INTRODUCTION

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PURPOSE OF THIS MANUAL

A design manual is a consolidated source of information governing the technical content of plan sets and outlining the steps required in the plan development and approval process. This manual provides a tool for answering designers' questions, training new employees, and documenting the design process.

This manual is intended to act as a guide in the development of Signing and Pavement Marking plans, Signal plans and Lighting plans. It documents the design procedures and steps required to bring a project from the Design Request stage through final PS&E documents. This book is not a standards manual, and does not duplicate information found in other State and Federal manuals. Instead, it is intended to be used in conjunction with the applicable standards noted below. When using tables, charts standards and figures from this manual, always check with the Traffic Engineering Design Division to ensure that you are using the latest version.

GOVERNING STANDARDS

All designs for new signing and pavement markings, signals and sign or highway lighting must comply with the latest edition of the following guidelines:

<u>All Traffic Control Devices</u>

- *Maryland Vehicle Law*
- *Maryland High-Voltage Line Act: Article 89, 58-63, Annotated Code of Maryland*
- *Specification for Consulting Engineer's Services, Volume II, Section VIII, "Traffic Engineering"*
- AASHTO's *A Policy on the Geometric Design of Highways and Streets*
- AASHTO's *Roadside Design Guide*
- AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*
- AASHTO's *Highway Safety and Operations Guide*
- MSHA's *Manual on Uniform Traffic Control Devices (MdMUTCD)*
- MSHA's *Book of Standards For Highway & Incidental Structures*
- MSHA's *Standard Sign Book*
- MSHA's *Standard Specifications for Construction and Materials*
- MSHA's *General Provisions for Construction Contracts*
- MSHA's *Procedures and Standards for Commercial, Industrial, and Subdivision Access to State Highways*
- MSHA's *Access Manual*
- MSHA's *Special Provisions Inserts, Special Provisions, and General Provisions for Construction Contracts*
- FHWA's *Manual on Uniform Traffic Control Devices (MUTCD), latest edition*
- NFPA's *National Electric Code (NEC)*
- IEEE's *National Electric Safety Code (NESC)*
- One Call Concept Statute "Miss Utility"
- FHWA's *Roundabouts: An Informational Guide*
- MSHA's (HDD) *Accessibility Guidelines for Pedestrian Facilities along State Highways*
- MSHA's *Bicycle Policy & Design Guidelines*
- MSHA's (OOTS) *Roundabouts Design Guide*
- MSHA's *ITS Design Manual*
- MSHA's *Street Name Sign Policy, Procedures, and Guidelines*

- TRB's *Accessible Pedestrian Signals: Synthesis and Guide to Best Practice*
- MSHA's *Guidelines for Traffic Barrier Placement and End Treatment Design*
- MSHA's *List of Qualified Products*
- MSHA OOTS *Traffic Control Device Application Guidelines*

Signing

- MSHA's *Guidelines for Form Single Lane Applications*

Pavement Markings

- MSHA's *Pavement Marking Material Selection Policy and Guidelines*
- MSHA's *Guidelines for Using Edge Line Extensions and Yield Lines*

Signals

- International Municipal Signal Association (IMSA) *Specifications for Traffic Signal Equipment.*
- Institute of Transportation Engineers (ITE) *Specifications for Traffic Signal Equipment*
- MSHA's *Median Area Analysis for Traffic Signal Pole Locations.*

Lighting

- *Illuminating Engineering Society of North America (IESNA)*
- AASHTO *Roadway Lighting Design Guide*
- *American National Standard for Roadway Lighting, IES, RP-8*
- *American National Standard for Sign Lighting, IES, RP-19.*
- *American National Standard for Tunnel Lighting, IES, RP-22.*
- *Roadway Lighting Handbook,* FHWA
- MSHA's *Lighting Guidelines*

USE AND APPLICATION OF STANDARDS AND MANUALS

Because of the breadth of information that designers are required to follow on the national and local level, Maryland SHA has prepared a series of standards and manuals which should be used by all designers to guide the design process and ensure that MSHA specific practices are followed. The designer should have a thorough understanding of the use and application of each of these manuals to their projects.

Maryland Manual on Uniform Traffic Control Devices (MdMUTCD):

The MdMUTCD governs the uniformity of design, placement, operations and maintenance of Traffic Control Devices (TCD's) throughout Maryland. It provides the adaptations to the Federal Highway Administration Manual on Uniform Traffic Control Devices based on past experience in the state. This manual should always be the first reference used when designing TCD's throughout the state.

Book of Standards for Highways and Incidental Structures:

This manual provides the standard details governing the fabrication and installation of TCD's throughout the state. It standardizes the type, size and installation requirements for TCD's and provides guidance on handling of special circumstances.

Standard Highway Sign Book:

This manual provides the standard fabrication details for signs in use throughout Maryland. It includes details for fabricating all standard signs, the symbols used on those signs, sign arrows, copy size and the standard alphabets used in sign legends. It also provides the information on the size and fabrication of standard sign blanks, provides the sizing of signs for each roadway classification (i.e. standard or freeway/expressway), outlines the

colors of each sign and indicates the sign sheeting used on each sign.

ORGANIZATION OF THIS MANUAL

The TCD Design Manual provides detailed guidance on the design process, content of plan sets, and decision making guidance that should be undertaken for signing, pavement markings, signals and roadway lighting projects in Maryland. This manual is intended to standardize the delivery of TCD design plans of all types of projects (i.e. Areawide, Insert, Shop Forces, Developer, Design-Build), regardless of who the designer is or where they sit.

It should be noted that this manual does not specifically include guidance on the design of Intelligent Transportation Systems (ITS) devices. However, many of the guidelines for other TCDs can be applied to ITS devices as well. For more details about ITS device design, the MSHA *ITS Design Manual* should be used.

This manual has been written for the designer. As discussed previously its primary purpose is to define how traffic control devices (TCD's) are designed in Maryland. To that end, it is organized in a way which discusses *overarching traffic design topics* first then *individual TCD Design topics* i.e., design of signing and pavement markings, signals, and finally sign/highway lighting. The *Appendices* have been reserved to capture those items that support the designer to produce high quality designs.

Overarching traffic design topics are those traffic engineering basics which govern no matter what TCD is being discussed.

Specific TCD design elements are organized by the steps in which we recommend design taking place. For example, the first and most important step in approaching the design of any TCD is the field review. The first major milestone that will minimize re-work (not eliminate) is the development of a concept plan or layout.

Appendices have been reserved for the glossary, accepted practices for applications of TCD's, sample plans, and process definitions, etc. The Appendices should be edited frequently once standards are approved and adopted into the Maryland Manual on Uniform Traffic Control Devices (MdMUTCD) or Book of Standards.