Research and Test Department

Association of American Railroads

IRON HIGHWAY
PHASE II EVALUATION

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By

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13. Abstract

Evaluation tests of Iron Highway Phase II prototype show that the technical benefits predicted from the integral train design are attainable. The tests prove that the control and braking, loading and unloading, split ramp and platform suspension systems are ready to be engineered into production equipment. The power system requires further development. The acceleration measurements during the dynamic tests show that the load bearing platforms provide a comparable or better ride than existing intermodal equipment with the exception of vertical bounce response. Further analysis will be made by the proponent to tune the suspension for a better vertical ride. Based on measurements taken in a 12-degree curve and a spiral leading to a 10-degree curve, wheel/rail forces show improved curving compared to any existing intermodal equipment. Response measurements of the power and control unit and its suspension show no derailment tendencies, but do suggest improvements can be made for better human ride comfort. The control system tests indicate that the central traction computer software is functional and provides accurate and repeatable commands for proper control and monitoring of the system. Powe system tests were not conducted due to failures in the differential gear box sub-systems. Limited brake system tests demonstrated successful operation in blended, full service and emergency braking modes. Tests of the split ramp car successfully demonstrated its function. The system allows loading and unloading of fully loaded, non-railroad trailers, up to 53 feet in length. Trailers can be loaded or unloaded at the middle of a consist, at any level gravel surface. Yard facilities are not required.

The tests were carried out at the Transportation Technology Center and were funded jointly by the Federal Railroad Administration and the AAR as part of the High Productivity Integral Train (HPIT) Program.

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EXECUTIVE SUMMARY

Results of testing to evaluate the New York Air Brake Company (NYAB) and CSX Intermodal (CSXI) sponsored Iron Highway Phase II prototype equipment show that the technical benefits predicted from the integral train design are attainable. Dynamic response tests, and control, loading/unloading and brake system performance tests were conducted under AAR's High Productivity Integral Train (HPIT) program at the Transportation Technology Center (TTC) in Pueblo, Colorado. The tests have proven that the control and braking, loading and unloading, split ramp and platform suspension systems are ready to be engineered into production equipment. The power system requires further development. The acceleration measurements during the dynamic tests show that the load bearing platforms provide a comparable or better ride quality than existing intermodal equipment with the exception of vertical bounce response. Further analysis will be made by the proponent to tune the suspension for a better vertical ride. Based on wayside strain gage measurements taken in a 12-degree curve and a spiral leading to a 10-degree curve, wheel/rail forces showed improved curving compared to any existing intermodal equipment. Response measurements of the power and control unit and its suspension show no derailment tendencies, but suggest improvements can be made for better human ride comfort.

The control system tests indicate that the central traction computer software is functional and provides accurate and repeatable commands for proper control and monitoring of the system. Modifications were identified to improve the response time of the control software. Power system tests were not conducted due to failures in the differential gear box sub-systems. Limited brake system tests demonstrated successful operation in blended, full service and emergency braking modes. The blended mode results show that the hydro-dynamic retarders functioned as intended. Tests of the split ramp car successfully demonstrated its function. The system allows loading and unloading of fully loaded non-railroad trailers, up to 53 feet in length.

Trailers can be loaded or unloaded at the middle of a consist, at any level gravel surface. Yard facilities are not required.

The test results prove that a drive on - drive off type intermodal system using a custom hostler and hitch design is practical. The economic benefits realized by being able to handle non-railroad trailers of any length should prove to be substantial.

The HPIT concept design was developed by NYAB. It consists of a 1000-foot continuous platform, supported by single axle trucks every 28 feet at an articulated joint. Power units, with two 750-horsepower diesel powered generators are connected at each 1000-foot platform. They supply AC three-phase power to traction motors on the first five single-axle trucks. The truck suspension is unique, in that, at each articulated joint, rubber springs connect the truck to the car body. The non-powered wheels at each truck are supported on stub axles and rotate independently of each other. Each of the wheel/axle assemblies has a pair of steering links, one above and one below the axle.

The Phase II test prototype consisted of a partial train element. Seven pieces of equipment were joined to form an articulated train. The first piece was a Power and Control Unit (PCU or P&C) frame. The PCU is equipped with a temporary cab, two power pods and fuel tanks. This unit pulls three load carrying platforms which were followed by the articulated split ramp car. A fourth load carrying platform was next. The last unit in the consist was a second ballasted power and control unit frame with no cab or engine. It served as an end-of- train buffer with on-board electronics to complete the train line functions.

Analyses of the test data supports the following observations and conclusions:

- The load or trailer bearing platforms exhibit better than average performance in hunting, twist/roll, yaw/sway and curving. The car body lateral acceleration and roll degree are lower in twist/roll, dynamic curving and yaw/sway when compared to an intermodal 40-foot Spine car and an 89-foot Autorack. Response in the bounce/pitch mode is comparable or slightly higher, in terms of accelerations, than those for a loaded autorack. No indications of unsafe or derailment tendencies were observed from the wayside rail forces during the curving and spiral negotiation tests.

- The PCU dynamic response tests indicated that the suspension is adequate from a safety or derailment aspect, but may need to be tuned to offer a better ride for the human occupants.
- The control system tests demonstrated that the software/hardware that controls and monitors the equipment under traction and braking functioned as designed. During the tests, successful software modifications were made to meet the design goals. Deliberately induced sticking brakes and excess bearing temperatures were successfully identified on the cab console.
- The power system tests were not undertaken due to mechanical failures of the differential gear box components. But the following observations were made during related tests: Train speed with the unloaded consist powered at 4.8 hp per ton seemed to balance at 63 mph on straight and level track. This horsepower is lower than NYAB's estimate of 5.18 hp per ton for an empty 20-platform element. For a 20-platform element loaded with trailers weighing 65,000 lbs each, NYAB estimates 3.0 hp per ton. Balance speed for the final element design is predicted by NYAB to be between 60 and 70 mph.
- The braking system, including the hydro-dynamic retarder during blended braking, performed as designed . For the empty consist stop distance test from 60 mph, the blended full service produced a shorter stopping distance than emergency and full service. Stop distances from 48 mph for the consist loaded with 20-foot containers and 40-foot trailers were the same for blended full service and full service. The stop distance for emergency required 42 feet more.

- Longitudinal squeeze loads up to the design buff load of 200 kips, applied to the empty consist, showed no high stress areas in the platforms, split ramp or PCU.
- The split ramp car and the custom hostler/hitch systems functioned as designed.

DATA SUMMARY

The tests were conducted in three configurations:

1. All platforms empty
2. A 53-foot trailer weighing 60 kips, using hitch No. 2 on Platform No. 2, trailer wheels towards PCU end of Platform No. 1
3. A 20-foot container on chassis weighing 67 kips, using hitch No. 1 on Platform No. 2, trailer wheels towards PCU end of Platform No. 1 and a 40-foot trailer weighing 65 kips using the movable hitch on Platform No. 3, trailer wheels over articulation between Platform Nos. 2 and 3

The control and braking system tests were conducted with the consist powered by the PCU. The problems with the differential gear box components prevented the operation of high speed runs under PCU power. The dynamic response tests were conducted by towing the test equipment with a conventional locomotive to evaluate the ride performance up to 70 mph.

To summarize the dynamic performance, Table 1 presents values from the speeds at which maximum peak-to-peak values were measured. Comparable acceleration data from previous tests conducted on an 89-foot autorack and a 5-platform (40 feet each) articulated all-purpose spine car is also presented. Both were equipped with conventional 3-piece trucks. Data from a conventional locomotive is presented to provide a means to evaluate the PCU.

As observed, the Iron Highway load platform equipment is generally superior. The PCU response needs to be improved to provide comparable human ride comfort. The lower center roll response was better than the conventional locomotive (see Table 1). The PCU has an upper center roll which generates high accelerations. Maximum peak-to-peak acceleration for the PCU was measured as 1.17 g at 54 mph. This is higher than a conventional locomotive which measured a maximum of 0.26 g at 55 mph.

The braking system test data consists of stop distances and brake pipe and cylinder pressures for three different braking modes. Tests were performed at various speeds. The brake pipe and cylinder pressures indicated that the blended full-service, emergency and full-service braking modes functioned as designed. The stop distances for the platforms in the empty condition for the three brake modes are presented in Table 2.

Table 1. Maximum Peak-to-Peak Values Measured During Dynamic Response Test Series

EQUIPMENT	HUNTING Peak-Peak/ Std. Dev. (g) EMPTY	BOUN/PITCH Peak-Peak (g) 30/5 HZ LOADED	YAW/SWAY Peak-Peak (g) 30/5 HZ LOADED	TWST/ROL Peak-Peak (Degree) LOADED	DYNMC CURVING Peak-Peak (Degree) LOADED
PCU	0.95/0.06 @ 75 mph	0.78/0.53 @ 60 mph	0.29/0.2 @ 70 mph	1.7 @ 20 mph	1.05 @ 20 mph
Platform No. 1	0.49/0.1 @ 75 mph	1.88/0.69 @ 60 mph	1.49/1.0 @ 70 mph		
Platform No. 2	0.47/0.07 @ 75 mph	2.237/0.5 @ 60 mph	0.97/0.5 @ 70 mph		
Platform No. 3	0.76/0.11 @ 75 mph	1.69/0.76 @ 60 mph	0.88/0.5 @ 70 mph		
53-Foot Trailer		0.47/0.11 @ 72 mph	0.48/0.3 @ 75 mph	1.33 @ 20 mph	0.79 @ 20 mph
20-Foot Container		2.84/1.6 @ 60 mph	1.12/0.6 @ 70 mph	1.53 @ 15 mph	2.09 @ 15 mph
40-Foot Spine			2.38 @ 15 HZ & 70 mph	1.98 @ 18 mph	1.56 @ 21 mph
Autorack Car	1.6/0.2 @ 75 mph LOADED	0.9@15 HZ @60 mph	1.55 @ 15 HZ & 50 mph		
Conventional Locomotive			0.26 @ 15 HZ & 64 mph	2.2 @ 10 mph	1.4 @ 12 mph

Table 2. Stop Distance For Various Brake Applications

SPEED (MPH)	BLENDED FULL SERV	FULL SERV AIR ONLY	EMERGENCY AIR ONLY	LOADED (L) EMPTY (E)
30	791	807	737	E
60	2994	3285	3175	E
30	935	1004	899	L
48	2658	2657	2702	L

The tests were carried out at the Transportation Technology Center and were funded jointly by the Federal Railroad Administration and the AAR as part of the High Productivity Integral Train Program.

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1.0 INTRODUCTION

In September 1984, the Association of American Railroads (AAR) requested proposals for new types of railroad rolling stock, bulk or intermodal service, which they designated the High Productivity Integral Train (HPIT). The objective was to eliminate loss, damage, and delay caused by the switching of individual cars and to permit the use of lighter weight and more fuel efficient trains by eliminating the constraints of interchange. New York Air Brake Company (NYAB) responded to the AAR request for proposal with a systems approach concept called the "Iron Highway." The concept is for a train and loading system, designed together, and intended primarily to haul highway trailers.

After conducting technical and economic evaluations based on design data, the AAR concluded that the system was feasible. The NYAB was requested to provide a prototype on which AAR funded tests could be conducted for further evaluation. Due to the complex nature of the system proposed, the test program was conducted in two phases. Phase I comprised an evaluation of the unique suspension system and loading/unloading equipment. This portion of the tests was funded by the AAR. Phase I was successfully completed in February 1991 and demonstrated that the novel truck and suspension would perform safely and efficiently and that the proposed loading and tie-down systems would function as intended (Reference AAR Report No. R-809).

Phase II of the test program which evaluated the full-powered prototype, was co-funded by the Federal Railroad Administration (FRA). The computer-based control and inspection system, as well as the propulsion, braking and transmission systems were tested. Safe operation of the train under loaded conditions with trailers of various length, weight and C.G. heights was verified. The center-of-train car loading split ramp was checked for proper operation of the ramp and safety interlock mechanisms. While these elements are less radical in design than the truck, they differ greatly from standard North American railroad practice and required physical testing to develop safety, load, stress, and control response data under actual operating conditions.

In Phase II, the testing mentioned above was carried out on a prototype partial train element consisting of the basic framework of two power and control units along with four platforms and one center-of-train split ramp car. Three of the platforms were powered from the two power pods mounted on the frame of one of the power and control units.

This 7-unit pre-prototype permitted sufficient testing to assure safe and effective performance of all the hardware which is unique to the Iron Highway concept. This report details the testing conducted under Phase II, including the results and conclusions.

2.0 IRON HIGHWAY - CONCEPT AND TEST EQUIPMENT

The HPIT concept design, Exhibit 1, as developed by NYAB, consists of a 1000-foot continuous platform, supported by single axle trucks every 28 feet at an articulated joint. Power units, with diesel powered generators, are connected at each end of the 1000-foot platform, supplying AC three-phase power to traction motors on the first five single-axle trucks. The truck suspension is unique, in that, at each articulated joint, rubber springs connect the truck to the car body, and the springs slew during curving. The suspension also provides lateral motion of the truck relative to the carbodies of ± ¾ inch, which is also taken through slewing the springs. This motion is resisted not only by the lateral rate of the springs, but also by an elastomeric mount, which includes cushioned lateral stops. The non-powered wheels at each truck are supported on stub axles and rotate independently of each other.

Each of the wheel/axle assemblies has a pair of steering links, one above and one below the axle. These are necessary because, while eliminating the connecting axle between wheels eliminates the wheel creep forces, which drive the "hunting" mechanism, it also eliminates the self-steering which helps tracking in some curves. Thus, forced steering, as provided by the linkage, is required. This not only guides the wheel properly through all curves, but also provides lesser rolling resistance both through reduction of flange contact and elimination of creep forces. Another key innovative feature of the concept, and a potentially advantageous one, is the freedom to load and unload trailers of any length on the platforms, using a scheme which has moveable hitches and a split ramp center platform, as shown in Exhibit 1.

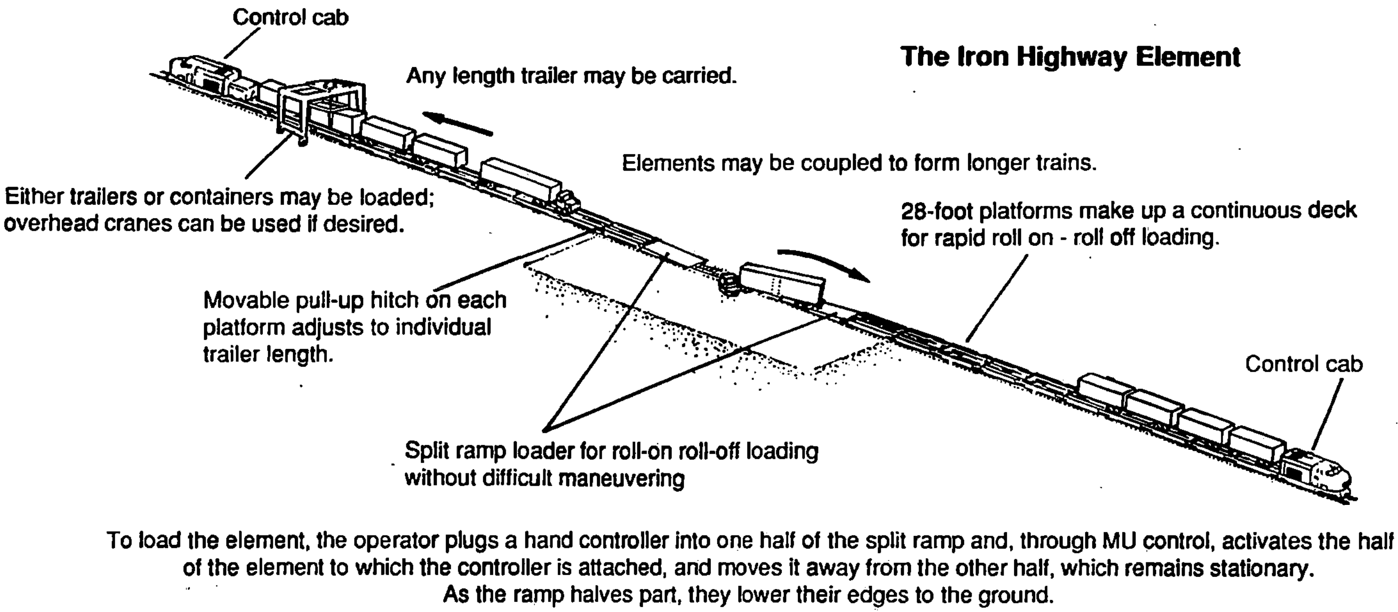


Exhibit 1. Schematic of Iron Highway System Concept as Proposed by NYAB Under the HPIT Program

From the above description, it can be seen that the salient features of the train are:

- Its loading system, which permits the quick loading and unloading of semitrailers at a minimum cost terminal by one man without cranes or other heavy equipment

- Its fully automatic coupling system, which permits elements or "subtrains" to be coupled together under remote control into trains of any practical length made up of "blocks" to be quickly added and dropped en route

- Its unique suspensions, which permit the train to be essentially a single platform while providing good ride quality and low rolling friction

- The unique propulsion system which provides commercial frequency, three-phase AC to a compact traction system under the load bearing platforms, thus reducing weight and complexity of motive power

- The microcomputer based traction control system, which uses a single wire to control all propulsion and braking functions of the train, including those of any trailing elements connected in multiple units so as to make trains of greater capacity

- The unique operator interface, which reduces operator controls down to a single handle master controller, keypad and display screen

- A "designed in" maintenance system, which provides the operator with on-screen help and advises the operator of the need for maintenance or repair before total failure occurs, and allows fast unit replacement of all components at terminals without having to withdraw the element from service

- The electronic inspection system, which permits real time operational checks of the brake status and journal temperature at every point in the train, thus reducing the necessity for terminal delay to a minimum, while greatly increasing safety in operation

All of these features are directed toward both reducing costs and improving performance and safety, and all are essentially made possible by the freedom granted to the engineer by integrating train system design.

2.1 SUSPENSION SYSTEM

The suspension system uses steered axles with independent wheels and rubber springs. The integrated design and lack of a standard coupler avoid undue restrictions on vertical spring travel. Further, the load from track irregularities is taken directly into the side sills, resulting in simplification of both car and truck design, which could not be achieved with conventional center sill construction.

The performance advantage of this system is that the rubber springs provide excellent riding characteristics so as to decrease loss and damage to lading, track and car. The independently steered axles reduce creep forces, thus offering the potential to save money on both track and wheel wear. The elimination of these forces reflects in a lower rolling resistance and reduced fuel consumption. Finally, the articulated connection eliminates slack, thus eliminating slack action induced impacts to reduce lading damage and equipment wear and repair costs.

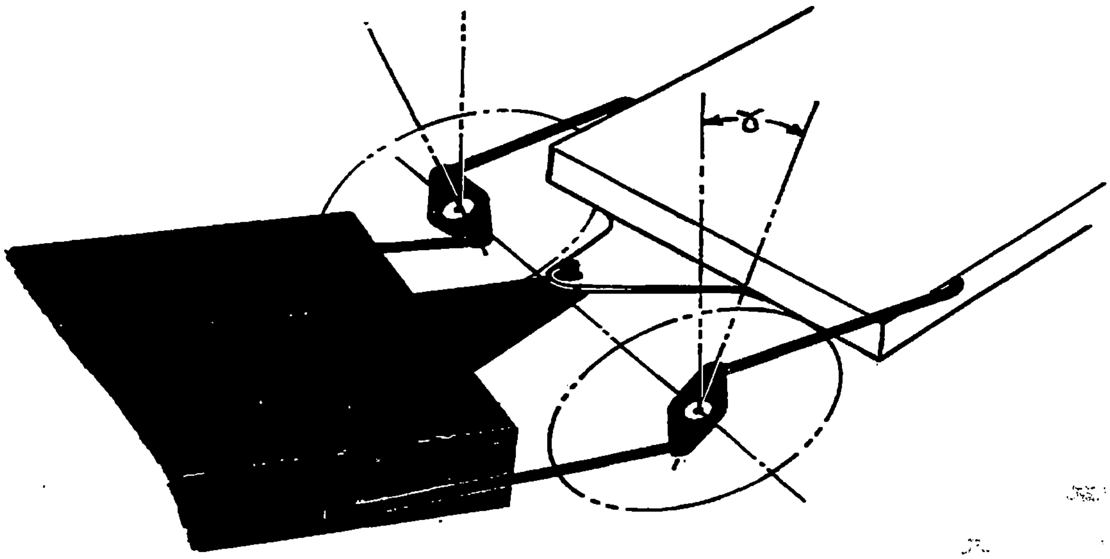


Exhibit 2. Schematic of Axle Steering Principle

The operating principle of the unique truck shown in Exhibit 2 illustrates that as the platforms round a curve and form an angle between their ends, the steering linkages connected to each adjacent sub-platform will rotate their links so as to force the axis of the truck to split this angle Thus, the truck axis always remains at right angles to the track. This reduces the angle of attack between flange and rail to essentially zero, thus reducing both curving forces and derailment tendency in curves.

The suspension shown in Exhibit 3 supports the end of one of the platforms in a straight forward vertical arrangement. The load path goes from the rail straight up through the rubber springs and into the car side sills which are beam members. The side sill then transmits load into the trailer tires or hitch. This can be compared with the 3-piece truck and center sill where load goes up to the bolster ends into the center plate, then back out, through the car body bolster.

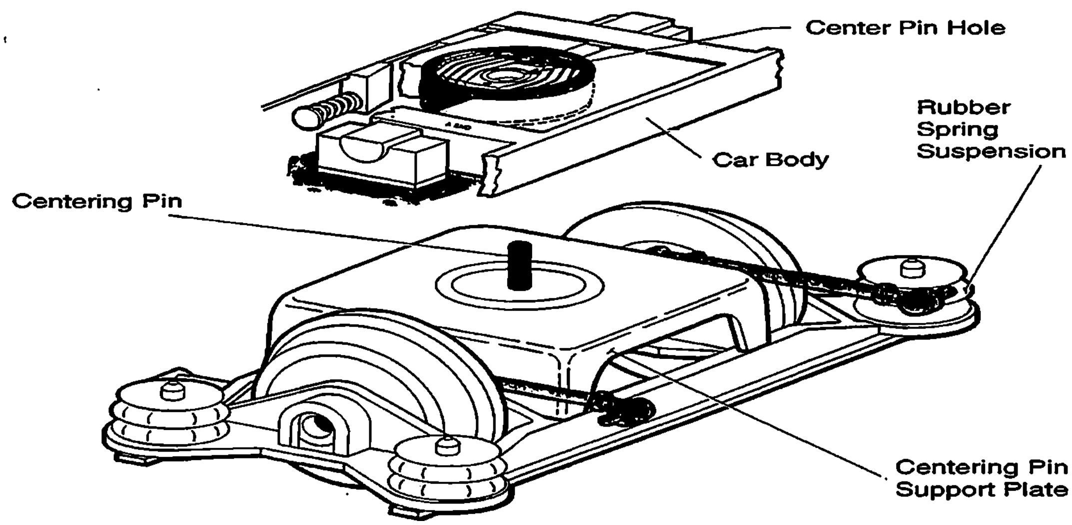


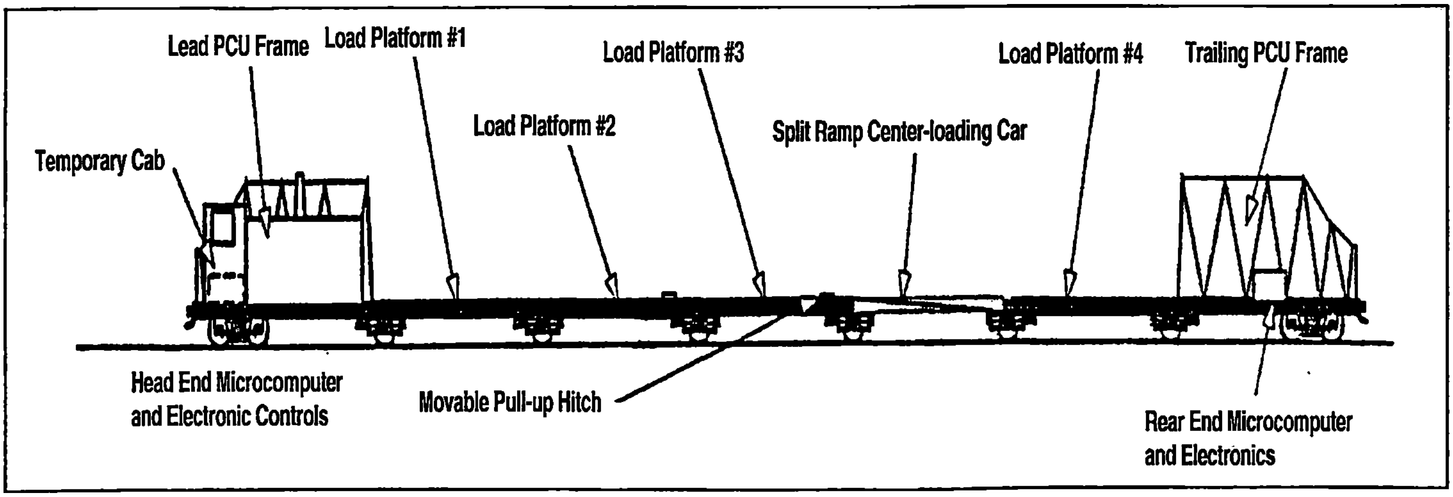
Exhibit 3. Schematic of Suspension Unit with Rubber Spring and Center Pin

As the truck swivels beneath this platform, the springs will slightly deflect. The 28-foot sub-platform length assures that even on the sharpest curves, this lateral spring deflection will be less than 2 inches. The springs have demonstrated the ability to accommodate this by test experience.

The second platform rests atop the first and the platforms are allowed to swivel to the left, right, and vertically by the trunnioned side bearings and the hemispherical centerplate, shown in Exhibit 3, but are prevented from rolling relative to one another. This stabilizes the entire train in roll and prevents destructive "rock-and-roll" action which can be a problem with high center of gravity equipment.

2.2 TEST EQUIPMENT

The test train, as shown in Exhibit 4, consists of seven pieces of equipment joined to form an articulated train. The first piece is a Power and Control (P&C or PCU) unit frame equipped with a temporary cab, two power pods and fuel tanks. But it lacks the finished shrouding required by design on the finished unit. This unit leads three load-carrying platforms which are followed by the articulated split ramp car. A fourth carrying platform follows the split ramp car, and the last unit in the consist is a second ballasted power and control unit frame with no cab, built up only to the point where it can serve as a suitable end-of-train buffer car.



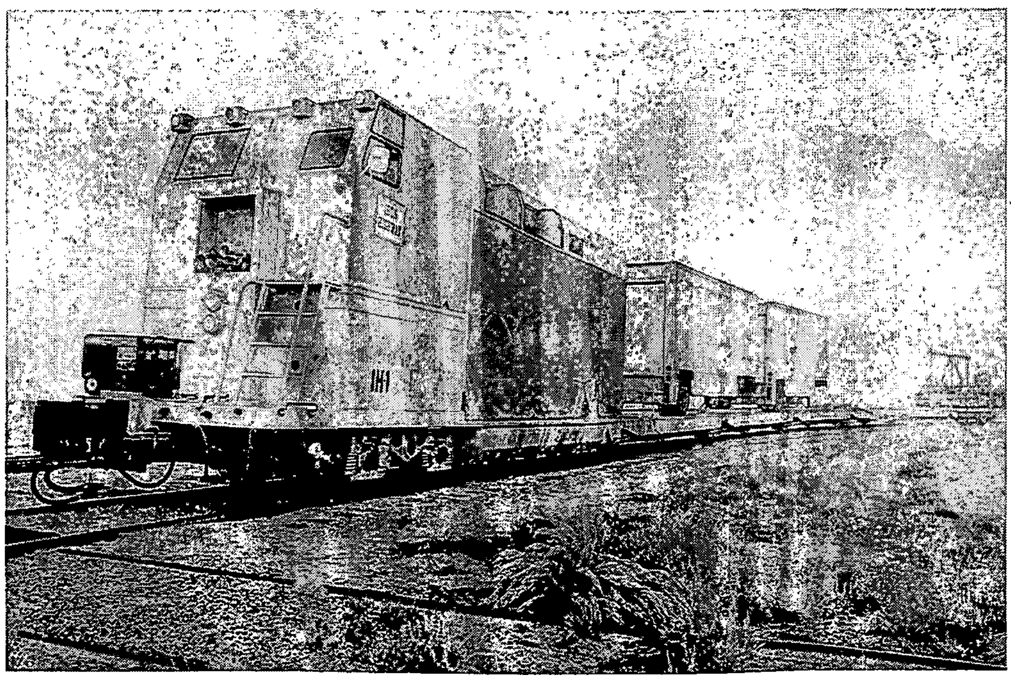


Exhibit 4. Photograph and Schematic of the Iron Highway Phase II Equipment during the Tests Conducted at TTC

The end units, each equipped with standard knuckle couplers and 1¼ inch brake hose, are arranged to permit towing by a conventional locomotive with full control of the brakes. The Iron Highway uses a graduated release brake system and is governed by passenger train handling rules rather than freight rules.

During operations where a conventional locomotive or test car is in the train with the test consist, the engineer in either the conventional locomotive or in the cab of the Iron Highway element is able to apply brakes at any time.

The lead truck under the lead P&C unit and the rear truck of the rear or dummy P&C unit were both originally two-axle freight trucks designed by Sambre-Meuse (SM). They were subsequently replaced by a GSI passenger-based design truck. The Sambre-Meuse truck is shown with an Instrumented Load Measuring Wheelset in Exhibit 4. The remainder of the suspensions are of the unique single-axle design described in Section 2.1.

The two-wheeled, single-axle trucks of the first three load carrying platforms are equipped with a differential gearbox driven through a cardan shaft driven from a car body mounted motor and transmission. Each of the transmissions is also equipped with a hydraulic retarder for use in dynamic braking. Control of transmission shifting is provided by the New York Air Brake trainlined microcomputer control system, programmed to include all interlocks and safety checks intended for inclusion in the final product. The second platform was equipped with two fixed hitches while the third load platform was equipped with a movable pull-up hitch to permit loading of different length trailers during testing.

In addition to the double convoluted elastomeric rubber spring, which has a load sensitive non-linear stiffness, at each of the articulated joints there were three different vertical dampers (refer to Exhibit 4):

- at suspension between rear end of PCU and lead end of the first Iron Highway load Platform No. 1, rotary hydraulic - 2 units

- at suspension between rear end of the first load Platform No. 1 and lead end of second load Platform No. 2, surface contact friction - 4 units

- at suspension between rear end of the second load Platform No. 2 and lead end of third load Platform No. 3, automotive hydraulic shocks - 4 units

- the automotive hydraulic shock absorber was also used at suspensions between rear end of load Platform No. 3 and lead end of split ramp car, rear end of split ramp car and lead end of load Platform No. 4

- the rotary damper was also used between the rear end of load Platform No. 4 and front end of the dummy trail PCU

3.0 TEST SEQUENCE

The following is the complete list of tests conducted to accomplish the goals of the Phase II test program:

- Squeeze test
- Split ramp car static load tests
- Preliminary tracking (safety) tests
- Control system tests
- Power system tests
- Brake/adhesion/retardation tests
- Split ramp car functional tests
- Train dynamics tests

The train dynamics tests were conducted to evaluate the ride performance and where possible (load measuring wheelsets) the safety aspects of the prototype equipment. The train dynamics tests included the following:

- Hunting tests from 30 to 75 mph

- Twist/roll tests from 10 to 55 mph
- Bounce/pitch tests from 30 to 60 mph
- Yaw/sway tests from 30 to 62 mph
- Constant curving tests at 15, 24 and 32 mph
- Spiral negotiation tests at 16 and 27 mph
- Dynamic curving tests from 10 to 32 mph

These tests were conducted in three configurations:

Configuration No. 1 - platforms empty

Configuration No. 2 - 53-foot trailer weighing 60 kips loaded using hitch No. 2 on load Platform No. 2, trailer wheels towards PCU on load Platform No. 1.

Configuration No. 3 - 20-foot container on chassis weighing 68 kips using hitch No. 1 on load Platform No. 2, trailer wheels towards PCU on load Platform No. 1 and 40-foot trailer weighing 65 kips using movable hitch on load Platform No. 3, trailer wheels over articulation between load Platform Nos. 2 and 3.

The train dynamics tests for all three configurations were conducted by towing the test equipment with a conventional locomotive in order to evaluate the ride performance up to 70 mph.

Each track section on which the above tests were conducted is briefly discussed.

Hunting or High Speed Stability

The track section comprises a 5000-foot tangent maintained to FRA Class 5 or better.

Twist/Roll

The track section consists of ten (10) 39-foot staggered rail sections with a crosslevel of 0.75 inch.

Bounce/Pitch

The track section consists of ten (10) 39-foot parallel jointed rail sections with a vertical profile of 0.75 inch.

Yaw/Sway

The track section consists of five (5) 39-foot rail sections with a misalignment of 1.25 inches.

Constant Curving

The track section consists of 7.5, 10 and 12-degree curves.

Spiral Negotiation

The track section consists of a spiral to a 10-degree curve. The superelevation changes 1 inch in every 17.7 feet up to 4.5 inches.

Dynamic Curving

The track section consists of five (5) 39-foot rail sections which have a combined cross-level of 0.5 inch combined with a gage deviation of 1.0 inch at each high rail joint.

In order to qualify the Iron Highway test consist as safe for manned operations at TTC, it was towed by a conventional locomotive through the rock and roll, vertical bounce, high speed stability, bunched spiral and dynamic curving test sections. In addition, the set of data from the preliminary tests sufficed to provide ride performance data for Configuration No. 1 - empty (platforms without any trailer loads) train dynamics tests.

The results of the preliminary tests conducted with the Sambre-Meuse trucks under the lead end of the P&C unit showed undesirable passenger ride quality. The proponent (NYAB) elected to change the truck to a design based on a modified passenger truck manufactured by GSI. Configuration Nos. 2 and 3 (the remainder of the tests) were conducted using the GSI trucks under the P&C unit. Since the performance of the empty platforms was not affected by the response of the P&C unit, the results from the preliminary tests are presented as ride performance data for the consist in the empty Configuration No. 1 under the section on train dynamics tests. Data for the ride performance of the P&C unit with the GSI truck is provided along with data from Configuration Nos. 2 and 3.

The control and braking system tests were planned to be conducted with the consists powered by the P&C unit. Problems with the differential gear box prevented the conduct of high speed runs under P&C unit power.

4.0 MEASUREMENTS

Response of the P&C unit as well as load platforms and split ramp car in terms of selected accelerations, displacements and roll degrees were measured. In addition, the lead axle of the lead truck under the P&C unit was replaced with an instrumented wheelset to measure wheel rail forces during Configuration No. 1 tests only. The remainder of the suspensions in the consist were of a single-axle, independently rotating wheel design. A lack of availability of instrumented load measuring wheelsets matching such a design pre-empted any other dynamic wheel/rail forces from being measured. Rail strain gaged wheel/rail forces measured in the spiral and the main body of a 12-degree curve.

A list of the data channels and identification labels used in presenting the results and plots are as follows:

AILC-P&C FR. TR.	Lateral Accel., P&C body over front truck
I1LC-P&C RR. TR.	Lateral Accel., P&C body over rear truck
I2LC-PFORM No. 1	Lateral Accel., Platform No. 1 body, trail end
I3LC-PFORM No. 2	Lateral Accel., Platform No. 2 body, trail end
I4LC-PFORM No. 3	Lateral Accel., Platform No. 3 body, trail end
LD. AUTORACK	Lateral Accel., Loaded-Trilevel body over truck
WHEEL L/V LEFT	Sambre-Meuse lead axle, left wheel L/V
WHEEL L/V RIGHT	Sambre-Meuse lead axle, right wheel L/V
AXLE SUM L/V	Sambre-Meuse lead axle, left & right sum L/V
ROLL-P&C UNIT	P&C body roll, rear end
I2VS-PFORM No. 1	Vertical Accel., Platform No. 1 body, trail end

I3VS-PFORM No. 2	Vertical Accel., Platform No. 2 body, trail end
I4VS-PFORM No. 3	Vertical Accel., Platform No. 3 body, trail end
R2VC-SPLTRAMP	Vertical Accel., Spilt Ramp body, top ramp
I2VL-PFORM No. 1	Vertical Disp., Platform No. 1, left trail spring
I3VL-PFORM No. 2	Vertical Disp., Platform No. 2, left trail spring
N1VL-PFORM No. 3	Vertical Disp., Platform No. 3, left trail spring

Appendix A has a full complement of schematics for each of the seven (7) units in the consist detailing each transducer and measurement type recorded during the tests. During the structural tests, a set of strain gage measurements were made, the details of which are also presented in schematic form in Appendix A.

A total of five (5) video cameras were located to view and record the wheel/rail interface and overall motions of the consist. Please refer to Appendix A for exact locations.

5.0 TEST RESULTS

5.1 SQUEEZE TESTS

The seven (7) unit consist was assembled and squeezed (buff forces) on tangent track as well as on a 10-degree curve. Maximum buff forces of 302 kips and 206 kips were imparted in the tangent and curve tests respectively, and strain measurements were tabulated. The in-train forces for a typical Iron Highway element and two P&C units with 30 to 35 loaded (20 trailers, 65,000 lb each) platforms in between, have been estimated by NYAB to be approximately 200 kips. The prototype equipment was designed for buff and draft loads of approximately 200 kips. Buff loads of 200 kips did not show any major concerns except in the area where the P&C unit couples to the first load platform. It was decided to increase the buff load past the 200 kip test limit to get an estimate of the maximum buff load the equipment could withstand without failure. Exhibits 5 and 6 show the maximum strains measured at the highest loads of 302 kip in tangent and 206 kip in the 10-degree curve. The exhibits show the maximum values, positive values for tensile strain, and negative values for compressive strain for each of the strain gages applied to the individual units in the consist.

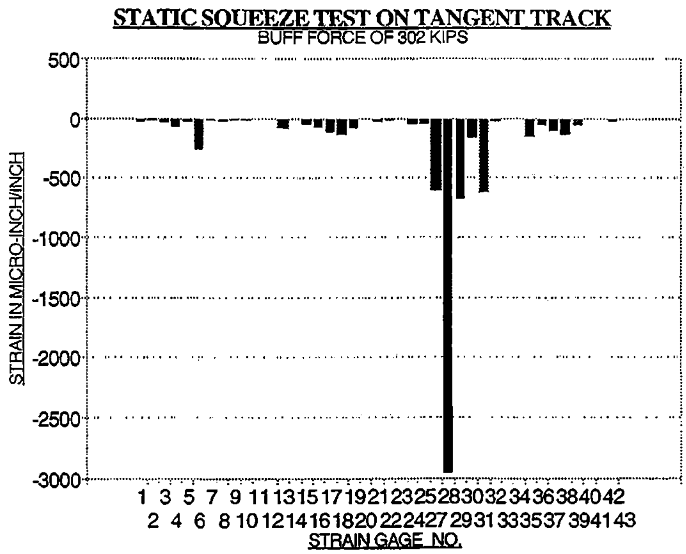


Exhibit 5. Squeeze Test of 7-Unit Consist on Tangent Track

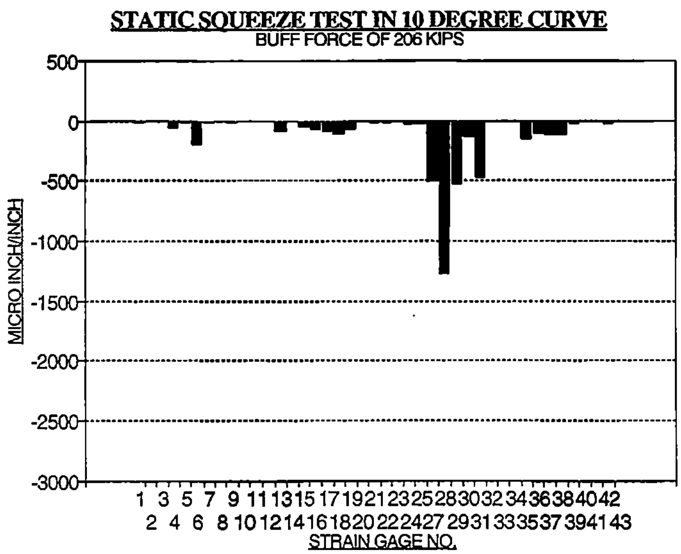


Exhibit 6. Squeeze Test of 7-Unit Consist on 10-Degree Curve

The strain gage number, a total of 43, refers to various locations as shown in the schematics in Appendix A. The strain gage numbers 28 to 31, all in the area of coupling between the P&C unit and the first load platform, registered high compressive strains during the squeeze tests. Gage number 28 showed a strain value of 2900 micro-inch/inch at an overload of 302 kips. It should be noted that the structural design limits for the equipment were 200 kips. At 206 kips, gage number 28 measured 1250 micro-inch/inch.

Transportation Technology Center

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Keith L. Hawthorne
Senior Assistant Vice President
Research & Test Department

January 26, 1996
TTDS/96-121/KLH

Car Engineering Committee
Car Performance Sub-Committee

Gentlemen:

Enclosed is a copy of AAR report R-888, "Iron Highway - Phase II Evaluation." This document is the final report in a long series of reports issued by the AAR's Research and Test Department under the High Productivity Integral Train (HPIT) Program, initiated in the mid 1980's. The HPIT program, through its history, has initiated and influenced several innovative car designs like the Articulated Hopper car, Lopac II, which was the precursor to the double stack cars, among others.

The Iron Highway system evaluated under this particular phase of HPIT was the only new and unique "Integral System" proposed under the program. The successful completion of this effort provides valuable information as to its viability. The system as proposed did not lend itself to a complete evaluation because of problems with the Power and Control System. Evaluated for ride performance, the load bearing platforms showed improvements over conventional ride performance. The center-of-train split ramp car which is used for loading and unloading without the use of yard facilities was tested and determined to be functional and reliable. Unique features like the onboard brake system detection and bearing temperature sensors also proved to be functional.

The Iron Highway is currently undergoing extensive checkout tests by the owners before being put into revenue service.

Sincerely,

Keith L. Hawthorne
Senior Assistant Vice President

KLH/mhj
Enc.

Task Order 7
DTFR 53-86-C-00011

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The NYAB plans to take corrective action to alleviate the high strains measured in the coupling area by designing additional buff/draft plate stiffeners in the coupling area. In addition NYAB plans to change the material of the housing center pivot from AAR M201 Grade B - 38,000 PSI yield to AAR Grade C - 60,000 PSI yield. With the addition of a stiffener plate and change in the grade of material, it is estimated that the longitudinal buff/draft load capability will be increased to 500 kips.

5.2 SPLIT RAMP CAR STATIC LOADING TESTS

The split ramp car was tested for structural adequacy by loading and unloading a 20-foot container on chassis (gross wt. 68,000 lbs) and a 45-foot refrigerated trailer (gross wt. 65,000 lbs) several times while measuring strain values. No strain values of concern were noted, all being under 500 micro-inch/inch. Exhibits 7 and 8 show strain gage numbers and maximum values measured, tensile and compressive, during the loading tests. Strain gage numbers 1 to 15 are on the first load platform and numbers 44 to 60 are on the split ramp car (refer to Exhibits in Appendix A for detail locations of the strain gage numbers).

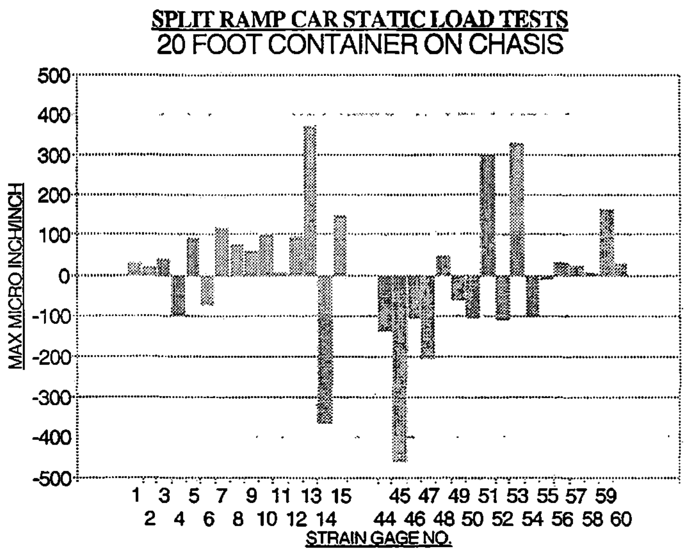


Exhibit 7. Split Ramp Car Loading Test with 20-Foot Container on Chassis

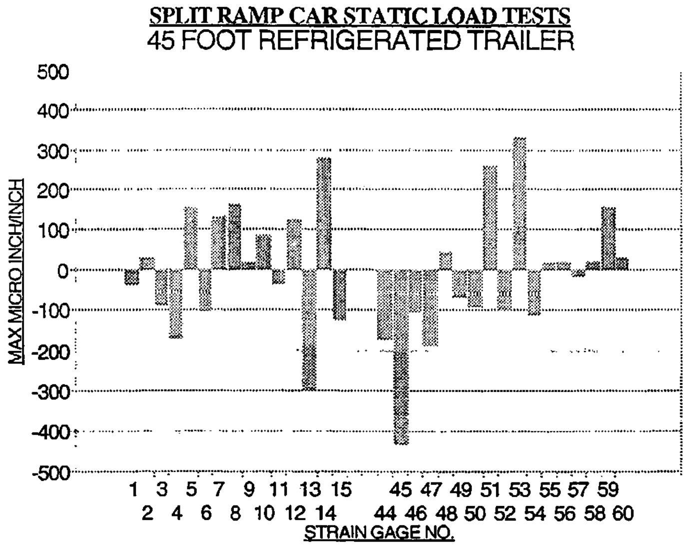


Exhibit 8. Split Ramp Car Loading Test with 45-Foot Refrigerated Trailer

5.3 CONTROL SYSTEMS TESTS

The purpose of these tests is to verify that the computer-based multiplex control and safety reporting system operates reliably and effectively and provides a level of safety equal to or better than that obtainable with existing standard systems. The Iron Highway control system is based on the use of a pair of Control Traction Computers (CTC) located at either end of an element on a P&C unit. These two microcomputers communicate with each other via modem at 9600 bps and communicate as well with sub-computers which in turn govern:

- communication of commands from the operator
- transmission shifting and direction control
- engine throttle operation
- total train journal bearing and air brake inspection
- control of air brakes and auxiliaries

The test consist included one CTC and air brake interface on each end. From the brake system's standpoint, this allowed checking that the control of the microcomputer and air brake interface panel does not produce any unsafe or undesirable interaction with the lead unit. The rear microcomputer provided output to and received other signals from a "dummy" interface so that its response to all Motive Power Unit commands could be observed.

This set-up permitted proper operation of the control and train inspection system which depends on communication between the two computers. All commands and indications normally expected between head and rear were produced or simulated, and any failures noted. The inspection system was operative and was checking the conditions of brakes applied, brakes released and journal bearing temperature and temperature changes.

The control system tests were run as follows:

a. Call for "start all engines" on start-up screen and observe that after cranking and achieving engine start on one engine, the process is repeated on the second. During this period, the "engine start in progress" screen should be displayed on the operator's console.

Note that after the engines are both on line and synchronized, the line voltage is reduced automatically and the drive motors are started sequentially with the transmissions in neutral. With engines started and drive motors on line, the operator's screen should change to the running screen, which permits either operating the unit or running a brake test.

b. Select initial terminal brake test on the control screen. Note that it properly reports the test events as they occur during the automatically operated leakage test, leakage and go or no-go condition for brake pipe, and that brakes apply and release at every car in the train as required by law for initial terminal brake inspection.

c. Release parking brakes when ready (still in test mode). The microcomputer should report on the screen that brake pipe pressure is full (90 psi), on head and rear, and that all individual car brakes have released and there is no hot journal problem requiring attention.

d. Request "equipment status report" and see that the system properly reports on the screen the condition of lead and trailing unit engines including water temperatures, oil temperatures, fuel load, fuel filter condition, oil filter condition, engine RPM, traction alternator amperes, traction motor temperature voltage and current.

e. Artificially cause a hot journal alarm condition on a trailing axle by heating the thermistor element and note that the system reports the condition. Then clear the condition and note that the system clears itself but stores a record.

f. Open the brake pipe by disconnecting the glad handle angle cock on the trailing unit and assure that an emergency brake application occurs on the entire train with proper brake pipe cut-off and proper screen display on the lead unit.

g. Place the reverser control handle in "forward" and observe physically that all transmissions respond properly and that screen display reflects this. Then return reverser to neutral, noting that individual transmissions go to neutral, but direction does not change at the reverse box actuator. Finally, repeat as above between reverse and neutral, noting again that reverse box actuator position is correct.

h. With reverser handle in neutral, advance throttle to fourth notch, note (from instrumentation) that rack actuator does not move beyond ½ fuel position, that engine speeds up to full 1800 rpm, and that the overspeed governor then backs off the fuel rack to a position which will maintain 1800 rpm at this no-load condition. (Note that engine speed may pick up before ½ travel is reached.)

i. Manually advance layshaft to cause engine speed increase to 1950 rpm. Note that fuel cut-off operates, engine stops and the condition is properly reported on the operator's screen.

5.3.1 Test Observations

The observations for steps a. through i. are as follows:

a. The two engines started as expected and the screens activated. The start-up time may be longer than expected in cold weather, since the water temperature in Engine No. 1 must reach 83 degrees F before Engine No. 2 will start.

b. The parking brake must be off for the brake tests. The computer successfully checked each car internally and reported any sticking brake or leaks. This brake test was also performed prior to testing each day and occasionally found a sticking brake in the test consist, which was corrected by applying and releasing the brakes.

c. The operator must change screens to confirm that the brakes are released on each car and that there are no bearing temperature problems.

d. The oil temperature did not show up on the "equipment status report", and only the traction motor currents were displayed. (These are software modifications which can be implemented if necessary.)

e. The bearing temperature sensor was removed and artificially heated with a heat gun to 277 degrees F. The hot bearing was successfully reported, but the screen did not refresh after the temperature was back down in the normal range. The system did not store a record of the hot bearing.

f. The train successfully went into emergency when the glad handle angle cock was opened. The brakes were set at all locations in the train and the brake pipe was cut off.

g. During this phase of the control tests when the power switch on the console was set to neutral, the reverser boxes went to neutral. The reverser box should have stayed in gear.

h. The engine governor was set to 2100 RPM. At idle, the rack was at 5.04 mm out of 12 mm. When the throttle was advanced to the middle position (T-50) the rack peaked at 6.5 mm and then fluctuated between 3.5 and 5.5 mm.

i. Manually advancing the layshaft was not attempted at the request of NYAB personnel. It was felt that this test could not be performed without putting the alternators at risk.

The above sequence of tests evaluated the control and indication system of the mini-consist.

5.4 POWER SYSTEMS TESTS

The purpose of these tests is to prove the ability of the power system to operate reliably under full traction and braking loads and of the train to maintain safe tracking under maximum longitudinal loads.

a. Preparatory/Checkout Tests

After a successful brake test, as described under Section 5.3 (b and c) above, the reverser handle was placed in forward and the single handle master controller moved to the first propulsion notch. The train moved forward with its speed maintained at a walk by manipulating the master controller handle between idle and Notch 1. The train was pulled past an inspection crew to make sure that all instrumentation, cabling, and parts of the train were clearing track and structures and that the rolling stock itself was functioning properly. When this pull-by inspection had been completed in the forward direction, the single handle master controller was moved to the first braking position and the train was brought to a halt. The reverser then was placed in reverse and the pull-by inspection was repeated for the opposite direction of train motion. This was completed successfully and power system testing was initiated.

b. Light Train Test

The first power system test was conducted to assure that the empty train operated properly over its entire speed range (up to 70 mph) and that transmission synchronization was properly handled.

Accordingly, the train was taken to the Railroad Test Track (RTT) and operated at progressively increasing speeds with the traction system performance noted through its normal range of speeds at this empty condition.

A maximum speed of 63 mph was reached with the light train, falling short of the target 70 mph. The test results suggest that the power requirements will need to be increased to achieve a balance speed of 70 mph on tangent and level track. In addition, the differential gear box components experienced several failures during the power system tests.

Due to the re-occurring problems with the gear box, a full-load power system test was not conducted, as per the advice of the NYAB personnel. The only occasion that the consist was moved under its own power while the platforms were loaded (Configuration No. 3) was to attempt to conduct the braking (stop/distance) tests. A top speed of 48 mph was achieved before the braking tests were abandoned.

The following observations can be made from the limited tests conducted. Train speed with the unloaded consist powered at 4.8 hp per ton (lower than the design estimate of 5.18 hp per ton for a light 20-trailer element) seemed to balance at 63 mph on straight and level track. A loaded prototype powered at 1.78 hp per ton (lower than the design estimate of 3.0 hp per ton for a full element with 20 trailers at 65,000 lb each on each platform) balanced at 48 mph. Design balance speed for the final element is predicted by NYAB as between 60 and 70 mph.

5.5 BRAKE, ADHESION AND RETARDATION TESTS

5.5.1 Friction Brake Test

The objective of these brake tests were:

- to verify the design net brake ratio for the Iron Highway and show that under extreme conditions the wheel-rail adhesion is sufficient to support the retarding forces generated from braking

- to determine actual stop distance capability of the friction brake system, and

- to determine the effectiveness of the blended (friction and hydro-dynamic) braking system.

Prior to any "on-track" braking tests, a static brake shoe force test was conducted by NYAB at their facility to determine the net shoe forces under various truck load conditions. The shoe forces were recorded at several increments of brake pipe reduction for each of two truck weights (light and loaded). The results of these tests partially satisfied the objectives stated in 5.5.1 a). The brake system on the test consist was equipped with a prototype variable load valve design. This design has not been field tested. The NYAB plans to install their model EL-50 or EL-60, which are 50 and 60 percent empty/load ratio valves on their first full element in the future. The variable load valve, which can provide a continuously varying braking ratio depending on the actual wheel load, will be evaluated further and may be introduced at a later date. Characteristics of the variable load, EL-50 and EL-60 valves are provided in Appendix B, along with a plot of the static shoe force measurements taken at the NYAB facility before commencing the tests at the TTC.

To fulfill objectives stated in 5.5.1 (b) and (c) the following tests were conducted:

On clean dry rail, the consist was accelerated to speeds between 30 and 63 mph and various brake applications initiated. After the train came to a halt, the distance that it traveled from a fixed point, noted with an automatic location detector, was recorded.

Data from the test were:

Speed (distance)
Brake Pipe Pressure
Brake Cylinder Pressure
Main Reservoir Pipe Pressure

Although the power systems and braking tests could not be successfully completed for the entire speed and load (trailing tonnage, light and loaded configurations) range as planned, it was mutually agreed by AAR, FRA and NYAB to report the findings of the partial set of tests conducted. NYAB plans to make modifications and test the system and document its performance in the Power and Braking regimes in 1995. Results from the braking tests conducted are presented in Table 1.

Table 1. Stop Distances in Feet for Various Brake Applications.

Speed	Blended	Full Serv	Emergency	Loaded (L)
30	791	807	737	E
60	2994	3285	3175	E
30	935	1004	899	L
48	2658	2657	2702	L

The braking system, including the hydro-dynamic retarder used during blended braking, performed as designed. The empty consist stop distance from 63 mph was the least for the blended full service compared to emergency and full service. The loaded consist stop distance from 48 mph was the same for the blended and full service applications. The stop distance for the emergency required 44 feet more for the loaded case from 48 mph.

The remainder of the brake tests, which were planned but could not be performed are described in Sections 5.5.2 and 5.5.3.

5.5.2 Dynamic Brake Test

Design of the train includes the use of a hydro-dynamic retarder feature of the standard transmission. As energy dissipation is limited by cooling capacity to approximately 150 hp per powered axle, the retarding force available must be controlled by fluid temperature.

For this test, Configuration No. 3 was to be used so as to bring the wheel load on the powered axles above 10,000 lbs. The consist was to be towed by a conventional locomotive with dynamometer coupler and brought up to a speed of between 25 and 30 mph. The retarders were then to be actuated to full capacity and the retarding force measured by the dynamometer coupler.

Even though these specific tests were not conducted, the functionality of the hydro-dynamic retarder was tested as part of the Friction Brake Tests.

5.5.3 Wheel/Rail Adhesion

The consist was to be accelerated to 40 mph on wet rail and brakes applied in emergency. After stopping, the wheels were to be inspected for signs of sliding, the consist moved approximately ¼ of a wheel revolution, and inspected a second time.

5.6 SPLIT RAMP CAR FUNCTIONAL TESTS

The sequence of tests included starting with the consist in the empty configuration spotted at a crossing/ramp. The ramp was specially graded at a selected location at the TTC to represent a revenue service condition where full-yard terminal facilities are not available. Full separation of the consist using pendant controls was demonstrated and the part of the consist designated as the moving end was operated under its own power. This was followed by a re-coupling operation. These tests were conducted with the consist in the empty and loaded (Configuration No. 3) configurations. Initially, some difficulty was encountered in splitting the consist in the loaded conditions because the consist went into emergency braking when the pendant controller was plugged into the electric receptacle. Successful software modifications were made by NYAB personnel to the Train Computer Control program and the tests were conducted without any further problems. Video recordings of the entire tests were retained as data.

5.7 TRAIN DYNAMICS TESTS

The purpose of these tests was to verify that train dynamics with loaded and empty trailers of different lengths would assure safe and reliable operation on the railways of North America. This test sequence also verified that the center loading split ramp car tracks properly and that its components are safe, effective and usable.

The consist was loaded in various configurations according to Table 2. These load cases include the variables of trailer length, kingpin to bogie length, trailer type and trailer C.G. height.

Table 2. Test Configurations for Train Dynamic Track Tests

Load Case	Hitch No. 1	Hitch No. 2	Track Section
1	Empty	Empty	All
2	53 ft Loaded 65,000 lbs	Empty	Ptt + Dc
3	20 ft Container On Chassis 68,000 lbs	40 ft Trailer 65,000 lbs	Ptt + Wrm

NOTE:
- *Railroad Test Track (RTT) for Hunting*
- *Precision Test Track (PTT) for Twist/Roll, Bounce/Pitch and Yaw/Sway*
- *Wheel Rail Mechanism (WRM) Loop for Constant Curving, Spiral Negotiation and Dynamic Curving (DC)*

Results from the tests conducted are presented separately for Configuration Nos. 1, 2 and 3.

Table 3 provides the axle weights for the three (3) configurations tested. Test data was reduced to obtain plots of car body and/or suspension response, in terms of acceleration, displacement and roll degrees as appropriate, versus speed. Using instrumented wheelsets, wheel/rail forces were recorded only during tests for Configuration No. 1. Plots of the vertical wheel load, wheel lateral-to-vertical load ratio (L/V) and axle sum wheel L/V versus speed are presented. In addition, the low and high rails were strain gaged in a 12-degree spiral and the main body of the 12-degree curve. Results from these are presented as Appendix C.

As a means of providing a comparison with typical 3-piece truck equipment when available, equivalent data for a tri-level autorack and a 5-platform articulated 70-ton spine car, is presented along with the Iron Highway load platform data. Also, as comparison, data for a conventional locomotive is presented along with the Iron Highway P&C unit data.

Table 3. Iron Highway Phase II Test Consist Axle Loads

Unit	Config No. 1 Empty 1bs.	Config No. 2 53' Trailer 1bs.	Config No. 3 20' Container on Chasis +40' Trailer 1bs.
Lead PCU (GSI Truck)	79,200	77,800	77,150
IH1 Axle	54,150	79,950	68,850
IH2 Axle	30,200	48,300	74,300
IH3 Axle	28,500	44,050	80,700
IH4 Axle	26,000	25,950	42,950
IH5 Axle	25,300	25,100	25,250
IH6 Axle	55,850	55,000	55,100
Trail PCU (GSI Truck)	68,150	68,050	68,200

5.7.1 Configuration No.1 Test Results

The test results from the preliminary tracking tests were used to analyze and draw conclusions regarding the ride performance of the unloaded platforms.

5.7.1.1 Lateral Stability

Exhibits 9 and 10 show the accelerations measured, peak-to-peak and standard deviation, during the lateral instability or hunting tests. The plots show the lateral accelerations measured during test runs between 30 and 75 mph on a 5000-foot tangent Class 6 track. Results show that the accelerations at the P&C unit are higher than those measured at the load platforms.

The results also clearly show the superior ride performance of any of the Iron Highway units compared to the loaded autorack (lateral instability of the autorack may degrade further in the empty configuration). The accelerations measured on the P&C unit over its lead truck, maximum of 0.9 g, may lead to some concerns regarding discomfort to the locomotive engineer. It should be noted that the lead P&C truck is the only two-axle truck suspension (based on a Sambre-Meuse freight truck design) in the consist. The remainder of the suspensions are of the single-axle design described in the section titled Suspension System earlier in this document.

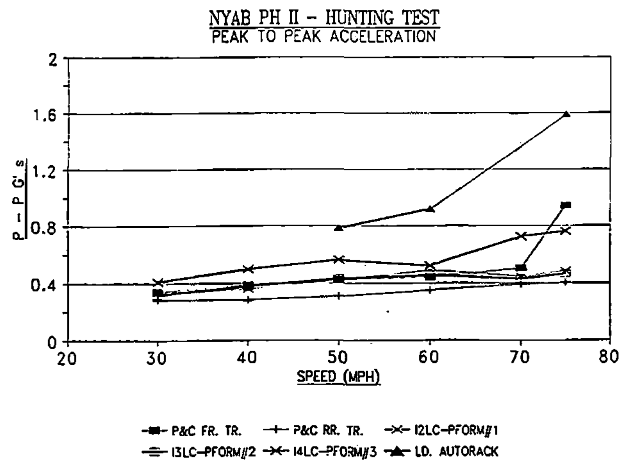


Exhibit 9. Hunting Tests - Lateral Car Body Accelerations

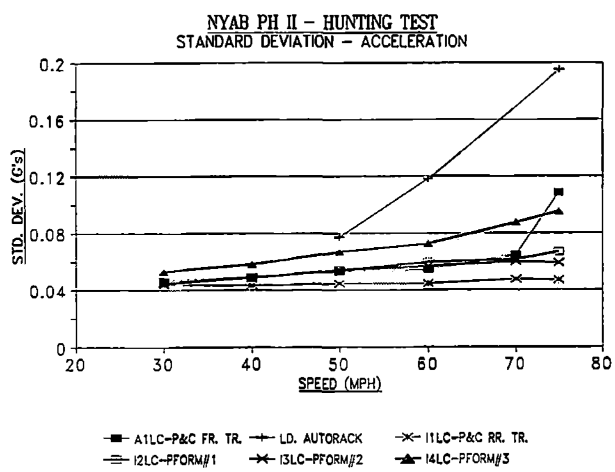


Exhibit 10. Hunting Tests - Standard Deviation of Accelerations

The derailment safety aspects of the suspensions were measured to be well within allowable AAR criteria of 0.26 standard deviation and axle sum L/V of 1.5. The maximum standard deviation measured at 75 mph was 0.18 and the corresponding axle sum L/V ratio was 0.75 (Exhibit 11).

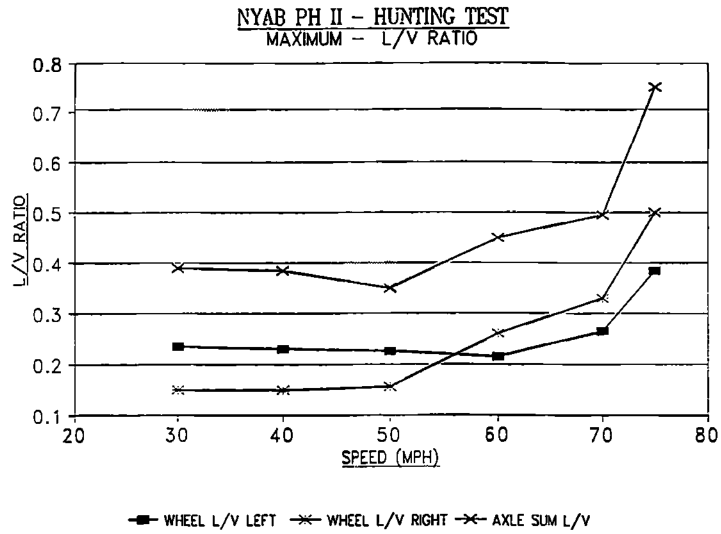


Exhibit 11. Hunting Tests - Wheel/Rail Forces, L/V Ratios

5.7.1.2 Twist/Roll

Exhibit 12 shows the degree of roll the P&C unit experienced while negotiating a section of track with a known crosslevel of 0.75 inch for ten (10) 39-foot staggered rail sections. The tests were conducted for speeds from 10 to 55 mph. The maximum roll angle measured was under 2 degrees peak-to-peak. In addition, the minimum vertical wheel load measured was 60 percent of the static vertical wheel load, against the AAR criteria of 10 percent. The roll phenomenon is usually more severe for a loaded configuration, so test data for the loaded platform response in addition to the P&C unit roll response is covered in later sections.

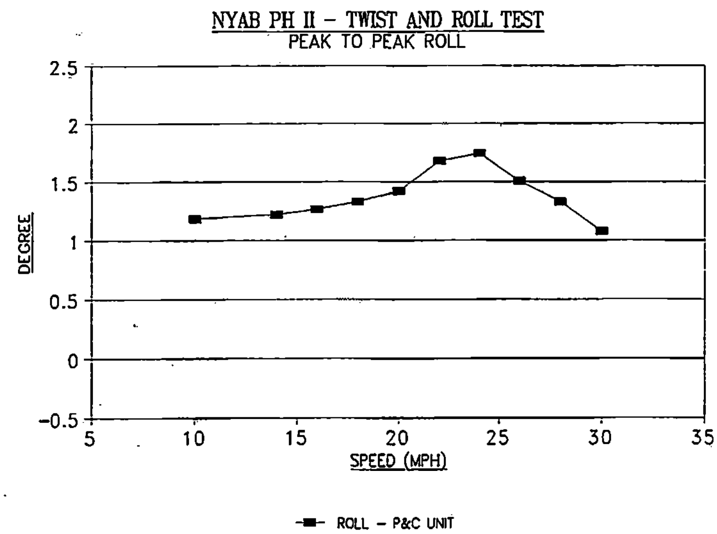


Exhibit 12. Twist/Roll Tests - Power and Control Unit Roll

5.7.1.3 Bounce/Pitch

Response was measured while negotiating ten (10) 39-foot parallel jointed rail sections with a vertical profile of 0.75 inch. The speed range tested was from 30 to 60 mph. The tests were discontinued at 60 mph due to concerns over the high vertical accelerations measured at the lead end of the P&C unit. Initial examination of the data showed higher than 1.0 g accelerations at each of the three load platforms, as illustrated in Exhibit 13. The associated displacement transducers showed no indications of the high accelerations measured (Exhibit 14). A frequency domain analysis of the accelerations showed peaks between 8 and 15 Hz. These frequencies are definitely above any rigid body bounce or pitch response frequency of approximately 2 to 4 Hz. The higher frequencies must be associated with local structural response, especially when the platforms are empty and the suspension is comparatively stiff. To extract the response associated with the rigid body bounce or pitch mode, the data was low-pass filtered at 5 Hz and the results are shown in Exhibit 15.

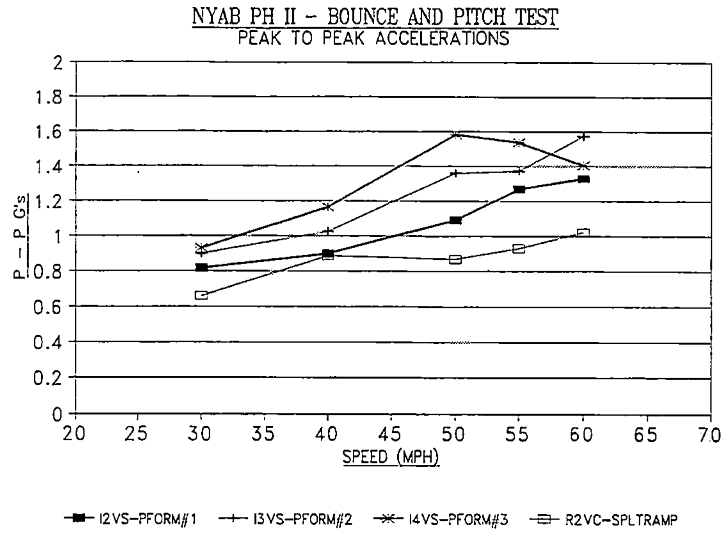


Exhibit 13. Bounce/Pitch Tests - Vertical Accelerations Filtered at 30 Hz

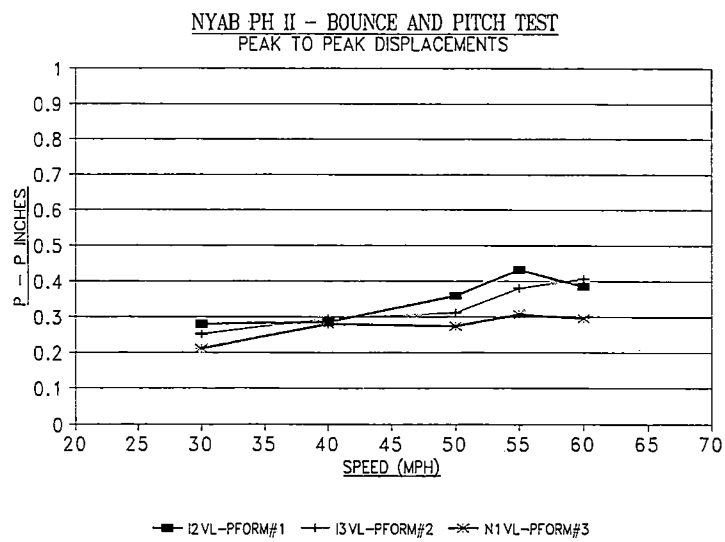


Exhibit 14. Bounce/Pitch Tests - Displacement Across Suspension

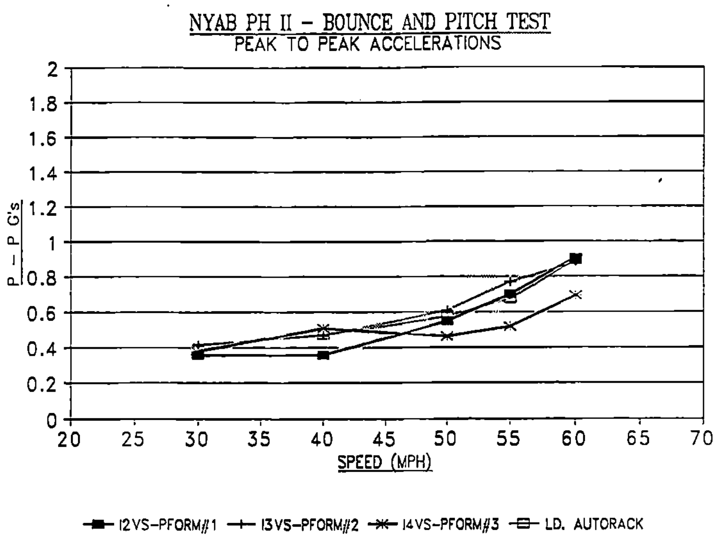


Exhibit 15. Bounce/Pitch Tests - Vertical Acceleration Filtered at 5 Hz

Unfortunately no vertical transducers measured the car body response at the lead end of the P&C unit. An accelerometer was mounted inside of the panel of the Control and Traction Computer (CTC). The CTC panel response is not a good reference to evaluate the car body response because there was indication of equipment being jostled loose during the 60 mph test run. Prior to completing testing on the 60 mph run, the data acquisition equipment (mounted in the cab of the P&C unit) failed as a result of a rough ride, and high vertical wheel loads (43 kips for a static wheel load of 19 kips) were measured.

The inferior vertical ride performance of the lead truck under the P&C unit has influenced the NYAB to replace it with a passenger-based truck design. It should be noted that at no time did the wheel/rail forces indicate any derailment safety concerns. The minimum wheel unloading measured was 50 percent of static vertical load up to 60 mph. The load platforms, on the other hand, responded well when compared to conventional equipment.

5.7.1.4 Yaw/Sway

Exhibit 16 shows the accelerations measured while negotiating five (5) 39-foot rail sections with a misalignment of 1.25 inches. Data for a loaded autorack is presented for comparison. Again the lead truck of the P&C unit exhibited high lateral accelerations. This just adds to any justification required to replace the truck in order to provide adequate human comfort. From a derailment safety aspect the truck was again quite adequate.

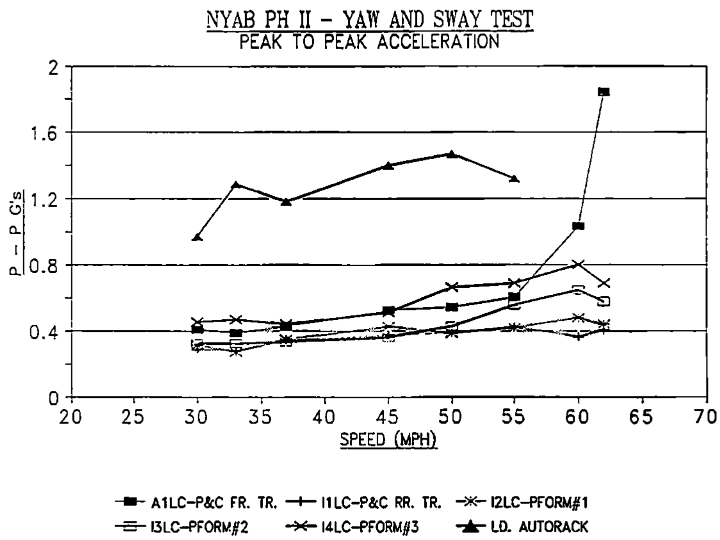


Exhibit 16. Yaw/Sway Tests - Lateral Accelerations

The maximum wheel and axle sum L/V ratios were 0.62 and 0.87 respectively, and the corresponding allowable AAR criteria were 1.0 and 1.5. The maximum truck side L/V measured was 0.48 with an allowable AAR criteria of 0.6.

5.7.1.5 Dynamic Curving

Exhibit 17 shows the P&C roll angle measured while negotiating five (5) 39-foot rail sections which have a combined cross-level of 0.5 inch and a gage deviation of 1.0 inch at each high rail joint. The maximum single wheel and axle sum L/V ratios measured were 0.8 and 1.3 respectively. The minimum vertical load measured corresponded to 47 percent of static vertical wheel load.

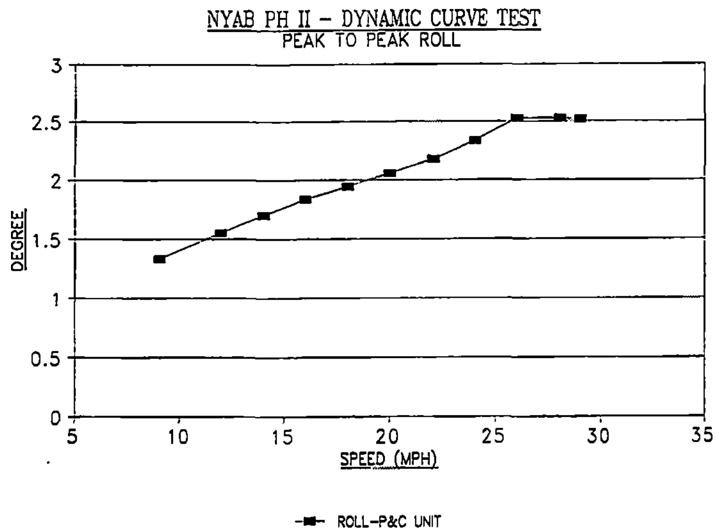


Exhibit 17. Dynamic Curving Tests - Power and Control Unit Roll

5.7.1.6 Constant Curving and Spiral Negotiation

Accelerations measured during the tests are not very meaningful in assessing the ride performance. Therefore wheel/rail forces are provided as a means of assessing the performance associated with safety.

During the constant curving runs, the maximum axle sum L/V ratios measured were 1.39 in a 10-degree curve and 1.43 in a 12-degree curve.

Spiral negotiation tests were conducted while entering and exiting a 10-degree curve. The spiral results provided maximum wheel and axle sum values of 0.6 and 1.1 respectively. Minimum wheel load was 51 percent of static wheel load.

5.7.2 Configuration No. 2 - Test Results

5.7.2.1 Lateral Stability

The P&C unit suspension, as mentioned earlier, exhibited poor human ride quality during Configuration No. 1 (Iron Highway platforms empty) high speed test runs. The NYAB elected to provide an improved suspension system, based on a modified passenger truck design manufactured by GSI. Configuration Nos. 2 and 3 used the new truck under the P&C units, lead and rear. High speed stability tests were repeated with the new P&C suspension and the load platforms in the empty condition to evaluate the entire system. Exhibits 18 and 19 show the standard deviations of the acceleration time history collected through the 5000-foot tangent. The standard deviations are provided, instead of the root mean square values, to avoid any errors caused by DC drift of the accelerometers during the tests. The AAR car certification safety criteria requires a car body acceleration standard deviation value of 0.26 g. For sensitive cargo, the recommended value currently used in the industry is 0.13 g. As illustrated in Exhibit 18, the standard deviations for the P&C unit body acceleration (A1LC, I1LC) values, front and rear suspensions, are below 0.13 g. The lead truck (GSI) bolster and sideframe (A1BV, A1LS) are also under 0.13 g. The axles (A1LA, A2LA) of the lead truck exhibited very stable performance at speeds up to 80 mph. Exhibit 19 shows the superior performance of the articulated single-axle suspensions of the iron highway load platforms, standard deviation below 0.13 g.

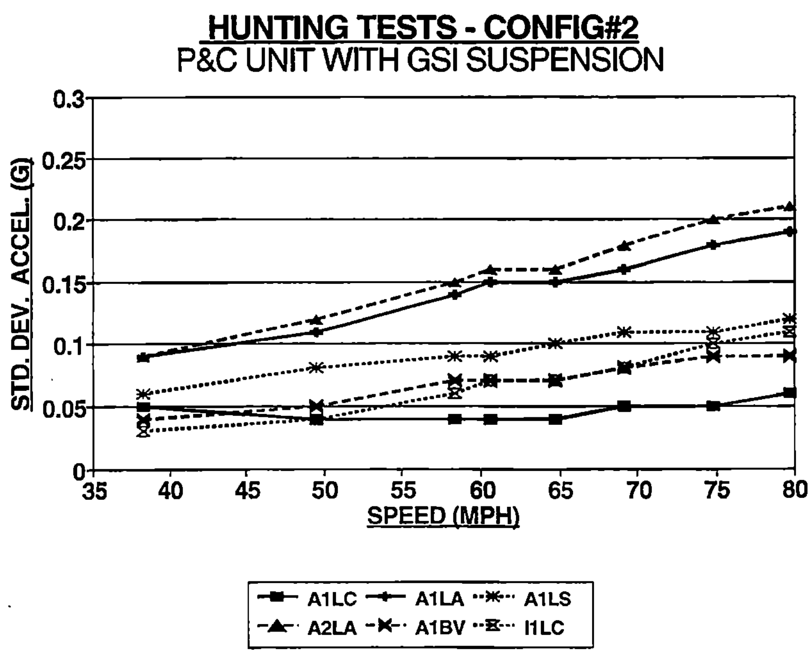


Exhibit 18. Hunting Tests - P&C Unit Standard Deviations

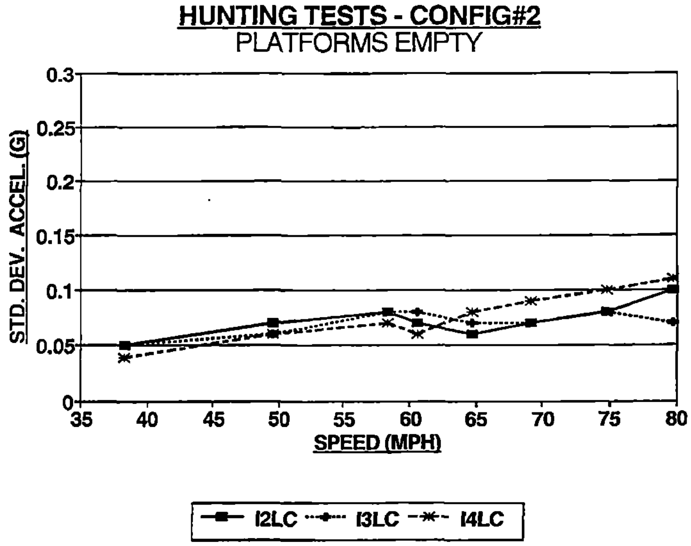


Exhibit 19. Hunting Tests - Platform Standard Deviations

5.7.2.2 Twist/Roll

Exhibit 20 is a plot of the roll angle in degrees that the P&C unit and the 53-foot trailer experienced while negotiating the twist/roll test track section. The AAR car certification criteria is 6 degrees peak-to-peak and as can be seen, the Iron Highway equipment performed very well. The P&C unit exhibited a combined lateral and roll mode at around 50 mph. This motion was greater at the rear end of the P&C unit. The twist and roll tests were discontinued at 55 mph with the intention of conducting further tests during Configuration No. 3 (please refer to Section 5.7.3.2).

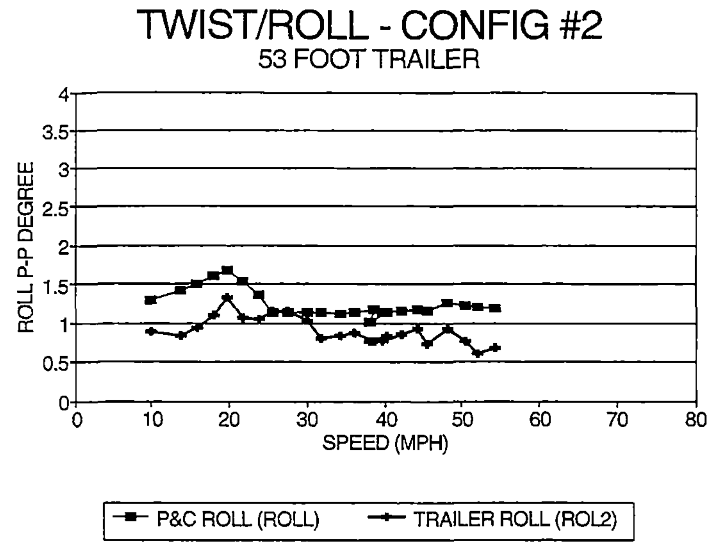


Exhibit 20. Twist/Roll Tests - P&C Unit and Trailer Roll

5.7.2.3 Pitch/Bounce

Exhibits 21 and 22 provide vertical displacement across the various suspensions and accelerations measured on P&C unit, load platforms and split ramp car. Displacements across the loaded (53-foot trailer) suspensions (I2VL, I3VL) measured in the range of 0.55 to 0.65 inch peak-to-peak at 75 mph. The unloaded suspension (N1VL) as expected, was in the lower range of 0.3 inch peak-to-peak at 75 mph.

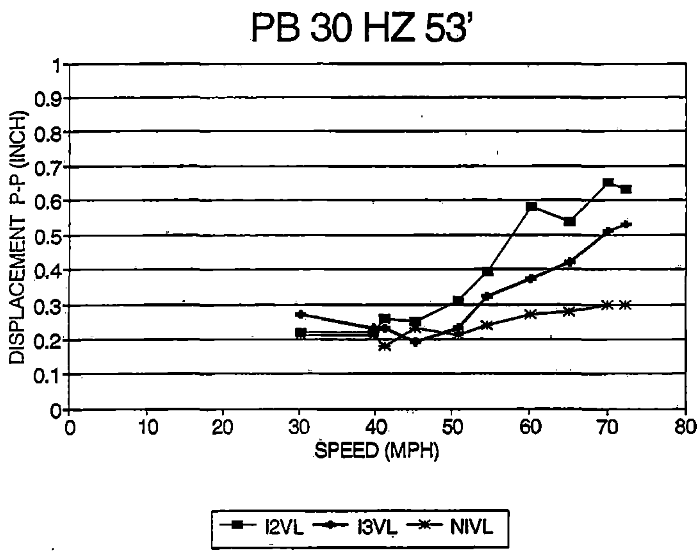


Exhibit 21. Bounce/Pitch Tests - Vertical Displacement Across Suspension

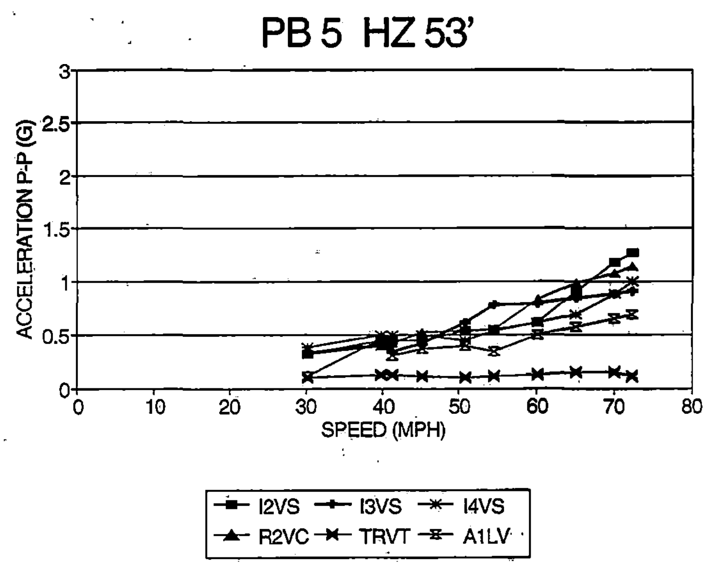


Exhibit 22. Bounce/Pitch Tests - Vertical Acceleration at 5-Hz Low Pass

The accelerations measured are presented after low-pass filtering at 5 Hz to reflect the response caused by the harmonic rigid body vertical mode (between 2.5 to 4 Hz), which is unaffected by any high local component structural frequencies. The platform accelerations

(I2VS, I3VS, I4VS) ranged from 0.8 to 1.25 g peak-to-peak and the split ramp car measured up to 1.15 g, at 75 mph. The P&C unit (A1LV) maximum g measured to be 0.65 g peak-to-peak while the 53-foot trailer (TRVT) was under 0.2 g peak-to-peak, at 75 mph. Exhibit 23 is a plot of the acceleration response up to 30 Hz. Trailer accelerations up to 30 Hz are under 0.5 g peak-to-peak.

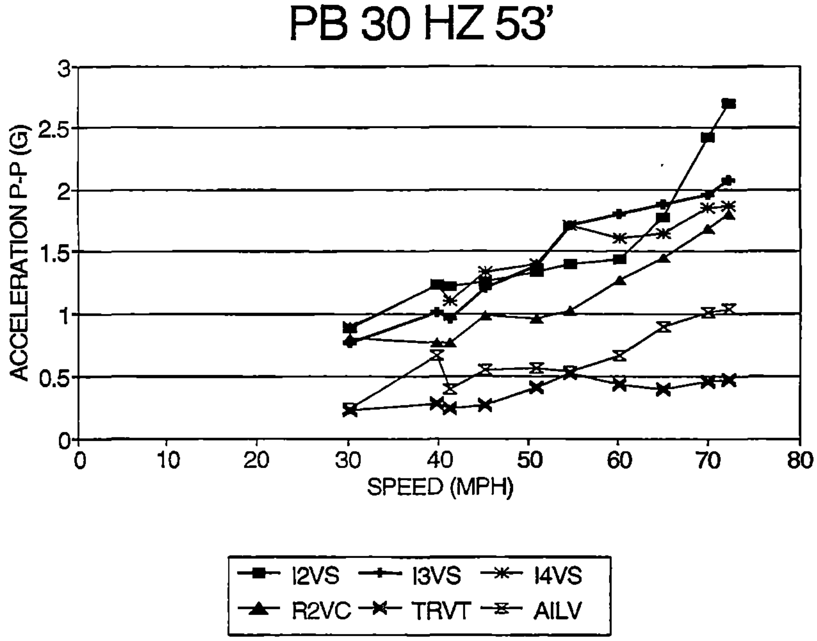


Exhibit 23. Bounce/Pitch Tests - Vertical Accelerations at 30 Hz Low Pass

5.7.2.4 Yaw/Sway

Exhibits 24 (up to 30 Hz) and 25 (up to 5 Hz) show the measured lateral acceleration response of the P&C unit, load platforms and the trailer while negotiating the yaw/sway test track section. The P&C unit, lead and rear end car body, (A1LC, I1LC) response was under 0.5 g at 30 Hz and under 0.4 g at 5 Hz peak-to-peak up to 75 mph. Loaded Platform Nos. 1 (I2LC) and 2 (I3LC) measured accelerations in the range of 1.1 to 1.5 g (30 Hz) and 0.75 to 1.2 g (5 Hz) peak-to-peak, up to 75 mph, with a resonant speed of 60 mph. The unloaded platform (I4LC) maximum acceleration was 1.1 g at 75 mph, while the resonant speed was probably higher than 75 mph, unlike the loaded resonant speed of 60 mph.

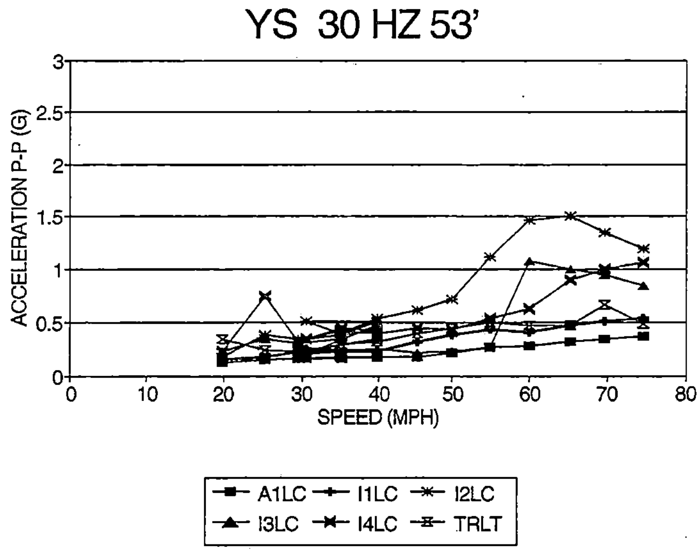


Exhibit 24. Yaw/Sway Tests - Lateral Accelerations at 30 Hz Low Pass

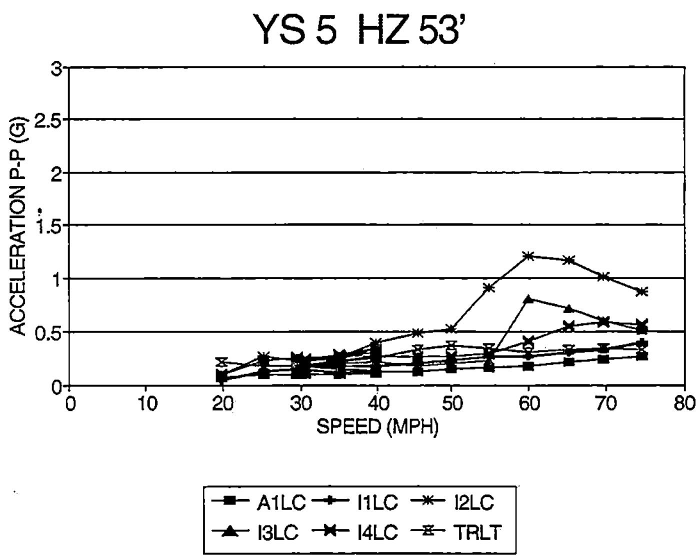


Exhibit 25. Yaw/Sway Tests - Lateral Accelerations at 5 Hz Low Pass

5.7.2.5 Dynamic Curving

Exhibits 26 and 27 show suspension displacement and roll angle response for the load platforms and the P&C unit and trailer. The dynamic curving test section is a combination of cross-level and misalignment track deviation in a 10-degree curve with 4.5-inch superelevation. As illustrated, the response through the test section for speeds from 12 to 29 mph (this speed range includes the balance and 3-inch under and over balance speeds for the curve) is very low and suggests good ride performance.

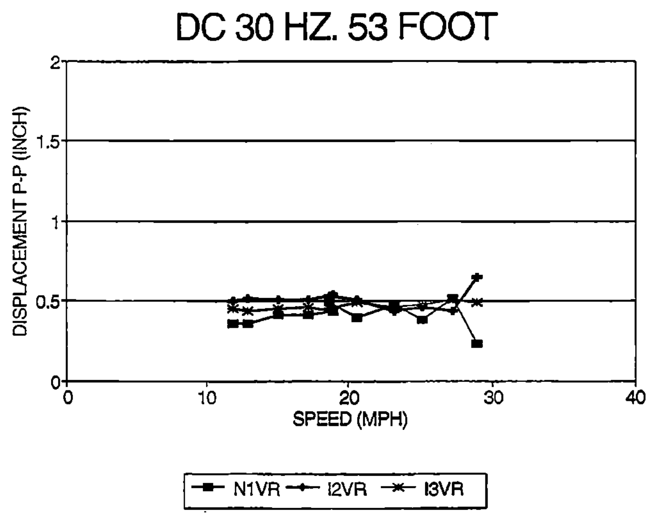


Exhibit 26. Dynamic Curving Tests - Vertical Displacements Across Suspension

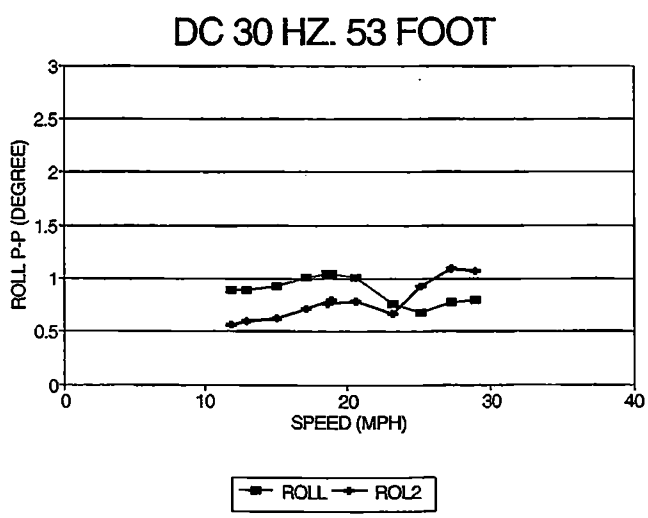


Exhibit 27. Dynamic Curving Tests - P&C Unit and 53-Foot Trailer Roll

5.7.3 Configuration No. 3 Test Results

The tests conducted in this configuration were a repeat of the test runs in the first two configurations. This configuration used a 20-foot container on a chassis and a 40-foot trailer as the loads for Platform Nos. 1, 2 and 3. The container was loaded to weigh 67 kips and the trailer loaded to weigh 65 kips.

5.7.3.1 Lateral Stability

Since the stability of the P&C unit was already evaluated in Configuration No. 2 with the GSI trucks and the platforms showed no sign of instability both in the empty and loaded conditions, the high speed stability tests were not repeated.

5.7.3.2 Twist/Roll

As mentioned in Section 5.7.2.2, the combined lateral and roll motion of the rear end of the P&C unit was of some concern in terms of ride quality (not safety). In order to investigate the phenomenon, all suspension components were checked for proper clearances, tolerances and alignments. The GSI suspension was modified to increase the gap between the bolster to car body to ½ inch on each side and the lateral rubber stops moved outboard (field side) by ⅜ inch. Exhibits 28 and 29 are plots of roll angle and acceleration response for speeds from 10 to 55 mph. Exhibit 28 illustrates P&C unit roll (ROLL) and container roll (ROL2). The container is loaded on Platform No. 1 and the trailer across Platform Nos. 2 and 3. Analysis of the roll angles shows good response.

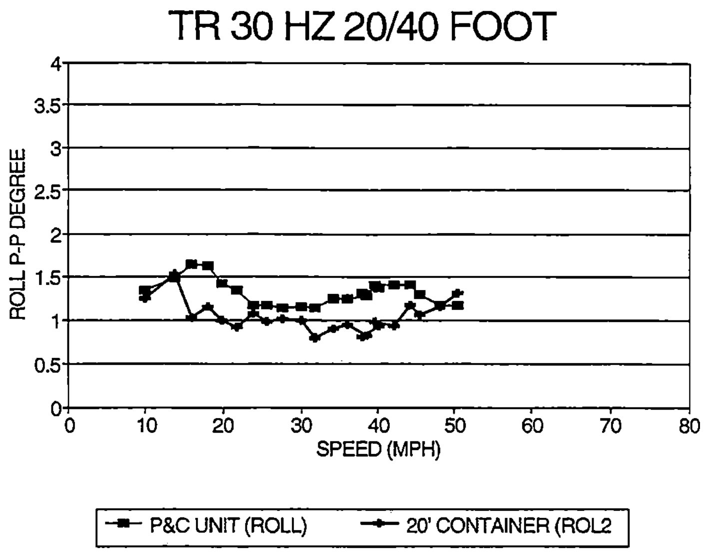


Exhibit 28. Twist/Roll Tests - P&C Unit and 20-Foot Container Roll Degree

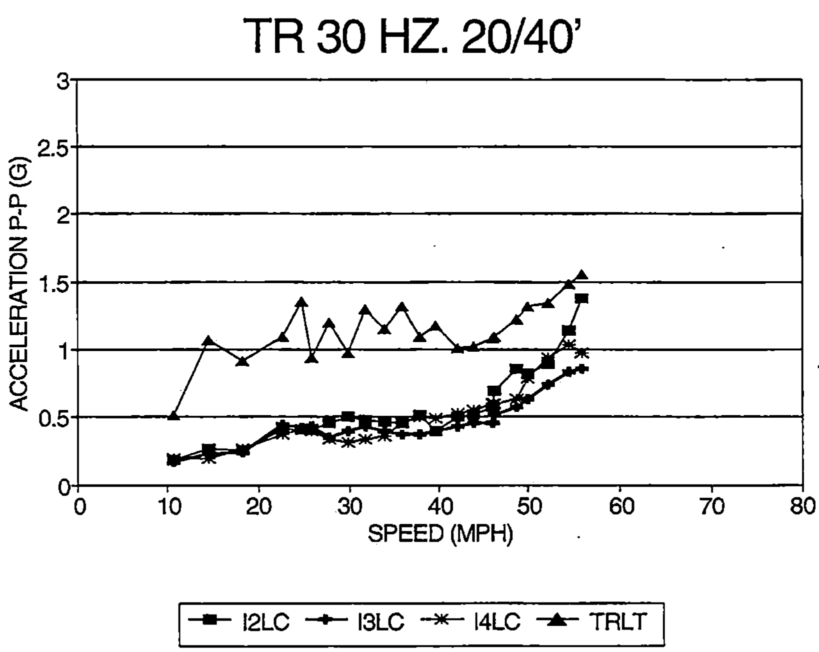


Exhibit 29. Twist/Roll Tests - Lateral Accelerations at 30 Hz Low Pass

Exhibit 29 shows the lateral acceleration response of the loaded platforms (I2LC,I3LC and I4LC) and container (TRLT). Platform lateral accelerations (I2LC, I3LC and I4LC) are in the range of 0.75 to 1.4 g peak-to-peak. These are accelerations for a frequency content up to 30 Hz. The response associated with the exciting frequency, which is under 5 Hz, would be lower.

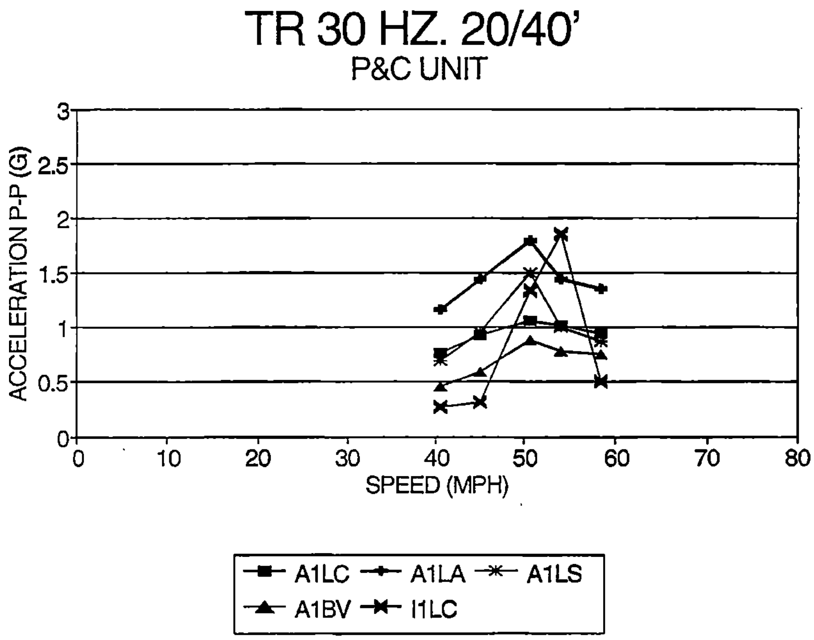


Exhibit 30. Twist/Roll Tests - Lateral Accelerations at 30 Hz Low Pass

Exhibit 30 is the acceleration response from various locations on the P&C unit. The lateral axle and sideframe accelerations (AILA, A1LS), up to 30 Hz and undamped, as expected, show high values between 1.5 and 1.7 g peak-to-peak. The lateral bolster acceleration up to 30 Hz was measured to be 0.75 g peak-to-peak. The P&C unit front (A1LC) end car body measured 1.1 g, while the rear end (I1LC) car body measured 1.75 g peak-to-peak.

Exhibits 31 and 32 are vertical acceleration responses of the platforms and P&C unit, filtered at 30 and 5 Hz. The 5 Hz filtered response, which gives the response associated with the track induced frequency, is in the range of 0.25 to 0.75 g peak-to-peak.

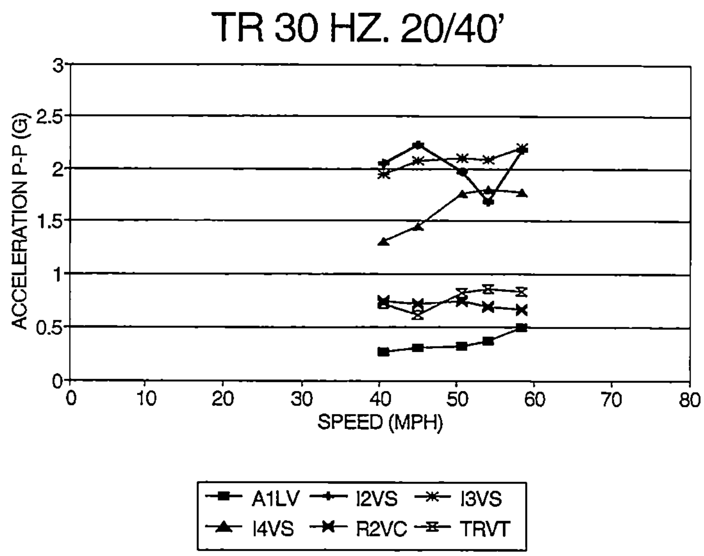


Exhibit 31. Twist/Roll Tests - Vertical Accelerations at 30 Hz Low Pass

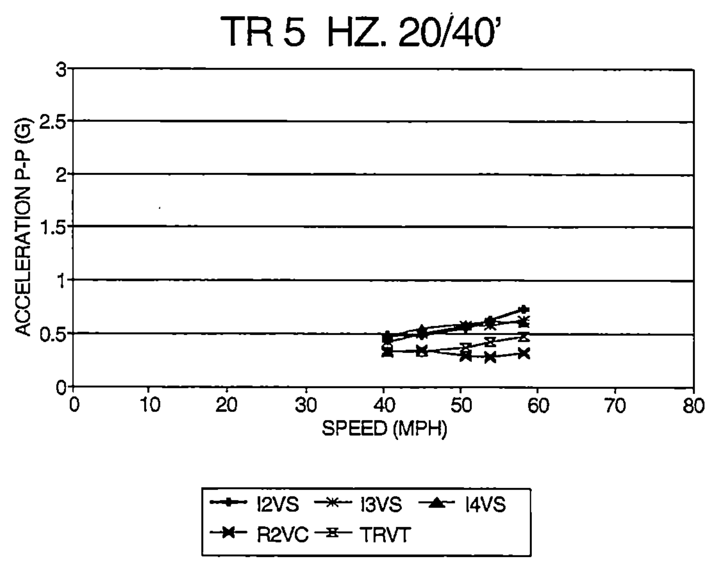


Exhibit 32. Twist/Roll Tests - Vertical Accelerations at 5 Hz Low Pass

The NYAB personnel have reviewed the twist/roll response data of the P&C unit and plan to redesign the rear end suspension to provide for a better ride quality. Modifications and tests are planned for 1995.

5.7.3.3 Pitch/Bounce

Exhibits 33 thru 36 are plots of displacement and acceleration response of the load platforms and P&C unit. Data filtered at 30 Hz and 5 Hz are provided. Since the data during the tests were being collected at 30 Hz and the accelerations on the trailer were exceeding 2.5 g peak-to-peak, test runs beyond 60 mph were not conducted. Of course, as can be seen from the 5 Hz filtered data, the maximum trailer acceleration associated with the exciting frequency is 1.6 g peak-to-peak. The rest of the equipment responded with values under 1.0 g peak-to-peak, at 5 Hz.

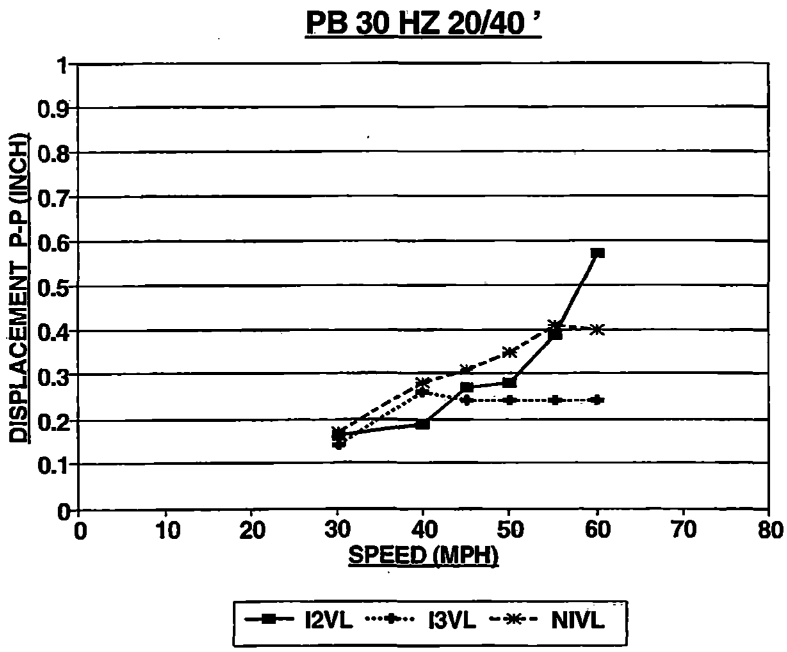


Exhibit 33. Bounce/Pitch Tests - Vertical Accelerations at 30 Hz Low Pass

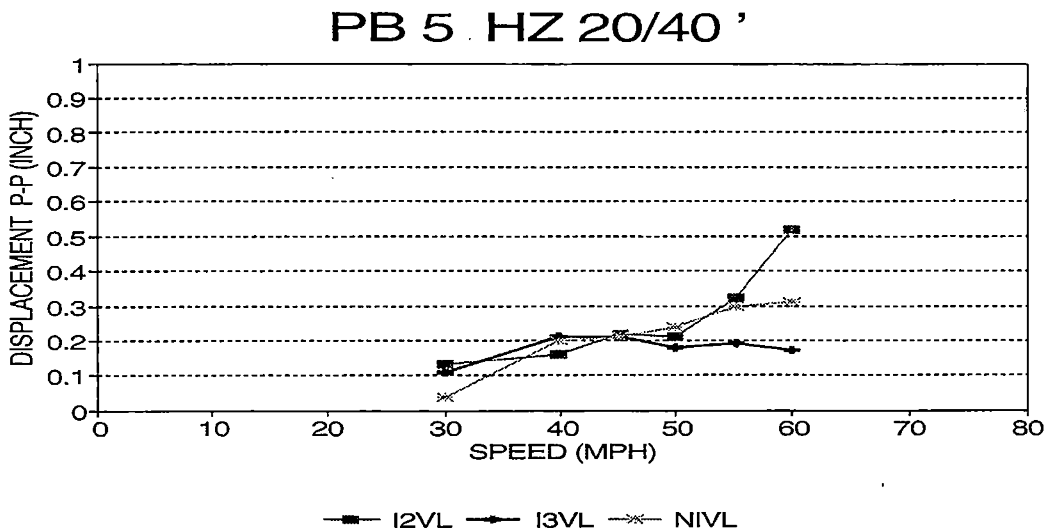


Exhibit 34. Bounce/Pitch Tests - Vertical Accelerations at 5 Hertz Low Pass

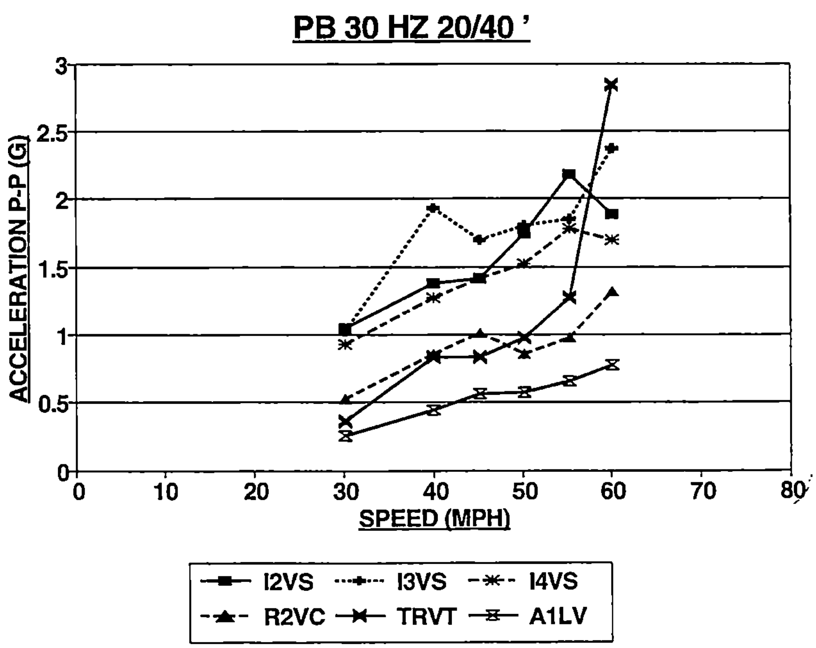


Exhibit 35. Bounce/Pitch Tests - Vertical Acceleration at 30 Hz Low Pass

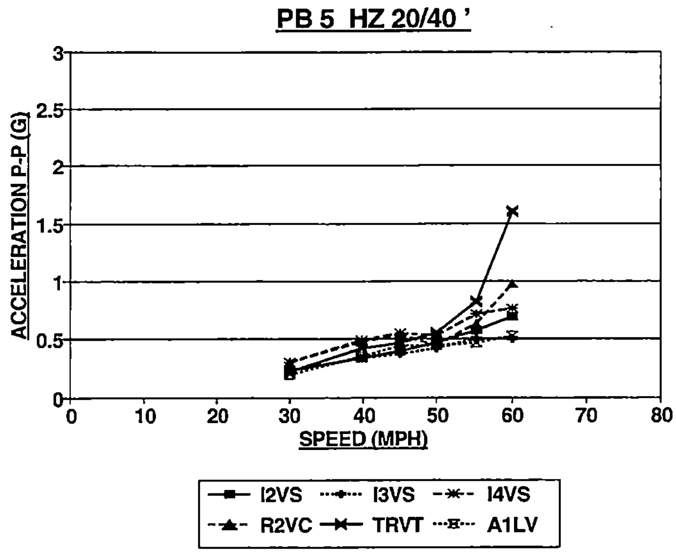


Exhibit 36. Bounce/Pitch Tests - Vertical Acceleration at 5 Hz Low Pass

5.7.3.4 Yaw/Sway

Exhibits 37 and 38 are lateral acceleration responses of the load platform and the P&C unit. Data filtered at 30 and 5 Hz are presented. Accelerations were under 1.0 g peak-to-peak, at 5 Hz.

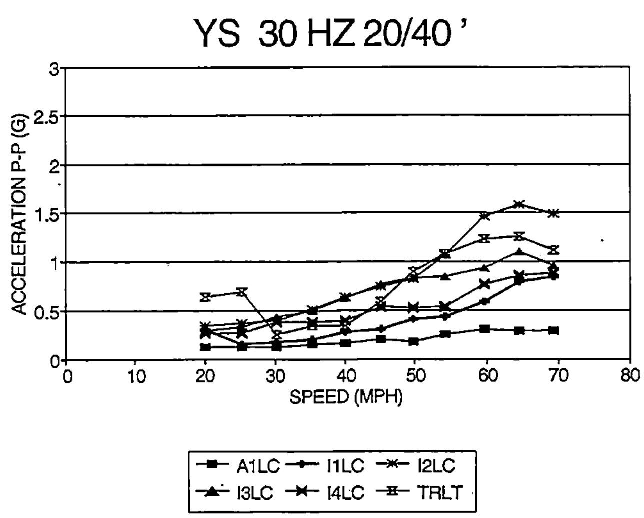


Exhibit 37. Yaw/Sway Tests - Lateral Accelerations at 30 Hz Low Pass

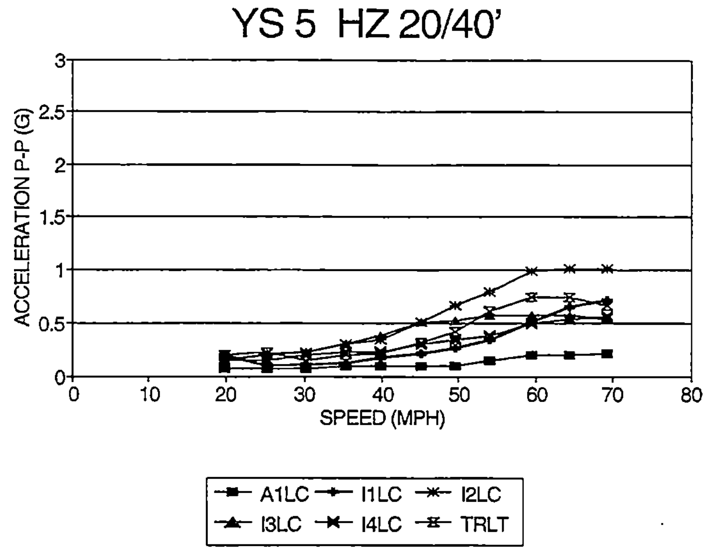


Exhibit 38. Yaw/Sway Tests - Lateral Accelerations at 5 Hz Low Pass

5.7.3.5 Dynamic Curving

Exhibit 39 shows the roll response of the P&C unit and the container while negotiating the dynamic track section. The maximum roll angle measured was 2.1 degrees peak-to-peak. The container seems to be rolling out of phase with respect to the P&C unit.

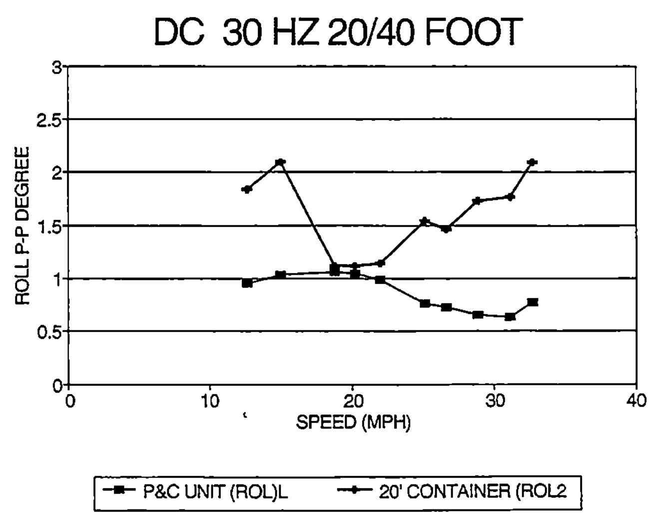


Exhibit 39. Dynamic Curving Tests - P&C Unit and 20-Foot Container Roll

5.8 DATA COMPARISON

Since the criteria for ride quality of freight vehicles is strongly dependent on the cargo or content of the lading to be transported, the data presented in the above sections become qualitative. In an attempt to overcome this drawback, several conventional equipment types were chosen and similar response data from the same test tracks at the TTC are presented. This should allow a quantitative assessment of the ride performance or quality of the Iron Highway equipment relative to the freight equipment in use today.

Data from tests conducted on a conventional locomotive, a loaded autorack and a five-platform articulated 70-ton spine car are presented. All data for other equipment presented is filtered at 15 Hz. The Power and Communication unit data is labelled PCU, the Iron Highway platforms labelled IH No. 1, IH No. 2 and IH No. 3. Data from existing equipment is labeled accordingly.

5.8.1 Lateral Stability

Exhibit 40 is a bar chart of maximum acceleration peak-to-peak and rms g values for the Iron Highway and typical equipment in service today. The maximum peak-to-peak value for the PCU is a singular event rather than a sustained harmonic value as opposed to the value for the loaded autorack. The loaded autorack exhibited sustained hunting at speeds of 65, 70 and 75 mph. This is reflected in the rms values which show values for the Iron Highway equipment below 0.11 and the autorack at 0.2 g rms. All of the data for the Iron Highway equipment is for the empty configuration which usually is the more sensitive condition for lateral instability. The empty autorack would produce even higher than 0.2 g rms values at 75 mph.

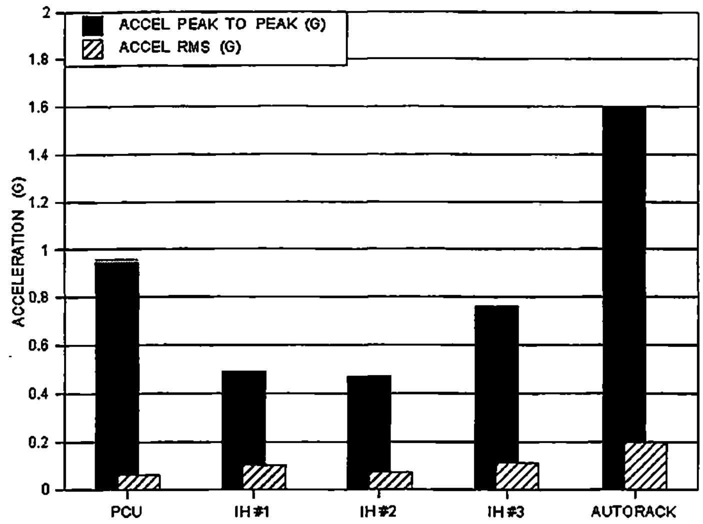


Exhibit 40. Comparative Plot, High Speed Stability - Lateral Accelerations

5.8.2 Twist Start-up Roll

Exhibits 41 and 42 are bar charts of lateral accelerations and roll angle maximum response for the labelled equipment while traversing the same test track section at the TTC. As shown, the load bearing platforms of the Iron Highway have a lower response than the 40-foot spine platform. The roll response of the Iron Highway equipment is lower than that of the 40-foot spine and the conventional locomotive. The acceleration response, due to a combined lateral and roll mode at speeds above 50 mph of the PCU could be a concern from a human ride comfort aspect. The Iron Highway data is up to 30 Hz and the other equipment data is up to 15 Hz.

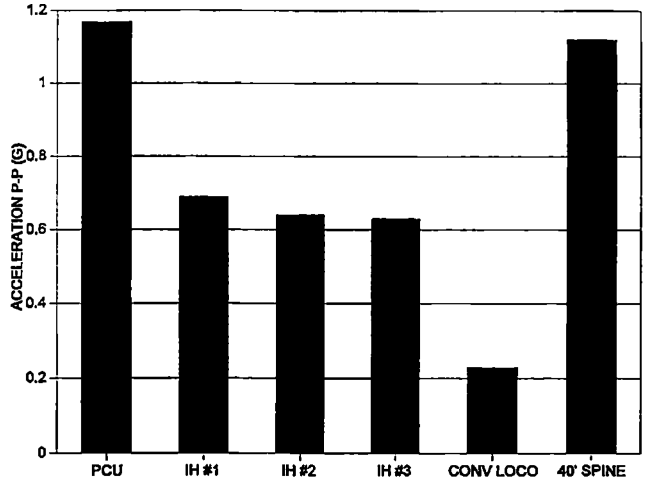


Exhibit 41. Comparative Plot - Twist/Roll Accelerations

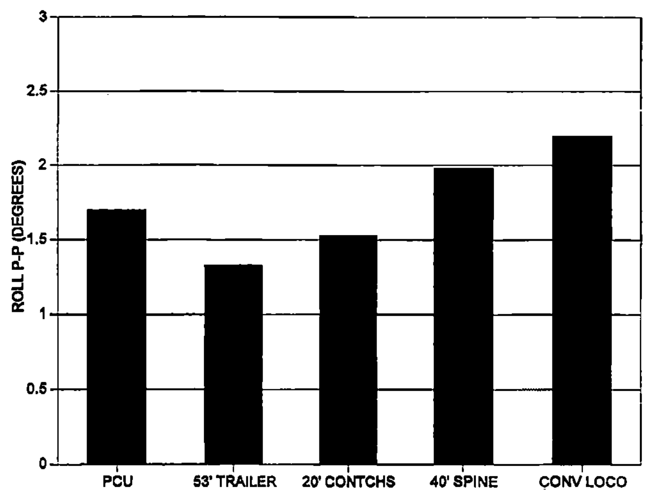


Exhibit 42. Comparative Plot - Twist/Roll Degrees

5.8.3 Pitch/Bounce

Exhibit 43 is a plot of maximum acceleration values as measured for various equipment, filtered at 5 Hz. Vertical acceleration response data suggests that the Iron Highway platforms are comparable to existing equipment. The 20-foot container on chassis showed a response above 1.5 g peak-to-peak, but this is also a function of its chassis suspension.

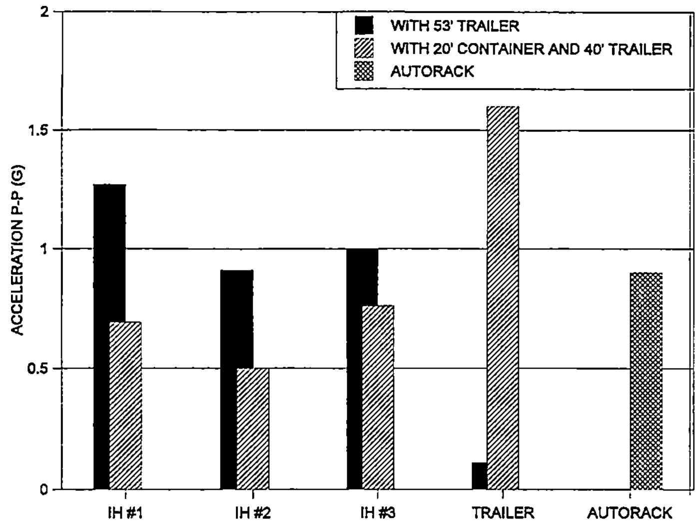


Exhibit 43. Comparative Plot - Bounce/Pitch Accelerations

5.8.4 Yaw/Sway

Exhibit 44 is a plot of maximum lateral accelerations for various equipment, the Iron Highway data filtered at 30 Hz and the other at 15 Hz. The Iron Highway data shows lower response than that from the other equipment.

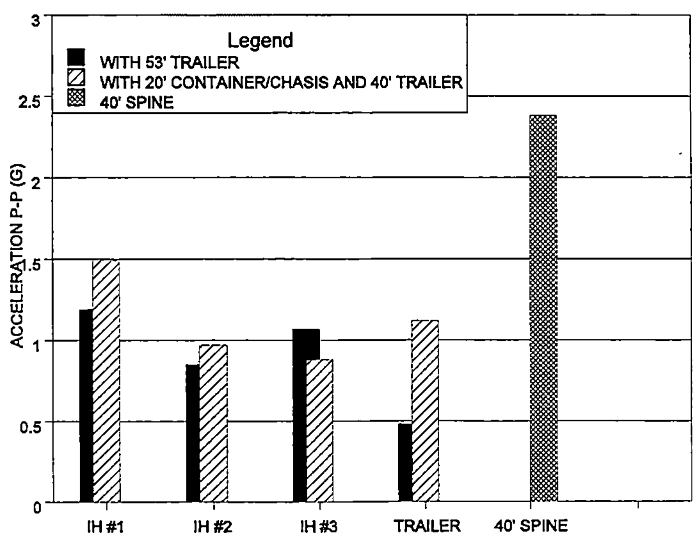


Exhibit 44. Comparative Plot, Yaw/Sway Accelerations.

5.8.5 Dynamic Curving

Exhibit 45 is a plot of maximum roll angles for various equipment types, Iron Highway filtered at 30 Hz and several others at 15 Hz. The Iron Highway equipment shows a lower response compared to data presented for the other typical equipment.

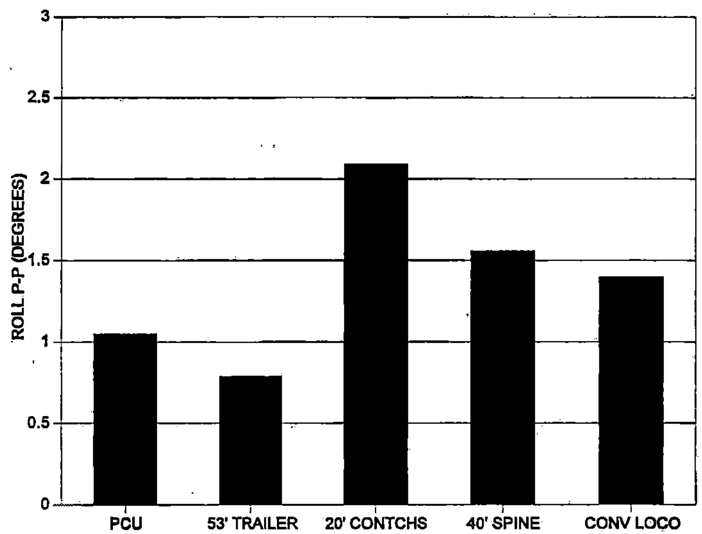


Exhibit 45. Comparative Plot - Dynamic Curving Roll Degrees

6.0 CONCLUSIONS AND OBSERVATIONS

Analyses of the test data supports the following observations and conclusions:

- The load or trailer bearing platforms exhibit better than average performance in hunting, twist/roll, yaw/sway and curving. When compared to an intermodal 40-foot spine car and an autorack, the car body lateral acceleration and roll angle in twist/roll, dynamic curving and yaw/sway are lower. Response in the bounce/pitch mode is comparable or slightly higher, in terms of accelerations, than those for a loaded autorack. No indications of unsafe or derailment tendency were observed from the wheel/rail interface video recordings during any of the tests and wayside rail forces during the curving and spiral negotiation tests.

- The PCU dynamic response tests indicated that the suspension is adequate from a safety or derailment aspect, but may need to be tuned to offer a better human ride performance.

- The control system tests concluded that the software and hardware that controls and monitors the equipment under traction and braking operated and functioned as designed. During the tests, successful software modifications were made to meet the design goals. Deliberately induced sticking brakes and over-heated bearings were successfully identified on the cab console.

- The power system tests were not undertaken due to mechanical failures to the differential gear box components but the following were observed during related tests:

  (1) Train speed with the unloaded consist powered at 4.8 hp per ton (lower than the 5.18 hp per ton for a light 20-trailer element) seemed to balance at 63 mph on straight and level track.

  (2) A loaded prototype powered at 2.4 hp per ton in Configuration No. 3 (compared with 3.0 hp per ton for a full element with 20 trailers at 65,000 lb each), balanced at 48 mph. Design balance speed for the final element is predicted by NYAB as between 60 and 70 mph.

- The braking system performed as designed, including the hydro-dynamic retarder during blended braking. The empty consist stop distance from 60 mph was the shortest for the blended full service compared to emergency and full service. The loaded consist stop distance from 48 mph was the shortest in emergency, the blended and full service being 44 feet more.

- Longitudinal squeeze loads applied to the empty consist, up to the design buff load of 200 kip, showed no high-stress areas in any of the platforms, split ramp or PCU equipment. The coupling details between the P&C Unit and the first load bearing platforms will be re-designed to increase the longitudinal load capability in buff and draft to 500 kips.

- The split ramp car and the custom hostler/hitch systems functioned as designed.

The future of the Iron Highway system as a viable means of transporting inter-modal commodities has been established based on a prototype test unit. The test results proved that a drive on - drive off type intermodal system using a custom hostler and hitch design is practical. The economic benefits realized by being able to handle non-railroad trailers of any length should prove to be substantial. CSXI has recently purchased the Iron Highway concept from the NYAB and plans to run the load bearing platforms towed by a conventional locomotive (as Version or Phase 2.5) in revenue service. The split ramp car functions and the brake and bearing monitoring functions of the Phase II control system will be incorporated in Phase 2.5 . Four Phase 2.5 full train elements, each of forty (40) load bearing platforms, are planned to be in service by the end of 1995 or early 1996.

ACKNOWLEDGMENTS

The author wishes to express his thanks to the invaluable contribution of Messrs. Kerry Hopkins and Ken Martin who worked long and hard in the conduct of the Iron Highway project. Special thanks to the instrumentation and data reduction departments of the AAR/TTC. Thanks and appreciation is also definitely due to the test operations division crew, in particular Mr. Dean Holcomb. Lastly, thanks to the NYAB personnel involved in the project and the FRA for their support and advice in the test conduct and preparation of the final report.

Appendix A

Details of Transducers and Video Locations

for Iron Highway - Phase II Tests

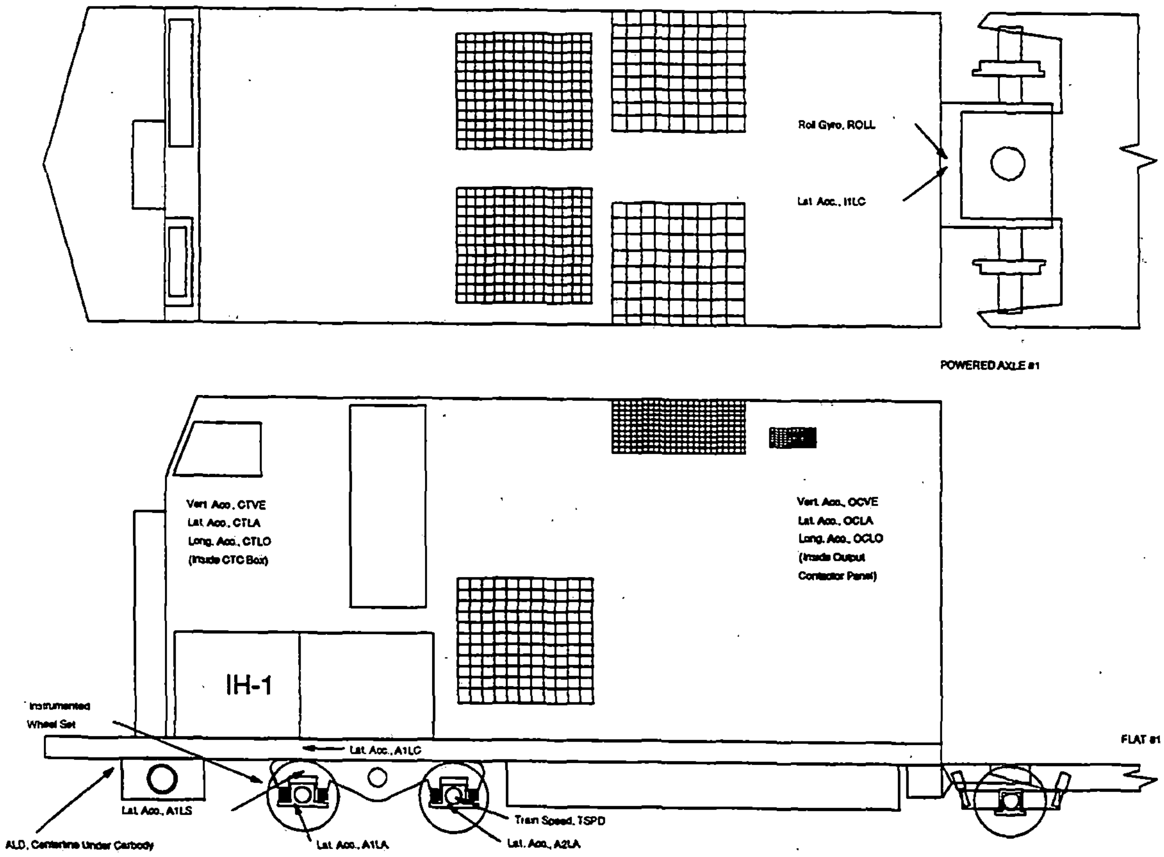


Exhibit A-1. Lead PCU - Train Dynamics Test Transducers.

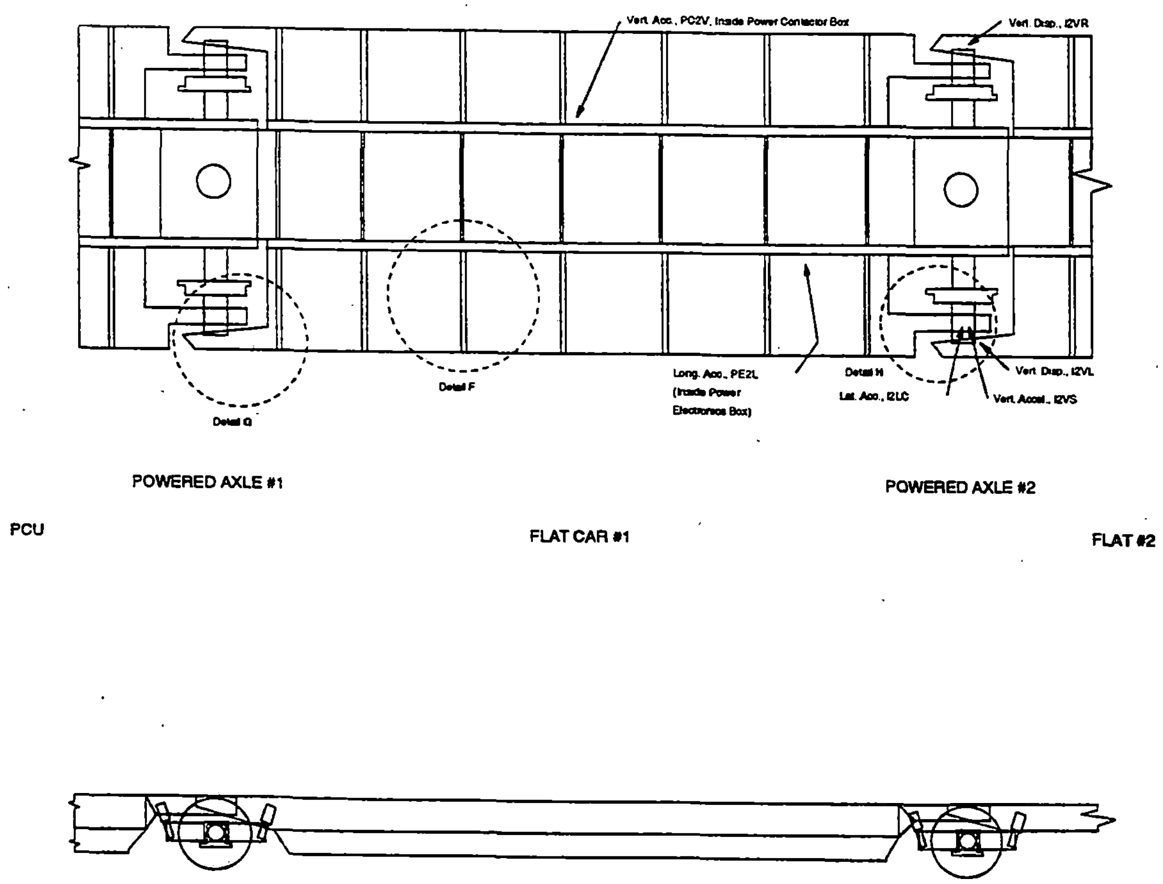


Exhibit A-2. Load Platform # 1 - Train Dynamics Test Transducers

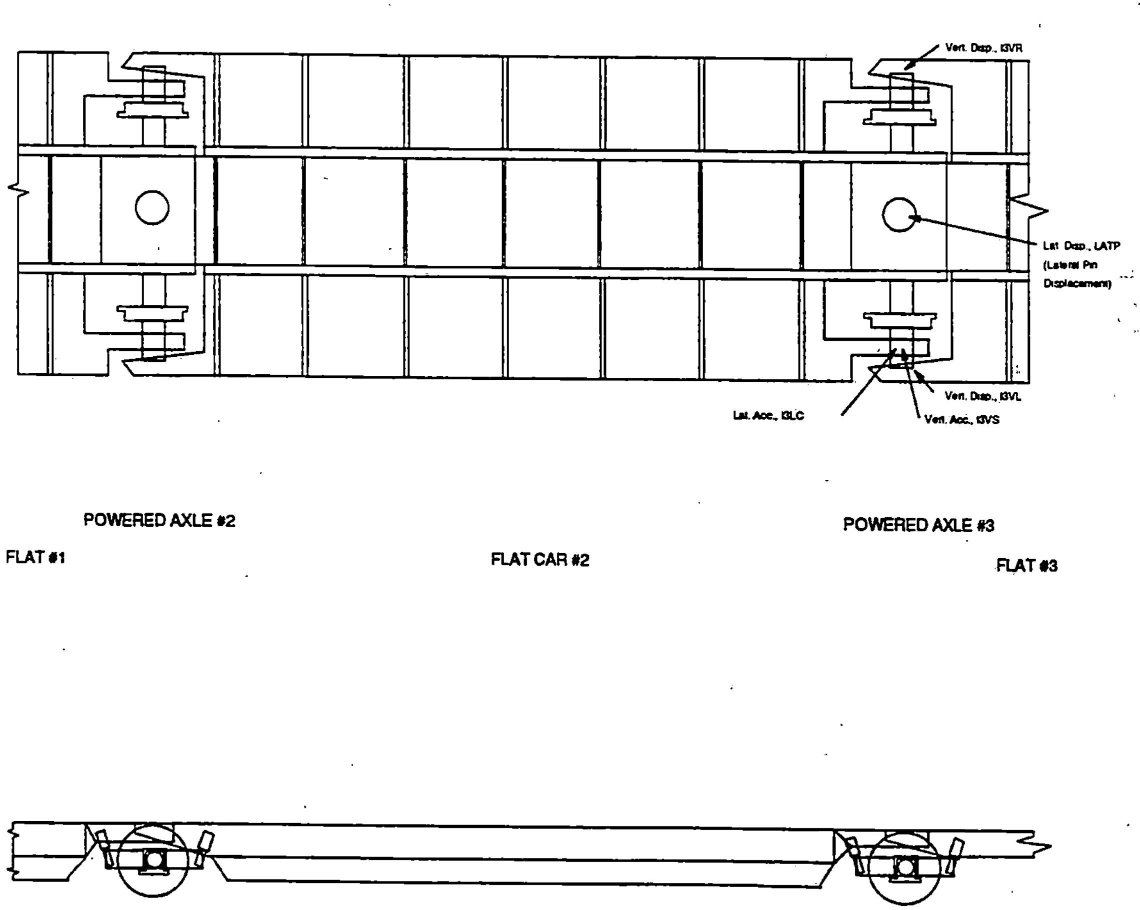


Exhibit A-3. Load Platform # 2 - Train Dynamics Test Transducers

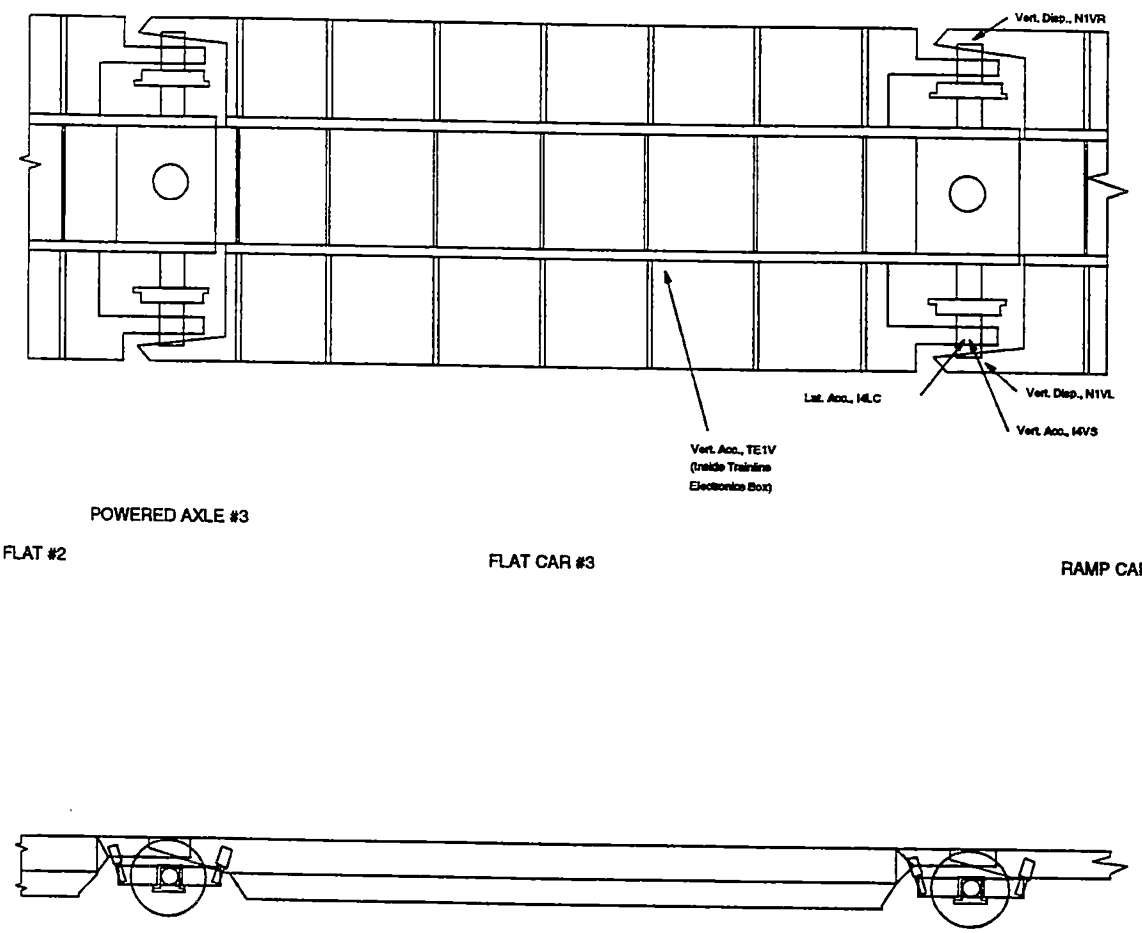


Exhibit A-4. Load Platform # 3 - Train Dynamics Test Transducers

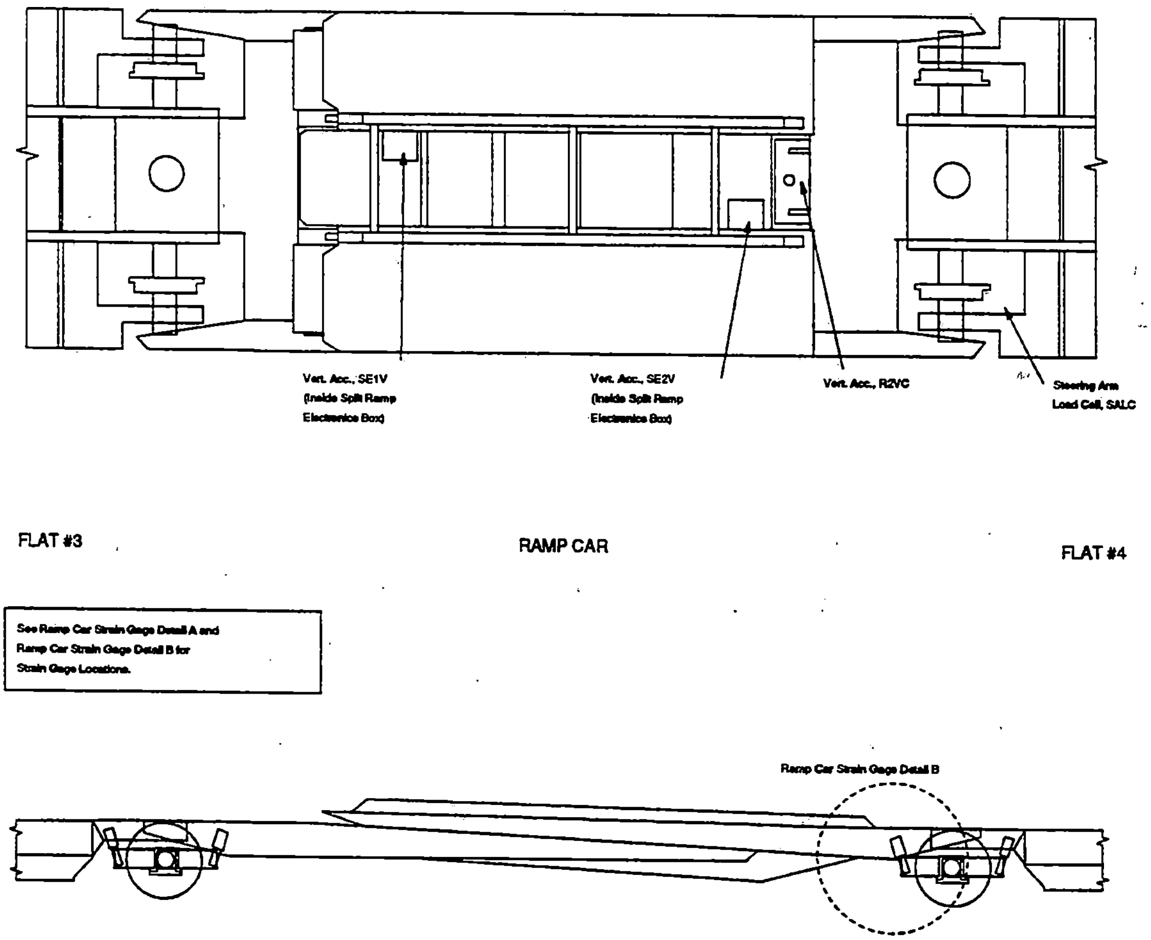


Exhibit A-5. Split Ramp Car - Train Dynamics Test Transducers

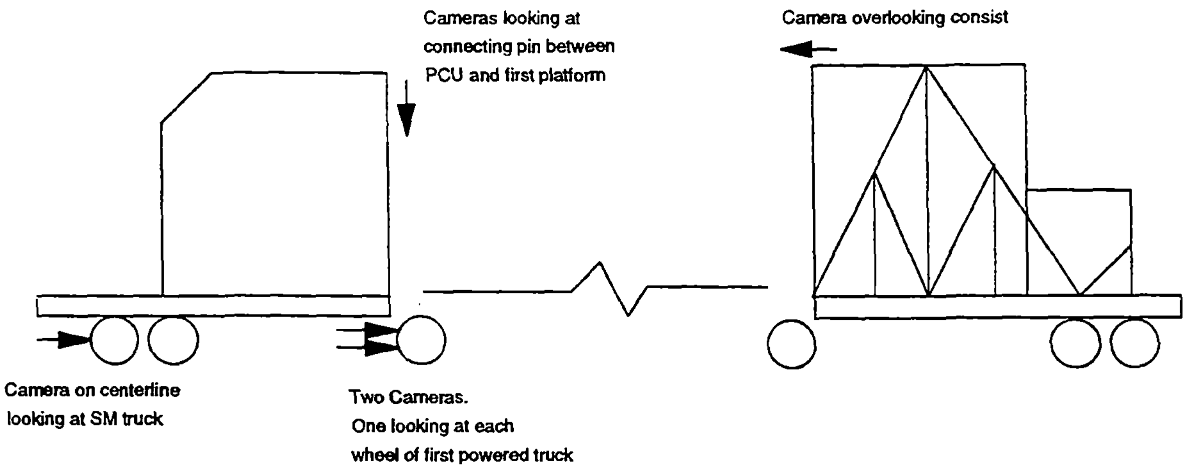


Exhibit A-6. Video Camera Locations - Train Dynamics Tests

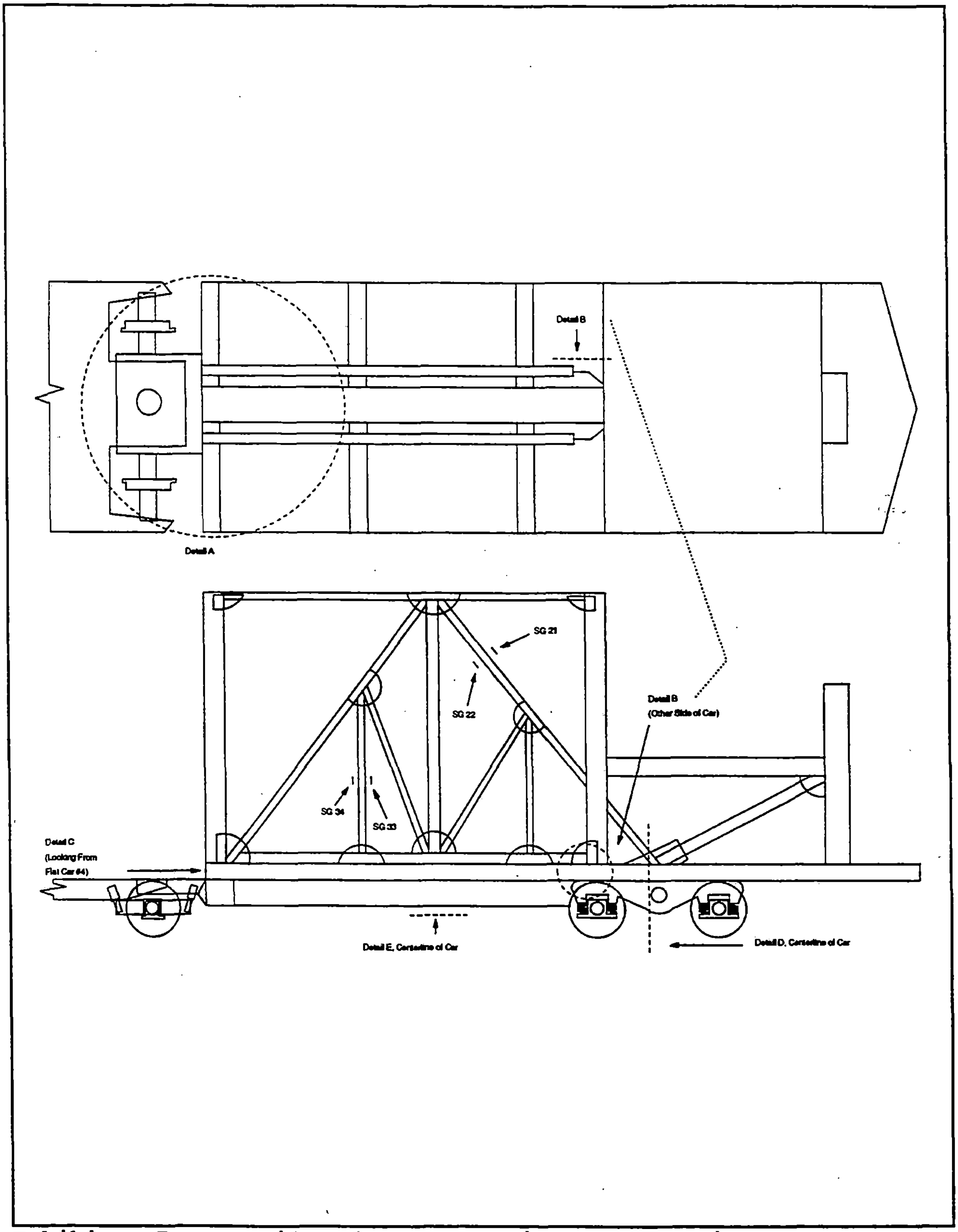


Exhibit A-7 . Trail-End PCU - Strain Gage Locations.

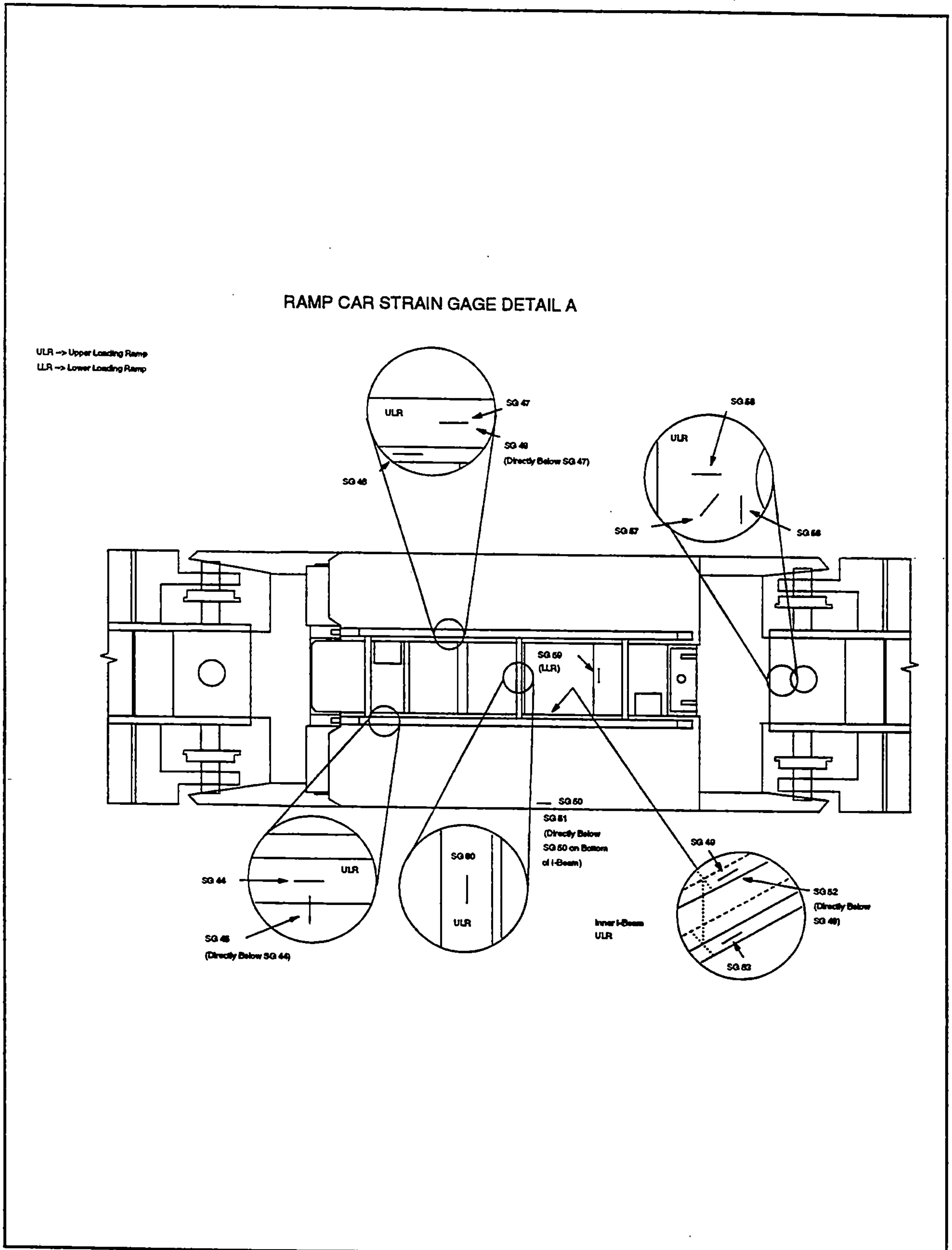


Exhibit A-8. Detail A, Split Ramp Car - Strain Gage Locations.

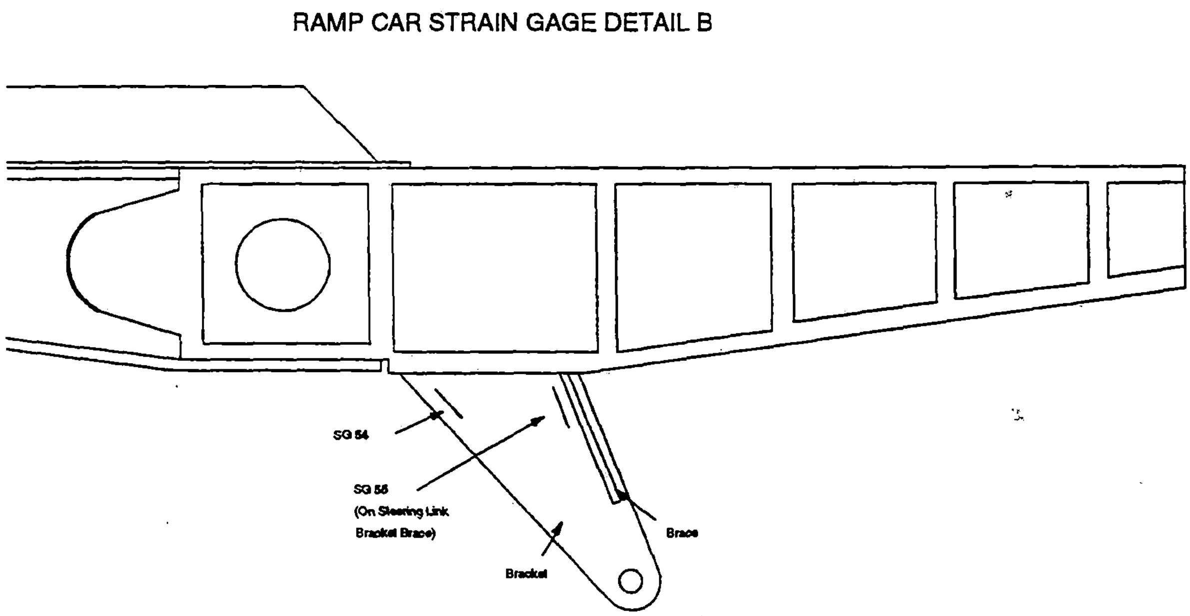


Exhibit A-9. Detail B, Split Ramp Car - Strain Gage Locations.

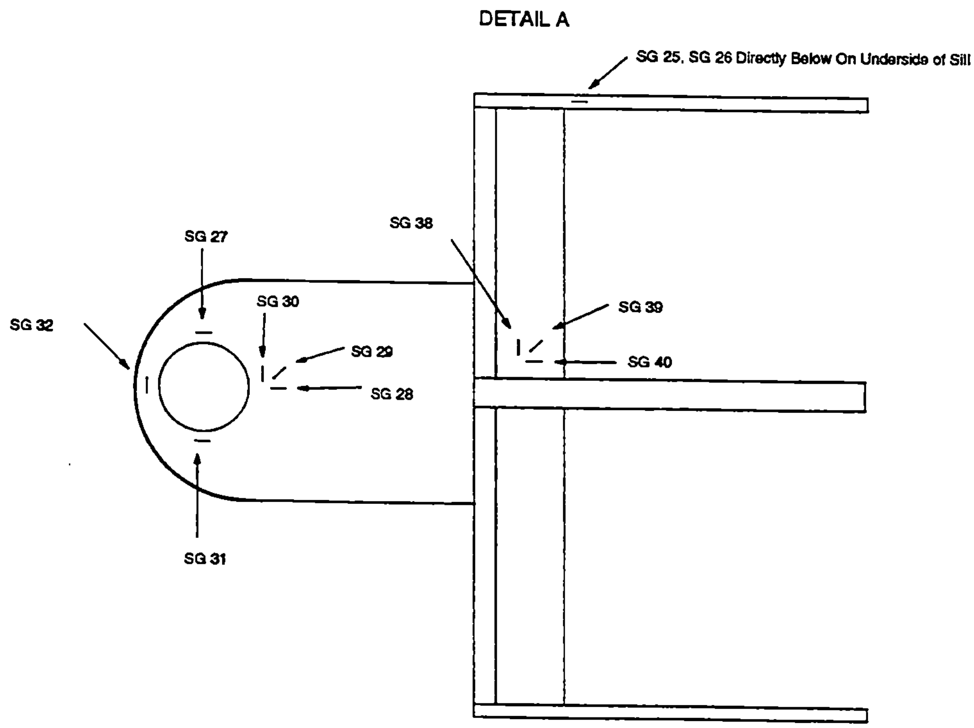


Exhibit A-10. Detail A (of Exhibit A-7), Trail End PCU

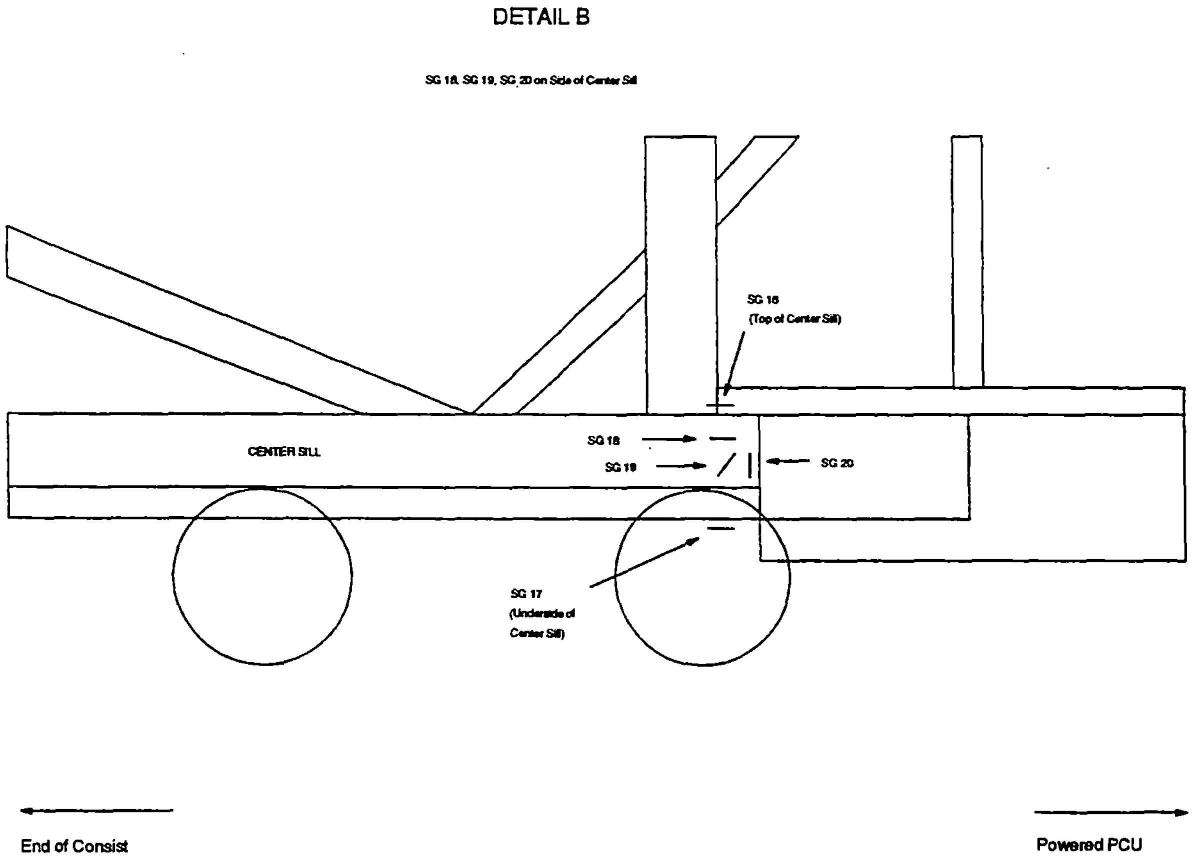


Exhibit A-11. Detail B (of Exhibit A-7), Trail End PCU

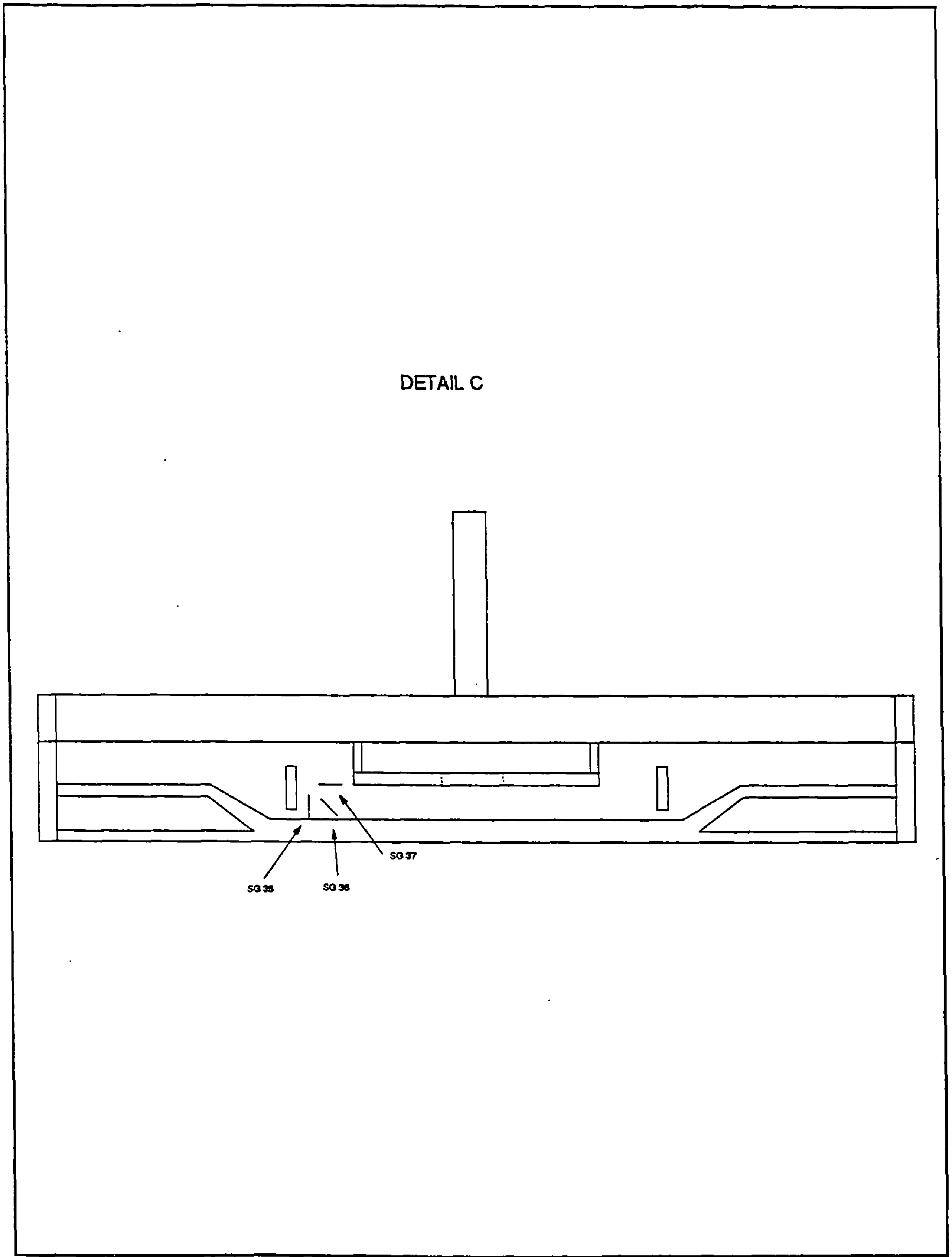


Exhibit A-12. Detail C (of Exhibit A-7), Trail End PCU

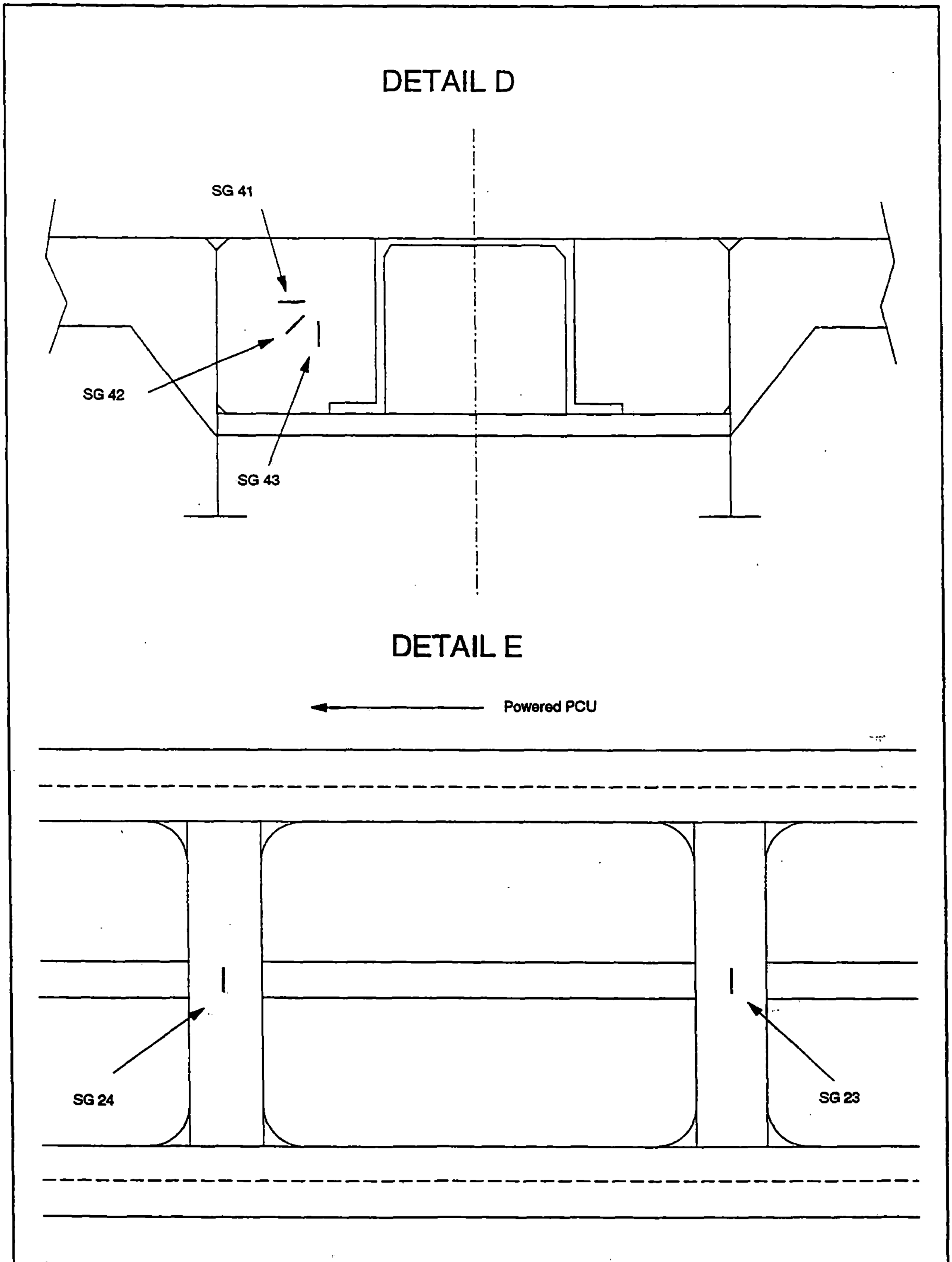


Exhibit A-13. Detail D and E (of Exhibit A-7), Trail End PCU

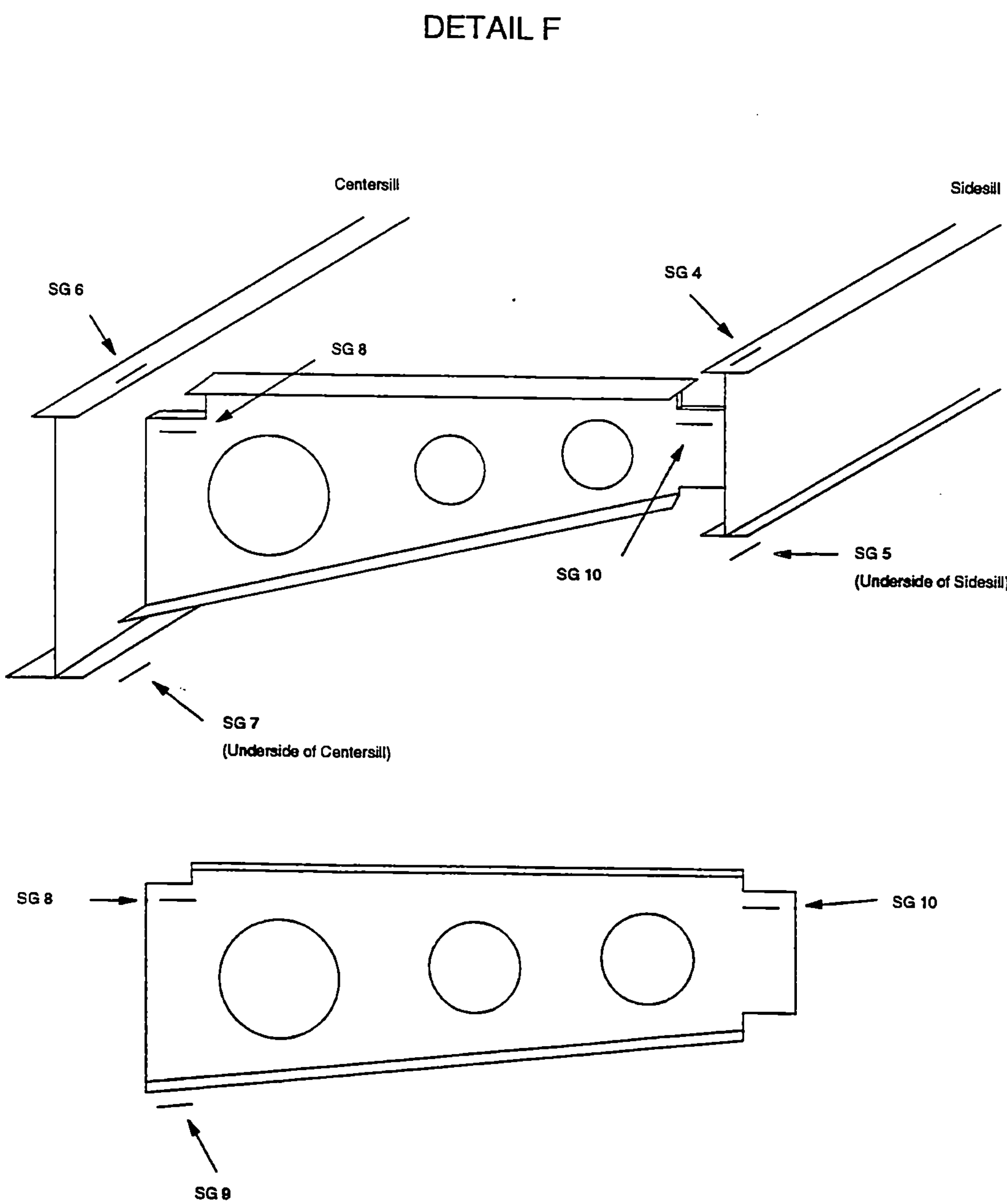


Exhibit A-14. Detail F (of Exhibit A-2), Load Platform #1

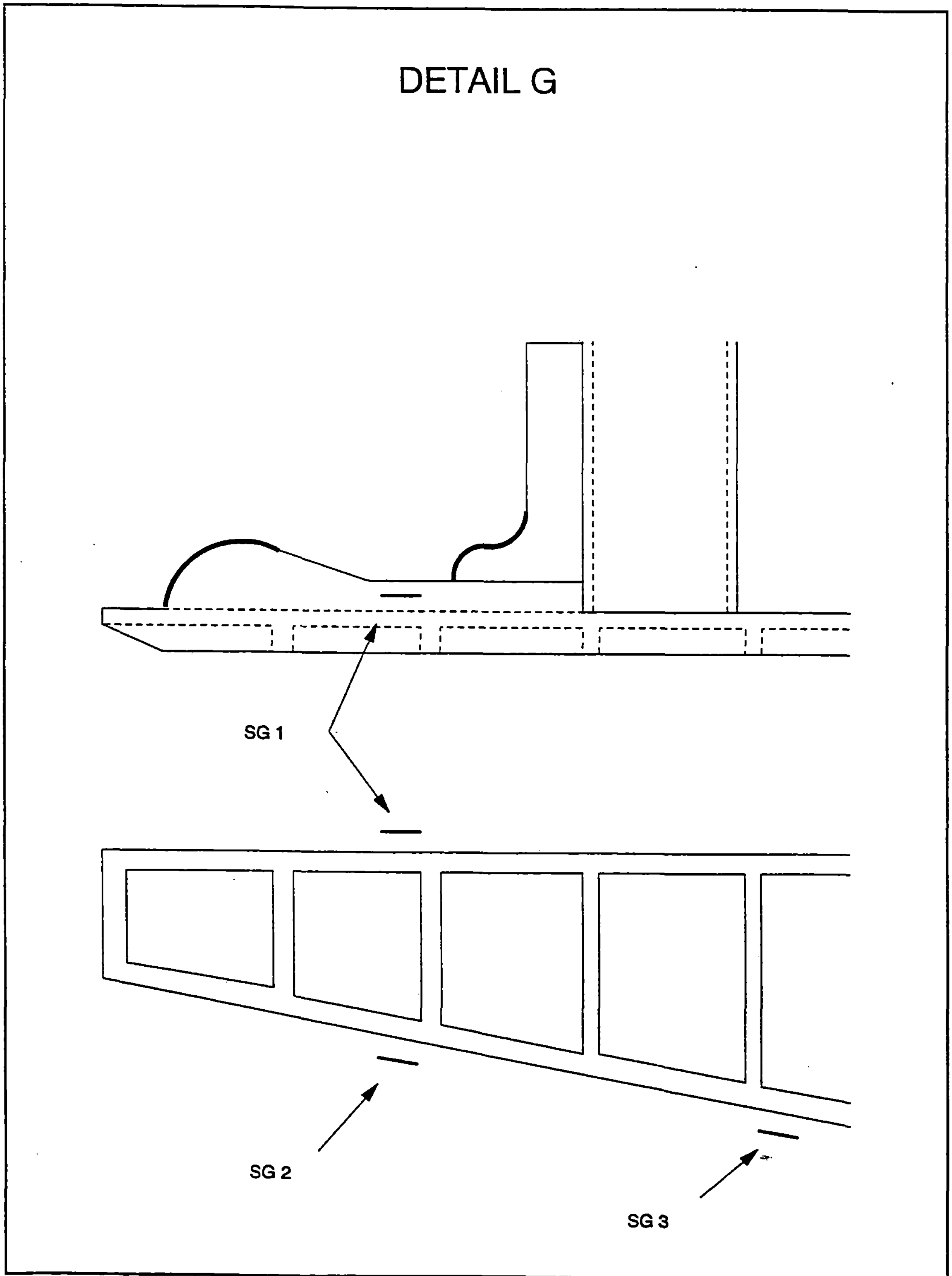


Exhibit A-15. Detail G (of Exhibit A-2), Load Platform #1

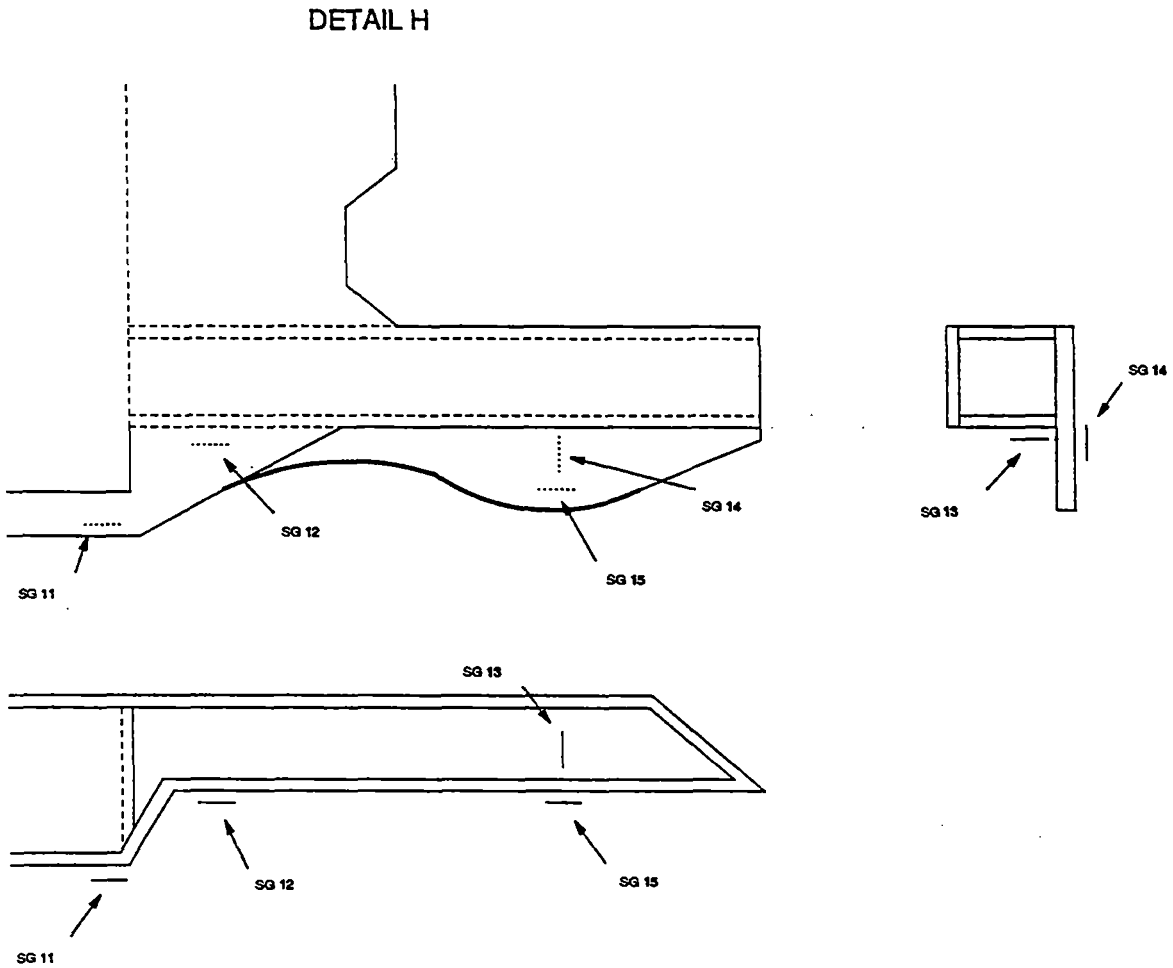


Exhibit A-16. Detail H (of Exhibit A-2), Load Platform #1

Appendix B

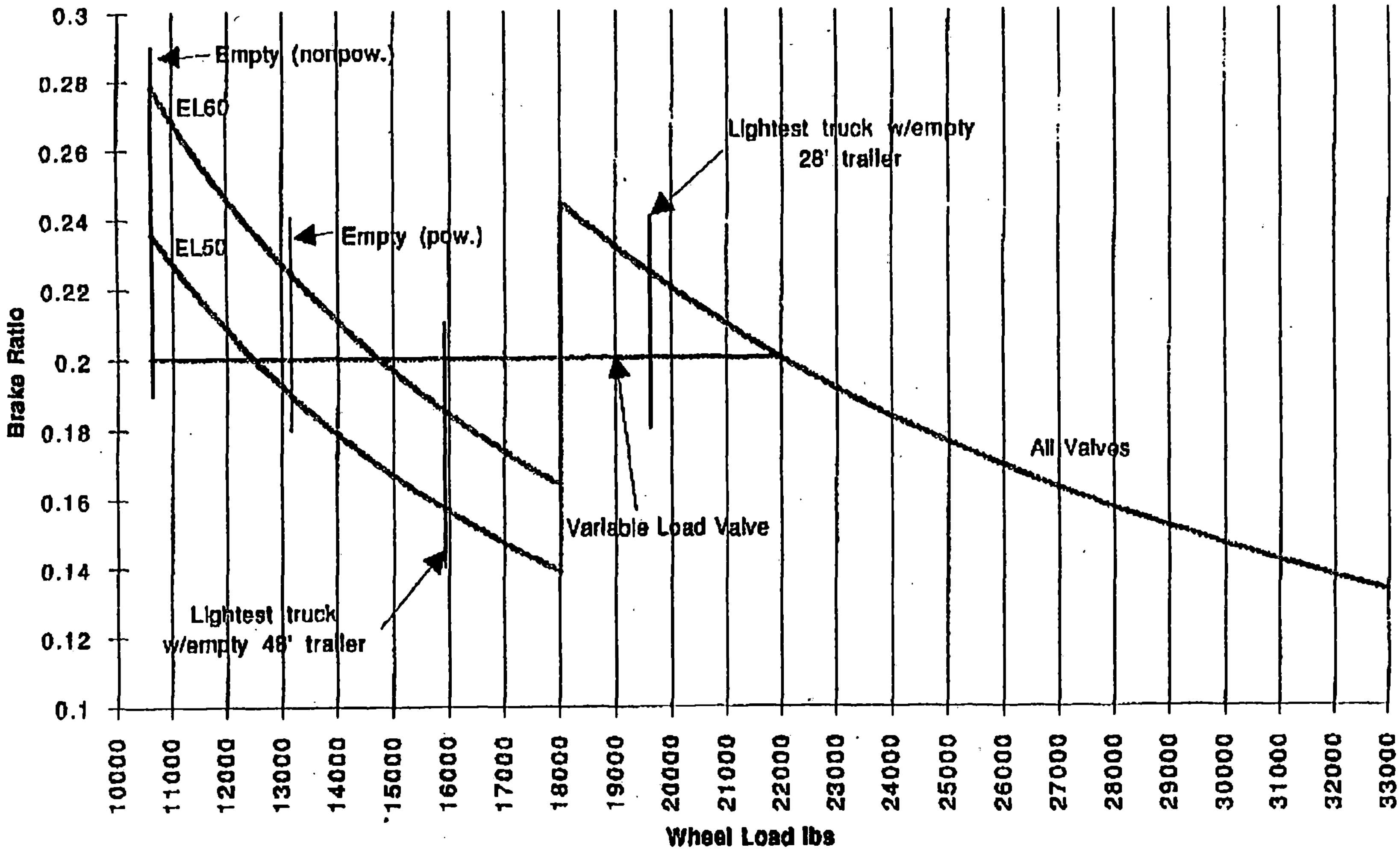
Brake Valve Comparisons

and

Brake Shoe Force Measurements

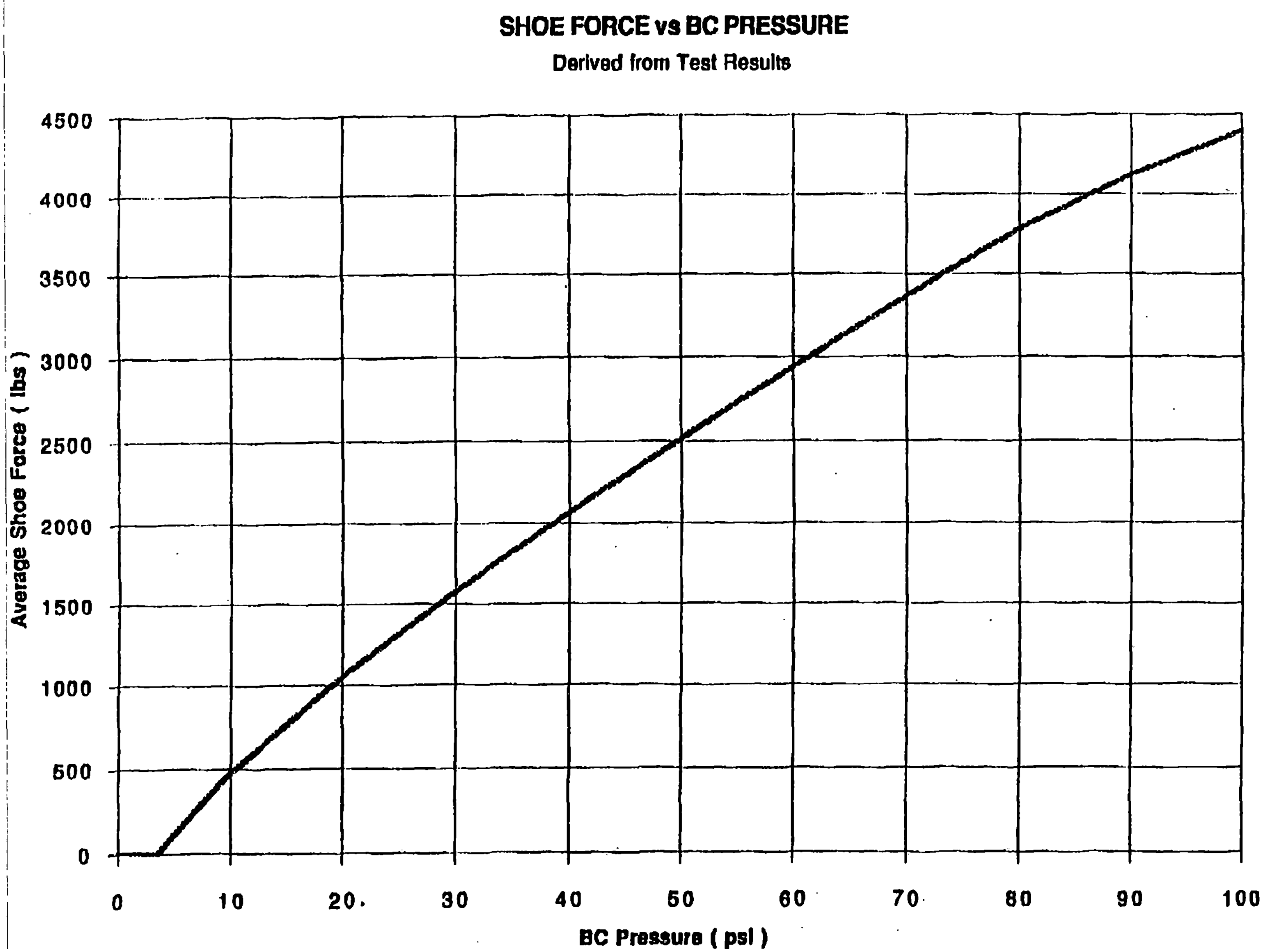
Iron Highway - Phase II Tests

COMPARISON OF EL60, EL50 & VARIABLE LOAD VALVE



AAR Min. BR= .085, Max BR=.30

JWC 4-12-94



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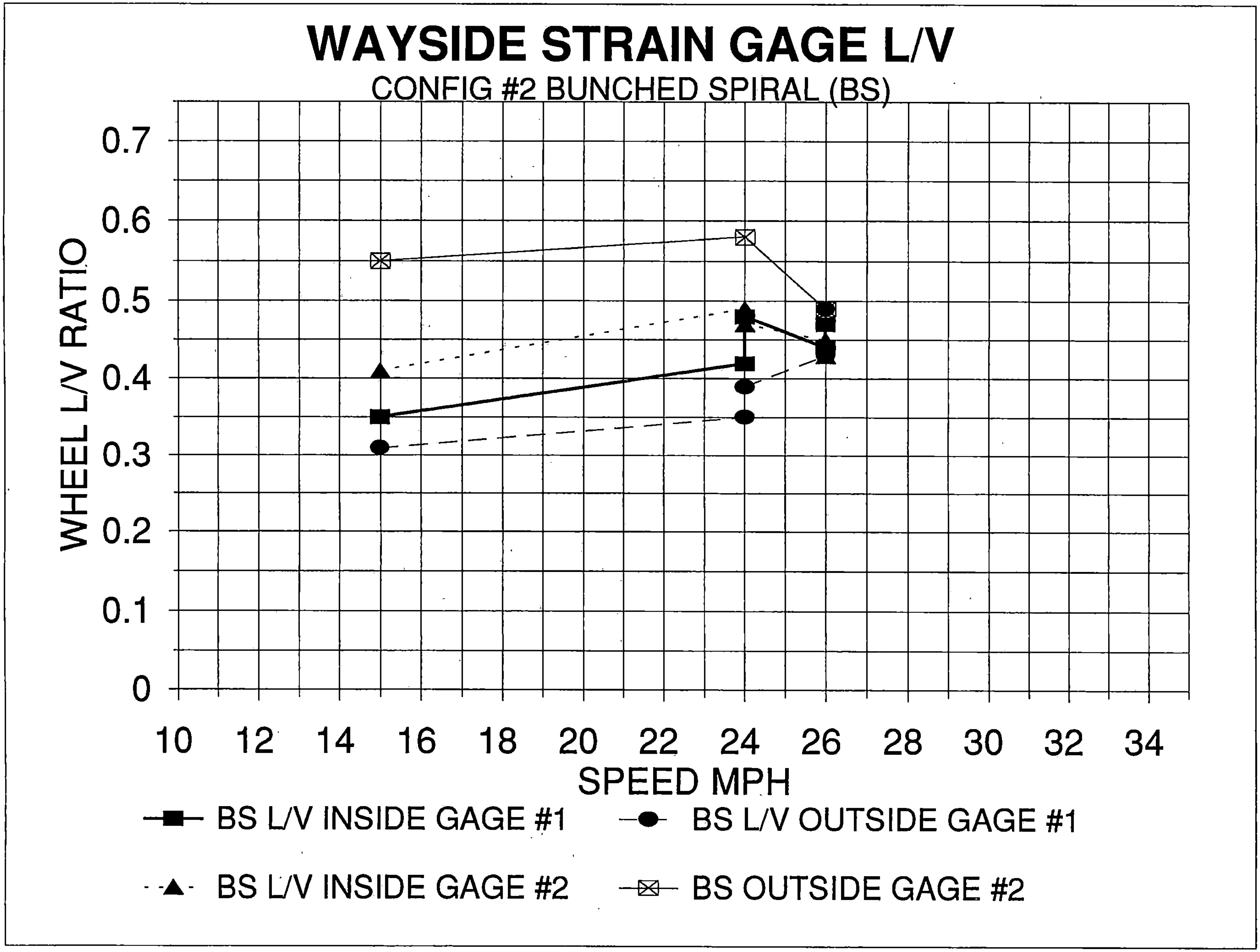
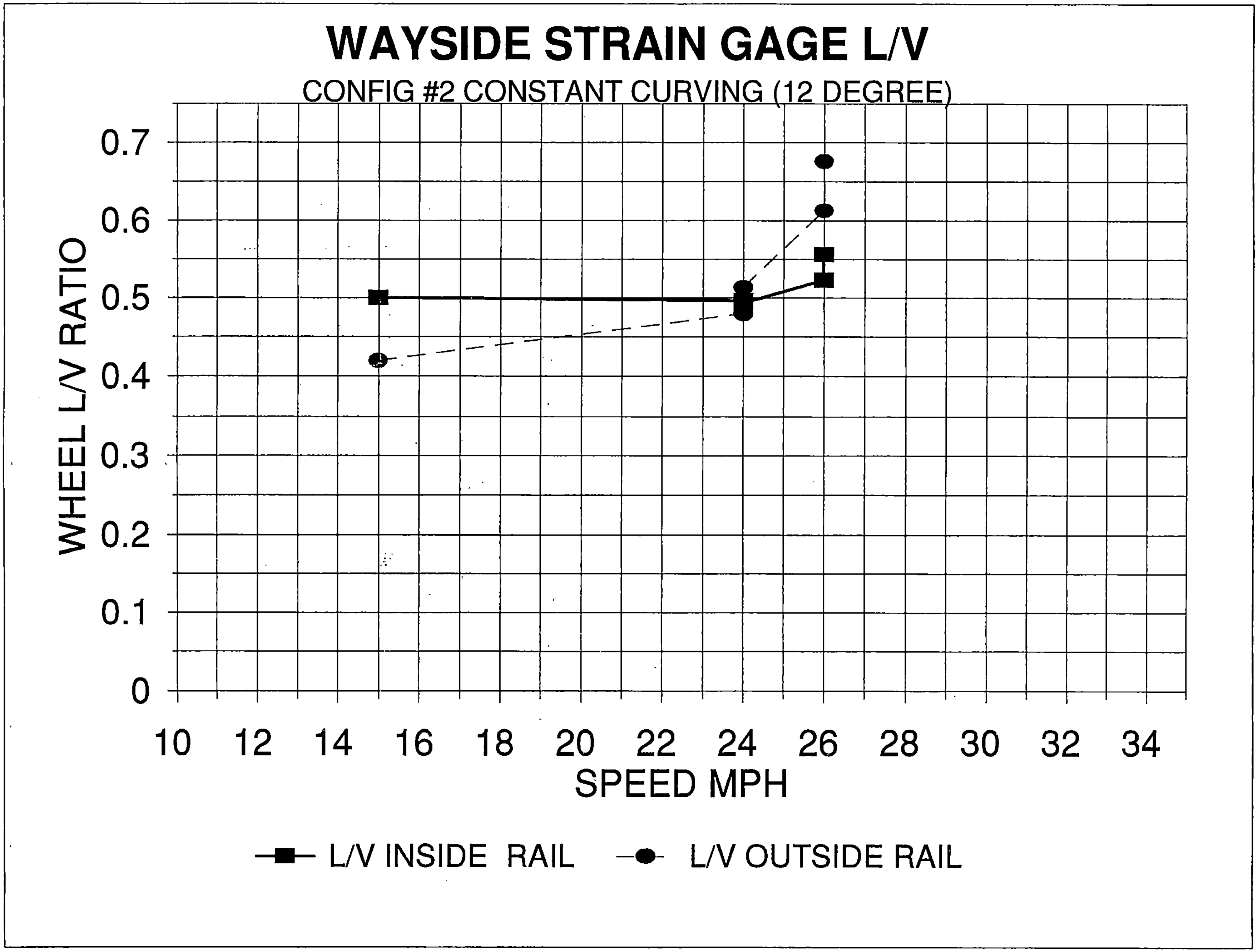
Appendix C

Wayside Strain Gage L/V

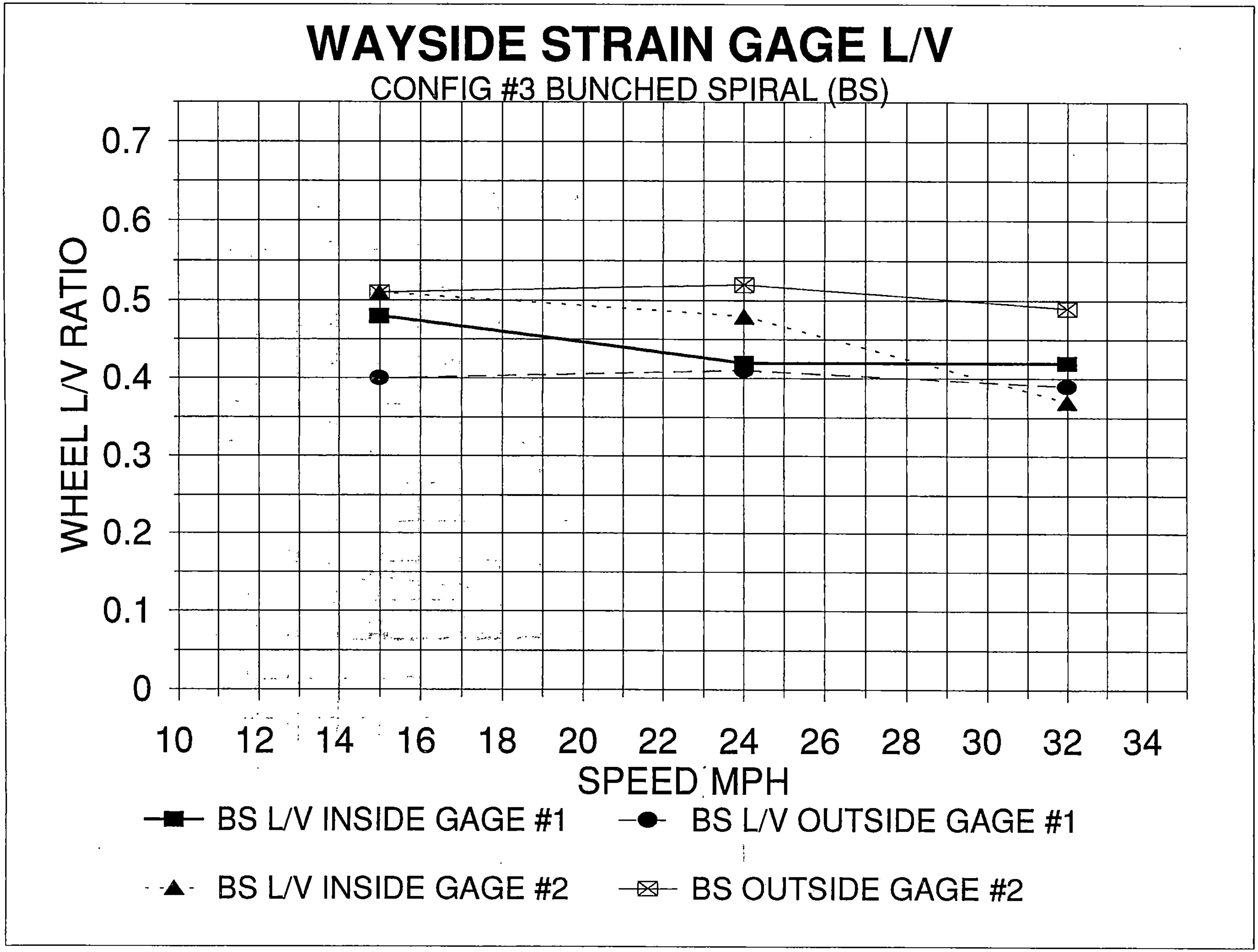
Maximum Wheel L/V's in Test Consist

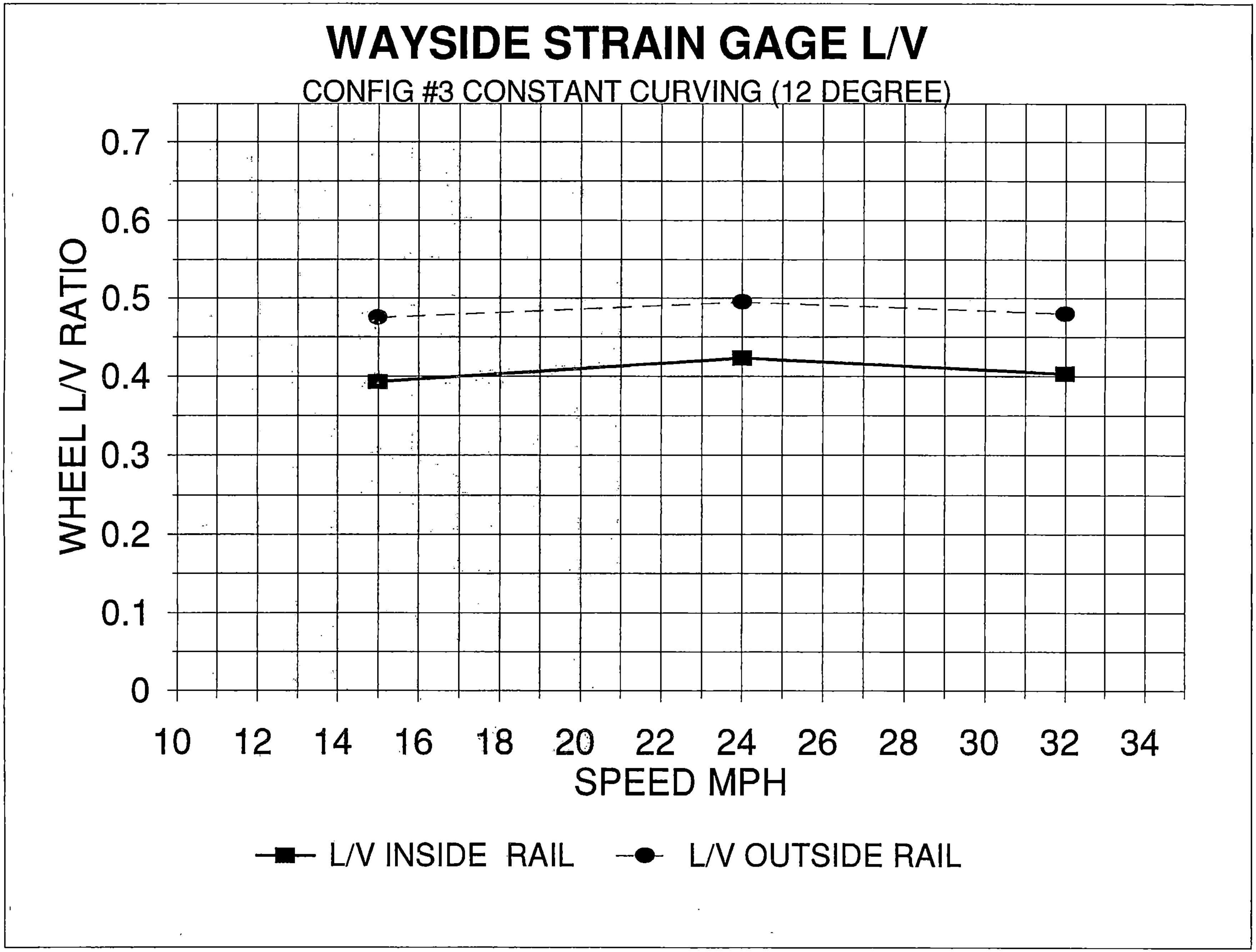


WAYSIDE STRAIN GAGE L/V
CONFIG #2 BUNCHED SPIRAL (BS)
WHEEL L/V RATIO
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
10
12
14
16
18
20
22
24
26
28
30
32
34
SPEED MPH
BS L/V INSIDE GAGE #1
BS L/V OUTSIDE GAGE #1
BS L/V INSIDE GAGE #2
BS OUTSIDE GAGE #2



WAYSIDE STRAIN GAGE L/V
CONFIG #2 CONSTANT CURVING (12 DEGREE)
WHEEL L/V RATIO
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
10
12
14
16
18
20
22
24
26
28
30
32
34
SPEED MPH
L/V INSIDE RAIL
L/V OUTSIDE RAIL


WAYSIDE STRAIN GAGE L/V
CONFIG #3 BUNCHED SPIRAL (BS)
WHEEL L/V RATIO
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
10
12
14
16
18
20
22
24
26
28
30
32
34
SPEED MPH
BS L/V INSIDE GAGE #1
BS L/V OUTSIDE GAGE #1
BS L/V INSIDE GAGE #2
BS OUTSIDE GAGE #2


WAYSIDE STRAIN GAGE L/V
CONFIG #3 CONSTANT CURVING (12 DEGREE)
WHEEL L/V RATIO
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
10
12
14
16
18
20
22
24
26
28
30
32
34
SPEED MPH
L/V INSIDE RAIL
L/V OUTSIDE RAIL

Association of American Railroads

Research & Test Department
Washington D.C. • Pueblo, Colorado

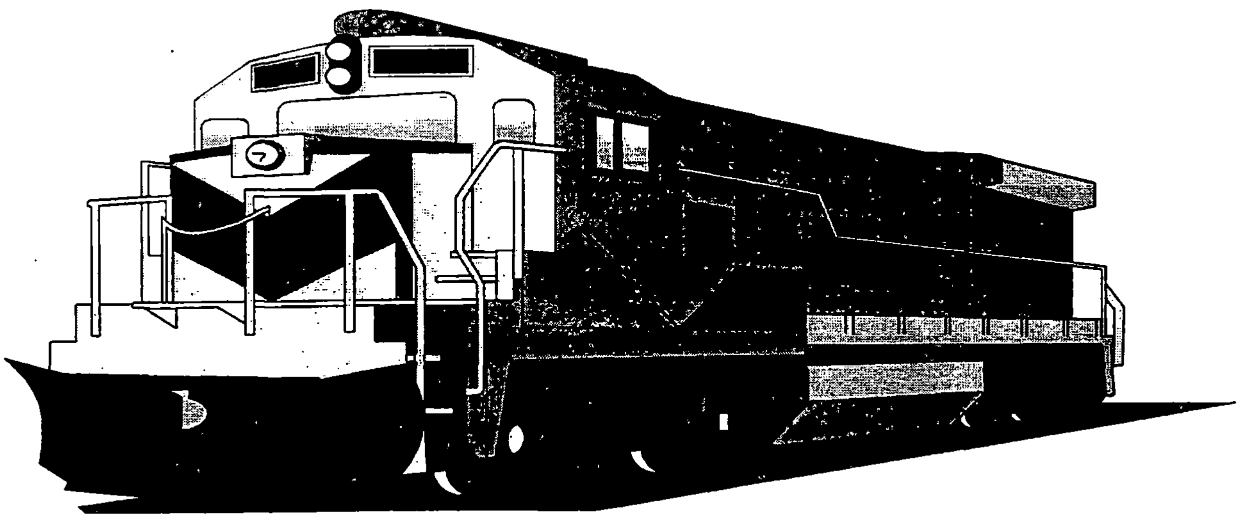
U.S. Department of Transportation
Federal Railroad Administration

A Comprehensive Study of Problems in the Old Metairie Railroad Corridor in Jefferson and Orleans Parishes in Louisiana

Volume I

Office of Railroad Development
Washington, DC 20590

DTFR53-95-C-00019



DOT-FRA-RDV-97-01A

Final Report
November 1996

This document is available to the public through the National Technical Information Service, Springfield, VA 22161

U.S. Department of Transportation
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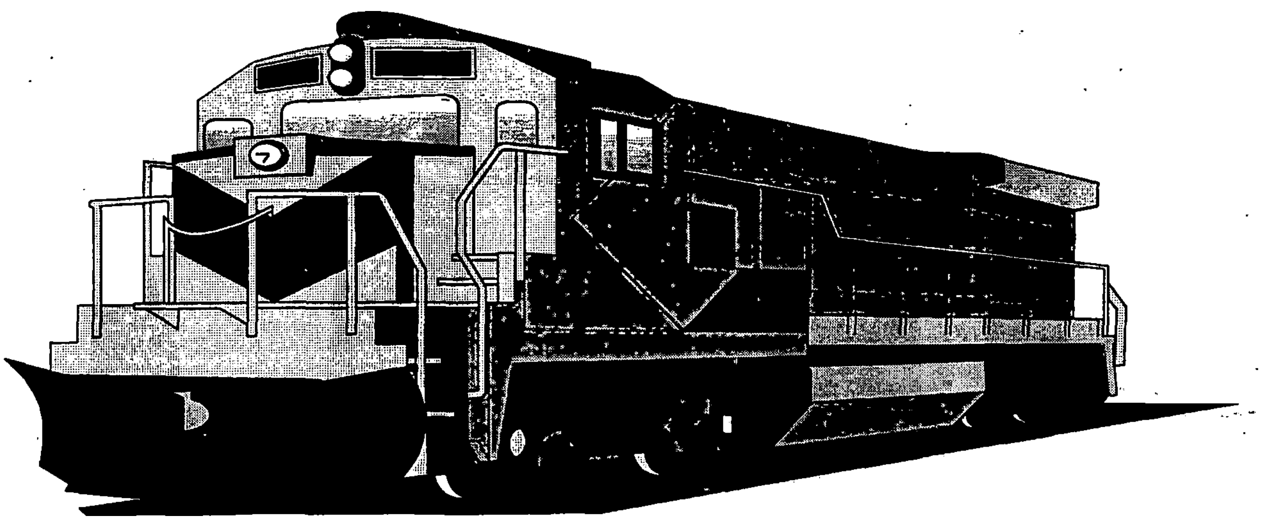

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Acknowledgements

The Federal Railroad Administration wishes to thank CONSAD Research Corporation and RailLease, Inc., and all those federal, state, and local officials who participated in this study for their cooperation, assistance, and support. In addition, the cooperation and assistance of the railroads, especially those members of the railroad technical advisory committee, are greatly appreciated. Moreover, the residents of Jefferson Parish and the surrounding parishes, especially those who participated in the focus group discussions, must also be thanked for their time and efforts. Numerous other private companies who contributed their time and knowledge are also to be thanked.

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Railroad Names and Abbreviations

Name	Abbreviation
CSX Transportation Company	CSX
Burlington Northern/Atchison Santa Fe	BN/ATSF
Illinois Central Railroad	IC
Kansas City Southern Railway Company	KCS
Louisville and Nashville Railroad Company	LN
Missouri Pacific Railroad Company	MP
New Orleans Public Belt Railroad	NOPB
New Orleans Terminal Railroad Company	NOT
New Orleans Union Passenger Terminal	NOUPT
Norfolk Southern Railroad	NS
Southern Pacific Transportation Company	SP
Union Pacific Railroad	UP

EXECUTIVE SUMMARY

I. Background and Purpose

This study has been prepared in response to the conference committee report accompanying the DOT Appropriations Act of 1995, which included direction and funding to the Federal Railroad Administration (FRA) "to conduct a comprehensive study of problems in the Old Metairie railroad corridor in Jefferson and Orleans Parishes in Louisiana." The FRA was directed to: "(1) identify safety problems and potential solutions regarding the transportation of hazardous materials along the corridor; (2) identify problems and potential solutions to vehicular traffic congestion along the corridor; (3) examine the railroad-community conflicts in the area; and (4) identify potential alternative track relocations." The study was to include "agency recommendations as well as cost and schedule estimates for resolving these problems."

This study describes and evaluates alternatives for resolving the railroad-community conflicts in the Old Metairie railroad corridor, also known as the "Back Belt". The rail-community conflicts which are specifically addressed include:

- Highway grade-crossing delays and accident risks;
- Train noise, horn-sounding, and vibration in residential areas;
- Risk of hazardous materials releases; and
- Stormwater flooding due to rail right-of-way location.

The railroad right-of-way and eight grade crossings also slow traffic movements, increase highway congestion, and slow emergency evacuations during hurricanes and floods. Metairie residents cite the impacts that the railroad operations have had on their lives, their safety, and their property.

The Metairie rail corridor provides a critical connecting link in the national rail system allowing western and eastern railroads to interchange trains and provide timely through movements of intermodal and land bridge traffic. As a key component in the national, state, and regional transportation infrastructure, timely movement of freight over the Back Belt benefits and impacts the local,regional, state, and U.S. economy.

The alternatives considered for alleviating the railroad-community conflicts include:

- Relocating the railroad corridor by rebuilding the I-10 Carrollton Avenue interchange at an estimated capital cost of $57 million; or relocating the corridor North of Lake Pontchartrain at capital costs ranging from $90 to $153 million; and

- A variety of short-term, in-place rail operational changes, involving a minimum to moderate amount of capital investment.

When selected in appropriate combination, their implementation will resolve the rail-community conflicts and improve freight rail service and operations in the region. The remainder of this Executive Summary describes these alternatives and their associated costs and benefits.

II. Definition and Analysis of Alternatives

The CONSAD/RailLease study team reviewed the fifty year evolution of the rail-community conflicts and the steps taken to alleviate them. The study team focused on the following types of alternatives:

- Those which would gain the support of many organizations and entities; i.e., would be consensus alternatives;
- Those which had never been considered in detail; and
- Those which had been considered before, but which were now cast in a new light because of changed circumstances.

The study team considered various approaches to bringing about a consensus among residential groups, government entities, and the railroads. The team gave considerable attention to the possible responses and positions with respect to the rail-community conflicts and to the various possible alternatives.

A finding from this effort was that consensus could be achieved on broad principles, such as the need for resident involvement in planning decisions. However, a long-term community orientation, education, and planning process is needed in order to gain a consensus on the implementation of specific strategies. That is, consensus will not emerge automatically for the alternatives proposed. Coalitions among community groups and government entities, including public-private coalitions for project financing, will require significant effort to build. Furthermore, the alternatives, in order to be successfully implemented, will require support from a large portion of the region's populace and institutions. No single group or parish will be successful acting alone.

III. Summary of Selected Alternatives

The present study has identified and evaluated both long term relocation alternatives and short term railroad operating changes that can reduce grade crossing delays, accidents, noise, vibration, and exposure to hazardous materials experienced by Metairie and other Jefferson Parish residents. "In-place" alternatives mean that rail movements through Metairie would continue but that the adverse impacts of these movements would be lessened. The other type of alternative, called "relocation", means that the Back Belt would be completely closed and train movements would follow another route. Some of the alternatives, involving the NOPB or the rerouting of some traffic to other gateways, are "partial relocation" alternatives because some of the train traffic would remain on the Back Belt.

The alternatives selected for detailed analysis, and their prospective benefits and costs, are discussed below. Table ES.1, presented at the end of Section III.1, summarizes the in-place alternatives. Table ES.2, presented at the end of Section III.3, summarizes the relocation alternatives in Section III.2 and the partial relocation alternatives in Section III.3.

III.1 In-place Alternatives

III.1.1 Change Railroad Operations and Other Short-term Improvements

The four alternatives in this group require little or no new capital. They are difficult to cost precisely because none of the companies have detailed plans for schedule or operations changes.

However, these alternatives would significantly improve the grade crossing delay situation in Metairie and Shrewsbury.

Revise Train Schedules to Avoid Rush Hours

Schedule changes, which might require the expansion of yard trackage for staging and holding, offer the prospect of significantly reducing grade crossing blockages and grade crossing accident potentials. The benefits of rescheduling trains to times when there is little highway traffic at grade crossings would be substantial in terms of time saved by drivers and passengers. Using models which calculate the accumulated time saved and the value of the time saved, the study team found that rescheduling trains to the night time hours (10PM to 6AM) would save motorists about $22 million (discounted to the present), in vehicle operating costs and the value of time saved over a 25 year period.

However, presently, there is no master train schedule governing train operating movements over the Back Belt. In other words, alleviating railroad-community conflicts through "schedule changes" implies that the railroads cooperatively develop a joint schedule or, failing that, establish a new coordinating entity to institute an overall multi-company schedule.

Decrease Train Transit Time Through the Corridor

The average time required for trains to transit the Metairie corridor can be reduced by constructing shallower turnouts and by improving the Metairie Road crossover and the East Bridge Junction, discussed in Section III.3.1, below. These changes will eliminate train braking and acceleration at each crossover and allow trains to maintain the full 20 miles per hour speed limit over the Back

Belt, rather than the current average of 12.5 mph. This will reduce rail operating costs, decrease train transit times through Metairie, and cut grade crossing blockage time.

Eliminate Train Stoppage on the Back Belt

The train stoppages of interest are related to the transfer of a train from the control of one railroad to the control of another. Seven rail companies operate in the region, including six major Class I railroads and the NOPB. Although interchanges among any of the seven can occur, the most common would be between the two eastern railroads (NS and CSX) and the four western and midwestern railroads (IC, KCS, SP, and UP).

These interchanges require not only crew changes, but also inspections. Any irregularity can cause an extended stoppage of several hours, during which time the train could be blocking one or more grade crossings.

Elimination of stoppages would require thorough inspections before the trains come to the interchange point and/or relocation of these interchange points so that interchanges occur at points well separated from grade crossings and from points where stoppage can cause chain-reaction delays of succeeding trains. In the constricted and congested New Orleans gateway region, such points are few in number.

Reduce Number of Trains by Train Consolidation or Rerouting

This alternative could be achieved by one of two strategies:

1. Increase the length of trains so that the total number of trains is reduced.

2. Reroute some of the trains through Baton Rouge or other gateways:

a. This alternative would be facilitated by the merger of two or more of the following four railroads: UP, SP, IC, and KCS, as an example. Such a merger would provide more flexibility in train consolidation.

b. Another merger possibility would involve either the NS or CSX with one of the other four railroads. This would create a transcontinental rail company with greater flexibility in choosing gateways.

c. The third alternative would involve the railroads establishing a joint bilateral agreement to reroute traffic through other gateways.

III.1.2 Improve Grade Crossing Protection as a Possible Alternative to Sounding Train Horns

According to the FRA Office of Safety, approximately 165 communities in the United States maintain local train horn sounding bans, most of which are 24-hour bans. These bans affect approximately 1,400 of the 167,000 public highway-rail crossings. Informal restrictions on the use of train horns exist in additional communities. On average, FRA estimates that train horn sounding bans drive up the risk of a crossing accident by approximately 84 percent.

Since 1992, when remaining crossings in Metairie were equipped with automated warning systems (flashing lights and gates), trains have been prohibited from routinely sounding their air horns on their approach to highway-rail crossings. The existing ban is viewed as having significantly reduced the impact of rail operations on the quiet of the community, and the installation of automated warning devices helped to reduce the risk of crossing accidents.

In 1994, the Swift Rail Development Act was enacted, mandating that FRA require trains to use audible warnings when approaching grade crossings, preempting state and local laws. The legislation permits FRA to make exceptions where safety does not require the use of train horns or where supplemental safety measures have been instituted to compensate for the loss of the audible warning. Conventional warning systems such as flashing lights and gates (blocking only half the roadway) do not qualify as supplemental measures, since it was assumed that these measures have been employed to meet an existing safety need.

FRA has not yet proposed regulations to implement this statute, but expects to do so in 1997. Options under consideration for supplemental safety measures include four-quadrant gates, gates with median barriers, paired one-way streets, photo enforcement programs, and other law enforcement options combined with public awareness campaigns. FRA has indicated an interest in considering crossing safety strategies that take into consideration overall opportunities for risk reduction on rail corridors, including options that include consolidation of crossings with enhancement of warning systems at remaining crossings. Given the recent accident experience in Metairie, the generally good sight distances, and the existence of newer generation automated warning devices, the opportunities for making marginal improvements in crossing safety, while retaining train horn sounding bans, appear to be excellent.

III.1.3 Examine Present Economic Incentives for Railroad Cooperation

Over the years of the Back Belt controversy, the railroad companies have taken some steps, such as removal of the old "Long Siding" in 1988, which gave evidence that they were, to a degree, sympathetic to the residents' complaints. In addition, Jefferson Parish has, from time to time, created ordinances which were and are intended to pressure the railroads to better manage the movement of trains, with the objective of reducing grade crossing delays. However, interviews conducted in 1996 revealed that the Sheriff's Department is not enforcing the ordinances. Enforcement of the existing Parish ordinances, by the issuing of citations by the Sheriff's Department and by the prosecution of offenders by the district attorney, when trains block crossings for more than five minutes, can also be used as an incentive to bring about improvements.

III.1.4 Close and/or Separate Grade Crossings

Large areas of both Orleans and Jefferson Parishes have already achieved complete separations of track and highway by overpasses or underpasses. However, in spite of extensive study and analysis since 1961, residents have rejected these solutions stating the rationale that they represent an increased permanence of the railroad's presence rather than a step towards eventual relocation.

Table ES.1: Overview of Benefit Cost Factors For In-place Alternatives

In-place Alternatives	Time Frame for Implementing Alternative	Benefit Factors				Cost Factors			Primary Reference Section(s)
		Impact on Highway Traffic Delays	Highway and Grade Crossing Accidents	Impact on Exposure to Hazardous Materials	Impact on Land Use and Economic Development	Capital Costs[1]	Operating Costs	Other Cost Factors, Including Environmental	
(1) Revise train schedules to avoid rush hours.	Short Term	Savings in highway traffic time delay could be $22 million over 25 year period (discounted to present).	Rescheduling trains to low highway volume hours will probably reduce accidents.	Direct exposure of residents to potential hazardous materials release is decreased.	Increased space required at interchange yards for staging and holding.	Increased yard trackage required for staging and holding.	Could increase car (per diem) costs and, to the extent to which rescheduling of crews is not feasible, could increase crew costs.	More trains running at night could motivate increased sound proofing of homes.	Sections 5.1.1, 6.2.5, and 6.4; and Tables 6.9 and 6.28.
(2) Decrease transit times of trains through the corridor by track improvements.	Short Term	Train speed increase will reduce grade crossing delay costs by $5.5 million over 25 year period (discounted to present).	Increase in train speeds could make accidents more severe.	As long as train speeds stay below approx. 20 mph, no significant change in potential release of hazardous materials would be expected.	Increases in average train speed could increase the perceived danger from derailed cars and motivate property owners gradually to eliminate structures near tracks.	Shallower turnouts must be built to allow higher operating speeds through the NOPB-IC crossing, and East Bridge Junction (EBJ) must be double-tracked (estimated at $4 million for EBJ in 1995 dollars).	Slight crew cost savings. Also, steadier speeds should lead to substantial operating savings.	Increased speeds will produce increased engine noise and, especially at the Carrollton Curve approach to Metairie Rd., increased wheel squeal.	Sections 5.1.1 and 6.2.5; and Table 6.9.
(3) Eliminate train stoppage on the Back Belt by changing interchange points, improving operations, and double tracking the East Bridge Junction.	Short Term	Reducing stops would be equivalent to increasing average train operating speeds. This could lead to highway traffic delay savings of $5.5 million over a 25 year period (discounted to present).	Reducing stops would reduce grade crossing blockage time, and thus would reduce chances of vehicle-vehicle accidents.	Reducing stops reduces exposure to hazardous materials.	No effect.	East Bridge Junction improvements are estimated to cost $4 million (in 1995 dollars).	Reduction of train stops will reduce operating costs.	Potentially eliminate need for additional locomotive and car inspections (at Central Ave.)	Sections 5.1.1 and 6.2.5; and Table 6.9.
(4) Reduce number of trains through Metairie by consolidation or rerouting of trains.	Short Term	Reduction of number of trains could lead to savings in highway traffic delays.	Rail-highway accident potential may decrease as the number of trains and frequency of gate closings decreases.	Increase in cars per train potentially increases possibility of a train accident, and if the additional cars contain hazardous materials, then the potential risk of a release would increase. Even if the probability of a train accident remains the same, any increase in the number of hazmat cars per train will increase the potential risk of a release, if an accident occurs.	May need to lengthen Gentilly, Oliver, and Avondale receiving and departure tracks, and increase train make-up switching.	May lead to an increase in make-up switching costs.	Savings for railroads, but may need more locomotives; crew time savings.	HPL Bridge coupler load situation limits train length.	Section 5.1.1.

Table ES.1: Overview of Benefit Cost Factors For In-place Alternatives (continued)

In-place Alternatives	Time Frame for Im-plementing Alternative	Benefit Factors				Cost Factors			Primary Reference Section(s)
		Impact on Highway Traffic Delays	Highway and Grade Crossing Accidents	Impact on Exposure to Hazardous Materials	Impact on Land Use and Economic Development	Capital Costs[1]	Operating Costs	Other Cost Factors, Including Environmental	
(5) Improve grade crossing protection as a possible alternative to sounding train horns.	Short to Medium Term	No effect.	This alternative directly relates to safety. It implies that train-auto accidents will be 99% eliminated; auto-auto accidents will be reduced.	A grade crossing accident could cause a derailment. Thus, risk of hazardous materials release is potentially reduced by this alternative.	Improved safety should increase neighborhood land values. An alternative to sounding horns for the community.	To convert existing grade crossing with barriers to new design is estimated at $49,400 per single track crossing.	Small increase in maintenance and operating costs of grade crossing devices at some crossings.	Redesigning streets and street intersections will cause some inconvenience until residents develop new traffic patterns.	Section 5.1.2; and Appendices B and I.
(6) Examine present economic incentives for railroad cooperation.	Short to Medium Term	Could potentially achieve savings from highway delay reductions as identified above for Alternative 1. Optimal scheduling would reduce stops and optimize operating speeds.	Depends on how much the incentives affect schedules; see Alternative 1, above. Optimal scheduling would reduce blockage and probability of accidents.	Depends on how the incentives change schedules; possibly no effect or impacts described in Alternative 1. Reduced train delays and stops would reduce exposure.	Could increase housing values by a small amount. Overall improved rail service in region.	No effect.	Depends on how much the schedules are changed. Implementing master schedule would involve significant one-time costs. Some permanent personnel costs.	An increase in economic incentives would result in additional administrative and other costs, but would be offset by additional revenues from fine collection.	Section 5.1.4.
(7) Close and/or separate grade crossings.	Short to Medium Term	Total elimination of delay by grade separation at all grade crossings would save $42.3 million from 1998 through 2020 (discounted to present). However, closing grade crossings would save the delay which occurs there, but potentially, the delay would be shifted to some other location.	Both separation and closing would eliminate highway-rail accidents at the crossings. Potentially, all highway accidents related to the existence of the crossings would also be eliminated.	Rail-highway accidents can potentially cause derailments, and grade crossing separations or closings can reduce the potential for hazmat releases which can result from these derailments.	The grade separation structures will change residential and commercial land use pattern, and street patterns, including the elimination of substantial amounts of residential property at some locations. Overall, local economy should improve because of improved safety and traffic flow.	Capital costs for grade separations were previously estimated in FHWA (1988) for some crossings; however, these data are out of date due to changes in railroad technology.	Maintenance costs would be in regular, street maintenance budget.	Temporary inconvenience of motorists as described in Alternative 5, above.	Sections 5.1.3, 6.2.5, and 6.4; Tables 6.8 and 6.28; Appendix I; and the 1988 FHWA report.

[1] Represents undiscounted total construction costs.

III.2 Relocation Alternatives and Variants

Relocation alternatives provide for the total diversion of all Back Belt traffic to another route. This diversion means that the Back Belt could be completely closed and reallocated to another use. This new use could be viewed by the community as either a benefit or a cost. Residents who want the Back Belt removed have taken the view that they will deal with the issues concerning the alternative uses of the land "when the time comes".

III.2.1 Construct the Carrollton Curve

This alternative would most likely be the least expensive relocation alternative, in private and social costs, although significant construction would occur at the location of the present Carrollton Interchange on Interstate 10. The result of this alternative would be the establishment of a completely grade separated rail route, so that the net effect would be the complete alleviation of the delays and accident risks presently associated with the Back Belt. The new route would use the existing rail corridor, except for the short distance of the curve itself, which would run under the interchange. The route would add all of the Back Belt traffic to the IC/NOUPT route through Orleans Parish. The residents of Jefferson Parish have favored this solution for over 40 years.

Construction of a new ground level track connection underneath the Carrollton Interchange is blocked by the interchange ramps. Thus, implementing this relocation alternative would require the elevation, relocation, and reconstruction of eight of the

Carrollton Interchange highway ramps, the extension of the western elevated portion of the Airline Highway railroad overpass, the construction of an 8.75 degree curved single track underneath the Carrollton Interchange, and the elevation of two Palmetto Avenue overpasses that lie on the western approach to the interchange. The total undiscounted construction costs (in 1995 dollars) are estimated at $57 million.

III.2.2 Relocate the Rail Corridor to North of Lake Pontchartrain

This group of northern route alternatives would use IC tracks as a link across Livingston Parish and would reroute all of the Back Belt traffic across the Mississippi River bridge in Baton Rouge. The expanded use of this bridge, and its approaches, must be investigated further, but this is a corridor which is presently in use, including the bridge and the track between Baton Rouge and Hammond. The new links in these alternatives are all east of Hammond (Tangipahoa Parish).

Mississippi Central Route Alternative

The Mississippi Central route alternative is the most northern of the Baton Rouge bridge alternatives and gives an advantage to the NS traffic over the CSX traffic. The eastbound traffic would follow a corridor north from Hammond to Brookhaven, MS, then east over a partially abandoned but still available corridor to Hattiesburg, and then over a presently used corridor into Mobile, for the CSX traffic. The NS traffic would proceed north from Hattiesburg on the extension of the same corridor (New Orleans-Slidell-Hattiesburg-Meridian) which it presently uses.

This alternative requires the replacement of abandoned track, including several bridges, between Hattiesburg and Silver Hill. The NS has estimated the total undiscounted construction costs of this replacement (in 1995 dollars) to be $90 million, which is the lowest estimated cost of the three North of Lake Pontchartrain alternatives analyzed. The route is also attractive from a hazardous materials and ecological view, since CSX traffic, which presently moves along the coast from Mobile to New Orleans, would avoid coastal wetlands entirely.

Washington Parish Route Alternative and Variant

Unlike those in St. Tammany Parish, the residents of Washington Parish are aware of the economic potential of their region, and many would welcome the development of a new railroad corridor if it would open the possibility of local industrial service.

This alternative would be less circuitous for both NS and CSX traffic because, instead of traffic moving north from Hammond to Brookhaven, traffic would turn east at Amite City, LA and use a to-be-constructed new corridor across the parish to a point near Franklinton. Traffic would then be routed over an abandoned but available corridor southeast to a point near Picayune, MS.

At Picayune, NS traffic would join the same corridor described above, while CSX traffic would either continue southeast direct to Mobile, a route which would require a 104-mile new corridor, or turn south toward the existing CSX coastal route, which it would join near Ansley, MS.

The total undiscounted construction costs of the Washington Parish route (in 1995 dollars) are estimated at $147.2 million. This would be the cost of the Picayune-Ansley variant for the CSX. Costs were not derived for the Mobile-direct route which, because of the new corridor required, would be significantly more expensive. However, this route would be much more attractive environmentally, because it would avoid, completely, both the densely populated coastal route and the cities of Hattiesburg and Brookhaven.

Mid-St. Tammany Route Alternative and Variant

For this alternative, a new corridor would be required which would turn northeast from Hammond (Tangipahoa Parish) and would then turn east and cross the northern part of St. Tammany Parish, passing north of Covington. At the eastern edge of St. Tammany, the new corridor would join an abandoned IC corridor and proceed south toward Slidell.

One variant of this route would use the existing Interstate 10 corridor as a location for new bridges which would be needed to cross the three branches of the Pearl River. The other variant would use existing NS corridor and bridges. The total undiscounted construction costs of the I-10 bridge variant (in 1995 dollars) would be $153.3 million. The total undiscounted construction costs of the NS bridge variant (in 1995 dollars) are estimated at either $99.1 or $103.4 million, depending on whether the track passes to the west or to the east of the NASA Stennis Test Facility.

This Mid-St. Tammany alternative, using the NS bridge variant, has a cost in the vicinity of the Mississippi Central route alternative described above, while the I-10 bridge variant is in the cost category of the Washington Parish route alternative described above. However, all of these alternatives are different both in terms of hazardous material exposure, environmental risks, and total operating distances (see Table ES.2).

III.2.3 New Mississippi River Bridge Alternative

The Mississippi River winds south from Baton Rouge, and actually turns mostly east as it approaches New Orleans. Thus, the area across the river from New Orleans is south of the city, but is called the "West Bank" by residents. The area is highly industrialized and has its own existing rail corridors. However, any eastbound rail shipments originating on the West Bank must proceed west to cross the Huey P. Long Bridge, then east again over the Back Belt, and either through the Oliver or the Gentilly Yards.

A new rail bridge over the river somewhere east of New Orleans would simplify this route, open the West Bank for additional industry, and provide a new route for commuter rail service. Such a bridge would be extremely expensive, however, depending on the actual location, the requirements of the Coast Guard which is responsible for navigation on the river, and technical design. If such a bridge were constructed, rail traffic crossing it from the West Bank would have the option of four kinds of service: proceeding into Gentilly or Oliver Yards, moving directly onto the CSX line to Mobile, moving directly onto the NS line to Slidell, or moving onto the NOPB for access to the New Orleans port facilities.

Construction of these access routes would be expensive. These connections alone are estimated to cost (in 1995 dollars) $76 million, and the bridge would cost about $577 million, for a total undiscounted construction cost of about $653 million. If the bridge, as eventually designed, did cost that amount, it would only be justifiable in terms of significant economic development, expansion of port volume, reduction of rail congestion on the East Bank, closing of the Back Belt, reduction of traffic and accident risk on the Huey P. Long Bridge, and reduction of environmental risks west of New Orleans in the Bonnet Carre and Atchafalaya regions. As noted, such a bridge would also open the possibility of commuter rail travel from suburban areas on the West Bank.

III.3 Partial Relocation Alternatives

III.3.1 Utilize the New Orleans Public Belt Railroad Corridor

The NOPB corridor is available, and has always been available, as a viable alternative to the Back Belt. Known as the "river front route", or the Front Belt, rail companies have tried to avoid using this corridor in recent years. However, the rail traffic volume and the related congestion on the Back Belt should cause them to reconsider its potential.

This corridor connects into NS and CSX facilities in the northeast part of Orleans Parish, and travels into Jefferson Parish in the west. The Huey P. Long Bridge, owned by New Orleans, is nominally the property of the NOPB.

Use the NOPB through Orleans Parish

Prior to 1984, the UP ran four to five trains per day over the Front Belt. Reducing the number of trains now transiting the Back Belt by this number would make a very large difference in the highway traffic delays at Back Belt grade crossings. In other words, the traffic over the Back Belt is at a level where the time and operating constraints prohibit flexibility in operations and scheduling. A difference of four or five trains per 24 hours would be significant.

Improve the East Bridge Junction Connecting the Front Belt with the Huey P. Long Bridge

The point where the Front Belt and the Back Belt merge as they both approach the Huey P. Long Bridge is called the East Bridge Junction, and several other rail routes merge at that point also. The East Bridge Junction is well known as a bottleneck for rail traffic in the region. Various plans have been devised to resolve the bottleneck, yet these plans have not been implemented either by one or more of the rail companies or by a public agency. The total undiscounted construction costs (in 1995 dollars) are estimated at $4 million.

The NOPB tracks approaching the bridge from the east do not, in fact, actually transit the bottleneck. When approaching the bridge from the east, a separate track is used which bypasses the East Bridge Junction, allowing traffic to move directly onto the bridge even though the Junction may be blocked. This arrangement provides an advantage to the Front Belt trains which may outweigh the fact that it is 10 miles longer than the Back Belt, and that train operating speeds on it may be a few miles per hour slower.

Create a Terminal Switching Carrier

The Front Belt corridor is owned by the NOPB, which is also an operating railroad owned by New Orleans, but with authority from Louisiana to own and operate rail and bridge facilities in the New Orleans area. The NOPB could become a terminal switching carrier (TSC) for the New Orleans Gateway. This arrangement would mean that major rail companies would not transit the Back Belt themselves; instead, their freight cars would be moved by the TSC. The choice of the Front Belt or the Back Belt would be made by the TSC, and operations problems of the major rail companies would not spill over onto the Back Belt, the Front Belt, the East Bridge Junction, or the Huey P. Long Bridge.

Improve the Huey P. Long Bridge Maintenance Schedules

The Huey P. Long Bridge is the longest and highest steel railroad bridge in the United States, and it also carries four lanes of highway traffic. Maintenance on the bridge is performed on a year round, 40 hours per week basis. This schedule has become institutionalized to the point that consultants retained to review maintenance practices stated that attempting to reduce the on-bridge maintenance activities below a four-day schedule would raise personnel management problems.

The on-bridge maintenance requires that one of the two rail tracks be closed. This has caused complaints from the rail companies, thus adding one more complication to the operational situation described in Section III.1.1, above. Presumably, if operational difficulties become so disruptive that the rail companies begin to notice significant revenue or profit reductions, one or more of the above strategies will be implemented.

III.3.2 Relocate Traffic, Especially Hazardous Materials, to Other Gateways

The control of the routing of hazardous materials by public agencies, especially materials carried by trucks, has gained wide acceptance both by carriers and by shippers. However, such control has not become widely applied to rail companies. Instead, some voluntary adjustment of routes by shippers has occurred. Given these trends, and the very high volumes of hazardous materials carried by rail in the New Orleans region (an estimated 8.2 million tons in 1994), it is likely that some legal pressure will come to bear on shippers, rail companies, or both.

Moreover, results of interviews with rail company officials suggest that they have substantial flexibility in choosing gateways, and that the relative advantages and disadvantages of a gateway could easily shift. Under these conditions, rail companies might well consider shifting some traffic, especially hazardous materials cars, to another gateway, assuming none of the relocation alternatives described above has come into existence.

Table ES.2: Overview of Benefit Cost Factors For Relocation Alternatives

Relocation and Partial Relocation Alternatives	Time Frame for Implementing Alternative	Benefit Factors				Cost Factors			Primary Reference Section(s)
		Impact on Highway Traffic Delays	Highway and Grade Crossing Accidents	Impact on Exposure to Hazardous Materials	Impact on Land Use and Economic Development	Capital Costs[1]	Operating Costs[2]	Other Cost Factors, Including Environmental	
(1) Construct the Carrollton Curve and reroute all rail traffic from the Back Belt.	Medium Term	The new route would be totally grade separated, thus saving all of the costs of the 8 crossings analyzed. *Time delay costs are* $34.3 million over 20 years (discounted to present).	Elimination of train related accidents on the Back Belt.	Increases potential exposure of I-10 travelers and residents on streets abutting or in the proximity of I-10, while decreasing potential exposure of Back Belt residents.	Back Belt corridor could become available for rezoning and redevelopment. Increased rail traffic on the NOUPT/IC route would impact on land values.	$57 million (1995 dollars).	Increased operating costs for railroads over the 1.2 mile longer route could be offset by smoother operations, *scheduling improvements*, reduced accident costs, and reduced grade crossing maintenance.	Railroads would gain benefits from land redevelopment of old Back Belt corridor.	Sections 5.1.5, 5.2, 6.1.1, 6.2.5, 6.3.4.5, and 6.4; Appendix M; and Tables 6.8 and 6.28.
(2) Northern Routes: Mississippi Central (Baton Rouge-Hammond-Brookhaven-Hattiesburg-Mobile).	Medium to Long Term	Uses existing or recently abandoned routes with mostly low highway traffic grade crossings.	Assume small net reduction or no change in accidents.	This alternative would provide net reduction of exposure in both MS and LA.	Some potential for commuter rail, e.g., Hattiesburg-Mobile. Note: corridor between Hattiesburg and Silver Hill would be reestablished.	$90 million (1995 dollars)	Rail operating costs are a function of distance. The SP/CSX route will increase by 69 miles, or 17% over present Beaumont to Mobile distance. The SP/NS route will increase by 3 miles over the present Beaumont to Hattiesburg route. Other cost factors, such as interchange and labor costs, will not necessarily increase as much.	Crew time and other operating costs will depend on yard and interchange factors. This route will significantly reroute hazardous materials away from coastal zones.	Sections 5.1.6, 6.1.2, and 6.3.4.5; and Appendix N.
(3) Northern Routes: Washington Parish (Baton Rouge-Hammond-Amite City-Rio-Ansley-Mobile).	Medium to Long Term	This is a rural, low population density route. Assume almost 100% net reduction in highway traffic delay.	The Washington Parish portion of this route is a rural, low population density route. If most new crossings are separated , assume net reduction, or no change, in accidents.	Net gain in exposure for Mississippi because of additional miles in Pearl River and Hancock Counties.	Assume Washington Parish (and possibly some counties in Mississippi) would base economic development on new rail corridor. Route could also be used for commuting from Franklinton to Baton Rouge.	$147.2 million (1995 dollars)	The SP/CSX route will increase by 8 miles, or 2%, over the present Beaumont-Mobile route. The SP/NS route will decrease by 22 miles, or 6%, below the present Beaumont-Hattiesburg route.	Same as above. Also , a possible variant of this route, the Rio-Mobile direct route, potentially reduces ecological risk by eliminating the coastal Ansley-Pascagoula route.	Sections 5.1.6, 6.1.2, and 6.3.4.5; and Appendix N.
(4) Northern Routes: Mid-St. Tammany Parish: variant 1 uses I-10/I-12 corridor to cross Pearl River; variant 2 uses NS Bridge.	Medium to Long Term	Complete removal of rail traffic from Back Belt is assumed, but 34 new crossings, with 8 requiring gates, would be constructed in St. Tammany Parish.	No further accidents would occur in Metairie, but some would occur in St. Tammany.	This alternative would reduce the exposure of persons in the NO region, but increase the exposure of persons in the Hancock County, MS region.	The rail route proposed would not be intended to serve local industries. Also it would not be intended for passenger rail travel. But these features could be added.	For variant 1, $153.3 million (1995 dollars). For variant 2, $99.1 to $103.4 million (1995 dollars).	The SP/CSX route will decrease 18 miles, or 4%, below the present Beaumont to Mobile route. The SP/NS route will decrease by 28 miles, or 7%, below the present Beaumont to Hattiesburg route.	Same as above.	Sections 5.1.6, 6.1.2, and 6.3.4.5; and Appendix N.

Table ES.2: Overview of Benefit Cost Factors For Relocation Alternatives (continued)

Relocation and Partial Relocation Alternatives	Time Frame for Im-plementing Alternative	Benefit Factors				Cost Factors			Primary Reference Section(s)
		Impact on Highway Traffic Delays	Highway and Grade Crossing Accidents	Impact on Exposure to Hazardous Materials	Impact on Land Use and Economic Development	Capital Costs[1]	Operating Costs[2]	Other Cost Factors, Including Environmental	
(5) Southern Route: New Mississippi River Bridge (Route 47 and I-510 Extension)	Long Term	This alternative could potentially be built with no new at-grade crossings, but some existing crossings would experience significantly increased blocking. Assume small net increase in delays, unless new separations are constructed.	Same problem as with grade crossing delays. Assume small net increase in accidents, unless new separations are constructed.	This alternative would have no effect on residents in MS, but would slightly increase exposure of residents in LA. However, more detailed analysis is needed because this increase was based on average parish population density.	This alternative would have very positive impact on economic development of the West Bank, especially Plaquemines Parish.	$653 million (1995 dollars)	The SP/CSX route will decrease 9 miles, or 2%, below the present Beaumont to Mobile route. The SP/NS route will decrease by 22 miles, or 6%, below the present Beaumont to Hattiesburg route.	Operating costs of the new bridge would be incurred. However, no significant change in environmental exposure would be expected.	Sections 5.1.7, 6.1.3, and 6.3.4.5.
(6) Use NOPB river front route-run 5 trains per day, mostly westbound.	Short to Medium Term	This alternative would reduce traffic delays in Metairie, but increase them on the grade crossings in the French Quarter and waterfront.	Substantial crossing protection improvements or grade separations on the NOPB would be required.	The average population density in Orleans Parish (NOPB) is approximately twice that of Jefferson Parish (Back Belt).	Improvements of safety along the NOPB would facilitate economic development.	About $49,400 per crossing for highest level, median barrier protection.	The NOPB is about 10 miles longer than the Back Belt, but access to the H. P. Long Bridge is easier than from the Back Belt and overall transit time might be about the same.	NOPB trackage rights fees, but these could be set to compete with NS-Back Belt.	Sections 5.1.9, 6.2.5, and 6.4; Tables 6.9 and 6.28; and Appendices B and K.1.
(7) Improve East Bridge Junction - add double track and better control to smooth operations through bottleneck.	Short to Medium Term	All rail traffic would move more smoothly over the Back Belt and also the IC tracks from St. Charles Parish. Thus, highway traffic delays in both areas would be reduced.	Overall reduced transit times for trains would improve safety.	Reduced stops and train delays would reduce exposure time.	Improved overall train operations would reduce shippers' costs, and railroads might be able to reduce the size of yards.	$4 million (1995 dollars)	Should be reduced.	Risk factors for railroad companies because control could still be arbitrarily biased.	Sections 5.1.9 and 6.2.5; and Table 6.9.
(8) Create Terminal Switching Carrier (TSC) - incorporate, desig-nate, or otherwise institute TSC to coordinate all rail movements in NO region.	Short to Medium Term	Improved scheduling and reduction of train delays would reduce highway traffic delay.	Improved scheduling would improve safety.	Same as above.	Same as above.	If NOPB is used, then additional capital would be very small.	Costs would be paid by the involved railroads, and would probably be less than what they pay now since the TSC would be non-profit.	Labor agreements would be complicated by unusual operating procedures (as versus line-haul railroad) but might be cheaper.	Sections 5.1.9, 6.2.5, and 6.4; and Tables 6.9 and 6.28.

Table ES.2: Overview of Benefit Cost Factors For Relocation Alternatives (continued)

Relocation and Partial Relocation Alternatives	Time Frame for Im-plementing Alternative	Benefit Factors				Cost Factors			Primary Reference Section(s)
		Impact on Highway Traffic Delays	Highway and Grade Crossing Accidents	Impact on Exposure to Hazardous Materials	Impact on Land Use and Economic Development	Capital Costs[1]	Operating Costs[2]	Other Cost Factors, Including Environmental	
(9) Improve Huey P. Long Bridge Operations - reduce stops and delays by changing maintenance schedule.	Short to Medium Term	Same as above.	Same as above.	Same as above. Note that a reduction of time for trains being on the bridge would reduce the risk of very serious dispersion of hazardous materials.	Same as above.	Although various capital improvements have been suggested, none has shown to be essential to the improvement of operations.	Presently, the bridge maintenance is mostly paid by the UP. This cost could be shifted to a TSC (see Alternative 8, above).	Bridge structure monitoring is done under contract.	Section 5.1.9; and Appendices G and K.1.
(10) Redirect hazardous materials traffic to other gateways/ routes.	Medium to Long Term	The number of hazmat rail cars crossing the Back Belt is about 19% of all cars, but the amount of pass-through tonnage available for rerouting to other gateways is estimated at 38%. These percent-ages imply the possible reduction of about 5 cars per train per day, or possibly the equivalent of one train per day. Elimination of one train per day would contribute slightly to the flexibility in scheduling trains to avoid rush hours.	Improved scheduling of trains would improve safety (see Alternative 8, above).	This alternative would not be feasible unless a net reduction in exposure could be achieved. To implement this alternative would require a comparative exposure analysis for each gateway.	Shifting a large percentage of rail car traffic to another gateway would have significant implications for rail yard size and other economic factors such as yard employment and maintenance.	Any capital cost impacts from this alternative would presumably occur at the alternative gateways.	Operating cost changes resulting from rerouting would be a function of changes in average distances. Because of requirements for placement of hazmat cars within a train, rerouting of such cars would reduce operating costs in the make-up yards.	In routing hazmat rail traffic, the natural environment should be another consideration, after population exposure. The New Orleans region has a sensitive natural environment, including river basins, wetlands, and coastal zones.	Sections 5.1.8 and 6.3; and Tables 6.20 and 6.22.

[1] Represents undiscounted total construction costs.
[2] All mileages are as shown on the Rand-McNally Handy Railroad Map, © Rand-McNally Company, Chicago.

IV. Review of Findings

The railroad-community conflicts in the New Orleans region, and especially in the Old Metairie neighborhood of Jefferson Parish, arise from two underlying problems:

- Growth in the region has led to highway congestion, land use competition, and environmental situations and risks which are perceived to result from the existing rail operations; and
- Rail operations in the region have reached a level where yard switching, interchange, and technologic constraints are limiting the flexibility of the rail companies, and are also limiting their choices in responding to the community conflicts.

A series of alternatives were identified which would address both of these underlying problems. The railroads and governmental organizations involved in the corridor are faced with a choice among two broad categories of alternatives:

- Those involving the relocation of the railroad traffic; and
- Those which would leave the traffic in place but reduce the impact on the community.

The relocation alternatives are, understandably, most favored by the community. However, they are not without potential impacts, though generally lesser, on other interests and tend to cost more than the in-place alternatives. Of these, one that should be given serious consideration is relocating rail traffic to an existing grade separated alignment on NOUPT trackage and rebuilding the I-10/Carrollton Avenue interchange at a cost of $57 million.

Of the in-place alternatives, the only one that would eliminate the principal community grievance -- road traffic delays at grade crossings -- would be the complete grade separation of all eight crossings. However, there appears to be significant community opposition, significant capital cost associated with this approach, as well as concerns about the feasibility of grade separations at all eight crossings. On the other hand, providing significantly improved crossing protection would cost less, provide significant safety benefits and, at the same time, provide an alternative to locomotive horn sounding (another community grievance) consistent with FRA regulations. While this would not solve the road traffic delay problem, this problem could be mitigated by a number of other in-place alternatives involving operational and physical changes that could be implemented with the cooperation of the railroads.

However, the results of focus group sessions and interviews did not provide a clear indication of exactly how residents would respond to the implementation of any given alternative. In other words, broad consensus on specific alternative strategies was not found by the study team.

In light of this condition, a period of community orientation and discussion is likely to be needed. This type of activity would help to foster the inter-parish and regional coalitions which will be required to implement the possible alternatives. No one parish or activist group will succeed in the type of program needed.

Finally, there are at least two factors which fully justify the national attention to, and the coordination of, possible developments in the New Orleans region. These are:

- The role of east-west gateways in the current rail freight system, and the possible role that control of these gateways will have in the various merger negotiations likely to develop in the near future; and

- The continued eminence of the south central region of the Unites States in the production and shipment of hazardous materials, as well as the continued high possibility of a severe hazardous materials incident, a possibility which must be viewed in conjunction with the high population densities along the entire Gulf coast and the environmental sensitivity of the coastal areas.

1.0 INTRODUCTION AND SUMMARY OF PRESENT IMPACTS

For the last 40 to 50 years, residents of Metairie, an unincorporated political subdivision of Jefferson Parish, Louisiana, have sought to eliminate grade crossing delays, locomotive and car coupling, horn sounding noise, vibration, flooding, and safety hazards created by the freight train right-of-way and railroad operations within their community. The history of these efforts (see Appendix A) and the results of two prior federally funded studies demonstrate that actions designed to resolve railroad-community problems have mitigated the impacts of railroad operations, but they have not resulted in the complete relocation of the line that residents have sought. Continuing citizen complaints and on-going safety concerns have prompted state and Congressional representatives to once again seek a better solution. In response to this pressure, Congress directed the Federal Railroad Administration to evaluate the current situation to identify alternative solutions capable of being implemented and accepted by the parties.

The purpose of Chapter 1.0 is to describe the rail and highway traffic over the affected tracks and highways, as they are today, and what they are likely to be over the next 25 years.

1.1 Study Focus: The New Orleans Terminal Railroad (NOT) or Back Belt

Currently, 23 to 27 freight trains a day move through Metairie over tracks owned by a subsidiary of NS, historically referred to as the New Orleans Terminal Railroad (NOT), or more commonly as the Back Belt. This track segment, which runs from the southwest to the northeast, extends from the East Bridge Junction (at the foot of the Huey P. Long Bridge) to the NOT Junction where it meets the CSX (see Figure 1.1). This analysis primarily focuses on that portion of the corridor running from the Shrewsbury grade crossing to the 17th Street Canal, a segment which is referred to as "the Old Metairie Railroad Corridor" (see Figure 1.2).

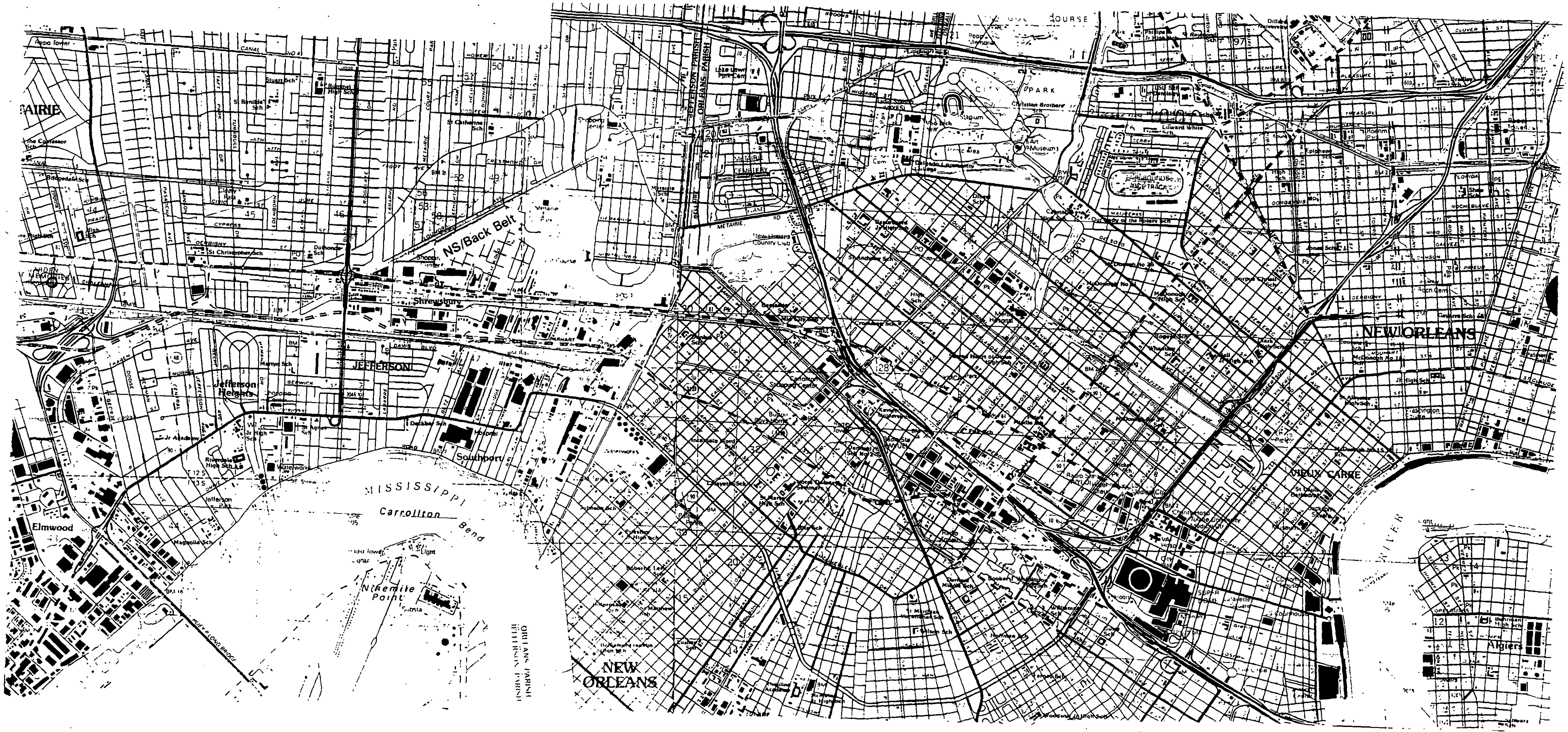
The Metairie railroad corridor links the western railroads UP and SP and the Mid-Western carriers KCS and IC with two major eastern railroads, NS and CSX. Based on train survey data collected by CONSAD and current operating schedules of the railroads, it is estimated that this 3.1 mile rail corridor carries over 700,000 railroad cars each year (empty and loaded), facilitating the interchange of approximately 2.5 percent of the nation's carloads. Given the Back Belt's important inter-connection function, it is arguably a more strategically significant railroad gateway link than Memphis, Tennessee, or St. Louis, Missouri.

1.2 Back Belt Traffic

1.2.1 Overview

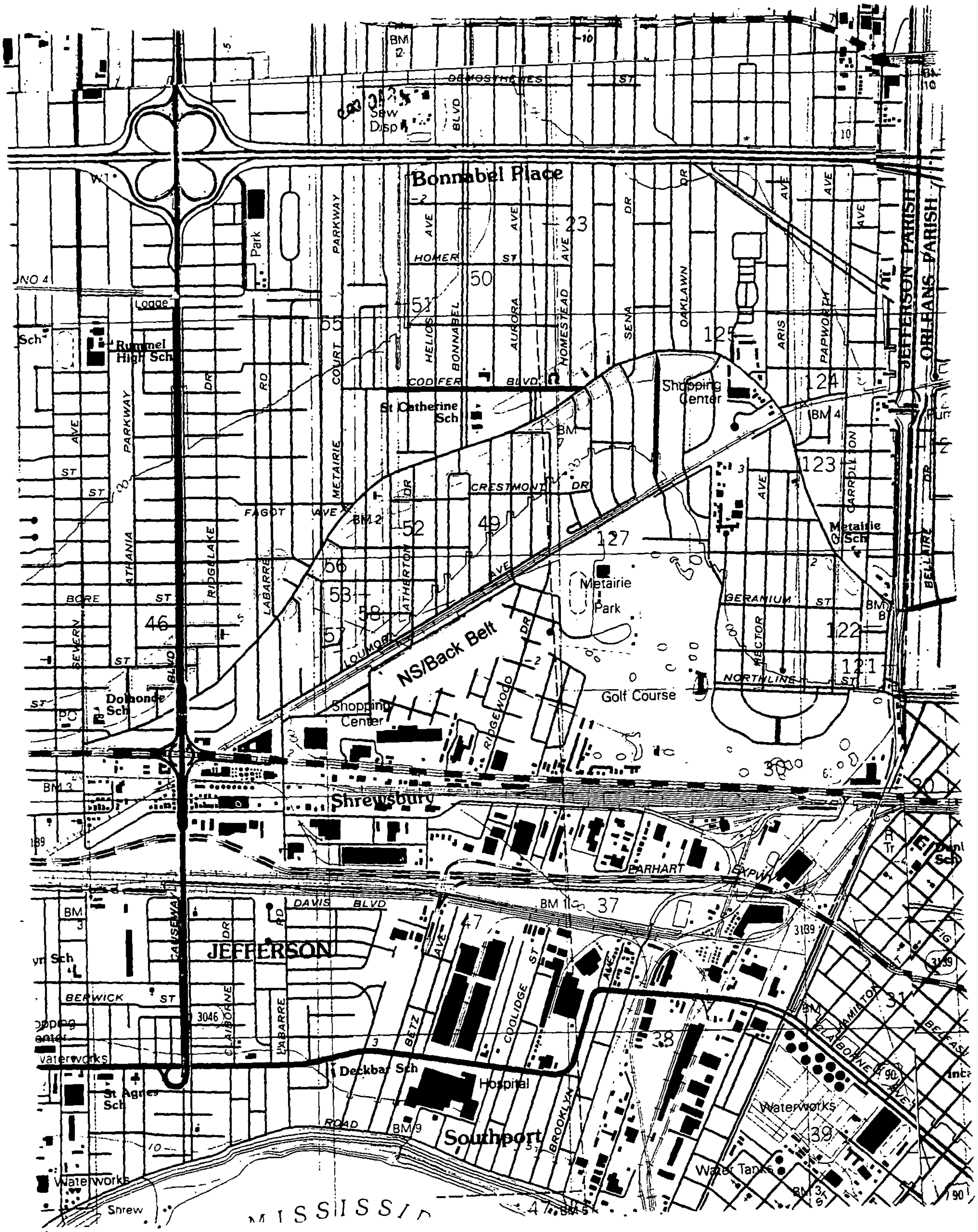
Based on an analysis of the data from the 1994 ICC waybill sample (ICC, 1995), it is estimated that approximately 60 percent of the tonnage (and 65 percent of the loaded cars) running over the Back Belt can be categorized as "interstate commerce" (as opposed to intrastate commerce), as it has neither an origin nor a

Figure 1.1: Map of the New Orleans Gateway



Source: USGS, "New Orleans West, LA" and "New Orleans East, LA", 1992.

Figure 1.2: Map of the Old Metairie Railroad Corridor Segment



Source: USGS, "New Orleans West, LA" and "New Orleans East, LA", 1992.

destination within the state of Louisiana (see Appendix F). This includes traffic, for example, moving from Texas, California, Oklahoma, Arizona, and New Mexico to the southeastern states of Alabama, Georgia, North Carolina, South Carolina, Florida, and Mississippi. It also includes some land-bridge (international) traffic. As such, the rail traffic activity through the New Orleans Gateway is more important to the economic vitality of the nation as a whole rather than the State of Louisiana.

Some of the petrochemical traffic transiting the Gateway continues on to northeastern states of Tennessee, Maryland, Virginia, West Virginia, Pennsylvania, and New Jersey. According to Gary Jackson, Assistant Terminal Superintendent for the CSX (8 November, 1995), there has been an influx of business through the New Orleans Gateway as a result of large scale flooding in the mid-west (in 1993), which has yet to revert to its prior routing. Thus, while there has been some cutback in traffic on many rail lines in the country, consistent with a slowdown in the economy, traffic moving through the New Orleans Gateway via the Back Belt has remained strong.

Over the last twenty years the percentage of intermodal traffic, piggyback, and double stack container cars moving through New Orleans has grown. The Asia to South America land-bridge route continues to grow, and, over time, the Los Angeles/Long Beach-to-New Orleans-to-Jacksonville route is becoming more competitive with the Seattle-to-Chicago-to-Kearney/Little Ferry, New Jersey bridge route for European traffic. Surprisingly, the Los Angeles-to-New Orleans-to-Jacksonville route for Asia to South America (east coast) land-bridge traffic is preferred over a much shorter route through Houston, as it is faster and saves money on time-sensitive higher valued commodities (see Table 1.1).

Moving Asian land-bridge traffic through the United States, as opposed to the Panama and/or Suez Canals, is vital to America's economic interests. It generates jobs and revenue for America's ports, railroads, and transportation equipment suppliers, thereby strengthening the country's transportation capability. In recognition of this fact, and in response to requests for assistance from the local community, DOT, FRA, FHWA, and the ICC [newly reorganized as the Surface Transportation Board (STB)] have historically intervened and involved themselves in the development of solutions designed to preserve and enhance the efficiency of the New Orleans Gateway, while mitigating the burden and impacts of rail operations on Metairie residents.

Intervention by federal agencies in the past has occurred when the railroad industry has had difficulty resolving gateway problems and issues in a manner that was compatible with local goals and community interests. In the largest east-west gateways, like St. Louis and Chicago, the intensity of competition between railroads, their individual lack of control over gateway movements, and the sheer complexity of interchange operations made it difficult for individual railroads to develop equitable rules governing train handling and movement priorities that were regarded by all the railroads as being fair and impartial. To address this need, the industry established jointly owned terminal switching companies to interchange rail cars and move trains between the western and

Table 1.1: Comparison of Land-Bridge Rail Miles

West Coast Port	Gateway	East Coast/Gulf Port	RR Miles
Los Angeles/Long Beach	Houston	Houston	1,670
Los Angeles/Long Beach	New Orleans	Jacksonville	2,652
Seattle	Chicago	Kearney New Jersey	3,100
Oakland	Chicago	Little Ferry New Jersey (UP)	3,396
Oakland	Chicago	Little Ferry New Jersey (SP)	3,462

eastern trunkline railroad yards. While New Orleans developed NOPB to switch the docks and water front industries (and, indeed, much later developed NOUPT to provide for the interchange of passengers and passenger trains), a true terminal switching carrier whose function was to interchange freight trains was never developed. Part of the reason for this was the amount of run through traffic simply was not there. The principal flows of manufactured goods, grain, and cattle in 1920 were through Chicago, Kansas City, St. Louis, and Memphis. There was no huge Gulf Coast petrochemical industry, and the state of Florida was still largely undeveloped. Most cotton, fertilizer, and agricultural import and export movements went to and from the port, and "intermodal" movements were, largely, an unknown term. The development of the economies and industrial strength of the southern states had not occurred, nor had the large scale shifts in population from northern to southern states, prompted by milder winters and warmer climates. As demographic, industrial, and economic changes shifted, rail movements through New Orleans did grow and the city emerged as a true intercontinental east-west railroad gateway.

The eleven railroads formerly serving New Orleans interchanged cars and trains on a joint bilateral agreement basis which has been the pattern for the last fifty years. There has been no push to establish a new terminal switching carrier by the railroads although there has been discussion of the idea. Some knowledgeable railroad operators, such as Jack Jenkins (former superintendent for SP at Avondale, then Southern division superintendent headquartered in Houston, and now chairman of the Houston Port Terminal Railroad), strongly believe that the establishment of a new terminal switching carrier offers the best hope for improving operations through the New Orleans Gateway.

However, the issue is not simply the improvement of railroad operations to provide seamless quality transportation but, rather, the balancing of public and community interests with these carriers' needs. The quality of life in Metairie (or, for that matter, any community in the United States) cannot be sacrificed or compromised by the railroad industry's need for efficiency and by their stockholders' demands for profit improvement. Solutions that best balance these interests are essential to a successful resolution.

1.2.2 Train Operating Schedules

One of the most effective methods for reducing grade crossing delays, and the resulting impact of railroad operations on the local community, is to change train movement times so that trains traversing Metairie would minimize grade crossing delays. While citizens have strongly favored this approach, it was rejected in the last federally funded study (FHWA, et al., 1988).

In 1994, local railroad superintendents and trainmasters began to explore ways of improving the movement and interchanging of cars through the New Orleans Gateway. A profile of typical operating times was developed to serve as a planning aid. As a consequence of their joint efforts, some changes were made to reduce the congestion and blockage through the Back Belt by reducing the number of trains. In 1995, some yard cuts were added to the head end of through freight trains to reduce the total number of trains moving through the East Bridge Junction and over the Back Belt.

While the current train schedule incorporates this consolidation (see Table 1.2), the timing of individual train movements over the Back Belt frequently differs from what is shown. This is due to track maintenance curfews which have the greatest on-going impacts, weather related problems, equipment failures, accidents and derailments, and crew shortages. To illustrate, NS train 393, normally scheduled to move around 5:00 PM, has been regularly 12 hours late since January due to weather-induced system congestion. Similarly SP's train HOSOM which is scheduled to move through Metairie at 10:00 PM is frequently delayed and moves through around 2:00 AM. Hurricanes and flooding periodically cause

Table 1.2: Train Operating Schedules from East Bridge Junction, Over the Back Belt, to the Northeast Tower

No.	Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Cars
1 2	12:01 AM	NS/CSX *to* IC AN40 IC *to* NS/CSX AN40	NS/CSX *to* IC AN40 IC *to* NS/CSX AN40	NS/CSX *to* IC AN40 IC *to* NS/CSX AN40	NS/CSX *to* IC AN40 IC *to* NS/CSX AN40	NS/CSX *to* IC AN40 IC *to* NS/CSX AN40	NS/CSX *to* IC AN40 IC-NS/CSX AN40	NS/CSX *to* ICAN40 IC *to* NS/CSX AN40	50 50
	1:00 AM	**IC Piggyback NB** **SP *to* KCS (Yd Cut)**	**IC Piggyback NB** **SP *to* KCS (Yd Cut)**	**IC Piggyback NB** **SP *to* KCS (Yd Cut)**	**IC Piggyback NB** **SP *to* KCS (Yd Cut)**	**IC Piggyback NB** **SP *to* KCS (Yd Cut)**	**IC Piggyback NB** **SP *to* KCS (Yd Cut)**	**IC Piggyback NB** **SP *to* KCS (Yd Cut)**	22 12
3 4	2:00 AM	NS *to* UP (315) SP *to* NS (LBAVT)	NS *to* UP (315) SP *to* NS (LBAVT)	NS *to* UP (315)	NS *to* UP (315)	NS *to* UP (315)	NS *to* UP (315)	NS *to* UP (315) SP *to* NS (LBAVT)	100 70
5 6	3:00 AM	SP *to* CSX (HOCXN) UP to CSX (LINOCB)	SP *to* CSX (HOCXN) UP *to* CSX (LINOCB)	SP *to* CSX (HOCXN) UP *to* CSX (LINOCB)	SP *to* CSX (HOCXN) UP *to* CSX (LINOCB)	SP *to* CSX (HOCXN) UP *to* CSX (LINOCB)	SP *to* CSX (HOCXN) UP *to* CSX (LINOCB)	SP *to* CSX (HOCXN) UP *to* CSX (LINOCB)	85 100
7	4:00 AM	CSX *to* SP (R145)	CSX *to* SP (R145)	CSX *to* SP (R145)	CSX *to* SP (R145)	CSX *to* SP (R145)	CSX *to* SP (R145)	CSX *to* SP (R145)	100
8	5:00 AM	UP *to* CSX (LINOCX) **KCS *to* SP** **UP *to* IC-Yd Cut**	UP *to* CSX (LINOCX) **KCS *to* SP** **UP *to* IC-Yd Cut**	UP *to* CSX (LINOCX) **KCS *to* SP** **UP *to* IC-Yd Cut**	UP *to* CSX (LINOCX) **KCS *to* SP** **UP *to* IC-Yd Cut**	UP *to* CSX (LINOCX) **KCS *to* SP** **UP *to* IC-Yd Cut**	UP *to* CSX (LINOCX) **KCS *to* SP** **UP *to* IC-Yd Cut**	UP *to* CSX (LINOCX) **KCS *to* SP** **UP *to* IC-Yd Cut**	120 5 75
9 10 11	6:00 AM	SP *to* CSX (LANOF)	SP *to* CSX (LANOF)	SP *to* CSX (LANOF)	SP *to* CSX (LANOF) UP *to* CSX (LINOCM)	SP *to* CSX (LANOF) UP *to* CSX (LINOCM) SP *to* NS (LBAVT)	SP *to* CSX (LANOF) UP *to* CSX (LINOCM) SP *to* NS (LBAVT)	SP *to* CSX (LANOF) UP *to* CSX (LINOCM)	75 90 70
12	7:00 AM	KCS *to* CSX (53) **IC Piggyback SB** **KCS 140 NB** **Amtrak 20 EB-UPT**	KCS *to* CSX (53) **IC Piggyback SB** **KCS 140 NB**	KCS *to* CSX (53) **IC Piggyback SB** **KCS 140 NB**	KCS *to* CSX (53) **IC Piggyback SB** **KCS 140 NB** **Amtrak 20 EB-UPT**	KCS *to* CSX (53) **IC Piggyback SB** **KCS 140 NB**	KCS *to* CSX (53) **IC Piggyback SB** **KCS 140 NB** **Amtrak 20 EB-UPT**	KCS *to* CSX (53) **IC Piggyback SB** **KCS 140 NB** **Amtrak 20 EB-UPT**	75 15 35
13	8:00 AM	CSX *to* UP (Q615)	CSX *to* UP (Q615)	CSX *to* UP (Q615)	CSX *to* UP (Q615)	CSX *to* UP (Q615)	CSX *to* UP (Q615)	CSX *to* UP (Q615)	100
14 15	9:00 AM	CSX *to* SP (601) **Amtrak 1 WB-UPT**	CSX *to* SP (601)	CSX *to* SP (601) **Amtrak 1 WB-UPT**	CSX *to* SP (601)	CSX *to* SP (601) SP *to* CSX (BCNOT)	CSX *to* SP (601) **Amtrak 1 WB-UPT**	CSX *to* SP (601)	100 23

Table 1.2: Train Operating Schedules from East Bridge Junction, Over the Back Belt, to the Northeast Tower (continued)

No.	Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Cars
16	10:00 AM	CSX *to* SP (R101) **IC-UP-Yd Cut**	CSX *to* SP (R101) **IC-UP-Yd Cut**	CSX *to* SP (R101) **IC-UP-Yd Cut**	CSX *to* SP (R101) **IC-UP-Yd Cut**	CSX *to* SP (R101) **IC-UP-Yd Cut**	CSX *to* SP (R101) **IC-UP-Yd Cut**	CSX *to* SP (R101) **IC-UP-Yd Cut**	130 70
17	11:00 AM	KCS *to* NS (55) **KCS 9 SB-West Yd**	KCS *to* NS (55) **KCS 9 SB-West Yd**	KCS *to* NS (55) **KCS 9 SB-West Yd**	KCS *to* NS (55) **KCS 9 SB-West Yd**	KCS *to* NS (55) **KCS 9 SB-West Yd**	KCS *to* NS (55) **KCS 9 SB-West Yd**	KCS *to* NS (55) **KCS 9 SB-West Yd**	25 100
18	12:01 PM	CSX *to* UP (Q605) **Amtrak 1 WB-SP**	CSX *to* UP (Q605)	CSX *to* UP (Q605) **Amtrak 1 WB-SP**	CSX *to* UP (Q605)	CSX *to* UP (Q605)	CSX *to* UP (Q605) **Amtrak 1 WB-SP**	CSX *to* UP (Q605)	100
	1:00 PM								
	2:00 PM	**Amtrak 59 SB-UPT**	**Amtrak 59 SB-UPT**	**Amtrak 59 SB-UPT**	**Amtrak 59 SB-UPT**	**Amtrak 59 SB-UPT**	**Amtrak 59 SBUPT**	**Amtrak 59 SB-UPT**	
19 20	3:00 PM	NS *to* KCS (56) CSX *to* SP (Yd Cut) **Amtrak 58 NB-IC**	NS *to* KCS (56) CSX *to* SP (Yd Cut) **Amtrak 58 NB-IC**	NS *to* KCS (56) CSX *to* SP (Yd Cut) **Amtrak 58 NB-IC**	NS *to* KCS (56) CSX *to* SP (Yd Cut) **Amtrak 58 NB-IC**	NS *to* KCS (56) CSX *to* SP (Yd Cut) **Amtrak 58 NB-IC**	NS *to* KCS (56) CSX *to* SP (Yd Cut) **Amtrak 58 NB-IC**	NS toKCS (56) CSX *to* SP (Yd Cut) **Amtrak 58 NB-IC**	75 70
21	4:00 PM	Lt.Eng.SP-NS	Lt.Eng.SP-NS	Lt.Eng.SP-NS	Lt.Eng.SP-NS	Lt.Eng.SP-NS	Lt.Eng.SP-NS	Lt.Eng.SP-NS	3
22	5:00 PM	NS *to* SP (393) **KCS *to* SP (Yd Cut)**	NS *to* SP (393) **KCS *to* SP (Yd Cut)**	NS *to* SP (393) **KCS *to* SP (Yd Cut)**	NS *to* SP (393) **KCS *to* SP (Yd Cut)**	NS *to* SP (393) **KCS *to* SP (Yd Cut)**	NS *to* SP (393) **KCS *to* SP (Yd Cut)**	NS *to* SP (393) **KCS *to* SP (Yd Cut)**	70 30
23 24	6:00 PM		NS *to* SP (APL)	NS *to* SP (APL) SP *to* NS (LBAVT)	NS *to* SP (APL)	NS *to* SP (APL		NS *to* SP (APL)	80 70
25 26	7:00 PM	CSX *to* KCS (54) SP *to* CSX (LBCXT) **IC Piggyback NB**	CSX *to* KCS (54) SP *to* CSX (LBCXT) **IC Piggyback NB Amtrak 2 EB UPT**	CSX *to* KCS (54) SP *to* CSX (LBCXT) **IC Piggyback NB Amtrak 19 UPT**	CSX *to* KCS (54) SP *to* CSX (LBCXT) **IC Piggyback NB Amtrak 2 EB UPT**	CSX *to* KCS (54) SP *to* CSX (LBCXT) **IC Piggyback NB Amtrak 19 UPT**	CSX *to* KCS (54) SP *to* CSX (LBCXT) **IC Piggyback NB Amtrak 19 UPT**	CSX *to* KCS (54) SP *to* CSX (LBCXT) **IC Piggyback NB Amtrak 19 UPT Amtrak 2 EB UPT**	55 110 20

Table 1.2: Train Operating Schedules from East Bridge Junction, Over the Back Belt, to the Northeast Tower (continued)

No.	Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Cars
	8:00 PM	**IC Piggyback SB** **KCS 10 NB**	**IC Piggyback SB** **KCS 10 NB**	**IC Piggyback SB** **KCS 10 NB**	**IC Piggyback SB** **KCS 10 NB**	**IC Piggyback SB** **KCS 10 NB**	**IC Piggyback SB** **KCS 10 NB**	**IC Piggyback SB** **KCS 10 NB**	15 50
27 28 29	9:00 PM	SP-NS/CSX (Yd Cut) UP *to* NS (LINONS) **KCS 139 SB** Lt. Eng.CSX-SP	SP-NS/CSX (Yd Cut) UP *to* NS (LINONS) **KCS 139 SB** Lt. Eng.CSX-SP	SP-NS/CSX (Yd Cut) UP *to* NS (LINONS) **KCS 139 SB** Lt. Eng.CSX-SP	SP-NS/CSX (Yd Cut) UP *to* NS (LINONS) **KCS 139 SB** Lt. Eng.CSX-SP	SP-NS/CSX (Yd Cut) UP *to* NS (LINONS) **KCS 139 SB** Lt. Eng.CSX-SP	SPNS/CSX (Yd Cut) UP *to* NS (LINONS) **KCS 139 SB** Lt. Eng.CSX-SP	SP-NS/CSX (Yd Cut) UP *to* NS (LINONS) **KCS 139 SB** Lt. Eng.CSX-SP	68 85 35 3
30	10:00 PM	**SP *to* IC-Yd Cut**	**SP *to* IC-Yd Cut**	**SP *to* IC-Yd Cut** SP *to* CSX (Yd Cut)	**SP *to* IC-Yd Cut**	**SP *to* IC-Yd Cut** SP *to* CSX (Yd Cut)	**SP *to* IC Yd Cut**	**SP *to* IC Yd Cut** SP *to* CSX (Yd Cut)	68 35
31	11:00 PM	SP *to* NS (HOSOM) **IC *to* SP-Yd Cut**	SP *to* NS (HOSOM) **IC *to* SP-Yd Cut** **Amtrak 2 EB CSX**	SP *to* NS (HOSOM) **IC *to* SP-Yd Cut**	SP *to* NS (HOSOM)) **IC *to* SP-Yd Cut** **Amtrak 2 EB CSX**	SP *to* NS (HOSOM) **IC *to* SP-Yd Cut**	SP *to* NS (HOSOM) **IC *to* SP-YdCut**	SP toNS (HOSOM) **IC *to* SP-Yd Cut** **Amtrak 2 EB CSX**	85 66
Tot	Back Belt Trains	23	24	25	24	27	24	26	
Tot	EastBdg	15	15	15	15	15	15	15	
Tot	Amtrak	5	4	5	5	3	6	6	
Tot	Amtrak EastBdg	4	3	3	4	2	4	4	
Tot	Amtrak WestWy	1	1	2	1	1	2	2	
Tot	Lt Eng	2	2	2	2	2	2	2	

Notes: Train schedule as of March 28, 1996. Trains not moving over Back Belt shown in **Boldface**. Actual train operating times differ from this schedule due to delays Random grain & military trains pass over Back Belt on an average bi-weekly basis. Second sections may be added to some trains. HOCXM and HOSOM, SP to CSX&NS are run through. LBAVT - SP to NS is APL's Liner Train to Atlanta, LBCXT - SP to CSX is run through with Atlanta & Jacksonville traffic -often 12 to 18 hrs.late, BCNOT -intermodal traffic from SP's Barbour Cut to CSX Ramp. NS Trains 315 and 393 running 12 hours late since January due to system congestion and weather induced delays- NS runs these trains ahead of CSX. CSX R145- originates In Atlanta -piggyback traffic, UP LINOCX -Merchandise Train switches out local traffic at Gentilly.. SP's LANOF - piggyback train with New Orleans ramp and Florida traffic arriving late, between 9:00AM and 11:00AM. CSX 601 merchandise train -originates in Florida -east of Orlando, CSX Q615 merchandise train -originates Hamlet North Carolina, carries autorack traffic. CSX R101 piggyback train originates Jacksonville FL with New Orleans ramp & SP traffic. CSX Q605 merchandise train originates Jacksonville Fla., SP/ UP scheduling one yard crew on weekends at Avondale and thus cannot protect CSX's westbound weekend trains, sometimes these crew shortage induced delays carry over to Monday. KCS 9 is a southbound intermodal train originating at Shreveport which is long, and on occasions the yard crew at West Yard must break the train into two pieces to receive it. This blocks the East Bridge Junction interlocking. KCS 139 and KCS 140 are the northbound and southbound Baton Rouge locals. Crew changes at Central Avenue create the greatest blockage of interlocking and grade crossings the U.S. Corps of Engineers to close flood gates surrounding the city, thus blocking rail movements through the New Orleans Gateway and over the Back Belt. This disrupts schedules for days at a time. Potential flooding in Metairie is prevented by closing the gates at the rail bridge over the 17th Street Drainage Canal.

Train delays also occur as a result of unanticipated high traffic levels that have the effect of plugging yards and necessitating the addition of trains and crews. The high level of railroad business and traffic growth over the last three years, combined with force reductions and early retirement buyout programs has, for the first time in many years, produced crew shortages, which in turn has led to trains being held or delayed for a lack of crews. Gary Jackson, Assistant Terminal Superintendent for the CSX, discussed the crew shortages that CSX has experienced and acknowledged that, in the past, crew shortages have disrupted their ability to move trains on a timely basis. The "extra boards" which normally provide backup train operating personnel to cover vacations, furloughs, and medical absences, are operating at less than half-strength.

While progress in eliminating crew shortages is slow due to the mergers, consolidations, and cutbacks, the evidence suggests that the major railroads are moving towards filling the gaps. Interviews with the carriers operating within the New Orleans Gateway found that all of the railroads regularly experience crew shortages, some more than others, and this factor adds to the complexity of maintaining train operating schedules.

NS train dispatchers in Birmingham, Alabama, control movements over the Back Belt based on recommendations from NS's local Oliver Yard dispatcher and CSX's dispatcher situated at the Gentilly Yard. The IC control tower operator at the East Bridge Junction controls east-west train movements through the Junction. Thus, both the East Bridge Junction tower operator and the Gentilly tower operator (who normally tells the Birmingham dispatchers what to do) effectively limit and control movements over the Back Belt. The West Bridge Junction tower operator controls movements over the Huey P. Long Bridge. All east-west trains move over a single crossover track on IC's right-of-way, which links the Huey P. Long Bridge or NOPB tracks with NS's Back Belt track.

The train schedule presented in Table 1.2 depicts the current weekly schedule for train movements over the Back Belt as well as through the East Bridge Junction. The current schedules for trains that do not move over the Back Belt, but do move through the East Bridge Junction interlocking, are included since these north-south KCS and IC trains effectively block movements over the Back Belt and, thus, control the east-west traffic flow; these trains are shown in **boldfaced** type. Amtrak's train schedules are also included in Table 1.2 (and shown in **boldfaced** type) since passenger trains are given movement priority over all other freight train movements, and thus can, and do, block access to the Back Belt when they move through the East Bridge Junction on the west end of the Back Belt and over the NS tracks when they move to and from the east.

As shown in Table 1.2, in an average week, a total of 23 to 27 trains operate over the Back Belt each day (excluding the two light engine movements), with Mondays having the fewest (23) trains and Fridays having the most (27) trains. About 10 trains are typically scheduled to move during daylight hours between 7:00 AM and 7:00 PM, and 13 to 17 trains operate during the other 12 hours. However, as discussed above, constant train delays force a daily readjustment of operating times. Amtrak, KCS, and IC trains block the East Bridge Junction and Northeast Tower interlockings during their passage, thereby effectively preventing movement onto and off of the Back Belt.

To establish a train schedule that keeps trains continuously moving over the Back Belt, time windows must be defined when trains can move through these interlockings. As a consequence, Amtrak's train schedule, and the timing of IC's piggyback trains and KCS' movements into and out of the West Yard, determine how well trains are able to cross the Back Belt. If Amtrak trains are delayed or if there are unanticipated schedule changes, the East Bridge Tower operator and the NS dispatcher will likely hold all other trains until Amtrak clears (this same situation applies to IC's piggyback trains). By increasing the protected time interval for running these trains, they reduce the remaining time or window available to run all other trains over the Back Belt.

These changes have a multiplier effect which forces everyone to make decisions as to which of the trains that are backed up and delayed will then be given priority in crossing the Back Belt. "First come, first served" is not always the operating rule governing train crossing priorities. The more seasoned and experienced dispatchers are better able to balance all railroads' priorities, whereas the newer, less experienced dispatchers have trouble prioritizing train movements equitably and tend to favor their own railroad.

1.3 Current Railroad Impacts

1.3.1 Highway Grade Crossing Delays and Costs

One of the major impacts resulting from the operation of the Back Belt is highway grade crossing blockages and delays experienced by motorists who use the roads in the vicinity of the railroad grade crossings. Moreover, motorists that are not blocked or delayed by a passing train are also impacted because they must slow down as they cross the grade crossings. The severity of the impact at any particular grade crossing is dependent upon the volume and average speed of vehicular traffic, the frequency and type of railroad traffic, and the roughness of the grade crossing.

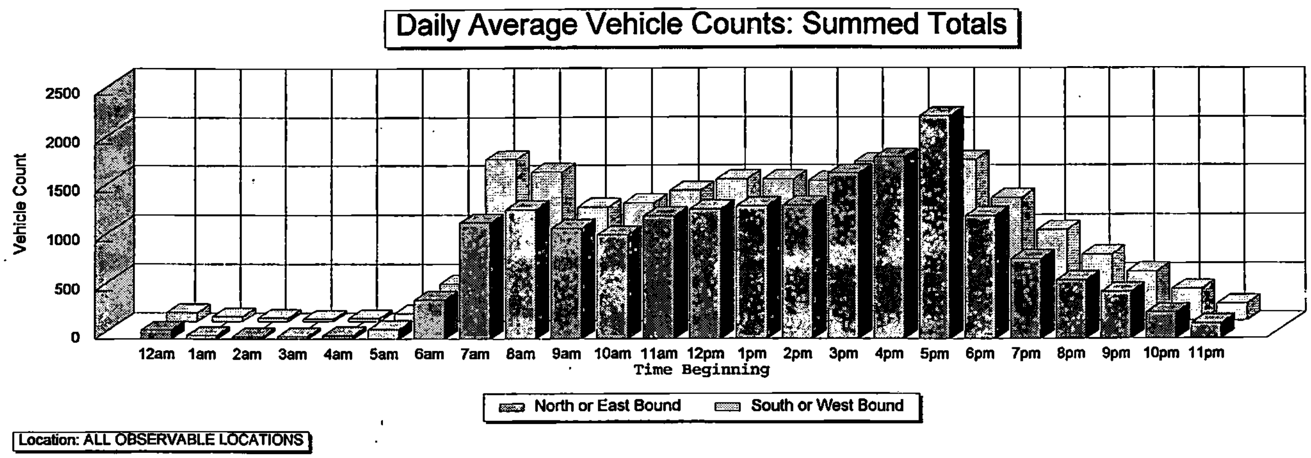
Within the study area, there are eight grade crossings where trains traversing the Back Belt have an impact on vehicular traffic. Traffic counts for the Carrollton, Metairie, West Oakridge, Farnham, Hollywood, Atherton, Labarre, and Shrewsbury grade crossings were taken by the Jefferson Parish Traffic Engineering Department. Table 1.3 presents a summary of the current daily highway traffic counts, by hour and direction, for all eight grade crossings combined. As indicated by these data, it is estimated that almost 41,000 vehicles go over these eight grade

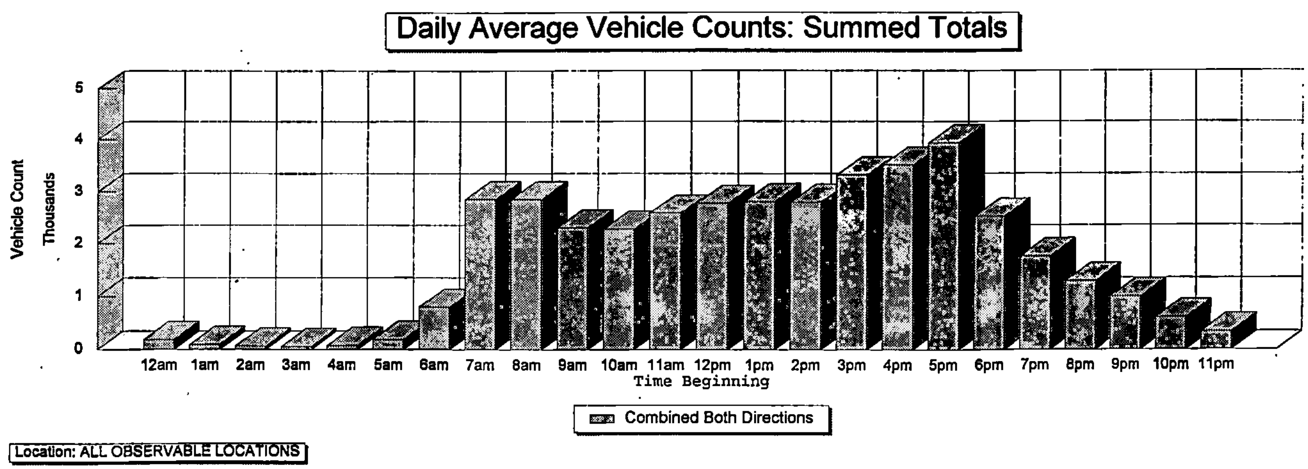
Table 1.3: Summary of Daily Highway Traffic Vehicle Counts for All Railroad Crossings, by Hour, 1995

Location: ALL OBSERVABLE LOCATIONS

Measuring Time Span:
METAIRIE ROAD
(2/14/95 to 2/17/95)
SHREWSBURY DRIVE
(2/5/96 to 2/8/96)
ALL OTHER LOCATIONS:
(12/11/95 to 12/13/95)

	DAILY AVERAGE		
Time Beginning	North or East Bound*	South or West Bound*	Combined
12am	92	93	185
1am	39	52	91
2am	25	35	60
3am	29	26	55
4am	37	33	70
5am	100	82	182
6am	406	390	796
7am	1,195	1,653	2,848
8am	1,326	1,522	2,848
9am	1,133	1,166	2,299
10am	1,066	1,208	2,274
11am	1,260	1,332	2,592
12pm	1,329	1,449	2,778
1pm	1,360	1,446	2,806
2pm	1,364	1,433	2,797
3pm	1,690	1,627	3,317
4pm	1,855	1,660	3,515
5pm	2,287	1,651	3,938
6pm	1,262	1,262	2,524
7pm	821	934	1,755
8pm	603	684	1,287
9pm	483	510	993
10pm	267	329	596
11pm	158	175	333
TOTAL	20,187	20,752	40,939





**Metairie Road traffic was measured east-west bound while the remaining seven grade crossings were measured north-south bound.*

Source: Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996.

crossings each day. The traffic between midnight and 6 AM is very light, and starts to build between 6 AM and 7 AM. The majority of the traffic occurs between 7 AM and 7 PM, with the largest amount of traffic occurring between 5 PM and 6 PM. Between 7 PM and midnight, the traffic steadily declines.

Metairie Road, the major thoroughfare through the Metairie community, carries 48 percent of this traffic, or 19,800 vehicles per day over the grade crossing. Labarre Road and Carrollton Avenue carry the next highest amounts of traffic (about 5,700 and 5,400 vehicles per day, respectively). The remaining five crossings, combined, carry 10,000 vehicles per day (see Table 1.4).

The current railroad operating schedule, presented earlier in Table 1.2, indicates that from 23 to 27 trains, excluding light locomotive movements, are currently moving over the Back Belt on a daily basis, producing a seven day average of 24.7 trains per day. The train survey data collected by CONSAD between October 11-14, 1995 at the Metairie Road, Labarre Road, and Shrewsbury Road grade crossings showed that the shortest train had 17 cars including one locomotive, while the longest train had 126 cars including two locomotives. The average length of each train was about 78 cars with three locomotives. For the average train, 15 cars contained hazardous materials. Based on standard car lengths for the different types of cars observed (Umler, 1993) and the composition of the average train observed, the average train is estimated to be about 5,033 feet in length (or about 62.2 feet, on average, for each car).

Table 1.4: Summary of Daily Highway Traffic Vehicle Counts, by Railroad Grade Crossing, 1995

	Vehicles per day*		
Location	North or East Bound	South or West Bound	Total
CARROLLTON AVENUE	2,817	2,553	5,370
METAIRIE ROAD	9,398	10,399	19,797
WEST OAKRIDGE DRIVE	719	667	1,386
FARNHAM PLACE	1,056	1,076	2,132
HOLLYWOOD DRIVE	1,874	1,946	3,820
ATHERTON DRIVE	494	747	1,241
LABARRE ROAD	3,367	2,355	5,722
SHREWSBURY ROAD	462	1,009	1,471
Totals	20,187	20,752	40,939

**Metairie Road traffic was measured east-west bound while the remaining seven grade crossings were measured north-south bound.*

Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

The train speeds, for those trains with cars, ranged from five to 27 miles per hour as they began their crossing. The average train speed observed was 12.4 miles per hour. However, it should be noted that it was not uncommon for trains to slow down or to stop for a period of time (i.e., the initial train speed observed is often an overestimate of the average train speed during the entire grade crossing blocking). The average observed blocking time, for those trains with cars, was eight minutes and 29 seconds, ranging from a low of one minute and three seconds to a high of 28 minutes. The number of vehicles estimated to be blocked by the trains travelling across the grade crossings was lowest at the Shrewsbury Road crossing and highest at the Metairie Road crossing, consistent with the vehicle traffic flow patterns for these roads. The largest vehicle queue was estimated at 297 vehicles (for both directions) for a train crossing Metairie Road at 5:35 PM. These long westbound queues on Metairie Road also prevent traffic on Narcissus Street, Dahlia Street, and others from dissipating. Similarly, eastbound queues created during the morning rush hour block Frisco, Central, and Focis Roads. The stopped traffic also makes entrance to, and exit from, the strip center parking lots difficult, much to the concern of store owners and shoppers.

The combination of the 23 to 27 trains traversing the Back Belt on a daily basis, coupled with the estimated almost 41,000 vehicles per day travelling over the roads where the eight grade crossings are located, produces an estimated total train blockage time ranging from 5.88 to 8.41 minutes per train or from 145.2 to 207.9 minutes per day (depending upon the crossing), for a total of

1,388 minutes per day (see Table 1.5). The additional daily blockage time caused by the creation of vehicle queues is estimated to range from about 2.7 minutes at the Atherton Drive crossing to 47.3 minutes at the Metairie Road crossing for a total of 95 additional minutes per day across all crossings. Thus, the total daily blockage time across all eight grade crossings is estimated at about 1,483 minutes (or 24.7 hours) per day.

Given the current traffic flow in the study area and the operating schedule of the trains, this results in over 5,200 vehicles each day being stopped or delayed as trains travel over the Back Belt, with over half of the traffic delay being experienced on Metairie Road (again, see Table 1.5). This stopped/delayed traffic volume represents about 12.8 percent of the **total** volume of traffic travelling over the eight grade crossings each day. This, in turn, translates into almost 19,300 minutes of total delay time each day for all affected vehicles, again with over half of the delay time experienced on Metairie Road.

For those vehicles not stopped or delayed by the trains, the slowing time associated with driving up and over the grade crossings is estimated to amount to 5,000 minutes per day with almost half of this time experienced on Metairie Road. Combined, the total delay and slowing time is almost 24,300 minutes per day.

Figure 1.3 illustrates the total current daily delay and slowing time for each of the eight grade crossings on an hourly basis. As indicated by the data, the largest amount of delay and slowing time (representing 20 percent of the total delay and slowing time) is estimated to occur during the afternoon between 3

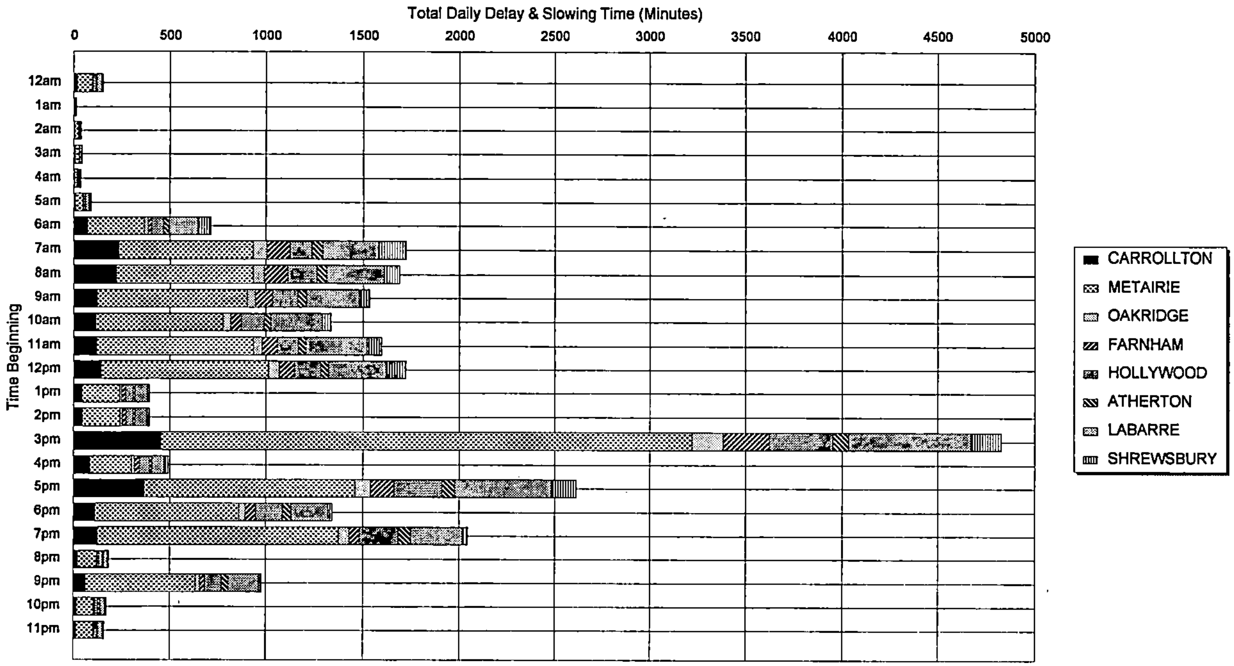
Table 1.5 :Highway Traffic Vehicle Delay, Slowing, and Cost Analysis
1995 Daily Totals

Location	Trains Per Day	Vehicles per day (Both Directions)	Total Train Blockage Time (Minutes)	Total Additional Blockage Time Caused by Vehicle Queues (Minutes)	Total Blockage Time (Minutes)	Total Number of Vehicles Delayed	Percent of Total Traffic Volume Delayed
CARROLLTON AVENUE	**24.7**	**5,370**	**145.22**	**10.51**	**155.72**	**555.10**	**10.34%**
METAIRIE ROAD	**24.7**	**19,797**	**145.22**	**47.31**	**192.53**	**2,725.38**	**13.77%**
WEST OAKRIDGE DRIVE	**24.7**	**1,386**	**172.51**	**3.11**	**175.62**	**160.34**	**11.57%**
FARNHAM PLACE	**24.7**	**2,132**	**172.51**	**4.68**	**177.19**	**242.12**	**11.36%**
HOLLYWOOD DRIVE	**24.7**	**3,820**	**172.51**	**8.34**	**180.85**	**432.85**	**11.33%**
ATHERTON DRIVE	**24.7**	**1,241**	**172.51**	**2.67**	**175.18**	**137.41**	**11.07%**
LABARRE ROAD	**24.7**	**5,722**	**199.73**	**14.94**	**214.66**	**781.77**	**13.66%**
SHREWSBURY ROAD	**24.7**	**1,471**	**207.91**	**3.78**	**211.69**	**195.31**	**13.28%**
Totals	**24.7**	**40,939**	**1,388.11**	**95.33**	**1,483.44**	**5,230.28**	**12.78%**

Location	Total Delay Time For All Affected Vehicles (Minutes)	Total Slowing Time For All Affected Vehicles (Minutes)	Total Delay + Slowing Time For All Affected Vehicles (Minutes)	Total Delay Time Cost (1995 Dollars)	Total Slowing Time Cost (1995 Dollars)	Total Delay + Slowing Time Cost (1995 Dollars)
CARROLLTON AVENUE	**1,723.96**	**674.09**	**2,398.05**	**$539.25**	**$284.00**	**$823.25**
METAIRIE ROAD	**9,954.04**	**2,390.03**	**12,344.07**	**$3,020.39**	**$998.86**	**$4,019.25**
WEST OAKRIDGE DRIVE	**571.42**	**171.59**	**743.01**	**$175.63**	**$72.33**	**$247.95**
FARNHAM PLACE	**866.29**	**264.58**	**1,130.88**	**$268.16**	**$111.88**	**$380.04**
HOLLYWOOD DRIVE	**1,560.73**	**474.20**	**2,034.93**	**$474.10**	**$198.94**	**$673.04**
ATHERTON DRIVE	**485.89**	**153.88**	**639.78**	**$147.40**	**$64.22**	**$211.61**
LABARRE ROAD	**3,284.15**	**691.63**	**3,975.78**	**$991.06**	**$290.95**	**$1,282.00**
SHREWSBURY ROAD	**832.88**	**178.60**	**1,011.47**	**$254.01**	**$75.54**	**$329.55**
Totals	**19,279.37**	**4,998.60**	**24,277.97**	**$5,869.99**	**$2,096.71**	**$7,966.70**

Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

Figure 1.3: Total Delay and Slowing Time for all Affected Vehicles, by Location (Minutes)
1995 Daily Totals by Hour



Time Beginning	CARROLLTON AVENUE	METAIRIE ROAD	WEST OAKRIDGE DRIVE	FARNHAM PLACE	HOLLYWOOD DRIVE	ATHERTON DRIVE	LABARRE ROAD	SHREWSBURY ROAD	TOTAL
12am	17	80	2	3	13	6	25	6	153
1am	1	9	0	0	1	1	1	0	13
2am	4	19	0	0	4	1	7	2	37
3am	6	23	0	1	1	0	11	3	45
4am	3	14	0	1	2	1	11	4	36
5am	9	40	4	1	7	2	19	9	91
6am	73	292	19	18	64	28	149	68	712
7am	233	699	72	118	114	54	289	143	1,722
8am	220	713	57	122	150	52	299	76	1,687
9am	121	780	43	88	129	45	274	56	1,536
10am	115	662	40	54	121	33	262	48	1,335
11am	118	818	45	77	109	37	317	74	1,595
12pm	142	871	53	78	135	42	299	102	1,723
1pm	41	199	12	20	38	10	61	12	392
2pm	44	199	12	18	37	11	59	13	392
3pm	452	2,768	163	239	331	81	635	159	4,827
4pm	86	215	16	26	51	11	64	20	489
5pm	366	1,093	82	120	250	67	503	132	2,613
6pm	112	747	35	52	141	42	192	22	1,342
7pm	124	1,250	54	54	201	63	271	27	2,045
8pm	19	104	4	6	18	7	21	2	181
9pm	63	568	23	26	90	34	156	17	978
10pm	15	91	4	6	15	8	27	7	172
11pm	14	92	2	4	11	6	26	8	162
TOTAL	2,398	12,344	743	1,131	2,035	640	3,976	1,011	24,278

Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

PM and 4 PM, primarily on Metairie Road. Substantial delay and slowing time is also estimated to occur between 7 AM and 1 PM and between 5 PM and 7 PM.

The cost to highway users of being stopped or delayed by the train blockage of a railroad crossing, or being slowed down by having to go over the grade crossing, has also been determined for each of the eight grade crossings, for each direction of traffic, for each of the 24 one-hour intervals in a day. One-hour intervals have been used in order to consider the variability in both the train schedule and traffic flow pattern. The highway user costs have two components: 1) the increased cost to the vehicle operator of time lost due to stoppage/delay or slowing down, and 2) the increased cost of operating the vehicle due to stoppage/delay or slowing down (during CONSAD's train survey, the majority of drivers observed did keep their engines running while waiting for the train to clear the crossing). Both costs are based upon the number of vehicles stopped/delayed or slowed and the average length of delay or slowing time experienced by stopped/delayed or slowed vehicles, respectively.

Considering both the user and vehicle delay time costs, it is estimated that the present train traffic over the Back Belt is currently costing vehicle operators about $5,900 per day in delay time costs (again, see Table 1.5). An additional $2,100 per day in user and vehicle slowing time costs are estimated for those vehicles travelling over the grade crossings but not actually stopped by the trains. This results in a total delay and slowing time cost of almost $8,000 per day. On an annual basis, this translates to about $2.9 million.

Based on a traffic cordon survey of the Old Metairie area (bounded by I-10 on the north, Causeway Boulevard on the west, Airline Highway on the south, and the 17th Street Canal on the east), 75 percent of the traffic moving through this area is estimated to have an origin and/or destination within the area; the remaining 25 percent of the traffic is considered through traffic (with an origin and a destination outside the area) (FHWA, et al., 1988). This suggests that the majority of the costs of grade crossing delays are being borne by Jefferson Parish residents and, most especially, by residents of Old Metairie.

1.3.2 Delays in Emergency Response

Potential problems relating to the delays in emergency response capability caused by trains blocking grade crossings have been a topic of debate in Metairie for many years. However, very little objective data on residents' attitudes and level of concern exist for the neighborhood or the parish as a whole. (Attitude surveys are discussed in Chapter 2.0, below.)

Nevertheless, it is possible to assume that, to drivers waiting at grade crossings for a train to pass, the thought might occur: "What if an emergency occurred which required a fire or rescue vehicle to cross the railroad?" In response to that question, it should be noted that there are 20 Fire Departments (not including Callander Naval Station) with 61 stations in

Jefferson Parish, and four of these departments with 20 stations are at dispersed locations on the East Bank:

Name	**# of stations**
Eastbank Consolidated	9
Harahan Volunteer	2
Kenner	5
Third District Volunteer	4
Total	20

Two of these stations are in the Metairie area, one on each side of the tracks. These fire departments could respond to any 911 call which reports an accident. In addition, an Emergency Medical Service (EMS) exists which maintains rescue vehicles at many locations.

Donald T. Bock, the Eastbank Consolidated Superintendent of Fire, explained in an interview on Nov. 6, 1995, that consideration had been given to the possibility that a fire station on either side of the tracks might need to respond to an accident on the other side, at a time when one or more crossings were blocked, perhaps, by a long, slow, or stopped train. The fire department's planning has had to consider the geography of Metairie including the following two factors:

- There is no continuous service road along either side of the Back Belt tracks. Short service roads exist, but the breaks require deviations through the neighborhoods on either side. Furthermore, some residents have steadfastly opposed the construction of a continuous service road (telephone conversation with Joe Perret, Jefferson Parish Planning Department, January, 1996).
- The 17th Street Canal forms a boundary between Orleans and Jefferson Parishes, which has street crossings at only a few locations along the portion between Airline Highway and Lake Pontchartrain.

Given these factors, the plan devised by the Eastbank Consolidated Fire Department, when responding to a call as described above, is to cross into Orleans Parish at the nearest crossing of the 17th Street Canal, proceed along the canal using streets with separated grade crossings to avoid train blockage, and recross into Jefferson Parish at the closest possible canal crossing. The vehicle would then use appropriate routes through Metairie neighborhoods.

In summary, a reasonable level of emergency service, and access for emergency vehicles, exists for Metairie neighborhoods. Further, the present situation appears, for now, to be acceptable to residents given their resistance to improvements such as the extension of service roads and/or the construction of grade separations.

Appendix K contains additional details on emergency response issues.

1.3.3 Railroad Grade Crossing Accidents

Scheduled train movements over the Back Belt block motorists at eight local grade crossings. Over the last 21 years there have been 45 grade crossing accidents on the Back Belt reported by the railroads to the Federal Railroad Administration (see Appendix I). These accidents produced 21 injuries and no fatalities, as the low speed of the trains (averaging 12.5 MPH and ranging from two to 20 MPH) typically bounces the vehicles off the tracks. While slow train operating speed limits have increased grade crossings delays, they also have acted to prevent fatalities and the kind of vehicle grinding and crushing that higher train speeds produce.

In addition to the grade crossing collisions, there have also been a large number of vehicle to vehicle collisions at the

Metairie grade crossings. In 1995, Jefferson Parish police recorded a total of nine accidents at or near the grade crossings. Inspection of the police accident reports revealed that two of the accidents, one at LaBarre Road and one at Metairie Road, involved a train hitting a motorist who was driving around the lowered crossing gates. The two railroads involved, SP and NS, respectively, both reported accident details to FRA. The remaining seven accidents [one at LaBarre, one at Carrollton, and five at Metairie Road (with four of these at the intersection of Frisco and Metairie Roads)] each involved the collision of two vehicles at the grade crossing. The accident reports (included in Appendix J) and our inspections of the crossings suggest that the most common factor influencing these rear-end collisions was the failure of the driver to see the vehicle in front in time to stop. The Metairie and LaBarre Road grade crossings are particularly dangerous because it is difficult to see traffic moving off of the side streets (Manley and Frisco), as well as traffic that may be turning into the strip shopping centers or, more typically, has stopped to make a turn. Analysis suggests several possibilities as to why it is so difficult to see these stopped or turning vehicles and to stop in time:

- Drivers approaching these grade crossings were observed to be momentarily taking their eyes off the road in front of them to look left and right down the tracks to check for approaching trains. This is, of course, a normal safety precaution. If a train's headlight was seen, the look is slightly extended. Done quickly, this visual check takes the driver's eyes off of the road in front for about one second (in the case of no approaching trains), and slightly longer if a train is approaching.

- The Metairie and LaBarre Road grade crossings are elevated approximately four feet from the approach lanes, which is enough to partially obscure traffic on the opposite side of the crossing, thus making it more difficult to judge stopping distances. One may see the tops of the cars, but in many cases, one cannot see their tail lights, the best visual cue that a vehicle has slowed or stopped.

The combination of train traffic during commuter rush hours (especially between 3:00 PM and 7:00 PM, when road traffic is heaviest), the presence of dangerous side streets, and the poor visibility at the grade crossings is, we believe, a situation guaranteed to produce future accidents at these grade crossings, especially in view of the increasing level of congestion which is projected (this is further discussed in Section 6.4, below).

1.3.4 Risk of Hazardous Materials Accidents

It is estimated, based on 1994 ICC waybill data, that between 5.6 and 8.1 million tons of hazardous materials presently go over the Back Belt annually. Based on train survey data collected by CONSAD, this amount may be as high as 10.8 million tons per year. Those residents living closest to the Back Belt rail corridor are fearful that a hazardous materials accident could have catastrophic results. While some accept the railroad's presence and acknowledge its existence before local community housing development, many are afraid that the deaths and evacuations caused by recent accidents at Bogalusa and Slidell, Louisiana, and at other locations around the country could be repeated in Metairie.

However, with the relocation of Long Siding in 1988, residents' exposure to hazardous materials contained in cars stored or stopped in the Metairie rail corridor has been dramatically reduced. Nevertheless, the interchange of trains between KCS and NS, which happens four times a day, results in trains being stopped and temporarily parked on the NS passing siding between LaBarre Road and Atherton. KCS eastbound trains (53-CSX at 8:00 AM, and 55-NS at 10:00 AM) are preblocked in Baton Rouge and delivered directly from Baton Rouge to the Metairie-NS passing siding by road crews. Longer trains stretching across Atherton must be broken to allow cars to cross the tracks. Normally the KCS-NS crew change is a simple matter of one crew getting off and another crew getting on. However, sometimes crews are delayed or are unavailable and a train may sit on the passing siding for two to three hours. This increases the risks of trespassing, tampering, and potential exposure to hazardous materials.

1.3.5 Locomotive Horns

Locomotive horn sounding at each of Metairie's eight grade crossings has been one of the key components of the railroad community conflict for many years. The loud horn noise level, which typically ranges from 105 dBA to 113 dBA measured 100 feet from the track, when sounded at each grade crossing, has, in the past, angered and awakened residents. In prior public meetings residents have complained about the stress the noise creates and some of the elderly residents have mentioned it as a cause for their insomnia.

In CONSAD's 1975 study (CONSAD, 1975), exterior noise measurements were taken 100 feet from the railroad tracks at five locations (these measurements are presented following this paragraph). Interior noise measurements found that the noise levels drop by 20 to 30 dBA and average 48 dBA during a train passby and 69 dBA when the horns were being sounded.

Exterior Noise Levels at 100 feet (dBA)

Location	Average High	Average Low	Percent Increase	Maximum High	Minimum Low
Metairie Road	63.3	58.0	11	99	44
Farnham Place	60.6	50.0	108	89	42
Livingston Place	54.8	48.0	60	90	41
LaBarre Road	65.2	60.4	39	82	48
Shrewsbury Road	60.3	48.4	128	97	46

Source: *Railroad/Community Conflicts Alternatives Analysis, Jefferson Parish, Louisiana.* CONSAD Research Corporation, May 1975. DOT-FR-4-3007.

A further comprehensive analysis of the noise impacts of rail operations in Metairie was completed in 1987 by Berger Associates, a New Jersey Engineering firm, as part of the Federal Highway Administration-Louisiana Department of Transportation and Development "Old Metairie Railroad Corridor Study" (FHWA, et al., 1988). Their analysis found that residents were exposed to significant noise pollution from railroad operations and that noise barriers, which would have to be from 25 to 30 feet tall to be effective, would cost $7 million to install, would restrict pedestrians crossing the tracks, and would block sunlight for residents close to the tracks. Subsequent to both of these prior studies, the United States Environmental Protection Agency targeted railroad noise pollution as an environmental problem and suggested regulatory action be taken at the state and local levels to control its impacts.

Surveys of Metairie resident attitudes completed in 1988 showed the majority favored the elimination of horn sounding completely and/or the enforcement of a Parish Ordinance (i.e., ban) on horn sounding between the hours of 10:00 PM and 6:00 AM. The study recommended the elimination of the use of train horns in the Old Metairie Rail Corridor as being beneficial to the community and especially to those residents that live close to the tracks, recognizing that it is still the common law duty of a train engineer to sound a train horn if there appears to be imminent danger of an accident.

After considerable time and political effort, Jefferson Parish and Metairie residents were successful in persuading the Louisiana State Legislature to pass a law relieving the railroads from liability for grade crossing accidents in Metairie. This release of liability allowed the railroads to refrain from horn sounding, secure in the knowledge that they would not be liable for damages in the event of a grade crossing accident. As a result, the railroads operating over the Back Belt turned off horn sounding with the completion of the installation of new crossing gates and improved warning signal devices at the Metairie grade crossings in 1992, much to the great relief and appreciation of residents.

However in 1994, Congress passed the Swift Railroad Development Act which outlawed horn sounding bans in local communities throughout the US. Congress passed this legislation in response to an FRA "Nationwide Study of Train Whistle Bans" report which provided statistical evidence showing that horn sounding reduces accidents and saves lives. Technically, the railroads have been prevented from immediately sounding their horns at every grade crossing in the country by a court injunction, and are awaiting the release of the final FRA regulations describing the exact circumstances where FRA can exempt a community from the Act and thus preserve a horn sounding ban. The new regulations should be released during 1997.

Representatives from FRA's Office of Safety have already met with Jefferson Parish officials to discuss the criteria and alternatives for maintaining the horn sounding ban. It is likely that FRA will allow Metairie's horn sounding ban provided some improvements in grade crossing safety are made.

Appendix B further discusses the relevant issues and our suggestions.

1.3.6 Locomotive and Rail Car Movement Noise and Vibration

In addition to horn sounding, residents are exposed to locomotive engine noise during acceleration (typically averaging 80 dBA) and car noise (which can range from 65 dBA to 80 dBA). The longer, slower moving trains are actually somewhat noisier than the shorter, faster moving trains as the banging caused by changes in slack take-up increase with the length of the train. Ambient day/night sound levels in Metairie range from 51 dBA between the grade crossings to 60 dBA at the Metairie Road grade crossing, so trains are always heard by residents living close to the tracks. The attenuation of noise from the wheels, cars, and engine is within 3.0 to 4.5 dBA per distance doubling. A maximum peak level sound level of 65 dBA inside during a train passby with the horn sounding is clearly irritating and intrusive. However, the average interior noise levels of 45 to 49 dBA associated with train passbys today is very acceptable to most residents and, in our opinion, does not appear to create a significant problem for the community today. Should the horn sounding ban be overturned, then residents would once again be experiencing irritating noise levels.

Homes situated within 50 feet of the roadbed also consistently experience vibration during train passage. Six homes situated on the track section between Metairie Road and Carrollton Avenue, which are within 30 feet of the tracks, experience the greatest vibration. While there have been no reports or evidence of structural damage incurred as a result of the vibration, the vibration is irritating and residents have complained about it.

The low speed of train movements and the soft soil have helped to minimize vibration and attenuate its effects. Due to the use of continuous welded rail there is very little vibration during train movements through Metairie, especially at very low speeds. However, when trains stop and then start again, there is a banging noise and vibration created as the coupler slack is either pulled out or taken in. The section of track between LaBarre and Atherton, where NS and KCS interchange crews, is subject to higher levels of noise and vibration. A skilled engineer can usually take in train slack or pull it out smoothly by a slow gradual application of the throttle or brakes, which reduces compressive and tractive forces and, thus, limits resulting noise and vibration. If the engineer is in a hurry or has to make a full brake application for an emergency stop, the banging and vibration can increase dramatically. By keeping trains moving through Metairie and eliminating any stopping, grade crossing delays as well as noise and vibration are reduced.

1.3.7 Property Values

Prices for those homes that are situated directly adjacent to the Back Belt tracks are priced from 10 to 20 percent below adjoining properties, based on a conversation with Bill Brewer, Prudential-Louisiana Properties, March 1996. In the event of corridor relocation, these homes would appreciate in price and any differential due to the presence of the railroad would be eliminated. Metairie is still a highly desirable community to live in, and there are no home vacancies that are attributable to the presence of the railroad. According to one realtor, the homes that are immediately adjacent to the tracks take a little longer to sell, but they do sell.

1.3.8 Flooding

On May 8, 1995, heavy, moisture-laden clouds discharged an incredible 19 inches of rain over Metairie and New Orleans within a 24-hour period. Thirteen inches of rain actually fell in seven hours, which hydrologic engineers describe as a rate equivalent to a 500 year flood event (see Table 1.6). According to Prat P. Reddy, Director of Drainage and Flood Control for Jefferson Parish, storm sewers quickly backed up and the rapidly rising surface runoff could not move through drainage canal gates fast enough to prevent flooding. The Metairie Road highway bridge blocked the water movement in the canal enough to cause major head loss and,

Table 1.6: Description of Flood Events

Flood Event	Inches of Water In A 24-Hour Period
10 Year Flood	9.2" -Jefferson Parish minimum design standard
50 Year Flood	State of Louisiana Standard
100 Year Flood	13.6" - FEMA Standard
300 Year Flood	18.0" - US Corps of Engineers - Levee Protection

consequently, this bridge is being raised and rebuilt to improve the flood control drainage system performance.

Storm water runoff in the Beverly Knoll area south of Metairie Road moves in a southerly direction towards the Geisenheimer Canal, which parallels Airline Boulevard. Water draining into this canal then flows into the Hoey Canal, which runs northeast through the Metairie Golf Course and then connects with the 17th Street Canal. The pumping station raises the water from the drainage level to the level of Lake Pontchartrain. Al Pirsalehy, Director of the 17th Street Canal pumping station (with a 10,000 cubic foot per second capacity and the largest of its kind in the world) said the station's pumps were adequate for a 10 year flood event (or 9.2 inches of rainfall within a 24 hour period). The station raises the runoff water from the input side of the Canal approximately twelve feet to the discharge side, which runs north and drains into Lake Pontchartrain. The 17th Street Canal - Back Belt railroad bridge crosses immediately at the discharge side of the pumping station. Jefferson Parish pays for (and is allotted) 23.5 percent of the station's pumping capacity.

Also during the May 8th flood event, rainwater ran south of Metairie Road at such a rate that the culverts underneath the Back Belt roadbed were quickly flooded and caused the water to run parallel to the tracks and steadily rise on the northern edge of the right-of-way. The widespread flooding which ensued affected one out of two homes in Metairie. A home at the end of Magnolia Street adjoining the rail corridor had three feet of water in it, and the resulting damage forced the homeowner to completely refurbish the interior of the home. He subsequently sold the house, which took an extra six months, according to a local realtor, due to its location next to the railroad tracks.

Residents complained that the railroad roadbed acted as a levee during the downpour and impounded the run-off water rather than allowing it to drain properly. At one of our focus group meetings, the suggestion was made that culverts be installed underneath the railroad tracks to allow the water to move freely towards drainage canals and thus prevent future property damage. The severity of the flooding and widespread damage helped explain why the issue of storm sewers and flooding rank high on residents' agendas.

In the past, the pedestrian tunnel that runs under the railroad at the Metairie Community Park carried some of the overflow, but this tunnel has been closed and a new covered culvert has been installed. According to Pirsalehy, there needs to be at least one or possibly several additional drainage culverts installed underneath the roadbed large enough to carry the runoff and prevent local flooding. The Parish engineers have surveyed the land and are in the process of developing suggestions for a location and an alignment. They have retained Lynnfield & Heister, consulting engineers, to analyze the flood gate, drainage canal, and railroad roadbed restrictions and develop recommendations for improving the drainage system effectiveness. They are hopeful that the railroad roadbed drainage can be improved to accommodate a 100 year flood event, which is the Federal Emergency Management Administration (FEMA) standard. [In the past, there have been isolated instances of the Back Belt's roadbed being undermined by flooding and at least one instance where a local resident called the railroad to warn them that ties were undercut and hanging without support (this too was reported at our focus group meeting)].

A single six foot wide, 30 foot long jack and bore culvert might cost as much as $200,000 to install. These culverts could be installed underneath the Back Belt tracks at some of the streets that end at the roadbed. This would eliminate surface water run-off flooding during heavy rain periods, and address one of the sources of community conflict. On the other hand, if the rail corridor is relocated completely and the right-of-way is sold and removed for subsequent property development, this would presumably eliminate the levee entirely and any potential for impeding storm water runoff.

Naturally, the issue of the railroad's presence causing the Metairie flooding would never have arisen were it not for this incredible rainfall and, in the minds of residents, this is one more reason why relocation of the corridor is necessary and desirable. The May 8th flood also revealed other deficiencies in the drainage system, one of which was the need to remove anything in the drainage canals that impeded the rapid flow of water.

1.3.9 Concluding Comments

Concerned for their safety and frustrated by their seeming inability to improve their circumstances, many citizens are discouraged with the presence of the railroad. For some, the derailment on September 29, 1995, which blocked Metairie Road for over an hour, confirmed their vulnerability. The reality of this derailment appeared in contrast to the conclusions advanced by the most recent FRA safety evaluation, which found the Back Belt track and roadbed to be in good condition and the railroads to be following safe operating procedures.

The importance of railroad impacts on the local community is reflected in a report prepared by the National Ports and Waterways Institute for the Louisiana Department of Transportation and Development on freight transportation, which has been incorporated in the new Louisiana Statewide Intermodal Plan, and states: "The principal challenge faced by Louisiana railroads which requires public sector action are the many safety and operating impacts of roadway grade crossings of railroads" (LSU, 1995, p.I-1). However, in the minds of Metairie residents, the issue is more simply put: "Get the railroads out of Metairie!"

1.4 Railroad Improvements

Some of the solutions, identified in two prior federal and state funded studies (CONSAD, 1975, and FHWA, et al., 1988) that were acceptable to the local community, have been implemented by the IC, KCS, and NS railroads during the last 20 years. These improvements have reduced switching noise and eliminated the exposure to railroad refrigerator car noise and tank cars containing hazardous substances. Grade crossing delays at LaBarre Road, Atherton, and Hollywood were reduced by the closure and relocation of IC's interchange track, known as the "Long Siding".

This action, recommended in the 1975 CONSAD report to FRA, was authorized and funded by Section 140 of the Federal-Aid Highway Act of 1976, which amended section 163 of the Federal-Aid Act of 1973 by adding Metairie as one of the four additional railroad-highway demonstration projects. Congress authorized a two phase project. The first phase consisted of the abandonment of the KCS right-of-way between Worth Street in Kenner and North Turnbull Drive in Metairie, the relocation of KCS train movements to IC tracks, and the relocation and reconstruction of the IC-NS interchange trackage. The second phase, which was never implemented, consisted of the relocation of the Old Metairie railroad corridor to the Carrollton I-10 Interchange. All of the Phase I actions allowed for the elimination of 15 railroad-highway grade crossings and the retirement of 25,519 feet of KCS (former Louisiana and Arkansas) tracks. At a cost of $19 million (of which $18 million was federally funded), these actions produced a huge reduction in local grade crossing vehicle delay time and costs.

The relocation of the Metairie corridor was authorized by Congress and approved by the railroads, but was never implemented because the Jefferson Parish Administration believed that a District Court decision prevented/blocked the Parish's desire to route rail traffic through the Carrollton Interchange using the NOUPT tracks. The NOUPT Agreement (see Section 2.9.9, below) stipulates that movement over their tracks be confined to passenger trains only.

Over the last 20 years, the numbers of preblocked and run-through trains have increased, reducing the number of yard cuts and light engine movements over the Back Belt. Centralized traffic control is now used, which has reduced dispatching delays. New grade crossing gates and constant warning device signal protection equipment were installed at seven of the Metairie grade crossings in 1992. Finally, after years of prodding by local citizens, and with the leadership of Senator John Hainkel, the Louisiana State Legislature passed a law exempting the railroads from liability for any grade crossing accident in Metairie, which allowed the railroads to refrain from sounding their horns at Metairie grade crossings (this is the only community in the state of Louisiana that has effectively established a horn sounding ban). This brought about a long sought after reduction in residential noise levels and an unprecedented measure of quiet during the nighttime for Metairie residents. More than any other single action, the elimination of the horn sounding at Metairie grade crossings helped reduce the intrusiveness of railroad operations. As one focus group participant commented (see Chapter 3.0, below), "I'm really very used to the railroads, they don't bother me like they used to".

Thus, while the railroads operating through Metairie have been viewed by many residents as being relatively unresponsive to community complaints in the past, the record shows that they, in fact, have implemented many of the recommendations made in prior studies. Indeed, problems today are less severe, in a relative sense, than they were in 1975, due to the current horn sounding ban, the new grade crossing protection equipment, the removal and relocation of the IC interchange operations, and other operating changes previously mentioned.

Railroads do recognize the importance of the Back Belt and, hence, the need to maintain the viability of this southern segment of the east-west transcontinental rail system. Their involvement and cooperation, through the auspices of the project's "railroad technical advisory committee" in the development of this study evidences, we believe, a desire and need to preserve this connection. Railroads must maintain profits to service their customers, comply with federal, state, and local regulations and safety standards, and financially reward their stockholders. Consequently, their contributions should generate enough return on investment to cover their capital costs. Financially prudent managers normally limit such contributions, be they direct capital investments or contributions of in-kind services, to the extent of carrier benefits. In past studies, railroads have expressed a willingness to participate in plans for separating the grade crossings on Metairie Road and double tracking the 17th Street Canal, actions which they believed at that time would eliminate some train delays.

1.5 Future Trends In the Absence of Railroad Operation Changes

In the absence of relocating the Back Belt railroad corridor, the impacts and costs of future rail operations on the local Metairie community will, in large measure, be determined by both grade crossing highway traffic volumes and the length, speed, and timing of freight train movements.

1.5.1 Highway Traffic Projections

Over the last 25 years, highway vehicular traffic on all of the Metairie grade crossings grew by approximately 20 percent, from 34,100 vehicles per day to 40,900 vehicles per day. Based on population growth projections for Jefferson Parish and the surrounding parishes, highway traffic is expected to grow another 18.5 percent between 1995 and 2020 (see Table 1.7).

Interstate I-10, from Causeway Boulevard to the Interchange with I-610, is the principal east-west freeway through Jefferson and Orleans Parishes. It has seven lanes and a design capacity of 130,000 vehicles per 24 hour day. Current I-10 traffic counts show that the freeway is handling 173,000 vehicles per day, approximately 30 percent over its design capacity. When the I-10 freeway widening projects are completed in eight to ten years, two lanes will have been added from Williams Boulevard through the Carrollton Avenue interchange. Some of the commuters using Metairie Road and other grade crossings to bypass the daily jam-up of cars at the Route 610 to I-10 interchange may revert to using I-10 at that time. Doug Roberts, Jefferson Parish traffic engineer, estimates this could reduce potential traffic volume on Metairie Road by five

Table 1.7: Daily Highway Vehicular Traffic Growth In the Study Area, by Railroad Grade Crossing, 1975-2020

	1975	1986	1995	2000	2010	2020
1. Carrollton	4,528	4,215	5,370	5,518	5,931	6,376
2. Metairie	17,113	18,785	19,797	20,341	21,866	23,505
3. W.Oakridge	1,012	1,264	1,386	1,424	1,531	1,646
4. Farnham	1,289	2,255	2,132	2,191	2,355	2,531
5. Hollywood	2,400	2,936	3,820	3,925	4,219	4,535
6. Atherton	2,363	1,126	1,241	1,275	1,371	1,473
7. LaBarre	4,529	5,930	5,722	5,879	6,320	6,794
8. Shrewsbury	871	NA	1,477	1,511	1,625	1,747
Totals	34,105	36,911	40,939	42,065	45,217	48,607

NA - Data not available.

Sources: CONSAD (1975); FHWA, et al. (1988); and Department of Sociology, Louisiana Population Data Center (1994).

percent. However, because local and regional traffic volumes are predicted to continue to grow, by the time the I-10 widening projects are completed, traffic growth will have absorbed the new I-10 freeway capacity, reducing the ability of this highway to mitigate the highway growth impacts in the Metairie area.

1.5.2 Rail Freight Traffic Projections

While train movements across the Back Belt have only slightly increased over the last 20 years, from about 24 to about 25 trains per day, the average number of cars per train (excluding locomotives) has increased by 63 percent (from 48 to 78).

Train consolidation has helped prevent further increases in the numbers of trains running over the Back Belt. The resulting grade crossing blockage time has also been controlled by reductions in the overall lengths of intermodal cars, which resulted from the replacement of longer (89 foot) piggyback cars with shorter (63 to 71 foot) double stack container cars. In addition, the 20 percent increase in the average rail car carrying capacity over the last 20 years has helped prevent ever longer trains from increasing grade crossing delays. [The average railcar capacity has grown from 72.9 tons per car in 1975 to 92.0 tons per car in 1994 (Progressive Railroading, 1995-1996)].

Back Belt rail traffic is forecasted to grow over the next several years as a result of the potential entry of the BN/ATSF into the New Orleans Gateway. UP is planning to purchase SP, and, in order to maintain effective railroad competition and avoid Surface Transportation Board (STB) disapproval, it has offered to sell BN/ATSF the Houston to New Orleans corridor along with a package of trackage rights. In this scenario, UP will continue to operate over the Houston to New Orleans-Avondale segment on a trackage rights basis. Assuming the new STB approves the acquisition, and their prescribed protective conditions allow BN/ATSF into New Orleans, BN/ATSF would have an opportunity to switch traffic moving through other gateways through the New Orleans Gateway, thus increasing train traffic over the Back Belt and potentially adding to grade crossing blockage in Metairie.

Based on conversations with Henry Lampe, Assistant Vice President of the BN/ATSF, it is believed that BN/ATSF could add a general merchandise train and an intermodal train to the New Orleans Gateway traffic volume. Assuming the volume eventually supports their running on a daily schedule, this would add four new trains to Back Belt traffic volumes bringing the total to about 29 trains per day. On the other hand, this may be overstating the potential impact, as most BN/ATSF traffic is now moving to and from southeastern points via Birmingham and Mobile. BN/ATSF accesses Mobile by running, on a trackage rights basis, from Kimbrough to Mobile on NS tracks. Further, Kimbrough, AL is located approximately halfway on the NS line running from Columbus, MS to Pensacola, FL. Some of the traffic moving to and from BN/ATSF- and CSX-served points between New Orleans and Mobile, such as petrochemical plants in Gulfport and Pascagoula, is already moving through the New Orleans Gateway and, thus, would not add to Back Belt traffic volumes.

In further commenting on BN/ATSF prospective traffic volumes through Metairie, Mr. Dave Clifton, Assistant Vice President of Operations for BN/ATSF said, "They could add as many as two additional daily merchandise trains, which would raise the total number of BN/ATSF trains from 4 to 6." However, he hastened to add that one train would represent traffic volume diverted from SP and UP and that, as a consequence, the net traffic volume increase would still amount to four trains per day.

This increase also ignores the potential for additional consolidation of trains moving through the New Orleans Gateway, although such consolidation may be limited. Since BN/ATSF will be operating into the Avondale Yard, inclusion of BN/ATSF cars in the combined SP/UP trains may be possible in the initial stages of their traffic development, but with traffic growth, the physical limitations imposed by coupler strength and the Huey P. Long Bridge geometry will limit train sizes and lengths.

Given the potential for additional consolidations and mergers, it is difficult for railroad officials to speculate on what the likely outcomes will produce in the way of traffic diversions and potential consolidations, as other service and competitive factors must be considered, and the ultimate configuration of the railroad will be dependent on what the new STB approves. While senior railroad officers postulated a variety of potential future transcontinental railroad mergers and consolidations, conversations with them showed no consensus emerging about what directions such consolidations might take. The planning quickly mires in the multiplicity of trackage rights options that can be considered to balance and maintain competition and considerable questions regarding the extent to which the new STB may strongly or loosely regulate such consolidations.

Nevertheless, without specifying, in detail, how rail freight traffic will grow, CONSAD utilized the rail freight commodity flow forecasts developed for the New Orleans Business Economic Area (BEA) by the National Ports and Waterways Institute at Louisiana State University as part of the freight transportation study for the Louisiana Statewide Intermodal Plan (LSU, 1995) in order to project railroad traffic volumes over the Back Belt over the next 25 years. Specifically, the medium cargo forecasts for 1990, 2000, 2010, and 2020 were used to estimate the percent change in rail freight traffic between 1995 and each of the three benchmark years in the future (see Appendix C).

Using these percent changes, two scenarios were developed. The first assumes that the number of trains (and operating schedule) over the Back Belt will remain constant and that the average number of cars per train will increase to handle the expected increase in rail freight traffic. The second scenario assumes that the number of trains over the Back Belt will increase, proportionately, according to the current operating schedule and that the average number of cars per train will remain constant. Based on the rail freight projections for 2000, 2010, and 2020, the data indicate that if the number of trains remain constant, the average length of each train will increase from 81 cars in 1995, to 88 cars in 2000, 101 cars in 2010, and 115 cars in 2020. Alternatively, if the average number of cars per train remain constant, the average number of trains crossing the Back Belt each day are projected to increase from about 24.7 trains in 1995, to 26.9 trains in 2000, 30.7 trains in 2010, and 35.1 trains in 2020. Figure 1.4 illustrates the distribution of these trains, by hour. For comparison purposes, the projected daily vehicle counts, by hour, are also presented in the bottom half of this figure.

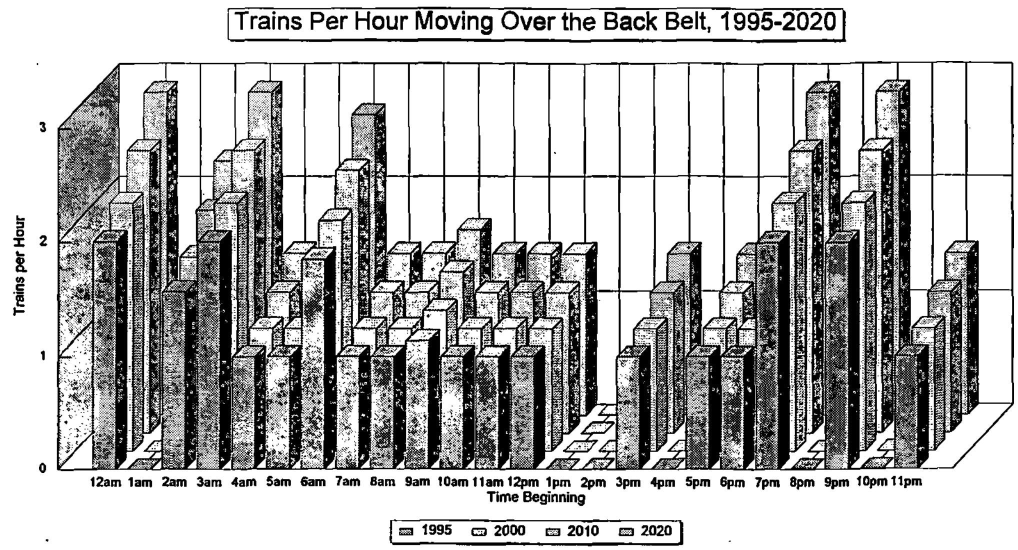
1.5.3 Highway User Impact Projections

Assuming that current railroad operations continue into the future, with no scheduling changes other than an increase in the average number of cars per train or trains per day, the projections for both highway vehicle and railroad freight traffic over the next

Figure 1.4: Projections of Rail Freight and Highway Vehicle Traffic
1995-2020 Daily Totals by Hour
With No Other Scheduling Changes in Current Railroad Operations

Trains Per Hour Moving Over the Back Belt, 1995-2020

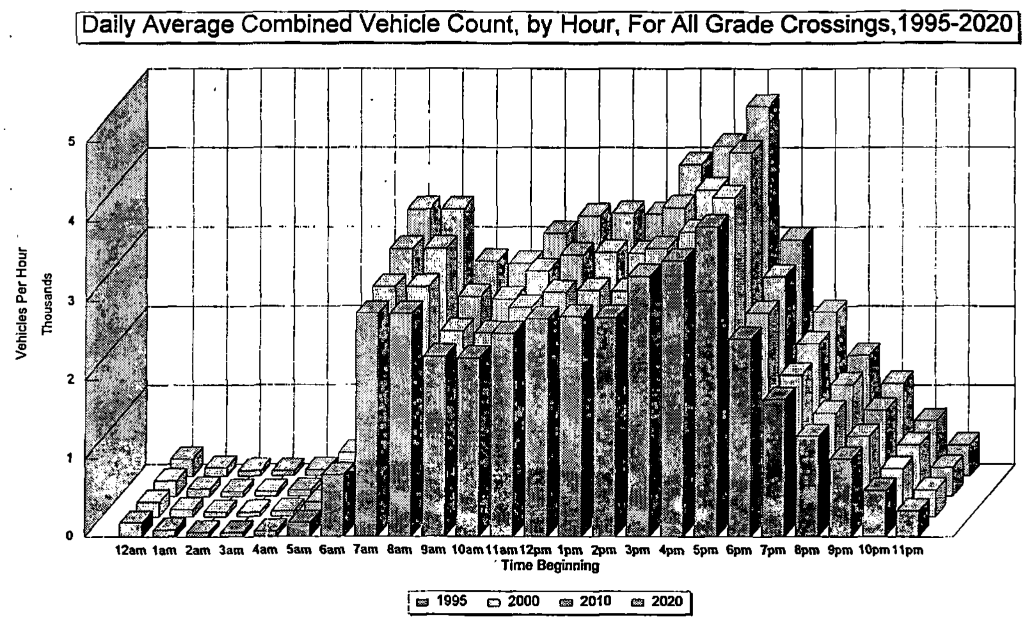
Time Beginning	1995	2000	2010	2020
12am	2.0	2.2	2.5	2.8
1am	0.0	0.0	0.0	0.0
2am	1.4	1.6	1.8	2.0
3am	2.0	2.2	2.5	2.8
4am	1.0	1.1	1.2	1.4
5am	1.0	1.1	1.2	1.4
6am	1.9	2.0	2.3	2.6
7am	1.0	1.1	1.2	1.4
8am	1.0	1.1	1.2	1.4
9am	1.1	1.2	1.4	1.6
10am	1.0	1.1	1.2	1.4
11am	1.0	1.1	1.2	1.4
12pm	1.0	1.1	1.2	1.4
1pm	0.0	0.0	0.0	0.0
2pm	0.0	0.0	0.0	0.0
3pm	2.0	2.2	2.5	2.8
4pm	0.0	0.0	0.0	0.0
5pm	1.0	1.1	1.2	1.4
6pm	0.9	0.9	1.1	1.2
7pm	2.0	2.2	2.5	2.8
8pm	0.0	0.0	0.0	0.0
9pm	2.0	2.2	2.5	2.8
10pm	0.4	0.5	0.5	0.6
11pm	1.0	1.1	1.2	1.4
TOTAL	24.7	26.9	30.7	35.1



Daily Average Combined Vehicle Count, by Hour, For All Grade Crossings,1995-2020

Time Beginning	1995	2000	2010	2020
12am	185	190	204	220
1am	91	94	101	108
2am	60	62	66	71
3am	55	57	61	65
4am	70	72	77	83
5am	182	187	201	216
6am	796	818	879	945
7am	2,848	2,926	3,146	3,381
8am	2,848	2,926	3,146	3,381
9am	2,299	2,362	2,539	2,730
10am	2,274	2,337	2,512	2,700
11am	2,592	2,663	2,863	3,077
12pm	2,778	2,854	3,068	3,298
1pm	2,806	2,883	3,099	3,332
2pm	2,797	2,874	3,089	3,321
3pm	3,317	3,408	3,664	3,938
4pm	3,515	3,612	3,882	4,173
5pm	3,938	4,046	4,350	4,676
6pm	2,524	2,593	2,788	2,997
7pm	1,755	1,803	1,938	2,084
8pm	1,287	1,322	1,421	1,528
9pm	993	1,020	1,097	1,179
10pm	596	612	658	708
11pm	333	342	368	395
TOTAL	40,939	42,065	45,217	48,607

**Metairie Road traffic was measured east-west bound while the remaining seven grade crossings were measured north-south bound.*



Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

Table 1.8: Highway Traffic Vehicle Delay and Cost Analysis
1995-2020 Annual Totals
With No Other Scheduling Changes in Current Railroad Operations

Assuming Number of Cars per Train Increase (Number of Trains per Day Remain Constant)

Location	1995 Total Delay and Slowing Time For All Affected Vehicles (Hours)	1995 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2000 Total Delay and Slowing Time For All Affected Vehicles (Hours)	2000 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2010 Total Delay and Slowing Time For All Affected Vehicles (Hours)	2010 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2020 Total Delay and Slowing Time For All Affected Vehicles (Hours)	2020 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	**14,588**	**$300**	**16,675**	**$338**	**21,491**	**$426**	**28,246**	**$547**
METAIRIE ROAD	**75,093**	**$1,467**	**88,074**	**$1,695**	**120,333**	**$2,261**	**168,683**	**$3,100**
WEST OAKRIDGE DRIVE	**4,520**	**$91**	**5,184**	**$102**	**6,672**	**$129**	**8,725**	**$165**
FARNHAM PLACE	**6,879**	**$139**	**7,888**	**$157**	**10,169**	**$198**	**13,322**	**$254**
HOLLYWOOD DRIVE	**12,379**	**$246**	**14,214**	**$278**	**18,361**	**$352**	**24,120**	**$452**
ATHERTON DRIVE	**3,892**	**$77**	**4,460**	**$87**	**5,721**	**$110**	**7,458**	**$140**
LABARRE ROAD	**24,186**	**$468**	**28,046**	**$536**	**36,816**	**$690**	**49,122**	**$905**
SHREWSBURY ROAD	**6,153**	**$120**	**7,113**	**$137**	**9,254**	**$175**	**12,222**	**$228**
Totals	**147,691**	**$2,908**	**171,655**	**$3,330**	**228,818**	**$4,341**	**311,899**	**$5,793**

Assuming Number of Trains per Day Increase (Number of Cars per Train Remain Constant)

Location	1995 Total Delay and Slowing Time For All Affected Vehicles (Hours)	1995 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2000 Total Delay and Slowing Time For All Affected Vehicles (Hours)	2000 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2010 Total Delay and Slowing Time For All Affected Vehicles (Hours)	2010 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2020 Total Delay and Slowing Time For All Affected Vehicles (Hours)	2020 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	**14,588**	**$300**	**16,193**	**$331**	**19,904**	**$401**	**24,895**	**$494**
METAIRIE ROAD	**75,093**	**$1,467**	**87,071**	**$1,680**	**117,426**	**$2,219**	**163,574**	**$3,028**
WEST OAKRIDGE DRIVE	**4,520**	**$91**	**4,976**	**$99**	**5,979**	**$118**	**7,245**	**$141**
FARNHAM PLACE	**6,879**	**$139**	**7,586**	**$152**	**9,166**	**$182**	**11,180**	**$219**
HOLLYWOOD DRIVE	**12,379**	**$246**	**13,698**	**$270**	**16,650**	**$324**	**20,476**	**$394**
ATHERTON DRIVE	**3,892**	**$77**	**4,278**	**$84**	**5,115**	**$100**	**6,160**	**$119**
LABARRE ROAD	**24,186**	**$468**	**27,054**	**$520**	**33,541**	**$637**	**42,172**	**$793**
SHREWSBURY ROAD	**6,153**	**$120**	**6,810**	**$132**	**8,248**	**$159**	**10,071**	**$193**
Totals	**147,691**	**$2,908**	**167,666**	**$3,268**	**216,028**	**$4,140**	**285,774**	**$5,381**

Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

25 years suggest that vehicle delay and slowing times, and vehicle delay and slowing time costs, will only get worse compared to today, especially after 2000. Table 1.8 summarizes the total delay and slowing time and total delay and slowing time costs, on an annual basis, for all affected vehicles, first assuming that the number of cars per train increase while the number of trains per day remain constant to handle the additional freight volume projected over the next 25 years, and then assuming that the number of trains per day increase while the number of cars per train remain constant. As indicated by these data, the total annual delay and slowing time for all affected vehicles is projected to increase from 147,700 hours in 1995, to between 285,800 and 311,900 hours by the year 2020.

As also indicated by the data in Table 1.8, in future years, especially by the year 2020, the delay and slowing times are expected to be more severe (i.e., about nine percent higher) if the number of cars per train increase rather than if the number of trains per day increase. This results, primarily, from the longer train blockages and the longer average delay times per vehicle caused by the longer trains. In other words, while increasing the length of each train will stop/delay less vehicles, each vehicle, on average, will be delayed for a longer amount of time since each train is longer. Overall, this is expected to produce total vehicle delay times that are slightly higher than if the number of trains increased.

In terms of total vehicle delay and slowing time cost, it is estimated that by the year 2020, costs (in 1995 dollars) will have increased to between \$5.4 and \$5.8 million, or between 85 and 100 percent above the estimated 1995 level of \$2.9 million (again, see Table 1.8). Assuming a discount rate of seven percent[1], the net present value (in 1996) of these constant (1995) dollar delay and slowing time costs for 1996 through 2020 is estimated to range from \$46.5 to \$48.1 million (again, these estimates assume that current railroad operations will continue with either the length of trains or the number of trains per day increasing).

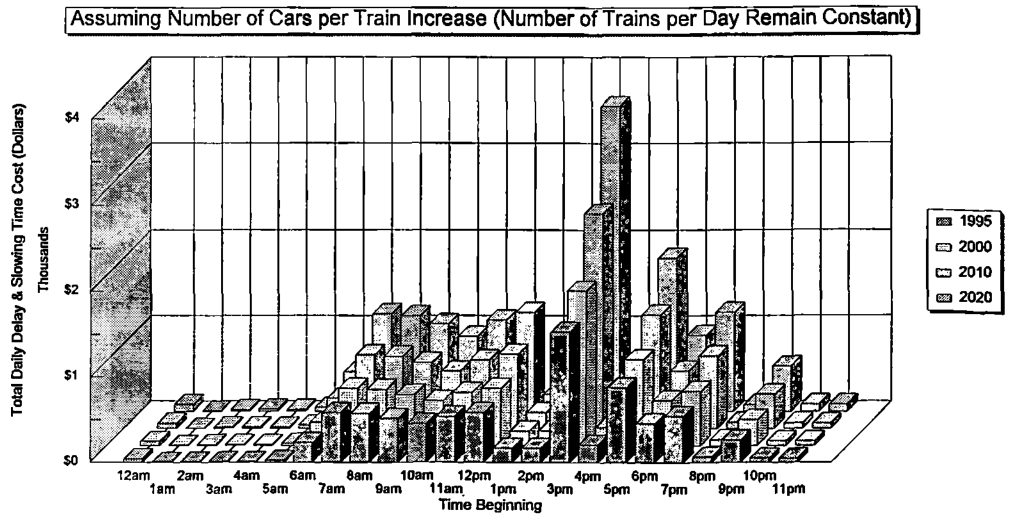
Figure 1.5 illustrates the total daily delay and slowing time cost, on an hourly basis, for all eight grade crossings combined, over this 25 year period, for both scenarios concerning how the projected increase in rail freight traffic will be accomplished. As the data illustrate, throughout the 25 years, the largest delay and slowing time costs, now and in the future, are expected to occur during the evening rush hours (in particular, between 3 PM-4 PM and 5 PM-6 PM), followed by the morning rush hour (i.e., 7 AM-9 AM) and mid-day hour (i.e., 12 noon-1 PM).

[1] This discount rate is the currently approved rate from the Office of Management and Budget (OMB).

Figure 1.5: Total Delay and Slowing Time Cost for All Affected Vehicles, for All Affected Locations (Dollars)
1995-2020 Daily Totals by Hour
With No Other Scheduling Changes in Current Railroad Operations

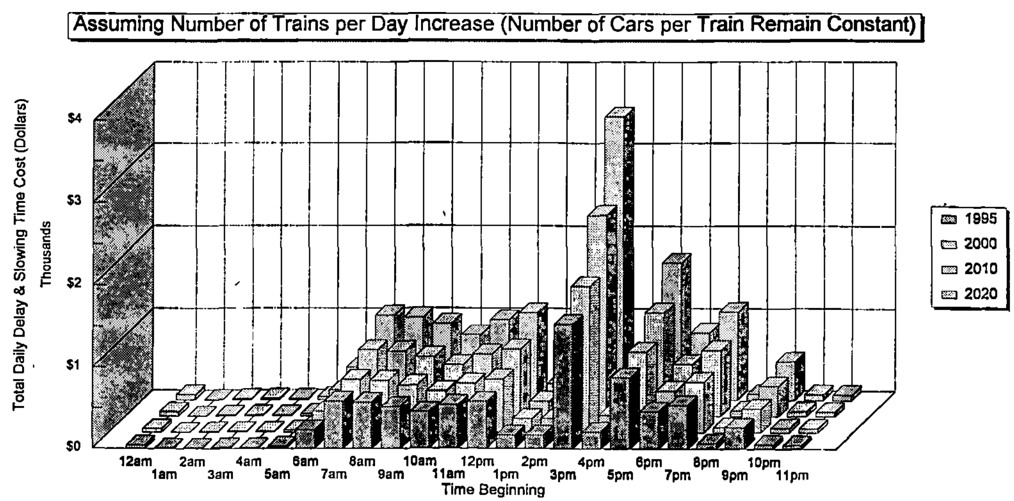
Assuming Number of Cars per Train Increase (Number of Trains per Day Remain Constant)

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	$42	$48	$62	$80
1am	$5	$5	$5	$6
2am	$11	$12	$15	$19
3am	$12	$14	$18	$23
4am	$10	$12	$15	$18
5am	$26	$29	$37	$47
6am	$234	$270	$351	$463
7am	$582	$665	$864	$1,142
8am	$572	$652	$845	$1,115
9am	$515	$592	$770	$1,024
10am	$453	$519	$668	$880
11am	$539	$617	$803	$1,069
12pm	$582	$667	$869	$1,159
1pm	$167	$171	$185	$199
2pm	$167	$173	$185	$199
3pm	$1,528	$1,807	$2,506	$3,551
4pm	$209	$215	$232	$249
5pm	$876	$1,009	$1,331	$1,796
6pm	$461	$527	$677	$895
7pm	$543	$635	$848	$1,158
8pm	$67	$69	$74	$79
9pm	$264	$306	$399	$532
10pm	$54	$59	$70	$85
11pm	$47	$53	$65	$83
TOTAL	$7,967	$9,125	$11,893	$15,871



Assuming Number of Trains per Day Increase (Number of Cars per Train Remain Constant)

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	$42	$46	$56	$68
1am	$5	$5	$5	$6
2am	$11	$12	$14	$16
3am	$12	$14	$16	$20
4am	$10	$11	$13	$16
5am	$26	$28	$33	$40
6am	$234	$261	$321	$398
7am	$582	$649	$813	$1,036
8am	$572	$637	$794	$1,008
9am	$515	$578	$725	$930
10am	$453	$506	$628	$795
11am	$539	$603	$760	$978
12pm	$582	$653	$823	$1,063
1pm	$167	$171	$185	$199
2pm	$167	$173	$185	$199
3pm	$1,528	$1,787	$2,446	$3,446
4pm	$209	$215	$232	$249
5pm	$876	$990	$1,271	$1,674
6pm	$461	$517	$642	$824
7pm	$543	$623	$809	$1,079
8pm	$67	$69	$74	$79
9pm	$264	$297	$372	$474
10pm	$54	$57	$66	$76
11pm	$47	$51	$60	$71
TOTAL	$7,967	$8,953	$11,342	$14,744



Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

2.0 DESCRIPTION OF THE POSITION AND INTERESTS OF PUBLIC OFFICIALS AND THE RAILROADS

2.1 Introduction and Purpose

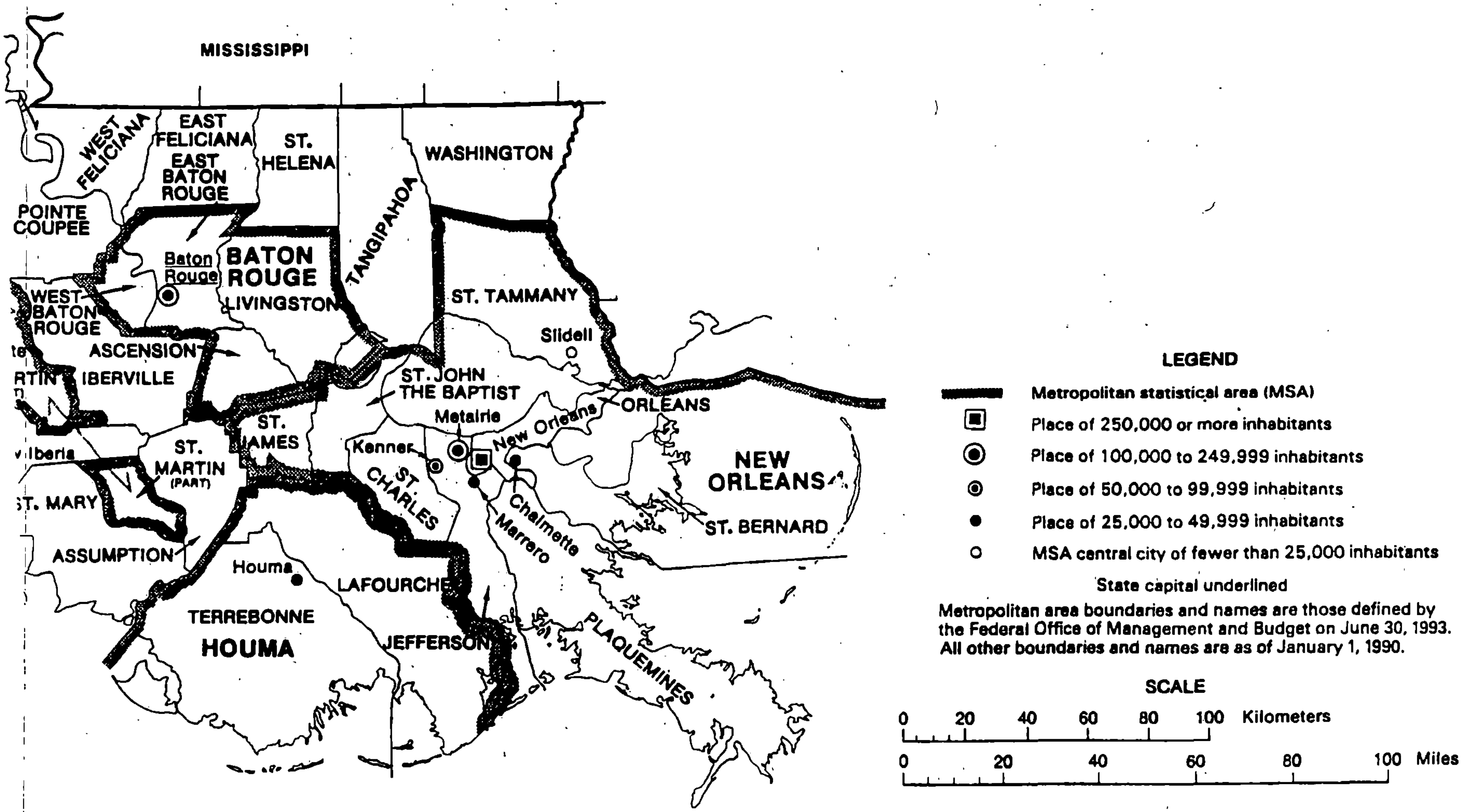
The purpose of Chapter 2.0 is to describe both: (a) how the officials of Metairie and the surrounding area view railroads and the issues relating to this project; and (b) how the railroads view the Metairie situation. In order to understand these perspectives, it is also necessary to have a picture of the economic and demographic conditions in the area. This chapter first describes these conditions. This chapter also reviews historical information from previous studies, including previous attitude surveys, since these results help to shape and define the interests of public officials.

2.2 Summary of Economic and Demographic Statistics

The rail-community conflicts arise partly because of the existing system of railroads and residential communities, but also because of the larger demographic and economic context in which the railroads operate. The southeast portion of Louisiana is mostly allocated among three Metropolitan Statistical Areas (MSA's): New Orleans, Baton Rouge, and Houma (see Figure 2.1). The parishes included in these MSA's define the geographic context for the rail-community debates which are the focus of this study.

Table 2.1 shows selected geographic background data for four parishes: Jefferson, Orleans, St. Charles, and Tangipahoa. Three

Figure 2.1: Metropolitan Statistical Areas of New Orleans, Baton Rouge, and Houma



Source: U.S. Bureau of the Census, City and County Data Book, 1994.

Table 2.1: Summary of Demographic Statistics for Jefferson and Nearby Parishes

Data Line	Total Population	1980	1992	% change	density per sq. mile
1	Jefferson	454,592	457,738	+0.6	1,496
2	Orleans	557.927	489,595	-13	2,711
3	St. Charles	37,259	44,372	+19	156
4	Tangipahoa	80,698	87,982	+9	111

	Age Distribution	Jefferson	Orleans	St. Charles	Tangipahoa
5	< age 5	7.3	7.8	9.2	7.8
6	5 - 17	19.6	19.7	22.3	22.5
7	18 - 24	10.2	11.4	8.9	12.2
8	25 - 34	17.9	16.9	19.3	15.3
9	35 - 44	15.8	14.3	15.6	14.0
10	45 - 64	19.0	16.9	17.2	17.2
11	> age 64	10.2	13.0	7.4	11.1

		Jefferson	Orleans	St. Charles	Tangipahoa
12	Birth rate (per 1000 population) - 1988	16.1	18.5	19.8	17.7
13	Infant deaths (per 1000 live births) - 1988	10.5	12.7	10.8	12.3
14	Building Permits: New private housing units, 1990-1992, as a percent of 1990 housing stock	1.2	0.2	3.7	2.6
	Journey to work (percent by each mode):				
15	Drive Alone	78.3	58.6	81.5	73.6
16	Car Pools	14.2	15.4	13.3	17.6
17	Public Transit	2.3	16.9	0.8	0.2
18	Average travel time to work (minutes) - 1990	22.8	23.7	25.7	25.8
19	Percent working outside parish of residence	37.4	18.8	52.6	28.3
20	Unemployment rate (percent)	5.6	6.1	6.5	9.5
21	Percent of labor force in manufacturing	9.8	6.8	20.0	10.9
22	Personal income per capita	$17,101	$16,578	$16,167	$11,704
23	Total personal income growth (percent) - 1980-1990	62.8	55.6	83.3	84.4

Source: U.S. Bureau of the Census, City and County Data Book, 1994.

of these parishes are within the New Orleans MSA, and one is approximately in between the New Orleans MSA and the Baton Rouge MSA. These four parishes provide contrasts in the economic and demographic characteristics for the broader geographic area impacted by the rail system that is the focus of this study.

These background data indicate that, although Jefferson Parish is the wealthiest of the four, its economic growth and housing construction have slowed. Similar trends are also found for Orleans Parish. Economic growth appears to be shifting to the less populated parishes on the fringes of the MSA.

2.3 Governmental Levels Which Are Relevant to the Project

The following governmental levels are particularly relevant to the study because, together, they comprise the full range of rail and community issues present in the area:

- Jefferson Parish
- Orleans Parish
- The Regional Planning Commission (RPC)
- The Louisiana State Government
- The Federal Rail Administration, U.S. Department of Transportation.

The residents and officials of each of the governmental levels also must be aware of various aspects of their location. For example, officials in Jefferson Parish must take note not only of conditions in Metairie, but also in Kenner, Harahan, and even of surrounding parishes.

Similarly, the rail-community conflict is complicated by the existence of still other issues. In the conduct of this study, focus group discussions and individual interviews on rail issues inevitably led to discussions of such issues as:

- Highway traffic and congestion
- Environmental health and safety
- Residential density
- Property values, and
- Floods and storm drainage.

Sections 2.4 through 2.8, below, describe the positions and interests of each of the groups identified above.

2.4 Jefferson Parish Position

The Mississippi River divides seven of Louisiana's 64 parishes into two parts. One of these seven, Jefferson, has a combined rail-highway bridge connecting its east bank and west bank. A second bridge connects two separate parishes at Baton Rouge, and a third bridge connects Concordia Parish with Warren County, Mississippi. Appendix H shows additional details for these bridges.

The bridge at Jefferson Parish, called the Huey P. Long (HPL) Bridge, was built in 1936 and, over the decades, has substantially contributed to the industrial and freight transportation nature of the parish. But, as suburban growth has spread from Orleans Parish, a conflict has inevitably developed between competing land uses: railroad and residential. Residents have argued that these two uses are acutely incompatible. Some features of this competition, most notably, rail-highway grade crossings, are described in Chapter 1.0, above (and in more detail, in Chapter 6.0, below).

Highway facilities are also a major land use in Jefferson Parish. Two primary expressways, Interstate 10 and the Earhart Expressway, cross the parish in an east-west direction. A major north-south route, the Lake Pontchartrain Causeway, runs through the parish and across Lake Pontchartrain. This causeway provides a route from northshore parishes through Jefferson Parish to the metropolitan airport, located on the western part of the east bank, and to the City of New Orleans.

Thus, many of Jefferson Parish's residential neighborhoods are impacted by major transportation facilities, in the form of noise and congestion. Furthermore, it is often difficult for the residents to perceive any direct economic or other value of these facilities to themselves.

Much of the vocalized resentment about railroads arises in the Metairie section of east Jefferson Parish. It is not the only railroad corridor in Jefferson Parish, nor is it the only corridor to arouse complaint, as well as attention from government officials. However, it very likely has the distinction of having attracted the attention of the highest level officials for the longest period. As early as July 1972, members of the Congressional Delegation, including U.S. Representative Hale Boggs, and U.S. Senators Allen Ellender and Russell Long; State and Parish Officials'; representatives of the Federal Railroad Administration, the Federal Highway Administration and Interstate Commerce Commission; and the Presidents of three Railroads involved made an on-site inspection of the Back Belt. The visit of these officials underscores the multi-jurisdictional and interstate nature of railroads. In other words, rail planning problem-solving is most likely to involve federal, state, and local officials.

2.4.1 The Neighborhoods of Jefferson Parish

In the early 1980's, the Jefferson Parish Planning Department conducted an important study to relate residents' concerns to the specific neighborhoods where they lived (Jefferson Parish Planning Department, 1984). The 1980 Census data showed that over 70 percent of the parish residents lived in unincorporated neighborhoods, many of which are well-recognized in terms of traditional boundaries. The remaining population live in the six incorporated cities, divided between two on the east bank and four on the west bank. Although this study is now more than ten years old, it is one of the few studies which provide information at the neighborhood level, and many of the issues are still relevant.

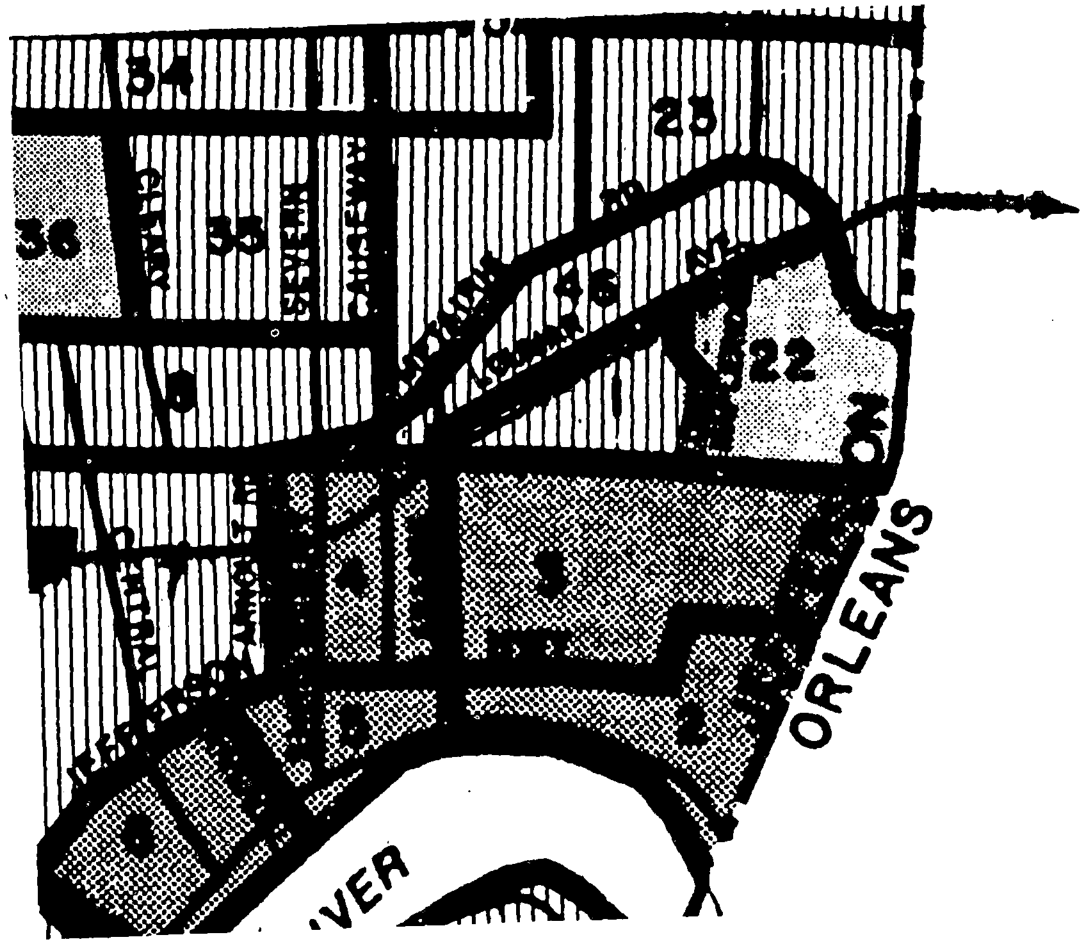
The neighborhood statistics show great diversity: the populations ranged from 895 to 23,548, and the median household incomes ranged from $11,138 to $44,460.

Approximately five of the 71 identified neighborhoods directly adjoin the three mile Back Belt rail corridor (see Figure 2.2):

- Beverly Knoll,
- Shrewsbury,
- Metairie Club Gardens,
- Old Metairie North, and
- Old Metairie.

The Planning Department obtained statistics for each neighborhood and ascertained that both the wealthiest and the poorest neighborhoods are located south of the "tracks."

Figure 2.2: Jeffferson Neighborhood Map



Neighborhood code numbers: (1) Beverly Knoll, (2) Shrewsbury, (22) Metairie Club Gardens, (23) Old Metairie North, (46) Old Metairie
Source. Jefferson Parish Planning Department.

Next, the Planning Department compared the results of a separate study of attitudes with their analysis of indicators. During the spring and summer of 1983, Jefferson Parish contracted with Allen Rosenzweig and Associates to conduct an attitude survey. The attitude study obtained responses concerning the "top three" neighborhood problems from a list of 33 items. Results for the five neighborhoods listed above are shown in Table 2.2. Considering that the respondents had 33 items from which to choose, the consistency of responses among the five neighborhoods is impressive.

Table 2.2: Summary of 1983 Neighborhood Analysis Report

Map No.	Neighborhood	Top Three Neighborhood Problems		
1	Beverly Knoll	1. Delays at railroad crossings	2. Drainage after rain	3. Reducing congestion on major arteries
4	Shrewsbury	1. Drainage after rain	2. New municipal auditorium facility	3. Enforcing housing codes
22	Metairie Club Gardens	1. Delays at railroad crossings	2. Drainage after rain	3. Reducing congestion on major arteries
23	Old Metairie North	1. Delays at railroad crossings	2. Enforcing housing codes	3. Reducing congestion on major arteries
46	Old Metairie	1. Delays at railroad crossings	2. Reducing congestion on major arteries	3. Drainage after rain

Source: Rosenzweig and Associates, 1983.

2.4.2 The FHWA-Urban Systems Attitude Study

Although the results of the Rosenzweig survey are clear in terms of the identification of problems by residents, the survey did not deal with what types of solutions the residents wished to see. During the remainder of the 1980's, the parish government was occupied with various activities relating to transportation, including the alleviation of the grade crossing and congestion problems (see Appendix A).

In addition, another survey -- the FHWA/Urban Systems Attitude Study (FHWA, et al., 1988) -- was conducted in 1985 and this time the questions concerned specific engineering and operational solutions to rail related complaints, as well as several types of complaints. In this survey, respondents indicated "favorable" and "unfavorable" to each of 30 items, including both complaints and proposed solutions, which the consultants had devised. While this survey is more than ten years old, it included more than 600 respondents, and is one of the most comprehensive undertaken of Metairie residents.

In general, the results of this survey (presented in detail in Appendix A) show that respondents were in agreement on the problems they wanted to have solved, and responded favorably to such ideas as "restriction of hazardous materials rail shipments" and "reduce number of trains using tracks." But when they were asked to choose specific construction or engineering plans, their support wavered. Such proposals as "construction of underpass at Metairie Road" and "construction of noise barriers" were generally rejected. One proposal stands out for its overwhelming approval: "relocation/removal of tracks."

2.4.3 A Councilman's Survey of Key Issues

At least one study was conducted recently (in 1995) by Parish Councilman Nick Giambelluca. Jefferson Parish is governed by a parish council, consisting of four councilmen who represent specific districts, two who represent larger areas, and a council president. Councilman Giambelluca's district includes parts of Metairie.

The Councilman's study addressed issues directly, without attempting to link them to any specific site or condition. The issues which Councilman Giambelluca's study assessed were, in order of their presentation on a questionnaire card, the following:

- Crime,
- New Jail,
- Traffic,
- Sewerage,
- Gambling,
- Waste in Government, and
- Drainage.

Respondents were asked to rate each issue with respect to its importance on a seven point scale, from one (most important) to seven (least important). The issues which received the largest number of "ones" were, in order:

- Crime,
- Gambling,
- Waste in Government,
- New Jail,
- Drainage,
- Traffic, and
- Sewerage.

The issues which received the largest number of "sevens" were, in order:

- Gambling,
- Sewerage,
- New Jail,
- Traffic,
- Drainage,
- Waste in Government, and
- Crime.

These results suggest that there is community consensus on the importance of crime and waste in government, but that, comparatively speaking, there is a relative lack of emphasis on the importance of sewerage. On the other hand, some diversity of attitude appears with regard to gambling and a new jail.

The most appropriate interpretation with regard to traffic and drainage is ambivalence. It should be noted that street traffic in parts of Metairie is seriously congested[1] (see Section 6.2, below). In addition, storm water drainage is a constant concern for Parish officials. On a USGS contour map, the highest contour line which passes through Metairie is the 5 feet above sea level line. The area is protected from flood waters flowing in the 17th Street Canal by flood walls which rise about 14 feet above sea level[2] (see Section 1.3.8, above).

Drainage and traffic congestion are the two issues in Councilman Giambelluca's study which would be thought to be most directly related to railroad facilities and operations, since the elevated rail right-of-way forms a natural barrier across the parish. In addition, as noted in Section 1.3.1, above, the eight at-grade street crossings in the approximately three mile Back Belt corridor cause traffic delays which vary with the time of day (also see Section 6.2, below).

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[1] Direct communication from Lee Daspit, Department of Public Works, Jefferson Parish in February, 1996.

[2] Direct communication from Gordon Hebert, U.S. Corps of Engineers, on March 6, 1996.

2.4.4 Interviews with Jefferson Parish Officials and Community Activists

In order to obtain a broad picture of issues throughout the parish, and a synthesis of constituents' views, the contractor team conducted a series of individual and small group interviews with parish officials and community activists, during the period July, 1995 through January, 1996.

A useful overview of the rail-community situation is provided in the following interview[3]:

> There are some complaints about traffic and delays at crossings, and these sometimes reach a high level. In other words, the extra long trains block the intersections.... With regard to what might be done with the land if the railroad is eliminated, the parish needs an east-west corridor.... People have also mentioned a bike trail.... With regard to growth in the Parish, there have been complaints about commercial changes in neighborhoods. However, property costs have continued to rise in Metairie....
>
> There is a plan for a new baseball stadium, but it will probably be two more years before it is built, and traffic from the stadium will be only a minor problem.... Flood drainage is a problem. Open space is not a problem in the Metairie vicinity because there are a lot of parks and playgrounds. Also, there has been some beautification around the railroad. Attitudes toward the railroad have changed a lot: some people who live next to the railroad say they like the rumble of the trains. They do not like the idea of a street through (along or replacing) the railroad right of way.

Rail-community conflicts are, clearly, linked to street traffic, environmental, and land use issues.

Parish officials recognize that overall growth pressures throughout the Parish (commercial growth was frequently mentioned) provide motivation to develop strategies which would accommodate

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[3] Ed Voltolina, July 18, 1995, based on interviewer notes.

growth, simultaneously alleviating current and future rail-community issues. The following were mentioned:[4]

- Widen and extend existing expressways through Jefferson Parish, especially I-10 and Earhart, which should be extended into St. Charles Parish and connect with I-310 (see regional traffic situation discussion in Chapter 4.0). Such measures, if successful, would reduce congestion in neighborhoods;

- Create an entirely new east-west highway corridor through the Parish (same objective as above): there are presently no plans for this and the location would be difficult to choose (direct communication from Lee Daspit, 5 February 1996);

- Press railroad management to reduce blocking of grade-crossings at traffic rush hours. Crossing blockage is a problem in other parts of the Parish (e.g., Kenner), not just on the Back Belt (in fact, in the neighborhood attitude survey described in 2.4.1 above, eight other neighborhoods chose "delays at railroad crossings" as one of the top three problems);

- Create high speed passenger train service through the Parish (the present high speed proposal is from downtown New Orleans to the airport);

- Construct a new Mississippi River bridge east of Orleans Parish, thus diverting highway, and possibly rail, traffic to the west bank of the river: this proposal is sometimes called the Route 47/I-510 plan; and

- Reroute trains carrying hazardous materials to routes outside the Parish. This proposal is discussed in Section 5.1.8, below.

Thus Jefferson Parish officials recognize the need for broad as well as specifically local geographic approaches to Parish growth and to resolving problem areas.

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[4] Interviews with Tim Coulon, Joe Perret, and Ed Durabb, July 18, 1996.

2.5 Orleans Parish Position

As shown in Table 2.1 above, Orleans Parish is experiencing some of the same problems as Jefferson Parish in terms of slow income growth. In terms of passenger transportation, even though less than 20 percent of Orleans Parish residents commute to other parishes, they still average a slightly longer commuting time (23.7 minutes versus 22.8 minutes) than do Jefferson Parish workers. Furthermore, more than 16 percent of these Orleans Parish workers travel on public transit, as opposed to less than three percent of Jefferson Parish workers.

Orleans Parish has a long history of passenger rail operations and is the location of NOUPT, a large facility which has been converted to accommodate intercity bus operations as well as Amtrak service.

A more picturesque type of passenger rail service which has a long history in Orleans Parish is the trolley system. Although limited in total trackage, the system could form the basis for an integrated multi-parish system with traditional as well as modern levels of service. This type of system is envisioned by the Louisiana Association of Railroad Passengers[5].

The traditions of public transportation in Orleans Parish, plus the higher population density, present a much different transportation context from that in Jefferson Parish.

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[5] Direct communication from Charles Apffel, Louisiana State University, January, 1996.

2.6 Regional Perspective of the Regional Planning Commission

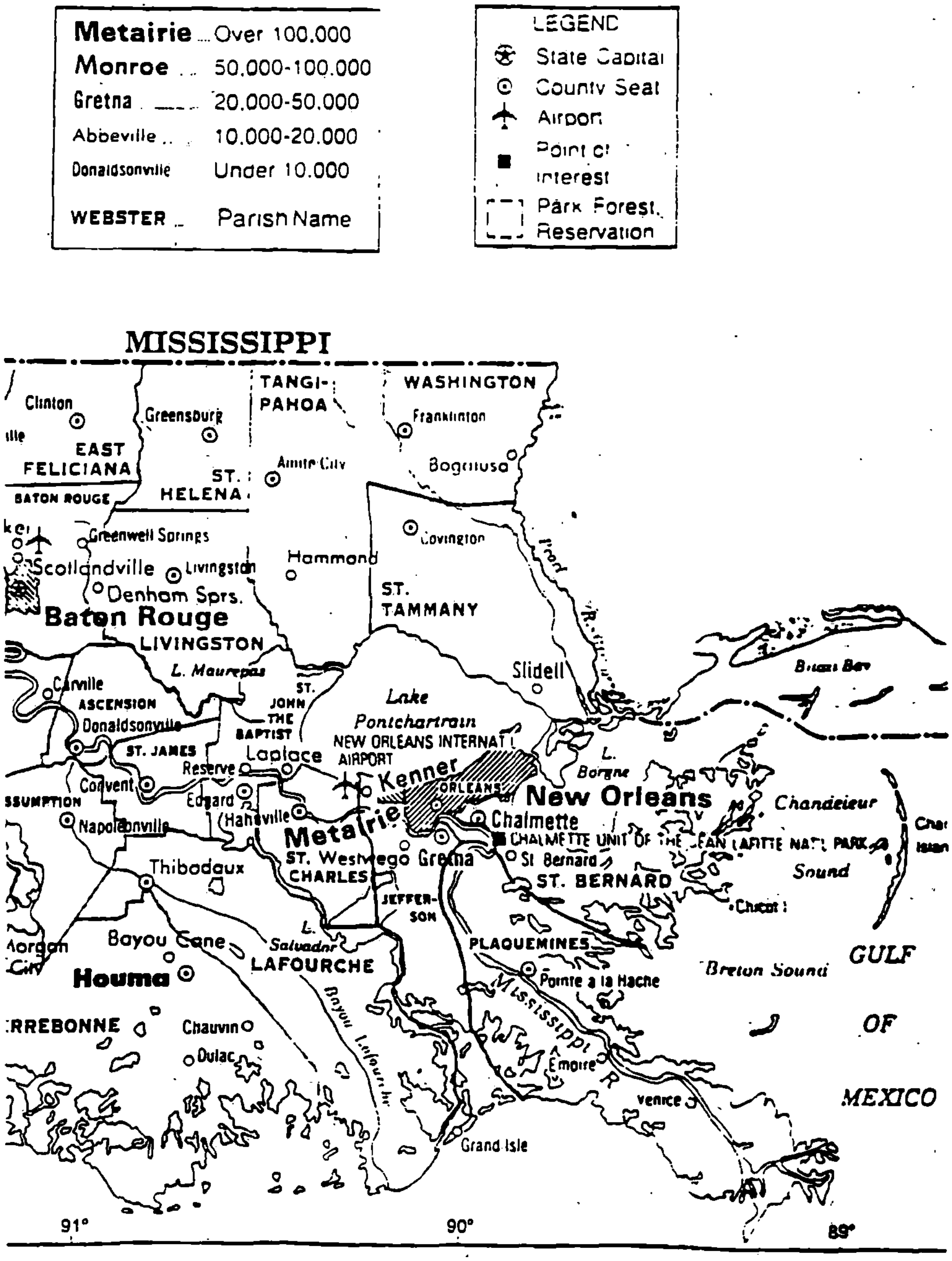
The New Orleans Regional Planning Commission (RPC) is assigned planning and coordinating functions for the region including Orleans, Jefferson, St. Tammany, and St. Bernard Parishes -- a smaller group than the eight parishes included in the Metropolitan Statistical Area. The region defined by these parishes assumes growth in a north-eastward direction, around the east end of Lake Pontchartrain to Slidell, and across the causeway to Covington (see Figure 2.3).

Only St. Bernard Parish shows a per capita income below the Louisiana average of $14,279 for 1990, and unemployment rates for all four parishes are below the state level of 7.1 percent. The income growth picture is slightly different: the Louisiana per capita income growth from 1980 to 1990 was over 64 percent, a rate which includes the effects of many rural and less developed parishes. Yet, three of the four parishes in the RPC region had lower income growth. Only the very high income growth of St. Tammany Parish was higher than the state level.

2.6.1 Regional Freight Transportation Context

Although the Port of New Orleans is a major source of income in the RPC region, it is in competition not only with other Gulf Coast ports, but also with Mississippi River ports in Plaquemines and St. Charles Parishes. In addition, the Port of New Orleans is restricted by land use competition from other urban uses, which include retail establishments, office buildings, and hotels and

Figure 2.3: Regional Planning Commission Parishes: Orleans, Jefferson, St. Bernard, St. Tammany



Source: Worldmark Press, Ltd., *Encyclopedia of the States*, 1986, p. 219.

other tourist facilities.

Both rail and truck transportation are large factors in the operational context of the Port of New Orleans. Several intermodal facilities exist which are intended to enable the efficient use of both modes but, in fact, NOPB, a railroad owned by the City of New Orleans, has experienced difficulty in competing with truck service. In addition, NOPB itself is an example of competing land use pressure, since its tracks run through the tourist section of downtown New Orleans.

2.6.2 Industrial Development Approach

One response of the RPC is to develop alternatives in connection with the Industrial Canal, a major port facility in eastern Orleans Parish which connects the Mississippi River with Lake Pontchartrain and the Intracoastal Waterway. At present three major Industrial Canal projects, two bridges and a lock, are in various stages of completion.

These developments in eastern Orleans Parish create the potential for further industrial development in St. Bernard Parish, the least densely populated parish in the RPC group. In this regard, a rail-highway bridge across the Mississippi River in St. Bernard Parish is an option for further study (see Sections 5.1.7 and 6.1.3, below). Such a bridge would relieve much of the pressure on the Back Belt and the HPL Bridge and would contribute to further development of the west bank sections of Jefferson and Orleans Parishes, and of Plaquemines Parish, although not part of the RPC group, as well.

Without question, the RPC planners are well aware of the serendipitous and interactive effects in regional development. Economic development in Plaquemines Parish would benefit not only the west bank but also a larger area south and west of the Mississippi River. Given this growth perspective, and given the fact that the Back Belt is a restricting factor for regional development, the Route 47/I-510 rail highway bridge project is an attractive development option.

2.6.3 Regional Divergence in Approaches to Development

The RPC supports coordinating activities among the planners and officials of the region. One such activity was a focus group meeting held in connection with this project. The personnel present represented not just the four parishes in the RPC region, but also Plaquemines Parish and the Louisiana government.

One of the outcomes of the focus group questionnaires was the shared concern of many present that various groups within the region held significantly divergent goals and priorities. This concern is evident in the questionnaire results shown in Table 2.3.

Of a total of four questions on the subject of regional consensus, the respondents showed some level of agreement on three of the items, with 50 per cent or greater answering either in the two "Agree" categories, or in the two "Disagree" categories. Thus, the group of planners and officials showed a consensus on "divisiveness." This result is especially important in view of the fact that some of the Back Belt alternatives proposed in Chapter 5.0 below, will require interparish cooperation to become

Table 2.3: Selected Items from Focus Group Questionnaires on Regional Consensus Issues

[Total number of respondents (n) varies slightly.]

Item		Percent of all responses: Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.3	The parishes are in agreement as to which issues are a priority. (n=17)	6	77	6	12	0
4.1	Our region suffers occasionally from divisiveness among parishes and other jurisdictions. (n=16)	0	0	6	69	25
5.8	In some ways, the conflict over the back belt reflects our regional inability to know who we are and what our goals are. (n=16)	13	19	19	44	6

viable.

On the other hand, many of the respondents showed optimism with respect to public involvement in the planning process, and in contributing to policy decisions. Items on this subject are shown in Table 2.4.

Another issue considered by the focus group was whether regional planning efforts should concern and involve railroads. Five items from the questionnaire concerned this issue and are shown in Table 2.5. The responses to these items indicate a skepticism about the "efficiency" of railroad operations. On the other hand, the focus group believed that railroad management would be amenable to considering relocation if they saw it as solving both rail and community problems.

In summarizing these focus group results, the overall optimistic outlook of the focus group participants is impressive. This focus group believes that broad public participation in

Table 2.4: Selected Items from Focus Group Questionnaires on Public Involvement in the Planning Process

[Total number of respondents (n) varies slightly.]		Percent of all responses				
Item		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2.8	Public involvement in policy decisions produce too many opinions and ineffectual policies. (n=16)	13%	50%	19%	19%	0
1.11	Public forum meetings are a useful tool for developing regional goals. (n=17)	0	0	19%	65%	19%
2.7	A good transportation company is one which seeks public involvement in its policy matters. (n=16)	0	16%	16%	38%	31%
3.9	The public should decide on matters concerning any **new** transportation corridors in the region. (n=16)	6%	19%	13%	50%	13%

Table 2.5: Selected Items from Focus Group Questionnaires on Involving Railroads in Regional Planning

(Total number of respondents = 16)		Percent of all responses				
Item		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2.1	People in our region generally view railroads as a crucial component of our industrial economy.	6	75	6	13	0
4.3	The railroads will never see relocation as benefitting their efficiency.	6	94	0	0	0
4.11	If we would let them, the railroads would do a good job of planning our entire region.	31	56	6	6	0
5.1	A little piece of railroad like the back belt has nothing to do with achieving our regional goals.	38	56	6	0	0
5.9	As presently operated, the back belt is fully capable of handling all of the demands placed on it.	13	75	13	0	0

planning is desirable and, also, that it is important for policy making and that a regional consensus is possible. However, the results do not show that a regional consensus presently exists relative to a solution strategy for Metairie and the Back Belt.

2.7 State Perspective

The Louisiana Department of Transportation and Development (LADOTD) has broad responsibility in the areas of highway, freight railroads, passenger rail service, and intermodal affairs.

The highway fund managed by the department obtained total revenues in 1993 of about $504.9 million, of which $21.7 million was transferred to local governments and $136.5 to non-highway uses: the above revenues do not include Federal Aid received ($228.2 million) and bond proceeds ($82.6 million). Louisiana also has access to various Federal assistance programs, such as the Economic Development Administration, for industrial development projects, which can include railroad components (other Federal programs are described in Chapter 7.0). Competing for these various funding sources, the LADOTD has various pressures for alleviating transportation problems from many parts of the state, separate and in addition to the problems in the New Orleans region.

One of the perceived statewide issues is the overall decline of the rail freight system. Since 1986, the state has lost 629 miles of track to abandonment[6] representing about 18 percent of the total track miles in the state [reported in the *Louisiana Statewide*

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[6] Interview with Ed Morris, Rail Program Manager, July 20, 1995.

Intermodal Plan to be 2,968 miles in 1991 (LSU, 1995, pp. 1-3)]. Another issue is the impact of bridge maintenance practices on the Huey P. Long (HPL) and the Baton Rouge Bridges, both of which are combined rail and highway bridges. The HPL Bridge is located in Jefferson Parish, was built in 1936, and is owned by NOPB. It requires the daily closing of one of its two rail tracks[7] (see Sections 2.9.7 and 5.1.9.4, below).

The Baton Rouge Bridge, connecting East Baton Rouge and West Baton Rouge Parishes, was built in 1940 and is owned by Louisiana. New proposals put forward include the closing of its highway portion in order to reduce stress[8]. Other rail facility problems are described in the *Louisiana Statewide Intermodal Plan* (LSU, 1995).

Superimposed on these rail issues are problems relating to highway traffic congestion, rail-highway grade crossings, and the need to develop high volume passenger rail service, both interstate and intrastate, many of which are interrelated.

Highway traffic congestion is a problem not only in dense metropolitan areas, but also on expressways in between them. This type of problem has led to proposals for a passenger rail service between Baton Rouge and downtown New Orleans. Baton Rouge is about 78 miles northwest of New Orleans, and is Louisiana's second largest city. East Baton Rouge Parish is over three-fourths the

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[7] Interview with Ray Duplichain, operating manager of NOPB, July 20, 1995.

[8] Interview with Ed Morris, *op.cit.*

size of Orleans Parish, and has enjoyed an overall positive growth rate of 6.9 percent during the 1980-1992 period.

Rail corridors between the two cities exist on both sides of the Mississippi River, as well as indirectly through Hammond. Proposals for passenger rail service suggest that these freight corridors could be shared.

A similar proposal is for passenger rail service between New Orleans and Mobile, Alabama, along the Gulf Coast, a distance of about 135 miles. Again, a rail corridor, owned by CSX, already exists. A three state organization, the Southern Rapid Rail Commission, is supporting this proposal.

A distance of 135 miles would be considered outside the normal commuting range, but there are several intermediate range cities along this route. At least one national level study is in progress concerning the feasibility of these intercity passenger rail proposals[9].

It is interesting to note that a proposal to link the two passenger rail service routes into a Mobile-New Orleans-Baton Rouge service will not necessarily include the Back Belt. At present, Amtrak passenger service enters New Orleans, arrives at the NOUPT, and departs New Orleans without ever passing over the Back Belt. But if the passenger rail service is to include a through train not stopping at NOUPT, it will very likely travel over the Back Belt.

The Back Belt, the HPL Bridge, and East Bridge Junction are all components of a bottleneck, which will be a problem for the

[9] Interview with Ron Mauri, Volpe National Transportation Systems Center, March 8, 1996.

proposed passenger rail service, as it is a problem for the freight service now (freight transportation study as part of the *Louisiana Statewide Intermodal Plan*, LSU, 1995, p. IX-49). A new Mississippi River bridge, as described in Section 5.1.7, below, would resolve the bottleneck problem[10].

Thus it is possible to see pressures which arise in connection with the demand for passenger service contributing to solutions for freight movement. But there are many other features of the eventual passenger rail service still to be planned: station locations, fare systems, and track improvements if existing track is to be used[11].

In connection with track improvements, state funded improvements to privately owned tracks are a possibility[12]. This means that, if Louisiana contracts for a passenger rail service, it may also contract separately for use of tracks owned by a separate company. Louisiana may then contract, again separately, with a company to make track improvements to accommodate passenger trains, these improvements being part of the contract with the owner of the tracks for their use.

This type of complexity in contracts between public agencies and private rail companies is not without precedent in Louisiana; specifically, the NOUPT Agreement of 1947 is discussed in the FHWA

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[10] Interview with Ed Morris, *op.cit.*

[11] Interview with Eric Kalivoda, LADOTD intermodal manager, July 18, 1995).

[12] *Ibid.*

report on Metairie (FHWA, et al., 1988) and is described in Section 2.9.9, below.

Fortunately, the planning effort for the passenger service will have the existing freight, ports and waterways efforts to use as a foundation (LSU, 1995). The six major deep draft ports in Louisiana will continue to act as major nodes for freight transportation, and because they are employment centers, they will likely become passenger rail service nodes also.

But there are still many major development issues which demand attention, and soon. These issues involve large investments in corridor development, probably including bridges and causeways. And all of these development issues include environmental and capital financing issues.

2.8 Federal Railroad Administration Perspective

In Chapter 1.0 and in the lengthy history of the Metairie/Jefferson Parish community-railroad conflict (see Appendix A) we describe how Congress has directed the Federal Rail Administration (FRA) to evaluate the current situation to identify alternative solutions capable of being implemented and accepted by the affected parties. FRA, in turn, has stated that the objectives of this project are to: (a) analyze the conflicts between railroad and motor vehicle traffic, and environmental conflicts between community and railroad operations; and (b) to propose long and short term solutions. The FRA has recognized that much has changed in the affected region, not the least of which is the nature and character of the conflicts, and most of the key players and institutions.

Conditions have substantially changed for all parties over the almost twenty-five year period since the FRA's first involvement in the Metairie-railroad conflict where, in 1972, FRA suggested some near-term "in-place" improvements that could be made at a relatively low cost in a short period of time:

- The role of the Federal government vis-a-vis states and localities has undergone a powerful devolution trend. Today, the Federal government sets national standards and provides technical and informational support, for the most part, rather than tangible monetary or other resources.
- Railroads have very much come into their own -- financially, economically, and politically -- as an essential, co-equal driver to other transportation modes, of the nation's economy.
- Historically, the FRA has provided technical assistance and research and design services in support of the railroad industry.

FRA assistance with the Metairie railroad-community conflict fits well into this context. At the federal level FRA's mission includes the enforcement of railroad safety regulations, the conduct of research and development to support improved railroad safety, national railroad transportation policy, and interest in the efficiency and financial viability of railroad freight and passenger operations and facilities.

To this end, FRA's interest in the continuing efficiency of national, regional, and local railroad services, providing technical assistance to assure area residents and state and local officials that the issues involved receive a thorough and impartial hearing and examination, and to ensure the railroads continue to be a viable and valuable national transportation resource.

2.9 Position of the Railroads

2.9.1 Introduction

Railroad management is currently focusing on the continued long term improvement of profitability. Key issues involve negotiating new labor agreements, improving customer service, the application and use of new technology, and doing a better job utilizing equipment (locomotives and freight cars). These are important and relevant themes for each carrier and tie directly to the issues of either relocating the Metairie Rail Corridor entirely or improving current operations sufficiently to reduce the impacts on the community.

In commenting on the industry's opportunities in the January 1996 issue of Progressive Railroading, Jerry R. Davis, Chairman and CEO of SP, said:

> The greatest single issue facing SP and the railroad industry, without question, is service. Customers will use rail and pay fair rates but in return they demand service. Providing good service - in particular improving service at interline Gateways -is our principal challenge. (p. 37)

In this same article, David Goode, CEO of NS stated:

> This new environment (speaking of a more dynamic global trading environment) challenges us to become more efficient, more cost-effective and to make better use of the technology at our disposal to create a seamless transportation network throughout the continent.

There are many other issues the railroad industry faces, including the possibility of the slowing of the domestic economy, truck over-capacity and potential increases in truck size and weight limitations, and the challenge of motivating personnel to work as a team when team numbers are being reduced.

Each railroad presently operating in the New Orleans Gateway and moving traffic over the Back Belt has an interest in improving the overall efficiency of the Gateway consistent with its individual profit, safety, and other corporate goals. While the interests of each railroad involved in the Metairie conflict varies by individual carriers, together they share a common desire to reduce costs and improve the efficiency of interchange operations and train movements. At the same time, they are aware of the long-standing complaints of residents and their insistent desire to relocate the Back Belt. Railroads have had to adjust their operations consistent with the public demands in order to preserve their freedom to compete with other modes. Public demands that go unheard often lead to direct Congressional (and other) involvements.

Twenty years ago, a study completed by Parsons Brinkerhoff found that it took an average of 24 hours for an individual railcar to move through the New Orleans Gateway, and some cars took as long as two days to be interchanged. Today, the major east-west run through trains can move through New Orleans in six to ten hours, while the "hottest" train, American President Line's Liner Train (LBAVT) -- originating in Long Beach California, destined for Atlanta -- crosses in an average of four hours. Occasionally, when everything is lined up "just right" through the Huey P. Long Bridge and East Bridge Junction, the LBAVT can cross the 12.6 miles of track, passing over the Mississippi and through Old Metairie, in just two hours and forty five minutes. While it takes less time to move through New Orleans than it does the Chicago Gateway, transit times can be improved significantly: this is where the railroads have a strong incentive to cooperate in developing a community sensitive solution.

Using an average car per diem cost of $15.10/day as a measure for the average cost of the time that each of 327,405 car days (empty and loaded) are now spent transiting the New Orleans Gateway, the current annual car costs for the time taken to run through the Gateway amount to approximately $4.94 million. If one uses the LBAVT train as the current best performing train as a standard of performance, one can gain an appreciation of the potential room for improvement. Table 2.6 illustrates the computed savings in railcar costs for different reductions in gateway transit times.

Reductions in transit times would also save yard and road crew costs and locomotive operating time and costs. To illustrate, on a daily basis, CSX has five yard crews that run out of time due to crossing delays which necessitates bringing on a new yard crew to move the train. The terminal log shows that, on average, each new crew spends 2.68 hours working these trains so that on any given day the total lost crew time amounts to 13.38 crew hours. The three man yard crews average $22.00 per hour or $66 per crew, producing a daily cost for this lost time of $883. Over a year, this lost crew time is costing CSX an estimated $322,295.

Table 2.6: Transit Time Savings In Railcar Costs

Reduction In New Orleans Gateway Transit Times	Potential Annual Savings in Rail Car Costs (1000's)
1 Hour	$412
2 Hours	$824
3 Hours	$1,236
4 Hours	$1,648
5 Hours	$2,060
6 Hours	$2,472

2.9.2 Norfolk Southern (NS) Railroad

As the owner of the Back Belt track, NS would like to see improvements made to the existing rail corridor that would reduce costs and improve profitability. While NS experiences somewhat fewer train delays than the other railroads (given that it controls and dispatches train movements over the Back Belt), it too has found that yard congestion and train delays can prevent their own trains from moving smoothly through the Gateway. While its current posture could best be described as "wait and see what this report suggests," it has, in prior studies, favored the following:

- Closure of grade crossings at Atherton, Hollywood, Farnham, and West Oakridge. This would save signal maintenance expense and eliminate the possibility of grade crossing accidents at these crossings. (Now that the State of Louisiana has exempted NS from legal liability for any grade crossing accident, as part of establishing Metairie's horn sounding ban, NS is theoretically less concerned that a grade crossing accident could produce a costly law suit.)
- Construction and extension of a double track section from Metairie Road past the 17th Street Canal. This would allow for the continuous movement of trains through Metairie from the East Bridge Junction Interlocking through Metairie to its

Oliver Yard (approximately 7.4 miles). Given that NS can hold eastbound trains on its main line at Marconi Avenue and that trains no longer have to stop to manually throw the switch at Metairie Road, the interest and potential support of a double tracking of the track section from the Canal to Metairie Road would have to be evaluated in light of current operating needs and priorities. Doubletracking this section of the corridor would clearly increase track maintenance expenses with perhaps only a minor gain in operating flexibility. Therefore this idea may be somewhat less attractive to NS than it was in earlier years.

- Constructing grade separations at Metairie Road, LaBarre Road, and Carrollton Avenue, which would eliminate the bulk of grade crossings delays, reduce accident potentials and eliminate grade crossing maintenance would be attractive.

A total of ten trains move through the NS Oliver Yard every day. The East Bridge tower operator has observed that NS moves its trains over the Back Belt in a somewhat faster and more disciplined manner than do the other carriers. Road and yard crews are held to high operating standards and are expected to perform or face dismissal.

On the other hand, some local NS train dispatchers have generated negative reactions among the other railroads for assigning NS trains movement priorities at the expense of the other carriers and to the detriment of the efficiency of the entire Gateway. Examples, set forth as "typical", were provided whereby trains that were in position and ready to move across the Back Belt were held to allow a later arriving and often shorter NS train to move. The trains being held tended to block the yards and make it impossible for carriers forwarding trains to these yards to gain clearance. Such delays compound crewing problems and make it necessary to change crews more often than is desirable and on occasion delay trains because no crews are available.

When SP and UP cannot deliver trains to CSX, because of delays induced by NS, the Avondale Yard becomes blocked, making it difficult for UP and SP to send and receive NS trains. Whether or not they are aware of it, when a NS dispatcher violates or preempts a "first come-first moved" rule for train operating priorities, they can and often do delay NS trains as well. The most experienced and intuitive dispatchers seem to know this, while the less experienced dispatchers, we believe, are showing preference to NS trains, regardless of the traffic effect.

Such dispatching power struggles seem to occur on a regular (e.g., twice a week) basis. Retaliation for the failure to dispatch crews in an equitable and fair manner is often addressed indirectly by the other carriers. For example, they may slow down or prevent the movement of a NS train by simply failing to have a crew ready to move their train. Another example is failing to call and notify the other railroad that a train is arriving or moving.

2.9.3 Illinois Central Railroad (IC)

IC has cooperated in past studies and efforts to reduce the conflicts between the local community and the railroads by relocating their Long Siding interchange track and interchange operations. New Orleans, which is the southern tip of IC's north-south track alignment, is an important traffic-generating origin and destination for IC. Currently, IC moves four daily piggyback trains through the East Bridge Junction, which, due to their shortness, rarely block the Junction.

2.9.4 Union Pacific (UP)

By virtue of its proposed acquisition of SP, UP is in the process of transforming itself from an "average" Gateway participant to the dominant carrier controlling the majority of traffic moving through the New Orleans Gateway. UP is already attempting to combine the West Bridge and East Bridge tower operations, which will save a small number of jobs, and is beginning to explore other strategic options that will allow it to gain more control of Gateway operations. UP and SP are now sharing the Huey P. Long Bridge maintenance expenses.

2.9.5 Southern Pacific (SP)

Approximately half of the trains (12) moving over the Back Belt are received from or destined to SP. As a consequence, Back Belt operations affect SP more than any other carrier. SP's run-through trains originate in Long Beach and Houston and move to their classification yard at Avondale, which is situated on the West Bank of the Mississippi River.

Like UP, SP experiences train movement and handling delays in the New Orleans Gateway that increase its crew and locomotive operating costs. Part of this results from SP's not participating in the new national labor union agreement as do the other Class I carriers, and part results from the delays encountered in moving over the Huey P. Long Bridge, through IC's East Bridge Junction interlocking, over the NS's Back Belt and into the Gentilly or Oliver Yard. SP is paying road crews and yard crews to move eastbound trains from its Avondale Terminal Yard to the east bank terminal yards of CSX and NS where the trains are interchanged.

Upon arrival at the Gentilly and/or Oliver Yard, crews are deadheaded back to Avondale Yard. Since SP is not part of the new national labor union agreement which allows road crews to drop off and pick up cars, SP road crews cannot move eastbound trains from Avondale, if they include cars that must be dropped out at their Avondale Yard. In this situation, road crew members, who may have five or six hours of time left, must stop and go off duty at Avondale. SP is thus paying the road crew for a full day's work and only receiving a half day's production. This situation should change and be remedied if UP completes its acquisition of SP.

Those eastbound trains that have cars to be dropped at Avondale are now moved from Avondale with an SP Yard crew, who are paid on an hourly basis. SP yard crews can and do make as many as three train deliveries across the Back Belt in a single shift; more typically, the traffic delays limit them to one or two trips. Yard crews that can't make a return movement are deadheaded back to Avondale where they go off duty.

SP acknowledges that the tri-parte train control (West Bridge Tower, East Bridge Tower, NS dispatcher) places a premium on communication and that dispatching needs to be improved. SP believes that train movements should be handled on a first come, first moved basis. SP cited situations where NS favors its own train movements over other carriers, mentioning an incident where NS allowed a light engine movement of NS locomotives to run ahead of several other freight trains that were waiting to move. To SP, this seemed unfair and unreasonable.

SP acknowledges that there are occasions when CSX has refused to receive trains due to its having no available yard space and that they had started to reciprocate. SP estimates that 20 percent of the scheduling and train movement delays are due to Huey P. Long Bridge maintenance which "needs to be changed and improved." SP acknowledges that Amtrak passenger train movements complicates everyone's efforts to move freight trains on a scheduled basis, and believes that unless an independent dispatching control of Back Belt train movements can be established, there will be little improvement.

SP is currently taking an average of 20 hours to move cars through its Avondale terminal, which is up from an prior average of 17 hours. Cars moving on "hot run-through" trains are averaging from 8 to 10 hours. The additional terminal time is caused by a new agreement which increased the rest time for its locomotive engineers. Senior SP management have been preoccupied with the pending acquisition by UP and appear relatively satisfied with Gateway operations.

2.9.6 Kansas City Southern Railroad (KCS)

KCS interchanges four trains a day in Metairie. Road crews from Baton Rouge deliver eastbound trains to NS at LaBarre Road. Generally IC's Mays Yard tower operator will check with NS to be sure that an NS crew is ready and will be on hand at LaBarre Road to accept the train. However, if the tower operator finds the NS crew to be delayed, he will hold the KCS train on IC's main line in Kenner, where there are 6,500 feet of track which can hold a train without blocking a grade crossing. If IC needs the mainline track, it will hold the KCS train at Central Avenue. If it cannot hold the train there, it will then let it run to LaBarre Road and wait for the NS crew. In this case, the train will usually be strung out between LaBarre and Central Avenue, blocking the grade crossing at Shrewsbury Road.

Westbound trains, such as Number 56 from NS at 3:00 PM and Number 54 from CSX at 7:00 PM, are hauled by NS crews to LaBarre Road, where a KCS crew is almost always ready to pick up the train. These long trains can block the Atherton, Hollywood, and, sometimes, Farnham grade crossings during afternoon rush hours, if the KCS crew cannot then move the train forward onto IC tracks because the East Bridge Junction tracks and interlocking are blocked. In these instances, the KCS crew waits and the train blocks traffic at these grade crossings. If the delays are longer than ten minutes, the KCS crew will get out and break the trains at each blocked grade crossing. Once the interlocking is clear, the crew will pull forward onto IC's tracks and will then back into its yard, with a switchman riding on the leading car controlling the train movement. This happens infrequently, according to the East Bridge tower operator. KCS crews attempt to keep LaBarre Road open. They do not like breaking up a train, because it takes time to couple and uncouple, and slows down the train's departure. If the train sits for more than two hours, a rare event, they would then, by FRA rules, have to perform a train air brake test and inspect each car.

KCS prefers to run on a daily basis. West Yard has 14 classification tracks and 5 additional short tracks that hold eight to ten cars apiece, for a total capacity of 1,000 cars. It switches about 150 to 250 cars a day. KCS generally has had adequate yard capacity, but lately the yard has been more crowded. If KCS and IC were ever to attempt to merge again, then traffic moving from NS and CSX to KCS's West Yard could be combined with traffic going to IC's Mays Yard, and the trains would be moved into Mays Yard rather than the West Yard. This would eliminate the parking and interchanging of trains at LaBarre Road and the associated grade crossing blockage and would allow trains to run continuously over the Back Belt to and from Mays Yard.

Another way this concept could be implemented immediately would be for IC to classify KCS's westbound traffic at its Mays Yard, thus moving the yard switching work from KCS's West Yard to IC's Mays Yard. IC would have to charge KCS a switching fee that was no greater than what it is currently costing KCS to switch this traffic to make this work; in addition, KCS's unions (which might protest losing this work) would have to agree.

2.9.7 CSX

The delays in moving trains across the Back Belt are increasing CSX's crew costs, locomotive costs, and car costs. Any changes that would speed up movement through the Back Belt corridor are, therefore, of great interest to CSX. They currently change crews at either Marconi Drive or Interstate 10. CSX's road crews come out of Mobile, a distance of 155 miles. If there is enough time, their road crews will deliver trains to SP or UP at Central

Avenue. About 75-95 percent of the time, the actual interchange is made with yard crews.

CSX used to send five trains a day westbound on the NOPB river front route and eastbound on the Back Belt. CSX does not have trackage rights on NS (they operate under the SP and UP trackage rights). At one time, CSX had a route around the NS's Oliver Yard to access the river front route, but that track has been taken up.

CSX believes their operation is most constrained by the daily restriction to a single lane of traffic on the Huey P. Long (HPL) Bridge. They believe that hiring a third party contractor to do the maintenance on the bridge, in a concentrated program, rather than the scheduled perpetual maintenance program, would free up the bridge. To eliminate the time and costs to cut the proper elevation into bridge ties, they would favor installing a mat and then ballasting the bridge so that standard ties could be used.

CSX believes that NS has been fairly good at handling their business. CSX pays NS $22 a car to handle interchange from IC and KCS to CSX. However, CSX believes that SP and UP are short on crews to get the trains across the HPL Bridge (this is one of the biggest problems creating train delays through the New Orleans Gateway). Consequently, CSX's Gentilly Yard, which has a 2,000 car capacity, is frequently full, holding trains that are delayed due to the SP and UP crew shortages. There is, however, room to expand the Gentilly Yard.

The most advantageous alternate corridor for CSX would be the IC route from East Bridge Junction through the Carrollton Curve. If there was a route north of Lake Pontchartrain, there would have to be a connection built to CSX (except for the Brookhaven alternative; see Section 6.1.2.3, below). That would require a major bridge building project across the Pearl River (see Section 6.1.2, below). Going from New Orleans, through Meridian would not be a good route for their Florida bound traffic due to the added distance (they have about 200-300 cars a day bound for Florida, which represents about 30 percent of their business).

CSX had given serious consideration to purchasing KCS, but they were concerned with potential environmental problems down the road. CSX's Dallas to Atlanta business comes through New Orleans. Acquisition or merger with KCS would divert this traffic to the Vicksburg Gateway. The institution of interline business agreements has greatly increased their business.

Finally, with respect to creating a terminal switching carrier, there have been several suggestions at the local superintendent's meeting that NOPB take over the interchanges. However, CSX believes that the terminal switching carrier concept will have labor problems with all the carriers.

2.9.8 New Orleans Public Belt (NOPB) Railroad

The Louisiana Constitution of 1921 defines NOPB as follows:

> Section 26. It shall be the duty of the City of New Orleans to continue the operation of a Public Belt Railroad by and through a commission to be known as the Public Belt Railroad Commission for the City of New Orleans, ... The control, operation, management and development of the Public Belt Railroad system shall be exclusively vested in said commission, which shall always be separate and distinct from that of any railroad... Said Public Belt Railroad system shall be and remain the sole property of the People of the City of New Orleans at all times...

> Section 28. ...The City of New Orleans, acting through the Public Belt Railroad Commission, shall have the power to acquire, construct, maintain and operate across the Mississippi River, at or near New Orleans, a bridge for railroad, railway, and highway uses...and shall also have the power to acquire, construct, maintain and operate railroads, terminals, depots, watercraft and other railroad facilities, and to acquire same either by purchase or lease, by expropriation, or otherwise... (Constitution of the State of Louisiana, printed by authority of the legislature, E.A. Conway, Secretary of State, June 1921)

The 1921 Constitution has been amended over the years. In 1974, Louisiana adopted a new one, their eleventh, with NOPB continuing to exist along the same lines as defined above, including responsibility for the Huey P. Long Bridge.

NOPB became, and continues to be, the railroad which serves the port facilities along the New Orleans waterfront. CONSAD's earlier study described NOPB as follows (CONSAD, 1975, p. 4.4):

> This railroad serves the port of New Orleans providing delivery and receipt of rail traffic from the wharves. The physical structure of the NOPB is such that it parallels the river front on the east bank of the Mississippi River, crossing numerous streets which provide access to the wharves, ferry depots, and river front industries.

However, even in 1975, NOPB was not seen as an attractive alternative route for through trains wishing to move directly through the New Orleans Gateway (CONSAD, 1975, p. 4.5):

> It does not presently function as a major through route for New Orleans (i.e., coast to coast) bridge traffic, especially since a straighter, shorter route already exists over the NOT (former name for the Back Belt). Bypassing Metairie by means of the river front route of the NOPB would increase the routing and movement of bridge traffic by approximately ten miles.

Nevertheless, in the subsequent twenty years people have continued to seek an alternative to the Back Belt, since it is privately owned (by NS at present) and since it cuts through residential neighborhoods.

In reexamining the potential for rerouting through trains from the Back Belt to NOPB, however, the situation has not improved, and may be thought to have deteriorated. The NOPB route has not become any shorter, so that the additional distance, on top of the Back Belt distance, would be ten miles. In addition, there are still at-grade crossings where streets approach the waterfront.

With regard to more recent negative trends, the urban area where the NOPB tracks run has become more heavily used by tourists, and new tourist attractions, such as a large aquarium, have appeared. Tourist oriented businesses complain that the movement of long trains through the area would inconvenience and discourage tourists. The area also has several new hotels which purport to offer evening tourist activities.

Another problem which has arisen is that trains are taller now than in 1974. Because of the stacking of containers on flat cars, trains with stacked flat cars now require 23 feet clearance instead of only 19 feet as in days gone by. There is one highway overpass on NOPB in eastern Orleans Parish, called the St. Claude Avenue overpass, with insufficient clearance. Three remedies are available for this problem, however:

- Bypass the St. Claude Avenue overpass, using a new exchange track belonging to NS, or construct a new bypass track on NS right-of-way, with a connecting switch.
- Construct a depressed track right-of-way under the St. Claude overpass. This construction was already done, but had to be abandoned because of improper foundation, so that reconstruction would be needed.

- Wait for reconstruction of the industrial canal in the vicinity of the St. Claude overpass, which will require rebuilding of the overpass, and the additional clearance can be built into it. The time frame for this project is uncertain.

But, in addition to trains getting taller, they have also become heavier, and some of the NOPB track would have to be replaced with heavy duty rails. This process has already begun in the Tchoupitoulas area of the waterfront.

In spite of all these problems, there are many features which make the NOPB route a possibility for diverting a portion of the trains which now use the Back Belt. The bottleneck nature of the Back Belt, with its delays at East Bridge Junction and its interchange and crew change points, means that travel over NOPB might not be significantly longer in time, even though longer in miles. Trains running east to west on the NOPB, e.g., from the Gentilly Yard in east Orleans Parish to the HPL Bridge, would not be held up at the East Bridge Junction interlocking inasmuch as the NOPB westbound track runs directly into the Huey P. Long Bridge track and does not cross through the East Bridge Junction. Thus, westbound trains can proceed directly and smoothly to the bridge approaches.

In response to the tourist businesses' complaints, these trains could run during the period from 2:30 AM to 6 AM, and avoid disturbing the majority of tourist activities. Even an average of two trains per hour during this period would reduce traffic on the Back Belt, making it easier to schedule trains.

This operation would also significantly reduce grade crossing backups, since the crossing blockage on NOPB would not delay many vehicles during this period. Most of the freight carried on NOPB would be stacked flat cars, not tank cars with hazardous materials, so there would be no net cost or benefit, either to Metairie or to the French Quarter, with respect to risk of hazardous materials release.

As noted in the constitutional discussion above, NOPB has broad powers of construction and ownership, and it also has bonding authority. Construction of the St. Claude bypass would require significant capital investments by NOPB.

2.9.9 New Orleans Union Passenger Terminal (NOUPT)

This section of the report has benefitted from the help provided by William M. Lucas Jr. and Joyce M. Dombourian, attorneys with Sessions & Fishman representing NOUPT. They, along with Betty Foley, Secretary for NOUPT, have been most helpful in answering questions concerning the potential redrawing and negotiation of a new NOUPT Agreement, which would allow for the relocation and movement of Metairie rail corridor trains to a section of NOUPT tracks. Additional information was abstracted from "Frankly Fritz", an autobiography written by former Lt. Governor James E. (Jimmie) Fitzmorris, who was, for many years, Vice President of KCS, and who now, as President of Fitzmorris and Associates, is currently serving as the City of New Orleans' senior technical representative.

Mr. Fitzmorris describes the organization and construction of NOUPT as one of the most important developments in the long history of New Orleans transportation. The new terminal replaced five small terminals scattered around the city and eliminated more than one hundred grade crossings. To facilitate the development of a site for the terminal, and an affordable system of track overpasses and underpasses, the obsolete New Basin Canal was filled. The voluminous 1947 NOUPT agreement, dubbed the "Blue Book," which was approved by the New Orleans commission-council and nine railroads, established NOUPT as a "non-profit" organization which would accommodate the arrival and departure of 44 passenger trains daily at the new terminal. The $16 million terminal, while owned by the city, was built and paid for by the railroads through revenue bonds that were issued through the Public Belt Railroad Commission.

The agreement provided for the consolidation of railroad right-of-ways, provided for several grade separations and, most importantly, designated the track running parallel to I-10 in the Carrollton area for passenger traffic only. At that time, Jefferson Parish was invited to join, but declined to do so because it could not finance its portion of the agreement.

The revenue bonds, which financed construction of the terminal and acquisition of IC land, property owned and controlled by the City of New Orleans and the Levee Board, will be paid off in 1998. Twenty years ago, it would have been difficult to relocate the Metairie rail corridor to the NOUPT tracks and the Carrollton interchange, as bond holders could win a court suit alleging their interests would be potentially maligned by allowing freight trains to use tracks dedicated to passenger trains use by the terms of the original NOUPT agreement. By 1998, the bondholders will no longer constitute an obstructing element.

The section of NOUPT corridor and tracks that would now carry both passenger trains and the relocated freight trains is the west branch of the NOUPT track, i.e., the west approach running parallel to Airline Highway from the Carrollton - I-10 Interchange to the Southport Junction. Amtrak's north-south Trains 58 and 59 (the Spirit of New Orleans), running daily between Chicago and New Orleans, use this track every afternoon between 2 PM and 4 PM, as does Train 1, the westbound Sunset Limited, and Train 20, its eastbound counterpart, between 7 AM and 10 AM.

Additional private property was needed to provide enough room for the railroad tracks, and land owners who were otherwise unwilling to sell their property did so on the understanding that it was only to be used for passenger train movement, not for freight trains. Now that passenger train traffic has all but vanished, it is not certain whether or not these original land sale agreements would affect the structuring of a new NOUPT agreement.

The only source of income for NOUPT has been the leasing of the terminal property to the freight railroads and to Amtrak, which, in 1974, assumed all operating expenses for the property including all the tracks, except grade crossing maintenance, overpasses, and underpasses, in return for the exclusive operating rights to the Terminal.

The provisions of the original NOUPT agreement were codified by their inclusion by the Louisiana State Legislature as a constitutional amendment and by the City of New Orleans in its ordinances. As a consequence, a new or revised NOUPT agreement will require both the consent and approval of the City of New

Orleans and the State of Louisiana, and ratification by each of the railroads. There have been no amendments to the Blue Book and, since it was "blessed" under the constitutional amendment, the carriers have in the past been reluctant to make any changes. A new City Ordinance would also be required for freight carriers to use any of the existing route.

While the original Blue Book agreement runs until 2004, with two 50 year renewal options, the railroads and the City of New Orleans and Amtrak are currently negotiating a new agreement.

There is considerable discussion between Amtrak and the carriers on the terms of the agreement. Amtrak is interested in reducing its pro-rated and assignable maintenance costs. There is also a belief among some local railroad operating personnel that the priority status accorded to Amtrak's trains, and their protected time schedule window and the incentive payments Amtrak makes to reward railroads for on-time performance, does not adequately compensate the railroads for the resulting delays to freight trains. No effort is made to address these issues, here, as they are beyond the scope of this assignment.

In response to federal budgetary cutbacks, Amtrak has recently cut the number of passenger trains running to and through New Orleans. Given the potential variability in on-going federal funding of passenger train deficits, it is uncertain as to how many trains Amtrak will or will not have running in any of the New Orleans corridors in the future and, thus, the extent to which the relocation of the Metairie Corridor would be complicated by the integration of passenger and freight train operations is uncertain.

At current levels of four to six passenger trains per day, the consensus of operating personnel is that there will be no problem integrating train movements. Developing schedules which minimize potential conflicts between passenger and freight train movements is, and will continue to be, an important prerequisite, not only for eliminating the conflicts in Metairie but also for improving the efficiency of the entire New Orleans Gateway.

Complicating matters is the threat of major lawsuits for soil and ground water contamination by diesel fuel, spent engine oil, cleaning compounds and waste lubricants attributable to railroad locomotive and equipment fueling, maintenance, and servicing. The exact extent of the soil and ground water contamination is unknown. However, there are currently investigations and soil sampling and analysis efforts underway to measure the extent of environmental damage. Further, at each of the former railroad terminal roundhouses there is undoubtedly a great deal of residual contamination. In fact, the Louisiana Highway Department actually "struck oil" during construction of the Earhart Expressway on railroad property.

IC would like to abandon any further involvements with NOUPT because of the environmental responsibility issue. However, it is reluctantly participating in the new negotiations in the belief that joint participation and inclusion under the NOUPT umbrella with a group of railroads affords some broader measure of legal protection for those seeking to sue them for environmental pollution and damage. An estimated eighty percent or so of the property of the NOUPT property is formerly owned by IC.

There is also approximately $2 million of NOUPT Trustee Funds generated from the sale of land and $5 million in an investment fund which has accumulated from the leases of non-operating rail property to the US Postal Service, a cement company, and a can company, among others. The City of New Orleans, as owner of NOUPT, wants to utilize this money while the railroads want to see the money used to reducing grade crossing maintenance expenses.

There appears to be no rush by any of the railroads to complete the renegotiations of a new NOUPT Terminal Agreement as most of the participants want to wait to see just what the ground/soil surveys reveal in the way of contamination and, from that, be able to gauge just how serious the potential liability damages might be before they execute a new NOUPT agreement. Best estimates are that it will take at least another two years to accomplish this renegotiation. Thus, there would appear to be ample time to negotiate and include a new trackage rights provision in the new agreement that would allow for freight train movement over the NOUPT tracks thereby facilitating the relocation of the Metairie rail corridor.

Amtrak does not appear to favor the current NOUPT agreement. Amtrak would want to become (only) a lessee without any responsibility for operating expenses. As part of the new agreement, the responsibility for track maintenance for the Southport Junction to 17th Street Canal section of track could be transferred from Amtrak to NS, or to IC, or to a combination of railroads that would be using the new run-around section. The track would have to be maintained at a much higher standard for heavy freight train movements than Amtrak would require for its passenger trains. Relieving Amtrak of some of its track maintenance expense should be attractive to them.

NS has an agreement with the City that no new crossings at grade will be allowed. The entire picture may become clearer in 1998 when the bonds are paid off and the environmental issues become better defined.

3.0 REGIONAL GOALS AND PRIORITIES OF LOCAL RESIDENTS

3.1 Approach and Procedures

In order to determine how railroad facilities and operations over the Back Belt fit into the goals and priorities of local residents affected by the railroads, a series of four focus group sessions were conducted during the fall of 1995. The first focus group, held in September, was a pilot session. The participants were all professional persons who were employed by local governments, state government, or agencies such as the Regional Planning Commission and the Port of New Orleans.

The planners and officials in the pilot session were selected by the staff of the Regional Planning Commission (RPC) from their list of regular regional advisors. It was expected that they would have divided interests, e.g., as between their profession and their parish of residence. That is, a planner who worked for the Port of New Orleans and resided in Jefferson Parish might have mixed professional and personal preferences regarding a rail issue which could benefit the Port but detract from his home neighborhood, or vice versa. The results of this pilot session are discussed in detail in Section 2.6.3, above, in connection with a discussion of regional level rail issues.

Each of the focus group sessions were conducted using the same procedure. A series of concepts or topics were introduced one by one by passing out short excerpts from policy documents or planning literature. Then, a moderator encouraged and fielded questions and comments from the participants.

Technical personnel from the CONSAD-RailLease project team were present to act as assistants if the discussion became mired in technical issues. The eight topics used to organize the discussion were:

- Regional Goals,
- Policy Issues in Transportation,
- Bonnet Carre Spillway and Other Wetlands,
- Multi-objective Planning,
- The Back Belt and Regional Goals,
- Time Tables and Regional Goals,
- Regional Goals and Hazardous Materials, and
- Community/Railroad Issues.

After about 15 minutes of discussion, a questionnaire containing about 12 rating scale items was distributed to each participant and a few minutes were allowed to mark the scales. Discussion documents and rating questionnaires are shown in Appendix L. At each session, one or more project personnel were assigned to take notes on the discussion, without identifying anyone.

After the pilot session, the handout documents and questionnaires used were re-edited and expanded. Thus, the last three sessions differed from the pilot session for two major reasons: first, the pilot session group consisted of planners and government officials; and second, the materials presented were changed.

3.2 Residences of Focus Group Participants

In preparing for the other three sessions, the members of the pilot session, plus various other neighborhood and civic organizations throughout the region, were contacted and asked to nominate persons who were neighborhood and/or civic group activists.

A total of about 54 people from six parishes were contacted by telephone and, then, received explanatory documents by mail about ten days before the session. They were recontacted by telephone about two days before their session. Table 3.1 shows that 26 people responded by participating, and that St. Tammany was the only parish from which no representative appeared. However, the sessions were held in the Jefferson and St. Bernard Parish office buildings and, although they were centrally located, they were relatively far from St. Tammany and Plaquemines Parishes.

Table 3.1: Distribution of Places of Residence of Focus Group Participants

Place of Residence	Focus Group Session			
	Nov. 6, 1995	Nov. 7, 1995	Nov. 8, 1995	Totals
Orleans	3	0	1	4
Jefferson	10	0	3	13
St. Bernard	0	6	0	6
St. Charles	0	0	2	2
Plaquemines	0	0	1	1
St. Tammany	0	0	0	0
Totals	13	6	7	26

As shown in Table 3.1, 50 percent of all participants were residents of Jefferson Parish. Even though they were not all from the same neighborhood, they could cause the questionnaire responses to be distorted if they made the same response. This potential for bias should be considered when reviewing the questionnaire results.

3.3 Analysis of Questionnaire Items

This section focuses on those questionnaire items receiving 50 percent or more responses in categories 1 (strongly disagree) or 5 (strongly agree). A total of seven items, out of the 98 in all eight of the questionnaires, received overwhelming response in one of the two extreme categories. These seven items are shown in Table 3.2.

It is safe to conclude that these seven items represent a regional consensus among the residents of the five parishes. But interpretation of these items is challenging. Two of the items, 7.1, and 7.2 are health and safety related, and the response consensus is easily interpreted as the "Not in my backyard" (NIMBY) type. Furthermore, the contradiction between these NIMBY responses and the strong response favorable to railroads (Item 2.1) is not surprising. Item 2.3 tests the sympathy of the residents with the need for private enterprise to be unfettered by popular local concerns. The responses indicate that local concerns override the needs of private enterprise.

Item 8.19 is not easily interpreted because the residents of Metairie are largely aware that their community is the beneficiary of a special Louisiana law which gives trains indemnity on the Back

Table 3.2: Summary of Focus Group Questionnaire Items Receiving 50 percent or More Responses in Either Categories 1 or 5

Item		Percent of all responses					
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Left Blank
1.2	The residents in our region are in agreement as to which issues are a high priority.	0	25.0	0	16.7	50.0	8.3
1.3	The railroads consider the objectives of the surrounding neighborhoods when forming railroad operating strategies.	66.7	0	16.7	16.7	0	0
2.1	Railroads are a crucial component of our industrial economy.	0	10	2	36	52	0
2.3	The railroad should do what is in the best interest of the railroad, regardless of community concerns.	64	28	4	4	0	0
7.1	There is reason to believe that a hazardous materials incident could occur at any time.	4	8	0	20	68	0
7.2	One of our regional goals should be to reduce the amount of hazardous materials carried in our region.	4	4	12	28	52	0
8.19	Barrier gates at railroad crossings are unnecessary.	54	33	8	0	0	4

Belt even in cases when they do not sound their horns at grade crossings (discussed in Section 1.3.5, above). This law specifies grade crossings on the Back Belt which have barrier gate protection. So, for the Metairie residents, the grade crossing barriers are necessary to preclude trains sounding their horns at grade crossings. One crossing on the Back Belt does not have barrier gates, and the trains do sound their horns there.

With regard to the present status of regional consensus, it is interesting to compare the results on Item 1.2 with a similar Item 1.3 from the focus group for planners and officials (described in Section 2.6.3, above):

Item		Percent of all responses					
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Left Blank
1.3	The parishes are in agreement as to which issues are a priority. (planners and officials)	6	77	6	12	0	0
1.2	The residents in our region are in agreement as to which issues are a high priority. (local residents)	0	25.0	0	16.7	50.0	8.3

These results are a clearcut reversal between the planners and the neighborhood residents: it is open to various interpretations, none of which is encouraging for the possibility of a regional consensus. In one interpretation, for example, the neighborhood respondents take the term "region" to mean the immediate neighborhood, or perhaps a few adjacent neighborhoods, which they know, but the planners take "region" to mean a group of parishes. This interpretation implies a strong parochialism on the part of the residents, with little comprehension of the regional scope of many planning and development issues.

Do the residents of Metairie truly believe that people in the diverse parishes of Orleans, Jefferson, and Plaquemines share the same priorities? Perhaps the key is in the concept of "priorities", which could mean broad concepts such as peace and prosperity. This problem is likely to cause difficulties in the development and implementation of specific transportation strategies and projects.

The next step in the analysis was to identify the items in which either categories 1 plus 2 or categories 4 plus 5 totalled 80 percent or more of the responses for that item. Leaving out the

Table 3.3: Summary of Focus Group Questionnaire Items with 80 Percent or More of Their Responses in Either Categories 1 plus 2 or 4 plus 5.

Item		Percent of all responses					
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Left Blank
1.8	Relieving highway traffic congestion is hopeless in this region.	25.0	58.3	0	16.7	0	0
3.4	The state legislature should provide corridors for private transportation companies wherever the companies need them.	36	44	12	4	4	0
4.1	Our region suffers occasionally from divisiveness among parishes and other jurisdictions.	0	8.3	0	50.0	41.7	0
4.9	If we would let them, the railroads would do a good job of planning our entire region.	41.7	50.0	0	8.3	0	0
6.7	We cannot allow achievement of our community goals to be deferred while we are waiting for the railroads to take action.	4	12	0	44	36	4
7.3	The transport of hazardous materials is acceptable if routed through unpopulated areas of our region.	0	4	12	56	28	0
7.11	The actual risks associated with hazardous materials transport are clearly identified and understood by the public.	40	60	0	0	0	0

items selected earlier (using the rule of 50 percent or more in either category 1 or 5), there were 10 items, out of the remaining 91, meeting the second rule. Seven of these items are listed in Table 3.3 (three were dropped because of difficulty in interpreting the wording of the questionnaire item; see Appendix L for further details).

One item which stands out in relation to the analysis of the questionnaires from the planners and officials is Item 4.1. On the top of the next page, their responses are compared with those of the local residents.

	Percent of all responses					
Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Left Blank
4.1 Our region suffers occasionally from divisiveness among parishes and other jurisdictions. (planners and officials)	0	0	6	69	25	0
4.1 Our region suffers occasionally from divisiveness among parishes and other jurisdictions. (local residents)	0	8	0	50	42	0

The wording of this item requires that "region" be considered to contain "parishes and other jurisdictions", and now the local residents are even more emphatic than the planners and officials on this divisiveness. Perhaps their responses on Item 1.2, shown in Table 3.2, imply that it is not their neighborhood which is being divisive.

Items 3.4 and 6.7 are intended to discover the attitudes of the participants with respect to public involvement in private railroad affairs. However, Item 3.4 could simply be a negative reaction to the Louisiana legislature, while Item 6.7 shows positive support for government action. This result is supported further by the negative responses to Item 4.9.

Possibly Item 3.4 would have elicited positive responses if it had specified "state government", or merely "the public". On the other hand, it is possible the phrase "wherever the companies need them" led to the negative responses. In other words, the results for this item should not be interpreted as a flat "no" to public and public agency involvement in railroad affairs.

The response to the two items on hazardous materials suggest that the participants misunderstand the risks associated with these materials, and therefore oppose them passing through their neighborhoods. These results raise the intriguing possibility that some negotiation is possible, if the residents themselves become informed and educated, and confident that they can make sensible choices about what materials travel through their neighborhoods.

Some comments taken down by the CONSAD-RailLease team in the sessions are relevant to this point, and these are shown below:

> "It's amazing what goes through residential neighborhoods."
>
> "The alternative is trucks and they go through residential areas as well."
>
> "Alternatively, the railroad can educate the community about safety measures that are already in place. There is a need for a neighborhood commission."
>
> "If rights of way are routed through wetlands, additional problems may arise with environmental groups."
>
> "There should be a land swap between the state and the railroads. That is, the railroads should give up old rights of way for new."
>
> "Railroads should publicize existing procedures taken to minimize risk, (delay) time at crossings, and so forth."
>
> "I'm concerned over the combination of chemicals included in a single train or yard."
>
> "The railroads have a very good safety record, but as with Russian Roulette, an accident will occur sooner or later."

One of the main results of the focus group sessions is that the railroads are perceived to be "necessary", but they should not have a right to exclude public sector involvement.

There are indications that existing government structures are not considered adequate, for example, in the negative reaction to the "state legislature" item, and in the mention of a "neighborhood commission". One Orleans Parish resident at a focus group session described how his neighborhood had organized a group which dealt directly with planners and engineers from the Corps of Engineers in connection with the Industrial Canal, but there were few questions directed to him by residents of other neighborhoods.

3.4 Summary of Focus Group Results

The focus group sessions suggested that a lack of regional and community consensus exists, and that consensus could be achieved on some broad goals. However, a gradual long term process will be needed. A community education and planning process is needed which would evolve its own institutional and engineering solutions, independently of those handed down by consultants.

The prospects for such a process are slim, however, given the long term existence of the issues, and the past opportunities for such a process to have arisen. One possible strategy would be to tap neighborhood groups in all the parishes where they have had success in direct planning and project involvement by residents and then feed this experience into parishes and neighborhoods which have been struggling without success.

While stressing the need for greater communication and involvement among railroads, planners, and neighborhood residents, there was some hesitation as to the degree to which the public should be involved in railroad affairs, and the mechanisms by which this involvement should be achieved. However, there was consensus that public involvement in railroad operations was desirable if the surrounding Parish residents had a stake in the impacts of these operations.

3.5 Conclusions From Focus Group and Individual Interviews

In addition to the focus groups, the project team conducted individual interviews with public officials and residents. The following findings and conclusions are taken from the combination of these sources:

- Previous studies have found a very strong preference among Metairie residents for the elimination and removal of the Back Belt. The present study found a strong persistence of this preference (also discussed in Section 2.4, above).
- The 1984 Jefferson Parish Neighborhoods Study, as discussed in Section 2.4, above, showed that a wide diversity of issues exists in the region, and that officials must consider this diversity. Thus, there is no region-wide concentration on railroad issues, although the extensive railroad facilities means that many separate neighborhoods are impacted.
- Local officials and residents in other parishes have their own rail-related, especially grade crossing, problems, and they do not see the Back Belt as a major REGIONAL issue.
- Many planners, on the other hand, are aware of the connection between the Back Belt problems and bottlenecks, and region-wide rail and economic development problems.
- The economic importance and necessity of rail corridors through Louisiana is generally understood and accepted. However, there is less acceptance of the high volume of "through" rail traffic, e.g., land-bridge traffic on the LA/Long Beach-New Orleans-East Coast ports route, through one particular gateway, the Back Belt, when other gateways exist.

Through this process of individual interviews, coupled with multiple focus groups, regional consensus on the important rail-community issues has been examined. The results indicate that any package of alternatives which is developed through multi-neighborhood involvement, which provides for steady public participation in railroad activities, and which addresses multiple rail issues in multiple parishes, will enjoy wide regional support.

4.0 REVIEW OF THE REGIONAL HIGHWAY TRAFFIC SITUATION

4.1 Introduction

The New Orleans area has been affected by the same social, economic, and demographic changes that have occurred in the U.S. over the last twenty years, and that have acted to increase the per capita vehicle miles driven. The emergence of the two wage earner family has resulted in an increase in home-to-work trips. The increase in vehicles owned and operated by teenagers means more drive to school in their own cars instead of taking a bus. The greater reliance on convenience services, such as restaurants, dry cleaners and commercial laundries for cleaning services, and the greater use of cars for shopping and entertainment in general, whether it be a visit to a local shopping mall or driving to rent a video tape at a local video store or take in a movie, all act to increase per capita vehicle miles and result in greater traffic congestion. In spite of work-at-home appliances such as computers, cable networks, portable telephones, fax machines, and pagers, per person vehicle miles are still increasing, adding to local highway volumes.

While the New Orleans gridlock will continue to worsen for the foreseeable future, it is, nevertheless, relatively less extreme and more bearable than those of Los Angeles, New York, and Houston. Walter Brooks, the Manager of Planning at the Regional Planning Commission (RPC), points out that a typical New Orleans commuter has an average of eight miles to travel from home to work, which is something of an anomaly among major urban areas with populations over one million.

This chapter discusses both the current highway situation as well as plans to alleviate the current congestion of the roadways, including the construction of an LRT system. Such a perspective is critical to understanding the impact that railroad operations in the Metairie area have on highway traffic, the constraints faced by traffic planners in alleviating this highway congestion and, thus, the viability of alternative rail-community solutions presented in Chapter 5.0.

4.2 Highway Traffic in the Study Area

Interstate 10, Metairie Road, Causeway Boulevard, and all major highways bordering the Metairie study area have exceptionally high volume-to-highway capacity (V/C) ratios, indicating they are carrying vehicular volumes well beyond their capacity. Barring any major changes in the area (which are not anticipated at this time), highway traffic on the roadways affected by the Back Belt is expected to increase in a fashion consistent with population forecasts in Jefferson and the surrounding Parishes, or by approximately 2.8 percent by 2000, 10.5 percent by 2010, and 18.7 percent by 2020 (see Appendix Table C.10). In other words, traffic conditions are expected to worsen over the next 25 years on all of the highways bounding the study area. These projections are consistent with the new *Louisiana Statewide Intermodal Plan* (LADOTD, 1995, pp. 88-90) where the forecasted arterial street traffic conditions indicate "extreme congestion during peak traffic periods" on all of the study's highways. Thus, it is hard not to imagine major lifestyle changes coming about as a result of this worsening traffic situation. For example, these forecasted conditions appear drastic enough to suggest that businesses that have not already relocated away from the central business district (CBD) may well find ways to do so. The higher travel costs and increasing lost time penalties to their employees will likely force such a change. Individuals that can will likely opt to find domiciles closer to their work rather than incur the burdens of commuting, or they will seek employment in peripheral parishes (where, incidentally, industrial growth is also less costly).

Given the growing congestion on I-10 and slower movement on Causeway Boulevard and Airline Highway, the incentives for drivers to use residential neighborhood streets in Metairie has increased. Thus, continuing pressure on Carrollton Avenue, Metairie Road, LaBarre Road, and Hollywood is likely. As a consequence of traffic growth, the costs of grade crossing delays, which are, in part, a function of average daily traffic counts on the eight Metairie grade crossings, will continue to increase. The potential benefits of eliminating and/or reducing these delays will similarly increase, as will the pressure to construct grade separations, or for safety reasons, to close crossings. While there are a number of construction projects planned and funded that will eventually add two additional travel lanes to I-10 from Williams Boulevard through the Carrollton Interchange (see Section 4.4, below), given the forecasted growth of traffic, these will not reduce Metairie's grade crossing blockage and delays. Without relocation of the Metairie rail corridor and/or changes in railroad operations, the negative and costly interaction of trains and highway traffic will continue to escalate (see Section 6.2 of this report).

4.3 Plans For a Light Rail Transit System (LRT)

State and regional planners have requested funds from the FHWA for another transit study and for the construction of a light rail transit (LRT) system between the CBD and the New Orleans International (Moissant) Airport. However, according to a study performed by Daniel, Mann, Johnson, & Mendenhall (DMJM, 1995), given the existing limitations on land for stations and parking, the prospective ridership on any new system would do relatively little to alleviate highway traffic conditions. At present, transit ridership is not expected to exceed ten percent of the total east-west trip demand. Any increase in ridership would be dependent on establishing adequate feeder bus connections and acquiring enough additional land to construct at least three park and ride facilities. In particular, portions of Jefferson Parish east of Cleary and Central Avenues would not have a convenient transit station close enough to warrant using the system. The reason for this is that a commuter transit station at Airline and Causeway would be inaccessible as both highways are grade separated and it would take "substantial capital funds to construct the ramps and roadways necessary to access a station near Causeway Boulevard and the LRT right-of-way" (DMJM, 1995, p.32).

The transit system would also require the reopening of seven highway grade crossings on Airline Highway, with a corresponding huge increase in grade crossing delays. The 1995 Daniel, Mann, Johnson, & Mendenhall (DMJM) study suggested that the former, now abandoned, KCS right-of-way be used for the LRT system. This would necessitate the acquisition of this land by the State, the Parishes, or, most likely, the existing Regional Transit Authority (RTA).

KCS is actively pursuing the maximization of its stockholder returns on the value of its assets. The real estate value of its Jefferson Parish Corridor property represents an underutilized asset to the railroad and therefore current KCS management is actively moving to sell this property. Jimmie Fitzmorris, representing KCS, reports that at least one offer to purchase portions of this corridor for $10 per square foot has been received, but that the offer has been put on hold while the railroad completes a property assessment to establish the corridor's current market value. KCS has offered to sell the property to the state on a four year basis, thus making it easier for the state to finance the acquisition.

While past efforts made by the Secretary of Louisiana's Department of Transportation and Development and others to secure this property for future transit corridor development have foundered due to failure of the legislature to provide funding, there is some hope that the new state leadership will be able to come up with the funds. As this KCS corridor was also to be used for the western extension of the Earhart Expressway, it is, in the minds of many of the region's transportation planners, critically important that it be preserved for future transit and highway development.

KCS has had a long history of actions supportive of the objectives of the City of New Orleans and Orleans Parish. The Superdome, as an example, was built on KCS property. KCS's willingness to work with the State of Louisiana is a modern day example of this public-spirited attitude. However, if KCS were to merge or be acquired by one of the major railroads, such as UP/SP, BN/ATSF, CSX, or NS, the attitude of the new owning railroad towards preserving this corridor for future transportation purposes could change. For example, Phil Anchutz purchased the Denver & Rio Grande Western, and then went on to make an estimated one billion dollars by buying SP and selling off key properties and corridors. A similar opportunity may exist with KCS. The point, here, is simply that corporations cannot afford the luxury of sitting on valuable assets. Sooner or later someone finds a way to convert them to something that gives the owners a return.

Assuming that the state buys the KCS property, thereby preserving the corridor for future transportation development, the question then becomes one of the effectiveness of the new LRT transit system in diverting highway commuters. The DMJM (1995) study suggested that the new system, while technically feasible to construct, would have to make extensive use of bus drop offs, park and ride facilities, and offer frequent service in order to attract riders.

4.4 Plans for a Heavy Rail Transit System

In addition, the State of Louisiana has engaged Morrisen and Knudsen to complete a rail passenger study and plan. This study will examine ridership potential, fare structures, and alternative service configurations, which will, at least, include rail passenger service between New Orleans and Baton Rouge.

4.5 Planned Highway Construction Projects

A review of the planned and programmed highway construction projects shows that these projects, while increasing highway system vehicular capacity, will not, alone, relieve current congestion, due to projected growth in highway traffic. Highway construction projects that are planned and funded by the with federal monies include the following major highway projects:

- Jefferson Parish, FHWA Project 450-15-0089: I-10 will be widened through the addition of two travel lanes From Causeway Boulevard through the 17th Street Canal, at a cost of $17 million dollars. The contract will be let in January 1998 and completed by 2001. This will help provide capacity for the St. Tammany Parish-Pontchartrain Bridge commuters driving from Causeway Boulevard to the CBD via I-10.

- Jefferson Parish, FHWA Project 450-15-0085: The Williams Boulevard I-10 Interchange will be modified with the addition of a fourth acceleration lane, at a cost of $19.5 million. The contract will be let in June 1997 and completed by 2000.

- Orleans Parish, FHWA Project 450-90-0083: The I-610 Interchange on I-10 will be widened, at a cost of $22 million. The contract will be let in June 1996 and is scheduled for completion in 1999. I-10 will be widened from Metairie Road to the Oaklawn overpass (from four to six lanes). Funding for this project will also include demonstration project funds.

- Orleans Parish, FHWA Project 450-90-0103: The SP underpass to Tulane Avenue will be constructed at an estimated cost of $11 million. Contract letting will be in November 1998.

- The US Route 61 (Airline Highway) Widening Corridor Study is to be conducted by the Metropolitan Planning Organization or the RPC.

- The reconstruction and improvement of Causeway Boulevard to the I-10 freeway is under study. The interchange is to be redesigned from the current cloverleaf junction to direct turning lanes. This project is unfunded and unscheduled. Jefferson Parish is performing the preliminary design.

- The widening of Ames Boulevard in Jefferson Parish from Palco to Ehret was let in January 1996 at an estimated cost of $4 million.

- Orleans Parish has plans to computerize 400 traffic signals to improve signal timing and improve traffic flow in the CBD. This project will improve signal timing on Earhart Boulevard, thereby smoothing the traffic movement from the Orleans Parish line to the CBD. However, traffic coming off the Earhart Expressway onto Earhart Boulevard will still be stopped by numerous traffic signals at each intervening cross street. The RPC is planning to improve interparish coordination of traffic signaling.

- The RPC believes that the completion of the Earhart Expressway improvements offers the best potential for improving the east-west highway flow of traffic between Jefferson and Orleans Parish, although they concede that the negative environmental impacts on the local neighborhoods has blocked the eastern continuation of the Expressway beyond the Orleans Parish line. They feel that traffic signaling changes on Earhart will help move vehicles into the CBD at a slightly faster rate than is currently possible, and they also point out that the full potential of the Expressway to divert east-west traffic will never be realized until the extension to the airport is completed.

RPC planners have identified the key bottlenecks in the regional highway system and have formulated preliminary plans for their removal. These bottlenecks include, but are not limited to, the following:

- The Causeway Boulevard to I-10 interchange,

- The I-10 to I-610 bypass interchange (widening of this interstate highway bottleneck will be completed in five years, but traffic growth will by that time take up any overall savings gained from adding the two lanes),

- Service roads underneath the I-10 freeway, and
- The Airline Highway intersections with LaBarre Road (no specific plan has been made).

In addition, the RPC also hopes that the LRT transit system (described in Section 4.3) can be established between the CBD and the International Airport as this offers some hope for diverting and reducing highway traffic in the east-west corridor.

While removal of highway bottlenecks should improve traffic flow over the entire regional highway system, it will be at least 10 years before some of these bottlenecks are eliminated. The RPC has also discussed converting the Earhart Expressway to a toll road, as well as other alternatives for public-private funding of highway improvements.

RPC planners are also concerned about providing an improved north-south access to the CBD for Pontchartrain Causeway commuters, as the exodus of New Orleans and Jefferson Parish residents relocating to St. Tammany Parish (situated north of lake Pontchartrain) continues, along with those relocating from other regions and states. St. Tammany planners have proudly announced that they are among the fastest growing areas in the country, that they are pleased to have been able to acquire parts of the former IC right of way for a bike trail, viewed as one of the more important amenities of area life, and would strongly resist any efforts to develop an alternative rail corridor that would use this former right of way or that would bisect their parish on a more northerly east-west alignment. As one resident put it, "I left

Jefferson Parish to get away from the trains; I would fight any effort to establish a new rail corridor here, however cost-effective or beneficial it might otherwise be." The price for this north of the lake preference is an increasingly long and frustrating trip across Lake Pontchartrain. Nevertheless, moving these commuters to and from the Pontchartrain Expressway entrance is an increasing issue for the RPC as it is looking at the bigger picture.

4.6 Concluding Remarks

Over the next 25 years, traffic delays will increase, as will the overall time required to travel between any two points in the New Orleans metropolitan area. The most important single highway traffic flow, as measured by average daily trips, consists of commuter movements from eastern areas in Jefferson Parish to the Orleans Parish CBD. These are primarily handled by I-10, Airline Highway, the Earhart Expressway to Earhart Boulevard, Metairie Road to I-10 (and alternatively to Canal Boulevard), and Jefferson Highway to Claiborne Avenue.

Extension of the Earhart Expressway west to the airport and east to the CBD offers the greatest long-term potential for relieving regional traffic gridlock. Should the KCS corridor property proposed for an LRT system be lost due to a failure to fund its acquisition from KCS, then Airline Highway could be widened to add additional east-west traffic flow capacity. However, Airline Highway is not a limited access freeway as is the Earhart Expressway, so this incremental traffic capacity would do little to reduce travel times and siphon traffic away from I-10 and the other arterial and collector highways.

The completion of a west bank expressway loop, which would join the I-310 bridge with the west bank expressway and then link up with a new Route 47/I-510 Mississippi River bridge, also has potential for siphoning off some of the east-west traffic flow.

5.0 ALTERNATIVE SOLUTIONS

A wide range of potential solutions to the railroad-community conflict were explored, including those that have been identified in prior studies. In focus group meetings and interviews, suggestions were solicited from participants. Five criteria were used to select alternatives for further analysis. These include:

- Is the alternative operationally feasible?
- How well does the alternative meet residents' goals, i.e., how well does the alternative reduce the negative impacts of grade crossing delays, safety risks, noise, vibration, intrusiveness, and overall impact on the community?
- How does implementation of the alternative impact railroad profitability and operations?
- Is the alternative financially feasible? What are the benefits and capital costs of the alternative? Who will pay for it?
- What construction feasibility issues and costs are involved with the alternative?

The actual process of selecting alternatives was done by key project team members evaluating each alternative and completing an informal check of the key assumptions with railroad technical advisory personnel, key citizens, and governmental personnel. The results of the focus groups were helpful as were follow-up meetings with several focus group participants in reducing the list. While this process was not structurally formalized it was rigorous and each alternative emerged with its proponents and detractors.

All of the potential solutions identified in prior studies, excluding those that have been implemented, as well as new alternatives that emerged in this study were considered. These are listed in Table 5.1. Table 5.1 also shows the results of an opinion poll undertaken in the FHWA, et al. (1988) survey asking Metairie residents how they felt about each of these alternatives. Section 2.4.2, above, further describes this study.

As indicated in Table 5.1, the alternatives considered by the study team include both long term relocation alternatives and short term railroad operating changes that can be made to reduce grade crossing delays, accidents, noise, vibration, and exposure to hazardous materials experienced by Metairie and other Jefferson Parish residents. "In-place" alternatives mean that rail movements through Metairie would continue but that the impacts of these movements would be lessened. The other type of alternative, called "relocation", means that the Metairie corridor (the Back Belt) would be completely closed and train movements would follow another route. Some of the alternatives, involving the NOPB or the rerouting of some traffic to other gateways, are "partial relocation" alternatives because some of the train traffic would remain on the Back Belt.

The alternatives selected for detailed analysis are identified in Table 5.1 by the reference section in this chapter where that alternative is further described. Based on the five criteria described above, 29 individual alternatives, grouped into nine broader sets of alternatives, were identified as having the most promise. These are described, below, in Sections 5.1.1 through 5.1.9.

Table 5.1: Overview of In-Place and Relocation Alternatives Considered

In-Place Alternatives

		Opinion Poll Responses*		Reference Section in Chapter 5 for alternatives selected for detailed analysis
		Favor-able	Unfav-orable	
1.	Reduction in the number of trains using tracks**	238	31	5.1.1.1
2.	Increase in the speed of trains	57	202	5.1.1.2
3.	Removal of second track from Metairie Road to LaBarre Road	185	57	5.1.1.3
4.	Operation of only run-through trains by the railroads	--	--	5.1.1.3
5.	Relocation of LaBarre Road switching activities	--	--	5.1.1.3
6	Relocation of KCS-NS interchange	--	--	5.1.1.3
7.	Restriction of train movements during peak traffic periods**	214	58	5.1.1.4
8.	Elimination of all train horns	128	131	5.1.2
9.	Placement of additional warning devices at crossings	164	95	5.1.2
10.	Close one or more crossings at Atherton, Hollywood, Cuddihy, or Farnham	46	211	5.1.3
11.	Construction of an overpass at Metairie Road	61	203	5.1.3
12.	Construction of an underpass at Metairie Road	71	193	5.1.3
13.	Construction of an overpass at LaBarre Road	46	185	5.1.3
14.	Construction of an underpass at LaBarre Road	60	173	5.1.3
15	Construction of an overpass at Carrollton Avenue	28	190	5.1.3
16.	Construction of an underpass at Carrollton Avenue	38	180	5.1.3
17.	Enforcement of existing rail ordinances	242	27	5.1.4
18.	Implementation of transportation system management techniques on the street system serving the study area	140	76	NS
19.	Elevation of railroad tracks in Metairie corridor	35	209	NS
20.	Construction of service streets parallel to railroad tracks, Metairie-LaBarre	100	151	NS
21.	Reopening of the pedestrian/bicycle underpass located at Metairie playground	84	140	NS
22.	Construction of one or more pedestrian/bicycle overpasses	71	159	NS
23.	Construction of additional pedestrian/bicycle underpasses	64	138	NS
24.	Construction of noise barriers	56	185	NS
25.	Depression of railroad tracks in Metairie NOT Railroad corridor	40	189	NS
26.	Fencing off of the tracks	39	198	NS
27.	Do nothing	51	205	NS

NS - Not selected for detailed analysis.

* **Based on a survey of approximately 285 Metairie residents conducted in 1986 and reported in FHWA, et al. (1988). Relocation alternatives based on response to relocate/remove railroad tracks. Alternatives with dashes were not rated by residents.**

** **Also represents a partial relocation alternative.**

Table 5.1: Overview of In-Place and Relocation Alternatives Considered (continued)

Relocation Alternatives

		Opinion Poll Responses*		Reference Section in Chapter 5 for alternatives selected for detailed analysis
		Favor-able	Unfav-orable	
28.	Carrollton Curve relocation from Metairie to Orleans Parish line	253	45	5.1.5
29.	Carrollton reverse movement	253	45	NS
30.	Mid St. Tammany Parish alternative: Baton Rouge-Hammond-Slidell-Ansley via I-12/I-10 corridor	253	45	5.1.6
31.	Mid St. Tammany Parish alternative: Baton Rouge-Hammond-Slidell-Nicholson-Ansley via NS Pearl River Bridge	253	45	5.1.6
32.	Mississippi Central Route alternative: Baton Rouge-Hammond-Brookhaven-Hattiesburg-Mobile	253	45	5.1.6
33.	Washington Parish alternative: Baton Rouge-Hammond-Amite City-Picayune-Nicholson-Ansley	253	45	5.1.6
34.	Mississippi River Bridge alternative: new rail bridge to west bank-east side of New Orleans-Route 47/I-510 extension	253	45	5.1.7
35.	Interstate 10-Causeway Boulevard corridor	253	45	NS
36.	Midtown (downtown) corridor-connect NOUPT trackage with NOPB river front tracks.	253	45	NS

Partial Relocation Alternatives

		Opinion Poll Responses*		Reference Section in Chapter 5 for alternatives selected for detailed analysis
		Favor-able	Unfav-orable	
37.	Redirect hazardous materials rail shipments	254	18	5.1.8
38.	River Front Route of NOPB	253	45	5.1.9.1
39.	Construct double tracks between Metairie Road and Orleans Parish Line, including improvements to East Bridge Junction and HPL Bridge	37	211	5.1.9.2, 5.1.9.4
40.	Establish centralized train control	--	--	5.1.9.3
41.	Maintain the good condition of the tracks	--	--	5.1.9.3
42.	Park waiting trains in areas outside of study area	242	23	5.1.9.4

NS - Not selected for detailed analysis.

* **Based on a survey of approximately 285 Metairie residents conducted in 1986 and reported in FHWA, et al. (1988). Relocation alternatives based on response to relocate/remove railroad tracks. Alternatives with dashes were not rated by residents.**

5.1 Description of Alternative Solutions Selected for Detailed Analysis

The first four sets of alternatives (Sections 5.1.1 through 5.1.4) represent in-place alternatives, the next three sets of alternatives (Sections 5.1.5 through 5.1.7) represent relocation alternatives, and the last two sets of alternatives (Sections 5.1.8 and 5.1.9) represent partial relocation alternatives.

5.1.1 Change Railroad Operations and Other Short Term Improvements

This package of improvements, taken together, would reduce grade crossing blockage time and the impacts of current switching operations. It includes completing the double tracking of the East Bridge Junction, establishing yard to yard interchanges, rerouting some traffic via alternative gateways, consolidating train movements, and effecting train scheduling changes which concentrate movements across the Back Belt during the evening hours from 7:00 PM to 6:00 AM.

More specifically, a variety of actions designed to reduce grade crossing blockage in Metairie were evaluated. They include:

- Reducing the number of train movements through Metairie,
- Decreasing the train transit time through the corridor,
- Eliminating trains stopping within the Metairie rail corridor, and
- Scheduling train movements to avoid the heaviest highway traffic periods.

Each of these alternative actions are discussed in the following sections.

5.1.1.1 Reduce the Number of Train Movements Through Metairie

The railroads have made progress in consolidating train movements through New Orleans, and yet, as a consequence of the forthcoming consolidation of SP and UP, there is potential for additional consolidation. Train consolidation coupled with the scheduling of the train movements across the Back Belt at night benefits the carriers and community in several ways. The obvious benefit to the railroads is the ability to reduce crew costs by spreading them out over a larger traffic base, thus reducing the per ton and per car costs of the movement. In addition, running one longer train through Metairie versus two shorter trains reduces crossing blockage, assuming both trains are running at the same track speed. By eliminating one train, the constant warning time interval provided by the grade crossing signals and gates can be saved. During rush hours, a 30 second savings typically means 25 less cars are blocked and delayed across all eight grade crossings. While longer trains increase the incentive for motorists to drive to other crossings or roads to run around the train, as a practical matter it is difficult, if not impossible, for a motorist to discern an 80 car train (one mile long) from a 160 car train (two miles long) at any of the Metairie grade crossings, as one cannot see the end of shorter train given the viewing angle. Again, the implication here is that the longer consolidated trains should be run during the night time hours when there is little highway traffic to produce the greatest savings and reductions in the risks and probabilities for grade crossing accidents.

However appealing this idea is conceptually, its application is limited by the total weight that can be placed on car couplers for trains moving over the Huey P. Long Bridge. Currently train length is controlled by train weight limitations established for the Huey P. Long Bridge, by NOPB, which owns and operates the bridge. The 9,000 ton bridge weight limit for trains, without pusher engines, establishes the upper limit or draft load for cars whose couplers can break going up and over the 1.25 percent grade with longer, heavier trains.

In fact, to prevent part of a train from rolling backwards off of the Huey P. Long Bridge, should a coupler pin break at the top of the grade (center) of the bridge due to excessive draft loads, cars are set up with a five percent application of brakes or enough to slow down the run-away section.

A typical 9,000 ton train would have, on average, three to five locomotive units on the head end and approximately eighty cars. The NOPB regulations further stipulate that pusher engines, the use of which allows UP and SP to increase the length of their trains, must be limited to 6,000 horsepower. This regulation creates a problem for SP and UP, as two 3,600 horsepower pusher locomotives, having a combined rating of 7,200 horsepower, would exceed the limit, meaning one of the engines could not be used. NOPB is in the process of seeking technical clarification of this question.

Given that eastbound trains typically carry a much higher percentage of loaded cars than do westbound trains, the tonnage weight limitation tends to restrict/limit the eastbound trains far more than it does the westbound trains that typically are hauling a higher percentage of empty cars. In actual practice, some of the eastbound trains are already near capacity (12,500 tons) with two pusher locomotives being utilized. UP uses its yard locomotives, operated by its own yard crews, as pushers.

Railroads, especially UP, have learned how to run long, heavy trains using distributed power, whereby locomotives are positioned in the middle and end of the train as well as at the front, and remote, cab-operated radio controls. Examples of long, heavy coal unit trains are now found throughout the country. By distributing the power throughout the train, the load on car coupler devices can be maintained within acceptable limits, and therefore reduce coupler failures. Could a Locotrol III remote radio controlled system movement using pusher locomotive and distributed power be established to move double length trains of 150 cars over the bridge and the Back Belt during the night time hours thereby drastically reducing grade crossing blockage? Perhaps, but the challenges to make this a cost-effective operational alternative would be significant given the short, 12.6-mile, distance involved, and the time and costs for switching the locomotives and assembling and disassembling the train. If the time and distances were increased, maybe it would be more cost effective than we currently believe it to be.

The problem is the switching of the locomotives out and off of the train once the bridge is clear and the additional switching that has to be done at each yard given the length of the train. Additional yard crews would need to be poised and ready to switch out the locomotives using conventional technology, and additional yard tracks may be needed, of greater length to minimize train switching.

Of course, the amount of train consolidation that can effectively be done by UP and SP and by NS and CSX may also be constrained by customer contractual agreements and the yard capacities and limitations at Avondale, Oliver, and Gentilly Yards. As an example, SP may be prevented from combining American President Line's run-through train (LBAVT) going to NS with any other cars or train going to NS or CSX by the terms of their APL agreement, or if they are not limited by the contact's terms, then additional cars can possibly be added to the train.

As a consequence of the forthcoming acquisition of SP by UP, there will emerge an opportunity for UP, as the surviving western carrier, to review the entire movements and scheduling of trains through the corridor and take advantage of opportunities for additional train consolidation that would reduce railroad operating costs and community grade crossing delays. Eastbound SP trains are sized somewhat smaller and shorter than the eastbound UP trains and this may suggest some incremental eastbound capacity. Even a one train per day reduction in train movements can have a dramatic impact on grade crossing blockage if the train happens to be running in the heavy daylight traffic hours.

The timing and scheduling of the two yard cut movements (SP to CSX and NS, and CSX to SP) are typically somewhat easier to control over the Back Belt than are the timing and movement of long haul run-through trains whose arrival times can be erratic. Moreover, yard cuts, typically, are smaller, shorter trains and tend to create less crossing blockage than the longer run-through trains. Thus, if trains have to be run during daylight hours when grade crossing traffic is highest, then scheduling a shorter, yard cut in lieu of a longer run-through train, and deferring the remaining cars to a late-night train, would produce a reduction in grade crossing blockage. An even more attractive alternative would be to combine the yard cut with another train moving across the Back Belt at night (8:00 PM or later), so that daytime trains are minimized.

UP and IC reroute/divert trains and rail traffic through Livonia Yard and Baton Rouge and other Mississippi River - east/west gateways. Rail mergers and acquisitions will make some movements through other gateways attractive and lead to traffic diversion and train consolidation. There are a number of potential future carrier combinations that could have the effect of diverting Back Belt movements to other Mississippi River Gateways and which could also lead to further train consolidation and improved scheduling.

UP's acquisition of SP is but one example. Two years ago, IC's proposed acquisition of KCS, if achieved, would have reduced the movements of trains over the Back Belt, as all westbound traffic could have been interchanged at IC's Mays Yard rather than KCS's West Yard thus eliminating the stopping and interchange of trains at LaBarre Road. While both railroads indicate there is very little chance that the two carriers would reconsider such an alliance, and indeed there are residual strong feelings which could obstruct the development of any new initiatives, this combination illustrates how such mergers can lead to operating improvements that effectively reduce train stoppage and delays and thus benefit the local community.

Two types of consolidations offer the prospect for reducing traffic volumes through the New Orleans Gateway over the long term. The first is the acquisition, merger, sale, or consolidation of operating control of either KCS or IC by one of the major western or eastern railroads. For some traffic movements, such a consolidation would reduce circuity and result in traffic diversion to the KCS gateway at Shreveport and IC's Gateway at Baton Rouge. In this scenario, the long haul, highest revenue division route would no longer be through New Orleans but rather to Dallas, Houston, Galveston, and Birmingham in the case of KCS and to Mobile and Baton Rouge in the case of IC. Acquisition of either of these two roads by one of the major eastern and western railroads would be categorized as a major market extension.

The second type of consolidation involves the establishment of a transcontinental railroad that would link one of the major western carriers with one of the eastern railroads. The prospects for this happening at some future point are excellent.

The difficulty in estimating potential traffic diversion to other gateways comes with the number of possible combinations and partial combinations that could result. It is not simply a matter of "selecting" which mergers have the highest probability of happening. There is also the necessity of considering what types of protective conditions (trackage rights) might be prescribed by the STB to preserve intramodal (railroad to railroad) competition.

Shipper groups can and do wield considerable political clout, thereby increasing the chances that any future transcontinental mergers would likely have multiple outcomes (network configurations). The current uncertainty of UP's acquisition of SP illustrates the potential complexity of the final outcome of any such effort. In exploring the potential for a future transcontinental railroad formation, the combinations shown in Table 5.2 were considered possible.

The acquisition, merger, sale or combination of KCS with any of the other major western or eastern carriers would likely have a somewhat greater potential to divert traffic away from the New Orleans - Back Belt Gateway than other possible combinations. Indeed, conversations with senior KCS operations personnel confirm that they are working actively to improve their participation in east-west traffic flows, particularly in the Texas to Birmingham and Atlanta corridor by reducing delays that occur in transiting Vicksburg. They are developing a by-pass or run around of the central city congestion to reduce over all transit times.

The history of the railroad industry for the last fifty years has been one of merger and consolidation with the paramount justification being the reduction of costs and improvement of service, and the unstated objective, the elimination/reduction of railroad competition. The Mississippi River was the north-south boundary line across which proposed mergers did not cross. For the last twenty years, railroad experts have said that it is only a matter of time before the first twentieth century transcontinental railroads are established. Frankly, we see the initiatives to

Table 5.2: Possible Future Railroad Mergers and Combinations: Diversion Of New Orleans Gateway Back Belt-Metairie Traffic to Mississippi River Gateway

	West	Central	East	Type	Probability	Baton Rouge	Vicksburg	Memphis	St. Louis
1.	UP/SP		CSX	Transcon-tinental	good			X	
2.	UP/SP	KCS		Market Extension	low		X		
3.	UP/SP	ICG	CSX	Transcon-tinental	low	X			
4.	UP/SP	KCS	CSX	Transcon-tinental	low		X	X	
5.	UP/SP	ICG		Mkt. Extension	low	X		X	
6.	UP/SP		NS	Transcon-tinental	moderate			X	
7.	UP/SP	KCS	NS	Transcon-tinental	low		X		
8.	UP/SP	ICG	NS	Transcon-tinental	low	X			
9.	UP/SP		Conrail	Transcon-tinental	low				X
10.	BN/ ATSF		CSX	Transcon-tinental	low			X	
11.	BN/ ATSF	KCS		Mkt. Extension	low		X		
12.	BN/ ATSF	ICG	CSX	Transcon-tinental	low			X	
13.	BN/ ATSF	KCS	CSX	Transcon-tinental	very low		X		
14.	BN/ ATSF	ICG		Mkt. Extension	very low			X	
15.	BN/ ATSF		NS	Transcon-tinental	moderate			X	
16.	BN/ ATSF	KCS	NS	Transcon-tinental	low		X		
17.	BN/ ATSF	ICG	NS	Transcon-tinental	very low			X	
18.	BN/ ATSF		Conrail	Transcon-tinental	low				X + **Chicago**
19.		IC	CSX	Mkt. Extension	low			X	
20.		IC	NS	Mkt. extension	moderate			X	
21.		IC	Conrail	Mkt. Extension	very low			X	
22.		KCS	CSX	Mkt. Extension	very low		X		
23.		KCS	NS	Mkt. Extension	moderate		X		

establish such coast to coast rail systems coming within the next five years, the amount of time it will take for the western carriers to thoroughly digest their most recent acquisitions. They could come sooner if "panic" sets in, that panic being the fear of being left out of the surviving network.

Some of these mergers may produce more traffic diversion than others thus reducing the impacts of rail operations on Metairie. Mergers offer the potential for reducing the time it takes for trains to transit the New Orleans Gateway with better scheduling, and improved control and balancing of equipment (cars and locomotives), and utilization of operating crews and personnel. For the local community, the prospects of future railroad mergers holds real benefits. On the other hand, the size of the resulting railroads may tend to diminish the impact that any local community could have on a mega-railroad. Thus, if Metairie and Jefferson Parish ever hope to improve their situation, they must take action now as it will likely become even more difficult to influence the railroads who have been gaining financial strength and real economic power over the last ten years.

5.1.1.2 Decrease Train Transit Time Through the Corridor

Train transit times through the Metairie corridor could be reduced by revising crew/interchange points and by upgrading and improving the track structure to allow trains to run at the allowable operating speed of 20 mph. For example, shallower turnouts in Metairie must be built and improvements to the East Bridge Junction and the Metairie crossover, discussed in Section

5.1.9.2, below, must be made. While the FRA mandated speed limit over the Metairie tracks is 20 mph, trains are currently moving through the corridor at an average speed of 12 mph. Eastbound trains can move at 10 mph through the IC crossover, and at 20 mph once they clear the 17th Street Canal. UP, SP, and NS trains generally move through this track section in 20 minutes, whereas CSX crews, which are yard crews, take 25 to 30 minutes.

Overall, costs for the carriers should be lower. However, the biggest issue here would be negotiating the complex set of operating rules, technical constraints, and juggling of demands from the various railroads. Enforcement of existing ordinances against trains delaying highway traffic at a crossing could be used as an incentive to bring about improvements; Section 5.1.4 further discusses this topic.

5.1.1.3 Eliminate Train Stoppage in the Metairie Corridor

This solution requires eliminating westbound train stoppage for crew interchanges at Central Avenue which ties the East Bridge Junction interlocking/tracks up completely. CSX and NS do not move westbound trains being interchanged to UP and SP over the Huey P. Long Bridge, but instead change crews and effect an interchange at Central Avenue. Interchanging at this location means that westbound trains are typically lying across the Shrewsbury Avenue and LaBarre Road grade crossings and are blocking the IC's north-south corridor. Crews must make locomotive and brake checks at this time and should, as regularly happens, the engines and or train fail these checks, the train is held blocking the interlocking completely until the problems are corrected. There is wide agreement that changing the crew interchange point is one critically important step to freeing up the East Bridge Junction blockage and thus eliminating train stoppage. This will also reduce grade crossing blockage by speeding up train movements and eliminating the additional blockage at Shrewsbury and LaBarre Roads.

Another problem that emerges during crew interchanges at Central Avenue is the failure to arrange hazardous materials cars in the train to insure that there is an adequate number of cars between the locomotives and crew and the potentially dangerous cars. Trains being made up or passed through Gentilly should be inspected to insure that this rule is not violated because failure to catch this means that the trains are then held at Central Avenue until the proper car separation is effected, thus blocking the entire East Bridge Junction interlocking and stopping train movement through Metairie.

A frequent problem delaying movements over the Huey P. Long Bridge, which in turn stops and/or slows trains moving through the Metairie rail corridor, is dispatching trains with inadequate power to get over the Bridge's 1.2 percent grade. Trains stall out on the Bridge shutting down movement and blocking the corridor. However, except for emergency situations where a locomotive occasionally develops difficulties after leaving the yard, this should not happen. Nevertheless, according to the IC tower operator, it is a regular occurrence.

KCS and CSX and KCS and NS also need to reestablish, somewhere outside of the Metairie area, the mutual blocking of trains being interchanged. This would eliminate the need for train movements into KCS's West Side Yard and for interchanging trains in Metairie between LaBarre Road and Atherton. For example, two years ago, KCS was blocking their CSX train in Baton Rouge and Shreveport, making up a Florida block, an Atlanta block, and a local New Orleans block. This saved CSX from having to switch the train at Gentilly and, more importantly, allowed for KCS crews to run through Metairie directly to Gentilly without stopping. Similarly, CSX was blocking a westbound train for KCS which allowed for a direct run-through to Baton Rouge. Appendix O provides additional information concerning the relocation of the KCS interchange.

5.1.1.4 Revise Train Schedules to Avoid Rush Hours

Schedule changes and the establishment of yard to yard interchanges, coupled with double tracking at East Bridge Junction, described in Section 5.1.9.2, below, offer the prospect of significantly reducing grade crossing blockages and grade crossing accident potentials. There is, at present, no master train schedule governing train operating movements over the Back Belt.

5.1.2 Improve Grade Crossing Protection as a Possible Alternative to Sounding Train Horns

The existing train horn sounding ban can likely be maintained by meeting forthcoming FRA criteria for supplemental safety measures. Options warranting consideration could include installation of four-quadrant gates at Metairie Road, implementing automated photo enforcement at one or more crossings (e.g., Metairie and LaBarre), use of median barriers or traffic separators at one or more crossings with existing gates (requiring reconfiguration of approaches and potentially affecting traffic patterns), and conversion of Farnham-West Oakridge and Hollywood-Atherton to two one-way paired streets coupled with longer gate arms at each crossing. Crossings with lower traffic volumes might be closed with traffic directed to crossings with full gate protection. Specific measures responsive to rules not yet proposed are not within the scope of this report, but it appears likely that several alternatives will be available to the community.

Further, on another matter also affecting traffic flow patterns, when the traffic signal at Focis Road turns red and stops westbound traffic on Metairie Road, it creates a solid queue of cars that, during commuter rush hours, are backed up over the Metairie grade crossing. A similar queue is created for traffic moving southbound on LaBarre Road by the traffic light at Airline Highway and LaBarre. To remedy these accident-causing situations, the traffic signals at these intersections can be interconnected with, and preempted by, the grade crossing signals, thus always allowing the traffic queues on Metairie Road and LaBarre to dissipate when a train approaches. Another alternative for Focis Road would be to eliminate the traffic light completely.

5.1.3 Close and Grade Separate Grade Crossings

The construction of grade crossing separations using overpasses or underpasses at Metairie Road, LaBarre Road, and

Carrollton Avenue would improve safety and reduce grade crossing delays. Closure of smaller grade crossings with low volumes of vehicle traffic would also improve safety and eliminate delays, provided the traffic does not cross the tracks at one of the remaining crossings or take an alternate but longer route to complete the trip. Parish and regional highway construction and improvements, traffic management programs, and transit services which reduce the traffic/vehicle volumes moving across Metairie grade crossings would further help to improve the situation.

5.1.4 Examine Present Economic Incentives for Railroad Cooperation

On September 3, 1970 Jefferson Parish established Ordinance Number 9782, a five minute grade crossing blockage ordinance, to provide an additional economic incentive for the railroads to minimize grade crossing blockage. (This ordinance is now contained in section 28.1 of the Jefferson Parish code.) A review of past actions taken by the community and the railroad industry to mitigate the impact of railroad operations on the local community since that time, shows that progress has been made in reducing impacts; see Appendix A - 100 Year History. While the actions taken did not result in the complete removal of the Back Belt from Metairie, they did reduce grade crossing blockage, improve warning and protection devices, remove temporary storage of hazardous materials on Long Siding, and eliminate horn sounding at each crossing.

The crossing blocking ordinance was initially challenged in the U.S. District Court for Eastern Louisiana by the NOT, but the court held that the ordinance was legal. The NOT appealed the decision, but the United States Supreme Court refused to hear the case, in effect establishing the legality of the ordinance by allowing the District Court's decision to remain unreversed.

The ordinance states that trains may not stop and block grade crossings for more than five minutes. As long as a train is moving slowly, there is no violation. At one time, the local sheriff's office cited the railroads for violating this ordinance and citizens were instructed how to identify the engine numbers and railroad markings. Video cameras were installed at grade crossings to videotape the offending locomotives and identify which railroad was violating the ordinance. However, today there is no effective law enforcement and no fines are being levied for violations of the ordinance. The local sheriff, whose constituency encompasses a broad area of the East and West Bank of Jefferson Parish, is focusing law enforcement efforts on the reduction and control of crime, drug and alcohol abuse, and gambling. There is no concerted effort on the part of Metairie residents to have the Sheriff's Office enforce the grade crossing blockage ordinance.

Currently, a violation of the parish ordinance is classified as a misdemeanor which carries a maximum penalty of $500 or six months in jail. The Jefferson Parish Assistant District Attorney believes that the lack of enforcement of this ordinance by the Sheriff's Office is, in part, a reflection of the fact that the electorate is more interested in seeing other, more serious, problems addressed and, from a purely administrative cost standpoint, diversion of law enforcement time, attention, and resources to penalizing the railroads, may not serve the best interests of the community. It was also noted that in past cases the judges were often sympathetic to the railroad's situation and ruled in their favor. Bringing a railroad engineer into court and fining or threatening to put him in jail failed to solve the problem in the minds of many residents.

The Assistant District Attorney also pointed out that there is no provision for escalation of fines for multiple offenses, which, if passed, might have a more significant impact on the railroads and perhaps prompt greater attention to reducing these impacts. According to the Assistant District Attorney, Jefferson Parish cannot pass any ordinance that would make grade crossing blockage a felony, and went on to say that there would be no problem getting the District Attorney to prosecute the railroads, but that this could only happen if, and when, the sheriff enforced the ordinance and began citing the railroads.

Metairie and Jefferson Parish voters would have to stress the importance of the issue to reorder the sheriff's priorities and thus reinstate enforcement of the ordinance. As part of such efforts, the community could conduct or sponsor legal research to determine whether or not stronger cumulative penalties are legal as well as examine other avenues for increasing economic incentives.

The current situation is unlikely to change without strong action by the residents. Given the willingness and evidence that the railroads are, in fact, making efforts to improve the situation, and the fact that changes in the timing and scheduling of trains have reduced grade crossing blockage, the community must decide whether these improvements are significant enough to remove the necessity for further economic incentives.

5.1.5 Construct the Carrollton Curve

This long term solution would establish a new grade separated right of way for all future freight train movement through the New Orleans Gateway. Eastbound trains routed from the Huey P. Long Bridge NOPB tracks, and arriving at the East Bridge Junction from the west and midwest, would be routed east via the north and southbound mains of IC's right of way which parallel the Earhart Expressway. They would then continue on from Southport Junction via the NOUPT tracks, which would then curve northward underneath the Carrollton Avenue I-10 interchange and then run via NOUPT's corridor paralleling I-10 on the east side of the highway to reconnect with the NS tracks past the cemeteries (see Appendix M). Jefferson Parish and Metairie residents have favored this relocation solution for over forty years.

Construction of a new ground level track connection underneath the Carrollton interchange is blocked by the interchange ramps. Thus, implementing this relocation alternative would require the elevation, relocation, and reconstruction of eight of the Carrollton Interchange highway ramps, the extension of the western elevated portion of the Airline Highway railroad overpass, the construction of a 8.75 degree curved single track underneath the Carrollton Interchange, and the elevation of two Palmetto Avenue overpasses that lie on the western approach to this interchange. Construction costs are estimated at $57 million (see Section 6.1.1

and Appendix M for a description of these costs). In addition, the support and approval of Orleans Parish for rebuilding the interchange will be necessary as will the establishment of a new operating agreement for NOUPT, which will allow freight train movement through a portion of its rail corridor.

NS would need to acquire trackage rights over the IC and NOUPT tracks to allow it to preserve the control and profitability of handling movements from Shrewsbury Junction to their main line junction. The trackage rights fees or other considerations that IC and NOUPT would be entitled to would have to be reasonably priced. Increases in railroad operating costs for moving the additional 1.2 miles via the Carrollton Interchange would be balanced by savings in grade crossing maintenance expenses, reduction of accident costs and liabilities, and the potential value of selling and/or developing this property.

5.1.6 Relocate the Rail Corridor to North of Lake Pontchartrain

This alternative would use IC railroad tracks as a link and would require the construction of a new rail corridor line north of Lake Pontchartrain, rerouting all east-west through traffic via the Baton Rouge-Mississippi River bridge. Eastbound trains arriving in the region via this bridge would move east to Hammond over IC's existing line. At Hammond, there are four alternative routings considered for extending further eastward to reconnect with the NS and CSX tracks (see maps in Appendix N). The four routings include:

- In the Mid St. Tammany Parish corridor, constructing a new rail link from Hammond to Talisheek to Slidell, and then southeast to Ansley, MS using the I-12/I-10 corridor.
- In the Mid St. Tammany Parish corridor, constructing a new rail link from Hammond to Talisheek to Slidell, then northeast to Nicholson, MS using the NS bridges to cross the Pearl River, and then southeast past the NASA Stennis Facility (on either the east or west side) to Ansley, MS.
- Routing trains north from Hammond to Brookhaven and then turning east via the old Mississippi Central Railroad corridor to Hattiesburg for interchange with NS, and then via IC's line on to Mobile for interchange with CSX.
- In Washington Parish, constructing a new rail corridor across open space, connecting IC's line in Amite City (north of Hammond) with the NS line in Picayune, MS, then south to Nicholson, MS, and then to Ansley, MS past the NASA Stennis Facility.

These routes are depicted in Figure 5.1 and further discussed and costed in Section 6.1.2, below.

5.1.7 Construct a New Railroad Corridor South and East of New Orleans

Construction of a new Route 47/I-510 Mississippi rail/highway bridge would allow east-west rail traffic to bypass the central city and move through Orleans and St. Bernard Parishes. This alternative would require the construction of a new Mississippi River bridge and a second equally high bridge over the Intracoastal Mississippi River Gulf Outlet Canal. Section 6.1.3, below, further describes this alternative.

5.1.8 Redirect Hazardous Materials Traffic To Other Gateways/Routes

Several important antecedent steps must be taken before the hazardous rail traffic now moving through New Orleans and Jefferson Parish can be redirected. A risk analysis of alternative routings for the east-west rail movement of hazardous materials through four

Figure 5.1: North of Lake Pontchartrain Relocation Alternatives

other Mississippi river Gateways (Memphis, Vicksburg, Baton Rouge, and St. Louis) should be performed to determine whether a policy of proscribing rail routes for hazardous materials movement would reduce risks and accident exposures and thus improve rail safety. If the results of this analysis demonstrate that overall rail safety is improved by rerouting shipments of hazardous materials, then FRA would be in the position to exercise its authority to proscribe certain routes. FRA could encourage or invite individual states to analyze alternative rail routings for hazardous materials and recommend candidate routes which would reduce population exposures and accident risks, or exercise it's authority directly. Alternatively, FRA can examine regulatory, administrative, and economic approaches that could be used to promote rail safety (e.g., FHWA has developed and implemented guidelines for states proscribing hazardous materials truck routes, and a similar approach could be taken by FRA). These issues are further discussed in Section 6.3, below.

5.1.9 Utilize the New Orleans Public Belt (NOPB) Railroad Corridor

This section discusses several issues involving NOPB and use of its corridor (described first in Section 2.9.8, above), including the river front route, the East Bridge Junction, creation of a terminal switching carrier, and maintenance on the Huey P. Long Bridge.

5.1.9.1 Reinstitute the River Front Route Alternative

Prior to the World's Fair held in New Orleans in 1984, UP ran four to five trains per day over the river front route of NOPB. In response to a petition from various community interests concerned for the safety of pedestrians and visitors attending the World's Fair, UP and NS agreed to allow UP to move its trains over the Back Belt. This had the effect of eliminating through train traffic during the World's Fair. However, it immediately increased the train traffic through Metairie and the resulting grade crossing delays. Some residents of Metairie believed that the arrangement was a temporary one and that this UP traffic would or should have reverted to the river front route at the conclusion of the World's Fair. The fact that this additional train traffic has continued to move through Metairie has been a sore point with the community ever since. Our study and, indeed, prior investigations have shown that there was never any formal agreement made by the railroads to return the traffic to the river front route. It was learned that UP had petitioned NS to run over the Back Belt prior to the World's Fair and, thus, the Fair provided an opportunity for UP to use the shorter, faster route.

The river front route is approximately 10 ten miles longer than the Back Belt since the tracks parallel the Mississippi Waterfront in a 10 mile loop. Train speeds are reduced to 10 MPH for safety purposes as there are many grade crossings and track conditions over portions of the eastern tracks that cannot support higher running speeds.

Prior studies have found that the circuity of the river front route and the grade crossing safety issues made this alternative unattractive to the railroads and to Orleans Parish. The concept of running trains through the heart of the Vieux Carre and the most heavily visited portions of the waterfront area is unattractive to the many business and political interests that view tourism and the convention business as a major industry and source of jobs, income, and revenue for the City of New Orleans. Several years ago, a valve was opened on a tank car of LPNG that was parked on the NOPB track and portions of the French Quarter had to be evacuated. Fortunately, the car never blew up or caught fire. However, the specter of a hazardous materials fire, explosion, or chemical release in this area, and the resultant permanent damage to the City's world class tourist image, is a great concern for those who must balance political and economic interests.

At the inception of this study, the question naturally arose as to whether this alternative should be considered at all, given its apparent lack of cost effectiveness and the obvious safety issues involved. Instead of treating the river front route of NOPB as a complete relocation alternative (that is, a rail corridor capable of handling 25 trains per day), it was instead considered as a potential route to divert a portion of the Back Belt traffic. By reducing the number of trains moving over the Back Belt, it was postulated that the reduction would make the scheduling and timing of the movements of the remaining trains across the Back Belt more manageable. The obvious question was whether UP trains could (or would) return to moving via the river front route as they had done up until the World's Fair. This initial scenario was further defined by the assumption that the trains being diverted would not run during daylight hours, but rather between 2:30 AM and 6 AM, a time when tourist, pedestrian, and automobile traffic near the NOPB would be minimal. In several of our focus group sessions, participants pointed out that some Bourbon Street and other downtown attractions never close completely, especially during Mardi Gras. However, there was general concurrence that movement of trains during these hours would be minimally disruptive.

Indeed, as the study progressed, it was clear that the in-place alternative of scheduling trains over the Back Belt to avoid the heaviest rush hour movements would clearly be cost-effective, and that any reduction in the number of trains moving over the Back Belt that could be achieved by using the river front route would make this alternative something truly practical. Meeting with NOPB officials confirmed their interest in this alternative, especially since such movements offer the prospect of increasing NOPB revenues which have been declining for some years due to traffic losses.

A "high rail trip" across the entire NOPB river front route showed that along the majority of the route there were wharves, commercial warehouse buildings, sea walls, and other separation between the tracks and residential areas. A complete photographic record of NOPB's tracks was made illustrating that the river front route, as a whole, is a viable alternative given that there is a separation between residents and the tracks. However, there are at least three places where the tracks run close to houses and an apartment building where residents living in these areas would be exposed to rail operations.

Other than the circuity which clearly increases fuel consumption, locomotive operating hours, and crew costs, it is the large number of grade crossings, many of which are unprotected, that creates the biggest problem. By virtue of the Swift Railroad Development Act's provisions, train movement via the NOPB river front route would require locomotive engineers to sound their horn at every grade crossing that does not meet FRA's criteria for a horn sounding exemption -- at present, that includes all of these crossings. So, in order for trains moving to and from UP to be diverted to the NOPB river front route and move relatively quietly through the French Quarter in the middle of the night, NOPB would have to install and upgrade grade crossings protection equipment at all of their unprotected crossings. Closing some crossings or constructing grade separations are unlikely alternatives. Crossings currently equipped with flashing lights and gates would have to have another set of gates added to provide four quadrant protection, thus preventing drive around, and would have to have median barriers as well. Some street crossings could be converted to one way movements making it necessary to guard each lane with two gates to meet the FRA criteria and, thus, preserve a horn sounding ban. The capital expense associated with installing all of this grade crossing protection equipment is substantial and well beyond NOPB's typical capital budget. Any funding for the installation of additional grade crossing protection equipment would have to come from state, federal, or other public sources.

In short, it seems that only by insuring that freight trains could move through these sensitive tourist areas quietly and unobtrusively could the NOPB river front route ever be realistically considered as an alternative freight corridor for much or even some of the traffic. However, UP must also be willing to divert its trains to running via NOPB's longer, slower route. The reason UP might be willing to do this is because current operations through the East Bridge Junction are frequently delayed with the concomitant increase in switching crew time and costs, and rail car costs. NOPB has a track which directly accesses the Huey P. Long Bridge and, thus, UP could run all of its westbound traffic around the river front route and access the bridge directly even though the East Bridge Junction may be blocked. This increases the timeliness and reliability of these westbound movements, perhaps more than enough to offset the additional fuel and running time costs. Running traffic in both directions (eastbound as well as westbound) would require the installation of additional passing tracks and, even then, would probably lead to train holding delays.

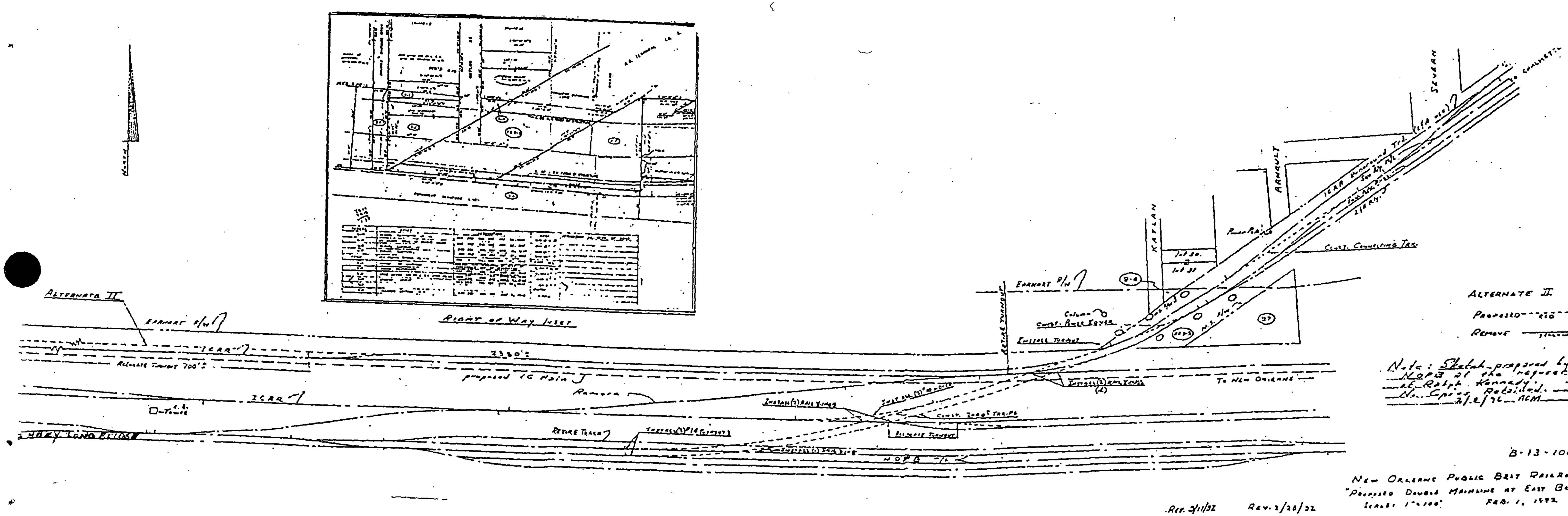
NOPB's trackage rights fees would also have to provide a savings relative to what NS is charging or, at least, be reasonably comparable. In sum, there is some incentive for UP to consider using the NOPB river front route. It should be pointed out that nothing can prevent east-west train movements from currently moving over the NOPB river front route. In fact, some track relocation, improvements, and upgrading have been on-going as part of the Tchoupitoulas Highway Corridor Project. Although some focus group participants had commented that through train movements via NOPB were prevented, this is not the case.

5.1.9.2 Improve the East Bridge Junction

NOPB has developed several track drawings showing a new double tracking alignment of tracks from the Huey P. Long Bridge to the Back Belt (see Figure 5.2). Under this plan, trains would move off of the Huey P. Long Bridge and remain on NOPB tracks moving eastward. Trains would then use a new two track crossover (to be built) crossing IC's tracks. NOPB would be helping to facilitate the elimination of the gauntlet effect that is created at the East Bridge Junction by two Huey P. Long Bridge tracks and the two Back Belt tracks funneling into a single crossover track. Double tracking the East Bridge Junction using the NOPB tracks would help reduce train delays and also allow for other improvements, such as the establishment of true yard to yard interchanges. This would eliminate the Central Avenue crew changes, and improve the dispatching, coordination, and/or establishment of a centralized train dispatching and control system for the entire New Orleans Gateway.

A variety of cost estimates for constructing the crossover have been put forth ranging from $300,000 to complete the crossover track work to $4,600,000 for the complete consolidation of the East Bridge, West Bridge, and Southport towers with new signaling and control circuits, switches, and possibly a new centralized control location. There has been limited progress made by the railroads in finding a solution to the delays caused by the East Bridge Junction

Figure 5.2: Proposed East Bridge Junction Double Tracking



over the last several years. The costs of installing a second crossover track and making other capital investments required to provide new signaling, switches, and controls requires a formula for prorating these costs to individual railroads based on some measure of the respective benefits to each railroad. Simply dividing the total costs for these capital improvements by seven railroads clearly works to the advantage of some of the larger carriers and to the disadvantage of the smaller volume railroads.

Some railroads may be reluctant to invest in major capital improvements at the East Bridge Junction when they are not certain if NS or IC will dispatch trains either on a first-come, first-served basis or following an unbiased pre-arranged and agreed to schedule of departure and arrival times. CSX and UP would be reluctant to make a major investment in double tracking through the East Bridge Junction if their trains are simply going to be held up by NS and IC dispatchers.

The rail carriers operating in the New Orleans Gateway need to come to general agreement about the necessity for eliminating the delays and bottlenecks at the East Bridge Junction which, in turn, increases the impacts of rail operations on the local community. They also need to arrive at a consensus concerning the other issues raised by this study that affect the operating efficiency and safety of the entire New Orleans Gateway.

There is potentially a role for an independent third party facilitator here to effect a solution to these problems. Its involvement would be warranted given the high volume of interstate traffic moving through the New Orleans Gateway and the fact that the railroads have not been able to produce the compromise solutions that benefit the industry and address the community's needs. As mentioned elsewhere in this report, the *Louisiana Statewide Intermodal Plan* (LSU, 1995), has identified the East Bridge Junction as its greatest rail bottleneck.

Thus, an independent third party could well act as a catalyst in the establishment and formation of a railroad industry technical committee consisting of senior officers from each railroad, to oversee the creation of an implementation program, the objectives of which would be the development of an agreement and plan for prorating costs and benefits. This committee could also oversee the development of an action plan and benchmark schedule for implementation of the committee's recommendations.

5.1.9.3 Create a Terminal Switching Carrier

In the event that the rail industry cannot agree to a course of action, or do not agree to establish a new program designed to improve the Gateway efficiency and reduce the negative impacts of rail operations on the local community, consideration could be given to establishing a new terminal switching carrier. As has been discussed elsewhere in this report, a terminal switching carrier has been the historical solution to the problems of interchanging cars and trains in all of the other Mississippi River Gateways. Such a carrier could control and dispatch local train movements and establish operating schedules that shift train operations to night time hours and periods of lower highway traffic volumes, thus reducing impacts on the local community. The terminal switching carrier would establish train movement priorities and work with each of the carrier's operations scheduling groups to develop win-win schedules and operating improvements (such as the double tracking of the East Bridge Junction).

NOPB has expressed an interest in becoming the terminal switching carrier for the Gateway, a role which would be consistent with language in the Louisiana Constitution establishing NOPB (see Section 2.9.8, above). IC, too, has expressed an interest in this idea. Whether or not any of the existing carriers could function in this role, or whether or not the terminal switching carrier should be jointly owned and controlled by all of the carriers, are issues that are most appropriately addressed in a separate study. That is, because there are numerous issues involved and a variety of ways in which the terminal switching carrier could be set up, the railroad industry and local community could consider sponsoring a separate study examining the potential costs and benefits and focusing on the "how to do it" alternatives for establishing such a carrier. Again, this action would become useful in the event that the railroads operating in the Gateway are unwilling or unable to reach a solution on their own initiative.

5.1.9.4 Improve the Huey P. Long Bridge Maintenance Schedules

Any discussion of NOPB inevitably results in a discussion of their ownership and maintenance of the Huey P. Long Bridge, the longest and highest steel railroad bridge in the United States. NOPB track and bridge maintenance personnel work on the bridge during the first shift (7 AM to 3 PM) and their mobile equipment requires that one of the two tracks be removed from service. At times, as many as three motorized self-contained work-cart trains used for sand blasting, painting, tie replacement, and girder, bolt, and plate replacements and repairs, may occupy one track. With the exception of NOPB, all of the railroads complained to the project team that the loss of one track during daylight hours has created delays and forced some trains to wait until the second shift to move. In response, NOPB has commented that:

- NOPB can and does remove its bridge maintenance personnel on the request of the individual railroads to make both of the bridge tracks available for any emergency or priority train movement. Thus, any train that absolutely has to move, can move. Naturally, these emergency movements would require NOPB to reschedule bridge maintenance personnel, and these occasions are, presumably, unusual and infrequent.

- Complaints about the loss of a track due to its being occupied by NOPB track and bridge maintenance personnel have, historically, been a convenient crutch for railroad personnel to use to explain operating delays.

The question has naturally been raised concerning the possibility of changing the bridge maintenance schedule from a five day per week, eight hours per day basis to a four day per week, ten hours per day basis. Modjeski and Masters Inc., consulting engineers to NOPB, indicated in a May 11, 1995 report on the bridge maintenance program that a four day per week schedule for on-track work could be established with a fifth day allotted to other non-track maintenance activities. They further raised the possibility of a four day, ten hours per day program during the summer and also considered the possibility of reducing on-track maintenance work to a three day program. They concluded that there are not enough other activities to occupy the maintenance personnel when off the track.

The desire to keep the NOPB bridge maintenance personnel fully employed is an understandable goal of NOPB. Nevertheless, it has the resulting effect of reducing bridge track time and availability which, in turn, contributes to the complication of train scheduling and train movement. However, the loss of operating flexibility for moving trains through Metairie is by no means entirely, or even preponderantly, attributable to NOPB's maintenance policies. There are many other factors affecting the problem as well, although NOPB's maintenance policies do contribute to the problem.

Therefore, UP, which pays the bulk of the railroad bill for the HPL bridge maintenance, and NOPB, could explore the costs and potential feasibility of retaining a bridge maintenance contractor to complete on-track maintenance services on a three day per week basis, with the slowest days of the week (i.e., when the fewest trains are using the bridge) being selected for this work to be performed. There are numerous highly qualified firms around the country, including some local New Orleans steel fabricators, that may be interested in performing this work. Most of the shipyards, as an example, have the necessary steel cutting equipment to fabricate bridge structural components. Contracting this work out to a third party contractor could be done gradually and a variety of actions can be taken by NOPB to eliminate any hardship on existing personnel. The question of the willingness of the City of New Orleans and the Public Belt Rail Commission to sell the bridge to UP and/or the state was not addressed in this study.

5.2 Alternative Land Uses in the Metairie Rail Corridor

If all railroad train movements would be relocated to an alternative corridor, NS would have the option of salvaging the rail, ballast, and ties and grade crossing equipment. Depending on the exact terms of the original deed or property easements, NS and/or other property owners to whom this property might revert could either sell or lease corridor property for residential real estate development or else develop the properties themselves. Property in Metairie is currently valued at $100 to $140 per square foot.

Alternative land uses for this corridor considered in prior studies included the construction of a road, bike trail, or park. Prior studies which included surveys of residents' attitudes have shown that such uses would be disapproved and contested by the local property owners. Owners fear these uses would increase the movement of non-residents through their neighborhoods which might, in turn, lead to an increase in crime, an important issue to Metairie residents. Any alternative uses that would improve the neighborhood and increase resident property values would likely be a more acceptable choice. This might include such activities as the construction of single family luxury homes, town homes,and apartments.

Property sales to adjacent home owners are also a possibility though less likely to maximize the development potential of the land. Any corridor land used for real estate development purposes would add to Jefferson Parish's taxable land base and thus would theoretically increase Jefferson Parish's real estate tax revenues.

Removal of the corridor would allow for the construction of 117 to 118 additional single family homes from LaBarre Road to Orpheum, based on an informal street survey and assumptions made concerning street extensions (see Appendix P for details). With an average lot price of $130,000 and an average price of $250,000 for a home and a lot, the market value of the Back Belt corridor property would be $15,210,000 based on potential lot sales and $29,250,000 based on these estimated home values. Construction of smaller town homes and luxury apartments would increase the numbers of new units that could be constructed and would thus produce higher estimates of the corridor's sales value.

Another choice which may be favored by some residents would be to simply allow the land to remain vacant, thereby adding to the Parish's open space. However, given the substantial property value of this land, it is difficult to imagine it remaining completely undeveloped.

6.0 COST BENEFIT ANALYSIS

This chapter presents the costs and benefits associated with the short and long range solutions described in Chapter 5.0. The costs consist primarily of engineering and construction costs required to implement each of the alternative solutions. The benefits to be derived from these alternative solutions consist primarily of reductions in the highway user impacts resulting from the train blockage and vehicle slowing caused at the eight railroad grade crossings over the Back Belt. Other benefits that can be expected include a reduction in the amount of (and/or the risk associated with) the transport of hazardous materials travelling over the Back Belt, as well as a reduction in railroad/highway accidents in the Metairie community. These topics are discussed in the sections below.

6.1 Engineering and Construction Costs For Alternative Relocation Solutions

The implementation of the alternative relocation solutions described in the previous chapter will require one or more of the following: the acquisition of rights of way; the construction of new railroad track and/or railroad bridges; and the construction and/or modification of highway interchanges and/or highway bridges. This section describes the engineering and construction costs associated with the Carrollton Curve alternative, several alternatives for rerouting trains north of Lake Pontchartrain, and a new Mississippi River bridge alternative to the east of the City of New Orleans. Most of the in-place alternatives described in the previous chapter have relatively modest engineering and construction costs.[1]

6.1.1 Carrollton Curve Relocation Alternative

The construction of the Carrollton Curve will require a new section of track to be built connecting the NS tracks with the IC mainline tracks using the NOUPT corridor. The work will also require the dismantling, demolishing, and removal of certain portions of the existing I-10 interchange ramps to allow clearance for a new ground level rail corridor. Below is an illustration of the work which would need to be done including a cost estimate[2]:

No.	Work Item	Estimated Cost (1995 Dollars)
1.	Carrollton Interchange Structures and Roadways:	
	Ramp "A"	$ 5,550,000
	Ramp "B"	3,100,000
	Ramp "D"	5,475,000
	Ramp "E"	3,525,000
	Ramp "J"	3,200,000
	Ramp "M"	7,825,000
	Southbound Airline Ramp	3,000,000
	Airline Highway	7,640,000
	I-10 Overpass-Footing Revision and Crash Walls	$100,000
	SUBTOTAL	39,415,000

[1] The costs of constructing median barriers to allow the present horn sounding ban to remain in effect are described in Appendix B.

[2] Appendix M contains detailed drawings of this work as well as a description of several other important assumptions that affect these construction cost estimates.

No.	Work Item	Estimated Cost (1995 Dollars)
2.	Reconstruct Palmetto Street Overpass to Provide 23 Feet of Overhead Clearance	9,350,000
3.	Construct New Mainline Track connecting NS track with I.C. Mainline track, including bridge over the 17th Street Canal	2,300,000
4.	**TOTAL CONSTRUCTION COST**	51,065,000

Refinement and "fine-tuning" of these cost estimates would require a line and grade study and extensive field surveys which are all beyond the scope of this study. These probable costs include both structural and at grade construction, including removal of existing structures as well as an arbitrary allowance for temporary work and drainage, but do not include the cost of any rights-of-way as well as new track from the East Bridge Junction to the IC mainline. These and other unforeseen costs are estimated at about $5-$6 million, bringing the total construction cost of the Carrollton Curve interchange to approximately $57 million. The net present value (in 1996) of these construction costs is estimated at $48.4 million. These estimates assume a discount rate of seven percent[3] and a five year construction time period (1996-2000) where 5, 15, 30, 30, and 20 percent of the total costs are incurred in each of the five years, respectively.

6.1.2 North of Lake Pontchartrain Relocation Alternatives

A variety of alternative corridors for relocating rail movements north of Lake Pontchartrain have been considered (see

[3] This discount rate is the currently approved rate from the Office of Management and Budget (OMB).

Figure 5.1, above, and maps in Appendix N). The common assumption is that east-west traffic that is now moving through New Orleans and Metairie that crosses the Mississippi River on the Huey P. Long bridge would be diverted north to Baton Rouge and would cross over the rail bridge at that location (owned by the State of Louisiana).

The obvious **benefit** that all these "North of the Lake" relocation scenarios share is that they completely eliminate the negative impacts and costs of non-local (pass-through) rail operations on the local community of Metairie, as well as on the rest of Jefferson and all of Orleans Parishes. The most obvious **problem** with these scenarios is that their circuity increases railroad mileage and operating costs. The cost to construct these new corridors is also very large. Moreover, the negative impacts of relocated rail operations are transferred to the communities and parishes which these new corridors traverse.

A careful inspection of any map will illustrate that each new route must cross many roads, and, unless separated, these new grade crossings will slow down and delay any traffic on these highways and local roads. Every stream, river, and swamp must be bridged and the expense of driving long pilings in areas with no bed rock or solid bottom is considerable. The new roadbed must be cut through hills that cannot be easily circumnavigated, and dips in the terrain and low spots must be filled in to create a solid supporting embankment. Normally, the longer the route, the higher the construction and operating costs and the less cost effective the alternative becomes. The additional running mileage impacts short haul movements (less than 300 miles) the most.

As noted above, each relocation alternative transfers or shifts the negative impacts associated with railroad operations to a different population (e.g., residents of Baton Rouge or St. Tammany Parish versus residents of New Orleans). It is not clear, for example, whether the residents of Baton Rouge would welcome the idea of relocating train traffic from New Orleans to their community. Similarly, to construct a new railroad corridor through St. Tammany Parish would require a major change in the attitudes of most residents and the Parish administration and planners who have indicated that attempts to establish a new rail corridor would be opposed. Clearly, the impact of 25 trains per day moving through St. Tammany Parish would be significant. No matter what routing is selected, there would be a large number of grade crossings affected. The new route from Hammond to CSX would have a minimum of 51 highway grade crossings and the existing rail line from Baton Rouge to Hammond currently has over 50 grade crossings. Thus, the 25 trains per day that would be relocated to a new rail corridor running through the middle of St. Tammany Parish would create the potential for significant grade crossing delays and accidents at over 100 grade crossings. The construction of grade separations, which would eliminate these highway grade crossing delays, would be rather expensive.

In the section below, the most promising possibilities that were identified make maximum use of existing rail corridors and trackage. Each of these were analyzed and order of magnitude construction cost estimates were developed.

6.1.2.1 Mid St. Tammany Parish Corridor Description and Costing (Variant One: Use of the I-12/I-10 Corridor to Cross the Pearl River)

In this scenario, a new 67.108 mile single track rail corridor would be established. It would run from Hammond to Slidell to connect with the NS tracks and, then, on to Ansley, Mississippi to interconnect with CSX[4]. Portions of the route would make use of existing IC trackage. On the eastern end of the route, an industrial siding would be used to interconnect with CSX's main line, while the remainder of the corridor would consist of new track/roadway construction.

The existing IC line from Baton Rouge to Hammond would be used. From Hammond to North Slidell (a distance of 47.34 miles), a new track would be constructed. From Hammond, a new 30.56 mile single track, with passing sidings, would be constructed eastward to Talisheek to connect up with IC's abandoned rail corridor running from Talisheek to Slidell (the proposed junction point would be just south of Talisheek). The alignment of this new corridor would be slightly to the north of the most rapidly developing suburban areas of St. Tammany Parish[5]. At Talisheek,

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[4] It should be pointed out that the former Illinois Central line from Hammond to Slidell could no longer be considered as a viable rail relocation corridor. The reason is that the abandoned sections of the corridor have been sold and redeveloped. In addition, a substantial portion of the former right-of-way has been dedicated to a bike trail. Efforts to repurchase and reestablish a new rail line over this former IC route will be strongly resisted by local residents and their political representatives.

[5] Selection of the track/corridor alignments were done using USGS topographic maps and Microsoft's Street Atlas program. Specific cost estimates (described below) would naturally be based

a new junction turnout switch would be constructed to allow trains to move south over the corridor to Slidell, another 16.78 miles, for interchange with NS.

The distance from North Slidell to the interconnection with CSX is an additional 19.768 miles; 17.719 miles would be new construction and 2.05 miles would consist of an existing industrial siding which could be used for the new rail corridor to shorten the amount of new track construction required. The total rail distance from Hammond to the CSX interconnect point near Ansley, Mississippi, as first stated, would amount to 67.108 miles.

Hammond to North Slidell Cost Estimates

To construct a new 100 foot wide rail corridor following this alignment (see map in Appendix N), a total of 161,357 lineal feet, or 16,135,700 square feet of land, or 370.42 acres, would need to be purchased for the new right of way. This includes room for two 2.5 miles passing tracks. Using a price of $15,000 per acre, the land acquisition costs are approximately $5,556,370. Grading the railroad road bed subgrade, installing parallel drainage ditches, and constructing a utility access road would require the bulldozing and grading of two to three yards of material/dirt per running foot of rail corridor. This would be done using conventional construction equipment consisting of bulldozers, pans, backhoes, dump trucks and graders. Given soil conditions and relatively flat

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on controlled ground surveys of the terrain, and detailed engineering analysis of topographic features, property ownership, environmental conditions and restraints, political conditions, construction requirements, and other applicable economic and cost factors, which are beyond the scope of this project.

terrain in St. Tammany Parish, no major cutting, filling, rock drilling or blasting would be required. Track construction from Hammond to Talisheek would cost $35,657,383 (at $190 per track foot) which includes an additional 26,400 feet for two 2.5 mile passing sidings in the Hammond to North Slidell track section. (This also assumes that 2-3 cubic yards per track foot of grading is needed with minimal drainage and that 130 to 132 pound continuous welded rail is installed, with a 24 inch minimum ballast section.) New track would also be constructed from Talisheek to Slidell, a distance of 16.87 miles, at a cost of $150 per track foot or $13,289,700.

It was assumed that the entire by-pass track would be equipped with Centralized Traffic Control (CTC) signaling which is estimated to cost $75,000/mile or $3,550,500 for the 47.34 miles and that the track would be tied into existing IC (or, alternately, NS and/or CSX) dispatching control centers. Electrical power for the intermediate signals would be provided by local electric utility lines at an estimated cost of $12,500 per running mile or $591,750 for the Hammond to North Slidell segment.

Other cost factors used in developing this estimate are:

Concrete Plank Roadway Crossings	$350 per track foot, or $10,000 for a typical 28 foot road
Crossing Protection (Bell or Gate)	$100,000 per crossing
Short span (15'-18') Bridges	$1,500 per track foot
River Crossings and Longer Spans	$2,200 per track foot
Swamps and Bogs (Piling Construction)	$2,200 to $2,600 depending on the depth of piles
Drainage Culverts	$800 for a 28 foot long by 36 inch wide corrugated pipe (installed).

In this Hammond to North Slidell segment, a total of 34 new grade crossings with crossbuck warning signs would have to be constructed at each of the country roads at a cost of $340,000. Grade crossing protection would be installed (either warning lights and/or gates) at eight of the 34 crossings (Route 1064, Turnpike Road-Main Street, Route 25, Route 437, Route 21, Allen Road, Money Hill Road, Route 435) at a cost of $800,000.

A total of twenty river, stream, creek and bog crossing bridges would need to be constructed on the Hammond to North Slidell segment. Bridges over creeks were estimated to average forty feet in length and river bridges were estimated to average 200 feet in length, with the exception of the bridge over the Tangipahoa River which was estimated to require a 400 foot long span. Bridge construction estimates are as follows:

No.	Description	Cost Factor	Estimated Cost (1995 Dollars)
1.	Skulls Creek	40 feet @ $1,500	$ 60,000
2.	Tangipahoa River	200 feet @ $2,200	440,000
3.	Chappepela Creek	40 feet @ $1,500	60,000
4.	Pollard Branch	40 feet @ $1,500	60,000
5.	Washley Creek	40 feet @ $1,500	60,000
6.	Little Creek	40 feet @ $1,500	60,000
7.	Unknown Creek	20 feet @ $1,500	30,000
8.	Baggage Creek	20 feet @ $1,500	30,000
9.	Tchefunete River	200 feet @ $2,200	440,000
10.	Small Creek - Tributary to the Tchefunete River	20 feet @ $1,500	30,000
11.	Horse Branch - to Lake Ramsey	40 feet @ $1,500	60,000

12.	Northeast Branch Running Into Lake Ramsey	40 feet @ $1,500	60,000
13.	Falaya River	200 feet @ $2,200	440,000
14.	Northeast Branch Running Into Falaya River	20 feet @ $1,500	30,000
15.	Venchy Branch	40 feet @ $1,500	60,000
16.	La Tice Branch Bog	100 feet @ $1,500	150,000
17.	Little Bogue of the Falaya	100 feet @ $1,500	150,000
18.	East Fork of the Falaya	40 feet @ $1,500	60,000
19.	Long Branch	40 feet @ $1,500	60,000
20.	Kimball Branch	40 feet @ $1,500	60,000
21.	Abitiva	40 feet @ $1,500	60,000
22.	**TOTAL BRIDGE COST**		2,460,000

Below is a summary of these construction cost estimates for the Hammond to North Slidell section:

No.	Description	Estimated Cost (1995 Dollars)
1.	Land Acquisition-Right of Way	$ 5,556,370
2.	Track Construction Hammond to Talisheek Talisheek to Slidell	 35,657,383 13,289,760
3.	Signal Construction	3,550,500
4.	Electrical Service	591,750
5.	CTC Switches-Turnouts (6)	1,200,000
6.	Grade Crossings	1,140,000
7.	Bridges	2,460,000
8.	**TOTAL COST**	62,519,643

North Slidell to Ansley Cost
Estimates Using the I-12/I-10 Corridor

In order to allow the full east-west interchange of cars and trains, track relocations north of Lake Pontchartrain must continue far enough east to allow for a reconnection with CSX. It is not simply enough to interchange and interconnect with NS because the majority of the east-west traffic moving through the New Orleans Gateway is either destined to or being received from CSX.

A new rail corridor would have to be constructed to facilitate the interconnection with CSX and it is this requirement that accounts for the major share of the construction costs for these North of the Lake alternatives. Unfortunately, there are no simple ways to effect this track interconnection. From an alignment and surveying standpoint, the most important issue is exactly where to cross the Pearl River Delta, that river whose eastern most branch forms the Louisiana-Mississippi border. This is a low wet swampy area lying to the east of Slidell on a north-south axis. All three branches of the River (the West, Middle, and East Branch) must be bridged. The ideal crossing location which minimizes the number of bridges that must be constructed is now taken by the interstate highway (I-10). Moving north or south of this point, automatically increases the extent of rivers and waterways that must be bridged..

This explains why constructing a new rail corridor from North Slidell using the median strip of Interstates 12 and 10 was initially viewed as a good idea. Utilization of the median right-of-way of this federal transportation corridor for the relocated railroad roadbed would, in theory, reduce property acquisition costs, lessen road bed grading costs, and minimize the new bridges that would have to be constructed across the Pearl River Delta. In other parts of the country, interstate freeway medians have been used for rail and transit purposes and recent federal legislation has encouraged greater use of these corridors. However in the course of analyzing the potential uses of this I-12/I-10 interstate highway corridor for relocating rail freight train movements, several significant problems were noted:

- A sufficient recovery/runout space must be provided adjacent to each interstate highway outside lane to allow for emergencies. Current FHWA highway design standards require that a 30 foot recovery zone/space be provided on either side of the highway roadway free of any permanent obstruction other than a frangible sign. To provide enough space for this recovery zone and the new rail road bed, the separation between opposing east-west lanes must be widened since the track supporting structure and fill for the elevated portions of the railroad would consume part of the median strip, thus reducing this recovery space.

- To relocate the railroad right-of-way to the I-12 median strip, 2,800 feet of the westbound lanes must be raised to allow the railroad to run underneath at ground level and still maintain a 23 foot vertical clearance (top of rail to bottom of bridge supports). The alternative of raising the entire railroad roadbed enough to allow the railroad to bridge over one highway lane and enter the median strip was rejected as being prohibitively expensive. Given the eight degree curve angle at which the railroad must cross into the median strip, 205 foot long steel beams will be needed to support the highway and span over the railroad roadbed. The deep steel beams raises the cost of the steel structure for the central span to $5,140 per foot of highway. Concrete reinforced girders would be used for the approach girders which, at $2,570 per lineal foot, are approximately half as expensive as the steel beams. Total costs for the 2,800 foot elevated I-12 roadway section amount to $9,870,000, which includes a 15 percent contingency. A similar overpass structure would be required just past the east branch of the Pearl River to allow the railroad to exit/leave the median strip.

To route the relocated rail corridor onto and off of I-12 will cost almost $20 million, a very expensive proposition. This expense could be reduced by utilizing a section of the interstate sufficiently elevated to allow a new railroad track to be built underneath. Unfortunately the I-12 elevated interchanges in the Slidell area not high enough to allow for this.

Consideration was given to running the railroad corridor immediately parallel to Interstate 12 on the north side. However, a road crossing, and the feeder ramps for the Route 11 and Route 59 interchanges, block this route. Running on the south side of I-12 causes similar problems and adds the expense of elevating the entire freeway to allow the new railroad corridor to cross underneath.

There were several alternatives for linking the IC tracks with the NS tracks in the Slidell area, which are located between .7 and 1.45 miles north of the current junction point. A map inspection suggests a new curved track linking the two railroads could be constructed so as to avoid local grade crossings. Whether or not these areas can truly be considered for this railroad to railroad track interconnection would require a ground inspection and controlled surveys of the area. However, the railroad right-of-way would have to cross under US Route 11 to intersect the NS tracks which run parallel to Route 11 on the eastern side. Thus, a 2,500 foot long grade separation and elevation of Route 11 would be necessary to allow the new railroad track to run underneath without grade crossing conflicts. The two alternative interconnections are illustrated in the maps in Appendix N. The curved track portions were shown at eight degrees. As both alternatives are in close proximity to residential areas, acquisition of additional residential property for the purposes of constructing this new corridor would have to be facilitated.

Then, the continuation of the new rail corridor eastward from Slidell would be effected using the I-10 median strip [or, alternately, by a more circuitous route that uses existing NS track, and NS's bridges and causeways which traverse the Pearl River Delta (this latter alternative is examined below in Section 6.1.2.2)].

With the relocated railroad right of way running in the I-12 median strip, to cross Route 11 and the NS right-of way at the intersection of I-12 and Route 11, the railroad roadbed must be elevated. To provide 30 feet of elevation will require 4,000 feet of gradient track on either side of Route 11. A portion of this graded roadbed would be constructed with fill and retaining walls, and the remainder built on concrete pillars designed to consume as little of the median space as possible. In order to maintain an adequate recovery zone width adjacent to the interstate roadway, 1,000 feet of the graded track corridor leading from the North Slidell track curve to the Route 11 overpass would be built using a filled cross section and retaining walls and the remaining 3,000 feet of elevated track would be constructed on concrete piers. A new 300 foot long rail bridge spanning Route 11 would be constructed in the median strip. Further east, the St. Joseph street overpass would have to be rebuilt and elevated to allow it to run over the higher (23 foot tall) rail corridor. The underpass piers would need to be repositioned to allow enough room for the rail corridor to pass between them.

The cost estimates for acquisition and construction from North Slidell to the CSX industrial track in Ansley (a distance of 19.768 miles), listed from west to east, are as follows:

No.	Distance	Description	Cost Factor	Estimated Cost (1995 Dollars)
1.	9.289 mi.	Land Acquisition Costs, East Branch of Pearl River Bridge to CSX near Ansley-49,051 feet x 50' wide corridor = 2,452,550 Sq. Ft. = 56.3 acres	$15,000/acre	$ 844,500
2.	2,500 ft.	Eight degree curved track at North Slidell, linking IC line with I-12 Median	$200/ft.	500,000
3.	2,800 ft.	Elevation of the westbound lane of I-12		9,870,000
4.	1,000 ft.	Filled elevated track section, N. Slidell to Rt. 11/I-12 Intersection	$300/ft.	300,000
5.	2,000 ft.	Elevated track section,on concrete piers and bents	$2,200/ft.	440,000
6.	300 ft.	Rail Bridge spanning Rt. 11, positioned in the median strip of I-12	$2,200/ft.	660,000
7.	3,500 ft.	Filled track section, Rt. 11 Interchange to I-12/I-59/I-10 Interchange	$300/ft.	1,050,000
8.	3,000 ft.	Rail Bridge-elevated section; crossing I-12/I-59/I-10 Interchange	$2,000/ft.	6,000,000
9.	2,154 ft.	Elevated filled track section, I-12/I-59/I-10 Intersection to Military Road	$300/ft.	646,200
10.	200 ft.	Rail Bridge over Military Highway	$2,500/ft.	500,000
11.	7,180 ft.	Track Section-Military Highway to West Branch Pearl River	$190/ft.	1,364,200
12.	300 ft.	Rail Bridge over West Branch of Pearl River	$2,500/ft.	750,000
13.	11,932 ft.	West Branch to Middle Branch Pearl River-piling required for swamp	$1,000/ft.	11,932,000
14.	300 ft.	Rail Bridge over Middle Branch of Pearl River	$2,500/ft.	750,000
15.	7,022 ft.	Elevated track section-on pilings Middle Branch to East Branch	$1,000/ft.	7,022,000
16.	250 ft.	Rail Bridge over East Br. Pearl River (drawbridge clearance of 55 ft. required, per Coast Guard)[6]		18,000,000

[6] Greg Taravella of Majeskie and Masters indicated that the Florida Avenue Bridge they are now designing and building will cost $35,000,000. It consists of a 300 foot long lift bridge which carries two railroad tracks (NS and NOPB) and two cantilevered highway lanes over the Industrial Canal. The bridge provides a 155 foot vertical clearance, per the U.S. Coast Guard requirements, for the channel (so the vertical towers are quite tall). Taravella indicated that lift bridges are typically used when spans exceed

No.	Distance	Description	Cost Factor	Estimated Cost (1995 Dollars)
17.	2,800 ft.	Elevation of the eastbound lane of I-12		9,870,000
18.	49,051 ft.	Track section: East Br. Bridge to Ansley Ind siding Interconnection	$250/ft.	12,262,750
19.	13,200 ft.	Passing Siding, near Ansley	$190/ft.	2,508,000
20.	100 ft.	Bridge over West Branches of Bogue Homa	$2,000/ft.	200,000
21.	100 ft.	Bridge over East Branches of Bogue Homa	$2,000/ft.	200,000
22.	50 ft.	Bridge over Mulatto Bayou	$1,500/ft.	75,000
23.	2,000 ft.	Raised Roadway - R16W-R15W swamp, pilings	$1,000/ft.	2,000,000
24.		Five grade crossings - crossbucks and concrete panels	$10,000/ea.	50,000
25.		Three grade crossings with gate protection: Rt. 604, Rt. 90, and Pearlington Rd.	$100,000/ea.	300,000
26.		Three CTC #20 Turnouts (two for passing siding, one for CSX main line)	$200,000/ea.	600,000
27.	2.05 mi. (10,824 ft.)	Rebuild CSX Industrial Siding near Ansley; new ties, new rail, clean-replace-add ballast; tamp, level, and align track	$54/ft.	584,496
28.	16.65 mi. mainline	CTC signaling (incl. a 2.5 mile passing sidings and intermediate signals)	$75,000/mi.	1,248,750
29.		Signaling electric power service	$12,500/mi.	208,125
30.		**TOTAL COST** (North Slidell to Ansley)		90,736,021

Total Construction Costs from Hammond to Ansley

The total estimated acquisition and construction cost for the Hammond-North Slidell-CSX (Ansley) alternative is $153.3 million. The estimates of the average construction costs per mile for the Hammond to Talisheek to Slidell 47.34 mile track segment amount to $1.3 million per mile, whereas these amount to $4.6 million for the far shorter Slidell to Ansley 19.768 mile track segment. The costs of constructing a raiseable bridge over the East Branch of the Pearl River, and the much higher costs of constructing a new

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200 feet and that bascule bridges, which are fixed on one end and tilt up for ship passage, are often used for shorter spans. He cited a 175 foot single span bascule bridge they built in 1985 for the NS's Lake Pontchartrain crossing which cost $6,000,000. The type of soils and/or bed rock underlying the bridge foundations are important cost determinants.

railroad roadbed through swamp areas, account for these dramatic cost differences.

The net present value (in 1996) of these construction costs is estimated at $130.2 million. These estimates assume a discount rate of seven percent[7] and a five year construction time period (1996-2000) where 5, 15, 30, 30, and 20 percent of the total costs are incurred in each of the five years, respectively.

6.1.2.2 Mid St. Tammany Parish Corridor Description and Costing (Variant Two: Use of NS Bridges to Cross the Pearl River)

The second alternative for circumventing the Pearl River Delta involves running northeast from Slidell to Nicholson, Mississippi and then turning and running southeast over a portion of NS's NASA branch line, which runs from Nicholson to the Stennis National Space Laboratories (NASA) Mississippi Engine Test Facility. This routing has the advantage of crossing the Pearl River Delta on the existing NS rail bridges, thus reducing capital construction costs by an estimated $54 million, but at the cost of adding considerable circuity (approximately 19.352 additional running miles). The Stennis or NASA Branch, as NS refers to it, is currently being used by NS for car storage, as there are no regular rail movements into the Stennis Engine Test Facility. The branch line would have to be upgraded to main line condition to carry 15 trains per day.

This alternate route would need to circumnavigate the Stennis Test Facility property either by running around it on the west

[7] This discount rate is the currently approved rate from the Office of Management and Budget (OMB).

side, thereby making full use of the entire branch line trackage or, alternatively, by passing the property on the northeast side. The western route would require the construction of a single span lift bridge over the channel leading from the Pearl River to the Stennis facility, estimated to cost $18 million, while the eastern route would have to traverse portions of the Devil's Swamp. Both the eastern and western runaround options must cross under Interstate 10 to then reconnect with CSX near Ansley.

To minimize construction costs, the railroad could cross under I-10 immediately adjacent and parallel to the road running from Gainesville to Logtown, as I-10 is elevated at this point. In the event the new railroad right-of-way cannot cross the interstate at an existing elevated portion, then additional costs for raising the freeway must be included.

The eastern side routing around the Stennis property would require more new track construction and highway grade crossings as it would angle left off of the Stennis branch line just south of the intersection of Route 607 and Three Notch Road near Santa Rosa and then run around the Engine Test Facility on the east side crossing through portions of the Devil's Swamp to rejoin an industrial siding that connects with CSX trackage to the southeast. This route requires that both lanes of I-10 freeway be raised by a minimum of 23 feet so that the rail line can cross underneath. The advantage of this eastern alternative is that it avoids having to bridge the Stennis-Pearl River waterway (an expensive proposition). However, it must cross at least two miles of the Devil's Swamp on a pilings supported structure.

The total estimated acquisition and construction costs for the Pearl River runaround using the NS tracks, first for the western route and then for the eastern route, are described below:

Western Route Around NASA-Stennis Facility
(Nicolson to CSX near Ansley = 13.53 miles)

No.	Description	Cost Factor	Estimated Cost (1995 Dollars)
1.	New Y track Turn out at Slidell to access NS tracks and at Nicholson Stennis Branchline	2 @ $200,000 each	$ 400,000
2.	Rehabilitate 10.42 miles to Stennis Branchline	$54/foot	2,970,950
3.	Right-of-way land acquisition costs	10.98 miles=57,974' x 50' width = 2,898,720 sq. ft./43,560 = 66.54 acres @ $10,000/acre	665,400
4.	Bridgeville to new Bridge over East Branch	1,851 ft. @ $190/ft.	351,690
5.	Single span 240 Ft. lift bridge - east Branch Pearl River		18,000,000
6.	East Branch Bridge to Rt I-10 Underpass track construction	2.86 miles=15,100 ft. @ $190/ft.	2,869,152
7.	100 ft. Bridge over West Branches of Bogue Homa	$2,000/ft.	200,000
8.	100 ft. Bridge over East Branch of Bogue Homa	$2,000/ft.	200,000
9.	Six grade crossings -Concrete panels and crossbucks	$10,000 per crossing	60,000
10.	Three Gated Grade Crossings at Rt. 604, Rt. 90, and Pearlington Rd.	$200,000 per crossing	600,000
11.	Rt. I-10 Underpass to Ansley Industrial Siding 8.	12 miles=42,873 ft. @ $190/ft.	8,145,870
12.	Turnout Industrial Siding		200,000
13.	Redo Industrial Siding Turnout to CSX main line		100,000
14.	Rehabilitate Industrial Siding	2.16 miles=11,405 ft @ $54/ft.	616,860
15.	CTC Signaling	71,429 ft. = 13.53 miles @ $75,000/mile	1,015,846
16.	Utility Service	13.13 miles @ $12,500/mile	169,125
17.	**TOTAL COST**		36,564,593

Eastern Route Around NASA-Stennis Facility
(Nicolson to CSX near Ansley, through Devil's Swamp = 15.71 miles)

No.	Description	Cost Factor	Estimated Cost (1995 Dollars)
1.	New Y track Turn out at Slidell to access NS tracks and at Nicholson Stennis Branchline	2 @ $200,000 each	$ 400,000
2.	Rehabilitate 6.21 of miles Stennis Branchline	$54/ft.	1,770,595
3.	Right-of-way land acquisition costs	15.71 miles = 82,948' x 50' = 4,147,440 sq. ft./43,560 = 95.21 acres @ $2,000/acre	190,420
4.	I-10 Underpass Construction - elevate 2,700 feet of highway	2,700 ft. @ $2,600/ft.	7,020,000
5.	Track Construction	14.95 miles @ $190/Ft.	14,997,840
		1.75 miles Devil's Swamp and Lower Devil's Swamp @ $1500/ft.	13,860,000
	Bridge Construction-Turtleskin Creek	40 ft. @ $1500/ft.	60,000
	Lion Branch of Catahoula Creek	40 ft. @ $1500/ft.	60,000
6.	Grade Crossings	11 @ $10,000/ea.	110,000
7.	Grade Crossings- Rt. 90, Rt. 607, Pearlington Rd.	Three gated @ $100,000 each	300,000
8.	Turnout Industrial Siding		200,000
9.	Redo Industrial Siding Turnout to CSX main line		100,000
10.	Rehabilitate Industrial Siding	2.16 miles = 11,405 ft. @ $54/ft.	616,860
11.	CTC Signaling	71,429 ft. = 15.71 miles @ $75,000/mile	1,015,846
12.	Electrical Utility Service	15.71 miles @ $12,500/mile	196,375
13.	**TOTAL COST**		40,897,936

A summary of the mid St. Tammany Parish Variant Two relocation alternative construction costs is provided on the next page:

Routing	Miles from Hammond to CSX	Estimated Costs (1995 dollars)
Western route: Hammond - Talisheek -New construction; IC Line-Slidell; NS line to Nicolson; Stennis Branch to Bridgeville-western runaround of Stennis Facility, using NS bridges to cross Pearl River and a new rail bridge to cross over the East Branch of the Pearl River Channel to Stennis	86.46	$99,084,236
Eastern route: Hammond - Talisheek - New construction; IC Line-Slidell; NS line to Nicolson; Stennis Branch to Santa Rosa-eastern runaround of Stennis Facility, crossing Devil's Swamp and requiring a new I-10 underpass to allow the railroad to cross under I-10	87.62	$103,417,570

The net present value (in 1996) of these construction costs is estimated at $84.2 and $87.9 million for the western runaround and the eastern runaround options, respectively. These estimates assume a discount rate of seven percent[8] and a five year construction time period (1996-2000) where 5, 15, 30, 30, and 20 percent of the total costs are incurred in each of the five years, respectively.

6.1.2.3 Mississippi Central Route Alternative

This is the most northern of the relocation alternatives considered that would use the Baton Rouge Bridge to cross the Mississippi River. This routing is similar to the Mid St. Tammany Parish corridor route in that eastbound trains would be diverted to cross the Mississippi River at Baton Rouge and would use the IC line from Baton Rouge to Hammond. At Hammond, trains would be routed northward to Brookhaven where they would then turn and head eastward towards Hattiesburg over the IC line, which was once a

[8] This discount rate is the currently approved rate from the Office of Management and Budget (OMB).

part of the Mississippi Central railroad. At Hattiesburg, approximately one third of the traffic (or 8 trains per day) would be interchanged with NS. The remaining 17 trains would then continue moving over IC's line running from Hattiesburg to Mobile, AL, where cars would be interchanged to CSX. Three years ago, this routing alternative existed; however, in the intervening time, IC has abandoned a 54 mile section of this route from Hattiesburg to Silver Creek. Their abandonment was predicated on a loss of traffic and the high costs of maintaining the line. The rail right-of-way from Silver Creek to Hattiesburg is characterized by several areas where wooden timber bridges that were used for stream crossings have rotted and would have to be replaced with new reinforced concrete pilings and beams.

The estimated cost to rebuild the bridges and replace all of the rotted timber supports with reinforced concrete piles and decking would amount to $90 million (conversation with Mr. John McPherson, VP Transportation for IC). This also includes the costs for reinstalling grade crossing protection equipment at grade crossings in Hattiesburg. As this route is the farthest north of all of the relocation alternatives which would cross the Mississippi River at Baton Rouge, it produces the greatest circuity. However, considering only the capital construction costs, this is clearly the least expensive alternative of all of the "North of the Lake" alternatives analyzed.

The net present value (in 1996) of these construction costs is estimated at $76.5 million. These estimates assume a discount rate of seven percent[9] and a five year construction time period (1996-2000) where 5, 15, 30, 30, and 20 percent of the total costs are incurred in each of the five years, respectively.

Were only the NS traffic to be considered, this route constitutes an excellent alternative. While it appears that considerable circuity is being added by this route, the additional mileage added on NS movements passing through Hattiesburg on the east and originating and terminating beyond Beaumont, Texas on the west is only 12 miles. However, the additional mileage added to the CSX movements is costly.

Were NS ever to acquire the IC railroad, NS could then examine the potential value of maintaining through movements to UP and SP via their present Oliver Yard and Back Belt route versus the costs and benefits of reestablishing this North of the Lake, former Mississippi Central route. While it is conceivable that some time savings on run-through movements could be effected via the Baton Rouge-IC route, particularly given the congestion and traffic delays that occur at East Bridge Junction, these savings would have to recoup the $90 million capital investment required to reestablish the Silver Creek to Hattiesburg section of this route. As further railroad consolidation occurs, and as the first transcontinental rail routes are formed, this option may once again emerge for consideration.

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[9] This discount rate is the currently approved rate from the Office of Management and Budget (OMB).

6.1.2.4 Washington Parish Alternative

Unlike St. Tammany Parish, the citizens of Washington Parish, which is situated north of St. Tammany Parish, would welcome the development of a new railroad corridor. Washington Parish is more rural in character than St. Tammany Parish, with dairy farming and timber and pulpwood production comprising the principal economic activities. Land prices are far lower than they are in suburban St. Tammany Parish, and local dairy farmers who have had a difficult time earning a living (due to higher feed prices and lower prices for their livestock) are eager to sell their land. The Parish is heavily dependent on the economic fortunes of a single company, Gaylord Container. According to the Parish's Director of Industrial Development, Ms. Sharon Stam, residents would benefit economically with a new railroad. They were distressed to lose a branch of the Gulf, Mobile, and Ohio (GM&O) Railroad several years ago.

The Washington Parish relocation alternative shares the same initial routing out of Baton Rouge as the Mid St. Tammany Parish alternative. However, at Amite City (in Tangipahoa Parish), approximately 15 miles north of Hammond, a new railroad corridor would be constructed eastward to intersect with NS and CSX railroads. Starting in Tangipahoa Parish the corridor would run just south of Route 10 crossing over into Washington Parish at the Tchefunete River just south of Stoney Point. Unlike St. Tammany Parish, the elevation of the land is slightly higher and the ground is somewhat hilly thus requiring higher grading costs to cut, fill, and contour the roadbed. Conversely, there are fewer swamps and bogs to cross. The biggest uncertainty in estimating the costs for constructing a new railroad through Washington Parish is the amount of grading, filling, and contouring that would need to be done. Again, aerial photography coupled with controlled ground surveys would be needed to improve routing alignments, costing precision, and minimize the total grading required.

The first section of the Washington Parish corridor running from the IC line just north of Amite City through Tangipahoa Parish to the Tchefunete River (approximately 15 miles) which forms the borderline for Tangipahoa and Washington Parishes could be built with many gently curved track sections to minimize grading expense, thus running around the hills rather than cutting through them. From the Tchefunete River to the Bogue Chitto River, the hilly topography becomes rougher and steeper and no readily apparent route exists that would minimize the amount of excavation and fill that would be required to construct a level roadbed through this area, the center of which lies approximately six miles southwest of Bogalusa.

The volume of material that must be cut and filled to create a one percent gradient roadbed in this area is roughly estimated at 88 cubic yards per foot of track for 4.75 miles or 25,080 feet. The total cubic yards to be graded was estimated to amount to 2,207,040 cubic yards. Assuming balanced construction (i.e., half cutting or excavation and half filling and embankment) and using an average of the latest LADOTD prices, the grading costs are estimated at $4.88 per cubic yard. The total grading costs for the

Washington Parish alternative amount to a very significant $10,770,355. (Note: A portion of the average railroad track construction cost factor, $190 per foot of track constructed, includes limited costs for grading, which, on average, amount to 2.5 cubic yards per foot of track constructed.) At least 25 drainage concrete box culverts (measuring 4 feet x 4 feet x 28 feet) would be needed to allow water impounded by the elevated railroad embankments and filled sections to run through the roadbed (these are estimated to cost $4,200 each without dewatering).

What is most significant about this alternative is that the eastern portion of the route can make use of the former Gulf, Mobile, and Ohio (GM&O) Railroad roadbed (which ran from Franklinton to Rio in a southeasterly direction on the eastern bank of the Bogue Chitto River) to reduce capital construction grading expenses. At Rio, the GM&O at one time interconnected and interchanged traffic with IC, which later acquired them and, still later, abandoned the route. It is assumed that the rail line would cross the Bogue Chitto River between the lakes at Green Jenkins, approximately 2.5 miles south of Franklinton, and intersect the former GM&O Railroad right-of-way at this point and turn southeast following the GM&O's abandoned roadbed to Rio. It is assumed that the nine GM&O railroad bridges spanning the tributary creeks and rivers running south into the Bogue Chitto River were still intact and potentially usable although some rehabilitation and reconstruction may be required.

At Rio, there are several options that can be taken to intersect the CSX line:

- The now abandoned IC rail corridor can be used from Rio to Slidell, as was proposed for the Mid St. Tammany Parish alternative. At Slidell, the NS route would be used to cross the Pearl River.

- A second option would require the construction of an entirely new 104 mile railroad corridor directly east from Rio. This new railroad link would intersect CSX tracks at Mobile, Alabama. The very hilly terrain that would have to be traversed and the numerous roads and bridges that would be required for this alignment (including a very long bridge over the Pascagoula River) would make its construction prohibitively expensive (probably in the neighborhood of $250 million).

- A third option (and the one used here) would require the construction of a much shorter new line running southeast on the eastern slopes of the Pearl River watershed to intersect a branchline of NS northwest of Picayune, Mississippi. This alternative reduces the circuity of the first alternative but would require the construction of at least three new railroad bridges over the Pearl River Canal, the Pearl River, and the Old River (one of the many eastern tributaries of the River). From Picayune, the line would run south to Nicholson. At Nicholson, the same route previously described to access CSX could be used (namely, the NS Stennis Branch line to run around the space center on the western side to eventually intersect the industrial siding corridor which joins CSX near Ansley).

The estimated land acquisition and construction costs for the Washington Parish Alternative from Amite City to Nicholson, through Picayune, are described below:

No.	Distance	Description	Cost Factor	Estimated Cost (1995 Dollars)
1.	53.69 miles	Land acquisition costs-Amite City, LA to Picayune, MS, via Green Jenkins to Rio. 297,739' x 50' = 14,886,970/43,562 = 341.74 acres	$ 2,000/acre	$ 683,480
2.		Two # 20 turnouts at Amite City & Picayune	$200,000/ turnout	400,000
3.		Cutting, grading, and filling roadbed to maintain 1% gradient (2,207,040 cu. yd.)	$4.88/cu. yd.	10,770,335
4.		Track construction (297,739 feet total)		

No.	Distance	Description	Cost Factor	Estimated Cost (1995 Dollars)
4a.	23 miles	Amite City to Green Jenkins-new corridor, roadbed, and track (121,440 ft.)	$190/ft.	23,073,600
4b.	18 miles	Green Jenkins to Rio via former GM&O corridor and roadbed (95,040 ft.)	$100/ft.	9,504,000
4c.	15.39 miles	Rio to Picayune-new corridor, roadbed, and track (81,259 ft.)	$190/ft.	15,439,248
5.		25 drainage culverts (4' x 4' x 28') - Tchefunete to Bogue Chitto section	$4,200 each	105,000
6.		22 new smaller bridges	$100,000 each	2,200,000
7.	400 ft.	Rehabilitate 9 existing former GM&O bridges	$2,600/ft.	1,040,000
8.		Six new major bridges		
8a.	300 ft.	Tangipahoa	$2,500/ft.	750,000
8b.	200 ft.	Tchefunete	$2,500/ft.	500,000
8c.	200 ft.	Gorman Creek	$2,000/ft.	400,000
8d.	1,500 ft.	Bogue Chitto River	$1,500/ft.	2,250,000
8e.	200 ft.	Pearl River Canal[10]	$2,500/ft.	500,000
8f.	15,840 ft.	Pearl River Delta, with required piling	$1,500/ft.	23,760,000
9.		Grade crossings; crossbucks and concrete panels (54 crossings)	$10,000 each	540,000
10.		Protected grade crossings (at Lee Road, Rt 16, Par Highway, Dummyline Road, Rt 450, Rt 445, Rt 25, Rt 16, Rt 1072, Parish Rd 15, Rt 60, Rt 1075, Rt 21, Dumas Wise Road, Burnt Bridge Road, Rock Ranch Road, & Burge Town Road)	$100,000 each	1,700,000
11.	5 miles	Two 2.5 mile passing siding (26,400 ft.)	$150/ft.	3,960,000
12.		Four turnouts #20	$200,000 each	800,000

[10] The U.S. Corps of Engineers may require a raiseable Bascule Bridge to cross the Pearl River Canal, which would increase this cost estimate by $8 million. There is currently no barge traffic on the Pearl River near Bogalusa. Environmentalists have defeated efforts to make this canal economically useful. There is some potential to haul sand and gravel from the Bogalusa area to New Orleans. The Corps, however, still maintains the Pearl Canal locks.

No.	Distance	Description	Cost Factor	Estimated Cost (1995 Dollars)
13.	2,000 ft.	Raised roadway - Rt 16W-Rt 15W swamp. Pilings near Dumas Wise Rd.	$1,000/ft.	2,000,000
14.	56.39 miles	Signaling, mainline inc., two 2.5 mile pass sidings and intermdt. signals	$75,000/mile	4,229,250
15.	56.39 miles	Signaling, electric power service	$12,500/mile	704,875
16.	4.3 miles	Picayune-Nicholson upgrade branch line to main line standards (22,704 ft.)	$54/ft.	1,226,016
17.		**TOTAL COST** (Amite City to Picayune to Nicholson)		106,535,824

As stated above, from Nicholson, the new line would connect with CSX near Ansley following the same corridor route that was assumed for the Mid St. Tammany Parish rail corridor. Two options were described for circumnavigating the Stennis-NASA Test Facility, a western (least expensive) and an eastern (Devil's Swamp) option. For cost estimation purposes, the western option (with a cost of $36,564,593) was used to obtain the total cost of $147,218,175 for the Washington Parish route.

The net present value (in 1996) of these construction costs is estimated at $125.1 million. These estimates assume a discount rate of seven percent[11] and a five year construction time period (1996-2000) where 5, 15, 30, 30, and 20 percent of the total costs are incurred in each of the five years, respectively.

6.1.2.5 Conclusions Concerning the "North of the Lake" Alternatives

None of the "North of the Lake" relocation corridors can be considered cost effective at this time. This assessment is based

[11] This discount rate is the currently approved rate from the Office of Management and Budget (OMB).

on the added operating costs and the magnitude of the capital construction costs, relative to the economic and social costs that current rail operations through Metairie are projected to produce between 2001 (when these alternatives would begin to materialize) and 2025. In other words, the present value (in 1996) of the construction costs (ranging from $76.5 to $130.2 million) and the additional railroad operating costs are not sufficiently offset by the present value (in 1996) of the highway user and vehicle stoppage/delay and slowing costs (ranging from $37 to $39 million) and accident costs that would no longer be incurred in the Metairie area once the alternative corridors are completed and operating.

Certainly, increases in the number of trains crossing the Back Belt and increasing grade crossing delays and accidents, at rates beyond those that have estimated in this project, could change this scenario. Moreover, beyond this strict benefit cost structure, it should be noted that large transportation construction projects have traditionally been justified on the basis of economic development, as well as concerns for the environment, safety, and/or hazardous materials accidents. If any of the jurisdictions (federal, state, or local) involved in the New Orleans region should see any of the above concerns as compelling in nature, subsidies for the above construction projects should be made available.

6.1.3 New Mississippi River Bridge Alternative: Route 47 and I-510 Extension

There has been considerable discussion concerning the possible construction of a new Mississippi River Highway Bridge that would be situated south of the existing Greater New Orleans (GNO) Mississippi River bridges. The bridge, which has no officially designated name, as yet, and is sometimes referred to as the "Chalmette to Algiers" bridge, has been discussed for more than 25 years. The Louisiana State Legislature has just funded a $1,000,000 study to evaluate the economics, financing, and siting for such a bridge which would essentially provide a outer belt loop connecting the west and east banks and allow travelers to drive around the City of New Orleans on its eastern side. The bridge would link the Route 47/I-510 extension, which intersects I-10 east of the City, with the West Bank Expressway via the bridge and a west bank highway link. The bridge study, awarded to Frederic R. Harris' New Orleans office, will take two years to complete, based on a conversation with Tom Jackson, Harris Project Director.[12]. The bridge, which would conceivably be financed entirely by the State of Louisiana using tolls, would open up Plaquemines Parish and the west bank to further development. It might, although still unproven, also reduce some of the highway traffic volumes on I-10, thereby benefitting Orleans and Jefferson Parishes.

Senator Landry, Chairman of the State's Transportation Committee, expressed the opinion that the bridge would never be

[12] The project is being managed for the state by Arthur Dandre who reports to Wayne Amon, Chief of Bridge Design at the LADOTD.

built because of it's negative environmental impacts, and, indeed, it is difficult to envision how any new bridge could avoid some negative impacts. The time required for planning, financing, permitting, and construction of a new Mississippi River bridge suggests that it would not be completed for at least 15 years or longer.

The suggestion has been made that instead of building a new highway bridge across the Mississippi River, that a joint rail-highway bridge could be built, similar in construction to the Huey P. Long Bridge, thereby allowing through train traffic to be routed on the west bank around the City of New Orleans on the east side, thereby avoiding Metairie and other densely populated areas. By prorating the construction expenses between the highway and rail beneficiaries, the total costs to each would be reduced. One obvious problem is that over 2.5 miles of elevated approach bridges would have to be constructed on both sides of the river to provide a 1.25 percent track gradient and a mean vessel clearance between the bottom of the bridge structure and the high water level of 165 feet[13] [however, there are no plans nor has any consideration been

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[13] Vertical clearances for other Mississippi River-area bridges in the region are as follows:

Rt 47-Rt 510 Extension Bridge (proposed)	210';
New Florida Avenue Bridge over the Industrial Canal (design stage)	155';
Greater New Orleans Bridge	150';
Huey P. Long Bridge (joint rail/highway)	135';
I-310 Bridge	133';
Baton Rouge I-10 Bridge	135';
Baton Rouge-Illinois Central rail bridge	65';

Baton Rouge Bypass Rt 415 Exit (South) - Only in discussion phase; and Saint Francisville Bridge - Only in discussion phase.

given to making this Route 47/I-510 extension bridge a joint rail-highway bridge (conversation with Wayne Amon)].

The relocation and establishment of a new rail corridor to the south and east of New Orleans would only be feasible with the construction of a new Mississippi River Bridge that could jointly accommodate train and highway movements. Whether or not such a bridge could be cost effective is dependent upon the assumptions made concerning its design and location and the resulting cost estimates for its construction and the proration of expenses.

If the highway bridge is built, it would be constructed east of the Industrial Canal from St. Bernard Parish on the east bank to Orleans Parish on the west bank. While several sites are under consideration, the best corridor for a new bridge is approximately 1.5 miles downstream from the intersection of the Gulf Intracoastal Canal and the Mississippi River, on an alignment that is just west of the Murphy Oil Refinery in Meraux (on the east bank) and Stanton (on the west bank). An alternate alignment would place the bridge corridor on the eastern side of the refinery. (The western alignment would require the repositioning of a plant gas flare whose proximity to the proposed eastern alignment would create a problem.) Approach ramps would be positioned within Orleans and St. Bernard Parishes to avoid residential areas and feed traffic smoothly into connecting highways.

Given the stresses induced by increasingly heavy unit trains moving over the bridge at speeds up to 30 MPH, it was assumed that a joint rail-highway bridge would have to be of the cantilever design, given the ability of such designs to resist the impacts and vibrations set up by moving live loads. The height of the bridge determines the extent or length of the rail approach bridges. According to Amon at the LADOTD, there has been discussion of large new cruise ships (Carnival Lines) and LPNG vessels using the river. Their superstructure and masts would require a 205 foot vertical clearance. Occasionally the U.S. Navy brings a carrier upriver to New Orleans, but not beyond the GNO bridges. To utilize a highway bridge constructed to provide a 210 foot vertical clearance for vessel navigation, jointly for train movements, would require 16,800 feet or 3.18 miles of elevated rail approaches on either side of the river to allow loaded trains to ascend the approach grades without helper engines. To support this top heavy load, the approach ramp support girders would be spaced a minimum of 200 feet wide at the base. They would, thus, consume approximately 150 acres in St. Bernard and Orleans Parishes. At an assumed market value of $100,000 per acre, land acquisition costs, alone, are estimated at $15,400,000. The 33,580 feet of bridge approaches, at an average of $10,000 per lineal foot for a two track, 40 foot wide ballasted roadbed, would result in a cost for the approach ramps of $335.8 million.

The bridge itself would measure 3,500 feet overall and would be supported by four huge caissons. Two of the caissons would be in the river and two would be on-shore, within 200 feet of the bank. Soil studies and samples would establish the shear weight capacity of the underlying alluvial compacted soils and clays and, thus, the ultimate size and depth that the caissons must be sunk. The river channel depth ranges from 120 to 140 feet depth in the

Stanton area (conversation with Bill Caver, a geotechnical engineer for the U.S. Corps of Engineers and Chief of Dams, Levees, and Channel Slopes). There has been some active sliding and loss of the river bank in the Stanton area, according to Caver, so the land bound west bank supporting caissons would have to be sunk as deeply as the two river piers. At a minimum, these huge piers would have to be designed to establish a firm substructure foundation and laterally stable base for an extremely top heavy bridge capable of withstanding the occasional ramming and impact by huge vessels and integrated barge tows (which necessitates the installation of massive bumpers), and hurricane force horizontal wind speeds of 150 MPH or more.

It has been assumed that the substructure caissons would be built 150 feet below the river bed bottom on compacted clays with a density and shear strength adequate to support the fully loaded bridge weight. Assuming a central span roughly 1,500 long and two end spans each 1,000 feet long, the four supporting caissons (400 feet tall, 125 feet long, 40 feet wide) would require 296,296 cubic yards of steel reinforced concrete. At an installed cost of $375 per cubic yard, it would cost $111.1 million to construct. (These costs also assume that the two land based piers are constructed 200 feet from the water's or river bank edge-behind the levee.)

The estimate for the steel required for this huge span was roughly calculated based on the amount of steel used to construct the Quebec City cantilever bridge (which is Canada's greatest railroad bridge, and, to our knowledge, the longest cantilever span bridge in the world). This bridge, which crosses the St. Lawrence

River downstream from Montreal, provides a important rail-highway link between the Province of Quebec and the Maritime Provinces. Built in 1917, it carries two rail lines and four highway lanes. The central span, of this 3,239 foot bridge is 1,900 feet long and is elevated 150 feet above the river.

While the length of this bridge is slightly shorter than the 3,500 foot bridge envisioned to be built across the Mississippi, the 66,480 tons of steel used in constructing the Quebec bridge provides a benchmark. It is assumed that a new New Orleans Bridge would have to carry at least eight lanes of highway so it would have to be stronger, slightly larger, and longer than the Quebec Bridge. On the other hand, the high tensile strength steels used in today's bridge construction were not available in 1917. It is further assumed that the Route 47/I-510 extension bridge would be constructed on top of the four large concrete reinforced caissons. Thus, steel would be used for the spanning trusses only (and not to elevate the bridge). The steel required for the new bridge was estimated at 71,836 tons. Using an average cost of $4,000 per ton to purchase, fabricate, transport, and erect this "high" steel, the total cost of the high steel bridge construction is estimated at $287.3 million.

While part of the steel structure for the rail viaduct would be used for highway support, the highway approach ramps would be far shorter. Assuming a four percent gradient, 5,250 feet of highway approach ramps would be required on either side of the river. At an assumed width for eight lanes of 100 feet, the total square footage of highway approach amounts to 1,050,000 square feet. At an average cost of $125 per square foot, these very high approach ramps would cost $131.3 million.

The total cost estimates (in 1995 dollars) for a new Mississippi River bridge (including approach ramps), and the rail-highway prorations, are summarized below:

Description	Total Cost	Cost Proration Rail / Highway	Railroad Cost
Land Acquisition - 155 acres	$15,400,000	50% / 50%	$7,700,000
Rail Approach Trestle/Viaduct - 6.36 miles	335,800,000	100% / 0%	335,800,000
Bridge Caissons (Four)	111,111,000	55% / 45%	61,111,050
Rail/Highway Bridge - 3,500 ft. - 71,836 tons of steel	287,344,000	60% / 40%	172,406,400
Highway Approach Ramps-10,500 ft.	131,250,000	0% / 100%	0
Total	880,905,000	---	577,017,450

Construction cost estimates were prorated between rail and highway users based on an assumption that to build a new bridge to carry trains as well as highway vehicles will require 20 percent more steel and 10 percent more concrete[14].

[14] It should be pointed out that the required vertical elevation for a new bridge has an enormous impact on its costs. A new bridge that simply maintained the 155 foot vertical clearance that the Greater New Orleans Bridges maintains would reduce this estimated cost by $100 million. These estimates also challenge the premise that there would be a savings in constructing a combined rail-highway bridge as the estimates indicate that building such a bridge more than doubles the expense of simply constructing a highway bridge. It also highlights the fact that rail bridges constructed upstream from Baton Rouge could be built at far less expense (given the necessity of only maintaining a 65 foot vertical clearance) than they can be built in the New Orleans area. This raises the question as to whether or not a new highway bridge at St. Francisville would define a potential new rail corridor that would provide a cost effective alternative to the Metairie corridor. Unfortunately, existing east-west rail access to St. Francisville would require considerable additional circuity,

On the east bank, from the approach ramp start or end in St. Bernard Parish, the new railroad would parallel the alignment of Route 47 and have to bridge across an additional 3.18 miles of environmentally sensitive wetlands on concrete pier trestles to intersect CSX tracks and, then, would need to continue further north for an additional 3.82 miles to rejoin the NS tracks. Finding a north-south alignment from the bridge that minimizes construction costs will be challenging. The I-510/I-10 interchange looms as a big obstacle that the railroad would have to run around or else cross at great expense. Including the costs for bridging over Bayou Bienvenue and the Intracoastal Canal, with a lift bridge, these additional costs would be as follows:

No.	Description	Cost Factor	Estimated Cost (1995 Dollars)
1.	Rt. 47/I-510 Bridge Exit ramp-Concrete Pier Trestle to CSX (16,791 ft.)	$1,500/ft.	$25,186,500
2.	Bridge over Bayou Bienvenue (300 ft.)	$2,500/ft.	750,000
3.	Lift Bridge (300 ft. Intracoastal Canal; 155 ft. vertical Clearance)	---	35,000,000
4.	CSX Intersection to NS Tracks (20,179 ft.)	$190/ft.	3,834,010
5.	Track Turnouts at CSX and NS intersection (2)	$200,000 each	400,000
6.	Grade Crossings (8)	$100,000 each	800,000
7.	I-510/I-10 Interchange-Run Around or Run Through	---	10,000,000
8.	**TOTAL COST** (New Bridge to Railroad Intersections)		75,970,510

The 3.18 mile bridge approach ramps on the west bank would be curved to allow the rail to intersect existing tracks of the New Orleans Lower Coast Railroad. Additional costs for upgrading the

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along with new track construction, making this an unattractive option.

tracks and raising the roadbeds and alignments to main line track standards have not been estimated but, clearly, some improvement and rebuilding of trackage on the west bank would be necessary to allow 25 trains per day to run through this corridor.

The total costs (in 1995 dollars) for constructing a new rail corridor that would run around the City of New Orleans on the west bank and cross over the Mississippi on a new Route 47/I-510 rail/highway bridge are estimated as follows[15]:

New Mississippi River Bridge Construction (rail portion only)	$577,017,450
New Rail Construction (including bridges over Bayou Bienvenue and Intracoastal Canal	75,970,510
	$652,987,960

With respect to the railroad operating impacts, after crossing the river, trains would have to be routed through to the east so as to by pass and avoid entering CSX's Gentilly Yard and NS's Oliver Yard or else be turned westward to access the yard. This turning westward will increase rail running miles and operating costs for all carloads and trains that must be switched and classified in these yards. Those trains and cars that can be switched at yards that are located farther to the east (for example, at Flomation in CSX's case and at Meridian in NS's case) could proceed eastward without the additional costs created by the circuitous routing that the new bridge would create.

The routing of trains from the Avondale Yard of SP and UP through various west bank communities enroute to the approach ramps

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[15] A net present value calculation was not made given the large uncertainty of the timing of this alternative.

for the new bridge would create grade crossing delays and blockages at a number of streets and would expose the local residents of these communities (e.g., Westwego, Marrero, Harvey, Getna, McDonoghville, Terrytown, and Algiers) to the same negative impacts to which the residents of Metairie are now exposed.

In conclusion, a new Route 47/I-510 Mississippi River Bridge would offer opportunities for constructing a joint rail-highway bridge. However, the huge capital costs associated with building the approach ramps and the bridge itself; the additional costs associated with having to cross the wetlands in St. Bernard Parish and for bridging the Intracoastal Canal; and the significant environmental and community impacts that would be involved on west and east bank communities, place this relocation alternative well beyond what could reasonably and prudently be considered. The substantial costs of constructing a new Mississippi River rail bridge supports the importance and necessity of maintaining the existing Huey P. Long Bridge in good operating condition.

6.2 Highway User Impacts

One of the major impacts resulting from trains traversing the Back Belt is highway grade crossing blockages and the associated delays experienced by motorists who use the roads in the vicinity of the railroad grade crossings. Moreover, motorists that are not blocked or delayed by a passing train are also impacted because they must slow down as they cross the grade crossings. The severity of the impact at any particular grade crossing is dependent upon the volume and average speed of vehicular traffic, the frequency and type of railroad traffic, and the roughness of the grade crossing. The first two sections, below, describe both the highway and railroad traffic in the study area. The third section describes the methodology used to calculate highway user operating impacts (i.e., the time associated with stoppage/delay and slowing, including the resultant costs) caused by the train blockages and by the railroad grade crossings themselves. Then, estimates of the current impacts experienced by motorists, and the expected impacts anticipated over the next 25 years, are presented. The final section describes the reductions in time delays or slowing and their associated costs (i.e., the benefits) for highway users, both today and over the next 25 years, with the implementation of alternative short and long term solutions.

6.2.1 Highway Traffic

Within the study area, there are eight grade crossings where trains traversing the Back Belt have an impact on vehicular traffic. Traffic counts for the Carrollton, Metairie, West Oakridge, Farnham, Hollywood, Atherton, Labarre, and Shrewsbury grade crossings were taken by the Jefferson Parish Traffic Engineering Department. These counts were taken for 15 minute intervals, for each direction of traffic [i.e, north and south for all crossings except Metairie Road (which was measured east and west)], between December 11 - 13, 1995 for all grade crossings except Metairie Road (which was taken between February 14 - 17, 1995) and Shrewsbury Road (which was taken between February 5 - 8, 1996). Average daily counts for each of the 24 one hour intervals, for each direction of traffic, were then calculated by the Jefferson Parish Traffic Engineering Department. Since each of the traffic counts was taken over a three or four day period, they are considered representative of each crossing.

Table 6.1 presents a summary of the daily highway traffic counts, by hour and direction, for all eight grade crossings combined (similar data for each of the grade crossings individually are presented in Appendix C). As indicated by these data, it is estimated that almost 41,000 vehicles go over these eight grade crossings each day. The traffic between midnight and 6 AM is very light, and starts to build between 6 AM and 7 AM. The majority of the traffic occurs between 7 AM and 7 PM, with the largest amount of traffic occurring between 5 PM and 6 PM. Between 7 PM and midnight, the traffic steadily declines.

Metairie Road, the major thoroughfare through the Metairie community, carries 48 percent of this traffic, or 19,800 vehicles per day over the grade crossing (see Table 6.2). Labarre Road and Carrollton Avenue carry the next highest amounts of traffic (about 5,700 and 5,400 vehicles per day, respectively). The remaining five crossings, combined, carry 10,000 vehicles per day.

In order to project highway traffic volumes over the next 25 years, population growth projections for Jefferson Parish and the surrounding parishes[16] were used [these projections were obtained

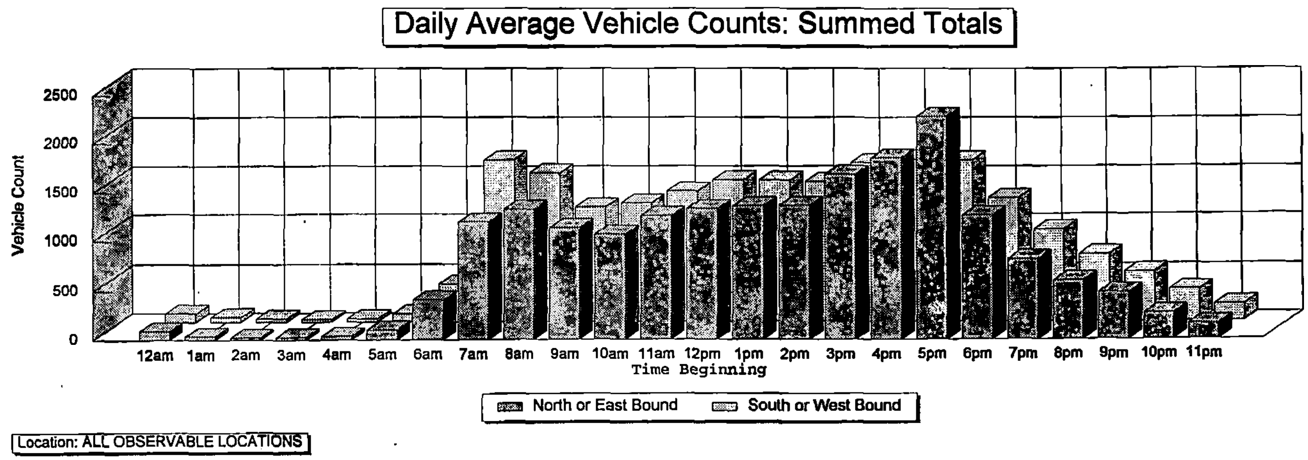
[16] The surrounding parishes include Livingston, Orleans, Plaquemines, St. Bernard, St. Charles, St. John the Baptist, St. Tammany, and Tangipahoa. It is assumed that through-highway traffic that originates and terminates outside of the study area could include employees and/or residents of any of these parishes.

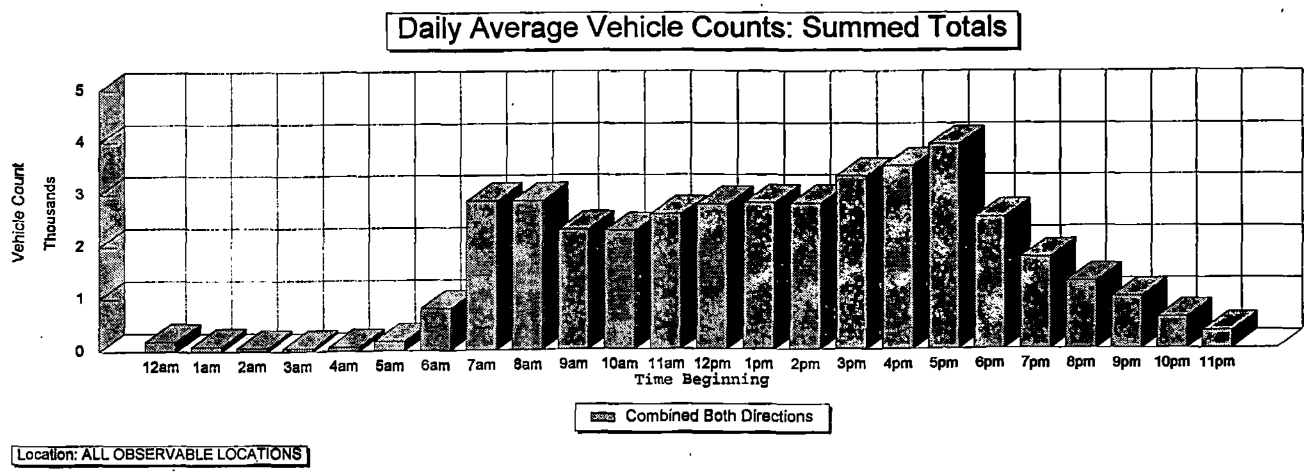
Table 6.1: Summary of Daily Highway Traffic Vehicle Counts for All Railroad Crossings, by Hour, 1995

Location: ALL OBSERVABLE LOCATIONS

Measuring Time Span:
METAIRIE ROAD
(2/14/95 to 2/17/95)
SHREWSBURY DRIVE
(2/5/96 to 2/8/96)
ALL OTHER LOCATIONS:
(12/11/95 to 12/13/95)

	DAILY AVERAGE		
Time Beginning	North or East Bound*	South or West Bound*	Combined
12am	92	93	185
1am	39	52	91
2am	25	35	60
3am	29	26	55
4am	37	33	70
5am	100	82	182
6am	406	390	796
7am	1,195	1,653	2,848
8am	1,326	1,522	2,848
9am	1,133	1,166	2,299
10am	1,066	1,208	2,274
11am	1,260	1,332	2,592
12pm	1,329	1,449	2,778
1pm	1,360	1,446	2,806
2pm	1,364	1,433	2,797
3pm	1,690	1,627	3,317
4pm	1,855	1,660	3,515
5pm	2,287	1,651	3,938
6pm	1,262	1,262	2,524
7pm	821	934	1,755
8pm	603	684	1,287
9pm	483	510	993
10pm	267	329	596
11pm	158	175	333
TOTAL	20,187	20,752	40,939





**Metairie Road traffic was measured east-west bound while the remaining seven grade crossings were measured north-south bound.*

Source: Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996.

Table 6.2: Summary of Daily Highway Traffic Vehicle Counts, by Railroad Grade Crossing, 1995

Location	Vehicles per day* North or East Bound	South or West Bound	Total
CARROLLTON AVENUE	2,817	2,553	5,370
METAIRIE ROAD	9,398	10,399	19,797
WEST OAKRIDGE DRIVE	719	667	1,386
FARNHAM PLACE	1,056	1,076	2,132
HOLLYWOOD DRIVE	1,874	1,946	3,820
ATHERTON DRIVE	494	747	1,241
LABARRE ROAD	3,367	2,355	5,722
SHREWSBURY ROAD	462	1,009	1,471
Totals	20,187	20,752	40,939

**Metairie Road traffic was measured east-west bound while the remaining seven grade crossings were measured north-south bound.*

Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

from the Department of Sociology and Louisiana Population Data Center at Louisiana State University (Irwin, 1994)]. That is, the percent change in traffic volume was assumed to closely parallel the percent change in population. Moreover, since (as discussed earlier in this report) it is estimated that 75 percent of the traffic represents individuals working and/or residing in the Metairie area and 25 percent of the traffic represents individuals working and/or residing in the surrounding parishes, the percent change in population in Jefferson Parish was more heavily weighted than the percent change in population in the surrounding parishes. The highway traffic volume projections for 2000, 2010, and 2020 are presented in Appendix C. These data indicate that highway traffic volumes are expected to climb from 40,900 vehicles in 1995, to 42,100 in 2000, 45,200 in 2010, and 48,600 in 2020.

6.2.2 Railroad Traffic

Information describing the amount of railroad traffic travelling over the Back Belt was obtained from several sources, including railroad operations personnel, train survey data collected by CONSAD personnel at three grade crossings in the Metairie area, and secondary data sources.

The current railroad operating schedule, summarized in Table 6.3, was obtained from various railroad personnel and indicates the number of trains crossing the Back Belt each week, by day, for each of the 24 one hour time periods. As portrayed by these data, from 23 to 27 trains, excluding light locomotive movements, are currently moving over the Back Belt on a daily basis, producing an average of 24.7 trains per day. Depending upon the day of the

Table 6.3: Summary of Current Weekly Train Operating Schedule Over the Back Belt, by Hour

Time Beginning	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Weekly Total	Daily Average
	Number of Trains								
12am	2	2	2	2	2	2	2	14	2.0
1am	0	0	0	0	0	0	0	0	0.0
2am	2	2	1	1	1	1	2	10	1.4
3am	2	2	2	2	2	2	2	14	2.0
4am	1	1	1	1	1	1	1	7	1.0
5am	1	1	1	1	1	1	1	7	1.0
6am	1	1	1	2	3	3	2	13	1.9
7am	1	1	1	1	1	1	1	7	1.0
8am	1	1	1	1	1	1	1	7	1.0
9am	1	1	1	1	2	1	1	8	1.1
10am	1	1	1	1	1	1	1	7	1.0
11am	1	1	1	1	1	1	1	7	1.0
12pm	1	1	1	1	1	1	1	7	1.0
1pm	0	0	0	0	0	0	0	0	0.0
2pm	0	0	0	0	0	0	0	0	0.0
3pm	2	2	2	2	2	2	2	14	2.0
4pm	0	0	0	0	0	0	0	0	0.0
5pm	1	1	1	1	1	1	1	7	1.0
6pm	0	1	2	1	1	0	1	6	0.9
7pm	2	2	2	2	2	2	2	14	2.0
8pm	0	0	0	0	0	0	0	0	0.0
9pm	2	2	2	2	2	2	2	14	2.0
10pm	0	0	1	0	1	0	1	3	0.4
11pm	1	1	1	1	1	1	1	7	1.0
TOTAL	**23**	**24**	**25**	**24**	**27**	**24**	**26**	**173**	**24.7**

Note: Excludes Light Engine Locomotive Movements.

Source: Railroad operating personnel in Metairie, Louisiana, March 28th, 1996.

week, from eight to 10 trains travel over the Back Belt between midnight and 7 AM. Another nine to 11 trains move between the hours of 7 AM and 7 PM, with the remaining five to six trains moving between 7 PM and midnight.[17]

The train survey data collected by CONSAD between October 11 - 14, 1995 at the Metairie Road, Labarre Road, and Shrewsbury Road grade crossings provided information concerning the number and types of cars in the trains crossing the Back Belt (including cars carrying hazardous materials), the direction of the train, the average train speed as it initially went over the crossing, total blocking times, as well as other information describing the vehicle queues (including the number of vehicles observed in the queue and the time interval between the arrival of the first and last vehicle in the queue). This information is summarized in Table 6.4.

In all, 70 trains were observed of which nine trains only involved the movement of locomotives. For the 61 trains involving the movement of cars, the shortest train had 17 cars including one locomotive, while the longest train had 126 cars including two locomotives. The average length of each train was about 81 cars, consisting of three locomotives, and, primarily, tank cars, long flat (TTX) cars, and box cars. On average, very few bulkhead flat cars and gondola cars were observed. For the average train, 15

[17] It should be noted that the train survey data collected by CONSAD in October 1995 (and described in the text below) produced an hourly frequency distribution of trains different from the current operating schedule used here. The schedule presented in Table 6.3 represents the most up to date information available as of March 31, 1996; thus, the highway user impact analysis presented here is based on this information.

Table 6.4: Summary of Train Data Collected at Labarre, Metairie, and Shrewsbury Railroad Grade Crossings From October 10-14, 1995

TRAIN NUMBER	RAILROAD	DATE	SITE	TIME	NEAR SIDE QUEUE (MIN)	FAR SIDE QUEUE (MIN)	TOTAL BLOCK TIME (MIN)	STOP AND BACKUP (MIN)	NEAR QUEUE NUMBER OF VEHICLES	FAR QUEUE NUMBER OF VEHICLES	TRAIN SPEED (MPH)	TRAIN DIRECTION	NUMBER OF CARS	CAR TYPE (see key below) L	BF	B	F	T	G	TTX	CH	H	NUMBER OF HAZMAT CARS
1(1)	KCS	10/10	Labarre	04:00 PM	1 :52 (2)	1 :05 (2)	5 :08	0 :00	10	4	22.0	W	43	6	0	9	5	15	0	0	0	8	8
2	(NA)	10/10	Labarre	07:01 PM	0 :35	5 :30	7 :09	0 :00	7	10	15.5	W	111	3	0	23	16	41	6	0	0	22	0
3	SP	10/10	Labarre	09:30 PM	8 :40	8 :38	8 :53	0 :00	2	2	20.0	W	106	3	0	0	30	0	0	73	0	0	0
4	(NA)	10/11	Labarre	01:35 AM	0 :00	4 :27	8 :30	0 :00	0	2	27.0	E	91	3	0	8	1	54	0	1	0	24	21
5	NS	10/11	Labarre	01:45 AM	0 :00	11 :01	14 :45	0 :57	0	1	27.0	W	126	2	0	19	0	84	8	0	0	13	58
6	SP	10/11	Labarre	02:40 AM	0 :00	0 :00	11 :45	2 :51	0	0	NA	W	79	3	0	34	1	21	0	0	0	20	7
7	RIO GRANDE	10/11	Labarre	03:40 AM	0 :00	0 :00	5 :02	0 :00	0	0	20.0	E	71	3	0	17	11	29	10	0	0	1	27
8	UP	10/11	Labarre	04:10 AM	0 :00	0 :00	5 :42	0 :00	0	0	5.0	E	84	3	0	11	0	30	12	15	13	0	23
9	NS	10/11	Labarre	04:25 AM	0 :00	0 :00	4 :00	0 :00	0	0	5.0	E	57	3	0	10	0	40	2	0	2	0	18
10	SP	10/11	Labarre	05:00 AM	0 :00	0 :00	6 :00	0 :00	0	0	10.0	E	91	3	0	0	0	0	0	88	0	0	0
11	SP	10/11	Labarre	05:05 AM	4 :43	4 :45	6 :15	0 :00	1	1	10.0	W	77	4	0	6	1	34	4	4	24	0	17
12	RIO GRANDE	10/11	Labarre	05:35 AM	0 :00	0 :00	0 :52	0 :00	0	0	5.0	NA	3	3	0	0	0	0	0	0	0	0	0
13	(NA)	10/11	Labarre	05:55 AM	0 :00	0 :00	1 :00	0 :00	0	0	NA	E	5	5	0	0	0	0	0	0	0	0	0
14	KCS	10/11	Labarre	06:00 AM	28 :00	0 :00	28 :00	0 :00	3	0	5.0	E	94	2	0	44	2	27	0	4	0	15	21
15	SP	10/11	Labarre	06:15 AM	0 :00	3 :32 (2)	13 :00	7 :17	0	4	10.0	W	110	3	0	17	0	53	1	0	35	0	34
16	UP	10/11	Labarre	08:53 AM	2 :51	2 :51	5 :34	0 :00	10	13	20.0	E	105	3	0	10	1	45	4	7	0	35	28
17	SP	10/11	Labarre	11:30 AM	1 :35	2 :07	4 :00	0 :00	4	8	10.0	E	51	3	0	26	3	11	2	2	0	4	5
18	UP	10/11	Labarre	11:40 AM	5 :54	7 :14	6 :56	0 :00	15	15	10.0	W	101	3	0	15	3	35	1	6	2	36	28
19	SP	10/11	Labarre	12:45 PM	6 :55	6 :55	7 :45	0 :26	18	11	15.0	W	100	6	0	0	14	0	0	81	0	0	1
20	UP	10/11	Labarre	03:35 PM	5 :42	5 :45	13 :00	0 :00	15	14	20.0	W	99	3	0	3	0	73	1	1	18	0	45
1	NS	10/12	Metairie	01:00 AM	1 :00	1 :00	1 :03	0 :00	1	3	10.0	W	17	1	0	2	0	7	1	0	3	0	6
2	SP	10/12	Metairie	01:05 AM	0 :00	0 :00	1 :16	0 :00	0	0	10.0	W	5	5	0	0	0	0	0	0	0	0	0
3	SP	10/12	Metairie	01:10 AM	6 :50	6 :50	9 :03	0 :00	4	5	10.0	E	112	4	0	45	2	37	0	4	20	0	14
4	NS	10/12	Metairie	01:45 AM	4 :04	4 :00	4 :10	0 :00	1	3	15.0	E	60	3	0	16	0	28	1	0	12	0	7
5	UP	10/12	Metairie	02:05 AM	2 :48	20 :00 (2)	7 :54	0 :00	1	5	5.0	W	88	3	0	13	0	41	0	3	28	0	26
6	KCS	10/12	Metairie	02:30 AM	5 :09	4 :25	6 :33	0 :00	1	3	20.0	W	89	4	0	36	5	24	2	0	18	0	15
7	NS	10/12	Metairie	03:15 AM	0 :00	1 :36	4 :54	0 :00	0	1	10.0	E	58	1	0	6	0	42	1	0	8	0	30
8	KCS	10/12	Metairie	03:45 AM	0 :00	0 :00	3 :41	0 :00	0	0	15.0	W	37	3	0	6	1	16	2	0	9	0	8
9	UP	10/12	Metairie	04:10 AM	0 :00	0 :00	5 :15	0 :00	0	0	10.0	E	59	3	0	5	0	28	0	11	0	12	26
10	RIO GRANDE	10/12	Metairie	04:30 AM	1 :36	3 :30	6 :01	0 :00	2	2	10.0	E	60	3	0	12	7	7	1	17	0	13	5
11	CONRAIL	10/12	Metairie	05:00 AM	6 :35	4 :11	8 :19	0 :00	4	1	NA	W	94	5	0	10	4	34	0	7	0	39	15
12	UP	10/12	Metairie	06:00 AM	7 :23	8 :00	9 :25	0 :00	10	5	11.0	E	97	5	0	6	0	42	0	22	0	24	35
13	UP	10/12	Metairie	06:41 AM	4 :44	3 :50	3 :50	0 :00	15	4	11.5	W	48	3	0	0	10	25	0	1	0	9	14
14	KCS	10/12	Metairie	09:10 AM	12 :00	19 :37	9 :50	0 :00	44	137	9.3	E	111	3	0	28	0	26	0	34	20	0	16
15	UP	10/12	Metairie	01:30 PM	0 :00	7 :55	10 :06	0 :00	0	4	11.4	W	118	4	0	3	0	83	3	2	0	23	51
16	COTTON BELT	10/12	Metairie	02:45 PM	11 :49	11 :54	9 :00	0 :00	42	19	15.0	E	37	1	0	0	0	0	0	36	0	0	0
17	SP	10/12	Metairie	03:00 PM	7 :20	3 :08	6 :40	0 :00	96	61	10.0	W	122	3	0	0	41	0	0	78	0	0	0
18	UP	10/12	Metairie	05:15 PM	19 :42	12 :00	8 :40	0 :00	97	104	10.0	W	103	3	0	0	1	22	1	38	36	0	13
19	CONRAIL	10/12	Metairie	05:35 PM	30 :00	12 :50	9 :42	0 :00	211	86	10.0	E	113	5	0	5	10	0	0	93	0	0	0
20	NS	10/12	Metairie	06:00 PM	9 :55	6 :40	4 :10(3)	0 :00	85	45	15.0	W	60	3	0	0	33	0	0	24	0	0	0
21	NS	10/12	Metairie	06:20 PM	0 :44	1 :56	1 :05(3)	0 :00	4	23	20.0	E	3	3	0	0	0	0	0	0	0	0	0
22	KCS	10/12	Metairie	07:25 PM	14 :50	13 :09	9 :00	0 :00	105	85	17.5	W	119	2	0	40	3	36	0	0	38	0	31
23	NS	10/12	Metairie	09:10 PM	8 :10	7 :39	6 :11	0 :00	46	34	9.7	E	78	3	0	13	1	39	2	0	0	20	16
24	NS	10/12	Metairie	10:20 PM	10 :41	9 :00	8 :58	0 :00	36	35	11.2	W	124	2	0	12	1	21	23	52	0	13	11
25	SP	10/12	Metairie	11:45 PM	5 :37	7 :25	7 :43	0 :00	8	2	7.4	W	87	2	0	0	0	0	0	85	0	0	0
26	SP	10/12	Metairie	12:00 AM	15 :00	0 :31	9 :00	0 :00	30	3	10.0	E	113	4	0	31	0	44	1	0	33	0	22
1	KCS	10/13	Shrewsbury	02:30 PM	1 :27	0 :00	2 :33	0 :00	1	0	10.0	E	23	2	0	7	0	6	1	5	2	0	4
2	KCS	10/13	Shrewsbury	02:38 PM	6 :00	7 :43	8 :29	0 :00	1	2	5.0	E	91	2	0	9	15	10	0	58	0	0	2
3	COTTON BELT	10/13	Shrewsbury	04:00 PM	2 :00	0 :00	4 :01	0 :00	5	0	15.0	E	47	2	0	0	10	0	0	35	0	0	0
4	KCS	10/13	Shrewsbury	05:15 PM	0 :30	0 :00	1 :30	0 :00	1	0	10.2	W	2	2	0	0	0	0	0	0	0	0	0
5	KCS	10/13	Shrewsbury	05:25 PM	0 :00	0 :00	0 :48	0 :00	0	0	NA	NA	2	2	0	0	0	0	0	0	0	0	0
6	KCS	10/13	Shrewsbury	05:30 PM	0 :30	1 :57	1 :57	0 :00	2	2	NA	NA	26	2	0	4	5	6	0	1	0	8	4
7	KCS	10/13	Shrewsbury	06:10 PM	0 :00	0 :00	0 :37	0 :00	0	0	20.3	NA	2	2	0	0	0	0	0	0	0	0	0
8	SP	10/13	Shrewsbury	06:13 PM	0 :00	0 :00	1 :07	0 :00	0	0	NA	E	2	2	0	0	0	0	0	0	0	0	0
9	NS	10/13	Shrewsbury	06:25 PM	0 :25	0 :00	1 :58	0 :00	1	0	19.9	E	24	3	0	0	0	0	0	21	0	0	0
10	SP	10/13	Shrewsbury	06:27 PM	4 :22	6 :49	8 :26	0 :00	1	1	7.1	W	67	2	0	0	0	0	0	65	0	0	0
11	KCS	10/13	Shrewsbury	08:50 PM	0 :00	1 :26	6 :46	0 :00	0	2	7.8	W	68	2	0	2	0	17	0	39	0	8	11
12	SP	10/13	Shrewsbury	09:51 PM	5 :46	0 :00	21 :28	10 :47	1	0	12.1	W	99	3	0	45	0	32	2	2	0	15	10
13	KCS	10/13	Shrewsbury	10:06 PM	2 :57	0 :00	4 :58	0 :00	3	0	8.4	W	58	2	0	3	0	17	0	0	33	3	14
14	SP	10/13	Shrewsbury	11:02 PM	5 :39	0 :00	7 :32	0 :00	1	0	12.9	E	110	4	2	0	0	0	0	104	0	0	0
15	UP	10/13	Shrewsbury	11:09 PM	0 :00	0 :00	24 :56	14 :06	0	0	13.9	NA	120	6	0	23	1	52	0	1	35	2	41
16	SP	10/13	Shrewsbury	11:47 PM	5 :18	5 :18	21 :17	8 :21	1	1	13.1	W	121	3	2	16	1	41	7	25	26	0	27
17	(NA)	10/14	Shrewsbury	12:06 AM	0 :00	0 :00	4 :40	0 :00	0	0	6.5	W	43	1	0	6	0	29	2	0	5	0	24
18	KCS	10/14	Shrewsbury	12:20 AM	0 :27	0 :00	6 :58	0 :00	1	0	NA	NA	76	3	4	6	0	7	0	50	6	0	4
19	KCS	10/14	Shrewsbury	01:52 AM	0 :00	0 :00	13 :22	8 :40	0	0	6.6	W	38	0	2	13	0	10	0	0	11	0	10
20	UP	10/14	Shrewsbury	02:21 AM	0 :00	0 :00	3 :59	0 :00	0	0	10.3	E	40	3	0	4	0	14	1	1	17	0	7
21	KCS	10/14	Shrewsbury	02:30 AM	0 :00	0 :00	8 :32	0 :00	0	0	8.2	W	102	2	2	45	0	29	0	3	19	2	16
22	UP	10/14	Shrewsbury	03:01 AM	0 :00	0 :00	3 :20	0 :00	0	0	NA	W	11	11	0	0	0	0	0	0	0	0	0
23	UP	10/14	Shrewsbury	03:16 AM	0 :00	0 :00	5 :53	0 :00	0	0	14.4	E	77	3	0	6	0	31	3	10	0	24	25
24	KCS	10/14	Shrewsbury	03:50 AM	0 :00	0 :00	22 :44	13 :50	0	0	20.9	NA	110	3	0	12	0	43	0	12	0	40	23
Average for All Trains Surveyed (Excluding Locomotive Only Trains)							7 :29				*12.42*		*80.98*	*2.95*	*0.20*	*12.16*	*3.92*	*25.21*	*1.72*	*20.02*	*7.75*	*7.10*	*15.15*

NA Data not collected or information unknown.

(1) As this train was crossing Labarre Road, a second train, heading Eastbound, approached the crossing and stopped for over two hours prior to reaching the crossing. Information for this train was not able to be collected once it did continue and crossed Labarre Road.

(2) Data not collected in survey. Estimate based on Jefferson Parish traffic count data and size of vehicle queue.

(3) Data not collected in survey. Estimate based on data for trains of similar length and speed.

Source: Train survey conducted by CONSAD Research Corporation, October 1995.

Car Type Key (With Assumed Car Length)

T = TANKER(45ft.)
G = GONDOLA(47ft.)
F = FLAT CAR(61ft.)
H = HOPPER(53ft.)
B= BOXCAR(60ft.)
L = LOCOMOTIVE(75ft.)
BF = BULKHEAD FLAT CAR(60ft.)
TTX = LONGFLAT(89ft.)
CH = CLOSED HOPPER(59ft.)

cars contained hazardous materials. Based on standard car lengths for the different types of cars observed (Umler, 1993) and the composition of the average train observed, the average train is estimated to be about 5,033 feet in length (or about 62.2 feet, on average, for each car).

The train speeds, as they began their crossing, ranged from five to 27 miles per hour for those trains with cars. The average train speed observed was 12.4 miles per hour (for each train, the train speed was determined by either using a speed gun or recording the amount of time it took the train to travel 150 feet and then calculating the train speed from this information).[18] The average observed blocking time, for those trains with cars, was eight minutes and 29 seconds, ranging from a low of one minute and three seconds to a high of 28 minutes.

The number of vehicles estimated to be blocked by the trains travelling across the grade crossings was lowest at the Shrewsbury Road crossing and highest at the Metairie Road crossing, consistent with the vehicle traffic flow patterns for these roads. The largest vehicle queue was estimated at 297 vehicles (for both directions) for a train crossing Metairie Road at 5:35 PM. It should be understood that all vehicle queue estimates are based on judgments made by CONSAD survey personnel concerning when the queue appeared to end and, by and large, only include vehicles observed

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[18] It should be noted that trains often slowed down, or even stopped for a period of time, after they began to cross the grade crossing. Thus, the initial train speed indicated is often an overestimate of the average train speed during the entire grade crossing blockage.

on the primary road. Thus, the estimates do not necessarily include all those vehicles travelling on the primary road that may, ultimately, have been delayed nor do they include all the additional vehicles on side streets feeding into the primary road that were also observed to be impacted.

In order to project railroad traffic volumes over the Back Belt over the next 25 years, CONSAD utilized the rail freight commodity flow forecasts developed for the New Orleans Business Economic Area (BEA) by the National Ports and Waterways Institute at Louisiana State University as part of the freight transportation study for the *Louisiana Statewide Intermodal Plan* (LSU, 1995). Specifically, the medium cargo forecasts for 1990, 2000, 2010, and 2020 were used to estimate the percent change in rail freight traffic between 1995 and each of the three benchmark years in the future.

Using these percent changes, two scenarios were developed. The first assumes that the number of trains (and operating schedule) over the Back Belt will remain constant and that the average number of cars per train will increase to handle the expected increase in rail freight traffic. The second scenario assumes that the number of trains over the Back Belt will increase, proportionately, according to the current operating schedule and that the average number of cars per train will remain constant. These rail freight projections for 2000, 2010, and 2020 are presented in Appendix C. The data indicate that if the number of trains remain constant, the average length of each train will increase from 81 cars in 1995, to 88 cars in 2000, 101 cars in

2010, and 115 cars in 2020. Alternatively, if the average number of cars per train remain constant, the average number of trains crossing the Back Belt each day are projected to increase from 24.7 trains in 1995, to 26.9 trains in 2000, 30.7 trains in 2010, and 35.1 trains in 2020.

6.2.3 Highway User Impact Methodology

The cost to highway users of being stopped or delayed by a train blocking a railroad grade crossing, or being slowed down by having to go over the grade crossing, is determined for each of the eight grade crossings, for each direction of highway traffic, for each of the 24 one-hour intervals in a day. One-hour intervals are used in order to consider the variability in both the train schedule and traffic flow pattern. The highway user costs have two components: 1) the increased cost to the vehicle operator of time lost due to stoppage/delay or slowing down, and 2) the increased cost of operating the vehicle due to stoppage/delay or slowing down (during CONSAD's train survey, most drivers stopped by a train were observed to keep their engines running while waiting for the train to clear the crossing). Both costs are based upon the number of vehicles stopped/delayed or slowed and the average length of the delay or slowing time experienced by stopped/delayed or slowed vehicles, respectively. This section briefly describes the methodology used in calculating highway user costs. A more complete description of the methodology is presented in Appendix C.

The initial number of vehicles stopped by a passing train is a function of both the probability of being stopped by a train blockage during each one-hour period and the number of vehicles passing the grade crossing each hour. The likelihood of being stopped, in turn, is based on the number of trains crossing over the Back Belt each hour and the length of time the crossing is blocked, on average, by a train. The average train blocking time can be calculated from the number and average length of cars per train, and the average speed of the train.[19] The traffic and railroad data needed for this analysis were described in the previous two sections.

In addition to the initial number of vehicles stopped during the time that the train physically blocks the crossing, additional vehicles (i.e., a second queue) will be delayed as a result of the time it takes the initial queue of cars to dissipate and move once the train has passed. In this analysis, 2.33 seconds per vehicle were allowed for dissipating the initial queue.[20] Moreover, the creation of a second queue of vehicles will then create a third vehicle queue as the second vehicle queue dissipates. In this analysis, three queues, in all, were considered in order to estimate the number of vehicles stopped/delayed by trains (the

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[19] An upward adjustment was also made to account for trains that slowed down or stopped for a period of time as they crossed a grade crossing (since the average train speed used represents the initial speed as the train first crosses the grade crossing). Separate adjustments were made for each crossing based on a comparison of the calculated train blockage times versus the observed blockage times at the surveyed crossings.

[20] This estimate is based on standard traffic engineering practice and allows 2.1 seconds per vehicle, with an additional one to 1.3 seconds for 20 percent of the vehicles to make a right or left hand turn [Wohl et al., 1967; and conversation with Doug Roberts (April 1996) in the Jefferson Parish Traffic Engineering Department].

initial queue resulting from the train blockage and two additional queues caused by the time it takes to dissipate each previous queue).

The number of vehicles slowed down by the grade crossings was estimated as the difference between the number of vehicles per hour travelling over each of the grade crossings and the number of vehicles stopped/delayed at each crossing as a result of trains traversing the Back Belt. In other words, every car going over each grade crossing is assumed to be affected either by being stopped/delayed by a train blockage or by being slowed by having to go over the grade crossing.

The average time delay experienced by the initial set (queue) of vehicles stopped by a train is equivalent to one-half of the average time the train blocks the crossing plus one half of the time needed to dissipate the initial queue created by the train blockage. This is based on standard traffic engineering practice (FRA/FHWA, 1974). Similarly, the average time delay experienced by additional vehicles delayed by the initial (or second) queue is equivalent to one half of the time needed to dissipate the initial (or second) queue plus one half of the time needed to dissipate the second (or third) queue created by the initial (or second) queue.

The average slowing time experienced by vehicles crossing the grade crossing is a function of how much a vehicle must slow down and for how long. Assuming a vehicle going 25 to 30 miles per hour slows down to 10 to 15 miles per hour, for a distance of approximately 0.05 miles (or about 130 feet on either side of the crossing), an additional 0.1 to 0.18 minutes of time will be needed to travel the distance, producing an average slowing time of 0.14 minutes per vehicle.

The average delay and slowing times, coupled with the numbers of vehicles being stopped/delayed or slowed, produces estimates of the total delay or slowing time (in minutes) experienced by motorists as the trains are travelling over the Back Belt or as vehicles are crossing the grade crossings. The highway user delay cost is calculated by multiplying the delay or slowing time (converted from minutes to hours) by the estimated cost per hour associated with the delays or slowing caused by the trains or crossings. The cost per hour estimates, in turn, were based on hourly wage rates for individuals working in Jefferson Parish and in the surrounding parishes, as well as on the median household income (expressed on an hourly basis) for individuals residing in Jefferson Parish and in the surrounding parishes.[21] While some individuals may value their time waiting at a railroad crossing (or travelling more slowly across a grade crossing) more or less than their average hourly compensation or their average household income, use of these income measures are assumed to be reasonable and appropriate surrogates for estimating the cost associated with highway user delays and slowing. These data (presented in Appendix C) were obtained from the U.S. Department of Commerce (1993 County Business Patterns, 1996 and 1990 Census of Population, 1994) and were adjusted for inflation to 1995 levels.

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[21] The surrounding parishes are the same as those used for projecting highway traffic flows (see footnote 7).

In this analysis, the wage rates and household income for Jefferson Parish were weighted more heavily than the average for the other surrounding parishes since, as discussed earlier in the report, it is estimated that 75 percent of the highway traffic in the Metairie area represents individuals beginning and/or terminating their trip in this area. In other words, it is assumed that 75 percent of the traffic represents individuals working and/or residing in the Metairie area and 25 percent of the traffic represents individuals working and/or residing in the surrounding parishes.

Taking an average of the hourly wage rate and household income figures, and weighting the Jefferson Parish data three times more than the data for the other parishes, produces an overall user delay or slowing cost per hour of $13.65 (this assumes that only one employee and only members of the same household are travelling in each vehicle). For rush hour and other daylight periods (i.e., 6 AM to 7 PM), this figure was adjusted upward to $17.05 assuming 25 percent of the vehicles have two employees or members of two different households travelling together).[22]

The vehicle delay time cost is calculated by multiplying the number of vehicles stopped/delayed by the delay cost per vehicle.

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[22] This assumption is based upon information received from the Regional Planning Commission (conversation with Tom Hunter, March 1996) that the average vehicle passenger occupancy rate ranges from 1.2 to 1.3 persons. Using a value of 1.25 is equivalent to 25 percent of the vehicles with two occupants and 75 percent of the vehicles with one occupant. While it appears that this vehicle occupancy rate could be assumed for all hours of the day, the analysis presented here assumed two occupants with two wage earners or two occupants from different households in 25 percent of the vehicles only during rush hour and other daylight hour periods.

This cost is based on both the average vehicle approach speed and the average time delay (FRA/FHWA, 1974). Based on the posted speed limits of 25 to 30 miles per hour for the eight roads with grade crossings, and average time delays generally ranging from about three to four minutes up to about 10 to 12 minutes (depending upon the time of day), it is estimated that the vehicle delay time cost ranges from $0.07 to $0.15 per vehicle, for an average cost of $0.11 per vehicle [this is based on engineering curves presented in FRA/FHWA (1974), with cost adjustments made for both general inflation and changes in automotive operating costs including depreciation, insurance, financing expenses, fuel and oil, maintenance, and tires (AAA, 1994)].

Similarly, the vehicle slowing time cost is calculated by multiplying the number of vehicles slowed by the slowing cost per vehicle. This cost is based on both the average vehicle approach speed and the roughness of the grade crossing (FRA/FHWA, 1974). Based on the posted speed limits of 25 to 30 miles per hour for the eight roads with grade crossings, across the range of grade crossing roughness indices, it is estimated that the vehicle slowing time cost ranges from $0.01 to $0.03 per vehicle, for an average cost of $0.02 per vehicle [again, this is based on engineering curves presented in FRA/FHWA (1974), with cost adjustments made for both general inflation and changes in automotive operating costs including depreciation, insurance, financing expenses, fuel and oil, maintenance, and tires (AAA, 1994)].

The highway user delay and slowing time costs, and the vehicle operating delay and slowing time costs, were estimated for 1995, 2000, 2010, and 2020 for the two rail freight traffic scenarios described above in the absence of any substantive changes to current railroad operations (other than an increase in the number of cars per train or the number of trains per day, as described in Section 6.2.2 above, to accommodate the projected increase in rail freight traffic) . These results are presented in Section 6.2.4 below. Section 6.2.5 then describes the impact (i.e., the benefits) that various short and long term alternative solutions would have on highway user costs.

6.2.4 Summary of Highway User Impacts

At present, it is estimated that 24.7 trains, on average, travel over the Back Belt on a daily basis. Each train is assumed to have three locomotives and 78 cars. Further, it is estimated that almost 41,000 vehicles per day travel over the roads where the eight grade crossings are located. The total train blockage time resulting from these train movements is estimated to range from 5.88 to 8.41 minutes per train (depending upon the grade crossing), or from 145.2 to 207.9 minutes per day per crossing (depending upon the crossing), for a total of 1,388 minutes per day (see Table 6.5)[23]. The additional daily blockage time caused by the first and second vehicle queues is estimated to range from about 2.7 minutes at the Atherton Drive crossing to 47.3 minutes at the Metairie Road

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[23] Additional, more detailed, information describing for the highway traffic vehicle delay and cost analysis can be found in Appendix C.

crossing for a total of 95 additional minutes per day across all crossings. Thus, the total daily blockage time across all grade crossings is estimated at about 1,483 minutes per day.

Given the current traffic flow in the study area and the operating schedule of the trains, this results in over 5,200 vehicles each day being stopped or delayed as trains travel over the Back Belt, with over half of the traffic delay being experienced on Metairie Road (again, see Table 6.5). This represents from 10.3 to 13.8 percent of the total volume of traffic travelling over the grade crossings each day. This, in turn, translates into 19,300 minutes of total delay time each day for all affected vehicles, again with over half of the delay time experienced on Metairie Road.

For those vehicles not stopped or delayed by the trains, the slowing time associated with crossing the grade crossings is estimated to amount to 5,000 minutes per day with almost half of this time experienced on Metairie Road. Combined, the total delay and slowing time is almost 24,300 minutes per day.

Considering both the user and vehicle delay time costs, it is estimated that the present train traffic over the Back Belt is currently costing vehicle operators about $5,900 per day in delay time costs. An additional $2,100 per day in user and vehicle slowing time costs are estimated for those vehicles travelling over the grade crossings but not actually stopped/delayed by the trains. This results in a total delay and slowing time cost of almost $8,000 per day (again, see Table 6.5).

Table 6.5 :Highway Traffic Vehicle Delay, Slowing, and Cost Analysis
1995 Daily Totals

Location	Trains Per Day	Vehicles per day (Both Directions)	Total Train Blockage Time (Minutes)	Total Additional Blockage Time Caused by Vehicle Queues (Minutes)	Total Blockage Time (Minutes)	Total Number of Vehicles Delayed	Percent of Total Traffic Volume Delayed
CARROLLTON AVENUE	**24.7**	**5,370**	**145.22**	**10.51**	**155.72**	**555.10**	**10.34%**
METAIRIE ROAD	**24.7**	**19,797**	**145.22**	**47.31**	**192.53**	**2,725.38**	**13.77%**
WEST OAKRIDGE DRIVE	**24.7**	**1,386**	**172.51**	**3.11**	**175.62**	**160.34**	**11.57%**
FARNHAM PLACE	**24.7**	**2,132**	**172.51**	**4.68**	**177.19**	**242.12**	**11.36%**
HOLLYWOOD DRIVE	**24.7**	**3,820**	**172.51**	**8.34**	**180.85**	**432.85**	**11.33%**
ATHERTON DRIVE	**24.7**	**1,241**	**172.51**	**2.67**	**175.18**	**137.41**	**11.07%**
LABARRE ROAD	**24.7**	**5,722**	**199.73**	**14.94**	**214.66**	**781.77**	**13.66%**
SHREWSBURY ROAD	**24.7**	**1,471**	**207.91**	**3.78**	**211.69**	**195.31**	**13.28%**
Totals	**24.7**	**40,939**	**1,388.11**	**95.33**	**1,483.44**	**5,230.28**	**12.78%**

Location	Total Delay Time For All Affected Vehicles (Minutes)	Total Slowing Time For All Affected Vehicles (Minutes)	Total Delay + Slowing Time For All Affected Vehicles (Minutes)	Total Delay Time Cost (1995 Dollars)	Total Slowing Time Cost (1995 Dollars)	Total Delay + Slowing Time Cost (1995 Dollars)
CARROLLTON AVENUE	**1,723.96**	**674.09**	**2,398.05**	**$539.25**	**$284.00**	**$823.25**
METAIRIE ROAD	**9,954.04**	**2,390.03**	**12,344.07**	**$3,020.39**	**$998.86**	**$4,019.25**
WEST OAKRIDGE DRIVE	**571.42**	**171.59**	**743.01**	**$175.63**	**$72.33**	**$247.95**
FARNHAM PLACE	**866.29**	**264.58**	**1,130.88**	**$268.16**	**$111.88**	**$380.04**
HOLLYWOOD DRIVE	**1,560.73**	**474.20**	**2,034.93**	**$474.10**	**$198.94**	**$673.04**
ATHERTON DRIVE	**485.89**	**153.88**	**639.78**	**$147.40**	**$64.22**	**$211.61**
LABARRE ROAD	**3,284.15**	**691.63**	**3,975.78**	**$991.06**	**$290.95**	**$1,282.00**
SHREWSBURY ROAD	**832.88**	**178.60**	**1,011.47**	**$254.01**	**$75.54**	**$329.55**
Totals	**19,279.37**	**4,998.60**	**24,277.97**	**$5,869.99**	**$2,096.71**	**$7,966.70**

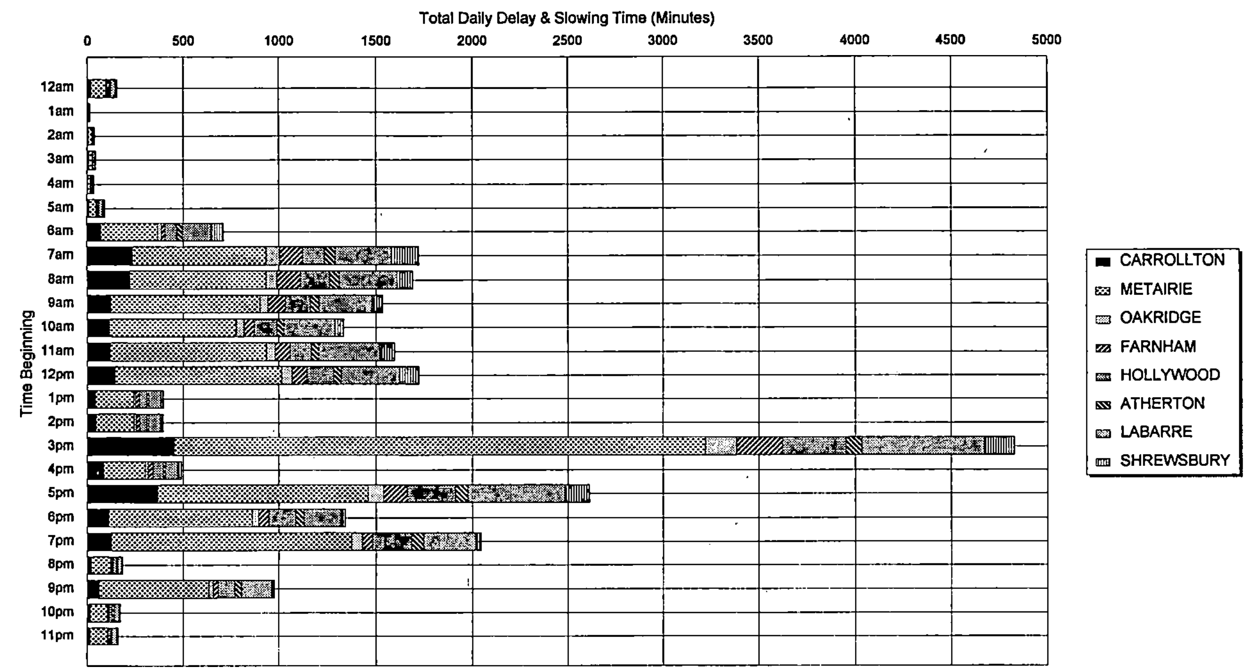
Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

Figure 6.1 illustrates the total current daily delay and slowing time for each of the eight grade crossings on an hourly basis. As indicated by the data, the largest amount of delay and slowing time (representing 20 percent of the total delay and slowing time) is estimated to occur during the afternoon rush hour between 3 PM and 4 PM, primarily on Metairie Road. Substantial delay and slowing time is also estimated to occur between 7 AM and 1 PM and between 5 PM and 7 PM.

Assuming current railroad operations continue into the future (that is, with no scheduling or operating changes other than simply an increase in the average number of cars per train or trains per day), the projections for both railroad freight and highway vehicle traffic over the next 25 years suggest that the situation will only get worse, especially after 2000. Table 6.6 summarizes the total delay and slowing time and total delay and slowing time costs, both daily and annually, for all affected vehicles, assuming that the number of cars per train increase (while the number of trains per day remain constant) to handle the additional freight volume projected over the next 25 years. Table 6.7 presents similar information under the alternative scenario that the number of trains per day increase (while the number of cars per train remain constant). As indicated by these data, the total delay and slowing time for all affected vehicles is projected to increase from 147,700 hours in 1995, on an annual basis, to between 285,800 and 311,900 hours by the year 2020.

Figure 6.2 illustrates the total daily delay and slowing time, on an hourly basis, for all eight grade crossings combined, over

Figure 6.1: Total Delay and Slowing Time for all Affected Vehicles, by Location (Minutes)
1995 Daily Totals by Hour



Time Beginning	CARROLLTON AVENUE	METAIRIE ROAD	WEST OAKRIDGE DRIVE	FARNHAM PLACE	HOLLYWOOD DRIVE	ATHERTON DRIVE	LABARRE ROAD	SHREWSBURY ROAD	TOTAL
12am	17	80	2	3	13	6	25	6	153
1am	1	9	0	0	1	1	1	0	13
2am	4	19	0	0	4	1	7	2	37
3am	6	23	0	1	1	0	11	3	45
4am	3	14	0	1	2	1	11	4	36
5am	9	40	4	1	7	2	19	9	91
6am	73	292	19	18	64	28	149	68	712
7am	233	699	72	118	114	54	289	143	1,722
8am	220	713	57	122	150	52	299	76	1,687
9am	121	780	43	88	129	45	274	56	1,536
10am	115	662	40	54	121	33	262	48	1,335
11am	118	818	45	77	109	37	317	74	1,595
12pm	142	871	53	78	135	42	299	102	1,723
1pm	41	199	12	20	38	10	61	12	392
2pm	44	199	12	18	37	11	59	13	392
3pm	452	2,768	163	239	331	81	635	159	4,827
4pm	86	215	16	26	51	11	64	20	489
5pm	366	1,093	82	120	250	67	503	132	2,613
6pm	112	747	35	52	141	42	192	22	1,342
7pm	124	1,250	54	54	201	63	271	27	2,045
8pm	19	104	4	6	18	7	21	2	181
9pm	63	568	23	26	90	34	156	17	978
10pm	15	91	4	6	15	8	27	7	172
11pm	14	92	2	4	11	6	26	8	162
TOTAL	2,398	12,344	743	1,131	2,035	640	3,976	1,011	24,278

Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

Table 6.6: Highway Traffic Vehicle Delay, Slowing, and Cost Analysis
1995-2020 Daily and Annual Totals
Assuming Number of Cars per Train Increase (Number of Trains per Day Remain Constant)
With No Other Scheduling Changes in Current Railroad Operations

Daily Totals

Location	1995 Total Delay and Slowing Time For All Affected Vehicles (Minutes)	1995 Total Delay and Slowing Time Cost (1995 Dollars)	2000 Total Delay and Slowing Time For All Affected Vehicles (Minutes)	2000 Total Delay and Slowing Time Cost (1995 Dollars)	2010 Total Delay and Slowing Time For All Affected Vehicles (Minutes)	2010 Total Delay and Slowing Time Cost (1995 Dollars)	2020 Total Delay and Slowing Time For All Affected Vehicles (Minutes)	2020 Total Delay and Slowing Time Cost (1995 Dollars)
CARROLLTON AVENUE	2,398	$823	2,741	$927	3,533	$1,167	4,643	$1,500
METAIRIE ROAD	12,344	$4,019	14,478	$4,643	19,781	$6,194	27,729	$8,495
WEST OAKRIDGE DRIVE	743	$248	852	$280	1,097	$353	1,434	$453
FARNHAM PLACE	1,131	$380	1,297	$429	1,672	$543	2,190	$697
HOLLYWOOD DRIVE	2,035	$673	2,337	$762	3,018	$963	3,965	$1,240
ATHERTON DRIVE	640	$212	733	$239	940	$300	1,226	$384
LABARRE ROAD	3,976	$1,282	4,610	$1,468	6,052	$1,891	8,075	$2,479
SHREWSBURY ROAD	1,011	$330	1,169	$376	1,521	$481	2,009	$624
Totals	**24,278**	**$7,967**	**28,217**	**$9,125**	**37,614**	**$11,893**	**51,271**	**$15,871**

Annual Totals

Location	1995 Total Delay and Slowing Time For All Affected Vehicles (Hours)	1995 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2000 Total Delay and Slowing Time For All Affected Vehicles (Hours)	2000 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2010 Total Delay and Slowing Time For All Affected Vehicles (Hours)	2010 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2020 Total Delay and Slowing Time For All Affected Vehicles (Hours)	2020 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	14,588	$300	16,675	$338	21,491	$426	28,246	$547
METAIRIE ROAD	75,093	$1,467	88,074	$1,695	120,333	$2,261	168,683	$3,100
WEST OAKRIDGE DRIVE	4,520	$91	5,184	$102	6,672	$129	8,725	$165
FARNHAM PLACE	6,879	$139	7,888	$157	10,169	$198	13,322	$254
HOLLYWOOD DRIVE	12,379	$246	14,214	$278	18,361	$352	24,120	$452
ATHERTON DRIVE	3,892	$77	4,460	$87	5,721	$110	7,458	$140
LABARRE ROAD	24,186	$468	28,046	$536	36,816	$690	49,122	$905
SHREWSBURY ROAD	6,153	$120	7,113	$137	9,254	$175	12,222	$228
Totals	**147,691**	**$2,908**	**171,655**	**$3,330**	**228,818**	**$4,341**	**311,899**	**$5,793**

Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

Table 6.7: Highway Traffic Vehicle Delay, Slowing, and Cost Analysis
1995-2020 Daily and Annual Totals
Assuming Number of Trains per Day Increase (Number of Cars per Train Remain Constant)
With No Other Scheduling Changes in Current Railroad Operations

Daily Totals

	1995		2000		2010		2020	
Location	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)
CARROLLTON AVENUE	2,398	$823	2,662	$906	3,272	$1,098	4,092	$1,353
METAIRIE ROAD	12,344	$4,019	14,313	$4,603	19,303	$6,079	26,889	$8,297
WEST OAKRIDGE DRIVE	743	$248	818	$271	983	$323	1,191	$387
FARNHAM PLACE	1,131	$380	1,247	$416	1,507	$498	1,838	$601
HOLLYWOOD DRIVE	2,035	$673	2,252	$739	2,737	$888	3,366	$1,080
ATHERTON DRIVE	640	$212	703	$231	841	$274	1,013	$327
LABARRE ROAD	3,976	$1,282	4,447	$1,424	5,514	$1,747	6,932	$2,172
SHREWSBURY ROAD	1,011	$330	1,119	$363	1,356	$436	1,655	$527
Totals	24,278	$7,967	27,562	$8,953	35,511	$11,342	46,977	$14,744

Annual Totals

	1995		2000		2010		2020	
Location	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	14,588	$300	16,193	$331	19,904	$401	24,895	$494
METAIRIE ROAD	75,093	$1,467	87,071	$1,680	117,426	$2,219	163,574	$3,028
WEST OAKRIDGE DRIVE	4,520	$91	4,976	$99	5,979	$118	7,245	$141
FARNHAM PLACE	6,879	$139	7,586	$152	9,166	$182	11,180	$219
HOLLYWOOD DRIVE	12,379	$246	13,698	$270	16,650	$324	20,476	$394
ATHERTON DRIVE	3,892	$77	4,278	$84	5,115	$100	6,160	$119
LABARRE ROAD	24,186	$468	27,054	$520	33,541	$637	42,172	$793
SHREWSBURY ROAD	6,153	$120	6,810	$132	8,248	$159	10,071	$193
Totals	147,691	$2,908	167,666	$3,268	216,028	$4,140	285,774	$5,381

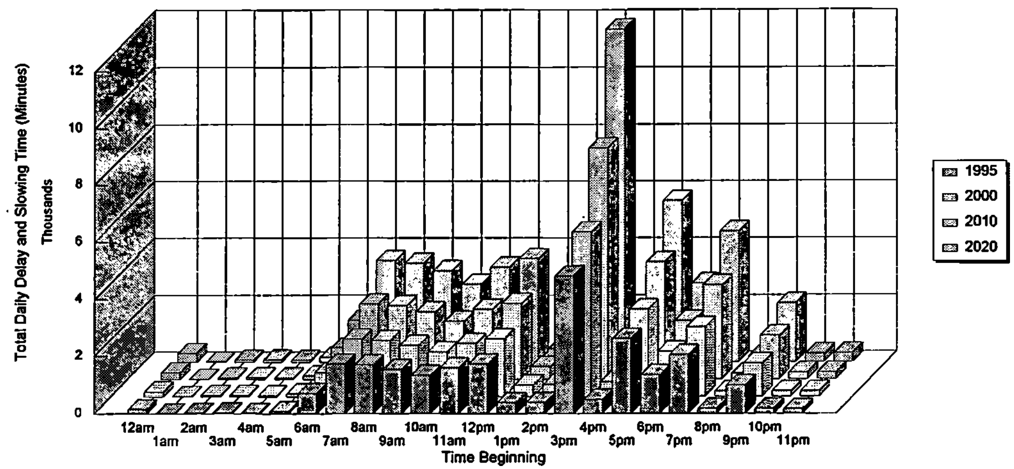
Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

Figure 6.2 : Total Delay and Slowing Time for All Affected Vehicles, for All Affected Locations (Minutes)
1995-2020 Daily Totals by Hour
With No Other Scheduling Changes in Current Railroad Operations

Assuming Number of Cars per Train Increase (Number of Trains per Day Remain Constant)

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	153	177	233	309
1am	13	13	14	15
2am	37	43	56	73
3am	45	52	68	90
4am	36	41	53	69
5am	91	104	133	173
6am	712	831	1,099	1,473
7am	1,722	1,994	2,644	3,567
8am	1,687	1,952	2,581	3,472
9am	1,536	1,788	2,373	3,216
10am	1,335	1,548	2,037	2,738
11am	1,595	1,852	2,463	3,342
12pm	1,723	2,003	2,667	3,628
1pm	392	400	434	466
2pm	392	405	433	465
3pm	4,827	5,770	8,125	11,678
4pm	489	504	544	584
5pm	2,613	3,051	4,111	5,660
6pm	1,342	1,557	2,047	2,768
7pm	2,045	2,422	3,303	4,594
8pm	181	185	199	214
9pm	978	1,148	1,531	2,078
10pm	172	191	234	292
11pm	162	185	235	306
TOTAL	24,278	28,217	37,614	51,271

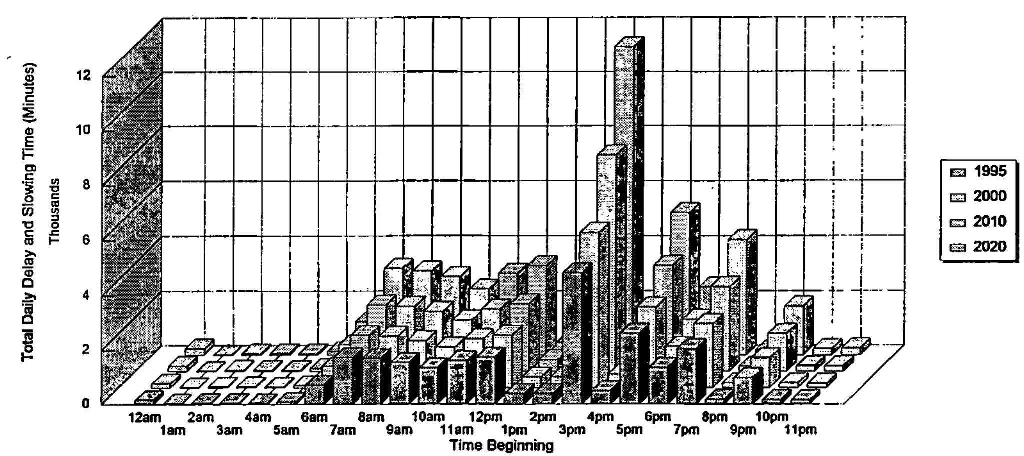
Assuming Number of Cars per Train Increase (Number of Trains per Day Remain Constant)



Assuming Number of Trains per Day Increase (Number of Cars per Train Remain Constant)

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	153	169	206	251
1am	13	13	14	15
2am	37	41	49	59
3am	45	50	60	72
4am	36	40	47	56
5am	91	99	118	142
6am	712	798	989	1,240
7am	1,722	1,937	2,458	3,180
8am	1,687	1,896	2,396	3,087
9am	1,536	1,737	2,209	2,875
10am	1,335	1,503	1,891	2,431
11am	1,595	1,802	2,303	3,011
12pm	1,723	1,950	2,498	3,279
1pm	392	400	434	466
2pm	392	405	433	465
3pm	4,827	5,693	7,900	11,279
4pm	489	504	544	584
5pm	2,613	2,982	3,889	5,211
6pm	1,342	1,518	1,920	2,507
7pm	2,045	2,366	3,124	4,231
8pm	181	185	199	214
9pm	978	1,110	1,406	1,814
10pm	172	185	215	251
11pm	162	178	211	254
TOTAL	24,278	27,562	35,511	46,977

Assuming Number of Trains per Day Increase (Number of Cars per Train Remain Constant)



Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

this 25 year period for both scenarios concerning how the projected increase in rail freight traffic will be accomplished. As the data illustrate, throughout the 25 years, the largest delay and slowing times are projected for the evening rush hours (in particular, between 3 PM-4 PM, and 5 PM-6 PM), followed by the morning rush hour (i.e., 7 AM-9 AM) and midday hour (i.e., 12 noon-1 PM).

As also indicated by the data in Tables 6.6 and 6.7 and Figure 6.2, in future years (especially by the year 2020), the delay and slowing times are expected to be more severe (i.e., about nine percent higher) if the number of cars per train increase rather than if the number of trains per day increase. This results, primarily, from the longer train blockages and the longer average delay times per vehicle caused by the longer trains. In other words, while increasing the length of each train will stop/delay less vehicles, each vehicle, on average, will be delayed for a longer amount of time (since each train is longer). Overall, this is expected to produce total vehicle delay times that are slightly more than if the number of trains increased.

In terms of total delay and slowing time cost, it is estimated that by the year 2020, costs (in 1995 dollars) will have increased to between \$5.4 and \$5.8 million, or between 85 and 100 percent above the estimated 1995 level of \$2.9 million (again, see Tables 6.6 and 6.7). Assuming a discount rate of seven percent[24], the net present value (in 1996) of these constant (1995) dollar delay and slowing time costs for 1996 through 2020 is estimated to range from

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[24] This discount rate is the currently approved rate from the Office of Management and Budget (OMB).

$46.5 to $48.1 million (again, assuming that current railroad operations continue into the future with no scheduling or operating changes other than an increase in the average number of cars per train or trains per day).

6.2.5 Impact of Alternative Solutions on Highway User Costs

This section of the report discusses the impact that the variety of alternative short and long term solutions described in earlier sections of this report are expected to have on highway traffic vehicle stoppage/delay, slowing, and costs. For this analysis, these solutions can be grouped into those that will eliminate the highway traffic impact entirely at one or more of the eight crossings versus those that will only partially alleviate the impact.

The first group of solutions include both in place alternatives such as closing one or more of the grade crossings or creating a grade separation at one or more of the grade crossings, as well as entirely eliminating train traffic over the Back Belt through the implementation of a relocation alternative such as the Carrollton Curve. The second group of solutions primarily include in place alternatives involving changes and improvements to current railroad operations that would either: 1) alter the operating schedule and concentrate train movements to hours when vehicle traffic is lightest; 2) allow trains to move across the Back Belt at faster speeds; and/or 3) permanently remove only a portion of the train traffic that is now travelling over the Back Belt through a partial relocation to other railroad corridors. In other words, the first group of solutions completely eliminates delays at one or more crossings, while the second group only reduces them.

For the first group of solutions, the impact (or benefit) of the various measures on highway traffic stoppage/delay, slowing, and costs would be the total elimination of the highway traffic stoppage/delay, slowing, and costs now being experienced (and projected) at a particular grade crossing (or across all grade crossings) under the assumption of no changes other than steady growth in railroad operations. These stoppage/delay/slowing costs for 1995, 2000, 2010, and 2020 were presented in Section 6.2.4.

Table 6.8 presents the cumulative impact (benefits) of these measures for the 25 year period 1996 - 2020 by grade crossing, and for all grade crossings, for the two alternative methods for handling rail freight growth (see Section 6.2.2, above). These benefit estimates are based on the assumption that no benefit would occur until 1998 to allow time for the in place solution to be implemented. For relocation alternatives such as the Carrollton Curve, additional time would be needed; it is assumed that no benefit would occur until 2001.[25]

As indicated by these data, either closing or grade separating all eight grade crossings, thereby totally removing the traffic stoppage/delay and slowing, would produce a benefit with a net present value in 1996 of between $40.6 and $42.3 million (with cost savings beginning to accrue in 1998). However, a possible

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[25] The lead times for the relocation alternatives are highly variable, ranging from about one year to over 10 years. Therefore, for this analysis, an average lead time of five years was chosen.

Table 6.8: Highway Traffic Vehicle Delay, Slowing, and Cost Analysis
Cumulative Benefits of Grade Crossing Closure, Grade Separation, and Relocation of All Traffic Off of the Back Belt, 1996-2020

Assuming Number of Cars Per Train Increase (Number of Trains per Day Remain Constant)

	Grade Crossing Closure or Grade Separation		Relocation of All Traffic Off of the Back Belt	
Location	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Net Present Value in 1996 of Reduction in Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Net Present Value in 1996 of Reduction in Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	494,183	$4,181	445,306	$3,369
METAIRIE ROAD	2,784,873	$21,926	2,527,426	$17,871
WEST OAKRIDGE DRIVE	153,214	$1,265	138,035	$1,020
FARNHAM PLACE	233,563	$1,940	210,461	$1,564
HOLLYWOOD DRIVE	421,850	$3,445	380,232	$2,778
ATHERTON DRIVE	131,366	$1,076	118,306	$867
LABARRE ROAD	846,526	$6,731	764,536	$5,449
SHREWSBURY ROAD	212,565	$1,714	191,767	$1,386
Totals	5,278,140	$42,278	4,776,068	$34,304
Time Period of Benefits	**1998 - 2020**		**2001 - 2020**	

Assuming Number of Trains Per Day Increase (Number of Cars per Train Remain Constant)

	Grade Crossing Closure or Grade Separation		Relocation of All Traffic Off of the Back Belt	
Location	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Net Present Value in 1996 of Reduction in Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Net Present Value in 1996 of Reduction in Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	456,523	$3,971	408,827	$3,174
METAIRIE ROAD	2,720,791	$21,592	2,465,736	$17,565
WEST OAKRIDGE DRIVE	136,698	$1,172	122,029	$933
FARNHAM PLACE	209,647	$1,804	187,286	$1,438
HOLLYWOOD DRIVE	381,117	$3,217	340,764	$2,567
ATHERTON DRIVE	116,891	$996	104,278	$792
LABARRE ROAD	768,668	$6,293	689,105	$5,043
SHREWSBURY ROAD	188,565	$1,577	168,509	$1,258
Totals	4,978,900	$40,621	4,486,534	$32,770
Time Period of Benefits	**1998 - 2020**		**2001 - 2020**	

Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

alternative scenario would involve the construction of grade separations at only the higher traffic volume grade crossings. These include Carrollton Avenue, Metairie Road, and Labarre Road. Combined, these three locations are expected to produce a benefit with a net present value in 1996 of between $31.9 and $32.8 million.

As shown in Table 6.8, relocating all of the existing train traffic off of the Back Belt is expected to produce a benefit with a net present value in 1996 of between $32.8 and $34.3 million (with cost savings beginning to accrue in 2001). For this alternative, in particular, it is important to note that these benefits represent **lower bound** estimates because only a 20 year period of time (2001 - 2020) is used in this calculation since projections of vehicle and rail freight traffic were only available through 2020. The benefit period associated with a relocation alternative such as the Carrollton Curve would typically extend to 25, 30, or even 50 years. For illustrative purposes, assuming that vehicle and rail freight traffic increase between 2021 and 2025 in a fashion similar to the increases projected for the previous five year time period, the projected delay and slowing time costs (in 1995 dollars) would increase from between $5.4 and $5.8 million per year in 2020 to between $6.0 and $6.5 million per year in 2025. The net present value in 1996 of these additional five years of benefits is between $4.6 and $5.0 million. This produces a net present value in 1996, for a relocation alternative such as the Carrollton Curve, of between $37.4 and $39.3 million for the 25 year period 2001 - 2025.

For the second group of solutions (involving less than a full elimination of traffic stoppage/delay and slowing), three basic operating changes were considered. The first would reschedule any existing train movements during peak hours of highway traffic (i.e, 11 AM - 8 PM) to the hours between 10 PM and 6 AM. The second change would reschedule the trains and also increase the average train speed from the existing 12.4 miles per hour to a "true" 20 miles per hour (i.e., this solution includes the necessary improvements to the track and operating control systems to eliminate any slowing or stopping of the trains as is now occurring). The third change would remove all existing (and future) train movements between 7 AM and 8 PM off of the Back Belt under the assumption that a partial relocation alternative would be implemented (train speeds, as above, would also be increased to a "true" 20 miles per hour). This last alternative would effectively reduce the amount of existing rail freight traffic over the Back Belt by almost half (49 percent).

Table 6.9 presents the cumulative impact (benefit) of these measures for the 25 year period 1996 - 2020 by grade crossing and for all grade crossings for the two alternative scenarios concerning how the projected increase in rail freight traffic will be accomplished. Implicit in these estimates is the assumption that benefits would begin to occur in 1996 for the first alternative that only involves train rescheduling changes. For the second and third alternatives that involve both operating and rescheduling changes (including either improvements to the track and operating control systems or a partial removal of trains with

Table 6.9: Highway Traffic Vehicle Delay, Slowing, and Cost Analysis
Cumulative Benefits of Rescheduling Trains and Partially Removing Traffic From the Back Belt, 1996-2020

Assuming Number of Cars Per Train Increase (Number of Trains per Day Remain Constant)

	Reallocate Trains From 11am-8pm to 10pm-6am		Reallocate Trains From 11am-8pm to 10pm-6am and Increase Train Speed to 20 MPH		Remove Trains From 7am-8pm and Increase Train Speed to 20 MPH	
Location	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Net Present Value in 1996 of Reduction in Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Net Present Value in 1996 of Reduction in Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Net Present Value in 1996 of Reduction in Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	233,484	$1,911	314,078	$2,359	330,917	$2,264
METAIRIE ROAD	1,600,283	$12,431	2,014,923	$14,505	2,070,237	$13,617
WEST OAKRIDGE DRIVE	74,736	$640	109,330	$814	109,244	$739
FARNHAM PLACE	108,432	$933	164,803	$1,235	167,382	$1,140
HOLLYWOOD DRIVE	201,575	$1,706	299,741	$2,203	298,106	$1,991
ATHERTON DRIVE	52,153	$446	89,494	$657	90,730	$606
LABARRE ROAD	403,803	$3,416	654,710	$4,796	640,211	$4,258
SHREWSBURY ROAD	89,338	$774	162,777	$1,209	159,676	$1,076
Totals	2,763,803	$22,258	3,809,856	$27,778	3,866,504	$25,691
Time Period of Benefits	**1996 - 2020**		**1998 - 2020**		**2001 - 2020**	

Assuming Number of Trains Per Day Increase (Number of Cars per Train Remain Constant)

	Reallocate Trains From 11am-8pm to 10pm-6am		Reallocate Trains From 11am-8pm to 10pm-6am and Increase Train Speed to 20 MPH		Remove Trains From 7am-8pm and Increase Train Speed to 20 MPH	
Location	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Net Present Value in 1996 of Reduction in Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Net Present Value in 1996 of Reduction in Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Net Present Value in 1996 of Reduction in Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	213,958	$1,799	282,083	$2,177	295,922	$2,075
METAIRIE ROAD	1,589,487	$12,373	1,961,870	$14,216	2,013,780	$13,334
WEST OAKRIDGE DRIVE	69,208	$583	94,416	$729	93,565	$654
FARNHAM PLACE	101,094	$855	143,323	$1,111	144,558	$1,015
HOLLYWOOD DRIVE	190,135	$1,576	263,175	$1,998	259,806	$1,785
ATHERTON DRIVE	47,982	$405	76,759	$585	77,216	$533
LABARRE ROAD	386,890	$3,186	583,334	$4,392	566,593	$3,860
SHREWSBURY ROAD	82,678	$704	140,763	$1,082	136,937	$950
Totals	2,681,431	$21,480	3,545,725	$26,292	3,588,377	$24,207
Time Period of Benefits	**1996 - 2020**		**1998 - 2020**		**2001 - 2020**	

Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

a partial relocation alternative, additional time would be needed. It is assumed that no benefit would occur until 1998 (for the second alternative) and 2001 (for the third alternative). These impacts are further discussed, below, for each of the rescheduling alternatives.

The impacts of rescheduling existing trains so that no movements occur over the Back Belt between 11 AM and 8 PM are further described in Tables 6.10 and 6.11. This step alone would have reduced the total daily delay and slowing times in 1995 to about 13,200 minutes across all eight crossings, producing an annual delay and slowing time in 1995 of about 80,200 hours and a reduction (benefit) of about 67,500 hours in the annual delay and slowing time. Larger reductions would occur in 2000, 2010, and 2020 for both alternative scenarios concerning how the projected increase in rail traffic will be accomplished.

Figures 6.3 and 6.4 illustrate the total daily delay and slowing times, by hour, from 1995 to 2020, assuming this rescheduling of trains for each of the two alternative scenarios concerning how the projected increase in rail freight traffic will be accomplished. Throughout the 25 years, the largest reductions in delay and slowing times (relative to the delay and slowing times that would result in the absence of any railroad operating changes, as shown in the bottom half of these figures) are projected for the afternoon and evening rush hours.

In terms of total delay and slowing time cost, it is estimated that the rescheduling of trains so that no train movements occur between the hours of 11 AM and 8 PM would have produced annual

Table 6.10: Highway Traffic Vehicle Delay, Slowing, and Cost Analysis
1995-2020 Daily and Annual Totals
Assuming Number of Cars per Train Increase (Number of Trains per Day Remain Constant)
Reallocate Trains from 11:00am - 8:00pm Time Slot to 10:00pm - 6:00am Time Slot

Daily Totals

	1995		2000		2010		2020	
Location	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)
CARROLLTON AVENUE	1,443	$527	1,597	$574	1,955	$685	2,441	$833
METAIRIE ROAD	6,299	$2,201	7,096	$2,438	9,013	$3,010	11,742	$3,810
WEST OAKRIDGE DRIVE	411	$147	457	$161	562	$193	704	$236
FARNHAM PLACE	651	$233	725	$255	896	$308	1,128	$379
HOLLYWOOD DRIVE	1,148	$405	1,279	$444	1,578	$534	1,983	$655
ATHERTON DRIVE	408	$141	457	$156	567	$189	718	$233
LABARRE ROAD	2,214	$750	2,506	$835	3,168	$1,031	4,081	$1,296
SHREWSBURY ROAD	614	$207	697	$232	882	$287	1,137	$361
Totals	13,188	$4,611	14,814	$5,094	18,622	$6,237	23,935	$7,803

Annual Totals

	1995		2000		2010		2020	
Location	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	8,780	$192	9,718	$210	11,891	$250	14,849	$304
METAIRIE ROAD	38,322	$804	43,168	$890	54,827	$1,099	71,432	$1,391
WEST OAKRIDGE DRIVE	2,500	$54	2,782	$59	3,420	$70	4,283	$86
FARNHAM PLACE	3,959	$85	4,411	$93	5,453	$113	6,863	$138
HOLLYWOOD DRIVE	6,983	$148	7,780	$162	9,597	$195	12,065	$239
ATHERTON DRIVE	2,479	$51	2,780	$57	3,452	$69	4,365	$85
LABARRE ROAD	13,469	$274	15,242	$305	19,274	$376	24,829	$473
SHREWSBURY ROAD	3,735	$76	4,237	$85	5,367	$105	6,917	$132
Totals	80,226	$1,683	90,117	$1,859	113,282	$2,276	145,603	$2,848

Annual Benefits From Train Reallocation

	1995		2000		2010		2020	
Location	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	5,808	$108	6,958	$129	9,600	$176	13,397	$243
METAIRIE ROAD	36,771	$664	44,906	$805	65,507	$1,162	97,251	$1,710
WEST OAKRIDGE DRIVE	2,020	$37	2,403	$44	3,251	$59	4,442	$79
FARNHAM PLACE	2,921	$54	3,477	$64	4,716	$85	6,459	$116
HOLLYWOOD DRIVE	5,397	$98	6,435	$116	8,763	$156	12,055	$214
ATHERTON DRIVE	1,413	$26	1,680	$30	2,269	$41	3,094	$55
LABARRE ROAD	10,717	$194	12,803	$231	17,542	$314	24,293	$432
SHREWSBURY ROAD	2,418	$45	2,875	$53	3,887	$71	5,305	$96
Totals	67,465	$1,225	81,537	$1,471	115,536	$2,065	166,296	$2,945

Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

Table 6.11: Highway Traffic Vehicle Delay, Slowing, and Cost Analysis
1995-2020 Daily and Annual Totals
Assuming Number of Trains per Day Increase (Number of Cars per Train Remain Constant)
Reallocate Trains from 11:00am - 8:00pm Time Slot to 10:00pm - 6:00am Time Slot

Daily Totals

	1995		2000		2010		2020	
Location	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)
CARROLLTON AVENUE	1,443	$527	1,559	$564	1,828	$652	2,173	$763
METAIRIE ROAD	6,299	$2,201	6,979	$2,409	8,637	$2,917	10,975	$3,621
WEST OAKRIDGE DRIVE	411	$147	443	$157	515	$181	604	$209
FARNHAM PLACE	651	$233	703	$249	824	$289	974	$337
HOLLYWOOD DRIVE	1,148	$405	1,241	$434	1,453	$502	1,718	$585
ATHERTON DRIVE	408	$141	442	$152	517	$176	609	$204
LABARRE ROAD	2,214	$750	2,425	$814	2,902	$961	3,515	$1,147
SHREWSBURY ROAD	614	$207	671	$225	797	$264	956	$313
Totals	13,188	$4,611	14,464	$5,004	17,474	$5,941	21,522	$7,179

Annual Totals

	1995		2000		2010		2020	
Location	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	8,780	$192	9,485	$206	11,123	$238	13,216	$279
METAIRIE ROAD	38,322	$804	42,454	$879	52,539	$1,065	66,766	$1,322
WEST OAKRIDGE DRIVE	2,500	$54	2,696	$57	3,136	$66	3,675	$76
FARNHAM PLACE	3,959	$85	4,279	$91	5,013	$105	5,922	$123
HOLLYWOOD DRIVE	6,983	$148	7,552	$159	8,841	$183	10,449	$214
ATHERTON DRIVE	2,479	$51	2,687	$55	3,143	$64	3,704	$75
LABARRE ROAD	13,469	$274	14,754	$297	17,656	$351	21,381	$419
SHREWSBURY ROAD	3,735	$76	4,082	$82	4,851	$96	5,814	$114
Totals	80,226	$1,683	87,989	$1,826	106,302	$2,168	130,927	$2,620

Annual Benefits From Train Reallocation

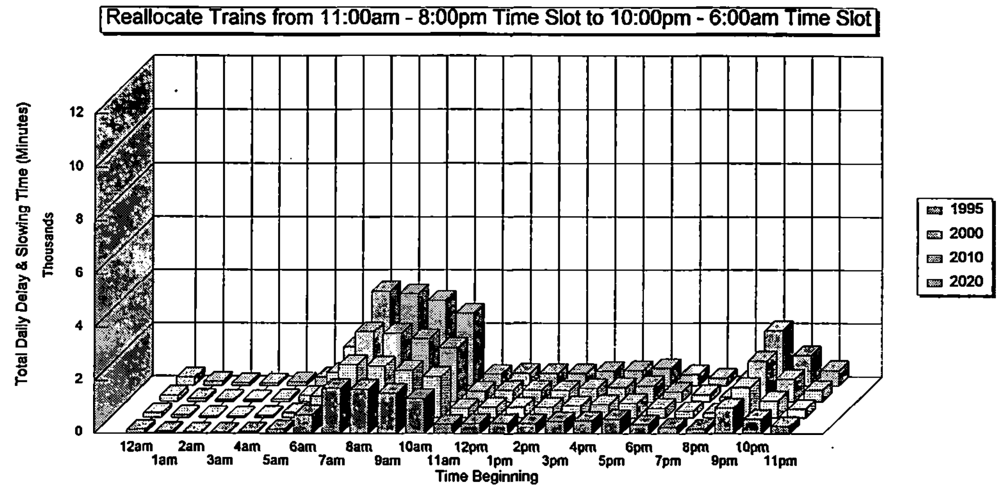
	1995		2000		2010		2020	
Location	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	5,808	$108	6,707	$125	8,780	$163	11,679	$215
METAIRIE ROAD	36,771	$664	44,617	$801	64,887	$1,154	96,808	$1,707
WEST OAKRIDGE DRIVE	2,020	$37	2,280	$42	2,843	$52	3,570	$65
FARNHAM PLACE	2,921	$54	3,307	$61	4,153	$76	5,258	$96
HOLLYWOOD DRIVE	5,397	$98	6,146	$111	7,809	$141	10,027	$181
ATHERTON DRIVE	1,413	$26	1,591	$29	1,971	$36	2,456	$45
LABARRE ROAD	10,717	$194	12,300	$223	15,885	$287	20,792	$374
SHREWSBURY ROAD	2,418	$45	2,728	$50	3,397	$63	4,257	$78
Totals	67,465	$1,225	79,677	$1,441	109,726	$1,971	154,847	$2,761

Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

Figure 6.3 : Total Delay and Slowing Time for All Affected Vehicles, for All Affected Locations (Minutes)
1995-2020 Daily Totals by Hour
Assuming Number of Cars per Train Increase (Number of Trains per Day Remain Constant)
Comparison Between Reallocating Trains from 11:00am - 8:00pm Time Slot to 10:00pm - 6:00am Time Slot Versus No Scheduling Changes

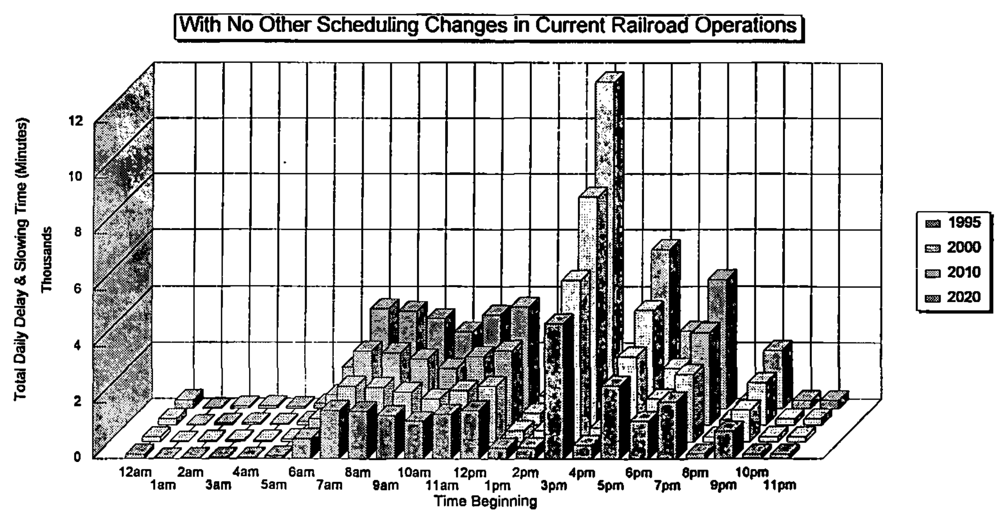
Reallocate Trains from 11:00am - 8:00pm Time Slot to 10:00pm - 6:00am Time Slot

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	153	177	233	309
1am	75	88	114	152
2am	53	62	81	107
3am	49	56	74	98
4am	68	80	105	139
5am	158	184	241	321
6am	712	831	1,099	1,473
7am	1,722	1,994	2,644	3,567
8am	1,687	1,952	2,581	3,472
9am	1,536	1,788	2,373	3,216
10am	1,335	1,548	2,037	2,738
11am	362	370	401	431
12pm	389	399	430	462
1pm	393	401	434	466
2pm	392	405	433	465
3pm	464	468	513	551
4pm	491	509	544	584
5pm	549	561	609	655
6pm	357	373	390	420
7pm	247	258	271	292
8pm	182	187	199	214
9pm	978	1,148	1,531	2,078
10pm	551	642	850	1,141
11pm	286	333	437	583
TOTAL	13,188	14,814	18,622	23,935



With No Other Scheduling Changes in Current Railroad Operations

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	153	177	233	309
1am	13	13	14	15
2am	37	43	56	73
3am	45	52	68	90
4am	36	41	53	69
5am	91	104	133	173
6am	712	831	1,099	1,473
7am	1,722	1,994	2,644	3,567
8am	1,687	1,952	2,581	3,472
9am	1,536	1,788	2,373	3,216
10am	1,335	1,548	2,037	2,738
11am	1,595	1,852	2,463	3,342
12pm	1,723	2,003	2,667	3,628
1pm	392	400	434	466
2pm	392	405	433	465
3pm	4,827	5,770	8,125	11,678
4pm	489	504	544	584
5pm	2,613	3,051	4,111	5,660
6pm	1,342	1,557	2,047	2,768
7pm	2,045	2,422	3,303	4,594
8pm	181	185	199	214
9pm	978	1,148	1,531	2,078
10pm	172	191	234	292
11pm	162	185	235	306
TOTAL	24,278	28,217	37,614	51,271

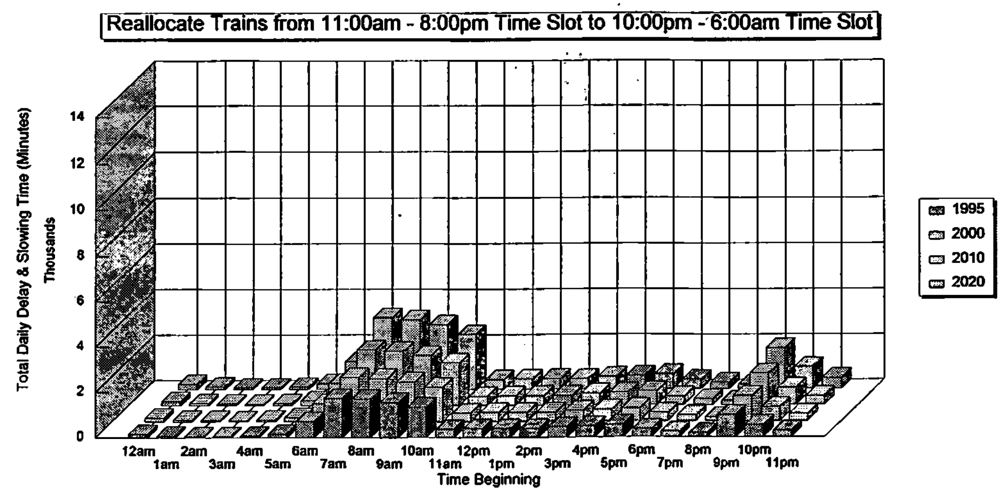


Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

Figure 6.4 : Total Delay and Slowing Time for All Affected Vehicles, for All Affected Locations (Minutes)
1995-2020 Daily Totals by Hour
Assuming Number of Trains per Day Increase (Number of Cars per Train Remain Constant)
Comparison Between Reallocating Trains from 11:00am - 8:00pm Time Slot to 10:00pm - 6:00am Time Slot Versus No Scheduling Changes

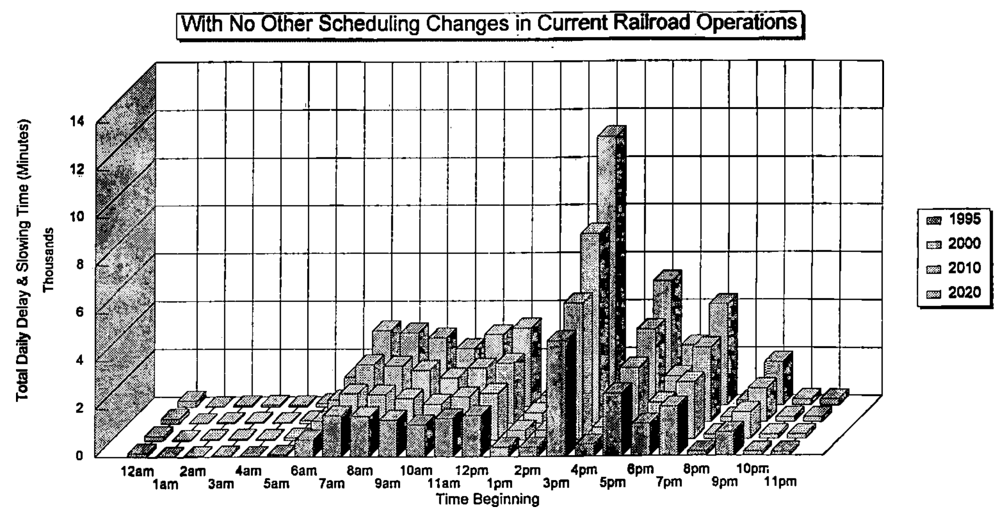
Reallocate Trains from 11:00am - 8:00pm Time Slot to 10:00pm - 6:00am Time Slot

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	153	169	206	251
1am	75	84	101	123
2am	53	59	71	86
3am	49	54	65	79
4am	68	76	92	111
5am	158	176	213	260
6am	712	798	989	1,240
7am	1,722	1,937	2,458	3,180
8am	1,687	1,896	2,396	3,087
9am	1,536	1,737	2,209	2,875
10am	1,335	1,503	1,891	2,431
11am	362	370	401	431
12pm	389	399	430	462
1pm	393	401	434	466
2pm	392	405	433	465
3pm	464	468	513	551
4pm	491	509	544	584
5pm	549	561	609	655
6pm	357	373	390	420
7pm	247	258	271	292
8pm	182	187	199	214
9pm	978	1,110	1,406	1,814
10pm	551	617	766	962
11pm	286	319	390	483
TOTAL	13,188	14,464	17,474	21,522



With No Other Scheduling Changes in Current Railroad Operations

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	153	169	206	251
1am	13	13	14	15
2am	37	41	49	59
3am	45	50	60	72
4am	36	40	47	56
5am	91	99	118	142
6am	712	798	989	1,240
7am	1,722	1,937	2,458	3,180
8am	1,687	1,896	2,396	3,087
9am	1,536	1,737	2,209	2,875
10am	1,335	1,503	1,891	2,431
11am	1,595	1,802	2,303	3,011
12pm	1,723	1,950	2,498	3,279
1pm	392	400	434	466
2pm	392	405	433	465
3pm	4,827	5,693	7,900	11,279
4pm	489	504	544	584
5pm	2,613	2,982	3,889	5,211
6pm	1,342	1,518	1,920	2,507
7pm	2,045	2,366	3,124	4,231
8pm	181	185	199	214
9pm	978	1,110	1,406	1,814
10pm	172	185	215	251
11pm	162	178	211	254
TOTAL	24,278	27,562	35,611	46,977



Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

costs of $1.7 million in 1995, with costs rising to between $2.6 and $2.8 million (in 1995 dollars) by the year 2020 (depending upon how the projected increase in rail freight traffic will be accomplished) (again, see Tables 6.10 and 6.11). This represents an annual reduction (benefit) in the total vehicle delay and slowing time cost equal to $1.2 million in 1995 and rising to between $2.8 and $2.9 million by the year 2020.[26] As described above (in Table 6.9), the net present value of these cost savings in 1996 is estimated to range from $21.5 to $22.3 million (with cost savings beginning to accrue in 1996).

The impact of both rescheduling existing trains so that no movements occur over the Back Belt between 11 AM and 8 PM and increasing the average train speed to a "true" 20 miles per hour is further described in Tables 6.12 and 6.13. This alternative would have further reduced the total daily delay and slowing times in 1995 to about 8,300 minutes across all eight crossings, producing an annual delay and slowing time in 1995 of 50,700 hours and a larger reduction (benefit) of 97,000 hours in the annual delay and slowing time. Greater reductions would occur in 2000, 2010, and

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[26] Although the expected total delay and slowing time and total delay and slowing time costs, for all grade crossings combined, are lower for this reallocation of trains when assuming that the number of trains per day will increase, the annual benefits from this reallocation of trains are larger for the alternative scenario that assumes the number of cars per train will increase. This results because the delay and slowing times and the delay and slowing time costs are larger for this latter scenario in the absence of any reallocation of trains. (This same phenomenon is also observed, as described below, for both the reallocation of trains with an increase in train speed, as well as the removal of trains between the hours of 7 AM and 8 PM with an increase in train speed.)

2020 for both alternative scenarios concerning how the projected increase in rail freight traffic will be accomplished.

Figures 6.5 and 6.6 illustrate the total daily delay and slowing times, by hour, from 1995 to 2020, assuming both this rescheduling of trains and increased train speed, for each of the two alternative scenarios concerning how the projected increase in rail traffic will be accomplished. Throughout the 25 years, the largest reductions in delay and slowing times (relative to the delay and slowing times that would result in the absence of any operating changes, as shown in the bottom half if these figures) are again projected for the afternoon and evening rush hours.

In terms of total vehicle delay and slowing time cost, it is estimated that increasing the train speed and rescheduling trains so that no train movements occur between the hours of 11 AM and 8 PM would have produced costs of $1.2 million in 1995, with costs rising to between $1.6 million and $1.7 million (in 1995 dollars) by the year 2020 (depending upon how the projected increase in rail traffic will be accomplished) (again, see Tables 6.12 and 6.13). This represents an annual reduction (benefit) in the total vehicle delay and slowing time cost, equal to $1.7 million in 1995 and rising to between $3.7 and $4.1 million by the year 2020. As described earlier (in Table 6.9), the net present value of these cost savings in 1996 is estimated to range from $26.3 to $27.8 million (with cost savings beginning to accrue in 1998).

Finally, partially removing existing (and future) traffic off of the Back Belt (i.e., traffic between the hours of 7 AM and 8 PM) and maintaining a "true" average train speed of 20 miles per hour

Table 6.12: Highway Traffic Vehicle Delay, Slowing, and Cost Analysis
1995-2020 Daily and Annual Totals
Assuming Number of Cars per Train Increase (Number of Trains per Day Remain Constant)
Reallocate Trains from 11:00am - 8:00pm Time Slot to 10:00pm - 6:00am Time Slot & Increase Train Speed to 20 MPH

Daily Totals

	1995		2000		2010		2020	
Location	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)
CARROLLTON AVENUE	1,044	$410	1,117	$435	1,291	$494	1,517	$569
METAIRIE ROAD	4,265	$1,623	4,624	$1,738	5,506	$2,023	6,706	$2,400
WEST OAKRIDGE DRIVE	259	$103	275	$108	315	$122	365	$139
FARNHAM PLACE	403	$160	429	$169	493	$191	574	$219
HOLLYWOOD DRIVE	717	$282	764	$298	876	$336	1,018	$383
ATHERTON DRIVE	243	$94	260	$100	300	$114	352	$130
LABARRE ROAD	1,113	$436	1,190	$462	1,375	$524	1,613	$603
SHREWSBURY ROAD	289	$114	309	$121	357	$137	418	$157
Totals	8,332	$3,223	8,968	$3,430	10,514	$3,941	12,564	$4,600

Annual Totals

	1995		2000		2010		2020	
Location	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	6,351	$150	6,793	$159	7,856	$180	9,229	$208
METAIRIE ROAD	25,943	$593	28,127	$634	33,493	$738	40,793	$876
WEST OAKRIDGE DRIVE	1,573	$37	1,674	$39	1,915	$44	2,221	$51
FARNHAM PLACE	2,453	$59	2,611	$62	3,001	$70	3,494	$80
HOLLYWOOD DRIVE	4,362	$103	4,647	$109	5,328	$123	6,195	$140
ATHERTON DRIVE	1,477	$34	1,584	$37	1,827	$42	2,139	$48
LABARRE ROAD	6,771	$159	7,241	$169	8,365	$191	9,812	$220
SHREWSBURY ROAD	1,758	$42	1,881	$44	2,172	$50	2,546	$57
Totals	50,687	$1,176	54,557	$1,252	63,958	$1,439	76,430	$1,679

Annual Benefits From Train Reallocation and Increase in Train Speed

	1995		2000		2010		2020	
Location	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	8,238	$151	9,882	$180	13,635	$246	19,017	$340
METAIRIE ROAD	49,150	$874	59,947	$1,060	86,840	$1,523	127,890	$2,224
WEST OAKRIDGE DRIVE	2,947	$53	3,511	$63	4,757	$85	6,504	$115
FARNHAM PLACE	4,427	$80	5,278	$95	7,168	$128	9,828	$175
HOLLYWOOD DRIVE	8,017	$143	9,568	$169	13,033	$229	17,925	$313
ATHERTON DRIVE	2,415	$43	2,877	$51	3,894	$68	5,319	$92
LABARRE ROAD	17,415	$309	20,804	$367	28,451	$499	39,309	$685
SHREWSBURY ROAD	4,395	$79	5,232	$93	7,082	$126	9,676	$171
Totals	97,004	$1,731	117,098	$2,079	164,860	$2,902	235,469	$4,114

Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

Table 6.13: Highway Traffic Vehicle Delay, Slowing, and Cost Analysis
1995-2020 Daily and Annual Totals
Assuming Number of Trains per Day Increase (Number of Cars per Train Remain Constant)
Reallocate Trains from 11:00am - 8:00pm Time Slot to 10:00pm - 6:00am Time Slot & Increase Train Speed to 20 MPH

Daily Totals

	1995		2000		2010		2020	
Location	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Minutes)	Total Delay and Slowing Time Cost (1995 Dollars)
CARROLLTON AVENUE	1,044	$410	1,105	$432	1,252	$485	1,434	$549
METAIRIE ROAD	4,265	$1,623	4,597	$1,733	5,426	$2,007	6,555	$2,372
WEST OAKRIDGE DRIVE	259	$103	272	$107	304	$119	342	$133
FARNHAM PLACE	403	$160	424	$167	477	$187	539	$210
HOLLYWOOD DRIVE	717	$282	755	$296	847	$329	957	$368
ATHERTON DRIVE	243	$94	257	$99	288	$111	326	$124
LABARRE ROAD	1,113	$436	1,177	$459	1,331	$513	1,518	$579
SHREWSBURY ROAD	289	$114	305	$120	343	$133	389	$150
Totals	8,332	$3,223	8,892	$3,413	10,268	$3,885	12,060	$4,484

Annual Totals

	1995		2000		2010		2020	
Location	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Total Delay and Slowing Time For All Affected Vehicles (Hours)	Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	6,351	$150	6,722	$158	7,619	$177	8,724	$200
METAIRIE ROAD	25,943	$593	27,966	$633	33,005	$733	39,873	$866
WEST OAKRIDGE DRIVE	1,573	$37	1,654	$39	1,848	$43	2,078	$48
FARNHAM PLACE	2,453	$59	2,580	$61	2,900	$68	3,277	$77
HOLLYWOOD DRIVE	4,362	$103	4,595	$108	5,154	$120	5,823	$134
ATHERTON DRIVE	1,477	$34	1,562	$36	1,755	$40	1,983	$45
LABARRE ROAD	6,771	$159	7,160	$167	8,095	$187	9,235	$211
SHREWSBURY ROAD	1,758	$42	1,856	$44	2,089	$49	2,368	$55
Totals	50,687	$1,176	54,095	$1,246	62,466	$1,418	73,362	$1,637

Annual Benefits From Train Reallocation and Increase in Train Speed

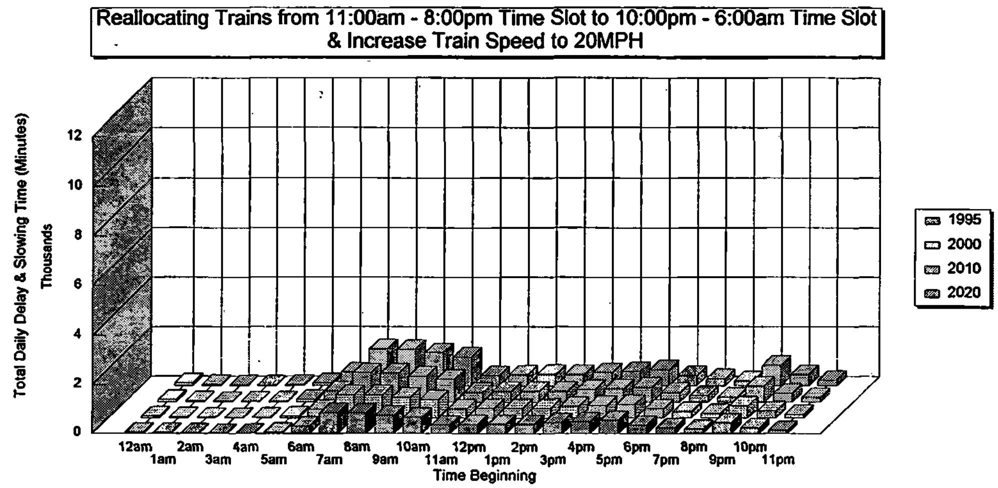
	1995		2000		2010		2020	
Location	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	8,238	$151	9,471	$173	12,285	$224	16,171	$293
METAIRIE ROAD	49,150	$874	59,105	$1,048	84,420	$1,486	123,700	$2,163
WEST OAKRIDGE DRIVE	2,947	$53	3,322	$60	4,131	$74	5,167	$93
FARNHAM PLACE	4,427	$80	5,006	$91	6,266	$113	7,903	$143
HOLLYWOOD DRIVE	8,017	$143	9,104	$162	11,496	$204	14,653	$260
ATHERTON DRIVE	2,415	$43	2,716	$48	3,360	$60	4,177	$74
LABARRE ROAD	17,415	$309	19,894	$352	25,446	$450	32,937	$581
SHREWSBURY ROAD	4,395	$79	4,954	$89	6,158	$110	7,702	$138
Totals	97,004	$1,731	113,571	$2,022	153,562	$2,722	212,412	$3,745

Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

Figure 6.5 : Total Delay and Slowing Time for All Affected Vehicles, for All Affected Locations (Minutes)
1995-2020 Daily Totals
Assuming Number of Cars per Train Increase (Number of Trains per Day Remain Constant)
Comparison Between Reallocating Trains from 11:00am - 8:00pm Time Slot to 10:00pm - 6:00am Time Slot and Increasing Train Speed Versus No Scheduling Changes

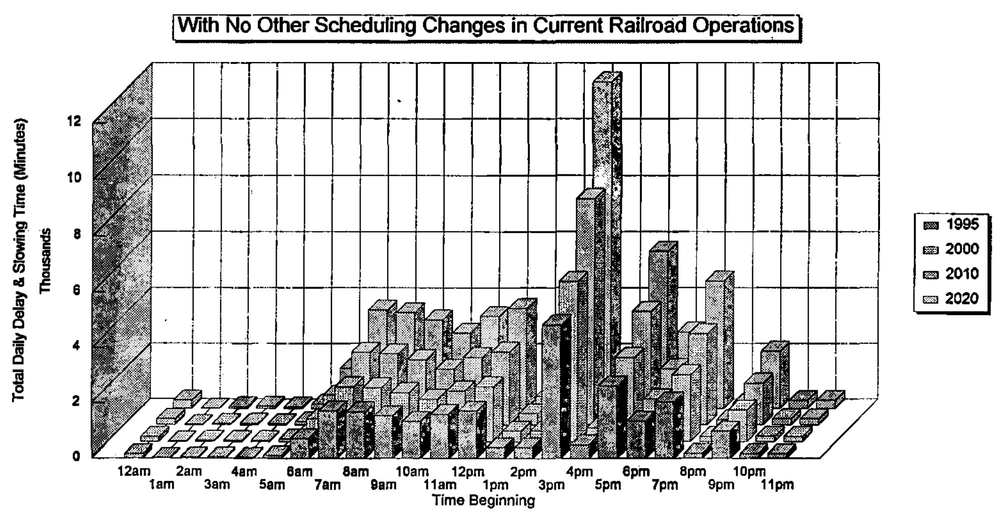
Reallocate Trains from 11:00am - 8:00pm Time Slot to 10:00pm - 6:00am Time Slot & Increase Train Speed to 20MPH

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	71	79	99	126
1am	36	40	50	63
2am	24	27	33	42
3am	22	25	31	39
4am	28	31	39	50
5am	69	78	97	123
6am	311	351	440	562
7am	850	942	1,177	1,497
8am	844	935	1,165	1,477
9am	751	841	1,050	1,347
10am	673	751	927	1,174
11am	363	370	401	431
12pm	389	399	430	462
1pm	393	401	434	466
2pm	392	405	433	465
3pm	464	468	513	551
4pm	491	509	544	584
5pm	549	561	609	655
6pm	357	373	390	420
7pm	247	258	271	292
8pm	182	187	199	214
9pm	444	505	642	834
10pm	250	281	354	454
11pm	133	150	186	237
TOTAL	8,332	8,968	10,514	12,564



With No Other Scheduling Changes in Current Railroad Operations

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	153	177	233	309
1am	13	13	14	15
2am	37	43	56	73
3am	45	52	68	90
4am	36	41	53	69
5am	91	104	133	173
6am	712	831	1,099	1,473
7am	1,722	1,994	2,644	3,567
8am	1,687	1,952	2,581	3,472
9am	1,536	1,788	2,373	3,216
10am	1,335	1,548	2,037	2,738
11am	1,595	1,852	2,463	3,342
12pm	1,723	2,003	2,667	3,628
1pm	392	400	434	466
2pm	392	405	433	465
3pm	4,827	5,770	8,125	11,678
4pm	489	504	544	584
5pm	2,613	3,051	4,111	5,660
6pm	1,342	1,557	2,047	2,768
7pm	2,045	2,422	3,303	4,594
8pm	181	185	199	214
9pm	978	1,148	1,531	2,078
10pm	172	191	234	292
11pm	162	185	235	306
TOTAL	24,278	28,217	37,614	51,271

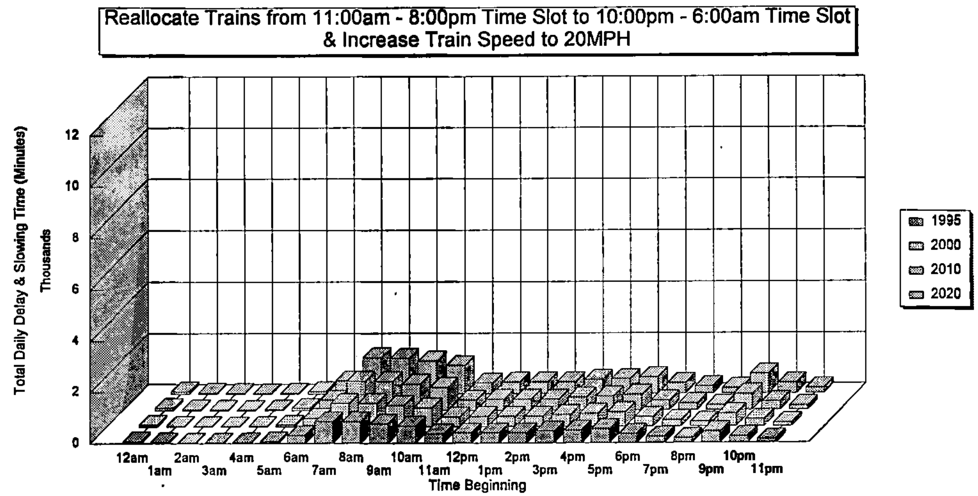


Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

Figure 6.6 : Total Delay and Slowing Time for All Affected Vehicles, for All Affected Locations (Minutes)
1995-2020 Daily Totals by Hour
Assuming Number of Trains per Day Increase (Number of Cars per Train Remain Constant)
Comparison Between Reallocating Trains from 11:00am - 8:00pm Time Slot to 10:00pm - 6:00am Time Slot and Increasing Train Speed Versus No Scheduling Changes

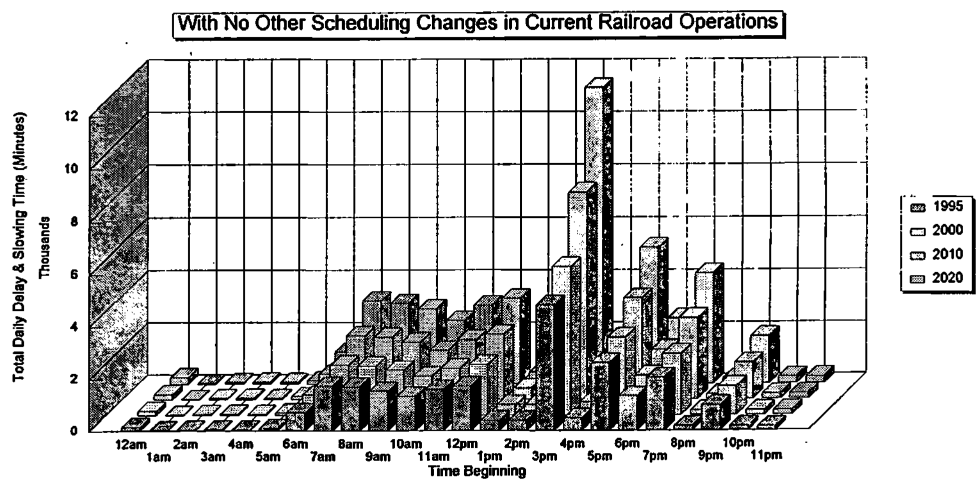
Reallocate Trains from 11:00am - 8:00pm Time Slot to 10:00pm - 6:00am Time Slot & Increase Train Speed to 20MPH

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	71	77	92	110
1am	36	39	46	55
2am	24	26	31	37
3am	22	24	28	34
4am	28	31	36	43
5am	69	76	90	107
6am	311	343	415	508
7am	850	931	1,142	1,427
8am	844	924	1,128	1,403
9am	751	831	1,019	1,286
10am	673	741	897	1,114
11am	363	370	401	431
12pm	389	399	430	462
1pm	393	401	434	466
2pm	392	405	433	465
3pm	464	468	513	551
4pm	491	509	544	584
5pm	549	561	609	655
6pm	357	373	390	420
7pm	247	258	271	292
8pm	182	187	199	214
9pm	444	497	615	777
10pm	250	275	333	410
11pm	133	146	174	210
TOTAL	8,332	8,892	10,268	12,060



With No Other Scheduling Changes in Current Railroad Operations

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	153	169	206	251
1am	13	13	14	15
2am	37	41	49	59
3am	45	50	60	72
4am	36	40	47	56
5am	91	99	118	142
6am	712	798	989	1,240
7am	1,722	1,937	2,458	3,180
8am	1,687	1,896	2,396	3,087
9am	1,536	1,737	2,209	2,875
10am	1,335	1,503	1,891	2,431
11am	1,595	1,802	2,303	3,011
12pm	1,723	1,950	2,498	3,279
1pm	392	400	434	466
2pm	392	405	433	465
3pm	4,827	5,693	7,900	11,279
4pm	489	504	544	584
5pm	2,613	2,982	3,889	5,211
6pm	1,342	1,518	1,920	2,507
7pm	2,045	2,366	3,124	4,231
8pm	181	185	199	214
9pm	978	1,110	1,406	1,814
10pm	172	185	215	251
11pm	162	178	211	254
TOTAL	24,278	27,562	35,511	46,977



Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

would produce the largest benefit to highway users of the three rescheduling alternatives considered here. These benefits are further described in Tables 6.14 and 6.15. For purposes of comparison with current railroad operations only (since it is assumed that this alternative could not be implemented until 2001), this alternative would have further reduced the total daily delay and slowing times in 1995 to about 6,400 minutes across all eight crossings, producing an annual delay and slowing time in 1995 of almost 39,000 hours and the largest reduction (benefit) of 108,700 hours in the annual delay and slowing time. Greater reductions would occur in 2000, 2010, and 2020 for both alternative scenarios concerning how the projected increase in rail freight traffic will be accomplished.

Figures 6.7 and 6.8 illustrate the total daily delay and slowing times, by hour, from 1995 to 2020, assuming both this reduction of trains and increased train speed, for each of the two alternative scenarios concerning how the projected increase in rail freight traffic will be accomplished. Throughout the 25 years, the largest reductions in delay and slowing times (relative to the delay and slowing times that would result in the absence of any operating changes, as shown in the bottom half of these figures) are again projected for the afternoon and evening rush hours.

In terms of total vehicle delay and slowing time cost, it is estimated that increasing the train speed and permanently reducing the number of trains per day by eliminating train movements between the hours of 7 AM and 8 PM would have produced costs of $948,000 in 1995, with costs rising to about $1.2 million (in 1995 dollars) by

Table 6.14: Highway Traffic Vehicle Delay, Slowing, and Cost Analysis
1995-2020 Daily and Annual Totals
Assuming Number of Cars per Train Increase (Number of Trains per Day Remain Constant)
Remove Trains from 7:00am - 8:00pm Time Slot & Increase Train Speed to 20 MPH

Daily Totals

Location	1995 Total Delay and Slowing Time For All Affected Vehicles (Minutes)	1995 Total Delay and Slowing Time Cost (1995 Dollars)	2000 Total Delay and Slowing Time For All Affected Vehicles (Minutes)	2000 Total Delay and Slowing Time Cost (1995 Dollars)	2010 Total Delay and Slowing Time For All Affected Vehicles (Minutes)	2010 Total Delay and Slowing Time Cost (1995 Dollars)	2020 Total Delay and Slowing Time For All Affected Vehicles (Minutes)	2020 Total Delay and Slowing Time Cost (1995 Dollars)
CARROLLTON AVENUE	817	$336	849	$348	932	$379	1,029	$415
METAIRIE ROAD	3,180	$1,274	3,331	$1,326	3,715	$1,460	4,185	$1,619
WEST OAKRIDGE DRIVE	207	$86	215	$89	235	$96	258	$105
FARNHAM PLACE	313	$130	323	$134	352	$146	384	$158
HOLLYWOOD DRIVE	585	$239	609	$248	669	$270	740	$296
ATHERTON DRIVE	194	$78	203	$82	224	$90	250	$99
LABARRE ROAD	883	$361	919	$374	1,013	$409	1,123	$449
SHREWSBURY ROAD	228	$94	237	$97	261	$106	290	$117
Totals	6,407	$2,599	6,686	$2,697	7,401	$2,956	8,259	$3,257

Annual Totals

Location	1995 Total Delay and Slowing Time For All Affected Vehicles (Hours)	1995 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2000 Total Delay and Slowing Time For All Affected Vehicles (Hours)	2000 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2010 Total Delay and Slowing Time For All Affected Vehicles (Hours)	2010 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2020 Total Delay and Slowing Time For All Affected Vehicles (Hours)	2020 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	4,970	$123	5,165	$127	5,671	$138	6,262	$151
METAIRIE ROAD	19,347	$465	20,264	$484	22,598	$533	25,459	$591
WEST OAKRIDGE DRIVE	1,261	$31	1,307	$32	1,428	$35	1,568	$38
FARNHAM PLACE	1,902	$48	1,963	$49	2,140	$53	2,336	$58
HOLLYWOOD DRIVE	3,559	$87	3,702	$90	4,070	$99	4,503	$108
ATHERTON DRIVE	1,180	$29	1,235	$30	1,366	$33	1,520	$36
LABARRE ROAD	5,370	$132	5,592	$137	6,160	$149	6,830	$164
SHREWSBURY ROAD	1,385	$34	1,443	$36	1,590	$39	1,764	$43
Totals	38,975	$948	40,671	$984	45,022	$1,079	50,242	$1,189

Annual Benefits From Partially Removing Trains and Increase in Train Speed

Location	1995 Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	1995 Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2000 Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	2000 Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2010 Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	2010 Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2020 Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	2020 Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	9,618	$178	11,510	$211	15,821	$288	21,985	$396
METAIRIE ROAD	55,746	$1,002	67,811	$1,211	97,736	$1,728	143,224	$2,509
WEST OAKRIDGE DRIVE	3,259	$59	3,877	$70	5,243	$94	7,157	$127
FARNHAM PLACE	4,977	$91	5,925	$108	8,030	$145	10,986	$197
HOLLYWOOD DRIVE	8,820	$158	10,512	$188	14,290	$253	19,618	$344
ATHERTON DRIVE	2,712	$49	3,225	$57	4,356	$77	5,938	$104
LABARRE ROAD	18,816	$336	22,454	$399	30,657	$541	42,291	$741
SHREWSBURY ROAD	4,768	$86	5,670	$102	7,664	$137	10,458	$185
Totals	108,716	$1,959	130,984	$2,346	183,796	$3,262	261,657	$4,604

Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

Table 6.15: Highway Traffic Vehicle Delay, Slowing, and Cost Analysis
1995-2020 Daily and Annual Totals
Assuming Number of Trains per Day Increase (Number of Cars per Train Remain Constant)
Remove Trains from 7:00am - 8:00pm Time Slot & Increase Train Speed to 20 MPH

Daily Totals

Location	1995 Total Delay and Slowing Time For All Affected Vehicles (Minutes)	1995 Total Delay and Slowing Time Cost (1995 Dollars)	2000 Total Delay and Slowing Time For All Affected Vehicles (Minutes)	2000 Total Delay and Slowing Time Cost (1995 Dollars)	2010 Total Delay and Slowing Time For All Affected Vehicles (Minutes)	2010 Total Delay and Slowing Time Cost (1995 Dollars)	2020 Total Delay and Slowing Time For All Affected Vehicles (Minutes)	2020 Total Delay and Slowing Time Cost (1995 Dollars)
CARROLLTON AVENUE	817	$336	846	$347	922	$377	1,007	$410
METAIRIE ROAD	3,180	$1,274	3,319	$1,324	3,677	$1,453	4,107	$1,603
WEST OAKRIDGE DRIVE	207	$86	214	$88	232	$96	253	$104
FARNHAM PLACE	313	$130	322	$134	349	$145	379	$157
HOLLYWOOD DRIVE	585	$239	606	$247	661	$268	722	$292
ATHERTON DRIVE	194	$78	202	$82	221	$89	242	$97
LABARRE ROAD	883	$361	915	$373	1,000	$406	1,095	$442
SHREWSBURY ROAD	228	$94	236	$97	258	$105	282	$115
Totals	6,407	$2,599	6,661	$2,692	7,319	$2,939	8,086	$3,219

Annual Totals

Location	1995 Total Delay and Slowing Time For All Affected Vehicles (Hours)	1995 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2000 Total Delay and Slowing Time For All Affected Vehicles (Hours)	2000 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2010 Total Delay and Slowing Time For All Affected Vehicles (Hours)	2010 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2020 Total Delay and Slowing Time For All Affected Vehicles (Hours)	2020 Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	4,970	$123	5,146	$127	5,607	$138	6,124	$150
METAIRIE ROAD	19,347	$465	20,193	$483	22,368	$530	24,982	$585
WEST OAKRIDGE DRIVE	1,261	$31	1,303	$32	1,414	$35	1,538	$38
FARNHAM PLACE	1,902	$48	1,959	$49	2,125	$53	2,303	$57
HOLLYWOOD DRIVE	3,559	$87	3,687	$90	4,020	$98	4,394	$106
ATHERTON DRIVE	1,180	$29	1,229	$30	1,343	$32	1,473	$35
LABARRE ROAD	5,370	$132	5,568	$136	6,081	$148	6,662	$161
SHREWSBURY ROAD	1,385	$34	1,436	$35	1,567	$39	1,716	$42
Totals	38,975	$948	40,521	$982	44,526	$1,073	49,192	$1,175

Annual Benefits From Partially Removing Trains and Increase in Train Speed

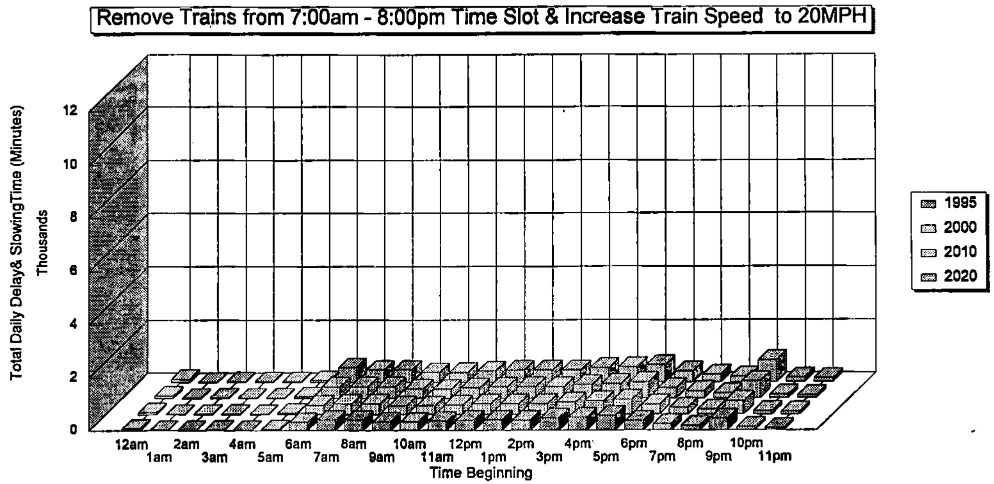
Location	1995 Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	1995 Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2000 Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	2000 Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2010 Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	2010 Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)	2020 Reductions in Total Delay and Slowing Time For All Affected Vehicles (Hours)	2020 Reductions in Total Delay and Slowing Time Cost (Thousands of 1995 Dollars)
CARROLLTON AVENUE	9,618	$178	11,047	$204	14,297	$263	18,771	$344
METAIRIE ROAD	55,746	$1,002	66,878	$1,197	95,058	$1,689	138,592	$2,443
WEST OAKRIDGE DRIVE	3,259	$59	3,673	$67	4,565	$83	5,707	$103
FARNHAM PLACE	4,977	$91	5,628	$103	7,041	$129	8,877	$162
HOLLYWOOD DRIVE	8,820	$158	10,011	$180	12,630	$226	16,082	$288
ATHERTON DRIVE	2,712	$49	3,049	$55	3,771	$68	4,688	$84
LABARRE ROAD	18,816	$336	21,486	$384	27,460	$489	35,510	$632
SHREWSBURY ROAD	4,768	$86	5,374	$97	6,680	$120	8,355	$151
Totals	108,716	$1,959	127,146	$2,285	171,502	$3,067	236,582	$4,206

Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

Figure 6.7 : Total Delay and Slowing Time for All Affected Vehicles, for All Affected Locations (Minutes)
1995-2020 Daily Totals by Hour
Assuming Number of Cars per Train Increase (Number of Trains per Day Remain Constant)
Comparison Between Removing Trains from 7:00am - 8:00pm Time Slot and Increasing Train Speed Versus No Scheduling Changes

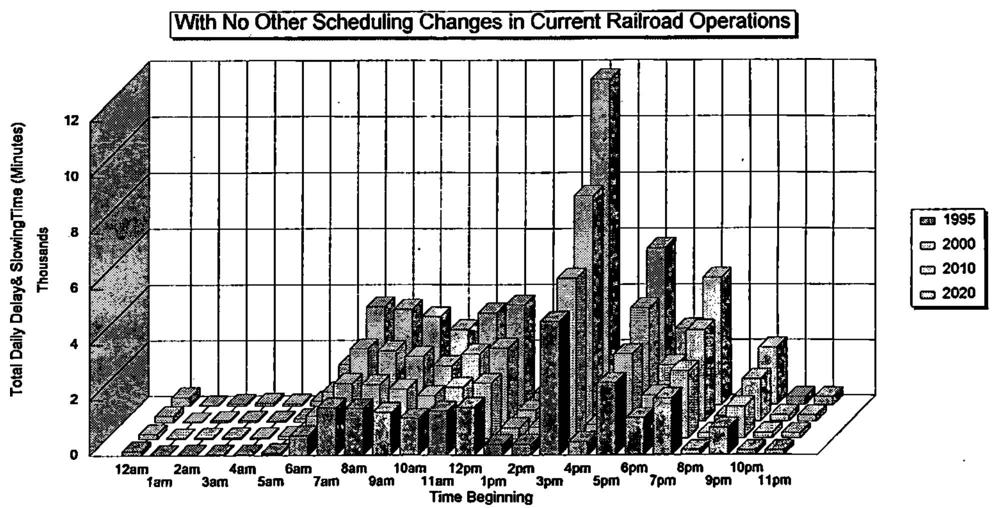
Remove Trains from 7:00am - 8:00pm Time Slot & Increase Train Speed to 20MPH

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	71	79	99	126
1am	13	13	14	15
2am	19	21	25	31
3am	21	23	29	36
4am	18	20	24	29
5am	47	52	62	75
6am	311	351	440	562
7am	397	403	440	473
8am	397	405	440	473
9am	324	334	355	382
10am	318	330	352	378
11am	363	371	401	431
12pm	389	399	430	462
1pm	393	401	434	466
2pm	392	405	433	465
3pm	464	468	513	551
4pm	491	509	544	584
5pm	549	561	609	655
6pm	357	373	390	420
7pm	247	258	271	292
8pm	182	187	199	214
9pm	444	505	642	834
10pm	115	122	140	163
11pm	88	97	115	141
TOTAL	6,407	6,686	7,401	8,259



With No Other Scheduling Changes in Current Railroad Operations

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	153	177	233	309
1am	13	13	14	15
2am	37	43	56	73
3am	45	52	68	90
4am	36	41	53	69
5am	91	104	133	173
6am	712	831	1,099	1,473
7am	1,722	1,994	2,644	3,567
8am	1,687	1,952	2,581	3,472
9am	1,536	1,788	2,373	3,216
10am	1,335	1,548	2,037	2,738
11am	1,595	1,852	2,463	3,342
12pm	1,723	2,003	2,667	3,628
1pm	392	400	434	466
2pm	392	405	433	465
3pm	4,827	5,770	8,125	11,678
4pm	489	504	544	584
5pm	2,613	3,051	4,111	5,660
6pm	1,342	1,557	2,047	2,768
7pm	2,045	2,422	3,303	4,594
8pm	181	185	199	214
9pm	978	1,148	1,531	2,078
10pm	172	191	234	292
11pm	162	185	235	306
TOTAL	24,278	28,217	37,614	51,271

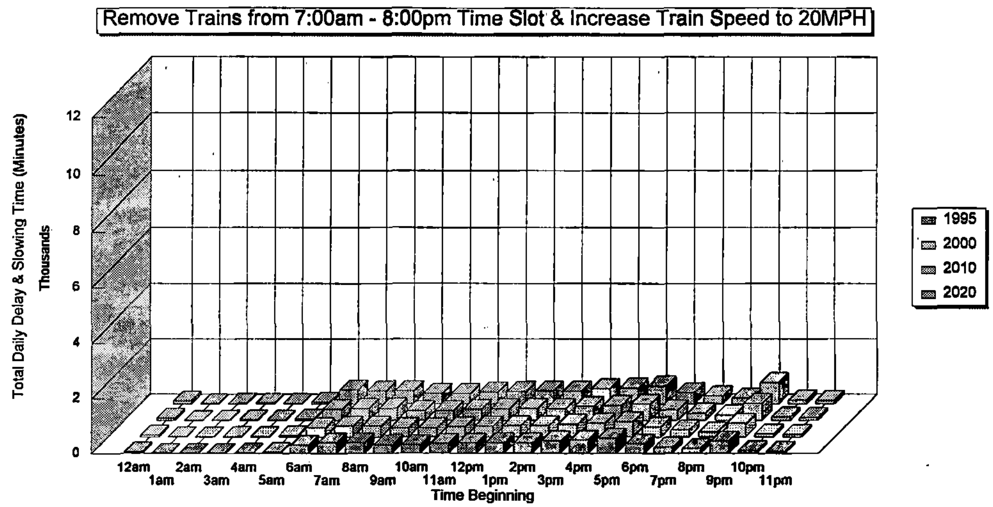


Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

Figure 6.8 : Total Delay and Slowing Time for All Affected Vehicles, for All Affected Locations (Minutes)
1995-2020 Daily Totals by Hour
Assuming Number of Trains per Day Increase (Number of Cars per Train Remain Constant)
Comparison Between Removing Trains from 7:00am - 8:00pm Time Slot and Increasing Train Speed Versus No Scheduling Changes

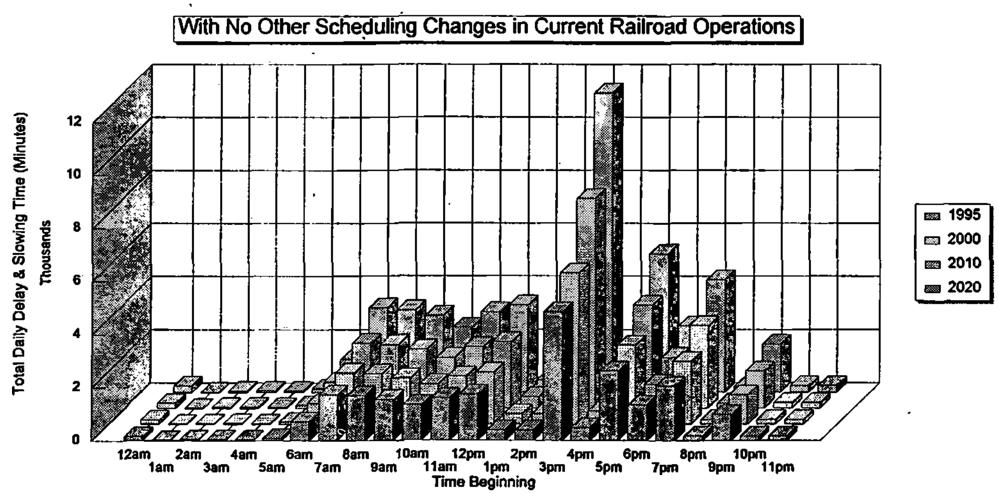
Remove Trains from 7:00am - 8:00pm Time Slot & Increase Train Speed to 20MPH

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	71	77	92	110
1am	13	13	14	15
2am	19	20	23	27
3am	21	23	27	31
4am	18	19	22	26
5am	47	50	58	67
6am	311	343	415	508
7am	397	403	440	473
8am	397	405	440	473
9am	324	334	355	382
10am	318	330	352	378
11am	363	371	401	431
12pm	389	399	430	462
1pm	393	401	434	466
2pm	392	405	433	465
3pm	464	468	513	551
4pm	491	509	544	584
5pm	549	561	609	655
6pm	357	373	390	420
7pm	247	258	271	292
8pm	182	187	199	214
9pm	444	497	615	777
10pm	115	120	135	152
11pm	88	95	109	127
TOTAL	6,407	6,661	7,319	8,086



With No Other Scheduling Changes in Current Railroad Operations

Time Beginning	1995 Total	2000 Total	2010 Total	2020 Total
12am	153	169	206	251
1am	13	13	14	15
2am	37	41	49	59
3am	45	50	60	72
4am	36	40	47	56
5am	91	99	118	142
6am	712	798	989	1,240
7am	1,722	1,937	2,458	3,180
8am	1,687	1,896	2,396	3,087
9am	1,536	1,737	2,209	2,875
10am	1,335	1,503	1,891	2,431
11am	1,595	1,802	2,303	3,011
12pm	1,723	1,950	2,498	3,279
1pm	392	400	434	466
2pm	392	405	433	465
3pm	4,827	5,693	7,900	11,279
4pm	489	504	544	584
5pm	2,613	2,982	3,889	5,211
6pm	1,342	1,518	1,920	2,507
7pm	2,045	2,366	3,124	4,231
8pm	181	185	199	214
9pm	978	1,110	1,406	1,814
10pm	172	185	215	251
11pm	162	178	211	254
TOTAL	24,278	27,562	35,511	46,977



Source: Railroad Operations Personnel in Metairie, Louisiana, March 1996; Jefferson Parish, Louisiana Traffic Engineering Department, January/February 1996; and CONSAD's Highway User Impact Analysis.

the year 2020 (regardless of how the projected increase in rail freight traffic will be accomplished) (again, see Tables 6.14 and 6.15). This represents the largest annual reduction (benefit) obtainable for the three train rescheduling/train speed alternatives considered. This savings, equal to $2.0 million in 1995, would rise to between $4.2 and $4.6 million by the year 2020. As described earlier, the net present value of these cost savings in 1996 is estimated to range from $24.2 to $25.7 million (with cost savings beginning to accrue in 2001).

6.3 Redirecting Hazardous Materials Rail Freight Traffic

One source of rail-community issues is the transport of hazardous materials which usually, but not always, involves the use of tank cars. A related hazardous materials concern of residents surrounds those local industrial firms which produce and/or use such materials. Regardless of the relative risks from these two types of activities, a reasonable approach for any community is to minimize the risk from each type.

There are many actions that a community can take to reduce its risks from hazardous materials. They fall into two broad categories:

- Relocate any firms and/or reroute any transportation facilities where hazardous materials exist; and
- Prepare for hazardous materials emergency incidents as completely as possible.

In order to effectively implement either of these actions, a comprehensive understanding of the types and amounts of hazardous materials located in or passing through the community is first needed. Such an analysis will reveal that no community is totally safe. Even remote rural communities will be exposed to rail and highway transportation of hazardous materials, and they may also have industrial facilities in their community. Communities within large urban regions will also be at risk, but the contributing components of the risks will vary, and will require careful analysis in order to design and organize appropriate responses.

6.3.1 Hazardous Materials Flows by State

Subsequent to the issuance of US Department of Transportation (DOT) regulations for hazardous materials, a separate commodity code (STCC) was established for materials on the DOT list (49CFR172.101). Code "49" is now used on Interstate Commerce Commission (ICC) waybills, and enables the analysis of the transportation of hazardous materials by rail.

A good example of such an analysis is "Flows of Selected Hazardous Materials by Rail" (Beier, et al., 1991). This report presents a breakdown of the tonnages of hazardous materials originating, terminating, and/or passing through each of the various states. The data base is the ICC waybill sample for 1986.

The startling result of this state by state comparison is that, in terms of tonnages of hazardous materials originating from shippers, the states of Texas and Louisiana originated more hazardous materials in 1986 than the total originated by the next eight states and Canadian provinces together (Illinois, New York, Florida, Ontario, Ohio, Tennessee, Alberta, and Alabama). Texas was first, with over 12 million tons annually, and Louisiana was second, with 9 million tons (see Table 6.16). The top ten Business Economic Areas (BEA's) where hazardous materials rail shipments originated include:

Houston, TX
Baton Rouge, LA
New Orleans, LA
Chicago, IL
Ontario Canada (province designated a BEA)
Jacksonville, FL
Alberta Canada (province designated a BEA)
Mobile, AL
Lake Charles, LA
El Paso, TX.

Three of these BEA's are in Louisiana.

The Beier, et al. (1991) report also presents data on the amounts of hazardous materials received from other states (i.e., terminating in the state, but not originating in the state). Illinois led the nation, with 4.3 million tons, followed by Texas, with 4.1 million tons. Louisiana dropped to tenth place, with 1.8 million tons, having been edged out by California, Florida, Georgia, New Jersey, Ohio, Pennsylvania, and Tennessee (again, see Table 6.16).

A third category of hazardous materials shipments are those neither originating nor terminating in, but passing through, a state. The Beier, et al. (1991) report uses the "pass-through" concept to calculate the percentage of all categories of hazardous materials which are only passing through the state (again, see Table 6.16). Many states were ahead of Texas and Louisiana on this percentage, but even with high shipping and receiving tonnages, Louisiana's pass-through proportion was almost 26 percent in 1986.

Table 6.16: Comparison of Originating, Terminating, and Pass Through Tonnages of Hazardous Materials For Selected States, 1986

State	Originating		Terminating (but not originating)	Pass-Through	Total
	Total	Originating and Terminating			
Alabama					
Tons	1,788,324	343,200	1,305,564	6,380,684	9,474,572
Percent	19		14	67	100
Arkansas					
Tons	387,400	2,960	464,720	6,415,164	7,267,284
Percent	5		6	88	100
Louisiana					
Tons	9,065,424	1,323,320	1,835,648	3,758,264	14,659,336
Percent	62		12	26	100
Mississippi					
Tons	1,420,994	66,840	961,540	7,204,868	9,587,352
Percent	15		10	75	100
Texas					
Tons	12,426,984	4,115,628	4,120,528	2,078,188	18,625,700
Percent	67		22	11	100

Source: "Flows of Selected Hazardous Materials by Rail" (Beier, et al., 1991, Table 2.1).

In other words, of the total tonnage of hazardous materials in the three categories, about 26 percent went through the state to recipients in other states in 1986. By comparison, 88 and 75 percent of the hazardous materials flows in the neighboring states of Arkansas and Mississippi, respectively, were pass-through tonnages. This suggests that these states already serve as a corridor for large amounts of pass-through hazardous materials, and transferring any route completely out of Louisiana and through those states could be problematic. This factor needs to be considered when looking at detailed links of routes.

Analysis of the 1994 ICC waybill sample suggests that the amount of hazardous materials going through the state increased by 29 percent to 18.8 million tons in 1994. Of this amount, about 65 percent originated in the state, 12 percent terminated (but did not originate) in the state, and 24 percent represented the pass through amount (ICC, 1995).

When examining hazardous materials flows, it is important to also consider the population exposed to them. As shown in Table 6.17, while Texas had the largest amount of hazardous materials

Table 6.17: Exposure to Hazardous Materials Carried by Rail

State	Population[1] 1994 estimate	Population density (persons/sq. mi.)	Hazardous Materials Flowing Through State, 1986[2]	Tons/person
Alabama	4,219,000	83.1	9,474,572	2.246
Arkansas	2,424,000	46.6	7,267,284	2.998
Louisiana	4,315,000	99.0	14,659,336	3.397
Mississippi	2,669,000	56.9	9,587,352	3.592
Texas	18,378,000	70.2	18,625,700	1.013

[1] U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States, 1995, pp. 28-29.
[2] "Flows of Selected Hazardous Materials by Rail" (Beier, et al., 1991, Table 2.1); see Table 6.16, above.

flows, on a per capita basis, it represented the smallest amount. It could be argued that Louisiana is in the worst position of all five states. Although Mississippi shows a slightly higher tons per capita, Louisiana shows a much higher average population density than Mississippi (potentially exposing more people per square mile).

Data provided in the report by Beier, et al. (1991) allow for the comparison of hazardous materials tonnages to all rail freight tonnages. This comparison is important because is suggests the probability of hazardous materials being involved should a rail accident occur. As shown in Table 6.18, almost 20 percent of the rail freight traffic through Louisiana consists of hazardous materials; this percentage is higher than any of the other four states. From the ICC waybill analysis for 1994, the percent for Louisiana remained essentially the same (at 19.6 percent) (ICC, 1995).

Table 6.18: Hazardous Materials Flows As a Percentage of Total Rail Shipping For Selected States, 1986

	Originating	Terminating (but not originating)	Pass-Through	Total
Alabama	3.73	6.99	13.23	8.25
Arkansas	3.37	1.63	11.55	7.61
Louisiana	31.86	8.78	15.66	19.98
Mississippi	10.85	10.21	16.54	14.51
Texas	15.70	5.34	5.91	9.73

Source: "Flows of Selected Hazardous Materials by Rail" (Beier, et al., 1991, Tables 2.1 and 2.2).

6.3.2 Regional Context

An examination of the average hazardous materials flows by state (as shown above) does not accurately illustrate the exposure of the population, because neither the hazardous materials carried by rail, nor the population, are distributed homogeneously over the state. To further analyze this issue, this report uses a region defined to lie between Mobile, Alabama and Baton Rouge, Louisiana, and from Brookhaven in Lincoln County, Mississippi south to Houma, Louisiana in Terrebone Parish. This region is shown on the map in Figure 6.9, and the populations of these counties and parishes are shown in Table 6.19.

As indicated by the data in Table 6.19, the Mississippi part of the region is generally less densely populated than the Louisiana portion. Of the five most densely populated counties (in Mississippi) and parishes (in Louisiana) in the region as a whole, four of them are parishes and, most notably, include Jefferson and Orleans Parishes. Sixteen of the 20 parishes are more densely populated than the average density for the counties, and only six counties are more densely populated than this average. Thus, it is reasonable to conclude that, should a hazardous materials accident occur, the potential risk would be greater if it occurred in Louisiana (especially in Jefferson or Orleans Parish) than in Mississippi. This suggests that rerouting hazardous materials flows out of Jefferson and Orleans Parishes will reduce the potential for harm should an accident occur involving a hazardous materials spill.

The next section provides a more complete picture of the exposure to hazardous materials for people residing in the Metairie area near the Back Belt. Also discussed is the impact of rerouting this traffic from the existing rail route to one or more proposed rail routes through the region.

Figure 6.9: Region Depicting Existing and Alternative Rail Corridors For Routing of Hazardous Materials

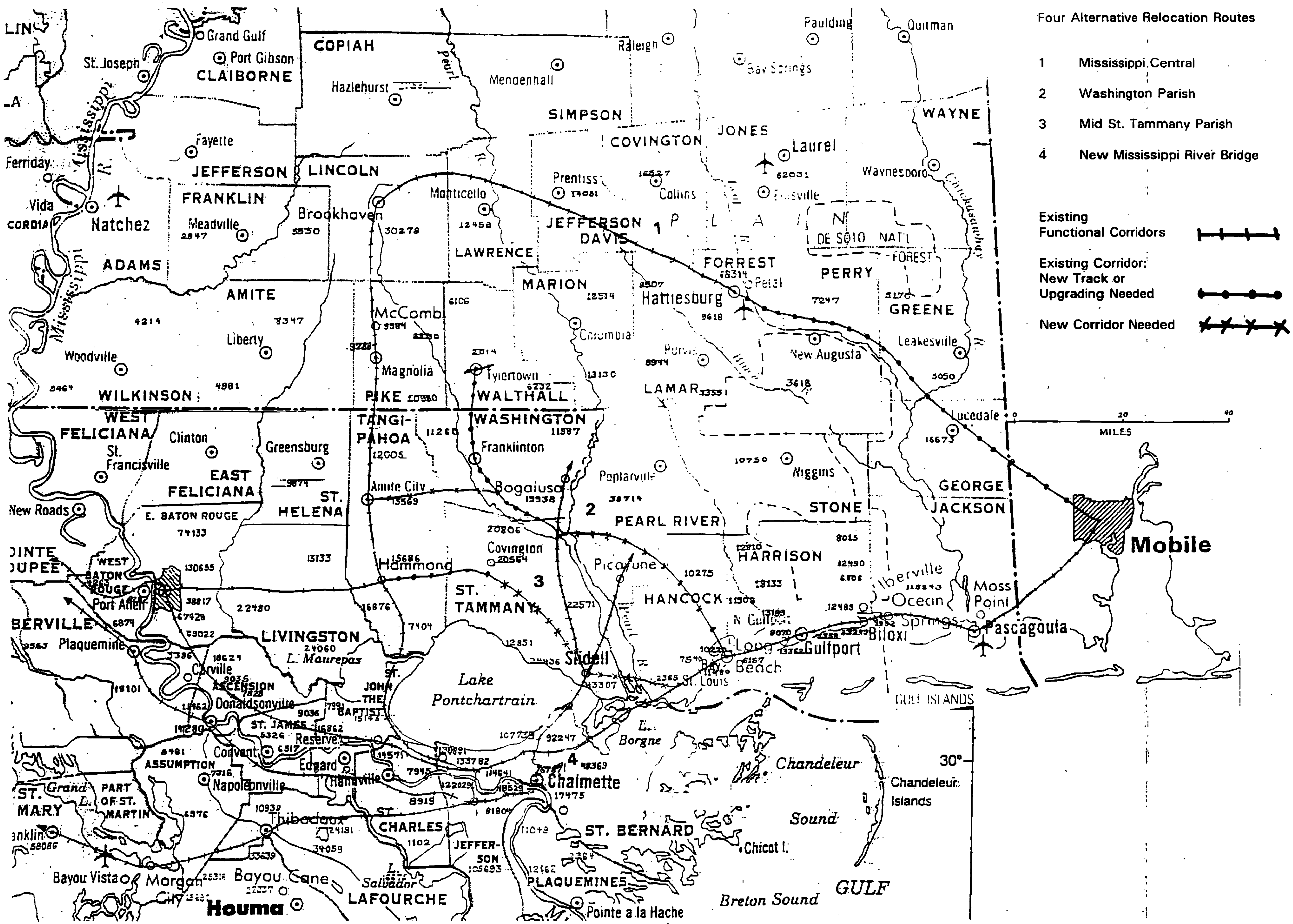


Table 6.19: Regional Context for Hazardous Materials Routing: Counties and Parishes in Region Containing Existing and Alternative Rail Corridors

MISSISSIPPI					
County	Total population	Density (per square mile)	County	Total population	Density (per square mile)
1 Amite	13,328	18	11 Lamar	30,424	63
2 Covington	16,527	40	12 Lawrence	12,458	29
3 Forrest	68,314	150	13 Lincoln	30,278	53
4 George	16,673	36	14 Marion	25,544	47
5 Greene	1,022	15	15 Pearl River	38,714	49
6 Hancock	31,760	70	16 Perry	10,865	17
7 Harrison	165,365	292	17 Pike	36,882	91
8 Jackson	115,243	167	18 Stone	10,750	26
9 Jefferson Davis	14,051	34	19 Walthall	14,352	36
10 Jones	62,031	89	20 Wilkinson	9,678	14
				Average Density	**66.8**

LOUISIANA					
Parish	Total population	Density (per square mile)	County	Total population	Density (per square mile)
1 Ascension	58,214	209	11 St Charles	42,437	156
2 Assumption	22,753	67	12 St Helena	9,874	24
3 East Baton Rouge	380,105	859	13 St James	20,879	84
4 Iberville	31,049	50	14 St John the Baptist	39,996	188
5 Jefferson	448,306	1496	15 St Mary	58,086	95
6 Lafourche	85,860	80	16 St Tammany	144,508	183
7 Livingston	70,526	114	17 Tangipahoa	85,709	111
8 Orleans	496,938	2711	18 Terrebone	96,982	80
9 Plaquemines	25,575	31	19 Washington	43,185	64
10 St Bernard	66,631	144	20 West Baton Rouge	19,419	104
				Average Density	**342.5**

Source: U.S. Department of Commerce, Bureau of the Census.

6.3.3 Hazardous Materials Flows Over the Back Belt

One reason why Louisiana has such a high percentage of hazardous materials passing through the state, compared to the total of received, shipped, and pass-through tonnages, is that it is an east-west gateway state, and it is likely that all of the pass-through tonnage goes through one of three Mississippi River gateways: Vicksburg-Monroe-Shreveport; Baton Rouge; or New Orleans-Jefferson Parish. Two approaches were used to determine the amount of hazardous materials flowing through the New Orleans Gateway (i.e., traveling over the Back Belt, which is the focus of this study).

In the first approach, CONSAD relied upon data collected in the train survey indicating that, on average, each train travelling over the Back Belt had 78.03 cars, of which 15.15 carried hazardous materials and 62.88 carried other commodities (see Table 6.20). By and large, the hazardous materials placards were almost always found on tank cars and primarily represented flammable/inflammable/poisonous gases, flammable and combustible liquids, and corrosive materials (see Table 6.21). Based on 24.7 trains, on average, travelling over the Back Belt each day, and assuming that all rail cars with placards were loaded cars, it is estimated that 374 loaded cars each day or 136,585 loaded cars annually travel over the Back Belt containing hazardous materials. Further, the ICC waybill data, for the major railroads operating over the Back Belt, indicate that the average tonnage for a rail car containing hazardous materials was 78.92 tons in 1994 (ICC, 1995). This

Table 6.20: Summary of Hazardous Materials Cars Observed Over the Back Belt

Direction	Number of Trains	Average Number of Cars Per Train	Average Number of Tank Cars Per Train	Average Number of Placarded Hazardous Materials Cars Per Train	Tank Cars as a Percentage of All Cars	Hazardous Materials Cars as a Percentage of All Cars	Hazardous Materials Cars as a Percentage of Tank Cars
Eastbound	26	72.38	22.69	13.54	31.4%	18.7%	59.7%
Westbound	31	82.68	27.10	16.13	32.8%	19.5%	59.5%
Direction not recorded	4	79.50	27.00	18.00	34.0%	22.6%	66.7%
Total	61	78.03	25.21	15.15	32.3%	19.4%	60.1%

Source: Train survey conducted by CONSAD Research Corporation, October 1995.

Note: Not all tank cars were placarded as containing hazardous materials. Moreover, hazardous materials can be transported in cars other than tank cars (i.e., closed hopper cars).

Table 6.21: Description Types of Hazardous Materials Flows Over the Back Belt

Hazard Class	Name of Class	Number of Hazardous Materials Cars	Distribution of Hazardous Materials
1	Explosives	1	0.1%
2	Flammable/Nonflammable/ Poison Gas	247	26.9%
3	Flammable/Combustible Liquid	217	23.6%
4	Flammable Solid, Spontaneously Combustible, or Dangerous When Wet	3	0.3%
5	Oxidizer/Organic Peroxide	11	1.2%
6	Poisonous Material/Infectious	42	4.6%
7	Radioactive	3	0.3%
8	Corrosive	260	28.3%
9	Miscellaneous	17	1.9%
Unknown		119	12.9%
Total		920	100.0%

Source: Train survey conducted by CONSAD Research Corporation, October 1995.

produces an estimated 10.8 million tons per year of hazardous materials travelling over the Back Belt. The Census Bureau estimates the population of Metairie, an unincorporated place, at 149,428 for 1990, which gives an average of about 34 tons of hazardous materials per person per year.

In the second approach to estimate the amount of hazardous materials going over the Back Belt, the 1994 ICC waybill data were used as follows: first, all freight cars containing hazardous materials with a code for Louisiana in the state routing field were selected to form the Louisiana subset (L Data); second, all freight cars with a code for New Orleans (NEWOR) in the junction (interchange) field were selected from the Louisiana subset (L Data) to form the A dataset (freight cars which did not have a code of NEWOR became the B dataset); third, both the A and B datasets were further separated into those freight cars which had a junction code showing a junction (interchange) between pairs of railroads which interchange just before and after the Back Belt (i.e., which connect through the Back Belt).

The results of this analysis indicate that 6.55 million tons of hazardous materials went into, out of, or just through the state with a NEWOR interchange code (what is called the A traffic and believed to have probably gone over the Back Belt). Of this traffic, almost 5.59 million tons of hazardous materials represent traffic where it is known that there was an interchange between NS and SP, NS and UP, NS and IC, NS and KCS, NS and MP, CSX and SP, CSX and UP, CSX and IC, CSX and KCS, or CSX and MP (i.e., those exchanges between railroads where the traffic **had to** go over the Back Belt). Moreover, there is an additional 1.57 million tons (part of what is called the B traffic) that went into, out of, or just through the state, where the NEWOR interchange code did **not** appear, but where the traffic interchanged between these railroads (whether or not this traffic went over the Back Belt is uncertain). If it is assumed that this B traffic did, in fact, go over the Back Belt, then the total hazardous materials flows over the Back Belt would equal between 7.16 and 8.12 million tons. (The above estimates, ranging from 5.59 to 8.12 million tons per year, produce a range of 37 to 54 tons of hazardous materials per person per year.)

Table 6.22: Summary of the Originating, Terminating, and Pass Through Hazardous Materials Flows Over the Back Belt

Traffic Description	Flows Originating in Louisiana		Flows Terminating but Not Originating in Louisiana	Pass-Through Flows	Total Flows in Louisiana Over the Back Belt
	Total	Originating and Terminating in Louisiana			
NEWOR traffic with selected railroad interchanges only[1]					
Tons	2,875,160	112,196	220,080	2,496,564	5,591,804
Percent	51		4	45	100
All NEWOR Traffic					
Tons	3,565,320	409,076	397,080	2,588,364	6,550,764
Percent	54		6	40	100
NEWOR and non-NEWOR traffic with selected railroad interchanges only[1]					
Tons	3,749,240	112,192	414,272	2,996,484	7,159,996
Percent	52		6	42	100
All NEWOR traffic and non-NEWOR traffic with selected railroad interchanges only[1]					
Tons	4,439,400	521,872	591,272	3,088,284	8,118,956
Percent	35		6	38	100

[1] Includes an interchange between the NS or CSX with the SP, UP, IC, KCS, or MP.

Source: CONSAD analysis of the 1994 ICC Waybill Sample Data.

Table 6.22 summarizes these data and also indicates the amount of hazardous materials originating, terminating, and only passing through the state. These data suggest that between 38 and 45 percent of the hazardous materials traffic passes through the state over the Back Belt but does not originate or terminate in the state. It is this traffic that could most easily be rerouted to other, less densely populated, corridors, thereby reducing the potential harm from a hazardous materials spill.

6.3.4 Exposure to Hazardous Materials Over Alternative Rail Routes

6.3.4.1 Basic Concepts

The analysis of exposure of populations to hazardous materials carried by rail requires that rail corridors be segmented according to the population areas through which the rail corridors pass. This procedure enables the use of convenient population surveys to estimate the number of people exposed along the rail route.

In addition, the concept of exposure implies an amount of hazardous materials over a specified period of time. The time interval must include not only the actual travel time of the materials, but also a longer period which reflects the possible occurrence of procedures such as switching, stopping on turnouts and sidings, and interchanging among railroads.

In the present analysis, two variables are used:

- the amounts of hazardous materials moving through the region over a one year time period; and
- the fixed distance of the corridor over which the trains move when passing through a population area.

These two variables are presented separately throughout the analysis. The one year period refers to the totals of hazardous materials provided on the 1994 ICC waybill data base. The fixed distance of the corridor refers to segments of corridors measured for population areas (specifically, parishes and counties).

Thus, the concept of exposure is defined to include a distance which is fixed within parishes and counties, but varies among the many parishes and counties in the region of interest. The time period, one year, is fixed for the entire region, and the ICC waybill data for 1994 were used.

Moreover, the concept of the Back Belt as a national and possibly international gateway implies that there is no single local region which is its primary service area. This national/international concept is central to understanding the implications of congestion and delay in rail operations across the Back Belt. In other words, the transportation improvements needed in the vicinity of the Back Belt must be considered as national needs.

In the present study, some of these needed improvements have been defined as relocation alternatives where rail traffic from the Back Belt is to be relocated to alternative routes which are minimal distances away. (Other alternatives, not considered here, could include rerouting Back Belt traffic through Vicksburg or Memphis, which are alternative gateways.) Sections 5.1.5 through 5.1.7 and 6.1 describe five alternative routes which are close enough that additional travel distances of from 1.5 to 30 miles would provide linkage back into the existing routes, while completely circumventing the Back Belt. Thus, although these relocation alternatives have implications for the national/international gateway operation, the movement of hazardous materials across them has implications for local jurisdictions and populations.

Selection of a region which contained these relocation alternatives, and their links back into the pre-existing routes, resulted in the delineation of two subregions, one in Louisiana, and the other in Mississippi, each consisting of 20 jurisdictions (20 parishes in Louisiana and 20 counties in Mississippi). The average population densities for each are 66.8 and 342.5 persons per square mile, respectively (see Table 6.19, above).

6.3.4.2 Identification of Rail Corridors

Part of the difficulty in estimating tons of material, whether hazardous or non-hazardous, travelling over rail corridors, arises because of the identity of the railroads carrying these tons. An inspection of a recent map of the Back Belt region shows various rail corridors with rail company names: Texas and Pacific, Louisiana and Arkansas, and Gulf, Mobile, and Ohio. But some of these rail companies are now owned or absorbed, partially or wholly, by or into others.

Thus, the Texas and Pacific Railroad is now part of KCS, but the ICC waybill records still show an abbreviation (TPW) which represents freight carried by the Texas and Pacific. Similarly, the MP railroad shown on route maps is now part of UP, but the MP freight is still shown separately in the ICC waybill data.

Keeping in mind these issues, USGS maps provided route identifications which were used to define eight separate corridors connecting with the Back Belt, four of which extended into Mississippi, and four of which ran into western Louisiana and did not appear in Mississippi. The labels abbreviated from those shown on the maps, along with the measured map mileages, are:

Corridor Label	Total Miles in LA (20 parishes)	Total Miles in MS (20 counties)
L&A/KCS	93	0
TXP/UP	127	0
MP/UP	102	0
SP	123	0
IC/VICKS	14	37
IC/BRK	80	39
NS	50	93
CSX	10	79
TOTALS	599	248

The miles of rail corridor feeding into the Back Belt are 248 for the Mississippi subregion and 599 for the Louisiana subregion. An additional 138 miles in Mississippi and 52 miles in Louisiana, which are presently local service or unused corridors mostly belonging to IC, also become part of the relocation alternatives. In addition, some entirely new corridor links are required for the relocation alternatives, which are discussed next.

6.3.4.3 Description of Relocation Alternatives

As previously stated, based on inputs from rail, shipping, and local and state planning officials, five relocation alternative routes were identified. The definition adopted for a relocation alternative was that it would enable complete bypass of the Back Belt by **all** traffic as needed, even though this complete bypass would not necessarily be implemented operationally.

For this analysis, in developing the concept of relocation alternatives, it was necessary to assume that certain operational decisions would be made if the Back Belt should be completely closed. Assuming that such closure should occur, then all rail traffic on the eight rail corridors defined above would be rerouted to one or more alternative routes. In other words, implementation and use of the relocation alternatives requires rerouting Back Belt traffic in various ways such that the pattern of usage of the entire rail network in the region is shifted.

The assumptions developed were:

- All rail traffic would continue to approach the New Orleans region, and would use the relocation alternative implemented; and
- Only **one** of the five relocation alternatives would be implemented in the foreseeable future.

Thus, all rail traffic which had previously moved over the Back Belt would now be relocated to exactly one route in the regional network, using whichever relocation alternative was implemented. The possibility that traffic would shift out of the regional network to an alternative gateway was not analyzed.

The five relocation alternatives, described in detail in other parts of this report, are summarized below, including the designations used in this section:

- Carrollton Curve Alternative: This relocation alternative connects approaches to and from the Back Belt in Orleans and Jefferson Parishes, Louisiana, in the immediate vicinity of it. A total additional (runaround) mileage of 1.4 miles is needed. The implications of this very minor route rearrangement has **no** implications with respect to change in the exposure to hazardous materials for the populations of these parishes. There is no implication for the population in Mississippi. Therefore, this alternative will **not** be discussed further in this hazardous materials analysis.
- Mississippi Central Route Alternative, from Brookhaven to Hattiesburg to Mobile **(Alt-1)**: This relocation alternative adds considerable mileage, and takes hazardous materials

furthest from New Orleans, but they will now run through Hattiesburg, Brookhaven, and Baton Rouge. Large segments of track in several Louisiana parishes will be completely bypassed. A train approaching the Back Belt from Shreveport would not come closer than Baton Rouge, where it would divert east and then north, leaving Louisiana, and not rejoining its original route until either Hattiesburg or Mobile.

- Washington Parish Alternative, from Picayune to Amite City to Baton Rouge **(Alt-2)**: This relocation alternative requires about 37 miles of new corridor through Washington and Tangipahoa Parishes, plus a bridge across the Pearl River near Picayune, Mississippi. The diversion route would rejoin the original routes near Picayune, or near Bay St. Louis. Conversely, a westbound train approaching the Back Belt from Bay St.Louis intending to proceed southwest from New Orleans on the SP route would have a long diversion, north through Washington Parish, Baton Rouge, across the Mississippi River, and south on the TXP/UP route to Thibodaux.

- Mid St. Tammany Parish Alternative **(Alt-3)**: This relocation route would use part of an existing transportation route, the corridor of Interstate Highway 12 from Slidell west to near Covington, where it would join an existing corridor of IC between Covington and Hammond, which continues west to Baton Rouge. Rail traffic from west of the Mississippi River would need to cross the river at Baton Rouge, continue east on the existing corridor, turn southeast into the I-12 corridor, and interchange with NS in Slidell. Traffic intending to interchange with CSX would need to use a new corridor from Slidell to the existing CSX corridor near Bay St. Louis. Westbound traffic from Bay St. Louis would divert through Slidell, Hammond, and Baton Rouge. This traffic could then go south on the west bank of the Mississippi River and join the SP corridor at Thibodaux. However, it is more likely that it would either turn north after crossing, to Alexandria and Shreveport, or it would continue west on the MP/UP corridor and turn south farther west, or continue to Beaumont.

- New Mississippi River Bridge Alternative: Route 47/I-510 Extension **(Alt-4)**: This relocation route would use existing corridors almost entirely, except for bridge approaches. On the east bank, the approach to the bridge would begin near the CSX Gentilly Yard, continue east, and turn south to cross the bridge, which would be a new combined highway and rail bridge. After crossing, trains would need about six miles of connecting corridor to the SP corridor near Gretna. (The total mileage, including the bridge, is estimated to be five miles in St. Bernard Parish and 10 miles in Orleans Parish.) Trains would continue west on the SP track, or turn north on the TP track near Westwego. Train traffic coming west through Mississippi might well divert to the Vicksburg-Shreveport gateway instead of coming south to New Orleans, crossing the

Alt-4 bridge, and then going back north on the TXP route. For purposes of this hazardous materials flows analysis, the assumption is that the TXP route will be used.

Some additional assumptions about the network usage shifting were necessary and are discussed next. (In order to follow this discussion, it is convenient to consult the appropriate USGS Topographic maps of the 1:250000 or 1:100000 series.)

6.3.4.4 Rail Network Routing

Assuming that the Back Belt is now closed completely, rail traffic which would have crossed it previously must now divert. Traffic approaching from the northwest, intending to interchange with NS or CSX, will now divert around Lake Pontchartrain to the north by Alt-1, Alt-2, Alt-3, whichever has been implemented. However, if Alt-4 is implemented, the traffic from the northwest must continue south on the west bank, using the TXP and SP corridors to reach the new bridge. Once across the bridge, the trains can proceed to the Oliver and Gentilly Yards and interchange normally.

These assumed shifts in routes mean that no traffic will use the east bank routes of the MP and the L&A/KCS from Baton Rouge to Jefferson Parish. In the case of Alt-4, it would be possible for trains to cross into Baton Rouge, proceed south along these corridors, cross back to the west bank by the HPL bridge, join SP on the west bank, cross back on the new Alt-4 bridge, and complete their interchange. This route would involve three crossings of the Mississippi River.

Therefore, the relocation alternatives assume that some control can be implemented which would prohibit more than **one** crossing. The reason for prohibiting more than one crossing is to reduce bridge wear and maintenance. In addition, it is almost inevitable that congestion and delays would increase with the number of bridge crossings. There is the possibility that some trains are currently crossing **both** at Baton Rouge and at the HPL Bridge. In planning for Alt-4, operating regulations would need to be developed to prevent more than one crossing of the Mississippi River.

6.3.4.5 Results

The above rules were applied to analyze the impacts of rerouting hazardous materials to or from the parish and county rail corridors. This was accomplished by using map measurements of miles of corridor, allocating tons of hazardous materials carried, and calculating ton-miles of hazardous materials for one year, using the 1994 ICC waybill data.

In addition, shifts in network usage were analyzed in terms of miles bypassed (diverted) to and from each parish/county and miles of new (additional) relocation corridor miles required for each county/parish. These calculations were made for each of the four alternative routings described above. The results are shown in Tables 6.23 and 6.24.

According to these results, a few parishes/counties which had no original (current) corridor traffic continued to have no traffic with the alternative relocated corridors. These areas had been included under the hypothesis that they might suffer some effects from nearby corridors.

Out of 20 parishes and 20 counties, seven parishes and ten counties received all of the diverted (relocated) hazardous

Table 6.23: Miles of Railroad Corridor Bypassed (Diverted), for Each Relocation Alternative, by Parish/County

		Miles of Corridor Bypassed (Diverted)			
		Alt-1	Alt-2	Alt-3	Alt-4
Louisiana Parishes					
1	Ascension Parish	42	42	42	30
2	Assumption Parish	13	13	13	0
3	East Baton Rouge Parish	32	32	32	14
4	Iberville Parish	8	8	8	8
5	Jefferson Parish	41	41	41	25
6	Lafourche Parish	42	42	42	0
7	Livingston Parish	0	0	0	0
8	Orleans Parish	34	34	34	0
9	Plaquemines Parish	0	0	0	0
10	St. Bernard Parish	0	0	0	0
11	St. Charles Parish	66	66	66	36
12	St. Helena Parish	0	0	0	0
13	St. James Parish	47	47	47	27
14	St. John the Baptist Parish	54	54	54	45
15	St. Mary Parish	59	59	59	0
16	St. Tammany Parish	22	22	11	0
17	Tangipahoa Parish	48	48	48	48
18	Terrebonne Parish	15	15	15	0
19	Washington Parish	0	0	0	0
20	West Baton Rouge Parish	0	0	0	0
	TOTAL	523	523	512	233
Mississippi Counties					
1	Amite County	0	0	0	0
2	Covington County	0	0	0	0
3	Forrest County	5	0	0	0
4	George County	0	0	0	0
5	Greene County	0	0	0	0
6	Hancock County	19	19	7	0
7	Harrison County	28	0	0	0
8	Jackson County	29	0	0	0
9	Jefferson Davis County	0	0	0	0
10	Jones County	0	0	0	0
11	Lamar County	9	0	0	0
12	Lawrence County	0	0	0	0
13	Lincoln County	0	0	0	0
14	Marion County	0	0	0	0
15	Pearl River County	41	14	0	0
16	Perry County	0	0	0	0
17	Pike County	0	0	0	0
18	Stone County	0	0	0	0
19	Walthall County	0	0	0	0
20	Wilkinson County	0	0	0	0
	TOTAL	131	33	7	0

Source: CONSAD analysis of relocation alternatives and existing track.

Table 6.24: Miles of Additional Railroad Corridor Needed, for Each Relocation Alternative, by Parish/County

		Miles of New Corridor Needed			
		Alt-1	Alt-2	Alt-3	Alt-4
Louisiana Parishes					
1	Ascension Parish	0	0	0	0
2	Assumption Parish	0	0	0	0
3	East Baton Rouge Parish	12	12	12	0
4	Iberville Parish	0	0	0	0
5	Jefferson Parish	0	0	0	0
6	Lafourche Parish	0	0	0	0
7	Livingston Parish	27	27	27	0
8	Orleans Parish	0	0	0	10
9	Plaquemines Parish	0	0	0	0
10	St. Bernard Parish	0	0	0	5
11	St. Charles Parish	0	0	0	0
12	St. Helena Parish	0	0	0	0
13	St. James Parish	0	0	0	0
14	St. John the Baptist Parish	0	0	0	0
15	St. Mary Parish	0	0	0	0
16	St. Tammany Parish	0	0	52	0
17	Tangipahoa Parish	38	38	19	0
18	Terrebonne Parish	0	0	0	0
19	Washington Parish	0	32	0	0
20	West Baton Rouge Parish	0	0	0	0
	TOTALS	77	109	110	15
Mississippi Counties					
1	Amite County	0	0	0	0
2	Covington County	0	0	0	0
3	Forrest County	20	0	0	0
4	George County	19	0	0	0
5	Greene County	12	0	0	0
6	Hancock County	0	20	9	0
7	Harrison County	0	0	0	0
8	Jackson County	0	0	0	0
9	Jefferson Davis County	24	0	0	0
10	Jones County	0	0	0	0
11	Lamar County	9	0	0	0
12	Lawrence County	16	0	0	0
13	Lincoln County	17	0	0	0
14	Marion County	0	0	0	0
15	Pearl River County	0	22	0	0
16	Perry County	21	0	0	0
17	Pike County	0	0	0	0
18	Stone County	0	0	0	0
19	Walthall County	0	0	0	0
20	Wilkinson County	0	0	0	0
	TOTALS	138	42	9	0

Source: CONSAD analysis of relocation alternatives and existing track.

materials. In Louisiana, three of these seven had zero previous traffic related to the Back Belt: Livingston, St. Bernard, and Washington. In Mississippi, five of the seven had zero traffic previously related to the Back Belt: George, Greene, Jefferson Davis, Lawrence, and Perry. In the case of the Mississippi counties all seven have population densities less than 60 percent of the average for the 20 county sample. The three Louisiana parishes each have population densities less than half of the average for the 20 parish sample.

An index of the net change in ton-miles was calculated by first subtracting the amount diverted away from each parish and county from the amount added by the relocation alternatives. Then, this difference was expressed as a percent of the original (current) ton-miles moving through the parish/county before the relocation. These results are shown in Table 6.25.

In Louisiana, only four parishes received positive percentages on this index: East Baton Rouge, Orleans, St. Tammany, and Tangipahoa. In Mississippi, five counties received positive percentages: Forrest, Hancock, Lamar, Lincoln, and Pearl River. However, none of the Mississippi counties received positive indicators for Alt. 4, and only one of the Louisiana parishes (Orleans) had a positive percentage. Thus, from the point of view of this particular index, Alt. 4, the New Mississippi River Bridge alternative, is the most desirable, although the likelihood that this alternative could be constructed is low due to the huge construction costs and other potential environmental/community impacts (see Section 6.1.3, above).

Table 6.25: Percent Change in Ton-Miles, for Each Relocation Alternative by Parish/County

		Percent Change in Ton-Miles[1]			
		Alt-1	Alt-2	Alt-3	Alt-4
	Louisiana Parishes				
1	Ascension Parish	-100	-100	-100	-98
2	Assumption Parish	-95	-95	-95	0
3	East Baton Rouge Parish	68	68	68	-21
4	Iberville Parish	-88	-88	-88	-88
5	Jefferson Parish	-100	-100	-100	-72
6	Lafourche Parish	-100	-100	-100	0
7	Livingston Parish	NA	NA	NA	0
8	Orleans Parish	-100	-100	-100	63
9	Plaquemines Parish	0	0	0	0
10	St. Bernard Parish	0	0	0	NA
11	St. Charles Parish	-100	-100	-100	-63
12	St. Helena Parish	0	0	0	0
13	St. James Parish	-100	-100	-100	-97
14	St. John the Baptist Parish	-100	-100	-100	-99
15	St. Mary Parish	-100	-100	-100	0
16	St. Tammany Parish	-100	-100	521	0
17	Tangipahoa Parish	342	342	121	-100
18	Terrebonne Parish	-100	-100	-100	0
19	Washington Parish	0	NA	0	0
20	West Baton Rouge Parish	0	0	0	0
	Mississippi Counties				
1	Amite County	0	0	0	0
2	Covington County	0	0	0	0
3	Forrest County	289	0	0	0
4	George County	NA	0	0	0
5	Greene County	NA	0	0	0
6	Hancock County	-95	76	42	0
7	Harrison County	-93	0	0	0
8	Jackson County	-100	0	0	0
9	Jefferson Davis County	NA	0	0	0
10	Jones County	0	0	0	0
11	Lamar County	71	0	0	0
12	Lawrence County	NA	0	0	0
13	Lincoln County	632	0	0	0
14	Marion County	0	0	0	0
15	Pearl River County	-100	96	0	0
16	Perry County	NA	0	0	0
17	Pike County	0	0	0	0
18	Stone County	0	0	0	0
19	Walthall County	0	0	0	0
20	Wilkinson County	0	0	0	0

NA - not applicable (no miles of railroad corridor currently exist).

[1] Calculated as: [(additional ton-miles - diverted ton-miles) ÷ current ton-miles] × 100

Source: Tables 6.22, 6.23 and 6.24 of this report.

In a further analytical step, the ton-miles of hazardous materials for each parish/county, for each alternative, were multiplied by the density (i.e., persons per square mile) of each parish/county to produce person-tons-per-mile. These results are shown in Table 6.26 and are compiled for the additional, diverted, and original (current) traffic.

Next, the person-tons-per-mile for the diverted results were subtracted from the additional results. A summary of these differences, in billions of person-tons-per-mile, is shown below.

	Current	Alt-1	Alt-2	Alt-3	Alt-4
Louisiana	180.37	-129.62	-124.50	-109.05	32.11
Mississippi	30.87	-4.96	12.86	5.84	0.0

Based on these data, Alt-1, the Mississippi Central Route Alternative, looks very attractive. For Louisiana, the net result of Alt-1 is negative, meaning a diversion amount greater than the additional amount when totalled over 20 parishes. For Mississippi, the net result is also negative, although small. The reason for this negative result in Mississippi is that, under Alt-1, hazardous materials will be diverted from the coastal route (through Gulfport and Biloxi) to go from Mobile to Baton Rouge.

Lacking here is a detailed analysis of scenarios, in which actual incidents involving releases of hazardous materials would be modelled. This type of analysis, which would need to also consider climate and meteorological conditions, as well as the nature of the materials which would most likely be released, is beyond the scope of this study.

Table 6.26: Additional and Diverted Person-Tons-Per-Mile, for Each Relocation Alternative, by Parish/County

		Current Person-tons-per-mile (in billions)	Additional Person-tons-per-mile (in billions)				Diverted Person-tons-per-mile (in billions)			
			Alt-1	Alt-2	Alt-3	Alt-4	Alt-1	Alt-2	Alt-3	Alt-4
	Louisiana Parishes									
1	Ascension Parish	3.12	0	0	0	0	3.12	3.12	3.12	3.07
2	Assumption Parish	0.60	0	0	0	0	0.57	0.57	0.57	0
3	East Baton Rouge Parish	18.56	25.73	25.73	25.73	0	13.17	13.17	13.17	3.90
4	Iberville Parish	0.15	0	0	0	0	0.13	0.13	0.13	0.13
5	Jefferson Parish	28.65	0	0	0	0	28.65	28.65	28.65	20.54
6	Lafourche Parish	1.70	0	0	0	0	1.70	1.70	1.70	0
7	Livingston Parish	0	7.68	7.68	7.68	0	0	0	0	0
8	Orleans Parish	106.88	0	0	0	67.68	106.88	106.88	106.88	0
9	Plaquemines Parish	0	0	0	0	0	0	0	0	0
10	St. Bernard Parish	0	0	0	0	1.80	0	0	0	0
11	St. Charles Parish	4.01	0	0	0	0	4.01	4.01	4.01	2.53
12	St. Helena Parish	0	0	0	0	0	0	0	0	0
13	St. James Parish	0.98	0	0	0	0	0.98	0.98	0.98	0.94
14	St. John the Baptist Parish	3.90	0	0	0	0	3.90	3.90	3.90	3.87
15	St. Mary Parish	3.12	0	0	0	0	3.12	3.12	3.12	0
16	St. Tammany Parish	4.16	0	0	23.76	0	4.16	4.16	2.08	0
17	Tangipahoa Parish	2.38	10.53	10.53	5.27	0	2.38	2.38	2.38	2.38
18	Terrebonne Parish	0.79	0	0	0	0	0.79	0.79	0.79	0
19	Washington Parish	0	0	5.11	0	0	0	0	0	0
20	West Baton Rouge Parish	1.37	0	0	0	0	0	0	0	0
	TOTAL	180.37	43.95	49.06	62.44	69.48	173.57	173.57	171.49	37.37
	Mississippi Counties									
1	Amite County	0.13	0	0	0	0	0	0	0	0
2	Covington County	0	0	0	0	0	0	0	0	0
3	Forrest County	2.32	0	0	0	0	0.77	0	0	0
4	George County	0	1.80	0	0	0	0	0	0	0
5	Greene County	0	0.71	0	0	0	0	0	0	0
6	Hancock County	2.05	2.10	0	0	0	1.95	1.95	0.72	0
7	Harrison County	12.82	0	14.58	6.56	0	11.97	0	0	0
8	Jackson County	7.09	0	0	0	0	7.09	0	0	0
9	Jefferson Davis County	0	0	0	0	0	0	0	0	0
10	Jones County	1.75	5.33	0	0	0	0	0	0	0
11	Lamar County	1.17	0	0	0	0	0.59	0	0	0
12	Lawrence County	0	0.65	0	0	0	0	0	0	0
13	Lincoln County	0.36	2.12	0	0	0	0	0	0	0
14	Marion County	0	1.99	0	0	0	0	0	0	0
15	Pearl River County	2.08	0	0	0	0	2.08	0.71	0	0
16	Perry County	0	0	0.93	0	0	0	0	0	0
17	Pike County	0.98	4.77	0	0	0	0	0	0	0
18	Stone County	0	0	0	0	0	0	0	0	0
19	Walthall County	0	0	0	0	0	0	0	0	0
20	Wilkinson County	0.13	0	0	0	0	0	0	0	0
	TOTAL	30.87	19.47	15.51	6.56	0	24.44	2.66	0.72	0

Source: Tables 6.19, 6.22, 6.23, and 6.24 of this report.

6.4 Railroad Grade Crossing and Other Highway Accidents

There are eight grade crossings over the 3.1 miles of the Back Belt. Accidents involving trains and vehicular traffic can occur when a train is traversing one of these crossings. Over the last 21 years there have been 45 grade crossing accidents on the Back Belt reported by the railroads to the Federal Railroad Administration (FRA); see Appendix J for a detailed listing of these accidents. Table 6.27 summarizes these accidents for five year time intervals along with information describing the daily vehicle and rail freight traffic volumes.

As indicated by the data, on average, there were 2.4 accidents per year between 1975 and 1979 dropping to 1.8 accidents per year between 1985 and 1989. Between 1990 and 1994, the average number of accidents increased slightly to two per year and then to three accidents in 1995. However, on average, for the most recent five year period (1991 - 1995), the average number of accidents stood at 1.8 per year. When examined in conjunction with the volume of vehicular and rail freight traffic, the number of accidents per year per billion vehicle-train days is estimated to be about 4.88 (again, based on the most recent five year time period). In previous years, this accident rate is estimated to have been higher, especially during the late 1970s before the current grade crossing warning devices were installed.

The 45 accidents reported to the FRA produced 21 injuries and no fatalities, as the low speed of the trains (averaging 12.5 MPH and ranging from two to 20 MPH) typically bounces the vehicles off

Table 6.27: Summary of Back Belt Railroad Grade Crossing Accidents Reported to the Federal Railroad Administration, 1975-1995

Time Period	Number of Accidents		Highway Traffic (Vehicles Per Day)	Train Traffic		Average Number of Accidents Per Year Per Billion Vehicle-Train Days
	Total	Average Number Per Year		Average Number of Trains Per Day	Average Train Length (without locomotives)	
75-79	12	2.4	34,105[1]	24[1]	48[1]	8.03
80-84	11	2.2	NA	NA	NA	NA
85-89	9	1.8	36,911[2]	21[2]	57[2]	6.36
90-94	10	2	NA	NA	NA	NA
95	3	3	40,939[3]	24.7[3]	78[3]	8.13
91-95	9	1.8	40,939[3]	24.7[3]	78[3]	4.88
1975-1995	45	2.1	---	---	---	---

1 Data for 1975 from CONSAD (1975).
2 Data for 1986 from FHWA, et al. (1988).
3 Data for 1995 from Sections 6.2.1 and 6.2.2 of this report.

the tracks. While slow train operating speed limits have increased grade crossings delays, they also have acted to prevent fatalities and the kind of vehicle grinding and crushing that higher train speeds produce.

In addition to these grade crossing collisions involving a train and a vehicle, accidents can also occur between two (or more) vehicles as they are waiting for a passing train to clear the grade crossing (for example, when a motorist decides to turn around rather than to wait for the train to pass) or as they are crossing the grade crossing in the absence of a train [for example, when a motorist's view of the vehicle ahead of them is obstructed due to the elevated nature of the crossing (as is the case at the Metairie and Labarre Road grade crossings)]. In 1995, Jefferson Parish police recorded a total of nine accidents at or near the grade crossings. Inspection of the police accident reports revealed that two of the accidents, one at LaBarre Road and one at Metairie Road, involved a train hitting a motorist who was driving around the lowered crossing gates. The two railroads involved, SP and NS, respectively, reported the accident details to the FRA.

The remaining seven accidents [one at LaBarre Road, one at Carrollton Avenue, and five at Metairie Road (with four of these at the intersection of Frisco and Metairie Roads)] involved the collision of two vehicles at the grade crossing. The accident reports (included in Appendix K), coupled with the study team's inspection of the crossings, suggest that the most common factor influencing these rear-end collisions was the failure of the driver to see the vehicle in front in time to stop. The Metairie and LaBarre Road grade crossings are particularly dangerous because it is difficult to see traffic moving off of the side streets (Manley and Frisco), as well as traffic that may be turning into the strip shopping centers or, more typically, has stopped to make a turn.

The combination of train traffic during commuter rush hours when road traffic is heaviest, the presence of dangerous side streets, and the poor visibility at the grade crossings is, in the opinion of the study team, a situation guaranteed to produce future accidents at these grade crossings, especially in view of the increasing levels of vehicle and rail freight traffic which are projected over the next 25 years. In order to project the number of vehicle-train and vehicle-vehicle accidents over the next 25 years, CONSAD considered the projected increases in both vehicular and rail freight traffic. In other words, all else equal, increases in highway traffic volumes and/or rail freight traffic volumes can be expected to produce an increased number of accidents.[27] This approach is based upon the currently accepted procedures of the Federal Railroad Administration and Federal Highway Administration as described in the <u>Guidebook for Planning to Alleviate Urban Railroad Problems</u> (FRA/FHWA, 1974 and Crisafulli, 1996).

Based upon the average vehicle-train accident rate for the most recent five year time period, it is estimated that the number of grade crossing accidents involving a train going over the Back Belt will increase from 1.8 in 1995 to between 2.1 and 3.0 in 2020 [with the higher number of accidents expected if the number of trains per day (rather than the number of cars per train) increase to accommodate the projected increase in rail freight traffic]. These estimates are summarized in Table 6.28. The number of vehicle-vehicle accidents, also summarized in Table 6.28, is projected to increase from seven in 1995 to 11.8 in 2020 (it is assumed that an increase in either the number of trains per day or the number of cars per train will produce a similar increase in the number of vehicle-vehicle accidents resulting from either more trains passing each day or longer waiting times for each vehicle

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[27] Not considered are improvements at the grade crossings or other countermeasures that might be taken to reduce the number of accidents.

prompting more motorists to turn around). Combined, the total number of accidents across the eight grade crossings is projected to increase from almost nine per year in 1995 to between 14 and 15 per year in 2020.

Table 6.28: Projected Number of Accidents Over the Back Belt Railroad Grade Crossings, 1995-2020

Time Period	Assuming Number of Cars Per Train Increase (Number of Trains Per Day Remain Constant)			Assuming Number of Trains Per Day Increase (Number of Cars Per Train Remain Constant)		
	Vehicle-Train Accidents	Vehicle-Vehicle Accidents	Total Accidents	Vehicle-Train Accidents	Vehicle-Vehicle Accidents	Total Accidents
1995	1.8	7.0	8.8	1.8	7.0	8.8
2000	1.9	7.8	9.7	2.0	7.8	9.9
2010	2.0	9.6	11.6	2.5	9.6	12.1
2020	2.1	11.8	14.0	3.0	11.8	14.9
1996-2020[1]	49	234	283	60	234	294
1998-2020[2]	46	219	265	56	219	276
2001-2020[3]	40	196	236	50	196	247

[1] Represents the total number of accidents in the absence of any changes to current railroad operations.

[2] Represents the benefits of an in-place alternative where all grade crossings are either closed or separated.

[3] Represents the benefits of a relocation alternative such as the Carrollton Curve.

Source: Table 6.27, and Appendix Tables C.10.9 and C.11 of this report.

Over the 25 year period, 1996 through 2020, it is estimated that a total of 49 to 60 vehicle-train accidents and 234 vehicle-vehicle accidents will occur over the Back Belt (see Table 6.28). For the time period following the implementation of a relocation alternative such as the Carrollton Curve (i.e., 2001 - 2020), it is estimated that a total of 40 to 50 vehicle-train accidents and 196 vehicle-vehicle accidents will occur over the Back Belt; the **avoidance** of these accidents represent an additional benefit of relocating the Back Belt to another corridor.

In place alternatives that would either close or create a grade separation at the crossings would also result in the reduction of accidents, thereby creating an additional benefit of implementing this alternative solution. The accident data suggest that two thirds of all accidents over the 21 years occurred at the Carrollton, Metairie, and Labarre crossings (i.e., those crossings where a grade separation, if chosen, would be most likely to occur). Assuming two thirds of all accidents projected to occur beginning in 1998 (when this alternative could be implemented) would be avoided, a total of 178 to 185 accidents between 1998 and 2020 would be **prevented**.

Other in place alternatives involving either the reallocation of all train traffic to night time hours (i.e., between 10 PM and 6 AM) or the partial removal of all train traffic from the daylight hours (i.e., between 7 AM and 8 PM) would also produce a reduction in accidents since vehicular traffic over the Back Belt grade crossings would be very light when the trains are crossing. Based upon the total percentage of the daily vehicular traffic occurring between 10 PM and 6 AM, it is estimated that reallocating the train traffic to these night time hours would reduce the total number of vehicle-train accidents by about 96 percent beginning in 1996 (when this alternative could be implemented), resulting in 47 to 58

avoided vehicle-train accidents between 1996 and 2020. Similarly, the partial removal of all trains during the daylight hours between 7 AM and 8 PM would reduce the total number of vehicle-train accidents by about 94 percent beginning in 2001 (when this alternative could be implemented), resulting in 38 to 47 **avoided** vehicle-train accidents between 2001 and 2020.

Neither of these estimates consider the impact of increasing the average train speed to a "true" 20 miles per hour [which would likely increase the severity of a vehicle-train accident when one would occur (however, with these alternatives, at most, only one vehicle-train accident would be estimated to occur every 9.5 years now, increasing to only one accident every 5.5 years by 2020)]. Moreover, these estimates do not consider the impact that revising the train schedules, by either reallocating or removing trains to avoid rush hour vehicular traffic, would have on the number of vehicle-vehicle accidents. They should be noticeably less, since highway traffic congestion, a major cause of these accidents, would be substantially reduced. However, it is difficult to quantify the number of **avoided** vehicle-vehicle accidents, since they can occur as a result of a train going past a grade crossing as well as in the absence of a train.

7.0 FINANCING ALTERNATIVES

7.1 Conceptual Background

The purpose of this chapter is to provide the basic information and data for devising specific financing plans for any of the alternative solutions for resolving the rail-community conflict situation in Metairie and the New Orleans region. Although the original plan for this Metairie/FRA study was to compare a series of alternative solutions and then to conduct a financial analysis for some narrowly defined single alternative, this proved to be unrealistic. The geographic scope of the study was necessarily regional, and the sequence of intermeshed alternatives which evolved as the necessary strategy for both short-term and also long-term issue resolution was simply not susceptible to a single financing instrumentality and effort.

Regardless of the eventual match between any given resolution alternative and some financing strategy, a federal financing role (not necessarily substantial) will be needed. The New Orleans rail corridor is of such national and international significance that a federal role in maintaining this Gateway is not only fully justified, but also essential.

The costs, benefits, and plans for various alternatives are described in earlier chapters of this report. This chapter describes how one or more of a series of financing approaches might be a match for any particular stage of an overall sequence of steps for implementing an alternative.

The planning of a sequence or package of alternatives must interact with, and have access to, specific financing tactics. For example, the consideration of a financing plan for any given alternative must consider:

- Who benefits from this alternative, in terms of what neighborhoods, what political entities, what users, riders, or other groups, and what corporate entities?
- What types of benefits from a given alternative have implications for the financing plan? For example, if the benefits will include increases in property values, should not the financing plan draw on property taxes?
- Will the alternative require federal funding, and if so, how will these funds impact the community? For example if the alternative involves land acquisition, will local property owners or absentee corporations benefit?
- What are the philosophical issues? For example, if a given alternative requires a wetlands offset, how should it be financed, and should this requirement make the alternative more preferable, or less?

This chapter provides a broad background of financing strategies and suggests some possible combinations of these financing strategies with some previously identified alternatives. A public funds financing effort involves many dimensions. For example, a revenue bond issue involves the issuing entity, the security mechanism, and the disbursing entity, which may or may not be the same. In the case of the types of alternatives required for the community-rail projects, original and imaginative financing tactics must be considered. Therefore, the discussion in this chapter will, from time to time, move in original directions.

In fact, it should be noted that recent approaches to highway and multimodal financing are built on more than two decades (since the mid-70's) of new, creative, experimental, demonstration multiphase and multi-level projects and programs at the state and local level. This is increasingly important given the current trend towards devolution away from the federal sector.

A range of innovations has focussed on ways of drawing on sources of revenue other than increases in the conventional fuel and vehicle taxes, with innovation focussing on three areas:

- New revenue sources (other than traditional tax sources): principally tolls, value capture and cost-sharing with benefitting abutters, combined into new mixes with conventional revenues;
- New roles for the public and private sector that support tapping of new resources, both financial and entrepreneurial, involving larger roles for the private sector beyond design and construction to include sharing in development, finance, and even ownership; and
- Financing structures and techniques that maximize the leveraging of existing revenue sources and encouragement of private investment -- both equity and debt.

7.2 Background of Recent Developments In Public Project Financing

7.2.1 Federal Level Sources

At the federal level, new regulations implementing the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) provide enhanced opportunities for railroads to participate in the development of state and local transportation plans. Thus, state and local planners now have an incentive to incorporate intermodal components into their planning, where "intermodal" is typically interpreted to include some type of freight transportation. Recent interpretations have put emphasis on strategies for improving intermodal freight terminal access, as well as on safety management which has extended to rail-highway grade crossing safety.

In other words, the Federal Highway Administration (FHWA) has developed a range of interpretations of ISTEA relative to types of projects which the agency considers eligible for funding. Some of these types include railroad related projects.

In particular, an FHWA program called the Surface Transportation Program (STP) provides for railroad-highway clearance projects. Increasing clearance between a highway and a railroad can result either from reconstruction of the rail right-of-way, or from moving the highway, and STP will fund whichever is more cost-effective. Other types of projects funded by STP have included intermodal passenger stations, highway-rail grade crossing improvements, and access roads to terminal facilities.

Another program developed under ISTEA is the Congestion Management and Air Quality (CMAQ) Program. This program funds transportation projects which help to reduce air pollution in regions designated "non-attainment" regions under the EPA ambient air quality standards. These projects must help the region meet air quality standards according to EPA deadlines.

Thus, ISTEA programs encourage states, MPO's, and railroads to work together to take advantage of expanded opportunities for use of multimodal contexts, within which they can work toward mutually desirable goals.

In order to place the above discussion into the context of the New Orleans region, it is possible to imagine how a group of Parishes could act together with the Regional Planning Commission, private rail companies, and perhaps other agencies at the state and regional level. Such a combined effort could produce a coordinated plan for alternative corridors which would completely bypass Jefferson Parish and much of Orleans Parish.

Such multimodal corridors would extend directly from Bay St. Louis or Mobile to Baton Rouge and to Port Arthur. Port facilities along the Mississippi would be multimodal, and would be linked directly to Port Arthur, or to Baton Rouge along the west bank of the Mississippi, so that freight from these ports would never pass through the present New Orleans corridor known as the Back Belt.

Of course this network is hypothetical, but it provides an idea of how readily the New Orleans region fits into a freight-passenger network which includes rail, highway, barge, and ocean traffic facilities. In this particular hypothetical system, the use of ISTEA funds would be appropriate because of the multimodal nature of the corridors, including the required new links, and because these corridors serve multimodal "container" facilities.

Because of the large number of jurisdictions involved in developing a regional network, one particular program of the US Department of Transportation called the "Partnership for Transportation Investment" (PTI) program might be appropriate. This particular program encourages state and local governments to use multiple financing strategies.

The PTI has rapidly gained popularity as a way to finance infrastructure improvements, and is presently in use in 35 projects in 21 states. The features of this program are:

- Private match: using private dollars to substitute for state matching funds.
- Revolving loan funds: for the first time, federal funds are being loaned, not just given for infrastructure construction.

- Flexible reimbursement rules: changing federal reimbursement rules so that states can collect from the Federal agency while they are building, instead of waiting for the full federal share.

- Credit enhancement: using federal funds as collateral for "lines of credit" to support bond issues.

Two examples of PTI projects in Ohio have major railroad components:

- Under a public-private partnering agreement, the state of Ohio, the U.S. Department of Transportation, and the Norfolk-Southern Corporation are building 3.5 miles of a third main line rail track and reconstructing bridges at four locations over the line.

- The Ohio Department of Transportation is constructing an intermodal facility that permits truck trailers and freight containers to be loaded onto and unloaded from railroad flat cars. The facility will increase mobility by serving as an interchange between rail and highway, increase freight capacity, and reduce truck travel through Ohio non- attainment areas.

This very promising type of coordination among FHWA, FRA, state, and private entities suggests many approaches for developing creative multimodal projects involving federal/state/regional/local/private partnership funding arrangements.

7.2.2 Non-Federal Financing Sources

The last twenty years have seen the development of a broad holistic approach below the federal level for funding transportation projects. A number of current efforts to combine, and to leverage support for, the needs of individual modal entities are illustrative of attitudinal and engineering shifts. Concurrent with these technologic and attitudinal shifts have appeared the extensive reorganization of the rail freight industry, exemplified by numerous mergers and consolidations. These multiple trends mandate taking a fresh look at resolving the traditional rail freight versus urban community issues, as well as examining funding strategies which are cost-effective from both the standpoint of the coordinating effort cost as well as the financing cost, for the community and for the rail companies.

The following points summarize the new public investment and financing situation:

- Pressure on state and local levels for financing mechanisms and entities: This entails creating special districts, authorities, and commissions for specific types of projects, with specific bonding and or taxing powers. These entities then attempt to leverage Federal and state funds. Applications to federal agencies under funding programs are expected to come later, rather than as a preliminary step.

- Preference for evidence of regional cooperation and involvement with multiple jurisdictions: Many traditional county and municipal governments had difficulty adjusting to regional cooperation pressures when Councils of Governments and Regional Planning Commissions were invented, and these pressures have never gone away. Long-standing institutional arrangements such as the NOUPT Agreement, which involve both government and private entities as partners, are good as background, but they must be updated or supplemented. Complex situations such as the location of the New Orleans International Airport (which is in Jefferson Parish but owned by Orleans Parish), are no longer isolated curiosities, and they are no longer acceptable as reasons for inaction.

- Importance of social planning sophistication at the local level: Parish and municipal planning agencies are expected to balance minority group demands, and to respond creatively to a very broad range of services and infrastructure needs. Planners and municipal managers are expected to be quasi-politicians, as well as neighborhood advocates, and to know whether financing referenda are going to pass. They are also expected to help keep their own jurisdiction well positioned among other regional jurisdictions in terms of regional projects.

- Pressures on railroads and other large industrial facilities: Corporate facilities are expected to handle conflicts between the demands of regional and local governments and the local community on one hand, and the demands of staying competitive in the national and global marketplace.

- The interrelationships among freight railroads and their clients are enormously complex, and sometimes involve quasisecret rate agreements: For this reason, financing assistance to meet freight costs is a relatively unknown subject in the public financing and industrial development sciences. The New Orleans region, as well as several other regions, already has a publicly owned railroad for servicing clients in the highly localized New Orleans port area (i.e., NOPB), and this entity has been recognized as an opportunity, if the region can just discover the best strategies for taking advantage of it.

- Real estate development: Railroads have long been involved in maximizing their real estate development opportunities -- including leasing arrangements, assembly of parcels, and diversification into other ventures. Any communities where large rail facilities exist should seek ways to make use of such experience, especially in the context of public acquisition of real estate.

The above six factors briefly set the scene where financing problems arise in the course of community-rail issue resolution. In other words, a community-rail issue might seem to be susceptible to a financing solution, but first all of the public and private regional pressures must be analyzed. Establishing a direct dialog between public planning and private management is often a good first step.

7.2.3 Private Sector/Market Solutions

In the new world of transportation financing, states are expected to be even more involved in a complete range of planning activities, at multiple geographic levels. But, when they produce good planning studies, the results are expected to mesh with the needs of private transportation companies.

The typical complex scenario would be a state planning effort which identifies growth centers, locales for industrial parks, and shipping corridors. But, on the day the plan is published and approved by the state legislature, the private railroads involved announce abandonment of the relevant rail lines. Assuming this catastrophe has been avoided, now the state is expected to persuade the private rail companies that any new corridors or links identified in the plan will be in their private interest to construct. In other words, states are expected to look to creative private and public-private infrastructure financing. One approach is to get those who benefit most from a public development policy to pay for the needed infrastructure, which would then be privately owned.

The term "user fee" is sometimes used to refer to such financing of public policies by private companies. Such an idea assumes that financing for the construction is available, and only a reasonable revenue source for security is needed. The examples of toll highways and bridges are often cited.

This concept does not apply easily to private railroad companies, who have traditionally owned their own tracks and other facilities. But it does fit nicely to publicly owned railroads, such as the one owned by New Orleans, NOPB. Contractual agreements with the private rail companies involved could provide for competitive or market-determined pricing for both trackage rights and locomotive services.

7.2.4 Design of a Market Pricing Rail System

A potentially relevant application, here, might involve the design of a market-based auction pricing system for the New Orleans Regional rail network/terminal switching operations. In essence, a pricing system for the New Orleans Regional Switching Railroad (to be created from NOPB) could be used to :

- Replace (in whole or in part) the current (non-pricing) system of rules and "arbitrary" assignments in which tower operators and various local personnel jockey for slots for their trains. Under the pricing system, each railroad would be assigned time slots for its trains depending on its "bid" in real or in "shadow" prices for a given slot.

- Levy charges for the use of the Gateway region's tracks and other facilities, and compensate the (public or private) owners with the economic rents appropriate to the values reached in the bidding process.

- Maximize the net value (income allocated for the use of the Gateway minus the user charges) of the use by all private railroads which use the Gateway network system.

- Permit the introduction and application of "shadow prices" to reflect community values and costs due to externalities such as risks due to hazardous materials, safety and congestion at grade crossings, and noise which are not currently explicitly included in private railroad decision-making concerning traffic flows through the Gateway. The objective, here: to reduce the community costs to the level that the total of its "shadow prices" rents plus the railroads' aggregate net income from the Gateway is at a maximum level.

Of all the transport (and communication) networks involving the analysis of road user pricing, charging, and congestion costs in the financing literature, the work by Nicholas Economides (with Larry White is the most useful for the present context (Economides and White, 1994).

7.3 Motivation and Strategies For Public Financing

Why is public financing needed for the various issue-resolution alternatives? It is notable that the issues involve a privately owned rail facility traversing mostly privately owned land, whether residential, commercial, or industrial. But the broad regional scope of the issues extend to many communities and jurisdictions, and the residents of these areas naturally turn to their existing entities (i.e., their governmental agencies) for concerted action.

Government is the avenue provided for making concerted efforts using aggregated funds. Ultimately, all government spending, directly or indirectly, means the spending of tax contributions of individual taxpayers. In our society, the level of government is defined by the number of taxpayers contributing, and this condition means that the state governments are often the best level for coordinating project spending among various Federal and local (as well as private) entities. In other words, state governments are in the middle.

7.3.1 Importance of the Role of State Government

For many reasons, state governments are of crucial importance in any regional level program. They have very broad capability for entering into agreements, and for coordinating efforts among local governments, the governments of adjoining states, and the various agencies of the federal government.

In the case of Louisiana, a variety of instrumentalities have illustrated the ability of the state government to develop coordinated projects with either federal or local cooperation, or both:

- The NOPB is identified as an instrumentality of the City of New Orleans in the Louisiana constitution of 1921. Provision is made for a Public Belt Railroad Commission, consisting of sixteen members. The Commission is given the authority to issue revenue bonds secured by the property of the railroad, and by the City of New Orleans taxes. Further provision is made for the construction of a bridge across the Mississippi river for railroad and highway users. [The bridge was later constructed in adjoining Jefferson Parish along with connecting tracks for NOPB, thus providing, presumably, a strong incentive for the two jurisdictions to cooperate closely in the development of rail and other transportation facilities. (Constitution of the State of Louisiana, printed by authority of the Legislature, June 18, 1921.)]

- Greater New Orleans Expressway (GNOE) Commission was created in 1954, after a 1952 amendment to the state constitution had provided for the construction of a causeway across Lake Pontchartrain. The Commission was created as an instrumentality of Jefferson and St. Tammany Parishes, with the authority to issue joint revenue bonds, but with the provision that the bonds may also be paid with some vehicle license tax monies from State Highway Fund No. 2. The Commission still exists as the operating authority for the Causeway, and its latest bond issue, dated November 1, 1992, was rated "A". (Moody's Municipal and Government Manual, issued by Moody's Investors Service, 1995, Vol. 1, p. 2516.)

- The Mississippi River Bridge Authority, now called the "Crescent Connection" was formed in a similar manner as the GNOE Commission described above, but was based on resolutions of Jefferson Parish and New Orleans (Orleans Parish). A later amendment included St. Bernard Parish. The Commission has constructed an initial bridge (opened 1955), has investigated locations for possible additional bridges, and has acquired and operated ferries. Its revenue bonds have been secured by bridge tolls and by state highway funds (Moody's Municipal and Government Manual, *op. cit.* p. 2517.)

- Louisiana Regional Transit Authority was created by the state legislature in 1969 under an act which specifically provided for the inclusion of the Parishes of Orleans , Jefferson, St. Tammany, and St. Bernard, but left open the possibility that other parishes who might wish to do so could join. The Authority has the power to design, construct, maintain, and operate a regional transit system in the metropolitan area. Some of its bonds are secured by a sales tax collected by the Authority, and some of them by U.S. government securities. (Moody's Municipal and Government Manual, *op. cit.*, p. 2517.)

Any of the above described instrumentalities could be used as models for an entity which could finance, plan, and construct any passenger, freight, or multimodal facilities needed for the resolution -- on a regional scale, using a significant proportion of Federal funds -- of the community issues surrounding Metairie and the Back Belt.

Other types of instrumentalities, such as the NOUPT Agreement, involving five railroad companies and the City of New Orleans (described in Section 2.9.9 of this report), also exist.

Furthermore, the possible requirement for a multistate entity leads to consideration of the Southern Rapid Rail Commission, which consists of representatives from Mississippi as well as Louisiana (interview on July 20, 1995 with Carol Cranshaw, Public Transportation Director and Ed Morris, Rail Program Manager, Louisiana Department of Transportation and Development).

7.3.2 State Government Revenue and Debt

The role of the state government is important not only with regard to how the regional entity is put together, but also with regard to how it is financed, i.e, how its bonds are secured.

The people of Louisiana have established a broad range of revenue sources, especially with respect to types of taxation, which could be used to finance new transportation entities and alternatives:

- Corporation franchise tax: This is not one of the major sources of revenue, but it would be relevant to financing services to industrial shippers.

- Income tax: The 1992 revenue from this source was approximately $1099.5 million. Both the personal and the corporate income tax are graduated. The personal income tax features payroll withholding, personal exemptions and dependent exemptions. (Moody's, *op. cit.*, p. 2491.)

- Gasoline tax: The tax is 16 cents per gallon, and the revenue in 1993 was $366.8 million, not including the special fuels tax, paid monthly by interstate users. (Moody's, *op. cit.*, p. a22.)

- Vehicle license tax: This tax varies from $3 to $1,144 per vehicle, and proceeds are allocated to the long range highway fund and to highway bonds. Proceeds to the state in 1990-91 were $78.3 million. (U.S. Bureau of Census, Government Finances, GF/91-5, 1993, p. 64.)

- Severance tax: This tax is levied on all natural resources extracted from soil or water. Proceeds would be appropriate for use on environmental projects.

- Alcoholic beverages, soft drinks, and tobacco tax: Liquor is taxed by liters, and soft drinks are taxed on the wholesale selling price of both bottled drinks and also syrup. Cigarettes, cigars, and smoking tobacco are taxed.

- Sales and use tax. Food for personal consumption is exempted from the 4 per cent sales tax. Revenues in 1992 were $2,161.7 million. (Moody's, *op. cit.* p. 2491.)

- Property tax: This is a major source of revenue for local governments, but it also has a state component, producing revenues in 1990-91 of $47.4 million. (U.S. Bureau of Census, Government Finances, GF/91-5, p. 64.)

Other forms of taxation used by Louisiana include inheritance tax, estate transfer tax, gift tax, occupational license tax, and utility license and gross receipts tax.

In spite of the large number of revenue sources, the total tax revenues to Louisiana, at least for one recent year (1994) did not exceed the payments from other governments, the major source of which was the federal government. These totals are compared in Table 7.1. This table shows that intergovernmental revenues increased from 1991 to 1994 more rapidly than did tax revenues for the state. (The Federal Aid Highway Funds for 1994 were $149.2 million). In other words, although intergovernmental revenues jumped by a large percentage over the three years, the residents of Louisiana were treated to a very small tax increase on their state taxes.

Further information about the financing strategies available to the people of Louisiana appears in Tables 7.2 and 7.3. Table

Table 7.1: Louisiana State Government Finances, 1991-1994

	1990-1991 (in thousands)[1]	1990-1991 dollars per capita	1994 (in thousands)[4]	1994 dollars per capita	% change in per capita amount
Total Revenue (all sources)	$9,409,886	$3,392	$11,572,573	$2,694	-26
Intergovernmental Revenues	2,856,778	673	4,909,612	1,143	+70
Tax Revenue Total	4,309,467	1,014	4,561,846	1,062	+5
Income Taxes (including corporate)	1,130,251	266	NA	NA	
General Sales	1,308,090	308	NA	NA	
Per Capita Income (dollars)		14,279[2]		16,588[2]	+16
State Population (in thousands)		4,252[3] (1991)		4,295[5] (1993)	

[1] U.S. Bureau of Census, Government Finances 1990-91 (GF/91-5), November 1993, Table 29, p. 64.

[2] Moody's Municipal and Government Manual, Moody's Investor Services, 1995, Special Section "2", p. 219.

[3] U.S. Bureau of Census, Government Finances 1990-91 (GF/91-5), November 1993, Table 35, p. 110.

[4] Moody's Municipal and Government Manual, Moody's Investor Services, 1995, Special Section "2", p. 2487.

[5] Estimated from Moody's Municipal and Government Manual, Moody's Investor Services, 1995, Special Section "2", pp. 217-9.

Table 7.2: Detailed State Finances for Louisiana, 1993-1994

Bonded Debt, June 30 ($000):

General obligations:	1994	1993
Various purp.	2,447,676	2,443,879
Hwy. constr., etc.	4,410	7,890
Cap. Imprv.	395	745
Total	2,452,481	2,452,514
Revenue Bonds:		
Port Commissions:		
Lake St. Charles	975	1,575
Facilities corp.	16,055	16,540
Opportunity loan fd.	13,395	14,550
St. James Bridge auth.	11,068	12,605
Parish road	5,075	5,450
Levee districts	9,561	9,705
Crescent City	30,860	30,870
Labor dept.	....	517,960
Agricultural dept.	6,900	7,540
Corrections dept.	133,625	143,220
Transportation	235,703	254,898
Jefferson Parish econ. dev. fnd.	....	400
Total	463,217	1,015,313

Revenues & Expenditures, year ended June 30, 1994 ($000):

General Fund

Intergov't revs.	4.632,736
Other revenues	2,109
Total revenues	4,634,835
Genl. govt. expenses	1,145,202
Recreatl. & culture, etc.	28,019
Transportation	227,661
Public safety	145,395
Health, etc.	4,738,301
Corrections	320,429
Conservation	131,798
Education	2,518,359
Principal	33,170
Interest	10,995
Capital outlay	....
Oth. oper. exp.	227,422
Total expend.	9,576,751
Excess expend.	4,941,906
Transfers, net	cr5,045,433
Bond proc.	6,770
Other fin. sources	18,928
Begin. fund bal.	457,909
Equity trfs.	cr461
Inventory reserve	7,448
Ending fund bal.	595,043

Special Revenue Fund

Intergov't revs.	251,256
Taxes	15,272
Money & prop.	72,702
Licenses, etc.	36,948
Commodities & servs.	99
Other revenues	3,610
Total revenues	379,887
Intergovernmental	87,322
Oth. oper. exp.	24,861
Total expend.	112,183
Excess revenues	267,704
Transfers, net	dr196,512
Begin. fund bal.	454,246
Ending fund bal.	525,438

Debt Service Fund

Intergov't revs.	251,256
Taxes	15,272
Money & prop.	72,702
Licenses, etc.	36,948
Commodities & servs.	99
Other revenues	3,610
Total revenues	379,887
Intergovernmental	87,322
Oth. oper. exp.	24,861
Total expend.	112,183
Excess revenues	267,704
Transfers, net	dr196,512
Begin. fund bal.	454,246
Ending fund bal.	525,438

Note: Bond debt not equivalent to total debt.

Source: Moody's Municipal and Government Manual. Moody's Investors Services, New York, 1995, vol. 1, p. 2487.

Table 7.3: State Government Operating Ratios, 1994

		thousands of dollars	percent of total personal income in 1993 of $71,252 million
(A)	Total revenue, all sources	$11,572,573	16.2
(B)	Intergovernmental revenue	4,909,612	6.9
(C)	Tax revenue	4,561,846	6.4
(D)	Total bond debt (not equivalent to total debt)	2,915,698	4.1
(E)	General obligation	2,452,481	3.4
(F)	Revenue	463,217	.6
(G)	Total debt service expenditure	549,438	.8

Operating Ratios (as percents):

B/A	42.4	F/D	15.9	G/C	12.0
C/A	39.4	G/A	4.7		

Source: Moody's Municipal and Government Manual, Moody's Investor Services, New York, 1995, Special section "2", p. 2487.

7.3 shows that their revenue bond debt for 1994 was 15.9 percent of their total bond debt, and the total debt service for both types or bonds was 12.0 percent of their tax revenues (note that bond debt is only a part of total state government debt).

These data suggest the use of revenue bonds for subsequent transportation programs, secured by property, tolls, and other user fees. Although this is not a widely used concept for rail freight transportation, the operation of the NOPB railroad has provided experience of this type (see Section 7.3.1, above).

7.3.3 Local Government Revenue and Debt

In Louisiana, the number of units of local government include:

- Parishes - 64,
- Municipalities - 301,
- Parish and city school systems - 66,
- Levee districts - 21,
- Port, harbor, and terminal districts - 3 (excluding three which do not tax).

In addition, a total of 1,041 other special taxing districts exist, mostly at the sub-parish level, which cover all types of government services and operations.

The transportation entities described in Section 7.3.1 above are examples of some of these taxing districts. But the important objective of studying local financing is to identify the appropriate parishes for the creation of new special districts. These new special districts must make sense in terms of the programs and projects needed to resolve the rail corridor issues.

Although property (ad valorem) taxes are important sources of revenue for local governments, the general sales tax in Louisiana yields more for them than does the property tax (as noted in

Section 7.3.2 above, although food for home consumption is excluded, the sales tax is 4 percent on most other consumer items). The data in Tables 7.1 and 7.4 indicate that the proceeds are found to be divided about evenly between the state and local governments.

The property tax is, nevertheless, the second largest source of tax revenue for the local governments, yielding about $264 per capita in 1990-1991, as compared to the $322 per capita from the sales tax. An important feature of the property tax is that assessments of some industrial units are made by the State Tax Commission, but only a small portion of these assessments provide revenue to the state government. The proportion allocated to the parishes and other local governments is billed and collected by their own collectors (interview February 21, 1996 with Glenn Thompson, Louisiana Tax Commission).

7.3.4 Multi-Jurisdiction Financing

The complexity of the role of indebtedness is depicted in Table 7.5, which includes data for Alabama, Louisiana, and Mississippi, all three of which might well be involved in any type of regional plan. Table 7.5 shows the variety of ways in which debt is distributed among state, local, and special district entities. In spite of the high level of debt in Louisiana, relative to the other three states, the amount of money which goes toward retirement of this debt is still only a small percentage (three percent for Louisiana) of the per capita income.

Thus, the financing strategy indicated by Tables 7.4 and 7.5 would be to create multi-parish special districts, and to increase the load on property taxes in those parishes. This would

Table 7.4: Summary of Total Louisiana Local Government Revenue (includes Parish, municipal, and taxing districts), 1986-1991

	1986-87[1] (current dollars in millions)	1990-91[2] (current dollars in millions)	1986-87 dollars per capita	1990-91 dollars per capita	% change in per capita amount
Total General Revenue	$5,697.6	$7,389.2	$1,382	$1,738	+25
Intergovernmental Revenue	1,991.1	2,631.8	483	619	+28
Taxes	2,043.8	2,723.5	496	641	+29
property (incl. commercial)	895.2	1,124.0	217	264	+22
other (sales)	1,148.6 NA	1,599.5 (1,370.,2)	279 --	376 (322)	+35 --
State Population in thousands	4,124[3]	4,252[4]			
Per Capita Income (current dollars)	11,495[5] (1985)	14,279[5] (1990)			

1 County and City Data Book. U.S. Bureau of the Census, 1994, p. 255.

2 Government Finances 1990-91. U.S. Bureau of the Census GF/91-5, November 1993, Table 29 p. 64.

3 Government Finances 1990-91. U.S. Bureau of the Census GF/91-5, November 1993, Table 35, p. 110.

4 pop. in 1991, Government Finances 1990-91. U.S. Bureau of the Census GF/91-5, November 1993, Table 35.

5 Moody's Municipal and Government Manual, Moody's Investor Services, New York, 1995, vol. 1, Special section 2, p. 219.

Table 7.5: Indebtedness and Debt Transactions of State and Local Governments, 1990-1991

	Alabama			Louisiana			Mississippi		
	total (in millions)	dollars per capita	% of per capita income	total (in millions)	dollars per capita	% of per capita income	total (in millions)	dollars per capita	% of per capita income
Debt outstanding at end of fiscal year, total	$10,786	$2,637	18	$19,400	$4,562	31	$4,868	$1,878	15
State	4,214	1,030	7	10,729	2,523	17	1,413	545	4
Local	6,572	1,607	11	8,671	2,039	14	3,455	1,333	10
Parishes	468	114	1	3,180	748	5	1,765	681	5
Spec. Distr.	1,302	318	2	634	149	1	248	96	1
State and Local combined									
Full faith & credit	3,196	782	5	6,084	1,431	10	1,681	649	5
Nonguaranteed	7,543	1,845	12	13,173	3,098	21	3,172	1,224	19
Long-term debt									
issued	1,181	90	2	876	206	1	459	177	1
retired	834	204	1	1,841	433	3	446	172	1
Population (thousands)	4,089			4,252			2,592		
per capita income (dollars)	15,021			14,542			12,823		

Source: U.S. Bureau of the Census, Government Finances, 1990-91 (GF/91-5) Nov. 1993, Table 25, pp. 36-37 and Table 35, p. 110.

facilitate: (1) keeping the sales tax at its present level, and (2) continuing to retire long term debt at the present rate.

As noted in Section 7.3.1 above, multi-parish districts are an established tradition in Louisiana. Table 7.6 shows some features of the funding strategies which have been used. This table also includes some financing data for two specific parishes, Jefferson and Orleans. These parishes are included in two of the districts shown, and they also have their own separate debt structure.

As shown in this table, parishes are able to sustain the activities of multi-parish districts, even when their own (separate) debt is over 30 percent of their assessed valuation (Jefferson and Orleans Parishes), and when their debt service is over 25 percent of their total revenues (Jefferson Parish). Whatever alternatives are selected for the overall issue resolution program, the financing strategy can involve a statewide obligation, or a multi-parish district obligation, or both.

7.3.5 Voting on Tax Referenda

Further insight into the financing process of individual parishes is provided by Tables 7.7 and 7.8, which show the results of financing referenda during 1995 in Jefferson Parish. Only two of these referenda were related to transportation; these were road lighting tax propositions, and both carried. Four fire district and two ambulance district propositions carried, but one fire district proposition failed.

Even though this mixture of referenda and results is confusing, there is one important implication of the data in Tables 7.7 and 7.8. Of the 22 votes taken, 17 carried and only five were

Table 7.6: Debt Financing for Selected Jurisdictions, as of June 30, 1994

	General Obligation Bonds (in thousands)	Revenue Bonds (in thousands)	Total Bond Debt (in thousands)	Debt Service Expenditure (in thousands)	Debt Service (percent of revenues)	Total Bond Debt (percent of total assessed valuation)
Louisiana[1]	$2,452,481	$463,217	$2,915,698	549,438	9.64	19.04
Greater New Orleans Expressway Commission, a tax entity of Jefferson and St. Tammany Parishes, 1954[2]	---	---	66,690	5,008	41.42	57.07
Louisiana Regional Transit Authority comprises Jefferson, Orleans, St. Tammany, and St. Bernard Parishes, 1979[3]	---	32,185	32,185	NA	---	---
Mississippi River Bridge Authority (Crescent City): Orleans, Jefferson, and St. Bernard Parishes, 1952[3]	---	30,860	30,860	NA	---	---
Jefferson Parish[4]	181,764	618,714	800,478	49,466	27.57	42.5
Orleans Parish[5]	368,610	309,670	678,280	103,410	13.34	38.53

NA - Data not available

1 **Moody's Municipal and Government Manual, Moody's Investor Services, New York, 1995, vol. 1, p. 2487.**

2 **Moody's, op. cit., p. 2516. Data for 1993. Property and equipment assets = $116,861,000; total revenues = $12,091,000 (1993).**

3 **Moody's, op. cit., p. 2518. Data for 1990 for Louisiana Regional Transit Authority.**

4 **Moody's, op. cit., p. 2539. Data for 1993. Assessed value of all property = $1,885,421,000 (1993).**

5 **Moody's, op. cit., p. 2558. However, total assessed value of all property (1991): $1,760,238,000. This value from Census Data, since value not given by Moody's for Orleans: 1992 Census of Governments, Washington, DC, 1994. Total general revenue from Census Data, since balance sheet not given by Moody's for Orleans: 775,272,000. This figure as well as Debt Service expenditure from City Government Finances 1990-91, U.S. Bureau of the Census, Government Finances, Washington, DC, 1993. Table 7, p. 12. Revenue Bond Debt includes "Limited Tax Bonds".**

Table 7.7: Summary of 1995 Tax Referenda in Jefferson Parish (Propositions Defeated)

Purpose	Levy	Time Period	Number of Precincts
1. Fire District #4	Review 15 mill and raise to 18.5	1996-2005	6 precincts
2. Jail Facilities	Raise sales/use tax ¼ of 1 percent	permanent	Parish-wide
3. Library Improvements	Raise 7 mill tax to 10 mills	1995-2004	Parish-wide
4. East Jefferson Park and Community Center	Raise monthly service charge per dwelling from $0.60 to $1.25	permanent	170 precincts
5. Juvenile Detention Home	4 mills	10 years	Parish-wide

Source: Jefferson Parish tax records.

defeated. Of the 17 which carried, 10 represented millages which were not simple renewals of existing millages, but were creations or consolidations of districts. The voters involved were willing to increase their taxes where they could see a clear improvement in services or conditions.

7.3.6 Assessed Valuations of Parishes

One further issue is suggested by the use of the property tax: the assessed valuations of all types of property. Even considering the imperfect process of assessing the value of residential and industrial property, this valuation is sometimes viewed as a basis for judging how much a jurisdiction should borrow.

For less industrialized parishes, however, it is tempting to create mixed districts where the financing obligation is distributed across some wealthy as well as some less wealthy jurisdictions. Tables 7.9 and 7.10 show a miscellaneous selection of parishes which might be grouped in various ways to create multi-

Table 7.8: Summary of Tax Referenda in Jefferson Parish (Propositions Carried)

Purpose	Levy	Time	Number of Precincts
1. Road Light District #7	Renew 10 mills	1995-2004	Precinct 1-GI
2. Garbage District #1	Renew 5 mills	1995-2004	127 precincts
3. Consolidate Road Lighting Districts	Renew 5 mills	1995-2004	160 precincts
4. Ambulance District #2	10 mills	10 years	Precinct GI
5. Fire District #9	10 mills	10 years	Precinct 1
6. Consolidate Waterworks District #1	5 mills	10 years	292 precincts
7. East Bank Consolidated Fire District	25 mills	10 years	121 precincts
8. Garbage District #6	5 mills	10 years	6 precincts
9. Playground District #16	10 mills	10 years	Precinct 1-GI
10. Ambulance District #1	Renew 10 mills	10 years	Ward 6, 6 precincts
11. Forensic Medical Facilities	1 mill	10 years	Parish-wide
12. Consolidate Recreation and Playground District #1	10 mills	10 years	Wards 7 - 10
13. Fire District #6	15 mills	10 years	Ward 3
14. Communication District	Monthly service charge: $0.60 residential, $1.90 commercial, $1.15 cellular (in lieu of $0.40/$1.25 for 911 systems)	permanent	Parish-wide
15. Consolidate Garbage District #2	5 mills	10 years	Wards 1-5
16. Fire District #3	Monthly service charge: $1.80 residential structure, $6.00 commercial	permanent	Ward 9, 20 precincts
17. Fire District #4	Raise 10 mills to 15 mills	10 years	Ward 6

Source: Jefferson Parish tax records.

Table 7.9: Local Government Revenue Summary for Eight Parishes in the New Orleans Region, 1994

	Total revenue (in millions)	Revenue per $1000 of personal income	Intergovernmental revenue (in millions)	Taxes (in millions)	Taxes per capita	Taxes (% property)	Federal funds and grants per capita
Louisiana	$5,697.6	$112	$1,991.1	$2,043.8	$470	43.8	$4,372
Orleans	851.8	121	278.1	346.0	653	34.2	7,724
Jefferson	696.1	107	157.2	279.1	610	34.8	2,875
St. Charles	74.8	134	20.4	33.6	798	59.4	3,868
St. Tammany	159.0	80	44.8	55.8	391	45.5	2,779
St. Bernard	68.4	86	27.5	23.6	350	38.0	2,850
Washington	46.8	110	21.0	13.7	304	43.2	4,111
Plaquemines	63.2	200	18.0	18.5	706	61.4	5,369
Tangipahoa	110.9	131	42.6	24.5	278	25.7	3,579

Source: U.S. Bureau of the Census, "County and City Data Book: 1994", 12th Edition. Washington, DC, August 1994.

parish districts at various stages in the issue resolution process.

In other words, a series of steps involving rail-highway grade separations, rail operations improvements, and major new corridor development, could all be components of a composite issue resolution process, and each could have a separate funding plan. As part of any of these plans, parishes or parts of parishes could be combined into a special taxing district.

As one hypothetical, arbitrary example, an industrial development district could be created with the two parishes, Washington, and Tangipahoa, to establish a new corridor link. In keeping with the industrial development concept, the corridor should be multimodal, including commuter rail service. The

Table 7.10: Total Value of Assessed Valuations, 1991

Parish and 1990 population[1]	Total, including state assessed property[2] (in thousands)	Locally assessed total real property[1] (in thousands)	State and local value per capita (in thousands)	Local value per capita (in thousands)
Orleans 496,938	$1,760,238	$1,305,528	$3.542	$2.627
Jefferson 448,306	1,863,607	1,412,49	4.157	3.150
St. Charles 42,437	369,681	118,174	8.711	2.785
St. Tammany 144,508	460,608	367,270	3.187	2.5415
St. Bernard 66,631	223,221	143,047	3.350	2.147
Washington 43,185	88,644	48,216	2.053	1.116
Plaquemines 25,575	395,783	67,738	15.475	2.649
Tangipahoa 85,709	201,104	140,962	2.346	1.645
Louisiana total 4,219,973	15,317,450[3]	9,112,363	3.630	2.159

1 U.S. Bureau of the Census, "County and City Data Book, 1994". Table B, p.242. Washington, DC, 1994.

2 U.S. Bureau of the Census, "1992 Census of Governments". Vol. 2, no. 1, Assessed Valuations for Local General Property Taxation, August 1994, p. 25. GC92(2)-1.

3 Of the 64 parishes in Louisiana, the total assessed value of property in the 8 listed is $5,362,886, equal to 35 percent of the state total.

corridor could be labelled "Bogaloosa-Amite City-Hammond".

A review of the data in Tables 7.9 and 7.10, however, shows that these two parishes are among the poorest in the selected group, in terms of property valuation. On the other hand, these two parishes have access to reasonable amounts of intergovernmental revenue per capita. Thus, their tax revenue per capita is relatively low. One strategy would be to use intergovernmental revenues to finance industrial development borrowing, part of which would then finance the multimodal corridor (see Section 7.2.1 above, item 4 under PTI program discussion).

As a final note, St. Charles and Plaquemines Parishes are in very strong positions to finance almost any kind of new project, although they are, unfortunately, not adjacent to each other. However, a district consisting of Orleans, St. Bernard, St. Charles, Plaquemines, and Jefferson Parishes would be in position to finance a corridor bypassing the Back Belt (given State and federal contributions), and to reap development benefits from it.

7.4 Conclusions and Recommendations

The overall conclusion of the above analysis is that the people of Louisiana and its jurisdictions have established a very flexible, balanced position for financing programs and activities relating to rail transportation, and they should have no difficulty devising pressures and incentives in dealing with railroad companies.

These pressures and incentives can (and should) include the maximum possible proportion of Federal funds, as discussed in

Section 7.2.1, above. And, they should take into consideration the values of the railroad properties (see Table 7.11), and the rail company revenues from various alternative routings.

Table 7.11: Railroad Company Assessments in Louisiana, 1992

	Total miles[1]	Total track value (in thousands)	Real estate value (in thousands)	Total assessments (in thousands)
CSX Transportation, Inc.	80.4	$314.5	$364.1	$1,379.7
Illinois Central Railway Company (mainline plus 5 branches)	586.5	3,633.4	883.2	6,534.2
Kansas City Southern Railway Company (mainline plus one branch)	441.2	3,694.7	613.7	8,217.9
Norfolk Southern	165.3	793.6	1,065.0	2,907.2
New Orleans Terminal	52.0	181.4	472.6	1,058.4
Two other branches	113.3	612.2	592.4	1,848.8
Southern Pacific Transportation Co. (3 mainlines plus 6 branches)	488.2	799.9	823.4	2,410.1
Union Pacific Railroad Co. (mainline plus 8 branches)	1,179.2	1,0850.1	1,141.4	22,113.3

Source: Louisiana Tax Commissions, 26th Biennial Report. pp. 4-5. Baton Rouge, February 1994.

[1] includes main miles, side miles, and second miles.

Within the context of developing agreements with the railroad companies, the people also have available a variety of legal and jurisdictional entities, both presently existing (e.g., NOPB and the Public Facilities Authority) as well as readily creatable from convenient models (e.g., the Regional Transit Authority and the Southern Rapid Rail Commission).

Finally, the constituents have shown themselves fully capable of defining and structuring the powers which these legal authorities can and should be given to achieve their objectives. These powers may include, for example, entering into agreements with railroads and other private companies, as well as developing financing strategies, and constructing and operating whatever rail and or multimodal facilities are required for achieving the resolution of the issues which are presently confronting the region.

The following recommendations are derived from the above analysis:

1. The resolution of the regional issues arising from the Metairie/Back Belt situation will require regional solutions, and the financing strategies should thus be defined on a regional level.

2. The state government is well positioned to act as a coordinator between the federal government, the parishes, and the various district entities, and the appropriate state agencies should take the initiative in planning and developing financing.

3. The Gateway nature of the issues requires that substantial federal involvement in financing should be obtained.

4. One or more specific entities should be created for planning, managing, and financing roles in the implementation of a sequence of alternatives. A single large entity would also be possible.

5. All of the agencies and entities involved will necessarily be required to negotiate and enter into agreements with railroad

companies, and this need should be recognized in the powers they are given.

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