

130 Conceptual Design and Environmental Review

130.1 General

This stage of project development, which establishes study scoping and conceptual design, is the process whereby the improvement needs identified in the Statewide Transportation Improvement Program (STIP) are more thoroughly defined and improvement alternatives are developed and evaluated as appropriate. This is called Phase I of the New Mexico Department of Transportation (NMDOT) project development process and can be completed with either an NMDOT Scoping Report or a corridor-level planning document. Typically, a Scoping Report is completed for general maintenance projects or minor spot improvements that do not require consideration of alternatives, addition of lanes, or major changes to roadway geometry. Scoping Reports define the general design concept and footprint of a project to a level sufficient for documentation under the National Environmental Policy Act (NEPA).

The [Location Study Procedures](#), describe the NMDOT's process for corridor-level planning, which is typically conducted for projects involving new roadways or major changes to existing roadways that alter the alignment, add traffic lanes or auxiliary lanes greater than one-half mile in length, and/or substantially alter roadway access. The corridor-level planning effort can be accomplished with either an alignment study or a corridor study. An alignment study is prepared for less complex actions where the roadway location is already established, whereas corridor studies are prepared for more complex actions where the route location is not established or the

magnitude of improvements may result in a substantial change to an existing alignment. While the type of study may vary, the general approach for both study types is the same. Both alignment and corridor studies involve establishing the project purpose and need; identifying and developing alternatives; assessing cost, right-of-way, engineering, environmental, social, and cultural effects; and coordinating with stakeholder agencies and the public. Collectively, these steps form Phase IA and IB of the process. By the end of the alignment/corridor study, the alternative(s) considered in the environmental document (Phase IC) should be developed to a point where the footprint is established and environmental impacts can be assessed to a level sufficient for documentation under the NEPA.

The Phase I Scoping Report or alignment/corridor study establishes the design concept and scope for a proposed action and is used to obtain authorization for federal or state funding through the approval of an environmental clearance document. Subsequent project phases include preliminary design (Phase ID), final design (Phase II), and construction (Phase III). Agency coordination and public involvement are crucial elements for each phase of project development and must begin with the long-range planning process and continue through the study phase and into final design and construction. Public involvement efforts are described in more detail in Chapter 150 of this manual.

130.2 References

The following references provide additional details concerning environmental coordination.

- [23 Code of Federal Regulations \(CFR\) 771](#) Environmental Impact and Related Procedures.

130.2.1 NMDOT-Specific References

The NMDOT has developed the following resources that provide specific information about environmental compliance for transportation projects in New Mexico. This chapter provides a general overview of NMDOT's conceptual design and

environmental process, but the documents identified below provide specific details.

- NMDOT [Location Study Procedures](#), current edition - This guidebook has been prepared to assist transportation engineers, planners, and other practitioners in conducting alignment and corridor studies for NMDOT projects. While the guidebook provides the information needed to cover the most complex transportation projects, it emphasizes the processes appropriate for the most common project scopes. The guidebook is also intended to establish consistency in how location studies are prepared, reviewed, and processed by the NMDOT.
- [IDD-2013-01 Categorical Exclusion \(CE\) Checklist](#) - This Infrastructure Design Directive (IDD) provides the checklist that is required for NMDOT projects being cleared with a CE.

130.3 Definitions

The following select definitions are from federal environmental regulations and NMDOT guidance. For a full listing, refer to 23 CFR 771, 40 CFR 1508, and the NMDOT [Location Study Procedures](#).

- **Alternatives** - Potential solutions to a transportation problem. Alternatives may consist of different alignments, lane configurations, types of access control, or transportation modes and strategies (such as transit, high occupancy vehicle lanes, systems management, or demand management).
- **Categorical Exclusion (CE)** - A category of actions which do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in procedures adopted by a federal agency and for which, therefore, neither an environmental assessment (EA) nor an environmental impact statement (EIS) is required. Any procedures under this section shall provide for extraordinary circumstances in which a normally excluded action may have a significant environmental effect.

- **Environmental Assessment (EA)** - A concise public document for which a federal agency is responsible that serves to:
 - Briefly provide sufficient evidence and analysis for determining whether to prepare an EIS or a Finding of No Significant Impact (FONSI)
 - Aid an agency's compliance with NEPA when an EIS is not necessary
 - Facilitate preparation of an EIS when it is required
 - The EA shall include brief discussions of the need for the proposal, of required alternatives, of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted.
- **Environmental Impact Statement (EIS)** - A detailed written statement on a major action which significantly affects the quality of the human environment, as required by Section 102(2)(C) of NEPA. It includes a discussion of purpose and need, alternatives, environmental conditions and effects, and public involvement activities.
- **Finding of No Significant Impact (FONSI)** - A document by a federal agency briefly presenting the reasons why an action will not have a significant effect on the human environment and for which an EIS therefore will not be prepared. It shall include the EA or a summary of it and shall note any other environmental documents related to it. If the EA is included, the finding need not repeat any of the discussion in the assessment but may incorporate it by reference.
- **National Environmental Policy Act (NEPA) Process** - All measures necessary for compliance with the requirements of Section 2 and Title I of NEPA.
- **Purpose and Need** - The project purpose is a broad statement of the overall objective to be achieved by a proposed action. The project purpose should be consistent with the goals and objectives of pertinent transportation-related planning policies. Need is a more detailed explanation of the specific transportation problems that exist, or are expected to occur in the future, such as pavement condition, geometric deficiencies, traffic congestion, etc.

- **Record of Decision (ROD)** - A concise public document that records a federal agency's decision(s) concerning a proposed action for which the agency prepared an EIS. The ROD identifies the selected alternative, presents the basis for the decision, identifies all alternatives considered, specifies the environmentally preferable alternative, and provides information on the adopted means to avoid, minimize and compensate for environmental impacts.

130.4 Scoping Report and Preliminary Field Review

Because Scoping Reports are normally completed for less complicated projects that do not involve an analysis of alternatives, they require a lesser level of documentation than an alignment/corridor study. The sequence of work for projects requiring a Scoping Report includes:

- Prepare draft Scoping Report
- Conduct preliminary field review
- Prepare final Scoping Report

The draft and final Scoping Reports should include a project description and a summary of key information including the project setting and existing conditions, design criteria and parameters, safety considerations, proposed improvements, and factors that could affect the project schedule. The outline for an NMDOT Scoping Report is attached to the end of this chapter and discussed below.

The project description for Scoping Reports should include general project data such as control and project number, type of work, and project location and termini, as well as a general statement of the project purpose and need, a description of the project site, survey and right-of-way requirements, the environmental documentation level of effort, and an initial cost and schedule estimate.

The existing conditions section should accurately describe the current facility including the typical roadway section, pavement condition, horizontal and vertical alignment, intersections and other access points, right-of-way width, structures, utilities,

environmental factors, posted speed limit, traffic volumes and level of service, driveway inventory, any previous construction, Americans with Disabilities Act (ADA) elements, railroad considerations, and special challenges. Safety considerations should also be documented in the Scoping Report and should include the crash history, geometrics, and roadside conditions for the project area. Pedestrian and bicyclist safety countermeasures must also be considered when safety and /or ADA facilities are under consideration for the project scope. See Chapter 1200, Pedestrian Facilities.

While design criteria and parameters for the project will typically be consistent with the latest version of design standards, design variances and exceptions may also need to be identified and justified. Design parameters may include consideration of functional classification, posted and design speeds, projected traffic volumes, driving lane and shoulder width, stopping sight distance, and other considerations identified in the attached outline.

The proposed improvements should be clearly identified in the Scoping Report. They should adhere to the stated design parameters and address any safety concerns and deficiencies identified in the existing conditions write-up. Topics to be addressed when developing proposed improvements include the typical section, structures, horizontal and vertical alignment, intersections and turnouts, safety, drainage, detours and traffic control, signalization, landscaping, multimodal elements, and other special or unique project elements.

Finally, the Scoping Report should identify factors that could affect the project schedule. This could include survey requirements, environmental and cultural resource requirements, right-of-way needs, utility conflicts, and agency coordination.

A preliminary field review should be held after the draft Scoping Report is circulated for comments and before the final Scoping Report is published. The purpose of the preliminary field review is for key discipline experts to see the project area, verify the findings of the draft Scoping Report, and identify any issues in the field that may be challenges for the project. The preliminary field review is an

Preliminary Field Review

A preliminary field review should be held after the draft Scoping Report is circulated for comments and before the final Scoping Report is published.

important part of the early project development process because it provides an opportunity for discipline leads to identify and see potential issues in the field before the final Scoping Report is issued. The Project Development Engineer (PDE) for the project should develop the list of attendees for the preliminary field review. Invited staff members should include:

- PDE, District staff, Design Bureaus (Geotechnical, Pavement, Construction, Traffic, Drainage, Environmental, Bridge, Right-of-Way, Utilities, Survey, Planning, as applicable)
- Consultant team members (if applicable)
- FHWA (if federally funded)
- Other stakeholders (tribes, local governments)

130.5 Location Study Procedures

Below is a summary of the goals and objectives for the work that occurs in Phases IA and IB of the NMDOT alignment or corridor study process. For a full description of the requirements of Phases IA and IB, refer to Chapter 3 of the [Location Study Procedures](#).

130.5.1 Phase IA, Initial Evaluation of Alternatives

Phase IA is the initial evaluation of alternatives. The primary objectives of this phase are to:

- Establish the need for action
- Develop a range of potential alternatives to achieve the need
- Eliminate alternatives that are not feasible or are clearly inferior to other options

Other important elements of Phase IA are the development and implementation of a context sensitive agency coordination and public involvement program, determining the appropriate level of effort for subsequent environmental documentation, and the development of concept designs, including typical sections and line diagrams.

130.5.2 Phase IB, Detailed Evaluation of Alternatives

Phase IB is the detailed evaluation of alternatives. This phase is intended to further evaluate and refine the alternatives advanced from Phase IA. This phase involves the development of additional

information such as conceptual engineering plans, right-of-way requirements, costs, performance data, environmental and social effects, and other data. During Phase IB, information that is relevant to the decision-making process is generally developed at a level of detail sufficient for an equitable comparison of each alternative and for the identification of a preferred alternative or alternatives to advance to Phase IC.

130.5.3 Combined Phase IA/IB Study

For the majority of NMDOT projects, especially those with a limited range of alternatives, Phases IA and IB are conducted as a single step. This is usually the case in studies where the improvement alternatives are limited in number and similar in design concept and scope. However, it is important that the objectives of each distinct phase are still achieved and documented when this approach is followed.

At the conclusion of Phase IB, FHWA should also be formally engaged in the study. FHWA should concur with an executive summary or checklist that covers the Phase IA/IB process and identifies alternatives to advance into Phase IC.

130.6 Phase IC, Environmental Documentation and Processing

Phase IC is the environmental documentation and processing phase. This step in the process satisfies the NEPA documentation requirements for the project. For the vast majority of projects, this phase will include the preparation of a CE; however, complex projects may require an EA or EIS. The [Location Study Procedures](#) provides additional guidance on establishing the appropriate environmental level of effort.

Regardless of the NEPA level of effort, affected and interested agencies, stakeholders, and the general public should be consulted. For a CE, this could involve letters describing the project and environmental concerns, while an EA or EIS would need to be circulated for review and comment. Commitments and changes to the project, as appropriate, which result from agency and public comments, are then presented to FHWA for final action.

For projects involving a CE, Phase IC culminates with FHWA approval of the document. Projects involving an EA are concluded with a FONSI or determination that an EIS is required, and an EIS would result in a ROD. The approved CE, FONSI, or ROD serves as authorization by FHWA for right-of-way acquisition, final design, and construction.

130.7 Documentation

Documentation requirements vary depending on the type of project and its complexity. However, basic documentation requirements for conceptual design and environmental review include:

- Draft and Final Scoping Report and/or corridor-level planning document (alignment study or corridor study), see the [Location Study Procedures](#) for more details.
- Environmental documentation - CE, EA, or EIS and supporting studies and documentation.

Scoping Report Content

1. Project Summary/General Description

- A. Project data
 - Control number
 - Project number
 - Type of work
 - Project purpose and need
 - Location description
 - Posted route
 - Milepost
 - Project length
 - NMDOT district
 - County
 - Functional classification
 - Terrain type
 - Fiscal year (study, design, construction)
 - Program (funding category)
- B. Site description (beginning of project to end of project)
- C. Survey requirements (location and/or property survey)
- D. Right-of-way requirements (include temporary construction permits and construction maintenance easements)
- E. Environmental level of effort
- F. Estimated project development time (from scoping to letting)
- G. Estimated project construction schedule and budget

2. Existing Conditions

- A. Typical roadway section
 - Driving lanes per direction
 - Auxiliary lanes (acceleration, deceleration, and turning lanes) and medians
 - Shoulders (including rumble strips/stripes) and/or curb and gutter
 - Surfacing tapers
 - Multimodal facilities (including transit, pedestrian and bicycle facilities)
- B. Roadside slopes
- C. Geotechnical conditions
- D. Surfacing type and condition
- E. Horizontal alignment
- F. Vertical alignment
- G. Major and minor roadway intersections
- H. Right-of-way width

- I. Major structures (> 20 foot span)
- J. Other structures (< 20 foot span, may include fencing, retaining walls, cattle guards, concrete box culverts, safety barriers, etc.)
- K. Roadway lighting
- L. Traffic control and management devices (traffic signals, intelligent transportation system [ITS] equipment, special traffic signs, etc.)
- M. Utilities (inventory and owners)
- N. Environmental factors
- O. Posted speed limit and design speed
- P. Previous construction
- Q. Driveway and entrances (inventory)
- R. Traffic volume and fleet characteristics
- S. Level of service
- T. Facilities and compliance with the Americans with Disabilities Act (ADA)
- U. Railroad facilities (identify, should include railroad right-of-way, crossings, etc.)
- V. Special challenges
- W. Erosion control and landscaping installations
- X. School crossings

3. Design Parameters

- A. Functional classification(s) and National Highway System (NHS) status
- B. Proposed posted speed limit and design speed
- C. Design year traffic volumes and fleet characteristics
- D. Driving lane width
- E. Shoulder width
- F. Surfacing taper width
- G. Stopping sight distance
- H. Roadside clear zone width
- I. Horizontal geometry
- J. Vertical geometry
- K. Intersection design parameters
- L. Driveway design parameters
- M. Route continuity
- N. ADA requirements
- O. Multimodal facilities (including transit, pedestrian and bicycle facilities)
- P. Roadway lighting requirements

4. Safety Considerations

- A. Crash history
- B. Geometrics
- C. Roadside conditions

5. Proposed Improvements

- A. Typical section (including surfacing type and thickness)
- B. Major structures
- C. Other structures
- D. Horizontal alignment
- E. Vertical alignment
- F. Intersections
- G. Turnouts
- H. Safety
- I. Drainage and erosion control
- J. Design exceptions/variances
- K. Detours and traffic control
- L. Warrants and signalization
- M. Landscaping and irrigation
- N. Pedestrian/bicycle
- O. Special issues or unique project elements

6. Factors Affecting Development Time

- A. Survey requirements
- B. Environmental requirements and certification
- C. Archaeological requirements
- D. Historic preservation requirements (include the State Historic Preservation Officer)
- E. Right-of-way considerations and certification
- F. Utility relocations and/or hookups and utility certification
- G. Outside agency involvement and coordination
- H. Railroad facilities and certification
- I. ITS facilities and certification

7. Attachments

- A. Statewide location map
- B. Vicinity map of project limits
- C. Typical sections

- D. Traffic projections
- E. Capacity analysis
- F. Crash summary
- G. Horizontal and vertical curve analysis
- H. Pavement design
- I. Drainage report
- J. Detailed project schedule
- K. Preliminary cost estimate
- L. Geotechnical report
- M. Environmental documentation
- N. Right-of-way and utilities report/s
- O. STIP information
- P. Road Diet decision matrix/evaluation

SHRP 2, R10 Project Management Documentation for Project Scoping/Location Study Procedures and Preliminary Design

SHRP 2, R10 Project Management Documentation for Project Scoping/Location Study Procedures and Preliminary Design

The exercises below comprise the work that should be done by the project manager in collaboration with other project team members to update project and risk management information developed during project definition. The intent of this work is not to create an onerous process for the project team, rather it is to help refine project and risk management strategies to ensure successful project delivery. As the project development and design process progresses, project complexities and risks can change. New project issues can emerge or project risks identified earlier in the process can be reduced or become more acute. The purpose of revisiting the initial project complexity assessment is to provide an updated snapshot of the project early enough in project development that project and risk management strategies can be modified to meet the updated needs of the project. Updating the SHRP 2, R10 project management documentation also helps to document project delivery successes. Information that is updated during this phase includes:

1. Complexity map
2. Project action plan

Work to update the complexity map and project action plan should be done near the end of project scoping or Location Study Procedures and Preliminary Design phases. Documentation during these phases can also include the development of a draft project cost and finance plan. This is an optional tool that can be used for projects that have identified complex cost and financing issues associated with their project.

Complexity Map Update

This series of exercises involves work needed to update the initial complexity mapping documentation completed as part of project definition.

Complexity Dimension Ranking Worksheet

Please rank (1 to 5) the complexity of the following dimensions (cost, schedule, technical, context, and financing) with 5 being the most complex and 1 being the least complex. Do not assign equal values to any dimension (no "ties" in the rankings).

	1 (least complex)	2	3	4	5 (most complex)
Cost	<input type="checkbox"/>				
Schedule	<input type="checkbox"/>				
Technical	<input type="checkbox"/>				
Context	<input type="checkbox"/>				
Financing	<input type="checkbox"/>				

Dimension Rating Worksheet

Indicate the overall complexity for each dimension by placing an “X” for each on the scale below. No “ties” can be assigned to any dimension. Note that the dimension rating becomes more complex the higher the rating. A score of 50 would represent a typical level of complexity for a dimension.

Exhibit A130-1

Dimension Rating Exercise¹

Dimension	Scale				
Cost Complexity	0	25	50	75	100
	Minimal		Average		High
Schedule Complexity	0	25	50	75	100
	Minimal		Average		High
Technical Complexity	0	25	50	75	100
	Minimal		Average		High
Context Complexity	0	25	50	75	100
	Minimal		Average		High
Financing Complexity	0	25	50	75	100
	Minimal		Average		High

¹ The complexity ranking worksheet on the previous page and Exhibit A130-1 are incorporated from the [Guide to Project Management Strategies for Complex Projects](#)

Do your ranks and ratings correspond? List the ranks and scores in Exhibit A130-2 below:

Exhibit A130-2

Complexity Map Exercise – Comparing Ranks and Relative Score²

Dimension	Rank	Rating/Relative Score
Cost		
Schedule		
Technical		
Context		
Financing		

² Exhibit A130-2 was modified from the [Guide to Project Management Strategies for Complex Projects](#)

Complexity Map

You will need to use the [Excel file that is provided here](#) under the NMDOT Design Manual to create the complexity map for your project using the information identified above in Exhibit A130-2. Compare it to the complexity map you developed during previous project development phases.

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Updated Project Action Plan

Use the worksheets below to create an updated project action plan based on information created as part of project definition.

Exhibit A130-3

NMDOT Updated Project Action Plan¹

More Complex to Less Complex	Complexity 5 (Most Complex)	Complexity 4	Complexity 3	Complexity 2	Complexity 1 (Least Complex)
Success factor					
Who is responsible?					
Are there adequate technical and human resources in place?					
When are resources needed?					
What are the interim milestones?					
What actions will be taken?					
Can the success factor be achieved using existing systems and practices? (Yes or No, If the answer is no, a specific action plan is needed, see the worksheet on the next page)					

¹ NMDOT adapted this form from *NMDOT adapted this form from several worksheets provided in the SHRP 2 Project Selection and Complexity Map Exercise, Appendix A, July 26-27, 2016*

Develop a Targeted Action Plan

Use Exhibit A130-4 below to develop a targeted action plan to address existing systems and practices that are road blocks to successful project delivery.

Exhibit A130-4

NMDOT Targeted Action Plan Worksheet¹

Targeted Plan	Action Plan Description	Constraint ²	Who is the champion?	What other plans depend on successful outcomes?	Deadline for action	Project management solutions considered ³
1						
2						
3						
4						

¹ This sheet only needs to be completed if the answer was "No" on the previous sheet to the question "Can the goal be achieved using existing systems and practices? This sheet was incorporated from SHRP 2 Project Selection and Complexity Map Exercise, Appendix A, July 26-27, 2016

² Indicate who controls the constraint, the public, legislature, railroad, etc.?

³ This refers to the 13 project management solutions contained at the end of Chapter 120 of the Design Manual. Project solutions in addition to the 13 solutions may also be considered and documented here.

Based on the funding gap identified above, use the worksheet below to identify possible funding sources.

Exhibit A130-6

Project Funding Gaps and Action Items¹

Possible Funding Source	Amount of Funding Available	Likelihood of Obtaining Funds?	Limitations of Funding Source	Action Items

¹ NMDOT developed based on information from the SHRP 2 Project Selection and Complexity Map Exercise, Appendix A, July 26-27, 2016

1. Based on the information identified above, the total possible additional funding identified = **<INSERT AMOUNT HERE>**

2. Has the funding gap been addressed?

The following technical resources are available for more in-depth information about preparing early cost models and a finance plan¹.

- NCHRP 8-57: Improved Framework and Tools for Highway Pricing Decisions. 2009.
- NCHRP 20-24(13): Innovative Financing Clearinghouse. 2002.
- NCHRP 20-24(14) H: Innovative Finance. 2001.
- NCHRP 20-24(26) A: Finance Trends—Trends in Non-Federal Funding and Debt. 2002.
- NCHRP 20-24(26) B: Trends in Non-Federal Funding and Debt. 2002.
- NCHRP 20-24(51) C: State DOT Funding and Finance. 2006.
- NCHRP 20-24(55): National Summit on Future Transportation Funding and Finance Strategies: States and Metropolitan Regions. 2008.
- NCHRP 20-24(62): Communications Strategies to Increase Understanding of Funding and Revenue Needs for the Nation’s Transportation System. 2010.
- Innovative Transportation Financing: A Report on the Results of a National Survey by the American Association of State Highway and Transportation Officials. AASHTO, 1995.
- Comparing State DOTs’ Construction Project Cost and Schedule Performance: 28 Best Practices from Nine States. AASHTO, 2007.
- Report on Long-Term Financing Needs for Surface Transportation. AASHTO, 2007.
- Transportation—Invest in Our Future: Revenue Sources to Fund Transportation Needs. AASHTO, 2007.
- Highway Program Financing. Course Number FHWA-NHI-152072.
- Highway Program Financing—Executive Session. Course Number FHWA-NHI- 152072A.
- FHWA Role in Public-Private Partnerships. Course Number FHWA-NHI-310116.

¹ Transportation Research Board, Guide to Project Management Strategies for Complex Projects, S2-R10-RW-2.

