CITY OF LIBERTY PUBLIC WORKS

2024 CITY OF LIBERTY FIRE HYDRANT REPLACEMENT PROJECT

BID NO. 2023-13

ADDENDUM NUMBER 1

DATE: JANUARY 8, 2024

GENERAL

The following changes, additions, or deletions shall be made to the following documents as indicated and all other conditions shall remain the same:

1. **BID SCHEDULE**

    - Remove Bid Schedule sheet (12) and replace with sheet (12) marked Addendum no. 1, see attached.

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2. **GENERAL NOTES**

    - Remove sheet (84) and Replace with sheets (84) marked Addendum No. 1, see attachment.

    - Remove sheet (85) and Replace with sheets (85) marked Addendum No. 1, see attachment.

3. **EXHIBIT A**

- Remove Exhibit sheet (89) and Replace with sheets (89) marked Addendum No. 1, see attachment.

- Add TCP sheets (1-1-18), (1-2-18), (1-3-18), (1-4-18), (1-5-18), (1-6-18) and (WZ(RS)-22) SEE sheet marked Addendum No. 1, see attachments.

SUBMITTED QUESTIONS

- **WHAT ARE THE DEPTHS OF THE WATER AND EXACT LOCATIONS OF WATER MAINS?**
  ANSWER: THE CITY DOES NOT HAVE EXACT LOCATIONS OF THE WATER MAINS, OUR MAPPING IS APPROXIMATE. ON SHEET 89 WE IDENTIFIED WHETHER THE MAIN IN IN THE ROADWAY.
- **WE'VE NOTICED ON THE BID FORM THERE ISN'T A LINE ITEM REPLACING THE CONCRETE/ASPHALT IN THE ROADS.**
  ANSWER: THE CONCRETE AND ASPHALT RESTORATION WILL BE SUBSIDIDARY TO VARIOUS BID ITEMS AND WILL NOT BE PAID SEPARATELY. SHEET 89 MARKED "ADDENDEM NO.1" .
- **DO WE NEED TO DO ANY CMT TESTING FOR THE MATERIAL USED FOR THE SCOPE OF WORK?**
  ANSWER: A DESIGN NEEDS TO BE SUBMITTED FOR THE PROPOSED ASPHALT AND CONCRETE PRIOR TO REPAIRS. TESTING WILL ONLY BE REQUIRED AT THE CONTRACTOR'S EXPENSE IF THERE ARE ISSUES WITH THE MATERIAL'S PREFORMANCE.

Section 0210

BID SCHEDULE

For construction of: 2024 CITY OF LIBERTY FIRE HYDRANT REPLACEMENT PROJECT

For the City of Liberty, Texas

ITEM NO.	ITEM CODE	ALT	DESCRIPTION	ESTIMATED QUANTITIES	UNIT	UNIT PRICE	UNIT PRICE (WRITTEN)	TOTAL
			TOTAL BID					
1			**COMPLETE REMOVAL: FIRE HYDRANT ASSEMBLY**	**20**	**EA**		And /100 Dollars	
2			**COMPLETE VALVE INSTALLATION: 6" VALVE HOT ON MAIN**	**9**	**EA**		And /100 Dollars	
3			**COMPLETE INSTALLATION: 8" VALVE HOT ON MAIN**	**2**	**EA**		And /100 Dollars	
4			**COMPLETE INSTALLATION: 12" VALVE HOT ON MAIN**	**4**	**EA**		And /100 Dollars	
5			**COMPLETE INSTALLATION AND REMOVAL: 6" LINE STOP**	**13**	**EA**		And /100 Dollars	
5			**COMPLETE INSTALLATION AND REMOVAL: 8" LINE STOP**	**3**	**EA**		And /100 Dollars	
5			**COMPLETE INSTALLATION AND REMOVAL 12" LINE STOP**	**6**	**EA**		And /100 Dollars	
6			**COMPLETE INSTALLATION: FIRE HYDRANT ASSEMBLY W/6"VALVE**	**21**	**EA**		And /100 Dollars	
7			**MOBILIZATION / DEMOBILIZATION (NOT TO EXCEED 5%)**	**1**	**LS**		And /100 Dollars	
8			**BARRICADES, TRAFFIC CONTROL AND SIGNS**	**4**	**MON**		And /100 Dollars	

16. If overhead or underground power lines need to be de-energized, contact the electrical service provider to perform this work. Costs associated with de-energizing the power lines or other protective measures required are at no expense to the City. If working near power lines, comply with the appropriate sections of Texas State Law and Federal Regulations relating to the type of work involved.

17. Material on hand will not be paid for.

18. Prior to final acceptance, all fire hydrants shall be tested for pressure and flow.

19. Move existing signs, mailboxes, delineators and any other similar obstructions that interfere with construction to temporary locations approved by the engineer. Move them back to their permanent positions when the work progresses to the point where this is possible. Place the sign post back in accordance with the applicable standard. This will not be paid for directly and will be considered subsidiary to various bid items.

20. Maintain adequate drainage throughout the limits of the project during all construction phases.

21. Verify all locations for proposed.

22. Concrete shall be 3,000 psi and asphalt shall be type "D" asphalt or approved high performance cold mix.

23. The Contractor will establish the project control point, points, or tangency, PI's (points of intersection), point of curvature (PC, PI, and PT) and bench marks at the beginning and end of the project on the plan view only. Contractor shall establish and maintain these points throughout construction. There will be no separate payment for this work, but it shall be considered subsidiary to various bid items.

24. Schedule work so that the street restoration work is performed safely, to reduce the hazard to the traveling public and to prevent undue delay caused by wet weather.

25. The Contractor shall schedule each work day so the roadway is compacted and open to traffic.

26. When design details are not shown on the traffic control plans, provide signs and arrows conforming to the latest "Standard Highway Sign Designs for Texas" manual.

27. All materials, labor and incidentals required for the contractor to provide for traffic across the streets and for temporary ingress and egress to private property shall be furnished by the contractor at no additional cost to the city and shall be considered as incidental to the various bid items in this project.

28. Contractor must keep working equipment readily available throughout the contract. Each street must be open to traffic at the end of each day. Streets shall not be closed over-night unless approved by the Public Works Director.

29. Any saw-cutting required for the project shall not be paid for directly but shall be considered subsidiary to various bid items.

30. The Contractor will notify the Engineer 48 hours in advance of completed work per site. The Engineer will inspect each site and submit a punch list per location to the Contractor as necessary. If work needs to be done after the inspection, the contractor will not be paid for re-mobilization.

31. **The restoration of concrete and asphalt shall not be paid separate and will be considered subsidiary to various bid items.**

2. ITEM 5: CONTROL OF WORK

1. Station the project prior to commencing work. Mark the stations every 100 feet. Contractor shall maintain stationing throughout the duration of the project. Remove the station markings at the completion of the project. Consider this work to be subsidiary to the various bid items of the contract.

3. ITEM 7: LEGAL RELATIONS AND RESPONSIBILITIES

1. Furnish all materials, labor and incidentals required to provide for traffic across the street and for temporary ingress and egress to private property in accordance with article 7.7 of the standard specifications at no additional cost to the City. Consider this work to be subsidiary to the various bid items of the contract.

2. Maintain the roadway slope stability. Temporary retaining structures or shoring may be required. Before installing any proposed temporary retaining structures or shoring, secure written approval. Submit design calculations, working drawings and a plan of operations including sequencing. Maintaining slope stability is subsidiary to the various bid items.

4. ITEM 8: PROSECUTION AND PROGRESS

1. Compute and charge working days in accordance with Article 8.3.1.3 Monday thru Sunday Work Week. However, there will be no work performed on Saturday or Sunday and the work day time is 7am to 6pm.

2. Gather information and direct attention to the aspects of adjoining projects that may be in the progress during the construction of a portion of this project. Plan and prosecute the sequence of construction and the traffic control plan with adjacent construction projects so as not to interfere with, or hinder the completion of the work in progress on the adjoining projects. Coordinate projects to ensure an uninterrupted flow of traffic.

5. ITEM 9: MEASUREMENT AND PAYMENT

1. The Contractor shall submit all tickets, As-Built drawings and updated schedule with each pay request.

2. The City will withhold a 5% retainage from each pay request.

ITEM 9001

GATE VALVE INSTALLATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Installation of 6”,**8”** or 12” EZ-Valve (installed on a hot waterline) or approved equal on an existing water main. Valves for fire hydrant assembly will be specified in the fire hydrant detail (Exhibit “A”)

EXHIBIT "A"

LIST OF FIRE HYDRANTS FOR REPLACEMENT

						PROPOSED WORK	
NO.	**LOCATION**	**LEAKING**	**MAIN SIZE**	**EXISTING CONDITION**	**WATER MAIN LOCATION**	**LINE STOP**	**EZ VALVE**
1	700 FM 563	NO	6"	NO VALVE, LEANING BAD	AC PIPE; NOT IN STREET	1 - 6" LS	1 - 6" VALVE
2	1611 FM 563	NO	8"	HAS A VALVE IS A KENNEDY HYDRANT	AC PIPE; NOT IN STREET	1 - 8" LS	-
3	500 FM 563	NO	6"	NO VALVE, BROKEN STEM	AC PIPE; NOT IN STREET	1 - 6" LS	1 - 6" VALVE
4	COS & FANNIN	NO	8"	NO VALVE, BROKEN STEM	AC PIPE; IN THE STREET (CONCRETE)	1 - 8" LS	1 - 8" VALVE
5	3323 BEAUMONT	NO	12"	NO VALVE, BROKEN STEM	AC PIPE; EDGE OF THE STREET (ASPHALT)	1 - 12" LS	1 - 12" VALVE
6	1707 TWIN OAKS	NO	6"	NO VALVE, BROKEN STEM	AC PIPE; NOT IN STREET	1 - 6" LS	-
7	4500 NORTH MAIN	NO	12"	NO VALVE, LEANING BAD	AC PIPE; NOT IN STREET	1 - 12" LS	1 - 12" VALVE
8	2700 CORNELL	NO	6"	HAS A VALVE IS A KENNEDY HYDRANT	AC PIPE; IN THE STREET (ASPHALT)	1 - 6" LS	-
9	WEBSTER & MAIN	NO	6"	NO VALVE, HYDRANT WILL NOT OPEN	AC PIPE; IN THE STREET (CONCRETE)	1 - 6" LS	1 - 6" VALVE
10	MIZELL RD	NO	6"	NO VALVE, HIT BY VEHICLE	AC PIPE; IN THE STREET (ASPHALT)	1 - 6" LS	1 - 6" VALVE
11	4402 MAIN ST	NO	12"	NO VALVE, HIT BY VEHICLE	AC PIPE; NOT IN STREET	1 - 12" LS	1 - 12" VALVE
12	WOODSPRINGS & BYPASS	NO	12	NO VALVE, HIT BY VEHICLE	AC PIPE; NOT IN STREET	1 - 12" LS	1 - 12" VALVE
13	MILAM & COS	NO	8"	NO VALVE, BROKEN STEM	AC PIPE; IN THE STREET (CONCRETE)	1 - 8" LS	1 - 8" VALVE
14	1000 MLK	NO	12	NO VALVE, BROKEN STEM	AC PIPE; IN THE STREET (CONCRETE)	1 - 6" LS	-
15	LAYL & AVENUE D	NO	6"	NO VALVE, BROKEN STEM	AC PIPE; EDGE OF THE STREET (ASPHALT)	1 - 6" LS	1 - 6" VALVE
16	LAYL & LONE OAK	NO	6"	NO VALVE, BROKEN STEM	AC PIPE; IN THE STREET (CONCRETE)	1 - 6" LS	1 - 6" VALVE
17	3446 NORTH MAIN ST	NO	6"	HAS VALVE	AC PIPE; NOT IN STREET	1 - 6" LS	-
18	KENTUCKY & GRAND	NO	6"	NO VALVE, BROKEN STEM	AC PIPE; IN THE STREET (CONCRETE)	1 - 6" LS	1 - 6" VALVE
19	1900 KIPLING	NO	6"	NO VALVE, BROKEN STEM	AC PIPE; IN THE STREET (ASPHALT)	1 - 6" LS	1 - 6" VALVE
20	HOLLY & HAWTHORNE	NO	6"	NO VALVE, BROKEN STEM	AC PIPE; IN THE STREET (ASPHALT)	1 - 6" LS	1 - 6" VALVE
21	**WOODSPRINGS 2000' WEST OF BYPASS**	**NO**	**12"**	**NO VALVE, BROKEN STEM**	PVC; NOT IN STREET	**2 - 12" LS**	

*** INFORMATION IN TABLE ARE ESTIMATED LOCATIONS AND CONDITIONS. FIELD VERIFICATION IS REQUIRED

EXHIBIT “A”

FIRE HYDRANT DETAIL

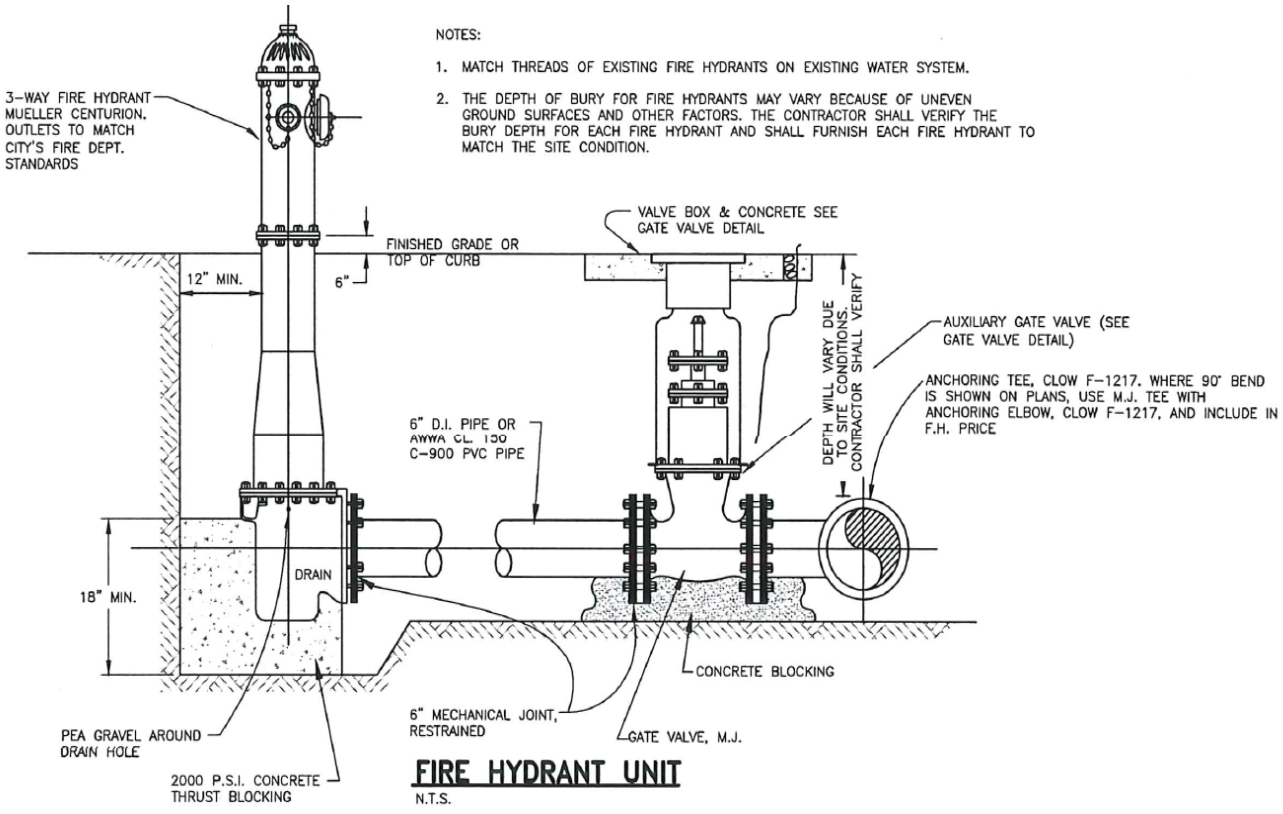
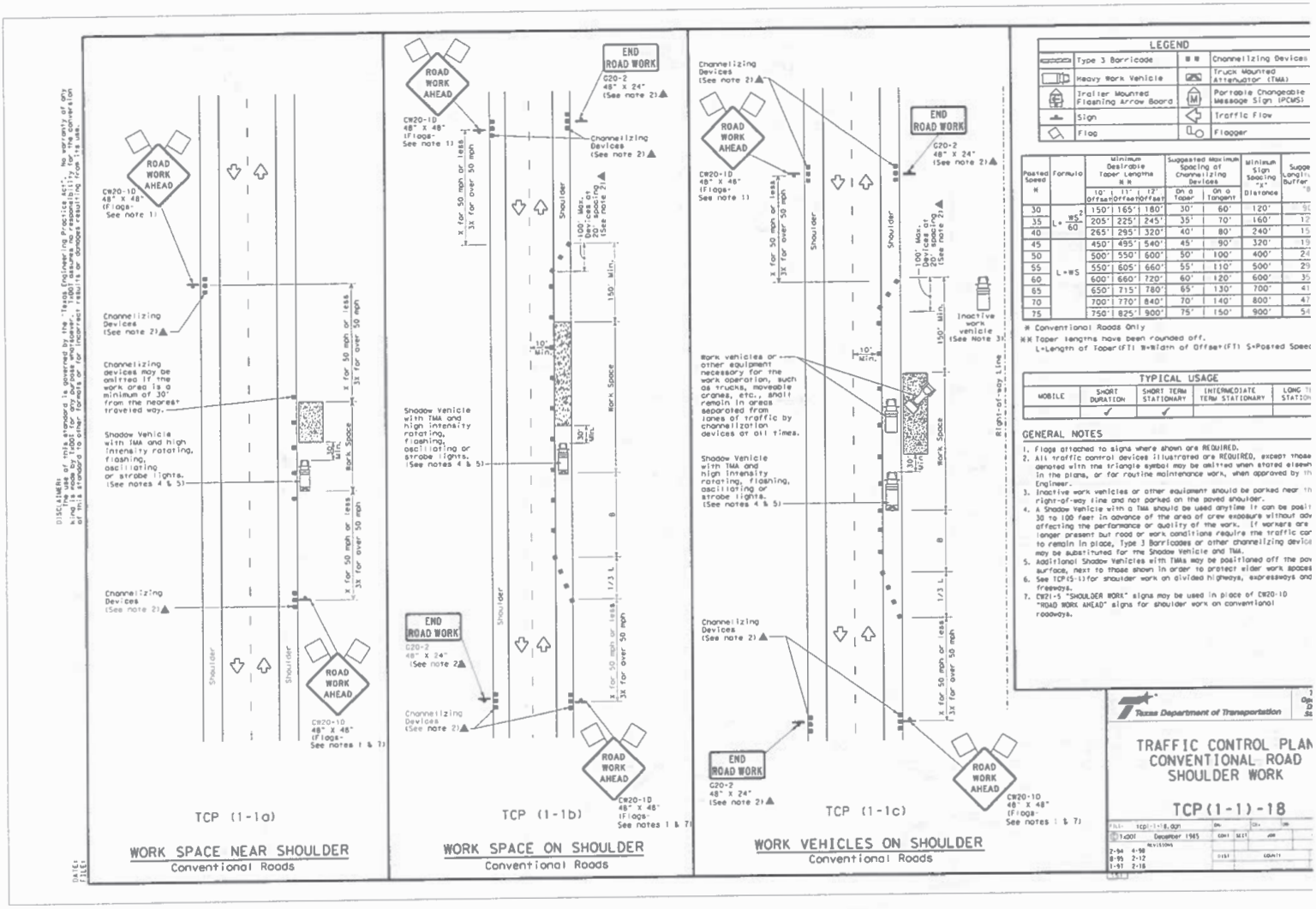
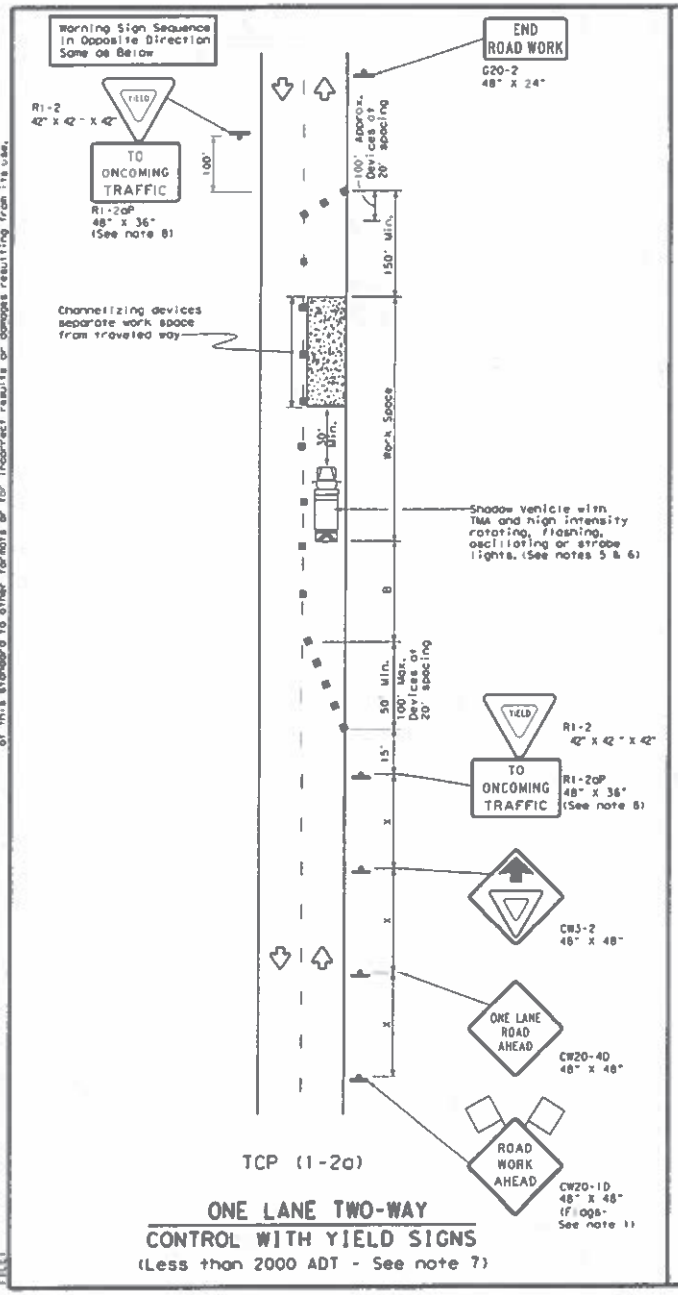


EXHIBIT "A"

**USE MUELLER FIRE HYDRANT OR APPROVED EQUAL

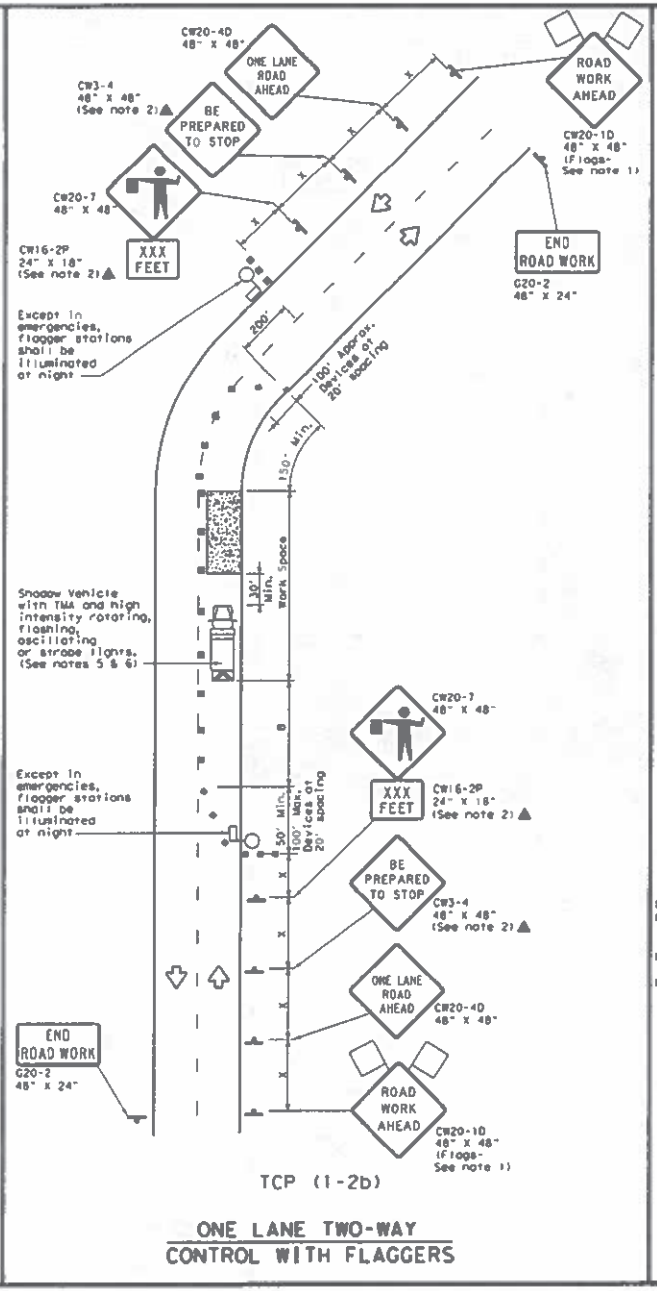

TCP (1-1a)
WORK SPACE NEAR SHOULDER
Conventional Roads
TCP (1-1b)
WORK SPACE ON SHOULDER
Conventional Roads
TCP (1-1c)
WORK VEHICLES ON SHOULDER
Conventional Roads
LEGEND
GENERAL NOTES
TYPICAL USAGE
TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK
TCP(1-1)-18



TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

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

Posted Speed MPH	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	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 DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. 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.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
8. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. 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).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

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©TxDOT: December 1985 | CONT | SECT | JOB | HIGHWAY
REVISIONS
4-98 4-98
2-94 2-12
1-97 2-18
DIST | COUNTY | SHEET NO.

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DATE:
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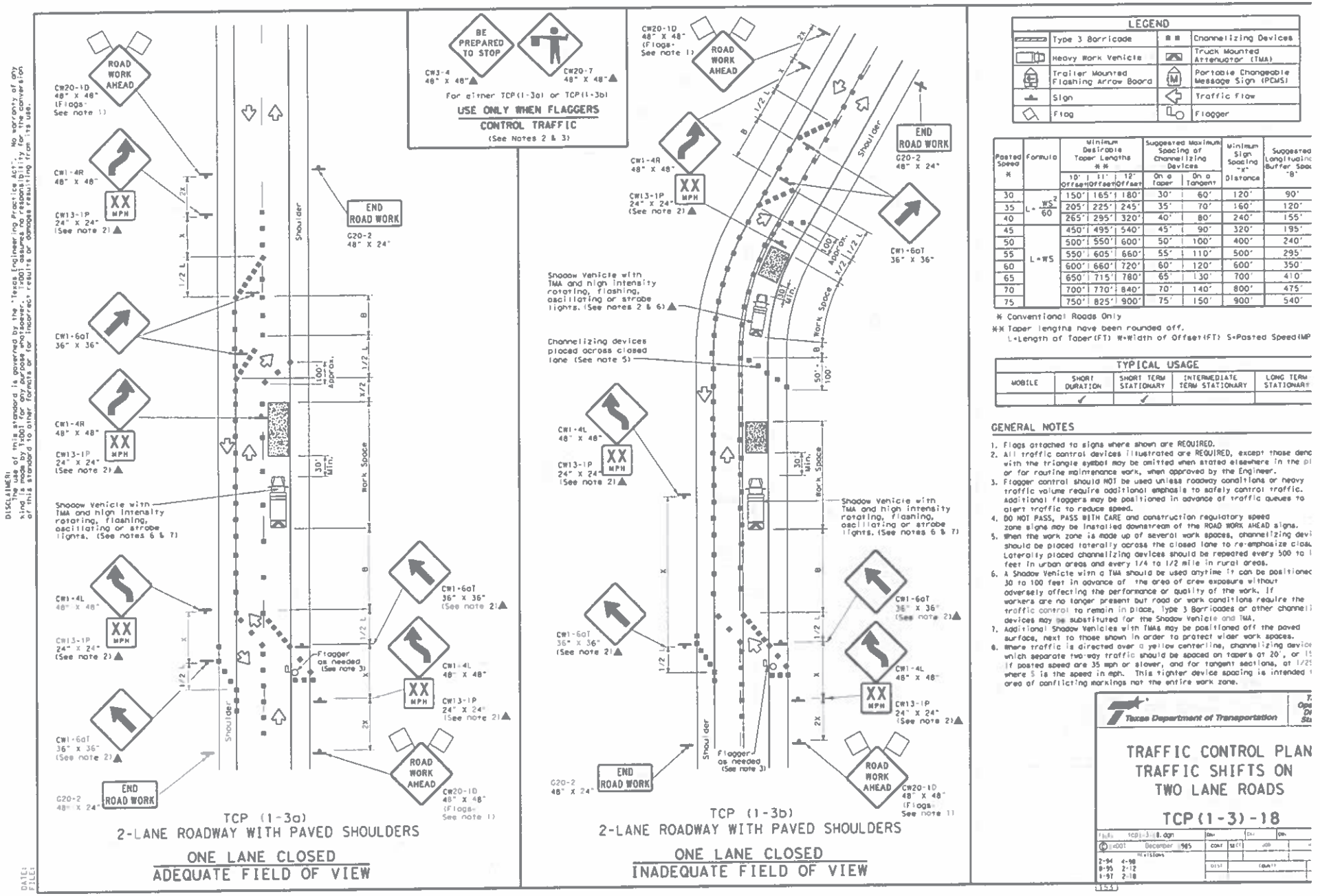

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FILE:

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denc with the triangle symbol may be omitted when stated elsewhere in the pl or for routine maintenance work, when approved by the Engineer.
3. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devi should be placed laterally across the closed lane to re-emphasize closu Laterally placed channelizing devices should be repeated every 500 to 1 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channeli devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
8. Where traffic is directed over a yellow centerline, channelizing device which separate two-way traffic should be spaced on tapers at 20', or 1 If posted speed are 35 mph or slower, and for tangent sections, at 1/2 where S is the speed in mph. This tighter device spacing is intended t area of conflicting markings not the entire work zone.

Texas Department of Transportation

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

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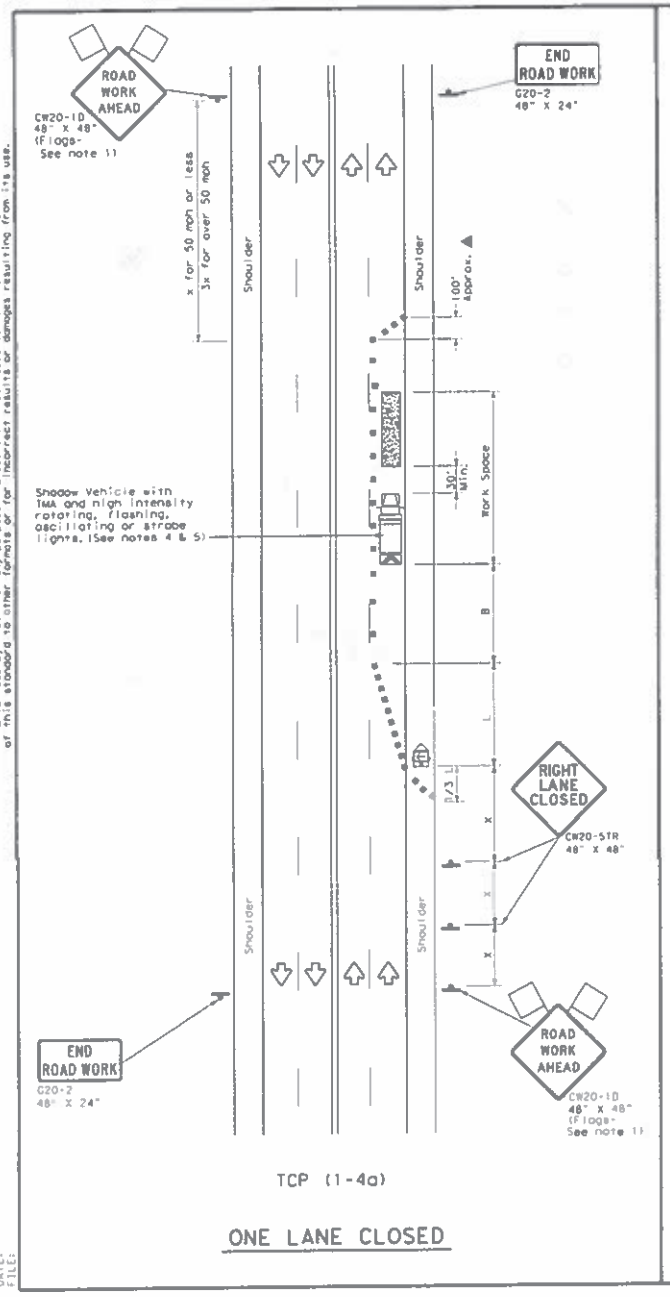
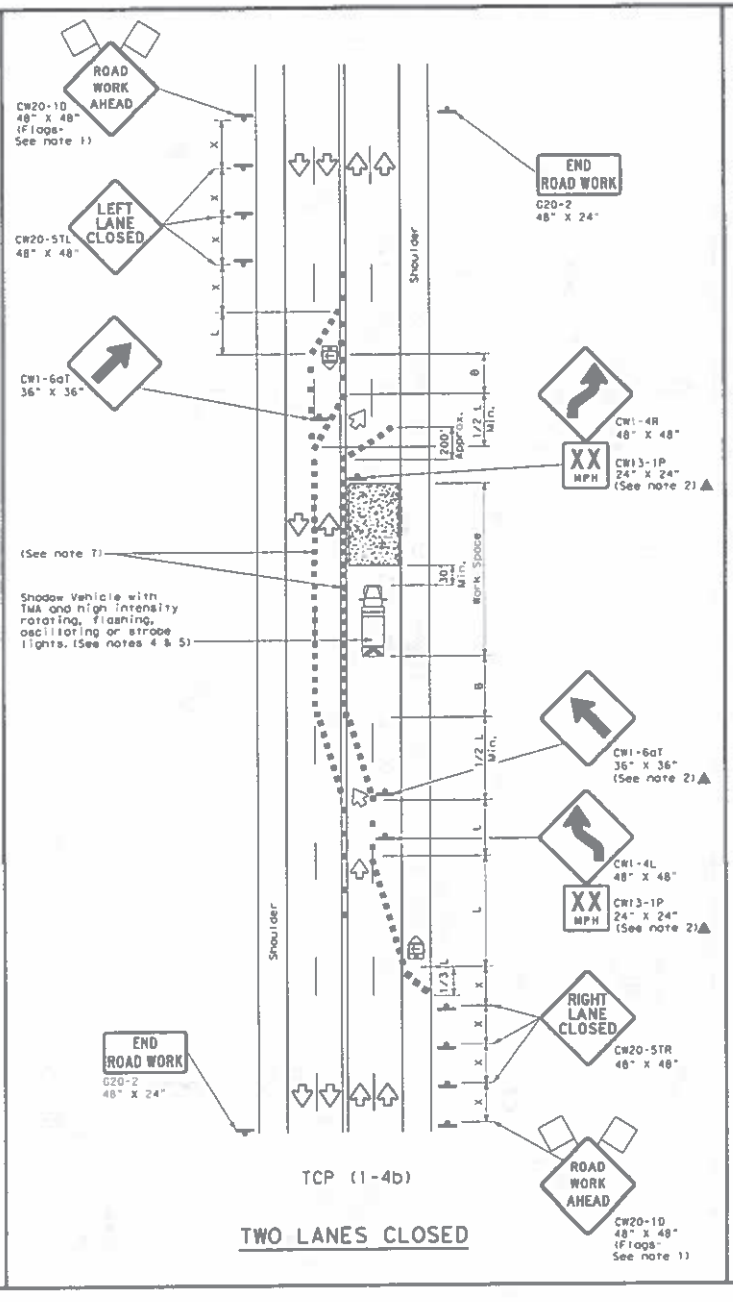
REVISIONS				
2-94 4-98	DIST	COUNTY		
8-95 2-12				
1-97 2-18				



TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	L = WS²/60	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-4a)

6. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.

TCP (1-4b)

7. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

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Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP (1-4)-18

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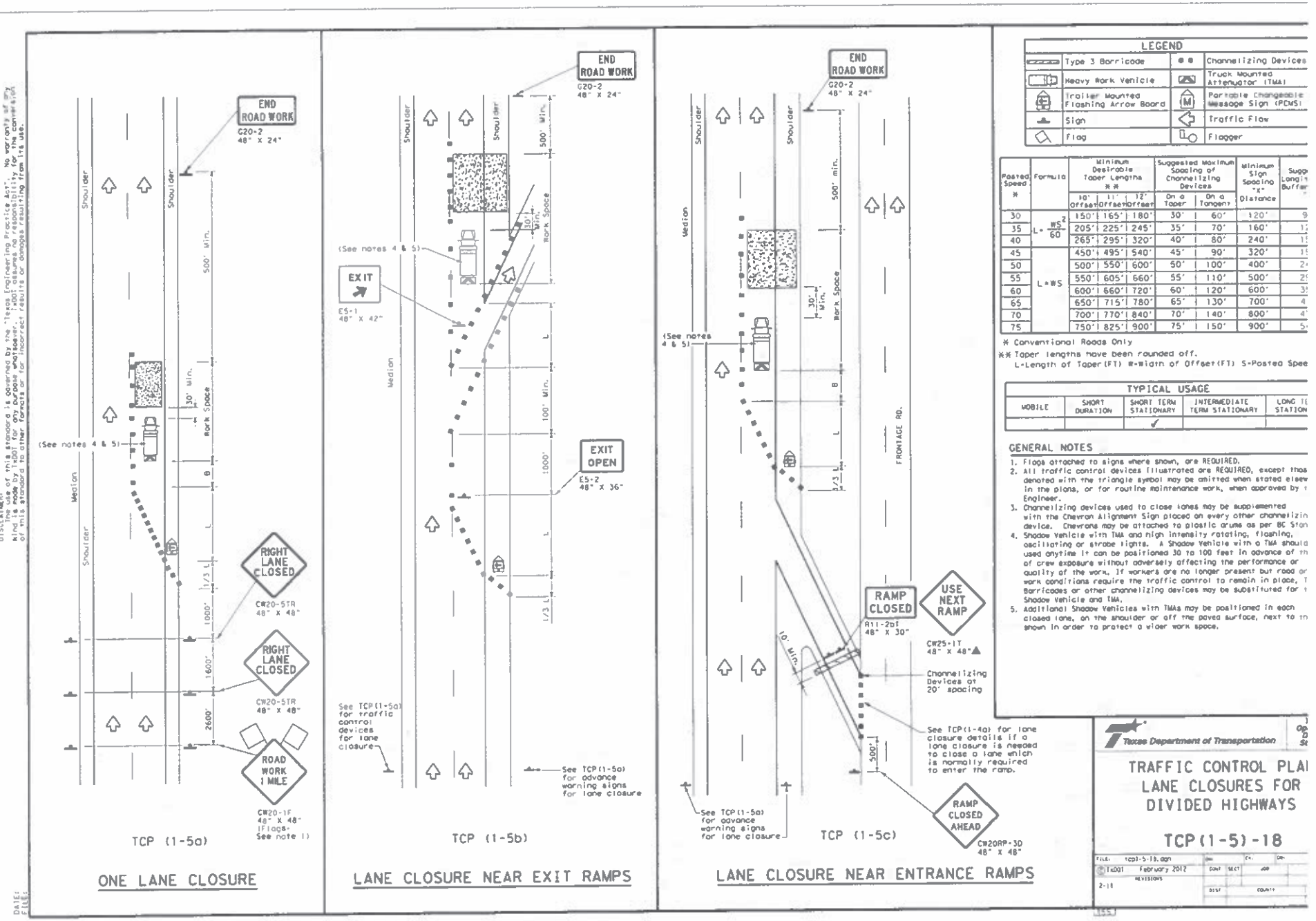
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	DIST	COUNTY		SHEET NO.

1-4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END ROAD WORK
G20-2
48" X 24"
Shoulder
Median
(See notes 4 & 5)
30' Min.
Work Space
500' Min.
L
B
1/3 L
1000'
1600'
2600'
RIGHT LANE CLOSED
CW20-5TR
48" X 48"
ROAD WORK 1 MILE
CW20-1F
48" X 48"
(Flags-See note 1)
TCP (1-5a)
ONE LANE CLOSURE
EXIT
E5-1
48" X 42"
100' Min.
EXIT OPEN
E5-2
48" X 36"
See TCP(1-5a) for traffic control devices for lane closure
See TCP(1-5a) for advance warning signs for lane closure
TCP (1-5b)
LANE CLOSURE NEAR EXIT RAMPS
FRONTAGE RD.
RAMP CLOSED
R11-2bT
48" X 30"
USE NEXT RAMP
CW25-1T
48" X 48"
10' Min.
Channelizing Devices at 20' spacing
See TCP(1-4a) for lane closure details if a lane closure is needed to close a lane which is normally required to enter the ramp.
RAMP CLOSED AHEAD
CW20RP-3D
48" X 48"
TCP (1-5c)
LANE CLOSURE NEAR ENTRANCE RAMPS
LEGEND
Type 3 Barricade
Channelizing Devices
Heavy Work Vehicle
Truck Mounted Attenuator (TMA)
Trailer Mounted Flashing Arrow Board
Portable Changeable Message Sign (PCMS)
Sign
Traffic Flow
Flag
Flagger
Posted Speed *
Formula
Minimum Desirable Taper Lengths **
10' Offset
11' Offset
12' Offset
Suggested Maximum Spacing of Channelizing Devices
On a Taper
On a Tangent
Minimum Sign Spacing "X" Distance
30 | L=WS²/60 | 150' | 165' | 180' | 30' | 60' | 120'
35 | | 205' | 225' | 245' | 35' | 70' | 160'
40 | | 265' | 295' | 320' | 40' | 80' | 240'
45 | L=WS | 450' | 495' | 540' | 45' | 90' | 320'
50 | | 500' | 550' | 600' | 50' | 100' | 400'
55 | | 550' | 605' | 660' | 55' | 110' | 500'
60 | | 600' | 660' | 720' | 60' | 120' | 600'
65 | | 650' | 715' | 780' | 65' | 130' | 700'
70 | | 700' | 770' | 840' | 70' | 140' | 800'
75 | | 750' | 825' | 900' | 75' | 150' | 900'
* Conventional Roads Only
** Taper lengths have been rounded off.
L-Length of Taper(FT) W-Width of Offset(FT) S-Posted Spee
TYPICAL USAGE
MOBILE | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY
✓
GENERAL NOTES
1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Stan
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should used anytime it can be positioned 30 to 100 feet in advance of the of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, T Barricades or other channelizing devices may be substituted for t Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to th shown in order to protect a wider work space.
Texas Department of Transportation
TRAFFIC CONTROL PLAN
LANE CLOSURES FOR
DIVIDED HIGHWAYS
TCP(1-5)-18
FILE: tcp1-5-18.dgn
TxDOT February 2012
REVISIONS
2-18
DATE:
FILE:

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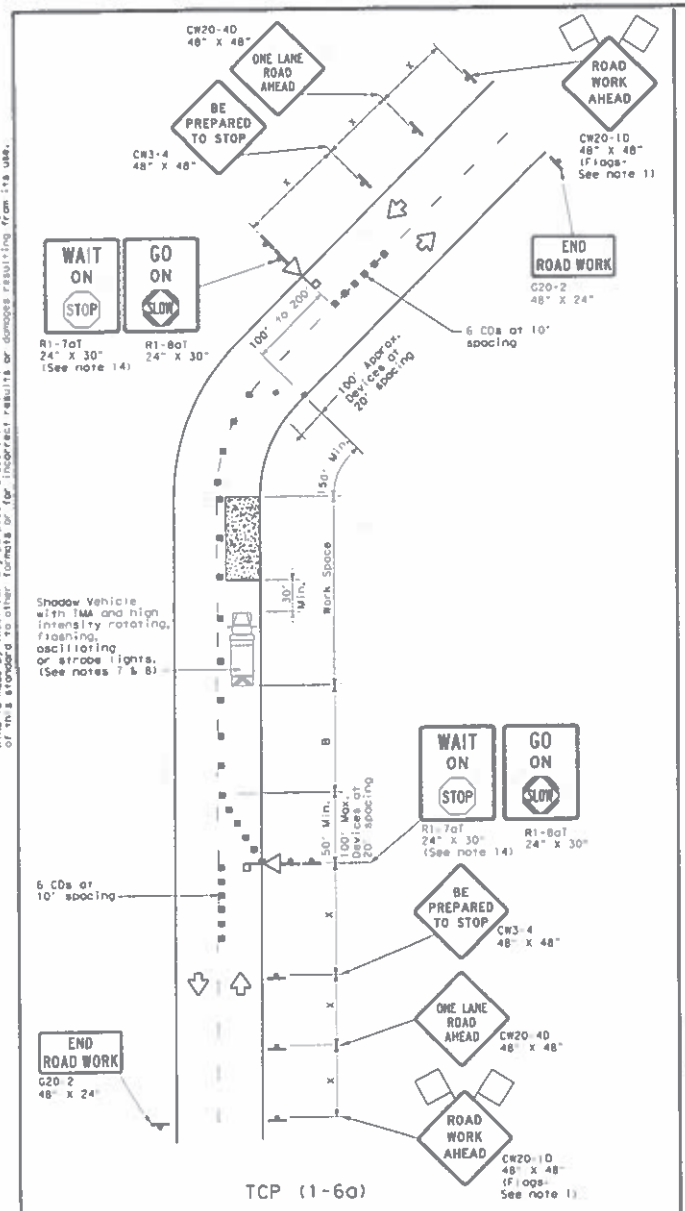
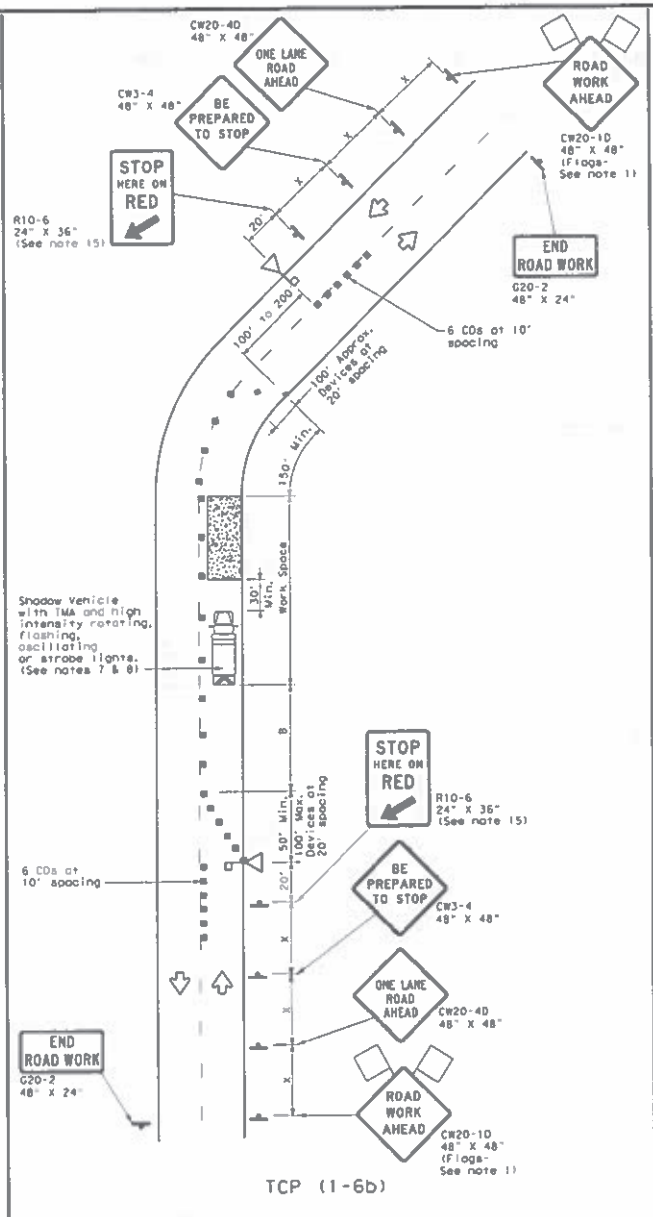
FILE:



TCP (1-6a)

ONE LANE TWO-WAY
CONTROL WITH STOP/SLOW AFADs



TCP (1-6b)

ONE LANE TWO-WAY CONTROL
WITH RED/YELLOW LENS AFADs

LEGEND			
	Type 3 Barricade	■ ●	Channelizing Devices (CDs)
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Automated Flagger Assistance Device (AFAD)	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	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 DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. AFADs shall only be used in situations where there is one lane of approaching traffic in the direction to be controlled.
3. Adequate stopping sight distance must be provided to each AFAD location for approaching traffic. (See table above).
4. Each AFAD shall be operated by a qualified/certified flagger. Flaggers operating AFADs shall not leave them unattended while they are in use.
5. One flagger may operate two AFADs only when the flagger has an unobstructed view of both AFADs and of the approaching traffic in both directions.
6. When pilot cars are used, a flagger controlling traffic shall be located on each approach. AFADs shall not be operated by the pilot car operator.
7. All AFADs shall be equipped with gate arms with an orange or fluorescent red-orange flag attached to the end of the gate arm. The flag shall be a minimum of 16" square.
8. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
9. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
10. Flaggers should use two-way radios or other methods of communication to control traffic.
11. Length of work space should be based on the ability of flaggers to communicate.
12. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the AFAD.
13. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
14. The R1-7aT "WAIT ON STOP" sign and the R1-8aT "GO ON SLOW" sign shall be installed at the AFAD location on separate supports or they may be fabricated as one 48" x 30" sign. They shall not obscure the face of the STOP/SLOW AFAD.
15. The R10-6 "STOP HERE ON RED" arrow sign shall be offset so as not to obscure the lenses of the AFAD.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
AUTOMATED FLAGGER ASSISTANCE DEVICES (AFADS)
TCP(1-6)-18

FILE: tcp1-6-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS				
2-18	DIST	COUNTY		SHEET NO.

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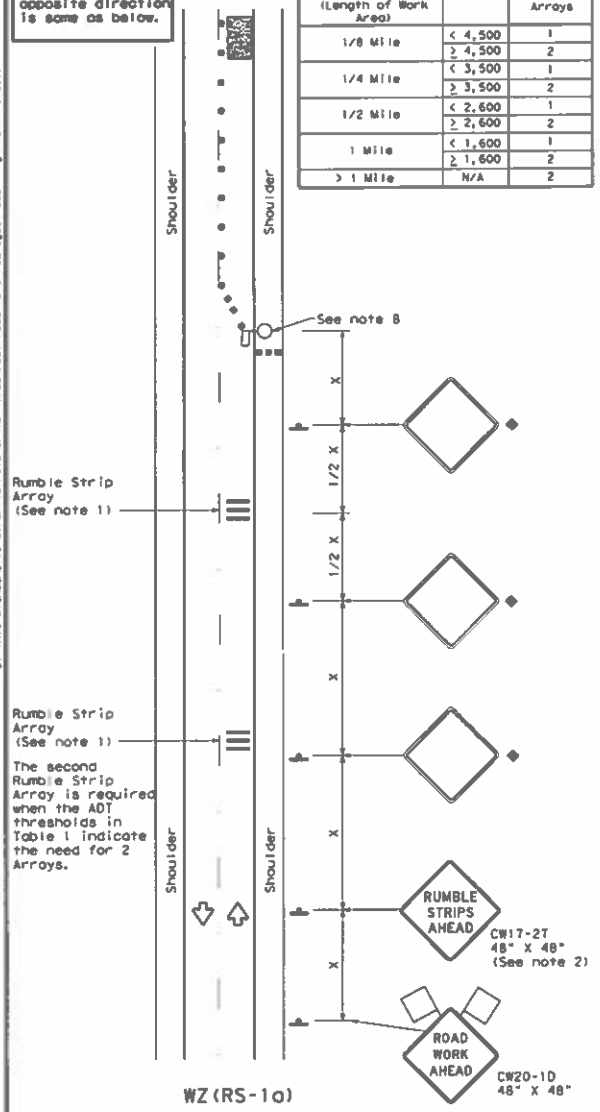
DATE:
FILE:

Warning sign and rumble strip sequence in opposite direction is same as below.

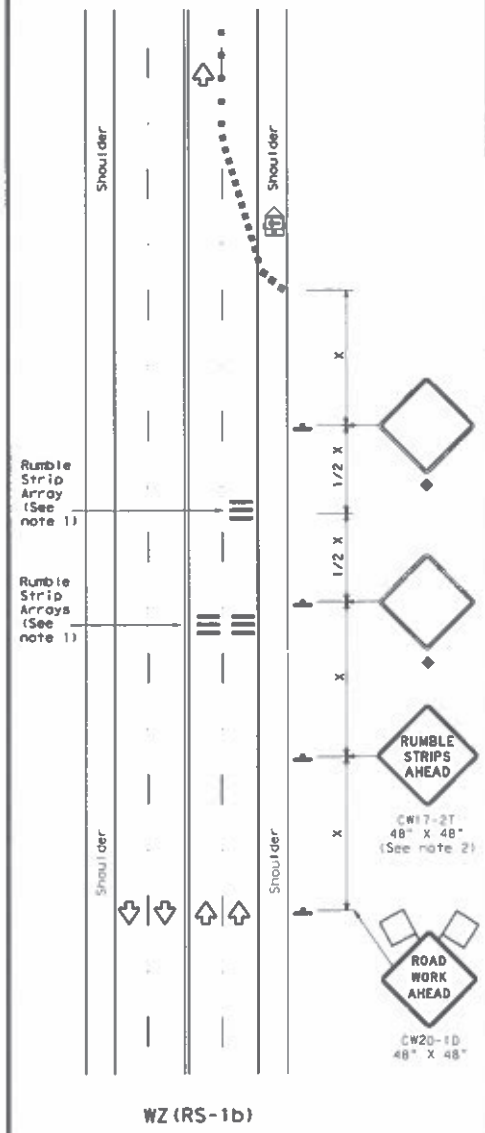


WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE
TWO-WAY APPLICATION

TABLE 1

Flagger to Flagger (Length of Work Area)	ADT	# of Rumble Strip Arrays
1/8 Mile	< 4,500	1
	≥ 4,500	2
1/4 Mile	< 3,500	1
	≥ 3,500	2
1/2 Mile	< 2,600	1
	≥ 2,600	2
1 Mile	< 1,600	1
	≥ 1,600	2
> 1 Mile	N/A	2



WZ(RS-1b)

RUMBLE STRIPS FOR LANE CLOSURE
ON CONVENTIONAL ROADWAY

GENERAL NOTES

1. Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
2. The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
3. Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
4. Remove Temporary Rumble Strips before removing the advanced warning signs.
5. Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
6. Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
7. This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
8. The one-lane two-way application may utilize a flagger, an Automated Flagger Assistance Device (AFAD) or a Portable Traffic Signal (PTS).
9. Replace defective Temporary Rumble Strips as directed by the Engineer.
10. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment and written direction from the Engineer.

LEGEND

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

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

* Conventional Roads Only

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

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

◆ Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.

* For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.

TABLE 2

Speed	Approximate distance between strips in an array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
= 60 MPH	20'
≥ 65 MPH	* 35' *

Texas Department of Transportation — Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 2-14 1-22 4-16	DIST	COUNTY		SHEET NO.

End of Addendum Number 1

City of Liberty Public Works Director

Damon Jones