# CHAPTER 1
# GENERAL INFORMATION

## 1.1 INTRODUCTION

### 1.1.1 Purpose

This manual has been created by the Road Design Section of the Louisiana Department of Transportation and Development (DOTD) to provide a convenient guide of the acceptable policies and procedures used for the development of roadway construction plans for DOTD. It is intended to promote consistency, where possible, between all individuals involved in the roadway design and plan preparation process.

The manual has been written to aid in-house DOTD personnel, as well as consultants or others responsible for providing professional services to the Department. It may also be used as a guide for local public agencies on matters related to state and local roadways within their jurisdiction.

### 1.1.2 Format and Revisions

The manual will be periodically updated and entire chapters re-issued. The latest issue date of each chapter is shown at the bottom of each page.

### 1.1.3 Definitions of Commonly Used Terms

Throughout the manual, acronyms and abbreviations are used to increase readability. Also, various terms are used that need to be defined. As a quick reference, the definition of these acronyms, abbreviations, and terms are listed below:

- **DOTD** – Louisiana Department of Transportation and Development
- **The Department** - DOTD
- **FHWA** – Federal Highway Administration
- **PoDI** – Project of Division Interest
- **AASHTO** – American Association of State Highway and Transportation Officials
- **FAA** – Federal Aviation Administration
- **U.S.G.S.** – United States Geological Survey
- **LPA** – Local Public Agency
- **Letting** – Opening of sealed bids from prospective contractors

- **Shall/Will** – The use of "shall" and "will" designate mandatory conditions, and the designer will make every practical effort to follow the criteria. If it is impractical to follow these criteria, a design waiver will need to be approved by the Road Design Engineer Administrator. It will be stated if approval of the design waiver is needed from someone other than the Road Design Engineer Administrator.
- **Should** – "Should" is used as an advisory condition. It is recommended, not mandated, that the designer follow the criteria. For situations where it is impractical to follow these criteria, authorization will need to be obtained from the Road Design Engineer Administrator. It will be stated if authorization will need to be obtained from someone other than the Road Design Engineer Administrator.
- **May** – The use of "may" indicates a permissive condition. The designer should make reasonable efforts to follow the criteria. For situations where it is impractical to follow these criteria, engineering judgment should be used, and no DOTD authorization is necessary.

### 1.1.4 Other Reference Sources

This manual is a principal source of information providing general guidance on the policies and procedures that should be followed in the roadway design and plan development process. However, it does not contain all the information required to fully develop highway projects for the Department. Therefore, other publications adopted by DOTD will need to be referenced to supplement this manual. The design and detailing information available in these other sources is not reproduced here. However, as the design process is discussed within this manual, appropriate reference to other publications are mentioned to provide a link for ease of use.

A brief description of each publication needed to supplement this manual is given below. Copies of these publications can be obtained as outlined in the section tabbed as "References." The designer should verify that the current version of each publication is used.

#### Publications Developed by Other Agencies:

1. **A Policy on Geometric Design of Highways and Streets** – Also known as the Green Book, this guide was developed by the AASHTO Standing Committee on Highways. Guidance included in the Green Book is based on established practices and is supplemented by recent research. It is intended to form a comprehensive reference manual for assistance in administrative, planning, and educational efforts pertaining to design formulation. The Green Book is the primary source of design criteria and guidelines for the Department.
2. **Roadside Design Guide** – The AASHTO Task Force for Roadside Safety developed this guide. It presents a synthesis of current information and operating practices related to roadside safety.
3. **Highway Capacity Manual (HCM)** – Published by the Transportation Research Board (TRB), this manual represents a collection of state-of-the-art techniques for estimating capacity and determining level of service for many transportation facilities and modes. These techniques have been developed and enhanced through funded research projects and through review of the research results by the TRB Committee on Highway Capacity and Quality of Service.

4. **Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)** – This manual has been developed by the National Committee on Uniform Traffic Control Devices and its successors and approved by FHWA as a National Standard. It sets forth the basic principles that govern the design and use of traffic control devices including signs, signals, markings and other devices.
5. **Code of Federal Regulations (CFR)** – This is a codification of the general and permanent rules published in the Federal Register by executive departments and agencies of the Federal Government. The CFR and the Federal Register must be used together to determine the latest revision of any given rule.
6. **Highway Safety Manual (HSM)** – This manual was developed by AASHTO and provides quantitative methods to develop a safer, more efficient roadway transportation system. The manual achieves this goal by providing information and tools in a useful format in order to make the best decisions to reduce the number and severity of crashes on our roadways. The HSM provides knowledge, techniques and methodologies to quantify the safety related effects of transportation decisions. By using the HSM, the frequency and severity of crashes can be quantified and that information can be integrated into roadway planning, design, operations and maintenance decisions.
7. **Designing Safer Roads: Practices for Resurfacing, Restoration and Rehabilitation (TRB Special Report 214)** – This publication provides guidelines for design criteria of 3R projects and was used to establish DOTD design guidelines for preservation, rehabilitation and replacement (PRR) projects.
8. **Guide for the Planning, Design and Operation of Pedestrian Facilities** – This AASHTO guide provides guidance on the planning, design and operation of pedestrian facilities along streets and highways. Specifically, the guide focuses on identifying effective measures for accommodating pedestrians on public rights-of-way.
9. **Guide for the Development of Bicycle Facilities** – This AASHTO guide provides information on how to accommodate bicycle travel and operations in most riding environments. It is intended to present sound guidelines that result in facilities that meet the needs of bicyclists and other highway users.

## Publications Developed by the Department:

10. **Engineering Directives and Standards Manual (EDSM)** – The EDSM consolidates all DOTD directives containing policies, procedures, standards and guides relating to the administration of the Highway Program which impact the engineering functions of the Department. It is organized along functional lines, with a separate volume provided for each of the following areas:

    - Volume I – General Policies
    - Volume II – Design and Contracts
    - Volume III – Construction
    - Volume IV – Maintenance
    - Volume V – Material Quality Control
    - Volume VI – Traffic Operations

    EDSM directives are signed by the DOTD Chief Engineer, and will be followed by the designer, unless exceptions are granted as described in Section 2.3. While this manual attempts to create uniformity and consistency in design and plan

development, the EDSM should be followed should any discrepancies inadvertently exist between this manual and the EDSM.

11. **Location and Survey Manual** – Prepared by the Location and Survey Section, this manual provides guidance for conducting and documenting location surveys and property surveys. It also provides guidance for preparing right-of-way maps.

12. **Hydraulics Manual** – The Hydraulics Manual was developed by the Hydraulics Section and is a comprehensive documentation of the Department's hydraulic design policies. It contains information on rural, urban, wetland, airport and bridge hydraulic design. A user's manual for hydraulic programs described in the manual is also available.

13. **Bridge Design & Evaluation Manual** – The Bridge Design Section has prepared this manual as a design policy guide and aid on structural analysis and details. It also establishes uniform construction details to be used by those performing work for the Department.

14. **Louisiana Standard Specifications for Roads and Bridges** – This document compiles the bidding and contractual requirements, provisions for construction items, and material specifications necessary to construct roads and bridges for the Department.

15. **Project Managers Manual** – The Project Managers Manual is an internal DOTD document that defines the roles and responsibilities of the project manager starting with Stage 0 and continuing through Stage 6.

16. **Project Delivery Manual** – The Project Delivery Manual defines the project delivery process starting with Stage 0 and continuing through Stage 6. It also defines the roles and responsibilities that apply to each stage.

17. **Construction Plans Quality Control-Quality Assurance Manual** – This document defines quality control/quality assurance and discusses how it is applies to the plan development process.

18. **Local Public Agency (LPA) Manual** – This manual was created to familiarize public agencies with the programs that are available to them through DOTD for local transportation and public works projects.

## 1.2 ORGANIZATION AND FUNCTIONS OF THE ROAD DESIGN SECTION

### 1.2.1 Organization

The Road Design Section is part of the Project Development Division of DOTD. It is organized as shown in Figure 1-01, and consists of the following units and programs:

- Units
  - Design Squads
  - Consultant Management Squads

- Pavement Preservation/Rehabilitation/Replacement Unit (PRR)
- Utilities Relocation Unit
- Right-of-Way Permit Unit
- Rail Safety and Construction Unit

- Programs
  - Urban System >200k
  - Urban System <200k
  - Rail Safety
  - Railroad Grade Separation/Construction
  - PRR
  - Transportation Systems Management (TSM)

### 1.2.2 Functions

1. The Road Design Section is subdivided into several in-house design squads and consultant management squads. These squads are responsible for preparing plans for roadway construction projects and supervising and directing the preparation of plans prepared by consultant engineering firms. In addition, they are responsible for preparing details and exhibits necessary for environmental clearance of roadway construction projects, and providing technical presentations at public meetings and public hearings during the environmental process.

2. The PRR Unit is responsible for the pavement preservation programs and the TSM program. These programs are responsible for implementing projects aimed at preserving the pavement structure on the existing highway system such as major and minor rehabilitation and preventative maintenance projects and improving operational efficiency by the addition of turn lanes.

3. The Utilities Relocation Unit is responsible for coordinating with the owners of utilities located within each project to ensure that all utility conflicts are addressed prior to construction. As part of this function, they review relocation cost estimates and plans prepared by the utility companies. Joint Use Agreements (when outside clients lease DOTD right-of-way) are also issued in this unit.

4. The Right-of-Way Permit Unit is responsible for issuing permits for allowing clients and entities access to DOTD right-of-way for placement of utilities or other activity occurring within DOTD right-of-way.

5. The Rail Safety and Rail Construction Unit is responsible for coordinating with the various railway companies for the reconstruction or new construction of railroad crossings on highway projects. They are also responsible for obtaining agreements with the railway companies for such construction.

### 1.2.3 Relationship to the Overall DOTD Organization

The Road Design Section works with other divisions and sections of the Department in order to complete the design and development of construction plans for projects. The relationship of the Road Design Section to other sections within the Project Development Division and the entire DOTD organization is shown on the DOTD Organizational Chart. These other divisions and sections have responsibilities that are vital to the overall

success and completion of roadway projects. The duties of these divisions and sections as they relate to the Road Design Section are described below, beginning with the Project Development Division.

- **Office of Engineering** – The Road Design Section is a part of the Project Development Division, which falls under the Office of Engineering.
    - **Project Development Division** – This division is responsible for plan development and the preparation of the construction documents. Right-of-way acquisition is also one of the duties this division performs.
        - **Real Estate** – The Real Estate Section is responsible for acquiring the right-of-way necessary for a project. This includes appraisals, negotiations with property owners and recording acquisitions in the appropriate parish courthouse. This section also provides estimates of right-of-way and relocation costs for use in evaluating alternate alignments during the environmental phase of project development. In addition, they are involved in the disposal of excess right-of-way.
        - **Location and Survey** – The Location and Survey Section is responsible for providing all field surveys required for plan development and property surveys used in the development of right-of-way maps. This section is also responsible for right-of-way map preparation. These services can be furnished either by in-house forces or by use of consultant's services. In support of design activities, they also develop aerial photography and aerial layout sheets when required for environmental clearance or plan development.
        - **Bridge Design** – The Bridge Design Section is responsible for the preparation of all bridge plans and other structural details, such as retaining walls, guardrail standards, sign supports and barrier rails. This section also has an electrical design unit and a mechanical design unit. The electrical unit provides plan details of electrical systems for buildings, movable bridges, roadway lighting and overhead signs. The mechanical unit provides plan details of the mechanical components for movable bridges.
        - **Project Management** – The mission of the Project Management Section is to institutionalize a culture and governing resource to manage DOTD projects in such a manner as to maximize efficiency, value and quality while minimizing their associated costs and risks.
        - **Pavement and Geotechnical** – The Pavement and Geotechnical Section is responsible for pavement structural design, embankment stability analyses, settlement analyses and soil foundation design.
    - **Contract Services** – Contract Services provides support to Project Development by developing consultant contracts, obtaining consultant services and providing construction contract documents. The section is divided into two groups, each responsible for distinct functions.
        - **Contracts and Specifications** – Near the end of project plan development, Contracts and Specifications prepares the construction contract package. This includes a cursory review of the construction plans, assembling the

standard specifications and supplemental specifications and developing special provisions for items for which there are no standard specifications. After the contract and specifications are assembled, the Plans, Specifications, and Estimate (PS&E) package is prepared and, if required, submitted to FHWA. Also, an ongoing responsibility of this section is to update and revise the Louisiana Standard Specifications for Roads and Bridges book.

- **Consultant Contracts** – Consultant Contracts is responsible for procuring consultant engineering services to support the plan development process. After receiving a fee package consisting of estimated man hours and documentation supporting the use of consultant services from the design coordinator, this section advertises for consultant services, analyzes the responses, prepares a short list of acceptable firms, and submits this list to the DOTD Secretary for final selection. Once the selection is made, a formal contract is prepared and a copy is sent to the design coordinator so that work by the consultant can begin. This section is also responsible for agreements with local agencies where a share in cost or maintenance agreements are required.

- **Public Works and Water Resources Program** – The Public Works and Water Resources Program provides engineering and technical assistance to eight non-coastal levee districts and provides oversight for their levee inspection activities. This division is also given statewide responsibility to provide for the effective administration and implementation of public works for flood control, dam safety, reservoir development and projects related to controlling, developing, conserving and protecting Louisiana's vast water resources.

  - **Hydraulics** – The Hydraulics Section is responsible for all aspects of drainage within DOTD right-of-way. This involves review of the project design to ensure that DOTD policies and guidelines are followed. They also provide standard plans and special details for catch basins, manholes, box culverts and other hydraulic items. The Hydraulics Manual, developed by the Hydraulics Section, provides design guidance for both rural and urban drainage systems. This section is also responsible for keeping the DOTD hydraulic computer programs up to date.

- **Construction** – Personnel in Construction provide expert advice in areas relating to the construction of roads and bridges. They are also a link between the headquarters offices and construction activities in the districts. Three components of Construction have a direct relationship with design activities.

  - **Systems Construction/Contract Administration** – Systems Construction/Contract Administration reviews design plans at various stages of plan development, participates in the plan-in-hand inspection and advises the designer on the acceptability of plan details related to constructability.

  - **Structural Construction/Structural Fabrication** – Structural Construction/Structural Fabrication performs a similar function for bridge plans as that provided by Systems Construction/Contract Administration.

- **Louisiana Transportation Research Center (LTRC)** – LTRC conducts short-term and long-term research and provides technology assistance, engineering training and continuing education, technology transfer and problem-solving services to DOTD and others in the transportation community.

  - **Materials and Testing** – The mission of Materials and Testing is to develop, administer and regulate the Department's Materials Quality Assurance Program, environmental evaluation programs and the geotechnical exploration and testing programs in cooperation with public and private partners.

- **Traffic Engineering** – The mission of Traffic Engineering is to provide traffic engineering expertise and leadership, for both permanent and temporary highway conditions, to the highway users, the Department's districts and headquarters office, other levels of government and our highway industry partners.

  - **Traffic Engineering Development** – Traffic Engineering Development is in charge of all statewide traffic signal projects (permit and construction), interstate guide signs, work zone, pavement marking and geometric plan reviews. The section also reviews geometry for Stage 0 and Stage 1 alignments.

  - **Traffic Engineering Management** – Traffic Engineering Management reviews Stage 0 and Stage 1 traffic studies and is involved in all aspects of traffic engineering for DOTD. The section is also responsible for working with the Districts on traffic operational issues that occur once projects are under construction or in assisting Districts with operational issues that may arise due to new developments or changes in traffic patterns.

- **Environmental** – Environmental provides environmental planning, analysis and documentation in accordance with NEPA and obtains scenic stream, wetland, coastal use, levee and bridge permits for Departmental projects.

- **Office of Multimodal Planning** – The Office of Multimodal Planning has several responsibilities directly related to the Road Design Section, including: transportation planning; data collection and management analysis; highway safety. These responsibilities are assigned to the units described below.

  - **Transportation Planning** – Transportation Planning is responsible for developing the highway construction program. This involves coordination of the evaluation, rating, and prioritizing of all highway improvements on the state maintained highway system. This section directs the inspection of all state routes and the analysis of that data along with other information to determine the program to be recommended to the Legislature. They also coordinate public meetings at which the proposed highway program is presented.

  - **Data Collection and Management Analysis** – Data Collection and Management Analysis is responsible for the roadway inventory of all state and local highways. They also maintain up-to-date records of traffic counts on the highway system. This section contains a cartography unit, which produces traffic maps, parish maps, and city maps for DOTD.

- **Highway Safety** – The mission of Highway Safety is to continually improve the safety of users of Louisiana's highway system through implementation of the highway safety program. Highway Safety maintains crash data and coordinates the development of abnormal crash locations with the districts. Highway Safety is also responsible for the safe routes to school program, the complete streets policy and bicycle and pedestrian program.

- **Office of Operations** – The Office of Operations is responsible for the operations of the nine highway districts, maintenance and ITS. Each district has dedicated personnel to provide local experience and expertise in the areas of:

  - Maintenance
  - Construction
  - Traffic Operations
  - Design (including PRR and TSM projects)

## 1.3 TYPICAL SEQUENCE OF PROJECT DEVELOPMENT

### 1.3.1 General

All projects generally follow similar phases of development. These phases may overlap for some types of projects. The major stages required before a project can be advertised for bid can be found in the Project Delivery Manual.

## 1.4 PROJECT REVIEW AND SUBMISSION REQUIREMENTS

During preliminary and final plan development, various reviews are made for content and correctness and to ensure that design procedures are followed. Figure 1-02 lists those sections that should receive submittals for review at each submittal. Figure 1-03 outlines the tasks that should be completed and in progress at each milestone.