



## 1.1 General

The concept definition phase of the process begins with the decision that "... something must be done . . ." From this point on, the designer formulates recommendations based upon what is already known about the problem area under consideration. The first action taken in this regard is the region's preparation of a decision document called the Concept Definition Report (CDR). Its purpose is to establish initial agreement between the Region Project Development (PD), System Planning and Operations (SPO), Technical Services (TS) and other sections as to the timing and scope of the project, and to initiate authorization to incur engineering charges. The CDR also provides various central office sections information about the project and an opportunity to offer their comments and perspectives.

The Concept Definition Report also identifies whether the project is located on a National Highway System route and, if so, establishes whether the project will be subject to oversight by the Federal Highway Administration or will be exempt from federal oversight. [FDM 5-5-15](#) describes the WisDOT-FHWA relationship in the development of federally-funded projects.

On local road projects, the CDR or approved application establishes initial agreement between the WisDOT and the Municipality. For local road projects, the approved application may serve as the initial CDR.

## 1.2 Content

Limit the length of the CDR to one sheet and present the basic project concepts in as brief and concise a manner as possible. The necessary elements of a CDR are as follows:

1. Where - Describe the project location.
2. Why - State the justification for establishing a project.
3. What - State the project concepts that the region is proposing.

Bicycle and pedestrian needs and the potential type(s) of accommodations should be made part of this report.

[Attachment 1.1](#) is a recommended format for presenting the text information required in a CDR.

Include a map that is appropriate to the scope of the project within the report. For rural projects this should be a county map showing the project termini. For urban projects this should be a street map, again showing project termini. For spot improvements like bridge projects, it can be either a county or street map with the project location circled. Typically, this map is printed on the reverse side of the CDR.

## 1.3 CDR Process

The CDR is typically prepared by region SPO staff for regular improvement projects, based on information gathered during program development (needs identification, evaluation, etc.). Procedures for acceptance vary among regions, but generally indicate agreement between SPO, PD, TS, and others involved. A statement of anticipated environmental documentation type serves to alert FHWA, Bureau of Technical Services Environmental Section, and other central office sections of the extent of involvement or, in the case of Categorical Exclusions, completes the documentation.

Updated CDR's are prepared and distributed when there is a change in concept, such as project description (revised length or limits), scope of improvement or improvement type (e.g. Resurface to Recondition) or a significant change in combined scope, special features, or cost that could cause a change in federal oversight status. For local road projects, the approved updated application may serve as the updated CDR.

Treat CDRs written before project scoping is completed as an initial document until the scoping process is completed. At that time the project manager shall decide if the current CDR is accurate or if it needs to be updated to reflect pertinent changes in project scope resulting from the scoping process.

The region should forward copies of the completed CDR to the individuals listed below for purposes indicated.

**Table 1.1 CDR Distribution**

<b>Organization, Attn.</b>	<b>Which Projects</b>	<b>Purpose</b>
Bureau of Project Development, Design Services Chief	All	Information and comment. This copy and notation will be maintained in C.O. File.
Bureau of Structures, Structures Design Section Chief	Projects involving bridgework	Information and comment.
Bureau of Traffic Operations, Chief Traffic Engineer Section	Projects involving signals, lighting, special traffic issues	Information and comment.
Bureau of Highway Maintenance, Highway Maintenance and Roadside Management Chief	All projects.	Information and comment
Region Railroad Coordinator (RRC)	All projects with a railroad crossing located within the project limits or within 1000 feet of the project location. All projects with grade separations between highway and railroad. All projects that parallel a railroad on adjacent right of way.	Information and comment. Begin railroad coordination efforts. The RRC will send a copy to the affected railroads and to the Bureau of Railroads and Harbors.
Bureau of Technical Services - Environmental Section Chief	All	Preparation of “quarterly listing” of ER and pER
USDA - Forest Service	All projects located within the Chequamegon and Nicolet National Forest	Information and Comment (see <a href="#">FDM 5-5 Attachment 5.1</a> , M.O.U.)
FHWA, “Point of Contact”	All projects located on the National Highway System with an estimated project cost of \$2,000,000 or more intended to be eligible for federal participation in any phase.	Information, reference, and to establish responsibility for oversight of 23 USC requirements.

NOTE: SHRM, TOIPS, or other special interest projects may warrant wider or targeted distribution as appropriate. See the Maintenance or Traffic Manuals regarding these.

#### **1.4 Community Sensitive Design**

Community Sensitive Design (CSD) is a philosophy of involving the “community” impacted by an improvement project early in the design process. See [FDM 11-3-1](#) for a detailed explanation of Community Sensitive Design.

During the Concept Definition phase, meetings with the public should be used to determine the “community values” which will be used to assess various alternates. At the same time, the community should be informed that there are certain physical and legal requirements that WisDOT and other agencies must meet when developing an improvement project. Each party needs to learn the issues important to the others. WisDOT and their consultant should host the meeting and both the public and other key agencies affected by the project should be invited to attend. At the public meeting:

WisDOT reports: “This is what the standards suggest we do” by providing a range of alternatives.

Other agencies report: “These are the non-highway related legal requirements for a project of this type.”

Community reports: “This is what is important to us.”

The goal of a public meeting held during this phase is to reach consensus on the project scope.

#### **1.5 Notes to Design**

The region Systems Planning & Operations Section will, include a “Notes to Design” document as an attachment to the CDR. The “Notes to Design” document is a means of providing the people involved in scoping and design with background information that was gathered by SPO staff in the development of the project CDR.

It also describes the local desires and commitments that may have been made when a project was put into the program. The document consists of 1 or 2 pages of text providing information on the most important factors affecting the projects schedule, cost and concept. Subjects that it might address are:

- Community growth, planning and development issues
- Corridor-specific issues that the community or public may have with this route
- Summary of public inquiries received or Safety Commission comments made
- Current pavement condition and history and where it is in its life cycle
- Any known desires on pavement type or roadway treatments requested by local government
- Any legislative interest in the project
- Any known detour issues
- A generic statement on guidelines in place at the time the project was originally programmed
- Any traffic capacity or access control issues
- Any other information relevant to project development, cost or schedule
- Recommendations to incorporate or not incorporate bicycle and pedestrian accommodations.

## **LIST OF ATTACHMENTS**

[Attachment 1.1](#)          Concept Definition Report Template

### **FDM 11-4-5 Location Study Report**

*March 28, 2014*

#### **5.1 General**

One report commonly used for major projects is a Location Study Report. This is used to document the factors affecting the selection of an alignment alternative and to solicit concurrence with that selection.

Concurrence in the corridor selection is required by the Administrators of the Divisions of Transportation System Development (DTSD) Regions, the Division of Transportation System Development, and the Division of Transportation Investment Management. The preferred method of securing concurrence is to prepare and forward to the Design Services Section of the Bureau of Project Development a Location Study Report containing a map which shows the alternative corridors or alignments, very briefly describes them, identifies the selected alternative, describes any controversial issues, and indicates which issues have and have not been resolved as well as the nature of the resolution. The report should be brief, no more than 2-3 typewritten pages plus maps. If the administrators did not attend the selection meeting, the cover letter should indicate whether a meeting with the administrators is recommended at this point. That recommendation should be based primarily on whether unresolved controversy still exists.

The staff of the Project Services Section will contact the three administrators, provide them with a copy of the Location Study Report and determine whether they desire to meet. If a meeting is not desired, the Chief of the Project Services Section will sign the report indicating that he and the administrators have been informed of the selected alternatives and concur with them.

If the administrators do wish to meet, the Design Services Section will schedule the meeting. The region should be prepared to discuss the scope of the project, the alternatives, their pros and cons and the controversial issues. They should also discuss timing of the notification of local and state elected officials prior to announcing the preferred location to the public.

If there is significant controversy associated with the preferred corridor, the concurrence of the Secretary of the Department is required prior to announcing the choice to the public. The coordination with the Secretary will be handled by the Administrator of the DTD who will advise the region what information is necessary and whether or how they will be expected to participate. After concurrence of all parties has been secured, the Chief of the Project Services Section will sign the report as noted above.

### **FDM 11-4-10 Design Study Report**

*March 28, 2014*

#### **10.1 Introduction**

Subsequent to a Concept Definition Report and prior to a Design Study Report, considerable data gathering, analysis of alternatives, public involvement, assessment of environmental effects, etc., may occur depending upon the nature and the complexity of the project. To implement these activities, the region or Bureau of Project Development (BPD) may determine that it is desirable to summarize concurrences, to specify various project considerations, or to involve department management in the resolution of specific project issues through the

development of an intermediate report.

Intermediate reports are not required as part of the specific approval steps of the facilities development process. However, they are prepared at the discretion of the region or Bureau of Project Development when either determines that they are necessary to adequately assess the more complex or unusual aspects of the project not covered by normal project development procedure. As appropriate, these reports are submitted to the Bureau Director for consideration at the appropriate level of management.

## 10.2 Location Study Report

One report commonly used for major projects is a Location Study Report. This is used to document the factors affecting the selection of an alignment alternative and to solicit concurrence with that selection.

## 10.3 Exceptions to Standards

Another type of report is a request for exception to design standards. In most cases this type of report should be submitted in advance of the design study report. This will prevent delays in Design Study Report approval while the exception request is evaluated.

See [FDM 11-1-2](#) for the content of requests for formal exceptions to standards and [FDM 11-1-4](#) for programmatic exceptions to standards and the procedures to get them approved.

## 10.4 Design Study Report (DSR)

All projects in the improvement program require a Design Study Report (DSR) to be completed. The purpose of the DSR is to document the decisions and rationale for decisions in the development of an improvement project. The DSR, at a minimum, shall address the following:

- Design criteria proposed, whether within or outside of desirable or minimum standards.
- Geometric and Safety aspects to be addressed by the project improvements
- Summary and Synopsis of important project approvals and decisions and rationale for decisions

Other things about DSRs to be aware of:

- Must be approved before Final Design can begin on a project. (Final Design is defined as any project development activity required to develop the PS&E beyond which is needed to complete the environmental document and establish key design criteria that will be used to prepare the DSR; i.e. - preliminary horizontal and vertical alignments, typical sections, etc.)
- Must be approved before Real Estate Relocation Orders can be approved and Real Estate acquisition can begin on a project
- Will be kept in the Central Office files indefinitely until a future DSR replaces it as defense against potential legal actions
- Serves as the bridging document between preliminary and final design.
- Serves as a good "check box" for designers as to what needs to be completed in preliminary design.
- Serves as a good summary of project decisions and source of project information when staff changes occur.

A DSR is approved upon completion of the hearing(s) or hearing opportunity (ies) and finalization of the environmental document and approval of the Transportation Management Plan (TMP). For those projects not requiring a hearing or an opportunity for a hearing, the final DSR can be submitted shortly after the approval of the environmental document and Transportation Management Plan (TMP). When the DSR originates outside the department, the report shall be signed and sealed by the professional engineer in responsible charge of its preparation. Draft DSRs can be submitted to the WisDOT region office and Bureau of Project Development staffs for review at any time for comments. This can be especially important when review comments are needed before significant effort or time is expended in finishing the preliminary right-of-way plats and design plans for a project.

The regions will develop DSRs for improvement projects designed in-house and will involve the appropriate bureau personnel while doing so. The regions will also review and approve DSRs for improvement projects on the STH system that are designed by consultants or local municipalities.

### 10.4.1 Concurrence Process

Region Project Development Chiefs will approve all DSRs for STH improvement projects within their region. Concurrence with the DSR from the Bureau of Project Development, Design Project Oversight Unit, is required for all state trunk highway (STH) and National Highway System (NHS) projects. Project oversight engineers in the Design Project Oversight Unit have been delegated authority to concur with these DSRs.

Local Program Management Consultants will recommend all DSRs for Local improvement projects within their region. The Bureau of Project Development, Region Local Program Project Manager will approve all DSRs on Local highway improvement projects <sup>(a)</sup>.

**Table 10.1 Authorizing Signature**

Project Type	Authorizing Signatures Required
Local	Regional Local Program Management Consultant and Region Local Program Project Manager <sup>(a)</sup>
STH and NHS	Region and Design Project Oversight Unit <sup>(b)</sup>

*(a) Concurrence on DSRs for Local Improvement projects on NHS routes shall be by the Bureau of Project Development, Design Project Oversight Unit Section.*

*(b) The regions shall provide a minimum of one (1) original signed copy to the Bureau of Project Development, Design Project Oversight Unit as shown in the table. Send additional signed copies if the region, locals or consultant desire a signed copy for their files. Otherwise, a photocopy of the signed cover sheet will be sent back to the region and the region will need to provide additional photocopies if desired.*

If the Design Project Oversight Unit-Oversight Engineer or Chief, or Region Local Program Project Manager or Local Program Management-Consultant Section Chief do not concur in a DSR then section staff will initiate discussions with the appropriate region staff or Local Program Management Consultant staff to resolve the differences. This shall begin within thirty days of receipt of the DSR in the Design Project Oversight Unit or Local Program Management-Consultant Section. If the issue cannot be resolved at the staff level, the Bureau Director shall seek resolution with the appropriate Region Director.

These concurrences are required prior to proceeding with the preparation of final design plans or approval of the relocation order. Under certain circumstances right of way may be appraised or acquired prior to concurrence in the DSR. See [FDM 3-20-15](#) for further guidance.

**10.4.2 Distribution**

BPD Design Project Oversight Unit and Region Local Program Project Management staff will forward to FHWA points of contact electronic copies of all approved DSR's for all projects that have been designated for Federal Oversight in accordance with the Federal Oversight Agreement. See [Table 10.2](#) for standard designated Federal Oversight categories. FHWA may choose to designate projects to be Federal Oversight that do not meet the [Table 10.2](#) categories, Region staff must check FIIPs or consult with their Region Planning section to determine if a project has been designated as Federal Oversight or not.

**Table 10.2 Federal Oversight Categories**

<b>TYPE OF PROJECTS</b>
<b>Federal “Major”</b> – Projects with an estimated total cost greater than <b>\$500 million in the Environmental Document</b> , or projects approaching \$500 million with a high level of interest by the public, Congress, or the Administration. <sup>(a)</sup>
<b>High-Cost Interstate</b> - New construction, reconstruction, 3R, and expansion projects on the Interstate system with total estimated costs greater than <b>\$25 million in the Environmental Document</b> . <sup>(a)</sup>
<b>High-Cost NHS</b> - New construction, reconstruction, 3R, and expansion projects on the NHS (non-interstate) with total estimated costs greater than <b>\$100 million in the Environmental Document</b> . <sup>(a)</sup>
<b>Other Designated “Oversight Projects”</b> – Additional NHS or non-NHS projects selected by FHWA as Federal “oversight” due to unique complexities related to such items as contracting methods, innovative financing methods, innovative or experimental materials or construction methods, complex traffic issues, route type, geographical location, or high political interest. <sup>(b)</sup>
<b>Special Funded (Earmark) Stand-Alone ITS Projects</b> – All special funded stand-alone ITS projects will have full FHWA oversight regardless of dollar amount.
<b>Right-of-Way Projects</b> – Federal oversight of ROW acquisition projects will follow the guidance above.

(a) **Applicability** - Oversight designation will apply to all phases of the project (design and construction). Unless FHWA specifically determines otherwise, all individual project IDs that comprise the overall project will be considered Federal oversight projects. FHWA may elect to waive oversight, on a project-by-project basis, of those projects and/or contracts that consist of work that is considered low risk such as pavement marking, signing, signals, guardrail, ramp metering and landscaping. State or locally-funded phases, segments or contracts (that are components of a larger project that has other phases, segments or contracts that are Federally-funded), will not be subject to Federal oversight, but will require compliance with selected Federal laws and regulations.

(b) **Applicability** - Projects may be designated “oversight” for one or both of the following phases: design and construction. FHWA will determine these “other” oversight projects, in consultation with WisDOT. The applicability will be defined as part of that identification process.

### 10.4.3 Content

The following is intended to explain in more detail the DSR topics. [Attachment 10.1](#), [Attachment 10.2](#) and [Attachment 10.3](#) shows the Regular DSR, Abbreviated DSR and Group III Pavement Strategies Preventative Maintenance (PM) DSR format documents with a link to electronic copies. Use the Regular DSR format document for projects in which work is proposed to be completed to the roadway cross section or geometrics in which either new construction or 3R/4R standards apply. Use the Abbreviated DSR and Group III Pavement Strategies PM DSR format documents on Preventative Maintenance (PM) projects or stand alone traffic signal, lighting, pavement marking or signing type projects. For the Abbreviated and Group III Pavement Strategies PM DSR format documents, only provide the information asked for in those sections shown in [Attachment 10.2](#) or [Attachment 10.3](#). The Abbreviated and Group III Pavement Strategies PM DSR format documents follow the same format as the Regular DSR format except that the sections not applicable to the Abbreviated or Group III Pavement Strategies PM DSR type projects were removed, thus the numbering of the sections is not always in sequential order. However, all these DSR formats refer to the same sections of this FDM chapter for information related to filling them out. It is not necessary to address every topic in depth for every DSR. Label topics that do not apply to the project as either;

- Do not exist on the project (e.g. no railroads exist within the project limits),
- Will not be affected by the project,
- Is not required for the project.

Information may be provided in either text, tabular or attachment form as explained in the topic sections that follow or as shown in [Attachment 10.1](#), [Attachment 10.2](#) and [Attachment 10.3](#). Any tables shown in Attachment 10.1, Attachment 10.2 and Attachment 10.3 that do not apply to the project or in which the information is provided on an attachment (e.g. typical cross sections) may be deleted if not needed. Just note “See Attachment \_\_\_” under the section titles where tables are deleted.

The items marked with an asterisk in [Attachment 10.1](#) are controlling criteria. If proposed conditions do not meet



current minimum standards (new construction standards for reconstruction and 3R standards for resurfacing and reconditioning projects), and the item is a controlling criterion, then an exception to standards must be secured separately for these items. (See [FDM 11-1-2](#)) Certain 3R projects are covered by a Programmatic Exception to Standards Report. See [FDM 11-1-4](#) for more guidance.

Exceptions for the following items can be secured through documentation in the DSR itself.

- Exceptions for standards that are not controlling criteria.
- Exceptions for non-compliance with a “Desirable” standard, as long as the minimum standard for the criterion is met.

Attach a map that is appropriate to the project as an appendix to every DSR. That would typically be a county map with termini marked on it for a rural project, a city street map for an urban project, or a county map with the location circled for a bridge or spot location project. If included, attach typical cross sections, as-built or preliminary plan sheets, encroachment reports, etc. as appendices rather than inserting them within the text.

### Cover Sheets

Transmittal Letter - A memo transmitting the DSR from the region to Bureau of Project Development is required. If WisDOT personnel prepare the DSR, this is the only cover sheet required. It should contain two signature blocks, one for either the Region Project Development Chief or Local Program Management Consultant's and one for either the Design Project Oversight Unit's or Local Program Management-Consultant Section's concurrence signature. [Attachment 10.1](#), [Attachment 10.2](#), and [Attachment 10.3](#) provide a format for these memos with imbedded Word shells. Use the titles of Region Project Development Chief or Local Program Management Consultant and Design Standards and Oversight Unit Section Chief or Local Program Management-Consultant Section Chief even though others may be authorized to sign for them. Do not place these signature blocks within the report.

Title Sheet - All DSR's prepared by consultants must contain their seal. The purpose of this sheet is to identify the project and provide a standard location for the seal. If DOT personnel prepare the DSR, this sheet is not required. Project identification on this sheet should include the design I.D. number, route number or road name, Structure ID number (when structures are part of the project), termini, and county.

### 1.0 Project Description and Need

- 1.1. Federal Oversight – State if project is a Federal oversight project (Yes or No). Check [Table 10.2](#) in this procedure for standard Federal Oversight project categories. Check FIIPs or with Region Planning Sections to determine if a project outside of the [Table 10.2](#) categories has been designated as Federal Oversight.
- 1.2. Project Length and Termini - State the length of the project. If generalized termini are used on the cover sheet define the limits more precisely here or attach a map or project overview with the termini labeled. Also provide beginning and ending stations for the project if stationing will be used in the document to describe locations of various features.
- 1.3. Functional Classification/Access Control - Indicate whether the roadway is an arterial, collector, or local service facility; whether the project or segments of the project are Rural, Urban or Transitional and whether the roadway is a Corridors 2020 Backbone Route or Connector Route. (see [FDM 4-1 Attachment 5.1](#)) Indicate if the road is an NHS route:  
<http://www.fhwa.dot.gov/planning/nhs/maps/wi/index.htm> (click on the city name for a local map) or not, part of a Federal (<http://www.fhwa.dot.gov/legregs/directives/fapg/cfr06581.htm>) or State (<http://wisconsindot.gov/Documents/dmv/shared/truck-routes.pdf>) Long Truck Route or not, and what Access Control Tier Category (see [FDM 7-5-1](#)) the project falls under. Also note if the roadway is on an approved bicycle or pedestrian transportation plan:  
<http://wisconsindot.gov/Documents/projects/multimodal/bike/coord-map.pdf>
- 1.4. Need for Project - Describe those deficiencies in the present facility that caused the project to be programmed. Generally, focus on pavement condition, safety, or traffic capacity. The list below describes some of these.
  - Age and condition of roadway, pavement, bridges, etc.
  - Traffic congestion (levels of service, operating conditions, etc.)
  - Significant crash locations and crash patterns
  - Other safety considerations
  - High maintenance costs
  - Public concern

- Construction staging (one phase of a much bigger improvement)
- Other considerations

## 2.0 Present Facility

- 2.1. Posted Speed - State the regulatory speed limit(s) and provide any advisory speeds.
- 2.2. Geometrics – Identify any features that are outside of desirable or minimum design standards based on the project type (e.g. new construction/reconstruction, 3R, rural or urban, etc.), how many of each there are, how much outside of design standards they are and where they are located relative to physical features. If no geometric features are outside of standards, then just state “None”.

The information for these features may either be given in the text/tables of the DSR or on as-built plan sheets attached to the DSR with the features highlighted.

- 2.2.1. For horizontal alignment features outside of desirable or minimum design standards, provide feature type (curve, P.I. deflection, etc.), location, size (radius, P.I. deflection, etc.), super-elevation rate and speed rating.
- 2.2.2. For vertical alignment features outside of desirable or minimum design standards, provide feature type (curve, grade deflection, etc.), location, whether sag or crest, grades, K value or grade deflection, speed rating and whether stopping sight distance and decision sight distance is met or not.
- 2.2.3. For vertical grades and clearance features, provide the location, % grade and vertical clearance for steep tangent grades and low vertical clearance locations. For the Abbreviated DSR, documentation of grade information is not required. Provide vertical clearances as measured from the roadway to bridges passing over the mainline, to overhead trusses on bridges carrying the mainline, and as measured from the bottom of mainline bridges to the surface of features below (e.g., RR tracks, water level in streams, etc.).
- 2.3. Side roads / Intersection / Interchanges – Provide existing side road, intersection and interchange information in the DSR. If there are no side roads, intersections, or interchanges on the project then just state “None”.

The intersection information for these features may either be given in the text/tables of the DSR or on as-built plan sheets attached to the DSR with the features highlighted.

- 2.3.1. Side road information should include roadway name, functional classification, posted speed, existing traffic (AADT), intersection approach grade and whether pedestrian or bicycle facilities are present. If existing traffic volumes are not known, state whether the AADT is assumed to be < 100 or > 100.
- 2.3.2. Intersection information should include intersecting roadway names, intersection types [Rural (A1/A2/B1/B2/C/D), urban, roundabout, etc. as described in [FDM 11-25-1](#) and [FDM 11-26-1](#)], intersection angles, traffic control (2 or 4-way stop, signal, roundabout, etc.), stopping sight distance, intersection sight distance, decision sight distance, vision triangles, and corner clearance to driveways.
- 2.3.3. Interchange information should include intersecting roadway names, interchange types (diamond, cloverleaf, etc. as described in [FDM 11-30-1](#)), ramp types (exit or entrance and whether tapered, parallel, collector/distributor, left side ramps, etc.), ramp design speed(s), what horizontal or vertical curves exist on the ramp, ramp grades, stopping sight distance and decision sight distance.
- 2.4. Cross Section – Identify cross section features by either attaching an existing typical cross section(s) as an attachment(s) to the DSR or by providing the information in the text of the DSR. Indicate ranges where applicable. Identify on-road bicycle facilities (bike lanes, paved shoulders, or wide lanes for bicyclists). Identify presence of sidewalks and curb ramps or shared-use paths. Identify widths outside of minimum or desirable standards. See [Attachment 10.4](#) for the format of information to be provided on attached typical cross sections<sup>1</sup>.
- 2.5. Pavement Structure / Condition - Provide types and thickness of pavement layers, including base course. Give a physical description of the pavement (e.g. rutting, transverse/longitudinal cracking, etc.) Information on type and thickness of pavement layers can be shown on either an attached existing typical cross section(s) or in the text or tables of the DSR. See [Attachment 10.4](#) for the format of

<sup>1</sup> The cross sections in Attachment 25.4 and others are available as CADD cells in a folder called cdtyps.cel.



information to be provided on attached typical cross sections.

- 2.6. Right of Way - Attach the project's list of encroachments (see [FDM 12-1-20](#)) or provide the information as text or as a table in the DSR. Identify any existing R/W issues that are unique to the project.
- 2.7. Structures – Indicate existing structure I.D. number, feature crossed, type of structure, sufficiency rating, clear roadway width, railing type and whether structurally deficient or functionally obsolete. If structurally inadequate, provide inventory load rating. Large drainage structures (box culverts and multiple pipe installations) with a span length less than 20 feet should also be described and their condition noted if they are to be replaced. Also, identify other types of structures such as sign bridges, tunnels, etc.
- 2.8. Utilities - List names, types and general locations of existing utility facilities and whether underground or overhead. Any utilities that will add to the complexity of the project or are attached to an existing bridge should be mentioned in the comments section.
- 2.9. Railroad Crossings - Indicate where they exist on the project and provide the name of the railroad, the number of tracks, their function (e.g., mainline, siding or spur, switching, etc.), and crossing type (arms, signals, cross-buck signing, grade separation, etc.). If a run-out lane is present at the crossing, then provide a description of its design in the comments section.
- 2.10. Special Soils Conditions – Describe only special or unique soils conditions (such as rock, marsh, or frost susceptible soils) that have a direct effect on the design features chosen for the project. If there are no special soil conditions then state "None".
- 2.11. Unique Project Features - Describe features of environmental significance on the project including historic, archeological, hazardous materials, or things that have been identified by a community or the public as being important to their community's identity or vitality.

### 3.0 Traffic

#### 3.1. Traffic Volumes / Conditions

- 3.1.1. Attach the project's Traffic Forecast Report. (see [FDM 3-10-10](#)). For the Abbreviated DSR, just provide the existing Average Annual Daily Traffic (AADT) volume(s) in place of the Traffic Forecast Report.
- 3.1.2. If a highway capacity analysis was completed for the project, provide the existing and design year levels of service. (See [FDM 11-5-3](#), [FDM 11-15-1](#), and [FDM 11-20-1](#) for guidance on when a level of service analysis needs to be completed.). For the Abbreviated DSR, use the Meta-manger LOS data for the existing, construction year and construction year + 10 year level of service information.

#### 3.2. Crash Analysis

- 3.2.1. Provide the crash rates for the project, using a minimum of the most current 3-year period available, and compare it to the most current statewide crash rates for that type of facility (e.g. two-lane rural, rural interstate, etc.) over the same years. Include the number and severity of crashes for each year. See the region Traffic Section to obtain the most current 3-year crash information for the project site. To find the statewide average crash rates go to:

<http://wisconsindot.gov/Pages/doing-bus/local-gov/traffic-ops/manuals-and-standards/manuals.aspx>

Consultants can also request this information from the region project development staff.

- 3.2.2. Even with a crash rate lower than the average statewide crash rate, identify other crash patterns (e.g. locations with crash concentrations, crash types, weather/road/light conditions, etc.). Identify any significant crash concentration locations (e.g. intersections or short sections of highway) or other crash patterns that might exist and explain the possible causes of the crashes. If no patterns are found, that should be stated so it is known that the crashes were examined.

### 4.0 Proposed Design Criteria

Any items listed under "Section 1.0 Project Description and Need, Sub-Section 1.4 Need for Project" should be resolved by the project proposal or this section should explain why the project cannot correct them.

- 4.1. Design Class - Indicate appropriate design class from:
  - [FDM 11-15-1](#), for rural new construction or reconstruction projects
  - [FDM 11-20-1](#), for urban new construction or reconstruction

- [FDM 11-40-1](#), for rural and urban 3R projects
  - [FDM 11-44-1](#), for interstates 4R
- 4.2. Design Speed - Indicate design speeds and posted speeds pertinent to the various portions of the facility. Substandard features retained through exceptions to standards do not establish the design speed.
- 4.3. Design Criteria Outside of Desirable Standards - Identify all features for which either less-than-desirable but better than minimum or, where appropriate, greater-than-desirable design standards are proposed. Document why design criteria outside the desirable values are proposed. Include the following information.
- The social / environmental factors and impacts involved.
  - Estimated cost to upgrade existing features to meet design standards criteria or estimated cost comparisons between different options using design criteria within or outside of design standards or both.
  - Review of crash history to assess the relative safety of existing roadway features.
  - Any other information necessary to justify the use of design criteria outside the range of desirable values.
  - Any mitigation measures proposed for use in conjunction with the less-than (or greater-than) desirable design criteria.
  - If bicycle and pedestrian facilities are not being proposed, the reasons for not providing the facilities documented in this section. The documentation must show that these facilities were initially pursued for the project but were later eliminated due to such factors as significant right-of-way constraints or community impacts, excessive costs to construct the facilities, complete lack of anticipated use (not uncommon for rural projects, especially sidewalks).
- 4.4. Exceptions to Standards - Identify the number and types of features listed under the 13 Controlling Criteria list in [FDM 11-1-2](#) either outside of FDM minimum or maximum design criteria to be retained. If previously approved by Bureau of Project Development or FHWA, provide the date of their concurrence. If not previously approved, follow the steps outlined in [FDM 11-1-2](#) to develop a separate Exception to Standards Report and seek approval of any proposed exceptions to standards.
- 4.4.1 Safety Screening Analysis (SSA) and Programmatic Exception to Standards per [FDM 11-1-4](#) (3R projects) and Group I & II Pavement Strategy PM Projects)
- Certain 3R projects are covered by a Programmatic Exception to Standards Report (PESR). See [FDM 11-1-4](#) for more guidance. For 3R projects on the National Highway System, document any features that do not meet 3R standards. Specify the approximate type, location and magnitude of the non-complying features and state that the non-complying features are not a significant contributing factor in any Crash Type flags identified on the project. Also state that this makes the project eligible for the Programmatic Exception to Standards.
- Certain non-complying geometric features on Group I & II Pavement Strategy PM Projects in which the Programmatic Exception to Standards Safety Screening Analysis is not met can be retained as long as the region considers improvements to these non-complying features by way of a future HSIP funded or other improvement program funded project. The reasons why these features cannot be improved need to be documented in the DSR. Specify the approximate type, location, magnitude and proposed operational improvements proposed to be made, if any, for the non-complying features and state that future improvement projects will be pursued to improve these non-complying features. Operational improvements need to be incorporated into the PM project at these locations that are consistent with the scope of the preventative maintenance work and approved based on the analysis of crash types.
- 4.5. Typical Cross Section Elements Considered – On new construction and reconstruction projects, describe typical cross section elements considered and explain what was chosen and what was not and why. Some of the most common typical cross section elements to consider are number of driving lanes, paved shoulders, parking lanes, median or no median, median widths, turn lanes, two-way left turn lanes (TWLTLs), bicycle lanes or accommodations, sidewalks and terrace widths. For 3R projects, this section may be left blank. The extent of this section should be proportional to the magnitude of the project.

## 5.0 Proposed Design Improvement

The preferred method of providing the required geometric design information is on attached preliminary plan sheets. These sheets should label the following information:

- Mainline information: horizontal geometrics (radii, bearings, P.I. deflections, etc.), vertical geometrics (curve lengths, k values, grades, vertical clearance under structures, etc.),
- Side road / intersection / interchange information: intersection angles, side-road alignments and profiles, lane widths, median widths, shoulder widths or curb & gutter type, turn lane information (widths, bay lengths and taper lengths).

If the information is shown and labeled on the proposed plan sheets, the same information is not required in the text or tables of the DSR.

- 5.1. Improvement Type - Provide the FIIPs Legislative program number and improvement program type definition (See [FDM 3-5-2](#) for improvement program type definitions).
- 5.2. Geometrics - Provide the information for the sections listed below on the attached plan sheets or as text/tables in the DSR.
  - 5.2.1. Horizontal alignment - list any information not shown on the attached plan sheets
  - 5.2.2. Vertical alignment/stopping sight distance - list any information not shown on the attached plan sheets
  - 5.2.3. Grades\* and Vertical Clearance - list any information not shown on the attached plan sheets
- 5.3. Side roads / Intersections / Interchanges - In locations where work is proposed at or alongside-roads, provide the proposed side-road, intersection and interchange information shown below. Information is not needed at those locations where no work at or alongside-roads is proposed (i.e. milling and resurfacing the mainline pavement across an intersection without any work along the side-road).
  - 5.3.1. Sideroad information should include the roadway name, functional classification, design speed, design year traffic (AADT), design class, approach grades and pedestrian and bicycle facilities proposed. If design year traffic volumes are not known, state whether the AADT is assumed to be < 100 or > 100.
  - 5.3.2. Intersection information should include names of intersecting roadways, intersection types [Rural (A1/A2/B1/B2/C/D), Urban, Roundabout, etc. as described in [FDM 11-25-1](#) and [FDM 11-26-1](#).], proposed intersection angles, proposed traffic control (2 or 4-way stop, signal, roundabout, etc.), stopping sight distance, intersection sight distance, decision sight distance, vision triangles, and corner clearances to driveways.
  - 5.3.3. Interchange information should include the names of intersecting roadways, interchange types (Diamond, Cloverleaf, etc. as described in [FDM 11-30-1](#)), ramp types (exit or entrance, tapered, parallel, collector/distributor, left handed ramps, etc.), ramp design speeds, ramp grades, Stopping Sight Distance, Decision Sight Distance and Vision Triangles.
- 5.4. Roundabouts – State if the construction or reconstruction of a roundabout(s) is part of the recommended design. If so, then include the critical design parameters chart as an attachment to the DSR. See [FDM 11-26-20](#) for definitions of the parameters. A template of this chart is shown in [FDM 11-26-5](#), Table 1. The values to be shown are those determined at the 60% plan complete stage. This chart may be omitted if a roundabout is not part of the recommended design or there are no changes proposed in the geometric features of a pre-existing roundabout (e.g., for resurfacing or pavement replacement projects).
 

For projects including new construction or reconstruction of interchanges, state whether a roundabout was considered for the crossroad ramp terminal intersections. If it was not considered, state why not. For projects including the installation of traffic signals or the establishing of 4-way stop control at an intersection, explain how the roundabout alternative was evaluated and, if not chosen, why it was rejected.
- 5.5. Cross Section / Pavement Structure - Describe those features listed in [Attachment 10.1](#) or [Attachment 10.2](#). Provide types and thickness of pavement layers for both driving lanes and shoulders. Note what type of bicycle and pedestrian accommodation (paved shoulders, bicycle lanes, wide curb lanes, paths, sidewalks, etc.) are being provided. Discuss the project with the region bicycle and pedestrian coordinators for assistance on facility selection:

<http://wisconsin.gov/Documents/projects/multimodal/bike/coord-map.pdf>

The information may either be described in the written text of the DSR or provided on an attached finished/proposed typical cross section. See [Attachment 10.4](#) for the format of information to be provided on attached typical cross sections.

- 5.6. Street Lighting - If street lighting is proposed for the project, describe its' general location(s) and type and identify any breakaway requirements for light poles within the clear zone. (see [FDM 11-50-15](#))
- 5.7. Structures - Provide the information requested below for all structures on which work is to be completed on the project. Information is not required for existing structures on which no work is to be completed on the project.
- 5.7.1. Bridges – For each bridge structure provide the structure I.D. #, location, type, length, clear roadway width, number of spans, vertical clearance, horizontal clearance under the structure and proposed improvement. Describe the proposed treatment of existing substandard bridges. Also address the inclusion and location of items such as pedestrian over-passes, and bicycle and pedestrian accommodations.
- 5.7.2. Box Culverts and Multiple Pipe Structures – For each box culvert or multiple pipe structure, provide the structure I.D. #, location, size/type, length, number of culverts or pipes and proposed improvement. Also address the inclusion and location of items such as cattle passes, pedestrian under-passes and bicycle and pedestrian accommodations.
- 5.7.3. Retaining Walls and Noise Barrier Structures - For each retaining wall or noise barrier structure, provide structure I.D. #, location, type, length, height and proposed improvement.
- 5.7.4. Sign Bridge Structures – For each sign bridge structure, provide the structure I.D. #, location, type, length, clear roadway width, vertical clearance, horizontal clearance, clear zone width under the structure and proposed improvement.
- 5.7.5. Tunnel Structures – For each tunnel structure, provide the structure I.D. #, location, type (vehicular, bicycle, pedestrian, etc.) length, type of lighting, vertical clearance and horizontal clearance in the tunnel, safety features required (stand pipes, video surveillance, ventilation, call boxes, etc.) and proposed improvement. State what coordination has occurred with local emergency responders.
- 5.7.6. Touchdown Points on Local Bridge Program Projects - For each local bridge project that is included in the Local Bridge Program, provide the approach lengths calculated in accordance with the Policy on Local Program Bridge Approaches ([FDM 3-5 Attachment 6.1](#)). For “short” approaches, document the lengths on the DSR template in the “Comments” area of 5.7.1, Bridge Structures. For “medium” and “long” approaches, document the justification and approvals for the lengths in the same area.
- 5.8. Permanent Traffic Control – Indicate whether permanent signs will be installed as part of the project. Indicate if non-standard sign layout details are needed. (Examples of signs needing layout details are large freeway/expressway guide signs and other signs with unique messages.)
- 5.9. Transportation Management Plan – Attach the Transportation Management Plan Documentation and Request for Approval Form as an attachment to the Design Study Report. See [FDM 11-50-5](#) for information on the content of the form, guidance on how to fill out the form and for a working copy of the form.
- 5.10. Safety Enhancements/Mitigation Measures - Describe features expected to improve safety and address crash patterns on the facility. Some of the more important features are increased lane widths, increased shoulder widths, wider clear zones, longer turning radii, intersections upgraded to higher types or roundabouts, safety barrier installation or upgrades, etc. Safety enhancements/mitigation measures must be addressed for all areas on the project where crash problems exist or where exceptions to standards are proposed.
- 5.11. Real Estate – If no real estate is required on the project then just state that.
- 5.11.1. If real estate is required on the project, then provide the R/W Plat I.D. #. If known, indicate general acreage to be acquired and whether permanent or temporary. Include easements and construction permits as well as fee acquisitions. If acreage is not known, provide some other indicator of the extent of acquisitions (i.e. strip takings). Indicate the number and type of relocations.
- 5.11.2. Describe encroachments and what is to be done about them in either the written text/table of the DSR or attach a list of encroachments to the DSR. Describe access control proposals, if applicable. (see [FDM 12-1-20](#))
- 5.12. Utilities – State whether the project is a Trans 220 utility project or not. Explain any unique or special design features that result from the need to accommodate any existing or planned utility facilities.

Identify major utility agreements when required. A description of proposed utility locations need not be given unless they are unique or add significantly to the complexity of the project.

- 5.13. Railroads - Describe any improvements to railroad facilities needed. If a run-out lane is needed at the crossing, then provide a description of its design. Identify railroad agreements when required.
- 5.14. Financing and Scheduling – Provide construction ID #s, most recent project cost estimate, the type of funding and their percentages (Federal, State, Local, etc.), proposed time frame for construction, ties to other work or projects (tied contracts), description of Incentive/Disincentive clauses; and any major amounts of non-participating work and any deferred construction work on PM projects.
- 5.15. Unique Project Features
  - 5.15.1. Hazardous Waste - Include a statement regarding known or potential hazardous waste areas required for construction. Describe proposed remediation efforts as well as any new or unusual products or techniques.
  - 5.15.2. Environmental Commitments – Describe features incorporated due to historic, archeological, or other environmental commitments. Attach the Environmental Commitments Basic Sheet of the Environmental Screening Worksheets as an appendix to the DSR when applicable. Identify and describe the locations of environmentally sensitive areas and any unusual erosion control and storm water management measures.
  - 5.15.3. Community Sensitive Design/Public Involvement - Describe any features to be incorporated into the project due to community sensitive design/public involvement coordination.
  - 5.15.4. Value Engineering - Describe the results of any value engineering (V.E.) studies and what V.E. recommendations are to be incorporated on the project.

## 6.0 Synopsis

Provide completion/approval dates for the following. Provide other relevant information as needed.

- Concept Definition Report (see [FDM 11-4-1](#))
- Speed Limit Change Declaration (Required on all projects in which speed limit changes from existing posted speeds are proposed. See Region Traffic Section)
- Environmental document – Indicate document type (see [FDM 21-5-1](#))
- Public Hearing/Public Information Meetings (see [FDM 6-10-1](#) and [FDM 6-5-10](#))
- SHPO Involvement (see [FDM 5-10-5](#))
- DNR Involvement (see [FDM 5-10-1](#))
- Agriculture Impact Statement (see [FDM 5-10-30](#))
- Pavement Design Report (see [FDM 14-15-1](#))
- Roundabout Review (see [FDM 11-26-5](#))
- Transportation Management Plan (see [FDM 11-50-5](#))
- Permits Required - Indicate Type (e.g. 401,404) and expiration date. (see [FDM 21-30-1](#) and [FDM 21-30-5](#))
- Value Engineering Study (see [FDM 3-15-15](#))
- Status of Statutory Actions (e.g. STH change) - Indicate type of action and who approved or accomplished it. (see [FDM 4-5-1](#), [FDM 4-5-5](#), [FDM 4-5-10](#), and [FDM 4-5-15](#))

## 7.0 Attachments

- Project Location / Overview Map
- As-built Plan Sheet(s) (For 3R projects only)
- Existing Typical Cross Section(s)
- List of Encroachments (If applicable) (see [FDM 12-1-20](#))
- Programmatic Exceptions to Standards Screening Analysis (If applicable) (see [FDM 11-1-4](#))
- Traffic Forecast Report (see [FDM 11-5-2](#))
- Preliminary Plan Sheet(s)
- Critical Design Parameters Chart for each proposed roundabout (If applicable) (see [FDM 11-26-5](#))
- Finished / Proposed Typical Cross Section(s)
- Environmental Commitments Basic Sheet (If applicable) Include coordination letter (see [FDM 21-15-5](#))



- Transportation Management Plan Documentation and Request for Approval Form (see [FDM 11-50-5](#))
- Roadside Hazard Analysis form template (see [FDM 11-45-3](#))

**LIST OF ATTACHMENTS**

<a href="#">Attachment 10.1</a>	Design Study Report Template
<a href="#">Attachment 10.2</a>	Abbreviated Design Study Report Template
<a href="#">Attachment 10.3</a>	Group III Pavement Strategies Preventative Maintenance Design Study Report Template
<a href="#">Attachment 10.4</a>	Sample Cross Sections