INTERSTATE SYSTEM ACCESS INFORMATIONAL GUIDE

AUGUST 2010

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

OFFICE OF INFRASTRUCTURE

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LIST OF ACRONYMS

23 U.S.C.111	Title 23, United States Code, Highways, Section 111
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
BPR	Bureau of Public Roads
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMP	Congestion Management Process
DOT	Department of Transportation
DSS	Decision Support System
EDTM	Efficient Transportation Decision Making Process
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration
FR	Federal Register
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FTP	Florida Transportation Plan
HCM	Highway Capacity Manual
HOV	High Occupancy Vehicle
HV	Hourly Volume
IAR	Interstate Access report
IHSDM	Interactive Highway Safety Design Module
IJR	Interchange Justification Report
IJS	Interchange Justification Study
IMR	Interchange Modification Report
IOAR	Interchange Operational Analysis Report
ISAT	Interchange Safety Analysis Tool
ISTEA	Intermodal Surface Transportation Efficiency Act
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation Systems
LOS	Level of Service
LRTP	Long-Range Transportation Plan
MIS	Major Investment Studies
MPO	Metropolitan Planning Organization

MUTCD	Manual on Uniform Control Devices
NAAQS	National Ambient Air Quality Standards
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
NHS	National highway System
pcphpl	Passenger Cars Per Hour Per Lane
PD&E	Project Development and Environmental Studies
ROW	Right-of-Way
RSA	Road Safety Audit
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SIP	State Implementation Plan
SOV	Single Occupant Vehicle
STIP	Statewide Transportation Improvement Plan
TEA-21	Transportation Equity Act for the 21st Century
TIP	Transportation Improvement Plan
TMA	Transportation Management Area
TOT	Transportation Operations Team
TRB	Transportation Research Board
TRCC	Traffic Coordinating Committee
TSM	Transportation System Management

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CHAPTER ONE: OVERVIEW

1.1 INTRODUCTION

The Interstate System was established for the movement of both military and civilian equipment, freight, and personnel over long distances between and within States. From the beginning, to over the next 50 years and to the present day, the FHWA is charged with administering the program to design and construct the Interstate System. It is the FHWA's continuing responsibility to protect both the structural and operational integrity of the Interstate System.

However, as the years have passed, the role, uses, and needs that the Interstate System serves as part of our transportation system has greatly expanded. Certainly the need to move both freight and people efficiently and safely long distances remains as its primary purposes. As part of the National Highway System (NHS), the Interstate System now addresses a broad range of issues including intermodal connectivity, economic development, commuter traffic, environmental concerns.

1.1.2 Purpose

The purpose of the Interstate System Access Informational Guide is to provide both FHWA field staff and the State Departments of Transportation (DOTs) guidance on how and what should be addressed in requests for new or modified access to the Interstate System. Although maintaining the operational integrity and safety of the Interstate System is of the utmost importance, addressing the new and expanded goals of our transportation system is important as well.

The Interstate System Access Informational Guide recognizes that the Interstate System is not only a part of the National Highway System, but is also a part of regional and local transportation systems. The Guide provides information and methods for analyzing access requests by considering the needs of the system on a national, State, and local level without compromising the integrity of the Interstate System.

The Guide provides the information for the FHWA to make informed decisions on requests for new or modified access to the Interstate System. It recognizes that interchange access requests should be evaluated as part of an integrated transportation system. The type of analysis necessary will vary on a request-by-request basis. At a minimum, the system analysis will include upstream and downstream interchanges, as well as the local road system feeding into the affected interchanges.

Even more important is for the Interstate System Access Informational Guide to expand not only the *geographic scope* of the access management analysis, but also to expand the *content* of the analysis. The impact of access changes on the operations of the Interstate System are important; also of equal importance is the impact the changes will have on the system as a whole, the environment, potential economic development, the local street system, and safety, both on and off of the Interstate System.

1.1.3 Goals

The goals of the Interstate System Access Informational Guide are to provide technical and policy support in the following areas:

- The understanding of The Policy and its application.
- The FHWA review and approval process.
- The justification for changes in Interstate System access.
- The issues to consider when analyzing Interstate System access changes.
- The resources available to assist in analyzing Interstate System access changes.

1.2 SCOPE OF GUIDE

While this Guide provides a basis for the uniform analysis through the application of criteria and standards that are outlined herein, the unique conditions that exist with each project require the application of sound engineering judgment, practice, and analysis. This Guide does not present new research; it provides information on existing practice to support the planning, design, and safety analysis of proposed changes to Interstate System access. As new and better techniques for the analysis of changes in access emerge, these tools should be used as appropriate based on FHWA review and coordination.

1.3 ORGANIZATION OF THIS GUIDE

The Guide is organized into two parts:

PART ONE: PURPOSE AND POLICY

- Chapter One: Overview – This chapter provides a summary of the purpose, objectives, goals, and organization of this Guide.

- Chapter Two: FHWA Policy – This chapter discusses the policy supporting the need for the Interstate System Access Change Requests and the policies that support the Interstate System. The applicability and other key points, such as what constitutes an access point, are discussed. The following elements also are discussed: the purpose; basis for justifying access changes; range of factors and issues to analyze in assessing impacts of proposed changes; how issues and analysis may vary based on conditions; and environment-related (e.g., rural, urban) issues.

- Chapter Three: FHWA Review and Action – This chapter provides guidance for the review and processing of Interstate System Access Change Requests. The roles of the FHWA, the State DOT, and other stakeholders are discussed.

PART TWO: TECHNICAL ANALYSIS FOR CHANGES IN INTERSTATE SYSTEM ACCESS

- Chapter Four: Planning Considerations – This chapter addresses the importance of the Interstate System Access Change Request within the planning process and how it relates to transportation plans and programs. This chapter also addresses the typical system and corridor planning that takes place between the development of a transportation plan and the decision by the agency to initiate an actual improvement project.

- Chapter Five: Environmental Considerations – This chapter discusses the extent of environmental documentation and the analysis required as part of an Interstate System Access Change Request.

- Chapter Six: Design Considerations – This chapter provides a summary of the role of geometric design in identifying and evaluating impacts of various design elements.

- Chapter Seven: Safety Considerations – This chapter discusses the safety issues to be considered, and provides a framework for analysis.

- Chapter Eight: Operational Considerations – This chapter provides summary of the operations issues that include the performance measures, thresholds, selection of the proper analysis tools, documentation of the analysis, and the relationship of operations to design, safety, and the environmental issues.

- Chapter Nine: Technical Resources – This chapter provides Web links and a list of available resources.

CHAPTER TWO: FHWA POLICY

2.1 INTRODUCTION

Title 23, United States Code, Highways Section 111 (23 U.S.C. 111) provides that all agreements between the Secretary of the U.S. Department of Transportation and the State DOTs for the construction of projects on the Interstate System shall contain a clause providing that the State will not add any points of access to, or exit from, the project in addition to those approved by the Secretary in the plans for such a project without prior approval of the Secretary. The Secretary has delegated the authority to administer 23 U.S.C. 111 to the Federal Highway Administrator pursuant to 49 CFR 1.48(b)(10). A policy statement consolidating a series of policy memoranda including guidance for justifying and documenting the need for additional access to the existing sections of the Interstate System, was published in the Federal Register on October 22, 1990 (55 FR 42670) entitled "Access to the Interstate System" and was then modified on February 11, 1998 (63 FR 7045) and on August 27, 2009 (74 FR 20679).

2.2 FHWA'S INTEREST WITH CHANGES IN INTERSTATE SYSTEM ACCESS

It is in the national interest to preserve and enhance the Interstate System to meet the needs of the 21st Century by assuring that it provides the highest level of service in terms of safety and mobility. Full control of access along the Interstate mainline and ramps, along with control-of-access on the local roadway network at interchanges, is critical to providing such service. Therefore, FHWA's decision to approve new or revised access points to the Interstate System should be supported by substantiated information justifying and documenting that decision.

Although the State DOTs own and operate the Interstate System, FHWA is required to approve all new access or changes in access points pursuant to 23 U.S.C. 111. The FHWA's interest is to ensure all new or revised access points:

- Are considered using a decision-making process that is based on information and analysis of the planning, environmental, design, safety and operational affects of the proposed change.
- Support the intended purpose of the Interstate System.
- Do not have an adverse impact on the safety or operations of the Interstate System and connecting local roadway network or other elements of the transportation system.
- Are designed to acceptable standards.

2.3 ACCESS POINTS DEFINED ON THE INTERSTATE SYSTEM

Each entrance or exit point, including "locked gate" access and access to collector-distributor roads or ramps, is considered to be an access point. For example, a diamond interchange configuration has four access points.

Interchange reconfiguration is considered to be a change in access even though the number of actual points of access may not change. For example, replacing one of the direct ramps of a diamond interchange with a loop, or changing a cloverleaf interchange into a fully directional interchange is considered revised access.

Access to the Interstate System is allowed only by interchanges at selected public roads. *Locked gate access* through the right-of-way fence may be allowed in rare instances as required by maintenance or utility forces in remote areas, between widely spaced interchanges, for emergency management or medical personnel, or for temporary construction access.

Access by vehicles, pedestrians, and bicycles to the Interstate System through rest areas, information centers, or weigh stations from outside the Interstate control of access right of way is prohibited. The only allowed exception is

for access to adjacent publicly owned conservation and recreation areas if access to these areas is only available through the rest area, as allowed under 23 CFR 752.5(d).

Pedestrian and bicycle access to the Interstate System is not prohibited by Federal law or regulation. However, many states may and do prohibit pedestrians and bicycles on their Interstates through the control of access.

2.4 APPLICABLE FACILITIES

The Policy is applicable to new or revised access points to the existing Interstate System regardless of the source of funding of the original construction or source of funding for the proposed access points. This includes routes incorporated into the Interstate System under the provisions of 23 U.S.C. 103(c)(4)(A) or other legislation.

This Policy also applies to routes approved to be part of the Interstate System in the future under 23 U.S.C. 103(c)(4)(B). Since the intention to add the route to the Interstate System has been formalized by agreement, any new or significant changes to proposed access points (beyond those covered in the agreement), regardless of funding, must be approved by FHWA.

The Policy is not applicable to toll roads incorporated into the original Interstate System under 23 U.S.C. 129 for connectivity. The only exceptions are for segments on these toll roads in locations where Federal-Aid Highway Funds have been expended or Federal funds will be used for the change in access.

Although the analysis described in The Policy can be applied to access requests for non-Interstate freeways or other access controlled highways, they are not required. Several State DOTs have adopted the intent of The Policy as a standard for supporting access decisions on non-Interstate freeways.

It is important to note that Congressionally directed funding for a change in access has no bearing on consideration of an Interstate System Access Change Request. The approval of funding for a project does not change the requirements for consideration of a proposed change in access or acceptance by FHWA.

2.5 INTERSTATE SYSTEM ACCESS CHANGE REQUESTS

For the purpose of this Guide, the term “Interstate System Access Change Request” is used to describe the formal request made to FHWA by a State DOT. These requests are inclusive of the written documentation that supports the formal request and the documentation of the coordination with other agencies. State DOTs utilize various terms for the requests submitted to the FHWA, usually in the form of reports such as an Interchange Justification Reports (IJR), Interchange Modification Report (IMR), Interstate Access Report (IAR), Interchange Operational Analysis Report (IOAR), Access Approval Report, Interstate Access Justification Study, and so forth. Many States refer to these terms within their own written procedures and manuals. State DOTs may retain any term they are currently using to identify these reports.

Early coordination between the State DOT and the FHWA Division Office is recommended to refine the scope of the analysis and to make an initial determination if the project is reasonable. This coordination will allow for the project analysis to be performed in a cost-effective manner and provide for a more effective review of the request.

The request is required to be a standalone document. Referencing information that is needed to support decision making in other documents (Feasibility Study or Preliminary Engineering Report) is discouraged. Relevant information from these documents should be provided in the appropriate section of the access request. Excerpts may be included as appendices. The document needs to be clearly written for someone who is not familiar with the project, the area, or the State.

The State DOT is responsible for ensuring that the collection of all data, conducting of all required analysis, and development of the required documentation is complete, correct, and appropriate for the proposed change in access.

2.6 SUMMARY OF THE POLICY

The Policy includes the requirements for the justification and documentation necessary to substantiate any request that is submitted to FHWA for approval. FHWA's decision to approve a request is dependent upon the information developed in support of fulfilling the requirements identified in The Policy. State DOTs are required to submit requests for proposed changes in access to their FHWA Division Office for review and action. These submittals also need to include a recommendation for action from the State DOT. Submission implies the State DOT has reviewed the request, it is complete and correct, and the State recommends the proposed change in access be approved. The State DOT is also responsible for ensuring the coordination with other agencies, such as a metropolitan planning organization (MPO) has been performed. The FHWA Division Office will ensure that all requests for changes in access contain sufficient information to allow FHWA to independently evaluate and act on the request.

A full copy of The Policy is provided in Appendix A.

2.7 THE EIGHT POLICY REQUIREMENTS

The Interstate System Access Change Request should include an introduction that describes the project and a statement of need. The request should address, at a minimum, the eight policy requirements outlined in The Policy. The access request should provide an explanation of how the request satisfies each of the eight policy requirements in The Policy. Supporting analysis to illustrate how that requirement is met also needs to be included. An approach is required that considers the issues identified in the coordination process and provides the information to allow an informed decision to be made considering all of these potential impacts and issues.

Interstate System Access Change Requests need to address the appropriate issues and provide the information necessary to allow the FHWA to make an informed decision considering the potential consequences of a change in access. Specifically, the following eight policy requirements should be addressed:

1. *The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).*

   The intent of this requirement is to demonstrate that an access point is needed for regional traffic needs and not to solve the needs associated with local traffic. While the Interstate facility should not be allowed to become part of the local circulation system, it should be maintained as the main regional facility. Improvements to parallel facilities should be considered in lieu of new access wherever feasible.

2. *The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).*

   Improvements within an existing interchange should be considered prior to new access. This point does not mean that only ramp metering, mass transit, and HOV facilities are the only TSM alternatives that should be considered. Analysis needs to be provided that addresses the design, safety, and operational considerations of these alternatives.

   The proposed change in access also needs to document the consistency of any proposed change with regional, corridor, or system-wide assumptions of special use lanes, transit, or other alternatives to ensure the change in access does not preclude implementation of these TSM alternatives in the future.

3. *An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network*

based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

The operational and safety analysis performed needs to include all elements of the Interstate System, including collector-distributor roads, and provide a comparison of the no-build and build conditions that are anticipated to occur through the design year of the project. The analysis may be extended beyond the minimum requirements outlined above to establish the potential extent and scope of the impacts. Extending the limits of the analysis in urbanized areas where there are closely spaced interchanges may be required. The analysis should demonstrate the engineering and operational acceptability of the proposed change in access. When considering the impacts of various alternatives, priority needs to be given to the performance of the Interstate System within the context of the local planning, environmental, design, safety, and operational conditions.

4. *The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).*

   All interchanges need to provide for each of the eight basic movements (or four basic movements in the case of a three-legged interchange), except in the most extreme circumstances. Partial interchanges usually have undesirable operational characteristics. If circumstances exist where a partial interchange is considered appropriate as an interim improvement, then commitments need to be included in the request to accommodate the ultimate design. These commitments may include purchasing the right-of-way required during the interim improvements.

   Access to special use lanes, transit stations, or park and ride lots that are part of the Interstate System are special cases, and the movements requiring access should be determined on a case-by-case basis.

5. *The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.*

   The Interstate System Access Change Request needs to include a discussion as to how the proposal is consistent with the transportation planning activities for the area. If the project will be added to the planning process in the future, a discussion needs to be provided that indicates how the project will affect the current plan.

   Although FHWA may review a proposed change in access prior to its inclusion in the transportation plans, final approval cannot be given until the project is adopted in the MPO's long-range transportation plan or MPO's TIP within metropolitan areas and the STIP in rural areas. This would include funding from any

sponsor, including a State, local agency, or private developer. Additionally, if approval of the access hinges upon improvements to the local street network, those local improvements must also be included in the TIP and STIP.

6. *In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).*

   Sufficient review and coordination needs to be performed to avoid conflicts with other proposed changes in access or corridor improvements. If two or more changes in access are being considered in the same vicinity, then these changes should be analyzed together. The combined effect of the proposed change in access is especially important when several new interchanges are proposed.

   The intent of this requirement is to avoid isolated, piecemeal analysis for access change decisions. Where multiple access changes are anticipated in the vicinity, analysis must consider the possible, cumulative effects if all were to be implemented.

7. *When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).*

   Highways should be developed in an orderly and coordinated manner to serve the public. When new development is the driving force behind the need for access, it is expected that the appropriate coordination and analysis is performed to achieve mutual benefits with minimal adverse impact on Interstate travelers. As a condition of approval, certain parts of the local circulation system may be required to be constructed or improved before the new or change in access is opened to traffic. Coordination and cooperation is essential to ensure that when several projects are linked to the approval of a change in access that they are constructed according to an appropriate phasing plan. A commitment of funding or inclusion of projects as part of the planning process prior to final approval of the change in access may be required.

8. *The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).*

   The Policy allows for a two-step approval process. The first step is the determination of engineering and operational acceptability. The final approval can be granted only after the National Environmental Policy Act (NEPA) process is completed. The NEPA process must be followed regardless of the source of funding (including private funding) for the project, since approval of the proposed change in access constitutes a Federal Action. The development of final plans, specifications and engineering, and right-of-way acquisition and construction may be performed only after this final approval is granted.

2.8 FHWA Acceptance and Final Approval

The FHWA Division Office is responsible for ensuring all requests contain sufficient information to allow the FHWA to independently evaluate the request and ensure all pertinent factors and alternatives have been appropriately considered. The FHWA may approve the access point if it complies with The Policy. If the access point is approved, the State DOT is responsible for following the normal project development stages (assessment of environmental impacts, detailed design, and if needed, acquisition of right-of-way) before construction can begin.

Access approval may be a two-step process to help the State manage risk and provide flexibility. It intends to identify fatal flaws and to help ensure the investment in the subsequent phases of production, including preparation of any environmental documents, is not wasted.

The first step is a finding of operational and engineering acceptability in accordance with the eight policy requirements previously described. An important part of the determination of acceptability is assessing the scope of work that is needed in the analysis of an access change. Small changes can make important changes operationally (e.g., changing a gore point, relative to sight distance, curvature, etc.). Therefore, all proposed access changes should be reviewed by the Division Office.

The scope of the analysis required and the level of documentation that needs to be submitted will be established, thereby minimizing risk for the State. The level of effort may vary by the type of project. Changing the tie-in point of an off-ramp may require only minimal analysis. A request for a new interchange requires a detailed analysis of the planning, environmental, design, safety, and operational consequences of the proposed action. However, both would require some input from FHWA. Coordination with the FHWA Division Office is recommended even for "small scale" changes that would not necessarily require a NEPA document.

The second step is the final FHWA approval which constitutes a Federal Action, and as such, requires that the NEPA procedures are followed. Compliance with the NEPA procedures need not precede the determination of engineering and operational acceptability; however, final approval of access cannot precede the completion of NEPA.

2.9 State DOTs' Role in Interstate System Access Change Requests

State transportation officials must request a change in access by submitting an Interstate System Access Change Request to the FHWA Division Office. The State DOT needs to request a meeting with the Division Office to discuss the request at the earliest possible time. This meeting is used to establish the scope of the analysis to be included in the request. The State DOT also is responsible for ensuring that the collection of all data, performance of all required analysis, and development of the required documentation is complete, correct, and appropriate for the proposed change in access as agreed to in the coordination process.

2.10 Re-evaluations

If the design or operations of a project that was previously accepted is significantly changed (e.g., land use, traffic volumes, roadway configuration or design, environmental commitments), then a re-evaluation is required. The scope of the changes and the factors justifying the change will determine the level of analysis required.

If an accepted change in access has not progressed to construction within 8 years after receiving affirmative determination of the engineering and operational acceptability from FHWA, a re-evaluation is required. The NEPA re-evaluation period is different from the Interstate System Access re-evaluation. The period for NEPA documents is 3 years (as per 23 CFR 771.129).

If the re-evaluation is performed after the planning, conformity, and environmental processes were completed, an explanation of how these processes were amended needs to be documented. The documentation needs to include the results and/or conditions that are addressed in the re-evaluation to allow FHWA to make an informed decision on the change in access.

2.11 References

(1) Title 23, United States Code, Highways Section 111 (23 U.S.C. 111), U.S. Code Home/Title 23—Highways/ Chapter 1—Federal-Aid Highways/Subchapter I—General Provisions/Section 111 Web Site (accessed August 30, 2010): <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&rgn=div5&view=text&node=23:1.0.1.1.1&idno=23>.

(2) 49 CFR 1.48(b)(10), U.S.C Web Page (accessed August 30, 2010): <http://edocket.access.gpo.gov/cfr_2009/octqtr/pdf/49cfr1.48.pdf>.

(3) 23 U.S.C. 103(c)(4)(A), FHWA Web Site, Program Administration/Mileage (accessed August 30, 2010): <http://www.fhwa.dot.gov/programadmin/interstate.cfm#interstate_trivia>.

(4) 23 CFR 752.5(d), Code of Federal Regulations/Title 23/Highways Web Page/Landscape and Roadside Development (accessed August 30, 2010): <http://edocket.access.gpo.gov/cfr_2010/aprqtr/pdf/23cfr752.5.pdf>.

(5) 23 U.S.C. U.S. Department of Transportation (USDOT) Office of Operations Web Page, Title 23 United States Code (23 U.S.C) Section 129 Toll Agreements (accessed August 30, 2010): <http://ops.fhwa.dot.gov/tolling_pricing/toll_agreements.htm>.

(6) 23 CFR part 450, Code of Federal Regulations/Title 23/Highways Web Page/Planning and Research/Statewide Transportation Planning (accessed August 30, 2010): <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=7f5985b5d2fe301f3fd5a6f537e6bfb8&rgn=div5&view=text&node=23:1.0.1.5.11&idno=23>.

(7) 40 CFR part 51, Code of Federal Regulations/Title 40/Protection of Environment Web Page/Requirements for Preparation, Adoption, and Submittal of Implementation Plans (accessed August 30, 2010): <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=2ae56d60171c5349aebc4b007a2a0fdf&rgn=div5&view=text&node=40:2.0.1.1.2&idno=40>.

(8) National Environment Policy Act Web Site (accessed August 9, 2006): <http://www.epa.gov/compliance/nepa>.

(9) 40 CFR part 93, Code of Federal Regulations/Title 40/Protection of Environment Web Page/Determining Conformity of Federal Actions to State or Federal Implementation Plans (accessed August 30, 2010): <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=55deb98e37e151dc8d03f7045b2db1f3&rgn=div5&view=text&node=40:20.0.1.1.7&idno=40>.

(10) 23 CFR 771.129, Environmental Impact and Related Procedures Web Page (accessed August 30, 2010): <http://www.dot.ca.gov/ser/vol1/sec1/ch1fedlaw/23CFR771.pdf>.

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CHAPTER THREE: FHWA REVIEW AND ACTION

3.1 INTRODUCTION

Regardless of the location or context of any proposed change in access, there are many common elements in the FHWA review and action of Interstate System Access Change Requests. This chapter summarizes a typical process that could be followed, although it is recognized that this process will not fit every project. This discussion will assist in providing understanding regarding many of the questions that arise during the process.

3.2 TYPICAL INTERSTATE SYSTEM ACCESS CHANGE REQUEST PROCESS

The basic process for Interstate System Access Change Requests is summarized in Figure 1. The typical process begins within the statewide or metropolitan planning process. Ideally, the change in access has been through a transportation planning process that has involved the stakeholders to ensure the project is in the appropriate transportation plan, a system or corridor study has been completed, and the project is in an approved transportation improvement program. The work completed in this transportation planning process can be used to define the initial scope and nature of the project. This can include an interchange access in the LRTP but its inclusion in the plan should not be interpreted as approval and should not be the basis for justification in the access request.

Early coordination between the State DOT and FHWA Division Office is recommended to refine the scope of the required analysis and to make an initial determination if the project is reasonable. Small changes can make important changes operationally (e.g., changing a gore point, relative to sight distance, curvature, etc.). Therefore, all proposed access changes should be discussed or submitted to the FHWA Division Office for a determination of the need for and scope of any documentation that should be submitted with a request for change in access. A request for a new interchange requires an analysis of the planning, environmental, design, safety, and operational consequences of the proposed action. Coordination with the FHWA Division Office is recommended even for “small scale” changes that would not necessarily require a NEPA document.

A preliminary Interstate System Access Change Request is prepared by the State DOT. At this point, the State DOT may decide that project does not satisfy its requirements in terms of the operations, safety, design, and environmental considerations for the project.

After determining the request is a change in access, the State DOT then submits the Interstate System Access Change Request for review by the FHWA Division Office. Although a request to change access may be initiated by cities, locals, developers, the request must be submitted to the DOT. If they concur, then the DOT submits the request to FHWA. The DOT may have requirements above and in addition to those required by FHWA policy. Access approval may be a two-step process developed to help the State manage risk and provide flexibility. It is intended to identify fatal flaws and to help ensure the investments in the subsequent phases of production, including any environmental documents, are not wasted.

The first step is a finding of operational and engineering acceptability in accordance with the eight policy requirements in The Policy. If the FHWA determines a project is acceptable, project development may occur.

The second step is the final FHWA approval which constitutes a Federal Action, and as such, requires that NEPA procedures are followed. Compliance with the NEPA procedures need not precede the determination of engineering and operational acceptability. Final approval of access cannot precede the completion of NEPA. Once NEPA has been completed, approval of access is granted as long as there are no changes to the location or design of the "accepted" concept. Completion of the Interstate System Access Change Request as outlined in this Guide does not guarantee approval of any new access or changes to the access; it does provide a framework for the analysis of the potential benefits and consequences of the proposed project.

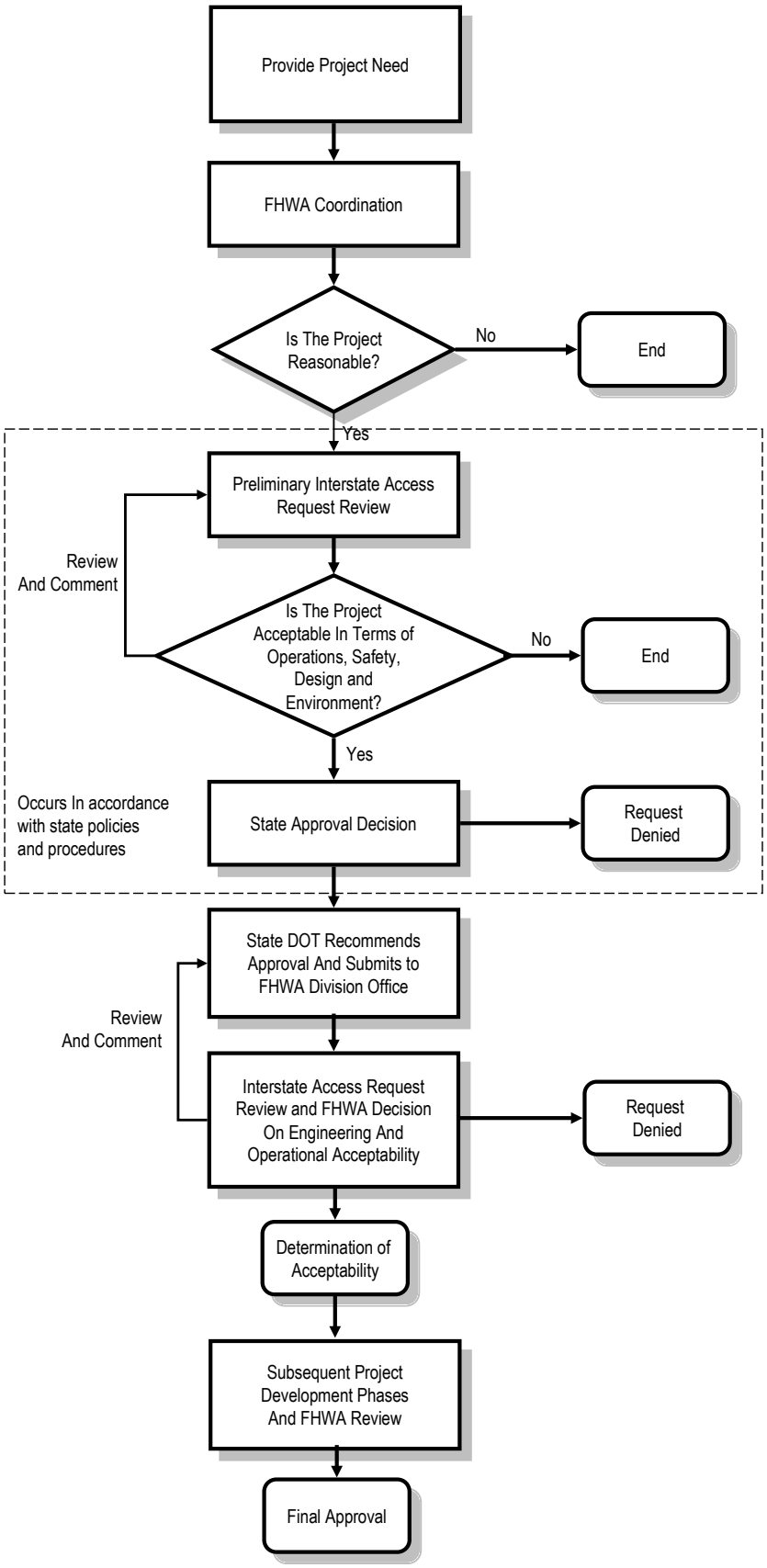


Figure 1. Typical Interstate System Access Change Request and Approval Process

Regardless of the funding source, since approval is considered a Federal Action, the project's final approval is contingent on the successful completion of the same process as used in the planning, engineering, and environmental phases for any federally funded project. The Interstate System Access Change Request also must be adopted as part of a conforming transportation plan and TIP to receive final approval. Review of the plans, specifications, and estimate is also performed by FHWA prior to construction. This is the final opportunity to review and approve proposed changes in access. The final design is the recommended construction plan and should be consistent with the engineering concepts approved under The Policy. If the final design is not consistent with the approval under The Policy, a re-evaluation is necessary.

3.3 FHWA COORDINATION

Early coordination is recommended to maximize input from all agencies and avoid duplication of effort or premature inclusion of proposed Interstate System access, main line, ramp, and crossroads at an interchange in the planning or environmental review. All coordination with the FHWA should be performed through the State DOT. The State DOT may choose to involve other public or private entities in the coordination, but the process should be administered by the State DOT. The stakeholders to consider may include, but are not limited to:

- The MPO.
- Regional and local operating organizations.
- Municipal public works departments.
- Transit operators.
- Traffic management and operations personnel.
- Emergency management personnel.
- FHWA Division Office.
- Federal Transit Administration (FTA) Regional Office.
- Impacted Railroad Companies.
- Federal Railroad Administration (FRA).
- Federal Aviation Administration (FAA).

FHWA allows flexibility in the process to request a change in access to the Interstate System. This flexibility includes the opportunity for a review of the engineering and operational aspects of a change in access prior to including the project in the long-range transportation plan and TIP or STIP in non-urban areas or initiating environmental phases of the project. Adoption of a project that includes changes in Interstate access in the MPO long-range transportation plan and/or TIP is not an acceptability determination or justification for approval. Involving the MPO early in this process is recommended, especially in a transportation management or non-conforming metropolitan area for air quality. Many State DOTs have developed policies and procedures to ensure that this coordination occurs early in the process. An appropriate level of detail and documentation should be provided as part of this coordination to make the discussions meaningful and productive.

The following issues should be addressed as part of the coordination meeting:

- Need for FHWA review and action.
- Study area or area of influence for analysis.

- Defining the goal and objective of the access request.
- Preliminary alternatives to be considered.
- Performance objectives and measures.
- Technical analysis requirements for the planning, environment, design, safety, and operations issues.

3.3.1 Access Changes Requiring FHWA Review and Action

The following changes to Interstate facilities require FHWA access approval:

- New freeway-to-freeway interchange.
- New service interchanges providing access between a non-freeway local roadway network (arterial, collector, or local road) and the Interstate.
- Modification of freeway-to-freeway interchange configuration; for example, adding new ramp(s), abandoning/removing ramp(s), completing basic movements, and reconstruction of structures.
- New partial interchanges or new ramps to-from continuous frontage roads that create a partial interchange.
- Modification of existing interchange configuration, such as adding a loop to a diamond interchange.
- Completion of basic movements at partial interchange, for example, completing a partial diamond interchange by adding a ramp.
- Locked gate access, for example, access via locked gates for emergency response.
- Abandonment of ramps or interchanges.
- Access to special use lanes such as high occupancy vehicle (HOV), high-occupancy toll (HOT) or truck only lanes (from the street network) within the Interstate System should be treated similar to any other access.
- Relocation of a terminal of a ramp to a different local road.
- Changes in operation of managed-lane access to general-purpose access to the Interstate.

Generally, a change in the interchange configuration is considered a change in access even though the number of actual points of access may not change. For example, replacing one of the direct ramps of a diamond interchange with a loop, or changing a cloverleaf interchange into a fully directional interchange would be considered revised access for the purpose of applying The Policy.

3.3.2 Projects That May Not Require FHWA Review and Action

Although access approval may not be needed, coordination with FHWA Division Office is recommended to determine if any analysis is required based on the context of the project. If it is determined these changes may require an analysis of the planning, environmental, design, safety, and operations of the proposed improvements, the State DOT should coordinate with the FHWA Division Office to determine the type and extent of analysis required. The following changes to Interstate facilities may not require approval under The Policy:

- Shift of a ramp's location within the same interchange configuration, which results in ramp spacing that meets FHWA's design criteria. If the interchange is reconfigured in such a way that the travel patterns change with the same number of access points, coordination of the project should be performed with FHWA

Division Office to determine the type of review and process to be considered. Changing the location of a ramp could result in changes to the safety and operational performance of the Interstate System.

- Addition of lanes to an on-ramp may not require an Interstate System Access Change Request be submitted; however, based on coordination with FHWA, analysis of the potential consequences of this change on the safety and operational performance of the Interstate may be required.

- Addition of left-turn storage lanes, right-turn storage lanes, and through travel lanes at the terminus of existing ramps.

- Relocation or shifting of the existing on-ramp or off-ramp termini (i.e., moving the ramp end that connects with the local road) along the same roadway.

- Addition of a single auxiliary lane between two adjacent interchange ramps where the single auxiliary lane does not function as a mainline travel lane.

- Modification of the length of acceleration or deceleration lanes involved with any ramp.

- Improvement of traffic signals at ramp termini with local roads should be reviewed to ensure that the changes in the signalization do not result in queue spillback into the mainline lanes of the Interstate and that sufficient storage is provided.

- Implementation of ramp metering or other active control of vehicles entering the Interstate System.

- Construction of new signing, striping, and/or resurfacing of an Interstate on-ramp or off-ramp, where geometric features are not changed.

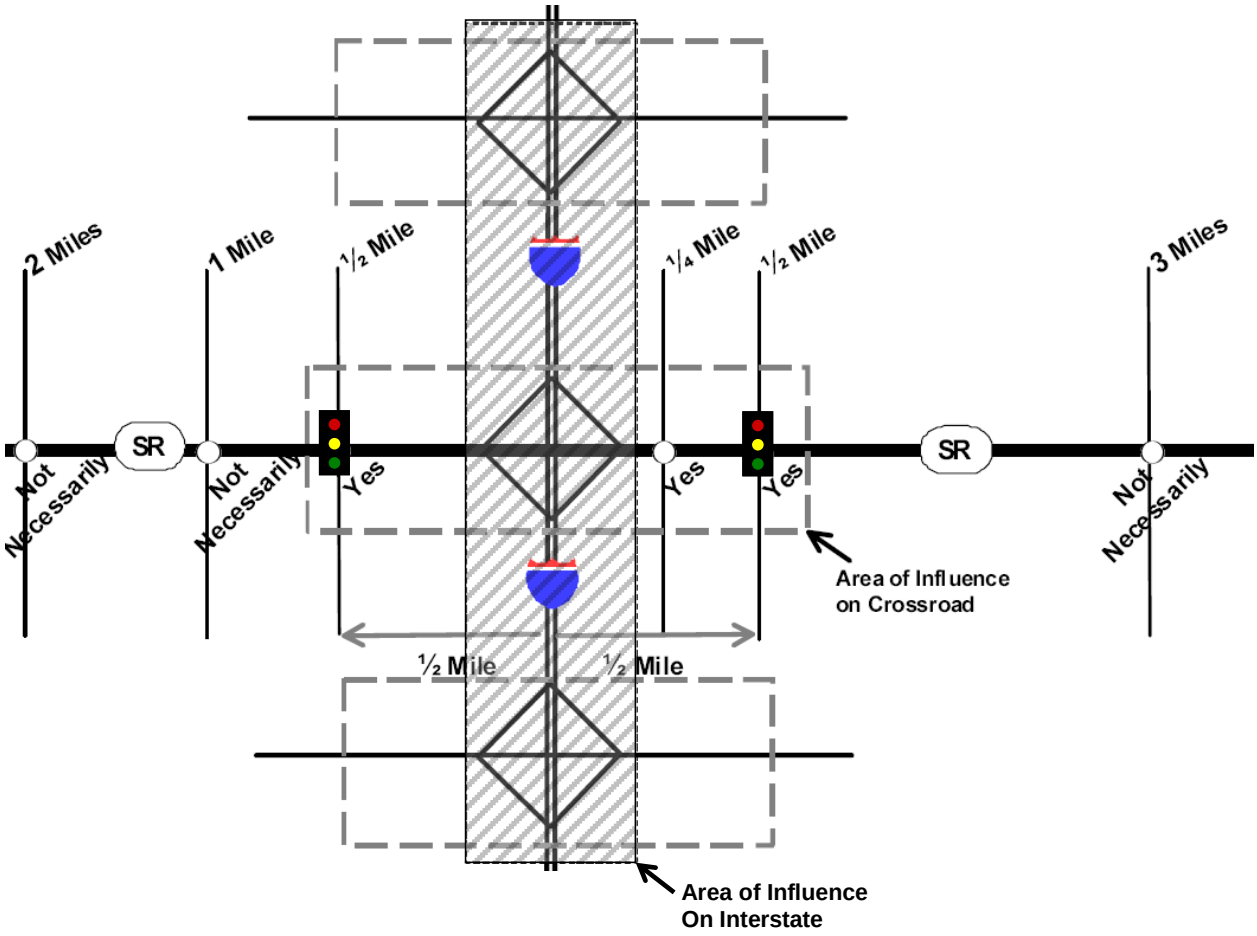
- Installation of roadside guardrail and concrete barriers (such as for resurfacing and safety projects).

- Construction of overpasses or grade separation structures without ramps along Interstate facilities. The approval of air-rights over Interstate facilities is addressed as part of the location and design concept acceptance with the NEPA process and approval of plans, specifications, and estimate.

- Changes in access between managed lanes and general purpose lanes on the Interstate

3.3.3 Study Area or Area of Influence

The Interstate System Access Change Request should include an area of influence based on safety and operations concerns. At least the first adjacent interchange on either side of the proposed change in access is required to be considered. The area of influence along the local roadway network should extend at least to the first adjacent signal in either direction or to the first major intersection. Figure 2 illustrates a sample area of influence for a request that proposes a new interchange. The area of influence should be extended beyond these limits based on the impact of the proposed change in access. If the safety or operational performance of segments beyond the adjacent interchanges may be affected, or a coordinated signal system is involved with the local roadway network, then the area of influence should be expanded to support making an informed decision based on the consequences of the project.



Source: Adapted from Florida Department of Transportation, *Interchange Handbook*.

Figure 2. Area of Influence

In establishing the area of influence, the current and the anticipated safety and operational performance associated with the proposed change in access in the design year is strongly related to the following:

- Traffic volume (average daily and peak periods).
- Mix of traffic volumes (percent trucks, transit, and special use (HOV/HOT)).
- Location (rural, urban, suburban).
- Terrain (mountainous, rolling, level).
- Interchange and access (ramp) spacing along the mainline and their effect on weaving distances, the number of lane changes required, and the speed differential of mixing vehicles.
- Roadway segments (mid-block or typical section; intersection, including type of intersection traffic control) along the local roadway network.

- Surrounding land use (number of driveways, commercial versus residential; associated pedestrian activity) and the anticipated changes in land use and resulting travel patterns.

- Limits of the project if part of a system of improvements.

- Influence of operations at adjacent interchanges along the Interstate facility or intersections along the intersecting roadways within the transportation network.

- Alternatives / modes that are being considered to address the problem.

- Hours of congestion (as defined by the problem statement) present today and in the future.

- Crash data as outlined in Part Two of this Guide.

3.3.4 Alternatives to be Considered

Defining the alternatives to be analyzed is an essential part of specifying the scope of the safety and operational analysis. For any Interstate System Access Change Request, the following alternatives should be analyzed:

- No Build or No Action Alternative – This alternative describes the conditions that will exist if the proposed new or modified access is not completed. The alternative should be analyzed in the existing condition and the design period to establish a baseline for the analysis of the potential benefits and impacts of the proposed new or modified access.

- TSM Alternative – This alternative should clearly show that there are no other alternatives which could meet the need addressed by the proposed new or modified alternative. This alternative will demonstrate the need being addressed by the request cannot be satisfied adequately by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets; improving traffic control; modifying ramp terminals and intersection; or adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands.

- Alternative Transportation Modes – In the operational analysis of this alternative, the consideration of any modal shift of traffic to public transit or special use lanes should be consistent with the planning data presented in other plans or studies and derived from the regional travel demand forecasting model provided by the State DOT or MPO.

- Build Alternative (Alternative[s] that Provide for New or Modified Access) – Only after the TSM and Alternative Transportation Modes have been analyzed to demonstrate that they cannot meet the needs being addressed in the request should new or modified access be considered. The analysis of these alternatives should provide an analysis that considers the safety, operational, design, and environmental consequences of the proposed action as compared to the No Build Alternative.

- Build Alternative which Incorporate TSM and Alternative Modes (Alternative[s] that Provide for New or Modified Access) – This is a hybrid alternative which reflects a combination of the previously discussed alternatives. Combining these alternatives may provide a greater value than the two other alternatives independent of each other.

The need for any change in access should be supported by a qualitative and quantitative comparison of these minimum alternatives. Additional guidance on the technical analysis required to support this comparison is provided in Part Two of this Guide.

The analysis of locked-gate access requests are a special case that should be evaluated on a case-by-case basis. Since these alternatives do not involve regular access to the Interstate, the scope and nature of the analysis may be more qualitative then quantitative.

Issues concerning partial interchanges

When partial interchanges (either system or service interchanges that do not provide for all possible interchanging movements between intersecting routes) are being considered as an alternative for a change in access, it is essential that coordination and development of alternatives begin during the early phases of the planning process. Not providing for all movements violates driver expectation and may lead to "wrong-way" movements on ramps. Therefore, alternatives for the construction of partial interchanges should generally be avoided. If partial interchanges are being considered, clear and detailed analysis must be conducted and documented as justification for their construction or retention. The alternatives to be analyzed should include at least one alternative for an interchange that provides ramps for all possible movements

3.3.5 Performance Objectives and Measures

The purpose, need, goal, and objective of the interchange should be discussed during the coordination process. This purpose and need identify or define the performance criteria or deficiency that the project is looking to address or overcome, and provides an objective and measurable baseline in which the proposed and recommended alternative is to address. These objectives should guide the scope of work and the analysis. A set of quantitative performance measures should be established to support this analysis.

3.3.6 Technical Analysis Requirements and Procedures

The technical analysis requirements and procedures used to support the data collection, analysis of alternatives, and justification for the proposed change in access should be developed in accordance with the guidance provided in Part Two of this Guide.

3.3.7 Documentation Requirements

The documentation requirements should be discussed and the minimum requirements for documentation are discussed in section 3.5.3 and 6.3 of this Guide.

3.4 STATE DOT REVIEW AND RECOMMENDATION

All proposals for either new or modified access to the Interstate System must be submitted by the State DOT, as the Interstate System owner and operator, to the FHWA Division Office, regardless of the proposal sponsor or the source of funding. The State DOT is responsible for the ensuring the analyses are conducted in accordance with The Policy and determining if the proposals are acceptable.

3.5 FHWA REVIEW

3.5.1 Purpose

The purpose of FHWA's review is to ensure compliance with The Policy. To implement this direction, the FHWA will need to make informed decisions that consider the full context of any proposed change in access. The context of the proposed change in access will be addressed through the analysis of the planning, environment, design, safety, and operational characteristics of the project. Trade-offs will be assessed through the comparison of the no-build and build alternatives. Based on the documentation of this analysis in the Interstate System Access Change Request, informed decisions can be made in support of The Policy.

3.5.2 Timing

A proposed change in access can be informally discussed with FHWA at any time during its development. All meetings or informal reviews must be requested by the State DOT but may be conducted by another public or private agency. The final proposal can only be submitted by the State DOT and must include its recommendation for the approval of the

project. The proposed change in access can be submitted for engineering and operations acceptability approval after it has been developed to the extent necessary to fully evaluate its effect on the Interstate System and local road system. This may be prior to completion of the planning, conformity, or environmental processes, but any acceptability approvals may be contingent upon the completion of these and other activities.

3.5.3 Submittal Requirements

FHWA requires an access report that addresses the eight policy requirements listed in The Policy. If required, additional information should be attached to the access report submitted to the FHWA. While there is no prescribed format for access requests, the State DOT should ensure that all Interstate System Access Change Requests contain sufficient information to allow them to independently evaluate and consider all pertinent factors and alternatives. The extent and format of the required justification and documentation should be jointly developed by the State DOT and the FHWA Division Office to accommodate the operations of both agencies, and also should be consistent with the complexity and expected impact of the proposed access. For example, information in support of isolated rural interchanges may not be as extensive as for a complex or potentially controversial interchange in an urbanized area.

The analysis provided should be consistent with the agreement between the State DOT and FHWA Division Office, and sufficient for a person unfamiliar with the project area or conditions to make an informed decision on the engineering and operational acceptability of the proposed change in access. Guidance on the analysis techniques and documentation requirements are discussed in greater detail Part Two of this Guide. Figure 3 provides a sample outline for an Interstate System Access Change Request.

SUMMARY

A clear and concise summary statement should be provided at the beginning of the report explaining how each of required policy points have been satisfied, along with how the collective assessment of each policy requirement provides the basis for the recommended change in access. It is recommended that a summary of the analysis that was performed, the methods and tools utilized, the assumptions, and the conclusions be included. Information also will include a description of the process followed to analyze different access changes and other transportation improvement alternatives considered and selected as the proposed recommendation (such as Interstate System facility, ramps, ramp terminal, crossroad, or local street network).

INTRODUCTION

An introduction to the project should be provided that summarizes the following:

Background – This section should identify any supporting information from previous studies or data acquired to introduce the project and support the project purpose.

Purpose – The project's purpose and objectives should be identified.

Project Location – Include aerial photography of the project area and area of influence, a map displaying the subject interchange location, and a brief description of the preliminary area of influence. Maps should be to scale or be schematic drawings showing distances between interchanges, intersections, and other key features. The subject interchange location should be identified by milepost, relationship to adjacent interchanges, and system linkages. Factors used to define the area of influence should be discussed, including interchange spacing, signal locations, anticipated traffic impacts, anticipated land use changes, or proposed transportation improvements.

METHODOLOGY

This section should summarize the methodology used to develop the Interchange Access Request. The discussion should provide sufficient detail for the reader to understand the processes used.

EXISTING CONDITIONS

This section should identify the conditions that existed in the project's base year. Text, figures, and tables should be used as appropriate to describe the existing land use, transportation system, demand, performance, and environmental conditions considering the following:

Demographics – This section should identify significant population and employment statistics within the project area of influence. Summary for traffic analysis zones for the base year from the selected travel demand forecasting model should be included.

Existing Land Use – Existing land use within the project area should be summarized by general land use classifications (residential, commercial, industrial, institutional, recreational, etc.). Major developments within the study area should be identified.

Existing Roadway Network – Facilities within the project area of influence should be identified by functional classification, laneage, and access control (e.g., limited or controlled-access). In addition to a discussion, a figure should be provided illustrating each facility within the study area.

Alternative Travel Modes – Existing single occupant vehicle (SOV) alternatives related to the project should be identified in this section. These modes may include special use/HOV, park and ride, bus transit, fixed-guide way mass transit, airports, ports, and forms of non-motorized transportation facilities. A figure should be provided illustrating the location of these modes.

Interchanges – This section should describe the existing configuration, geometry and other design features of existing interchanges in the area of influence, including identifying any elements that do not meet current design standards. This section should also identify any approved but not yet constructed interchanges, and define their geometry and status. Also, any other Interchanges being developed in the area of influence should be identified.

Existing Data – This section will discuss existing data source(s) and quality of the data.

Operational Performance – This section will summarize the results of the operational analysis including the methodology, assumptions, and conclusions. A comparison of the no-build and build conditions should be provided along the Interstate facility and the local roadway network to support the need for the project. Tables and figures should be employed to summarize operational performance.

Existing Safety Conditions – This section will summarize an analysis of the safety performance of the existing conditions including existing crash data supporting the need for the project. Any strategies used to mitigate safety concerns should be discussed. A comparison of the no-build and build conditions should be provided along the Interstate facility and the local roadway network to support the need for the project. Tables and figures should be employed to summarize operational performance

Existing Environmental Constraints – This section should identify any potential environmental fatal flaws or areas of concern that will be addressed during this effort or in subsequent project phases. This analysis is not intended to provide extensive examination of environmental and community impact issues that will be accomplished in the NEPA process.

NEED

The need for improvement should be established using factors such as existing conditions and the conditions anticipated to occur in the analysis years under the No-Build Alternative, or other factors such as the need for system linkage.

ALTERNATIVES

This section will discuss the alternatives considered. A brief narrative regarding location and design elements should be provided for each alternative. At a minimum, the following alternatives will be considered:

- No-Build Alternative.
- Improvements to Alternate Interchanges.
- Transportation System Management Alternative.
- Alternatives Providing a Change in Access.

Each of these alternatives should be identified in independent sections. The proposed modifications and engineering factors including structures, landscaping, schedule, cost, and traffic control devices should be discussed for each alternative considered.

FUTURE YEAR TRAFFIC

This section should document the development of the future-year design traffic for each alternative. Information to be contained should include network and project validation, future travel demand projections, and the design traffic projections.

ALTERNATIVES ANALYSIS

This section will discuss the analysis of alternatives based on engineering policies and standards, traffic operations, and environmental impacts using the evaluation criteria agreed to in the coordination meetings with FHWA. These alternatives then may be evaluated in economic cost and benefits terms and a financial analysis will be performed. This analysis would normally consider, at a minimum, the following:

Conformance with Transportation Plans – This section will discuss the proposal's relationship to Interstate Corridor Studies or similar investment studies. This section should identify the attainment status of the area for the National Ambient Air Quality Standards (NAAQS) established in the Clean Air Act Amendments. If the project is located in a nonattainment or maintenance area for ozone, the relationship of the proposed improvements to the conforming TIP, State Implementation Plan (SIP) and MPO Long-Range Transportation Plan should be discussed.

Compliance with Policies and Engineering Standards – This section will document each alternative's consistency with State and FHWA policies and engineering standards, and the need for any design exceptions based on the preliminary engineering concepts.

Environmental Impacts – A potential environmental impact summary considering all NEPA elements from a fatal flaw perspective for each alternative should be presented.

Safety – The effects on safety (increase or decrease in the type, number, and severity of crashes) of the proposed project should be discussed. This section should also discuss the project's effects on public safety issues such as emergency services and evacuations.

Operational Performance – The documentation of the operational analysis should provide sufficient information for an independent review of the conditions, and not require the use of the selected traffic analysis tool software.

Evaluation Matrix – This section will present an analysis of the alternatives using various criteria to assess the impacts and potential consequences for the proposed change in access.

Coordination – This section will also summarize stakeholder involvement or any public involvement which occurred during the project.

FUNDING PLAN
This plan will identify the specific funding programs or private sources needed to support all of the improvements proposed. Project revenue requirements will be discussed if the project is a toll project.

RECOMMENDATIONS
This section will discuss the preferred alternative selection and any recommendations for further action, such as programming the NEPA or design phases.

APPENDICES
Appendices will be used for other supporting documents such as traffic operational analysis documentation. Lane configuration schematic and figures illustrating the existing geometry overlaid with proposed geometry are recommended. These figures should clearly show dimensions for the acceleration and deceleration lane spacing, lane transition taper lengths, auxiliary lanes, and interchange spacing (measured from the centerline of grade-separation structures).

Figure 3. Sample Outline for Interstate System Access Change Request

3.6 DETERMINATION OF ACCEPTABILITY

If the FHWA determines a project is acceptable, additional phases of the production may occur. The following is a list of the most common needs that are addressed by a change in access.

- Systems linkage or connectivity.
- Road user benefits.
- Access to areas currently not served.
- Address an existing congestion or safety problem.
- Prevention of future congestion or safety problems.

3.6.1 Systems Linkage or Connectivity

The need to provide new system connectivity many times can be supported based on the need to provide links between existing and proposed facilities to alleviate congestion or provide an alternate route that is currently not available. In these cases, the proposed connection should provide for the appropriate balance between access and mobility as part of an overall transportation network design that is well coordinated with the land uses within the area as part of the transportation planning process. In this context, the transportation network includes multimodal and intermodal facilities. The new or revised access should be such that it is compatible with the appropriate hierarchy[1] of movement as shown in Figure 4 and supports the role of the Interstate System as a thoroughfare for high-speed, high-volume, and long-haul travel, and not for local access between adjacent areas.

[1] Hierarchy is explained further in the AASHTO *Policy on the Geometric Design of Highways and Streets*.

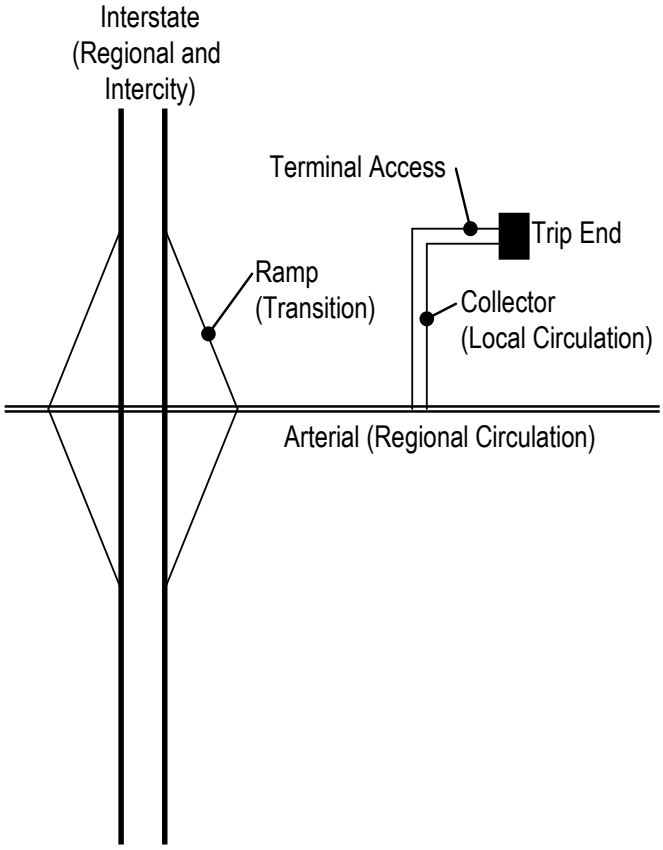


Figure 4. Hierarchy of Movement

3.6.2 Road User Benefits

Road user benefits are commonly used to support the need for a change in access. In these cases, the need is closely related to the systems linkage and/or addressing current or future congestion or safety problems. Congestion-related analysis of road user benefits may include values for travel costs and travel time costs; safety performance related analysis should differentiate between severe (injury and fatal) crashes and non-severe (property damage) crashes, as well as focus on crash frequency rather than crash rate. In both cases, the cost basis associated with these variables should be consistent within a State. The FHWA's "Manual of User Benefit Analysis for Highways with CD-ROM, 2003" provides additional guidance on the analysis of road user benefits.

3.6.3 Access to Areas Currently Not Served

Access to areas currently not served is similar to system connectivity. When this need is used to support the request for a change in access, the analysis should clearly indicate that existing interchanges and roadway networks cannot provide similar access and connectivity. Techniques commonly used include origin-destination studies and travel time studies. When this need is used to support proposed changes in access, it should be consistent with the transportation and land use planning activities, and within the hierarchal role of the Interstate System.

3.6.4 Address an Existing Congestion or Safety Problem Along the Interstate Facility

This is one of the most common needs addressed by a change in access. Quantitative information on the safety and operational performance of the Interstate System and local roadway network should be used to support the need. This information should include a comparison of the No-Build and Build Alternatives and demonstrate that TSM alternatives and alternative transportation modes cannot meet the need for the project for any change of access to occur.

3.6.5 Prevention of Future Congestion or Safety Problems Along the Interstate Facility

The use of this need for justifying new or modified access is similar to the need to justify the proposed action based on existing congestion or safety. Quantitative information on the safety and operational performance of the Interstate System and local roadway network should be used to support the need. This need is typically used to ensure that infrastructure requirements are in place concurrent with approved development. The information provided should include a comparison of the No-Build and Build Alternatives and demonstrate that TSM alternatives, alternative transportation modes, or a hybrid cannot meet the need for the project for any change of access to occur.

3.7 Submission for Final FHWA Action

A proposed change in access can be submitted for final action only after the appropriate planning, conformity, and environmental processes under NEPA have been completed, and are determined to be complete and correct by the State DOT. The proposal should also be included in the TIP/STIP and LRTP prior to final approval. Furthermore, any commitments to be completed by the State DOT, local agency or private entity should also be included in the TIP/STIP and LRTP and may be made conditions for final approval.

3.8 Approval Duration and Re-evaluation

An approved change in Interstate System access should be re-evaluated whenever there is a significant change in conditions or design, or if the project has not progressed to construction within 8 years after receiving an affirmative determination of the engineering and operational acceptability from FHWA. The NEPA re-evaluation period is different from the Interstate System Access re-evaluation. The period for NEPA documents is 3 years (as per 23 CFR 771.129).

The process for determining the nature and scope of the re-evaluation needed should consider the changes in the project that would affect the safety, operations, or design criteria that were used in the prior approval. Changes in the interchange concept that result from the NEPA process or further design development may require a re-evaluation.

If after 8 years the project has not progressed to construction, the re-evaluation should contain an updated analysis explaining the changes that have occurred since the initial finding of engineering and operational acceptability. If the re-evaluation is performed after completion of the planning, conformity, and environmental processes were completed, an explanation of how these processes were amended should be documented. The documentation should include the results and/or conditions that are addressed in the re-evaluation.

3.9 References

(1) Florida Department of Transportation, Interchange Handbook, Florida Department of Transportation Web Site (accessed August 30, 2010): <http://www.dot.state.fl.us/planning/systems/sm/intjus/default.shtm>.

(2) AASHTO, *Policy on the Geometric Design of Highways and Streets*, AASHTO Bookstore Web Site (accessed August 30, 2010): <https://bookstore.transportation.org/item_details.aspx?ID=110>.

(3) National Environment Policy Act Web Site (accessed August 30, 2010): <http://www.epa.gov/compliance/nepa>.

(4) 23 CFR 771.129, Environmental Impact and Related Procedures Web Page (accessed August 30, 2010): <http://www.dot.ca.gov/ser/vol1/sec1/ch1fedlaw/23CFR771.pdf>.

CHAPTER FOUR: PLANNING CONSIDERATIONS

4.1 INTRODUCTION

Provision of a change in access, particularly new access, should be considered in the context of statewide and local transportation and land use planning. The Interstate System typically serves as the backbone of the transportation network, and access to this facility can have significant impact on local and regional traffic circulation. The existing transportation planning activities provide a venue for coordination of stakeholders with divergent interests and concerns. Understanding the stakeholder interests and concern is an important aspect of developing an informed decision about the merits of a change in access.

This chapter discusses the various transportation planning activities that may be significant in considering proposed changes in Interstate access. The various factors and considerations of the relationship between the transportation planning process and The Policy are discussed. The documentation requirements for ensuring the information needed to support informed decision making is also discussed.

4.2 TRANSPORTATION PLANNING ACTIVITIES

The Interstate System Access Change Request must be consistent with the local, regional, and/or state land use and transportation plans. This requires that prior to final approval of the change in access, all requests for new or revised access be consistent with the metropolitan and the statewide transportation planning requirements, as appropriate, and the applicable provisions of 23 U.S.C. 104, 134, and 135.

In metropolitan areas, the metropolitan planning process provides a framework for coordination of the various stakeholders within the metropolitan area. The metropolitan planning organization develops the transportation improvement program (TIP) that is coordinated with the state transportation planning process. In rural areas, involvement with local stakeholders is less formal and coordination with the state transportation program is required. The result of these planning efforts is a program of projects identified in the statewide transportation improvement program (STIP).

In some cases, an Interstate System Access Change Request may be generated from outside of the metropolitan or state transportation planning process, such as new or modified access requested by a developer. Access requests which are currently not part of the metropolitan or statewide transportation plans are normally not considered. Early coordination with the MPO, State, and FHWA Division Office is suggested in these cases.

For an Interstate System Access Change Request to receive final approval, the project must be included in the STIP, and for metropolitan areas, the TIP. Regardless of the funding source, since approval is considered a Federal Action, the project's final approval is also contingent on the successful completion of the same process as used in the planning, engineering, and environmental phases for any federally funded project.

Coordination with the following planning activities may be required within the analysis of proposed change in access and are discussed in the following sections:

- Metropolitan Transportation Plan.
- Statewide Transportation Improvement Program.
- Congestion Management Process.
- Air Quality Conformity Determination.
- Interstate Corridor Plans.

- State Strategic Highway Safety Plan.
- Land Use Plans.

4.2.1 Metropolitan Transportation Plans

In metropolitan areas, the MPO is responsible for the coordination and selection of local transportation needs and priorities. In accordance with Federal regulations, the MPO is required to carry out the metropolitan transportation planning process in cooperation with the State and with operators of publicly owned transit services. These needs are documented in a Long-Range Transportation Plan (LRTP) that addresses the anticipated needs over a 20-year horizon. The long-range plan is also required to have a financially constrained component that addresses the project's priorities and anticipated funding over the study horizon. The MPO approves the transportation plan, and thus, will consider the consistency of any proposed change in Interstate access with the goals and objectives of the LRTP.

The MPO is responsible for preparing a TIP within the metropolitan area. The TIP is a 4-year program that is financially constrained and, like the STIP, includes all transportation projects, regardless of funding source, anticipated to occur within the metropolitan boundaries that may require Federal Action. Both the Governor and the MPO approve the TIP. Interstate System Access Change Requests will be coordinated with the MPO and subsequent phases of the project included in the TIP prior to the determination of engineering and operational acceptance by the FHWA. Inclusion of the project in the TIP is not a commitment that the project will be accepted or approved. Approval of the TIP and STIP are also subject to the regulations of the Clean Air Act.

Figure 5 is a summary of these elements and the other factors that may be considered in the metropolitan planning process and how it relates to project development.

4.2.2 Statewide Transportation Improvement Program

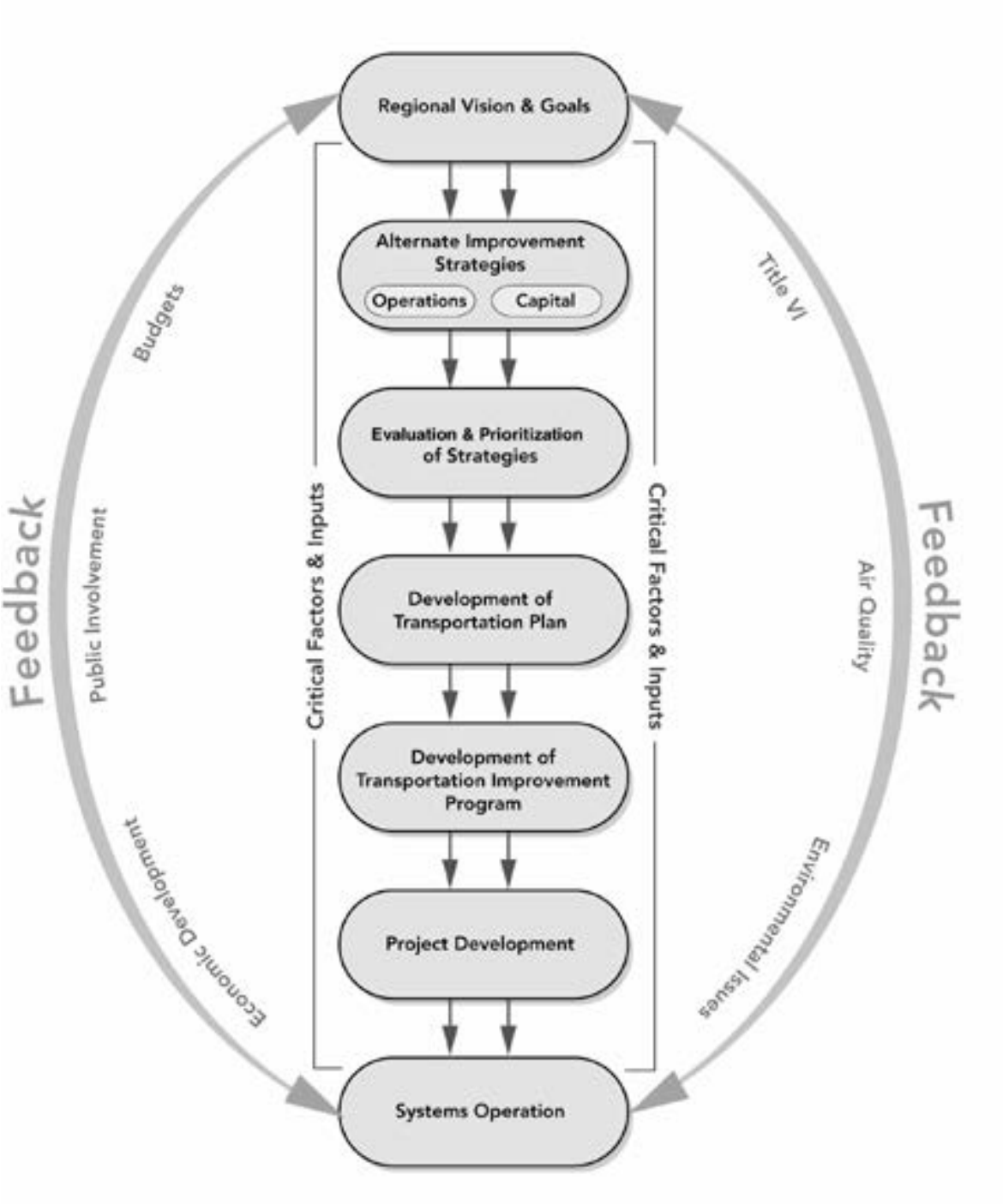
The proposed change in access must be compatible with the goals and objectives of local, regional, and or state planning, transportation plans, and land use plans, as applicable. The transportation planning process begins by identifying transportation problems, analyzing the problems, carefully considering a range of solutions, and then selecting and implementing the most cost-effective solutions, strategies, or policies.

In this process the need for new or modified access is developed and assessed using the planning factors required in 23 U.S.C. 135. For an Interstate System Access Change Request to be considered, funding for subsequent phases of the project should be contained in the financially constrained STIP. The STIP is a 4-year program that is financially constrained and includes all the transportation projects, regardless of funding source, anticipated to occur within the state that may require Federal Action. The FHWA and the FTA approve the STIP, and this approval constitutes a commitment of Federal funds.

4.2.3 Congestion Management Process

During the assessment of a change in access, all reasonable alternatives for design options, location, and transportation system management type improvements[2] may be evaluated and provisions included for accommodating such facilities, if a future need is identified as consistent with Congestion Management Process. The Congestion Management Process (CMP) documents the process for ensuring these options are adequately considered. CMPs are required for all Transportation Management Areas (TMAs), which are defined as areas with population greater than 200,000, per 23 U.S.C. 134(k)(3).

[2]Examples of transportation system management improvements include ramp metering, mass transit, and HOV facilities.



Source: U.S. Department of Transportation: http://www.planning.dot.gov/documents/BriefingBook/BBook.htm#2BB.

Figure 5. Metropolitan Planning Process

The FHWA maintains a map showing the boundaries for all MPOs, including both those that do and those that do not meet the population threshold for a TMA. The map may be viewed at: http://hepgis.fhwa.dot.gov/hepgis_v2/UrbanBoundaries/Map.aspx .

4.2.4 Air Quality Conformity Determination

In areas designated as nonattainment or maintenance areas for air quality in accordance with the Clean Air Act, as amended, the MPO is responsible for coordinating transportation and air quality planning. Any requests for new or modified Interstate Access Change are required to be part of a conforming transportation plan and TIP prior to final approval of the access. For areas outside of an MPO, the State is responsible for evaluating project air quality impacts and conformity within the NEPA process.

4.2.5 Interstate Corridor Plans

In areas where the potential exists for future multiple changes in Interstate access, all requests for new or revised access must be supported by an Interstate System analysis and/or corridor study. For urbanized areas where congested travel conditions are projected, this study must include detailed operational analysis. For rural areas where congested travel conditions are not projected, a planning-level operational analysis is sufficient. This study provides an analysis and makes recommendations that address all proposed and desired access.

If the change in access is occurring in a developing area or in an area that has the potential for future interchange additions, the study should show how the proposed access is compatible with other planned access points changes and provide for a substantive analysis of the cumulative effects if all proposed changed are implemented.

Some States develop processes to ensure that, when an Interchange System Access Request is needed as part of a corridor plan which outlines a number of improvements, a systems approach is used in the analysis. The systems approach addresses several interchange improvements or proposed new interchanges in a single Interstate System Access Change Request.

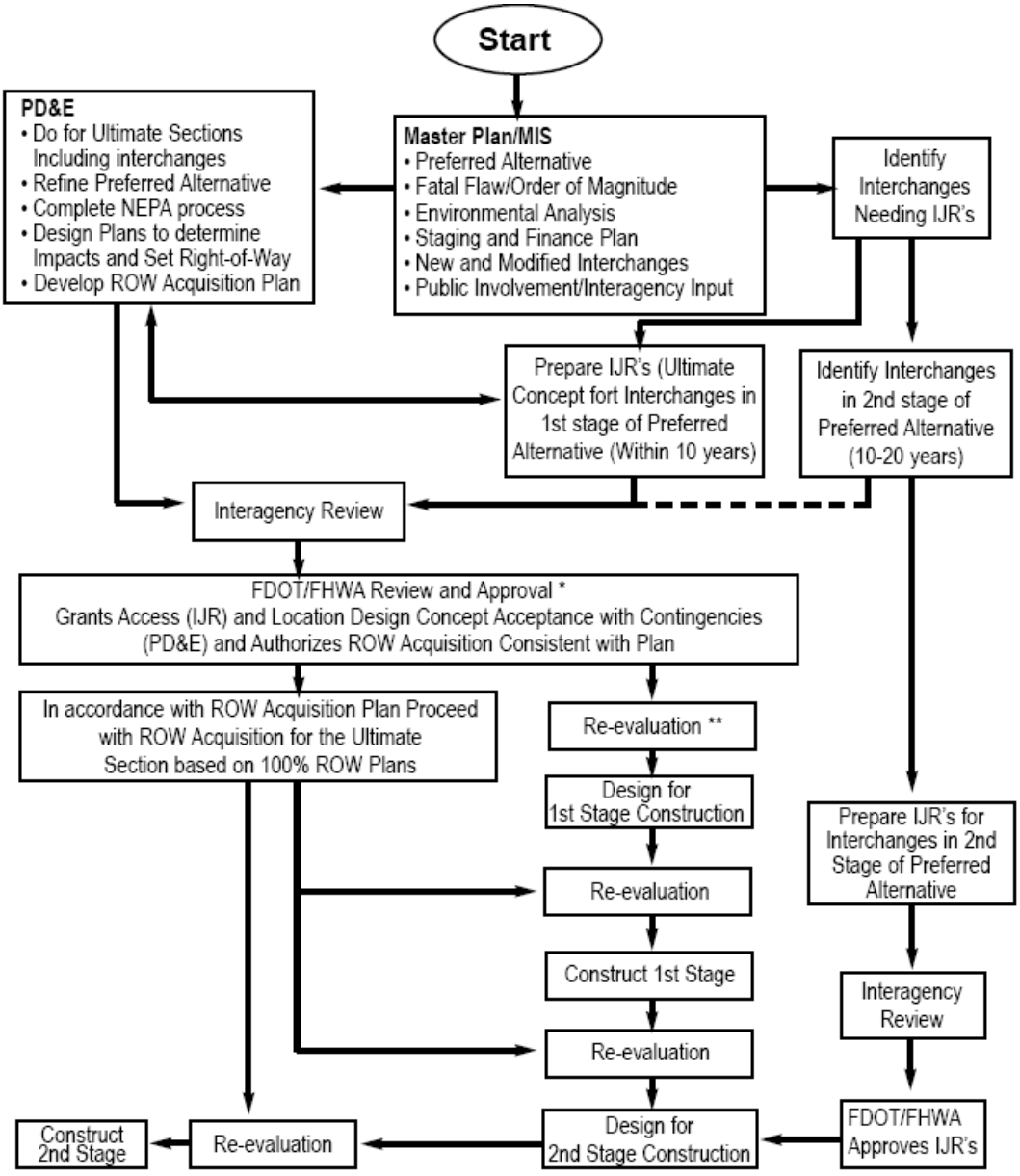
Figure 6 provides as an example of the process used by the State of Florida for coordination of Interstate corridor studies, preliminary engineering, and NEPA phases. This example is provided to illustrate the complexity of the institutional and planning framework for Interstate System Access Change Requests and the need to promote early coordination between the stakeholders in the any project.

In this example, Master Plan/MIS (Major Investment Study)[3] refers to corridor studies, and PD&E (project development and environmental studies) refers to the preliminary engineering and NEPA phases of a project. In Florida, Interstate System Access Change Requests are also known either as Interchange Modification Reports (IMRs) or Interchange Justification Reports (IJRs). IMRs are used for modifications to an existing interchange and IJRs are used for new access. These procedures and terminology vary from state-to-state and close coordination with the State DOT is needed.

4.2.6 Consideration of Transportation system management (TSM) strategies

Consideration and assessment of TSM strategies and alternatives has two objectives; first, to make sure that there are not less costly solutions to serving the need, and second, to promote planning for features that will enhance traffic carrying capability. TSM strategies include the implementation of HOV, transit, ramp metering, and demand management strategies.

[3] TEA-21 has eliminated the MIS requirement: however, transportation planning studies are encouraged to integrate the linkages between planning and project development/environment.



Source: Florida Department of Transportation, *Interchange Handbook*.

Figure 6. FDOT's Process for the Coordination of Corridor Studies, Interchange Access Requests, and NEPA Phases

Consideration and assessment of TSM alternatives does not require an extensive analysis or costly study of impractical options, nor is it intended to mandate the implementation of TSM strategies as a prerequisite to achieving access approval. The word assess should be broadly interpreted and used with good judgment. A new interchange in a predominantly rural area with no local bus service would clearly not warrant analysis or explicit consideration. However, discussing whether an interchange should be designed to accommodate metering, or to include a park-n-ride facility, or to include provision for bus stops are all relevant and important.

4.3 PLANNING ANALYSIS

Each Interstate System Access Change Request should include an analysis or confirmation of the project's inclusion and consistency with the various transportation planning activities (long-range plan, TIP, air quality conformity plan). The planning for an Interstate access request should address the following as applicable to the proposal:

- Stakeholder and public involvement
- Travel demand forecasts
- Air quality conformity
- Financial plan (when required for project phasing)
- Determination of consistency with local, regional, and/or State land use and transportation plans

4.3.1 Stakeholder and Public Involvement

Stakeholder involvement is critical to the development of an access change and an important part of the planning process. The involvement of the appropriate stakeholders can help prevent delays and provide information that is necessary for a successful project. Stakeholder involvement also is required by FHWA during this planning process.

Stakeholders are individuals, groups, and organizations who may be impacted by the change in access. If there is any question about who should be involved, the State DOT or local government can help determine the appropriate organizations based on the location of the change in access. Typical stakeholders are identified and discussed in Part One, section 3.3 of this Guide.

Early discussions with stakeholders can identify issues related to the proposed access change and determine the planning steps that should be taken during the development of the project.

The project must be a part of the State or MPO's public involvement process. Information about the project and key decisions should be made available for public review and comment as a part of the planning processes.

4.3.2 Travel Demand Forecasts

A consistent approach to travel demand forecasting should be used in the Interstate System Access Change Request as with other planning activities. If a regional travel demand forecasting model is available from the MPO or State DOT, it should be used as the baseline for developing any demand forecasts and design traffic for the proposed new or modified access. Any changes to the network, socioeconomic, or other elements of the model made as part of the development of the design traffic should be documented and consistent with MPO and State DOT forecasts and Interstate corridor studies that may exist within the project study area.

4.3.3 Air Quality Conformity

Similar to the travel demand forecasting activities, the air quality model approved by the MPO and State DOT in the project area should be used as the basis for performing air-quality planning as part of any Interstate System Access Change Request. Any changes made to this model should be documented and consistent with the MPO and State

DOT conforming plans. A conformity analysis of the proposed action is required if located in a nonattainment or maintenance area.

4.3.4 Financial Plan

For Interstate System Access Change Requests prepared for projects derived from the MPO or State DOT planning processes, subsequent phases and of the project and all project commitments, such as adding lanes to the Interstate or improvements to the local transportation network to accommodate the proposed access, must be included in the TIP and STIP. Funding for successive phases must be clearly identified to ensure all phases of project development are financially feasible.

For projects where the need for the project was developed outside of these processes and will be paid for by other parties, such as a project proposed by a developer, a financial plan that provides the State or MPO with enough detail that the agency can determine the source of all funds available to finance the change in access project is required. This financial plan should also indicate the needed ongoing maintenance and the responsible parties for funding this activity. The project also must be included in the TIP and STIP prior to approval of the access request.

4.3.5 Coordination of Planning and Environmental Considerations and Requirements for Federal Funding

The connection between transportation planning and the project development process is acknowledged by 23 U.S.C 771.105(a) and (b) as follows:

> *To the fullest extent possible, all environmental investigations, reviews and consultations [shall] be coordinated as a single process . . . Alternative courses of action [shall] be evaluated and decisions made on the best overall public interest based on a balanced consideration of the need for safe and efficient transportation, of the social, economic and environmental impacts of the proposed transportation improvement; and of national, state and local environmental protection goals.*

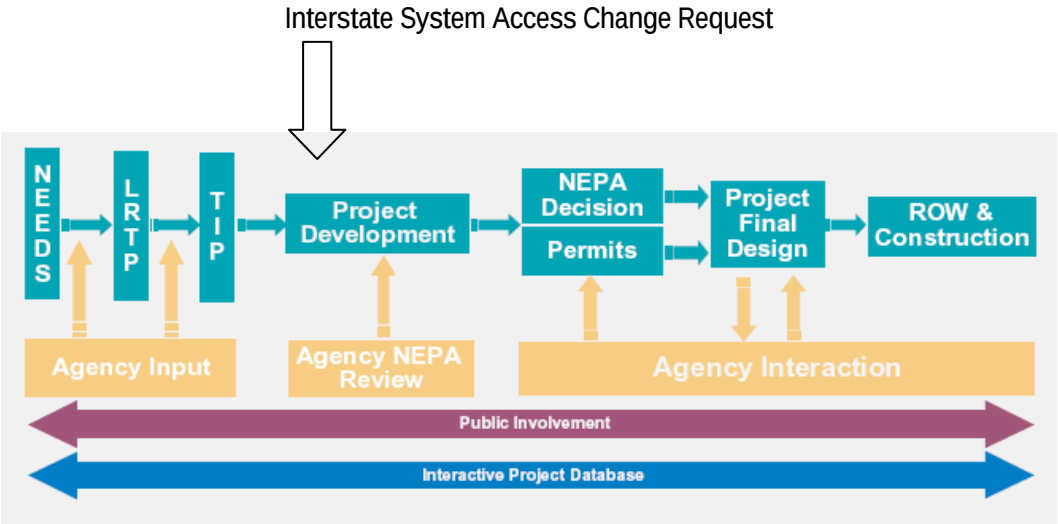
This required coordination is described in more detail in Appendix A of 23 CFR Part 450, "Linking the Transportation Planning and NEPA Processes," which further clarifies that the transportation planning process is "the foundation for project decisions, emphasizing public involvement, consideration of environmental and other factors, and a Federal role that oversees the transportation planning process…statewide and metropolitan transportation planning should be the foundation for highway and transit project decisions."

Interstate System Access Change Requests must be developed from a transportation planning process that considers these planning factors since they require Federal Action. Coordinating with stakeholders during the planning constitutes early identification of cooperating agencies, or agencies with jurisdiction, for the environmental review in subsequent project development phases. These stakeholders include Federal, State, Tribal, and local transportation, regulatory, and resource agencies. Substantively, the products of the planning process can shape the proposal's purpose and need, the consideration of alternatives for evaluation and elimination, the analysis of impacts (including indirect and cumulative), and the mitigation plan.

One example of a State's implementation of this process is the FDOT's Effective Transportation Decision Making Process (ETDM).[4] This process is intended to bring agency interaction forward into the early stages of transportation planning when avoidance and minimization strategies are identified much earlier, and cost impacts for these strategies can be built into the cost-feasible LRTP. Agency interaction then occurs with the FDOT and its consultants during project development. This leads to adjustment in project design concepts to satisfy permitting requirements and minimizing risk. Continuing and effective public involvement and access to project information through an interactive database are the foundations for early issuance of permits concurrently with the NEPA Record of

[4] Source: Florida Department of Transportation's ETDM Process Web Site (accessed August 30, 2010): <http://www.dot.state.fl.us/emo/ETDM.shtm>.

Decision. Figure 7 illustrates that this process is continuous through all phases of project development and should be initiated as part of the Interstate System Access Change Request.



Source: Adapted from Florida Department of Transportation's ETDM Process.

Figure 7. Example of Effective Transportation Decision Making Process

Building on this process, the Interstate System Access Change Request should contain a review of known needs, issues, and potential impacts from this standpoint at a "fatal flaw" or programmatic level. The Interstate System Access Change Request is intended to determine the feasibility of the project prior to performing detailed investigations in subsequent phases of the project development.

4.3.6 Project Development Phases

At this point, the change in access has been through a transportation planning process that has involved the stakeholders to ensure the project is in the appropriate transportation plan, a system or corridor study has been completed and the project is in an approved transportation improvement program. The work completed in this transportation planning process can now be rolled into the other phases of developing the change in access project.

Identification of the purpose and need and various alternatives for adding new access to the Interstate is a key initial step to eventually lead to the analysis and justification necessary for approval of the change in access. If the change in access is part of a larger project, the no-build alternative for the overall project may differ from the no-build alternative needed to justify the change in access. To justify the change in access, there must be a comparison with alternatives making improvements to the Interstate and the local street network without adding access to the Interstate. Adding access to the Interstate is only appropriate when all other alternatives fail to satisfy the purpose and need.

Access approval is a two-step process that was developed to help the State manage risk and provide flexibility. It is intended to identify fatal flaws and to help ensure the investment in the subsequent phases of production including preparation of any environmental documents is not wasted. The first step is a finding of operational and engineering acceptability. The second step is the final approval. Often these steps are done at the same time, though it is not necessary. The finding of operational and engineering acceptability requires satisfying the eight policy requirements in The Policy.

4.3.7 Relationship of Final Approval for Interstate Access to the Planning Process

The final approval of a change in Interstate access cannot be granted until FHWA approves the NEPA document and has verified that the preferred alternative in each document are consistent, in accordance with 23 U.S.C. 771.113(a).

4.4 DOCUMENTATION

A section should be provided in the Interstate System Access Change Request that discusses the proposal's relationship to each of the planning activities identified in section 2.2 of this Guide and the coordination and consistency of the various planning factors discussed in section 2.3 of this Guide. For example, this section should identify the attainment status of the area for the National Ambient Air Quality Standards established in the Clean Air Act Amendments. If the project is located in a nonattainment or maintenance area for ozone, discuss the relationship of the proposed improvements to the conforming TIP, STIP, and MPO LRTP. The documentation should also discuss consistency with local, regional and/or state land use and transportation plans.

4.5 REFERENCES

(1) Florida Department of Transportation, Interchange Handbook, Florida Department of Transportation Web Site (accessed August 30, 2010): <http://www.dot.state.fl.us/planning/systems/sm/intjus/default.shtm>.

(2) Florida Department of Transportation's ETDM Process Web Site (accessed August 30, 2010): http://www.dot.state.fl.us/emo/etdm.shtm.

(3) 23 U.S.C. 103, United State Code/Title 23/Highways/Chapter 1/Federal-Aid Highways (accessed August 30, 2010): <http://frwebgate.access.gpo.gov/cgi-bin/usc.cgi?ACTION=RETRIEVE&FILE=$$xa$$busc23.wais&start=210950&SIZE=69071&TYPE=TEXT>.

(4) 23 U.S.C. 134, United State Code/Title 23/Highways/Chapter 1/Metropolitan Transportation Planning (accessed August 30, 2010): <http://frwebgate.access.gpo.gov/cgi-bin/usc.cgi?ACTION=RETRIEVE&FILE=$$xa$$busc23.wais&start=997506&SIZE=63189&TYPE=TEXT>.

(5) 23 U.S.C. 135, United State Code/Title 23/Highways/Chapter 1/Statewide Transportation Planning (accessed August 30, 2010): <http://frwebgate.access.gpo.gov/cgi-bin/usc.cgi?ACTION=RETRIEVE&FILE=$$xa$$busc23.wais&start=1060701&SIZE=41795&TYPE=TEXT>.

(6) 23 U.S.C. , U.S. Code Home Page (accessed August 30, 2010): <http://frwebgate.access.gpo.gov/cgi-bin/usc.cgi?ACTION=BROWSE&TITLE=23USCC1>.

(7) Clean Air Act, DOE Environmental Policy & Guidance Web Page (accessed August 30, 2010): <http://www.epa.gov/air/caa/>.

(8) 23 U.S.C. 134(k)(3), U.S. Department of Transportation Memo on Interim Guidance for implementing Key SAFETEA-LU Provisions on Planning, Environment, and Air Quality for Joint FWHA.FTA Authorities, September 2, 2005 (accessed August 30, 2010): <http://www.nado.org/legaffair/safeteamemo.pdf>.

(9) 23 U.S.C 771.105(a), U.S. Environmental Protection Agency/Federal Register Environmental Documents Web Site (accessed August 30, 2010): <http://www.epa.gov/fedrgstr/EPA-IMPACT/2005/May/Day-09/i9128.htm>.

(10) 23 U.S.C 771.105(b), U.S. Department of Transportation, Federal Highway Administration/HEP Web Page (accessed August 30, 2010): <http://www.fhwa.dot.gov/HEP/plannepalegal050222.htm>.

(11) National Environment Policy Act Web Site (accessed August 30, 2010): <http://www.epa.gov/compliance/nepa>.

(12) 23 U.S.C. 771.113(a), Code of Federal Regulations/Title 23/Highways Web Page (accessed August 30, 2010): <http://edocket.access.gpo.gov/cfr_2010/aprqtr/pdf/23cfr771.113.pdf>.

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CHAPTER FIVE: ENVIRONMENTAL CONSIDERATIONS

5.1 INTRODUCTION

The FHWA approval of Interstate System Access Requests constitutes a Federal Action, and as such, requires that the National Environmental Policy Act (NEPA) is followed. NEPA codified the national commitment to the environment quality, established a national environmental policy, and provided a framework for environmental planning and decision-making by Federal agencies. NEPA directs Federal agencies, when developing projects or issuing permits, to conduct environmental reviews to consider the potential impacts on the environment by their proposed actions. NEPA also established the Council on Environmental Quality (CEQ), which is charged with the administration of NEPA. The NEPA process consists of a set of fundamental objectives that include interagency coordination and cooperation and public participation in planning and project development decision making.

With the two-step process for approval of Interstate System Access Change Requests, compliance with the NEPA procedures need not precede the determination of engineering and operational acceptability. However, final approval of access cannot precede the completion of NEPA, even if no Federal funds are used. Once NEPA has been completed, approval of access is granted as long as there are no changes to the location or design of the accepted concept. Typically, NEPA requirements are met through the normal project development process of each State.

5.2 ENVIRONMENTAL FACTORS

The environmental discussion provided in the Interstate System Access Change Request will vary depending upon the location and complexity of the project and the preferences of the State DOT. Because the request for engineering and operations acceptability may be submitted in advance of environmental studies, the environmental factors may be based upon secondary research. Generally, the document should provide information regarding the following, where relevant to the project decision.

- Existing Environmental Constraints – Summarize any environmental issues or areas of concern that influenced the development of the proposed access concept. If certain social or environmental impacts were specifically avoided, provide this information.

- Air Quality Status – Identify the air quality attainment status for the project location area. If the project is located in a nonattainment or maintenance area, discuss the relationship of the proposed improvements to the conforming TIP, STIP, and MPO LRTP.

- Planning/Land Use – Summarize consistency with, or effect upon, existing transportation and land use plans.

- Environmental Impacts – Summarize the potential for social, economic, and environmental impacts of the proposed access change based upon secondary research. Secondary research involves the synthesis of already existing research rather than performing actual data collection or experiments. The topics covered will vary depending upon the project setting. In general, it is appropriate to summarize the potential for impacts and those features that may influence a future NEPA decision. These may include impacts to communities and neighborhoods; public facilities; environmental justice populations; streams; wetlands; threatened and endangered species; noteworthy hazardous materials sites; historic and archaeological resources; and other Section 4(f) and/or 6(f) properties (parks, recreation areas, wildlife/waterfowl refuges). This summary is to provide context for the reviewer and is not intended to take the place of or to be at the same level of detail as normally required for NEPA documentation.

- Relationship To NEPA Approval – Coordinate requests for new or revised access early in the process with FHWA to ensure the engineering, safety, and operational acceptability of the concept prior to completion of the NEPA process. The FHWA Division Office will issue access approval in a two-step process that was developed to help the State manage risk and provide flexibility. It is intended to identify

fatal flaws and to help ensure the investment in the subsequent phases of production including preparation of any environmental documents is not wasted. Development of the Interstate Access Change Request should run concurrently with the development and analysis of alternative for the NEPA process.

The first step in approving the access request is a finding of operational and engineering acceptability by the FHWA. The finding of engineering, safety, and operational acceptability requires consideration of the eight requirements identified in The Policy. This provides confidence that there are no fatal flaws in the proposed change in access, and that those alternatives can reasonably be included as part of the NEPA document. As a part of this early review, it is not anticipated that environmental studies will be completed; however, the access request should contain adequate information to identify potential flaws, substantial environmental requirements, and the potential for public controversy. If potential flaws are identified, close coordination with the FHWA and State DOT is needed to determine if the project should move forward, and if it does, under what conditions.

The second step is the final approval of the change of access. Final approval can only be given by the FHWA upon successful completion of the NEPA document. This final approval is contingent on consistency of the chosen NEPA alternative with the proposed access change approved in the first step. FHWA regulations (23 CFR 771.113 [a]) state that "final design activities, property acquisition …" (with exceptions), "…or project construction shall not proceed" until FHWA accepts the general location and concepts as described in the environmental document. If the NEPA process is complete, both steps of the access approval may be done at the same time.

5.3 CONSIDERATIONS FOR DEVELOPING ALTERNATIVES

A larger project that includes a change in Interstate Access may require additional alternatives associated with the interchange above and beyond those needed for approval of the overall project. The Access Request may need to include analysis of these additional alternatives to adequately demonstrate that the new access is justified. This may be best demonstrated by an alternative that includes improvements to the local street network, additional lanes on the Interstate, or improvements to adjacent interchanges without adding a new point of access to the Interstate.

In the extreme and extraordinary circumstances where a partial interchange is being considered, a full interchange must be included as an alternative for comparison in the decision-making process. Consideration of a partial interchange will also increase the study area to include the impact to adjacent corridors, interchanges, and the local street network affected by not providing all movements.

5.4 DOCUMENTATION

The requirements for documentation of the environmental considerations as part of an Interstate System Access Change Request will vary by project and location. The purpose of providing environmental information is to support informed decision making on the potential consequences of the project and summarize the issues that may impact the future NEPA decision, particularly those that will impact the evaluation of alternatives when the NEPA document is prepared.

A summary of the potential environmental impacts considering NEPA elements from a fatal flaw perspective for each alternative should be presented. This overview may be required to cover literature searches of historic, prehistoric and archaeological resources; literature searches of aquatic/terrestrial habitat, wetlands, and threatened and endangered species; a literature/record search of solid/hazardous waste sites; potential involvement of Section 4(f) lands; air quality implications; and any other related special social, economic, or environmental impacts. The level of detail and the analysis required should be discussed as part of the FHWA coordination early in the project.

5.5 REFERENCES

(1) Section 4(f), U.S. Department of Transportation/National Highway Administration/ Environment/Project Development/Section 4(f) Web Page (accessed August 30, 2010): <http://environment.fhwa.dot.gov/projdev/pd5sec4f.asp>.

(2) 23 U.S.C., U.S. Code Home Page (accessed August 30, 2010): <http://frwebgate.access.gpo.gov/cgi-bin/usc.cgi?ACTION=BROWSE&TITLE=23USCC1>.

(3) 23 CFR 771.113(a), U.S. Code of Federal Regulations/Title 23/Highways/Part 771—Environmental Impact and Related Procedures Web Page (accessed August 30, 2010): <http://edocket.access.gpo.gov/cfr_2010/aprqtr/pdf/23cfr771.113.pdf>.

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CHAPTER SIX: DESIGN CONSIDERATIONS

6.1 INTRODUCTION

Geometric design relates to the visible dimensions of a highway and includes horizontal and vertical alignments, cross-sectional elements (lanes, shoulders, roadside, etc.), lateral and vertical clearances, sight lines, and so forth for the mainline, ramps, and crossroad. These features of a design define the form of a facility and are directly influenced by variables such as modal types, volumes, speeds, desired operational quality of service, safety performance, available right-of-way, environmental impacts, and cost constraints. Consequently geometric design is specifically addressed in an Interstate System Access Change Request. While detailed geometric design will be reviewed prior to approval of the plans, specifications, and estimate; information conveyed in the Request should be of sufficient detail to allow full evaluation of the eight policy requirements and to determine overall adequacy in terms of design standards and criteria and any anticipated design exceptions. It should be noted that compliance with standards and criteria does not guarantee engineering and operational acceptability of an access Request. Other aspects of designs, such as structures, pavement, geotechnical, etc., need to be addressed in a Request, but only to the conceptual level necessary to define potential impacts.

The proposal of a change in access that complies with design standards does not guarantee engineering, safety, and operational acceptability, nor does the use of design exceptions indicate that a proposed design will not function well. In general design exceptions should be avoided, however designers are often required to make trade-offs in balancing competing project needs and limited resources. Appropriate evaluation of design standards, design exceptions, and safety and operational characteristics of the facility will all be considered in the determination of engineering and operational acceptability.

6.2 GEOMETRIC DESIGN STANDARDS

FHWA has adopted the AASHTO publication *A Policy on Design Standards Interstate System* for all projects on the Interstate System, regardless of the funding for the proposed project. The Interstate Design Standards are not intended to be a standalone document for all the geometric design standards that are used in the development of projects on the Interstate System. FHWA has also adopted AASHTO's *A Policy on Geometric Design of Highways and Streets* (commonly called the Green Book) as the standard for geometric design of the National Highway System. The Green Book covers all geometric design issues not specifically addressed in the Interstate Standards. Other standards which apply to the geometric design are identified in 23 CFR 625.

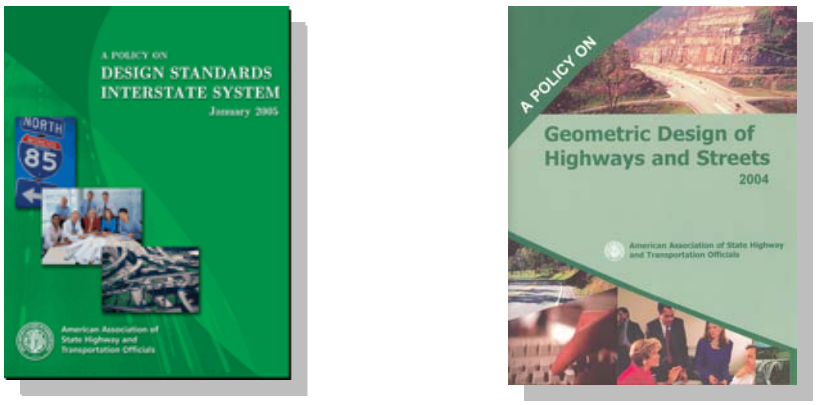

Figure 8. AASHTO Policy Publications on Design Standards Interstate System and Geometric Design of Highways and Streets

Many State DOTs also provide their own standards for geometric design, standard drawings, and standard specifications that should be consulted. These State standards must meet or exceed the FHWA's adopted standards for projects on the interstate. The intent of this Guide is not to replicate or replace established standards, but to highlight some of the key features to assist in the planning, design, and review of Interstate System Access Change Requests.

In addition to this Guide and these established standards, there are other sources of information on good practices in the design of interstates and interchanges. Among these is the Institute of Transportation Engineers' publication *Freeway and Interchange Geometric Design Handbook*, which provides more in-depth discussion of design issues for freeway interchanges.

As designers begin to undertake the design of a new or modified interchange, the following should be kept in mind:

- Application of the concepts of route continuity and lane balance warrant thoughtful analysis and careful consideration, particularly where there are multiple diverging or converging lanes. Related issues include choosing a "preferred" or priority route when dealing with functionally equal facilities, using option versus dedicated lanes at a major fork (diverging roads), introduction and termination of auxiliary lanes through an interchange, and how to avoid the design of a branch connection (converging roads) that may violate driver expectation (i.e., an abrupt inside merge). Remember that the goal is an operationally balanced, self-explaining design.

- Satisfying the need for access between the Interstate System and the local highway and street network becomes more complicated when attempted within the vicinity of a system interchange. To every extent possible, system movements should be preserved as separate and independent of service movements to avoid mixed speed environments and to keep related signing clear and simple. When this is not possible, other solutions, such as the use of collector-distributor roadways, may help to overcome some challenges, but designers should be careful to avoid introducing movements that are counterintuitive or confusing to a motorist.

- Selection of interchange type and location for the access should be considered in the overall context of the corridor so that drivers can anticipate actions and choices they will need to make as they travel the corridor. As stated in the Green Book, "An inconsistent arrangement of exits between successive interchanges caused driver confusion, resulting in drivers slowing down on high-speed lanes." Interchanges should be located on tangent sections rather than curves and where there are good sight lines on the approach to the interchange. Curved sections are problematic locations for interchanges as they may limit sight-distance and drivers' perspective of lane assignments depicted on signs will change as they advance around the curve.

6.2.1 Freeway Segments

Chapters 8 and 10 of the Green Book provide a discussion of the design standards and concepts that should be met as part of any change in Interstate access.

6.2.2 Interchange Configuration and Spacing

Interchanges, when spaced too closely along an Interstate corridor, negatively affect the traffic operations and safety performance of the Interstate. When evaluating the interval at which interchanges will be located, factors such as spacing between ramps, auxiliary lanes, weaving areas, and signing between interchanges need to be scrutinized. The minimum spacing for urban interchanges specified in the AASHTO Interstate Access Guide is 1 mile (3 miles in rural areas). However, longer intervals between points of access may be needed to preserve operations and performance of the system. In particular, system interchanges (which may have higher traffic volumes, multi-lane ramps, and longer ramps) will need more distance to the next interchange. To mitigate the effects of closely-spaced interchanges, designers may need to employ braided ramps, collector-distributor roads, or frontage roads.

Left-hand entrances and exits to the Interstate are contrary to driver expectation and may bring slower-moving ramp traffic into the higher-speed mainline lanes. With the exception of direct entrances to HOV or managed lanes, left-hand entrances should be avoided.

6.2.3 Ramps/Interchange Areas

Chapters 8 and10 of the Green Book provide a discussion of the design standards and concepts that should be met as part of any change in Interstate access. The designer is also encouraged to draw upon the latest research and best practices to aid the design decision-making process. For example, while the Green Book provides criteria for both tapered and parallel style ramps, States may choose to use one style or a mixture of both styles of ramps on the same facility based on operational and safety observations.

6.2.4 Auxiliary Lanes, Collector Distributor Roads, and Frontage Roads

Chapters 8 and10 of the Green Book provide a discussion of the design standards and concepts that should be met as part of any change in Interstate access. One area that may warrant special attention is the design of local access to frontage roads where the frontage road also serves as part of one or more ramps. States that have widespread experience with this condition have adopted policies that require access control along portions of frontage roads depending on locations of ramps and primary crossroads. For example, access may be restricted along the frontage road between the slip ramp exiting the Interstate and the next primary cross-road.

6.2.5 Signing and Human Factors

Drivers need sufficient information and time to interpret and respond to make decisions and maneuvers through a freeway interchange. For conditions where there is complex geometry and major merge/diverge areas, the ability to adequately provide signing for motorists may be a limiting factor on the design. Signing is not an adequate replacement for sound geometric design, and the geometry of a complex interchange needs to accommodate the signing and traffic control for motorists to safely navigate these decision points. Consideration must be given to whether all the signs can be sequenced in the space available while still providing meaningful direction to motorists. New sign structures or relocation of existing sign structures is often necessary to accomplish this.

Additionally, enhanced use of pavement markings allows additional information to be communicated to motorists that supplement the roadway geometry and signing. Wider and/or patterned longitudinal markings, chevron markings through ramp gore areas, “horizontal” signing, and other supplementary pavement markings have become increasingly popular at interchanges throughout the United States. *The Manual on Uniform Traffic Control Devices* (MUTCD)[5] provides guidance on Interstate signing standards and criteria and pavement marking techniques.

Utilizing a process known as Road Safety Audits (RSA) is one way to address human factors issues. RSAs are independent and interdisciplinary safety reviews intended to identify opportunities to improve safety performance for all users. The greatest benefit of an RSA comes during the planning and early design stages of a project when the scope, schedule, and budget are able to absorb changes resulting from the review. The results of an RSA would be a valuable component of the safety analysis required for an access request.

Another way to address human factors is through use of visualization tools that create realistic, three-dimensional renderings of proposed designs. Visualizing a design can aid in the evaluation of overall interchange composition, examining items such as sight lines to signs and decision points, legibility and comprehension of legends, and clarity of pavement markings. These products can also be invaluable in describing proposed changes to non-technical audiences such as elected officials and community interest groups.

[5] *The Manual on Uniform Traffic Control Devices* may be accessed via the Internet at: http://mutcd.fhwa.dot.gov/.

6.2.6 Ramp Intersections with Crossroad

The ability of a service interchange to adequately meet the demands of its users is inherently limited by the capacity of the intersection formed by the ramp terminals and crossroad. Consequently, there are several important factors to consider:

- The basic intersection design (roundabout, channelized free-flow, etc.) and type of traffic control (unsignalized or signalized) will affect queue storage lengths (stacking of stopped vehicles). Furthermore, depending on if the crossroad is crosses over or under the Interstate, the acceleration and/or deceleration components of the ramps may need to be adjusted, especially when there is a high percentage of large trucks. Consider the effects of adjacent intersections along the crossroad on the queue storage requirements of the ramp terminals.

- In order to reduce the likelihood of queued traffic extending the entire length of an exit ramp and into the high speed mainline traffic lanes, it is important to conduct an analysis to determine the length of queues at ramp terminals.

- Evaluate the effect of the spacing/separation of traffic signals within the crossroad interchange area and the interrelated effects on queue storage and progression through the intersections. This is closely tied to the operational analysis along the crossroad, and may result in recommendations to modify signal timings, phasings to promote improved progression within a series of signals, or relocation of intersections.

- The extent of access management along the crossroad will also affect how safely and efficiently traffic can move to and from the freeway mainline. As a general rule, the better the access management along the crossroad, the better the safety performance, the better the crossroad progression for the signalized corridors, and the more simple the interchange signing on the approach to the Interstate.

- Minimum recommended distances for access control along the crossroad are discussed in the AASHTO Interstate Access Guide. However, some States have adopted policies that determine the length of access control based on analysis of the geometry, traffic operations, and safety performance. A more comprehensive resource on this topic is the 2005 Transportation Research Board Access Management Manual, which relates context and type of crossroad access to desirable functional distances along the crossroad as measured from the ramp terminal locations.

- Consider channelization to provide free-flow movements at crossroad ramp intersection. Channelization alternatives should consider the effect on pedestrians and bicyclists along the crossroads and conform to requirements of the Americans with Disabilities Act (ADA).

- Ensure turning radii and other elements of design are appropriate for the number and type of vehicles. An AASHTO WB-67 vehicle is recommended as the minimum design vehicle for all turning movements on the Interstate System.[6]

- Manage access along the intersecting roadways near ramp termini to avoid creating conflicting movements and mixing traffic of different speeds. The standards for the control of access along the crossroad vary from state-to-state but in principle, the objective is to provide sufficient control in the interchange area to limit conflicting movements with traffic entering or exiting the freeway. AASHTO or the adopted state standards provides minimum recommendations for these distances; however, longer distances are often necessary to maintain the traffic operations and safety performance of the interchange. The entire intersection of the

[6] AASHTO, *A Policy on the Geometric Design of Highways and Streets*, 2004.

ramp with the cross-street is part of the ramp terminal. In the limited circumstances under which the minimum values for access control will suffice, those distances are measured from a point beyond any intersection cross-walks, widening, turn-lanes, acceleration lanes, and tapers.

- Consider the effects on bicycles, pedestrians, and transit operations along the intersecting roadway. Avoid creating high-speed conflicts with pedestrian or bicycle facilities, if possible. Requirements of the Americans with Disabilities Act must be met when designing pedestrian facilities.

- Connecting ramps to a public road assures that the access to the Interstate will not be closed by private interests and that a public agency has the authority to make necessary improvements to maintain the safety and traffic operations of the interchange and the Interstate. The cross-street should be public right-of-way that extends at least as far as the access control provided along the cross-street for the interchange. The public road preferably should be connected to a well-planned street network. In locations where the cross-street dead-ends or enters private property near the interchange, provision should be made to allow the design vehicle to safely turn around without leaving the public right-of-way or degrading operations.

6.2.7 Issues for New Access

Requests for new access points to the Interstate System will be held to the highest standards of care in terms of design, operations, and safety performance and hence will generally be scrutinized more than proposals for modifications to existing access. This also serves as a reminder to transportation planners and designers that new access proposals should never represent a shortcut or substitute for legitimate enhancements to existing access via the existing highway and street network.

6.2.8 Issues in Rural Areas

In rural environments, operating speeds tend to be higher and congestion levels may be lower than in urbanized areas. Rural Interstates typically carry a higher percentage of truck volumes. Drivers tend to become accustomed to high travel speeds and the transitions between design speed changes should be above the minimum standards. As a result, decision sight distance may be more appropriate to analyze the visibility along freeway or ramp segments and at complex ramp locations.

6.2.9 Issues in Urban Areas

In urbanized areas, the Interstate access can be a more complex issue with more concessions in the design, operational, safety, cost, and environmental considerations than in other areas. Congestion levels tend to be higher and the demands on the driver are high as a result. In these areas, the desire to provide a higher level of geometric design criteria often is balanced within the socioeconomic, environmental, and cost of the proposed improvements. Land values can be significantly greater in urbanized areas and the acquisition of right of way and access rights along the crossroad also can be more costly.

6.2.10 Access to Managed Lanes

Slip ramps to/from managed lanes that are proposed as a part of an interstate corridor do not require access justification. However, care must be taken in the design of these ramps to ensure that they will function efficiently and safely within the context of the overall freeway corridor in which they are located. For instance, the location of the slip ramps will require careful consideration to ensure that they will not encourage hazardous weaving maneuvers across the general purpose lanes. Proposed ramps that will provide access between the general purpose lanes of an interstate freeway and the managed lanes of another non-interstate freeway or route do require a change in access justification. Adequate signing along the Interstate should be provided to inform drivers that they may be entering a managed lane facility.

6.2.11 Issues with Partial Interchanges

Drivers have the expectation that when they exit the Interstate, they will be able to enter again, either to continue their journey in the same direction or make the return trip. Partial system interchanges affect regional travel by forcing

drivers who remain on the Interstate System to follow other corridors on the return journey and may take them many miles off course. Partial system interchanges also eliminate the opportunity to use alternate freeway corridors to maintain traffic operations during construction, traffic incidents, special events, or emergencies.

In the rare and extraordinary circumstances that consideration is given to a partial interchange, way-finding signage is critical for the routes to which traffic is diverted, whether surface streets or another freeway corridor. With local development having multiple approaches to the Interstate, adequate signage can be difficult to achieve. Additional improvements may also be needed to increase capacity on those corridors providing the movements not available at the interchange.

Even when there is sufficient and compelling justification for consideration of a partial interchange, there are long-term considerations to take into account. If all movements are not provided when the interchange is first constructed, it may not be possible to ever build the missing movements even when a need for them emerges. With consideration of a partial interchange, priority should be given to a design that will accommodate the later addition of the missing movements and to preservation of right-of-way.

6.2.12 Issues with Locked-Gate Access

Since locked-gate accesses are intended only for a few select users, they should be inconspicuous to the general travelling public with limited improvements. Key consideration in the location and design of locked-gate access are sight distance where vehicles will be entering the freeway and acceleration of the entering vehicles. The proposal should also clearly describe to whom access is granted, how the access will be secured, and maintenance responsibilities.

6.2.13 Issues with Temporary Construction Access

Temporary construction access is usually granted only for construction activities within the Interstate right-of-way. The only circumstances that would justify temporary construction access to an adjacent property is when the construction is occurring in an isolated location with no other means of access, the access is for a limited and finite period time, and there will not be a recurring need.

6.2.14 Issues with Design Exceptions

Any variations from adopted design standards would be considered a design exception and should be evaluated and documented. FHWA has identified 13 Controlling Criteria for which limiting values are specified the Green Book. Any variation from these 13 criteria would require FHWA review and approval in accordance with the procedures established in the Stewardship and Oversight agreement between FHWA and the State. It should be noted that approval of an access request does not constitute approval of the design exceptions associated with the proposal, and vice versa. A useful resource when considering design exceptions is the FHWA document *Mitigating for Design Exceptions.*

6.3 DOCUMENTATION

To have sufficient information for a well-developed access request, design and analysis of alternatives should be developed to the 30% stage of project development. Lane configuration schematic and figures illustrating the existing geometry overlaid with proposed geometry are needed to fully evaluate the proposal. These figures should clearly show dimensions for the acceleration and deceleration lane lengths, lane transition taper lengths, auxiliary lanes, ramp spacing, and interchange spacing (measured from the centerline of grade-separation structures), and equivalent design elements along the crossroad within the interchange areas. Any identified design exceptions should be noted. The proposed limits of construction and ROW requirements, including control-of-access, should be clearly shown on these exhibits. The use of aerial photography is encouraged in these exhibits to assist a reviewer who is not familiar with the project area to understand the impacts of the project.

6.4 REFERENCES

(1) AASHTO, *Policy on the Geometric Design of Highways and Streets*, AASHTO, Bookstore Web Site (accessed August 30, 2010): <https://bookstore.transportation.org/item_details.aspx?ID=110>.

(2) AASHTO, *A Policy on Design Standards: Interstate System,* 2005, 5th Edition, AASHTO, Bookstore Web Site (accessed August 30, 2010): <https://bookstore.transportation.org/item_details.aspx?ID=1175>.

(3) FHWA, MUTCD (accessed August 30, 2010): <http://mutcd.fhwa.dot.gov/kno_2009.htm>.

(4) 2005 Transportation Research Board Access Management Manual

(5) FHWA, *Mitigating for Design Exceptions*

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CHAPTER SEVEN: SAFETY CONSIDERATIONS

7.1 INTRODUCTION

It is in the national interest to maintain as high a degree of mobility and safety performance on the Interstate System as possible, while at the same time balancing the need to provide connectivity to the local road network. Therefore, quantifying the impacts of a change of Access to each of these key factors is an important aspect of protecting the integrity of the Interstate System. For safety performance, this involves the need to examine both qualitatively and quantitatively, the effects of the proposed change in access.

7.2 SAFETY FACTORS

Ultimately, the safety analysis must enable an informed decision as to whether The Policy will be satisfied. The safety analysis should demonstrate the proposed change in access will not have significant or adverse impact on the safe operation of the Interstate System. The factors to be considered in the safety analysis of a proposed change in access include:

- Reducing potential safety problems in the preliminary engineering phases and designing to correct them before the projects are built.
- Improve operations and system reliability by reducing delays caused by crash incidents within the traffic stream.
- Addressing human factors in the design and operational elements of the proposed project.

Currently, there is little in the way of widely accepted safety guidance and tools available for agencies to use in the analysis of safety performance of highways. As a result, safety considerations often carry little weight in the project development process. However, with continued emphasis being placed on reducing the numbers of fatal and serious crashes on the highway system, new approaches and tools for the quantitative analysis of safety performance are being developed. For instance, two new tools for the analysis of safety performance that will have a large impact on the development of highway projects will be the *Highway Safety Manual* to be published in 2010 and the *Interchange Safety Analysis Tool (ISAT)* that is currently available at: http://www.tfhrc.gov/safety/pubs/07045/.

7.3 SAFETY ANALYSIS

The analysis of the safety considerations associated with an Interchange Access Change Request should consider anticipated safety performance confirmed with substantive safety data when available for any proposed change in access. While this terminology is relatively new, the concepts are not, and are reflected in good practices by many states.

Substantive safety analysis involves the evaluation of the actual performance of a highway or facility as measured by its crash experience (number of crashes per mile per year, with consequences of those crashes as specified by injuries, fatalities, or property damage).

The analysis of safety in the context of an Interchange Access Request should address the following:

- Establish safety area of influence.
- Collect traffic, geometric, and crash data (including design-year volumes).
- Analyze crash data.
- Identify Corrective Actions and Countermeasures.

- Assess existing and future safety conditions under build and no-build scenarios.
- Consider possible corrective actions and counter measures.
- Document the current and anticipated safety performance.

7.3.1 Establish Safety Area of Influence

The Interstate System Access Change Request should include an area of influence that addresses the safety concerns for the project and includes at least the adjacent interchanges along the Interstate including the roads in the area of influence. For most cases, this will be the same area as the operational analysis. The area of influence can and should be expanded where crash data suggests the need to do so, such as for high crash locations adjacent to the area. At a minimum, the area of influence along the crossroad should extend at least one-half mile from the ramp terminal and include the first major intersection. An exhibit illustrating these requirements is provided in Chapter 3, Figure 2 of this Guide.

Establishing the area of influence for safety performance associated with Interstate System Access Change Requests is strongly related to the following:

- Traffic volume (average daily and peak periods).
- Mix of traffic volumes (percent trucks).
- Location (rural, urban, suburban).
- Terrain (mountainous, rolling, level).
- Interchange type and access (ramp) spacing along the mainline and their effect on weaving distances, the number of lane changes required, and the speed differential of mixing vehicles.
- Roadway segment (mid-block or typical section; intersection, including type of intersection traffic control) along the crossroad.
- Surrounding land use (number of commercial and residential driveways, and associated pedestrian activity).
- Emergency response times and access for public safety personnel.
- Transit, pedestrian, bicycle, and motorcycle use.

7.3.2 Collect Traffic, Geometric, and Crash Data

Guidance on the collection of traffic data and geometric data and developing design-year volumes are provided in other chapters.

Crash or collision data for diagnosing safety as part of an Interstate System Access Change Request should include at least 3 years of related historical data for the following:

- Crash Frequency – Crash frequency is the number of crashes or collisions that occur at a given location. In addition to the location of the collision, additional information on the time of day and weather conditions at the time of the crash should be collected.
- Crash Type – Some of the most common types of collisions that could be involved in an interchange are summarized as follows:

Common Freeway Collision Types:
- Rear-end
- Head-on
- Sideswipe, same direction
- Single vehicle, off-road
- Single vehicle, diverge area

Common Intersection Collision Types:
- Rear-end
- Head-on
- Sideswipe, same direction
- Sideswipe, opposite direction
- Overtaking
- Right turn, rear-end
- Right turn, oncoming
- Left turn, oncoming
- Left turn, rear-end
- Left turn, opposing through
- Right angle
- Right turn, sideswipe
- Through with right,
- Left turn, sideswipe
- Through with left
- Left and right turn, sideswipe
- Single vehicle with parked car
- Single vehicle with other than parked car
- Vehicle with pedestrian
- Vehicle with bicycle
- Bicycle with pedestrian

- Severity – The severity of crashes should be classified as property-damage only, crashes involving injury, and crashes involving fatalities.

Common sources of these data include State DOT traffic record systems, other State agencies that may be responsible for highway safety, emergency management personnel, and State or Local law enforcement.

Availability of complete and accurate crash data is a critical element during the analysis of Interstate access, especially the safety considerations. The strength of the safety analysis is the State's ability to identify, analyze, prioritize, and evaluate reliable data. Careful analysis of the best available data is needed to determine the effects of the new access or the lack thereof. Data should include, but not be limited to, vehicle, driver, and pedestrian crash data; roadway and travel data; citation data; observational and opinion surveys; behavioral risk factor surveys; emergency response; medical data, including hospital discharge summaries; and other databases.

SAFETEA-LU requires States to have in place a crash data system with the ability to perform safety problem identification and countermeasure analysis on all public roads. SAFETEA-LU also requires States to advance their capabilities for traffic records data collection, analysis, and integration with other sources of safety data (such as State traffic record systems; input from police such as citations; input from emergency service providers and highway maintenance workers; motor carrier data; transit data; the Federal Railroad Administration (FRA) inventory of highway-railroad grade crossings; medical records; crash data research; public meetings; road inventories; driver records; insurance industry records; etc.).

States should strive to improve the timeliness, accuracy, completeness, uniformity, integration, and accessibility of the safety data needed to analyze the safety impacts of Interstate System. However, the safety analysis should not be delayed in anticipation of better data systems, nor should the safety analysis be omitted due to lack of data. States should begin by using the best data that is available and build upon it.

To advance States' data gathering capabilities, each State should develop an active partnership with an existing Traffic Records Coordinating Committee (TRCC). If the State does not currently have a TRCC, it should establish one. TRCCs are responsible for identifying data system enhancement strategies that can affect access to data, as well as its accuracy and timeliness.

7.3.3 Analysis of Safety Data

An important aspect in understanding crash data is that the quality of the data may be compromised as a result of unreported collisions; self-reporting of collisions with incomplete data; and collisions being coded incorrectly in data management systems. Before using this data, the analyst should ask:

- Is the data reasonable?
- Was the data collected consistently?
- Was quality control/quality assurance in place to verify the data?
- Does over-representation of the data exist that suggests problems with particular traffic patterns or locations within the area of influence?

Guidance on the use and appropriateness of this data can be provided in the FHWA document, *Signalized Intersections: Informational Guide*, FHWA Publication HRT-04-091, 2004 and other guides available from the FHWA at: http://safety.fhwa.dot.gov/.

The analysis of the safety impacts at ramp terminals with the crossroads can be performed using the procedures identified in *Signalized Intersections: An Informational Guide* (FHWA Publication Number HRT-04-091). This guide identifies several common methods for assessing safety at a location as summarized in Table 1. As a result of the analysis, potential safety issues and concerns should be evaluated and addressed considering the operational and geometric conditions being evaluated. In this analysis, the following issues should be considered from a driver's perspective:

- Driver workload and decision making.
- Consistency in geometric design.
- Number of lane changes required by drivers.
- Number of conflicts for drivers.
- Operational consistency along a system of interchanges.
- Flexible design solutions that can work in a variety of traffic flow volumes and patterns.

Table 1. Common Methods for Assessing Safety

Method	Advantages	Disadvantages
Collision Frequency	• Simple to use. • Easy for the public to understand.	• Biased toward high-volume sites. • Does not consider exposure. • Severity not considered. • Regression to the mean[7] not addressed.
Collision Rates	• Simple to use. • Considers exposure.	• Biased toward low-volume sites. • Requires volume data. • Assumes collisions and volume have relationship. • Severity not considered. • Regression to the mean not addressed.
Critical Collision Rate	• Relatively simple. • Considers exposure. • Applies a recognized statistical method.	• Requires volume data. • Assumes collisions and volume have a linear relationship. • Severity not considered. • Regression to the mean not considered.
Collision Severity Method	• Relatively simple. • Considers exposure.	• Biased toward high-speed sites. • Assumes collisions and volume have a linear relationship. • Regression to the mean not considered.
Risk Analysis Methods	• Accurate. • Considers exposure and severity. • Considers varying safety levels but locally, among a group of similar locations and across an entire jurisdiction.	• Requires volume data. • Assumes collisions and volume have a linear relationship. • Regression to the mean not considered.
Safety Performance Functions	• More accurate. • Considers exposure. • Acknowledges that collisions and volume have a non-linear relationship.	• Requires volume data. • Regression to the mean not considered. • Labor intensive. • Difficult for public to conceptualize.
Empirical Bayes Method	• Most accurate. • Considers exposure. • Acknowledges that collisions and volume have a non-linear relationship. • Addresses regression to the mean.	• Requires volume data. • Difficult for public to conceptualize.

Source: FHWA, *Signalized Intersections: An Informational Guide.*

[7] "Regression to the mean is a statistical phenomenon that occurs whenever you have a nonrandom sample from a population and two measures that are imperfectly correlated." This concept results in mean frequencies that could be highly influenced by a few data elements that are extremely high or low. William Trochim, Ph.D., The Research Methods Knowledge Base, 2e ISBN: 1-931442-48-7, 2001.

In the analysis of safety, a number of key stakeholders should be identified early in the process and participate in any coordination or methodology meetings that are performed. These stakeholders may include, but are not limited to:

- Incident management.
- ITS operations.
- Law enforcement.
- Fire.
- Rescue.
- EMS.
- Maintenance.
- Traffic.
- Design professionals.

In addition to the existing conditions, analysis of the potential safety performance in the future also should be considered. The future operational conditions in this analysis should be based on the design traffic and include the proposed design alternatives. Within the analysis of the design year conditions, the analysis should identify the following aspects:

- For the No-Build Alternative, will any future traffic conditions (through the design year) result in a substantive safety concern that does not exist today for the Interstate and other facilities in the area of influence?
- For the Build Alternative, what is potential change in crash frequency rates and severity based on similar conditions that exist on other segments today for the Interstate, local roads, and other facilities in the area of influence?
- What is the substantive change in safety performance for the proposed change in access within the area of influence compared to the No-Build Alternative?
- Does the difference in projected safety performance between the No-Build Alternative and the proposed change in access constitute a significantly adverse impact on the safe operation of the Interstate System?
- What are the impacts of various alternatives based on the safety, geometric design, operational, and environmental characteristics?

Road Safety Audits (RSAs) are an excellent way to address the safety aspects of the proposed project. An RSA is a formal and independent safety assessment of a proposed highway project by a multidisciplinary team of experts. The audit team assesses crash potential and safety performance of a roadway for all the users, and prepares an audit report that identifies potential safety problems. The audit report provides the decision makers with information and tools to evaluate, select, and justify proper design changes to improve the safety performance of roadways. For more information, see FHWA's *Road Safety Audit Guidelines*, FHWA Document No. FHWA-SA-06-06 and the *Road Safety Audit Case Studies*, FHWA Document No. FHWA-SA-06-16.

7.3.4 Identify Corrective Actions and Countermeasures

Following the completion of the analysis of the safety for existing and future conditions, corrective actions and potential countermeasures are needed to address these concerns. Since local conditions vary significantly, no comprehensive research has been performed to quantify the potential benefits for many of these measures. Qualitatively, several possible treatments exist to correct nominal and substantive safety concerns along freeways and intersecting local roadways. Table 2 and Table 3 provide a summary of the common crash types, possible causes, and potential corrective actions that could be considered.

Table 2. Common Collision Types, Possible Causes and Countermeasures along Freeways and Within Interchange Areas

Collision Type	Possible Cause	Possible Countermeasures
Rear-End	• Queue spillback along interchange ramps. • Queues resulting from other collisions. • New points of Interstate Access	• Improve crossroad intersection operations to reduce queue spillback. • Ensure decision sight distance is provided to back of queue if the spillback does not occur in freeway lanes and is hidden on the ramp. • Provide additional storage lanes along ramp. • Provide adequate storage. • Add lanes on ramp to distribute traffic.
	• Left exits or entrances resulting in driver indecision.	• Remove left exists or entrances. • Improve signing and/or pavement markings in advance of left exit or entrance.
	• Mainline lane drops. • Lack of lane continuity. • Lack of route continuity. • Lack of lane balance. • Inadequate application of auxiliary lanes.	• Eliminate reduction of basic number of lanes. • Improve freeway operational level of service. • Correct lane balance issues. • Correct lane continuity issues.
	• Slowing of vehicles resulting in a speed differential.	• Lengthen acceleration/deceleration lanes. • Flatten profiles grades for deceleration lanes. • Correct loop ramp radius. • Improve or eliminate weaving sections. • Provide decision sight distance.
Head-On	• Inadequate median protection. • Vehicle entered freeway in wrong direction.	• Implement median barriers. • Improve signing and channelization where wrong-way movements may occur.
Sideswipe, Same Direction	• Excessive driver workload in merge/diverge area. • Inadequate acceleration length. • Too many lane changes. • Weaving distances too short. • Spacing between ramps too short. • Inadequate decision sight distance. • Driver confusion/indecision.	• Reduce/simplify signing. • Lengthen acceleration lanes. • Correct lane balance issues. • Correct lane continuity issues. • Reduce number of required lane changes. • Improve or eliminate weaving sections. • Provide decision sight distance. • Provide consistency in ramp locations.

Single Vehicle, Off-Road	• Ramp curve radii. • Horizontal alignment that does not meet design standards for speed or vehicle type. • Driver fatigue.	• Increase loop ramp radius. • Correct horizontal geometry issues. • Provide roadside barriers. • Improve enforcement. • Provide traversable recovery areas.
Single Vehicle, Diverge Area	• Weaving distances too short. • Inadequate decision sight distance. • Driver confusion/indecision.	• Improve or eliminate weaving sections. • Provide decision sight distance. • Reduce/simplify signing. • Provide consistency in ramp locations.

Table 3. Common Collision Types, Possible Causes, and Countermeasures along Non-Freeways

Collision Type	Possible Cause	Possible Countermeasures
Rear-End	• Sudden and unexpected slowing or stopping when motorists make left turns in and out of driveways along corridor	• Median Improvements
	• Sudden and unexpected slowing or stopping when motorists make right turns in and out of driveways along corridor	• Access management
	• Too much slowing and stopping along corridor due to turbulent traffic flow	• Signal spacing and coordination improvement
	• Too much slowing and stopping along intersection approaches due to traffic-control issues • Drivers caught in intersection during red phase due to inadequate traffic control or inadequate clearance interval • Traffic signal not conspicuous or visible to approaching drivers, causing sudden and unexpected slowing or stopping movements	• Traffic control improvement • Enforcement of red light running and aggressive driving
	• Drivers unable to stop in time due to road surface	• Pavement/crosswalk improvements
	• Sudden and unexpected slowing or stopping due to inadequate intersection capacity	• Individual movement treatments • Enforcement to discourage aggressive driving
Angle	• Drivers caught in intersection during red phase due to inadequate traffic control or inadequate clearance interval • Traffic signal not conspicuous or visible to approaching drivers, causing drivers to get caught in intersection during red phase • Drivers caught in intersection during red phase due to inadequate warning/inability to stop	• Traffic control improvement • Approach improvement • Enforcement to discourage red light running and aggressive driving
Left-Turn Collisions	• Intersection cannot accommodate left-turn movements safely	• Alternative intersection treatments • Individual movement treatments
Collisions Involving Bicycles or Pedestrians	• Either the intersection cannot safely accommodate the pedestrians and/or the bicyclists, or motorists are failing to see or yield to their movement	• Pedestrian, bicycle and/or transit improvements • Enforcement of aggressive driving

Source: FHWA, *Signalized Intersections: Informational Guide,* Chapter 6, Table 31.

It is important to note that when balancing all of the factors that are considered in the selection of a preferred alternative, an alternative with a higher crash potential than another alternative may be selected. The selection of a preferred alternative includes geometric design, operational, environmental, constructability, cost, and other planning considerations in addition to safety and the selection is based on a tradeoff between those factors to provide the highest overall value to the traveler and public.

7.4 DOCUMENTATION

The documentation of the safety analysis should provide sufficient information for an independent review of the conditions and usually contains:

- a description of the performance measures related to the study goals and objectives;
- a description of the existing interchange and the alternatives considered;
- a summary of any issues that were considered in the proposed design and operational improvements needed;
- a discussion of how these improvements may improve safety for the controlled access facility or adjacent street system;
- a description of the study limits and performance characteristics;
- a description of the chosen safety analysis tool(s) and the assumptions used in the analysis;
- a summary of current versus design year characteristics and the impacts to the Interstate and other roadways within the area of influence under build and no-build conditions; and
- a determination of the safety impact of the project and an interpretation of results of the safety analysis. This will be done by comparing a baseline of safety performance from the existing year to the existing build, future no build, and future build(s) conditions.

7.5 REFERENCES

(1) FHWA, *Signalized Intersections: Informational Guide*, FHWA Publication HRT-04-091, 2004. The guide may be accessed from the FHWA Web Site (accessed August 30, 2010): http://www.tfhrc.gov/safety/pubs.htm.

(2) Transportation Research Board (TRB), National Cooperative Highway Research Program (NCHRP) Report 480: *A Guide to Best Practices for Achieving Context Sensitive Solutions*, 2002.

(3) FHWA, *A Manual of User Benefit Analysis for Highway*s, 2003.

(4) William Trochim, Ph.D., The Research Methods Knowledge Base, 2e ISBN: 1-931442-48-7, 2001.

(5) FHWA, *Road Safety Audit Guidelines*, FHWA Document No. FHWA-SA-06-06.

(6) FHWA, *Road Safety Audit Case Studies* document, FHWA Document No. FHWA-SA-06-16.

(7) FHWA, *Interchange Safety Analysis Too*l User Manual and Program, TFHRC

(8) FHWA, *Highway Safety Manual*

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CHAPTER EIGHT: OPERATIONAL CONSIDERATIONS

8.1 INTRODUCTION

The operational analysis of new or modified access is integral to understanding the benefits and potential impacts to the Interstate System and local roadway network. In accordance with FHWA's Policy, a detailed traffic operational analysis must accompany all requests for change in Interstate access. This chapter discusses an approach to address the operational aspects of The Policy, including defining an analysis study area, establishing operational performance measures, and selecting and interpreting the results of traffic analysis tools. This chapter will draw heavily upon the guidance of the FHWA Traffic Analysis Toolbox.

8.2 OPERATIONAL FACTORS

The analysis of the operations effects of proposed changes in Interstate access should be performed to support the following:

- Improve the Decision-Making Process – Operational analysis supports the planning / engineering decision-making for complex transportation problems, and promotes consistency in comparing alternatives.

- Assess Scenarios to Identify Robust Concepts – Operational analysis of future-year conditions is important when long-term improvements are being considered, operational concepts are being discussed, and when traffic and land use patterns are dynamic.

- Evaluating and Prioritizing Alternatives – Operational analysis assists in understanding and comparing the impacts of different alternatives. This typically involves the comparison between the no-build conditions with various build alternatives. The impacts are reported as performance measures and should be defined as the difference between the No-Build and Build Alternatives.

- Present Strategies to General Public and Stakeholders – Some traffic analysis tools have graphical and animation capabilities which assist in describing the problem, purpose, need, and proposed alternatives.

8.3 OPERATIONAL ANALYSIS

Defining the scope of the operational analysis will in part be driven by the problem, purpose, and need of study. It is recommended that this analysis be supported by defining the current operational performance measures. It is further recommended that the goals and objectives be defined in a manner which relate to the desired and acceptable operational performance of the system. With this approach, a future no-build condition can be established as a base of comparison, and future build alternatives may be assessed with a focus on the goals and objectives of the stakeholders. The coordination of the scope of the analysis will likely require a meeting of all the stakeholders.

Successfully achieving a cost-effective analysis will be supported with a management plan which defines the goals and objectives, the study breadth, the approach to the analysis, the effective selection and application of the traffic analysis tools, and the resources and time available to support the study. The remainder of this section will discuss each element in greater detail.

8.3.1 Define the Problem, Purpose, Need, Goal, and Objective

Before embarking on any major analytical effort, it is recommended that the problem, purpose and need be defined. This definition will be most effective when it includes specific performance characteristics. These specific characteristics would be identified for a specific location and period of time, and examples may include average speed and an average volume of vehicles per lane per hour.

For example purposes only, a problem definition may include performance characteristics stating that the existing corridor realizes an average speed of 37 mph during the time period of 5:15 to 5:30 p.m. between two known points

and is accompanied by an average throughput of 1,628 vehicles per hour per lane. This same segment is able to support an average throughput of 2,011 vehicles per hour per lane between 4 to 4:15 p.m. with an average speed of 53 mph.

By defining the problem, along with these types of operational performance measures, the analyst begins to focus on a top priority issue. This would not be possible with a broad all-encompassing statement that the existing facility is congested or that access is currently not supported.

The study goal and objective can then be established to further define the focus of the analysis and the desired future conditions for the facility. A goal and objective statement should emphasize specific, measurable outcomes as in the following example.

It is a goal and objective of this study to identify an alternative which:

- *Provides for minimum average freeway speeds of 47 mph throughout the peak period between Points A and Point B.*
- *Supports a freeway flow rate of 2,150 passenger cars per hour per lane (pcphpl) throughout the peak period.*
- *Provides for ramp operations which do not generate queues or spillback which impact operations on the freeway or major crossroad.*
- *All parcels are within 2.5 miles of a major arterial, which has the following operational characteristics:*
  - *Arterial operations do not result in phase failure or spillback along the approach defined as the major roadway.*
  - *Operations favor traffic flowing along the major roadway at an average speed of 35 mph.*
  - *Supports continuous arterial flow along the major roadway for a minimum of five signals before a vehicle is required to stop.*
  - *Minimizes delay at all signalized approaches.*

Overall, the study objectives should define why the analysis is needed, what questions the analysis should answer, and what type of information is required to support a more informed decision.

8.3.2 Define Study Breadth and Elements to be Analyzed

Once the study objectives have been identified, the next step is to identify the breadth of the analysis – both geographic and temporal. Several questions (although not exhaustive) relating to the required breadth of the analysis should be considered and are presented below:

- What are the limits of the project?
- What is the proximity to adjacent interchanges and intersections?
- How does the study area influence operations at adjacent locations within the transportation network?
- What alternatives / modes are being considered to address the problem?
- What physical elements within the network can be analyzed to support the purpose, goal and objective of the study?
- How many hours is congestion (as defined by the problem statement) present today, and how will this change in the future?
- Will the operational characteristics of the surrounding area change in the future, and if so, will an understanding of how this relates to the study area warrant analysis?

- What degree of precision do the decision makers require?
- Will varying travel demand patterns and land use scenarios be considered to assess how robust and flexible the alternatives are?
- In corridors where the potential exists for future multiple interchange additions, has a comprehensive corridor or network study been completed (Section 4.2.5)?

Defining the physical terminus of an improvement project versus the limits of a traffic analysis may be debated; in the end, it is a matter of balancing study objectives and study resources. The analysis should reflect the operational concerns and desires when defining the boundaries. The analysis likely will be dependent on the zone of influence of the facility in question, should be defined in consultation with the stakeholders, and should consider the geographic and temporal aspects which the alternatives may influence. Depending on the goals and objectives to the specific study, this may be further modified.

On corridors in urban areas with a series of service and system interchanges with minimum spacing between them, a change in access usually influences traffic operations beyond the adjacent interchanges. Alterations in patterns of lane change and weaving maneuvers will be observed several miles upstream and downstream of a new point of access. The proximity of adjacent interchanges will compound and extend the effects of these changes in traffic patterns. The boundaries of the study may need to include several interchanges upstream and downstream of the proposed access to identify the full effects of the proposal on traffic operational performance.

In extraordinary circumstances that prompt the consideration of a partial interchange, the zone of influence of the proposal will often extend over a much wider area. Such a proposal will necessitate operational analysis of the other interchanges, freeway corridors, and surface streets to which traffic will be diverted to make the maneuvers not provided. For a partial system interchange, the analysis would need to include the adjacent system interchanges, which may be many miles away from the project area.

Prior to beginning the analysis process, it is recommended that a coordination meeting be held to explicitly define the problem, purpose, and need; the goals and objectives of the study; and the limits of the operational analysis. The scope of the operational analysis likely will influence the stakeholders to be included in the initial and subsequent meeting. The stakeholders that may be involved are discussed in Part One, section 3.3 of this Guide.

8.3.3 Define the Design Year and Analysis Period

Traditionally, the design year assessed reflects a 20-year horizon from the anticipated opening date of the project. A minimum design year based on 20 years following the approval of the plans, specifications, and engineering for a project is required by 23 U.S.C. Section 109(b), which states:

> *(b) The geometric and construction standards to be adopted for the Interstate System should be those approved by the Secretary in cooperation with the State transportation departments. Such standards, as applied to each actual construction project, should be adequate to enable such project to accommodate the types and volumes of traffic anticipated for such project for the twenty-year period commencing on the date of approval by the Secretary, under section 106 of this title, of the plans, specifications, and estimates for actual construction of such project.*

The 30th highest hourly volume (30 HV) in the design year is required as a minimum.[8] Additional periods may be required for times which reflect, for example, typical AM /PM peak conditions.

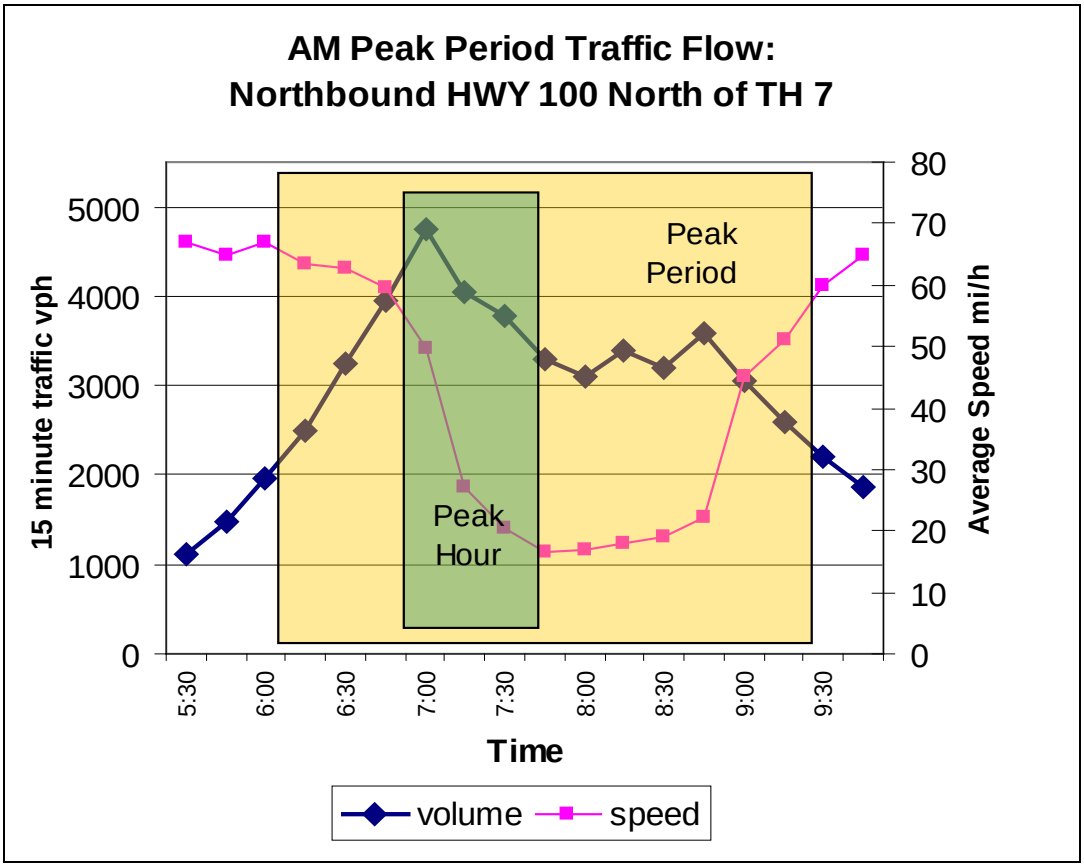
[8] American Association of State Highway and Transportation Officials (AASHTO), *A Policy On Design Standards Interstate System,* p.1, (January 2005).

In addition to the existing and design years, interim years may need to be considered--resulting from phased construction, changes in land use, or other projects within the area of influence. With construction phased over an extended period of time, analysis should be provided for each phase to evaluate operations until the next phase will be implemented.

Recognizing that congested conditions may extend beyond a single hour in some cases, the minimum requirement of a 30-HV design year may not be adequate for the operational analysis. In these cases, a multi-period analysis, such as microsimulation, may be needed with some traffic analysis tools that include demand volumes that represent the 30 HV. The analyst should consider this in assessing the traffic forecast demands and in preparing the required data.

For locations and conditions in which a facility is at or near capacity today or in the future, a multi-hour time period would be warranted. When the volume/capacity ratio is near or exceeds 1.0, microsimulation analysis should be employed. Understanding the operational conditions throughout the peak period in particular, would provide insights to the length of time in which a corridor is at or near saturation; promote an understanding of the geographic and temporal expanse of congestion due to one or more geometric features within an alternative; and support an ability to quantify multiple operational performance measures.

As depicted in Figure 9, while the peak period and peak hour relate to each other, the average speed and traffic flow vary within each and have different maximums and minimums. Understanding how an alternative supports and recovers from a given traffic demand profile may be as important as understanding how it operates during the peak 15 minutes.



Source: *Traffic Analysis Toolbox Volume IV: Guidelines for Applying CORSIM Microsimulation Modeling Software*, January 2007, Publication Number FHWA-HOP-07-079.

Figure 9. Selecting a Peak Period for Analysis

8.3.4 Define Performance Measures

Identifying the problem, purpose, need, goal, and objective of a study has become more complex in recent years due to several factors, including:

- Managed operations of freeways include special use lanes, such as HOV lanes and reversible lanes, making the operational analysis of Interstate System projects more complex.

- Increased levels of congestion, particularly in urbanized areas, where stop-and-go conditions are common and may exist for more than 15-minutes or 1 hour as analyzed using traditional operating techniques.

- Systems reliability and other performance measures have become increasingly important in addition to the traditional measures of effectiveness outlined in the Highway Capacity Manual (HCM).

Reflecting performance criteria in the scope of work will focus the analysis and enhance the understanding of the benefits and impacts of an Interchange Access Change Request. NCHRP Synthesis 311: *Performance Measures of Operational Effectiveness for Highway Segments and Systems* provides a summary of current knowledge and practice regarding this topic.

The performance measure(s) chosen should be based on the goals and objectives defined in a manner that relates to the desired and acceptable operational performance of the system. For the performance measures to be useful, they must ultimately provide information that can be used to make investment and management decisions. Use of the HCM and traffic simulation tools has become the standard approach for evaluating transportation design alternatives, operational performance, and traffic operations strategies. However, the HCM procedures and traffic simulation tools seldom result in identical performance measurements. Moreover, there are no guidelines on interpreting these performance measurements. This leaves decision makers and transportation professionals with the dilemma of identifying the true performance of the design alternatives and strategies. Interpretation of performance measures consists of distinguishing between acceptable and unacceptable traffic operations.

It should be recognized that performance measures are defined and calculated differently in various operational analysis tools as demonstrated in the FHWA study "Definition, Interpretation, and Calculation of Traffic Analysis Tools Measures of Effectiveness." Overall, the analyst is encouraged to focus on how the chosen tool(s) is applied and interpreted in a manner that permits various alternatives to be compared to each other.

Local and state public agencies have traditionally used the HCM LOS grades to determine if operations are acceptable or unacceptable. A certain letter grade is set as the agency standard. Project designs and impacts are then compared against that letter grade standard. A project design is considered unacceptable if the letter grade level of service is below the agency standard. An impact is determined to be significant if the project changes the letter grade from an acceptable letter to an unacceptable letter. Volume/capacity (v/c) ratios have been used by some agencies to determine acceptability of operations. For example, a v/c ratio less than one is acceptable, while a v/c ratio greater than one is unacceptable.

However, there is no guidance or standard practice on the interpretation and use of other performance measures that do not have HCM LOS equivalents, such as travel time, reliability, vehicle-hours traveled, vehicle-miles traveled, mean system speed, etc. Some agencies have used non-HCM performance measures for comparing alternatives. In an alternatives analysis, less of an undesirable feature (such as vehicle-hours traveled or variability of travel time) is considered better, but there is no standard threshold of acceptability. Interpretation of these non-HCM measures is currently difficult in the absence of information on national averages or national practice that would help an agency characterize a particular value of a non-HCM performance measure as acceptable.

In the analysis of more constrained facilities, the use of multiple performance measures is encouraged that can fully capture the duration, extent, intensity, and reliability of operations. HCM analyzes each highway segment separately and does not address the influence of traffic from the adjacent segments. When the influence of traffic slowing or

queuing extends beyond the segment, a simulation model is needed to represent the conditions. Additionally in densely populated urban areas, the analysis of the existing conditions and reasonable alternatives may be giving the same result of LOS F. Other measures are then needed to distinguish between the alternatives.

When an interchange is to be constructed with gaps of several years between phases, performance measures and a monitoring plan may be indicated to evaluate performance of the system. Performance measures should be selected to identify the influence of the uncompleted project during the interim years on other freeway corridors, interchanges, and surface streets.

8.3.5 Select an Operational Analysis Tool

There are numerous tools available for operational analysis available for different situations. These tools can be grouped into the following categories:

- Sketch-planning tools
- Travel demand models
- Analytical/deterministic tools (HCM-based)
- Traffic signal optimization tools
- Macroscopic simulation models
- Mesoscopic simulation models
- Microscopic simulation models

The characteristics of these types of tools are discussed in chapter 1.3 of *Traffic Analysis Toolbox Volume I: Traffic Analysis Tools Primer.* The analyst and project manager should understand the limitations of each tool considered and apply the tool(s) that are most appropriate to support the scope of the study.

Each analysis tool has differing capabilities and limitations, and care must be used to choose the tool that will provide the information necessary to evaluate the alternatives being considered. The analysis method from the Highway Capacity Manual (HCM) may be useful so long as the traffic on each discrete segment can be approximated as functioning independently. Conversely, microsimulation may be appropriate for very complex systems with high traffic volumes. The various tools will also differ significantly in the data requirements and expenditure of resources. A comparison of HCM analysis to simulation is provided in chapter 1.4 of *Traffic Analysis Toolbox Volume II: Decision Support Methodology for Selecting Traffic Analysis Tools.* The following is a summary of the limitations of the HCM freeway analysis approach from chapter 22 of the HCM 2000:

- A complete discussion of freeway control systems or even the analysis of the performance alternatives is beyond the scope of HCM 2000. The reader should consult the references identified in HCM 2000. The methodology does not account for delays caused by vehicles using alternate routes or vehicles leaving before or after the duration of the study.
- Certain freeway traffic conditions cannot easily be analyzed by the methodology (e.g., multiple overlapping bottlenecks). Therefore, other tools may be more appropriate for specific applications beyond the capabilities of the methodology. Refer to part V, HCM 2000, for a discussion of simulations and other models.
- User demand responses, such as spatial, temporal, modal, or total demand responses caused by traffic management strategies, are not automatically incorporated within the methodology. After viewing the facility

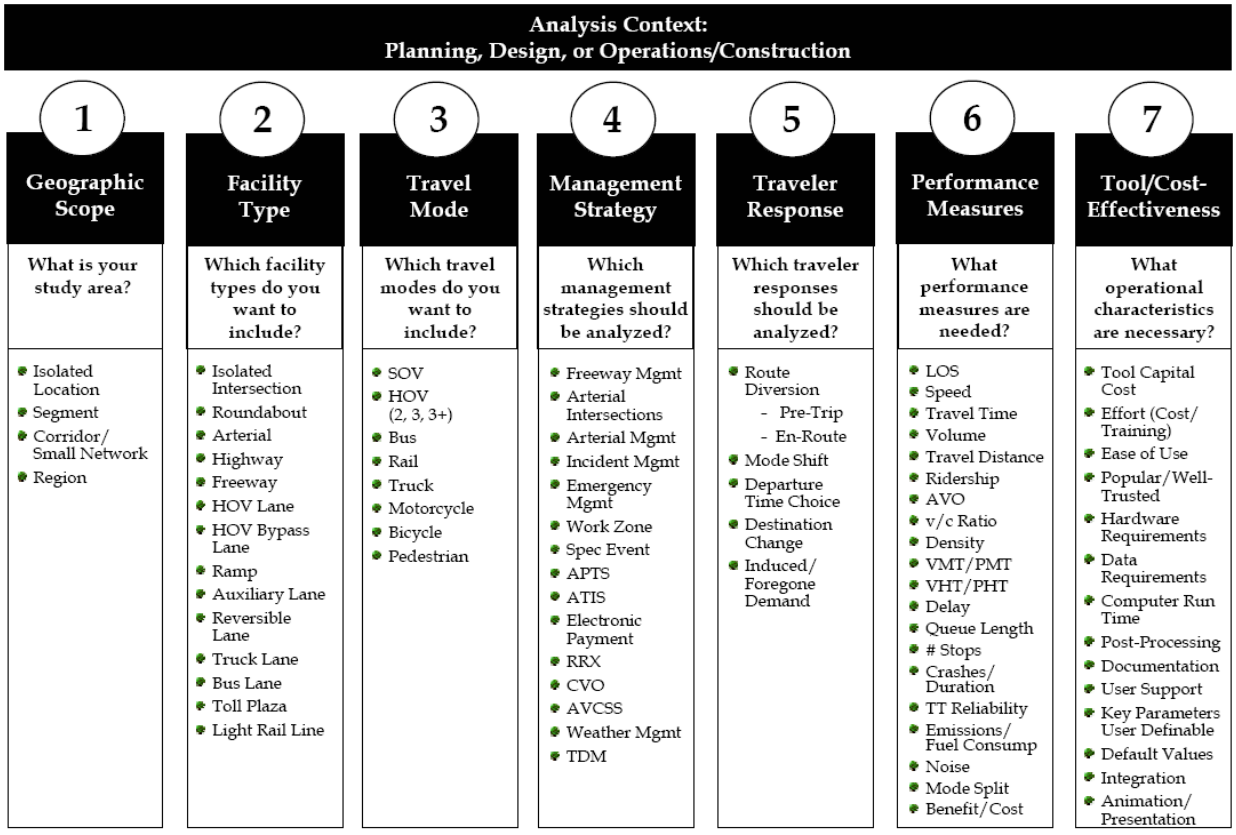
traffic performance results, the analyst can modify the demand input manually to analyze the effect of user demand responses or traffic growth. The accuracy of the results depends on the accuracy of the estimation of the users' demand responses.

- The freeway facility methodology is limited to the extent that it can accommodate demand in excess of capacity. The procedures address only local oversaturated flow situations, not system-wide oversaturated flow conditions.

- The completeness of the analysis will be limited if freeway segments in the first time interval, the last time interval, and the first freeway segment do not all have demand-to-capacity ratios less than 1.00. The rationale for these limitations is discussed in the section on demand-capacity ratio.

- Given enough time, the analyst can analyze a completely undersaturated time-space domain manually, although this is difficult. It is not expected that analysts will ever manually analyze a time-space domain that includes oversaturation. For heavily congested freeway facilities with interacting bottleneck queues, the analyst may wish to review part V, HCM 2000, before undertaking this methodology.

To get meaningful results from an operational analysis, having a clear understanding of the context for the analysis is vital to selection of the appropriate analysis tool. It is important to recognize that every traffic analysis tool has limitations, regardless of the analytical approach or tool type. With this information, the advantages and disadvantages of each tool may be considered. Answering the questions identified in Figure 10 about the context for the analysis will assist in defining the needs and requirements of the analysis tool. The context may then be compared with the ratings given for the various tools in volume II of the Toolbox.



Source: Traffic *Analysis Toolbox Volume II: Decision Support Methodology for Selecting Traffic Analysis Tools*, January 2007, Publication Number FHWA-HOP-07-079.

Figure 10. Decision Support Methodology for Selecting Traffic Analysis Tools

Table 4 provides additional guidance on the selection of an appropriate analysis tool for the analysis of changes in Interstate access. However, it is important to note that this table is not absolute and does not replace a project specific assessment for selecting the most appropriate tool(s).

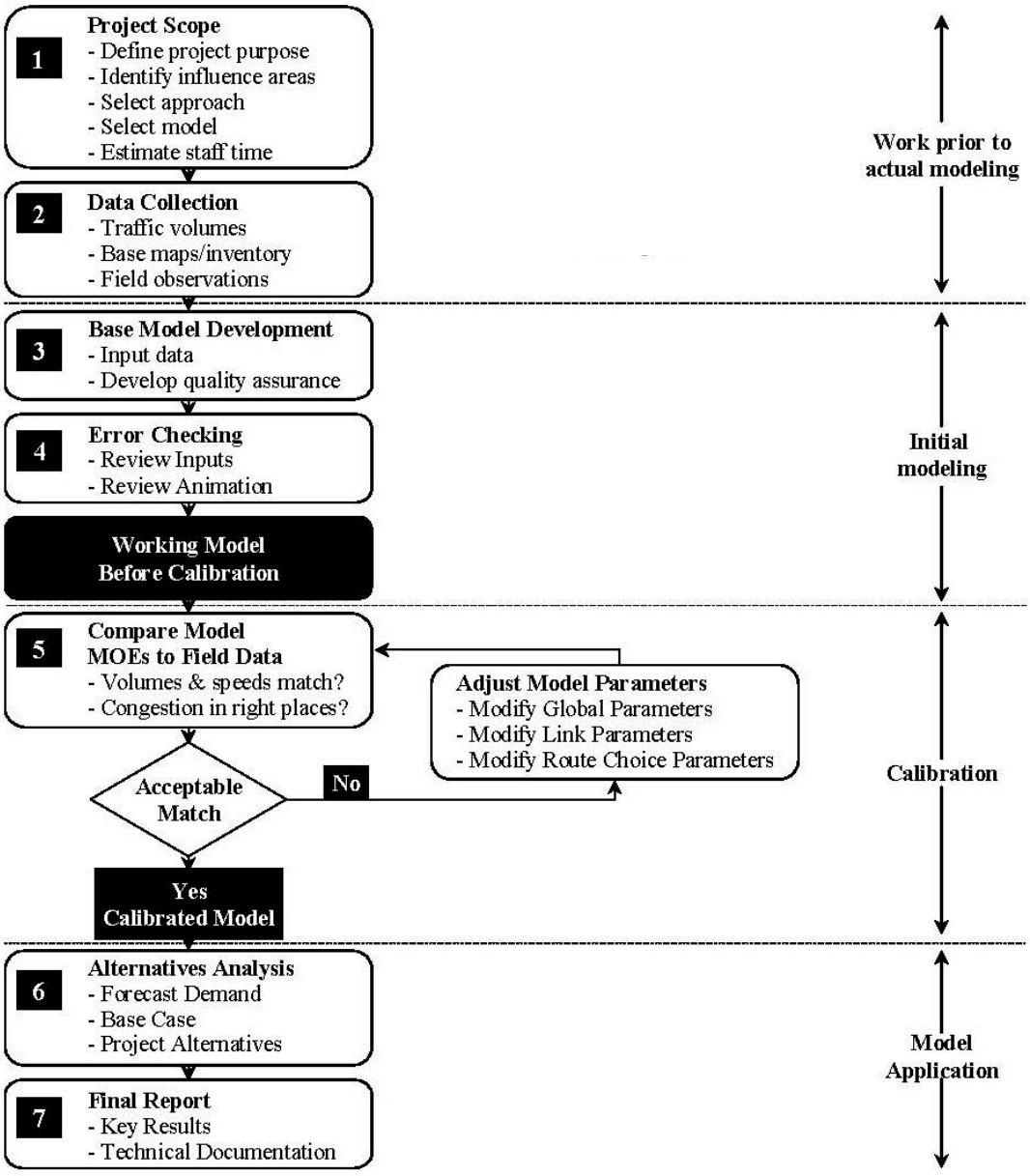
Table 4. General Examples for Selecting the Appropriate Analysis Tool

Area-Type Setting	Operational Analysis Tool(s) to Consider	Additional Considerations
Rural		
1. *Undersaturated* traffic conditions; interchange is isolated from adjacent access locations; crossroads have access control adjacent to interchange; and abutting land use does not generate significant traffic.	The HCM methodologies are applicable for the entire interchange, freeway, and crossroad analysis.	Simulation may be used to complement an HCM analysis under the following scenarios: • Evaluating ITS and/or other operational strategies. • Evaluating nonrecurring congestion (e.g., work zones, weather, incidents, etc.). • Evaluating conditions that are beyond the stated limitations of the HCM.
2. *Saturated* traffic conditions; interchange is isolated from adjacent access locations; crossroads have access control adjacent to interchange; and abutting land use generates significant traffic.	The HCM methodologies are applicable for the entire interchange, freeway, and crossroad analysis. However, simulation may be needed if congestion is system-wide (i.e., more than at isolated locations).	Simulation may be used to complement an HCM analysis under the following scenarios: • Evaluating ITS and/or other operational strategies. • Evaluating nonrecurring congestion (e.g., work zones, weather, incidents, etc.). • Evaluating conditions that are beyond the stated limitations of the HCM.
Suburban		
1. *Undersaturated* traffic conditions; interchange spacing approximately 2 miles; crossroads have signalized access control adjacent to interchange; and abutting land use generates moderate traffic.	The HCM methodologies are applicable for the entire interchange, freeway, and crossroad analysis. Simulation analysis may be performed to complement the HCM analysis.	Simulation may be used to complement an HCM analysis under the following scenarios: • Evaluating ITS and/or other operational strategies. • Evaluating nonrecurring congestion (e.g., work zones, weather, incidents, etc.). • Evaluating managed lanes (e.g., HOV, etc.). • Evaluating transit alternatives. • Evaluating congestion pricing strategies. • Evaluating ramp metering strategies. • Evaluating conditions that are beyond the stated limitations of the HCM.

Area-Type Setting	Operational Analysis Tool(s) to Consider	Additional Considerations
2. *Saturated* traffic conditions; interchange spacing approximately 2 miles; crossroads have signalized access control adjacent to interchange; and abutting land use generates significant traffic.	Simulation is recommended for system-wide analysis. The HCM methodologies may also be used for segments of interchange, freeway, and crossroad analysis.	Simulation may be used to compliment an HCM analysis under the following scenarios: • Evaluating ITS and/or other operational strategies. • Evaluating nonrecurring congestion (e.g., work zones, weather, incidents, etc.). • Evaluating managed lanes (e.g., HOV, etc.). • Evaluating transit alternatives. • Evaluating congestion pricing strategies. • Evaluating ramp metering strategies. • Evaluating conditions that are beyond the stated limitations of the HCM.
<u>Urban</u> 1. *Undersaturated* traffic conditions; interchange spacing approximately 1 mile; crossroads have signalized access control adjacent to interchange; and abutting land use generates moderate traffic.	The HCM methodologies may be applicable for segments of interchange, freeway, and crossroad analysis. However, simulation is recommended for system-wide analysis.	Simulation may be used to compliment an HCM analysis under the following scenarios: • Evaluating ITS and/or other operational strategies. • Evaluating nonrecurring congestion (e.g., work zones, weather, incidents, etc.). • Evaluating managed lanes (e.g., HOV, etc.). • Evaluating transit alternatives. • Evaluating congestion pricing strategies. • Evaluating conditions that are beyond the stated limitations of the HCM.
2. *Saturated* traffic conditions; interchange spacing approximately 1mile; crossroads have signalized access control adjacent to interchange; and abutting land use generates significant traffic.	Simulation analysis is the recommended analysis approach for system-wide analysis.	Not Applicable.

Regardless of which tool type is selected, it is not only important to understand the limitations of the chosen tool(s), it is also essential to apply the tools in a manner which supports a verifiable, reproducible, and accurate analysis. This includes the effective calibration of the chosen tool(s) and proper interpretation of the output.

Figure 11 presents a process for the application of traffic microsimulation. While developed for microsimulation, the overall framework may be used to support any traffic analysis, regardless of tool type, and should be referred to for further details.



Developed by the FHWA Traffic Analysis Tools Team and later adapted from *Advanced Corsim Training Manual*, Short, Elliott, Hendrickson, Inc., Minnesota Department of Transportation, September 2003.

Figure 11. Modeling Process – Guidelines for Applying Traffic Microsimulation Modeling Software

There are noteworthy differences in the definitions of the performance measures produced, as discussed above in section 8.3.4. While many simulation models will provide LOS results, direct comparison of the LOS results between different methods may be misleading. Therefore, FHWA does not recommend the reporting of the HCM measures of effectiveness or levels-of-service using simulation analysis results. Refer to the FHWA report titled "Definition, Interpretation, and Calculation of Traffic Analysis Tools Measures of Effectiveness," for an expanded discussion on these differences and the interpretation of their outputs.

Specific to the application of microsimulation, the analyst should refer to *Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software.*

8.3.6 Data Collection and Preparation

This activity may include the confirmation of geometric data; existing demand data, which should include turn volumes; origin-destination data; data to support the calibration of the chosen traffic analysis tool(s); confirmation of the placement and use of traffic control devices; railroad-highway crossing data; transit data; and information on bicycles and pedestrians. Efforts to draw upon existing databases and studies can assist this overall activity and promotes consistency in the analysis and conclusions, and should be confirmed with field observations.

A consistent approach to travel demand forecasting should be used in the Interstate System Access Change Request as with other planning activities. If a regional travel demand forecasting model is available from the MPO or State DOT, it should be used as the baseline for developing any demand forecasts and design traffic for the proposed new or modified access. Any changes to the network, socioeconomic, or other elements of the model made as part of the development of the design traffic should be documented and consistent with MPO and State DOT forecasts and Interstate corridor studies that may exist within the project study area.

Additional information regarding data collection and preparation is available in chapters 2 and 3 of Volume III of the FHWA Traffic Analysis Toolbox. Although written for microsimulation, the principles and concepts are easily translated and applied for other analytical approaches.

8.3.7 Assessment of Existing Conditions

The intent of assessing the existing or base condition is to realize a verifiable, reproducible, and accurate study. This may be a complex and time-consuming task with steps that are specific to the chosen analytical approach or software. It is suggested that this task include the implementation of a quality assurance / quality control plan to ensure optimal efficiency throughout the study.

Through validation in the field and an assessment with the chosen tool(s), errors in databases and field devices may be discovered. A comparison of software output to field data may highlight data entry errors, and the existing performance characteristics may be confirmed to support an alternative analysis.

Specific to the calibration of the chosen software, the analyst is modifying user-adjustable parameters that enable the software to better match specific local conditions. Key issues to calibration are:

- Identification of necessary calibration targets of acceptability.
- Allocation of sufficient time and resources to achieve calibration targets.
- Selection of the appropriate calibration parameter values to best match locally measured facility operations.
- Selection of calibration parameter values that best reproduce current route choice patterns.
- For tools and measures that reflect the overall network, calibration of the model against the overall system performance.

8.3.8 Alternatives Analysis

Defining the alternative to be analyzed is an essential part of specifying the scope of the operational analysis. For any Interstate System Access Change Request, the following alternatives should be analyzed:

- No-Build or No-Action Alternative – This alternative describes the conditions that will exist if the proposed new or modified access is not completed. The alternative should be analyzed in the existing condition and the design year at the design hour to establish a baseline for the analysis of the potential benefits and

impacts of the proposed new or modified access. If other improvements, such as adding lanes to the Interstate or local streets, are being considered, then those improvements should be evaluated without the new access to demonstrate whether or not the new access is necessary.

- TSM Alternative – This alternative should clearly show that there are no other alternatives which could meet the needs addressed by the proposed new or modified access. This alternative will demonstrate the need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate. Additionally, this alternative will demonstrate that local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved to satisfactorily accommodate the design-year traffic demands. Such improvement to local roads and streets may include increasing access control, improving traffic control, modifying ramp terminals and intersections; and adding turn bays or lengthening storage.

- Alternative Transportation Modes – This alternative is required to demonstrate that the need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities); geometric design; and alternative improvements to the Interstate without the proposed change(s) in access. In the operational analysis of this alternative, the consideration of any modal shift of traffic to public transit should be consistent with the planning data requirements for other activities in the planning process and derived from the regional travel demand forecasting model provided by the State DOT or MPO.

- Build Alternative (Alternative(s) that Provide for New or Modified Access) – Only after the TSM and Alternative Transportation Modes have been analyzed to demonstrate that they cannot meet the needs being addressed in the request, should new or modified access be considered. The analysis of these alternatives should provide analysis that considers the safety, operational, design, and environmental consequences of the proposed action as compared to the No-Build Alternative.

- Build Alternative(s) which Incorporate TSM and Alternative Modes (Alternative(s) that Provide for New or Modified Access) – This is a hybrid alternative which reflects a combination of the previously discussed alternatives, recognizing that the synergy of two or more may provide a greater value than the two independent of each other.

Following the completion of the analysis of the No-Build Alternative for the existing and future conditions, corrective actions and potential countermeasures should be identified to address these needs. Table 5 provides a summary of the common operational problems, possible causes, and potential corrective actions that should be considered. This is not an exhaustive listing.

If during the assessment of a change in access, particularly for new access, the operational performance of the Interstate facility will be negatively impacted, additional capacity along the Interstate in the form of new general use lanes, special use lanes, and/or collector-distributor roads may be required to maintain the operational performance of the Interstate. Other hybrid alternatives are also a possibility which could include ramp metering or speed management lanes. Where congested conditions currently exist as a result of mainline capacity deficiencies, sufficient information should be provided in the Interstate System Access Change Request to allow FHWA to make an informed decision considering the engineering and operational acceptability of these changes. The intent of The Policy is to fulfill the requirements of SAFETA-LU *to preserve and enhance the Interstate System.*

Depending on the analytical approach, such as simulation, it may be very informative to conduct an alternatives analysis which compares the no build alternative and two or more build alternatives. By doing this, a stronger appreciation of the benefits of the proposed alternative may surface and elements of cost, time to construct, and localized and network-wide measures may be compared and weighed.

Table 5. Common Operational Deficiencies and Countermeasures

Common Operational Deficiencies	Possible Countermeasures[1]
• Queue spillback interchange ramps	• Improve crossroad intersection operations to reduce queue spillback. • Ensure decision sight distance is provided to back of queue spillback if the spillback does not occur in freeway lanes and is hidden from main line • Provide additional storage in lanes along ramp. • Provide adequate storage and deceleration distance through parallel deceleration lanes. • Consider roundabout ramp terminals
• Driver indecision resulting in platoons of slower moving vehicles near left exits and entrances or deficient quality of service	• Remove left exists or entrances. • Improve signing and/or pavement markings in advance of left exit or entrance.
• Quality of service diminishes at lane transitions	• Eliminate reduction of basic number of lanes. • Correct lane balance issues. • Correct lane continuity issues.
• Slowing of vehicles resulting in a speed differential or deficient operating quality of service near ramps	• Lengthen acceleration or deceleration lanes. • Check profiles for deceleration occurring in mainline lanes. • Correct loop ramp radius. • Improve or eliminate weaving sections. • Reduce number of required lane changes. • Provide decision sight distance.
• Deficient quality of service in ramp areas	• Separate entrance movements into two ramps.[2] • Reconfigure interchange to provide semi-directional or directional ramps for each movement. • Eliminate loop ramps.
• Deficient quality of service in weaving areas	• Increase length of weaving area. • Eliminate weave area. • Provide collector-distributor roads. • Provide braided ramps. • Improve alternate facilities to provide diversion routes to relive traffic congestion on mainline and/or eliminate short-trips on the Interstate System.
• Deficient quality of service in mainline lanes	• Improve alternate facilities to provide diversion routes to relieve traffic congestion on mainline. • Implement incident management services.

Notes:
[1] Several of the possible countermeasures presented in this table may not require preparation of an Interstate System Access Change Request. The countermeasures are provided to show some of the types of modifications that can be evaluated based on local site conditions.
[2] This countermeasure has impacts which should be highlighted. Specifically, for areas with growth rates and changing land use conditions, this countermeasure has the potential to increase the traffic realized on the Interstate from 2,000 pcphpl per ramp (one-lane entrance ramp) to 4,000 pcphpl per ramp (two-lane entrance ramps).

Although not traditionally considered, there is an increasing realization that the travel demand forecast volumes analyzed are being exceeded well in advance of the 20-year design year. Realizing that a 5 or 10 percent increase in demand could result in nearly saturated or oversaturated operations, it is suggested that alternatives be tested under a variety of demand volumes. This is commonly referred to as a sensitivity analysis.

Through a sensitivity analysis the alternative(s) discussed above are loaded with traffic demands which exceed the design year forecast volumes. This process may also consider specific origin-destination patterns which reflect potential changes in land use. In conducting the sensitivity analysis, the analyst gains a greater appreciation of the system's ability to serve the "dynamics of the unknown," and in the case of simulation, conveys an appreciation of how the system operates under even slight modifications in traffic demand. In essence, the analyst is conducting a "stress test" of the design and gains an added appreciation of the strengths and limitations of a given alternative.

To visualize the benefits of this, Figure 12 reflects a base analysis, and Figure 13 reflects a 10 percent increase in traffic demand (where dark green reflects speeds over 70 mph and red reflects speeds of less than 35 mph). For designs which are on the threshold of congested operations, this may be of very high interest to the decision makers when selecting the preferred alternative and are interested in understanding the benefits for the respective costs. Specifically, two alternatives may have similar operational characteristics with a modest change in demand; however, the relative cost between the two alternatives may be clearly different.

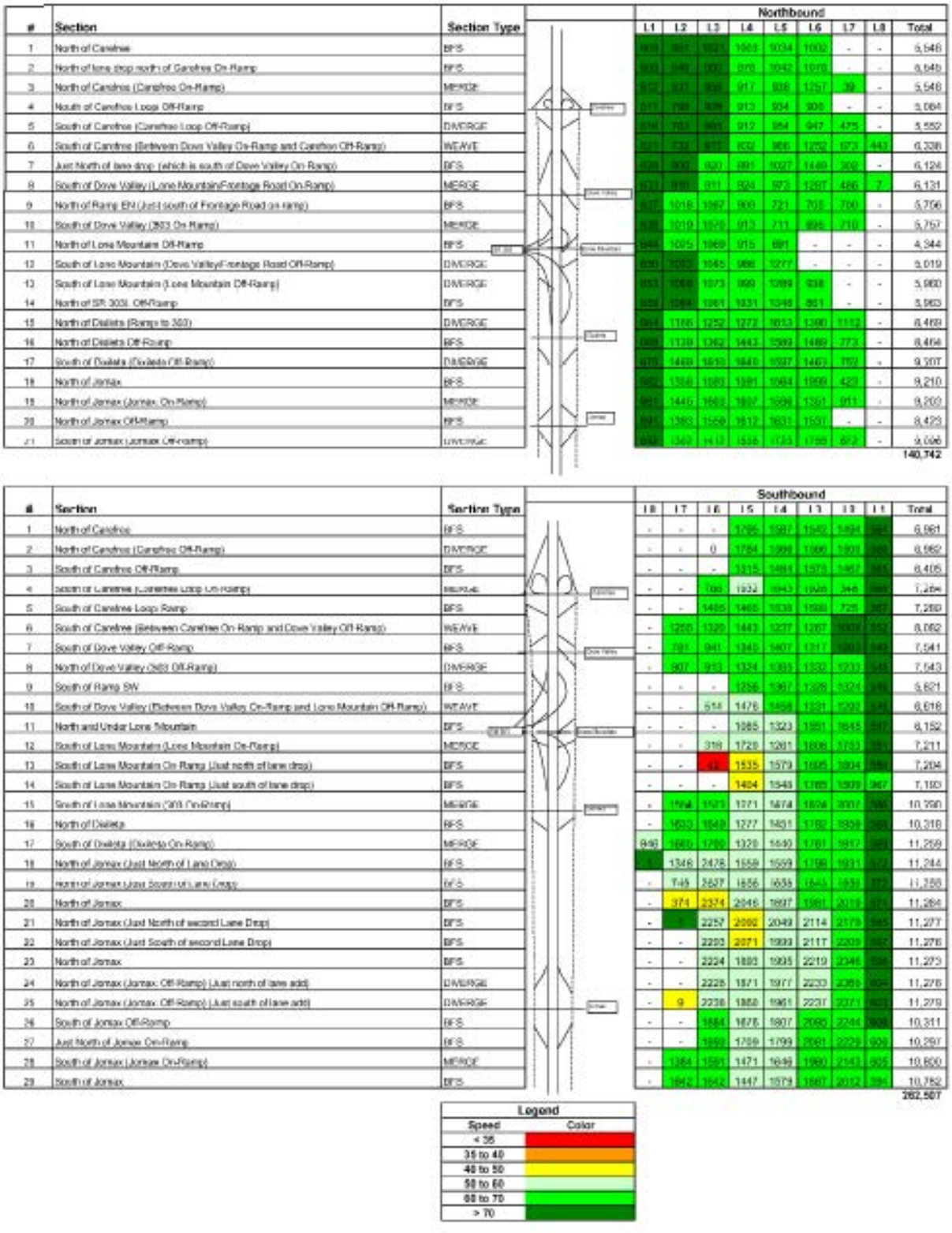
The key issues to consider in the alternatives analysis are:

- Assessing the No-Build Alternative with two or more Build Alternatives for the respective analysis years.
- Forecasting realistic future demands.
- Selecting the appropriate performance measures for evaluation of the alternatives.
- Accurate accounting of the full congestion – reduction benefits of each alternative.
- Properly interpreting the output of the chosen tool(s).

8.4 DOCUMENTATION

The documentation of the operational analysis should provide sufficient information for an independent review of the conditions, does not require the use of any specific traffic analysis tool software, and usually contains the following elements listed below.

- Description of the performance characteristics which define the problem, purpose, and need.
- Description of the performance measures upon which the study goals and objectives were based
- Description of the existing interchange and the alternatives considered.
- Summary of any issues that were considered in the proposed design and operational improvements needed.
- Discussion of how these improvements may improve traffic flow for the controlled access facility or adjacent street system.
- Description of the study limits and performance characteristics.
- Description of how a chosen traffic analysis tool(s) was calibrated, including which default values were modified, and why the chosen value was used.



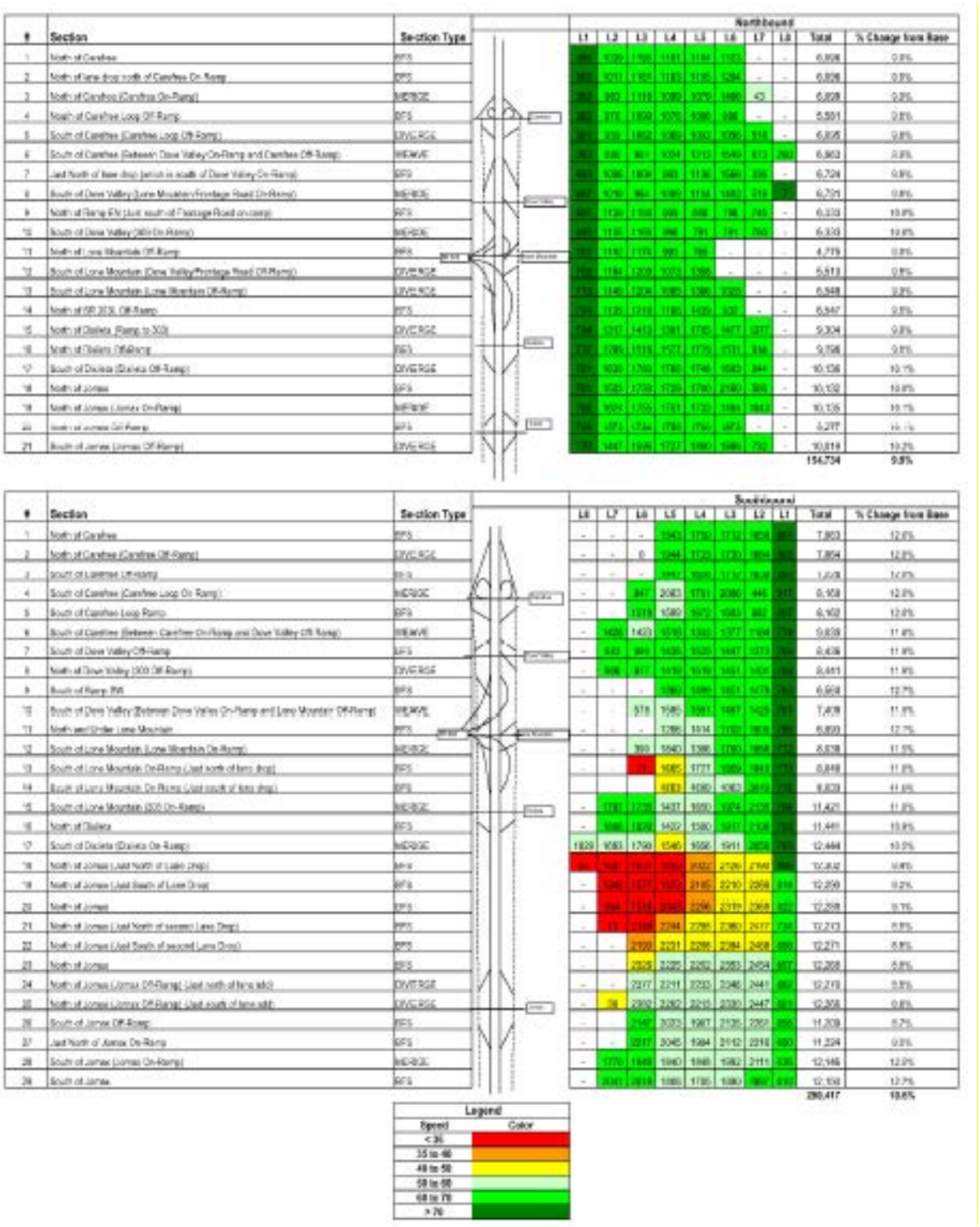
#	Section	Section Type	Northbound								
			L1	L2	L3	L4	L5	L6	L7	L8	Total
1	North of Carefree	BFS	[illegible]	[illegible]	[illegible]	1563	1034	1002	-	-	5,546
2	North of lane drop north of Carefree On-Ramp	BFS	[illegible]	[illegible]	[illegible]	970	1042	1078	-	-	5,545
3	North of Carefree (Carefree On-Ramp)	MERGE	[illegible]	[illegible]	[illegible]	917	936	1257	39	-	5,548
4	South of Carefree Loop Off-Ramp	BFS	[illegible]	[illegible]	[illegible]	913	934	908	-	-	5,064
5	South of Carefree (Carefree Loop Off-Ramp)	DIVERGE	[illegible]	[illegible]	[illegible]	912	954	947	475	-	5,552
6	South of Carefree (Between Dove Valley On-Ramp and Carefree Off-Ramp)	WEAVE	[illegible]	[illegible]	[illegible]	932	966	1252	673	443	6,338
7	Just North of lane drop (which is south of Dove Valley On-Ramp)	BFS	[illegible]	[illegible]	[illegible]	891	1027	1449	302	-	6,124
8	South of Dove Valley (Lone Mountain/Frontage Road On-Ramp)	MERGE	[illegible]	[illegible]	[illegible]	923	972	1287	486	7	6,131
9	North of Ramp EN (Just south of Frontage Road on-ramp)	BFS	[illegible]	[illegible]	[illegible]	969	721	705	700	-	5,756
10	South of Dove Valley (303 On-Ramp)	MERGE	[illegible]	[illegible]	[illegible]	913	711	695	710	-	5,757
11	North of Lone Mountain Off-Ramp	BFS	[illegible]	[illegible]	[illegible]	915	691	-	-	-	4,344
12	South of Lone Mountain (Dove Valley/Frontage Road Off-Ramp)	DIVERGE	[illegible]	[illegible]	[illegible]	988	1277	-	-	-	5,019
13	South of Lone Mountain (Lone Mountain Off-Ramp)	DIVERGE	[illegible]	[illegible]	[illegible]	899	1089	938	-	-	5,960
14	North of SR 303L Off-Ramp	BFS	[illegible]	[illegible]	[illegible]	1331	1349	851	-	-	5,963
15	North of Daisleta (Ramp to 303)	DIVERGE	[illegible]	[illegible]	[illegible]	1272	1653	1380	[illegible]	-	8,469
16	North of Daisleta Off-Ramp	BFS	[illegible]	[illegible]	[illegible]	1443	1569	1469	773	-	8,464
17	South of Daisleta (Daisleta Off-Ramp)	DIVERGE	[illegible]	[illegible]	[illegible]	1648	1937	1463	782	-	9,507
18	North of Jomax	BFS	[illegible]	[illegible]	[illegible]	1381	1564	1999	423	-	9,210
19	North of Jomax (Jomax On-Ramp)	MERGE	[illegible]	[illegible]	[illegible]	1897	1596	1361	911	-	9,200
20	North of Jomax Off-Ramp	BFS	[illegible]	[illegible]	[illegible]	1612	1831	1531	-	-	8,423
21	South of Jomax (Jomax Off-ramp)	DIVERGE	[illegible]	[illegible]	[illegible]	1536	1733	1799	672	-	9,096
											140,742

#	Section	Section Type	Southbound								
			L8	L7	L6	L5	L4	L3	L2	L1	Total
1	North of Carefree	BFS	-	-	-	1286	1587	1542	1494	[illegible]	6,961
2	North of Carefree (Carefree Off-Ramp)	DIVERGE	-	-	0	1784	1999	1999	1901	[illegible]	9,992
3	South of Carefree Off-Ramp	BFS	-	-	-	1315	1461	1573	1467	[illegible]	6,405
4	South of Carefree (Carefree Loop On-Ramp)	MERGE	-	-	786	1932	1943	1946	346	[illegible]	7,264
5	South of Carefree Loop Ramp	BFS	-	-	1466	1466	1939	1599	725	[illegible]	7,289
6	South of Carefree (Between Carefree On-Ramp and Dove Valley Off-Ramp)	WEAVE	-	1256	1329	1443	1237	1267	[illegible]	[illegible]	8,092
7	South of Dove Valley Off-Ramp	BFS	-	791	941	1345	1407	1311	[illegible]	[illegible]	7,541
8	North of Dove Valley (303 Off-Ramp)	DIVERGE	-	807	953	1324	1393	1332	1231	[illegible]	7,543
9	South of Ramp SW	BFS	-	-	-	1256	1397	1328	1324	[illegible]	6,821
10	South of Dove Valley (Between Dove Valley On-Ramp and Lone Mountain Off-Ramp)	WEAVE	-	-	516	1476	1468	1331	1292	[illegible]	8,618
11	North and Under Lone Mountain	BFS	-	-	-	1385	1323	1351	1845	[illegible]	8,152
12	South of Lone Mountain (Lone Mountain On-Ramp)	MERGE	-	-	319	1729	1261	1608	1733	[illegible]	7,211
13	South of Lone Mountain On Ramp (Just north of lane drop)	BFS	-	-	42	1535	1579	1695	1804	[illegible]	7,204
14	South of Lone Mountain On Ramp (Just south of lane drop)	BFS	-	-	-	1484	1548	1765	1909	947	7,193
15	South of Lone Mountain (SR 74 On-Ramp)	MERGE	-	1794	1121	1771	1674	1604	3017	[illegible]	10,790
16	North of Daisleta	BFS	-	1603	1649	1277	1451	1782	3358	[illegible]	10,318
17	South of Daisleta (Daisleta On-Ramp)	MERGE	846	1685	1760	1328	1649	1781	3917	[illegible]	11,259
18	North of Jomax (Just North of Lane Drop)	BFS	5	1348	2478	1559	1599	1798	1931	[illegible]	11,244
19	North of Jomax (Just South of Lane Drop)	BFS	-	745	2627	1856	1655	1643	1838	[illegible]	11,356
20	North of Jomax	BFS	-	374	2374	2046	1897	1981	2018	[illegible]	11,264
21	North of Jomax (Just North of second Lane Drop)	BFS	-	9	2257	2002	2049	2114	2179	[illegible]	11,277
22	North of Jomax (Just South of second Lane Drop)	BFS	-	-	2293	2071	1993	2117	2203	[illegible]	11,276
23	North of Jomax	BFS	-	-	2224	1893	1935	2219	2346	[illegible]	11,273
24	North of Jomax (Jomax Off-Ramp) (Just north of lane add)	DIVERGE	-	-	2228	1871	1977	2233	2359	[illegible]	11,276
25	North of Jomax (Jomax Off-Ramp) (Just south of lane add)	DIVERGE	-	9	2238	1868	1961	2237	2371	[illegible]	11,279
26	South of Jomax Off-Ramp	BFS	-	-	1884	1676	1807	2080	2244	[illegible]	10,311
27	Just North of Jomax On-Ramp	BFS	-	-	1859	1709	1799	2081	2229	[illegible]	10,297
28	South of Jomax (Jomax On-Ramp)	MERGE	-	1384	1581	1471	1646	1980	2143	[illegible]	10,800
29	South of Jomax	BFS	-	1842	1642	1447	1579	1887	2012	[illegible]	10,782
											262,507

Legend	
Speed	Color
< 35	
35 to 40	
40 to 50	
50 to 60	
60 to 70	
> 70	

Source: Arizona DOT.

Figure 12. Base Analysis



Source: Arizona DOT.

Figure 13. Analysis with 10 Percent Increase in Demand

- Documentation of the traffic analysis models, including copies of the electronic files used in the analysis and a description of the contents of each file. Files should contain sufficient data and information to allow an independent analysis of traffic performance using the same analysis tool. Input files for microscopic simulation tools should be developed to allow for detailed output on a wide range of performance measures and provide the ability to assess traffic performance on a lane-by-lane basis.

- Description of the process that was followed for performing current and future operational analysis, and any assumptions that were made.

- Summary of current- versus design-year characteristics and the impacts to the roadway system under build and no-build conditions. In a chart or a table listing the design performance measure for existing AM/PM, design year no-build AM/PM, and design year build AM/PM for all necessary Interstate on-ramps, off-ramps, and through lanes.

- Determination of the impact of the project and an interpretation of results of the operational analysis. This will be done by comparing a baseline of performance from the existing year to the existing build, future no build, and future builds conditions.

8.5 REFERENCES

(1) FHWA, *Traffic Analysis Toolbox,* http://ops.fhwa.dot.gov/trafficanalysistools/index.htm.

(2) American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Design Standards Interstate System,* p.1, January 2005.

(3) NCHRP Synthesis 311: *Performance Measures of Operational Effectiveness for Highway Segments and Systems.*

(4) AASHTO, *A Policy on Geometric Design of Highways and Streets,* 2004.

(5) Joel Liesch, PE *Freeway and Interchange Geometric Design Handbook,* TRB 2005.

(6) FHWA study, "Definition, Interpretation, and Calculation of Traffic Analysis Tools Measures of Effectiveness"

(7) Texas Transportation Institute, *Quantifying Congestion*.

(8) FHWA ,*Traffic Analysis Toolbox, Volume II: Decision Support Methodology for Selecting Traffic Analysis Tools,* chapters 1.3 and 1.4.

(9) *Highway Capacity Manual,* part V and chapter 22, 2000.

(10) FHWA, *Traffic Analysis Toolbox, Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software,* chapters 2 and 3.

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CHAPTER NINE: TECHNICAL RESOURCES

9.1 INTRODUCTION

The following resources provide additional information and guidance on the technical analysis of changes in Interstate access. These practices were established between the States and their FHWA Division to promote a consistent and effective process within the requirements and context of the associated State program. Web links to the references are provided when available (at the time of publication).

9.2 POLICY, STANDARDS GUIDANCE, AND INFORMATION

- A Policy on Design Standards – Interstate System, AASHTO.
  Order Information: https://bookstore.transportation.org/item_details.aspx?ID=1175

- A Policy on Geometric Design of Highways and Streets, AASHTO.
  Order information: https://bookstore.transportation.org/item_details.aspx?ID=110.

- Guide for Achieving Flexibility in Highway Design, AASHTO.
  Order Information: https://bookstore.transportation.org/item_details.aspx?ID=103.

- Guide for High-Occupancy Vehicle Facilities, AASHTO.
  Order Information: https://bookstore.transportation.org/item_details.aspx?ID=114.

- Guide to Quality in Preconstruction Engineering, AASHTO.
  Order Information: https://bookstore.transportation.org/item_details.aspx?ID=142.

- Guidelines for Value Engineering, AASHTO.
  Order Information: https://bookstore.transportation.org/item_details.aspx?ID=1555.

- Highway Safety Design and Operations Guide, AASHTO.
  Order Information: https://bookstore.transportation.org/item_details.aspx?ID=154.

- Manual on Uniform Traffic Control Devices, FHWA: http://mutcd.fhwa.dot.gov/kno_2009.htm.

- Manual of User Benefit Analysis for Highways, AASHTO.
  Order Information: https://bookstore.transportation.org/item_details.aspx?ID=5.

- Roadside Design Guide, AASHTO.
  Order Information: https://bookstore.transportation.org/item_details.aspx?ID=148.

- Access Management Manual, TRB.
  Order Information: http://trb.org/news/blurb_detail.asp?id=1427.

- Access Management Program Plan, FHWA: http://ops.fhwa.dot.gov/access_mgmt/.

- Freeway Management and Operations Handbook, FHWA:
  http://ops.fhwa.dot.gov/freewaymgmt/publications/frwy_mgmt_handbook/index.htm.

- National ITS Architecture, FHWA: http://www.iteris.com/itsarch/.

- Ramp Management and Control Handbook, FHWA:
  http://ops.fhwa.dot.gov/publications/ramp_mgmt_handbook/manual/manual/index.htm.

- *Signalized Intersections: Informational Guide*, FHWA: http://www.tfhrc.gov/safety/pubs/04091/.

- Traffic Analysis Tools, FHWA: http://www.ops.fhwa.dot.gov/trafficanalysistools/index.htm.

- Geometric Design and Operational Considerations for Trucks, ITE.
  Order Information: http://www.ite.org/bookstore/index.asp.

- Guidelines for the Safety Audit of Highways, ITE.
  Order Information: http://www.ite.org/bookstore/index.asp.

- Manual of Traffic Engineering Studies, ITE.
  Order Information: http://www.ite.org/bookstore/index.asp.

- Planning Urban Arterial and Freeway Systems, ITE.
  Order Information: http://www.ite.org/bookstore/index.asp.

- Road Safety Audits, ITE.
  Order Information: http://www.ite.org/bookstore/index.asp.

- Roundabouts: An Informational Guide, FHWA.
  Order Information: http://www.tfhrc.gov/safety/00068.htm.

- Toolbox for Alleviating Traffic Congestion and Enhancing Mobility, ITE.
  Order Information: http://www.ite.org/bookstore/index.asp.

- Traffic Engineering Handbook, ITE.
  Order Information: http://www.ite.org/bookstore/index.asp.

- Traffic Safety Toolbox: A Primer on Traffic Safety, ITE.
  Order Information: http://www.ite.org/bookstore/index.asp.

- Guide for Effective Freeway Performance Measurement, NCHRP Project 3-68.
  http://www.trb.org/Main/Blurbs/Guide_to_Effective_Freeway_Performance_Measurement_158642.aspx.

- HOV Systems Manual, NCHRP Report 414.
  http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_414.pdf.

- Highway Capacity Manual¸ TRB.
  Order Information: http://www.trb.org/Main/Public/Blurbs/152169.aspx.

- Highway Safety – Design, Features, and Evaluation, TRB.
  Order Information: http://trb.metapress.com/home/main.mpx.

- Highway Safety Modeling Analysis and Design, Transportation Research Record 1635, TRB.
  Order Information: http://trb.metapress.com/home/main.mpx.

- Highway Safety – Modeling, Analysis, Management, Statistical Methods and Crash Location, Transportation Research Record 1746, TRB.
  Order Information: http://trb.metapress.com/home/main.mpx.

- Improved Safety Information to Support Highway Design, TRB NCHRP Report 430. Order Information: http://books.trbbookstore.org/nr430.aspx.

- Quantifying Congestion: Final Report, TRB NCHRP Report 398. Order Information: http://books.trbbookstore.org/nr398a.aspx.

- Guidebook for Transportation Corridor Studies: A Process for Effective Decision Making, TRB NCHRP Report 435. Order Information: http://books.trbbookstore.org/nr435.aspx.

- Single Point Urban Interchange Design and Operational Analysis, TRB NCHRP Report 345. Order Information: http://books.trbbookstore.org/nr345.aspx.

- Title 23 United States Code: http://www.fhwa.dot.gov/legsregs/title23.pdf.

9.3 *Selected State/Division Practices*

The following State and FHWA Division practices provide additional guidance in the support of the analysis of changes in access. Web links to the references are provided when available (at the time of publication):

- Legacy 2030 Transportation Plan Update, East-West Gateway Council of Governments: http://www.ewgateway.org/pdffiles/library/trans/legacy2030/LongRangePlan.pdf.

- Interstate Change of Access Reports, FHWA Arizona Division.

- Guidance for the Preparation of a FHWA Interstate Access Request, FHWA Minnesota Division: http://www.dot.state.mn.us/trafficeng/modeling/resources/FHWAMinnesotaDivision-IJR-Guide.pdf.

- Standard Operating Procedures: Interchange Justification Study (IJS), Ohio Division of FHWA Transportation Operations Team (TOT).

- Procedures for Monitoring Interstate Access – P-5b, FHWA Tennessee Division.

- Interchange Handbook, Florida Department of Transportation: http://www.dot.state.fl.us/planning/systems/sm/intjus/default.shtm.

- Bureau of Design and Environment Manual, Illinois Department of Transportation: http://dot.state.il.us/desenv/bdemanual.html.

- Policy and Procedures for New or Revised Interstate Access Approval in Illinois, Illinois Department of Transportation.

- Process for New or Revised Interstate Access in Iowa: Interchange Justification Report, Iowa Department of Transportation: http://www.iowadot.gov/systems_planning/pdf/ijr_process_doc_mar2002.pdf.

- Guide for New Interchanges, Michigan Department of Transportation.

- Requests for FHWA Interstate Access Approval or Modification, Technical Memorandum 01-03-TS-03, Minnesota Department of Transportation.

- Policy on New Interchanges: Policy Statement 13, Montana Department of Transportation: http://www.mdt.mt.gov/other/dir/external/commission/policies/13-additional_interchanges.pdf.

- Policy on Valuation of Break in Control of Access, Nevada Department of Transportation.
- Access Control Agreement for Interstate Interchanges in Virginia Between the Virginia Department of Transportation and Federal Highway Administration, Virginia Department of Transportation.

APPENDIX A: INTERSTATE ACCESS POLICY

DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

Access to the Interstate System

AGENCY: Federal Highway Administration (FHWA), U.S. Department of Transportation.

ACTION: Notice of revised policy statement.

Summary:

This document issues the revised FHWA policy statement regarding requests for new or modified access points to the Interstate System. The policy includes the requirements for the justification and documentation necessary to substantiate any request that is submitted to FHWA for approval.

FOR FURTHER INFORMATION CONTACT: For technical information: Mr. Jon Obenberger, Office of Program Administration (HIPA–20), (202) 366–2221. For legal information: Mr. Robert Black, Office of the Chief Counsel (HCC–32), (202) 366–1359, Federal Highway Administration, 1200 New Jersey Avenue, SE, Washington, DC 20590. Office hours are from 7:45 a.m. to 4:15 p.m., e.t., Monday through Friday, except Federal holidays.

SUPPLEMENTARY INFORMATION:

Background:

The surface transportation system plays a key role in shaping the economic health, quality of life and sustainability of a metropolitan area, region, and State. The Interstate System is critical element providing a network of limited access freeways which facilitate the distribution of virtually all goods and services across the United States. The Interstate System also influences the mobility and safety of people and goods by providing access to local highways and network of public streets. As a result, it is in the national interest to preserve and enhance the Interstate System to meet the needs of the surface transportation system of the United States for the 21st Century.

The FHWA's Policy on Access to the Interstate System provides the requirements for the justification and documentation necessary to substantiate any proposed changes in access to the Interstate System. This policy also facilitates decisionmaking regarding proposed changes in access to the Interstate System in a manner that considers and is consistent with the vision, goals and long-range transportation plans of a metropolitan area, region and State. This policy reflects the congressional intent and direction provided in Section 1909(a)(3) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (Pub. L. 109-59, 119 Stat. 1144), which amended section 101 of title 23 United States Code by adding subsection (b)(3)(H): "the Secretary should take appropriate actions to preserve and enhance the Interstate System to meet the needs of the 21st Century."

Section 111 of title 23 United States Code, provides that all agreements between the Secretary and the State departments of transportation (State DOTs) for the construction of projects on the Interstate System shall contain a clause providing that the State will not add any points of access to, or exit from, the project in addition to those approved by the Secretary in the plans for such project, without the prior approval of the Secretary. The Secretary has delegated the authority to administer 23 U.S.C. 111 to the Federal Highway Administrator pursuant to 49 CFR 1.48(b)(1). A formal policy statement including guidance for justifying and documenting the need for additional access to the existing sections of the Interstate System was published in the Federal

Register on October 22, 1990 (55 FR 42670), and modified on February 11, 1998 (63 FR 7045).

The FHWA has adopted the AASHTO publication "A Policy on Design Standards -- Interstate System" as the standard for projects on the Interstate System as incorporated by reference at 23 CFR 625.4(a)(2). Section 625.4(a)(2) further requires that access to the Interstate System shall be fully controlled, and that access to the Interstate System shall be achieved by interchanges at selected public highways.

Summary of Changes:

The changes in FHWA's policy were made to reflect the direction provided in SAFETEA-LU, to clarify the operational and safety analysis and assessment of impacts that provides the basis for proposed changes in access to the Interstate System, and to update language at various locations to reference Federal laws, regulations, and FHWA policies. The following specific revisions have been made to the existing policy statement:

1. Updates were made to Requirement 1 clarifying the need for agencies to analyze and justify that the projected design-year traffic demands cannot be adequately accommodated by existing access to the Interstate.
2. Additional examples were added to Requirement 2 to identify the type of improvements to be considered in the planning for and development of proposed changes in access.
3. Text was added to Requirement 3 to clarify that the safety and operational analysis to be performed and documentation to be submitted provides the justification for proposed changes in access.
4. Revisions were made to Requirement 4 clarifying the need to meet or exceed design standards for all roadway improvements included in proposals to change access.
5. Changes were made to Requirement 5 to reference the current requirements contained in SAFETEA-LU and 23 CFR part 450.
6. Text was added to Requirement 6 clarifying the analysis to be performed in support of proposed changes in access involving multiple interchanges.
7. Clarification to Requirement 7 was made identifying the justification needed to support any proposed change in access due to changes in land use or density of development.
8. Revision was made to Requirement 8 to clarify and avoid duplication with Requirement 5.
9. Updates were made to the Application section to reference current Federal laws, regulations, and FHWA policies. Revisions were made to paragraph 4 and a new paragraph 5 was added to clarify what is a change in access and how this policy may apply to different types of access changes. Paragraph 8 was added to clarify how FHWA's review and approval of proposed changes in access relate to other Federal actions, reviews, and approvals. Paragraph 9 was added to clarify that proposals for changes in access need to be reevaluated and the proposal resubmitted to FHWA for review and approval if the project has not proceeded to construction within 8 years.

The revised policy statement also includes various editorial changes to enhance clarity and readability. The revised policy statement is as follows:

Policy:

It is in the national interest to preserve and enhance the Interstate System to meet the needs of the 21st Century by assuring that it provides the highest level of service in terms of safety and mobility. Full control of access

along the Interstate mainline and ramps, along with control of access on the crossroad at interchanges, is critical to providing such service. Therefore, FHWA's decision to approve new or revised access points to the Interstate System must be supported by substantiated information justifying and documenting that decision. The FHWA's decision to approve a request is dependent on the proposal satisfying and documenting the following requirements.

Considerations and Requirements:

1. The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).

2. The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).

3. An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

4. The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).

5. The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.

6. In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).

7. When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).

8. The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).

Application:

This policy is applicable to new or revised access points to existing Interstate facilities regardless of the funding of the original construction or regardless of the funding for the new access points. This includes routes incorporated into the Interstate System under the provisions of 23 U.S.C. 103(c)(4)(A) or other legislation.

Routes approved as a future part of the Interstate System under 23 U.S.C. 103(c)(4)(B) represent a special case because they are not yet a part of the Interstate System. Since the intention to add the route to the Interstate System has been formalized by agreement, any proposed new or significant changes in access beyond those covered in the agreement, regardless of funding, must be approved by FHWA.

This policy is not applicable to toll roads incorporated into the Interstate System, except for segments where Federal funds have been expended or these funds will be used for roadway improvements, or where the toll road section has been added to the Interstate System under the provisions of 23 U.S.C. 103(c)(4)(A). The term “segment” is defined as the project limits described in the Federal-aid project agreement.

Each break in the control of access to the Interstate System right-of-way is considered to be an access point. For the purpose of applying this policy, each entrance or exit point, including "locked gate" access, is considered to be an access point. For example, a diamond interchange configuration has four access points.

Ramps providing access to rest areas, information centers, and weigh stations within the Interstate controlled access are not considered access points for the purpose of applying this policy. These facilities shall be accessible to vehicles only to and from the Interstate System. Access to or from these facilities and local roads and adjoining property is prohibited. The only allowed exception is for access to adjacent publicly owned conservation and recreation areas, if access to these areas is only available through the rest area, as allowed under 23 CFR 752.5(d).

Generally, any change in the design of an existing access point is considered a change to the interchange configuration, even though the number of actual points of access may not change. For example, replacing one of the direct ramps of a diamond interchange with a loop, or changing a cloverleaf interchange into a fully directional interchange would be considered revised access for the purpose of applying this policy.

All requests for new or revised access points on completed Interstate highways must closely adhere to the planning and environmental review processes as required in 23 CFR parts 450 and 771. The FHWA approval constitutes a Federal action and, as such, requires that the transportation planning, conformity, congestion management process, and the National Environmental Policy Act procedures be followed and their requirements satisfied. This means the final FHWA approval of requests for new or revised access cannot precede the completion of these processes or necessary actions.

To offer maximum flexibility, however, any proposed change in access can be submitted by a State DOT to the FHWA Division Office for a determination of engineering and operational acceptability. This flexibility allows agencies the option of obtaining this acceptability determination prior to making the required

modifications to the Transportation Plan, performing any required conformity analysis, and completing the environmental review and approval process. In this manner, State DOTs can determine if a proposal is acceptable for inclusion as an alternative in the environmental process. This policy in no way alters the planning, conformity or environmental review and approval procedures as contained in 23 CFR parts 450 and 771, and 40 CFR parts 51 and 93.

An affirmative determination by FHWA of engineering and operational acceptability for proposals for new or revised access points to the Interstate System should be reevaluated whenever a significant change in conditions occurs (e.g., land use, traffic volumes, roadway configuration or design, environmental commitments). Proposals shall be reevaluated if the project has not progressed to construction within 8 years of receiving an affirmative determination of engineering and operational acceptability (23 CFR 625.2(a)). If the project is not constructed within this time period, an updated justification report based on current and projected future conditions must be submitted to FHWA to receive either an affirmative determination of engineering and operational acceptability, or final approval if all other requirements have been satisfied (23 U.S.C. 111, 23 CFR 625.2(a), and 23 CFR 771.129).

Implementation:

State DOTs are required to submit requests for proposed changes in access to their FHWA Division Office for review and action under 23 U.S.C. 106 and 111, and 23 CFR 625.2(a). The FHWA Division Office will ensure that all requests for changes in access contain sufficient information, as required in this policy, to allow FHWA to independently evaluate and act on the request. Guidance to assist with the implementation and consistent application of this policy can be accessed electronically through the FHWA Office of Infrastructure's Web page at: http://www.fhwa.dot.gov/programadmin/index.htm.

Policy Statement Impact:

The policy statement, first published in the Federal Register on October 22, 1990 (55 FR 42670), and modified on February 11, 1998 (63 FR 7045), describes the justification and documentation needed for requests to add or revise access to the existing Interstate System.

The revisions made by the publication of this policy statement reflect the direction provided in SAFETEA-LU, clarify the operational and safety analysis to accompany proposed changes in access on the Interstate System, and update language at various locations to ensure consistency with other Federal laws, regulations and FHWA policies. State DOTs should take these factors into consideration when making requests for new or revised access points, but the overall effort necessary for developing the request will not be significantly increased.

Authority: 23 U.S.C. 111 and 315; 49 CFR 1.48.

Issued on: August 18, 2009

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