CITY OF EL PASO, TEXAS
AGENDA ITEM
DEPARTMENT HEAD'S SUMMARY FORM

DEPARTMENT: Streets and Maintenance

AGENDA DATE: August 9, 2016

CONTACT PERSON/PHONE: Ted Marquez, Director, Streets and Maintenance (915) 212-0151

DISTRICT(S) AFFECTED: 8

STRATEGIC GOAL: **No. 7: Enhance and Sustain El Paso's Infrastructure Network**

SUBJECT:
The City Manager be authorized to execute a Traffic Signal Maintenance Agreement ("Agreement") between CSM Realty Holdings, LTD., and the City of El Paso for the maintenance of median opening and improvements and new traffic signal all located at the intersection of State Highway 20 (Mesa Street) and Champions Circle ("Project"). Further, that the Director of Streets and Maintenance Department is authorized to accept the Project once it is completed in accordance to the terms of the Agreement.

BACKGROUND / DISCUSSION:
A request was made by the developer to Streets and Maintenance (SAM) for the acceptance of the maintenance of median opening and improvements and new traffic signal all located at the intersection of State Highway 20 (Mesa Street) and Champions Circle ("Project").

SELECTION SUMMARY:
N/A

PRIOR COUNCIL ACTION:
N/A

AMOUNT AND SOURCE OF FUNDING:
Account No: N/A
Funding Source: N/A
Amount: N/A

BOARD / COMMISSION ACTION:
N/A

**********REQUIRED AUTHORIZATION**********

DEPARTMENT HEAD: _____
Ted Marquez, P.E., Director, Streets and Maintenance

RESOLUTION

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF EL PASO:

That the City Manager is authorized to execute a Traffic Signal Maintenance Agreement ("Agreement") between CSM Realty Holdings, LTD., and the City of El Paso for the maintenance of median opening and improvements and new traffic signal all located at the intersection of State Highway 20 (Mesa Street) and Champions Circle ("Project").

Further, that the Director of Streets and Maintenance Department is authorized to accept the Project once it is completed in accordance to the terms of the Agreement.

PASSED AND APPROVED THIS ____ DAY OF JULY 2016.

CITY OF EL PASO

_____
Tomás González, City Manager

ATTEST:

_____
Richarda Duffy Momsen
City Clerk

APPROVED AS TO FORM:

_____
Omar A. De La Rosa
Assistant City Attorney

APPROVED AS TO CONTENT:

_____
Ted Marquez, Director
Streets and Maintenance Department

STATE OF TEXAS)
)
)
COUNTY OF EL PASO)

TRAFFIC SIGNAL MAINTENANCE AGREEMENT

This Traffic Signal Maintenance Agreement ("Agreement") is made this _____ day of _____, 2016, by and between the **CITY OF EL PASO**, hereinafter referred to as the "City", and **CSM REALTY HOLDINGS, LTD.,** a Texas limited partnership, hereinafter referred to as the "Developer."

WITNESSETH:

WHEREAS, Developer, in conjunction with its design and construction of a mixed use property (the "Development"), desires to design and construct a median opening and improvements, and a new traffic signal on State Highway 20 (Mesa Street) at the intersection of Mesa Street and Champions Circle (the "Project");

WHEREAS, Developer shall be responsible for 100% of the cost of the Project;

WHEREAS, the Project will improve the safety of drivers and pedestrians in this area of the development by providing a traffic signal controlled intersection and left turning medians and this development will be an economic benefit to local tax payers; and

WHEREAS, Developer and the City agree that Developer shall, within the right-of-way of State Highway 20 (Mesa Street), design and construct a median opening and improvements, and a traffic signal.

NOW, THEREFORE, in consideration of the promises and of the mutual covenants and agreements of the parties hereto, the City and Developer do agree as follows:

I
Scope of Project

The "Project" is defined as:

1) Design and construction of a median opening and improvements, and a traffic signal within the right-of-way of State Highway 20 (Mesa Street) in the vicinity of the intersection of Mesa Street and Champions Circle pursuant to the construction Drawings, Plans and Specifications attached hereto as **Attachment "A"** and incorporated herein by reference for all purposes and hereinafter referred to as the "Plans". Construction and design plans shall be processed in accordance with the subdivision process established pursuant to the El Paso City Code Chapter 19.08. All work and construction shall comply with the City of El Paso Design Standards for Construction.

II
Term

This Agreement becomes effective and binding and enforceable against the parties upon approval by the City Council for the City of El Paso (the "Effective Date").

All Project construction shall be completed by Developer within one hundred eighty days (180) from the Effective Date of this Agreement unless otherwise extended by written amendment and approval by the City.

It is hereby understood and mutually agreed, by Developer and the City that the date of beginning and the time for completion of the Project are **ESSENTIAL CONDITIONS** in this Agreement.

III
Funding

Developer understands and agrees that Developer will be responsible for all costs associated with the Project and this Agreement. Developer shall not request reimbursement from the City, nor shall Developer be eligible for reimbursement from the City for any improvements under this Agreement. The estimated cost for this Project is as shown in **Attachment "B"** attached and incorporated herein by reference for all purposes, such amount being **SIX HUNDRED FOURTEEN THOUSAND ONE HUNDRED AND NO/100 DOLLARS ($614,100.00).**

IV
Responsibilities of Developer

(1) Developer shall construct the Project the subject of this Agreement pursuant to the terms and conditions specified herein and pursuant to the Plans attached hereto as **Attachment "A"**. Developer further agrees that it shall be solely responsible for payment of any and all costs for design and construction of the Project.

(2) In constructing the Project, Developer shall comply with all applicable federal, state and local law including all City ordinances, codes and regulations. Failure to do so in any manner shall constitute a material breach of this Agreement. In addition, Developer shall obtain all permits and inspections required by the City and be responsible for any costs associated with obtaining such permits and inspections, including but not limited to, Traffic Control Plan Permit and Landscape and Irrigation Permit.

(3) Developer shall not commence construction of the Project without receiving the written approval by the City Streets and Maintenance Department, the Capital Improvement Department and the Texas Department of Transportation (TxDOT) of the design, materials, and construction plans, which approval shall not be unreasonably withheld or delayed. The cost of any required re-design and/or change order during construction shall be borne by Developer.

(4) Any work performed by a contractor or consultant of Developer will not, under any circumstances, relieve Developer of its responsibilities and obligations under this Agreement. All work performed by Developer or its agent shall be done in a good and workmanlike manner satisfactory to the City, in its reasonable discretion. Any contractor or consultant hired by Developer shall be approved by the City and have sufficient skills and experience to properly perform the work described in the Plans and shall provide adequate supervision to assure competent performance of the work.

(5) Developer agrees that all construction and materials shall be subject to inspection and approval by the City. All Project materials must conform to the Plans and are subject to quality control testing by the City at Developer's sole cost and expense.

(6) Additionally, Developer shall provide all traffic control for construction. Developer agrees to provide adequate traffic controls designed to cause minimum inconvenience to motorists, pedestrians and adjacent property owners. At least seventy-two (72) hours prior to the start of construction Developer shall submit a traffic control plan to both TxDOT and the Streets and Maintenance Department for approval. Additionally, Developer is responsible for obtaining any necessary approvals required by TxDOT for performing work within the TxDOT right-of-way.

(7) Developer agrees that construction of the Project shall be pursued regularly, diligently, and uninterrupted at such a rate of progress as shall ensure completion of the Project within the time specified. It is expressly understood and agreed, by Developer and the City, that the time for the completion of the Project is a reasonable time for completion.

(8) The Project shall be completed and accepted by the City for operation and maintenance in accordance with this Agreement within one hundred eighty (180) days following the Effective Date of this Agreement, unless otherwise extended by written amendment and approval by the City, subject to delays by reason of Force Majeure. It is hereby understood and mutually agreed by Developer and the City that the date of beginning and the time for completion of the Project are **ESSENTIAL CONDITIONS** in this Agreement. **It is further mutually understood and agreed that the construction on the Project shall begin promptly following the Plan approval and communicated notice of that approval to Developer.** The City Manager is authorized to approve any amendments required under this paragraph, provided that such amendments do not require the City to participate in the costs of the Project. The term "Force Majeure" means an event that causes delay by reason of an act of God, fire, windstorm, flood, explosion, collapse of structure or other casualty, epidemic, infectious disease, riot, war, terrorism, military power, labor disputes, failure of utility service, court order, inability to obtain materials, adverse weather that is unusual and unanticipated for the period of time, or an act of like nature that is beyond the reasonable control of such party.

(9) Contractor will utilize the City of El Paso specifications when selecting traffic signal equipment for the installation at this intersection. All equipment will be subject to inspection and testing by the City of El Paso Streets and Maintenance Department.

(10) The City of El Paso will provide traffic signal phasing, timing and coordination setting to be installed in the equipment by Developer's Contractor. The City of El Paso will inspect the installation and settings prior to the traffic signal being placed in normal operation.

(11) Developer agrees to warrant to the City that all work in connection with the Project shall be performed in a good and workmanlike manner, strictly in accordance with the Plans, and as otherwise provided in this Agreement. Developer shall warrant the Project for a period of one year for defective material, construction or workmanship following acceptance by the City of the Project and shall provide a maintenance bond in the amount of fifty percent (50%) of the costs of the Project for such period. This warranty shall remain in full force and effect for a

period of one (1) year from and after the date of the City's final acceptance of the Project. It is understood and agreed that, notwithstanding the acceptance of the Project by the City, Developer remains fully responsible for the repair and maintenance of the Project as such relates to Developer's warranty of the Project, as set forth above, for a period of one (1) year from the date of the City's acceptance of the Project.

(12) **If Developer shall neglect, fail or refuse to complete the construction of the Project within the time herein specified, subject to delays by reason of Force Majeure, or any extension granted by the City, or to maintain the Project until inspected and accepted for maintenance by the City as specified in Article II hereof, and such neglect, failure or refusal to substantially complete or maintain the Project results in any safety issue to persons or property as reasonably identified by the Traffic Engineer or his designee, Developer agrees that the City may issue a stop work order for any work in progress under any issued building permit for the Project, and Developer waives any and all causes of action it may have against the City arising from the City's stop work order. Additionally, Developer will defend, indemnify and hold the City harmless from any and all causes of action any third party may have against the City arising from the City's stop work order.**

(13) All of Developer's books and other records related to the Project shall be available for inspection by the City.

V
Bond Required

Developer agrees to execute performance and payment bonds for one hundred percent (100%) of the Project costs to secure fulfillment of all of Developer's obligations under this Agreement. The bond will be in a form approved by the City. The bond must be executed by a corporate surety in accordance with Texas Government Code, Chapter 2253. The bond shall identify the City as Owner and Obligee and shall bind both Developer and the Surety, their heirs, administrators, executors, successors and assignees, jointly and severally. The bonds shall expressly provide that Developer shall faithfully render performance under this Agreement and shall remain in full force and effect until all requirements of this Agreement have been performed to the City's satisfaction. The Bonds shall be provided to the Director of the Streets and Maintenance Department prior to the date this Agreement is approved by the City Manager.

VI
Insurance

Developer agrees to procure and shall maintain during the life of this Agreement, Commercial General Liability, Property Damage Liability and Automobile Liability Insurance to protect Developer and Developer's employees performing work covered by this Agreement, and the City, from claims for damages for personal injury, including accidental death, as well as from claims for property damages, which may arise from operations under this contract, whether such operations be by Developer or by anyone directly or indirectly employed by Developer. The minimum limits of liability and coverages shall be as follows:

a) **COMMERCIAL GENERAL LIABILITY**

Personal Injury or Death
$1,000,000.00 for one person or occurrence
$2,000,000.00 for two or more persons or occurrences

Property Damage
$1,000,000.00 per occurrence

General Aggregate
$2,000,000.00

b) **AUTOMOBILE LIABILITY**
Combined Single Limit
$1,000,000.00 per accident

The insurance policies shall include endorsements that the City is named as an additional insured to the full amount of the policy limits and that the City shall be notified at least thirty days in advance in the event the policy or policies are canceled and ten days in advance for non-payment of policy premiums. The thirty day notice of cancellation endorsement shall contain substantially the following statement: "The insurance included within this policy shall not be cancelled or materially altered except after thirty (30) consecutive calendar days [ten (10) consecutive calendar days for non-payment of policy premiums] written notice by certified mail of intent to cancel or materially alter said insurance has been provided to the City of El Paso [additional insured]." Such insurance policy shall be issued by an insurance company duly authorized to do business in the State of Texas. Developer shall furnish the Director of the Streets and Maintenance Department with certificates showing the type of insurance coverages, limits on each insurance policy, class of operations covered under each insurance policy, effective dates and expiration dates of policies, insurance companies providing the insurance coverages, name of agent/broker and include confirmation of any endorsement(s) required in this Agreement.

All certificates shall be provided to the Director of the Streets and Maintenance Department prior to the date this Agreement is approved by City Manager. All certificates shall also include the name of the Project on the corresponding insurance certificate.

VII
Indemnification

Developer or its insurer shall INDEMNIFY, DEFEND AND HOLD the City, its officers, agents and employees, HARMLESS FOR AND AGAINST ANY AND ALL CLAIMS, CAUSES OF ACTION, LIABILITY, DAMAGES OR EXPENSE, (INCLUDING BUT NOT LIMITED TO ATTORNEY FEES AND COSTS) FOR ANY DAMAGE TO OR LOSS OF ANY PROPERTY, OR ANY ILLNESS, INJURY, PHYSICAL OR MENTAL IMPAIRMENT, LOSS OF SERVICES, OR DEATH TO ANY PERSON ARISING OUT OF OR RELATED TO THE CONSTRUCTION, OWNERSHIP AND OPERATION OF THE PROJECT OTHER THAN THE ACTIONS OF THE CITY AND/OR ACTIVITIES OF THE CITY PURSUANT TO ARTICLE VIII HEREOF. Without modifying the conditions of preserving, asserting or enforcing any legal liability against the City as required by the City Charter or any law, the City will promptly forward to Developer every demand, notice, summons or other process received by the City in any claim or legal proceeding contemplated

herein. Developer shall: 1) investigate or cause the investigation of accidents or occurrences involving such injuries or damages; 2) negotiate or cause to be negotiated the claim as Developer may deem expedient; and 3) defend or cause to be defended on behalf of the City all suits for damages even if groundless, false or fraudulent, brought because of such injuries or damages. Developer shall pay all judgments in actions defended by Developer pursuant to this section along with all attorneys' fees and costs incurred by the City including interest accruing to the date of payment by Developer, and premiums on any appeal bonds. The City, at its election shall have the right to participate in any such negotiations or legal proceedings to the extent of its interest. The City will not be responsible for any loss of or damage to Developer's property from any cause except arising out of its breach of the terms of this Agreement.

VIII
Ownership and Right of Access

Developer hereby acknowledges the rights of the City, its agents, contractors and subcontractors to enter upon and construct and install any equipment that may be required pursuant to this Agreement to complete the Project. This right of access shall include the right to use or modify any Developer construction materials as deemed necessary by the City. Additionally, in the event that additional authorization is required, Developer agrees to promptly execute the required documents at the request of the City.

IX
Termination

(1) **Termination upon Completion of the Project**. This Agreement shall terminate upon completion of the following:

(a) The Project is completed and the Director of the Streets and Maintenance Department has accepted the Project for operation and maintenance by the City, and

(b) Developer provides the required maintenance bond under the one year warranty provisions specified above.

(2) **Termination for Default**. In the event that Developer fails to complete the Project within the time provided in this Agreement, and such failure continues for a period of 30 days after written notice is sent by the City, the City reserves the right to terminate this Agreement, secure completion through the performance or payment bond, or complete the construction itself and assess the costs of completion not covered under the performance or payment bond to Developer for payment.

X
Relationship of the Parties

Developer acknowledges that it is not an agent, servant, or employee of the City and is therefore, responsible for its own actions performed by itself, its agents or employees during the term of this Agreement.

XI
Increased Costs

It the event that additional costs arise from unforeseen site conditions or latent defects, Developer agrees that Developer will be solely responsible for payment of all increased costs in the construction of the Project, regardless of the cause.

XII
Non-Assignability

The parties hereto agree that the rights of Developer and the City under this Agreement are not assignable and will survive the sale, rental, gift or devise of any property adjacent to the Project.

XIII
Notice

All notices provided for herein shall be sufficient if sent by certified mail, return receipt requested, postage fully prepaid, addressed to the proper party at the following addresses:

CITY:
The City of El Paso
Attn: City Manager
P.O. Box 1890
El Paso, Texas 79950-1890

Copy to:
The City of El Paso
Streets and Maintenance Department
Attn: Director
7968 San Paulo
El Paso, Texas 79907-1246

DEVELOPER:

As of 6/30/16 and earlier:

CSM Realty Holdings, Ltd.
c/o C. Michael Maddox, CPA
P.O. Box 13464
El Paso, Texas 79913
Telephone: (915) 584-4282

With a copy to:
ScottHulse, PC
201 E. Main, 11th Floor
El Paso, Texas 79901
Attn: Bernard D. Felsen and
G. Russell Hill

From and after 7/01/16:
CSM Realty Holdings, Ltd.
c/o C. Michael Maddox, CPA
6801 N. Mesa St., S. B-200
El Paso, Texas 79912

With a copy to:
ScottHulse, PC
201 E. Main, 11th Floor
El Paso, Texas 79901
Attn: Bernard D. Felsen and
G. Russell Hill

or such other addresses as the parties may designate to each other in writing from time to time.

XIV
Law Governing Agreement

The laws of the State of Texas shall govern the validity, performance, interpretation and enforcement of this Agreement. Venue shall be in the courts of El Paso County, Texas.

XV
Interpretation

The City and Developer agree that this Agreement has been freely negotiated by both parties and that in any controversy, dispute or contest over the meaning, interpretation, validity or enforceability of this Agreement, or any of its terms or conditions, there shall be no inference, presumption or conclusion drawn whatsoever against either party by virtue of that party having drafted this Agreement or any portion thereof.

XVI
Severability

If any provision of this Agreement is prohibited by law or otherwise determined to be illegal, invalid or unenforceable in a court of competent jurisdiction, such provision shall not affect the validity of the remaining provisions of this Agreement; instead, this Agreement shall be construed as if it did not contain the illegal, invalid or unenforceable provision(s) and the rights and obligations of the parties shall be construed and enforced accordingly.

XVII
Future Maintenance Work

The City shall be responsible for any maintenance or repairs of the median improvements and the new traffic signal. The City's obligations for such work shall begin upon completion of the Project as defined by this Agreement and upon expiration of Developer's warranty. The City agrees that Developer is not responsible for any maintenance and repair of such work after expiration of Developer's warranty.

XVIII
Entire Agreement

This Agreement constitutes and expresses the entire agreement between the parties and supersedes all prior negotiations, representations or agreements, either written or oral. This Agreement shall not be amended or modified except by written instrument signed by both parties.

XIX
Authority to Contract

All persons that are signatories to this Agreement represent that they have authority to enter into this Agreement and bind their respective organizations thereto.

IN WITNESS THIS _____ DAY OF _____, 2016.

CITY OF EL PASO:

_____
Tomás González
City Manager

APPROVED AS TO FORM:

_____
Omar A. De La Rosa
Assistant City Attorney

APPROVED AS TO CONTENT:

_____
Ted Marquez, Director
Streets and Maintenance Department

DEVELOPER:
CSM REALTY HOLDINGS, LTD.,
a Texas limited partnership

_____
CCA, L.C., a Texas limited liability company
Its: General Partner

_____
Name: Carroll S. Maxon
Its: Authorized Manager

(Acknowledgments begin on following page)

ACKNOWLEDGMENT

STATE OF TEXAS)
)
COUNTY OF EL PASO)

This instrument was acknowledged before me on the _____day of _____, 2016, by **Tomás González** as **City Manager** of the **City of El Paso.**

My Commission Expires:

_____

_____
Notary Public, State of Texas

ACKNOWLEDGMENT

STATE OF TEXAS)
)
COUNTY OF EL PASO)

This instrument was acknowledged before me on the 27 day of July, 2016, by Carroll S. Maxon, acting in her capacity of Authorized Manager of CCA, L.C., a Texas limited liability company, general partner of **CSM REALTY HOLDINGS, LTD**, a Texas limited partnership, on behalf of said limited partnership.

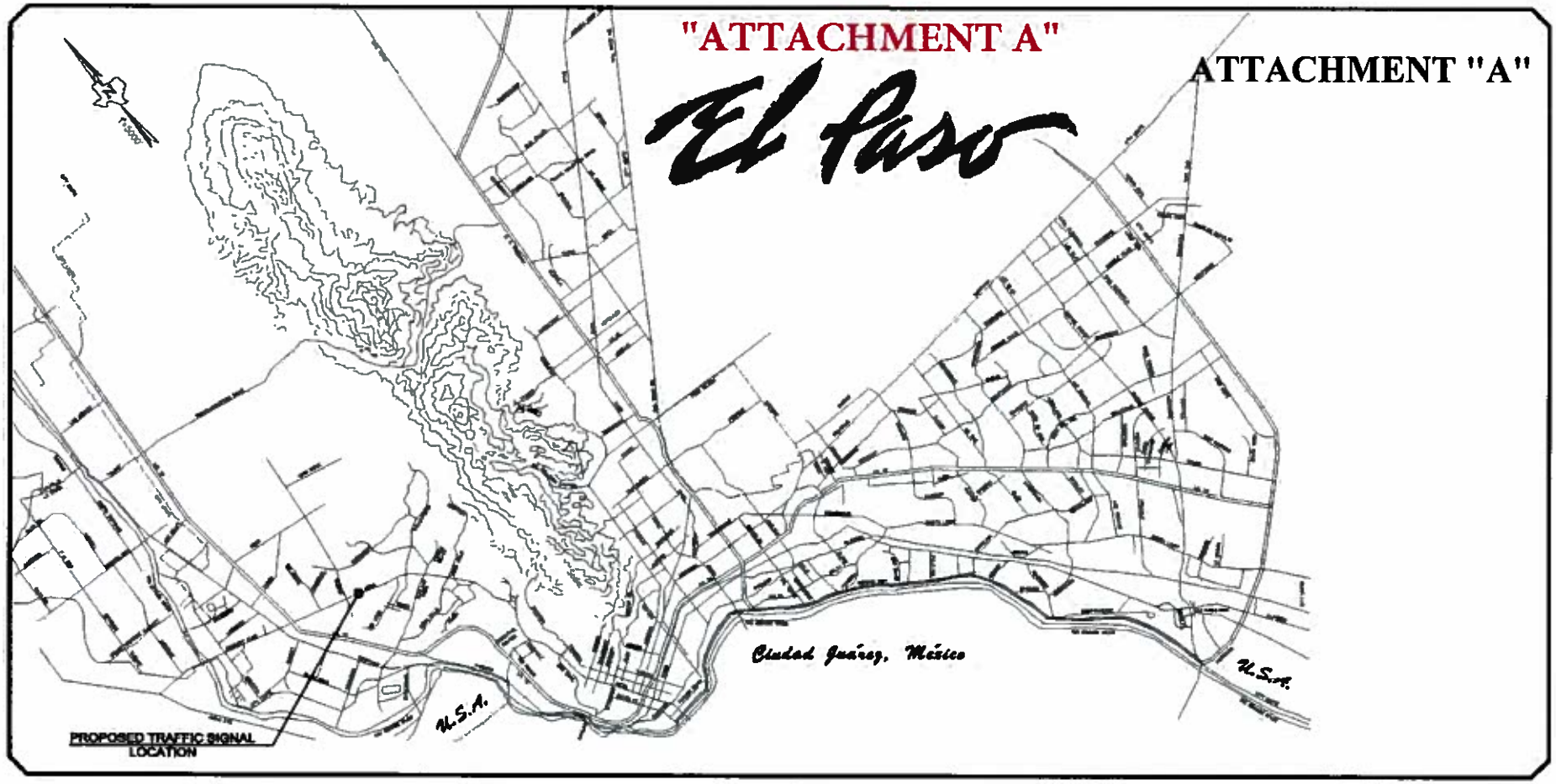
_____
Notary Public, State of Texas

My Commission Expires:
8/14/18

IRMA MOORE
MY COMMISSION EXPIRES
AUGUST 14, 2018

"ATTACHMENT A"

ATTACHMENT "A"



Kimley»Horn
801 CHERRY STREET, UNIT 11
SUITE 950
FORT WORTH, TEXAS 76102
PH: (817) 335-6511
TBPE FIRM REGISTRATION NO. F-928

SEE SHEET No. 2
FOR INDEX TO
PLAN SHEETS

TRAFFIC SIGNAL DESIGN
MESA STREET AT CHAMPIONS CIRCLE

THE CITY OF EL PASO, TEXAS
STREETS AND MAINTENANCE
"STRENGTHEN, BUILDING FOR THE FUTURE"
7968 SAN PAULO DRIVE
TELEPHONE : 915 621-6750

FILE NO.

MESA STREET AT CHAMPIONS CIRCLE
TRAFFIC SIGNAL DESIGN

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR1

ATTACHMENT "A"

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[illegible]	[illegible]
[illegible]	[illegible]

Kimley-Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO 20
EL PASO, TEXAS

SHEET INDEX

SHEET NUMBER
C-2

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR2

ATTACHMENT "A"

CSJ:

County: EL PASO

Highway: MESA STREET (SH 20)

Kimley»Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO 20
EL PASO, TEXAS

GENERAL NOTES
SHEET 1 OF 2

C-3

15-1036-455 / 520919

Whole Foods Traffic Signal Agreement Mesa & Champions

OAR3

CITY OF EL PASO STREETS AND MAINTENANCE
GENERAL NOTES
APPLICABLE TO ALL PLAN SHEETS

ATTACHMENT "A"

1. ITEMS AND MATERIALS CALLED FOR ON THESE PLANS ARE THE SAME AS MATERIALS SPECIFIED ON THE TEXAS DEPARTMENT OF TRANSPORTATION, 2014 SPECIFICATIONS BOOK OR BY SPECIAL SPECIFICATIONS. ALL SIGNING & PAVEMENT MARKINGS SHALL COMPLY WITH TEXAS MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES (TXMUTCD) 2011 EDITION. HOWEVER, THE CONTRACTOR MAY BE DIRECTED TO DEVIATE FROM MATERIALS TO MEET CITY OF EL PASO STANDARD TRAFFIC SIGNAL EQUIPMENT.

2. THE QUANTITIES SHOWN IN THE DIFFERENT QUANTITY TABLES ARE "ESTIMATES ONLY". THEY ARE SHOWN IN THESE PLANS ONLY FOR THE PURPOSE OF COMPARING BIDS AS AN EXPECTED TOTAL EXPENDITURE. EL PASO STREETS AND MAINTENANCE AND TXDOT, AT ITS SOLE DISCRETION, WILL DIRECT EXACTLY HOW MANY ACTUAL UNITS OR WHAT MATERIALS WILL BE PLACED AND WILL PAY FOR THOSE UNITS OR MATERIALS THAT ARE ORDERED AND ACCEPTED. NO PAYMENTS WILL BE MADE REGARDING ESTIMATED QUANTITIES, THEY ARE "ESTIMATES" ONLY.

3. CONTRACTOR IS TO CONFIRM RIGHT OF WAY / PROPERTY LINES PRIOR TO DRILLING FOUNDATIONS OR REMOVING ANY TRAFFIC SIGNAL EQUIPMENT. FINAL FOUNDATION AND POLE PLACEMENTS MAY BE FIELD CHANGED BY TXDOT'S INSPECTOR AND/OR TXDOT'S/EL PASO STREETS AND MAINTENANCE TRAFFIC SIGNAL SUPERVISORS. CONTRACTOR SHALL OBTAIN PERMISSION FROM THE PROPERTY OWNER IN ORDER TO REMOVE ANY TRAFFIC SIGNAL APPURTENANCES.

4. NO INTERSECTION MAY REMAIN WITHOUT POWER TO THE TRAFFIC SIGNALS, EXCEPT WHEN THERE IS THE NEED TO TRANSFER OR "TURN-ON" THE NEW ELECTRICAL SERVICE. CONTRACTOR SHALL PROVIDE POLICE ON DUTY TO DIRECT TRAFFIC AT THE CONTRACTOR'S EXPENSE, AND AS DIRECTED BY THE TXDOT'S INSPECTORS AND/OR CITY OF EL PASO STREETS AND MAINTENANCE TRAFFIC SIGNAL SUPERVISORS.

5. FINAL PLACEMENT OF ALL TRAFFIC SIGNAL FOUNDATIONS, CONTROLLER FOUNDATIONS, CONDUIT RUNS, GROUND BOXES, TRAFFIC SIGNS, TRAFFIC PAVEMENT MARKINGS MAY BE ADJUSTED BY THE TXDOT'S INSPECTORS AND/OR CITY OF EL PASO STREETS AND MAINTENANCE TRAFFIC SIGNAL SUPERVISORS.

6. DIRECTIONAL ORIENTATION OF ALL MAST ARMS AND POLES & POLE FOUNDATION ANCHOR BOLTS FOR TRAFFIC MOVEMENT/FLOW ALIGNMENT IS THE RESPONSIBILITY OF THE CONTRACTOR.

7. THE CONTRACTOR HAS, AT THEIR OPTION, TO PURCHASE ALL THE SIGNS SHOWN ON THESE PLANS FROM THE CITY OF EL PASO STREETS AND MAINTENANCE. CONTRACTOR WILL INSTALL OR RE-INSTALL THE SIGNS AS CALLED FOR ON THESE PLANS COMPLETE WITH FOUNDATIONS, MAST ARM MOUNTING HARDWARE, BREAK-AWAY SIGN POST, AND SIGN POST MOUNTING HARDWARE.

8. ALL GROUND BOXES INSTALLED SHALL HAVE THE LOGO ON THE GROUND BOX COVER, ON THREE LINES, AS SHOWN.

9. AT THIS INTERSECTION, AT THE DIRECTION OF THE TXDOT INSPECTOR AND/OR CITY OF EL PASO STREETS AND MAINTENANCE TRAFFIC SIGNAL SUPERVISORS, THE FIBER OPTIC PIG TAILS MAY REQUIRE RETRACTION INTO THE EXISTING COMMUNICATION CONDUIT FOR REUSE AND/OR RE-INSTALLATION. WHERE THIS OCCURS THE WORK SHALL BE PART OF THE TRAFFIC SIGNAL INSTALLATION AND NOT A SEPARATE PAY ITEM. WHEN REUSING OR RE-INSTALLING FIBER OPTIC CABLE, IF THE RUN BETWEEN THE CONTROLLER AND THE NEAREST GROUND BOX, WHERE A SPLICE(S) CAN BE PROVIDED, IS LESS THAN SIXTY (60) FEET IN ONE DIRECTION THE ADDITIONAL REQUIRED FIBER OPTICS IS TO BE INSTALLED AND CONSIDERED AS A PART OF THE TRAFFIC SIGNAL INSTALLATION.

10. WHEN REMOVING OR INSTALLING GROUND BOXES, OR TRAFFIC SIGNAL POLE(S) & CABINET FOUNDATIONS AND IT IS NECESSARY TO REMOVE A SECTION OF SIDEWALK, SUCH REMOVAL SHALL BE DONE FROM JOINT TO JOINT. THE REPLACEMENT OF THE DISTURBED SIDEWALK IS SUBSIDIARY AND INCLUSIVE WITH THE COST OF REMOVING AND/OR INSTALLING GROUND BOXES, TRAFFIC SIGNAL POLE(S), CABINET FOUNDATIONS AND TRAFFIC SIGN(S) FOUNDATIONS & POLES CALLED FOR IN THIS PLAN SET.

11. ALL TRAFFIC SIGNAL EQUIPMENT & APPURTENANCES REMOVED, I.E. TRAFFIC SIGNAL CONTROLLER AND CABINET, TRAFFIC SIGNAL POLES, POLE PEDESTALS, VEHICLE SIGNAL HEADS, PEDESTRIAN SIGNAL HEADS, ALL TRAFFIC SIGNAL CABLES, TRAFFIC SIGNS, TRAFFIC SIGN POSTS (FREE OF CONCRETE FOUNDATIONS) AND GROUND BOXES SHALL BE RETURNED TO:

TEXAS DEPARTMENT OF TRANSPORTATION
ATTN: MR. JOE MENDEZ
TRAFFIC SIGNAL SHOP
13301 GATEWAY WEST BLVD
EL PASO, TEXAS 79907
TELEPHONE NUMBER: 915-790-4245

WHO MAY DIRECT THE CONTRACTOR THAT THE MATERIALS BE DELIVERED TO:

CITY OF EL PASO STREETS AND MAINTENANCE
ATTN: MR. ISRAEL TORO
1059 LAFAYETTE, BLDG. 8
EL PASO, TEXAS 79907
TELEPHONE NUMBER: 915-212-7063

ALL OTHER MATERIALS SHALL BE DISPOSED OF BY THE CONTRACTOR.

12. THE CONTRACTOR SHALL MAINTAIN A DETAILED SET OF "AS-BUILT" RECORD DRAWINGS FOR THIS PROJECT. ONCE AN INSPECTION IS COMPLETED THE CONTRACTOR SHALL TURN OVER THE "AS-BUILT" RECORD DRAWINGS TO:

TEXAS DEPARTMENT OF TRANSPORTATION
ATTN: MR. JOE MENDEZ
TRAFFIC SIGNAL SHOP
13301 GATEWAY WEST BLVD
EL PASO, TEXAS 79907
TELEPHONE NUMBER: 915-790-4245

WHO MAY DIRECT THE CONTRACTOR THAT THE RECORD DRAWINGS BE DELIVERED TO:

CITY OF EL PASO STREETS AND MAINTENANCE
ATTN: MR. ISRAEL TORO
1059 LAFAYETTE, BLDG. 8
EL PASO, TEXAS 79907
TELEPHONE NUMBER: 915-212-7063

13. AT SOME INTERSECTIONS, AT THE DIRECTION OF TXDOT'S INSPECTOR AND/OR CITY OF EL PASO TRAFFIC SIGNAL SUPERVISORS, THE CONTRACTOR MAY BE DIRECTED THAT THE EXISTING APPURTENANCES WILL REMAIN IN PLACE. THE CONTRACTOR SHALL RETURN MATERIALS NOT INSTALLED OR CONSTRUCTED TO:

TEXAS DEPARTMENT OF TRANSPORTATION
ATTN: MR. JOE MENDEZ
TRAFFIC SIGNAL SHOP
13301 GATEWAY WEST BLVD
EL PASO, TEXAS 79907
TELEPHONE NUMBER: 915-790-4245

WHO MAY DIRECT THE CONTRACTOR THAT THE MATERIALS BE DELIVERED TO:

CITY OF EL PASO STREETS AND MAINTENANCE
ATTN: MR. ISRAEL TORO
1059 LAFAYETTE, BLDG. 8
EL PASO, TEXAS 79907
TELEPHONE NUMBER: 915-212-7063

14. ALL INTERSECTIONS WHERE PEDESTRIAN HEADS ARE TO BE INSTALLED, THOSE PEDESTRIANS SHALL BE "LED" "COUNTDOWN" TYPE PEDESTRIAN HEADS.

Kimley»Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO. 20
EL PASO, TEXAS

GENERAL NOTES
SHEET 2 OF 2

C-4

15-1036-455 / 520919

Whole Foods Traffic Signal Agreement Mesa & Champions

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ATTACHMENT "A"

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FILE: ...\Data\Project\...\TXDOT\STANDARDS\SUMSOB-WF.DGN

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN TEXT	DIMENSIONS	ALUMINUM TYPE A	ALUMINUM TYPE C	Post Type: FRP = Fiberglass; TWT = Thin-Wall; 10BWG = 10 BWG; S80 = Sch 80	Posts (1 or 2)	Anchor Type: UA=Univer-Conc; UB=Univer-Bolt; SA=Slip-Conc; SB=Slip-Bolt; WS=Wedge Steel; WP=Wedge Plastic	Mounting Designation: P = Prefab. "Plain"; T = Prefab. "T"; U = Prefab. "U"	EXT or 2EXT = # of Ext.; BM = Extruded Wind Beam; WC = 1.12 #/ft Wing Chan.; EXAL = Extruded Aluminum
C-17		[illegible]7R	RIGHT LANE MUST TURN RIGHT	36" X 36"	X		10BWG	1	SA	P	
		R3-8LR	LANE USE (LEFT/RIGHT)	30" X 30"	X		10BWG	1	SA	P	
	3	R3-7R	RIGHT LANE MUST TURN RIGHT	36" X 36"	X		10BWG	1	SA	P	
		[illegible]7R	RIGHT LANE MUST TURN RIGHT	36" X 36"	X		10BWG	1	SA	P	
		[illegible]-1R	ONE-WAY RIGHT	36" X 12"	X		10BWG	1	SA	P	
		[illegible]1-1	STOP	36" X 36"	X		10BWG	1	SA	P	
C-11	[illegible]	[illegible]-1R	ONE-WAY RIGHT	36" X 12"	X		10BWG	1	SA	P	

STATE OF TEXAS
SCOTT R. ARNOLD
96782
LICENSED
PROFESSIONAL ENGINEER

10/30/2015

Scott R. Arnold, P.E.

ALUMINUM SIGN BLANKS (TYPE A)

Square Ft.	Min. Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.

SUMMARY OF SMALL SIGNS

SOSS

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DIST	COUNTY	SHEET NO.
ELP	EL PASO	

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ATTACHMENT "A"

SUMMARY OF LARGE SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN BACK-GROUND COLOR	SIGN TEXT	SIGN DIMENSIONS	PLAQUES & OTHER ATTACHMENTS: DIRECT APPLY	PLAQUES & OTHER ATTACHMENTS: * ALUMINUM (TYPE A)	BACKGROUND SUBSTRATE (SQ FT): GROUND MOUNT (TYPE G)	BACKGROUND SUBSTRATE (SQ FT): OVERHEAD (TYPE O)	TYPE OF MOUNT	"X" DIMENSION ⊡ post ①	post ②	post ③	GALVANIZED STRUCTURAL STEEL: SIZE	LINEAR FEET post ①	post ②	post ③	TOTAL WEIGHT LBS.	DRILLED SHAFT: NON-REINF 12"⌀	LINEAR FEET REINFORCED 24"⌀	30"⌀	36"⌀
C-13	9	D3-1 (MOD) GREEN	100 Champions	102" X 18" 8.5' X 1.5' 1-EA		10.64		TO BE MOUNTED ON MAST ARM													
C-13	10	R3-8LR GREEN		30" X 30" 2.5' X 2.5' 1-EA		10.64		TO BE MOUNTED ON MAST ARM													
C-13	11	D3-1 (MOD) GREEN	6900 Mesa 6800	84" X 18" 7' X 1.5' 1-EA		10.64		TO BE MOUNTED ON MAST ARM													
C-13	12	D3-1 (MOD) GREEN	Champions 100	102" X 18" 8.5' X 1.5' 1-EA		10.64		TO BE MOUNTED ON MAST ARM													
				PAGE TOTALS													PAGE TOTALS				

⊡ The "X" dimension is the elevation difference of the post between the ground and the edge of pavement or top of curb.
Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
The post lengths listed here are approximations. The corrected post lengths will be furnished by the Contractor after the stud posts are placed.
Tower heights shall be verified with the Engineer before fabrication.

* This column is for aluminum Type A and not direct apply. Direct apply is subsidiary to the sign.

STATE OF TEXAS
SCOTT R. ARNOLD
96782
LICENSED PROFESSIONAL ENGINEER
10/30/2015
Scott R Arnold P.E.

SIGN TYPE

SIGN TYPE 1 3 0
- Wind Design Zone
- Series No.: 0 Aluminum/Fiberglass, 1 Aluminum, 2 Fiberglass
- No. of Posts

See sheet SMD(GEN)

SUMMARY OF LARGE SIGNS

SOLS

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11-03 1-04
8-95 9-08
5-01
EL PASO
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ATTACHMENT "A"

ELECTRICAL SERVICE DATA													
ELECTRIC SERVICE NO.	INTERSECTION	SHEET NO.	ELECTRICAL SERVICE DESCRIPTION (SEE ED(4)&(5)-03)	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN CIRCUIT BREAKER POLE/AMP	TWO-POLE CONTACTOR AMPS	PANELBD./ LOADCENTER AMP RATING	CIRCUIT NO.	BRANCH CIRCUIT BREAKER POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
1	MESA ST & PROPOSED DWY	C-13	ELEC SRV TY D 120/240 060 (NS)GS(N)GC(O)	2"	3/#6*1	N/A	2P/60	N/A	100	1 - TRAFFIC SIGNAL	1P/50	40	4.8

TRAFFIC SIGNAL, STRIPING, AND SIGNING QUANTITY SUMMARY				
ITEM NO.	TxDOT BID ITEM	DESCRIPTION	UNIT	QUANTITY
1	0416 6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	16
2	0416 6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	11
3	0416 6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	13
4	0416 6034	DRILL SHAFT (TRF SIG POLE) (48 IN)	LF	22
5	0500 6001	MOBILIZATION	LS	1
6	0502 6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3
7	0610 6004	RELOCATE RD IL ASM (TRANS BASE)	EA	2
8	0618 6023	CONDT (PVC) (SCH 40) (2")	LF	1,705
9	0618 6024	CONDT (PVC) (SCH 40) (2") (BORE)	LF	400
10	0618 6029	CONDT (PVC) (SCH 40) (3")	LF	150
11	0618 6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	220
12	0620 6010	ELEC CONDR (NO.6) INSULATED (GROUND)*2	LF	2,475
13	0620 6010	ELEC CONDR (NO.8) INSULATED	LF	2,579
14	0624 6002	GROUND BOX TY A (122311) W/APRON	EA	1
15	0624 6008	GROUND BOX TY C (162911) W/APRON	EA	5
16	0628 6126	ELC SRV TY D 120/240 060(NS)GS(N)GC(O)	EA	1
17	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	9
18	0644 6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	2
19	0662 6052	WK ZN PAV MRK REMOV (REFL) TY II-C-R	EA	12
20	0666 6003	REFL PAV MRK TY I (W) 4" (SLD) (100MIL)	LF	120
21	0666 6036	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	739
22	0666 6048	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	368
23	0666 6054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	8
24	0666 6078	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	7
25	0666 6120	REFL PAV MRK TY I (Y) 4" (SLD) (100MIL)	LF	260
26	0666 6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	120
27	0666 6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	739
28	0666 6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	368
29	0666 6184	REFL PAV MRK TY II (W) (ARROW)	EA	8
30	0666 6192	REFL PAV MRK TY II (W) (WORD)	EA	7
31	0666 6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF	260
32	0672 6010	REFL PAV MRKR TY II-C-R	EA	61
33	0677 6001	ELIM EXT PAV MRK & MRKS (4")	LF	220
34	0677 6005	ELIM EXT PAV MRK & MRKS (12")	LF	421
35	0677 6007	ELIM EXT PAV MRK & MRKS (24")	LF	700
36	0678 6001	PAV SURF PREP FOR MRK (4")	LF	380
37	0678 6002	PAV SURF PREP FOR MRK (6")	LF	480
38	0678 6004	PAV SURF PREP FOR MRK (8")	LF	739
39	0678 6008	PAV SURF PREP FOR MRK (24")	LF	368
40	0678 6009	PAV SURF PREP FOR MRK (ARROW)	EA	8
41	0678 6016	PAV SURF PREP FOR MRK (WORD)	EA	7
42	0680 6002	INSTALL HWY TRF SIG (ISOLATED)*3	EA	1
43	0680 6004	REMOVING TRAFFIC SIGNALS	EA	1
44	0682 6001	VEH SIG SEC (12")LED(GRN) COMPLETE W/ HOUSING	EA	7
45	0682 6002	VEH SIG SEC (12")LED(GRN ARW) COMPLETE W/ HOUSING	EA	1
46	0682 6003	VEH SIG SEC (12")LED(YEL) COMPLETE W/ HOUSING	EA	7
47	0682 6004	VEH SIG SEC (12")LED(YEL ARW) COMPLETE W/ HOUSING	EA	1
48	0682 6005	VEH SIG SEC (12")LED(RED) COMPLETE W/ HOUSING	EA	7
49	0682 6006	VEH SIG SEC (12")LED(RED ARW) COMPLETE W/ HOUSING	EA	1
50	0682 6018	PED SIG SEC (LED)(COUNTDOWN) COMPLETE W/ HOUSING	EA	6
51	0682 6035	BACK PLATE (12")(3 SEC)(VENTED)ALUM	EA	8
52	0684 6007	TRF SIG CBL (TY A)(12 AWG)(2 CONDR)	LF	690
53	0684 6012	TRF SIG CBL (TY A)(12 AWG)(7 CONDR)	LF	621
54	0684 6017	TRF SIG CBL (TY A)(12 AWG)(12 CONDR)	LF	635
55	0684 6024	TRF SIG CBL (TY A)(12 AWG)(19 CONDR)	LF	565
56	0684 6054	TRF SIG CBL (TY A)(16 AWG)(2 CONDR)	LF	722
57	0684 6055	TRF SIG CBL (TY A)(16 AWG)(4 CONDR)	LF	706
58	0687 6001	PED POLE ASSEMBLY	EA	4
59	0688 6001	PED DETECT PUSH BUTTON (APS)	EA	5
60	0688 6003	PED DETECTOR CONTROLLER UNIT	EA	1
61	6002 6001	VIVDS PROCESSOR SYSTEM	EA	3
62	6002 6002	VIVDS CAMERA ASSEMBLY	EA	3
63	6002 6003	VIVDS SET-UP SYSTEM	EA	1
64	6007 6011	FIBER OPTIC CBL (SINGLE-MODE)(12 FIBER)	LF	1,580
65	6007 6023	FIBER OPTIC PATCH PANEL (12 POSITION)	EA	1
66	6027 6003	CONDUIT (PREPARE)	LF	1,025
67	6027 6008	GROUND BOX (PREPARE)	EA	1
68	6048 6004	RE PM W/RET REQ TY I (W)8"(SLD)	LF	480
69	6048 6012	RE PM W/RET REQ TY II (W)8"(SLD)	LF	480
70	[illegible]	INS TRF SIG PL [illegible] (ELP STD)	EA	1
71	[illegible]	[illegible]	EA	1
72	—	INS TRF SIG PL AM(S)1 ARM(24') (ELP STD)	EA	1
73	—	TOMAR FIRE/TRANSIT PREEMPTION SYSTEM	EA	2

NOTES:

*1 1 BLACK/WHITE/GREEN GROUND WIRES.
*2 GREEN GROUND WIRES.
*3 CONTRACTOR SHALL FURNISH AND INSTALL A TYPE 332 CABINET AND A TYPE 170 CONTROLLER.

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WHOLE FOODS
MESA STREET
STATE HIGHWAY NO 20
EL PASO, TEXAS

QUANTITY SUMMARY
TRAFFIC SIGNALS

C-06

15-1036-455 / 520919
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NOTES

1 PRIMECOAT QUANTITY BASED ON 0.3GAL/SQYD APPLICATION RATE

ATTACHMENT "A"

ADA & PAVING QUANTITY SUMMARY				
ITEM NO.	TxDOT BID ITEM	DESCRIPTION	UNIT	QUANTITY
1	0100 6008	PREP ROW (TREE)(LESS THAN 24" DIA)	EA	2
2	0104 6015	REMOVING CONC (SIDEWALKS)	SY	604
1	0104 6022	REMOVING CONC (CURB AND GUTTER)	LF	1,875
2	0104 6032	REMOVING CONC (WHEELCHAIR RAMP)	SY	2
3	0105 6021	REMOVING STAB BASE AND ASPH PAV (0-4")	SY	685
4	0110 6001	EXCAVATION (ROADWAY)	CY	2,100
5	0170 6001	IRRIGATION SYSTEM	LS	1
6	0192 6017	VEGETATION BARRIER	SY	685
7	0247 6382	FL BS (CMP IN PLC)(TY A GR 5)(8")	SY	3,707
8	0310 6005	PRIME COAT (AE-P)	GAL	4,683
9	0341 6006	D-GR HMA TY-C SAC-A PG70-22	TON	400
10	0500 6001	MOBILIZATION	LS	1
11	0506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	800
12	0506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	800
13	0529 6008	CONC CURB & GUTTER (TY II)	LF	1,828
14	0530 6004	DRIVEWAYS (CONC)	SY	206
15	0531 6001	CONC SIDEWALKS (4")	SY	600
16	0531 6005	CURB RAMPS (TY 2)	EA	1
17	0531 6010	CURB RAMPS (TY 7)	EA	5
18	0531 6015	CURB RAMPS (TY 20)	EA	1
19	0531 6016	CURB RAMPS (TY 21)	EA	1
20	0644 6076	REMOVE SM RD SN SUP&AM	EA	1
21	2000 6001	DECOMPOSED GRANITE	SY	685

Kimley»Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO 20
EL PASO, TEXAS

QUANTITY SUMMARY
PAVING

C-07

15-1036-455 / 520919

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TRAFFIC CONTROL NOTES

1. ALL TRAFFIC CONTROL SIGNS, PLASTIC DRUMS, AND VERTICAL PANELS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM CONTROL DEVICES (TEXAS MUTCD)
2. THE LANE CLOSURES WILL BE ALLOWED 9 PM - 6 AM, SUNDAY - THURSDAY ONLY FOR THE INSTALLATION OF THE LOW PROFILE CONCRETE BARRIERS.
3. ANY VARIATIONS TO THE TRAFFIC CONTROL PLAN MUST BE APPROVED BY THE ENGINEER, THE CITY, AND TXDOT
4. CONTRACTOR SHALL MAINTAIN ACCESS TO DRIVEWAYS AT ALL TIMES
5. CONTRACTOR SHALL CONTACT THE CITY ENGINEERING & CONSTRUCTION DEPARTMENT AT (915) 212 - 0065 ONE (1) WEEK IN ADVANCE OF IMPLEMENTING THIS TCP
6. REFERENCE SHEET C-10 FOR PEDESTRIAN CROSSING DETOUR PLAN.

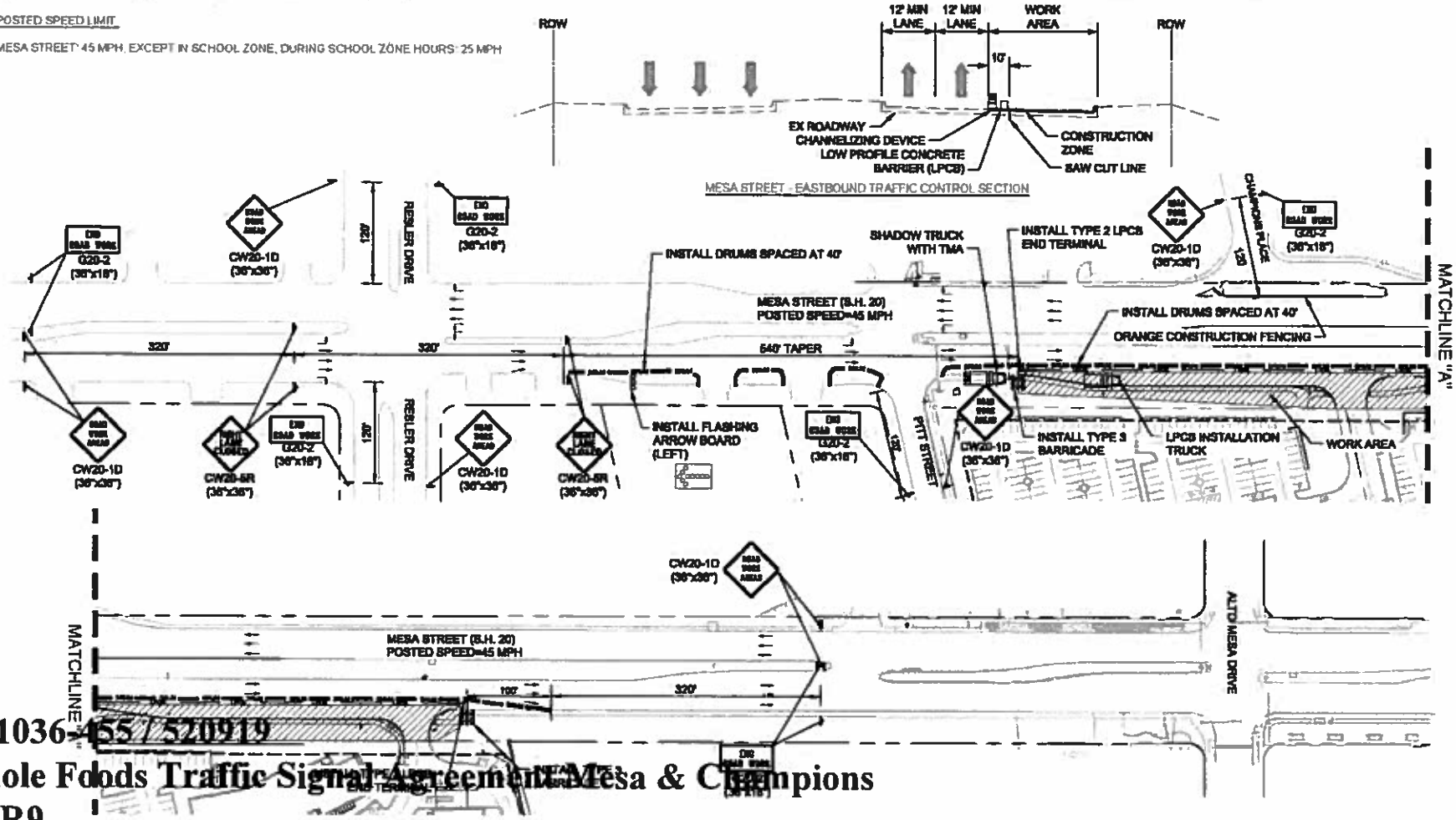
POSTED SPEED LIMIT

MESA STREET: 45 MPH, EXCEPT IN SCHOOL ZONE, DURING SCHOOL ZONE HOURS: 25 MPH

LEGEND

- PROPOSED SIGN
- FLOW ARROW
- DRUMS
- FLASHING ARROW BOARD
- WORK AREA
- TYPE 3 BARRICADE
- LOW PROFILE CONCRETE BARRIER

ATTACHMENT "A"



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WHOLE FOODS
MESA STREET
STATE HIGHWAY NO 20
EL PASO, TEXAS

TRAFFIC CONTROL PLAN DETAIL 1 LPCB INSTALLATION

C-08

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ATTACHMENT "A"

TRAFFIC CONTROL NOTES

1. ALL TRAFFIC CONTROL SIGNS, PLASTIC DRUMS, AND VERTICAL PANELS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM CONTROL DEVICES (TEXAS MUTCD)
2. THE LANE CLOSURES WILL BE ALLOWED 24 HOURS A DAY, 7 DAYS A WEEK. THE DURATION FOR THIS TCP PHASE SHALL NOT EXCEED FOUR (4) WEEKS
3. ANY VARIATIONS TO THE TRAFFIC CONTROL PLAN MUST BE APPROVED BY THE ENGINEER, THE CITY, AND TXDOT
4. CONTRACTOR SHALL MAINTAIN ACCESS TO DRIVEWAYS AT ALL TIMES
5. CONTRACTOR SHALL CONTACT THE CITY ENGINEERING & CONSTRUCTION DEPARTMENT AT (915) 212 - 0065 ONE (1) WEEK IN ADVANCE OF IMPLEMENTING THIS TCP
6. REFERENCE SHEET C-08 FOR TCP FOR INSTALLATION OF LPCB
7. REFERENCE SHEET C-10 FOR PEDESTRIAN CROSSING DETOUR PLAN

POSTED SPEED LIMIT

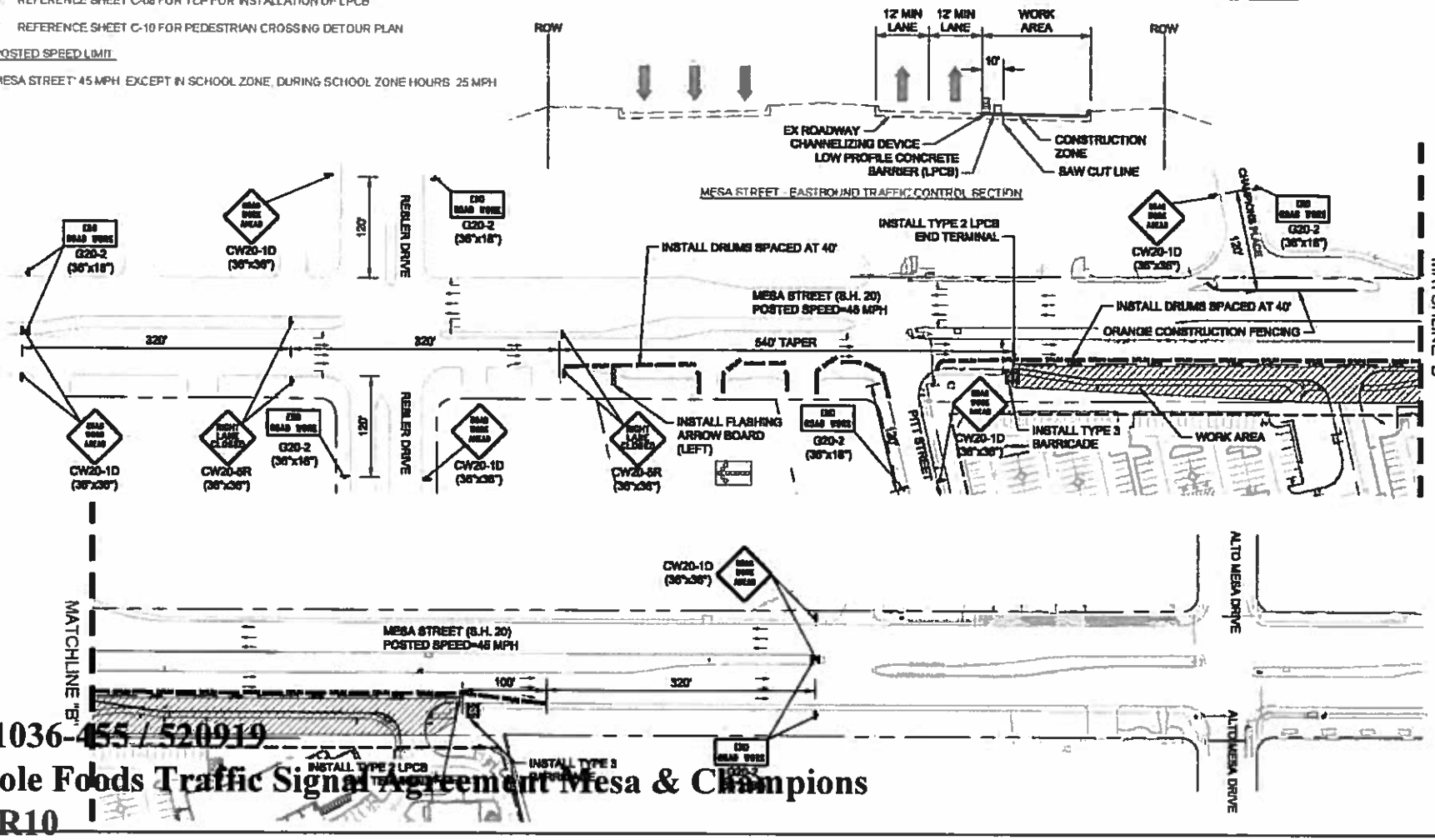
MESA STREET: 45 MPH EXCEPT IN SCHOOL ZONE, DURING SCHOOL ZONE HOURS: 25 MPH

SIGNAL CONSTRUCTION SEQUENCE NOTES

1. INSTALL SIGNAL AND IMPROVEMENTS AT MESA AND CHAMPION (TURN SIGNAL OFF AT ALTO MESA AND COVER SIGNAL HEADS ON DAY OF CHAMPION SIGNAL TURN ON)
2. CLOSE MEDIAN AT ALTO MESA WITH LPCB
3. REMOVE SIGNAL AT ALTO MESA

LEGEND

- PROPOSED SIGN
- FLOW ARROW
- DRUMS
- FLASHING ARROW BOARD
- WORK AREA
- TYPE 3 BARRICADE
- LPCB — LOW PROFILE CONCRETE BARRIER



Kimley»Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO. 20
EL PASO, TEXAS

TRAFFIC CONTROL PLAN DECLERATION LANES

C-09

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CAR10

TRAFFIC CONTROL NOTES

1. ALL TRAFFIC CONTROL SIGNS, PLASTIC DRUMS, AND VERTICAL PANELS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM CONTROL DEVICES (TEXAS MUTCD)
2. ANY VARIATIONS TO THE TRAFFIC CONTROL PLAN MUST BE APPROVED BY THE ENGINEER, THE CITY, AND TXDOT.
3. CONTRACTOR SHALL CONTACT THE CITY ENGINEERING & CONSTRUCTION DEPARTMENT AT (915) 212 - 0065 ONE (1) WEEK IN ADVANCE OF IMPLEMENTING THIS TCP.

POSTED SPEED LIMIT:

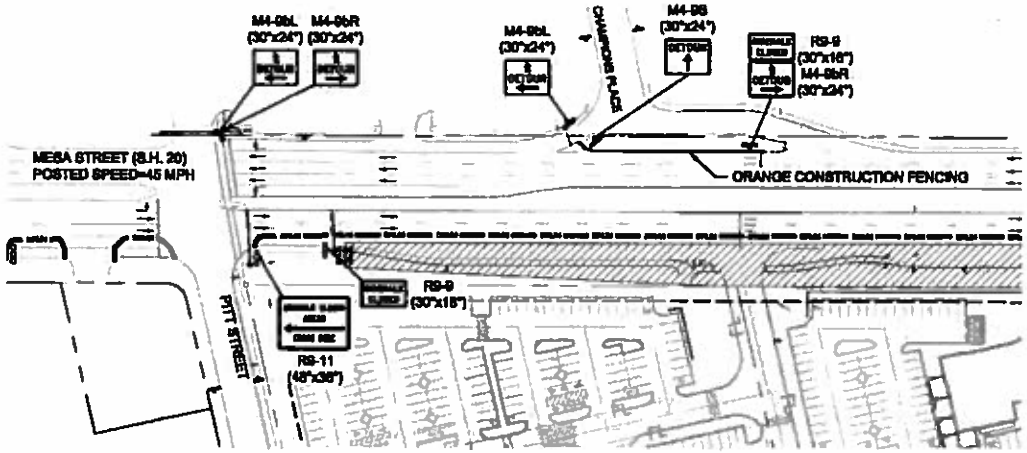
MESA STREET: 45 MPH, EXCEPT IN SCHOOL ZONE, DURING SCHOOL ZONE HOURS: 25 MPH

LEGEND

- PROPOSED SIGN
- FLOW ARROW
- DRUMS
- FLASHING ARROW BOARD
- WORK AREA
- TYPE 3 BARRICADE
- LOW PROFILE CONCRETE BARRIER

GRAPHIC SCALE IN FEET

ATTACHMENT "A"



Kimley»Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO. 20
EL PASO, TEXAS

TRAFFIC CONTROL PLAN
PEDESTRIAN DETOUR ROUTE

SHEET NUMBER
C-10

F: 1036-455 / 520919

Whole Foods Traffic Signal Agreement Mesa & Champions

CAR11

ATTACHMENT "A"

TRAFFIC CONTROL NOTES

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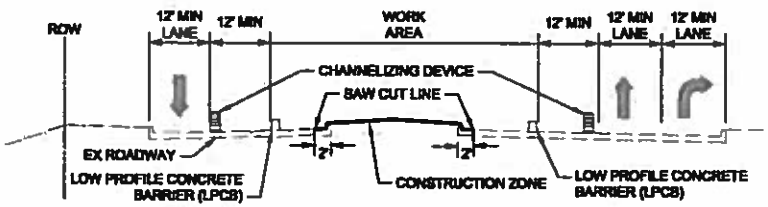
2. THE LANE CLOSURES WILL BE ALLOWED 9 PM - 6 AM, SUNDAY - THURSDAY ONLY FOR THE INSTALLATION OF THE LOW PROFILE CONCRETE BARRIERS
3. ANY VARIATIONS TO THE TRAFFIC CONTROL PLAN MUST BE APPROVED BY THE ENGINEER, THE CITY, AND TXDOT
4. CONTRACTOR SHALL MAINTAIN ACCESS TO DRIVEWAYS AT ALL TIMES
5. CONTRACTOR SHALL CONTACT THE CITY ENGINEERING & CONSTRUCTION DEPARTMENT AT (915) 212 - 0065 ONE (1) WEEK IN ADVANCE OF IMPLEMENTING THIS TCP
6. REFERENCE SHEET C-10 FOR PEDESTRIAN CROSSING DETOUR PLAN.
7. CONTRACTOR MAY ONLY CLOSE ONE DIRECTION OF SH 20 AT A TIME.

POSTED SPEED LIMIT

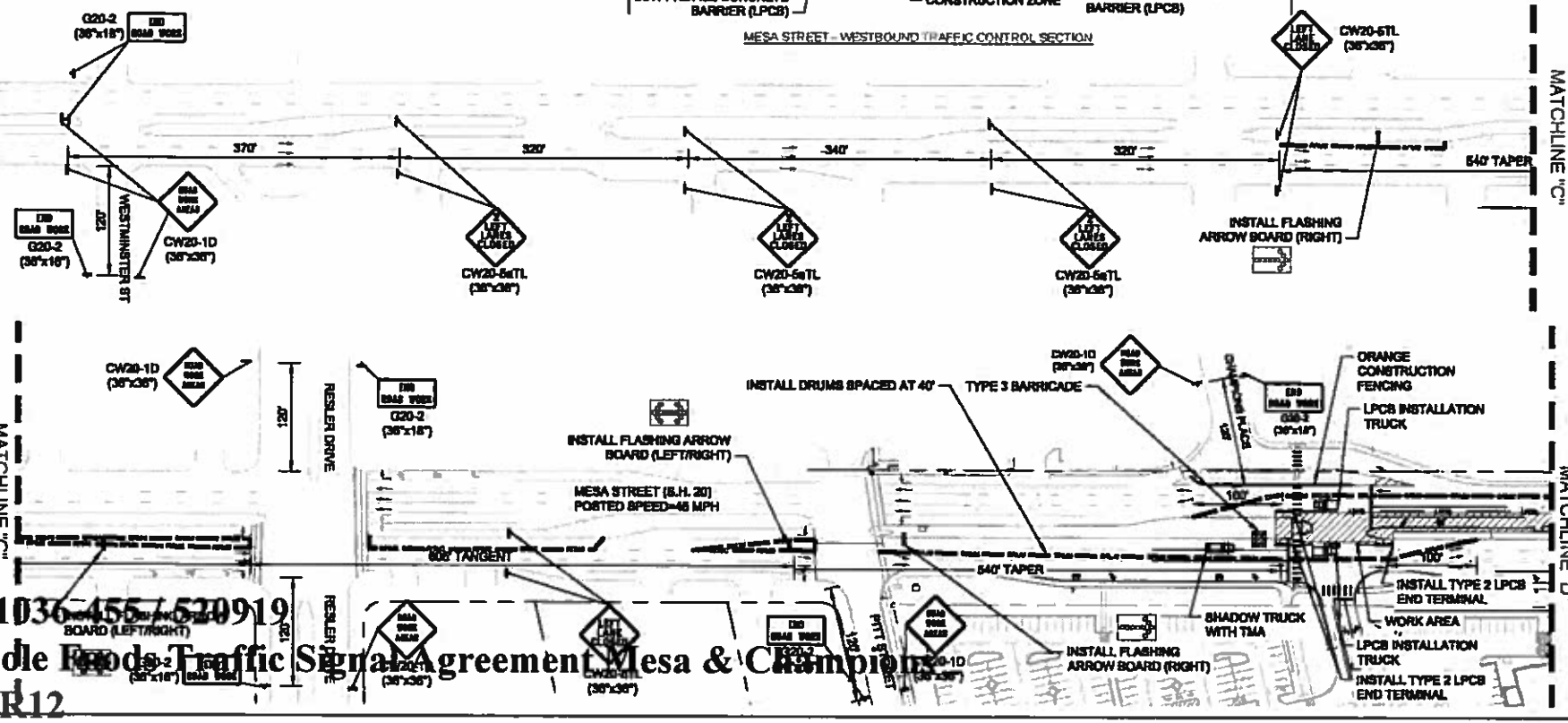
MESA STREET: 45 MPH, EXCEPT IN SCHOOL ZONE, DURING SCHOOL ZONE HOURS: 25 MPH

LEGEND

- PROPOSED SIGN
- FLOW ARROW
- DRUMS
- FLASHING ARROW BOARD
- WORK AREA
- TYPE 3 BARRICADE
- LOW PROFILE CONCRETE BARRIER



MESA STREET – WESTBOUND TRAFFIC CONTROL SECTION



Kimley»Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO 20
EL PASO, TEXAS

TRAFFIC CONTROL PLAN DETAIL 2 LPCB INSTALLATION (SHEET 1 OF 2)

C-11

TRAFFIC CONTROL NOTES

1. ALL TRAFFIC CONTROL SIGNS, PLASTIC DRUMS, AND VERTICAL PANELS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM CONTROL DEVICES (TEXAS MUTCD)
2. THE LANE CLOSURES WILL BE ALLOWED 9 PM - 6 AM, SUNDAY - THURSDAY ONLY FOR THE INSTALLATION OF THE LOW PROFILE CONCRETE BARRIERS
3. ANY VARIATIONS TO THE TRAFFIC CONTROL PLAN MUST BE APPROVED BY THE ENGINEER, THE CITY, AND TXDOT
4. CONTRACTOR SHALL MAINTAIN ACCESS TO DRIVEWAYS AT ALL TIMES
5. CONTRACTOR SHALL CONTACT THE CITY ENGINEERING & CONSTRUCTION DEPARTMENT AT (915) 212 - 0065 ONE (1) WEEK IN ADVANCE OF IMPLEMENTING THIS TCP
6. REFERENCE SHEET C-10 FOR PEDESTRIAN CROSSING DETOUR PLAN.
7. CONTRACTOR MAY ONLY CLOSE ONE DIRECTION OF SH 20 AT A TIME.

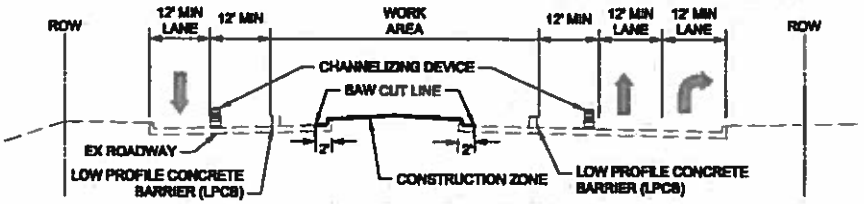
POSTED SPEED LIMIT

MESA STREET: 45 MPH, EXCEPT IN SCHOOL ZONE, DURING SCHOOL ZONE HOURS: 25 MPH

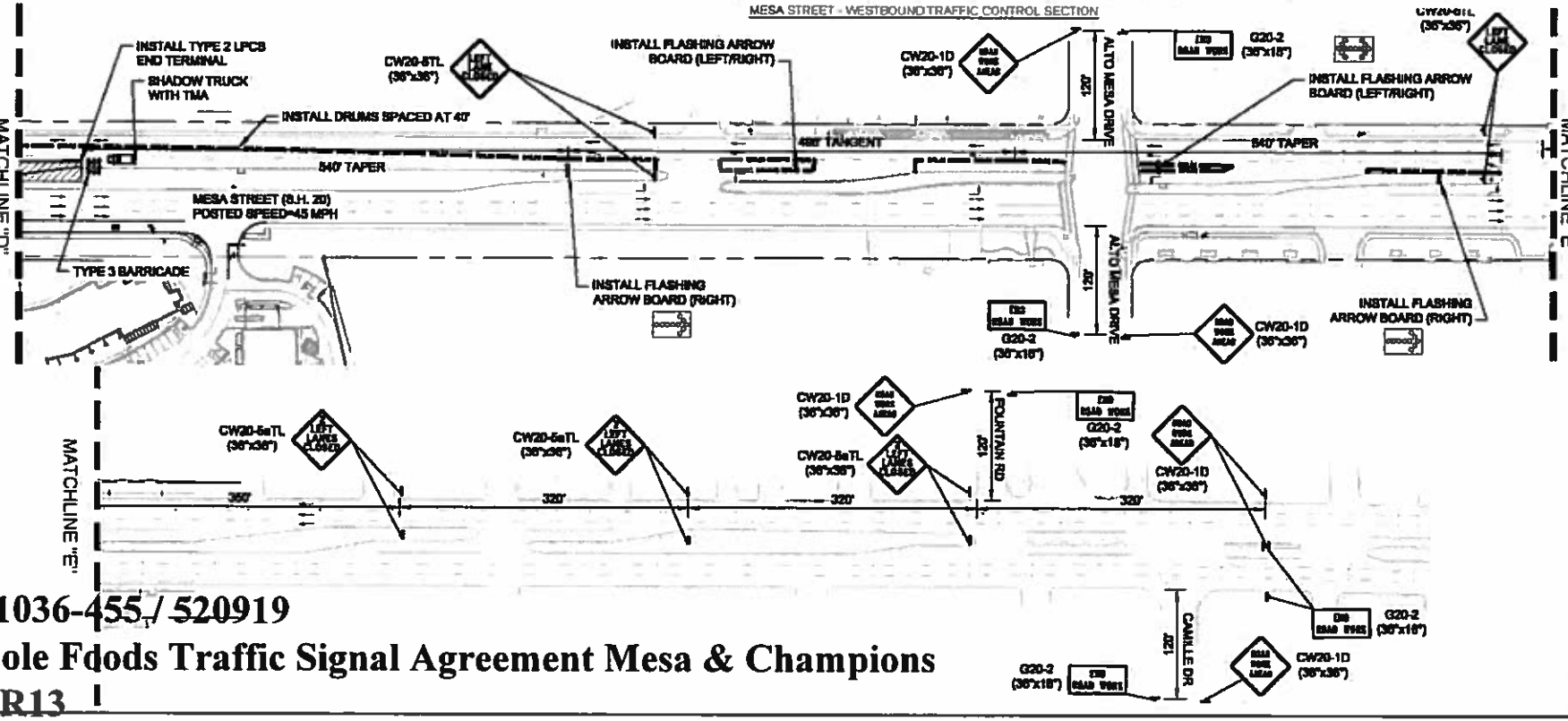
LEGEND

- PROPOSED SIGN
- FLOW ARROW
- DRUMS
- FLASHING ARROW BOARD
- WORK AREA
- TYPE 3 BARRICADE
- LOW PROFILE CONCRETE BARRIER

ATTACHMENT "A"



MESA STREET - WESTBOUND TRAFFIC CONTROL SECTION



15-1036-455 / 520919

Whole Fdods Traffic Signal Agreement Mesa & Champions

CAR13

Kimley»Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO 20
EL PASO, TEXAS

TRAFFIC CONTROL PLAN DETAIL 2 LPCB INSTALLATION (SHEET 2 OF 2)

C-12

TRAFFIC CONTROL NOTES:

1. ALL TRAFFIC CONTROL SIGNS, PLASTIC DRUMS, AND VERTICAL PANELS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM CONTROL DEVICES (TEXAS MUTCD).
2. THE LANE CLOSURES WILL BE ALLOWED 24 HOURS A DAY, 7 DAYS A WEEK. THE DURATION FOR THIS TCP PHASE SHALL NOT EXCEED FOUR (4) WEEKS.
3. ANY VARIATIONS TO THE TRAFFIC CONTROL PLAN MUST BE APPROVED BY THE ENGINEER, THE CITY, AND TXDOT.
4. CONTRACTOR SHALL MAINTAIN ACCESS TO DRIVEWAYS AT ALL TIMES.
5. CONTRACTOR SHALL CONTACT THE CITY ENGINEERING & CONSTRUCTION DEPARTMENT AT (915) 212-0065 ONE (1) WEEK IN ADVANCE OF IMPLEMENTING THIS TCP.
6. REFERENCE SHEETS C-11 AND C-12 FOR TCP FOR INSTALLATION OF LPCB.
7. REFERENCE SHEET C-10 FOR PEDESTRIAN CROSSING DETOUR PLAN.

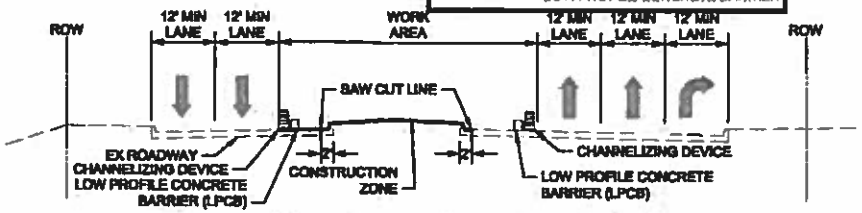
POSTED SPEED LIMIT

MESA STREET: 45 MPH, EXCEPT IN SCHOOL ZONE, DURING SCHOOL ZONE HOURS: 25 MPH

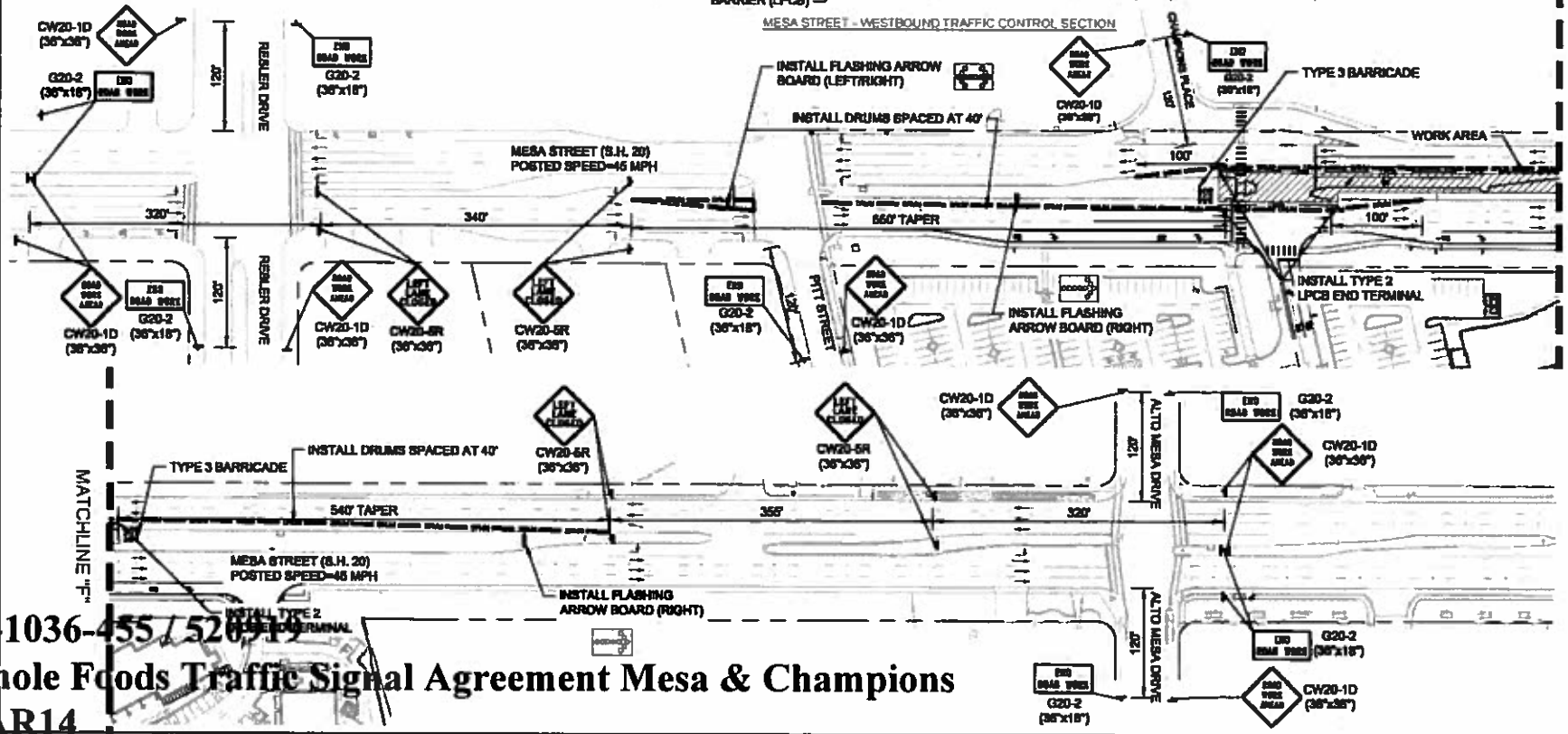
LEGEND

- PROPOSED SIGN
- FLOW ARROW
- DRUMS
- FLASHING ARROW BOARD
- WORK AREA
- TYPE 3 BARRICADE
- LOW PROFILE CONCRETE BARRIER

ATTACHMENT "A"



MESA STREET - WESTBOUND TRAFFIC CONTROL SECTION

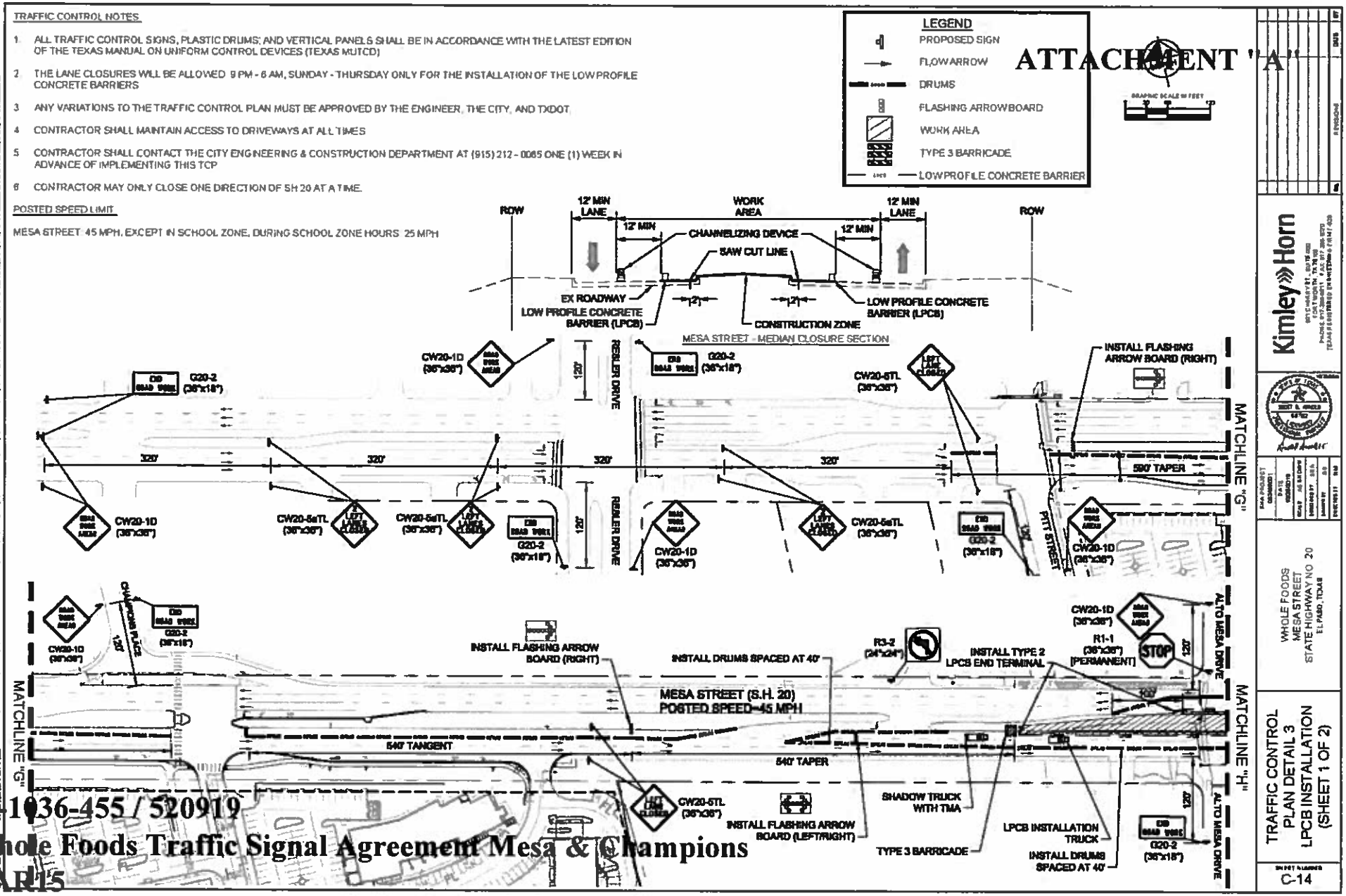


Kimley»Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO. 20
EL PASO, TEXAS

TRAFFIC CONTROL PLAN LEFT TURN LANE

SHEET NUMBER C-13



F: 1936-455 / 520919

Whole Foods Traffic Signal Agreement Mesa & Champions

CART5

ATTACHMENT "A"

TRAFFIC CONTROL NOTES

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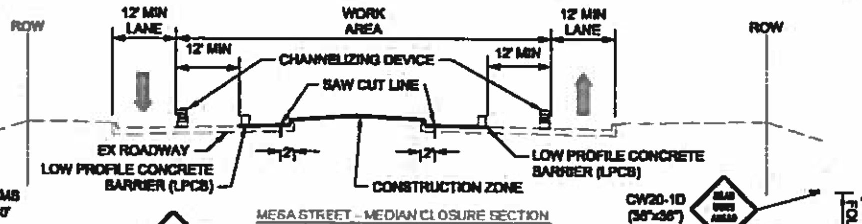
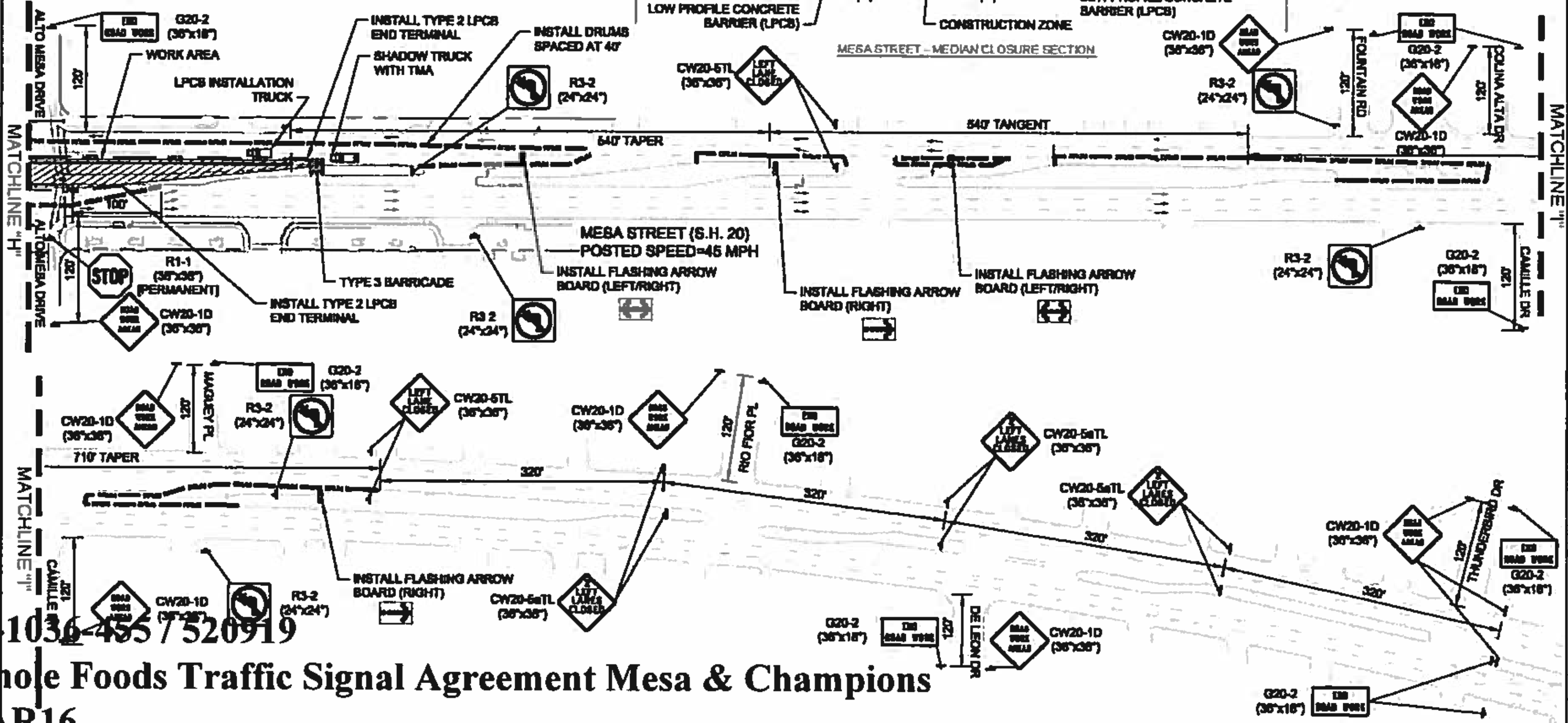
POSTED SPEED LIMIT

MESA STREET: 45 MPH, EXCEPT IN SCHOOL ZONE, DURING SCHOOL ZONE HOURS: 25 MPH

LEGEND

- PROPOSED SIGN
- FLOW ARROW
- DRUMS
- FLASHING ARROW BOARD
- WORK AREA
- TYPE 3 BARRICADE
- LOW PROFILE CONCRETE BARRIER





WHOLE FOODS
MESA STREET
STATE HIGHWAY NO. 20
EL PASO, TEXAS

TRAFFIC CONTROL PLAN DETAIL 3
LPCB INSTALLATION
(SHEET 2 OF 2)

C-15

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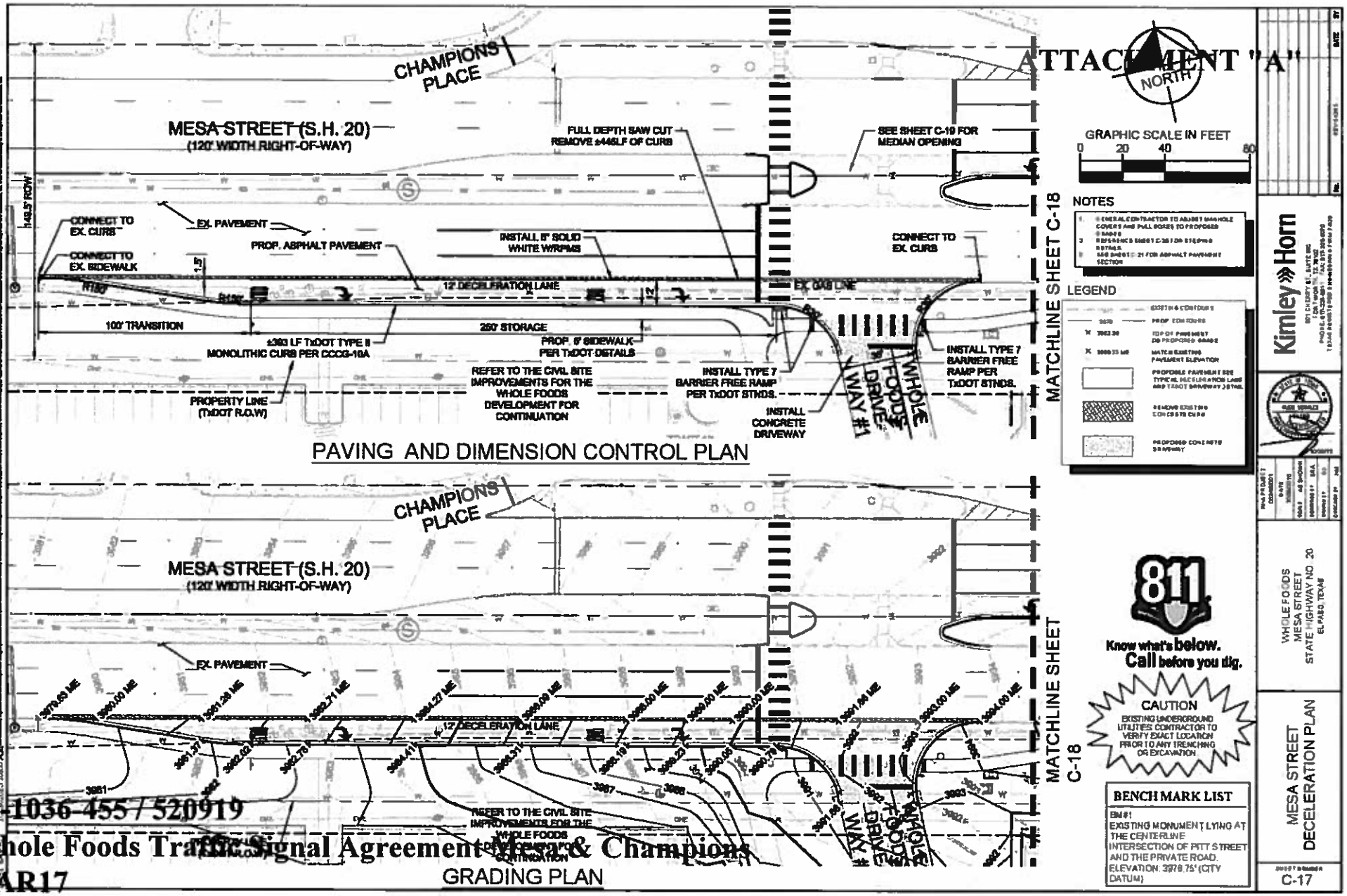
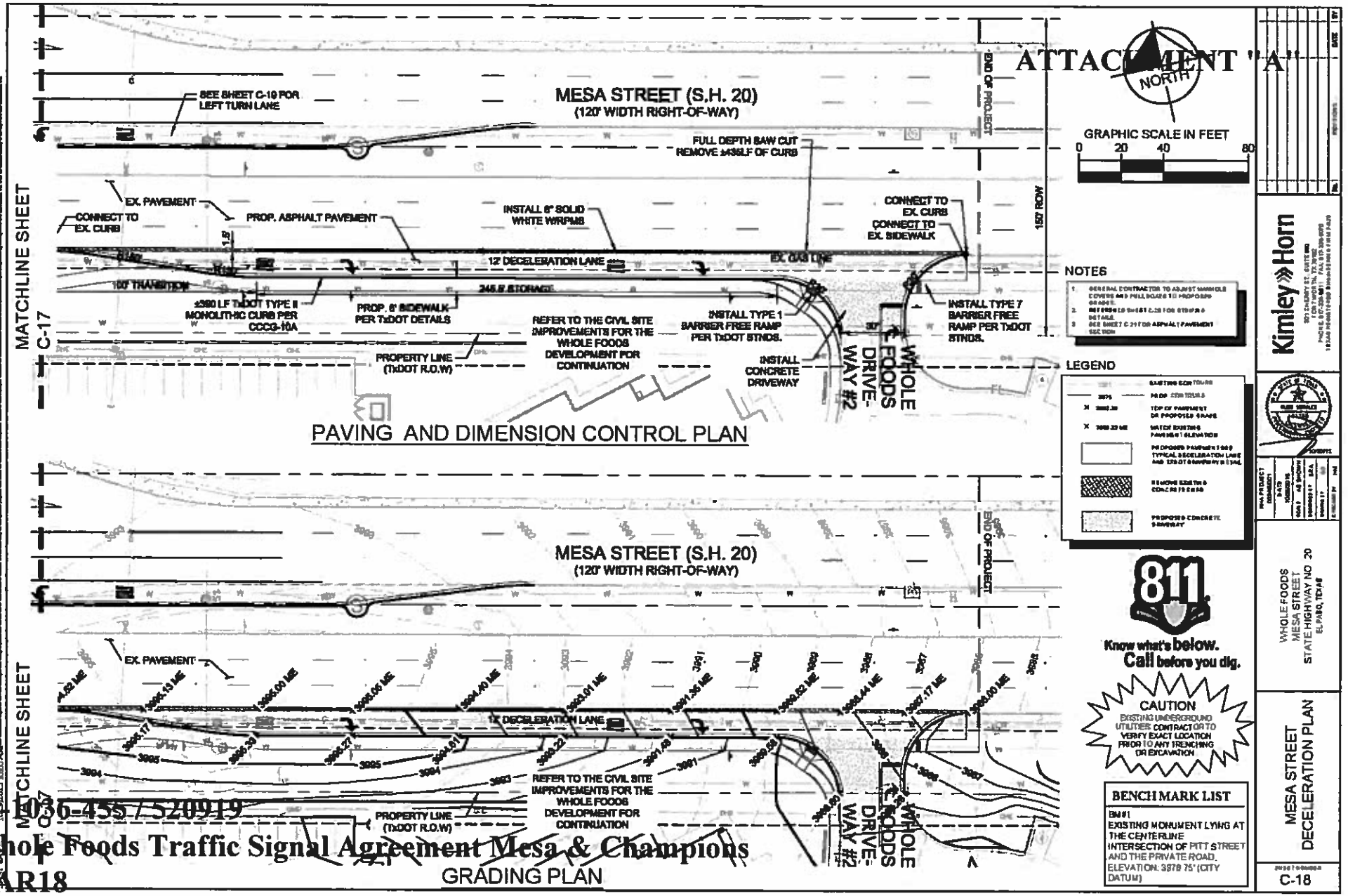
15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR16



15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR17

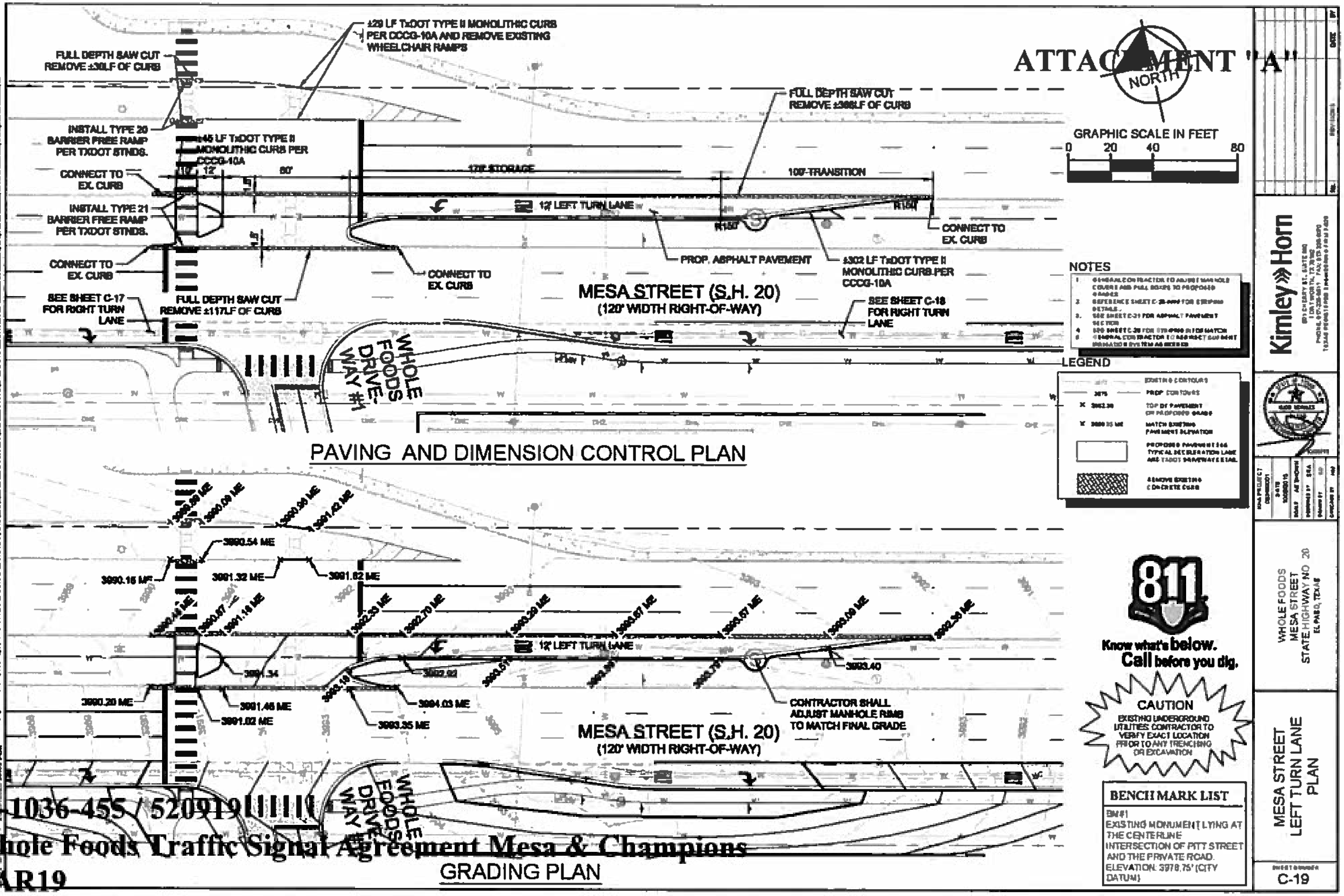


15-036-455 / 520919

Whole Foods Traffic Signal Agreement Mesa & Champions

CAR18

ATTACHMENT "A"



15-1036-455 / 520919

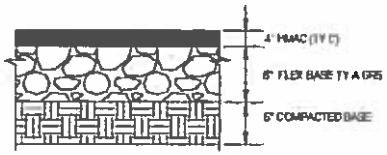
Whole Foods Traffic Signal Agreement Mesa & Champions

OAR19

ATTACHMENT "A"

ASPHALT PAVEMENT NOTES

1. SUBGRADE TO BE COMPACTED TO 95% OF MAXIMUM DENSITY AS PER TxDOT'S TEST PROCEDURE TEX-113-E
2. BASE TO BE COMPACTED TO NOT LESS THAN 100% DENSITY IN ACCORDANCE WITH TxDOT'S TEST PROCEDURE TEX-113-E TYPE A, GRADE 5
3. BITUMINOUS MATERIAL SHALL CONFORM TO ITEM 341, TYPE "C" ACCORDANCE WITH TxDOT STANDARDS.
4. PRIME COAT TO BE 0.15 GAL. PER SQUARE YARD (MINIMUM COVERAGE)
5. COMPACTION TEST WHERE REQUIRED BY THE CITY ENGINEER MUST BE PAID FOR BY THE DEVELOPER
6. STRICT VERTICAL CONTROL OF ALL CURB AND GUTTER ELEVATIONS WILL BE MAINTAINED BLUE TOPPING WILL BE REQUIRED THROUGHOUT.
7. ALL PLANS MUST BE IN ACCORDANCE WITH THE LATEST EDITION OF TxDOT STANDARDS.
8. HMAC BASE, SUB BASE WILL BE IN ACCORDANCE WITH THE LATEST TxDOT STANDARDS
9. MINIMUM PAVEMENT DESIGN DETAILS ARE SHOWN ACTUAL PAVEMENT DESIGN WILL BE DETERMINED BY TxDOT STANDARDS.



ASPHALT PAVEMENT SECTION

Know what's below.
Call before you dig.

CAUTION
EXISTING UNDERGROUND UTILITIES. CONTRACTOR TO VERIFY EXACT LOCATION PRIOR TO ANY TRENCHING OR EXCAVATION

BENCH MARK LIST

BM#1
EXISTING MONUMENT LYING AT THE CENTERLINE INTERSECTION OF PITT STREET AND THE PRIVATE ROAD. ELEVATION: 3978.75' (CITY DATUM)

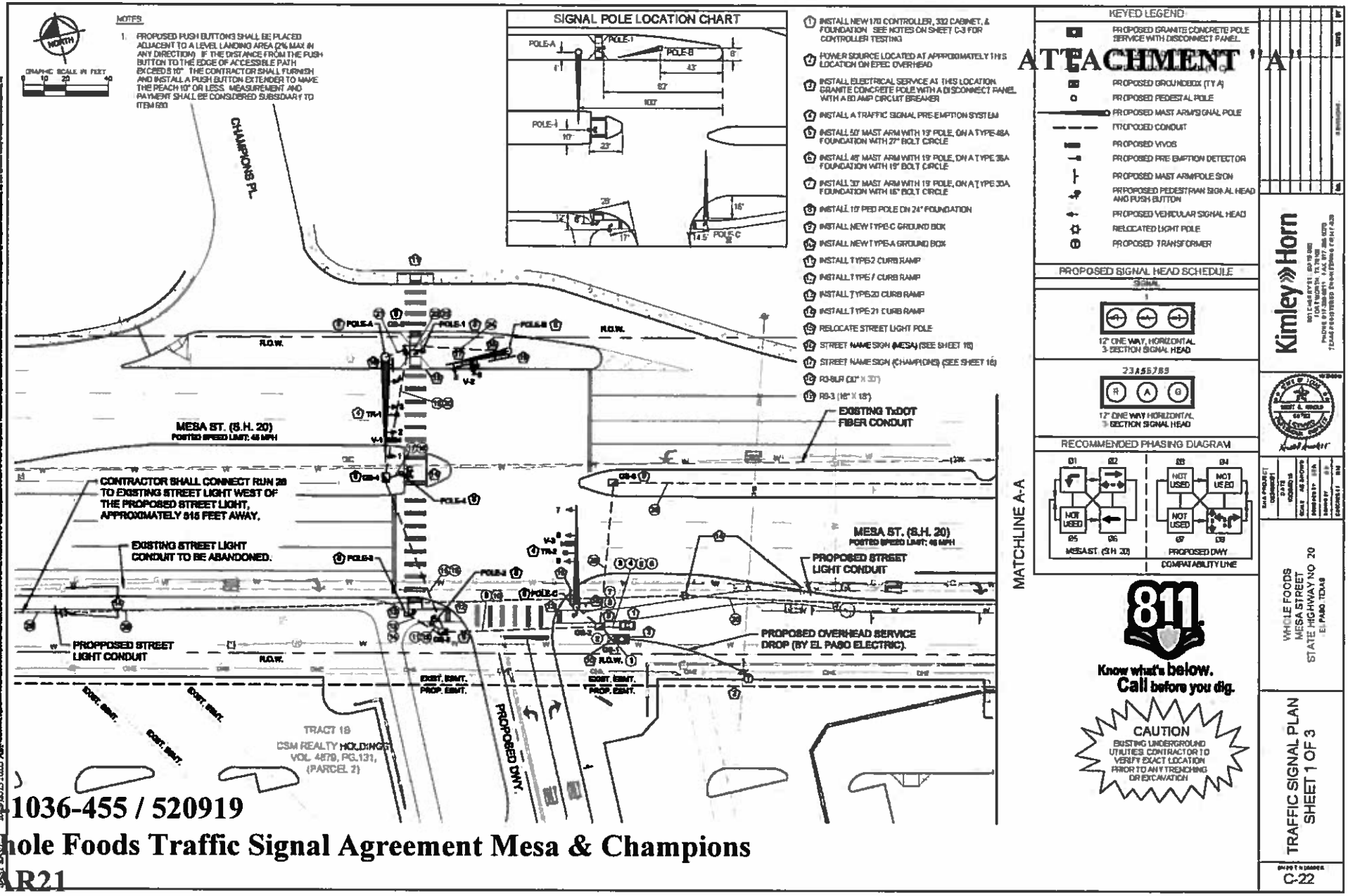
Kimley»Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO. 20
EL PASO, TEXAS

PAVING DETAIL SHEET

SHEET NUMBER
C-21

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR20



FP1036-455 / 520919

Whole Foods Traffic Signal Agreement Mesa & Champions

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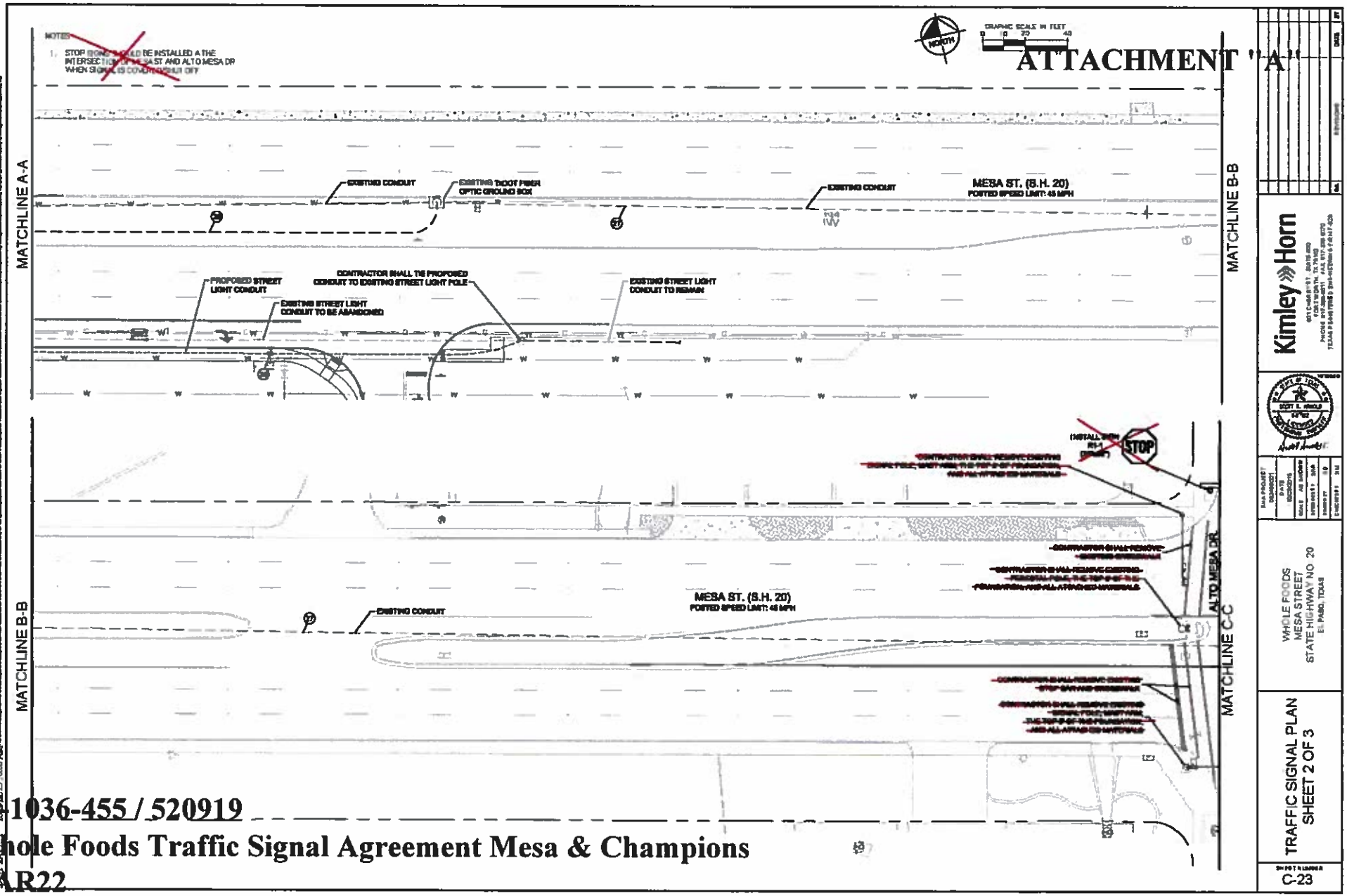

EP 1036-455 / 520919

Whole Foods Traffic Signal Agreement Mesa & Champions

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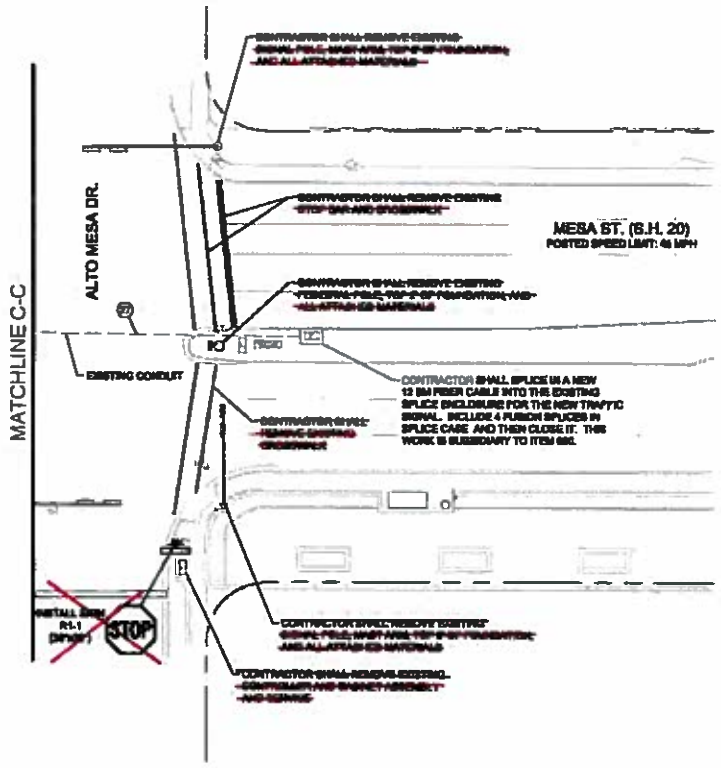
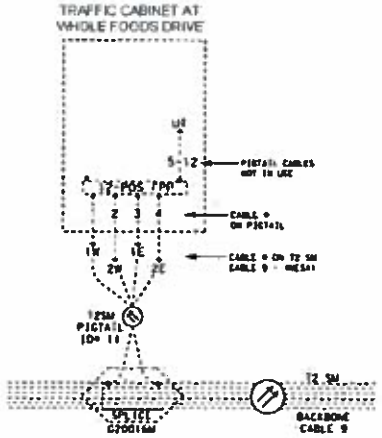
ATTACHMENT "A"

NOTES:

1. STOP SIGNS SHOULD BE INSTALLED AT THE INTERSECTION OF MESA ST AND ALTO MESA DR WHEN SIGNAL IS OVERRIDE/FLASH OFF.
2. PULL OUT EXISTING CONDUCTORS FROM EXISTING CONDUIT.
3. ONLY THE TOP 2' OF SIGNAL POLE FOUNDATIONS SHALL BE REMOVED.





I-1036-455 / 520919

Whole Foods Traffic Signal Agreement Mesa & Champions

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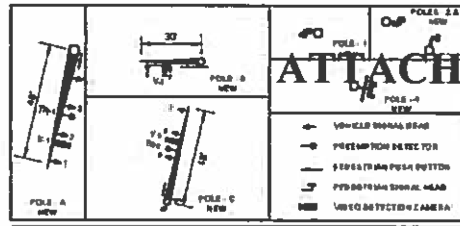
WHOLE FOODS
MESA STREET
STATE HIGHWAY NO 20
EL PASO, TEXAS

TRAFFIC SIGNAL PLAN
SHEET 3 OF 3

C-24

ATTACHMENT "A"



CONDUIT RUN #	LENGTH OF RUN (FT)	CONDUIT # (BORED)	CONDUIT SIZE (INCHES) (BORED)	CONDUIT # (TRENCH)	CONDUIT SIZE (INCHES) (TRENCH)	ELEC CONDUCTOR (NO. 6) INSULATED GROUND	ELEC CONDUCTOR (NO. 6) INSULATED POWER	TRF SIG CBL (TY A) (2 CONDR) (18 AWG) (APS)*	TRF SIG CBL (TY A) (3 CONDR) (18 AWG) W/COAXIAL	TRF SIG CBL (TY A) (4 CONDR) (18 AWG) (BUS PREMPT)	TRF SIG CBL (TY A) (12 CONDR) (12 AWG)	TRF SIG CBL (TY A) (19 CONDR) (12 AWG)	12 FOC SM PIGTAIL
1	5			1	2	1	2						
2	10			1	2	1	2						
3	15			1	2	1	2						1
4	15			1	2	1		5					
5	18			1	3	1			3	2	4		
6	15			1	3	1						3	
7	18			1	2	1		1		1			
8	15			1	3	1			1			1	
9	75	1	2			1		4		1			
10	75	1	3			1			2		4	2	
11	10			1	2	1		1					
12	10			1	3	1					1		
13	20			1	2	1		1					
14	20			1	3	1					1		
15	80	1	2			1		2		1			
16	80	1	3			1			2		3	3	
17	10			1	2	1		1					
18	10			1	3	1					1		
19	65	1	2			1		1		1			
20	65	1	3			1			2		1	2	
21	15			1	3	1			1	1		1	
22	10			1	2	1		1					
23	10			1	3	1					1		
24	40			1	3	1			1			1	
25	70	1	2			1							1
26	450			1	2	1							1
27	1,025		EXISTING										1
28	515			1	2	1	2						
29	295			1	2	1	2						
30	445			1	2	1	2						
TOTAL						2,475	2,570	665	505	280	635	535	1,580

*2 CONDR CBL SHALL NOT BE SPLICED. CABLE SHOULD BE RUN FROM CONTROLLER TO EACH PUSH BUTTON.

CONDUIT TOTALS (LF)	
2" TRENCH	1,705
2" BORE	400
3" TRENCH	150
3" BORE	220

LIGHT POLE FOUNDATION		
ITEM	QUANTITY	UNIT
DRILL SHAFT (RDWY ILL POLE) (30 IN)	16	LF

NUMBER OF CONDUCTORS FROM POLE BASE TO FIRE/TRANSIT TOMAR PREEMPTION DEVICE						
POLE ID	MAST ARM TRANSIT PREEMPT DEVICE				SUBTOTAL (FT)	CONDUCTOR (TYPE) (NO.) (SIZE)
	TP-1	TP-2				
POLE-A	56				56	(TY-A) (4 CONDR) (18 AWG)
POLE-C		56			56	(TY-A) (4 CONDR) (18 AWG)
TOTAL					112	

NUMBER OF CONDUCTORS FROM POLE BASE TO VIDEO DETECTION CAMERA					
POLE ID	VIVDS NO.			SUBTOTAL (FT)	SIAMESE CONDUCTORS CABLE (TY) (NO.) (SIZE) (COAXIAL)
	V-1	V-2	V-3		
POLE-A	68			68	(TY-A) (3 CONDR) (18 AWG) COMMUN. CABLE (COAXIAL)
POLE-B		43		43	(TY-A) (3 CONDR) (18 AWG) COMMUN. CABLE (COAXIAL)
POLE-C			56	56	(TY-A) (3 CONDR) (18 AWG) COMMUN. CABLE (COAXIAL)
TOTAL				167	

GROUND BOX SCHEDULE		
GROUND BOX ID#	TYPE-A	TYPE-C
GB-1	NEW	
GB-2		NEW
GB-3		NEW
GB-4		NEW
GB-5		NEW
GB-6		NEW
TOTAL	1	5

NUMBER OF CONDUCTORS FROM BASE TO SIGNAL HEAD											
POLE ID	VEHICLE SIGNAL HEAD NO.									SUBTOTAL (FT)	CONDUCTOR (TYPE) (NO.) (SIZE)
	1	2	3	4	5	6	7	8	9		
POLE-A	76	64	53	41						234	(TY-A) (7 CONDR) (12 AWG)
POLE-B					56	45				101	(TY-A) (7 CONDR) (12 AWG)
POLE-C							75	63	51	190	(TY-A) (7 CONDR) (12 AWG)
TOTAL										525	

NUMBER OF CONDUCTORS FROM POLE BASE TO PEDESTRIAN HEAD						
POLE	PEDESTRIAN SIGNAL HEAD NO				SUBTOTAL (FT)	CONDUCTOR (TYPE) (NO.) (SIZE)
	A-A	B-B	[illegible]	[illegible]		
[illegible]	[illegible]				18	(TY-A) (7 CONDR) (12 AWG)
POLE-1	16				16	(TY-A) (7 CONDR) (12 AWG)
POLE-2	[illegible]				[illegible]	(TY-A) (7 CONDR) (12 AWG)
[illegible]	[illegible]				[illegible]	[illegible]
POLE-4	[illegible]				32	(TY-A) (7 CONDR) (12 AWG)
TOTAL					86	

NUMBER OF CONDUCTORS FROM POLE BASE TO ACCESSIBLE PEDESTRIAN SIGNALS PUSH BUTTON						
POLE ID	PEDESTRIAN SIGNAL HEAD NO			PED PB	SUBTOTAL (FT)	CONDUCTOR (TYPE) (NO.) (SIZE)
	A-A	B-B	C-C			
POLE-C				5	5	(TY-A) (2 CONDR) (18 AWG)
POLE-1				5	5	(TY-A) (2 CONDR) (18 AWG)
POLE-2				6	6	(TY-A) (2 CONDR) (18 AWG)
[illegible]				[illegible]	[illegible]	(TY-A) (2 CONDR) (18 AWG)
POLE-4				6		(TY-A) (2 CONDR) (18 AWG)
TOTAL					25	

TRAFFIC SIGNAL, STRIPING, AND SIGNING QUANTITY SUMMARY				
ITEM NO.	TxDOT BID ITEM	DESCRIPTION	UNIT	QUANTITY
1	0416 6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	16
2	0416 6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	11
3	0416 6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	13
4	0416 6034	DRILL SHAFT (TRF SIG POLE) (48 IN)	LF	22
5	0500 6001	MOBILIZATION	LS	1
6	0502 6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3
7	0610 6004	RELOCATE RD IL ASM (TRANS-BASE)	EA	2
8	0618 6023	CONDT (PVC) (SCH 40) (2")	LF	1,705
9	0618 6024	CONDT (PVC) (SCH 40) (2") (BORE)	LF	400
10	0618 6029	CONDT (PVC) (SCH 40) (3")	LF	150
11	0618 6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	220
12	0620 6010	ELEC CONDR (NO.6) INSULATED (GROUND)*2	LF	2,475
13	0620 6010	ELEC CONDR (NO.6) INSULATED	LF	2,570
14	0624 6002	GROUND BOX TY A (122311) W/APRON	EA	1
15	0624 6008	GROUND BOX TY C (162911) W/APRON	EA	5
16	0628 6128	ELC SRV TY D 120/240 [illegible]	EA	1
17	0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	9
18	0644 6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	2
19	0662 6062	WK ZN PAV MRK REMOV (REFL) TY II-C-R	EA	12
20	[illegible]	REFL PAV MRK TY I (W) 4" (SLD) (100MIL)	LF	120
21	[illegible]	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	739
22	[illegible]	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	[illegible]
23	[illegible]	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	8
24	[illegible]	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	7
25	[illegible]	REFL PAV MRK TY I (Y) 4" (SLD) (100MIL)	LF	280
26	[illegible]	REFL PAV MRK TY II (W) 4" (SLD)	LF	120
27	[illegible]	REFL PAV MRK TY II (W) 8" (SLD)	LF	739
28	[illegible]	REFL PAV MRK TY II (W) 24" (SLD)	LF	[illegible]
29	[illegible]	REFL PAV MRK TY II (W) (ARROW)	EA	8
30	[illegible]	REFL PAV MRK TY II (W) (WORD)	EA	7
31	[illegible]	REFL PAV MRK TY II (Y) 4" (SLD)	LF	280
32	0672 6010	REFL PAV MRKR TY II-C-R	EA	61
33	0677 6001	ELIM EXT PAV MRK & MRKS (4")	LF	230
34	0677 6005	ELIM EXT PAV MRK & MRKS (12")	LF	421
35	0677 6007	ELIM EXT PAV MRK & MRKS (24")	LF	200
36	0678 6001	PAV SURF PREP FOR MRK (4")	LF	[illegible]
37	0678 6002	PAV SURF PREP FOR MRK (6")	LF	480
38	0678 6004	PAV SURF PREP FOR MRK (8")	LF	739
39	0678 6006	PAV SURF PREP FOR MRK (24")	LF	[illegible]
40	0678 6009	PAV SURF PREP FOR MRK (ARROW)	EA	8
41	0678 6016	PAV SURF PREP FOR MRK (WORD)	EA	7
42	0680 6002	INSTALL HWY TRF SIG (ISOLATED)*3	EA	1
43	0680 6004	REMOVING TRAFFIC SIGNALS	EA	1
44	0682 6001	VEH SIG SEC (12")LED(GRN) COMPLETE W/ HOUSING	EA	7
45	0682 6002	VEH SIG SEC (12")LED(GRN ARW) COMPLETE W/ HOUSING	EA	1
46	0682 6003	VEH SIG SEC (12")LED(YEL) COMPLETE W/ HOUSING	EA	7
47	0682 6004	VEH SIG SEC (12")LED(YEL ARW) COMPLETE W/ HOUSING	EA	1
48	0682 6005	VEH SIG SEC (12")LED(RED) COMPLETE W/ HOUSING	EA	7
49	0682 6006	VEH SIG SEC (12")LED(RED ARW) COMPLETE W/ HOUSING	EA	1
50	0682 6018	PED SIG SEC (LED)(COUNTDOWN) COMPLETE W/ HOUSING	EA	8
51	[illegible]	BACK PLATE (12")(3 SEC)(VENTED)(ALUM)	EA	8
52	0684 6007	TRF SIG CBL (TY A)(12 AWG)(2 CONDR)	LF	880
53	0684 6012	TRF SIG CBL (TY A)(12 AWG)(7 CONDR)	LF	621
54	0684 6017	TRF SIG CBL (TY A)(12 AWG)(12 CONDR)	LF	635
55	0684 6024	TRF SIG CBL (TY A)(12 AWG)(19 CONDR)	LF	535
56	0684 6054	TRF SIG CBL (TY A)(18 AWG)(3 CONDR)	LF	772
57	0684 6055	TRF SIG CBL (TY A)(18 AWG)(4 CONDR)	LF	738
58	0687 6001	PED POLE ASSEMBLY	EA	4
59	[illegible]	PED DETECT PUSH BUTTON (APS)	EA	8
60	[illegible]	PED DETECTOR CONTROLLER UNIT	EA	1
61	6002 6001	VIVDS PROCESSOR SYSTEM	EA	3
62	6002 6002	VIVDS CAMERA ASSEMBLY	EA	3
63	6002 6003	VIVDS SET-UP SYSTEM	EA	1
64	6007 6011	FIBER OPTIC CBL (SINGLE-MODE)(12 FIBER)	LF	1,500
65	6007 6023	FIBER OPTIC PATCH PANEL (12 POSITION)	EA	1
66	6027 6003	CONDUIT (PREPARE)	LF	1,025
67	6027 6008	GROUND BOX (PREPARE)	EA	1
68	6048 6004	RE PM W/RET REQ TY I (W)8"(SLD)	LF	480
69	6048 6012	RE PM W/RET REQ TY II (W)8"(SLD)	LF	480
70	—	INS TRF SIG PL AM(S)1 ARM(30') (ELP STD)	EA	1
71	—	INS TRF SIG PL AM(S)1 ARM(44') (ELP STD)	EA	1
72	—	INS TRF SIG PL AM(S)1 ARM(60') (ELP STD)	EA	1
73	—	TOMAR FIRE/TRANSIT PREEMPTION SYSTEM	EA	2

*2 GREEN GROUND WIRES

*3 CONTRACTOR SHALL FURNISH AND INSTALL A TYPE 332 CABINET AND A TYPE 170 CONTROLLER.

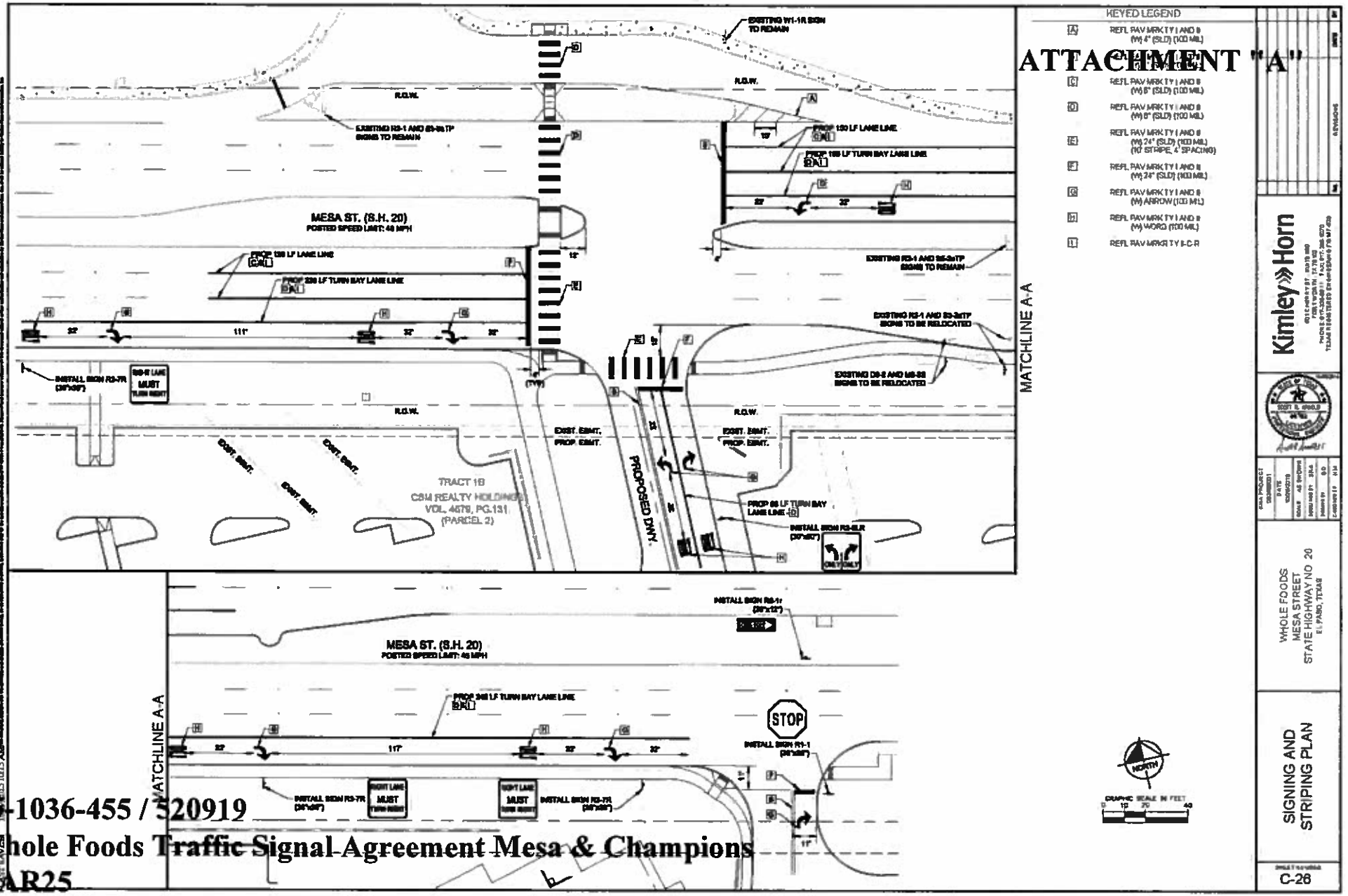
Kimley»Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO. 20
EL PASO, TEXAS

TRAFFIC SIGNAL QUANTITIES PLAN

SHEET NUMBER
C-25

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR24



15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR25

ATTACHMENT "A"

1.5" Radius, 0.5" Border, White on Green;
"100" Clearview Hwy-3-W; "Champions" Clearview Hwy-3-W 70% spacing; "PI" Clearview Hwy-3-W;

1.5" Radius, 0.5" Border, White on Green;
"6900" Clearview Hwy-3-W; "Mesa" Clearview Hwy-3-W 70% spacing;
"St" Clearview Hwy-3-W; "6800" Clearview Hwy-3-W;

1.5" Radius, 0.5" Border, White on Green;
"Champions" Clearview Hwy-3-W 70% spacing; "PI" Clearview Hwy-3-W; "100" Clearview Hwy-3-W;

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OAR26

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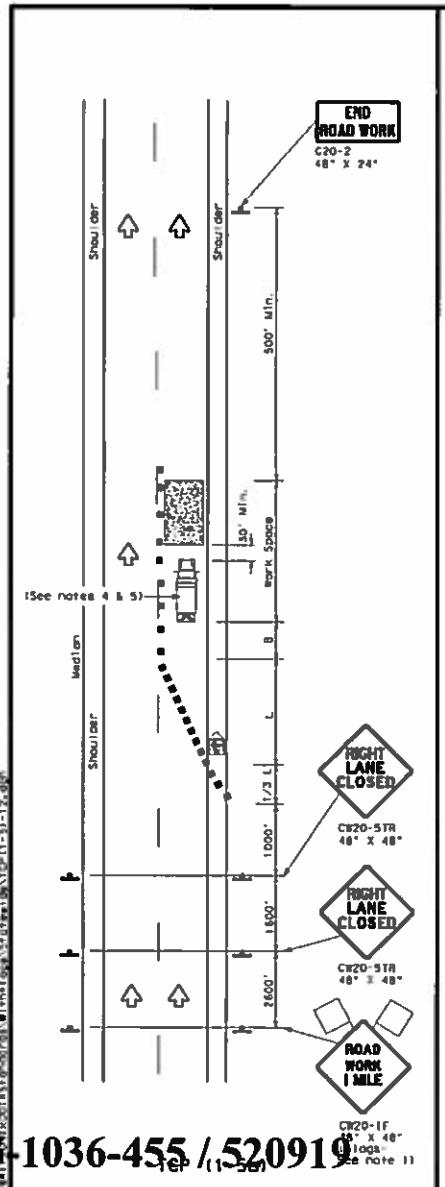
WHOLE FOODS
MESA STREET
STATE HIGHWAY NO. 20
EL PASO, TEXAS

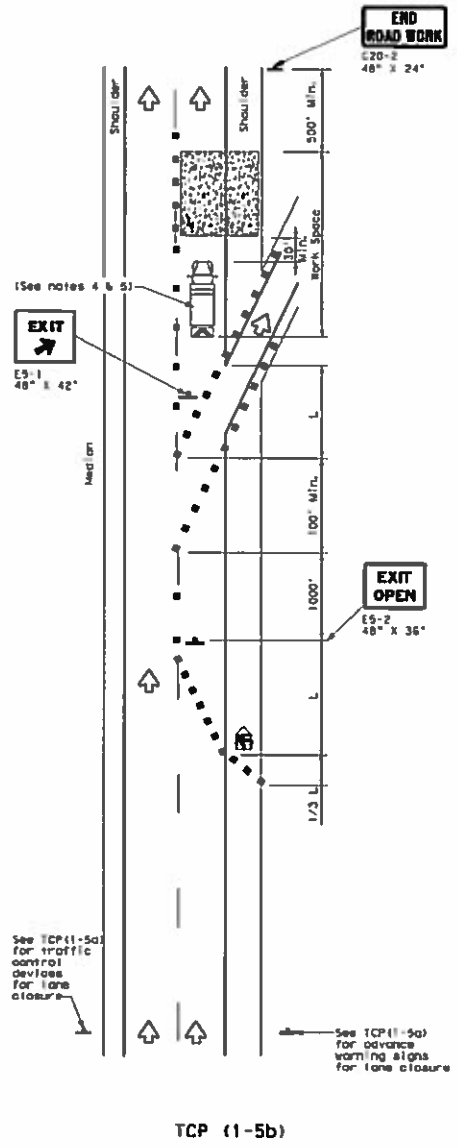
MAST ARM SIGN DETAILS

C-27



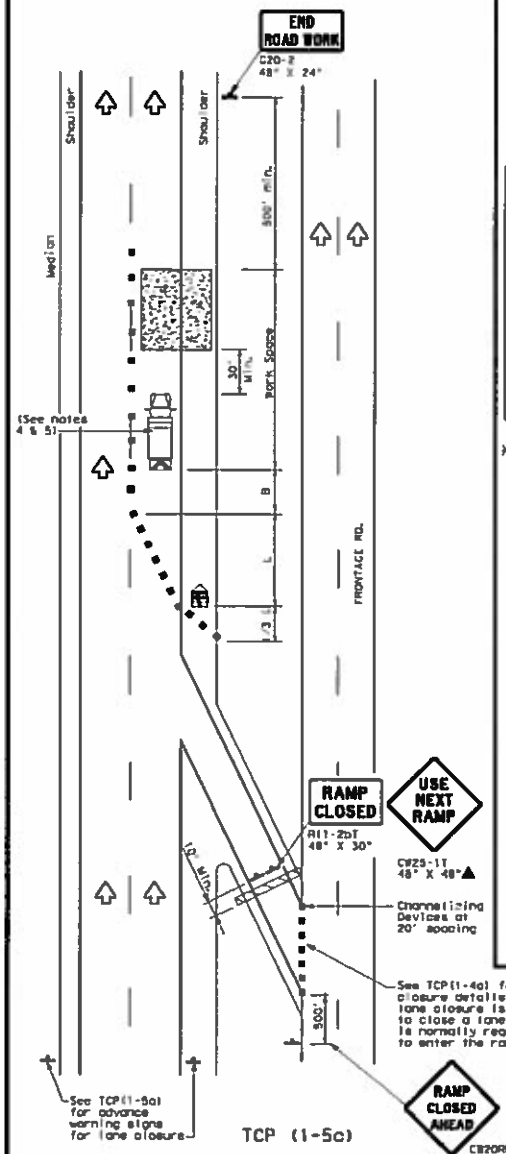
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Vehicle Mounted Impact Attenuator (IA)
	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(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. 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 Standards.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of area 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 in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-12

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REVISIONS	CONT	SECT	JOB	HIGHWAY
	---	---	---	SH 20
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		C-24

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
10. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.
11. Except for devices required by Note 10, 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 APPAREL NOTES:

[illegible] to traffic or to construction equipment [illegible] wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent [illegible] and labeled as ANSI 107-2004 standard [illegible] considered for high traffic volume work areas or night time work.

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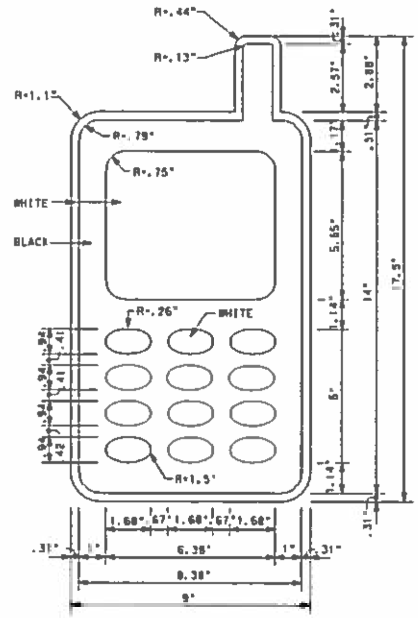

ATTACHMENT A

3.0" Radius, 1.25" Border, 0.75" Indent, Black on Yellow; (STAY ALERT) Font: D
3.0" Radius, 1.25" Border, 0.75" Indent, Black on Orange; (TALK OR TEXT LATER) Font: C specified length

SIGN DETAIL (G20-10T)

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3118

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

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn
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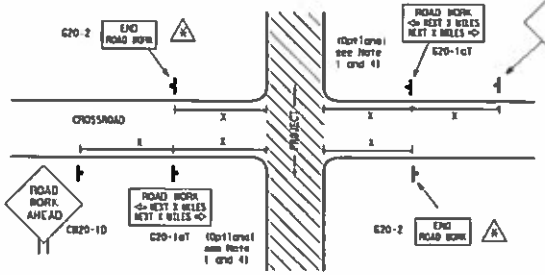
REVISIONS: 4-03 9-07 5-10 7-13 8-14
DN: TxDOT CK: TxDOT DW: TxDOT CK: TxDOT
DIST: ELP COUNTY: EL PASO

ATTACHMENT "A"

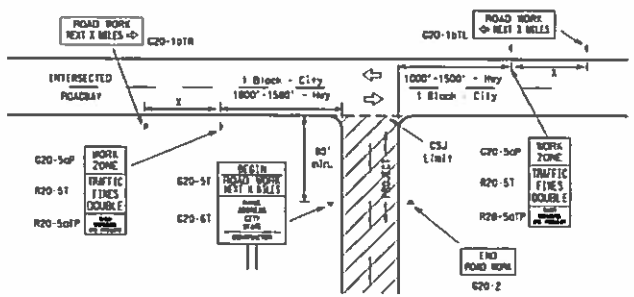
TYPICAL LOCATION OF CROSSROAD SIGNS



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

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (C20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(C20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(C20-1a)sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection the Contractor shall place the "CONTRACTOR NAME"(C20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow(C20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (C20-1bTR)" signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING [1,2,3]

Sign Number or Series	SIZE Conventional Road	SIZE Expressway/ Freeway	SPACING Posted Speed	SPACING Sign Spacing "X" Δ
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"	MPH	Feet (Approx.)
			30	120
			35	160
			40	240
			45	320
			50	400
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	55	500[2]
			60	600[2]
			65	700[2]
			70	800[2]
			75	900[2]
			80	1000[2]
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	Δ	Δ [3]

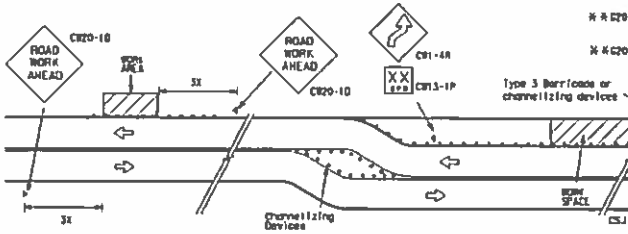
4 For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

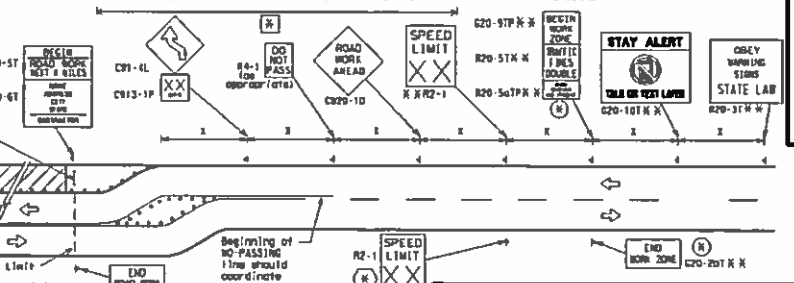
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

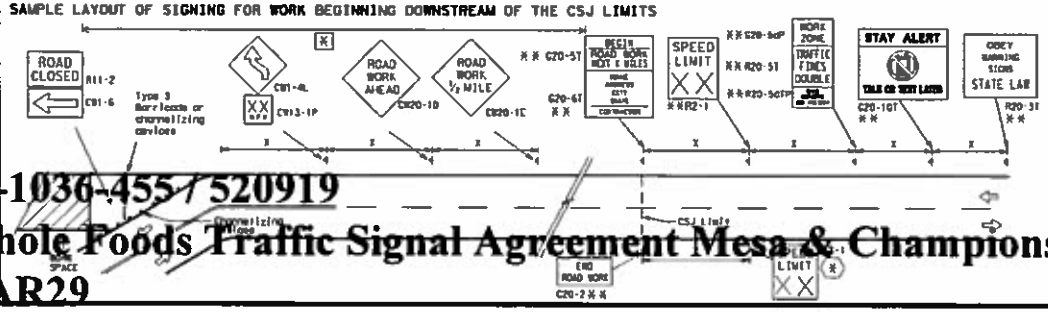


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



NOTES

The Contractor shall determine the appropriate distance to be placed on the C20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(C20-5T)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"(C20-9TP) and "END WORK ZONE" (C20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

* * Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

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

(X) Contractor will install a regulatory speed limit sign at the end of the work zone.

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

SHEET 2 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	---	---	---	SH 20
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	ELP	EL PASO		C-10

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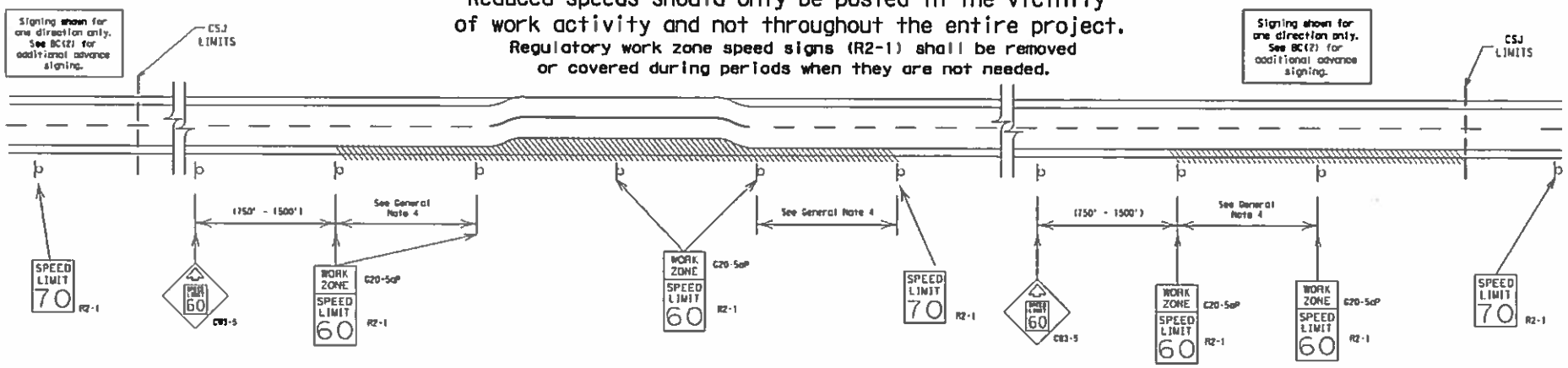
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

ATTACHMENT "A"

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 travelled way.

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

GENERAL NOTES

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

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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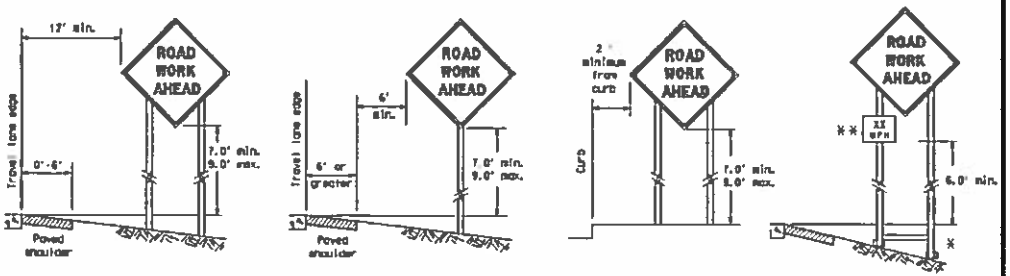
REVISIONS	---	---	---	SH 20
9-07 8-14	---	---	---	
7-13	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		C-31

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR30

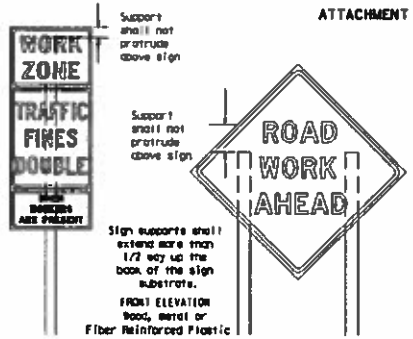
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



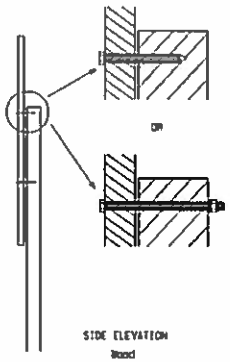
X When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS



Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the splice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert length should be at least 3 times nominal post size, centered on the splice and of at least the same gauge material.



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

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

STOP/SLOW PADDLES

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. [illegible] Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer [illegible] guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans [illegible] Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD). The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

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

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor studs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, consistantess sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

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BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

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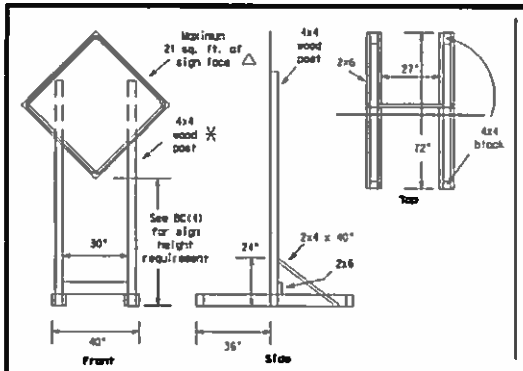
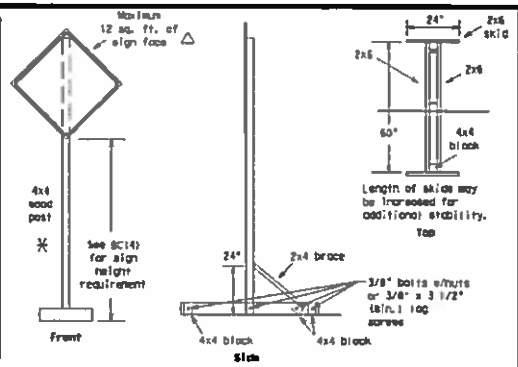
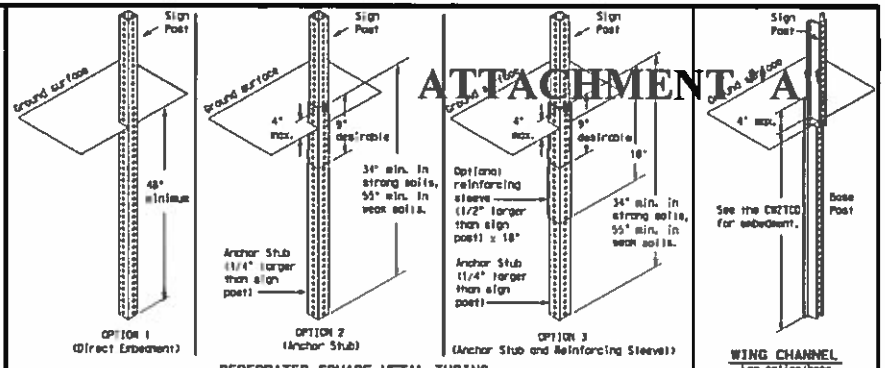
	ELP	EL PASO		C-37





SKID MOUNTED WOOD SIGN SUPPORTS

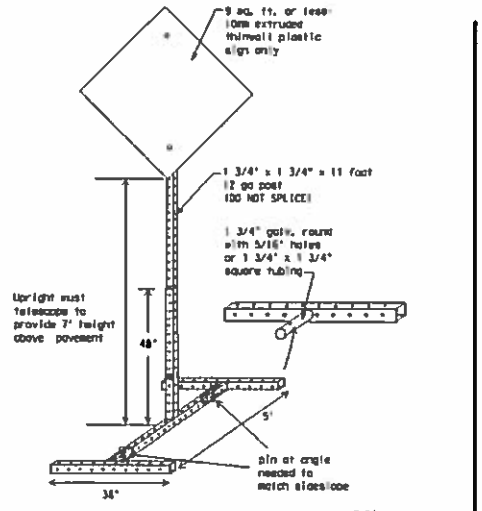
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

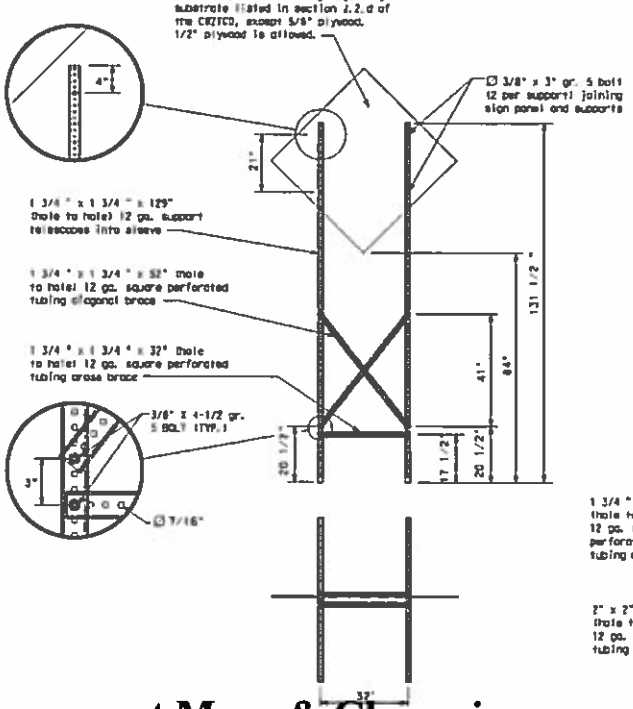


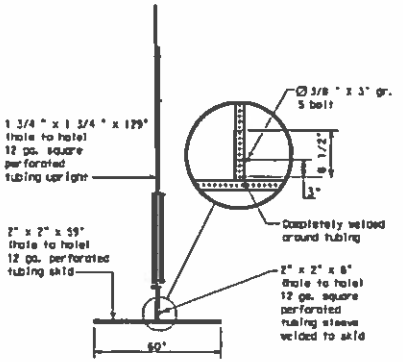
PERFORATED SQUARE METAL TUBING

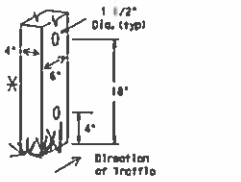
GROUND MOUNTED SIGN SUPPORTS

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









Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Holes Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CMTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered auxiliary to Item 502.

□ See BC(4) for definition of "Work Duration."

✳ Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

△ See the CMTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

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SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Cannot	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
Exit	E	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound	(route) S
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DWNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLRS
High-Occupancy Vehicle	HOV	Tuesday	TUES
Highway	HWY	Time Minutes	TIME MIN
Hour(s)	HR, HRS	Upper Level	UPR LEVEL
Information	INFO	Vehicles (s)	VEH, VEHS
Left	LFT	Warning	WARN
Left Lane	LFT LN	Wednesday	WED
Lane Closed	LN CLOSED	Weight Limit	WT LIMIT
Maintenance	MAINT	West	W
Monday	MON	Westbound	(route) W
		Width Restriction	WDTH RSTRCT

Abbreviation = IH-number, US-number, SH-number, FM-number

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

ATTACHMENT "A"

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Components List

Action to Take/Effect on Travel List

MERGE RIGHT	FORM X LINES RIGHT
DETOUR NEXT X EXITS	USE XXXXX RD EXIT
USE EXIT XXX	USE EXIT I-XX NORTH
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N
TRUCKS USE US XXX N	WATCH FOR TRUCKS
WATCH FOR TRUCKS	EXPECT DELAYS
EXPECT DELAYS	PREPARE TO STOP
REDUCE SPEED XXX FT	END SHOULDER USE
USE OTHER ROUTES	WATCH FOR WORKERS
STAY IN LANE *	

Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXX TO XXXXXXX
US XXX TO FM XXXX

Warning List

SPEED LIMIT XX MPH
MAXIMUM SPEED XX MPH
MINIMUM SPEED XX MPH
ADVISORY SPEED XX MPH
RIGHT LANE EXIT
USE CAUTION
DRIVE SAFELY
DRIVE WITH CARE

** Advance Notice List

TUE-FRI XX AM- X PM
APR XX- XX X PM-X AM
BEGINS MONDAY
BEGINS MAY XX
MAY X-X XX PM - XX AM
NEXT FRI-SUN
XX AM TO XX PM
NEXT TUE AUG XX
TONIGHT XX PM- XX AM

* See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phase is used.

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

FULL MATRIX PCMS SIGNS

1. When full matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol" (CW20-7), are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it [illegible] supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
3. [illegible]
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same type arrow.

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

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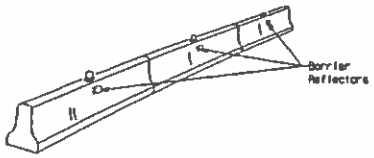
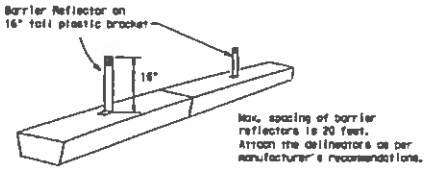
©TxDOT November 2002	CONT: 1421	JOB		HIGHWAY
REVISIONS				SH 249
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	ODP	EL PASO		C 34

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

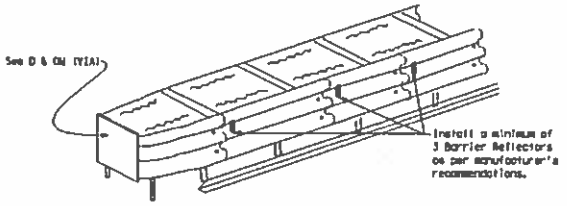


CONCRETE TRAFFIC BARRIER (CTB)

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



LOW PROFILE CONCRETE BARRIER (LPCB)

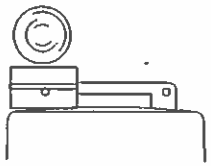


DELINEATION OF END TREATMENTS

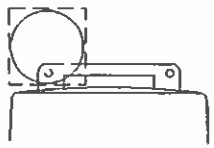
END TREATMENTS FOR
CTB'S USED
IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

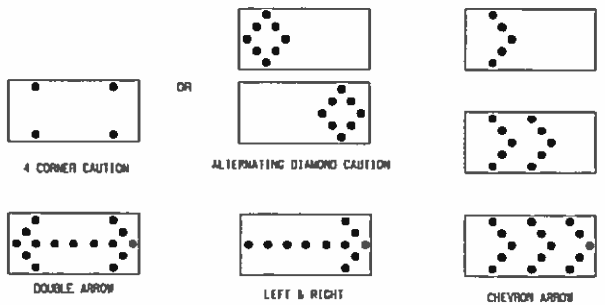
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

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

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work area is on extended distance from the TMA.

SHEET 7 OF 12

Texas Department of Transportation

Traffic Operations Division Standard

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

BC(7)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				SH 20
9-07 8-14				
7-13	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		C-35

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

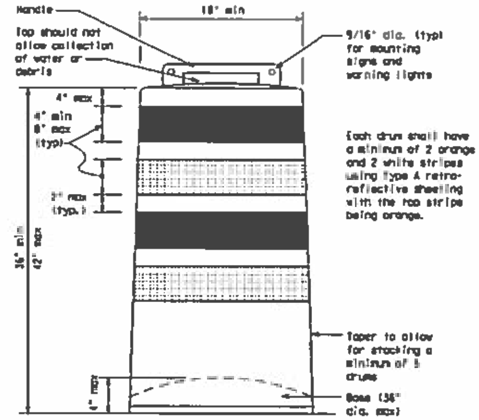
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

RETROREFLECTIVE SHEETING

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

BALLAST

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



ATTACHMENT "A"

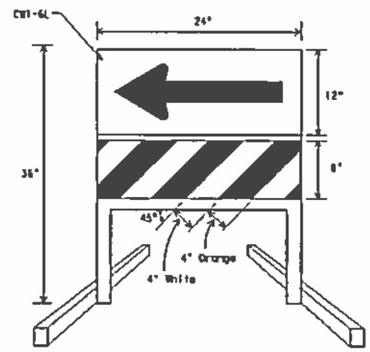
18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer

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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

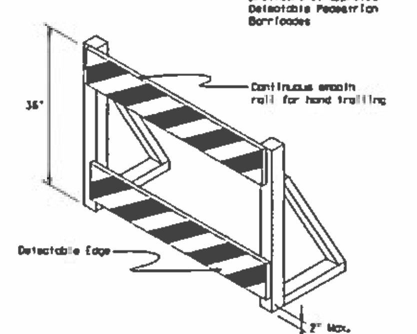
1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face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



DIRECTION INDICATOR BARRICADE

1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.

This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades



DETECTABLE PEDESTRIAN BARRICADES

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

SHEET 8 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

FILE: bc-14.dgn
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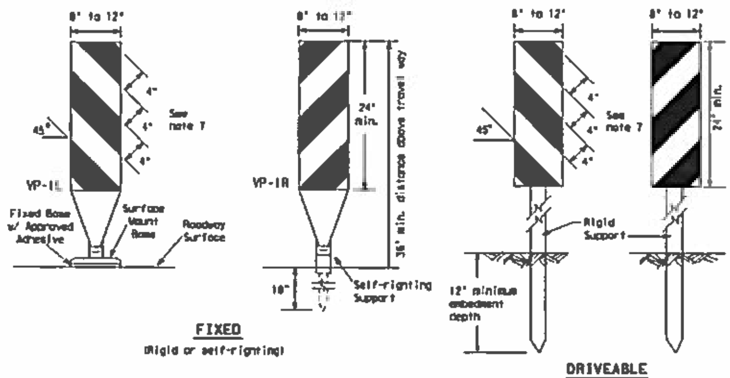
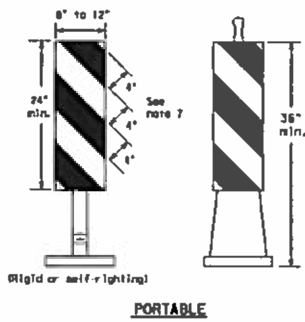
REVISIONS
4-03 7-13
9-07 8-14
DIST: ELP
COUNTY: EL PASO
SHEET NO. C-36

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR35

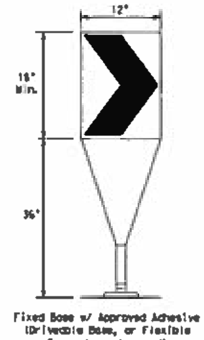
ATTACHMENT "A"





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

VERTICAL PANELS (VPs)

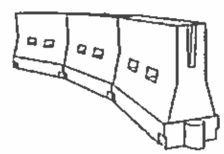


1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10) placed 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 NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

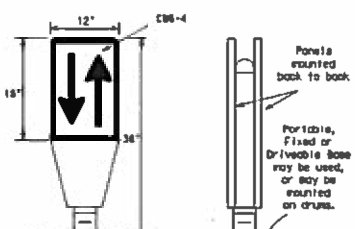
If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

SHEET 9 OF 12

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

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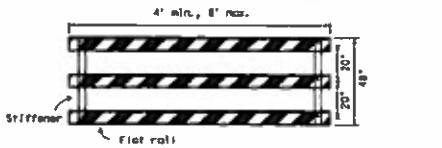
15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR36

TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.

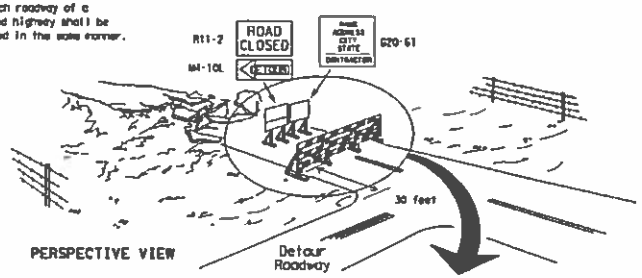
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

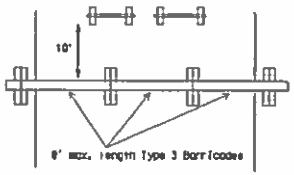
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.

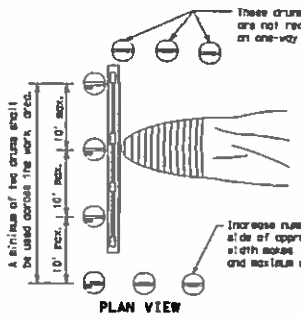


PLAN VIEW

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

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION

PERSPECTIVE VIEW

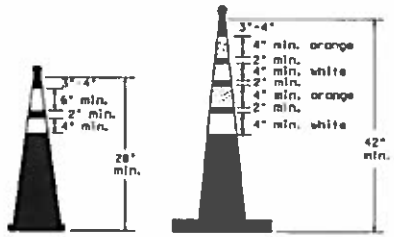


PLAN VIEW

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

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

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



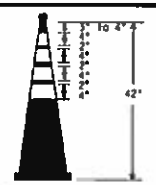
Two-Piece cones | One-Piece cones | Tubular Marker

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

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

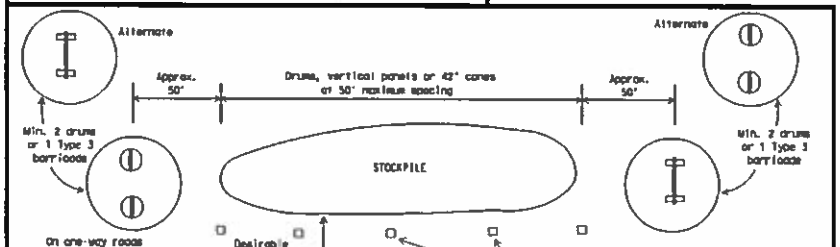
1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added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

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



EDGELINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping patterns four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

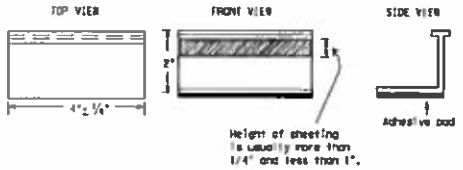
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 150 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material not applied on butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

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

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

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

ATTACHMENT "A"

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Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

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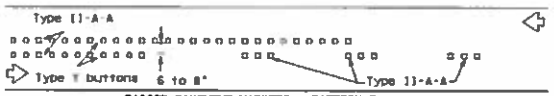
PAVEMENT MARKING PATTERNS

REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

RAISED PAVEMENT MARKERS - PATTERN A

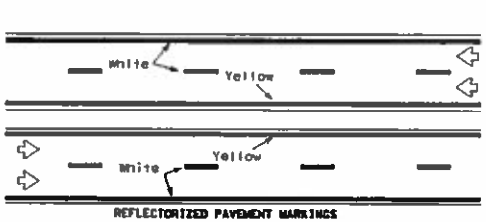
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



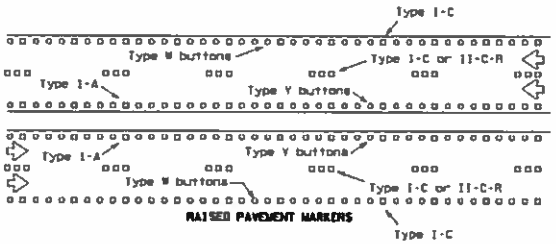
RAISED PAVEMENT MARKERS - PATTERN B

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

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



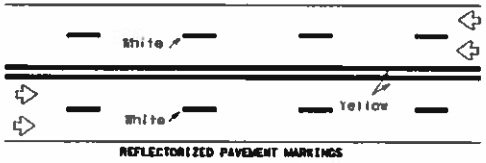
REFLECTORIZED PAVEMENT MARKINGS



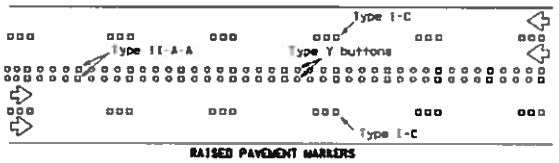
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



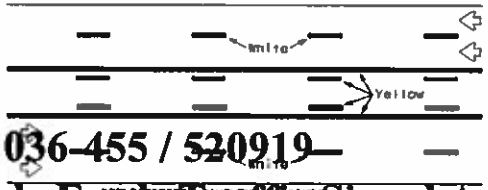
REFLECTORIZED PAVEMENT MARKINGS



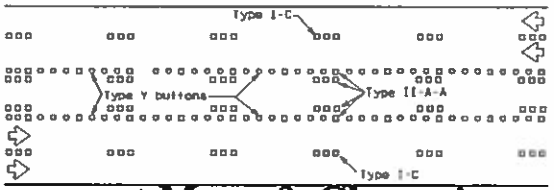
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

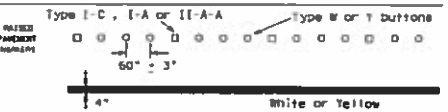
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

ATTACHMENT A

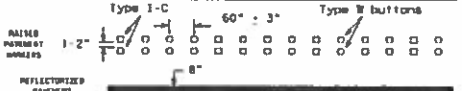
SOLID LINES

DOUBLE NO-PASSING LINE

EDGE LINE OR SINGLE NO-PASSING LINE

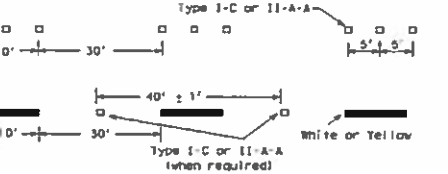


WIDE LINE



BROKEN LINES

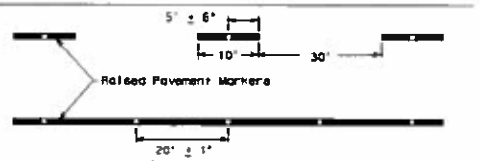
CENTER LINE OR LANE LINE



AUXILIARY OR LANEDROP LINE

REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

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Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

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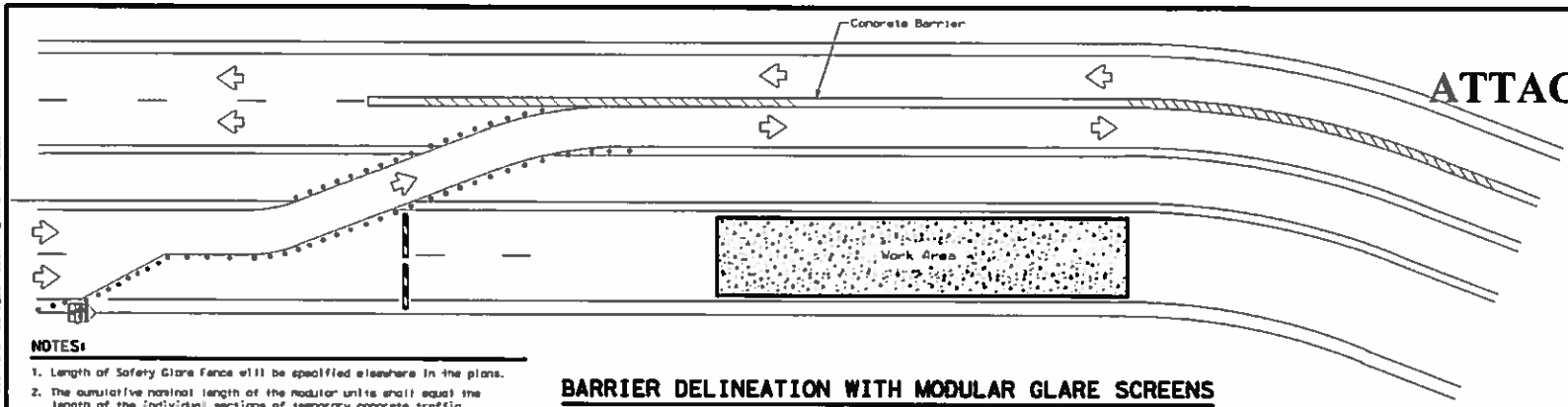
1-97 9-07				
7-96 7-13	DIST	COUNTY		SHEET NO.
11-07 8-14	ELP	EL PASO		C-43



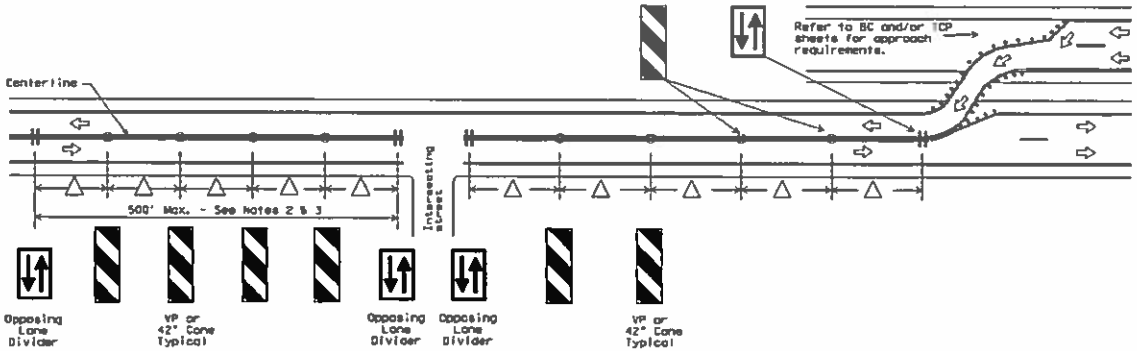
LEGEND

	Type 3 Barricade
	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	Sign
	Safety glare fence

NOTES:

1. Length of Safety Glare Fence will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one unit.
3. Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

BARRIER DELINEATION WITH MODULAR GLARE SCREENS



VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100'.
3. [illegible] An OTLD should
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain these in their proper position should be noted elsewhere in the plans.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-13

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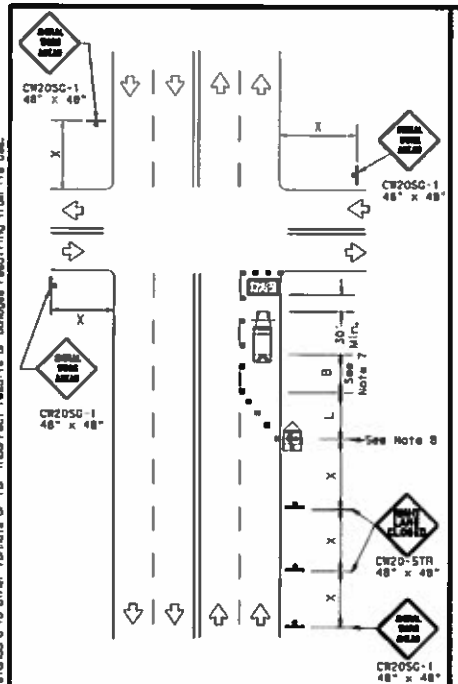
REVISIONS					SH 78
4-98					
3-03		DIST	COUNTY		SHEET NO.
7-13		ELP	EL PASO		C-41

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR40

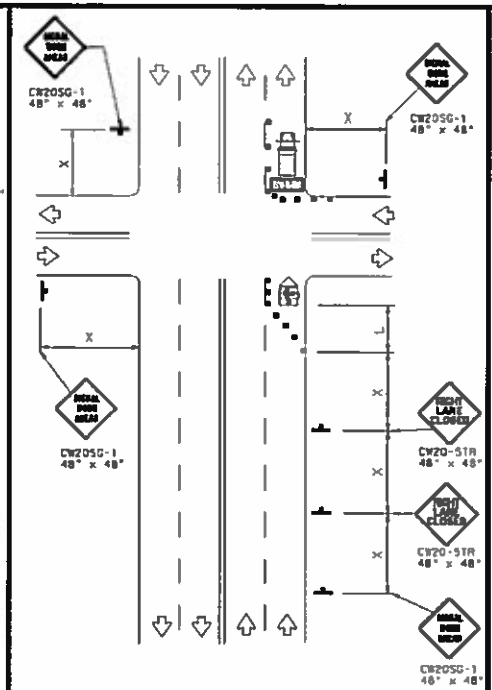
ATTACHMENT A

ATTACHMENT A



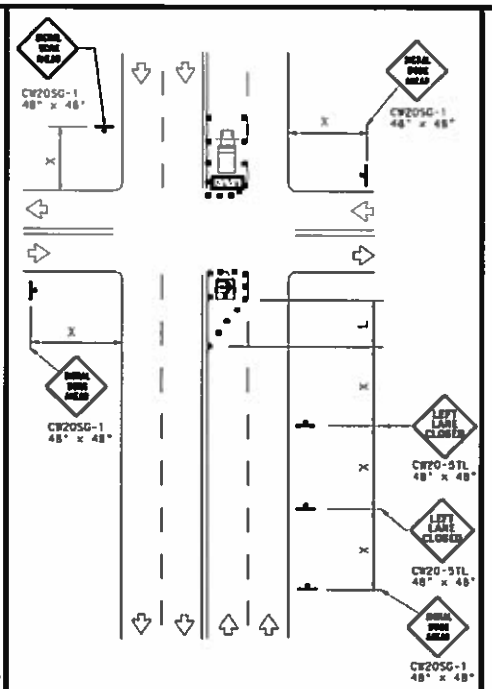
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE RIGHT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY

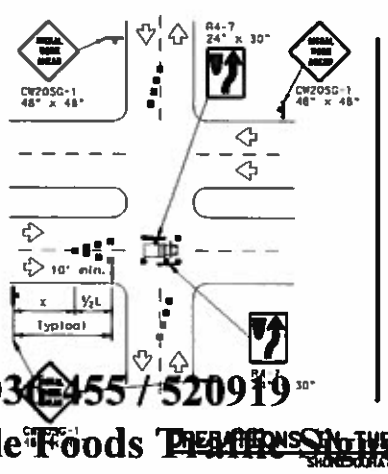
LEGEND			
	Type Barricade		Channelizing Devices
	Truck Mounted Attenuator (TMA)		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

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	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		450'	495'	540'	45'	90'	320'	195'
50	L=WS	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

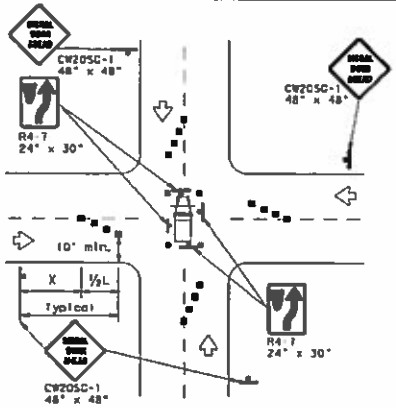
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.



PREPARATIONS AT THE INTERSECTION

SHORT DURATION



GENERAL NOTES

1. The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
2. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
3. Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
4. Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
5. High level warning devices (flag trees) may be used at corners of the vehicle.
6. When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
7. For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
8. The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
9. Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for [illegible] by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

SHEET 1 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE: wzbts13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	---	---	---	SH 20
7-98 10-95 7-13	DIST	COUNTY		SHEET NO.
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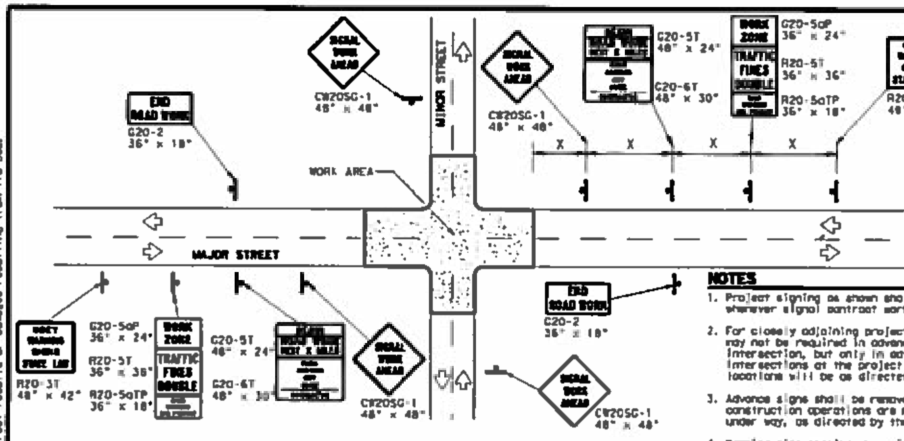


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

1. Project signing as shown shall be in place whenever signal contract work is in progress.
2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
4. Warning sign spacing shown is typical for both directions.
5. See the Table on sheet 1 of 2 for typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
8. Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
9. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover [illegible] properties under [illegible] the sign sheeting. [illegible] aluminum shall not be used to cover signs.
3. [illegible] other [illegible] material [illegible] NOT [illegible] affixed to a [illegible]
4. Signs and anchor stubs shall be removed and holes backfilled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

SIGN SUPPORT WEIGHTS

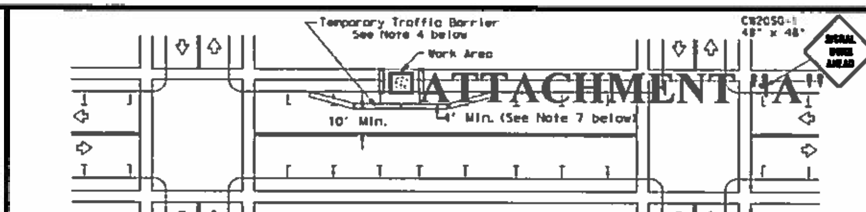
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber, such as tire inner tubes, shall not be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

LEGEND	
(symbol)	Sign
(symbol)	Channelizing Devices
(symbol)	Type 3 Barricade

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

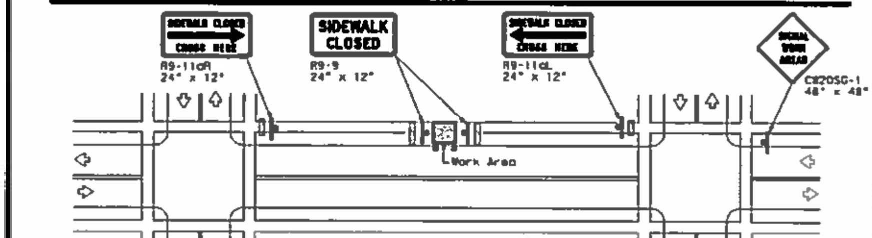
COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
WHITE	BACKGROUND	TYPE A SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

Only pre-qualified products shall be used. A copy of the "[illegible]" [illegible] be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm

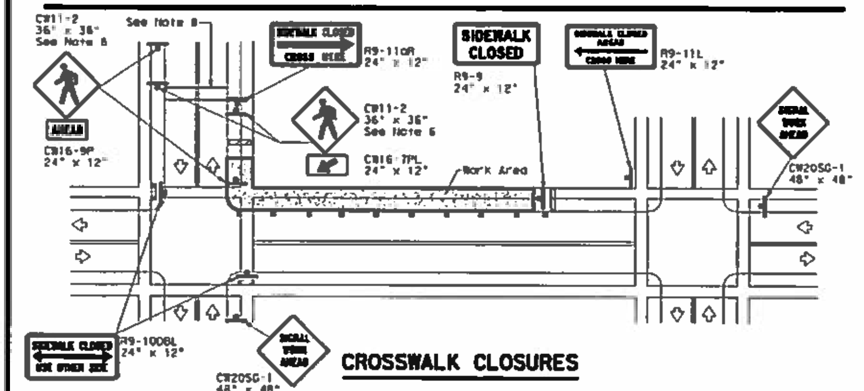


ATTACHMENT "A"

SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
3. R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
5. Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practical.
8. Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
[illegible] When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

SHEET 2 OF 2

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

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© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS				SH 20
2-98 10-99 7-13 4-98 3-03	DIST	COUNTY		SHEET NO.
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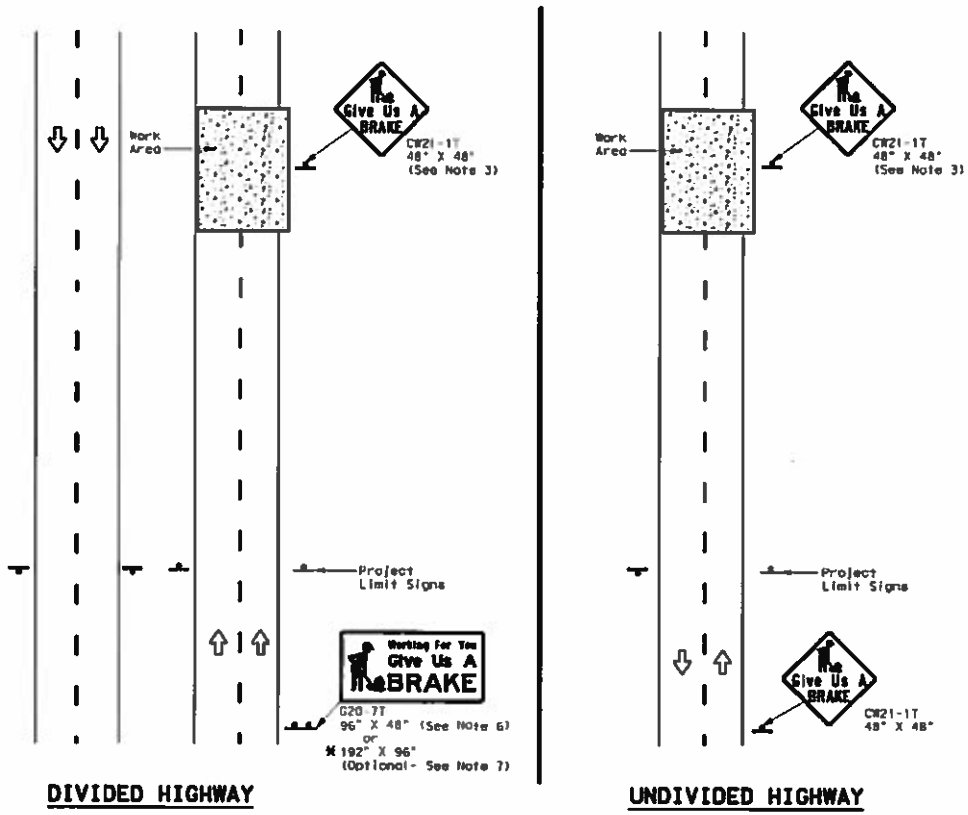

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

* When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	RETROREFLECTIVE SHEETING		GALVANIZED STRUCTURAL STEEL ▲▲ (LF)			DRILLED SHAFT 24" DIA. (LF)
						Size	①	②	
Orange	G20-7T	Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND

	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS

PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL}
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   - Item 636 - Aluminum Signs
   - Item 647 - Large Roadside Sign Supports and Assemblies.
   - Item 416 - Drilled Shaft Foundations
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.

Texas Department of Transportation | Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

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REVISIONS				SH 20
8-96 5-98 7-13				SHEET NO.
8-96 3-03				C 44

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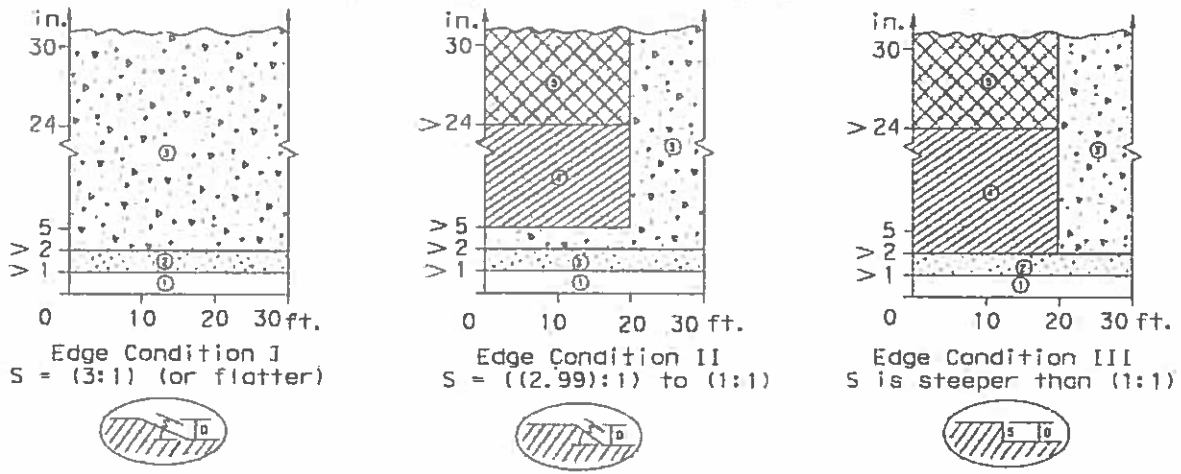
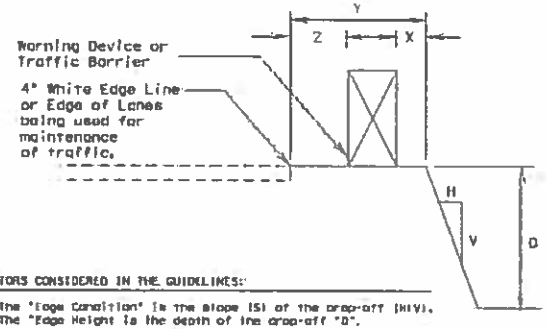
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet





FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height" is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone 5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may [illegible] and barriers. Right-angled edges, [illegible] and located within a lateral offset of 6 feet, may indicate a higher level of treatment.

[illegible] a desired 11 to 12 feet or 10 feet minimum [illegible] provide an edge slope such as Edge Condition I.

Zone	Treatment Types Guidelines:
①	No treatment.
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a "Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW 8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge fill may be provided to change the edge slope to that of the preferable Edge Condition I.
⑤	Check indications (Figure-1) for positive barrier. Where positive barrier is not indicated, the treatment shown above for Zone 4 may be used after consideration of other applicable factors.

Edge Condition Notes:

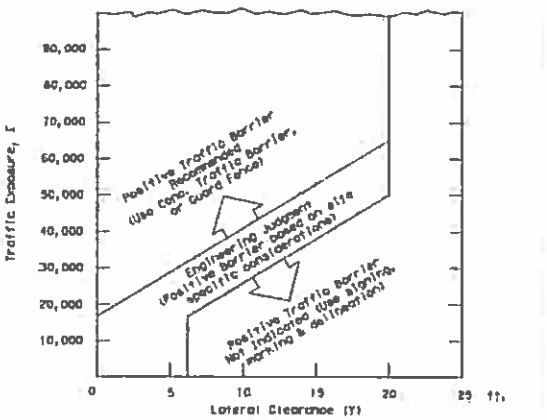
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1to 1) as long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 5 inches. As "D" exceeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

[illegible] Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5



1. E = ADT x T
   Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.

2. Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.

3. An approved end treatment should be provided for any positive barrier and located within a lateral offset of 20 feet from the edge of the travel lane.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's online manuals.

Engineer's Seal

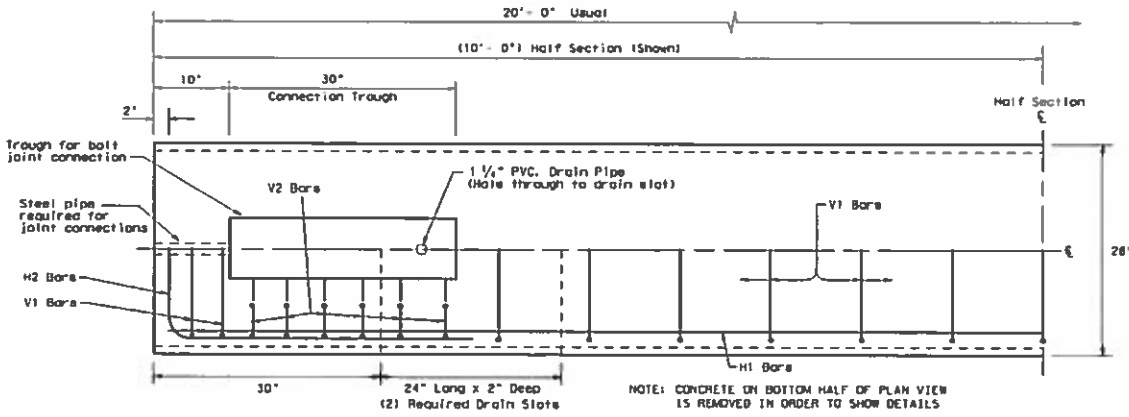
STATE OF TEXAS
SCOTT R. ARNOLD
96782
LICENSED PROFESSIONAL ENGINEER

Date 10/30/2015

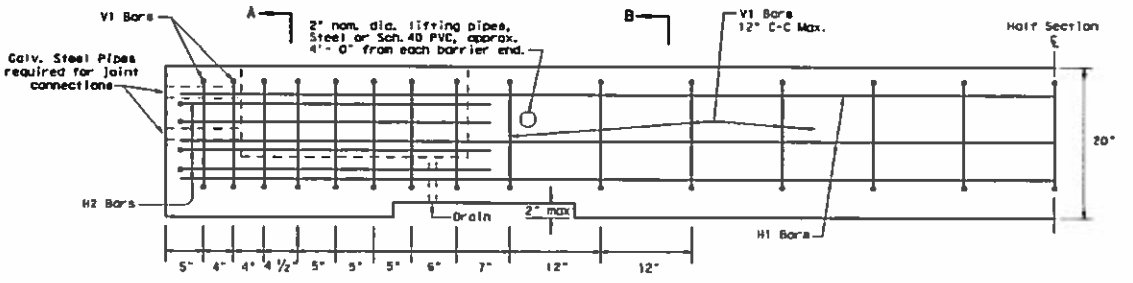
Texas Department of Transportation
Traffic Operations Division

TREATMENT FOR VARIOUS EDGE CONDITIONS

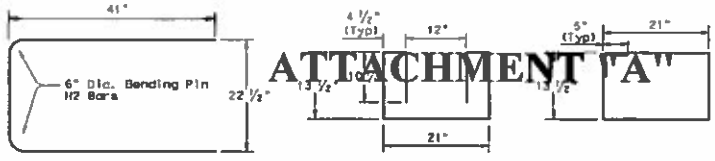
(C)TxDOT August 1998	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
	CONT	SECT	JOB	HIGHWAY
03-01				SH 20
06-01 control type	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		C-45



PLAN
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)

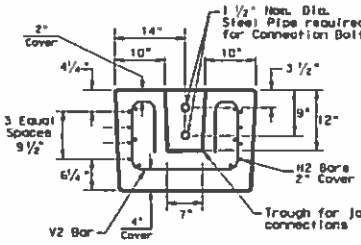


ELEVATION
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)

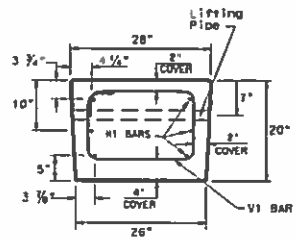


REINFORCING STEEL DETAILS
TYPE 1 - BARRIER SEGMENT

Note: Use 2" Dia. Bending Pin, unless otherwise shown



SECTION A-A



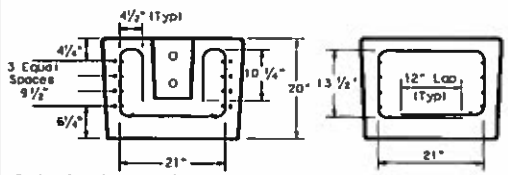
SECTION B-B

GENERAL NOTES

1. Low Profile Concrete Barrier (LPCB), is approved for use in temporary work zone locations, where the posted speed is 45 mph, or less.
2. Concrete shall be Class H for precast barrier with a minimum compressive strength of 3,600 psi.
3. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
4. Precast LPCB barrier length shall be 20 ft.
5. All barrier edges shall have ¾" chamfer or a tooled radius.
6. Joint connection hardware shall be in accordance with Item 449, "Anchor Bolts," and is considered subsidiary.
7. Steel pipe required for joint connection bolts shall be galvanized in accordance with Item 445, "Galvanizing."
8. Welded wire reinforcement (WWR) may be used in lieu of conventional reinforcement for Type 1 barrier, and shall meet the requirements shown.

FOR CONTRACTORS INFORMATION ONLY

(TYPE 1) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	2.6
REINFORCING STEEL	LBS	330
TOTAL BARRIER WT.	LBS	11000



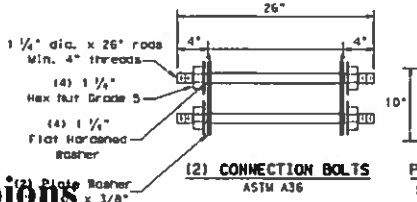
(WWR) GENERAL NOTES

1. Deformed Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded wire cage may be cut or bent, if necessary, but must be approved by the Engineer.
3. Combinations of reinforcing steel and WWR are permitted, as directed by the Engineer. The dimensions from the end of the barrier section to the first wire shall not exceed 3".

REQUIRED (WWR) WIRE DESIGN

8 - (D31) Horizontal Wires (Equally spaced)
10 - (D20) Horizontal Wires (Equally spaced)
29 - (D20) Vertical Wires (Spaced as shown in Elevation View)

WELDED WIRE REINFORCEMENT (WWR) OPTIONAL REINFORCING



(2) CONNECTION BOLTS
ASTM A36

PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

SHEET 1 OF 2

Texas Department of Transportation

Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER
(TYPE 1)
LPCB-13

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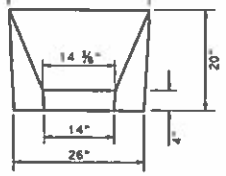
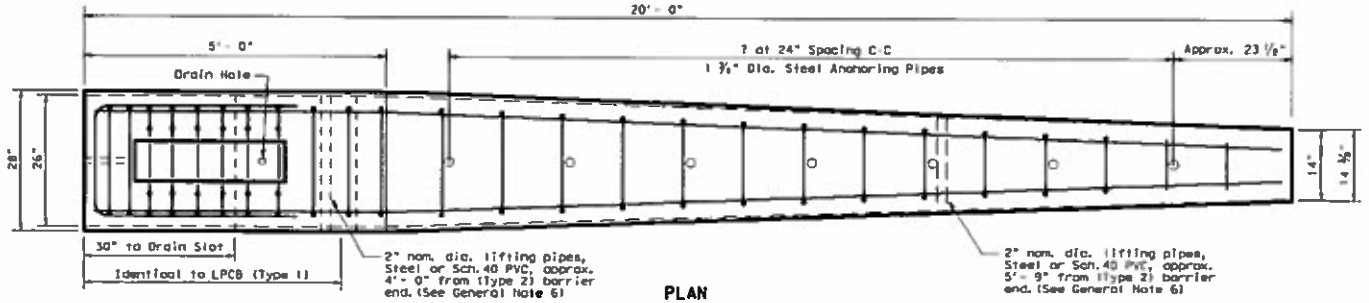
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		C-48

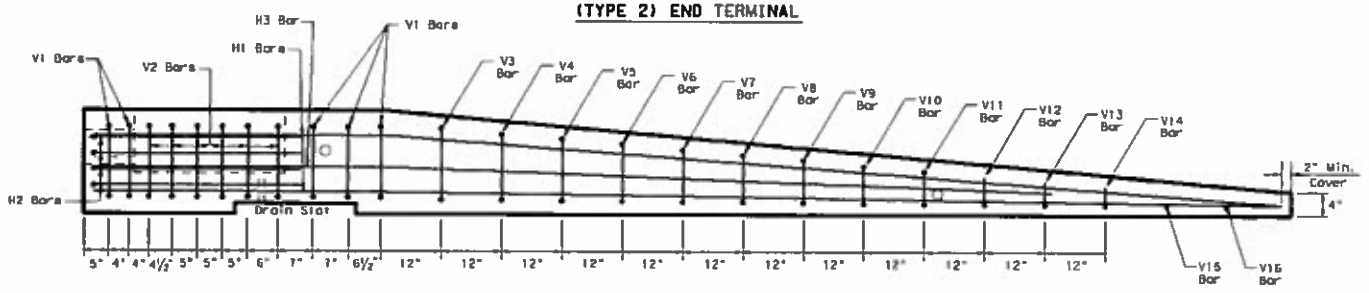
ATTACHMENT "A"



APPROACH VIEW



PLAN
(TYPE 2) END TERMINAL

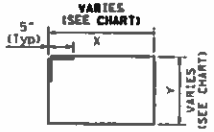


ELEVATION
(TYPE 2) END TERMINAL

Note:
Anchoring pipes not shown in Elevation View

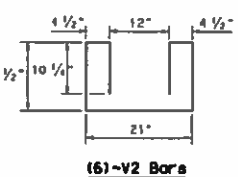
TYPE 2 - NOTES

1. Welded wire reinforcement (WWR) is "not" an option for Type 2 Barrier.
2. Type 2 Barrier shall be used as an end treatment for the Type 1 barrier segments, when applicable.
3. The end treatment can be used without the anchor pins in locations that can accommodate approximately 4 ft. of lateral displacement of the end treatment. The use of non-pinned end treatment does not affect the performance or the deflection of the Low-Profile barrier system.
4. The anchor pins are all the same length and are to be driven flush with the top of the (Type 2) barrier surface.
5. The bends in the H3 and H1 bars are slight, no formal bend is necessary.
6. The Type 2 barrier segment must be lifted from the rear first, to prevent cracking of sloped section.
7. See LPCB sheet 1 for additional information.

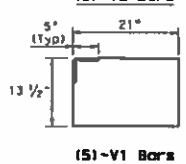


V3-V14 Bars

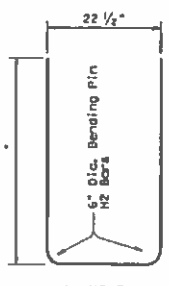
BAR (#4)	X (IN.)	Y (IN.)
V3 BAR	20 ⅛	14 ½
V4 BAR	19 ⅛	13 ½
V5 BAR	18 ½	12 ⅛
V6 BAR	17 ½	11 ⅛
V7 BAR	17	10 ¼
V8 BAR	16 ⅛	9
V9 BAR	15 ½	8
V10 BAR	14 ½	7
V11 BAR	13 ¾	6



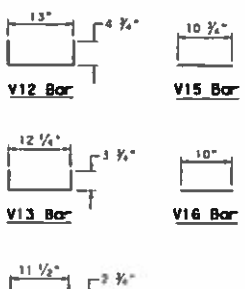
(6)-V2 Bars



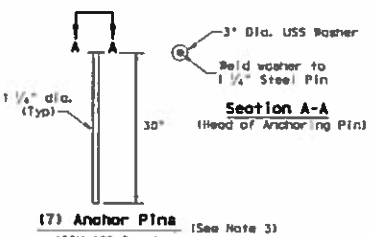
(5)-V1 Bars



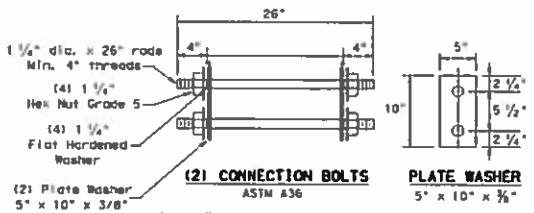
(4)-H2 Bars
(#5) Bars



Note: All V Bars are (#4)



(7) Anchor Pins
ASTM A36 Steel (See Note 3)



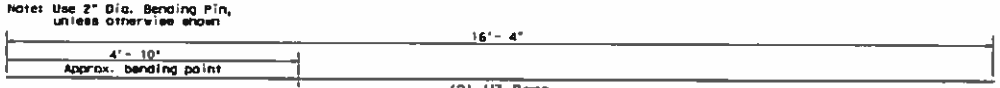
(2) CONNECTION BOLTS
ASTM A36

PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

REINFORCING STEEL DETAILS
TYPE 2 - END TERMINAL

Note: Use 2" Dia. Bending Pin, unless otherwise shown



(2)-H3 Bars
(#5) Bar

Note: Bends on H1 and H3 bars are slight and do not require formal bends.

(4)-H1 Bars
(#5) Bar

FOR CONTRACTORS INFORMATION ONLY

(TYPE 2) APPROX. QUANTITIES	20 FT. SECTION	
CONCRETE	CY	1.65
REINFORCING STEEL	LBS	240
TOTAL BARRIER WT.	LBS	7000

SHEET 2 OF 2

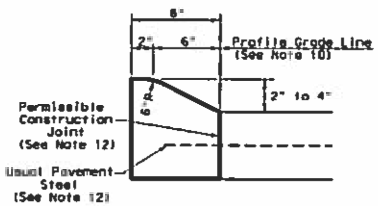
Texas Department of Transportation

Design Division Standard

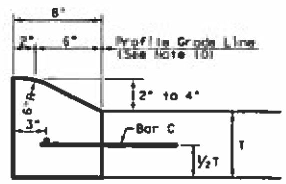
LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 2)
LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: TP	CK:
©TxDOT December 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	---	---	---	DIST: 20
	DIST	COUNTY		SHEET NO.
	CL P&SD			C-17

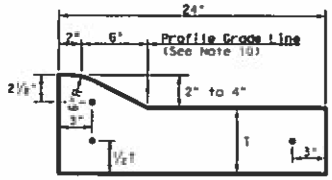
15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR46



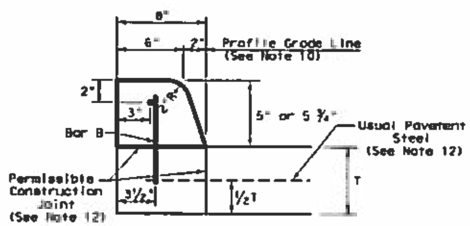
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



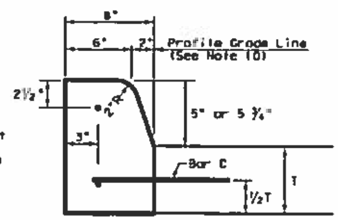
TYPE I CURB
2" - 4" HEIGHT



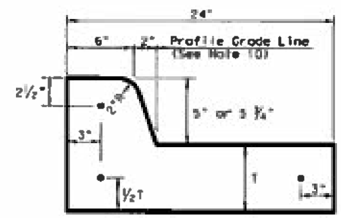
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



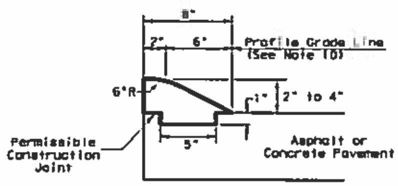
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



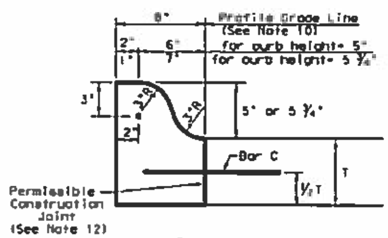
TYPE II CURB
5" - 5 ¾" HEIGHT



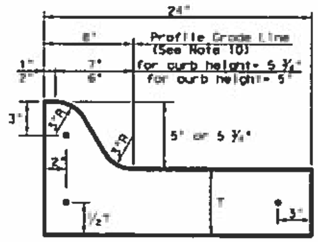
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



TYPE III CURB (KEYED)
2" - 4" HEIGHT

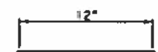


TYPE IIa CURB
5" - 5 ¾" HEIGHT

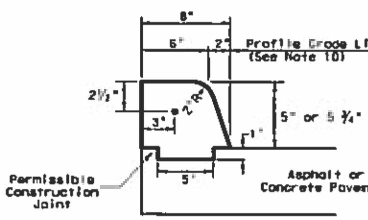


TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT

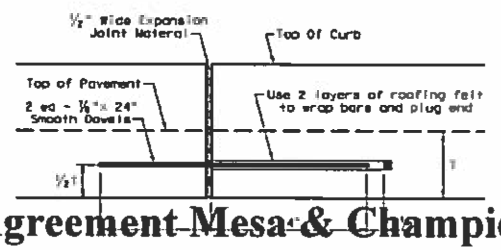
BAR B



BAR C

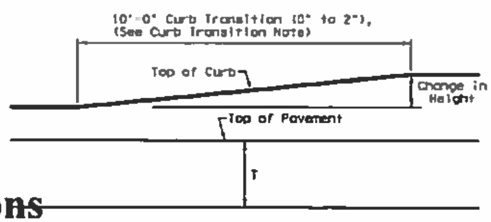


TYPE III CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

Curb Transition Note:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

General Notes

1. All [illegible] and [illegible] with [illegible] Combination Curb and Gutter.
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Producer List (MPL), maintained by TxDOT, Construction Division.
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is placed on existing concrete pavement, the pavement shall be drilled and the reinforcing bars grouted in place.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C-C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When vertical permissible construction joints are used, resulting in a longitudinal construction joint in the pavement, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans for longitudinal construction joints. Reinforcing steel for curb section shall then conform to that required for concrete curb.

Texas Department of Transportation
Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

CCCG-12

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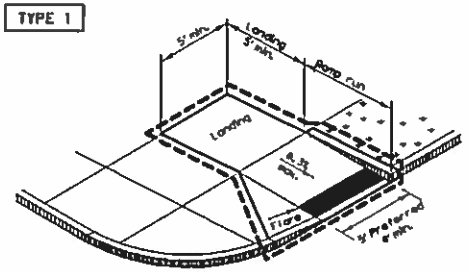
EL PASO

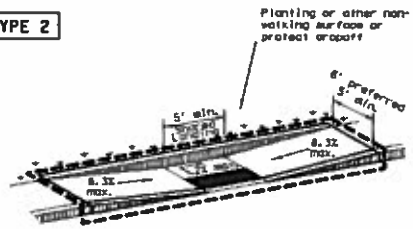
ATTACHMENT "A"

TYPE 1



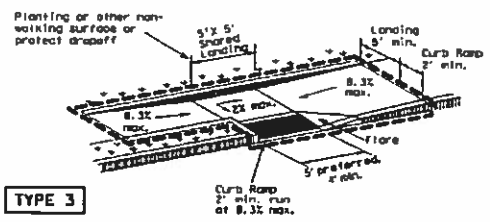
PERPENDICULAR CURB RAMP

TYPE 2

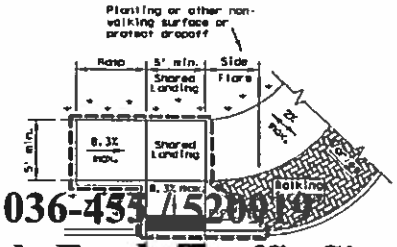


PARALLEL CURB RAMP
(Use only where water will not pond in the landing.)

TYPE 3

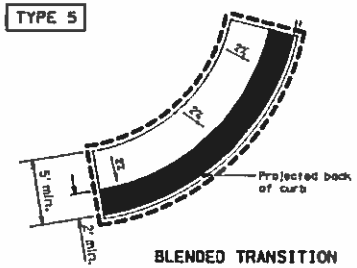


TYPE 4



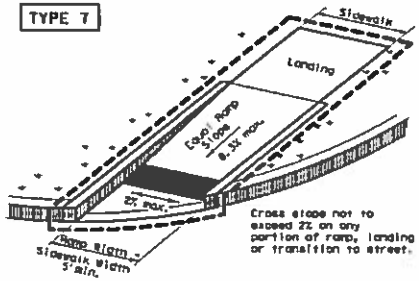
COMBINATION CURB RAMPS

TYPE 5



BLENDED TRANSITION

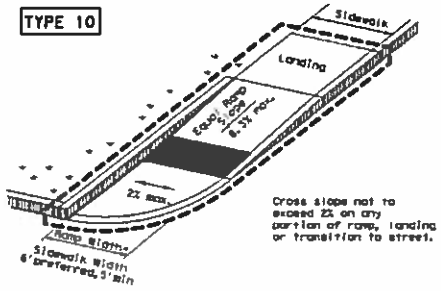
TYPE 7



Cross slope not to exceed 2% on any portion of ramp, landing or transition to street.

(Sidewalk set back from curb)

TYPE 10

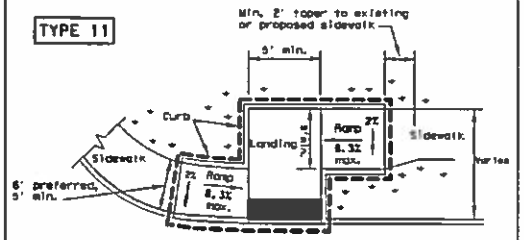


Cross slope not to exceed 2% on any portion of ramp, landing or transition to street.

(Sidewalk adjacent to curb)

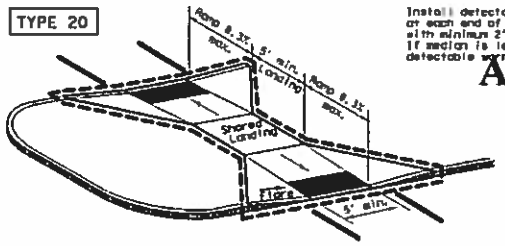
DIRECTIONAL RAMPS WITHIN RADIUS

TYPE 11



OFFSET PARALLEL CURB RAMP

TYPE 20



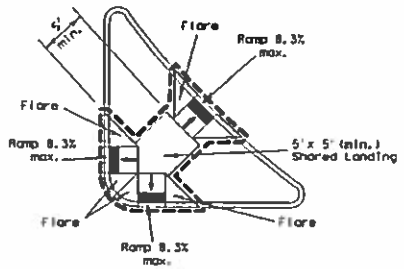
Install detectable warning surface at each end of cut-through ramp with minimum 2' smooth surface between. If median is less than 6' wide, eliminate detectable warning surface.

CURB RAMPS AT MEDIAN ISLANDS

TYPE 21

Curb details are shown elsewhere in the plans.

TYPE 22



COMBINATION ISLAND RAMPS

NOTES / LEGEND:

See General Notes on sheet 2 of 4 for more information.

Denotes planting or non-walking surface not part of pedestrian circulation path.

Ramp Limits of Payment

Detectable Warning Surface

SHEET 1 OF 4

Texas Department of Transportation
Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

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REVISIONS		---	---	---	SH 28
9/9 June 13, 2012		DIST	COUNTY		SHEET NO.
		ELP	EL PASO		C-49

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ATTACHMENT "A"

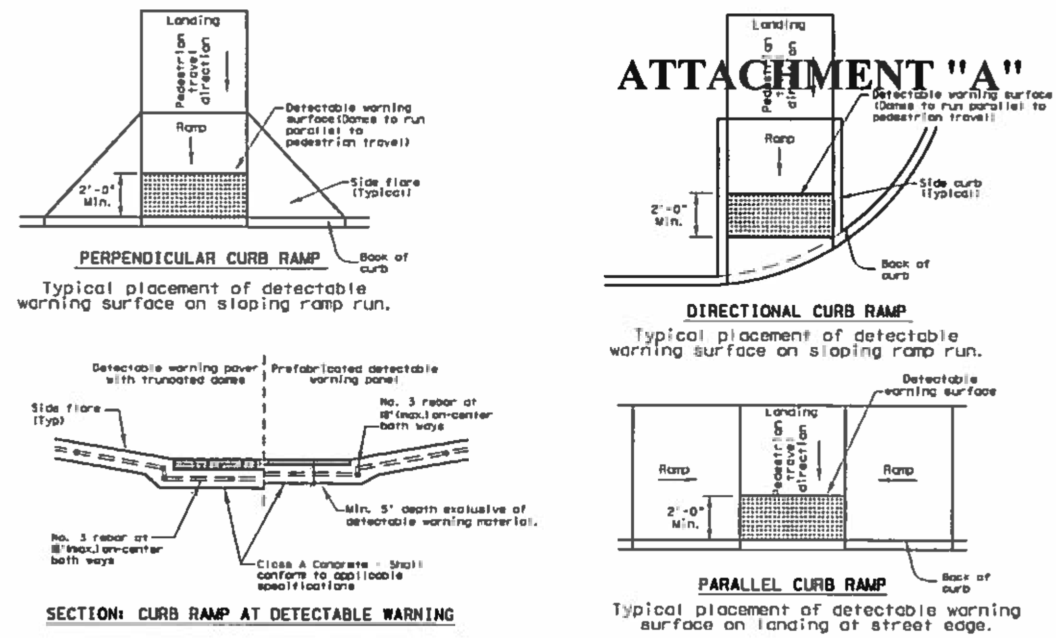
General Notes

Curb Ramps

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Lesser slopes that will still drain properly should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
4. Landings shall be 5'x 5' minimum with a maximum 2% slope in any direction.
5. Maneuvering space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
6. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the current edition of the Texas Accessibility Standards (TAS) and 16 TAC 68.102.
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Handrails are not required on curb ramps. Provide curb ramps wherever an accessible route crosses (penetrates) a curb.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Provide a smooth transition where the curb ramps connect to the street.
16. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
17. Existing features that comply with TAS may remain in place unless otherwise shown on the plans.

Detectable Warning Material

18. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with Section 705 of the TAS. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
19. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
20. Detectable warning surfaces must be slip resistant and not allow water to accumulate.
21. Detectable warning surfaces shall be a minimum of 24" in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
22. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb. Align the rows of domes to be perpendicular to the grade break between the ramp run and the street. Detectable warning surfaces may be curved ...
23. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.



DETECTABLE WARNINGS

Detectable Warning Pavers

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

Sidewalks

26. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within one or more reach ranges specified in TAS 308.
27. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
28. Street grades and cross slopes shall be as shown elsewhere in the plans.
29. Changes in level greater than 1/4 inch are not permitted.
30. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than 5% must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with TAS 505.
31. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
32. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
33. Sidewalk ... where in the plans.

SHEET 2 OF 4

Texas Department of Transportation
Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

FILE: ped12a.dgn	DN: TxDOT	CK:	DW: TxDOT	CK:
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REVISIONS				
VP June 13, 2012				
	DIST	COUNTY		SHEET NO.
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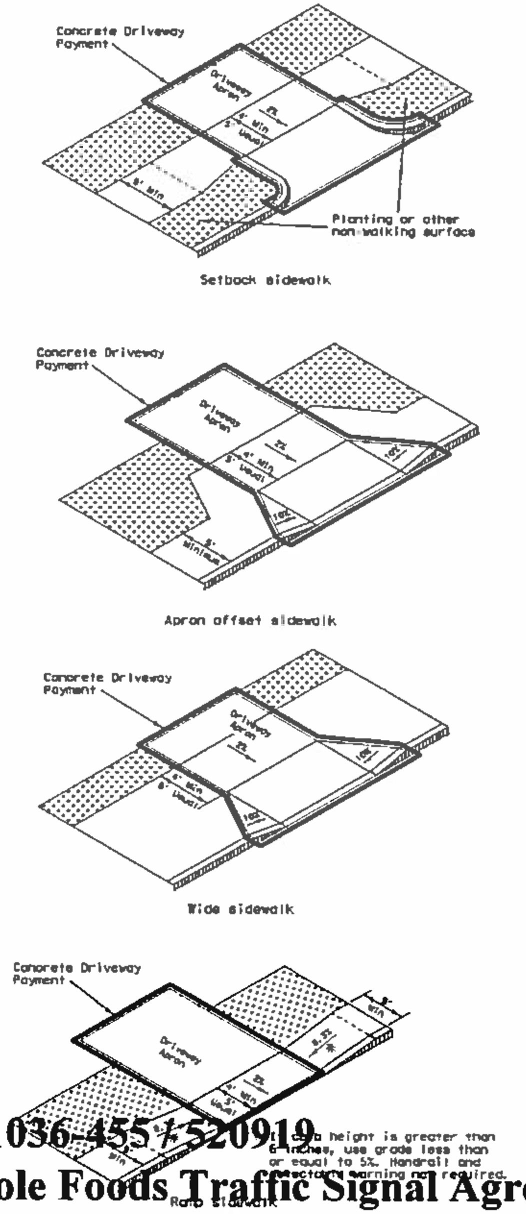
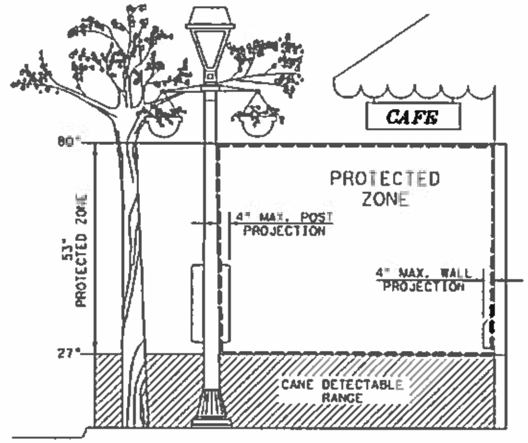
ATTACHMENT "A"



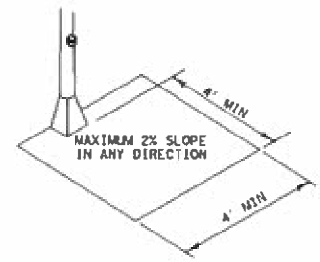
If curb height is greater than 6 inches, use grade less than or equal to 5%. Handrail and detectable warning not required.

SIDEWALK TREATMENT AT DRIVEWAYS

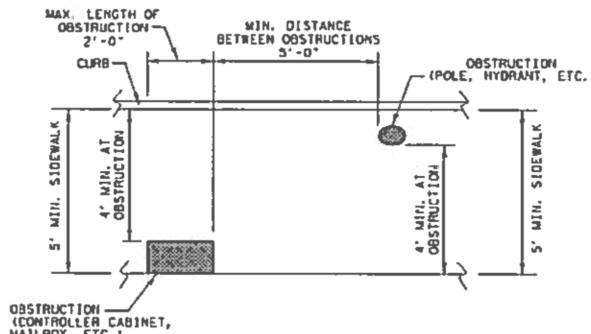


PROTECTED ZONE

In pedestrian circulation area, maximum 4" projection for post or wall mounted objects between 27" and 80" above the surface.



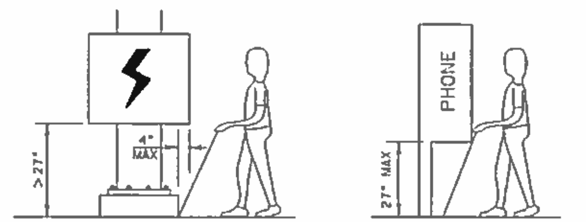
CLEAR GROUND SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



PLAN VIEW

PLACEMENT OF STREET FIXTURES

(ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' x 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.)



When an obstruction of a height greater than 27" from the surface would create a protrusion of more than 4" into the pedestrian circulation area, construct additional curb or foundation at the bottom to provide a maximum 4" overhang.

Protruding objects of a height ≤ 27" are detectable by cane and do not require additional treatment.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

SHEET 3 OF 4

Texas Department of Transportation
Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

FILE: ped12a.dgn	DN: TxDOT	CK: PL	DW: TxDOT	CK: HO
© TxDOT March 2002				
REVISIONS				SH 20
June 13, 2012	ELP	EL PASO		C-51

15-1036-455 / 520919
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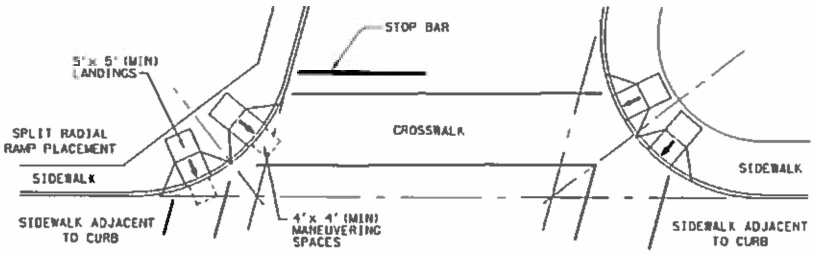
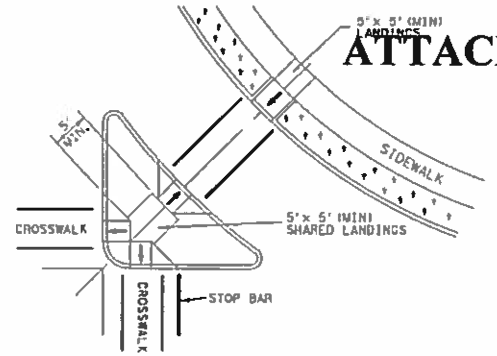
OAR50

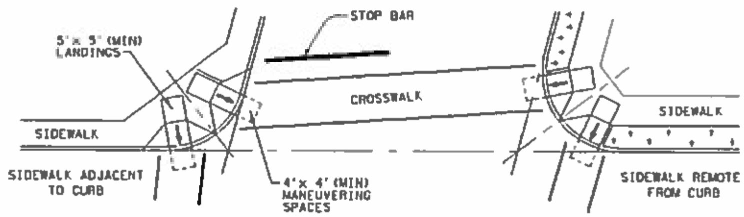
ATTACHMENT "A"



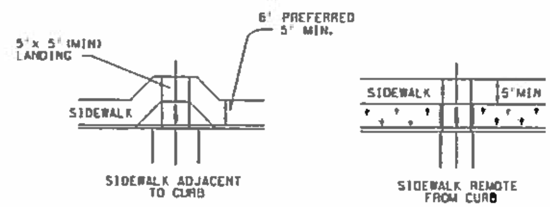
SKEWED INTERSECTION WITH "LARGE" RADIUS



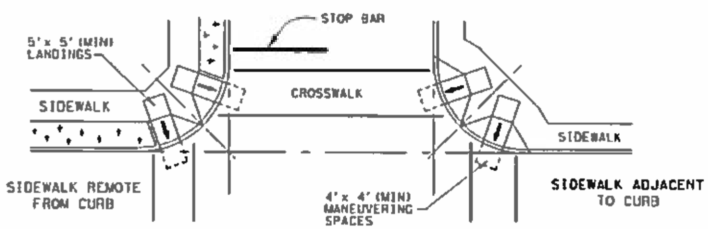
AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



SKEWED INTERSECTION WITH "SMALL" RADIUS



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS



NORMAL INTERSECTION WITH "SMALL" RADIUS

TYPICAL CROSSING LAYOUTS

SHEET 4 OF 4

Texas Department of Transportation
Design Division Standard

PEDESTRIAN FACILITIES
CURB RAMPS

PED-12A

FILE: ped12a.dgn	DN: TxDOT	CK: PK	DW: TxDOT	CK: HB
© TxDOT March 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				SH 20
VP June 13, 2012	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		C-52

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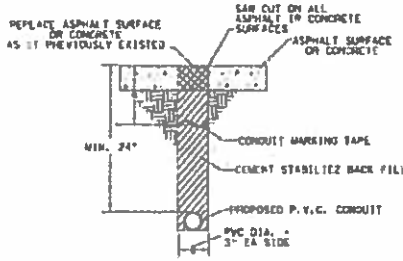
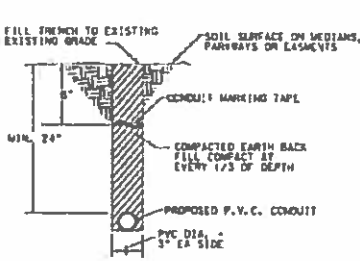
OAR51

ATTACHMENT "A"

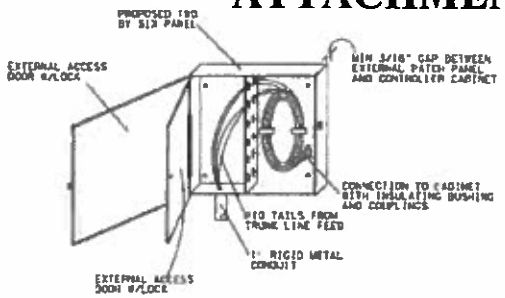
TRENCH DEPTH CHART	
SYSTEM	DEPTH (MIN)
ILLUMINATION	24 INCHES
TRAFFIC SIGNALS	24 INCHES
TRAFFIC MANAGEMENT	42 INCHES
TRAFFIC MANAGEMENT (BORED)	60 INCHES



PAVEMENT CUT

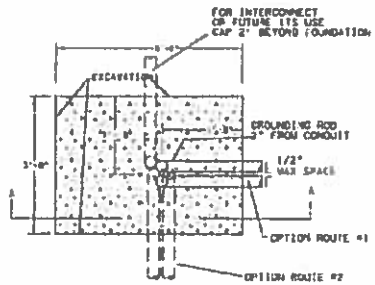


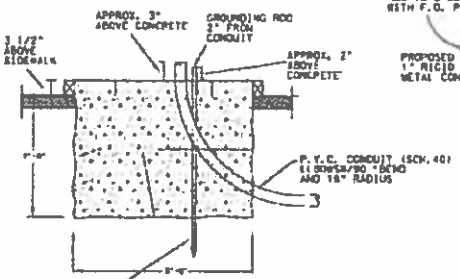
OPEN CUT TRENCH

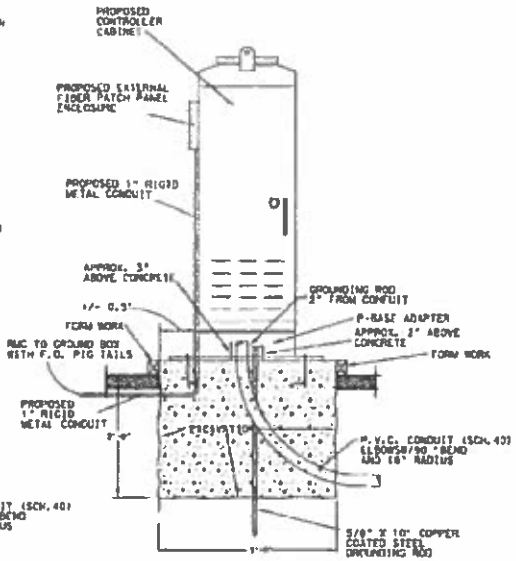


FIBER OPTIC EXTERNAL PATCH PANEL ASSEMBLY
(NTS)

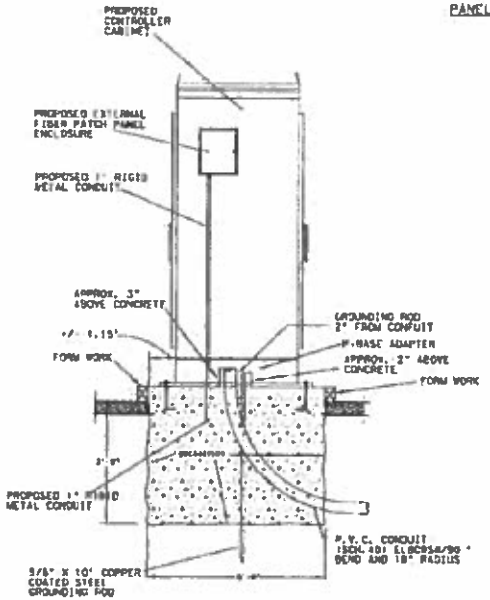
TRENCH DETAILS
NOT TO SCALE







CONTROLLER ON 3' SIDE OF FOUNDATION



CONTROLLER ON 5' SIDE OF FOUNDATION

TYPE-1 (P-332 CABINET)
170 CONTROLLER FOUNDATION DETAIL

15-1036-455 / 520919

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WHOLE FOODS
MESA STREET
STATE HIGHWAY NO 20
EL PASO, TEXAS

CONTROLLER FOUNDATION AND TRENCH DETAILS

SHEET NUMBER
C-53

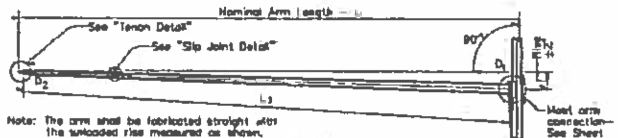
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	(1) thk	D_B	D_{19}	D_{24}	D_{30}	(1) thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.8	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
25	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
30	12.3	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
35	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	30-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	(1) thk	Rise	L_1	D_1	(2) D_2	(1) thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	8.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
25	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
30	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
35	33.0	9.5	4.8	.179	2'-4"	33.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-6"	39.0	9.5	3.5	.239	2'-3"
48	47.0	10.5	4.1	.239	3'-4"	47.0	11.0	3.5	.239	2'-9"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out luminaire
D_{30} = Pole Top O.D. with luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

(1) Thickness shown are minimums, thicker materials may be used.

(2) D_2 may be increased by up to 1" for polygonal arms.



TRAFFIC SIGNAL ARM

(Fixed Mount)

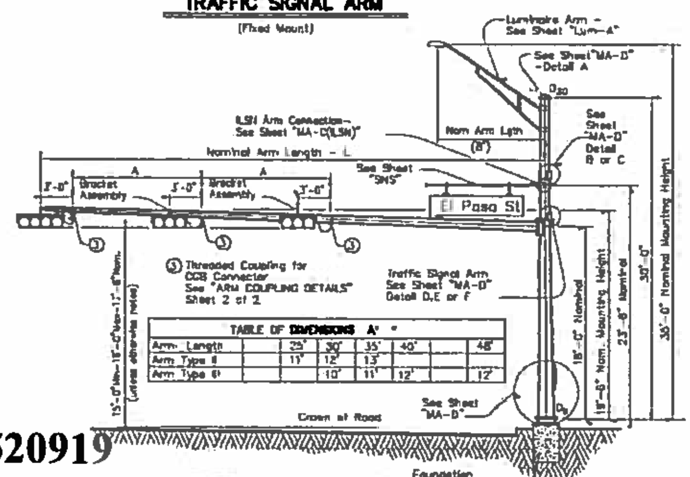


TABLE OF DIMENSIONS "A"

Arm Length	25'	30'	35'	40'		48'
Arm Type II	11'	12'	13'			
Arm Type III		10'	11'	12'		12'

STRUCTURE ASSEMBLY

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30' Poles With Luminaire		24' Poles With ILSN		19' Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	
25	25L-80		25S-80		25-80	
30	30L-80		30S-80		30-80	1
35	35L-80		35S-80		35-80	
40	40L-80		40S-80		40-80	
48	48L-80		48S-80		48-80	1

Traffic Signal Arms (1 per Pole) — Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CCB connector		1 Bracket Assembly and 2 CCB Connectors		2 Bracket Assemblies and 3 CCB Connectors	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
25	25I-80		25II-80			
30			30II-80	1	30III-80	
35			35II-80		35III-80	
40					40III-80	
48					48III-80	1

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 1/2"	3'-4"	1
1 3/4"	3'-10"	1

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

SHEET 1 OF 2

ATTACHMENT "A"

Kimley»Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO 20
EL PASO, TEXAS

TRAFFIC SIGNAL SUPPORT STRUCTURES SINGLE MAST ARM ASSEMBLY

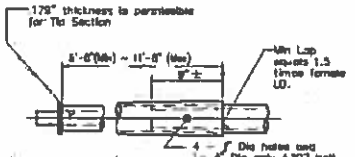
C-54

15-1036-455 / 520919

Whole Foods Traffic Signal Agreement Mesa & Champions

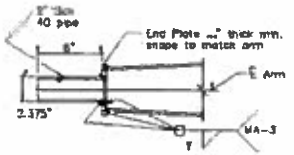
OAR53

ATTACHMENT "A"



Note: A slip joint is permissible for arms 40' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

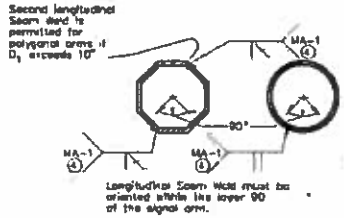
SLIP JOINT DETAIL



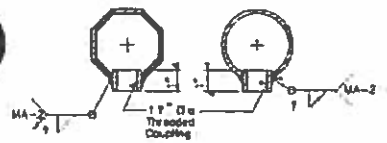
TENON DETAIL

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL



ARM COUPLING DETAILS

④ 80% Min. penetration 100% penetration within 6" of circumferential base welds.

VIBRATION WARNING

Mast Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aerodynamic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; grain-wind orientations and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having ventilated backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backplates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

The visual inspection shall be repeated after each modification of the structure that could affect its aerodynamic response. Excessive vibrations shall not be allowed to continue for more than two days.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor.

Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 50 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.8 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (LSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 448, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of the sheet and Item 448, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

SHEET 2 OF 2

Kimley»Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO 20
EL PASO, TEXAS

TRAFFIC SIGNAL SUPPORT STRUCTURES SINGLE MAST ARM ASSEMBLY

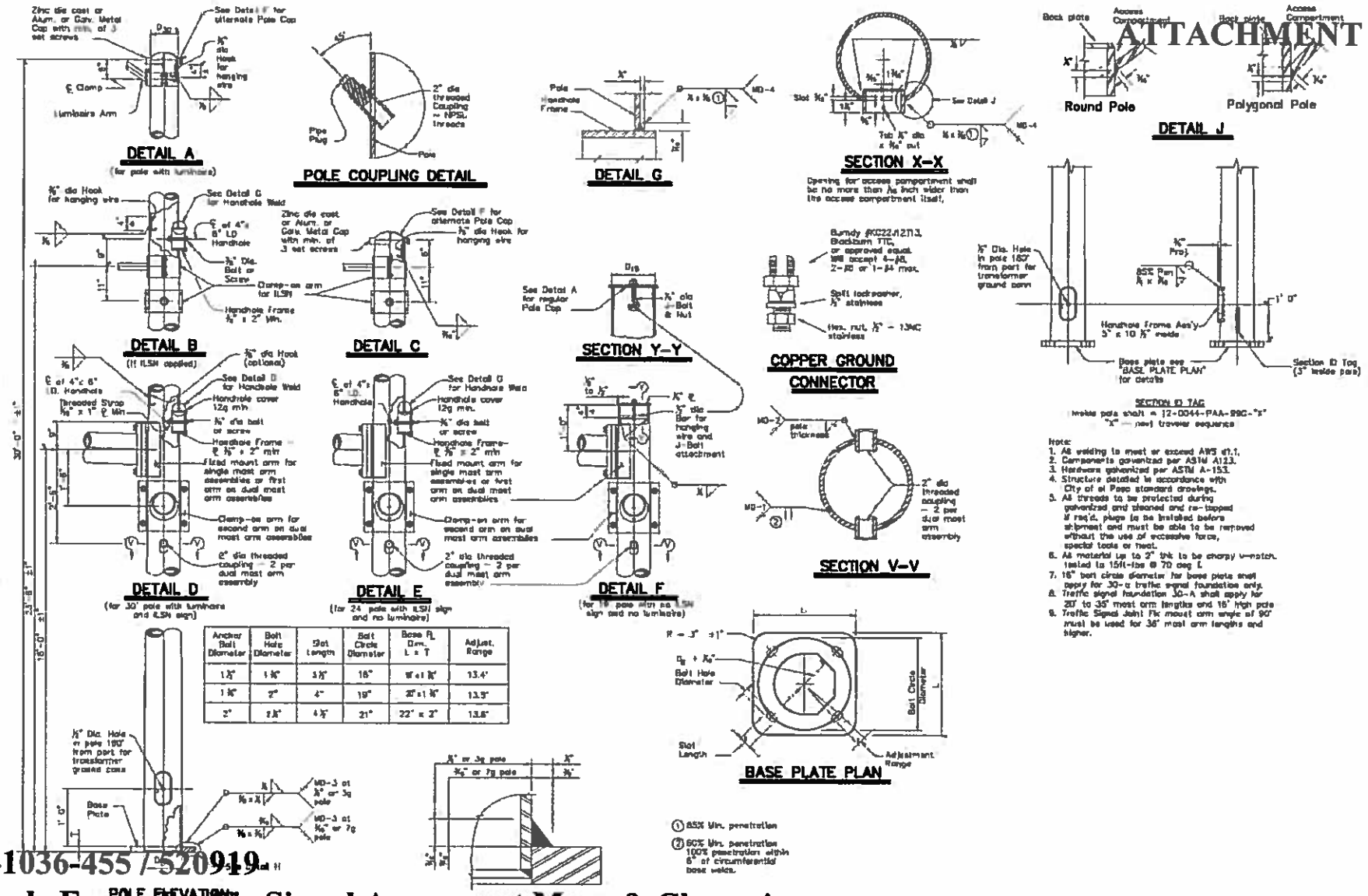
C-55

15-1036-455 / 520919

Whole Foods Traffic Signal Agreement Mesa & Champions

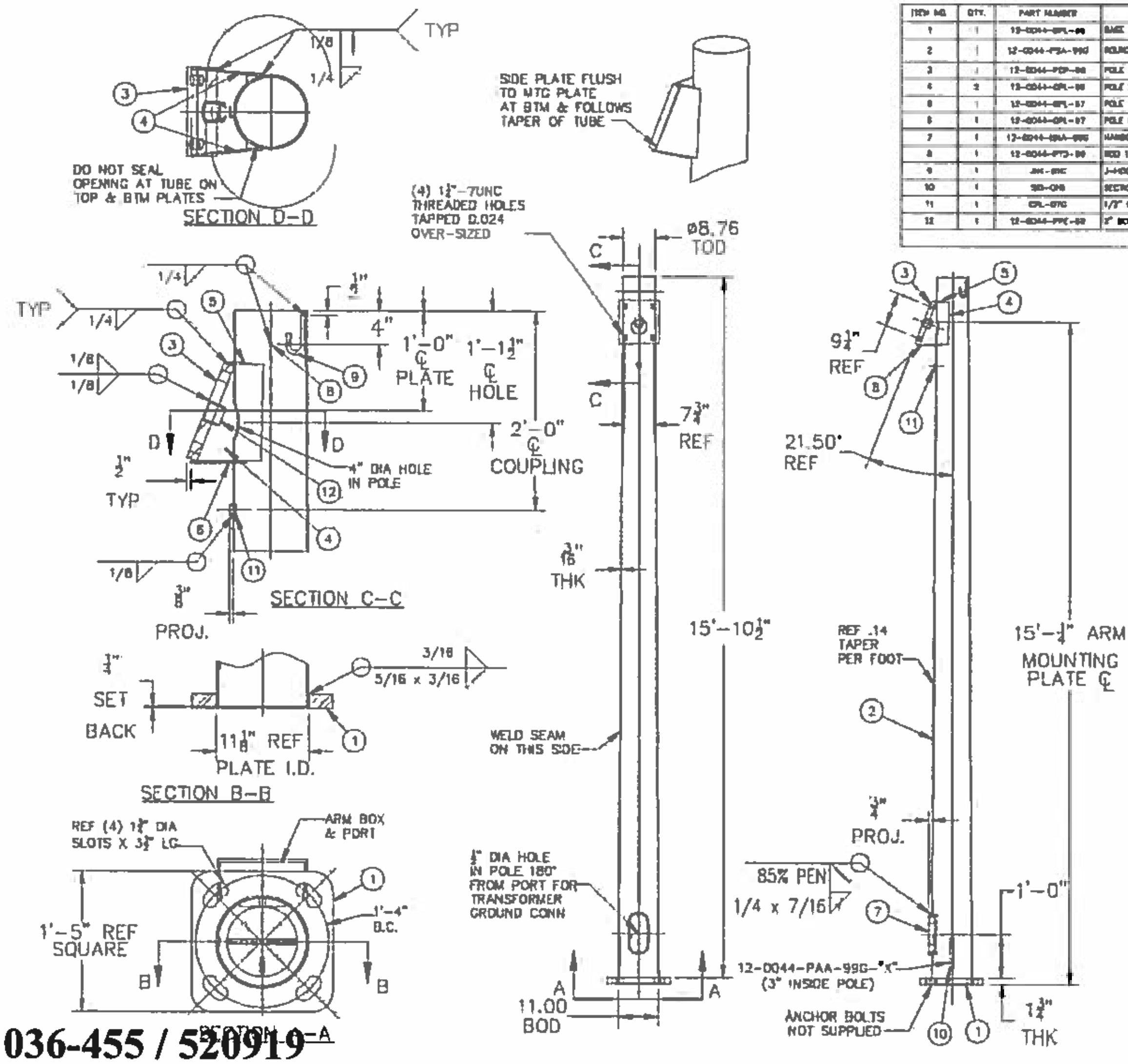
OAR54

ATTACHMENT "A"



ATTACHMENT "A"

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION			
1	1	12-0044-BPL-[illegible]	BASE PLATE 1 3/4" THK X 1'-6" X 1'-6"	A572-GR50	[illegible]	[illegible]
2	1	12-0044-PSA-99G	ROUND SHAFT 3/16" THK X 11.00" BOD X 8.76" TOD X 16'-0" LG	A572-GR55	311.83	311.83
3	1	12-0044-PCP-00	POLE ARM PLATE 1 1/4" THK X 10 3/4" X 1'-1/2"	A572-GR50	43.31	43.31
4	2	12-0044-SPL-00	POLE SIDE PLATE 1/4" THK X 8 1/16" X 11 3/8" LG	A572-GR50	4.64	9.28
5	1	12-0044-BPL-57	POLE TOP PLATE 1/4" THK X 2 3/4" X 10" LG	A572-GR50	1.11	1.11
6	1	12-0044-BPL-07	POLE BTM PLATE 1/4" THK X 8 3/4" X 10 1/4" LG	A572-GR50	4.17	4.17
7	1	12-0044-HHA-000	HANDHOLE FRAME ASSY 5" X 10 1/2" [illegible]	A572-GR50	5.82	5.82
8	1	12-0044-PTS-00	ROD 1/2" DIA X 8 3/8" LG	A36	0.40	0.40
9	1	JHK-BRC	J-HOOK 1/2" DIA BAR	A36	0.44	0.44
10	1	SID-ONS	SECTION ID TAG	A36	0	0
11	1	CPL-07G	1/2" NPT PIPE HALF COUPLING	A107	0	0
12	1	12-0044-PPC-00	2" SCH 40 (1040) PIPE X 2" LG	A107	0.82	0.82
					TOTAL WEIGHT	[illegible]



SECTION ID TAG

INSIDE POLE SAHFT = 12-0044-PAA-99G-"X"
"X" - NEXT TRAVELER SEQUENCE

NOTE:

1. ALL WELDING TO MEET OR EXCEED AWS D1.1.
2. COMPONENTS GALVANIZED PER ASTM A123.
3. HARDWARE GALVANIZED PER ASTM A-153.
4. STRUCTURE DETAILED IN ACCORDANCE WITH CITY OF EL PASO STANDARD DRAWINGS.
5. ALL THREADS TO BE PROTECTED DURING GALVANIZING, CLEANED AND RE-TAPPED IF REQ'D. PLUGS TO BE INSTALLED BEFORE SHIPMENT AND MUST BE ABLE TO BE REMOVED WHITEOUT THE USE OF EXCESSIVE FORCE, SPECIAL TOOLS OR HEAT.
6. ALL MATERIAL UP TO 2" THK TO BE CHARPY V-NOTCH TESTED TO 15 FT-LBS @ 70 DEG. F.
7. 16" BOLT CIRCLE DIAMETER FOR BASE PLATE SHALL APPLY FOR 30-A TRAFFIC SIGNAL FOUNDATION ONLY.
8. TRAFFIC SIGNAL FOUNDATION 30-A SHALL APPLY FOR 20' TO 35' MAST ARM LENGTHS AND 18' HIGH POLE.
9. TRAFFIC SIGNAL JOINT FIXED MOUNT ARM ANGLE OF 90 DEGREES MUST BE USED FOR 35' MAST ARM LENGTHS AND HIGHER.

Kimley»Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO 20
EL PASO, TEXAS

MAST ARM POLE
DETAIL MA-D

C-57

15-1036-455 / 520919
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OAR56

FOUNDATION DESIGN TABLE

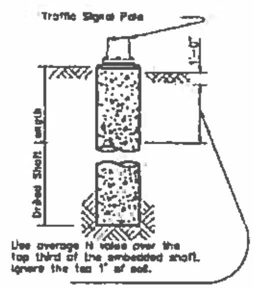
FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL: VERT BARS	REINFORCING STEEL: SPIRAL & PITCH	DRILLED SHAFT LENGTH-ft ④, ⑤, ⑥ TEXAS CONE PENETROMETER N blows/ft: 10	15	40	ANCHOR BOLT DESIGN ①: ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	FOUNDATION DESIGN LOAD ②: MOMENT K-ft	SHEAR Kips	TYPICAL APPLICATION
24-A	24"	4- #5	#2 at 12"	5.7	3.3	4.5	¾"	36	12¾"	1	10	1	Pedestal pole, pedestal mounted controller
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1½"	55	15"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1¾"	55	18"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
40-A	40"	14- #9	#3 at 6"	17.4	15.6	11.9	2"	55	21"	2	271	6	Mast arm assembly. (see Selection Table)

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

		FDN 30-A	FDN 36-A	FDN 40-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	35'	48'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	20' X 20'		
		25' X 25'		
		30' X 25'	30' X 30'	
			35' X 35'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		35'	48'
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		20' X 20'	
			25' X 25'	
			30' X 20'	30' X 30'
				35' X 35'

EXAMPLE:

1. For 80mph design wind speed, foundation 30-A can support up to a 35' arm with another arm up to 25'



NOTES:

① Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

② Foundation Design Loads are the allowable moments and shears at the base of the structure.

③ Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

④ Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

⑤ If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table

ANCHOR BOLT & TEMPLATE SIZES						
BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTT THREAD	BOLT CIRCLE	R1	R2
¾"	1'-6"	3"	—	12¾"	7⅛"	5⅝"
1½"	3'-4"	6"	4"	15"	10"	7"
1¾"	3'-10"	7"	4½"	18"	11¼"	7¾"
2"	4'-3"	8"	5"	21"	12½"	8½"

⑦ Min dimensions given, longer bolts are acceptable

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural [illegible] Traffic Sig[illegible]

ATTACHMENT "A"

Reinforcing steel shall conform to Item 440.

Concrete shall be Class A or C.

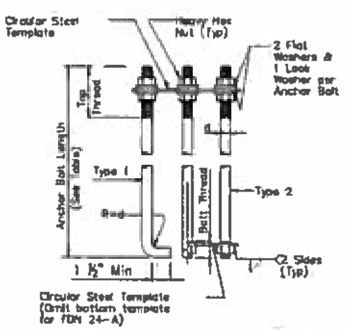
Threads for anchor bolts and nuts shall be rolled or cut threads of unified national coarse thread series up to 2" in diameter or UNC for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "anchor bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".

FOUNDATION SUMMARY TABLE ③

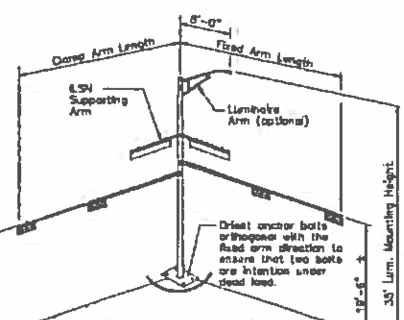
LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH (FEET) ⑥: 24-A	30-A	36-A	40-A	
POLE B	10	30-A	1		11			
POLE C	10	36-A	1			13		
POLE 1	10	24-A	1	6				
POLE 2	10	24-A	1	6				
POLE 3	10	24-A	1	6				
POLE 4	10	24-A	1	6				
TOTAL DRILLED SHAFT LENGTHS				24	11	13		



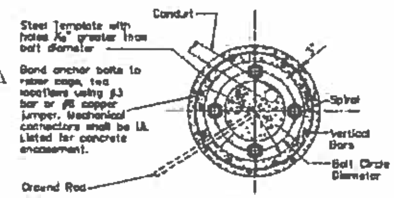
ANCHOR BOLT ASSEMBLY

INSTALLATION PROCEDURE:

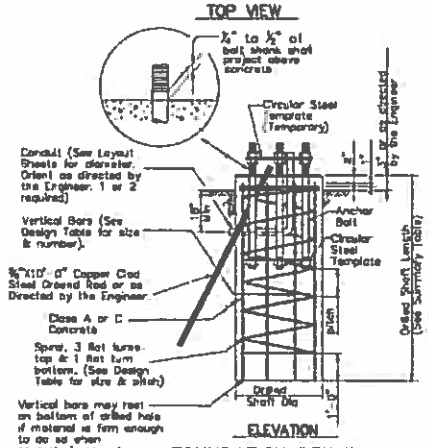
Threads of anchor bolts shall be coated with pipe joint compound prior to installation of upper nuts when erecting pole. After pole is plumbed and in permanent [illegible] an [illegible] coating [illegible] paint applied to seal the bolt thread-nut [illegible].



TYPICAL MAST ARM ASSEMBLY



TOP VIEW



ELEVATION

FOUNDATION DETAILS

Kimley»Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO 20
EL PASO, TEXAS

TRAFFIC SIGNAL POLE FOUNDATION DETAIL
TS-FD

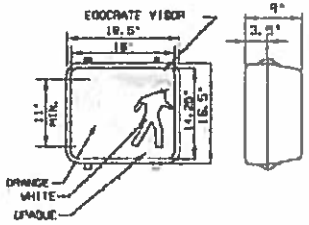
C-58

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR57

ATTACHMENT "A"

NOTES:

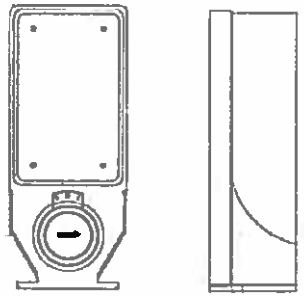
1. ALL SIGNAL HEADS SHALL BE OF THE SAME MANUFACTURER AND ALL OF THESE SHALL BE INTERCHANGEABLE WITH OTHER UNITS OF THE SAME TYPE.
2. ALL SIGNALS SHALL HAVE 12" ADJUSTABLE HEADS WITH DETACHABLE 12" VISORS.
3. SEE SHD STANDARD SHEETS FOR LATERAL AND VERTICAL CLEARANCES AND SIGN MOUNTING DETAILS.



PEDESTRIAN SIGNAL HEAD

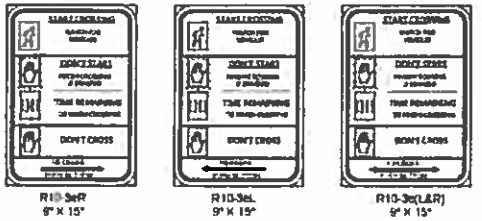
NOTE:

PEDESTRIAN SIGNAL HEADS SHALL BE EQUIPPED WITH EGGCRATE VISORS AND SHALL COMPLY WITH MATERIAL SPECIFICATION TD-7862. BOTH SYMBOLIC PEDESTRIAN SIGNAL INDICATIONS SHALL BE SOLID. OUTLINED INDICATIONS ARE NOT ACCEPTABLE.

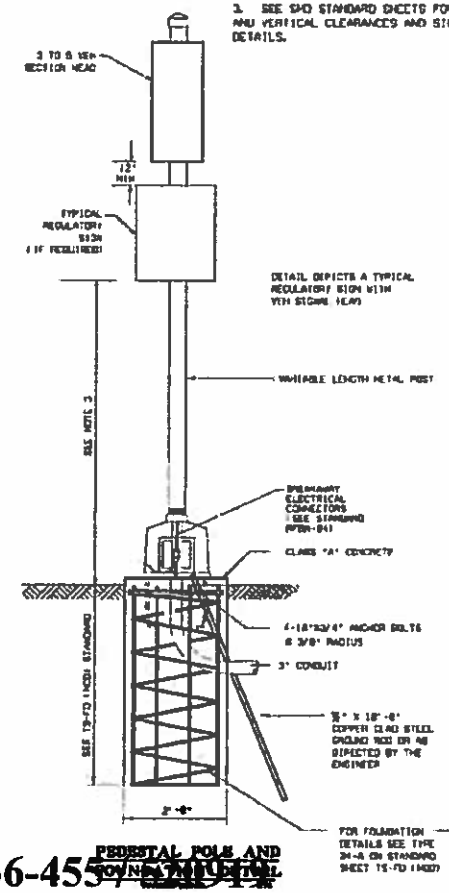


APS PUSH BUTTON NOTES

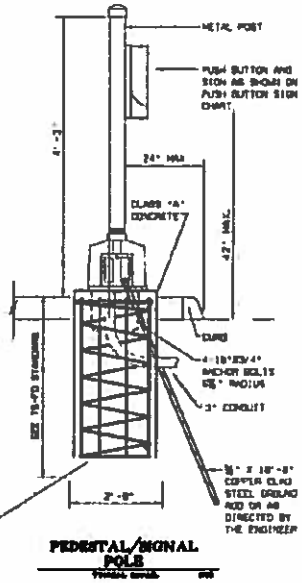
1. APS PUSH BUTTON UNITS SHALL BE DELIVERED TO EPDOT TRAFFIC SIGNAL SHOP, 1058 LAFAYETTE, BLDG 8, FOR VOICE PROGRAMMING.
2. PROPOSED PUSH BUTTONS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX IN ANY DIRECTION). IF THE DISTANCE FROM THE PUSH BUTTON TO THE EDGE OF ACCESSIBLE PATH EXCEEDS 10", THE CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10" OR LESS. MEASUREMENT AND PAYMENT SHALL BE CONSIDERED SUBSIDIARY TO ITEM 680.



APS
PEDESTRIAN PUSH BUTTON UNIT
WITH MOUNTABLE SIGNS



PEDESTAL POLE AND
[illegible]



PEDESTAL/SIGNAL POLE

ARROW DIRECTION INFORMATION

ARROW	SIZE	QUANTITY
INTERSECTION		MESA AT CHAMPIONS
LEFT	9" X 15"	2
RIGHT	9" X 15"	2
BOTH	9" X 15"	1

15-1036-455

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CAR58

Kimley»Horn

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO 20
EL PASO, TEXAS

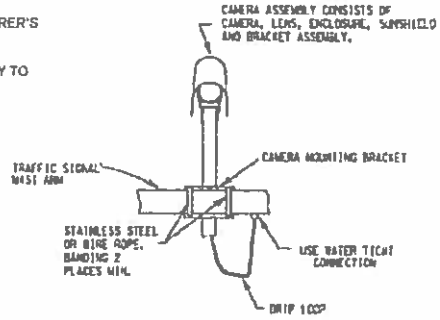
PEDESTAL POLE DETAILS

SHEET NUMBER C-59

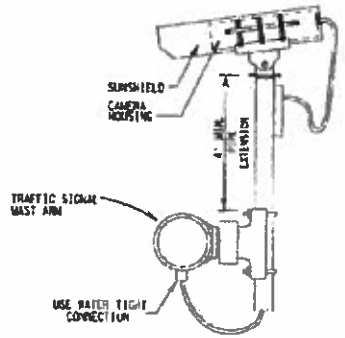
ATTACHMENT "A"

GENERAL NOTES:

1. INSTALL VIDEO DETECTION PROCESSOR UNIT INSIDE CONTROLLER CABINET. USE ONLY SINGLE CHANNEL PROCESSORS.
2. INSTALL VIDEO DETECTION CAMERA & BRACKET AS DETAILED OR AS DIRECTED BY THE VIDEO DETECTION SUPPLIER.
3. WHEN LEFT TURN LANES ARE PRESENT, MOUNT CAMERA CENTERED BETWEEN ELFT TURN LANE AND ADJACENT THROUGH LANE. IF THERE IS NO LEFT TURN LANE, MOUNT CAMERA AS CLOSE TO CENTER OF APPROACH AS POSSIBLE.
4. USE WIRE ROPE TO INSTALL CAMERA MOUNTS.
5. AIM CAMERA SO THAT HORIZON IS NOT VISIBLE IN THE FIELD OF VIEW. FIELD OF VIEW MUST BE LEVEL.
6. INSTALL CAMERA ENCLOSURE ASSEMBLY SO THAT IT CAN ROTATE AFTER INSTALLATION TO PROVIDE PROPER ALIGNMENT.
7. PROVIDE WATER TIGHT CABLE ENTRY AND EXIT POINTS IN THE MAST ARM AND/OR POLES.
8. CAMERA AND EXTENSION WILL BE INSTALLED VERTICALLY PLUMB.
9. ALL WIRING SHALL BE TERMINATED WITHIN MANUFACTURER'S ENCLOSURE.
10. CABLE SHALL RUN FROM CAMERA ENCLOSURE DIRECTLY TO THE TRAFFIC SIGNAL CABINET. NO SPLICING ALLOWED.



TRAFFIC SIGNAL ARM
FRONT VIEW



TRAFFIC SIGNAL ARM
SIDE VIEW

WHOLE FOODS
MESA STREET
STATE HIGHWAY NO 20
EL PASO, TEXAS

VIVDS DETAILS

C-60

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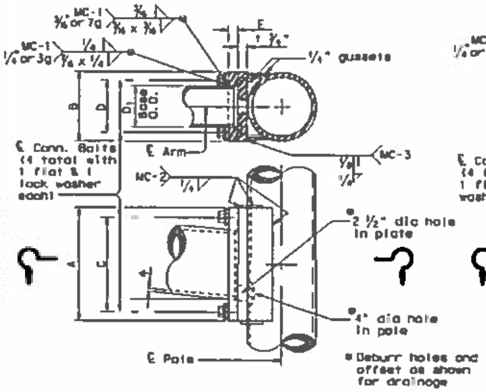
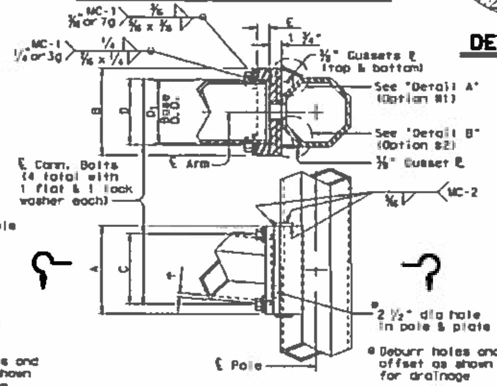
ARM SIZE D_1	ARM SIZE t	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
6.5	.179	12	9	9	6	1 3/4	1
7.5	.179	13	9	10	6	1 3/4	1
8.0	.179	14	10	11	7	2	1 1/4
9.0	.179	16	11	13	8	2	1 1/4
9.5	.179	17	12	14	9	2	1 1/4
9.5	.239	18	12	15	9	2	1 1/4
10.0	.239	18	12	15	9	2	1 1/4
10.5	.239	18	13	15	10	3	1 1/2
11.0	.239	18	13	15	10	3	1 1/2

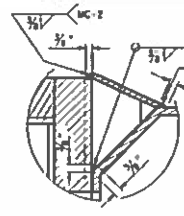


FIXED MOUNT DETAIL 1

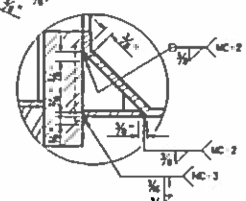
ARM SIZE D_1	ARM SIZE t	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
7.0	.179	11	11	8	8	1 3/4	1 1/4
7.5	.179	11	11	8	8	1 3/4	1 1/4
8.0	.179	11	11	8	8	2	1 1/4
9.0	.179	13	13	10	10	2	1 1/4
10.0	.179	13	13	10	10	2	1 1/4
9.5	.239	13	13	10	10	2	1 1/4
10.0	.239	14	14	11	11	2	1 1/2
11.0	.239	14	14	11	11	3	1 1/2
11.5	.239	14	14	11	11	3	1 1/2



FIXED MOUNT DETAIL 2



DETAIL A

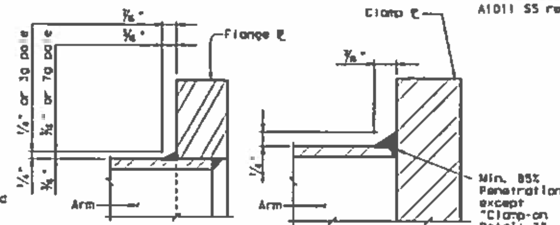


DETAIL B

MATERIALS	
Round Shafts or Polygonal Shafts ①	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ②
Plates ①	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe ①	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

① ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

② ASTM A1011 SS Gr.50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.



FIXED MOUNT ARM

CLAMP-ON ARM

ARM BASE WELD DETAILS

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 1/2" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

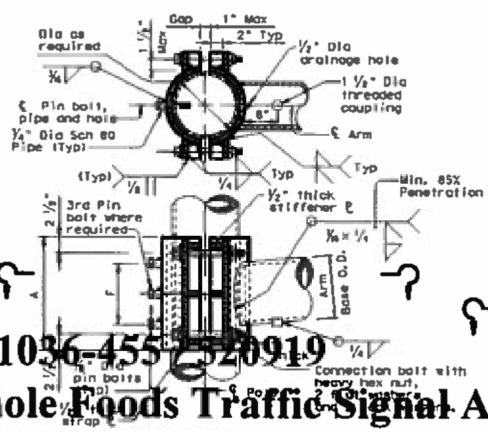
Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

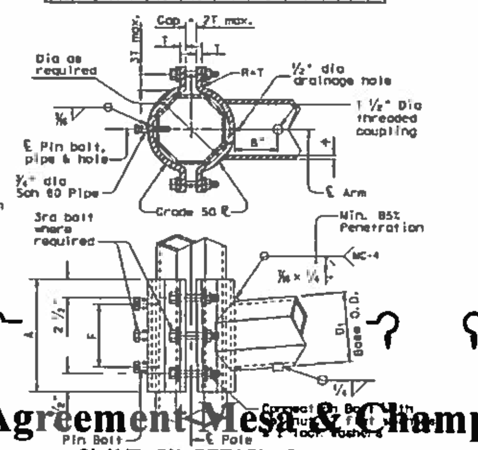
Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and 3/4" dia pipe shall have 3/8" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a 3/4" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

ARM SIZE D_1	ARM SIZE t	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	4	1 1/4	3	5/8
9.5	.239	18	12	4	1 1/4	3	5/8
10.0	.239	18	12	4	1 1/4	3	5/8



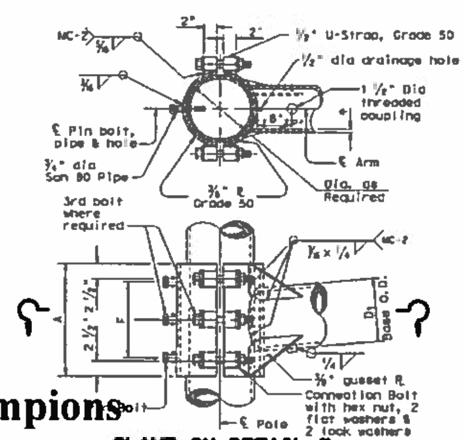
CLAMP-ON DETAIL 1

ARM SIZE D_1	ARM SIZE t	A	F	T	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	in.	ea.	in.	ea.	in.
7.0	.179	12	6	3/4	4	3/4	2	5/8
7.5	.179	14	8	3/4	4	3/4	2	5/8
8.0	.179	14	8	3/4	4	3/4	2	5/8
9.0	.179	16	10	7/8	4	1	2	5/8
10.0	.179	18	10	7/8	4	1	2	5/8
9.5	.239	18	10	1	6	1	3	5/8
10.0	.239	18	10	1	6	1	3	5/8



CLAMP-ON DETAIL 2

ARM SIZE D_1	ARM SIZE t	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8



CLAMP-ON DETAIL 3

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST ARM CONNECTIONS

MA-C-12

EL PASO

GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is $\frac{7}{8}$ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications for Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor [illegible] Size all galvanized steel junction boxes [illegible] junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless [illegible]

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich [illegible] galvanized materials required to be galvanized.

Texas Department of Transportation | Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

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31A

ATTACHMENT "A"

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half lap of tape.

2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.

3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.

4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.

2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.

3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.

4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.

5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.

6. Support conductors in illumination poles with a J-hook at the top of the pole.

7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.

8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.

9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.

10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.

11. [illegible] a bid under Item 620 whenever those [illegible] support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of [illegible] a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors [illegible] on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.

2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.

3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.

4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.

5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.

2. Do not place ground rods in the same drilled hole as a timber pole.

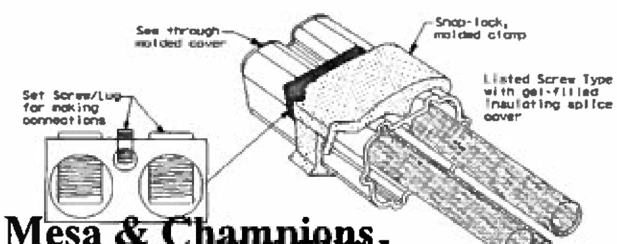
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

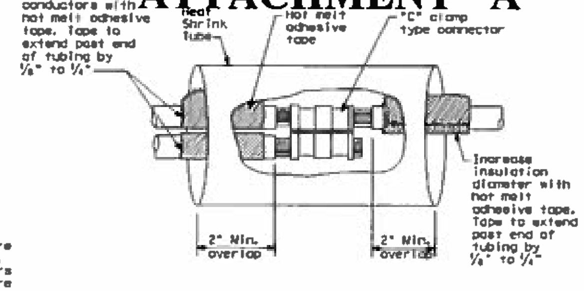
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

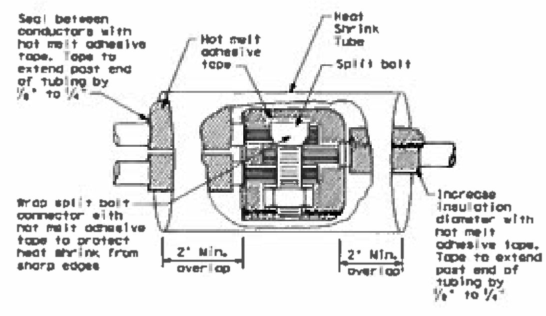
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 3
Listed Screw Type



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type

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ELECTRICAL DETAILS
CONDUCTORS

ED(3)-14

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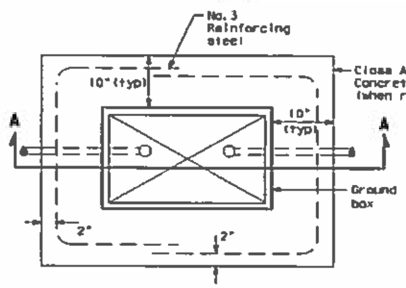
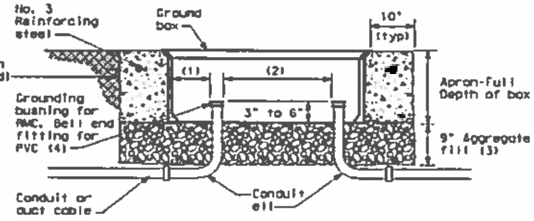


PLAN VIEW



SECTION A - A

APRON FOR GROUND BOX

(1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.

(2) Maintain sufficient space between conduits to allow for proper installation of bushings.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

ATTACHMENT "A"

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

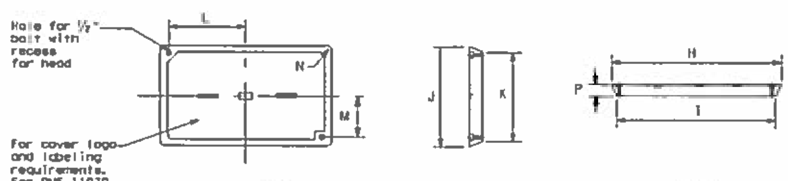
11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

GROUND BOX DIMENSIONS

TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS

TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/8	6 3/4	1 3/8	2



PLAN VIEW END SIDE

GROUND BOX COVER

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
GROUND BOXES

ED(4)-14

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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.
2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services," DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.
3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.
4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.
5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.
6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.
7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.
8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.
9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.
10. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.
11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.
12. Ensure all mounting hardware and installation details of services conform to utility company specifications.
13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.
14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan [illegible] circuits supplied by that service. Reduce [illegible] in before laminating. Deliver these drawings [illegible] the Engineer, instead of placing in enclosure that has no door pocket.
15. [illegible] bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted [illegible] conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.
2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.
3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.
4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill [illegible] needed, to [illegible] ensure hand[illegible] is [illegible] position.
2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

* ELECTRICAL SERVICE DATA

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contactor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

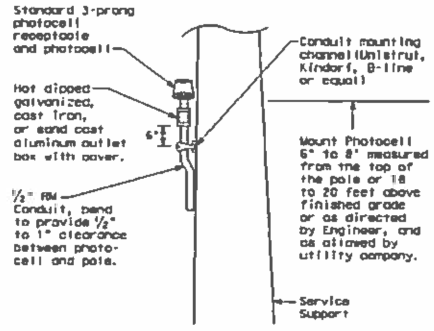
* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National Electrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

- Schematic Type
- Service Voltage V / V
- Disconnect Amp Rating
  000 Indicates main lug only/
  Typically Type T
- (SS)- Safety Switch Ahead of Meter-Check with Utility
  (NS)- No safety Switch Ahead of Meter-Check with Utility
- Enclosure Type
  GS- Galvanized steel ("off the shelf")
  SS- Stainless steel (Custom Enclosure) See MPL
  AL- Aluminum (Custom Enclosure) See MPL
- Photocell Mounting Location
  (E)- Inside Service/Enclosure Mounted
  (T)- Top of pole
  (L)- Luminaire mounted
  (N)- None/No Photocell or Lighting Contactor Required
- Service Support Type
  GC- Granite concrete
  OC- Other concrete
  TP- Timber pole
  SP- Steel pole
  SF- Steel frame
  OT- Pole by others or paid for separately
  EX- Existing pole
  TS- Service on traffic signal pole
  PS- Pedestal Service
- O- Overhead Service feed from Utility
  U- Underground Service feed from Utility



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

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ELECTRICAL DETAILS SERVICE NOTES & DATA

ED(5)-14

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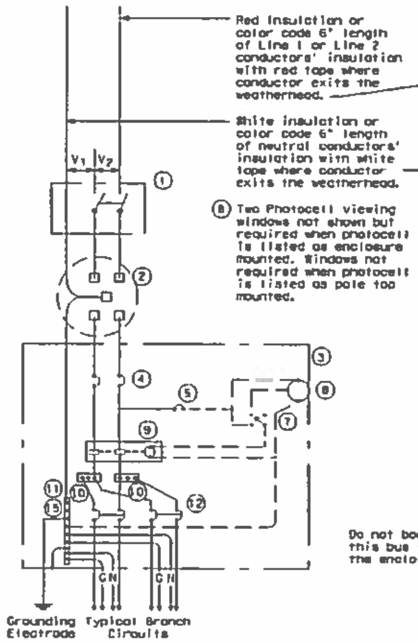
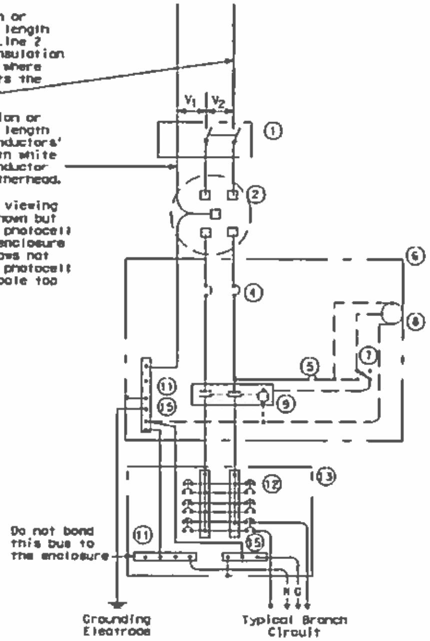
SH 20 | DIST: ELP | COUNTY: EL PASO | SHEET NO.: E-66

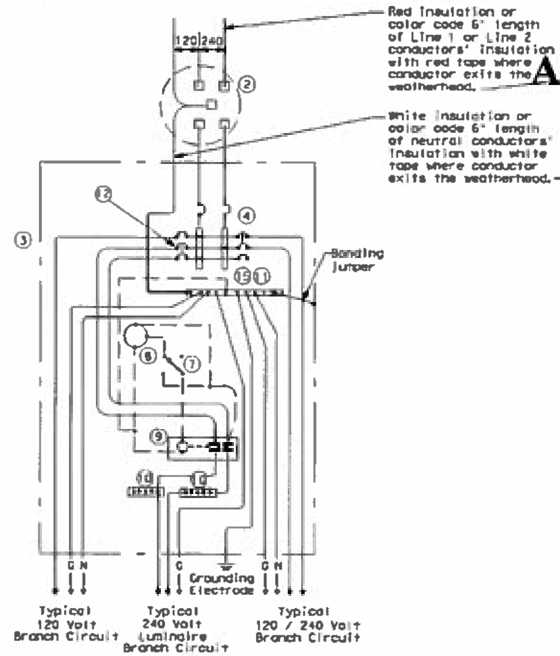
ATTACHMENT "A"



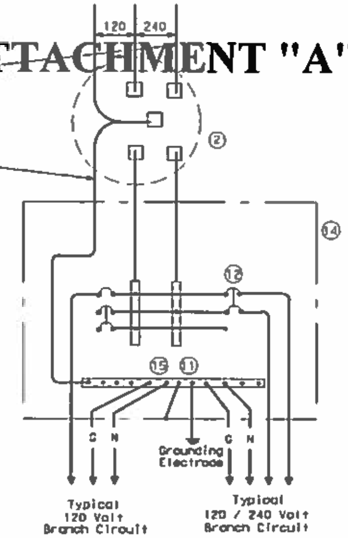
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel "Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

SCHEMATIC LEGEND

1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

WIRING LEGEND

———	Power Wiring
— — —	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

Texas Department of Transportation — Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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DIST: ELP	COUNTY: EL PASO			SHEET NO.

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TIMBER POLE (TP) SERVICE SUPPORT NOTES

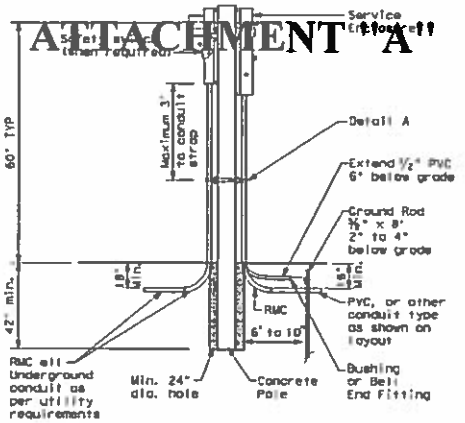
1. Ensure electrical service support is a class 5 treated timber pole as per Item 627 "Treated Timber Poles." Embed timber pole to depth required in Item 627.
2. Conduit and electrical conductors attached to the electrical service pole and underground within 12 in. of service pole are not paid for directly but are subsidiary to the electrial service.
3. Install pole-top mounted photocell (1) on north side of pole, or in service enclosure (E) as required. See Electrical Service Data chart in plan set.
4. Gain pole as required to provide flat surface for each channel. Gain timber pole to ⅜ in. max. depth and 1 ⅝ in. max. height. Gain pole in a neat and workmanlike manner.
5. Mount meter and service equipment on stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Provide channel sized 1 in. to 3 ⅜ in. maximum depth, and 1½ in. to 1⅝ in. maximum width. File smooth the cut ends of galvanized channel and paint with zinc rich paint before installing on pole. Secure each channel section to timber pole with two galvanized or SS lag bolts, ⅝ in. minimum diameter by 1½ in. minimum length. Use a galvanized or SS flat washer on each lag bolt. Do not stack channel.
6. When excess length must be trimmed from poles, trim from the top end only.

GRANITE CONCRETE (GC) & OTHER CONCRETE (OC) NOTES

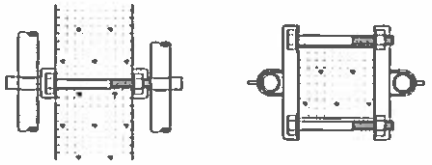
Ensure electrical service support structures bid as type Granite Concrete (GC) or Other Concrete (OC) meet the following requirements.

1. Provide GC and OC poles that meet the requirements of DMS 11080 "Electrical Services."
2. Provide prestressed concrete poles suitable for direct embedment into the ground without special foundations.
3. Verify poles are marked as required on DMS 11080. Location of marking should be approximately 4' above final grade. Use the two-point pickup locations when handling pole in horizontal position, and one-point pickup location for use in raising the pole to a vertical position. These marks are small but conspicuous.
4. Embed poles 42 in. or 10% of the length plus 2 ft., whichever is greater.
5. Ensure all installation details of services are in accordance with utility company specifications.
6. Install a one point rack or eye bolt bracket 6 inches to 12 inches below the weatherhead as an overhead service drop anchoring point for the electric utility.
7. Furnish and install galvanized or stainless steel channel strut 1 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ⅜ in. deep (Unistrut, Kindorf, B-line or equal). Attach channel strut with stainless steel concrete anchors (max. 1" depth), square U-bolts or back to back channel strut with long bolts, or other secure mounting as approved by the Engineer. Ensure bolts are galvanized in accordance with ASTM A153. Do not stack channel struts.
8. Backfill the holes thoroughly by tamping in 6 in. lifts. After tamping to grade, place additional backfill material in a 6 inch high cone around the pole to allow for settling. Use material equal in composition and density to the surrounding area. Backfilling will not be paid for directly but is subsidiary to various bid items.

ATTACHMENT "A"

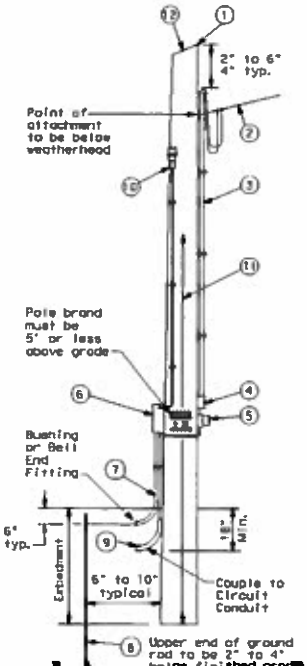


CONCRETE SERVICE SUPPORT
Underground (U)

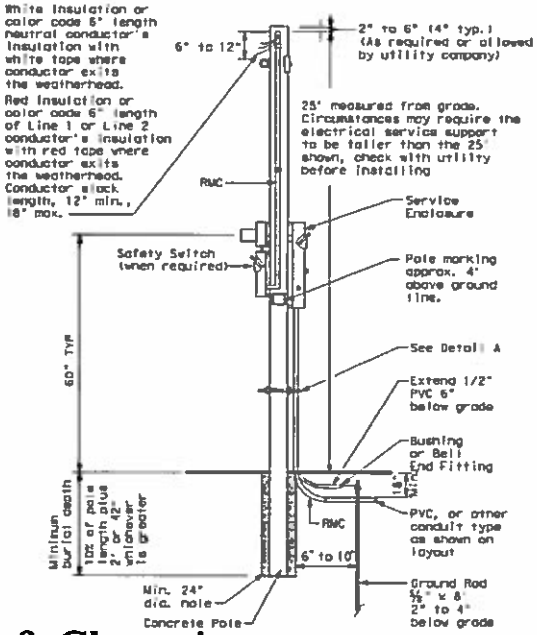


DETAIL A

See Note 7. Before installing channel that has been cut, file sharp edges and paint with zinc-rich paint. Ensure there is no paint splatter on the pole.



SERVICE SUPPORT TYPE TP (O)



CONCRETE SERVICE SUPPORT
Overhead (O)

Texas Department of Transportation — Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, & TP

ED(10)-14

FILE: ed10-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	---	---	---	SH 20
	DIST	COUNTY		SHEET NO.
	ELP	CL PASO		C-07

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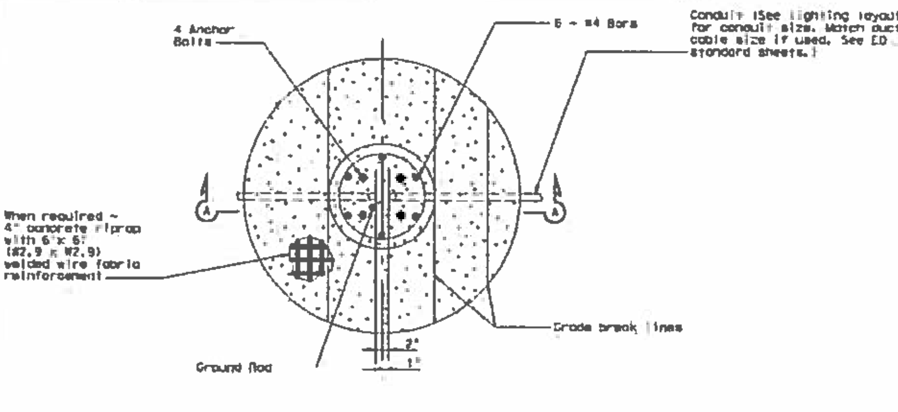
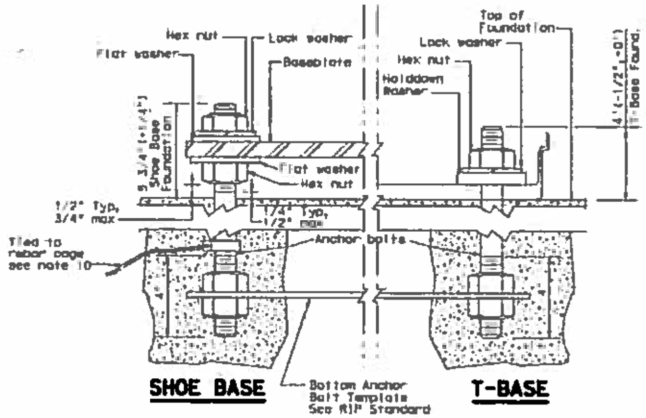
ATTACHMENT "A"

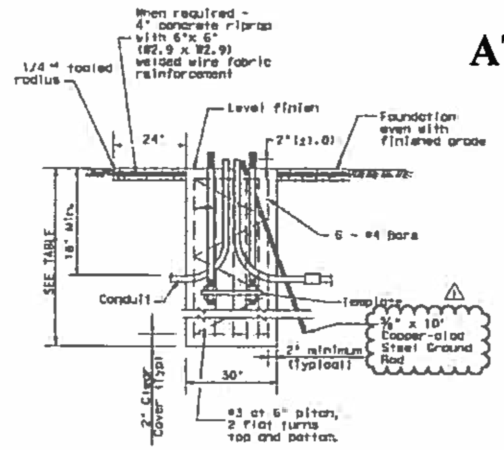


FOUNDATION DETAIL

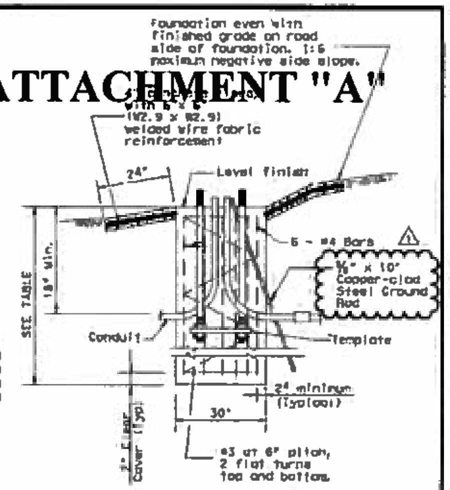


SHOE BASE Bottom Anchor Bolt Template See RIP Standard **T-BASE**

ANCHOR BOLT DETAIL



SECTION A-A
SHOWING CONSTANT GRADE



SECTION A-A
SHOWING SLOPED GRADE

PAY QUANTITY OF RIPRAP PER FOUNDATION (Install only when shown on the plans)		
Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

RECOMMENDED FOUNDATION LENGTHS (See note 1)			
MOUNTING HEIGHT	TEXAS CONE PENETROMETER N Blows/ft		
	10	15	40
≤20 ft.	6'	6'	6'
>20 ft. to 30 ft.	8'	8'	6'
>30 ft. to 40 ft.	8'	8'	6'
>40 ft. to 50 ft.	10'	8'	6'

ANCHOR BOLTS			
POLE MOUNTING HEIGHT	BOLT CIRCLE		ANCHOR BOLT SIZE
	Shoe Base	T-Base	
<40 ft.	13 in.	14 in.	1in. x 30in.
40-50 ft.	15 in.	17 ½in.	1 ¼in. x 30in.

BREAKAWAY POLE PLACEMENT (See note 6)	
Roadway Functional Classification	** Pole offset (distance to transformer base, tolerance + 6in.-0in.)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum* (15 ft. desirable) from lane edge

* or as close to ROW line as is practical

** provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.

1. "Recommended Foundation Lengths" table is for information purposes only. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations," unless otherwise shown on the plans.
2. Erect roadway illumination assembly poles plumb and true. Form and level the top 6" of the foundation so the pole will be plumb. Use leveling nuts to plumb shoe base poles. Do not use shims or leveling nuts under transformer bases. Do not grout between baseplate and the foundation.
3. Ensure Class 2A and 2B fit for anchor bolts and nuts. Tap and chase nuts after galvanizing. Anchor bolt body with rolled threads need not be full size.
4. Use appropriate class of concrete as specified in Items 416 and 432.
5. Place riprap around the foundation when called for elsewhere in the plans. Riprap will be paid for under Item 432.
6. Locate breakaway roadway illumination assemblies as shown in the placement table, unless otherwise dimensioned on the plans. Protect non-breakaway illumination assemblies from vehicular impact (i.e. 2 ft. behind guard rail or mounted on traffic barrier), or located outside the clear zone, except that 2.5 ft. from curb face is minimum desired for light poles on city streets, 45 mph or less, see design guidelines for further information.
7. [illegible] base poles as recommended by the manufacturer and supplied with base.
8. [illegible] each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Cap unused conduits in foundations on both ends.
9. Conduit location in foundations is critical for breakaway devices. Place conduits 2 in. apart on centerline [illegible]
10. [illegible] rebar for embedment in concrete.
11. Use rip rap on T-base foundations that are located on a sloped grades.

SCOTT R. ARNOLD 96782 LICENSED PROFESSIONAL ENGINEER 10/30/2015

Scott R. Arnold, P.E.

Texas Department of Transportation
Traffic Operations Division

ROADWAY ILLUMINATION DETAILS

(RDWY ILLUM FOUNDATIONS)

RID(FND)-11(MOD)

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1-11
6-15

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ATTACHMENT "A"

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

- FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
- TWT = Thin-Walled Tubing (see SMD(TWT))
- 10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
- S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

Anchor Type

- UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
- UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
- WS = Wedge Anchor Steel - (see SMD(TWT))
- WP = Wedge Anchor Plastic (see SMD(TWT))
- SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
- SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

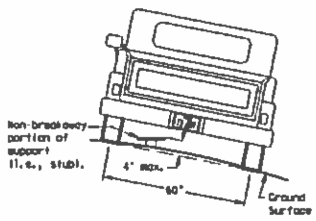
Sign Mounting Designation

- P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
- T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
- U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))

IF REQUIRED

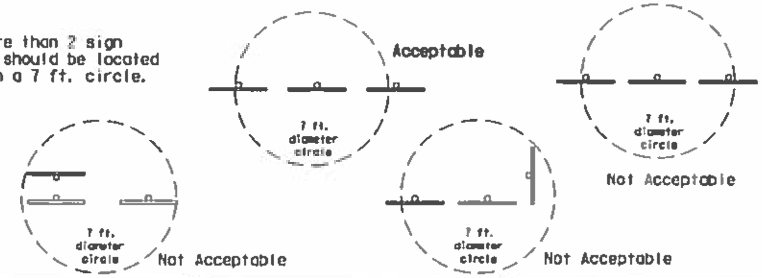
- 1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
- BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
- WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
- EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



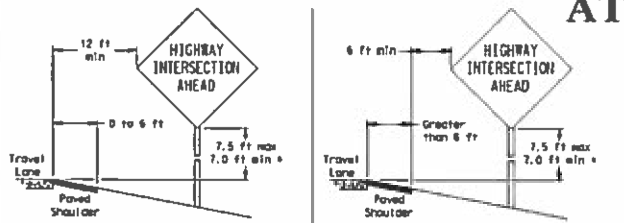
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

No more than 2 sign posts should be located within a 7 ft. circle.



SIGN LOCATION

PAVED SHOULDERS



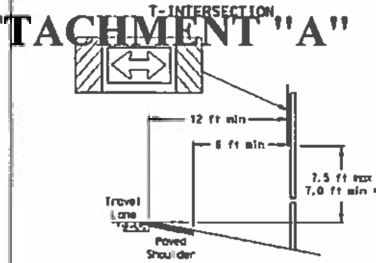
LESS THAN 6 FT. WIDE

When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.

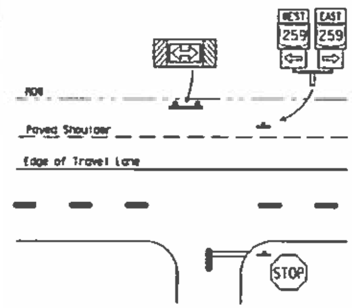
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

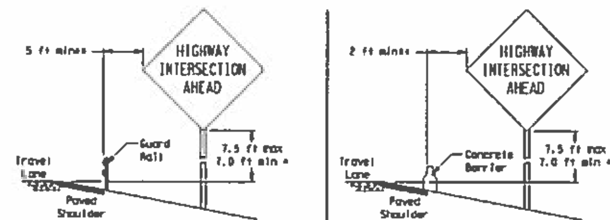
T-INTERSECTION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL

BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

- Signs shall be mounted using the following condition that results in the greatest sign elevation:

  (1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

  (2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

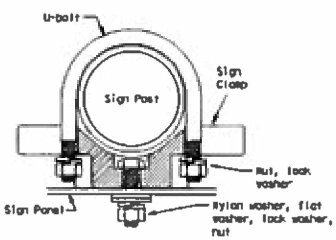
  The maximum values may be increased when directed by the Engineer.

  See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

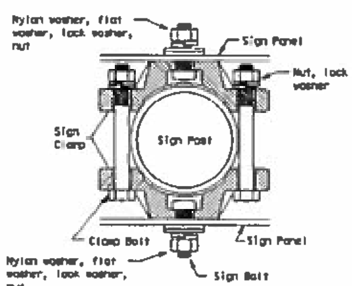
  The website address is:
  http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



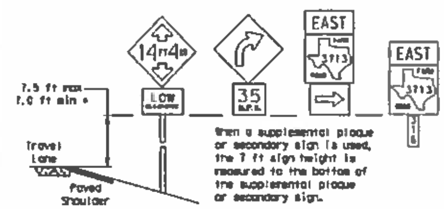
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use 5/16-18 UNC [illegible] ... the approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted [illegible]

Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
[illegible]	[illegible]	[illegible]

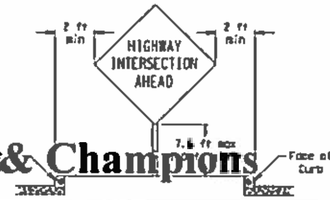
Sign clamps may be either the specific size clamp or the universal clamp.

SIGNS WITH PLAQUES



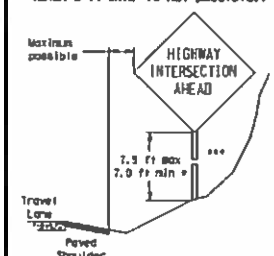
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

**SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
GENERAL NOTES & DETAILS**

SMD(GEN)-08

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REVISIONS 9-08	CONT 6LP	SECT 6	JOB ---	HIGHWAY
	DIST EL PASO	COUNTY ---	---	SHEET NO. C-69 / SH 20

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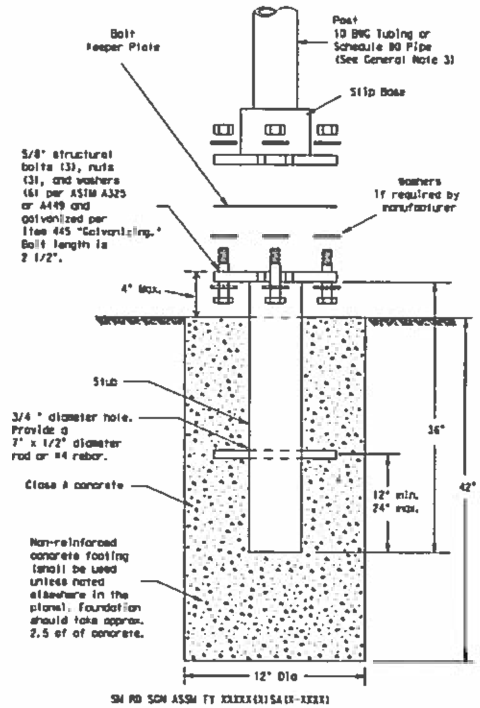
ATTACHMENT "A"

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

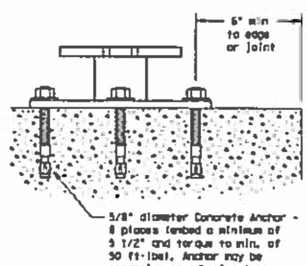
Foundation

1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support

1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

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IS-1036-455 / 520919

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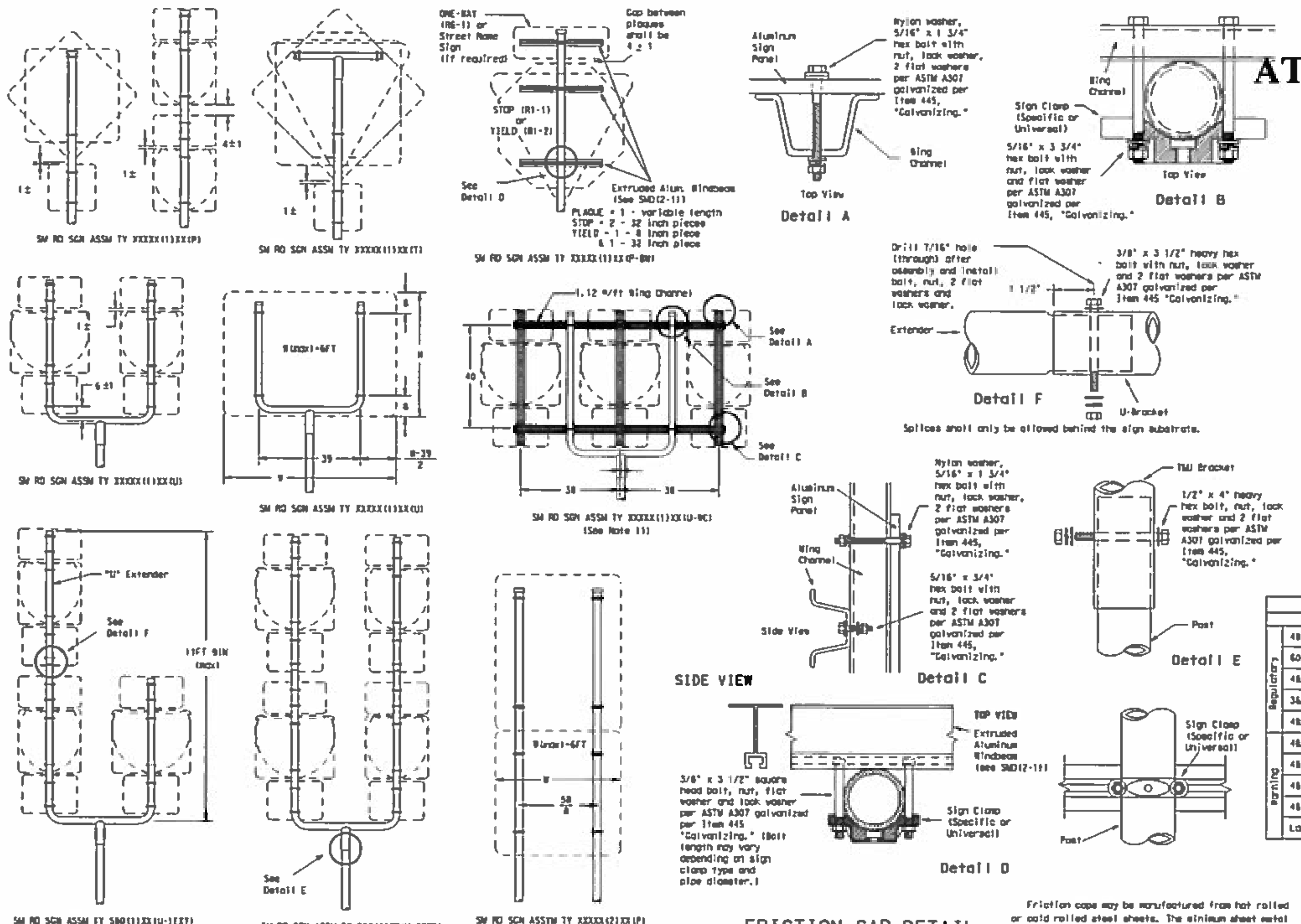

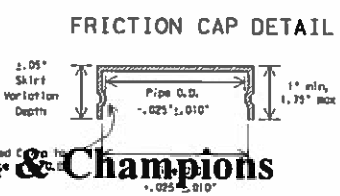

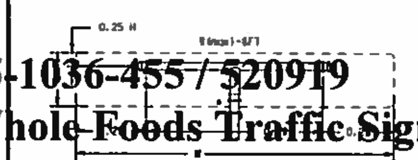

Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	[illegible]	[illegible]
Sch 80	[illegible]	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x18-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

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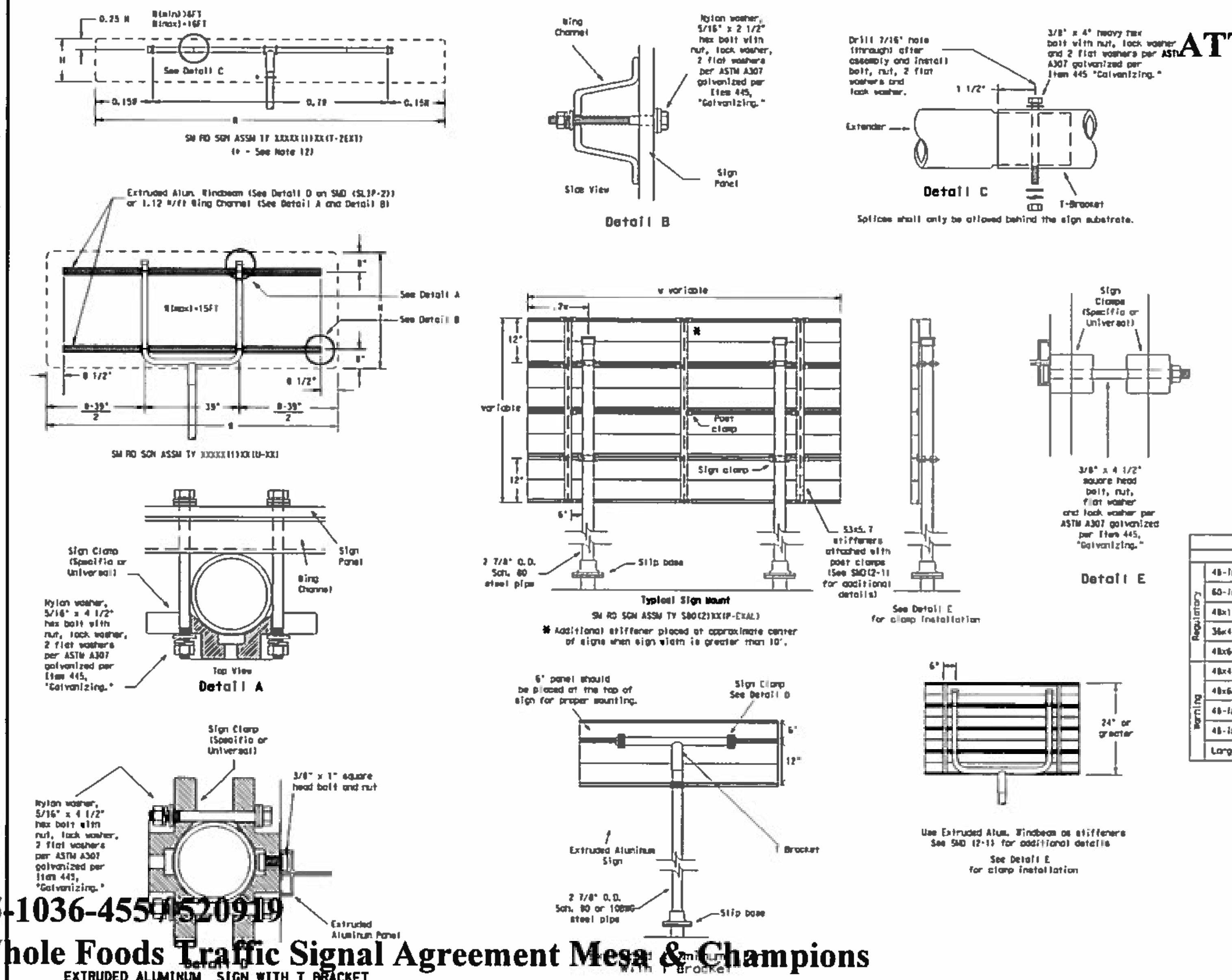
S-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR70

ATTACHMENT "A"



GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
[illegible]	2	32 SF
[illegible]	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x18-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

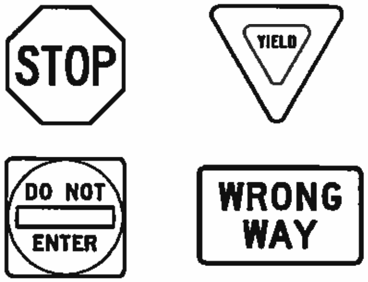
SMD(SLIP-3)-08

©TxDOT July 2002 | 9-08 | ELP | C-72 | EL PASO | SH 20

260

18-1036-455 #520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR71

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS
(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS
(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

GENERAL NOTES

ATTACHMENT "A"

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheets. ... can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.
http://www.txdot.gov/

REQUIREMENTS FOR WARNING SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	[illegible]	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

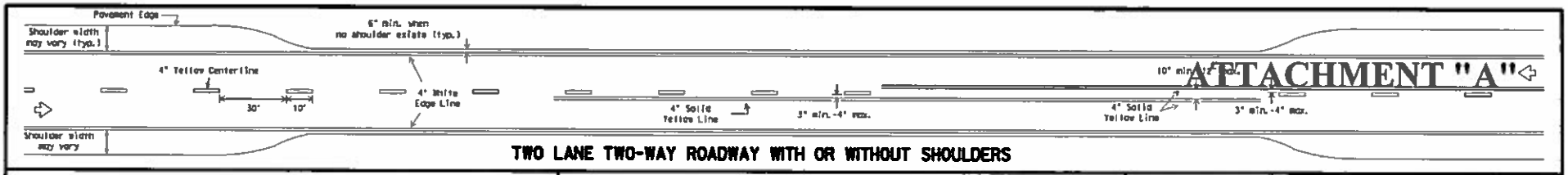
Texas Department of Transportation
Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

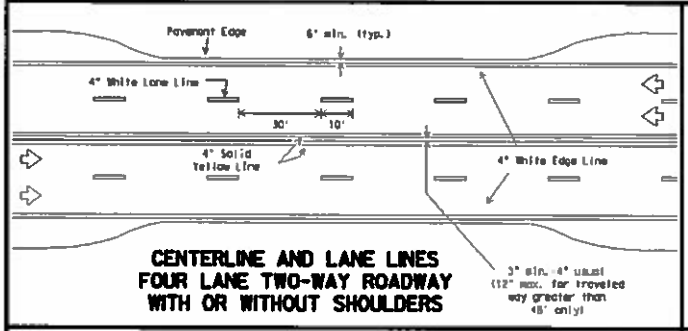
TSR(4)-13

FILE: tsr4-13.dgn
© TxDOT October 2003
REVISIONS
12-03 7-13
9-08
DN: TxDOT CK: TxDOT DW: TxDOT CK: TxDOT
SH 20
DIST: ELP COUNTY: EL PASO SHEET NO. C-73

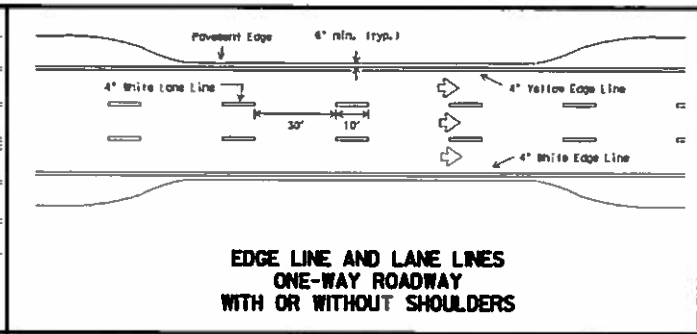
15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR72



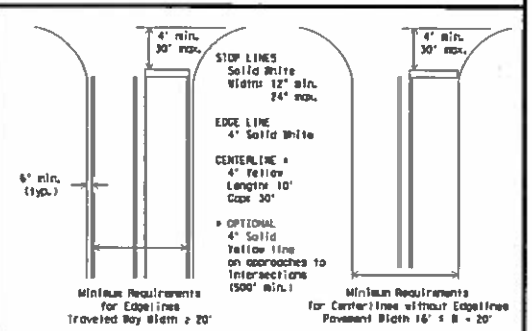
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

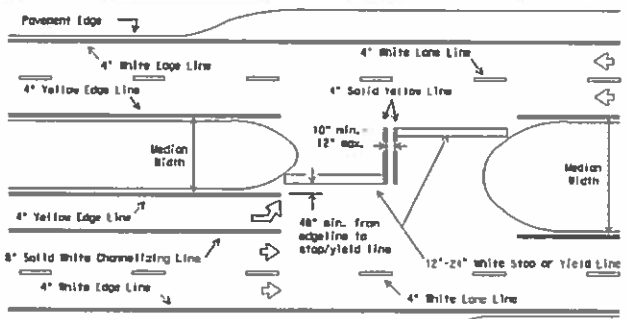


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



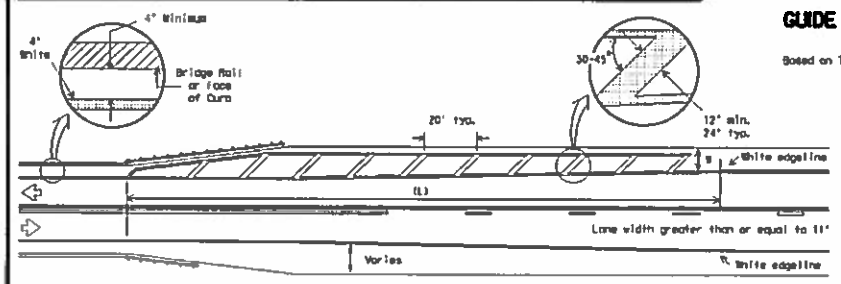
GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways



All medians shall be field measured to determine the location of necessary striping. Stop/Yield bars and centerlines shall be placed when the median width is greater than 30 ft. The median width is defined as the area between two roadways of a divided highway measured from edge of traveled way to edge of traveled way. The median excludes turn lanes. The median width might be different between intersections, interchanges and at opposite approaches of the same intersection. The narrow median width will be the controlling width to determine if markings are required.

FOUR LANE DIVIDED ROADWAY INTERSECTIONS



NOTES:

1. No-passing zone on bridge approach is optional but if used, it shall be a minimum 500 feet long.
2. For crosshatching length (L) see Table 1.
3. The width of the offset (W) and the required crosshatching width is the full shoulder width in advance of the bridge.
4. The crosshatching is not required if delineators or barrier reflectors are used along the structure.
5. For guard fence details, refer elsewhere in the plans.

ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT

TABLE 1 - TYPICAL LENGTH (L)

Posted Speed *	Formula
≤ 40	$L = \frac{WS^2}{60}$
≥ 45	L=WS

* 85th Percentile Speed may be used on roads where traffic speeds normally exceed the posted speed limit. Crosshatching length should be rounded up to nearest 5 foot increment.

L=Length of Crosshatching (Ft.) W=Width of Offset (Ft.)
S=Posted Speed (MPH)

EXAMPLES:

An 8 foot shoulder in advance of a bridge reduces to 4 feet on a 70 MPH roadway. The length of the crosshatching should be:

L = 8 x 70 = 560 ft.

A 4 foot shoulder in advance of a bridge reduces to 2 feet on a 40 MPH roadway. The length of the crosshatching should be:

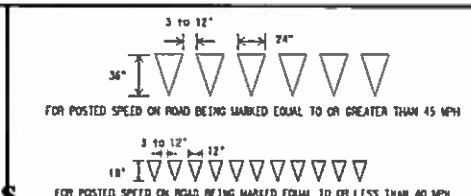
L = 4(40)² / 60 = 106.67 ft. rounded to 110 ft.

GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should typically be placed a minimum of 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
2. Traveled way includes auxiliary lanes carrying the roadway used for vehicular movements, passing lanes, climbing lanes, turning lanes and shoulders. The traveled way shall be measured from the inside of edgeline to inside of edgeline of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement markings required shall conform to the required Departmental Material Specifications as specified by the plans.



YIELD LINES

Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD PAVEMENT MARKINGS

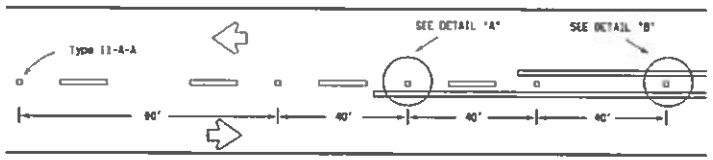
PM(1)-12

©TxDOT November 1975	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
8-86 Z-12				SH 20
5-00	DIST	COUNTY		SHEET NO.
8-00	ELP	EL PASO		C-24
3-03				

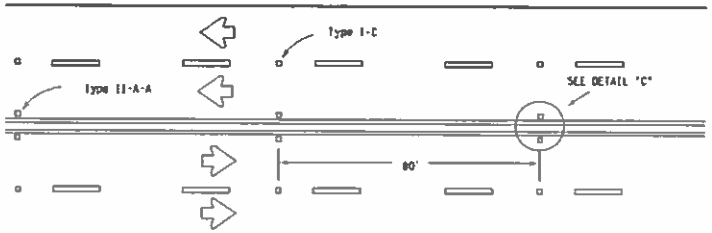
22A

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

ATTACHMENT A

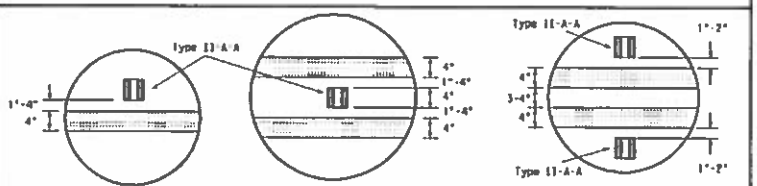


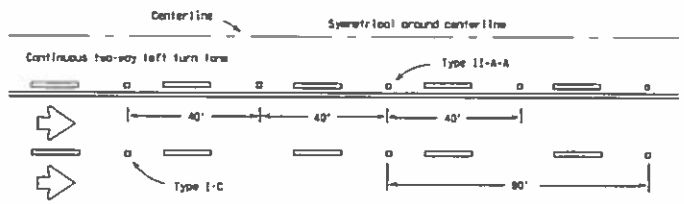
CENTERLINE FOR ALL TWO LANE ROADWAYS



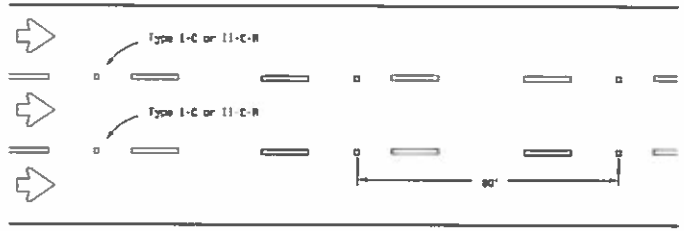
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS

Raised pavement marker Type I-C, clear face toward normal traffic, shall be placed on 80-foot centers.



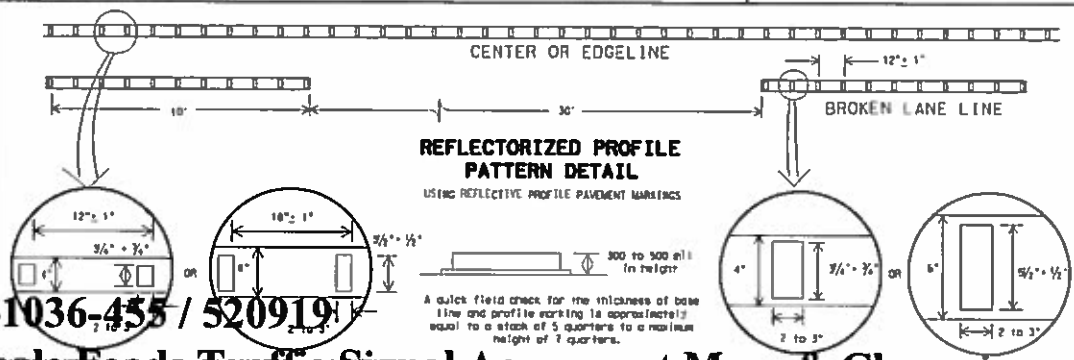


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong way traffic.



NOTE:
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

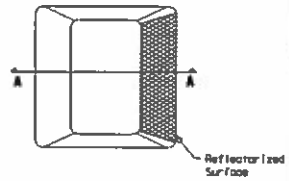
GENERAL NOTES

All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.

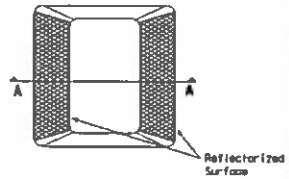
On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (RETROREFLECTORIZED)	DMS-4200
EPOXY	DMS-6100
PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

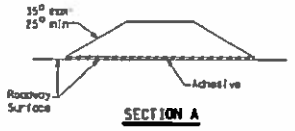
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

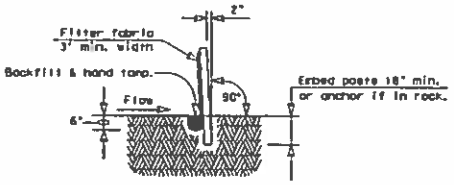
Texas Department of Transportation
Traffic Operations Division

POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS

PM(2)-12

©TxDOT April 1997	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
4-92 8-13				SM PD
2-00 2-12	DIST	COUNTY		SHEET NO.
8-00	ELP	EL PASO		C-75
7-08				

226



SECTION A-A

GENERAL NOTES

1. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

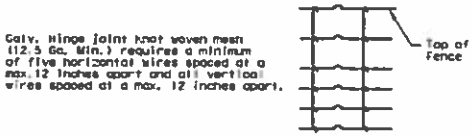
PLAN SHEET LEGEND

Sediment Control Fence —SCF—

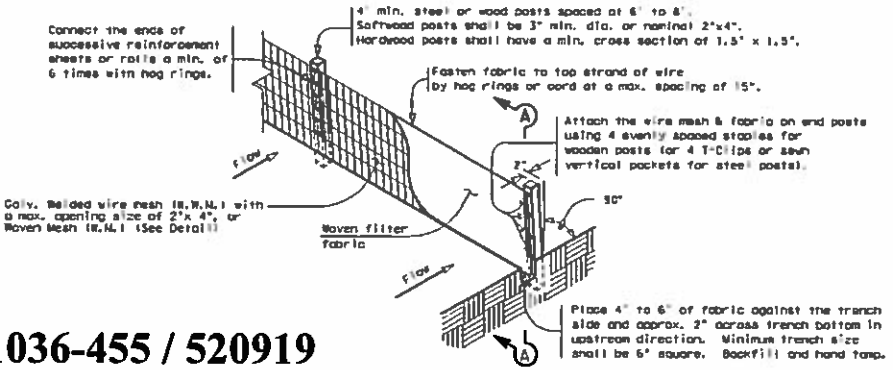
SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a max. flow through rate of 100 GPM/FT². Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

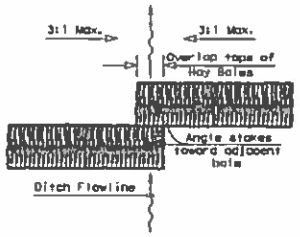


Hinge Joint Knot Woven Mesh (Option)

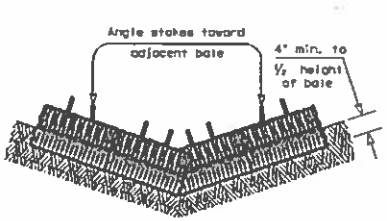


TEMPORARY SEDIMENT CONTROL FENCE

SCF



PLAN VIEW



PROFILE VIEW

PLANS SHEET LEGEND

Baled Hay —BH—

BALED HAY USAGE GUIDELINES

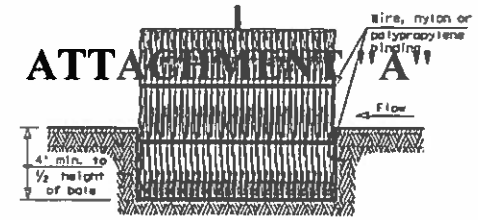
A Baled Hay installation may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A two year storm frequency may be used to calculate the flow rate to be filtered. The installation should be sized to filter a maximum flow thru rate of 5 GPM/FT² of cross sectional area. Baled hay may be used at the following locations:

1. Where the runoff approaching the baled hay flows over disturbed soil for less than 100'. If the slope of the disturbed soil exceeds 10%, the length of slope upstream the baled hay should be less than 50'.
2. Where the installation will be required for less than 3 months.
3. Where the contributing drainage area is less than ½ acre.

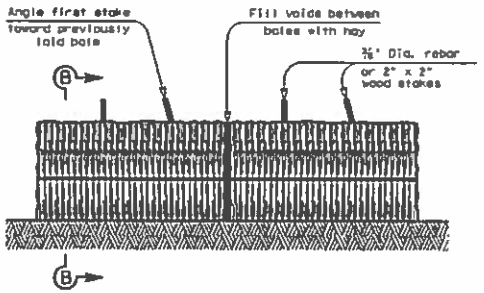
For Baled Hay installations in small ditches, the additional following considerations apply:

1. The ditch sideslopes should be graded as flat as possible to maximize the drainage flowrate thru the hay.
2. The ditch should be graded large enough to contain the overtopping drainage when sediment has filled in the top of the baled hay.

Bales should be replaced usually every 2 months or more often during wet weather when loss of structural integrity is accelerated.



SECTION B-B



BALED HAY FOR EROSION CONTROL

BH

GENERAL NOTES

1. Hay bales shall be a minimum of 30" in length and weigh a minimum of 50 Lbs.
2. Hay bales shall be bound by either wire or nylon or polypropylene string. The bales shall be composed entirely of vegetative matter.
3. Hay bales shall be embedded in the soil a minimum of 4" and where possible ⅓ the height of the bale.
4. Hay bales shall be placed in a row with ends tightly abutting the adjacent bales. The bales shall be placed with bindings parallel to the ground.
5. Hay bales shall be securely anchored in place with ⅜" Dia. rebar or 2" x 2" wood stakes, driven through the bales. The first stake shall be angled towards the previously laid bale to force the bales together.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation
Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & BALED HAY

EC(1)-09

FILE:	ec109.dgn	DN: TxDOT	CK: DW	DW: TV	CK: DW
©TxDOT	June 1993	CONT	SECT	JOB	HIGHWAY
	REVISIONS				SH 20
		DIST	COUNTY		SHEET NO.
		ELP	EL PASO		C-78

ATTACHMENT "A"

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

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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 ☐ Required Action

Action No.

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 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.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

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 (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# ______

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices 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.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	■ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ [illegible]	☐ [illegible]	☐ Erosion Control Compost
☐ [illegible] Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ [illegible]	☐ [illegible]	☐ [illegible]
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

■ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

■ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

■ No Action Required ☐ Required Action

Action No.

1.

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 caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
[illegible]	[illegible]	[illegible]	[illegible] Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting [illegible] and making workers aware of potential hazards [illegible] that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

- Dead or distressed vegetation (not identified as normal)
- Trash piles, drums, canister, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ■ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ■ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

■ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

■ No Action Required ☐ Required Action

Action No.

1.

2.

3.

STATE OF TEXAS
SCOTT R. ARNOLD
96782
LICENSED
PROFESSIONAL ENGINEER

10/30/2015

Scott R Arnold, P.E.

Texas Department of Transportation | Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn

© TxDOT: February 2016

DIST: EL PASO

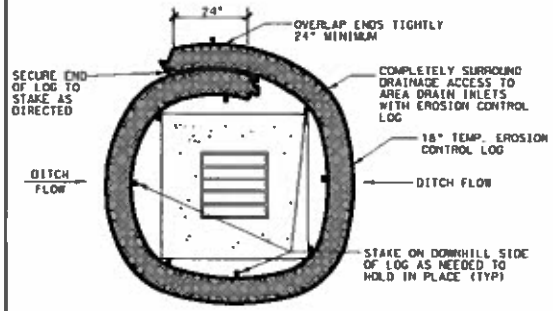
SHEET NO.

15-1036-455 / 520919

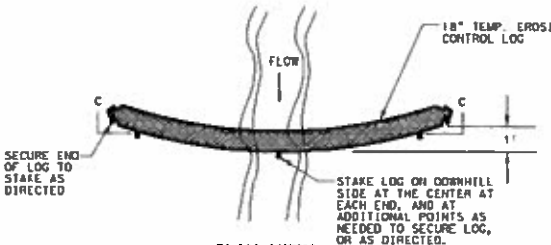
Whole Foods Traffic Signal Agreement Mesa & Champions

OAR76

ATTACHMENT "A"



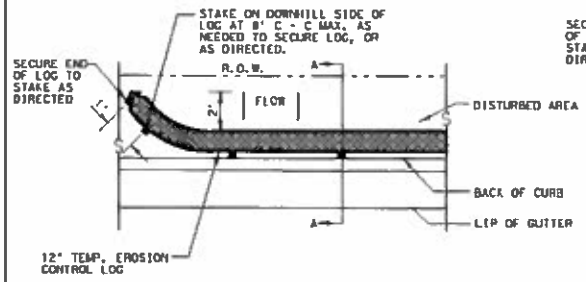
LOGS PLACED AT AREA DRAIN INLETS
NTS



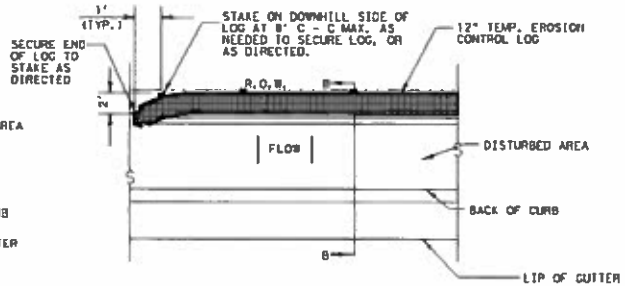
PLAN VIEW

SECTION C-C

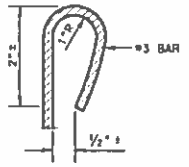
EROSION CONTROL LOG CHECK DAM
NTS



PLAN VIEW



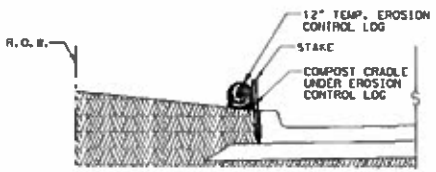
PLAN VIEW



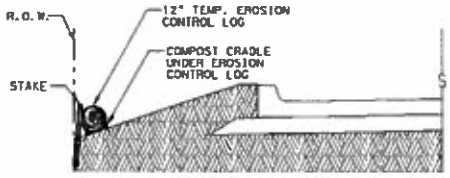
REBAR STAKE DETAIL
NTS

GENERAL NOTES:

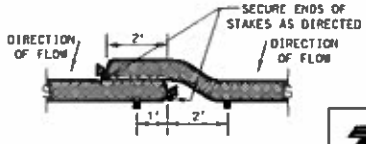
1. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED. MAXIMUM LENGTH OF LOGS SHALL BE 60' FOR 18" DIAMETER OR 30' FOR 12" DIAMETER LOGS.
2. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
3. STUFF LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE DENSITY THAT WILL HOLD SHAPE WITHOUT EXCESSIVE DEFORMATION.
4. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED.
5. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.



SECTION A-A



SECTION B-B



LAP DETAIL
NTS

LOG PLACED AT BACK OF CURB
NTS

LOG PLACED AT EDGE OF RIGHT-OF-WAY
NTS

EL PASO DISTRICT

EROSION CONTROL LOGS

SCALE: NOT TO SCALE (1 OF 2)

DESIGN	FED.RD. DIV.NO.			HIGHWAY NO.
	24			SH 20
CHECKED	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	ELP	EL PASO	
CHECK	CONTROL	SECTION	JOB	C-78
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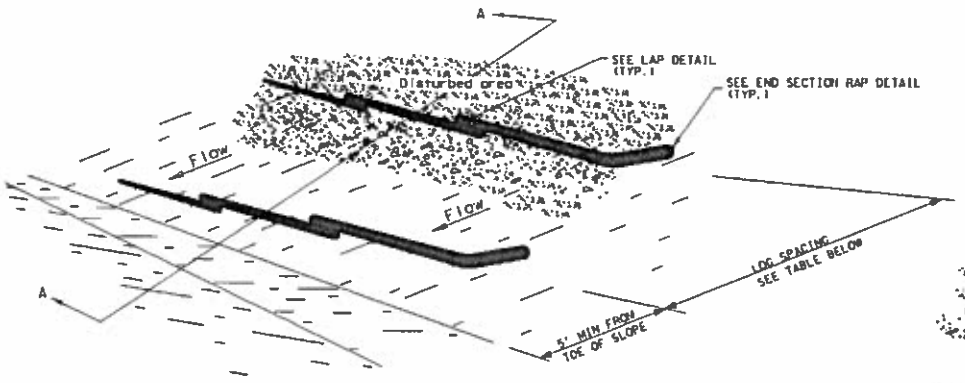
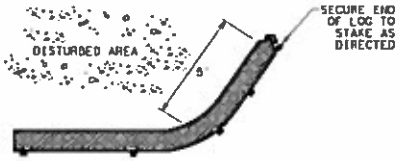


LOGS PLACED ON EXPOSED SLOPES

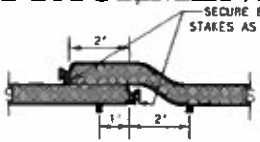
NTS



END SECTION RAP DETAIL

NTS

ATTACHMENT "A"



LAP DETAIL

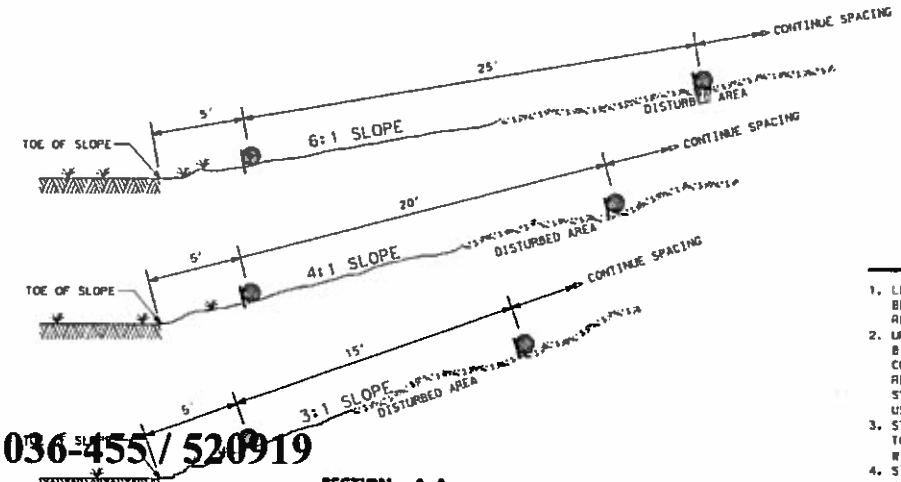
NTS

STAKE ON DOWNHILL SIDE OF LOG AT 8' C. TO C. MAX. AS NEEDED TO SECURE LOG, OR AS DIRECTED.

STAKE DETAIL

NTS

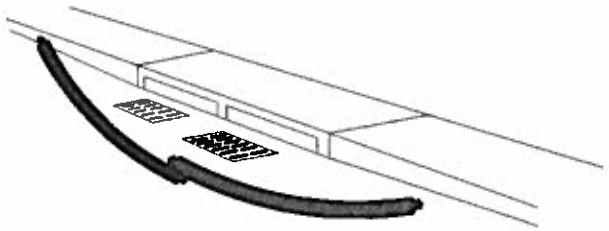
SLOPE	LOG DIAMETER	SPACING BETWEEN LOGS
3:1	6"	15'
4:1	6"	20'
6:1	6"	25'



SECTION A-A

LOGS PLACED ON EXPOSED SLOPES

NTS



COMPLETED INLETS DETAIL

WITH NO TRAFFIC NTS

GENERAL NOTES:

1. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS DIRECTED BY THE ENGINEER.
2. 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.
3. STUFF LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE DENSITY THAT WILL HOLD SHAPE WITHOUT EXCESSIVE DEFORMATION.
4. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 4' LONG, EMBEDDED SUCH THAT [illegible] OF LOG, OR AS DIRECTED. [illegible] THROUGH CONTAINMENT MESH.

EL PASO DISTRICT

EROSION CONTROL LOGS

SCALE: NOT TO SCALE (2 OF 2)

DESIGN	FED. RD. DIV. NO.		HIGHWAY NO.
DRAWN	24		SH 20
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	ELP	EL PASO	
CHECK	CONTROL	SECTION	JOB	C-79
	---	---	---	

ATTACHMENT A

1. SITE OR PROJECT DESCRIPTION:

NATURE OF THE CONSTRUCTION ACTIVITY: SEE TITLE SHEET

POTENTIAL POLLUTANTS AND SOURCES:

Sediment laden storm water	Storm water conveyance over disturbed areas
Fuels, oils, and lubricants	Construction vehicles and storage areas
Construction debris and waste	Various construction activities
Sanitary waste	Restroom facilities
Trash	Construction site and Receptacles

SEQUENCE OF ACTIVITIES THAT WILL DISTURB SOILS:

1. Demolition of existing curb & parkway.
2. Excavation for driveway subbase.

AREAS:

TOTAL AREA OF PROJECT: 0.36 ACRES
TOTAL AREA OF SOIL DISTURBANCE: 0.36 ACRES
TOTAL AREA OFF-SITE:
WEIGHTED RUNOFF COEFFICIENT (BEFORE AND AFTER CONSTRUCTION): N/A

GENERAL LOCATION MAP: SEE TITLE SHEET

THE LOCATION AND DESCRIPTION OF CONCRETE AND ASPHALT PLANTS:

Supporting Concrete Plant Facilities shall be located off site.

Supporting Asphalt Plant Facilities shall be located off site.

NAME OF RECEIVING WATERS: Rio Grande

401 WATER QUALITY CERTIFICATION: YES____ NO__X__

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR79

2. BEST MANAGEMENT PRACTICES (BMPs):

EROSION AND SEDIMENT CONTROLS: Erosion and sediment controls have been designed to retain sediment on-site. Controls shall be utilized to reduce off site transport of suspended sediments and pollutants if it is necessary to pump water from the site. Control measures shall be installed per specifications or as directed. Sediment must be removed from controls per manufacturers recommendations, but no later than the time that design capacity has been reduced by 50%. If sediment escapes the site, accumulations will be removed to minimize further negative effects. Controls will be developed to limit the off site transportation of litter, construction debris, and construction materials.

INTERIM (INT), PERMANENT (PER), AND 401 CERTIFICATION BMP'S:

EROSION CONTROLS:	401	INT	PER
☐ Compaction & Tracking of slopes	—	—	—
☐ Diversion Dike	—	—	—
☐ Preserve Existing Vegetation	—	—	—
☐ Soil Stabilization	—	—	—
☐ Permanent Vegetation	—	—	—
☐ No Erosion Controls are Required.			

SEDIMENT CONTROLS:	401	INT	PER
☒ Silt Fence	—	X	—
☐ Rock Berm	—	—	—
☐ Buffer Zones	—	—	—
☐ Vegetative Filter Strips	—	—	—
☐ Ditch Block	—	—	—
☐ Stabilize by composting decomposed granite	—	X	X

POST CONSTRUCTION TSS CONTROL (401 CERTIFICATION ONLY):

- ☐ Vegetation Lined Drainage Ditch
- ☐ Retention/Irrigation
- ☐ Erosion Control Compost
- ☐ Grassy Swales
- ☐ Vegetative Filter Strips
- ☐ No Post Construction TSS Control Required.

The El Paso District of the Texas Department of Transportation uses Site-Manager, a computer based construction record-keeping system. Documentation describing grading activities, temporary or permanent cessation of construction, and stabilization measures is a part of this system and is incorporated by reference into this SWPP.

5. OTHER CONTROLS:

OFF-SITE VEHICLE TRACKING OF SEDIMENTS AND THE GENERATION OF DUST: The off site vehicle tracking of sediments shall be minimized by removal of excess dirt from the road and at entrances to the work site. The generation of dust will be minimized as directed by the Project Engineer by dampening haul roads and covering haul trucks with a tarpaulin.

CONSTRUCTION AND WASTE MATERIALS: The contractor will maintain a clean, orderly construction site. Construction waste including trash, rubble, scrap and vegetation shall be disposed of in lidded dumpsters or in a manner approved by the Project Engineer. Disposal methods must meet Federal, State, and local waste management guidelines. No construction waste will be buried or burned on site. Spoils disposal, material storage, and materials resulting from the destruction of existing roads and structures shall be stored in areas designated by the Project Engineer and protected from run-off. All waterways shall be cleared of temporary embankment, temporary bridges, matting, false work, piling, debris, or other obstructions placed during construction operations, that are not part of the finished work, as soon as practicable. All excess soil generated by the construction will be collected and disposed of by the contractor. Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, water body, or stream bed.

POLLUTANT SOURCES FROM AREAS OTHER THAN CONSTRUCTION: Staging areas and [illegible] minimize the runoff of pollutants. If potential pollutant sources are identified after the start of construction, controls and measures shall be implemented as directed by the Project Engineer.

5. OTHER CONTROLS (CONT):

DEDICATED ASPHALT PLANTS: Asphalt or asphaltic material for this project will be produced off site. If the project requires a dedicated asphalt plant and the plant is within 1 mile of the project limits it will be considered an off site PSL. Consideration shall be given to an site plant and storage facilities and measures implemented as directed by the Project Engineer.

DEDICATED CONCRETE PLANTS: Cement or Concrete material for this project will be produced off site. If the project requires a dedicated concrete plant and the plant is within 1 mile of the project limits it will be considered an off site PSL. Consideration shall be given to an site plant and storage facilities and measures implemented as directed by the Project Engineer. Concrete trucks shall be washed or rinsed out in locations designated by the Project Engineer. The locations shall be protected by a berm sufficient to contain all waste and wash water. Wash water shall not be allowed to enter any storm drainage system or waterway. The residual material and contaminated soil shall be collected and disposed of in accordance with Federal, State, and Local guidelines. Staging areas and vehicle maintenance areas shall be located and constructed in a manner to minimize the runoff of pollutants.

HAZARDOUS MATERIALS AND SPILL REPORTING: The contractor shall take appropriate measures to prevent, minimize, and control the spillage or leakage of hazardous materials and any associated wastes on site and in maintenance and staging areas. Hazardous materials shall include but are not limited to paints, acids, solvents, asphalt products, chemical additives, curing compounds, oils, fuels, and lubricants. Hazardous materials shall not be stored, accumulated, or transported in open containers subject to precipitation or spillage, but shall be stored, accumulated, or transported in closed containers of the type recommended by the manufacturer. In the event of a spill the Project Engineer should be contacted immediately. All spills shall be immediately cleaned and any contaminated soil removed and disposed of in accordance with Local, State, and Federal laws. Fuel tanks shall be protected by a secondary containment, such as a lined berm, capable of containing 1.5 times the capacity of the tank, or as approved by the Project Engineer.

OFF SITE PSL: All off site project specific locations including dedicated asphalt plants, concrete plants, or utility installations, required by the contractor, are the contractor's responsibility. The contractor shall secure all permits required by local, state, or federal laws for off site PSLs. The contractor shall provide diagrams and areas of disturbance for all PSL's within 1 mile of the project.

SANITARY FACILITIES: All sanitary or septic wastes that are generated onsite shall be treated and disposed of in accordance with state and local regulations. Raw sewage or septage shall not be discharged or buried on site. Precaution shall be taken to prevent illicit discharges to storm water. Licensed waste management contractors shall be required to dispose of sanitary waste. Porta johns will be required for the construction site or as directed by the Project Engineer.

VELOCITY DISSIPATION DEVICES: Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as shown in the plans or as directed by the Project Engineer to provide a non-erosive flow velocity from the structure to a watercourse so that the natural physical and biological characteristics and functions are maintained and protected.

7. MAINTENANCE:

Control measures shall be properly installed according to specifications. If inspections or other information indicates a control has been installed, used, or is performing inadequately, the contractor must replace or modify the control as soon as practicable after discovery. Control measures shall be maintained in effective operating condition. If inspections determine that BMPs are not operating effectively maintenance will be performed as necessary to continue the effectiveness of the controls. Maintenance must be accomplished as soon as practicable. Controls adjacent to creeks, culverts, bridges, and water crossings shall have priority. Controls that have been disabled, run over, removed, or otherwise rendered ineffective must be corrected immediately upon discovery.

8. INSPECTION OF CONTROLS:

A TxDOT Inspector will inspect disturbed areas of the site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, and structural controls for evidence of, or the potential for, pollutants entering the drainage system. Sediment and erosion controls measures identified in the SWP3 will be inspected to ensure that they are operating correctly. Locations where vehicles enter or exit the site will be inspected for evidence of off-site vehicle tracking.

9. NON-STORM WATER COMPONENTS:

The contractor shall be required to implement appropriate pollution prevention controls and measures for all eligible non-storm water components of the discharge as approved and directed by the Project Engineer.

STATE OF TEXAS
HUGO MORALES
81188
LICENSED
PROFESSIONAL ENGINEER
10/30/15

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SWP3)
DISTURBANCE LESS THAN 1 ACRE)

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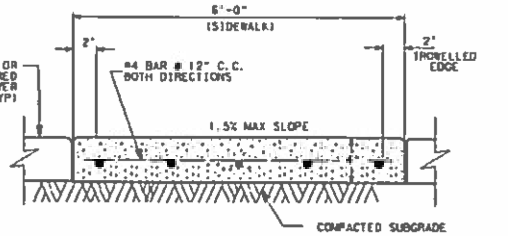
FED.RD. DIV.NO.			SHEET NO.
6			C-8C
STATE	STATE DIST.	COUNTY	
TEXAS	ELP	EL PASO	
CONT.	SECT.	JOB	HIGHWAY NO.
---	---	---	SH 20

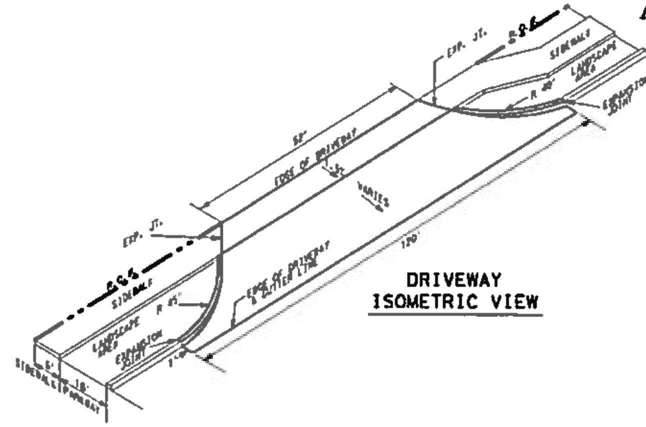
REV 07-2014

NOTE:
1. DOWEL BARS ARE SUBSIDIARY TO ITEM 531.

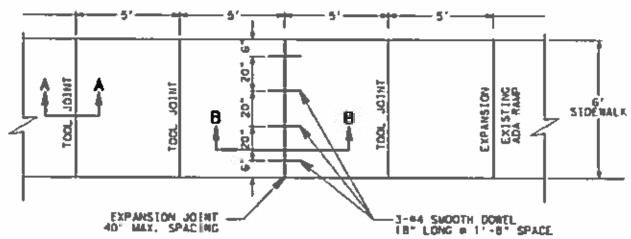
ATTACHMENT "A"



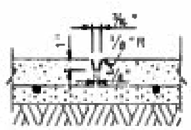
TYPICAL SIDEWALK SECTION THRU SIDEWALK



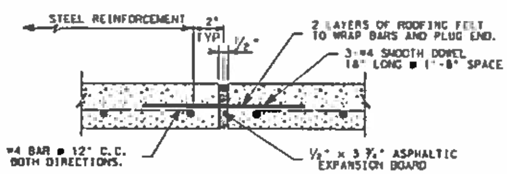
DRIVEWAY
ISOMETRIC VIEW



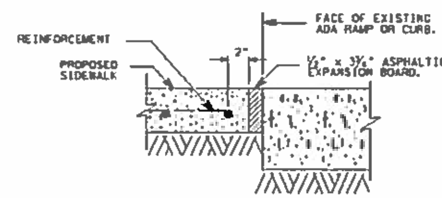
PLAN VIEW
TYPICAL SIDEWALK



SECTION A-A
TOOL JOINT



SECTION B-B
EXPANSION JOINT DETAIL



MATCHING AT EXISTING ADA RAMP

WHOLE FOODS
SIDEWALK DETAILS

SHEET 1 OF 1 NOT TO SCALE

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6			C-81
STATE	DIST.	COUNTY	
TEXAS	ELP	EL PASO	
CONTROL	SECTION	JOB	HIGHWAY NO.
---	---	---	SH 20

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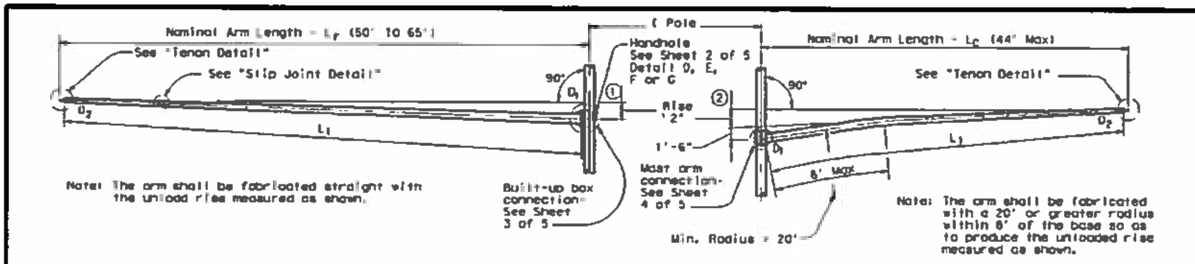
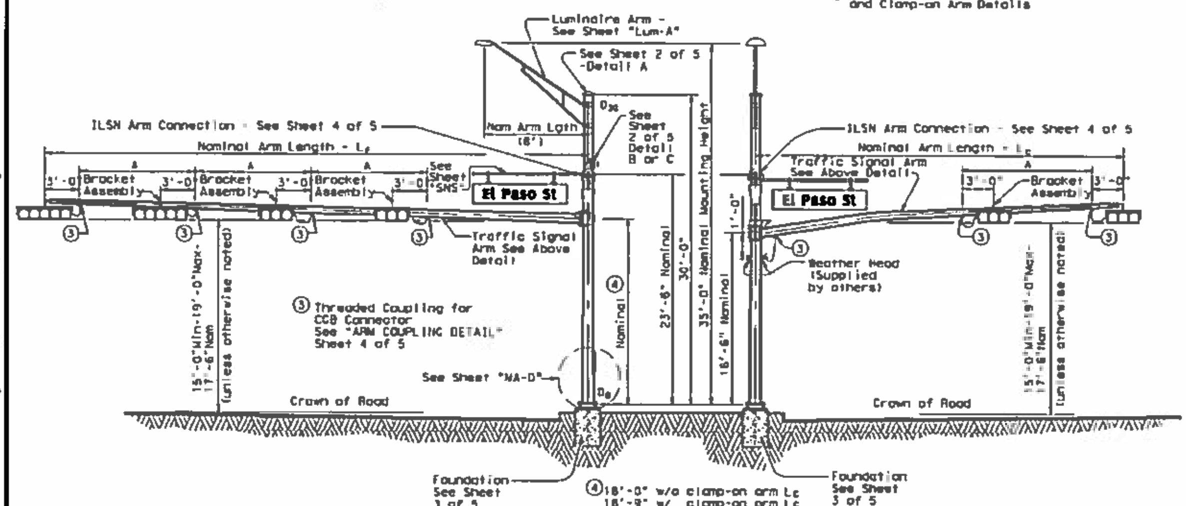


FIXED MOUNT TRAFFIC SIGNAL ARM

(1) See Sheet 3 of 5 for Arm Rise

CLAMP-ON TRAFFIC SIGNAL ARM (IF REQUIRED)

(2) See Sheet 4 of 5 for Arm Rise and Clamp-on Arm Details

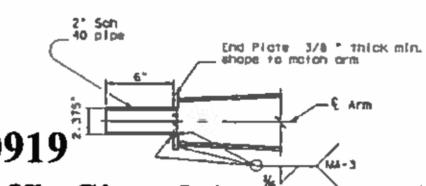


ELEVATION
(Showing fixed mount arm)

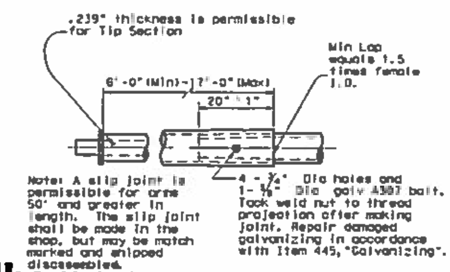
STRUCTURE ASSEMBLY

ELEVATION
(Showing clamp-on arm)

TABLE OF DIMENSIONS "A"										
Arm Length	24'	28'	32'	36'	40'	44'	50'	55'	60'	65'
Arm Type II	10'	11'	12'	13'						
Arm Type III			10'	11'	12'	12'				
Arm Type IV							12'	12'	12'	12'



TENON DETAIL



SLIP JOINT DETAIL (FIXED MOUNT ARM)

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed can be either 100 mph or 80 mph plus a 1.3 gust factor. If clamp-on traffic signal is required, [illegible] or more. Angles of less than [illegible] special design.

ATTACHMENT "A"

Poles are designed to support one 8'-0" luminaire arm, two 9'-0" internally lighted street name (ILSN) signs and two traffic signal arms with limited length combinations.

Each arm with its related attachment is shown below

Arm	Equivalent DL (5)	WL EPA (5)(6)
8' Luminaire Arm	Luminaire 60 lbs	1.6 sq ft
9' ILSN Arm	Sign 85 lbs	11.5 sq ft
50' to 65' Fixed Mount Arm	Signal Loads 310 lbs	52 sq ft
Up to 44' Clamp-on Arm	Signal Loads 180 lbs	32.4 sq ft

(5) Equivalent dead load plus horizontal wind load applied at the end of arm except ILSN arm, which applied 4.5' from the centerline of the pole.

(6) Effective projected area (actual area times drag coefficient) for the application of horizontal wind load.

Except as noted in Sheet 1 thru 5 of 5, other details not covered shall refer to Standard Sheet "MA-D" for pole details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the fabricator must obtain prior to fabrication. Material, fabrication tolerances, and shipping practices shall also meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing" after fabrication.

Deviations from the details and dimensions shown herein require submission of shop drawings in accordance with the Item 441, "Steel Structures". Alternate designs are not acceptable.

Installation of damping plate for the long mast arm is not recommended.

Provision of the bracket assembly used to support the traffic signal heads shall be under the direction of the Engineer for approval.

Design also conforms to NCHRP Report 412 for fatigue resistance except that there are no stiffeners at the base plate. TxDOT is conducting tests to determine if stiffeners at the base plate will or will not result in optimal performance; depending upon the results of the tests, poles may need a retrofit to ensure optimal fatigue performance.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

LMA(1)-12

Sheet 1 of 5

EL PASO

131A

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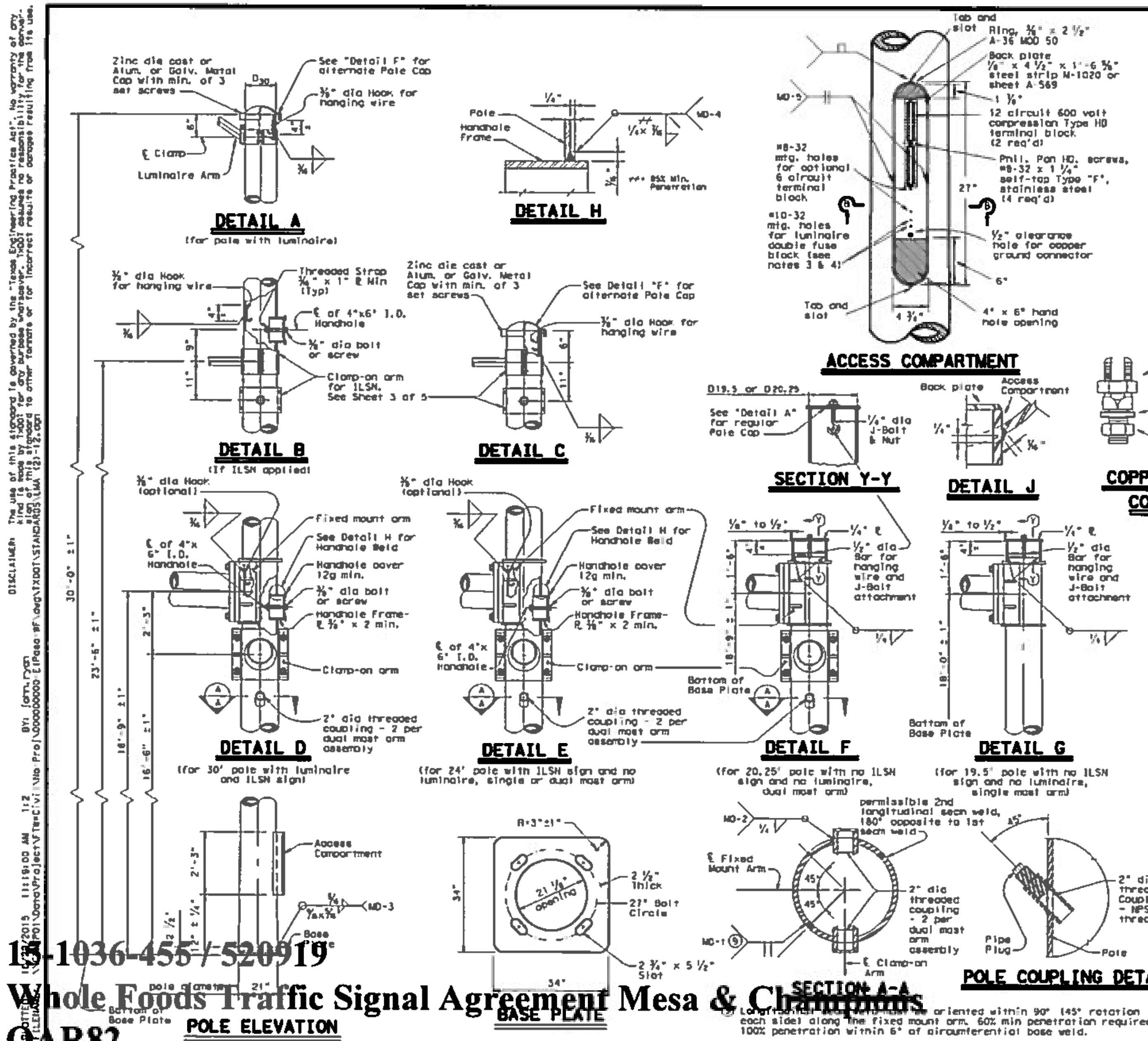
ATTACHMENT "A"



MATERIALS	
Round Shafts or Polygonal Shafts (7)	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50
Plates (7)	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325, or A449 except where noted
Pin Bolts	ASTM A325
Pipe (7)	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

(7) ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F, or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

(8) ASTM A1011 SS Gr.50 shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

ACCESS COMPARTMENT NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #LG0030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

Texas Department of Transportation
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TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)
LMA(2)-12

Sheet 2 of 5

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DIST	COUNTY	SHEET NO.
ELP	EL PASO	C-61

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ATTACHMENT "A"

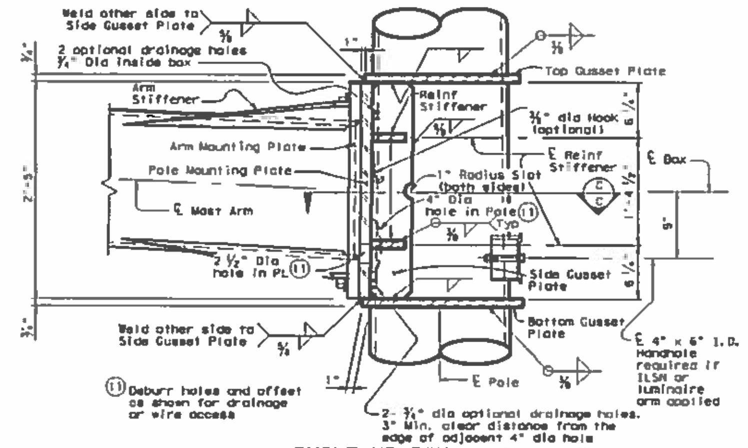
Fixed Mount Arm L_F	ROUND POLES (13)					Foundation Type
	D_B	$D_{19.5}$ or $D_{20.25}$	D_{24}	D_{30}	(12) thk	
ft.	in.	in.	in.	in.	in.	
50', 55' / 60', 65'	[illegible]	[illegible]	[illegible]	[illegible]	.3125	48-A

Fixed Mount Arm L_F	ROUND ARMS (13)				
	L_1	D_1	D_2	(12) thk	Rise
ft.	ft.	in.	in.	in.	
50	49	18.5	11.7	.3125	3'- 3"
55	54	18.5	11.0	.3125	3'- 7"
60	59	18.5	10.3	.3125	3'-11"
65	64	18.5	9.6	.3125	4'- 4"

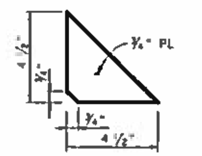
D_B = Pole Base O.D.
$D_{19.5}$ = Pole Top O.D. with no Luminaire and no ILSN (single mast arm)
$D_{20.25}$ = Pole Top O.D. with no Luminaire and no ILSN (dual mast arm)
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L_F = Fixed Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

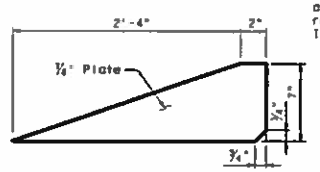
(13) Shaft profile 16-sided or 18-sided is considered to be equivalent to round section.



BUILT-UP BOX CONNECTION

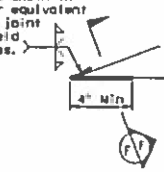


REINFORCING STIFFENER



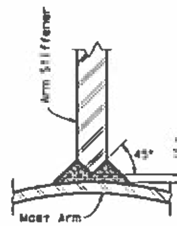
ARM STIFFENER
(Cut to match arm inclination and taper)

Provide Detail shown in SECTION F-F or equivalent 100% complete joint penetration weld from both sides.

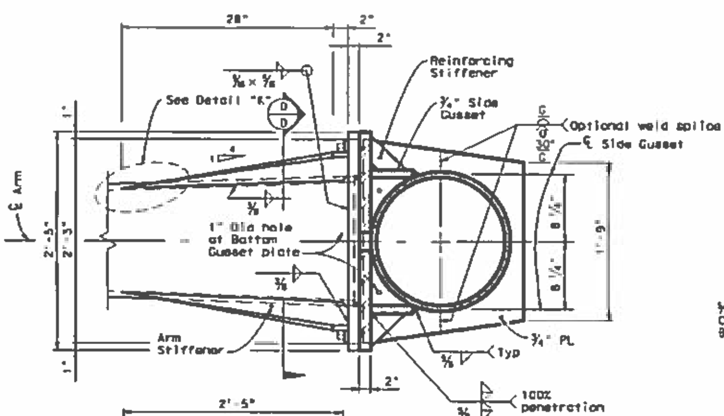


Only 4" length at tip of Arm Stiffener requires a complete joint penetration weld. Smooth weld radius to connect Stiffener. Only a fillet weld is required for the remaining weld length.

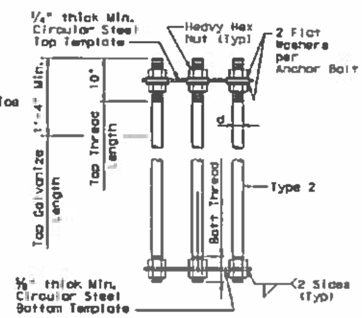
DETAIL "K"



SECTION F-F

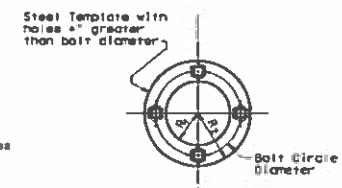


SECTION C-C



NUT ANCHOR
(TYPE 2)

ANCHOR BOLT ASSEMBLY



TEMPLATE DETAIL

GENERAL NOTES:

Built-up Box Connection: For the welded arm-to-pole connection as a build-up box configuration illustrated here is an example only, fabricators are required to submit a shop drawing of box connection for approval. The drawing shall specify the details of each box element, welds of arm-to-pole connection, arm-to-plate socket connection, and arm rise creation. Specify the proper location of drain holes along the pole. 2 ½" dia hole in the pole mounting plate and 4" dia hole in the pole need to be aligned for wiring access or drainage. Arm stiffeners cut to match arm inclination and taper shall also be included.

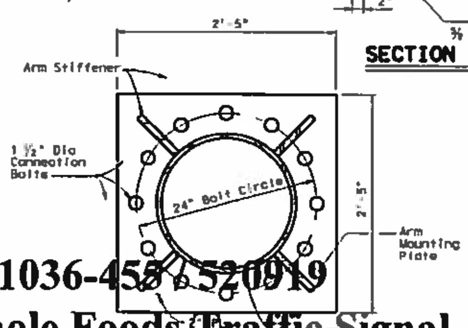
The deviation from flat for either arm or pole mounting plate shall not exceed ⅛ in., which is measured along the center of mounting plate to a radial distance of 13.5 in. The deformed-from-flat connection between arm and pole mounting plates shall not be allowed if the center of both mounting plates cannot contact directly.

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

ANCHOR BOLT & TEMPLATE SIZE

Bolt Dia In.	Length *	Top Thread	Bottom Thread	Bolt Circle	R_2	R_1
2 ½"	5'-2"	10"	6 ½"	27"	16"	11"

* Min dimension given, longer bolts are acceptable.



SECTION D-D

FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		DRILLED SHAFT LENGTH-ft (16), (17), (18)			ANCHOR BOLT DESIGN (14)				FOUNDATION DESIGN LOAD (15)		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft 10	15	40	ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
48-A	48"	20 #9	#4 at 6"	21.9	19.5	14.7	2 ½"	55	27"	2	490	10	50' to 65' Mast arm assembly.

SEE SHEET "TS-FD" FOR ADDITIONAL DETAILS.

(14) Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

(15) Foundation Design Loads are the allowable moments and shears at the base of the structure.

(16) Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

(17) If rock is encountered, the drilled shaft shall extend a minimum of two [illegible]

(18) Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

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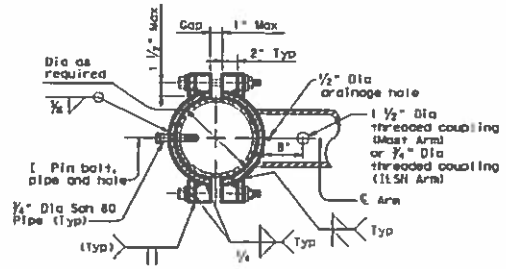
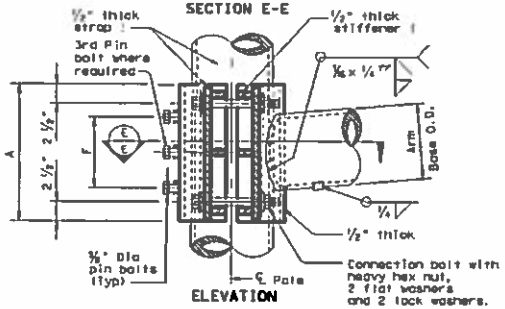
TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY
(50 TO 65 FT)
(80 AND 100 MPH WIND ZONE)

Sheet 3 of 5
LMA(3)-12



SECTION E-E



ELEVATION
(Mast Arm or ILSN Arm to pole)

** = 85% Min. Penetration

CLAMP-ON CONNECTION

80 MPH WIND

Clamp-on Arm L c	ROUND ARMS L1	D1	D2	thk (12)	Rise	POLYGONAL ARMS L1	D1	D2	thk (12)	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	8.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"

100 MPH WIND

Clamp-on Arm L c	ROUND ARMS L1	D1	D2	thk (12)	Rise	POLYGONAL ARMS L1	D1	D2	thk (12)	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	8.0	5.3	.179	1'-8"	19.1	8.0	3.5	.179	1'-7"
24	23.1	9.0	5.8	.179	1'-9"	23.1	9.0	3.5	.179	1'-8"
28	27.1	9.5	5.7	.179	1'-10"	27.1	10.0	3.5	.179	1'-9"
32	31.0	9.5	5.2	.239	1'-11"	31.0	9.5	3.5	.239	1'-10"
36	35.0	10.0	5.1	.239	2'-0"	35.0	10.0	3.5	.239	1'-11"
40	39.0	10.5	5.1	.239	2'-3"	39.0	11.0	3.5	.239	2'-1"
44	43.0	11.0	5.1	.239	2'-8"	43.0	11.5	4.0	.239	2'-3"

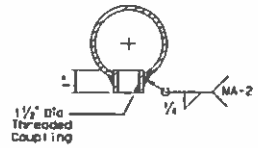
D1 = Arm Base O.D.
D2 = Arm End O.D.
L1 = Shaft Length
Lc = Clamp-on Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

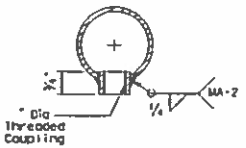
CLAMP-ON ARM CONNECTION

ILSN Arm Size Base Dia	Thick	A	F	4 Conn. Bolts Dia	⅝" Dia. Pin Bolts No.
in.	in.	in.	in.	in.	ea
3	.216	10	4		2

Mast Arm Size Base Dia	Thick	A	F	4 Conn. Bolts Dia	⅝" Dia. Pin Bolts No.
in.	in.	in.	in.	in.	ea
6.5	.179	12	6	1	2
7.5	.179	14	8	1	2
8.0	.179	14	8	1	2
9.0	.179	16	10	1	2
9.5	.179	18	12	1 ¼	3
9.5	.239	18	12	1 ¼	3
10.0	.239	18	12	1 ¼	3
10.5	.239	18	12	1 ¼	3
11.0	.239	18	12	1 ¼	3
11.5	.239	18	12	1 ¼	3



ARM COUPLING DETAIL



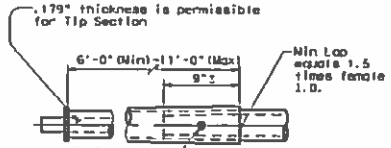
ILSN ARM COUPLING DETAIL

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies or ILSN arm support. For a clamp-on mast arm, a maximum 1 ½" wide vertical slotted hole may be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1". For an ILSN arm, a 1 ½" diameter hole shall be cut in the front clamp plate for wire access. A matched hole shall be field drilled through the pole to provide wire access after arm is oriented. Deburr both holes.

Where duplicate parts occur on a detail, welds shown for part shall apply to all similar parts on the detail.

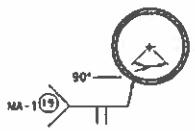
Pin bolts are required to prevent rotation of clamp-on arms under design wind forces. Pin bolts shall be ASTM A325 with threads excluded from the shear plane. Pin bolt and ¾" diameter pipe shall have ⅛" diameter holes for a ⅛" diameter galvanized cotter pin. Back clamp plate shall be furnished with a ¾" diameter hole for each pin bolt. An ⅛" diameter hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.



SLIP JOINT DETAIL (CLAMP-ON ARM)

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

(19) Longitudinal Seam Weld must be oriented within the lower 90° of the signal arm. 60% Min penetration 100% penetration within 6" of circumferential base welds.

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Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

Sheet 4 of 5 LMA(4)-12

Shipping Parts List

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed arm connection bolts and washers, and any additional hardware listed in the table.

Nominal Arm Length	30' Poles with Luminaire: See note above plus: one (or two if ILSN attached) small hand hole, clamp-on simplex	24' Poles with ILSN: See note above plus one small hand hole	19.50' (Single Mast Arm) 20.25' (Dual Mast Arm) Poles with no Luminaire and no ILSN: See note above

Single Mast Arm

Lf ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50	50L		50S		50	
55	55L		55S		55	
60	60L		60S		60	
65	65L		65S		65	

Dual Mast Arm

Lf ft.	Lc ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50	20	5020L		5020S		5020	
	24	5024L		5024S		5024	
	28	5028L		5028S		5028	
	32	5032L		5032S		5032	
	36	5036L		5036S		5036	
	40	5040L		5040S		5040	
	44	5044L		5044S		5044	
55	20	5520L		5520S		5520	
	24	5524L		5524S		5524	
	28	5528L		5528S		5528	
	32	5532L		5532S		5532	
	36	5536L		5536S		5536	
	40	5540L		5540S		5540	
	44	5544L		5544S		5544	
60	20	6020L		6020S		6020	
	24	6024L		6024S		6024	
	28	6028L		6028S		6028	
	32	6032L		6032S		6032	
	36	6036L		6036S		6036	
	40	6040L		6040S		6040	
	44	6044L		6044S		6044	
65	20	6520L		6520S		6520	
	24	6524L		6524S		6524	
	28	6528L		6528S		6528	
	32	6532L		6532S		6532	
	36	6536L		6536S		6536	
	40	6540L		6540S		6540	
	44	6544L		6544S		6544	

Foundation Summary Table **

Location Ident.	Avg. N Blow/ft.	No. Each	Drill Shaft *** Length (feet)
			48-A
POLE-A	10	1	22
Total Drill Shaft Length			

Shipping Parts List

Traffic Signal Arms (Fixed Mount) (1 per pole)
Ship each arm with listed equipment attached

Nominal Arm Length	Type IV Arm (4 Signals) 3 Bracket Assembly and 4 CGB Connectors	
ft.	Designation	Quantity
50	50IV	1
55	55IV	
60	60IV	
65	65IV	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
2 1/2 "	5' - 3"	1

Each anchor bolt assembly consists of the following: Top and bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers and 4 nut anchor devices (type 2) per Standard Drawing "TS-FD". Templates may be removed for shipment.

Anchor Arm (Max. 1 per pole)

Nominal Arm Length	Quantity
8' Arm	

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Traffic Signal Arms (80 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal) 2 CGB connector and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 1 Bracket Assembly and 3 CGB connectors, and 1 clamp w/bolts and washers		Type III Arm (3 Signals) 2 Bracket Assembly and 4 CGB connectors, and 1 clamp w/bolts and washers	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	
40					40III-80	
44					44III-80	1

Traffic Signal Arms (100 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm	Type I Arm (1 Signal) 2 CGB connector and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 1 Bracket Assembly and 3 CGB connectors, and 1 clamp		Type III Arm (3 Signals) 2 Bracket Assembly and 4 CGB connectors, and 1 clamp	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-100					
24	24I-100		24II-100			
28	28I-100		28II-100			
32			32II-100		32III-100	
36			36II-100		36III-100	
40					40III-100	
44					44III-100	

Notes

** Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

*** Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

Abbreviations
Lf= Fixed Arm Length
Lc= Clamp-on Arm Length (44' Max.)

STATE OF TEXAS
SCOTT R. ARNOLD
96782
LICENSED PROFESSIONAL ENGINEER
10/30/2015
Scott R. Arnold, P.E.

Texas Department of Transportation
Traffic Operations Division

LONG MAST ARM ASSEMBLY PARTS LIST

LMA(5)-12

Sheet 5 of 5

ATTACHMENT "A"

15-1036-455/520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR85

LANDSCAPE LEGEND

SYMBOL	COMMON NAME	BOTANICAL NAME	QTY
3" CALIPER TREE - 16' HEIGHT MINIMUM - SINGLE LEADER UNLESS INDICATED			
	CHINQUAPIN OAK	QUERCUS MUHLENBERGII	6
	RED PUSH PISTACHE	PISTACIA X 'RED PUSH'	8
	HONEY MESQUITE	PROSOPIS GLANDULOSA	41
	DESERT MUSEUM PALO VERDE	PARKINSONIA CERCIDIUM X 'DESERT M.'	14
	MONTROSE PURPLE VITEX	VITEX AGNUS-CHASTUS 'MONTROSE P.'	17
5 GALLON SHRUB - 18" HEIGHT MINIMUM UNLESS OTHERWISE INDICATED			
	CHAPARRAL SAGE	SALVIA CLEVELANDII	135
	RED BIRD OF PARADISE	CAESALPINIA PULCHERRIMA	104
	YELLOW YUCCA	HESPERALOE PARVIFLORA 'YELLOW'	104
	TRAILING INDIGO BUSH	DALEA GREGGII	103
	GIANT HESPERALOE	HESPERALOE FUNIFERA	37
	REGAL MIST	MUHLENBERGIA CAPILLARIS	226
	GOPHER PLANT	EUPHORBIA RIGIDA	144
	BASKET GRASS (BACAHUISTA)	NOLINA TEXANA	257
	TWIN-FLOWERED AGAVE	AGAVE GEMINIFLORA	38
3 GALLON CACTUS/SUCCULENT			
	SPINELESS PRICKLY PEAR	OPUNTIA ELISIANA	91
	VARIEGATED MURPHEY'S AGAVE	AGAVE MURPHEYI 'RODNEY'	116
1 GALLON SHRUB			
	BLUE GRAMA	BOUTELOUA GRACILIS 'BLONDE AMBITION'	159
	COLUMBINE	AQUILEGIA CHRYSANTHA	38
BOULDERS			
BOULDER - FRANKLIN RED, PARTIALLY BURIED TO WIDEST POINT SO THAT BOULDER IS WIDER THAN IT IS TALL			
	4'X4'		22
	3'X3'		38
GRAVELS & MULCHES			
	3" MCAUTT FITTED ARROYO ROCK, 3" DEPTH W/ WEED BARRIER FABRIC		7,709 SQ.FT.
	1.5" FRANKLIN RED ROCK, 3" DEPTH W/ WEED BARRIER FABRIC		15,666 SQ.FT.
	FRANKLIN RED ROCK BLEND: 60% 3/4" , 30% 1.5", AND 20% 3"-6", 3" DEPTH W/ WEED BARRIER FABRIC		13,828 SQ.FT.

LANDSCAPE NOTES

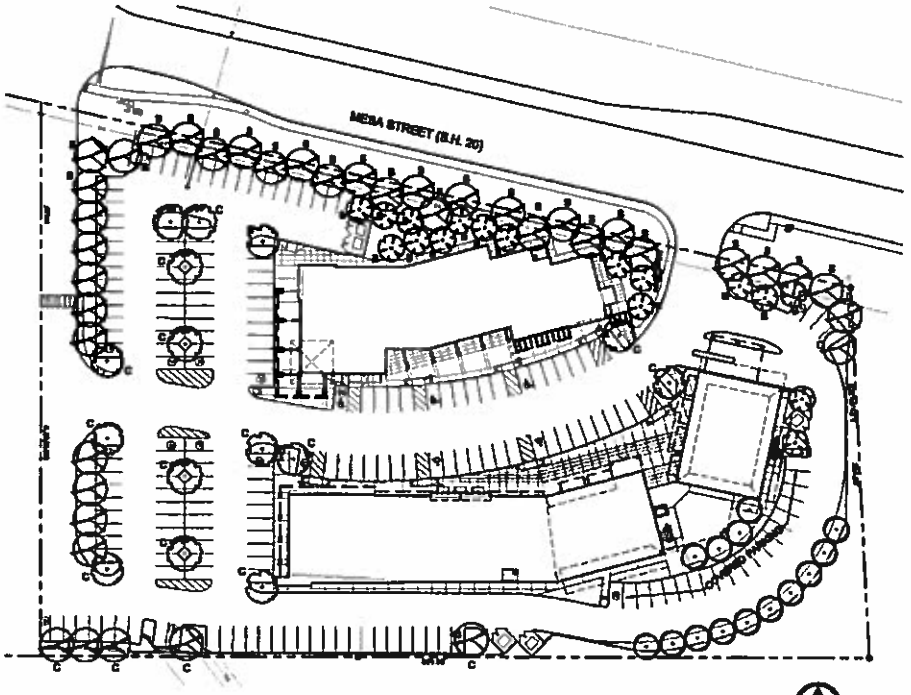
- ALL UTILITY EASEMENTS SHALL BE MARKED PRIOR TO EXCAVATION, AND PARTICULAR ATTENTION PAID TO TREE PLACEMENT WITHIN AND THROUGHOUT SITE.
- THERE SHALL BE NO STEEL EDGING INBTWEEN ROCK TYPES. (UNLESS OTHERWISE NOTED)
- CONTRACTOR SHALL PROVIDE ROCK SAMPLES AND OBTAIN APPROVAL FROM OWNER PRIOR TO FINAL DELIVERY OF QUARRIED MATERIALS.
- CONTRACTOR TO PAY CLOSE ATTENTION TO FINISH GRADES. SHOULD GRAVELLED AREAS EXCEED 4:1 SLOPE, CONTRACTOR TO OBTAIN APPROVAL OF LANDSCAPE DESIGNER PRIOR TO MULCH INSTALLATION.
- LANDSCAPE SHALL BE INSTALLED ACCORDING TO PLANS, DETAILS, AND SPECIFICATIONS. SHOULD CHANGES BE IMPLEMENTED IN THE FIELD, A NEW SET OF PLANS IS REQUIRED TO BE SUBMITTED TO THE CITY OF EL PASO. LANDSCAPE DESIGNER IS NOT UNDER CONTRACT TO PROVIDE THESE PLANS, EXCEPT AS PROVIDED FOR IN ORIGINAL CONTRACT.

LANDSCAPE CALCULATIONS

NEW BUILDING SITE
TOTAL SITE AREA = 169,[illegible] SQ.FT.
TOTAL BUILDING AREA = 34,169 SQ.FT.
[169,035 sq.ft. - 34,169 sq.ft.] X .15 = 22,778 SQ.FT.
TOTAL LANDSCAPE AREA REQUIRED = 22,778 SQ.FT.
TOTAL LANDSCAPE AREA PROVIDED = 34,497 SQ.FT.
TOTAL FRONTAGE LENGTH = 262'
MAXIMUM REQUIRED PARKING = 325 SPACES
COVERED PARKING = 13 SPACES
TOTAL PARKING PROVIDED = 308 SPACES

TOTAL PLANT QUANTITIES	REQUIRED	PROPOSED
QTY. OF STREET TREES (S)	20	20
QTY. OF FRONTAGE TREES (F)	20	20
QTY. OF CANOPY TREES (C)	18	18
QTY. OF PROJECT TREES (P)	24	24
QTY. OF 5 GAL. SHRUBS	1,026	880
QTY. OF 1 GAL. GROUND COVER	0	913

NOTE:
A) ALL 5 GALLON SHRUBS CONVERTED TO 1 GALLON SHRUBS FOR CALCULATION PURPOSES.
B) SHRUBS LOCATED WITHIN PARKWAY WERE NOT INCLUDED UNDER PROPOSED PLANT COUNT.



OVERALL SITE AND TREE LAYOUT

NORTH
SCALE: 1" = 40'

ATTACHMENT A

5/15/15

REVISIONS
DESCRIPTION
DATE:

CONSULTANTS SEAL

LA VILLITA
EL PASO, TX 79912

LANDSCAPE PLAN

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SHEET 1 OF 7

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
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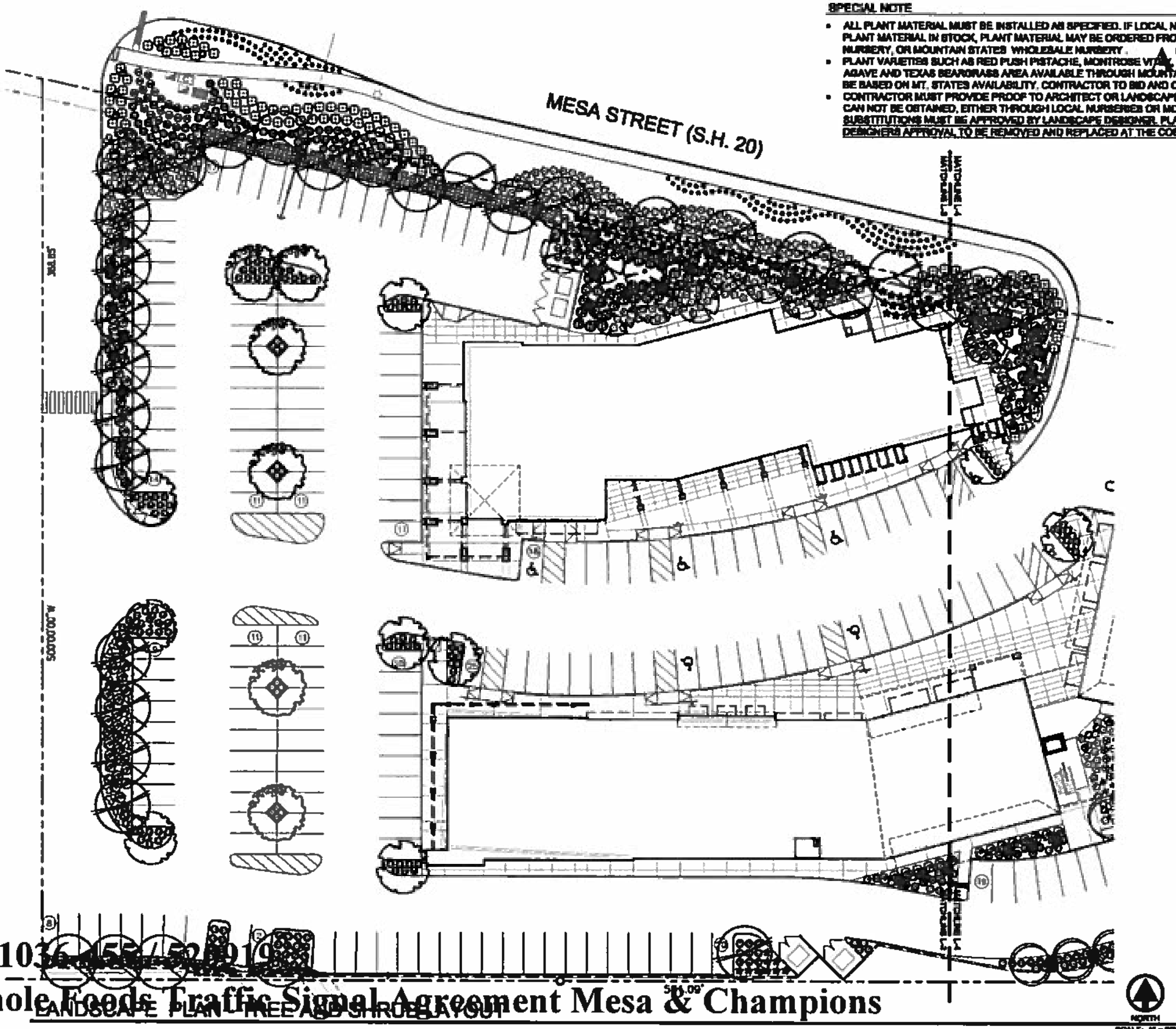
ATTACHMENT "A"

SPECIAL NOTE

- ALL PLANT MATERIAL MUST BE INSTALLED AS SPECIFIED. IF LOCAL NURSERIES DO NOT HAVE CERTAIN PLANT MATERIAL IN STOCK, PLANT MATERIAL MAY BE ORDERED FROM SIERRA VISTA GROWERS, SUNLAND NURSERY, OR MOUNTAIN STATES WHOLESALE NURSERY.
- PLANT VARIETIES SUCH AS RED PUSH PISTACHE, MONTROSE VITEX, MURPHEY'S AGAVE, TWIN-FLOWERED AGAVE AND TEXAS BEARGRASS AREA AVAILABLE THROUGH MOUNTAIN STATES. SUBSTITUTIONS MAY ALSO BE BASED ON MT. STATES AVAILABILITY. CONTRACTOR TO BID AND ORDER PLANT MATERIAL ACCORDINGLY.
- CONTRACTOR MUST PROVIDE PROOF TO ARCHITECT OR LANDSCAPE DESIGNER THAT PLANT MATERIAL CAN NOT BE OBTAINED, EITHER THROUGH LOCAL NURSERIES OR MOUNTAIN STATES. ALL PLANT SUBSTITUTIONS MUST BE APPROVED BY LANDSCAPE DESIGNER. PLANT MATERIAL SUBSTITUTED WITHOUT DESIGNERS APPROVAL TO BE REMOVED AND REPLACED AT THE COST OF THE CONTRACTOR.



LANDSCAPE PLAN - TREE AND SHRUB LAYOUT

LANDSCAPE LEGEND

SYMBOL	COMMON NAME
2" CALIPER TREE	
	CHINQUAPIN OAK
	RED PUSH PISTACHE
	HONEY MESQUITE
	DESERT MUSEUM PALO VERDE
	MONTROSE PURPLE VITEX
5 GALLON SHRUB	
	CHAPARRAL SAGE
	RED BIRD OF PARADISE
	YELLOW YUCCA
	TRAILING INDIGO BUSH
	GIANT HESPERALOE
	REGAL MIST
	GOPHER PLANT
	BASKET GRASS (SACAHUISTA)
	TWIN-FLOWERED AGAVE
3 GALLON SHRUB	
	SPINELESS PRICKLY PEAR
	VARIEGATED MURPHEY'S AGAVE
1 GALLON SHRUB	
	BLUE GRAMA
	COLUMBINE

5/15/15

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CONSULTANT'S SEAL

LA VILLITA
MESA STREET
EL PASO, TX 79912

LANDSCAPE PLAN

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SHEET 2 OF 7

15-1036 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
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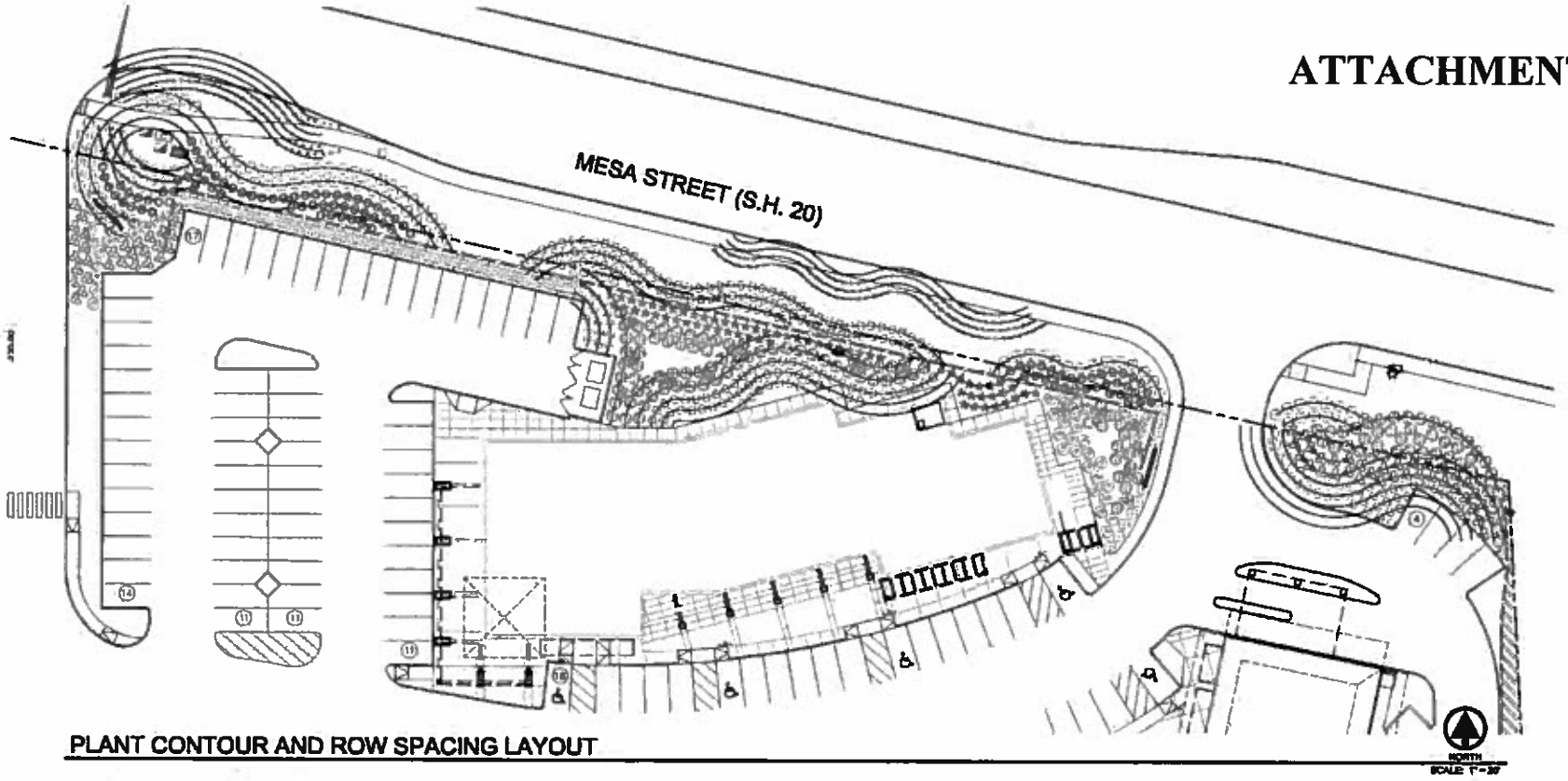
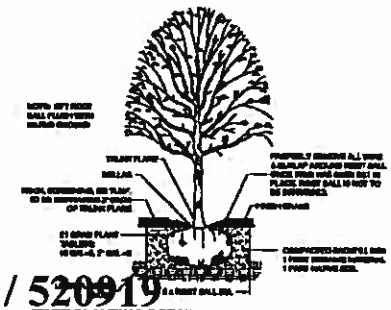
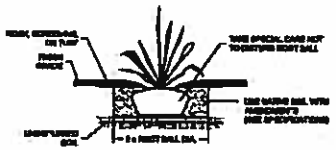
ATTACHMENT "A"



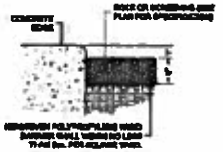
PLANT CONTOUR AND ROW SPACING LAYOUT



TREE PLANTING DETAIL



SHRUB PLANTING DETAIL



ROCK/SCREENING DETAIL

BOULDER PLACEMENT DETAIL

5/15/15

LA VILLITA

LANDSCAPE PLAN

L-3

SHEET 3 OF 7

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
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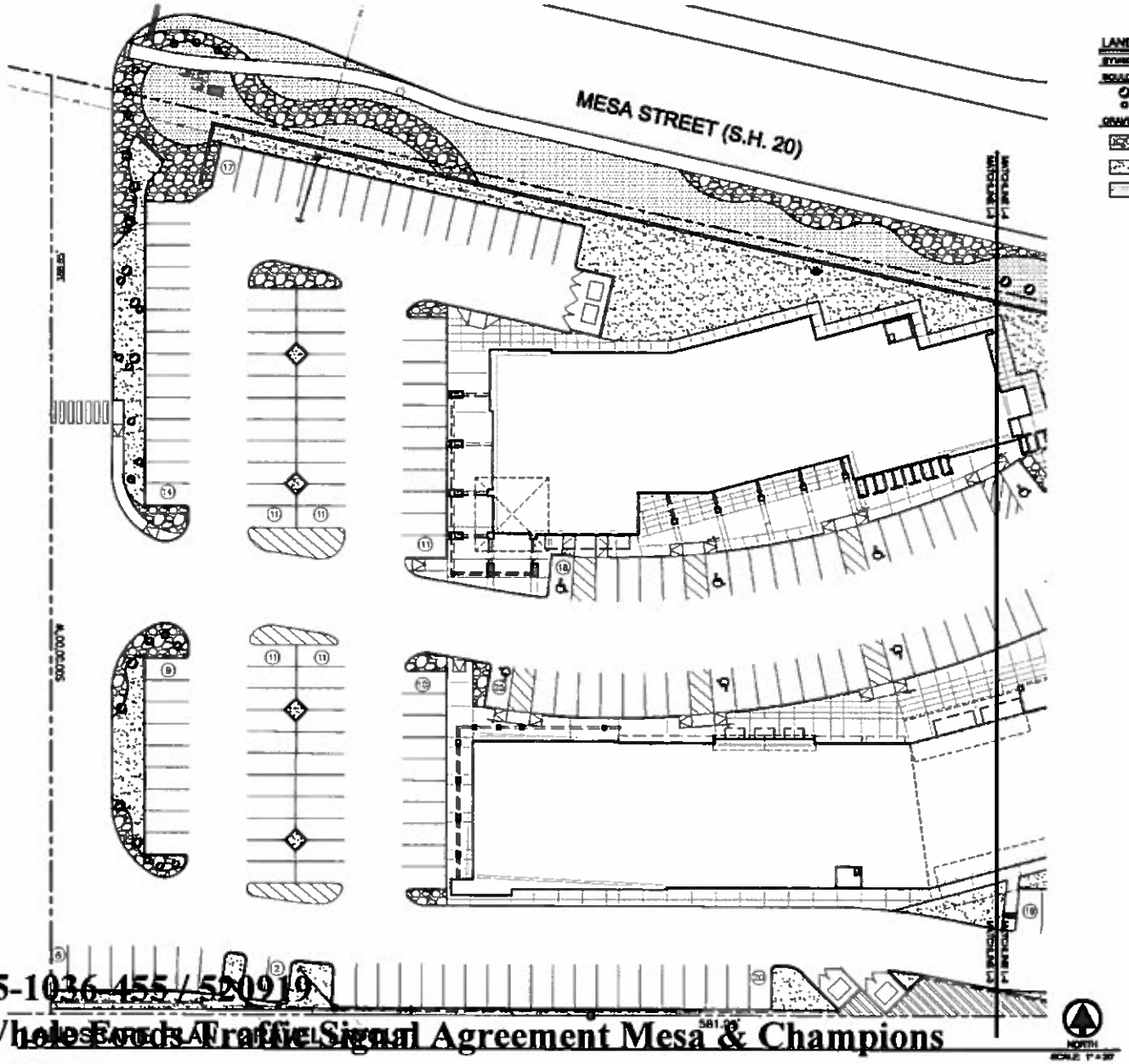

LANDSCAPE LEGEND

SYMBOL

BOULDERS

BOULDER - FRANKLIN RED, PARTIALLY BURIED TO WIDEST POINT SO THAT BOULDER IS WIDER THAN IT IS TALL

GRAVELS & MULCHES

3" MCNUTT FITTED ARROYO ROCK, 3" DEPTH W/ WEED BARRIER FABRIC

1.5" FRANKLIN RED ROCK, 3" DEPTH W/ WEED BARRIER FABRIC

FRANKLIN RED ROCK BLEND: 60% 3/8" - 3/8" 1.5", AND 20% 3"-6", 3" DEPTH W/ WEED BARRIER FABRIC

5/15/15

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CONSULTANT'S SEAL

LA VILLITA
6901 MESA STREET EL PASO, TX 79912

LANDSCAPE PLAN

L-4
SHEET 4 OF 7

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
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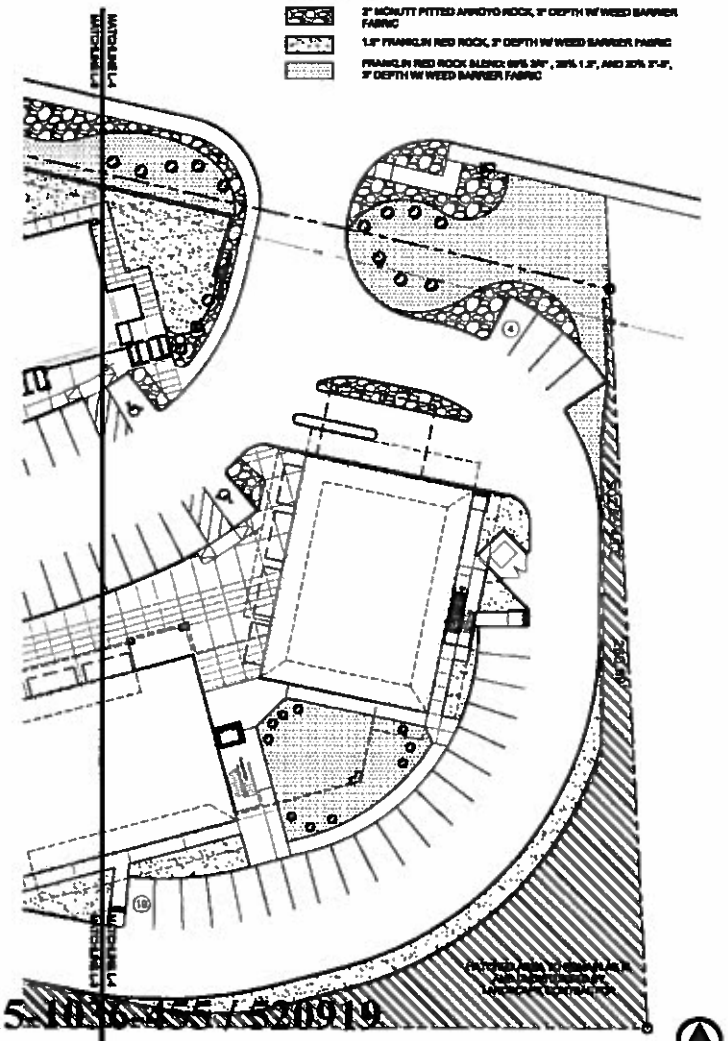
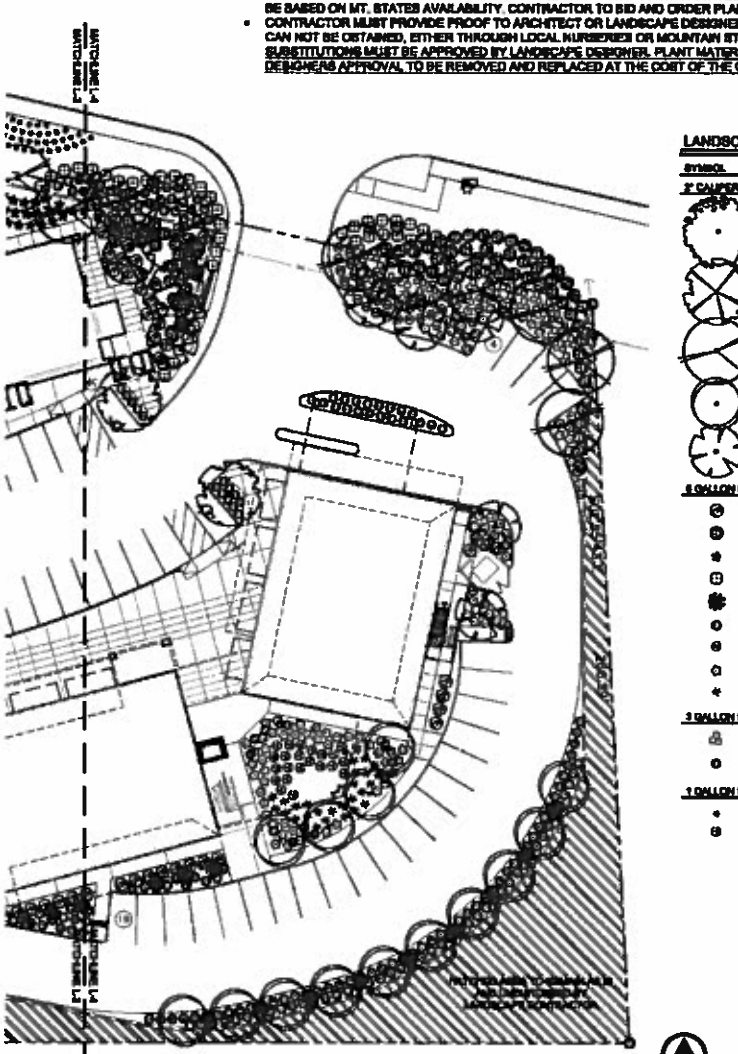
ATTACHMENT "A"





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CONSULTANT'S SEAL

LA VILLITA
8901 MESA STREET
EL PASO, TX 79925

LANDSCAPE PLAN

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SHEET 5 OF 7

15-1136-455 / 530919
Whole Foods Traffic Signal Agreement, Mesa & Champions
OAR90

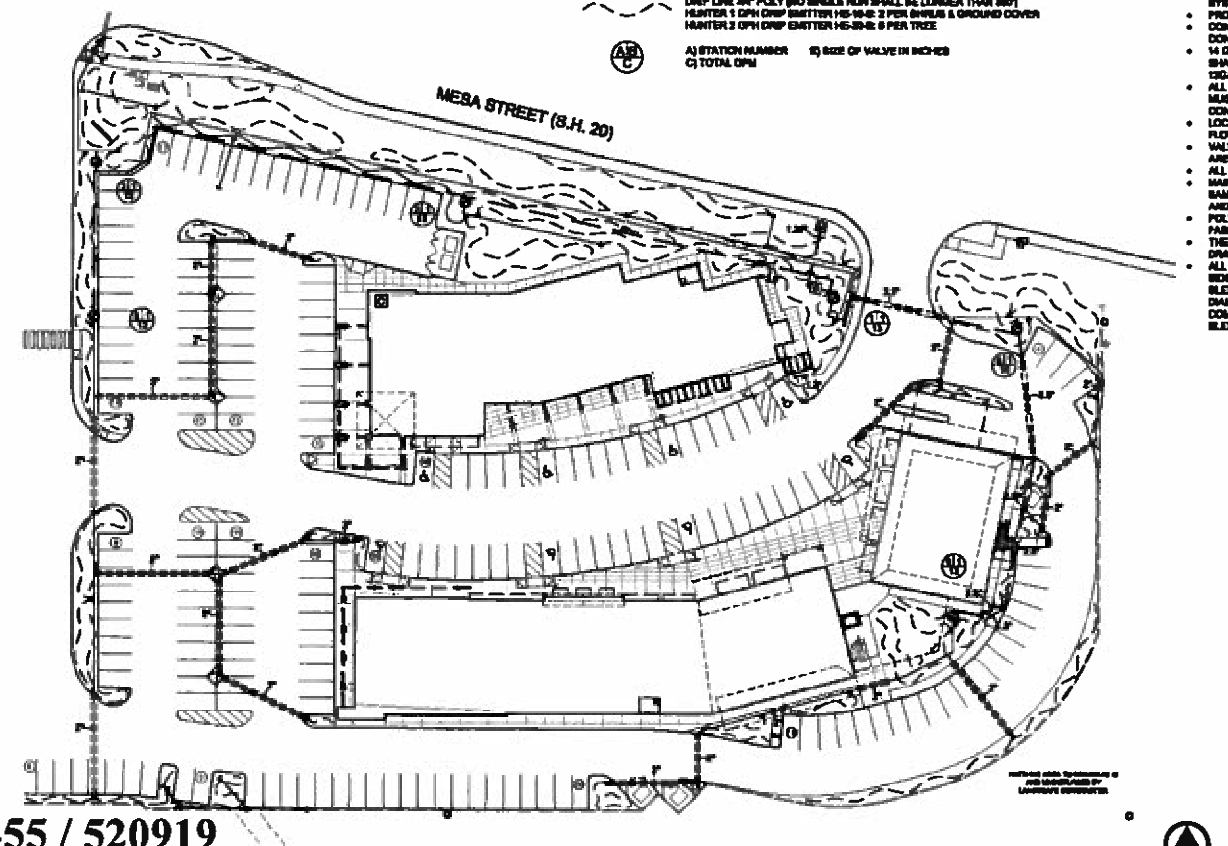
ATTACHMENT "A"

IRRIGATION LEGEND

SYMBOL	ITEM
[M]	1" YARD METER
[B]	3/4" FEBCO 825Y RP BACKFLOW PREVENTER W/ ALUM. HOTBOX ENCLOSURE - CLASS 2, ASSE #1020.
[C]	HUNTER I-CORE, 8 STATION CONTROLLER - METAL CABINET COORDINATE LOCATION WITH OWNER & ELECTRICAL CONTRACTOR
(valve symbol)	1" HUNTER- ICV-101G-FS- AS-40PSI - REMOTE CONTROL VALVE WITH FILTER SENTRY AND ACCU-SYNC ADJUSTABLE PRESSURE REGULATOR
(dashed line)	1.25" MAINLINE - CLASS 200 PVC
(solid line)	1" LATERAL LINE - CLASS 200 PVC
(sleeve line)	PVC SLEEVE - 2 SIZES LARGER THAN LATERAL OR MAIN
•	CONVERSION FROM PVC TO POLYTUBING
(wavy line)	DRIP LINE 3/4" POLY (NO SINGLE RUN SHALL BE LONGER THAN 300') HUNTER 1 GPH DRIP EMITTER HE-10-B: 2 PER SHRUB & GROUND COVER HUNTER 2 GPH DRIP EMITTER HE-20-B: 6 PER TREE
(A/B over C)	A) STATION NUMBER B) SIZE OF VALVE IN INCHES C) TOTAL GPM

IRRIGATION NOTES

- IRRIGATION IN TEXAS IS [illegible] ON ENVIRONMENTAL QUALITY [illegible]
- CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL EXISTING AND PROPOSED UTILITIES AND ALL SITE CONDITIONS PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE OWNER.
- IRRIGATION SHALL BE INSTALLED ACCORDING TO PLANS, DETAILS, AND SPECIFICATIONS. SHOULD CHANGES BE IMPLEMENTED IN THE FIELD, A NEW SET OF PLANS IS REQUIRED TO BE SUBMITTED TO THE CITY OF EL PASO. LANDSCAPE DESIGNER IS NOT UNDER CONTRACT TO PROVIDE THESE PLANS, EXCEPT AS PROVIDED FOR IN ORIGINAL CONTRACT.
- CONTRACTOR WILL NOT WILLFULLY INSTALL THE IRRIGATION SYSTEM AS DESIGNED IF IT IS OBVIOUS THAT FIELD CONDITIONS EXIST THAT WERE NOT CONSIDERED DURING DESIGN. ANY CONDITIONS NOTED AS SUCH SHALL BE REPORTED TO THE ARCHITECT AND IRRIGATION DESIGNER. IF THE CONTRACTOR FAILS TO DO SO, THE CONTRACTOR ASSUMES FULL RESPONSIBILITY FOR ANY CORRECTIONS NEEDED.
- PLANS SCHEMATIC FOR READABILITY. CONTRACTOR TO ADJUST AS NECESSARY TO FIT SITE.
- CONTRACTOR SHALL VERIFY STATIC PRESSURE AT METER MEETS SYSTEM NEEDS. LICENSED IRRIGATOR TO AMEND AS NECESSARY.
- PROVIDE SHUTOFF VALVE BETWEEN METER AND BACKFLOW.
- CONTRACTOR IS RESPONSIBLE FOR CONNECTING AUTOMATIC CONTROLLER TO ELECTRICITY.
- 14 GA. SOLID COPPER WIRE (PVC INSULATED AND UL APPROVED) SHALL RUN FROM CONTROLLER TO VALVES. COMMON WIRE TO BE 12GA.
- ALL CONTROL WIRING FROM THE VALVES TO THE CONTROLLER MUST BE INSTALLED IN A 1" PVC CONDUIT PIPE IF BURIED BENEATH CONCRETE OR ASPHALT SURFACES.
- LOCATE VALVES AWAY FROM LOW SPOTS OR AREAS OF DRAINAGE FLOW.
- VALVE CAPS SHALL BE GREEN IN TURF AREAS, TAN IN MULCH AREAS.
- ALL MAINLINES SHALL BE BURIED MIN. 18", ALL LATERALS 12".
- MAINTAIN 4" MINIMUM CLEARANCE BETWEEN PIPE RUNNING IN THE SAME TRENCH. CONTROL WIRE SHALL ALWAYS BE TO THE SIDE AND BELOW THE TOP OF THE PIPE RUNNING IN THE SAME TRENCH.
- POLYETHYLENE TUBING TO BE PLACED UNDER WEED BARRIER FABRIC. MICROTUBING TO BE STAKED.
- THE CONTRACTOR SHALL PROVIDE THE OWNER WITH AS-BUILT DRAWINGS PRIOR TO APPROVAL OF FINAL PAYMENT.
- ALL PIPING/WIRING RUNNING BENEATH PAVED SURFACES (DRIVES, SIDEWALKS, ETC.) SHALL BE INSTALLED IN CLASS 200 PVC SLEEVES. SLEEVES SHALL BE OF THE SIZE SO THAT THE INSIDE DIAMETER OF THE SLEEVE IS 2 TIMES GREATER THAN THAT OF THE COMBINED OUTER DIAMETER OF ALL ITEMS INSTALLED IN THE SLEEVES.



IRRIGATION PLAN

NORTH

5/15/15

REVISIONS: DATE: DESCRIPTION:

CONSULTANT'S SEAL

LA VILLITA

EL PASO, TX 79912

IRRIGATION PLAN

L-6

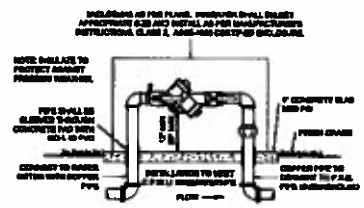
SHEET 6 OF 7

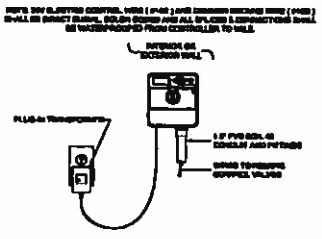
15-1036-455 / 520919

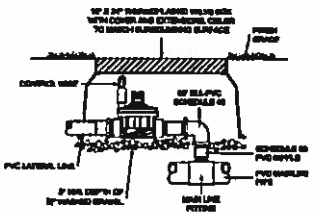
Whole Foods Traffic Signal Agreement Mesa & Champions

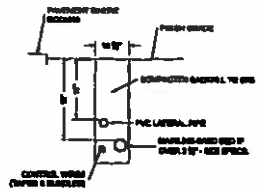
OAR91

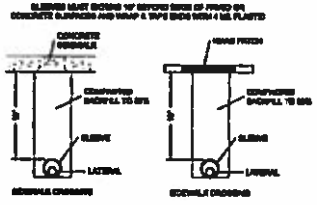
ATTACHMENT "A"

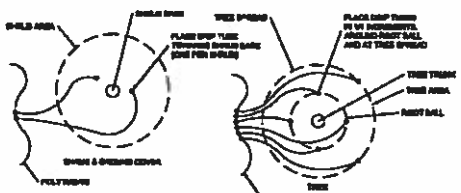

RPA FEBCO Mo.825Y DETAIL


HUNTER CONTROLLER DETAIL


HUNTER-ICV CONTROL VALVE DETAIL


TRENCHING DETAIL


SLEEVING STANDARD DETAIL


DRIP EMITTER PATTERN DETAIL

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Whole Foods Traffic Signal Agreement Mesa & Champions
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5/15/15

REVISIONS:
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CONSULTANT'S SEAL

LA VILLITA
6901 MESA STREET EL PASO, TX 79912

IRRIGATION DETAILS

L-7
SHEET 7 OF 7

LANDSCAPE LEGEND

SYMBOL	COMMON NAME	BOTANICAL NAME	QTY
2" CALIPER TREES - 10' HEIGHT MINIMUM - SINGLE LEADER UNLESS INDICATED			
	CHINQUAPIN OAK	QUERCUS MUHLENBERGII	25
	HONEY MESQUITE	PROSOPIS GLANDULOSA	33
	DESERT MUSEUM PALO VERDE	PARKINSONIA CERCIDIUM X 'DESERT M.'	25
	RED PUSH PISTACHE	PISTACIA X 'RED PUSH'	16
	LUCRETIA HAMILTON DESERT WILLOW OR ART'S RECKLESS DESERT WILLOW	CHILOPSIS LINEARIS 'LUCRETIA HAM.'	22
GALVANIZE PLANT - SIZE SPECIFICATIONS (15 gallon equivalent)			
	OCOTILLO - 6-8' HEIGHT	FOUQUIERIA SPLENDENS	18
5 GALLON SHRUB - 15" HEIGHT MINIMUM UNLESS OTHERWISE INDICATED			
	CHAPARRAL SAGE	SALVIA CLEVELANDII	133
	RED BIRD OF PARADISE	CAESALPINIA PULCHERRIMA	133
	YELLOW YUCCA	HESPERALOE PARVIFLORA 'YELLOW'	152
	TRAILING INDIGO BUSH	DALEA GREGGII	134
	GIANT HESPERALOE	HESPERALOE FUNIFERA	12
	REGAL MIST	MUHLENBERGIA CAPILLARIS	84
	GOPHER PLANT	EUPHORBIA RIGIDA	171
	BASKET GRASS (SACAHUISTA)	NOLINA TEXANA	270
3 GALLON CACTUS/SUCCULENT			
	GOLDEN BARREL CACTUS	ECHINOCACTUS GRUSONII	78
	SPINELESS PRICKLY PEAR	OPUNTIA ELISIANA	102
	VARIEGATED MURPHEY'S AGAVE	AGAVE MURPHEYI 'RODNEY'	177
1 GALLON SHRUB			
	BLUE GRAMA	BOUTELOUA GRACILIS 'BLONDE AMBITION'	201
	MEXICAN FEATHER GRASS	NASSELLA TENUISSIMA	168
BOULDERS			
BOULDER - FRANKLIN RED, PARTIALLY BURIED TO WIDEST POINT SO THAT BOULDER IS WIDER THAN IT IS TALL.			
	4'X4'		21
	3'X3'		31
GRAVELS & MULCHES			
	2" MINUTT PITTED ARROYO ROCK, 3" DEPTH W/ WEED BARRIER FABRIC		7,992 SQ.FT.
	1.5" FRANKLIN RED ROCK, 3" DEPTH W/ WEED BARRIER FABRIC		21,618 SQ.FT.
	FRANKLIN RED ROCK BLEND: 60% 6/8", 20% 1.5", AND 20% 3"-6", 6" DEPTH W/ WEED BARRIER FABRIC		6,335 SQ.FT.
	3/4" GREY ARROYO STONE, 3" DEPTH W/ WEED BARRIER FABRIC		5,880 SQ.FT.

LANDSCAPE NOTES

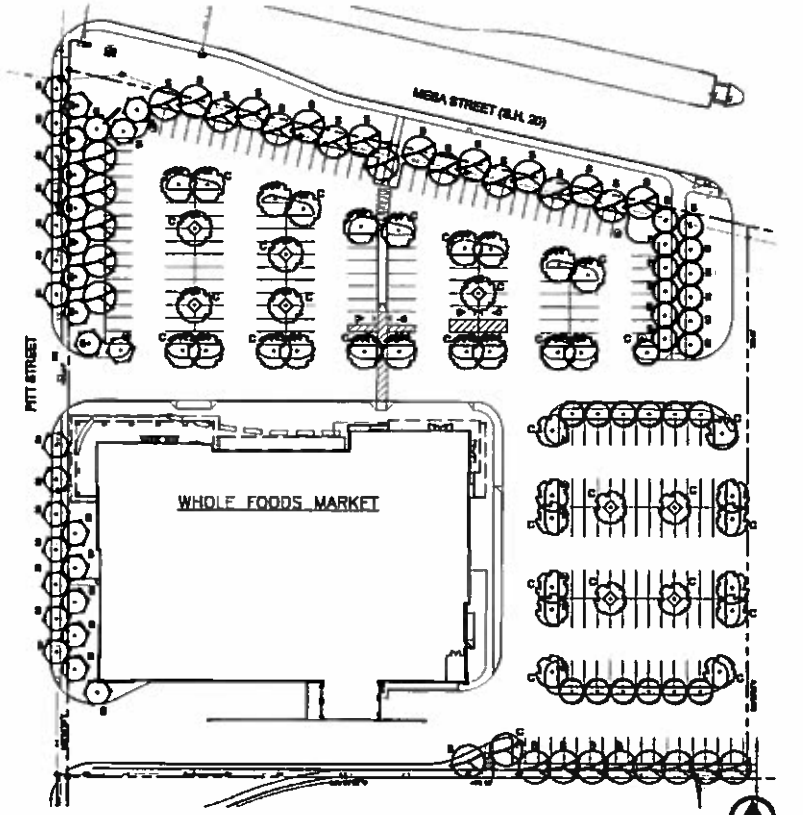
- ALL UTILITY EASEMENTS SHALL BE MARKED PRIOR TO EXCAVATION, AND PARTICULAR ATTENTION PAID TO TREE PLACEMENT WITHIN AND THROUGHOUT SITE.
- THERE SHALL BE NO STEEL EDGING BETWEEN ROCK TYPES. (UNLESS OTHERWISE NOTED)
- CONTRACTOR SHALL PROVIDE ROCK SAMPLES AND OBTAIN APPROVAL FROM OWNER PRIOR TO FINAL DELIVERY OF QUARRIED MATERIALS.
- CONTRACTOR TO PAY CLOSE ATTENTION TO FINISH GRADES. SHOULD GRAVELLED AREAS EXCEED 4:1 SLOPE, CONTRACTOR TO OBTAIN APPROVAL OF LANDSCAPE DESIGNER PRIOR TO MULCH INSTALLATION.
- LANDSCAPE SHALL BE INSTALLED ACCORDING TO PLANS, DETAILS, AND SPECIFICATIONS. SHOULD CHANGES BE IMPLEMENTED IN THE FIELD, A NEW SET OF PLANS IS REQUIRED TO BE SUBMITTED TO THE CITY OF EL PASO. LANDSCAPE DESIGNER IS NOT UNDER CONTRACT TO PROVIDE THESE PLANS, EXCEPT AS PROVIDED FOR IN ORIGINAL CONTRACT.

LANDSCAPE CALCULATIONS

NEW BUILDING SITE
TOTAL SITE AREA = 252,[illegible] SQ.FT.
TOTAL BUILDING AREA = 45,216 SQ.FT.
(210,841 sq.ft. - 45,216 sq.ft.) X .15 = 34,916 SQ.FT.
TOTAL LANDSCAPE AREA REQUIRED = 34,916 SQ.FT.
TOTAL LANDSCAPE AREA PROVIDED = 35,368 SQ.FT.
TOTAL FRONTAGE LENGTH = 974'
MAXIMUM REQUIRED PARKING = 309 SPACES
TOTAL PARKING PROVIDED = 314 SPACES

TOTAL PLANT QUANTITIES	REQUIRED	PROPOSED
QTY. OF STREET TREES (S)	33	33
QTY. OF BUFFER TREES (B)	33	33
QTY. OF CANOPY TREES (C)	33	33
QTY. OF PROJECT TREES	33	66
QTY. OF 15 GAL. SHRUBS	0	16
QTY. OF 5 GAL. SHRUBS	1,125	912
QTY. OF 1 GAL. GROUND COVER	0	1,284

NOTE:
A) ALL 3 GALLON SHRUBS CONVERTED TO 1 GALLON SHRUBS FOR CALCULATION PURPOSES.
B) SHRUBS LOCATED WITHIN PARKWAY WERE NOT INCLUDED UNDER PROPOSED PLANT COUNT.



OVERALL SITE AND TREE LAYOUT
SCALE: 1" = 40'

ATTACHMENT 2

5/15/15

REVISIONS:
DATE: | DESCRIPTION:

CONSULTANT'S SEAL

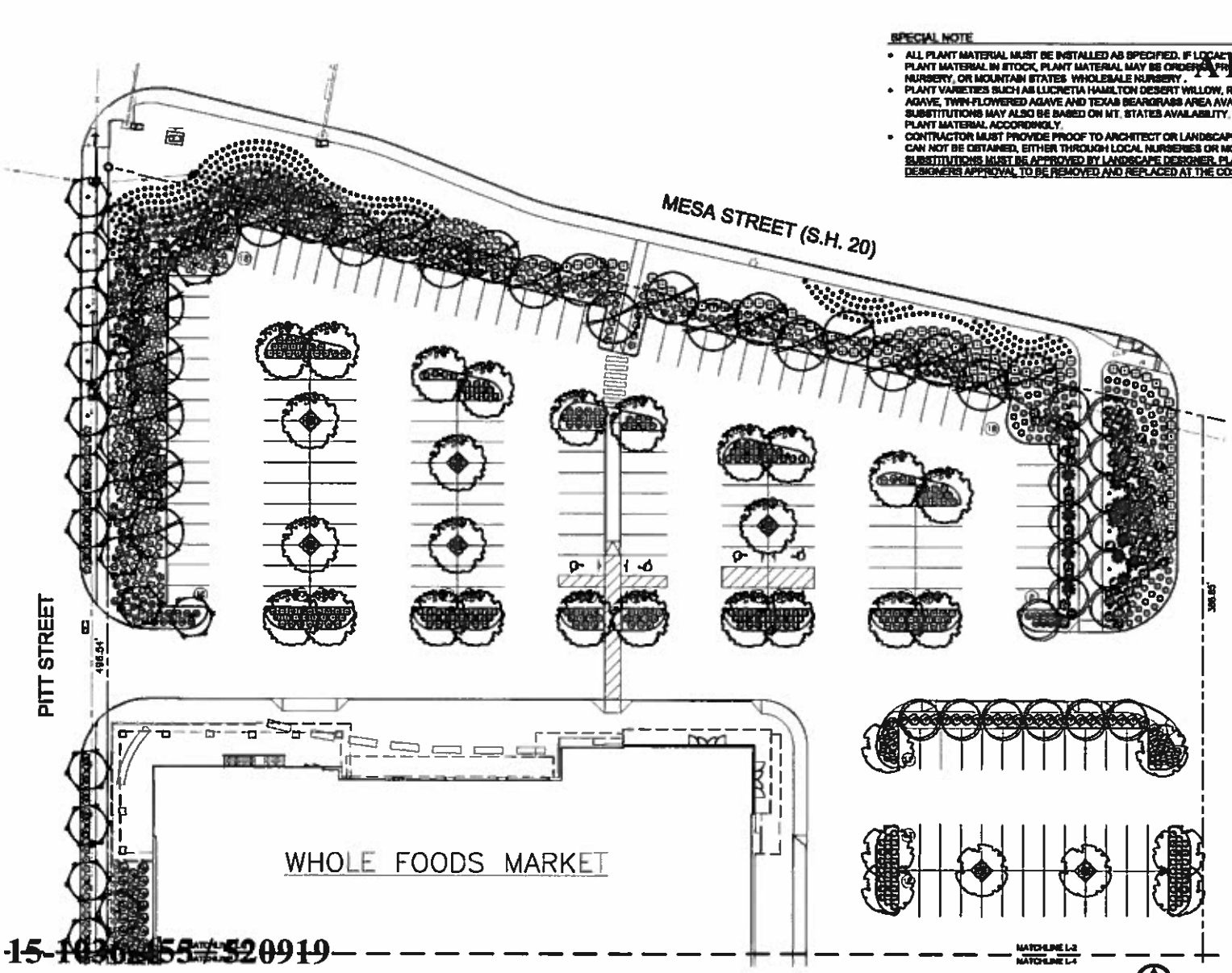
WHOLE FOODS COMPLEX
100 PITT STREET EL PASO, TX 79912

LANDSCAPE PLAN

L-1
SHEET 1 OF 7

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR93

ATTACHMENT "A"



SPECIAL NOTE

- ALL PLANT MATERIAL MUST BE INSTALLED AS SPECIFIED. IF LOCAL NURSERIES DO NOT HAVE PLANT MATERIAL IN STOCK, PLANT MATERIAL MAY BE ORDERED FROM SERVICE PLANTA GROWERS AND NURSERY, OR MOUNTAIN STATES WHOLESALE NURSERY.
- PLANT VARIETIES SUCH AS LUCRETIA HAMILTON DESERT WILLOW, RED PUSH PISTACHE, MURPHEY'S AGAVE, TWIN-FLOWERED AGAVE AND TEXAS BEARGRASS AREA AVAILABLE THROUGH MOUNTAIN STATES. SUBSTITUTIONS MAY ALSO BE BASED ON MT. STATES AVAILABILITY. CONTRACTOR TO BID AND ORDER PLANT MATERIAL ACCORDINGLY.
- CONTRACTOR MUST PROVIDE PROOF TO ARCHITECT OR LANDSCAPE DESIGNER THAT PLANT MATERIAL CAN NOT BE OBTAINED, EITHER THROUGH LOCAL NURSERIES OR MOUNTAIN STATES. ALL PLANT SUBSTITUTIONS MUST BE APPROVED BY LANDSCAPE DESIGNER. PLANT MATERIAL SUBSTITUTED WITHOUT DESIGNERS APPROVAL TO BE REMOVED AND REPLACED AT THE COST OF THE CONTRACTOR.

LANDSCAPE LEGEND

SYMBOL — COMMON NAME

2" CALIPER TREE
- CHINQUAPIN OAK
- HONEY MESQUITE
- DESERT MUSEUM PALO VERDE
- RED PUSH PISTACHE
- LUCRETIA HAMILTON DESERT WILLOW

SALVAGE PLANT
- OCOTILLO - 5-6' HEIGHT

5 GALLON SHRUB
- CHAPARRAL SAGE
- RED BIRD OF PARADISE
- YELLOW YUCCA
- TRAILING INDIGO BUSH
- GIANT HESPERALOE
- REGAL MIST
- GOPHER PLANT
- BARBET GRASS (BACHARISTA)

3 GALLON SHRUB
- GOLDEN BARREL CACTUS
- SPINELESS PRICKLY PEAR
- VARIEGATED MURPHEY'S AGAVE

1 GALLON SHRUB
- BLUE GRAMA
- MEXICAN FEATHER GRASS

5/15/15

REVISIONS — DESCRIPTION — DATE

CONSULTANT'S SEAL

WHOLE FOODS COMPLEX
100 PITT STREET EL PASO, TX 79912

LANDSCAPE PLAN

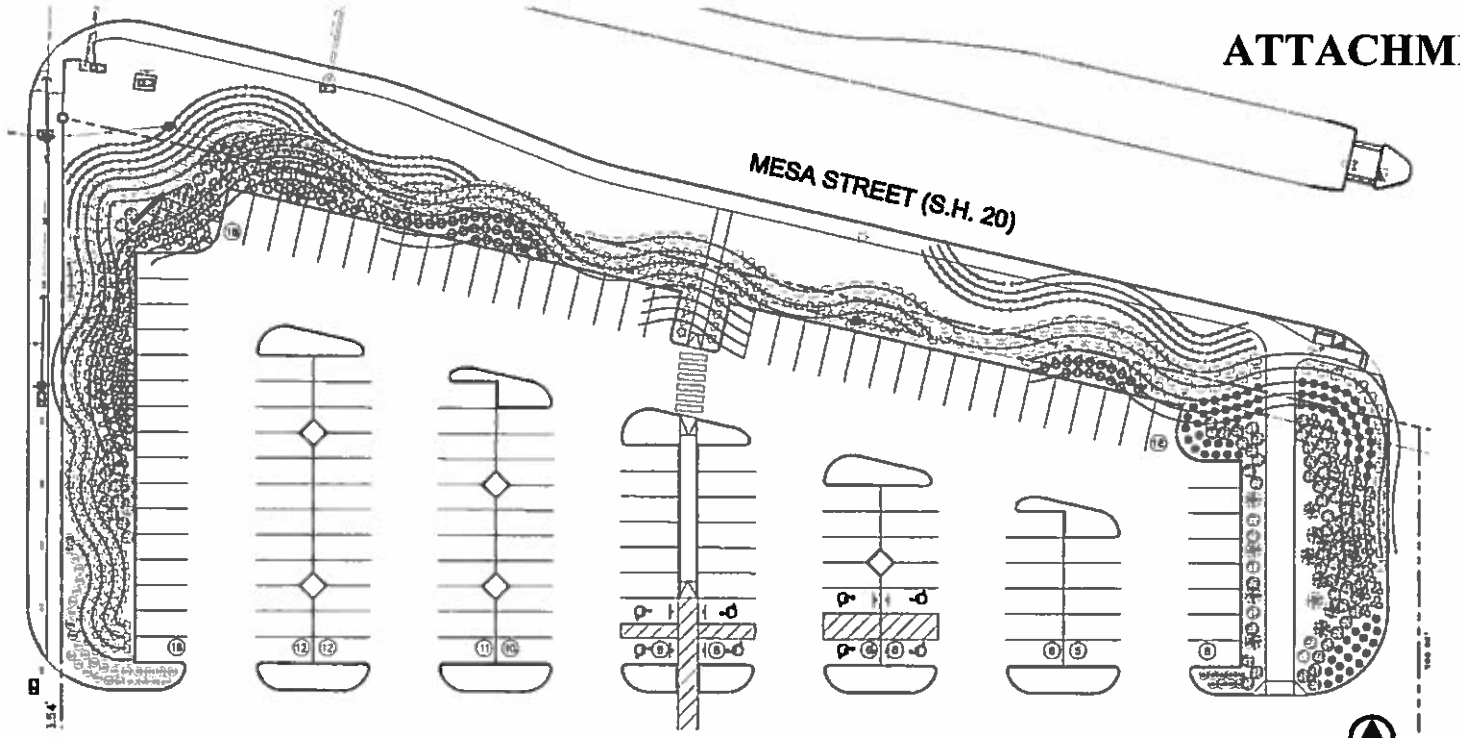
L-2
SHEET 2 OF 7

15-1020.55 520919

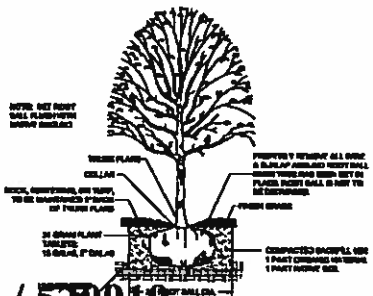
Whole Foods Traffic Signal Agreement Mesa & Champions

OAR94

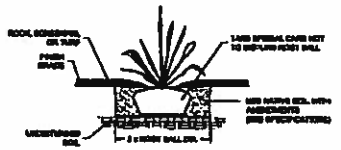
ATTACHMENT "A"



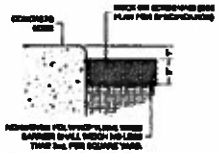
PLANT CONTOUR AND ROW SPACING LAYOUT



TREE PLANTING DETAIL



SHRUB PLANTING DETAIL



ROCK/SCREENING DETAIL

BOULDER PLACEMENT DETAIL

5/15/15

REVISIONS: DESCRIPTION | DATE

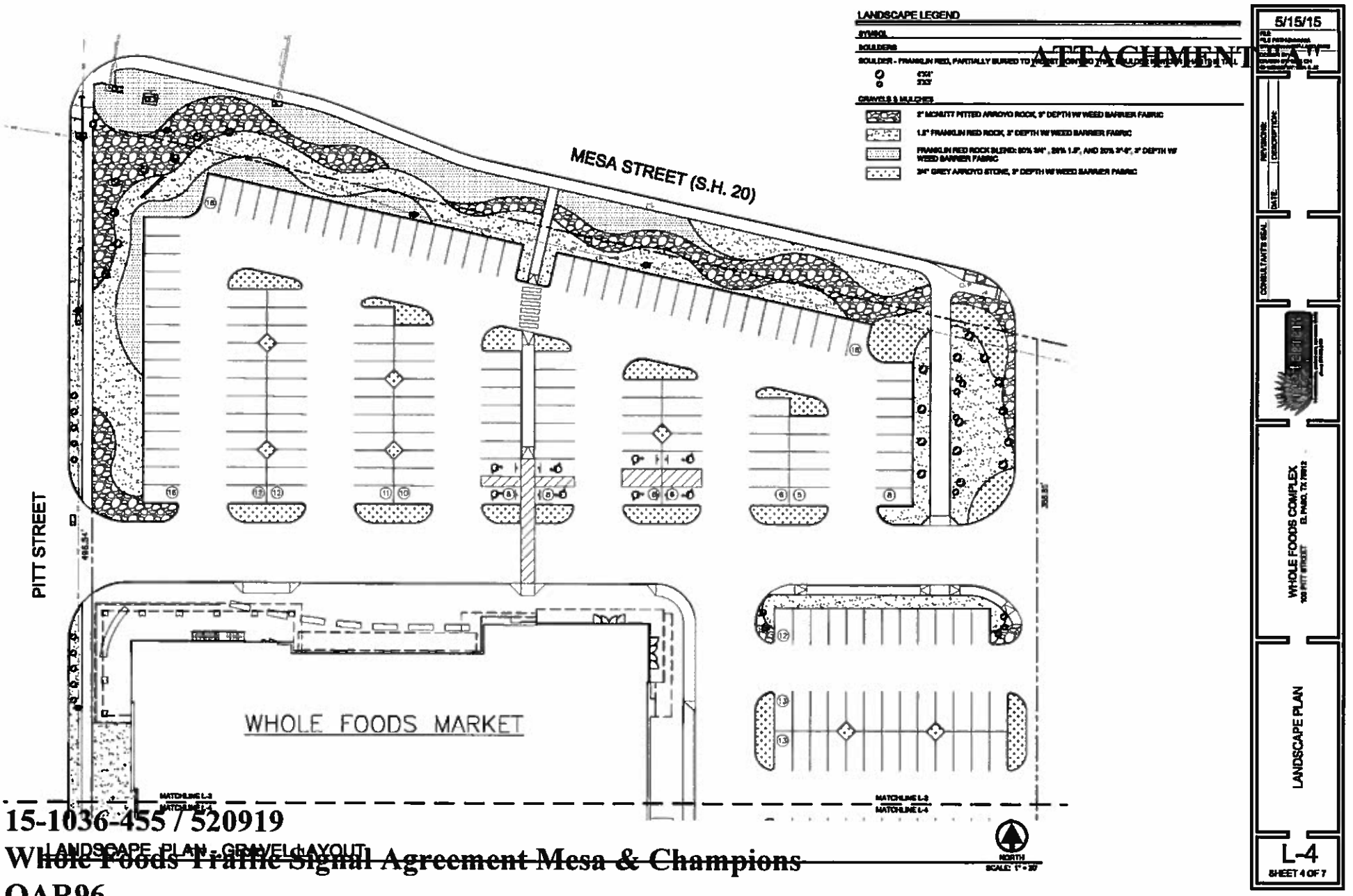
CONSULTANTS SEAL

WHOLE FOODS COMPLEX
100 PITT STREET EL PASO, TX 79912

LANDSCAPE PLAN & DETAILS

L-3
SHEET 3 OF 7

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR95



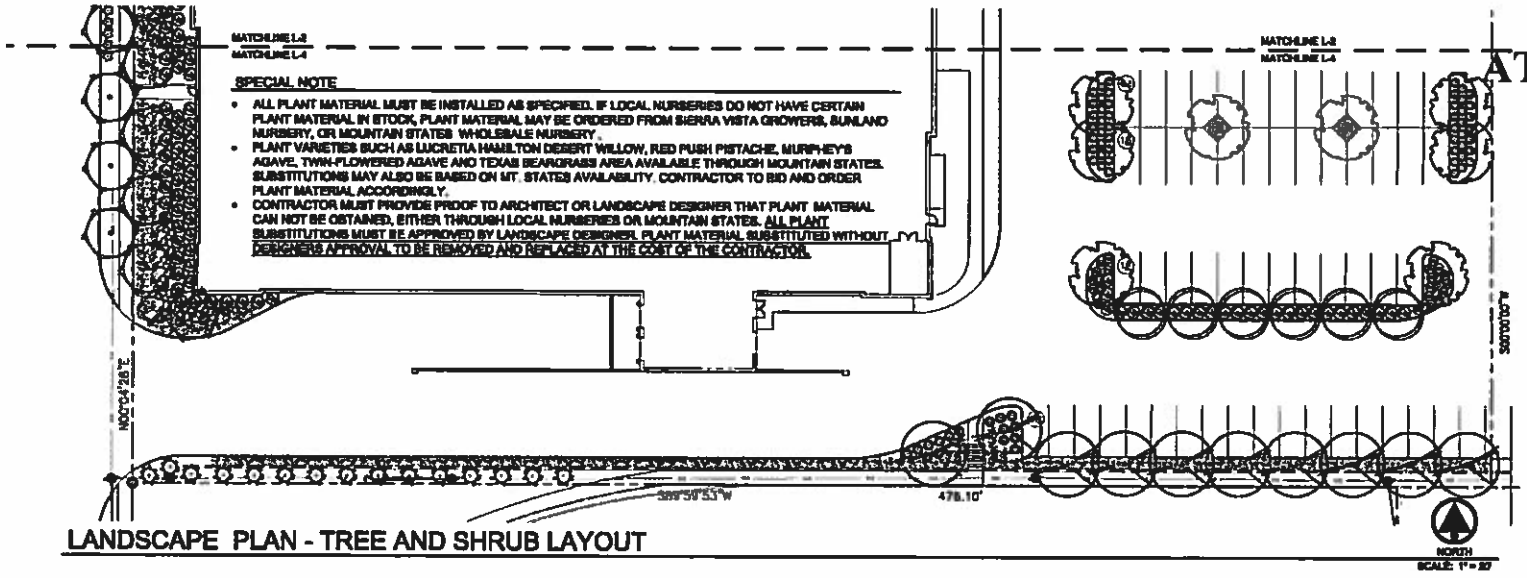
ATTACHMENT A

15-1036-455 / 520919

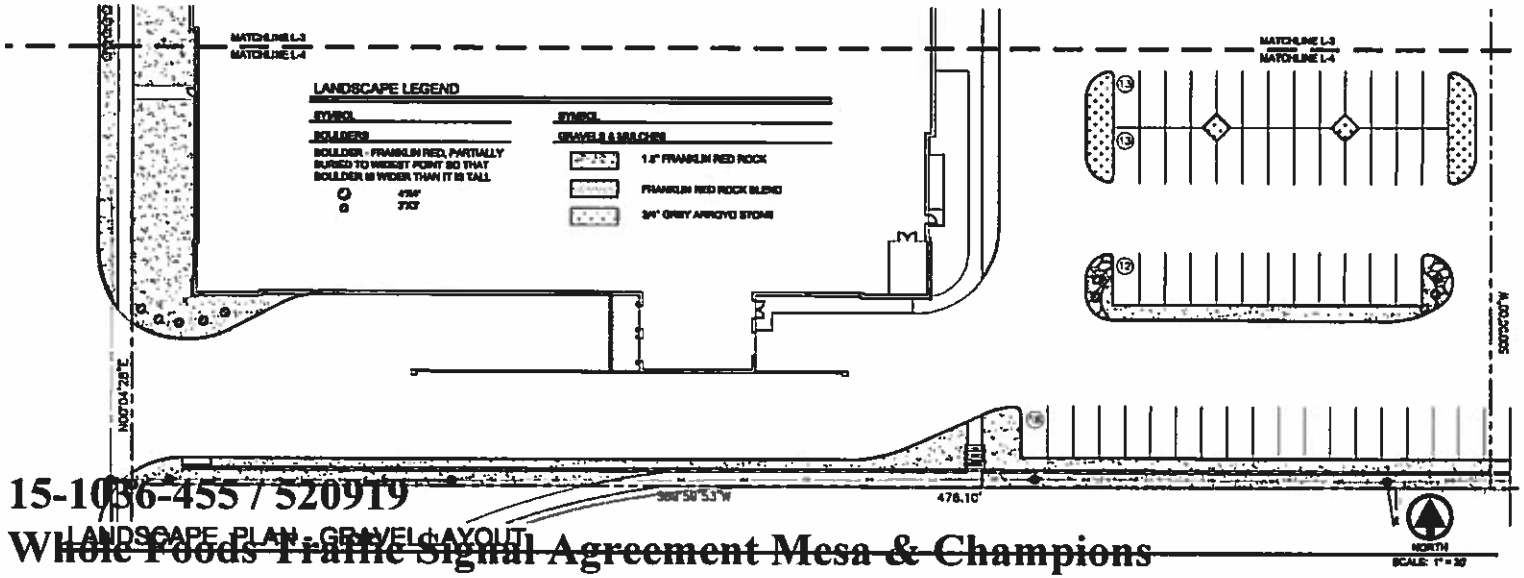
~~Whole Foods Traffic Signal Agreement Mesa & Champions~~

OAR96

ATTACHMENT A



LANDSCAPE PLAN - TREE AND SHRUB LAYOUT



LANDSCAPE PLAN - GRAVEL LAYOUT

LANDSCAPE LEGEND

TREES

- CHINQUAPIN OAK
- HONEY MESQUITE
- DESERT MUSEUM PALO VERDE
- RED PUSH PISTACHE
- LUCRETIA HAMILTON DESERT WILLOW

SALVAGE PLANT

- OCOTILLO - 6-8' HEIGHT

5 GALLON SHRUB

- CHAPARRAL SAGE
- RED BIRD OF PARADISE
- YELLOW YUCCA
- TRAILING INDIGO BUSH
- GIANT HESPERALOE
- REGAL MIST
- GOPHER PLANT
- BABIES' GRASS (SACAHUISTA)

3 GALLON SHRUB

- GOLDEN BARREL CACTUS
- SPINELESS PRICKLY PEAR
- VARIEGATED MURPHEY'S AGAVE

1 GALLON SHRUB

- BLUE GRAMA
- MEXICAN FEATHER GRASS

5/15/15

REVISIONS
DESCRIPTION:
DATE:

CONSULTANT'S SEAL

WHOLE FOODS COMPLEX
100 PITT STREET EL PASO, TX 79912

LANDSCAPE PLAN

L-5
SHEET 5 OF 7

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR97

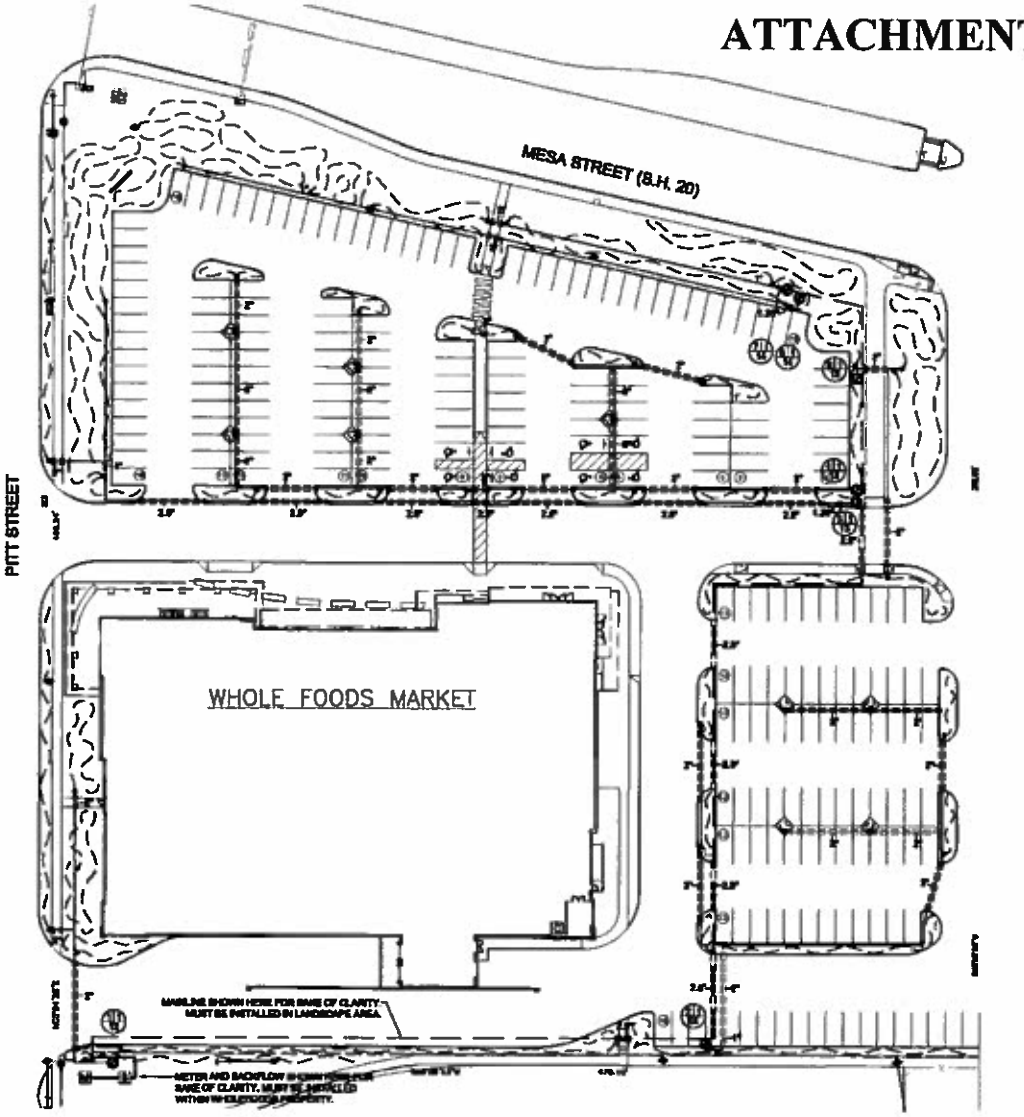
ATTACHMENT

IRRIGATION LEGEND

SYMBOL	ITEM
M	1" YARD METER
B	3/4" FEBCO 825Y RP BACKFLOW PREVENTER W/ ALUM. HOTBOX ENCLOSURE - CLASS 2, ASSE #1022.
C	HUNTER I-CORE, 6 STATION CONTROLLER - METAL CABINET COORDINATE LOCATION WITH OWNER & ELECTRICAL CONTRACTOR
	1" HUNTER- ICV-101G-FB-AS - 40PSI - REMOTE CONTROL VALVE WITH FILTER SENTRY AND ACCU-SYNC ADJUSTABLE PRESSURE REGULATOR
— — —	1.25" MAINLINE - CLASS 200 PVC
———	1" LATERAL LINE - CLASS 200 PVC - 1" UNLESS OTHERWISE SPECIFIED
==========	PVC SLEEVE - 2 SIZES LARGER THAN LATERAL OR MAIN
•	CONVERSION FROM PVC TO POLYTUBING
~~	DRIP LINE 3/4" POLYTUBING (NO SINGLE RUN SHALL BE LONGER THAN 200') HUNTER 1 GPH DRIP EMITTER HE-16-E 2 PER SHRUB & GROUND COVER HUNTER 2 GPH DRIP EMITTER HE-20-E 6 PER TREES
A/B/C	A) STATION NUMBER B) SIZE OF VALVE IN INCHES C) TOTAL GPM

IRRIGATION NOTES

- IRRIGATION IN TEXAS IS REGULATED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY, P.O. BOX 13087, AUSTIN, TX 78711.
- CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL EXISTING AND PROPOSED UTILITIES AND ALL SITE CONDITIONS PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE OWNER.
- IRRIGATION SHALL BE INSTALLED ACCORDING TO PLANS, DETAILS, AND SPECIFICATIONS. SHOULD CHANGES BE IMPLEMENTED IN THE FIELD, A NEW SET OF PLANS IS REQUIRED TO BE SUBMITTED TO THE CITY OF EL PASO. LANDSCAPE DESIGNER IS NOT UNDER CONTRACT TO PROVIDE THESE PLANS, EXCEPT AS PROVIDED FOR IN ORIGINAL CONTRACT.
- CONTRACTOR WILL NOT WILLFULLY INSTALL THE IRRIGATION SYSTEM AS DESIGNED IF IT IS OBVIOUS THAT FIELD CONDITIONS EXIST THAT WERE NOT CONSIDERED DURING DESIGN. ANY CONDITIONS NOTED AS SUCH SHALL BE REPORTED TO THE ARCHITECT AND IRRIGATION DESIGNER. IF THE CONTRACTOR FAILS TO DO SO, THE CONTRACTOR ASSUMES FULL RESPONSIBILITY FOR ANY CORRECTIONS NEEDED.
- PLANS SCHEMATIC FOR READABILITY. CONTRACTOR TO ADJUST AS NECESSARY TO FIT SITE.
- CONTRACTOR SHALL VERIFY STATIC PRESSURE AT METER MEETS SYSTEM NEEDS. LICENSED IRRIGATOR TO AMEND AS NECESSARY.
- PROVIDE SHUTOFF VALVE BETWEEN METER AND BACKFLOW.
- CONTRACTOR IS RESPONSIBLE FOR CONNECTING AUTOMATIC CONTROLLER TO ELECTRICITY.
- 14 GA. SOLID COPPER WIRE (PVC INSULATED AND UL APPROVED) SHALL RUN FROM CONTROLLER TO VALVES. COMMON WIRE TO BE 12GA.
- ALL CONTROL WIRING FROM THE VALVES TO THE CONTROLLER MUST BE INSTALLED IN A 1" PVC CONDUIT PIPE IF BURIED BENEATH CONCRETE OR ASPHALT SURFACES.
- LOCATE VALVES AWAY FROM LOW SPOTS OR AREAS OF DRAINAGE FLOW.
- VALVE CAPS SHALL BE TAN COLOR.
- ALL MAINLINES SHALL BE BURIED MIN. 18". ALL LATERALS 12".
- MAINTAIN 4" MINIMUM CLEARANCE BETWEEN PIPE RUNNING IN THE SAME TRENCH. CONTROL WIRE SHALL ALWAYS BE TO THE SIDE AND BELOW THE TOP OF THE PIPE RUNNING IN THE SAME TRENCH.
- POLYETHYLENE TUBING TO BE PLACED UNDER WEED BARRIER FABRIC. MICROTUBING TO BE STAKED.
- THE CONTRACTOR SHALL PROVIDE THE OWNER WITH AS-BUILT DRAWINGS PRIOR TO APPROVAL OF FINAL PAYMENT.
- ALL PIPING/WIRING RUNNING BENEATH PAVED SURFACES (DRIVES, SIDEWALKS, ETC.) SHALL BE INSTALLED IN CLASS 200 PVC SLEEVES. SLEEVES SHALL BE OF THE SIZE SO THAT THE INSIDE DIAMETER OF THE SLEEVE IS 2 TIMES GREATER THAN THAT OF THE COMBINED OUTER DIAMETER OF ALL ITEMS INSTALLED IN THE SLEEVES.



IRRIGATION PLAN

5/15/15

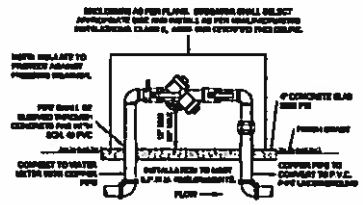
WHOLE FOODS COMPLEX
100 PITT STREET EL PASO, TX 79912

IRRIGATION PLAN

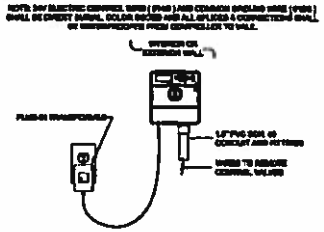
L-6
SHEET 6 OF 7

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR98

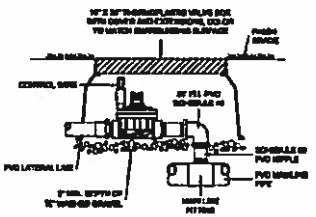
ATTACHMENT A



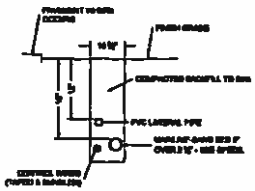
RPA FEBCO Mo.825Y DETAIL



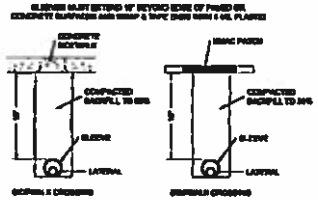
HUNTER CONTROLLER DETAIL



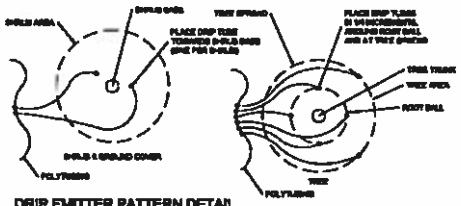
HUNTER-ICV CONTROL VALVE DETAIL



TRENCHING DETAIL



SLEEVING STANDARD DETAIL



DRIP EMITTER PATTERN DETAIL

5/15/15

WHOLE FOODS COMPLEX
150 PITT STREET EL PASO, TX 79912

IRRIGATION DETAILS

L-7
SHEET 7 OF 7

15-1036-455 / 520919
Whole Foods Traffic Signal Agreement Mesa & Champions
OAR99

ATTACHMENT "B"

ZTEX
CONSTRUCTION INC.

Serving Texas, New Mexico, Arizona, Oklahoma

On time and in budget

Minority Business, Veteran Owned Business and Small Business

ZTEX Construction
1326 Henry Brennan
El Paso, Texas 79936

Tel 915 591 6900
Fax 915 591 6911

PROJECT
LA VILLITA ON MESA - TXDOT WORK

DATE
28-Sep-15

DESCRIPTION Turning Lane and Deceleration Lanes	QTY	UNIT	Total
Install Silt Fence	800.00	LF	
Remove Silt Fence	800.00	LF	
Demolition of Existing Left Turning Lane on Mesa Street			
Tree Removal	2.00	EA	
Removal of 4" Concrete	605.00	SY	
Removal of 6" Header Curb	1,395.00	LF	
Removal of ADA Ramps	2.00	EA	
Sawcut Existing Mesa Street	1,395.00	LF	
Remove Base Course and Asphalt	685.00	SY	
Excavation Roadway	2,100.00	CY	
Turning Lane and Deceleration Lanes on Mesa Street (4" HMAC + 8" Base + 6" Cement Treated Subgrade)	**1,707.00**	**SY**	
4" Asphalt Type D	406.00	TONS	
8" Crushed Stone Base Type A Grade 4	811.00	TONS	
Prime Coat	3,414.00	SY	
6" Compacted Subgrade	1,707.00	SY	
4" Concrete Driveway	215.00	SY	
Concrete Ramp (Ty 2)	1.00	EA	
Concrete Ramp (Ty 7)	5.00	EA	
Concrete Ramp (Ty 20)	1.00	EA	
Concrete Ramp (Ty 21)	1.00	EA	
4" Reinforced Concrete Sidewalk	600.00	SY	
Type II Curb and Gutter Reinforced w/3 - #5 Continuous Rebars	1,118.00	LF	
Adjust Existing MH to FG elevations	1.00	EA	
Striping and Signage for all TxDOT Work	1.00	LS	
Traffic Control for Deceleration Lanes and Turning Lane	1.00	LS	

Excluding: Irrigation System, Cement Treated Subgrade, All Traffic Signals, All Electrical

Sub Total for Turning Lane	**$**	**291,209.00**
Tax on Materials	**$**	**5,496.00**
Total for Turning Lane	**$**	**296,705.00**

ATTACHMENT "B"
TRI-STATE ELECTRIC LTD.

PROJECT:	Traffic Signal Design
CONTROL NO.:	N/A
HIGHWAY:	Mesa St AT Champions Circle
COUNTY:	El Paso
DATE:	8/12/2015

QUOTATION (Revised @ August 12 2015)

ITEM/ CODE	DESCRIPTION	UNIT	QUANTITY	UNIT	TOTAL
416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	16.00	$ 298.00	$ 4,768.00
416-6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	11.00	$ 325.00	$ 3,575.00
416-6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	13.00	$ 375.00	$ 4,875.00
416-6034	DRILL SHAFT (TRF SIG POLE) (48 IN)	LF	22.00	$ 395.00	$ 8,690.00
502-6001	BARRICADES, SIGNS & TRAFFIC HANDLING	MO	3.00	$ 5,000.00	$ 15,000.00
610-6004	RELOCATE RD IL ASM (TRANS-BASE)	EA	2.00	$ 2,200.00	$ 4,400.00
618-6023	CONDT (PVC) (SCHD 40) (2")	LF	1,705.00	$ 12.00	$ 20,460.00
618-6024	CONDT (PVC) (SCHD 40) (2") (BORE)	LF	400.00	$ 36.72	$ 14,688.00
618-6029	CONDT (PVC) (SCHD 40) (3")	LF	150.00	$ 15.00	$ 2,250.00
618-6030	CONDT (PVC) (SCHD 40) (3") (BORE)	LF	220.00	$ 48.55	$ 10,681.00
620-6010	ELEC CONDR (NO.6) INSULATED (GROUND)(2 GROUND WIRES)	LF	2,475.00	$ 2.95	$ 7,301.25
620-6010	ELEC CONDR (NO.6) INSULATED	LF	2,570.00	$ 2.95	$ 7,581.50
624-6002	GROUND BOX TY A (122311) W/APRON	EA	1.00	$ 950.00	$ 950.00
624-6008	GROUND BOX TY C (162911) W/APRON	EA	5.00	$ 1,025.00	$ 5,125.00
628-6128	ELC SRV TY D 120/240 060 (NS) GS (N) GC (O)	EA	1.00	$ 6,500.00	$ 6,500.00
644-6001	INS SM RD SN SUP & AM TY 10 BWG (1) SA (P)	EA	9.00	$ 550.00	$ 4,950.00
644-6068	RELOCATE SM RD S SUP & AM TY 10 BWG	EA	2.00	$ 380.00	$ 760.00
644-6076	REMOVE SM RD S SUP & AM	EA	1.00	$ 275.00	$ 275.00
680-6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1.00	$ 29,075.65	$ 29,075.65
680-6004	REMOVING TRAFFIC SIGNALS	EA	1.00	$ 12,966.54	$ 12,966.54
682-6001	VEH SIG SEC (12") LED (GRN) COMPLETE W/HOUSING	EA	8.00	$ 325.00	$ 2,600.00
682-6002	VEH SIG SEC (12") LED (GRN ARW) COMPLETE W/HOUSING	EA	1.00	$ 325.00	$ 325.00
682-6003	VEH SIG SEC (12") LED (YEL) COMPLETE W/HOUSING	EA	8.00	$ 325.00	$ 2,600.00
682-6004	VEH SIG SEC (12") LED (YEL ARW) COMPLETE W/HOUSING	EA	1.00	$ 325.00	$ 325.00
682-6005	VEH SIG SEC (12") LED (RED) COMPLETE W/HOUSING	EA	8.00	$ 325.00	$ 2,600.00
682-6006	VEH SIG SEC (12") LED (RED ARW) COMPLETE W/HOUSING	EA	1.00	$ 325.00	$ 325.00
682-6018	PED SIG SEC (LED) (COUNTDOWN) COMPLETE W/HOUSING	EA	6.00	$ 650.00	$ 3,900.00
682-6035	BACK PLATE (12")(3 SEC)(VENTED) ALUMINUM	EA	9.00	$ 102.00	$ 918.00
684-6007	TRF SIG CBL (TY A)(12 AWG)(2 CONDR)	LF	690.00	$ 2.90	$ 2,001.00
684-6012	TRF SIG CBL (TY A)(12 AWG)(7 CONDR)	LF	621.00	$ 5.20	$ 3,229.20
684-6017	TRF SIG CBL (TY A)(12 AWG)(12 CONDR)	LF	635.00	$ 5.55	$ 3,524.25
684-6024	TRF SIG CBL (TY A)(12 AWG)(19 CONDR)	LF	555.00	$ 6.90	$ 3,829.50
684-6054	TRF SIG CBL (TY A)(18 AWG)(3 CONDR)	LF	722.00	$ 3.98	$ 2,873.56
684-6055	TRF SIG CBL (TY A)(18 AWG)(4 CONDR)	LF	708.00	$ 3.26	$ 2,308.08
687-6001	PED POLE ASSEMBLY	EA	4.00	$ 2,500.00	$ 10,000.00
688-6001	PED DETECT PUSH BUTTON (APS)	EA	6.00	$ 2,000.00	$ 12,000.00
688-6002	PED DETECTOR CONTROLLER UNIT	EA	1.00	$ 3,665.00	$ 3,665.00
6002-6001	VIVDS PROCESSOR SYSTEM	EA	3.00	$ 7,500.00	$ 22,500.00
6002-6002	VIVDS CAMERA ASSEMBLY	EA	3.00	$ 2,000.00	$ 6,000.00
6002-6003	VIVDS SET-UP SYSTEM	EA	1.00	$ 450.00	$ 450.00
6014-6011	FIBER OPTIC CABLE (SINGLE-MODE)(12 FIBER)	LF	1,560.00	$ 12.65	$ 19,734.00
6014-6023	FIBER OPTIC PATCH PANEL (12 POSITION)(EXTERNAL)	EA	1.00	$ 2,500.00	$ 2,500.00
6027-6003	CONDUIT (PREPARE)	LF	1,025.00	$ 5.50	$ 5,637.50
6027-6008	GROUND BOX (PREPARE)	EA	1.00	$ 985.00	$ 985.00

ATTACHMENT "B"

	TOMAR FIRE/TRANSIT PREEMPTION SYSTEM	EA	2.00	$ 3,200.00	$ 6,400.00
	INS TRF SIG PL AM (S) 1 ARM (30') (ELP STD)	EA	1.00	$ 5,761.00	$ 5,761.00
	INS TRF SIG PL AM (S) 1 ARM (48') (ELP STD)	EA	1.00	$ 9,300.00	$ 9,300.00
	INS TRF SIG PL AM (S) 1 ARM (50') (ELP STD)	EA	1.00	$ 16,231.97	$ 16,231.97

Item 680-6004 pertains to the removal of traffic signals and signage at the intersection of Alto Mesa & Mesa St.

TOTAL $ 317,395.00

Remarks:

1. Quote valid for a period of 90 days.
2. General Contractor is responsible for all engineering and layout for our work on this project.
3. **Above quantities are estimated only. Actual field quantities will be used for billing.**
4. Tri-State Electric Ltd. Will provide insurance naming General Contractor as additional insured for our items of work only.
5. Tri-State Electric Ltd. Will not provide Primary or Noncontributory Insurance coverage.
6. Past history has shown this is very difficult to bore. We will make (3) attempts to bore if unsuccessful, the open cut method is the only option.
7. **Quoted based on revised prints dated 8/5/15.**

Includes:

1. All labor, materials equipment required to carry out the various bid items listed above.
2. Traffic control for our items of work only.

Exclusions:

1. Engineering and layout. Confirmation of TxDOT rightaway.
2. Concrete work such as ADA ramps or curb.
3. Asphalt paving.
4. Pavement surface preparation, pavement markings and/or striping removal.
5. Asphalt/concrete cutting and patching of any kind.
6. Payment and performance bonds.
7. Uniformed police officers.
8. Permits and agency fees.
9. Raising of El Paso Electric Co. overhead power lines, if required.
10. Steel casing if required by TXDOT, this is normally required when using multiple bores. This may of may not be an issue and is not shown on the contract drawings.

Date Submitted: 8/12/2015