

PREFACE

The *Bureau of Design and Environment Manual* has been prepared to provide uniform practices for the Department and consultant personnel preparing Phase I studies and reports and contract plans for Department projects. The *Manual* presents most of the information normally required in the development of a typical roadway project. The designer should attempt to meet all criteria and practices presented in the *Manual*; however, the *Manual* should not be considered a standard that must be met regardless of impacts. The designer should develop roadway designs that meet the Department's operational and safety requirements while preserving the aesthetic, historic, or cultural resources of an area. Designers must exercise good judgment on individual projects and, frequently, they must be innovative in their approach to roadway design. This may require, for example, additional research into the highway literature.

The *Bureau of Design and Environment Manual* was developed by the Policy and Procedures Section within the Bureau of Design and Environment with assistance from the engineering consulting firm of Roy Jorgensen Associates, Inc.



Illinois Department of Transportation Departmental Policies

D&E-1

Effective Date: October 16, 2010

Scheduled Review Date: 5 Years

BUREAU OF DESIGN AND ENVIRONMENT MANUAL

1. POLICY

The Bureau of Design and Environment shall publish and maintain a manual which establishes uniform policies and procedures for the location, design, and environmental evaluation of highway construction and reconstruction type projects on the State Highway System. The title of the manual will be the *Bureau of Design and Environment Manual (BDE Manual)*.

2. PURPOSE

The purpose of this Policy is to compile the policies and procedures which govern project location, design, and environmental evaluation into one comprehensive manual.

3. GUIDELINES FOR IMPLEMENTATION

The policies and procedures contained in the electronic version of the *BDE Manual* are the current best practices. The *BDE Manual* is intended to apply primarily to the State Highway System. The *BDE Manual* provides detailed requirements on such subjects:

- a. Administration and Procedures
- b. Project Development
- c. Environmental Procedures
- d. Roadway Design Elements
- e. Design of Highway Types
- f. Other Highway Design Elements
- g. Plans and Contracts

4. RESPONSIBILITIES

The Bureau of Design and Environment is responsible for preparing and maintaining this Policy and the associated *BDE Manual*. All

October 16, 2010

D&E-1

projects on the State Highway System developed by the District Offices or other agencies shall be in compliance with this Policy and the *BDE Manual*.

5. ACCESSIBILITY**A. LOCATION**

Electronic version of this Policy and accompanying *BDE Manual* are located at the Policy and Research Center site on InsideIDOT, the department's internal website. Additionally, the *BDE Manual* is available on the official department's website.

B. COPIES

Hard copies of this Policy may be obtained by contacting the department's Policy and Research Center Library.

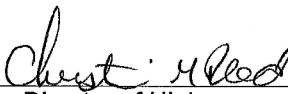
C. ARCHIVES & REVISION HISTORY

Archived versions of this Policy and accompanying *BDE Manual* may be reviewed by contacting the department's Policy and Research Center Library.

CLOSING NOTICE

Supersedes: Department Policy D&E-1, *Bureau of Design and Environment Manual*, dated March 1, 2001.

Approved:



Director of Highways

10/13/10

Date

MANUAL FORMAT/UPDATE

The *Bureau of Design and Environment Manual* is available as a PDF document on the IDOT's website: <http://www.dot.il.gov/desenv/bdemanual.html>. It is intended to provide current design and environment policies and procedures for use in developing State highway projects. To ensure that the *Manual* remains up to date and appropriately reflects changes in IDOT's needs and applicable requirements, its contents will be updated on an ongoing basis. To aid users in keeping track of revisions and understanding their background, BDE Procedure Memoranda will be posted to the *Manual* website; however, the associated policy revisions will be incorporated in the relevant chapter(s) of the *Manual* itself.

To distribute items of information that are of interest and are related to topics covered in the *Manual* but that are not a part of the framework of IDOT policies and procedures for project development, BDE Information Memoranda will be used.

BDE will be responsible for evaluating changes in the highway design and environmental literature (e.g., the issuance of new research publications, revisions to Federal regulations) and will ensure that those changes are appropriately addressed through the issuance of revisions to the manual. In addition, it is important that users of the *Manual* inform BDE of any inconsistencies, errors, need for clarification, or new ideas to support the goal of providing the best and most up-to-date information practical. A form entitled BDE Manual Comments and/or Corrections (see page viii) has been provided for use in submitting any comments and/or suggestions.

This 2010 Edition of the *Bureau of Design and Environment Manual* replaces the 2002 Edition of the *Manual*. This edition contains numerous minor changes and corrections. It also incorporates a number of other noteworthy revisions as reflected in the list below. Vertical lines in the page margins of the *Manual* generally denote the location of revisions.

Chapter 1 – The Bureau of Safety Engineering added and BDE System and Services Section removed.

Chapters 2 and 3 – BDE PM 41-08 and 48-06 incorporated. BDE PM 61-08 incorporated, which added and revised several Phase I Activities.

Chapter 4 – New section added on NPDES/Erosion and Sediment Control (4-2.35).

Chapter 5 – Updated signature requirements and processing procedures (5-1.03 and 5-8). BDE PM 68-10 incorporated (5-5.02).

Chapter 6 – Updated processing procedures.

Chapter 7 – BDE PM 53-06 incorporated (7-3.02(f)).

Chapter 8 – Annual fee capacity values increased, updated procedures and signature authority, new discussion on completion dates (8-4.04(b)), updated evaluation requirements (8-4.05), and BDE PM 16-00 incorporated (8-6).

Chapter 11 – BDE PM 5-07 (11-7.03), BDE PM 41-08, and BDE PM 48-06 incorporated.

Chapter 12 – BDE PM 41-08 (12-5) and BDE PM 58-08 (12-3) incorporated. ECAD and Clearinghouse references deleted. Extensive revisions made to checklist for Phase I reports (12-3.09).

Chapter 13 – Title and text changed to Transportation Management Plans (TMP), guidance on TMP added (13-1), revised existing and added new traffic control strategies (13-3), and added new sections on Public Information Plan (PIP) (13-4), Transportation Operations Plan (TOP) (13-5), requests for exception to compliance (13-7), and example TMP for small projects on significant routes (13-8).

Chapter 14 – BDE PM 41-08 incorporated (14-4).

Chapter 15 – BDE PM 41-08 incorporated (15-1.03 and 15-2.02).

Chapter 16 – Updated Rest Area Committee, updated BDE and district responsibilities (Figure 16-1.A), and updated and reorganized comfort station requirements (16-1.05).

Chapter 17 – BDE PM 68-10 incorporated.

Chapter 19 – BDE PM 48-06 incorporated (19-3) and guidance on Clearinghouse requirements deleted.

Chapter 20 – New chapter “Requirements for Major Projects” added.

Chapter 22 – BDE PM 19-08 incorporated (22-4), BDE PM 43-09 incorporated and all information on coordination with Federal and State regulatory and resource agencies restructured (22-5.02), added discussion on Congestion Management System alternatives (22-6.04), and updated and expanded information on useful National environmental publications (22-8.01).

Chapter 23 – ECAD procedures and guidance deleted and BDE PM 54-07 incorporated (23-1.04(c)).

Chapter 24 – BDE PM 44-05 incorporated and EA Process Activities extensively revised and updated (24-2), new Template Format alternative added (24-3.02(a)), BDE PM 40-04 and BDE PM 42-04 incorporated and content guidance for numerous other environmental issue areas revised/updated (24-3.02(e)).

Chapter 25 – BDE PM 44-05 and BDE PM 61-08 incorporated and EIS Process Activities extensively revised and updated (25-2), BDE PM 40-04 incorporated (25-3.08(j)), and BDE PM 42-04 incorporated (25-3.08(e)), and content guidance for numerous other environmental issue areas revised/updated (25-3.08).

Chapter 26 – Section 4(f) guidance and procedures extensively revised/updated (26-2) and Historic Act Compliance guidance and procedures updated and expanded (26-5.04(c)). Incorporated BDE PM 31-03 (26-9.06(h)), BDE PM 32-03 (26-2.04(b)), BDE PM 33-03 (26-8), BDE PM 37-03 (26-14), BDE PM 40-04 (26-21), BDE PM 42-04 (26-11), BDE PM 49-06 (26-2.04(d)), BDE PM 50-06 (26-6), BDE PM 52-06 (26-13), BDE PM 55-07 (26-8.05(c)), BDE PM

57-08 (26-8.05(c)), and BDE PM 60-08 (26-12). New sections added on migratory birds (26-15), wildlife resources (26-16), tree and vegetation assessments (26-17), invasive species and noxious weeds (26-18), surface water resources and aquatic habitat (26-19), nationwide rivers inventory (26-20), and groundwater (26-22).

Chapter 27 – BDE PM 43-09 incorporated and Biological and Cultural Survey procedures extensively revised/updated (27-1). BDE PM 66-09A incorporated (27-2).

Appendix A – Ten additional references added, including the interagency agreements from BDE PM 19-08, BDE PM 43-09, and BDE PM 44-05.

Chapter 31 – Section 31-7 revised to be consistent with current oversight agreement between IDOT and FHWA. BDE PM 41-08 and BDE PM 48-06 incorporated, and waiver request procedures for ADA items updated (31-8).

Chapter 32 – Updated to reflect the changes made in the 2004 AASHTO *Green Book* for side friction factors, superelevation, and sight distance terminology at horizontal curves. Extensive changes made in the methodology for selecting superelevation rates and determining superelevation runoff lengths.

Chapter 34 – BDE PM 15-02 incorporated (34-2.02(c)), added discussion on rumble strips (34-2.02(e)), and BDE PM 53-06 incorporated (34-2.04(c)).

Chapter 35 – BDE PM 41-08 incorporated (35-3.02).

Chapter 36 – Updated to reflect the revised horizontal alignment criteria in the 2004 AASHTO *Green Book*. New sections added on alternative intersection designs (36-1.03(b)) and roundabouts (36-9).

Chapter 37 – BDE PM 41-08 incorporated (37-1.01), updated information on new and revised Interstate access approval (37-1.03), new section added on diverging diamond interchanges (37-10), and updated to reflect the revised horizontal alignment criteria in the 2004 AASHTO *Green Book*.

Chapter 38 – BDE PM 34-08 (38-8), BDE PM 36-08 (38-5 and 38-6), and BDE PM 39-08 (38-7) incorporated.

Chapter 40 – BDE PM 65-08 incorporated (40-3.07).

Chapter 41 – New chapter “Construction Site Storm Water Pollution Control” added.

Chapter 44 – Tables of design criteria updated to reflect changes in the 2004 AASHTO *Green Book* and IDOT criteria (44-5).

Chapters 45, 46, and 47 – Horizontal alignment criteria revised to reflect changes in the 2004 AASHTO *Green Book*.

Chapter 48 – Horizontal alignment criteria revised and tables of design criteria updated to reflect changes in the 2004 AASHTO *Green Book* and IDOT criteria (48-6).

Chapter 49 – Horizontal alignment criteria revised to reflect changes in the 2004 AASHTO *Green Book*. Revised discussions on safety analyses and updated roadside safety criteria to be consistent with NCHRP Report 350, *AASHTO Manual for Assessing Safety Hardware*, and Bureau of Safety Engineering policies.

Chapter 50 – Revised discussions on safety analyses and updated roadside safety criteria to be consistent with NCHRP Report 350, *AASHTO Manual for Assessing Safety Hardware*, and Bureau of Safety Engineering policies.

Chapter 52 – New chapter “Pavement Preservation” added, which incorporated BDE PM 47-05.

Chapter 53 – BDE PM 23-01 and BDE PM 64-08 incorporated (53-4.08). New section added on guidelines for material sampling and testing of existing hot-mix asphalt pavements and overlays (53-3.08). Revised, added, and deleted pavement rehabilitation methods (53-4).

Chapter 54 – BDE PM 67-09 incorporated (54-4.01(o)). Mechanistic design guidance/criteria revised and updated. New sections added for unbound concrete overlay (54-4.03) and HMA overlay of rubblized PCC pavement (54-5.03).

Chapter 55 – Reorganized chapter. Added Transportation Management Plan (TMP) guidance (55-1), drop-off exposure policy (55-2.04), lighting for nighttime construction (55-5.05(c)), and enforcement (55-6). Horizontal alignment criteria revised to reflect changes in the 2004 AASHTO *Green Book* (55-2.07). BDE PM 27-02 incorporated. Updated discussions/criteria on roadside safety to be consistent with NCHRP Report 350, *ILMUTCD*, *Highway Standards*, and *IDOT Work Site Protection Manual*.

Chapter 56 – New sections added for roundabouts (56-2.08), lighting for nighttime construction (56-2.16), temporary lighting (56-2.17), replacement lighting (56-2.18), electrical service (56-3.07), and pedestrian conflict area classifications (56-5.04(c)). Updated to be consistent with the *AASHTO Roadway Lighting Guide* and IDOT current practices.

Chapter 58 – BDE PM 35-05 incorporated (58-1.09). New section added on fencing or safety devices on top of retaining walls (58-4.05).

Chapter 59 – Section on erosion and sediment control moved to new Chapter 41 and chapter title revised accordingly. BDE PM 62-08 incorporated (59-7.01(a)).

Chapter 60 – Five new documents added and two documents removed.

Chapter 63 – BDE PM 9-00 incorporated (63-4.07(d)). CADD/computer and plan sheet guidance updated.

Chapter 64 – BDE PM 8-00 incorporated (64-1.06).

Chapter 65 – Discussion on Pre-Awards Committee deleted.

Chapter 66 – BDE PM 51-06 (66-3.01(b)) and BDE PM 59-08 (66-2.04) incorporated. Guidance on the letting process (66-4.04) and execution of contracts (66-4.05) updated.

TABLE OF CONTENTS

Preface

Signature Sheet

Manual Format/Updates

Manual Comments and/or Corrections

Table of Contents

PART I – ADMINISTRATION AND PROCEDURES

| | |
|------------|--|
| Chapter 1 | Organization and Functions (Program Development) |
| Chapter 2 | Project Development Network (New Alignment) |
| Chapter 3 | Project Development Network (Existing Alignment) |
| Chapter 4 | Coordination Responsibilities |
| Chapter 5 | Local Agency Agreements |
| Chapter 6 | Utility Coordination |
| Chapter 7 | Railroad Coordination |
| Chapter 8 | Consultant Developed and/or Designed Projects |
| Chapter 9 | (Reserved) |
| Chapter 10 | (Reserved) |

PART II – PROJECT DEVELOPMENT

| | |
|------------|---|
| Chapter 11 | Phase I Studies |
| Chapter 12 | Phase I Engineering Reports |
| Chapter 13 | Work Zone Transportation Management Plans |
| Chapter 14 | Intersection Design Studies |
| Chapter 15 | Interchange Type and Design Studies |
| Chapter 16 | Rest Areas/Weigh Stations |
| Chapter 17 | Bicycle and Pedestrian Accommodations |
| Chapter 18 | Transportation Enhancements |
| Chapter 19 | Public Involvement Guidelines |
| Chapter 20 | Requirements for Major Projects |
| Chapter 21 | (Reserved) |

PART III – ENVIRONMENTAL PROCEDURES

| | |
|------------|--------------------------------------|
| Chapter 22 | General Environmental Procedures |
| Chapter 23 | Categorical Exclusions |
| Chapter 24 | Environmental Assessments |
| Chapter 25 | Environmental Impact Statements |
| Chapter 26 | Special Environmental Analyses |
| Chapter 27 | Environmental Surveys |
| Chapter 28 | Environmental Permits/Certifications |
| Chapter 29 | (Reserved) |
| Chapter 30 | (Reserved) |

Appendices

| | |
|------------|--|
| Appendix A | Regulations and Guidance |
| Appendix B | Acronyms/Glossary of Environmental Terms |
| Appendix C | Authority/Responsibilities |

PART IV – ROADWAY DESIGN ELEMENTS

| | |
|------------|---|
| Chapter 31 | Basic Design Controls |
| Chapter 32 | Horizontal Alignment |
| Chapter 33 | Vertical Alignment |
| Chapter 34 | Cross Section Elements |
| Chapter 35 | Access Control/Access Management |
| Chapter 36 | Intersections |
| Chapter 37 | Interchanges |
| Chapter 38 | Roadside Safety |
| Chapter 39 | Structure Planning/Geometrics |
| Chapter 40 | General Drainage Procedures |
| Chapter 41 | Construction Site Storm Water Pollution Control |
| Chapter 42 | (Reserved) |

PART V – DESIGN OF HIGHWAY TYPES

| | |
|------------|---|
| Chapter 43 | Highway Systems |
| Chapter 44 | Rural and Urban Freeways (New Construction/Reconstruction) |
| Chapter 45 | Expressways (New Construction/Reconstruction) |
| Chapter 46 | Strategic Regional Arterials (New Construction/Reconstruction) |
| Chapter 47 | Rural Two-Lane/Multilane State Highways (New Construction/Reconstruction) |
| Chapter 48 | Urban Highways and Streets (New Construction/Reconstruction) |
| Chapter 49 | 3R Guidelines for Rural and Urban Highways (Non-Freeways) |
| Chapter 50 | 3R Freeway Projects |
| Chapter 51 | (Reserved) |

PART VI – OTHER HIGHWAY DESIGN ELEMENTS

| | | |
|------------|---------------------------|--|
| Chapter 52 | Pavement Preservation | |
| Chapter 53 | Pavement Rehabilitation | |
| Chapter 54 | Pavement Design | |
| Chapter 55 | Work Zone Traffic Control | |
| Chapter 56 | Highway Lighting | |
| Chapter 57 | Traffic Control Devices | |
| Chapter 58 | Special Design Elements | |
| Chapter 59 | Landscape Design | |
| Chapter 60 | Other Department Manuals | |
| Chapter 61 | (Reserved) | |
| Chapter 62 | (Reserved) | |

PART VII – PLANS AND CONTRACTS

| | |
|------------|-----------------------|
| Chapter 63 | Plan Preparation |
| Chapter 64 | Quantity Computations |
| Chapter 65 | Cost Estimating |
| Chapter 66 | Contract Processing |

PART VIII – PROCEDURE MEMORANDA

