IOWA DOT
I-80 Planning Study

INTERSTATE 80
PLANNING STUDY (PEL)

Guiding Principles

Office of Location and Environment | April 2016

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INTRODUCTION

To better guide the planning and development of improvement strategies throughout the Interstate 80 corridor, this technical memorandum details the basic principles to inform the planning and project development process. These principles may seem fundamental, but they comprise the core to maintaining consistency for the corridor throughout the development process.

The principles outlined below will serve to guide the development of the I-80 interstate planning study across the state:

1. Balance access and mobility
2. Design for future needs, considering emerging technologies
3. "Right-size" Interstate 80
4. Consider environmental and social implications
5. Build on past efforts
6. Consider practical transportation modes
7. Engage stakeholders
8. Develop an implementation plan

1. BALANCE MOBILITY AND ACCESS

Roadways provide mobility and access. Mobility is the ability to move people or goods from place to place. Access is getting those people and goods to or from specific locations adjacent to the roadway, such as another road or a driveway. Each point of access adds interference to the free movement of traffic. Interstates are intended to maximize mobility but limit access, with access allowed only at interchanges.

Interstate standards provide the highest design speed for geometric features, limit entrance and exit locations, and provide a forgiving roadside design. These features allow interstates to provide a high degree of mobility.

The posted speed limit for the rural portions of I-80 in Iowa is 70 mph. The design speed for these portions will be set at 75 mph, consistent with expected operating speeds

The interstate is a fully controlled access facility, access is allowed only at interchanges. Minimum desirable spacing for interchanges is one mile in urban areas and three miles in rural areas. Additional interchanges in rural areas are not anticipated.. Urban areas will require additional consideration. Additional interchanges will require a detailed study and Federal Highway Administration (FHWA) approval.

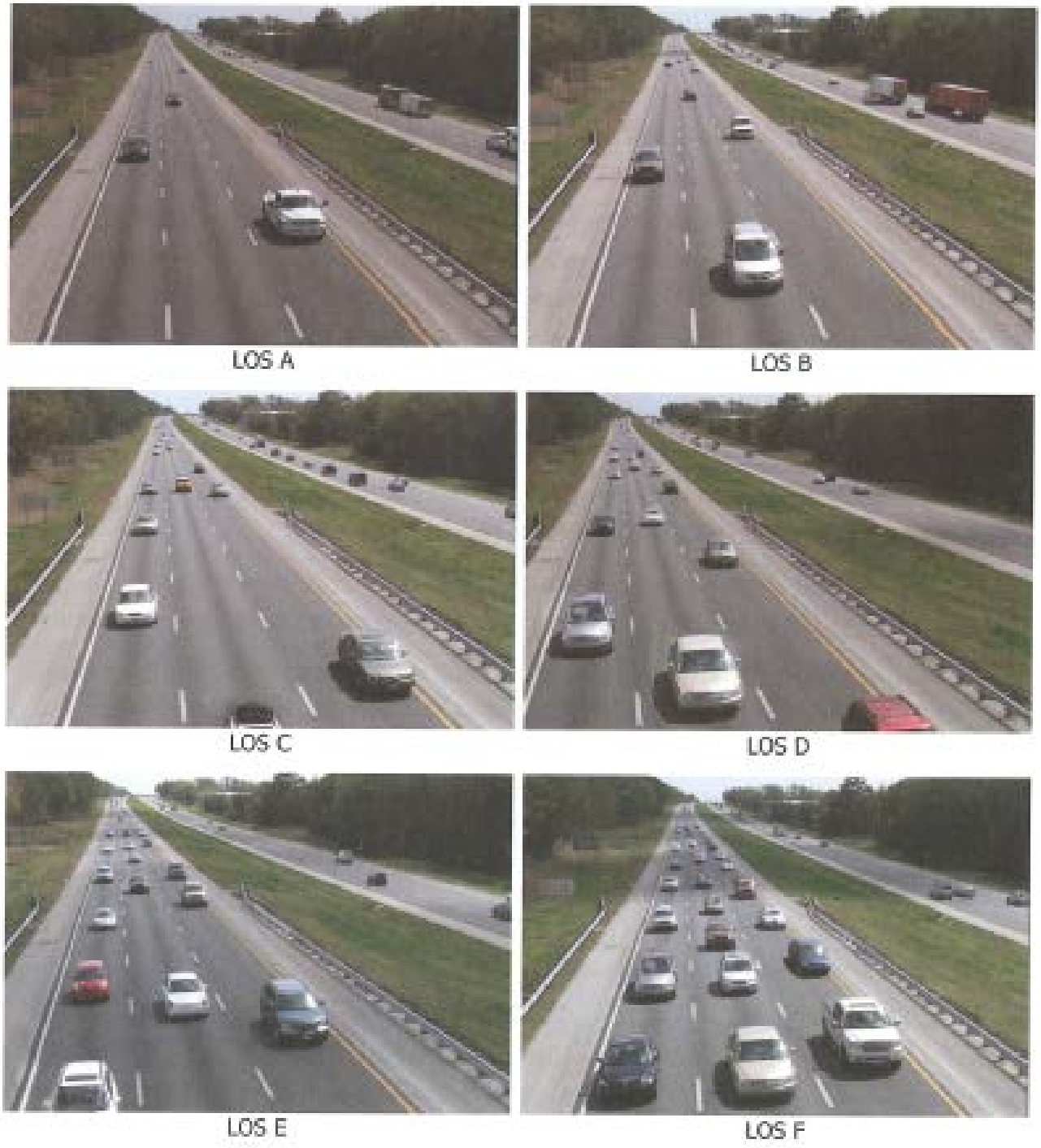
2. DESIGN FOR FUTURE NEEDS CONSIDERING EMERGING TECHNOLOGIES

Traffic volumes on the interstate system have grown over the years, and are expected to continue to grow. A traffic forecast prepared by the Iowa DOT Office of Systems Planning for the Design Year of 2040 will be used as the basis of the traffic volumes for operations evaluations.

Two primary components make up highway operations evaluations, traffic flow and crashes. One method to measure the quality of traffic flow is the Highway Capacity Manual Level of Service (LOS) grade scale. The Highway Capacity Manual provides commonly accepted definitions for LOS based on the number of vehicles within a section of roadway or the delay associated with a roadway feature, such as an intersection. For a free-flow roadway, such as an interstate, LOS is based on vehicle density. Figure 1 gives illustrative examples of various LOS “letter grades”.

The FHWA regulates interstate design standards (23 CFR Part 625). Two of the documents cited in 23 CFR are A Policy on Geometric Design of Highways and Streets, commonly referred to as the AASHTO Greenbook, and A Policy on Design Standards – Interstate System. In accordance with these documents, our criteria for acceptable LOS will be “B” for rural portions of the interstate and “C” for the urban portions.

Figure 1. HIGHWAY CAPACITY MANUAL LOS EXHIBIT



Several technologies are developing with the potential to alter our transportation system. These may include driving assist features, autonomous vehicles, real-time traffic analysis and regulation of traffic control devices, interconnectivity of vehicles and infrastructure, and the capability to gather and analyze huge amounts of data.

These technologies will likely have an effect on the performance and operation of the transportation system. Transportation needs and priorities will be difficult to discern, as the facility planned today and built in the near future, will have a life expectancy of fifty to seventy years, much like the original interstate system. We will use an approach that considers long-term traffic growth, but also allows for occasional re-evaluation of the necessary facilities, including pavement, communication devices, and intelligent transportation components.

Without a clear understanding of what our world will be like beyond our planning timeframe, the key decision at this point may be to acknowledge that some of the emerging technologies will be extremely valuable. Emerging technologies will be further explored as part of this planning study.

Crash rates for the interstate are the lowest of any of the roadway types, due to the design features, controlled access, and high volume of traffic. Existing crash numbers, types, and locations, will be reviewed to determine areas of concern. The goal is an overall decrease in the rates of serious injury and fatality crashes.

3. "RIGHT-SIZE" INTERSTATE 80

It is critical to acknowledge public funds are finite and highway investments need to be made considering all life cycle costs of the infrastructure. Adequate capacity is necessary to minimize crashes and promote economic vitality. Building capacity beyond that needed is an unwise investment. It not only unnecessarily increases upfront expenditures; it also stretches already thin operational budgets throughout the life of the infrastructure. A delicate balance exists to provide needed capacity but not an excessive amount of underutilized capacity.

If the best choice for improvement of a section of the interstate is complete reconstruction, consideration will be given to strategies that allow a future capacity improvement to be added with the least disruption to the users of the roadway. An incremental approach to adding

capacity may also be the chosen approach to provide the greatest possible mobility for the system as a whole within the design life of the improvements.

The study will investigate other right-sizing issues related to the adjacent roadway system.

4. CONSIDER ENVIRONMENTAL AND SOCIAL IMPLICATIONS

Since the original construction of the Interstate System, and partially in response to lessons learned during that time, a framework of laws and best practices has been established to provide acceptable stewardship of the environment during the development and operation of highway facilities. During the planning of these improvements, the Iowa DOT will seek to protect and enhance our waterways, minimize harm to endangered and threatened species, reduce impacts to ecosystems, moderate the effects of traffic noise, and identify and address potential disproportionately high adverse effects on minority or low-income populations.

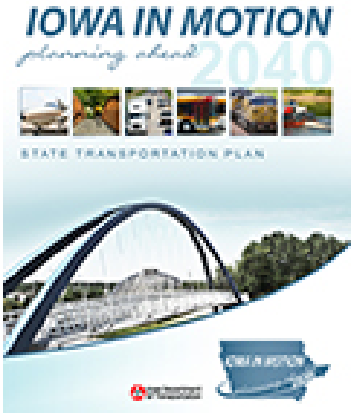
While environmental impacts are possible from improvements of this type, efforts will be made to avoid, minimize and/or mitigate these impacts. After this initial study, smaller segments of the interstate will be studied to lead to the development of construction plans. During that development, a thorough evaluation of environmental impacts will occur for each segment.

5. CONSIDER PRACTICAL TRANSPORTATION MODES

Recent studies of alternative modes of transportation will be reviewed. These include, but are not limited to, the Iowa Park and Ride Plan and the Chicago to Council Bluffs-Omaha Regional Passenger Rail System Planning Study. The goal will be to incorporate the features that provide travelers with additional transportation options to the extent possible in a fiscally prudent manner.

6. BUILD ON PAST EFFORTS

State Transportation Plan - Iowa in Motion (2012)



This document serves as the framework for investment in the state transportation system for the next two decades. The plan includes:

- Trends
- System condition
- Guiding Principle and goals
- Investment actions
- Costs and revenues
- Implementation strategies

Key points from this plan that will influence the planning for I-80 are:

- I-80 is the critical freight facility in Iowa. In 2010, 435.2 million tons of freight were moved in Iowa, 79% of these by truck. I-80 carries the most trucks of any highway in the state. In 2040, 620 million tons of freight are anticipated, with 83% of these moved by truck.
- Population is growing slowly in Iowa, with the growth near urban areas and shrinkage in the more rural areas. I-80 crosses the state though much of the area that is anticipated to experience growth.
- The average age of Iowa residents is increasing. This affects mode and route choices.
- Overall, more miles are being travelled on Iowa's highway system, especially on the Interstates.

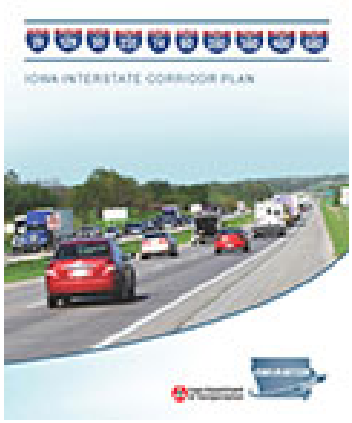
The goals set out in this plan will guide the planning of I-80 improvements, these goals are:

Safety — to make Iowa a safer place to travel

Efficiency — to make the best use of resources

Quality of life — to make Iowa a better place to live, work, and travel

Iowa Interstate Corridor Plan (2013)

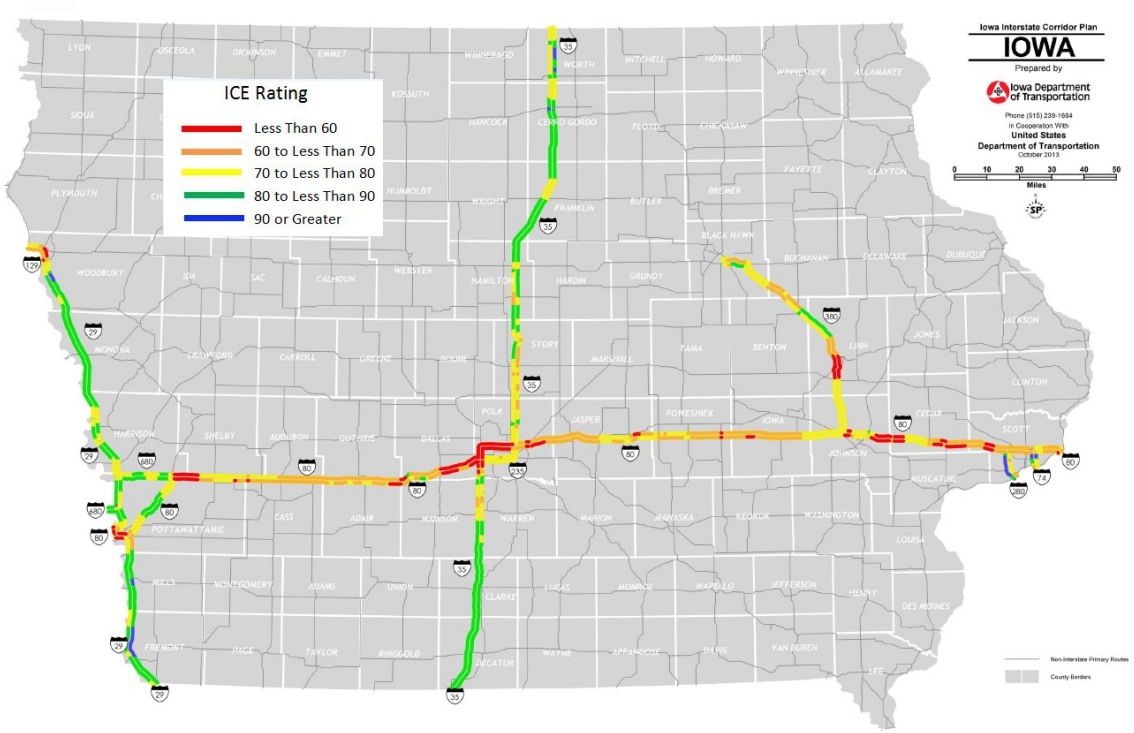


This document provides an assessment of all segments of the Interstate system in Iowa on the basis of the seven core criteria below:

- Average annual daily traffic, combination truck count
- Average annual daily traffic, passenger count
- Average annual daily traffic, single-unit truck count
- Congestion Index value
- International Roughness Index (IRI) value
- Pavement Condition Index (PCI) rating
- Structure Inventory and Appraisal (SIA) sufficiency rating

The Statewide Interstate Condition Evaluation (ICE) rating is an averaged "score" of the seven criteria, with a higher score representing a better condition. Figure 2 shows the prioritized segments from the Iowa Interstate Corridor Plan.

Figure 2. Iowa Interstate Corridor Plan PRIORITIZED SEGMENTS



Report on Goals & Best Management Approaches to Reconstruction the Interstate System in Iowa (2011)

This effort was undertaken to provide DOT Management with a variety of goals for consideration during reconstruction of the interstate system. The topics evaluated were:

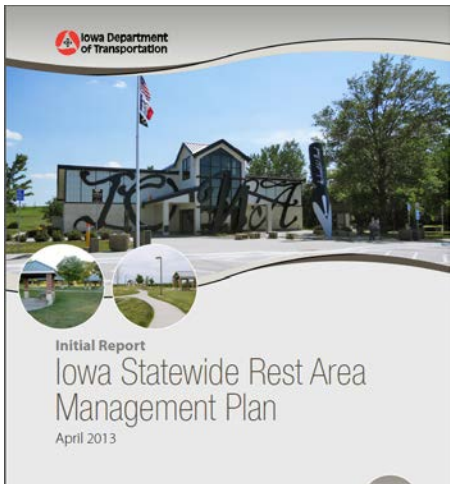
- Aesthetics
- Constructability
- Cost computation
- Design
- Interchange/intersections
- LOS
- PCI/IRI
- Model and freight movement
- Rest areas
- Stewardship/ environmental sustainability

Key conclusions of this document include:

- Constructability
    - Use a multidisciplinary approach to gather information from those outside the typical groups
    - Construction clear of existing has the least effect on existing traffic
- LOS
    - Design year LOS standard should be LOS “B” in rural and LOS “C” in urban
    - Design exceptions should be avoided to the greatest extent possible.
- Modal and Freight Movement
    - Consider and account for increased number and size of trucks
- Stewardship/ environmental sustainability
    - Considerations to reduce weather impacts

Iowa Statewide Rest Area Management Plan (2013)

This document provides an in-depth look at the State of Iowa's rest area inventory and needs. It provides the information needed for the creation of a statewide rest area development program. The efforts to create an implementation plan are on-going.

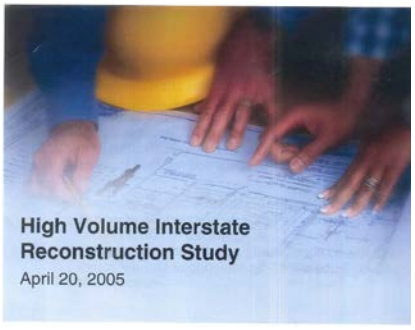


Iowa Park and Ride System Plan (2014)

This document analyzed existing park and ride facilities and commuter patterns and identified locations that would be suitable for additional facilities.

High Volume Interstate Reconstruction Study (2005)

This study highlights that I-80 has some segments where improvement needs are driven by pavement conditions to a greater extent than capacity needs. However, the traffic volumes on these are generally such that the traditional method of maintaining construction traffic by reducing the



number of lanes available will not suffice. Presented are several alternative lane arrangements that maintain the current number of traffic lanes during reconstruction.

7. ENGAGE STAKEHOLDERS

Involvement of agency partners and public stakeholders is a vital component of a successful corridor planning effort. Community stakeholders and the public will be provided the opportunity to help guide the outcomes of the study. The primary method of public outreach will be through the I-80 Planning Study webpage, available at www.iowadot.gov/interstatestudy. The webpage contains information pertaining to the I-80 studies, online public meetings, links to social media, and contact information for stakeholders and the public to present their ideas, comments, and questions to the DOT. At the conclusion of the I-80 planning study, a public hearing will be held to present the findings to the public and to solicit feedback. Please refer to the Public Involvement Plan (2015) for more information regarding stakeholder engagement.

8. DEVELOP AN IMPLEMENTATION PLAN

With growing volumes of traffic, the I-80 corridor is reaching the limits of its capacity in the central and eastern parts of the state. The 2005 High Volume Interstate Reconstruction Study anticipated unacceptable LOS would occur in the 2010 to 2025 time frame for all sections of the interstate. While the economic downturn of 2008 led to a drop in vehicle miles driven, the long-term trend of increasing traffic volumes has recovered and continued in the past five years. The Iowa Interstate Corridor Plan provides a general framework for developing an implementation plan that incorporates both aging infrastructure and capacity concerns. Critical items that need incorporated into this plan are:

- An implementation schedule that addresses the locations causing the largest delays first
- Consideration of mobility and travel time reliability during construction
- Continuity of the interstate system, especially with respect to increased capacity
- Incorporation of recent spot improvements to the greatest extent possible
- Where practical, build in the ability to provide future needed capacity with the least amount of disruption

This study represents the initial steps in the major undertaking of updating I-80. These efforts will require several years to develop and construct and require a significant amount of funding. As the study progresses, it may be determined that the traffic and truck volumes in the three sections, Council Bluffs to Des Moines, Des Moines to Iowa City, and Iowa City to Davenport differ enough that the best solution for each section also differs.

The primary outcome of this study is a determination of what type of improvements are to be made to provide consistency to the I-80 corridor across the state.

DESIGN PARAMETERS

Several specific parameters intended to guide the design of the interstate have been discussed previously and are presented in Table 1. As the project develops, additional design criteria will supplement and comply with these primary parameters.

Table 1. DESIGN PARAMETERS

DESIGN YEAR	2040
DESIGN SPEED	75 mph (rural)
MINIMUM INTERCHANGE SPACING	3 miles (rural), 1 mile (urban)
LEVEL OF SERVICE	B (rural), C (urban)

These design parameters, along with the cross section of the roadway, will have the greatest influence on the final layout of the interstate. Figure 3 represents the basic cross section for a six-lane roadway. This cross section provides for the addition of future capacity, gentle slopes for recovery of an errant vehicle, snow storage and drainage for both the near term construction and a future facility with added capacity.

Figure 3. CROSS SECTIONAL VIEW

REFERENCES

TRB. *Highway Capacity Manual* (HCM) 2010. Transportation Research Board of the National Academies. Washington, DC.

AASHTO. *A Policy on Design Standards - Interstate System* January 2005. American Association of State Highway and Transportation. Washington, DC

AASHTO. *A Policy on Geometric Design of Highways and Streets, 6th Edition,* 2011. American Association of State Highway and Transportation. Washington, DC