CHAPTER 1

INTRODUCTION

1.0 About this Manual – This manual is prepared as a supplement to the Tennessee Department of Transportation (TDOT) Design Division Roadway Design Guidelines to aid in the development of signal, minor intersection improvement, lighting and signing and marking plans. Projects involving grading and drainage improvements and significant right-of-way acquisition should adhere strictly to the Design Division's Design Guidelines where any conflict with this manual may occur in the areas of project management or plans organization. Although this manual is not intended to provide the ultimate answers to all traffic engineering questions, the guidelines listed do represent the preferred procedures for developing signal, signing, and lighting plans.

The technical requirements of this manual should be used in the design of any traffic control devices that will be placed on a state highway, regardless of whether or not it is part of a TDOT construction project. Any devices installed on state highways by local forces or directly for a local agency shall adhere to this manual.

The purpose of this manual is to present the concepts and standard practices related to the design of traffic signals systems within the State of Tennessee.

This manual includes the following chapters:

CHAPTER 1 - INTRODUCTION

Chapter 1 introduces this Manual and gives background and the justifications.

CHAPTER 2 – TDOT PROJECT DEVELOPMENT

Chapter 2 discusses the traffic signal project development process.

CHAPTER 3 – NEED FOR TRAFFIC SIGNALS

Chapter 3 discuses the activities required in the preliminary design stages. This includes the procedures for justifying, approving, planning and designing a traffic signal.

CHAPTER 4 – TRAFFIC SIGNAL DESIGN

Chapter 4 details the operation and design of a traffic signal including phasing, detection, displays, timing, preemption, etc.

CHAPTER 5 – OTHER TYPES OF TRAFFIC SIGNALS

Chapter 5 reviews other types of highway traffic signals including emergency vehicle traffic control signals and flashing beacons.

CHAPTER 6 – SIGNING AND PAVEMENT MARKING

Chapter 6 covers the traffic signing and pavement marking related to traffic signals and intersection design.

CHAPTER 7 – ROADWAY LIGHTING

Chapter 7 summarizes the design of roadway lighting projects and design requirements.

CHAPTER 8 – INTELLIGENT TRANSPORTATION SYSTEMS

Chapter 8 addresses policies, guidelines, standard procedures, etc. related to Intelligent Transportation Systems (ITS) and the Systems Engineering Analysis.

1.1 Traffic Control Devices – Defined by the Manual on Uniform Traffic Control Devices (MUTCD) as all signs, signals, markings, and other devices used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, pedestrian facility, or bicycle path by authority of a public agency having jurisdiction.[1]

The purpose of traffic control devices, as well as the principles for their use, is to promote highway safety and efficiency by providing for the orderly movement of all road users on streets and highways…Traffic control devices notify road users of regulations and provide warning and guidance needed for the safe, uniform, and efficient operation of all elements of the traffic stream.[2]

Three common types of traffic control devices are given below:

1.1.1 Traffic Signs – any traffic control device that is intended to communicate specific information to road users through a word or symbol legend.[3]

1.1.2 Markings – devices including pavement and curb markings, object markers, colored pavements, delineators, barricades, islands and channelizing devices used either alone or with other traffic control devices to communicate regulations, warnings, or guidance to road users.

1.1.3 Traffic Signals – any highway traffic signal by which traffic is alternately directed to stop and permitted to proceed.[4]

---

[1] MUTCD, 2003, FHWA, p. 1A-14
[2] Ibid. p. 1A-1
[3] Ibid. p. 1A-13
[4] Ibid. p. 1A-14

1.2 Design of Traffic Control Devices – The design of traffic control devices must be carefully prepared by a qualified individual in the civil engineering profession. The proper design and use of traffic control devices can result in an efficient and safe transportation system. However, improper or inadequate design can result in system inefficiency, decreased safety and potential liability. Traffic engineering is a specialty of the civil engineering discipline.

Traffic control designs must be sealed by a registered professional engineer with specialized training and experience in traffic engineering. Some States (such as California) and some organizations (such as the Institute of Transportation Engineers) provide registration or certification in traffic engineering.

1.3 TDOT Traffic Design Section – The TDOT Design Division, Traffic Design Section, is responsible for the development of traffic signal, roadway lighting and signing and marking plans both as stand alone projects and in support of larger roadway design projects administered by TDOT.

1.4 TDOT Information – General information about the Tennessee Department of Transportation is available on its web site at www.tdot.state.tn.us.

1.5 Governing Laws, Rules and Regulations – State laws, which govern the process of determining the need for and the installation of traffic control devices on all streets and highways in Tennessee, include:

T.C.A. 54-5-108. Cooperation by department with federal government in designating roads, and in erection of danger signals and safety devices;

... (b) The department has full power, and it is made its duty, acting through its commissioner, to formulate and adopt a manual for the design and location of signs, signals, markings, and for posting of traffic regulations on or along all streets and highways in Tennessee, and no signs, signals, markings or postings of traffic regulations shall be located on any street or highway in Tennessee regardless of type or class of the governmental agency having jurisdiction thereof except in conformity with the provisions contained in said manual.

T.C.A. 54-5-601. Maintenance of signal light on state highway without commissioner's approval - Misdemeanor.

Any person who installs or maintains a signal light on a state highway without having secured prior written approval of the commissioner commits a Class C misdemeanor.

T. C.A. 54-5-602. Signal light declared public nuisance.

In addition, a signal light installed and maintained on a state highway without the authority of the commissioner is hereby declared a public nuisance which may be abated by the employees of the department at the direction of the commissioner

or, upon the commissioners request, by any peace officer, or by civil actions or suits brought in the circuit or chancery courts as provided by the general law.

T C.A. 54-5-603. Inapplicable within boundaries of municipal corporation.

This part does not apply within the boundaries of municipal corporations.

Under the Administrative Procedures Act, the Manual on Uniform Traffic Control Devices (MUTCD) and subsequent revisions became a part of the Rules and Regulations of the State of Tennessee, Department of Transportation as approved by the Secretary of State (Tennessee Rule 1680-3-1.06). The MUTCD shall serve as the basis for the choice and installation of all traffic control devices installed in State of Tennessee, Department of Transportation roadway projects.

State Standards, References and Specifications include, but are not limited to the following:

Reference	Publisher
Design Guidelines	TDOT
Standard Roadway and Structures Drawings	TDOT
Standard Specifications for Road and Bridge Construction	TDOT
Speical Provisions	TDOT
Survey Manual	TDOT
Manual on Uniform Traffic Control Devices	FHWA
Standard Highway Signs	FHWA
23 CFR 940	FHWA
Standard Specifications for Structural Supports for Highway Signs, Lumiaires and Traffic Signals	AASHTO
A Policy on Geometric Design of Highways and Streets (Green Book)	AASHTO