MOUNTAIN DIVISION RAIL STUDY

REPORT ON POTENTIAL USES AND IMPLEMENTATION COSTS

Maine Department of Transportation Office of Freight Transportation

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DECEMBER, 2007

HNTB

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EXECUTIVE SUMMARY

I. INTRODUCTION

The purpose of this Report is to investigate the present condition, potential use of and probable implementation costs for freight and/or passenger services on the 50 mile Mountain Division Rail Corridor within Maine and a 10 mile segment within New Hampshire, to Intervale, within the town of Conway. The essential findings of the Report and summaries of potential implementation costs are included in this summary.

II. HISTORICAL CONTEXT

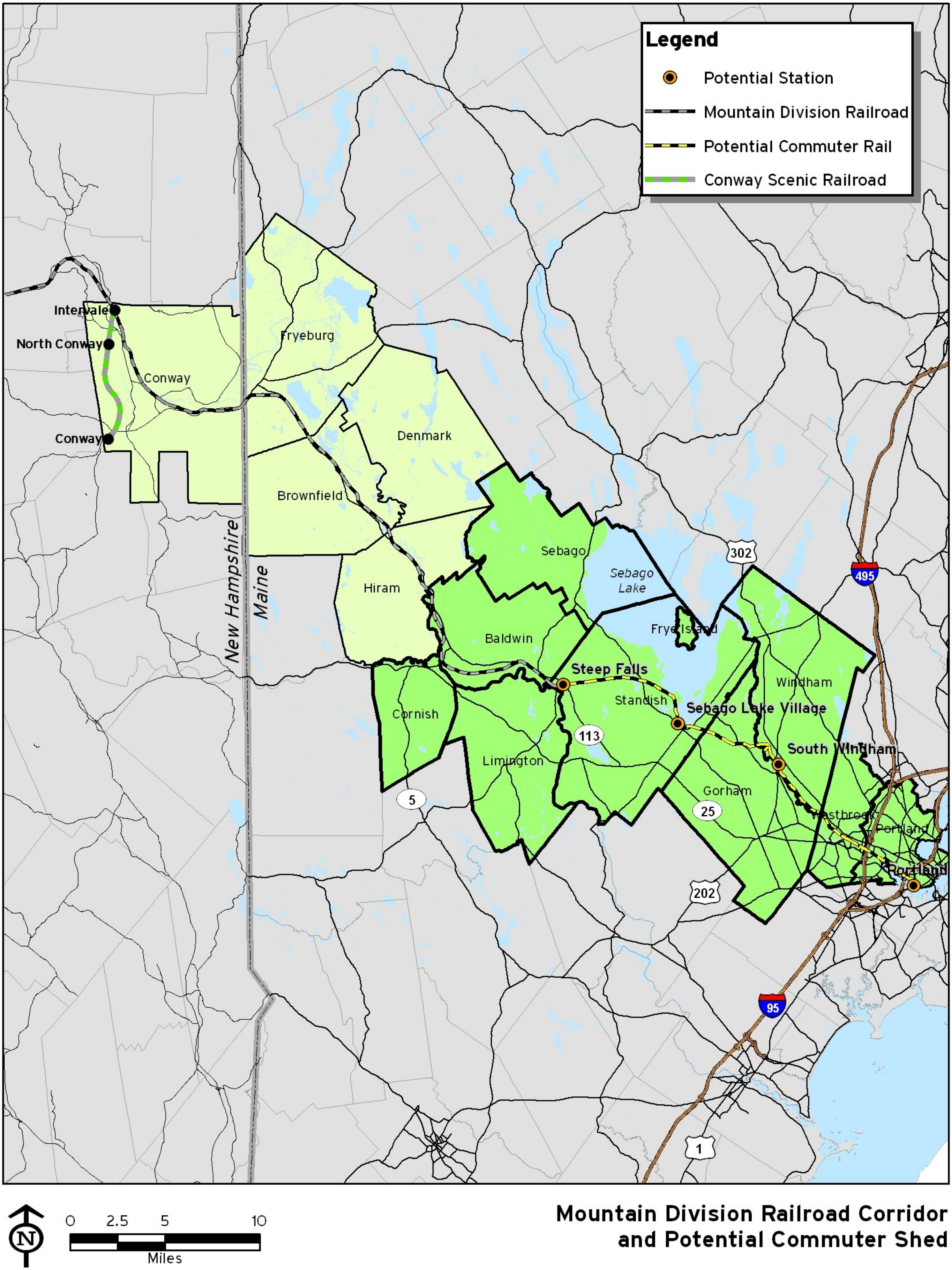
The Mountain Division name came to be in the early years of the 20th century when the railroad came under the control of the Maine Central Railroad. Prior to that time, the Mountain Division was known as the Portland and Ogdensburg Railroad, chartered in Maine in 1867 with construction starting in 1869. The original concept of the P&O was never fully realized. Insufficient funds, other railroads that blocked completion of key sections in northwestern Vermont and across the northern reaches of Lake Champlain, and the fact that Ogdensburg never became a major port; all conspired against realization of the ambitious plan. The route did exist, but never under the control of a single carrier.

By the early part of the 20th century, the expanding Maine Central Railroad absorbed the P&O between Portland and St. Johnsbury, Vermont, a distance of 131 miles, together with a line branching north from Whitefield, New Hampshire deep into Quebec. At St. Johnsbury, the Maine Central connected to the St. Johnsbury and Lake Champlain RR west across the top of Vermont (a piece of the original P&O concept) and a north-south route of the Canadian Pacific RR. The Canadian Pacific had leased this line from the Boston & Maine in 1926 with purchase in 1946. The CP line north out of St. Johnsbury turns west after exiting the top of Vermont, passes through Montreal and then west with connections back into the U. S. in the Detroit area. History now informs us that the CP route was the major outlet for the Mountain Division freight traffic, not the original conceived route west from St. J.

The Mountain Division from Portland to St. Johnsbury seems to purposely avoid any major population or industrial centers. As a result, there never was significant freight or passenger traffic[1] generated along the line. Instead, the Mountain Division functioned mostly as what is known as a “bridge” or “overhead” route for freight traffic in and out of Maine to the U. S. Midwest. Volume levels of this overhead traffic actually increased over time reaching a peak in the 1970’s and holding up fairly well to 1982, the last full year of operation of the Mountain Division. The relatively high volume (about 16% of total Maine Central carloads in 1972) of overhead traffic using this difficult route was due mostly to two factors:

1. The Maine Central got a longer haul and better division of revenue on cars routed this way rather than interchanging to the Boston & Maine at South Portland (Rigby Yard).

[1] Except during the last half of the 19th century and early 20th century when in summer, large numbers of patrons came to and from the White Mountain resort hotels on passenger trains.



Mountain Division Railroad Corridor and Potential Commuter Shed

2. For many years, there existed a "Canadian Differential"; that is a lower cost freight charge on some volume of rail freight moving in and out of Canada. So Maine shippers enjoyed a lower freight rate using this slower route to and from the U. S. Midwest via Canada.

Local freight traffic along the line was always very minimal, the exception being the Portland/Westbrook end, a small paper mill in Gilman, Vermont and interchange to the Boston & Maine Railroad at Whitefield, mostly for traffic to and from the paper mills at Berlin and Groveton.

From the mid 1940's till the end of passenger service in April of 1958, passenger service was limited to a single round trip from Portland to St. Johnsbury, daily except Sunday. These were trains 162 & 163, generally consisting of a baggage/mail car or two and a single coach. These two trains were supplemented by seasonal trains of the Boston & Maine entering the Mountain Division at Intervale in Conway and Whitefield.

When Pan Am Railway (formerly Guilford) acquired the Maine Central in 1981 and the Boston & Maine in 1983, the Mountain Division's viability as through route ceased because the combined railroad had a longer haul staying on the B&M rather than the Mountain Division routing. Since it was a very difficult railroad to operate and maintain and with little on-line traffic, Guilford had no incentive to maintain the scenic but difficult passage. The Canadian Pacific interchange point was changed from St. Johnsbury to Mattawamkeag, Maine and 114 years of Mountain Division railroading came to an end.

III. CURRENT STATUS AND USE OF THE MOUNTAIN DIVISION

Currently, the 22 miles in Vermont is in place but overgrown. In New Hampshire, most of the line is cleared and from Whitefield to Redstone (46 miles), just south of North Conway, in service and used to varying degrees by the Conway Scenic Railroad under a lease from the State of New Hampshire. There is a 5 mile segment in New Hampshire, from Redstone to the Maine border, that is not cleared but the tracks are still in place. In Maine, the 40 miles from the state line at Fryeburg to South Windham is cleared and the tracks in place with minimal but important minimal maintenance performed by MEDOT. The grade crossings on the MEDOT owned track are mostly paved over. The last 10 miles from South Windham to Portland are owned by Pan Am Railway. About 4 ½ miles of the track has been removed into Westbrook and from there into Portland in use by Pan Am Railway to access the Sappi paper mill in Westbrook. The Amtrak Downeaster trains use the first half mile or so in Portland to reach the Transportation Center located long the Mountain Division tracks. Currently, MEDOT is negotiating purchase of the unused segment between South Windham and Westbrook, about 5 miles.

IV EXISTING CONDITION OF RAILROAD - PORTLAND TO NORTH CONWAY (60 miles)

A. Track and Roadbed

The condition of the railroad was assessed through a hi-rail trip of 40 miles of cleared track in Maine and walking inspections of limited but representative segments in New Hampshire and Maine. From those inspections the work program required to bring the Railroad up to three different levels of improvement on a mile by mile basis was developed. The three levels of improvement relate to track conditions defined by the Federal Railroad Administration (FRA), noted as FRA Class 1, 2 and 3. Those classes correlate to the condition of the track structure in terms of number of good ties per rail length, good tie spacing at rail joints, track surface and alignment tolerances (how smooth and how straight are the rails) and a number of other factors that allows the track to operate at certain speeds shown in Table E-1.

TABLE E-1
MAXIMUM ALLOWABLE SPEEDS
EXCEPTED TRACK TO FRA CLASS 5

FRA CLASS	FREIGHT	PASSENGER
Excepted	10 MPH	Not Allowed
Class 1	10 MPH	15 MPH
Class 2	25 MPH	30 MPH
Class 3	40 MPH	60 MPH
Class 4	60 MPH	80 MPH
Class 5	80 MPH	90 MPH

Operation of passenger trains above 59 MPH requires that a complete signal system be in place. Since that is not anticipated, at least in initial operations on the Mountain Division, upgrading to a classification higher than Class 3 was not considered nor necessary.

Excepted track is in very poor condition with other restrictions on operation in addition to the speed and no passenger operation is allowed as noted in the table.

The condition of the timber cross ties is the most noticeable deficiency on most of the Mountain Division, along with lack of stone ballast in many areas. The roadway crossings are paved over and the bridge decks (the large bridge timbers and other wooden components that lie between the bridge steel and the rails) are in generally poor condition. The existing rail is relatively light 85 lb per yard material but is in generally good condition, sufficient for a Class 1 and 2 track condition but not for Class 3. Class 3 is generally required for passenger operations and would require new 115 lb per yard rail and other track material such as tie plates, joint bars and rail anchors.

The estimated cost to upgrade the main track for the 50 miles in Maine and the 10 miles in New Hampshire for the three FRA track classifications would be:

TABLE E-2
SUMMARY OF COST TO UPGRADE
MAIN LINE TRACK BY CLASS

FRA CLASS.	MAINE	NEW HAMPSHIRE	TOTAL
1	$17,676,000	$2,164,000	$19,840,000
2	$19,825,000	$3,057,000	$22,882,000
3	$41,934,000	$7,526,000	$49,460,000

(All costs in 2007 dollars)

B. Bridges and Major Culverts

A cursory, visual inspection of the 19 bridges and 3 of the 9 major culverts on the 60 miles was undertaken over a two day period in September, 2007. The inspection revealed that the bridges are typically in good condition. Some of the stone bridge abutments show signs of movement with some stones missing. The bridges should be steam cleaned, repairs made to the stone abutments and other minor repairs. The timber bridge decks need to completely replaced, together with the entire track approach structure on both ends of all bridges. The estimated cost for the bridge repairs is about $750,000 and the bridge deck replacement is estimated at $1,630,000. Those costs are included in Table E-2.

V. FREIGHT OPPORTUNITIES

A list of potential shippers and consignees was prepared with the assistance of the Greater Portland Council of Governments. That list was supplemented by internet searches of potential business types that may use rail service, review of recent aerial photography of the Mountain Division Corridor and field inspections. The list was further refined based on the types of industry that typically use carload rail service (versus intermodal containers and piggyback services), and firms that either ship or receive in carload volumes.

Currently, the types of products that move non-intermodal in conventional rail cars can be summarized as follows in bold type with some notes on specific prospects on the Mountain Division.

1. Aggregates from pits and quarries located on or immediately adjacent to the rail line. There are some operations too far removed so they would have to put the material on a truck to move to the railroad. The extra cost of loading on to rail and then unloading from rail at the end of the trip would make rail use by off-line pits and quarries uneconomical, at least for the Portland market.

2. Cement to the Ciment Quebec distribution facility in Mattocks (East Baldwin). This cement is currently trucked from Saint Basile, PQ, located on the north shore of the St. Lawrence River between Trois Revières and Quebec City.

3**. Plastic resins** – if Poland Spring/Nestle were to construct a substantial bottling plant at Fryeburg. Currently this seems unlikely. Perhaps some other type of plastic product firm could locate along the Mountain Division.

4. Propane – There are several small facilities that could use rail transport. Two in the Portland area and one at Newhalls[2] have sidings but do not use rail for a number of reasons, mostly due to lower volumes and unreliable delivery times associated with rail. A facility in North Conway is next to the rail line and could build a connecting siding very easily.

5. Fuel oil, gasoline, diesel – There is a large volume of petroleum product moving in trucks from Portland to various locations in the North Country. It may be possible to develop several bulk terminals in Western Maine, Northern New Hampshire and Vermont that would act as transload facilities from rail to truck for local distribution. Possible locations could be Fryeburg, Whitefield, New Hampshire and St. Johnsbury or Lyndonville, Vermont.

6. **Steel Products** – At least one firm in Maine currently rails re-bars to Ossipee on the New Hampshire North Coast RR and trucks from there to their facility in Fryeburg.

6. Lumber and building materials – Could have potential if a number of retail dealers combined resources to create a shared, centrally located transload facility.

From the list, telephone interviews were conducted of about two dozen of the most likely shippers and receivers. In general, the comments received can be summarized as follows:

[2] Of course the facility at Newhalls can't use rail service as the railroad is out of service there.

Most were very interested in the prospect of rail freight service but also noted that:

A. They could not live with the inconsistent delivery time of rail for distant shipments.
B. Would be cost prohibitive if more than 2 or 3 rail carriers were involved in the shipment.
C. Do not ship or receive in sufficient volumes to use rail.
D. Their product or raw material is not presently conducive to rail shipment: too fragile, too dispersed in origin, destination, too time sensitive.

A few thought that rail could be a viable alternative to trucking, depending on cost and factors related to consistent service. Most of the more positive firms were in the aggregate business (sand, gravel and crushed stone).

Based on this exercise and an understanding of current rail freight business, we postulate that the Mountain Division could potentially serve several gravel pits and rock quarries located on and very close to the corridor. Initially, the material would move into the Portland market, if truck competitive in price, or later; the Boston aggregate market if and when existing sources play out or become equal or greater in cost than the delivered cost from Mountain Division sources. Other commodities such as cement, propane, building material and petroleum products have some small potential but not in sufficient volumes and likely not competitive with existing trucking services.

The key to starting a freight service on the Mountain Division would be the commitment of the larger aggregate operations to use rail for most of their shipments to Portland and possibly to Boston when and if that became financially feasible. Since this is seasonal business, it may be that the initial Mountain Division freight operation would not operate during the winter.

The aggregate operators would need to furnish their own rail cars, have a facility to unload the gravel and stone and build sidings both at the loading operation and the discharge point. Thus, an initial and ongoing investment would be necessary and the rate charged by the rail operator would have to be sufficient to sustain the rail operation. Whether or not the overall cost to the aggregate firms would be truck competitive at this time is questionable and would have to be explored in detail with the potential aggregate shippers. Our initial sense is that the delivered cost to the Portland market by rail, including the rental cost of the rail cars, transportation cost of the rail carrier and amortizing some amount of the cost of the unloading facility and track cost, would be in the range of $7 to $9 per ton. Indications are that the average trucking cost currently is slightly lower.

There is an existing railroad in New Hampshire, owned by a major aggregate operation in the Boston area that functions similar to the postulated Mountain Division operation. That is the New Hampshire Northcoast Railroad, owned by Boston Sand & Gravel. That line is about 40 miles long running from gravel deposits in Ossipee, New Hampshire to Dover. From Dover to Boston, the gravel moves over Pan Am (formerly Guilford) and MBTA track to Boston, about 67 miles. During the “Big Dig” project 8,000 to 9,000 carloads of aggregate per year were shipped plus a small amount of inbound Propane, steel re-bars and plastic resins. Currently, volumes on the New Hampshire Northcoast are about 3,000 to 4,000 carloads per year.

If the Portland aggregate market can be economically served by rail and some other possible commodities moved, we postulated two initial scenarios for a start-up operation. One is described as "Optimistic" and the second may be described as somewhat less optimistic.

TABLE E-3
ANNUAL CARLOAD AND REVENUE ESTIMATES

OPTIMISTIC INITIAL FREIGHT TRAFFIC AND REVENUE

COMMODITY	ANNUAL CARLOADS	REVENUE PER CARLOAD	REVENUE
Aggregates (Sand & Gravel)	3,000	$600	$1,800,000
Crushed Stone	500	$600	$300,000
Propane	50	$600	$30,000
Plastic Resin	200	$650	$130,000
Cement	400	$500	$200,000
Steel (Rebar)	150	$550	$82,500
Fuel Oil, Gasoline, Diesel	400	$600	$240,000
Building Materials	100	$550	$55,000
TOTAL CARLOADS	**4,800**	**Total Revenue**	**$2,837,500**
Annual Carloads per Mile*	**80**		

*Based on 60 miles - Portland to Intervale, NH

MINIMUM INITIAL FREIGHT TRAFFIC AND REVENUE

COMMODITY	ANNUAL CARLOADS	REVENUE PER CARLOAD	REVENUE
Aggregates (Sand & Gravel)	3,000	$600	$1,800,000
Crushed Stone	500	$600	$300,000
Propane	50	$600	$30,000
Steel Rebar	150	$550	$82,500
TOTAL CARLOADS	**3,700**	**Total Revenue**	**$2,212,500**
Annual Carloads per Mile*	**62**		

*Based on 60 miles - Portland to Intervale, NH

We also calculated what the railroad operating costs would be for these two scenarios: Those figures were $2,874,000 and $2,016,000 respectively. The railroad could at least be self sustaining, and potentially marginally profitable, provided that the level of aggregate traffic equaled our estimates and the revenue per car noted would allow the rail move to be truck competitive. It should also be noted that no rental payments from the rail operator to the State were included in the operating costs. We did assume a minimal amount of maintenance by the rail operator to hold the infrastructure together for some time. A capital program would be required every 5 to 10 years to maintain the FRA track condition. That cost would likely have to be in some form of public support. We also calculated the rehabilitation cost to bring the Railroad to an FRA Class 2 condition (25 MPH for freight, 30 for passenger). These figures assume no strengthening of the bridges or rail replacement to allow handling of rail cars with a gross weight of 286,000 lbs. The railroad would be limited to 263,000 lb cars. The upgrade to allow heavier cars could be done later if the traffic levels and requirements for the heavier cars warranted it.

All costs are in current (2007 dollars) and would need be inflated to the mid point of construction. We estimated several termination points for upgrading; first all the way from Portland to Intervale, New Hampshire and then cutting back to locations where some of the major aggregate operations are located.

A. Option – Shortline all the way to Intervale, New Hampshire (Milepost 61.4)

Item	**Maine**	**New Hampshire**
Main Track Rehab	$20,000,000	$3,000,000
Additional Operating Track	$2,125000	$36,000
Property Acquisition	$225,000	
Rail Trail Modifications	$3,000,000	
Contingency (15%)	$3,802,000	$456,000
CAPITAL COST	**$29,152,000**	**$3,492,000**
Engineering	$1,458,000	$175,000
Program & Constr. Mgmt.	$729,000	$88,000
PROGRAM COST	**$31,339,000**	**$3,755,000**

B. Option – Shortline ending at Brownfield, Maine (Milepost 43.5 ±)

Item	**Maine**
Main Track Rehab.	$17,800,000
Additional Operating Track	$1,780,000
Property Acquisition	$225,000
Rail Trail Modifications	$3,000,000
Contingency (15%)	$3,421,000
CAPITAL COST	**$26,226,000**
Engineering	$1,311,000
Program & Constr. Mgmt.	$656,000
PROGRAM COST	**$28,193,000**

C. Option – Shortline ending at East Hiram, Maine (Milepost 37.5 ±)

Main Track Rehab.	$15,300,000
Additional Operating Track	$1,780,000
Property Acquisition	$225,000
Rail Trail Modifications	$3,000,000
Contingency (15%)	$3,046,000
CAPITAL COST	**$23,351,000**
Engineering	$1,168,000
Program & Constr. Mgmt.	$584,000
PROGRAM COST	**$25,103,000**

VI – PASSENGER OPPORTUNITIES

A. Summary

We looked at both commuter rail and tourist/excursion potential on the Mountain Division. At this time it appears that there is insufficient population density in the corridor combined with longer commuter travel times versus driving to allow commuter rail to be feasible. This may change over time and become a viable option as the region continues to grow. Any public transportation system will require public support to be viable. The point at which the benefits outweigh the cost of public support is never clear cut. That point may arrive on the Mountain Division as both population and employment densities grow and traffic congestion becomes more widespread and impossible to mitigate by reasonable roadway improvements.

The tourist/excursion potential appears more viable but would require the participation and cooperation of the other northern New England States in developing a regional network of interconnected rail lines. The capital cost to initiate this service on the Maine segment of the Mountain Division would be significant on its own. If either the freight or commuter service were in operation, the incremental cost to add the tourist/excursion service would obviously be less and perhaps become viable.

B. Commuter Rail Service

For purposes of analysis and cost, a commuter rail operation was assumed running 23 miles from Steep Falls in the Town of Standish to the existing Portland Transportation Center. Intermediate stations would be at Sebago Lake Village (also in the Town of Standish) and South Windham (Little Falls).

For purposes of comparison we looked at two of the smallest commuter rail operations in North America (the Shore Line East serving New Haven, Connecticut - 33 miles long, and the Music City Star – 32 miles long, serving Nashville, Tennessee). In addition, a well established commuter rail line serving Boston from a commuter shed at a similar distance to the postulated Mountain Division service was also investigated.

We first compared the economic demographics of the three samples to the Mountain Division Corridor. It is known that the typical commuter rail patron is affluent and well educated. We found that the Towns of Gorham, Windham, Standish and Sebago exhibited some of the characteristics of the other samples. We also looked at population and housing densities per acre, a key indicator for the suitable type of transit service and ridership forecasting. That indicated that Westbrook and Gorham were the only communities in the Corridor with sufficient population densities. However, Westbrook is too close to Portland and the rail line passes along the northern border of Gorham, removed from its population centers and in the wrong direction for Portland bound commuters.

We also looked at employment densities in Westbrook and Portland and found that the Portland Peninsula is approaching densities that could support commuter rail but not Portland overall nor Westbrook. We also looked at the percentage of potential commuters to the terminal city that were using the commuter rail service in the three examples.

Finally, we looked at what a typical commuter travel time would be from various points in the Mountain Division Corridor into Portland if they used the postulated commuter rail service. Since almost all rail trips would be a three seat ride (car, train, bus) total travel times would be significantly greater than driving door to door. Although there is congestion in segments of the Corridor, most commuters would experience longer trip times using the commuter rail.

Using census data showing the number of Portland bound commuters within the Corridor we estimated the number of commuters that may use a commuter rail service. That indicated that about 90 one-way commuters and about 200 total daily boardings would be anticipated. The operating cost would be about $4,000,000 annually resulting in an operating subsidy of about $72 per boarding. Even doubling average daily boardings to 400 would result in an operating subsidy of about $36 per boarding.

There are several facts that sway us towards a low capture ratio:

- The present Portland Transportation Center is too far removed from the area of Portland with higher employment densities. Most would have to transfer to a local bus.
- The combined total trip time of a three seat ride (car, train, bus) would be substantially greater than a one seat auto trip, even with some traffic congestion along the way.
- The location of the Mountain Division in Gorham (along its northern border) would require almost all Portland bound commuters in Gorham to drive away from Portland to reach the railroad.

A next step may be to perform a more complete analysis of the corridor with projections of growth. In the meantime, communities within the corridor may wish to encourage denser residential development at suitable locations near potential stations. Also, if future extensions of Amtrak service to Brunswick and Auburn happen, another terminal station in Portland, perhaps closer to downtown employment centers, may be considered.

In addition, the capital cost to upgrade the track, provide stations, parking, maintenance facilities and other infrastructure would be as follows:

NOTE – ALL COSTS ARE IN 2007 DOLLARS. ACTUAL WOULD NEED TO BE INFLATED TO MID POINT OF CONSTRUCTION

Commuter Service Between Portland Transportation Center and Steep Falls

1. Option A–No Underlying Freight Operation

Item		
Main Track Rehab	$19,600,000	
Additional Operating Track	$1,000,000	
Property Acquisition	$850,000	
Stations	$5,300,000	
Additional AHCWS	$1,500,000	(Automatic Highway Crossing Warning Systems)
DTMF’s & Switch Heaters	$150,000	(Power operated turnouts at passing track locations)

Shop Facility	$900,000	
Layover Facility	$1,750,000	
Rail Trail Modifications	$3,000,000	(Modifications along existing rail trail)
Contingency (15%)	$5,108,000	
CAPITAL COST	**$39,158,000**	
Engineering	$1,858,000	
Program & Constr. Mgmt.	$979,000	
PROGRAM COST	**$41,995,000**	**(About 1.8 million per mile)**

2. Option B – Shortline Freight Operation in Place (Incremental Cost to add Commuter)

Item	
Main Track Rehab	$11,100,000
Additional Operating Track	$1,000,000
Property Acquisition	$600,000
Stations	$5,300,000
Additional AHCWS	$1,500,000
DTMF's & Switch Heaters	$150,000
Layover Facility	$1,750,000
Contingency (15%)	$3,210,000
CAPITAL COST	**$24,610,000**
Engineering	$1,231,000
Program & Constr. Mgmt.	$615,000
PROGRAM COST	**$26,456,000**

C. Rolling Stock Cost

Assumed Equipment Roster for Start-up Commuter and Excursion Services

3 Locomotives (or none if new Diesel Multiple Units –DMU's are acquired)
3 Cab or control coaches
3 Regular coaches (no engineer cab or control)
2 Cafe-lounge with glass roofed seating area (bi-level arrangement)

TABLE E-4
ROLLING STOCK OPTIONS AND COST

	Used Cost plus Min. Refurbishment	New Cost- Minimal Options	New Cost – Deluxe Options	New DMU's
3 Locos.	$700,000	$5,200,000	$6,600,000	0
3 Cab/control cars	$250,000	$4,200,000	$6,000,000	$12,300,000
3 Coaches	$220,000	$3,600,000	$5,400,000	$5,400,000
2 Cafe Lounge/Dome	$1,000,000	$7,000,000	$8,100,000	$8,100,000
TOTALS	**$2,170,000**	**$20,000,000**	**$26,100,000**	**$25,800,000**

The above would provide for both commuter operation and excursion services with the potential to operate up to three trains, two commuter with a cab/control car plus a coach and an excursion train with a cab car, coach and 2 cafe lounge/dome cars.

If commuter service only, deduct the last line (2 Cafe Lounge/Dome cars)

The DMU cab/control cars would be powered units, acting as a locomotive. However they would be limited to pulling no more than 2 cars each so that an excursion train would be limited to 3 cars unless another powered unit was acquired. Pulling two cars, the acceleration would be considerably reduced versus a locomotive hauled train of 3 or 4 cars.

D. Tourist/Excursion Service

The most significant tourist destination along the Mountain Division Corridor is the Mount Washington Valley centered on North Conway. Following that are the Portland area and the Sebago Lake region. Therefore, any rail tourist operation would need to allow access to North Conway.

We looked at what the cost would be to provide a 1 ½ hour trip with several stops between Portland and North Conway. This could initially be done with some of the equipment used by the commuter rail operation since that equipment would otherwise be idle during the middle of the day.

1. The "Land Cruising" Concept

The experience of "land cruising" through scenic areas by rail is a trend that seems to be gaining momentum. This trend is driven not by economic factors, but a growing awareness that rail travel is less obtrusive to and taxing on the environment. And the scenery can be better appreciated from a rail car designed for sight-seeing and people enjoy riding on a train sharing the camaraderie of other passengers collectively engaged in a pleasant experience.

The Maine passenger rail system is evolving as evidenced by:

- Current frequent Amtrak Downeaster service to and from Boston.
- Possible extension of the Downeaster service to Brunswick and possibly Auburn.
- Current seasonal Maine Eastern passenger operation from Brunswick to Rockland along the coast.
- Portland's establishment and growth as a major tourist destination
- Portland's role as a port-of-call for cruise ships

From the above we can postulate that the Mountain Division may have a promising future as a key link in a regional, tourist oriented rail system carrying groups of people enjoying the land cruising experience while participating in varied tourist experiences.

2. Requirements for Tourist Oriented Rail Trips

Separating Americans from their automobiles for any type of rail touring experience is possible only if the overall journey is seamless in terms of mobility at each end of the train ride and the rail journey itself is entertaining. With good planning and regional cooperation of businesses, chambers of commerce, state and municipal governments; seamless transportation is possible. The proper rail equipment, onboard staff and scenery provides the entertainment.

Although the trip itself is an attraction, a destination or purpose enhances the experience. At Intervale (part of North Conway), rail tourists could easily transfer to the Conway Scenic Railroad's highly scenic run through Crawford Notch, or perhaps stay on the same train that brought them from Portland. Alternatively, local trolley buses or vans from area inns and resorts could transfer the tourists to their establishments or other tourist destinations. And of course, tourists in the Mountains could opt for a rail trip to Portland and coastal Maine using rail.

The concept of "The Crown of New England" a vision promulgated by Jack Sutton of MRG, Inc./DownEast Rail, certainly has merit. That concept is a "land cruise" rail trip connecting the Amtrak Downeaster at Portland to the Amtrak Vermonter[3] at White River Junction, Vermont via a scenic rail trip that would be:

- The Mountain Division Portland to Conway
- Then up through Crawford Notch through Whitefield, New Hampshire and on to St. Johnsbury, Vermont.
- From St. J, south along the very scenic Passumpsic and Connecticut River valleys for 60 miles to White River Junction.

The total length of the run from Portland to White River Jct. would be 190 miles. Establishment of that trip would require the cooperation and investment by all three northern New England States, or a joint, public-private venture. Currently, in New Hampshire, most of the route is open and passable except the very eastern segment into Maine. In Vermont, from the Connecticut River west into St. J, the track is overgrown and would need to be cleared and upgraded. From St. J south to White River Junction, the 60 mile route is currently in operation for freight service.

Combined with other passenger rail options in Maine, as noted above, and additional rail options and links in other states, the market potential and the opportunities for extensive rail touring could be almost limitless.

<u>3.. Initial Excursion Options on the Mountain Division</u>

The potential start-up commuter options could allow the same rolling stock to be utilized during the middle of the day for trips between Portland and North Conway. If upgraded to a Class 3 condition (60 MPH max. speed) the 60 mile trip with several stops could be done in 1 ½ hours or a little less. The excursion schedules could allow a stop at Steep Falls for the outbound train to meet a tour bus that could take tourists along the Route 113 corridor to visit the area in a more leisurely manner than the train that would continue on non-stop to Fryeburg. This bus could be an alternative or side trip from the train excursion. Later, the bus would arrive in Fryeburg to put tourists back on the train from Conway and back to Portland.

[3] The Vermonter runs from New York City to St. Albans Vermont via New Haven, Hartford, and Springfield. Currently patrons are bussed from St. Albans in northwestern Vermont to Montreal but if some cost issues were resolved, the train could run directly to Montreal.

There are a number of different types of tourist and interests that could be marketed and catered to. Eco-tourism is a growing segment of the industry. Mountain bikers currently are the most affluent leisure activity group and winter sports enthusiasts are not far behind in that category. Provisions for convenient carriage of bicycles, skis and luggage would be a pre-requisite. Innovative marketing of various tour packages that included arrangements for local transportation between the train, lodgings and tourist destinations, all provided under a single rate or group package could open up unlimited markets. These initiatives have the potential to grow exponentially as the concept of vacationing without a car becomes viable and an environmentally responsible way to vacation. Europeans "holiday" by train routinely on a dense system of railroads that link most areas of the continent. Whether or not we can do it here is a matter of priorities both at the grass roots and legislative levels.

Major regional attractions would include the trip through Crawford Notch, shopping at the outlets in North Conway, overnight stays in various inns and B&B's, skiing at all of the ski areas along the route in New Hampshire and Maine, dining at the Mount Washington Hotel, possible "Round the Mountains" train trips such as Portland to Groveton on the St. Lawrence & Atlantic RR then down to Whitefield on the NH owned, New Hampshire Central operated line to the Mountain Division and then back to Portland.[4] The rail trips could be coordinated with local bus trips of other attractions.

With Portland as a hub and realization of other routes from Portland discussed above, tourists could visit the Maine Coast, Portland and other regions, all in the comfort of a train equipped with glass roofs for unequalled viewing, food service and a comfortable, carefree (and car free) experience.

Quantifying what this tourist/excursion market may be is difficult. If we were to assume that initially the Mountain Division were opened to North Conway; in summer there would be day trips from cruise ships, from Portland residents and visiting tourists, possible dinner trains from Portland to some point and back. In the winter, ski trains and people coming along just for the ride through the winter landscape and "Polar Express" family trips. In fall leaf peeping specials of varying durations, perhaps with overnight stays where other activities may be enjoyed. The capital cost to realize this potential may never be fully recovered in fares but the economic benefits to both Maine and New Hampshire's tourist industry could be significant.

E. Capital Cost Summary for Excursion/Tourist to Conway, NH

NOTE – ALL COSTS ARE IN 2007 DOLLARS. ACTUAL WOULD NEED TO BE INFLATED TO MID POINT OF CONSTRUCTION

Tourist and Excursion between Portland Transportation Center and Intervale, NH – FRA Class 3 Track Condition

1. Option A – No Other Operation in Place (Commuter or Freight)

Item	**Maine**	**New Hampshire**
Main Track Rehab	$41,935,000	$7,500,000

[4] The 470 Railroad Club ran trips of this name and itinerary from Portland during the 1960's and other groups from Boston in the 1950's

Additional Operating Track	$1,200,000	$300,000
Stations	$2,300,000	$1,500,000
Additional AHCWS	$4,700,000	$700,000
Property Acquisition	$250,000	
DTMF's & Switch Heaters	$100,000	$50,000
Shop Facility	$900,000	
Layover Facility	$1,750,000	
Rail Trail Modifications	$3,000,000	
Contingency (15%)	$8,420,000	$1,508,000
CAPITAL COST	**$64,555,000**	**$11.558,000**
Engineering	$3,228,000	$578,000
Program & Constr. Mgmt.	$1,614,000	$289,000
PROGRAM COST	**$69,397,000**	**$12,425,000**

2. Option B – Freight Service in Place all the way to North Conway (Incremental Cost)

Item	**Maine**	**New Hampshire**
Main Track Rehab	$22,109,000	$4,470,000
Additional Operating Track	$1,200,000	$300,000
Stations	$2,300,000	$1,500,000
Additional AHCWS	$4,700,000	$700,000
Property Acquisition	$150,000	
DTMF's & Switch Heaters	$100,000	$50,000
Layover Facility	$1,750,000	
Contingency (15%)	$4,846,000	$1,053,000
CAPITAL COST	**$37,155,000**	**$8,073,000**
Engineering	$1,858,000	$404,000
Program & Constr. Mgmt.	$929,000	$202,000
PROGRAM COST	**$39,942,000**	**$8,679,000**

3. Option C – Commuter Service in Place – No Freight Operation

Item	**Maine**	**New Hampshire**
Main Track Rehab	$22,274,000	$7,500,000
Additional Operating Track	$600,000	$300,000
Stations	$750,000	$1,500,000
Additional AHCWS	$2,950,000	$700,000
DTMF's & Switch Heaters	$50,000	$50,000
Layover Facility	$1,750,000	
Contingency (15%)	$4,256,000	$1,508,000
CAPITAL COST	**$32,630,000**	**$11.558,000**
Engineering	$1,632,000	$578,000
Program & Constr. Mgmt.	$816,000	$289,000
PROGRAM COST	**$35,078,000**	**$12,425,000**

4. Option D – Commuter Service in Place and Freight Operation to Conway

Item	Maine	New Hampshire
Main Track Rehab	$13,724,000	$4,4700,000
Additional Operating Track	$1,200,000	$300,000
Stations	$2,300,000	$1,500,000
Additional AHCWS	$2,950,000	$700,000
DTMF's & Switch Heaters	$50,000	$50,000
Layover Facility	$1,750,000	
Contingency (15%)	$3,296,000	$1,053,000
CAPITAL COST	**$25,270,000**	**$8,073,000**
Engineering	$1,264,000	$404,000
Program & Constr. Mgmt.	$632,000	$202,000
PROGRAM COST	**$27,166,000**	**$8,679,000**

E Excursion Service Operating Costs and Revenue

Due to the almost unlimited variations possible in excursion services in terms of schedules, operations, rolling stock ownership, fare structures, arrangements with steamship lines, various tour packages, etc.; establishing operating costs and revenues is not possible within the scope of this study.

For example, on the Alaska Railroad, the various steamship lines own the rail cars their patrons ride on and pay a fee to the Alaska Railroad to haul the cars, along with those of several other cruise lines. That may or may not be a way of financing rolling stock for excursions around northern New England. An option may be public/private partnerships between states and major tour companies to acquire equipment and a percentage of the tour package revenue going towards a car mile charge to cover track and vehicle maintenance.

It would seem highly unlikely that revenue from tourist operations alone would cover the cost of rolling stock, staffing and maintenance of the railroad and equipment. Public support would be necessary to some degree with the payback coming from increased tax revenue, employment and other spin offs from increased tourism.

VII. CONCLUSIONS AND NEXT STEPS

A seasonal freight operation may be possible if the movement of aggregate from locations along the Corridor by rail is truck competitive. This possibility needs to be investigated in greater detail with the potential aggregate operators and potential rail service providers to confirm that such movement is economically viable and then determine if the capital cost to upgrade the railroad can be secured. Establishment of a freight service could help to reduce the incremental cost of future passenger initiatives.

Commuter service does not seem viable at this time. Actions that could lead to and facilitate a viable commuter service would be:

1. Encourage denser residential development along the rail corridor, especially in the general vicinity of potential commuter rail stations.
2. Consider a Portland rail terminal closer to the main employment centers on the Peninsula.
3. Complete the purchase of the entire rail corridor.

4. Allow alternative uses of the rail corridor (such as recreational rail trails) ***only*** if they are designed and built to protect the rail infrastructure and provide adequate separation of rail operations and trail users. Continued trail development without such measures will become increasingly costly to remedy in the event rail service is restored.
5. If and when a freight service is initiated, the incremental cost to add commuter rail will be significantly less than commuter rail alone both in capital and operating cost.
6. Preserve and protect the corridor from encroachments, uses that may degrade it or other uses or improvements that would have to be removed or extensively modified if rail service were resumed.
7. Investigate the use of the corridor for fiber optics or other types of utility corridors, being careful not to impede return to an active rail corridor.

Excursion and tourist rail operations may have great potential if the three northern New England States can partner in establishing a strategic network of scenic rail lines linking key tourist destinations. Public/private partnerships with cruise lines and the tourist industry may be a means to partially finance appropriate rail equipment and part of the operating and maintenance cost of the rail system. Public support would be justified because of the payback coming from increased tax revenue, employment and other spin offs from increased tourism. Add to that the fact that increased rail travel will result in less demand on the regions highway system and the environment; public support is a reasonable consideration. Such an endeavor will require financial participation and considerable planning and cooperation among the various states. How and when this may happen is not clear but the rising cost of energy, concern for the environment, an aging population less inclined to drive long distances and an increased awareness of the pleasures of travel by rail may collectively provide the will to enable a reincarnated Mountain Division as part of regional passenger rail system. These multi-state discussions and planning should be implemented while simultaneously engaging elements of the tourist industry that may benefit from this initiative.

CHAPTER 1

History and Background of the Mountain Division

I. – HISTORICAL CONTEXT

A. A Difficult Passage

Mention "The Mountain Division" to anyone familiar with New England Railroads and immediately they conjure up visions of trains climbing along the steep walled confines of the great White Mountain pass in New Hampshire. The highest in northeastern North America, the White Mountains form a very effective east-west barrier along their north-south axis from the Androscoggin River to the north and the Route 25 corridor south of the Sandwich Range[1], a north-south distance of about 40 miles. Named after Abel Crawford, an early settler of this wild, rugged region,

Figure 1-1 - Eastbound (down) train YR-1 coming off "The Girders" in Crawford Notch

Figure 1-2 – Westbound train (up) RY-2 passing over the "The Girders" just below the summit at "The Gateway".

Crawford Notch is the only point that allows passage of a main line railroad across the main ranges of the White Mountains without extensive tunneling.

The Mountain Division crests at an elevation of 1,900 feet above sea level at the top of Crawford Notch, the highest point reached by a standard gauge main line steam railroad in New England and all of Atlantic Canada. Contrast that with the generally parallel route of the Grand Trunk (now the St, Lawrence & Atlantic RR) just 16.5 miles to the northeast of Crawford Notch at Gorham. There the Grand Trunk alignment turns north following the Androscoggin to Berlin and tributaries northwest and then west across the lower, northerly mountain ranges. The maximum elevation reached by the Grand Trunk route over the White Mountains is just 1,075 feet above sea level, a full 825 feet lower than the Mountain Division's passage and with maximum grades only half as steep as the Mountain Division[2]. The significant physical barrier and high operating costs imposed upon a railroad passing through the middle of

[1] The Route 25 corridor between Ossipee and Meredith never had a railroad.

[2] The Grand Trunk reaches 1,379 feet above sea level further west in Vermont, cresting the divide between the Connecticut and St. Lawrence River watersheds, but still with grades less than half of that of the Mountain Division.

the highest, most rugged mountains in the region without ever touching another major population center en route raises two questions:

1. Why did its promoters choose to build a railroad here in the first place?
2. Why did it continue to be operated as a through freight route until 1983?

To answer those questions one needs to understand the patterns of commerce in the mid 19th century and some obscure idiosyncrasies inherent in the railroad business. This knowledge will shed light on past operations of the Mountain Division and some insight on the current picture for rail freight in the region.

B. - The Lure of the Lakes

The Saint Lawrence River links the Great Lakes and much of North America to the Atlantic Ocean. However, rapids and waterfalls (including Niagara Falls) made the River above Montreal and passage between Lake Erie and Lake Ontario impossible. Starting in the early 1800's with the first Welland Canal, larger and larger canals and locks slowly improved the flow of commerce, culminating with the opening of the St. Lawrence Seaway in 1959.

At the beginning of the 19th century, cities on the northeast coast of the United States looked at the potential trade of the Great Lakes as the means of boosting their importance as ports and centers of commerce. The coming of age of railroads in the 1840's was seen by both Boston and Portland interests as the means to tap into the great potential of that natural artery of commerce.

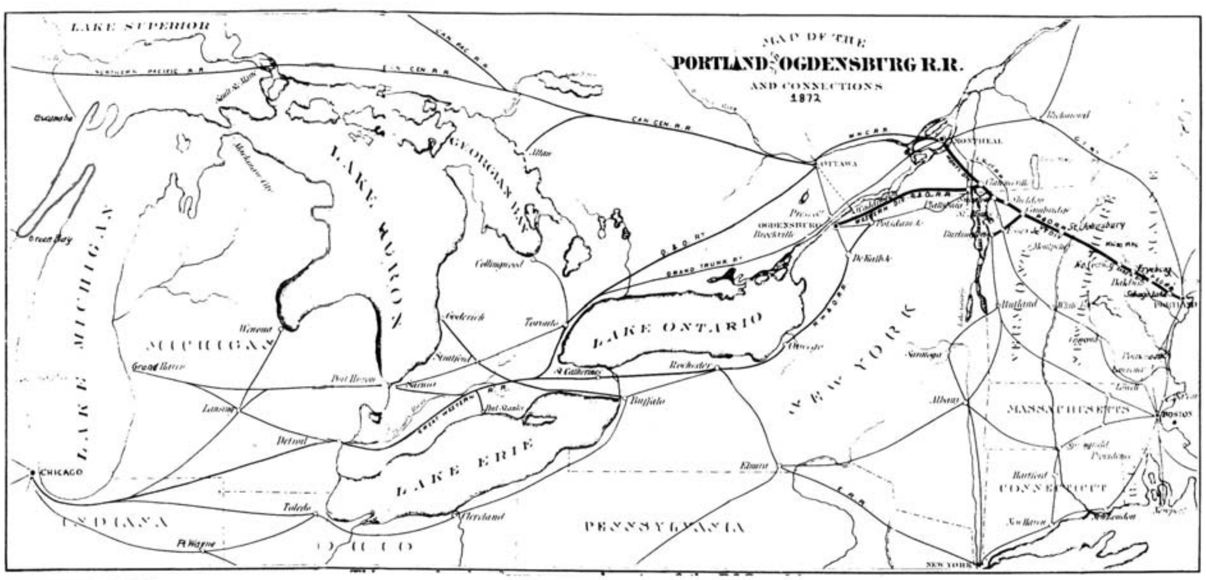


Figure 1-3 – This map of 1872 was drawn while pieces of the Railroad in Maine, New Hampshire and Vermont were still under construction. Of the four divisions shown: Portland, Vermont, Western and Montreal, only the first two were ever built. The Vermont Division was officially part of the P&O for only a few short years between 1875 and 1880.

Montreal became a major port at the head of navigation for ocean going vessels since it is situated just below the Lachine Rapids, the last of the rapids heading down to open water. The Lachine Rapids were bypassed by a canal and locks by the 1830's but at that time, sufficient only for relatively small vessels. Below Montreal, the St. Lawrence River freezes for several months of the year, and before the advent of steel hulled ships and ice breakers, Montreal was effectively land locked for four or more months per year.

Draw a circle centered on Montreal and the closest point to the Atlantic Ocean is Portland, Maine at 206 miles, with Boston at about 250 miles. Another geographic fact of importance is that Ogdensburg, in upstate New York, is situated at the eastern end of the Great Lakes on the St. Lawrence River above the first rapids leading down river towards Montreal. Draw circles centered on Ogdensburg and Portland lies at 269 miles distance and Boston at 275 miles, barely a difference at all except that the Adirondack Mountains of upstate New York and Lake Champlain effectively block a direct route to Boston.

Figure 1-4 – View from Frankenstein Trestle (Named after a painter of the region and not the character in Kate Shelly's novel)

This last fact was apparent to the Portland interests that pursued the pot of gold they hoped for at the end of a metaphoric rainbow in the form of a railroad. This railroad, the predecessor of the Mountain Division, started as the Portland and Ogdensburg Railroad.

History now informs us that the pot of gold never materialized sufficient to justify the struggles that were ahead. However, success or failure is not always measured in gold or financial gain. Perhaps the original supporters were ultimately successful, not in their own time, but in the 20^{th} century. Maine shippers ultimately benefited from a lower cost alternative routing for car load traffic moving to and from the mid west because of the Canadian Differential, a lower rate for traffic moving in and out Canada. Less tangible, seven generations have enjoyed the sight and sound of trains struggling against gravity in spectacular surroundings, on a railroad blending with the landscape unobtrusively, seeming as much a natural part of the great White Mountain notch as the granite precipices themselves.

Figure 1-5 – Looking west from "The Great Fill" to the "Gateway", the rock cut at the top of the notch

II - THE PORTLAND AND OGDENSBURG, A DREAM NEVER FULFILLED

From the very beginning, the Portland and Ogdensburg was up against not only difficult terrain but were starting serious planning 16 years after completion of the Grand Trunk Railroad between Portland and Montreal. In addition to the difficult passage through New Hampshire, the P&O promoters never had ownership or control of the entire railroad between Portland and Ogdensburg.

Another on-going issue was that the route never passed through a major population center (St. Johnsbury was one of the larger cities). They never established their own rails across the top of New York State to Ogdensburg and always seemed to be in or on the brink of receivership. Ogdensburg, although a port of some stature; never became a major port because the navigation on the St. Lawrence improved over time to erase its initial geographic advantage at the east end of Great Lakes navigation.

Instead, the P&O in Maine, New Hampshire and the short segment in Vermont east of St. Johnsbury did become a through route, not to Ogdensburg, but north from St. Johnsbury to Montreal and then west from there, via the Canadian Pacific Railroad. Some traffic did move across the top of Vermont and on across the top of New York State, but very little ever actually went from Portland to Ogdensburg.[3]

Following is a brief history of the various elements that make up the story of the Portland and Ogdensburg. In the Appendix to this chapter is quantitative data on freight traffic over time to illustrate the business side of the Mountain Division illustrating that the original concept of the Portland and Ogdensburg never developed as originally planned.

A. The Grand Trunk Railroad

The Atlantic and Saint Lawrence Railroad was chartered in Maine in 1845, largely through the 11 year efforts of John Alfred Poor, a Bangor lawyer. Poor envisioned Portland as a major year round port for Montreal and with other rail connections to the northeast; to New Brunswick and Nova Scotia, linking Portland and other points in Maine to year round commerce with Europe.

Portland was connected to Boston by rail in 1842 through a standard gauge (4' – 8 1/2") railroad. Poor espoused an isolationist strategy to keep the Canadian commerce from being siphoned from Portland to Boston. As a result, the Atlantic and Saint Lawrence was constructed to the "broad" gauge of 5'-6". The entire route from Portland, across New Hampshire and the northeast corner of Vermont to a point on the south bank of the St. Lawrence across from Montreal was completed in July of 1853. The last rail link into Montreal via the Victoria bridge occurred in 1859. Just before completion of the route in 1853, the Canadian segment (called the Saint Lawrence & Atlantic) was acquired by Canada's Grand Trunk Railroad with the American segment leased to the Grand Trunk.

By the 1870's all of the other railroads in the region were standard gauge and the Grand Trunk's broad gauge proved increasingly limiting. In 1874, the entire railroad was converted to standard gauge over a weekend.

For most of the last half of the 19th century until just after World War 1, the Grand Trunk Railroad and the port of Portland generally lived up to Poor's vision. In 1923, the Grand Trunk became part of the nationalized

[3] This is documented in the Appendix at rear of this chapter.

Canadian National Railroad, an amalgamation of many smaller railroads in Canada that were facing financial difficulty. Soon after the CN amalgamation, the combination of the St. Lawrence River being kept open year round and political pressure to favor Canadian ports, reduced the volume of commerce flowing to Portland along this route. The Grand Trunk New England[4] was able to keep going to the present day mostly due to the paper industry in Maine and northern New Hampshire coupled with the benefit of Canadian National's ability to supply paper grade box cars to the Maine and New Hampshire paper mills.

In an effort to reduce costs and focus on major through traffic routes, CN put the Grand Trunk New England up for sale in 1989. The 164 mile main line in the US was purchased by Emmons Transportation Group and named as the original incorporation in Canada; Saint Lawrence and Atlantic. Several years later Emmons acquired another 110 miles of the line in Quebec to a point just east of St. Hyacinth where connection is made to CN's main line that passes just over the top of Maine from the Maritime Provinces and eastern Quebec. In 2002 Emmons sold the railroad to Genesee & Wyoming, a holding company for an increasing number of regional and short line railroads.

B. The Portland and Ogdensburg

With a virtual monopoly of traffic between Portland and Montreal, the Grand Trunk was able to charge high rates for the movement of freight, a situation that was increasingly vexing to Portland merchants and others in the North Country.

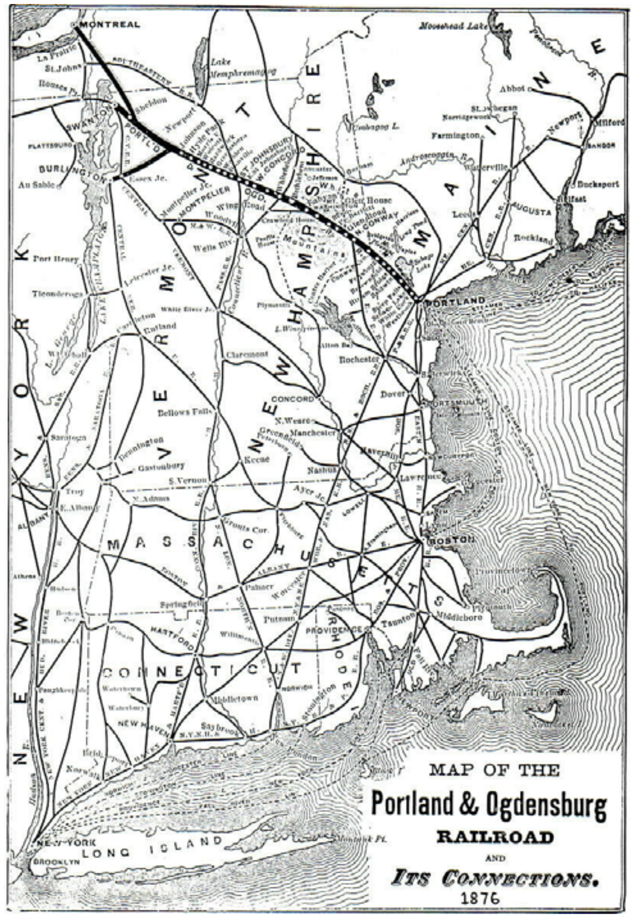


Figure 1-6 – By 1876 the P&O vision had already diminished, compared to Figure 1-3. By 1880, most of the Vermont segment would no longer be corporately part of the P&O.

In the meantime, the beauty of the White Mountains and the desire to escape the unhealthy, stifling environment of the industrialized cities fostered the phenomenon of large hotels springing up in remote locations difficult to reach in comfort on the regions primitive roads. Sylvester Marsh completed the miraculous Cog Railroad to the top of Mount Washington in 1869, further increasing the tourist trade.

The burgeoning commerce of the Great Lakes, the new tourist trade in the White Mountains and the growing markets of agricultural and timber resources of the North Country combined into a powerful attraction for a through rail route between Portland and

[4] The "New England" was added to distinguish the line from the "other" Grand Trunk Railroad that operated in the midwestern US, also owned by Canadian National.

Ogdensburg. However, as the following summary of a rather complex history unfolds, we find that the route never was combined under common ownership and that the operation of the middle section in Vermont always had a difficult existence.

1. New York Segment (Ogdensburg & Lake Champlain)

Before the chartering of the Portland & Ogdensburg in 1867 in Maine and New Hampshire and its actual formation in 1869, a rail line across the top of New York State between Ogdensburg and Rouses Point at the top of Lake Champlain was opened in 1850. Boston, not Portland, was the underlying goal of that venture, first chartered as the Northern Railroad, then reorganized as the Ogdensburg RR in 1858 and then Ogdensburg and Lake Champlain in 1864. The line was connected by a bridge across the top of Lake Champlain to the Vermont & Canada Railroad in 1852. That railroad traversed southeast across Vermont to White River Junction connecting to railroads building to there from Boston and southern New England. The Vermont & Canada later became the Vermont Central and then the Central Vermont which became part of the Canadian National and now exists as the New England Central Railroad. Over the ensuing years, this railroad proved to be a major nemesis for realization of the Portland and Ogdensburg dream. But of course, the founders of the P&O did not have the benefit of history. For them, the fact that a railroad already existed for about a third of the distance from Ogdensburg to Portland was encouraging, although initially; the plan was to build a separate line just north and parallel to the Ogdensburg and Lake Champlain.

2. Portland and Ogdensburg in Maine and New Hampshire

The Portland and Ogdensburg Railroad was chartered in Maine in 1867 and officially organized in January, 1869. In July of that year, the New Hampshire Legislature authorized the P&O to extend its line through their state to the east border of Vermont ***as long as the line did not pass around or outside of Crawford Notch***[5]***,*** and some other caveats as to a minimum amount of money to be spent in New Hampshire and a completion date. Since the best route northwest from Portland across the grain of the North Country was already occupied by the Grand Trunk, another route further south tapping into the heart of the tourist trade was now a necessity.

Figure 1-7 Maine Central train YR-1 at South Windham (Little Falls), Maine, early 1970's

Construction started at both Portland and Fryeburg late in 1869 with completion between those two points in June 1871 and then to North Conway in August. The railroad through the Notch was not completed through to Fabyan until August, 1875. The P&O was completed though to the New Hampshire/Vermont state line at Lunenburg, Vermont by December of 1875 where it connected to the railroads that had been simultaneously under construction in Vermont. It should be noted that the P&O between Fabyan and Scotts, west of Whitefield, was over the tracks of the Boston, Concord & Montreal Railroad that had arrived

[5] Obviously, New Hampshire was focused on the tourist trade, perhaps more than other potential economic advantages of the railroad.

at Fabyan from Wells River and Littleton before the P&O. The P&O did not close this gap and complete its own route through to the Connecticut River until 1890 when the Maine Central Railroad had leased the P&O.

Figure 1-8 South Windham, Maine, early 1970's

3. The St.Johnsbury and Lake Champlain

Almost at the same time as the Maine and New Hampshire formation of the Portland and Ogdensburg, interests mostly in St. Johnsbury, Vermont, were contemplating an east-west rail line across the top of Vermont, the middle link of the planned route.

A north-south rail line along the Connecticut and Passumpsic River valleys (The Connecticut and Passumpsic Rivers RR) had reached St. Johnsbury in 1850 and became a through route north into Canada by 1863

Residents of St. Johnsbury and towns of northern Vermont were drawn to the need for an east-west railroad to connect with the Vermont and Canada Railroad to the west and the chartered Portland and Ogdensburg to the east. Towards this end, the 118 miles between Lake Champlain and the New Hampshire border saw three pieces of railroad chartered in Vermont. These three pieces were the Essex County Railroad between Lunenburg, Vermont on the Connecticut River to St. Johnsbury, the Montpelier and St. Johnsbury between St. Johnsbury and Danville and the Lamoille Valley between Danville and Swanton, Vermont. The Montpelier and St. Johnsbury was originally to go to Montpelier, but lack of interest on the part of that city and opposition of the Vermont Central that already passed through Montpelier soon pushed the planning further north and a longer route all the way to Swanton, near Lake Champlain.

Although initially backed only by Vermont interests and not the Portland group, the Vermont pieces briefly came to be the Vermont Division of the P&O. The underlying reason for the Vermont consolidation was the inability to sell bonds for three separate Vermont companies not under common management and all in very shaky financial condition. In 1875 the Maine Legislature very liberally amended the P&O charter to allow the P&O to combine with about any railroad in New England, New York or Canada. By then, Portland and various towns and backers of the P&O in Maine were deeply committed financially and there was a good measure of desperation for a western connection. A new board of directors was put in place that included the Vermont interests and six members from Portland.

Figure 1-9 Fryeburg, ME, 1978. Unusual meet between trains RY-2 and YR-1. Running late, RY-1's train had to be distributed on all the available sidings at Fryeburg.

The Vermont Division was completed through to Swanton in July of 1876 with a connection to the Vermont Central Railroad. A short extension to the shore of Lake Champlain at Maquam was completed in August of 1877.

The 14.5 mile gap over the Vermont Central between Swanton and the Ogdensburg and Lake Champlain at Rouses Point caused difficulty from the beginning. The VC was very uncooperative with routes and rates between the Ogdensburg and Lake Champlain Railroad to the west and the P&O to the east. The VC was "short hauling" itself on traffic routed that way, preferring to keep traffic on its own route southeast to and from White River Junction for the longer haul and a better division of revenue.

In 1883, interests of the Ogdensburg and Lake Champlain together with the St. Johnsbury and Lake Champlain pooled their resources to the close the gap and built a new line from Maquam, north along the Lake to a point opposite Rouses Point. Ferry service was there inaugurated until a bridge could be built just south of the Vermont Central bridge. By 1884, the principles of the Vermont Central quietly purchased enough shares of St. J & LC stock to turn out its board and then quickly acted to stop the competitive construction and tore up the recently built rail line just months after it went into service. This turned out to be the final blow to ever establishing a through route under common ownership or control between Portland and Ogdensburg.

Figure 1-10 South Windham, Maine about 1976, still open as a freight agency. Station building was later moved across the tracks and east of present location.

By 1877, the P&O Vermont Division was in receivership and in 1880 was reorganized as the St. Johnsbury and Lake Champlain Railroad Company, again totally under local control. The Portland folks had given up with their poor country cousins in Vermont to focus on their own concerns. Thus, the corporate linkage west of St. Johnsbury was very short lived and never again was to be.

C.- Later History of the Three Components of the Portland & Ogdensburg Route

The segment in New York State continued to be operated as the Ogdensburg and Lake Champlain Railroad until the early part of the 20th century. At the end of the 19th century, what came to be the Rutland RR with its northern terminus in Burlington, Vermont came under the control of the New York Central. Under their control and backing the Rutland constructed a new line up along the northern reaches of the Lake to Alburg, Vermont and then across to Rouses Point, acquiring the Ogdensburg and Lake Champlain. So, the powerful New York Central succeeded to cross the Lake to New York where the St. J & L.C. had failed almost 20 years before.

The Rutland's focus was for traffic towards Boston, southern New England and New York. The original P&O vision for Portland was effectively cut off, not only by the Rutland, but the still remaining piece of the Central Vermont between Rouses Point and Alburg Vermont.

Figure 1 – 11 South Windham Maine about 1976 at Route 202 crossing, current end of MEDOT ownership.

The Rutland was abandoned in its entirety in 1961 with the lines south of Burlington purchased by the State and now operated as the Vermont Railway System. Portions of the Ogdensburg and Lake Champlain are operated as the short line Norwood and St. Lawrence, but the link across the top of Lake Champlain has been gone since shortly after the demise of the Rutland. What was the Vermont Central, now the New England Central, does not cross the top of Lake Champlain but goes north towards Montreal via the Canadian National Railway.

The middle segment across the top of Vermont from St. Johnsbury west had a long difficult existence, coming under control of the Boston & Maine for a while, then several short line operators including the Salzburg family in 1959 and then Samuel Pinsley (Salzburg's brother-in-law) in 1967. Finally acquired by the State of Vermont in 1973 to save the service, millions of dollars of State funds were spent to try to keep the line going through the 1970's and 80's, but to no avail. The route west of St. Johnsbury is now abandoned and portions have or are about to become rail trails

The route from Portland to St. Johnsbury, Vermont came under lease and then purchase by the Maine Central Railroad and came to be called the Mountain Division. The Maine Central operated the line as a through route, connecting to the Canadian Pacific at St. Johnsbury as the primary interchange partner[6] and source of most traffic on the Mountain Division (See the Appendix at rear of this chapter).

Figure 1-12 Maine Central and Canadian Pacific Locomotives at St. Johnsbury, Vermont (late 1970's)

Up until the end, the Maine Central also interchanged cars to the St. Johnsbury and Lake Champlain (Lamoille Valley in later reorganizations). Shortly after Guilford (now Pan Am) acquired the Maine Central in 1981 and then the Boston & Maine, the Mountain Division was cast off. Guilford would have been "short hauling" itself from Portland to St Johnsbury (131.3 miles versus 270 to 292 miles on the Boston & Maine). The Canadian Pacific agreed to move the interchange from St. J. to Mattawamkeag, Maine for most traffic in and out of Maine. Lack of on-line traffic and difficult operating conditions on the Mountain Division also sealed its fate as a through freight route.

III - BRANCHING NORTHWARD

In addition to the main route between Portland and St. Johnsbury, 131.3 miles; various north-south segments of railroad were constructed by timber interests in New Hampshire and Quebec during the 1880's.

[6] This was the original north-south line that came to St. Johnsbury in 1850 as the Connecticut and Passumpsic River Railroad, later part of the Boston & Maine and finally to Canadian Pacific by lease in 1926 and purchase in 1946.

These lines were pieced together by the Maine Central in 1890 to 1891, connecting at their south end to the original Portland and Ogdensburg at Quebec Junction, just south-east of Whitefield, New Hampshire. This route ran 108.2 miles north to Lime Ridge, Quebec. (See the map on the following page).

Over the ensuing years, the Maine Central cut the line back in stages with Beecher Falls, Vermont being the northern terminus for some time, 59 miles from Quebec Junction.

Figure 1-13 Maine Central train YR-1 at Miles Pond, Vermont, about 1978

This came to be known as the Beecher Falls Branch of the Maine Central and was operated out of either Bartlett, New Hampshire or St. Johhsbury, Vermont. Much of the route paralleled parts of the Grand Trunk and Boston and Maine lines in the area and portions of the parallel pieces were abandoned and trackage rights agreements established to use each others tracks for segments of the run.

Some of the remaining pieces of this line are owned by the State of New Hampshire and currently operated in freight service by the New Hampshire Central Railroad out of North Stratford, New Hampshire.

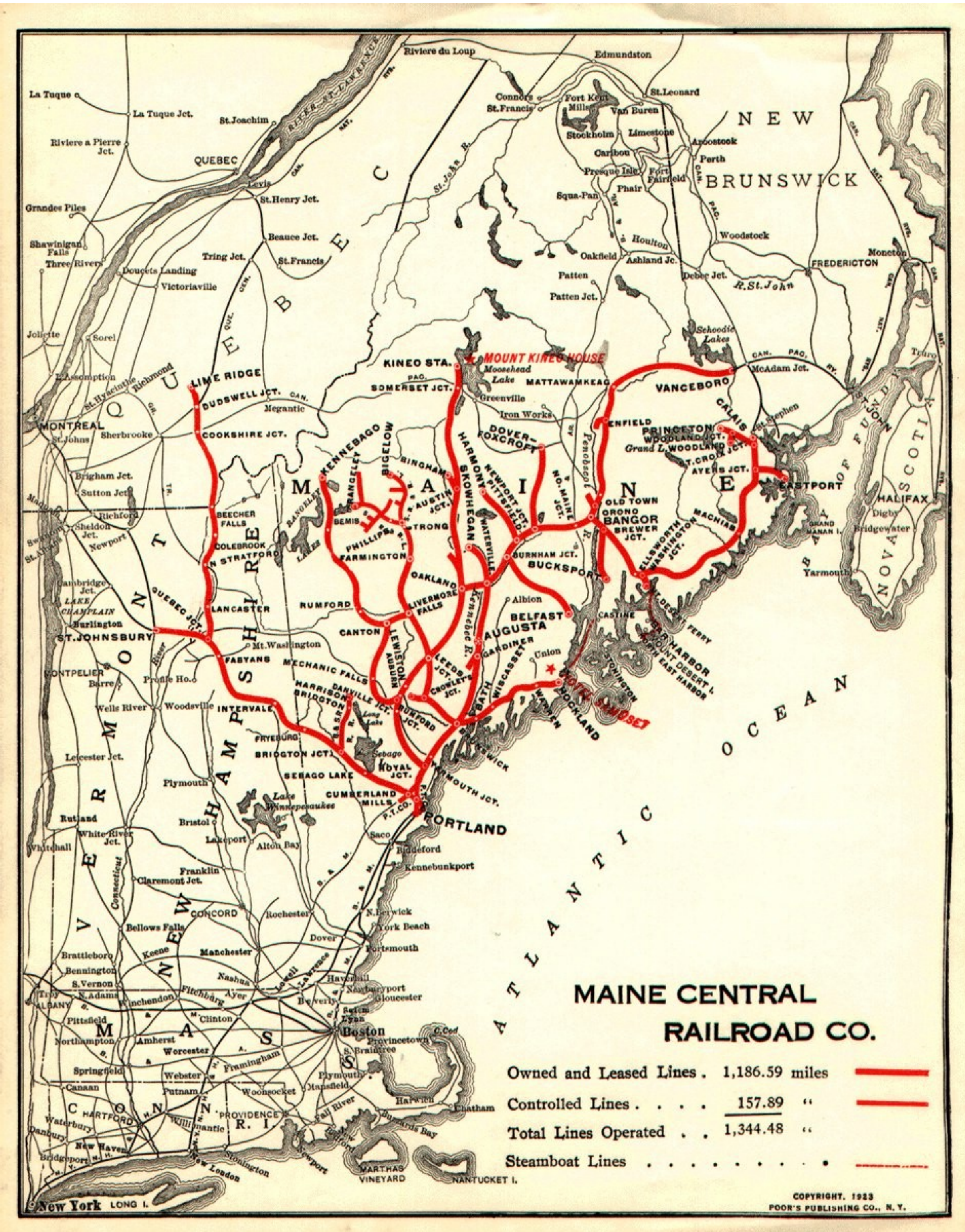


Figure 1-14 This map from 1923 shows the Maine Central almost at its peak size, including the narrow gauge railroads in the Rangeley Lakes and the Bridgeton & Saco River connecting to the Mountain Division. By this time, the Maine Central had full control of the route to St. Johnsbury as well as the 108 miles of line north to Lime Ridge, Quebec, later cut back to Beecher Falls, VT.

IV – OVERVIEW OF RAILROAD ISSUES THAT FAVORED MOUNTAIN DIVISION OPERATION UNTIL 1983

A. - Division of Revenue

A freight shipment on a railroad is often moved across a number of different railroads on its journey. However, the customer for that shipment pays a single bill, typically to the railroad that delivered the car. That railroad is then responsible to pay the other railroads that moved the car, based on an agreed upon or stipulated division of the total bill for moving the car.

Figure 1-17 Maine Central RY-2 coming through the Gateway at Crawford Notch – late 1970's

This division of revenue is based on a combination of general guidelines and negotiation. The general guidelines are that the originating carrier and the terminating carrier get a larger percentage of the revenue for the cost associated with switching the car in or out of the customers siding or delivery point. Railroads that simply haul the car across their railroad; that is, the car did not originate or terminate on their railroad, get a lesser portion of the revenue. They would be considered overhead or bridge carriers for that shipment. The division of revenue is also calculated based on the length of the haul on each railroad compared to the total distance the shipment moved. Obviously, a railroad will try to maximize the length of haul on their railroad and be adverse to interchanging the car to a connecting railroad which would result in a shorter haul.

The map of the Maine Central on the previous page shows what seems to be a north-south oriented web of lines rather like a tree with its main trunk at Portland. However, the Maine Central was actually an east-west railroad. There simply are no lines that cut across Maine east-west on the Maine Central. Only the Canadian Pacific route further north between St. John, New Brunswick and Montreal does that.

Consider a rail shipment going to the mid west from say Bangor prior to the 1983 demise of through service on the Mountain Division. That car would move towards Portland and from there have three choices:

1. It could be backhauled a short distance to Danville Junction and interchanged to the Grand Trunk (now the St. Lawrence and Atlantic RR) for movement west.
2. It could be interchanged at Portland (Rigby Yard in South Portland) to the Boston & Maine Railroad for movement south and then west across Massachusetts.
3. It could be kept on the Maine Central's Mountain Division to St. Johnsbury, Vermont where it could continue either on the Canadian Pacific north and then west or the St. Johnsbury and Lake Champlain west across the top of Vermont where it would most likely be interchanged to the Central Vermont, a subsidiary of Canadian National up until the 1980's.

Obviously, the third choice would provide the Maine Central the better division of revenue on that shipment increasing the haul from 136 miles from Bangor to Portland to 269 miles to St. Johnsbury.

Figure 1 – 18 Maine Central train YR-1 at the "diamond" crossing of the Boston & Maine Railroad at Whitefield, New Hampshire. B&M train JU-1 (White River Jct. to Berlin) is off to the left. Note the ball signals to the left of the yellow Maine Central locomotive.

B. Canadian Differential

Over the years, it has been standard practice to utilize higher or lower rail shipping rates to or from a particular port or over a certain rail route as a means of equalizing the competitiveness of a port, a circuitous rail route or a region, (such as certain grain producing areas of western Canada far removed from markets). This differential pricing of railroad rates existed in New England on the Rutland Railroad on shipments from Boston and southern New England using its route up through Vermont and then over the top of New York State (part of the original Ogdensburg and Lake Champlain) where they interchanged to the New York Central south to Syracuse, New York. This was a very circuitous route compared to routings directly west across the Hudson River from New England. Shippers using this longer routing were allowed a lower shipping cost on a portion of their total shipments via the circuitous routing, a differential rate.

The Rutland was a rural railroad with only about half of its total carloads coming from on line business. The overhead or "bridge" traffic derived from this differential pricing kept the Rutland going for many years, often accounting for almost half their annual carloads. Shippers were willing to exchange a slower transit time in exchange for a lower rate, provided the service was reasonably consistent.

The so-called Canadian Differential applied to rail traffic coming out of Maine going west provided it traveled over a Canadian rail line for some part of its journey. From the Portland area, three such routings existed:

1. The Grand Trunk from Portland to Montreal which lead to the Canadian National Railroad.[7]
2. The Maine Central Mountain Division to St. Johnsbury, Vermont to the Canadian Pacific Railroad north towards Montreal and then west
3. The Maine Central Mountain Division to St. Johnsbury, Vermont and then west on the St. Johnsbury and Lake Champlain across Vermont for interchange with the Central Vermont (a Canadian National subsidiary until it was sold in the late 1980's) for furtherance towards Montreal and then west.

Most of the Canadian Differential rail traffic came to and from the U. S. mid west where the Canadian trunk line railroads had lines that came back into the U. S. in the Detroit area.

Records of rail traffic interchanged between the Maine Central at St. Johnsbury to the Canadian Pacific versus the St. Johnsbury and Lamoille County clearly show that the greater volumes by far were via the CP north out of St. Johnsbury versus following the original Portland and Ogdensburg vision to go west

[7] For the most part, interchange from the Maine Central to Grand Trunk was not at Portland, but at Danville Junction (in Auburn) and Yarmouth Junction.

over what became the St. Johnsbury and Lake Champlain. (See data in the following Appendix that illustrates this).

So, the answer to the second question posed on page 2 of this Chapter (Why did the Mountain Division continue to be operated as a through freight route until 1983?) is:

1. The Maine Central got a better division of revenue using the Mountain Division versus interchanging with the Boston and Maine RR at Rigby Yard, South Portland due to the longer haul to the CP and St. J & LC at St. Johnsbury.
2. Maine shippers enjoyed a lower rate on paper (westbound), grain and chemicals (eastbound) coming to and from the U.S, mid west due to the Canadian Differential.

So, it was not surprising when the Maine Central and Boston & Maine railroads were combined under common ownership in 1983 to shut down the Mountain Division. There was little on-line traffic and instead of a 131 mile haul from Portland to St. Johnsbury, the combined railroad would get a 270 to 292 mile haul from Portland to the Boston & Maine's western gateways on the west side of the Hudson River in the Albany area. The steep grades and rugged passage through the mountains also made the Mountain Division a very expensive railroad to operate and maintain. The combined railroad quickly cut deals with the Canadian Pacific and other railroads to interchange traffic with them at other locations. Thus, 108 years of regular operation on most of the Mountain Division came to an end. This action also hastened the demise of the St. J & LC route across the top of Vermont, part of the original concept of the Portland and Ogdensburg.

Figure 1 – 19 Maine Central train RY-2 pulling upgrade though Notchland between Bartlett and Crawford Notch

Figure 1 – 20 Heavy brake shoe smoke as down train YR-1 descends the Crawford Notch grade from the opposite direction of above photo.

V. CURRENT SITUATION IN THE NORTH COUNTRY OF NEW HAMPSHIRE & VERMONT

The Canadian Pacific no longer operates through St. Johnsbury (current operation is primarily local, on-line traffic provided by a subsidiary of the Vermont Railway – The Washington County Railroad). They are trying to develop overhead or bridge traffic from Maine via a routing that comes out of Maine on the former east –west Canadian Pacific line across Maine from St John, NB though Mattawamkeag, Brownville Junction, Jackman and across Quebec. This former CP line is currently operated by the Maine, Montreal and Atlantic Railroad west of Brownville Junction. From Farnham, Quebec a branch line heads south through Richford, Vermont and then to east to Newport and south to White River Junction, passing through St. Johnsbury. The Washington County operates the line between Newport, Vermont and White River Jct. From there, routings are available into southern New England and west. This routing by-passes the current Pan Am Railway (formerly Guilford, formerly Maine Central and Boston & Maine) route through Portland. .

The line west out of St. Johnsbury, the original St. Johnsbury and Lake Champlain, is now abandoned and likely never to see rail operation again.

The New Hampshire Central Railroad currently operates out of North Stratford, New Hampshire over various pieces of the remaining Boston & Maine & Maine Central trackage in northern New Hampshire and perhaps into Vermont. The paper mill at Gilman, Vermont, the largest customer on the Mountain Division west of Westbrook, has started and stopped several times lately and now appears to be at the end of its use as a paper mill.

Presby Industries, a firm making plastic components for septic systems, has established itself on the east side of Whitefield, known as Hazens. They have recently started to take delivery of cars of plastic resins from the railroad. There is also a power plant that burns waste wood in this same area that could start to use waste wood imported by rail. There may be some additional opportunities in the Littleton-Whitefield-Lancaster area that could develop and use rail service.

The state of Vermont has not decided whether or not to open the section of the Mountain Division from Gilman, west to St. Johnsbury. Part of that decision will likely be based on the status of the now closed paper mill at Gilman. The New Hampshire Central's only connection to the rest of the railroad world is via the St. Lawrence & Atlantic (formerly Grand Trunk) at Groveton. This is now also the only way for the Conway Scenic Railroad to move equipment on and off their operation.

Currently the State of New Hampshire and the New Hampshire Central are upgrading portions of the track in the Whitefield-Lancaster area to preserve rail service. What the future holds is uncertain but it would seem that any rail operation in this area will require some measure of public support to survive, especially if the paper mill at Gilman does not re-open. The New Hampshire Central's other main business is contract car repair at their shop in North Stratford and storage of surplus rail cars on the unused track north of the shop.

VI. – HISTORIC TRAFFIC VOLUMES ON MOUNTAIN DIVISION AND ST. JOHNSBURY INTERCHANGE

A review of past traffic volumes and patterns provides an understanding of the relative significance of freight traffic on the Mountain Division and background to later chapters related to the potential of restoring the line to service. This data is presented in the attached Appendix to this Chapter.

There are three key points that emerge from the data and review of operations on the Mountain Division.

1. With the exception of a paper mill at Gilman, Vermont; there never was significant on-line freight traffic on the Mountain Division between Portland and St. Johnsbury. Discounting the paper mill, about 97% of traffic came to and from other railroads (The Canadian Pacific, St. Johnsbury & Lake Champlain, the Boston & Maine and the Grand Trunk.

2. The interchange at St. Johnsbury was always greater to the North out of St. Johnsbury (via the Canadian Pacific) than to the west via the original Portland and Ogdensburg envisioned route (via the St. Johnsbury and Lake Champlain).
3. Freight traffic on the Mountain Division actually increased over time, reaching its peak during the last 20 years or so of its existence. This was primarily “overhead” or “bridge” traffic between Maine and the mid west.

Review of the tables and text in the following Appendix will illustrate all three of these points and provides some comparative data on the Mountain Division’s traffic in relation to all rail traffic in Maine.

APPENDIX - HISTORIC DATA ON FREIGHT TRAFFIC LEVELS ON THE MOUNTAIN DIVISION – MOSTLY THROUGH INTERCHANGE DATA AT ST. JOHNSBURY, VT.

TABLE 1A -1

SUMMARY OF CARS INTERCHANGED TO MEC AT ST. JOHNSBURY - 1935

ST. JOHNSBURY & LAKE CHAMPLAIN INTERCHANGE TO MEC AT ST. JOHNSBURY

	ST. J & LC TO MEC			MEC TO ST. L & LC			TOTAL INTERCHANGE		
	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total
Total Cars	685	266	951	424	319	743	1,109	585	1,694
Percent of Total	16.3%	8.0%	12.6%	5.5%	15.0%	7.5%	9.3%	10.8%	9.7%

CANADIAN PACIFIC RR INTERCHANGE TO MAINE CENTRAL AT ST JOHNSBURY

	CP TO MEC			MEC TO CP			TOTAL INTERCHANGE		
	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total
Total Cars	3,520	3,051	6,571	7,338	1,802	9,140	10,858	4,853	15,711
Percent of Total	83.7%	92.0%	87.4%	94.5%	85.0%	92.5%	90.7%	89.2%	90.3%

Interchange between St. J & LC to CP not available

TOTAL MAINE CENTRAL INTERCHANGE TRAFFIC AT ST. JOHNSBURY - 1935

EASTBOUND			WESTBOUND			TOTAL MEC TRAFFIC		
Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total
4,205	3,317	7,522	7,762	2,121	9,883	11,967	5,438	17,405

Not included in above totals would be any cars originating or terminating at St. Johnsbury

TABLE 1A -2

SUMMARY OF CARS HANDLED AT ST JOHNSBURY - 1936

CARS HANDLED	Canadian Pacific	St. J & L. C.	Maine Central
Cars Arriving in Trains			
Loads	9,605	5,792	8,830
Empties	6,285	917	1,325
Passenger	*	678	939
TOTAL FREIGHT	15,890	6,709	10,155
Cars Departing in Trains			
Loads	14,447	3,529	3,906
Empties	4,181	2,710	3,682
Passenger	*	678	939
TOTAL FREIGHT	18,628	6,239	7,588
TOTAL LOADS	24,052	9,321	12,736
TOTAL EMPTIES	10,466	3,627	5,007
TOTAL CARS (FREIGHT)	34,518	12,948	17,743
Local Cars Handled to Exclusive Switching Areas (Loads & Empties Counted once in each direction)	3,377	1,161	1,884
TOTAL CARS HANDLED	37,895	14,109	19,627
PERCENT	52.9%	19.7%	27.4%
Cars Loaded and Unloaded on Team Tracks			
Cars Loaded	62	14	7
Cars Unloaded	410	125	80

* No passenger cars were handled for Canadian Pacific because all their passenger trains were through trains and not switched at St. Johnsbury. Both St. J & LC and MEC passeger trains terminated at Saint Johnsbury.

Tables 1A-1 and 1A-2 indicate 11,967 loads in and out of St. Johnsbury on the Mountain Division (Maine Central) in 1935 and 12,756 in 1936. Also note that there was considerably more traffic to the Canadian Pacific than to the St. J & LC, part of the original concept of the Portland and Ogdensburg. Table 1A-3 from 1954 shows that Maine Central totaled about 18,000 car loads interchanged plus about 3,300 local cars for St. Johnsbury proper and local traffic (figures based on extrapolated data for a one week period that was representative of traffic) and that most was still going to and from the Canadian Pacific. Note also that average tons per car increases over time so that actual amount of freight was considerably more than the carload increase would indicate compared to the 1930's data. The largest carload customer at St. Johnsbury was the Ralston Purina feed mill. They received many inbound loads of grain and other feed components and shipped many cars of bagged and bulk feed to many points in New England

TABLE 1A-3

SUMMARY OF FREIGHT TRAFFIC AT ST. JOHNSBURY VERMONT - 1954

CANADIAN PACIFIC												
	TOTAL CP INBOUND			TO MAINE CENTRAL			TO ST J & LC			CP LOCALS & TOWN		
	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total
Annual Cars	14,664	6,864	21,528	9,880	832	10,712	624	1,924	2,548	4,160	4,108	8,268
Percent				67.4%	12.1%	49.8%	4.3%	28.0%	11.8%	28.4%	59.8%	38.4%
	TOTAL CP OUTBOUND			FROM MAINE CENTRAL			FROM ST J & LC			FROM CP LOCALS & TOWN		
	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total
Annual Cars	15,184	5,980	21,164	6,656	4,056	10,712	2,912	364	3,276	5,616	1,560	7,176
Percent				43.8%	67.8%	50.6%	19.2%	6.1%	15.5%	37.0%	26.1%	33.9%
	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total
TOTALS	29,848	12,844	42,692	16,536	4,888	21,424	3,536	2,288	5,824	9,776	5,668	15,444

MAINE CENTRAL												
	TOTAL MEC INBOUND			TO CP			TO ST J & LC			MEC LOCALS & TOWN		
	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total
Annual Cars	8,372	4,836	13,208	6,656	4,056	10,712	624	312	936	1,092	468	1,560
Percent				79.5%	83.9%	81.1%	7.5%	6.5%	7.1%	13.0%	9.7%	11.8%
	TOTAL MEC OUTBOUND			FROM CP			FROM ST J & LC			FROM MEC LOCALS & TOWN		
	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total
Annual Cars	13,208	1,612	14,820	9,880	832	10,712	1,092	0	1,092	2,236	780	3,016
Percent				74.8%	51.6%	72.3%	8.3%	0.0%	7.4%	16.9%	48.4%	20.4%
TOTALS	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total
	21,580	6,448	28,028	16,536	4,888	21,424	1,716	312	2,028	3,328	1,248	4,576

ST J & LC												
	TOTAL ST J & LC INBOUND			TO CP			TO MEC			TO TOWN		
	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total
Annual Cars	5,668	364	6,032	2,912	364	3,276	1,092	0	1,092	1,664	0	1,664
Percent				51.4%	100.0%	54.3%	19.3%	0.0%	18.1%	29.4%	0.0%	27.6%
	TOTAL ST J & LC OUTBOUND			FROM CP			FROM MEC			FROM TOWN		
	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total
Annual Cars	2,236	3,224	5,460	624	1,924	2,548	624	312	936	988	988	1,976
Percent				27.9%	59.7%	46.7%	27.9%	9.7%	17.1%	44.2%	30.6%	36.2%
TOTALS	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total	Loads	Empties	Total
	7,904	3,588	11,492	3,536	2,288	5,824	1,716	312	2,028	2,652	988	3,640

Data extrapolated from a full weeks survey July 7 to July 13, 1954

Table 1A-4 on the following page is different in that it shows the make-up of trains leaving Rigby Yard in South Portland over 36 days in 1982, the last full year of operations on the Mountain Division. This data extrapolates to about 10,000 carloads into St. Johnsbury .in a westbound direction comprised of 9,145 cars interchanged and 1,308 local cars in and around St. Johnsbury. Table 1A-5 then shows cars out of St. Johnsbury for 1982, but in less detail as to where they came from or were going.

TABLE 1A- 4

SUMMARY OF CARS AT RIGBY YARD (SOUTH PORTLAND) FOR RY-2 ON VARIOUS DAYS - 1982

DATE	DETROITS		ST J - CP		LVRC		WHITEFIELDS		GILMANS		OTHER		TOTAL		TONNAGE
	L	E	L	E	L	E	L	E	L	E	L	E	L	E	
19-Feb	17	8	2	12	8	2	6	0	2	0			35	22	4,028
24-Feb	25	14	5	12	13	4	10	0			2	0	55	30	6,170
1-Mar	10	0	1	3	1	0	1	0			0	1	13	4	1,457
3-Mar	19	6	2	9	7	1	6	1			2	0	36	17	4,022
5-Mar	28	1	2	7	10	3	5	0			1	0	46	11	4,500
10-Mar	19	8	0	9	9	2	5	0					33	19	3,541
16-Mar	22	7	4	7	1	0	8	0			2	0	37	14	3,971
17-Mar	22	7	1	0	5	1	10	0	1	0	2	6	41	14	4,208
27-Mar	24	10	1	10	5	0	8	0					38	20	3,913
30-Mar	30	1	5	0	7	0	6	0			1	0	49	1	4,858
31-Mar	26	9	5	20	2	1	7	0	2	0			42	30	4,680
9-Apr	42	0	11	0	8	0	11	0	2	0	6	0	80	0	7,160
13-Apr	28	7	2	0	5	0	8	0	4	0			47	7	4,708
14-Apr	13	10	5	24	2	1	6	0					26	35	3,337
15-Apr	16	12	3	7	0	5	8	0			1	0	28	24	3,380
16-Apr	21	6	3	0	2	0	6	0	1	0			33	6	2,972
19-Apr	30	0	6	4	9	0			7	0	4	0	56	4	5,046
22-Apr	15	0	9	0	12	0	9	0	7	0			52	0	4,959
23-Apr	12	11	2	14	8	2	12	0	4	0			38	27	4,366
26-Apr	13	5	3	7	12	0	10	0	6	0	2	0	46	12	4,627
27-Apr	24	0			11	0	18	0	9	0	2	0	64	0	6,146
29-Apr	17	20	3	11	4	4	6	0	2	0	0	1	32	36	4,230
30-Apr	31	3	5	0	1	0							37	3	3,456
3-May	6	1	3	5	3	0	5	0	7	0			24	6	2,546
4-May	15	6	3	5	8	0	5	1	9	0			40	12	4,368
6-May	11	10	4	15	5	2	10	0	2	0			32	27	3,582
9-May	12	12	9	22	12	0	6	0	5	0	2	0	46	34	?
10-May	14	0	10	0	12	0	10	0	5	0	8	0	59	0	5,221
12-May	13	16	1	33	4	2	6	0					24	51	3,874
14-May	6	10	1	14	8	1	8	0	5	0			28	25	3,569
16-May	12	4	3	2	6	0	3	1	8	0	4	0	36	7	3,135
18-May	12	4	3	6	12	2	7	0	3	0			37	12	4,048
21-May	15	10	1	21	5	2	8	0	4	0	1	0	34	33	4,300
23-May	14	4	4	7	4	1	7	1	5	0	4	0	38	13	3,941
27-May	15	6	4	11	8	2	6	0	1	0			34	19	3,316
30-May	21	1	3	2	3	1	15	0	8	0	2	0	52	4	4,775
TOTALS	670	229	129	299	232	39	262	4	109	0	46	8	1448	579	
YEAR	6,793	2,322	1,308	3,032	2,352	395	2,656	41	1,105	0	466	81	14,681	5,870	

TOTAL CARS INTO ST JOHNSBURY L = 10,453 E = 5,749 T = 16,202

LEGEND
L = Loaded Cars, E = Empty Cars
Detroits are cars to mid west via Canadian Pacific interchange at St. Johnsbury
St J - CP are cars for St Johnsbury and other points on the Canadian Pacific not through for Detroit and west
LVRC is the Lamoille Valley Railroad, name at that time for the St Johnsbury and Lake Champlain RR
Whitefields are cars to be interchanged to the Boston & Maine RR where the two lines cross in NH
Gilmans are for the paper mill at Gilman, Vermont along the Mountain Division
Other are assumed to be cars for various other stations along the Mountain Division
Tonnage is gross weight of train leaving Rigby Yard in South Portland

Year total is the total displayed for dates indicated times 365/36 (actual data extrapolated)

See the following page for data on cars out of St. Johnsbury (eastbound)

TABLE 1A-5
CARS FROM ST. JOHNSBURY -1982

DATE 1982	L	E	TOTAL CARS	GROSS TONS
12-Feb	24	7	31	2,380
13-Feb	13	56	69	2,936
15-Feb	24	6	30	2,273
17-Feb	28	33	61	3,539
23-Feb	23	43	66	3,171
26-Feb	20	22	42	2,394
10-Mar	31	32	63	3,836
12-Mar	19	29	48	2,608
13-Mar	11	21	32	1,517
17-Feb	31	47	78	4,371
22-Mar	19	49	68	2,897
25-Mar	15	59	74	3,476
27-Mar	19	34	53	2,566
29-Mar	13	34	47	2,218
31-Mar	34	37	71	4,474
10-Apr	44	45	89	5,125
11-Apr	27	29	56	3,493
20-Apr	31	47	78	4,646
21-Apr	22	27	49	2,838
25-Apr	14	18	32	1,947
28-Apr	46	24	70	4,864
29-Apr	16	50	66	2,970
11-May	43	32	75	5,489
13-May	26	45	71	3,576
22-May	15	40	55	2,421
28-May	16	10	26	1,596
30-May	26	36	62	3,658
TOTALS	650	912	1,562	
AVG.	24.1	33.8	57.9	3,233
YEAR	**8,787**	**12,329**	**21,116**	

TOTAL CARS EAST FROM ST.J

LEGEND
L = Loaded Cars, E = Empty Cars
Yearly totals extrapolated by 365/27 day sample times total for 27 days.

Combining the total loads into St, Johnsbury (Table 1A-4 with the total loads out of St. Johnsbury from the table above results in over 19,000 car loads per year through the Mountain Divisions western gateway in 1982. This would indicate that carload volumes peaked about 1972 but held up to levels almost as high as they ever were right up to the end of operation. Factoring in that the average car load in tons kept increasing over time, the actual freight moved over the Mountain Division was increasing, but not the local traffic; only the overhead or bridge traffic.

1972 DATA

We also had data on the carload interchange in 1972 (no empties counted). This showed the westbound interchange as 12,786 to CP and 1,200 to the St. J & LC and eastbound as 9,091 from the CP and 750 from the St J & LC for a total of about 23,800, not including local cars to and from St. Johnsbury and the general area; probably over 2,000 carloads at that time. If we were to add in some of the other traffic along the Mountain Division in 1972, somewhat as shown in the 1982 data in Table 1A-4, we probably would see a total of about 28,000 carloads total traffic.

HOW DOES THIS VOLUME OF TRAFFIC RELATE TO MAINE CENTRALS TOTAL FREIGHT TRAFFIC VOLUMES?

We had fairly complete data from 1972 of rail traffic in Maine. Looking just at the Maine Central in that year, they handled a total of 167,658 carloads so the approximately 28,000 carloads total on the Mountain Division was about 16% of their total volume. The 167,658 total carloads broke down as follows:

Originated & terminated on MEC = 39,474
Originated & delivered to other RR = 59,264
Received & terminated on line =44,057
Received & delivered (overhead) =24,863

Looking at all the points where Maine Central interchanged cars to other railroads in 1972 we see the following volumes:

INTERCHANGE POINT	ANNUAL CARLOADS
St. Johnsbury (CP & St. J &LC)	23,800 carloads
Boston & Maine @ Rigby Yard, South Portland	73,323 carloads*
Bangor & Aroostook @ Northern Maine Junction	37,667 carloads
Canadian National (Grand Trunk) @ Danville Jct., Yarmouth Jct. & Portland	13,679 carloads
Belfast & Moosehead Lake @ Burnham Jct.	2,979 carloads
Miscellaneous points (Whitefield, Groveton)	4,000 approx.

* About 20,000+ carloads of interchange at Rigby were to points on Portland Terminal RR in the Portland area and not counted in Maine Central total carload traffic.

From the above we can see that the Mountain Division's western gateway was the third largest interchange point on the Maine Central, although significantly lower than to the B&M at Rigby.

LOCAL TRAFFIC ON THE MOUNTAIN DIVISION

Perusal of the above data clearly indicates that the main function of the Mountain Division was as a bridge or overhead carrier for traffic in and out of Maine to the mid west and other distant locations via the Canadian Pacific Railroad and the St. J & LC who delivered most of their overhead traffic to the Canadian National (Central Vermont) in western Vermont.

Table 1A-4 on page 18 gives us some idea of the other traffic volumes, including local traffic, characterized as "other" in the table. We need to be aware that the table only shows westbound traffic out of Rigby and no indication of what the eastbound local cars may have been. We would expect it to be much less than the westbound, since much local traffic coming east may have gone to Rigby first to be handled in the westbound train. With the exception of the Whitefield cars that were interchanged to the Boston & Maine to and from the paper mills in Berlin and Groveton, local traffic handled west was about 466 carloads and spotting of about 81 empties for the entire year. A reasonable estimate of the combined westbound and eastbound local volumes would be about 700 carloads and 120 empties as the total local traffic on Mountain Division outside of the above noted Gilman and St. Johnsbury area.

It should also be noted that these figures do not include the traffic in the Portland/Westbrook segment of the Mountain Division. This was within the terminal district operated by Maine Central subsidiary Portland Terminal out to just past milepost 7 in Westbrook. That would include the SD Warren (now Sappi) paper mill and a number of other shippers and consignees that existed in that area, even in 1982. Currently only the Sappi mill ships and receives cars in this area and only a handful every week at present.

On the following page is summary of traffic levels on the St. Johnsbury & Lake Champlain RR during its last 25 years of operation. This was the original Vermont Division of the Portland & Ogdensburg and a link in the original concept of that endeavor.

DECLINING TRAFFIC ON THE ST. JOHHNSBURY AND LAKE CHAPLAIN (later LAMOILLE COUNTY)

Following is listing of total annual carload volumes on the St. J & LC across the top of Vermont and the overhead component where known. Very minimal traffic for a line 92 to 96 miles long and the middle link of the original Portland & Ogdensburg vision.

YEAR	TOTAL CARLOADS	OVERHEAD*
1960	14,245	6,430
1969	10,000+	
1971	8,500	2,485
1975	4,400	
1980	4,251	
1981	4,061	
1982	3,117	
1983	1,292	(Mountain Division shuts down with loss of overhead traffic)
1984	364	
1985	218	

Overhead traffic was principally from the Maine Central and some from Canadian Pacific at St. Johnsbury to the Central Vermont in western Vermont. The CV was a subsidiary of Canadian National. Most of the on-line outbound traffic was talc, limestone and asbestos with inbound feed, coal and oil rounding out the bulk of the on-line business. Overhead traffic was mostly paper westbound with some logs, wood pulp and feed stock eastbound.

As Robert Nimke noted in one of his books on the St J & LC RR, *"a sad end to someone's dream of a through route between Portland and Ogdensburg"*.

CHAPTER 2

Right of Way Condition Report

I. – INTRODUCTION

This chapter is a summary of observed track and right-of-way conditions based on a hi-rail trip on September 12 over the 40 miles of current MEDOT owned and cleared line and several field inspections at other times and on the other segments of the Railroad up to Intervale, New Hampshire. The following elements are included in this preliminary evaluation:

1. Roadbed
2. Ballast
3. Ties
4. Rail
5. Other Track Material (OTM) – includes tie plates, fasteners, joint bars, track bolts, rail anchors.
6. Turnouts
7. Grade Crossings
8. Sidings and Passing Tracks
9. Geometrics

A report on the condition of the bridges and approximate cost to place in service is included in Chapter 3, following.

The Railroad can be divided into eight segments based on a combination of ownership, current status of operation and general state of maintenance. From east to west these are as follows:

SEGMENT	OWNER	MILEPOST TO MILEPOST	STATUS
Mtn. Jct. to Westbrook	PanAm RR	1.16 to 5.73	Active Operation by Pan Am and Amtrak to MP 1.80 or so.
Westbrook to S. Windham	PanAm RR	5.73 to 11.14	Inactive, track mostly removed (6.40 to 11.14)
S, Windham to State Line	MEDOT	11.14 to 51.13	Inactive, track in place, cleared
State Line to Redstone	NHDOT	51.13 to 56.54	Inactive, not cleared
Redstone to Milepost 59.10	NHDOT	56.54 to 59.10	Cleared and occasional operation by Conway Scenic
North Conway rebuilt	NHDOT	59.10 to 60.05	Reconstructed as part of East Side Roadway Project. Occasional operation by Conway Scenic
North Conway	NHDOT	60.05 to 60.76	Cleared and occasional operation by Conway Scenic
Intervale	NHDOT	60.76 to 61.36	Regular operation by Conway Scenic as part of their Bartlett and Notch Excursions

NOTE: MEDOT is in the process of negotiating purchase of the segment from about MP 5.73 to 11.14.

A. Roadbed

In most areas the roadbed is of adequate width to support the track structure in fills and is sufficiently wide in cuts for drainage ditches. No obvious areas of settlement or instability were noted over most of the segment from Milepost 59.13 to 11.14.

In many locations from Milepost 36 east and more so starting at about Milepost 24, all terrain vehicles (ATV's) have scoured one or both sides of the roadbed to varying degrees and removed the ballast shoulder(s). This damage will need to be repaired if the railroad is restored to service and the illegal use of the rail corridor by ATV's enforced to prevent damaging the repairs.

Figure 2-1 – Steep stone paved slope from track down to rail trail.

Figure 2-2 – Slope for rail trail above filled in ditch along the railroad. Water now flows between rails during heavy rains.

From approximately Milepost 12 to 15.8 a rail trail was recently constructed along side the railroad. In many locations, the trail is too close to the track structure. This was a consequence of having insufficient funds and not enough right-of-way to build the trail as if it were in an active rail corridor. In many areas the trail is much lower than the track (Figure 2-1) and the steep slope down from the track to the trail paved with stones. Over time, heavy rains and snow melt will cause the granular material comprising most of the underlying roadbed that supports the track to be washed out through the stone paved slope causing the track structure to tip and have an irregular surface. At other locations the trail is much higher than the track (Figure 2-2) and the slope from the trail down to the track ends close to the ends of the ties, having filled in the drainage ditch. Reportedly, during heavy rains, water coming down from the trail runs along the track between the rails in this area.

If the railroad is put back into service retaining walls, fencing and additional right-of-way in a few locations will be required to protect both the railroad and the users of the trail.

B. Ballast

Ballast is generally either gravel, washed gravel or crushed stone. Over the final 10 - 15 years of operation by the Maine Central, the Mountain Division had a program of installing crushed ballast in segments probably selected based on a variety of factors such as curves, tie condition, difficulty in maintaining a smooth surface (profile), etc. The crushed stone ballast is of varying quality. Generally the stone ballast is of small rock size and some of the last sections done used stone that is rounded and not angular. These rounded stones do not interlock and provide less track stability as compared with angular stones that interlock and provide a rigid structure. In general, the inspection revealed that any areas that have stone ballast have a better tie condition, surface and alignment.

C. Tie Condition and Assessment

Because the Mountain Division from Westbrook west to Redstone, New Hampshire has not been an active, maintained railroad for about 24 years, the tie condition is very poor. Random tie counts indicate a range of from 3 to 7 acceptable ties per 33 foot rail length. There is an average of 18 ties per 33' foot rail length or about 2,900 ties per mile for an average tie spacing of about 22 inches. Currently, 19 ½ to 20" spacing is preferred using timber ties. On average, about 19% of the ties are in good to fair condition and about 81% are poor to completely failed.

In general, the tie condition is better in areas that had crushed stone ballast applied than those segments with gravel ballast. This is primarily due to better drainage afforded by the stone ballast and perhaps a tie replacement cycle was last done at locations that were stone ballasted.

Figure -2-3 – Crushed Stone Ballasted Segment

Figure 2-4 – Gravel Ballasted Segment

Figure 2-5 – Skewed Ties

Figure 2-6 – Bunched Ties (Note overall poor tie condition)

Figure 2-7 – Large gap (spacing) resulting from bunched and skewed ties

Figure 2-8 – Moss covered roadbed and ties

At many locations the ties are badly skewed and bunched, leaving large gaps where the rail is unsupported for 3 feet or more. This appears to be largely the result of no rail anchors having been applied. This condition is shown in Figures 2-5 and 2-6 and the large gaps in Figure 2-7. The very poor tie condition within the gravel ballasted segments is also illustrated in the above figures.

There are a number of areas where moss is growing over much of the roadbed and ties (Figure 2-8). Since moss retains moisture, the ties in these locations are likely further deteriorated than other more open locations. At bridge approaches, there are generally no satisfactory ties for 40 to 50 feet or more.

To verify the observed overall tie condition on the Mountain Division along the Maine DOT ownership starting at South Windham (Milepost 11.14) to the State Line (Milepost 51.13) and the segment in New Hampshire to where the line is maintained by the Conway Scenic Railroad, (Milepost 57.7±), we did the following analysis. This analysis assumes that at end of regular operations about 1983, the Mountain Division had a fairly good tie condition. The track charts do not indicate when the last tie job was done but do indicate that much ballast work was done in the period 1977 to 1980. For purposes of this analysis, we assumed that the last tie job (replacement of defective ties with new ties) was about 1980 and that prior to that the Maine Central had performed a normalized[1] maintenance program for ties. The results of this analysis indicate that the tie condition at the end of regular railroad operations was probably fairly good where the tracks were rock ballasted and slightly less so in areas where the gravel ballast was retained.

The first table (Table 2-1) on the following page shows the expected age of the tie population about 1980 assuming that the Maine Central had been performing a normalized tie replacement

[1] Normalized maintenance refers to periodic maintenance cycles at intervals and in sufficient amounts to keep the railroad in good repair. In the case of ties; in this part of the country, treated ties have an average life expectancy of about 40 years. A normalized maintenance cycle for ties would be to replace about 12% of the ties every five years.or stretched out to about 1/3 of the ties every 12 or so years.

program every 5 years or so. The second table (Table 2-2) simply "ages" the ties by the 28 years between now and the last assumed tie replacement cycle. The percent of ties that may be expected to be in acceptable condition at this time would be a good percentage of the ties less than 40 years old and a very small amount of the ties 40 years or older.

Table 2-2 shows that we should expect to see about 8 to 9 ties per rail length that are in acceptable condition. Field inspection generally bears that out in areas where there is rock ballast but acceptable ties are in the 3 to 5 range per rail length in areas of gravel ballast. As noted earlier, all else being equal, ties will last longer in crushed rock ballast and the Maine Central probably did a tie replacement cycle in the late 1970's to 1980 in areas where they rock ballasted and did less or no tie replacements during that time period in the areas that did not receive the new crushed rock ballast.

The short segment of the Mountain Division in New Hampshire that was rebuilt as part of the highway project had all ties replaced with new timber ties. Other segments in New Hampshire now operated and maintained by the Conway Scenic Railroad have had sufficient ties replaced to allow operation as either FRA Class 1 or Class 2.

TABLE 2-1
PRESUMED TIE POPULATION IN 1980

AGE OF TIES IN 1980	PERCENT IN TRACK	TIES PER MILE	TIES PER 33' RAIL
1 or less	12%	348	2
5	12%	348	2
10	12%	348	2
15	11%	319	2
20	10%	290	2
25	9%	261	2
30	8%	232	1
35	7%	203	1
40	7%	203	1
45	5%	145	1
50	4%	116	1
55	2%	58	0
60 or older	1%	29	0
TOTALS	100%	2900	18

TABLE 2-2
PRESUMED TIE POPULATION IN 2007

AGE OF TIES IN 2007	PERCENT IN TRACK	TIES PER MILE	TIES PER 33' RAIL
28	12%	348	2
33	12%	348	2
38	12%	348	2
43	11%	319	2
48	10%	290	2
53	9%	261	2
58	8%	232	1
35	7%	203	1
63	7%	203	1
73	5%	145	1
78	4%	116	1
83	2%	58	0
88 or older	1%	29	0
TOTALS	100%	2900	18

<u>Bridge Timbers</u>

All of the open deck bridge timbers need to be completely replaced on the Mountain Division between the Mallison Road Bridge (MP 10.32) and the Saco River Bridge in New Hampshire (MP 55.37). That would be 13 bridges with a total length of about 1,226 feet. In addition, the ties on bridge approaches are generally in very poor condition and should be addressed when the bridge decks are replaced.

D. Rail

Rail on the Mountain Division is generally 85 lb per yard or newer 115 lb per yard. There is a short segment of 112 lb rail between Milepost 15.13 and 15.25 in Gorham. Most of sidings remaining in place are 80 lb rail.

Rail on the PanAm Railway owned section is 115RE and is in fair condition. The track structure has been removed for about 4.7 miles from just before Pierce Street, Westbrook (MP 6.43) to MEDOT start of ownership at Milepost 11.14. From Milepost 11.14 at South Windham, ME to about 59.10 in New Hampshire, the rail is 85 lb dating from about 1903 to 1921 with most having been rolled about 1917-1918. This rail is generally in fair condition with little or no surface bending and minimal rail end batter. A few joints with excessive gap were noted and some minor chipping of the rail head on the gauge side and top of rail at joints was noted.

A broken rail or rail joint was observed at one of the private gravel operation grade crossings. The heavy truck traffic at that location has also depressed the track structure at this location. (See Figure 2-9).

Figure 2-9 – Note the broken rail on right side of crossing and depressed surface.

This photograph gives some indication of the issues as to what type of new crossing surface and required measures may be necessary to prevent future damage to the track structure at these types of private, heavy traffic industrial crossings.

About seven of the grade crossings of major streets and highways in the current MEDOT owned segment were rebuilt during Maine Central tenure using 115 RE rail through the crossing, compromising down to 100 ARA A rail for a rail length and then down to the 85 lb rail. This two stage set of compromise joints (also know as step joints) is necessary since going directly from the 115 RE rail to the 85 Lb, a 30 Lb difference, exceeds the recommended maximum of about 25 Lbs difference. Since compromise joints are a weak point, the greater the "step" the more prone they become to rail and joint bar failures at these locations.

The State of New Hampshire recently rebuilt almost one mile of the railroad in North Conway as part of their East Side highway project. Rail on this segment is relay 115 RE jointed rail in good condition. From Milepost 59.90 to 61.36 at Intervale, NH, the rail is again 85 lb and is in fair condition.

In general terms, the 85 lb rail is generally adequate for operation as FRA Class 1 and possibly 2 if a good tie condition were achieved. If the Mountain Division were to be operated as FRA Class 3, the 85 lb rail would need to be replaced with newer, heavier 115 RE rail.

E. Other Track Material (OTM)

This includes all the other metal components of the track structure except the rail.

Tie plates used today with cut spikes (the typical railroad spike rather than various resilient fastening systems) normally have a shoulder on both sides of the rail (a raised ridge parallel to the base of the rail that helps to hold the rail in place on the tie plate). Older tie plates may have only a single shoulder or no shoulders (flat plates). Tie plates are also defined by their length along the tie (perpendicular to the rail), their width (along the rail) and by their punching (the number of and arrangement of the spike holes). Larger tie plates are desirable as they spread the heavy loadings of today's freight cars out over a larger area of the tie, minimizing plate cutting of the tie and tie deterioration in the most critical area of the tie, right under the tie plate. Double shoulder tie plates at least 12 inches long are typical on a railroad built to today's standards. Much of the Mountain Division where the older 85 lb rail is in place has smaller single shoulder and flat plates. Since the 85 Lb ASCE rail has an odd base width[2] of 5 3/16" (rail rolled today is either 5 ½" or 6" base), double shouldered plates are not available for this rail. The largest tie plate currently available new would be AREMA[3] Plan No. 2 which is a 7 1/2" x 11" single shoulder plate.

The PanAm Railway active segment in Portland and Westbrook has 7 ¾" x 12" and 7 ¾" x 13 double shoulder tie plates. The 85 Lb rail has a mixture of plates both flat and single shoulder from 5" x 8" up to 7 ½" x 10 ¾". There are a large number of 6' x 9 ½" and a few unusual 8" x 10 ¾" plates. The 5" x 8", 6" x 8" and 6" x 9 ½" plates should be replaced with larger plates, regardless of the FRA Class of track to be upgraded to.

The Mountain Division uses cut spikes to hold the tie plates and the rail to the ties. There are no resilient fasteners in place including the new segment built by the NHDOT in North Conway.

The joint bars on the 115 RE rail both in Portland/Westbrook as well as the new section in North Conway, NH uses 36" – six hole, toeless head free joint bars. According to the track charts and visual observations, all of the 85 Lb rail in both Maine and New Hampshire uses 24" – four hole, toeless head free joint bars (Figure 2-10). These are a more modern design than is often found on older rail of this vintage. These joint bars appear to be in good condition and may be re-used if the 85 Lb rail is retained.

[2] Today, standard rail sections such as the 115 RE and larger as well as the fairly common, in northern New England, 100 ARA A; have a 5 ½" wide base with rail sections heavier than 119 having a 6" base width.

[3] AREMA standard practice for the American Railway Engineering and Maintenance of Way Association. That entity has established the standards for the railroad industry for over a century and was formerly known as AREA (American Railway Engineering Association).

Figure 2-10 – Headfree Toeless Joint Bar Assembly on 85 Lb Rail

The bolt assemblies are complete with spring washers and appear to be in good condition with no loose bolts noted.

On the 115 RE rail in both Maine and the short new section in New Hampshire, drive on type rail anchors are in place in a typical pattern for jointed rail. None of the 85 Lb rail had rail anchors, perhaps accounting for the large number of skewed ties observed in many locations. At the bridges, none of the bridge timbers are connected to the structural members of the bridge. This was apparently standard practice on the Maine Central. On the two new deck truss bridges built by NHDOT in North Conway, the bridge timbers are connected to the bridge structure with hook bolts every third or fourth tie, standard practice today.

F. Turnouts

1. PanAm Railway segment - Milepost 1.16 to 5.73

In Portland, the Mountain Division connects to PanAm Railway's Freight Main at Milepost 1.16 (Mountain Junction) with a number 10, left hand,115 RE, RBM[4] frog, power operated turnout. There are then a left hand and right hand No. 10, 115 RE, RBM frog, manual operated turnouts at either end of a 2,330 foot long runaround/passing track that extends through the Amtrak Station and Layover Facility. The layover facility has 2 - number 8 turnouts, a left hand and a right hand, connecting the two stub ended layover tracks to the runaround track.

Just north of the Amtrak layover facility there are two number 6 right hand turnouts from the passing track that connect to a bottled gas facility and a warehouse (both no longer active).

Between Rand Road and the I-95 overhead bridge is a number 8, right hand 115 RE turnout for the Nexcycle facility. Just east of Larrabee Road is a number 10, left hand 115 RE, turnout to the Blue Rock Industries facility.

Between Larrabee Road and Forest Street, Westbrook is a 2,175 foot clear length, passing/runaround track. The east end of this track appears to be a number 8 right hand turnout and the west end, a number 10 left hand turnout. At the approximate middle of this track is a

[4] RBM stands for Rail Bound Manganese which is a type of frog currently suitable for main line operation. It consists of a manganese steel casting that is framed or "bound" by steel rails bent and milled to conform to the shape of the frog casting. Other types of frogs such as SG (self guarded) and "common" are considered suitable for yards and sidings and not for use on the main line or where train speed is over 15 MPH.

number 10 left hand crossover. Diverging from the runaround track are a total of three number 8 left hand turnouts connecting to various industries. None of these are currently in use.

Centered on Main Street, Westbrook is a 1,470 foot clear length passing/runaround track. The east end of the track appears to be number 8 right hand turnout and the west end near the bridge over the Presumpscott River appears to be a number 10 left hand turnout. There are a number of other turnouts that used be connected in this area but all appear to be have been disconnected except for what appears to be a number 6 right hand turnout at the east end of the runaround track. That turnout leads to the paper machine end of the current Sappi paper mill and has not been used for some time.

Just west of the Presumpscott River and Brown Street undergrade bridges at Milepost 5.73, there is a number 8 right hand turnout diverging to the pulp mill end of the current Sappi Mill. This is the end of current operations on the Mountain Division, although the track extends some distance further west.

Summary of Turnouts on the PanAm Railway segment, Milepost 1.16 to 5.73 (not including the number 10 turnout connecting to the Freight Main).

Number 10 Turnouts - 6 left hand, 1 right hand
Number 8 Turnouts - 4 left hand, 5 right hand
Number 6 Turnouts - 0 left hand, 3 right hand

2. PanAm Railway Segment, Milepost 5,73 to 11.13
There are no known turnouts and most of the track has been lifted on this segment.

3. MEDOT Segment, Milepost 11.14 to 51.13
There a total of 25 turnouts on this segment, most of which are 85 lb RBM frog turnouts and other turnouts on various sidings and side tracks. These turnouts are located at some of the town and station locations as follows:

TOWN/LOCATION	85 lb. No. 10 RBM Frog	85 lb No 8 RBM Frog	85 lb. No 10 Spring Rail Frog	85 lb No 8 Common or SG Frog
Newhall	2	1		
Sebago Lake	1	1		
Steep Falls	2	1		1
Mattocks	1			
Cornish	2			
Hiram		1	1	
Brownfield		1		
Fryeburg	2	2		1
TOTALS	10	8	1	2

In addition there are a total of four 80 lb turnouts, either common or self guarded frogs. These are located on the sidings where 80 lb rail is typical.

Figure 2-11 – Typical 85 Lb RBM Frog Turnout, Fryeburg, ME

In general, the 85 lb RBM frog turnouts with the addition of some new switch timbers and minor repairs would be satisfactory to be reused for FRA Class 1 operation, possibly for Class 2 but not for Class 3. The other turnouts would not be reused in main track and would be considered as scrap material.

The approximate value of this material for scrap under various upgrading scenarios is calculated in Chapter 4 of this Report.

4. NHDOT Segment from Milepost 51.13 to 59.10

Within this segment the only known turnouts are two 85 Lb turnouts at Redstone, forming a short passing/runaround track.

5. NHDOT Segment from Milepost 59.10 to 60.50

Within this recently constructed segment of railroad in North Conway are a right hand and left hand No. 10, 115 RE, RBM frog turnout. These are relay units, jointed, with horizontal switch rods and adjustable braces. These form a short runaround/passing track between Grove Street and A Street in North Conway. (Figures 2-12 and 2-13).

Figure 2-12 – Segment of Reconstructed Railroad in North Conway showing new runaround track, portion of turnout.

Figure 2-13 – Relay 115 RE, No. 10 Turnout installed by NHDOT in North Conway

6. NHDOT Segment from Milepost 60.05 to 61.36

Within this segment is one turnout at Intervale. This connection is the northerly limit of what was the Boston & Maine Railroad's Conway Branch from Rollinsford (Dover), New Hampshire. Currently, this is where the Conway Scenic joins the Mountain Division. There used to be a runaround track and a spur at Intervale. These turnouts and track have been removed and there is little evidence of them at present..

G. Grade Crossings

Due to the large number of grade crossings and their overall condition, placing the out of service segments of the Mountain Division back into service will require a large expenditure on crossings.

On the current MEDOT owned segment, only crossings of major highways had automatic warning systems installed. Most of the equipment for those installations will have to be replaced due to their age and condition. Other lesser crossings that only had cross bucks may now warrant automatic warning systems, especially if any passenger operation is anticipated.

Figure 2-14 – Typical paved secondary road

Figure 2-15 – Typical major crossing with Nelson Chair Rails installed

Almost all of the crossings have been paved over and the condition of the track structure beneath the pavement is unknown. Since all of these crossings are at least 30 or more years old, if the railroad were to be placed back in service to any FRA class of track or usage, it would be prudent to remove and replace the track structure as part of the rebuilding process. Most of crossings did not appear to have any type of crossing surface or formed flangeways. The flangeways appear to be simply cut into the pavement. Major road crossings that were rebuilt with the 115 RE rail were generally "Nelson Chair Rail" crossings, a system that used rails on each side of the running rail supported by special metal castings (chairs) that support both the running rail and the flangeway rails. These types of crossings were common from about 15 to 30 years ago and are not normally installed anymore.

There are a large number of private grade crossings that will need some type of crossing surface installed to protect both the track from damage as well as vehicles passing over the track. Some private crossings may warrant installation of simple, manually operated swing gates that are normally closed to vehicular traffic, locked, with a key for the land owner. Most will also require cross bucks to be installed at both sides of the crossing and in some cases, pipes to carry runoff if there are right-of-way ditches. Determining which private crossings need to be kept in service may take some effort. Some are "deeded" and still used, many are deeded and no longer in use and some are in use without any deed or license from the Railroad.

Figure 2-16 – Typical private or farm type crossing

Figure 2-17 – Typical gravel crossing

There are a large number of gravel crossings, both private and public. Gravel crossings pose challenges in that if a new crossing surface is installed along the track structure, the constant tracking of stones and sand onto the crossing surface and into the flangeways deteriorates the crossing much more quickly than a more heavily traveled crossing on a paved roadway. This is a very difficult issue at the heavy truck traffic private crossings at several of the gravel and rock quarries through which the Railroad passes. (See Figure 2-9, Page 6).

Figure 2-18 – New rubber rail seal and bituminous crossing in N. Conway, NH

Figure 2-19 – New rubber rail seal crossing crossing and track in N. Conway, NH

The following listing summarizes the currently known public and active private crossings along the eight segments of the Mountain Division between Mountain Junction in Portland and Intervale, New Hampshire.

TABLE 2-3
SUMMARY OF GRADE CROSSINGS
PORTLAND TO INTERVALE

SEGMENT	PUBLIC			PRIVATE	
	Paved W/Warning System	Paved Passive System	Gravel Passive System	Paved	Gravel
Mountain Jct. to Westbrook	9				1
Westbrook to South Windham *	1	3			5
South Windham to State Line	7	19	2		20
State Line to Redstone	2		3		1
Redstone to North Conway			1		
New section in North Conway	5				
North Conway to Intervale		1			
TOTAL CROSSINGS	24	23	6	0	27

Note: There are many more private grade crossings (mostly farm crossings) that used to exist. The total indicated are approximately the number observed today that appear to be used. There may be some additional private crossings that will have to be installed if the Railroad were placed back into service.
** The rail has been removed from most of this section or paved over so that there are no discernable crossings in this segment at present.*

H. Sidings and Passing Tracks

There never were a large number of ancillary tracks on the Mountain Division. Some locations, such as Newhalls, South Windham and Fryeburg had more track that has been removed either completely or partially. The following is a summary of remaining sidings and passing tracks by location. Most of the side track material west of current PanAm operation in Portland and Westbrook is 80 Lb with some lighter and some 85 Lb material.

The approximate length of connecting turnouts has been deducted from the following approximate track lengths. In a few cases, the exact amount of rail in place is difficult to determine as the track is buried.

PANAM/AMTRAK IN PORTLAND AND WESTBROOK – LENGTH OF SIDINGS

Portland	2,425' Runaround by Amtrak Station
	940' Amtrak Layover Tracks (2 tracks)
Westbrook	2,000' Runaround Track between Larrabee Road and Forrest St.
	1,480' Runaround Track centered on Main Street
TOTAL PANAM	6,845'

MEDOT OWNERSHIP – SOUTH WINDHAM TO STATE LINE – LENGTH OF SIDINGS

Newhalls	540' Gambo Road to Crossover at middle of segment
	540' East Switch to crossover
	375' Spur to gas company (Trk. 4)
	500' Assumed remnant of Trk. 9 (may be longer or shorter)
Sebago Lake	1,354' Runaround Track
Steep Falls	704' Siding east of Rte. 113
	890' Siding in and west of Rte. 113
Mattocks	1,080' Siding (west end turnout removed)
Cornish	1,200' Runaround Track
Hiram	1,225' Runaround Track
Brownfield	300' Siding
Fryeburg	475' Trk. 13 (East of Porter Street)
	1,865' Runaround Porter to Smith St.
	820' Runaround west (south of main track)
	600' Remnant of Trk. 5 (to Gulf Oil)
	250' Remnant of spur to Forrest Industries
TOTAL MEDOT	12,718' (Approximate)

NHDOT OWNERSHIP – STATE LINE TO INTERVALE

Center Conway	1,350 Runaround
Redstone	709' Runaround
North Conway	1,020' New Runaround of 115 RE relay material

I. GEOMETRICS

The Mountain Division was not built to high standards of alignment and never developed enough passenger or freight traffic to justify major projects that reduced curvature or lessened grades. For the most part the line follows the general shape of the existing land. The profile is quite undulating, generally following the surface of the ground. There are few cuts of any significance and long high fills seem to be limited to a few locations where watercourses pass under the tracks.

1. Curvature

The sharpest curve west of the present Amtrak station in Portland is six degrees located at Newhall about Milepost 12. There are a number of curves in the range of three to four degrees. Based on the maximum amount of superelevation allowed of 6 inches plus the maximum allowable unbalanced[5] elevation of 3 inches, the following table shows the maximum speed allowable on a curve of a certain degree of curvature. In addition, the Federal Railroad

[5] Unbalanced elevation is a deficiency in the actual amount of banking the track (superelevating) to achieve speed. The 3 inch deficiency is the most allowed by the Federal Railroad Administration (FRA) for most types of passenger cars. This deficiency in banking of the track results in passengers feeling 0.1 G's of lateral force and the car body to roll somewhat while moving around the curve at the speed allowed with 3 inches unbalance. The unbalanced elevation allows higher speed than if only the elevation for equilibrium was used and passengers feel no sideways force. This is very conservative in terms of safety as the amount of unbalanced elevation to actually tip a car over is generally more the 20 inches. Passengers start to feel uncomfortable as unbalance increases past 5 inches or so.

Administration (FRA) limits passenger trains to no more than 59 MPH on track that is not signalled (dark territory) and no more than 79 MPH on track that has signals but no form of cab signalling or automatic train stop. Cab signalling provides the engineer with a constant signal indication inside the locomotive cab, not relying on the wayside signals along the track spaced every mile or more.

TABLE 2-4
MAXIMUM SPEED BY DEGREE OF CURVE

DEGREE OF CURVE	MAX SPEED USING 3" UNBALANCED ELEVATION
6^0 - 00'	46 MPH
5^0 - 00'	50 MPH
4^0 - 30'	53 MPH
4^0 - 00'	56 MPH
3^0 - 30'	60 MPH
3^0 - 00'	65 MPH
2^0 - 30'	72 MPH
2^0 - 00'	80 MPH

A review of the track charts indicates that most of the curves on the Mountain Division could be run at 60 MPH. There area total of 12 curves of about 4 degrees that would limit speed to just below 60. There is the one curve at Newhall that is 6 degrees and one curve in North Conway that would limit speed to about 50 MPH. The maximum speed of 60 MPH also correlates to an FRA track classification of Class 3. FRA Class 4 allows a maximum passenger speed of 80 MPH but that would require a signal system to be in place.

2. Grades

As noted, the profile of the Mountain Division is quite undulating, generally following the lay of the land without significant cuts and fills or bridges except at water courses. Due to the relatively low power to weight ratio of trains, grades of over 0.50% up to 1.00% pose operating issues for freight trains. Grades over 1.00% pose serious operating restrictions for freight trains and 2.00% or more, very significant restrictions. Between Portland and Fryeburg, westbound the maximum grade is a very short section of 1.68% (a rise of 1.68 feet vertically over a length of 100' or 88.7 feet per mile). That is located at Milepost 18.3 just east of the Smith Hill Road grade crossing. There are sustained grades of a little over one half mile long of 1.53% and 1.60% at Milepost 13 and 15.5 respectively.

In an eastbound direction from Fryeburg to Portland, the maximum grade is 1.58% at Milepost 25.3, just west of Steep Falls. That grade is fairly short at less than ¼ mile but there are some longer grades of 1.26% at Milepost 31 and 1.06% at Milepost 39.5.

The steepest grades on the Mountain Division from Portland all the way to St. Johnsbury, Vermont were over 2% either side of Crawford Notch with an average grade of 2.2% westbound.

In the past, through freight trains were dispatched with sufficient tractive effort to ascend Crawford Notch. The current 1.5% to 1.6% grades between Portland and Intervale, New Hampshire would not have significant impacts on passenger operation but could create some operating issues for freight trains, especially if heavy aggregate traffic were operated in any volume. Sufficient tractive effort would be required by use of either heavy enough locomotives or multiple locomotives if necessary.

CHAPTER 3

Bridge Condition Report

I. – INTRODUCTION

This chapter is a summary of observed bridge conditions based on a hi-rail trip on September 12 over the 40 miles of current MEDOT owned and cleared line. Additional field inspections were subsequently made at other times and on the other segments of the Railroad.

II- BRIDGE INSPECTION FINDINGS

A cursory inspection of all 19 bridges and three of the 9 major culverts[1] along the 61 miles of track was performed in mid September 2007 by HNTB personnel. Refer to Table 1 at the rear of this chapter for a summary of information. The inspection involved visual observation of structural members, bridge seats, stone abutments and culverts; gathering dimensional data for determining member sizes on selected bridges; and identifying obvious locations of deterioration and/or problems in order to describe *in general terms* their potential for reuse and approximate costs for placing them back in service. Note, for purposes of this report, a culvert is defined as a drainage opening or conduit passing through an embankment for the purpose of conveying water having no definite distinction between substructure and superstructure.

Visual observations revealed that the bridges were typically in good condition. The main structural components usually exhibited light to moderate pitting and a uniformly oxidized surface with full section thicknesses and rivet heads. These main components (i.e. chords, diagonals, verticals & end posts of trusses, plate girders, stringers and transverse floorbeams) range from simple rolled shapes to built-up riveted sections composed of angles/channels/plates, lacing bars and batten plates. There was little, if any, paint system remaining on any of the bridges although some coating residue was occasionally observed. Also, hookbolts used to fasten timber ties to the supporting steel were not observed on any of the bridges. The bridge decks (bridge timbers and spacing timbers) are in generally poor condition and most will need to be totally replaced on the presently inactive bridges. The cost for deck replacements are not included in the costs noted in Table 1 at the rear of this Chapter. Deck replacement costs are shown in the cost estimates in Chapter 4.

The following is a brief description of each bridge with exceptions to the above conditions noted as well as any noteworthy comments. Similar descriptions for the major culverts follow those for the bridges.

1. MP 5.63 Presumpscot River

This bridge consists of a 130' long Pratt deck truss (with counters) flanked by shallower 35' long deck girders on both sides. Two river piers support the truss. The bridge originally carried two tracks but only one remains. There is a pedestrian walkway suspended from the bridge along the south side. Framing for the walkway appears to be of original construction. Unique truss features include pin connections and eyebars for diagonals, counters and bottom chords. Significant section loss was observed at the deck girder to vertical end post connection at the southeast corner of the truss. Heavy corrosion with section loss was also observed on members beside the track on the north side of the truss throughout its length for reasons unknown. Some settlement of the approach fill behind the west abutment was also observed..

[1] A major culvert is one whose span is more than about eight feet. There are just over 100 smaller culverts located along the current MEDOT ownership between Milepost 11.14 and 51.13.

Presumpscot River – Bridge 5.63

Figure 3-1 - Presumpscot River, Looking east Note provision for second track on main truss span but not on approach span

Figure 3-2 - Presumpscot River, south side. Note pedestrian bridge supported on this side.

Figure 3-3- Presumpscot River, Pedestrian Bridge on south side, looking east

Figure 3-4 -Presumpscot River, East approach deck girder span. West approach the same. Note lack of intermediate diaphragms and and cross bracing.

Figure 3-5- Settlement at west abutment

Figure 3-6 - South Side from west shore of River

2. MP 5.66 Brown Street

This bridge consist of a 72' long through girder on the north side and a 54' long through girder with an 18' long deck girder on the south side. A steel bent supports the south side girders as well as the railroad floor system. This unusual arrangement is necessitated by the insufficient width of the east abutment and consequently, lack of a bridge seat. This bridge also has a large skew which produces uneven deflections between girders, albeit perhaps slight, as trains cross.

Figure 3-7 - Brown Street, South Side

Figure 3 - Brown Street, Looking West

3. MP 10.32 Mallison Falls Road

The bridge consist of four rolled beams spaced 2.5' apart supporting timber ties on the top flanges. Given their 30" depth and flange dimensions , these beams were likely manufactured no earlier than 1931. Therefore, the bridge is presumed to have been built after that time. The paint system is intact with local degradation of the coating at isolated locations. The bottom flanges of three of the beams exhibit slight sweeps (deformation) with multiple scrapes at midspan resulting from vehicular impacts due to the low underclearance.

Figure 3-9 – South side of Bridge

Figure 3-10 – Bridge deck, looking east. Tracks have been removed in this segment.

4. MP 12.63 Presumpscot River (Gambo Bridge)

The 105' long deck truss which crosses the river is an uncommon Double System Warren truss with half-height, intermediate verticals. The truss has riveted connections but relatively light compression members having inefficient properties. A timber frame is suspended just below the bottom chord which butts up against each abutment. This framework reportedly serves as a brace between the abutments to halt their movement toward the river. The date of its installation and condition is not known.

Figure 3-11 – Presumpscot River, looking west

5. MP 18.05 Sticky River

This short span open deck bridge consists of two riveted plate girders spaced 6.75' apart and supporting ties along the top flange. This type of bridge configuration was commonly selected during the early 1900's by engineers for single spans in the 20' to 110' range as having the least steel weight (cost) and where underclearance was not an issue. The bridge appears in generally good condition with some local section loss in the top gusset plates and spalling of the concrete veneer on the west abutment. The timber bridge seats, however, are mostly deteriorated. The deck needs to be replaced and the ties on the approaches are in poor condition and undermined. MEDOT is planning on some repairs to the washouts around the approaches in the near future.

(See photographs on following page).

Sticky River Bridge - MP 18.05

Figure 3-11a – South side, looking west

Figure 3-12 – Bridge deck, looking east

Figure 3-13 – Tie undermining, west approach

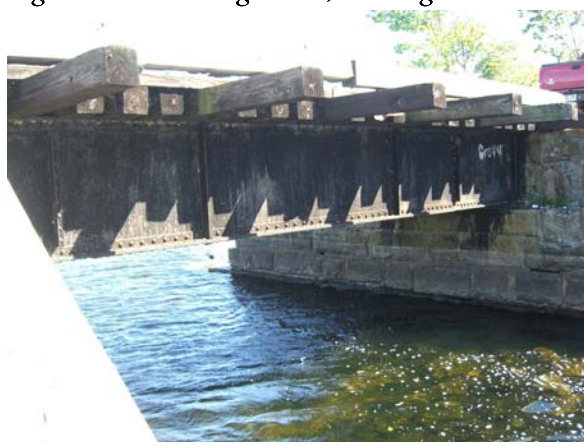


Figure 3-14 – South side, looking east

6. MP 26.04 Quaker Brook

This open deck bridge also consists of two riveted plate girders. The bridge is in generally good condition. The tall east abutment has vertical cracks and some stones have moved out-of-position. Soil anchors may be required to halt further movement.

Figure 3-15 – South side, looking west

Figure 3-16 – Looking east

7. MP 29.70 Red Brook and MP 30.39 unnamed

Both these short span crossings consist of two groups of bundled I-beams with one bundle under each rail. Each bundle is composed of a pair of rolled 15" standard I-beams spaced roughly 7" apart and connected together by spacers. The timber ties are supported directly on the top flanges. The beams rest on timber bridge seats, however, the condition of the timbers is unknown. On MP 29.70, timber struts span between the abutments at the stream bottom presumably to halt the inward movement of the abutments as has been used elsewhere on other bridges. These timbers appear to be deteriorating.

Figure 3-17 – Deck 0f Bridge 30.39

Figure 3-18 – Bridge 30.39

8. MP 36.32 Saco River

This bridge is a 183' long Warren (with verticals) through truss. It is an open deck riveted truss with robust members – characteristic of trusses built in the mid-twentieth century for the heavier railroad loadings. The stringers and transverse floorbeams are likewise riveted plate members. The bridge is in generally good condition with light to moderate pitting, full section thicknesses and full rivet heads. The concrete bridge seats exhibit occasional spalls and some of the granite stones on the abutments are misaligned or cracked.

Figure 3-19, Looking west

Figure 3-20, North side, looking west

9. MP 37.01 cattle pass

Two 12" x 12" timber beams resting on timber bridge seats comprise the span for this 9' crossing. Timber ties are supported directly on the top face of the beams. The timber beams and bridge seats are deteriorated. This bridge does not appear to be functioning as a cattle pass any more. Consideration may be given to replacing with a pipe culvert to allow water to pass through as there is evidence that water passes through in season.

Figure 3-21 – South side

Figure 3-22 – Detail, west abutment

10. MP 37.45 Red Mill Brook

This short span crossing is similar to MP 29.70 & 30.39 and consist of two groups of bundled I-beams with one bundle under each rail. Each bundle is composed of two inner 15" standard I-beams and one outer 15" channel separated roughly 7" apart and connected together by spacers. The timber ties are supported directly on the top flanges. The beams rest on timber bridge seats, however, the condition of the timbers is unknown.

Figure 3-23 – Underside of Red Mill Brook

Figure 3-24 – Side view of Red Mill Brook

11. MP 38.67 Pierce's Brook

This open deck bridge consists of two riveted plate girders. The steel girders are in generally good condition. Five timber struts span between the abutments near the stream bottom presumably to halt inward movement of the abutments. The timber struts show signs of deterioration. The girders rest on timber bridge seats, however, the condition of the timbers is unknown.

Figure 3-25 – Bridge deck

Figure 3-26 – Timber struts between abutments

Figure 3-27 – North side of bridge

Figure 3-28 – Southwest corner of abutment

12. MP 39.90 Rattlesnake Pond

The only ballasted crossing on the rail line, this 5' span consists of multiple I-beams spread across the width of the bridge spaced close together confined by 17" deep granite lintels on each outside edge. The I-beams are likely cast into a supported concrete slab to form a single monolithic structural plate upon which the ballast and track is placed. Slight to moderate corrosion was observed on the bottom flanges of almost all the beams.

Figure 3-29 – South end of culvert

Figure 3-30 – Steel beams back inside past the granite lintel.

13. MP 41.06 Ten Mile Brook

Similar to those described above, this is an open deck bridge with two riveted plate girders. The steel girders appear in generally good condition. The girders rest on granite stone bridge seats which also appear in good condition. The NW and SW wingwalls apparently have shown signs of movement in the past which has been slowed or arrested with the installation of wall anchors. Some of the granite stones are misaligned or cracked.

Figure 3-31 – North side of bridge, looking east

Figure 3-32 – Bridge deck, looking west

14. MP 43.76 Shepard's Brook

The only other through girder bridge crossing besides Brown Street. A 56' span consisting of two 72" deep riveted plate girders with transverse floorbeams and longitudinal stringers constructed in typical fashion. The use of through girders rather than deck girders at this location is likely due to the short distance between top of rail and water elevation. There is a second set of timber ties placed on top the original timber ties to raise the track elevation. No hookbolts or other means were observed to fasten the ties together. The girders rest on timber bearing blocks which are mostly deteriorated. The clearance between the knee braces and the girder flanges is less than the required minimum clearance per AREMA specifications for new bridge construction. This operational restriction should be evaluated, however, in conjunction with other bridges located along the rail line.

Figure 3-33 – Side view and underside

Figure 3-34 – Bridge deck and through girders. Note additional set of timbers on top of main girders.

14. MP 46.27 Little Saco River

A short span open deck bridge with two riveted plate girders. The steel girders appear in good condition. The girders rest on granite stone bridge seats which also appear in good condition.

Figure 3-35 – Side view

Figure 3-36 – Bridge deck and wingwall

15. MP 55.37 Saco River (Conway, New Hampshire)

This crossing is roughly 800' in total length and consists of two Warren (with verticals) through trusses spanning the river and a 480' east approach trestle with intermediate spans equal to twice the tower spans. The trestle is composed of a pair of riveted deck girders and seven steel bent towers. The trusses rest on granite piers and abutments which appear in good condition. The top of rail is located some 23' or more above the floodplain along the approach trestle. The crossing has an open deck floor system throughout. However this is not visible as a new walkway system has been installed over the rails and deck using timber planks with safety railings along both sides for snowmobiles across the entire bridge length. All structural members are composed of built-up riveted plate members. The portions of the bridge which were observed were clean and in very good condition with light to moderate pitting, full section thicknesses and full rivet heads.

Figure 3-37 – Through trusses, looking west

Figure 3-38 – Through trusses, looking northwest

Figure 3-39 – Looking west from east end of bridge. Note that entire deck has been planked over for snow mobile use and railings installed

Figure 3-40 – Detail at end of bridge where decking has been installed up over both running and guard rails

Additional Photographs of Bridge 55.37

Figure 3-41 – Side view of portion of east approach trestle

Figure 3-42 – Portion of east approach trestle, looking west

Figure 3-43 – East abutment

16. MP 59.20 Artist Falls Road and MP 59.24 Artist Falls Brook

Both these bridges are new Warren (with verticals) deck trusses approximately 50' and 100' in length respectively. These bridges were constructed by the State of New Hampshire as part of the track realignment made necessary by the construction of the North-South Bypass Road. They both have an open deck arrangement. All structural members are composed of rolled shapes or structural tubes made of high strength weathering type steel. Bolted connections at the panel points are used throughout giving a riveted truss appearance. The bridges are in excellent condition. The concrete abutments are also in excellent condition. (See following page for photographs).

Artist Falls Brook – MP 59.24

Figure 3-44 – Artist Falls Bridge – side view of truss

Figure 3-45 – Bridge deck, looking east

III - CULVERTS

There are about 111 culverts of various sizes and types on the MEDOT owned segment. Most are pipes from 12" to 36" diameter and there are a number of stone box culverts and stone arch culverts, generally four to six feet or less in span. MEDOT has been clearing blockages in these culverts and observing their general condition. Several of the larger culverts were not observed due to lack of access, negligible influence on track support (e.g. small opening with 15' of earth cover) or budgetary limitations. Those larger culverts that were observed are described herein.

1. MP 29.30 Pidgeon Brook

This semi-circular stone arch has a 12' span at the springline. The voussoirs forming the arch are roughly cut, semi-tapered stone blocks of equal depth and width with a deeper, raised keystone. The joints are unfilled but the stone blocks are butted properly and intact. The arch rests on short foundation walls consisting of three visible courses of large, roughly cut stone blocks with unfilled joints. The headwall and wingwalls are constructed similarly. The culvert appears in good condition.

Figure 3-46 – South side of culvert

2. MP 32.90 Dug Hill Brook

The only corrugated metal pipe (CMP) of significant diameter on the rail line, it is a large 16' diameter pipe of more recent vintage. The protective galvanized coating remains evident and intact except along the invert. Here, reported heavy corrosion resulting in intermittent areas of section loss has allowed leakage to occur under the pipe which may eventually lead to undermining of the pipe. Neither the out-of-roundness (deformation) nor type and condition of the seams of this flexible type conduit were observed.

Figure 3-47 – South side of pipe culvert

Figure 3-48 – Interior of pipe culvert showing corrosion along invert

3. MP 33.97 Break Neck Brook

A semi-circular stone arch having a 12.5' span. The voussoirs forming the arch are squarely cut, stone blocks of equal depth and width with a center keystone. The stone blocks are butted tight along the intrados with small, tightly fitted stones inserted along the extrados. The arch rests on short foundation walls consisting of four visible courses of large, evenly cut stone blocks with unfilled joints. The headwall and wingwalls are constructed similarly. Closely spaced timber struts span between the foundation walls which were reportedly added to halt inward movement of the walls. In addition, scour repairs were performed whereby sandbags were placed and grout pumped into the cavities which had formed under the foundation walls. The culvert appears in good condition.

Figure 3-49 - South side of culvert
Note timber grillage in stream bed

Figure 3-50 – View through length of culvert

IV - BRIDGE RATINGS

Historically, structural components of railroad bridges were proportioned based on stresses computed using steam locomotive axle loads with large dynamic (impact) effects added which were compared to accepted percentages of the yield strength (elastic limit) of the steel provided. The loadings are referred to as Cooper E_ _ with a number that refers to the axle load in thousands of pounds of the drive wheels of the locomotive selected for design. For instance, a Cooper E60 would be a group of four closely spaced 60,000 lb axle loads representing the close spaced main driver axles of a steam locomotive with another group of four smaller axle loads (65%) for the lighter pilot wheels that may exist on either side of the main driver axles. Modern railroad bridges and components are still proportioned the same way but railroads now use diesel or electric locomotives that have similar or larger axle loads but wider spacing with less impact and utilize larger percentages of higher strength steels. Hence, modern railroad bridges are usually lighter yet carry more load than older bridges of similar type.

In order to determine the carrying capacity of an existing railroad bridge, a load rating analysis in accordance with AREMA[2] 15-7.3 is typically performed giving the maximum size locomotive in terms of axle loads permitted across a structure. Five bridges were selected for which preliminary ratings could readily be determined to provide a range of ratings representative of the rail line. Results indicate that a Cooper E52 to E60 locomotive could be permitted to operate unrestricted along the line. This is somewhat less than the reported E65 locomotive (i.e. 260,000# on 4 axles) which operated along the line prior to the mid 1980's when the line was removed from service. Load ratings could be increased, however, by strengthening components using additional steel plates or angles, testing to determine the *actual* yield strength rather than the minimum specified strength of the steel, reducing track speed, or complete replacement.

Further investigation would be required to determine which decision would be most appropriate for each bridge which is beyond the scope of this report. However, for determining an order of magnitude cost for placing the bridges back in service report, an estimated amount of strengthening is presumed.

V - ESTIMATED REHABILITATION COST

The costs to strengthen, repair or replace the steel bridges and culverts as described above are given in Table 1 on the following page. Costs are estimated based on similar construction projects awarded in Maine and the Northeast. As a minimum, a cost to pressure wash the structural steel and bridge seats has been included for each bridge as applicable. Similarly, a cost to remove debris from the streambed and pressure wash the culverts to remove vegetative growth has been included. Note, painting of the bridges is not included in the estimate as such costs would undoubtedly double the estimate due to the issues associated with lead paint containment and disposal. As shown, the total estimated cost to place the bridges and culverts back in service is roughly $750,000. These costs do not include deck repairs and replacements. Those costs are included in the estimates contained in Chapter 4.

[2] AREMA is the American Railway Engineering and Maintenance Association. This organization has set engineering standards and practice for the railroad industry for over 100 years.

Table 1 - Inventory of Bridges & Culverts

Milepost	Type	Length	Deck	Crossing	Built	Actions	Est. Cost
5.63	Deck Girders (2) +	35' - 130' - 35'	open	Presumpscot River	1875	clean, stl. repairs, part. stl. removal	$ 110,000
	Deck Truss (1)						
5.66	Through Girder	72' & 18'+54'	open	Brown Street	1875	clean, strengthen (1 girder)	$ 35,000
7.34	Stone Arch Culvert (3)	12'	---	Ink Horn Brook	1875	clean & remove debris	$ 5,000
9.70	Stone Box Culvert (3)	9' x 13.5'	---	Dole Brook	1875	clean & remove debris	$ 5,000
10.32	Deck Beams	28'	open	Mallison Falls Road	≥ 1931	clean, stl. repairs, beam straighten	$ 19,000
11.12	Stone Arch Culvert (3)	8'	---	Black Brook	1875	clean & remove debris	$ 5,000
12.63	Deck Truss	105'	open	Presumpscot River	1890	clean, strengthen	$ 110,000
15.25	Stone Arch Culvert (3)	5.5'	---	Westcott Brook	1875	clean & remove debris	$ 5,000
18.05	Deck Girder	29'	open	Sticky River	1895	clean, strengthen, replace seats	$ 20,000
26.04	Deck Girder	33.5'	open	Quaker Brook	1902	clean, strengthen, replace seats	$ 20,000
29.30	Stone Arch Culvert	12'	---	Pidgeon Brook	1875	clean & remove debris	$ 5,000
29.70	bundled I - beams	10'	open	Red Brook	1890	remove & replace (incl seats)	$ 40,000
30.39	bundled I - beams	10'	open	no name	1890	remove & replace (incl seats)	$ 40,000
32.90	corrugated metal pipe	16'	---	Dug Hill Brook	1966	clean & remove debris, repair invert	$ 56,000
33.97	Stone Arch Culvert	12.5'	---	Break Neck Brook	1875	clean & remove debris	$ 5,000
36.32	Through Truss	183'	open	Saco River	1942	clean only	$ 10,000
37.01	Timber Stringers	9'	open	cattle pass	1951	remove & replace (incl seats)	$ 40,000
37.45	bundled I - beams	15.5'	open	Red Mill Brook	1911	remove & replace (incl seats)	$ 45,000
38.67	Deck Girder	15'	open	Pierce's Brook	1906	clean, strengthen, replace seats	$ 16,000
39.90	multiple I - beams	5'	ballasted	Rattlesnake Pond	1875	remove & replace	$ 20,000
41.06	Deck Girder	45'	open	Ten Mile Brook	1904	clean, strengthen	$ 15,000
43.76	Through Girder	56'	open	Shepard's Brook	1902	clean, jack, strengthen, replace brgs	$ 35,000
46.27	Deck Girder	28'	open	Little Saco River	1911	clean, strengthen	$ 15,000
52.42	Stone Box Culvert (3)	8' x 7'	---	Black Cat Brook	1875	clean & remove debris	$ 5,000
53.66	Stone Box Culvert (3)	15' x 15'	---	Mill (Walker's) Brook	1875	clean & remove debris	$ 5,000
55.37	Deck Girders (15) +	7@(42'+21')+42'	open	Saco River		clean only	$ 50,000
	Through Trusses (2)	149' - 164'					
59.20	Deck Truss (new)	50' est.	open	Artist Falls Road	2002	clean only	$ 2,000
59.24	Deck Truss (new)	100' est.	open	Artist Falls Brook	2002	clean only	$ 4,000
						Total =	**$ 742,000**

Notes:

1. All deck girders, deck trusses, through girders and through trusses prior to 1950 are riveted steel construction.
   Deck beams and I - beams are rolled steel shapes.
2. Stone arches are cut stone blocks.
3. Did not observe.
4. Estimated costs based and engineering judgement alone. Detailed estimates have not been performed.

CHAPTER 4

Cost Estimates – Track & Right-of-Way

I. – INTRODUCTION

This chapter includes:

- Estimates of capital cost to bring the 60 miles of the Mountain Division Rail Line from Portland to Intervale, New Hampshire up to three different levels of improvement.
- A description of how costs were derived, overall methodology and assumptions.

The three levels of upgrading essentially are as defined by the Federal Railroad Administration (FRA) within the Code of Federal Regulations dealing with track safety standards. That is Title 49, Part 213, Subpart A to F, Class of Track 1-5.[1]

The classes of track represent varying overall track condition defined by geometric deviation horizontally and vertically (how straight and how smooth are the rails), deviation from gauge (the distance between the two rails), the number of "good" ties per unit (typically a 39 foot rail length), and a "good" tie within a minimum prescribed distance from a rail joint. The higher the FRA classification number, the better the overall condition of the track and the higher the operating speed allowed.

There is an additional classification known as "excepted" track. This is track in poor condition, below that of Class 1, but can be operated for freight service only at no more than 10 MPH, not more than 5 cars of hazardous material can be carried in a single train, no passenger trains with passengers on board and a number of other restrictions.

For this Report, we have assumed no better than a Class 3 condition. The reason for that limitation is illustrated in the following tables. Table 1-2 indicates that operation above 59 MPH requires a signal system to be in place. Class 3 allows operation up to 60 MPH so that condition is the best required unless the considerable added expense of a complete signal system is added.

[1] Actually, under Title 49, there are nine classes of track plus the category known as "Excepted" track. Classes 6-9 are high speed corridors (up to 150 MPH for Class 8 and up to 200 MPH for Class 9) and are not relevant to this report

TABLE 4-1
MAXIMUM ALLOWABLE SPEEDS
EXCEPTED TRACK TO FRA CLASS 5

FRA CLASS	FREIGHT	PASSENGER
Excepted	10 MPH	Not Allowed
Class 1	10 MPH	15 MPH
Class 2	25 MPH	30 MPH
Class 3	40 MPH	60 MPH
Class 4	60 MPH	80 MPH
Class 5	80 MPH	90 MPH

TABLE 4-2
MAXIMUM SPEEDS ALLOWABLE
BASED ON TYPE OF SIGNAL SYSTEM

No Signals	59 MPH
Automatic Block System[2]	79 MPH
Cab Signals w/Auto. Stop[3]	≤79 MPH

[2] Automatic Block is a system of wayside signals placed a "block" length apart, somewhere between one to two miles. When a train is in a "block" the signal behind that block would be red and the signal at the next block back "in advance of" the occupied block would show yellow or some combination (signals often consist of multiple signal heads displaying various colors) to indicate the block ahead is occupied. The idea is that a train never comes up on a red signal at maximum speed, but at a restricted speed wherein they could stop safely and to keep trains separated by sufficient distances for safe braking. (Trains may take a mile or more to stop).

[3] Cab signaling may or may not eliminate the wayside, fixed signals but does have a constant signal display in the "cab" of the locomotive so the engineer always sees the condition ahead. This is done using low voltage coded data in the track rails, read by sensors in the locomotive so equipped. Automatic brake application is normally added to this system so that if an engineer does not respond to a restrictive signal appropriately, the brakes apply automatically.

These estimates cover the 50 miles of railroad in Maine as well as the 10.2 miles in New Hampshire to Intervale in North Conway. Intervale is just past the junction where the Conway Scenic Railroad from their North Conway station complex joins the Mountain Division.

Not included in this section are costs associated with facilities required for passenger and/or freight operations. Only the main track repairs are included herein. Other facilities such as stations, sidings, etc are included in subsequent chapters and the Summary.

II – METHODOLOGY & ASSUMPTIONS

To develop mile by mile capital cost estimates to upgrade the Mountain Division to the three FRA track classifications, the following steps were undertaken and various assumptions made:

A. Field Inspections

1. A hi-rail[4] trip was conducted over the Maine DOT owned segment from Fryeburg to South Windham (40 miles)
2. Limited inspection from public property of the segments still owned by PanAm Railway in Gorham, Westbrook and Portland.
3. Limited inspection from public property of active Conway Scenic operated segments in New Hampshire.
4. Limited inspection of un-cleared section in New Hampshire (from the State Line to Redstone).
5. More detailed walking inspection of several short segments on Maine DOT ownership. The intent was to walk segments of varying condition that are representative of the whole line as observed on the hi-rail trip.

All inspections were conducted in September and early October, 2007.

Track charts of the line showing the limits of types of ballast, curves, size of tie plates and other data were consulted to assist in a mile by mile tabulation that included the grade crossings, bridges and cuvlerts.

Typical unit costs for the various elements of the track work were then applied to the estimated quantities on a mile by mile basis.

B. Comments on Condition Related to Costs and Cost Summaries

In developing a program to upgrade track to a certain level there is a margin of subjective opinion as to what the minimum actions should be, the methods; and from that, costs to achieve a certain condition.

The fact that the Mountain Division has been out of service for over 23 years, had no maintenance at all during that period except important holding actions by MEDOT over the last several years, and was not up to high standards at the time service was suspended; point to the need for a substantial program to put the line in a good condition that can then be maintained.

We have taken a conservative approach to provide a level of repair at each FRA track classification to assure a track condition that could be maintained at that class for at least 5 years without ongoing heavy maintenance and repairs. Towards that end, we have estimated more tie replacements than the minimum to meet class, considerable ditching for drainage, excavation of fouled gravel ballast areas,

[4] Hi-rail is a term used to describe what is otherwise an over- the road vehicle (such as pick-up truck) equipped with flip-down railroad wheels at both ends. This allows the truck to operate along tracks using its regular tires for propulsion but steered and kept on the tracks by the small rail wheels at each end.

sufficient new rock ballast, complete reconstruction of all grade crossings and re-timbering all of the bridge decks, even for the Class 1 condition. This approach results in a higher cost per mile than other recent up-grade examples that could be cited, however, over time, this approach will be less expensive and assure that the track does not suddenly deteriorate to the next lower classification.

For example, many of the tie plates in-track are very small, flat or single shoulder plates. We have included cost to replace those tie plates with larger plates whenever a new tie is put in track. This will prevent premature plate cutting that would occur if the small plates were reused.

Based on visual inspection, the existing 85 lb rail and joint bar assemblies appear to be sufficient for FRA track classifications 1 and 2; provided a good tie condition is achieved to adequately support this light rail section. If the track is upgraded to FRA class 3, new rail, most likely 115 RE welded rail, would be required.

Another aspect of the cost in Maine is that about 4 ½ miles of track has been removed in Westbrook and Gorham and must be completely replaced. Another consideration is that most of the first 4 ½ miles in Portland and Westbrook has had minimal maintenance for a number of years and will need to be upgraded to some degree even for a Class 1 condition.

The net result of this conservative approach and circumstances for the 50 miles in Maine is an average cost per mile and per foot as noted below

TABLE 4-3
MAIN LINE REHABILITATION COSTS
BY CLASS - MAINE

FRA CLASS	AVERAGE COST/MILE	AVERAGE COST/FOOT
1	$350,000	$67
2	$396,000	$75
3	$838,000	$158

The costs for the 10.2 miles in New Hampshire is lower because one mile was recently rebuilt to an FRA Class 3 condition (but operated as Class 2) and other segments are currently FRA Class 1 or 2 and in operation (although very infrequently) by the Conway Scenic Railroad between Intervale and Redstone. There is also a segment of just under 5 miles (Redstone to the State Line) that is not cleared of trees and brush and will require similar levels of upgrading as the current MEDOT segment.

TABLE 4-4
MAIN LINE REHABILITATION COSTS
BY CLASS – NEW HAMPSHIRE

FRA CLASS	AVERAGE COST/MILE	AVERAGE COST/FOOT
1	$212,000	$40
2	$299,000	$57
3	$736,000	$139

The slight difference between Class 1 and 2 in Maine especially, is because of the base cost of rebuilding all the crossings, repairing all the bridges common to all levels of upgrading with the only major additional cost from Class 1 to 2 generally related to replacing some additional ties and providing some additional ballast.

The large increase in cost to FRA Class 3 is mostly related to the complete replacement of the rail with new continuous welded rail using a resilient fastening system rather than cut spikes and rail anchors. The Class 3 upgrade is essentially a complete removal of existing track, salvaging some of the ties, excavating and compacting the track bed and putting down an all new track structure.

For the FRA Class 1 and 2 conditions, applying a less conservative approach to providing a sustainable track condition could result in a cost reduction of about $100,000 per mile. This is not recommended since the cost will be greater over time, and without significant yearly maintenance, could result in the track slipping into a lower classification.

Table 4-5 provides a summary of the cost of main line track upgrades from Portland to Intervale, New Hampshire, a distance of 60 miles.

TABLE 4-5
SUMMARY OF COST TO UPGRADE
MAIN LINE TRACK BY CLASS

FRA CLASS.	MAINE	NEW HAMPSHIRE	TOTAL
1	$17,676,000	$2,164,000	$19,840,000
2	$19,825,000	$3,057,000	$22,882,000
3	$41,934,000	$7,526,000	$49,460,000

Due to the relatively small difference in cost between FRA Class 1 and 2, it would be prudent to not consider upgrading to just a Class 1 condition. We have assumed upgrading to a Class 2 condition for restoration of freight service and a Class 3 condition for commuter rail or tourist train operation to North Conway.

C. Tie Condition Issues

The most obvious need is the poor tie condition. The condition is quite variable from fair to very poor. The fair sections seem to generally align with those parts of the railroad that had been rock ballasted by the Maine Central prior to ceasing service. The segments of gravel ballast (now generally fouled with fines and soil) have the poorest tie condition. We conducted tie counts of good ties per rail length at various locations where there is rock ballast and not. This provided a reasonable average of good ties now in track per 33 foot rail length within those types of ballast. We then used the track charts, which show the limits of rock ballast, to determine the average number of new ties that would be required to bring the track up to a maintainable condition for each FRA class.

In many sections the tie condition is so bad that in the case of bringing the tie condition up to just an FRA Class 1 condition, there would remain large spans of rail with insufficient vertical support. The light 85 lb rail would become surface bent under rail traffic and ruin the rail. In those areas where the tie condition is very poor we have calculated more new ties than necessary to just bring the track to that class.

D. Rail and Joint Bars

The existing 85 lb rail appears to be in good condition. The joint bars are a more modern design (headfree, toeless) than is often found on this older 85 lb rail. With a good tie condition, this rail should be sufficient for service up to FRA Class 2 but not for FRA Class 3. Complete rail replacement to new 115 lb welded rail would be required to achieve that condition and for operation of passenger trains up to 60 MPH allowed under that class of track.

E. Grade Crossings

There are a large number of grade crossings along the route, both public, paved crossings and many gravel crossings both public and private.

Many of the major road crossings were rebuilt by the Maine Central during the 1970's. Most appear to be what is called a "Nelson Chair Rail" crossing. This type of crossing can usually be identified by the three close spaced rails, with one on either side of the running rail. The "Nelson Chair" is a metal casting that replaces the usual railroad tie plate that supports the running rail on the tie as well as the two rails either side of the running rail. These additional rails form a flangeway through the crossing and absorb much of impact of highway vehicles over the crossing. This system is not normally used anymore. These crossings generally held up well, the major issue being corrosion of the supporting rail chair assembly.

The rebuilt crossings generally have heavier 115 lb rail in the crossing, stepping down to 100 ARA A rail then to the 85 lb rail. This is good practice to prevent too large a step from one rail section to the other as these "step" joints, also known as compromise joints, are a weak part of the track structure.

Without benefit of excavating these crossings, it is difficult to know the condition of the ties, rail, subgrade and extent of corrosion on the base of the rail and Nelson Chairs. The newest of these crossing installations are now almost 30 years old, so it would be prudent to assume that they are nearing the end of their useful life. To put railroad loadings on these crossings without replacing them could cause rapid deterioration. We have therefore assumed a complete tear out and installation of all new material at all grade crossings.

For main road crossings we assumed all new ties, crushed rock ballast, underdrains for drainage, hot mix asphalt underlayment under the ballast or geotextile fabric, new 115 RE welded rail and steel edged concrete crossing panels on both gauge and field sides of the crossing, raising the track wherever possible, running out the road profile sufficient to avoid "humped" crossings for vehicles and to run out the track raise in both directions. For Class 1 and 2 track, proper transitions from the 115 lb rail to 85 lb rail have also been included.

For lower volume highway traffic paved crossings, we have assumed an all new track structure and a rubber rail seal and bituminous type of crossing with the rubber extrusions on both the gauge and field side of the rails.

For existing gravel crossings we have assumed two different types depending on the extent of vehicular traffic. At heavy traffic locations, such as access roads to gravel pits, we have assumed use of the steel edged concrete panels with bituminous pavement 9 inches thick for 100 feet on both sides of the crossing. For light traffic private crossings, either the rubber rail seal and bituminous or pressure treated timber panels as appropriate to the particular situation.

Most of the grade crossings on the currently active segment owned by Pan Am Railway are in poor condition and we have included cost to replace all of those crossings with all new material as appropriate for the highway traffic volumes.

Most of the crossings would be reconstructed in segments to allow maintenance of highway traffic.

F. Automatic Highway Crossing Warning Systems

Most of the major highway crossings on the Maine DOT owned segments had train activated flashers and bells. At several of the crossings, the signal cases and flasher post assemblies appear to be intact. At several other crossings, at least one of the flasher posts was missing. At other locations, the signal case is the old style and is likely not possible to re-use. It may be possible to re-use some of the signal equipment at the crossings that were rebuilt in the 1970"s. However, for purposes of this preliminary cost estimate, we have assumed that all major road crossings would have a complete, new warning system installed.

The passive warning system (cross bucks and pavement markings) are partially in place (only one cross buck in many cases) but no pavement markings were observed anywhere. (Of course not possible at gravel crossings). We have assumed that all paved crossings would receive a painted stop bar the "RR" pavement marking in advance of the crossing, cross bucks and other signage in advance of the crossing.

G. Bridges

The cursory inspection indicated that the bridges were in generally good condition. Several of the stone abutments are shifting and need to be stabilized. All of the bridges are open deck and need to have complete deck replacement consisting of all new, pressure treated, dapped bridge timbers, spacer blocks and timbers as well as hook bolts to anchor the decks to the steel structure. (This last item is missing on all the bridges). Guard rails would be placed on all bridges with a span more than 50 feet; and all through trusses, regardless of span. Guard rails would be omitted on spans less than 50 feet and where there are no bridge members that could be struck by a derailed train.

All steel should be steam cleaned to remove debris, especially on the lattice work of the through trusses.

The approach ties at the bridges are generally in very poor condition. We have included cost at all bridges to completely remove and rebuild the track structure for 40 feet at both ends of the bridges.

H. Rail Anchors

There are no rail anchors on any of the 85 lb rail on the Maine DOT owned segment. Pictures of the rail line when it was active show that there were no rail anchors then. This was apparently standard Maine Central practice. This would explain the large amount of skewed and bunched ties noted at various locations. For Class 1 and 2 conditions, we have estimated cost for purchasing and installing sufficient rail anchors as is generally recommended and practiced today. The unit cost is the cost for the anchor plus installation. No anchors are included for the new 115 RE welded rail as we have assumed and priced that as being resiliently fastened.

I. Tie Plates

As noted under ties, many of the existing tie plates are small, flat or single shoulder plates. For FRA Class 1 and 2 upgrades we have included cost to replace those plates on any ties being replaced with new ties, with larger, double shoulder tie plates. The unit cost includes cost of a new plate and track spikes.

For the new 115 RE welded rail for the Class 3 condition, we have assumed the use of a resilient fastener system and the unit cost is the cost for the plate, spring clips and screw spikes for each plate.

J. Rail

Class 1 and 2 would reuse the existing 85 lb. rail with a few replacements in kind where visual and ultrasonic testing revealed any flaws. For FRA Class 3 we have assumed all new 115 RE continuous welded rail with a resilient fastening system such as Pandrol "e" clips and screw spikes. The cost noted for the rail includes removal of the present track stucuture, rail purchase, welding and installation cost for the new track structure. Ties, tie plates, ballast and final surfacing are included in other unit costs.

K. Net Salvage Value

We have assumed that all existing turnouts and sidings will be picked up and removed, unless they are being used. At this time the only turnouts used are in the vicinity of the Amtrak Station in Portland and the switch to the Sappi Mill in Westbrook.

Net salvage value is the scrap value of the rail and OTM (other track material that includes, tie plates, joint bars, bolts, spikes, rail anchors) less the cost to remove from track, sort, load onto trucks and in the case of ties; legally disposed of. We first calculated the approximate salvage value of the 14 unused turnouts on the current Pan Am Railway owned section and two short passing sidings totaling about 3,645 feet of track and then calculated the cost to remove and dispose of that material. The scrap value was about $39,000 and the cost to remove the track and turnouts and dispose of the ties was about $48,000. For purposes of this preliminary estimate, we have considered this to be a "wash" so have not included this as a project cost or as a credit to the project.

For the Class 3 up grade, all of the existing 85 lb track material, including most of the ties, would be removed and scrapped. Based on a scrap value of $220 per ton for the rail and heavy metal melt (most of the OTM) at about $300 per ton, the salvage value of the existing track is about $38,700 per mile. The cost to pick up the track and dispose of most of the ties is around $48,000 per mile, maybe less assuming that many of the ties are so deteriorated they could be mulched and not have to be disposed of in a licensed incinerator. Based on this brief analysis, we have not included the track removal as a cost nor taken a credit for the material removed.

If the railroad were upgraded to a Class 1 or 2 condition, the existing 85 lb RBM frog turnouts should be saved for potential re-use as necessary. These may require some work on the switch points and repairs to the frog assemblies before putting back into track. Records indicate that there are a total of 10 No. 10 frog, 8 No. 8 frog and 1 No. 10 Spring Rail frog turnouts that could be salvaged for potential reuse.

III. - ESTIMATE TABLES

The tables on the following fold-out pages summarize the above items on a mile by mile basis, showing the estimated cost for each mile and a cumulative cost. Note that the mileposts on the Mountain Division start at milepost 1.16 at Mountain Junction where the Mountain Division joins the Freight Main Line of the Pan Am Railway. The original "0" milepost was at the original railroad station located further east on Commercial Street.

Separate tables are included for each class of track in both Maine and New Hampshire.

As noted at the beginning of the section, the costs are only to upgrade the main line track. Costs for sidings, stations, additional track and other facilities related to various modes of use are included in the chapters following.

MOUNTAIN DIVISION
COST ESTIMATE FOR FRA CLASS 1 TRACK CONDITION
MAINE SEGMENT, INCLUDING CURRENT PAN AM SECTION

MILE	DITCHING		TIES		SUB GRADE EXCAV.		TIE PLATES		RAIL ANCHORS		RAIL		BALLAST		SURFACING		BRIDGE REPAIRS		BRIDGE DECKS		SMALL CULVERTS		GRADE CROSSINGS PRIVATE		GRADE CROSSINGS PUBLIC		WARNING SYSTEM ACTIVE	WARNING SYSTEM PASSIVE	TOTAL COST PER MILE	CUMULATIVE COST
	UNIT COST $6.00	LF	UNIT COST $70.00	EA	UNIT COST $15.00	CY	UNIT COST $9.00	EA	UNIT COST $2.50	EA	UNIT COST $65.00	TF	UNIT COST $15.00	TON	UNIT COST $4.00	TF	UNIT COST Varies	EA	UNIT COST $825.00	LF	UNIT COST $1,500	EA	UNIT COST $3,200	EA	UNIT COST $550	LF	$175,000	$5,000		
	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost				
1.16 to 2	500	$3,000	0	$0	0	$0.00	0	$0	600	$1,500	0	$0	147	$2,205	4435	$17,740					3	$4,500			56	$30,800			$59,745	$59,745
2 to 3	1200	$7,200	0	$0	0	$0	0	$0	1,200	$3,000	0	$0	175	$2,625	5280	$21,120					3	$4,500			193	$106,150			$144,595	$204,340
3 to 4	1200	$7,200	0	$0	0	$0	0	$0	1,200	$3,000	0	$0	175	$2,625	5280	$21,120					4	$6,000			42	$23,100			$63,045	$267,385
4 to 5	1200	$7,200	0	$0	0	$0	0	$0	1,200	$3,000	0	$0	175	$2,625	5280	$21,120					3	$4,500			108	$59,400			$97,845	$365,230
5 to 6	1200	$7,200	600	$42,000	348	$5,214	1,200	$10,800	1,200	$3,000	0	$0	627	$9,403	5280	$21,120	2	$145,000	326	$300,950	2	$3,000			309	$169,950			$717,637	$1,082,867
6 to 7	2500	$15,000	2,500	$175,000	2376	$35,640	5,000	$45,000	600	$1,500	3170	$206,050	4,041	$60,615	5280	$21,120					2	$3,000	2	$6,400	82	$45,100	$350,000		$964,425	$2,047,292
7 to 8	3000	$18,000	3,160	$221,200	3960	$59,400	6,320	$56,880			5280	$343,200	6,732	$100,980	5280	$21,120	1	$5,000			2	$3,000	1	$3,200	28	$15,400	$175,000	$5,000	$1,027,380	$3,074,672
8 to 9	3000	$18,000	3,160	$221,200	3960	$59,400	6,320	$56,880			5280	$343,200	6,732	$100,980	5280	$21,120					3	$4,500	1	$3,200					$828,480	$3,903,152
9 to 10	3000	$18,000	3,160	$221,200	3960	$59,400	6,320	$56,880			5280	$343,200	6,732	$100,980	5280	$21,120	1	$5,000			3	$4,500	1	$3,200					$833,480	$4,736,632
10 to 11	3000	$18,000	3,160	$221,200	3960	$59,400	6,320	$56,880			5280	$343,200	6,732	$100,980	5280	$21,120	1	$19,000	28	$39,100	2	$3,000	1	$3,200	76	$41,800	$175,000		$1,101,880	$5,838,512
11 to 12	3000	$18,000	1,550	$108,500	1,561	$23,412	3,100	$27,900	3,769	$9,422	740	$48,100	3,349	$50,235	5280	$21,120	1	$5,000			3	$4,500	2	$6,400	60	$33,000	$175,000		$530,589	$6,369,101
12 to 13	3000	$18,000	1,280	$89,600	1,162	$17,424	2,560	$23,040	4,332	$10,830			2,830	$42,451	5280	$21,120	1	$105,000	105	$102,625	3	$4,500	1	$3,200	60	$33,000		$15,000	$485,790	$6,854,891
13 to 14	3000	$18,000	1,280	$89,600	1,162	$17,424	2,560	$23,040	4,332	$10,830			2,830	$42,451	5280	$21,120					2	$3,000	2	$6,400	120	$66,000	$175,000	$10,000	$482,865	$7,337,756
14 to 15	3000	$18,000	1,189	$83,236	1,030	$15,444	2,378	$21,404	4,332	$10,830			2,658	$39,877	5280	$21,120					3	$4,500	2	$6,400	24	$13,200		$5,000	$239,011	$7,576,767
15 to 16	3000	$18,000	1,280	$89,600	1,162	$17,424	2,560	$23,040	4,332	$10,830			2,830	$42,451	5280	$21,120	1	$5,000			4	$6,000	1	$3,200					$236,665	$7,813,433
16 to 17	3000	$18,000	1,115	$78,069	921	$13,820	2,231	$20,075	4,332	$10,830			2,518	$37,767	5280	$21,120					2	$3,000			50	$27,500		$10,000	$240,181	$8,053,614
17 to 18	3000	$18,000	480	$33,600	0	$0	960	$8,640	4,332	$10,830			1,320	$19,800	5280	$21,120					2	$3,000							$114,990	$8,168,604
18 to 19	3000	$18,000	1,053	$73,691	832	$12,474	2,105	$18,949	4,332	$10,830			2,401	$36,016	5280	$21,120	1	$20,000	29	$39,925	3	$4,500	1	$3,200	24	$13,200		$5,000	$276,905	$8,445,509
19 to 20	3000	$18,000	780	$54,600	436	$6,534	1,560	$14,040	4,332	$10,830			1,886	$28,294	5280	$21,120					3	$4,500	1	$3,200				$5,000	$166,118	$8,611,627
20 to 21	3000	$18,000	871	$60,964	568	$8,514	1,742	$15,676	4,332	$10,830			2,058	$30,868	5280	$21,120					3	$4,500			52	$28,600	$175,000	$5,000	$379,072	$8,990,699
21 to 22	3000	$18,000	1,280	$89,600	1,162	$17,424	2,560	$23,040	4,332	$10,830			2,830	$42,451	5280	$21,120					4	$6,000							$228,465	$9,219,164
22 to 23	3000	$18,000	1,280	$89,600	1,162	$17,424	2,560	$23,040	4,332	$10,830			2,830	$42,451	5280	$21,120					2	$3,000	1	$3,200					$228,665	$9,447,830
23 to 24	3000	$18,000	1,280	$89,600	1,162	$17,424	2,560	$23,040	4,332	$10,830			2,830	$42,451	5280	$21,120					1	$1,500							$223,965	$9,671,795
24 to 25	3000	$18,000	1,280	$89,600	1,162	$17,424	2,560	$23,040	4,332	$10,830			2,830	$42,451	5280	$21,120					3	$4,500	1	$3,200	164	$90,200	$350,000	$5,000	$675,365	$10,347,160
25 to 26	3000	$18,000	1,022	$71,570	788	$11,814	2,045	$18,404	4,332	$10,830			2,344	$35,158	5280	$21,120					4	$6,000	4	$12,800					$205,696	$10,552,855
26 to 27	3000	$18,000	1,280	$89,600	1,162	$17,424	2,560	$23,040	4,332	$10,830			2,830	$42,451	5280	$21,120	1	$20,000	33.5	$43,638	3	$4,500	1	$3,200	138	$75,900		$15,000	$384,703	$10,937,558
27 to 28	3000	$18,000	1,219	$85,358	1,074	$16,104	2,439	$21,949	4,332	$10,830			2,716	$40,735	5280	$21,120					3	$4,500	1	$3,200	48	$26,400		$10,000	$258,196	$11,195,754
28 to 29	3000	$18,000	1,219	$85,358	1,074	$16,104	2,439	$21,949	4,332	$10,830			2,716	$40,735	5280	$21,120					2	$3,000							$217,096	$11,412,850
29 to 30	3000	$18,000	1,280	$89,600	1,162	$17,424	2,560	$23,040	4,332	$10,830			2,830	$42,451	5280	$21,120	2	$45,000	10	$24,250	3	$4,500	1	$3,200	58	$31,900		$5,000	$336,315	$11,749,165
30 to 31	3000	$18,000	1,280	$89,600	1,162	$17,424	2,560	$23,040	4,332	$10,830			2,830	$42,451	5280	$21,120	1	$40,000	10	$24,250	2	$3,000							$289,715	$12,038,880
31 to 32	3000	$18,000	795	$55,661	458	$6,864	1,590	$14,313	4,332	$10,830			1,915	$28,723	5280	$21,120					2	$3,000			45	$24,750	$175,000		$358,261	$12,397,141
32 to 33	3000	$18,000	1,128	$78,994	942	$14,124	2,257	$20,313	4,332	$10,830			2,544	$38,161	5280	$21,120	1	$56,000			4	$6,000	1	$3,200					$266,742	$12,663,883
33 to 34	3000	$18,000	1,189	$83,236	1,030	$15,444	2,378	$21,404	4,332	$10,830			2,658	$39,877	5280	$21,120	1	$5,000			3	$4,500	1	$3,200	18	$9,900			$232,511	$12,896,394
34 to 35	3000	$18,000	1,189	$83,236	1,030	$15,444	2,378	$21,404	4,332	$10,830			2,658	$39,877	5280	$21,120					2	$3,000			42	$23,100		$5,000	$241,011	$13,137,405
35 to 36	3000	$18,000	1,280	$89,600	1,162	$17,424	2,560	$23,040	4,332	$10,830			2,830	$42,451	5280	$21,120					3	$4,500	1	$3,200	24	$13,200		$5,000	$248,365	$13,385,770
36 to 37	3000	$18,000	856	$59,903	546	$8,184	1,712	$15,404	4,332	$10,830			2,029	$30,439	5280	$21,120	1	$10,000	183	$166,975	3	$4,500							$345,355	$13,731,125
37 to 38	3000	$18,000	480	$33,600	0	$0	960	$8,640	4,332	$10,830			1,320	$19,800	5280	$21,120	2	$85,000	15.5	$28,788	3	$4,500	1	$3,200	74	$40,700		$10,000	$284,178	$14,015,303
38 to 39	3000	$18,000	719	$50,358	348	$5,214	1,439	$12,949	4,332	$10,830			1,772	$26,578	5280	$21,120	1	$16,000	15	$28,375	1	$1,500	1	$3,200	110	$60,500	$175,000	$5,000	$434,624	$14,449,927
39 to 40	3000	$18,000	480	$33,600	0	$0	960	$8,640	4,332	$10,830			1,320	$19,800	5280	$21,120	1	$20,000			1	$1,500							$133,490	$14,583,417
40 to 41	3000	$18,000	1,083	$75,812	876	$13,134	2,166	$19,495	4,332	$10,830			2,458	$36,874	5280	$21,120					2	$3,000			66	$36,300		$10,000	$244,565	$14,827,981
41 to 42	3000	$18,000	1,128	$78,994	942	$14,124	2,257	$20,313	4,332	$10,830			2,544	$38,161	5280	$21,120	1	$15,000	45	$53,125	3	$4,500			82	$45,100	$175,000		$494,267	$15,322,248
42 to 43	3000	$18,000	1,007	$70,509	766	$11,484	2,015	$18,131	4,332	$10,830			2,315	$34,729	5280	$21,120					2	$3,000				$0			$187,803	$15,510,051
43 to 44	3000	$18,000	1,174	$82,176	1,008	$15,114	2,348	$21,131	4,332	$10,830			2,630	$39,448	5280	$21,120	1	$35,000	56	$62,200	1	$1,500	2	$6,400	133	$73,150		$15,000	$401,069	$15,911,120
44 to 45	3000	$18,000	1,280	$89,600	1,162	$17,424	2,560	$23,040	4,332	$10,830			2,830	$42,451	5280	$21,120					3	$4,500	3	$9,600					$236,565	$16,147,686
45 to 46	3000	$18,000	1,280	$89,600	1,162	$17,424	2,560	$23,040	4,332	$10,830			2,830	$42,451	5280	$21,120					3	$4,500	1	$3,200					$230,165	$16,377,851
46 to 47	3000	$18,000	1,219	$85,358	1,074	$16,104	2,439	$21,949	4,332	$10,830			2,716	$40,735	5280	$21,120	1	$15,000	28	$39,100	2	$3,000			88	$48,400	$175,000		$494,596	$16,872,447
48 to 49	3000	$18,000	571	$39,964	132	$1,980	1,142	$10,276	4,332	$10,830			1,492	$22,374	5280	$21,120					1	$1,500	1	$3,200					$129,244	$17,001,691
49 to 50	3000	$18,000	1,007	$70,509	766	$11,484	2,015	$18,131	4,332	$10,830			2,315	$34,729	5280	$21,120					4	$6,000			87	$47,850		$10,000	$248,653	$17,250,344
50 to 51	3000	$18,000	1,144	$80,055	964	$14,454	2,287	$20,585	4,332	$10,830			2,573	$38,590	5280	$21,120					3	$4,500			38	$20,900	$175,000	$5,000	$409,034	$17,659,378
51 to 51.13	600	$3,600	62	$4,327	0	$0	124	$1,113	563	$1,408			172	$2,573	686	$2,744					1	$1,500							$17,264	$17,676,642
ITEM TOTAL	137,400	$824,400	58,112	$4,067,836	52,823	$792,338	116,224	$1,046,015	174,948	$437,370			128,456	$1,926,840	258,561	$1,034,244	23	$671,000	884	$953,300	129	$193,500	37	$118,400	2499	$1,374,450		$2,610,000		
AVERAGE COST PER MILE	2,748	$16,488	1,162	$81,357	1,056	$15,847	1,937	$20,920	3,499	$8,747			2,569	$38,537	5,171	$20,685	0.46	$13,420	17.68	$19,066	2.58	$3,870			49.98	$27,489		$52,200		$353,533

Plus $16,000 per bridge
for complete removal
and replacement
of track for 40 feet on
both ends

MOUNTAIN DIVISION
COST ESTIMATE FOR FRA CLASS 2 TRACK CONDITION
MAINE SEGMENT, INCLUDING CURRENT PAN AM SECTION

MILE	DITCHING		TIES		SUB GRADE EXCAV.		TIE PLATES		RAIL ANCHORS		RAIL		BALLAST		SURFACING		BRIDGE REPAIRS		BRIDGE DECKS		SMALL CULVERTS		GRADE CROSSINGS PRIVATE		GRADE CROSSINGS PUBLIC		WARNING SYSTEM ACTIVE	WARNING SYSTEM PASSIVE	TOTAL COST PER MILE	CUMULATIVE COST
	UNIT COST $6.00	LF	UNIT COST $70.00	EA	UNIT COST $15.00	CY	UNIT COST $9.00	EA	UNIT COST $2.50	EA	UNIT COST $65.00	TF	UNIT COST $15.00	TON	UNIT COST $4.00	TF	UNIT COST Varies	EA	UNIT COST $825.00	LF	UNIT COST $1,500	EA	UNIT COST $3,200	EA	UNIT COST $550	LF	$175,000	$5,000		
	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost				
1.16 to 2	500	$3,000	455	$31,841	0	$0.00	910	$8,188	600	$1,500	0	$0	147	$2,205	4435	$17,740					3	$4,500			56	$30,800			$99,774	$99,774
2 to 3	1200	$7,200	542	$37,908	0	$0	1,083	$9,748	1,200	$3,000	0	$0	175	$2,625	5280	$21,120					3	$4,500			193	$106,150			$192,250	$292,024
3 to 4	1200	$7,200	542	$37,908	0	$0	1,083	$9,748	1,200	$3,000	0	$0	175	$2,625	5280	$21,120					4	$6,000			42	$23,100			$110,700	$402,724
4 to 5	1200	$7,200	542	$37,908	0	$0	1,083	$9,748	1,200	$3,000	0	$0	175	$2,625	5280	$21,120					3	$4,500			108	$59,400			$145,500	$548,225
5 to 6	1200	$7,200	1,379	$96,564	348	$5,214	2,759	$24,831	1,200	$3,000	0	$0	627	$9,403	5280	$21,120	2	$145,000	326	$300,950	2	$3,000			309	$169,950			$786,232	$1,334,457
6 to 7	2500	$15,000	2,700	$189,000	2376	$35,640	5,400	$48,600	600	$1,500	3170	$206,050	4,041	$60,615	5280	$21,120					2	$3,000	2	$6,400	82	$45,100	$350,000		$982,025	$2,316,482
7 to 8	3000	$18,000	3,160	$221,200	3960	$59,400	6,320	$56,880			5280	$343,200	6,732	$100,980	5280	$21,120	1	$5,000			2	$3,000	1	$3,200	28	$15,400	$175,000	$5,000	$1,027,380	$3,343,862
8 to 9	3000	$18,000	3,160	$221,200	3960	$59,400	6,320	$56,880			5280	$343,200	6,732	$100,980	5280	$21,120					3	$4,500	1	$3,200					$828,480	$4,172,342
9 to 10	3000	$18,000	3,160	$221,200	3960	$59,400	6,320	$56,880			5280	$343,200	6,732	$100,980	5280	$21,120	1	$5,000			3	$4,500	1	$3,200					$833,480	$5,005,822
10 to 11	3000	$18,000	3,160	$221,200	3960	$59,400	6,320	$56,880			5280	$343,200	6,732	$100,980	5280	$21,120	1	$19,000	28	$39,100	2	$3,000	1	$3,200	76	$41,800	$175,000		$1,101,880	$6,107,702
11 to 12	3000	$18,000	1,964	$137,480	1,561	$23,412	3,928	$35,352	3,769	$9,422	740	$48,100	2,695	$40,425	5280	$21,120	1	$5,000			3	$4,500	2	$6,400	60	$33,000	$175,000		$557,211	$6,664,913
12 to 13	3000	$18,000	1,760	$123,200	1,162	$17,424	3,520	$31,680	4,332	$10,830			3,252	$48,787	5280	$21,120	1	$105,000	105	$102,625	3	$4,500	1	$3,200	60	$33,000		$15,000	$534,366	$7,199,279
13 to 14	3000	$18,000	1,760	$123,200	1,162	$17,424	3,520	$31,680	4,332	$10,830			3,252	$48,787	5280	$21,120					2	$3,000	2	$6,400	120	$66,000	$175,000	$10,000	$531,441	$7,730,720
14 to 15	3000	$18,000	1,669	$116,836	1,030	$15,444	3,338	$30,044	4,332	$10,830			3,081	$46,213	5280	$21,120					3	$4,500	2	$6,400	24	$13,200		$5,000	$287,587	$8,018,307
15 to 16	3000	$18,000	1,760	$123,200	1,162	$17,424	3,520	$31,680	4,332	$10,830			3,252	$48,787	5280	$21,120	1	$5,000			4	$6,000	1	$3,200					$285,241	$8,303,548
16 to 17	3000	$18,000	1,596	$111,720	921	$13,820	3,192	$28,728	4,332	$10,830			2,940	$44,103	5280	$21,120					2	$3,000			50	$27,500		$10,000	$288,821	$8,592,369
17 to 18	3000	$18,000	960	$67,200	0	$0	1,920	$17,280	4,332	$10,830			1,742	$26,136	5280	$21,120					2	$3,000							$163,566	$8,755,935
18 to 19	3000	$18,000	1,533	$107,291	832	$12,474	3,065	$27,589	4,332	$10,830			2,823	$42,352	5280	$21,120	1	$20,000	29	$39,925	3	$4,500	1	$3,200	24	$13,200		$5,000	$325,481	$9,081,416
19 to 20	3000	$18,000	1,260	$88,200	436	$6,534	2,520	$22,680	4,332	$10,830			2,309	$34,630	5280	$21,120					3	$4,500	1	$3,200				$5,000	$214,694	$9,296,111
20 to 21	3000	$18,000	1,351	$94,564	568	$8,514	2,702	$24,316	4,332	$10,830			2,480	$37,204	5280	$21,120					3	$4,500			52	$28,600	$175,000	$5,000	$427,648	$9,723,759
21 to 22	3000	$18,000	1,760	$123,200	1,162	$17,424	3,520	$31,680	4,332	$10,830			3,252	$48,787	5280	$21,120					4	$6,000							$277,041	$10,000,800
22 to 23	3000	$18,000	1,760	$123,200	1,162	$17,424	3,520	$31,680	4,332	$10,830			3,252	$48,787	5280	$21,120					2	$3,000	1	$3,200					$277,241	$10,278,041
23 to 24	3000	$18,000	1,760	$123,200	1,162	$17,424	3,520	$31,680	4,332	$10,830			3,252	$48,787	5280	$21,120					1	$1,500							$272,541	$10,550,582
24 to 25	3000	$18,000	1,760	$123,200	1,162	$17,424	3,520	$31,680	4,332	$10,830			3,252	$48,787	5280	$21,120					3	$4,500	1	$3,200	164	$90,200	$350,000	$5,000	$723,941	$11,274,524
25 to 26	3000	$18,000	1,502	$105,170	788	$11,814	3,005	$27,044	4,332	$10,830			2,766	$41,494	5280	$21,120					4	$6,000	4	$12,800					$254,272	$11,528,795
26 to 27	3000	$18,000	1,760	$123,200	1,162	$17,424	3,520	$31,680	4,332	$10,830			3,252	$48,787	5280	$21,120	1	$20,000	33.5	$43,638	3	$4,500	1	$3,200	138	$75,900		$15,000	$433,279	$11,962,074
27 to 28	3000	$18,000	1,699	$118,958	1,074	$16,104	3,399	$30,589	4,332	$10,830			3,138	$47,071	5280	$21,120					3	$4,500	1	$3,200	48	$26,400		$10,000	$306,772	$12,268,846
28 to 29	3000	$18,000	1,699	$118,958	1,074	$16,104	3,399	$30,589	4,332	$10,830			3,138	$47,071	5280	$21,120					2	$3,000							$265,672	$12,534,518
29 to 30	3000	$18,000	1,760	$123,200	1,162	$17,424	3,520	$31,680	4,332	$10,830			3,252	$48,787	5280	$21,120	2	$45,000	10	$24,250	3	$4,500	1	$3,200	58	$31,900		$5,000	$384,891	$12,919,409
30 to 31	3000	$18,000	1,760	$123,200	1,162	$17,424	3,520	$31,680	4,332	$10,830			3,252	$48,787	5280	$21,120	1	$40,000	10	$24,250	2	$3,000							$338,291	$13,257,700
31 to 32	3000	$18,000	1,275	$89,261	458	$6,864	2,550	$22,953	4,332	$10,830			2,337	$35,059	5280	$21,120					2	$3,000			45	$24,750	$175,000		$406,837	$13,664,537
32 to 33	3000	$18,000	1,608	$112,594	942	$14,124	3,217	$28,953	4,332	$10,830			2,966	$44,497	5280	$21,120	1	$56,000			4	$6,000	1	$3,200					$315,318	$13,979,854
33 to 34	3000	$18,000	1,669	$116,836	1,030	$15,444	3,338	$30,044	4,332	$10,830			3,081	$46,213	5280	$21,120	1	$5,000			3	$4,500	1	$3,200	18	$9,900			$281,087	$14,260,942
34 to 35	3000	$18,000	1,669	$116,836	1,030	$15,444	3,338	$30,044	4,332	$10,830			3,081	$46,213	5280	$21,120					2	$3,000			42	$23,100		$5,000	$289,587	$14,550,529
35 to 36	3000	$18,000	1,760	$123,200	1,162	$17,424	3,520	$31,680	4,332	$10,830			3,252	$48,787	5280	$21,120					3	$4,500	1	$3,200	24	$13,200		$5,000	$296,941	$14,847,470
36 to 37	3000	$18,000	1,336	$93,503	546	$8,184	2,672	$24,044	4,332	$10,830			2,452	$36,775	5280	$21,120	1	$10,000	183	$166,975	3	$4,500							$393,931	$15,241,401
37 to 38	3000	$18,000	960	$67,200	0	$0	1,920	$17,280	4,332	$10,830			1,742	$26,136	5280	$21,120	2	$85,000	15.5	$28,788	3	$4,500	1	$3,200	74	$40,700		$10,000	$332,754	$15,574,154
38 to 39	3000	$18,000	1,199	$83,958	348	$5,214	2,399	$21,589	4,332	$10,830			2,194	$32,914	5280	$21,120	1	$16,000	15	$28,375	1	$1,500	1	$3,200	110	$60,500	$175,000	$5,000	$483,200	$16,057,354
39 to 40	3000	$18,000	960	$67,200	0	$0	1,920	$17,280	4,332	$10,830			1,742	$26,136	5280	$21,120	1	$20,000			1	$1,500							$182,066	$16,239,420
40 to 41	3000	$18,000	1,563	$109,412	876	$13,134	3,126	$28,135	4,332	$10,830			2,881	$43,210	5280	$21,120					2	$3,000			66	$36,300		$10,000	$293,141	$16,532,561
41 to 42	3000	$18,000	1,608	$112,594	942	$14,124	3,217	$28,953	4,332	$10,830			2,966	$44,497	5280	$21,120	1	$15,000	45	$53,125	3	$4,500			82	$45,100	$175,000		$542,843	$17,075,404
42 to 43	3000	$18,000	1,487	$104,109	766	$11,484	2,975	$26,771	4,332	$10,830			2,738	$41,065	5280	$21,120					2	$3,000				$0			$236,379	$17,311,783
43 to 44	3000	$18,000	1,654	$115,776	1,008	$15,114	3,308	$29,771	4,332	$10,830			3,052	$45,784	5280	$21,120	1	$35,000	56	$62,200	1	$1,500	2	$6,400	133	$73,150		$15,000	$449,645	$17,761,428
44 to 45	3000	$18,000	1,760	$123,200	1,162	$17,424	3,520	$31,680	4,332	$10,830			3,252	$48,787	5280	$21,120					3	$4,500	3	$9,600					$285,141	$18,046,569
45 to 46	3000	$18,000	1,760	$123,200	1,162	$17,424	3,520	$31,680	4,332	$10,830			3,252	$48,787	5280	$21,120					3	$4,500	1	$3,200					$278,741	$18,325,310
46 to 47	3000	$18,000	1,699	$118,958	1,074	$16,104	3,399	$30,589	4,332	$10,830			3,138	$47,071	5280	$21,120	1	$15,000	28	$39,100	2	$3,000			88	$48,400	$175,000		$543,172	$18,868,482
48 to 49	3000	$18,000	1,051	$73,564	132	$1,980	2,102	$18,916	4,332	$10,830			1,914	$28,710	5280	$21,120					1	$1,500	1	$3,200					$177,820	$19,046,302
49 to 50	3000	$18,000	1,487	$104,109	766	$11,484	2,975	$26,771	4,332	$10,830			2,738	$41,065	5280	$21,120					4	$6,000			87	$47,850		$10,000	$297,229	$19,343,532
50 to 51	3000	$18,000	1,624	$113,655	964	$14,454	3,247	$29,225	4,332	$10,830			2,995	$44,926	5280	$21,120					3	$4,500			38	$20,900	$175,000	$5,000	$457,610	$19,801,142
51 to 51.13	600	$3,600	124	$8,655	0	$0	247	$2,225	563	$1,408			226	$3,396	686	$2,744					1	$1,500							$23,528	$19,824,669
ITEM TOTAL	137,400	$824,400	79,887	$5,592,122	52,823	$792,338	159,775	$1,437,974	174,948	$437,370			143,908	$2,158,621	258,561	$1,034,244	23	$671,000	884	$953,300	129	$193,500	37	$118,400	2499	$1,374,450		$2,610,000		
AVERAGE COST PER MILE	2,748	$16,488	1,598	$111,842	1,056	$15,847	2,663	$28,759	3,499	$8,747			2,878	$43,172	5,171	$20,685	0.46	$13,420	17.68	$19,066	2.58	$3,870			49.98	$27,489		$52,200		$396,493

Plus $16,000 per bridge for complete removal and replacement of track for 40 feet on both ends

MOUNTAIN DIVISION
COST ESTIMATE FOR FRA CLASS 3 TRACK CONDITION
MAINE SEGMENT, INCLUDING CURRENT PAN AM SECTION

MILE	DITCHING		TIES		SUB GRADE EXCAV.		TIE PLATES		RAIL		BALLAST		SURFACING		BRIDGE REPAIRS		BRIDGE DECKS		SMALL CULVERTS		GRADE CROSSINGS PRIVATE		GRADE CROSSINGS PUBLIC		WARNING SYSTEM ACTIVE	WARNING SYSTEM PASSIVE	TOTAL COST PER MILE	CUMULATIVE COST
	UNIT COST $6.00	LF	UNIT COST $70.00	EA	UNIT COST $15.00	CY	UNIT COST $25.00	EA	UNIT COST $65.00	TF	UNIT COST $15.00	TON	UNIT COST $4.00	TF	UNIT COST Varies	EA	UNIT COST $825.00	LF	UNIT COST $1,500	EA	UNIT COST $3,200	EA	UNIT COST $550	LF	$175,000	$5,000		
	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost				
1.16 to 2	500	$3,000	1,137	$79,603	0	$0.00	569	$14,215	0	$0	147	$2,205	4435	$17,740					3	$4,500			56	$30,800			$152,062	$152,062
2 to 3	1200	$7,200	1,354	$94,769	0	$0	677	$16,923	0	$0	175	$2,625	5280	$21,120					3	$4,500			193	$106,150			$253,287	$405,350
3 to 4	1200	$7,200	1,354	$94,769	0	$0	677	$16,923	0	$0	175	$2,625	5280	$21,120					4	$6,000			42	$23,100			$171,737	$577,087
4 to 5	1200	$7,200	1,354	$94,769	0	$0	677	$16,923	0	$0	175	$2,625	5280	$21,120					3	$4,500			108	$59,400			$206,537	$783,624
5 to 6	1200	$7,200	2,578	$180,456	348	$5,214	1,289	$32,224	0	$0	627	$9,403	5280	$21,120	2	$145,000	326	$300,950	2	$3,000			309	$169,950			$874,518	$1,658,142
6 to 7	2500	$15,000	2,900	$203,000	2376	$35,640	5,800	$145,000	3170	$206,050	4,041	$60,615	5280	$21,120					2	$3,000	2	$6,400	82	$45,100	$350,000		$1,090,925	$2,749,067
7 to 8	3000	$18,000	3,160	$221,200	3960	$59,400	6,320	$158,000	5280	$343,200	6,732	$100,980	5280	$21,120	1	$5,000			2	$3,000	1	$3,200	28	$15,400	$175,000	$5,000	$1,128,500	$3,877,567
8 to 9	3000	$18,000	3,160	$221,200	3960	$59,400	6,320	$158,000	5280	$343,200	6,732	$100,980	5280	$21,120					3	$4,500	1	$3,200					$929,600	$4,807,167
9 to 10	3000	$18,000	3,160	$221,200	3960	$59,400	6,320	$158,000	5280	$343,200	6,732	$100,980	5280	$21,120	1	$5,000			3	$4,500	1	$3,200					$934,600	$5,741,767
10 to 11	3000	$18,000	3,160	$221,200	3960	$59,400	6,320	$158,000	5280	$343,200	6,732	$100,980	5280	$21,120	1	$19,000	28	$39,100	2	$3,000	1	$3,200	76	$41,800	$175,000		$1,203,000	$6,944,767
11 to 12	3000	$18,000	2,514	$175,980	1,561	$23,412	6,320	$158,000	5280	$343,200	5,532	$82,986	5280	$21,120	1	$5,000			3	$4,500	2	$6,400	60	$33,000	$175,000		$1,046,597	$7,991,364
12 to 13	3000	$18,000	2,400	$168,000	1,162	$17,424	6,320	$158,000	5280	$343,200	5,333	$79,992	5280	$21,120	1	$105,000	105	$102,625	3	$4,500	1	$3,200	60	$33,000		$15,000	$1,069,061	$9,060,425
13 to 14	3000	$18,000	2,400	$168,000	1,162	$17,424	6,320	$158,000	5280	$343,200	5,333	$79,992	5280	$21,120					2	$3,000	2	$6,400	120	$66,000	$175,000	$10,000	$1,066,136	$10,126,561
14 to 15	3000	$18,000	2,327	$162,909	1,030	$15,444	6,320	$158,000	5280	$343,200	5,267	$79,002	5280	$21,120					3	$4,500	2	$6,400	24	$13,200		$5,000	$826,775	$10,953,337
15 to 16	3000	$18,000	2,400	$168,000	1,162	$17,424	6,320	$158,000	5280	$343,200	5,333	$79,992	5280	$21,120	1	$5,000			4	$6,000	1	$3,200					$819,936	$11,773,273
16 to 17	3000	$18,000	2,270	$158,921	921	$13,820	6,320	$158,000	5280	$343,200	5,213	$78,190	5280	$21,120					2	$3,000			50	$27,500		$10,000	$831,752	$12,605,024
17 to 18	3000	$18,000	1,760	$123,200	0	$0	6,320	$158,000	5280	$343,200	4,752	$71,280	5280	$21,120					2	$3,000							$737,800	$13,342,824
18 to 19	3000	$18,000	2,218	$155,273	832	$12,474	6,320	$158,000	5280	$343,200	5,168	$77,517	5280	$21,120	1	$20,000	29	$39,925	3	$4,500	1	$3,200	24	$13,200		$5,000	$871,409	$14,214,233
19 to 20	3000	$18,000	2,000	$140,000	436	$6,534	6,320	$158,000	5280	$343,200	4,970	$74,547	5280	$21,120					3	$4,500	1	$3,200				$5,000	$774,101	$14,988,334
20 to 21	3000	$18,000	2,073	$145,091	568	$8,514	6,320	$158,000	5280	$343,200	5,036	$75,537	5280	$21,120					3	$4,500			52	$28,600	$175,000	$5,000	$982,562	$15,970,896
21 to 22	3000	$18,000	2,400	$168,000	1,162	$17,424	6,320	$158,000	5280	$343,200	5,333	$79,992	5280	$21,120					4	$6,000							$811,736	$16,782,632
22 to 23	3000	$18,000	2,400	$168,000	1,162	$17,424	6,320	$158,000	5280	$343,200	5,333	$79,992	5280	$21,120					2	$3,000	1	$3,200					$811,936	$17,594,568
23 to 24	3000	$18,000	2,400	$168,000	1,162	$17,424	6,320	$158,000	5280	$343,200	5,333	$79,992	5280	$21,120					1	$1,500							$807,236	$18,401,804
24 to 25	3000	$18,000	2,400	$168,000	1,162	$17,424	6,320	$158,000	5280	$343,200	5,333	$79,992	5280	$21,120					3	$4,500	1	$3,200	164	$90,200	$350,000	$5,000	$1,258,636	$19,660,440
25 to 26	3000	$18,000	2,194	$153,576	788	$11,814	6,320	$158,000	5280	$343,200	5,146	$77,187	5280	$21,120					4	$6,000	4	$12,800					$801,697	$20,462,137
26 to 27	3000	$18,000	2,400	$168,000	1,162	$17,424	6,320	$158,000	5280	$343,200	5,333	$79,992	5280	$21,120	1	$20,000	33.5	$43,638	3	$4,500	1	$3,200	138	$75,900		$15,000	$967,974	$21,430,110
27 to 28	3000	$18,000	2,352	$164,606	1,074	$16,104	6,320	$158,000	5280	$343,200	5,289	$79,332	5280	$21,120					3	$4,500	1	$3,200	48	$26,400		$10,000	$844,462	$22,274,572
28 to 29	3000	$18,000	2,352	$164,606	1,074	$16,104	6,320	$158,000	5280	$343,200	5,289	$79,332	5280	$21,120					2	$3,000							$803,362	$23,077,934
29 to 30	3000	$18,000	2,400	$168,000	1,162	$17,424	6,320	$158,000	5280	$343,200	5,333	$79,992	5280	$21,120	2	$45,000	10	$24,250	3	$4,500	1	$3,200	58	$31,900		$5,000	$919,586	$23,997,520
30 to 31	3000	$18,000	2,400	$168,000	1,162	$17,424	6,320	$158,000	5280	$343,200	5,333	$79,992	5280	$21,120	1	$40,000	10	$24,250	2	$3,000							$872,986	$24,870,506
31 to 32	3000	$18,000	2,012	$140,848	458	$6,864	6,320	$158,000	5280	$343,200	4,981	$74,712	5280	$21,120					2	$3,000			45	$24,750	$175,000		$965,494	$25,836,001
32 to 33	3000	$18,000	2,279	$159,515	942	$14,124	6,320	$158,000	5280	$343,200	5,223	$78,342	5280	$21,120	1	$56,000			4	$6,000	1	$3,200					$857,501	$26,693,502
33 to 34	3000	$18,000	2,327	$162,909	1,030	$15,444	6,320	$158,000	5280	$343,200	5,267	$79,002	5280	$21,120	1	$5,000			3	$4,500	1	$3,200	18	$9,900			$820,275	$27,513,777
34 to 35	3000	$18,000	2,327	$162,909	1,030	$15,444	6,320	$158,000	5280	$343,200	5,267	$79,002	5280	$21,120					2	$3,000			42	$23,100		$5,000	$828,775	$28,342,552
35 to 36	3000	$18,000	2,400	$168,000	1,162	$17,424	6,320	$158,000	5280	$343,200	5,333	$79,992	5280	$21,120					3	$4,500	1	$3,200	24	$13,200		$5,000	$831,636	$29,174,188
36 to 37	3000	$18,000	2,061	$144,242	546	$8,184	6,320	$158,000	5280	$343,200	5,025	$75,372	5280	$21,120	1	$10,000	183	$166,975	3	$4,500							$949,593	$30,123,782
37 to 38	3000	$18,000	1,760	$123,200	0	$0	6,320	$158,000	5280	$343,200	4,752	$71,280	5280	$21,120	2	$85,000	15.5	$28,788	3	$4,500	1	$3,200	74	$40,700		$10,000	$906,988	$31,030,769
38 to 39	3000	$18,000	1,952	$136,606	348	$5,214	6,320	$158,000	5280	$343,200	4,926	$73,887	5280	$21,120	1	$16,000	15	$28,375	1	$1,500	1	$3,200	110	$60,500	$175,000	$5,000	$1,045,602	$32,076,371
39 to 40	3000	$18,000	1,760	$123,200	0	$0	6,320	$158,000	5280	$343,200	4,752	$71,280	5280	$21,120	1	$20,000			1	$1,500							$756,300	$32,832,671
40 to 41	3000	$18,000	2,242	$156,970	876	$13,134	6,320	$158,000	5280	$343,200	5,190	$77,847	5280	$21,120					2	$3,000			66	$36,300		$10,000	$837,571	$33,670,242
41 to 42	3000	$18,000	2,279	$159,515	942	$14,124	6,320	$158,000	5280	$343,200	5,223	$78,342	5280	$21,120	1	$15,000	45	$53,125	3	$4,500			82	$45,100	$175,000		$1,085,026	$34,755,268
42 to 43	3000	$18,000	2,182	$152,727	766	$11,484	6,320	$158,000	5280	$343,200	5,135	$77,022	5280	$21,120					2	$3,000				$0			$784,553	$35,539,821
43 to 44	3000	$18,000	2,315	$162,061	1,008	$15,114	6,320	$158,000	5280	$343,200	5,256	$78,837	5280	$21,120	1	$35,000	56	$62,200	1	$1,500	2	$6,400	133	$73,150		$15,000	$989,582	$36,529,403
44 to 45	3000	$18,000	2,400	$168,000	1,162	$17,424	6,320	$158,000	5280	$343,200	5,333	$79,992	5280	$21,120					3	$4,500	3	$9,600					$819,836	$37,349,239
45 to 46	3000	$18,000	2,400	$168,000	1,162	$17,424	6,320	$158,000	5280	$343,200	5,333	$79,992	5280	$21,120					3	$4,500	1	$3,200					$813,436	$38,162,675
46 to 47	3000	$18,000	2,352	$164,606	1,074	$16,104	6,320	$158,000	5280	$343,200	5,289	$79,332	5280	$21,120	1	$15,000	28	$39,100	2	$3,000			88	$48,400	$175,000		$1,080,862	$39,243,537
48 to 49	3000	$18,000	1,833	$128,291	132	$1,980	6,320	$158,000	5280	$343,200	4,818	$72,270	5280	$21,120					1	$1,500	1	$3,200					$747,561	$39,991,098
49 to 50	3000	$18,000	2,182	$152,727	766	$11,484	6,320	$158,000	5280	$343,200	5,135	$77,022	5280	$21,120					4	$6,000			87	$47,850		$10,000	$845,403	$40,836,501
50 to 51	3000	$18,000	2,291	$160,364	964	$14,454	6,320	$158,000	5280	$343,200	5,234	$78,507	5280	$21,120					3	$4,500			38	$20,900	$175,000	$5,000	$999,045	$41,835,546
51 to 51.13	600	$3,600	227	$15,867	0	$0	822	$20,540	686.4	$44,616	618	$9,266	686	$2,744					1	$1,500							$98,133	$41,933,679
ITEM TOTAL	137,400	$824,400	110,956	$7,766,886	52,823	$792,338	282,270	$7,056,748			235,343	$3,530,147	258,561	$1,034,244	23	$671,000	884	$953,300	129	$193,500	37	$118,400	2499	$1,374,450		$2,610,000		
AVERAGE COST PER MILE	2,748	$16,488	2,219	$155,338	1,056	$15,847	4,704	$141,135			4,707	$70,603	5,171	$20,685	0.46	$13,420	17.68	$19,066	2.58	$3,870			49.98	$27,489		$52,200		$838,674

Plus $16,000 per bridge
for complete removal
and replacement
of track for 40 feet on
both ends

MOUNTAIN DIVISION

AVERAGE TIES PER MILE FOR FRA CLASS OF TRACK

MAINE SEGMENT, INCLUDING CURRENT PAN AM SECTION

			FRA CLASS 1			FRA CLASS 2			FRA CLASS 3		
MILE	LENGTH OF ROCK BALLAST WITHIN MILE	LENGTH OF GRAVEL BALLAST WITHIN MILE	AVERAGE TIES PER MILE IN ROCK LOCATIONS	AVERAGE TIES PER MILE IN GRAVEL BALLASTED LOCATIONS	TOTAL TIES PER MILE FOR CLASS	AVERAGE TIES PER MILE IN ROCK LOCATIONS	AVERAGE TIES PER MILE IN GRAVEL BALLASTED LOCATIONS	TOTAL TIES PER MILE FOR CLASS	AVERAGE TIES PER MILE IN ROCK LOCATIONS	AVERAGE TIES PER MILE IN GRAVEL BALLASTED LOCATIONS	TOTAL TIES PER MILE FOR CLASS
1.16 to 2	4435	0	0		0	455	0	455	1,137	0	1,137
2 to 3	5280		0		0	542	0	542	1,354	0	1,354
3 to 4	5280		0		0	542	0	542	1,354	0	1,354
4 to 5	5280		0		0	542	0	542	1,354	0	1,354
5 to 6	3700	1580	0	600	600	579	800	1,379	1,678	900	2,578
6 to 7	No track in place, MP 6.4 to 7		1900	600	2500	1900	800	2,700	1900	1000	2,900
7 to 8	No track in place		3160	0	3160	3160	0	3,160	3160	0	3,160
8 to 9	No track in place		3160	0	3160	3160	0	3,160	3160	0	3,160
8 to 10	No track in place		3160	0	3160	3160	0	3,160	3160	0	3,160
10 to 11	No track in place		3160	0	3160	3160	0	3,160	3160	0	3,160
11 to 12	No track in place, MP 11 to 11.14		450	1100	1550	450	1514	1,964	450	2064	2,514
12 to 13	0	5280	0	1280	1280	0	1,760	1,760	0	2,400	2,400
13 to 14	0	5280	0	1280	1280	0	1,760	1,760	0	2,400	2,400
14 to 15	600	4680	55	1,135	1,189	109	1,560	1,669	200	2,127	2,327
15 to 16	0	5280	0	1,280	1,280	0	1,760	1,760	0	2,400	2,400
16 to 17	1100	4188	100	1,015	1,115	200	1,396	1,596	367	1,904	2,270
17 to 18	5280	0	480	0	480	960	0	960	1,760	0	1,760
18 to 19	1500	3780	136	916	1,053	273	1,260	1,533	500	1,718	2,218
19 to 20	3300	1980	300	480	780	600	660	1,260	1,100	900	2,000
20 to 21	2700	2580	245	625	871	491	860	1,351	900	1,173	2,073
21 to 22	0	5280	0	1,280	1,280	0	1,760	1,760	0	2,400	2,400
22 to 23	0	5280	0	1,280	1,280	0	1,760	1,760	0	2,400	2,400
23 to 24	0	5280	0	1,280	1,280	0	1,760	1,760	0	2,400	2,400
24 to 25	0	5280	0	1,280	1,280	0	1,760	1,760	0	2,400	2,400
25 to 26	1700	3580	155	868	1,022	309	1,193	1,502	567	1,627	2,194
26 to 27	0	5280	0	1,280	1,280	0	1,760	1,760	0	2,400	2,400
27 to 28	400	4880	36	1,183	1,219	73	1,627	1,699	133	2,218	2,352
28 to 29	400	4880	36	1,183	1,219	73	1,627	1,699	133	2,218	2,352
29 to 30	0	5280	0	1,280	1,280	0	1,760	1,760	0	2,400	2,400
30 to 31	0	5280	0	1,280	1,280	0	1,760	1,760	0	2,400	2,400
31 to 32	3200	2080	291	504	795	582	693	1,275	1,067	945	2,012
32 to 33	1000	4280	91	1,038	1,128	182	1,427	1,608	333	1,945	2,279
33 to 34	600	4680	55	1,135	1,189	109	1,560	1,669	200	2,127	2,327
34 to 35	600	4680	55	1,135	1,189	109	1,560	1,669	200	2,127	2,327
35 to 36	0	5280	0	1,280	1,280	0	1,760	1,760	0	2,400	2,400
36 to 37	2800	2480	255	601	856	509	827	1,336	933	1,127	2,061
37 to 38	5280	0	480	0	480	960	0	960	1,760	0	1,760
38 to 39	3700	1580	336	383	719	673	527	1,199	1,233	718	1,952
39 to 40	5280	0	480	0	480	960	0	960	1,760	0	1,760
40 to 41	1300	3980	118	965	1,083	236	1,327	1,563	433	1,809	2,242
41 to 42	1000	4280	91	1,038	1,128	182	1,427	1,608	333	1,945	2,279
42 to 43	1800	3480	164	844	1,007	327	1,160	1,487	600	1,582	2,182
43 to 44	700	4580	64	1,110	1,174	127	1,527	1,654	233	2,082	2,315
44 to 45	0	5280	0	1,280	1,280	0	1,760	1,760	0	2,400	2,400
45 to 46	0	5280	0	1,280	1,280	0	1,760	1,760	0	2,400	2,400
46 to 47	400	4880	36	1,183	1,219	73	1,627	1,699	133	2,218	2,352
48 to 49	4680	600	425	145	571	851	200	1,051	1,560	273	1,833
49 to 50	1800	3480	164	844	1,007	327	1,160	1,487	600	1,582	2,182
50 to 51	900	4380	82	1,062	1,144	164	1,460	1,624	300	1,991	2,291
51 to 51.13	680	0	62	0	62	124	0	124	227	0	227
ITEM TOTAL					58,112 $4,067,836			79,887 $5,592,122			110,956 $7,766,886
AVERAGE COST PER MILE					$81,357			$111,842			$155,338

MOUNTAIN DIVISION

AVERAGE TIES PER MILE FOR FRA CLASS OF TRACK

NEW HAMPSHIRE SEGMENT - TO INTERVALE STATION

			FRA CLASS 1			FRA CLASS 2			FRA CLASS 3		
MILE	LENGTH OF ROCK BALLAST WITHIN MILE	LENGTH OF GRAVEL BALLAST WITHIN MILE	AVERAGE TIES PER MILE IN ROCK LOCATIONS	AVERAGE TIES PER MILE IN GRAVEL BALLASTED LOCATIONS	TOTAL TIES PER MILE FOR CLASS	AVERAGE TIES PER MILE IN ROCK LOCATIONS	AVERAGE TIES PER MILE IN GRAVEL BALLASTED LOCATIONS	TOTAL TIES PER MILE FOR CLASS	AVERAGE TIES PER MILE IN ROCK LOCATIONS	AVERAGE TIES PER MILE IN GRAVEL BALLASTED LOCATIONS	TOTAL TIES PER MILE FOR CLASS
51.13 to 52	4594	0	418	0	418	835	0	835	1,392	0	1,392
52 to 53	5280	0	480	0	480	960	0	960	1,600	0	1,600
53 to 54	5280	0	480	0	480	960	0	960	1,600	0	1,600
54 to 55	2400	2880	218	698	916	436	960	1,396	727	1309	2,036
55 to 56	3780	1500	344	364	707	687	500	1,187	1,145	682	1,827
56 to 57	5280	0	480	0	480	960	0	960	1,600	0	1,600
57 to 58	5280	0	480	0	480	960	0	960	1,600	0	1,600
58 to 59	5280	0	480	0	480	960	0	960	1,600	0	1,600
59 to 60	5280	0	New Section	0	0	New Section	0	0	New Section	0	0
60 to 61	5280	0	480	0	480	960	0	960	1,600	0	1,600
61 to 61.36	1900	0	173	0	173	345	0	345	576	0	576
ITEM TOTAL					5,094 $356,580			9,524 $666,705			15,432 $1,080,206
AVERAGE COST PER MILE					$7,132			$13,334			$21,604

MOUNTAIN DIVISION
COST ESTIMATE FOR FRA CLASS 1 TRACK CONDITION
NEW HAMPSHIRE SEGMENT TO INTERVALE STATION

MILE	CLEARING		DITCHING		TIES		SUB GRADE EXCAV.		TIE PLATES		RAIL		BALLAST		SURFACING		BRIDGE REPAIRS		BRIDGE DECKS		SMALL CULVERTS		GRADE CROSSINGS PRIVATE		GRADE CROSSINGS PUBLIC		WARNING SYSTEM ACTIVE	WARNING SYSTEM PASSIVE	TOTAL COST PER MILE	CUMULATIVE COST
	UNIT COST $9,000	MILE	UNIT COST $6.00	LF	UNIT COST $70.00	EA	UNIT COST $15.00	CY	UNIT COST $9.00	EA	UNIT COST $65.00	TF	UNIT COST $15.00	TON	UNIT COST $4.00	TF	UNIT COST Varies	EA	UNIT COST $825.00	LF	UNIT COST $1,500	EA	UNIT COST $3,200	EA	UNIT COST $450	LF	$175,000	$5,000		
	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost				
51.13 to 52	0.87	$7,830	2000	$12,000	418	$29,235	92	$1,378	835	$7,517		$0	1,215	$18,226	4,594	$18,374					2	$3,000	1	$3,200		$0			$100,760	$100,760
52 to 53	1	$9,000	3000	$18,000	480	$33,600	106	$1,584	960	$8,640		$0	1,457	$21,859	5,280	$21,120	1	$10,000			3	$4,500	1	$3,200	82	$36,900	$175,000		$168,403	$269,163
53 to 54	1	$9,000	3000	$18,000	480	$33,600	106	$1,584	960	$8,640		$0	1,457	$21,859	5,280	$21,120	1	$10,000			3	$4,500	2	$6,400		$0			$134,703	$403,867
54 to 55	1	$9,000	3000	$18,000	916	$64,145	202	$3,024	1,833	$16,495		$0	1,582	$23,731	5,280	$21,120					3	$4,500	2	$6,400	56	$25,200		$10,000	$201,615	$605,482
55 to 56	1	$9,000	1000	$6,000	707	$49,509	156	$2,334	1,415	$12,731		$0	1,522	$22,834	5,280	$21,120	1	$150,000	800	$676,000	2	$3,000	1	$3,200	60	$27,000	$175,000		$982,728	$1,588,210
56 to 57	0.7	$6,300	2000	$12,000	480	$33,600	106	$1,584	960	$8,640		$0	1,457	$21,859	5,280	$21,120					4	$6,000			120	$54,000		$15,000	$180,103	$1,768,313
57 to 58			2000	$12,000	480	$33,600	106	$1,584	960	$8,640		$0	1,457	$21,859	5,280	$21,120					2	$3,000	1	$3,200		$0			$105,003	$1,873,316
58 to 59			1000	$6,000	480	$33,600	106	$1,584	960	$8,640		$0	1,457	$21,859	5,280	$21,120					2	$3,000	1	$3,200					$99,003	$1,972,320
59 to 60				$0	0	$0	0	$0	0	$0		$0		$0	5,280	$21,120					3	$4,500							$25,620	$1,997,940
60 to 61			2000	$12,000	480	$33,600	106	$1,584	960	$8,640		$0	1,457	$21,859	5,280	$21,120					3	$4,500				$0			$103,303	$2,101,243
61 to 61.36			500	$3,000	173	$12,091	38	$570	345	$3,109		$0	525	$7,869	1,901	$7,603					1	$1,500			48	$21,600	$175,000	$5,000	$62,342	$2,163,585
ITEM TOTAL	5.57	$50,130	19,500	$117,000	5,094	$356,580	1,121	$16,810	10,188	$91,692			13,588	$203,815	54,014	$216,058	3	$170,000	800	$676,000	28	$42,000	9	$28,800	366	$164,700		$555,000		
AVERAGE COST PER MILE			1,906	$11,437	498	$34,856	110	$1,643	996	$8,963			1,328	$19,923	5,280	$21,120	0.2932551	$16,618	78.20137	$66,080	2.7370479	$4,106			35.7771261	$16,100		$54,252		$211,494

Plus $16,000 per bridge
for complete removal
and replacement
of track for 40 feet on
both ends

MOUNTAIN DIVISION
COST ESTIMATE FOR FRA CLASS 2 TRACK CONDITION
NEW HAMPSHIRE SEGMENT TO INTERVALE STATION

MILE	CLEARING		DITCHING		TIES		SUB GRADE EXCAV.		TIE PLATES		RAIL		BALLAST		SURFACING		BRIDGE REPAIRS		BRIDGE DECKS		SMALL CULVERTS		GRADE CROSSINGS PRIVATE		GRADE CROSSINGS PUBLIC		WARNING SYSTEM ACTIVE	WARNING SYSTEM PASSIVE	TOTAL COST PER MILE	CUMULATIVE COST
	UNIT COST $9,000	MILE	UNIT COST $6.00	LF	UNIT COST $70.00	EA	UNIT COST $15.00	CY	UNIT COST $9.00	EA	UNIT COST $65.00	TF	UNIT COST $15.00	TON	UNIT COST $4.00	TF	UNIT COST Varies	EA	UNIT COST $825.00	LF	UNIT COST $1,500	EA	UNIT COST $3,200	EA	UNIT COST $450	LF	$175,000	$5,000		
	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost				
51.13 to 52	0.87	$7,830	2000	$12,000	835	$58,469	184	$2,756.40	1,671	$15,035		$0	1,334	$20,017	4593.6	$18,374					2	$3,000	1	$3,200		$0			$132,852	$132,852
52 to 53	1	$9,000	3000	$18,000	960	$67,200	211	$3,168	1,920	$17,280		$0	1,595	$23,918	5280	$21,120	1	$10,000			3	$4,500	1	$3,200	82	$36,900	$175,000		$380,286	$513,139
53 to 54	1	$9,000	3000	$18,000	960	$67,200	211	$3,168	1,920	$17,280		$0	1,595	$23,918	5280	$21,120	1	$10,000			3	$4,500	2	$6,400		$0			$171,586	$684,725
54 to 55	1	$9,000	3000	$18,000	1,396	$97,745	307	$4,608	2,793	$25,135		$0	1,719	$25,790	5280	$21,120					3	$4,500	2	$6,400	56	$25,200		$10,000	$238,498	$923,223
55 to 56	1	$9,000	1000	$6,000	1,187	$83,109	261	$3,918	2,375	$21,371		$0	1,660	$24,893	5280	$21,120	1	$150,000	800	$676,000	2	$3,000	1	$3,200	60	$27,000	$175,000		$1,194,611	$2,117,835
56 to 57	0.7	$6,300	2000	$12,000	960	$67,200	211	$3,168	1,920	$17,280		$0	1,595	$23,918	5280	$21,120					4	$6,000			120	$54,000		$10,000	$214,686	$2,332,521
57 to 58			2000	$12,000	960	$67,200	211	$3,168	1,920	$17,280		$0	1,595	$23,918	5280	$21,120					2	$3,000	1	$3,200		$0			$150,886	$2,483,408
58 to 59			1000	$6,000	960	$67,200	211	$3,168	1,920	$17,280		$0	1,595	$23,918	5280	$21,120					2	$3,000	1	$3,200					$144,886	$2,628,294
59 to 60				$0	0	$0	0	$0	0	$0		$0		$0	5280	$21,120					3	$4,500							$25,620	$2,653,914
60 to 61			2000	$12,000	960	$67,200	211	$3,168	1,920	$17,280		$0	1,595	$23,918	5280	$21,120					3	$4,500				$0			$149,186	$2,803,100
61 to 61.36			500	$3,000	345	$24,182	76	$1,140	691	$6,218		$0	574	$8,610	1900.8	$7,603					1	$1,500			48	$21,600	$175,000	$5,000	$253,853	$3,056,954
ITEM TOTAL	5.57	$50,130	19,500	$117,000	9,524	$666,705	2,095	$31,430	19,049	$171,439			14,855	$222,822	54,014	$216,058	3	$170,000	800	$676,000	28	$42,000	9	$28,800	366	$164,700		$550,000		
AVERAGE COST PER MILE			1,906	$11,437	931	$65,172	205	$3,072	1,862	$16,758			1,452	$21,781	5,280	$21,120	0.2932551	$16,618	78.20137	$66,080	2.7370479	$4,106			35.7771261	$16,100		$53,763		$298,822

Plus $16,000 per bridge
for complete removal
and replacement
of track for 40 feet on
both ends

MOUNTAIN DIVISION
COST ESTIMATE FOR FRA CLASS 3 TRACK CONDITION
NEW HAMPSHIRE SEGMENT TO INTERVALE STATION

MILE	CLEARING		DITCHING		TIES		SUB GRADE EXCAV.		TIE PLATES		RAIL		BALLAST		SURFACING		BRIDGE REPAIRS		BRIDGE DECKS		SMALL CULVERTS		GRADE CROSSINGS PRIVATE		GRADE CROSSINGS PUBLIC		WARNING SYSTEM ACTIVE	WARNING SYSTEM PASSIVE	TOTAL COST PER MILE	CUMULATIVE COST
	UNIT COST $9,000	MILE	UNIT COST $6.00	LF	UNIT COST $70.00	EA	UNIT COST $15.00	CY	UNIT COST $18.00	EA	UNIT COST $65.00	TF	UNIT COST $15.00	TON	UNIT COST $4.00	TF	UNIT COST Varies	EA	UNIT COST $825.00	LF	UNIT COST $1,500	EA	UNIT COST $3,200	EA	UNIT COST $450	LF	$175,000	$5,000		
	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost				
51.13 to 52	0.87	$7,830	2000	$12,000	1,392	$97,448	306	$4,594	2,784	$50,116	4,382	$284,856	4,342	$65,135	4,594	$18,374					2	$3,000	1	$3,200		$0			$538,724	$538,724
52 to 53	1	$9,000	3000	$18,000	1,600	$112,000	352	$5,280	3,200	$57,600	5,280	$343,200	5,210	$78,144	5,280	$21,120	1	$10,000			3	$4,500	1	$3,200	82	$36,900	$175,000		$864,944	$1,403,668
53 to 54	1	$9,000	3000	$18,000	1,600	$112,000	352	$5,280	3,200	$57,600	5,280	$343,200	5,210	$78,144	5,280	$21,120	1	$10,000			3	$4,500	2	$6,400		$0			$656,244	$2,059,912
54 to 55	1	$9,000	3000	$18,000	2,036	$142,545	448	$6,720	4,073	$73,309	5,280	$343,200	5,334	$80,016	5,280	$21,120					3	$4,500	2	$6,400	56	$25,200		$10,000	$731,011	$2,790,922
55 to 56	1	$9,000	1000	$6,000	1,827	$127,909	402	$6,030	3,655	$65,782	5,280	$343,200	5,275	$79,119	5,280	$21,120	1	$150,000	800	$676,000	2	$3,000	1	$3,200	60	$27,000	$175,000		$1,683,360	$4,474,282
56 to 57	0.7	$6,300	2000	$12,000	1,600	$112,000	352	$5,280	3,200	$57,600	5,280	$343,200	5,210	$78,144	5,280	$21,120					4	$6,000			120	$54,000		$10,000	$699,344	$5,173,626
57 to 58			2000	$12,000	1,600	$112,000	352	$5,280	3,200	$57,600	5,280	$343,200	5,210	$78,144	5,280	$21,120					2	$3,000	1	$3,200					$635,544	$5,809,170
58 to 59			1000	$6,000	1,600	$112,000	352	$5,280	3,200	$57,600	5,280	$343,200	5,210	$78,144	5,280	$21,120					2	$3,000	1	$3,200					$629,544	$6,438,714
59 to 60				$0	0	$0	0	$0	0	$0		$0		$0	5,280	$21,120					3	$4,500							$25,620	$6,464,334
60 to 61			2000	$12,000	1,600	$112,000	352	$5,280	3,200	$57,600	5,280	$343,200	5,210	$78,144	5,280	$21,120					3	$4,500							$633,844	$7,098,178
61 to 61.36			500	$3,000	576	$40,303	127	$1,900	1,152	$20,727	1,901	$123,552	1,875	$28,131	1,901	$7,603					1	$1,500			48	$21,600	$175,000	$5,000	$428,316	$7,526,495
ITEM TOTAL	5.57	$50,130	19,500	$117,000	15,432	$1,080,206	3,395	$50,924	30,863	$555,535			48,084	$721,264	54,014	$216,058	3	$170,000	800	$676,000	28	$42,000	9	$28,800	366	$164,700		$550,000		
AVERAGE COST PER MILE			1,906	$11,437	1,508	$105,592	332	$4,978	3,017	$54,304			4,700	$70,505	5,280	$21,120	0.2932551	$16,618	78.20137	$66,080	3	$4,106			36	$16,100		$53,763		$735,728

Plus $16,000 per bridge
for complete removal
and replacement
of track for 40 feet on
both ends

CHAPTER 5

Freight Rail Opportunities

I. – INTRODUCTION

This chapter includes an analysis of the potential freight opportunities on the Mountain Division, various options to service those opportunities and estimates of revenue and operating cost as well as capital cost. The cost data is summarized at the rear of the Chapter.

The capital cost estimates assume that initially the railroad would be upgraded to an FRA Class 2 condition, using the existing 85 Lb rail and minimal to no bridge strengthening. Therefore the gross weight of cars would be limited to 263,000 lbs (100 ton load capacity) and not the current general standard of 286,000 lbs (110 to 112 ton load capacity). That would require new rail (an upgrade to FRA Class 3) and an unknown amount of additional bridge work.

It is also assumed that by the time the Mountain Division is returned to service, the Maine DOT would have acquired the balance of the track and right-of-way between South Windham and Mountain Junction in Portland (about 10 miles). Those acquisition costs are not included in this report.

A. - Past Local Traffic on the Mountain Division

From Chapter 1, we can see that the most of the freight traffic on the Mountain Division was overhead or bridge traffic moving between Maine and the Midwest, most via the Canadian Pacific Railroad at St. Johnsbury and a lesser amount generally traversing the St Johnsbury and Lake Champlain RR across the top of Vermont to a Canadian National connection at Swanton or St. Albans.. Local traffic was concentrated only on the Portland end including the former S.D Warren paper mill (now Sappi) and other industry between Westbrook and Portland. Near the west end of the Mountain Division, a small, single paper machine mill at Gilman, Vermont and interchange traffic at Whitefield to and from the Boston & Maine for furtherance to and from the pulp and paper mills at Berlin and the mills at Groveton, New Hampshire provided most of the on-line traffic. From Westbrook through to North Conway local traffic consisted of some small feed mills and distributors, several wood products mills shipping wood flour, some coal, oil, propane and building materials dealers rounded out the local traffic. From about the 1960's on there seemed to be between 1,000 & 1,200 carloads per year along the 124 miles between Westbrook and St. Johnsbury, exclusive of the above noted exceptions. This small level of on-line business could never have sustained operations on the Mountain Division.

Some of the known local traffic between Westbrook and North Conway during the 1970's included the following:[1]

South Windham	Feed dealer, lumber mill and a forging plant
Newhall	Propane dealer, roof truss manufacturer and a lumber company
Steep Falls	Feed mill
Mattocks	Wood flour from a saw mill
Cornish	Oil company, feed store
Brownfield	Bagged feed trucked to a location in Denmark
Fryeburg	Lumber, dowels, plastic resin, farm machinery, oil and grain
North Conway	Propane dealer, coal and oil

[1] Source*: Maine Central Mountain Division* by Ron Johnson published by the 470 Railroad Club

B. Realities of Rail Freight in New England

Over the last forty to fifty years, rail freight has declined markedly in New England while it has grown substantially in other parts of the Country. Railroads excel at moving large volumes of goods long distances. Currently the larger railroads (known as Class 1's[2]), prefer to run long unit trains of a single commodity, or 100 or more cars of mixed freight between major centers, and long trains of containers and trailers to and from terminals outside major cities where the trailers and containers are transferred to and from trucks for final delivery or pick-up. The switching of individual or small groups of freight cars onto and from sidings next to factories and warehouses is becoming a rarity on the Class 1 railroads and is more likely done by what are generically referred to as "short line" railroads. These are small, generally locally operated railroads with a lower cost structure and in tune with local business needs and a desire to seek out even small opportunities.

New England has traditionally been a receiver of freight with little outbound, the primary exception being the paper industry in Maine and northern New Hampshire. That fact together with our location at the end of the supply line, with relatively short hauls more conducive to truck transport, all combine to make New England a difficult environment for freight railroads to operate. Currently, only one Class 1 railroad operates in New England; CSX in Massachusetts and part of Connecticut.

Figure *5-1 Double Stack Rail Cars with international containers*

Coal was always the largest volume and revenue generator for North American railroads. Within the last year or so, intermodal; the movement of merchandise in containers and trailers that can move between rail, truck, ship, and to a limited degree air; has surpassed coal in revenue on railroads. Coal has not been a major commodity in New England for decades. We don't mine it and power plants that burn coal have located where they could be supplied by lower cost water borne shipment or converted to oil or natural gas. Currently there are only two power plants in all of New England that receive coal by rail and one or two paper mills in Maine that burn a limited amount of coal.

Intermodal rail traffic has increased markedly along with the expanding global economy. Most major commercial market areas in North America have intermodal rail terminals. At these terminals international and domestic containers and trailers moving on rail at distances over 400-500 miles are transferred to and from trucks for local delivery and shipment. The majority of rail intermodal traffic now moves in "double stack" rail cars (Figure 5-1). These cars require high vertical clearance under bridges. In New England, most rail lines do not have sufficient clearance for double stack.

Intermodal rail transportation requires considerable volumes and rail distances of at least 400-500 miles to be viable. Currently, the only double stack capable rail to truck transfer facilities in all of

[2] Currently, the Class 1 railroads are: Burlington Northern Santa Fe (BNSF), Union Pacific (UP), CSX, Norfolk Southern (NS), Kansas City Southern (KCS), Canadian Pacific (CP) and Canadian National (CN).

New England are located at Springfield and Worcester on CSX's main line into Massachusetts, at Ayer on Pan Am Railway (formerly Guilford and then Boston & Maine RR) route and a small facility in Auburn, Maine on the short line St. Lawrence & Atlantic RR. (Figure 5-3 on page 4). Extending double stack railroad clearance and service further than the present centralized population centers would be cost prohibitive and have little or no economic value to the railroads.

Figure 5-2 A Large Container Ship with International Containers

With the exception of the paper industry in Maine and northern New Hampshire, industries that may use traditional non-intermodal rail service (also known as car-load or loose car railroading) have been declining in all of New England. In fact, it can be stated that there are currently very few commodities that regularly move by rail any where in North America outside of intermodal. These commodities can be summarized as follows:

- Coal
- Chemicals, both liquid and dry bulk
- Paper and board (board is generally used to make corrugated boxes and other containers)
- New Automobiles and Light Trucks moving from assembly plants to regional distribution centers (currently at East Brookfield and Framingham on CSX's Main Line in Massachusetts).
- Food products
  - Beer
  - Canned goods
  - Edible oils (vegetable oils)
  - Corn syrup and sweeteners
  - Root vegetables and frozen foods – if long distances and volumes are truck competitive
- Plastic resins (plastic pellets of various types of plastic)
- Lumber and building materials such as bricks, roofing materials
- Cement
- Aggregates for concrete and asphalt pavement and general construction
- Steel products such as structural steel, cast iron ingots, reinforcing bars, steel coil for cans, etc.
- Grain and animal feeds
- Highway deicing salt
- Solid waste

Most of the above can also be moved by truck. Rail movement becomes economic only if the distance and volumes are sufficient.

In addition to intermodal, the major growth segment for railroads in major urban areas has been the haulage of waste to distant locations where the cost to "tip" (dispose of by tipping the load into a landfill or possibly an incinerator) is much lower than the cost of disposal closer to the source. Over the past 10 to 15 years southern New England has seen an increase in intermodal rail traffic hauling consumer goods manufactured in the Pacific Rim, landed in shipping containers on the west coast and moved across country by rail where they are consumed and then disposed of. As the cost of disposal has risen and landfills closed in southern New England, railroads have been hauling an increasing volume of various waste products to distant landfills in states such as North Carolina and Ohio where the tipping fee is low enough to offset the transportation cost. These waste streams can generally be categorized as follows:

MSW – Municipal solid waste, the general waste stream that is not necessarily "municipal" but can also be commercial waste from dumpsters that users pay to have removed.

C&D – Construction demolition, such as broken-up concrete, lumber, steel, and various rubble from demolition of buildings, bridges and roadways.

ASR – Auto shredder residue – all of the non-metallic residue left when old autos are shredded for scrap metal. The non-metallic material is often land filled.

Analysis of rail freight traffic in New England reflects the forgoing very closely. In southern New England, the major component of rail traffic consists of intermodal containers and trailers to facilities at Springfield, Worcester (three facilities in Worcester), Beacon Park Yard in Boston (single level only due to vertical clearance restrictions) and Ayer; automobiles to the two currently active distribution centers and various waste products shipped out of the region from a number of transfer stations. There are a number of car load rail consignees and shippers that generally deal in the commodities noted in the listing above. These tend to be fairly widely scattered and ship and receive relatively low volumes compared to the intermodal facilities.

Figure 5-3 Auburn Intermodal Facility – rail to truck transfer – Auburn, Maine

Rail traffic in Northern New England is even more diluted. There are two small intermodal facilities in Maine, one located in Auburn, ME on the St. Lawrence & Atlantic Railroad (Figure 5-3) and an even smaller facility in Presque Isle. The Auburn facility has small volumes, handling some outbound paper traffic from Maine mills and some inbound consumer goods, and up until recently; bark mulch. Pan Am has a facility in Waterville, but that has been inactive for several years. The major issue for the Waterville facility was the cost to position empty trailers for paper loading. There is a traffic imbalance resulting in insufficient trailers coming into the state with loads.

The only significant non-intermodal rail traffic in northern New England is associated with a handful of the larger pulp and paper mills in central and northern Maine and two smaller mills in northern New Hampshire [3] There is some animal feed, propane gas, food products, lumber, some scrap metal and waste paper. In Vermont; limestone, both a liquid "slurry" used by the paper industry and in powdered form is shipped by rail in significant volumes and inbound petroleum products and animal feed are the major rail commodities.

C. Current Statistical Data on Maine Railroads

Currently, only about 8% of total freight movement in Maine moves by rail. Current estimates are that well over 100 million tons of freight moves within and to and from Maine on all modes. The largest portion of freight (about 64%) both originated and terminated in Maine. According to the American Association of Railroads, in 2005 total rail traffic in Maine amounted to 101,652 carloads that hauled a total of 7,243,880 tons of freight. Most of the freight moved by Maine's railroads was to and from other parts of the country and Canada.

Unlike the other New England States, Maine's rail traffic is fairly balanced between originated and terminated traffic. The paper and forest products industry dominates Maine's rail traffic as the tables below show. Not immediately obvious from the tables is that some of the Glass and Stone category, the Petroleum and Chemicals categories are to a large degree, related to the pulp and paper industry. This would include clay and limestone slurry for coated paper, chemicals for pulp mills and oil for mill boilers.

TABLE 5-1
RAIL FREIGHT TRAFFIC IN MAINE - 2005

Tons Originated 2005

	Tons	%
Pulp & Paper Products	2,523,520	64%
Lumber & Wood Products	786,400	19
Glass & Stone, Farm Pr.	264,400	7
Coal & Petroleum Pr.	193,264	5
Waste & Scrap	142,180	4
All Other	68,200	2
TOTAL	3,947,124	100

Tons Terminated 2005

	Tons	%
Pulp & Paper Products	1,054,080	28%
Glass & Stone Products	791,120	21
Chemicals	550.400	15
Lumber & Wood Pr.	388,360	10
Food Products	271,012	7
All Other	656,768	18
TOTAL	3,711,740	100

Source: American Association of Railroads

The Maine Integrated Freight Plan (available on the MEDOT web site) gave the estimated 2006 total rail commodities, both originating and terminating, as follows in Table 5-2:

[3] In Maine,: Fraser Papers in Madawaska, Great Northern in Millinocket and East Millinocket, Domtar in Woodland (paper mill recently closed, only pulp mill operating), SAPPI Paper in Hinckley, Madison Paper in Madison, Verso Paper in Bucksport and Jay, and NewPage in Rumford. Some of the smaller mills such as Lincoln Pulp & Paper, the SAPPI mill in Westbrook and Wausau-Mosinee in Otis are relatively small rail shippers and receivers. In New Hampshire, the Fraser pulp mill at Berlin is closed and being dismantled, leaving just the paper mill operation at Cascade; while in Groveton, the Groveton Paper Board plant closed last year and the Wausau-Mosinee fine paper mill is closing at the end of this year leaving no mills in Groveton. The former Boise Cascade mill at Old Town, Maine is in the process of being converted to a bio energy facility. The extent of rail service to this new operation is unknown.

TABLE 5-2
ESTIMATED RAIL FREIGHT TRAFFIC IN MAINE - 2006

Pulp, paper or allied products	36%
Lumber or wood products, excluding furniture	20%
Clay, concrete, glass or stone products	11%
Petroleum or coal products	9%
Chemicals or allied products	7%
Coal	6%
Farm Products	3%
Food or kindred products	2%
Waste or scrap materials	2%
Primary metal products	2%
Other	2%

Based on the above and other data from various sources it can be concluded that about 65% of Maine's rail freight traffic is associated with a handful of the larger pulp and paper mills around the state. The fact that a single industry dominates the rail freight traffic combined with limited other heavy industry that typically may use rail service make development of a base of potential rail freight shippers and consignees along the generally suburban and rural confines of the Mountain Division highly problematic.

II– DETERMINATION OF POTENTIAL FREIGHT TRAFFIC OPPORTUNITIES
With the proceeding snapshot of current rail freight operations in Maine we next focus on what the potential is on the Mountain Division. Before we describe the process by which we came up with what a potential freight service could look like in terms of traffic volumes, operations, revenue and operating cost we need to discuss some options on who may operate the service.

A. Options for a Potential Freight Operator
A key question to be answered, at some point is – what entity would operate the railroad?

There are two primary possibilities:
1. Operation by Pan Am Railway[4] as an extension of their existing services in Maine.
2. Operation by a separate short line operator, interchanging to Pan Am at Portland.

Option 1 would have the advantage of reducing the number of rail companies involved in a shipment compared with Option 2. Under Option 2, Pan Am Railway would still be the primary connecting

[4] Pan Am Railway, was Guilford Transportation which in turn was a consolidation of the former Maine Central and Boston & Maine Railroads in 1983. Pan Am's Main Line runs from Mattawamkeag, Maine through Bangor, Waterville, Portland, Biddeford, Dover, NH and then into Massachusetts where it turns west near Lowell to pass though Ayer, Fitchburg, Greenfield, North Adams, cuts the southwest corner of Vermont and into New York State. Their western end is at two locations, one just north of Schenectady and one just west of Schenectady. At those locations they connect to the Canadian Pacific RR (formerly Delaware & Hudson) that in turn connects to Norfolk Southern and to CSX. There are a number of branches from this main route in Maine, New Hampshire and Massachusetts.

carrier to most, if not all the rail freight traffic moving on and off the Mountain Division anyway so one less carrier, division of revenue and the physical interchange of cars from one carrier to another would be eliminated with Option 1. Cost would be lower in terms of operating and facilities costs since all that would be required are a locomotive and a few operating personnel. However past experience indicates that Pan Am Railway's business model may not be compatible with operating what is likely to be a low volume branch line. Pan Am management has learned through experience that in order to succeed in the lean rail freight environment of New England, only routes and customers with sufficient volume with shipments generally captive to rail can be profitably served. Although implementation of this practice has created displeasure in the shipping community and with various government agencies, Pan Am Railway's management cannot really be faulted. They are after all, a for-profit company, providing essential freight services without receiving direct subsidies.

Pan Am would potentially be interested in serving the Mountain Division if sufficient volumes and revenue could be derived to make it a profitable operation. Indications are that this may be the case over time but not during initial phases of operation.

Option 2, a separate short line operator, would incur the additional cost of separate facilities for maintaining locomotives, clerical staff, dispatching, maintenance forces and all the accoutrements of an operating; albeit small, railroad. The cost of interchanging to Pan Am Railway and the need to generate revenue to support the short line operation may increase the net cost to rail freight shippers and consignees on the Mountain Division. That potential negative may be offset by the aggressive marketing and personal service that a short line rail operator could provide.

B.- Methodology of Search for Potential Rail Shippers and Consignees

To ascertain what the current and near term prospects for rail freight traffic are between Portland and Intervale, New Hampshire, we had the help of the Greater Portland Council of Governments. They undertook data base searches of commercial property within a half mile or so of the Mountain Division and from that developed a list of potential prospects. Also, during our field inspections, we looked for likely rail freight opportunities, supplemented by careful screening of recent aerial photography of the area through which the Mountain Division passes.

We also did internet searches in the corridor area of the industry types that could use rail service to see if there were any "hidden" prospects not found by other means.

We then conducted telephone interviews of potential rail shippers between Portland and North Conway. Most were very interested in the prospect of rail freight service but also noted that:

A. They could not live with the inconsistent delivery of rail for distant shipments.
B. Would be cost prohibitive if more than 2 or 3 rail carriers were involved in the shipment.
C. Do not ship or receive in sufficient volumes to use rail.
D. Their product or raw material is not presently conducive to rail shipment: too fragile, too dispersed in origin, destination, too time sensitive.

A few thought that rail could be a viable alternative to trucking, depending on cost and factors related to consistent service. Most of these firms were in the aggregate business (sand, gravel and crushed rock).

From these interviews and some understanding of the rail freight business, we postulate the following commodity groups that may have some potential. These are each discussed in detail later in this Chapter.

1. **Aggregates** from pits and quarries located on or immediately adjacent to the rail line. There are some operations too far removed so they would have to put the material on a truck to move to the railroad. The extra cost of loading on to rail and then unloading from rail at the end of the trip would make rail use by off-line pits and quarries uneconomical, at least for the Portland market.
2. **Cement** to the Ciment Quebec distribution facility in Mattocks. This cement is currently trucked from Saint Basile, PQ, located on the north shore of the St. Lawrence River between Trois Revières and Quebec City.
3. **Plastic resins** – if Poland Spring were to construct a substantial bottling plant at Fryeburg. Currently this seems unlikely. Perhaps a new plastic product firm could locate along the Mountain Division.
4. **Propane** – There are several small facilities that could use rail transport. Two in the Portland area and one at Newhalls[5] have sidings already but do not use rail for a number of reasons, mostly due to lower volumes and unreliable delivery times associated with rail. A facility in North Conway is next to the rail line and could build a siding very easily.
5. **Fuel oil, gasoline, diesel** – There is a large volume of petroleum product moving in trucks from Portland to various locations in the North Country. It may be possible to develop several bulk terminals in Western Maine, Northern New Hampshire and Vermont that would act as transload facilities from rail to truck for local distribution. Possible locations could be Fryeburg, Whitefield, New Hampshire and St. Johnsbury or Lyndonville, Vermont.
6. **Steel Products** – At least one firm in Maine currently rails re-bars to Ossipee on the New Hampshire North Coast RR and trucks from there.(see below).
6. **Lumber and building materials** – Could have potential if a number of retail dealers combined resources to create a shared, centrally located transload facility.

C. An Existing Model for Operation of the Mountain Division as a Short Line Railroad

Just over the border in New Hampshire there is an existing railroad that functions much like the potential Mountain Division operation. That would be the New Hampshire Northcoast Railroad (NHNC). Their primary commodity is aggregates, some propane and a smattering of other commodities such as re-bar and some plastic resins. Their line of railroad was formerly the Conway Branch of the Boston & Maine Railroad. That line diverges from the Pan Am Main Line that runs between Portland and Massachusetts at Rollinsford, New Hampshire, just northeast of Dover. The New Hampshire Northcoast Railroad acquired about 40 miles of the 70 mile long branch from the Boston & Maine Railroad running between Rollinsford, north through Rochester to Ossipee. Over the past 20 years, millions of dollars has been invested by the NHNC, the State of New Hampshire and federal funds, to upgrade the 39 miles of railroad between Rollinsford on its south end, to the large gravel operation that exists in Ossipee, just east of Route 16. In total, the NHNC maintains about 41 miles of track.

[5] Of course the facility at Newhalls can't use rail service as the railroad is out of service there.

The NHNC is a wholly owned subsidiary of Boston Sand & Gravel and the primary function of this railroad is to move aggregate (sand and gravel) from the pit[6] in Ossipee to their large concrete batch plant in Boston. They also have supplied gravel to other operations and handle tank cars of propane to a transload facility in Rochester. In addition, on occasion, a few other commodities such as plastic resins are handled at a rail to truck transload near the propane facility. They also transload cars of re-bar at Ossipee that go to Harmac Steel in Fryeburg, a 41 mile truck haul.

They have an engine house and car storage yard at the north end of their main track where a mile long spur diverges across Route 16 to where the gravel is loaded. They had 6 locomotives but now only 3 or 4 and about 200 hopper cars with a 100 ton capacity. When the "Big Dig" was in full swing in Boston, they were moving 8,000 to 9,000 carloads per year of gravel from the pit to Boston. Currently, these volumes are down to approximately 3,000 to 4,000 annual carloads plus the propane at Rochester, perhaps 200 to 300 cars per year and the re-bar at Ossipee, 100 to 150 cars per year.

The NHNC crew moves the cars about 38 miles from the pit, south to Rollinsford, New Hampshire where the train enters the Pan Am main line (same tracks as used by the Downeaster) and proceeds to Dover, about 2 miles further. There the train stops on a siding adjacent to the main track, the NHNC crew gets off and a Pan Am crew takes over for the run to Boston & return, about 67 miles in each direction. The NHNC locomotives remain on the train to Boston. Normal operation is 5 days per week during the warmer months and less during the winter. The cycle starts in the morning in Dover where a NHNC crew boards an empty train returned from Boston. They move the train 2 miles to Rollinsford and then 38 miles up their own railroad to the pit where the empty cars are exchanged for loaded cars. The same crew then moves the loaded cars south to Dover, arriving in mid afternoon. The Pan Am crew leaves Dover with the train about 6:00 PM, arriving in Boston later that evening where they exchange the loaded cars for empties at or near the concrete batch plant. They then bring the empty cars back to Dover, arriving about 3:00 to 4:00 AM, ready for the NHNC crew.

The NHNC track has been upgraded to and is maintained at an FRA Class 2 condition. This allows a 25 MPH speed for the gravel train over most of its 38 mile route to Rollinsford. The Pan Am Railway and MBTA track from Rollinsford to Boston is mostly FRA Class 4 and some Class 3. That allows operation of freight trains ups to 60 and 40 MPH respectively. However, the trains generally do not operate above 40 to 45 MPH.

The total rail haul from the pit at Ossipee to the Boston batch plant is about 109 miles for a round trip of 218 miles. Three sets of rail cars are required; one at the pit being loaded, one in transit and one in Boston being unloaded. In the past when operating trains up to 50 to 60 cars at peak volumes, four locomotives were generally required. Grades on the NHNC are similar to the Mountain Division so that a single locomotive could handle about 2,000 tons on the grades which reach to 1.5% against loaded trains.

An understanding of the pricing of this move would be useful for our purposes but because this is proprietary information we can only speculate based on generalities as follows. Based on ton

[6] Actually the operation is removing the "Pine River Esker", a long, sinuous ridge of gravel deposited in a vast tunnel underneath an ice sheet as it melted during the last ice age.

measure rather than cubic yard measure[7] (assume that gravel or sand weighs from 1.2 to 1.3 tons per cubic yard), to be competitive in the Boston market, the material would need to have a delivered cost of around $18 per ton. The cost at the pit placed into a rail car is probably about $6-7 per ton. If those numbers are in the correct range, we could postulate an upper range transportation cost of $11 to $12 per ton or $1,100 to $1,200 per 100 ton rail car load. This calculates to about 11 – 12 cents per ton-mile for the move. This is a rather high ton mile cost (the national average for railroads is about 3 cents per ton mile), but that low figure is for average rail hauls of 700 to 800 miles and heavily weighted towards low value commodities under contracts with utility companies (long distance unit coal trains). This revenue would be shared between the NHNC and Pan Am. The mileage split is 42 miles NHNC and 67 miles on Pan Am/MBTA. However, the carloads originated on NHNC, the cars, locomotives, and fuel are borne by NHNC so the split should favor NHNC. Our estimate would be that NHNC would receive about $700 per loaded car and Pan Am $400. In addition, there would be a car mile charge of about $30 per car for movement over the MBTA owned track in Massachusetts.

III – DISCUSSION OF POTENTIAL FREIGHT TRAFFIC OPPORTUNITIES AND DETERMINATION OF VOLUMES AND REVENUES

A. Commodity and Volume Estimates

1. Aggregates

The most promising commodity appears to be the movement of sand, gravel and crushed rock from several locations along the Mountain Division to the Portland area, and potentially at a later date; to the Boston market. However, there are a number of factors that potential users of this type of rail service need to consider.

a. Rail Car Supply - Assuming that rail service were instituted, aggregate shippers would need to furnish their own hopper cars. These could be purchased new, used or leased and in sufficient quantity. Generally it would be necessary to have three times the number of cars to be loaded daily plus a few spares. One third would be at the loading location, one third in transit and one third at the unloading location. These cars would be open top hoppers with bottom discharge, have a capacity of 100 tons with an empty weight of about 30 tons for a gross weight of 263,000 lbs. Approximate cost of these cars would be as follows based on 100 cars:

   1. Purchase new = $80,000 each X 100 cars = $8,000,000
   2. Purchase used but serviceable = $25,000-$40,000 each X 100 cars = $2,500,000 to $4,000.000.
   3. Lease $400 per month per car (used cars) based on 100 car lease. Leaser would be responsible for repairs, insurance and maintenance on cars. = $480,000 per year

b. Unloading Facility - An unloading facility would be necessary in the Portland area. This would consist of a pit under the track that the car would discharge into with some type of conveyor system to lift the material and move to piles, storage bins, silos, etc. There is an abandoned facility in Scarborough along the Pan Am Main Line, but it appears that it would need considerable work to put in back into service. In addition, there are new homes across

[7] Gravel and material companies think and deal in volume measure (cubic yards) while railroads think and price in terms of weight measure (tons). So, to keep things in a rail pricing mode, we need to deal in tons, not cubic yards.

the track from that facility so that starting up this type of operation there could be problematic. Cost of constructing an unloading system would be borne by the aggregate operation or end user; not the railroad. In addition, some means to move the rail cars on and off the discharge pit during unloading would be required and sufficient track to hold not only the loaded cars but to move the cars over the pit and then place the empty cars out of the way. Moving the cars, a few at a time, could be with a "trackmobile", a car puller or a large front end loader. Cost for sufficient track, unloading pit and conveyor system would be in the range of $500,000 to $1,000,000.

c. Siding at Loading Location - A side track as long as the number of cars to be loaded per day would be required. Preferably this siding would be parallel to the railroad's main track but at least 25 feet away with a turnout to the main track at each end. Single or dead ended sidings heading away from the main track are also possible but potentially pose somewhat greater operating costs for the railroad. Usually the railroad would install the turnouts in the main track and a short length of track (typically to clearance or the property line) provided that the shipper agreed to a minimum number of revenue cars per year. Most of the siding would be paid for by the shipper, approximately $100 to $125 per track foot, assuming a level site with minimal grading. Length of siding would be number cars loaded per day times 50+ feet per car plus a 100-150 foot buffer – Say about $160,000 for a 20 car siding.

The minimum total cost to start would be about $650,000 in infrastructure plus $480,000 per year in car lease costs or $2,500,000 at the low end of purchasing used cars. Some of these costs could potentially be shared among several aggregate operations. If leased, the annual cost per carload assuming 3,500 carloads per year would be $137 or $1.37 per ton.

Assuming that the railroad would be operated by a short-line operator the transportation cost per carload would be in the range of $500 to $600 to Portland without interchange to Pan Am Railway. If the car were interchanged to Pan Am for movement to Scarborough, for example (about 5 miles from Portland); the preferable arrangement would be for the short line operator to obtain trackage rights over the 5 miles so that the short line's crews and locomotives would move the train to Scarborough, pick up the empties and come back. The short line's crews would have to be qualified on the Pan Am Main Line. What Pan Am would charge for this 10 mile transit (5 miles each way) would have to be negotiated. Based on a high car mile charge of $3 per car mile, that would be $30 per car. If the cars were interchanged to Pan Am for subsequent movement by their crews and locomotives, the cost could be about $300 per car to Scarborough and $800 per car to Boston. These costs are highly conjectural. The actual cost would be based on negotiation between Pan Am Railway, the potential shipper and the short line operator.

If operated 100% by Pan Am Railway, the total cost may be somewhat lower, but probably not significantly less.

Based on the above rail costs, plus amortizing the cost of an unloading facility and siding construction, the cost per ton based on 100 tons per car to the following points would be:

To Portland – no movement on Pan Am	$7 to $9 per ton

To Scarborough with trackage rights	$7.30 to $9.30 per ton
To Scarborough with interchange to Pan Am	$10 to $11 per ton
To Boston	$15 to $16 per ton

Again, these are our best "guesstimates". Actual rail cost would have to negotiated and above based on current costs, not several years from now.

Based on discussions with several potential aggregate shippers, we have estimated an initial volume of 300,000 tons per year of sand and gravel and 50,000 tons per year of crushed stone. This would equate to 3,500 rail cars per year, mostly during a period from May to October, generating about 25 carloads per day assuming 5 day per week operation. Over time, this volume could grow if additional markets, such as Boston, could later be developed as existing gravel operations currently supplying that market are used up.

Another alternative could be loading the aggregate onto barges in Portland for water delivery to Boston. This would assume that suitable loading and unloading facilities are in place on both ends of the sea trip and that the total cost would be less than an all rail move that involves less handling of the material.

2. Cement - Ciment Quebec has a small distribution facility at Mattacks (East Baldwin). Currently inbound cement is trucked from their plant in St. Basile, Quebec, up to 16 trucks per day during the peak construction season. Their Mattocks facility is over 500 feet from the Mountain Division rail line. Either some type of vacuum system that goes under or over Route 113 or a side track across Route 113 would be required if they used rail service for delivery.

An inherent issue is the number of rail carriers and potential time for a shipment of cement from their plant in Quebec. The rail route would likely be Quebec Gateneau Railroad[8] toward Montreal, interchange to the Canadian National who would move it to Richmond, Quebec and then the St. Lawrence and Atlantic Railroad to Danville Junction, Maine to Pan Am Railway to Portland to the potential short line up to Mattocks. Currently, Ciment Quebec has a similar distribution terminal in Bow, New Hampshire that is rail served. The routing to that terminal is as circuitous and multi carrier as the route to Maine.

Based on an average throughput of about 300 tons per day during the peak construction season, about 150 tons per day during spring and fall and 100 tons per week or less during the winter, total volume through this facility could be about 40,000 tons per year[9] or about 400 carloads per year if all material came by rail. Ciment Quebec would need to invest in sufficient rail cars to cycle between Maine and Quebec and the cost of a siding(s) that would hold about 15 cars (about one weeks supply at peak volume) and either a 900 foot long vacuum system or 700 feet of track and a grade crossing to connect their terminal to the railroad. There would also be some private property that would have to be crossed between the railroad and the terminal.

[8] Quebec Gatineau is a short line railroad that took over the Canadian Pacific route between Montreal and Quebec City. They are owned by the same holding company that currently owns the St. Lawrence & Atlantic Railroad in Maine; this is, Genesee & Wyoming.
[9] Our rough estimate based on limited data

3. Plastic Resins – These are plastic pellets of various types of plastic that move in covered hopper cars. They are unloaded via a vacuum line connected to the bottom of the rail car. The only potential prospect for this type of product would be if Nestle/Poland Spring constructed a significantly sized bottling plant at Fryeburg.

At this time the commercial extraction of ground water for sale without some form of tax or fee is becoming an issue in Maine and other states. The Town of Fryeburg and Nestle are presently at odds over the prospect of building a large bottling plant. Nestle acquired property along the railroad at the site of the now closed Bailey Manufacturing Company. How large and if the facility is built at all are unknown. Reportedly, their current primary facility in Maine uses plastic resins at the rate of about 7 rail car loads per week. The plant is not on rail, but is located only 3.5 miles from the St. Lawrence & Atlantic RR intermodal facility in Auburn and a little over 6 miles from Safe Handling, a firm that has constructed an extensive rail to truck transload operation in Auburn. Currently, Nestle is building a smaller bottling plant in Kingfield, Maine which is also not on rail.

If we were to take an optimistic view we could speculate that at some point a bottling plant may be built in Fryeburg that would be large but somewhat smaller than the main facility – say four cars per week or about 200 cars per year.

In general, firms that make plastic products are desirable for rail if they use sufficient raw material. They are relatively clean and provide good manufacturing jobs. Plastic resins typically move by rail and would be desirable businesses for the Mountain Division and the region. The plastic products industry should be a target industry for the region.

4. Propane – is used in large quantities in the region. Rail does provide delivery to some of the larger, regional distribution facilities and a few smaller retail sized facilities. Propane comes into the region in a number of different ways, including ship, rail and truck. From where and by what mode it moves around the region is determined by a number of variables including supply issues, cost and reliability of both the source and transport mode. Most of the potential users of propane along the Mountain Division are smaller retail type operations, even though they are associated with large firms. For these smaller operations, delivery by truck from a major port facility or rail transload is the most practical method.

Rail cars used to move propane are large cars, typically with a 30,000 gallon liquid capacity. A typical retail sized operation may use 15 to 20 cars of that size per year at most. For our optimistic traffic projections we assumed that several dealers along the Mountain Division may use rail service for some or most of their yearly requirements, say 50 cars per year in total.

5. Fuel Oil, Gasoline and Diesel – obviously, large quantities of all of these commodities move around the region although the first is more seasonal. In addition, bio-fuels are increasing in usage. Currently, ethanol is moving into southern New England (Providence) by rail and other terminals using rail are planned.

Portland has been and still is a significant petroleum import location with Searsport, Bucksport and several other locations seeing imports also. Many tank truck loads per year move from Portland into all parts of northern New England. Thirty or more years ago, some of this moved on rail to some of the larger dealers and distributors. Currently railroads in Maine move heavy residual oil (known as "Bunker C" oil) from coastal terminals to boilers at some of the paper mills.

Over the last 30 years or so, the smaller and medium sized distribution terminals that existed were closed or downsized for a number of reasons. These include environmental and safety concerns with storage tanks, the cost of storing large volumes of inventory and the ability of trucks to deliver product from coastal terminals to any part of the region in a day or less.

As the cost of petroleum and bio substitutes increase, there could be a change in the economics of distributing these products throughout the region. As with the aggregate operation on the New Hampshire North Coast Railroad, there is already a rail model in western New England that could serve as a blueprint for a potential service to the east in Maine, northern New Hampshire and possibly northeastern Vermont. This is a "tank train" service operated by the Vermont Railway from the Port of Albany, New York to Burlington in northwestern Vermont.

This rail service has operated for almost 30 years and currently consists of three - 15 car sets of 30,000 gallon tank cars that are interconnected by hoses. Each set of 15 cars can be "compartmentized" so that some of the permanently coupled cars can handle different grades of gasoline and others fuel oil, kerosene or whatever. Each set of cars makes a 24 hour trip from tank farms on the Hudson River in Albany, north on the Canadian Pacific (formerly D & H) line to Whitehall, New York where they are interchanged to the Vermont Railway, east to Rutland and then north to Burlington. Located along the shore of Lake Champlain on the north side of Burlington is a 15 tank, 16.8 million gallon oil terminal where the cars are unloaded and ready to be returned the next day. The 15 rail cars have a total capacity of about 400,000 gallons. When this service started, the train consisted of three – 10 car sets.

The terminal in Burlington is currently owned by Global Partners, LLC who recently purchased it from Exxon. Global is planning on adding three more tanks to the facility. It is estimated that about 5,000 carloads per year are operating in this service which would be about 135,000,000 gallons per year. From Burlington, gasoline, heating oil, diesel, kerosene and bio fuels are distributed to many dealers. Global plans to use the terminal more intensely than did Exxon.

Could a similar "tank train" or perhaps on a smaller scale with individual cars be operated from Portland to some centrally located terminal(s) in western Maine or northern New Hampshire? Perhaps, but the economics would need to be right. The tank farm in Burlington has existed for a number of years so there was not the large capital cost to develop a multi-tank facility that may be required to start this type of service in the territory close to the Mountain Division. The "tank train" works because it is moving relatively large volumes of product in a mini "unit train", the basic concept of what a railroad does best; moving a lot of material cheaply, provided it is all going to one place and not requiring a lot of handling of multiple pieces (individual cars). The other factor in Burlington's favor is that a round trip truck trip from Albany to Burlington and return is just beyond what could be reasonably and legally done in a day. From Portland, where would such a terminal need to be to have that economic advantage? Certainly not Fryeburg, nor Conway nor even Whitefield. Maybe it gets close to that distance at St. Johnsbury; but by then you are getting rather close to Burlington.

Another issue for the Mountain Division is that much of that product (heating oil) needs to move in the winter. (It could be stockpiled during the warmer months if there is enough storage capacity, but all that inventory costs money). Keeping the line open through Crawford Notch and the rest of the route would be a difficult and costly endeavor for a short line railroad considering the low volumes of freight involved. It would not be practical to try and rail serve any terminals past Fryeburg or North Conway via the Mountain Division. The St. Lawrence and Atlantic already has a much better route (both in grades and condition) from just north of Portland across western Maine and the North Country. If we take an optimistic view, perhaps a smaller terminal could be developed around Fryeburg that could be economical. We have factored this into our optimistic model at the end of this chapter.

<u>6. Steel Products</u> - Currently there are two firms in Fryeburg that import steel products to their facilities using truck. Neither is located directly on the railroad. One is Dearborn Precision Tubular Products and the other is Harcom Steel.

Dearborn Precision Tubular Products specializes in equipment for the oil drilling industry. Conversations with them indicate that due to small incoming volumes from a number of different origins and the delicate nature of their finished product, that rail use is not a viable option.

Harcom Steel is primarily a structural steel fabricator and currently uses rail for inbound reinforcing bars. Currently they transload about 100 to 150 rail cars of re-bar per year from the New Hampshire North Coast Railroad at Ossipee, New Hampshire to Fryeburg, a 41 mile truck haul. They would be very interested if rail returned to Fryeburg, it would reduce their truck haul to just a few miles. (They are located north of Fryeburg off Route 11).

<u>7. Lumber and Building Materials</u> – These are products that traditionally moved by rail and still do. In addition to finished dimensional lumber and plywood; building materials include, wall board, particle board, roofing shingles, bricks, concrete blocks, decorative stone, pavers, bagged concrete and cement or; just about anything you may find at your local hardware store/home center/lumber yard. However what has changed over the last 20 to 30 years is that these products no longer move to individual retail operations by rail, but to larger regional distribution facilities where product is then delivered by truck as required.

In addition, Maine produces lumber and manufactures a number of wooden products at various sized saw mills and manufacturing plants around the state. Some of the larger saw mills and stud mills and a couple of particle board plants in the northern part of the state produce in large enough quantities that it moves out of state on rail. Several of these mills have closed in the last few years and there seems to be a trend that they remain closed. One of the problems they face is a diminishing supply of suitable raw material, not because Maine is running out of trees, but because there are fewer people logging, there is less material suitable for dimensional lumber and the pulp mills chip and willingly consume trees that are unsuited for anything else.

The many wood products plants around the State have been hurt by cheap imports and the high cost of purchasing suitable raw material. Scores of these plants have closed over the last 15 to 20 years. Most of the operations remaining have become much more efficient and found niche markets where they can compete. Interestingly, some import their raw material from other states as they require wood not found locally. From a rail use perspective, the remaining wood products mills do not receive or ship to or from a single source in sufficient volumes and over long enough distances to use rail service.

One of the larger, more obvious wood products plants along the Mountain Division is Limington Lumber. They import some of their raw stock (eastern white pine) from New York State. Their finished product, mostly pine flooring, primarily goes to New York and south. They ship some of their product via rail intermodal using the Auburn facility. Their product is fairly delicate and they feel not conducive to loading into rail cars, besides the fact that they do not typically ship to a single destination in car load volumes. There is some possibility that if rail rates could be competitive from New York State, they could get some of their raw material in by rail.

On the retail side, we talked with the two largest operations in the Conway area, both located very close to the Mountain Division. One said quite plainly that they have not used rail for 30 years and would not use it now if available. The other was less emphatic but obviously not interested. To both we proposed the idea of a regional building material transload that a number of firms could have access to and order material in larger quantities with potential cost savings. Of course, the issue with that approach would be that it would require the cooperation of competitors in a venture that would not give one or the other a competitive advantage.

8. Regional Transload Facilities

There is a decided increase in regional rail to truck transload facilities where various bulk materials consumed in a region arrive by rail in multiple car quantities to be unloaded, either directly to trucks for local distribution, or to storage areas for later delivery as and when required. This type of facility may be feasible now in a market the size of the Portland area and a smaller operation in the Fryeburg area may be feasible and actually facilitate economic growth. All it would take is a few changes in the way we do business and the financial realities we are encountering in the dynamic global economy driven by the increasing competition for and rising cost of energy.

In our optimistic scenario, we have included a small amount of building material in the Fryeburg area, with the assumption that a regional transload facility could be built there. We would envision that this terminal would handle petroleum products, lumber and other building materials, possibly plastic resins. This could act as a stimulus for development of industry in the region through lower transportation costs and provide a good economic base for rail freight services on the Mountain Division.

B. Quantifying the Potential Rail Operation

We have developed two potential rail freight scenarios. These are characterized as a "very optimistic" scenario and a realistic, moderately optimistic scenario. In operation, each scenario will require various infrastructure depending on if it is operated by a new short line railroad or Pan Am Railway and depending on the presence of and extent of a passenger operation, as defined in Chapter 6. For example, if the railroad were upgraded to FRA Class 3 for passenger operation, the facilities and cost structure would be different than if there is only a freight operation.

For a freight only operation, the most plausible strategy would be to upgrade to an FRA Class 2 condition. This will allow 25 MPH freight operation, is not much more costly than Class 1 (15 MPH freight) and considerably less costly than Class 3 which is driven more by passenger operation requirements.

The railroad would initially be restricted to 263,000 lb gross weight cars. Going to 286,000 lb cars would require all new rail and work to strengthen most of the bridges. Those costs could be considered when and as future conditions warrant.

With no passenger operation the number of passing sidings would be less. As soon as regular passenger operation starts, either commuter or excursion service or both, additional track would be necessary to allow meets and passes of trains on the single track line.

Following is a table that shows estimates of initial car load volumes by commodity type and estimated revenue that may be expected. It is essential to note that in both cases the aggregate operation is the "mainstay" or "anchor tenant" for freight operations on the Mountain Division. If these did not materialize to at least the volume indicated, the railroad could not sustain itself. Another item of concern is that this traffic is very seasonal. Keeping the railroad open and operating during the winter months absent this primary source of traffic could be a difficult burden to overcome.

C. Freight Volume and Revenue Estimates

TABLE 5-3

ANNUAL CARLOAD AND REVENUE ESTIMATES

OPTIMISTIC INITIAL FREIGHT TRAFFIC AND REVENUE

COMMODITY	ANNUAL CARLOADS	REVENUE PER CARLOAD	REVENUE
Aggregates (Sand & Gravel)	3,000	$600	$1,800,000
Crushed Stone	500	$600	$300,000
Propane	50	$600	$30,000
Plastic Resin	200	$650	$130,000
Cement	400	$500	$200,000
Steel (Rebar)	150	$550	$82,500
Fuel Oil, Gasoline, Diesel	400	$600	$240,000
Building Materials	100	$550	$55,000
TOTAL CARLOADS	**4,800**	**Total Revenue**	**$2,837,500**
Annual Carloads per Mile*	**80**		

*Based on 60 miles - Portland to Intervale, NH

MINIMUM INITIAL FREIGHT TRAFFIC AND REVENUE

COMMODITY	ANNUAL CARLOADS	REVENUE PER CARLOAD	REVENUE
Aggregates (Sand & Gravel)	3,000	$600	$1,800,000
Crushed Stone	500	$600	$300,000
Propane	50	$600	$30,000
Steel Rebar	150	$550	$82,500
TOTAL CARLOADS	**3,700**	**Total Revenue**	**$2,212,500**
Annual Carloads per Mile*	**62**		

*Based on 60 miles - Portland to Intervale, NH

Under the minimum scenario, only the propane and some re-bar would move in winter, with almost no aggregate. As noted on the previous page, keeping the railroad open and operating on a few cars per week would probably not be possible. Even under the optimistic traffic levels, winter operation would be pretty lean. Keeping staff employed year round to then have qualified personnel for the busier summer months would be an issue. It is very possible, that initially the Railroad would only be open 8 or 9 months per year and be primarily a seasonal aggregate operation.

On the following pages are itemized tables showing the anticipated operating costs at both traffic levels. It is assumed that the shortline operator would furnish their own shop facilities, rent office space and perform minimal maintenance to just hold a class 2 condition. No rental payments to the State are included.

D. Anticipated Operating Costs

TABLE 5-4

ITEMIZED EXPENSES ASSUMING OPTIMISTIC TRAFFIC LEVELS

LABOR	NUMBER	AVERAGE WAGE	BENEFITS	ANNUAL COST
TRANSPORTATION				
Trainmen	2.5	$58,500	$20,475	$197,438
MAINTENANCE OF WAY				
Foreman	1	$65,520	$22,932	$88,452
Laborers	3	$51,480	$18,018	$208,494
Signal Maintainer	1	$72,800	$25,480	$98,280
MECHANICAL				
Mechanic	1	$70,720	$24,752	$95,472
ADMINISTRATION				
Clerical/Dispatcher	2.0	$45,760	$16,016	$123,552
Marketing/Management	1	$79,040	$27,664	$106,704
TOTALS	**12**			**$918,392**

LOCOMOTIVE	NUMBER OF UNITS	MONTHLY PAYMENTS		ANNUAL COST
LEASE OR PAYMENTS	2	$12,733		$152,801
FUEL	**GALLONS PER DAY**	**COST PER GAL**	**COST PER OP DAY**	**COST PER YEAR**
	800	$2.75	$2,200.00	$605,000
				$757,801

HIGHWAY VEHICLES	MONTHLY LEASE	FUEL MONTHLY	MAINT. MONTHLY	ANNUAL COST
Auto	$250	$450	$75	$9,300
Pickup for Signal	$275	$525	$125	$11,100
Pickup for Track Crew	$300	$550	$125	$11,700
Boom Truck	$500	$475	$300	$15,300
				$47,400

TRACK MAINT EQUIP	MONTHLY LEASE	FUEL MONTHLY	MAINT. MONTHLY	ANNUAL COST
Backhoe/Front End Loader	550	$450	250	$15,000
Air Compressor	250	$200	125	$6,900
Swivel Dump Truck	500	$350	350	$14,400
Tamper-Liner	700	$300	600	$19,200
Tie Handler/Inserter	550	$225	400	$14,100
				$69,600

FIXED FACILITIES **Office Space**	**MONTHLY RENT**	**MONTHLY TELEPHONE**	**MONTHLY SUPPLIES**	**ANNUAL COST**
(2000 SF)	$2,500	$250	$600	$40,200
	MONTHLY	**MONTHLY**	**MONTHLY**	**ANNUAL**
	PAYMENT	**UTILITIES**	**SUPPLIES**	**COST**
Shop, Storage & Crew Fac.				
(6,500 SF)	$8,354	$2,000	$4,000	$172,249
				$212,449

TRACK & SIGNAL MATERIAL	**Number per year**	**Unit**	**Unit Cost**	**ANNUAL COST**
Ties	5000	Each	$35	$175,000
Ballast	4000	Tons	$15	$60,000
Rail	150	Tons	$1,100	$165,000
OTM	1	LS	$115,500	$115,500
Signal Equipment	1	LS	$75,000	$75,000
				$590,500

MISCELLANEOUS		**ANNUAL COST**
Car Hire	For foreign cars, assumed 2 days average	$39,000
Software & Licenses	Car tracking, and various industry applications	$12,000
Radio System	Maintain and leased phone line to remote bases	$15,000
Repay Initial Capitalization	$300,000 @ 8.5% for 5 years	$76,806
General Contingency (5%)	Miscellaneous unbudgeted costs	$135,000
		$277,806

ESTIMATED ANNUAL COST $2,873,948

ESTIMATED ANNUAL REVENUE $2,837,500

Based on this exercise, it would appear that that the Optimistic operation could be self sustaining if not profitable.

On the following pages is a similar break down for the minimal operation.

TABLE 5-5

ITEMIZED EXPENSES ASSUMING MINIMAL TRAFFIC LEVELS

LABOR	**NUMBER**	**AVERAGE WAGE**	**BENEFITS**	**ANNUAL COST**
TRANSPORTATION				
Trainmen	2.0	$58,500	$20,475	$157,950
MAINTENANCE OF WAY				
Foreman	1	$65,520	$22,932	$88,452
Laborers	2	$51,480	$18,018	$138,996
Signal Maintainer	0.5	$70,720	$24,752	$47,736
MECHANICAL				
Mechanic	1	$70,720	$24,752	$95,472
ADMINISTRATION				
Clerical/Dispatcher	1.0	$45,760	$16,016	$61,776
Marketing/Management	1	$72,800	$25,480	$98,280
TOTALS	**8.5**			**$688,662**

LOCOMOTIVE	**NUMBER OF UNITS**	**MONTHLY PAYMENTS**		**ANNUAL COST**
LEASE OR PAYMENTS	1	$6,367		$76,401
FUEL	GALLONS	COST	COST PER	COST PER
	PER DAY	PER GAL	OP DAY	YEAR
	600	$2.75	$1,650.00	$453,750
				$530,151

HIGHWAY VEHICLES	**MONTHLY LEASE**	**FUEL MONTHLY**	**MAINT. MONTHLY**	**ANNUAL COST**
Auto	$250	$450	$75	$9,300
Pickup for Signal	$275	$525	$125	$11,100
Pickup for Track Crew	$300	$550	$125	$11,700
Boom Truck	$500	$475	$300	$15,300
				$47,400

TRACK MAINT EQUIP	**MONTHLY LEASE**	**FUEL MONTHLY**	**MAINT. MONTHLY**	**ANNUAL COST**
Backhoe/Front End Loader	400	$450	250	$13,200
Air Compressor	175	$200	125	$6,000
Swivel Dump Truck	400	$350	350	$13,200
Tamper-Liner	600	$300	600	$18,000
Tie Handler/Inserter	400	$225	400	$12,300
				$62,700

FIXED FACILITIES Office Space	MONTHLY RENT	MONTHLY TELEPHONE	MONTHLY SUPPLIES	ANNUAL COST
(1200 SF)	$1,600	$200	$400	$26,400
	MONTHLY	**MONTHLY**	**MONTHLY**	**ANNUAL**
	PAYMENT	**UTILITIES**	**SUPPLIES**	**COST**
Shop, Storage & Crew Fac.				
(4000 SF)	$5,848	$1,500	$2,500	$118,174
				$144,574

TRACK & SIGNAL MATERIAL	Number per year	Unit	Unit Cost	ANNUAL COST
Ties	2500	Each	$35	$87,500
Ballast	2000	Tons	$15	$30,000
Rail	100	Tons	$1,100	$110,000
OTM	1	LS	$77,000	$77,000
Signal Equipment	1	LS	$75,000	$75,000
				$379,500

MISCELLANEOUS		ANNUAL COST
Car Hire	For foreign cars, assumed 2 days average	$2,500
Software & Licenses	Car tracking, and various industry applications	$12,000
Radio System	Maintain and leased phone line to remote bases	$15,000
Repay Initial Capitalization	$150,000 @ 8.5% for 5 years	$38,403
General Contingency (5%)	Miscellaneous unbudgeted costs	$95,000
		$162,903

ESTIMATED ANNUAL COST	**$2,015,890**
ESTIMATED ANNUAL REVENUE	**$2,212,500**

This minimal operation appears to also be self sustaining. Some cost savings could be achieved by laying off staff during the winter. However, that would make maintaining a qualified staff for summer operation difficult.

IV. OTHER COSTS REQUIRED FOR FREIGHT-ONLY OPERATION

The above costs are just for the operation of the railroad for freight service. Included is minimal maintenance to the track, financing a basic shop facility and equipment, one or two used locomotives and miscellaneous start-up expenses.

In Chapter 4, the cost to bring the railroad back into service was calculated based on the three FRA classifications considered. Those costs were just to restore the main line of the railroad. No costs were included for additional track and facilities necessary to operate the railroad because those additional costs are variable, depending on the required rail operation: freight only, freight and some combination of passenger service, the number of trains to be operated, etc.

For a freight-only operation, an FRA Class 2 condition should be adequate. From Chapter 4 we see that restoration of the entire 50 miles of main line to FRA Class 2 within Maine is about $20,000,000 and about $3,000,000 for the 10 miles in New Hampshire. We next have to consider cost for additional track, turnouts and miscellaneous facilities that would be required. To determine that, we need to have some idea of how the railroad might operate on a day to day basis. Then we can determine additional track and other items to facilitate the operation.

A. Assumed Freight Operation

1. We will assume that only one train at time would be on the line except the beginning at the Amtrak Station.
2. We will assume that there is some business in Fryeburg and very occasional traffic through to Conway.
3. The major volume of traffic would be from two locations along the Baldwin to Brownville area where aggregates and crushed stone would be loaded.
4. Cars other than the aggregate would be interchanged to Pan Am Railway at Rigby Yard in South Portland and possibly, an occasional car at Intervale, New Hampshire for forwarding to the New Hampshire Central through Crawford Notch to Whitefield and beyond.
5. All or some of the aggregate cars would go to an unloading facility in Scarborough, 5 miles south of Mountain Junction. The short line operator would handle these cars under a trackage rights agreement between Pan Am Railway and the short line.
6. Runaround tracks would be needed at several locations to along the Mountain Division to allow the train to turn at different locations. These would need to be long enough for the longest train typically operated.
7. A small yard would be needed where the shop facility is located. To allow sharing the shop with potential commuter operations, the shop should be located at the logical terminal for commuter rail operation; which as we shall see in Chapter 6, is at Steep Falls in Standish.

A typical days operation would be the crew on duty at Steep Falls early in the morning, sort[10] out the cars brought up from the Pan Am interchange the previous afternoon and head towards Fryeburg. Several industries would be switched (exchange inbound cars for outbound) along the way. If necessary, the train would go all the way to Fryeburg. There the train would set out inbound cars, pick up any outbound and "turn" by running the locomotive to the opposite end of the train via a long runaround track (a siding with a turnout connecting to the main track at each end) and start back towards Portland. It may be necessary to perform a switch at any sidings that were facing the wrong way on the trip up. The train would continue past Steep Falls into Portland. They could be delayed before coming into the Amtrak Station if both tracks there were occupied and then possibly again before entering the Pan Am Main Line at Mountain Junction. It would then be a quick trip for the two miles to the north end of Rigby Yard and then onto a prescribed track to drop the outbound cars.

[10] The cars may be in random order and need to be grouped according to destination up the line. For instance all the aggregate cars for a particular location placed together or cars of oil for a terminal in Fryeburg put together and then all cars placed in an order that minimizes switching along the line.

If loaded aggregate cars were destined to an unloading facility in Scarborough, south of Rigby Yard, the train would have to re-enter the Main Line south of the yard to deliver the loads and pick up the empties during a "window" when no trains were using the single track south of Rigby. The train would then return to Rigby to pick up any other cars for the Mountain Division.

At Rigby Yard the locomotive and empty aggregate cars would typically back onto a track where any other cars for the next day would be coupled onto, air hoses connected, brake system charged, brake test made, paper work picked up and then head north up the Main Line to Mountain Junction. Hopefully not delayed again at the Amtrak Station, the train would move along towards Steep Falls, maybe switching a siding along the way. At Steep Falls the train would pull into the small yard, head pin (remove the locomotive from the train) and put the locomotive away for the night.

A simple time study, assuming some minimal delays and waiting at Portland and Rigby indicate that this operation would take about 10 ½ to 11 hours if going all the way from Fryeburg to Scarborough. Under Federal Law, railroad crews cannot be on duty more than 12 hours. It is very unlikely that the above described operation could reliably be completed in less than 12 hours. Since the aggregate business would be the primary customer, and perhaps a trip to Fryeburg required only once or twice a week, some type of variable, overlapping schedule during the week would need to be devised. As business grew it may be necessary to operate two crews, either simultaneous during the day or serially one at night and one during the day. One crew would work from Steep Falls to Fryeburg or North Conway and the second from Steep Falls to Portland and Scarborough.

B. Additional Facilities Required

1. A shop building for locomotives, shop equipment, material storage together with track maintenance equipment and tools. – The shop was budgeted in the operating cost tables as a 15 year financing arrangement with a capital cost of $900,000 under the "optimistic" program and a somewhat lesser amount (smaller shop) in the minimum program. That cost could be shifted away from the operator and built as part of the capital work of restoring the railroad to service. That would remove the financing cost noted in the above operating cost schedule and add that cost to the capital cost being computed in this section. (***See Figure 6-7 in Chapter 6 for a conceptual layout of potential terminal facilities at Steep Falls).***
2. Yard and storage tracks at Steep Falls – Assuming that a train may consist of 25 aggregate cars and up to a dozen additional cars on peak day, would need at least one track 1,800 feet long and several additional tracks for car storage and to re-order cars. Would also need a lead to the locomotive shop and a RIP (repair in place) track near the shop. Assume 9 turnouts using 85 Lb material salvaged from main line work, refurbished points with new switch timbers and installed at a cost of $25,000 each = $225,000 plus 6,000 feet of track at $110 per foot = $660,000 for a total cost of $885,000. In addition, would need site grading and preparation for the yard area, say $75,000 for a total cost of $1,000,000. Would also require purchase of land for the shop and yard, say $250,000.
3. Runaround track 1,800 feet long at Mattocks (East Baldwin) and turnout for Ciment Quebec. Total of 3 turnouts @ $25,000 plus 2,000 feet of track @ $110 per foot = $220,000 for a total of $295,000.
4. Two turnouts and 200 feet of track for an aggregate operation. Pit owner to pay for balance of siding as required = $72,000

5. Two turnouts and 200 feet of track for second quarry on pit, same as above item = $72,000.
6. 1,800 foot runaround track north of aggregate operation = $270,000
7. Two connections in Fryeburg for potential consignees = $72,000.
8. 1,800 foot runaround track at Fryeburg = $270,000
9. Side track connection in North Conway = $36,000
10. Two additional side track connections along railroad = $72,000

The total estimated cost of this additional track including the yard at Steep Falls is $2,160,000.
Plus property acquisition at Steep Falls = $250,000.

C. Current Rail Trail

The current rail trail between Newhalls in Windham and Route 35 near Sebago Lake Village presents numerous issues for start up of rail operations. To protect the rail infrastructure, railroad operations and the users of the rail trail; retaining walls, fencing and possibly additional right-of-way would be required. As a very rough, order of magnitude estimate we suggest a budgetary figure of about $3,000,000 to provide retaining walls, earthwork and fencing. Some additional costs may be required to acquire additional right-of-way. Survey and further engineering analysis would be necessary to arrive at a better estimate of what the actual cost may be.

V. COST SUMMARY OF FREIGHT – ONLY OPERATION

NOTE – ALL COSTS ARE IN 2007 DOLLARS. ACTUAL WOULD NEED TO BE INFLATED TO MID POINT OF CONSTRUCTION

A. Option – Shortline all the way to Intervale, New Hampshire (Milepost 61.4)

Item	Maine	New Hampshire
Main Track Rehab	$20,000,000	$3,000,000
Additional Operating Track	$2,125000	$36,000
Property Acquisition	$225,000	
Rail Trail Modifications	$3,000,000	
Contingency (15%)	$3,802,000	$456,000
CAPITAL COST	**$29,152,000**	**$3,492,000**
Engineering	$1,458,000	$175,000
Program & Constr. Mgmt.	$729,000	$88,000
PROGRAM COST	**$31,339,000**	**$3,755,000**

B. Option – Shortline ending at Brownfield, Maine (Milepost 43.5 ±)

Item	Maine
Main Track Rehab.	$17,800,000
Additional Operating Track	$1,780,000
Property Acquisition	$225,000
Rail Trail Modifications	$3,000,000
Contingency (15%)	$3,421,000
CAPITAL COST	**$26,226,000**

Engineering	$1,311,000
Program & Constr. Mgmt.	$656,000
PROGRAM COST	**$28,193,000**

C. Option – Shortline ending at East Hiram, Maine (Milepost 37.5 ±)

Item	**Maine**
Main Track Rehab.	$15,300,000
Additional Operating Track	$1,780,000
Property Acquisition	$225,000
Rail Trail Modifications	$3,000,000
Contingency (15%)	$3,046,000
CAPITAL COST	**$23,351,000**
Engineering	$1,168,000
Program & Constr. Mgmt.	$584,000
PROGRAM COST	**$25,103,000**

CHAPTER 6

Passenger Rail Opportunities

I. – INTRODUCTION

This chapter includes an analysis of the potential use of a portion of the Mountain Division for a commuter rail operation and for some type of tourist/excursion service, perhaps to Conway, New Hampshire and beyond. Estimates of capital cost, revenue and operating cost are also included.

To assess commuter rail potential, we looked at demographic indicators of the Mountain Division Corridor in comparison with two other functioning commuter rail systems that are among the smallest systems currently in operation. We also compiled population and housing unit densities for the corridors, a key indicator in determining the required transit system to service an area. From that we extrapolated what the potential ridership might be for a commuter rail operation on the Mountain Division.

What we concluded, on page 17, is that at this time commuter rail would not be viable between Portland/Westbrook and the towns along the Mountain Division. There is simply not enough population density along the corridor and employment density in the Portland/Westbrook area for commuter rail. More important, almost all potential commuter rail users would experience longer overall door to door travel times. Although commuting cost would be lower, the increased trip time and convenience of driving door to door would not offset the reduction in commuting cost.

In spite of the negative conclusion, we developed potential train schedules and made some basic assumptions as to what a start-up commuter rail operation on the Mountain Division Corridor might look like, what the capital cost would be, the annual revenue and the annual operating cost.

We also evaluated the tourist excursion potential for the route. That would appear to have some potential if other states in northern New England cooperated in development of a regional passenger rail initiative focused on tourism and linking existing and future intercity service around the region. The major drawback would be the cost of putting such a system in place. If neither the freight nor commuter opportunities materialize, the capital cost to put a viable tourist operation in place from Portland to Conway would be very high. We have provided capital cost estimates at the end of this chapter with and without freight and commuter rail.

It should be noted at the beginning that neither commuter rail nor excursion operations will ever recover capital cost and do not typically recover all of their operating costs through fares. Public support in some form is necessary to construct, operate and maintain commuter rail systems and the type of excursion service anticipated. This cost is typically more than offset by the benefits, not only to the users of the system, but the communities and states they operate in. These benefits are both obvious and not so obvious, and are discussed in Chapter 7.

A. Commuter Rail – A Good Choice for Many Cities

Commuter rail often provides the lowest cost means of establishing public transportation along corridors that are too long or do not have enough density for other forms of fixed facility transit systems. They take advantage of existing rail lines, lowering initial investment. This is especially true if the rail line is not currently used as a main line by a major freight carrier. In that case, there may not be enough capacity on the line to allow adding trains for a commuter operation without significant investment in additional track, signal systems and major infrastructure investment. This is an issue that many commuter rail systems face around major cities in other parts of the country, but not on the Mountain Division.

Looking around North America there are many existing and proposed commuter rail systems that may inform us. For our purpose, we need to focus on smaller operations and cities and from that we observe that:

1. Other areas are also interested in exploring the use of commuter rail, for example, Ann Arbor, Michigan.
2. Other smaller cities are beginning to see the benefits of patient development of commuter rail; perhaps the best example is Shore Line East service in Connecticut.
3. Commuter rail is off to a reasonable start in Nashville (Music City Star).
4. Commuter rail is off to a very good start in Albuquerque, New Mexico.
5. Commuter rail's future in Harrisburg, Pennsylvania faces strong challenges
6. Planning is well underway for commuter rail service in Charlotte, North Carolina.

Preliminary observations on new commuter rail start-ups:

1. Planners cannot assume significant federal funds;
2. Dedicated sources of funding are essential to success;
3. Commuter rail is a major financial investment.

Following is a list of most of the commuter rail systems currently operating in the United States and Canada. Some of these are very large operations and some are relatively small in terms of mileage, routes and passenger volumes. We have chosen to look at two of the smaller systems in greater detail and also a segment of a long established MBTA line in Boston. The two smaller systems are highlighted in bold italics.

LIST OF OPERATIONAL COMMUTER RAIL SYSTEMS IN NORTH AMERICA

LOCATION	NAME OF OPERATION
Albuquerque, New Mexico	Rail Runner Express
Austin, Texas	Capital MetroRail *(opening 2008)*
Boston, Massachusetts	Massachusetts Bay Transportation Authority
Chicago, Illinois	Metra
Chicago/Gary/Michigan City/South Bend	Chicago South Shore Line
Dallas/Fort Worth, Texas	Trinity Railway Express (TRE)
Harrisburg/Lancaster. Pennsylvania	Corridor One (Capital Area Transit)
Los Angeles, California	Metrolink
Miami/West Palm Beach, Florida	Tri-Rail
Miami, Florida	Miami-Dade Metrorail
Montreal, Quebec	Agence métropolitain de transport
Nashville, Tennessee	***Music City Star***
New Haven, Connecticut	***Shore Line East***
New Jersey, statewide	New Jersey Transit
New York – Long Island	Long Island Rail Road
New York – northern suburbs & CT.	Metro-North Railroad

Philadelphia, Pennsylvania	SEPTA Regional Rail
Philadelphia, Pennsylvania	SEPTA Victory Division
San Diego, California	Coaster
San Diego (Oceanside), California	Sprinter
San Francisco/San Jose, California	Caltrain
San Jose, California	Altamont Commuter Express
Seattle/Tacoma, Washington	Sound Transit (Sounder)
Toronto, Ontario	GO Transit
Syracuse, New York	OnTrack
Vancouver, British Columbia	West Coast Express
Washington – central Maryland	MARC
Washington – northern Virginia	Virginia Railway Express

In addition to the above, there are a number of commuter rail operations in various stages of planning and development throughout the United States.

II. ASSESSING POTENTIAL COMMUTER RIDERSHIP

A. Fundamental Criteria for a Commuter Rail Service

There are certain requirements needed to make rail commuter corridors viable. Among them are sufficient population density, significant highway congestion on existing commuter routes, appropriate balance between populations of the central city and its suburbs, continued vitality of the central city, ease of access from the commuter terminal to the central city employment areas, and comparability of rail/auto travel times.

Successful commuter rail corridors have certain characteristics in common. Among them is length of the rail corridor. Outside of New York City, where some commuter corridors are 72 to 75 miles in length, most commuter corridors are under 60 miles in distance. Of the dozen commuter lines serving Chicago, only four exceed 50 miles in length. The Peninsula Commuter service linking San Jose and San Francisco (Caltrains) is 47 miles long, and of the four Washington, DC lines, only the Virginia Railway Express (VRE) route to Fredericksburg exceeds 50 miles. In addition, one and a half hours appears to be the maximum permissible commuter travel time.

To be successful, a rail commuter corridor must link a sizable suburban population with a substantial central city that is a major source of regional employment. Just as important, geography must assist in dictating where the suburban populations will be, preferably arranged in a linear fashion radiating out from the central city. Boston, San Diego, San Francisco and Chicago are perfect examples of where harbors, mountains and large bodies of water have dictated where people will live and where they will work.

B. Demographics of Mountain Division Corridor versus Other Commuter Rail Operations

To assess the potential for a commuter rail operation west from Portland, we compared some basic demographics of the Mountain Division Corridor to those of two relatively small existing commuter rail operations. One is the Shore Line East that has New Haven, Connecticut as its terminal city and the Music City Star which has Nashville, Tennessee as its terminal city. Although Nashville is a much larger city than Portland, the Music City Star serves an area east of Nashville that overall is similar to the Mountain Division Corridor close to Portland but serves clusters of more intense development along its route. It is also a very recent start –up (September, 2006).

In addition, we had some fairly complete data for one of the MBTA's commuter rail lines that runs northwest of Boston for 49.5 miles, the Fitchburg commuter rail line. A portion of the Fitchburg Line, characterized as "suburban", at a distance from about 15 miles to 27 miles from Boston was also examined. As noted in Note 4, below, the MBTA Fitchburg Suburban line segment is a very mature commuter rail line serving a very wealthy area with a high percentage of Boston bound commuters. The Fitchburg line is in no way similar to the Mountain Division. It is simply an example of what the demographics are of a well established commuter rail service serving a dense urban business district.

One of the most useful demographics in assessing the viability of any public transportation system is population and housing unit densities. We also compiled that data and will discuss what those figures tell us later in this chapter.

TABLE 6-1

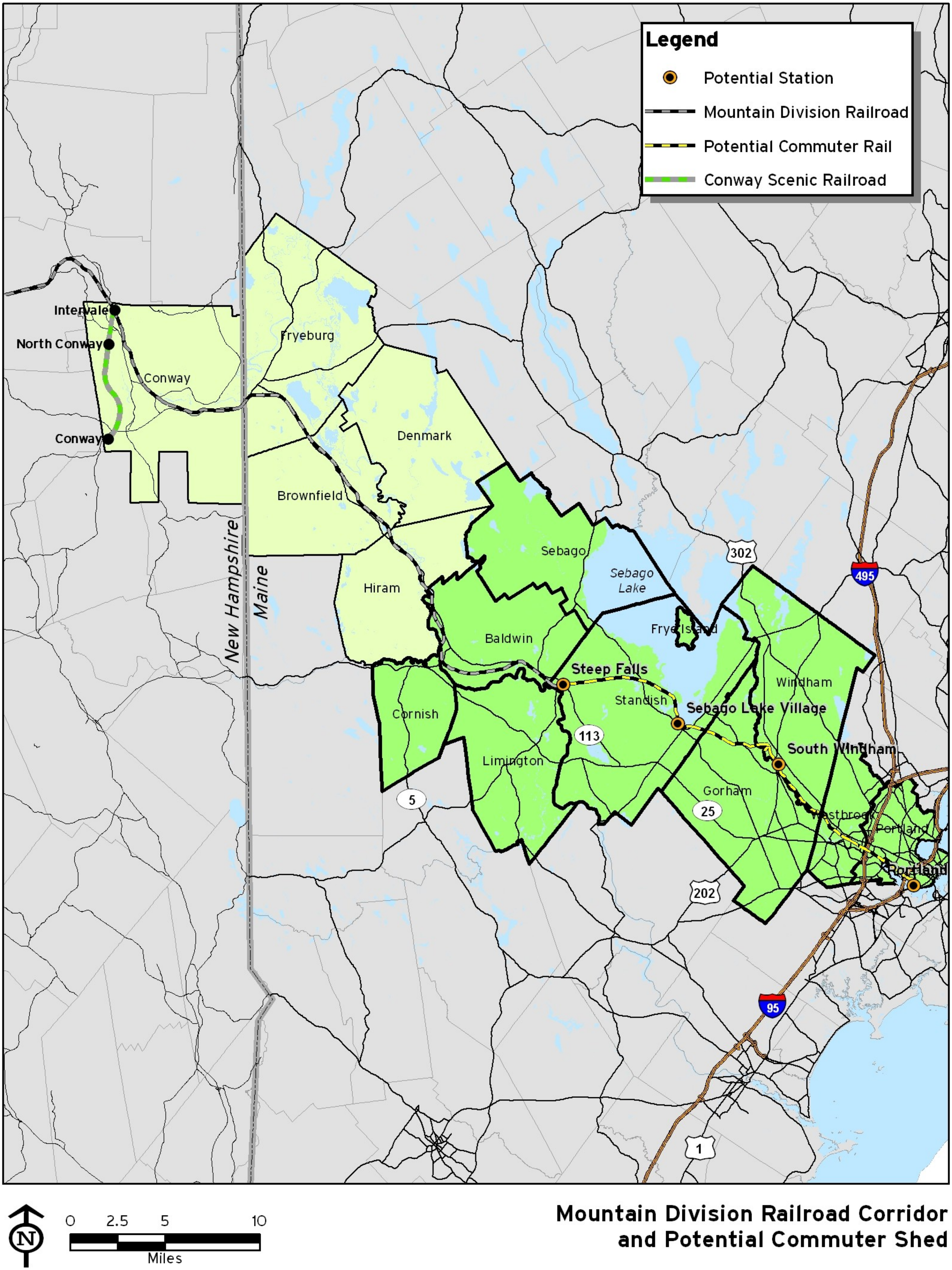
POPULATION OF VARIOUS COMMUTER RAIL CORRIDORS AND TOTAL AVERAGE DAILY BOARDINGS

Mountain Division Corridor		**Shore Line East**		**Music City Star**		**MBTA Fitchburg Suburban**	
Length of Run 23 Miles	2000 Population	Length of Run 33 Miles	2000 Population	Length of Run 32 Miles	2006 Population	Legnth of Run 27.5 Miles	2000 Population
Terminal City		Terminal City		Terminal City		Termainal City	
Portland/Westbrook	80,391	New Haven	123,626	Nashville	552,120	Boston	589,141
Commuter Shed		Commuter Shed		Commuter Shed		Commuter Shed	
Gorham	14,141	Branford	28,863	Wilson County	104,035	Weston	11,469
Windham	14,904	Guilford	21,398	Mount Juliet*	19,389	Lincoln	8,056
Standish	9,285	Madison	17,858	Lebanon*	23,702	Concord	16,993
Baldwin	1,290	Clinton	13,094			Acton	20,331
Limington	3,403	Westbrook	6,292			Boxborough	4,868
Cornish	1,269	Old Saybrook	10,367				
Sebago	1,433	New London	25,871				
Total Com. Shed	45,725	Total Com. Shed	123,743	Total Com. Shed	104,035	Total Com. Shed	61,717
Average Daily Boardings	???????	Average Daily Boardings	1,700	Average Daily Boardings	700	Average Daily Boardings	2,094

* Mount Juliet and Lebanon are two towns within Wilson County. Music City Star serves a corridor within Wilson County and part of the eastern approach to Nashville which is in another county. Actual "commuter shed" is likely somewhat less than the 104,000.

Notes on Population Table and the following table on the MBTA Fitchburg Suburban Line:

1. *Boardings represent about two times actual users, assuming a round trip is made each day (which is not always the case so that the number of individual users is often more than half the total boardings).*
2. *Data is year 2000, except Music City Star is 2006, the year service started.*
3. *Original ridership projections for the Music City Star were 1,500 boardings per day or about 10% of workers commuting to Nashville from the region. Less than 3% were captured originally and ridership has grown slightly to about 4% of Nashville bound commuters.*
4. *The suburban portion of the MBTA Fitchburg Line is quite different than the Mountain*



Mountain Division Railroad Corridor and Potential Commuter Shed

Division and the other two existing commuter rail operations. It serves a very wealthy area with a high concentration of people working in Boston and Cambridge and has had commuter service for over 100 years. As a result, the percent of "capture", as shown in the following two tables, is very high. People living in the "urban" segment have other public transit options besides commuter rail. Note that the second table below is actual number of users while first table is total boardings.

5. *On the Mountain Division Corridor, Westbrook is so close to Portland it is really part of the "terminal" area so that we have added the two populations together in the above table.*

TABLE 6-2
MBTA FITCHBURG COMMUTER RAIL LINE DATA

MBTA FITCHBURG MAIN LINE BOARDINGS VERSUS POPULATION

REGION OR ZONE	MILES FROM N. STATION	POPULATION	TOTAL DAILY BOARDINGS	PERCENT OF POPULATION USING RAIL	TOTAL PARKING SPACES	PARKING SPACES PER ONE WAY RIDE
Urban	3.5 to 15 miles	380,000	1,700	0.22%	161	0.18
Suburban	15 to 27.5	62,000	2,094	1.69%	743	0.71
Montachuset Region	27.5 to 49.5	208,000	1,499	0.36%	532	0.71
	TOTALS	650,000	5,293	0.81%	1,436	0.27

MBTA FITCHBURG MAIN LINE RIDERSHIP VERSUS TOTAL COMMUTERS TO URBAN CENTER

REGION OR ZONE	MILES FROM N. STATION	TOTAL COMMUTERS TO BOSTON & CAMBRIDGE	TOTAL BOSTON & CAMBRIDGE USING RAIL	PERCENT BOSTON & CAMBRIDGE USING RAIL
Urban	3.5 to 15 miles	62,332	1,384	2.22%
Suburban	15 to 27.5	6.668	1,017	15.25%
Montachusett	27.5 to 49.5	3,367	719	21.35%
	TOTALS	70,970	3,120	4.40%

From Table 6-1 we can see from the three existing commuter rail samples, there is a wide range of average daily boardings versus population. This is due to a number of factors:

1. Affluent communities tend to have high use of commuter rail
2. Terminal cities with a concentrated business center and good transportation options within the city have higher use.
3. Commuter rail use is greater on older, established systems - the community grew up around the train service and people are used to commuting by train.

C. Brief Description of Other Commuter Rail Operations Used for Comparison

1. Shore Line East

The Shore Line East (SLE) is a diesel powered commuter rail operation commenced in 1990 running along a section of Amtrak's electrified, high speed Northeast Corridor between Boston and New York. It runs between Old Saybrook, Connecticut and New Haven, about 33 miles, on the same tracks as Amtrak's intercity service. Service is also provided to New London but only on regular Amtrak trains that stop at both New London and New Haven. In 2005, limited service was added in the opposite direction from New Haven, providing express service to and from Stamford and Bridgeport to New Haven.. About 23 trains are run per weekday, with limited weekend service. Average daily boardings are about 1,700. In 2003 revenue was $1,119,623 and expenses of $7,500,793 producing a deficit per boarding of about $15.00

SLE is run by Amtrak under contract to the Connecticut Department of Transportation.

Figure 6-1 – Shore Line East Train at Station Platform

Figure 6-2 – New Shore Line East Station

2. Music City Star

The Music City Star (MCS) started operation in September, 2006 on a 32 mile route running east from Nashville. The total cost for putting this service into operation was about $41,000,000. This is the lowest cost per mile commuter rail start-up in recent times.

Three inbound trips are made in the morning and three outbound in the afternoon. Equipment consists of three locomotives and 11 coaches. These were all purchased second hand, the cars for $1 each from Chicago's Metra and the locomotives for less than $200,000 each, formerly Amtrak units. The bargain price on the cars was because they had been retired by Chicago's Metra and were acquired and rebuilt with Federal money. Metra had to sell them to another bona fide transit operator for $1. MCS spend a small amount of money for minor refurbishment and some ADA modifications.

Figure 6-3 – Music City Star train

Figure 6-4 – New Station platform and shelter

This is the first of other commuter rail lines planned in Nashville. The other planned routes will serve more densely populated areas. This line was the first because of the relatively low initial cost to put it into service.

Ridership was initially estimated to be about 10% of Nashville bound commuters from the area served, about 1,500 boardings per day. Initial ridership was less than 500 boarding per day but has climbed to about 700 boardings per day or about 4% of the commuter trips to and from Nashville.

Original projections for revenue in 2008 were $1,574,000 based on projected ridership in excess of 1,500 per day. Current revenue is about $712,000 and operating expenses are about $3,800,000 resulting in an annual deficit of $3,100,000 and a subsidy of about $17 per boarding. The average fare is less than $5.

The capital cost to put the 31.2 mile into service was as follows:

Project Management	$4,396,458	
Railroad Rehabilitation	22,118,288	(Track, crossings, bridges, passing sidings)
Station Design	1,114,924	
Riverfront Station	2,373,104	(Terminal station in Nashville – no parking)
Donelson Station	2,457,349	(140 parking spaces)
Hermitage Station	2,051,708	(280 parking spaces)
Mt. Juliet Station	2,242,769	(220 parking spaces)
Martha Station	1,024,226	(?)
Lebanon Station	1,676,793	(140 parking spaces)
Rolling Stock	528,696	
TOTAL	$40,983,215	

Figure 6-5 Entering Riverfront Station Nashville

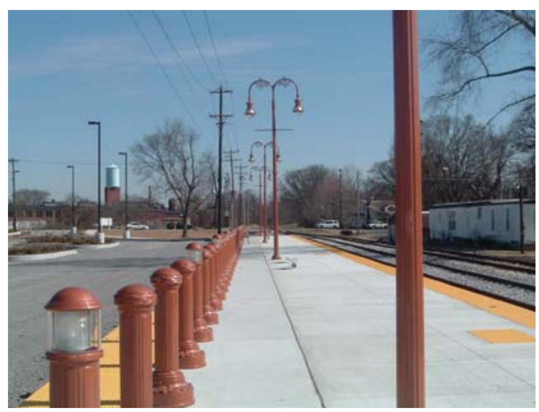


Figure 6-6 Suburban Station Platform and portion of Parking Area

3. MBTA Fitchburg Route Commuter Rail Line

This is the longest MBTA commuter rail line at 49.5 miles. Originating at Boston's North Station, the route passes through Cambridge with a stop at Porter Square where there is a direct connection to the MBTA's Red Line transit to Harvard Square, Kendall Square and Boston. Passing through Belmont and Waltham the line then crosses Route 128 and traverses the suburban and very affluent communities of Weston, Lincoln, Concord, Acton and Boxborough. The line then continues through a number of smaller communities terminating in the Fitchburg/Leominster area, a transit district outside the MBTA's and known as the Montachusett region.

The segment from Weston to Boxborough, about 15 to 27 miles from North Station Boston, is identified in Table 6-2 on page 5 as "Suburban". Good rail service to Boston has been available to these communities for over 100 years. We have included data on this corridor because good data is available and because it has one of the higher percentages of commuter rail usage to Boston & Cambridge in the region. It is in many ways the antithesis of the Mountain Division Corridor. The outer communities (the Montachusett Region) show an even higher percentage of usage even though the travel time is up to 1 ½ hours. The Fitchburg line is in need of improvements to shorten the running time and provide more frequent service to the Montachusett Region. The MBTA is planning on making needed upgrades to this line over the next 5 to 6 years.

Besides North Station, commuters have access to the MBTA Red Line rapid transit at Porter Square, Cambridge where many patrons transfer for Harvard Square, MIT/Technology Square at Kendall Square, Cambridge and downtown Boston locations not close to North Station.

D. Comparison of Economic and Commuting Demographics

Following are tables showing various characteristics of the Mountain Division corridor compared with the corridors of the three systems described above. Although there is no true measure or yardstick that would tell us exactly who would or would not use a commuter rail trip to work, we do know that typically they tend to be highly educated and affluent.

TABLE 6-3

MOUNTAIN DIVISON CORRIDOR
INCOME, EDUCATION AND HOUSING

TOWN	HIGH SCH. OR HIGHER (Percent)	BACHELORS OR HIGHER (Percent)	MEDIAN HOUSEHOLD INCOME	MEDIAN AGE	INDIVIDUALS BELOW POVERTY LINE (Percent)	AVERAGE HOUSEHOLD SIZE	OCCUPIED HOUSING UNITS	PERCENT OWNER OCCUPIED
Westbrook	87.7	18.5	$ 37,873	37.8	6.7	2.33	6,863	59.9
Gorham	91.5	31.5	$ 50,316	34.3	7.4	2.67	4,875	80.1
Windham	90.2	20.8	$ 46,526	36.5	5.0	2.58	5,522	80.6
Standish	91.3	21.3	$ 50,278	33.8	3.6	2.72	2,812	87.7
Baldwin	80.2	15.9	$ 36,500	38.7	11.2	2.62	493	87.8
Limington	82.5	15.5	$ 42,023	36.6	12.9	2.84	1,141	66.2
Cornish	86.2	15.9	$ 38,125	40.5	13.7	2.43	521	79.5
Sebago	92.1	22.1	$ 40,391	42.4	5.8	2.45	584	85.1

TABLE 6-4

SHORE LINE EAST CORRIDOR

INCOME, EDUCATION AND HOUSING

TOWN	HIGH SCH. OR HIGHER (Percent)	BACHELORS OR HIGHER (Percent)	MEDIAN HOUSEHOLD INCOME	MEDIAN AGE	INDIVIDUALS BELOW POVERTY LINE (Percent)	AVERAGE HOUSEHOLD SIZE	OCCUPIED HOUSING UNITS	PERCENT OWNER OCCUPIED
Branford	90.6	38.7	$ 58,009	41.4	4.1	2.26	12,543	68.6
Guilford	94.9	50	$ 76,843	41.8	3.1	2.59	8,151	85.4
Madison	96.6	57.2	$ 87,497	41.0	1.3	2.72	6,515	88.2
Clinton	92.9	33.3	$ 60,471	38.2	4.2	2.55	5,234	79.8
Westbrook	91.3	21.4	$ 57,531	41.0	5.2	2.39	2,605	73.2
Old Saybrook	92.7	38.2	$ 62,742	44.5	4.5	2.41	4,184	83.5
New London	78.4	19.6	$ 33,809	32.2	15.8	2.26	10,181	37.9

TABLE 6-5

MUSIC CITY STAR CORRIDOR

INCOME, EDUCATION AND HOUSING

COUNTY (TOWN)	HIGH SCH OR HIGHER (Percent)	BACHELORS OR HIGHER (Percent)	MEDIAN HOUSEHOLD INCOME	MEDIAN AGE	INDIVIDUALS BELOW POVERTY LINE (Percent)	AVERAGE HOUSEHOLD SIZE	OCCUPIED HOUSING UNITS	PERCENT OWNER OCCUPIED
Wilson Cty.	85.9	22.6	$ 60,278	37.2	7.3	2.7	38,149	83.7
(Mt. Juliet)	89.2	27.8	$ 58,600	33.9	2.7	2.82	4,341	86.3
(Lebanon)	80.4	24.4	$ 35,118	35.4	13.0	2.41	7,987	66.2

TABLE 6-6

MBTA FITCHBURG SUBURBAN CORRIDOR

INCOME, EDUCATION AND HOUSING

TOWN	HIGH SCH OR HIGHER (Percent)	BACHELORS OR HIGHER (Percent)	MEDIAN HOUSEHOLD INCOME	MEDIAN AGE	INDIVIDUALS BELOW POVERTY LINE (Percent)	AVERAGE HOUSEHOLD SIZE	OCCUPIED HOUSING UNITS	PERCENT OWNER OCCUPIED
Weston	96.1	75.1	$ 153,918	41.9	2.9	2.85	3,718	66.2
Lincoln	98.7	69.2	$ 79,003	35.3	0.8	2.83	2,790	61.3
Concord	93.7	66.1	$ 95,897	42.2	3.9	2.62	5,948	80.7
Acton	97.8	69.3	$ 91,624	37.9	2.9	2.69	7,495	76.1
Boxborough	98	72.1	$ 87,618	36.7	2.8	2.63	1,853	70.7

Following are summaries of commuting data within the four corridors.

TABLE 6-7
MOUNTAIN DIVISION CORRIDOR
COMMUTING DATA

TOWN	TOTAL WORKFORCE	PERCENT HOUSEHOLDS WITH 2 or MORE CARS	DROVE TO WORK ALONE	CAR POOLED	TOOK PUBLIC TRANSP. (Inc. Taxi)	WALKED AND OTHER MEANS	MEAN TRAVEL TIME TO WORK (Minutes)
Westbrook	8,585	51.7%	84.1%	7.7%	1.6%	2.7%	18.5
Gorham	8,047	67.6%	81.2%	8.2%	0.6%	4.6%	23.6
Windham	8,253	69.7%	84.5%	10.0%	0.0%	1.9%	26.7
Standish	5,395	72.6%	82.8%	10.9%	0.0%	4.1%	30.8
Baldwin	610	67.1%	75.0%	15.3%	0.0%	3.1%	35.6
Limington	1,794	73.3%	76.9%	16.8%	0.5%	2.5%	34.0
Cornish	645	59.5%	74.0%	16.9%	0.6%	1.9%	34.2
Sebago	765	71.9%	84.9%	6.3%	0.0%	1.8%	36.5

MOUNTAIN DIVISION
PORTALND AND WESTBROOK COMMUTERS

	TO PORTLAND	TO WESTBROOK
Gorham	2,039	699
Windham	2,579	585
Standish	1,311	486
Baldwin	66	28
Limington	374	138
Cornish	72	28
Sebago	158	79
TOTAL	6,599	2,043

TABLE 6-8

SHORE LINE EAST CORRIDOR
COMMUTING DATA

TOWN	TOTAL WORKFORCE	PERCENT HOUSEHOLDS WITH 2 or MORE CARS	DROVE TO WORK ALONE	CAR POOLED	TOOK PUBLIC TRANSP. (Inc. Taxi)	WALKED AND OTHER MEANS	MEAN TRAVEL TIME TO WORK (Minutes)
Branford	15,539	57.5%	87.8%	6.8%	2.0%	0.4%	25.2
Guilford	11,447	72.0%	84.2%	6.2%	1.8%	0.3%	27.3
Madison	8,831	75.8%	82.2%	7.5%	3.3%	0.4%	31.1
Clinton	6,994	67.0%	84.7%	9.1%	1.9%	0.9%	26.4
Westbrook	3,186	61.4%	83.2%	6.3%	2.2%	0.8%	22.5
Old Saybrook	4,896	63.2%	86.1%	6.3%	1.6%	0.5%	26.2
New London	12,201	35.5%	66.8%	12.2%	3.1%	2.3%	17.2

SHORE LINE EAST CORRIDOR
NEW HAVEN COMMUTERS

	TO NEW HAVEN	FROM NEW HAVEN
Branford	3,701	1,237
Guilford	2,213	514
Madison	1,107	199
Clinton	636	148
Westbrook	124	28
Old Saybrook	175	6
New London	19	32
	7,975	2,164

TOTAL New Haven	10,139
Using Commuter Rail	875
Percent Using Comm. Rail	**8.6%**

Reverse commuting is fairly heavy on Shore Line East. Reducing the amount of outbound New Haven to be consistent with other examples would obviously increase the percent using rail.

TABLE 6-9

MUSIC CITY STAR CORRIDOR
COMMUTING DATA

TOWN	TOTAL WORKFORCE	PERCENT HOUSEHOLDS WITH 2 or MORE CARS	DROVE TO WORK ALONE	CAR POOLED	TOOK PUBLIC TRANSP. (Inc. Taxi)	WALKED AND OTHER MEANS	MEAN TRAVEL TIME TO WORK (Minutes)
Wilson County	45,839	72.9%	83.3%	11.6%	0.3%	1.5%	29.2
Mt. Juliet	6,558	75.3%	83.2%	12.4%	0.2%	1.2%	29.9
Lebanon	9,594	55.9%	81.4%	13.2%	0.6%	1.9%	23.7

Above data based on 2000 data, not 2006. Music City Star not operating at that time.

MUSIC CITY STAR CORRIDOR
NASHVILLE COMMUTERS

	TO NASHVILLE	FROM NASHVILLE
Wilson County	20,626	3,151
	20,626	3,151

Extent of Reverse Commuting unknown

TOTAL Nashville to Wilson Cty.	23,777
Using Commuter Rail	350
Percent Using Comm. Rail	**1.5%**

Since above is county wide data, not specific towns or locations, only a fraction of the total potential riders are actually in the "commuter shed" of the Music City Star.
Current estimates are that Star is capturing about 4 percent of Nashville commuters in areas served.

TABLE 6-10

MBTA FITCHBURG SUBURBAN CORRIDOR
COMMUTING DATA

TOWN	TOTAL WORKFORCE	PERCENT HOUSEHOLDS WITH 2 or MORE CARS	DROVE TO WORK ALONE	CAR POOLED	TOOK PUBLIC TRANSP. (Inc. Taxi)	WALKED AND OTHER MEANS	MEAN TRAVEL TIME TO WORK (Minutes)
Weston	5,232	76.0%	79.3%	5.6%	4.8%	5.1%	27.3
Lincoln	4,080	72.8%	79.1%	5.0%	4.1%	4.6%	25.5
Concord	7,624	69.0%	76.8%	5.2%	5.2%	3.7%	28.5
Acton	11,298	70.8%	80.8%	7.4%	7.4%	1.6%	31.0
Boxborough	2,845	69.4%	84.6%	5.9%	5.9%	1.1%	31.7

MBTA FITCHBURG SUBURBAN CORRIDOR
BOSTON & CAMBRIDGE COMMUTERS

	TO BOSTON	TO CAMBRIDGE
Weston	1,422	231
Lincoln	669	891
Concord	899	567
Acton	1,080	613
Boxborough	220	76
	4,290	2,378

TOTAL Boston & Cambridge	6,668
Using Commuter Rail	1,017
Percent Using Comm. Rail	**15.3%**

E. Population Density Demographics

Perhaps more than any other measure, population density (how many people per acre or square mile and how many housing units per acre or per square mile) is the most useful demographic in determining the validity of a public transportation system to serve that area. In fact, this is one of the elements looked at by the Federal Transit Administration (FTA) when assessing if a transit project meets the threshold to be eligible for federal funding. The density of jobs per acre within the downtown area served is also used to validate what the appropriate mode of transit may be.

Many studies have been done to try and quantify approximate ranges of population density that match what would be the appropriate mode of publicly supported transit to service that area. Some of the modes may be:

1. Intermediate Service Local Bus
2. Frequent Local Bus
3. Bus Rapid Transit
4. Commuter Rail
5. Light Rail (generally a modern form of "street car" running most of the time on its own right-of-way, not in a street)
6. Heavy Rail (essentially a subway type system, although not necessarily in a subway)

Following are tables indicating the population densities of the corridors.

TABLE 6-11

POPULATION AND HOUSING DENSITY

PER SQUARE MILE

Mountain Division Corridor			**Shore Line East**			**Music City Star**			**MBTA Fitchburg Suburban**		
Population Density Per Square Mile			Population Density Per Square Mile			Population Density Per Square Mile			Population Density Per Square Mile		
Terminal City			Terminal City			Terminal City			Termainal City		
Portland	1,502.2	3,029	New Haven	2,808.50	6,558	Nashville **	642.1	1,728	Boston	5,202.50	12,166
Commuter Shed			Commuter Shed			Commuter Shed			Commuter Shed		
	Housing Units / Sq. Mile	Persons/ Sq. Mile		Housing Units /Sq. Mile	Persons/ Sq. Mile		Housing Units/ Sq. Mile	Persons/ Sq. Mile		Housing Units/ K126Sq. Mile	Persons /Sq. Mile
Westbrook	420.3	956.9	Branford	607.1	1,305.2	Wilson County	61.2	155.60	Weston	224.8	674.0
Gorham	253.4	769.6	Guilford	185.4	454.8	Mount Juliet*	287.6	761.20	Lincoln	202.6	560.7
Windham	130.4	319.3	Madison	204	493.3	Lebanon*	297.3	692.00	Concord	246.9	682.0
Standish	67.5	157.2	Clinton	353.6	804.2				Acton	384.6	1,018.1
Baldwin	16.3	36.5	Westbrook	220.1	400.3				Boxborough	183.9	469.7
Limington	32.2	81.1	Old Saybrook	356.3	689.5						
Cornish	26.6	57.4	New London	2,087.40	4,635.5						
Sebago	37.8	43.7									

* These are towns served by Music City Star within the overall Wilson County

** Numbers for Nashville are for the entire County, not just the urbanized area, so densities are lower than the City only.

POPULATION AND HOUSING DENSITY

PER ACRE

Mountain Division Corridor			**Shore Line East**			**Music City Star**			**MBTA Fitchburg Suburban**		
Population Density Per Acre			Population Density Per Acre			Population Density Per Acre			Population Density Per Acre		
Terminal City			Terminal City			Terminal City			Termainal City		
Portland	2.35	4.7	New Haven	4.39	10.2	Nashville	1.00	2.7	Boston	8.13	19.0
Commuter Shed			Commuter Shed			Commuter Shed			Commuter Shed		
	Housing Units per Acre	Persons per Acre		Housing Units per Acre	Persons per Acre		Housing Units per Acre	Persons per Acre		Housing Units per Acre	Persons per Acre
Westbrook	0.66	1.50	Branford	0.95	2.04	Wilson County	0.10	0.24	Weston	0.35	1.1
Gorham	0.40	1.20	Guilford	0.29	0.71	Mount Juliet*	0.45	1.19	Lincoln	0.32	0.9
Windham	0.20	0.50	Madison	0.32	0.77	Lebanon*	0.46	1.08	Concord	0.39	1.1
Standish	0.11	0.25	Clinton	0.55	1.26				Acton	0.60	1.6
Baldwin	0.03	0.06	Westbrook	0.34	0.63				Boxborough	0.29	0.7
Limington	0.05	0.13	Old Saybrook	0.56	1.08						
Cornish	0.04	0.09	New London	3.26	7.24						
Sebago	0.06	0.07									

* These are towns served by Music City Star within the overall Wilson County

** Numbers for Nashville are for the entire County, not just the urbanized area, so densities are lower than the City only

The appropriate number of dwelling units per acre or persons per acre necessary to support a certain mode of transit is not an exact measure. There are a number of variables from one location to another and how the numbers are actually applied. For example, most of the criteria that various studies have come up with measure not just the entire city or town densities, but the narrower corridor along which the service may run. However, the towns in the Mountain Division Corridor beyond Gorham are so large in area and small in population that the few denser clusters would not aggregate into a number of persons sufficient to skew the town wide data enough to make a case for one mode of transit over another.

Most of the studies look at residential units per acre. Typically, not a town wide measure, but a corridor of about ¼ mile either side of the route or a cluster around a station. Here is a sampling of some of the numbers along a transit corridor.

Infrequent Bus (about one per hour)	2 to 3 dwelling units per acre
Intermediate Bus (about 30 minutes)	5 to 6 dwelling units per acre
Frequent Bus (about every 10 minutes)	10 to 15 dwelling units per acre
Light Rail	10 to 15 dwelling units per acre

Commuter rail is not specifically cited in the studies but we know that since most people drive to a suburban commuter rail station, the densities for commuter rail will be less than a bus or trolley service where people generally walk to the stop or station. Looking at the density tables on the previous pages we can see that the town-wide figures for the existing systems range from about 0.3 to a little less than 1.0 dwelling units per acre (except New London at 3.26). In the Mountain Division Corridor, only Westbrook and Gorham fall in that range. Westbrook is too close to Portland for consideration of commuter rail and the route through Gorham is far removed from where most people live and also too close to Portland for commuter rail. Windham at 0.20 dwelling units per acre is the only town in the realistic commuter shed of the Mountain Division that comes close to the range of the other systems.

F. Employment Density

Another metric is the employment density of the terminal city. Figure 6-12 calculates the employment densities for Portland and Westbrook and the Portland Peninsula or downtown Portland.

FIGURE 6-12

EMPLOYMENT DENSITY - PORTLAND AND WESTBROOK

	TOTAL 2006 JOBS	AREA IN SQUARE MILES	JOBS PER SQUARE MILE	JOBS PER ACRE
Portland	68,841	21.21	3,245.7	5.1
Portland Peninsula	56,009	2.5	22,403.6	35.0
Westbrook	11,758	16.87	697.1	1.1

There is a wide range of employment densities per acre within various studies and surveys that have been conducted to establish the type of transit system suitable in a terminal city. In general the following employment densities per acre seem to be reasonable averages that may be used in determining appropriate transit types:

Intermediate Service Local Bus (every 30 Minutes)	Frequent Service Local Bus (every 10 Minutes)	Light Rail System
10 - 20	30 - 75	60 to 120+

From Table 6-12 we can see that as a whole, neither Portland nor Westbrook come close to supporting any type of fixed transit system although the Portland Peninsula falls into a category of a 10 minute frequency bus service. There are a few large employment islands that have higher employment densities but these are scattered and not sufficient to justify any type of a fixed system including commuter rail.

Looking at the overall traffic and commute conditions in the other three existing commuter rail corridors selected for comparison, we know that:

- Traffic congestion is a major issue
- Driving times during rush hours are at least equal to or greater than taking public transportation
- The rail terminal is located close to the urban core or major employment area and has good transit links from the terminal to other parts of the employment area.
- Parking fees in the terminal city are very high and parking spaces are in short supply
- Commuter rail has been available for a number of years – people are used to taking the train (except the Music City Star and ridership there is much lower than the other corridors).

G. Estimating Potential Commuter Rail Ridership on the Mountain Division

On the following Table 6-13 is a listing of the number of people commuting to Portland and Westbrook from the various towns. Note that we added all towns in what we consider to be the Mountain Division Corridor commuter corridor plus a few towns surrounding a potential terminal in Steep Falls. This was to try and show as many potential commuters as possible. As the Table shows, the number of daily commuters to Portland and Westbrook falls off to very small numbers past Standish.

We do not believe that people in Westbrook would take the train to Portland, its just too close, and there are probably very few that would take the train to Westbrook from the other communities. As the above tables indicate, the employment density in Westbrook is very dispersed. The Table following does show a few commuters that may go to Westbrook using rail, but most of the train schedules we developed later in this Chapter do not have a Westbrook stop. There are just too few to justify the added cost and increase in running time a stop at Westbrook would impose.

It could be argued that the percent capture shown on the following table is too low, and we may agree with that view. However, even doubling the numbers does not come close to justifying running a commuter rail service at this time.

There are several facts that sway us towards a low capture ratio:

- The present Portland Transportation Center is too far removed from the area of Portland with higher employment densities. Most would have to transfer to a local bus.
- The combined total trip time of a three seat ride (car, train, bus) would be substantially greater than a one seat auto trip, even with some traffic congestion along the way.
- The location of the Mountain Division in Gorham (along its northern border) would require almost all Portland bound commuters in Gorham to drive away from Portland to reach the railroad.

A next step may be to perform a more complete analysis of the corridor with projections of growth. In the meantime, communities within the corridor may wish to encourage denser residential development at suitable locations near potential stations. Also, if future extensions of Amtrak service to Brunswick and Auburn happen, another terminal station in Portland, perhaps closer to downtown employment centers, may be considered.

TABLE 6-13
MOUNTAIN DIVISION CORRIDOR
INBOUND COMMUTING ESTIMATE

TOWN	DAILY COMMUTERS TO PORTLAND	ESTIMATED PERCENT CAPTURE	ESTIMATED ONE-WAY RIDERS	DAILY COMMUTERS TO WESTBROOK	ESTIMATED PERCENT CAPTUE	ESTIMATED ONE-WAY RIDERS
Westbrook	3,221	0.0%	0			
Gorham	2,039	0.5%	10	699	0.1%	0.7
Windham	2,579	1.5%	39	585	0.2%	1.2
Standish	1,311	2.0%	26	486	0.2%	1.0
Baldwin	66	0.5%	0	28	0.1%	0.0
Limington	374	0.5%	2	138	0.1%	0.1
Cornish	72	0.5%	0	28	0.1%	0.0
Hiram	85	0.1%	0	21	0.2%	0.0
Brownfield	23	0.1%	0	3	0.1%	0.0
Denmark	27	0.1%	0	10	0.1%	0.0
Fryeburg	11	0.1%	0	3	0.1%	0.0
Sebago	158	2.0%	3	49	0.5%	0.2
TOTAL	**9,966**	**0.8%**	**81**	**2,050**	**0.2%**	**3**

Source: U. S. Census - Journey to Work - Year 2000

ESTIMATED TOTAL ONE WAY RIDERS - year 2000	84	
INCREASE BY 8% (Average population increase 2000 to 2007)	7	
ESTIMATED TOTAL ONE WAY RIDERS - year 2007	**91**	
ESTIMATED TOTAL AVERAGE BOARDINGS - year 2007	**200**	(Commuters times 2 plus some additional one way)
Total Potential Commuters	12,977	(Total from table inflated 8%)
Estimated Capture	91	
Percent Capture	**0.7%**	

The table above presents a realistic estimate of what the ridership may be on a start-up commuter rail system in the present Mountain Division Corridor. There simply is not enough population concentrated in reasonable proximity to the corridor. Total boardings of 200 or less would not justify the required capital investment and on-going operating cost. Portland is not large enough or centralized to a degree that would make commuter rail feasible, at least in the near future. Almost all potential users would need to drive to a station, take the train and then transfer to one or more bus routes to reach their destination. Trip total trip time in most cases would be significantly higher versus driving. Although there is traffic congestion in the area, it is not to the extent to drive people from their cars. The low density of population in the commuter shed and dispersal of work destinations in Portland and Westbrook make commuter rail a viable option for very few commuters.

Although the net of cost of driving versus taking public transportation is significantly lower, the increased door to door trip time coupled with the convenience of driving door to door would be very difficult to overcome. As the cost of commuting increases along with population and employment densities, a commuter rail system may become an option for Portland.

III. – ASSESSING TOURIST/EXCURSION POSSIBILITIES

A. A Significant Tourist Destination on the Mountain Division

The Mount Washington Valley region of New Hampshire and western Maine and the Sebago Lake Region of western Maine are major tourist destinations for many types of leisure trips and touring. North Conway has become an especially robust attraction in New England over the last 15 to 20 years. Located at the southeastern entrance to the Mount Washington Valley, North Conway offers myriad lodging, dining and shopping experiences coupled with scenic vistas, and many tourist options in all seasons. Located within 2 ½ hours of Boston and 7 hours from New York, the tourist industry of North Conway and the surrounding area are a huge economic wave that splashes over into the Fryeburg area of western Maine.

To the east, the Sebago Lake, Songo River and Long Lake Region of western Maine and towns such as Naples, Bridgeton, Harrison; and further north towards Kezar Lake, are also significant tourist/leisure destinations, but more summer oriented and not as four season and intense as North Conway.

B. The "Land Cruising" Concept

The experience of "land cruising" through scenic areas by rail is a trend that seems to be gaining momentum. This trend is currently driven not by economic factors, but a growing awareness that rail travel is less obtrusive to and taxing on the environment. And the scenery can be better appreciated from a rail car designed for sight-seeing and people enjoy riding on a train sharing the camaraderie of other passengers collectively engaged in a pleasant experience.

The Maine passenger rail system is evolving as evidenced by:

- Current frequent Amtrak Downeaster service to and from Boston.
- Possible extension of the Downeaster service to Brunswick and possibly Auburn.
- Current seasonal Maine Eastern passenger operation from Brunswick to Rockland along the coast.
- Portland's establishment and growth as a major tourist destination
- Portland's role as a port-of-call for cruise ships

All of the above combined seem to indicate that-the Mountain Division may have a promising future as a key link in a regional, tourist oriented rail system carrying groups of people enjoying the land cruising experience while participating in varied tourist experiences.

C. Requirements for Tourist Oriented Rail Trips

Separating Americans from their automobiles for any type of rail touring experience is possible only if the overall journey is seamless in terms of mobility at each end of the train ride and the rail journey itself is entertaining. With good planning and regional cooperation of businesses, chambers of commerce, state and municipal governments, seamless transportation is possible. The proper rail equipment, onboard staff and scenery provides the entertainment.

Although the trip itself is an attraction, a destination or purpose enhances the experience. At Intervale (part of North Conway), rail tourists could easily transfer to the Conway Scenic Railroad's highly scenic run through Crawford Notch, or perhaps stay on the same train that brought them from Portland for that trip. Alternatively, local trolley buses or vans from area inns and resorts could transfer the tourists to their establishments or other tourist destinations. And of course, tourists in the Mountains could opt for a rail trip to Portland and coastal Maine by train.

The concept of "The Crown of New England" a vision promulgated by Jack Sutton of MRG, Inc./DownEast Rail, certainly has merit. That concept is a "land cruise" rail trip connecting the Amtrak Downeaster at Portland to the Amtrak Vermonter[1] at White River Junction, Vermont via a scenic rail trip that would be:

- The Mountain Division Portland to Conway
- Then up through Crawford Notch through Whitefield, New Hampshire and on to St. Johnsbury, Vermont.
- From St. J, south along the very scenic Passumpsic and Connecticut River valleys for 60 miles to White River Junction.

The total length of the run from Portland to White River Jct. would be 190 miles. Establishment of that trip would require the cooperation and investment by all three northern New England States, or a joint, public-private venture. Currently, in New Hampshire, most of the route is open and passable except the very eastern segment into Maine. In Vermont, from the Connecticut River west into St. J, the track is overgrown and would need to be cleared and upgraded. From St. J south to White River Junction, the 60 mile route is currently in operation for freight service.

Combined with other passenger rail options in Maine, as noted above, and additional rail options and links in other states, the market potential and the opportunities for extensive rail touring could be almost limitless.

D. Initial Excursion Options on the Mountain Division

The potential start-up commuter rail schedules depicted later in this chapter, illustrate how the same equipment used for a commuter service could be utilized during the middle of the day for trips between Portland and North Conway. If upgraded to a Class 3 condition (60 MPH max. speed) the 60 mile trip with several stops could be done in 1 ½ hours or a little less. The excursion schedules show a stop at Steep Falls. The reason for that stop would be for the outbound train to meet a tour

[1] The Vermonter runs from New York City to St. Albans Vermont via New Haven, Hartford, and Springfield. Currently patrons are bussed from St. Albans in northwestern Vermont to Montreal but if some cost issues were resolved, the train could run directly to Montreal.

bus at Steep Falls that could take tourists along the Route 113 corridor to visit the area in a more leisurely manner than the train which would continue on non-stop to Fryeburg. This bus could be an alternative or side trip from the train excursion. Later, the bus would arrive in Fryeburg to put tourists back on the train from Conway and back to Portland.

There are a number of different types of tourist and interests that could be marketed and catered to. Eco-tourism is a growing segment of the industry. Mountain bikers currently are the most affluent leisure activity group and winter sports enthusiasts are not far behind in that category. Provisions for convenient carriage of bicycles, skis and luggage would be a pre-requisite. Innovative marketing of various tour packages that included arrangements for local transportation between the train, lodgings and tourist destinations, all provided under a single rate or group package could open up unlimited markets. These initiatives have the potential to grow exponentially as the concept of vacationing without a car becomes viable and an environmentally responsible way to vacation. Europeans "holiday" by train routinely on a dense system of railroads that link most areas of the continent. Whether or not we can do it here is a matter of priorities both at the grass roots and legislative levels.

Major regional attractions would include the trip through Crawford Notch, shopping at the outlets in North Conway, overnight stays in various inns and B&B's, skiing at all of the ski areas along the route in New Hampshire and Maine, dining at the Mount Washington Hotel, possible "Round the Mountains" train trips such as Portland to Groveton on the St. Lawrence & Atlantic RR then down to Whitefield on the NH owned, New Hampshire Central operated line to the Mountain Division and then back to Portland.[2]

With Portland as a hub and realization of other routes from Portland discussed above, tourists could visit the Maine Coast, Portland and other regions all in the comfort of a train equipped with glass roofs for unequalled viewing, food service and a comfortable, carefree (and car free) experience.

Quantifying what this tourist/excursion market may be is difficult. If we were to assume that initially the Mountain Division were opened to North Conway; in summer there would be day trips from cruise ships, from Portland residents and visiting tourists, possible dinner trains from Portland to some point and back. In the winter, ski trains and people coming along just for the ride through the winter landscape and "Polar Express" family trips. In fall leaf peeping specials of varying durations, perhaps with overnight stays where other activities may be enjoyed. The capital cost to realize this potential may never be recovered in fares but the economic benefits to both Maine and New Hampshire's tourist industry could be significant.

[2] The 470 Railroad Club ran trips of this name and itinerary during the 1960's and the Mass Bay Club from Boston on other routings during the 1950's.

IV. – QUANTIFYING COST OF POTENTIAL PASSENGER RAIL OPERATIONS

A. Potential Operating Schedules

In order to evaluate potential costs of a start-up commuter system with some level of excursion options we have undertaken the next step in the process and prepared several schedules. The principle applied was the minimal rail equipment for a basic commuter service that could also provide some tourist/excursion potential with minimal additional cost. We have also shown some more ambitious commuter schedules that provide service during the day, not just during the commute periods. Most of the schedules assume no more than two sets of trains in service and two schedules use just one set of equipment. Some spare equipment would be required as a back-up to "protect" the service from interruption and to perhaps provide occasional additional capacity for special events.

We envision the trains to initially be just two cars with a locomotive, with perhaps the second train set having a cafe-lounge car for the tourist trade, preferably with some type of vista dome. For a start-up service this could all be used equipment as the Music City Star operation. Alternatively, the cars could be self propelled DMU's (diesel multiple unit) cars that have large truck engines located under the floors of the cars and don't need a locomotive. These cars are quite expensive to purchase new (about $4,000,000 each) and serviceable used DMU units are becoming very scarce.

We emphatically believe that any passenger rail service on the Mountain Division, either commuter or tourist oriented; must operate on track upgraded to FRA Class 3, 60 MPH maximum speed. If tourists are to be moved from Portland to Conway, a distance of 60 miles, the trip must be relatively swift; under 1 ½ hours. Upgrading to just a 30 MPH maximum speed will result in Portland to Conway trip times of at least 2 ¼ to 2 ½ hours, much too long if the line is a part of an interconnected rail cruising network or to serve the cruise ship market. Certain types of trips such as dinner trains and tours that may discharge passengers for mini-side trips of the region could be operated at lower speed.

At a speed of 60 MPH the view of scenery from a train a few hundred feet distance is not a blur and can be appreciated as it unfolds in succession, changing as if one is slowly turning the pages of a picture book, pausing just long enough to take it in but not study the detail. At 30 MPH (FRA Class 2 track condition) the changing panorama slows down to a long, slow moving procession, generally of unbroken forest. The 2 ½ hours will go very slowly and not be appreciated by the majority of tourists anxious to get to the next point on their itinerary. Of course, the train speed could be varied depending on the clientele, focus of the trip and at especially scenic areas such as along Sebago Lake and some of the river crossings.

B. Sample Schedules

SCHEDULE 1

COMMUTER AND TWO ROUND TRIPS TO CONWAY WITH TWO TRAINSETS BASED AT STEEP FALLS

COMMUTER SCHEDULE
EASTBOUND (INBOUND TO PORTLAND)

STATION	MILES		TRAIN NUMBER							
			1	3	5	7		9	11	13
Steep Falls	0.00	Leave	5:50 AM	6:30 AM	7:28 AM	8:10 AM		3:30 PM	5:30 PM	6:20 PM
Sebago Lake Village	8.04	Leave	6:00 AM	6:40 AM	7:38 AM	8:20 AM		3:40 PM	5:42 PM	6:30 PM
South Windham	13.85	Leave	6:09 AM	6:49 AM	7:47 AM	8:29 AM		3:49 PM	5:51 PM	6:41 PM
Portland	22.78	Arrive	6:22 AM	7:02 AM	8:00 AM	8:42 AM		4:02 PM	6:04 PM	6:54 PM

WESTBOUND (OUTBOUND FROM PORTLAND

STATION	MILES		TRAIN NUMBER								
			2	4	6			10	12	14	16
Portland	0.00	Leave	6:34 AM	7:15 AM	8:15 AM			4:46 PM	5:35 PM	6:25 PM	7:10 PM
South Windham	8.93	Leave	6:51 AM	7:28 AM	8:31 AM			5:00 PM	5:49 PM	6:39 PM	7:24 PM
Sebago Lake Village	14.74	Leave	6:59 AM	7:40 AM	8:39 AM			5:08 PM	5:57 PM	6:47 PM	7:32 PM
Steep Falls	22.78	Arrive	7:09 AM	7:50 AM	8:49 AM			5:18 PM	6:07 PM	6:57 PM	7:42 PM

EXCURSION SERVICE - PORTLAND TO CONWAY
WESTBOUND TO CONWAY

STATION	MILES		TRAIN NUMBER				
						80	82
Portland	0.00	Leave				10:15 AM	2:00 PM
Steep Falls	22.78	Leave				10:45 AM	2:30 PM
Fryeburg	48.65	Leave				11:21 AM	3:06 PM
North Conway	58.17	Leave				11:36 AM	3:21 PM
Intervale	60.20	Arrive				11:41 AM	3:26 PM

EASTBOUND TO PORTLAND

STATION	MILES		TRAIN NUMBER					
						81	83	
Intervale	0.00	Leave				12:10 PM	3:45 PM	
North Conway	2.03	Leave				12:18 PM	3:53 PM	
Fryeburg	11.55	Leave				12:33 PM	4:08 PM	
Steep Falls	37.42	Leave				1:09 PM	4:44 PM	Train 83 meets Train 10 at
Portland	60.20	Arrive				1:40 PM	5:15 PM	South Windham at 5:00 PM

INITIAL EQUIPMENT CONSISTS

LEGEND

184 miles per day [yellow] = Train set No. 1 - Locomotive and 2 Coaches

378 miles per day [blue] = Train set No. 2 - Locomotive, 2 Coaches and Café-Lounge Car

5:00 PM = Red Lettering is where a scheduled "meet" between trains is occuring

This schedule has "tight" turnbacks with little allowance for schedule slippage. Attempt is to provide maximum utiliization of just two train sets.
Provides four inbound morning trains and four outbound evening trains with just three in the opposite direction.
Train set No. 1 (Yellow) makes two round trips in the morning, staying at Steep Falls during the day for service.
Train set No. 2 (Blue) makes two round trips Portland to Conway duirng the day, providing second outbound commuter run in the evening.
Excursion schedule provides about a four hour stay in North Conway area. No same day service provided from Conway to Portland.
Both train sets layup during the evening in Steep Falls.

SCHEDULE 2
COMMUTER AND ONE ROUND TRIP TO CONWAY WITH TWO TRAINSETS BASED AT STEEP FALLS

COMMUTER SCHEDULE
EASTBOUND (INBOUND TO PORTLAND)

STATION	MILES		TRAIN NUMBER 1	3	5	7	9	11	13
Steep Falls	0.00	Leave	5:50 AM	6:30 AM	7:28 AM	8:10 AM	3:30 PM	5:30 PM	6:20 PM
Sebago Lake Village	8.04	Leave	6:00 AM	6:40 AM	7:38 AM	8:20 AM	3:40 PM	5:42 PM	6:30 PM
South Windham	13.85	Leave	6:09 AM	6:49 AM	7:47 AM	8:29 AM	3:49 PM	5:51 PM	6:41 PM
Portland	22.78	Arrive	6:22 AM	7:02 AM	8:00 AM	8:42 AM	4:02 PM	6:04 PM	6:54 PM

WESTBOUND (OUTBOUND FROM PORTLAND)

STATION	MILES		TRAIN NUMBER 2	4	6		10	12	14	16
Portland	0.00	Leave	6:34 AM	7:15 AM	8:15 AM		4:46 PM	5:35 PM	6:25 PM	7:10 PM
South Windham	8.93	Leave	6:51 AM	7:28 AM	8:31 AM		5:00 PM	5:49 PM	6:39 PM	7:24 PM
Sebago Lake Village	14.74	Leave	6:59 AM	7:40 AM	8:39 AM		5:08 PM	5:57 PM	6:47 PM	7:32 PM
Steep Falls	22.78	Arrive	7:09 AM	7:50 AM	8:49 AM		5:18 PM	6:07 PM	6:57 PM	7:42 PM

EXCURSION SERVICE - PORTLAND TO CONWAY
WESTBOUND TO CONWAY

STATION	MILES		TRAIN NUMBER			80
Portland	0.00	Leave				10:30 AM
Steep Falls	22.78	Leave				11:00 AM
Fryeburg	48.65	Leave				11:36 AM
North Conway	58.17	Leave				11:51 AM
Intervale	60.20	Arrive				11:56 AM

EASTBOUND TO PORTLAND

STATION	MILES		TRAIN NUMBER			81
Intervale	0.00	Leave				3:45 PM
North Conway	2.03	Leave				3:53 PM
Fryeburg	11.55	Leave				4:08 PM
Steep Falls	37.42	Leave				4:44 PM
Portland	60.20	Arrive				5:15 PM

Train 81 meets Train 10 at South Windham - 5:00 PM

INITIAL EQUIPMENT CONSISTS

LEGEND

184 miles per day	(Yellow)	=	Train set No. 1 - Locomotive and 2 Coaches
358 miles per day	(Blue)	=	Train set No. 2 - Locomotive, 2 Coaches and Café-Lounge Car
	5:00 PM	=	Red Lettering is where a scheduled "meet" between trains is occuring

This schedule has "tight" turnbacks with little allowance for schedule slippage. Attempt is to provide maximum utiliization of just two train sets.
Provides four inbound morning trains and four outbound evening trains with just three in the opposite direction.
Train set No. 1 (Yellow) makes two round trips in the morning, staying at Steep Falls during the day for service.
Train set No. 2 (Blue) makes one round trip Portland to Conway duirng the day, providing second outbound commuter run in the evening.
Both train sets layup during the evening in Steep Falls.

SCHEDULE 3
ALL DAY COMMUTER - NO EXCURSION
(ADDS A STOP AT WESTBROOK)

COMMUTER SCHEDULE
EASTBOUND (INBOUND TO PORTLAND)

STATION	MILES		TRAIN NUMBER 1	3	5	7	9	11	13	15	17	19	21	23
Steep Falls	0.00	Leave	5:50 AM	6:30 AM	7:30 AM	8:10 AM	10:30 AM	2:00 PM	3:30 PM	4:27 PM	5:30 PM	6:20 PM	7:26 PM	10:00 PM
Sebago Lake Village	8.04	Leave	6:00 AM	6:40 AM	7:40 AM	8:20 AM	10:40 AM	2:10 PM	3:40 PM	4:37 PM	5:40 PM	6:30 PM	7:36 PM	10:10 PM
South Windham	13.85	Leave	6:09 AM	6:49 AM	7:49 AM	8:29 AM	10:49 AM	2:19 PM	3:49 PM	4:46 PM	5:49 PM	6:39 PM	7:45 PM	10:19 PM
Westbrook	19.28	Leave	6:17 AM	6:57 AM	7:57 AM	8:37 AM	10:57 AM	2:27 PM	3:57 PM	4:54 PM	5:57 PM	6:47 PM	7:53 PM	10:27 PM
Portland	22.78	Arrive	6:24 AM	7:04 AM	8:04 AM	8:44 AM	11:04 AM	2:34 PM	4:04 PM	5:01 PM	6:04 PM	6:54 PM	8:00 PM	10:34 PM

WESTBOUND (OUTBOUND FROM PORTLAND)

STATION	MILES		TRAIN NUMBER 2	4	6	8	10	12		14	16	18	20	22	24
Portland	0.00	Leave	6:34 AM	7:16 AM	8:15 AM	9:00 AM	12:00 PM	2:50 PM		4:25 PM	5:30 PM	6:20 PM	7:10 PM	9:00 PM	11:15 PM
Westbrook	3.50	Leave	6:41 AM	7:23 AM	8:22 AM	9:07 AM	12:07 PM	2:57 PM		4:32 PM	5:37 PM	6:27 PM	7:17 PM	9:07 PM	11:22 PM
South Windham	8.93	Leave	6:51 AM	7:31 AM	8:31 AM	9:16 AM	12:16 PM	3:06 PM		4:45 PM	5:48 PM	6:38 PM	7:27 PM	9:17 PM	11:32 PM
Sebago Lake Village	14.74	Leave	6:59 AM	7:41 AM	8:39 AM	9:24 AM	12:24 PM	3:14 PM		4:53 PM	5:55 PM	6:45 PM	7:35 PM	9:25 PM	11:40 PM
Steep Falls	22.78	Arrive	7:09 AM	7:52 AM	8:49 AM	9:34 AM	12:34 PM	3:24 PM		5:03 PM	6:06 PM	6:56 PM	7:45 PM	9:35 PM	11:50 PM

INITIAL EQUIPMENT CONSISTS

LEGEND

276 miles per day [yellow] = Train set No. 1 - Locomotive and 2 Coaches

276 miles per day [blue] = Train set No. 2 - Locomotive and 2 coaches

5:00 PM [red] = Red Lettering is where a scheduled "meet" between trains is occuring

SCHEDULE 4
ALL DAY COMMUTER - USING JUST 1 TRAINSET

COMMUTER SCHEDULE
EASTBOUND (INBOUND TO PORTLAND)

STATION	MILES		TRAIN NUMBER 1	3	5	7	9	11	13	15	17
Steep Falls	0.00	Leave	5:50 AM	7:30 AM	9:00 AM	11:00 AM	2:00 PM	3:40 PM	5:20 PM	7:00 PM	9:30 PM
Sebago Lake Village	8.04	Leave	6:00 AM	7:40 AM	9:10 AM	11:10 AM	2:10 PM	3:50 PM	5:30 PM	7:10 PM	9:40 PM
South Windham	13.85	Leave	6:09 AM	7:49 AM	9:19 AM	11:19 AM	2:19 PM	3:59 PM	5:39 PM	7:19 PM	9:49 PM
Portland	22.78	Arrive	6:22 AM	8:02 AM	9:32 AM	11:32 AM	2:32 PM	4:12 PM	5:52 PM	7:32 PM	10:02 PM

WESTBOUND (OUTBOUND FROM PORTLAND)

STATION	MILES		TRAIN NUMBER 2	4	6	8	10	12	14	16	18
Portland	0.00	Leave	6:34 AM	8:15 AM	10:00 AM	12:00 PM	2:50 PM	4:30 PM	6:10 PM	7:50 PM	11:00 PM
South Windham	8.93	Leave	6:47 AM	8:28 AM	10:13 AM	12:13 PM	3:03 PM	4:43 PM	6:23 PM	8:03 PM	11:13 PM
Sebago Lake Village	14.74	Leave	6:55 AM	8:36 AM	10:21 AM	12:21 PM	3:11 PM	4:51 PM	6:31 PM	8:11 PM	11:21 PM
Steep Falls	22.78	Arrive	7:05 AM	8:46 AM	10:31 AM	12:31 PM	3:21 PM	5:01 PM	6:41 PM	8:21 PM	11:31 PM

INITIAL EQUIPMENT CONSISTS

LEGEND

414 miles per day [yellow] = Commuter Periods Locomotive and 2 cars

[white] = Off peak Periods

SCHEDULE 5
COMMUTER AND EXCURSION- USING JUST 1 TRAINSET

COMMUTER SCHEDULE
EASTBOUND (INBOUND TO PORTLAND)

STATION	MILES		TRAIN NUMBER					
			1	3	5		7	9
Steep Falls	0.00	Leave	5:50 AM	7:30 AM	9:00 AM		5:20 PM	7:00 PM
Sebago Lake Village	8.04	Leave	6:00 AM	7:40 AM	9:10 AM		5:30 PM	7:10 PM
South Windham	13.85	Leave	6:09 AM	7:49 AM	9:19 AM		5:39 PM	7:19 PM
Portland	22.78	Arrive	6:22 AM	8:02 AM	9:32 AM		5:52 PM	7:32 PM

WESTBOUND (OUTBOUND FROM PORTLAND)

STATION	MILES		TRAIN NUMBER					
			2	4		8	10	12
Portland	0.00	Leave	6:34 AM	8:15 AM		4:30 PM	6:10 PM	7:50 PM
South Windham	8.93	Leave	6:47 AM	8:28 AM		4:43 PM	6:23 PM	8:03 PM
Sebago Lake Village	14.74	Leave	6:55 AM	8:36 AM		4:51 PM	6:31 PM	8:11 PM
Steep Falls	22.78	Arrive	7:05 AM	8:46 AM		5:01 PM	6:41 PM	8:21 PM

EXCURSION SERVICE - PORTLAND TO CONWAY
WESTBOUND TO CONWAY

STATION	MILES		TRAIN NUMBER		
					60
Portland	0.00	Leave			10:30 AM
Steep Falls	22.78	Leave			11:00 AM
Fryeburg	48.65	Leave			11:36 AM
North Conway	58.17	Leave			11:51 AM
Intervale	60.20	Arrive			11:56 AM

EASTBOUND TO PORTLAND

STATION	MILES		TRAIN NUMBER		
					61
Intervale	0.00	Leave			2:30 PM
North Conway	2.03	Leave			2:38 PM
Fryeburg	11.55	Leave			2:53 PM
Steep Falls	37.42	Leave			3:29 PM
Portland	60.20	Arrive			4:00 PM

380 miles per day

C. Defining a Commuter Rail System

A commuter rail system would run from Portland to Steep Falls, a distance of just under 23 miles. This would require upgrading to an FRA Class 3 condition. As determined in Chapter 4, the cost for upgrading of the main line track structure Portland to Steep Falls would be approximately $19,600,000.

If freight service were operating on that segment, the current cost to upgrade to FRA Class 2 required for freight on that same segment would be approximately $10,500,000, so the incremental cost to a condition for passenger operation would be about $11,100,000. However, it is important to note that the freight operation, as defined in Chapter 5, would not be able to support the cost of the track upgrade.

In addition to the main line track upgrades there would be a number of other facilities and elements necessary to provide a commuter rail system. A perusal of the preliminary train schedules as well as

POTENTIAL STEEP FALLS TERMINAL
PASSENGER & FREIGHT
FGIURE 6-7

the descriptions of additional facilities following will provide a basis for development of additional capital costs.

D. Stations and Layover Facility

1. Standish Terminal Facilities – (22.78 miles from Portland Transportation Center)

(See Figure 6-7 on the following page for a conceptual layout of a combined passenger and freight terminal at Steep Falls)

The "country" end of a commuter rail operation to Portland would be at Steep Falls in the town of Standish. It is at the outer limit of any semblance of population density in the foreseeable future, is a junction of several regional roads, and has enough room for a suitable layover facility to store and service the train consists over night and during the day for servicing and inspections.

This terminal station would contain a paved platform(s) long enough for four to five rail cars, a simple shelter, lighting, auto parking, a drop-off area, ticket vending machines and possibly a bus-way and berth close to the train platform. (See the Music City Star photos on pages 5 & 6 to see what the stations might look like). The bus connection may be used for potential alternative touring up and down the Route 113 corridor, reconnecting to the train, possibly at Fryeburg as described above.

If freight service is operating and if multiple passenger trains are operated, the station perhaps should have two tracks with a platform serving each track. This would allow meets and passes of trains and the simultaneous occupancy and boarding of two trains at the station. A protected pedestrian crossing of the tracks would be required at one end of the platforms. We would envision the station to be located within the triangle formed by the railroad and the two intersecting highways, just to the west of the Route 113 grade crossing at the location of the abandoned feed mill.

To the east across Route 113 and behind the store and other buildings north of the railroad, there would be a small freight yard (if freight service is operated), a shop building for locomotive servicing and inspections (shared use by both freight and passenger if freight service operated) and a layover facility. A layover facility consists of tracks for each train consist (a train with locomotive and cars) that is fenced in, has lighting, oil drip pans and retention system under the locomotive locations, and; most importantly; an electric substation and power distribution system that provides electricity for train air conditioning and heat so the locomotive can be shut down. This saves fuel and noise of a locomotive running all night. Layover facilities need to be at the "country" end of commuter rail operations to avoid the "dead heading" that would be necessary to run trains out to the end of the line at the beginning of the inbound commute period and run them back into the city at the end of the day.

2. Sebago Lake Village Station – (14.74 miles from Portland Transportation Center)

Located on property owned by the Portland Water District, this location is at a key crossroads from four directions and a good intercept for commuters coming from those directions.

This location will be controversial as the Portland Water District is protective of any development or encroachment along this part of Sebago Lake, the Portland Region's water supply. With proper safeguards, a station could be built here that would not pose a threat to the integrity and security of the water supply. Containment of surface runoff and non-use of inappropriate de-icing agents should mitigate environmental concerns and fencing off the area between the station and the Lake will provide an area more secure than at present around the existing boat launch area.

The schedules show some trains in opposite directions "meeting" at this location, so a passing track and two sets of platforms will be required as at Steep Falls. A protected pedestrian crossing will be required at one end of the platforms.

3. South Windham (Little Falls) – (8.93 miles from Portland Transportation Center)

A proposed commuter rail station has been already been contemplated by planning for the Village of Little Falls and shown on preliminary plans for development. The station may be located south of Depot Street and east of the Railroad. The main portion of the site, an old mill building planned for demolition, would consist of a complex of apartment buildings or condominiums, a good choice adjacent to a commuter station. In a regional context, this station seems to be strategically located for potential commuters. The preliminary schedules show that most meets between trains will occur at this location. If freight service is also operating, the passing track should be at least 2,000 feet long to allow a meet with a freight train.

Platforms will be needed on both tracks with a protected pedestrian track crossing located at one end of the platforms.

4. Portland Transportation Center

Currently this facility has a single platform serving the main track only. There is a long passing siding adjacent to the main track. There is also a two track layover facility along the passing siding opposite the station. The layover facility is used for overnight storage of the two sets of Downeaster equipment and has electric power connections to maintain heat or air conditioning in the cars with the locomotives shut down.

The Downeaster schedule does not allow occupancy of the single platform for both commuter and intercity service. A short (2 car lengths) platform could be built along the passing siding opposite the station. This short platform would have to fit between the grade crossing of Sewall Street (Thompson's Point Road) and the layover facility. In the way would be the Amtrak trailer and the substation for the electric layover facility. Two un-used freight sidings serving a propane dealer and a warehouse would also have to be removed.

A longer platform could be built west of the grade crossing, acquiring adjacent property which is currently a truck parking area. This platform would not be in close proximity to the Transportation Center, being staggered to the west of the present platform and separated by the Sewall Street grade crossing.

If and when Amtrak service may be extended to Brunswick and Auburn, some other arrangement of the present transportation center or perhaps an entirely new center located in another part of Portland is another possibility. For commuter purposes, a station located in closer proximity to the downtown Portland area would be a positive for development of commuter rail. Whatever the outcome, either the existing station would have to be modified or a new station would need to have provisions for intercity service, commuter and excursion services.

5. Station Cost

We assumed that the outer stations would all have two platforms, long enough to accommodate future growth to 5 car trains, with an ADA compliant platform at one end, and two shelters on each platform, one over the ADA platform and one over the main platform. We have estimated bituminous platforms and bus boarding area, drainage, lighting, landscaping, intertrack fence, pedestrian crossing, parking for about 100 to 150 cars and short entrance/exit road(s). The estimated cost per station, assuming an appearance similar to the Music City Star stations shown at the beginning of this chapter, is about $1,500,000 each. Initially the stations could be built with concrete platforms, more attractive shelters and landscaping. However, this would increase average cost to over $2,000,000 per station, perhaps worth the extra expense to provide an attractive facility and encourage riders.

The station at the Portland Transportation Center already exists so the cost there would be for a single platform and perhaps the cost to move the Amtrak trailer and layover facility substation, upgrade the siding and a few site amenities. A budgetary cost of $800,000 should provide the necessary platform and other site work.

In addition, property will have to be acquired at each station. The outlying stations would have a foot print of about 1.5 acres. Assuming a total requirement of 2 acres at each location, we would budget an average of $150,000 per station for total acquisition cost of $600,000.

Total station cost would be $5,900,000 including land acquisition.

E. Passing Sidings

As noted in the station descriptions, passing sidings should be provided at all station locations. This will be more critical if freight service is also operating. In that case at least two of the sidings need to be long enough to clear the expected length of the freight trains, about 2,000 feet. Assume three sidings/passing tracks, one at Steep Falls, a shorter track at Sebago Lake and a 2,000 foot siding at South Windham. That would be six turnouts at $70,000 each, 3,600 feet of new track at $150 per foot and two crossing installations, one over Route 113 at Steep Falls and one over Depot Street in South Windham, about $50,000, for a total cost of $1,000,000.

If both a freight service and excursion/tourist services are operating all the way to Fryeburg and North Conway, additional passing/runaround tracks would be required to allow the freight train to clear for the passenger train. Within the freight budget in Chapter 5, we have provided what should be sufficient sidings between Steep Falls and Fryeburg for that purpose. However, if more than one excursion train at a time were on that segment (the sample schedules only have one at a time), then some additional passing sidings may be necessary. Also, the sidings provided for freight operation were only for FRA Class 2 operation, perhaps re-using the existing turnouts. At the very least, the cost difference between the relay and new turnouts at three locations would need to be added to the cost to run all the way to Conway. That would be $270,000.

F. Additional Automatic Highway Crossing Warning Systems

The tables in Chapter 4 for the FRA Class 3 upgrade include costs for new grade crossing warning systems only at the major highway crossings. If regular 60MPH passenger trains were to be operated, all public crossings, no matter how lightly used, should have active warning systems. This would add an additional $1,500,000 in the commuter only area out to Steep Falls and an additional $2,775,000 all the way to Fryeburg if 60 MPH passenger excursion trains were to operate. In New Hampshire, an additional $700,000 would be required on that 10 mile segment.

G. DTMF Remote Control Turnouts and Switch Heaters

In the commuter rail segment, the passing track or siding locations should have electric or propane switch heaters installed at each of the siding plus a DTMF remote controlled switch activation mechanism. This is to keep the switches clear of ice and snow and allows the switch to be thrown from the locomotive via a radio signal. Since we are not including the cost of a full signal system with remote dispatcher controlled turnouts, this lower cost option would obviate the need for a train crew member to come off the train to throw the switch, wait for the train to pass and then throw the switch back and then get back on board. With regular meets between trains, this would be too time consuming. The total cost is $25,000 at each location. We have assumed 7 locations; at each end of the three passing sidings and the switch approaching the Portland Transportation Center for a total cost of $175,000.

H. Layover Facility and Maintenance Shop

The layover facility, shop, storage area and crew reporting location would be at Steep Falls. Under the freight costs in Chapter 5, there is a $900,000 item in the operating budget for the short line operator to provide a shop facility. It may be assumed this facility could be shared between the passenger and freight operation if the short line operator and the commuter rail operator were the same. Otherwise, a similar cost would need to be carried in this summary for Commuter. Additionally, a $250,000 property acquisition cost would need to be added if no freight operation was in place.

In addition, a layover facility for two train sets would need to be built adjacent to the shop at Steep Falls. This would consist of two tracks about 600 feet long each (sized to handle potential 5 car trains), have oil drip pans, storm water retention system, lighting, 550 to 600 volt electric system for powering train heat and air conditioning, toilet dumping facilities, fencing, miscellaneous equipment and material storage. Total estimated cost is $1,750,000

I. Current Rail Trail

The current rail trail between Newhalls and Route 35 near Sebago Lake Village presents numerous issues for start up of rail operations. To protect the rail infrastructure, railroad operations and the users of the rail trail; retaining walls, fencing and possibly additional right-of-way would be required. As a very rough, order of magnitude estimate we suggest a budgetary figure of about $3,000,000 to provide retaining walls, earthwork and fencing. Some additional costs may be required to acquire additional right-of-way. Survey and further engineering analysis would be necessary to arrive at a better estimate of what the actual cost may be.

V. CAPITAL COST SUMMARY FOR COMMUTER RAIL OPERATION

NOTE – ALL COSTS ARE IN 2007 DOLLARS. ACTUAL WOULD NEED TO BE INFLATED TO MID POINT OF CONSTRUCTION

Commuter Service Between Portland Transportation Center and Steep Falls

A. Option 1–No Underlying Freight Operation

Item	Maine	
Main Track Rehab	$19,600,000	
Additional Operating Track	$1,000,000	
Property Acquisition	$850,000	
Stations	$5,300,000	
Additional AHCWS	$1,500,000	
DTMF's & Switch Heaters	$150,000	
Shop Facility	$900,000	
Layover Facility	$1,750,000	
Rail Trail Modifications	$3,000,000	
Contingency (15%)	$5,108,000	
CAPITAL COST	**$39,158,000**	
Engineering	$1,858,000	
Program & Constr. Mgmt.	$979,000	
PROGRAM COST	**$41,995,000**	**(About 1.8 million per mile)**

B. Option 2 – Shortline Freight Operation in Place (Incremental Cost to add Commuter)

Item	Maine
Main Track Rehab	$11,100,000
Additional Operating Track	$1,000,000
Property Acquisition	$600,000
Stations	$5,300,000
Additional AHCWS	$1,500,000
DTMF's & Switch Heaters	$150,000
Layover Facility	$1,750,000
Contingency (15%)	$3,210,000
CAPITAL COST	**$24,610,000**
Engineering	$1,231,000
Program & Constr. Mgmt.	$615,000
PROGRAM COST	**$26,456,000**

VI. CAPITAL COST SUMMARY FOR EXCURSION/TOURIST TO CONWAY, NH

NOTE – ALL COSTS ARE IN 2007 DOLLARS. ACTUAL WOULD NEED TO BE INFLATED TO MID POINT OF CONSTRUCTION

Tourist and Excursion between Portland Transportation Center and Intervale, NH – FRA Class 3 Track Condition

A. Option 1 – No Other Operation in Place (Commuter or Freight)

Item	Maine	New Hampshire
Main Track Rehab	$41,935,000	$7,500,000
Additional Operating Track	$1,200,000	$300,000
Stations	$2,300,000	$1,500,000
Additional AHCWS	$4,700,000	$700,000
Property Acquisition	$250,000	
DTMF's & Switch Heaters	$100,000	$50,000
Shop Facility	$900,000	
Layover Facility	$1,750,000	
Rail Trail Modifications	$3,000,000	
Contingency (15%)	$8,420,000	$1,508,000
CAPITAL COST	**$64,555,000**	**$11.558,000**
Engineering	$3,228,000	$578,000
Program & Constr. Mgmt.	$1,614,000	$289,000
PROGRAM COST	**$69,397,000**	**$12,425,000**

B. Option 2 – Freight Service in Place all the way to North Conway (Incremental Cost)

Item	Maine	New Hampshire
Main Track Rehab	$22,109,000	$4,470,000
Additional Operating Track	$1,200,000	$300,000
Stations	$2,300,000	$1,500,000
Additional AHCWS	$4,700,000	$700,000
Property Acquisition	$150,000	
DTMF's & Switch Heaters	$100,000	$50,000
Layover Facility	$1,750,000	
Contingency (15%)	$4,846,000	$1,053,000
CAPITAL COST	**$37,155,000**	**$8,073,000**
Engineering	$1,858,000	$404,000
Program & Constr. Mgmt.	$929,000	$202,000
PROGRAM COST	**$39,942,000**	**$8,679,000**

C. Option 3 – Commuter Service in Place – No Freight Operation

Item	Maine	New Hampshire
Main Track Rehab	$22,274,000	$7,500,000
Additional Operating Track	$600,000	$300,000
Stations	$750,000	$1,500,000
Additional AHCWS	$2,950,000	$700,000
DTMF's & Switch Heaters	$50,000	$50,000
Layover Facility	$1,750,000	
Contingency (15%)	$4,256,000	$1,508,000
CAPITAL COST	**$32,630,000**	**$11.558,000**
Engineering	$1,632,000	$578,000
Program & Constr. Mgmt.	$816,000	$289,000
PROGRAM COST	**$35,078,000**	**$12,425,000**

D. Option 4 – Commuter Service in Place and Freight Operation to Conway

Item	Maine	New Hampshire
Main Track Rehab	$13,724,000	$4,4700,000
Additional Operating Track	$1,200,000	$300,000
Stations	$2,300,000	$1,500,000
Additional AHCWS	$2,950,000	$700,000
DTMF's & Switch Heaters	$50,000	$50,000
Layover Facility	$1,750,000	
Contingency (15%)	$3,296,000	$1,053,000
CAPITAL COST	**$25,270,000**	**$8,073,000**
Engineering	$1,264,000	$404,000
Program & Constr. Mgmt.	$632,000	$202,000
PROGRAM COST	**$27,166,000**	**$8,679,000**

VII. ROLLING STOCK OPTIONS AND COST

There are many options for rolling stock for a start up commuter service and potential tourist excursion service. We could assume used equipment with some small amount of refurbishing or all new equipment with a wide range of options that would run the cost up very quickly; or new with minimal options.

We have assumed that the trains would run as "Push-Pull", keeping the locomotive on one end of the train. When running with the engine at the back (effectively in reverse) the engineer would be operating the train from the cab or control car on the other end from the locomotive. This is common practice today since locomotives run the same in forward or reverse. There are electrical connections running along the length of the train that allow the engineer to control all train functions from the "cab" at the front end of a car equipped with the control equipment and a windshield.

The number of train sets and cars per train set would also need to be established. As noted in the schedule section of this chapter, it would be possible to start with just one set of equipment. That could provide a very minimal commuter schedule but probably not sufficient to attract and grow ridership. We will therefore assume two train sets with sufficient spare equipment to cover a normal service and repair schedule and provide a small reserve for special events and some modest growth before new equipment needed to be acquired.

Assumed Equipment Roster for Commuter and Excursion Services
3 Locomotives (or none if new Diesel Multiple Units –DMU's are acquired)
3 Cab or control coaches
3 Regular coaches (no engineer cab or control)
2 Cafe-lounge with glass roofed seating area (bi-level arrangement)

TABLE 6-14
ROLLING STOCK OPTIONS AND COST

	Used Cost plus Min. Refurbishment	New Cost- Minimal Options	New Cost – Deluxe Options	New DMU's
3 Locos.	$700,000	$5,200,000	$6,600,000	0
3 Cab/control cars	$250,000	$4,200,000	$6,000,000	$12,300,000
3 Coaches	$220,000	$3,600,000	$5,400,000	$5,400,000
2 Cafe Lounge/Dome	$1,000,000	$7,000,000	$8,100,000	$8,100,000
TOTALS	**$2,170,000**	**$20,000,000**	**$26,100,000**	**$25,800,000**

The above would provide for both commuter operation and excursion services with the potential to operate up to three trains, two commuter with a cab/control car plus a coach and an excursion train with a cab car coach and 2 cafe lounge/dome cars.

If commuter service only, deduct the last line (2 Cafe Lounge/Dome cars)

The DMU cab/control cars would be powered units, acting as a locomotive. However they would be limited to pulling no more than 2 cars each so that an excursion train would be limited to 3 cars unless another powered unit was acquired. Pulling two cars, the acceleration with a single powered DMU unit would be considerably reduced versus a locomotive hauled train of 3 or 4 cars.

VIII - COMMUTER RAIL OPERATING COSTS AND REVENUE

The basic rush hour service of 3 to 4 trains in the morning and 3 to 4 in the afternoon would require two train sets and the following order of magnitude operating costs. One issue would be crew requirements. If working a split shift, both trains would need to return to the starting terminal (Steep Falls), to allow the second train crew to go off duty at Steep Falls after the morning commute period. This would require both train sets to make 2 round trips in the morning, basically Schedule 2 on page 22 without the trip to North Conway). If ticket vending machines were provided at all stations and monthly and 10 ride tickets purchased in advance by mail or at the Transportation Center, only one train crew member would be required on each train, plus an engineer.

A. Operating Costs

The breakdown on the following two pages shows the approximate operating cost for a stand alone commuter rail operation. If a freight service were operating, some of the costs would be shared or transferred to the freight operation.

TABLE 6 -15

ITEMIZED OPERATING EXPENSES ASSUMING TWO TRAINSETS
RUSH HOUR SERVICE ONLY

LABOR	NUMBER	AVERAGE WAGE	BENEFITS	ANNUAL COST
TRANSPORTATION				
Engineers and Conductors	6	$70,200	$24,570	$568,620
MAINTENANCE OF WAY				
Foreman	2	$65,520	$22,932	$176,904
Laborers	8	$51,480	$18,018	$555,984
Signal Maintainer	1	$74,880	$26,208	$101,088
MECHANICAL				
Mechanic	2	$74,880	$26,208	$202,176
ADMINISTRATION				
Clerical/Dispatcher	2	$52,000	$18,200	$140,400
Marketing/Management	2	$72,800	$25,480	$196,560
TOTALS	**23**			**$1,941,732**

LOCOMOTIVE FUEL	NUMBER OF UNITS	GALLONS PER DAY	COST PER GALLON	ANNUAL COST
	2	700	$2.75	$1,001,000
OTHER EXPENDIBLES				
(Oil, filters, brake shoes, etc.)				$175,000
				$1,176,000

HIGHWAY VEHICLES	MONTHLY LEASE	FUEL MONTHLY	MAINT. MONTHLY	ANNUAL COST
Auto	$250	$450	$75	$9,300
Pickup for Signal	$275	$525	$125	$11,100
Pickup for Track Crew (2)	$600	$1,100	$250	$23,400
Boom Truck	$500	$475	$300	$15,300
				$59,100

TRACK MAINT EQUIP	MONTHLY LEASE	FUEL MONTHLY	MAINT. MONTHLY	ANNUAL COST
Backhoe/Front End Loader(2)	800	$900	500	$26,400
Air Compressor	175	$200	125	$6,000
Swivel Dump Truck	400	$350	350	$13,200
Tamper-Liner	600	$300	600	$18,000
Tie Handler/Inserter	400	$225	400	$12,300
				$75,900

Continued on next page.

TABLE 6-15 *Continued*
ITEMIZED OPERATING EXPENSES ASSUMING TWO TRAIN SETS
RUSH HOUR SERVICE ONLY

FIXED FACILITIES Office Space	MONTHLY RENT	MONTHLY TELEPHONE	MONTHLY SUPPLIES	ANNUAL COST
(2000 SF)	$2,400	$200	$400	$36,000
	MONTHLY PAYMENT	MONTHLY UTILITIES	MONTHLY SUPPLIES	ANNUAL COST
Shop, Storage & Crew Fac.				
(6500 SF)	$8,354	$1,500	$2,500	$148,248
				$184,248

TRACK & SIGNAL MATERIAL	Number per year	Unit	Unit Cost	ANNUAL COST
Ties	3000	Each	$35	$105,000
Ballast	2500	Tons	$15	$37,500
Rail	75	Tons	$1,100	$82,500
OTM	1	LS	$50,000	$50,000
Signal Equipment	1	LS	$50,000	$50,000
				$325,000

MISCELLANEOUS		ANNUAL COST
Advertising	Local paper and radio	$50,000
Ticket Machine Vendor	Maint and supply ticket machines	$24,000
Radio System	Maintain and leased phone line to remote bases	$15,000
Printing and outside services		$25,000
General Contingency (5%)	Miscellaneous unbudgeted costs	$175,000
		$289,000

ESTIMATED ANNUAL COST **$4,034,132**

B. Estimated Revenue

Based on an average daily boarding of 200 (as shown on Page 17) and an average fare of $5, annual revenue would be $260,000 against an annual operating cost of $4,000,000 yielding an operating subsidy per boarding of $72. Doubling average daily boardings to 400 would reduce the subsidy per boarding to $36. Some portion of the operating cost could be offset if there were a freight operation or if the commuter operation were scaled back to only running one train, the subsidy per boarding could be reduced.

IX EXCURSION SERVICE OPERATING COSTS AND REVENUE

Due to the almost unlimited variations possible with an excursion service in terms of schedules, operations, rolling stock ownership, fare structures, arrangements with steamship lines, various tour packages; establishing operating costs and revenues is not possible within the scope of this study.

For example, on the Alaska Railroad, the various steamship lines own or lease the rail cars their patrons ride on and pay a fee to the Alaska Railroad to haul the cars, along with those of several other cruise lines. That may or may not be a way of financing rolling stock for excursions around northern New England. An option may be public/private partnerships between states and major tour companies to acquire equipment and a percentage of the train revenue going toweards a car mile charge to cover track and vehicle maintenance.

It would seem highly unlikely that revenue from tourist operations alone would cover the cost of rolling stock, staffing and maintenance of the railroad and equipment. Public support would be necessary to some degree with the payback coming from increased tax revenue, employment and other spin offs from increased tourism. The fact that increased rail travel will result in less demand on the regions highway system and the environment; this public support is not an unreasonable scenario. As noted earlier in this Chapter, such an endeavor will require cooperation among the various states. How and when this may happen is not clear but the rising cost of energy, concern for the environment, an aging population less inclined to drive long distances and an increased awareness of the pleasures of travel by rail may collectively provide the will to enable a reincarnated Mountain Division.

CHAPTER 7

External Benefits and Potential Funding Sources

I. EXTERNALITIES OF TRANSPORTATION INVESTMENTS

Highways and transit systems[1] are crucial components of the U.S. transportation network and play vital roles in maintaining the vigor of the U.S. economy. The use of private automobiles on the highway system provides Americans with a high level of personal mobility, allowing people to travel where and with whom they want, but under conditions of increasing system unreliability and declining velocity. In 2001, 87 percent of daily trips involved the use of personal vehicles. Travel to and from work however, continues to decline as a proportion of all travel, as trips rise for purposes including shopping, household errands, and recreational activities.

Highways are a key conduit for freight movement in the United States. Trucks carry 60 percent of total freight shipments by weight and 70 percent by value (not including shipments moved by truck in combination with another mode). Trucks have an increasingly important role in freight mobility as businesses make use of just-in-time delivery systems to minimize logistics and inventory cost factors.

Transit also plays a vital role in enhancing productivity and the quality of life in the United States. It provides basic mobility and expanded opportunities to people without the use of a car and broader transportation choices to people with cars. Transit plays a key role in economic growth and development, connecting workers and employers.

Transit helps people without automobiles to take advantage of a wider range of job and educational opportunities and access to health care and other vital services. It also enables them to be more active members of their communities and to build and maintain social relationships. In 2001, 43 percent of nationwide transit riders lived in households with incomes of less than $20,000 and 44 percent came from households without automobiles.

Transit investments can improve the operational performance of highways by attracting private vehicle drivers off the road during peak travel times thereby reducing periods of congestion. The availability of a transit alternative as a backup mode increases the attractiveness of carpooling for some commuters.

Transit projects frequently produce social and economic externalities and may influence the character and nature of communities. These impacts generally fall into the following categories: community impacts, land use and development, economic impacts and safety/security.

The external benefits of transit investments are those that cannot be measured in hard analysis – or as quantifiable benefits to cost ratios. These factors include the redundancy provided by public transit, the opportunity for mobility for those without access to private modes, and the sense of place and community that evolves from a public system of transportation.

[1] In the context of this chapter, the term transit system or transit is used generically, to include local or regional bus or fixed guideway systems (such as commuter rail), and in a very broad sense, tourist rail operations.

The need for public support to build, operate and maintain public transit systems often creates political challenges. However, the argument in favor of subsidizing public transit follows from the acknowledged under-pricing of road travel. In the absence of marginal-cost pricing, individual drivers typically do not take into account the congestion they impose on others when making travel decisions. Since automobile travel creates negative effects in terms of congestion and pollution, reducing auto travel demand will have economic benefits as long as the marginal cost of inducing a driver to take transit is less than the marginal social cost imposed by driving. Indeed, society may be better off by subsidizing transit fares, thus drawing travelers away from road use and reducing the social costs they previously imposed on other road users.

II. ECONOMIC AND COMMUNITY DEVELOPMENT ISSUES

Transportation systems have a direct impact on land use and development patterns. As the highway system has become the dominant route of travel for most Americans, and the dominant mode for the movement of freight, land use patterns have followed the course of the interstate and state highway systems. Just as the railroads followed the low lying and level routes that parallel rivers, so too the highway system has allowed for communities to spread out beyond town and city centers. The affordable mobility provided by the highway system has created challenges for certain segments of our society. Thus, the development of transit services helps those members of society to reach services, facilities and locations that are otherwise inaccessible.

Transit systems also encourage reinvestment in town, village or city centers, providing opportunities for affordable housing, accessible employment and other community services. Property values increase when transit is available, and the system provides for safety, security and transportation redundancy.

Lower income populations, aged, and otherwise mobility challenged populations are afforded the opportunity to participate in their community, travel to work, school or other activities, and contribute to the vibrancy of the community.

III. QUALITY OF LIFE

The availability of transit has the potential to improve health and the general quality of life by reducing dependence on automobiles, thereby reducing pollution and congestion. This in turn encourages economic investment, growth in jobs, tax revenues and the community benefits that accrue from those investments.

As noted earlier, the term transit as used in this chapter is used generically to cover a wide range of transportation systems, including bus, light rail and commuter rail. In the context of this Mountain Division study, we also include tourist/excursion rail operations since such operations provide many of the same external benefits to the region served. Tourism is an important element of the state's economy, with a reported payroll of $3.8 B, employment of over 176,000 people, and tax revenues of $531M. The development of a tourist rail operation on some or all of the Mountain Division would be supportive of one of Maine's policy objectives – a car free tourist experience. A significant capital investment would be required, of course, to make this operation attractive. The examples given in Ch. 6 suggest that tourist/excursion rail operations may well fit into the overall strategy for southern and western Maine. The Mountain Division Rail line is located in the Maine Lakes and Mountain Tourism Region. There are a total of 8 million visitors to this region each year. Of those visitors, 6.2% are considered pass-through, 18% or 1.8 million stay overnight, and 75.8% are day trips. The majority of day and overnight trips are for outdoors and beach resort recreation.

IV. - PUBLIC FINANCE OPTIONS

A. Introduction

The decision to invest public resources in the rehabilitation of the Mountain Division rail line, for either freight or passenger operations (or both) must be made in the context of the broader state and regional economy. In essence, running trains on the line should not be an end in itself, but rather must meet well thought out public policy objectives. Certainly the movement of goods and people by rail has positive value – reduced fuel consumption, improved air quality, reduced highway congestion, regional economic development – all are positive potential outcomes of restoration of rail services in the corridor. These benefits must be balanced with the costs needed to implement the project.

Throughout the United States, and especially in New England, states are grappling with the challenges of increased demand for capacity in the transportation system. Freight tonnage in the United States is projected to increase by 65 – 70 percent by 2020[2]. The efficient movement of goods is clearly dependent on the ability of the nation's roads, rails and ports to increase capacity and efficiency.

Concurrently, demand for public passenger transportation services has grown faster than the resources available to build, operate and maintain such services. Shared use of railroad lines for both freight and passenger operations is not unusual, but does require careful planning to provide safe and efficient operations.

There are serious challenges to financing the restoration of an abandoned railway line. These challenges include:

- Competition for scarce public resources
- Definition of public benefits (vs. private benefits)
- Multi-state institutional barriers
- Lack of specific federal funding category
- High start up costs (capitol and operations)

[2] U.S. Department of Transportation, Federal Highway Administration. *Freight Facts and Figures 2005.*

However, with broad public support and governmental commitment, there are a range of public and private finance mechanisms that can be explored in further detail as the project evolves. Section B will provide basic information on these funding sources.

B. Public Funding Sources

The federal government has long played a key role in the development of the nation's transportation infrastructure. Railroads, canals and other waterways, airports and the interstate highway system were all developed with the active participation of the federal government. States have had limited roles in recent years especially with respect to traditionally private freight operations, but Maine is certainly an exception with its positive experience with the Industrial Rail Access Program (IRAP) and its work with Northern New England Passenger Authority (NNEPRA).

A range of public finance programs may be available for the required capitol investment to restore the railroad infrastructure. These are described briefly below:

1. Highway Programs

- *Surface Transportation Program (STP)* – 23 USC 133, 104(b)(3), 140 – provides flexible funding for projects on any federal-aid highway, bridges on public roads, and for intracity and intercity bus terminals and facilities. States have used STP funds for the preservation of rail corridors; bridge clearance increases to accommodate double-stack freight trains; railroad crossing improvements; and for the development of freight transfer yards.
- *Congestion Mitigation and Air Quality Improvement Program (CMAQ)* – 23 USC 149, 104(b)(2), 126(c) – provides funding for projects that contribute to diversion of traffic from highways to rail corridors or otherwise provide for reductions of emissions from heavy trucking. Maine has had experience with this funding source for both the development of the Auburn Intermodal transfer facility and the operation of the *Downeaster* passenger rail service.
- *Railway-Highway Crossings* – 23 USC 130 – is a long established program that provides funding for projects that improve public safety at highway-rail at grade crossings. States have used this program to provide for grade separation; reconstruction of existing structures; and relocation of either highways or rail lines to eliminate crossings at grade.
- *Capital Grants for Rail Line Relocation Projects* – 49 USC 20154 (SAFETEA-LU Section 9002) – authorizes grants to states for projects that improve rail traffic safety, motor vehicle flow, community quality of life or economic development. These funds are subject to appropriation.

2. Transit Programs

- *Federal Transit Administration (FTA) Fixed Guideway Capital Investment Program ("New Starts")* – 49 USC 5309 (SAFETEA-LU Section 3011) – includes a new category of projects that will require a federal investment of $75M or less for projects of less than $250M. This "Small Starts" program is in its early stages, with FTA having issued interim policy guidelines pending final rulemaking. FTA is also developing guidelines for a "Very Small Starts" program, for projects of less than $50M. The process for applying for these funds will follow a modification of the basic New Starts criteria, including alternatives analysis; cost effectiveness (transportation system user benefit); and transit supportive land use policies.

C. Other Federal Programs

- *U S Department of Commerce – Economic Development Administration* – provides grants for projects located within designated EDA redevelopment areas (economically distressed areas). Projects have included railroad rehabilitation projects (freight) and intermodal facilities.
- *U S Department of Agriculture – Community Facility Program* – provides loans, loan guarantees and grants for construction, enlargement, extension or improvement of community facilities that provide essential services in rural areas and towns (less than 20,000 population). Projects have included airports, bridges, parking facilities and railroads. Generally these funds are used in concert with other funding sources.
- *Transportation Infrastructure Finance and Innovation Act (TIFIA)* – SAFETEA-LU Section 1601 – provides credit assistance for major transportation investments (projects of at least $50M) and is intended to leverage limited federal resources by stimulating private capital investment. Eligible projects include public or private freight rail facilities that provide benefits to highway users (freight diversion); intermodal freight transfer facilities; and projects that facilitate intermodal interchange to and from ports.
- *State Infrastructure Banks (SIB)* SAFETEA-LU Section 1602 – allows states to establish infrastructure revolving funds capitalized with federal transportation dollars (authorized through FY 2009). SIB's can issue loans and other credit tools to both public and private sponsors of transportation infrastructure projects.
- *Rail Rehabilitation and Improvement Financing (RRIF)* – SAFETEA-LU Section 9003 – also provides loans and credit assistance to both public and private sponsors of rail and intermodal projects. This program is oriented to freight operations, and can provide up to 100% of the cost of the project, with repayment terms of up to 25 years with interest rates equal to the cost of borrowing to the federal government. This program lowers the cost of capital for private sector participants in projects that may otherwise prove uneconomic.
- *GARVEE Bonds* – Grant Anticipation Revenue Vehicle bond financing provides a means for states to borrow funds backed by future federal-aid highway revenues. This instrument has been successfully used by Rhode Island for its Freight Rail Improvement Project.
- *Private Activity Bonds* – SAFETEA-LU Title XI section 11143amends the IRS tax code to allow the issuance of tax-exempt private activity bonds for highway and freight transfer facility projects sponsored by private investors. This lowers the cost of capital and spurs private investment in transportation infrastructure.

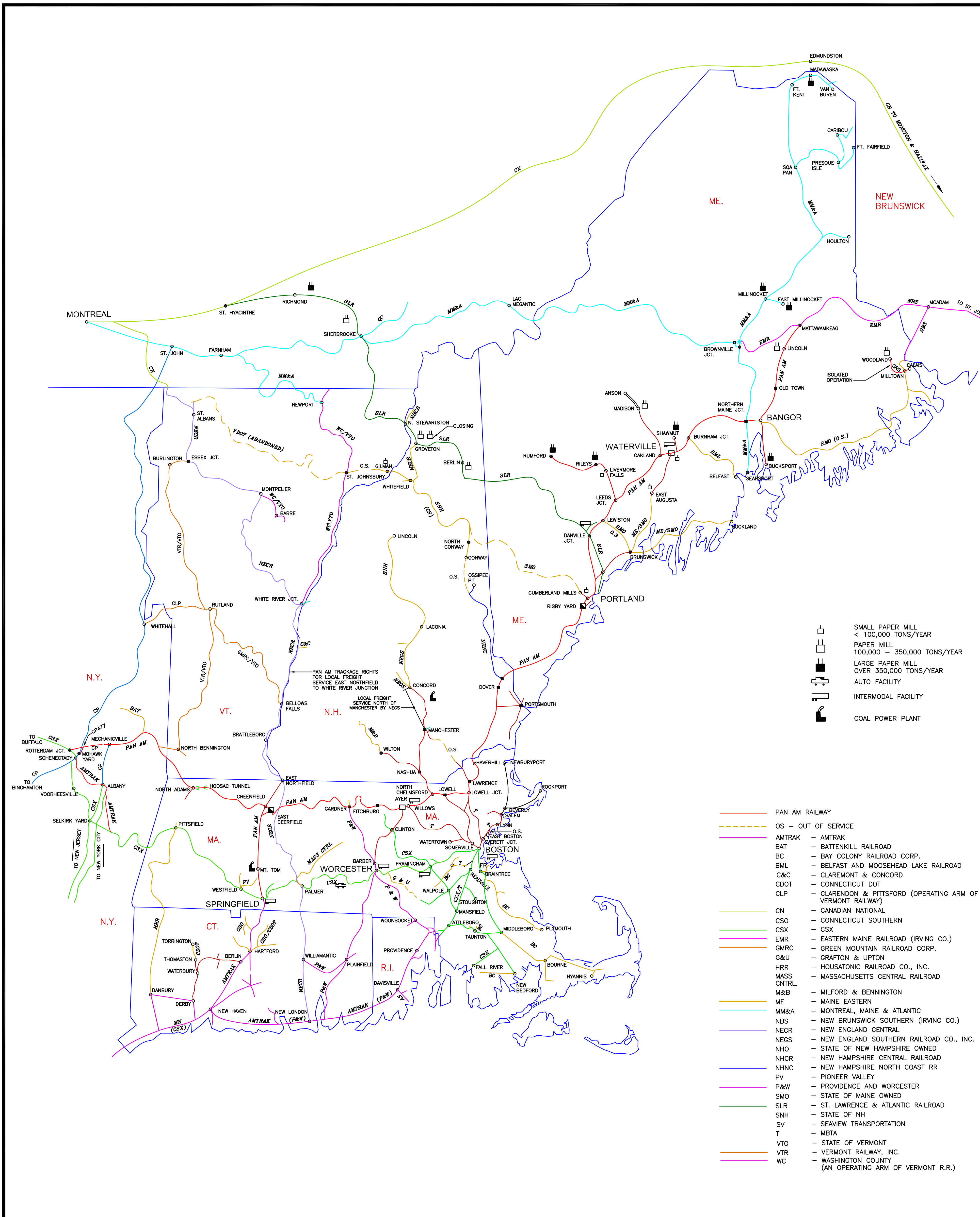
D. Public Private Partnerships

P3's have become a popular approach to funding public infrastructure in the United States. Examples include the sale of a public asset to a private investor group, with that organization taking on responsibility for operation and maintenance of the once public asset. Other forms have included DBOM (design-build-operate-maintain) or variations of that theme.

As noted above, federal loan programs also encourage private sector participation in transportation infrastructure projects. In reality – a combination of financing sources will be critical to the successful implementation of a railroad corridor rehabilitation project. There is no one single funding source that can provide all the funding. State and local funds will also be required to match federal funds.

The potential use of the Mountain Division for freight – in particular the hauling of aggregates from pits and quarries located west of Portland, offers potential for development of a public/private partnership that could utilize some of the programs cited above, along with private investments. To justify the public involvement, of course, there need to be identifiable public benefits. In the example provided in chapter 5, hauling aggregate by rail to Portland could reduce truck traffic in the corridor by some 13,000 truck trips per year (based on moving some 3,500 rail cars per year). This would reduce wear and tear (and maintenance costs) on public roads, reduce fuel consumption (and therefore improve air quality) and encourage development of the aggregate business in the region. With cost-competitive rail services, these quarries could extend their market reach beyond southern Maine, and potentially include export via the Port of Portland or longer rail hauls to other cities.

Once in place for this movement, the rail line could attract other new business, such as moving fuel oils that are imported through the Port of Portland, to the western region of Maine. This service would also reduce truck traffic in the corridor, and provide for lower transportation costs. All such hopes are dependent on the economics of the particular markets. States need to carefully evaluate how they may attempt to influence market decisions.



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