



March 15, 2022

RE: Invitation to Bid Howard County RFB 2020029 GRH CR 1

Dear Contractor,

Howard County Road & Bridge thanks you for your interest in Howard County RFB 2020029. In order to bid this Project, you must be prequalified with the Road & Bridge Department. After reviewing the attached plans if you are interested in bidding, please contact me for the prequalification questionnaire. The questionnaire must be returned to us a minimum of 5 days before the bid is due, for us to review. We will be taking bids through April 7, 2022, 10:00 A.M. Your Bid Packet and specifications will be sent in a separate email once your questionnaire is accepted. If you have any questions, please feel free to contact me at (432) 264-2208 or brian.klinksiek@howardcountytexas.gov

Sincerely,

A handwritten signature in green ink that reads 'Brian J. Klinksiek'.

Brian J. Klinksiek P.E., D.R.

Invitation To Bid Howard County RFB 2020029 GRH CR 1

The Howard County Auditor will accept sealed bids until 10:00 AM on April 7, 2022. This bid requires prequalification with Howard County Road and Bridge Department, specifications may be obtained at that office, 3604 Old Colorado City Road, Big Spring, Texas 79720. The work is to supply labor, materials and equipment to rehabilitate CR 1 from FM 818 to CR 3. Work includes reshaping ditches, widening subgrade, additional base, scarifying and shaping roadway, inverted prime & surface treatment.

Bids may be mailed to the Howard County Auditor, at P.O. Box 1949, Big Spring, Texas 79721-1949 or delivered to the Auditor's Office, Room 202, Howard County Courthouse. **Mark Sealed Envelope "RFB2020029"**

Bids will be presented to the Commissioner's Court at their regular meeting 3:30 PM April 11th. for their consideration. The Court reserves the right to reject any or all bids.

Jackie Olson-Howard County Auditor

NOTICE TO BIDDERS RFB 2020029

1. Bids are to be submitted on this form. Be sure to include pages 1-3. Each bid shall be placed in an envelope, sealed and properly identified with the bid title and delivered to the County Auditor's Office before 10:00 A.M., Thursday, April 7, 2022. Late bids will not be considered under any circumstances. Mark Bids "RFB 2020029".

This is a bid to provide materials, labor and equipment to provide a completed project to Howard County. Bidders must be prequalified through the Howard County Road & Bridge Engineer to be opened. Contact Brian Klinksiek, P.E. at (432)-264-2208 to obtain this prequalification. All items must meet 2014 TxDOT Standard Specification. **Bid Bond or Check (5% of Bid), and Payment / Performance Bonds are required.** The successful bidder will be notified within 1 business day. The County will send the bidder a contract. **Insurance coverage limits shall conform to the attached Exhibit A.**

2. Bidders attention is directed to the Texas Government Code Title 10 Chapter 2258 Prevailing wage rates. **All wage rates must meet the minimum shown on the attached Exhibit B.** To insure compliance Howard County Road & Bridge will request a random payroll from both the general contractor and sub-contractor's
3. **All work shown must be completed on or before September 15, 2022.** Unless authorized in writing by the Howard County Road & Bridge Engineer, the open season for the application of asphalt is May 1 to September 15. Sunday work will only be allowed with written permission from the engineer.
4. Traffic control is of the utmost importance for the safety of the traveling public. Project Signage (Name signs, etc.) are required. Payment will follow the schedule shown on plan sheet 3.
5. Item 1000 6010 SURF TREAT CNTY RDS (ALTERNATE)(AC 12-5 TR) (TY-PB GR 3) is an alternate for use outside of the asphalt season. Per the manufacturer the following must be met in order to shoot asphalt: 50 and rising or 60 and falling. Must have a minimum of 2 hours sunlight on finished shot.
6. The quantities in the proposal are approximate. The quantities of work and materials may be increased or decreased as considered necessary to complete the work as planned and contemplated. Total must include the base bid and the alternate. Only one surface asphalt item will be used and paid.
7. The County is exempt from Federal Excise Tax, State Tax and Local Tax. Do not include tax in bid. If it is determined that tax was included in the bid, it will not be included in the tabulation or any awards and will be deleted from subsequent invoices.
8. Bids cannot be altered or amended after opening time. Any alterations made before opening time must be signed by the bidder or his agent. No bid can be withdrawn after the opening time without approval of the Commissioners' Court based on reasonable acceptable reason.
9. The County will evaluate the bids and make awards for supplies, materials, services and equipment on the basis of the lowest and best bid, which meet the specifications. Awarded bid will be paid for out of current county funds.
10. The County reserves the right to accept or reject all or any part of any bid and award the bid to best serve the interest of the County.

NOTICE TO BIDDERS RFB 2020029

11. By signing and executing this bid, the bidder certifies and represents to the County that bidder has not offered, conferred or agreed to confer any pecuniary benefit or other thing of value for the receipt of special treatment, advantage, information, recipient's decision, opinion, recommendation, vote or any other exercise of discretion concerning this bid.
12. Bidder further certifies and represents that bidder has not violated any State, Federal, Local Law regulations or ordinance relating to bribery, improper influence, collusion, discrimination or other similar crimes and all items or services provided or delivered under and awarded shall conform hereto.
13. Bid unit price on quantity specified, extend and show total. In case of errors in extension, unit price shall govern.
14. Unless otherwise noted, bid prices must be firm for acceptance 60 days from opening date of bid.
15. Engineer's estimate for this project is \$ 198,654.00

Please initial _____

DISCLOSURE OF CERTAIN RELATIONSHIPS

Effective January 1, 2006, Chapter 176 of the Texas Local Government Code requires that any vendor or person considering doing business with a local government entity disclose in the Questionnaire Form CIQ, the vendor or person's affiliation or business relationship that might cause a conflict of interest with a local government entity. By law, this questionnaire must be filed with the County Clerk of Howard County no later than the 7th business day after the date the person becomes aware of facts that require the statement to be filed. See Section 176.006, Local Government Code. A person commits an offense if the person violates Section 176.006, Local Government Code. An offense under this section is a Class C misdemeanor.

A copy of the law is available at:

<https://statutes.capitol.texas.gov/Docs/LG/htm/LG.176.htm>

Frequently ask questions are available at:

<https://www.county.org/TAC/media/TACMedia/Legal/Legal%20Publications%20Documents/2019-Disclosure-of-Certain-Business-Relationships.pdf>

The forms for reporting are available at:

<https://www.ethics.state.tx.us/data/forms/conflict/CIQ.pdf>

By submitting a response to this request, the vendor represents that it is in compliance with the requirements of Chapter 176 of the Texas Local Government Code.

Please turn completed forms to the Howard County Auditor's Office located at 300 Main, Room 202 Big Spring, TX or mail to P.O. Box 1949, Big Spring, TX 79721.

EXHIBIT A

- A. Contractor shall, at all times during the term hereof, maintain such insurance coverage as may be required by County. All such insurance, including renewals, shall be subject to the approval of County for adequacy of protection and evidence of such coverage shall be furnished to County on Certificates of Insurance indicating such insurance to be in force and effect and providing that it will not be canceled during the performance of Work under this Agreement without thirty (30) calendar days prior written notice to County. Completed Certificates of Insurance shall be filed with County prior to the performance of services hereunder, provided however, that Contractor shall at any time upon request, file duplicate copies of the policies of such insurance with County.
- I
- B. If in the judgment of County, prevailing conditions warrant the provision by Contractor of additional liability insurance coverage or coverage which is different in kind, County reserves the right to require the provision by Contractor of an amount of coverage different from the amounts or kind previously required and shall afford written notice of such change in requirements thirty (30) days prior to the date on which the requirements shall take effect. Should the Contractor fail or refuse to satisfy the requirement of changed coverage within thirty (30) days following County's written notice, this Agreement shall be considered terminated on the date that the required change in policy coverage would otherwise take effect.

General Conditions

The following condition shall apply to all insurance policies obtained by Contractor for the purpose of complying with this Agreement:

- 1) Named Insureds: All insurance policies required herein shall be drawn in the name of Contractor, with County, its council members, board and commission members, officials, agents, guests, invitees, consultants and employees named as additional insureds, except on Workers' Compensation coverage.
- 2) Waiver of Subrogation: Contractor shall require its insurance carrier(s), with respect to all insurance policies, to waive all rights of subrogation against County, its council members, board and commission members, officials, agents, guests, invitees, consultants and employees.
- 3) Certificates of Insurance: At or before the time of execution of this Agreement,

Contractor shall furnish County's Risk Manager with certificates of insurance as evidence that all of the policies required herein are in full force and effect and provide the required coverage and limits of insurance. All certificates of insurance shall clearly state that all applicable requirements have been satisfied. The certificates shall provide that any company issuing an insurance policy shall provide to County not less than thirty (30) days advance notice in writing of cancellation, non-renewal, or material change in the policy of insurance. In addition, Contractor and insurance company shall immediately provide written notice to County's Risk Manager upon receipt of notice of cancellation of any insurance policy, or of a decision to terminate or alter any insurance policy. Certificates of insurance and notices of cancellations, terminations, or alterations shall be furnished to:

County Engineer at 3604 Old Colorado City Rd, Big Spring Texas 79720.

- 4) Contractor's Liability: The procurement of such policy of insurance shall not be construed to be a limitation upon Contractor's liability or as a full performance on its part of the indemnification provisions of this Agreement. Contractor's obligations are, notwithstanding any policy of insurance, for the full and total amount of any damage, injury, or loss caused by or attributable to its activities conducted at or upon the premises. Failure of Contractor to maintain adequate coverage shall not relieve Contractor of any contractual responsibility or obligation.
- 5) Subcontractors' Insurance: Contractor shall cause each Subcontractor and Sub-Sub-Contractor of Contractor to purchase and maintain insurance of the types and in the amounts specified below. Contractor shall require Subcontractors and Sub-Subcontractors to furnish copies of certificates of insurance to the County Engineer evidencing coverage for each Subcontractor and Sub-Subcontractor.

Types And Amounts Of Insurance Required

Contractor shall obtain and continuously maintain in effect at all times during the term hereof, at Contractor's sole expense, insurance coverage as follows with limits not less than those set forth below:

- 1) Commercial General Liability: This policy shall be occurrence-type policy and shall protect Contractor and additional insureds against all claims arising from bodily injury, sickness, disease or death of any person (other than Contractor's employees) and damage to property of County or others arising out of the act or omission of Contractor or its agents and employees. This policy shall include completed operations, products liability, contractual coverage, broad form property coverage, explosion, collapse, underground, premises/operations, and independent contractors (to remain in force for two years after final payment). Coverage limits shall not be less than:

\$1,000,000.00 General Aggregate
\$1,000,000.00 Products Completed Operations
\$1,000,000.00 Personal & Advertising Injury
\$1,000,000.00 Each Occurrence
\$ 100,000.00 Fire Damage (Any one Fire)

- 2) Business Automobile Liability: This policy shall protect Contractor and the additional insureds against all claims for injuries to members of the public and damage to property of others arising from the use of motor vehicles and shall cover operation on and off the premises of all motor vehicles licensed for highway use, whether they are owned, non-owned or hired. Coverage limits shall not be less than:

\$1,000,000.00 Combined Single Limit

- 3) Workers' Compensation and Employer's Liability: If Contractor hires any employees, Contractor shall maintain Workers' Compensation and Employer's Liability insurance, which shall protect Contractor against all claims under applicable state workers' compensation laws and employer's liability. The insured shall also be protected against claim for injury, disease or death of employees which for any reason, may not fall within the provisions of a workers' compensation law. Coverage shall not be less than:

Statutory Amount	Workers' Compensation
\$ 500,000.00	Employer's Liability, Each Accident Employer's
\$ 500,000.00	Liability, Disease - Each Employee Employer's
\$ 500,000.00	Liability, Disease - Policy Limit



The wage rates listed herein are those predetermined by the Secretary of Labor and State Statute and listed in the United States Department of Labor's (USDOL) General Decisions dated 01-01-2021 and are the minimum wages to be paid accordingly for each specified classification. To determine the applicable wage rate zone, a list entitled "TEXAS COUNTIES IDENTIFIED BY WAGE RATE ZONES" is provided in the contract. Any wage rate that is not listed herein and not in the USDOL's general decision, must be submitted to the Engineer for approval. IMPORTANT NOTICE FOR STATE PROJECTS: only the controlling wage rate zone applies to the contract. Effective 01-01-2021.

CLASS. #	CLASSIFICATION DESCRIPTION	ZONE TX02 *(TX20210002)	ZONE TX03 *(TX20210003)	ZONE TX04 *(TX20210004)	ZONE TX05 *(TX20210005)	ZONE TX06 *(TX20210006)	ZONE TX07 *(TX20210007)	ZONE TX08 *(TX20210008)	ZONE TX24 *(TX20210024)	ZONE TX25 *(TX20210025)	ZONE TX27 *(TX20210027)	ZONE TX28 *(TX20210028)	ZONE TX29 *(TX20210029)	ZONE TX30 *(TX20210030)	ZONE TX37 *(TX20210037)	ZONE TX38 *(TX20210038)	ZONE TX42 *(TX20210042)
1428	Agricultural Tractor Operator						\$12.69					\$12.35			\$11.75		
1300	Asphalt Distributor Operator	\$14.87	\$13.48	\$13.88	\$15.72	\$15.58	\$15.55	\$15.72	\$13.28	\$15.32	\$15.82	\$14.36	\$14.25	\$14.03	\$13.75	\$14.06	\$14.40
1303	Asphalt Paving Machine Operator	\$13.40	\$12.25	\$12.35	\$13.87	\$14.05	\$14.36	\$14.20	\$13.26	\$13.99	\$14.66	\$12.92	\$13.44	\$12.53	\$14.00	\$14.32	\$12.99
1106	Asphalt Raker	\$12.28	\$10.61	\$12.02	\$14.21	\$11.65	\$12.12	\$11.64	\$11.44	\$12.69	\$12.05	\$11.34	\$11.67	\$11.40	\$12.59	\$12.36	\$11.78
1112	Batching Plant Operator, Asphalt																
1115	Batching Plant Operator, Concrete																
1214	Blaster																
1615	Boom Truck Operator						\$18.36										
1444	Boring Machine Operator																
1305	Broom or Sweeper Operator																
1144	Communications Cable Installer	\$11.21	\$10.33	\$10.08	\$11.99		\$11.04	\$11.62		\$11.74	\$11.41	\$10.30		\$10.23	\$10.60	\$12.68	\$11.05
1124	Concrete Finisher, Paving and Structures	\$13.55	\$12.46	\$13.16	\$12.85	\$12.64	\$12.56	\$12.77	\$12.44	\$14.12	\$13.04	\$13.38	\$12.64	\$12.80	\$12.79	\$12.98	\$13.32
1318	Concrete Pavement Finishing Machine Operator				\$16.05		\$15.48			\$16.05		\$19.31				\$13.07	
1315	Concrete Paving, Curing, Float, Texturing Machine Operator											\$16.34				\$11.71	
1333	Concrete Saw Operator				\$14.67					\$14.48	\$17.33					\$13.99	
1399	Concrete/Gunite Pump Operator																
1344	Crane Operator, Hydraulic 80 tons or less				\$18.22		\$18.36			\$18.12	\$18.04	\$20.21			\$18.63	\$13.86	
1345	Crane Operator, Hydraulic Over 80 Tons																
1342	Crane Operator, Lattice Boom 80 Tons or Less	\$16.82	\$14.39	\$13.85	\$17.27		\$15.87			\$17.27		\$14.67			\$16.42	\$14.97	\$13.87
1343	Crane Operator, Lattice Boom Over 80 Tons				\$20.52		\$19.38			\$20.52		\$17.49			\$25.13	\$15.80	
1306	Crawler Tractor Operator	\$13.96	\$16.63	\$13.62	\$14.26		\$15.67			\$14.07	\$13.15	\$13.38			\$14.60	\$13.68	\$13.50
1351	Crusher or Screen Plant Operator																
1446	Directional Drilling Locator						\$11.67										
1445	Directional Drilling Operator				\$20.32		\$17.24										
1139	Electrician	\$20.96		\$19.87	\$19.80		\$26.35		\$20.27	\$19.80		\$20.92				\$27.11	\$19.87
1347	Excavator Operator, 50,000 pounds or less	\$13.46	\$12.56	\$13.67	\$17.19		\$12.88	\$14.38	\$13.49	\$17.19		\$13.88			\$14.09	\$12.71	\$14.42
1348	Excavator Operator, Over 50,000 pounds		\$15.23	\$13.52	\$17.04		\$17.71			\$16.99	\$18.80	\$16.22				\$14.53	\$13.52
1150	Flagger	\$9.30	\$9.10	\$8.50	\$10.28	\$8.81	\$9.45	\$8.70		\$10.06	\$9.71	\$9.03	\$8.81	\$9.08	\$9.90	\$10.33	\$8.10
1151	Form Builder/Setter, Structures	\$13.52	\$12.30	\$13.38	\$12.91	\$12.71	\$12.87	\$12.38	\$12.26	\$13.84	\$12.98	\$13.07	\$13.61	\$12.82	\$14.73	\$12.23	\$12.25
1160	Form Setter, Paving & Curb	\$12.36	\$12.16	\$13.93	\$11.83	\$10.71	\$12.94			\$13.16	\$12.54	\$11.33	\$10.69		\$13.33	\$12.34	\$13.93
1360	Foundation Drill Operator, Crawler Mounted				\$17.99					\$17.99						\$17.43	
1363	Foundation Drill Operator, Truck Mounted		\$16.86	\$22.05	\$21.51		\$16.93			\$21.07	\$20.20	\$20.76		\$17.54	\$21.39	\$15.89	\$22.05
1369	Front End Loader Operator, 3 CY or Less	\$12.28	\$13.49	\$13.40	\$13.85		\$13.04	\$13.15	\$13.29	\$13.69	\$12.64	\$12.89			\$13.51	\$13.32	\$12.17
1372	Front End Loader Operator, Over 3 CY		\$13.69	\$12.33	\$14.96		\$13.21	\$12.86	\$13.57	\$14.72	\$13.75	\$12.32			\$13.19	\$13.17	\$13.02
1329	Joint Sealer																
1172	Laborer, Common	\$10.30	\$9.86	\$10.08	\$10.51		\$10.50	\$10.24	\$10.58	\$10.72	\$10.45	\$10.30	\$10.25	\$10.03	\$10.54	\$11.02	\$10.15
1175	Laborer, Utility	\$11.80	\$11.53	\$12.70	\$12.17	\$11.81	\$12.27	\$12.11	\$11.33	\$12.32	\$11.80	\$11.53	\$11.23	\$11.50	\$11.95	\$11.73	\$12.37

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1346	Loader/Backhoe Operator	\$14.18	\$12.77	\$12.97	\$15.68		\$14.12				\$15.18	\$13.58	\$12.87		\$13.21	\$14.13	\$12.90
1187	Mechanic	\$20.14	\$15.47	\$17.47	\$17.00	\$17.00	\$17.10				\$18.84	\$18.94	\$17.00	\$16.81	\$18.46	\$16.96	\$17.47
1380	Milling Machine Operator	\$15.54	\$14.64	\$12.22	\$14.29		\$14.18				\$14.32	\$14.35	\$12.86		\$14.75	\$13.53	\$12.80
1390	Motor Grader Operator, Fine Grade	\$17.49	\$16.52	\$16.88	\$17.12	\$18.37	\$18.51	\$16.69	\$16.13		\$17.19	\$18.95	\$17.07	\$17.74	\$17.08	\$15.69	\$20.01
1393	Motor Grader Operator, Rough	\$16.15	\$14.62	\$15.83	\$16.20	\$17.07	\$14.63	\$18.50		\$16.02	\$16.44	\$15.12	\$16.85	\$14.47	\$17.39	\$14.23	\$15.53
1413	Off Road Hauler			\$10.08	\$12.26		\$11.88			\$12.25		\$12.23			\$13.00	\$14.60	
1196	Painter, Structures				\$21.29		\$18.34						\$21.29			\$18.82	
1396	Pavement Marking Machine Operator	\$16.42		\$13.10	\$13.55		\$19.17	\$12.01		\$13.63	\$14.60	\$13.17		\$16.65	\$10.54	\$11.18	\$13.10
1443	Percussion or Rotary Drill Operator																
1202	Piledriver															\$14.95	
1205	Pipelayer		\$11.87	\$14.64	\$13.17	\$11.17	\$12.79		\$11.37	\$13.24	\$12.66	\$13.24	\$11.17	\$11.87		\$12.12	\$14.84
1384	Reclaimer/Pulverizer Operator	\$12.85			\$11.90		\$12.88			\$11.01		\$10.46					
1500	Reinforcing Steel Worker	\$13.50	\$14.07	\$17.53	\$16.17		\$14.00			\$16.18	\$12.74	\$15.83		\$17.10		\$15.15	\$17.72
1402	Roller Operator, Asphalt	\$10.95		\$11.96	\$13.29		\$12.78	\$11.61		\$13.08	\$12.36	\$11.68			\$11.71	\$11.95	\$11.50
1405	Roller Operator, Other	\$10.36		\$10.44	\$11.82		\$10.50	\$11.64		\$11.51	\$10.59	\$10.30		\$12.04	\$12.85	\$11.57	\$10.66
1411	Scrapper Operator	\$10.61	\$11.07	\$10.85	\$12.88		\$12.27		\$11.12	\$12.96	\$11.88	\$12.43		\$11.22	\$13.95	\$13.47	\$10.89
1417	Self-Propelled Hammer Operator																
1194	Service	\$13.98	\$12.34	\$14.11	\$14.74		\$14.51	\$15.56	\$13.44	\$14.58	\$14.31	\$13.83		\$12.43	\$13.72	\$13.97	\$14.11
1513	Sign Erector																
1708	Slurry Seal or Micro-Surfacing Machine Operator																
1341	Small Slipform Machine Operator									\$15.96							
1515	Spreaders Box Operator	\$12.60		\$13.12	\$14.71		\$14.04			\$14.73	\$13.84	\$13.68		\$13.45	\$11.83	\$13.58	\$14.05
1705	Structural Steel Welder															\$12.85	
1509	Structural Steel Worker						\$19.29									\$14.39	
1339	Subgrade Trimmer																
1143	Telecommunication Technician																
1145	Traffic Signal/Light Pole Worker						\$16.00										
1440	Trenching Machine Operator, Heavy						\$18.48										
1437	Trenching Machine Operator, Light																
1609	Truck Driver Lowboy-Float	\$14.46	\$13.63	\$13.41	\$15.00	\$15.93	\$15.66			\$16.24	\$16.39	\$14.30	\$16.62	\$15.63	\$14.28	\$16.03	\$13.41
1612	Truck Driver Transit-Mix				\$14.14					\$14.14							
1600	Truck Driver, Single Axle	\$12.74	\$10.82	\$10.75	\$13.04	\$11.61	\$11.79	\$13.53	\$13.16	\$12.31	\$13.40	\$10.30	\$11.61		\$11.97	\$11.46	\$10.75
1606	Dump Truck	\$11.33	\$14.53	\$11.95	\$12.95		\$11.68		\$14.06	\$12.62	\$11.45	\$12.28		\$13.08	\$11.68	\$11.48	\$11.10
1607	Truck Driver, Tandem Axle Tractor with Semi Trailer	\$12.49	\$12.12	\$12.50	\$13.42		\$12.81	\$13.16		\$12.86	\$16.22	\$12.50			\$13.80	\$12.27	\$12.50
1441	Tunneling Machine Operator, Heavy																
1442	Tunneling Machine Operator, Light																
1706	Welder		\$14.02		\$14.86		\$15.97		\$13.74	\$14.84					\$13.78		
1520	Work Zone Barricade Servicer	\$10.30	\$12.88	\$11.46	\$11.70	\$11.57	\$11.85	\$10.77		\$11.68	\$12.20	\$11.22	\$11.51	\$12.96	\$10.54	\$11.67	\$11.76

Notes:

*Represents the USDOL wage decision.

Any worker employed on this project shall be paid at the rate of one and one half (1-1/2) times the regular rate for every hour worked in excess of forty (40) hours per week.

For reference, the titles and descriptions for the classifications listed here are detailed further in the AGC of Texas' Standard Job Classifications and Descriptions for Highway, Heavy, Utilities, and Industrial Construction in Texas posted on the AGC's Web site for any contractor.

**TEXAS COUNTIES IDENTIFIED BY
WAGE RATE ZONES: 2, 3, 4, 5, 6, 7, 8, 24, 25, 27, 28, 29, 30, 37, 38, 42**

County Name	Zone	County Name	Zone	County Name	Zone	County Name	Zone
Anderson	28	Donley	37	Karnes	27	Reagan	37
Andrews	37	Duval	30	Kaufman	25	Real	37
Angelina	28	Eastland	37	Kendall	7	Red River	28
Aransas	29	Ector	2	Kenedy	30	Reeves	8
Archer	25	Edwards	8	Kent	37	Refugio	27
Armstrong	2	El Paso	24	Kerr	27	Roberts	37
Atascosa	7	Ellis	25	Kimble	37	Robertson	7
Austin	38	Erath	28	King	37	Rockwall	25
Bailey	37	Falls	28	Kinney	8	Runnels	37
Bandera	7	Fannin	28	Kleberg	27	Rusk	4
Bastrop	7	Fayette	27	Knox	37	Sabine	28
Baylor	37	Fisher	37	Lamar	28	San Augustine	28
Bee	27	Floyd	37	Lamb	37	San Jacinto	38
Bell	7	Foard	37	Lampasas	7	San Patricio	29
Bexar	7	Fort Bend	38	LaSalle	30	San Saba	37
Blanco	27	Franklin	28	Lavaca	27	Schleicher	37
Borden	37	Freestone	28	Lee	27	Scurry	37
Bosque	28	Frio	27	Leon	28	Shackelford	37
Bowie	4	Gaines	37	Liberty	38	Shelby	28
Brazoria	38	Galveston	38	Limestone	28	Sherman	37
Brazos	7	Garza	37	Lipscomb	37	Smith	4
Brewster	8	Gillespie	27	Live Oak	27	Somervell	28
Briscoe	37	Glasscock	37	Llano	27	Starr	30
Brooks	30	Goliad	29	Loving	37	Stephens	37
Brown	37	Gonzales	27	Lubbock	2	Sterling	37
Burleson	7	Gray	37	Lynn	37	Stonewall	37
Burnet	27	Grayson	25	Madison	28	Sutton	8
Caldwell	7	Gregg	4	Marion	28	Swisher	37
Calhoun	29	Grimes	28	Martin	37	Tarrant	25
Callahan	25	Guadalupe	7	Mason	27	Taylor	2
Cameron	3	Hale	37	Matagorda	27	Terrell	8
Camp	28	Hall	37	Maverick	30	Terry	37
Carson	2	Hamilton	28	McCulloch	37	Throckmorton	37
Cass	28	Hansford	37	McLennan	7	Titus	28
Castro	37	Hardeman	37	McMullen	30	Tom Green	2
Chambers	38	Hardin	38	Medina	7	Travis	7
Cherokee	28	Harris	38	Menard	37	Trinity	28
Childress	37	Harrison	42	Midland	2	Tyler	28
Clay	25	Hartley	37	Milam	28	Upshur	4
Cochran	37	Haskell	37	Mills	37	Upton	37
Coke	37	Hays	7	Mitchell	37	Uvalde	30
Coleman	37	Hemphill	37	Montague	37	Val Verde	8
Collin	25	Henderson	28	Montgomery	38	Van Zandt	28
Collingsworth	37	Hidalgo	3	Moore	37	Victoria	6
Colorado	27	Hill	28	Morris	28	Walker	28
Comal	7	Hockley	37	Motley	37	Waller	38
Comanche	37	Hood	28	Nacogdoches	28	Ward	37
Concho	37	Hopkins	28	Navarro	28	Washington	28
Cooke	37	Houston	28	Newton	28	Webb	3
Coryell	7	Howard	37	Nolan	37	Wharton	27
Cottle	37	Hudspeth	8	Nueces	29	Wheeler	37
Crane	37	Hunt	25	Ochiltree	37	Wichita	5
Crockett	8	Hutchinson	37	Oldham	37	Wilbarger	37
Crosby	2	Irion	2	Orange	38	Willacy	30
Culberson	8	Jack	28	Palo Pinto	28	Williamson	7
Dallam	37	Jackson	27	Panola	28	Wilson	7
Dallas	25	Jasper	28	Parker	25	Winkler	37
Dawson	37	Jeff Davis	8	Parmer	37	Wise	25
Deaf Smith	37	Jefferson	38	Pecos	8	Wood	28
Delta	25	Jim Hogg	30	Polk	28	Yoakum	37
Denton	25	Jim Wells	27	Potter	2	Young	37
DeWitt	27	Johnson	25	Presidio	8	Zapata	30
Dickens	37	Jones	25	Rains	28	Zavala	30
Dimmit	30			Randall	2		

Final Plans

Date Work Began: _____
Date Work Was Completed: _____
Date Work Was Accepted: _____
Final Contract Cost: _____

HOWARD COUNTY
ROAD & BRIDGE DEPARTMENT
PLANS OF PROPOSED
COUNTY ROAD IMPROVEMENT

- 1 Title Sheet
- 2 Typical Sections
- 3 General Notes
- 4 Estimated Quantities & Sequence of Work
- 5 Project Work Segments
- 6-17 BC (11)-21 Through BC (12)-21 *
- 18 TCP (SC-1) - 21 *
- 19 Storm Water Prevention Prevention Plan
- 20 Environmental Permits, Issues and
- 21-23 Commitments (EPIC)
- EC(9)-16 Erosion Control Log

Project 2020029

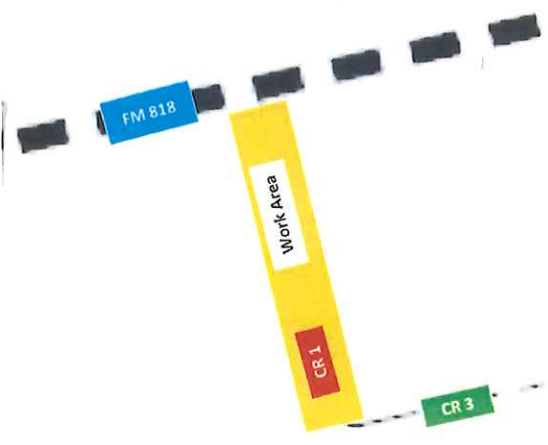
For the Rehabilitation of CR 1 From FM 818 To CR 3

Consisting of subgrade widening, base, scarifying & shaping, inverted prime, 1 course surface treatment, and traffic control

Project Length: 5,225 Feet
Project Length: 0.99 Miles

The standard sheets specifically identified above with an (*) have been selected by me or under my responsible supervision as being applicable to this project.

Brian J. Klinski P.E. 3/18/2022 Date



Locator Map

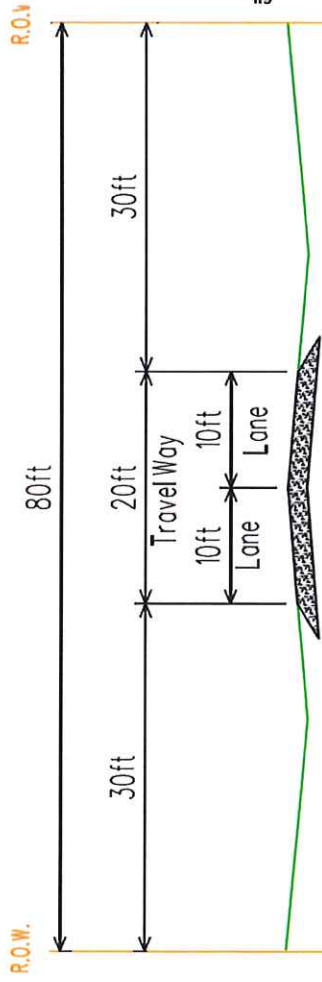


Title Sheet

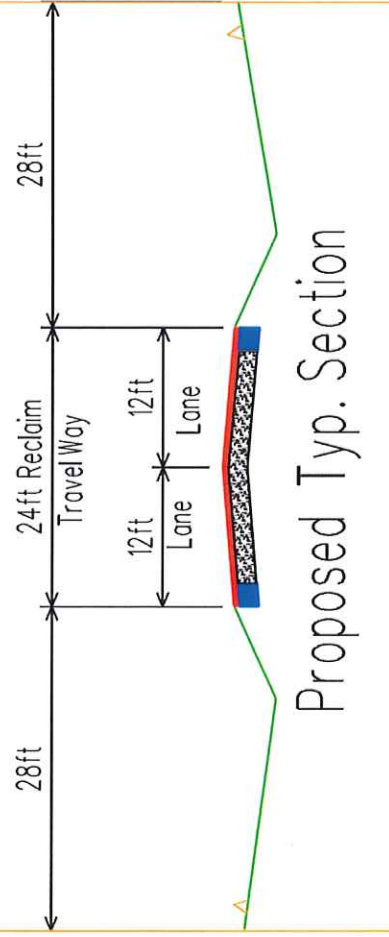
Project #	Precinct	Sheet #
2020029	3	1

Equations: None
Exceptions: None
Railroad X-ings: None

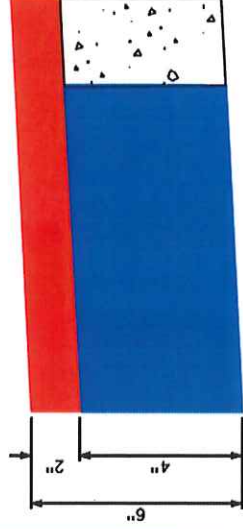
Specifications adopted by the Texas Department of Transportation, November 1, 2014 and specification items listed and dated as follows, shall govern on this project:



Existing Typ. Section



Proposed Typ. Section



Sta. 7+50 to 53+42

R.O.W.

2ft typ.

Proposed Windrow Detail

Contractor to windrow excess material.
HC R&B will remove at a later date



3-8-2022

Date

Brian J. Klinksek
BRIAN J. KLINKSEK
P.E.



Typical Sections

Project #	Precinct	Sheet #
2020029	3	2

General Notes

All pages of the bid package must be initialed or signed as indicated for a bid to be considered complete. This package has 3 pages

All items reference the Texas Department of Transportation 2014 English Specification Book

Bids will be opened at 10:00 AM April 7, 2022 in the Howard County Auditor's Office. Final acceptance of bids will be made during the regular session of Howard County Commissioner's Court at 3:30 PM April 11, 2022.

In order to qualify to have a bid read the contractor must prove that they have the knowledge and capability to perform the work described herein. Provide the Howard County Road & Bridge (HC R&B) Engineer with a list of personnel, their experience, and references from recent jobs. Traffic control is of the utmost importance for the safety of the traveling public of Howard County. Documentation on traffic control certifications must also be provided. The Engineer will supply to the Auditor a list of all contractors meeting the qualification process before the bid opening. If a contractor has worked for Howard County Road & Bridge within the last 8 years they may request placement on the list based solely on their previous work without the need for documentation.

Delineate stockpiles located in the right of way with 42" cones at 75 foot on center or as approved in writing by the Engineer. Failure to meet this requirement will impact payment of Material on Hand. Stockpiles should maintain a 7 foot clear zone from the edge of pavement. Stockpile placed on TxDOT right of way must conform to the Abilene district stockpile procedure to qualify for payment of Material on hand.

The Engineer has secured stockpile locations and will assist the contractor in locating these locations. These locations are noted on the plans. If the Contractor sees the need for additional stockpile locations the Engineer is willing to assist in locating and securing additional sites. The Contractor is not limited to these locations and may find their own alternate locations. Howard County is not responsible for cleaning these locations and any material left there must be delivered to the Howard County Road & Bridge Yard in Big Spring prior to final payment being made

A Preconstruction conference shall be held at the Howard County Road & Bridge Office, located at 3604 Old Colorado City Road, in order to establish starting date and location. A written notice to proceed will be given at this conference and work may then commence.

Payment for Material on Hand will be allowed. Contractor must submit the supplier's invoice to the Road & Bridge Engineer's office. Road & Bridge will verify quantity in place within Howard County and check for proper traffic control before submitting the invoice to be paid. Materials so submitted and paid become the property of Howard County.

Unless authorized in writing by the Howard County Road & Bridge Engineer, the open season for the application of asphalt is May 1 to September 15. Sunday work will only be allowed with written permission from the engineer.

Unless authorized in writing by the Howard County Road & Bridge Engineer, the open season for the application of inverted prime is September 30 to May 15. Sunday work will only be allowed with written permission from the engineer.

Howard County has programed funds from the current fiscal year budget for the completion of this project. The quantities in the proposal are approximate. The quantities of work and materials may be increased or decreased as considered necessary to complete the work as planned and contemplated.

Item 247-6043 FLBS (CMP in PLC)(TY A GR 3)(FNAL POS)

- Aggregate:** Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications. Notify the Engineer of the proposed material sources and of changes to material sources. The Engineer may sample and test project materials at any time before compaction throughout the duration of the project to assure specification compliance
- Water:** Howard County will make available its water stations for use by the contractor. Water for this project is located at the intersection of SH 350 & CR 35
- Compaction:** Howard County will use a third party testing service to check the density of the work performed in accordance with the TxDOT testing schedule for this item.

Item 310-9000 RC 250, GR-5 INVERT PRIME

Aggregate will conform to Howard County Item 302M Type Grade 5. Suggested application rate will be between 120 to 130 SY/CY. Adjustment may be made in field with the agreement of the Engineer.

Asphalt will conform to TxDOT Item 300.2.B: (RC-250). Suggested application rate will be between 0.25 to 0.35 Gal/Sy. Adjustment may be made in field with the agreement of the Engineer

Item 316-6005 SEALCOAT COUNTY ROADS (PB Grade 3 Flexible Asphalt)

Aggregate will conform to TxDOT Item 302 Type PB Grade 3. Suggested application rate will be between 90 to 100 SY/CY. Adjustment may be made in field with the agreement of the Engineer.

Asphalt will conform to TxDOT Item 300.2.B: (AC-20-5Tr or AC-15-P) or Item 300.2.1: A-R Binder. Suggested application rate will be between 0.40 to 0.75 Gal/Sy. Adjustment may be made in field with the agreement of the Engineer

Item 502-6025 BARR, SIGNS, & TRAFFIC HANDLING

Lump Sum may be made in installments according to the schedule below:

- 20% For installation of Item 247-6043
- 20% For mixing and compaction of Item 247-6043
- 20% For finish riding surface of Item 247-6043
- 20% For Item 310-9000 Inverted Prime
- 20% For Item 316-6005 or Item 100-6010 depending on which is placed as final surface course

Failure to up keep signage and or failure to provide proper traffic control may result in reduced payment

Engineer's Estimate:

Howard County Road & Bridge Engineer's estimate is \$ 198,654.00



General Notes

Project #	Precinct	Sheet #
2020029	3	3

Estimated Project Quantities										
Length	Existing Width	Design Width	Widening Depth	Plating Depth	FL BS (CMP IN PLC) (TY B GR 3) (FNAL POS)	0247 6047	0310 9001	0316 6005	502 6025	506 6040
							INVERT PRIME CNTY RDS (RC-250) (TY-B GR 5S)	SURF TREAT CNTY RDS (ASPH-VARIABLE) (TY-PB GR 3)	BARR, SIGNS, & TRAFFIC HANDLING	BIODEGRASION CONTROL LOGS (INSTL) (8")
Ft	Ft	Ft	In	In		CY	SY	SY	LS	LF
5,225	18	24	6	2	1,161		13,933	13,933	1	60

Suggested Sequence of Work	
1) Widen 1/2 mile section	
1.1) Place daily temporary traffic control. Reference TCP 1-1	
1.2) Using road widener remove existing material to form 2 foot widening for length of section on each side of road	
1.3) Using Drag Box place base windrow. Once Motor Grader complete item 2 remove road widen and use windrow to fill widening.	
1.4) Water, Compact and Sweep to allow for overnight traffic	
1.5) fold all sign down for night.	
2) Cap existing Pavement	
2.1) Place daily temporary traffic control. Reference details page 5	
2.2) Using Drag Box place base windrow on half of roadway. Spread to an even 2" layer w/ Motor Grader	
2.3) Water, and Compact to allow for overnight traffic	
3) Reclaim Widened & Capped Section	
3.1) Place daily temporary traffic control. Reference details page 5. Note this section will be 1 mile in length	
3.2) Using Reclaimer, Water tanker reclaim to a 5" depth, controlling moisture across roadway.	
3.3) Compact reclaimed strips until reclaimed roadway is compacted.	
3.4-3.8) repeat steps 1.1 through 1.5 on next section.	
3.9) Shape reclaimed roadway to allow night traffic.	
4) Repeat Items 1-3 until all segments of the road are reclaimed Refer to page 4 for number of segments.	
5) Shape roadway.	
5.1) Place daily temporary traffic control. Reference details page 5. Note this section will be variable Length	
5.2 Shape with motor Grader, Water, and Compact	
5.3) open roadway to traffic at night.	
6) Clean and shape ditches	

Estimated Disturbed Soil Quantities					
Length	ROW Width	Roadway Width	Total ROW Disturbed Area	Total ROW Disturbed Area	Total RD Disturbed Area
Ft	Ft	Ft	SY	AC	AC
5,225	60	40	34,833	7,20	23,222
					4,80



3-8-2022

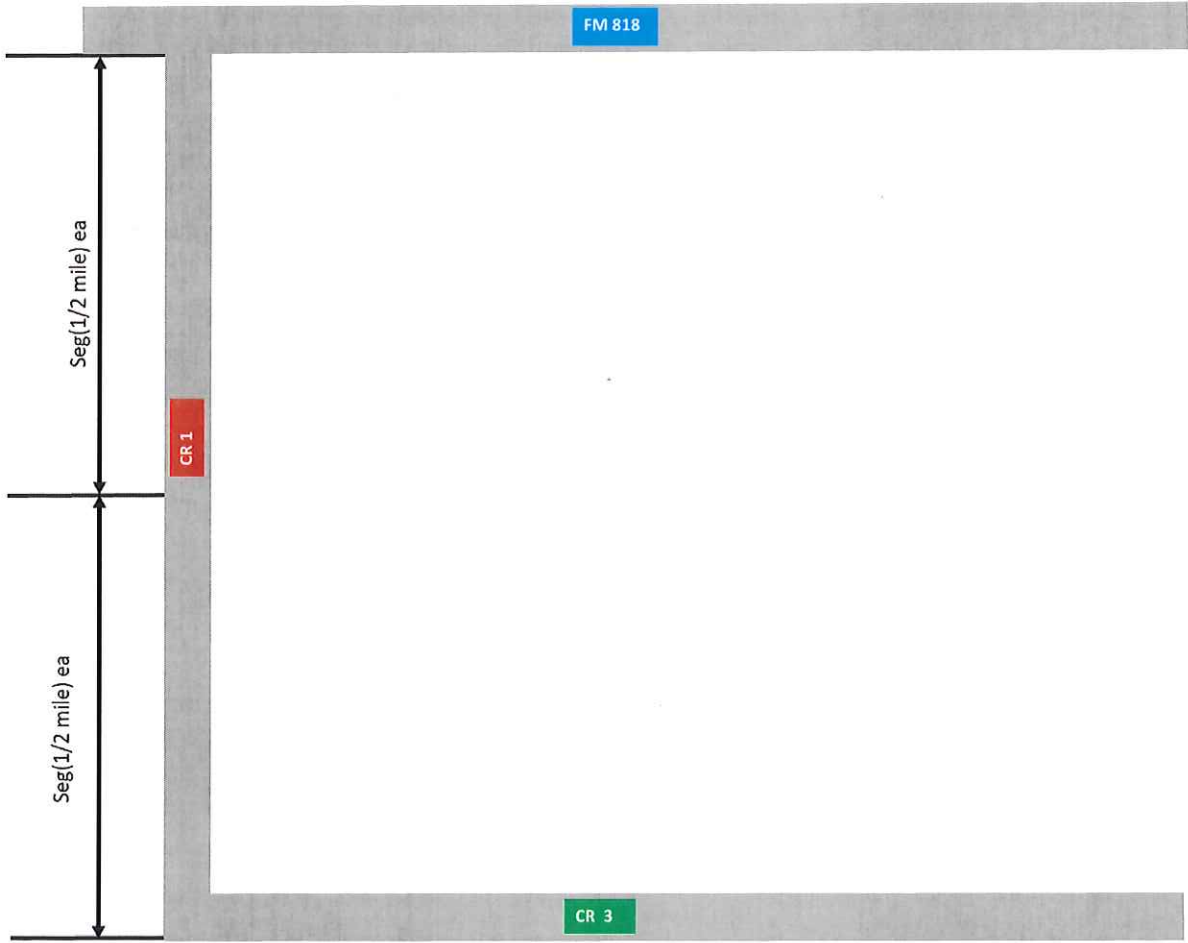
Date

Brian J. Klinksieck
BRIAN J. KLINSIEK
P.E.



© 2021
Estimated Quantities &
Sequence of Work

Project #	Precinct	Sheet #
2020029	3	4



3-8-2022

Date

Brian J. Klinksek
BRIAN J. KLINKSEK, P.E.

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Project Work Segments

Project #	Precinct	Sheet #
2020029	3	5

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

WORKER SAFETY NOTES:

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.
2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety hardware (MASH).

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT

<http://www.txdot.gov>

COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

SHEET 1 OF 12



BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILED:	BC-21-0PT	DATE: 10/01/2002	BY: 10/01/2002	BY: 10/01/2002	BY: 10/01/2002
PROJECT:	20020029	DATE: 10/01/2002	DATE: 10/01/2002	DATE: 10/01/2002	DATE: 10/01/2002
SECTION:	4-03	SECTION: 7-1	SECTION: 8-14	SECTION: 9-10	SECTION: 5-21
COUNTY:	COMMIT	COUNTY:	COUNTY:	COUNTY:	COUNTY:
SHEET NO.:	1	SHEET NO.:	SHEET NO.:	SHEET NO.:	SHEET NO.:

The diagram illustrates the typical location of crossroad signs at a crossroad intersection. It shows a main road with a crossroad intersecting it. The signs are placed as follows:

- On the main road, approaching the crossroad:**
 - ROAD WORK AHEAD (C20-10):** Located at a distance 'X' from the crossroad.
 - ROAD WORK - REST 1 MILES (C20-101):** Located at a distance 'X' from the crossroad.
 - END ROAD WORK (C20-22):** Located at a distance 'X' from the crossroad.
- On the crossroad, approaching the intersection:**
 - ROAD WORK AHEAD (C20-10):** Located at a distance 'X' from the intersection.
 - ROAD WORK - REST 1 MILES (C20-101):** Located at a distance 'X' from the intersection.
 - END ROAD WORK (C20-22):** Located at a distance 'X' from the intersection.

The diagram also includes a note: "(Optional - see Note 1 and 4)".

3. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (Q202-10) sign and a "Q202-2" END ROAD WORK" sign, unless noted otherwise in plans. The Engineer may use the reduced 8.125' x 3.5' ROAD WORK AHEAD (Q202-10) sign mounted back to back with the reduced 32" x 18" END ROAD WORK (Q202-2) sign on low volume crossroads. See Note 4 under "Typical Minimum Signing" on page 132 and Signing 1. The Standard Highway Sign listings for "Road Work" signs (for use with the Engineer's standard sign inventory) are found on page 10 of the volume "Standard Highway Signs and Markings" (see the "Sign Inventory" section of the volume).

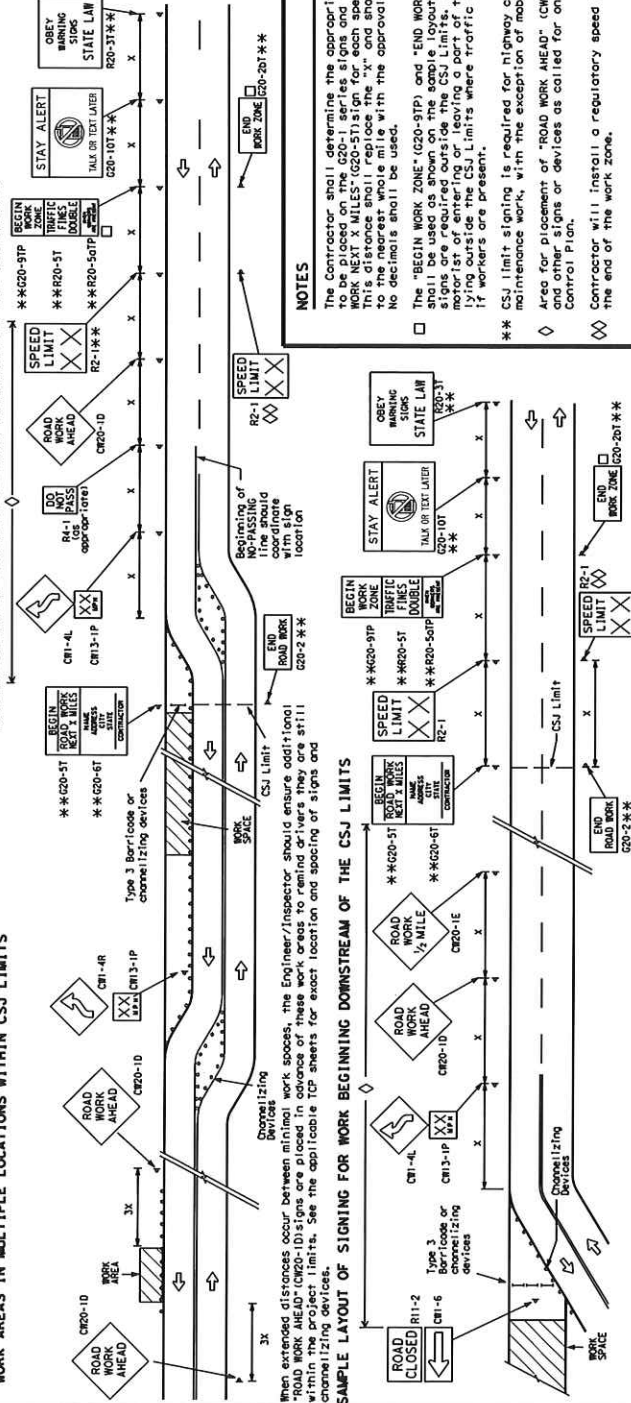
4. The Engineer will determine whether a road is low volume as per MUTCD Part 3. This information shall be shown in the plans.

- The "ROAD WORK AHEAD" (W10-43) sign is required for all high volume crossroads to advise the driver of the work zone. The sign should be placed at least 1/2 mile from the intersection. The Engineer will determine whether a roadway is considered high volume.
- Additional traffic control devices may be used to ensure the safety of the work zone. Crossroads, roundabouts, and other intersections may require additional signs, such as FLASHERS, ADVANCE, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be placed at least 1/2 mile from the intersection. The Engineer will determine the proper placement and spacing of any sign not shown on the BC sheets. Traffic Control Plan sheets at the Work Zone Standard Sheets.

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.

2. If construction closes the road at a T-intersection, the Contractor shall place the "CONTRACTOR NAME" (G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" (left arrow)(G20-1bTL) and "ROAD WORK NEXT X MILES" (right arrow) (G20-1bTR) signs shall be replaced by the detour signing called for in the plans.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure that "ROAD WORK AHEAD" (W20-1D) signs are placed in advance of these work areas to remind drivers they are within the project limits. See the applicable TCP sheets for exact location and spacing of signs and for additional details.

1994-1995

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

- The "BEGIN WORK ZONE" (W20-20T) and "END WORK ZONE" (W20-20T) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the traveling public of the work zone and the limits of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
- ** CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.
- ◇ Area for placement of "ROAD WORK AHEAD" (W20-10) signs and other signs or devices as called for on the Traffic Control Plan.
- ◇ Contractor will install a regulatory speed limit sign at the end of the work zone.

AND SPACING:^{15,16}

SIZE		SPACING	
Sign Number or Series	Conventional Road	Expressway/ Freeway	Posted Speed Sign X
CM204	48" x 48"	48" x 48"	30
CM2			120
CM23			160
CM24			200
CM25			240
CM1, CM2, CM7, CM8, CM9, CM11, CM14	36" x 36"	48" x 48"	45
			50
			55
			60
			65
CM3, CM4, CM6, CM8-3, CM10, CM12	48" x 48"	48" x 48"	70
			75
			80
			85
			90

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

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

1. Special or larger size signs may be used as necessary.

2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (ICG2-10) signs may be used on low volume crossroads at the discretion of the Engineer as per "TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. All diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD". Sign appendix or the "Standard Highway Signs for Texas" manual for complete list of available sign design sizes.

LEGEND	
I	Type 3 Barricade
o o o	Channelizing Devices
+	Sign
x	See Typical Construction Warning Sign Size and Spacing chart or the Spacing chart for the MUTCD for sign spacing requirements.

SHEET 2 OF 12

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

**BARRICADE AND CONSTRUCTION
PROJECT LIMIT**

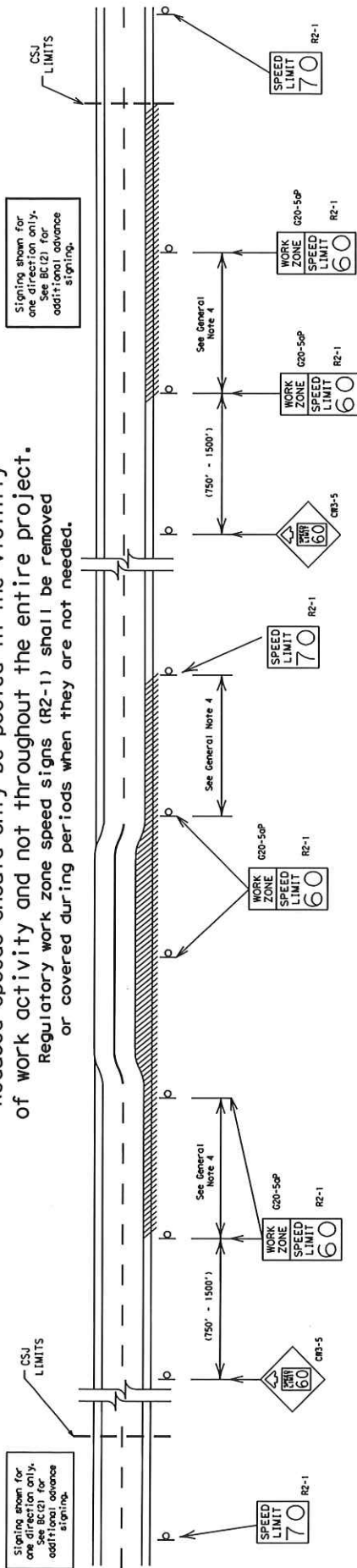
BC (2) - 21

[illegible]

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present.

- Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:
- a) rough road or damaged pavement surface
 - b) substantial alteration of roadway geometrics (diversions)
 - c) construction detours
 - d) grade
 - e) width
 - f) other conditions readily apparent to the driver
- As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

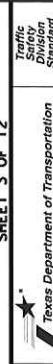
This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the traveled way.

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

GENERAL NOTES

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:
 - 40 mph and greater 0.2 to 2 miles
 - 35 mph and less 0.2 to 1 mile
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheet" on BC(4)).
- Fabrication, erection and maintenance of the "ADVANCE SPEED LIMIT" (W3-5) sign, "WORK ZONE (G20-50P) plaque and the "SPEED LIMIT (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
 - A. Low enforcement.
 - B. Flogger stationed next to sign.
 - C. Portable changeable message sign (POMS).
 - D. Low-power (drone) radar transmitter.
 - E. Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

SHEET 3 OF 12



BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE#	DC-21-001	ON TxDOT	ON TxDOT	ON TxDOT	ON TxDOT
REVISIONS	NOVEMBER 2002	NOVEMBER 2002	NOVEMBER 2002	NOVEMBER 2002	NOVEMBER 2002
DATE	9-07	9-07	9-07	9-07	9-07
BY	7-13	7-13	7-13	7-13	7-13
CHECKED	7-13	7-13	7-13	7-13	7-13
APPROVED	7-13	7-13	7-13	7-13	7-13
SHEET NO.	3	3	3	3	3

shall not protrude above sign

Support shall not protrude above sign

Sign supports shall extend more than 1/2 way up the back of the sign substrate.

FRONT ELEVATION
Wood, metal or Fiber Reinforced Plastic

Slice embedded perforated square tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the splice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths shall be equal to length of tubing.

WOOD BRACKETS AND JOINTS

TRAFFIC FINES DOUBLE

WORK ZONE

ROAD WORK AHEAD

OR

WOOD

SIDE ELEVATION

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

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

Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, points of interest, and other geographical, recreational, specific service (L000), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway that

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

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

USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B ₉₀ OR C ₉₀ SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Bar/flags shall NOT be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and direct traffic.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer.
5. The Contractor may require the Contractor to furnish other in the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and direct traffic.
6. The Contractor shall furnish sign supports listed in the "Commitment to Traffic Control Device List" (CETCD) for all roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets. The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding the installation procedures, the Contractor shall consult with the Engineer a copy of the manufacturer's installation recommendations.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or crooked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.
10. **REMARKS:** All signs shall be installed in accordance with the "Traffic Manual on Uniform Traffic Control Devices" (Part 8).
11. The type of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
- a. Long-term stationary - work that occupies a location more than 3 days.
- b. Short-term stationary - work that occupies a location more than one hour.
- c. Short-term hourly - daytime work that occupies a location for more than 1 hour in a single daylight period up to 3 days, or nighttime work lasting more than one hour.

1. The bottom of longitudinal/intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except for signs for supplemental plaques mounted below other signs.
2. The bottom of Short-term/intermediate-term signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the pavement surface.
3. The bottom of Long-term/Short-term Signs may be used in lieu of Short-term/Short-term Signs.
4. Short-term/Short-term Signs shall be used only during daylight and shall be removed at the end of the workday or rolled to the side of the roadway.
5. Long-term/Long-term/intermediate-term signs shall be removed at the end of the workday or rolled to the side of the roadway.
6. Long-term/Long-term/intermediate-term signs shall be removed at the end of the workday or rolled to the side of the roadway.

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

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CAZTD lists each substrate that can be used on the different types and models of sign supports.
2. All wooden individual sign panels are to be constructed of 2" thick plywood or 1/2" thick, by 6" wide, aluminum extrusion.
3. The sign panel shall be fastened to the back of the sign and extending fully across the sign. The client shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the sign and spaced at 6" centers. The Engineer may approve other methods of securing the sign face.

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting meeting the requirements of DMS-8300 Type A shall be used for signs with a white background.

SIGN LETTERS

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

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.

4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and other structures shall be removed and holes backfilled upon completion of work.

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.

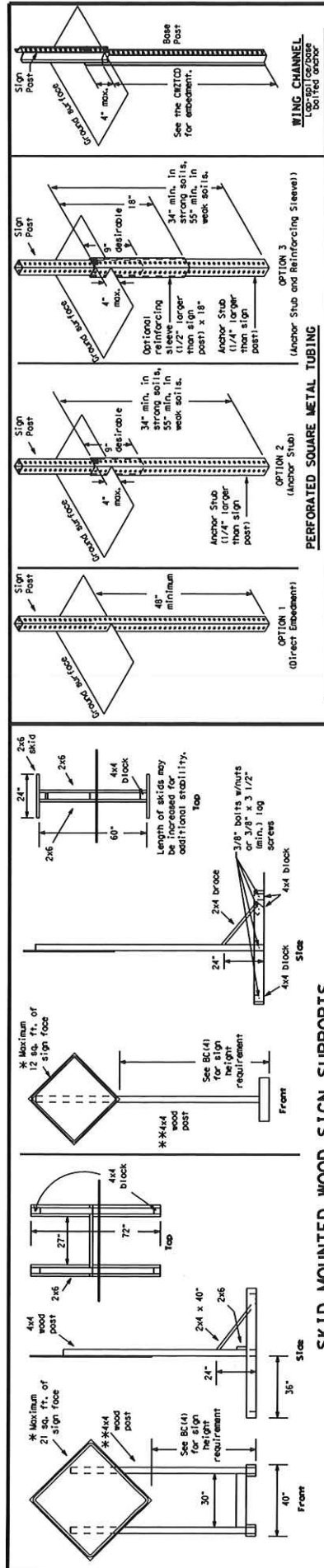
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTICES

BC(4) - 21

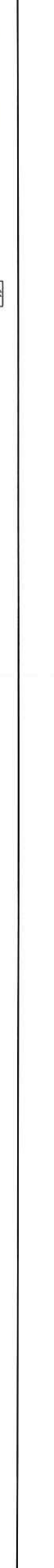
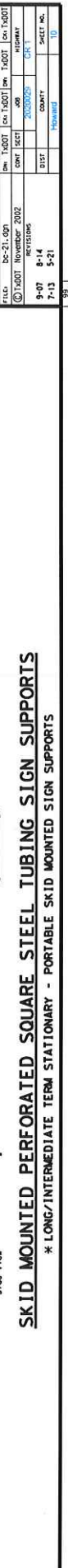
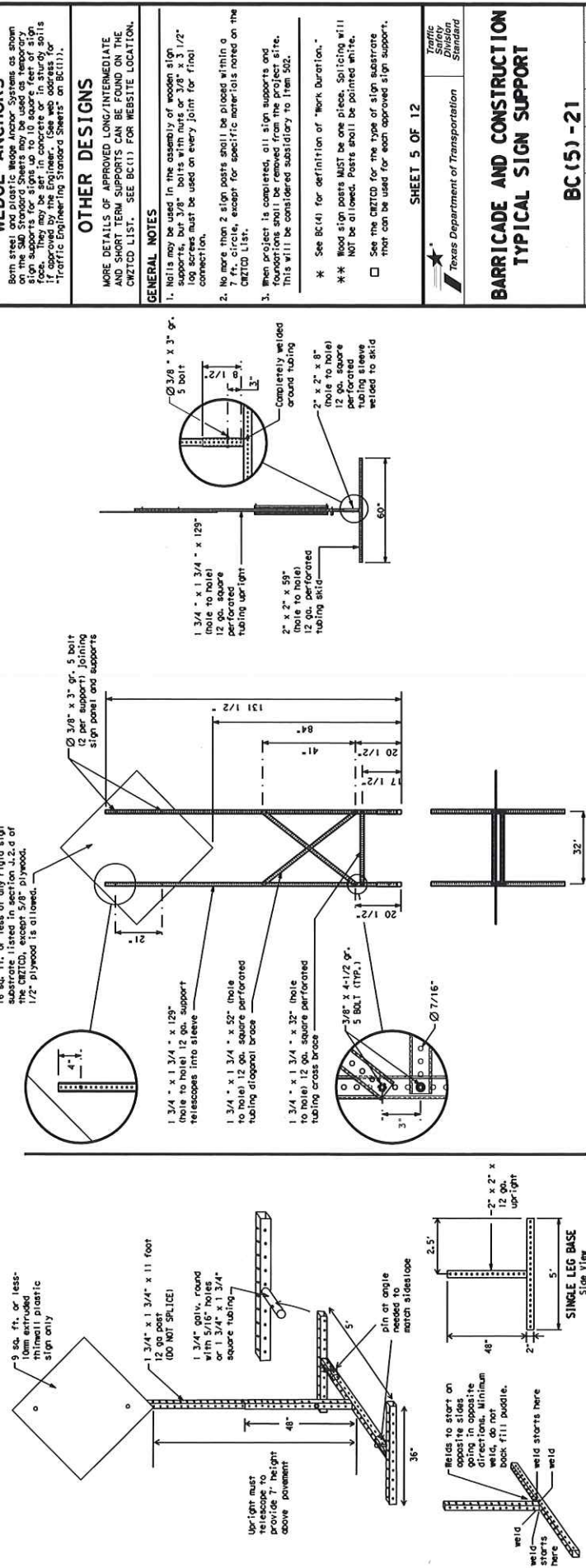
Notes:

1. For use as sign support weights.
2. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
3. Signs shall weigh a minimum of 35 lbs and a maximum of 50 lbs.
4. Signs shall be made of aluminum, steel, plastic, wood, or other material.
5. Insects, spiders, and other animals shall not be used as sign supports or rubber (such as fire inner tubes) shall not be used.
6. Rubber ballistics designed for channelizing devices should not be used for barricade signs. Signs shall be made of wood and manufactured with rubber bases designed with the use of the CRSTD list.
7. Rubber cones may be used when shown on the CRSTD list.
8. Signs shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or placed on the base supports of the traffic control device. Signs shall be placed along the length of the signs to weigh down the sign support.
9. Signs shall NOT be placed under the sign and shall not be used to level the sign.

PLANS ON STORES		REVISED		COMMITTEE		DATE	
NO.	DESCRIPTION	DATE	BY	DATE	BY	DATE	BY
1.	Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.	9-07	8-14				
		7-13	5-21				



Refer to the CWTCD and the manufacturer's installation procedure for each type sign support. The maximum sign square footage should adhere to the manufacturer's recommendation. Two post installations can be used for larger signs.



DISCLAIMER: The use of this standard for any purpose whatsoever, without the written consent of the American Association of Highway Engineers, Inc., is prohibited. The American Association of Highway Engineers, Inc., assumes no responsibility for the consequences of the use of this standard for any purpose whatsoever. No warranty of any kind is made by the American Association of Highway Engineers, Inc., for the consequences of the use of this standard for any purpose whatsoever.

TRAFFIC SIGN DIVISION
SHEET 5 OF 12
BARRICADE AND CONSTRUCTION
TYPICAL SIGN SUPPORT
BC(5)-21

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

Road/Lane/Ramp Closure List

[illegible]

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

Action to Take/Effect on Travel

MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX- XX X PM-X AM
USE EXIT XXX	USE EXIT XX NORTH	NEXT XX MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE 1-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS US US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT FOR DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM

*** See Application Guidelines Note 6.

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/inspector shall approve all messages used on portable changeable message signs (PMS).
2. Messages on PMS should contain no more than 8 words (about four "10-4"s) per phase. Words should be simple and easily understood by all.
3. Messages should consist of a single phrase, or two phrases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by all.
4. A message word "EXIT" to refer to an exit ramp on a freeway i.e., "EXIT CLOSED". Do not use the term "RAMP".
5. Always use the route or Interstate designation (IH, US, SH, ERI along with the number when referring to a roadway.
6. Do not use the word "obstruction" for a stationary PMS message panel should be a minimum of ten feet away from the obstruction.
7. The message term "BEARING" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PMS if work is scheduled during the week.
8. The Engineer/inspector must make one of the following markings available for displaying a two-phase message on a PMS. Each phrase may be displayed for either "two seconds each" or "four seconds each."
9. Do not present redundant information on a message. The message should be clear and concise.
10. Do not present redundant information on a two-phase message i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "danger" in a message.
12. Do not display the message "LAMES SHIFT LEFT" or "LAMES SHIFT RIGHT".
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that can be used on a PMS. These words in a phrase must not be displayed vertically. Abbreviations in this list should not be abbreviated, unless shown in the MUTCD.
15. PMS character height should be at least 18 inches for roller mounted units. They should be visible from at least 1/2 (1.5) mile and the text should be legible from at least 1/4 (.75) mile.
16. Traffic mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
17. If a PMS unit should be centered on the message board rather than placed to the left or right, it should be centered on the message board. If disabled, the PMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PMS has been disconnected. A pattern such as a series of horizontal solid bars would be acceptable.

1. Only 1 or 2 phrases can be used on a PDS.
2. The last phrase (or both) should be selected from the "Road/Run/Leap Closure List" and the "Other Condition List".
3. A 2nd phrase can be selected from the "Action to Take/Effect" phrase list.
4. The Location, General Warning, or Advance Notice phrase list.
5. A location phrase is necessary only if a distance or location is not included in the first phrase selected.
6. If two PDS are used in a sequence, they must be separated by a comma.
7. Phrases should be limited to two phrases.
8. Phrases should be understandable by themselves.
9. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced by the number of work days prior to the work.

1. THE WORDS RIGHT, LEFT AND ALL can be interchanged as appropriate.
2. Responses to questions IN, ON, SH, FR and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH for abbreviations E, W, N and S) can be interchanged as appropriate.
4. ROAD, HIGHWAY and FREWAY can be interchanged as needed.
5. AHEAD may be used instead of distances if necessary.
6. FT and MI, MILE and MILES interchanged as appropriate.
7. AT, BEFORE and PAST interchanged as needed.
8. Location should be eliminated from the message if a location appears to be superfluous.

FULL MATRIX X PCMS SIGNS

1. When Full Matrix PDS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE UNIDIRECTIONAL MESSAGE SIGNS" above. (Tripper Symbol (Q200-7) are represented graphically on the full Matrix PDS sign and, with the approval of the Engineer, it may be replaced with the letter "A" for "AHEAD".)
2. When symbols, legibility/visibility, and size requirements are not specified on the sign, the sign shall be designed to meet the requirements of the sign.
3. When symbol signs are represented graphically on the full Matrix PDS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PDS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

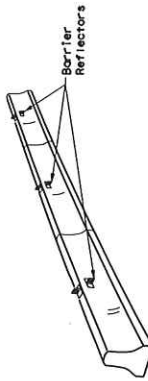
POMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE POMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH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

**BARRICADE AND CONSTRUCTION
PORTABLE CHANGEABLE
MESSAGE SIGN (PCMS)**

BC (6) - 21

FILE#	DO-21.dgn	DW T=00T	NOVEMBER 2002	DIST	COUNTY	SHEET NO.
					2020029	C&T
						Hatched
						TS

- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-5800. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(11).
- Color Barrier Reflectors shall be as specified in the TMSD. The color of the reflectors shall be considered subsidiary to Item 312.

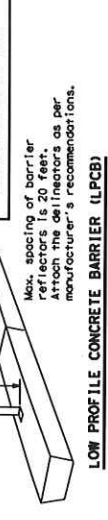


CONCRETE TRAFFIC BARRIER (CTB)

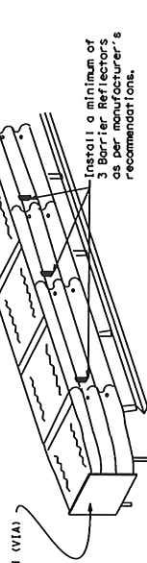
- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. This will allow for the placement of a barrier gap without the loss of reflectivity. The reflectors shall be mounted on top of the CTB and shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
- Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each side of the CTB. The reflector unit on top shall have two yellow reflective faces (DMS-5800 Type B) and the reflector on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
- When CTB separates traffic traveling in the same direction, no barrier reflectors shall be mounted on the side of the CTB facing the traffic.
- Barrier reflector units shall be yellow or white in color to match the edge line being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Barrier reflectors shall be replaced as directed by the Engineer.
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LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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



LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall be as specified in the TMSD. Refer to the CRD for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

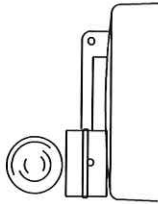
- Warning lights shall meet the requirements of the TMSD.
- Warning lights shall NOT be installed on barriers.
- Type A Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall be used in conjunction with the Type B or C flashing drums. The flashing drums shall be used in conjunction with the Type A Warning Lights.
- Type-C and Type-D 360 degree Steady-Burn Warning Lights are commonly used with drums. They are intended to warn of a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type C and Type D Warning Lights shall be used in conjunction with the Type A or Type B flashing drums.
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control device. Then required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
- Warning lights shall be installed on drums that have a minimum of 30 square inches of reflectorized sheathing. They do not have to be reflectorized where it is used in conjunction with a flashing drum.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

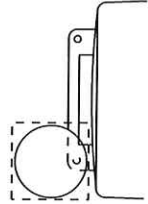
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in a continuous fashion. The flashing rate for each light shall be 60 flashes per minute, plus or minus 10 flashes.
- Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

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

- A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light if the warning reflector or approved substitute meets the requirements of the TMSD.
- The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CRD.
- The warning reflector shall have a minimum retroreflective surface area one-side of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- Rectangular reflectors shall have a minimum of 30 square inches of reflectorized sheathing. They do not have to be reflectorized where it is used in conjunction with a flashing drum.
- The size of the warning reflector facing approaching traffic shall have sheathing meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.



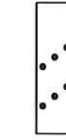
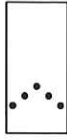
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



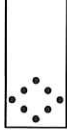
Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches.

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

- The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
- Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or other situations where the Arrow Board would be used to indicate a lane closure or other traffic control device that should be used in conjunction with the Flashing Arrow Board.
- The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
- The Flashing Arrow Board should be able to display the following symbols:



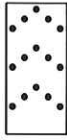
RIGHT/LEFT SEQUENTIAL CHEVRON (right chevron shown, left is similar)



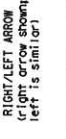
ALTERNATING DIAMOND CAUTION



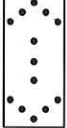
DOUBLE ARROW



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



ALTERNATING DIAMOND CAUTION



DOUBLE ARROW

- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The Flashing Arrow Board display is NOT ALLOWED.
- The Flashing Arrow Board shall have a minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
- Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal to the "off time" for the sequential chevron.
- The sequential chevron display is the TMSD standard; however, the sequential chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- The Flashing Arrow Board shall be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
- Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

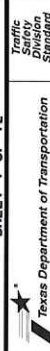
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM DISTANCE
A	30 x 60	13	3/4 mile
B	48 x 96	15	1 mile

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

SHEET 7 OF 12



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

BC (7) - 21

FILED	BC-21-01	Rev. TMSD	Rev. TMSD	Rev. TMSD	Rev. TMSD
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COUNTY	7-13	COUNTY	7-13	COUNTY	7-13
SHEET NO.	7-13	SHEET NO.	7-13	SHEET NO.	7-13

TRUCK-MOUNTED ATTENUATORS

- Truck-mounted attenuators (TMAs) used on TMSD facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MSH).
- Refer to the CRD for the requirements of Level 2 or 3.
- Refer to the CRD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- TMAs may be used anytime they can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
- The only reason a TMA should not be required is when a work zone is closed and the work crew is on an extended distance from the TMA.

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

re-qualified plastic drums shall meet the following requirements:

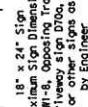
1. Plastic drums shall be purpose designed for the body of the drum shall be constructed of a single piece of plastic.
2. The body and base shall look together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 mph or greater but prevents accidental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

1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Material Specification DAS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain attached to the drum and shall not delaminate, crack, or lose retroreflective ability other than that loss due to abrasion on the sheeting surface.

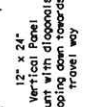
1. Unbolstered bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in three separate bags from the base, sand in a sand-filled plastic bag, or sand in a sand-filled plastic bag with the bag being bolted to the base. The weight of the ballast will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral curbs rubber base or a solid rubber base.
3. A sand-filled plastic bag, if allowed, may be used for ballast on drums approved for this type of ballast on the CATCHED list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bases so that water will not collect and freeze becoming a hazard to the traveling public.
6. Ballast may not be placed on top of drums.
7. Injunctives may be used to secure the bases of drums to pavement.



Continuous smooth rail for hand trailing

[illegible]

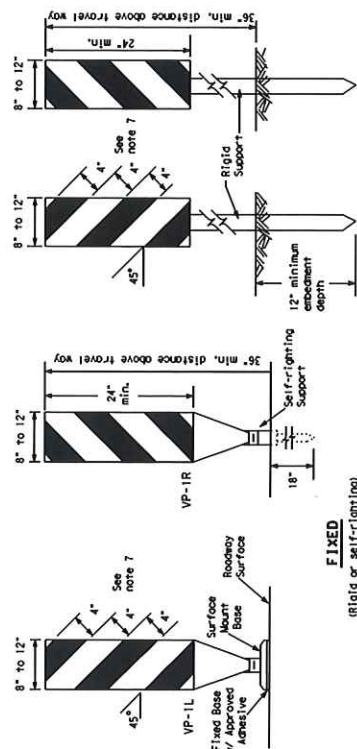
18" x 24" Sign
Maximum Sign Dimensions
W1-8, Opposing Traffic
Highway sign D70a,
or other signs as
by Engineer



12" x 24"
Vertical Panel
Unit with diagonal
slats opening down towards
travel way

DESIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CE2CD.
2. Deviants and other work zone signs with an orange background shall be manufactured with type III, or type IV, orange reflective sheeting. Signs with reflective sheeting elements of IMC-8000, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white reflective sheeting. Signs with reflective sheeting elements of IMC-8000, "Sign Face Material," unless otherwise specified in the plans.
4. Other sign messages, text, or symbols may be used as approved by the Engineer. Sign dimensions shall not exceed 18" in height and 36" in width. Signs shall conform to the series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Deviants may be placed on drums on the outside of curves. Signs shall be placed on drums in the same locations as these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. 89-9, 89-10, 89-11 and 89-11a Standard Closed Signs shall be placed on drums. Signs shall be mounted on plastic drums with approval of the Engineer.

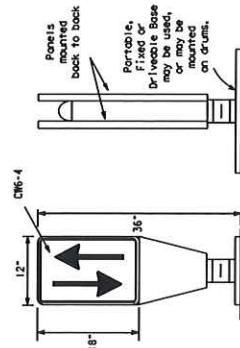


DRIVEABLE

1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's are used to separate opposing lanes of traffic. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive day/night and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use of VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and reflective yellow and reflective white.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable bases. See "Longitudinal Channelizing Devices List" (C2120).
6. Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification (DMS-8300).
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VP's)

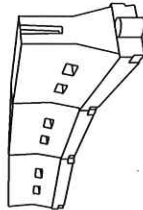
1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary construction projects to convert one-way traffic on the right side of the roadway to two-way traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VP's.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VP's placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B₉ or Type C₉ conforming to Departmental Material Specification (DMS-8300), unless noted otherwise. The legend shall meet the requirements of DMS-8300.



OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for drivers. They are used to indicate changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a curve or turn, or on the far side of an intersection. They shall be in line with the direction of travel and shall be placed at an angle of 45 degrees to the direction of travel. Spacing should be such that the motorist always sees a chevron until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons can be made with a black nonreflective sheeting. The sheeting for the chevron shall be retroreflective Type B₉ or Type C₉ conforming to Departmental Material Specification (DMS-8300), unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on topers or on temporary structures, the chevron shall be made of plastic drums but not to replace plastic drums.

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MSHA) crashworthiness requirements based on the design speed of the facility.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve day/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 mph) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. Water ballasted systems as barriers should be used in accordance to traffic. They should be attenuated as per manufacturer recommendations or forced to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems shall be used in accordance to the requirements of long cones and the top of the unit shall not be less than 32 inches in height.

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

GENERAL NOTES

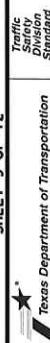
1. Work zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement of devices conform to the "Texas Manual on Uniform Traffic Control Devices" (TMUD).
2. Channelizing devices shown on this sheet may be a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices shall be placed in accordance to application and installation requirements. They shall be placed in accordance to application and installation requirements. They shall be placed in accordance to application and installation requirements.
4. Channelizing devices shall be placed in accordance to application and installation requirements. They shall be placed in accordance to application and installation requirements. They shall be placed in accordance to application and installation requirements.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall be a minimum of 30 lbs. that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surface. Including proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.

Passed Speed	Formula	Minimum Desirable Taper Lengths (ft.)	Suggested Maximum Spacing of Channelizing Devices (ft.)
30	$W = \frac{L}{10}$	10' 11' 12'	On a Taper
35	$W = \frac{L}{15}$	150' 165' 180'	On a Taper
40	$W = \frac{L}{20}$	205' 225' 245'	On a Taper
45	$W = \frac{L}{25}$	265' 295' 320'	On a Taper
50	$W = \frac{L}{30}$	450' 495' 540'	On a Taper
55	$W = \frac{L}{35}$	500' 550' 600'	On a Taper
60	$W = \frac{L}{40}$	550' 605' 660'	On a Taper
65	$W = \frac{L}{45}$	600' 660' 720'	On a Taper
70	$W = \frac{L}{50}$	650' 715' 780'	On a Taper
75	$W = \frac{L}{55}$	700' 770' 840'	On a Taper
80	$W = \frac{L}{60}$	750' 825' 900'	On a Taper
85	$W = \frac{L}{65}$	800' 880' 960'	On a Taper
90	$W = \frac{L}{70}$	850' 935' 1020'	On a Taper

XXX-taper lengths have been rounded off.
L=Length of Taper (ft.) *Station of Offset (ft.)
S=Posted Speed (mph)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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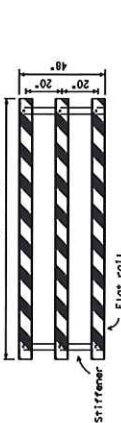
FILED	BC-21-100	DATE	10/01/2002	BY	10/01/2002	10/01/2002	10/01/2002
REVISED	10/01/2002	DATE	10/01/2002	BY	10/01/2002	10/01/2002	10/01/2002
REVISED	10/01/2002	DATE	10/01/2002	BY	10/01/2002	10/01/2002	10/01/2002
REVISED	10/01/2002	DATE	10/01/2002	BY	10/01/2002	10/01/2002	10/01/2002
REVISED	10/01/2002	DATE	10/01/2002	BY	10/01/2002	10/01/2002	10/01/2002

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCO) for details of the Type 3 Barricodes and a list of all materials used in the construction of Type 3 Barricodes.

2. Type 3 bar-locks shall be installed on all traffic lanes of the roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may also command in both directions from the center of the bar-locks. The slope of the stripes should slope downward in both directions toward the center of roadway.
4. Striping of rolls, for the right side of the roadway, should slope downward to the left, for the left side of the roadway, striping downward to the right.
5. Identification markings may be shown only on the back of the bar-locks rolls. The maximum height of letters and/or company logos used for identification shall be 1".
6. Bar-locks should be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on bar-locks.
8. Bar-locks require the use of weights to keep from turning over, and the weight should be placed on the back of the bar-locks to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a bar-locks rolls reflective sheeting.
9. Bar-locks shall be made of a durable material that meet used vehicle impact. Rubber (such as tire inner tubes) shall not be used for the construction of the device and shall not be placed along the supports of the device and shall not be placed along the ground level or with wind rods, wire, chains or other fasteners.
10. Bar-locks shall be retroreflective. Type A or Type B. Sheeting for bar-locks shall be retroreflective Specification B-6300 unless otherwise specified.
11. Bar-locks shall be retroreflective Specification B-6300 unless otherwise specified.

Diagram illustrating the cross-section of the reflective sheeting. The sheeting has a minimum width of 7 inches. The cross-section shows a 45-degree angle and a minimum width of 7 inches.

4' min., 8' max.

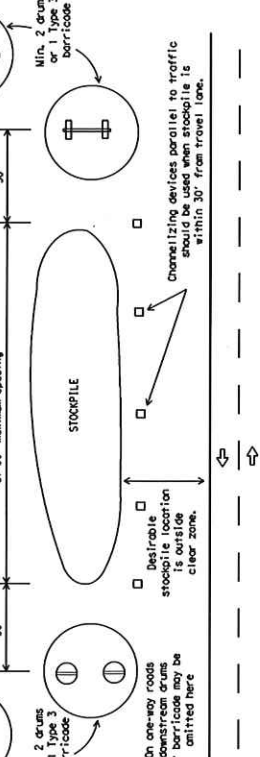


2 stiffeners shall be allowed on one barricade.

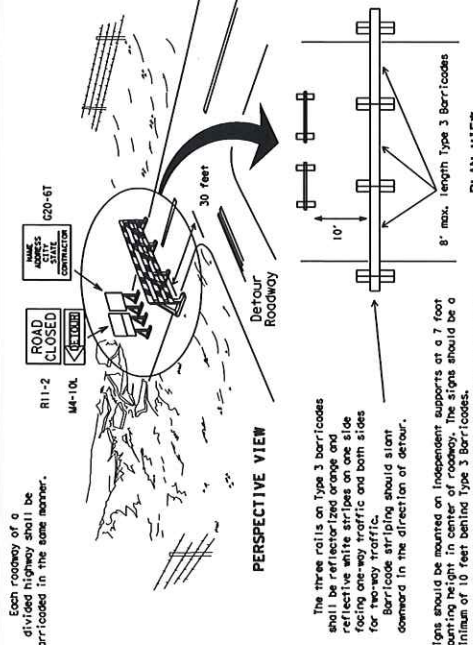
Alternate

Approx. 50'

Drums, vertical panels or 42" c at 50' maximum spacing



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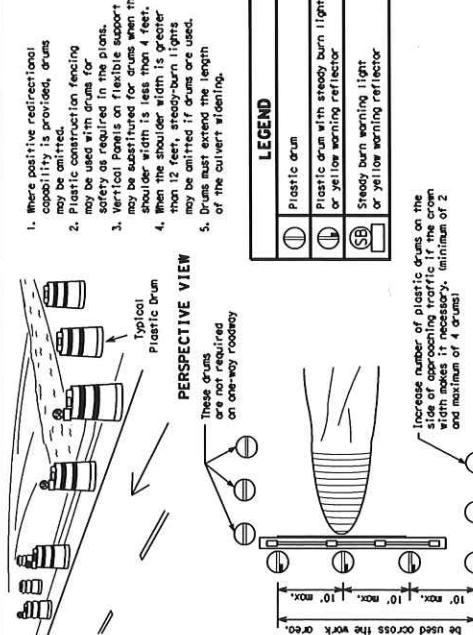
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricodes.
2. Advance signing shall be as specified elsewhere in the plans.

Diagram of a lighthouse with a spiral staircase. The staircase has 16 steps, each 4 minutes to ascend. The lighthouse has a 28-minute rotation period. The diagram shows the spiral path and the time taken to reach the top.

28" Cones shall have a minimum weight of 9 1/2 lbs.
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated piece. Two-piece cones have a separate base. The base of either type of cone, or ballast, must be added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown. In order to aid in retrieving the device.
4. Cones or tubular markers shall have white and orange reflective bands. The bands shall be reflective and meet the requirements of Departmental Material Specification 045-8300 Type A and Type B.
5. Cones and tubular markers are generally suitable for short duration and short-term use. They are not suitable for long-term use.
6. For immediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
7. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
8. Cones or tubular markers used on each project should be of the same size.

1. The first part of the document is a list of the names of the members of the committee, followed by a list of the names of the members of the subcommittee. The names are listed in alphabetical order.

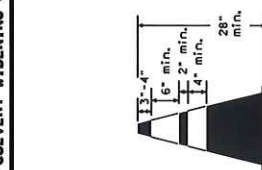


1. Where positive redirection capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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

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

- Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums)

WIDENING



SHEET 10 OF 12


 Texas Department of Transportation
 Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

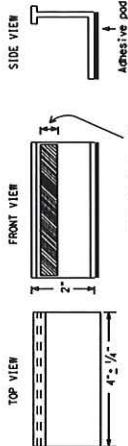
- Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
- Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

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Temporary Flexible-Reflective Roadway Marker Tabs



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

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- Tabs detailed on this sheet are to be inspected and accepted by the Engineer. The Engineer shall determine the quality of the tabs and shall normally require, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
 - Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
 - Select five (5) tabs at 24 inch intervals on an opposite pavement in a straight line, using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour. Four (4) times in each direction. No tabs shall be lost or displaced. If tabs are lost or displaced, the tabs shall be lost or displaced as a result of this test.
- Small variations may be noted between tab manufacturers.
- See Standard Sheet RE(STRIP) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

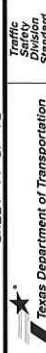
RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
 - All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
 - Adhesive for guidemarks shall be bituminous material hot applied or burl rubber pad for all surfaces, or thermoplastic for concrete surfaces.
- Guidemarks shall be designated as:
 YELLOW - (two amber reflective surfaces with yellow body).
 WHITE - (one silver reflective surface with white body).

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

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

SHEET 11 OF 12

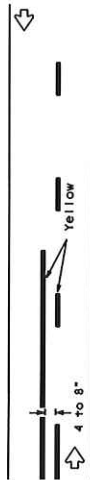


BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

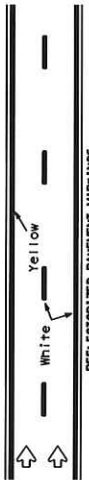
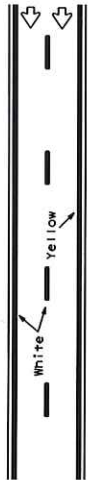
FILED	BC-21-100	ON 10/07	ON 10/07	ON 10/07	ON 10/07
REVISED	2-08	9-07	5-21	CR 1	
DATE	1-02	7-13			
BY	11-02	8-12			
COUNTY	Howard				
SHEET NO.	15				

PAVEMENT MARKING PATTERNS



Pattern A is the TxDOT Standard. Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectORIZED pavement markings.

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



Prefabricated markings may be substituted for reflectORIZED pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



Prefabricated markings may be substituted for reflectORIZED pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS

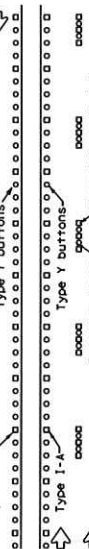
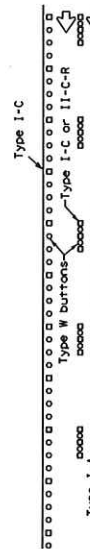
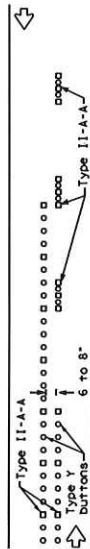
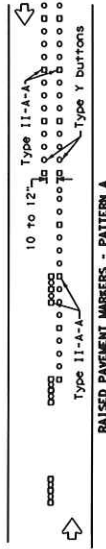


Prefabricated markings may be substituted for reflectORIZED pavement markings.

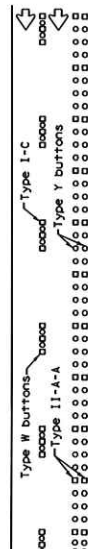
TWO-WAY LEFT TURN LANE



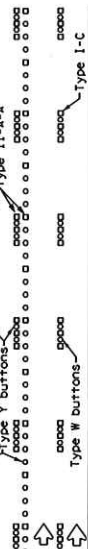
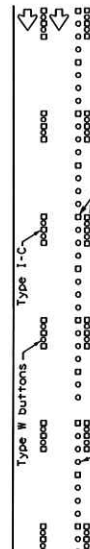
RAISED PAVEMENT MARKERS



RAISED PAVEMENT MARKERS

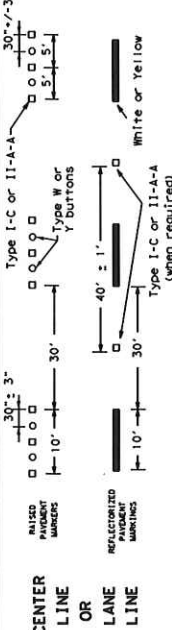
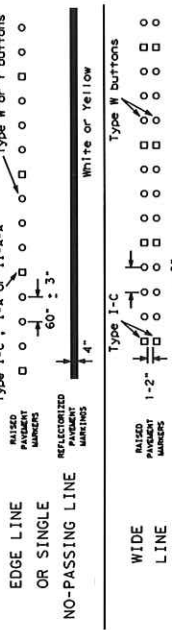
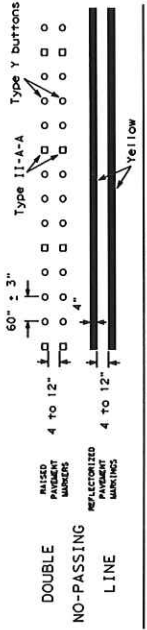


RAISED PAVEMENT MARKERS



RAISED PAVEMENT MARKERS

STANDARD WORK ZONE PAVEMENT MARKING DETAILS



BROKEN LINES



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement removable markings, the markers shall be applied to the pavement surface at the same time and length of time used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tabs.

Center line only - not to be used on edge lines

SHEET 12 OF 12

Texas Department of Transportation
Traffic Safety Division
Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC (12) -21

FILED	BC-21-001	REV. 10/01	REV. 10/01	REV. 10/01	REV. 10/01
DATE	1-07	9-07	9-21	2-08	7-13
BY	1-07	9-07	9-21	2-08	7-13
CHKD	1-07	9-07	9-21	2-08	7-13
APP'D	1-07	9-07	9-21	2-08	7-13
DESIGNED BY	1-07	9-07	9-21	2-08	7-13
CHECKED BY	1-07	9-07	9-21	2-08	7-13
APPROVED BY	1-07	9-07	9-21	2-08	7-13

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

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

Based on Speed	Formula	Minimum Desirable Total Lengths	Suggested Maximum Spacing of Channelizing Devices	Minimum Spacing of Channelizing Devices	Suggested Maximum Spacing of Channelizing Devices	Stopping Sight Distance
30	WS^2	10' 11"	10' 11"	30'	120'	200'
35	WS^2	150'	165'	30'	120'	250'
40	WS^2	205'	225'	35'	160'	305'
45	WS^2	265'	295'	40'	240'	350'
50	WS^2	330'	370'	45'	320'	425'
55	WS^2	400'	450'	50'	400'	495'
60	WS^2	475'	535'	55'	500'	570'
65	WS^2	555'	620'	60'	600'	645'
70	WS^2	640'	715'	65'	700'	730'
75	WS^2	730'	815'	70'	800'	820'

* Conventional Roads Only

** Taper lengths have been rounded off.

L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE			
MOBILE	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
✓	✓	✓	✓

GENERAL NOTES

- Flags attached to signs where shown are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stored elsewhere in the plans, or for routine maintenance work when approved by the Engineer.
- The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
- Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger sign is less than 1500 feet.
- Flaggers should use two-way radios or other methods of communication at all times to control traffic.
- Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.
- If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
- If the seal coat operation crosses intersections, traffic in these areas must be controlled. Care must be taken to prevent vehicles from crossing the asphalt before the operation is completed. It may require positioning other members of the traffic control crew at the intersection.
- Temporary rumble strips are not required on seal coat operations.
- Pilot car is used to guide vehicles through traffic control zone. Vehicle shall have an identification name displayed and "PILOT CAR, FOLLOW ME" (CW20-4) sign or message board mounted in a conspicuous position on rear.

TCP (SC-10)

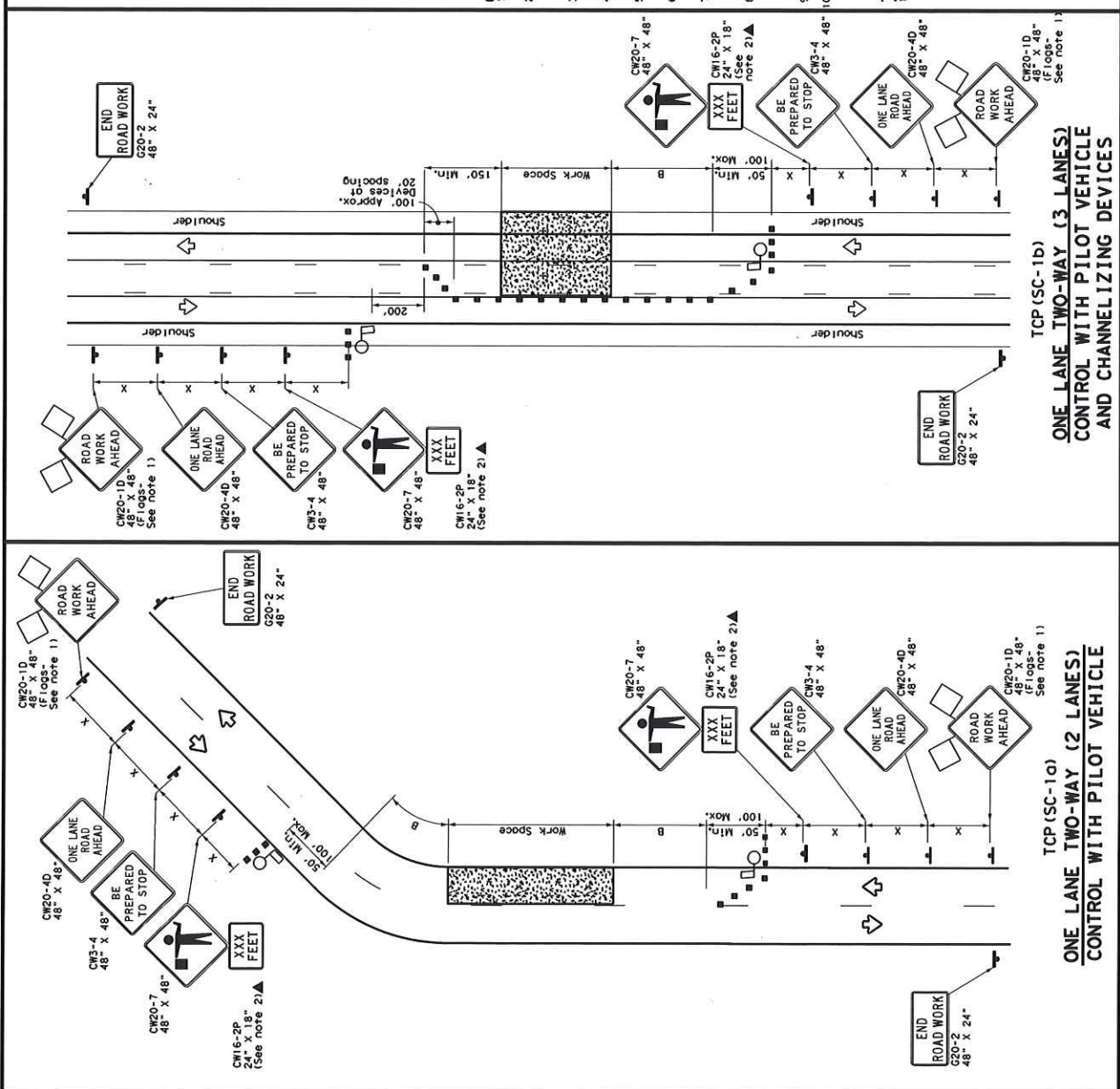
1. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic.

Texas Department of Transportation
Traffic Division
Standard

TRAFFIC CONTROL PLAN SEAL COAT OPERATIONS

TCP (SC-1) - 21

FILE#	102000-1-21-001	DATE	08/11/2021	JOB	HOUSTON	CD	001
REVISIONS		DATE		BY			
1	T-001	08/11/2021		DESIGN			
				CHECK			
				APPROVE			
				DATE			
				SHEET NO.			10



TCP (SC-1b)
ONE LANE TWO-WAY (3 LANES)
CONTROL WITH PILOT VEHICLE
AND CHANNELIZING DEVICES

TCP (SC-1a)
ONE LANE TWO-WAY (2 LANES)
CONTROL WITH PILOT VEHICLE

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402	III. CULTURAL RESOURCES	VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES																																																													
TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506. List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities. 1 _____ 2 _____ No Action required ☒ Action required. Action Number: _____ 1 Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000 2 Comply with the SW3P and revise when necessary to control pollution or as required by the Engineer. 3 Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.	Refer to TXDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately. Action Number: _____ 1 ☒ No Action required ☐ Action Required 2 _____ 3 _____ 4 _____	General (applies to all projects): Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used. Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, including, but are not limited to the following categories: Points, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bore ground and covered, for products which may be hazardous. Maintain product labeling as required by the Act. Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills. Contact the Engineer if any of the following are detected: * Unusual dead or distressed vegetation * Unidentified trash piles, drums, canisters, barrels, etc. * Undesirable smells or odors * Evidence of leaching or seepage of substances Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)? ☒ No, then no further action required ☐ Yes, then an abestos inspection by a qualified inspector required ☐ No Abestos found coordination with DSHS is complete. Paperwork available on request ☐ Yes Abestos found. Abatement plan is a part of this project. Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project: ☒ No Action required 1 ☐ Action required 2 ☐ 3																																																													
II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404 USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas. The Contractor must adhere to all of the terms and conditions associated with the following permit(s): ☒ No Permit required ☐ Nationwide Permit 14-PCN not Required (<1/10 acre water/wetland) ☐ Nationwide Permit 14-PCN Required (1/10 to 1/2 acre 1/3 in tidal waters) ☐ Individual 404 Permit ☐ Other Nationwide Permit required NWP# _____ Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS. 1 _____ 2 _____ 3 _____ 4 _____ The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.	IV. VEGETATION RESOURCES Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, & 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal Action Number: _____ 1 ☒ No Action required ☐ Action Required 2 _____ 3 _____ 4 _____	V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS 1 _____ 2 _____ 3 _____ 4 _____ If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If coves or sinkholes are discovered, cease work in the immediate area, and contact the	OTHER ENVIRONMENTAL ISSUES ☒ No Action required 1 ☐ Action required 2 ☐ 3																																																												
BEST MANAGEMENT PRACTICES <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Erosion</th> <th colspan="2">Sediment</th> <th>Post-Construction TSS</th> </tr> </thead> <tbody> <tr> <td>Temporary Vegetation</td> <td>☐</td> <td>Silt Fence</td> <td>☐</td> <td>☐</td> </tr> <tr> <td>Blankets / Matting</td> <td>☐</td> <td>Rock Dams</td> <td>☐</td> <td>☐</td> </tr> <tr> <td>Mulch</td> <td>☐</td> <td>Erosion Control Logs</td> <td>☐</td> <td>☐</td> </tr> <tr> <td>Sodding</td> <td>☐</td> <td>Triangular Filter Dike</td> <td>☐</td> <td>☐</td> </tr> <tr> <td>Interceptor Swale</td> <td>☐</td> <td>Sand Bag Berm</td> <td>☐</td> <td>☐</td> </tr> <tr> <td>Diversion Dike</td> <td>☐</td> <td>Straw Bale Dike</td> <td>☐</td> <td>☐</td> </tr> <tr> <td>Erosion Control Logs</td> <td>☐</td> <td>Brush Berms</td> <td>☐</td> <td>☐</td> </tr> <tr> <td>Erosion Control Compost</td> <td>☐</td> <td>Erosion Control Compost</td> <td>☐</td> <td>☐</td> </tr> <tr> <td></td> <td>☐</td> <td>Mulch Filter Dam & Sock</td> <td>☐</td> <td>☐</td> </tr> <tr> <td></td> <td>☐</td> <td>Compost Filter D&S</td> <td>☐</td> <td>☐</td> </tr> <tr> <td></td> <td>☐</td> <td>Sediment Basin</td> <td>☐</td> <td>☐</td> </tr> </tbody> </table>				Erosion		Sediment		Post-Construction TSS	Temporary Vegetation	☐	Silt Fence	☐	☐	Blankets / Matting	☐	Rock Dams	☐	☐	Mulch	☐	Erosion Control Logs	☐	☐	Sodding	☐	Triangular Filter Dike	☐	☐	Interceptor Swale	☐	Sand Bag Berm	☐	☐	Diversion Dike	☐	Straw Bale Dike	☐	☐	Erosion Control Logs	☐	Brush Berms	☐	☐	Erosion Control Compost	☐	Erosion Control Compost	☐	☐		☐	Mulch Filter Dam & Sock	☐	☐		☐	Compost Filter D&S	☐	☐		☐	Sediment Basin	☐	☐
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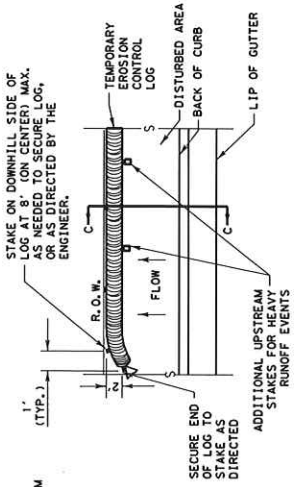
© 2021 **Howard County Road & Bridge**

Environmental Permits, Issues and Commitments (EPIC)

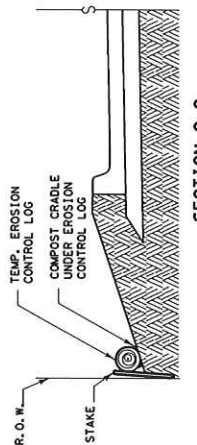
Project #	Precinct	Sheet #
2020029	3	20

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
4. STAKES SHALL BE 2" x 2" WOOD OR #3 REBAR, 2'-4" LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
5. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
6. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
7. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
8. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
9. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

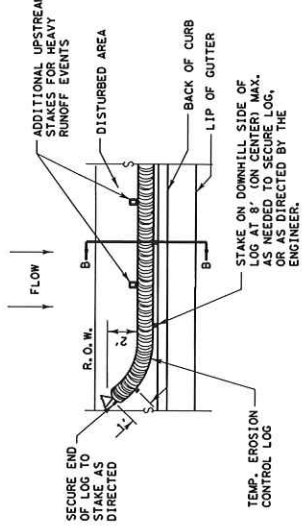


PLAN VIEW

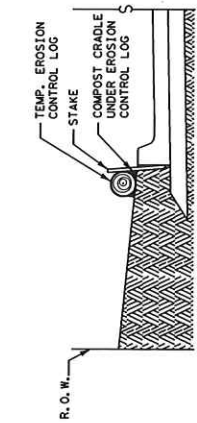


SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

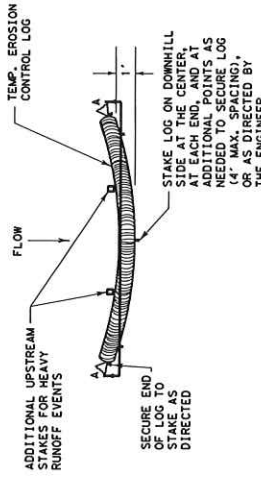


PLAN VIEW

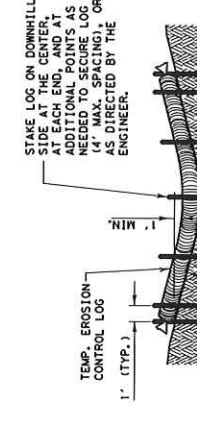


SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB



PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-B/C — EROSION CONTROL LOG AT BACK OF CURB
- CL-R/W — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

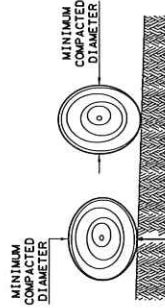
Log Traps:
 The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/acre (10.5' over the drainage area).

Control logs should be placed in the following locations:
 1. Within drainage ditches spaced as needed or min. 500' on center
 2. Immediately preceding ditch inlets or drain inlets
 3. Just before the drainage enters a water course
 4. Just before the drainage enters a water body
 5. Just before the drainage leaves the construction
 Limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

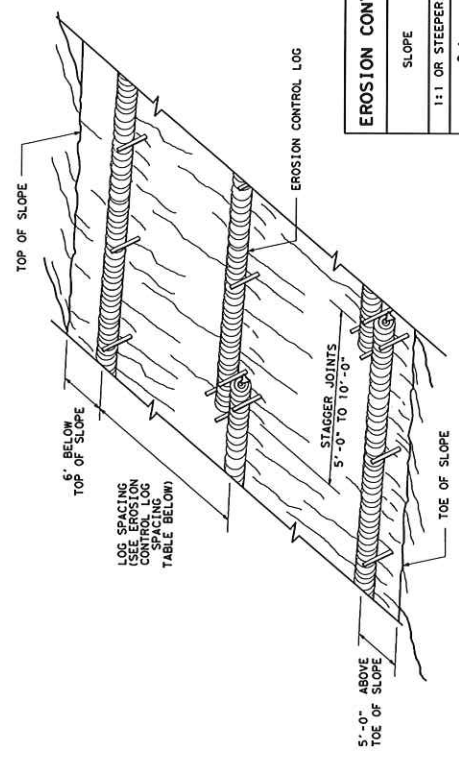
DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS



SHEET 1 OF 3

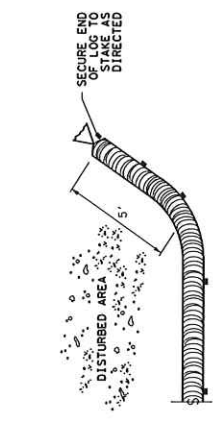
Texas Department of Transportation		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES			
EROSION CONTROL LOG			
EC (9) - 16			
FILE: ec916	DATE: 07/16	BY: JMS	CHK: JMS
REVISIONS	DATE	BY	CHK
1	07/16	JMS	JMS
COUNTY		SHEET NO.	
HARRIS		21	

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EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

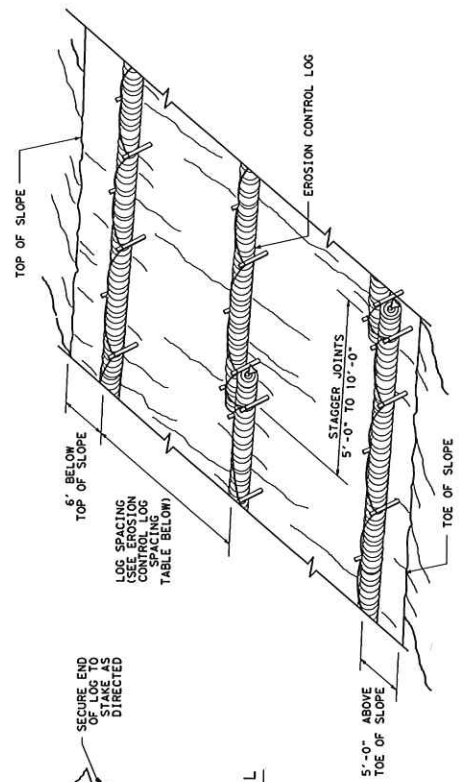
CL-SST



END SECTION RAP DETAIL

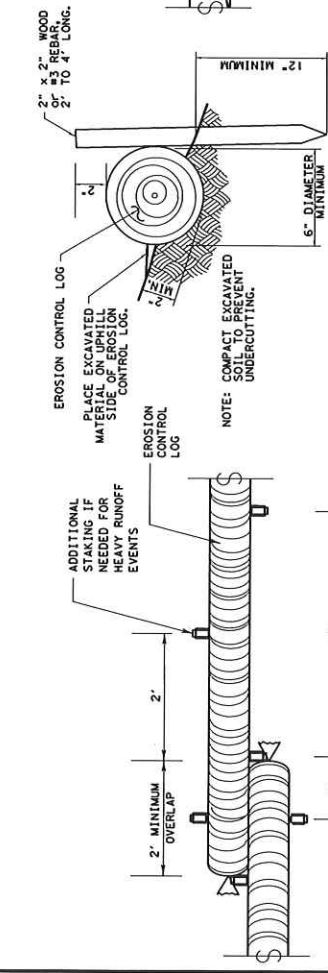
SLOPE	LOG DIAMETER				
	6"	8"	12"	18"	24"
1:1 OR STEEPER	5'	10'	15'	20'	30'
2:1	10'	20'	30'	40'	60'
3:1	15'	30'	45'	60'	90'
4:1 OR FLATTER	20'	40'	60'	90'	120'

* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE.
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



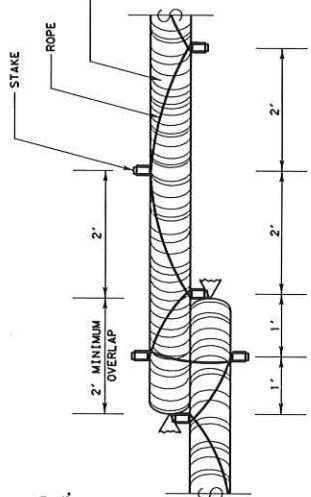
EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL



STAKE AND TRENCHING ANCHORING DETAIL

CL-SST



STAKE AND LASHING ANCHORING DETAIL

CL-SSL

LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC (9) -16

FILE: ec116

REV: 1

DATE: JULY 2016

DESIGNED BY: JMM

CHECKED BY: JMM

APPROVED BY: JMM

REVISIONS:

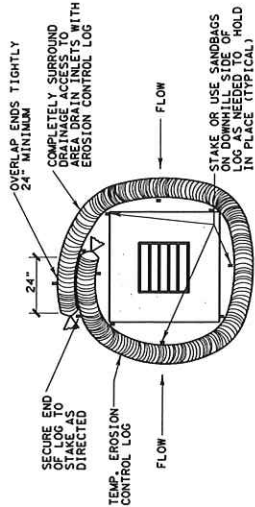
NO. 1

DATE

BY

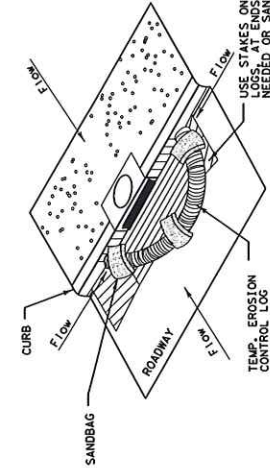
REASON

SHEET NO. 22



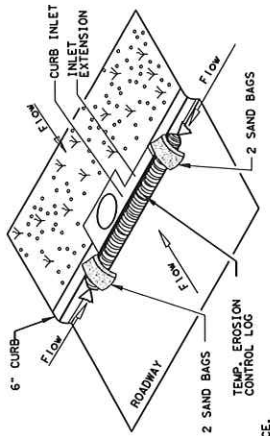
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

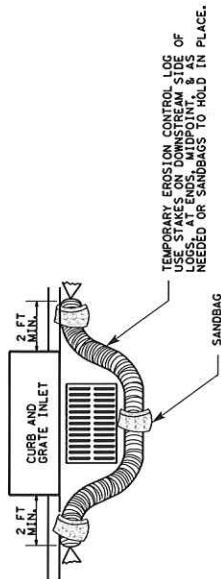
CL-CI



EROSION CONTROL LOG AT CURB INLET

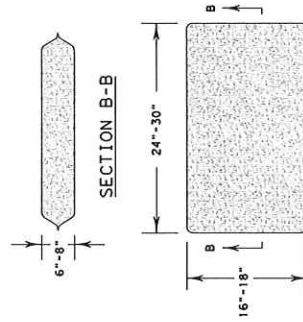
CL-CI

NOTE: EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SANDBAG DETAIL

SHEET 3 OF 3

		Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES EROSION CONTROL LOG EC (9) - 16			
FILE: 90316 DATE: JULY 2016 REVISIONS	DESIGNED BY: JON CHECKED BY: JON COUNTY: HOWARD	DRAWN BY: JON CHECKED BY: JON COUNTY: HOWARD	SHEET NO.: 23