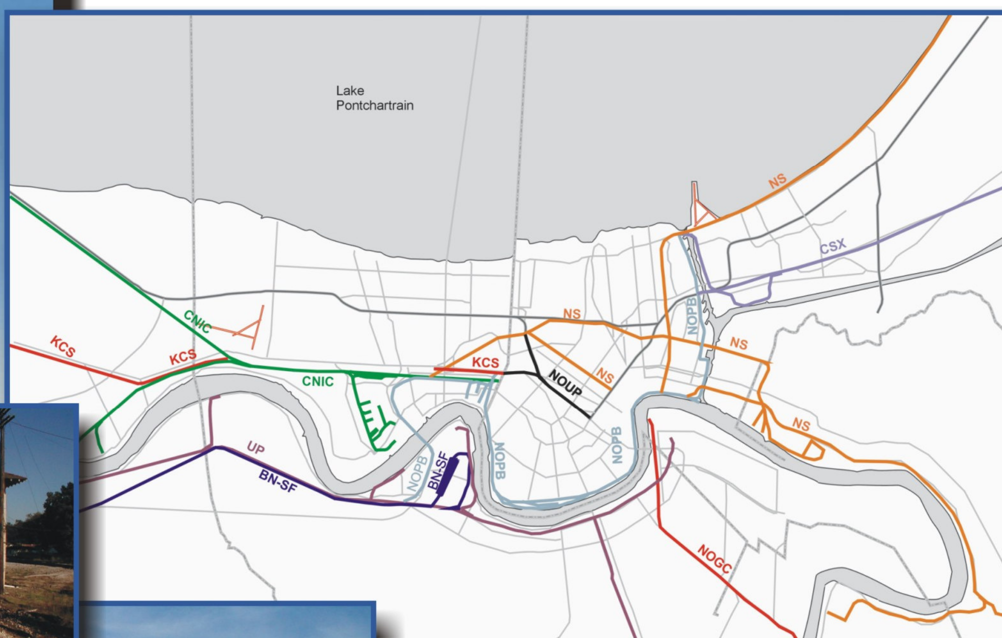
New Orleans Rail Gateway & Regional Rail Operational Analysis

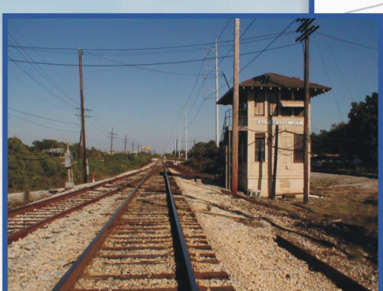
Prepared for:

Louisiana Department of Transportation and Development

State Project No. 737-26-0002
F.A.P. No. HP-T021(021)
Various Parishes

September 2002





Prepared by:

URS

In association with:

CANAC, Inc.
N-Y & Associates, Inc., and
Darrel J. Saizan & Associates, Inc.

NEW ORLEANS RAIL GATEWAY
REGIONAL RAIL OPERATIONAL ANALYSIS

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Notice to Reader:

Cost and manpower estimates submitted herein are based on time-honored practices within the industry. URS does not control the cost of labor, materials, and equipment. Estimates contained herein represent The Project Team's best judgements as design and planning professionals, using the information available at the time of preparation. URS cannot guarantee that proposals, bids, and/or construction costs will not vary from these estimates.

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1.0 INTRODUCTION

Due to its strategic location on the Mississippi River, New Orleans has a long history as a major transportation center, operating one of the busiest ports in the United States for nearly three centuries. During the 19^{th} Century, railroads established rail links to New Orleans to service the thriving Port City.

The major impediment of the Mississippi River forces railroads to terminate/originate either on the east or west side of the river, i.e., eastern railroads terminated on the east side of the river and western railroads on the west side. As demand for cross-country transport of freight grew, New Orleans became a major interchange point for the railroads. Eastern carriers interchanged rail cars with western carriers and vice versa. Interchange with carriers servicing the central and midwest United States also developed.

Today six Class 1 railroads provide service into New Orleans including: two eastern railroads – CSX and Norfolk Southern (NS); two western railroads – Union Pacific (UP) and Burlington Northern Santa Fe (BNSF); and two railroads servicing the central United States – Canadian National Illinois Central (CNIC) and Kansas City Southern (KSC). All six Class 1 railroads interchange freight in New Orleans, creating one of four primary gateways within the United States along the Mississippi River. Other primary rail gateways include Chicago, Illinois; St. Louis, Missouri; and Memphis, Tennessee.

The New Orleans Gateway (Gateway) is also serviced by a publicly owned terminal switching railroad (New Orleans Public Belt Railroad) which provides switching service access to Port terminals and some interchange movements for Class 1 carriers.

Passenger service is accommodated within the gateway utilizing operating rights over the existing Class I railroads and also utilizing trackage and a station operated by the New Orleans Union Passenger Terminal. Amtrak provides passenger service to and from New Orleans to destinations outside of the gateway. In addition, a short line carrier operates on the west bank of the Mississippi River, the New Orleans Gulf Coast Railroad (NOGC).

Deregulation and consolidation in the rail industry, the advent and rapid growth of intermodal rail service, and landbridge concepts have had a significant impact on the railroad industry both nationally, as well as within the New Orleans Gateway. Currently, the majority of rail traffic, both carload and intermodal, moving through the New Orleans Gateway neither originates nor terminates in the New Orleans region. The majority of the traffic is through traffic interchanged between eastern, western and midwestern carriers, which is indicative of changes in the railroad industry, landscape and landbridge concepts.

Significant concerns regarding rail operations within the New Orleans Gateway and within the region have come to the forefront over the last decade, including:

- Concerns from rail customers and the Port of New Orleans regarding rail congestion and transit times through the Gateway.
- Inefficiency in the regional intermodal transportation system, including the interchange and make-up of trains at intermodal yards.
- Vehicular delays and safety at at-grade rail crossings.
- Impacts of freight train operations (i.e., noise and vibration) on adjacent residential landuses.

These concerns voiced by business and industry, as well as local leadership and elected officials prompted the Regional Planning Commission (RPC) in conjunction with the Louisiana Department of Transportation and Development (LDOTD) to initiate a detailed evaluation of current rail operations within the New Orleans Gateway. This evaluation is intended to identify specific deficiencies/problems, which are resulting in congestion and inefficiency in the system and develop an action plan to address those issues.

1.1 Goals and Objectives of the Study

The goal of this study is to develop an implementable *Rail Gateway Action Plan* to improve the regions competitive position in the transportation marketplace so that it will support existing and future economic activity, and associated goods movement needs while minimizing community impacts and improving the overall intermodal transportation system operations in the region and nation.

Specific objectives of the study include the following:

1. Quantify specific operating and infrastructure deficiencies of the New Orleans Rail Gateway network.
2. Develop alternative operating strategies and infrastructure solutions for immediate-term, short-term and long-term planning horizons that:
   - Reduce average transit time for traffic handled through the gateway.
   - Optimize operating cost.
   - Provide improved operating flexibility and ability to recover from major service outages.

- Integrate with requirements and constraints of committed highway and rail transit plans.

- Minimize impact of rail operations to the community and the environment.

- Maximize use of existing infrastructure capacity, thereby minimizing new capital requirements.

- Achieve reasonable consensus of identified stakeholders.

It should be noted that recent initiatives by the railroads are already improving gateway performance and community relations. This study hopes to augment that effort and build upon its success.

1.2 Report Organization

This report is organized into eight primary sections, which describe the process and logical progression of the evaluation. The following format has been utilized.

- **SECTION 1.0: INTRODUCTION**

- **SECTION 2.0: STAKEHOLDER INVOLVEMENT PROCESS**

  In **Section 2.0**, the groundwork of the stakeholder involvement process is examined. To establish the greatest level of involvement and to best manage the process of involvement, three (3) working stakeholder groups were used for the New Orleans Rail Gateway project.

- **SECTION 3.0: DATA COLLECTION AND DISCOVERY**

  Section 3.0 provides a brief description of project efforts for collecting data and information. Methodology is discussed, as is current operations in both freight rail and passenger rail. Initial collection efforts for modeling are also included in this section.

- **SECTION 4.0: RAIL OPERATIONS ANALYSIS**

  In **Section 4.0**, the methodology for rail operations modeling and analysis are more fully discussed. Insight into current operations problems and deficiencies, as well as opportunities, are examined. The results of modeling future rail operations-including an "unconstrained analysis"- are presented, as well. This section concludes with an overview of the modeling results and some conclusions about possible improvements to increase efficiency.

- **SECTION 5.0: DEVELOPMENT OF IMMEDIATE-TERM OPERATIONAL STRATEGIES AND IMPROVMENTS**

  In **Section 5.0**, the development of immediate-term operational strategies and improvements are examined. Three distinct items are highly recommended as a result of rail operation modeling and stakeholder input. They are each included in this section along with cost estimates, schematic layout drawings, and a descriptive overview and need. Several other near-term operational strategies to improve rail operations are also briefly described.
  Section 5.0 also provides a prioritization of the immediate-term projects identified in the previous section. It also gives a phasing schedule, funding breakdown, and an implementation agreement.

- **SECTION 6.0: IMMEDIATE-TERM IMPROVEMENTS COST/BENEFIT ANALYSIS**

  Section 6.0 provides a discussion of the financial benefits associated with the immediate-term improvements.

- **SECTION 7.0: LONG-TERM IMPROVMENTS AND STRATEGIES**

  Section 7.0 includes the remaining potential long-term improvements discussed for the New Orleans Rail Gateway. Several relate to possible future developments that are not well defined at this point, such as the Millennium Port. These improvements include several large cost items. Prioritization of the improvements is also discussed.

- **SECTION 8.0: CONCLUSIONS**

2.0 STAKEHOLDER INVOLVEMENT PROCESS

To fully understand deficiencies in the rail transportation system and to devise an implementable plan of action, two integrated processes were undertaken; 1) a detailed technical and engineering analysis of rail operations and issues; and 2) an extensive stakeholder involvement program. The stakeholder involvement program was initiated early in the process and helped to guide the direction of the study, prioritize deficiencies from a stakeholder's viewpoint, and identify alternative strategies for implementation. Due to the importance of stakeholder involvement in defining an implementable plan, stakeholder involvement was maintained throughout the process. It should be noted that in order to move the proposed recommendations through to implementation, the stakeholder involvement process, especially with participating, railroads, must continue.

To establish the greatest level of involvement and to best manage the process, three (3) working stakeholder groups were initially established for the New Orleans Rail Gateway project. Two of these groups were established via committees: a **Senior Level Steering Committee** and a **Technical Advisory Committee.** The third group was composed of **General Stakeholders** in the community**.** Each of these group's roles, membership and focus are described at length below:

- As its name indicates, the **Senior Level Steering Committee** (SLSC) was composed of the prime decision-makers from the various entities associated with New Orleans Rail Gateway. Committee members included senior executives from each of the six Class 1 rail companies operating in New Orleans, as well as senior executives from the two local lines (New Orleans Public Belt Railway and New Orleans Gulf Coast Railway). Executives from the Port of New Orleans and the various rail-line shippers were also represented on the Committee. In terms of political representation, the Committee also included the Mayor of New Orleans and the Parish President of Jefferson (or their appointees).

  The role of the Senior-Level Steering Committee was primarily one of *policy.* The Committee discussed key questions and issues regarding the New Orleans Rail Gateway, and made joint decisions on future actions. By involving key decision-makers, a higher level of effectiveness in implementation of policy and plans was envisioned. The use of senior-level executives also ensured that the project retained the corporate or organizational focus of each railroad or stakeholder, while still building a consensus on how to improve the New Orleans Rail Gateway. Please see **Table 2-1** for a list of the original Senior-Level Steering Committee members. Some variation in committee membership occurred over time due to internal decisions by representative organizations.

Table 2-1 Senior Level Steering Committee Members		
Name	**Title**	**Company**
Mr. David Carrol	Vice President, High Speed Rail Programs	Amtrak
Mr. E.L. Hord	Vice President, Ft. Worth Service Region	Burlington Northern Santa Fe Railroad
Mr. Terry McManaman	Vice President	Canadian National Illinois Central Railroad Co.
Mr. Marc Morial	Mayor	City of New Orleans
Mr. T.M. Pendergrass	Vice President, Southern Region	CSX Transportation Company
Mr. Jas Gill	Vice President, Manufacturing Past President representing the Louisiana Chemical Alliance	CYTEC Industries
Mr. Tim Coulon	President	Jefferson Parish
Mr. Jack Dail	Vice President, Sales and Marketing	New Orleans Gulf Coast Railway Company (Rio Grande Pacific)
Mr. Gerald Hutchinson	General Manager	New Orleans Public Belt Railroad
Mr. Rick Crawford	Special Assistant, Corporate Affairs	Norfolk Southern Railroad
Mr. Ron Brinson	President & CEO	Port of New Orleans
Mr. Ab Rees	Senior Vice President, International Operations	The Kansas City Southern Railroad
Mr. Steve Barkley	Regional Vice President, Southern Region	Union Pacific Railroad

- The **Technical Advisory Committee** (TAC) was more oriented to the day-to day *operations* within the New Orleans Rail Gateway. The Committee was composed of local operators (management level) of the major rail companies and local rail companies, the Port, freight shipping trucking operators, and representatives of the rail-served business and industrial parks in the area. The Committee also included representation from local and state emergency management agencies. Many members of the TAC were appointed or recommended by their senior-level counterparts on the SLSC.

  In terms of role and purpose, the TAC assisted with the definition of problems and solutions associated with the operations of the New Orleans Rail Gateway. They provided an understanding of how the local rail system functions, provided local data, identified problem areas in operations, and helped to develop operating solutions to those problems. See **Table 2-2** for a list of the original Technical Advisory Committee Members.

Table 2-2 Technical Advisory Committee Members		
Name	**Title**	**Company**
Mr. Steve Johnson	Trainmaster – Avondale	Burlington Northern Santa Fe Railroad
Mr. Jim Fitzgerald	Superintendent, Gulf – South	Canadian National Illinois Central Railroad Co.
Mr. David Hamby	District Superintendent	CSX Transportation Company
Mr. Ray Duplechain	Assistant General Manager	New Orleans Gulf Coast Railway Company
Mr. Kurt Nastasi	Superintendent of Operations	New Orleans Public Belt Railroad
Mr. David Fowler	Superintendent Terminals	Norfolk Southern Railroad
Mr. Max Sanders	Terminal Manager	Universal Maritime Service Maersk-Sealand
Mr. John Cikota	Senior Transportation Executive High Speed Ground Transportation	U.S. Department of Transportation Federal Railroad Administration
Mr. Jim Love	Trainmaster	The Kansas City Southern Railroad
Mr. Willie Reynolds	Superintendent, Livonia, Louisiana Service Unit	Union Pacific Railroad

Table 2-2
Technical Advisory Committee Members

Name	Title	Company
Mr. Patrick Gallwey	Vice-President, Maritime Operations	Port of New Orleans
Mr. Wayne Tankersley	Director, Terminal Operations	CSX Intermodal
Ms. Deborah Wetter	General Manager	Gulf Coast Business Group, (Amtrak)
Ms. Kathleen Norman	President	H.C. Freight Systems, Inc.
Mr. Dan Borne	President	Louisiana Chemical Association
Mr. Glenn Guillot	Vice-President	Southeast Motor Freight

- The third group was the **General Stakeholders**. Composed of local community leaders, elected officials and business leaders, this group's efforts were focused on community issues. The individual stakeholders acted as a conduit for community and neighborhood input, providing an understanding of local citizens' concerns about the railroads, identifying perceived deficiencies, working in consensus building, and assisting in the developing of solutions.

2.1 Senior Level Steering Committee Meetings

The first meeting of the SLSC was held on September 26, 2000 at the Regional Planning Commission, and essentially was a kick-off meeting for the project. A general history and introduction to the project was provided, including a review of the project goal and objectives; a summary of the past, related studies; and a review of the study schedule. Each rail company representative also explained their company’s operations for the benefit of the public officials present at the meeting.

The importance of identifying the problems and concerns in improving freight rail operations in the region was underscored, as was the relationship of the rail system to the proposed Millennium Port, and the various passenger rail initiatives (i.e., between the New Orleans International Airport and the New Orleans Union Passenger Terminal and between Baton Rouge and New Orleans).

A second meeting of the SLSC was held on April 26th, 2001 at the Regional Planning Commission. This SLSC Meeting was held in order to provide a summary of existing and unconstrained model results to the Committee, achieve positive concerns regarding modeling results of existing conditions, and to discuss potential strategies and proposed improvements for consideration.

In regards to the modeling and results, the Project Team provided a review of the rail model program (utilizing the computer animation projection on a presentation screen), showing the differences between the constrained and unconstrained simulations. The Project Team also delivered a presentation showing some of the initial results of the modeling, including inter-yard movements. Data on delay times and constrained versus unconstrained movement times were presented, followed by a review of the strategies and improvements submitted for consideration.

These improvements were divided into three main categories: operational, lower cost capital, and higher cost capital.

The group then discussed several of the proposed strategies and alternatives, with the general consensus items being presented below:

- There was some discussion as to the double tracking through East Bridge Junction (EBJ) and the double tracking of the back belt at Metairie Road 17th Street canal. Although there was some expressed opinions that the former would be of limited value without the latter, others expressed the opinion that it might work in conjunction with the closure of the road crossing at Shrewsbury. Most agreed that the double tracking of the Metairie Road 17th street Canal segment, with or without a grade separation at Metairie Road, would be difficult from a community acceptance standpoint.

- All parties agreed that additional improvements to provide more efficient rail operations through EBJ were critical to the efficiency of the rail gateway.

- An additional item discussed by the group was the potential need for signalization along the Back Belt in Old Metairie.

- Most committee members noted and agreed that the proposed improvement of double-tracking near the 17th Street Metairie Road area, along with the Carrollton curve, needs to be one of the last improvements for implementation because of intense political and community opposition.

2.2 Technical Advisory Committee Meetings

The first Technical Advisory Committee meeting was held on December 15, 2000 at the Regional Planning Commission in New Orleans. The meeting began with an overview of the background of the study and the purpose of the project and meeting. This was followed by a presentation of an outline of the goals of the study, including the differing public and private goals, and the difficulty in balancing these goals in developing strategies to improve the overall freight rail operations in the New Orleans Gateway.

Requests for data were next discussed, as track and operations data were crucial to the successful modeling efforts. The week of December 4-10 was noted as the sample week for traffic data acquisition as it avoided the NOPB work program to replace certain rail on the Huey P. Long Bridge and that week avoided holiday traffic fluctuations and special holiday schedules. The operational analysis and associated modeling efforts were also explained.

Next discussed was the methodology of the modeling efforts that would be undertaken and how requested data would be used therein. An existing scenario would be modeled as well as an unconstrained, but realistic, improved operating scenario without major physical plant improvements. The runs would be executed with existing and forecasted rail traffic. It was explained that immediate operational solutions to the deficiencies would first be investigated, followed by shorter-term smaller scale infrastructure improvements, and other larger scale improvements, as future capacity requirements dictate.

A summary of preliminary identified deficiencies in the New Orleans Gateway was then presented, including the following observations:

1. Excessive train delays await crews at some interchanges;
2. Low crew productivity and poor utilization due to train delays;
3. Poor condition and questionable reliability of key control towers;
4. Chronic congestion at East Bridge junction;
5. Huey P. Long Bridge maintenance regularly impedes traffic fluidity;
6. Potential yard holding capacity constraints contribute to train delays;
7. Operating curfews on Front Belt limit ability to handle major traffic increase;
8. Inconsistent passenger train performance detrimental to fluid gateway operations;
9. Inequities in some interchange procedures leads to reduced traffic fluidity;
10. Operating restrictions near street level crossings in Old Metairie reduce gateway capacity & efficiency and ability to recover from significant outages or weather;
11. Bunching/platooning of inbound trains to yards leads to increased gateway congestion and delay; and
12. Excessive communication and coordination required for basic control within the gateway.

It was then requested that committee members review the list and add any missing issues. The additional items noted were condensed into four additional issues for consideration:

13. Line up sheet Open Line Communications;
14. Double tracking at 17th Street Canal Bridge to and including East Bridge Junction;
15. Redesign and Upgrade signal and switching equipment at East Bridge Junction and West Bridge Junction; and
16. Address intermodal rail operations with trucking.

Once a comprehensive list of deficiencies was identified, all attendees were then asked to rank the priorities, and the rankings/scores of the issues were tabulated. **Table 2-3** lists the noted rail system deficiencies and their prioritization.

Table 2-3
Senior Level and Technical Advisory Committee Prioritized List of Issues and Deficiencies Impacting Gateway Performance

Rank	Issue / Deficiency	Item No.
1	Chronic congestion at East Bridge Junction decreases traffic velocity	4
2	East Bridge Junction to Huey P. Long Bridge double tracking, outdated switching equipment	15
3	Poor condition and questionable reliability of key control towers	3
4	Double Track 17th Street	14
5	Excessive communication and coordination required for basic traffic control	12
6	Bridge maintenance regularly impedes traffic fluidity	5
7	Excessive train delays awaiting crews at some interchange points	1
8	Yard capacity constraints contribute to train delays	6
9	Line up Sheet / Open Line (Status)	13
10	Front Belt operating curfews and lack of room for expansion limit its ability to handle major traffic increase	7
11	Inequities in some interchange procedures leads to reduced traffic fluidity	9
12	Low crew productivity and poor utilization in some areas	2
13	Street level crossings in Metairie reduce gateway capacity and efficiency	10
14	Bunching of inbound trains to yards leads to increased congestion and delay	11
15	Inconsistent passenger train performance detrimental to smooth gateway operations	8
16	Added intermodal operations	16

Source: December 15th, 2000 Technical Advisory Committee (TAC) Meeting, Regional Planning Commission.

The second meeting of the TAC occurred on April 25th, 2001 at the Regional Planning Commission. The meeting began with the presentation of several "unconstrained" model animations of gateway operations. The constrained model presented was the data collected for the model week, December 4 through December 10, 2000 including recorded delays.

The meeting then proceeded with reviews of project objectives, project program to-date, and the operations modeling approach. The initial results of the modeling were then presented, including train delays at key gateway locations, and transit time (present versus unconstrained) for selected interyard movements.

The next steps in the modeling process were then reviewed:

(a) Model future conditions based on traffic growth using projected annual increases.

(b) Look at maximum useable train lengths to only add trains as required.

(c) Add Millennium Port rail traffic projections to model.

(d) Evaluate solutions developed to improve rail operations for near-mid-and long-term in the gateway.

All parties agreed that the modeling effort to date appeared to be reasonable and accurately modeled the existing conditions.

The Project Team and Committee then preliminarily identified and discussed potential improvement strategies, which were divided into a) Operational; b) Lower Cost Capital Improvements; and c) Capital Intensive Improvements. **Table 2-4** indicates the results.

Table 2-4
Potential Strategies and Improvements for Consideration

Operational	Capital Improvements	
	Lower Costs	Capital Intensive
Coordinated Operation of East and West Bridge Towers	New East Bridge Tower	Evaluate adding Yard Capacity
Gateway Coordination Center	Improve East Bridge Controls	Double Track 17th Street
Evaluate Impact of Crew Changes	Consolidate East / West Bridge Operations	Evaluate NOPB to Westbound CNIC / KCS
Evaluate Bridge Maintenance Practices	Evaluate Improved Dispatching / Communications Equipment	Evaluate NOPB to Eastbound UP (Millennium Port Connection)
Directional Travel Within Gateway	Double Track East Bridge Junction	Evaluate Ballast Deck for HLP Bridge
	Enhance Highway / Rail Warning System	Evaluate Grade Separated Crossings in Metairie
	Additional Warning Devices on Back Belt	Carrollton Curve Alternatives

Late in the process, the FRA provided additional input. They requested that scaled maps of proposed improvements to the physical plant and signal system be provided. Second, they requested that the future needs of high-speed rail be taken into consideration regarding any proposed upgrades to the system consistent with FRA guidance as provided in **Appendix C**. They also requested that signal upgrades along the NS Back Belt be considered and along with remote operations of such upgraded signal systems from the Regional Rail Coordination and Communication Center.

2.3 General (Individual) Stakeholder Meetings

As part of the New Orleans Rail Gateway Study, the Project Team held a series of "one-on-one" meetings with general stakeholders in the area. Stakeholders are identified as major clients or business partners of the rail network (shippers, intermodal operators, and port), as well as elected officials and other representatives of the general public and affected community.

Table 2.5 summarizes General Stakeholder Meetings and key issues discussed. **Appendix A** includes detailed meeting minutes.

Table 2-5
General Stakeholder Meeting Summary

Stakeholder	Meeting Date	Issues Noted by Stakeholder
New Orleans City Councilperson District C	February 13, 2001	• Interruption of traffic flow/vehicular delay at rail-highway crossing • Noise • Vibration • Policy on at-grade rail delays
New Orleans City Councilperson District D	February 13, 2001	• Need for passenger rail • Noise • Blockage of intersections/rail-highway crossings • Maintenance of rail right-of-way • Movements of hazardous materials
New Orleans City Councilperson District B	March 26, 2001	
New Orleans City Councilperson District E	March 26, 2001	• Blockage of intersections/rail-highway crossing • Maintenance of rail right-of-way • Safety of at-grade intersections
Jefferson Parish Councilperson 6th District	March 23, 2001	• Frustrated with lack of action on rail issue in Old Metairie • Relocation of rail line out of Old Metairie • Horn blowing requirements Blockage of at-grade intersections • Maintenance of rail right-of-way
Jefferson Parish Councilperson Representative 3rd District	May 3, 2001	• Difficulty in dealing with railroads on Public Works issues
Director of Terminal Operations, CSX Intermodal	March 1, 2001	• Need for coordinated operations
Traffic and Transportation Club President	March 2, 2001	• Economics of shipping freight through Gulf Coast Port (Houston vas. New Orleans)
Port of New Orleans	March 2, 2001	• Drayage dominate between Port and rail • Impacts of Millennium Port concept • Congestion at East Bridge Junction
Maersk-Sealand Terminal Representatives	April 19, 2001	• Maintenance on Huey P. Long Bridge • Lack of Traffic with western carriers for Port of New Orleans import/export
New Orleans Regional Chamber of Commerce's Intermodal Transportation Council	April 20, 2001	• Need for westbound connection coming off Huey P. Long Bridge on Eastbank • Consolidation of IC and KCS lines over Bonnet Carrie Spillway

2.4 Continuing Stakeholder Involvement and Coordination

In addition to the documented key stakeholder meetings, numerous other discussions were held with representatives of the railroads and other stakeholders during the data collection and technical evaluation of the gateway, some via phone and others face-to-face. Comments and technical data acquired from these discussions and meetings were utilized in the technical and communities issues evaluation.

As the study progressed, important decision making forums were utilized to further the stakeholder involvement process. Project Team members met with the New Orleans Terminal Improvement Committee, which is comprised of representatives of all Railroads operating in the New Orleans region, as well as the New Orleans Public Belt Railroad. This committee had been established by the railroads operating in the region to identify and implement improvements in the New Orleans Gateway for the purpose of improving rail operations and transit time. Personnel on this committee had been meeting regularly for some time and membership was generally consistent with that of the TAC established as part of this study. This group corresponded regularly with SLSC personnel who also attended the New Orleans Terminal Improvement Team Meeting at milestone / decision points.

The meetings were held typically at the NOPB Administration Building. The Project Team was invited to attend several of these meetings to present and get concurrence on study findings, review proposed strategies and improvements for implementation, to prioritize improvements regarding rail operations, and physical plant and improvements. Details regarding consensus for the proposed improvement program, funding considerations, and implementation strategies resulting from the stakeholder involvement program are outlined in **Section 5.0** "Immediate-Term Improvements / Program Summary."

2.5 Key Stakeholder Issues

Rail deficiencies and operating issues were identified through a combination of Technical Advisory and Stakeholder involvement and are documented in **Table 2-3**.

Other key stakeholder issues can be divided into two main types: issues relating to the general public, which were primarily offered by community officials; and commercial issues, which were generally offered by the clients/business partners of the rail network. These issues are listed and summarized as follows:

2.5.1 General Public Issues

1. Traffic Flow Interruption/Vehicular Delays at Highway-Rail Grade Crossings - Almost every elected official described this as a concern of his constituents. There are a number of at-grade crossings in the metro area, some of which occur on major thoroughfares. The duration of vehicular delay is a major point of contention that the general public has with the rail operators.

2. Noise - Several officials stated that train noise was an issue, whether it was from direct train movement (engine noise; rumbling, squealing wheels) or horns/whistles associated with at-grade crossings. This issue is of significant importance in the Jefferson Parish segment of the Back Belt where a State statute has been instituted, which prohibits the blowing of train horns at seven at-grade crossings. The Parish and community are adamant about maintaining the ban on horn blowing in that segment of the Back Belt despite proposed FRA regulations requiring that any locomotive approaching a crossing sound a horn. A "*Notice of Proposed Rule-Making*" released by FRA in 2000 discussed a provision for a "*Quiet Zone*" as long as "*supplementary safety measures*" have been implemented. The final rule has not yet been issued.

3. Supplementary Safety Measures - From a community acceptance standpoint, it is imperative that any "*supplementary safety measures*" necessary to maintain prohibition on horn blowing at these seven intersections be implemented as expeditiously as possible. Vibration from passing trains was also listed as an associated concern.

4. Property Maintenance - At least two officials stated that they and their constituents had problems with how the local rail operators maintained their right-of-way, whether it was in regards to cutting of grass and weeds along the right-of-way or maintenance of physical improvements related to the railroads (ditches, bridges, underpasses, etc). The Louisiana Legislature has recently enacted new legislation requiring maintenance of the entire right-of-way.

5. Hazardous Materials - At least two officials stated that the movement of hazardous materials through their district was a concern, with past incidences of derailments given as examples.

2.5.2 Commercial Issues

1. Congestion at East Bridge Junction – All parties contacted confirmed the findings and opinions of the committees – that East Bridge Junction is the biggest bottleneck in the local system, and it severely affects operating efficiency in the New Orleans Gateway. As an extension of the junction, the Huey P. Long Bridge was also seen as a problem by some, due to its usual limit of having only one lane open for train traffic several days a week due to maintenance operations.

2. Millennium Port and associated infrastructure improvements - Key stakeholders were in agreement that some type of new port facility was essential to keeping New Orleans transportation/shipping operations viable. Other ports, such as Houston and Gulfport were described as moving forward and increasing their business at New Orleans' expense. Most felt that the Millennium Port concept is a good start, but pointed out that necessary infrastructure improvements (notably, rail and highway connections) were essential to making the concept work. Several ideas for connectivity were advanced by the stakeholders during the course of the meetings.

3. North/South Trade Corridor – Several of the commercial stakeholders pointed out that the main focus of trade and transfer in the New Orleans Area is North/South: north to and from the markets of the Midwest or 'heartland' of the country, and south to and from Latin America. East/West rail movements are also critical to the regional and national transportation system; however, a majority is through traffic.

It is important to note that the stakeholder involvement process was consistent throughout the development of the study and helped to shape the outcome of the report. The deficiencies and strategies for improvement identified for study in coordination with the Project Team became the strategies analyzed as documented in **Section 4.0**. Prioritized strategies and improvements, as well as implementation strategies, were developed in coordination with key stakeholders to build consensus for the Implementation Program.

3.0 DATA COLLECTION AND DISCOVERY

3.1 Data Collection

The study began with the Project Team devoting considerable time to become fully familiarized with the railroad infrastructure and daily operation of trains in the gateway region. Meetings were held with each of the designated representatives of the various railroad stakeholders, from frontline terminal superintendents to regional vice-presidents, to collect operating data in its various forms to support the project effort. The collected information included track diagrams, timetables, yard plans, train schedules, and operating statistics.

Interviews with operating personnel provided details of typical day-to-day operations for each of the railroads, as well as traffic interchange procedures – including the location, sequence and frequency of these movements between each of the gateway railroads. Interviews with senior management representatives provided a broader perspective of the role of the New Orleans gateway in each of the major carrier's networks, in terms of upstream terminals and general mainline flow patterns. Details pertinent to current gateway performance, identification of chronic operating problems, and suggested improvements were discussed and noted.

An important facet of this data collection phase was to gain an understanding of the present methods and procedures used to dispatch the movement of trains through the gateway. Of particular interest were the methods employed to coordinate the movement of traffic from one railroad to another, particularly through interlocking zones, where two or more railroad networks meet (e.g. typically, in a complex cluster of track connections and signals). Details of dispatch authorities, prioritization of traffic and operating constraints and curfews were noted.

The Project Team also verified the accuracy of track plans in the field to ensure the documentation of the track arrangements was current. At the same time, general condition of track, structures, bridges were noted. At grade level crossing locations and general activity levels were noted, as well.

3.2 Freight Rail Operations

3.2.1 Physical Plant

Figure 3-1 is a schematic of the regional rail gateway network indicating the ownership and layout of principal trackage, location of junctions, bridges and interlocking facilities, classification yards and intermodal terminals.

Figure 3-1
New Orleans Gateway Primary Rail Network

(Please download *3_1.pdf*)

It has evolved over time that New Orleans became one of four national, east/west traffic interchange centers for the major Class 1 railroads. In New Orleans, interchange traffic is moved amongst the Eastern (CSX and NS), Mid-West (KCS and CNIC), and Western (UP and BNSF) freight carriers. In addition, two shortline railroads, the NOPB and the NOGC support the city's role as a principal Gulf coast and Mississippi River port. Their main focus is to serve local port terminals and rail-based industries.

The Class I carriers handle a variety of traffic in the New Orleans area. In addition to handling interchange traffic, each carrier operates domestic intermodal facilities handling local traffic, as well as serving regional industries with local switching assignments.

The two dominant geographical features of the gateway region are the Mississippi River, which forms the natural separation between the eastern and western carrier operations, and Lake Pontchartrain, which diverts north-south train movements to its eastern and western shorelines. three rail lift bridges span the Industrial Canal, which connects these two bodies of water in the eastern section of the city.

Spanning the Mississippi River is the Huey P. Long (HPL) Bridge, a 5-mile long, double tracked TRUSS bridge built in the mid-1930's. The HPL Bridge is owned and maintained by the NOPB.

The two western Class I carriers operate from the west bank of the Mississippi River from a cluster of yard facilities at Avondale. UP operates trains over the HPL to interchange traffic with the other Class I railroads and is the largest operator in the gateway in terms of traffic handled. The UP also serves a variety of local industries on the west bank in addition to interchanging a small volume of interchange traffic to the NOGC – principally grain trains destined to local elevators.

As a result of the UP-SP merger, Avondale was split into three freight yards with UP operating out of the north and south yards, and BN in the middle. UP uses their yard to support the handling and switching of both interchange as well as local switching assignments. Whereas, BN utilizes their yard primarily as an exchange point with the NOPB, who perform their interchange and switching operations on behalf of BN.

UP operates an intermodal terminal at Avondale with two ramp tracks of 1,645 feet each, served by a gantry crane. UP's mainline extends to the west towards Livonia Yard, the next major upstream yard. UP and BN jointly dispatch their two mainlines, running trains directionally.

BN interchange traffic is handled by the NOPB, which acts as BN's operating agent in the gateway area. BN operates a small intermodal terminal located east of Avondale, adjacent to UP's Westwego Yard. It has a single ramp track served by a front-end loader.

Train movements at the west end of the HPL Bridge are controlled at the West Bridge Junction Interlocking (WBJ). The interlocking plant consists of a control tower and a signal system for a network of powered track switches. The interlocking facility is owned by the NOPB but the UP maintains the plant and supplies the tower operator. See **Figure 3-2** for a schematic of the WBJ plant.

Movements over the bridge are coordinated with the East Bridge Junction (EBJ) interlocking operator located at the opposite end of the bridge. This facility is also owned by the NOPB, with signal maintenance and operators provided by the CNIC. The EBJ operator controls the busiest section of track in the gateway. This interlocking facility connects trackage for all six Class I freight carriers and is the principal corridor through which over 80 percent of all gateway interchange train movements flow. **Figure 3-3** is a schematic of the East Bridge Junction plant.

The primary traffic route through EBJ is via the 7.7-mile long NS connection track, known locally as the Back Belt. Most traffic exchanged between the UP, CNIC and KCS with the east coast carriers, NS and CSX, moves by this route. Over 50 percent of gateway interchange trains move across the Back Belt corridor.

Beginning at the western end at the junction with the CNIC mainline, the Back Belt consist of: single track mainline with a passing track for 2.2 miles to Metairie Road.; 0.5-mi. single track over the 17^{th} Street Canal; 5 miles of double track to Terminal Junction where the Back Belt leads into Oliver Yard. The double track connection to the CSX is located at Mile 7.0, known as New Orleans Terminal Junction.

NS has a main yard, Oliver Yard, located in the city's east side, with a capacity of 550 cars. They also operate a small intermodal terminal and auto compound located on adjacent property. The NS mainline to Birmingham runs north from Oliver Yard and over the Seabrook Lift Bridge, which crosses the Industrial Canal.

The alternative route across the gateway is via the NOPB mainline called the Front Belt. This 18-mile cross-town route follows the river's east bank from the HPL Bridge through the city. At the east end of the Front Belt, the NOPB connects into the NS Oliver Yard and to CSX's Gentilly Yard. NOPB mainline is mostly single track with 90-lb. to 133-lb. rail. In addition to Cotton Warehouse, with a capacity of 900 cars, NOPB has two other yards: France Yard (capacity of 180 cars) and Claiborne Yard (capacity of 180 cars) which is primarily used for plastics car storage.

CSX's Gentilly Main Yard, with a capacity of 2500 cars, is located east of the Industrial Canal. All interchange train movements with the other gateway carriers must cross the Almonaster Lift Bridge. CSX operates a large intermodal terminal on the east end of their property. The CSX mainline to Mobile extends to the east of Gentilly Yard.

CNIC's main yard is Mays Yard located west of EBJ. The CNIC have running rights over the Front Belt to access their intermodal yard located east of Cotton Warehouse Yard. They are considering plans to move their intermodal terminal to Mays Yard and potentially consolidating operations with KCS.

CNIC's mainline extends westward from Mays Yard and splits at the west end of the city to Memphis and to Baton Rouge.

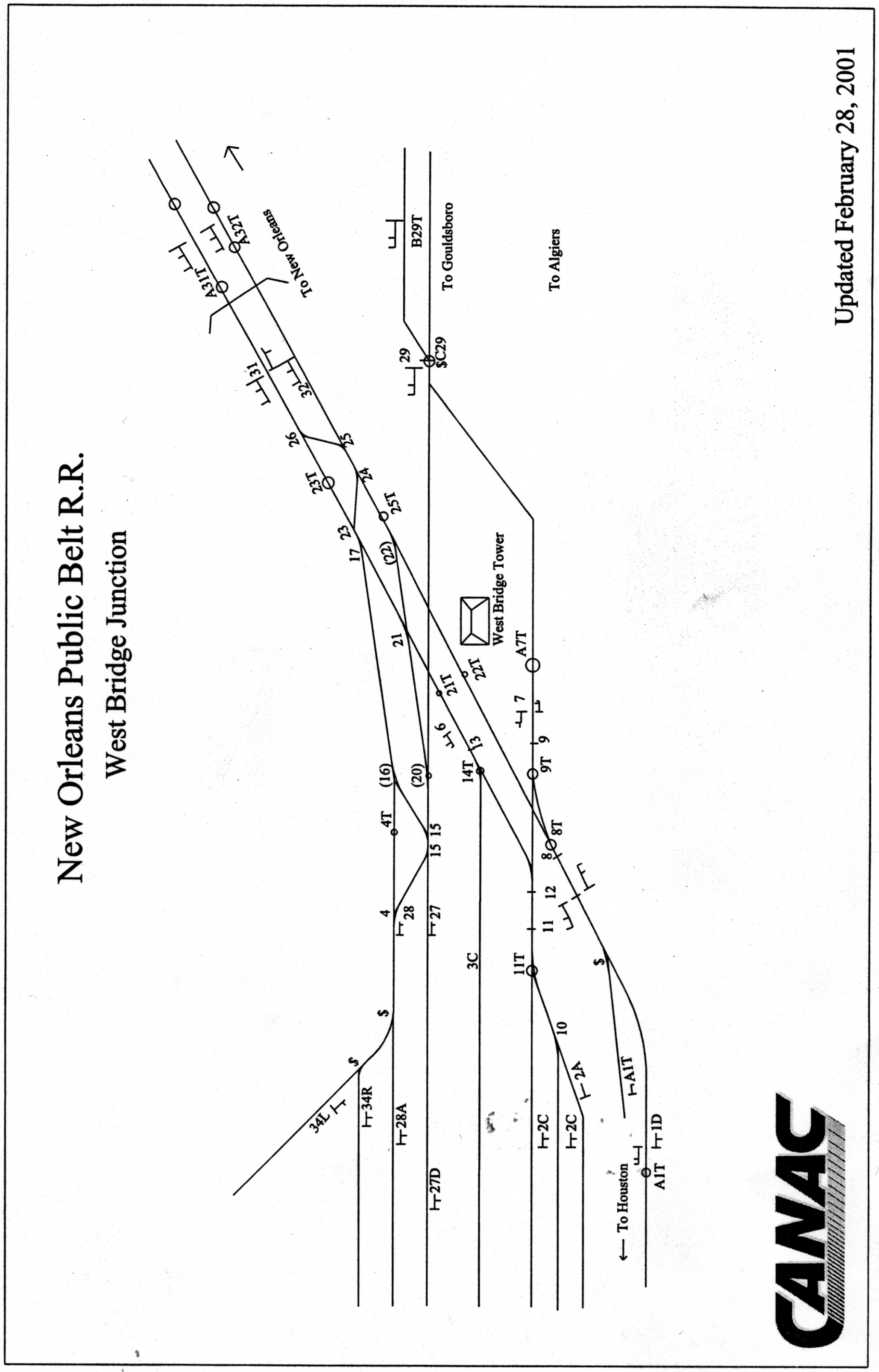


Figure 3-2 – West Bridge Junction Layout

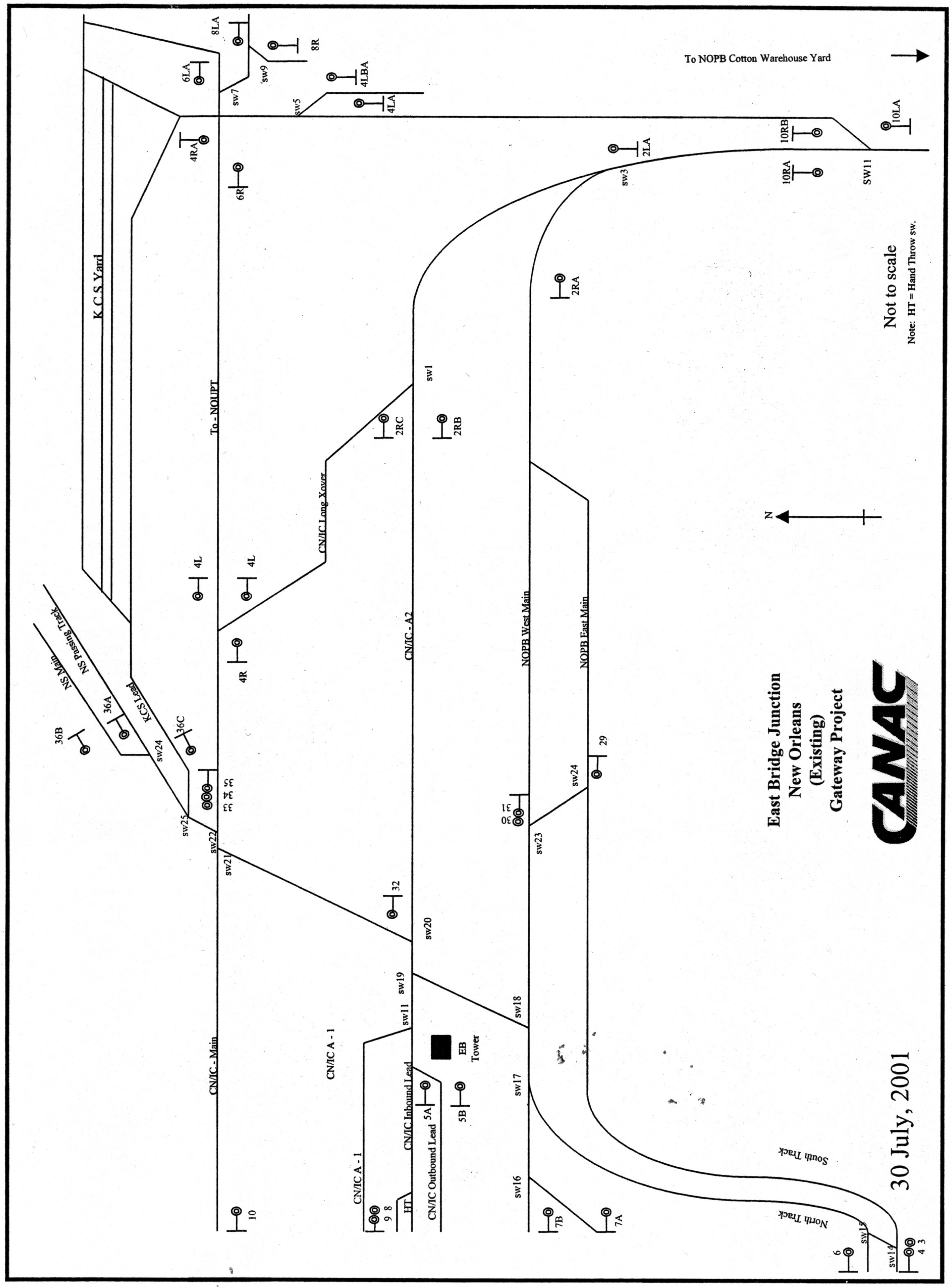


Figure 3-3 – East Bridge Junction Layout

Interchange movements between Mays Yard and the HPL Bridge require reverse movements through EBJ due to the orientation of the track at EBJ. This causes undue delay to trains operating through this junction when these movements occur.

The KCS operates into New Orleans from the west exercising their running rights over the CNIC mainline. To access the KCS main yard, trains must run through EBJ and over a short segment of NS track at the west end of the Back Belt. KCS Yard has a capacity of 600 cars. The KCS mainline connection to Shreveport is accessed via the CNIC mainline to Baton Rouge.

The NOGC railroad single track mainline extends 24 miles southward from the UP interchange yard at Gouldsboro to the grain terminal at Myrtle Grove. Mainline speed is limited to 10 mph due to numerous (>200) public and private at-grade level crossings. Their main yard is located at Belle Chasse, 10 miles south of Gouldsboro, and has a holding capacity of 190 cars.

3.2.2 Existing Train Operations by Carrier

Interchange movements within the gateway between mainline carriers were the primary focus of the gateway analysis. On a typical day, over 35 train movements are associated with freight interchange traffic across the gateway. In addition to these, other train movements also take place including passenger trains, local industrial switchers, intra-railroad yard transfers, and track maintenance movements.

Interchange procedures and frequency amongst the railroads has evolved over time to suit changes in volume of traffic and to reduce operating costs for locomotives and crews. Wherever possible, run-through trains are kept out of yards and forwarded intact to the receiving railroad - often with road power exchanged. Crew change locations have also changed over the years to minimize the impact on adjacent highway-rail grade level crossings.

The following are details of the typical daily interchange movements and their associated procedures as performed by the various mainline carriers:

<u>Union Pacific</u>

CSX - Eastbound

UP delivers 5 trains per day to CSX via the Back Belt using UP crews. Four (4) trains are delivered to Gentilly Yard while one through train is delivered to France Road for re-crewing by a CSX road crew.

CSX - Westbound

CSX crews deliver 5 trains daily via the Back Belt to Marconi Drive for pick-up by UP crews. Three (3) of these are through trains, which are re-crewed by UP road crews. One additional intermodal train is brought to France Yard by CSX crew for delivery by NOPB crew to Avondale Yard via the Front Belt. NOPB is committed to deliver this priority intermodal train to UP within 3 ½ hours.

Marconi Drive has been designated as a crew change location for westbound trains on the Back Belt since up to three trains can be staged without fouling any at-grade level crossings. Although the crew change point was switched functionally to Marconi several years previously, the official interchange point for UP traffic remains at Central Ave, at the eastern foot of the HPL Bridge.

NS - Eastbound

UP delivers 4 trains per day to NS. Three (3) are delivered to Oliver Yard by UP crews. One of the daily CSX interchange trains includes a cut of NS traffic that is set off at New Orleans Terminal Junction for subsequent pick-up by a NS Oliver Yard crew.

NS - Westbound

NS delivers up to 3 to 4 trains per day to Marconi Drive for pick-up by UP crews for delivery to Avondale. Run through trains (3) are picked by UP road crews.

CNIC - Eastbound

UP crews deliver 1 train per day to Mays Yard.

CNIC - Westbound

UP picks up 1 train per day from Mays Yard.

NOPB - Eastbound

UP delivers 3 trains per week to Cotton Warehouse Yard. Cuts include traffic for NOPB, KCS, and BN.

NOPB - Westbound

UP picks up 3 trains per week from Cotton Warehouse Yard with same traffic mix as above.

Burlington Northern

NOPB - Eastbound

NOPB mandated to act as BN's operating agent in New Orleans. NOPB picks up from Avondale Yard 2 to 3 trains per day of mixed interchange traffic and delivers to Cotton

Warehouse Yard for switching and re-blocking. If sufficient time is available, BN road crews may also deliver trains directly to Cotton Warehouse.

NOPB - Westbound

NOPB delivers to Avondale Yard up to 3 trains per day of mixed origin. NOPB blocks traffic on behalf of BN.

Norfolk Southern

CNIC / KCS - Eastbound

NS picks up KCS and IC traffic once daily at Mays Yard on return trips from eastbound set-off. Part of this return consist includes traffic for CSX which NS delivers to Gentilly Yard before completing its run at Oliver Yard. CNIC blocks traffic for NS and CSX.

CNIC / KCS - Westbound

NS interchanges with both the CNIC and the KCS at CNIC Mays Yard. NS delivers 1 train per day with cuts for both railways.

New Orleans Public Belt

NOPB - Eastbound/Westbound

NOPB delivers and pulls interchange traffic on behalf of BN once daily at NS Oliver Yard via the south end of the yard.

CSXT

NOPB - Eastbound

NOPB delivers once a day to Gentilly Yard.

NOPB - Westbound

CSX crew delivers 2 trains per day to NOPB France Yard with traffic destined for IC, KCS, NOPB, as well as lesser amounts for NS and BN. CSX interchanges with NS primarily at Birmingham. NOPB must switch and block this traffic before delivery to the other railroads.

Canadian National

KCS - Eastbound

KCS picks up CNIC and NS traffic once a day or as required, at Mays Yard.

KSC - Westbound

KCS delivers traffic once a day or as required, for IC and NS to Mays Yard.

NOPB - Eastbound

CNIC delivers traffic for NOPB and BN to Cotton Warehouse once a day.

NOPB - Westbound

CNIC returns daily with traffic from BN and CSXT from Cotton Warehouse.

Kansas City Southern

CSX - Eastbound

Once a day, a 'solid' CSX-destined train from Shreveport is brought to Central Ave where KCS road crew changes with an NS crew who delivers train to Louisa Street A CSX crew then delivers the train to Gentilly Yard.

CSX - Westbound

Interchange provided through NOPB.

NOPB - Eastbound

KCS delivers traffic to NOPB Cotton Warehouse Yard, 3 times per week, and returns empty.

NOPB - Westbound

NOPB delivers traffic to KCS daily, and returns empty.

New Orleans Gulf Coast

UP - Eastbound/Westbound

UP delivers and picks up traffic once per day, 5 days per week, at Gouldsboro Yard.

3.2.3 Operational Issues Through Gateway

In anticipation of the potential impact of future traffic growth on top of the present volume of over 20 trains a day through the Back Belt corridor, the Project Team focussed on identifying any operating characteristics that limit traffic fluidity. Several operating constraints were noted.

Traffic movements over the Back Belt are restricted by the presence of seven at-grade level public crossings within the Old Metairie residential district. Although 2.2 miles is essentially double tracked between Metairie Road and the CNIC mainline, trains are not permitted to pass each other or stop on this segment, in order to limit interference with vehicular movements over these crossings. Furthermore, westbound trains cannot be held at the end of the double track segment (i.e., 17th St. Canal due to restrictions against idling of engines in close proximity to local residential properties. These trains must be held at Marconi Boulevard, within City Park, at Mile 4.2. Consequently, this trackage is functionally limited to single track for 4.2 miles between Marconi Boulevard and EBJ. The additional advantage of staging trains at Marconi is that up to three westbound trains are able to queue without occupying any at-grade level crossing.

Eastbound trains are frequently held on the HPL Bridge until authorized to proceed across the EBJ and the Back Belt.

In addition, the EBJ operator is instructed to allow 5 to 10 minutes between train movements to allow any queued vehicles to clear the crossings. This further contributes to loss of potential line capacity and operational fluidity.

Another factor affecting Back Belt fluidity and capacity is that the 2.2 mile segment from Metairie Road to the connection at EBJ is unsignaled. Hence, trains must operate as per "yard limits," under the authority of the Yardmaster at Oliver Yard, at speeds not to exceed 20 mph, as compared to 30 mph in effect over the balance of the Back Belt, which is all Centralized Traffic Control (CTC) signaled.

Past suggestions to improve rail operations through this corridor by increasing train speeds and/or closing and grade separating certain public crossings have typically been met with significant community resistance over concerns with noise, safety, and quality of life issues.

3.2.4 Communications/Coordination Basic Protocols

It was noted from field observations and review of available operating statistics that traffic movements across the bridge and through the Back Belt experience significant delays. These delays are often attributable to lengthy crew changes and authorization delays at Marconi. Queuing of trains on the HPL Bridge awaiting permission to proceed through the interlockings at both ends was also observed.

To obtain authorization for a train to pass through the gateway may require many phone calls to several railroads depending upon the routing of the train. For example, a single interchange train movement between UP and CSX across the Back Belt requires the communication and collaboration of eight contacts: UP yard tower; WBJ control tower, EBJ control tower; CNIC yard tower; NS yard tower; NS Birmingham dispatcher; CSX tower; Almonaster Lift Bridge operator. It was noted that a minimum of 10 to 15 minutes is typically required for the EBJ operator to receive authorization from all parties for a single movement. At times, the communication process takes so much time that the whole process must be repeated to ensure all parties still concur.

The railroads hold three conference calls daily to plan and coordinate gateway traffic movements in advance for each shift. This process has helped reduce delays to some degree. However, given the dynamic railroad-operating environment, resource constraints, conflicting priorities of individual railroads, and frequent delays in communication-chronic delays within the gateway are to be expected. The resulting train delays represent additional operating costs for crews, power, rail cars and, of particular importance, added transit time for potentially time-sensitive traffic.

3.2.5 Yard Capacity Issues

Site visits to each of the rail yards were conducted during the course of the data collection/field investigation component of the study. Carload capacity of rail yards were documented in **Section 3.2.1 Physical Plant**. While detailed yard capacity analysis was not performed as part of this effort, several observations were made, which may reflect some possible yard capacity constraints, including the following:

- Queuing of trains at Marconi and on the Huey P. Long Bridge within the gateway. Some trains may be launched prematurely in order to "free-up" receiving yards, and/or trains are delayed at these locations because the receiving yards may not be able to accept trains.

Potential capacity constraints at yards may include track capacity, switching crew capacity, switching power capacity and inspection and repair capabilities.

3.3 Passenger Rail Operations

Amtrak trains operate daily over the Class I carrier lines en route to (or from) trackage owned by the NOUPT, a combination passenger train and bus station located in the center of town. Passenger trains are given high priority for operation through the gateway. One hour operating curfews are regularly imposed for freight movements in front of passenger trains to ensure no delays are incurred.

3.3.1 Existing Rail Operations in Gateway - Passenger Rail

Amtrak Service

Amtrak serves intercity passenger rail in the New Orleans Gateway. Three trains serve New Orleans:

- The *City of New Orleans*, a daily line which runs north-south between New Orleans and Chicago;
- The *Crescent*, a daily line which runs northeast-southwest between New Orleans and New York; and
- The *Sunset Limited*, a tri-weekly line that runs east-west between Los Angeles and Orlando.

Timetables for departures and arrivals of these lines (within the New Orleans gateway area) are presented below:

City of New Orleans (daily)	
(outbound)	
Departs New Orleans	2:05 PM
Departs Hammond	3:14 PM
(inbound)	
Departs Hammond	1:40 PM
Arrives New Orleans	3:40 PM
The Crescent (daily)	
(outbound)	
Departs New Orleans	7:00 AM
Departs Slidell	7:55 AM
(inbound)	
Departs Slidell	6:45 PM
Arrives New Orleans	8:20 PM
Sunset Limited (tri-weekly)	
(westbound, Wednesday/Friday/Sunday)	
Arrives New Orleans	9:20 AM
Departs New Orleans	12:45 PM
(eastbound, Tuesday/Thursday/Sunday)	
Arrives New Orleans	7:25 PM
Departs New Orleans	10:30 PM

All passenger trains arrive and depart from the NOUPT located in the downtown section of the city. The Amtrak trains utilize four major freight rail routes leading into and out of the city: the Norfolk Southern Line to the northeast, the CSX line to the east, the BNSF line to the west (via the westbank) and the CNIC to the north. As mentioned in the previous section, conflicts between scheduled Amtrak trains and scheduled freight trains can occur, particularly when one of the trains is running off-schedule (i.e., late).

Current ridership figures for Amtrak service were obtained through the local Amtrak office. In general, ridership averages about 300 passengers per day divided among the three trains. Although the Sunset Limited is a ‘pass-through’ route in New Orleans, it has roughly as many passenger boardings and disembarkations as the other two routes that have their termini in New Orleans.

In terms of future ridership projections, Amtrak has indicated that they are anticipating a 10 percent annual increase on the *City of New Orleans* and *Crescent*, with about a 5 percent increase on the *Sunset Limited*. This increase can be absorbed by the existing trains, however, as they generally run at 60 percent capacity. No additional daily trains are foreseen, nor are any additional cars expected to be added to trains.

There are several possible route changes to Amtrak, which may affect operations in the New Orleans Rail Gateway. One is the route change of the *Sunset Limited*. The *Sunset Limited* currently runs west to Houston and San Antonio, then on to El Paso. Under planned changes, this route will go through Houston then north to Dallas, then west to El Paso. Amtrak has indicated that this is a long-term possibility and not a certainty, one that had a lot to do with freight and mail issues rather than passenger issues. If implemented, it would not be before the fall of 2002, and it would involve a daily train accessing New Orleans, rather then the current tri-weekly train.

Another change is a "split" in the *Crescent*, with the train "splitting" from the main route at Meridian, Mississippi. Some cars would continue on the traditional route to New Orleans, while some would join with a new engine and head westward through Jackson, Vicksburg, Monroe, Grambling and Shreveport to Dallas as an alternate terminus. This would have little effect on the ridership of the *Crescent* into and out of New Orleans.

Conversely, there has been much talk in Congress regarding funding for Amtrak. There has been some discussion of eliminating long-distance passenger trains altogether, which would result in New Orleans having no future Amtrak passenger rail service. At the present time, however, such modification moves do not appear imminent and for purpose of analysis, current operations are considered to be the norm throughout the near-term horizon.

3.4 Freight and Passenger Rail Conflicts

In terms of conflicts with freight rail in the New Orleans area, Amtrak currently has operating priority for their trains with an approximate one-hour "window" during their scheduled arrival or departure time. In other words, if a train is to leave at 3:00 P.M, it has an operating window of one hour around which it has first priority on moving through the New Orleans Gateway. After that, it is at the "mercy" of the freight rail owners, and is "fit in" as quick as possible. Most of the time, the *Crescent* and *City of New Orleans* are on-time 85 percent, but the *Sunset Limited* is on-time only about 15 percent of the time. On occasion, there have been problems with CSX when *Sunset Limited* trains have not made their operating window, and passengers have had to be bused to Florida rather than ride the train. There have also been problems with Amtrak trains operating on the UP line.

There are daily conference calls with the freight operators to arrange times for Amtrak trains to pass through the gateway at an amenable schedule for all involved.

By law, Amtrak trains are not allowed to travel over 79 mph. In the New Orleans Gateway, speeds generally do not exceed 40 mph as a safety precaution at at-grade highway/rail crossings.

A proposed future fixed light rail line from the downtown to the airport would be on separate track and would not conflict with freight rail movements. High-Speed Passenger Rail trains (90 to 125 mph) do not exist in this region to date. They would require dedicated right-of-way and therefore, would not conflict with freight rail movements.

4.0 RAIL OPERATIONS ANALYSIS

4.1 Methodology for Rail Operations Modeling and Analysis

4.1.1 Computer Simulation Modeling

One of the most significant efforts undertaken in this study was the development of a computer simulation model in order to analyze current operating patterns, capacity bottlenecks and impacts of proposed strategies and improvements. The Project Team utilized the *RAILS 2000* computer simulation model. Operations simulation modeling is used routinely throughout the railroad industry as a key rail network capacity planning tool. Once the particulars of a rail network and traffic characteristics are coded into the system, the model allows a wide variety of operating and infrastructure solutions to be tested and benefits measured under current and future traffic scenarios.

RAILS™ (Railway Analysis and Interactive Line Simulator) is a powerful, accurate, flexible integrated system of computer software for determining train performance and for simulating the dispatching and control of trains. RAILS™ is divided into two main program groups. The first program group is the Train Performance Calculator (TPC) group of programs which are used in building and editing data files of track descriptions and train characteristics (commuter, passenger, freight, or light rail); the main program to calculate performance (operating characteristics) of one or more trains; and output programs to produce a wide variety of statistical and graphical outputs on video or on paper.

The second program group is the Train Dispatching Simulation (TDS) family of programs. The TDS group creates additional files, performs the line simulation, moving all trains for a defined period over specified routes, and creates a wide variety of train performance and delay reports and graphical video and paper outputs. The model is "calibrated" to closely match historical operations based on actual train data, helping to provide strong confidence in its simulation of new operations, revised plant, or combination thereof. An example is **Figure 4-1,** which is a screen capture of an actual simulation of the New Orleans Rail Gateway.

Computerization of line operations analysis allows rapid, economical evaluation of a large number of complex alternatives. Simulation procedures realistically reproduce human dispatcher decision-making to control all types of light or heavy volumes of traffic over combinations of single-and multiple-track lines. An important analytical tool for evaluating rail line operations and capacity is the string-line diagram. RAILS™ generates string-line diagrams for simulations. A sample of string-line diagram for Simulation No. 2 for the New Orleans Rail Gateway is shown in **Figure 4-2**.

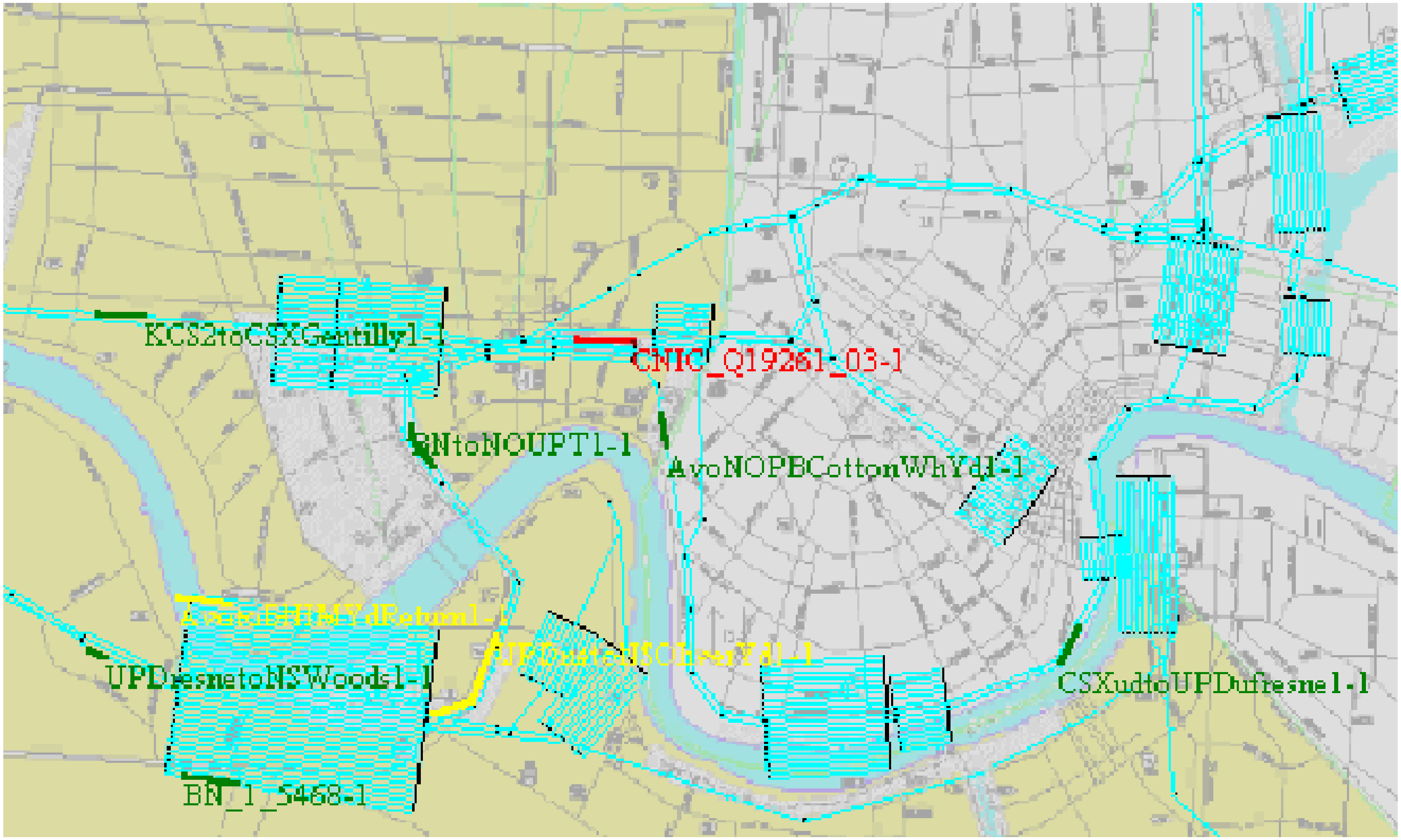


Figure 4-1 – Sample Animation Screen from RAILS Modeling Program

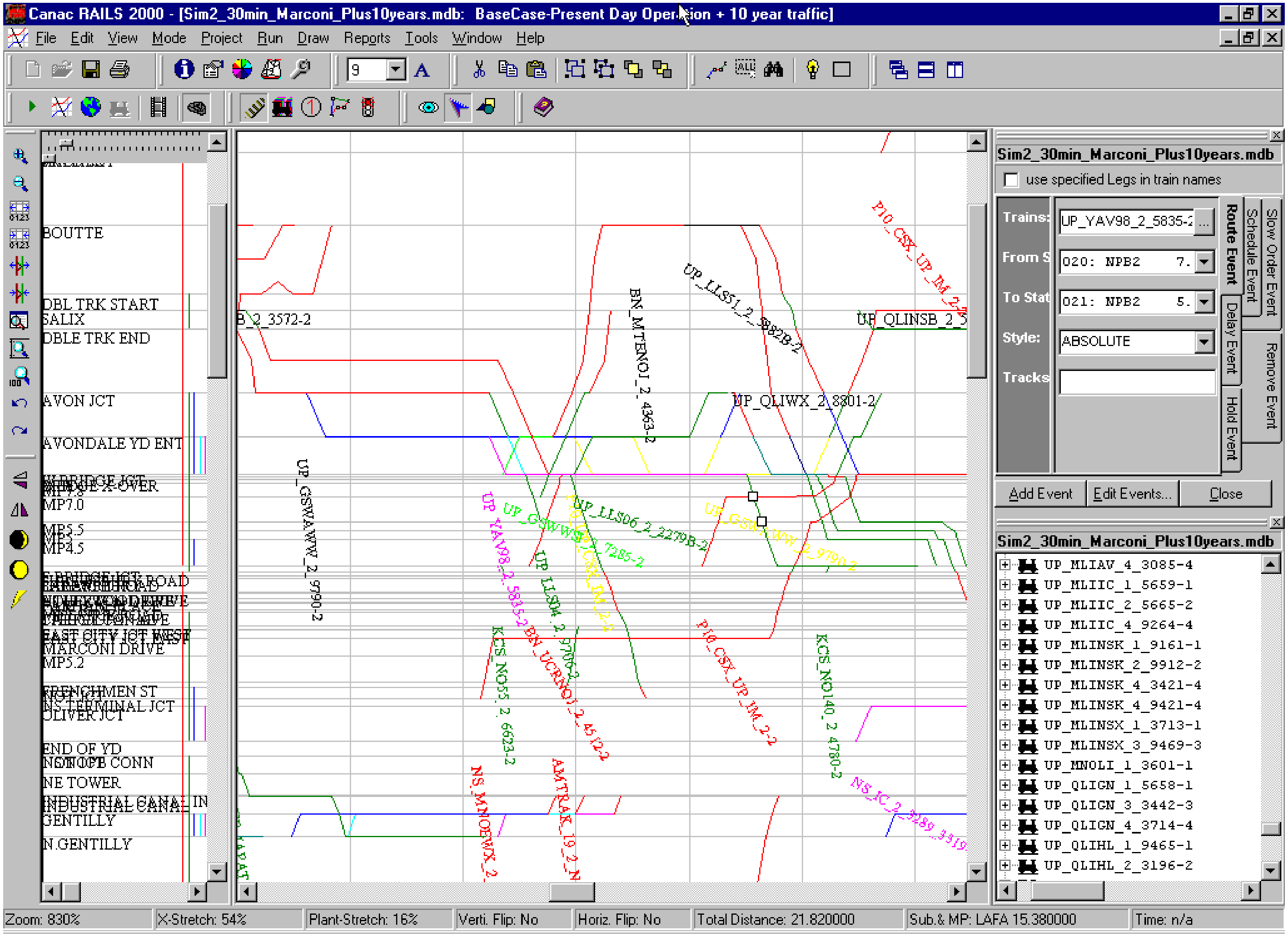


Figure 4-2 – Sample "Stringline" Diagram from RAILS Modeling Program

The model considers, and consequently is sensitive to, a wide range of rail line and operating characteristics, fully covering most real-life situations.

- Line Configuration:
  - Mixed single and multiple track
  - Siding length, configuration, and location
  - Interlocking configuration and location
  - Mixed single or double running on any track – non-signaled, Automatic Block, Centralized Traffic Control(CTC) or Track Warrant Operations
  - Signal location, spacing, and indications
  - Power and spring switches
  - Speed through turnouts (switches)
- Train Characteristics:
  - Length, power, weight
  - Number and types of locomotives
  - Locomotive availability
  - Braking characteristics
- Operating Policy:
  - Train Priorities (Passenger, Commuter, Intermodal, Freight, Coal, etc.)
  - Speed limit rules governing their operation
  - Schedules of dispatch (including random late or early dispatch options for any train or class of trains)
  - En route schedules (commuter, passenger, local freight work)
  - Train routings (track assignments - mandatory or preferred)
  - Maintenance times by location and track number

- Temporary slow orders
- Track and signal failures
- Schedule adherence

To effectively develop the model, the Project Team requested actual operating data from each of the railroads for the sample week of December 4 - 10, 2000. A sample "data request form" is shown on the following page. This week was chosen and accepted as being reasonable in terms of traffic handled and being current enough to ensure availability of detailed data such as AEI scanner data. Dispatch records from control towers and yards were also gathered for analysis.

Details of the gateway track network, including track speeds, track profiles, signaling and interlocking details were gathered as noted in the previous section from railroad sources and coded into the model.

The one-week traffic sample provided detailed movement records for over 430 individual train movements. Of these trains, 254 were identified as inter-yard freight movements, plus 34 passenger trains. These interchange movements, which represent the prime activity of the gateway, became the main focus for the Project Team with regards to the measurement of gateway performance. The remaining movements represent a wide variety of non-interchange traffic movements, which regularly take place in support of general railroad activity in the region. These include local switching assignments; maintenance crews; intercity freight and passenger trains, light engine movements, etc.

SAMPLE DATA REQUEST FORM

Train Operating Data
Period: Dec. 4th 0001 hrs thru Dec. 10th 2359 hrs

Railroad: ______________________________

Yard: ______________________________

Departing Trains (for each train):

Direction

Date; Time

Destination (RR for interchange traffic or City for own network)

Train / Assignment ID

Loco Unit Nos.

No. of cars

Total tons

Train length

Arriving Trains (for each train)

Direction

Date; Time

Origin (RR for interchange traffic or City for own network)

Train / Assignment ID

Loco Unit Nos.

No. of cars

Total tons

Train length

Table 4-1, provides further details of the number of inter-yard train movements, which took place amongst the various railroads during the sample week. An average of 41 trains operated per day, including 5 passenger trains. Note that the two largest interchanging railroads are the UP and CSX, which handled 79 trains or 31 percent of the total freight interchange traffic.

Table 4-2, provides a summary of the routing taken by inter-yard gateway movements. Note that the three most heavily utilized routes(i.e., utilized by over half of all interchange traffic) are East Bridge Junction (80 percent of all moves), the HPL Bridge (61 percent) and the NS Back Belt (51 percent).

4.2 Current Operations

All movement details of trains operating during the sample week were coded into the model including the actual starting and ending points, specific routing, delays location and duration. The model's representation of train movements for the first four days of the sample period was then validated to ensure an accurate representation of train movements. This set of 277 train movements (130 inter-yard plus 147 other) formed the present baseline scenario upon which all other simulations were to be compared. The basic measure for gateway performance is the transit time incurred by **inter-yard interchange movements only**. Time measured includes the total time of each train on the model network, including travel time, delays and dwell time in gateway yards.

The simulation results for inter-yard trains, operating as per current practices, are defined in **Table 4-3** and indicate an average transit time of 7 hours 38 minutes. Individual times vary considerably by origin/destination combination ranging from a low average of 3 hours 29 minutes (NOPB to KCS) to a high average of 25 hours 4 minutes (NS to UP). In consideration of the relatively short distances involved in the gateway, where the longest unrestricted travel time between yards is less than one hour, these results clearly indicate considerable evidence of train delays and poor gateway operating performance.

Table 4-1
Inter-Yard Train Movements*
Sample Week: Dec 4 – 10

From RR	To Railroad AMTK	BN	CSX	IC	KCS	NOPB	NS	UP	Total	Avg./Day
AMTK	34								34	4.9
BN						17			17	2.4
CSX						15		36	51	7.3
IC					2	9	7	6	24	3.4
KCS			7	2					9	1.3
NOPB		15	8	6	8		7	4	48	6.9
NS				7		7		16	30	4.3
UP			43	11		4	17		75	10.7
Total	34	15	58	26	10	52	31	62	288	
Avg./Day	4.9	2.1	8.3	3.7	1.4	7.4	4.4	8.9	41.1	

* Excludes: UP to/from NOGC traffic
Intra-RR Movements – Maintenance; industrial/support yard switching; mainline operations
Notes: IC to NS move includes IC to CSX and NS to CSX moves all performed by NS
NS to IC includes KCS traffic

Table 4-2
Inter-Yard Movements by Gateway Route
Sample Week: Dec 4 – 10
SUMMARY

Route	Back Belt		Front Belt		East Bridge Jct.		HPL Bridge	
Direction	East	West	East	West	East	West	East	West
Total	86	65	41	61	120	110	95	80
% by Direction	30%	23%	14%	21%	42%	38%	33%	28%
% both Direction	52%		35%		80%		61%	
Average Daily	12	9	6	9	17	16	14	11
Average Daily Both Direction	22		15		33		25	

Total Inter-Yard Train Moves: 288

Table 4-3
Baseline/Current Operations Simulation

From	Data	To							Grand Total
		BN	CSX	IC	KCS	NOPB	NS	UP	
BN	Number of Trains					12			12
	Average Duration					7:52:14			7:52:14
	Max Duration					22:03:47			22:03:47
CSX	Number of Trains					8		17	25
	Average Duration					4:03:06		9:26:40	7:43:08
	Max Duration					5:29:51		20:00:21	20:00:21
IC	Number of Trains				1	4		1	6
	Average Duration				3:43:56	11:55:49		2:28:46	9:00:00
	Max Duration				3:43:56	12:28:39		2:28:46	12:28:39
KCS	Number of Trains		3	2					5
	Average Duration		3:52:33	4:39:34					4:11:21
	Max Duration		4:45:53	5:44:34					5:44:34
NOPB	Number of Trains	8	6	2	6		4	2	28
	Average Duration	6:22:20	5:12:11	5:32:51	3:29:33		4:25:05	9:00:56	5:21:19
	Max Duration	7:20:43	7:21:28	10:32:17	4:58:33		5:19:04	11:19:41	11:19:41
NS	Number of Trains			4				9	13
	Average Duration			8:52:36				12:32:11	11:24:37
	Max Duration			12:06:37				31:29:56	31:29:56
UP	Number of Trains		25	4		2	10		41
	Average Duration		7:53:31	12:05:26		5:08:59	7:46:22		8:08:19
	Max Duration		13:45:23	25:04:44		6:20:01	15:29:43		25:04:44
Total Number of Trains		8	34	12	7	26	14	29	130
Average Duration		6:22:20	7:03:47	8:41:25	3:31:37	7:06:48	6:48:51	10:08:03	7:38:55
Max Duration		7:20:43	13:45:23	25:04:44	4:58:33	22:03:47	15:29:43	31:29:56	31:29:56

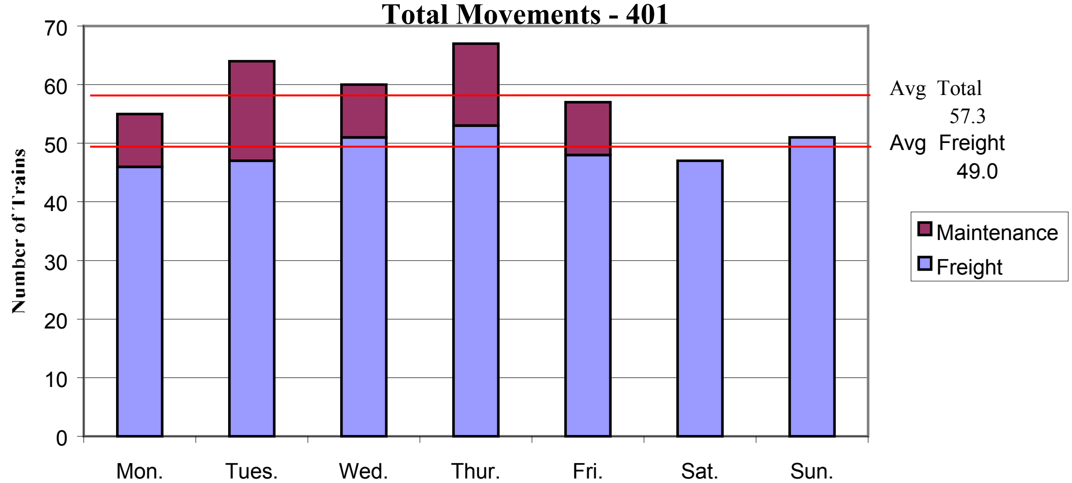
The simulation results for inter-yard trains operating as per current practices confirmed the location of chronic gateway bottlenecks and the statistics provided a measure of the extent of the problem. Of the 164 trains traversing the HPL Bridge, 80 percent incurred a delay averaging nearly two hours. Westbound trains on the Back Belt at Marconi incurred the greatest average delay at 2 hours 26 minutes with one train incurring a delay of 12 hours. **Table 4-4** below, provides details.

Table 4-4
Train Delays at Key Gateway Locations
Sample Week (excluding Amtrak)

Location	Direction	Total Trains	Trains Delayed	% Delayed	Total Delay Hrs	Avg Delay Hrs	Max Delay Hrs
HPL Bridge	East	92	79	86%	143:05:00	1:48	8:41
HPL Bridge	West	72	52	72%	50:23:00	0:58	3:27
Marconi	West	41	37	90%	90:36:00	2:26	12:00

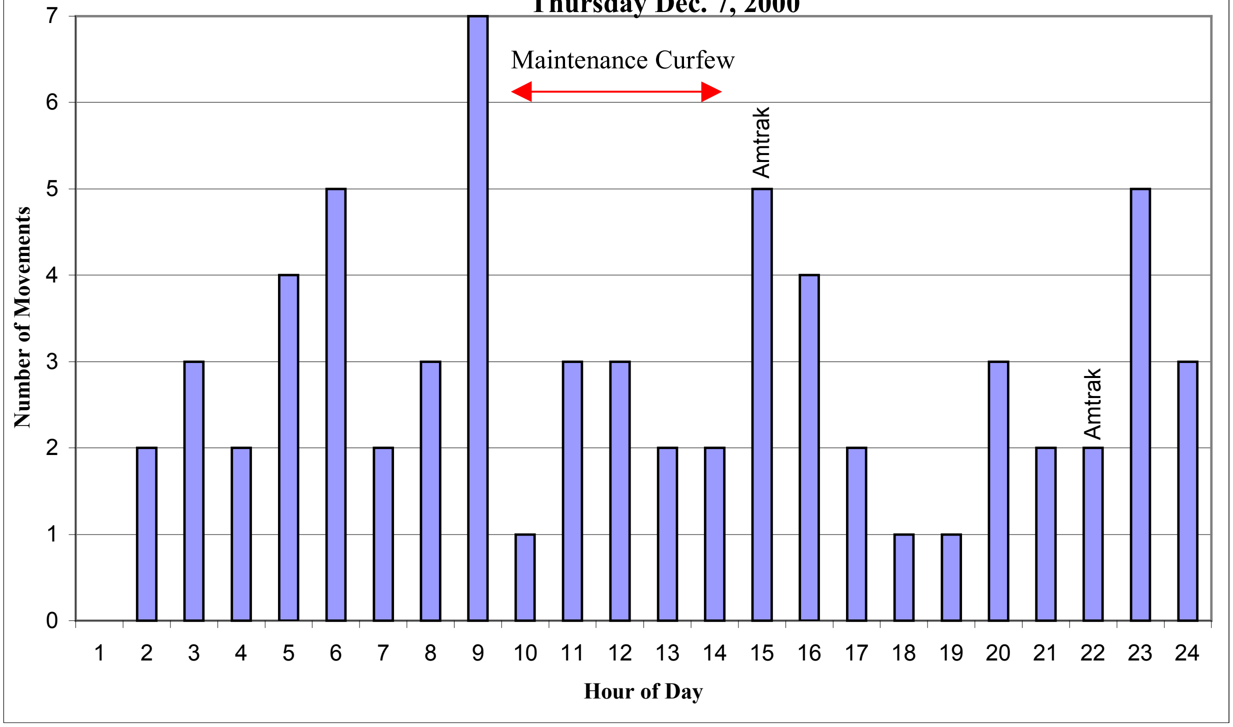
An assessment of daily traffic volume at EBJ indicated a generally even pattern throughout the week for freight and passenger movements (see **Figure 4-3**, below). However, bridge maintenance movements added approximately 10 movements on each weekday. Note that during the sample week, bridge maintenance was still being performed 5 days per week for 6 to 8 hours. This has since been reduced to 4 days/week but for up to 10 hours per day.

Figure 4-3
Total Train Movements by Day (Sample Week)
East Bridge Junction
Total Movements - 401



An evaluation of EBJ movements by hour of a typical day clearly indicates the negative impact of bridge maintenance activity on throughput (see **Figure 4-4**, below). It is apparent that the railroads try as best they can to plan the movement of trains around this maintenance curfew to minimize delays. Amtrak train movements cause some bunching of freight movements due to the imposition of freight movement curfews (i.e., minimum of 30 minutes) in front of expected passenger train movements.

Figure 4-4
East Bridge Junction - Total Train Movements by Hour
Thursday Dec. 7, 2000



4.2.1 Current Operations - Existing Freight Rail Deficiencies

Based upon the Project Team's observations, stakeholder interviews, review of historical operating data, and simulation modeling of current operations, the following are the key deficiencies of the present rail gateway operation, which were identified.

<u>Gateway Congestion</u>

It was observed that trains are regularly delayed and are held in queue at two specific locations within the gateway, which impacts over 60 percent of interchange traffic. These locations are the HPL Bridge and Marconi Boulevard on the Back Belt.

Reference **Table 4-4** for delay statistics recorded during the sample week of December 4 - 10, 2000, for these two locations. Note that average delays range between approximately 1 and 2½ hours per train impacting from 72 percent to 90 percent of freight trains. As a point of reference, a typical unimpeded run time across the gateway from CSX's Gentilly Yard to UP's Avondale Yard is less than 1 hour.

There are numerous causes of these observed gateway delays depending on the delay location. For eastbound trains on the HPL Bridge, it is a common practice for both UP and, at times, BN to put trains onto the bridge before their movement through EBJ is authorized, to ensure a priority position in the queue and to relieve apparent congestion in their respective yards.

For westbound trains on the HPL Bridge, fewer train delays are incurred. These delays are caused by the inability of the destination yard to immediately receive the train – likely due to the lack of open receiving track capacity.

Westbound trains being held at Marconi Boulevard on the Back Belt incur the longest and most frequent delays. Marconi is the designated crew change location for all UP destined trains originating from CSX or NS. Trains also queue here awaiting dispatch authorization to proceed through Old Metairie, EBJ and onto the HPL Bridge with throughput depending upon train priorities and slot availability through EBJ. The longest delays are incurred awaiting UP crews to be taxied from Avondale. If trains are held for long periods of time, the assigned UP crews, at times, must book-off due to their on-service time being expended. This further exacerbates the queuing problem, as replacement crews must be called.

It was readily apparent from these observations, that an operating pattern had evolved resulting in chronically inefficient use of available railroad resources (infrastructure, crews, power, rail cars), as well as delays in the movement of potentially time-sensitive commodities.

Condition of EBJ and WBJ Interlockings

Both East and West interlocking facilities were built at the time of the bridge construction in the mid-1930s. They are now in very poor structural condition, and the signal system is technically obsolete and becoming increasingly more difficult to maintain due to lack of spare parts.

East Bridge Junction Tower
Operator Interlocking Controls (top)
Display Panel (bottom)

West Bridge Junction Tower

Front Belt Constraints

In consideration of the potential use of the NOPB Front Belt as an alternative to the congested Back Belt route, the option to route trains directly between the HPL Bridge and the Front Belt would appear to be an efficient alternative. However, this route has certain inherent constraints that limit its potential as a prime gateway routing alternative:

Characteristic	Front Belt	Back Belt
Length	17.4 miles	9.3 miles
Speed	10 to 15 mph	20 to 30 mph
Signals	mostly CTC	mostly no CTC
Operating Limitations	Downtown tourist area	Old Metairie issues

NOPB Front Belt Line passes through the CBD Riverfront Area

HPL Bridge Maintenance Program

NOPB is the owner of the 5.2 mile long, double track HPL Bridge and is responsible for its maintenance. The bridge is designed such that the track ties are laid directly upon the steel superstructure – without stone ballast. The wooden ties are individually designed and numbered for their specific position on the bridge in accordance to the grade and superelevation requirements. This requires a regular daily, labor intensive maintenance program to systematically replace the custom shaped wooden ties over time. One track is regularly taken out of service for 6 to 8 hours, 4 days per week, for crews to carry out this planned maintenance.

This effectively reduces the capacity of the bridge down to single-track capacity for the duration of the maintenance block. This reduced throughput capability to cross the bridge during these periods' results in traffic bunching and associated delays.

4.3 Future Rail Operations – Traffic Forecasts

4.3.1 Methodology

An essential part of this analysis was to acquire rail traffic forecasts for gateway operations. These growth forecasts are crucial to the modeling exercise of gateway operations for determining future capacity and operating deficiencies in the gateway and evaluate potential strategies and solutions to deficiencies that are being considered for implementation.

For the purpose of this study, the intent was to utilize existing data and projections where possible including acquiring traffic growth forecast data from each of the respective railroads operating within the gateway.

Trend Data

Two primary sources of historic data were initially acquired and evaluated: 1) the Interstate Commerce Commission (ICC) / Surface Transportation Board (STB) data; and 2) The Association of American Railroads (AAR) statistics. After reviewing the data from the two primary sources, a decision was made to utilize one source, the AAR data for purposes of consistency.

It is important to note that the numerous mergers that have transpired since our initial analysis year (1989), increase the complexity of evaluating the data. In an effort to more effectively evaluate the available statistics, the project team aggregated data for all the railroads making up merged new lines even though they were reported as separate lines. For the represented railroads being evaluated, this is true for only BNSF and UP.

Data was acquired for numerous categories (see **Appendix B** for detailed historical operating statistics), with the emphasis on carloads carried, gross ton-miles, and freight car-miles. Each category was broken down by total United States, Eastern United States, Western United States, and, by each of the six Class 1 carriers operating within the New Orleans Gateway.

Table 4-5 below refers to carloads carried and indicates a greater than 20 percent growth in "carloads carried" for the entire United States between 1989 and 1999. The average growth rate for "carloads carried" for the six Class 1 carriers operating in the gateway was over 45 percent.

Table 4-5 Carloads Carried (millions)					
	1989	**1994**	**1999**	**5-Yr Growth**	**10-Yr Growth**
US	56.75	65.17	68.26	4.7%	20.3%
East	30.19	35.41	37.16	5.0%	23.1%
West	26.56	29.76	31.10	4.5%	17.1%
BNSF	8.88	10.10	12.11	19.9%	36.3%
CSX	12.58	16.09	18.64	17.1%	49.8%
IC		0.84	0.95	12.4%	22.4%
KCS	0.72	1.24	1.55	24.9%	114.9%
NS	9.00	10.35	13.43	29.8%	49.2%
UP	14.54	16.18	15.36	-5.0%	5.7%

Source: Association of American Railroads (AAR)

Table 4-6 represents growth between 1989 and 1999 for "gross ton-miles." The 10-year average within the United States for this category was 40.1 percent with the average growth rate of the same period for the represented six Class 1 carriers greater than 50 percent.

Table 4-6 Gross Ton-Miles (billions)					
	1989	**1994**	**1999**	**5-Yr Growth**	**10-Yr Growth**
US	2,128.28	2,475.28	2,982.28	20.5%	40.1%
East	764.46	858.82	945.59	10.1%	23.7%
West	1,363.81	1,616.46	2,036.69	26.0%	49.3%
BNSF	627.20	703.40	957.09	36.1%	52.6%
CSX	297.79	336.27	438.02	30.3%	47.1%
IC	36.09	39.77	46.82	17.7%	29.7%
KCS	23.37	33.77	43.16	27.8%	84.7%
NS	211.11	247.07	344.77	39.5%	63.3%
UP	674.00	838.97	995.80	18.7%	47.7%

Source: Association of American Railroads (AAR).

Growth in "freight car-miles" is represented in **Table 4-7** below indicating an approximate 30 percentage growth over the 10-year analysis period for the entire United States and a 40 percentage over average growth rate in "freight car-miles" for the six Class 1 carriers.

Table 4-7
Freight Car-Miles (billions)

	1989	1994	1999	5-Yr Growth	10-Yr Growth
US	26.08	28.48	33.85	18.9%	29.8%
East	10.07	10.33	11.04	6.9%	9.6%
West	16.01	18.15	22.81	25.7%	42.5%
BNSF	7.22	7.82	8.99	15.0%	24.5%
CSX	3.95	3.97	5.05	27.2%	27.8%
IC	0.50	0.49	0.56	14.3%	12.0%
KCS	0.28	0.40	0.49	22.5%	75.0%
NS	2.73	3.01	4.03	33.9%	47.6%
UP	8.01	9.43	12.85	36.3%	60.4%

Source: Association of American Railroads (AAR).

Railroad Forecasts

Traffic growth forecast data was requested for Year 2005, 2010, and 2020 from each railroad. Requests were broken down by manifest and intermodal traffic growth forecasts including:

- Local manifest traffic
- Local intermodal traffic
- Through or interchange manifest traffic with other railroads
- Through or interchange intermodal traffic with other railroads

A sample of the traffic growth forecast data sheets that were sent to all Class 1 carriers, as well as NOPB and NOGC railroads, is provided on the following page.

SAMPLE RAILROAD FORECAST REQUEST FORM

New Orleans Regional Railway Study

Railway: __________

Strictly Confidential – Information will be used to generate train movements & corridor flows
Provide to most appropriate level possible

Base Case = 2000 Actuals

Manifest Traffic Forecasts

1. Originating or Interchanging Received at New Orleans

Origin RR	Dest RR	Interchange Location	Traffic Type L=Local T=Through	Forecast Growth Rate over Base (%) 2005	2010	2020	Comments
______	______	______	______	______	______	______	________________
______	______	______	______	______	______	______	________________
______	______	______	______	______	______	______	________________
______	______	______	______	______	______	______	________________
______	______	______	______	______	______	______	________________
______	______	______	______	______	______	______	________________
______	______	______	______	______	______	______	________________

2. Destined New Orleans or for Forwarding to another RR at New Orleans

Origin RR	Dest RR	Interchange Location	Traffic Type L=Local T=Through	Forecast Growth Rate over Base (%) 2005	2010	2020	Comments
______	______	______	______	______	______	______	________________
______	______	______	______	______	______	______	________________
______	______	______	______	______	______	______	________________
______	______	______	______	______	______	______	________________

Railway: ___________ (cont'd)

Strictly Confidential – Information will be used to generate train movements & corridor flows
Provide to most appropriate level possible

Base Case = 2000 Actuals

Intermodal Traffic Forecasts

3. Originating or Interchanging Received at New Orleans

Origin RR	Dest RR	Interchange Location	Traffic Type L=Local T=Through	Forecast Growth Rate over Base (%) 2005	2010	2020	Comments

4. Destined New Orleans or for Forwarding to another RR at New Orleans

Origin RR	Dest RR	Interchange Location	Traffic Type L=Local T=Through	Forecast Growth Rate over Base (%) 2005	2010	2020	Comments

Responses were received from all railroads, with the majority providing forecast data for their operation. It was noted by some railroads that long-term traffic forecasts are not readily available; however, most did provide 10-and 20-year forecasts for traffic growth. Certain railroads also noted that they often utilize the Industrial Production Indexes (IPIs) for forecasting.

It was noted in the request for traffic growth forecasts that specific forecasts, by railroads, would be kept strictly confidential. Due to this, the Project Team cannot provide specific forecast data by railroad in this report; however, overall and general results can be provided. In general terms, annual growth rates ranged from 3 percent to 5 percent were relatively consistent with minimal variation. Forecasts for intermodal traffic were generally more aggressive than those for carload traffic. Annualized growth rates in the 3 percent to 5 percent range appear reasonably consistent with the previous 10-year trend noted earlier for the overall average for the represented Class 1 carriers for carloads carried.

The IPIs come from the Federal Reserve. The IPI forecast for the United States economy during the next 20 years is approximately 3 percent per year on average in aggregate. Specific commodity growth rates vary slightly from the industrial production 3 percent average. Sample areas include:

Chemicals	3.0%
Energy	3.0%
Agriculture	1.5%
Industrial Products	2.0%
Intermodal	4.0%
Automotive	3.0%

After thorough evaluation of historic traffic growth data, individual railroad forecasts, and the IPIs, the project item chose an annual growth factor of 3 percent for carload traffic and 4 percent for intermodal for gateway traffic growth. With compounding, this results in the following effective growth factors applied to present carload traffic levels:

Table 4-8
Carload Traffic Growth Factors

Year	Freight	Intermodal
10	34.4%	48.0%
20	80.6%	119.1%

To convert this general traffic growth into train movements, the above factors were applied to the total car counts moving between railroads on intermodal and freight movements. Recognizing that present trains would generally be filled out to some degree before adding more assignments, future train counts were extrapolated based on a reasonable increase in cars per train. Growth factors were applied to both inter-yard trains, as well as most "other" category trains, as appropriate.

The following table displays resulting counts, by train type, as applied to the model.

Table 4-9
Train Count Growth Factors

Scenario	Inter-Yard	Other	Total
Present	130	147	277
Year 10	153	168	321
Year 20	215	203	418

The new trains added to represent future traffic growth were distributed proportionately amongst the present baseline trains and given reasonable launch times to avoid obvious conflicts with existing trains. Representative dwell times were added to these trains at the arrival and departure yards, varying between 1 and 2 hours, depending upon the length of train.

Based on the forecasts, simulation was performed to represent the operation of the Gateway 10 years into the future under increased traffic levels, using the same operating practices as today - i.e., including the inherent gateway delays, re-crewing practices, bridge maintenance schedules, etc. In essence this simulation was to show what delays might be expected 10 years from now if no improvements are put in place, and the situation is allowed to continue "as is." **Table 4-10** displays the results of this simulation.

The Year 10 - Current Operation-simulation results indicate a 17 minute (4 percent) increase in average transit time per train, resulting from greater congestion at higher traffic volumes. Applied to all inter-yard trains, this represents a total of **10.8 train-hours of traffic delay per day**.

This illustrates that if nothing is done to improve the current operating practices and/or infrastructure, the trend will be that Gateway performance and efficiency will steadily deteriorate as traffic increases.

4.4 Development of Model Simulation Scenarios

Based on stakeholder coordination issues, evaluation of existing operations, modeling results of existing operations, future operations with no improvements, and noted deficiencies; a list was developed of potential strategies and improvements to evaluate. Identified potential strategies and improvements for evaluation were developed jointly with the Project Team and Technical Advisory Committee. **Table 4-11** provides a summary of the options identified for evaluation.

Table 4-10
10-Year Forecast With No Improvements
Simulation 2

From	Data	To							Grand Total
		BN	CSX	IC	KCS	NOPB	NS	UP	
BN	Number of Trains					13			13
	Average Duration					8:05:30			8:05:30
	Max Duration					22:03:47			22:03:47
CSX	Number of Trains					10		22	32
	Average Duration					4:48:30		8:56:29	7:38:59
	Max Duration					8:09:23		20:00:21	20:00:21
IC	Number of Trains				1	4	1	1	7
	Average Duration				3:43:56	11:55:31	6:16:44	2:28:46	8:35:56
	Max Duration				3:43:56	12:28:39	6:16:44	2:28:46	12:28:39
KCS	Number of Trains		4	2					6
	Average Duration		4:25:38	4:39:33					4:30:16
	Max Duration		6:04:45	5:44:32					6:04:45
NOPB	Number of Trains	9	6	3	6		4	2	30
	Average Duration	5:58:09	5:21:12	6:24:48	3:29:33		4:25:05	8:36:14	5:21:50
	Max Duration	7:18:34	7:26:07	10:36:27	4:58:33		5:19:04	10:30:16	10:36:27
NS	Number of Trains			4				12	16
	Average Duration			9:34:03				12:23:53	11:41:26
	Max Duration			12:06:33				31:29:56	31:29:56
UP	Number of Trains		29	6		2	12		49
	Average Duration		8:38	11:42		5:08	8:00		8:43
	Max Duration		14:06	1:04		6:20	15:29		1:04
Total Number of Trains		9	39	15	7	29	17	37	153
Average Duration		5:58:09	7:41:56	9:08:12	3:31:37	7:17:07	7:04:03	9:52:11	7:55:25
Max Duration		7:18:34	14:06:22	25:04:44	4:58:33	22:03:47	15:29:43	31:29:56	31:29:56

Table 4-11
Summary of Strategy Improvement Options to Carry Forward to the Evaluation Phase

Option No.	Option Description	Required Modeling	Expected Questions to Address via Modeling
1	Gateway Coordination Center – Several options have been discussed regarding the center. One option is the development of a "virtual center" that could be located anywhere via communication. The railroads have discussed development of a center in the UPT station. Another option is to develop center near the East Bridge Tower location. Another option is to include this coordination center with the proposed ITS Traffic Control Center to be manned by RPC and LDOTD (i.e. expand ITS center to include RR). This concept would provide enhanced communications between railroads, automated trackage control capabilities for east and west bridge approaches, as well as East Bridge Junction, network surveillance via CCTV or other train detection devices, and possibly a computer aided dispatch (CAD) system for dispatch of interyard movements within the gateway. This replacement and upgrade and controls / switches at both approaches and East Bridge Junction would be necessary to accommodate this concept.	Modeling effort should attempt to mimic this "coordination" effort by releasing some of the train delays due to premature launch from the yards. The model would reflect the improved dispatching operation.	1. Does such coordinated operation improve performance of gateway? 2. Which MOEs are appropriate to quantify improvement? 3. Discuss any limitations of current operations and the specific benefits of consolidated operations. 4. Discuss any interagency requirements (agreements).
2	Evaluate impact of modification to Crew Change Policy – It was discussed that crew changes near Marconi appear to have a "built-in" delay to the system. This option will look at either limiting the crew change at Marconi to 30 minutes, or eliminate the crew change by allowing UP crews to man the trains from the CSX yard.	1. Limit crew change to 30-minute delay. 2. Eliminate crew change at Marconi.	Describe the overall improvement to the gateway performance using appropriate MOEs.
3	Evaluate Bridge Maintenance Practices – NOPB has described that they will be modifying their work hours on the bridge. In addition, it is envisioned that improved maintenance practices may minimize some of the down time on the bridge.	1. Revise the work schedule to that described by NOPB. 2. Suggest other work hours based on other sites that may limit work hours on the bridge.	Describe the overall improvement to the gateway performance using appropriate MOEs.

Table 4-11
Summary of Strategy Improvement Options to Carry Forward to the Evaluation Phase

Option No.	Option Description	Required Modeling	Expected Questions to Address via Modeling
4	Evaluate Capacity Improvements at East Bridge Junction – This option includes the addition of track within the East Bridge Junction to allow for simultaneous east and west traffic from the HPL Bridge to the Norfolk-Southern track (Back Belt). This configuration should ease a "pinch point" in the train traffic flow onto and off of the bridge. Evaluate this in conjunction with Shrewsberry Road closure.	Model the improvements to include such additional track in the East Bridge Junction, with and without Shrewsberry Road crossing.	Provide a description of the improved operation including appropriate MOEs.
5	Directional Travel within Gateway – Evaluate an operation of running all westward traffic on the Back Belt traffic and all eastbound traffic on the Front Belt (or vise versa). This will require rerouting of train traffic from current patterns to this revised pattern.	Redirect train traffic.	Determine overall gateway performance with revised operation. Also, evaluate the effect on existing grade crossing locations (i.e. total delay, number of times closed, etc.).
6	Evaluate Four-Quadrant Grade Crossing Protection – Evaluation of grade crossings is an important element within the Back Belt and the Front Belt. A determination should be made to document the existing grade crossings that need to be evaluated. The evaluation should include closure of the crossing and operational changes to modify the grade crossing occupation by rains during "peak periods".	Include in the model the location of identified existing grade crossings so that "statistics" can be generated for various scenarios. Develop a special scenario to either allow / permit a grade crossing or replacement.	Provide statistics regarding grade crossing occupation during various times of the day for different operating scenarios.
7	Evaluate Rail Traffic Signals on N/S Line – One of the railroads suggested adding traffic signals on the N/S Line (Back Belt) in order to increase speed in the area. A determination needs to be made as to where the signals would be placed and how they would be operated.	Modeling effort should determine, first if signals are warranted and what, if any, potential increase in speed / reduction in delay they might provide.	Determine if signals have any impact on the overall operational efficiency of the gateway.
8	Evaluate Yard Capacity Improvements – Preliminary indications are that existing yard may impact on the overall operation	Modeling effort should first limit existing modeling to "existing conditions" (i.e. eliminate "unlimited" yard capacity from "unconstrained" condition). Develop alternatives to increase / assist yard capacity issues.	Determine which yard capacity alternatives provide the best relief to the overall operations

Table 4-11
Summary of Strategy Improvement Options to Carry Forward to the Evaluation Phase

Option No.	Option Description	Required Modeling	Expected Questions to Address via Modeling
9	Evaluate Connection of NOPB to Westbound CNIC / KCS – The current operation of westbound traffic from the HPL Bridge requires entry to the East Bridge Junction and backing into Mays Yard. This alternative includes the development of track which would allow a direct movement from the bridge to the west on CNIC / KCS lines.	Model the proposed improvement.	Determine the number of trains per week making that movement. Also determine the decrease in movements within the East Bridge Junction. Determine the overall operations impact to the gateway.
10	Evaluate Connection of NOPB to Eastbound UP – The alternatives provide for a connection of the UP to the NOPB on the west bank of Jefferson Parish and east of the existing West Bridge Tower. The connection may become important in the evaluation of the Millennium Port.	Model the proposed improvement.	Determine the number of trains per week making that movement. Also determine the decrease in movements within the East Bridge Junction. Determine the overall operations impact to the gateway.
11	Evaluate Ballast Deck for Huey P. Long Bridge – This option provides for improvement of the HPL to a ballast deck track. This would virtually eliminate (drastically minimize) existing maintenance and allow for the near full utilization of the double track capacity of the HPL Bridge.	Model the potential to reduce maintenance on the bridge to some reasonable time.	How does elimination of maintenance improve gateway operation? Provide appropriate MOEs.
12	Evaluate Grade Separated Crossing in Metairie – This option is related to Option 6, but includes the development of grade separated construction. From Option 6 evaluation of the candidate crossings for grade separation, determine the feasibility of implementing.	Model as for other options.	Provide statistics as per Option 11.
13	Review Carrollton Curve Alternatives – Evaluate the benefits to the gateway capacity of implementing the Carrollton Curve Alternatives. Evaluate as per elimination of Back Belt and directional running.	Add the trackage as part of the Carrollton Curve. Evaluate alternative operation.	Provide discussion on impacts to overall gateway operation using appropriate MOEs. Discuss any operational difficulties.
14	Evaluate Capacity Improvement at 17Th Street – Evaluate the benefits of adding track to connect from Jefferson Parish to the N/S Line in Orleans Parish. Evaluate in conjunction with double track of East Bridge Junction.	Add the track to the model.	Provide a discussion of impacts to the overall gateway operations using appropriate MOEs.

Table 4-11 Summary of Strategy Improvement Options to Carry Forward to the Evaluation Phase			
Option No.	**Option Description**	**Required Modeling**	**Expected Questions to Address via Modeling**
15	Evaluate Elevated Alternative at East Bridge Junction – This is a variation on the Carrollton Curve Alternative (Option 12) where the off ramp from the HPL Bridge remains elevated through East Bridge Junction, eliminating the at-grade crossing of railroads.	Add the elevated track to the model.	Provide a discussion of impacts to the overall gateway operations using appropriate MOEs.
16	Evaluate Consolidation of CNIC Intermodal Yard and KCS Yard to May's Yard. Old KCS Yard will continue to be used for storage by CNIC.	Model reduction of traffic through EBJ.	Provide a discussion of impacts to the overall gateway operations using appropriate MOEs. Discuss any operational difficulties.

The Project Team, including RPC and DOTD, met to review all options (i.e. alternative strategies) under consideration. Understanding that resources were not available to evaluate all options identified, the Project Team with RPC and DOTD prioritized the options/alternatives to be evaluated. **Table 4-12** provides a summary of all alternatives considered, including the ones prioritized for evaluation as part of this study, and the alternatives to be evaluated as part of a future supplemental phase. Associated modeling simulations relevant to the alternatives are also provided, as applicable.

Table 4-13 provides a summary of all model scenarios as part of this study as well as a brief summary of the modeling results. Further description of the model results is provided in the following section.

Table 4-12
Summary of Alternatives and Schedule of Evaluation

Scheduled Reporting	Alternative Description (Refer to Options Description Sheet)	Summary of Modeling Scenarios (Refer to Simulation Modeling Sheet)			Summary of Engineering Analysis
		Present	10 Year Projection	20 Year Projection	
Alternatives to be evaluated as part of Phase I of this study.	Baseline (Current Operations)	Sim No. 1	Sim No. 2		
	Improved Operations (Option No. 1, 2 and 3)	Sim No. 3	Sim No. 4	Sim No. 15	See description for Options 1, 2 and 3
	Added capacity at East Bridge Junction (Option No. 4) Simulations should include with and without closure of Shrewsbury Road.	Sim No. 6a	Sim No. 6b		
	Ballast Decking (Option No. 11)		Sim No. 9		
	Improved connection to IC Yard (Option No. 9)		Sim No. 13		
	Yard Consolidation (Option No. 16)		Sim No. 7		
	Four Quadrant Grade Crossings (Option No. 6)	Include data from other scenarios			Limit to obtain data from others (BKI report)
	Directional Running (Option No. 5)		Sim No. 5		See description for Option 5.
	Yard Staging (Option No. 8)		Sim No. 8		See description for Option 8.
Phase II Supplemental (Long-Term Initiatives) to be included in the future.	Millennium Port Alternatives (Includes Option Nos. 10, 13)		Sim No. 11		Not analyzed as part of this Phase.
	St. Charles Parish Rail Realignment				
	Add Back Belt Capacity (Option No. 14)		Sim No. 10		Not analyzed as part of this Phase.
	EBJ / Back Belt Flyover (Option No. 15)		Sim No. 12		Not analyzed as part of this Phase.
	Carrollton Curve Alternative(s) (Option No. 13)		Sim No. 14		Not analyzed as part of this Phase.
	Evaluated Rail Traffic Signals (Option No. 7)		Sim No. 16		Not analyzed as part of this Phase.
Options, Alternatives or Model Simulations Eliminated	Grade Separated Crossing in Metairie (Option No. 12)				

Table 4-13
Summary of Simulation Model Scenarios and Results

Simulation Number	Scenario Description	Parameters	Model Methodology	Summary of Results/ Recommendations
1	Baseline (Current Operations)	Utilize the Sample Week (December 4-10, 2000) as the model scenario.	Utilized to calibrate the model. Ran model to simulate four full days of service. Total 277 train movements modeled. Actual recorded train movements and delays coded into model. Yard dwell capacities were added in order to mimic existing operations.	Average transit time for the 130 sampled inter-yard freight train movements was 7 hr 38 min., Including yard dwell time allowance of 1 to 2 hours.
2	Baseline (Future Operations)	Utilize projections of future traffic (10 year projection) with same operating characteristics of Simulation No. 1	Utilized to project future anticipated delays with no improvements. Total of 321 train movements modeled including 153 inter-yard freight movements.	Average transit time increased by 4%, or 17 minutes, to 7 hrs 55 min. Per train due to impact of increased traffic volume from present level.
3	Improved Operations (Current)	Assumed implementation of coordinated communication center with improved Marconi crew change operations (Option1), with elimination of Marconi crew change (Option 2). Utilized current baseline traffic for analysis.	Allowed model to dispatch trains within gateway, using baseline departure times and routings, while maintaining other constraints regarding priorities, speed, meet procedures, headways, etc. Improved re-crewing procedures principally benefit westbound Back Belt trains.	Option 1: Avg. Transit time for inter-yard trains reduced by 54% to 3 hrs 32 min. Compared to present baseline operations. Option 2: Avg. Transit time reduced to 3 hrs 27 min.
4	Improved Operations (Future)	Same as Simulation No. 3 (above) but utilizes 10 year projected freight traffic.	Added trains to represent 10 year projected freight flows.	Option 1: Avg. Transit time for inter-yard trains reduced by 51% to 3 hrs 52 min. As compared to Year 10 baseline operations. Option 2: Avg. Transit time reduced to 3 hrs 46 min. Or 52% reduction.
5	Directional Travel Within Gateway (Future)	Generally, eastbound traffic routed on the front belt and westbound traffic on the back belt. Utilized 10 year projected freight traffic. Marconi crew change set at 30 min.	Rerouted trains as per the directional travel pattern.	Avg. Transit time for inter-yard trains reduced by 49% to 4 hrs 01 min. As compared to Year 10 baseline operations. However, results are 29 min. Longer per train than Scenario 3 due to impact of more traffic being routed over longer Front Belt route.

Table 4-13
Summary of Simulation Model Scenarios and Results

Simulation Number	Scenario Description	Parameters	Model Methodology	Summary of Results/ Recommendations
6a	Added Capacity At East Bridge Junction (Current)	Added new connection between East Bridge Junction and the Back Belt as described in Option 4. Included closure of Shrewsbury Road. Utilized present day freight traffic level.	Assumed closure of Shrewsbury Road, thus allowing staging of short (<3000 ft), westbound trains between LaBarre Road and East Bridge Junction.	Avg. Transit time for inter-yard trains was 3 hrs 31 min. - only marginally better (< 1 min) than Scenario 3. Train meet constraints through Old Metairie limit potential benefits.
6b	Added Capacity At East Bridge Junction (Future)	Same as Simulation No. 6a (above). Utilized 10 year projected freight traffic flows.	Same as Simulation 6a (above).	Avg. Transit time for inter-yard trains was 3 hrs 52 min. - only marginally better (< 1 min) than Scenario 4. Train meet constraints in Old Metairie limit potential benefits.
7	Consolidation Of IC/KCS Yard (Future)	Relocated IC Intermodal and KCS yard facilities (including origin and destination trains) to an "expanded" Mays Yard facility. Utilized 10 year projected freight rail traffic.	Rerouted train legs for affected traffic.	Avg. Transit time for inter-yard trains was 3 hrs 44 min., or 8 min. Per train better than Scenario 4. IC originated trains accrued the greatest benefit impact.
8	Additional Yard Staging Capacity (Future)	Added train-staging capacity at major yards to determine impact on gateway fluidity as per Option No. 8. Utilized 10 year project freight rail traffic.	Added 1 additional staging track per yard.	Total avg. Results showed no significant run time savings. However, results are inconclusive due to the complexities of analyzing actual yard receiving / departure operations which is beyond present mandate.
9	Ballast Decking On Huey P. Long Bridge (Future)	Modeled future projected 10 year freight traffic with a major reduction in the maintenance window on the Huey P. Long Bridge (Option No. 11).	Model run based on negligible daily maintenance window.	Avg. Transit time for inter-yard trains was 3 hrs 46 min. , or 6 min. Per train better than Scenario 4. As expected, UP & BN trains crossing the bridge accrued the greatest time savings.
10	Back Belt Additional Capacity (Future)	Modeled by addition of double track near the 17th Street Canal on a section of N-S track (Option No. 14). Included the grade separation of traffic along back belt through Old Metairie. Utilized 10 year projected freight rail traffic.	Added missing double track (approximately 0.5 mile section).	THIS SIM NOT IN PHASE 1 MANDATE

Table 4-13 Summary of Simulation Model Scenarios and Results				
Simulation Number	**Scenario Description**	**Parameters**	**Model Methodology**	**Summary of Results/ Recommendations**
11	Millennium Port Alternatives (Future)	Evaluated Options No. 10 and 13 with projected Millennium Port Traffic imposed on the network. Assumed origin from a West Bank location and destinations as per Millennium Port projections.	Modified network to accommodate additional track legs.	THIS SIM NOT IN PHASE 1 MANDATE
12	East Bridge Junction / Back Belt Fly-Over (Future)	Evaluated Option No. 15 utilizing 10 year projected future freight rail traffic.	Modified network to reflect fly-over and modified crossovers.	THIS SIM NOT IN PHASE 1 MANDATE
13	Improved Connection To IC Mays Yard From HPL Bridge (Future)	Evaluated potential benefit of new connection at east end of HPL Bridge to allow more efficient movement of trains between IC Mays Yard and the bridge. Utilized 10 year projected freight rail traffic.	Modified routing of train movements to and from Mays Yard over the bridge over new connection.	Avg. transit time for all inter-yard trains was 3 hrs 51 min. or 1 min. faster than Scenario 4 results. However, UP movements to IC accrued an average 26 min. Time saving.
14	Carrollton Curve Alternative(s)	Eliminate		THIS SIM NOT IN PHASE 1 MANDATE
15	Improved Operations (Future)	Same as Simulation No. 3 (above) but utilized 20 year projected freight traffic.	Added trains to represent 20 year projected freight flows. Total of 418 train movements modeled including 215 inter-yard freight movements. HPL bridge maintenance program reduced to 3 days per week.	Option 1: Avg. transit time for inter-yard trains was 4 hrs 21 min. Compared to 7 hrs 55 min for Year 10 baseline operations (Year 20 baseline sim not mandated). Option 2: Avg. transit time was 4 hrs 16 min.
16	Evaluate rail traffic signals on NS Back Belt	Evaluate potential benefits of signaling NS Back Belt.	Modeling effort should determine first if signals are warranted and what, if any, potential increase in speed / reduction in delay they might provide.	THIS SIM NOT IN PHASE 1 MANDATE

4.5 Simulation Model Results

A list of potential strategies, operational improvements, and capital improvements were identified for evaluation to determine the effectiveness of addressing current system deficiencies. Initially, the focus was on defining low cost, expeditions solutions for immediate implementation (i.e., 12 – 24-month time frame).

Based on this, the search for solutions to improve gateway performance initially focused on solving operational deficiencies with near-term initiatives that could produce significant performance improvements. The Project Team's findings pointed to two (2) high priority issues, which, if addressed, could significantly improve transit time performance and reliability, and help realize the goal of long-term gateway competitiveness. These high-priority issues are:

1. Poor overall structural condition and reliability of interlocking control facilities at EBJ and WBJ.

2. Need for improved coordination, prioritization and dispatch control of train movements through the gateway.

These two issues can be addressed with the modernization and centralization of gateway dispatch operations. This concept would involve the replacement of the two interlocking control towers with a new traffic coordination facility located at the NOUPT terminal. Included with this solution would be upgrading of the signaling and power switch equipment at both interlocking sites with remote operating capabilities. The main benefit from this concept would be to bring together representatives from each of the gateway operating railways in one physical location or through constant direct communications, thereby greatly facilitating communications and coordination of operations. It would also lead to the establishment of Gateway operating policies and procedures to keep Gateway traffic fluid, ensure fair and equitable access and use of infrastructure, and facilitate prompt identification and resolution of daily, as well as recurring, operating problems.

The next set of simulations focused on measuring the potential operational benefits of improving these current operating practices. The common assumption for these simulations is that trains are permitted to flow through the Gateway, unconstrained by the daily operational inefficiencies that stem primarily from poor Gateway communications, traffic coordination and prioritization. To simulate the potential for improvement under present traffic conditions, all recorded delay or anchor times for individual trains were removed and the trains were allowed to make their way to their destinations in accordance with their designated routing, operating at normal, safe speeds and headways. A check was made to ensure that Metairie Road crossings were respected, and that in no case were Amtrak trains delayed. The only delays allowed to occur were those resulting from traffic congestion. Yard receiving and departure capacity was assumed unconstrained. Launch times for individual trains remained unchanged from the present base case.

Another operating issue significantly impacting transit times is the current practice of UP re-crewing at Marconi on the Back Belt for all CSX and NS trains westbound to Avondale. This practice leads to lengthy delays at Marconi from awaiting crews and awaiting permission to proceed through EBJ. As documented, these delays average almost 2 ½ hours, delay other trains in the queue and are generally contrary to the objective of ensuring traffic fluidity.

Based on this, the improved operating scenario simulations also analyze the impact of these crew change practices. Two operating assumptions were tested for each traffic level. The first is to limit crew changes at Marconi to a reasonable target of 30 minutes. The second is the elimination of Marconi crew changes, thereby allowing UP-bound trains to move without stopping at Marconi.

The following describes the simulation scenarios tested:

Simulation 3: Improved Operations – Current Traffic

(a) 30 minute Marconi Crew Change

(b) Eliminate Marconi Crew Change

Simulation 4: Improved Operations – Year 10 Traffic

(a) 30 minute Marconi Crew Change

(b) Eliminate Marconi Crew Change

Simulation 15: Improved Operations – Year 20 Traffic

(a) 30 minute Marconi Crew Change

(b) Eliminate Marconi Crew Change

The full results of the above simulations are shown in **Tables 4-14** through **4-19.** A comparative summary of the simulations is shown in **Figure 4-5.**

Table 4-14
Improved Operations – Current Traffic Simulation 3a
30 Minute Marconi Crew Change

From	Data	To							Grand Total
		BN	CSX	IC	KCS	NOPB	NS	UP	
BN	Number of Trains					12			12
	Average Duration					3:18:34			3:18:34
	Max Duration					4:15:56			4:15:56
CSX	Number of Trains					8		17	25
	Average Duration					4:00:27		3:25:08	3:36:26
	Max Duration					5:34:12		6:05:09	6:05:09
IC	Number of Trains				1	4		1	6
	Average Duration				2:47:09	8:58:46		0:53:36	6:35:58
	Max Duration				2:47:09	9:40:35		0:53:36	9:40:35
KCS	Number of Trains		3	2					5
	Average Duration		3:01:18	3:34:46					3:14:41
	Max Duration		3:26:19	3:43:02					3:43:02
NOPB	Number of Trains	8	6	2	6		4	2	28
	Average Duration	3:21:35	4:24:29	1:34:15	2:24:16		2:39:22	3:10:40	3:08:18
	Max Duration	5:34:29	7:13:57	2:38:45	3:43:07		2:58:25	3:16:23	7:13:57
NS	Number of Trains			4	`			9	13
	Average Duration			5:03:50				3:08:32	3:44:00
	Max Duration			6:54:40				6:22:49	6:54:40
UP	Number of Trains		25	4		2	10		41
	Average Duration		3:17:47	4:23:50		3:56:40	2:55:03		3:20:35
	Max Duration		4:11:26	4:42:18		4:45:51	5:12:19		5:12:19
Total Number of Trains		8	34	12	7	26	14	29	**130**
Average Duration		3:21:35	3:28:06	4:00:43	2:27:32	4:26:43	2:50:34	3:13:46	**3:31:56**
Max Duration		5:34:29	7:13:57	6:54:40	3:43:07	9:40:35	5:12:19	6:22:49	**9:40:35**

Table 4-15
Improved Operations – Current Traffic Simulation 3b
Eliminate Marconi Crew Change

From	Data	To: BN	CSX	IC	KCS	NOPB	NS	UP	Grand Total
BN	Number of Trains					12			12
	Average Duration					3:13:41			3:13:41
	Max Duration					4:11:35			4:11:35
CSX	Number of Trains					8		17	25
	Average Duration					4:00:27		3:04:59	3:22:44
	Max Duration					5:34:12		5:33:43	5:34:12
IC	Number of Trains				1	4		1	6
	Average Duration				2:47:09	8:58:24		0:53:36	6:35:44
	Max Duration				2:47:09	9:40:35		0:53:36	9:40:35
KCS	Number of Trains		3	2					5
	Average Duration		3:01:18	3:34:46					3:14:41
	Max Duration		3:26:19	3:43:02					3:43:02
NOPB	Number of Trains	8	6	2	6		4	2	28
	Average Duration	3:22:05	4:24:29	1:34:15	2:23:06		2:39:22	3:10:40	3:08:12
	Max Duration	5:34:29	7:13:57	2:38:45	3:43:07		2:58:25	3:16:23	7:13:57
NS	Number of Trains			4				9	13
	Average Duration			5:03:50				2:42:26	3:25:56
	Max Duration			6:54:40				5:48:35	6:54:40
UP	Number of Trains		25	4		2	10		41
	Average Duration		3:19:16	4:19:28		3:56:16	2:55:58		3:21:16
	Max Duration		4:24:15	4:42:18		4:45:03	5:12:19		5:12:19
Total Number of Trains		8	34	12	7	26	14	29	**130**
Average Duration		3:22:05	3:29:12	3:59:16	2:26:33	4:24:23	2:51:14	2:53:51	**3:27:13**
Max Duration		5:34:29	7:13:57	6:54:40	3:43:07	9:40:35	5:12:19	5:48:35	**9:40:35**

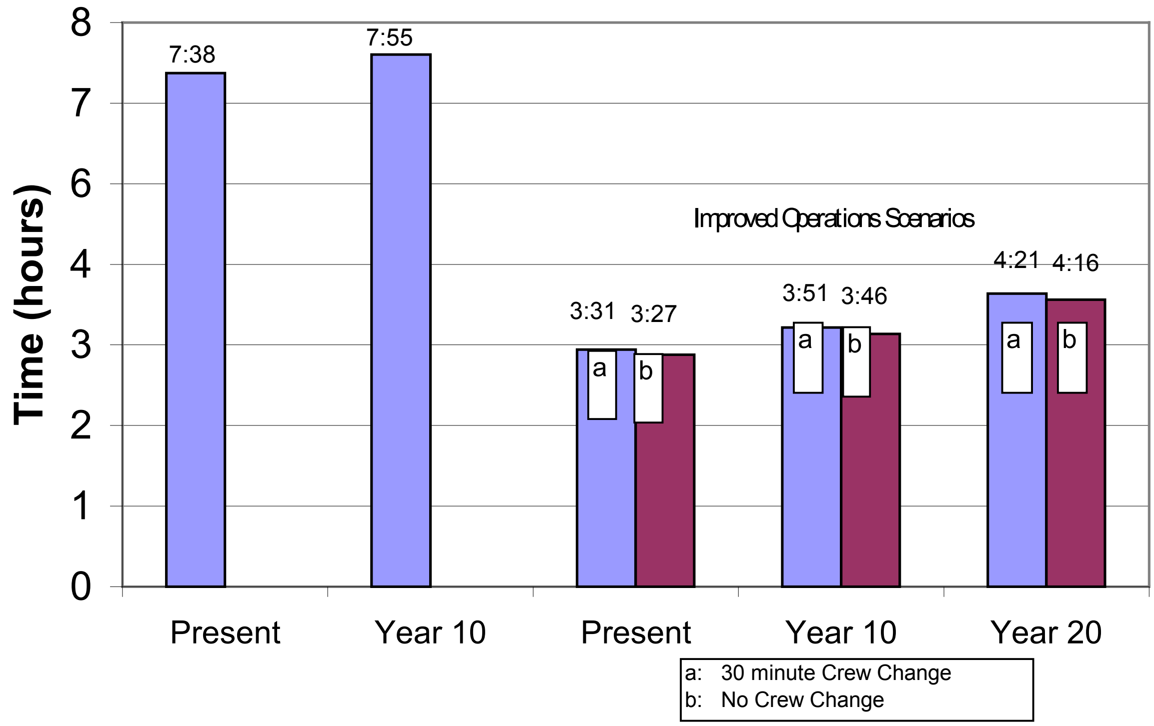
Table 4-16 Improved Operations – Year 10 Traffic Simulation 4a 30 Minute Marconi Crew Change									
From	**Data**	**To**							**Grand Total**
		BN	**CSX**	**IC**	**KCS**	**NOPB**	**NS**	**UP**	
BN	Number of Trains					13			13
	Average Duration					3:46:08			3:46:08
	Max Duration					6:38:46			6:38:46
CSX	Number of Trains					10		22	32
	Average Duration					4:41:51		3:47:54	4:04:46
	Max Duration					7:29:05		7:02:04	7:29:05
IC	Number of Trains				1	4	1	1	7
	Average Duration				2:47:09	9:02:25	5:47:03	1:21:53	6:35:07
	Max Duration				2:47:09	9:40:35	5:47:03	1:21:53	9:40:35
KCS	Number of Trains		4	2					6
	Average Duration		3:10:31	3:34:46					3:18:36
	Max Duration		3:32:26	3:43:02					3:43:02
NOPB	Number of Trains	9	6	3	6		4	2	30
	Average Duration	3:22:17	4:24:29	3:17:24	2:24:16		2:39:22	3:10:40	3:16:08
	Max Duration	5:39:31	7:13:57	6:43:42	3:43:07		2:58:25	3:16:23	7:13:57
NS	Number of Trains			4				12	16
	Average Duration			5:02:41				3:57:39	4:13:54
	Max Duration			6:54:40				6:42:14	6:54:40
UP	Number of Trains		29	6		2	12		49
	Average Duration		3:38:15	4:38:06		3:56:40	3:11:29		3:39:46
	Max Duration		5:26:12	5:08:21		4:45:51	6:23:25		6:23:25
Total Number of Trains		9	39	15	7	29	17	37	**153**
Average Duration		3:22:17	3:42:31	4:20:04	2:27:32	4:49:42	3:13:04	3:45:06	**3:51:40**
Max Duration		5:39:31	7:13:57	6:54:40	3:43:07	9:40:35	6:23:25	7:02:04	**9:40:35**

Table 4-17 Improved Operations – Year 10 Traffic Simulation 4b Eliminate Marconi Crew Change									
From	**Data**	**To**							**Grand Total**
		BN	**CSX**	**IC**	**KCS**	**NOPB**	**NS**	**UP**	
BN	Number of Trains Average Duration Max Duration					13 3:44:33 6:38:46			13 3:44:33 6:38:46
CSX	Number of Trains Average Duration Max Duration					10 4:41:53 7:29:05		22 3:26:41 5:26:48	32 3:50:1 7:29:05
IC	Number of Trains Average Duration Max Duration				1 2:47:09 2:47:09	4 9:00:07 9:40:35	1 5:47:03 5:47:03	1 1:48:09 1:48:09	7 6:37:33 9:40:35
KCS	Number of Trains Average Duration Max Duration		4 3:10:31 3:32:26	2 3:34:46 3:43:02					6 3:18:36 3:43:02
NOPB	Number of Trains Average Duration Max Duration	9 3:22:43 5:45:04	6 4:24:29 7:13:57	3 3:17:24 6:43:42	6 2:23:49 3:43:07		4 2:39:22 2:58:25	2 3:19:09 3:33:21	30 3:16:44 7:13:57
NS	Number of Trains Average Duration Max Duration			4 5:02:41 6:54:40				12 3:19:52 5:48:35	16 3:45:34 6:54:40
UP	Number of Trains Average Duration Max Duration		29 3:39:21 5:26:12	6 4:33:17 5:04:21		2 3:57:34 4:47:40	12 3:12:13 6:23:25		49 3:40:03 6:23:25
Total Number of Trains		9	39	15	7	29	17	37	**153**
Average Duration		3:22:43	3:43:20	4:18:09	2:27:09	4:48:45	3:13:36	3:21:24	**3:51:40**
Max Duration		5:45:04	7:13:57	6:54:40	3:43:07	9:40:35	6:23:25	5:48:35	**9:40:35**

Table 4-18 Improved Operations – Year 20 Traffic Simulation 15a 30 Minute Marconi Crew Change									
From	**Data**	**To**							**Grand Total**
		BN	**CSX**	**IC**	**KCS**	**NOPB**	**NS**	**UP**	
BN	Number of Trains					18			18
	Average Duration					3:56:51			3:56:51
	Max Duration					5:23:34			5:23:34
CSX	Number of Trains					14		34	48
	Average Duration					5:27:57		4:51:04	5:01:50
	Max Duration					7:31:35		7:30:25	7:31:35
IC	Number of Trains				1	6	3	2	12
	Average Duration				2:47:09	7:40:02	4:49:25	3:11:26	5:48:12
	Max Duration				2:47:09	9:40:35	5:48:06	4:55:54	9:40:35
KCS	Number of Trains		6	3					9
	Average Duration		3:24:43	4:01:57					3:37:08
	Max Duration		4:15:09	4:47:14					4:47:14
NOPB	Number of Trains	12	7	4	8		4	2	37
	Average Duration	4:03:00	4:33:26	4:18:13	2:51:42		2:39:22	3:11:58	3:43:11
	Max Duration	5:59:31	7:13:57	7:12:55	3:58:02		2:58:25	3:18:17	7:13:57
NS	Number of Trains			5				17	22
	Average Duration			5:08:11				4:33:44	4:41:34
	Max Duration			6:39:09				6:48:04	6:48:04
UP	Number of Trains		44	9		2	14		69
	Average Duration		4:17:07	4:18:39		3:58:09	3:23:32		4:05:54
	Max Duration		5:43:36	5:09:11		4:48:48	6:15:41		6:15:41
Total Number of Trains		12	57	21	9	40	21	55	**215**
Average Duration		4:03:00	4:13:37	4:27:58	2:51:11	5:02:16	3:27:23	4:38:29	**4:21:52**
Max Duration		5:59:31	7:13:57	7:12:55	3:58:02	9:40:35	6:15:41	7:30:25	**9:40:35**

Table 4-19 Improved Operations – Year 20 Traffic Simulation 15b Eliminate Marconi Crew Change									
From	**Data**	**To**							**Grand Total**
		BN	**CSX**	**IC**	**KCS**	**NOPB**	**NS**	**UP**	
BN	Number of Trains					18			18
	Average Duration					3:56:10			3:56:10
	Max Duration					5:23:34			5:23:34
CSX	Number of Trains					14		34	48
	Average Duration					5:27:57		4:34:12	4:49:52
	Max Duration					7:31:35		7:22:51	7:31:35
IC	Number of Trains				1	6	3	2	12
	Average Duration				2:47:09	7:40:00	4:49:25	3:24:02	5:50:17
	Max Duration				2:47:09	9:40:35	5:48:06	5:13:51	9:40:35
KCS	Number of Trains		6	3					9
	Average Duration		3:24:42	3:59:25					3:36:16
	Max Duration		4:14:14	4:47:14					4:47:14
NOPB	Number of Trains	12	7	4	8		4	2	37
	Average Duration	3:59:42	4:33:26	4:13:38	2:51:42		2:39:22	3:11:29	3:41:36
	Max Duration	5:57:25	7:13:57	7:12:55	3:58:02		2:58:25	3:18:03	7:13:57
NS	Number of Trains			5				17	22
	Average Duration			5:01:34				4:05:31	4:18:15
	Max Duration			6:37:15				6:25:01	6:37:15
UP	Number of Trains		44	9		2	14		69
	Average Duration		4:15:55	4:17:08		3:56:16	3:24:29		4:05:05
	Max Duration		5:43:36	4:58:42		4:45:03	6:15:41		6:15:41
Total Number of Trains		12	57	21	9	40	21	55	**215**
Average Duration		3:59:42	4:12:41	4:24:31	2:51:11	5:01:52	3:28:01	4:19:46	**4:16:18**
Max Duration		5:57:25	7:13:57	7:12:55	3:58:02	9:40:35	6:15:41	7:22:51	**9:40:35**

Figure 4-5
Average Transit Time
Interchange Traffic



Beginning with the present traffic scenario, the impact of improved coordination of traffic and minimizing Marconi re-crewing times reduces average transit times by 4 hours 7 minutes or 54% percent The greatest proportional time improvements were for CSX to UP trains, where average times improved by over 6 hours under the streamlined operation scenario.

These order-of-magnitude improvements represent a major operational advance for the gateway. While it should be noted that these simulated results are somewhat theoretical, given they are based on the premise that all trains would operate at maximum efficiency. In actual practice, up to 80 percent of this level of improvement should be realistically achievable taking into account realistic operating factors; hence, the realistic scenario would still translate to major time savings for all interchange traffic.

Elimination of crew changes at Marconi provides only marginal incremental improvement (i.e., only 4 minutes) in average transit time over the scenario based on 30-minute crew changes. This is to be expected since the improvement benefits only 26 trains out of the total 130 inter-yard trains. Results comparing these same two improvements under the Year 10 and Year 20 traffic conditions shows an expected increase in overall average transit times. Year 10 average times increased approximately 20 minutes over Present conditions and Year 20 increased 30 minutes over Year 10 conditions. The transit time advantage of no Marconi crew changes over the 30-

minute crew changes remained in the 4-to 5-minute range. Note that even under Year 20 traffic levels, the average transit time for the streamlined operation remained well below the present performance at 43 percent below baseline. This indicates that with a well-conceived and managed operating plan in place that keeps the gateway fluid by directing every train movement on a timely, prioritized, and logical basis; considerable performance improvements can be achieved without adding gateway track infrastructure. The only condition on this is that there must be adequate railroad resources at each yard to keep pace with gateway flow. These resources include receiving/departure yard holding and processing capacity, train crews, maintenance gangs, power availability, and other issues.

Based on these results, the immediate-term improvements were further defined as described in **Section 5**. Other analytical results of the modeling effort that were not scheduled a part of the immediate-term improvement package are included in **Section 7.0** *Long-Term Improvements and Strategies.*

5.0 DEVELOPMENT OF IMMEDIATE-TERM IMPROVEMENTS AND OPERATIONAL STRATEGIES

5.1 Immediate-Term Improvements / Program Summary

The development of an immediate-term improvement program was based on mutual discussions between the DOTD, the RPC, the Railroads and the Project Team. After completion of the simulation modeling for operational alternative improvements described in **Section 4.0**, a preliminary list of proposed improvements was developed by the Project Team. **Table 5-1** provides a summary of the immediate-need alternative components as originally discussed.

Three additional items noted for possible inclusion in the Immediate-Term Improvement Program by the railroads were: the signalization of the Diamond Intersection of NOPB and NS near France Road and Florida Avenue; the integration of the Clara Street (Amtrak) tower operations into the Regional Rail Coordination Center; and the potential for remote operations of the four railroad drawbridges from the Regional Rail Coordination Center. While they all provide some potential benefits, complexities regarding implementation and targeted priorities resulted in these three potential improvements be slated for farther evaluation. The signalization of the Diamond Intersection at the NOPB and NS intersection near France Road and Florida Avenue would allow priority trains to proceed unimpeded through the intersection, specifically movements from CSX to the Front Belt and from the Front Belt to the NS Oliver and CSX Yard. Under current unsignalized conditions, all trains must stop at the intersection prior to proceeding. While this improvement does provide potential benefits, the railroad's highest priorities were the upgrades of the interlockings at East and West Bridge Junction for the Immediate-Term Implementation. Due to this, the proposed signalization of the NOPB – NS Diamond is recommended for farther evaluation in Phase II and is included under the "Immediate-Term Improvements to be Reconsidered at a Later Date".

Amtrak, through the Clara Street Tower, operates passenger trains that have a direct impact on Gateway operations and performance. The integration of the Amtrak operation center into the Regional Rail Coordination Center should improve coordination of Amtrak movements through the Gateway and minimize impacts to other freight operations. Consolidation may also result in more efficient use of personnel resources. However, due to possible consolidation within Amtrak nationally and pending financial difficulties, this option will have to be reconsidered at a later date also.

Remote operation of the four rail bridges over navigable waterways from the Regional Rail Coordination Center could reduce operational costs and minimize the burden on personnel resources. However, do to safety and liability concerns, especially regarding the complexities associated with vehicular traffic on two of the four bridges, the option requires significant additional evaluation prior to implementation.

A summary of the Immediate-Term Improvement Program and preliminary estimated costs are shown in **Table 5-2**. It is interesting to note that seven of the sixteen prioritized issues noted in **Table 2-3** (Senior Level and Technical Advisory Committee Prioritized List of Issues and Deficiencies Impacting Gateway Performance), are addressed by the proposed Immediate-Term Improvement Program.

These improvements and preliminary cost estimates were discussed with the DOTD and RPC to determine potential eligibility for funding. Based on the recommendation of the DOTD and RPC, it was decided that this group of preliminary, immediate-term improvements should be presented to the Railroads and that options for funding should be discussed. It was further decided by DOTD and RPC that since the railroads would derive certain benefits from the proposed improvements, a cost-sharing agreement should be developed whereby the railroads would participate in funding the improvements on a 50:50 basis, with the DOTD/RPC participation initially at $5 million maximum, due to funding constraints.

On September 5, 2001, the DOTD, RPC and Project Team made a presentation to the Class 1 railroads representatives at a New Orleans Terminal Improvement Team Meeting. This presentation outlining the improvements detailed in **Table 5-1** and recommending an action plan in order to implement the improvements. The action plan called for:

1. The railroads to decide if they wanted to move forward with the proposed improvements, including the concept coordinated communication center.

2. The establishment of a “rail partnership” that would participate in the funding of the proposed improvements. The rail partnership would need to identify an agent and would need to have the ability to contract in Louisiana.

3. The development of a cooperative agreement whereby DOTD/RPC would release federal funds for the improvements to the "rail partnership" and detail the “rail partnership” participation in the project cost.

4. The establishment of a lease agreement between the “rail partnership” and either the NOUPT or the New Orleans Building Corporation (whichever would “own” the UPT building at the time) for establishment of the coordinated communication center.

The meeting was opportune as the next meeting of the UPT Board was scheduled for September 10, 2001. (The UPT Board was officially dissolved as of May 2002 and the UPT building is now under the management of the City of New Orleans through the New Orleans Building Corporation.)

Table 5-1
Summary Components of Draft Immediate Need Alternative

Item	Description	Implementation or Procurement Method
1. Central Communications and Coordination Center	There are currently several options being considered. One is to provide renovated space at the UPT. Other include new construction, or addition to the proposed ITS center in New Orleans.	Local contractor to provide renovations or new building. No specialty required, typical architectural general contractor.
2. Communication Center Equipment	Communication equipment include telephones and radios for the center. Other communications would include e-mail. Other equipment would likely be console and other furniture. Equipment will also include computers and other electronic equipment needed for field communications (routers, switches, etc.)	Computers – Computer vendor Elect. Equipment – Equipment Vendors Furniture – Furniture Vendor Telephones – Telephone Vendor
3. Computer Aided Dispatch (CAD) Center Equipment	This may range from a stand alone computer (PC) to a LAN connection to an existing railroad mainframe computer.	Computers – Computer Vendor CAD Software – Specialty software. Railroads have their own in-house staff or vendors that provide this software.
4. Increase reliability of East Bridge Junction and West Bridge Junction	Provide remote control of and dual control of existing switch equipment. There are some 20 to 30 switches that need to be replaced. Replacement may vary from new switch or simply new controller (price difference). Determination needs to be made as to what is recommended.	Specialty switch equipment and controllers – Specialty equipment vendors. Communication equipment to switches – Communication vendors. May look at either spread spectrum wireless or direct connect. Would depend on bandwidth and reliability needs.
5. Connection of drawbridges to central communication center	Provide remote control of drawbridge operation.	Same type of equipment and vendors as above.
6. Relocation of AMTRAK control center to central center.	Similar renovation / equipment as above.	Same vendors / equipment as above.

Table 5-2
Summary of Immediate-Term Program Improvements

Item	Description	Preliminary Estimates of Cost for Implementation		
IMMEDIATE-TERM PHASE I ITEMS				
1. Central Communications and Coordination Center	The Regional Rail Coordination Center is proposed to be located in the New Orleans Union Passenger Terminal (NOUPT) Building. It is estimated that approximately 3,000 square feet will be required to house all necessary equipment, staff and functions. The Facility will operate 24 hours per day, 365 days per year and will provide computer-aided dispatched capabilities within the gateway, improved communications, and remote capabilities to operate switches and signals at both East and West Bridge Junctions. Assumes utilizing existing HVAC and mechanical equipment at NOUPT.	Assume $100 / s. f. for build-out cost Construction Buildout $3,000 s. f. x $100 / s. f. = Infrastructure Wiring	 $300,000 $100,000	**$400,000**
2. Communication equipment for Central Communication and Coordination Center	Communication equipment includes public switch telephone system installation; radio communication systems for operations center; communication equipment for interface with field devices; and interoffice communication network (Local Area Network). Other communications would include e-mail. Equipment may include computers, racks, servers, routers/hubs, monitors, UPS, video switches, multiplexing equipment, and encoding and decoding devices.	PBX Telephone System Radio Base Station Radio Consoles Local Area Network Communications to Field Equipment Dictaphone Recording Equipment	$ 50,000 $300,000 $100,000 $100,000 $200,000 $ 50,000	**$800,000**
3. Computer Aided Dispatch (CAD) Center Equipment	Three workstations are proposed. One for the operator, one for the analyst and one for the manager. The CAD system can reside locally or an existing CAD system at a remote location can be accessed and expanded for gateway dispatch. Software will be customized for gateway operations.	CAD Computer Terminals Central CAD Computer Hook-up CAD Software Programming		**$575,000**

Table 5-2
Summary of Immediate-Term Program Improvements

Item	Description	Preliminary Estimates of Cost for Implementation		
4. Upgrade East Bridge and West Bridge interlockings and establishing remote communication capabilities with Central Communications and Coordination Center	Includes the upgrade of 17 switch machines at East Bridge Junction and 19 switch machines at West Bridge Junction to 110-volt dual control models. This will improve throw times and handling operations under hand-operating conditions. All signal and associated field equipment will be renewed including 34 signals at East Bridge Junction and 18 signals at West Bridge Junction. New underground cabling will be provided. Communication will be established between field equipment and the Central Communications and Coordination Center.	**East Bridge Junction Interlocking** Includes signals, switches, communications equipment, power and installation **West Bridge Junction Interlocking** Includes signals, switches, communications equipment, power and installation		**$4,265,000** **$3,660,000**
SUBTOTAL – IMMEDIATE-TERM PHASE I ITEMS				**$9,950,000**
IMMEDIATE-TERM IMPROVEMENTS TO BE RECONSIDERED AT A LATER DATE				
5. Signalization diamond intersection of NOPB and Norfolk-Southern near France Road and Florida Avenue	Includes the installation of signalization for the existing at-grade diamond intersection near France Road and Florida Avenue. Currently all railroads must come to a complete stop.	Includes signals, communications equipment, power and installation		**$250,000**
6. Relocation of AMTRAK (Clara Street) control center to Central Coordination Center	Renew an upgrade of signals and switches with implementation of remote communications capabilities from the Central Communications and Coordination Center. Operations would be transferred to the Central Coordination Center. All necessary communications and computer equipment to be housed at the Central Coordination Center would also be included.			To be Determined
7. Provide remote operation of drawbridges at Central Communication Center	Provide remote control capabilities of drawbridge operation for the following: Harvey Canal Bridge (UP) Almonaster Bridge (CSX, PONO) Florida Avenue Bridge (NS, PONO) Sea Brook Bridge (NS)			To Be Determined

The railroads were provided with information that demonstrated that the proposed improvements could reduce overall transit times, increase system performance and reliability, and had the potential to reduce operating costs in the Gateway, Improvements addressed were long-term capital improvement items (i.e. deferred maintenance issues at the key interlockings). In addition, the proposed program would serve as a model under United States Department of Transportation (USDOT) policy and could increase the potential for future USDOT funding for other improvements within the gateway. The key to such potential future funding would be the demonstration of cooperation and agreement between the carriers.

Based on the information presented, the railroads requested that a detailed benefit-cost analysis be performed in order to determine the potential participation of each of the railroads in capital improvements. It was mutually agreed by DOTD and RPC to address this request and the Project Team was directed to conduct a benefit-cost analysis, which is presented in **Section 6.0**.

While some railroads supported the proposal for Immediate-Term Improvement, there was not consensus at the time for the railroads to form a partnership and move the program forward. In addition, the New Orleans Public Belt, which had been a leader in the development of the rail partnership had a change in the General Manager position. Mr. Jim Bridger was appointed General Manager in December 2001. In addition, Mr. Tom Atkinson was appointed Director of Intermodal Operations for the DOTD and took a lead role in the project beginning in January, 2002.

In January 2002, the DOTD, RPC, and Project Team met with Mr. Bridger to review the study objectives and results and review the proposed improvement plan. Through discussion, Mr. Bridger generally agreed with the Project Team recommendations but suggested a modified phasing to the implementation. Mr. Bridger stated that the proposed staffing of the "communication center" could likely be reduced to two persons per shift on a 24-hours/day, 7-days/week basis. In addition, it was recommended and agreed that an "*Operations Manual*" would need to be developed to document the rules and procedures for operating the gateway through the East Bridge and West Bridge interlockings. Mr. Bridger indicated his willingness to continue pursuing the participation of the other railroads in the proposed program. It was further agreed that as a quasi-governmental agency, the NOPB would be a partner to the cooperative agreement with the DOTD/RPC for disbursement of the funds for the proposed improvements.

In February, 2002, the Project Team, in cooperation with the DOTD and RPC developed a draft cooperative agreement for participation by the DOTD/ RPC and the NOPB for implementation of the proposed immediate-term improvements, as described in **Section 5.0**. Options and questions to consider regarding the form and implementation of the cooperative agreement include:

1. Who will be responsible for design of the improvements?

2. Who will hire the contractor to complete the work?

3. Will a design/build approach be appropriate?

4. Does the NOPB have sufficient funds to "float" construction while waiting on DOTD reimbursements?

5. How can the DOTD ensure that NOPB participates financially in the project?

6. How can DOTD verify that improvements designed are actually implemented?

There are obviously other questions that need to be addressed; however, the draft agreement as it currently stands, appears to be a good starting point for negotiation between the NOPB and the DOTD/RPC.

5.2 Other Immediate-Term Needs

An important community issue noted in the Stakeholder Involvement Program was the negative impact of noise (i.e., trains blowing horns at highway/rail grade crossings) in Old Metairie residential areas. The following photograph displays a typical Old Metairie at-grade rail crossing. A Louisiana State Statute currently prohibits trains from blowing horns at seven of the grade crossings in Old Metairie is currently in place. The Federal Railroad Administration (FRA) is currently in the process of trying to enact regulations requiring trains to blow horns at all at-grade crossings throughout the United States. While these federal regulations would supercede State regulations regarding the horn-blowing ban, it appears at this time that the regulations could allow horns to remain silent if appropriate FRA-approved supplementary safety measures are instituted at the seven Old Metairie at-grade crossings. While final regulations have not been issued, there currently appears to be two supplementary safety measure options that would allow the prohibition of horn blowing through Old Metairie to continue:

1. Install four-quadrant gates at affected crossings; or

2. Institute a programmed enforcement/public awareness program.

At this point, the four-quadrant gate system appears to be the most reasonable alternative. **Table 5-3** identifies the at grade crossings and preliminary probable cost to institute such improvements.

Table 5-3
Back Belt Grade Crossing Warning System Improvements

Location	Warning System Improvement
LaBarre Road	$250,000
Atherton Drive	$250,000
Hollywood Drive	$250,000
Farnham Place	$250,000
Oakridge Park	$250,000
Metairie Road	$250,000
Carrollton Avenue	$250,000
TOTAL	**$1,750,000**

Metairie Road Crossing

The Regional Planning Commission and Jefferson Parish are aware of this issue and have instituted parallel studies to address these problems. Currently, RPC has programmed funding for these improvements in the Transportation Improvement Program. Due to the importance of these improvements from a quality-of-life livable-community standpoint, the project team recommends that these improvements be implemented as soon as the final FRA regulations are issued, and FRA approval can be obtained. These improvements should also be considered part of the Immediate-Term Improvement Program, as recommended throughout this study.

5.3 Immediate-Term Improvement Program Components

To institute the operational improvements and derive the transit time benefits defined in the improved operation conditions simulation runs, the following physical improvements must be instituted:

1. The centralization and integration of Gateway traffic interlocking control under 'one roof' at a "Regional Rail Coordination Center"; and

2. An upgrade of the interlockings, signals and control equipment at both the West Bridge Junction and East Bridge Junction interlocking sites.

In April 2002, members of the Project Team including RPC, LDOTD and the Consultant Team met with representatives of the FRA to review the proposed improvements. In general, the FRA agreed with the intent of the proposed improvements, but requested that specific details as to the full extent of the improvements as well as the reason for the improvements be fully documented in order to avoid 1) miscommunication among the parties involved, 2) undesirable or unacceptable reliability and/or performance, and 3) avoid replacement of the installed improvements if other initiations are planned for future improvement. The FRA provided a guidance manual entitled *"Railroad Corridor Transportation Plans,"* which details the information typically provided for high-speed rail corridor projects. (See **Appendix C**).

The Project Team recognizes the value of the information requested and also recognizes the potential for high-speed rail within the New Orleans Gateway. While high-speed rail initiatives are in early stages of development, it is not reliable to estimate at this time any additional impacts on the proposed improvements due to high-speed rail. In addition, the level of detail requested in the guidance document is beyond the scope of the current work and determined to be best addressed by the parties handling the negotiations for improvements. Certainly, such detail should be defined prior to construction, but is more likely to be completed by the designer of the final high speed passenger rail improvements.

What follows in this section are preliminary details of improvements, including description, cost estimates and conceptual engineering layouts.

5.4 Regional Rail Coordination Center

5.4.1 Overview and Need

Chronic congestion at East Bridge Junction was ranked as the most pressing problem affecting rail traffic performance in transiting the New Orleans Gateway. There was reasonable consensus among certain key participating railroads that this problem could best be alleviated by modernization and common operation of both the East Bridge and West Bridge interlocking plants at a central control facility. The simulation model of this concept clearly indicated that substantial improvements in gateway fluidity could be achieved. Discussion of a site for the central control facility to operate the interlocking revealed that it could be remotely located. Remote operation can be accomplished by using either a wireless or hard-wired communication system for voice, video, and data transmission for the operation of signals and switches within the limits of both interlocking plants. These limits would extend from connections with UP and BN Railroads on the west bank across the Huey P. Long Bridge via the New Orleans Public Belt (NOPB) to interlockings with the CNIC and the KCS at EBJ and connecting to the Back Belt of the NS. The Back Belt also serves as the connection to the CSX in eastern New Orleans. Along the river front line, the limits would include Southport and Lampert Junctions, and extend to Eagle Street in Orleans Parish.

Consideration of a location for the central control facility has resulted in serious consideration of the UPT in downtown New Orleans. This site is already owned by the City and it is currently designated as a future intermodal transportation center to house the City of New Orleans Transit and Traffic Management for Advanced Surface Street Control and Transit Operations.

5.4.2 Program and Spacial Requirements

Program requirements for the Regional Rail Coordination Center were developed based on a Long-Term Staffing Plan, which would ultimately include a director, manager, system operators, and an analyst. The resulting preliminary program requirements include:

SPACE	AREA
Control Room (3 stations)	445 square feet (sf)
Training Room (1 station)	192 square feet (sf)
Director's Office	160 square feet (sf)
Meeting / Conference Room	230 square feet (sf)
Manager / Trainmaster	120 square feet (sf)
Kitchen / Lunch / Break	200 square feet (sf)
Restrooms (2)	120 square feet (sf)
Lockers Room & Spare Parts Storage	182 square feet (sf)
Signal Maintainer Control / Comm. Equip.	304 square feet (sf)
Hallways / Passage	472 square feet (sf)
TOTAL AREA	**2,925 square feet (sf)**

Approximately three thousand (3,000) square feet are available in the UPT, which should be sufficient to provide the spacial requirement needed for the center. The center will include a central control room, training room, offices for a director and an analyst/data keeper and space to house computer, relay and communications equipment, and a small signal maintenance shop. Standby power provided by diesel generators either dedicated to the center or common to the entire building, will be required.

Communications facilities will include direct contact, either wireless or hard-wired, with the interlocking plants, as well as dedicated fax and telephone equipment that provides direct connection with each of the carriers. A conceptual layout of program requirements for the Regional Rail Coordination Center is shown in **Figure 5-1** supporting the need for approximately 3,000 square feet (sf) in the long-term.

While the long-term concept was used as the planning scenario, it is probable that initially the facility could be run with two operators per shift. Current operating staff at both East Bridge and West Bridge Towers could be considered for staffing of this new facility.

5.4.3 Functional Capabilities

The operator on duty at the center will have the capability of receiving advance information regarding planned train movements through the area that are controlled by direct contact with yardmasters at each carrier's yard. This will permit the operation to monitor each movement by radio and enable him to facilitate train progress through the area by programming the required switches and signals.

Figure 5-1
Conceptual Plan of Regional Rail Coordination Center

(Please download *5_1.pdf*)

5.4.4 Organization, Management and Staffing

The anticipated staffing of the center will include an operator, a manager, and an analyst (record keeper) who will each be equipped with a complete workstation. These positions will be manned on a twenty-four hour, seven day-a-week basis. The overall operation of the facility will be the responsibility of the Director. It is also anticipated that a trainmaster will be on duty at all times. A full-time signal maintainer will be a staff member of the facility, who will be responsible for providing equipment maintenance.

5.4.5 Estimated Costs

A conceptual or order-of-magnitude estimate of the probable cost involved in establishing a Regional Rail Coordination Center at the NOUPT is outlined in **Table 5-4**. The estimate includes the cost of building the required space for the center's furniture and equipment configuration. The signal and communication portion of the estimate includes the hardware and software items necessary to place the center in operation. The estimate has been increased to accommodate an escalation factor to update the costs since they were developed more than a year ago.

This estimate does not include any costs for asbestos or lead paint abatement for existing buildings. No tests were performed since an actual location in the NOUPT has not been determined.

Table 5-4
Order of Magnitude Estimate of Cost for Establishing and Equipping The Regional Rail Coordination Center

Item	Units	Price	Quantity	Amount	Totals
BUILDOUT AND FURNITURE					
Modify Existing Space to Accommodate the Center	Sq. Ft.	$100	3,000	$300,000	
Miscellaneous Furniture					
TOTAL BUILDOUT AND FURNITURE:					**$300,000**
EQUIPMENT AND COMMUNICATION ITEMS					
Materials and Equipment					
Communication Equipment	Lot	$300,000	1	$300,000	
Computer Based Control System	Lot	$500,000	1	$500,000	
Standby Power Supply	Lot	$100,000	1	$100,000	
Surge Protection Equipment	Lot	$1,000	1	$1,000	
Wire and Cable	Lot	$25,000	1	$25,000	
Miscellaneous Signal Material	Lot	$10,000	1	$10,000	
Subtotal				**$936,000**	
Material Handling (17.5%)				$163,800	
Total Materials and Equipment:				**$1,099,800**	
Labor and Subsistence:					
Signal	Crew Day	$1,500	20	$30,000	
Communications	Crew Day	$300	15	$4,500	
Labor Additives				$30,720	
Subsistence				$2,300	
Total Labor and Subsistence:				**$67,520**	
Engineering:					
Engineering				$50,000	
Engineering Additives				$20,700	
Total Engineering				**$70,700**	
TOTAL EQUIPMENT AND COMMUNIATIONS ITEMS:					**$1,238,020**
SUBTOTAL:					**$1,538,020**
ESCALATION TO JUNE 2002 (4%):					$61,520
SUBTOTAL:					**$1,599,540**
20% CONTINGENCY:					$319,908
TOTAL REGIONAL RAIL COORDIN ATION CENTER:					**$1,919,448**

5.5 East and West Bridge Junction Interlocking Upgrade/Remote Switch Capabilities

5.5.1 Overview and Need

The current interlocking plants and towers at both EBJ and WBJ are dated from the 1930s when the Huey P. Long Bridge was constructed. The machines, which operate the powered switches, are, for the most part, antiquated and unsuitable for remote operation. This is also the case to an even greater extent with the switchgear in each of the towers, as well as the tower buildings themselves. The limits of the proposed interlocking plants to be remotely controlled are described in the previous section on the Regional Rail Coordination Center. Except for a few switch machines (which have been recently installed) it will be necessary to replace all the remaining units, as well as, all of the required signals to allow for the remotely controlled system.

5.5.2 Interlocking Upgrade Plan

Single line plots of rail lines are illustrated both on 1" = 200' scale aerial photograph base maps and on white backgrounds ("stick drawings") in this section. These are designated as **Figures 5-3A** through **5-11B** for the East Bridge Interlocking Plant and **Figures 5-12A** through **5-13B** for the West Bridge Interlocking Plant. These maps are indexed in **Figure 5-2**. The trackage on the HPL Bridge joins the two interlocking plants. Signals on the bridge were upgraded and modernized with an Electro-Code System in 1995 under an unrelated improvement program. The aerial photographs show the proposed location of each new signal and each new switch machine to be installed, as a part of the present proposed upgrade plan.

Since these aerial photographs were flown in the mid 1990s, numerous changes have occurred in the track layouts. These track changes have been added in the form of single line drawings to depict removals and additions to update the layouts to represent current conditions.

5.5.3 Cost Estimates for Upgrade and Remote Communications Capabilities

A conceptual estimate of the probable cost to upgrade the East and West Bridge Junction Interlocking Plants is outlined in **Tables 5-5** and **5-6**. **Tables 5-5a** and **5-6a** relate to **Tables 5-5** and **5-6** respectively and lists all components shown on the figures and the appropriate figure number along with the status as to whether or not it will be upgraded. The estimated cost at East Bridge Junction is $4,419,535 and at West Bridge Junction is $3,849,581. The estimates include new switch machines, signals, electrical power, hardwiring for each unit to an estimated four control bungalows, and the communication system between each bungalow and the Regional Rail Coordination Center. Estimates also include costs for connecting existing switch machines to the system, which do not need to be replaced.

Table 5-5
Cost Estimate to Upgrade East Bridge Junction Interlocking Plant to Permit Remote Operations

Item	Units	Price	Quantity	Amount	Totals
EAST BRIDGE JUNCTION					
Materials and Equipment					
Signals, C/S 20 C/W Masts and Ladders	Each	$4,500	32	$144,000	
Switch Machines and Layout	Each	$30,000	17	$510,000	
Communications Equipment	Lot	$50,000	1	$50,000	
Control System Bungalows	Each	$250,000	3	$750,000	
Field VHLC Programming	Lot	$250,000	1	$250,000	
Coded Interface Equipment	Each	$9,500	7	$66,500	
AC/DC Power Supply	Lot	$75,000	1	$75,000	
Surge Protection Equipment	Lot	$5,000	1	$5,000	
Wire and Cable	Lot	$650,000	1	$650,000	
Miscellaneous Housings	Each	$4,000	3	$12,000	
Miscellaneous Signal Material	Lot	$25,000	1	$25,000	
Subtotal				**$2,537,500**	
Material Handling (17.5%)				$444,063	
Total Materials and Equipment:				**$2,981,563**	
Labor and Subsistence:					
Signal	Crew Day	$1,500	120	$180,000	
Communications	Crew Day	$300	14	$4,200	
Labor Additives				$164,000	
Subsistence				$12,200	
Total Labor and Subsistence:				**$360,400**	
Engineering:					
Engineering				$250,000	
Engineering Additives				$103,300	
Total Engineering				**$353,300**	
TOTAL:					**$3,695,263**
ESCALATION TO JUNE 2002 (4%):					$147,811
SUBTOTAL:					**$3,843,074**
15% CONTINGENCY:					$576,461
TOTAL EAST BRIDGE JUNCTION:					**$4,419,535**

Table 5-5A East Bridge Junction Interlocking Plant to Permit Remote Operations			
Equipment	**Description**	**Figure No.**	**Apparent Through Track Owner**
Switch #1	Replace existing switch machine with new dual control (power and hand) switch	5-7 & 5-9	CNIC
Switch #2	Replace existing hand throw with new dual control (power and hand) switch	5-6	CNIC
Switch #3	Replace existing switch machine with new dual control (power and hand) switch	5-8 & 5-9	CNIC
Switch #4	Replace existing hand throw with new dual control (power and hand) switch	5-8 & 5-9	CNIC
Switch #5	Existing power switch to remain or replace with hand throw switch	5-8 & 5-9	KCS
Switch #6	Replace existing hand throw with new dual control (power and hand) switch	5-4	CNIC
Switch #7	Existing power switch to remain or replace with hand throw switch	5-8	CNIC
Switch #9	Existing power switch to remain or replace with hand throw switch	5-8	NOPB
Switch #10	Replace existing switch machine with new dual control (power and hand) switch	5-10	CNIC / NOPB / KCS / BNSF / UP
Switch #11	Replace existing switch machine with new dual control (power and hand) switch	5-4	CNIC
Switch #14	Replace existing switch machine with new dual control (power and hand) switch	5-3	NOPB
Switch #15	Replace existing switch machine with new dual control (power and hand) switch	5-3 & 5-4	NOPB
Switch #16	Existing power switch to remain or replace with hand throw switch	5-4	UP
Switch #17	Replace existing switch machine with new dual control (power and hand) switch	5-4	NOPB
Switch #18	Replace existing switch machine with new dual control (power and hand) switch	5-4	NOPB
Switch #19	Replace existing switch machine with new dual control (power and hand) switch	5-4	CNIC
Switch #20	Replace existing switch machine with new dual control (power and hand) switch	5-4	CNIC
Switch #21	Replace existing switch machine with new dual control (power and hand) switch	5-5	CNIC
Switch #22	Replace existing switch machine with new dual control (power and hand) switch	5-5	CNIC
Switch #23	Existing hand throw switch to remain	5-4	NOPB
Switch #24	Replace existing switch machine with new dual control (power and hand) switch	5-5	NS
Switch #25	Replace existing switch machine with new dual control (power and hand) switch	5-5	NS
Switch #26	Existing hand throw switch to remain	5-4	NOPB
Signal 2LA	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-8 & 5-9	NOPB
Signal 2RA	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-8 & 5-9	NOPB

Table 5-5A
East Bridge Junction
Interlocking Plant to Permit Remote Operations

Equipment	Description	Figure No.	Apparent Through Track Owner
Signal 2RB	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-7 & 5-9	CNIC
Signal 2RC	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-7 & 5-9	CNIC
Signal 3 & 4	Double signal to be inspected, replace / salvage as needed, provide new communication to signal	5-3	NOPB
Signal 4R	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-5	NOPB
Signal 4RA	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-8	KCS
Signal 4L (2 signals)	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-6	CNIC
Signal 4LA	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-8 & 5-9	KCS
Signal 4LB	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-8 & 5-9	KCS
Signal 5A	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-3 & 5-4	CNIC
Signal 5B	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-3 & 5-4	CNIC
Signal 6	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-3	NOPB
Signal 6R	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-8	NOPB
Signal 6LA	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-8	NOPB
Signal 7A	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-3 & 5-4	NOPB
Signal 7B	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-3 & 5-4	UP
Signal 8 & 9	Double signal to be inspected, replace / salvage as needed, provide new communication to signal	5-3 & 5-4	CNIC
Signal 8R	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-8	NOPB
Signal 8LA	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-8	NOPB
Signal 10	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-4	CNIC
Signal 10RA	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-10	NOPB
Signal 10RB	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-10	NOPB
Signal 10LA	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-10	NOPB
Signal 29	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-4	NOPB
Signal 30 & 31	Double signal to be inspected, replace / salvage as needed, provide new communication to signal	5-4	NOPB

Table 5-5A East Bridge Junction Interlocking Plant to Permit Remote Operations			
Equipment	**Description**	**Figure No.**	**Apparent Through Track Owner**
Signal 32	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-4	CNIC
Signal 33, 34 & 35	Triple signal to be inspected, replace / salvage as needed, provide new communication to signal	5-5	CNIC
Signal 36A	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-5	KCS
Signal 36B	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-5	NS
Signal 36C	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-5	KCS

Table 5-6
Cost Estimate to Upgrade West Bridge Junction Interlocking Plant to Permit Remote Operation

Item	Units	Price	Quantity	Amount	Totals
WEST BRIDGE JUNCTION					
Materials and Equipment					
Signals, C/S 20 C/W Masts and Ladders	Each	$4,500	15	$67,500	
Switch Machines and Layout	Each	$30,000	20	$600,000	
Communications Equipment	Lot	$100,000	1	$100,000	
Control System Bungalows	Each	$250,000	1	$250,000	
Field VHLC Programming	Lot	$250,000	1	$250,000	
Coded Interface Equipment	Each	$9,500	2	$19,000	
AC/DC Power Supply	Lot	$75,000	1	$75,000	
Surge Protection Equipment	Lot	$5,000	1	$5,000	
Wire and Cable	Lot	$650,000	1	$650,000	
Miscellaneous Housings	Each	$4,000	3	$12,000	
Miscellaneous Signal Material	Lot	$25,000	1	$25,000	
Subtotal				**$2,053,500**	
Material Handling (17.5%)				$359,363	
Total Materials and Equipment:				**$2,412,863**	
Labor and Subsistence:					
Signal	Crew Day	$1,500	150	$225,000	
Communications	Crew Day	$300	21	$6,300	
Labor Additives				$205,950	
Subsistence				$15,300	
Total Labor and Subsistence:				**$452,550**	
Engineering:					
Engineering				$250,000	
Engineering Additives				$103,300	
Total Engineering				**$353,300**	
TOTAL:					**$3,218,713**
ESCALATION TO JUNE 2002 (4%):					$128,749
SUBTOTAL:					**$3,347,462**
15% CONTINGENCY:					$502,119
TOTAL WEST BRIDGE JUNCTION:					**$3,849,581**

Table 5-6A West Bridge Junction Interlocking Plant to Permit Remote Operations			
Equipment	**Description**	**Figure No.**	**Apparent Through Track Owner**
Switch #1	Existing spring switch to remain	5-12	UP
Switch #2	Existing spring switch to remain	5-12	UP
Switch #3	Existing spring switch to remain	5-12	UP
Switch #4	Replace existing switch machine with new dual control (power and hand) switch	5-12	UP
Switch #5	Replace existing switch machine with new dual control (power and hand) switch	5-12	UP
Switch #8	Replace existing switch machine with new dual control (power and hand) switch	5-12	UP
Switch #9	Replace existing switch machine with new dual control (power and hand) switch	5-12	BNSF
Switch #10	Replace existing switch machine with new dual control (power and hand) switch	5-12	BNSF
Switch #11	Replace existing switch machine with new dual control (power and hand) switch	5-12	NOPB
Switch #12	Replace existing switch machine with new dual control (power and hand) switch	5-12	NOPB
Switch #13	Replace existing switch machine with new dual control (power and hand) switch	5-12	NOPB
Switch #15	Replace existing switch machine with new dual control (power and hand) switch	5-12	UP
Switch #16	Replace existing switch machine with new dual control (power and hand) switch	5-12	UP
Switch #17	Replace existing switch machine with new dual control (power and hand) switch	5-12	NOPB
Switch #18	Existing spring switch to remain	5-12	BNSF
Switch #19	Replace existing switch machine with new dual control (power and hand) switch	5-12	BNSF
Switch #20	Replace existing switch machine with new dual control (power and hand) switch	5-12	UP
Switch #21 (2 machines)	Replace existing switch machine with new dual control (power and hand) switch	5-12	NOPB
Switch #22	Replace existing switch machine with new dual control (power and hand) switch	5-12	NOPB
Switch #23	Replace existing switch machine with new dual control (power and hand) switch	5-12	NOPB
Switch #24	Replace existing switch machine with new dual control (power and hand) switch	5-12	NOPB
Switch #25	Replace existing switch machine with new dual control (power and hand) switch	5-12 & 5-13	NOPB
Switch #26	Replace existing switch machine with new dual control (power and hand) switch	5-12 & 5-13	NOPB
Signal 1D (2 signals)	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-12	UP
Signal A1T	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-12	UP
Signal 2A	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-12	BNSF

Table 5-6A West Bridge Junction Interlocking Plant to Permit Remote Operations			
Equipment	**Description**	**Figure No.**	**Apparent Through Track Owner**
Signal 2C (2 signals)	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-12	BNSF
Signal 3C	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-12	NOPB
Signal 6*	Inspect signal, evaluate elimination of signal, removal from service	5-12	NOPB
Signal 7*	Inspect signal, evaluate elimination of signal, removal from service	5-12	BNSF
Signal 8*	Inspect signal, evaluate elimination of signal, removal from service	5-12	UP
Signal 9*	Inspect signal, evaluate elimination of signal, removal from service	5-12	UP
Signal 27*	Inspect signal, evaluate elimination of signal, removal from service	5-12	UP
Signal 27D	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-12	UP
Signal 28*	Inspect signal, evaluate elimination of signal, removal from service	5-12	UP
Signal 28A	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-12	UP
Signal 29*	Inspect signal, evaluate elimination of signal, removal from service	5-12	BNSF
Signal B29	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-12 & 5-13	BNSF
Signal C29	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-12 & 5-13	BNSF
Signal 31	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-13	NOPB
Signal 32	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-13	NOPB
Signal 34R	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-12	UP
Signal 34L	Signal to be inspected, replace / salvage as needed, provide new communication to signal	5-12	UP

* Not included in signal total.

The complete system to provide for the upgrade of the interlocking plant and their remote operation consists of all of the elements estimated in **Tables 5-5** and **5-6**; thus, the total probable cost is as follows:

Upgrade East Bridge Junction	$4,419,535
Upgrade West Bridge Junction	$3,849,581
Establish Regional Rail Coordination Center	$1,919,448
Total Cost for Complete System	**$10,188,564**

It should be noted that environmental clearance through the NEPA process will be necessary prior to implementation if Federal funds are used. Due to the fact no new capacity is being added and it appears no additional right-of-way is required, a Categorical Exclusion (CE) may be applicable. Applicability of Section 106, Historic Preservation Act issues regarding the East and West Bridge Tower should be evaluated prior to implementation.

Figure 5-2
Index of Figures 5-3 through 5-13

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Figure 5-3A
Aerial

(Please download *5_3A.pdf*)

Figure 5-3B
Stick

(Please download *5_3B.pdf*)

Figure 5-4A
Aerial

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Figure 5-4B
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Figure 5-5A
Aerial

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Figure 5-5B
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Figure 5-6A
Aerial

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Figure 5-6B
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Figure 5-7A
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Figure 5-7B
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Figure 5-8A
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Figure 5-9A
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Figure 5-13A
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Figure 5-13B
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5.6 Other Operational Strategies to Improve Rail Operations in Gateway

In addition to the capital expenditure projects described above, it should be noted that there are at least two operational-only changes that should improve rail operations in the New Orleans Rail Gateway:

1. Limit crew changes at Marconi to thirty (30) minutes - As pointed out in **Section 4.0**, an operating issue significantly impacting transit times is the crew changes occurring at Marconi Boulevard on the Back Belt. The current practice is that UP re-crews all CSX and NS trains westbound to Avondale at this location. This practice leads to lengthy delays at Marconi from awaiting crews and awaiting permission to proceed through EBJ. As documented earlier, these delays average almost 2 ½ hours, delay other trains in the queue and are generally contrary to the objective of ensuring traffic fluidity. Computer simulation models have shown that if crew changes can be limited to a window of thirty minutes, significant improvements can be made.

2. Limit crew changes at and in vicinity of HPL Bridge to thirty (30) minutes - Traffic movements across the HPL Bridge are often delayed due to lengthy crew changes, authorization delays and most notably, *queuing of trains on the bridge* awaiting permission to proceed through the interlockings at either end. The resulting trains' delays represent additional operating costs for crews, power, rail cars and, of particular importance, added transit time for time-sensitive traffic. Changes placed into effect since the events of September 11, 2001 have prohibited the queuing of trains on the bridge. Installation of the Regional Rail Coordination Center should help with authorization delays. Changes in crew change practices at and in the vicinity of the HPL Bridge would help in increasing efficiency - perhaps a time limitation of 30 minutes, as is proposed for crew changes at Marconi, would be sufficient.

5.7 Summary of Benefits

Section 6 of this report will provide an in-depth, benefit cost analysis for the immediate-term benefits outlined in this section. Below, however is a listing of the qualitative benefits of these immediate-term improvements:

5.7.1 Qualitative Benefits of Proposed Interim Improvements

1. Reduction in transit time for all traffic, including time-sensitive shipments, to cross the gateway.

2. Improved utilization of railroad assets and resources, and associated reduction in operating costs for crewing, locomotives, fuel, rail cars, and fuel.

3. Improved ability of the gateway to support and improve on-time performance of high priority, scheduled, through-trains.
4. Improved capability to respond to rapid, day-to-day changes in operating conditions and movement priorities.
5. Improved coordination capability in the event of maintenance activities, derailments, and regional/state emergency conditions.
6. Increased reliability and lower maintenance costs for critical signal plant at East and West Bridge interlockings, which handle the majority of gateway traffic.
7. Improved coordination of passenger and freight movements thereby improving use of gateway slots and reducing potential for costly passenger train delays.
8. Improved utilization of present rail infrastructure will defer any required future plant expansion as traffic grows.

5.7.2 Benefits for General Public

As can be ascertained by reading the above list, these benefits accrue to the rail operators. There are, however, benefits accruing to the general public.

One of the prime concerns given by public officials in their role as general stakeholders was the presence of hazardous materials on trains, stored in rail cars on tracks in their neighborhood for long periods of time. The improvements listed in this section should help in significantly reducing transit time for such hazardous material, and thus lessen the amount of time that local citizens may be "vulnerable" to such cargo.

Another prime public concern was noise, most notably horn/and whistle blowing associated with at-grade crossings. The recently passed *Swift Rail Act* enforced by the FRA has decreed that the only way that the whistle ban will be allowed, is if supplemental safety improvements are made to the at-grade crossings. In addition to having lights and crossing guard arms, at-grade crossing must be "boxed" in such a way so that traffic cannot go around the arms, and the crossings must be improved with sensors that will prevent cars from getting caught on the tracks in between the crossing guard arms. The exact standards on how to improve the intersections to qualify for whistle bans is still being finalized by the FRA. When the standards are finalized, there is an opportunity for the railroads and local communities to work together on improving the intersections to the new standards, so that both parties can exist in harmony.

6.0 IMMEDIATE-TERM IMPROVEMENTS BENEFIT COST ANALYSIS

6.1 Introduction

As noted in **Section 5**, the railroads requested that a benefit-cost Analysis be performed for the proposed Immediate-Term Improvement Program, so that the railroad could more fully understand specific benefits attributable to each railroad. They also felt this information could assist them in determining their level of participation in the program. As detailed in other report sections, an analysis of train movements in the New Orleans Rail Gateway area revealed that many train delays result from conflicts related to uncoordinated movements and the to resolution movement authorities. Computer model simulations showed that removing these constraints could expedite the flow of traffic and increase the number of movements that can be handled. Accordingly, this report recommends that the railroads serving the Gateway centralize the control of main line train movements, at least as it affects current traffic congestion and capacity issues. Central to this is placing the control of East Bridge and West Bridge Junction under the control of a coordinated dispatcher authority, which favors no single railroad and serves solely to expedite the movement of trains in and through the Gateway in accordance with written procedures developed by the railroads. To function most effectively, this dispatch concept must have current and accurate information on all trains in transit or ready to move, and the availability of data on main lines, receiving tracks, or holding tracks.

Some questions have been raised regarding the economic benefits of making the required capital expenditure. Secondary issues relate to the determination of “who benefits and who should pay.” The benefit-cost analysis presented in this section addresses many of the issues.

6.2 Analysis Objectives

The objectives of the analysis were to quantify the potential time saving benefits accruing to movements between each railroad in the New Orleans Rail Gateway, convert those benefits to a dollar value, and determine the return on investment. Previous efforts have estimated that the capital cost of centralizing dispatching would be approximately $10 million.

This benefit-cost evaluation is not intended to be an in-depth analysis. An in-depth analysis is needed only if the findings of this evaluation are inconclusive. Findings that are overwhelmingly positive or negative need no further examination, since a more refined analysis is not likely to change the outcome with respect to the merits of the project.

6.3 Scope and Caveats

This evaluation included the use of a number of assumptions. Principal assumptions follow:

- Many unit costs were derived from 1998 U.S. System averages, using data reported to the Association of American Railroads (AAR). Estimated unit costs were not indexed for inflation to current levels;

- Some unit costs are based on estimates (such as fuel at $.80 per gallon) or simplified statistics. For example, depreciation, increased by 7 percent (divided by number of locomotive units or railroad owned freight cars) served as a surrogate for equipment cost of capital unit cost (owned or leased). This cost is far below locomotive or car-hire fees railroads charge one another;

- Labor costs per hour were based on the assumption that one-half of crews operating on study trains were paid on an hourly basis (as opposed to a mileage basis). No study was performed to determine how accurate this assumption was; and,

- One half of cars in a train were assumed to be railroad owned or leased.

Other assumptions or estimates used by the Project Team are included in discussions in the following Methodology section.

6.4 Methodology

The economic analysis is represented in a spreadsheet model. The model is divided into four basic sections (worksheets). The first section (two worksheets) develops unit costs used in the study. Only three unit cost factors were developed:

- Cost per train hour, including only labor (based on 1999 National Agreement rates, unadjusted for inflation), assuming only one-half of crews are paid on an hourly rate;

- Cost per locomotive unit hour, reflecting capital, maintenance, and fuel cost (the latter two estimated to reflect costs accruing while idling); and,

- Freight car capital cost per hour, applied to only half of cars handled (assuming only half are railroad owned or leased).

Though depreciation is a non-cash cost, it is used as a conservative surrogate for longer-term avoidable capital costs. **Tables 6-1** and **6-2** develop unit costs used in this study.

Table 6-1 shows the calculation of 1999 daily train labor costs for the stated assumptions of two locomotive units, a train of 79 cars, and Western Region rates. **Table 6-2** summarizes statistical extracts from the AAR Analysis of Class 1 railroads, used to prepare other unit costs used in this study. Three digit line numbers contain data reported by the AAR. One and two digit line numbers represent numbers derived from AAR data or as assumed. U.S. averages were used as most suited to represent economics in the New Orleans Gateway.

The first unit cost developed – $14.70 per locomotive unit hour (Line 11) – represents ownership (cost of capital), maintenance (assignable to idling locomotive time), and fuel consumption while idling. Each component of cost is developed separately and may be replaced if a railroad believes it has a more accurate number or unit cost. The second unit cost – $.096 Freight Car Ownership/Lease Cost per hour (Line 13) - is simplistically represented by dividing depreciation by estimated serviceable railroad-owned freight car-hours. The calculated rate is well below car hire rates typically charged by railroads. This cost can easily be replaced by a railroad's own preferred value. The third unit cost – $26.56 per crew hour (Line 17, which is one half of the crew hourly rate) – was derived from the 1999 National Labor Agreement.

Table 6-1
National Labor Agreement
Estimated Train Labor Rate - Hourly Basis

BASE YEAR	1999	2.1 MAN CREWS - New Orleans Study			
EQUIPMENT SPECIFICATIONS					
LOCOMOTIVE UNITS (For calculating engine crew wages)					
Locomotive Unit Type			EMD - SD60MAC/SD40-2		
No. of Units			2		
Gross Wt. Adjustment Factor			10%	\Note 1	
Use this adjustment to account for additional or extended components, fuel capacity, or ballast.					
INPUT VARIABLES FOR MOVEMENT UNDER STUDY					
No. of Cars (For Calculating Crew Wages)			79		
Crew Size					
Engineer			1.0		
Fireman			0.0		
Conductor			1.0		
Brakeman			0.1		
Pay Basis					
Train Crew			Daily		
BRT Region			West		
Train-Miles (This Crew)			120.0		
Note 1: Minimum weights shown in `The Car and Locomotive Cyclopedia.' Actual weight depends on					
fuel tank size, presence or absence of dynamic brakes, etc., and amount of additional ballasting added.					
O U T P U T S	Effective July 1, 1999				
TRAIN OPERATED	2.0 SD60MAC'S; 79 CAR CONSIST; 2.1 MAN CREW				
APPLICABLE PARAMETERS - CURRENT BLE/UTU AGREEMENTS					
Basic Day (Miles)			130.0		
`Lonely Pay' - Engineer w/o Fireman					
$ Per Day			$6.00		
$ Per Mile			$0.0600	In excess of basic day.	
NET PAY STRUCTURE (INCL. FRACTIONAL EMPLOYEES)				Rate for Mileage in Excess of Basic Day	
Crew Wages, Effective July 1, 1999					
Engineer (1.0)...........	$152.81	Per Day		$1.1557	Per Mile*
Fireman (0.0)............	$0.00	Per Day		$0.0000	Per Mile
Conductor (1.0)..........	$133.96	Per Day		$0.0000	Per Mile
Brakemen (0.1)...........	$12.53	Per Day		$0.0000	Per Mile
Includes Applicable Lonely Pay, pro-rated on percent time with fireman.					

	Total Effective Pay	Average Effective Wages Per Train Mile	
Engineer (1.0)...	$152.81	$1.2734	
Fireman (0.0)...	$0.00	$0.0000	
Conductor (1.0)...	$133.96	$1.1163	
Brakeman (0.1)...	$12.53	$0.1044	
TOTAL CREW	$299.30	$2.4942	Per Train Mile for 120.0 Miles

Table 6-2
Development of Unit Costs Used in Study

Selected Data - AAR Analysis of Class I Railroads. 1998

Line Item	US	EAST	WEST	CSX	NSC	CR	IC	BNSF	KCS	UP
(Thousands in Dollars)										
150. Locomotives - Operating Expenses, Exc. Fuel	2,444,752	842,554	1,602,198	349,017	209,356	228,463	33,457	672,919	38,079	848,909
151. Depreciation	547,006	240,395	306,611	95,932	68,133	74,624	1,341	101,117	2,288	200,869
182. Total Locomotives	2,440,106	842,554	1,597,552	349,017	209,356	228,463	33,457	672,919	38,079	844,263
153. Freight Cars – Operating Expense	3,789,646	1,557,108	2,232,538	596,123	419,725	423,751	75,696	798,612	62,040	1,302,979
154. Depreciation	406,699	232,029	174,670	93,824	83,976	46,249	5,650	42,456	4,465	114,374
385. Diesel-Electric – Number in Service	20,259	7,418	12,841	2,647	2,201	1,984	346	4,990	418	7,040
391. Diesel-Electric – Total HP	63,332,152	22,590,640	40,741,512	8,629,740	6,957,050	5,704,300	817,050	15,612,162	1,148,550	22,805,600
393. Diesel-Electric – HP/Unit	3,126	3,045	3,173	3,260	3,161	2,875	2,361	3,129	2,748	3,239
426. Total Freight Cars in Service	501,862	256,114	245,748	99,952	91,197	44,772	15,354	96,372	15,691	119,776
427. Owned	333,127	169,962	163,165	49,807	84,995	23,366	7,647	63,864	3,998	86,777
428. Leased	168,735	86,152	82,583	50,145	6,202	21,406	7,707	32,508	11,693	32,999
650. Total Freight Train-Miles	474,947,058	172,588,766	302,358,292	68,126,177	53,009,618	38,354,683	8,101,689	147,158,791	7,439,532	140,493,696
651. Loco Unit Miles – Freight Road Service	1,285,706,279	413,403,205	872,303,074	153,974,082	130,355,029	99,291,698	18,713,051	426,571,007	19,303,395	409,257,690
694. Total Car-Miles	32,657,356	11,081,702	21,575,654	4,345,136	3,179,475	2,685,109	544,030	9,051,706	488,837	11,552,221
(Thousands)										
701. Gross Ton Miles – Cars, Contents and Cabooses	2,603,939,786	859,881,338	1,744,058,448	337,310,614	249,840,444	209,069,308	41,635,597	841,954,810	38,582,636	826,426,098
703. Gross Ton Miles – Non-Revenue	19,482,858	3,905,316	15,577,542	1,855,881	708,483	817,411	437,370	8,711,991	218,472	6,647,079
702. Total Gross Ton-Miles	2,623,422,644	863,786,654	1,759,635,990	339,166,495	250,548,927	209,886,719	42,072,967	850,666,801	38,801,108	833,073,177
712. Freight Train Hours – Road Service	24,897,877	9,592,290	15,305,587	4,138,947	3,001,449	1,765,518	419,684	7,546,644	398,594	7,024,797
726. Freight Car-Miles Per Train-Mile	69	64	71	64	60	70	67	62	66	82
Study Assumptions										
1. Total Loco Unit Hours Per Train Hr. (L.651/L.650)	2.71	2.40	2.88	2.26	2.46	2.59	2.31	2.90	2.59	2.91
2. Total Loco Unit Hours (L.712 x L.1)	67,399,842	22,976,486	44,156,588	9,354,562	7,380,811	4,570,531	969,374	21,875,550	1,034,234	20,463,211
3. Average Horsepower per Trailing Gross Ton-Mile	1.53	1.46	1.57	1.48	1.64	1.36	1.05	1.57	1.37	1.59
4. Nominal Cost of Capital Rate Locomotives	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
5. System Average Operating Cost Per Unit Hour, Except Depreciation and Fuel (L.150 – L.151) x 1000 / L.2)	$28.16	$26.21	$29.34	$27.05	$19.13	$33.66	$33.13	$26.14	$34.61	$31.67
6. Assume Operating Cost per Unit Hour (Except Depreciation and Fuel) is Ten Percent of System Average Cost	$2.92	$2.62	$2.93	$2.71	$1.91	$3.37	$3.31	$2.61	$3.46	$3.17

Table 6-2
Development of Unit Costs Used in Study

Selected Data - AAR Analysis of Class I Railroads. 1998

Line Item	US	EAST	WEST	CSX	NSC	CR	IC	BNSF	KCS	UP
7. Capital Cost Per Unit Hour (L.151 x 1000 / L.2 + L.4 Cost of Capital)	$8.68	$11.20	$7.43	$10.97	$9.88	$17.47	$1.48	$4.95	$2.37	$10.50
8. Approximate Fuel Cost per Gallon	$0.80									
9. Approximate Average Fuel per Unit Hour, Idling, Gallons	4.0									
10. Approximate Total Fuel Cost per Unit Hour, Idling (L.8 x L.9)	$3.20	$3.20	$3.20	$3.20	$3.20	$3.20	$3.20	$3.20	$3.20	$3.20
11. Total Locomotive Unit Hour Cost (Capital, Maintenance, and Fuel) per Hour, Idling (L.10 + L.7)	$14.70	$17.02	$13.56	$16.88	$14.99	$24.04	$7.99	$10.76	$9.03	$16.87
11a. Total Locomotive Unit Hour Cost (Capital, Maintenance and Fuel) per Horsepower per Hour Freight Cars	$0.0047	$0.0056	$0.0043	$0.0052	$0.0047	$0.0084	$0.0034	$0.0034	$0.0033	$0.0052
12. Approximate Owned Serviceable Freight Car Hours (1,000's)(L.427 x 365 x 24 x 96 Percent Availability / 1000)	4,220,459	2,153,816	2,066,642	840,556	766,930	376,515	129,121	810,450	131,955	1,007,268
13. Owned Freight Car Hour (L.154 / (L.12 / 1000) + L.4 Cost of Capital)	$0.096	$0.108	$0.085	$0.112	$0.109	$0.123	$0.044	$0.052	$0.034	$0.114

Labor

Some Labor is paid at an hourly rate, some at a mileage rate, subject to hourly pay if terminal time allowances, usually 20 minutes, is exceeded. Assume the average effective hourly rate is 30 percent of wage Scale labor rates.	
14. Total 1999 Crew Labor Rate, Hourly Basis (See Attached Calculations)	$299.30
15. Fringe Costs at 42 percent of Direct Wages	$125.71
16. Total Labor Costs on an Hourly Basis (L.15 / 8)	$53.13
17. Assume Hourly Payments are Made to ½ of Crews, Making Effective Labor Rate for Time	$26.56
New Orleans Study Operating Factors	
18. Average Horsepower per Gross Trailing Ton (90% of L.3)	1.40
19. Average Car Gross Weight per Car-Mile (Loads Plus Empties) (L.702 / L.694)	80

The second section of the model, **Tables 6-3** through **6-5**, represent evaluation traffic statistics. **Table 6-3** contains data for only through or interchange movements between railroads for the study week of December 4-10, 2000. The lower half of **Table 6-3** converts the sampled movements to an estimate of annual traffic data using the conversion factors shown in the middle of the exhibit. Conversion factors are developed in **Table 6-2** (Lines 18, 393, and 19, respectively). **Tables 6-4** and **6-5** contain similar data for years 10 and 20, using growth factors agreed upon by the railroads.

The third section of the model, represented in **Tables 6-6** through **6-8**, show average run times for trains represented in **Tables 6-3** through **6-5**. **Table 6-6** shows average run times as experienced during the study week. Average run times for "improved operations" are based on simulating the same traffic movements during the study week, but removing from the simulation all known traffic conflict related delays from the simulation, this allows the model make its own conflict resolving decisions, much as a centralized dispatcher would do. All other delays and dispatch schedules in the "improved operations" model run were the same as reported in the sample week. The bottom half of the exhibit shows average net time saving for each movement: current versus improved operations. One simulation anomaly of longer run time from NS to CNIC under improved operations was observed, but was deemed insignificant.

Table 6-7 reports similar run time estimates for Year 10 – current versus improved operations. All run times are based on simulations. Simulation of current operations include the same dispatch-related delays observed during the study week, but expanded to the larger traffic base anticipated in Year 10.

No simulations using current operating procedures in Year 20 were run. The table of run times for this period is based on a linear extrapolation of current operations and Year 10 traffic with current operating procedures (**Tables 6-6** and **6-7**). In practice, delays increase exponentially with volume, not linearly as assumed.

Tables 6-7 and **6-8** include separate movements between UP and NS and QLINSB. For this study, UP - QLINSB movements were assigned UP - NS using the weighting procedures shown in the footnote of each table.

The fourth section of the model summarizes economic benefits in several ways. **Tables 6-9** through **6-11** estimate annual cash savings of improved operations versus current operating procedures for current traffic levels and forecast traffic, in Years 10 and 20. Dollar values are calculated as the product of time saved multiplied by the number of units multiplied by the unit costs. **It is important to note that the dollar savings shown do not necessarily accrue to the "From Railroad" or the "To Railroad."** The identified savings accrue to the railroad responsible for generating the traffic statistics associated with the movement. If one railroad performs the service and charges another for doing so, economic benefits may or may be not be passed on to the railroad paying for the service.

Table 6-3
Current Traffic

Gateway Loaded Train Movements Sample Week (Dec 4 to 10, 2000)

From RR		To RR							TOTAL
		BN	CSX	IC	KCS	NOPB	NS	UP	
BN	Train Count					17			17
	Total Cars					1,022			1,022
CSX	Train Count					15		36	51
	Total Cars					1,275		2,202	3,477
IC	Train Count				2	9	6	6	23
	Total Cars				102	358	667	440	1,567
KCS	Train Count		7	2					9
	Total Cars		546	100					646
NOPB	Train Count	14	8	6	8			3	39
	Total Cars	906	526	431	586			63	2,512
NS	Train Count			8				16	24
	Total Cars			446				1,763	2,209
UP	Train Count		43	11		4	17		75
	Total Cars		2,404	836		92	1,288		4,620
Total	**Trains**	**14**	**58**	**27**	**10**	**45**	**23**	**61**	**238**
Interchange	**Cars**	**906**	**3,476**	**1,813**	**688**	**2,747**	**1,955**	**4,468**	**16,053**

Conversion to Approximate Annual Operating Statistics

Conversion Factors:	
Weeks Per Year	50
Average Horspower per Gross Trailing Ton:	1.4
Average Horsepower Per Locomotive Unit	3,126
Average Car Gross Weight per Car-Mile:	80

From RR		To RR							TOTAL
		BN	CSX	IC	KCS	NOPB	NS	UP	
BN	Total Trains					850			850
	Total Units					1,831			1,831
	Total Cars					51,100			51,100
CSX	Total Trains					750		1,800	2,550
	Total Units					2,284		3,945	6,229
	Total Cars					63,750		110,100	173,850
IC	Total Trains				100	450	300	300	1,150
	Total Units				183	641	1,195	788	2,807
	Total Cars				5,100	17,900	33,350	22,000	78,350
KCS	Total Trains		350	100					450
	Total Units		978	179					1,157
	Total Cars		27,300	5,000					32,300
NOPB	Total Trains	700	400	300	400			150	1,950
	Total Units	1,623	942	772	1,050			113	4,500
	Total Cars	45,300	26,300	21,550	29,300			3,150	125,600
NS	Total Trains			400				800	1,200
	Total Units			799				3,158	3,957
	Total Cars			22,300				88,150	110,450
UP	Total Trains		2,150	550		200	850		3,750
	Total Units		4,307	1,498		165	2,307		8,276
	Total Cars		120,200	41,800		4,600	64,400		231,000
Total	**Total Trains**	**700**	**2,900**	**1,350**	**500**	**2,250**	**1,150**	**3,050**	**11,900**
Interchange	**Total Units**	**1,623**	**6,227**	**3,248**	**1,233**	**4,921**	**3,502**	**8,004**	**28,758**
	Total Cars	**45,300**	**173,800**	**90,650**	**34,400**	**137,350**	**97,750**	**223,400**	**802,650**

Table 6-4
Traffic in Year 10

10 Year Projected Average Weekly Train Movements (Year 2010)

From RR		To RR							TOTAL
		BN	CSX	IC	KCS	NOPB	NS	UP	
BN	Train Count					19			19
	Total Cars					1,376			1,376
CSX	Train Count					19		46	65
	Total Cars					1,709		3,134	4,843
IC	Train Count				2	9	8	7	25
	Total Cars				137	488	894	590	2,108
KCS	Train Count		9	2					11
	Total Cars		732	134					866
NOPB	Train Count	15	8	7	9			3	42
	Total Cars	1,218	705	578	785			84	3,370
NS	Train Count			8				21	29
	Total Cars			598				2,362	2,960
UP	Train Count		50	13		4	19		86
	Total Cars		3,537	1,120		123	1,831		6,611
Total Interchange	**Trains**	**15**	**67**	**30**	**11**	**51**	**27**	**77**	**278**
	Cars	**1,218**	**4,974**	**2,430**	**922**	**3,696**	**2,724**	**6,171**	**22,135**

Conversion to Approximate Annual Operating Statistics
Conversion Factors:

Weeks Per Year	50
Average Horspower per Gross Trailing Ton:	1.4
Average Horsepower Per Locomotive Unit	3,126
Average Car Gross Weight per Car-Mile:	80

From RR		To RR							TOTAL
		BN	CSX	IC	KCS	NOPB	NS	UP	
BN	Total Trains					950			950
	Total Units					2,465			2,465
	Total Cars					68,800			68,800
CSX	Total Trains					950		2,300	3,250
	Total Units					3,062		5,614	8,676
	Total Cars					85,450		156,700	242,150
IC	Total Trains				100	450	400	350	1,300
	Total Units				245	874	1,602	1,057	3,778
	Total Cars				6,850	24,400	44,700	29,500	105,450
KCS	Total Trains		450	100					550
	Total Units		1,311	240					1,551
	Total Cars		36,600	6,700					43,300
NOPB	Total Trains	750	400	350	450			150	2,100
	Total Units	2,182	1,263	1,035	1,406			150	6,037
	Total Cars	60,900	35,250	28,900	39,250			4,200	168,500
NS	Total Trains			400				1,050	1,450
	Total Units			1,071				4,231	5,303
	Total Cars			29,900				118,100	148,000
UP	Total Trains		2,500	660		175	955		4,290
	Total Units		6,336	2,006		220	3,280		11,843
	Total Cars		176,850	56,000		6,150	91,550		330,550
Total Interchange	**Total Trains**	**750**	**3,350**	**1,510**	**550**	**2,525**	**1,355**	**3,850**	**13,890**
	Total Units	**2,182**	**8,911**	**4,353**	**1,652**	**6,621**	**4,882**	**11,053**	**39,653**
	Total Cars	**60,900**	**248,700**	**121,500**	**46,100**	**184,800**	**136,250**	**308,500**	**1,106,750**

Table 6-5
Traffic in Year 20

20 Year Projected Average Weekly Train Movements (Year 2020)

From RR		To RR							TOTAL
		BN	CSX	IC	KCS	NOPB	NS	UP	
BN	Train Count					25			25
	Total Cars					1,868			1,868
CSX	Train Count					26		66	91
	Total Cars					2.308		4.483	6,791
IC	Train Count				2	11	10	9	33
	Total Cars				185	670	1,207	796	2,859
KCS	Train Count		12	3					14
	Total Cars		988	181					1,169
NOPB	Train Count	20	11	9	12			4	56
	Total Cars	1,651	952	780	1,061			114	4,557
NS	Train Count			9				29	39
	Total Cars			807				3,191	3,998
UP	Train Count		74	18		5	27		123
	Total Cars		5,209	1,513		167	2,615		9,503
Total Interchange	**Trains**	**20**	**97**	**39**	**14**	**67**	**37**	**108**	**381**
	Cars	**1,651**	**7,149**	**3,282**	**1,245**	**5,013**	**3,822**	**8,585**	**30,746**

Conversion to Approximate Annual Operating Statistics

Conversion Factors:	
Weeks Per Year	50
Average Horspower per Gross Trailing Ton:	1.4
Average Horsepower Per Locomotive Unit	3,126
Average Car Gross Weight per Car-Mile:	80

From RR		To RR							TOTAL
		BN	CSX	IC	KCS	NOPB	NS	UP	
BN	Total Trains					1,250			1,250
	Total Units					3,346			3,346
	Total Cars					93,400			93,400
CSX	Total Trains					1,300		3,300	4,600
	Total Units					4,135		8,031	12,166
	Total Cars					115,400		224,150	339,550
IC	Total Trains				100	550	500	450	1,600
	Total Units				331	1,200	2,162	1,426	5,120
	Total Cars				9,250	33,500	60,350	39,800	142,900
KCS	Total Trains		600	150					750
	Total Units		1,770	324					2,094
	Total Cars		49,400	9,050					58,450
NOPB	Total Trains	1,000	550	450	600,1,901			200	2,800
	Total Units	2,958	1,705	1,397	53,050			204	8,165
	Total Cars	82,550	47,600	39,000				5,700	227,900
NS	Total Trains			450				1,450	1,900
	Total Units			1,446				5,716	7,162
	Total Cars			40,350				159,550	199,900
UP	Total Trains		3,685	890		240	1,355		6,170
	Total Units		9,332	2,710		299	4,685		17,026
	Total Cars		260,450	75,650		8,350	130,750		475,200
Total Interchange	**Total Trains**	**1,000**	**4,835**	**1,940**	**700**	**3,340**	**1,855**	**5,400**	**19,070**
	Total Units	**2,958**	**12,807**	**5,878**	**2,232**	**8,980**	**6,847**	**15,378**	**55,079**
	Total Cars	**82,550**	**357,450**	**164,050**	**62,300**	**250,650**	**191,100**	**429,200**	**1,537,300**

Table 6-6
Average Run Times for Through Trains – Current Traffic
Current Operation for Four Day Study (Sim 1)

From	To						
	BN	CSX	IC	KCS	NOPB	NS	UP
BN					07:52		
CSX					04:03		09:26
IC				03:43	11:56	05:02	02:28
KCS		03:52	04:39				
NOPB	06:22	05:12	05:32	03:29		04:25	09:00
NS			03:35				12:32
UP		07:53	12:05		05:08	07:46	

Average Run Times for Through Trains – Current Traffic
Improved Operations for Four Day Study (Sim 3A)

From	To						
	BN	CSX	IC	KCS	NOPB	NS	UP
BN					03:18		
CSX					04:00		003:25
IC				02:47	08:58	02:42	00:53
KCS		03:01	03:34				
NOPB	03:21	04:24	01:34	02:24		02:39	03:10
NS			05:03				03:08
UP		03:17	04:23		03:56	02:55	

Net Time Savings Per Through Train
Current Minus Improved Operations

From	To						
	BN	CSX	IC	KCS	NOPB	NS	UP
BN					04:33		
CSX					00:02		06:01
IC				00:56	02:58	02:20	01:35
KCS		00:51	01:04				
NOPB	03:00	00:47	03:58	01:05		01:45	05:50
NS			-0.0613				09:23
UP		04:35	07:41		01:12	04:51	

Table 6-7
Average Run Times for Through Trains – Future 10 Year Traffic
Current Operation for Four Day Study (Sim 2MBR)

From	To						
	BN	**CSX**	**IC**	**KCS**	**NOPB**	**NS**	**UP**
BN					07:52		
CSX					04:03		09:26
IC				03:43	11:56	05:02	02:28
KCS		03:52	04:39				
NOPB	06:22	05:12	05:32	03:29		04:25	09:00
NS			03:35				12:32
UP		07:53	12:05		05:08	07:46	

Average Run Times for Through Trains – Future 10 Year Traffic
Improved Operations for Four Day Study (Sim 4A)

From	To						
	BN	**CSX**	**IC**	**KCS**	**NOPB**	**NS**	**UP**
BN					03:18		
CSX					04:00		003:25
IC				02:47	08:58	02:42	00:53
KCS		03:01	03:34				
NOPB	03:21	04:24	01:34	02:24		02:39	03:10
NS			05:03				03:08
UP		03:17	04:23		03:56	02:55	

Net Time Savings Per Through Train
Current Minus Improved Operations

From	To						
	BN	**CSX**	**IC**	**KCS**	**NOPB**	**NS**	**UP**
BN					04:33		
CSX					00:02		06:01
IC				00:56	02:58	02:20	01:35
KCS		00:51	01:04				
NOPB	03:00	00:47	03:58	01:05		01:45	05:50
NS			-0.0613				09:23
UP		04:35	07:41		01:12	04:51	

Note: NS Includes QLINSB

From		To		
UP	Data	NS	QLINSB	Combined
	Count of Duration	10	2	12
	Average Run Time	02:58	04:18	03:11

Table 6-8 Average Run Times for Through Trains – Future 20 Year Traffic (Linear Extrapolation of Current and 10 Year Trend)							
From	To						
	BN	CSX	IC	KCS	NOPB	NS	UP
BN					08:18		
CSX					05:33		08:26
IC				03:43	11:54	07:31	02:28
KCS		04:58	04:39				
NOPB	05:33	05:30	07:16	03:29		04:25	08:11
NS			15:32				12:15
UP		09:22	11:19		05:08	08:15	

Average Run Times for Through Trains – Future 20 Year Traffic Improved Operations for Four Day Study (Sim 15A)							
From	To						
	BN	CSX	IC	KCS	NOPB	NS	UP
BN					03:56		
CSX					05:27		04:51
IC				02:47	07:40	04:49	03:11
KCS		03:24	04:01				
NOPB	04:03	04:33	04:18	02:51		02:39	03:11
NS			05:08				04:33
UP		04:17	04:18		03:58	03:23	

Net Time Savings Per Through Train Current Minus Improved Operations							
From	To						
	BN	CSX	IC	KCS	NOPB	NS	UP
BN					04:21		
CSX					00:05		03:35
IC				00:56	04:14	02:42	-0.0296
KCS		01:34	00:37				
NOPB	01:30	00:56	02:58	00:37		01:45	04:59
NS			10:24				07:41
UP		05:05	07:00		01:10	04:52	

Note: NS Includes QLINSB

From		To		
UP	Data	NS	QLINSB	Combined
	Count of Duration	10	4	14
	Average Run Time	02:57	04:28	03:23

Table 6-9
Annual Cash Savings – Current Versus Improved Operations, Current Traffic

1. Effective Labor Rate for Time Savings per Crew Hour $26,56
2. Loco Unit Hour Cost (Capital, Maintenance and Fuel), Idling $14.70
3. Average Capital Cost per Freight Car Hour (RR Owned) $0.096
4. Assume: Only half of Freight Cars are Railroad Owned

Formulas:

Train Labor = Line 1 x Annual Number of Trains x Hours Saved per Through Train
Loco Units = Line 2 x Annual Number of Locomotive Units in Through Trains x Hours Saved per Through Train
Freight Cars = Line 3 x Annual Number of Freight Cars x Hours Saved per Through Train ÷ 2

From RR	Savings Related To	To RR							Total
		BN	CSX	IC	KCS	NOPB	NS	UP	
BN	Train Labor					$103,000			$103,000
	Loco Units					$122,800			$122,800
	Freight Cars					$11,200			$11,200
	Total BN					**$237,000**			**$237,000**
CSX	Train Labor					$900		$288,100	$289,000
	Loco Units					$1,500		$349,400	$350,900
	Freight Cars					$100		$32,000	$32,100
	Total CSX					**$2,500**		**$669,500**	**$672,000**
IC	Train Labor				$2,500	$35,500	$18,600	$12,600	$69,200
	Loco Units				$2,500	$28,000	$41,000	$18,400	$89,900
	Freight Cars				$200	$2,600	$3,700	$1,700	$8,200
	Total IC				**$5,200**	**$66,100**	**$63,300**	**$32,700**	**$167,300**
KCS	Train Labor		$7,900	$2,900					$10,800
	Loco Units		$12,300	$2,800					$15,100
	Freight Cars		$1,100	$300					$1,400
	Total KCS		**$21,300**	**$6,000**					**$27,300**
NOPB	Train Labor	$56,000	$8,400	$31,700	$11,600			$23,300	$131,000
	Loco Units	$71,900	$11,000	$45,100	$16,800			$9,700	$154,500
	Freight Cars	$6,600	$1,000	$4,100	$1,500			$900	$14,100
	Total NOPB	**$134,500**	**$20,400**	**$80,900**	**$29,900**			**$33,900**	**$299,600**
NS	Train Labor			($15,600)				$199,600	$184,000
	Loco Units			($17,300					$418,800
	Freight Cars			($1,600)					$38,300
	Total NS			**($34,500)**					**$641,100**
UP	Train Labor		$262,400	$112,400		$6,400	$109,600		$490,800
	Loco Units		$290,900	$169,400		$2,900	$164,700		$627,900
	Freight Cars		$26,600	$15,500		$300	$15,100		$57,500
	Total UP		**$579,900**	**$297,300**		**$9,600**	**$289,400**		**$1,176,200**
Total Interchange	Train Labor	$56,000	$278,700	$131,400	$14,100	$145,800	$128,200	$523,600	$1,277,800
	Loco Units	$71,900	$314,200	$200,000	$19,300	$155,200	$205,700	$813,600	$1,779,900
	Freight Cars	$6,600	$28,700	$18,300	$1,700	$14,200	$18,800	$74,500	$162,800
	Grand Total	**$134,500**	**$621,600**	**$349,700**	**$35,100**	**$315,200**	**$352,700**	**$1,411,700**	**$3,220,50**

Total Train Hours Saved									Savings Per Train Hour
From	**BN**	**CSX**	**IC**	**KCS**	**NOPB**	**NS**	**UP**	**Total**	
BN					3,877			3,877	$61.13
CSX					33		10,846	10,879	$61.77
IC				95	1,335	700	476	2,606	$64.20
KCS		299	108				0	407	$67.09
NOPB	2,109	318	1,193	435			876	4,931	$60.76
NS			(588)				7,515	6,927	$92.55
UP		9,880	4,231		241	4,127		18,480	$63.65
Total	2,109	10,497	4,944	530	5,486	4,827	19,713	48,106	
Total Savings / Train Hour	$63.78	$59.21	$70.73	$66.23	$57.45	$73.07	$71.61	$66.95	

Table 6-10
Annual Cash Savings – Current Versus Improved Operations, 10 Year Traffic

1. Effective Labor Rate for Time Savings per Crew Hour $26,56
2. Loco Unit Hour Cost (Capital, Maintenance and Fuel), Idling $14.70
3. Average Capital Cost per Freight Car Hour (RR Owned) $0.096
4. Assume: Only half of Freight Cars are Railroad Owned

Formulas:

Train Labor = Line 1 x Annual Number of Trains x Hours Saved per Through Train
Loco Units = Line 2 x Annual Number of Locomotive Units in Through Trains x Hours Saved per Through Train
Freight Cars = Line 3 x Annual Number of Freight Cars x Hours Saved per Through Train ÷ 2

From RR	Savings Related To	To RR							Total
		BN	CSX	IC	KCS	NOPB	NS	UP	
BN	Train Labor					$109,100			$109,100
	Loco Units					$156,600			$156,600
	Freight Cars					$14,300			$14,300
	Total BN					**$280,000**			**$280,000**
CSX	Train Labor					$2,800		$314,200	$317,000
	Loco Units					$5,000		$424,500	$429,500
	Freight Cars					**$500**		**$38,800**	**$39,300**
	Total CSX					**$8,300**		**$777,500**	**$785,800**
IC	Train Labor				**$2,500**	**$34,500**	**$5,300**	**$10,400**	**$52,700**
	Loco Units				**$3,400**	**$37,100**	**$11,600**	**$17,300**	**$69,400**
	Freight Cars				**$300**	**$3,400**	**$1,100**	**$1,600**	**$6,400**
	Total IC				**$6,200**	**$75,000**	**$18,000**	**$29,300**	**$128,500**
KCS	Train Labor		$15,000	$2,900					$17,900
	Loco Units		$24,100	$3,800					$27,900
	Freight Cars		$2,200	$300					$2,500
	Total KCS		**$41,300**	**$7,000**					**$48,300**
NOPB	Train Labor	$51,800	$10,000	$29,000	$13,000			$21,600	$125,400
	Loco Units	$83,300	$17,600	$47,500	$22,500			$12,000	$182,900
	Freight Cars	$7,600	$1,600	$4,300	$2,100			$1,100	$16,700
	Total NOPB	**$142,700**	**$29,200**	**$80,800**	**$37,600**			**$34,700**	**$325,000**
NS	Train Labor			$48,000				$235,300	$283,300
	Loco Units			$71,200				$524,800	$596,000
	Freight Cars			$6,500				$48,000	$54,500
	Total NS			**$125,700**				**$808,100**	**$933,800**
UP	Train Labor		$331,900	$123,900		$5,600	$122,400		$583,800
	Loco Units		$465,500	$208,500		$3,900	$232,700		$910,600
	Freight Cars		$42,600	$19,100		$400	$21,300		$83,400
	Total UP		**$840,000**	**$351,500**		**$9,900**	**$376,400**		**$1,577,800**
Total Interchange	Train Labor	$51,800	$356,900	$203,800	$15,500	$152,000	$127,700	$581,500	$1,489,200
	Loco Units	$83,300	$507,200	$331,000	$25,900	$202,600	$244,300	$978,600	$2,372,900
	Freight Cars	$7,600	$46,400	$30,200	$2,400	$18,600	$22,400	$89,500	$217,100
	Grand Total	**$142,700**	**$910,500**	**$565,000**	**$43,800**	**$373,200**	**$394,400**	**$1,649,600**	**$4,079,200**

Total Train Hours Saved									Savings Per Train Hour
From	**BN**	**CSX**	**IC**	**KCS**	**NOPB**	**NS**	**UP**	**Total**	
BN					4,107			4,107	$68.18
CSX					105		11,829	11,934	$65.85
IC				95	1,298	198	390	1,981	$64.87
KCS		563	108				0	671	$71.95
NOPB	1,948	378	1,093	490			814	4,724	$68.80
NS			1,809				8,859	10,668	$87.53
UP		12,495	4,665		211	4,608		21,980	$71.78
Total	1,948	13,437	7,676	584	5,721	4,806	21,892	56,065	
Total Savings / Train Hour	$73.24	$67.76	$73.61	$74.96	$65.23	$82.07	$75.35	$72.76	

Table 6-11
Annual Cash Savings – Current Versus Improved Operations, 20 Year Traffic

1. Effective Labor Rate for Time Savings per Crew Hour $26.56
2. Loco Unit Hour Cost (Capital, Maintenance and Fuel), Idling $14.70
3. Average Capital Cost per Freight Car Hour (RR Owned) $0.096
4. Assume: Only half of Freight Cars are Railroad Owned

Formulas:

Train Labor = Line 1 x Annual Number of Trains x Hours Saved per Through Train

Loco Units = Line 2 x Annual Number of Locomotive Units in Through Trains x Hours Saved per Through Train

Freight Cars = Line 3 x Annual Number of Freight Cars x Hours Saved per Through Train ÷ 2

From RR	Savings Related To	To RR							Total
		BN	CSX	IC	KCS	NOPB	NS	UP	
BN	Train Labor					$144,900			$144,900
	Loco Units					$214,700			$214,700
	Freight Cars					$19,600			$19,600
	Total BN					**$379,200**			**$379,200**
CSX	Train Labor					$3,400		$314,400	$317,800
	Loco Units					$6,000		$423,500	$429,500
	Freight Cars					$600		$38,700	$39,300
	Total CSX					**$10,000**		**$776,600**	**$786,600**
IC	Train Labor				$2,500	$61,900	$35,900	($8,500)	$91,800
	Loco Units				$4,600	$74,700	$85,800	($14,900)	$150,200
	Freight Cars				$400	$6,800	$7,900	($1,400)	$13,700
	Total IC				**$7,500**	**$143,400**	**$129,600**	**($24,800)**	**$255,700**
KCS	Train Labor		$25,000	$2,500					$27,500
	Loco Units		$40,800	$3,000					$43,800
	Freight Cars		$3,700	$300					$4,000
	Total KCS		**$69,500**	**$5,800**					**$75,300**
NOPB	Train Labor	$40,300	$13,800	$35,600	$10,100			$26,500	$126,300
	Loco Units	$65,900	$23,700	$61,100	$17,600			$15,000	$183,300
	Freight Cars	$6,000	$2,200	$5,600	$1,600			$1,400	$16,800
	Total NOPB	**$112,200**	**$39,700**	**$102,300**	**$29,300**			**$42,900**	**$326,400**
NS	Train Labor			$124,400				$296,500	$420,900
	Loco Units			$221,100				$646,900	$868,000
	Freight Cars			$20,200				$59,200	$79,400
	Total NS			**$365,700**				**$1,002,600**	**$1,368,300**
UP	Train Labor		$498,600	$165,600		$7,500	$175,200		$846,900
	Loco Units		$698,700	$279,200		$5,200	$335,200		$1,318,300
	Freight Cars		$63,900	$25,500		$500	$30,700		$120,600
	Total UP		**$1,261,200**	**$470,300**		**$13,200**	**$541,100**		**$2,285,800**
Total Interchange	Train Labor	$40,300	$537,400	$328,100	$12,600	$217,700	$211,100	$628,900	$1,976,100
	Loco Units	$65,900	$763,200	$564,400	$22,200	$300,600	$421,000	$1,070,500	$3,207,800
	Freight Cars	$6,000	$69,800	$51,600	$2,000	$27,500	$38,600	$97,900	$293,400
	Grand Total	**$112,200**	**$1,370,400**	**$944,100**	**$36,800**	**$545,800**	**$670,700**	**$1,797,300**	**$5,477,300**

Total Train Hours Saved									Savings Per Train Hour
From	**BN**	**CSX**	**IC**	**KCS**	**NOPB**	**NS**	**UP**	**Total**	
BN					5,457			5,457	$69.49
CSX					129		11,838	11,967	$65.73
IC				95	2,330	1,350	(320)	3,455	$74.01
KCS		940	94					1,034	$72.83
NOPB	1,516	521	1,339	379			999	4,753	$68.67
NS			4,682				11,162	15,844	$86.36
UP		18,771	6,236		283	6,596		31,886	$71.69
Total	1,516	20,231	12,351	473	8,199	7,947	23,678	74,396	
Total Savings / Train Hour	$74.00	$67.74	$76.44	$77.76	$66.57	$84.40	$75.91	$73.62	

The conclusion of the economic study is shown in **Table 6-12**, summarizing economic benefits versus project costs. The top half of the exhibit shows the (positive and negative) income stream for the 20-year period, commencing with an estimated $10 million project outlay in Year 0 and a stream of pre-tax cash savings in Years 1 through 20. Benefits of the recommended project are presented in four ways:

- Present Value (PV) using two different (arbitrary) discount (hurdle) rates;
- Internal Rate of Return (IRR);
- Annuity Value; and,
- Payback period.

Each railroad has its own hurdle rate for capital investments.[1] If the hurdle rate is 20 percent, it means that the project must yield at least a benefit of 20 percent because if it doesn't, then it is presumed that there is another project or investment that will yield 20 percent. Assuming a 20 percent discount rate yields a PV of benefits equal to $17.9 million dollars, which is well in excess of the estimated $10 million investment requirements. If the hurdle rate is a lower value of 10 percent, the PV value of benefits is even greater, at $33.2 million – $23.2 million in excess of the required $10 million investment.

The Internal Rate of Return is determined by calculating what discount (hurdle) rate will make the PV of the stream of benefits exactly equal to the required investment. In this case, the project has a pre-tax IRR of approximately 35 percent – a very good investment by most standards for the risks involved.

The Annuity Value of benefits answers the question, "For a $10 million investment, what will I earn in each year of the life of the project, assumed to be 20 years?" The Annuity Value is a function of PV, using the same hurdle rate discussed above. The PV of benefits is converted to a Future Value using a nominal "safe" interest rate. The Annuity Value is then determined as the amount "invested" (saved) each year, which compounded (invested or borrowed) at the "safe" interest rate will yield the stated Future Value. The gross Annuity Value of benefits is determined to be $6.5 million at a 20 percent hurdle rate and $12.1 million at a 10 percent hurdle rate. From the gross income annuity, the payment annuity of the investment must be subtracted, which at 7 percent interest, is $0.7 million per year (to retire the $10 million investment). The Net Annuity benefit is $5.8 million at the 20 percent hurdle rate and $11.4 million at the 10 percent hurdle rate.

The payback period is the simplest calculation of project benefits. It is equal to the cost of the project divided by the number of years of benefits it takes to equal the cost that, in this case, is approximately three years.

[1] A hurdle or discount rate is a measure of indifference. A 20 percent hurdle rate means one is indifferent to $1.00 today or $1.20 a year from now or $1.44 two years from now. If the choice is $1.00 today or $1.30 a year from now, one will take the $1.30 because it exceeds the 20 percent hurdle rate. That $1.30, discounted to present value at a hurdle rate of 20 percent, is equal to $1.08 - more than the present $1.00.

Because the analysis is contained in a spreadsheet, the railroads can evaluate the project using different hurdle and interest rates or changes in unit costs. By virtually any measure, the project should easily meet the collective economic criteria for making the investment.

Table 6-12
Analysis of Economic Benefits

(Dollars in Millions)		
Item	**Benefit Year**	**Cash Income (Outlay)**
Capital Expenditure	0	($10.000)
Benefit in Year	1	$3.221
	2	$3.316
	3	$3.411
	4	$3.507
	5	$3.602
	6	$3.698
	7	$3.793
	8	$3.888
	9	$3.984
	10	$4.079
	11	$4.219
	12	$4.359
	13	$4.499
	14	$4.638
	15	$4.778
	16	$4.918
	17	$5.058
	18	$5.198
	19	$5.337
	20	$5.477
Alternative Determination of Net Benefits		
Discount Rate	**20.0%**	**10.0%**
Present Value	**$17.879**	**$33.201**
Internal Rate of Return =	**35%**	
Present Value	**$17.879**	**$33.201**
Future Value - Interest Rate:	**7.0%**	**7.0%**
Future Value:	**$69.187**	**$128.479**
Annuity of Benefits	**$6.531**	**$12.128**
Payment on $10M Investment	**($0.700)**	**($0.700)**
Net Annuity of Benefits	**$7.231**	**$12.828**
Payback Period Years =	**3.0**	**3.0**

6.5 Conclusions

The analysis performed above has many variables that were not or could not be considered. For example, shortening transit time through the Gateway increases capacity by making line segments available for more traffic sooner than they would otherwise be available. This could have significant capital savings implications – permitting more intensive use of existing infrastructure assets and postponing or eliminating future capital expenditures (were expenditures could exceed the total cost of the project studied).

Since reducing transit times increases capacity, it is likely that some trains will experience less holding times in terminals while awaiting dispatch (movement authority). No dispatch times of any trains were changed in the simulations, since the Project Team had no knowledge regarding whether or not these trains were available for an earlier dispatch.

While the study conclusively confirms the economic merits of centralized dispatching in the Gateway, it is contingent on realizing the time savings identified by simulations. Simulations assumed that trains were not held out of destination points by trains ahead or for the unavailability of receiving tracks. It raises the question whether or not receiving capabilities' limitations will continue to restrict the flow of traffic through the Gateway, and whether or not a centralized dispatching facility will have the ability to schedule trains through open traffic slots. If flow continues to be restricted, then receiving capabilities and capacities must be increased as part of the recommended improvement plan in order to maximize Gateway throughput capabilities. While this will obviously reduce the perceived economic benefits, the additional cost will be all or partially offset by additional time saved by reduced traffic holds at origin points.

The analysis conducted above makes no consideration that in the absence of building a centralized dispatch facility, capital dollars must still be spent to rehabilitate or upgrade existing EJB and WBJ facilities. If this otherwise mandatory capital expense is subtracted from the estimated $10 million facility cost, then the return on the incremental investment is even greater than the conclusions reached above.

One of the most significant "soft" economic benefits of reducing transit time through the Gateway is the impact on service reliability – both in average transit time and in the time variability of each movement. These benefits offer a significant marketing advantage that can be exploited to get more trucks off the highway.

Another soft economic benefit is the potential improvement in private freight car utilization afforded by faster equipment turn around times. This does not have direct benefits to the railroads, but will certainly be appreciated by shippers.

The benefit-cost evaluation approximates the longer-term cash savings associated with each “From-To” movement, but does not evaluate which railroad realizes the benefit. In general, the railroad that performs the service will realize all or most of the savings.[2] If one railroad charges another for the service provided and if those fees are not reduced, then the paying railroad receives no economic benefit. The evaluation clearly suggests that the savings are sufficiently large and concentrated. The study also suggests that it is not necessary for all railroads to share in the capital cost of centralizing dispatch control although, clearly, all must consent to the proposed operation.

6.6 Summary

Principal study findings, conclusions, and recommendations are summarized below:

6.6.1 Findings

- Three unit costs can be used to approximate cash operating costs and savings "above the rail." These are: 1) labor cost per train hour [train labor]; 2) cost per locomotive unit hour [loco units]; and 3) cost per freight-car hour [freight cars];

- Centralized train (dispatch) control can significantly reduce Gateway train delays and their wide variance;

- Additional receiving capacities (i.e., power; crews; track) may be required to realize the time savings determined through simulations. Significant constraints to receiving trains can undermine the benefits of centralized train control;

- Reducing train delays through and in the Gateway adds capacity to handle more trains;

- The ranking of economic benefits appears to be locomotive unit related savings (loco units), followed by labor cost savings (train labor), then car cost savings (freight cars). Changing unit costs used in this study could affect this ranking;

- Benefits of time-related savings are not proportionately shared among railroads;

- Future levels of anticipated traffic add urgency to implement solutions to increase capacity; and

- There are significant "soft" economic benefits associated with reducing transit times – especially those that are marketing related.

6.6.2 Conclusions

- The benefits of the proposed project to centralizing train control exceeds most railroad investment criteria by all standards of measure;

[2] The point at which interchange occurs will affect who benefits from freight car time savings.

- Leveraging (debt financing) the project will further increase economic benefits, as cash savings can greatly exceed debt amortization;
- Potential operating and marketing benefits of centralized dispatching far outweigh perceived loss of control over operations;
- Receiving capabilities must be examined and expanded, as necessary, to realize the benefits anticipated in the benefit-cost evaluation;
- The project remains fully justified with only a few key railroads funding the project, though all must agree to the proposed operation in changes;
- Failure to implement the plan will result in continuing service problems and the need for additional capital infrastructure investments to increase capacity; and,
- No further, more detailed benefit-cost study is required, although railroads may want to test the sensitivity of the results with variable inputs alternative variables in the benefit-cost analysis model (available in either Excel or Lotus 123 formats).

6.6.3 Recommendations

- Principal railroad beneficiaries, if not all railroads, should proceed immediately to implement the proposed project of centralized train control. All railroads affected by the project must agree to the plan;
- Railroads should discuss and agree among themselves how the project will be funded and the economic benefits shared; and
- Constraints to receiving trains must be carefully examined, and improvements must be made to avoid imposing movement constraints on the central dispatcher.

7.0 MID TO LONG-TERM IMPROVEMENTS AND STRATEGIES

The following improvement strategies were modeled (as described in **Table 4-13**) and a summary of the results are presented. Following the modeled strategies, other strategies for consideration are presented.

7.1 East Bridge Junction to Back Belt Double Tracking – Simulation 6a and 6b (Option 4)

7.1.1 Overview and Need

Due to significant interest from participating railroads, this relatively low-cost capital improvement was evaluated in detail. **Figures 5-3A** through **5-5B**, presented in the **Section 5.0**, shows the existing trackage connecting the HPL Bridge and the Back Belt. The connection consists of a single-track route between the NOPB westbound main and the NS (Back Belt). This single track currently accommodates all of the movements between the eastside and westside carriers, and as a result, often becomes a bottleneck delaying the flow of rail traffic that must transit this area. Double-tracking between these two points was ranked number two in importance by the railroad representatives in the list of issues and deficiencies impacting overall Gateway performance. **Figures 7-2** through **7-4** show line diagrams depicting a recommended scheme for double-tracking, which would provide almost one mile of additional double-track by utilizing a portion of the NS passing track without impacting the surrounding Metairie residential areas (i.e., no new rail right-of-way would need to be purchased).

The proposed second track would not connect with the CNIC A1-A2 track, but would connect with their mainline. which has the advantage of providing a dual route for any passenger movements using the HPL Bridge to reach the UPT. Possible disadvantages of this scheme include removal of a portion of the NOPB westbound main and the north track of the CNIC. An additional crossover between the NOPB mains near the end of the bridge has been included to increase the flexibility of the proposed track arrangement.

7.1.2 Recommended Modifications and Cost Estimate

The proposed changes include the addition of five switch machines and the relocation of seven others to accommodate the twelve turnouts, which would be required. Four additional signals and the associated reworking of the hardwiring, power supply and communications would be required to adapt the changes into the new remote control system. The track work estimate utilizes earlier estimates by the railroad for similar work in 1998, modified to include an additional crossover.

All prices have been updated to June 2002 levels, by the application projected inflation factors.

The total conceptual estimate of probable cost for the track changes and integration into the central control system as recommended in this section are outlined in **Table 7-1**. The resulting total estimated cost is $3,378,000.

A summary of all simulation model scenarios and results is included in **Table 8-4**. Detailed model simulation results for long-term strategies and improvements previously discussed in this section are included in **Appendix D**.

7.2 Ballast Deck for Huey P. Long Bridge – Simulation 9 (Option 11)

A ballast deck track system would be an improvement for the HPL Bridge, involving replacement of its current system of wooden ties connected directly to the steel bridge structure. such a deck system would virtually eliminate - at least drastically minimize existing maintenance, and it would allow for the near full utilization of the double track capacity of the HPL Bridge. Relatively high cost is one factor that prevents this improvement from being considered in the near-term. A conceptual construction cost estimate for the ballest decking improvement is approximately $20 million, as documented as part of the *Conceptual Planning for the Huey P. Long Bridge Improvements*. See **Appendix E**. Other factors include uncertainty over the future of the bridge itself—a recent study has looked at increasing the automobile capacity of the bridge by tripling the width of the main structure and adding new approach ramps. Rail improvements, such as a ballast deck, might be able to be incorporated into such developments. Additionally, as noted earlier, the maintenance schedule has been changed, and this may affect sufficient utilization of the bridge's track system. A simulation with projected 10-year freight traffic and a major reduction in the maintenance window on the HPL Bridge was performed.

The simulation did indicate some improvement in transit time with the UP and BNSF trains accruing the greatest time savings. When 20-year traffic projections are coupled with potential Millennium Port traffic volumes, the ability to fully utilize the double track capacity of the bridge may provide substantial transit time savings. The opportunity to implement the ballast deck system while other major modifications are being designed and implemented on the bridge is also a serious consideration because it may be another 50 years, or more, until significant modifications to the bridge are made again.

Table 7-1
Cost Estimate to Double-Track through East Bridge Junction to the Back Belt

Item	Units	Price	Quantity	Amount	Totals
TRACKWORK:					
Note: The required trackwork to accomplish this double-tracking was previously estimated by the railroads in 1998 at $1,470,000. Using a factor of 16% to reflect current prices and adding approximately $150,000 for an additional crossover between the NOPB main tracks west of Central Avenue results in the following total cost for this item.					
TOTAL TRACKWORK:					**$1,855,000**
SIGNAL AND COMMUNICATION ITEMS					
Materials and Equipment					
Signals, C/S 20 C/W Masts and Ladders	Each	$4,500	4	$18,000	
Switch Machines and Layout	Each	$30,000	7	$210,000	
Field VHLC Changes	Lot	$100,000	1	$100,000	
Control Center Additions and Programming	Lot	$100,000	1	$100,000	
AC/DC Power Supply	Lot	$25,000	1	$25,000	
Surge Protection Equipment	Lot	$1,000	1	$1,000	
Wire and Cable	Lot	$100,000	1	$100,000	
Miscellaneous Housings	Each	$4,000	1	$4,000	
Miscellaneous Signal Material	Lot	$10,000	1	$10,000	
Subtotal				**$568,000**	
Material Handling (17.5%)				**$99,400**	
Total Materials and Equipment:				**$667,400**	
Labor and Subsistence:					
Signal	Crew Day	$1,500	50	$75,000	
Communications	Crew Day	$300	5	$1,500	
Labor Additives				$68,120	
Subsistence				$5,060	
Total Labor and Subsistence:				**$149,680**	
Engineering:					
Engineering				$75,000	
Engineering Additives				$30,990	
Total Engineering				**$105,990**	
TOTAL SIGNAL AND COMMUNIATIONS ITEMS:					**$923,070**
SUBTOTAL:					**$2,778,070**
UPDATE SIGNALS AND COMMUNICATIONS ITEMS TO JUNE 2002 (4%):					**$36,930**
SUBTOTAL:					**$2,815,000**
20% CONTINGENCY:					**$563,000**
TOTAL DOUBLE-TRACK THROUGH EBJ:					**$3,378,000**

Figure 7-1
Index of Figures 7-2 through 7-4

(Please download *7_1.pdf*)

Figure 7-2
Stick

(Please download *7_2.pdf*)

Figure 7-3
Stick

(Please download *7_3.pdf*)

Figure 7-4
Stick

(Please download *7_4.pdf*)

7.3 Improved Connection to CNIC/Mays Yard – Simulation 13 (Option 9)

The current operation of westbound traffic from the HPL Bridge requires entry to the EJB, and a subsequent backing of the train into Mays Yard. Both connections of NOPB (off HPL Bridge) to westbound CNIC/KCS, and connections of NOPB (off HPL Bridge) to eastbound UP were submitted during the initial meetings by one of the general stakeholders, who emphasized the need for a new rail "curve" on the east bank side of the HPL Bridge. Trains coming from the west bank cannot make a "left turn" to the CNIC / KCS lines heading west. Currently, they need to come down through the already-crowded EBJ, then back into Mays Yard, where they have their power sources switched, then proceed west. Trains doing the reverse movement (CNIC trains bound for points west via the UP or BN-SF) must perform a similarly convoluted movement. These movements not only take up considerable time, but also add congestion by blocking the EBJ. The stakeholder also pointed out that a "right turn" rail curve (i.e., to/from the east) might need to be installed on the west bank side of the HPL Bridge, particularly if a Millennium Port is developed down river on the west bank of Plaquemines Parish.

These inefficient operations utilize significant interlocking capacity. Model simulation results indicated nearly a half hour reduction in transit times for UP movements to Mays Yard with the proposed improvement would be revised. Modeled Gateway benefits were modest due to the fact there are only a few trains daily that interchange via that route; however, the North-South trade axis associated with the Millennium Port development could significantly add traffic to the interchange movement, providing strong justification for the project.

Conceptual-level engineering was performed for this proposal. To make the connection as described would involve coming off the elevated track section of the HPL Bridge and building a substantial rail curve on elevated structure. In this case, crossings of major highways would be involved: Clearview Parkway and the Earhart Expressway on the east bank. Consequently, the connections would be very expensive to build.

7.4 Yard Consolidation of KCS/CNIC – Simulation 7 (Option 16)

This option would include the relocation of the KCS Yard operations to the CNIC Mays Yard. Relocating the KCS operations, which is currently east of the EBJ to the Mays Yard, which is west of the EBJ, would eliminate the daily "double" train movement required for KCS to deliver to the eastern carriers. Due to the existing track configuration, movements to/from eastern carriers to KCS must pass through the EBJ on one pass and the "back" into the KCS Yard. By consolidating all KCS operations through joint agreement with CNIC, these "double" movements would be eliminated. The existing KCS Yard would then be utilized as additional storage tracks for joint KCS/CNIC engines and rail cars. Model results showed only minimal improvement to the Gateway operations on the whole, resulting in an average one (1) minute improvement in average interyard movements over scenario 4; however, there was an over twenty-six (26) minute time savings to individual UP to CNIC movements. Thus, such a consolidation would have advantages to UP, CNIC and KCS.

7.5 Four Quadrant Grade Crossing on Norfolk Southern "Back Belt" Line – No Simulation (Option 6)

This option is addressed in **Section 5.2**.

7.6 Directional Travel Within Gateway – Simulation 5 (Option 5)

One option discussed during stakeholder meetings was the possibility of directional travel, i.e. running all westward traffic on the Back Belt and all eastbound traffic on the Front Belt (or vice-versa). This would require rerouting of train traffic from current patterns to this revised pattern. This alternative was evaluated in Simulation No. 5. Transit times actually increased from the improved operating Scenario 3 due to more traffic being routed over the significantly longer Front Belt route. This would also result in an increase in the number of trains passing along the Front Belt as compared to current operations. These additional trains would pass through the downtown and French Quarter section of New Orleans. The general public and elected officials would likely oppose this, as this would impede heavy pedestrian traffic between the French Quarter and recently developed riverfront uses (e.g., Aquarium, Woldenberg Park, Riverwalk).

7.7 Yard Staging Improvements – Simulation 8 (Option 8)

Preliminary indications are that existing yard capacity may have an impact on the overall operation of the Gateway. A simulation was performed adding additional staging and receiving tracks at each yard. Results showed no significant run time savings. However, results are inconclusive because of the complexity of analyzing actual yard receiving departure operations. Capacity constraints may be physical plant related (e.g., need for more receiving/departure track) or it may be a result of switching crew capacity and/or power locomotive capacity. Currently the UP and CSX railroads handle the most traffic within the Gateway. Farther evaluation and planning of yard capacity issues for major rail operations within the Gateway should be seriously considered.

7.8 Other Improvements Not Evaluated in this Phase

7.8.1 Change Bridge Maintenance Practices

As described in **Section 2**, the HPL Bridge requires daily, labor-intensive maintenance primarily to replace custom shaped wooden ties. At the time the study began, one track was regularly taken out of service for 6 to 8 hours, 5 days per week for crews to carry-out planned maintenance. This reduced the capacity of the bridge to a single track for the duration of the maintenance block. The evaluation of EBJ movements by hour of a typical day clearly indicated the negative impact of bridge maintenance activity on throughput. In addition to the closure issue, bridge maintenance movements added approximately 10 movements on each weekday through EBJ. Railroads attempt to plan the movement of trains around this maintenance curfew to minimize delays.

Changing bridge maintenance practices was not explored as an immediate-term strategy because NOPB is modifying its work hours on the bridge. Since the time of the sample week, maintenance has been reduced to 4 days/week but for up to 10 hours per day. In addition, it is envisioned that improved maintenance practices may minimize some of the down time on the bridge.

7.8.2 Grade Separated Crossings in Metairie and Kenner

The City of New Orleans had an intensive program of developing grade-separated street crossings during the 1950s. Metairie and East Jefferson Parish, most of which has been developed since that time, have few grade-separated crossings other than state highway overpasses. This proposal would involve examining all of the crossings in East Jefferson Parish, both on the NS Back Belt and the CNIC/KCS mainline. Those with clear merits (i.e., high daily automobile traffic locations) would then have grade-separated crossings installed - either underpasses or overpasses.

This alternative was not examined in the immediate-term because of cost and political infeasibility. Local terrain make *cost* a prohibitive factor beyond the normally high costs of building a grade separation. The New Orleans Metropolitan area is extremely flat, with a relatively shallow water table: (some areas are at elevations below mean sea level). As overpasses cannot take advantage of terrain changes for elevation, they require substantial structures. Underpasses, on the other hand, have a tendency to flood and must include a suitable pumping system in order to keep them passable.

Grade-separated crossings are seen as politically infeasible, as well. In past, grade-separated crossing have been proposed at Metairie Road (probably the busiest road/rail at-grade crossing) in Old Metairie as well as several other locations. The installation of grade-separated crossings usually is tied in with other factors: 1) double-tracking the Back Belt through Metairie Road and the 17th Street Canal; and 2) closure of some other street crossing locations. Elected officials and the general public tend to see adding grade-separated crossings as causing more problems than it solves resulting in constrained access, higher train speeds in residential neighborhoods, and with the double tracking, "stacking" of trains in their neighborhood. Therefore, they are generally opposed to the installation of grade-separation crossings.

7.8.3 Capacity Improvement at 17th Street/Metairie Road

This improvement would add a second track along the NS Back Belt in order to make the entire Back Belt a dual track system. The Back Belt at present reduces to one track just west of Metairie Road, and then expands back to two tracks just east of the 17th Street Canal Bridge. This alternative along with the double track of EBJ that is discussed in the Mid to Long-Term improvements section, would be expected to improve efficiency in movements across the Back Belt and through EBJ.

This new trackage is seen as politically infeasible, for reasons listed in the previous description on grade-separated crossings. Old Metairie leaders and citizens feel that that a second track will lead to both higher operating speeds and "stacking" of trains in their neighborhood, and as such, have been vehemently opposed to such measures in the past.

7.8.4 Carrollton Curve Alternatives

While the previous two alternatives (i.e., grade-separated crossing in Kenner and Old Metairie and capacity improvements at 17th Street/Metairie Road) are not popular with elected leaders and citizens in Old Metairie, this alternative appears to have support. The *Carrollton Curve* alternative involves the construction of a track connection from the UPT line along Airline Drive to the UPT track running alongside the Pontchartrain Expressway (i.e., I-10). This track would enable eastbound trains to travel from the CNIC/KCS mainline to the UPT line, travel a short distance north on the UPT main, then join the NS Back Belt at East City Junction. The reverse movement would also be accommodated. The ostensible purpose of this improvement would be the removal of the NS Back Belt line in Metairie, from EBJ to East City Junction.

The negatives surrounding this alternative prevent it from being considered as anything but a long-term improvement. First among the negatives is the cost. Some preliminary engineering has been done on the feasibility of this proposal. In order to construct the ‘Carrollton Curve’ rail connection, almost all of the US 61 / “old” Pontchartrain Expressway interchange would have to be rebuilt. The new I-10 mainline overpass, built in the 1970s, would be only minimally affected. This alternative, as a result, is very expensive.

While this alternative may be politically acceptable from a Metairie/Jefferson Parish point-of-view, it will not be as well accepted in the City of New Orleans. Rerouting numerous freight rail trains from high-income residential neighborhoods in Metairie to lower-income neighborhoods in New Orleans will not be palatable to elected officials and the citizens in New Orleans. Federal environmental justice concerns would certainly come into play, as well.

Finally, there are many logistical and legal questions remaining with the proposed Carrollton Curve: 1) legal issues regarding the running of freight traffic on the UPT tracks; 2) CNIC/KCS willingness to run additional trains over their tracks; 3) NS willingness to abandon rail right-of-way; and others. Due to these logistical and legal concerns, this alternative is considered only as a long-term possibility.

7.8.5 Elevated Overpass at East Bridge Junction

This alternative involves eliminating the switches connecting the Back Belt through EBJ to the HPL Bridge, and replacing them with a direct mainline track on elevated structure above the CNIC mainline. Depending on preferences, the elevated track could possibly be extended the length of the Back Belt through Metairie; or extend along the CNIC/KCS corridor, cross over Airline Drive, then rejoin the Back Belt at East City Junction.

Overwhelming cost was one reason for placing this suggested improvement in the list of possible long-term improvements. Additionally, through the computer simulation modeling, the double tracking through EBJ alone appears to supply an adequate increase in efficiency.

7.8.6 Signalize NS Back Belt

The Federal Railroad Administration requested consideration of signalizing the NS Back Belt Mainline segment between Metairie Road (mi. 2.2) and the IC connection (mi. 0.0).

Extending the CTC signal system would allow freight speeds to be increased from 20 to 30 mph over most of the 2.2 mile segment. This would increase the effective line capacity and fluidity of this key segment of the Gateway network as well as to allow trains to clear grade crossings more quickly than today (approximately 33% less time). Subject to field verification of bridge condition and crossing sightlines at Metairie Road, the posted speed on the 0.5 mile signaled segment between Metairie Road and the 17th Street Canal would also be increased from 20 to 30 mph.

The above assumes that any potential community resistance to increased train speeds through Old Metairie can be overcome.

Note that this speed increase would also require a corresponding adjustment to the crossing protection timing systems at each crossing.

The overall level of safety for train movements would likely be enhanced due to the automatic separation and protection of train movements. Presently, trains proceed under Yard Limits rules which relies soley upon train operator judgement to control their movements.

Efficiency of train movements would be enhanced due to the removal of the necessity for train crews to contact the Oliver Yard Yardmaster by radio for permission to enter this track segment – a process which can cause movement delays during busy periods at the Yard.

Signalization also complements the key operating principals and associated benefits of the proposed centralized coordination center and East Bridge Junction double tracking.

7.9 Schematic Level Millennium Port Evaluation

7.9.1 Millennium Port Traffic Forecasts and Analysis

The *Millennium Port Feasibility Study (FR Harris, 1999)* was used as the basis for Millennium Port Traffic Forecast. Several forecasts were presented in the *Millennium Port Feasibility Study* and all were evaluated. Option No. 2 was based on a Millennium Port location near River Mile 45 in Plaquemines Parish and assumed direct rail service to the site. It also provided a mid-range forecast for rail traffic compared to the other options. Alternatives 3 and 4 were based on a new

Port facility near Head of Passes, which would rely on rail cargo being transported upriver via shallow draft vessels to an undetermined rail/water interchange location.

The *Millennium Port Feasibility Study* forecasted traffic volumes for Option 2 are shown below in **Table 7-2**.

Table 7-2
Intermodal Traffic Forecast (TEUs)

Option 2	Per Millennium Port Feasibility Study							
	2000		2005*		2010		2020	
NS	46,323	17%	67,617	17%	88,910	17%	161,702	17%
IC	56,726	21%	82,801	21%	108,876	21%	198,014	21%
CSX	109,079	40%	159,219	40%	209,358	40%	380,763	40%
KCS	22,397	8%	32,692	8%	42,986	8%	78,180	8%
UP	37,524	14%	54,773	14%	72,021	14%	130,985	14%
BNSF		0%	0	0%		0%		0%

* Developed by interpolation.

For purposes of this study and based on railroad interviews, Option 2 was modified as shown below. NS, CNIC and KCS traffic levels for Year 2000 were maintained as per Option No. 2. BN-SF was added to the mix, as they were not operating into New Orleans when the *Millennium Port Feasibility Study* was performed. Equal splits between UP and BNSF were assumed. The CSX volume was reduced slightly, more consistent with regional splits discussed at railroad interviews.

The resulting Millennium Port forecast used for the rail analysis is shown in **Table 7-3** below.

Table 7-3
Rail Forecast Assuming Millennium Port Development

Railroad	Traffic Share	2000	2005	2010	2020
NS	17%	46,323	63,613	88,910	161,702
IC	20%	56,726	82,797	108,877	198,016
CSX	25%	69,079	100,828	132,587	241,138
KCS	8%	22,397	32,691	42,988	78,182
UP	15%	42,524	62,068	81,618	148,441
BNSF	15%	42,524	62,068	81,618	148,441

Based on the adjusted traffic forecasts, an estimate of additional trains operating through the Gateway was determined. The results are shown in **Table 7-4** indicating a total of eighteen (18) potential new trains per day. For modeling purposes, fourteen (14) of these new trains were assumed to cross through EBJ and WBJ with four (4) destined for the two (2) western carriers.

Table 7-5 indicates the results of this conceptual level analysis. Generally if the operational improvements denoted in the Immediate-Term Plan are implemented and the stated benefits are achieved the model simulation indicates that the Gateway physical plant may have the capacity to handle increased traffic flow from the Millennium Port over the twenty (20) year horizon.

Table 7-4
Millennium Port Gateway Traffic Simulation

Additional Train Estimate								
		Inbound Container Traffic (TEU)					Avg Two	Total New
Railroad	Traffic Source	2000	2005*	2010	2020	Avg One Way Trains/day*	Way Trains/day	Sim trains/day
NS	17%	46,323	63,613	88,910	161,702	1.5	3.0	4
IC	20%	56,726	82,797	108,877	198,016	1.8	3.6	4
CSX	25%	69,079	100,828	132,587	241,138	2.2	4.4	4
KCS	8%	22,397	32,691	42,988	78,182	0.7	1.4	2
Total						6.3	12.5	14
UP	15%	42,524	62,068	81,618	148,441	1.4	2.7	
BNSF	15%	42,524	62,068	81,618	148,441	1.4	2.7	
						2.7	5.5	
Total	100%	279,573	404,065	536,598	975,920	9.0	18.0	

* Based on: 20 train feet per twenty-feet equivalent units (TEU); 6,000 feet/train; 362 days per year.

Table 7-5
10-Year Forecast With No Improvements

From	Data	To: BN	CSX	IC	KCS	NOPB	NS	UP	Grand Total
BN	Number of Trains					18			18
	Average Duration					3:54:44			3:54:44
	Max Duration					5:25:14			5:25:14
CSX	Number of Trains					14		34	48
	Average Duration					5:28:38		4:51:23	5:02:15
	Max Duration					7:31:35		7:07:43	7:31:35
IC	Number of Trains				1	6	3	2	12
	Average Duration				2:47:09	7:41:48	4:49:25	3:21:04	5:50:42
	Max Duration				2:47:09	9:40:35	5:48:06	5:13:51	9:40:35
KCS	Number of Trains		6	3					9
	Average Duration		3:25:33	4:02:16					3:37:47
	Max Duration		4:24:18	4:47:14					4:47:14
NOPB	Number of Trains	12	7	4	8		4	2	37
	Average Duration	4:00:05	4:34:55	4:18:38	2:50:55		2:39:22	3:11:37	3:42:23
	Max Duration	5:57:25	7:24:20	7:12:55	3:54:19		2:58:25	3:18:17	7:24:20
NS	Number of Trains			5				17	22
	Average Duration			5:07:25				4:34:21	4:41:52
	Max Duration			6:39:09				6:42:59	6:42:59
UP	Number of Trains		44	9		2	14		69
	Average Duration		4:20:01	4:19:13		3:58:09	3:24:11		4:07:57
	Max Duration		6:14:33	5:09:11		4:48:48	6:17:22		6:17:22
Total Number of Trains		12	57	21	9	40	21	37	**215**
Average Duration		4:00:05	4:16:07	4:28:10	2:50:30	5:01:50	3:27:49	9:52:11	**4:22:40**
Max Duration		5:57:25	7:24:20	7:12:55	3:54:19	9:40:35	6:17:22	31:29:56	**9:40:35**

8.0 CONCLUSIONS

8.1 Summary of Study Findings

Existing simulation conditions for inter-yard trains operating as per current practices indicate an average transit time of 7 hours 38 minutes through the Gateway. Individual times vary considerably by origin/destination combination ranging from a low average of 3 hours 29 minutes (NOPB to KCS) to a high average of 25 hours 4 minutes (NS to UP). In consideration of the relatively short distances involved in the Gateway, where the longest unrestricted travel time between yards is less than one hour, these results clearly indicate considerable evidence of train delays and poor Gateway operating performance.

The simulation results for inter-yard trains operating as per current practices confirmed the location of chronic Gateway bottlenecks, and the statistics provided a measure of the extent of the problem. Of the 164 trains traversing the HPL Bridge, 80 percent incurred a delay averaging nearly two hours. Westbound trains on the Back Belt at Marconi incurred the greatest average delay at 2 hours 26 minutes with one train incurring a delay of 12 hours.

To evaluate the potential operational improvements in the Gateway, simulations of existing traffic where trains were permitted to flow through the Gateway unconstrained by the daily operational inefficiencies that stem primarily from poor Gateway communications and traffic coordination and prioritization. To simulate the potential for improvement under present traffic conditions, all recorded delay or anchor times for individual trains were removed and the trains were allowed to make their way to their destinations in accordance with their designated routing operating at normal, safe speeds and headways. A check was made to ensure that Metairie road crossings were respected and that in no case were Amtrak trains delayed in all cases. The only delays allowed to occur were those resulting from traffic congestion. Launch times for individual trains remained as in the present, base case. A maximum of 30 minutes crew change times were permitted at Marconi.

Under the present traffic scenario, the impact of improved coordination of traffic and minimizing Marconi re-crewing times reduces average transit times by 4 hours 7 minutes or 54 percent. The greatest proportional time improvements were for CSX to UP trains where average times improved by over 6 hours under the streamlined operation scenario.

These order-of-magnitude improvements represent a major operational advance for the Gateway. While it should be pointed out that these simulated results are somewhat theoretical given that they are based on the premise that all trains would operate at maximum efficiency. In actual practice, up to 80 percent of this level of improvement is reasonably expected, given current operating factors. Hence, these improvements would translate to major time savings for all interchange traffic.

Year 20 traffic levels simulations were also performed and indicate the average transit time for the streamlined operation remained well below the present performance at 43% below baseline. This indicates that with a well-conceived and managed operating plan in place that keeps the Gateway fluid by directing every train movement on a timely, prioritized and logical basis, considerable performance improvements can be achieved without adding Gateway track infrastructure. The only condition on this is that there must be adequate railroad resources at each yard to keep pace with Gateway flow. These resources include receiving departure yard holding and processing capacity, train crews, maintenance gangs, power availability, etc.

The following items summarize the conclusions of the analysis:

- If implemented, the proposed immediate-term operational improvement program would reduce transit time in the Gateway. Reducing transit time through the Gateway increases capacity by making line segments available for more traffic sooner than they would otherwise be available. This could have significant capital savings implications permitting more intensive use of existing infrastructure assets and postponing or eliminating future major capital expenditures and in turn reducing community impacts. In essence, the analysis indicates that if operated more efficiently the existing rail plant, with relatively minimal improvements, could provide the needed capacity to handle existing and future traffic over the 10-to 20-year horizon.

- The benefit-cost analysis clearly indicated that centralizing train control (i.e., immediate-term improvement program) significantly exceeds most railroad investment criteria, by any standard of measure.

- The benefit-cost analysis conducted does not incorporate the future rehabilitation costs of EBJ and WBJ facilities, which in the absence of building a centralized control facility, would be required. If this otherwise mandatory capital expense is subtracted from the estimated $10 million immediate-term implementation cost, then the return on the incremental investment is even greater than the conclusions reached in the benefit-cost analysis.

- One of the most significant soft economic benefits of reducing transit time through the Gateway is the impact on service reliability – both in average transit time and in the time variability of each movement. These benefits offer a significant marketing advantage that can be exploited to ultimately reduce commercial truck traffic in the region.

- Another soft economic benefit is the potential improvement in private freight car utilization afforded by faster equipment turnaround times. This does not have direct benefits to the railroads but will certainly be appreciated by shippers.

- The benefit-cost evaluation approximates the longer-term cash savings associated with each “From-To” movement, but does not identify which railroad realizes the benefit. In general, the railroad that performs the service will realize all or most of the savings. If one railroad charges another for the service provided and if those fees are not reduced, then the paying railroad receives no economic benefit.

- The study clearly suggests that the savings are sufficiently large and concentrated and that it is not necessary for all railroads to share in the capital cost of the immediate-term improvement program. However, clearly, all must consent to cooperation. This is something the railroads must work out among themselves.

- Simulations assumed that trains were not held out of destination points by trains ahead or the unavailability of receiving tracks. Receiving capabilities limitations could restrict the flow of traffic through the Gateway and the ability of a centralized control facility to schedule trains through open traffic slots. If this is the case, then receiving capabilities and capacities must be increased as part of the recommended improvement plan in order to maximize Gateway throughput capabilities. While this will obviously reduce the perceived economic benefits, the additional cost will be all, or partially offset, by additional time saved by reduced traffic holds at origin points. Receiving capabilities must be examined and expanded, as necessary, to realize the benefits anticipated from the benefit-cost evaluation.

- Potential operating and marketing benefits of centralized train control far outweigh perceived loss of control over operations.

8.2 Millennium Port Alternative Considerations

While a full scale Millennium Port alternative could not be evaluated due to lack of information regarding the alternative (i.e. site location, one or more terminals, proposed operating characteristics, etc.) a schematic level analysis was performed in an effort to obtain some indication of potential impacts of a proposed new "super port facility."

The conceptual analysis gave an indication that if the operational improvements outlined in the immediate-term program were instituted (.e. a true central dispatch center were implemented and adequate yard capacity were available); the Gateway may be able to handle the increased traffic of a Millennium Port in the 20 year horizon. As this analysis was conceptual in nature, a more detailed analysis based on the detailed Millennium Port location, operating characteristics, and revised traffic forecasts with updated origin and destination data should be performed. A detailed analysis will be necessary to determine long-term Millennium Port rail capacity needs.

One project, which should be seriously considered, is the implementation of ballast decking on the HPL Bridge. This improvement would significantly reduce the maintenance window on the bridge, and allow utilization of full bridge capacity on a consistent basis. This is especially true given the fact that major improvements are planned for the bridge through the "TIMED" program. This magnitude of improvement on a Mississippi River Bridge crossing does not happen often, and is likely a "one time shot" over the next 50 years to make such an improvement. While modest operational improvements were modeled over the 10 year horizon with significantly reduced maintenance windows over the 20 to 40 year horizon, (especially if the Millennium Port does become reality) the ballast decking on the HPL Bridge should provide significant benefit, and the additional capacity will, in all likelihood, be needed.

Another longer term alternative associated with the Millennium Port that warrants additional consideration is a improved connection to the CNIC Mays Yard from the HPL Bridge. If projections and stakeholder comments hold true, the North-South trade axis may be dominant in Millennium Port operations. This could significantly increase traffic for CNIC and KCS. Currently, trains heading east over the HPL Bridge must back through EBJ to access Mays Yard. Model simulations reflect significant transit time savings for trains making this movement if the improved connection is made.

8.3 Action Plan

The immediate-term action plan includes the immediate-term improvement program and associated low-cost (i.e., operational and capital improvements) activities to maximize efficiency and capacity in the Gateway with minimal community impacts. The following action items should be completed within one year.

1) Complete agreement between NOPB and LDOTD/RPC to institute immediate-term improvement program.

   - Determine procurement process for design and implementation;
   - Complete environmental assessment of proposed improvements;
   - Revise draft agreement;
   - Complete detailed plans for improvements; and
   - Direct railroads to develop operation plan and procedure for operation.

2) Negotiate agreement with NOUPT to implement communication center improvements space.

   - Meet with railroads to finalize program for space;
   - Meet with City of New Orleans and their architect to initiate process for renovation;
   - Direct railroads to negotiate lease agreement; and
   - Possibly proceed with an alternate interim approach that could utilize railroad provided space for communication center.

3) Initiate implementation of improvements necessary to maintain prohibition of horn blowing through Old Metairie.

   - Review current status of federal rule,
   - Conduct final evaluation of alternatives to maintain horning blowing ban, and

- Institute agreement for implementation of improvements.

The following Action Items should be completed after the implementation of the coordination center and based on supporting information collected by the communication center.

1) Initiate detailed yard capacity analysis to verify receiving capacity at strategic yards.

   - Meet with railroads to open discussion and seek cooperation; and

   - Initiate analysis upon railroad agreement;

2) Expand participation of railroads in communication center.

   - Approach railroads to join communication center operation; and

   - Provide additional communications to other railroad dispatch and operations.