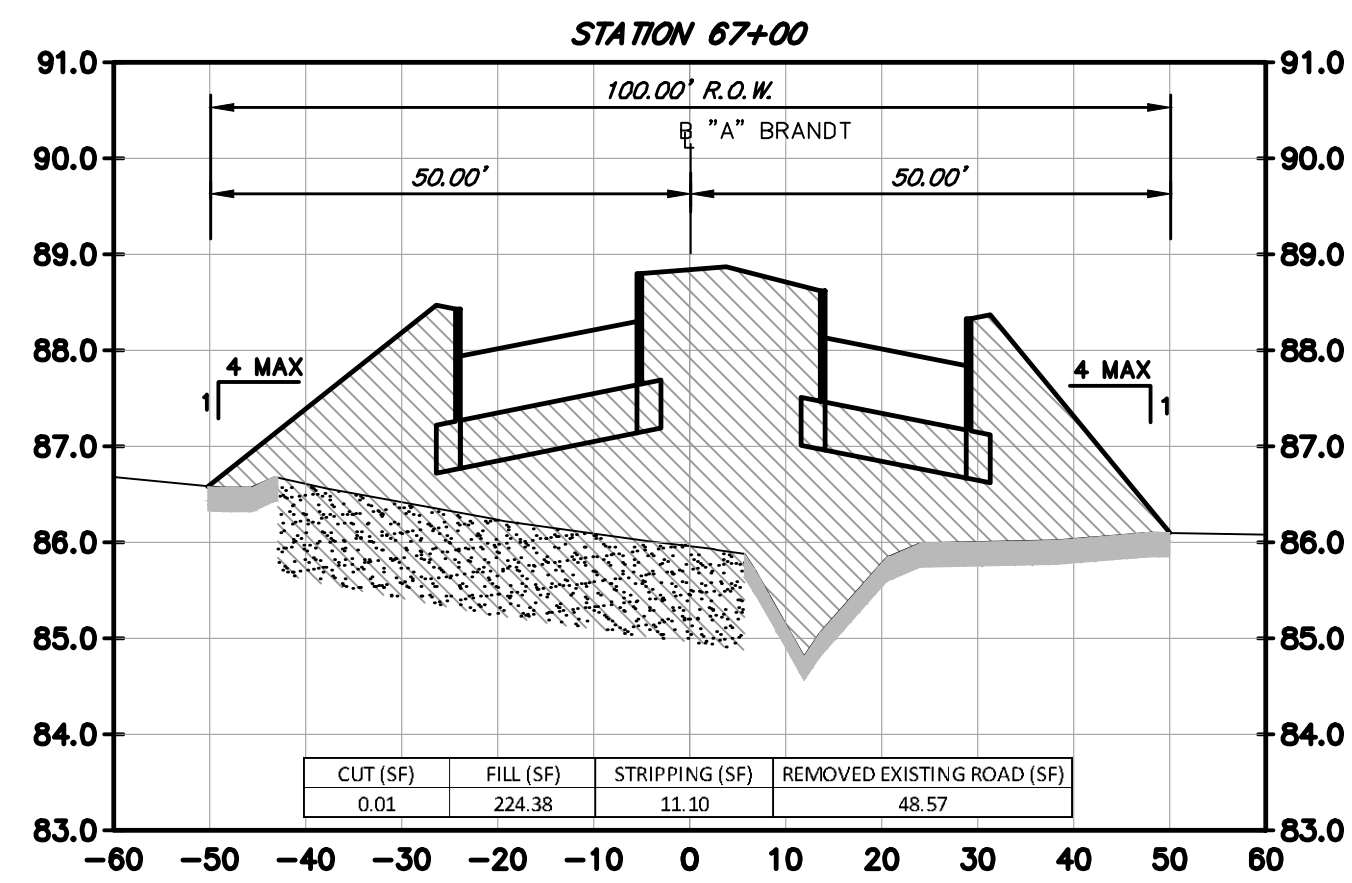
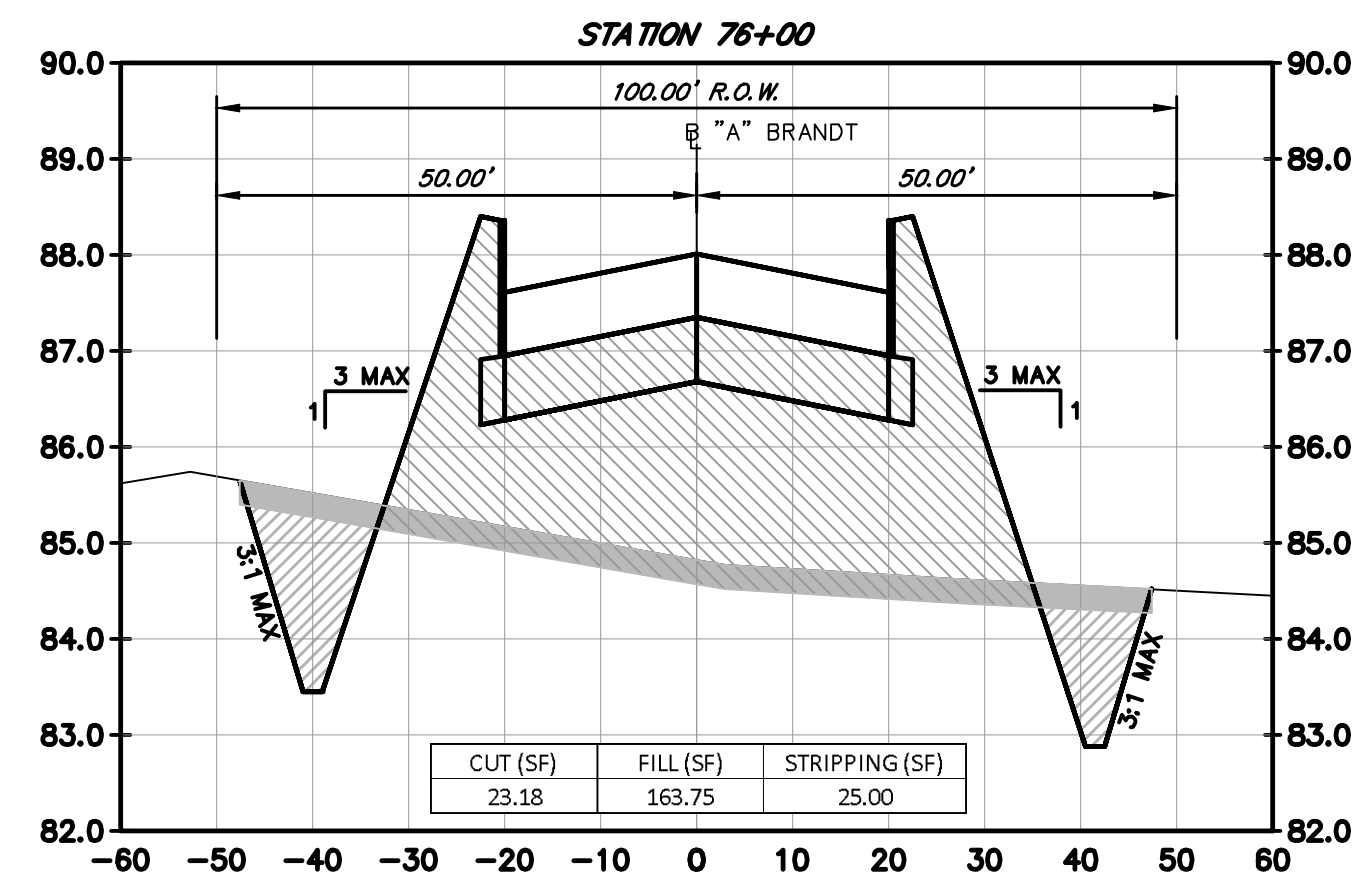
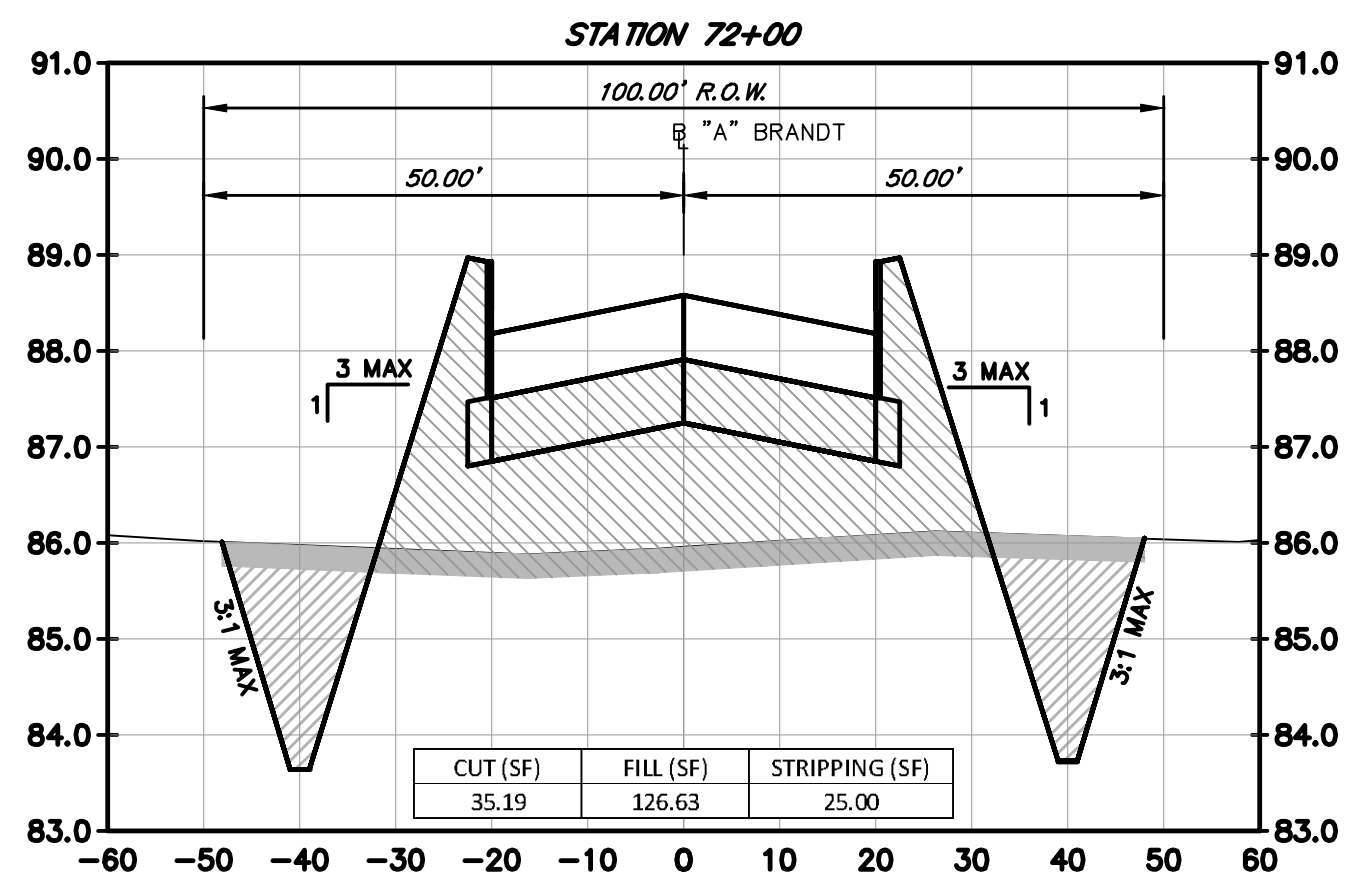
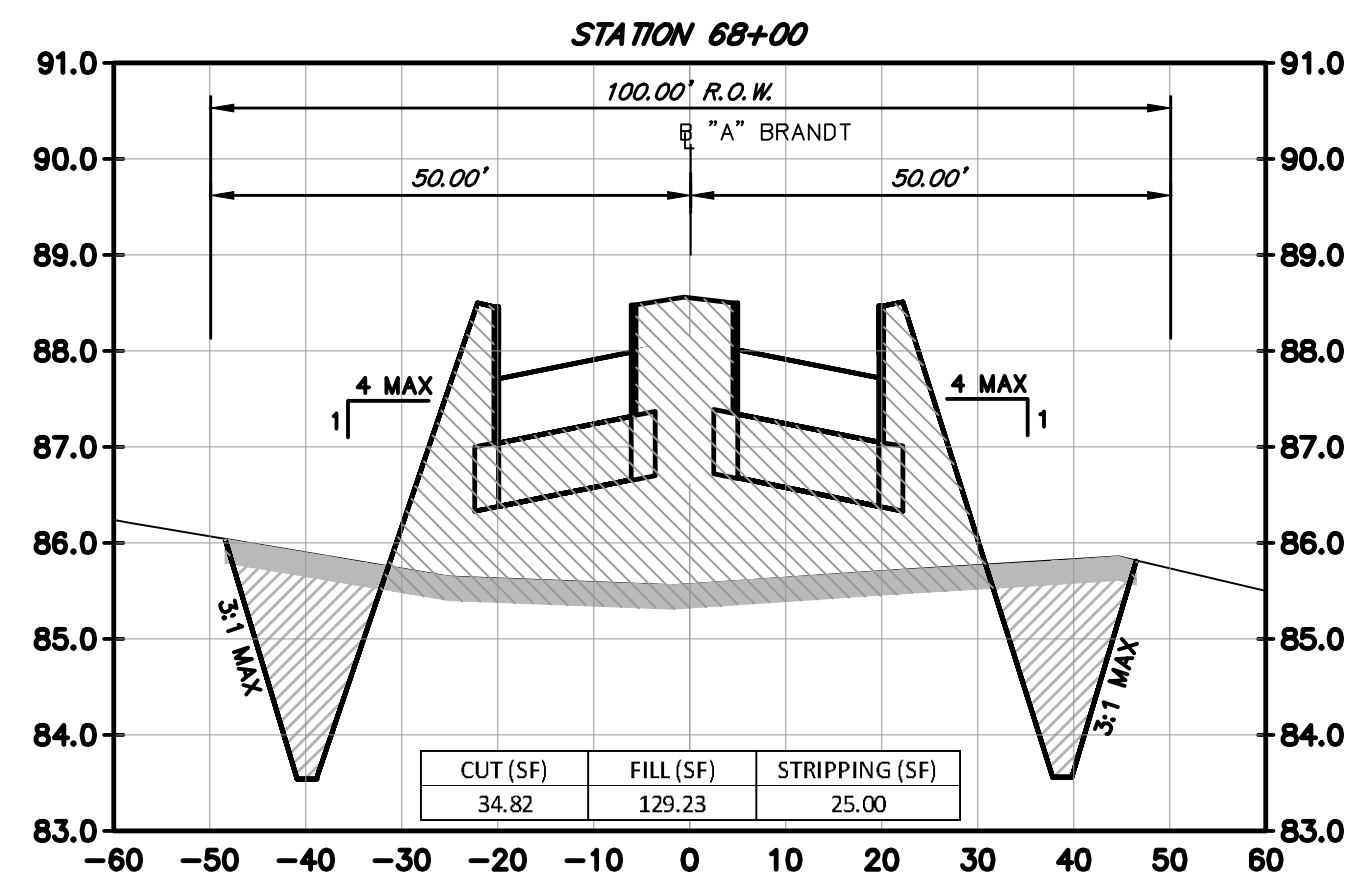


REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD CROSS-SECTIONS STA. 54+00 TO STA. 64+00			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77454 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.		SCALE: 1" = 20' H 1" = 2' V	
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	
		PROJECT No. 0522-1801 CONTRACT: 1 SHEET CS03	

F:\Clients\0522-Fort Bend County Engineering\0522-1801_Brandt_Road\Drawings\Reference\C3D_Data\CSD7_EARTHWORK_QUANTITIES.dwg, Feb 17, 2023-11:50am, Terra Associates Inc., Thanh Dao

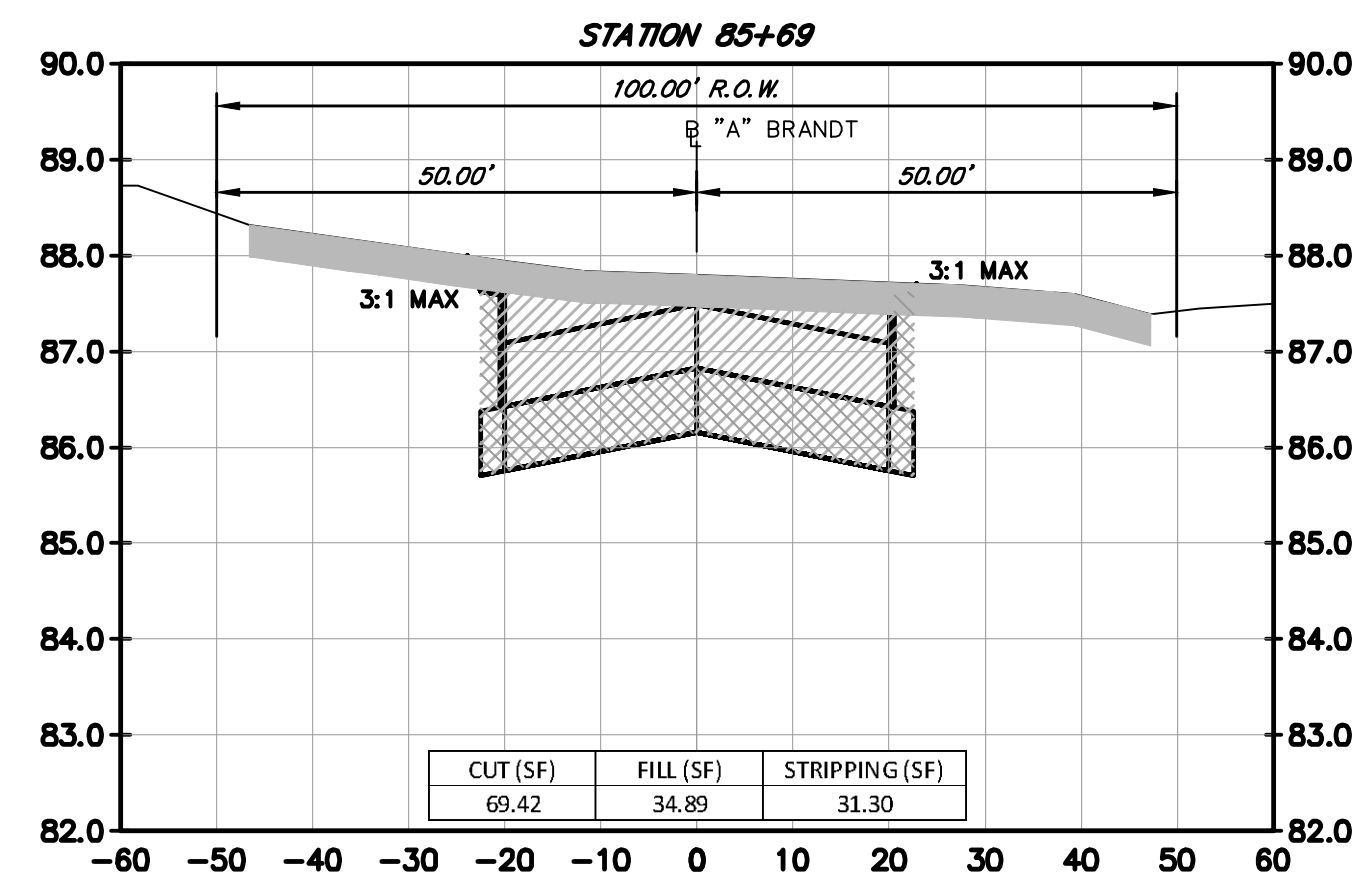
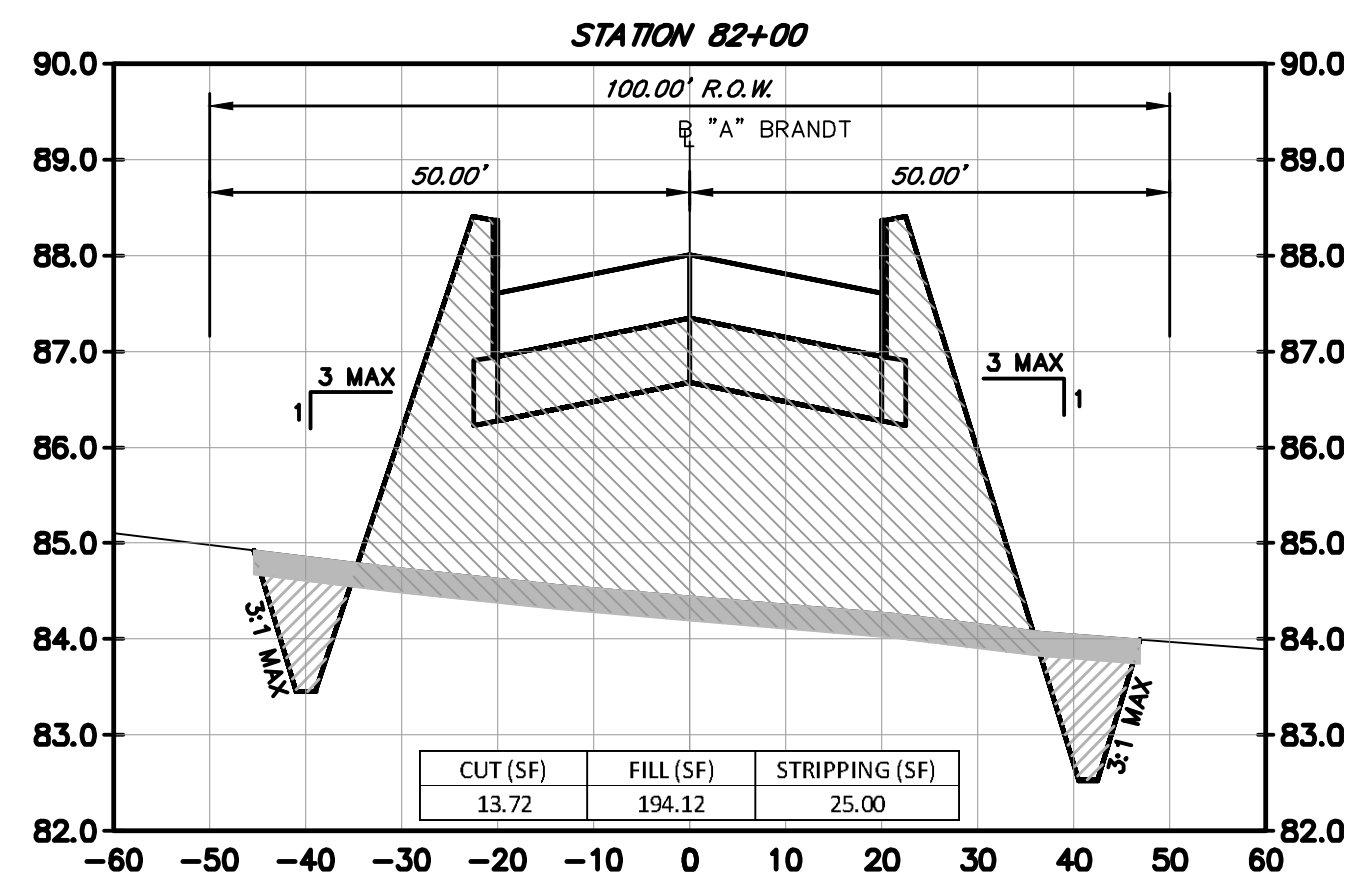
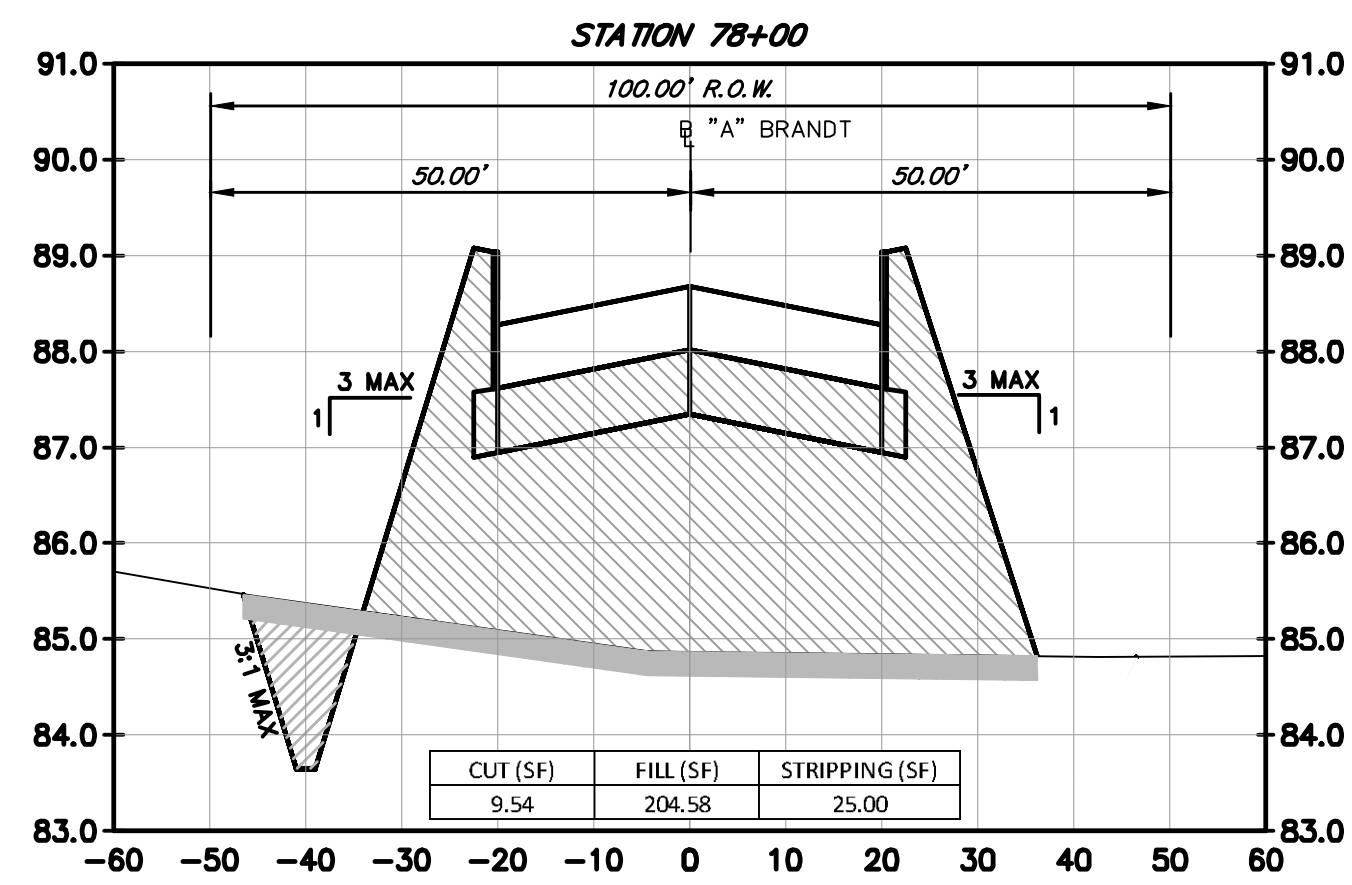
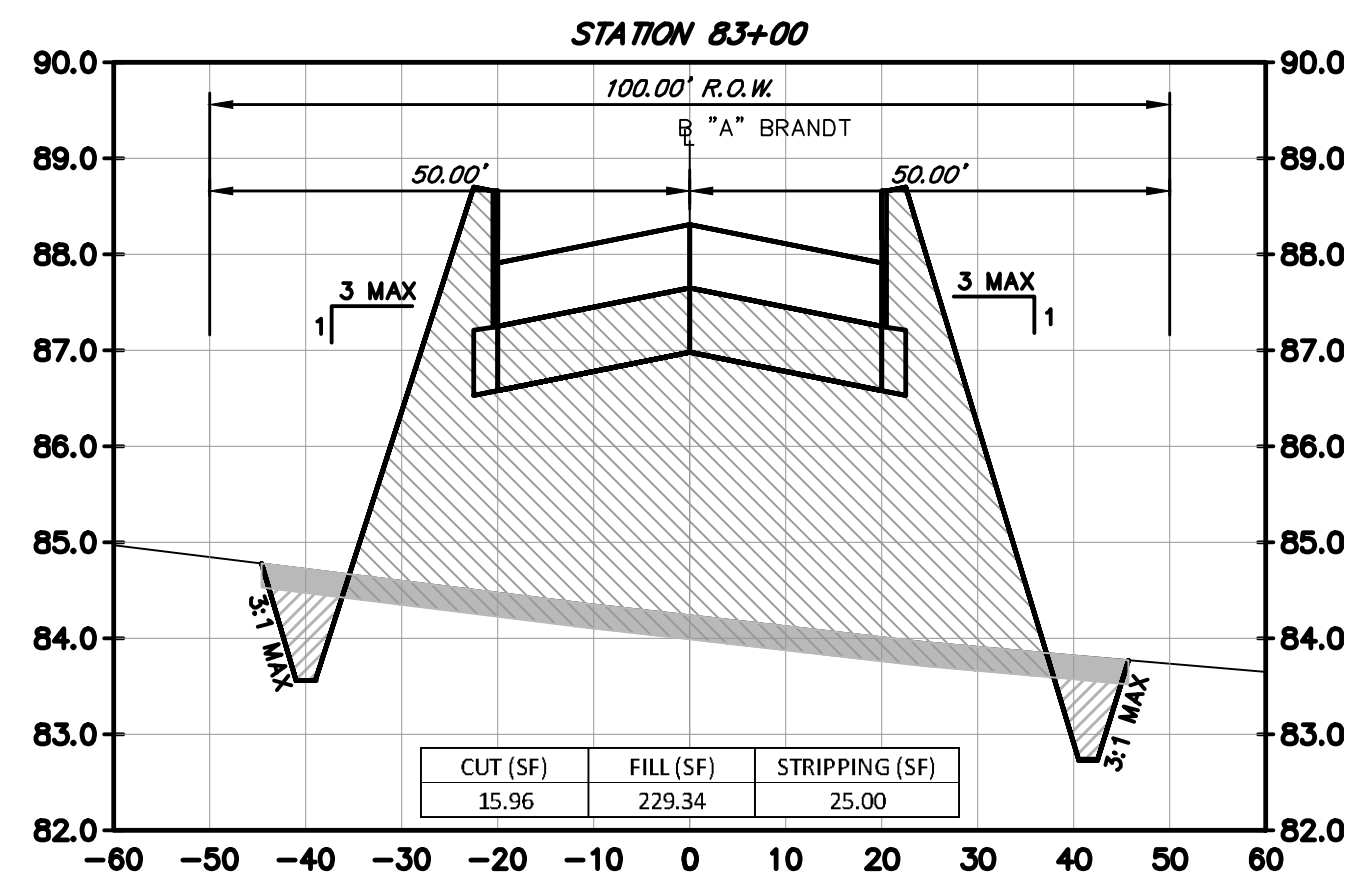
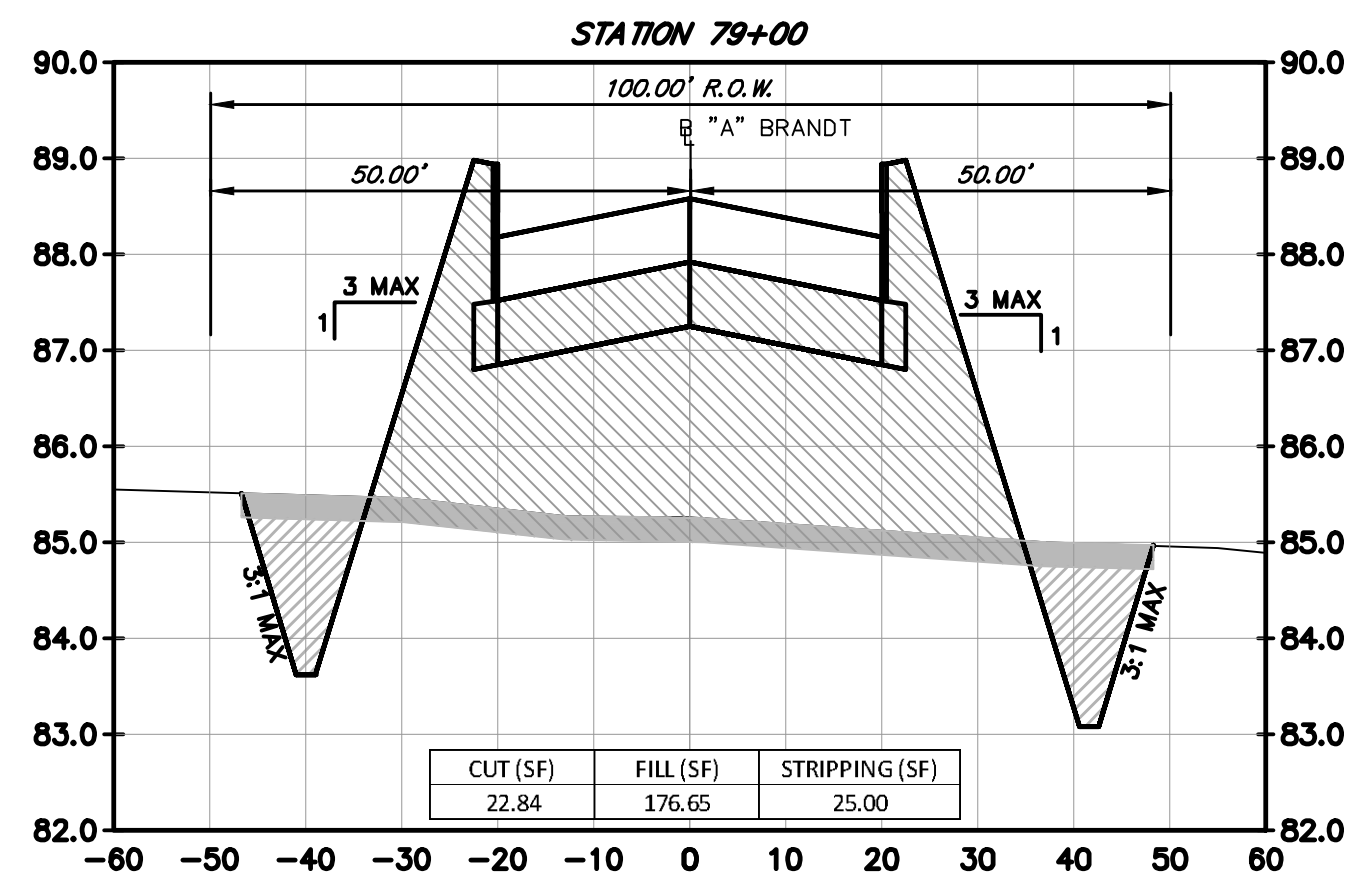
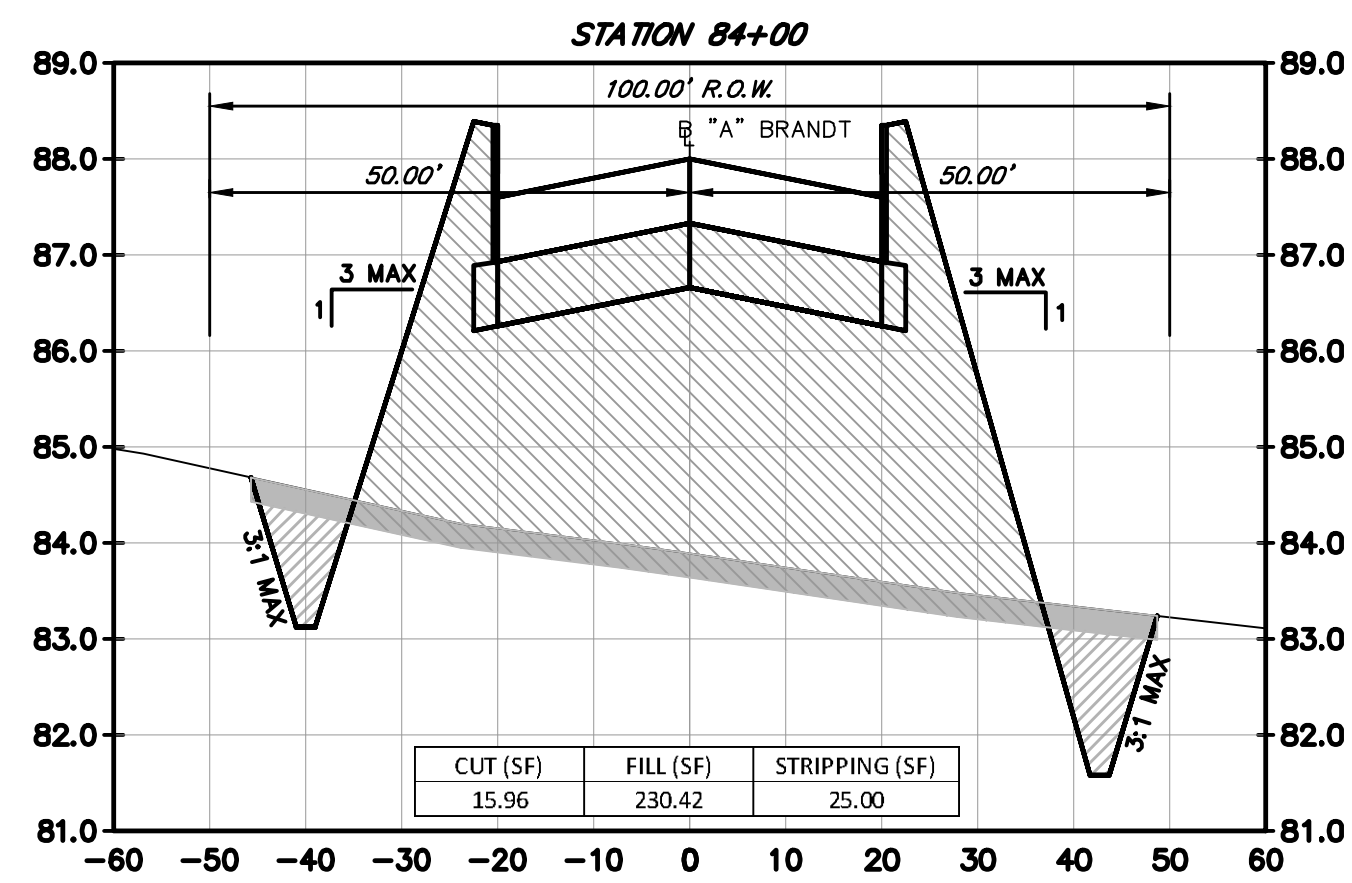
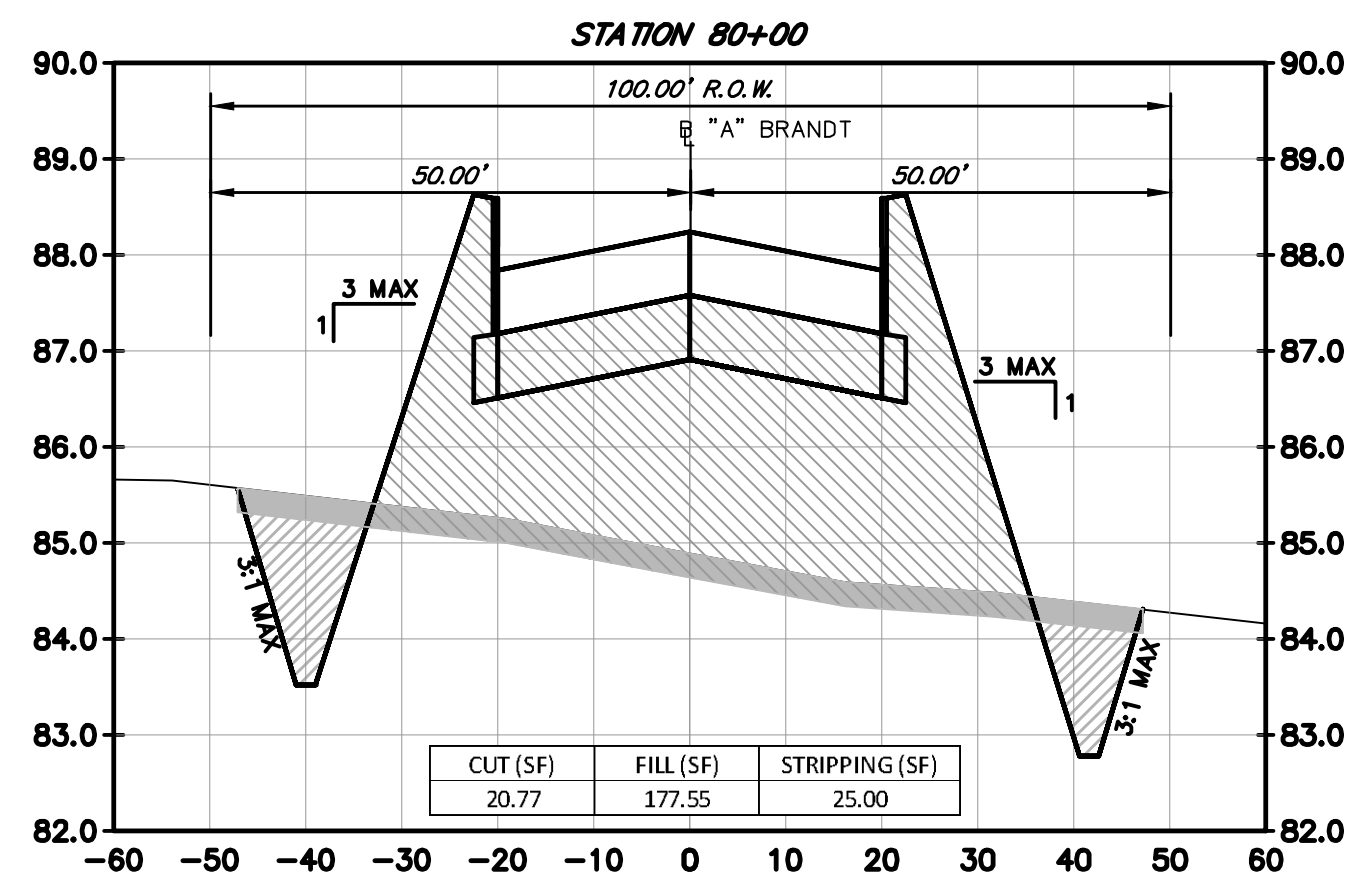
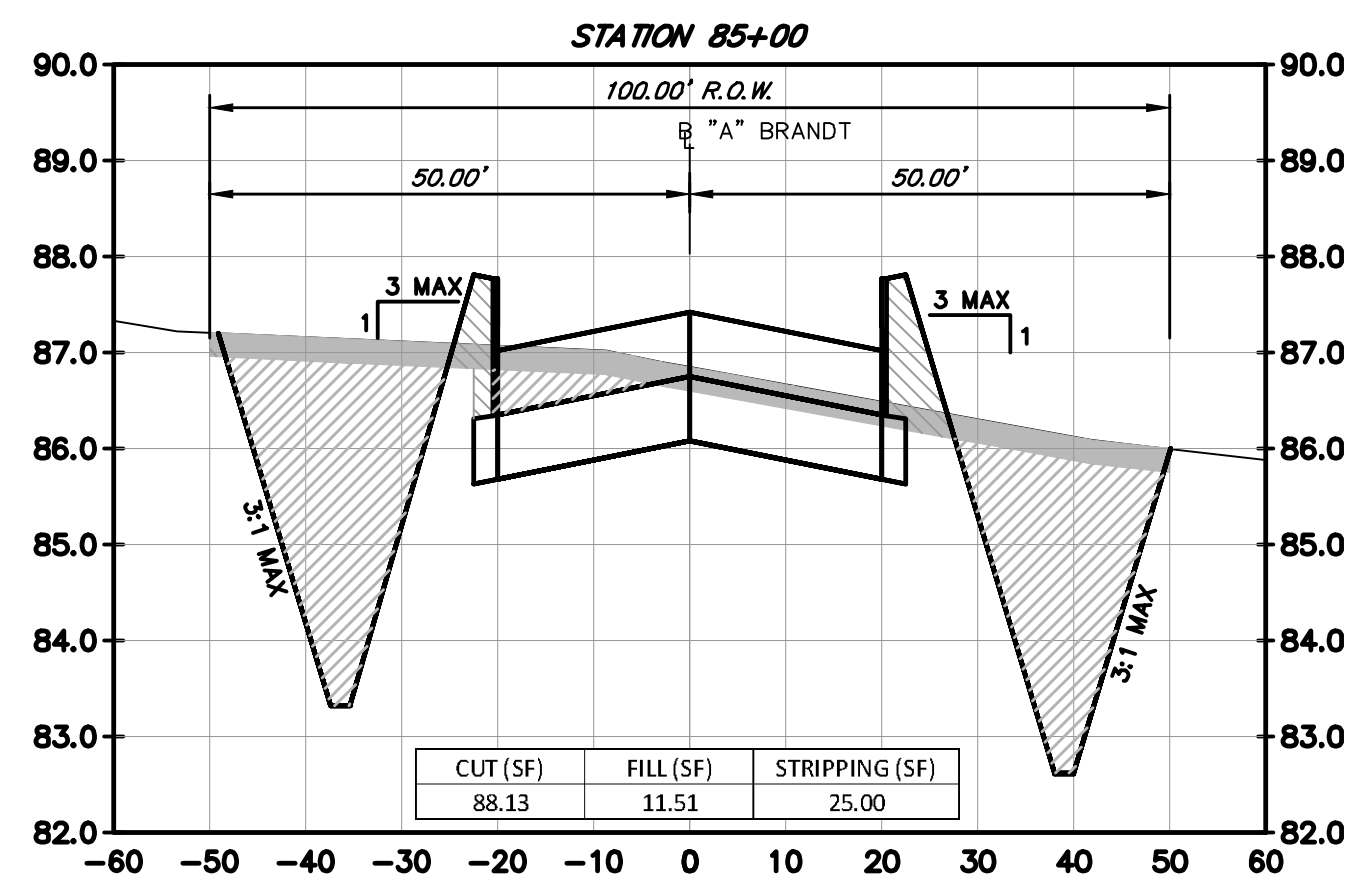
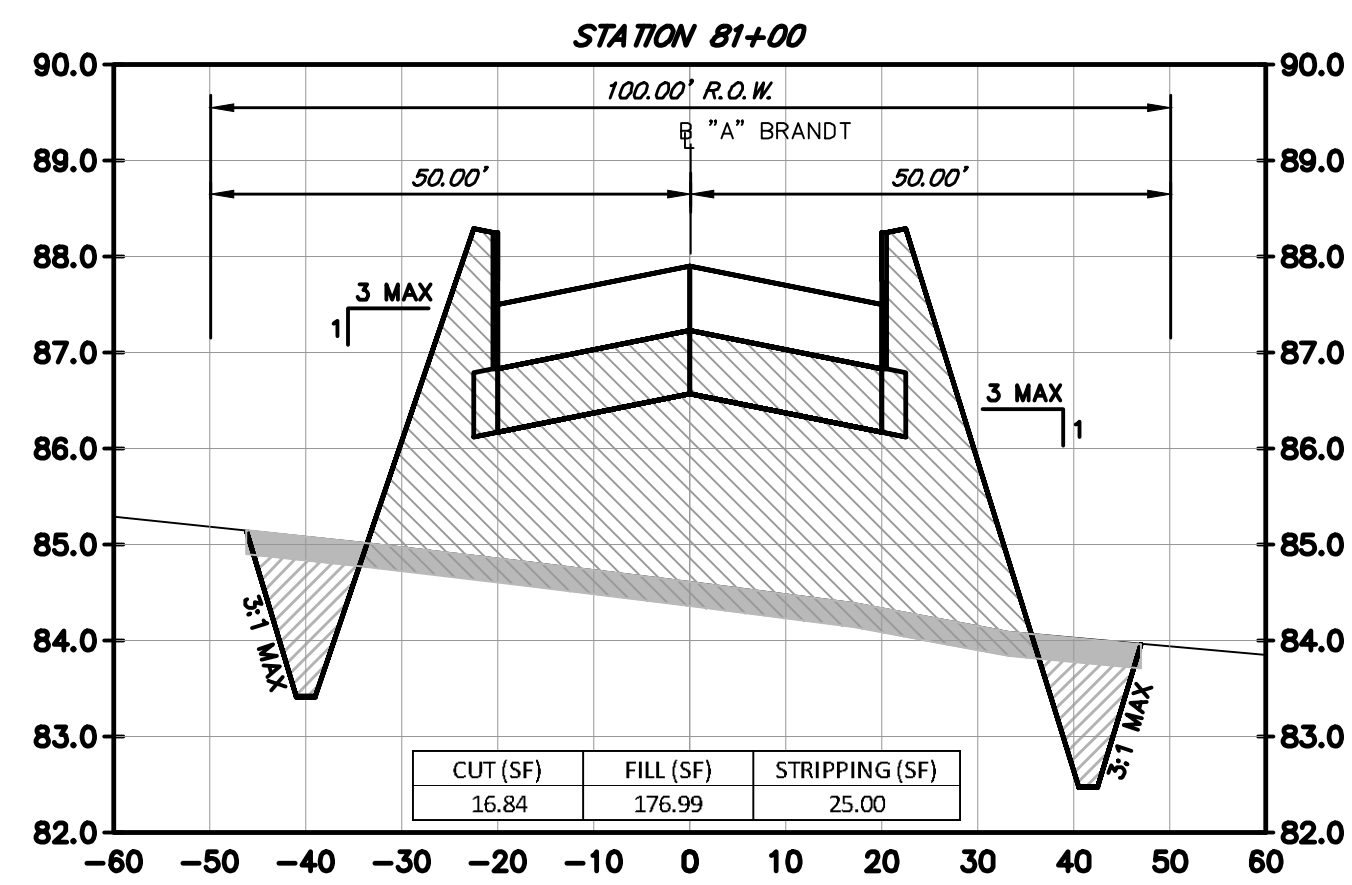


- LEGEND**
- 3" STRIPPING
 - EMBANKMENT AREA
 - ROADWAY EXCAVATION
 - REMOVED EXISTING ROAD

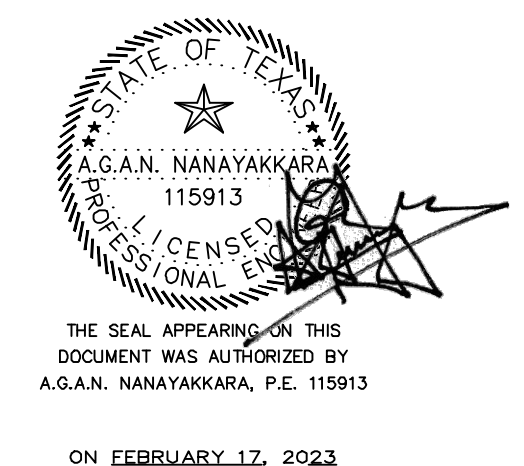


REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD CROSS-SECTIONS STA. 65+00 TO STA. 77+00			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.		SCALE: 1" = 20' H 1" = 2' V	
CHECKED BY: A.G.A.N.		DATE: FEBRUARY, 2023	
		PROJECT No. 0522-1801 CONTRACT: 1 SHEET CS04	

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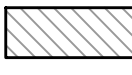

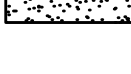
- LEGEND**
- 3" STRIPPING
 - EMBANKMENT AREA
 - ROADWAY EXCAVATION
 - REMOVED EXISTING ROAD

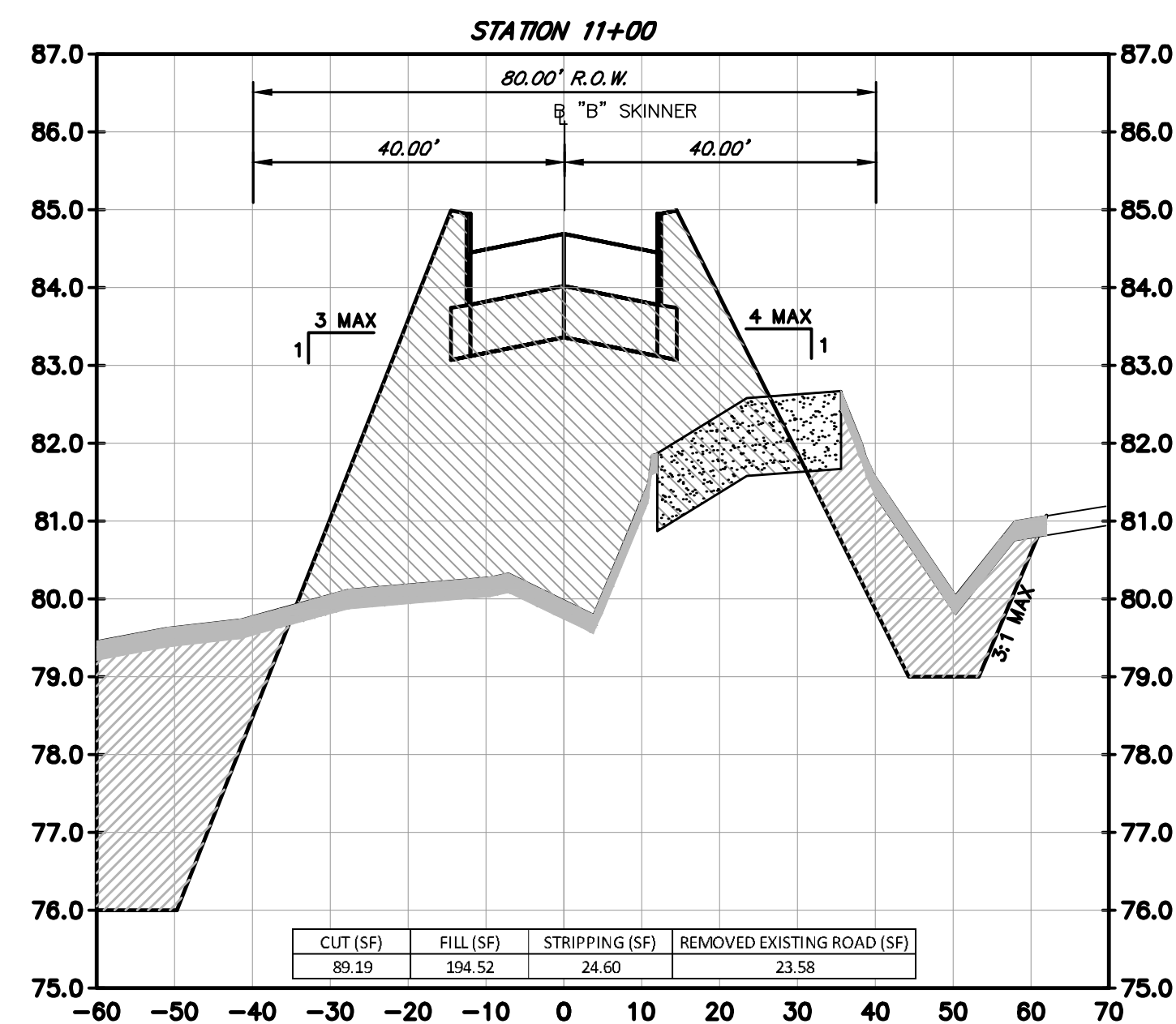
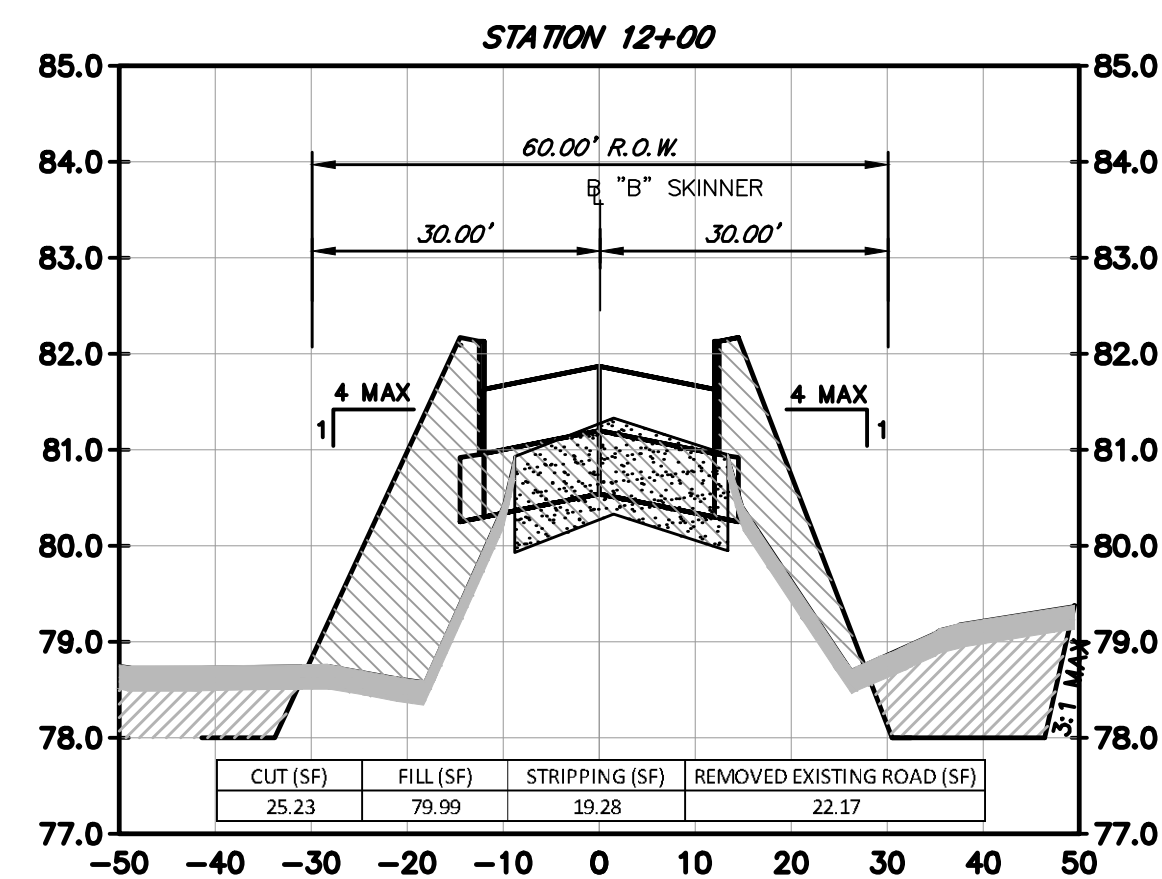
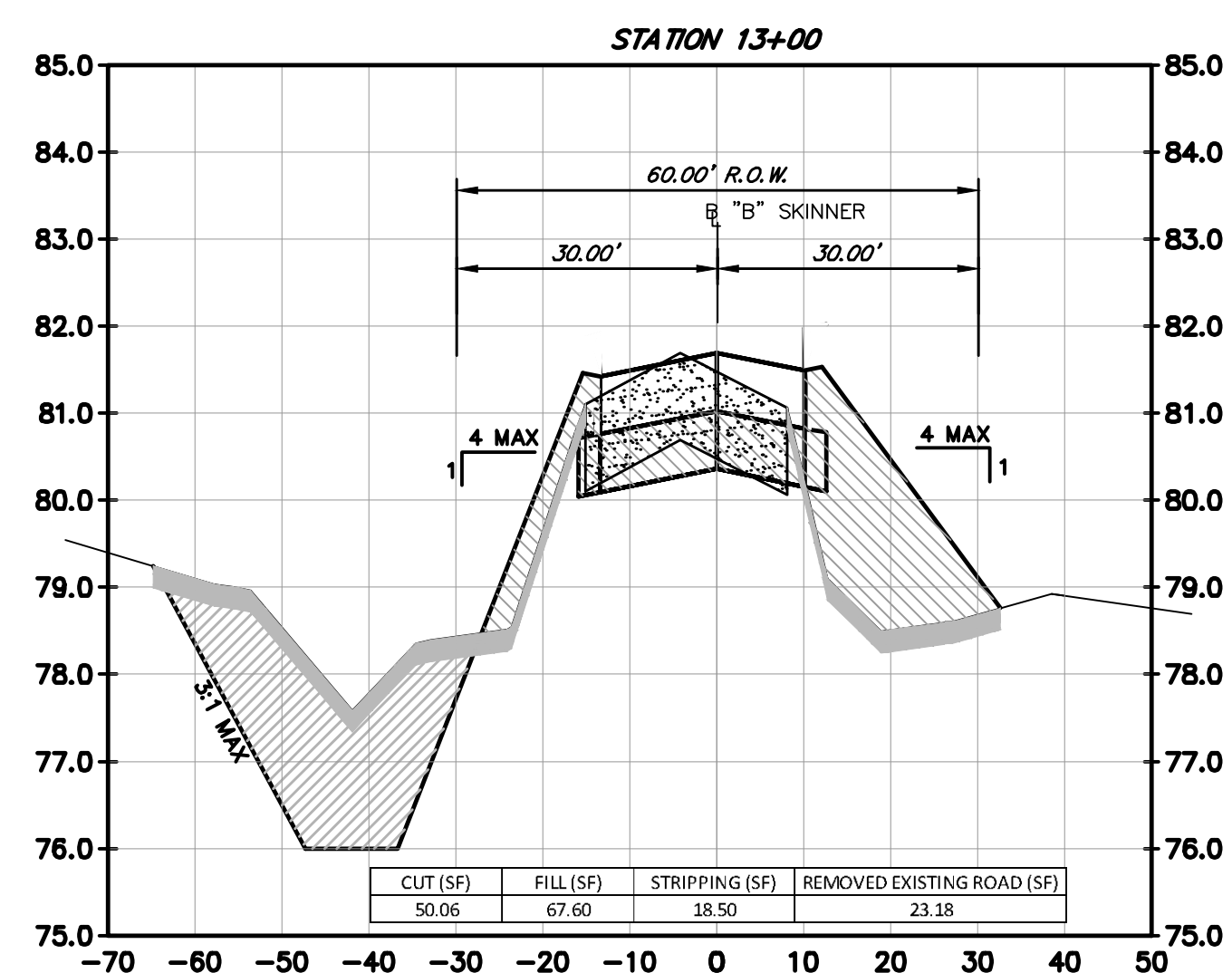


REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD CROSS-SECTIONS STA. 78+00 TO STA. 85+69			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.S.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 20' H 1" = 2' V	PROJECT No. 0522-1801	CONTRACT: 1
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET CS05	

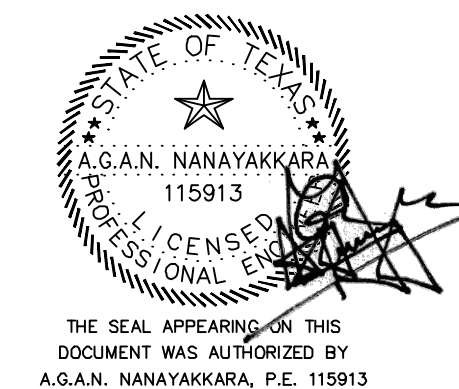
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LEGEND


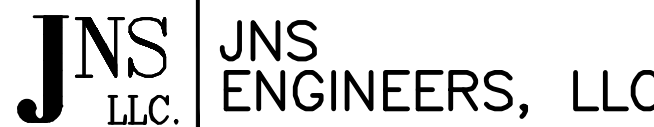
-  3" STRIPPING
-  EMBANKMENT AREA
-  ROADWAY EXCAVATION
-  REMOVED EXISTING ROAD



SKINNER ROAD EARTHWORK QUANTITIES WORKSHEET													
version 11.06.17													
Station	Cross Sectional Areas				Average Cross Sectional Areas			Distance Between Stations	Volumes				
	Roadway Excavation [SF]	Embankment Area [SF]	3" Stripping [SF]	Removed Existing Road [SF]	Average Total Roadway Excavation [SF]	Average Embankment Area [SF]	Average 3" Stripping [SF]	Distance Between Stations [FT]	ITEM 110 ROADWAY EXCAVATION [CY] - PAY	STRIPPING [CY]	Removed Existing Road [CY]	REUSEABLE ROADWAY EXCAVATION * [CY]	ROADWAY EMBANKMENT [CY]
	AR	BR	CR	DR	FR	GR	HR	KR	LR	MR	NR	PR	QR
ROADWAY													
011+00	89.19	194.52	24.60	23.581	57.21	137.26	21.94	100	212	81	85	131	508
012+00	25.23	79.99	19.28	22.173	37.65	73.79	18.89	100	139	70	84	69	273
013+00	50.06	67.60	18.50	23.178									
								Roadway Totals:	351	151	169	200	782



ON FEBRUARY 17, 2023

REV. NO.	DESCRIPTION	DATE	APP.
BRANDT ROAD PRECINCT LINE RD TO MASON RD			
SKINNER ROAD CROSS SECTIONS			
		1445 N. LOOP WEST - SUITE 450 HOUSTON, TEXAS 77008 713-993-0333 TBPE Registration No.: F-14309	
		722 PIN OAK ROAD, STE 202A KATY, TEXAS 77494 TELEPHONE: (281) 391-3366 FAX: (281) 391-3375 WWW.JNSCE.COM T.B.P.E. FIRM REGISTRATION NO. 11653	
DRAWN BY: T.D.	SCALE: 1" = 20' H 1" = 2' V	PROJECT No. 0522-1801 CONTRACT: 1	
CHECKED BY: A.G.A.N.	DATE: FEBRUARY, 2023	SHEET CS06	

