



**REVIEW BY FORT BEND COUNTY
COMMISSIONERS COURT**

**Fort Bend County
Engineering Department**
301 Jackson Suite 401
Richmond, Texas 77469
281.633.7500
Permits@fortbendcountytexas.gov

- Right of Way Permit**
- Commercial Driveway Permit**

Permit No: 2018-24237

Applicant: Crown Castle NG Central LLC/CobbFendley

Job Location Site: 22502 Oak Mist Lane, Katy, TX 77494

Bond No. **Date of Bond:** 5/12/2014 **Amount:** \$50,000.00

The above applicant came to make use of certain Fort Bend County property subject to, "The Order Regulating the Laying, Construction, Maintenance, and Repair of Buried Cables, Conduits, and Pole Lines, In, Under, Across or Along Roads, Streets, Highways, and Drainage Ditches in Fort Bend County, Texas, Under the Jurisdiction of the Commissioners Court of Fort Bend County, Texas," as passed by the Commissioners Court of Fort Bend County, Texas, of the Minutes of the Commissioners Court of Fort Bend County, Texas, to the extent that such order is not inconsistent with Chapter 181, Vernon's Texas Statutes and Codes Annotated.

Notes:

1. Evidence of review by the Commissioners Court must be kept on the job site and failure to do so constitutes grounds for job shutdown.
2. Written notices are required:
 - a. 48 hours in advance of construction start up, and
 - b. When construction is completed and ready for final inspection, submit notification to Permit Administrator thru MyGovernmentOnline.org portal.
3. This permit expires one (1) year from date of permit if construction has not commenced.
4. This permit applies to work performed within right-of-ways owned and maintained by Fort Bend County only, and it is the responsibility of the applicant to acquire all other necessary permits.

On this 13th day of November, 2018, Upon Motion of Commissioner _____, seconded by Commissioner _____, duly put and carried, it is ORDERED, ADJUDGED AND DECREED that said notice of said above purpose is hereby acknowledged by the Commissioners Court of Fort Bend County, Texas, and that said notice be placed on record according to the regulation order thereof.

Signature
By: 
County Engineer

Presented to Commissioners Court and approved.
Date Recorded _____ Comm. Court No. _____

N/A
By: _____
Drainage District Engineer/Manager

Clerk of Commissioners Court
By: _____
Deputy



**PERMIT APPLICATION REVIEW FORM FOR
CABLE, CONDUIT, AND POLE LINE ACTIVITY
IN FORT BEND COUNTY**

**Fort Bend County
Engineering Department**
301 Jackson Suite 401
Richmond, Texas 77469
281.633.7500
Permits@fortbendcountytx.gov

- Right of Way Permit**
 Commercial Driveway Permit

Permit No: 2018-24237

The following "Notice of Proposed Cable, Conduit, and/or Pole Line activity in Fort Bend County" and accompanying attachments have been reviewed and the notice conforms to appropriate regulations set by Commissioner's Court of Fort Bend County, Texas.

(1) COMPLETE APPLICATION FORM:

- a. Name of road, street, and/or drainage ditch affected.
 b. Vicinity map showing course of directions
 c. Plans and specifications

(2) BOND:

- County Attorney, approval when applicable.
- Perpetual bond currently posted. Bond No: Amount: \$50,000.00
- Performance bond submitted. Bond No: Amount:
- Cashier's Check Check No: Amount:

(3) DRAINAGE DISTRICT APPROVAL (WHEN APPLICABLE):

Drainage District Approval

Date

We have reviewed this project and agree it meets minimum requirements.



Permit Administrator

11/6/2018

Date



SPRINT CO LOCATION ON EXISTING CROWN CASTLE NODES FORT BEND COUNTY, TX

DRAWING INDEX:	
SHEET	DESCRIPTION
1	COVER SHEET
2-3	GENERAL CONSTRUCTION NOTES & DETAILS
4-5	NODE LOCATION MAP
6-14	CONSTRUCTION DETAILS

NO WATER, WASTEWATER, OR DRAINAGE PROPOSED IN THIS PLAN SET.

CALL BEFORE YOU DIG!
 TEXAS ONE CALL IMPROVEMENT REQUEST
 800-4-A-DIG OR 832-STOP-DIG
 Texas One Call System
 1-800-344-9377

APP.	REVISIONS	DATE
Δ		
Δ		
Δ		

CobbFendley
 Texas Registration No. 274
 13430 Northwest Freeway, Suite 1100
 Houston, Texas 77040
 713-462-3242 | fax: 713-462-3262 | www.cobbfendley.com

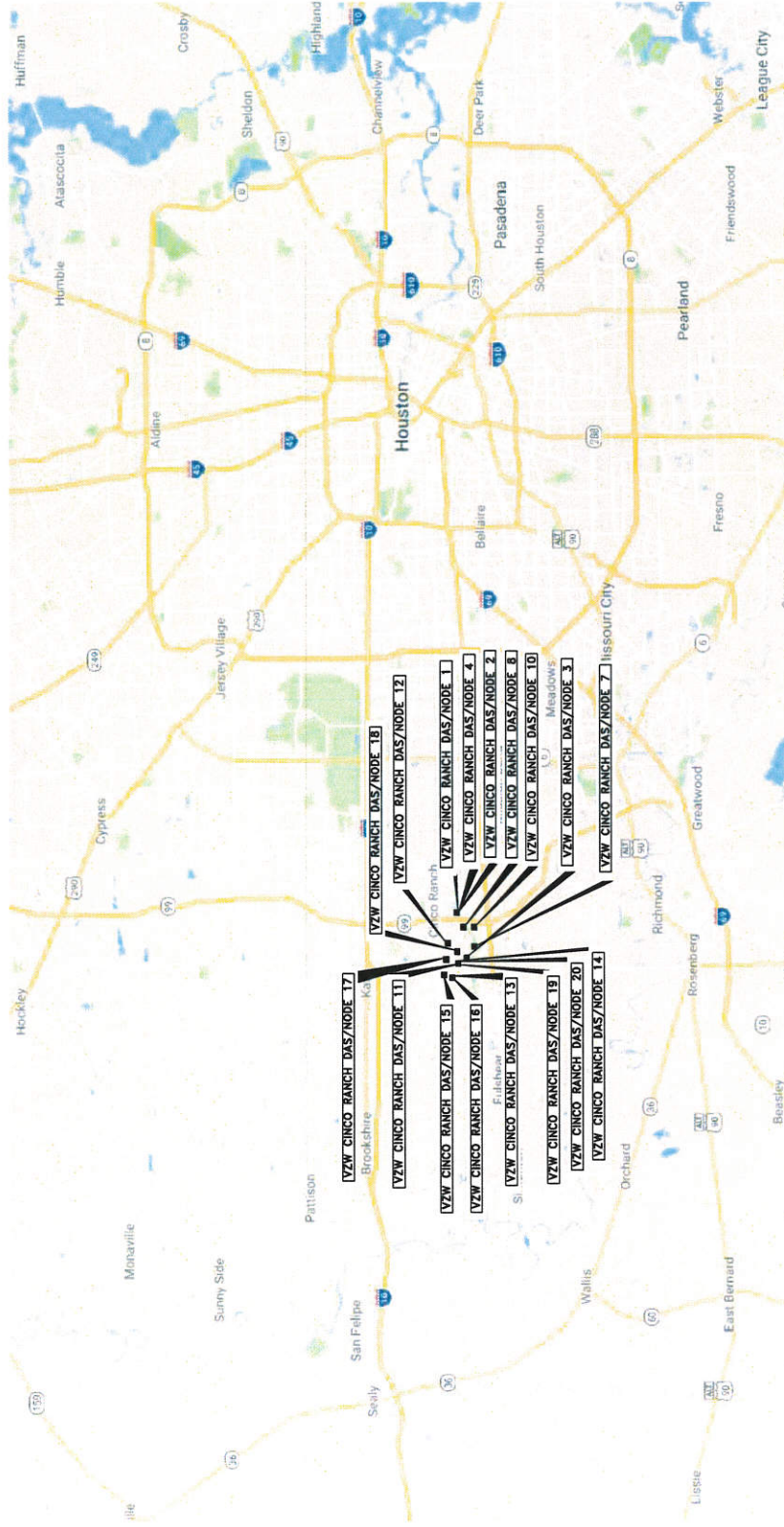
INTERNAL REVIEW
 Not intended for construction.
 Engineer: DANIEL C. WARD
 License No. 32802
 State of TEXAS
 11/20/2018

FORT BEND COUNTY

TELECOMMUNICATION	DATE
CITY ENGINEER	DATE

SHEET NO 1 OF 16 SHEETS

NO. SHEET NO.	CC NODE I.D.	SCU NO.	SPRINT NODE I.D.	LATITUDE	LONGITUDE	NEAREST ADDRESS	ZIP CODE
1	VZW Cinco Ranch DAS/Node12	409941	HO90XSS62	29.728380	-95.789440	Cinco Ranch Blvd & Heritage Grand Ln	77494
2	VZW Cinco Ranch DAS/Node2	409931	HO90XSU00	29.722200	-95.767760	22502 Oak Mist Ln	77494
3	VZW Cinco Ranch DAS/Node1	409930	HO90XST99	29.718967	-95.763267	Spring Walk Dr & Ivy Terrace Cir	77450
4	VZW Cinco Ranch DAS/Node4	409933	HO90XSU01	29.714380	-95.766700	22319 Bridgehaven Dr	77494
5	VZW Cinco Ranch DAS/Node15	409944	HO90XST35	29.728929	-95.812045	Evening Canyon Ln & Blackwood Bridge Ln	77494
6	VZW Cinco Ranch DAS/Node17	409946	HO90XST36	29.727290	-95.806960	Evening Canyon Ln & Willow Colony Ln	77494
7	CCR-016	409945	HO90XST21	29.725420	-95.817400	Spring Green Blvd & Briarlily Ln	77494
8	VZW Cinco Ranch DAS/Node13	409942	HO90XST34	29.724680	-95.812980	Blackwood Bridge Ln & Shady Walk Ln	77494
9	VZW Cinco Ranch DAS/Node20	409949	HO90XST38	29.722980	-95.807810	4903 Slate River Ln	77494
10	VZW Cinco Ranch DAS/Node14	409943	HO90XSS56	29.721719	-95.813370	26827 Sandy Arbor Ln	77494
11	VZW Cinco Ranch DAS/Node19	409948	HO90XSS44	29.720922	-95.806294	4910 Cadence Ct	77494
12	VZW Cinco Ranch DAS/Node18	409947	HO90XST37	29.719860	-95.799640	Gaston Rd. & Pointer Ridge Ln	77494
13	VZW Cinco Ranch DAS/Node11	409940	HO90XSS45	29.718380	-95.809560	26900 Cinco Ranch Blvd	77494
14	VZW Cinco Ranch DAS/Node8	409937	HO90XSO50	29.715860	-95.776210	6920 S Fry Rd	77494
15	VZW Cinco Ranch DAS/Node3	409932	HO90XST39	29.712240	-95.805409	8951 S Fry Rd	77494
16	VZW Cinco Ranch DAS/Node10	409939	HO90XST33	29.711980	-95.775470	23103 Tranquil Spring Ln	77494
17	VZW Cinco Ranch DAS/Node7	409936	HO90XST40	29.711070	-95.796460	6010 Dillon Creek	77494



NODE LOCATION MAP
N.T.S.

CobbRendley
13430 Northwest Freeway, Suite 1100
 Houston, Texas 77040
 713.462.3342 | Fax: 713.462.3301 | www.cobbrendley.com

GENERAL	DATE	REVISION	DATE	REVISION	DATE

GENERAL NODE LOCATION MAP

THIS DRAWING SHALL BE THE FINAL DRAWING SET OF RECORD.

FORT BEND COUNTY

TELEPHONE/NUMBER: _____ DATE: _____

FILE NO: _____

DRAWING SCALE: _____

WORK: _____

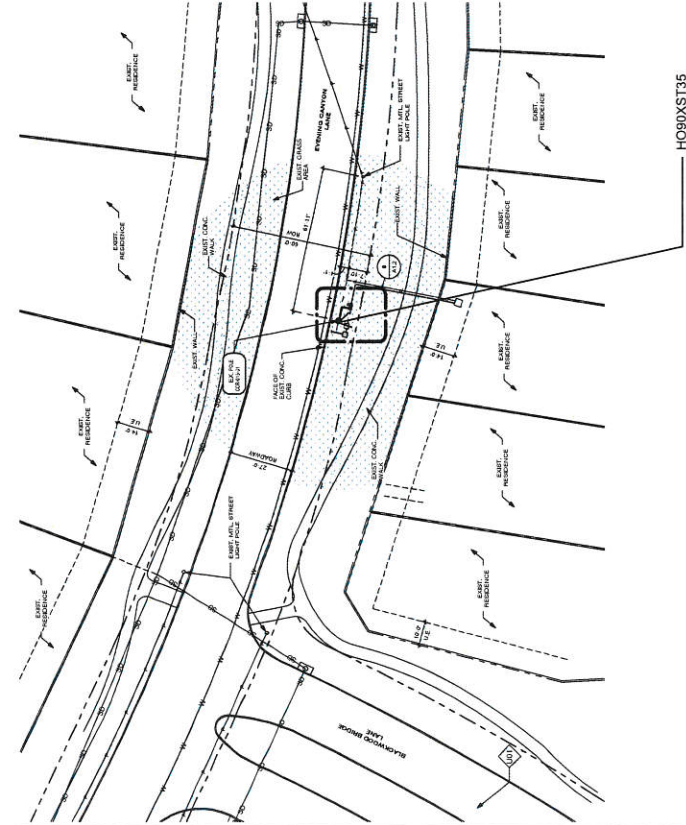
DATE: _____

SHEET No: 4 OF 16

REFER TO SHEET 4 OF THE APPROVED PLAN SET FOR ADDITIONAL NODE DETAILS.

NEAREST ADDRESS:
EVENING CANYON LN
AND BLACKWOOD
LN, HOUSTON,
TX 77484

LATITUDE:	28.72808
LONGITUDE:	-95.83206
POLE TYPE:	METAL SLIMLINE POLE
POLE ID #:	NA

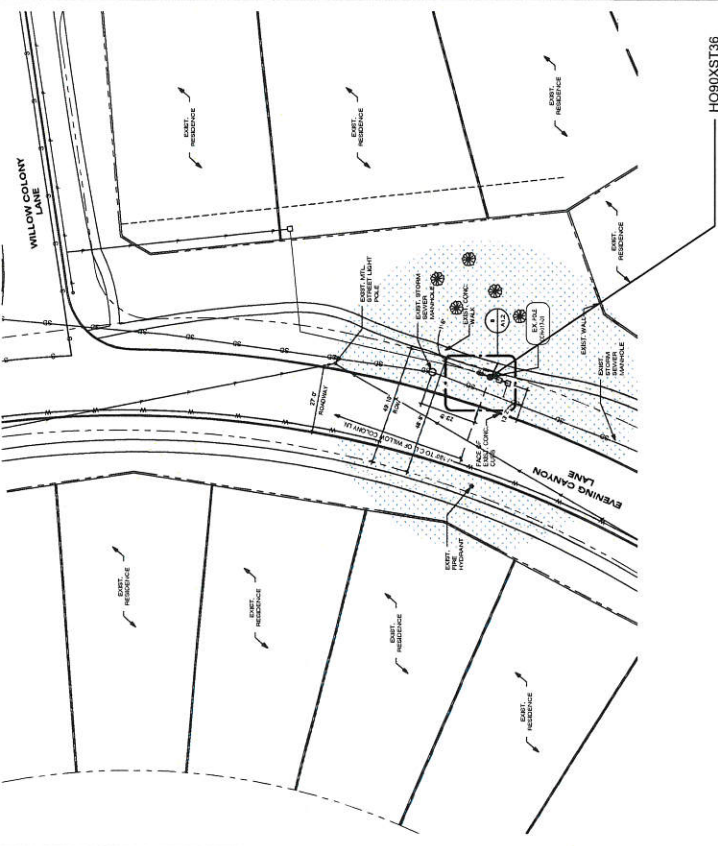


NODE ID: VZW CINCO RANCH DAS/NODE 15

REFER TO SHEET 4 OF THE APPROVED PLAN SET FOR ADDITIONAL NODE DETAILS.

NEAREST ADDRESS:
EVENING CANYON LN
AND WILLOW COLONY
LN, HOUSTON, TX
77484

LATITUDE:	28.77360
LONGITUDE:	-95.80980
POLE TYPE:	METAL SLIMLINE POLE
POLE ID #:	NA



NODE ID: VZW CINCO RANCH DAS/NODE 17

NOTES
1. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES AND RECORD THEM PRIOR TO PROJECT COMMENCEMENT.
2. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES AND RECORD THEM PRIOR TO PROJECT COMMENCEMENT.
3. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES AND RECORD THEM PRIOR TO PROJECT COMMENCEMENT.
4. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES AND RECORD THEM PRIOR TO PROJECT COMMENCEMENT.
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9. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES AND RECORD THEM PRIOR TO PROJECT COMMENCEMENT.
10. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES AND RECORD THEM PRIOR TO PROJECT COMMENCEMENT.

TREE NOTE
1. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES AND RECORD THEM PRIOR TO PROJECT COMMENCEMENT.
2. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES AND RECORD THEM PRIOR TO PROJECT COMMENCEMENT.
3. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES AND RECORD THEM PRIOR TO PROJECT COMMENCEMENT.
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10. CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES AND RECORD THEM PRIOR TO PROJECT COMMENCEMENT.



CobbFendley
13450 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.662.3342 | info@cobbfendley.com

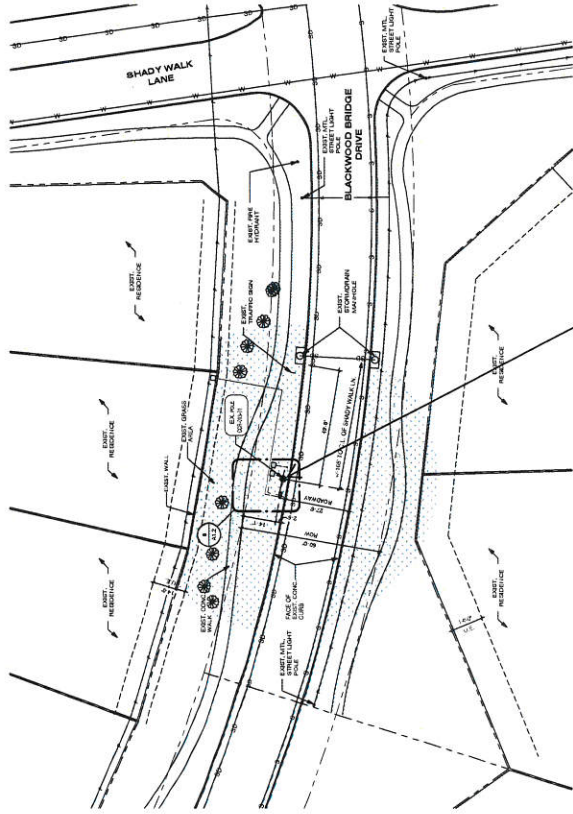
PLAN AND PROFILE
H090XST35 AND H090XST36
WITH 30' MINIMUM CLEARANCE FROM THE TOP OF EACH POLE END OF SERVICE
FORT BEND COUNTY

TELECOMMUNICATION	DATE
FILE NO.	
DRAWING SCALE	
HORIZ. :	
VERT. :	
SHEET	7 OF 16

LATITUDE:	29.74680
LONGITUDE:	-95.91986
POLE TYPE:	METAL SLIMLINE POLE
POLE ID #:	N/A

NEAREST ADDRESS:
BLACKWOOD BRIDGE
AND SHADY WALK
LANE HOUSTON,
TX 77494

REFER TO SHEET 4 OF THE
APPROVED PLAN SET FOR
ADDITIONAL NODE
DETAILS.



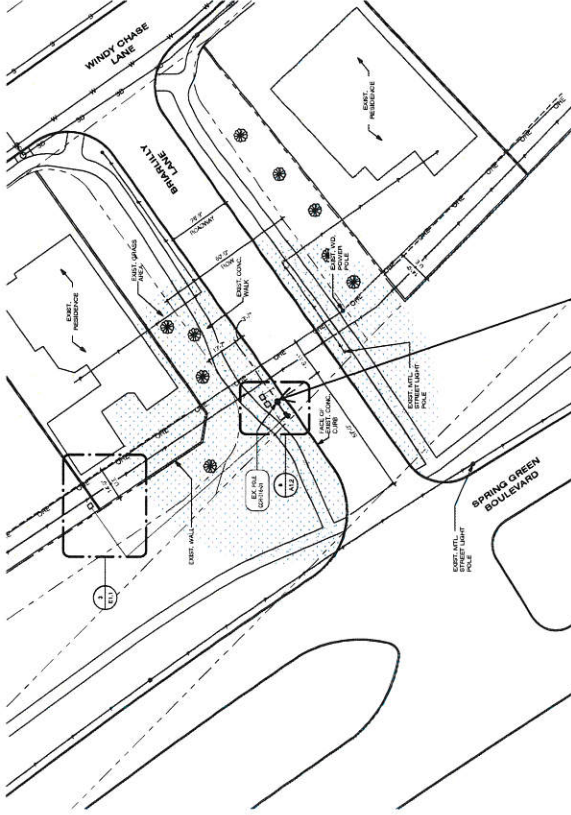
H090XST34
PROP. RADIO EQUIPMENT

NODE ID: VZW CINCO RANCH DAS/NODE 13

LATITUDE:	29.72540
LONGITUDE:	-95.81740
POLE TYPE:	METAL SLIMLINE POLE
POLE ID #:	N/A

NEAREST ADDRESS:
BRINLEY LANE
AND BRINLEY LN
HOUSTON, TX 77494

REFER TO SHEET 4 OF THE
APPROVED PLAN SET FOR
ADDITIONAL NODE
DETAILS.



H090XST21
PROP. RADIO EQUIPMENT

NODE ID: VZW CINCO RANCH DAS/NODE 16

NOTES:
CONTRACTOR SHALL REVERSE DETERMINED AREAS SHOWN
ON THIS DRAWING TO BE PROTECTED BY THE CONTRACTOR
PRIOR TO PROJECT COMMENCEMENT.
CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES AND
STRUCTURES AND UTILITIES WITHIN THE MAINTAINANCE
AREAS. CONTRACTOR SHALL BE RESPONSIBLE FOR THE
PROTECTION OF ALL UTILITIES AND STRUCTURES WITHIN
THE MAINTAINANCE AREAS. CONTRACTOR SHALL
NOTIFY THE ENGINEER.

TREE NOTE
RELOCATIONS AND REMOVALS OF TREES
SHOWN ON THIS DRAWING SHALL BE PERFORMED
IN ACCORDANCE WITH THE CITY OF HOUSTON
TREES, NO OPEN CUT
AND THE CITY OF HOUSTON TREE
REMOVAL PERMIT.



NO.	REVISION	DATE	DESCRIPTION

CobbFendley
13430 Northwest Freeway, Suite 1100
Houston, Texas 77040
713.462.3342 | Fax 713.462.3352 | www.cobbfendley.com

PLAN AND PROFILE
H090XST21 AND H090XST34

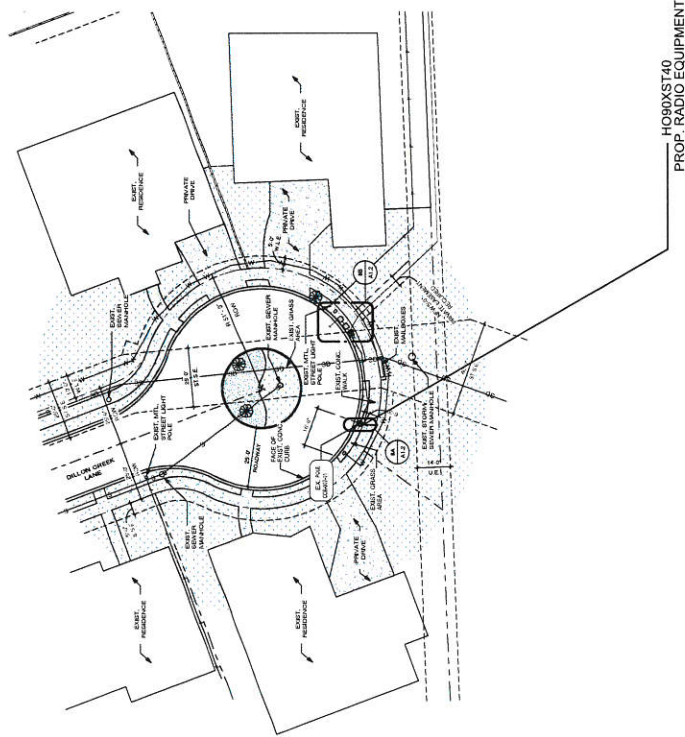
DATE OF REVISION: 08/01/2018
FORT BEND COUNTY

TELECOMMUNICATION	DATE
FILE NO.	
DRAWING SCALE	
HORIZ :	
VERT :	
SHEET	8 OF 16
No.	

REFER TO SHEET 4 OF THE
PROJECT FOR
ADDITIONAL NODE
DETAILS.

NEAREST ADDRESS:
DALLAS CREEK
HOUSTON, TX 77054

LATITUDE:	28°71'07"
LONGITUDE:	-95°06'46"
POLE TYPE:	METAL SUMMINE POLE
POLE ID #:	N/A



NODE ID: VZW CINCO RANCH DAS/NODE 7

NOTES:
 1. CONTRACTOR TO VERIFY ALL SURFACE UTILITIES PRIOR TO PROJECT COMMENCEMENT.
 2. CONTRACTOR TO VERIFY ALL SURFACE UTILITIES PRIOR TO PROJECT COMMENCEMENT.
 3. CONTRACTOR TO VERIFY ALL SURFACE UTILITIES PRIOR TO PROJECT COMMENCEMENT.
 4. CONTRACTOR TO VERIFY ALL SURFACE UTILITIES PRIOR TO PROJECT COMMENCEMENT.
 5. CONTRACTOR TO VERIFY ALL SURFACE UTILITIES PRIOR TO PROJECT COMMENCEMENT.
 6. CONTRACTOR TO VERIFY ALL SURFACE UTILITIES PRIOR TO PROJECT COMMENCEMENT.
 7. CONTRACTOR TO VERIFY ALL SURFACE UTILITIES PRIOR TO PROJECT COMMENCEMENT.
 8. CONTRACTOR TO VERIFY ALL SURFACE UTILITIES PRIOR TO PROJECT COMMENCEMENT.
 9. CONTRACTOR TO VERIFY ALL SURFACE UTILITIES PRIOR TO PROJECT COMMENCEMENT.
 10. CONTRACTOR TO VERIFY ALL SURFACE UTILITIES PRIOR TO PROJECT COMMENCEMENT.

TREE NOTE
 1. REEVALUATE NUMBER OF FEET OF TREES.
 2. REEVALUATE NUMBER OF FEET OF TREES.
 3. REEVALUATE NUMBER OF FEET OF TREES.
 4. REEVALUATE NUMBER OF FEET OF TREES.
 5. REEVALUATE NUMBER OF FEET OF TREES.



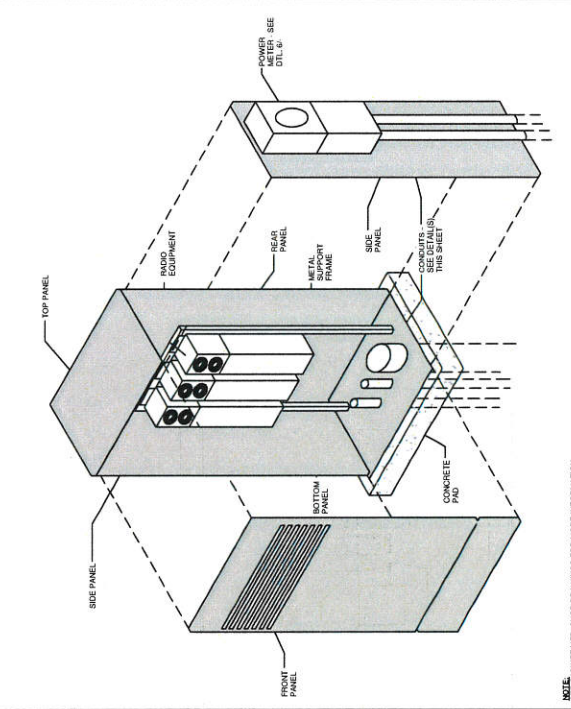
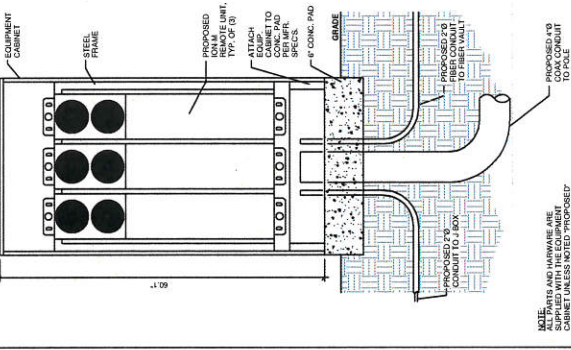
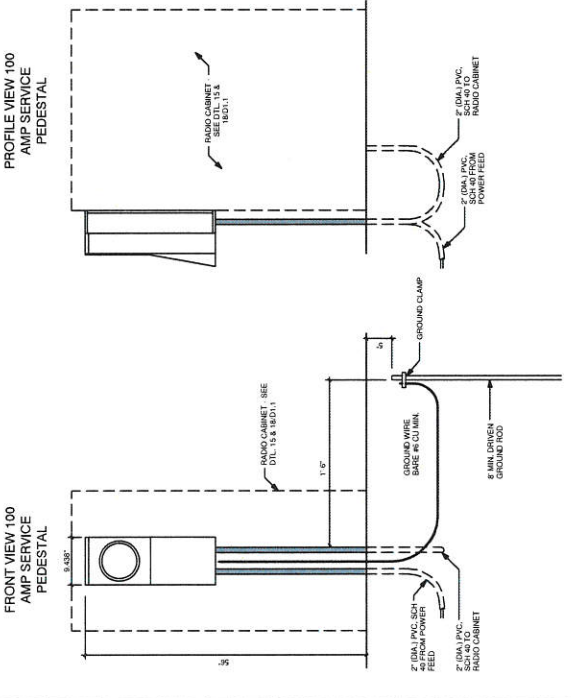
NO.	DESCRIPTION	DATE	BY

CobbFendley
 Texas Registration No. 274
 13430 Northwest Freeway, Suite 1100
 Houston, Texas 77040
 713.462.3242 | Fax 713.462.3252 | www.cobbhendley.com

PLAN AND PROFILE
 HOB09XST40

CITY OF HOUSTON
 HOUSTON PUBLIC WORKS

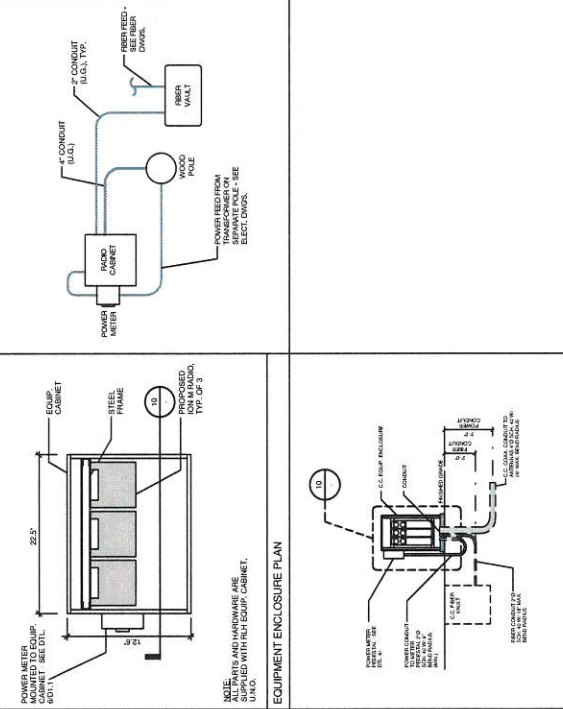
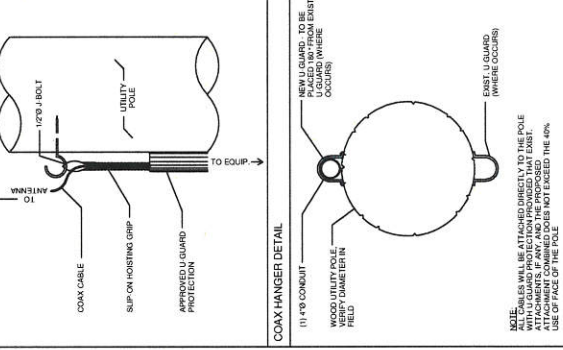
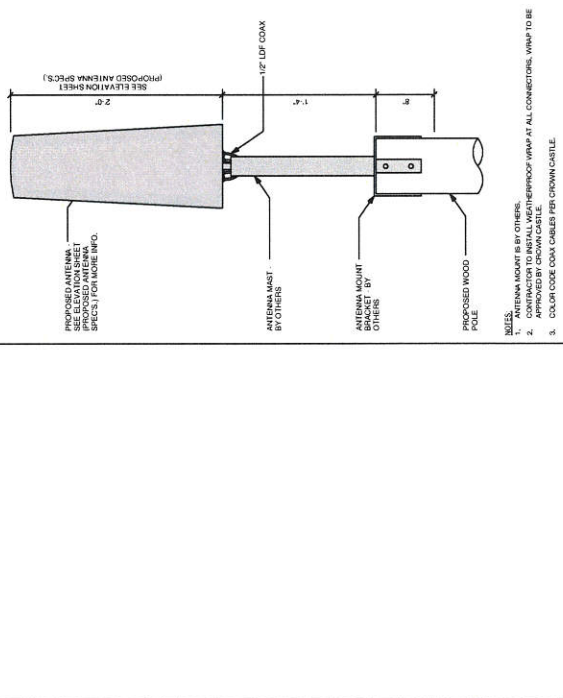
TELECOMMUNICATION	DATE
FILE NO.	FOR CITY OF HOUSTON USE ONLY
DRAWING SCALE	
HORIZ :	
VERT :	
SHEET	13 OF 16
NO.	



POWER METER - MOUNTED TO RADIO CABINET

EQUIPMENT CABINET SECTION

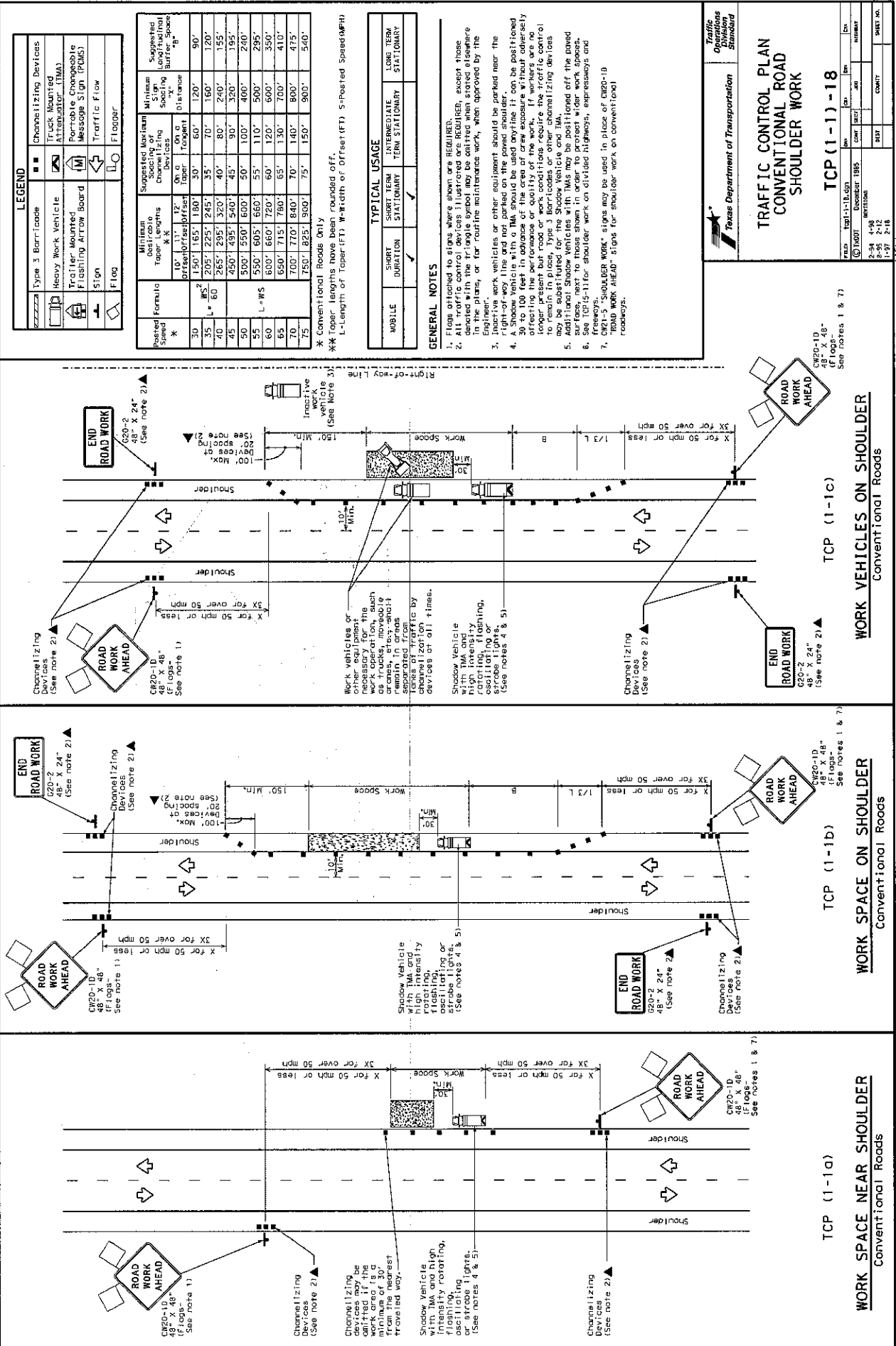
EQUIPMENT ENCLOSURE



ANTENNA MOUNTING DETAIL

COAX HANGER DETAIL

CONDUIT AND POWER RISER DIAGRAM



LEGEND

Channelizing Devices	Trucks Mounted Attenuator (TMA)
Heavy Work Vehicle	Portable Channelizing Message Sign (PCMS)
Trailer Mounted Flashing Arrow Board	Traffic Flow
Sign	Flagger

Posted Speed (MPH)	Formula	Minimum Sign Spacing (ft)	Suggested Location Channelizing Devices (ft)	Minimum Sign Spacing (ft)	Suggested Location Channelizing Devices (ft)	Recommended Longitudinal Buffer Space (ft)
35	$L = WS$	30	30'	120'	90'	120'
40	$L = WS$	30	30'	120'	120'	120'
45	$L = WS$	30	30'	120'	120'	120'
50	$L = WS$	30	30'	120'	120'	120'
55	$L = WS$	30	30'	120'	120'	120'
60	$L = WS$	30	30'	120'	120'	120'
65	$L = WS$	30	30'	120'	120'	120'
70	$L = WS$	30	30'	120'	120'	120'
75	$L = WS$	30	30'	120'	120'	120'

* Conventional Roads Only
** Taper Lengths have been rounded off.
L = Length of Taper (ft); W = Width of Offset (ft); S = Posted Speed (MPH)

GENERAL NOTES

- Flagger attached to sign shall always be required.
- All traffic control devices illustrated per REQUIRED, except those denoted with the triangle symbol may be omitted when stated otherwise in the plans, or for routine maintenance work, when approved by the Engineer.
- Right-of-way lines and other equipment should be marked near the work area.
- A shadow vehicle with a TMA should be used anytime it can be positioned offering the performance or quality of the work. If workers are no longer in the work area, the shadow vehicle should be positioned to control traffic in the plan. The TMA should be positioned off the paved surface, next to those shown in order to protect wider work spaces.
- Use of TMA's for shoulder work on divided highways, expressways and freeways.
- "ROAD WORK AHEAD" signs may be used in place of CW20-10 roadway.

TYPICAL USAGE

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

Texas Department of Transportation
Traffic Operations Standard

**TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK**

TCP (1-1) - 18

REV	DATE	BY	CHK
01	08/07	08/07	08/07
02	08/07	08/07	08/07
03	08/07	08/07	08/07
04	08/07	08/07	08/07
05	08/07	08/07	08/07
06	08/07	08/07	08/07
07	08/07	08/07	08/07
08	08/07	08/07	08/07
09	08/07	08/07	08/07
10	08/07	08/07	08/07
11	08/07	08/07	08/07
12	08/07	08/07	08/07
13	08/07	08/07	08/07
14	08/07	08/07	08/07
15	08/07	08/07	08/07
16	08/07	08/07	08/07
17	08/07	08/07	08/07
18	08/07	08/07	08/07

LEGEND

	Type 3 Barricade		Channelizing Devices
	Truck Mounted Attenuator (TMA)		Trucks Mounted Attenuator (TMA)
	Portable Changeable Message Sign (PCMS)		Traffic Flow
	Flashing Arrow Board		Flagger
	Sign		

Posted Speed Limit (mph)	Formula	Minimum Taper Lengths (ft)	Suggested Maximum Spacing of Channelizing Devices (ft)	Minimum Spacing of Channelizing Devices (ft)	Suggested Longitudinal Buffer Space (ft)
30	$M \leq 2$	150', 165', 180', 30'	30'	60'	90'
35	$L = 60$	205', 225', 245', 35'	35'	70'	120'
40		255', 285', 320', 40'	40'	80'	155'
45		430', 495', 540', 45'	45'	90'	195'
50		500', 550', 600', 50'	50'	100'	240'
55	$L = WS$	550', 605', 650', 55'	55'	110'	295'
60		600', 660', 720', 60'	60'	120'	350'
65		650', 715', 780', 65'	65'	130'	410'
70		700', 770', 840', 70'	70'	140'	475'
75		750', 825', 900', 75'	75'	150'	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 TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
✓	✓		

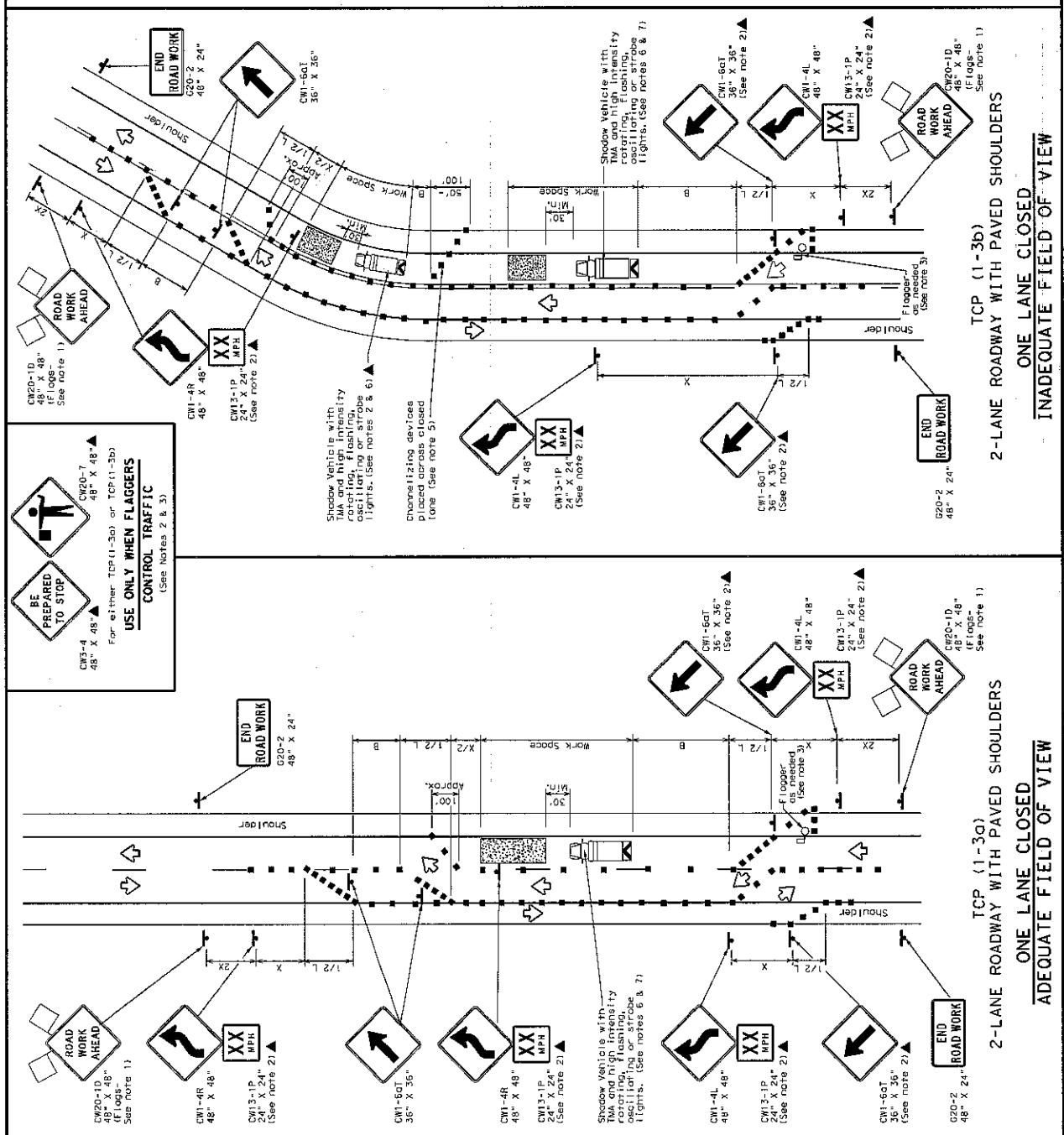
- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
 - Signs should be placed in the work zone, except those denoted with the triangle symbol which may be placed elsewhere in the zone, or for routine maintenance work, when approved by the Engineer.
 - Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis in advance of traffic queues to additional flaggers. Flaggers may be positioned in advance of traffic queues to additional flaggers. Flaggers may be positioned in advance of traffic queues to additional flaggers. Flaggers may be positioned in advance of traffic queues to additional flaggers.
 - DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD sign.
 - When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Channelizing devices should be placed every 1/2 to 1/2 mile in each area 500 to 1000 feet in length.
 - 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 Shadow Vehicle, it may be substituted for the Shadow Vehicle and TMA. Additional Shadow Vehicles with TMAs may be positioned off the paved surfaces, next to those shown in order to protect wider work spaces. When traffic is directed over a yellow centerline, channelizing devices should be placed every 1/2 mile in each area 500 to 1000 feet in length. If posted speed is 35 mph or slower, and for tangent sections at 1/25 where 5 is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

Texas Department of Transportation
 Traffic Operations Division Standards

TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON
TWO LANE ROADS

TCP (1-3)-18

DATE	12/15/18	BY	W. J. ...
REVISED	12/15/18	BY	W. J. ...
PROJECT NO.	1-37	COUNTY	...
SHEET NO.	2-18		



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

LEGEND

Channelizing Devices	Truck Mounted Attenuator (TMA)
Heavy Work Vehicle	Portable Changeable Message Sign (PCMS)
Trailer Mounted Flashing Arrow Board	Traffic Flow
Sign	Flopper
F flag	

Posted Speed μ	Formula	Minimum Taper Lengths X	Minimum Sign Spacing Y	Minimum Buffer Space Z	Maximum Length L
30	WS^2	11'	12'	10'	30'
35		130'	165'	180'	30'
40		205'	225'	245'	35'
45		265'	295'	320'	40'
50		450'	495'	540'	45'
55		550'	605'	660'	50'
60		600'	660'	720'	60'
65		700'	770'	840'	70'
70		750'	825'	900'	75'
75					150'
80					180'
85					210'
90					240'
95					270'
100					300'

* 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

- Floppers attached to signs where shown are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, specifications, or contract documents, when approved by the Engineer.
- The CW20-1D "ROAD WORK AHEAD" sign shall be used in lieu of the standard sign where the visibility of the work zone is less than 1500 feet.
- 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 in the work zone, the Shadow Vehicle with TMA should be substituted in place of the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to these shown in order to protect wider work spaces.

TCP (1-4a)

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

TCP (1-4b)

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 lighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

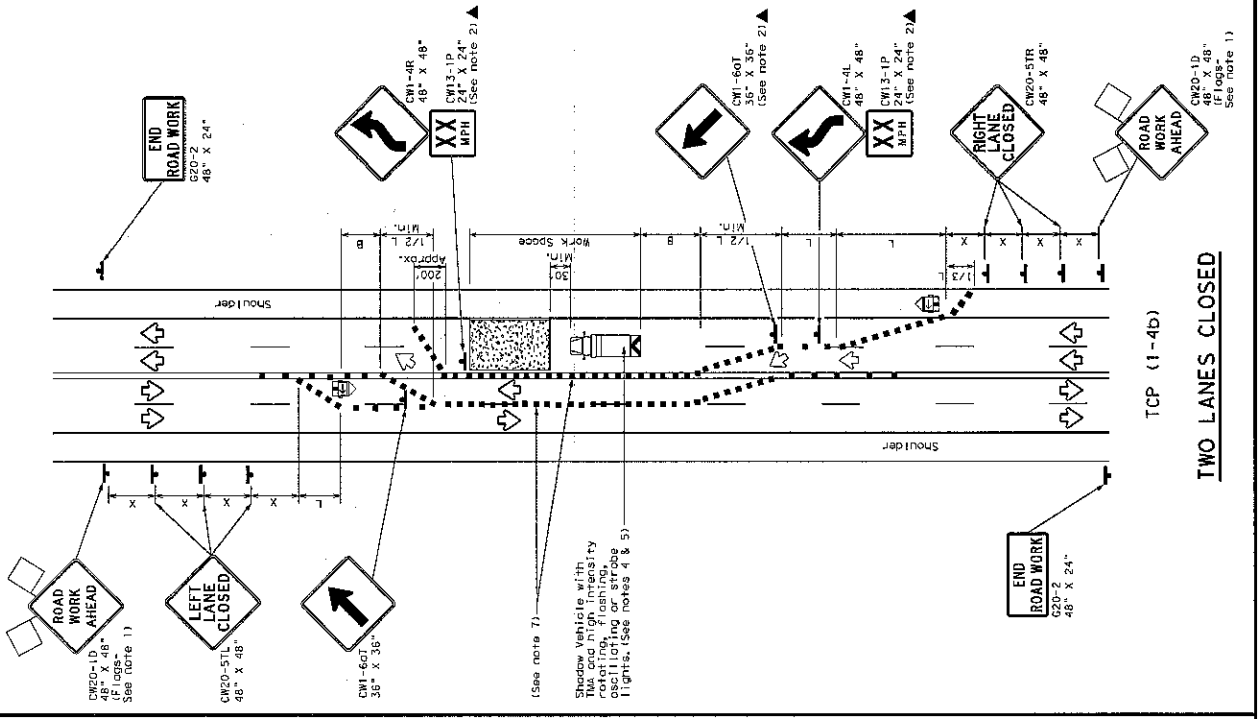
Texas Department of Transportation
 Traffic Operations Division
 Standard

**TRAFFIC CONTROL PLAN
 LANE CLOSURES ON MULTILANE
 CONVENTIONAL ROADS**

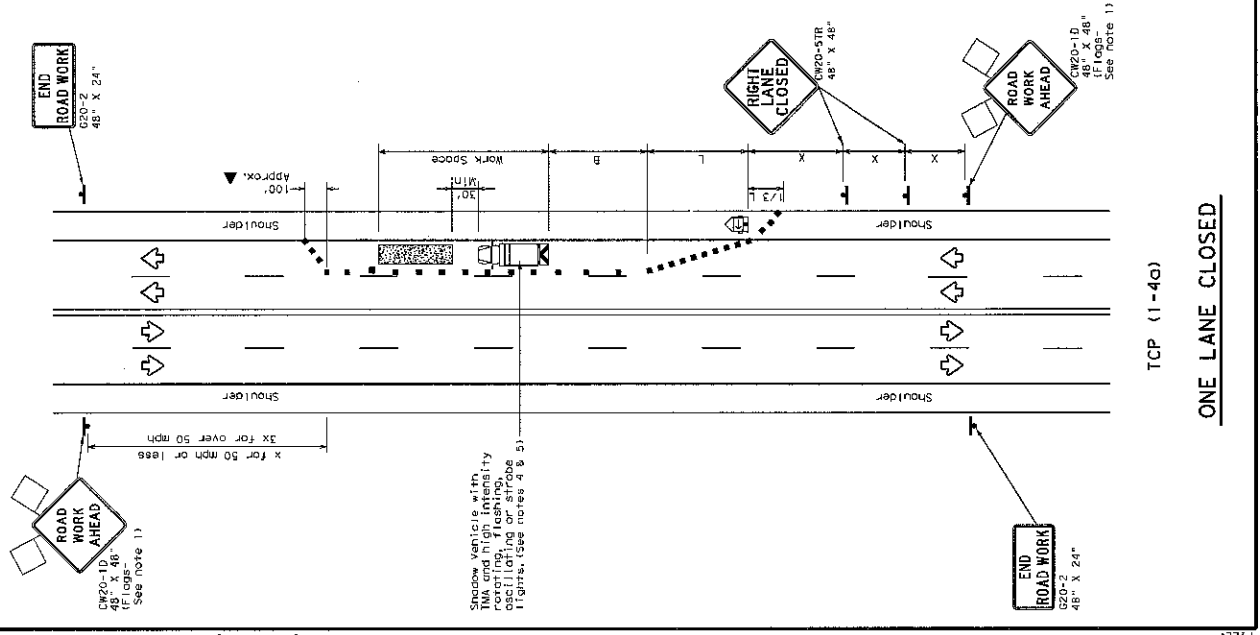
TCP (1-4) -18

FILE	1820-1-18-483	REV	10/1
DATE	10/1/00	DESIGNED BY	ALBANY
PROJECT	2-34	CHECKED BY	ON
REVISION	8-95 2-12	BY	COUNTY
	1-97 2-18		

151



TCP (1-4b)
TWO LANES CLOSED



TCP (1-4a)
ONE LANE CLOSED

LEGEND

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

Proposed Speed *	Minimum Taper Lengths X x X	Suggested Maximum Spacing of Channelizing Devices	Minimum Spacing of Channelizing Devices	Suggested Maximum Spacing of Channelizing Devices	Minimum Longitudinal Buffer Space
35	L=MS ²	150' 165' 180' 30'	60'	120'	90'
40	L=MS ²	205' 225' 245' 35'	70'	160'	120'
45	L=MS ²	265' 295' 320' 40'	80'	240'	155'
50	L=MS ²	450' 495' 540' 45'	90'	320'	195'
55	L=MS ²	500' 550' 600' 50'	100'	400'	240'
60	L=MS ²	550' 605' 660' 55'	110'	500'	295'
65	L=MS ²	600' 660' 720' 60'	120'	600'	350'
70	L=MS ²	650' 715' 780' 65'	130'	700'	410'
75	L=MS ²	700' 770' 840' 70'	140'	800'	475'
	L=MS ²	750' 825' 900' 75'	150'	900'	540'

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

TYPICAL USAGE

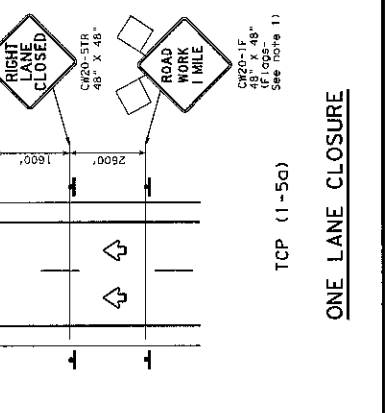
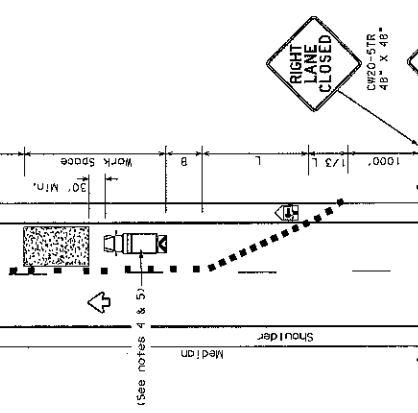
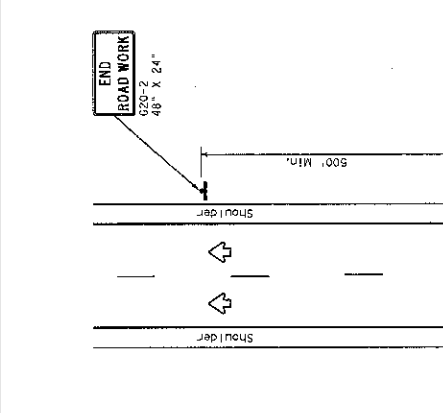
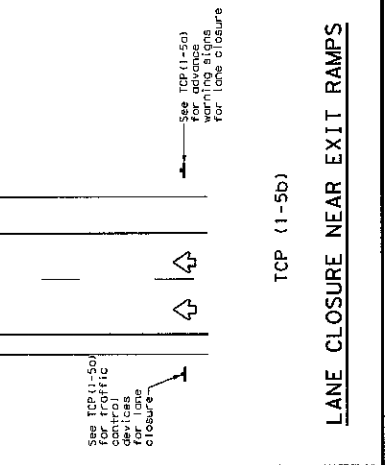
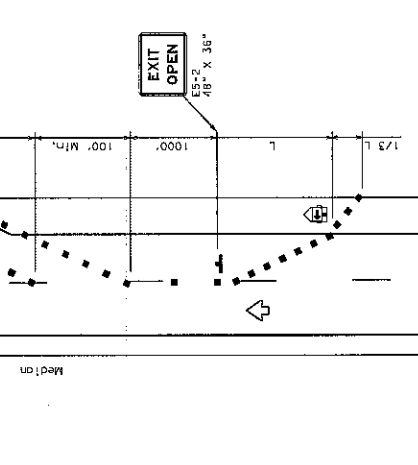
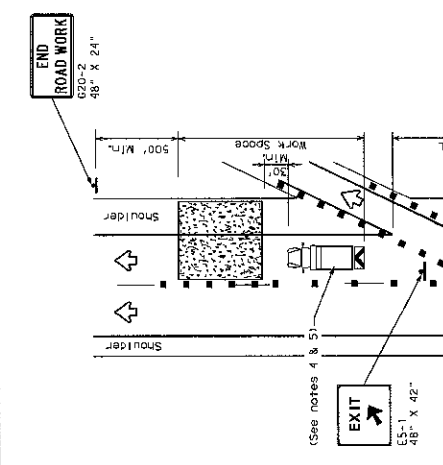
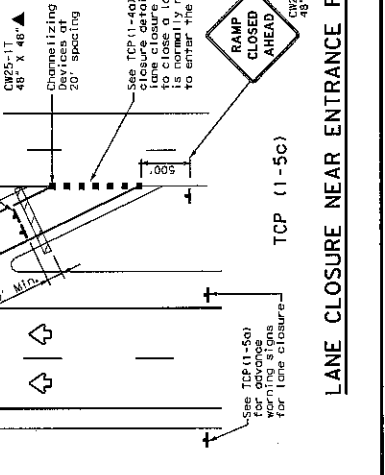
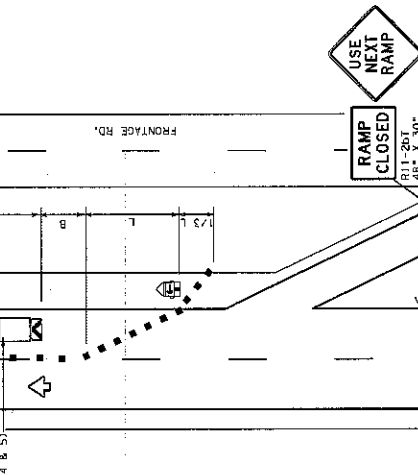
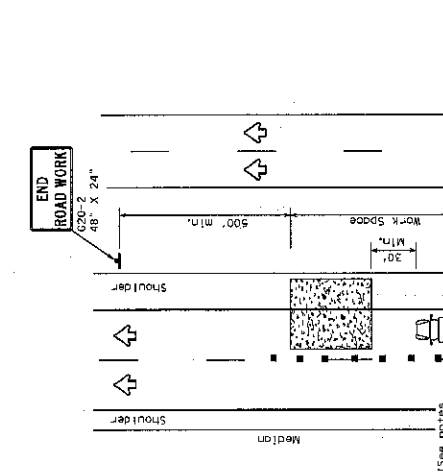
MOBILE	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY

GENERAL NOTES

- Flares 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.
- Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelized device. Chevrons may be attached to plastic drums as per BC Standards.
- Shadow vehicles with TMA and high intensity flashing, flashing, or flashing arrow boards may be used to supplement channelizing devices. They should be used only if it can be positioned 30 to 100 feet in advance of the work area 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 Shadow vehicles with TMA may be substituted for the channelizing devices.
- Additional Shadow vehicles with TMA may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation
TRAFFIC CONTROL PLAN
LANE CLOSURES FOR
DIVIDED HIGHWAYS
TCP (1-5)-18

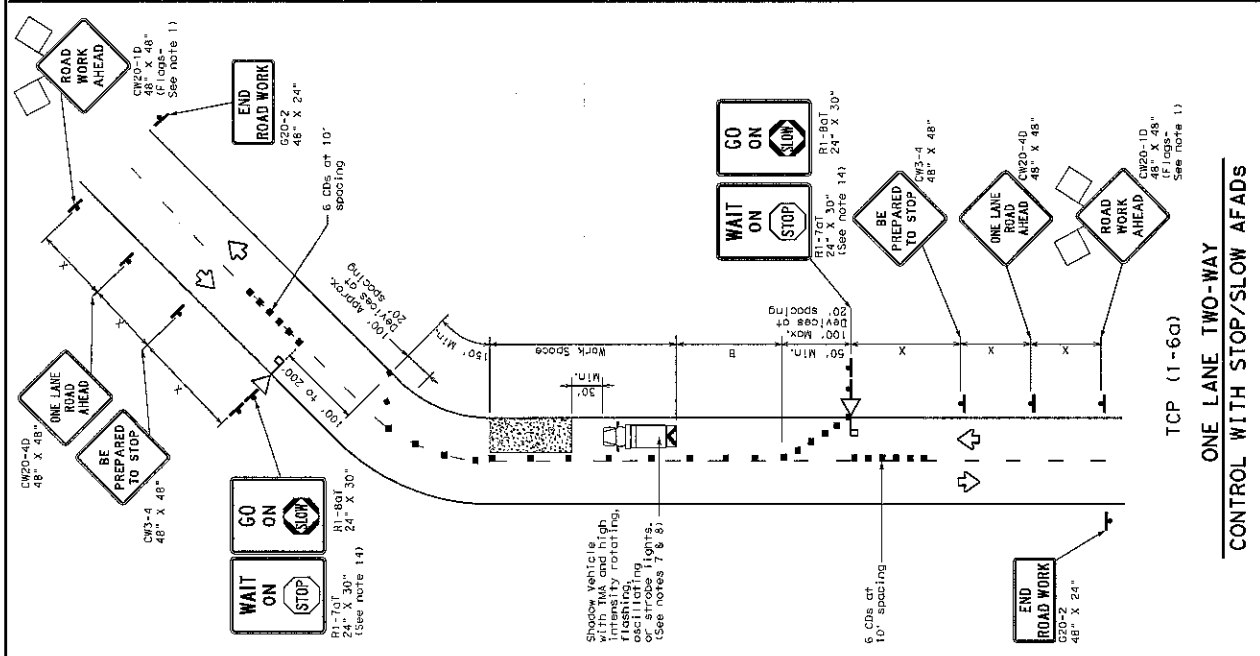
DATE: 01/01/2012 PROJECT: 2-18 SHEET NO. 18



LANE CLOSURE NEAR ENTRANCE RAMP

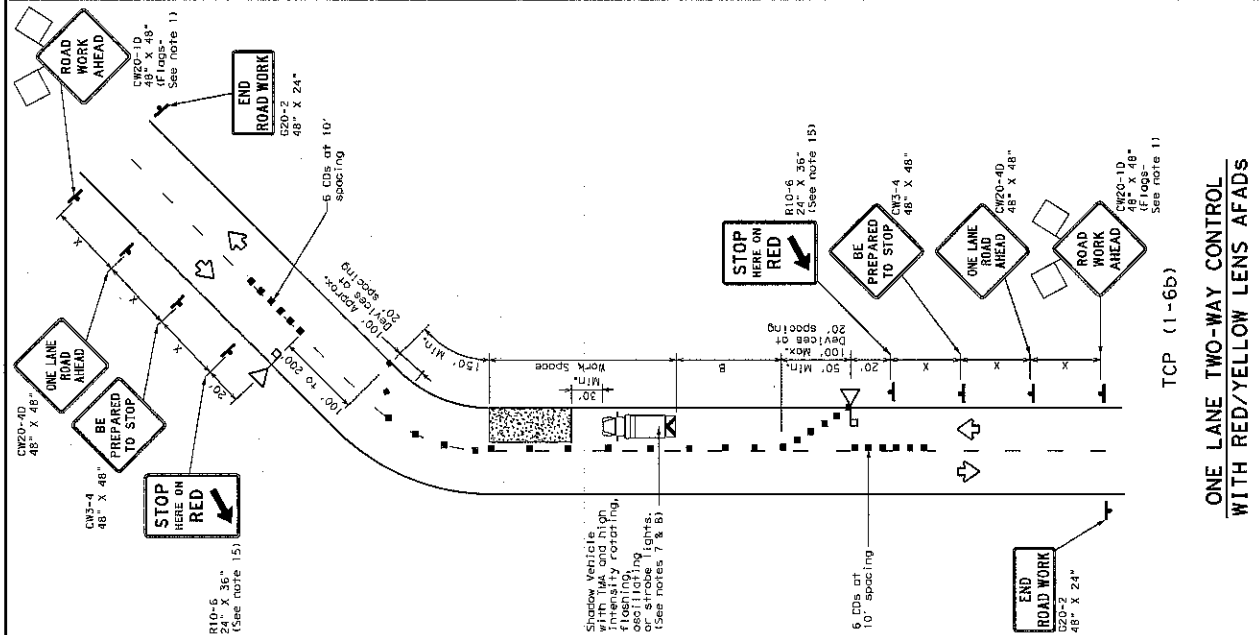
LANE CLOSURE NEAR EXIT RAMP

ONE LANE CLOSURE



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)	▣	Portable Changeable Message Sign (PCMS)
▣	Sign	▣	Traffic Flow
▣	Flag	▣	Flagger

Posted Speed *	Formula	Minimum Taper Lengths X X X	Suggested Maximum Spacing of Channelizing Devices	Minimum Sign Spacing	Suggested Spacing of Buffer Spacing
30	L=60	150' 185' 180'	30'	60'	90'
35	L=60	205' 225' 245'	35'	70'	120'
40	L=60	265' 295' 320'	40'	80'	160'
45	L=60	480' 495' 540'	45'	90'	200'
50	L=60	500' 550' 600'	50'	100'	250'
55	L=60	550' 605' 650'	55'	110'	305'
60	L=60	600' 660' 720'	60'	120'	360'
65	L=60	650' 715' 780'	65'	130'	425'
70	L=60	700' 770' 840'	70'	140'	495'
75	L=60	750' 825' 900'	75'	150'	570'

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper; FT=Width of Offset; FT=5-Posted Speed(MPH)

TYPICAL USAGE

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

GENERAL NOTES

- Flags attached to signs where shown are REQUIRED.
- AFADs shall only be used in situations where there is one lane of approaching traffic in the direction to be controlled.
- Minimum sight distances must be provided to each AFAD location for approaching traffic. (See table above)
- Each AFAD shall be operated by a qualified/certified flagger. Flaggers operating AFADs shall not leave their unattended while they are in use.
- The flagger may operate two AFADs only when the flagger has an unobstructed view of approach. AFADs shall not be operated by the pilot car operator.
- When pilot cars are used for flagger control, the pilot car shall be located on each approach. 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.
- When a truck with a TMA would be used to control traffic, the TMA shall be placed to the left of the work zone or at the end of the work zone. The TMA shall be placed to the left of the work zone or at the end of the work zone.
- 100 feet of cones or other traffic control devices shall be placed at the end of the work zone. The cones or other traffic control devices shall be placed at the end of the work zone.
- Other channelizing devices may be substituted for the shadow vehicle and TMA.
- When a shadow vehicle with TMA and high intensity rotating flashing lights or strobe lights is used, it shall be positioned off the paved surface, next to the work zone.
- Length of work space should be based on the ability of flaggers to communicate.
- 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.
- When a shadow vehicle with TMA and high intensity rotating flashing lights or strobe lights is used, it shall be positioned off the paved surface, next to the work zone.
- The R1-76T "WAIT ON STOP" sign and the R1-90T "GO ON SLOW" sign shall be installed on the AFAD location on separate supports or they may be fabricated as one sign. They shall not obscure the face of the STOP/SLOW AFAD.
- When a shadow vehicle with TMA and high intensity rotating flashing lights or strobe lights is used, it shall be positioned off the paved surface, next to the work zone.

Texas Department of Transportation

TRAFFIC CONTROL PLAN

AUTOMATED FLAGGER ASSISTANCE DEVICES (AFADs)

TCP (1-6) - 18

DATE	10/14/10	REV	01	BY	JKM
PROJECT	14001	EMPLOYEE	2012	REVISED	
SHEET NO.	2-18	COUNTY			