CHAPTER 2
ALTERNATIVES

This chapter identifies the initial range of route alternatives proposed for consideration for the Study. Route alternatives are the alternatives for the overall Project route and identify the termini and alignment for the service. The screening criteria and multi-step process used to evaluate these route alternatives, and the results of the alternatives analysis are also described. Subsequent to the route screening process, options for service (speeds, frequencies, and station stops) were identified, reviewed, and screened, and design options for route connectivity through the Des Moines, Iowa, area and the Council Bluffs, Iowa, and Omaha, Nebraska, area were considered. Although preliminary design would address specific infrastructure needs during the Tier 2 NEPA process, which may include the evaluation of design options, connectivity options must be initially addressed during preparation of the Tier 1 NEPA process. The No-Build Alternative and Build Alternative (including its phased implementation) are described in this chapter. Finally, a summary of potential impacts of the No-Build Alternative and Build Alternative is provided.

2.1 ROUTE ALTERNATIVES DEVELOPMENT AND SCREENING

The identification of route alternatives and the screening process were documented in an Alternatives Analysis Report (FRA and Iowa DOT, 2012). This report was made available for review as discussed in Sections 4.1.3 and 4.3.1. Section 2.1 provides a summary of the Alternatives Analysis Report, which was revised in response to comments and is included in Appendix A.

2.1.1 Initial Range of Route Alternatives

The Study evaluated potential route alternatives for the Corridor based on reviews of previous studies and also the ideas or concepts that were suggested by resource agencies or the public during the scoping process.

The range of route alternatives includes the No-Build Alternative and existing or former freight-only or freight-passenger routes that may have been previously identified by the MWRRI and other studies. Entirely new construction on new right-of-way (ROW) (that is, a greenfield route) was considered but determined to be unreasonable because of the cost of new ROW and the challenge of timely acquisition of property. Additionally, grading entirely new ROW, rather than expanding as needed along existing ROW, would cause more impact on the natural and human environments[1] than on-alignment route alternatives.

[1] The natural environment includes living and non-living things that are naturally on earth, whereas the human environment is the remaining portion of the environment that has been modified by man.

The No-Build Alternative, the five previously established passenger rail routes in the Corridor (Route Alternatives 1 through 5), and the combination of Route 4 and Route 5 (Route Alternative 4-A) compose the initial range of route alternatives proposed for consideration for the Study. These route alternatives are shown in Figure 2-1. The No-Build Alternative is included to provide a basis of comparison to the other route alternatives (40 CFR 1502.14; 64 FR 28545).

2.1.2 Screening Methodology

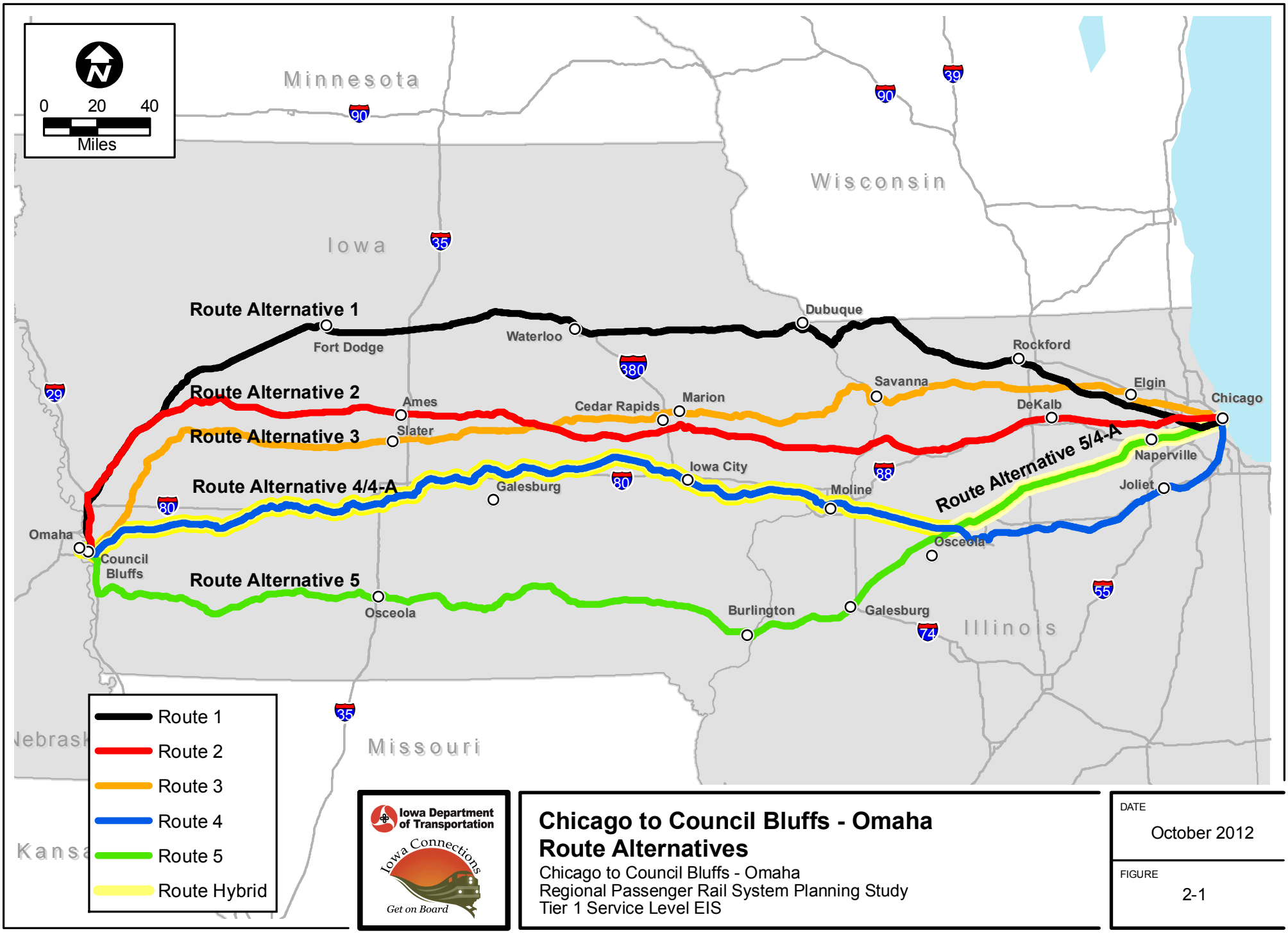
The methodology for screening route alternatives consisted of developing screening criteria and performing the screening process. The screening process included two steps: an initial coarse-level screening to identify whether any route alternative is hindered by major challenges (and would thus be eliminated from further evaluation) and a subsequent fine-level screening to evaluate each route alternative in greater quantitative and qualitative detail. This two-step screening process was intended to allow the Tier 1 EIS to focus on only those route alternatives that would meet the purpose and need for the service and that are reasonable and feasible.

2.1.3 Screening Criteria

The screening process for evaluating and eventually selecting reasonable and feasible route alternatives to carry forward for detailed consideration in the Tier 1 EIS relied on four broad screening criteria that were used for coarse- and fine-level screening. These four criteria are noted below, with Table 2-1 identifying and describing subcriteria for coarse-level screening, and Table 2-2 identifying and describing subcriteria for fine-level screening:

- Meeting the purpose and need for passenger rail service between Chicago and Omaha (this is a critical criterion under NEPA because those alternatives that don't meet the underlying purpose and need for a project are eliminated from further consideration)
- Technical feasibility (this criterion addresses physical and operational considerations for a project)
- Economic feasibility (this criterion applies to economic considerations of anticipated revenue and costs)
- Environmental concerns (this criterion considers whether there would be substantial concerns with respect to impacts on the natural and human environment)

These screening criteria were used to compare the merits and drawbacks of each route alternative during both levels of the two-step screening process. Appendix A includes additional description of the criteria and the screening process for identification and review of route alternatives.



Chicago to Council Bluffs - Omaha Route Alternatives

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FIGURE
2-1

2.1.4 Screening Process

A two-step screening process—coarse-level screening and fine-level screening—was used to evaluate proposed route alternatives using the four screening criteria. The purpose of the two-step screening process was to eliminate route alternatives burdened by major challenges. The coarse-level screening was applied to the initial range of route alternatives, unreasonable alternatives were eliminated from further consideration, fine-level screening was applied to the remaining alternatives, and the one or more alternatives that passed through the fine-level screening process were carried forward for detailed evaluation under the Tier 1 NEPA process.

2.1.4.1 Coarse-Level Screening of Route Alternatives

Coarse-level screening is a high-level screening to determine which route alternatives meet the purpose and need, are technically and economically feasible, and are environmentally reasonable. Route alternatives that met all of these criteria were carried forward to fine-level screening. Route alternatives that did not meet all of these criteria were eliminated from further consideration. The route alternatives that did meet purpose and need were evaluated based on technical, economic, and environmental criteria. These criteria and their factors for evaluation are presented in Table 2-1; the Purpose and Need criterion and the Environmental Concerns criterion each have subcriteria defined for evaluation (see Appendix A for more comprehensive information on the screening process). Information gained during the scoping process was used to help compare and screen route alternatives.

A 500-foot wide buffer was applied to each of the route alternatives analyzed in the coarse-level screening. This buffer provided a conservative limit for screening the route alternatives.

Table 2-1. Coarse-Level Screening Criteria

Criteria	Factors
Purpose and Need: Travel Demand	Other than the Chicago and Omaha/Council Bluffs metropolitan areas, what is the population served by the route alternative?
Purpose and Need: Competitive and Attractive Travel Modes	Would the route alternative provide a time-competitive route compared to other route alternatives?
Technical Feasibility	Would the route alternative involve substantially more technical hurdles than other route alternatives? Factors considered include: • Major construction efforts, such as major earthwork and major new bridges • Potential for freight train traffic conflicts and scope of engineering solutions for such conflicts
Economic Feasibility	Would the route alternative have costs far in excess of its anticipated benefits? Would the route alternative be substantially more expensive than other route alternatives?
Environmental Concerns: Major Challenges	Based on qualitative analysis, does the route alternative have major environmental (natural and human environment) challenges compared to other considered route alternatives?
Environmental Concerns: Sensitive Areas	Based on qualitative analysis, would the route alternative traverse substantially more environmentally sensitive areas (such as wetlands, wildlife and waterfowl refuges, cultural resources, and park and recreation lands) than other route alternatives?
Environmental Concerns: Right-of-Way	Would the route alternative require substantially more ROW acquisition than other route alternatives?

2.1.4.2 Fine-Level Screening of Route Alternatives

Fine-level screening was conducted to determine which remaining route alternatives would be carried forward for detailed evaluation in this Tier 1 EIS. During fine-level screening, route alternatives carried forward from the coarse-level screening were screened for their ability to offer the highest potential ridership; the least potential construction, operating, and maintenance cost; and the least potential impact on the natural and human environment.

In order to estimate potential impacts, a preliminary impact area was identified for each route alternative. Existing ROW was assumed to be 100 feet wide throughout each route alternative. A buffer ranging from 25 to 50 feet wide was then applied where necessary to accommodate additional track needs, to promote efficient track maintenance, and to mitigate any operating disruptions generated by passenger trains. Therefore, the buffer area applied is specific to each route alternative. The preliminary impact area analyzed for each route alternative in the fine-level screening included the estimated 100-foot-wide ROW and the 25- to 50-foot-wide buffer area for additional track.

The criteria and their factors evaluated during fine-level screening are listed in Table 2-2. Purpose and Need, Technical Feasibility, and Environmental Concerns each have subcriteria defined for evaluation. The environmental criteria were selected from those resources that were readily quantifiable, and often include constraints on project development. Some of the resources selected for screening would also require permits or approvals. Consequently, although not every environmental resource included in this NEPA document was considered for initial screening of alternatives, the resources selected for screening were known to be key constraints.

Table 2-2. Fine-Level Screening Criteria

Criteria	Factors
Purpose and Need: Travel Demand	Does a preliminary travel demand analysis indicate that the route alternative would attract a substantially greater or lesser number of riders compared to other route alternatives? Would the route alternative attract sufficient ridership to be an economically feasible alternative?
Purpose and Need: Competitive and Attractive Travel Modes	Based on information from coarse-level screening, determine if running times can be further refined for each route alternative. Would the route alternative provide a time-competitive route compared to other route alternatives?
Technical Feasibility: Passenger and Freight Capacity	Determine general infrastructure improvements that would be required to deliver desired passenger train speeds and schedules. Determine general infrastructure improvements required to maintain existing and future freight train services while enabling prioritized passenger-train operation.
Technical/Economic Feasibility: Alignment	Would the route alternative involve a more challenging alignment or grading problems, including flyovers, in order to meet speed and capacity requirements?
Technical/Economic Feasibility: Structures	Establish conceptual costs for structures for each route alternative for purposes of comparison.
Technical/Economic Feasibility: Grade Crossings	Determine the number of new and expanded grade crossings and grade separations for each route alternative for purposes of comparison.
Economic Feasibility:	Determine high-level project cost for route alternative comparison utilizing subcomponents that address alignment, structures, grade crossings, etc. Determine operating and maintenance costs for each route alternative as a basis for comparison.
Environmental Concerns: Environmental Impacts	Upon initial evaluation of the route alternative and quantification of conceptual environmental effects, would the route alternative have the potential to impact substantially more environmentally sensitive areas in the following categories compared with other route alternatives? • Streams • Floodplains • Wetlands • Farmland • Threatened and endangered species • Cultural resources • Potential Section 4(f)/6(f) protected properties • Environmental justice • Noise and vibration • Hazardous materials
Environmental Concerns: Right-of-Way	Determine conceptual ROW acquisition for each route alternative for purposes of comparison (refined from coarse-level screening). Would the route alternative require acquisition and demolition/disruption of substantially more structures, developments, agricultural resources, or features of the existing built environment (including homes, businesses, farms, and historic properties listed on the NRHP) than other route alternatives?

2.1.4.3 Results of Route Alternative Screening Process

The coarse- and fine-level screening of route alternatives is documented in detail in the Final Alternatives Analysis Report (FRA and Iowa DOT, 2012), included in Appendix A. The coarse-level screening process eliminated Route Alternative 3 from further consideration because it would have the highest cost; require a substantial permitting effort; result in unacceptably high impacts on landowners because of the ROW needs; and cause extensive impacts on communities, infrastructure, wetlands, streams, and wildlife habitat. The fine-level screening process eliminated Route Alternatives 1, 2, 4, and 5 from further consideration. Therefore, Route Alternative 4-A is the only route alternative carried forward for further analysis in the Tier 1 EIS. Below is a summary from the Alternatives Analysis Report providing the rationale for eliminating or carrying forward the aforementioned route alternatives.

Route Alternative 1

Route Alternative 1 did not meet the purpose and need for the Project because it would not attract the necessary ridership from Iowa communities and the Omaha/Council Bluffs metropolitan area to generate adequate revenue. In addition, because this route alternative is longest and slowest of the route alternatives, it would not offer a competitive travel time, and because of its length, Route Alternative 1 would have excessive operations and maintenance costs. Route Alternative 1 also did not meet the technical/economic criteria because it would require a major new structure over the Mississippi River and its costs were excessive compared to the base case of preliminary cost estimates for improvement of Route Alternative 4, which had the least expensive costs. Route Alternative 1 was determined to be neither reasonable nor feasible.

Route Alternative 2

Despite the fact that it has the shortest travel time, Route Alternative 2 did not meet the purpose and need for the Project because it would not attract adequate ridership or generate the necessary revenue to make the service viable. Route Alternative 2 also did not meet the technical/economic criteria; it would require extensive new ROW and a major new structure over the Mississippi River. Route Alternative 2 did not meet the economic criterion because of the excessive capital cost requirements. Route Alternative 2 would cost approximately $1 billion more than the base case, without providing any additional service or ridership benefits. Route Alternative 2 was determined to be neither reasonable nor feasible.

Route Alternative 3

Of the six route alternatives, the greatest challenges are presented by Route Alternative 3. Not only would Route Alternative 3 have the highest cost, but also the permitting effort would be substantial. Establishing approximately 225 miles of new railroad ROW would create unacceptably high impacts on landowners, and the resulting permitting process would be extremely long. An extended permitting process could void the early baseline data prior to the permit being issued, thus requiring a second round of baseline data gathering and potentially requiring a re-evaluation of the findings of the Tier 1 EIS. Constructing essentially greenfield railroad for Route Alternative 3 would have significant impacts on communities, infrastructure, wetlands, streams, and wildlife habitat. Former bridges across

major rivers would need to be reconstructed at high costs and environmental impacts. In addition to the high cost of ROW acquisition and bridge reconstruction, track and infrastructure would also need to be reestablished at an appreciable cost. As a result of the extremely high environmental and economic hurdles to re-establishing this abandoned rail corridor and anticipated local opposition and controversy, Route Alternative 3 was deemed unreasonable and was eliminated from further study.

Route Alternative 4

Route Alternative 4 does not meet the purpose and need for the project because the Chicago termini of Route Alternative 4 is at LaSalle Street Station instead of Chicago Union Station and provides substantially less modal interconnectivity at Chicago. It would not provide for the connection to the MWRRI high-speed network, which is connected through the Chicago hub at Chicago Union Station. This connection would be costly, have impacts on urban areas that the connection would be constructed through, and is not practical.

Route Alternative 4 was the least costly (not accounting for a connection from La Salle Street Station to Chicago Union Station) and was considered to represent the base case for comparison of preliminary costs of the other route alternatives, and it would attract adequate ridership and would generate adequate revenue. However, based on the lack of a connection from La Salle Street Station to Union Station, and the associated cost and impacts of constructing a connection, Route Alternative 4 was determined to be neither reasonable nor feasible.

Route Alternative 5

Route Alternative 5 did not meet the purpose and need for the Project because it would not attract adequate ridership or generate the necessary revenue to make the service viable. Route Alternative 5 also did not meet the technical/economic criteria; it would require extensive new ROW and a major new structure over the Mississippi River. Route Alternative 5 did not meet the economic criterion because of the excessive capital cost requirements. Route Alternative 5 would cost approximately $1.2 billion more than the base case, without providing any additional service or ridership benefits. Route Alternative 5 was determined to be neither reasonable nor feasible.

Route Alternative 4-A

Route Alternative 4-A was identified as the only reasonable route alternative for the Project to carry forward for further analysis in the Tier 1 EIS. Table 2-3 (derived from Table 7-1 from the Final Alternatives Analysis Report, which is included in Appendix A and provides detailed information on the screening process) illustrates the comparison of the criteria from fine-level screening supporting the screening process. Route Alternative 4-A was carried forward for detailed evaluation because, when compared to the other route alternatives considered, it:

- Meets project purpose and need (purpose and need)
- Has relatively low construction complexity and relatively low construction costs (technical and economic feasibility)

- Has grade-crossing complexity similar to all route alternatives (technical feasibility)
- Does not appear to require a new bridge over the Mississippi River (technical and economic feasibility)
- Is the shortest route alternative (purpose and need)
- Has a competitive passenger-train travel time (purpose and need)
- Serves the largest population (purpose and need)
- Has the highest ridership and farebox revenue forecast (purpose and need, and economic feasibility)
- Has direct access to Chicago Union Station (technical and economic feasibility)
- Has no unreasonable environmental resource issues (environmental concerns)

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Table 2-3. Route Alternative Comparison

Criteria	Relative Ranking of Route Alternative					
	Route Alternative 1	Route Alternative 2	Route Alternative 4	Route Alternative 5	Route Alternative 4-A	No-Build Alternative
Purpose and Need: Travel Demand	774,000 total population served	523,940 total population served	1,034,000 total population served	167,000 total population served	1,034,000 total population served	No additional service
Ridership Forecast	505,000 to 715,000	375,000 to 550,000	640,000 to 885,000	255,000 to 370,000	680,000 to 935,000	None
Revenue Forecast	$15.2 to $22.2 million	$14.7 to $22.0 million	$22.9 to $32.2 million	$11.2 to $16.6 million	$24.2 to $33.9 million	None
Preliminary Running Time	• Base 79 + 43 minutes • Base 90 + 43 minutes • Base 110 + 40 minutes	• Base 79 • Base 90 • Base 110	• Base 79 + 17 minutes • Base 90 + 22 minutes • Base 110 + 25 minutes	• Base 79 + 18 minutes • Base 90 + 16 minutes • Base 110 + 13 minutes	• Base 79 + 4 minutes • Base 90 + 8 minutes • Base 110 + 14 minutes	Not Applicable
Purpose and Need: Competitive and Attractive Travel Modes	• 516 miles long • Excessive travel time	• 479 miles long • Competitive travel time	• 490 miles long • Competitive travel time • Lack of connection to Chicago Union Station	• 496 miles long • Competitive travel time	• 474 miles long • Competitive travel time	No new travel mode
Technical Feasibility: Passenger and Freight Capacity	• New Mississippi River Bridge • Freight congestion Dubuque terminal • Partial second main track	• New Mississippi River Bridge • New third main track entire distance	• Freight congestion Des Moines terminal • Partial second main track	• New Mississippi River Bridge • New third main track entire distance	• Freight congestion Des Moines terminal • Partial second and third main track	No change to existing capacity

Criteria	Relative Ranking of Route Alternative					
	Route Alternative 1	Route Alternative 2	Route Alternative 4	Route Alternative 5	Route Alternative 4-A	No-Build Alternative
Technical/ Economic Feasibility: Alignment	• Heavy curvature on approaches to Mississippi River valley • Moderate curvature in Iowa • Heavy earthwork requirements on approaches to Mississippi River valley	• Light curvature • Heavy earthwork requirements to add third main track	• Moderate curvature along Illinois River • Moderate curvature between Des Moines and Atlantic • Moderate earthwork requirements	• Light curvature • Heavy earthwork requirements to add third main track	• Moderate curvature between Des Moines and Atlantic • Moderate earthwork requirements	• No change to existing alignments
Technical/ Economic Feasibility: Structures	• New or improved East Dubuque Tunnel • New Mississippi River bridge	• New Mississippi and Des Moines (Kate Shelly) bridges	• Grade separation with UP at Des Moines	• New Mississippi River bridge	• Grade separation with UP at Des Moines	• No changes to structures
Technical/ Economic Feasibility: Grade Crossings	High number of grade crossings, but not technically complicated	Substantial challenges at each grade crossing	High number of grade crossings, but not technically complicated	Substantial challenges at each grade crossing	High number of grade crossings, but not technically complicated	No changes to grade crossings
Economic Feasibility:	Base + $550 million	Base + $1,005 million	Base	Base + $1,230.6 million	Base + $147.2 million	Not applicable
Environmental Concerns: Environmental Impacts	No unreasonable environmental resource issues identified	No unreasonable environmental resource issues identified	No unreasonable environmental resource issues identified	No unreasonable environmental resource issues identified	No unreasonable environmental resource issues identified	No unreasonable environmental resource issues identified
Environmental Concerns: Right-of-Way	2,200 acres needed (600 urban/1,600 rural)	3,200 acres needed (950 urban/2,250 rural)	2,100 acres needed (800 urban/1,300 rural)	3,000 acres needed (850 urban/2,150 rural)	2,200 acres needed (800 urban/1,400 rural)	None
Meets Purpose and Need	**No**	**No**	**No**	**No**	**Yes**	**No**
Carried forward	**No**	**No**	**No**	**No**	**Yes**	**Yes[a]**

Note: [a] While the No-Build Alternative does not meet purpose and need, it is carried forward to provide a basis of comparison to any route alternative (40 CFR 1502.14; 64 FR 28545).

2.2 DESCRIPTION OF ALTERNATIVES

The No-Build Alternative and the Build Alternative carried forward for analysis in this Tier 1 EIS are described below.

2.2.1 No-Build Alternative

The No-Build Alternative would consist of the current trackage and operations with the present level of maintenance and no appreciable change to current track configuration or operations. The No-Build Alternative would not involve construction and operation of intercity passenger rail service from Chicago to Omaha, but independently planned construction of passenger rail service from Chicago to Moline would still occur. This project is referred to as the Chicago to Quad Cities Expansion Program and includes operation of two round-trips per day at speeds of up to 79 mph, a connection to join BNSF and IAIS track near Wyanet, Illinois, as well as improvements at Eola Yard in Eola, Illinois. Construction for the Chicago to Quad Cities Expansion Program is anticipated to commence in 2013 and the service to be operational by 2015.

Other transportation projects in the vicinity of the proposed Chicago to Council Bluffs-Omaha Regional Passenger Rail System could occur independently, with or without the Project, and include the projects listed below (Section 3.26.2 provides more information on these projects, and Section 1.5 discusses some of the projects).

MWRRI Projects:

- Chicago to Detroit-Pontiac, Michigan
- Chicago to St. Louis, Missouri
- Chicago to Milwaukee, Wisconsin, to Twin Cities, Minnesota, to Duluth, Minnesota

Metra Projects:

- STAR Line SES
- UP-NW Line
- UP-W Line
- BNSF Line Aurora to Oswego Extension

Additional projects to facilitate passenger rail systems in Illinois and Iowa include:

- Illinois: Midwest Train Equipment Fleet
- Illinois: Chicago Terminal Limits for the Midwest Regional Rail System
- Illinois: Chicago to St. Louis High-Speed Rail Corridor
- Illinois: Amtrak Illinois Zephyr Galesburg Congestion Relief Project
- Iowa: Ottumwa Subdivision Capitalized Maintenance
- Iowa: Ottumwa Subdivision Crossover Improvements

Major roadway projects:

- Illinois: *Move Illinois*
- Illinois: *Congestion-Relief Program*
- Illinois: Illiana Expressway
- Illinois: Elgin O'Hare West Bypass
- Iowa: Ottumwa Subdivision Capitalized Maintenance
- Iowa and Nebraska: CBIS Improvements Project

Other intercity passenger rail services that currently operate within or adjacent to the Chicago to Omaha Corridor, including Amtrak's *California Zephyr* and *Southwest Chief*, and Illinois' state-supported, Amtrak-operated *Illinois Zephyr* and *Carl Sandburg* services, are assumed to continue to operate under the No-Build Alternative. The *California Zephyr* and *Southwest Chief* are categorized as long-distance trains, with schedules and accommodations oriented for passengers traveling long distances, such as between Chicago and California. Accordingly, these trains have schedules designed primarily to serve their target long-distance markets, and include both sleeper and full-service diner accommodations for passengers. As such, while they operate within or adjacent to the Chicago to Omaha Corridor, their operation is not specifically designed to meet the needs of travelers within that Corridor. The *Illinois Zephyr* and *Carl Sandburg* are operated by Amtrak under contract to the State of Illinois and are supported by financial assistance provided through appropriations by the Illinois Legislature. They are categorized as regional trains with daytime schedules, begin and end their trips between their endpoints within the same calendar day, and do not offer sleeper or full-service diner accommodations for passengers. While the design of the operation of these services is similar to what is contemplated for the Chicago to Omaha Corridor, they generally service different geographic markets.

Similarly, under the No-Build Alternative, other forms of long-distance and regional transportation, such as commercial airline and bus services, are assumed to continue operating within the Corridor in the same manner as current operations.

The No-Build Alternative would not meet the project purpose and need because intercity passenger rail service would not be reestablished in Iowa City or Des Moines, there would not be an attractive alternative to highway or airline travel; and congestion of these modes of transportation in the Corridor would not be reduced. As population increases, demand for regional and long-distance travel services is projected to increase, and the number of flights, bus trips, and personal vehicle trips would increase, causing increased congestion.

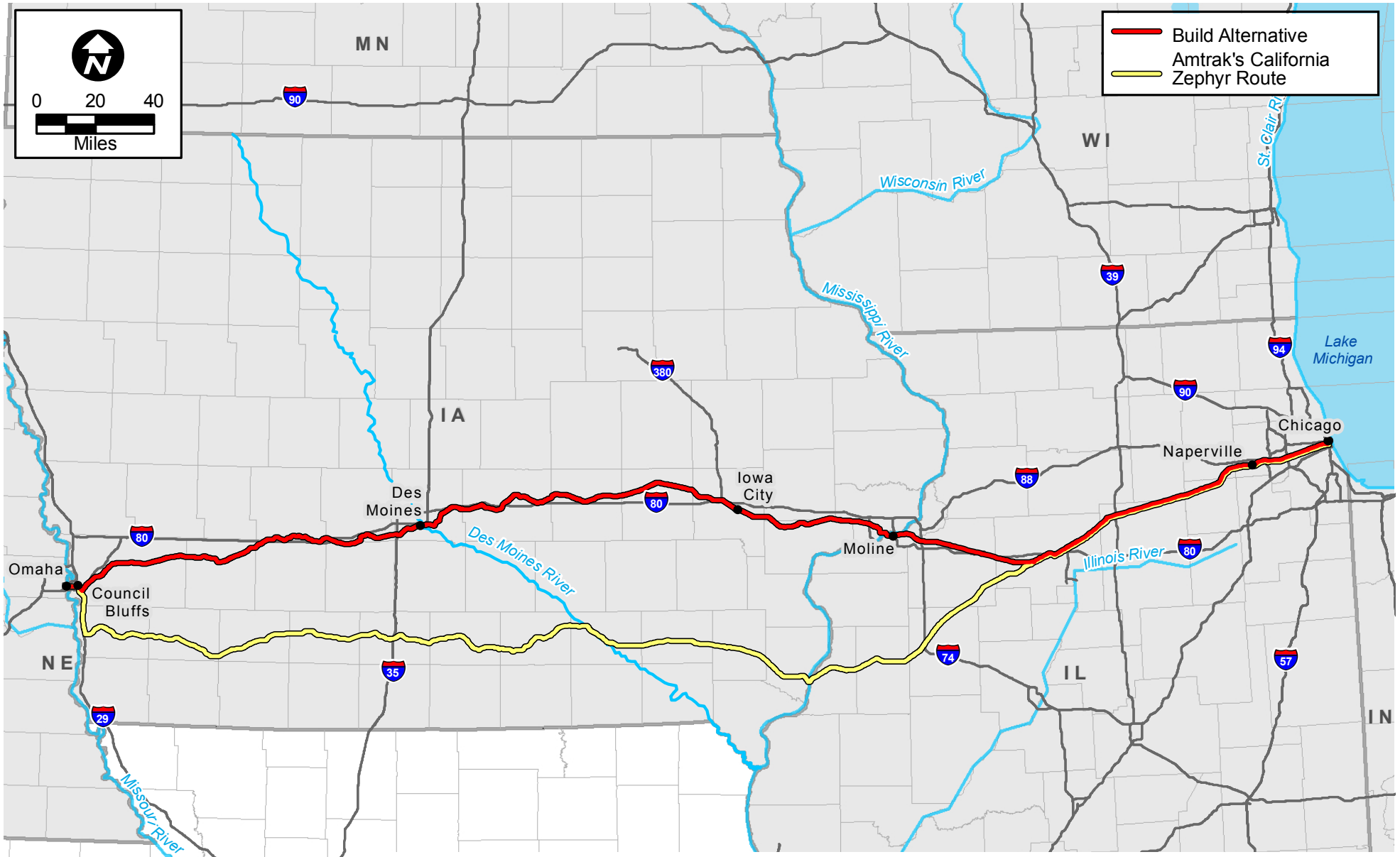
The No-Build Alternative was retained for detailed analysis to allow equal comparison to the Build Alternative carried forward and to help decision makers and the public understand the consequences of taking no action. Additionally, NEPA requires consideration of no action to serve as a baseline for comparison with the proposed action and other alternatives carried forward.

2.2.2 Build Alternative

The Build Alternative consists of the improvements associated with Route Alternative 4-A to accommodate up to seven round-trip passenger trains per day at maximum speeds of up to 110 mph. Current maximum train speeds vary along the Corridor due to existing operations, traffic volumes, and infrastructure condition. The Build Alternative, shown in Figure 2-2, is approximately 475 miles long and consists of tracks currently owned and operated by four rail carriers between Chicago and Omaha. Figure 2-2 also shows the route of the *California Zephyr*; this service is anticipated to continue regardless of whether the Chicago to Council Bluffs-Omaha Project is constructed. These four rail carriers and the approximate distances of trackage[2] on which the Build Alternative would operate are as follows:

- Amtrak – 1.6 miles from Chicago Union Station to 21st Street in Chicago
- BNSF – 110.5 miles from 21st Street in Chicago to a proposed connection with Iowa Interstate Railroad (IAIS) near Wyanet, Illinois
- IAIS – 45.9 miles from a proposed connection with BNSF near Wyanet, Illinois, to its connection with BNSF near Silvis, Illinois
- BNSF – 5.1 miles from its connection with IAIS near Silvis, Illinois, to its connection with IAIS near Rock Island, Illinois
- IAIS – 172.7 miles from its connection with BNSF near Rock Island, Illinois, to its connection with Union Pacific Railroad (UP) near Short Line Yard, East Des Moines, Iowa (this section includes the Government Bridge, a multiple-span movable bridge across the Mississippi River owned and maintained by the U.S. Army, Rock Island Arsenal, and administered by the U.S. Army Corps of Engineers [USACE])
- UP – 12 miles from its connection with IAIS near Short Line Yard, East Des Moines, Iowa, to its connection with IAIS near West Des Moines, Iowa
- IAIS – 125 miles from its connection with UP near West Des Moines, Iowa, to its connection with UP at Pool Yard, Council Bluffs, Iowa
- UP – 2.5 miles from its connection with IAIS at Pool Yard, Council Bluffs, Iowa, to its connection with BNSF at Tower A, Omaha, Nebraska
- BNSF – 0.5 mile from its connection with UP at Tower A, Omaha, Nebraska, to the vicinity of the Omaha Amtrak station

[2] The distances of trackage are only approximate because there have been changes in mileposts over the 150 years that the railroads have been operating, and in several locations, the length depends on which main track the mileage is estimated along.



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Subsequent to selection of Route Alternative 4-A, further evaluations were conducted regarding the infrastructure needed to support operations on the Project. The aforementioned list of existing track does not account for new track anticipated to be needed in a few locations, such as upgrading the connection of BNSF and IAIS tracks at Wyanet, and connections in Des Moines, and through Council Bluffs to Omaha. Additionally, the need for stations and maintenance facilities to support the passenger rail operations was identified. The planned increased in train speeds involved a preliminary review of existing at-grade rail crossings. A process to review service options including number of round-trips per day, train speeds, and types and numbers of station stops was conducted. Due to predicted funding limitations, implementation phases for the Project were studied. In addition, current and projected freight and passenger operations were reviewed. The following subsections summarize the evaluations performed to help define the Build Alternative.

2.2.2.1 Infrastructure

For the Build Alternative to function efficiently, improvements would be required. A preliminary analysis of improvements has been conducted in support of the Tier 1 Draft EIS, and will be refined in the Tier 1 Final EIS after additional modeling and operational analysis is performed, resulting in a list of specific required improvements. However, a detailed study of the specific design for each identified improvement would not be conducted until Tier 2 analysis of the Project. The types of improvements needed include infrastructure upgrades, at-grade roadway crossings, stations, and layover and maintenance facilities.

The Build Alternative would include construction of new main track, sidings, and connection tracks; upgrades to existing track to enable faster passenger train speeds and the desired passenger train service reliability; installation of wayside signaling systems to enable Centralized Traffic Control (CTC)[3] as the method of operation throughout the route; and installation of a Positive Train Control (PTC)[4] system where not already implemented.

Throughout the Corridor, connections to the existing main track would be required for meet/pass events, access to industries, and capacity for maintenance-of-way activities. The additional main track constructed may be discontinuous through urban areas and across bridges. Revisions of and improvements to the signaling systems would be implemented.

The preliminary analysis of improvement needs was conducted along the Corridor to establish a boundary of the area potentially disturbed during construction of the Project. The area potentially needed to construct the improvements constitutes the Potential Impact Area, and is further described in the introduction to Chapter 3. The basic infrastructure needs are subject to further refinement after continuing study and analysis, including preliminary modeling of capacity and demand, and will be documented in the Tier 1 Final EIS. If additional land outside the Potential Impact Area is needed to support new infrastructure or modification of existing infrastructure, the boundary of the Potential Impact Area would be

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[3] CTC is a method of train traffic control in which a dispatcher remotely controls signals and switches. Trains must observe the controlled signals (Bryan, May 1, 2006).

[4] PTC is defined by FRA as "communication-based/processor-based train control technology that provides a system capable of reliably and functionally preventing train-to-train collisions, overspeed derailments, incursions into established work zone limits, and the movement of a train through a main line switch in the improper position" (FRA, June 7, 2012).

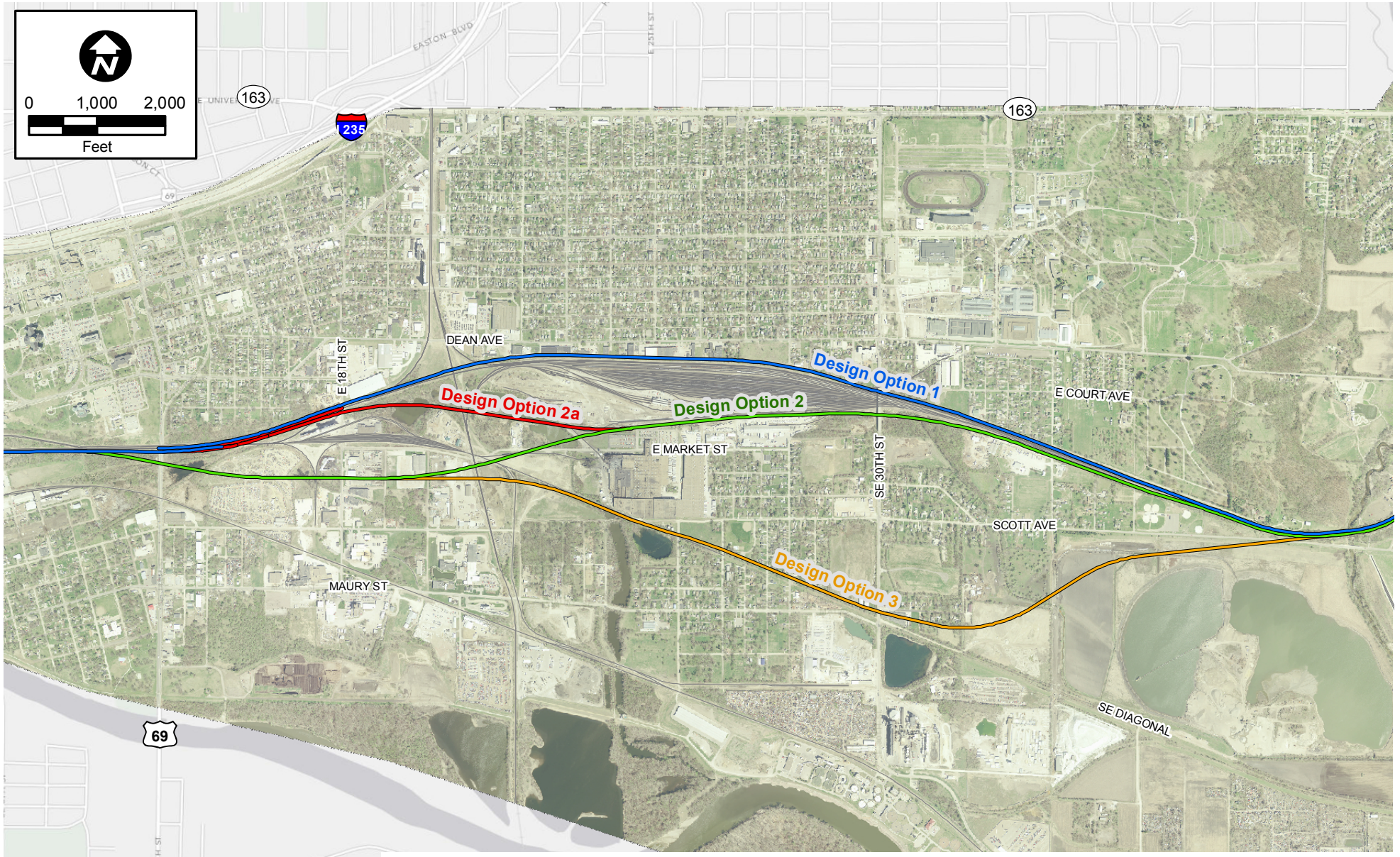
revised and environmental impacts would be reassessed in the Final EIS. Detailed capacity modeling will be conducted during Tier 2 analysis to identify more specific requirements for revisions of and improvements to the wayside signal system, crossovers and interlocking plants, and connection tracks in order to provide adequate capacity for the proposed passenger trains.

In consideration of existing infrastructure, train traffic, roadways, urban land uses, and abandoned rail corridors, a few alignment options within the Corridor were identified. There are multiple alignment options through East Des Moines, Iowa, and across the Missouri River between Council Bluffs, Iowa and Omaha, Nebraska, as well as multiple station location options in Des Moines, Council Bluffs, and Omaha. Consequently, the Potential Impact Area includes all alignments and locations currently under consideration. Figure 2-3 illustrates potential options for connecting the Corridor through Des Moines, and Figure 2-4 shows potential options for crossing of the Missouri River. The Tier 2 analysis will confirm selection of the alignment locations and station locations.

2.2.2.2 Station Stops

Station stops considered include all of the stops identified in the Final Alternatives Analysis Report (see Appendix A) as well as additional stops. The proposed passenger rail service would continue to use existing Amtrak long-distance or Illinois-state-sponsored service stations at Chicago Union Station, La Grange Road, Naperville, Plano, Mendota, and Princeton, Illinois; and potentially at Omaha, Nebraska. New stations or reuse and modification of existing or past stations are proposed at Geneseo and Moline, Illinois; Iowa City, Grinnell, Des Moines, Atlantic, and Council Bluffs, Iowa; and potentially Omaha, Nebraska. Proposed station locations (accounting for more than one option of station locations for Des Moines, Council Bluffs, and Omaha) are shown in Figure 2-5. The proposed location in Des Moines is at or near the former Rock Island railroad station between 4th and 5th Streets. In Council Bluffs, the proposed location is adjacent to the CBEC Railway, with alternate locations off the BNSF Council Bluffs Subdivision, at or near the former Rock Island/Milwaukee Road Council Bluffs Union Station, off Valley View Drive, and in the southeast quadrant of the I-80 and U.S. Highway 6 interchange. The proposed location in Omaha is at the former Burlington Route station, with alternate locations in north downtown, by the CenturyLink Center, the former Union Station, and the current Amtrak station. Figure 2-6 shows proposed locations for stations in Grinnell (in the southeast quadrant of the intersection of IAIS and UP rail lines), at or near the former Rock Island station, and Atlantic (at or adjacent to a former Rock Island railroad station).

Specific sites for passenger rail stations in Iowa City, Grinnell, Des Moines, Atlantic, and Council Bluffs, Iowa, and Omaha, Nebraska, have not yet been determined. Final site selection, construction, and operation of these passenger rail stations will be evaluated in subsequent Tier 2 NEPA documents.



Iowa Department of Transportation

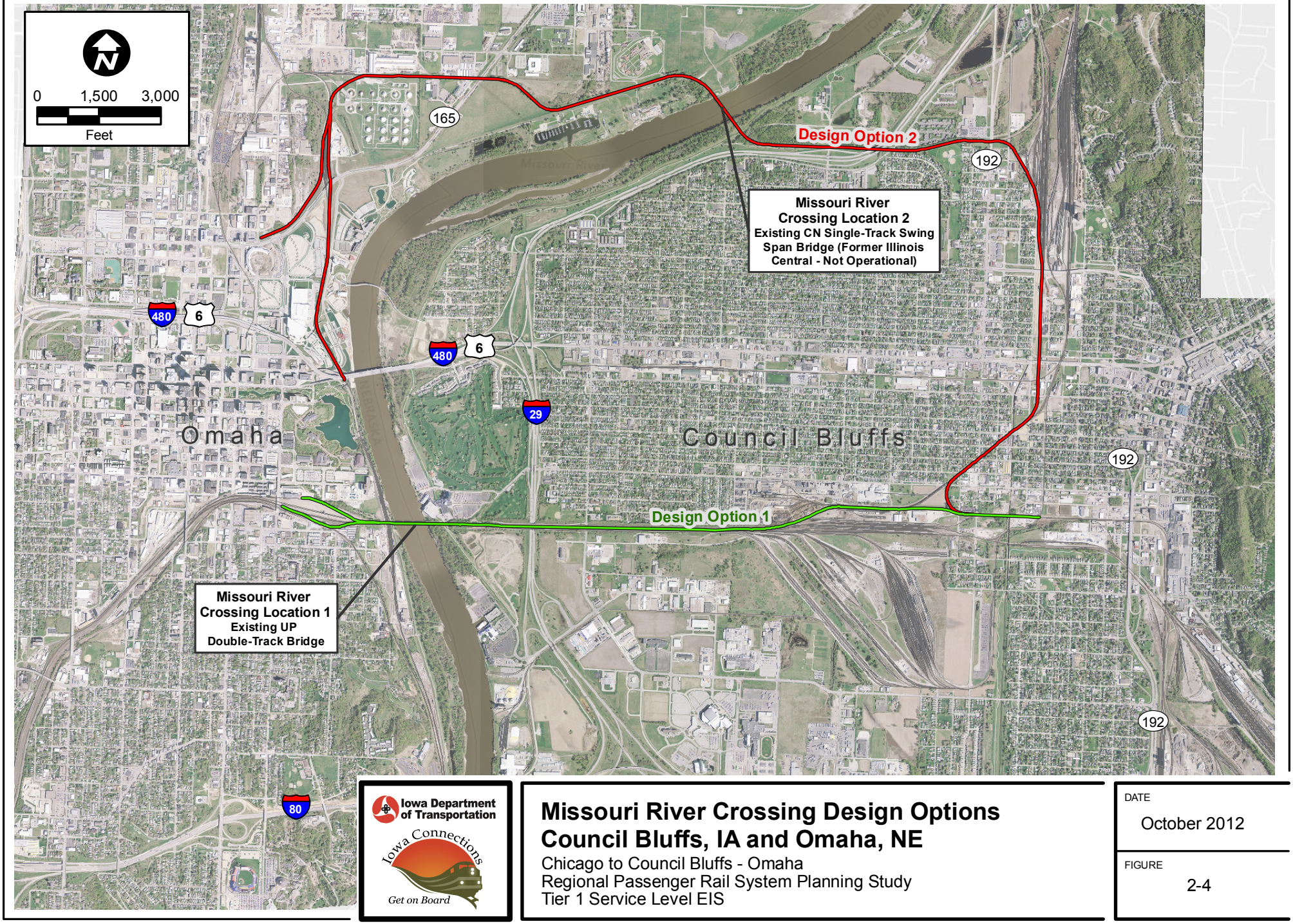
Iowa Connections
Get on Board

Des Moines Design Options

Chicago to Council Bluffs - Omaha
Regional Passenger Rail System Planning Study
Tier 1 Service Level EIS

DATE
October 2012

FIGURE
2-3



Iowa Department of Transportation

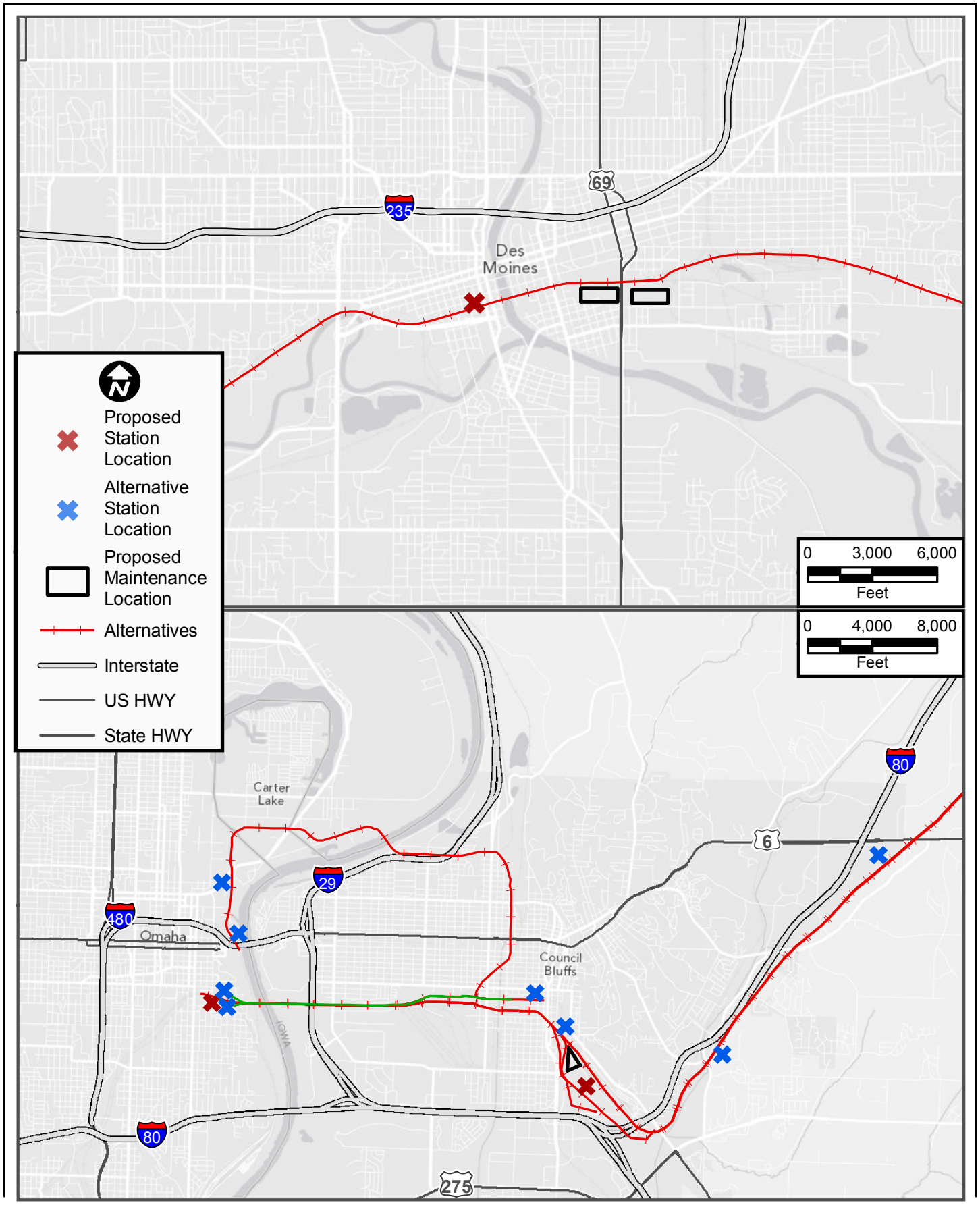
Iowa Connections
Get on Board

Missouri River Crossing Design Options
Council Bluffs, IA and Omaha, NE

Chicago to Council Bluffs - Omaha
Regional Passenger Rail System Planning Study
Tier 1 Service Level EIS

DATE
October 2012

FIGURE
2-4



Iowa Department of Transportation

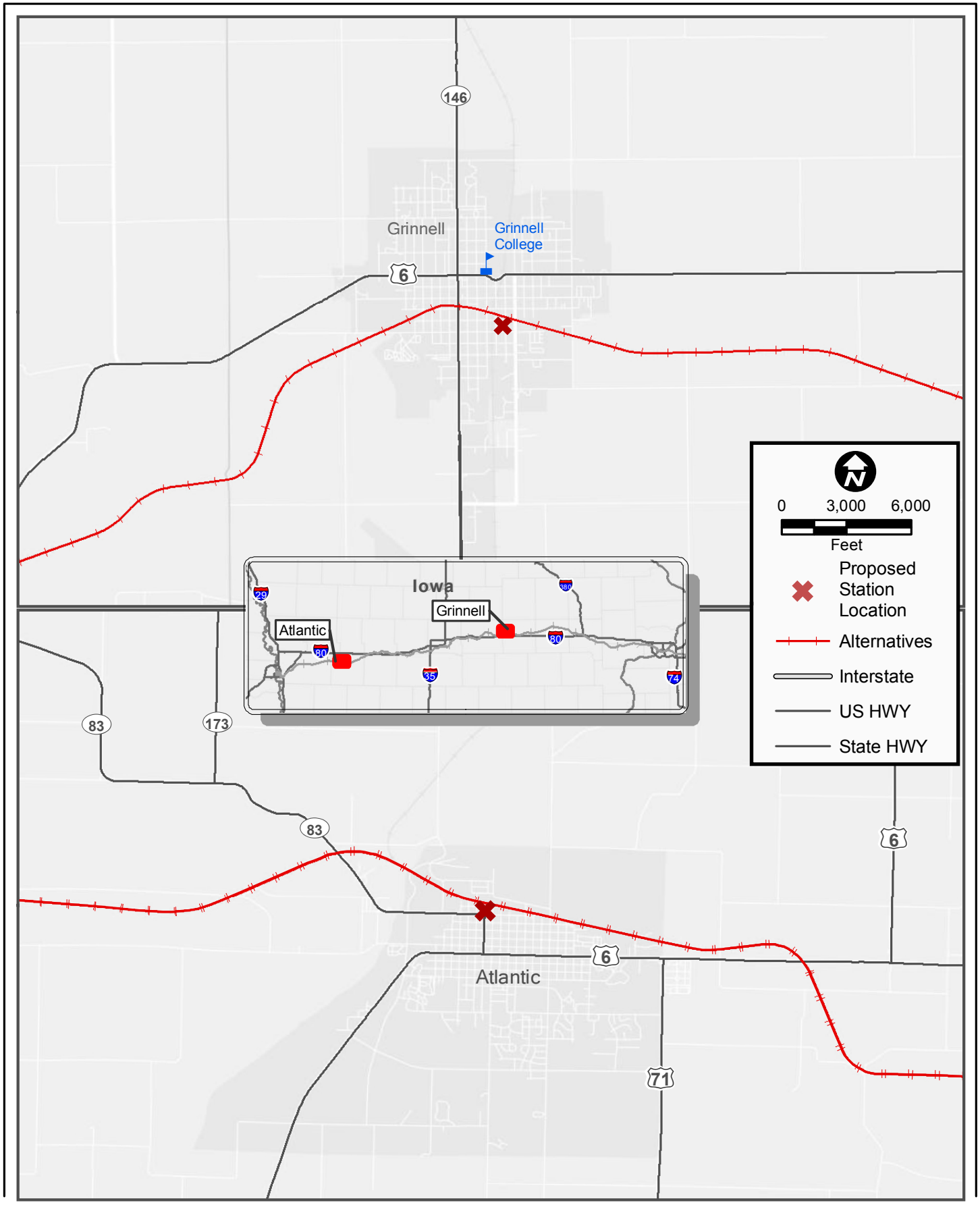
Iowa Connections Get on Board

Proposed Station and Maintenance Locations Des Moines and Council Bluffs/Omaha

Chicago to Council Bluffs - Omaha
Regional Passenger Rail System Planning Study

DATE
October 2012

FIGURE
2-5



Iowa Department of Transportation

Iowa Connections

Get on Board

Proposed Station Locations
Grinnell and Atlantic

Chicago to Council Bluffs - Omaha
Regional Passenger Rail System Planning Study

DATE
October 2012

FIGURE
2-6

2.2.2.3 Maintenance Facilities

An overnight train layover and light maintenance facility would be required in the Des Moines and Omaha/Council Bluffs metropolitan areas. Specific sites for these facilities have not yet been determined; however, Figure 2-5 shows proposed areas that could host maintenance facilities in the Des Moines and Omaha/Council Bluffs metropolitan areas. Interim layover and light maintenance facilities may be required at Moline or Iowa City depending on implementation strategies. The development of Moline and Iowa City layover and maintenance facilities could occur as part of implementation of other passenger rail projects. Tentative locations for these facilities could be near IAIS Rock Island Yard in Moline and in Coralville, Iowa, southwest of the I-80 and Coral Ridge Avenue interchange. These sites, as well as any interim-phase train layover and light maintenance facilities required, will be evaluated in subsequent Tier 2 NEPA documents.

In addition to light maintenance, heavy maintenance for locomotives and train sets would be required. The aforementioned Des Moines and Omaha/Council Bluff locations for light maintenance could potentially be selected to also support heavy maintenance activities. The method by which such maintenance would be performed has not yet been determined. Potential methods include construction of a dedicated maintenance facility for the Project, contracting with existing Amtrak or Metra heavy maintenance facilities in Chicago, or contracting with a third-party contractor using an existing railroad heavy maintenance facility at some other location. The heavy maintenance facility for the Project if constructed as part of the Project will be evaluated through Tier 2 analysis.

2.2.2.4 At-Grade Crossings

There are approximately 850 at-grade roadway crossings on the Build Alternative. Grade crossing surfaces and warning systems would need to be improved to meet safety standards for passenger trains traveling at 110 mph. All crossings would undergo diagnostic studies during Tier 2 analysis for improvement needs in concert with Illinois DOT, the Illinois Commerce Commission, and the host railroad in Illinois; Iowa DOT and the host railroad in Iowa; and the Nebraska Department of Roads and the host railroad in Nebraska. The crossing analysis would evaluate all crossings with potential for closure under the Build Alternative. Warning devices would be installed based on speed-dependent criteria. Existing warning devices would be reused where practical if they conform to the speed-dependent criteria.

2.2.2.5 Service Options

An iterative process was conducted for determining the optimum number of round-trips per day, train speeds, and types and numbers of station stops for the Build Alternative. The process considered ridership and revenue, as well as general operation and maintenance costs, as maximum frequency and speed increased and as station stops were added. Service options considered between two and seven round-trips per day between Chicago and Omaha, and also between Chicago and Des Moines; maximum speeds of between 79 and 110 mph; and two types of station stop service, standard-stop or selected-stop, as defined below. Station stops intersected by Route Alternative 4-A were considered. Station stops are typically located at the largest intermediate cities, or as close as possible to the largest intermediate cities, in order to attract and serve the largest possible ridership. In addition, potential station stops in suburban areas and smaller urban areas were evaluated to determine

whether such stops would increase overall ridership and revenue despite longer overall Corridor travel times, to determine potential ridership gained from each urban area, and to determine the anticipated effect on Corridor-wide ridership and travel time. Standard-stop service would involve a train stopping at all identified station stops, and selected-stop service would involve a train stopping at only some identified station stops.

The iterative process was bounded by considering the feasibility and practicality of low and high limits of trains, trains speeds, and types and numbers of station stops. Providing more than seven round-trips per day would not generate substantial additional ridership, so the maximum service level evaluated was seven round-trips per day. The maximum speed range was identified based on estimated costs of implementing the service. Speeds above a maximum of 110 mph would require closure or costly grade separations of all existing at-grade crossings in order to comply with FRA high-speed rail corridor guidelines for grade-crossing safety. In addition, extensive reduction of curvature would be required in order to obtain speeds in excess of 110 mph over most of the route. Passenger train maximum speeds below 79 mph would not generate sufficient ridership and would not be competitive with travel by automobile.

Service options were compared based on estimated travel times, ridership, revenue, and general operation and maintenance costs. The primary criteria used to screen the service options were the ridership and revenue forecasts because they are indicative of competitiveness with other modes of transportation. Average Chicago to Omaha travel time varies between speed regimes but does not vary substantially for the service options considered within each speed regime. As anticipated, the 110 mph design speed resulted in the quickest trips and the highest estimated ridership. Iowa DOT selected the optimum service option for full implementation, and eliminated other considered options that did not have adequate ridership and revenue, and did not have sufficient station stops. Although all service options considered were feasible, the eliminated options were not reasonable and did not fully meet the purpose and need for the Project to the extent of the optimum service option. The selection of a service option for study was based on service development planning and did not consider environmental impacts. As presented in Section 2.2.2.6, a phased implementation of the optimum service option is advisable given anticipated funding availability. The optimum service option would be implemented in various phases.

Operations under the Build Alternative would ultimately include a combination of standard-stop and selected-stop service. Selected-stop station stops would be Chicago Union Station, Naperville, Princeton, and Moline, Illinois; Iowa City, Des Moines, and Council Bluffs, Iowa; and Omaha, Nebraska. Standard-stop service would include the selected-stop locations as well as station stops at La Grange Road, Plano, Mendota, and Geneseo, Illinois, and Grinnell and Atlantic, Iowa. There would be up to seven round-trip passenger trains per day travelling between Chicago and Des Moines, with five of these round-trips continuing to Omaha. The passenger trains would travel at speeds of up to 110 mph, with travel time averaging under 7 hours from Chicago to Omaha and under 5 hours from Chicago to Des Moines. These travel times are competitive with the personal automobile.

2.2.2.6 Phased Implementation

Based on experience with other passenger rail projects, FRA anticipates that the Chicago to Council Bluffs-Omaha Project would be incrementally funded and that construction and operations would be implemented in phases. The specific phasing of the Project is not known at this time but would be determined as funding is allocated to the Project.

The Project is anticipated to expand from the baseline of two round-trips per day from Chicago to Moline at a maximum speed of 79 mph (included in the Quad Cities Expansion Program passenger rail project) and service extended to Iowa City (included in the Chicago to Iowa City project). The Project would then be extended westward sequentially from Iowa City, to Des Moines, to Council Bluffs, and then to Omaha. At a maximum speed of 79 mph, average travel times between Chicago and Omaha would be approximately 8 hours, and between Chicago and Des Moines would be approximately 6 hours.

The speed and the frequency of round-trips would increase with subsequent implementation phases up to a maximum of 110 mph and up to seven round-trips per day from Chicago to Des Moines, with five of the round-trips extending from Chicago to Omaha. The ultimate proposed implementation would be realized over many years of phased implementation as federal and state funds are allocated to the Project. Section 5.6 provides additional background on the phased implementation process. After further study during the Tier 1 NEPA process, more detail on the phasing may be determined and documented in the Final EIS. The Tier 2 NEPA process would address phased implementation in detail as successive projects are proposed.

2.2.2.7 Current Passenger Service

Based on initial coordination and for the purposes of the Tier 1 Draft EIS, it is assumed that Amtrak and the State of Illinois would continue their respective passenger services in conjunction with the proposed Chicago to Council Bluffs-Omaha service. Similarly, other forms of long-distance and regional transportation such as airplane and bus services are assumed to continue operating in and between the Chicago and Omaha/Council Bluffs metropolitan areas in the same manner as current operations. Further interaction between the States of Iowa and Illinois, and coordination with Amtrak would occur for the continuation of the service of through ticketing and Amtrak ticket marketing and point-of-sale system that is common to all Amtrak long-distance and state-supported, Amtrak-operated regional trains, as well as many commuter trains and bus services.

2.2.3 Preferred Alternative

The Build Alternative is the Preferred Alternative for this Project.

2.3 SUMMARY OF POTENTIAL IMPACTS

Table 2-4 summarizes the potential impacts of the No-Build Alternative and the Build Alternative based on the detailed analysis documented in Chapter 3 of this Tier 1 EIS.

Table 2-4. Summary of Impacts

Resource Topic	No-Build Alternative	Build Alternative
Transportation	Increased traffic congestion on highway system	Competitive transportation alternative; reduced freight traffic interference
Land Use, Zoning, and Property Acquisitions	Minor impacts (much less than Build Alternative)	Impacts on land use, primarily on industrial and farmland
Agricultural Resources	Minor impacts (much less than Build Alternative)	3,190 acres prime farmland; 840 acres statewide important farmland
Socioeconomic Environment	Minor improvements to socioeconomic conditions (Chicago to Quad Cities only)	Economic benefits provided through job creation, joint development, improved accessibility, and increased economic activity (Chicago to Omaha)
Title VI and Environmental Justice	No disproportionately high and adverse impacts	Beneficial economic and mobility impacts; potential impacts on Environmental Justice population area in Des Moines
Elderly and People with Disabilities	New accessible service between Chicago and Quad Cities	New accessible service between Chicago and Omaha
Public Health and Safety	Improvements to at-grade crossings and signals (Chicago to Quad Cities)	Improvements to at-grade crossings and signals (Chicago to Omaha)
Noise and Vibration	Minor impacts (much less than Build Alternative)	1.6 noise impacts per mile; 7 vibration impacts per mile
Air Quality	Increase in pollutant emissions over time due to fewer modal shifts	Decrease of most pollutant emissions due to increased modal shifts
Hazardous Waste and Waste Disposal	Minor impacts (much less than Build Alternative)	Minor impacts on 3 Superfund sites, 34 leaking underground storage tanks, 27 Non-National Priorities List sites, and 1 wastewater treatment facility site
Cultural Resources	No Project impacts	60 historic resources (37 buildings, 1 structure, 3 bridges, and 19 historic districts)
Parks and Federally or State-Listed Natural Areas	No Project impacts	44 parks, 24 recreation areas, and 22 natural areas
Section 4(f) and 6(f) Properties	No Project impacts	44 public parks, 21 public recreation areas, 8 public refuges, and 60 historic properties
Visual Resources and Aesthetic Quality	Minor impacts on sensitive receptors	Impacts on visual resources (parks, natural areas, riparian corridors) and sensitive receptors in Des Moines
Waterways and Water Bodies	Minor impacts	Streams :104,150 linear feet Lakes: 32 acres Ponds: 33 acres
Wetlands	Minor impacts	238 acres (1 acre aquatic bed, 84 acres emergent, 33 acres scrub-shrub, and 120 acres forested)
Water Quality	Minor potential impacts	24 streams on 303(d) list of impaired water bodies; more impacts than No-Build Alternative
Floodplains	Minor impacts	1,657 acres
Topography, Geology, and Soils	Minor impacts	More impacts than No-Build Alternative, but minor impacts on Loess Hills

Resource Topic	No-Build Alternative	Build Alternative
Natural Habitats and Wildlife	Minor impacts	178 acres of natural terrestrial habitat; aquatic habitat impacts; increase in noise and vibration, train collisions, and water pollution
Threatened and Endangered Species	Suitable habitat for federally and state-listed species	Suitable habitat for federally and state-listed species with potential for impact from constructing a new Missouri River crossing
Energy Use and Climate Change	Increase in energy consumption and greenhouse gas emissions due to fewer modal shifts	Long-term decrease in energy consumption and greenhouse gas emissions due to increased modal shifts
Construction Impacts	Minor, temporary impacts	Substantially more impacts than No-Build, but temporary in nature
Irreversible and Irretrievable Commitments of Resources	Minor commitments of land, construction materials, financial resources, and energy consumption by automobiles	Substantial commitments of land, construction materials, financial resources, and energy consumption
Short-Term Use versus Long-Term Productivity	Short-term construction impacts of other projects, including benefit of construction employment; minimal reduction in long-term productivity of natural resources; and improvement in transportation network	Short-term construction impacts (including benefit of construction employment) and reduction in air pollutant emissions and long-term productivity of natural resources beyond that of the No-Build; improved long-term socioeconomic productivity through transportation network enhancement
Indirect and Cumulative Impacts	Increase in vehicular traffic congestion and decrease in air quality and energy	Reduced traffic congestion and vehicle emissions; reduced ridership of other transportation modes; improved air quality and safety; indirect impacts on parks, natural areas, and wildlife; increased chance of hazardous material incidents and water pollution; transit-oriented development near stations

Note: All potential impacts shown are preliminary and have been evaluated at a Tier 1 level of analysis. Impacts will be reviewed and revised as necessary within future Tier 2 NEPA documents.

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