

Module 9

Traffic Operations

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Section 1

Overview

The TxDOT District Office traffic operations and project development staff is the primary contact point for the Local Government (LG) on traffic operations projects. If the LG is required to submit plans, specifications and estimates (PS&E) for TxDOT review and approval, the LG will transmit the PS&E to the TxDOT District Office staff and the District will send the PS&E to Austin for final review. In Austin, the Traffic Operations Division coordinates internally with the Design Division, Bridge Division, or other Responsible Division, for plan review and approval. For this reason, the LG will not usually work directly with the Traffic Operations Division, unless specific technical issues need to be resolved.

The Traffic Operations Division is responsible for statewide traffic operations, including traffic safety, traffic signals, intelligent transportation system, operational engineering and management issues, and railroad signals and crossings. This division is also managing the Safe Routes to School Program.

The authority of the LG to alter the speed limits are addressed in Transportation Code, §370.033 and 545.354. These decision making authorities are required to follow the Procedures for Establishing Speed Zones when altering speed limits on off-system turnpikes.

The following sections contain information on how TxDOT envisions traffic operations issues will be addressed by the LG and how TxDOT will monitor the LGs performance.

Section 2

Category 8 Safety Projects (HSIP, HRRR, SRTS, and RXR)

General “Category 8 Safety Projects” are a collection of project types advanced with federal funds. Safe Routes to School projects are the only projects in the Category 8 Safety Projects Program that the LG can directly administer. TxDOT does not allow the LG to let and manage Highway Safety Improvement Program (HSIP), High Risk Rural Road Program (HRRR) and RXR (FRS) projects. The district will execute an advance funding agreement (AFA) with the LG outlining the financial responsibilities of the LG for those projects not on the state highway system. An AFA is not required on RXR (FRS) projects.

Federal Regulation

- a. SAFETEA-LU Section 1401 – Addresses development and implementation of a strategic highway safety improvement program and plan in each State.
- b. SAFETU-LU Section 1404 – Addresses development and implementation of a Safe Routes to School Program in each State.

State Regulation

- a. Texas Administrative Code, Title 43, §25.500 – 25.505 – Establishes the Safe Routes to School Program and defines the project eligibility, application, and selection processes.
- b. The Category 8 programs are part of the Statewide Preservation and Safety Program (SPSP) of the Unified Transportation Program (UTP) and include several types of work. Refer to the UTP on TxDOT’s web site for more detailed information.
- c. Texas Administrative Code, Title 43 – Projects must be designed in accordance with TxDOT procedures, standards, manuals, and guidelines.

Required Practices

- a. For the Safe Routes to School program, the LG must apply for funding as required in the periodic “call for projects”. If selected and determined by the district to allow engineering and construction by the LG, the LG must develop and administer the project in accordance with the appropriate sections of this guide.
- b. For RXR (FRS), HSIP, and HRRR projects, TxDOT will select projects based on a statewide priority listing. TxDOT will involve the LG as necessary based on location and whether the project is on or off the state highway system.
- c. For HSIP and HRRR projects, only those elements included in the project scope will be evaluated for compliance with geometric design criteria.

LG Responsibilities

- a. Apply to TxDOT for funding. (Not applicable for RXR (FRS) projects).
- b. Manage project with TxDOT involvement as described in agreement with TxDOT.
- c. Participate in RXR (FRS) project diagnostic inspection during project development process.

TxDOT District Responsibilities

- a. Provide assistance to the LG as requested and serve as liaison between the LG and TRF as dictated by the program.
- b. Execute advance funding agreements (AFA) for all infrastructure Safe Routes to School projects and off-system HSIP and HRRR projects.
- c. Initiate the federal project authorization (FPAA) process for all off-system projects.
- d. HSIP, SRTS, and HRRR projects must be sent to TRF for PS&E approval.
- e. Evaluate proposed project locations during the selection process of RXR (FRS) projects. Develop RXR (FRS) preliminary project plan, participate in diagnostic inspection process, and prepare final plans. Provide construction inspection, signing and pavement markings, and conduct final inspection.

Section 3

Illumination/Electrical

General Roadway illumination normally falls into one of several categories, continuous lighting, safety lighting, and bikeway and pedestrian lighting. Illumination may be provided on “eligible” roadways where conditions “warrant” installation. Guidance is contained in TxDOT’s *Highway Illumination Manual*.

Electrical work is covered by various state and local statutes and codes. Applicability to all possible situations is outside the scope of the LGPP.

Federal Regulation

- a. 23 CFR 655.603 – The National MUTCD is the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel. A State MUTCD must be in substantial conformance with the National MUTCD.
- b. MUTCD Section 2A.08 – All regulatory, warning, and guide signs must be either retroreflective or illuminated to show the same shape and similar color both day and night. Street or highway lighting does not satisfy this requirement. All overhead sign installations should be illuminated unless otherwise supported by an engineering study.
- c. There are no federal statutes for general roadway illumination. However, CFR 635.410, Buy America Requirements, applies when furnishing steel light poles. CFR 635.411, Material or Product Selection, does not allow proprietary materials to be used on Federal-aid projects.

State Regulation

NOTE: Texas Occupations Code 1305.003(a)(5)(C), Electricians. This statute does NOT apply to highway work.

- a. Texas Administrative Code, Title 43 – Projects must be designed in accordance with TxDOT procedures, standards, and guidelines. For RMA, toll and pass-through financed projects, preliminary design information must be sent to TxDOT for review and approval when the design is approximately 30% complete. Title 43 Rule 25.11 gives the requirements for financing and installation of continuous lighting and safety lighting systems on the State highway system.
- b. Texas Health and Safety Code, Chapter 425– Provides standards to be met if state funds are used for installation or operation of outdoor lighting fixtures. TxDOT must also determine that the purpose of the outdoor lighting fixture on the state highway system cannot be achieved by other methods as a condition of participation with state funds.

Required Practices

- a. For projects with state or federal funds and all projects on the state highway system regardless of source of funds, the LG must determine eligibility for lighting in accordance with TxDOT’s *Highway Illumination* manual and submit to TxDOT

for approval as a condition of receiving funds. The submission must also provide evidence of compliance with Chapter 425 of the Texas Health and Safety Code. For concession projects, the LG must comply with the terms of the Project Development Agreement with TxDOT and may use TxDOT manuals and specifications as a reference. According to TxDOT's *Highway Illumination Manual*:

- i. For projects on the state highway system, illumination levels for continuous lighting should be according to the *AASHTO Roadway Lighting Design Guide*.
 - ii. For projects on the state highway system, roadway lighting installed by LG's should meet all safety-related requirements under State and Federal law and TxDOT functional manuals.
 - iii. For projects on the state highway system, LG's must obtain the approval of the State for all proposals to install illumination. The proposals should be reviewed by TxDOT for compliance with pole placement guidelines.
 - iv. For projects with state or federal funds and all projects on the state highway system regardless of source of funds, the LG must use TxDOT standard plan sheets or the LG's standard sheets and specifications that have been approved by TxDOT and must incorporate the provisions of TxDOT Standard Specification Item 7.15 for construction of electrical and illumination facilities including the latest required TxDOT special provisions.
- b. For projects on the state highway system or projects with state or federal funds, the LG must assure compliance with the latest edition of the National Electrical Code.
- c. For projects off the state highway system with no state or federal funds, the LG may follow their own procedures.

LG Responsibilities

- a. For projects with state or federal funds and all projects on the state highway system regardless of source of funds:
 - i. Meet warrants for illumination and submit to TxDOT.
 - ii. Include TxDOT Standard Specification Item 7.15 and any required special provisions or equivalent in PS&E or other bid documents (design-build).
 - iii. Include TxDOT standard plan sheets as appropriate in PS&E or other bid documents (design-build).
 - iv. For concession projects, comply with technical and other provisions of Project Development Agreement with TxDOT.
- b. For projects off the state highway system with no state or federal funds, address illumination and electrical issues using local procedures.

TxDOT District Responsibilities

- a. For projects with state or federal funds and all projects on the state highway system, process the LG's submission as outlined in the *Highway Illumination Manual*. For projects with a Pass-through Financing arrangement, the District approves the eligibility determination, but may contact TRF for assistance as needed.

- b. For projects with state or federal funds and all projects on the state highway system, assure construction plans and specifications or other procurement documents include TxDOT Standard Plans and concept of Item 7.15 of the Standard Specifications.
- c. There is no monitoring for projects off the state highway system with no state or federal funds.

Section 4

Intelligent Transportation Systems

General Intelligent Transportation Systems (ITS) use a variety of strategies to enhance transportation operations on the existing highway system. An intelligent transportation system is an integrated system that uses video and other electronic detection devices to monitor roadway conditions. When problems (called "incidents") are detected, operators may use remote controls to redirect traffic, inform motorists (through the use of dynamic message signs) and notify emergency response services as appropriate.

Federal Regulation

- a. 23 CFR 940.5 – ITS projects must conform to the National ITS Architecture and standards.
- b. 23 CFR 940.11 – Projects must be developed to comply with approved regional ITS architecture.

State Regulation

- a. There are no state statutes related to ITS (except as to providing distribution of information for Amber/Silver Alerts).

Required Practices

- a. For projects with state or federal funds and all projects on the state highway system regardless of funding source, the LG must gain approval from TxDOT's Traffic Operations Division before developing and implementing any ITS components.
- b. For concession projects, the LG must provide a complete and operational ITS network throughout the Project that is expandable as capacity is increased along the Project roadways and is compatible with TxDOT systems.
- c. For all projects, the LG must:
 - i. Develop using the TxDOT ITS Architecture and require National Transportation Communications for ITS Protocol (NTCIP) compliant components.
 - ii. Provide Center to Center (C2C) communication access to TxDOT.
- d. For projects off the state highway system and no state or federal funds, the LG may follow their own procedures. The LG is still encouraged to develop their system in compliance with recognized national standards.

LG Responsibilities

- a. For projects with state or federal funds and all projects on the state highway system regardless of funding source:
 - i. Solicit TxDOT approval of all ITS issues.
 - ii. For concession projects:
 - a) Provide ITS system in compliance with Technical Provisions.
 - b) After all project subsystem testing has been completed, advise TxDOT 30 days before connecting to TxDOT system.

- b. For projects off the state highway system with no state or federal funds, follow local practices, but consider compliance with recognized national standards.
- c. Ensure compliance with the TMUTCD.

TxDOT District Responsibilities

- a. For projects with state or federal funds and all projects on the state highway system regardless of funding source, the District must refer all ITS questions to the Traffic Operations Division to assure compliance with approved ITS architecture.
- b. There is no monitoring for projects off the state highway system and no state or federal funds.

Section 5

Pavement Markings and Markers

General Pavement markings are markings set into the surface of, applied upon, or attached to the pavement to inform or guide traffic. Markings intended to guide traffic, including striping, traffic buttons, raised pavement markers and graphics.

Federal Regulation

- a. 23 CFR 655.603 – The National MUTCD is the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel. A State MUTCD may be used if found by FHWA to be in substantial conformance with the National MUTCD. The Texas MUTCD has been found to meet these criteria.

State Regulation

- a. Texas Transportation Code 544.001 – TxDOT must develop a manual and specifications for a uniform system of traffic control devices that correlates with and to the extent possible conforms to the system approved by the American Association of State Highway and Transportation Officials.
- b. The Texas Manual on Uniform Traffic Control Devices (TMUTCD) is incorporated by Texas Transportation Code §544.001 and shall be recognized as the Texas standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel.
- c. Texas Administrative Code, Title 43 – Projects must be designed in accordance with TxDOT procedures, standards, and guidelines.

Required Practices

- a. For design-bid-build and design-build projects with state or federal funds and all design-bid-build and design-build projects on the state highway system, the LG must:
 - i. Develop pavement marking plans to comply with the TMUTCD;
 - ii. Consult with the TxDOT District concerning any district policies on types of materials;
 - iii. Include the latest TxDOT standard sheets in the project plans. The sheets are listed in the “Traffic CAD Standards” section of the Traffic Operations web site;
 - iv. Include TxDOT standard specifications and latest required special provisions in contract documents;
 - v. Require testing of pavement markings and markers in accordance with TxDOT Test Procedures 800-B Series.
- b. For concession projects, the LG must ensure that the design and installation of all pavement markings comply with applicable TMUTCD requirements.
- c. For projects off the state highway system with no state or federal funds, the LG must assure compliance with the TMUTCD in accordance with their local procedures.

LG Responsibilities

- a. Assure compliance with the TMUTCD.
- b. For projects on the state highway system:
 - i. Consult with the TxDOT District concerning material preferences.
 - ii. Include TxDOT standard specifications and required special provisions.
 - iii. Assure material testing complies with TxDOT test procedures.

TxDOT District Responsibilities

- a. For design-bid-build and design-build projects with state or federal funds and all design-bid-build and design-build projects on the state highway system, the District:
 - i. Should assure that the LG understands district material preferences;
 - ii. Review PS&E for compliance with TMUTCD and TxDOT manuals and policies.
 - iii. Submit LG requests for alternate specifications to TRF for approval. For projects with a pass-through financing arrangement, the District approves alternate specifications but may request assistance from TRF as needed.
- b. There is no monitoring for projects off the state highway system and no state or federal funds.

Section 6

Railroad Coordination

General When projects cross railroad right-of-way or otherwise affect railroad facilities, pre-design and pre-construction coordination with the railroad is necessary to protect the interests of both the railroad and the entity administering the project. Coordination also involves obtaining railroad approval of the project PS&E by executing an agreement with the railroad, and providing mandatory insurance for the railroad. This can be a time-consuming process and should be started early in the project development process.

Federal Regulation

- a. 23 CFR 646A – Requires that contractors have public liability and property damage insurance in effect on federally funded projects when working within railroad right-of-way.
- b. 23 CFR 646.214 – Requires that grade crossing improvements conform to the specified design standards of the railroad company and/or highway authority.
- c. 23 CFR 646.216(d) – Requires a written agreement be executed by the contracting agency and the railroad company for federally funded projects that require use of railroad properties or adjustments to railroad facilities.
- d. 23 CFR 646.216(e) – The following must be accomplished before authorization for receipt of bids:
 - i. The PS&E must be approved,
 - ii. A proposed agreement between the contracting agency and the railroad has been found to be satisfactory,
 - iii. There must be adequate provisions for any needed easements, right-of-way or, temporary crossings for construction purposes, and
 - iv. The pertinent portions of the contracting agency-railroad agreement applicable to any protective services required during performance of the work must be included in the project specifications and special provisions.

State Regulation

- a. Texas Administrative Code, Title 43 – Projects must be designed in accordance with TxDOT procedures, standards, and guidelines.
- b. Vernon’s Texas Civil Statutes, Article 6327 – Railroads are required to place and keep that portion of its roadbed and right of way, over or across which any public road may run, in proper condition for the use of the traveling public.

Required Practices

- a. For projects with state or federal funds and all projects on the state highway system, the LG must develop projects involving railroads to the standards contained in TxDOT’s *Traffic Operations Manual, Railroad Operations Volume* for the applicable type of work and source of funding. This includes provisions of the railroad agreement, content of Exhibit A, and specific design features. The agreement must contain all of the provisions contained in TxDOT’s *Traffic Operations Manual, Railroad Operations Volume* for the applicable type of work.

- b. For all projects on the state highway system, TxDOT is to be a party to the railroad agreement. In addition, the LG must furnish a copy of the fully executed railroad agreement to TxDOT. The LG may request assistance from TxDOT to help prepare and process the agreement.
- c. For projects off the state highway system and no state or federal funds, the LG must coordinate with the railroad using their own procedures.
- d. For all projects, the LG must include appropriate provisions of the railroad agreement in the contract documents.

LG Responsibilities

- a. For design-bid-build projects with state or federal funds or on the state highway system regardless of funding source:
 - i. Develop agreement with railroad using TxDOT's standard agreement form and Exhibit A and submit to TxDOT with PS&E.
 - ii. Include agreement provisions and applicable specifications in the PS&E.
 - iii. Adopt TxDOT Standard Specification Item 7.16 or equivalent.
 - iv. Include special provision 007-001 or latest version
- b. For design-build projects with state or federal funds, or on the state highway system regardless of funding source, submit certification of railroad coordination with request for TxDOT to approve final design and construction (See Right-of-way and Utility Certification section of Module 7, Preliminary Engineering, Design, and PS&E).
- c. For concession projects with state or federal funds, or on the state highway system regardless of funding source, comply with the Federal regulations as outlined above (for project with Federal funds) and follow terms of Project Development Agreement with TxDOT.
- d. For projects off the state highway system and no state or federal funds, assure compliance with Vernon's Texas Civil Statutes using local procedures.

TxDOT District Responsibilities

- a. For projects where the PS&E will be approved by TxDOT, review agreement and Exhibit A for conformity with TxDOT policy and assure the exhibit and any appropriate special provisions / specifications are included in the PS&E.
- b. There is no monitoring for projects where TxDOT does not approve the PS&E or request to proceed with final design and construction.

Section 7

Signing Requirements for Geometric Schematic

General Module 7, Preliminary Engineering, Design, and PS&E, includes a section on development of a geometric schematic. The geometric schematic shows features such as location of interchanges, ramps, and number and arrangement of lanes. It is critical to consider signing at this stage of project development to assure that a facility is constructed that can be properly signed and operated.

Federal Regulation

- a. 23 CFR 655.603 – The National MUTCD is the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel. A State MUTCD may be used if found by FHWA to be in substantial conformance with the National MUTCD. The Texas MUTCD has been found to meet these criteria.

State Regulation

- a. Texas Administrative Code, Title 43 – Projects must be designed in accordance with TxDOT procedures, standards, and guidelines. For RMA, toll and pass-through financed projects, preliminary design information must be sent to TxDOT for review and approval when the design is approximately 30% complete.
- b. Texas Transportation Code 544.001 – TxDOT must develop a manual and specifications for a uniform system of traffic-control devices that correlates with and to the extent possible conforms to the system approved by the American Association of State Highway and Transportation Officials.
- c. The Texas Manual on Uniform Traffic Control Devices (TMUTCD) is incorporated by State Transportation Code § 544.001 and shall be recognized as the Texas standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel.

Required Practices

- a. All traffic control devices on all projects must comply with the TMUTCD.
- b. For projects that require development of a geometric schematic, major guide signs must be included on the geometric schematic. (See Geometric Schematic section of Module 7, Preliminary Engineering, Design, and PS&E). A geometric schematic is required for new location, added capacity, or controlled access projects or projects requiring an Environmental Impact Statement.
- c. When geometric schematics are not required, the LG is encouraged to assure that major guide signing will meet the TMUTCD provisions before committing to a final project layout.

LG Responsibilities

- a. Ensure signing on all projects complies with the TMUTCD and TxDOT standards.

- b. For projects with state or federal funds or on the state highway system regardless of funding source:
 - i. Design-bid-build – Include major guide signs on geometric schematic.
 - ii. Design-build – Develop and submit signing schematic to TxDOT if geometric schematic is required by agreement.
 - iii. Concession – Prepare draft signing plan for TxDOT review and approval if “Preliminary Operational Signing Schematic” is not furnished by TxDOT.

TxDOT District Responsibilities

- a. Receive geometric schematic from LG and review major guide signs for compliance with TMUTCD.
- b. Once signing is satisfactory, submit final geometric schematic to DES/TRF for approval. For projects with a Pass-through financing arrangement, the District approves the guide signs, but may contact TRF for assistance as needed.
- c. The geometric schematic must be submitted to DES for all projects on the National Highway System.

Section 8

Speed Zones, Including Construction Speed Zones

General Speed limits are established to reflect the reasonable speed of the majority of drivers on a particular section of highway. The Texas Manual on Uniform Traffic Control Devices (TMUTCD) is the state standard applicable to all roadways open to public traffic. Section 2B.13 states “After an engineering study has been made in accordance with established traffic engineering practices, the Speed Limit (R2-1) sign shall display the limit established by law, ordinance, regulation, or as adopted by the authorized agency.

State law requires that speed limits on state highways be set at the maximum established by law unless traffic and an engineering study show the need for a lower speed limit. Local agencies have the authority to establish speed zones on state highways within the limits of their jurisdiction and for roadways off the state highway system. The process for establishing speed limits on the state highway system, including regulatory speed limits in construction zones, is contained in TxDOT’s *Procedures for Establishing Speed Zones*.

Federal Regulation

- a. 23 CFR 655.603 – The National MUTCD is the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel. A State MUTCD may be used if found by FHWA to be in substantial conformance with the National MUTCD. The Texas MUTCD has been found to meet these criteria.

State Regulation

- a. Texas Transportation Code 544.001 – TxDOT must develop a manual and specifications for a uniform system of traffic-control devices that correlates with and to the extent possible conforms to the system approved by the American Association of State Highway and Transportation Officials.
- b. The Texas Manual on Uniform Traffic Control Devices (TMUTCD) is incorporated by State Transportation Code §544.001 and shall be recognized as the Texas standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel. Section 2B.13 requires a speed limit sign be placed based on an engineering study made in accordance with established traffic engineering practices and established by law, ordinance, regulation, or as adopted by the authorized agency. Section 6C.01 states that reduced speed limits in construction zones should be used only in the specific portion of the work zone where conditions or restrictive features are present
- c. Texas Transportation Code, Chapter 545, Subchapter H – Constitutes “basic speed law” in Texas. Establishes “prima facie” speed limits on Texas highways and allows changes if approved by the Texas Transportation Commission and supported by TxDOT manual *Procedures for Establishing Speed Zones*.
- d. Texas Transportation Code §545.354 – Allows a Regional Tollway Authority to alter speed limits on Turnpike projects if *Procedures for Establishing Speed Zones* is followed.

- e. Texas Transportation Code §545.355 – Allows a County to alter speed limits on a County Road.
- f. Texas Transportation Code §545.356 – Allows a Municipality to alter speed limits on a city road within the Municipality, including one on the state highway system if *Procedures for Establishing Speed Zones* is followed.

Required Practices

- a. For all projects, the LG must conduct speed studies conforming to the requirements of TxDOT's manual *Procedures for Establishing Speed Zones* if the desired speed limit differs from the prima facie limit established by state statute. Documentation and approval of the request must follow the *Procedures* manual.
- b. For all requests for permanent speed limit changes that must be approved by the Transportation Commission, the District will review the request for completeness and submit to the Traffic Operations Division with an approval recommendation.
- c. For all projects where the PS&E is approved by TxDOT, the LG must submit requests for construction speed zones on TxDOT Form 1204. The form is available for download in the "Forms" section of the Traffic Operations Division web site.
- d. For projects off the state highway system and no state or federal funds, the LG must assure compliance with the TMUTCD in accordance with their own procedures.

LG Responsibilities

- a. For projects with state or federal funds or on the state highway system regardless of funding source:
 - i. Conduct speed studies and submit documentation to TxDOT in compliance with TxDOT's *Procedures for Establishing Speed Zones*.
 - ii. Submit completed Form 1204 to TxDOT for approval.
 - iii. Assure "approved" construction and permanent speed limits are posted.
 - iv. Follow the above for design-build and concession projects unless modified by agreement with TxDOT.
- b. For projects off the state highway system with no state or federal funds, comply with TMUTCD using local procedures.

TxDOT District Responsibilities

- a. For all projects with state or federal funds and all projects on the state highway system regardless of funding source, where the LG is allowed to approve requests to post a speed limit different than the prima facie limit, the District must assure that the LG has properly documented the approval before the project is opened to traffic.
- b. For projects where the PS&E is approved by TxDOT, the District must:
 - i. Review Form 1204 for completeness and transmit to TRF for action by the Transportation Commission.
 - ii. Assure the plans include construction and permanent signing appropriate for the legal speed limit.

- c. There is no monitoring for projects off the state highway system with no state or federal funds.

Section 9

Texas Manual on Uniform Traffic Control Devices Compliance

General The National Manual on Uniform Traffic Control Devices (MUTCD) is the national standard applicable to all roadways open to public traffic. This includes roadways under the jurisdiction of local public agencies. A State MUTCD may be used if found by FHWA to be in substantial conformance with the National MUTCD. The Texas MUTCD has been found to meet these criteria.

Federal Regulation

- a. 23 CFR 655.603 – The National MUTCD is the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel.

State Regulation

- a. Texas Transportation Code 544.001 – TxDOT must develop a manual and specifications for a uniform system of traffic-control devices that correlates with and to the extent possible conforms to the system approved by the American Association of State Highway and Transportation Officials.
- b. The Texas Manual on Uniform Traffic Control Devices (TMUTCD) is incorporated by Texas Transportation Code §544.001 and shall be recognized as the Texas standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel.

Required Practices

- a. All traffic control devices must comply with the TMUTCD.

LG Responsibilities

- a. Assure all applicable devices are in compliance with the TMUTCD before a roadway is complete and open to traffic.

TxDOT District Responsibilities

- a. For design-bid-build and design-build projects with state or federal funds and all projects on the state highway system, the District will review the PS&E and other project documents for compliance with TMUTCD. For projects with a Pass-through financing arrangement, the District will retain approval authority for all phases of this subject.
- b. Monitoring for concession projects will be as outlined in the Project Development Agreement with TxDOT and applicable Technical Specifications.
- c. There is no monitoring for projects off the state highway system with no state or federal funds.

Section 10

Traffic Control Plan

General The traffic control plan is defined as all documents pertinent to the proposed efficient, effective, and safe travel of the public through work zones, including the safety of construction workers and inspection personnel. Such documents include plan sheets, general notes, specifications, special specifications, special provisions, and quantities. Traffic control plans are an integral part of each construction and maintenance project. Part 6 of the Texas MUTCD contains criteria for development of traffic control plans. TxDOT policy on work zones is contained in an Administrative Memorandum issued on July 13, 2007 titled “Guidelines for Traffic Safety in Work Zones.” (The memorandum is available from TxDOT.) Traffic control devices exposed to traffic must meet certain safety criteria to be considered “crash-worthy”. Devices in the current version of TxDOT’s *Compliant Work Zone Traffic Control Devices* list meet these criteria.

Federal Regulation

- a. 23 CFR 630.1006 – Each state must implement a policy for the systematic consideration and management of work zone impacts on all federally funded projects.
- b. 23 CFR 630.1012 – Each project must have a Transportation Management Plan (TMP) which includes a Traffic Control Plan (TCP). The plan must be consistent with Part 6 of the MUTCD and with the work zone hardware recommendations in Chapter 9 of the American Association of State Highway and Transportation Officials (AASHTO) *Roadside Design Guide*.

State Regulation

- a. Texas Administrative Code, Title 43 – Projects must be designed in accordance with TxDOT procedures, standards, and guidelines. For RMA, toll and pass-through financed projects, preliminary design information must be sent to TxDOT for review and approval when the design is approximately 30% complete.
- b. Texas Transportation Code 544.001 – TxDOT must develop a manual and specifications for a uniform system of traffic-control devices that correlates with and to the extent possible conforms to the system approved by the American Association of State Highway and Transportation Officials.
- c. The Texas Manual on Uniform Traffic Control Devices (TMUTCD) is incorporated by State Transportation Code §544.001 and shall be recognized as the Texas standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel.

Required Practices

- a. TxDOT meets the requirements of 23 CFR 630 by adoption of the Administrative Memorandum titled “Guidelines for Traffic Safety in Work Zones” as implemented by memorandum dated July 13, 2007. For projects with state or federal funds and all projects on the state highway system, the LG must comply with the guidelines. These guidelines are available from TxDOT.

- b. For concession projects, the LG must develop Technical Requirements that require compliance with the TMUTCD.
- c. All work zone traffic control devices must be in compliance with the Compliant Work Zone Traffic Control Devices list, available as a publication at TxDOT's Traffic Operations Division web site.
- d. For projects off the state highway system with no state or federal funds, the LG should be aware that the TMUTCD is the recognized standard for ALL projects in the state of Texas. However, the LG may determine how they will comply with the criteria.

LG Responsibilities

- a. For design-bid-build projects with state or federal funds or on the state highway system regardless of funding source:
 - i. Submit completed Form 2229 to TxDOT early in the project development phase.
 - ii. Develop TMP/TCP as applicable and include in contract documents.
 - iii. Adopt TxDOT Standard Specification Items 4.5 and 502 or submit alternate specification to TxDOT for approval. Include required special provisions or equivalent.
 - iv. Specify devices from the *Compliant Work Zone Traffic Control Devices* list.
 - v. Assure contract documents require compliance with TMUTCD.
 - vi. Assure compliance with the requirements of 23 CFR 630 by adoption of the Administrative Memorandum titled "Guidelines for Traffic Safety in Work Zones" as implemented by memorandum dated July 13, 2007.
- b. For design-build projects with state or federal funds or on the state highway system regardless of funding source:
 - i. Assure contract documents require compliance with TMUTCD.
 - ii. Specify devices from the *Compliant Work Zone Traffic Control Devices* list.
- c. For concession projects with state or federal funds or on the state highway system regardless of funding source:
 - i. Prepare and implement a (TMP) in compliance with the technical requirements.
 - ii. Specify devices from the *Compliant Work Zone Traffic Control Devices* list.
- d. For projects off the state highway system with no state or federal funds, comply with TMUTCD using local procedures.
- e. For all projects with Federal funds, assure contract documents require compliance with TMUTCD. Assure compliance with the requirements of 23 CFR 630 by adoption of the Administrative Memorandum titled "Guidelines for Traffic Safety in Work Zones" as implemented by memorandum dated July 13, 2007.

TxDOT District Responsibilities

- a. For projects with state or federal funds and all projects on the state highway system, the District will review the project for compliance with the "Guidelines for Traffic Safety in Work Zones." The District will submit Form 2229 and Form 1002 to DES with the PS&E.

- b. For projects with state or federal funds and all projects on the state highway system, the District will review the PS&E to assure that the TMP complies with TxDOT policy and Part 6 of the TMUTCD.
- c. For projects with a Pass-through financing arrangement, the District will retain approval authority for all phases of this subject.
- d. There is no monitoring for projects off the state highway system with no state or federal funds.

Section 11

Traffic Signal Warrants

General A comprehensive investigation of traffic conditions and characteristics of potential signal locations is necessary to determine the need for signal installations and to collect data for the design and operation of signals. Traffic control signals should not be installed unless the investigation reveals that at least one of the warrants contained in the Texas Manual on Uniform Traffic Control Devices (TMUTCD) is met. Meeting a warrant(s) is only the first step to justifying a traffic signal. The TMUTCD states that engineering judgment is required and that all factors should be considered when determining if a traffic signal should be installed. Even if a traffic signal is warranted, the signal does not have to be installed. TxDOT's procedure for evaluating traffic signals is contained in TxDOT's *Traffic Signals Manual*.

Federal Regulation

- a. 23 CFR 655.603 – The National MUTCD is the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel. A State MUTCD may be used if found by FHWA to be in substantial conformance with the National MUTCD. The Texas MUTCD has been found to meet these criteria.

State Regulation

- a. Texas Administrative Code, Title 43 – Projects must be designed in accordance with TxDOT manuals, procedures, standards, and guidelines. For RMA, toll and pass-through financed projects, preliminary design information must be sent to TxDOT for review and approval when the design is approximately 30% complete
- b. Texas Transportation Code 544.001 – TxDOT must develop a manual and specifications for a uniform system of traffic-control devices that correlates with and to the extent possible conforms to the system approved by the American Association of State Highway and Transportation Officials.
- c. The Texas Manual on Uniform Traffic Control Devices (TMUTCD) is incorporated by State Transportation Code § 544.001 and shall be recognized as the Texas standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel.

Required Practices

- a. For projects with state or federal funds and all projects on the state highway system, the LG must meet warrants for traffic signals in accordance with TxDOT's *Traffic Signals Manual* and the TMUTCD. The Traffic Signal Authorization Request and supporting information must be submitted to TxDOT for approval. (The form is available from TxDOT). For concession projects, the LG must follow the provisions of the CDA Technical Provisions.
- b. For projects off the state highway system with no state or federal funds, the LG must determine compliance with traffic signal warrants in the TMUTCD before installing the signal.

LG Responsibilities

- a. For design-bid-build projects with state or federal funds or on the state highway system regardless of funding source:
 - i. Conduct traffic study using information in TxDOT's *Traffic Signals Manual*.
 - ii. Meet signal warrants.
 - iii. Coordinate with local agencies as appropriate.
 - iv. Submit completed Traffic Signal Authorization Request to TxDOT for approval.
- b. Design-build projects with state or federal funds or on the state highway system regardless of funding source follow the same process except as modified by agreement with TxDOT.
- c. For concession projects with state or federal funds or on the state highway system regardless of funding source:
 - i. Prepare warrant studies for intersections that are not signalized at the time of NTP and submit to TxDOT for approval.
 - ii. Design and install fully-actuated permanent traffic signals at all TxDOT-authorized intersections.
 - iii. Coordinate with local agencies as appropriate.

TxDOT District Responsibilities

- a. For projects with state or federal funds and all projects on the state highway system, review the LG's traffic study for compliance with the Traffic Signals Manual. Approval of the Traffic Signal Authorization Request is by the District Engineer.
- b. There is no monitoring for projects off the state highway system with no state or federal funds.