

Section **6** **TRANSPORTATION
IMPACTS**



6.0 Transportation Impacts

This section describes the transportation impacts expected with the No-Build and Build Alternatives. The Service Development Plan and expected travel benefits are presented. Year 2030 ridership projections and operating revenues for passenger rail service are presented for each alternative. Projected annual person trips for air, bus, and automobile intercity travel are also presented. In addition to the intercity passenger information, impacts to future freight and commuter rail operations and vehicular traffic are discussed, including impacts from construction and vehicular impacts associated with the changes proposed at the highway-railroad at-grade crossings in the corridor. Generally, transportation impacts are expected to be the same for the Build Alternatives (Alternatives A and B and **Preferred Alternatives C and D**). Therefore, much of the discussion in this chapter compares impacts between the No-Build and Build Alternatives. Where there are expected differences amongst the Build Alternatives, additional documentation is provided for each of the four Build Alternatives.

6.1 Service Development Plan

In accordance with FRA High Speed Rail guidance referred to in 74 Fed. Reg. 29900 (June 23, 2009), this section outlines the Service Development Plan (SDP) for the Build Alternatives (Alternatives A and B and **Preferred Alternatives C and D**) for the Chicago – St. Louis corridor described by this Tier 1 Environmental Impact Statement. The following items are addressed within this subsection:

- Intercity travel options
- Service levels/frequencies
- Capital program needs
- Ridership/revenue forecasted, including number of passengers and boardings/disembarking at stations

6.1.1 Intercity Travel Options

Intercity travel by auto, bus, and air represent alternative travel options to high-speed intercity rail. Air travel offers the advantage of relatively shorter time in flight but further analysis shows that travel to the airport and time required to prepare for boarding add substantially to total trip time. The time advantage is diminished for trips under 500 miles and is reduced further for shorter trips.

The private automobile offers extreme convenience with door-to-door service. The perception of cost also makes the auto seem more advantageous than it really is. Most users only relate to the cost of fuel when evaluating auto usage when comparing to other modes, however other costs such as depreciation, maintenance and insurance are usually not considered in a casual evaluation. In part this is because some of these costs continue to some degree even if the auto is not used. The auto also has a time advantage

but, unlike cost, the factor is usually accurately perceived. The auto becomes more cost advantageous only if a group is traveling together.

For the Chicago-St. Louis Corridor, the dominant type of travel is by automobile. Intercity bus service is available by Greyhound and Megabus. Air travel is also available via eight different airlines between Chicago and St. Louis, with one carrier providing service between Chicago and Springfield and Chicago and Bloomington/Normal. Intercity passenger rail service will not replace any of these other modes, but will supplement them as a viable cost effective option.

In May 2012, based on the various travel and airline websites and purchasing a ticket one week in advance, the airfare for a one-way, non-stop trip from Chicago to St. Louis ranged from \$186 to \$447. Based on the Greyhound and Megabus websites and purchasing a ticket one week in advance, the bus fare for a one-way trip from Chicago to St. Louis ranged from \$15 to \$39. With regard to automobile travel costs, based on the 2012 federal mileage reimbursement rate of 55.5 cents/mile and a travel distance of 297 miles, the cost to travel by automobile from Chicago to St. Louis would be \$165. For comparison, the estimated one-way fare from Chicago to St. Louis for the high-speed rail Build Alternatives (Alternatives A and B and **Preferred Alternatives C and D**) would be \$39 to \$78 (Steer Davies Gleave, 2011). As a result, the fare for the Build Alternatives would be up to \$107 to \$389 less than automobile and airfare travel costs and \$43 to \$63 more than bus fare. Note that the fare for the Build Alternatives is estimated for the 2030 design year and in 2010 dollars and the other modes of transportation are for 2012.

Table 6.1-1 summarizes travel time and cost by mode for the Chicago to St. Louis Corridor.

Table 6.1-1. Travel Times and Costs by Mode of Transportation

Mode	Travel Time	Fares/Travel Costs
Rail		
No-Build Alternative	4 hrs 30 min to 4 hrs 45 min	\$39
Build Alternatives	3 hrs 51 min to 4 hrs 10 min	\$39-78
Highway	5 hrs	\$165
Bus	5 hrs 10 min to 8 hrs 40 min	\$15-\$39
Air	1 hr to 1 hr 15 min	\$186-\$447

6.1.1.1 *Costs of Travel Options*

Intercity travel in the Midwest region is growing rapidly, and the increasing demand for travel cannot be easily met by existing modes. Regulatory, environmental and budgetary

constraints are making it increasingly difficult to expand highway capacity and, in particular, to build new highways or expand existing highways.

In the case of air travel, deregulation has resulted in the reduction of service and significant fare increases on shorter routes. The four major carriers in the region have increased their average flight length to more than 900 miles and find that flights of less than 300 miles are costlier and less efficient to operate, usually requiring cross-subsidy from longer flights. The phasing out of turboprop equipment in favor of regional turbojet aircraft intensifies this trend.

An analysis was undertaken to test the potential impact on a competitive response by the airlines to high-speed rail service. The analysis showed that if the airlines reduced their fares by 25 percent on routes served by the Midwest Regional Rail System (MWRRS), high-speed rail ridership and revenue would fall by only two to three percent.

Some airlines have also started to analyze their cost structure by flight segment rather than origin-destination pairs, that is, a short feeder flight is assessed on its ability to economically support itself rather than relying on a cross subsidy from a longer distance connecting segment. Airlines could come to view a properly configured high-speed rail system as a replacement for their high-cost short-range flights since passengers flying into or out of Chicago could take the train to St. Louis.

6.1.1.2 Benefits and Impacts of Different Modes of Travel

There are numerous attributes that can be used to qualitatively or quantitatively describe the benefits and impacts of the travel options available for a given corridor. These may include benefits or impacts on the public making the trip within the corridor, potential impacts to those residing within the corridor, physical environmental impacts, and economic influences on local economies. As described in the previous section, there are four feasible travel modes: automobile, intercity bus, air travel and intercity passenger rail. More details on these travel options are offered below and in Section 2.2.1.

Rail service in this corridor presents the traveling public with a mode option that has certain unique characteristics. Automobile travel totally occupies the attention of the driver making the accomplishment of other tasks not possible or extremely dangerous. Commercial aviation severely curtails the choice of destinations. Intercity bus offers a wider range of destinations than air travel in the corridor but has not gained the acceptance of the economically prosperous customer base. While both intercity bus and air service offer limited seating space, rail travel offers comfortable seating configurations, a choice of intermediate destinations, and the ability for business travelers to work and communicate while en route.

Recent events have highlighted the volatility in pricing of liquid petroleum fuels. The inherent low-rolling resistance of rail and its reduced energy demands can account for proportional reductions in emissions of pollutants associated with petroleum fuels.

The majority of intercity automobile travel in the Chicago - St. Louis Corridor is concentrated on Interstate 55 (I-55), which primarily runs parallel to the Chicago - St. Louis Amtrak route. A new four-lane I-70 Mississippi River bridge is being constructed at St. Louis that will provide additional highway capacity between Missouri and Illinois. This will provide some congestion relief for I-55 which currently shares the Poplar Street bridge with I-70, I-64, I-44 and US 40.¹

Direct, intercity bus service on the corridor is provided by Greyhound and Megabus. It is assumed that the number of bus trips would increase proportionately with the projected growth of bus travel demand in the corridor. It is also assumed that the number of corridor air service flights would increase proportionately to the projected air travel demand growth in the Corridor. Ultimately, this could change if the airlines find shorter corridor routes cost prohibitive.

6.1.1.3 Risks Associated with Different Modes of Travel

In the United States, 2008 was the first year traffic fatalities dropped below 40,000 in close to 50 years. Traffic death is the number one cause of death in persons aged five to 27. Approximately 100 times the fatality rate are injured and ten times the number are seriously injured due to crashes. Weather conditions have an adverse effect on crash rates and the lack of enforceable regulations do nothing to deter drivers from continuing travel in severe conditions.

Commercial air travel has proven to be a very safe mode. Aircraft can safely fly over, around or even through all but severe meteorological conditions, although passenger fear becomes a factor. A degree of this safety is derived from the highly-trained air crews and the professional judgment brought to bear, and also the advanced weather monitoring systems and a set of enforceable regulations that limits flight in unsafe circumstances. The experienced air traveler knows that safety has a price in delayed or cancelled flights, unexpected stranding in mid-trip, and other inconveniences that can make air travel less than pleasant. These factors affect on-time performance of air travel and can substantially increase trip length with little predictability.

Passenger rail's safety record is also very good and is not as sensitive to foul weather conditions. Rail vehicles successfully navigate all but the most severe wind, ice, snow or flood conditions. Passengers also have a greater sense of safety in unsettled conditions.

No significant risks are anticipated with this program for rail system infrastructure improvements. The rail infrastructure improvements would be made on existing railroad property. Property would be required for some of the new passing sidings and upgraded station facilities, but there is expected to be significant community support for stations, lessening the likelihood of property acquisition issues.

The trackwork and station site upgrades included with the program are not atypical or complicated for railroad infrastructure upgrade projects, and are not anticipated to

¹ <http://newriverbridge.org/>

present any significant construction or schedule risk. Development of the new signal and communications technologies to be deployed is progressing.

6.1.1.4 Sustainability

System Sustainability

IDOT and UP have a significant and long-standing record of achievement in terms of making improvements to the corridor, including upgrades to existing track and signals and grade crossing improvements. New commitments made in 2010 and 2011 as part of a Grant Agreement with FRA, including significant infrastructure work now underway that will provide train operations at up to 110mph, is further demonstration of this partnership.

In 2006, IDOT increased the number of trains it supported from one to three daily round trips of the “Lincoln Service” in the Chicago – St. Louis corridor. The Build Alternatives will provide high-speed rail service that will largely replace this current conventional service with the ability to attract higher ridership and revenue with improved trip times and reliability and new equipment IDOT has demonstrated a significant, sustained commitment to supporting and expanding rail transportation options throughout the state and on key corridors throughout Amtrak's existence. The State's recent doubling of support on three corridors (including Chicago – St. Louis) has achieved substantial results in terms of increased train frequency and ridership over the past two years. IDOT also has a sustained history of having supported major capital improvements on passenger rail corridors throughout the state, including implementation of state of the art signaling and grade crossing protection systems, as well as major track improvement projects.

IDOT and UP developed an agreement during 2010 to begin the process of improving the Chicago – St. Louis corridor to accommodate the implementation of high speed intercity passenger rail. A Service Outcomes Agreement was executed by IDOT and UP on December 20, 2010 to reflect improved operations as a result of these improvements. This is another major milestone for the program, as it sets forth a 20-year term of agreement, whereby UP agrees to reliability targets, and to not to abandon the rail line and to maintain access to the line. In addition, IDOT and UP have agreed that service agreements will be binding on any new owner of the corridor or lessee for partial or full sale or for assignment or lease of the line.

IDOT will participate in on-going maintenance costs incurred as a result of high speed rail operation including such items as the inspection and maintenance of track, signal and communications, and other facilities. UP and IDOT executed a maintenance agreement on March 22, 2012 which addresses this matter. Maintenance costs for this 20-year agreement will begin upon completion of the current funded project. UP will maintain the section from Joliet to Godfrey Illinois at Class 6 standards (110 mph passenger). The section from Godfrey to Q Tower will be maintained at Class 4 standards (80 mph passenger). Per the agreement, the parties will create a 20-year maintenance plan and 20-year budget. Each year, these budgets can be amended by mutual agreement of the parties. UP will perform both scheduled and unscheduled

maintenance (as needed). UP's cost contribution is based on its historic experience of maintaining similar track segments for freight to normal Class 4 standards. Its contribution is based on gross ton miles (subject to an annual adjustment). IDOT's financial contribution will be the maintenance costs in excess of Class 4 standards. IDOT will make equal monthly maintenance payments into an escrow fund. There will be an annual reconciliation of the party's cost contributions. After 60 months of data collection, the cost formula will be adjusted, if necessary.

Environmental Sustainability

The rehabilitation of the rail stations presents opportunities for improving energy performance, minimizing water use, improving construction practices, and selecting materials with good life cycle assessments. The stations and rail facilities will be considered as whole buildings, with interrelated buildings systems that deliver high-performance. Green design principles can inform this process by guiding the designers to consider the most environmentally optimal solution for the buildings, and consider how the buildings can improve and enhance the environment they are built in.

IDOT will also require (where it is practical) that stations and related facilities are designed and built using the US Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system. When identified as a goal early in development, rail facilities can achieve Silver or Gold certifications.

Design teams for the buildings associated with the Corridor project will consider energy savings strategies for lighting, heating and cooling, in addition to organizing the project to reduce construction waste, improve water efficiency, select materials with good life cycle assessment ratings, consider natural ventilation and daylight, enhance the indoor air quality and use low volatile organic compounds (VOC) products.

LEED V3 has advanced the assessment of sustainability to explicitly measure important GHG reduction strategies for buildings. Design teams will design to current American Society of Heating, Refrigeration, and Air conditioning Engineers (ASHRAE) standards, and client teams will work to properly site and program building locations in order to achieve this aggressive rating standard.

Green design practices are a part of the 2004 ROD improvements. Outside of the buildings in the system, the rail systems themselves are being designed and delivered in a way that respects the environment through which they run. For example, the new rolling stock to be procured as part of the 2004 ROD improvements will feature improved emissions and fuel economy, compared to existing equipment.

6.1.1.5 Corridor Development Synergies

The Build Alternatives (Alternatives A and B and **Preferred Alternatives C and D**) would provide options for an alternative means of travel for employment, business or vacation. This service would be an integral part of the Midwest's high-speed intercity passenger rail system, providing additional connections through Chicago to other Midwest and national railroad destinations. With Chicago being the hub of the

MWRRS, the Chicago-St. Louis service would provide connections between the cities and towns served within the corridor to the rest of the MWRRS. Passenger rail travel would be available and practical between St. Louis, Springfield and other cities and communities along the Chicago – St. Louis corridor, and all other routes and destinations to be served by the MWRRS including Milwaukee, WI; Dubuque, IA; Detroit, MI; Kansas City, MO; Cleveland, OH; Cincinnati, OH; and others.

The Chicago – St. Louis high-speed intercity passenger rail service will afford the opportunity to:

- Achieve significant reductions in travel times and improve service reliability,
- Introduce an alternative to auto travel to many small towns and cities of the Midwest that lack travel choices,
- Introduce a regional passenger rail system designed to generate significant revenues towards addressing its operating costs, and
- Provide major capital investments in rail infrastructure to improve passenger and freight train efficiency, safety and reliability on shared rights-of-way.

The improvements to the Chicago – St. Louis Corridor are expected to create significant near-term economic benefits in the corridor in addition to the State of Illinois and other regions of the United States. The Chicago – St. Louis Corridor’s economic benefits from the program would be driven by an increase in construction spending in the region. These expenditures would generate a short term increase in demand for construction-related labor and material as well as engineering and technical services in the corridor. In addition, as part of the program, it is anticipated that rolling stock would be procured. While it is not yet known where the rolling stock would be manufactured, the program would generate additional economic benefits in that region as well.

Based on the estimated capital construction expenditure, it is estimated that approximately 5,861 direct and indirect engineering, construction and other short-term jobs would be generated within the corridor as a result of this program. The associated estimated earnings for these jobs are \$92,922,000 and the projected resulting economic output is \$1,347,708,000.

For ongoing job creation, it is estimated that the annual operations and maintenance budget for the Chicago - St. Louis Corridor Intercity Passenger Rail Service would generate 407 jobs with an earnings of \$23,342,000 and an economic output of \$98,247,000. The Bureau of Economic Analysis (BEA) Regional Input-Output Modeling System (RIMS II) was used to generate the employment forecasts.

6.1.2 Service Levels and Frequency

The Build Alternatives (Alternatives A and B and **Preferred Alternatives C and D**) would enable the existing passenger rail service to be expanded, with operation of 18 trains per day (9 daily round trips), seven days per week. The daily service is currently assumed to include the following Amtrak trains:

- High Speed Express Trains – Five southbound and four northbound trains per day
- High Speed Standard – Three southbound and four northbound trains per day
- “Texas Eagle” long distance service – One round trip per day

Table 6.1-2 provides currently assumed travel time information for the corridor service for southbound trains under existing, No-Build, and Build conditions. Similar end-to-end travel times are expected for northbound trains. This table does not apply to the long distance Texas Eagle.

Table 6.1-2. Chicago–St. Louis Intercity Passenger Rail Service Representative Travel Times – Southbound

Station	Existing	No-Build		Build Alternatives	
	Lincoln Service 303	HSR Express	HSR Standard	HSR Express	HSR Standard
Chicago	0:00	0:00	0:00		0:00
Joliet	0:50	0:50	0:53	0:45	0:45
Dwight	1:24	---	1:22	---	1:12
Pontiac	1:41	---	1:36	---	1:28
Normal-Bloomington	2:14	1:53	1:57	1:43	1:53
Lincoln	2:45	---	2:26	---	2:19
Springfield	3:25	2:41	2:49	2:27	2:44
Carlinville	4:03	---	3:19	---	3:14
Alton	4:34	3:34	3:49	3:16	3:42
St. Louis	5:35	4:30	4:45	3:51	4:10

Any revisions to these run times for the No-Build Alternative are subject to mutual agreement of the FRA, IDOT, UP and Amtrak.

6.1.2.1 Railroad Operation Performance

Overall Chicago to St. Louis Corridor Performance

To assess future railroad operations and assist in determining necessary infrastructure improvements, operation analyses have been performed for this program. The UP initially completed an analysis of the corridor between Chicago and E. St. Louis in support of the October 2009 FRA funding application. Subsequently, the UP completed

additional preliminary analysis of the E. St. Louis to St. Louis section of the corridor. Finally, in direct support of this Tier 1 EIS, operational analyses were completed for the two alternative routes between Chicago to Joliet. Since the UP's operational analyses did not include the Rock Island District route, it was determined that new analyses of both routes between Chicago and Joliet should be completed so that each route could be evaluated at the same level of detail.

The results of the simulation and operations analysis performed for the alternatives that supported the current Cooperative Agreement reveal that performance will be improved. As expected, the greatest improvements will come with the completion of a Build Alternative (Alternatives A and B and **Preferred Alternatives C and D**). Current passenger service in the corridor requires between 5 hours and 20 minutes and 5 hours and 57 minutes between Chicago and St. Louis. Following the completion of the 2004 ROD improvements (under construction as of 2012), which is included in the No-Build Alternative for this analysis, the one-way travel time for a standard HSR train will be approximately 4:45 hours.

When the improvements associated with the Preferred Alternative are completed, the one-way travel time would be as low as 3 hours and 51 minutes for express trains regardless of alternative. This is a time reduction of about 30 minutes compared to the No-Build Alternative express trains. As discussed later in this section, the Build Alternatives (Alternatives A and B and **Preferred Alternatives C and D**) would also provide the capacity for the additional trains and improve reliability.

A large number of trains are projected to be operating in the corridor under the Build Alternatives between Joliet and St. Louis where the corridor is primarily single track. At the projected train frequencies, it was envisioned that two main tracks would be required to increase passenger service, maintain passenger service reliability and to maintain No-Build condition freight levels of service. As part of a sensitivity analysis to support this assumption, UP evaluated the full double tracking of the corridor and then also evaluated the corridor if two segments of the route remained with single track. These two segments total 16 miles and are located in the Macoupin Bottoms and near Alton, where construction may be more costly and impacts more significant due to the sharper curves and more challenging topography. Based on the UP analysis, on time performance would be reduced by approximately five percent and travel time would increase by four to five minutes on average with the removal of the 16 miles of double track. Additional, more detailed operational analyses regarding potential capacity improvements will be performed in the Tier 2 studies if this program is advanced.

Stringline diagrams were produced that provide a graphic representation of the results of the operational analyses performed. Each line, or "stringline", in these diagrams represents one train. The x-axis of the diagram represents time, and the y-axis represents distance. The points where the stringlines cross represent the approximate time and location that a northbound train would pass a southbound train. These stringline diagrams are used throughout this section to show the potential conflicts where meets and passes may occur such that operations and schedules may be adjusted

to maximize efficiencies and reduce the potential for delays and were used to identify improvements. The results of the operational analyses lead to the conclusion that the proposed schedules and service are viable and can be successfully operated in conjunction with the existing and proposed freight operations.

No-Build Alternative

As described in Section 3.2.1, the No-Build Alternative assumes implementation of the 2004 ROD improvements which include the reconstruction of passing tracks, construction of 24 miles of new second track, and an upgrade to 110 mph capable main track between Joliet and Alton, the installation of positive-train control (PTC), and other improvements. According to the capacity simulations done as part of the October 2009 FRA funding application, the 2004 ROD improvements (which are assumed to be completed under the No-Build Alternative) were expected to reduce delays to corridor trains by 50 percent over current conditions

Currently, very few freight trains traverse the entire corridor, though this will grow over the coming years as the overall economy grows, and as UP’s traffic builds to and from their relatively new Joliet Intermodal Facility. In general, freight traffic is currently higher on the southern portions of the corridor. Forecasted no-build scenario operating conditions were provided by UP for the entire corridor.

On the existing Amtrak/Metra Heritage/ Canadian National (CN) route between Chicago and Joliet (i.e., Section 1), the train operations assumed by UP in their operations analysis are listed in Table 6.1-3. Exhibit 6.1-1 shows the Amtrak/Metra Heritage/CN route between Chicago and Joliet. Exhibit 6.1-2 shows the railroads, major junctions, and freight yards between Chicago and Joliet.

Table 6.1-3. Trains per Day - Chicago to Joliet (Section 1)

Type of Train	Current Quantity	Assumed No-Build Quantity
Amtrak/IDOT Corridor	8	No change
Amtrak “Texas Eagle”	2	No change
Metra-Heritage Corridor	6	No change
CN – Local/Through Freights	8	No change
UP Intermodal (Argo)	0	8
UP Merchandise (Argo)	0	2
Total	24	34

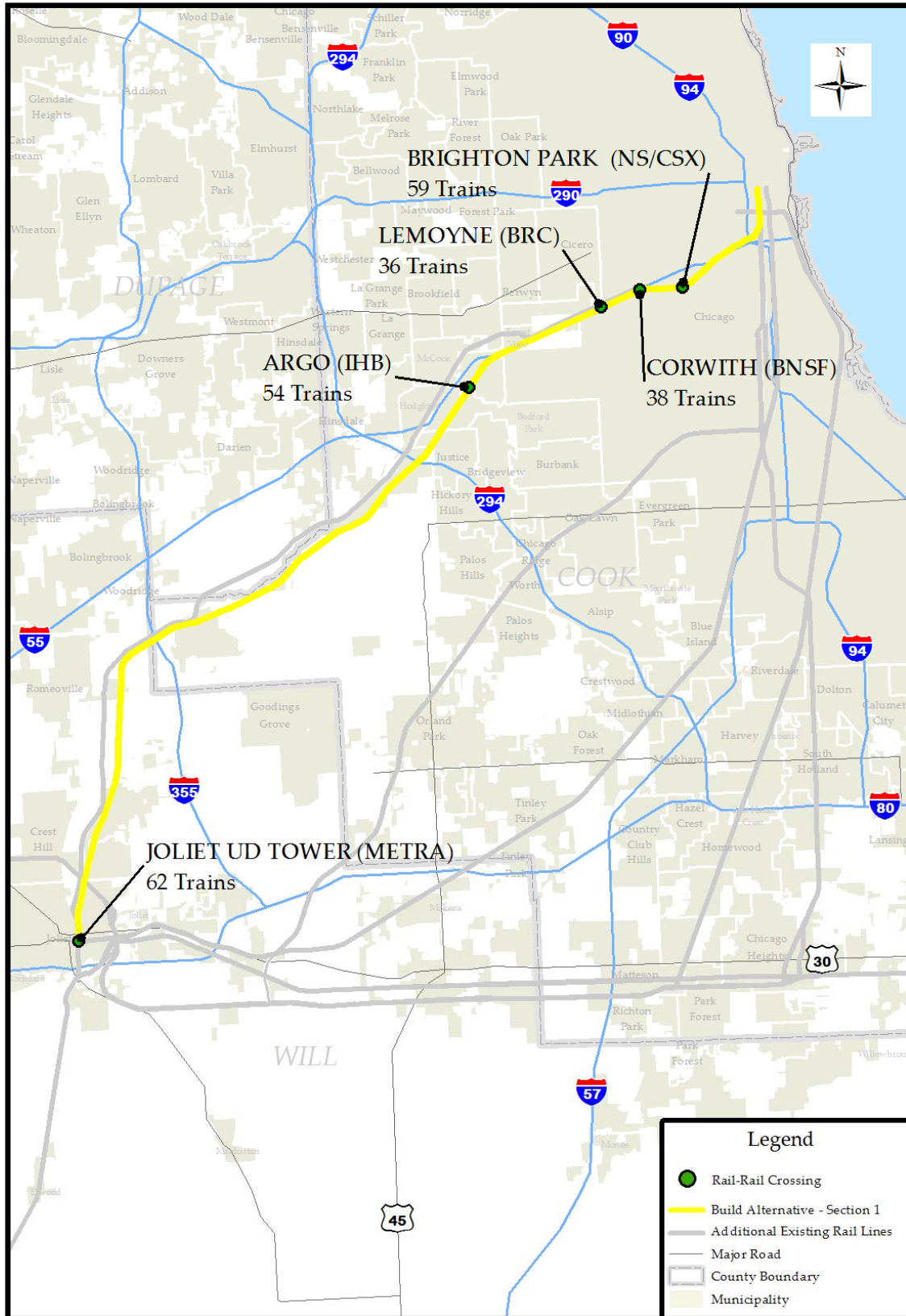


Exhibit 6.1-1. Rail to Rail Crossings – Chicago to Joliet (Build Alternative Section 1)

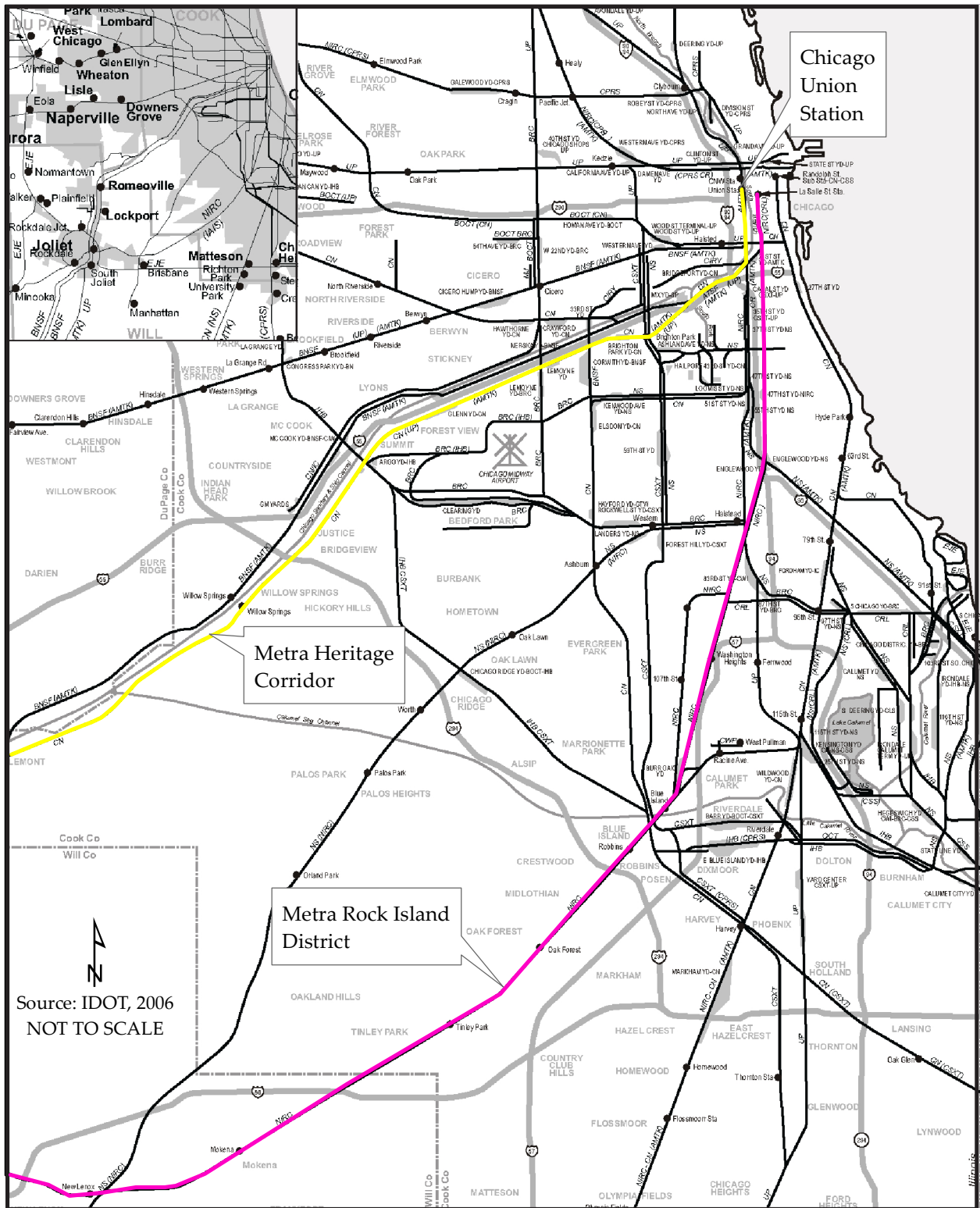


Exhibit 6.1-2 Railroads Between Chicago and Joliet

Cross-traffic at rail-rail grade crossing diamonds is significant on this section. For the Chicago-Joliet section now owned by Canadian National (CN), the following locations and daily volume of trains are:

- Brighton Park (Norfolk Southern (NS)/CSX Corporation) – 59 trains
- Corwith (BNSF Railroad Company) – 38 trains
- LeMoyne (Belt Railway Company of Chicago (BRC)) – 36 trains
- Argo (Indiana Harbor Belt Company (IHB)) – 54 trains
- Joliet UD Tower (Metra) – 62 trains

UP and the IHB expect to interchange traffic at Argo where a new rail connection is under construction as of 2012. As noted in the table, it is projected that some future UP trains would operate over the CN to and from Argo where they would access the IHB

On the existing Metra Rock Island District route between Chicago and Joliet (i.e., Section 2), the train operations are listed in Table 6.1-4. If the Metra SouthWest Service is shifted over to the Rock Island District route as planned under the CREATE program, the number of Metra trains would increase by up to 53 trains per day. There is also freight and passenger train traffic on the NS line north of 40th Street, and the 21st Street bridge over the Chicago River carries approximately 100 trains per day. Exhibit 6.1-3 shows the Metra Rock Island District route between Chicago and Joliet.

Table 6.1-4. Trains per Day - Chicago to Joliet (Section 2)

Type of Train	Current Quantity	Assumed No-Build Quantity
Metra-Rock Island District	92 (maximum; varies along route; includes deadhead movements between 40 th Street and the 47 th Street Yard)	No change
Local/Through Freights	12	No change
Total	75	75

There is one rail-rail grade crossing in this section at the Elgin, Joliet, and Eastern (EJ&E) Railway in Joliet. Approximately 15 trains use this crossing daily over the EJ&E tracks.

The UP Joliet Subdivision (Joliet to Bloomington) train operations along the corridor under the No-Build Alternative assumed by UP in their operations analysis are listed in Table 6.1-5.

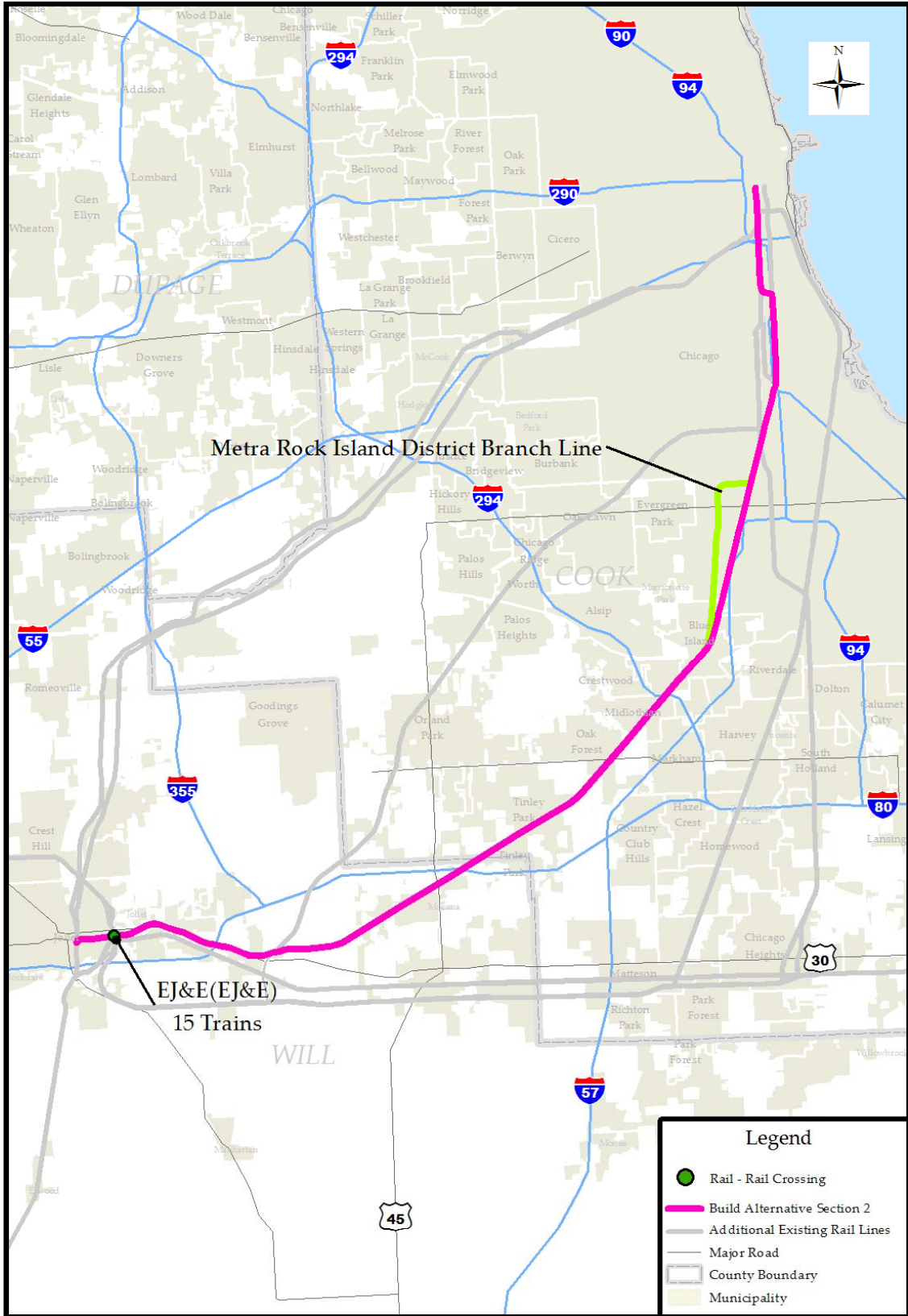


Exhibit 6.1-3. Rail to Rail Crossings – Chicago to Joliet (Build Alternative Section 2)

Table 6.1-5. Chicago-St. Louis Train Operations on the UP Joliet Subdivision (Joliet to Bloomington)

Type of Train	Current Quantity	Projected No-Build Quantity
Amtrak/IDOT Corridor	8	No change
Amtrak "Texas Eagle"	2	No change
UP Intermodal	0	15
UP Merchandise (Argo)	0	2
UP Coal (Plaines)	2	No change
UP Grain	1	No change
UP Local Freight	2	No change
Total	15	24

It is recognized that the new Joliet Intermodal Facility will be a significant driver of freight traffic on the corridor in the future. In terms of traffic into and out of the Joliet Intermodal Facility, the UP operation analyses assumed the following:

- Five northbound trains per day originating from the intermodal facility (from Elwood to the north along CN);
- Two northbound trains per day operating past the intermodal facility (from Bloomington to the north along CN);
- Four southbound trains per day operating into the intermodal facility (from the north along CN); and
- Three southbound trains per day originating from the intermodal facility (from Elwood to Bloomington).

The intermodal traffic is originating from/destined for the south and southwest United States depending on a variety of economic and operating factors.

Cross-traffic was also modeled for the UP Joliet Subdivision. It should be noted that UP controls the interlockings at these crossings, so will be in position to avoid delays to passenger services as a result of these crossing movements. The following locations and daily volume of freight trains included:

- Dwight (NS) – 12 trains (trains were modeled throughout the day with the periods in between moves ranging from one to five hours)

- Chenoa (Toledo, Peoria & Western Railroad (TP&W)) – 2 trains (trains were modeled in the midday)
- Bloomington (NS) – 6 trains (trains were modeled throughout the day with the periods in between moves ranging from one to seven hours)

Freight train flows on the UP Springfield Subdivision (Bloomington to East St. Louis) can be considered in three distinct route segments: between Bloomington and Ridgley; between Ridgley and Godfrey; and between Godfrey and the WR Tower (MP 275.4). Train operations assumed by UP for their operations analysis for these areas are listed in Tables 6.1-6, 6.1-7, and 6.1-8.

Table 6.1-6. Chicago-St. Louis Train Operations on the UP-Springfield Subdivision (Bloomington to Ridgley)

Type of Train	Current Quantity	Assumed No-Build Quantity
Amtrak/IDOT Corridor	8	No change
Amtrak "Texas Eagle"	2	No change
UP Intermodal	0	15
UP Merchandise	1	3
UP Grain	1	No change
UP Local Freight	1	No change
Total	13	22

Table 6.1-7. Chicago-St. Louis Train Operations on the UP-Springfield Subdivision (Ridgley to Godfrey)

Type of Train	Current Quantity	Projected No-Build Quantity
Amtrak/IDOT Corridor	8	No change
Amtrak "Texas Eagle"	2	No change
UP Intermodal	0	15
UP Merchandise	3	5
UP Grain	2	No change
UP Local Freight	1	No change
Total	16	27

Table 6.1-8. Chicago-St. Louis Train Operations on the UP-Springfield Subdivision (Godfrey to WR Tower)

Type of Train	Current Quantity	Projected No-Build Quantity
Amtrak/IDOT Corridor	8	No change
Amtrak "Texas Eagle"	2	No change
UP Intermodal	0	15
UP Merchandise	3	5
UP Grain	2	No change
UP Local Freight	1	No change
KCS (Godfrey)	4	No change
Total	20	29

Cross-traffic at a crossing is significant on the UP Springfield Subdivision at Iles (MP 187.4) (NS) with 23 trains. This is not a diamond configuration, but occurs via crossovers.

UP began routing some intermodal trains to/from their new Joliet Intermodal Facility at Elwood south of Joliet via the HSR corridor during fall 2012 (not reflected in preceding tables). UP expects to increase the number of trains (adding some running south from the Joliet Intermodal Facility) in succeeding years. The modernized Panama Canal can be expected to direct more Asian container traffic to Gulf Ports such as Houston rather than the West Coast ports. For inland destinations in the Midwest, rail is expected to be the dominant mode of land transport.

Since the corridor has limited freight traffic, meets between passenger trains are a primary source of delay on this single track corridor. This is especially true between Dwight and Joliet. Components of the 2004 ROD improvements included in the No-Build Alternative are slated to improve these challenges, but meets will continue to constrain passenger trains. The northbound "Texas Eagle" can also be a source of operational delays if its on-time arrival at St. Louis has been compromised farther south as often is the case. As noted elsewhere in this plan, Amtrak has been discussing operational changes (frequency, routing, etc.) for the "Texas Eagle" with the UP; these revisions may affect the train's operation on the HSR corridor under the No-Build Alternative.

Build Alternatives (Alternatives A and B and Preferred Alternatives C and D)

Based on discussions with the railroads and previous analyses, improvements included with the Build Alternatives were developed to address the program's purpose and need. A complete description of the improvements included with the Build Alternatives is provided in Section 3.3.7 of this Tier 1 EIS. These improvements generally include:

- Construction of additional main track, resulting in at least two main tracks over the entire corridor where it will not already be in place under the No-Build Alternative.
- Capacity improvements between Chicago and Joliet along either potential route.
- Flyovers at existing rail-rail crossings between Chicago and Joliet. Four flyovers (at Brighton Park, Corwith, LeMoyne, and Argo) in Section 1 and one flyover (at the EJ&E) in Section 2.
- Flyover at Iles with NS just south of Springfield.
- Construction of a new bridge in the MacArthur Bridge area in St. Louis.
- Additional improvements are proposed to address the additional needs in Springfield. These improvements are discussed in Volume II of this Tier 1 Final EIS.

Under the Build Alternatives, intercity passenger rail service would consist of eight HSR round trips per day operating at speeds up to 110 mph and the continuance of the Amtrak Texas Eagle service (one round trip per day). The proposed HSR improvements are envisioned to:

- Improve intercity passenger rail service on-time performance while maintaining projected baseline freight and commuter service levels.
- Provide sufficient capacity to accommodate the increased passenger frequencies.
- Maintain UP's capacity for existing and forecasted freight traffic.
- Provide flexibility to perform track maintenance operations to be accomplished along the mainline without devastating schedule performance effects.

The ability to efficiently perform maintenance operations is dependent on spacing of main and siding tracks at 20-foot track centers, where this can be provided without unusual impact or cost. Besides this being the current UP standard for new construction system-wide, this offers safety, maintenance, and construction productivity benefits. The safety benefits that come with 20-foot track spacing are supported by UP's standard operating rules. To summarize, where track centers are less than 19 feet, all work on an adjacent track must in essence come to a stop while trains at speeds of over 40 mph are passing, and there are over 40 trains per day projected through the corridor under the future Build Alternative conditions. Conversely, work can continue with little loss of productivity and reduced worker safety risk in many situations with the 20-foot track centers.

The proposed double track system in the Build Alternatives also includes the provision of maintenance access roads, where possible, minimizing train delays and maintenance time and costs.

As in all shared-track freight and passenger operations, performance results are dependent on skilled dispatchers making real time decisions, as well as adherence to the timetable instructions governing the territory.

Simulation analyses were conducted for the Build Alternatives, assuming the improvements previously identified. For the Chicago to St. Louis analysis, standard trainsets for Metra, Amtrak, high-speed rail and freight trains were simulated using a Train Performance Calculator (TPC) to estimate running time over the Chicago to Joliet corridors. The TPC uses the tractive effort of locomotives assigned to each trainset versus the trailing consist and the grades to simulate the operation of each train over the corridor. Curve speed restrictions are “held” until the rear of a train has completely cleared each curve. The TPC runs for each train between Chicago and Joliet were then modeled over a 24-hour period to create the stringline diagrams. This data is used to assess railroad operations and the effectiveness of proposed infrastructure improvements at providing for HSR service and maintaining freight and commuter service levels. South the Joliet, the UP analyzed railroad operations with their Rail Traffic Controller (RTC) model.

The railroad operations analysis is presented for four geographic areas: (1) Chicago to Joliet, (2) Joliet to Bloomington, (3) Bloomington to East St. Louis, and (4) St. Louis area. The design year is 2030 for all areas.

Chicago to Joliet

There are two sections between Chicago and Joliet, Section 1 and **Preferred Section 2**, as discussed in section 3.3.7. Section 1 is the current Amtrak/Metra Heritage route between Chicago and Joliet and Section 2 is a proposed route between Chicago to Joliet using the Metra Rock Island District. Alternatives A and B use Section 1 and Alternatives C and D use Section 2. Stringline diagrams for both sections are presented below. These two routes were chosen based on the results of an alternatives screening analysis as documented in Section 3.3.4. One of the major differentiators for these two routes over others evaluated was that these two had the potential to provide a shorter travel time between Chicago and Joliet. Operational factors and environmental issues were also considered prior to selecting these two routes.

Alternatives A and B (Section 1)

The HSR operations could be conducted in 2030 on Section 1 without significant conflicts or interactions with freight and commuter operations, given the proposed infrastructure improvements. Metra operates only limited (three daily round trips per day) commuter service, and freight black-outs, which are periods where freight trains don't operate, are imposed in the morning and evening rush hour periods.

A total of 26 freight “slots”, which are gaps between the passenger trains where freight trains could traverse the corridor, can be identified for the corridor, all of them extending between Brighton Park and Joliet. These slots are on 45-minute headways (minimum signal headway for freight on the line is currently 20+ minutes). This would be sufficient to accommodate the 18 daily freight trains projected to operate along this section. UP trains can operate all the way to the new connection at Brighton Park, while CN trains would enter and exit the corridor primarily at Glenn Yard. Slower way

freights will require two of the freight slots as they work the corridor north of Joliet, but terminal switching operations will use the new industry leads on either side of the main line in order not to occupy the main tracks for extended periods.

String-line diagrams in Exhibits 6.1-4 and 6.1-5 show the AM (midnight to noon) and PM (noon to midnight) pattern of commuter, Amtrak Texas Eagle, and HSR trains through Section 1 for 2030. Freight schedule slots are also identified from Joliet to Brighton Park that can be used by any freight operator. The reports show the effectiveness of the freight black-out periods in isolating the passenger service and permitting it to operate without conflict with the freight.

Preferred Alternatives C and D (Section 2)

Unlike Section 1, with its limited Metra service and the ability to impose AM and PM freight blackouts to create space for the HSR trains, Metra service on Section 2 is extensive and will continue to be so in the design year of 2030. Daily, Metra service would be at its peak precisely when there will be demand for HSR service (6:00 a.m. to 8:00 a.m. with 11 Metra trains arriving in Chicago and 4:00 p.m. to 6:00 p.m. with 13 trains departing Chicago).

Viable strategies exist to address the challenge of operating HSR service on this section in 2030. One is to provide an additional third main track. Another is to hold (or shift departure from the La Salle Street Station) southbound trains north of CP Pershing (the connection to the NS/Amtrak line from Union Station) until the southbound HSR train has cleared, then follow it south with the commuter train. The southbound HSR train needs sufficient headway that it does not overtake another Metra train as that train makes its many intermediate station stops to Joliet. A substantial amount of Metra service enters and exits the main line and operates on the Branch Line between Gresham Junction (around 87th Street) and just south of 127th Street in Blue Island. The Branch Line provides a “3rd track” option for passing some of the Metra trains while keeping the HSR trains on the main line.

The scheduling of HSR trains to avoid conflict with Metra service will be an important component of future Tier 2 studies. The preliminary analysis included in this document indicates that there are workable solutions for providing reliable HSR service along the Rock Island District route.

Northbound and southbound HSR trains are assumed to use a new connection between the Metra Rock Island District line and the NS/Amtrak line at “CP Pershing—CP 518”, near 40th Street. The speed of the connecting track is assumed to be 25 mph, with 15 mph connections at either end to account for the extreme curvature on these connections. During the future Tier 2 studies, this connection will be evaluated in greater detail to determine if higher speeds can be achieved. Additional alternative connections between the Metra Rock Island District line and the NS/Amtrak line in this vicinity will be considered as well.

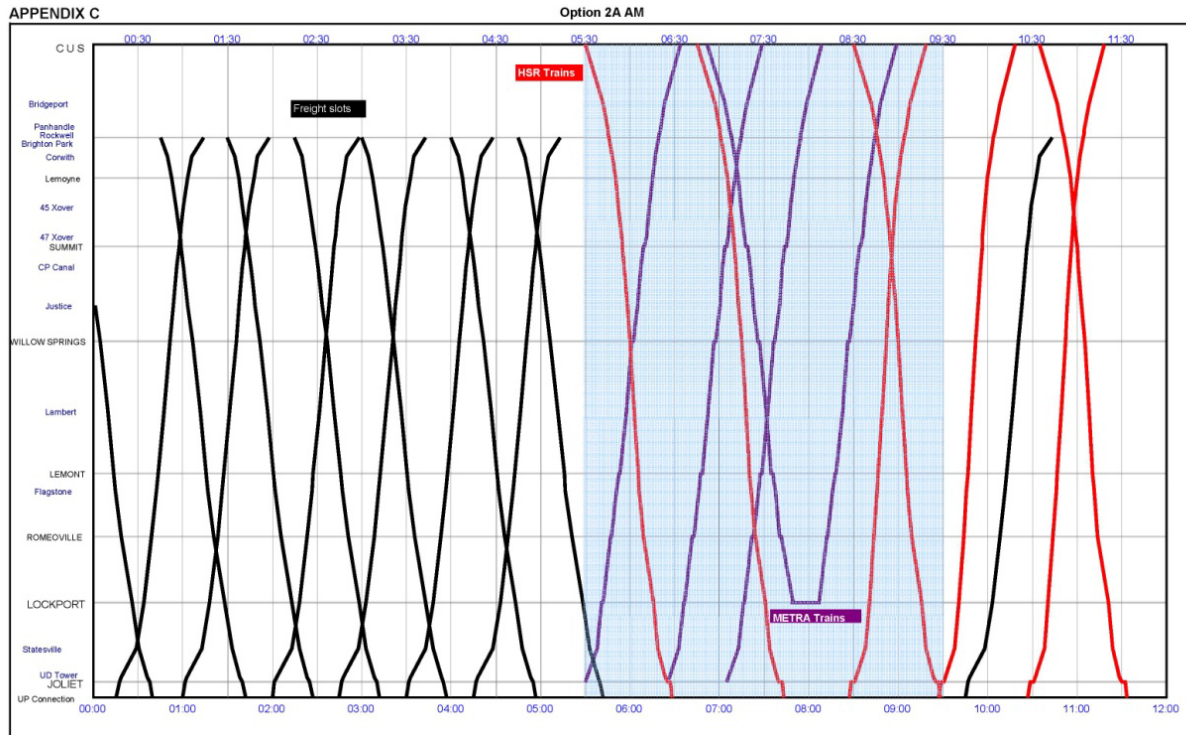


Exhibit 6.1-4. Build Alternative Stringline Diagram (Alternatives A and B - AM)

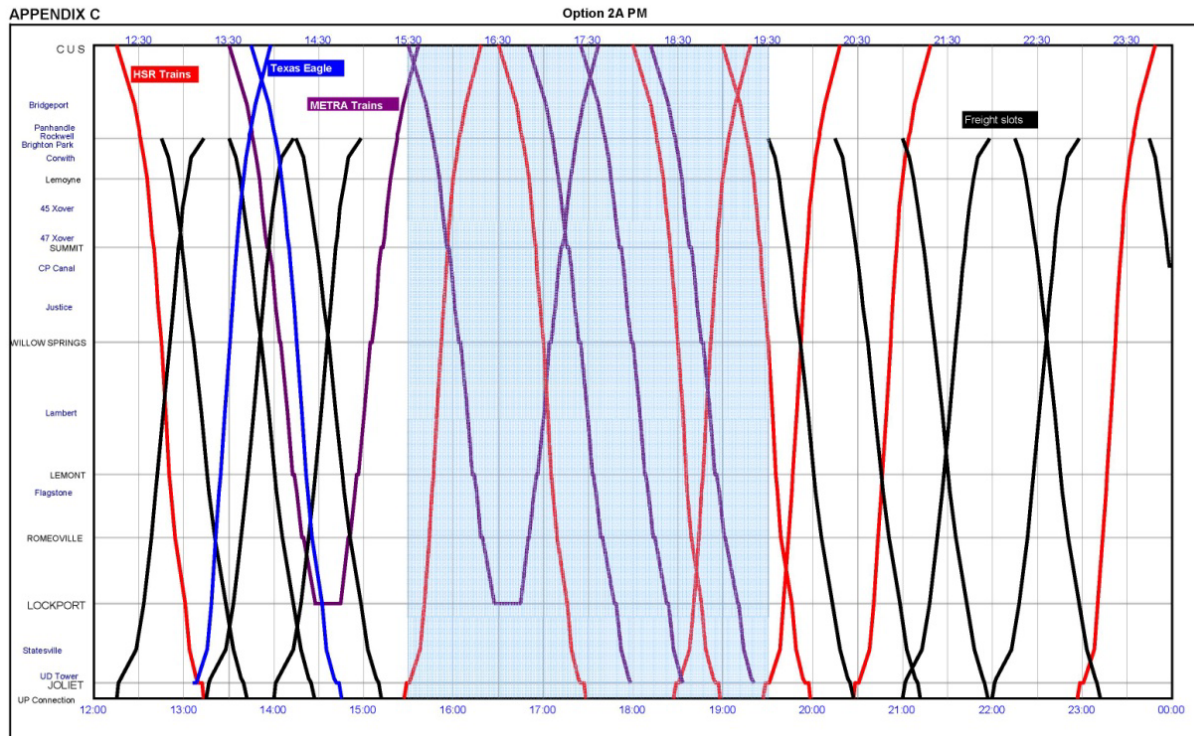


Exhibit 6.1-5. Build Alternative Stringline Diagram (Alternatives A and B - PM)

Many of the Metra peak trains run off the Branch Line between Washington Heights and Blue Island, instead of the mainline. The Branch Line location is shown on Exhibit 6.1-3. Metra's use of the Branch Line provides some flexibility in the scheduling of HSR trains as this location provides an additional location for HSR trains to pass Metra trains if required.

Recent information provided by Metra indicates that approximately 12 freight trains operate along the Rock Island District daily. Additionally, there are plans to shift Metra's SouthWest Service to the Rock Island District route between 75th Street and the LaSalle Street Station. Additional operations modeling will be conducted during future Tier 2 studies to develop schedules that will provide for reliable HSR and Metra service and allow the freight trains to operate effectively on the corridor as well.

String-line diagrams in Exhibits 6.1-6 and 6.1-7 for 2030 show the AM (midnight to noon) and PM (noon to midnight) pattern of freight, Metra commuter, and HSR trains on the Rock Island line. The reports show the peak period congestion between HSR and commuter trains as both services work to serve their respective ridership markets. HSR trains can be slotted into the Metra service and can operate at up to 110 mph (90 mph through Metra station areas) while doing it. Metra has indicated their intent to limit HSR trains to 90 mph through the station areas for safety reasons.

Joliet to Bloomington

In 2020, the UP predicts there will be 22 freight trains using this section of track between Joliet and Bloomington in 2020. Under the Build Alternatives (Alternatives A and B and **Preferred Alternatives C and D**), which include a double track mainline system with some additional passing sidings between Joliet and Bloomington, the number of meet, overtake or delay events is expected to rise to 59 per typical operating day between Joliet and Bloomington in 2020. This is a more than three-fold increase in the number of events. In addition, the geographic distribution of these events occurs throughout the length of Joliet to Bloomington, with 23 occurring between Joliet and Odell and 36 between Odell and Bloomington. And, the need to accommodate delayed trains makes flexibility in meet points even more important. This supports the need for full double-tracking of the subdivision.

Under the No-Build Alternative, 24 percent of this section would include sidings/extended second main track. For the Build Alternative, the remaining 76 percent (approximately 67 miles) of the area between Joliet and Bloomington would need to be double-tracked to achieve the on-time performance target of 90 percent.

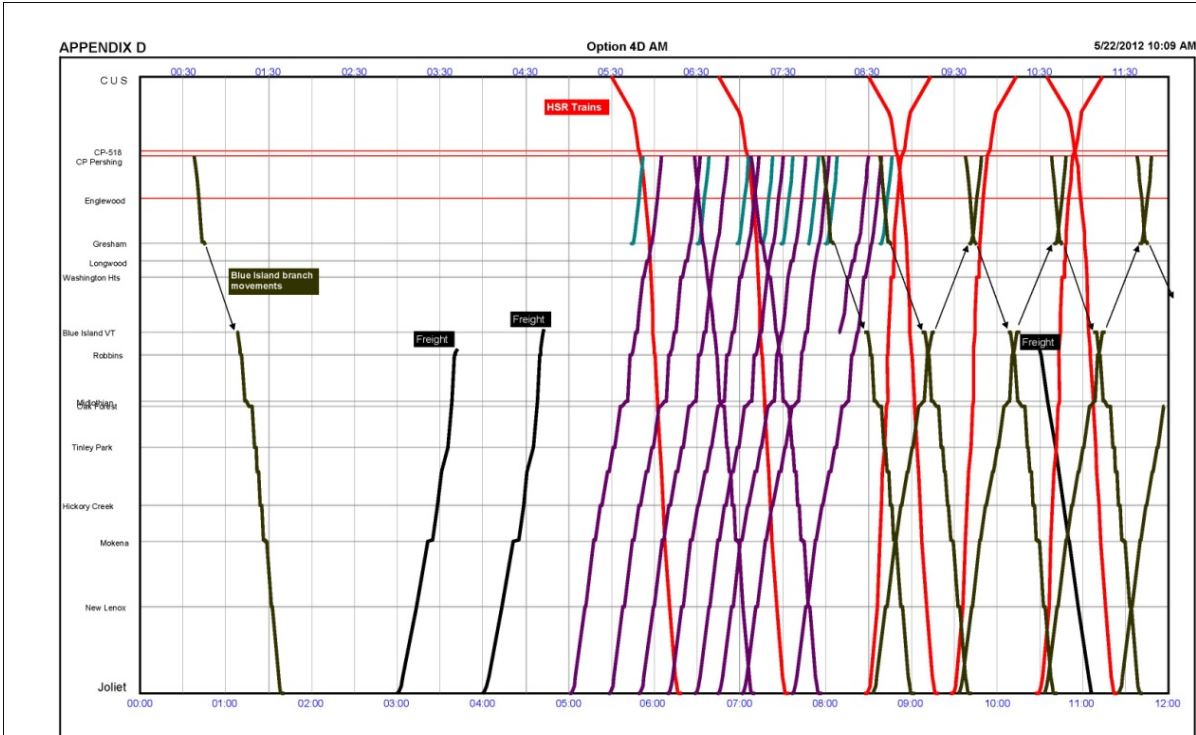


Exhibit 6.1-6. Build Alternative Stringline Diagram (Alternatives C and D - AM)

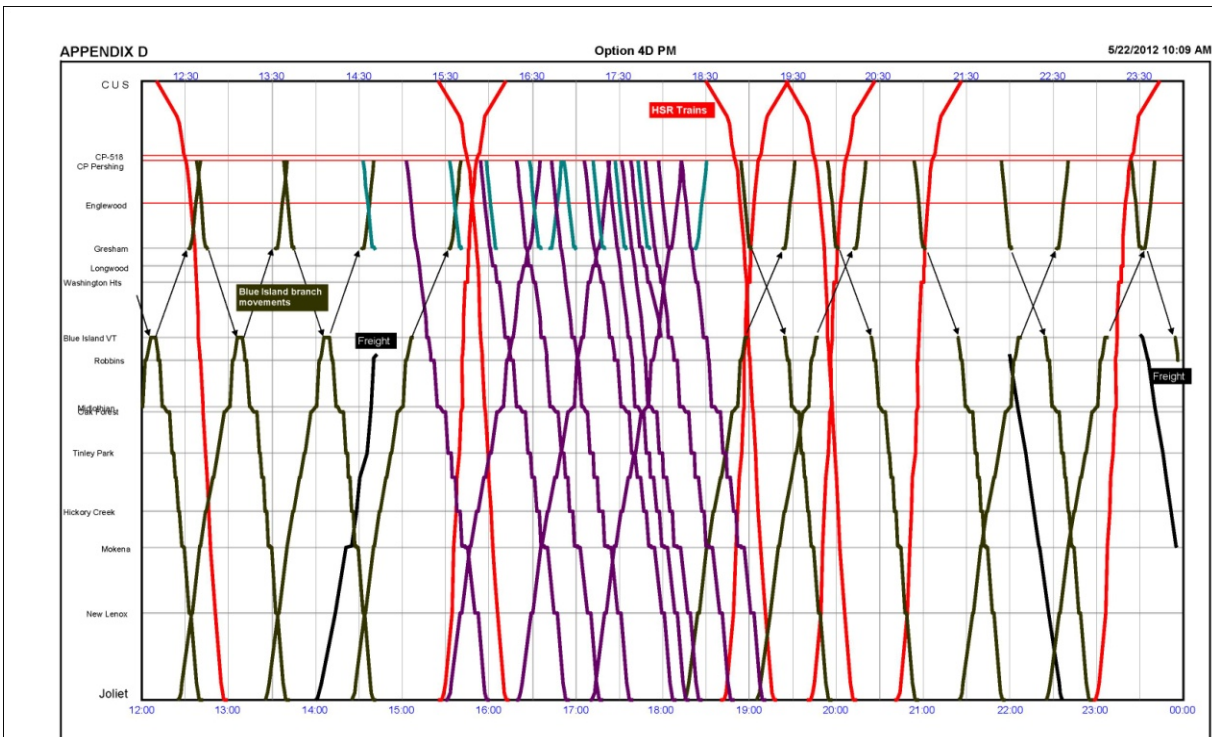


Exhibit 6.1-7. Build Alternative Stringline Diagram (Alternatives C and D - PM)

With provision of a double-track configuration, the projected number of delay or holding events, where a freight train would wait in a siding while a HSR train passed, is eight per operating day. Only freight trains are expected to be held or delayed while traversing this segment. Additional infrastructure or capacity to further reduce this is not proposed as part of the Build Alternatives. Exhibit 6.1-8 provides the stringline diagram for projected Build Alternative train operations between Joliet and Bloomington for 2020.

Although the simulations presented in Exhibit 6.1-8 were done for 2020, the design year for this program is 2030. Simulations for 2030 have not been completed by UP but the number of meet, overtake, or delay events would increase since freight in the corridor would increase. If the assumption is made that freight growth in the corridor between 2020 and 2030 is two percent per year, the number of freight trains running on this section of track would increase from 22 to 27. This further supports the need for a full double track configuration, maximizing operating flexibility.

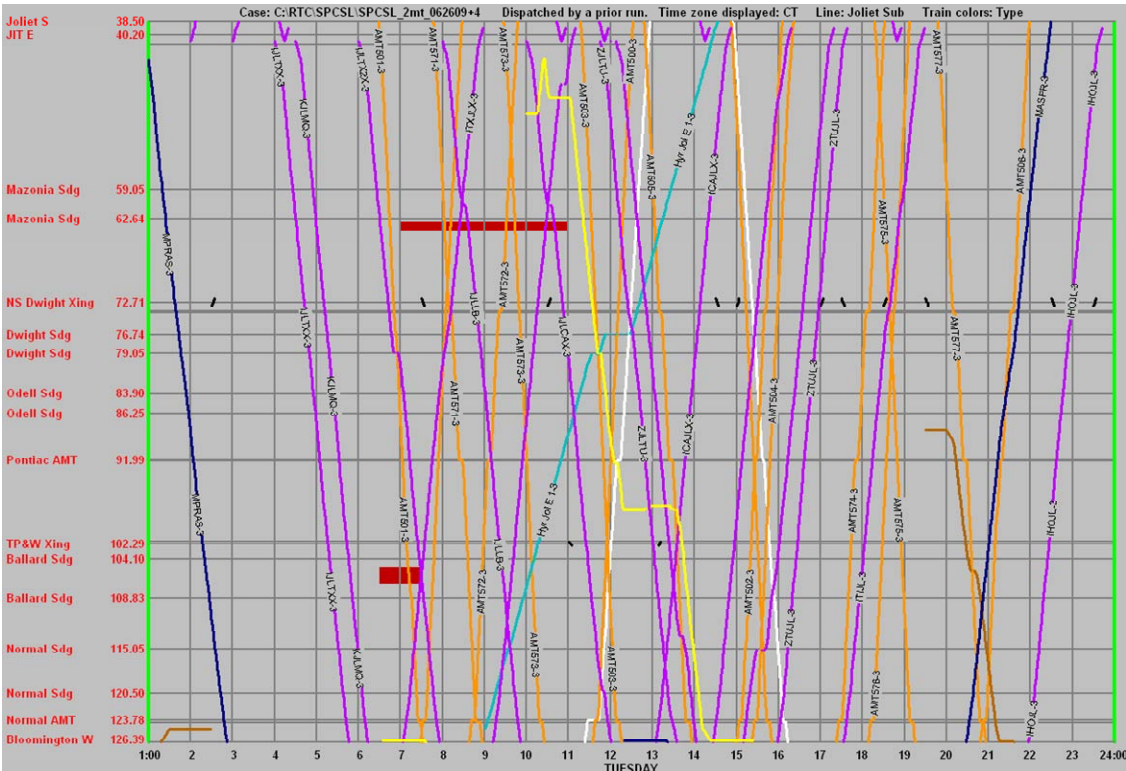


Exhibit 6.1-8. Build Alternative Stringline Diagram (Joliet to Bloomington)

Legend

- White Amtrak Texas Eagle
- Orange Amtrak Lincoln Service or HS Trains
- Purple Future UP Joliet Intermodal (IM) Trains
- Yellow UP Local Trains
- Black Foreign Trains to UP (NS, BNSF, CN, etc.)
- Aqua Blue Track Inspectors
- Dark Blue UP Manifest / Coal
- Dark Orange Grain Trains

Bloomington to East St. Louis

Under the Build Alternatives (Alternatives A and B and **Preferred Alternatives C and D**), which include a double track mainline system with some additional passing sidings between Bloomington and East St. Louis,, the number of meet, overtake or delay events is expected to rise to 112 per typical operating day in 2020 in this segment. This is a more than three-fold increase in the number of events. The geographic distribution of these events occurs throughout the length of the subdivision, with 51 occurring between Bloomington and Auburn and 61 between Auburn and Q Tower. This need for passing capability throughout the segment supports the need for full double-tracking of the subdivision, at this level of detail.

In the East St. Louis area, there are a number of rail junctions that funnel additional freight traffic onto and off of the corridor. UP is further developing a simulation model with additional detail to confirm the Build Alternatives possible additional infrastructure improvements. This analysis will be done in a Tier 2 environmental document.

Under the No-Build Alternative, which includes the improvements being made under the 2004 ROD, 43 percent of this section would include sidings/extended second main track. For the Build Alternatives, the remaining 57 percent (approximately 88 miles) of the subdivision would be double-tracked.

With provision of a double-track configuration, the projected number of delay or holding events is three per operating day. Only freight trains are expected to be held or delayed while traversing this length of track. These expected performance statistics indicate the soundness of making the investment in the full double-tracking between Bloomington and Q Tower, near Granite City. Exhibit 6.1-9 provides the stringline diagram for projected Build Alternative train operations between Bloomington and E. St. Louis.

Again, the simulations presented in Exhibit 6.1-9 were done for 2020, but the design year for this program is 2030. Simulations for 2030 have not been completed by UP but the number of meet, overtake, or delay events would increase since freight in the corridor would increase. If the assumption is made that freight growth in the corridor between 2020 and 2030 is two percent per year, the number of freight trains running on this section of track would increase from 22 to 27. This further supports the need for a full double track configuration, maximizing operating flexibility.

St. Louis Area

UP forecasts increased freight traffic flows in the St. Louis area in 2020 and 2030. St. Louis freight traffic on the corridors under consideration for this analysis is expected to increase by 23 percent by 2020 as a result of UP freight traffic to/from the Joliet and Springfield Subdivisions, as well as by 25 percent from the freight flows of the other

Class I rail carriers (BNSF, CSX, NS, etc.) in the St. Louis metropolitan area. UP has not forecasted freight growth for the St. Louis area past 2020, but a growth rate of 2 percent per year is assumed.

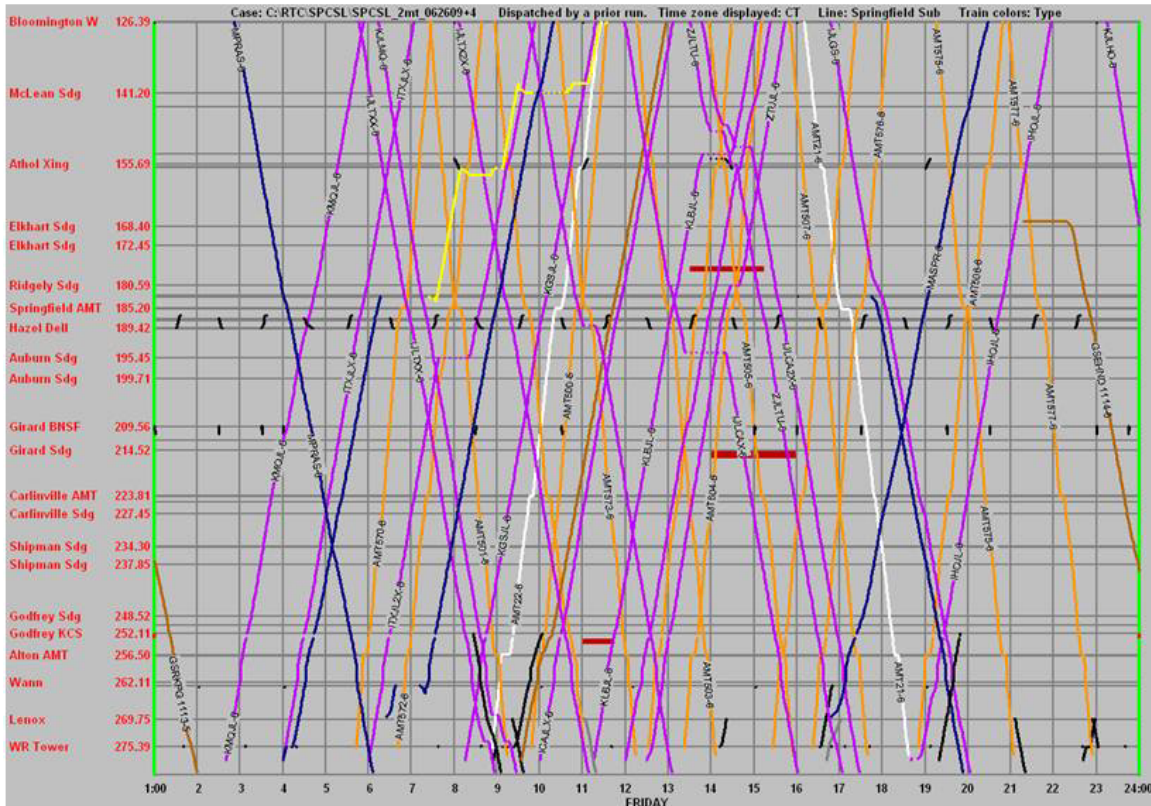


Exhibit 6.1-9. Build Alternative Stringline Diagram (Bloomington to East St. Louis)

Legend	
White	Amtrak Texas Eagle
Orange	Amtrak Lincoln Service or HS Trains
Purple	Future UP Joliet Intermodal (IM) Trains
Yellow	UP Local Trains
Black	Foreign Trains to UP (NS, BNSF, CN, etc.)
Aqua Blue	Track Inspectors
Dark Blue	UP Manifest / Coal
Dark Orange	Grain Trains

The expected freight train growth is assumed to result in a similar increase in the number of trains crossing the Mississippi River in the St. Louis area. These bridge crossings are a significant potential bottleneck for both passenger and freight trains. Passenger trains currently can operate over either the Merchants or MacArthur bridges, but predominantly use MacArthur Bridge (See Exhibit 6.1-10 for the location of the two routes into and out of St. Louis.). Exhibit 6.1-11 shows the railroads, major junctions, and freight yards in the St. Louis area.

Existing limitations of the crossing via the Merchants Bridge include restrictions on engine and car size/configuration, meets on the bridge, etc., which currently restrict

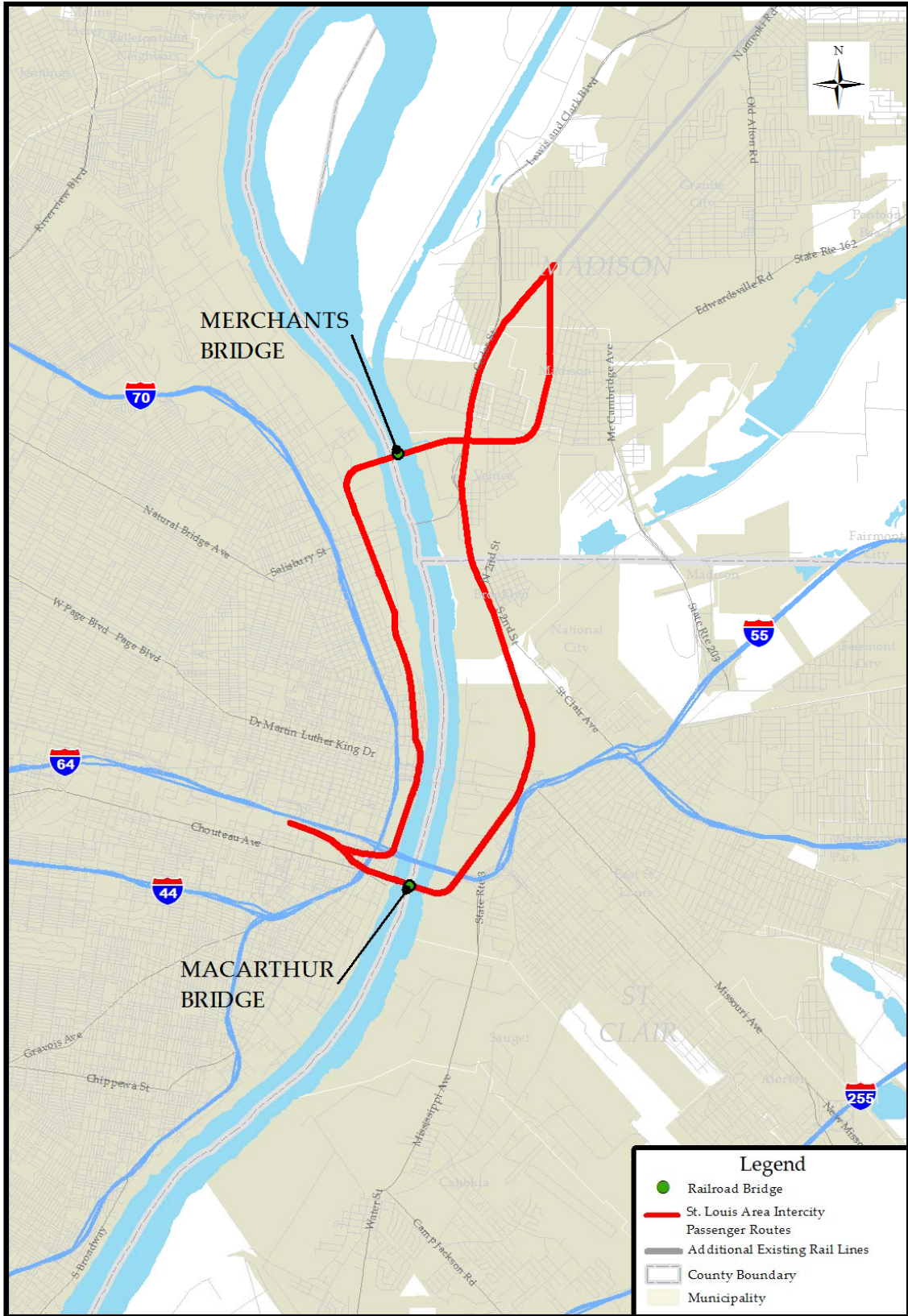


Exhibit 6.1-10. St. Louis Area Intercity Passenger Routes

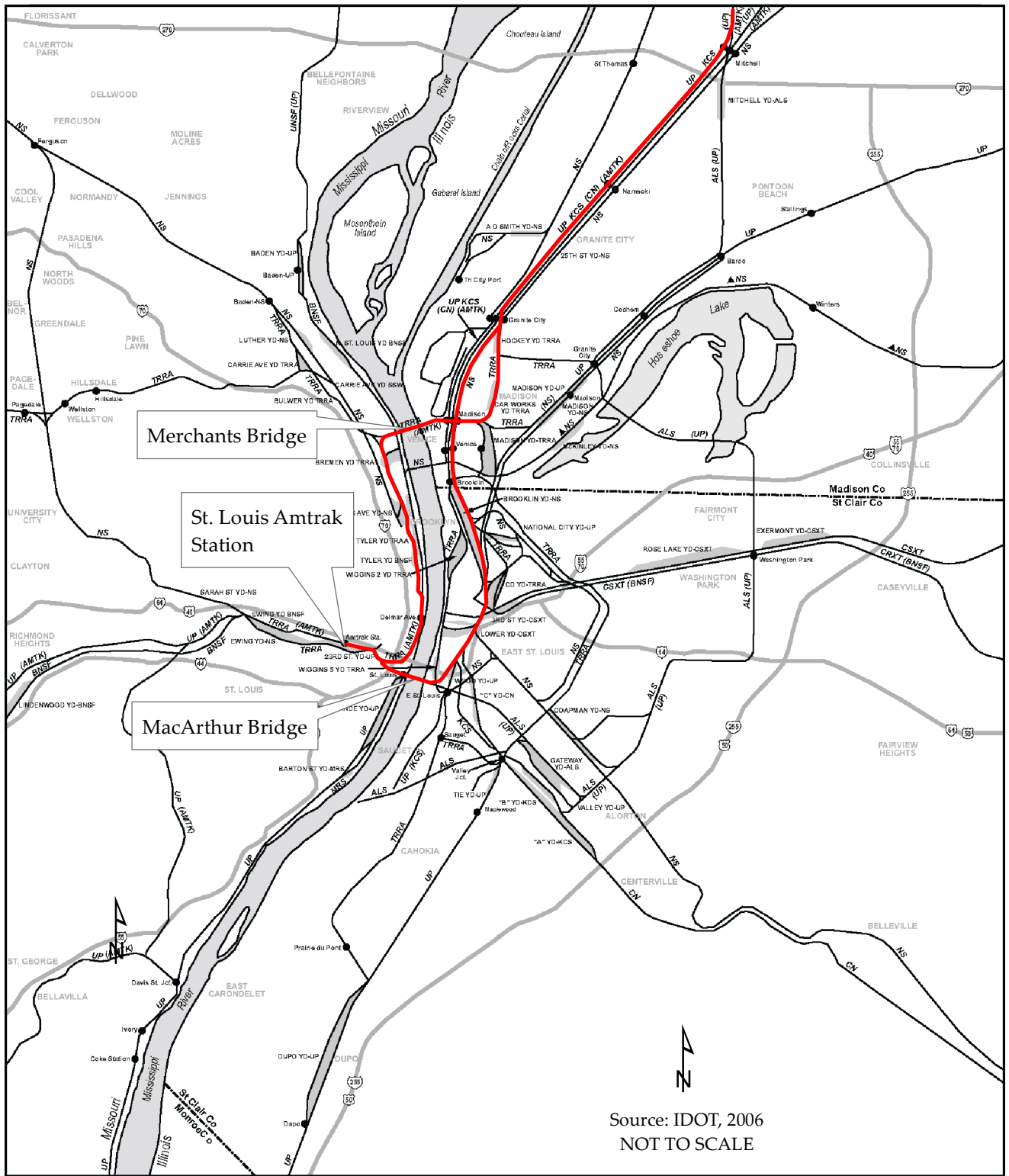


Exhibit 6.1-11 Railroads in the St. Louis Area

traffic flows. The State of Missouri has embarked on a project to improve the west approach to the Merchants Bridge which will start to address bridge limitations. However, there are also several impediments to expedited train flow on the route via the Merchants Subdivision of the TRRA along the west bank of the Mississippi, including Bremen Avenue interlocking and the single track on the elevated structure and under the St. Louis Arch.

By UP's early 2011 estimate, nearly 60 trains per day (including Amtrak) were crossing the MacArthur Bridge, with a further 30 per day (all carriers) using the Merchants Bridge. Examples of the expected 25 percent increase in Class I freight traffic via the Merchants Bridge would include more than 13 NS trains per day originating from Luther Yard in Missouri and several additional BNSF trains per day originating at Lindenwood Yard in Missouri.

As previously noted, the proposed build alternatives must accommodate the proposed high speed passenger service while also supporting the projected freight traffic of the UP and other railroads. To deal with increased freight and passenger traffic at both of these river crossings and to provide some relief on both the Illinois and Missouri sides, at this Tier 1 level of detail, proposed improvements in the St. Louis area include new approaches with added rail capacity and added rail capacity over the Mississippi River at MacArthur Bridge (The need for a new bridge and a determination of ultimate capacity needs will be further evaluated at a future Tier 2 studies.). This is assumed to accommodate additional passenger trains, as well as additional freight trains. The proposed improvements also address train congestion at Poplar South, Gratiot Street and 14th Street, St. Louis by providing new double-track connections to the Amtrak Station. Without additional rail capacity over the Mississippi River, UP estimates that on-time performance for the Chicago to St. Louis intercity passenger trains would drop to below 40 percent.

The reliability of the HSR service in the proposed Build Alternative is dependent on the St. Louis area freight traffic flow to also be reliable and not congested. The Merchants Bridge also will play an important role in serving as an alternative route during maintenance and unexpected disruptions. For these reasons, the Build Alternatives also include substantial improvements needed to increase the utility of the Merchants crossing. This includes providing direct connection from the UP at Venice, replacing the superstructure on the bridge to allow longer and heavier trains to cross it, as well as making improvements to the TRRA along the west side of the Mississippi to expedite train movements. The combination of these improvements will increase capacity and flexibility for routing passenger trains over MacArthur, and freight movements over both bridge crossings. The UP simulations completed thus far for this area do not assume proposed improvements that exactly match what is proposed with the Build Alternatives. The UP simulations do indicate that a MacArthur Bridge routing would

work from an operational perspective. Additional simulation in this area may be required in future Tier 2 studies.

6.1.2.2 Equipment Scheduling

This section presents information regarding equipment needs including trainset requirements, etc. based on the implementation of the complete Midwest high-speed rail network.

No-Build Alternative

Under the No-Build Alternative, six trainsets, each comprising five passenger cars and two locomotives are required to support the proposed operations on the corridor. Four trainsets are required to cover the service and two spare trainsets are required to cover maintenance and other operating needs. These trainsets will be procured with funding provided for the 2004 ROD improvements.

In the No-Build Alternative, no extensive maintenance facilities are planned in St. Louis. Servicing requirements for all 6 corridor trainsets will be handled out of the existing Amtrak-Chicago maintenance facility.

Build Alternatives (Alternatives A and B and Preferred Alternatives C and D)

In the Build Alternatives, additional maintenance facility capacity will be required. The Chicago – St. Louis corridor schedules could be covered with two additional trainsets.

The decision on maintenance facility site and location for Chicago to St. Louis service is related to the same needs for services on other Chicago Hub corridors. A Tier 2 study is proposed to be performed. The Tier 2 study would evaluate and identify a proposed site for the maintenance facility, and the appropriate level of environmental documentation would be prepared in accordance with the National Environmental Policy Act (NEPA). Based on current assumptions, a feasible rotation could be developed for any shop development plan that offers capacity of at least 16 trains per night. The following conclusions were reached regarding the development of shops for maintaining the trains:

- The final choice of shop locations must largely hinge on the availability of reasonably priced real estate in reasonable proximity to the endpoint stations. It is recommended that further study be undertaken to find a better and larger location for the proposed St. Louis shop.
- Based on previous MWRRI analyses, a two-train shop at St. Louis would provide insufficient capacity to meet the needs of the 2014 MWRRS system. A minimum three-train capacity would be needed at St. Louis to increase the system production rate to 16 trains per night.
- The nearby location of Amtrak maintenance facilities to the Chicago terminus for this service would provide for convenient access to servicing and maintenance facilities which will enhance equipment availability and reliability. However, the

current facility cannot support the increased services proposed in the future for the Midwest.

6.1.2.3 Crew Scheduling

The operator of the service would provide train operating crews, crew supervision and crew support. The operator may or may not provide cabin services or station services, pending final contractual arrangements with IDOT. Train operating crews will be qualified for high-speed operations and be rotated for service in accordance with the operator's policies as well as federal laws and regulations. Operation contracts will contain provisions guaranteeing availability of crews to cover the service.

Consist Analysis

No-Build Alternative

In the No-Build Alternative, six sets of 110 mph-capable locomotives and cars suitable for sustained 110 mph operation would operate in the corridor.

Build Alternatives (Alternatives A and B and Preferred Alternatives C and D)

In the Build Alternatives, 12 locomotives and 30 cars would be required. For consistency in appearance, branding, and fleet utilization, all of the HSR trips would be equipped with the new rolling stock. This excludes the Texas Eagle which would continue to operate in the corridor at a maximum speed of 79 mph. These needs are included in the equipment totals noted above.

Standard coaches and business class cars would be available in each train on the Chicago-St. Louis line. Business class seating would be in cars which also provide food service, with the dispensing of food and beverages from an attended counter, as well as seating at tables in a part of the car.

The 110 mph cars would incorporate many new features, including a train monitoring system (to assist in operations and on-line trouble-shooting), passenger emergency intercom provisions, a public address/automated announcement system, bike racks, visual message signs and provisions for the installation of wireless internet. The new cars would also incorporate a global positioning system.

Locomotives to be procured under the FRA High-Speed Intercity Passenger Rail (HSIPR) Program would also incorporate many new features, including compliance with EPA Tier IV emissions. The performance specifications for the new locomotives require strict fuel efficiency and that there be no serious degradation of this performance if the locomotive is used in non-high speed (under 110 mph) service.

Using the 2030 ridership projections with a 100, 150, and 200 percent fare scenarios, the projected annual ridership of 1,707,109 (100% fare, no increase), 1,551,618 (150% fare increase) and 1,391,402 (200% fare increase) is divided by 313 to arrive at a typical day's demand. This results in 5,454 (100% fare), 4,957 (150% fare increase), and 4,445 (200% fare increase) riders per average day. It was assumed that the demand for business class

would be on the order of 7 percent of the daily ridership by the design year, with the balance being in coach class. The business class demand per train is 20-24 riders on average. The coach demand would be 5,072 (100% fare), 4,610 (150% fare increase), and 4,134 (200% fare increase) per average day and when divided by the 16 trains per day, this results in an average load of 317 (100% fare), 288 (150% fare increase), and 258 (200% fare increase) coach passengers per train. Therefore, each consist needs to have one coach-cab car, three straight coaches and one business class/food service car. This would provide a consist with 348 coach seats and 30 business class seats. If eight trainsets are needed to run the build schedule and if 15 to 20 percent spare cars (for maintenance, etc.) by car configuration are provided, the Build Alternatives will require 10 cab cars, 29 straight coaches, and 10 business class/food service cars, for a total of 49 cars.

The Passenger Demand Forecasting Handbook, which is only available to member organizations of the Association of Train Operating Companies, gives an overall guideline that demand may increase by up to 3-4 percent from the types of rolling stock improvements being implemented.

6.1.3 Capital Costs

The capital requirements to initiate the Chicago - St. Louis service are described and quantified within this section. A summary of the start-up capital costs are also provided in this section, along with additional information relative to capital cost estimates for Build Alternatives corridor improvements and operating costs, respectively.

6.1.3.1 Vehicles

No-Build Alternative

Rolling stock, including 12 locomotives and 30 passenger cars are being acquired as part of the 2004 ROD improvements. Each of the six trainsets is assumed to have a locomotive at each end providing traction redundancy, as well as the additional horsepower required to meet the demanding schedules of the HSR corridor. Each trainset would consist of four coaches and one Business Class/Café car.

In all, six of the cars would be of the Business Class/Café variety with the remaining 24 being Coach Class chair cars. Four trainsets would be in operation to provide the three round trips per day while two trainsets would be held for maintenance and operational spares, one at each end of the route.

Build Alternatives (Alternatives A and B and Preferred Alternatives C and D)

The Build Alternatives would require an additional four locomotives and 10 passenger cars (2 Business/Café cars and 8 Coach Class chair cars). This equipment would be purchased new with estimated capital costs as follows in Table 6.1-9.

Table 6.1-9. Chicago to St. Louis Passenger Vehicles

Rolling Stock Equipment Type	Quantity to be Purchased	Unit Cost (Million 2010)	Total Cost (\$Million 2010)
Build Alternatives			
Diesel Locomotive with 110 mph Capabilities	4	\$5.0	\$20.0
Business Class/Café car	2	\$4.0	\$8.0
Coach Class chair car	8	\$4.0	\$32.0
TOTAL Build Alternatives			\$60.0

6.1.3.2 Infrastructure

Permanent Way

The infrastructure improvements to be performed for the Chicago-St. Louis High-Speed Rail Program are cumulative in nature. That is, the 2004 ROD improvements that comprise the No-Build Alternative provide a basis for and support the improvements scheduled for any of the Build Alternatives. The goal of the engineering design for infrastructure improvements is to avoid duplication of construction efforts and to minimize “rework”.

No-Build Alternative

The No-Build Alternative assumes the existing corridor conditions, plus the 2004 ROD improvements and Dwight to Joliet 2011 Environmental Assessment (EA)/Finding of No Significant Impact (FONSI) improvements now funded and under construction. These include adding or expanding passing tracks to minimize delays from off-schedule train meets, improved fencing to discourage trespass on the right-of-way, and upgraded grade crossing protection appropriate and timed for the operations. Provision of HSR service with the 2004 ROD improvements and Dwight to Joliet EA/FONSI improvements includes:

- Reconstruction of main track and related improvements
- Rehabilitation of 13 passing sidings
- Rehabilitation or replacement of stations at Dwight, Pontiac, Lincoln, Springfield, Carlinville and Alton
- Installation of Positive Train Control (PTC) on the Joliet-Q Tower section of line
- Enhanced warning devices at all grade crossings.

The physical improvements covered in the 2004 ROD and Dwight to Joliet EA are located between Joliet and East St. Louis.

Grade crossings that accommodate 110 mph operations are key to the success of passenger rail service. IDOT’s policy is to eliminate redundant or unnecessary crossings where consensus can be reached, and to install the most sophisticated traffic control/warning devices compatible with the location of the crossing. Numerous grade

crossings exist throughout downtown business areas and residential communities where 110 mph operations are essential to the success of the system. Additionally, in many rural areas, secondary roads parallel the railroad right-of-way. The treatment of crossings in close proximity to parallel roadways may include the installation of acceleration and deceleration lanes and/or the installation of traffic signals on the secondary roadway. This highway work has not been included in the capital cost estimates. Humped crossings that minimize sight distance for both train and passenger vehicles and restrict the movements of certain trucks are another challenge that are being addressed by the current 2004 ROD improvements. Four-quadrant gates will be installed.

Implementation of a state-of-the-art signal and communications system is integral to the implementation of 110 mph operations. Improved signaling will increase track throughput and raise the efficiency, productivity and safety of the track as well as meet regulatory requirements that will soon take effect. For 110 mph operations, overlay of state-of-the-art signal and communications system on the existing signal system is required. A state-of-the-art system is necessary to coordinate freight and passenger operations and permit joint service to share the same track. Subject to acceptance by the FRA and freight railroads, it is assumed that Positive Train Control system technology will be applied to all portions of the route with speeds over 80 mph.

The estimated capital costs for the infrastructure improvements associated with these improvements are estimated at \$1,450,956,316.

Under the No-Build Alternative, HSR service would consist of three high-speed round trips per day. The Texas Eagle and one additional Lincoln service round trip will also operate in the corridor. HSR trains will stop at all of the stations currently served by the existing Chicago - St. Louis Amtrak route (i.e., Chicago Union Station, Summit, Joliet, Dwight, Pontiac, Bloomington/Normal, Lincoln, Springfield, Carlinville, Alton, and St. Louis). The existing route will be utilized under the No-Build Alternative throughout the study corridor.

Build Alternatives (Alternatives A and B and Preferred Alternatives C and D)

Improvements would achieve 110 mph corridor for the majority of the distance from Joliet to St. Louis. Due to the more urban setting and the presence of existing Metra stations, improvements for 90 mph operations would be initiated between Joliet and Chicago.

Improvements are assumed to include:

- Construction new second main track where not provided by the No-Build Alternative.
- Completion of PTC installation on new trackage.
- Modifications to four-quadrant gate installations as required to accommodate additional trackage.
- Construction of track and signal improvements between Chicago and Joliet.

- Grade separation from the Norfolk Southern Railroad (NS) at Iles (MP 187.4) (near Springfield).
- Various capability improvements on the Terminal Railroad Association (TRRA) trackage near St. Louis, and on the Chicago – St. Louis routes.
- Second Americans with Disabilities Act (ADA)-compliant station platform installations to accommodate new double track.
- Additional improvements are proposed to address the additional needs in Springfield. These improvements are discussed in Volume II of this Tier 1 Final EIS.

The Build Alternatives include completion of triple track over sections of the selected route between Chicago and Joliet. Exact locations of a third track between Chicago and Joliet will be determined during future Tier 2 studies. The estimated capital costs for the infrastructure improvements required within the Chicago – St. Louis Corridor Build Alternatives is provided in Chapter 3.

Stations

No-Build Alternative

Station improvements are planned under the 2004 ROD improvements or separate projects at all stations within the corridor with the exception of Chicago Union Station, Summit, and the St. Louis Intermodal Center. These station improvements are assumed to be included in the No-Build Alternative. Improvements to the Springfield station are being deferred until decisions are made about the Springfield Rail Improvements Project. A summary of the station improvements included in the No-Build Alternative is provided in Section 3.3.7.3.

Build Alternatives (Alternatives A and B and Preferred Alternatives C and D)

Additional expanded parking and pedestrian grade separations would be required at most locations. This would include improvements at existing Metra stations. The extent of these improvements will be determined and evaluated during future Tier 2 studies.

Maintenance Facilities

No-Build Alternative

Amtrak's existing 16th Street Diesel Shop and 14th Street Coach Shop in Chicago would be used for train servicing when it is required in Chicago. These shops and their associated train storage yards are conveniently located just south of the Chicago Union Station, the proposed Chicago terminus for the new service. The existing shops and yards have adequate existing capacity to perform repairs to the train equipment initially.

Build Alternative (Alternatives A and B and Preferred Alternatives C and D)

For the Build Alternatives, a new maintenance facility would be located in St. Louis. Current facilities cannot handle the volume of trains that would be in service over the route. While land in St. Louis is expected to be more expensive, it was found that moving trains back across the Mississippi River was impractical and would encounter (and cause) traffic congestion at the bridge. A shop at St. Louis would be required to

store and service three trains every night. Additionally, the current Amtrak facility in Chicago cannot support the increased services proposed in the future for the Midwest.

Administrative Facilities

Chicago's Union Station is currently owned and operated by Amtrak, and includes Amtrak administrative offices and facilities. Additional administrative facilities are not anticipated to be required to support the Chicago - St. Louis HSR service.

There are no capital costs associated with the No-Build Alternative. Capital cost estimates for the Build Alternative are provided in Chapter 3.

6.1.3.3 Future Expansion and Growth

No-Build Alternative

There is no future expansion or growth anticipated to be possible with the No-Build Alternative.

Build Alternatives (Alternatives A and B and Preferred Alternatives C and D)

As ridership grows in this corridor and if the expected growth occurs in the intermodal service offered by the UP on this line, there could be a need to provide additional passing tracks or universal crossovers to accommodate the mixed speed trains and additional meets/overtakes that would result. The analysis of locations for these types of facilities would need to be accomplished in the future as service demand patterns emerge.

Passenger demand would dictate the frequency and type of services offered. Possible patterns might include originating trains from stations other than the end points, the introduction of 'super express' trains without intermediate stops, or running limited stop express trains tailored to passenger demand.

All cars and locomotives used in the high-speed service would be compatible with other passenger cars and equipped with couplers, so that cars can be added to the trains to accommodate more passengers as required.

In order to constrain project costs, horizontal and vertical clearances at structures are not being revised in all instances. Clearances are being revised as appropriate to meet existing railroad standards and regulatory requirements. This means that overhead clearances (required to install catenary for traction power distribution) may require structural modifications in the future. However, changes such as electrification of the line and the provision for expansion or improvement beyond the Build Alternatives would be developed later.

6.1.4 Ridership and Revenue Forecast

6.1.4.1 Ridership Forecasts

Ridership forecasts have been updated since the 2003 FEIS and are shown in the tables below. Total rail ridership in the Build Alternatives (Alternatives A and B and **Preferred**

Alternatives C and D) in the year 2030 is projected to range between 1.07 and 1.70 million passengers depending on the fare policies established. Table 6.1-10 shows existing annual ridership by station-pair combination. Table 6.1-11 show estimated annual ridership for Year 2030, also by station-pair combination, for the No-Build Alternative. Tables 6.1-12, 6.1-13, and 6.1-14 show estimated annual ridership for the Year 2030, also by station-pair combination, for the Build Alternatives. At this Tier 1 level of detail, because of the similarities of the alternative routes, ridership is assumed to be the same for all Build Alternatives.

The updated ridership forecasts were developed using mode diversion models that have been previously used in other passenger rail forecasting studies in the U.S. and was adapted for the Chicago – St. Louis corridor. For the purposes of this analysis, ridership projections are assumed to be the same for all of the Build Alternatives since end to end travel times are similar for each alternative, and service would be provided at all of the same stations with the exception of the suburban Chicago station.

Forecasts are prepared separately for business and non-business travel purposes using separate models and input data for each purpose. The service attributes included in the model were time, cost/fare, and frequency with time disaggregated into access, egress, and line haul components. Mode-specific constants account for the unobserved attributes (not explicitly modeled) of the passenger rail service relative to other modes. Reliability, comfort, cleanliness, perception, ability to work, new rolling stock and station amenities were all taken into consideration in determining the value of the mode-specific constant.

The demand forecasting model covers a geographic area that follows the existing Chicago – St. Louis passenger rail corridor and extends approximately 50 miles on each side of the proposed alignments. This study area was then disaggregated into 100 zones each assigned to one of the 11 corridor stations. The in-scope travel market of air, bus, and automobile trips were estimated and disaggregated by trip purpose. Next the

Table 6.1-10. Annual Ridership – Existing (2010)

	Chicago	Summit	Joliet	Dwight	Pontiac	Normal	Lincoln	Springfield	Carlinville	Alton	St. Louis	Total
Chicago	-	93	1,927	2,518	5,646	79,560	5,922	59,783	2,580	16,012	75,420	249,461
Summit	60	-	17	44	117	1,550	126	730	89	289	627	3,649
Joliet	1,767	26	-	269	258	8,487	535	5,374	239	2,075	6,101	25,131
Dwight	2,452	41	239	-	78	521	41	416	99	246	490	4,623
Pontiac	5,617	93	279	38	-	747	40	243	36	106	274	7,473
Normal	79,543	1,955	8,968	614	844	-	1,409	6,272	306	2,325	7,097	109,333
Lincoln	6,670	110	578	70	44	1,169	-	1,421	57	182	578	10,879
Springfield	59,025	818	5,194	407	257	6,264	1,816	-	933	5,966	11,900	92,580
Carlinville	2,676	103	253	111	42	355	43	688	-	147	490	4,908
Alton	15,916	340	2,060	281	124	2,389	171	6,292	194	-	1,246	29,013
St. Louis	74,406	725	6,266	544	280	7,446	573	12,610	460	1,227	-	104,537
Total	248,132	4,304	25,781	4,896	7,690	108,488	10,676	93,829	4,993	28,575	104,223	641,587

Table 6.1-11. Annual Ridership – 2030 No-Build Alternative

	Chicago	Summit	Joliet	Dwight	Pontiac	Normal	Lincoln	Springfield	Carlinville	Alton	St. Louis	Total
Chicago	-	158	3,275	1,104	5,574	107,197	7,922	81,327	3,930	32,418	161,150	404,055
Summit	102	-	29	15	126	1,703	160	1,152	115	320	721	4,443
Joliet	3,003	44	-	457	439	15,511	1,118	9,541	504	3,883	15,046	49,546
Dwight	1,756	18	406	-	133	1,331	39	332	99	284	570	4,966
Pontiac	10,815	133	387	65	-	1,270	63	348	58	274	637	14,049
Normal	124,334	2,736	11,509	1,561	1,435	-	2,395	7,521	426	6,083	13,588	171,588
Lincoln	9,266	147	588	52	65	1,987	-	2,415	74	649	1,012	16,256
Springfield	87,056	1,546	6,768	310	351	7,444	3,087	-	1,586	13,743	20,918	142,809
Carlinville	4,028	158	276	106	66	495	60	1,169	-	250	951	7,561
Alton	31,887	462	4,775	318	269	5,606	596	13,430	330	-	2,118	59,789
St. Louis	149,156	997	18,991	541	591	11,841	937	18,842	646	2,086	-	204,628
Total	421,405	6,398	47,004	4,529	9,048	154,385	16,376	136,079	7,767	59,989	216,710	1,079,690

Table 6.1-12. Annual Ridership – 2030 Build Alternatives (Alternatives A and B and Preferred Alternatives C and D) – Existing (100%) Fare

	Chicago	Summit ¹	Joliet	Dwight	Pontiac	Normal	Lincoln	Springfield	Carlinville	Alton	St. Louis	Total
Chicago	-	244	5,053	1,422	7,083	165,153	10,218	120,310	5,156	53,321	276,908	644,868
Summit	157	-	45	20	162	2,181	208	1,435	153	431	1,004	5,797
Joliet	4,633	68	-	705	676	23,547	1,421	14,726	652	5,824	24,667	76,920
Dwight	2,280	23	627	-	205	1,695	50	429	129	370	768	6,574
Pontiac	13,931	170	487	100	-	1,959	79	442	75	347	836	18,426
Normal	195,166	3,483	16,212	1,975	2,213	-	3,694	11,742	541	9,608	22,038	266,672
Lincoln	12,078	192	752	67	81	3,065	-	3,726	93	824	1,306	22,182
Springfield	130,134	1,917	10,044	396	444	11,562	4,762	-	2,446	20,976	32,786	215,466
Carlinville	5,299	209	351	137	84	627	76	1,804	-	385	1,208	10,181
Alton	53,254	604	6,900	404	344	8,859	757	20,539	509	-	3,267	95,438
St. Louis	258,936	1,349	29,535	707	767	19,120	1,200	28,935	818	3,217	-	344,585
Total	675,868	8,258	70,004	5,934	12,061	237,769	22,466	204,088	10,572	95,304	364,787	1,707,109

1. Ridership forecasts in this table include the Summit Station along Alternatives A and B. Alternatives C and D would utilize a new suburban station. For the purposes of this study, it is assumed that ridership at the new suburban station would be similar to the ridership projected for Summit. The ridership forecasts do not assume a new suburban St. Louis station. A new suburban St. Louis Station is possible in the future and would be subject to a Tier 2 study.

Table 6.1-13. Annual Ridership – 2030 Build Alternatives (Alternatives A and B and Preferred Alternatives C and D) – 150% Fare

	Chicago	Summit ¹	Joliet	Dwight	Pontiac	Normal	Lincoln	Springfield	Carlinville	Alton	St. Louis	Total
Chicago	-	222	4,595	1,335	6,709	152,918	9,310	109,203	4,564	47,248	246,725	582,830
Summit	143	-	41	18	152	1,944	183	1,264	132	365	831	5,073
Joliet	4,214	62	-	642	615	22,415	1,296	13,624	576	5,373	23,479	72,296
Dwight	2,128	21	570	-	186	1,602	46	385	113	315	652	6,018
Pontiac	13,152	159	467	91	-	1,781	76	418	66	315	753	17,277
Normal	180,087	3,123	15,545	1,869	2,013	-	3,360	11,376	509	8,923	20,601	247,405
Lincoln	11,021	168	688	62	77	2,788	-	3,389	89	767	1,227	20,276
Springfield	117,300	1,679	9,364	356	418	11,196	4,331	-	2,225	20,265	31,382	198,517
Carlinville	4,695	182	309	120	77	588	73	1,641	-	351	1,184	9,221
Alton	47,328	528	6,484	354	310	8,234	700	19,838	463	-	2,971	87,209
St. Louis	225,767	1,134	27,726	604	678	17,561	1,108	27,215	778	2,926	-	305,497
Total	605,836	7,278	65,788	5,449	11,235	221,027	20,484	188,353	9,515	86,848	329,805	1,551,618

1. Ridership forecasts in this table include the Summit Station along Alternatives A and B. Alternatives C and D would utilize a new suburban station. For the purposes of this study, it is assumed that ridership at the new suburban station would be similar to the ridership projected for Summit. The ridership forecasts do not assume a new suburban St. Louis station. A new suburban St. Louis Station is possible in the future and would be subject to a Tier 2 study.

Table 6.1-14. Annual Ridership – 2030 Build Alternatives (Alternatives A and B and Preferred Alternatives C and D) – 200% Fare

	Chicago	Summit ¹	Joliet	Dwight	Pontiac	Normal	Lincoln	Springfield	Carlinville	Alton	St. Louis	Total
Chicago	-	199	4,114	1,251	6,348	141,340	8,468	98,660	4,030	41,601	208,547	514,557
Summit	128	-	36	17	142	1,729	160	1,112	114	306	682	4,426
Joliet	3,773	56	-	574	551	21,323	1,180	12,588	506	4,935	20,767	66,253
Dwight	1,985	20	510	-	167	1,511	42	346	99	266	529	5,475
Pontiac	12,407	147	447	81	-	1,595	73	394	57	286	650	16,139
Normal	165,822	2,795	14,904	1,768	1,802	-	3,008	11,017	479	8,272	18,537	228,403
Lincoln	10,039	147	628	57	74	2,496	-	3,034	85	714	1,108	18,381
Springfield	104,965	1,465	8,725	320	394	10,838	3,877	-	1,992	19,584	28,912	181,072
Carlinville	4,147	159	272	105	70	552	70	1,469	-	314	1,115	8,272
Alton	41,782	458	6,066	308	279	7,641	647	19,140	414	-	2,660	79,396
St. Louis	195,101	941	25,844	512	596	16,091	1,022	25,561	739	2,620	-	269,027
Total	540,148	6,385	61,546	4,994	10,422	205,116	18,548	173,321	8,516	78,898	283,508	1,391,402

1. Ridership forecasts in this table include the Summit Station along Alternatives A and B. Alternatives C and D would utilize a new suburban station. For the purposes of this study, it is assumed that ridership at the new suburban station would be similar to the ridership projected for Summit. The ridership forecasts do not assume a new suburban St. Louis station. A new suburban St. Louis Station is possible in the future and would be subject to a Tier 2 study.

future market growth was estimated using forecast socio-economic trends and assumptions regarding the sensitivity of changes in trip making behavior with respect to these trends. The Level of Service (LOS) characteristics for each mode and zone pair were then estimated taking into account the in-vehicle time, frequency of service, fare, and time/cost needed to access and egress the mode's station from the trip's actual origin and destination respectively. For a trip by automobile, this takes into account the origin-destination travel time (including any delays due to road congestion) and vehicle operating costs (primarily the cost of gasoline). The potential diversion from the air, bus and auto modes to the proposed new rail service was then estimated using the LOS characteristics calculated in the previous step and the established mode diversion models.

The level of induced demand was then estimated, which includes new inter-urban trips that are not made in the no-project situation, but that occur as a result of the improved service provided by the proposed program. The total updated rail ridership for any given year is then the sum of the existing rail ridership grown to that particular year, the diverted trips to rail from the auto, air and bus modes and the induced rail trips. The estimated farebox revenue is then calculated by multiplying the total rail ridership at the station pair level by the corresponding fare assumptions (separate for business and non-business) used for the new rail service. Note that the level of ridership is also sensitive to the level of fare.

6.1.4.2 Revenue Forecasts

The projected ticket revenues for both the No-Build Alternative and the Build Alternatives (Alternatives A and B and **Preferred Alternatives C and D**) are shown in Table 6.1-15. Ticket revenue is assumed to be the same for all build alternatives. Primary revenue sources are ticket sales and fees from station concession licenses. Other sources are profits from on-board services (food and beverage), express package services, parking fees and profits from station development.

In addition to full fares, a series of market-specific promotional and discount fares could be established to fill off-peak trains and encourage certain segments of the population, in particular students and senior citizens, to travel at off-peak times. A variety of travel cards and other promotional ticketing systems would also be developed to further promote widespread use of the service.

The ridership and revenue forecasts assume that for each fare scenario the prices increase at the rate of inflation and are the same in real terms for each of the forecast years. The 100 percent fare scenario assumes fares will be priced for each station – station pair at the average real price paid in FY2010.

Additional revenue might be made available through concessions at station locations, depending upon the passenger volume. Food service, ranging from light snacks and beverages up to fine dining can be provided depending on station size, location and neighborhood.

Table 6.1-15. Ticket Revenue Forecasts (in 2010 dollars)

Scenario	Fare	2010		2015		2030		Growth	
		Annual Ridership	Revenue (2010 \$)	Annual Ridership	Revenue (2010 \$)	Annual Ridership	Revenue (2010 \$)	Ridership (2010-2030)	Revenue (2010-2030)
Existing	100%	641,587	15,536,301	-	-	-	-	-	-
No-Build	100%	-	-	841,988	20,768,320	1,079,690	27,083,316	68%	74%
	150%	-	-	746,764	25,868,937	953,649	33,598,733	49%	116%
	200%	-	-	660,845	29,275,595	841,225	37,905,834	31%	144%
Build (A, B, C, D)	100%	-	-	-	-	1,707,109	41,375,656	166%	166%
	150%	-	-	-	-	1,551,618	52,862,106	142%	240%
	200%	-	-	-	-	1,391,402	60,671,370	117%	291%

6.2 Travel Benefits

6.2.1 No-Build Alternative

6.2.1.1 Travel Time, Frequency, and Reliability

Existing passenger rail travel time between Chicago and St. Louis ranges from five hours and 20 minutes to five hours and 57 minutes. Under the No-Build Alternative, passenger rail travel time is expected to range from four hours and 30 minutes and four hours and 45 minutes as a result of implementation of the 2004 ROD improvements. This travel time is greater than the ultimate goal for the HSR service from Chicago to St. Louis corridor of under four hours.

Rail communication and signal systems will be upgraded with the 2004 ROD improvements, which will improve some of the reliability and on-time performance issues. However, the limited capacity (i.e., the single track through most of the corridor) would continue to affect reliability and on-time performance and limit the ability to add additional trains through the corridor.

With limits on travel time, passenger rail capacity, and reliability that remain with the No-Build Alternative. Ridership in 2030 is forecast to be approximately 1.1 million passengers with the No-Build Alternative, an increase of over 400,000 passengers compared to existing conditions.

6.2.1.2 Safety

Overall passenger safety in the corridor will increase in that the passenger miles traveled by rail in the corridor is expected to rise to 203 million passenger miles from the existing 114 million passenger miles. Passenger miles were developed using the ridership forecasts developed for this program (See Section 5.3). To the extent that this increase represents a diversion from automobile travel, the safety risk to travelers will decrease in that rail travel is safer than automobile travel based on information presented in Section 2.3.2 of the Purpose and Need.

However, fewer passengers are expected to divert under the No-Build Alternative compared to the Build Alternatives, which would have overall travel times that are expected to be substantially shorter than automobile travel times.

6.2.2 Build Alternatives (Alternatives A and B and Preferred Alternatives C and D)

6.2.2.1 Travel Time, Frequency, Reliability

Rail passenger travel time between Chicago and St. Louis would decrease from a range of four hours and 30 minutes to four hours and 45 minutes, to three hours and 51 minutes to four hours and 10 minutes. The Build Alternatives could therefore result in an additional 35- to 39-minute travel time savings compared to the No-Build Alternative.

With the Build Alternatives, three additional passenger round trips would be operated daily. The Build Alternatives would include the addition of a second track through most of the corridor (Dwight to St. Louis), rail-to-rail grade separations, and added capacity north of Joliet, as well as associated signal improvements. These features would address the reliability-related issues due to train interference that are not addressed by the No-Build Alternative.

6.2.2.2 Safety

Overall passenger safety in the corridor will increase in that the annual passenger miles traveled by rail in the corridor is expected to rise to 328 million passenger miles (Year 2030) from the existing 114 million passenger miles. This is 125 million passenger miles greater than with the No-Build Alternative. Passenger miles were developed using the ridership forecasts developed for this program (See Section 5.3). To the extent that this increase represents a diversion from automobile travel, the safety risk to travelers will decrease in that rail travel is safer than automobile travel. Annual passenger miles by automobile are projected to decrease by 118 million passenger miles compared to the No-Build Alternative.

With additional trains operating in the corridor, the possibility of train collisions is increased. However, the implementation of a state of the art signaling system would mitigate this risk.

6.2.2.3 *Additional Travel Benefits*

Improvements to passenger rail service improve its competitiveness with other modes of travel. When compared to the other transportation modes, the Build Alternatives would provide more access to intermediate markets along the corridor except for automobile travel, which currently provides access along the entire corridor via the interstate interchanges. Between Chicago and St. Louis, the Build Alternatives would provide improved access to nine intermediate markets via the train stations while air and bus travel currently provides access to only two markets (Bloomington/Normal and Springfield). With regard to trip service, the Build Alternatives would provide for safe use of cell phones and internet access for diverted automobile drivers. As for air travel, although cell phone and internet access is available at airports, there are more restrictions/limitations regarding their use during flight. With regard to cost and service, Build Alternatives would provide higher quality service than bus travel and rail service under the No-Build Alternative at a lower cost than air travel.

6.3 Impacts to Freight Rail Service

6.3.1 No-Build Alternative

The No-Build Alternative includes conditions as exist in 2012, plus the completion of construction of track upgrades, capacity improvements, and signal improvements between Joliet and St. Louis per the 2004 ROD improvements and 2011 Dwight to Joliet EA (See Section 3.2.1.). IDOT and UP have coordinated extensively on these changes so that the projected freight, as well as the No-Build Alternative's intercity passenger service, can operate with current or improved reliability relative to existing conditions.

6.3.2 Build Alternatives (Alternatives A and B and Preferred Alternatives C and D)

Implementation of a Build Alternative is not expected to result in a change in the number of freight trains operating in the Chicago - St. Louis corridor. Freight traffic is more dependent on markets and demand than capacity. Some freight train scheduling modifications would be required to prevent conflicts with passenger rail service proposed for the Build Alternatives. The increased frequency of passenger trains will further restrict freight movements, so capacity and other improvements will be required to accommodate both freight and passenger service. Between Chicago and Joliet, there is more freight train activity on the CN line (Section 1) than on the Metra Rock Island District (**Preferred Section 2**). Through Springfield, there would be less freight train activity on the 3rd Street corridor (Section 4) than on the 10th Street corridor (Section 5). Infrastructure improvements are included in the Build Alternatives so that freight train reliability is not reduced by the program.

Similar to the No-Build Alternative, IDOT and UP have coordinated extensively regarding infrastructure improvements as a part of the Build Alternatives that would be required to serve both projected freight service and proposed increases in the frequency and speed of intercity passenger trains. This coordination was documented in IDOT's HSIPR applications submitted to FRA in 2009 and has continued since funding for the

Chicago to St. Louis HSR corridor was awarded. UP and CN have completed simulation analyses for the portions of the corridor under their jurisdiction to identify capacity and signal improvements that would be required to improve reliability and allow for increased speed for intercity passenger trains.

6.4 Impacts to Commuter Rail Service

6.4.1 No-Build Alternative

Commuter rail service in the Chicago area currently operates on Sections 1 (Metra Heritage Corridor) and 2 (Metra Rock Island District). No other commuter rail service operates in the corridor. Preliminary Metra data for March 2011 and 2012 was reviewed to determine consist lengths and utilization, as well as ridership trends for the Heritage Corridor and the Rock Island District. Heritage Corridor ridership declined by 2.2 percent from March 2011 (2,642 riders) to March 2012 (2,585 riders). Overall weekday ridership (including peak, reverse peak, midday and evening totals) on the Rock Island District increased by 1.4 percent from 30,105 riders in March 2011 to 30,564 riders in March 2012. Saturday, Sunday and Holiday ridership also increased over this same period for the Rock Island District trains.

In summary, Metra has no plans for changing or expanding the existing service along Metra's Rock Island District, used by Alternatives C and D. There is also no intercity passenger service currently operated via the Metra Rock Island District. For alternatives A and B (using Metra Heritage Corridor north of Joliet), Amtrak service in the No-Build Alternative will remain largely similar to the current service, with the operation of five Amtrak round trips. Metra does have plans to expand service along the Metra Heritage Corridor, possibly adding six trains per day and adding a new station between Lemont and Lockport. The assumed capacity improvements for the high speed service will be developed further in the Tier 2 process to provide appropriate additional capacity, but not for the additional commuter service. Further improvements (crossovers, segments of new trackage, etc) could be developed and analyzed to support the future additional commuter rail service.

Existing operation on the Metra-Heritage Corridor consists of 3 inbound AM peak-period suburban trains leaving Joliet on a 40-minute headway between 5:45 a.m. and 7:05 a.m., weekdays only. There are four intermediate stops, and all trains make all stops. This equates to an average station spacing on the order of 9.3 miles. All three inbound trains are scheduled to make the trip in 1 hour, 5 minutes, for an average speed of 34.2 mph. Outbound PM peak service consists of three trains, again making all stops on the line to Joliet. These trains depart the South Concourse of Chicago Union Station between 4:50 p.m. and 6:12 p.m.; the headway varies between 35 and 50 minutes. All trains are scheduled to make the outbound trip in 62 minutes, for an average speed of 35.8 mph. With regard to capacity utilization, Heritage Corridor trains 914 and 921 are a 3-car consist, trains 916 and 919 are a 5-car consist and trains 917-918 are a 6-car consist. According to preliminary March 2012 data the average load on these six trains was 61.4 percent of the available seated capacity.

All trains on the Metra-Heritage Corridor are kept overnight and on weekends in the Metra-Joliet Yard, which also serves that carrier's Rock Island District trains. There is no weekend or Holiday Metra service on the Heritage Corridor. Stations in common with Amtrak "Lincoln Service" trains include Joliet and Chicago Union Station. Seven of the eight "Lincoln Service" trains also stop at the Summit station, which serves the southwest side of Chicago.

As noted above, there are eight daily "Lincoln Service" trips and two "Texas Eagle" trips which operate via the Heritage Corridor. These are timed to occur throughout the day. "Lincoln Service" trains are scheduled to depart from Chicago Union Station's South Concourse at 0700, 0925, 1715 and 1900. The outbound "Texas Eagle" leaves Chicago at 1345. Inbound "Lincoln Service" trains are scheduled in Joliet at 0859, 1119, 1926 and 2002. The inbound "Texas Eagle" is due in Joliet at 1256. All Amtrak trains operate seven days per week. "Lincoln Service" trains are generally made up of a combination of Amfleet and Horizon type cars; the "Texas Eagle" is composed of Superliner cars. Amtrak GE P42DC diesels operate on all trains.

Running times vary by stopping pattern and by time of day/other traffic on the line. Trains 303, 305 and 307 each make the Summit stop, but are scheduled to traverse the Heritage Corridor in 50 minutes, working out to an average speed of 44.4 mph. Train 301 runs express past Summit, but is scheduled to make its AM reverse peak trip in 57 minutes, for an average speed of 38.9 mph. The longest travel time allotted to "Lincoln Service" trains on the Heritage Corridor is the 74 minutes given to train 304, which makes a run into Chicago following the PM rush. This train averages 30 mph. The other Amtrak trains operating on this corridor fall within this general range. There is considerable congestion from 21st Street on into Union Station, particularly in the peak periods. Freight traffic (both intersecting and along the Heritage Corridor) can also affect the running time of the passenger trains via this routing.

Existing weekday Metra operation on the Rock Island District consists of 35 scheduled inbound suburban trains leaving either Joliet or Blue Island and operating via either the mainline or the suburban line between Blue Island to Gresham. Each weekday, 23 scheduled trains leave Joliet between 5:00 a.m. and 10:30 p.m. Of these, 13 trains run from Joliet to Chicago on the mainline, while the other 10 trains are routed on the suburban line from Joliet to Chicago (generally, this routing is used midday and in the evening). One inbound train (leaving Blue Island) is routed via the mainline to Chicago, while an additional 11 trains per weekday are routed via the suburban line between Blue Island and Gresham. All 35 inbound trains use the same tracks between Gresham and LaSalle Street station.

Existing weekday Metra operation on the Rock Island District consists of 34 scheduled outbound suburban trains leaving LaSalle Street Station, Chicago (between 6:00 a.m. and 10:00 p.m.) and operating via either the mainline or the suburban line between Gresham and Blue Island. Of these 34 scheduled departures, 11 trains each run from Chicago to Joliet via the mainline or the suburban line. One outbound train is routed via the

mainline to Blue Island, while an additional 11 trains per weekday are routed via the suburban line between Gresham and Blue Island.

In addition to the scheduled Metra passenger trains that provide commuter service, there are other train movements that need to be considered. First, Metra operates a number of deadhead trains along the route. Second, one of the CREATE projects, if implemented, will shift the Metra SouthWest Service trains to the Rock Island District route. The combination of additional service and deadhead trains will increase the number of Metra trains operating on the route by 53.

This does not include deadhead (non-revenue trains). Metra-Rock Island District trains are stored and serviced at the 47th Street Shops. This means that there are several deadhead trips each weekday between 47th and LaSalle Street Station to prepare for rush service. In addition, since 47th Street is also Metra's main overhaul shops, there may be other deadhead moves bringing shopped or newly-accepted equipment from 47th Street to connections with other rail carriers in Chicago. Along the Metra Rock Island District, less service is provided on the weekends compared to the weekdays. Overnight and weekend storage/servicing of Rock Island District consists is done at Metra's Joliet Yard, which is just east of the Joliet Union Depot, where the Metra-Rock Island District crosses the UP and BNSF lines.

Preliminary March 2012 data for the Rock Island District (considering 35 inbound revenue trains and 34 outbound revenue trains, as well as 5 deadhead trains in each direction) indicates that there is one 10-car train on the line and that there are three 5-car consists operated. All other trains are in this range of capacities. Inbound trains during March 2012 operated with a total of 286 cars, of which 172 were open for passenger occupancy. The average load per train was 58.7 percent of the available seated capacity. Outbound trains in this same time period operated with 279 cars, of which 169 were open for passenger occupancy. The average load per train was 61.8 percent of the available seated capacity.

6.4.2 Build Alternatives (Alternatives A and B and Preferred Alternatives C and D)

Implementation of a Build Alternative would not result in changes in the number of commuter trains operating daily. For the design year of 2030, the Metra service on Section 1 is assumed to expand by six trains per day per current Metra plans. For the design year of 2030, commuter rail service frequency and capacity was assumed to be the same as today on **Preferred Section 2** since ridership has been relatively flat for the last 10 years and the average load per commuter train ranges between was 58.7 percent to 61.8 percent for both sections, and there are no current Metra plans to expand service. However, as part of the Chicago Region Environmental and Transportation Efficiency (CREATE) Program, there are plans to potentially shift the Metra SouthWest Service trains over to the Rock Island District line (**Preferred Section 2**). Future Tier 2 studies will further evaluate intercity passenger and commuter operations through Section 2 and determine the required capacity improvements.

Under the Build Alternatives, additional intercity passenger trains would operate, potentially affecting commuter rail service. Commuter rail schedules were evaluated to determine how much of an affect the Build Alternatives would have on commuter service.

Build Alternative operations in the Section 1 (Alternatives A and B) would operate on the same tracks as the Metra Heritage Corridor Line between Chicago Union Station and Joliet. This is the route currently used by Chicago to St. Louis trains. Therefore, under the Build Alternatives A and B an additional eight intercity passenger trains would be operating along Section 1. Build Alternative operations in Section 2 (**Preferred Alternatives C and D**) would operate with Metra Rock Island District service (and potentially shifted SouthWest service) between 40th Street and Joliet. Under **Preferred Build Alternatives C and D**, 18 intercity passenger trains would be added along Section 2. Section 6.1.2.1 includes a discussion of how the proposed HSR service would operate with Metra commuter service between Chicago and Joliet.

6.5 Impacts to Rail Service During Construction

6.5.1 No-Build Alternative

Under the No-Build Alternative, construction will be limited to regular maintenance activities, and improvements as planned by the 2004 ROD improvements. Therefore, impacts to railroad operations will be minimal.

6.5.2 Build Alternatives (Alternatives A and B and Preferred Alternatives C and D)

Permission and participation from the railroad owners would be obtained for all construction that would take place within the railroad right-of-way. In general, construction activities for corridor improvements would affect rail traffic by reducing operating train speeds through the construction zones, adding to rail travel time and, in turn, cost. This would occur when adding new siding tracks, double-tracks, and connection tracks, upgrading signals, and modifying grade crossings. The other impact would be schedule adjustments for existing operations to create windows of opportunity for temporary shutdown of rail operations on selected track sections, such as when the new turnouts are being placed for the passing sections and new sidings, or when there is a potential safety risk, such as during the construction of a flyover. During construction, there may be track outages that would interrupt intercity passenger rail service. As necessary, bus service would be provided along the corridor to replace intercity passenger rail service lost during construction.

6.6 Impacts at Highway-Rail Grade Crossings

6.6.1 No-Build Alternative

Based on the 2004 Record of Decision and 2011 EA, at-grade highway-rail crossings through most of Sections 3 through 7 (Joliet to East St. Louis) will be upgraded to provide four-quadrant gates and roadway configuration/approach improvements based

on crossing diagnostics. Under the No-Build Alternative, no further modification to grade crossing warning devices in the study corridor would be made.

6.6.2 Build Alternatives (Alternatives A and B and Preferred Alternatives C and D)

Under the Build Alternatives, modifications or further improvements to the four-quadrant gates would be installed at all of the public highway-rail grade crossings. See Appendix E for a complete listing of crossings and the proposed crossing warning device. For crossings already equipped with four-quadrant gates, improvements to accommodate the upgraded service may be required. For example, where additional tracks are to be added, crossing surfaces, gates, and other equipment would be relocated and redesigned to account for the additional track.

The Build Alternatives would increase vehicular delay at highway-rail grade crossings for the following reasons:

- **Additional intercity passenger rail service:** Gate down time would increase because the number of passenger trains operating in the corridor would increase from 10 per day to 18 per day.
- **Increase in advance warning time:** All crossings will be equipped with constant warning time. Currently, crossing gates are activated approximately 20 to 30 seconds prior to a train reaching the grade crossing. For high-speed passenger trains, crossing gates are planned to activate 80 seconds before a train reaches the crossing. This increase in time would cause additional vehicular delay for motorists using the highway-rail grade crossing. This part of implementation of the 2004 ROD improvements was coordinated with the Illinois Commerce Commission and FRA.
- The combination of additional trains and longer gate down times would increase the amount of time that a crossing is blocked by approximately 20 minutes per day.
- Every highway-rail crossing in the study corridor was evaluated for its suitability for grade separation. This analysis is also included in Appendix E. Potential grade separation locations were identified based on setting (urban or rural) and their predicted exposure factor, a function of train and vehicular volumes. At the conclusion of this evaluation, 101 crossings were identified in the study corridor for potential grade separation, which would be evaluated further during Tier 2 analysis.

6.7 Impacts to Vehicular Traffic During Construction

6.7.1 No-Build Alternative

No construction would occur with the No-Build Alternative.

6.7.2 Build Alternatives (Alternatives A and B and Preferred Alternatives C and D)

Vehicular traffic would be temporarily affected at locations where grade crossings will be separated, modified, or improved. While the exact construction zones are not known

at this time, temporary lane closures or roadway closures will be required to construct the some of the proposed improvements. The grade crossing improvements would, at a minimum, require traffic to slow down as it passes through the construction zone while new warning devices and other improvements are installed. In some cases, temporary diversion of traffic to adjacent crossings could be required.

Construction of grade separations would be staged to minimize street closures. This would be accomplished primarily by closing the outside lanes during retaining wall and bridge abutment construction while maintaining traffic on the inside lanes. The adjacent parallel streets would be used for detour traffic during street closures. Another option is to construct a temporary detour around the construction site. This would reduce the amount of adverse travel but add to the total project cost.

Where impacts to vehicular traffic exists, emergency services, schools, businesses, and other activities requiring vehicular access would be affected by potential delays or detours. However, construction related impacts on vehicular traffic would be temporary. Traffic maintenance planning would be coordinated with schools and emergency service providers.

6.8 Station Access and Parking

Concept plans have been developed for the stations in Dwight, Pontiac, Lincoln, Carlinsville, and Alton for both the 2004 ROD improvements and full build improvements, which are included as part of the Build Alternatives evaluated in this Tier 1 Final EIS. Additionally, under separate projects station improvements are being pursued through local initiatives in Joliet, Bloomington/Normal, and Alton. The 2004 ROD improvements and the station improvements in Joliet and Bloomington/Normal will be implemented as separate projects independent of this program. As a result, they are not included as part of the Build Alternatives for this Tier 1 Final EIS. For the purpose of this evaluation, the station access and parking for the Tier 1 Final EIS Build Alternatives were compared to the 2004 ROD improvements and not existing conditions. Development of the concept plans considered projected ridership when determining the number of parking spaces to be provided and considered vehicular circulation. A summary of proposed station improvements is provided in Section 3.3.7.3.

6.8.1 No-Build Alternative

No station improvements or modifications are included with the No-Build Alternative.

6.8.2 Build Alternatives (Alternatives A and B and Preferred Alternatives C and D)

6.8.2.1 *Dwight Station*

The Build Alternatives would not result in any changes to access to the station, with West Main Street and East Main Street still representing the main points of access. With

regard to parking, depending on the concept plan implemented, the parking configuration and number of parking spaces would remain the same or result in a relatively minor reduction in parking spaces. It is anticipated that the proposed parking spaces would be sufficient to accommodate the increase in ridership and that there would be no access or traffic congestion problems associated with the Build Alternatives.

6.8.2.2 Pontiac Station

The Build Alternatives would not result in any changes to access to the station, with Washington Street and Water Street still representing the main points of access. With regard to parking, depending on the concept plan implemented, the parking configuration and number of parking spaces would remain relatively the same on the southeast side of the train station. The Build Alternatives, however, would involve a proposed parking expansion on the northwest side of the station at the corner of Ladd Street and Water Street. It is anticipated that the proposed parking spaces would be sufficient to accommodate the increase in ridership and that there would be no access or traffic congestion problems associated with the Build Alternatives.

6.8.2.3 Lincoln Station

The Build Alternatives would not result in any changes to access to the station, with Sangamon Street and Chicago Street still representing the main points of access. With regard to parking, depending on the concept plan implemented, the parking configuration and number of parking spaces would remain relatively the same with the exception that the Build Alternatives would provide additional parking spaces along Sangamon Street and one of the concept plans would also provide additional parking spaces on the southeast side of the station at the corner of Chicago Street and Pekin Street. It is anticipated that the proposed parking spaces would be sufficient to accommodate the increase in ridership and that there would be no access or traffic congestion problems associated with the Build Alternatives.

6.8.2.4 Carlinville Station

Under the Build Alternatives, no changes would be made to the station access and parking. It is anticipated, that the parking spaces proposed under the 2004 ROD improvements would be sufficient to accommodate the increase in ridership and that there would be no access or traffic congestion problems associated with the Build Alternatives.

6.8.2.5 Alton Station

The Build Alternatives would not result in any changes to access to the new station location proposed with the 2004 ROD improvements, with Crossroads Court still representing the main point of access. With regard to parking, the Build Alternatives would expand the parking lot to the northeast. It is anticipated that the proposed parking spaces would be sufficient to accommodate the increase in ridership and that there would be no access or traffic congestion problems. The City of Alton also received a Transportation Investment Generating Economic Recovery (TIGER) grant that would be used to relocate the Alton train station to a different location.

6.8.2.6 Other Existing Station Locations

With regard to the Springfield Station, there are currently two alternative routes being evaluated in this area as part of this Tier 1 Final EIS. The Springfield Rail Improvements Project Tier 2 Environmental Evaluation studies these routes in greater detail and is included as Volume II of this Tier 1 Final EIS. Depending on which corridor is identified as the Preferred Alternative, either a new station at a new location would need to be developed or the existing station would be renovated. One of the Build Alternatives retained in the Tier 1 uses the existing station location. Thus, concept plans for a station at this location have not been developed yet. Sufficient sites exist along both corridors to provide station improvements. Potential impacts associated with station improvements in Springfield are evaluated in the Tier 2 Environmental Evaluation.

As for the Joliet and Bloomington/Normal Stations, any access and/or parking improvements to these stations will be evaluated as separate projects and, therefore, are not considered in this Tier 1 Final EIS. However, it is anticipated that the parking to be provided under these separate projects would be sufficient to accommodate the increase in ridership and that there would be no access or traffic congestion problems.

No improvements are included in the Build Alternatives that would change the access and/or parking at the Chicago, Summit, and St. Louis stations. Existing station features would be sufficient to accommodate the increase in ridership and that there would be no access or traffic congestion problems.

6.8.2.7 Potential New Station Locations

Potential new stations will be evaluated in suburban Chicago (between Chicago and Joliet) and St. Louis (between St. Louis and Alton). If this program moves forward, the potential location for these stations would be evaluated in Tier 2 studies. It is assumed that the location of new stations would be easily accessible from the highway and arterial system. Provision of suburban stations adjacent to the highway system would increase the attractiveness of intercity passenger rail service because it will enhance passenger accessibility to HSR service, allowing potential travelers an additional option of not travelling to downtown to board a train. Between Chicago and Joliet, use of an existing Metra station also would be considered. Additional information regarding potential new station locations is provided in Section 3.3.7.3.