Iowa State Rail Plan Final

Chapter 4

Proposed Freight Rail Improvements and Investments

IOWA DOT

Contents

4.1 Introduction

The purpose of Chapter 4 of the Iowa State Rail Plan is to:

- Identify recent improvements and investments made or being made to the Iowa railroad network by the state's railroads and the state and investment trends generally, to the extent known through coordination with railroads and Iowa DOT and through analysis of publically available data during development of the Iowa State Rail Plan.
- Describe possible future railroad improvements and investments that could address the freight rail and rail safety needs of Iowa, as identified through railroad and stakeholder outreach and internal Iowa DOT coordination during development of the Iowa State Rail Plan.

Many of these potential future projects focus on the opportunity for enhanced access to the state's rail network for shippers; fixing rail service gaps; options for improvements to infrastructure and the capacity, safety, and efficiency of rail service and operations; climate change adaptation and environmental sustainability; and economic development. Capital projects that may provide opportunities for improved coordination, integration, and operations of passenger rail services in the state will also be identified. Specific potential future freight rail projects will be identified, described, and prioritized for short-term and long-term implementation in the Iowa Rail Service and Investment Plan featured in Chapter 5 of the Iowa State Rail Plan.

The chapter concludes with a description of iTRAM, an Iowa DOT travel demand model that can be used to forecast the ridership potential of freight rail services.

4.2 Class I Railroad Improvements

Class I railroad companies in Iowa must use private financing to cover the cost of equipment acquisition (that is, locomotives and railcars) and infrastructure improvements aimed at renewing, upgrading, or expanding the state rail network (that is, rail, ties, bridges, signal systems). Railroads rely on a regulatory framework that provides sufficient return on investment as a means to accommodate these capital expenditures. Some programs administered by the state of Iowa — notably the Iowa Railroad Revolving Loan and Grant Program (RRLG) and Linking Iowa's Freight Transportation System Program (LIFTS) — are available to Class I railroads to help fund rail network improvement projects, targeted job creation projects, and more; however, the available funding amounts available are seldom attractive nor sufficient for significant Class I projects. The potential for this funding and its applicability to Class I railroad improvement projects in Iowa is identified in Chapter 5.

Capital investment in rail infrastructure in the state of Iowa by the Class I railroads has been generally robust and continuous since the 1980s. Historically, most projects were aimed at developing the capacity necessary to efficiently handle traffic originating and terminating in Iowa and the rail traffic traveling through Iowa (notably the surge of coal shipments out of Wyoming's Powder River Basin that began in the 1970s, and an intermodal traffic increase that began in the 1980s), to upgrade track structure and bridges to accommodate railcars with a maximum allowable gross weight of 286,000 lbs., and to expand and create new terminal facilities.

Funds are budgeted by the Class I railroads each year to facilitate ongoing capital investment in the state's rail network. Systemwide capital expenditure budgets are reported by the Class I railroads annually, and may or may not identify specific rail projects by state or their estimated capital cost.

The Class I railroads have continued to invest heavily in their networks during the last 5 years in order to solve ongoing factors constraining the capacity, efficiency, and velocity of the high volumes of through traffic in Iowa; to eliminate or mitigate operational chokepoints; to handle various upgrades associated with maintenance and safety (including implementation of federally mandated Positive Train Control [PTC] systems, which reduce the likelihood of train over-speed incidents and collisions between trains); to implement various other technologies that improve the safety, economic efficiency, and environmental sustainability of railroad operations generally; and to accommodate routine infrastructure renewal. Iowa's Class I railroads will also continue to upgrade bridges and other infrastructure on branch lines in the state as required, in order to be able to accommodate railcars with a maximum allowable gross weight of 286,000

lbs. (the heavier cars are replacing the lighter 268,000 lb. cars and are becoming the industry standard; Class I railroad segments of the Iowa rail network incapable of handling these heavier loads are identified in Chapter 2 of the Iowa State Rail Plan). The Class I railroads have also identified some ongoing projects for the state. Class I needs were discussed with each of the carriers during the stakeholder outreach process conducted for the Iowa State Rail Plan.

4.2.1 Class I Main Line Capacity Analysis

In Chapter 2 of the State Rail Plan, a planning level capacity analysis was conducted to assess the degree of congestion on major higher volume Class I main lines of BNSF Railway (BNSF) and Union Pacific Railroad (UP) in Iowa. The main lines investigated, and the results of the analysis, are identified in Section 2.2.5 of Chapter 2.

In general, over the BNSF and UP lines analyzed, it appeared as if the present estimated train volumes could be accommodated without consuming the practical capacity of the lines as they presently exist on all but two short segments. The potential capacity constraints were identified on the UP Overland Route in western Iowa. Single track segments of the UP Blair Subdivision between California Junction and Missouri Valley, Iowa, and the UP Omaha Subdivision between North Council Bluffs and Missouri Valley, Iowa, constrict volume to the point where current volumes appear to be consuming the practical capacity of the lines.

Previous Analysis

Iowa DOT's 2014 Iowa Freight Mobility Survey identified bottlenecks of several types on the Iowa rail network through a survey it sent to the state's Class I, II, and III railroads, Metropolitan Planning Organizations, Regional Planning Affiliations, and Iowa DOT District Transportation Planners for inputs. Capacity constraints identified through the survey were generally attributable to:

- Insufficient capacity to accommodate carload interchange between railroads.
- Insufficient capacity for staging, switching, and storing rail cars in yards.
- Slow operating speeds in urban terminal areas.
- Insufficient vertical and/or horizontal clearances for handling high-wide loads.
- Delays to railroad operations attributed to the opening of bridges over the Mississippi River during barge navigation season.

The types and locations of the bottlenecks identified through the survey — some of which may result from insufficient capacity and other constraints — were previously identified in Section 2.3.1.3 of Chapter 2.

Iowa DOT has developed a forecasting tool called the Iowa Traffic Analysis Model (iTRAM) that is used to estimate present and future intercity passenger and freight rail demand in a modeling area consisting of Iowa and portions of adjacent states. A summary of iTRAM is provided later in this chapter.

Any intersections between the results of the capacity analysis conducted for the State Rail Plan, the Iowa DOT freight mobility survey and iTRAM tool, and the railroad improvements discussed in this chapter will be identified.

4.2.2 Class I Railroads Planned Improvements

BNSF Railway

BNSF identified some capital investments in its Iowa network made in the last 5 years.

Capital investment undertaken by BNSF on its total network during 2014 was $5.5 Billion and included maintenance and upgrading of existing track and bridges, adding new track capacity, and improvements to network and facility efficiency[1]. Approximately $61 Million of this investment was made in Iowa. BNSF did not identify estimated capital costs for all of the projects identified.

1 *BNSF Corporate Responsibility and Sustainability Report, 2014*

Table 4.1 below identifies some specific projects completed by BNSF in Iowa during 2010-2014. These projects were intended by BNSF to address main line and yard capacity constraints and operating efficiency issues within its Iowa network and to implement a PTC system to comply with a federal safety mandate.

Table 4.1: BNSF Capital Projects in Iowa, 2010-2014

PROJECT	TYPE OF IMPROVEMENT	LOCATION	ESTIMATED CAPITAL COST
Burlington (Mississippi River) Bridge Replacement Project	Capacity, Economic Development, Safety	Burlington, Iowa-Gulf Port, Illinois	Approximately $124 Million[2] (Constructed 2009-2011)
Ottumwa Subdivision Crossover Improvements Project[3]	Capacity, Safety	Near Beckwith, Ottumwa, Osceola, and Afton, Iowa	Approximately $17.3 Million[4] (Completed 2013)
Positive Train Control (PTC) Implementation[5]	Safety	Statewide	BNSF was expected to invest an additional $200 Million on PTC implementation on its total network (including on lines in Iowa) in 2015.

Source: BNSF

Some capital projects on BNSF identified in the table above have also demonstrated opportunities for improved coordination, integration, and operations of passenger rail services, as all regularly scheduled Amtrak passenger rail services in Iowa operate over BNSF lines. These synergies include:

- **Burlington Bridge Replacement Project** — The project, which included the replacement of a legacy swing span bridge with a new vertical lift span over the Mississippi River, improved capacity and safety for BNSF operations and also enhanced the on-time performance and reliability of Amtrak's daily roundtrip California Zephyr service (Chicago-Omaha-Denver-San Francisco Bay Area), which operates over the bridge between Gulf Port, Illinois, and Burlington, Iowa.
- **Ottumwa Subdivision Crossover Improvement Project** — The primary purpose of the project was to improve the on-time performance, reliability, and safety of Amtrak's California Zephyr on the BNSF route across southern Iowa using FRA high-speed rail funding awarded to Iowa DOT. BNSF also realized a benefit from the project in terms of enhanced operating capacity, mitigation of bottlenecks and freight congestion, and reduced delays to trains and freight transported in Iowa.
- **PTC Implementation** — BNSF projects to implement PTC on its principal lines in Iowa will provide another safety measure for Amtrak passenger rail operations by preventing collisions between trains, and other potential accidents. Amtrak trains operating over principal BNSF lines in Iowa that will be PTC-equipped include the daily California Zephyr and the daily roundtrip Southwest Chief service (Chicago-Kansas City-Los Angeles).

BNSF reported that it anticipated investing approximately $6 Billion in capital expansion and maintenance on its total network in 2015[6].

BNSF identified one key project for Iowa for 2015:

- **Sioux City, Iowa:** Construct a new bypass track on the Sioux City Subdivision[7].

2 Project funding included appropriations from the Truman-Hobbs Act which provided federal funding for bridges discovered to be unreasonably obstructive to navigation and is managed by the U.S. Department of Homeland Security and the U.S. Coast Guard, and funding from BNSF. Source: https://www.bnsf.com/media/news/articles/2009/09/2009-09-23a.html

3 Project included installation of double crossovers between the two main tracks and islands of Centralized Traffic Control (CTC) wayside signaling to control their use at four locations on the BNSF Ottumwa Subdivision in Iowa.

4 Project funded by a FRA High-Speed Intercity Passenger Rail Program grant awarded to Iowa DOT in 2009.

5 Note: Installation of PTC hardware and software, wayside PTC infrastructure, and PTC technology on locomotives is ongoing. The U.S. Congress passed the Surface Transportation Extension Act of 2015, under which U.S. railroads will have until December 31, 2018, to fully implement PTC.

6 BNSF's 2015 $6 Billion Capital Plan: http://www.bnsf.com/media/pdf/2015-capital-expansion-map.pdf

7 Ibid

BNSF reported that it planned to invest approximately $4.3 Billion on its total network in 2016[8]. Projects will generally include maintenance of the core network and infrastructure, PTC implementation, and locomotives and equipment.

Current bottlenecks and specific future capital investment projects for its network in Iowa were not identified by BNSF during development of the Iowa State Rail Plan.

Canadian National Railway
CN identified some capital investments in its Iowa network made in the last 5 years. Specific projects and their respective capital costs were not identified.

The total investments by CN for general rehabilitation of its network infrastructure in Iowa during the last 5 years are as follows[9]:

- 2014 — Approximately $16.2 Million
- 2013 — Approximately $13.4 Million
- 2012 — Approximately $12.8 Million
- 2011 — Approximately $17.8 Million
- 2010 — Approximately $11.3 Million

CN reported that it planned to make a capital investment of approximately $2.7 Billion in 2015 to maintain and improve rail infrastructure to enhance capacity, safety, and efficiency on its total network and to make improvements to its equipment[10]. These investments generally include:

- **Track and Bridge Infrastructure** — Includes replacement of rail and ties, improvements to bridges, and upgrades to some branch lines that have realized an increase in traffic volumes.
- **Safety** — Includes installation of additional wayside asset protection devices, such as hot wheel detectors, wheel impact load detectors, signaled sidings for broken rail detection, and implementation of new track geometry testing and joint bar inspection technology.
- **Growth and Productivity Initiatives** — Includes improvements to yards, intermodal terminals and transload and distribution facilities, and information technology.
- **Equipment** — Includes acquisition of new high-horsepower locomotives and investment in and rehabilitation of freight rail cars.

For 2016, CN reported that it planned to invest approximately $2.1 Billion in its total network[11]. These investments include:

- Network Investments — $1.2 Billion
- PTC Implementation — $285 Million
- Rail Equipment — $428 Million

Current bottlenecks and specific future capital investment projects for its network in Iowa were not identified by CN during development of the Iowa State Rail Plan.

Canadian Pacific Railway
CP identified some capital investments and projects in its Iowa network made in the last 5 years.

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8 2016 Capital Expenditures: Don't Panic; Railway Track and Structures, February 2016
9 Annual Report of Chicago Central and Pacific Railroad Company to the Iowa Department of Revenue and Finance Property Tax Section, Schedule 800 (System Indicators), 2010-2014; and Annual Report of Cedar River Railroad Company to the Iowa Department of Revenue and Finance Property Tax Section, Schedule 800 (System Indicators); 2010-2014. Note that CN operates in Iowa through its subsidiaries CC&P and CEDR.
10 http://www.cn.ca/en/media/2015/05/pressrelease_20150505100224_7356
11 2016 Capital Expenditures: Don't Panic; Railway Track and Structures, February 2016

CP reported that it made capital investments in its total network of approximately $1.4 Billion in 2014[12]. These investments generally include:

- **Track and Roadway** — Includes replacement and enhancement of track structure, renewal of bridges and signals, and PTC implementation.
- **Rolling Stock** — Includes locomotives and freight cars.
- **Information Systems**
- **Buildings and Facilities** — Includes intermodal and automotive facilities.

Capital investment undertaken by CP for its network in Iowa during 2014 was approximately $51.5 Million. Specific projects and their respective capital costs were not identified.

CP reported for 2015 that it continued to make capital investments that support business growth, build capacity, and enhance its ability to operate safely on its network[13].

CP selected its Ottumwa Subdivision (Nahant-Ottumwa, Iowa) for a pilot PTC implementation program and anticipated that it would receive FRA approval to begin revenue service test runs of the system by the end of 2015. CP did not identify the specific capital cost for the project. CP anticipates that it will next implement a PTC system in Iowa on its connecting Davenport Subdivision (Nahant-Sabula, Iowa) and Laredo Subdivision (Ottumwa, Iowa-Iowa / Missouri state line near Sewal, Iowa); however, neither the schedule nor specific capital cost for the projects were identified by CP.

For 2016, CP reported that it planned to invest approximately $785 Million on its total network[14]. Specific investment categories and allocations were not identified.

Current bottlenecks and specific future capital investment projects were not identified by CP for its network in Iowa during development of the Iowa State Rail Plan.

Kansas City Southern Railway
KCS accesses Iowa via haulage rights over BNSF and UP only and does not own any lines in the state. Therefore, no bottlenecks or future capital projects were identified by KCS for Iowa during development of the Iowa State Rail Plan.

Norfolk Southern Railway
NS did not identify capital investments in its Iowa network made in the last 5 years.

NS reported that it planned to make a capital investment of approximately $2.4 Billion in 2015 to enhance capacity and service and to support business growth on its total network[15]. These investments generally include:

- Renewal of rail, ties, ballast, and bridges.
- Improvements to infrastructure and facilities.
- Investment in locomotives and freight cars.
- Investment in PTC and technology initiatives.

For 2016, NS reported that it planned to invest approximately $2.1 Billion on its total network[16]. Specific investment categories include:

- Roadway — $817 Million

12 *Canadian Pacific Railway Annual Report, 2014*
13 *Ibid*
14 *2016 Capital Expenditures: Don't Panic; Railway Track and Structures, February 2016*
15 *Norfolk Southern's 2015 $2.4 Billion Capital Plan: http://nscorp.com/content/nscorp/en/norfolk-southerns201524billioncapitalplan.html*
16 *2016 Capital Expenditures: Don't Panic; Railway Track and Structures, February 2016*

- Infrastructure — $89 Million
- Facilities and Terminals — $222 Million
- Other Investments — $163 Million

No bottlenecks or specific future capital investment projects were identified by NS for its network in Iowa during development of the Iowa State Rail Plan.

Union Pacific Railroad
This section identifies the UP infrastructure projects in Iowa funded by capital expenditure and completed during the last 5 years. UP's capital investment in Iowa by year is as follows:

- 2014 — $59.8 Million
- 2013 — $79.0 Million
- 2012 — $87.4 Million
- 2011 — $92.8 Million
- 2010 — $40.0 Million

Table 4.2 below identifies some specific capital projects completed in Iowa during the 2010-2014 period. These projects were generally intended by UP to address main line and yard capacity constraints and operating efficiency issues within its Iowa network and to implement a PTC system to comply with a federal safety mandate.

Table 4.2: UP Capital Projects in Iowa, 2010-2014

PROJECT	TYPE OF IMPROVEMENT	LOCATION	ESTIMATED CAPITAL COST
Boone Run-through Track	Capacity	Boone	$10.6 Million
Beverly Yard — Extend Yard Leads	Capacity	Cedar Rapids	$6.9 Million
Remote Control Switches — Short Line Yard	Capacity	Des Moines	$1.9 Million
Hull Avenue Yard Expansion	Capacity	Des Moines	$12.4 Million
Carnes Siding — Centralized Traffic Control Switches	Capacity	Carnes	$1.3 Million
Sheffield Siding — Centralized Traffic Control Switches	Capacity	Sheffield	$2.0 Million
Le Mars — Centralized Traffic Control Switch (Note: Under construction in 2015)	Capacity	Le Mars	$2.6 Million
PTC Implementation	Safety	Statewide	UP's 2015 investment in PTC on its network includes principal lines in Iowa

Source: UP

In its 2015 capital program, UP was anticipated to invest approximately $4.3 Billion in the total UP network. UP reported that it planned to invest approximately $109 Million on its network in Iowa in 2015, including[19]:

- $105 Million for track maintenance
- $1.5 Million for signal system enhancements
- $2.8 Million for bridge maintenance and replacement

17 Note: Installation of PTC hardware and software, wayside PTC infrastructure, and PTC technology on locomotives is ongoing. The U.S. Congress passed the Surface Transportation Extension Act of 2015, under which U.S. railroads will have until December 31, 2018, to fully implement PTC.
18 UP invested approximately $2 Billion on PTC implementation on its total network through January 1, 2016, including over principal line segments in Iowa. . UP's total estimated investment in PTC is about $2.9 Billion. Source: http://www.up.com/media/media_kit/ptc/about-ptc/index.htm#
19 http://www.up.com/media/releases/0504_iowa-rail.htm

UP's key projects for 2015 were focused on the Mason City and Clinton subdivisions — which are components of two of UP's most heavily trafficked lines in Iowa — and include the following[20]:

- **Bradford, Iowa — Mason City, Iowa, Segment — Mason City Subdivision ($18.3 Million):** Replace about 34 miles of rail, repair surfaces at 37 road crossings, and replace seven switches.
- **Garden City, Iowa, Area — Mason City Subdivision ($13.3 Million):** Replace about 23 miles of rail, repair surfaces at 30 road crossings, and replace nine switches.
- **Ames, Iowa-Belle Plaine, Iowa, Segment — Clinton Subdivision ($12.0 Million):** Replace 83,300 railroad ties, install 25,100 tons of crushed rock ballast, and repair surfaces at 67 road crossings.

For 2016, UP reported that it planned to invest approximately $3.75 Billion on its total network[21]. Specific investment categories include:

- Infrastructure — $1.825 Billion
- Locomotives and Equipment — $965 Million
- Capacity and Commercial Facilities — $395 Million
- Technology — $190 Million
- PTC Implementation — $375 Million

The UP identified a bottleneck on its network in Iowa during development of the Iowa State Rail Plan: openings of the Mississippi River Bridge at Clinton, Iowa, which delays trains and hampers rail capacity on the UP Geneva and Clinton subdivisions in Iowa during river barge navigation season.

Future capital investments undertaken by UP for its network in Iowa were not identified by UP during development of the Iowa State Rail Plan.

4.3 Class II and Class III Railroads Past and Planned Improvements

Class II and Class III railroads generally face a different set of challenges meeting their needs than the Class I railroads do, since they often may not possess the capital and technical resources, operating capacity and flexibility, or modern infrastructure of the larger Class I railroads.

Class II and Class III railroads typically rely upon private funding, public funding, or some combination of these sources to cover the capital cost of equipment acquisition and general infrastructure improvements. Some programs administered by the state of Iowa — notably the Iowa Railroad Revolving Loan and Grant Program (RRLG) and Linking Iowa's Freight Transportation System Program (LIFTS) — are available to Class II and Class III railroads to help fund rail network improvement projects, targeted job creation projects, and more. The potential for this funding and its applicability to Class II and Class III railroad improvement projects in Iowa are discussed in Chapter 5.

Typically, the largest constraints on Class II and Class III railroads in the U.S. involve accommodating railcars with a maximum allowable gross weight of 286,000 lbs. (the heavier cars are supplanting the lighter cars and are becoming the industry standard) and operational chokepoints caused by insufficient operating capacity on main lines, in rail yards, and locations where railroads interchange with each other.

Railcars with larger loading capacity provide greater operating efficiency by reducing labor, fuel, and maintenance costs while increasing capacity and synergy for rail operations and rail shippers. Most Class III railroads have a legacy infrastructure suited to low-density operations and railcars of lighter weight (268,000 lbs. or less). Class II and Class III railroads that are unable to make the appropriate upgrades may be at a competitive disadvantage and lose business to transportation competitors, namely to trucks or nearby Class I railroads that are capable of handling the 286,000 lb. cars.

20 Ibid

21 2016 Capital Expenditures: Don't Panic; Railway Track and Structures, February 2016

Several of the lines operated by Class II and Class III railroads in Iowa, however, have been the recipients of capital investments to bridge and other infrastructure upgrades in the last two decades in order to be 286,000 lbs. compliant (segments of the Iowa rail network incapable of handling these heavier loads are identified in Chapter 2 of the Iowa State Rail Plan).

Class II and Class III railroad chokepoints are often attributed to legacy infrastructure tailored to historical railroad practice, which can limit capacity and hamper the efficiency and flexibility of modern operations. Such factors include yard capacity that is insufficient for building trains; switching; and staging cars and sidings that are of inadequate number, length, or location to accommodate the demands of present-day train operations, meet-pass events, and schedules. Some Class II and Class III railroads are further constrained by delays that stem from interchanging railcars with another carrier or in the use of trackage rights to access an isolated segment of their network. These deficiencies not only compromise rail transit times and operational safety and cause main line and yard congestion, they have the unintended consequence of affecting the quality of life for adjacent communities. Among other things, chokepoints and their resultant operational impacts can lead to protracted delays for motorists and emergency vehicles at blocked highway-rail grade crossings, and also affect air quality due to increased emissions from idling vehicles and trains.

One key recent example of an investment targeted at updating or supplanting legacy rail infrastructure in Iowa was demonstrated by Class II, IAIS. The railroad's legacy, primary rail yard and locomotive maintenance facility at Iowa City was located in a residential neighborhood adjacent to the city's central business district. It had limited capacity and flexibility for IAIS' expanding modern operations and for accommodating increasing volumes of interchange with the CIC, which resulted in yard congestion, impacts to operations on the connecting IAIS network, and delays to vehicles at grade crossings near the yard. In 2012, IAIS relocated to a newly constructed rail yard with greater capacity and a modern locomotive maintenance facility 25 miles west of Iowa City, in a rural area near South Amana, where the IAIS mainline across Iowa meets with CIC's connecting line to Cedar Rapids. The South Amana facility is today used for switching, staging, and meeting trains; facilitating more efficient interchange with CIC; and for maintaining IAIS' fleet of modern, high-horsepower locomotives, while the old yard facility in Iowa City remains and is used primarily for staging railcars for local rail shippers. All Class II and Class III railroads in Iowa were sent survey forms soliciting their needs during the development of the State Rail Plan. The forms provided the railroads the opportunity to verify the details of the physical and operating characteristics of their respective networks.

Of the 12 Iowa regional and short line railroads, 10 completed the surveys. Appendix A in Chapter 2 presents the information provided by these railroads. Iowa's Class II and Class III railroads were further queried during the stakeholder outreach process undertaken for the Iowa State Rail Plan about the specific challenges they face now and for the future in terms of capacity constraints, infrastructure needs and upgrades, railroad regulation, capital funding needs, and strategies for mitigating climate change adaptation. As previously mentioned, Class I railroads have the capital resources to make investments in improvements, while Class II and Class III railroads typically do not. Potential projects of the Class II and Class III railroads identified through the survey and the stakeholder outreach process are identified and described in Iowa DOT's Rail Service and Investment Program, which is the subject of Chapter 5 of the Iowa State Rail Plan.

4.4 Other Past and Planned Improvements

One additional ongoing capital project undertaken with federal and state funds that provided an investment in state's railroad network has also demonstrated opportunities for improved coordination, integration, and operations of freight railroads in the multimodal environment.

The Council Bluffs Interstate System Improvement Program (CBIS) was an innovative solution to complex, interlaced infrastructure in the Council Bluffs urban area. Railroad infrastructure consists of a nationally significant terminal where freight trains are collected, classified, and dispatched from all four directions. Railroad traffic consists of flows from Canada, Mexico, the Gulf, Pacific, and Atlantic Coasts, and regional manufacturing and agricultural and processing centers. The railroad infrastructure is a hub, with 10 main lines of four Class I railroads (including BNSF; CN; KCS via haulage agreement over BNSF and UP; and UP) and one regional railroad (IAIS) radiating in all directions, as well as a locally important short line (CBEC)

that delivers coal to a large generating station. The highway infrastructure consists of the interchange of nationally significant Interstate Highways 29 and 80, as well as local road networks. The railroad and highway infrastructure is interlaced vertically and horizontally, and is complicated by urban housing, commercial, and industrial activity in Council Bluffs.

The CBIS project, originally an Interstate Highway reconstruction and improvement project, sought to streamline and improve all three aspects of the Council Bluffs infrastructure: railroad, highway, and urban use; and to develop economies that enabled capital cost, functionality, and urban development improvement beyond the original project vision. Through cooperative discussions among all stakeholders, the highway, railroad, and urban uses of the area were coordinated and their needs and requirements were expressed creatively, enabling cost reductions in the highway project, improvements for residents and businesses in Council Bluffs, and streamlined and consolidated railroad infrastructure including grade crossing closures. The rail-related segment of CBIS is being conducted under the Iowa DOT Railroad Relocation Grading Project began in 2015 and estimated for completion in 2017. The $13.2 Million rail segment of CBIS is funded by the Iowa Highway Improvement Program, which is a part of the Iowa Transportation Improvement Program (TIP). The anticipated completion of the total CBIS project is 2022.

4.5 Improvements to Intermodal Connections

Iowa's rail system is a component of a comprehensive multimodal transportation network, which includes linkages to highway, river, and air modes. The opportunity for enhanced multimodal transportation opportunities could be met through investments targeted to promote interconnectivity, capacity, and environmental sustainability. Such investments could include construction or rehabilitation of existing rail connections between principal railroad lines and river port properties; enhancement or construction of transload and intermodal facilities; and additional sidings, spurs, or yard tracks for switching, staging, and storing railcars at or near port, transload, or intermodal facilities.

Potential projects aimed at improving intermodal connections and captured through the survey and the stakeholder outreach process are identified and described in Iowa DOT's Rail Service and Investment Program, which is the subject of Chapter 5 of the Iowa State Rail Plan.

4.6 Highway-Rail Crossing and Safety Improvements

Iowa DOT spends approximately $7.3 Million per year on highway-rail crossing improvements to enhance safety. Funding comes from the Iowa Highway-Railroad Grade Crossing Safety Program (supported by the Federal Highway Safety Improvement Program; formerly Section 130 funds), the Iowa Highway-Railroad Grade Crossing Surface Repair Program, and the Iowa Primary Road-Highway-Railroad Grade Crossing Repair Program. Iowa DOT strives to consolidate projects were possible (e.g., a combination of closures and warning device installation as one project). Refer to Section 2.1.5 of Chapter 2 for further details about these federal and state funding sources and Section 2.1.6.3 in Chapter 2 for a rail crossing inventory and safety data for Iowa.

Iowa DOT anticipates spending approximately $5.7 Million annually via the Federal Highway-Railroad Crossing Safety Program to upgrade crossings with passive warning devices including crossbucks to active warning devices including flashing light signals and gate arms; upgrade existing signals; improve crossing surfaces; and provide low-cost improvements such as increased sight distance, medians, widened crossings, or to close crossings. Iowa DOT will also receive an additional $2.9 Million in Federal Highway Safety Improvement Program funding for 2016 that is yet to be programmed to specific projects. Projects recommended for 2015-2017, along with the anticipated total capital investment for each year's projects, include[22]:

- **2015 ($5,710,000)** — 32 total projects:
  - 20 projects upgrading crossings with passive warning devices including crossbucks to active warning devices including flashing light signals and gate arms

22 *http://www.iowadot.gov/iowarail/assistance/130/federalaid.htm*

  - 7 projects upgrading crossing with flashing light signals only to flashing light signals and gate arms
  - 5 projects upgrading circuitry in a crossing protected by flashing light signals and gate arms
  - Contribution to crossing closures statewide
- **2016 ($5,735,000)** — 30 total projects[23]:
  - 23 projects upgrading crossings with passive warning devices including crossbucks to active warning devices including flashing light signals and gate arms
  - 7 projects upgrading crossing with flashing light signals only to flashing light signals and gate arms
  - Contribution to crossing closures statewide
- **2017 ($5,720,000)** — 28 total projects:
  - 23 projects upgrading crossings with passive warning devices including crossbucks to active warning devices including flashing light signals and gate arms
  - 5 projects upgrading crossing with flashing light signals only to flashing light signals and gate arms
  - Contribution to crossing closures statewide

A list of the State Highway-Railroad Crossing Surface Repair Program improvement projects in Iowa for 2015 and 2016 and those recommended for 2017, and the anticipated capital cost of each, is listed in Appendix E of the Iowa State Rail Plan.

Iowa DOT anticipates spending about $900,000 annually via the State Highway-Railroad Crossing Surface Repair Program to promote safety through surface replacement programs at public highway-railroad grade crossings. Owing to a large existing backlog in surface repair projects, in 2016 through 2020, an additional $500,000 annually in Federal Highway Safety Improvement Program funding will be allocated to surface repair projects not yet identified. Projects recommended for 2015-2016, along with the anticipated total capital investment for each year's projects, include[24]:

- **2015 ($961,027)** — 14 total projects
- **2016 ($919,140)**[25] — 10 total projects
- **2017 ($1,060,800)** — 15 total projects

A list of the State Highway-Railroad Crossing Surface Repair Program improvement projects in Iowa for 2015 and 2016 recommended for 2017, and the anticipated capital cost of each, is listed in Appendix E of the Iowa State Rail Plan.

For the long term, Iowa DOT identified specific goals for rail safety and estimated the costs for achieving these goals, beyond highway-rail crossing and safety improvements. The goals and estimated costs are discussed in Chapter 5 of the Iowa State Rail Plan.

The Iowa Highway Grade Crossing Safety Fund has covered a portion of maintenance costs for traffic control devices, activated by the approach or presence of a train (such as flashing light signals, flashing light signals with cantilever assemblies, and flashing light signals with automatic gate arms), installed under the Highway-Railroad Crossing Safety Program since 1973. The annual funding level is $700,000. The fund is administered by Iowa DOT.

4.7 RRLG Projects

The Iowa Railroad Revolving Loan and Grant Program (RRLG) administered by Iowa DOT, provides annual financial assistance to improve rail facilities that will create jobs, spur economic development, and improve the Iowa Rail network[26]. Projects are generally classified as targeted job creation projects, rail network improvements, or rail-port planning and development studies. Entities eligible for RRLG funding include

23 An additional $2.4 Million in additional projects will be programmed with the additional Federal Highway Safety Improvement Program funding Iowa DOT received in 2016.

24 2016-2020 Iowa Transportation Improvement Program

25 An additional $500,000 in additional projects will be programmed with the additional Federal Highway Safety Improvement Program funding Iowa DOT received in 2016.

26 http://www.iowadot.gov/iowarail/assistance/rrlgp.htm

railroads, businesses, local governments, economic development agencies, and non-profit organizations.

Table 4.3 below identifies specific rail-related projects awarded RRLG loan and/or grant funding, as approved by the Iowa Transportation Commission, for Fiscal Years 2015 and 2016, and includes additional information about awards made back to FY 2006[27]. An additional $4 Million of available funding will be awarded to yet undetermined projects in FY 2016.

Table 4.3: Projects Funded by RRLG Loans and Grants, FY 2006-2016

RAILROAD REVOLVING LOAN AND GRANT PROGRAM *INCLUDES FISCAL YEAR 2011 AWARDS FOR RAIL PORT DEVELOPMENT (A $7.5 M SPECIAL APPROPRIATION)* FUNDED PROJECTS SUMMARY *FISCAL YEARS 2006 THROUGH 2016* SUMMARY (SINCE ORIGINATION OF RRLGP)		
SUMMARY (SINCE ORIGINATION OF RRLGP)		
APPLICATIONS	$109	unique project applications (omits multiple applications for essentially the same project)
	$81,286,994	requested in grants and loans for unique projects
	$303,248,549	cost of proposed rail infrastructure improvements associated with unique projects
	3846	new jobs (FY2006-2010) or new & retained jobs (FY2011-FY2012) supported by proposed projects1
	$3,807,511,869	other capital investment associated with proposed projects 2
AWARDS	60	total awards
	$37,200,362	total awards
	$114,086,143	estimated cost of rail infrastructure improvements associated with awards
	$1,823	new jobs (FY2006-2010) or new & retained jobs (FY2011) supported by projects 1
	$659,589,418	other capital investment associated with awards 2
1 Certain projects have no requirement for associated job creation or retention (i.e., direct legislative apporpriation, rail network or branch line assistance projects, flood restoration grants, windport projects or planning grants) 2 Does not include public funds or other investments for flood restoration over and above the grants		

FISCAL YEAR	APPLICANT	LOCATION	GRANT	LOAN	AWARDED TOTAL
2006	Absolute Energy LLC	Mitchell Co.	$246,000	$254,000	$500,000
2006	Cascade Lumber Company	Pleasantville	$214,000	$320,000	$534,000
2006	Eastern Iowa Industrial Center	Davenport	$450,000	$310,791	$760,791
2006	Green Plains Renewable Energy	Shenandoah	$126,000	$154,000	$280,000
2006	Iowa Cold Storage	Altoona	$120,000	$259,500	$379,500
2006	Iowa Renewable Energy LLC	Washington	$168,000	$132,000	$300,000
2006	Metzler Automotive	Keokuk	$60,000	$-	$60,000
2007	Siemens Wind Power**	Fort Madison	$326,000	$-	$326,000
2008	Norfolk Iron & Metal**	Durant	$810,000		$810,000
2008	City of Newton/Trinity Towers**	Newton	$165,795	$-	$165,795
2009	Burlington Junction Railway	Track restoration-flooding	$-	$71,000	$71,000
2009	Cedar Rapids and Iowa City Railway Co.	Track restoration-flooding	$-	$320,000	$320,000
2009	Iowa Interstate Railroad Ltd.	Track restoration-flooding	$-	$772,000	$772,000
2009	Iowa Northern Railway Co.	Track restoration-flooding	$-	$681,000	$681,000
2009	Iowa River Railroad	Track restoration-flooding	$-	$184,000	$184,000

27 *Ibid*

2009	Iowa, Chicago and Eastern Railroad Corp. (now owned by CP)	Track restoration-flooding	$-	$1,417,000	$1,417,000
2009	Keokuk Junction Railway Co.	Track restoration-flooding	$-	$554,000	$554,000
2010	Ia Northern/UP Bridge Replacement	Waterloo	$1,000,000	$-	$1,000,000
2010	Burlington Junction RR Industrial Park Line Rehabilitation	Burlington	$25,000	$30,400	$55,400
2010	CRANDIC Railway Walford Bridge Replacement	Walford	$-	$700,000	$700,000
2010	Schau Recycling Industrial Spur Construction	Ida Grove	$30,000	$195,000	$225,000
2010	Shine Brothers Industrial Track Rehabilitation	Spencer	$105,000	$206,071	$311,071
2010	Waterloo (on behalf of Secor Specialty)	Waterloo	$126,000	$-	$126,000
2011	Lincoln Way Rail Port	Clinton	$443,800	$-	$443,800
2011	Manly Terminal Wind Rail Port	Worth County	$3,000,000	$-	$3,000,000
2011	Southbridge Rail Yard	Sioux City	$3,000,000	$-	$3,000,000
2011	Wind Energy Supply Chain Ind. Park	Iowa City	$1,056,200	$-	$1,056,200
2011	Eastern Iowa Industrial Center	Davenport	$2,000,000	$-	$2,000,000
2011	Nypro Kánaak	Mount Pleasant	$51,183	$122,839	$174,022
2012	Burlington Junction Rail Spur Rehab.	Burlington	$-	$157,948	$157,948
2012	Butler Cross Dock	Butler County	$282,000	$423,621	$705,621
2012	Cherokee Industrial Corp. Rail Spur	Cherokee	$-	$617,454	$617,454
2012	CRANDIC Iowa River Crossing South Bridge	Iowa County	$-	$2,000,000	$2,000,000
2012	North Central Iowa Rail Corridor	Forest City to Belmond	$-	$400,000	$400,000
2012	Valley Distribution Corp. Rail Spur	West Burlington	$-	$218,652	$218,652
2012	Waverly GMT Rail Spur	Waverly	$204,000	$185,676	$389,676
2013	BJRY Rail/Truck/Barge Planning Study	Burlington	$40,000	$-	$40,000
2013	Central Iowa Transloading Facility Feasibility Study	Central Iowa	$100,000	$-	$100,000
2013	CRANDIC Iowa River Crossing North Bridge	Iowa County	$-	$1,500,000	$1,500,000
2013	Iowa Falls/Hardin County Rail Port Planning Study	Iowa Falls/Hardin Co.	$100,000	$-	$100,000
2013	Iowa Falls UP/CN Connector	Iowa Falls	$300,000	$600,000	$900,000
2013	Mills/Pottawattamie County Rail Port Study	Mills & Pottawattamie Co.	$78,400	$-	$78,400
2013	Rail One	Clinton/Clinton Co.	$372,000	$744,000	$1,116,000
2013	Souix City Rail Study Phase II	Sioux City	$100,000	$-	$100,000
2014	HF Clor-Alkali LLC	Eddyville	$150,000	$174,000	$324,000
2014	Iowa Corn Processors	Glidden	$174,000	$245,000	$419,000
2014	Owen Industries	Carter Lake	$108,000	$-	$108,000
2014	Heartland Co-op	Fairfield	$-	$1,450,000	$1,450,000
2014	CRANDIC - Millrace and Price Ck. Bridge	Amana	$-	$725,000	$725,000
2014	Red Rock Industrial Park Study	Knoxville	$94,400	$-	$94,400

2015	West Charles Street Viaduct	Olwein	$327,158	$196,295	$523,452
2015	Iowa Crossroads of Global Innovation	Fort Dodge	$-	$1,600,000	$1,600,000
2015	Des Moines Rail Port	Des Moines	$-	$1,700,000	$1,700,000
2015	KJRY Track Enhancements	Keokuk	$-	$228,800	$228,800
2015	Sioux Center Rail Port Study	Sioux Center	$100,000	$-	$100,000
2016	BSV Ind. Park Phase I	Boone	$330,000	$226,050	$556,050
2016	Iowa Traction Transload	Mason City	$59,653	$35,792	$95,445
2016	A to Z Rail Enhancment	Osage	$-	$200,000	$200,000
2016	ADM "S" Curve	Clinton	$-	$165,600	$165,600
2016	KJRY Yard Enhancements II	Keokuk	$-	$280,285	$280,285
		TOTALS	**$16,442,589**	**$20,757,774**	**$37,200,362**

***Acepted grant, declined loan* *Source: Iowa DOT*

Iowa DOT anticipates making additional RRLG loans and/or grants available for investment in the state on an annual basis in future years. Amount of funding is dependent on annual state appropriations and loan repayments.

4.8 LIFTS Projects

The Iowa Linking Iowa's Freight Transportation System Program (LIFTS) is a new grant funding opportunity to make improvements to the Iowa multimodal freight network. The program is administered by the Iowa DOT and it seeks to address gaps in multimodal funding and to promote effective and efficient freight transportation. Eligible grant funding is not limited to a particular transportation mode[28].

Some examples of rail-related projects that could be funded by LIFTS include:

- Transload and intermodal facilities
- Port-Rail improvements
- Removal of height clearance restrictions on existing infrastructure that inhibits the movement of freight
- Increase maximum allowable gross railcar weight to 286,000 lbs. on lines that are not capable of doing so at present
- Expansion or reconfiguration of rail yards to increase capacity
- Safety improvements to increase freight capacity

The 2016 LIFTS program was supported by a one-time funding source of approximately $2.6 Million in unused State Infrastructure Bank funding (Federal loans that had been paid back to the state of Iowa.). The state may offer additional rounds of the LIFTS program in the future, if additional funding is made available.

In late 2015, DOT received 25 project applications for the 2016 LIFTS funding, with grant requests totaling $17.2 Million[29]. Included were rail-related projects related to the expansion of existing and construction of new transload facilities (13 applications), rail and capacity upgrades and improvements (nine applications), and a planning study for a multimodal container facility (one application)[30].

Table 4.4 below shows the funding recommendations made by DOT and approved by the Iowa Transportation Commission in Fiscal Year 2016[31]. Five out of the six projects awarded full or partial funding by LIFTS have a rail mode component.

28 http://www.iowadot.gov/iowarail/assistance/lifts.htm
29 http://www.iowadot.gov/iowarail/assistance/documents/2016_01_12_LIFTS%20Commission%20Recommendation.pdf
30 http://www.iowadot.gov/iowarail/assistance/documents/2016_LIFTS_website_summary.pdf
31 http://www.news.iowadot.gov/newsandinfo/2016/02/more-than-26-million-awarded-from-linking-iowas-freight-transportation-system-program.html

Table 4.4: LIFTS Projects Funded in 2016

PROJECT NAME / LOCATION	DESCRIPTION	FUNDING REQUEST	LIFTS GRANT AWARD
Port of Muscatine (Muscatine)	Conduct a planning study for establishing a multi-modal container port facility on the Mississippi River (rail access to CP)	$80,000	$80,000
Hall Towing (Fort Madison)	Construction of a warehouse and transload dock on the Mississippi River for a barge to truck transload project (not a rail-related project; BNSF adjacent to facility)	$479,812	$479,000
Council Bluffs Transload Facility (Council Bluffs)	Expansion of an existing transload facility to include additional rail capacity for direct rail to truck and truck to rail transloading (rail access to IAIS)	$702,225	$500,000
Iowa Traction Railway Propane Terminal (Mason City)	Construction of two risers, a permanent storage tank, and truck loading facility to transload propane from rail to a storage tank and from a storage tank to truck (rail access to IATR)	$544,631	$544,000
Standard Distribution Company (Waterloo / Cedar Falls)	Increase facility size and track capacity (rail access to CN)	$1,450,000	$584,000
Eastern Iowa Logistics Park (Cedar Rapids)	Construct a direct transfer transload facility in Cedar Rapids (rail access to CIC)	$2,116,500	$500,000
	Total 2016 LIFTS Funding	**$5,373,168**	**$2,687,000**

Source: Iowa DOT

4.9 Concepts from Stakeholder Outreach

Various rail needs and potential project concepts, including rail studies, were identified by the participants of public and stakeholder outreach conducted for the State Rail Plan. This outreach was facilitated through an the Issues-Based Workshop on September 24, 2015; High Leverage Stakeholder Committee meetings on November 18, 2015, and February 24, 2016; interviews and coordination with representatives of the state's Class I, II, and III railroads; interviews with railroad shippers; and the on-line survey provided on the Iowa State Rail Plan webpage on the Iowa DOT website. Outreach conducted as part of the Iowa State Rail Plan will be described in detail in Chapter 6.

Potential projects identified during the outreach included the following general categories. Specific potential projects will be identified, described, and prioritized for short-term and long-term implementation in the Iowa Rail Service and Investment Plan featured in Chapter 5 of the Iowa State Rail Plan.

4.9.1 Proposed Freight Rail Project Categories

Stakeholders generally identified the potential for freight rail-related projects, studies, or initiatives to address:

- Bottlenecks associated with capacity on rail lines and in rail yards
- Congestion on the state's railroad network in urban areas
- Development of a major intermodal hub and additional transload facilities
- Enhanced railroad access and multimodal connectivity (i.e. truck/rail and river barge/rail)
- Opportunities for economic development and maintaining Iowa's competitiveness in the global marketplace
- Availability of additional state funding for railroad improvement projects
- Availability of railcars of sufficient capacity for lease or purchase
- Availability of rail shipping containers
- Improved network efficiency
- Maintenance and/or replacement of aging rail infrastructure
- Improvement of the state of good repair of the state's freight transportation network

Specific projects identified through the survey and the stakeholder outreach process, and any opportunities

for improved coordination or integration with current and potential future passenger rail services in the state, are included in Iowa DOT's Rail Service and Investment Program, which is the subject of Chapter 5.

4.9.2 Proposed Safety and Security Project Categories

Stakeholders generally identified the potential for freight rail-related projects or initiatives to address:

- Positive Train Control implementation
- Grade crossing safety, improvements, and reduction by closure and/or grade separation
- Protecting the integrity of Iowa's freight
- Improved awareness of hazardous materials transportation by rail and improved training and response to hazardous materials incidents

Specific project concepts identified through the survey and the stakeholder outreach process, and any opportunities for improved coordination or integration with current and potential future passenger rail services in the state, are included in Iowa DOT's Rail Service and Investment Program, which is the subject of Chapter 5.

4.10 iTRAM Travel Demand Model Summary

iTRAM (Iowa Travel Analysis Model) is a state-of-the-art travel demand model developed for the Iowa DOT Division of Planning, Programming, and Modal Division. The model consists of several key components and numerous subcomponents. The key parts are:

- Statewide Traffic Model
- Passenger Rail Model
- Freight Rail Model

This summary will describe what the Freight Rail Model is, and how the model can be applied.

4.10.1 Statewide Freight Rail Model

The iTRAM Freight Rail Model was designed to conduct rail investigations by individual commodity or for all commodities that travel through the state of Iowa. A base year of 2010 and a future year of 2040 were used along with data from the Freight Analysis Framework (FAF), the Surface Transportation Board (STB) Rail Waybill Sample, and other sources to develop trip tables and flows for the model.

4.10.2 Typical Applications

The iTRAM Freight Rail Model can be used to gauge changes to the Iowa rail network and freight traveling over the state's rail network. Some examples include:

- Diversion of rail commodities given rail traffic blockage incidents (e.g., a line washout, bridge collapse, or movable bridge span failure on a principal rail line, which could potentially force freight trains to an alternate route).
- Change in track configurations, Method of Operation, or train speeds on a rail corridor.
- Change in ownership on a rail corridor.

IOWA DOT