

Chapter Sixty

OTHER DEPARTMENT MANUALS

BUREAU OF DESIGN AND ENVIRONMENT MANUAL

Chapter Sixty
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Table of Contents

<u>Section</u>	<u>Page</u>
60-1 GENERAL	60-1.1
60-2 BUREAU OF DESIGN AND ENVIRONMENT	60-2.1
60-2.01 <i>IDOT Coded Pay Items</i>	60-2.1
60-2.02 <i>Standard Specifications for Road and Bridge Construction</i>	60-2.1
60-2.03 <i>Computer Aided Design, Drafting, Modeling and Deliverables Manual</i>	60-2.1
60-2.04 <i>Highway Standards</i>	60-2.2
60-2.05 <i>Survey Manual</i>	60-2.2
60-2.06 <i>Community Impact Assessment Manual</i>	60-2.2
60-3 BUREAU OF BRIDGES AND STRUCTURES	60-3.1
60-3.01 <i>Bridge Manual</i>	60-3.1
60-3.02 <i>Culvert Manual</i>	60-3.1
60-3.03 <i>Prestressed Concrete Manual</i>	60-3.1
60-3.04 <i>Sign Structure Manual</i>	60-3.2
60-3.05 <i>Drainage Manual</i>	60-3.2
60-3.06 <i>Structural Services Manual</i>	60-3.2
60-3.07 <i>Geotechnical Manual</i>	60-3.3
60-3.08 <i>Bridge Manual Design Guides</i>	60-3.3
60-3.09 <i>Bridge Condition Report Procedures and Practices</i>	60-3.4
60-4 BUREAU OF CONSTRUCTION	60-4.1
60-5 BUREAU OF LAND ACQUISITION	60-5.1
60-6 BUREAU OF LOCAL ROADS AND STREETS.....	60-6.1
60-6.01 <i>Local Roads and Streets Manual</i>	60-6.1
60-6.02 <i>Highway Jurisdiction Guidelines for Highway and Street Systems</i>	60-6.1
60-7 BUREAU OF OPERATIONS.....	60-7.1
60-7.01 <i>Traffic Policies and Procedures Manual</i>	60-7.1
60-7.02 <i>Illinois Standard Highway Signs</i>	60-7.1
60-7.03 <i>Illinois Manual for Uniform Traffic Control Devices</i>	60-7.1
<i>Handbook for the Policy on Permits for Access</i>	60-7.2
60-7.04 <i>Driveways to State Highways</i>	60-7.2
60-7.05 <i>Accommodation of Utilities on Right-of-Way of the Illinois</i> <i>State Highway System</i>	60-7.2
60-7.06 <i>Policy on Establishing and Posting Speed Limits on the</i> <i>State Highway System</i>	60-7.2
60-7.07 <i>Maintenance Policy Manual</i>	60-7.3
60-7.08 <i>Pavement Marking Selection Installation & Inspection Manual</i>	60-7.3

Table of Contents
(Continued)

<u>Section</u>	<u>Page</u>
60-7.09 <i>Reporting and Signing of Vertical Clearances and Obstructed Turning Movements</i>	60-7.3
60-8 BUREAU OF MATERIALS.....	60-8.1
60-8.01 <i>Manual of Test Procedures for Materials</i>	60-8.1
60-8.02 <i>Manual for Materials Inspection</i>	60-8.1
60-9 BUREAU OF SAFETY PROGRAMS AND ENGINEERING.....	60-9.1
60-9.01 <i>Traffic Control Field Manual</i>	60-9.1
60-9.02 <i>Systemic Safety Improvements: Analysis, Guidelines and Procedures Manual</i>	60-9.1

Chapter Sixty

OTHER DEPARTMENT MANUALS

The *Bureau of Design and Environment Manual (BDE Manual)* includes the necessary information on the topics discussed in the *Manual* for the vast majority of roadway projects designed by the districts. However, it does not present all information that may be required by the designer on all projects. For specific projects or for specific project elements, the road designer may need to reference other publications to perform a fully comprehensive analysis of the project. Chapter 60 briefly discusses other publications available within IDOT that are often required by the designer for a roadway project. The designer may also need to review the national highway engineering literature to research a specific problem or to design special elements. Summaries of national publications can be found in the publication catalogs of the various organizations (e.g., AASHTO, ITE, TRB).

60-1 GENERAL

For in-house designers, copies of most documents and publications used in design are available on the Inside IDOT Policy and Research Center Library website or by contacting the IDOT Library. For consultants and other individuals, these documents can be located on the Department's official website.

60-2 BUREAU OF DESIGN AND ENVIRONMENT

In addition to the *BDE Manual*, the various sections of the Bureau of Design and Environment are responsible for maintaining the following documents:

60-2.01 *IDOT Coded Pay Items*

Every pay item has a unique assigned number for data processing. The *IDOT Coded Pay Items* provides a listing of all pay items and numbers used by the Department for a project. These numbers and titles are tied to the *Standard Specifications for Road and Bridge Construction*. Only use these numbers and descriptions in the plans and estimates. Both US Customary and metric pay items are presented in the *IDOT Coded Pay Items*.

Part VII of the *BDE Manual* provides additional information on how to use the *IDOT Coded Pay Items* during plan development.

60-2.02 *Standard Specifications for Road and Bridge Construction*

The *Standard Specifications for Road and Bridge Construction (Standard Specifications)* are the specifications adopted by the Department for work methods, materials, and basis of payment used in construction. The *Standard Specifications* are intended for general repetitive use. They provide Department criteria for:

- bidding,
- awarding the contract,
- the contractor's duties,
- controlling the material quality,
- the contractor's and the Department's legal requirements,
- executing the contract, and
- measuring and paying for construction.

See Section 66-1.02 for more information on the *Standard Specifications*.

60-2.03 *Computer Aided Design, Drafting, Modeling and Deliverables Manual*

The *Computer Aided Design, Drafting, Modeling and Deliverables Manual* provides the policies on the use of Computer Aided Design and Drafting (CADD) software used on Department roadway and structures projects. It defines the following:

- The requirements for CADD files and 3D models used on Department projects, such as file formats and file naming and referencing conventions,
- The deliverables requirements for both 2D and 3D CADD files at various stages of the project lifecycle,
- MicroStation and GEOPAK configuration information,

- Standard software used by the Department,
- CADD Workspace Configuration used by the Department,
- Drafting guidelines to be used on both roadways and structures projects,
- Links to additional resources, district CADD contacts, CADD subscription services, and example roadway and structures construction plans, and
- Various Frequently Asked Questions (FAQ's) concerning CADD.

60-2.04 Highway Standards

The *Highway Standards* provide details for laying out or constructing various design elements that are consistent from project to project (e.g., guardrail, curb and gutter, signs, fencing, landscaping). The *Highway Standards* contain both US Customary and metric units. The *Highway Standards* are developed by BDE in collaboration with other bureaus. See Section 66-1.05 for more information on the *Highway Standards*.

60-2.05 Survey Manual

The *Survey Manual* provides the Department's survey policies and regulations. It includes:

- a discussion of geodetic surveying covering datums, State-plane coordinates, and geodetic surveying;
- design surveys;
- photogrammetric surveys covering accuracy requirements as well as GPS procedures;
- land surveys, which includes a discussion of the public land surveys;
- construction surveys, which includes staking procedures;
- a chapter on safety designed to eliminate crashes and property damage; and
- several appendices with more in-depth discussion of curves, specifications for different types of surveys, survey point codes, and confined space entry policy.

60-2.06 Community Impact Assessment Manual

The purpose of the *Community Impact Assessment Manual* is to present information to be used in socioeconomic or community impact assessments, identify data sources, and aid in the evaluation of alternatives for transportation improvements. This manual is designed to provide accurate, clear, and consistent information to assist IDOT personnel and consultants in completing community/socioeconomic impact documentation. The manual encompasses the socioeconomic or community impacts of the environmental assessment process from initiation of a highway project through the various stages of project development, to the concluding

stages of the preparation of final documentation. In addition, the manual includes suggestions for mitigation and enhancement efforts that may be appropriate for various projects.

60-3 BUREAU OF BRIDGES AND STRUCTURES

The Bureau of Bridges and Structures is responsible for the following documents:

60-3.01 Bridge Manual

The *Bridge Manual* is a compilation of design procedures, plan presentation guidelines, specifications interpretation, standard practices, design details, and base sheets for bridges and other structures. It includes:

- a discussion on the organization of the Bureau of Bridges and Structures;
- plan preparation checklists for TS&L and final plans;
- sample plan sheets;
- a discussion on the Department's bridge planning process;
- preliminary bridge investigation techniques;
- bridge geometric criteria;
- structure rehabilitation techniques;
- utility attachments on structures; and
- design criteria for decks, structural steel, expansion devices, bearings, abutments, piers, piles, embankment and slope walls, and other miscellaneous details.

There are both US Customary and metric versions of the *Bridge Manual*.

60-3.02 Culvert Manual

The *Culvert Manual* is a compilation of design procedures, design charts and tables, standard details, and base plan sheets which are used to aid in the design and detailing of:

- simple-span, reinforced concrete box culverts;
- precast concrete box culverts;
- horizontal cantilever wingwalls;
- vertical cantilever, L-type wingwalls; and
- vertical cantilever, T-type wingwalls.

There are both US Customary and metric versions of the *Culvert Manual*.

60-3.03 Prestressed Concrete Manual

The *Prestressed Concrete Manual* is a compilation of design procedures, design charts and tables, examples, standard details, and base plan sheets that are used to aid in the design and detailing of Illinois standard precast, prestressed concrete bridge beams.

60-3.04 Sign Structure Manual

The *Sign Structures Manual* presents guidelines for the selection of sign supports, sign support design details, and CADD criteria for incorporating traffic signs into the plans. The following types of sign structures are discussed in the *Sign Structures Manual*:

- simple-span sign structures,
- cantilever sign structures,
- bridge-mounted sign structures,
- monotube sign structures,
- break-away wide flange steel sign posts, and
- break-away tubular steel sign posts.

60-3.05 Drainage Manual

The *Drainage Manual* is a compilation of the Department's policies and criteria on drainage and hydraulics for road and bridge projects. The *Drainage Manual* provides guidance on:

- division of responsibility for drainage,
- legal requirements,
- drainage polices,
- permits,
- preparation of drainage studies and hydraulic reports,
- floodplain encroachments,
- hydrology,
- open channel flow,
- culvert hydraulics,
- bridge hydraulics,
- storm sewers,
- roadside ditches,
- erosion and sediment control,
- scour,
- detention storage,
- pumping stations, and
- rules for construction in rivers, lakes, and streams.

60-3.06 Structural Services Manual

The *Structural Services Manual* provides guidance and information on the maintenance and repair of existing structures. It includes information on:

- plan preparation and review responsibilities,
- bridge inspections,

- bridge deck overlays,
- expansion joint replacement,
- longitudinal joint closure,
- bridge rail and parapet repair and replacement,
- deck drains,
- bearing replacements,
- jacking and cribbing,
- pin and link replacement,
- fatigue,
- impact repairs for steel and concrete beams,
- steel and concrete superstructure repairs,
- guidelines for bridge deck repair, and
- substructure repairs.

60-3.07 Geotechnical Manual

The *Geotechnical Manual* addresses the application and treatment of soils and foundations on State projects. It presents guidance and information on:

- geotechnical investigation requirements;
- geotechnical analyses of subgrades, embankments, cut slopes, and foundations;
- recommendations for design problems involving embankments, cut slopes, peat deposits, frost action, drainage, and foundations;
- preparation and submittal of Geotechnical Reports;
- geotechnical engineering aspects for construction;
- the State's geology and pedology;
- laboratory and field testing of soils;
- Illinois' modified testing procedures and methods; and
- geotechnical glossary.

60-3.08 Bridge Manual Design Guides

The *Bridge Manual Design Guides Manual* is a compilation of various design elements on CADD that are commonly found on bridge and other structures projects. The manual provides examples of Type, Size, and Location (TSL) plans that indicate a range of grade separation and stream crossing structures, as well as retaining walls that have been developed to provide planners with a quick reference for bridge planning policy and presentation methods.

60-3.09 Bridge Condition Report Procedures and Practices

This document is a guideline for preparing Bridge Condition Reports for the improvement of roadway structures and was developed to provide the wide range of information necessary to complete reports for various types of bridge projects. The guideline reviews background information, field inspection, and testing (in brief), general analysis procedures and report preparation. Example Bridge Condition Report formats are provided in the document.

60-4 BUREAU OF CONSTRUCTION

The Bureau of Construction is responsible for the *Construction Manual*. The *Construction Manual* expands on the *Standard Specifications for Road and Bridge Construction* and provides guidelines for uniform field inspection and documentation procedures on highway construction. It contains explanatory information on:

- contract administration;
- earthwork;
- landscaping;
- temporary erosion control;
- subgrades, subbases, and base courses;
- surfacing;
- structures including concrete, steel, and timber structures;
- piling;
- reinforcing bars;
- culverts;
- curb and gutter;
- chain link and woven wire fencing;
- traffic control;
- construction memoranda;
- documentation and project procedure guidelines;
- inspection checklists; and
- construction forms and reports.

60-5 BUREAU OF LAND ACQUISITION

The Bureau of Land Acquisition is responsible for the *Land Acquisition Policies and Procedures Manual*. The *Land Acquisition Policies and Procedures Manual* presents information on:

- the organization, functions, and activities of the Bureau of Land Acquisition;
- preparation of right-of-way plans;
- programming of right-of-way projects;
- land surveying criteria;
- development of right-of-way plats;
- legal descriptions for right-of-way;
- guidelines for designing the right-of-way;
- administration of incidental land surveying services;
- policies and procedures for appraisals and appraisal reviews;
- policies and procedures for negotiations;
- policies and procedures for acquisition;
- policies and procedures for property management of State property;
- policies and procedures for relocation assistance and payment program; and
- other miscellaneous Land Acquisition policies and procedures.

60-6 BUREAU OF LOCAL ROADS AND STREETS

The Bureau of Local Roads and Streets is responsible for the following documents:

60-6.01 Local Roads and Streets Manual

The *Local Roads and Streets Manual* replaces the *Administrative Policies and Federal-Aid Procedures Manuals*, used previously.

The *Local Roads and Streets Manual* provides information on:

- the Bureau of Local Roads and Streets' responsibilities for vouchering the State's motor fuel tax funds and township bridge funds to the local agencies;
- local agency (i.e., municipalities, counties, and road districts) responsibilities for maintaining complete records of disbursements, refunds, transfers, and balances involving all State funds transferred to the local agencies;
- design guidelines for local roads and streets including functional classification, engineering analyses, roadway design, traffic control devices, pavement design, bridges and culverts, and hydraulics;
- guidelines for addressing right-of-way acquisitions, railroads, and utilities;
- policies and procedures for preparing plans, specifications, estimates, proposals, contracts, highway system revisions, resolutions, agreements, and other miscellaneous documents;
- letting, award, and construction procedures;
- maintenance administration and operations for local facilities; and
- guidelines and procedures for projects involving Federal funding, including:
 - + environmental analyses and reports;
 - + public involvement guidelines; and
 - + FHWA coordination, review, and approval.

60-6.02 Highway Jurisdiction Guidelines for Highway and Street Systems

The guidelines in the above referenced document summarize highway jurisdiction issues and outline the process required for jurisdictional transfers. The document also addresses vacations and additions to the township and road district system, which may become necessary in the project development process.

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60-7 BUREAU OF OPERATIONS

The Bureau of Operations is responsible for the following documents:

60-7.01 *Traffic Policies and Procedures Manual*

The *Traffic Policies and Procedures Manual* presents guidelines for the uniform placement of traffic control devices and the application of traffic control policies and procedures. It contains guidance and information on:

- statutory and administrative requirements for traffic control devices;
- information-gathering procedures and data sources;
- traffic engineering studies and investigations including accident studies, speed studies, warrant studies, observance studies, time and delay studies, and school-zone safety;
- plan preparation including agreements, contracts, specifications, etc., for traffic plans;
- the selection, design, and placement of signing, pavement markings, traffic signals, object markers, delineation, rumble strips, traffic control in work zones, bikeways, and highway and sign lighting, and;
- permits including access control, special vehicular movements, road closures for local celebrations, utilities, snowmobiles on State routes, and other miscellaneous permits.

60-7.02 *Illinois Standard Highway Signs*

The *Illinois Standard Highway Signs* illustrates the layout and design details for the highway signs used by the Department. It includes the MUTCD number, allowable sign sizes, and design details for:

- regulatory signs,
- warning signs,
- construction signs,
- guide signs,
- general information signs,
- motorist services signs,
- civil defense signs, and
- school signs.

60-7.03 *Illinois Manual for Uniform Traffic Control Devices*

The *Illinois Manual for Uniform Traffic Control Devices* (ILMUTCD) consists of the *Illinois Supplement to the MUTCD* and the *FHWA Manual on Uniform Traffic Control Devices* (MUTCD). Note that there is not actually a document entitled the *Illinois Manual for Uniform Traffic Control Devices*. Wherever a publication refers to the *Illinois Manual for Uniform Traffic*

Control Devices, the user should first review the *Illinois Supplement to the MUTCD* and, if it does not address the issue, the user should then use the criteria in the *FHWA Manual on Uniform Traffic Control Devices*. These combined documents address the selection, design, and placement of traffic control devices on State facilities.

The *Illinois Supplement to the MUTCD* presents criteria and guidance specific to Illinois which may vary or which are in addition to the *FHWA MUTCD*. It includes:

- reprint of the applicable sections from the *Illinois Vehicle Code* which pertain to traffic control devices;
- revisions and additions to the *FHWA MUTCD* traffic control devices for signing, pavement markings, traffic signals, construction signing, schools, and railroads; and
- a table of Illinois standard signs.

60-7.04 Handbook for the Policy on Permits for Access Driveways to State Highways

The *Handbook for the Policy on Permits for Access Driveways to State Highways* provides detailed information regarding requirements for the construction or modification of permitted access to State Highways or the access permit process in general. The information in the *Handbook* is governed by the *Illinois Highway Code sections 605 ILCS 5/4-209, 4-210, 4-211 and 4-212*, and *92 Ill. Admin. Code 550*.

60-7.05 Accommodation of Utilities on Right-of-Way of the Illinois State Highway System

The purpose of the above referenced manual is to establish policies and procedures for accommodating utilities on right-of-way of the Illinois State Highway System, which may become necessary for review during project development.

60-7.06 Policy on Establishing and Posting Speed Limits on the State Highway System

The above referenced manual, along with the latest revisions/editions to Chapter 11, Article VI of the *Illinois Vehicle Code*, enumerates the procedures for establishing speed limits on highways under the jurisdiction of the Illinois Department of Transportation (IDOT).

60-7.07 Maintenance Policy Manual

The purpose of the *Maintenance Policy Manual* is to provide a written reference that will enable IDOT personnel to more uniformly maintain the State Highway System. This manual contains:

- Guidelines for completing work activities assigned to the central and district Bureaus of Operations (Bureau of Maintenance in District 1).
- References to policies and procedures governing functions of bureaus, offices, or agencies which have a bearing on highway maintenance operations activities, including the planned activities of roadway and structures designers.
- Information regarding necessary local agency agreements and maintenance obligations on state highway projects with side roads or local participation.

60-7.08 Pavement Marking Selection Installation & Inspection Manual

The above-referenced manual is authorized by Department Policy TRA-14. It serves as both a guideline for selecting optimum pavement marking materials and as a reference for inspecting the installation of pavement markings. The manual is intended for use in design, maintenance, and inspection.

60-7.09 Reporting and Signing of Vertical Clearances and Obstructed Turning Movements

It is necessary to report truck length restrictions for routes where difficulties from load length have occurred due to obstructed turning radii or sag curves with low vertical clearances. Reported truck length restrictions will be utilized, by the central Bureau of Operations, when issuing oversize load permits in order to prevent permitted loads from damaging roadways and becoming entrapped. Additionally, the Illinois Department of Transportation is authorized by the Size, Weight, Load, and Permits law [625 ILCS 5/15-101 *et seq.*, Ch. 15] to issue special permits to allow the operation of vehicles or loads that exceed the legal maximum dimension and weights on highways under Department jurisdiction (Federal and State non-local highways maintained by IDOT). Measurements of vertical clearances are used when issuing these permits. It is therefore necessary that IDOT exercise due diligence in the collection, maintenance, security and reporting of all minimum vertical clearances, measured to overhead obstructions, over all state-maintained roadways.

The intent of the above referenced policy document is to provide uniform signing and reporting procedures for vertical clearances and obstructed turning movements in order to reduce instances of vehicles entrapped on roadways.

60-8 BUREAU OF MATERIALS

The Bureau of Materials is responsible for the following documents:

60-8.01 Manual of Test Procedures for Materials

The above referenced manual presents the Department's criteria for sampling and test procedures for evaluating the following materials for road and bridge construction:

- aggregates,
- hot-mix asphalt, and
- Portland cement concrete.

60-8.02 Manual for Materials Inspection

The above-referenced manual is authorized by Department Policy MAT-11.

This manual is a guide for the inspection of metals, plastics, chemicals, admixtures, and other miscellaneous materials. It generally covers materials that are not soils, hot mix, concrete or aggregates.

60-9 BUREAU OF SAFETY PROGRAMS AND ENGINEERING

The Bureau of Safety Programs and Engineering is responsible for the following documents:

60-9.01 Traffic Control Field Manual

The *Traffic Control Field Manual* is issued for the purpose of the proper application of temporary traffic control devices. The manual has been developed to establish the minimum requirements for work site protection, when traffic control is provided by the Department.

60-9.02 Systemic Safety Improvements: Analysis, Guidelines and Procedures Manual

The Systemic Safety Improvements: Analysis, Guidelines and Procedures Manual explains how to collect crucial safety data that is not readily available, analyze safety data, use available resources to implement strategies effectively and make proactive infrastructure improvements, and to target enforcement and education programs. The information presented in this document will assist in better identifying potential safety performance issues on a roadway system and guide efforts to save lives. Specifically, this document includes the tools necessary for conducting safety analyses, network screening and the systemic approach. These guidelines detail the systemic process which includes collecting and organizing data, obtaining critical values, compiling the results, assessing existing field conditions, and selecting appropriate countermeasures.