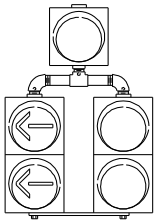
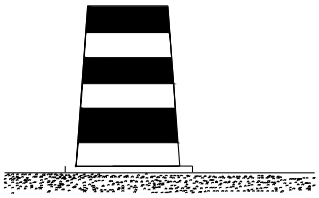
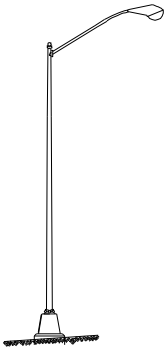
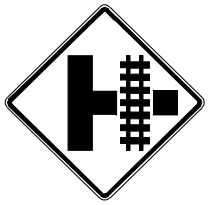
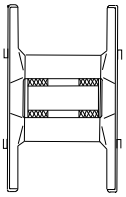
Traffic Engineering Manual











October 23, 2002 Edition

includes revisions through July 16, 2004

Ohio Department of Transportation
Office of Traffic Engineering

Ohio Department of Transportation
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1980 W. Broad St., P.O. Box 899
Columbus, OH 43216-0899

Web addresses:
ODOT: http://www.dot.state.oh.us
Office of Traffic Engineering: http://www.dot.state.oh.us/traffic/
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PREFACE

The **Traffic Engineering Manual (TEM)** has been developed to assure uniformity in application of **ODOT** traffic engineering policies, guidelines, standards and practices. The **OMUTCD** establishes the basic, minimum traffic control standards for all public highways in **Ohio**, and all supplemental **ODOT** traffic engineering design, construction and operations related information is contained and/or referenced in the **TEM**.

This Manual contains standards, policies, etc. established for use in **ODOT** work; however, various situations will present themselves where engineering knowledge, experience and judgment will have to be used to determine how to apply the information included herein to specific situations.

Comments, questions and proposed revisions should be submitted to the **Traffic Standards, Operations and Safety Section, Office of Traffic Engineering, Ohio Department of Transportation**, 1980 W. Broad St., P.O. Box 899, Columbus, Ohio 43216-0899. Forms for submitting proposed revisions or a change of address are included in Part 1 of this Manual.

Office of Traffic Engineering

MISSION STATEMENT

Our mission is to provide traffic engineering expertise and leadership, for both permanent and temporary highway conditions, to ODOT Districts and Central Office, other levels of government, our highway industry partners, and the highway users by:

- Developing traffic control policies and standards, principally the Ohio Manual of Uniform Traffic Control Devices;
- Providing traffic engineering support services, such as, plan review, field troubleshooting, signal repair, sign design and fabrication, etc.;
- Monitoring district implementation of standards by establishing performance measures and assessing performance;
- Developing training materials, and conducting classes in traffic engineering specialties;
- Developing and monitoring a strategic research plan;
- Evaluating new products, techniques, and concepts; and
- Publishing information beneficial to our customers.

PUBLICATION RECORD
for the
ODOT Traffic Engineering Manual

2002 October 23, 2002 Edition, effective December 2, 2002

New edition, updating and consolidating information previously published in the ODOT Traffic Control Application Standards Manual, the Traffic Control Design Information Manual, the Construction Guidelines for Traffic Control Devices and various separate policies, guidelines and procedures.

2003 January 17, 2003

Revision consists of the following (as well as related pages needed for double-sided printing of the revised pages):

- a new **Cover Sheet**, **Publication Record**, and **Table of Contents**;
- **in Part 1**, a revised Table 197-1;
- **in Part 2**, a revised Section 208-3, and editorial changes in Section 205-2.3.1;
- **in Part 3**, a revised Table of Content, revised Sections 304-2, 342-2, 342-3, 342-4, 342-5 and 343, and editorial changes in Sections 301-1, 301-3, 302-1, 304-1, 304-3, 304-6, 306, 307, 320-4, 320-5, 340-1, 340-2, 340-3 and 350-2;
- **in Part 4**, a revised Table of Content, revised Sections 442-3, 442-5, 442-9, 442-10, 442-11, 442-15, 442-16 and 442-19, deleted Sections 442-14, 442-17 and 442-18, and editorial changes in Sections 401-1, 403-1, 404-1, 420-1, 421-1, 441-9, 442-4, 442-6, 442-7, 442-8, 442-12, 442-13, 443, 450-3.2 thru 450-3.6, 450-4.1, 450-4.3, 450-4.4, 450-6.2, 450-6.3, 450-8.2, 450-8.5, 450-8.7, 450-8.8, 450-9, 450-10.2 thru 450-10.7 and 450-11.1 thru 450-11.8;
- **in Part 6**, a revised Table of Content, a new Section 605-8.4 , revised Sections 605-6.5, 607-40, 607-41, 640-14, 640-24.1, 641-8.4, 641-10.5, 642-3, 642-9, 642-16, 642-17, 642-19, 642-20, 642-21, 642-24, 642-25, 642-26, 642-27, 642-28, 642-30, 642-31, 642-32, 642-35, 642-39, 642-41, 670-7 and Figure 698-3a, and editorial changes in Sections 605-2.1, 605-7.3, 605-11.3, 605-11.4.1, 605-11.5, 605-11.10.2, 606-2, 606-12, 606-14, 606-15, 607-1, 620-3, 620-6.1, 620-6.2, 620-6.3, 640-1, 640-8, 640-11.3, 640-11.6, 640-11.7, 640-18.2, 640-21, 640-22, 641-2.6, 641-5.1 thru 641-5.4, 641-5.6, 641-6.1 thru 641-6.5, 641-7.2, 641-8.5, 641-9.6, 641-9.7, 641-10.4, 641-10.8, 641-11, 641-12, 641-13, 641-14, 641-15, 641-16, 641-17, 641-19, 642-2, 642-4, 642-5, 642-6, 642-9, 642-10, 642-12, 642-18, 642-22, 642-29, 642-33, 642-34, 642-36, 642-37, 642-38 and 642-40;
- **in Part 11**, a revised Table of Content, revised Sections 1141-3.1, 1142-2 thru 1142-19, 1142-21 thru 1142-23, 1142-26, 1142-31, 1142-32 and 1142-34, and editorial changes in Sections 1142-20, 1142-24, 1142-25, 1142-27 thru 1142-30, 1142-33, 1142-35 and 1143;
- **in Part 12**, a revised Table of Content and revised Section 1215; and
- **in Part 14**, the Index was revised.

2003 April 18, 2003

Revision consists of the following (as well as related pages needed for double-sided printing of the revised pages):

- a new **Cover Sheet**, **Publication Record** and **Table of Contents**;
- **in Part 2**, revised Section 201-8 and Table 297-9;
- **in Part 3**, revised Sections 302-3 and 343; and editorial corrections in Section 302-2 and Table 397-1;
- **in Part 4**, new Sections 442-17, 442-18 and 442-19; a revised Table of Contents and revised Sections 442-1 thru 442-16 and Figures 498-3 and 498-5;
- **in Part 6**, a revised Table of Contents, and revised Sections 602-5.3, 605-10.2, 642-1 thru 642-32 and Table 697-9; and editorial changes in Sections 605-11.4.1, 640-12.2, 640-20, 640-23.3.4, 640-23.5, 641-7.4, 641-15, 642-9, 642-36;
- **in Part 11**, new Sections 1150-1 thru 1150-21 and 1160-11 thru 1160-14; a revised Table of Contents; and editorial changes in Section 1100-1, 1140-4.3.5, 1140-5.6.2, 1140-5.7.2, 1140-7.3, 1141-4.2.3, 1142-16, 1142-17 and 1142-18; and
- **in Part 12**, revised Section 1202-1.

2003 October 17, 2003

Revision consists of the following (as well as related pages needed for double-sided printing of the revised pages):

- a new **Cover Sheet** and **Table of Contents,** and an updated **Publication Record**;
- **in Part 1**, a revised Table of Contents, and revised Sections 100-2, 100-5, 101-1, 101-2, 101-3.2, 101-3.3, 101-3.4, 101-4, 101-5, 102-2, 102-3.2, 102-3.4, 102-3.5, 102-5, 103-3.1, 103-3.3, 103-3.8, 103-4, 103-5, 104-1, 104.2, 105-1, 106-2, 106-3, 130-2.1, 130-2.3, 140-2.6, 194-9, 197 and 198, and Form 196-3, Tables 197-1, 197-2, 197-3, 197-9 and 197-10, and Figures 198-1a, 198-1b, 198-1c and 198-2; deleted Section 106-4 and Figure 198-1d; editorial changes in Sections 100-1.4 and 103-3.4; and general editorial/formatting changes;
- **in Part 3**, a new Section 301-14; revised and renumbered Sections 301-12.4 and 301-12.5 (now Sections 301-12 and 301-13, respectively); a revised Table of Contents, and revised Sections 301-1, 301-4 through 301-11, 302-1, 303-1, 303-2, 304-1, 304-3, 304-5, 304-6, 305, 306 and 310, and Figures 398-1, and 398-3 through 398-5; deleted Sections 301-12.1 through 301-12.3; editorial changes in Sections 301-2 and 320-1; and general editorial/ formatting changes;
- **in Part 4**, new Sections 401-6 through 401-8, 402-3.5, 403-7, 408-2, 440-5 and 440-6, and Forms 496-8 through 496-18; a revised Table of Contents, and revised Sections 400-1, 401-1, 401-3, 401-4, 402-1, 402-3.1 through 402-3.4, 403-1 through 403-3, 403-5, 403-6.1, 404-1 through 404-3, 405-1, 406-1 through 406-3, 407-2, 408-1, 420-4.1 through 420-4.4, 420-4.7, 420-4.8, 421-1, 441-3, 450-10.4, 450-10.6, 496 and 497, and Table 497-3; and general editorial/reformatting changes;
- **in Part 5**, revised Sections 500 and 595;
- **in Part 7**, a revised Table of Contents, and revised Sections 700, 701, 702-1 through 702-5, 702-7 and 704; and general editorial/reformatting changes;
- **in Part 8**, a revised Table of Contents, and revised Sections 800, 801-1, 801-2.2, 802-1, 802-2, 803, and 804; and general editorial/reformatting changes;
- **in Part 9**, a revised Table of Contents and revised Section 900; and general editorial/ reformatting changes;
- **in Part 10**, revised Sections 1000 and 1095; and
- **in Part 11**, a revised Table of Contents, and Sections 1100-1, 1103-6.8, 1140-4.6.2, 1142-14, 1142-15, 1142-25, 1160-6 and 1160-8; and an editorial change in Section 1160-13.

2004 January 16, 2004

Revision consists of the following (as well as related pages needed for double-sided printing of the revised pages):

- a new **Cover Sheet** and **Table of Contents,** and an updated **Publication Record**;
- **in Part 2**, a revised Table of Contents, and revised Sections 200-1, 201-1 through 201-3, 201-5, 201-7, 201-8, 201-10 through 201-13, 202-1, 202-4 through 202-7, 203-1, 203-2, 204-1 through 204-4, 205-1, 205-2.1, 205-2.3.3, 205-3, 206-1, 206-3 through 206-15, 207, 207-1, 207-2.1, 207-3.1, 207-4, 207-5, 207-6.1, 207-6.3, 207-6.4, 207-7, 208-1, 208-2, 208-3, 208-4, 208-6, 209-1, 209-2.2, 209-2.3, 209-3, 209-4, 209-5, 210-2, 211-1, 212-1, 220-7, 240-2.3, 240-3, 250-3.1, 295-2, 297 and 298, and Tables 297-1 and 297-4, and Figures 298-1, 298-2, 298-4a, 298-4b, 298-5a through 298-5d, 298-6a, 298-6b, 298-7, 298-22 and 298-24; deleted Sections 201-6, 206-2 and 295-3, and Figure 298-6c; and general editorial/formatting changes;
- **in Part 3**, editorial corrections in Section 398;
- **in Part 6**, new Sections 605-5.12 through 605-5.15, 606-19, 606-20, 640-26, 642-42 through 642-45, 670-6.1 through 670-6.3; a revised Table of Contents, and revised Sections 601-1, 602-4.1, 602-4.4.4, 602-5.1 through 602-5.6, 602-5.8, 602-6, 602-7, 603, 604, 605-1 through 605-3, 605-4.2, 605-4.3, 605-5.1 through 605-5.11, 605-6, 605-7, 605-8, 605-9605-10.1, 605-10.2, 605-11.1 through 605-11.9, 605-11.10.1, 605-11.11 through 605-11.13, 605-12, 605-13, 605-14.1, 605-14.2, 605-14.5, 605-15.1, 605-15.2.2, 605-15.2.3, 605-16 through 605-20, 606-1 through 606-18, 607-1 through 607-15, 620-3, 620-6.1, 640-4, 640-5.3, 640-12.1, 640-12.4, 640-18.2, 640-20, 640-22, 641-5.2, 641-5.3, 641-6.3, 641-6.5, 641-7.3, 641-8.3, 641-9.3, 641-9.6, 641-10.3, 641-10.4, 641-11 through 641-13, 641-15, 641-17, 641-19, 642-24, 642-27, 642-31 through 642-34, 660-2, 670-6 through 670-8, 695-2, 697, 698, and Tables 697-5 through 697-9, and Figures 698-1 through 698-4; deleted Sections 605-6.1 through 605-6.5, 605-9.1 through 605-9.3, 605-10.3, 605-11.14, 607-16 through 607-44, 670-

9, 670-10, and Tables 697-10 through 697-14, and Figures 698-5 through 698-49; editorial corrections in Sections 620-2.2, 642-5, 642-30; and general editorial/formatting changes.

- **in Part 11**, revised Section 1141-3.1;
- **in Part 12**, a revised Table of Contents, and revised Sections 1210, 1211, 1212-1, 1212-2.2, 1212-2.3, 1213-1, 1213-2, 1213-3, 1214, 1215, 1220-3, 1220-5.1, 1230-2.1 and 1230-6.13; and editorial corrections in Sections 1220-5.7 and 1230-6.9.
- **in Part 13**, a revised Table of Contents, and revised Sections 1301-2, 1301-3, 1305, 1312 and 1399, and general editorial/formatting changes.

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